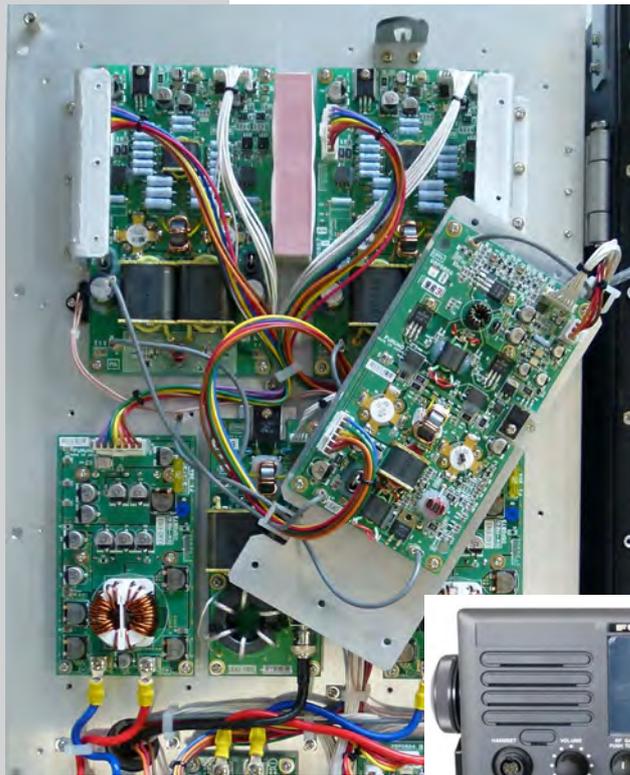


FURUNO

SERVICE MANUAL

SSB RADIOTELEPHONE

MODEL **FS-1575/2575/5075**



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FURUNO ELECTRIC CO., LTD.

9-52 Ashihara-cho,
Nishinomiya, 662-8580, JAPAN

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Introduction

For equipment checks, start with checks for antenna, antenna coupler, and antenna lead-in wire. For example, check the antenna coupler for any burnout and the antenna lead-in wire for proper connection and contact with stanchion.

- 1) To check for RX, check for receiver sensitivity by band.
If no communication is in progress, approximate sensitivity can be roughly checked by connecting and disconnecting the reception antenna or hearing changes in noises. The main point is to check based on the band divisions of the RX FIL board. For details, refer to information on page 7-37.
- 2) To check for TX, make measurement of SWR on all bands using a power meter. If Pr on a specific band exceeds 20% of the rated TX output power, it is advisable to reduce the TX output power on the relevant band within the standard range. In this case, it is required that the Transceiver unit including the antenna, antenna coupler, and TX FIL board has no problem.

If no power meter is available, approximate TX output power can be found from PA IC and PA VC values. Refer to the table shown below. It shows data on measurement made with a single tone.

Furthermore, check for all detection voltage referring to the TX output power of the DRV, PA, and TX FIL circuits and detection voltage characteristics data described in “6.11 Level Check” on page 6-74. This shows approximate TX output power.

	PA VC	PA IC	Efficiency	24V Input Current	Power Supply
FS-5075 (500W)	42V	18 to 25A	60 to 45%	45 to 55A	PR-850A (60A)
FS-2575 (250W)	42V	9 to 14A	60 to 45%	25 to 30A	PR-850A (40A)
FS-1575 (150W)	24V				PR-300 (20A)

- 3) Ensure that self-tests and self-checks all resulted in “OK.”
If “NG,” this basically resulted from failures of the relevant board. Even if transmission tests resulted in “OK” with all the PA, DRV, and TX FIL boards, make an overall judgment based on TX output power (Pf/Pr), numerical results of the tests, and PA IC and PA VC values.
For example of self-check results, refer to information in “6.2 SERVICE: SELF CHECK” on page 6-15.
- 4) For a service report, describe by band not only symptoms, causes, and measures, but also measurements of TX output power (Pf/Pr), and PA IC, PA VC, Ia and VS values. Furthermore, describe antenna type, length, and lead-in length without fail.

- 5) Frequency deviation is to be within ± 10 Hz on all bands. If DSC or NBDP communications are not successfully completed, check for frequency deviation. If the frequency deviation falls within ± 50 Hz, messages can be decoded although error rate surely increases. For the frequency adjustment procedure, refer to information on page 5-26.

1. Optional Operation

1.1 Registering MMSI and Performing CLEAR ALL (See 4-3)

Press and hold [S1] on the T-IF board for a period of four seconds or more, and then enter the password: XXXXXX.

1.2 Entering Service menu (See 4-49)

Select [MENU] -> Press [TAB] five times -> Select "9.SERVICE" -> Enter the password: XXXXXX.

1.3 Entering Network Setting menu (See 4-26)

Enter the password: XXXXXXXXXX on the NETWORK <View> window.

1.4 Monitoring DSC reception signal (See 4-40 and 4-41)

Enter the password: XXXXXX on the SCAN window, and then select whether to monitor ROUTINE or DISTRESS SCAN.

However, note that the ringtone is outputted according to the setting made by selecting [MENU] -> 7.AUDIO -> 2.OFF HOOK.

1.5 Clearing received Distress log

- 1) Select [MENU] -> 9.SERVICE -> 4.RESTOE FACTORY SETTINGS.
- 2) Press and hold [S1] on the T-IF board for a period of four seconds or more, enter the password: XXXXXX, and then click on "CLEAR ALL."

1.6 Connecting Parameter Browser (See Appendix-1)

- 1) UserID: N/A, Password: 652111 Port No.: 10999
- 2) Communication -> LAN Connect Settings -> Connect
- 3) Main -> Connect Target

Reference)

The password "XXXXXX" is the same as that for the FS-xx70 series.

1.7 Optional operation of IB-583 / IB-585 (See 4-97 to -119)

- 1) Rewriting ID: Type "ID_(space)CODE" in all caps.
- 2) Rewriting AAB: Type "ANSWER_(space)CODE" in all capital letter.
- 3) Access to [F11] Setup menu: Type "DP6" in all capital letter.
- 4) Access to [F6] System menu: Type "DP6" in all capital letter.
- 5) Selecting Russian mode: Press Power + [R] keys.
- 6) Switching between Russian and English for characters: Press [Shift] + [Alt] keys
- 7) Conducting IB-585: [F6] -> Self-Test: Type "DP6" in all caps.

2. Software

Software package number is "**APP: 0550243-xx.xx.**" To verify the number, select [MENU] -> 1.TEST -> 1.DAILY TEST.

To update the software, it is just needed to make a LAN connection (172.31.5.3/16) between the transceiver unit and the PC, and then click on the "nUP_FSXX75.bat" file. After update, no actions such as Memory Clear need not to be taken. Furthermore, no setting parameters are deleted.

Note)

Loading a program to the T-CPU of the Transceiver unit will automatically load the same to the C-CPU of the Control unit. The 78K CPU program used to communicate with the NBDP terminal unit will also be automatically loaded.

If combinations of T-CPU program, C-CPU program, and 78K CPU program are different, programs will be automatically loaded from T-CPU to C-CPU and 78K CPU.

For example, when the Control unit is replaced, programs will be automatically loaded to the C-CPU, 40 seconds after turning ON the power.

3. Settings

Be sure to make the following settings:

3.1 MMSI Setting (See 4-3)

3.2 WR Jumper Setting (See 4-90)

To use a FAX-5 + 2.6m whip antenna for the WR antenna, change the setting of J3 jumper on the WR board to "ACTIVE." +12VDC power is supplied to the WR antenna terminal.

3.3 RX ANT Setting (See 4-73)

Depending on the configuration of RX antenna, ensure the connection of RX antenna route.

- 1) When RX ANT is installed (to receive via RX ANT or T/R ANT):
 - Select [MENU] -> 9.SERVICE -> 3.RT SETUP -> 1.SETUP -> RX ANT -> "CONNECT";
 - Select [MENU] -> 5.SYSTEM -> 7.RT SETUP -> 2.ANT SELECT -> Any mode; or
 - Select [MENU] -> 9.SERVICE -> 3.RT SETUP -> 1.SETUP -> DIVIDER -> "OFF".
- 2) When RX ANT is installed on the FS-5075 to operate Duplex communication:
 - Select [MENU] -> 9.SERVICE -> 3.RT SETUP -> 1.SETUP -> RX ANT -> "CONNECT";
 - Select [MENU] -> 5.SYSTEM -> 7.RT SETUP -> 2.ANT SELECT -> RX ANT; or
 - Select [MENU] -> 9.SERVICE -> 3.RT SETUP -> 1.SETUP -> DIVIDER -> "OFF."

Note)
Be sure to mount the DUP FIL board and change connectors on the DUP FIL and RX FIL boards.
- 3) When RX ANT is not mounted (to transceiver via T/R ANT):
 - Select [MENU] -> 9.SERVICE -> 3.RT SETUP -> 1.SETUP -> RX ANT -> "DISCONNECT"; or
 - Select [MENU] -> 9.SERVICE -> 3.RT SETUP -> 1.SETUP -> DIVIDER -> "OFF."

4. TX output Power Check and Adjustment

4.1 Power Check and Adjustment (See 5-11 to 5-14)

- Power check in SSB mode:
Select [MENU] -> 1.TEST -> 3.TONE TEST (by 1-tone or 2-tone signal)
- Power adjustment:
Select [MENU] -> 9.SERVICE -> 3.RT SETUP -> 4.TX PWR (FREQ), 5.TX PWR (USER CH), 6.TX PWR (TUNE) or 7.TX PWR (SEL CALL).

4.2 ALC Adjustment (See 5-48)

Power adjustment is made with power data. However, when the TX FIL, TX, PA, and/or DRV boards are replaced, power may vary on all bands.

In this case, make power adjustment with [R43: ALC VR] on the TX FIL board. This allows for making power adjustment on all bands at a time.

- 1) Connect the Power meter (50 ohms) to the output port of the T/R ANT.
- 2) Set the band to SSB 12M band.
- 3) Select [MENU] -> 1.TEST -> 3.TONE TEST -> 1100/1700Hz (2-tone).
- 4) Transmit frequency to make power adjustment with [R43: ALC VR] on the TX FIL board so that it will come to the rated TX output power.
 - FS-1575: 75W (150W x 1/2),
 - FS-2575: 125W (250W x 1/2),
 - FS-5075: 250W (500W x 1/2)
- 5) Check for power on other bands. If necessary, make power adjustment according to power data.

4.3 Measures against High Reflected Power

If reflected power is 20% or more of the rated TX output power, check the antenna centering on the following:

- Damage to the antenna
- Touch of the antenna including its lead-in wire with structure
- Proper grounding of the ATU
- Internal burnout of the antenna coupler
- Soldering of coaxial connector of the antenna and its connection to the ATU
- Water leakage from the coaxial cable of the antenna

If no problems, it is advisable to reduce power by 10% to 20%.

5. Frequency Adjustment

5.1 Standards

Ensure that frequencies are maintained within the range of “ ± 10 Hz” on all bands in SSB, TLX, and CW modes.

- SSB (1500Hz tone) : $F_o + 1500$ Hz
- TLX (Space tone) : $F_o + 85$ Hz
- CW : F_o

5.2 Frequency Adjustment (See 5-29)

To make frequency adjustment, select [MENU] -> 9.SERVICE -> 3.RT SETUP ->

1. SETUP -> “REF OSC.”

To facilitate making frequency adjustment, select [MENU] -> 1.TEST ->

3. TONE TEST (1-tone) in SSB mode.

To make frequency adjustment in TLX mode, select [MENU] -> 9.SERVICE ->

3.RT SETUP -> 4.TX PWR (FREQ) -> “DSC.”

6. Replacement of Boards

Name	Type	FS-1575	FS-2575	FS-5075	Actions to be taken after replacing board
Transceiver unit: FS-2575T, 5075T					
WR1	05P0847A	✓	✓	✓	Ensure the J3 jumper setting (ACTIVE or WIRE).
WR2	05P0847B	✓	✓	✓	
TX	05P0856	✓	✓	✓	Check for TX output power and frequency.
DRV	05P0866A			✓	Check for TX output power.
	05P0866B		✓		
PA	05P0867A			✓	
	05P0867B		✓		
	05P0868	✓			
COMB	05P0869			✓	
TX FIL	05P0870A			✓	Check for TX output power. Make ALC adjustment.
	05P0870B		✓		
	05P0876	✓			
PA-IF	05P0864		✓	✓	Check for VS reading.
	05P0864A	✓			
RX	05P0842	✓	✓	✓	No actions need to be taken.
DUP-FIL	05P0863			✓	
RX FIL	05P0862A			✓	
	05P0862B	✓	✓		
MOT	05P0860	✓	✓	✓	
T-CPU	05P0859	✓	✓	✓	Ensure that S2 is all set to "OFF". Make all system settings.
T-IF	05P0861		✓	✓	Make setting of "J8" EXT ALM jumper.
	05P0861A	✓			
FET	05P0872			✓	No actions need to be taken.
P-SW	05P0871	✓	✓	✓	
PWR	05P0874	✓	✓	✓	
SW REG	05P0873		✓	✓	
Control unit: FS-2575C					
PANNEL	05P0844	✓	✓	✓	No actions need to be taken.
C-IF	05P0853	✓	✓	✓	
C-CPU	05P0852	✓	✓	✓	Ensure that S2 is all set to "OFF".
Antenna Coupler unit					
AT-5075 COUP	05P0875		✓	✓	Make settings of J11 (ANT BK) and J10 (ANT GND).
AT-1575 COUP	05P0883	✓			Make settings of J4 (ANT BK) and J5 (ANT GND).

7. Checks List

7.1 Installation Checks

- Type of antenna: _____
- Lead-in wire: _____ Length: _____ m / Wire type: _____
- ATU grounding band: Length: _____ mm / Width: _____ mm
- Installation of RX ANT: YES / NO (_____ m Whip ANT)
- RX ANT installation location: _____
- Type of WR1 ANT: _____ Wire (_____ m) / FAX-5 + 2.6m
- Type of WR2 ANT: _____ Wire (_____ m) / FAX-5 + 2.6m

	Check Point	Result
1.1	Ensure that power supply voltage falls within the range of 10% of input voltage by transmitting frequency to make measurement.	
1.2	Is grounding wire connected to the transceiver unit?	
1.3	Are cables connecting to the Transceiver unit properly tied?	
1.4	Are cables of the Transceiver unit securely connected?	
1.5	Is grounding wire connected to the Control unit?	
1.6	Is copper grounding band connected to the ATU?	
1.7	Is copper grounding band connection to the ATU made as short as possible?	
1.8	Does self-supporting antenna not come into touch with structures such as radar mast at the curve?	
1.9	Does antenna lead-in wire not come into touch with structures such as stanchion?	
1.10	Is antenna lead-in wire installed with proper tension and unlikely to cause fracture even if it sways?	
1.11	Is antenna lead-in wire connected to the antenna terminal of the ATU without slackness?	
1.12	Are internal cables of the ATU securely connected?	
1.13	Is there any burnout in the ATU?	
1.14	Is the grounding of ATU water-proofed?	
1.15	Is the connector of antenna coaxial cable properly soldered?	
1.16	Is the coaxial connector of RX ANT water-proofed?	
1.17	If RX ANT is connected to jumper, is the jumper connected with grounding wire and water-proofed?	
1.18	Are the coaxial connectors of WR1 and WR2 ANT water-proofed?	
1.19	If WR1 and WR2 antennae are FAX-5+2.6m whip antennae, are the FAX-5 preamps connected with grounding wire and water-proofed, respectively?	
1.20	If WR1 and WR2 antennae are FAX-5+2.6m whip antennae, are 2.6m antennae securely mounted?	
1.21	If T/R antenna is of the self-supporting type, are elements securely mounted?	

7.2 System Settings

	Check Point	Result
2.1	Is MMSI setting properly made?	
2.2	With systems designed for Duplex communication, are antenna wirings for the DUP FIL and RX FIL boards properly changed?	
2.3	With systems designed for Duplex communication, is the reception antenna setting made to "RX ANT?" [MENU] -> 9.SERVICE -> 3.RT SETUP -> 1.SETUP -> RX ANT; or [MENU] -> 4.SYSTEM -> RX ANT.	
2.4	Is the setting of OFF HOOK SP made as requested by user? [MENU] -> 7.AUDIO -> 2.OFF HOOK SP.	
2.5	Is DSC class setting properly made according to sail marine area? [MENU] -> 9.SERVICE -> 2.DSC SETUP -> CLASS	
2.6	Is the setting of TX FREQ made as requested by user? [MENU] -> 9.SERVICE -> 3.RT SETUP -> 1.SETUP -> TX FREQ -> ALL FREE, FREE, MARINE/USER, ITU/USER, or USER	
2.7	Is TX TUNE set to "ON?" [MENU] -> 9.SERVICE -> 3.RT SETUP -> 1.SETUP -> TX TUNE	
2.8	Is Position data displayed? [MENU] -> 9.SERVICE -> 3.RT SETUP -> 1.SETUP -> FORMAT	
2.9	When the system is connected to IC-350 alarm unit; ▪ Is IC-350 setting made? ▪ Is setting made by selecting [MENU] -> 9.SERVICE -> 7.OTHER -> ALARM UNIT -> CONNECT?	
2.10	Are the settings of [J3] jumper of WR1 and WR2 boards properly made? (For FAX-5+2.6m whip antennae, set [J3] to "ACTIVE.")	
2.11	Is ID number set to the NBDP terminal unit?	
2.12	Is AAB set to the NBDP terminal unit?	
2.13	Is the [F6] of the NBDP terminal unit properly set by selecting System -> Slave Delay? IB-583 -> 8msec, IB-585 -> 12msec	

7.3 Measurement

1. Frequency measurement

Allowable frequency deviation is within $\pm 10\text{Hz}$. Make frequency deviation measurement on 22 M and 2 M bands in SSB mode.

Select [MENU] -> 1.TEST -> 3.TONE TEST -> "1500 Hz" to make frequency deviation measurement.

$$F_o = F_c + 1500\text{Hz}$$

22 M band: _____ MHz _____ Hz

2 M band: _____ MHz _____ Hz

2. TX output power measurement

Precondition: TUNE OK

To make measurement, select [MENU] -> 1.TEST -> 3.TONE TEST.

Note) When modulated with 2-tone frequency, the reading of power meter will come to approximately a half of that when modulated with 1-tone 1500 Hz frequency.

Freq.	Pf	Pr	PA Ic	PA Ic	VS	Ia	P. data	Note
2M :								
4M :								
6M :								
8M :								
12M :								
16M :								
18M :								
22M :								
25M :								

8. Comprehensive Tests

8.1 Self-tests

1. Select [MENU] -> 1.TEST -> 2.SELF TEST to conduct self-tests. All tests should result in OK.
Print out the test results. Result: _____

2. Select [MENU] -> 1.TEST -> 1.DIALY TEST to conduct daily tests. All tests should result in OK.
Print out the test results. Result: _____

3. Select [MENU] -> 9.SERVICE -> 3.RT SETUP -> 2.SELF CHECK to conduct self-checks.
Print out the test results. Result: _____

4. Select [MENU] -> 9.SERVICE -> 5.TEST -> 1.VERSION to print out the Version List. Result: _____

5. If available, use Parameter Browser to save set values with the Export-CSV. Result: _____

8.2 Communication Tests

	Frequency	Intended Other Station	Date / Time	Result
Voice				
DSC				
NBDP				

Chapter 1. Overview

1.1 Overview

The FS-xx75 Series is equipment integrated with a MF/HF transceiver unit that allows SSB, CW, and TLX communications, DSC function, DSC watch receiver function, and NBDP function. The RF output power is 150 W for FS-1575, 250 W for FS-2575, and 500 W for FS-5075.

The FS-5075 is available for full-duplex communication. To perform full-duplex communication, the FS-5075 should have an Rx antenna connected to and a DUP-FIL board (option) incorporated in it.

The FS-xx75 Series is available for connection of two controller units. It is designed to give the priority for communication operation to the controller unit connected to the "CONTROLLER-1" port side.

The NBDP terminal should be connected to No. 1 controller unit. Connecting it to No. 2 controller unit disables the equipment to perform communications.

The FS-xx75 Series complies with the rules and regulations, including

IMO A.806 (19), IMO A.694 (17), MSC 36 (63), MSC 68 (68), IEC 61162-1Ed.4, IEC 60945 Ed.4, ETS 300 067 Ed.1, EN 300 338, EN 300 373-1, EN 301 033, ITU-R M.476-5, ITU-R M.490, ITU-R M.491-1, ITU-R M.492-6, ITU-R M.493-13, ITU-R M.541-9, ITU-R M.625-3, ITU-R M.821-1, ITU-R M.1082-1, ITU-R M.1173, and MSC/Circ. 862

Table 1.1.1 Overview of Equipment Specifications

	FS-1575	FS-2575	FS-5075
Transceiver Unit	FS-1575T	FS-2575T	FS-5075T
Controller Unit	FS-2575C (Common to all models)		
Antenna Coupler	AT-1575 AES AT-1575 SUS	AT-5075	AT-5075
NBDP Terminal	IB-583 and IB-585 (Common to all models)		
Full-Duplex operation	No	No	Yes (DUP board is required)
RF Output Power	150 W	250 W	500 W
AC/DC Power Supply	PR-300	PR-850A	PR-850A
Software	Common		
Built-in WR1 Kit	Standard		
Built-in WR2 Kit	Option		
CW Communication	Allowed		
RX Antenna	RX-only antenna or shared use of T/R antenna		

1.1.1 System Configuration

1. FS-2575 and -5075 System Configuration

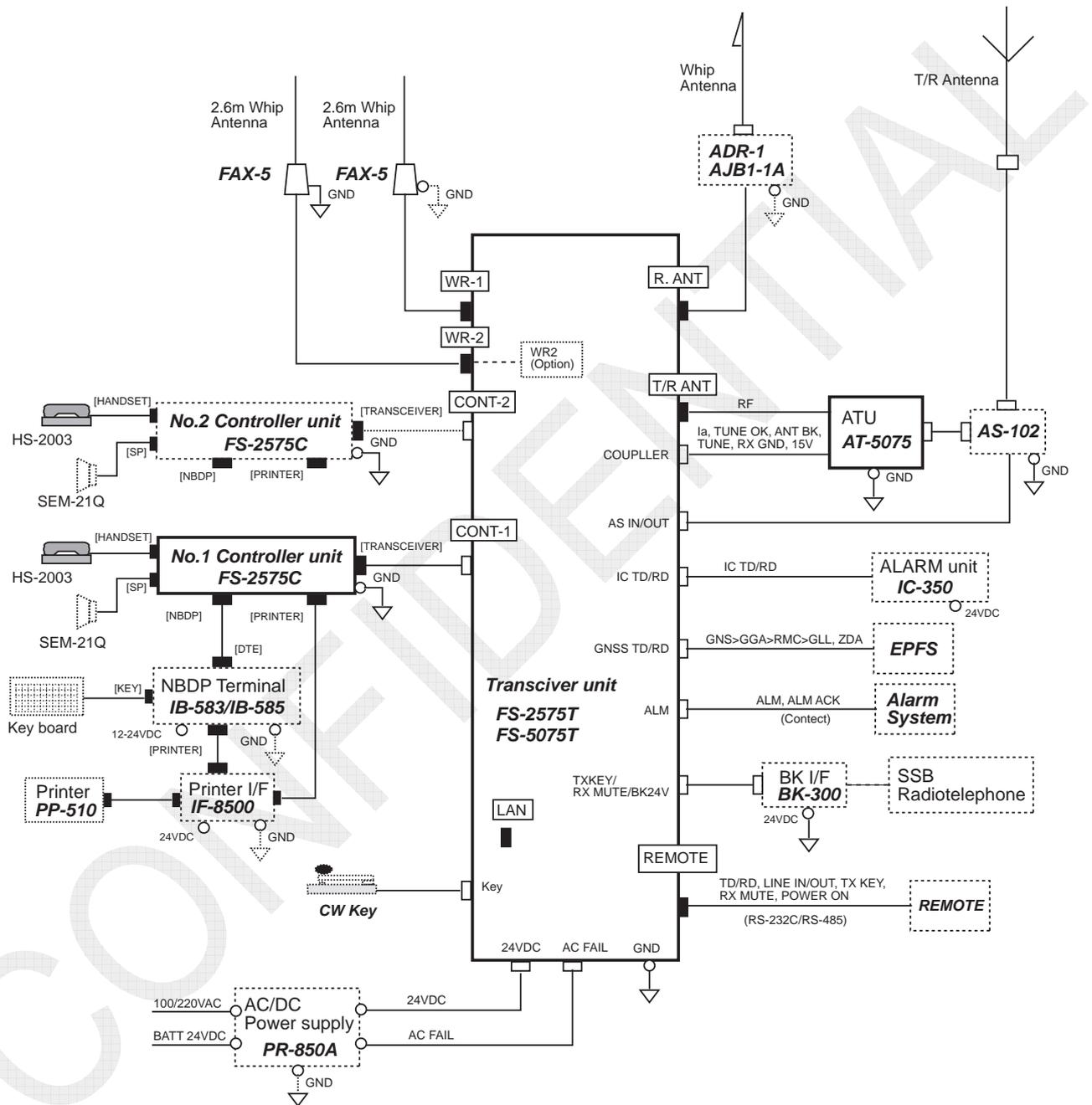


Fig. 1.1.1 FS-2575 and -5075 System Configuration Diagram

2. FS-1575 System Configuration

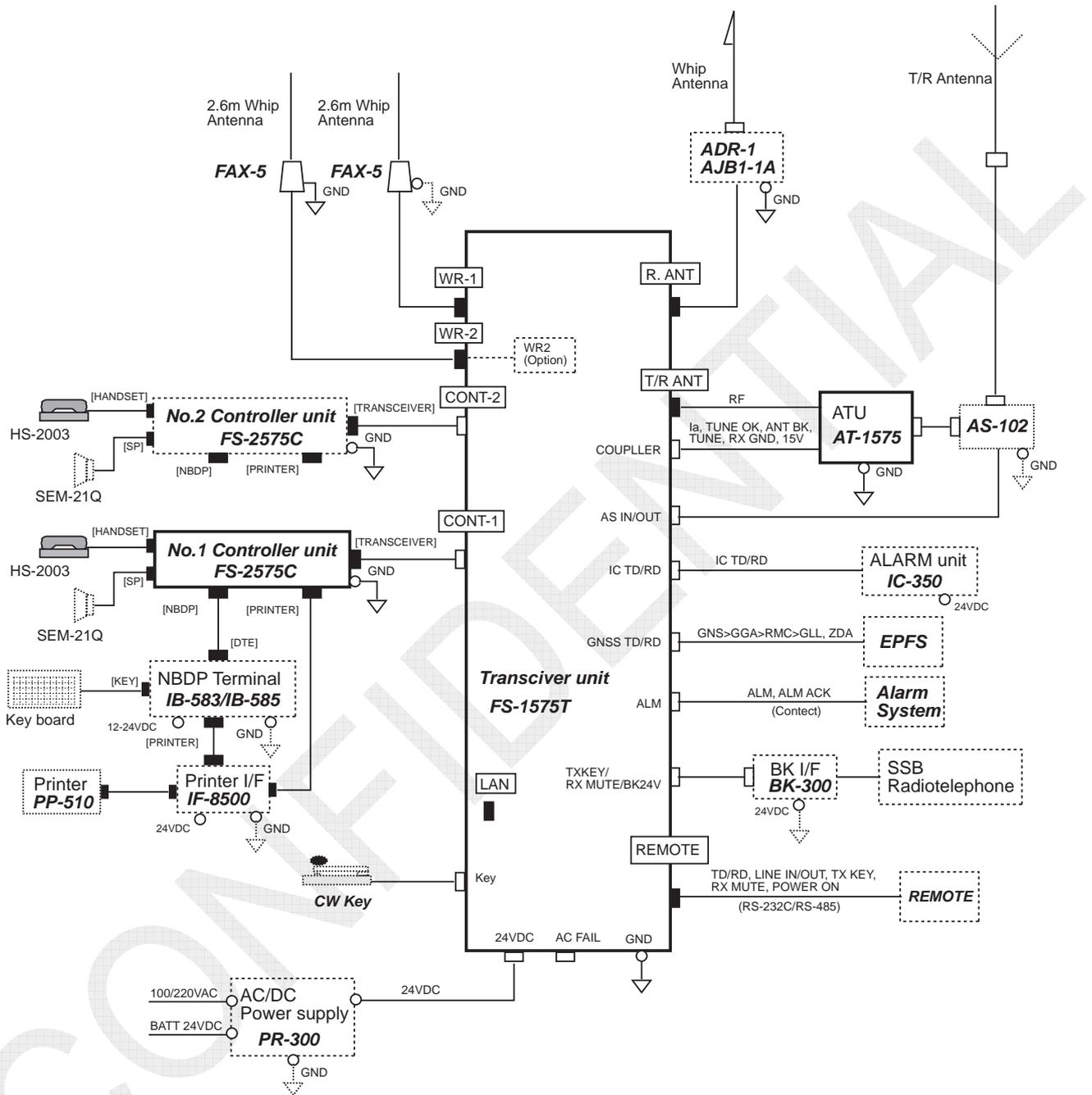


Fig. 1.1.2 FS-1575 System Configuration Diagram

Table 1.1.2 Port I/O Specification

Unit	Connection Port		Specification	Remark	
FS-xx75T	REMOTE		RS-232C/422	SD/RD, TD-A/B, RD-A/B LINE-IN/OUT, TX KEY, RX MUTE, STAND-BY, PWR ON	
	T/R ANT		50Ω	Transceiver antenna	
	R. ANT		50Ω	Connect an Rx antenna.	
	WR1 ANT		50Ω	To connect to FAX-5, set FAX-5 supply voltage to this port (J3).	
	WR2 ANT		50Ω	To connect to FAX-5, set FAX-5 supply voltage to this port (J3).	
	LAN		10/100BASE-T	For P. Browser and S/W Update	
	T-IF Board	TB5	CONT-1	RS-485	Max. 50 m CONT-1 is given priority for communication. Note: Turn ON the system power supply from CONT-1.
			CONT-2	RS-485	
		TB6	GNSS TD	RS-422	\$CT DSC, \$CT DSE
			GNSS RD	RS-422	GNS>GGA>RMC>GLL, and ZDA
			COUPLER	C. Loop	Max. 50 m IA, TUNE OK, TUNE, ANT BK, RX GND, 15V
			EXT BK		TX KEY, RX MUTE, BK24V
		TB7	AC FAIL		From AC/DC Power supply
ALARM UNIT				IC-350 connection	
ALARM				ALM contact signal output	
CW KEY					
	AS-102				
FS-2575C	TRANSCIVER		RS-485	Used to connect to FS-xx75T	
	NBDP		RS-232C	Used for SD and RD functions	
	PRINTER		Centronics	Used for DSC and NBDP functions	
	HANDSET (Front Panel)		MIC)600Ω/-36dBm SP)150Ω/1mW min.	Used for HS-2003	
	HANDSET (Rear Panel)		MIC)600Ω/-36dBm SP)150Ω/1mW min.	Used to HS-2003	
	SPEAKER		4Ω/5W	Used to give priority to external speaker (φ3.5 jack)	

1.2 Installations

1.2.1 Antenna Wiring

1. Key Points to Installation of Antenna

- 1) To install a self-supporting antenna, leave a space of not less than 5 m between the antenna and structures including radar mast in consideration of bending of the antenna caused by wind pressure.
Note: For details, refer to the antenna specification.
- 2) To install a self-supporting antenna, join the antenna element so as not cause itself to come off. Apply a coating of silicon sealant to the area on which it is jointed.
- 3) Determine the tension of the lead-in in consideration of the deflection of lead-in caused by the swing of the antenna. Too high tension results in the fracture of lead-in connection. Too low tension causes the lead-in to come into contact with other structures.
- 4) To connect the antenna lead-in to the antenna terminal of the antenna coupler, refer to FQ5-2008-011 and FQ5-2006-010.
- 5) Make the ground of the antenna coupler as short as possible using a copper band of 50 mm or more in width. As a guide, take 1 to 10 or less as a ratio of width to length of the copper band. For example, to use a copper band of 50 mm in width, the length should be not more than 500 mm.

2. Requirements for T/R Antenna

A T/R antenna with capacitance of not less than 100 pF at 1.6 MHz is required. For wiring, use a T/R antenna of not less than 10 m in length, such as AT-101 or AT-130. To use an antenna of 8 m in length such as AT-82D/S, provide a lead-in of not less than 2 m in length.

Reference:

When the power supply turns OFF, the T/R antenna will be grounded through a relay in the antenna coupler. If R.ANT is used, the T/R antenna will be grounded when message is received.

3. Receiving Antenna Wiring Configuration

For a receiving antenna, a dedicated RX antenna can be connected, and also the T/R antenna can be shared. In addition, the WR2 antenna can be shared as well.

For details, refer to information on pages 4-73 to -78.

- 1) Change the “TP connector” wiring on the RX FIL board.
- 2) Make setting as follows:
[MENU] -> 9. SERVICE -> 3. RT SETUP -> 1. SETUP -> Set DIVIDER to “ON”

4. Full-Duplex Communications

For the configurations of receiving antenna, refer to information on pages 4-73 to -78. For ships requiring the Full-duplex operation, provide dedicated RX antenna (example, 6-m whip antenna). In this case, keep the TX antenna as far away from the RX antenna as possible. Installing both antennae on a compass deck will make it difficult to perform Full-duplex communications. Consequently, the TX antenna should be installed on the compass deck or in the wing area, while the RX antenna should be installed on the fore mast.

- 1) Incorporate a DUP FIL board (option) in FS-5075T.
- 2) Make system settings for the Full-duplex specification as follows:
 - [MENU] -> 9. SERVICE -> 3. RT SETUP -> 1. SETUP -> Set RX ANT to "CONNECT"
 - [MENU] -> 5. SYSTEM -> 7. RX SETUP -> 2. SETUP -> Set ANT SELECT to "RX ANT"

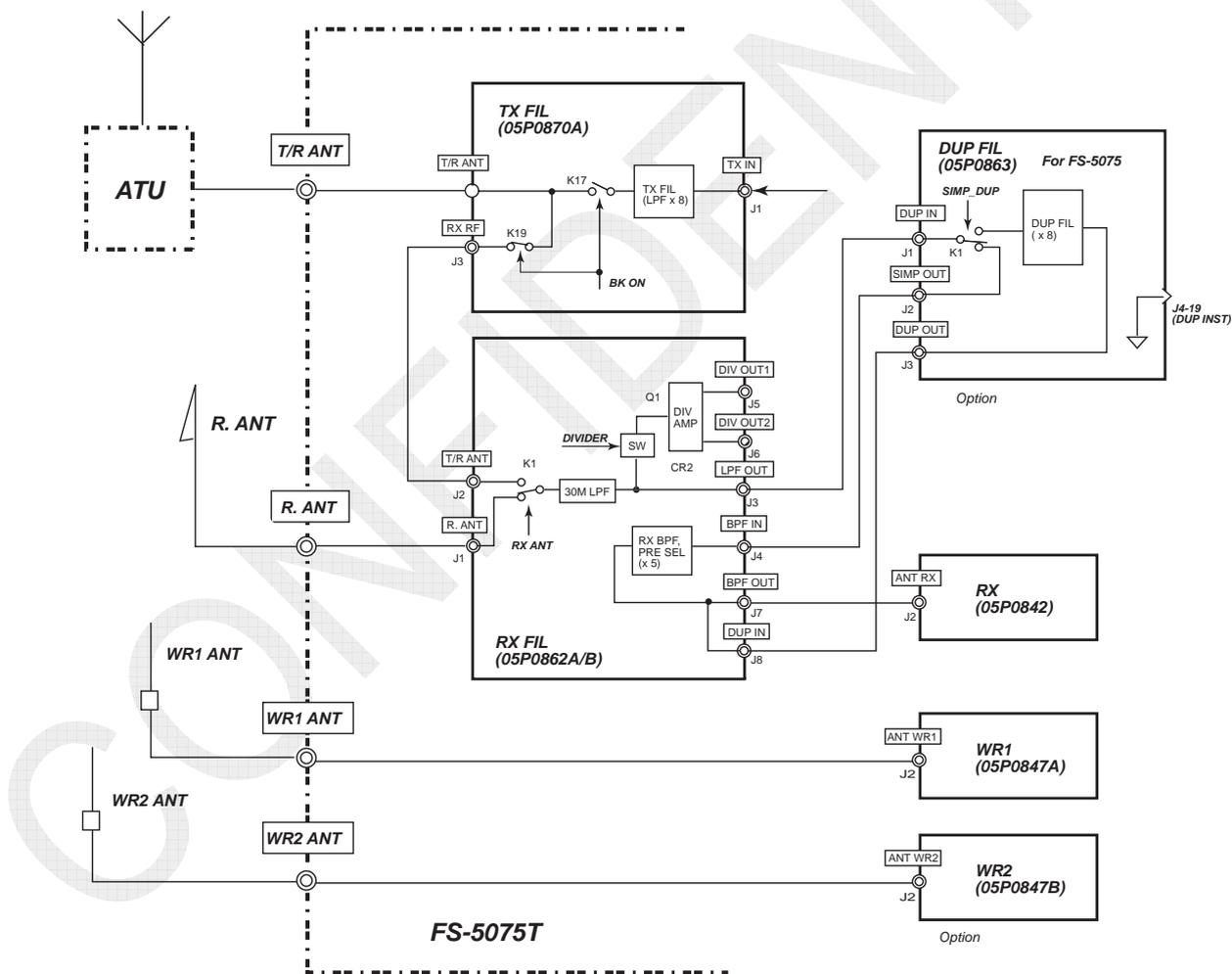


Fig. 1.2.1 Example of Antenna Wiring

1.2.2 Selection of Power Supply Cable

Select a power supply cable that allows power loss in the power supply cable, i.e., voltage drops in the cable, to fall within the range of 3% to 5%.

Cable selection is determined by current passing through the cable and the cable length.

Fig. 1.2.2 shows a graph for 5% voltage drop in individual cables. For example, supposing that current passing through the cable is 20A and the cable length is 30 m, DPYC-25 should be selected. However, be noted that voltage drops are caused not only in the cable, but also in power supply connection terminals, power supply unit, and internal wirings of devices. As a result, it is advisable to select a power supply cable slightly larger than a calculated size.

Voltage drop in cable: $e = (K \times I \times L) / 1000$

Cable length: $L = (1000 \times e) / (K \times I \times r)$

- K = Coefficient (Single phase/DC: 2, three phase: $\sqrt{3}$)
- I = Current (A)
- R = Resistance per 1-km cable (ohm/km)
- L = Cable length (m)

Current (A)

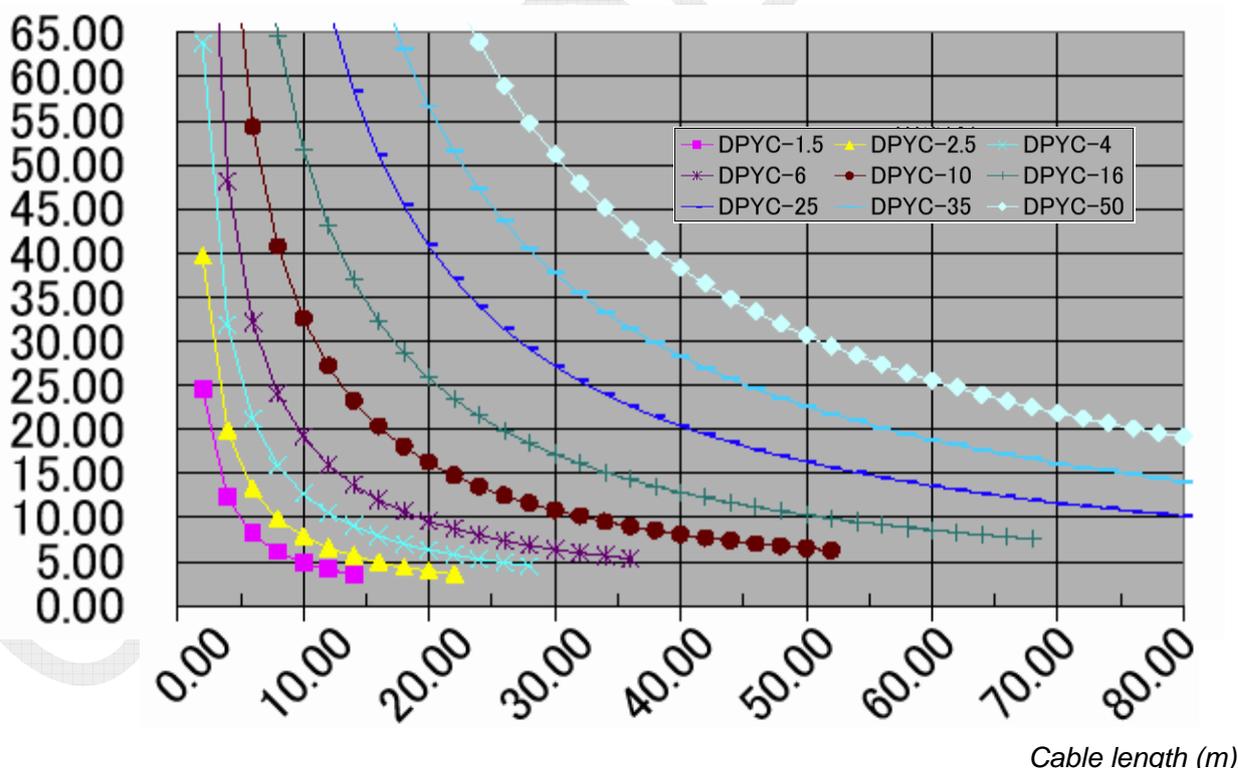


Fig. 1.2.2 Voltage Drops in Cables:5%

1. Positional Data

Connect a GPS to the transceiver unit. The system receives GNS, GGA, RMC, GLL, and ZDA sentences. Basically, the IEC-61162-1ed.4.0 version of signal is connected. Depending on setting, however, the NMEA Ver.1.5, 2.0, and 3.0 messages can be received.

TD data will be output when a DSC message is received. The sentences are \$CT DSC and \$CT DSE.

2. Connection of MAIN FAIL Signal

Connect MAIN FAIL signal output from an AC/DC power supply such as PR-850A to FS-xx75T. When the “Main power source” is shutdown, it will be automatically switched to “Radio battery” source to automatically set transmission power output to “LOW.” Furthermore, when the MAIN FAIL signal is detected, the message “Tx Power reduced. Ship’s main failure” will be displayed.

3. EXT BK

Make “BK” connections to a radiotelephone and receiver, as appropriate.

- TX KEY: When the TX KEY(FS-xx75 is state of transmitting) signal is activated, BK signal will be activated.
- RX MUTE: When the BK signal is activated, the external speaker and the handset speaker will be muted.

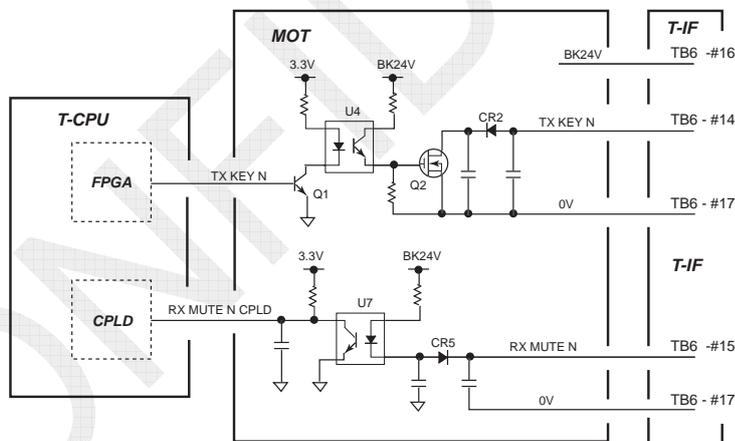


Fig. 1.2.3 FS-xx75 Block Circuit Diagram

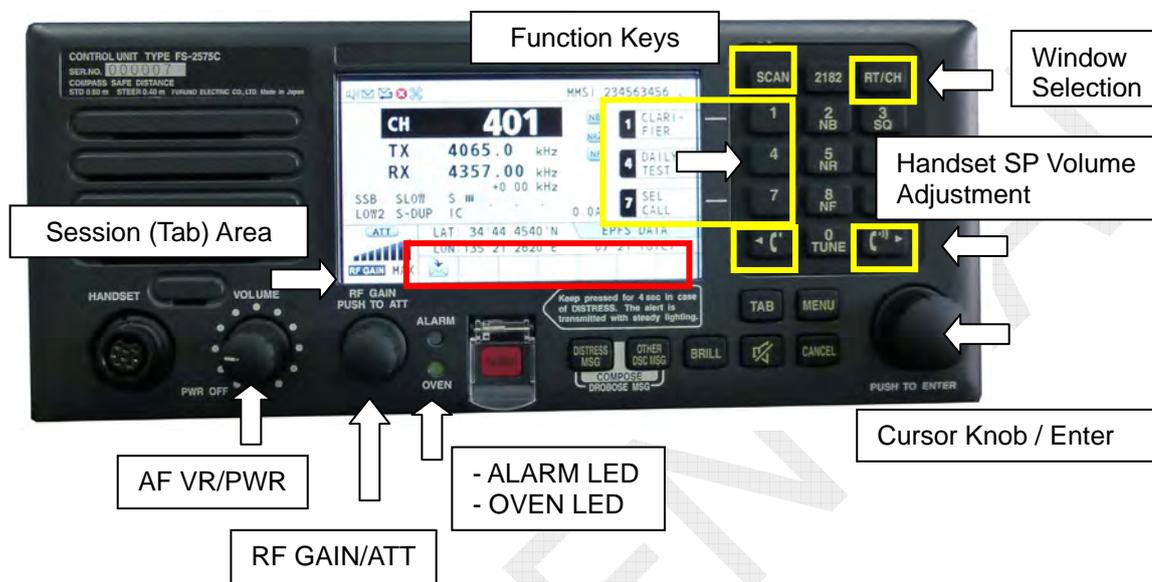
4. Connection of Handset

Handset port is provided on the front and rear panels on the FS-2575C, respectively. Do not connect a handset to both ports at a time. If one handset is in the On-Hook state, the other one will be unable to transmit.

However, if both handsets are in the Off-Hook state, transmission from both handsets will be allowed, provided that the handset of the front panel will be prioritized.

1.3 Operations

1.3.1 FS-2575C Control Panel



- [DISTRESS]: Transmits Distress alert message (Press and hold this key for a period of four seconds or more.)
- [OTHER DSC MSG]: Creates IND, GROUP, PSTN, AREA, POS, TEST, SPEC messages.
- [DISTRESS MSG]: Creates Distress alert message.
- [OTHER DSC MSG] + [DISTRESS MSG]: Creates IND RELAY message.
- [TAB]: Selects a session (tab area).
- [BRILL]: Selects luminance (including Day or Night mode selection).
- [1], [4], and [7]: Function keys registered with KEY ASSIGN
- ALARM LED: Displays an alarm when receiving a DSC message. This LED turns ON in Red when receiving a Distress and Urgency/ message, and in Green when receiving a Safety and/Routine message.
- OVEN LED: Turns ON (in Green) when 24 V power is supplied to FS-xx75T.

1.3.2 Overview of Display

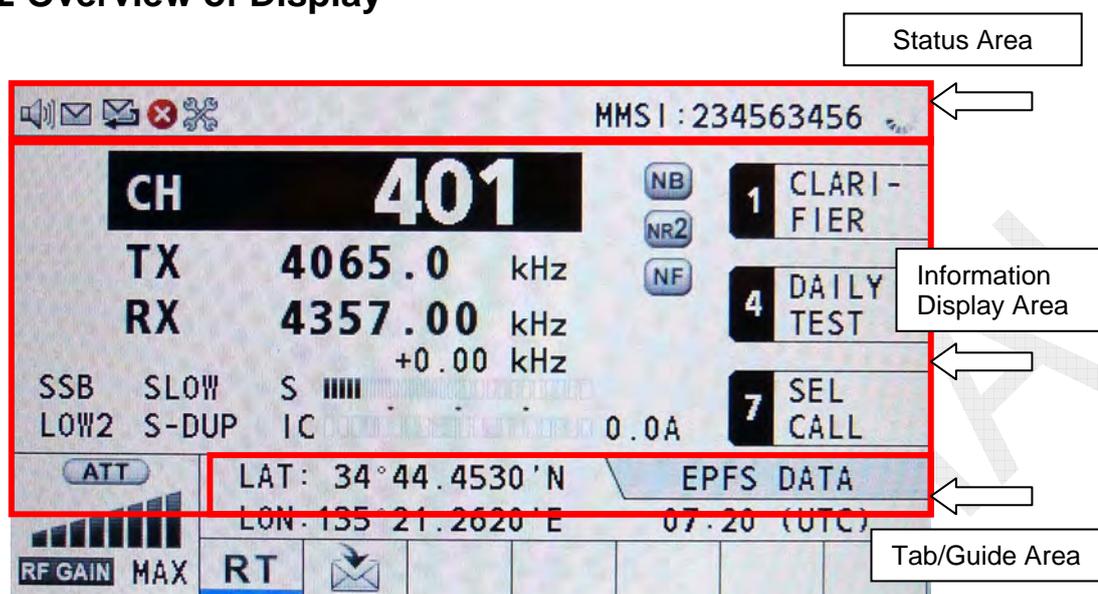


Fig. 1.3.1 Display of Controller unit

1. Status Area

The status area is located at the top of the screen and mainly used to display icons. The RT window displays MMSI, while the DSC window and the Menu window display radio communication frequencies.

Table 1.3.1 List of Status Icon Displays

Icon	Function
	Appears when the speaker is set to "ON" (not on mute).
	Appears when the speaker is set to "OFF" (on mute).
	Appears when there are one or more unread logs.
	Appears when ACK transmission is set to "ABLE."
	Appears when a hardware error occurs and disappears when the error is eliminated.
	Appears when the system entry into the maintenance mode. To set the system to service menu, press the [MENU] key, and then press the [TAB] key five consecutive times to put the system into maintenance mode. Subsequently, click on "SERVICE" on the MENU window, and then enter a password.
	Indicates that the screen is updated at regular intervals of time.
MMSI	Displays registered MMSI.
	Appears when communication with the NBDP terminal is established.
	On the DSC window and the MENU window, appears when the emission type is set to "SSB".
	On the DSC window and the MENU window, appears when the emission type is set to "TLX".
	On the DSC window and the MENU window, appears when the emission type is set to "FAX".

	On the DSC window and the MENU window, appears when the emission type is set to "LSB".
	On the DSC window and the MENU window, appears when the emission type is set to "CW".
	On the DSC window and the MENU window, appears when the emission type is set to "AM".
TX, RX	On the DSC window and the MENU window, displays TX/RX frequencies set

2. Tab/Guide Area

On the RT window or the DSC window, this area serves as the Tab area to display a list of procedures (sessions) in a tabbed format. When the menu dialog box opens, it serves as the Menu Guide area to display key guides. The area allows for handling a maximum of seven sessions. If any more sessions are created, low-priority sessions will be deleted.

Table 1.3.2 List of Tab Icon Displays

Icon	Function
RT	Appears while radio communication (voice) is in process.
	Appears when own ship's Distress alert is transmitted.
	a) Appears when a DSC Distress message transmitted from other ships is received. b) Appears when a Distress relay message is transmitted from the own ship.
	Appears when any DSC message other than Distress and Distress relay is transmitted.
	Appears when any DSC message other than Distress and Distress relay is received.

3. Information Display Area

The Information Display area is located in the middle of the screen and used to display information on radio communications and DSC.

When switching the tab, the display will also be switched. The DSC window displays user options for control guide.

Blue line: Active procedure



User option

Tab: Procedure being initiated

Table 1.3.3 List of User Options

Option	Function
ACK	Appears when receiving a DSC message that needs to be acknowledged. Selecting the option ACK allows the immediate transmission of the Acknowledgement message. If the message could not be properly transmitted (ECC NG), it will be grayed out.
ACCEPT	Allows the immediate transmission of ABLE acknowledgement message in response to the DSC message received. If the message could not be properly transmitted (ECC NG), it will be grayed out.
ACTIVE	Appears only in case of procedure being held and allows for the activation of the procedure.
CANCEL	Cancels a procedure. For example, this option allows for the transmission of a DSC message in order to cancel the false transmission of Distress alert.
CHANGE	Appears when transmitting or receiving a Distress alert at multiple frequencies. Selecting the option CHANGE allows for the selection of any Distress/Safety communication frequency.
HOLD	Appears in case of active procedure and allows for holding the procedure.
HISTORY	Displays a history list.
INFO	Displays detailed information that cannot be displayed all on the DSC window. Clicking on “[9]: ADDRESS REGISTER” when detailed information is displayed allows for the registration of MMSI set to the DSC message with the address book. In this case, the current date and time are entered in the NAME parameter.
PRINT	Allows for printing out the contents of procedure being displayed on the window. This option can be selected too when printer is not connected. In this case, however, the “Printer not connected” error is displayed.
PROPOSE	Allows for the transmission of an acknowledgement message saying that a communication frequency proposed by the counterparty is accepted after changing it.
QUIT	Quits the selected procedure and deletes the tab. Once the tab has been deleted, it cannot be restored.
PAUSE/ START	Allows for suspending the automatic retransmission of a Distress alert that is repeated while waiting for the Distress alert acknowledgement message. Setting this user option to PAUSE stops counting down until DISTRESS ALERT is automatically transmitted and changes the setting from “PAUSE” to “START.” Selecting “START” at this time resumes counting down and changes the user option setting from “START” to “PAUSE.”
RELAY	Appears when DISTRESS ALERT is received. Selecting the option RELAY allows for the creation of DISTRESS RELAY message.
RESEND	Allows for the retransmission of any DSC message (other than DISTRESS ALERT) that has already been transmitted. Selecting the option RESEND allows for the retransmission of the DSC message.
UNABLE	Immediately transmits “UNABLE ACK” message in response to the DSC message received or displays the UNABLE ACK creation window.

4. Overview of RT Window

ITU CH: xxx
USER CH: 0xxx

Voice signal processing

Mode: SSB, TLX, AM, LSB, and CW are subject to setting.

POWER:
FS-1575/2575: Hi, MID, LOW
FS-5075: Hi, MID, LOW1, LOW2

ATT: -10dB
(RF AMP passed)

AGC:
OFF, FAST, SLOW

SIMP
S-DUP
DUP (FS-5075 only)

S-Meter
IA: ATU
IC: PA IC
VC: PA VC
RF: TX FIL OUT (Vf)
VS: 24V

Function Registers with KEY ASSIGN

Pos & Pos Source: EPFS/MANUAL

EPFS(OLDER): No data for 4 hours
EPFS(OFFLINE): No data for 10 min.

CH 401
TX 4065.0 kHz
RX 4357.00 kHz
+0.00 kHz

SSB SLOW S IIII
LOW2 S-DUP IC 0.0A

LAT: 34° 44. 4530 'N
LON: 135° 21. 2620 'E

EPFS DATA
07:20 (UTC)

MMSI: 234563456

1 CLARIFIER
4 DAILY TEST
7 SEL CALL

5. Overview of SCAN Window

DISTRESS:
Registers with DISTRESS SCAN.

ROUTINE:
Registers with ROUTINE SCAN.

- WR2: Indicates reception with the WR2 board.
- RX: Indicates reception with the RX board.

WATCH KEEPING

DISTRESS	WR
▶ 2187.5	4207.5 6312.0
8414.5	12577.0 16804.5
ROUTINE	WR2
2177.0	4219.5 ▶ 6331.0
8436.5	

LAT: 34° 44. 4580 'N
LON: 135° 21. 2700 'E

EPFS DATA
06:58 (UTC)

MMSI: 234563456

- DISTRESS SCAN : [MENU] -> 6. DSC -> 6. DISTRESS SCAN
- ROUTINE SCAN : [MENU] -> 6. DSC -> 5. ROUTINE SCAN
- MONITOR : 652111 -> Select DISTRESS/ROUTINE
- DISTRESS SCAN Stop : [MENU] -> 9. SERVICE -> 5. TEST -> 4. TA TEST -> DISTRESS SCAN
- ROUTINE SCAN Stop : [SCAN]

6. Overview of DSC Window

[OTHER DSC MSG]: DSC COMPOSE Window



INDIVIDUAL
GROUP
PSTN
AREA
POSITION
TEST
SPECIAL: Subject
to setting

[OTHER DSC MSG] + [DISTRESS MSG]: RELAY COMPOSE Window



RELAY INDIVIDUAL
RELAY AREA

[DISTRESS MSG]: DISTRESS COMPOSE Window



MULTI
AUTO
SINGLE: 2M – 16M

- MULTI : Transmits at 2, 8, 16, 4, 12, and 6M band consecutively one time.
- AUTO : Repeatedly transmits at each of 2, 8, 16, 4, 12, and 6M band frequencies five times.
- SINGLE : Transmits at a specified frequency out of 2M to 16M band five times.

1.3.3 Transmission of Distress Alert

To transmit a Distress alert, press and hold the [DISTRESS] button for a period of four seconds or more. The Distress Alert Message Creation window will appear when press the [DISTRESS MSG] button. This window allows for selecting the Nature of Distress, a communication mode (COMM MODE), and a mode to transmit Distress alert messages. The mode includes MULTI, AUTO, and SINGLE. The default is MULTI. Distress alert messages from IC-350 are transmitted in MULTI mode.

1. MULTI

While in MULTI mode, a Distress alert message is transmitted at 2MHz, 8MHz, 16MHz, 4MHz, 12MHz, and 6MHz in the order described consecutively one time each. An interval to the subsequent transmission is automatically set to a random period of time in the range of 3.5 to 4.5 minutes.



2. AUTO

While in AUTO mode, a Distress alert message is repeatedly transmitted at 8MHz, 16MHz, 4MHz, 12MHz, 6MHz, 2MHz, and 8MHz in the order described after it is transmitted at 2MHz until a Distress acknowledgement (DIS ACK) message is received. The Distress alert message is transmitted repeatedly five times at each frequency aforementioned. An interval to the subsequent transmission is automatically set to a random period of time in the range of 3.5 to 4.5 minutes.



3. SINGLE

While in SINGLE mode, a Distress alert message is transmitted five times at a single frequency selected from 2MHz, 4MHz, 6MHz, 8MHz, 12MHz, and 16MHz.

An interval to the subsequent transmission is automatically set to a random period of time in the range of 3.5 to 4.5 minutes.



1.3.4 Reception of DSC Message

Table 1.3.4 Reception of DSC Message

		RT	WR1	WR2
Acknowledgement after a DSC general message(Urgency, Safety Routine) is transmitted *TEST CALL*		✓	SCAN	SCAN
Reception of DSC general message		__ See Note.	SCAN	✓
Acknowledgement after a Distress alert message is transmitted	MULTI	COM. FREQ related to acknowledgement received (Wait at 8MHz until the acknowledgement is received)	✓:SCAN	SCAN
	AUTO	COM. FREQ related to acknowledgement received (Wait at 8MHz until the acknowledgement is received)	✓:SCAN	SCAN
	SINGLE	Already-transmitted related COM. FREQ	✓:SCAN	SCAN
Reception of Distress alert message	MULTI	COM. FREQ related to acknowledgement received (Wait at 8MHz until the acknowledgement is received)	✓:SCAN	SCAN
	AUTO	COM. FREQ related to acknowledgement received (Wait at 8MHz until the acknowledgement is received)	✓:SCAN	SCAN
	SINGLE	COM. FREQ related to acknowledgement transmitted	✓:SCAN	SCAN

Note:

If WR2 is not incorporated, DSC general messages are received on the “RT.”

1.3.5 Audio Alarms

When you receive a Distress alert or General call addressed to your ship, the audio and visual alarms are released. The audio alarm can be silenced with the **CANCEL** key.

Table 1.3.5 Audio Alarm list

Alarm	Frequency (interval)
Safety call received	750 Hz and 650 Hz (50 ms)
Routine call received	750 Hz and 650 Hz (50 ms)
While DISTRESS key is pressed for four seconds	2000 Hz and 0 Hz (500 ms)
Distress alert sent	2200 Hz, continuous (2 seconds)
Own ship position not updated	2000 Hz (250 ms) and 0 Hz (500 ms)
Distress alert call received	2200 Hz and 1300 Hz (250 ms)
Distress relay call received	2200 Hz and 1300 Hz (250 ms)
Distress relay ack call received	2200 Hz (500 ms) and 1300 Hz (500 ms)
Distress ack call received	2200 Hz (500 ms) and 1300 Hz (500 ms)
Urgency call received	2200 Hz and 0 Hz (250 ms)
Urgency ack call received	2200 Hz and 0 Hz (500 ms)

Chapter 2. Parts Location

2.1 Control Unit: FS-2575C





Fig. 2.1.3 Cover opened

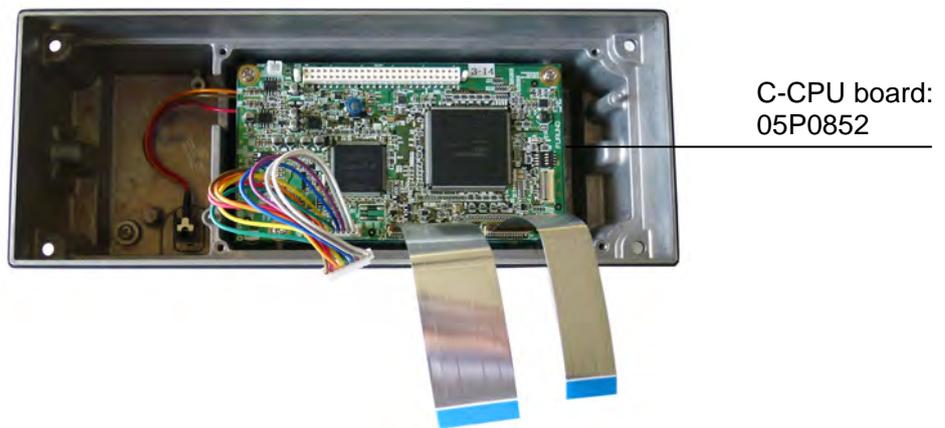


Fig. 2.1.4 Rear panel, shield cover removed



Fig. 2.1.5 Rear panel, C-CPU board removed

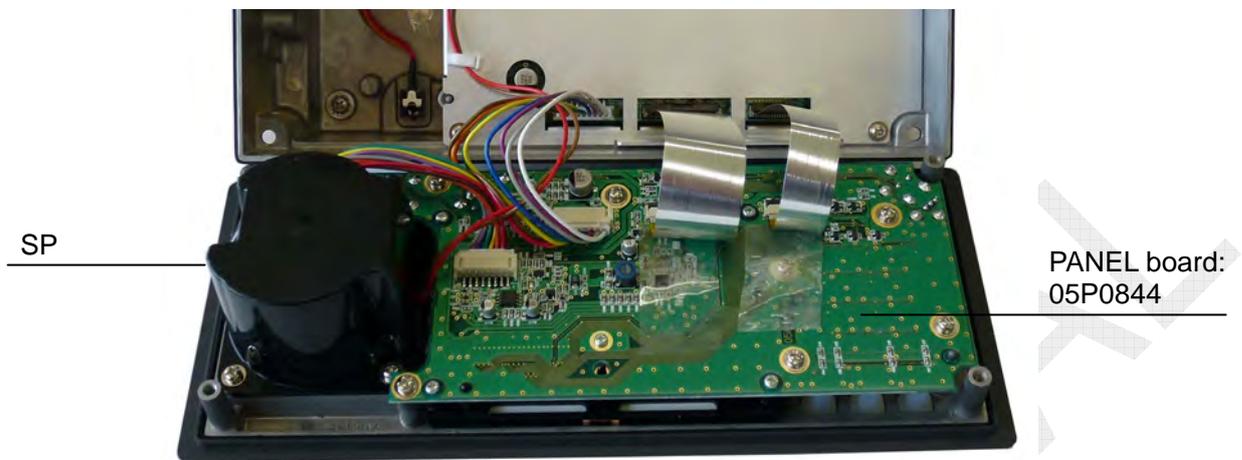


Fig. 2.1.6 Front panel opened



Fig. 2.1.7 Front panel, PANEL board removed



Fig. 2.1.8 Speaker



Fig. 2.1.9 C-CPU board: 05P0852 (A-side)

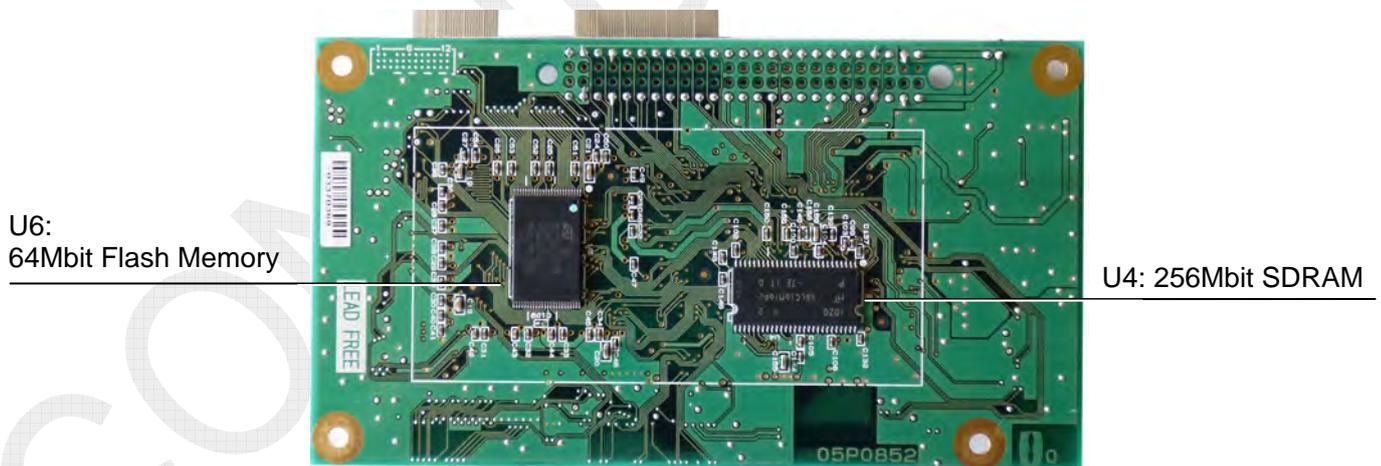


Fig. 2.1.10 C-CPU board: 05P0852 (B-side)

U6: AF Power AMP



Fig. 2.1.11 C-IF board: 05P0853 (A-side)

[NBDP]

[PRINTER]

[TRANSCIVER]



Fig. 2.1.12 C-IF board: 05P0853 (B-side)



Fig. 2.1.13 PANEL board: 05P0844

2.2 Transceiver Unit: FS-1575T

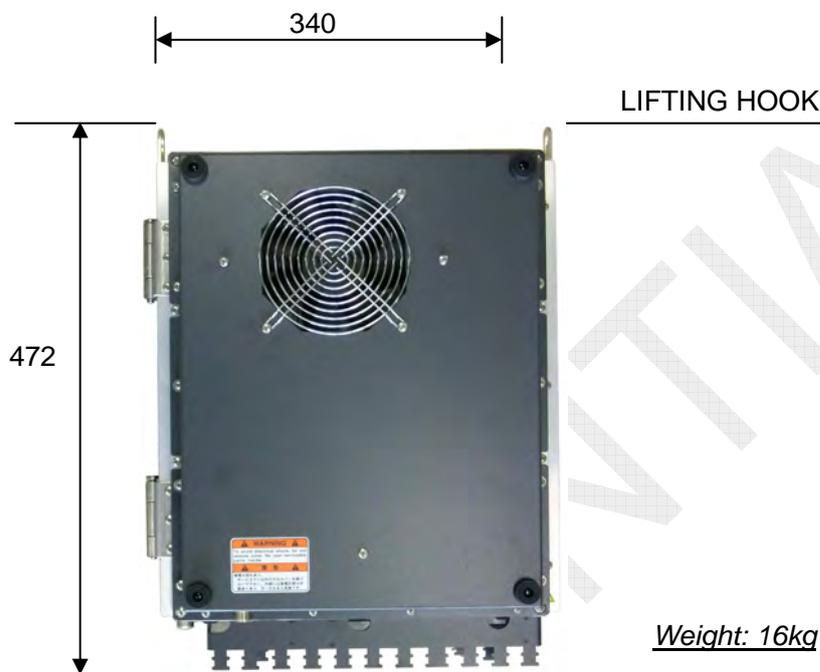


Fig. 2.2.1 FS-1575T, front view

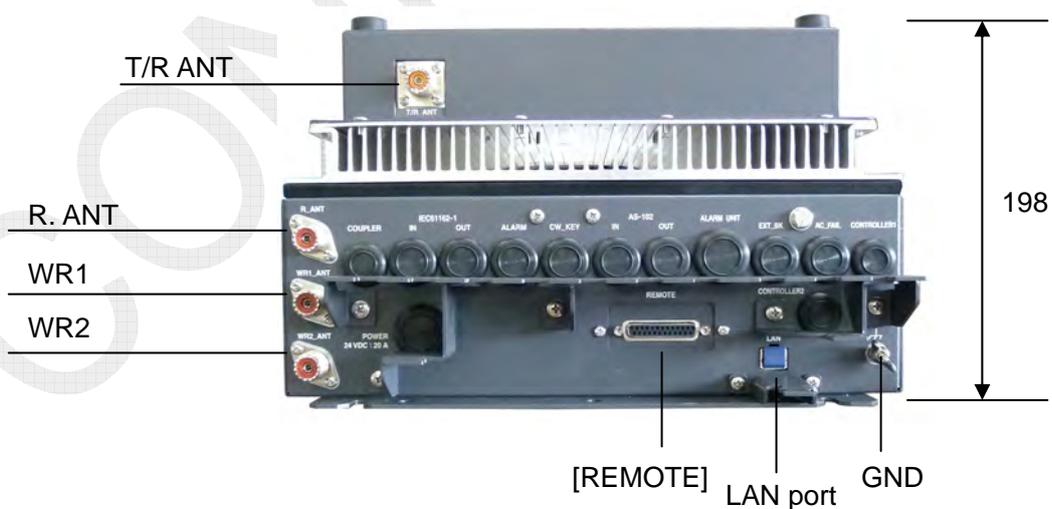


Fig. 2.2.2 FS-1575T, bottom view

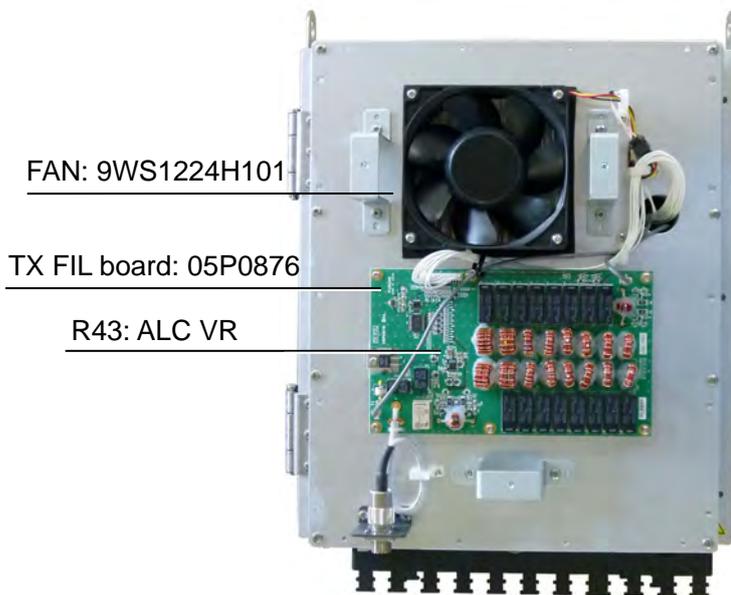


Fig. 2.2.3 FS-1575T, front cover removed

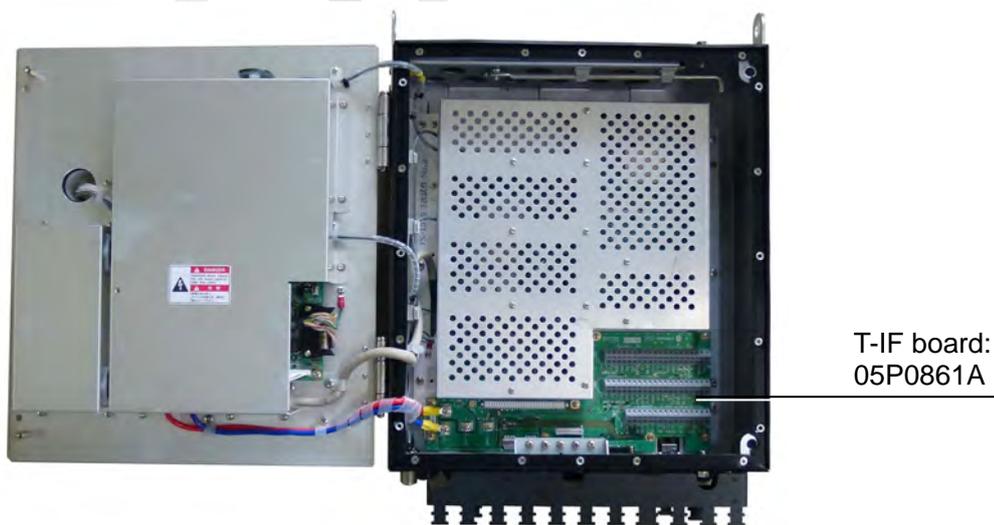


Fig. 2.2.4 FS-1575T, door opened

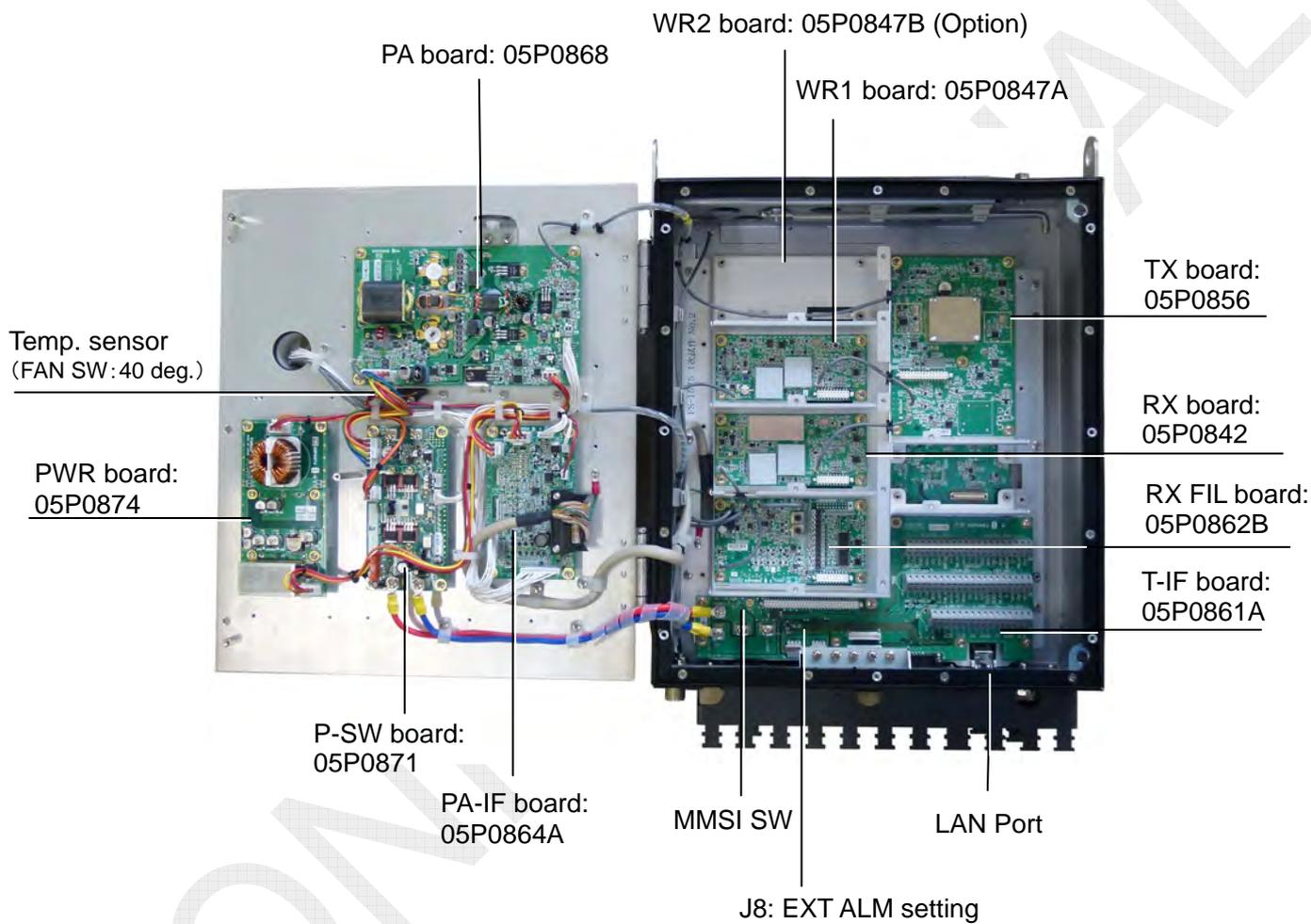


Fig. 2.2.5 FS-1575T, shield cover removed

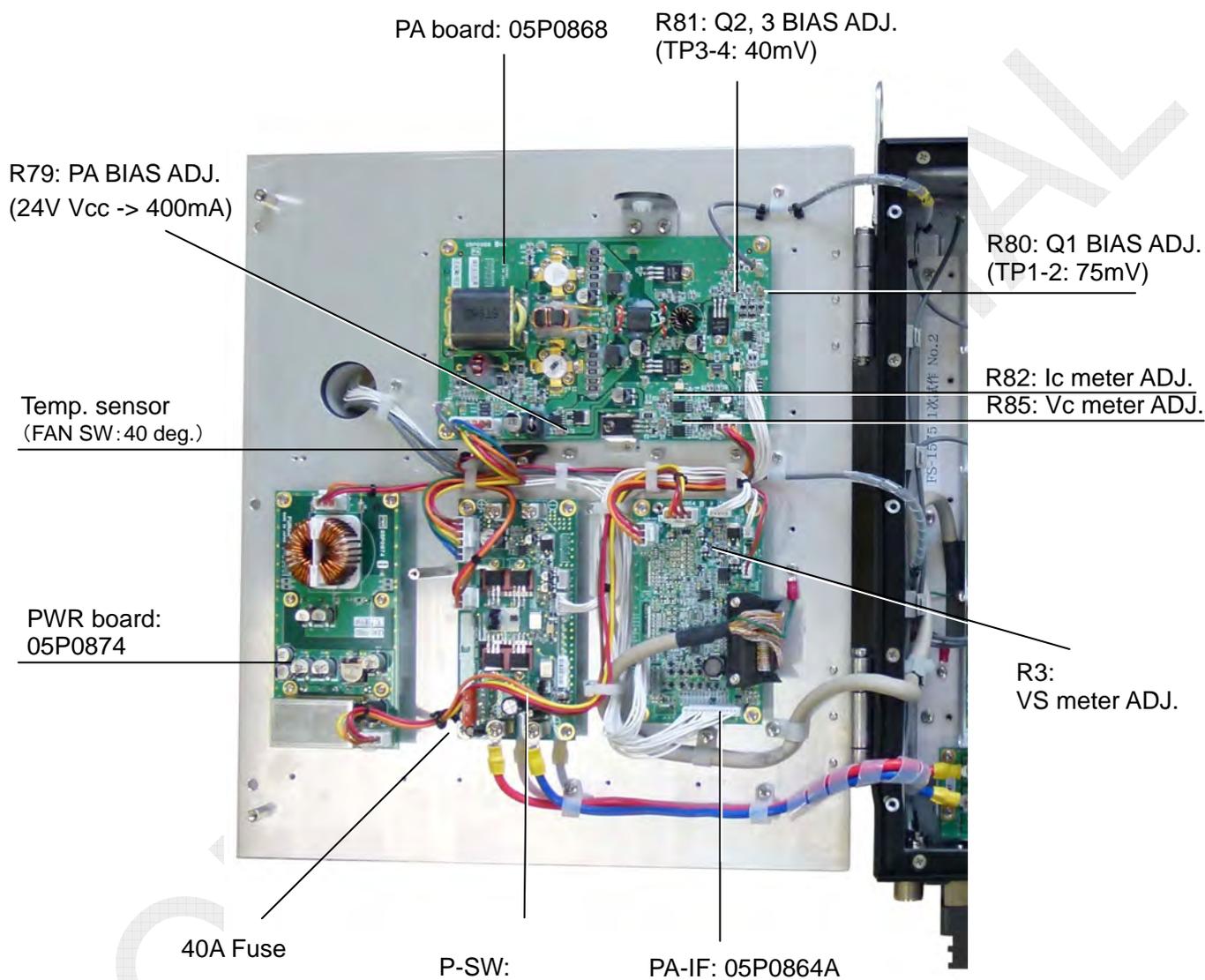


Fig. 2.2.6 FS-1575T, heat sink side

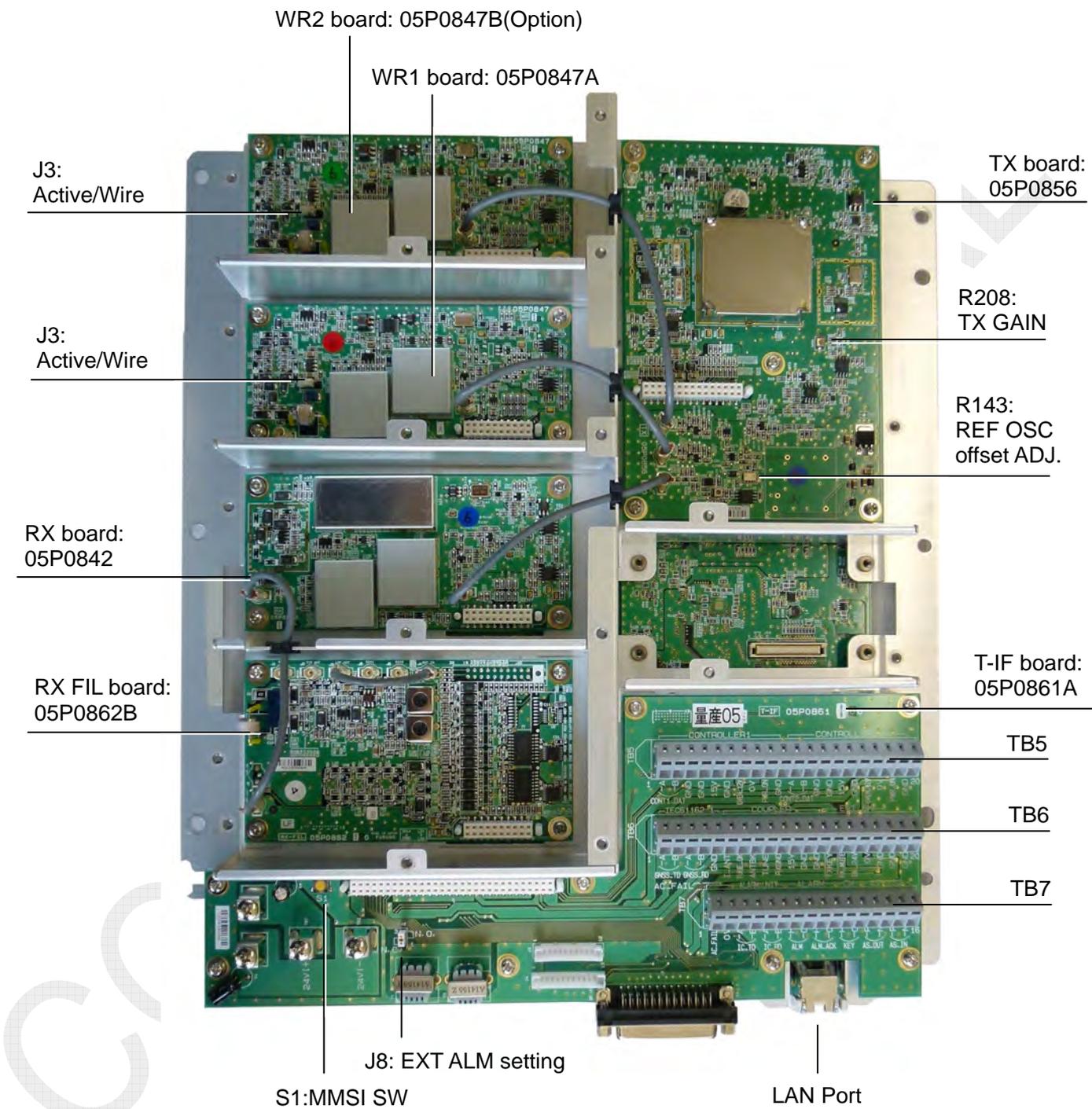


Fig. 2.2.7 FS-1575T, mounting board (A-side)

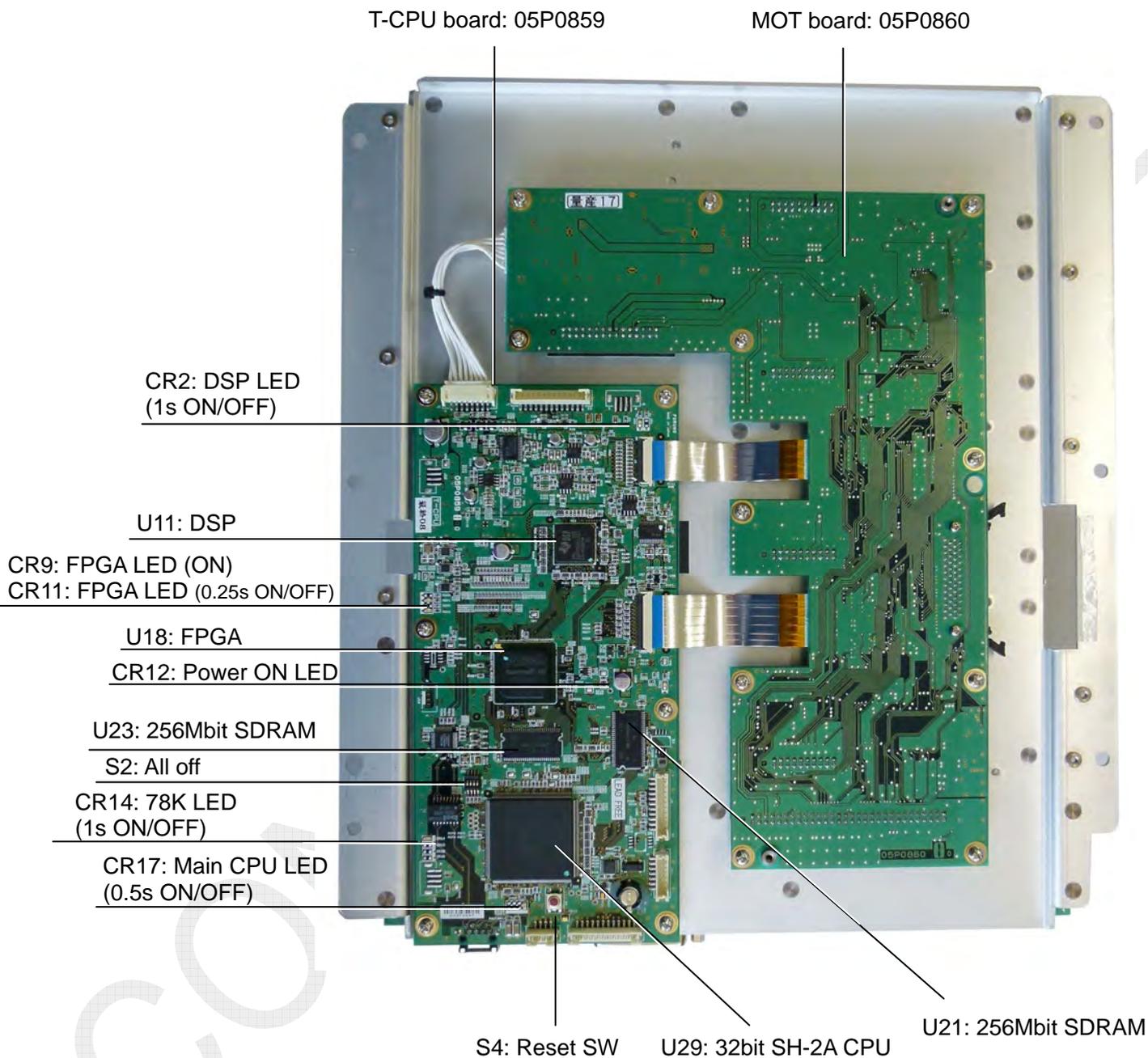


Fig. 2.2.8 FS-1575T, mounting board (B-side)

2.3 Transceiver Unit: FS-2575T

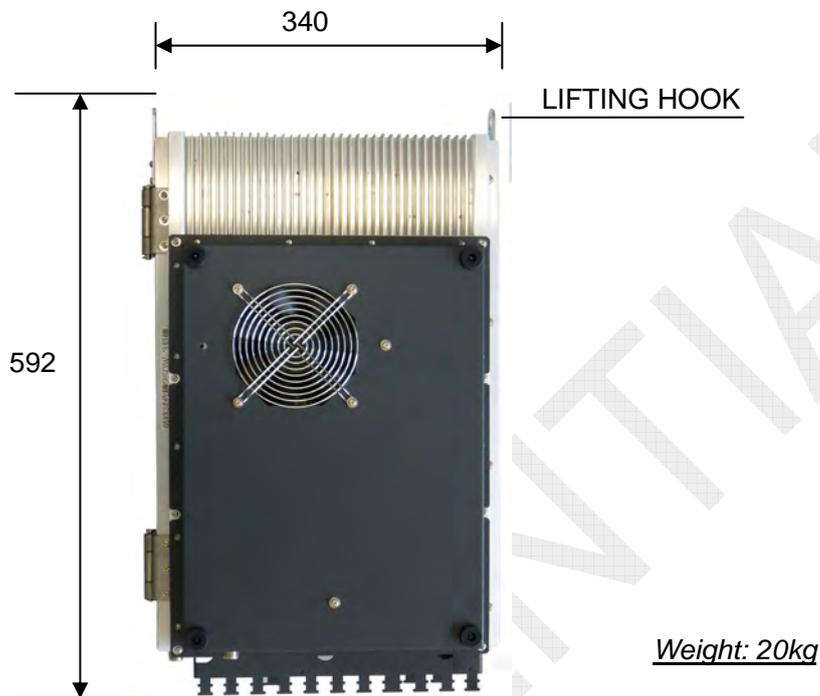


Fig. 2.3.1 FS-2575T, front view

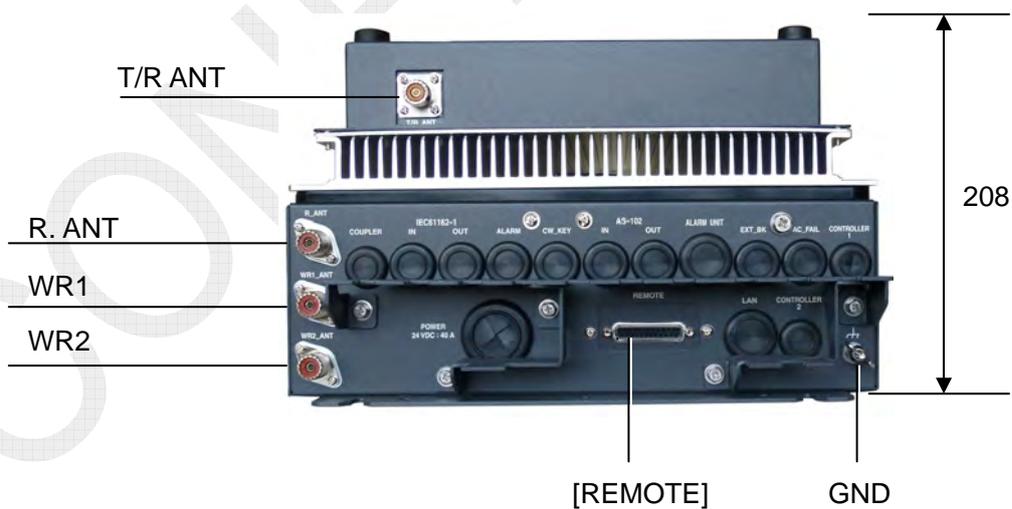


Fig. 2.3.2 FS-2575T, bottom view

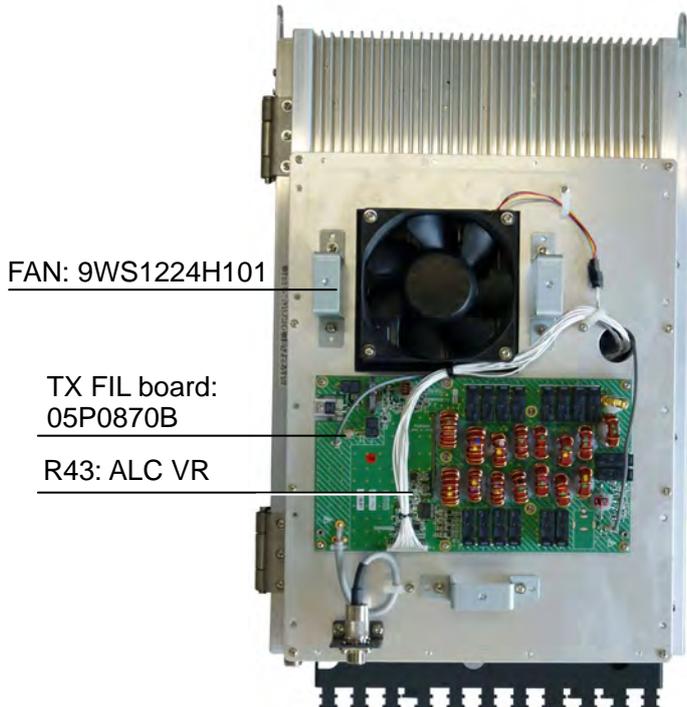


Fig. 2.3.3 FS-2575T, front cover removed

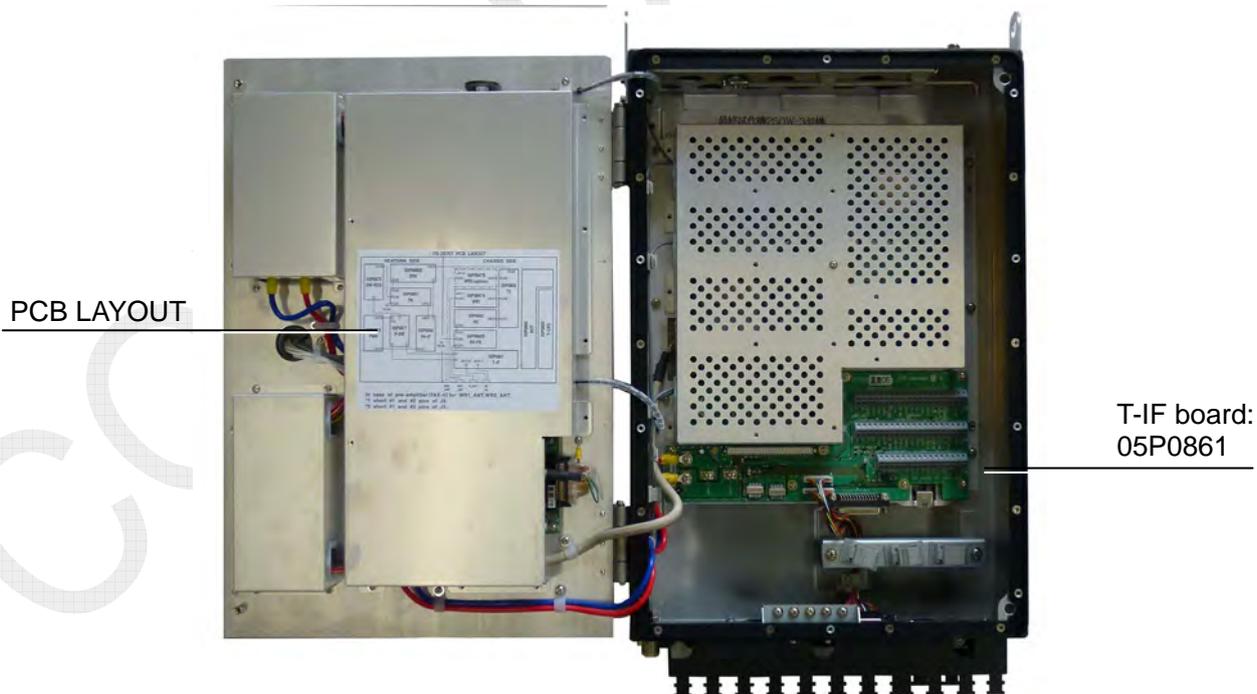


Fig. 2.3.4 FS-2575T, door opened

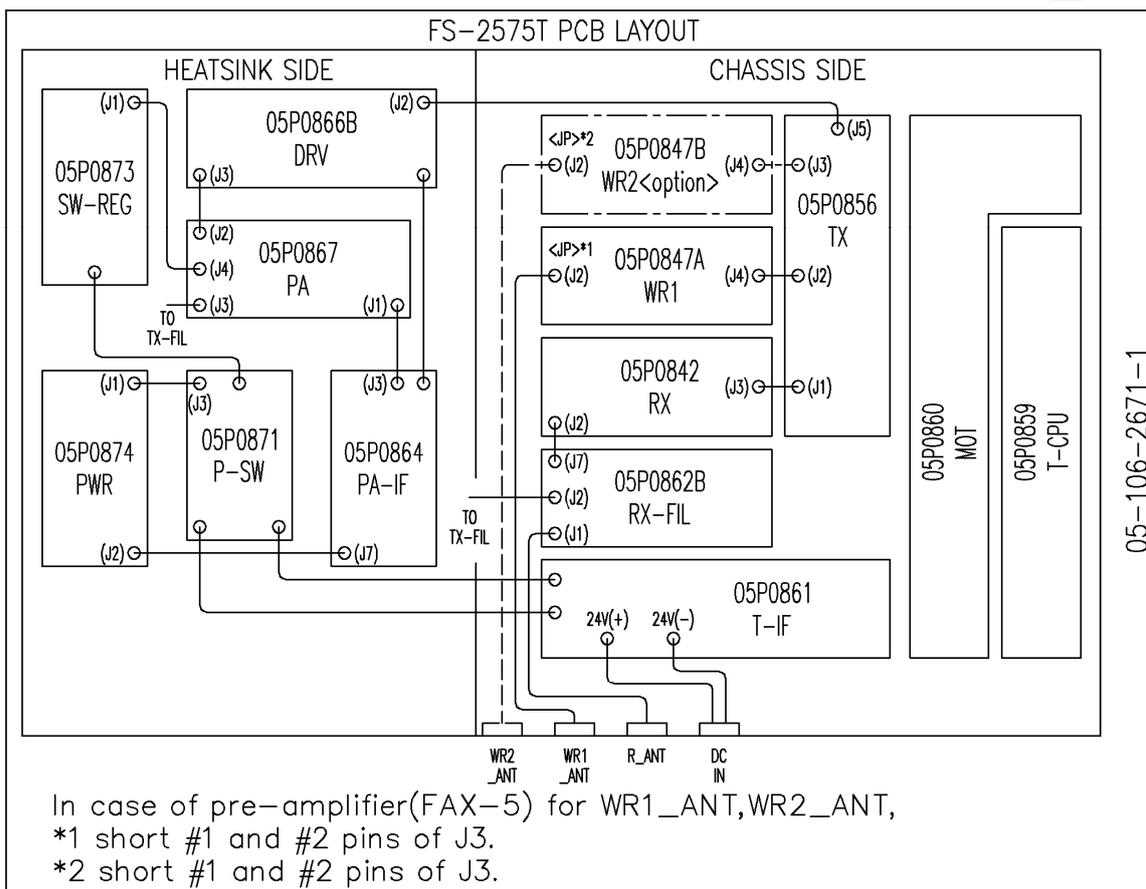


Fig. 2.3.5 FS-2575T, PCB LAYOUT

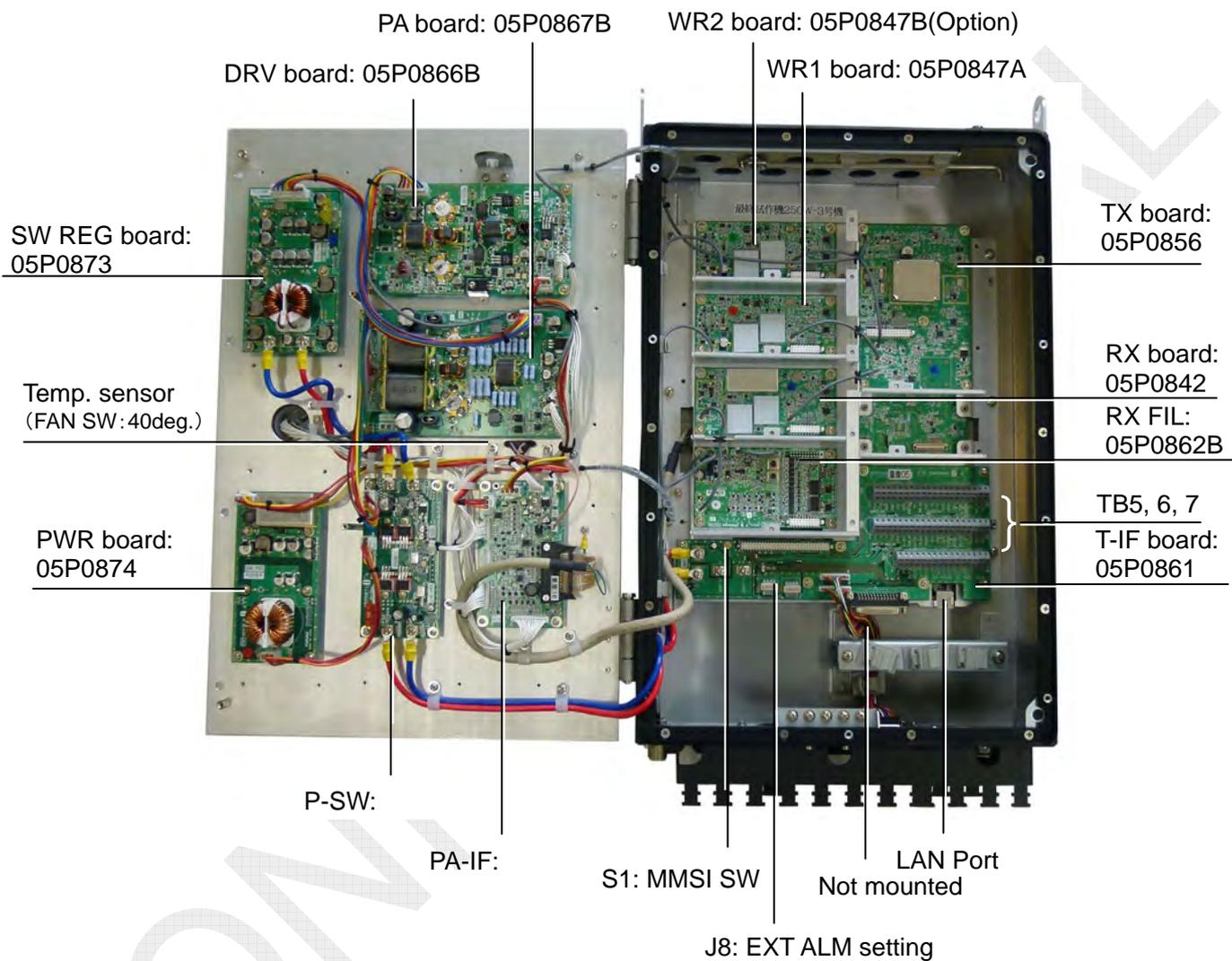


Fig. 2.3.6 FS-2575T, shield cover removed

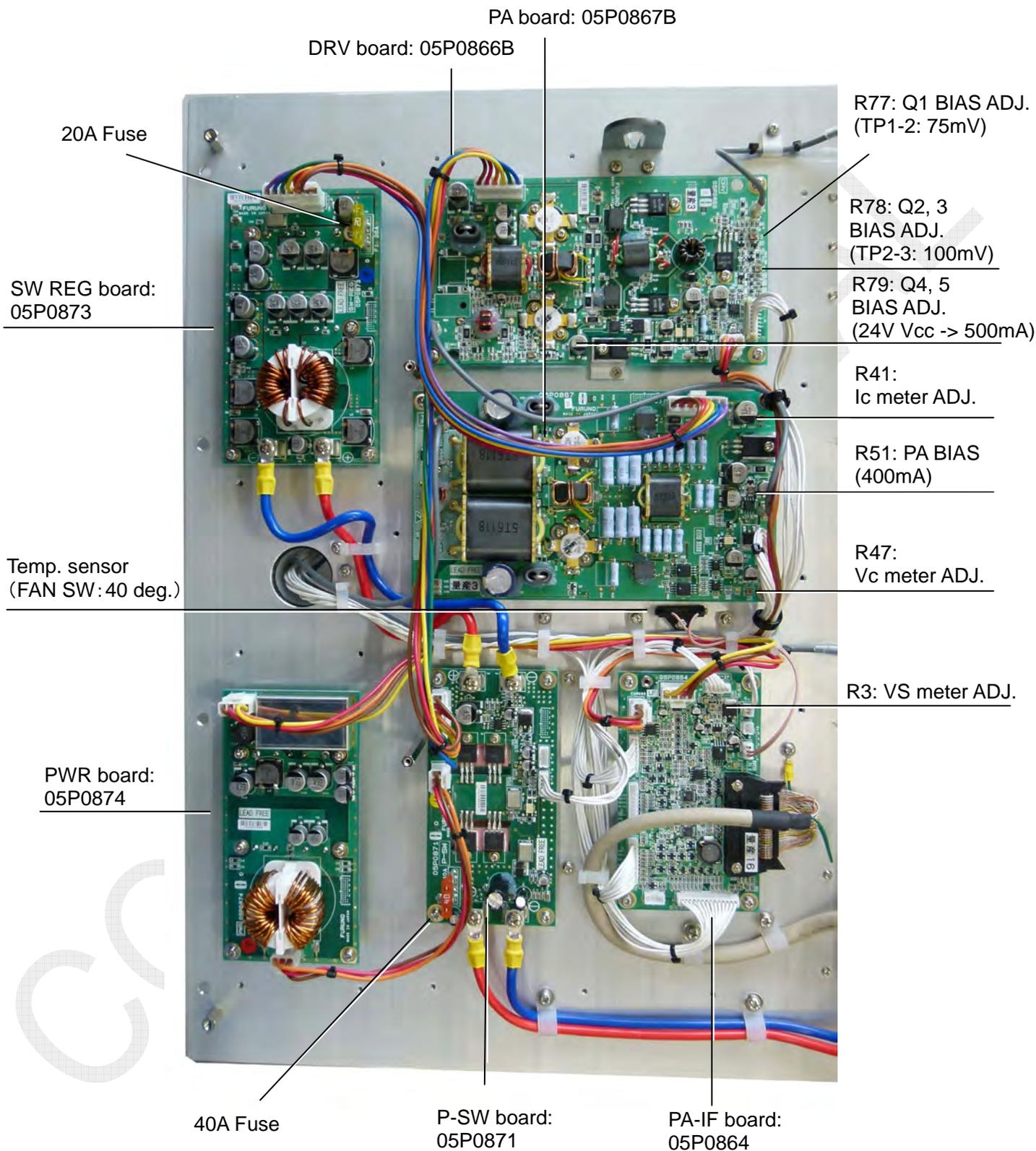


Fig. 2.3.7 FS-2575T, heat sink side

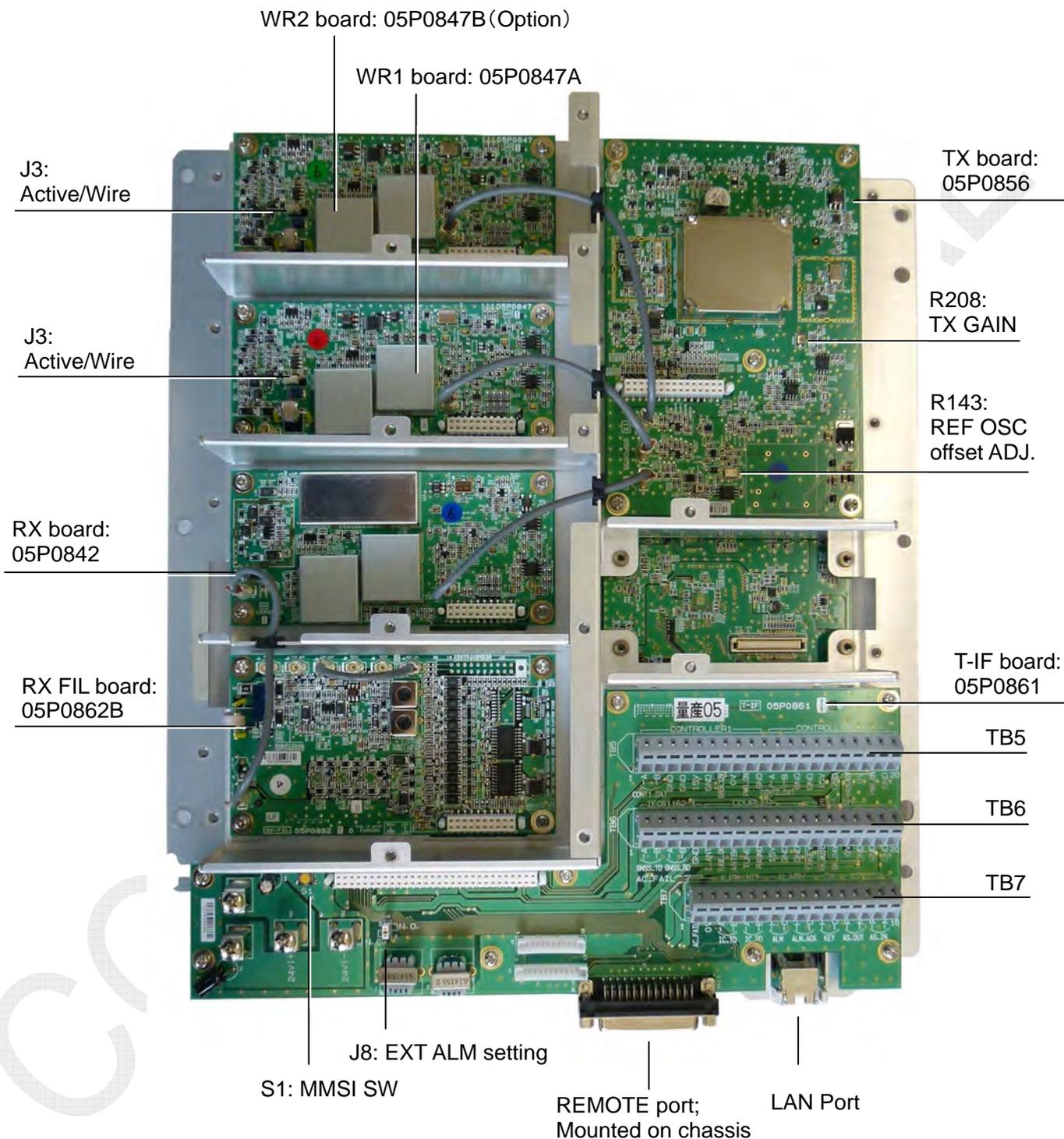


Fig. 2.3.8 FS-2575T, mounting board (A-side)

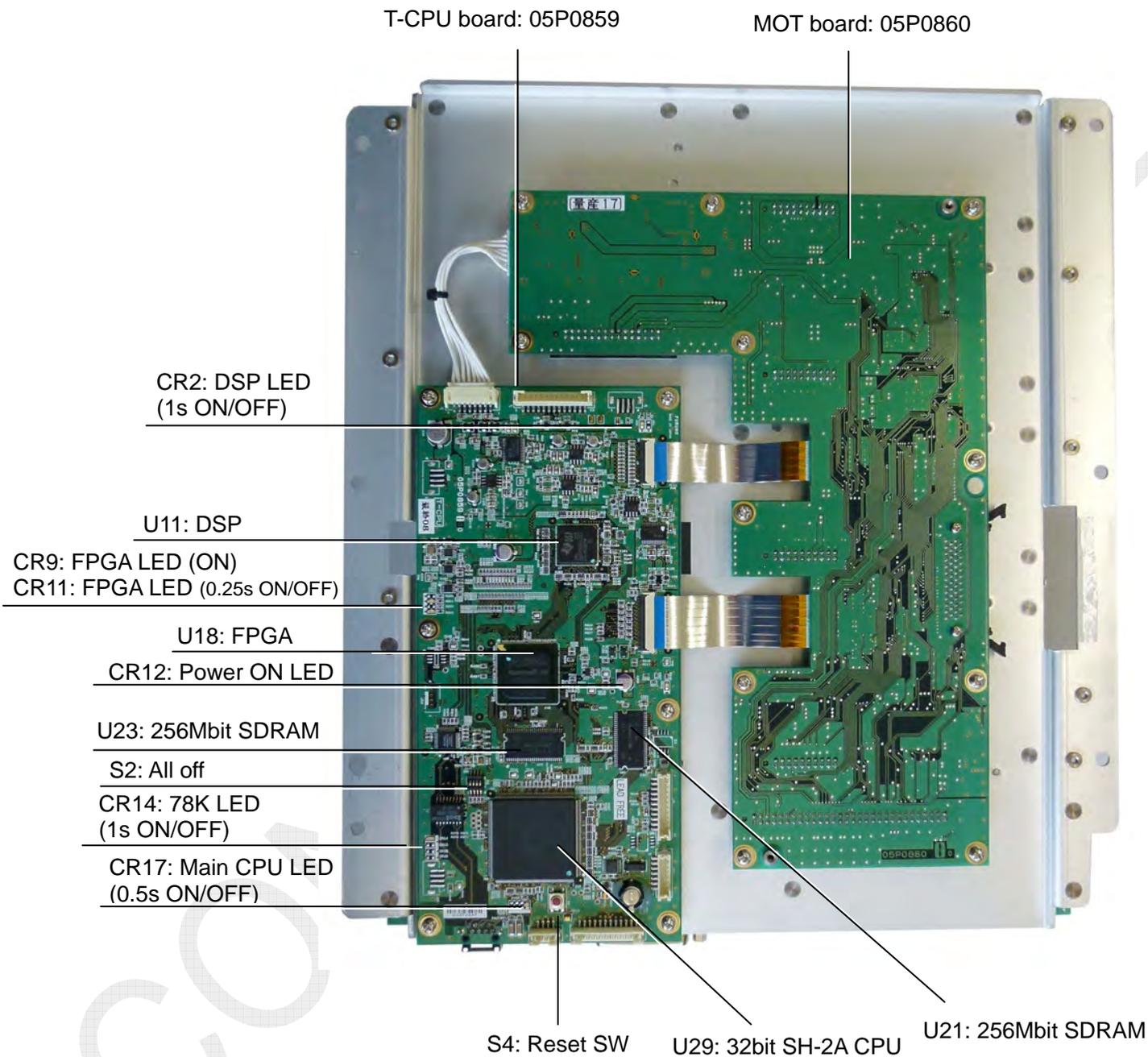


Fig. 2.3.9 FS-2575T, mounting board (B-side)

2.4 Transceiver Unit FS-5075T

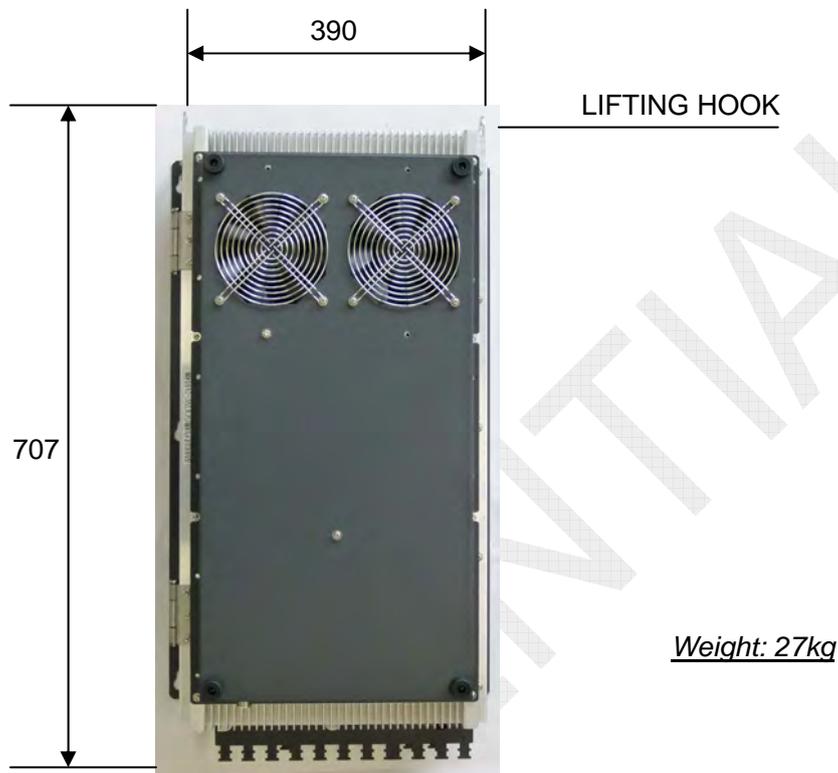


Fig. 2.4.1 FS-5075T, front view

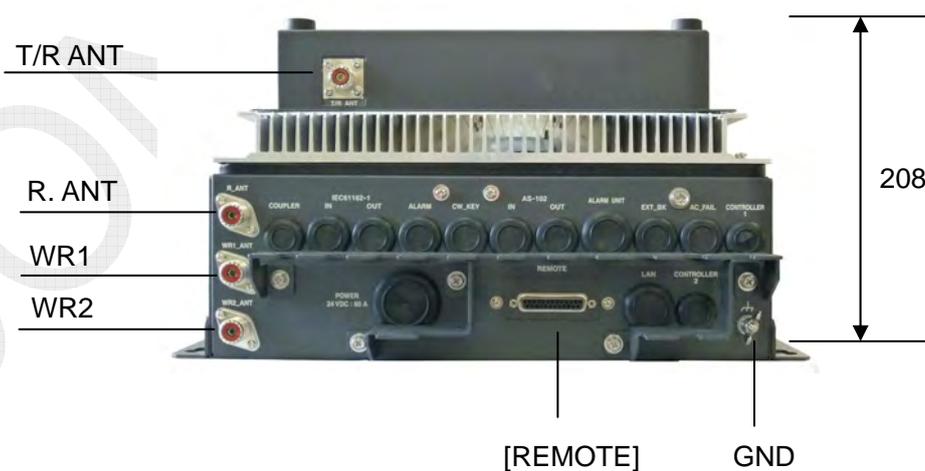


Fig. 2.4.2 FS-5075T, bottom view

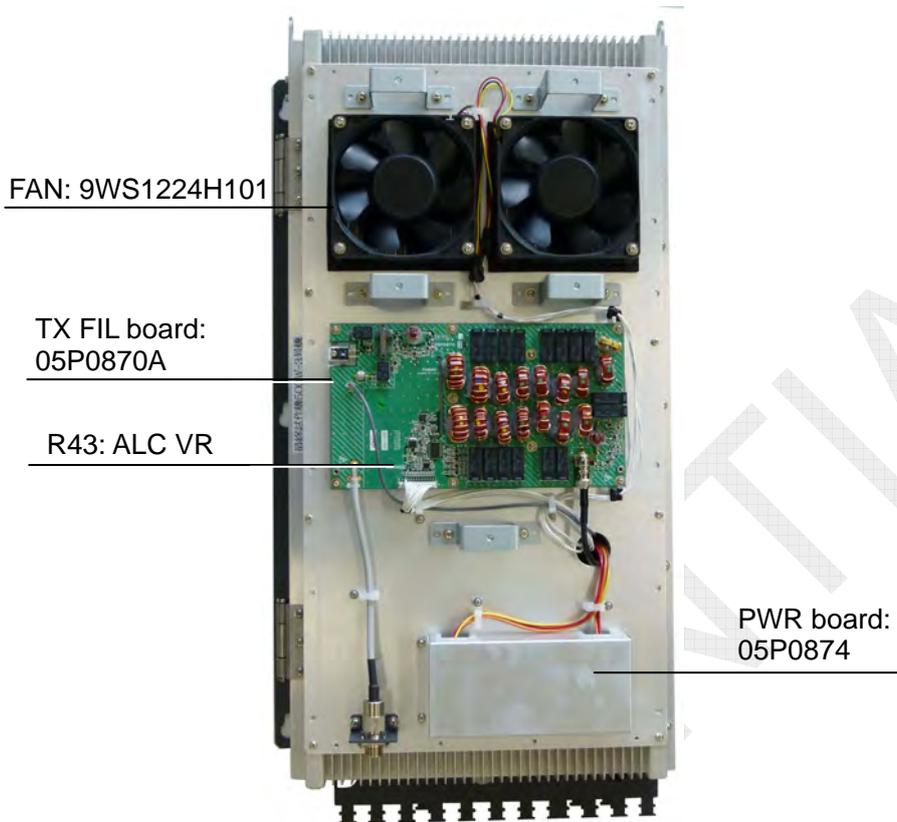


Fig. 2.4.3 FS-5075T, front cover removed



Fig. 2.4.4 FS-5075T, door opened

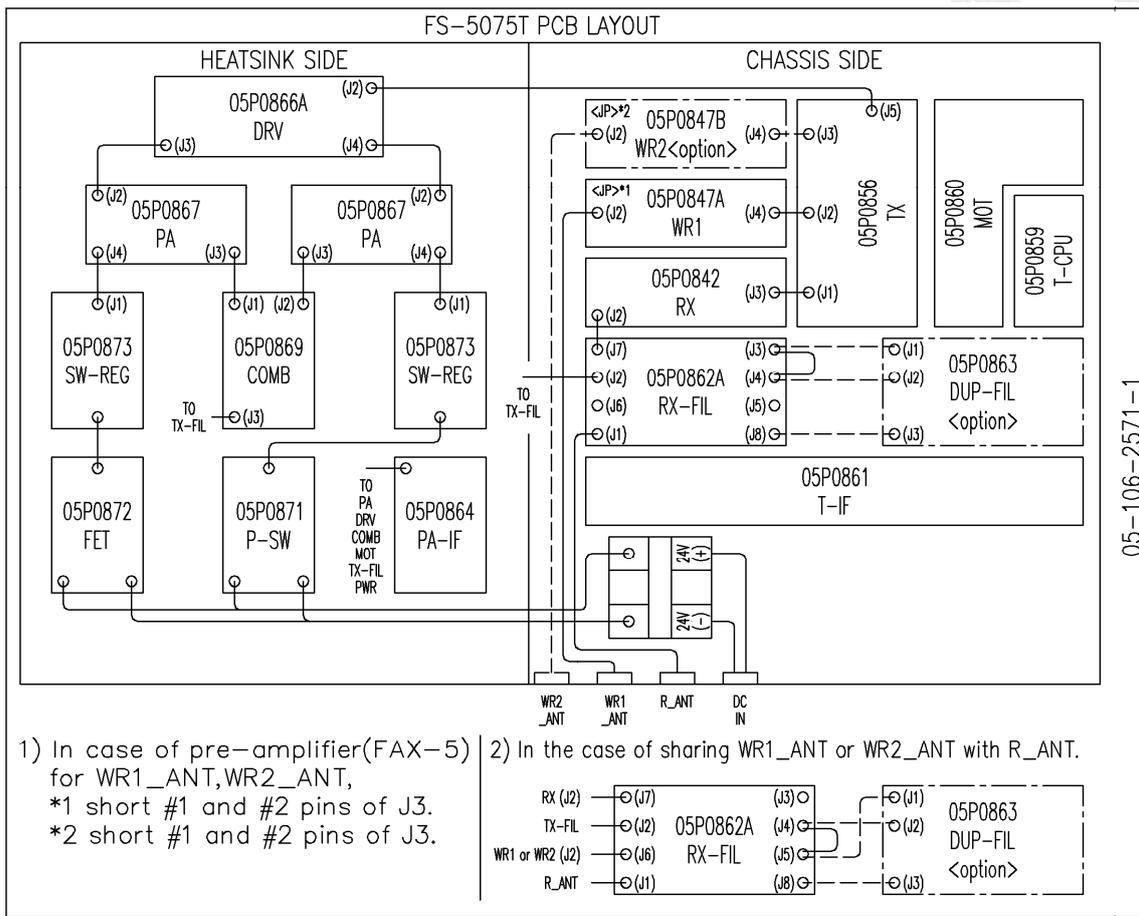


Fig. 2.4.5 FS-5075T, PCB LAYOUT

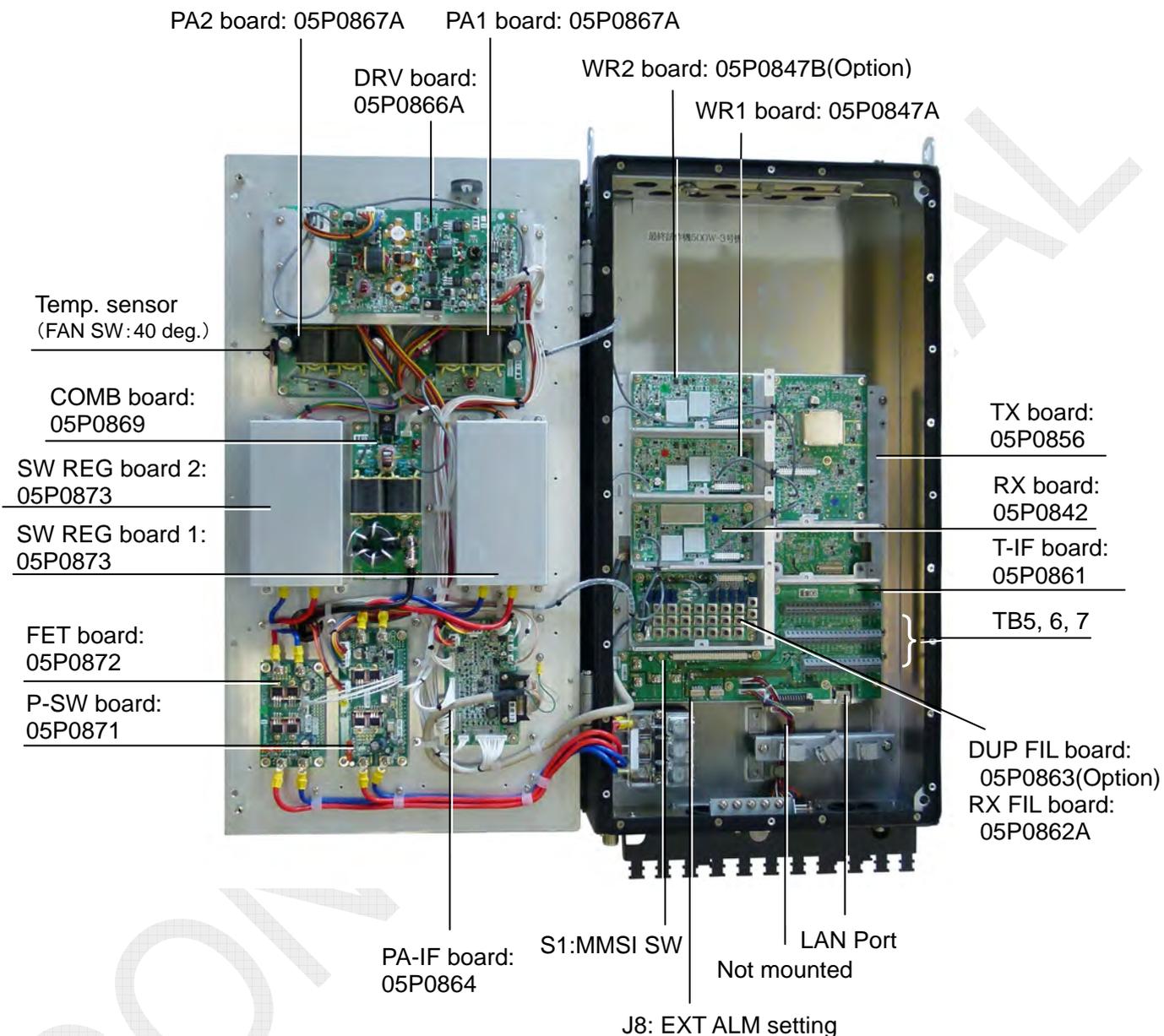


Fig. 2.4.6 FS-5075T, shield cover removed

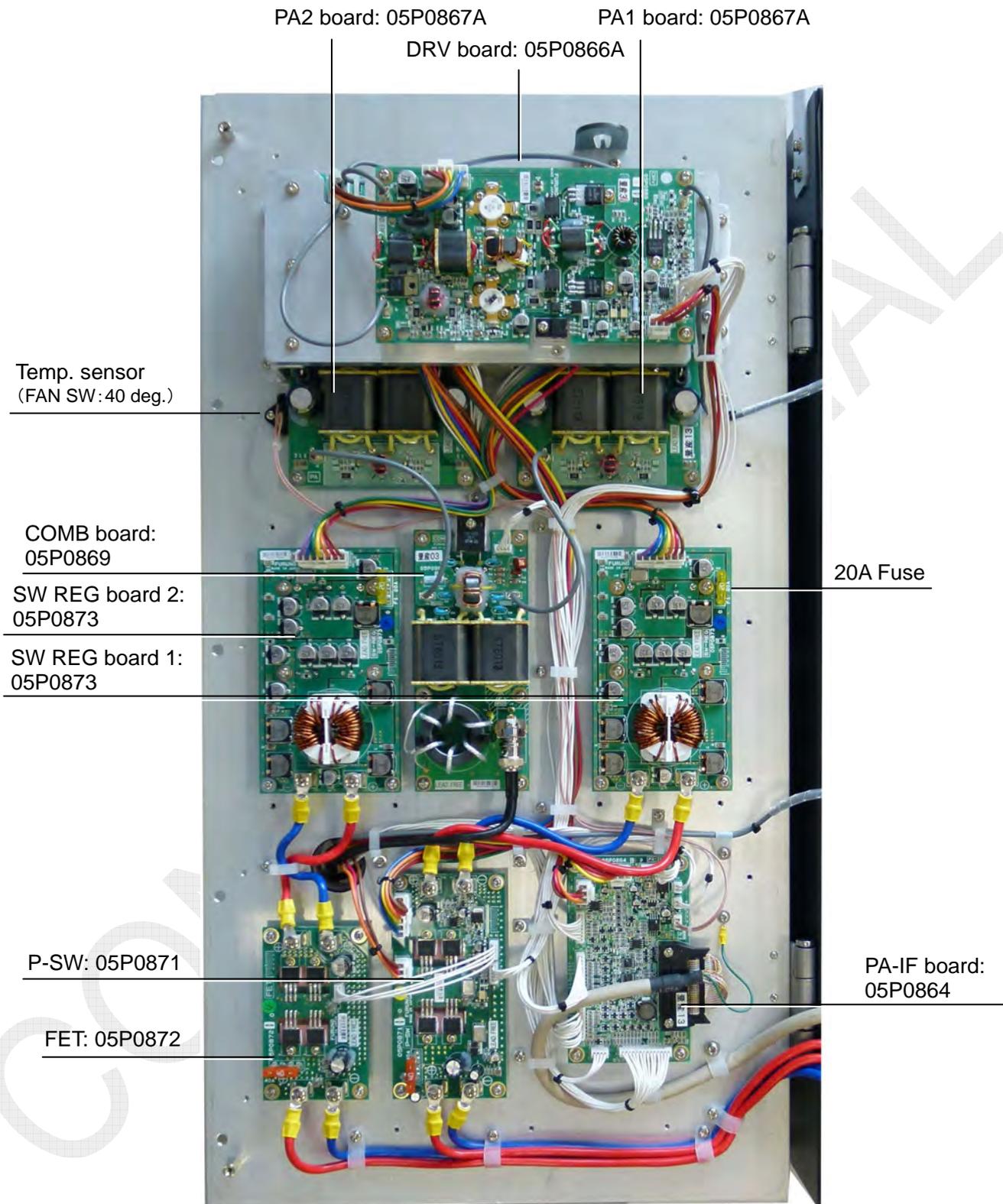


Fig. 2.4.7 FS-5075T, heat sink side

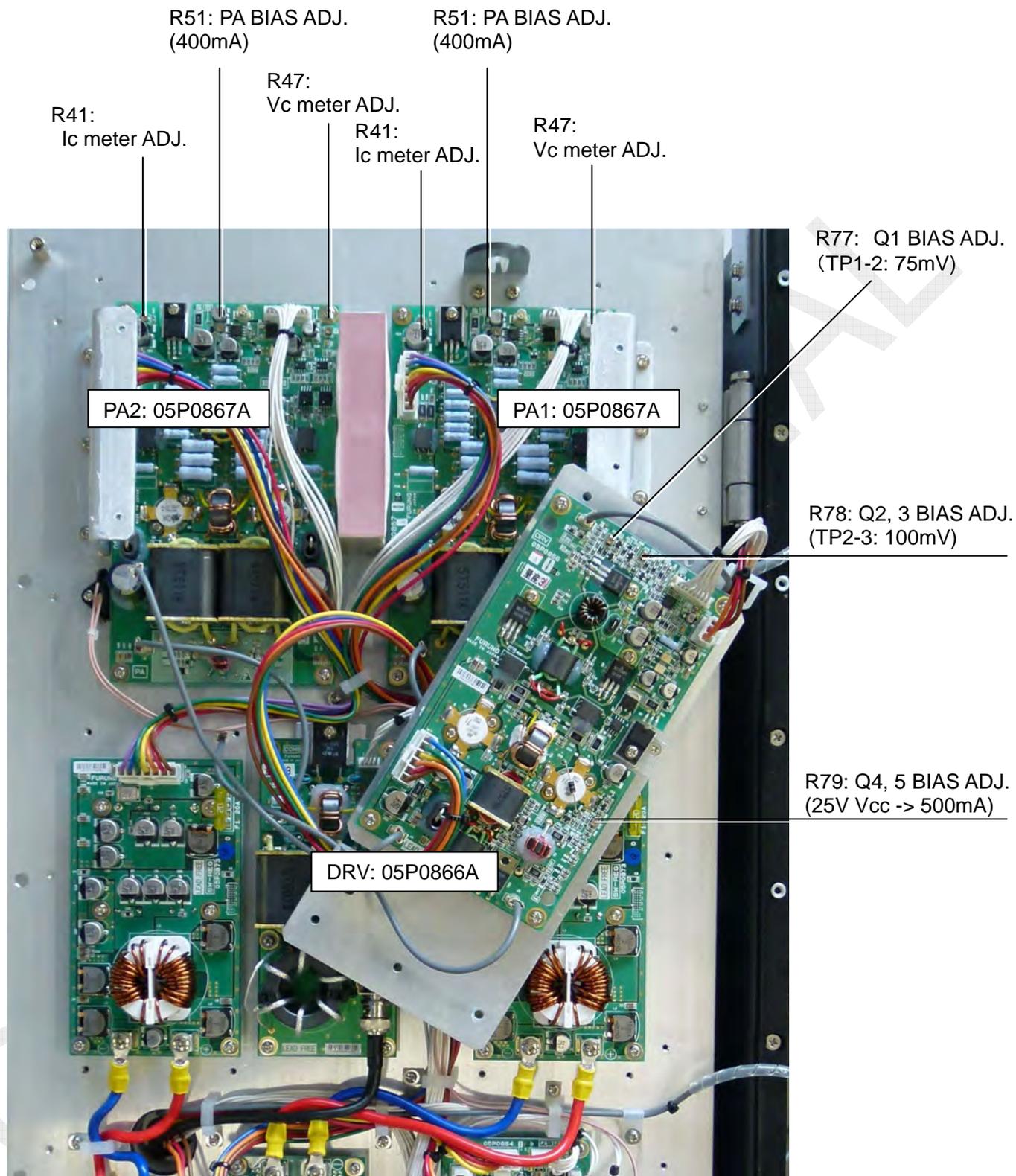
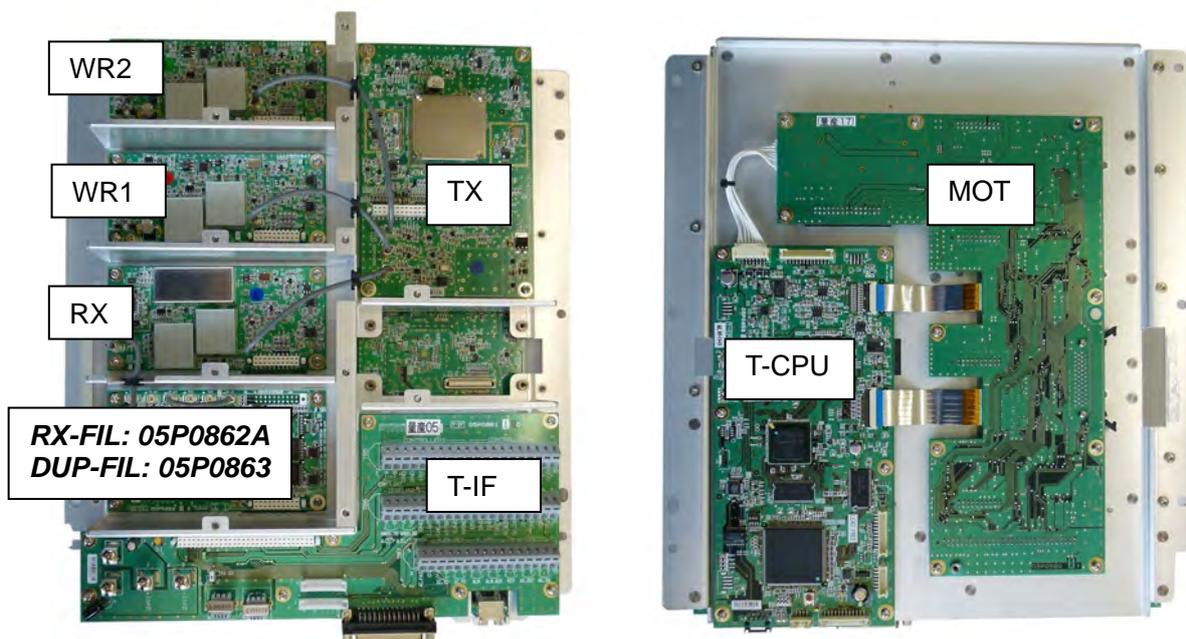
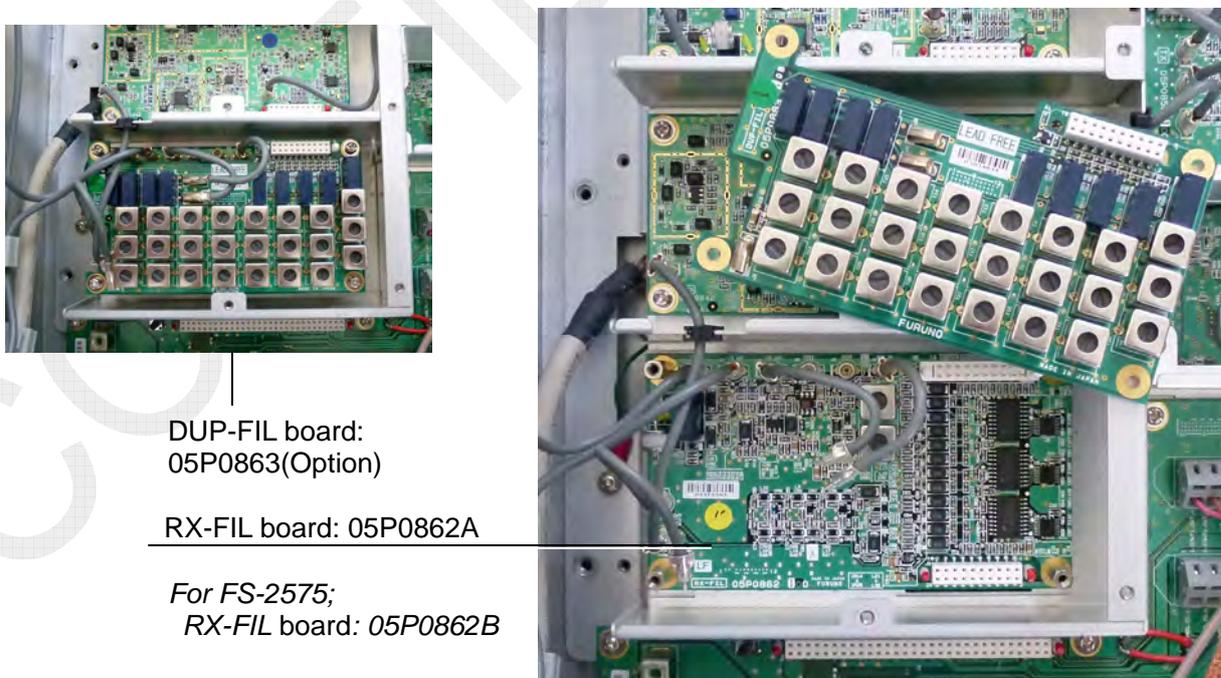


Fig. 2.4.8 FS-5075T, DRV board removed



Note)
 Board attachment chassis of FS-5075T is the same as FS-2575T except for a RX-FIL board.
 For details, refer to Fig. 2.3.8 and 2.3.9.

Fig. 2.4.9 FS-5075T, mounting board



DUP-FIL board:
 05P0863(Option)
 RX-FIL board: 05P0862A
 For FS-2575;
 RX-FIL board: 05P0862B

Fig. 2.4.10 FS-5075T, RX-FIL and DUP FIL board

2.5 Board

1. TX FIL board: 05P0876 (FS-1575)

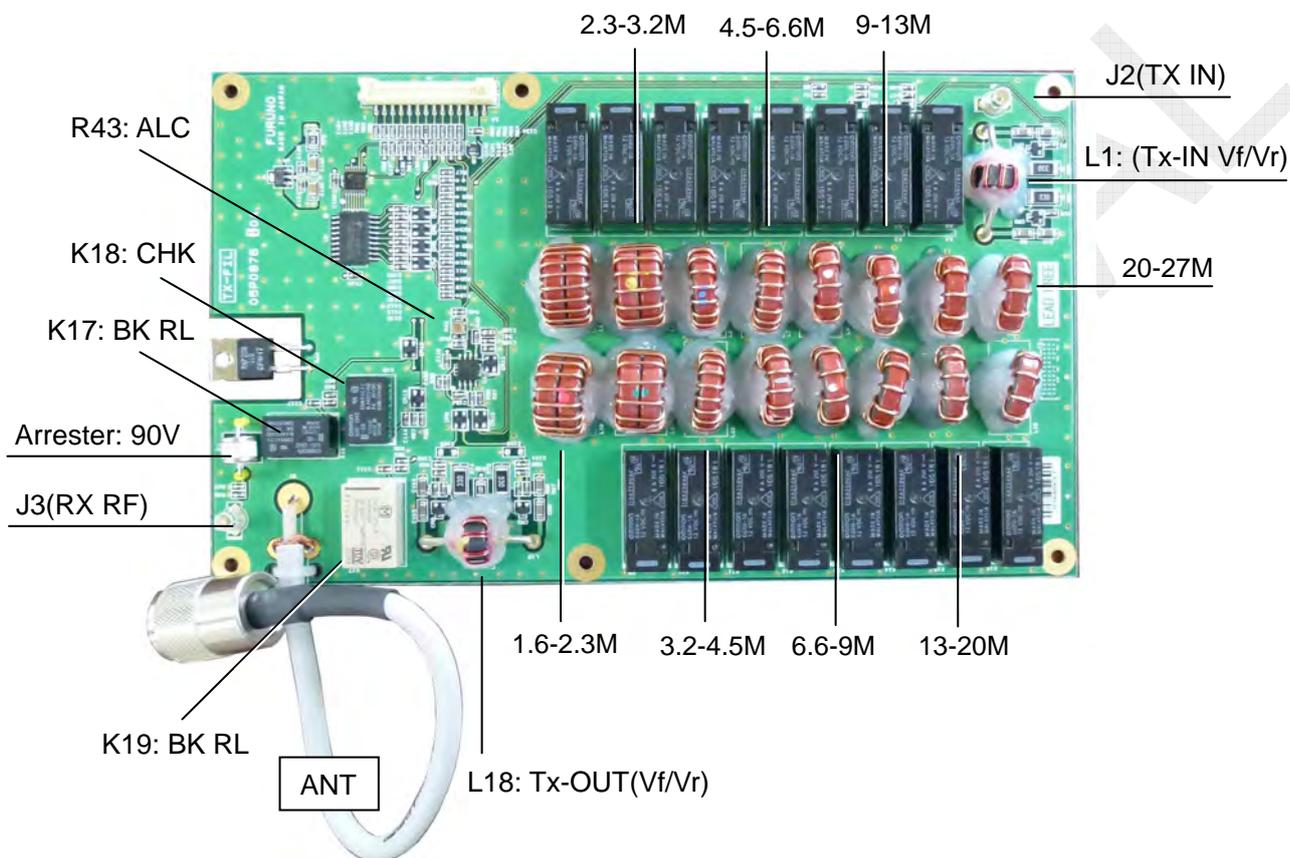


Fig. 2.5.1 TX-FIL board (05P0876) A-side

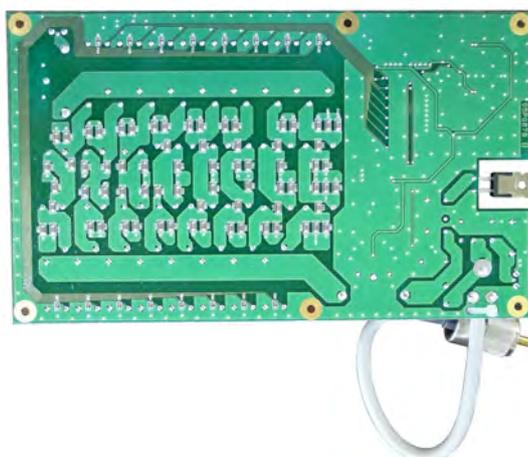


Fig. 2.5.2 TX-FIL board (05P0876) B-side

2. TX FIL board: 05P0870B (FS-2575)

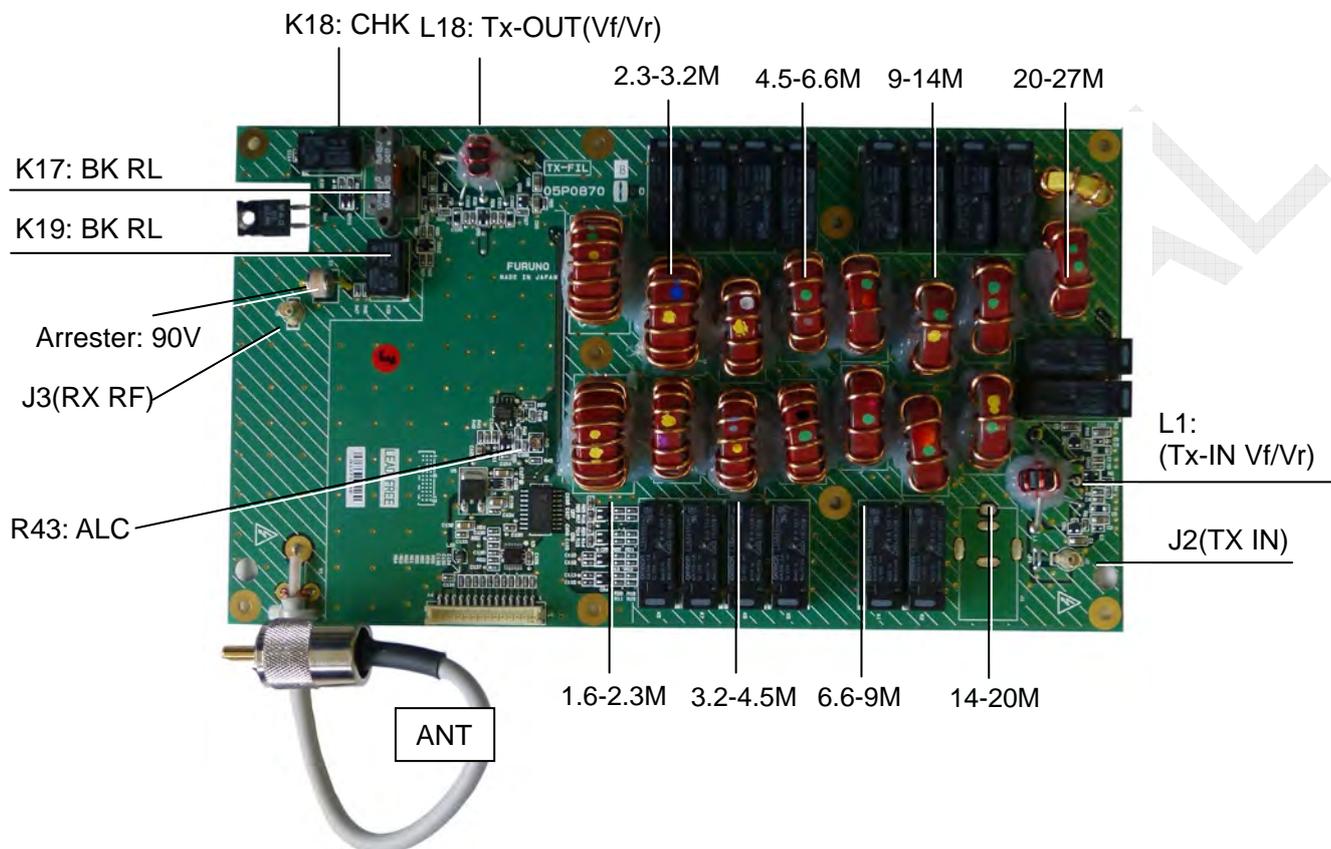
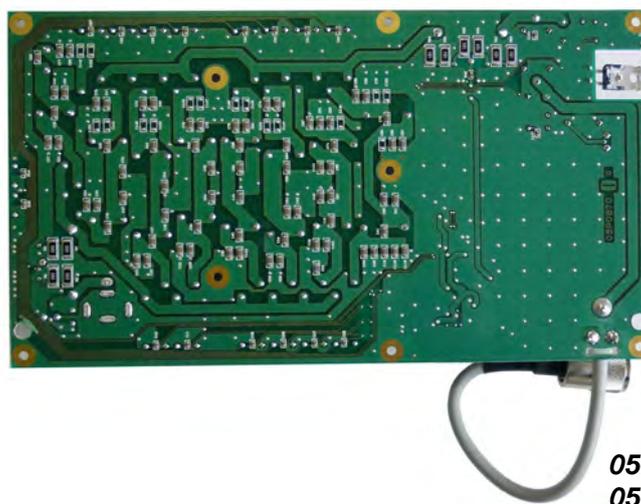


Fig. 2.5.3 TX-FIL board (05P0870B) A-side



05P0870A: J2, JP1 not mount
05P0870B: J1, not mount

Fig. 2.5.4 TX-FIL board (05P0870B) B-side

3. TX FIL board: 05P0870A (FS-5075)

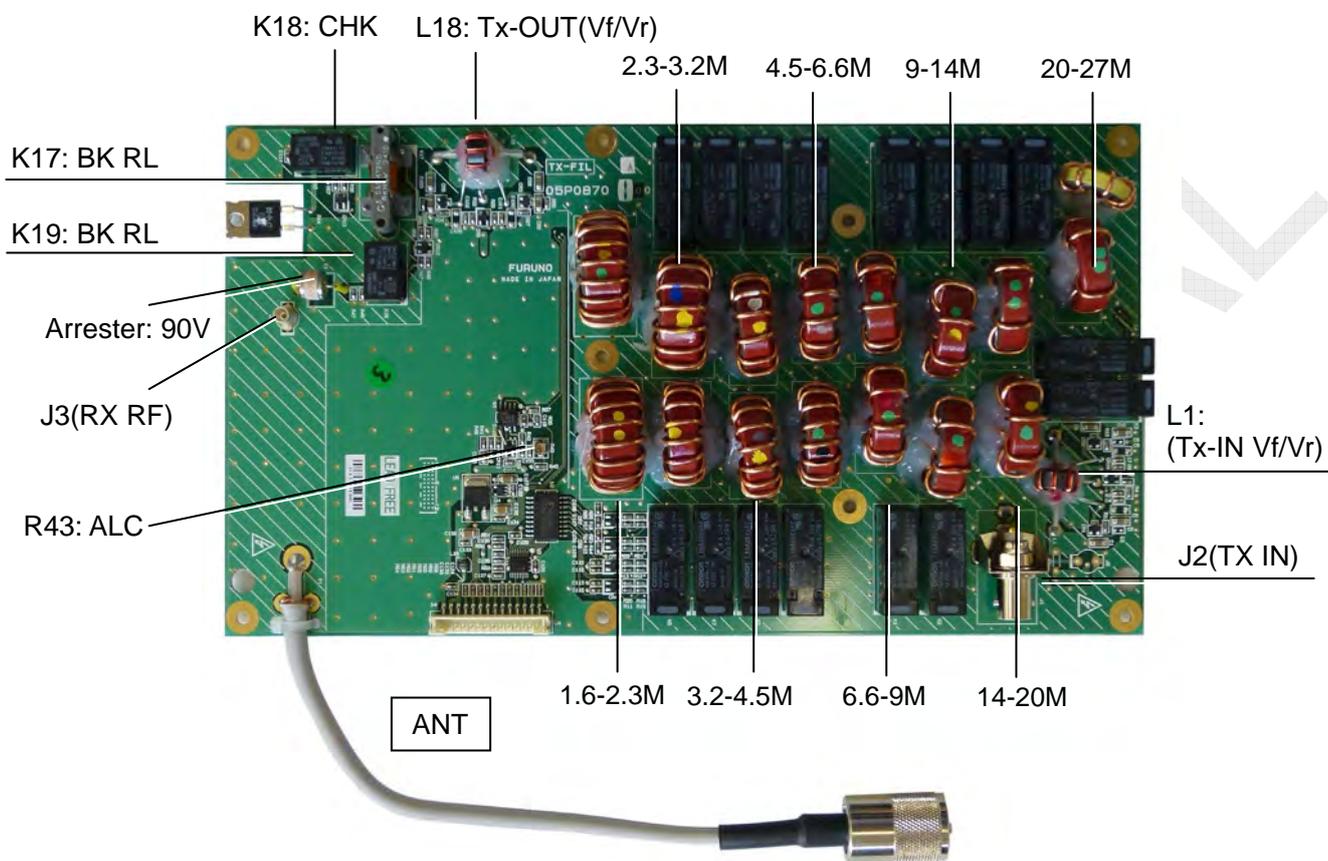


Fig. 2.5.5 TX-FIL board (05P0870A) A-side

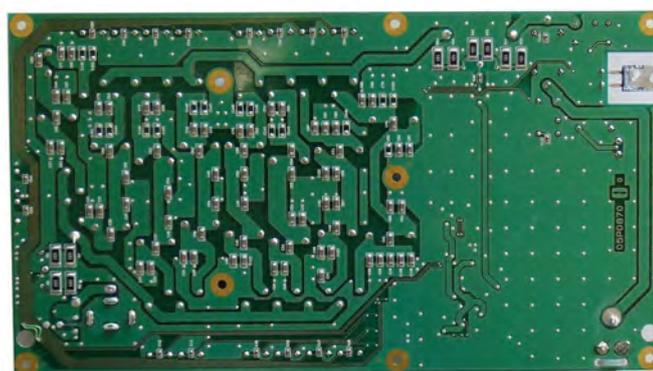


Fig. 2.5.6 TX-FIL board (05P0870A) B-side

05P0870A: J2, JP1 not mounted
05P0870B: J1, not mounted

4. COMB board: 05P0869 (FS-5075)

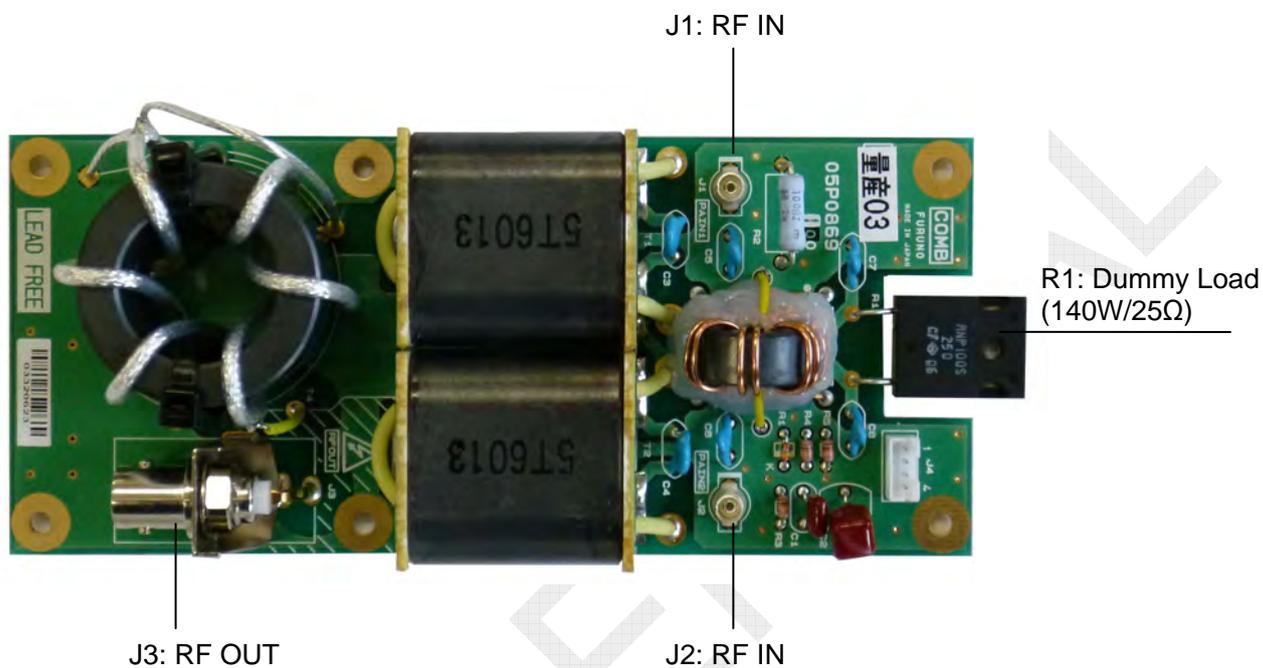


Fig. 2.5.7 COMB board (05P0869) A-side

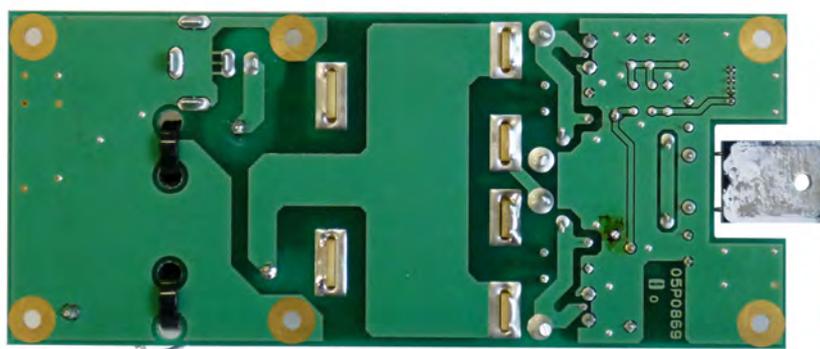


Fig. 2.5.8 COMB board (05P0869) B-side

5. PA board: 05P0868 (FS-1575)

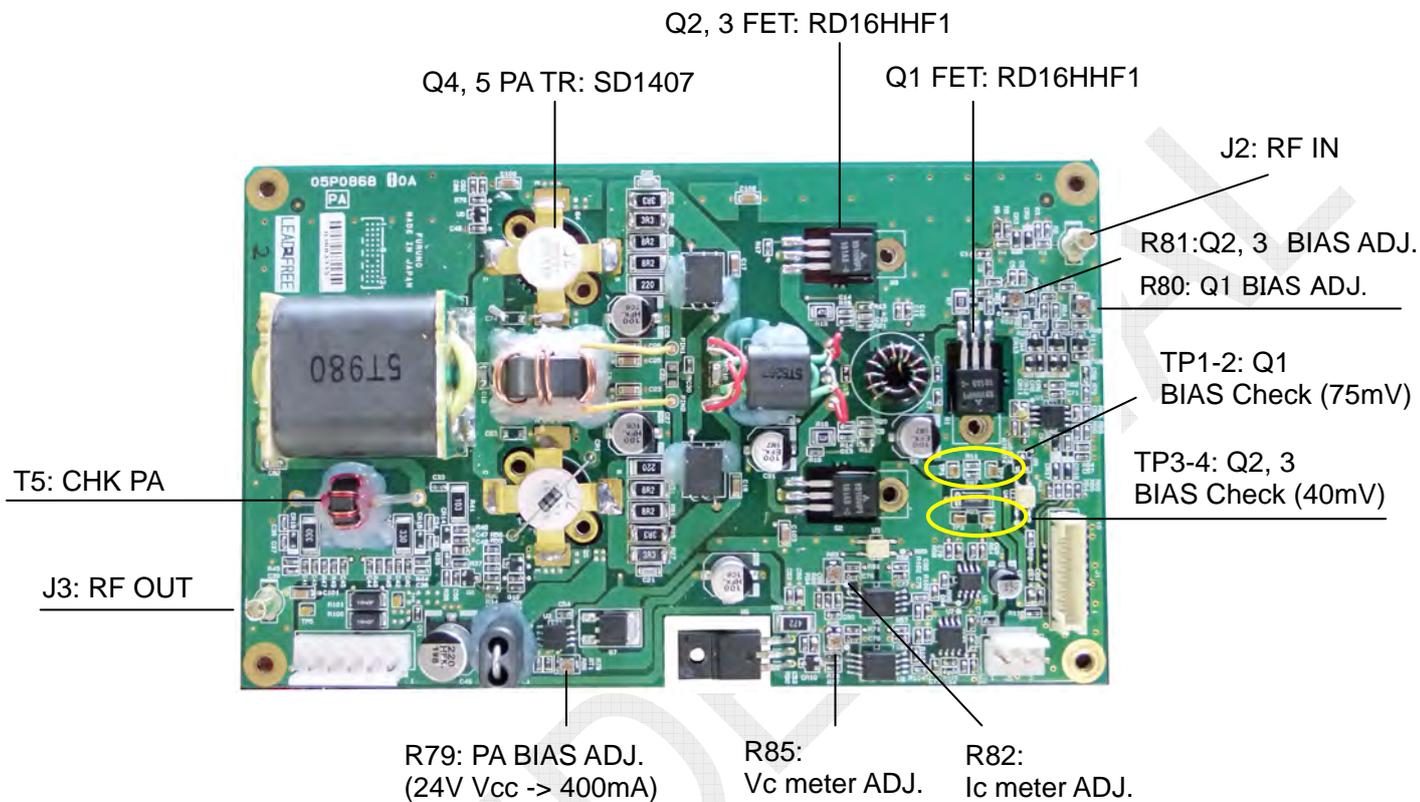


Fig. 2.5.9 PA board (05P0868) A-side

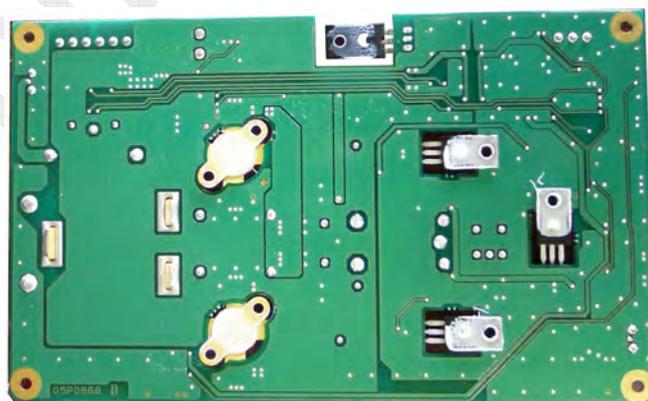
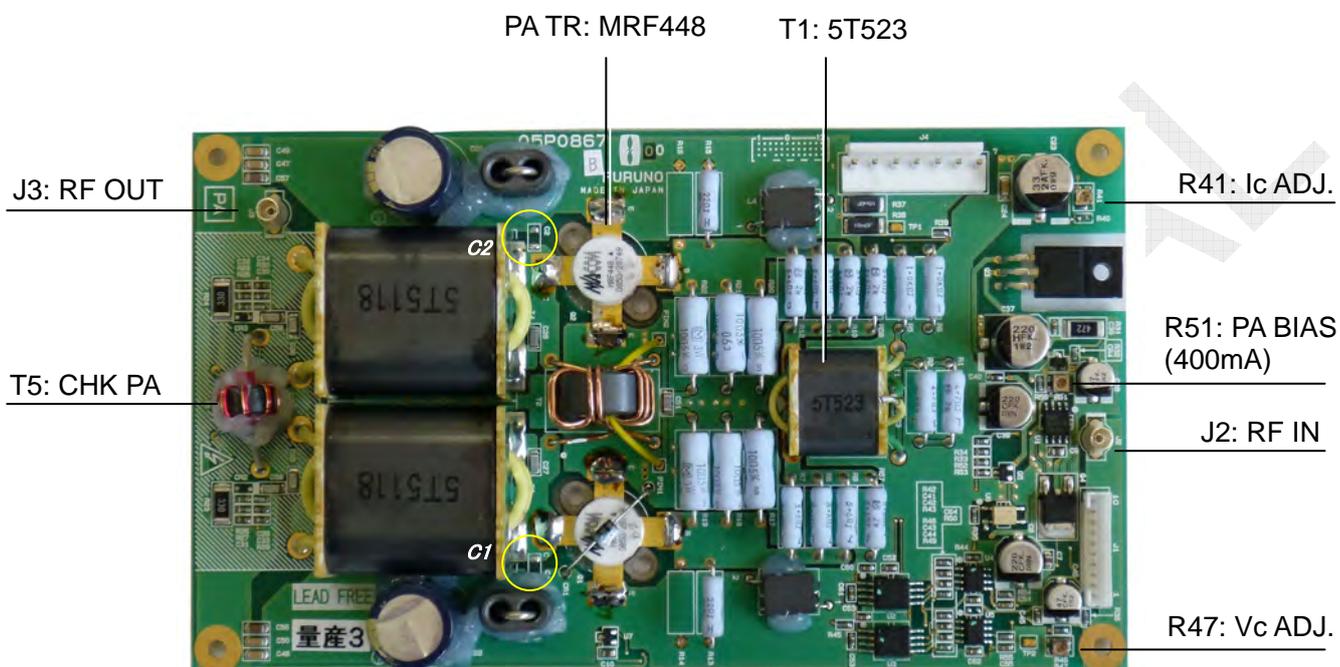


Fig. 2.5.10 PA board (05P0868) B-side

6. PA board: 05P0867B (FS-2575)



FS-5075 -> 05P0867A: T1 = 5T992
 FS-2575 -> 05P0867B: T1 = 5T523
 C1, C2: not mounted

Fig. 2.5.11 PA board (05P0867B) A-side

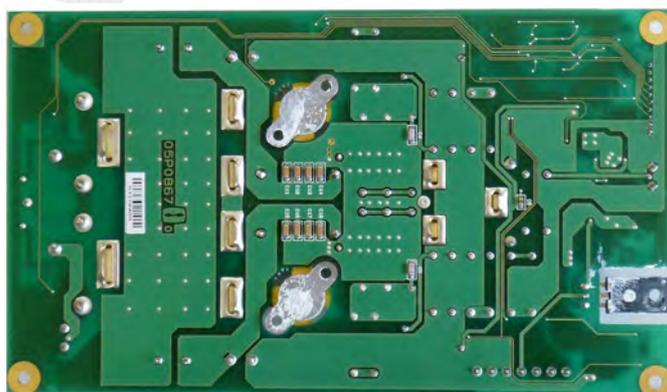
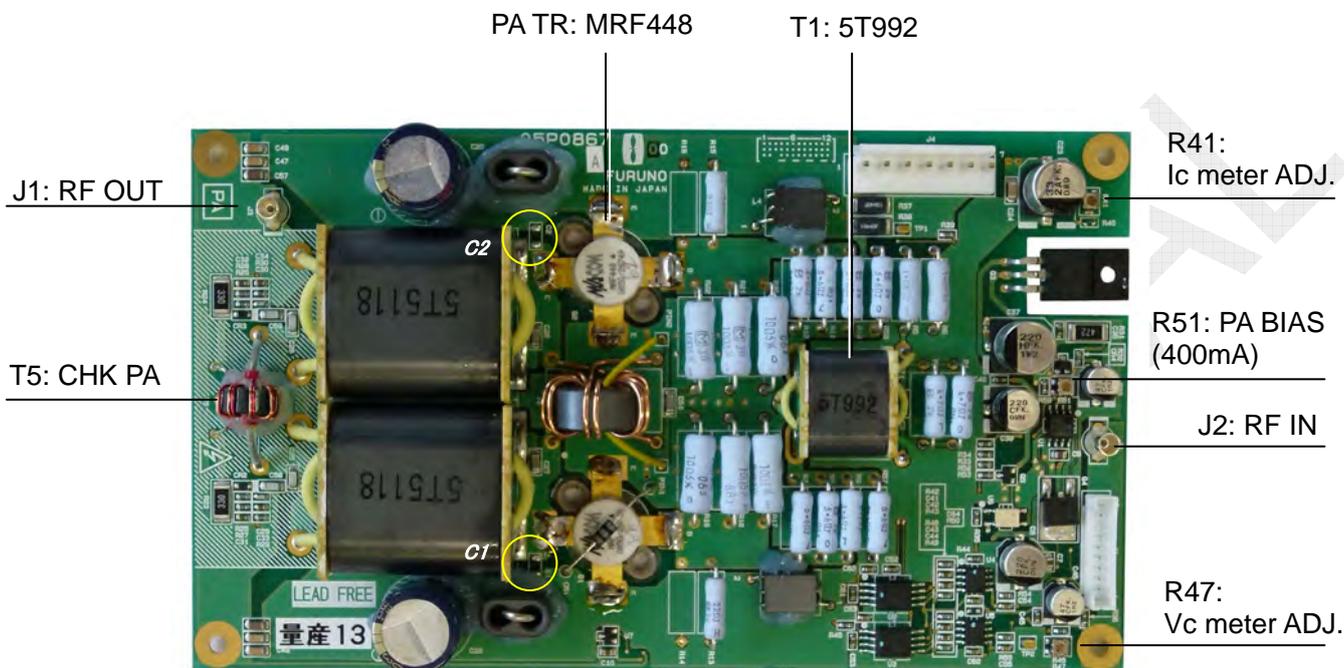


Fig. 2.5.12 PA board (05P0867B) B-side

7. PA board: 05P0867A (FS-5075)



FS-5075 -> 05P0867A: T1 = 5T992
 FS-2575 -> 05P0867B: T1 = 5T523
 C1, C2: not mounted

Fig. 2.5.13 PA board (05P0867A) A-side

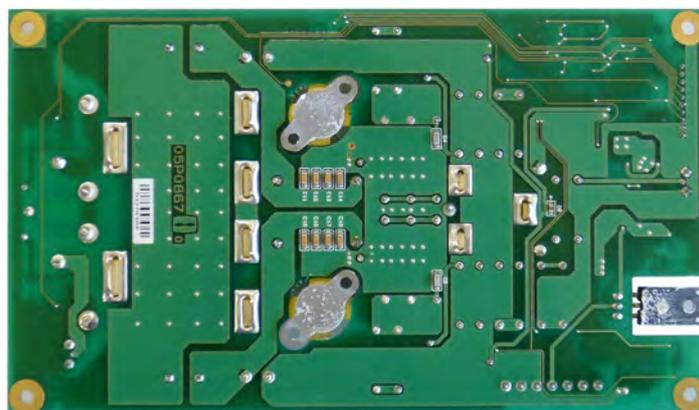


Fig. 2.5.14 PA board (05P0867A) B-side

8. DRV board: 05P0866B (FS-2575)

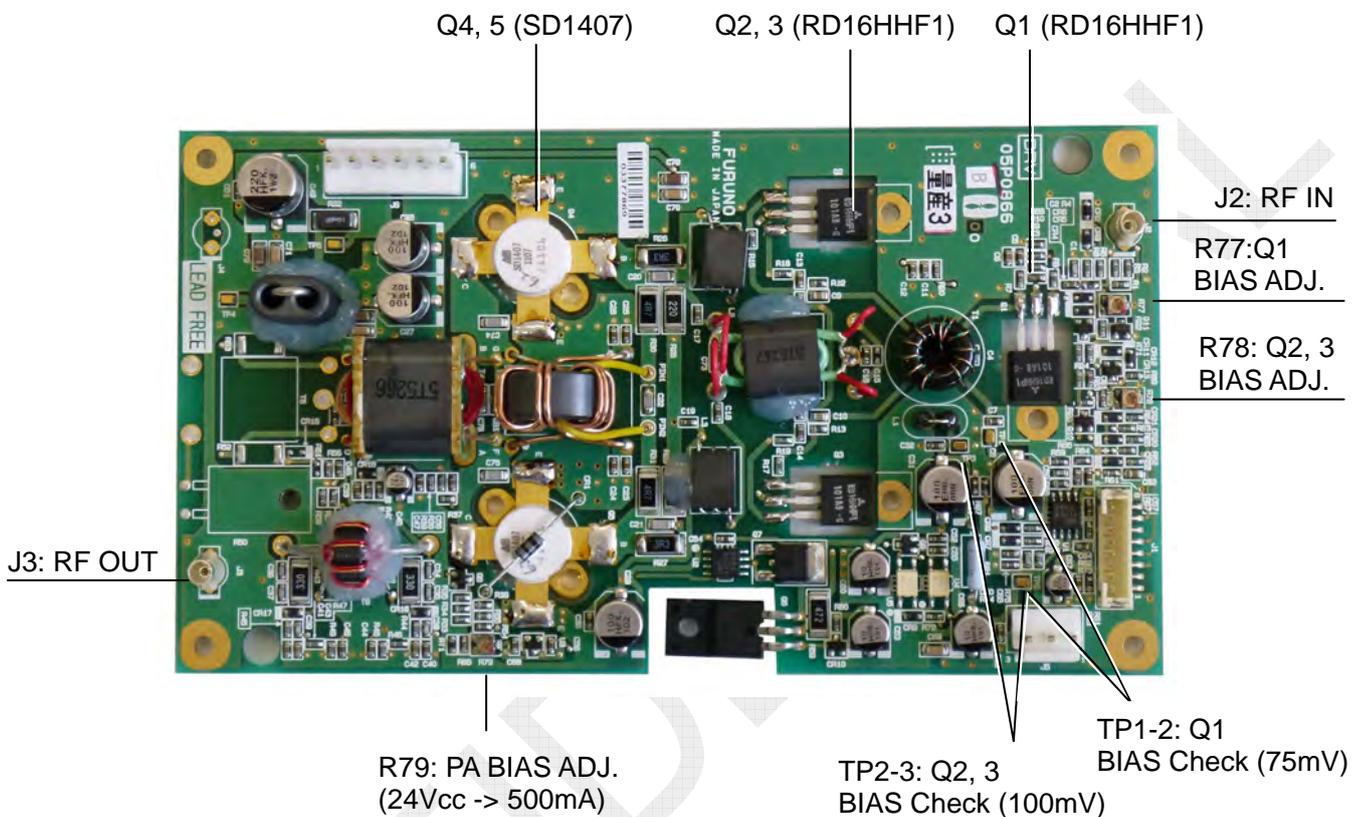
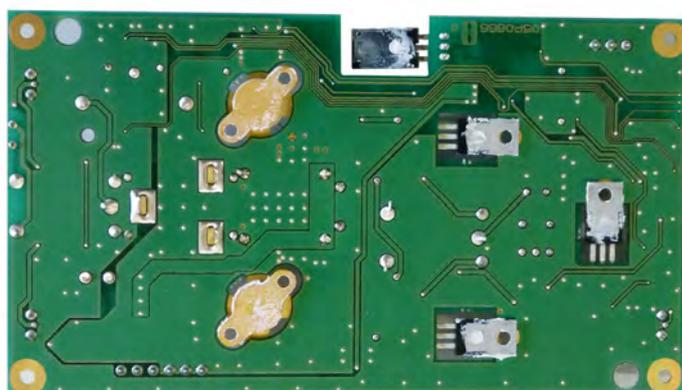


Fig. 2.5.15 DRV board (05P0866B) A-side



05P0866A:
 R85, 80 not mounted, R39=10k, R4=18
 05P0866B:
 J4, T5, R50, 52, 53 not mounted
 R39=6.8k, R4=47

Fig. 2.5.16 DRV board (05P0866B) B-side

9. DRV board: 05P0866A (FS-5075)

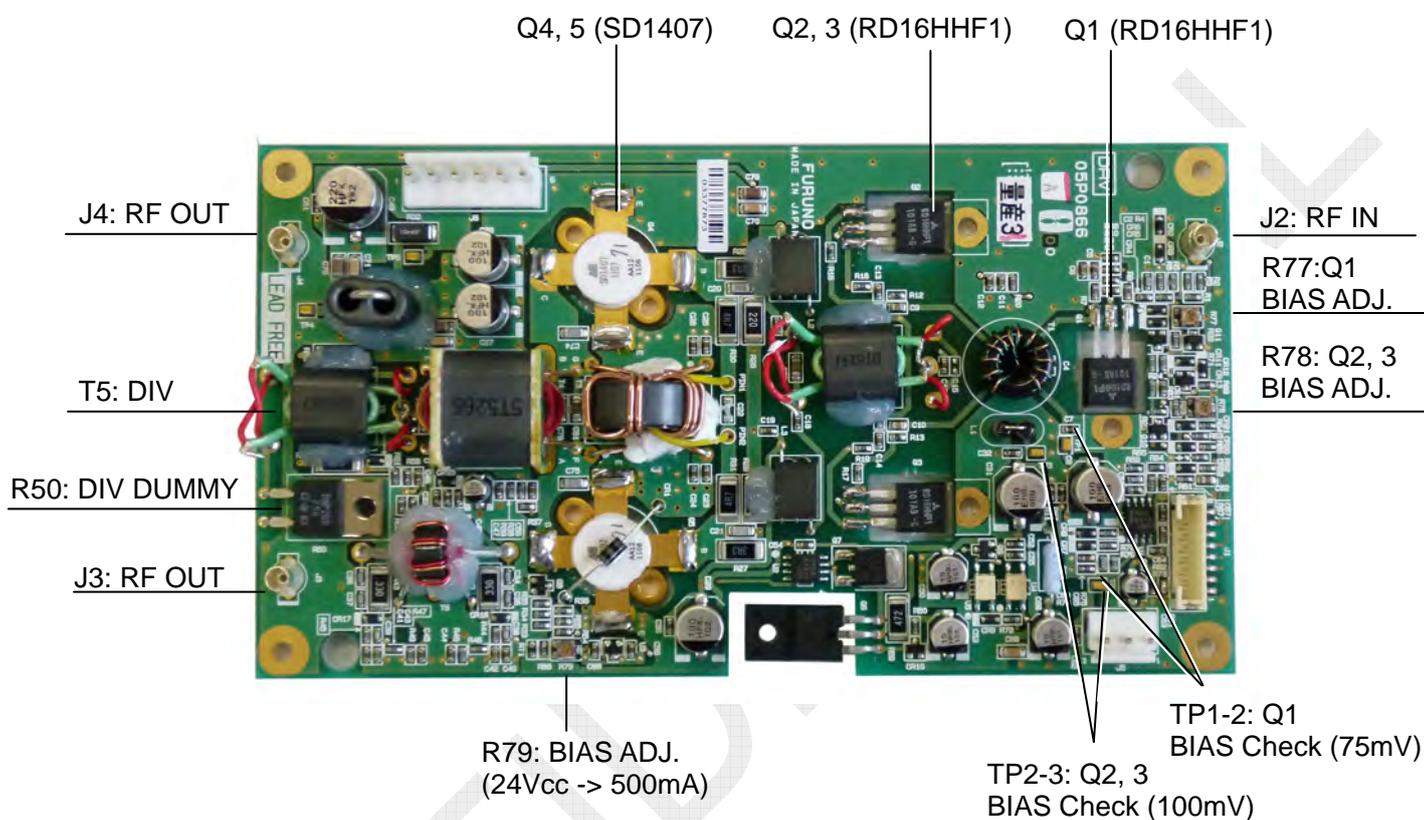
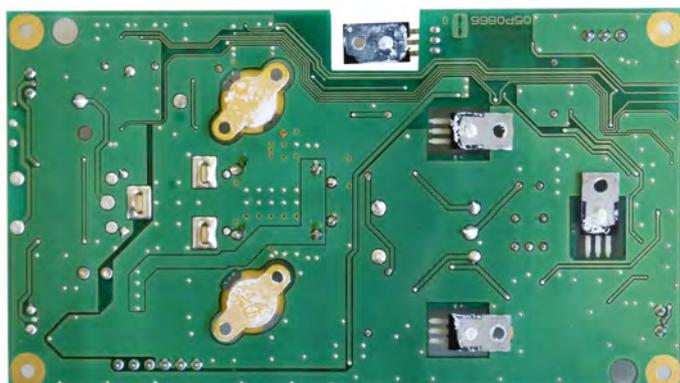


Fig. 2.5.17 DRV board (05P0866A) A-side



05P0866A:
R85, 80 not mounted, R39=10k, R4=18
05P0866B:
J4, T5, R50, 52, 53 not mounted
R39=6.8k, R4=47

Fig. 2.5.18 DRV board (05P0866A) B-side

10. TX board: 05P0856 (FS-1575, FS-2575, FS-5075)

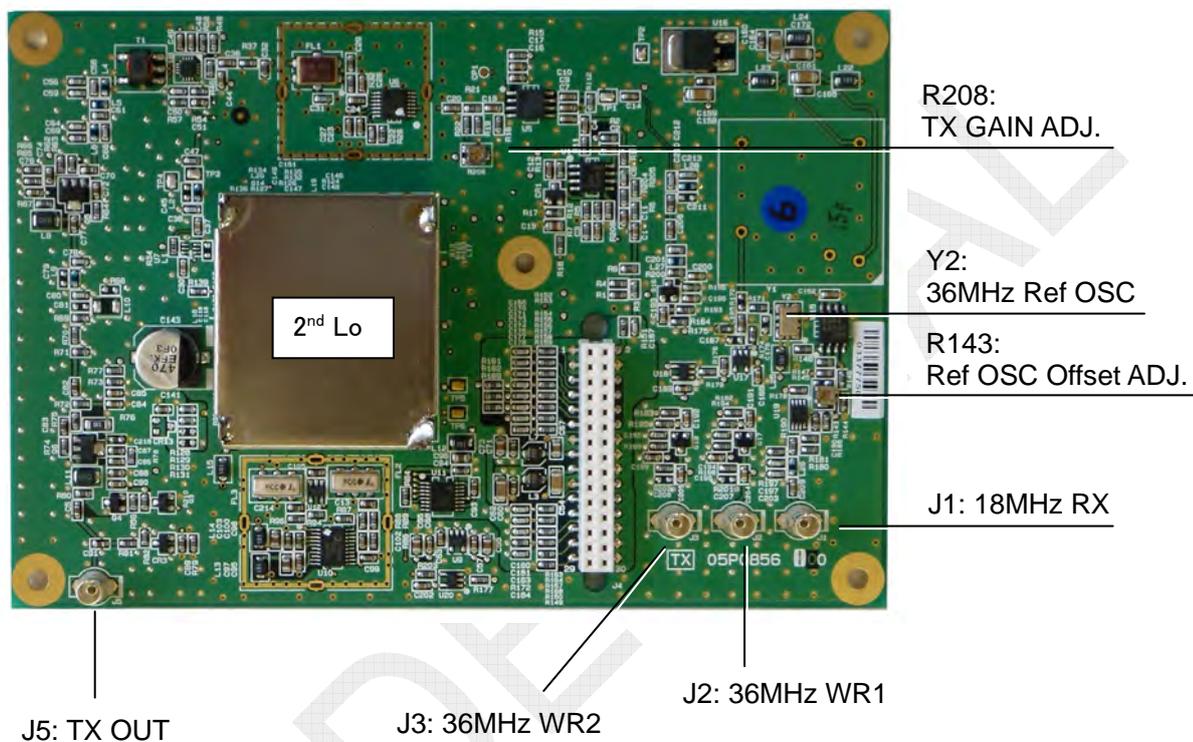


Fig. 2.5.19 TX board (05P0856) A-side

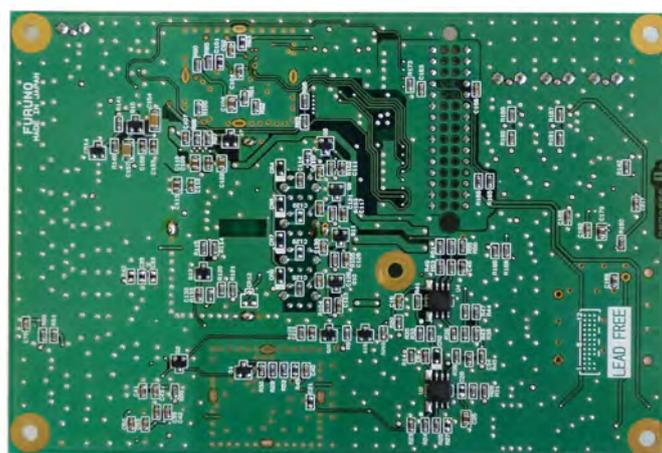


Fig. 2.5.20 TX board (05P0856) B-side

11. PA-IF board: 05P0864 (FS-2575, FS-5075)

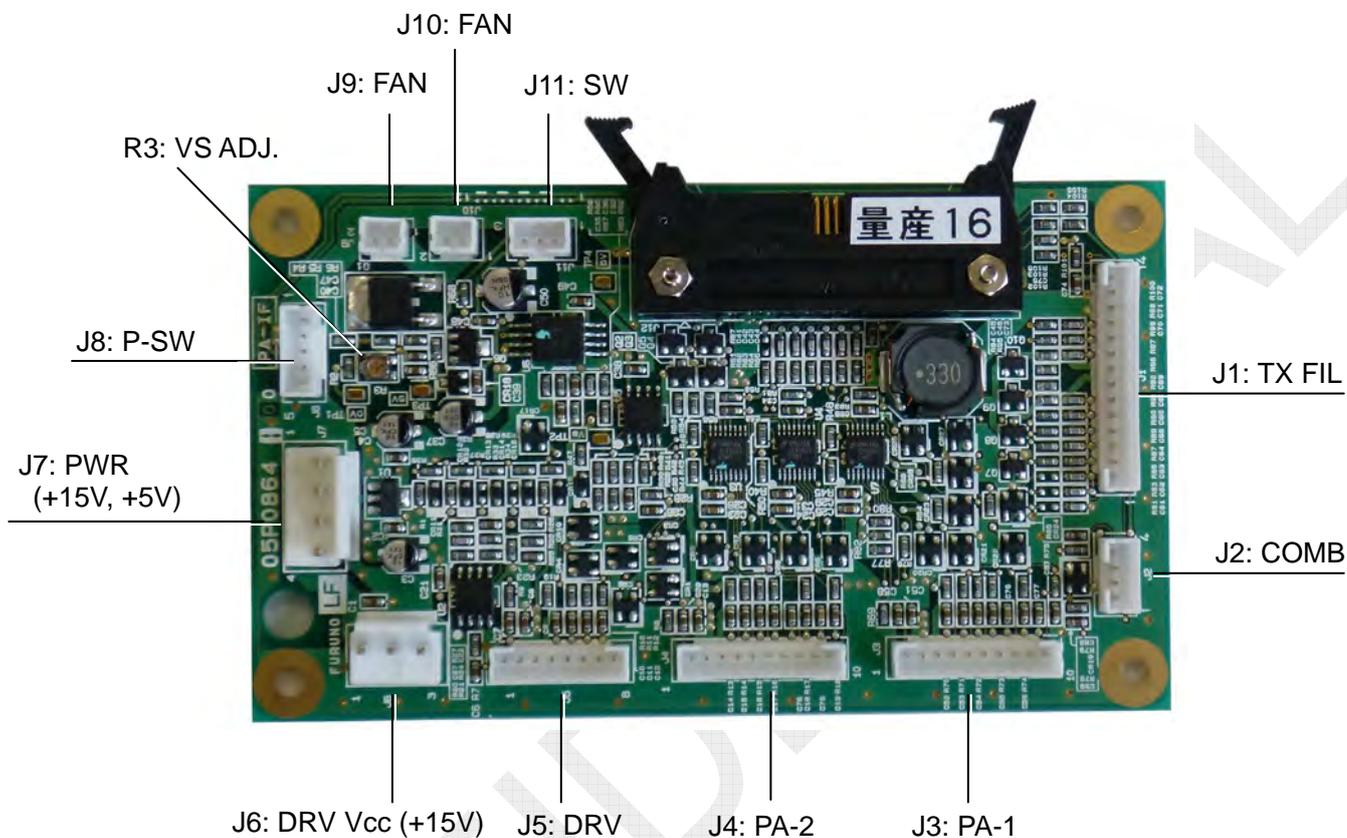


Fig. 2.5.21 PA-IF board (05P0864) A-side



Fig. 2.5.22 PA-IF board (05P0864) B-side

12. PA-IF board: 05P0864A (FS-1575)

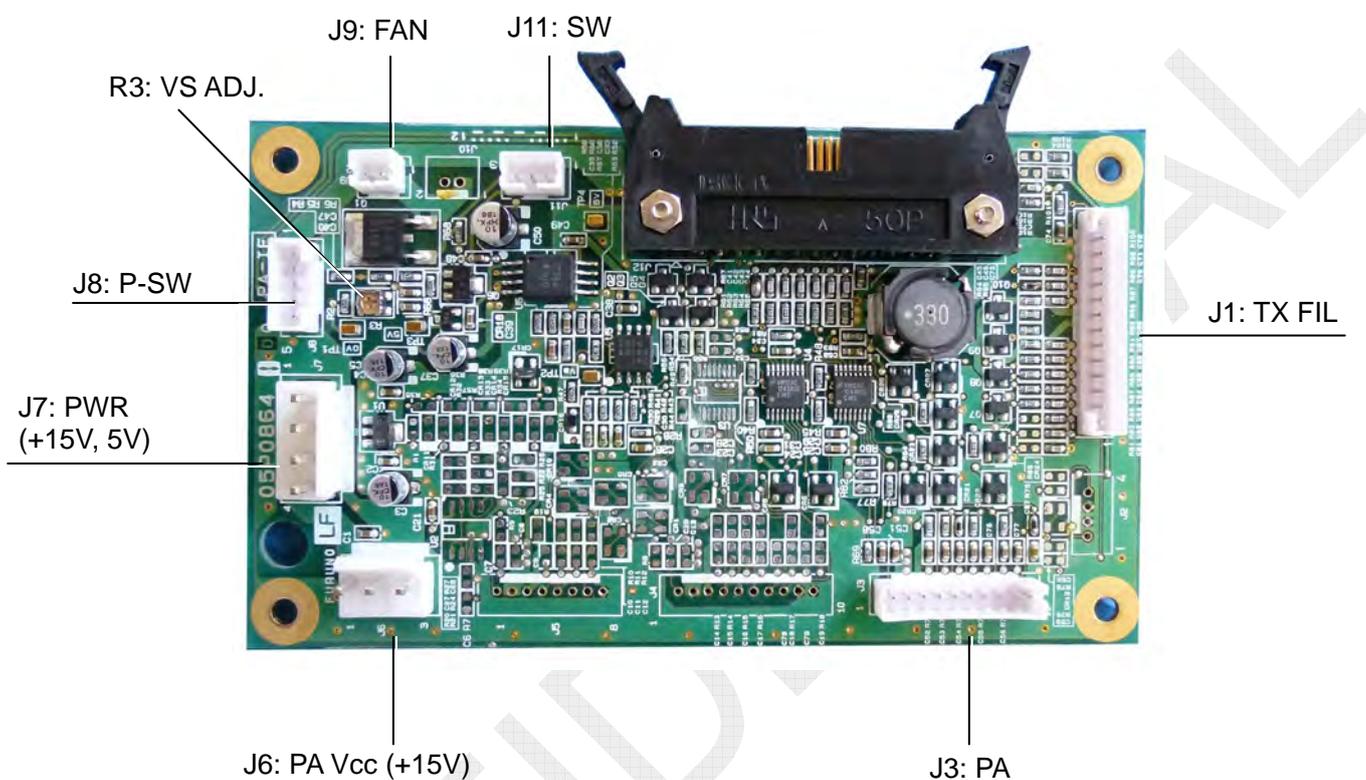


Fig. 2.5.23 PA-IF board (05P0864A) A-side

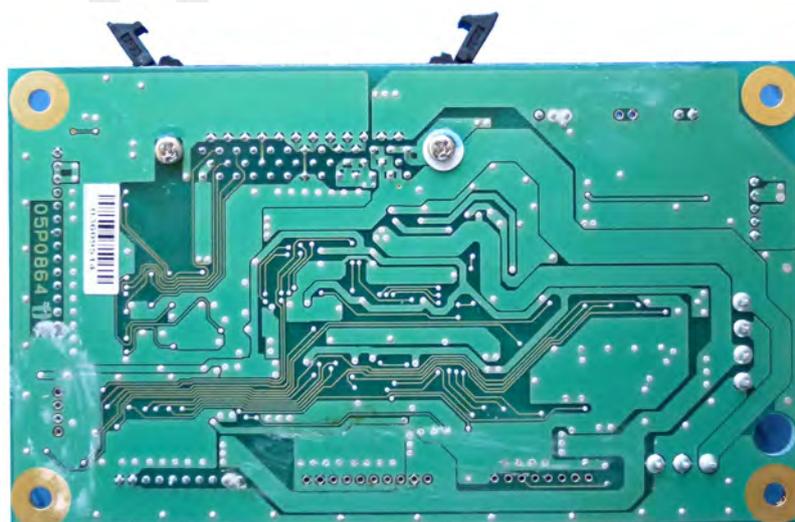
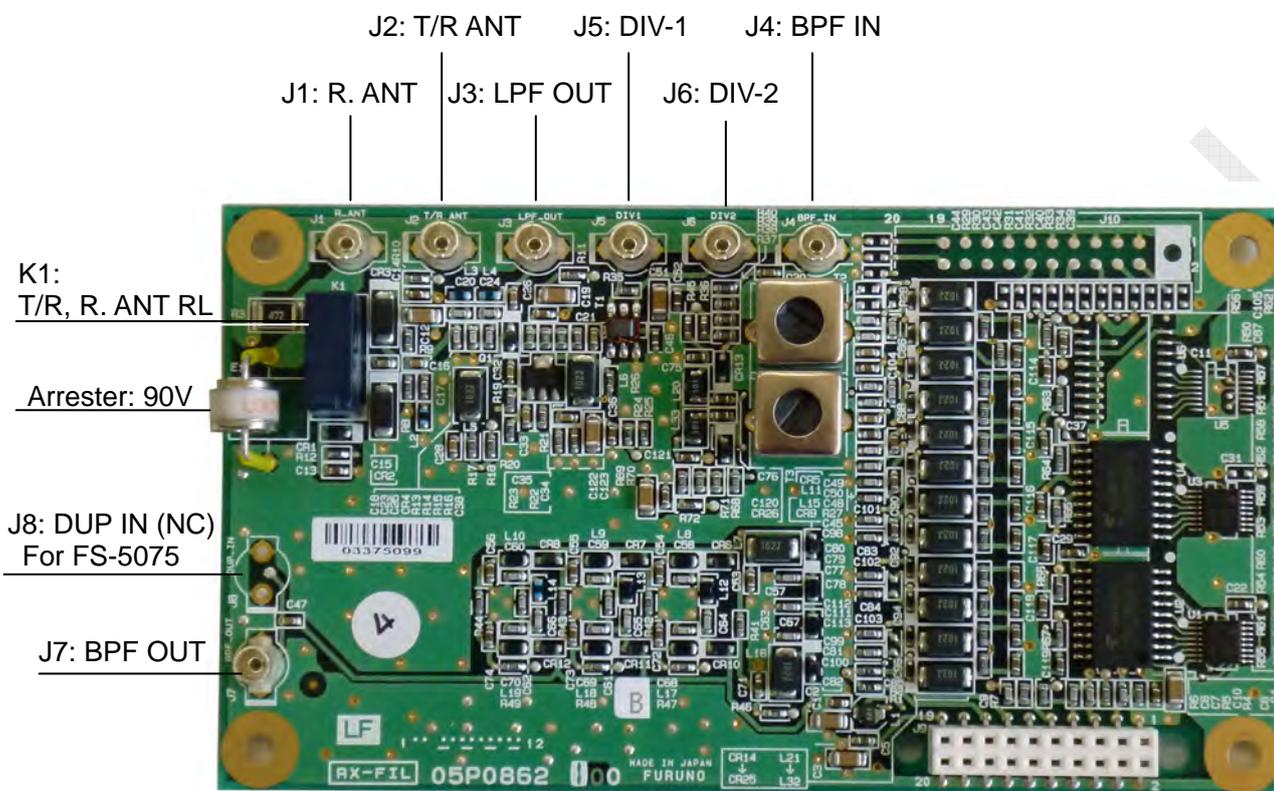


Fig. 2.5.24 PA-IF board (05P0864A) B-side

13. RX-FIL board: 05P0862B (FS-1575, FS-2575)



**05P0862B: J8, 10 not mounted
U5, 6 not mounted**

Fig. 2.5.25 RX-FIL board (05P0862B) A-side

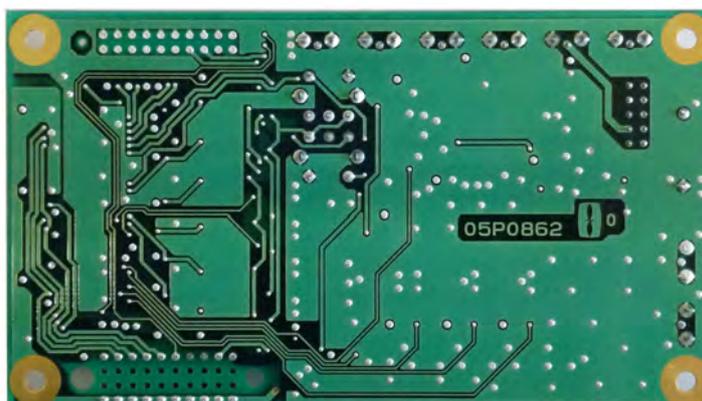
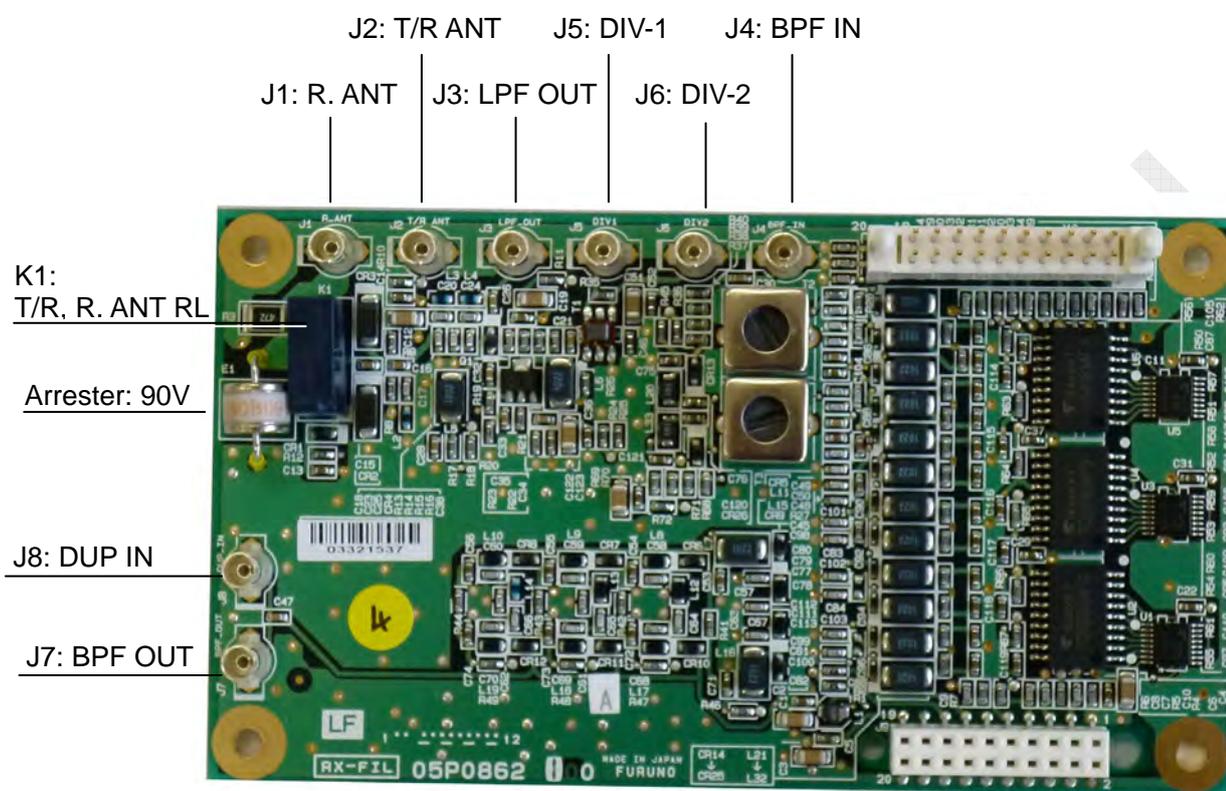


Fig. 2.5.26 RX-FIL board (05P0862B) B-side

14. RX-FIL board: 05P0862A (FS-5075)



**05P0862B: J8, 10 not mounted
U5, 6 not mounted**

Fig. 2.5.27 RX-FIL board (05P0862A) A-side

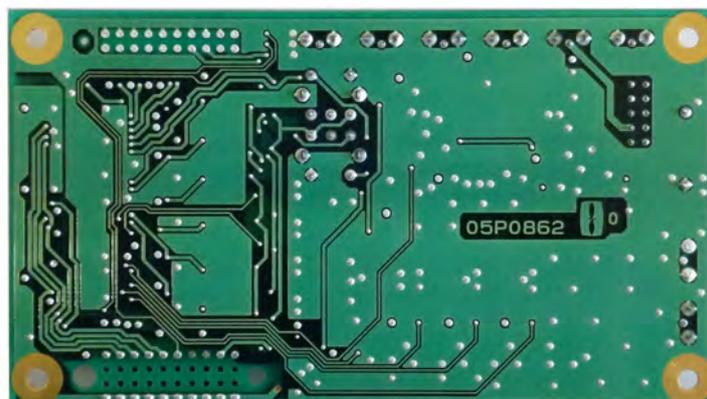


Fig. 2.5.28 RX-FIL board (05P0862A) B-side

15. DUP-FIL board: 05P0863 (FS-5075)

Option

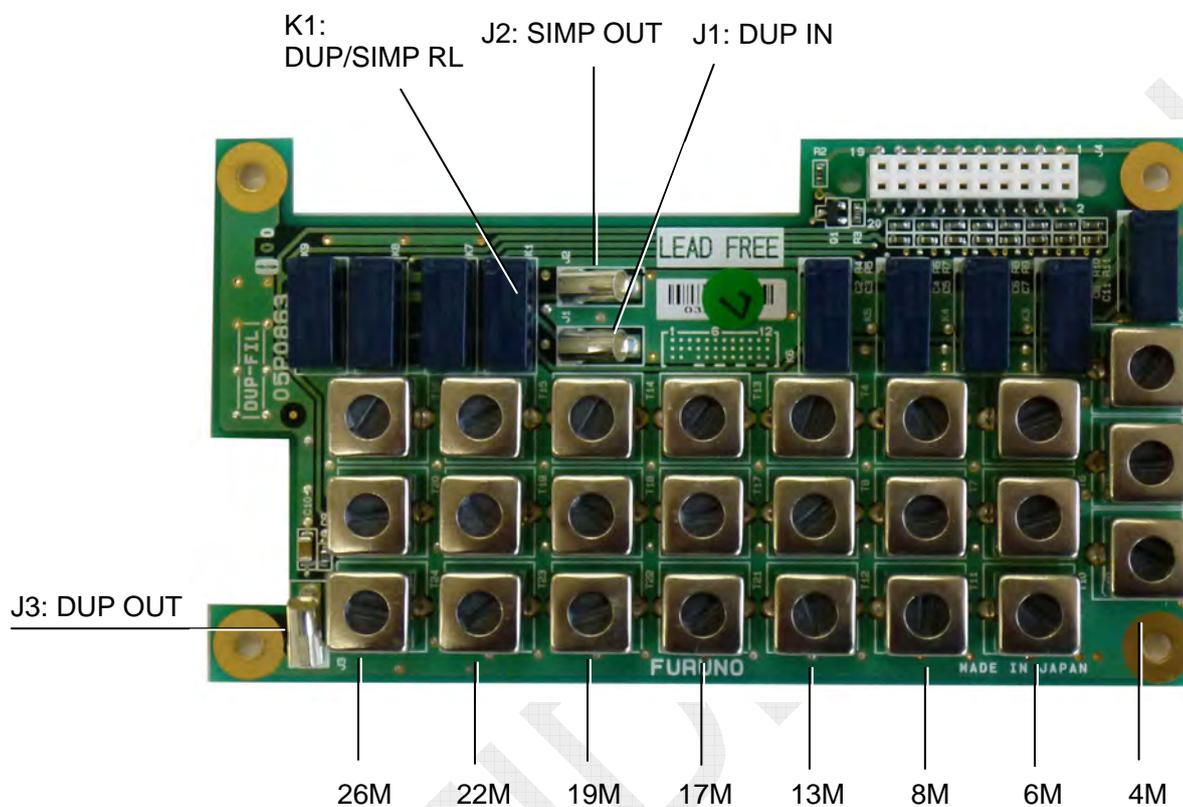


Fig. 2.5.29 DUP-FIL board (05P0863) A-side

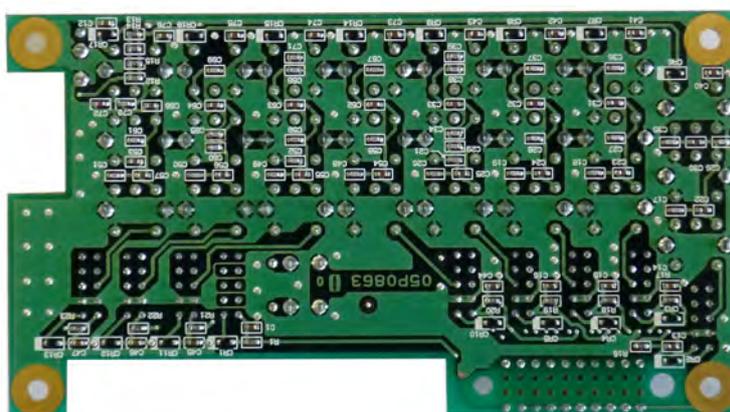


Fig. 2.5.30 DUP-FIL board (05P0863) B-side

16. RX board: 05P0842 (FS-1575, FS-2575, FS-5075)

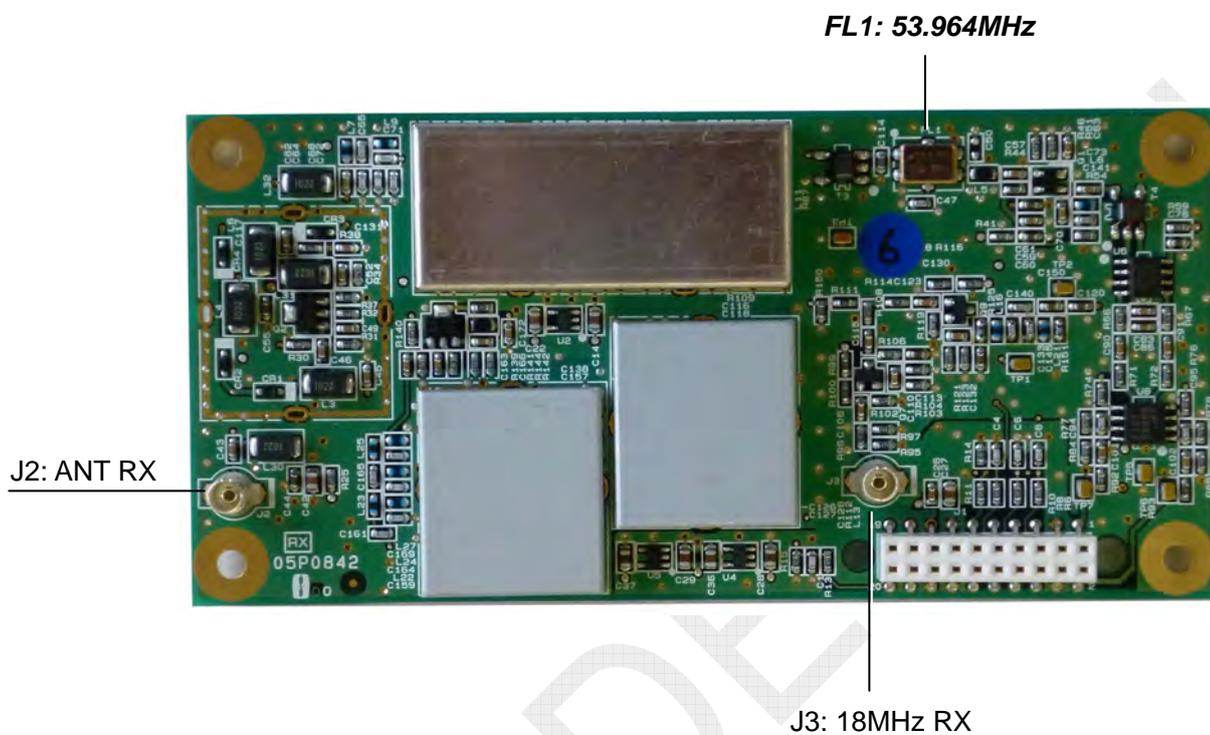


Fig. 2.5.31 RX board (05P0842) A-side



Fig. 2.5.32 RX board (05P0842) B-side

17. WR1 board: 05P0847A (FS-1575, FS-2575, FS-5075)

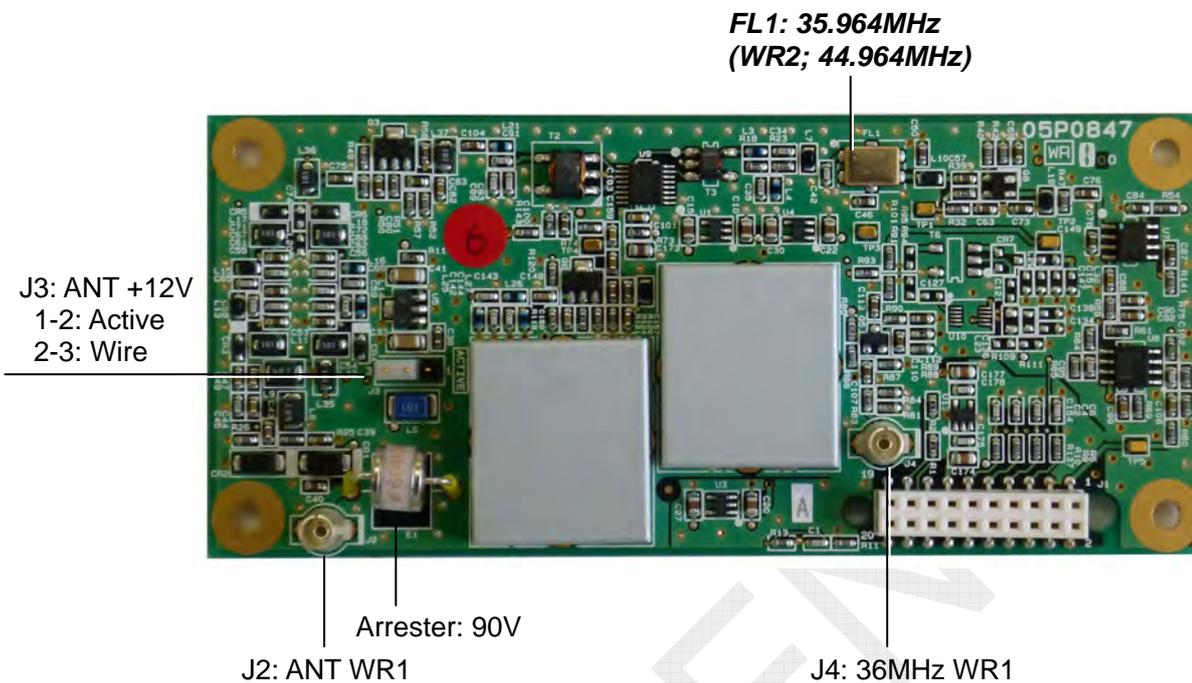


Fig. 2.5.33 WR1 board (05P0847A) A-side



Fig. 2.5.34 WR1 board (05P0847A) B-side

18. WR2 board: 05P0847B (FS-1575, FS-2575, FS-5075)

Option

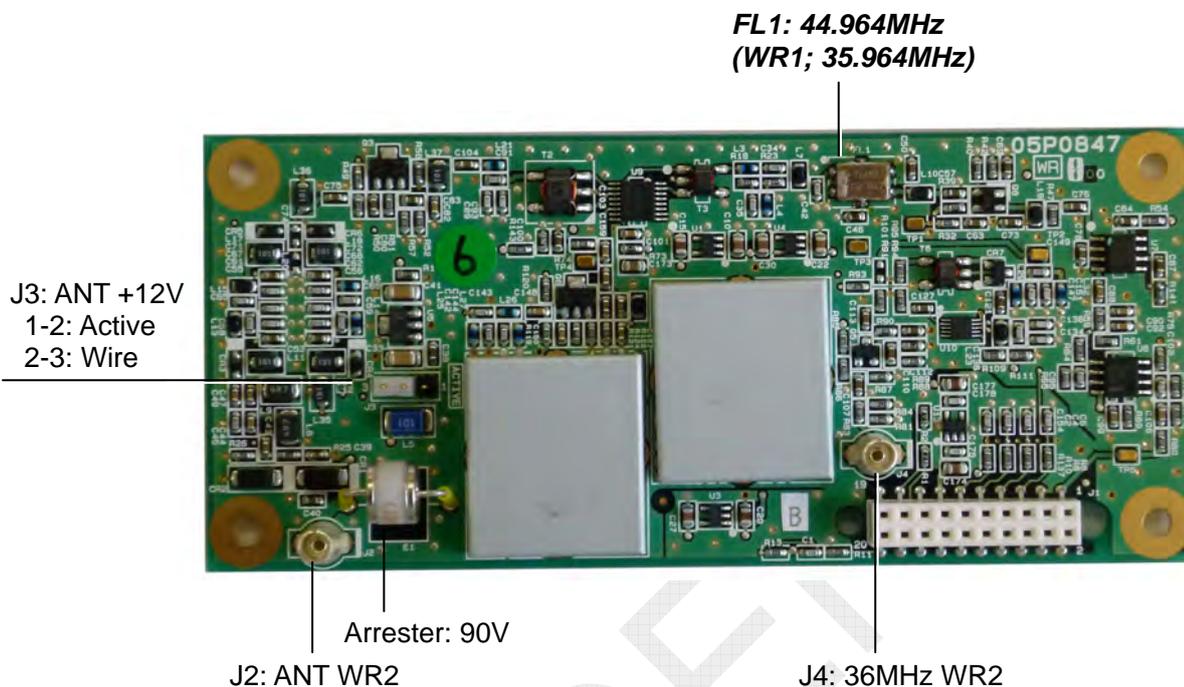


Fig. 2.5.35 WR2 board (05P0847B) A-side



Fig. 2.5.36 WR2 board (05P0847B) B-side

19. T-IF board: 05P0861 (FS-2575, FS-5075), 05P0861A (FS-1575)

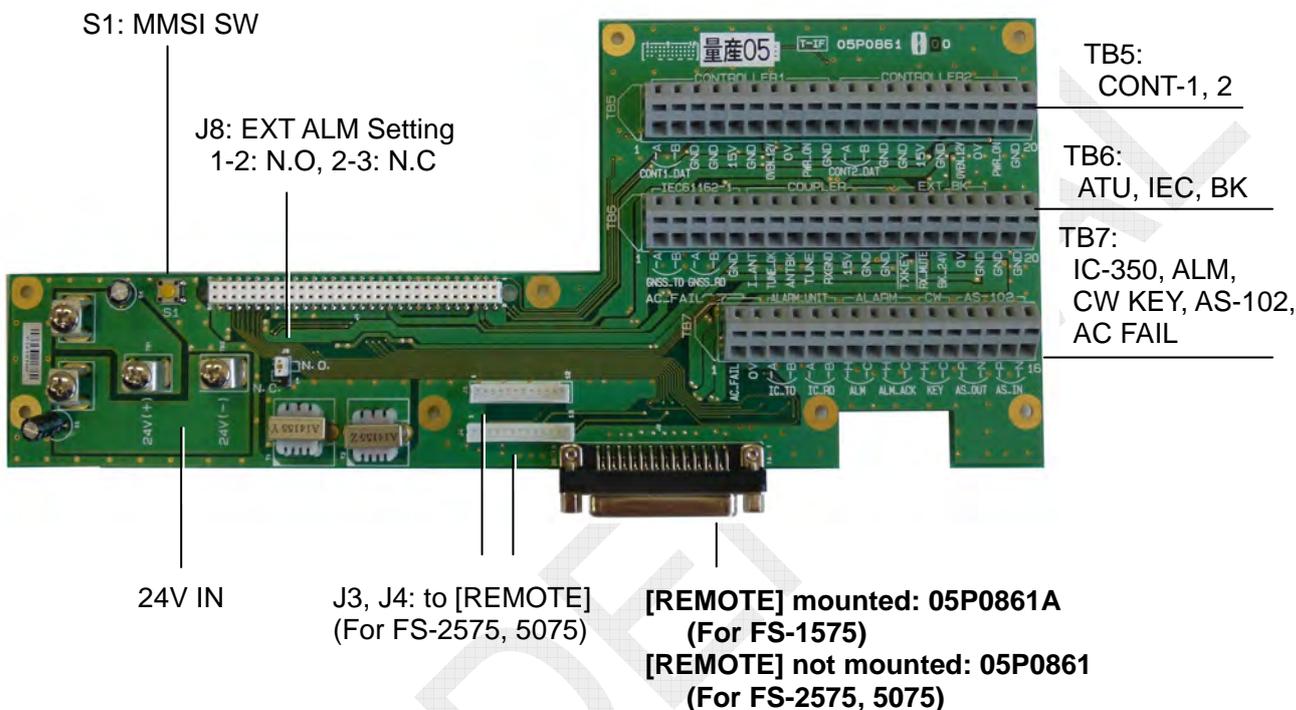
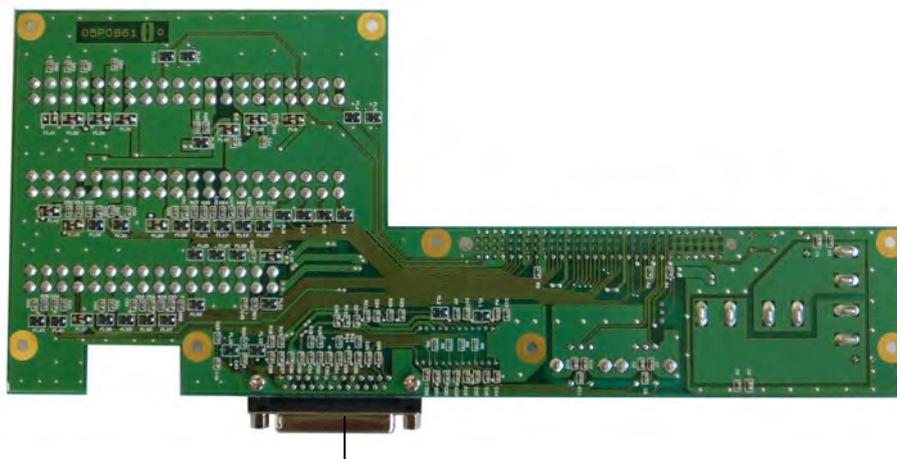


Fig.5.37 T-IF board (05P0861A) A-side



[REMOTE] mounted: 05P0861A
(For FS-1575)
[REMOTE] not mounted: 05P0861
(For FS-2575, 5075)

Fig. 2.5.38 T-IF board (05P0861A) B-side

20. MOT board: 05P0860 (FS-1575, FS-2575, FS-5075)

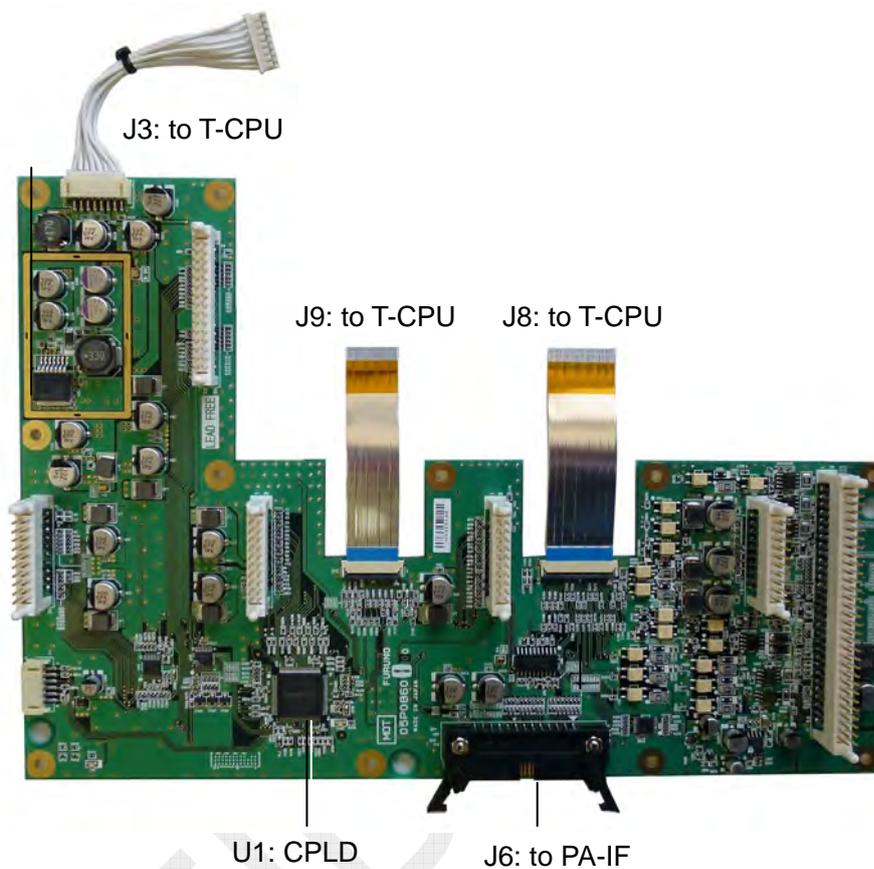


Fig. 2.5.39 MOT board (05P0860) A-side

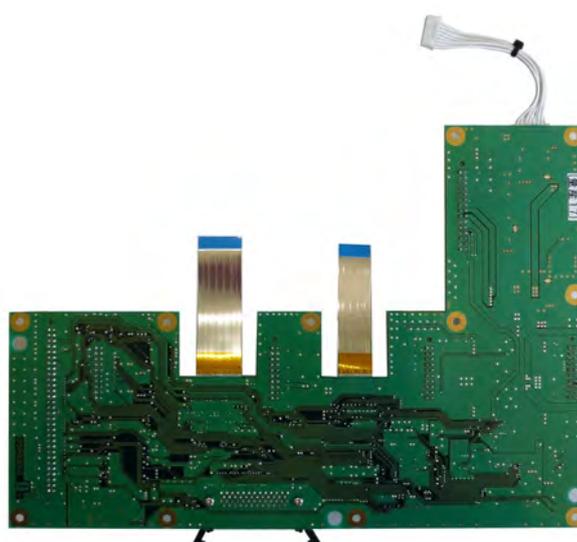


Fig. 2.5.40 MOT board (05P0860) B-side

21. T-CPU board: 05P0859 (FS-1575, FS-2575, FS-5075)

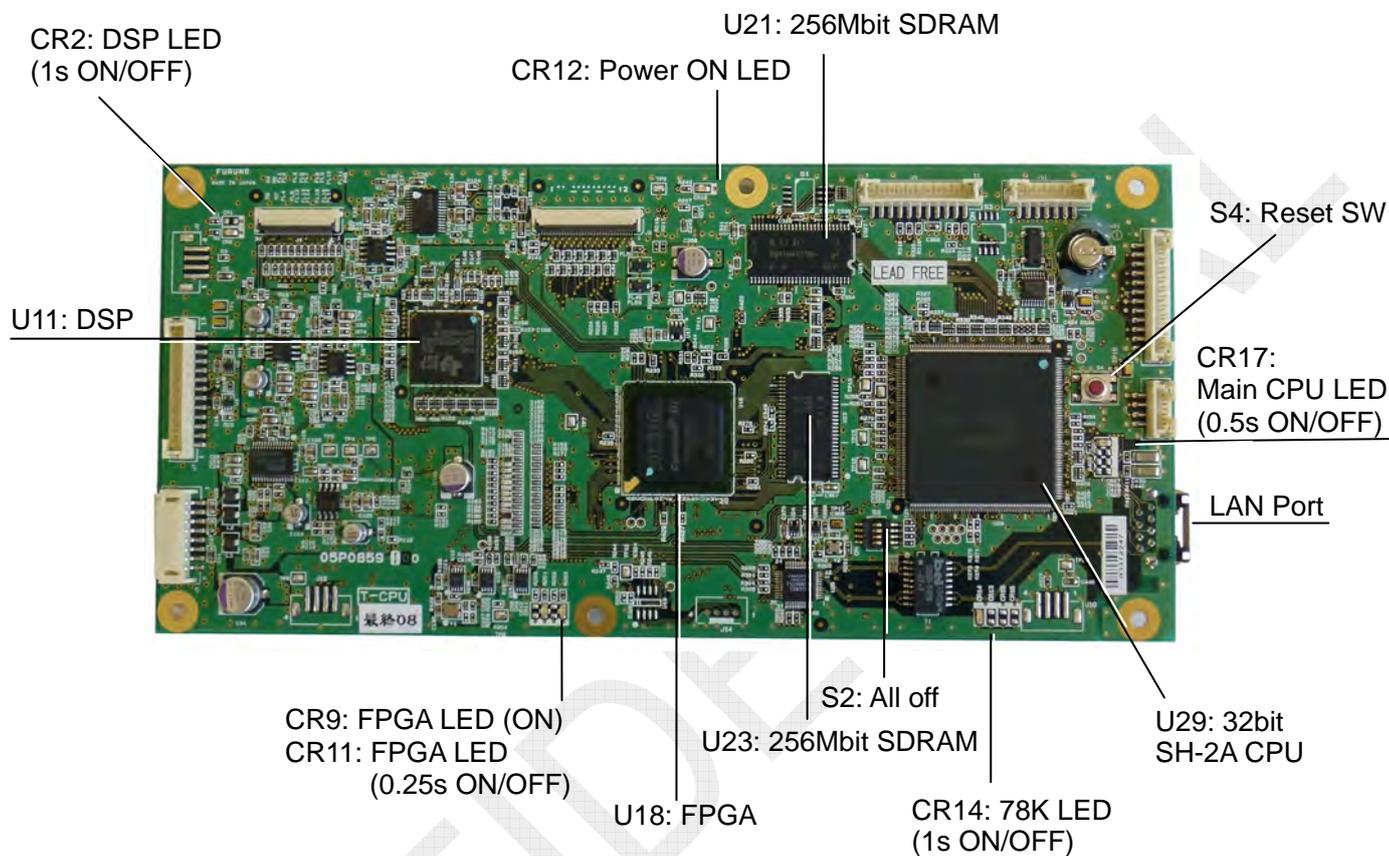


Fig. 2.5.41 T-CPU board (05P0859) A-side



Fig. 2.5.42 T-CPU board (05P0859) B-side

22. SW-REG board: 05P0873 (FS-2575, FS-5075)

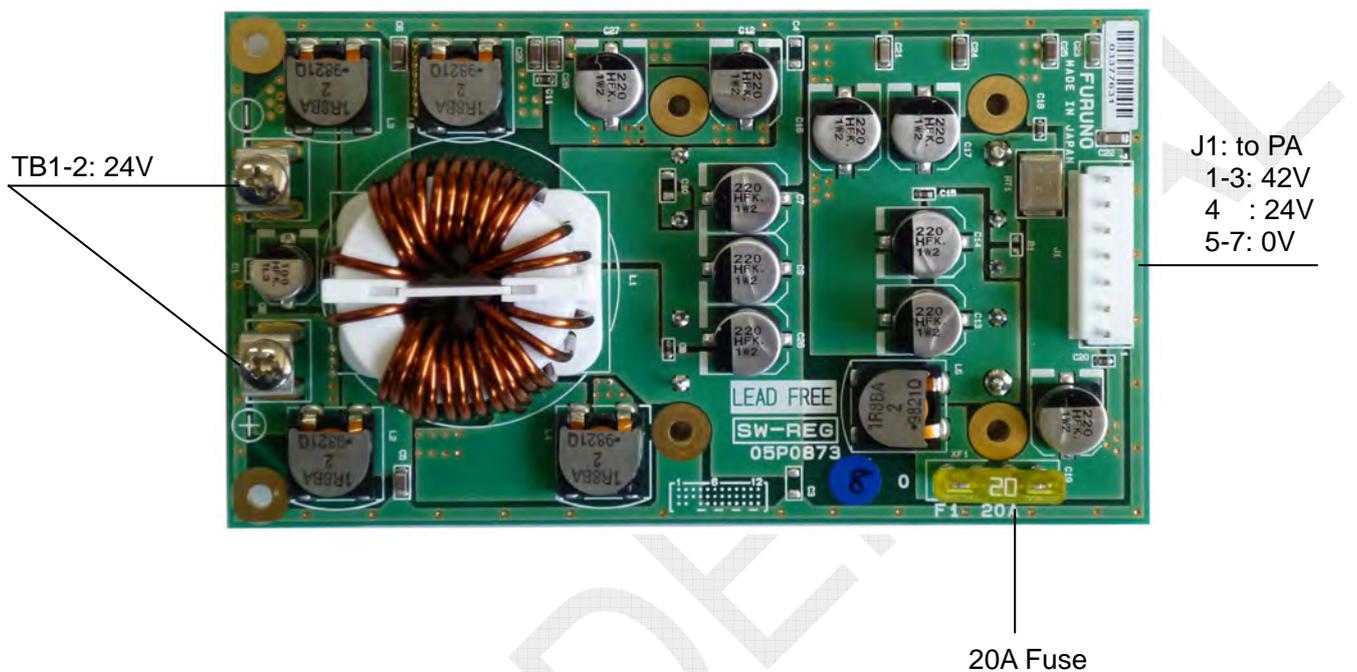


Fig. 2.5.43 SW-REG board (05P0873) A-side

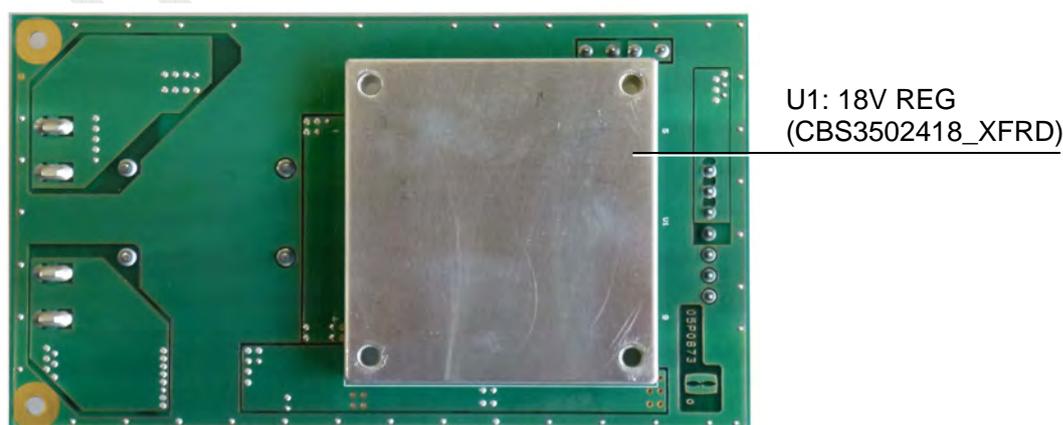


Fig. 2.5.44 SW-REG board (05P0873) B-side

23. PWR board: 05P0874 (FS-1575, FS-2575, FS-5075)

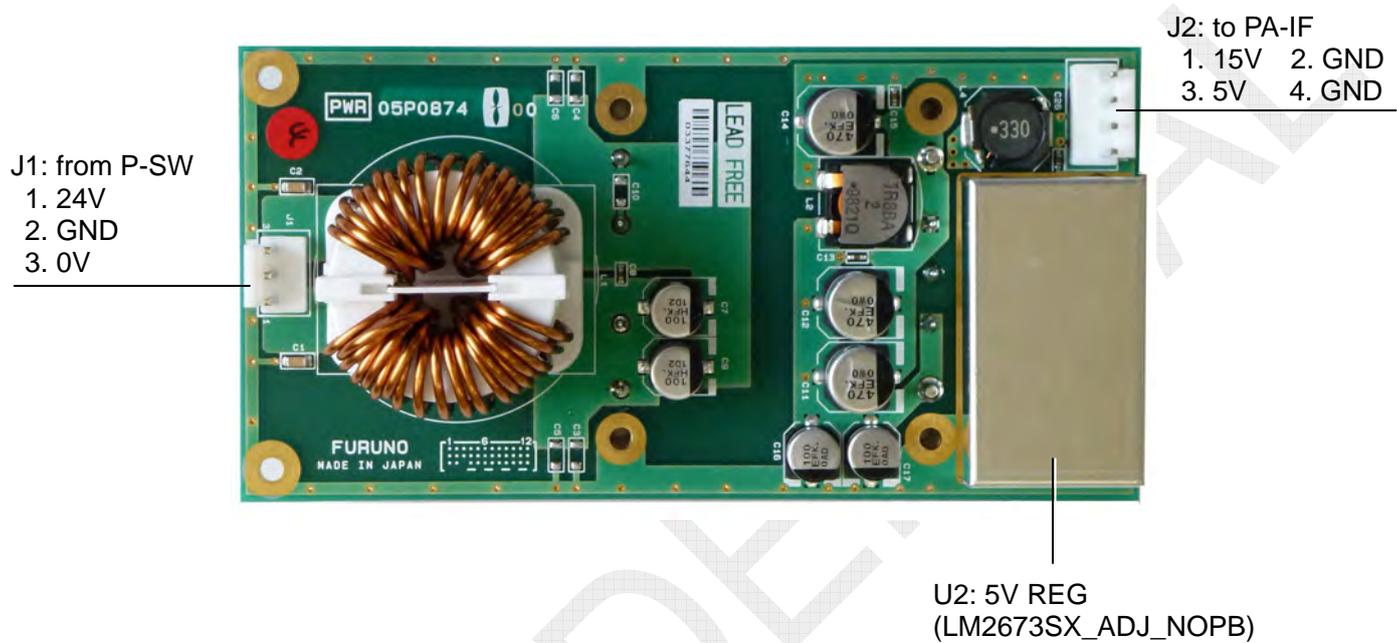


Fig. 2.5.45 PWR board (05P0874) A-side

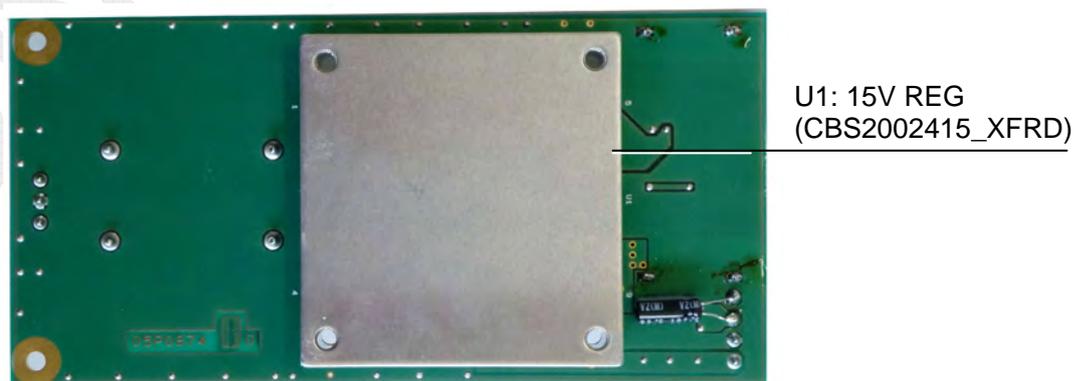


Fig. 2.5.46 PWR board (05P0874) B-side

24. P-SW board: 05P0871 (FS-1575, FS-2575, FS-5075)

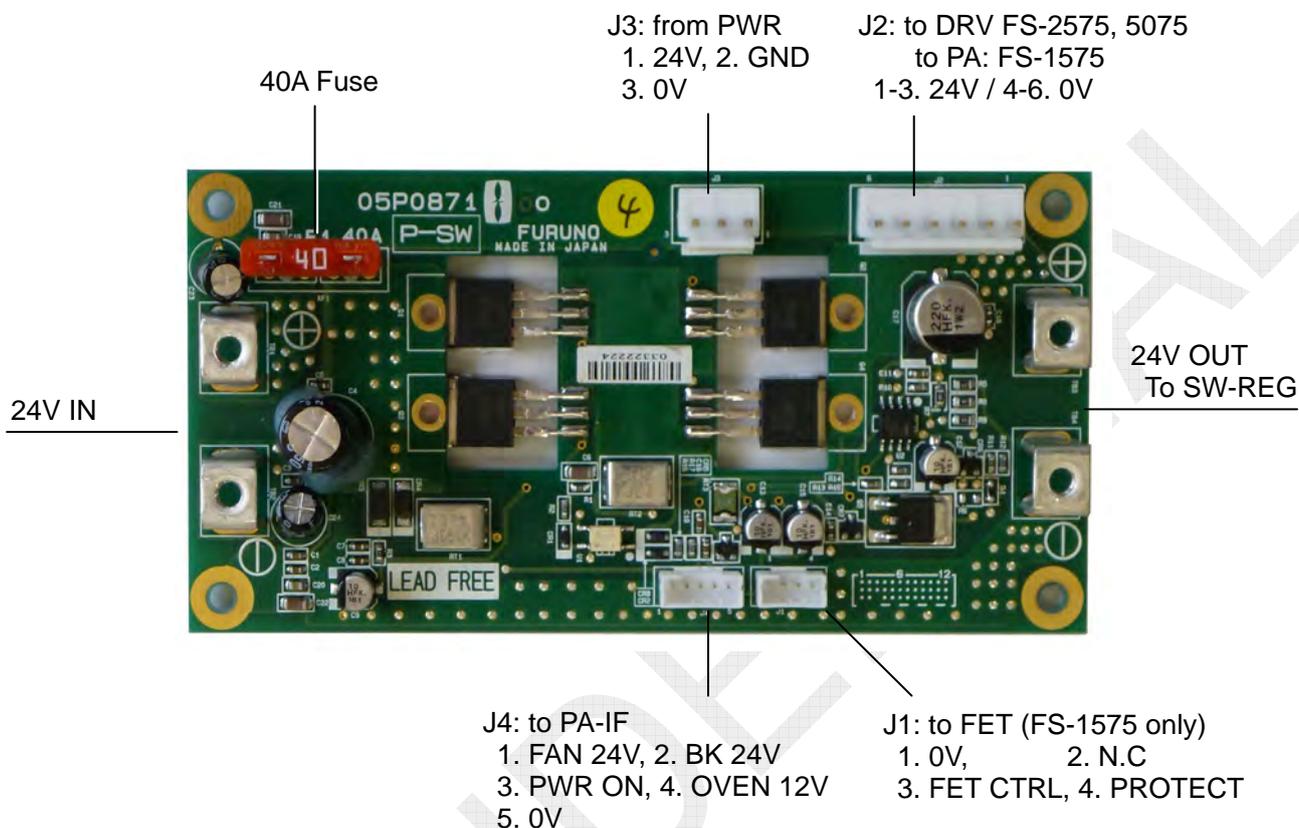


Fig. 2.5.47 P-SW board (05P0871) A-side

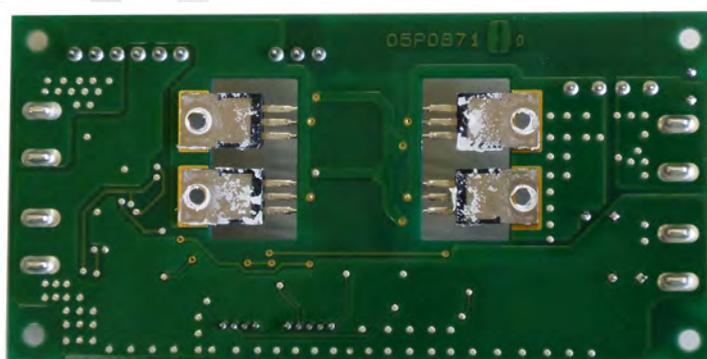


Fig. 2.5.48 P-SW board (05P0871) B-side

25. FET board: 05P0872 (FS-5075)

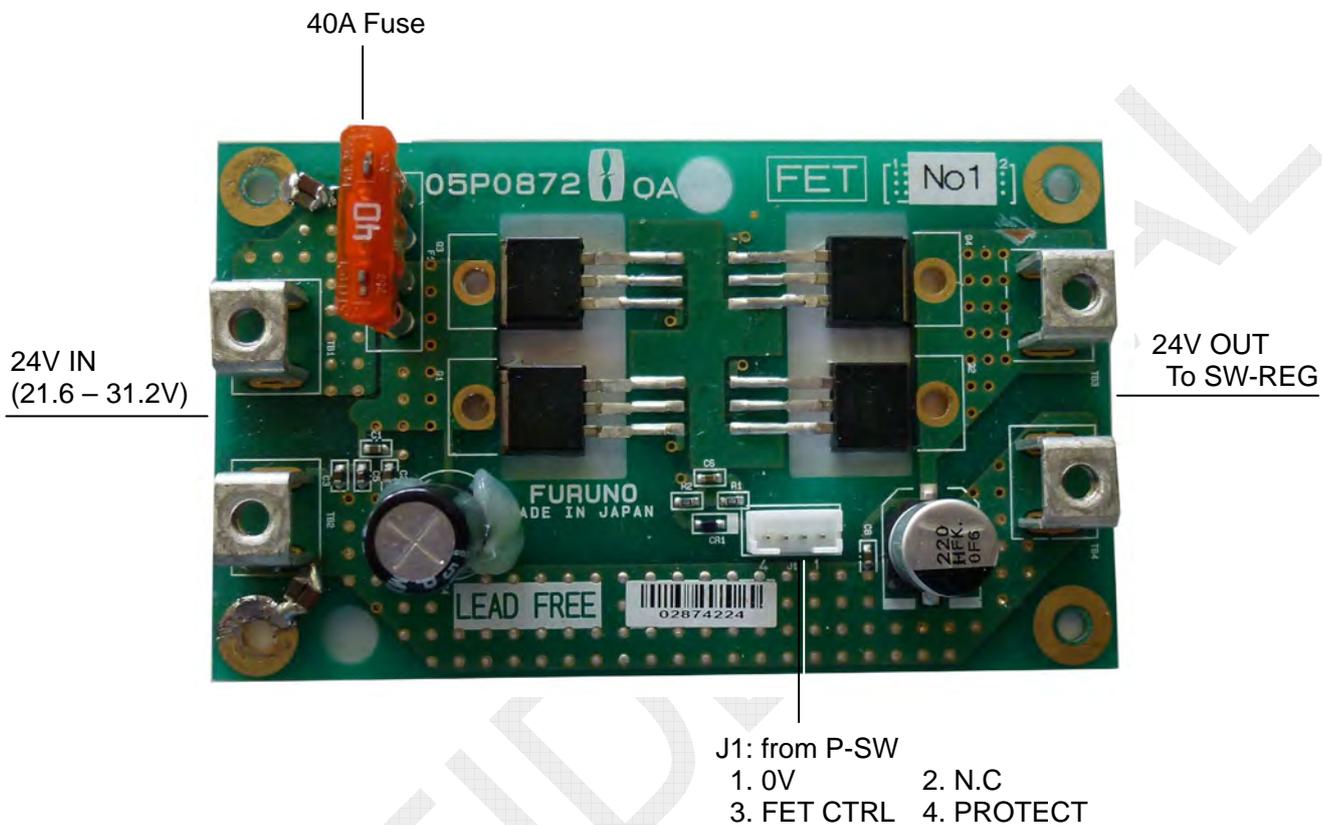


Fig. 2.5.49 FET board (05P0872) A-side

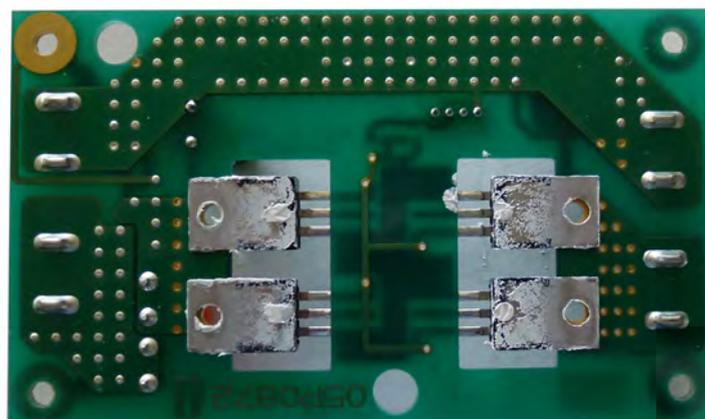


Fig. 2.5.50 FET board (05P0872) B-side

2.6 Antenna Coupler

2.6.1 AT-5075

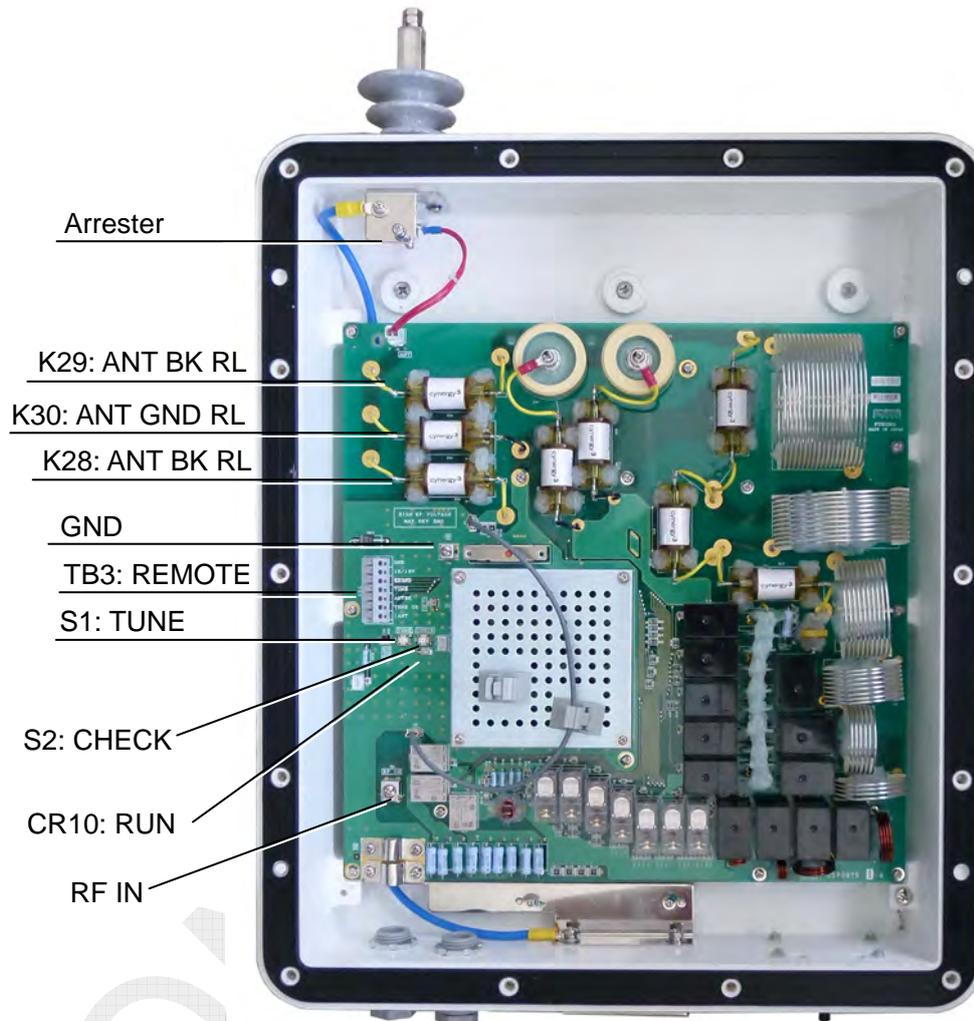


Fig. 2.6.1 AT-5075

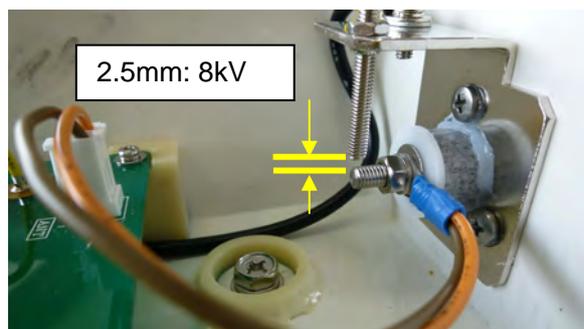


Fig. 2.6.2 Arrester

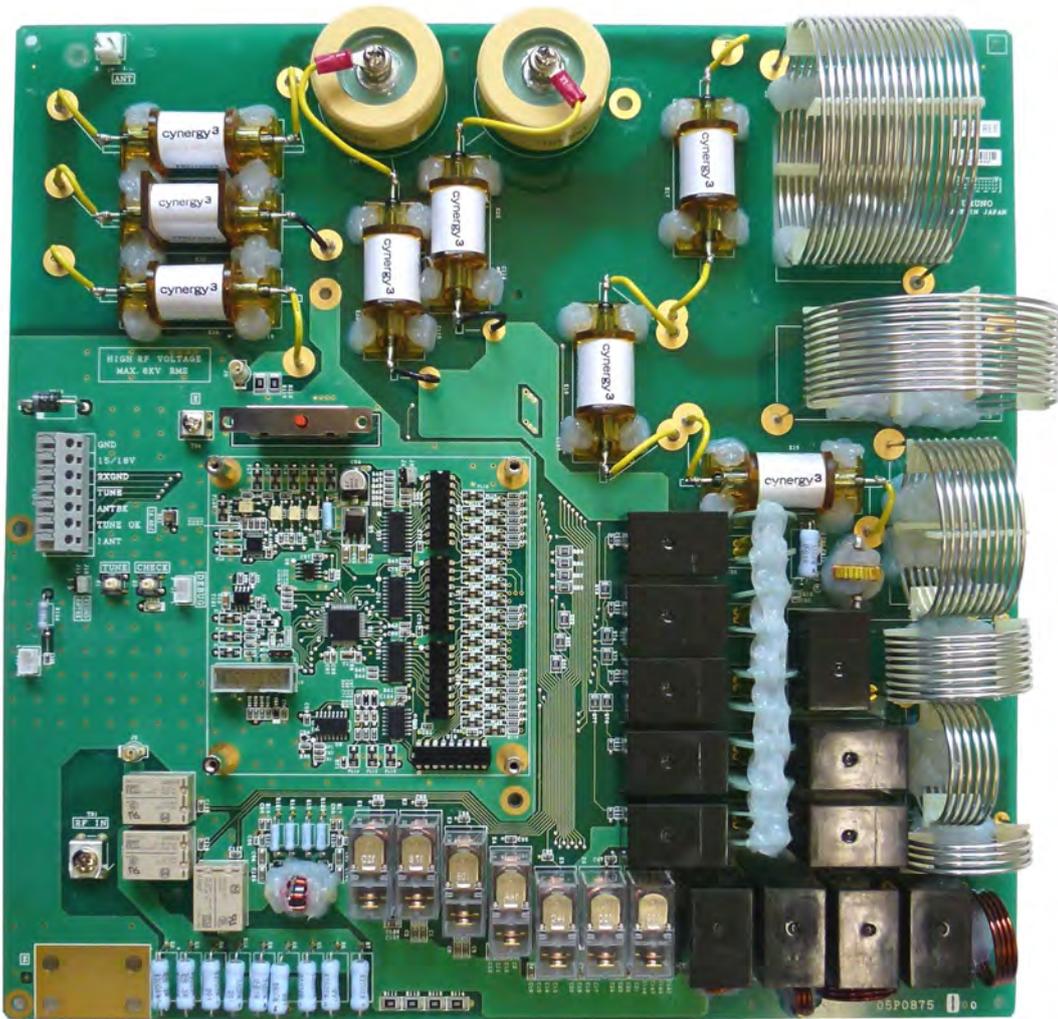


Fig. 2.6.3 COUP board (05P0875) A-side

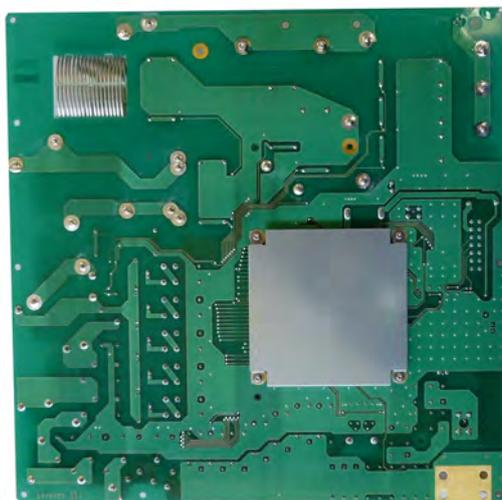


Fig. 2.6.4 COUP board (05P0875) B-side

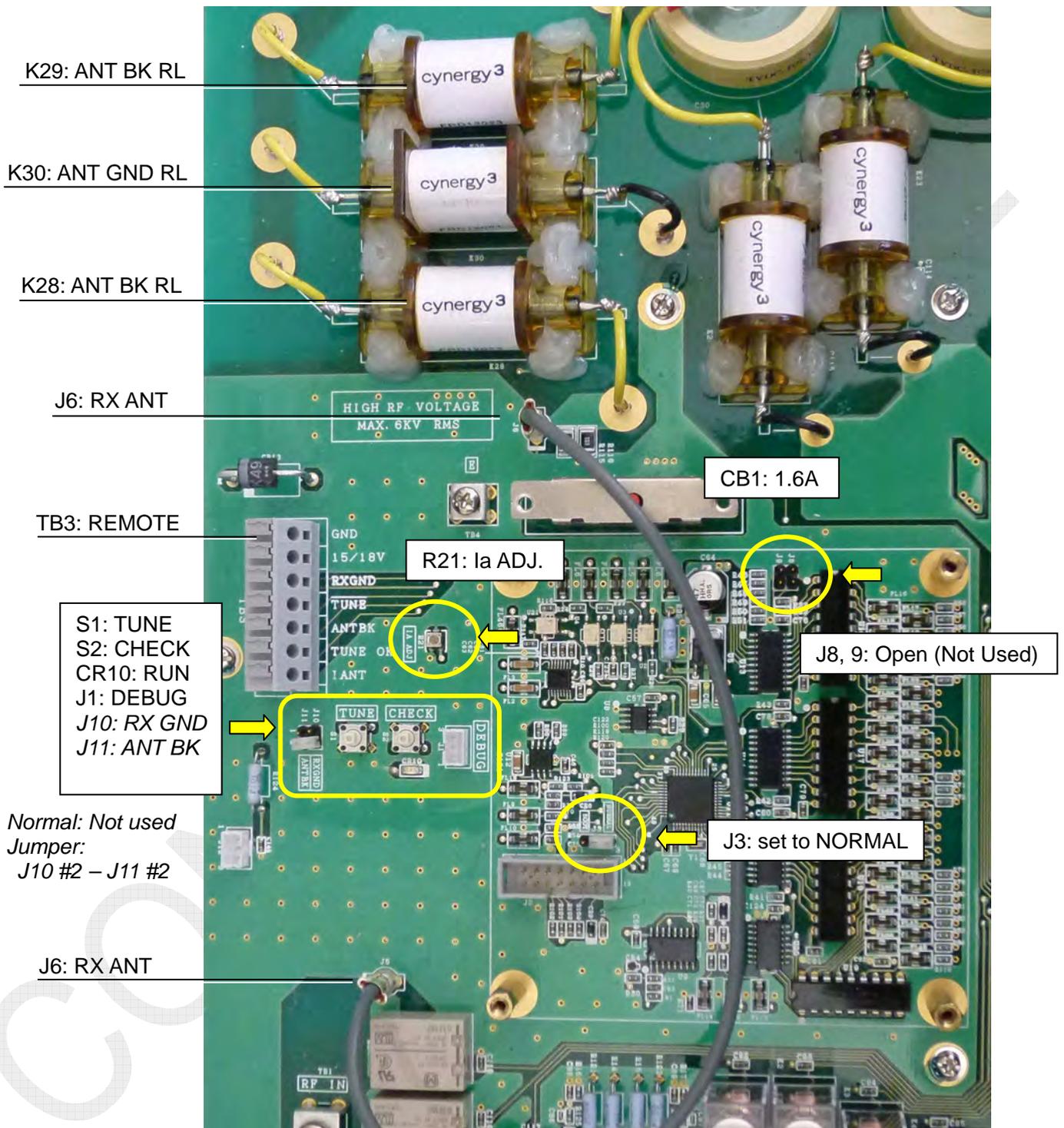


Fig. 2.6.5 COUP board terminal area

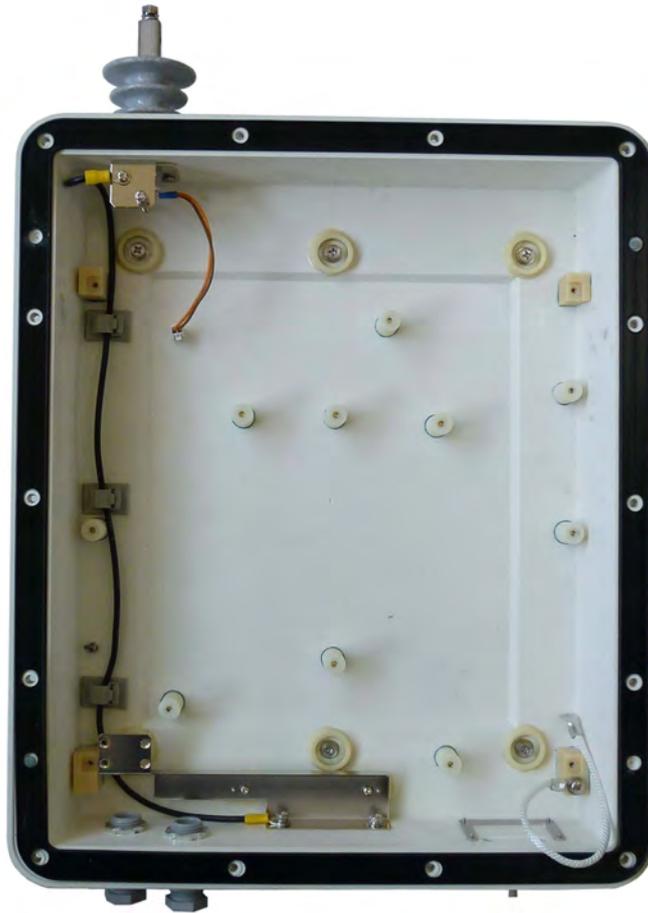


Fig. 2.6.6 ATU chassis

GND terminal



Drain tube

Fig. 2.6.7 ATU GND, Drain tube

2.6.2 AT-1575



Fig. 2.6.8 AT-1575-AES



Fig. 2.6.9 AT-1575-SUS

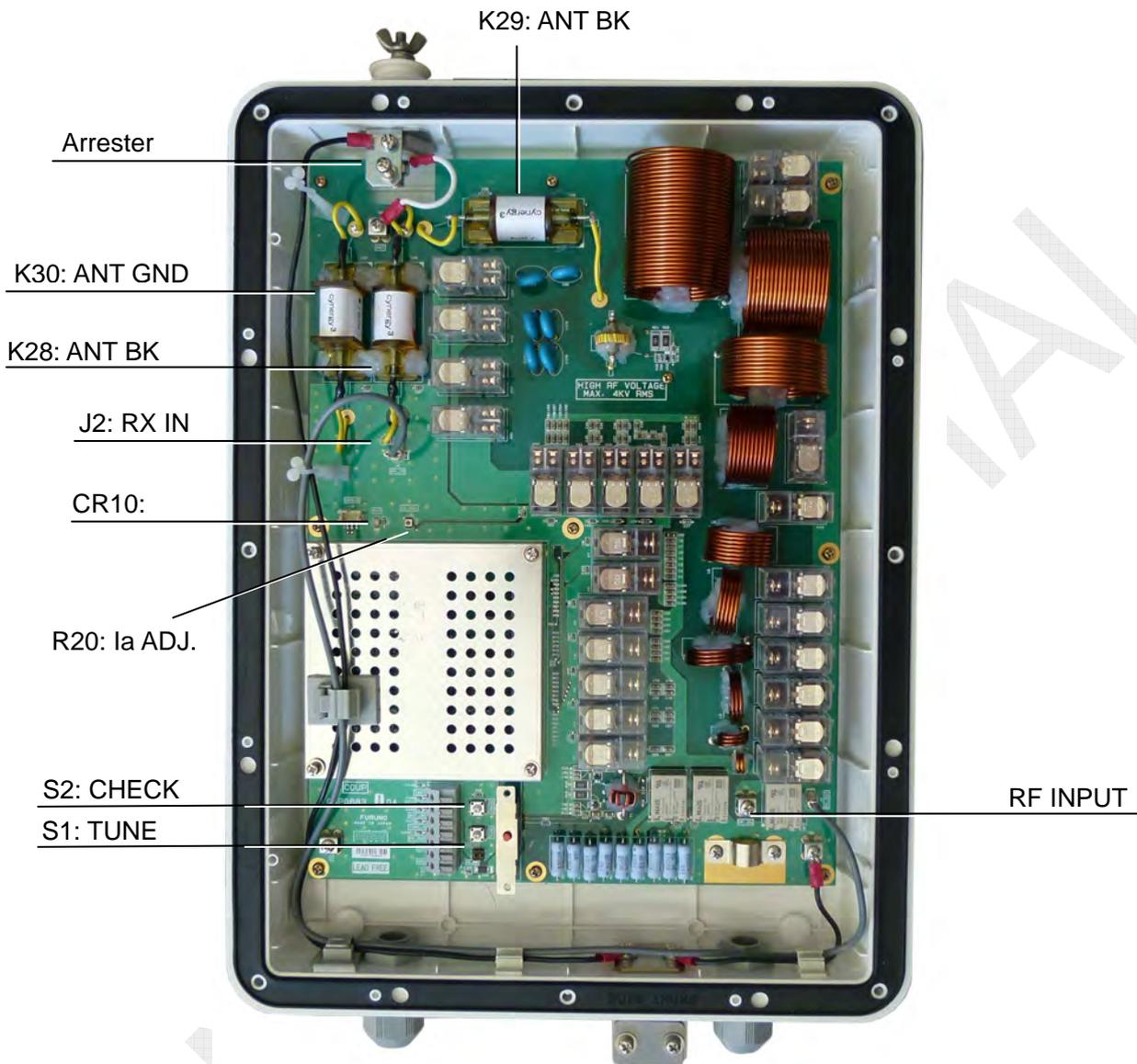


Fig. 2.6.10 AT-1575-AES

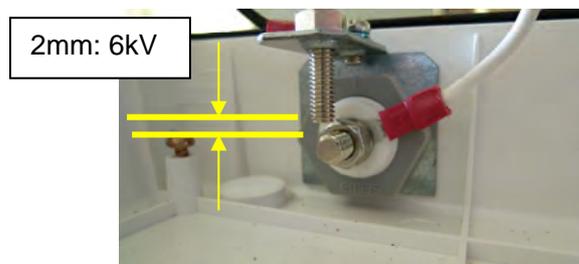


Fig. 2.6.11 Arrester



Fig. 2.6.12 AT-1575-SUS

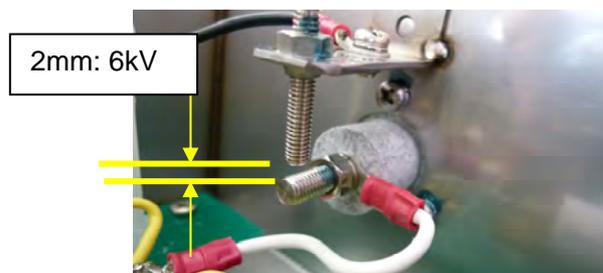
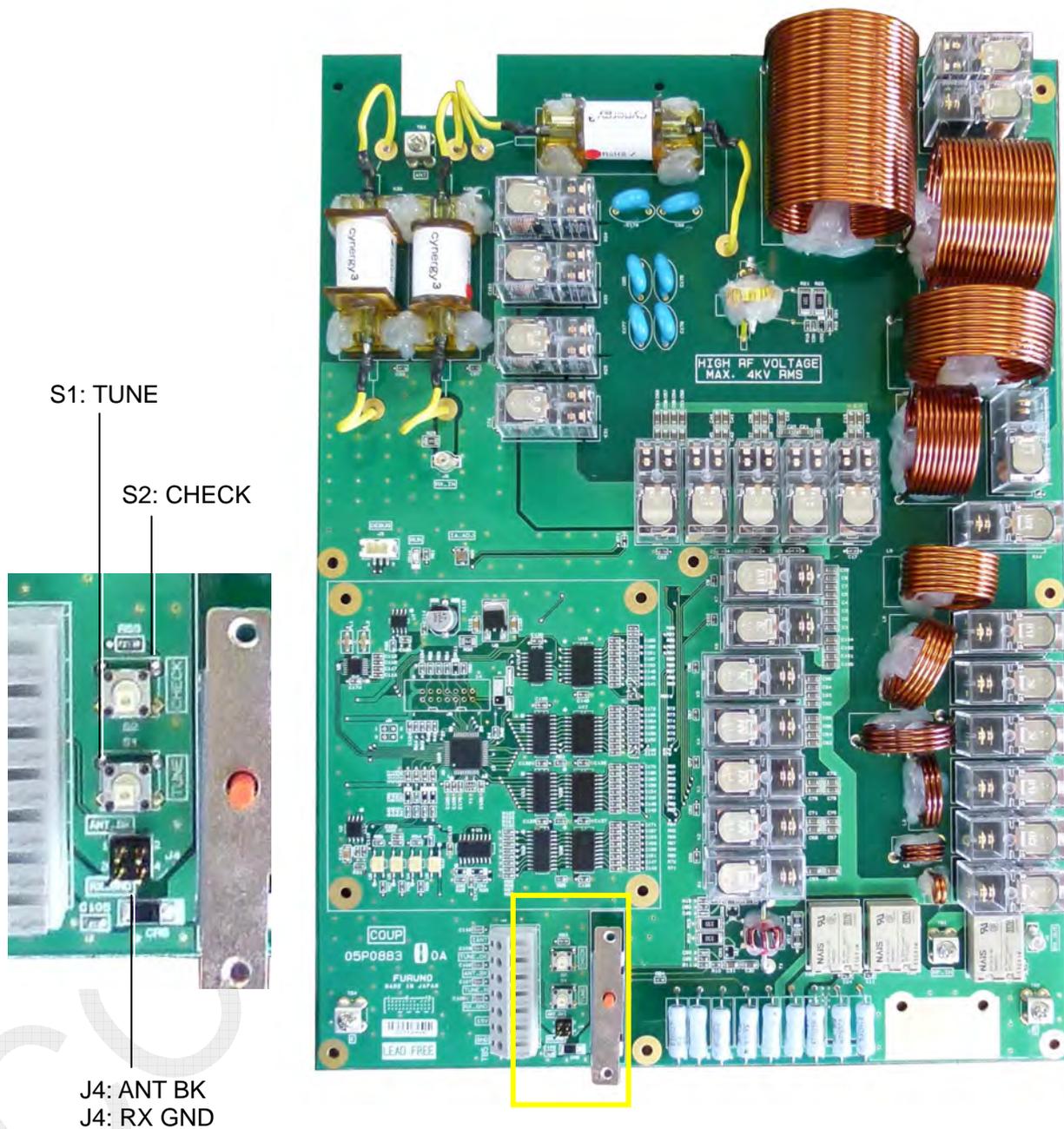


Fig. 2.6.13 Arrester



S1: TUNE

S2: CHECK

J4: ANT BK
J4: RX GND

Normal: Not used
Jumper: J4 #2 – J4 #4

Fig. 2.6.14 COUP board (05P0883)

2.7 NBDP Terminal

2.7.1 IB-583

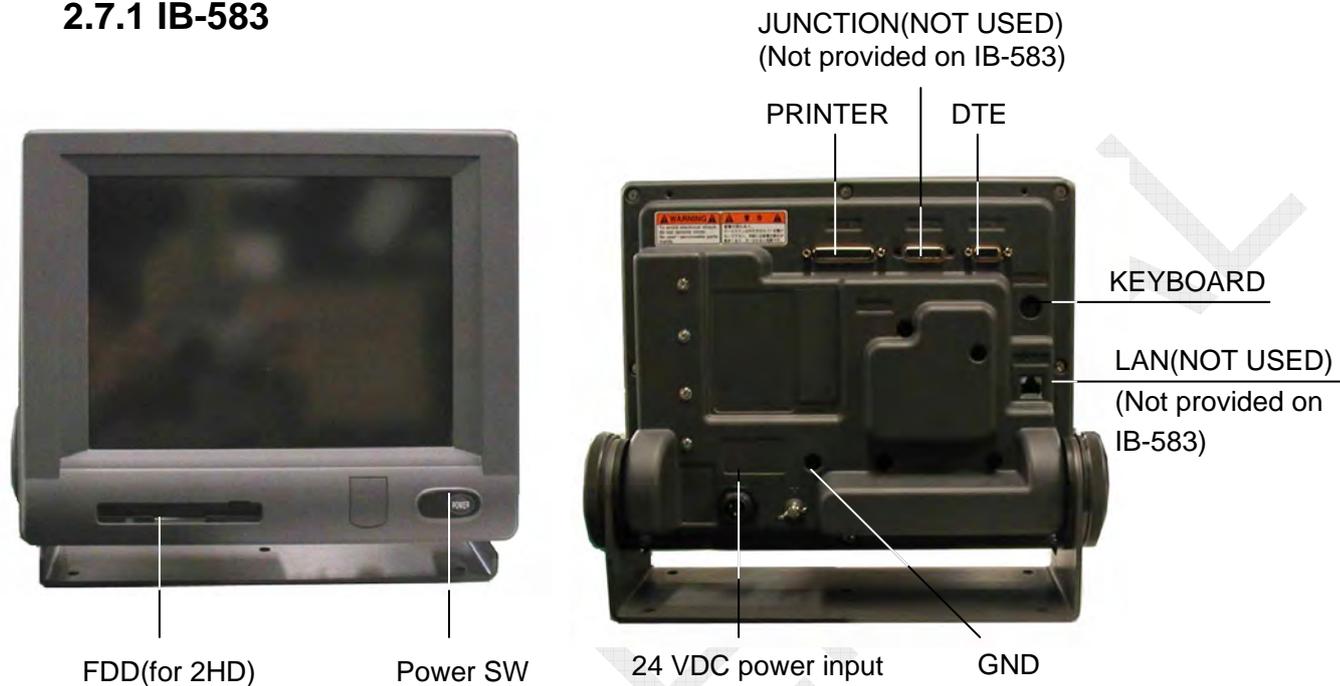
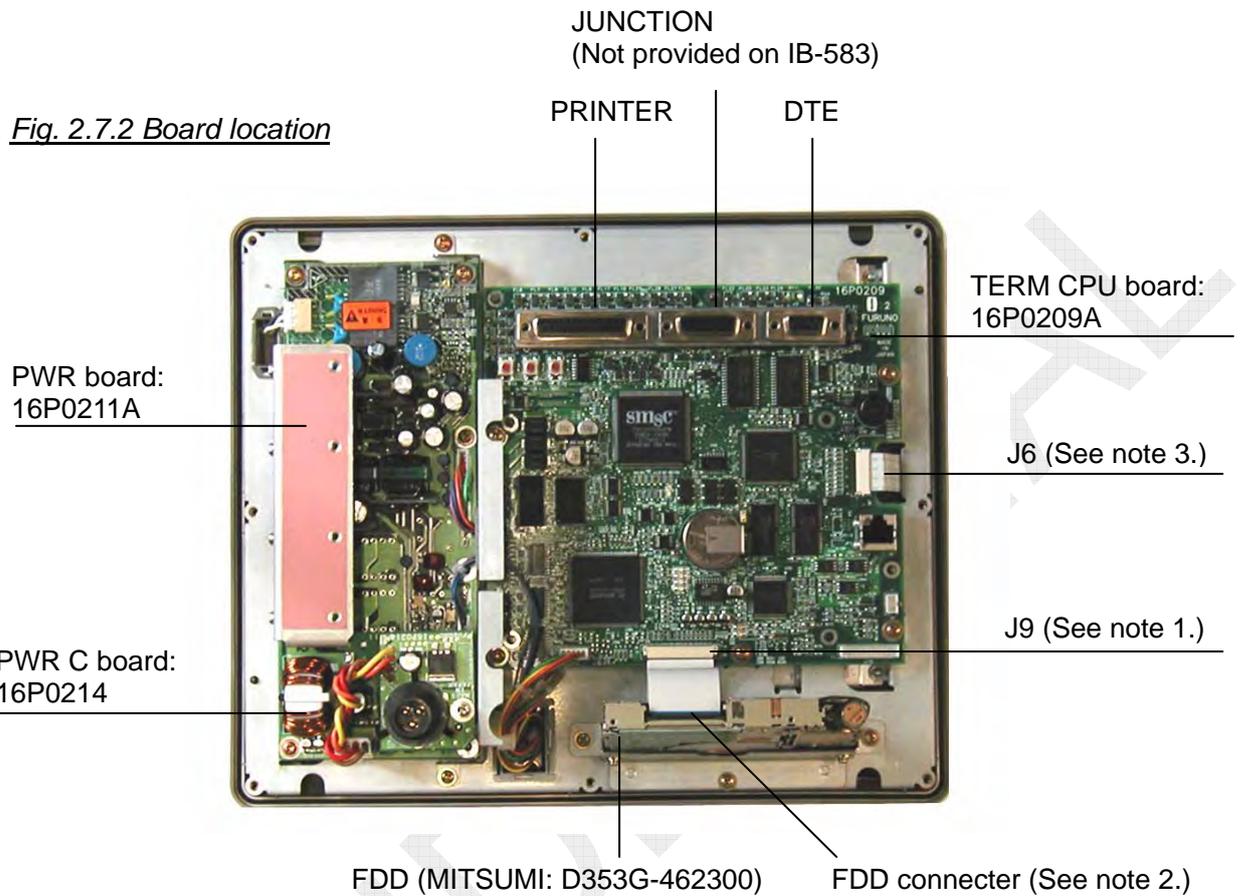
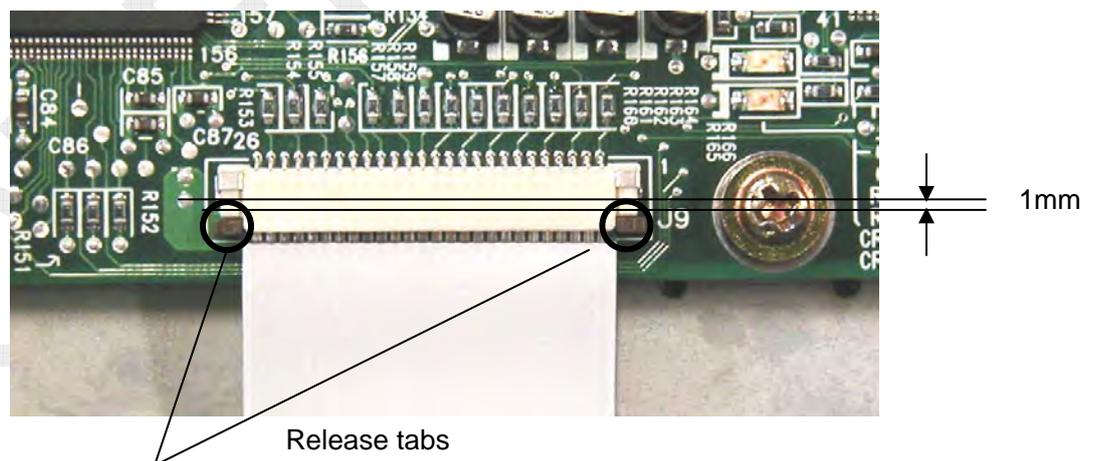


Fig. 2.7.1 IB-583 Overview



[J9] connector



Note 2) Disconnecting flat cable from FDD connector

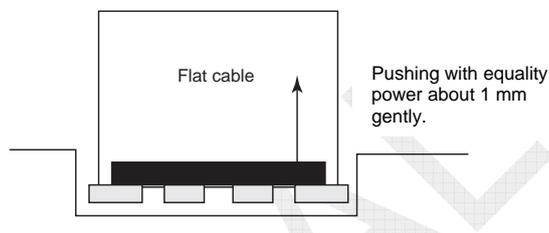
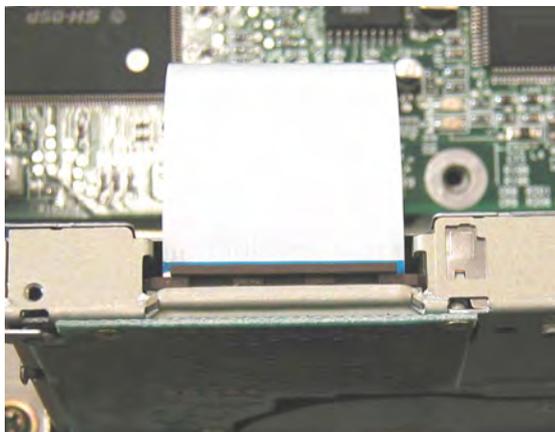
To disconnect the flat cable;

1. Release the locking tabs by pushing the tabs toward the cable about 1 mm gently. Excess force will damage the connector.
2. Pull out the cable.

To connect the cable, reverse the above procedure.

Fig. 2.7.3 FDD connector - 2

[FDD] connector



Note 2) Disconnecting flat cable from FDD connector

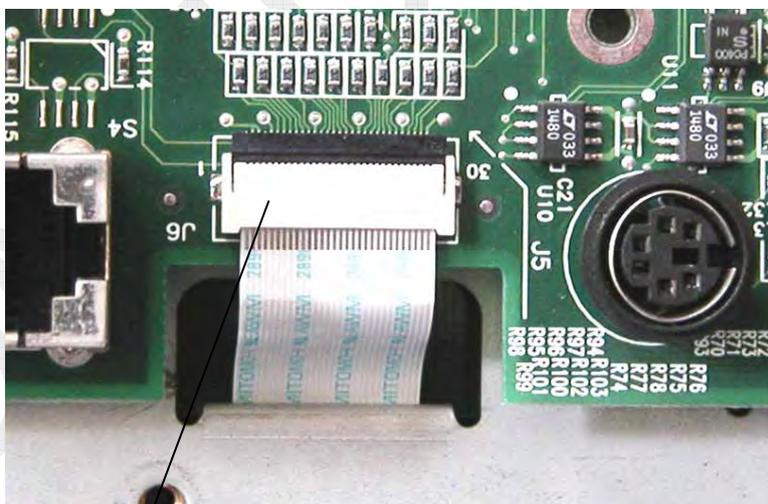
To disconnect the flat cable;

1. Release the locking tabs by pushing the tabs toward the cable about 1 mm gently. Excess force will damage the connector.
2. Pull out the cable.

To connect the cable, reverse the above procedure.

Fig. 2.7.4 FDD connector - 2

[J6] connector



Note 3) Disconnecting flat cable from J6

To disconnect the flat cable, gently, set the locking tab to vertical position and then pull out the cable from the connector. Excess force will damage the connector tab. To connect the cable, reverse the above procedure.

Fig. 2.7.5 J6 flat cable - 3



Fig. 2.7.6 Panel

1) TERM CPU (16P0209A)

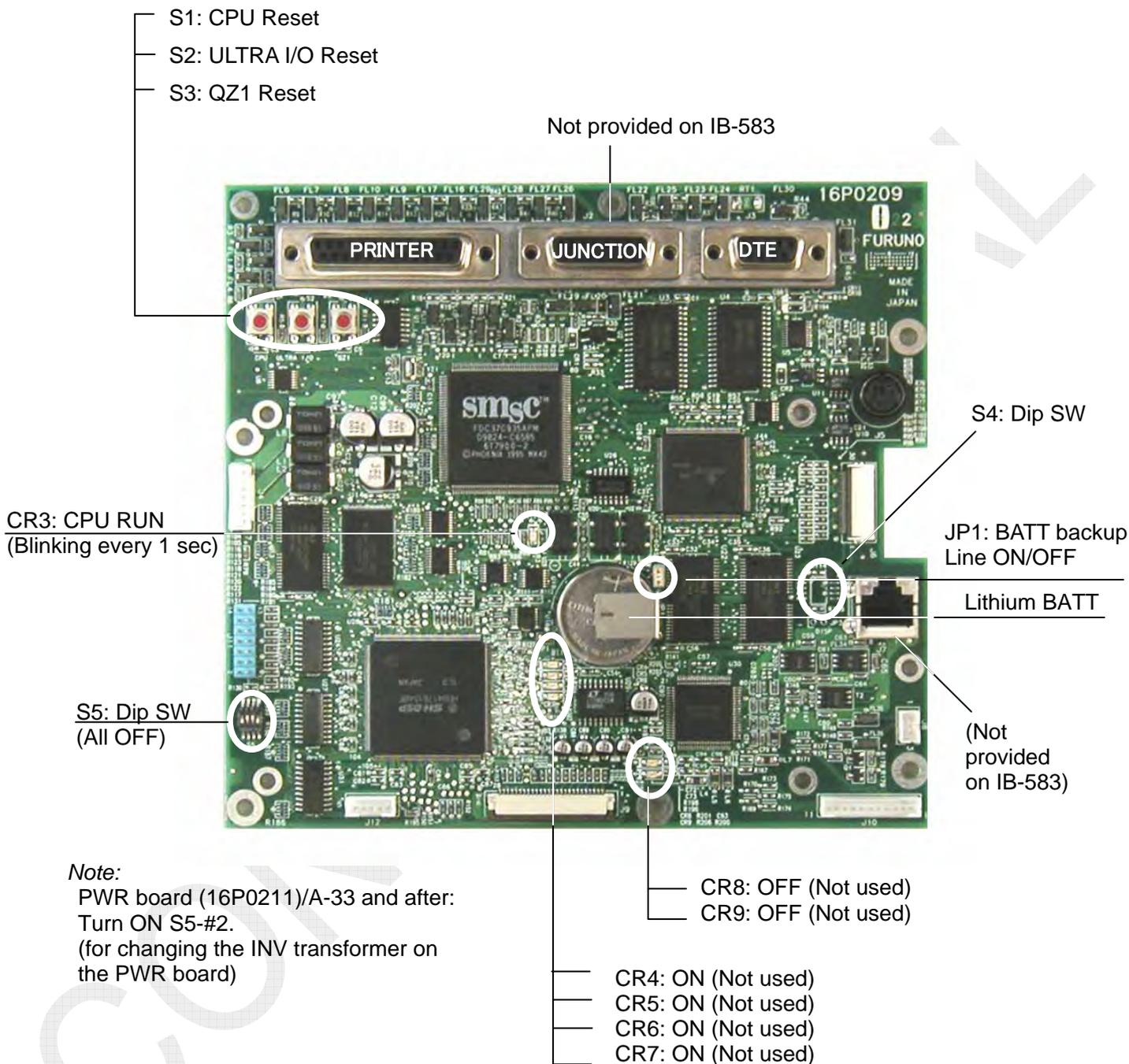
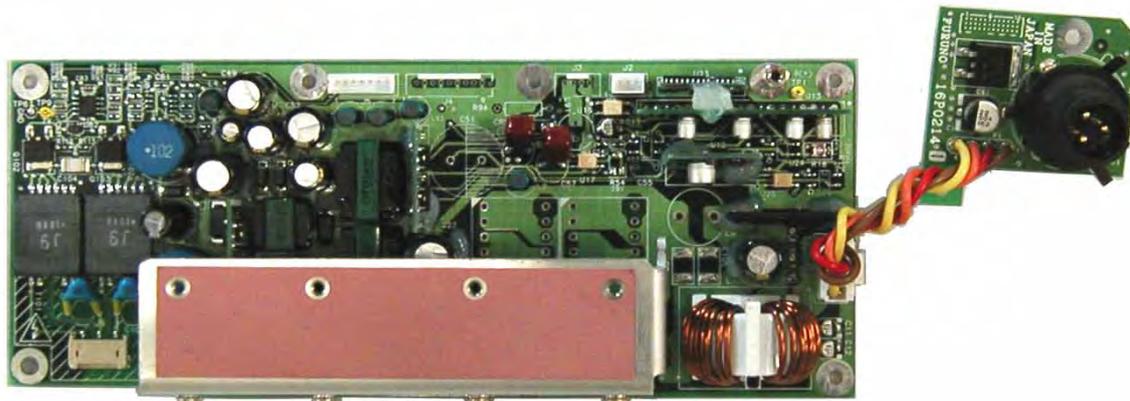


Fig. 2.7.7 TERM CPU board (16P0209A)

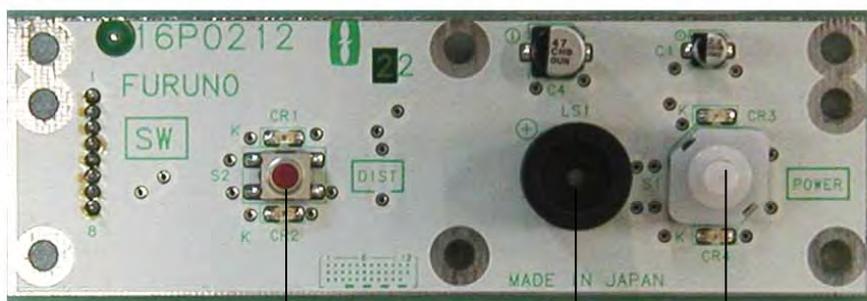
2) PWR board (16P0211A)



Note:
 PWR board (16P0211)/A-33 and after:
 Turn ON S5-#2 in the TERM board.
 (for changing the INV transformer on
 the PWR board)

Fig. 2.7.8 PWR board (16P0211A)

3) SW board (16P0212)



Not used
 (Distress button for FELCOM15) Buzzer Power

Fig. 2.7.9 SW board (16P0212)

2.7.2 IB-585



Fig. 2.7.10 IB-585 Overview

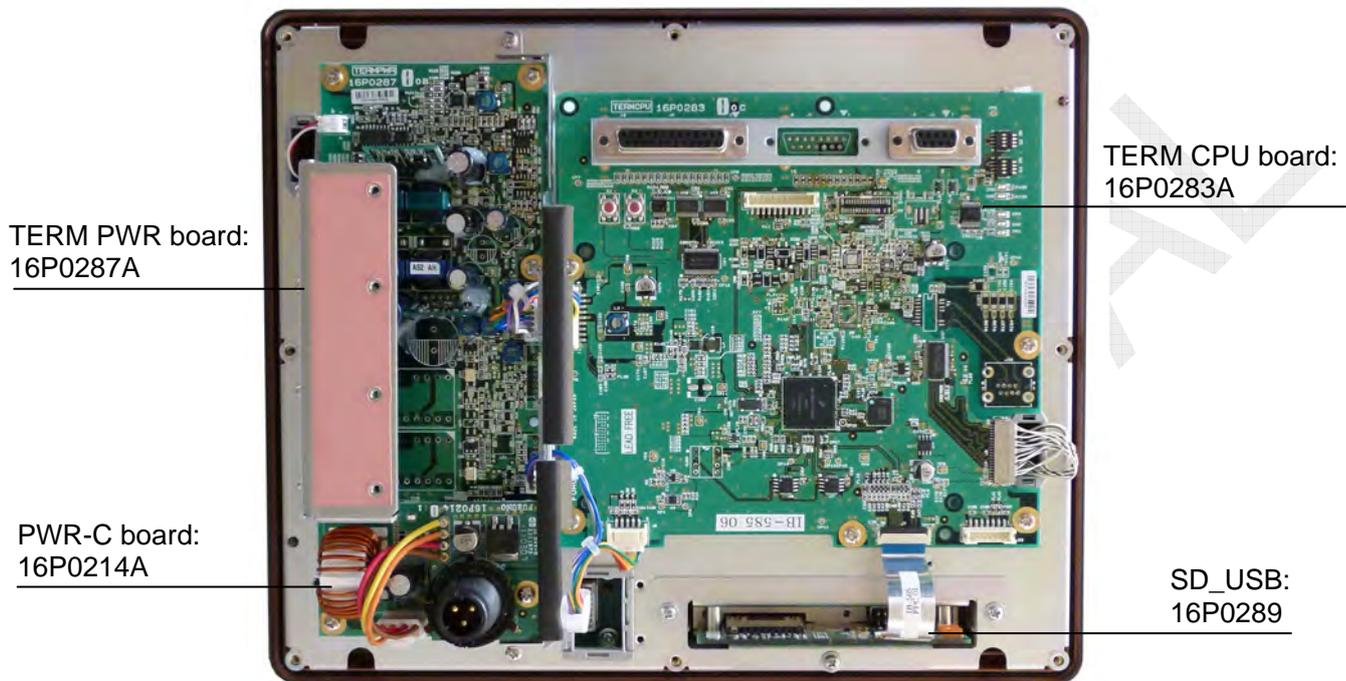


Fig. 2.7.11 Board location

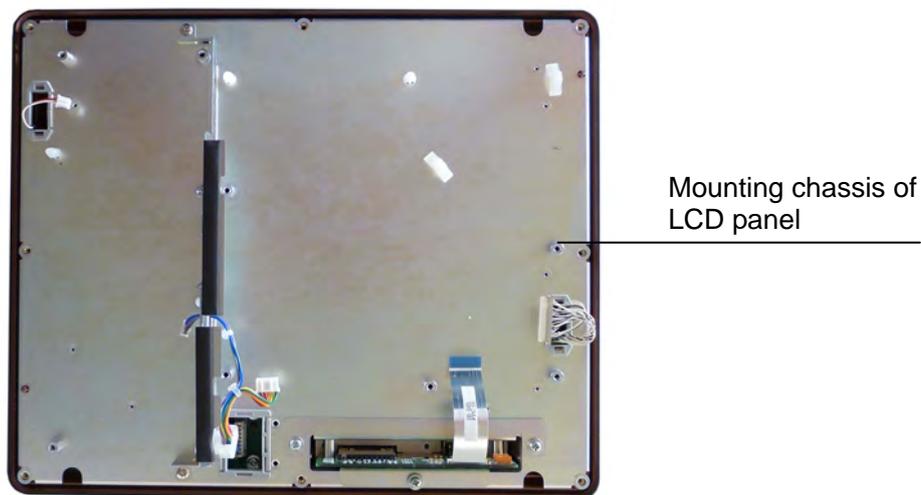
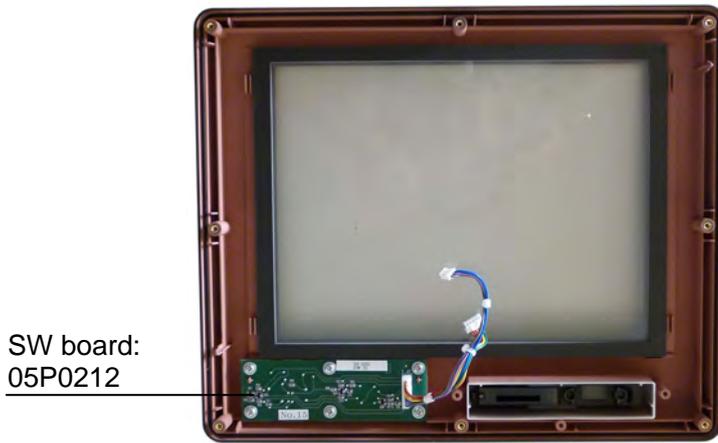


Fig. 2.7.12 boards removed



SW board:
05P0212

Fig. 2.7.13 front panel back side



Fig. 2.7.14 Mounting chassis of LCD panel



Fig. 2.7.15 LCD panel

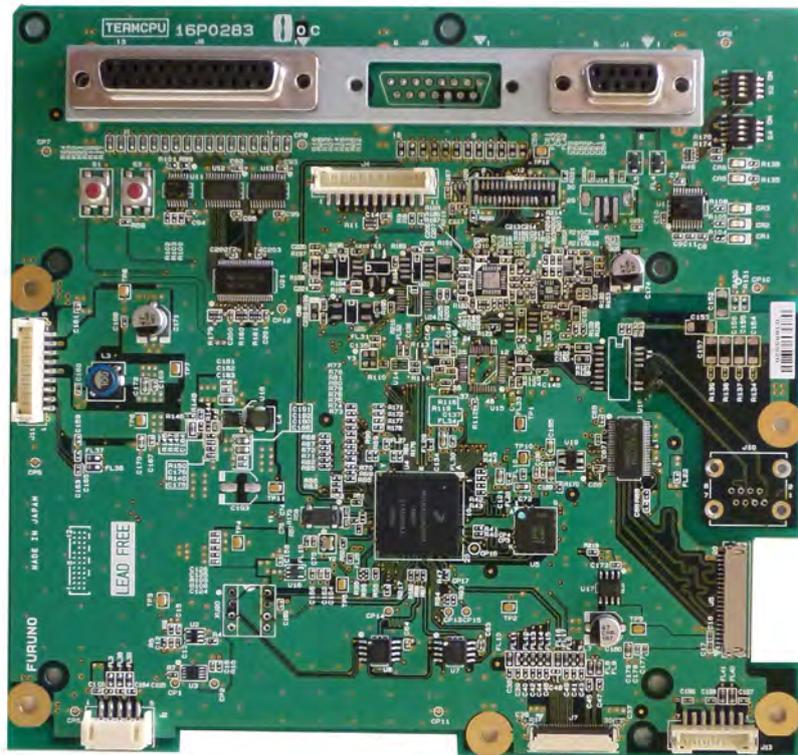


Fig. 2.7.16 TERM CPU board (16P0283A)A-side

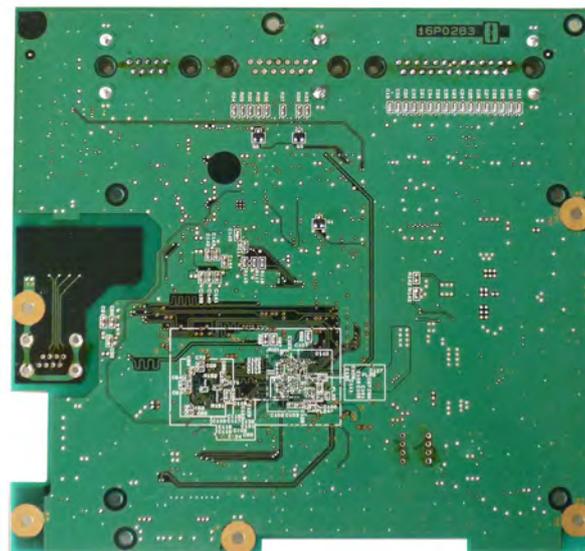


Fig. 2.7.17 TERM CPU board (16P0283A)B-side



Fig. 2.7.18 TERM PWR board (16P0287A) A-side



Fig. 2.7.19 TERM PWR board (16P0287A) B-side



Fig. 2.7.20 SD USB board (16P0289)

2.8 Handset: HS-2003

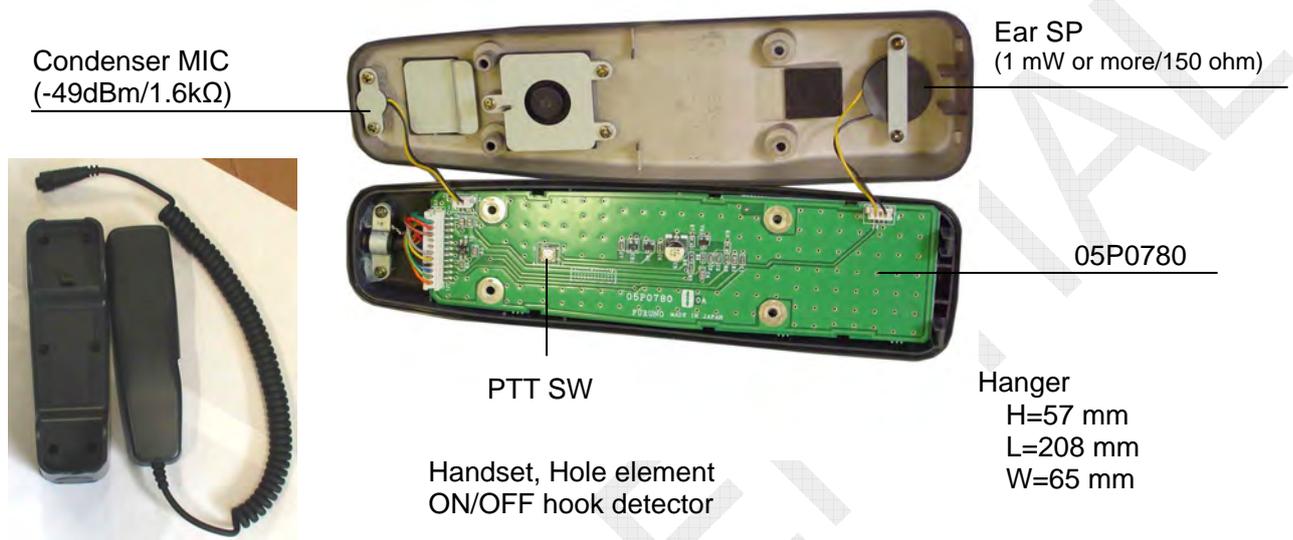


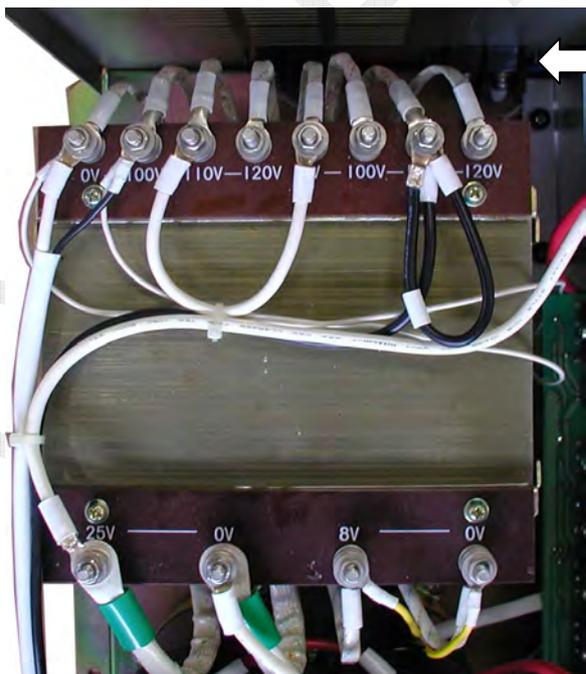
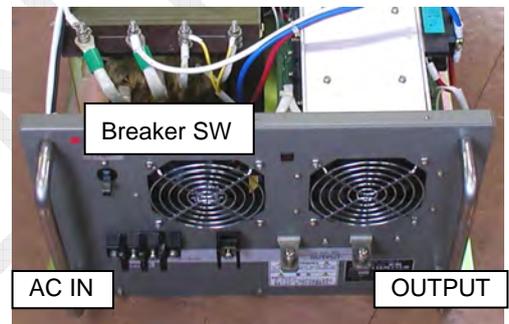
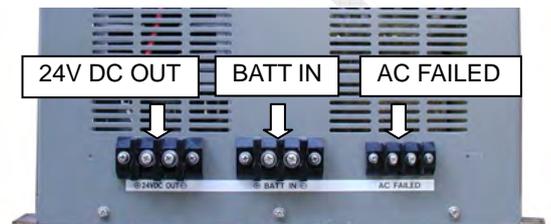
Fig. 2.8.1 Handset



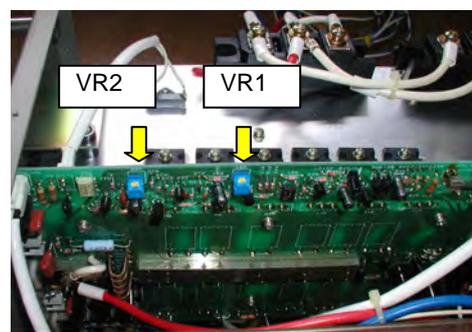
Fig. 2.8.2 Handset Hanger

2.9 AC/DC Power Supply Unit

2.9.1 PR-850A

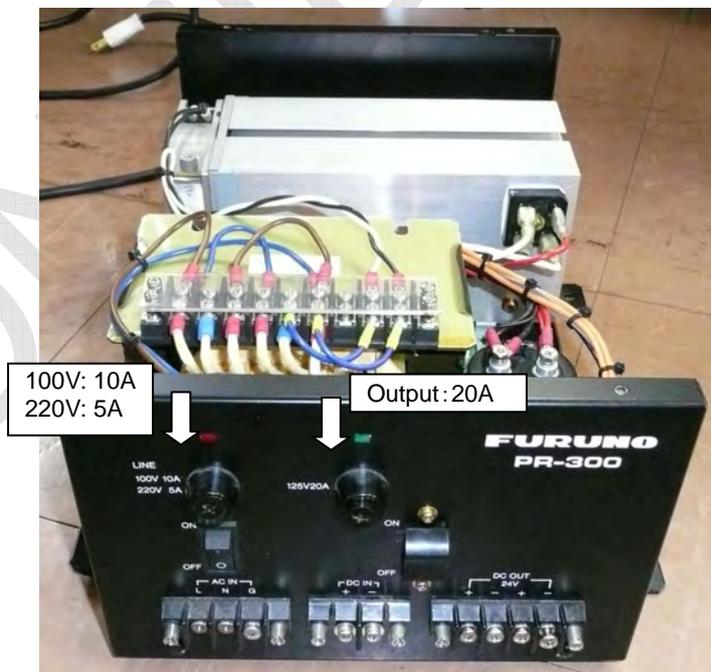
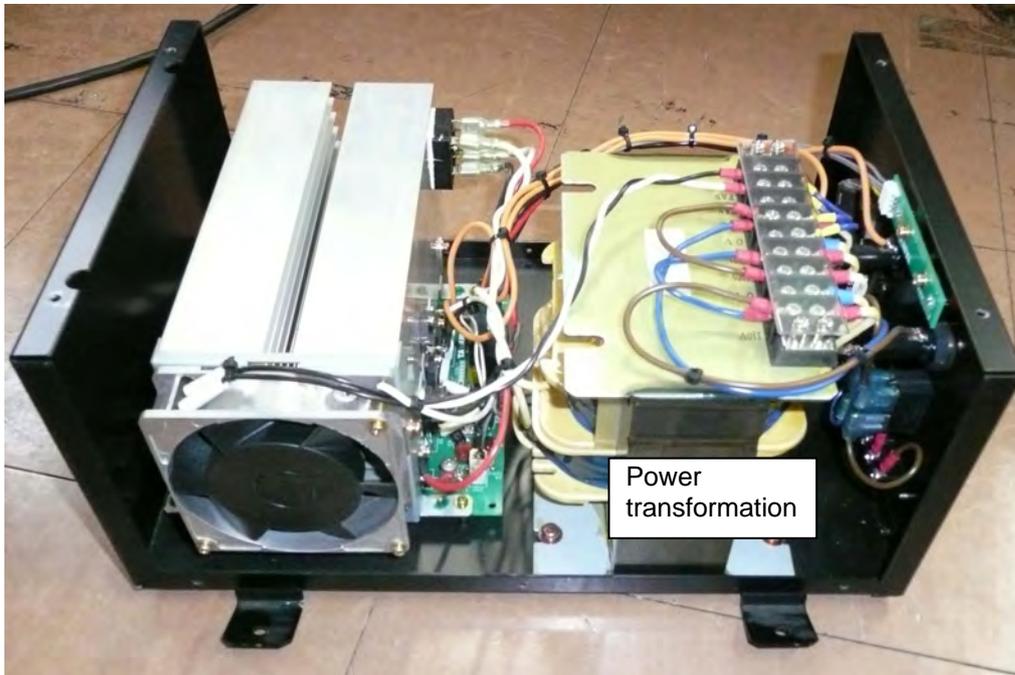


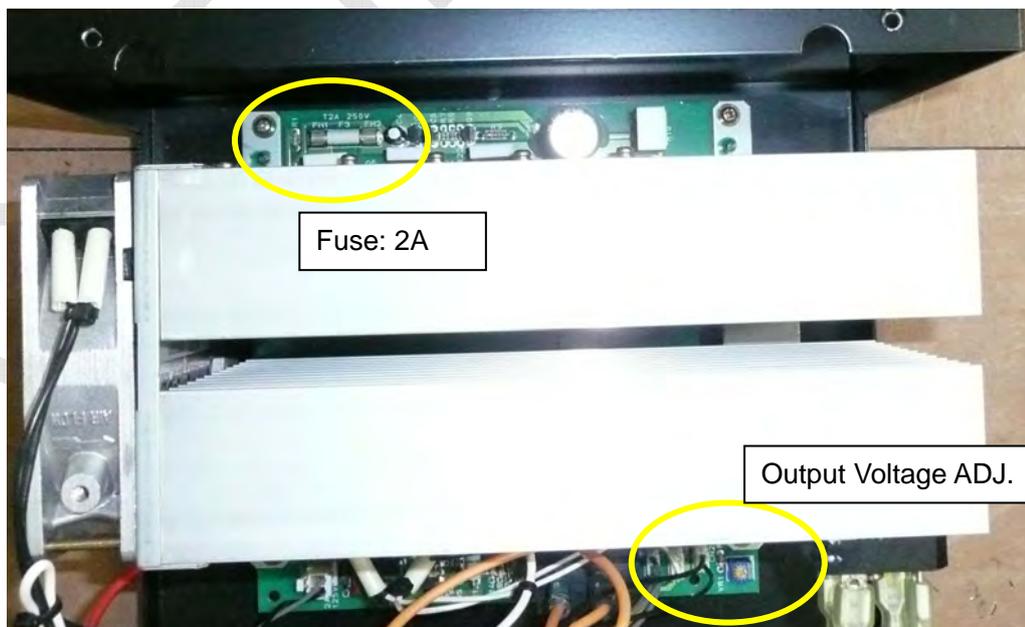
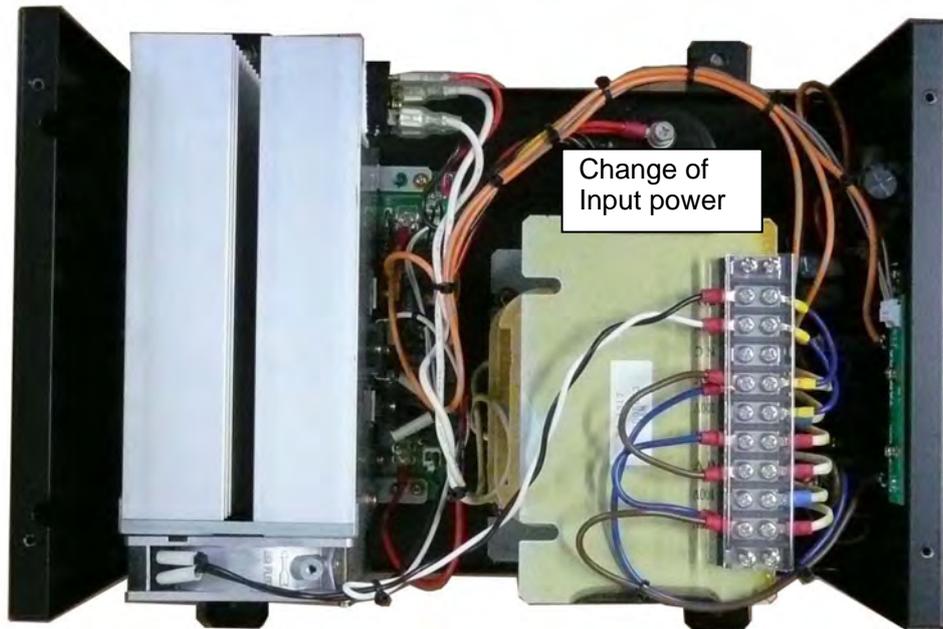
Input power: Changed the tap of the transformer.



Adjustment points
VR1: over current
VR2: output power

2.9.2 PR-300





Chapter 3. Menu Tree

Pressing the [MENU] key will display a menu list. Menus marked with “▶” have submenus. To enter “Service” menu, follow the procedure shown below.

3.1 Entering Service Menu

Procedure:

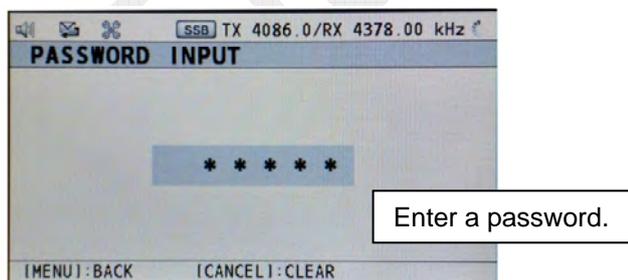
1. Press the [MENU] key to display a menu list.
2. Press the [TAB] key five consecutive times. If the key is normally accepted, a spanner mark will be displayed on the window.



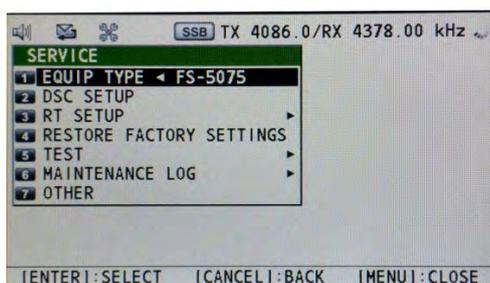
Spanner Mark



3. Select “[9] SERVICE,” and then press the [ENTER] knob. The window will be switched to the PASSWORD INPUT window. Then, enter a password “XXXXXX.”



4. The system will enter service mode to display a service menu. To cancel service mode, turn OFF the power supply, and then press the [TAB] key twice. The service mode will be canceled three minutes after exiting from the service menu.



3.2 Menu Tree

Main Menu	Sub-Menu 1	Sub-Menu 2	Sub-Menu 3	Sub-Menu 4	Note	
1. TEST	1. DAILY TEST	TIME				
		Program Ver,	APP, CPLD, 78k BOOT, PANEL BOOT		Displays programs version.	
		RX, DSC, WR1, WR2, ALARM UNIT			OK, NG <i>Note) Select 9.SERVICE -> 7.OTHER -> ALARM UNIT -> CONNECT to display.</i>	
	2. TX SELF TEST	SW REG1, SW REG 2, CODEC, TX PLL, TX, DRV, PA, COMB, TX FIL, COUPLER	<DETAILED> 1. TX PLL		2, 4, 8, 12, 16, 18, 22, 27MHz	OK, NG
			<DETAILED> 2. PA		PA1, PA2, COMB	OK, NG FS-5075: SW REG2, COMB Check
			<DETAILED> 3. TX FIL		1, 3, 4, 6, 8, 12, 18, 22MHz	OK.NG
	3. TONE TEST	OFF 1500Hz 1100/1700Hz 700/1700Hz				
						- TONE output from SP
						- TONE MOD: MODE -> SSB, FREQ -> RT FREQ
2. USER CH	SSB (list)				<REGISTER>: Total x/256 MODE: SSB, CH: 1-29/00-99 TX FREQ: xxxxx.x RX FREQ: xxxxx.x	
	NBDP (list)				<REGISTER>: Total x/256 MODE: NBDP CH: 1-29/00-99 TX FREQ: xxxxx.x RX FREQ: xxxxx.x	
	DSC (list)				<REGISTER>: Total x/256 MODE: DSC BAND: 2, 4, 6, 8, 12, 16, 18, 22, 25 CH: 01 - 04 TX FREQ: xxxxx.x RX FREQ: xxxxx.x	
	CW (list)				<i>Note) Select 9.SERVICE -> 3.RT SETUP -> 1.SETUP -> CW -> ENABLE to display.</i> <REGISTER>: Total x/256 MODE: SSB, CH: 1-29/00-99 TX FREQ: xxxxx.x RX FREQ: xxxxx.x	

3. LOG	RX DISTRESS				Saves 50 logs.	
	RX GENERAL				Saves 50 logs.	
	TX				Saves 50 logs.	
4. INTERCOM					Commences calling INTERCOM.	
5. SYSTEM <i>Cont'd</i>	1. SQ FREQ	1000Hz	500 – 2000Hz			
	2. KEY ASSIGN	1. F1: RX FREQ	-----			
			TX/RX FREQ			
			RX FREQ			
			MODE			
			AGC			
			TX PWR			
			TX MONITOR			
			TEST CALL			
			MSG FILE			
			DAILY TEST			
			LOG			
			INTERCOM			
	CLARIFIER					
	2. F2: DAILY TEST		<i>Ditto</i>			
	3. F3: TEST CALL		<i>Ditto</i>		If “SELCALL” is set to “ENABLE,” the submenu will be fixed to “SELCALL.” Consequently, F3 will not be displayed.	
	3. PRINT	1. TX MSG		MANUAL		
				AUTO		
		2. RX MSG		MANUAL		
				AUTO		
		3. DAILY TEST		MANUAL		
				AUTO		
	4. POSITION	INPUT TYPE		EPFS		Switch the input type manually.
			MANUAL			
			NO INFO			
5. DATE/TIME	SOURCE		INTERNAL/EPFS		Automatically switches between EPFS and INTERNAL (EPFS > INTERNAL).	
	DATE		dd/mm/yyyy			
	TIME		xx:xx UTC			

5. SYSTEM <i>Cont'd</i>	6. TIME OUT	1. MENU END	10 MIN		
			NO TIME OUT		
		2. DSC GENERAL	15 MIN		
			NO TIME OUT		
		3. RX DISTRESS	15 MIN		
			NO TIME OUT		
		4. SSB	10 SEC		
			30 SEC		
			10 MIN		
		5. TELEX	10 SEC		
	30 SEC				
	10 MIN				
	NO TIMEOUT				
	6. FAX	<i>Ditto</i>		Appears when selecting 5.SYSTEM -> 7.RX SETUP -> 1.FAX RX -> ENABLE.	
	7. AM	<i>Ditto</i>			
	8. CW	<i>Ditto</i>		Appears when selecting 9.SERVICE -> 3.RX SETUP -> 1.SETUP -> CW -> ENABLE.	
	7. RX SETUP	1. FAX RX	DISABLE		<i>Related) 5.SYSTEM -> 6.TIME OUT -> 6.FAX</i>
			ENABLE		
		2. ANT SELECT	RX ANT		Appears when selecting 9.SERVICE -> 3.RT SETUP -> 1.SETUP -> RX ANT -> CONNECT.
	TRX ANT				
	3. CLARIFIRE	ON		<i>Related) 9.SERVICE -> 3.RT SETUP -> 1.SETUP -> CLARIFIER LIMIT</i>	
OFF					
8. EXTERNAL ALARM	1. URGENCY	ON			
		OFF			
	2. SAFETY	ON			
		OFF			
	3. ROUTINE	ON			
		OFF			

5. SYSTEM	9. NETWORK	<VIEW> IP ADDRESS	172.031.005.003	<VIEW>
		<VIEW> SUBNET MASK	255.255.000.000	
		<VIEW> GATEWAY	000.000.000.000	
		<VIEW> HOST NAME	SSB003	FS-5075: SSB003, FS-2575: SSB004 FS-1575: SSB005
		<EDIT> IP ADDRESS		Password: 012345678
		<EDIT> SUBNET MASK		
		<EDIT> GATEWAY		
	HOST NAME		FIXED	
6. DSC <i>Cont'd</i>	1. ADDRESS BOOK	SHIP (list)	NAME/MMSI	<REGISTER> Total x/50 NAME: MMSI: MIDxxxxxx
		COAST (list)	NAME/MMSI	<REGISTER> Total x/50 NAME: MMSI: 00MIDxxxx
		GROUP (list)	NAME/MMSI	<REGISTER> Total x/50 NAME: MMSI: 0MIDxxxx
	2. MSG FILE	INDIVIDUAL (list)		<REGISTER> MSG TYPE: INDIVIDUAL TO: MIDxxxxxx(DIRECT INPUT/ADDRESS BOOK) COMM MODE: COMM FREQ: DSC FREQ: FAIL NAME:
		GROUP (list)		<REGISTER> MSG TYPE: GROUP TO: 0MIDxxxxxx(DIRECT INPUT/ADDRESS BOOK) COMM MODE: COMM FREQ: DSC FREQ: FAIL NAME:
		PSTN (list)		<REGISTER> MSG TYPE: PSTN TO: 00MIDxxxx(DIRECT INPUT/ADDRESS BOOK) COMM MODE: TELEPHONE TEL: DSC FREQ: FAIL NAME:
		TEST (list)		<REGISTER> MSG TYPE: TEST TO: MIDxxxxxx(DIRECT INPUT/ADDRESS BOOK) DSC FREQ: 2 – 16M DIS/SAF FREQ FAIL NAME:

6. DSC	3. ACK SETTINGS	1. INDIVIDUAL	MANUAL			
			AUTO(UNABLE)			
		2. PSTN	AUTO(ABLE)			
			AUTO(UNABLE)			
		3. REASON	NO REASON			
			BUSY			
			EQUIP ERROR			
			CAN'T USE MODE			
			CAN'T USE CH			
		4. POSITION MSG	AUTO(ABLE)			
			AUTO(UNABLE)			
			MANUAL			
		5. POLLING MSG	AUTO			
			MANUAL			
		6. TEST MSG	AUTO			
			MANUAL			
		4. SPECIAL MSG	NEUTRAL	ABLE		SPECIAL MSG added to MSG TYPE of ABLE: [OTHER DSC MSG]
				UNABLE		
	MEDICAL	ABLE				
		UNABLE				
	5. ROUTINE SCAN	SCAN1 - 6	OFF, 2, 4, 6, 8, 12, 16, 18, 22, 25MHz		Default -> F1: 2177kHz	
6. DISTRESS SCAN	2M(FIXED)			9. SERVICE -> 2. DSC SETUP -> CLASS -> - MF/HF: 2, 8MHz + One Freq - MF: 6. DISTRESS SCAN -> Deleted		
	4M	ON/OFF				
	6M	ON/OFF				
	8M(FIXED)					
	12M	ON/OFF				
	16M	ON/OFF				

7. AUDIO	1. KEY CLICK	0 – 3 (2)				
	2. OFF HOOK SP	SP ON				
		MUTE				
	3. ORDINARY ALARM	SAFETY	0 – 5 (5)			Allows for the output of monitoring sound through making alarm sound setting.
		ROUTINE	0 – 5 (5)			
	4. ALARM DISTANCE	500NM				
OFF						
5. SIDE TONE	400 – 1000Hz	600Hz			Enabled when selecting 9.SERVICE -> 3.RT SETUP -> 1.SETUP -> CW -> ENABLE.	
6. SIDE TONE LV	0 – 63	32				
8. ALARM					Displays alarm currently in progress.	

9. SERVICE <i>Cont'd</i>	1. EQUIP TYPE	<i>FS-xx75</i>			Display only. (Automatic discrimination)		
	2. DSC SETUP	MMSI				Display only. (Setting: MMSI SW ON -> Password)	
		SIG DETECT S-LEVEL	0 – 100 (80)				
		DISTRESS ALARM	0 – 31 (16)				
		CLASS	MF/HF				MF/HF: A1, A2, A3, A4 MF: A1, A2
			MF				
			NON-GMDSS				
		DSC/DSE SENTENCE	ON				
			OFF				
	<i>[LAST DISTRESS LOG]</i>	<i>UNIT</i>				CNTRL1, CNTRL2, ALARM UNIT	
		<i>TIME</i>					
	3. RT SETUP <i>Cont'd</i>	1. SETUP <i>Cont'd</i>		TX FREQ	ALL FREE		
					FREE		
					MARINE/USER		
					ITU/USER		
					USER		
				AM MODE	RX ONLY		
					TX/RX		
				CW	ENABLE	Allows mode selection. Side tone adjustment is enabled by using AUDIO menu.	
					DISABLE		
				LSB	ENABLE	Allows mode selection.	
					DISABLE		
				SELCALL	ENABLE	Setting this submenu to “ENABLE” will assign “SELCALL” to [7] of KEY ASSIGN.	
					DISABLE		
				REF OSC	-127 – 127 (0)	Makes frequency adjustment.	
				CLARIFIER LIMIT	50 – 990Hz (200Hz)	<i>Related) 5.SYSTEM -> 7.RX SETUP -> 3.CLARIFIRE</i>	
TX TUNE				ON			
	OFF						
COUPLER THROUGH	OFF						
	RCVD						
	DIFF						

9. SERVICE <i>Cont'd</i>	3. RT SETUP <i>Cont'd</i>	1. SETUP	RX ANT	DISCONNECT	<i>Related)</i> 5.SYSTEM -> 7.RX SETUP -> 2.ANT SELECT			
				CONNECT				
			DIVIDER	ON	Makes setting of the divider circuit of the RX FIL board to ON or OFF.			
				OFF				
			LINE IN	-10 – 10 (0)				
			LINE OUT	-10 – 10 (0)				
		FORMAT	IEC	IEC: IEC-61162 -1Ed.4				
			IEC+NMEA					
		MIF	RS-232C					
			RS-485					
		2. SELF CHECK	VS, TX, DRV, COMB, PA, FIL		Displays numerical values.			
		3. DSC TEST	TX TYPE	DOT				
				MARK				
				SPACE				
			TX FREQ	1605.0 – 27500.0	Recalls frequency set on the RT window.			
		TX KEY	ON					
			OFF					
		TX MODE	SSB					
			DSC					
			NBDP					
			CW	<i>Related)</i> 9.SERVICE -> 3.RT SETUP -> 1.SETUP -> CW				
		TX FREQ		Recalls frequency set on the RT window.				
		TX POWER	HIGH	FS-5075: HIGH/MID/LOW1/LOW2 FS-2575/1575: HIGH/MID/LOW				
			MID					
LOW1								
LOW2								
TX POWER ADJ	0 – 255	Varies with model and frequency band.						
TX TONE	SSB	DSC	NBDP	CW				
	OFF	OFF	OFF	OFF				
	1500Hz	1615Hz	1615Hz	TONE				
	1100/1700Hz	1785Hz	1785Hz					
	700/1700Hz	DOT	DOT					
<LOAD DEFAULT>	YES/NO							

9. SERVICE <i>Cont'd</i>	3. RT SETUP	5. TX PWR (USER CH)	TX MODE	SSB			
				DSC			
				NBDP			
				CW			<i>Related) 9.SERVICE -> 3.RT SETUP -> 1.SETUP -> CW</i>
			TX CH	---			
			TX POWER	HIGH	FS-5075: HIGH/MID/LOW1/LOW2 FS-2575/1575: HIGH/MID/LOW		
				MID			
				LOW1			
				LOW2			
			TX POWER ADJ	0 – 255			
		TX TONE	SSB	DSC	NBDP	CW	
			OFF	OFF	OFF	OFF	
			1500Hz	1615Hz	1615Hz	TONE	
	1100/1700Hz		1785Hz	1785Hz			
	700/1700Hz		DOT	DOT			
	<LOAD DEFAULT>	YES/NO					
	6. TX PWR (TUNE)	TX FREQ		Recalls frequency set on the RT window.			
		TX POWER ADJ	0 – 140	FS-5075: 65, FS-2575: 80			
		<LOAD DEFAULT>	YES/NO				
	7. TX PWR (SEL CALL)	TX POWER ADJ	0 – 255	AM/2331.5kHz			
		<LOAD DEFAULT>	YES/NO				
	4. RESTOR FACTORY SETTINGS	Yes		Return to factory settings, except MMSI, MAC address, and adjusted values.			
		No					

9. SERVICE <i>Cont'd</i>	5. TEST <i>Cont'd</i>	1. VERSION <i>Cont'd</i>	[FS-xx75] (1/2)		<i>FS-xx75 Program Version</i>
			APP	0550243-0x.xx	
			CPLD	0550245-0x.xx	
			78K BOOT	0550247-0x.xx	
			PANEL BOOT	0550246-0x.xx	
			[FS-2575C] (1/2)		<i>FS-xx75C Program Version</i>
			STARTER	01.xx.20xxxxxx	
			FPGA	01.xx.20xxxxxx	
			APP	01.xx.20xxxxxx	
			BOOT	01.xx.20xxxxxx	
			[FS-2575C PCB] (1/2)		<i>Board Version</i>
			C-CPU	0, 1--	
			PANEL	0, 1--	
			C-IF	0, 1--	
			[FS-2575T] (2/2)		<i>FS-xx75T Program Version</i>
			STARTER	01.xx.20xxxxxx	
			FPGA	01.xx.20xxxxxx	
			SH2A APP	01.xx.20xxxxxx	
			SH2A BOOT	01.xx.20xxxxxx	
			NIOS APP	01.xx.20xxxxxx	
DSP APP	01.xx.20xxxxxx				
78K APP	01.xx.20xxxxxx				
78K BOOT	0550247-01.xx				

9. SERVICE <i>Cont'd</i>	5. TEST <i>Cont'd</i>	3. C-CPU PCB	[PROGRAM VERSION] (1/4)		<i>FS-2575C Program Version</i>
			FS-xx75 PG	0550243-01.xx	
			FS-2575C BOOT	0550246-01.xx	
			[TEST] (1/4)		
			ROM CHECK	OK/NG	
			RAM CHECK	OK/NG	
			NBDP	OK/NG	
			[PCB VERSION] (1/4)		<i>Board Version</i>
			C-CPU	0, 1--	
			C-IF	0, 1--	
			PANEL	0, 1--	
			[LED TEST] (2/4)		<i>LED Test</i>
			BACK LED		
			ALARM LED(RED)		
			OTHER LED		
			PRINTER STATUS		<i>KEY Test</i>
			[KEY TEST] (3/4)		
			ENCODER KNOB		
			VOLUME KNOB	0 - 520	
			RF GAIN KNOB	0 - 40	
HOOK	ON/OFF				
PTT	OFF/ON				
[LCD TEST] (4/4)					

9. SERVICE <i>Cont'd</i>	5. TEST <i>Cont'd</i>	4. TA TEST	[CONTACT SIGNAL]		<i>Contact Signal Check</i>
			AC FAIL	ON/OFF	
			CW KEY	ON/OFF	
			RX MUTE	ON/OFF	
			ALARM ACK	ON/OFF	
			EXT PTT	ON/OFF	
			CONTINUOUS PRINT	START/STOP	
			DISTRESS SCAN	<i>NORMAL, 2 - 16M</i>	
			POPUP ALARM	ON/OFF	
			MIC LOOP BACK	ON/OFF	
		[LOOP BACK]		<i>Loop Back Test</i>	
		IEC-61162	OK/NG		
		ALARM UNIT	OK/NG		
		REMOTE	OK/NG		
	5. DISPLAY TEST	[BRIGHTNESS]		<i>Brightness, LCD Check</i>	
		DISTRESS KEY LED			
		ALARM LED(RED)	<i>0 - 17</i>		
		ALARM LED (YELLOW)	<i>0 - 17</i>		
		PANEL KEY LED	<i>0 - 17</i>		
		DISPLAY LCD	<i>0 - 17</i>		
		LCD CURRENT ADJ	<i>0 - 255</i>		
		3: NEXT			
	6. MAINTENANCE LOG	1. I/O MONITOR	1. IEC-61162		<i>Data Monitor</i>
2. ALARM UNIT					
3. REMOTE					
2. ERROR LOG					
3. SW UPDATE LOG					
4. POWER ON LOG					
5. INFORMATION LOG					

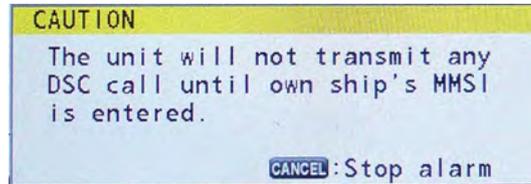
9. SERVICE	7. OTHER	[for SERVICE]			
		PA	ON		
			OFF		
		ALARM UNIT	CONNECT		
			DISCONNECT		
		P-BROWSER	ON		
			OFF		
		SOFTWARE ERASE	YES		
			NO		
		[for DEVELOP]			
DEBUG MODE	OFF				
	ON				

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Chapter 4. System setting

Introduction

When the FS-xx75 Series is installed, be sure to register MMSI. Not doing so will disable DSC communications. Creating a DSC message or making a Distress call without registering the MMSI will cause to display the following message and output an alarm.



To make and receive a group call, a Group ID must be registered. Select [MENU] -> 6. DSC -> 1. ADDRESS BOOK to register the Group ID.

1. Menus

Table 4.1 Overview of Menus

Menu	Description	Relevant Page
1. TEST	Conducts DAILY TEST, TX SELF TEST, and other TX output power check with TONE modulation. Be sure to provide user with an explanation of handling of this operation. Explain to the user that information on the TEST results helps the user conduct troubleshooting in case of equipment failure.	6-1
2. USER CH	Registers USER CH for SSB, DSC, and NBDP frequencies.	4-5
3. LOG	Checks DSC communication LOG.	
4. INTERCOM	Select this menu to perform "Inter-comm." calls when two units of FS-2575C are connected.	
5. SYSTEM	This menu includes user setting submenus. Particular settings are as follows: <ul style="list-style-type: none">• KEY ASSIGN setting: Provides a useful function that allows the assignment of commonly-used operation to a specific key.• RX SETUP: Makes setting of this menu according to the configuration of antenna.• NETWORK: Default setting is accepted. Making a setting change requires entry of a password.	4-10
6. DSC	Makes DSC-related settings, including SCAN, ADD BOOK, and MSG FILE registration. Provide user with an explanation of the method for registering station to make a test call and the handling of the station.	4-27
7. AUDIO	Makes alarm-related settings. This menu includes the setting of OFF HOOK SP.	4-43
8. ALARM	Displays an alarm currently in progress. When the cause of the alarm is eliminated, the alarm display will disappear. Explain to the user that information displayed on this window helps the user conduct troubleshooting in case of equipment failure.	6-20
9. SERVICE	Entering this menu requires entry of a password. Used to install and perform maintenance of equipment. This menu includes DSC- and RT-related system settings and a more detailed maintenance menu.	6-23 4-49

2. Special Operation

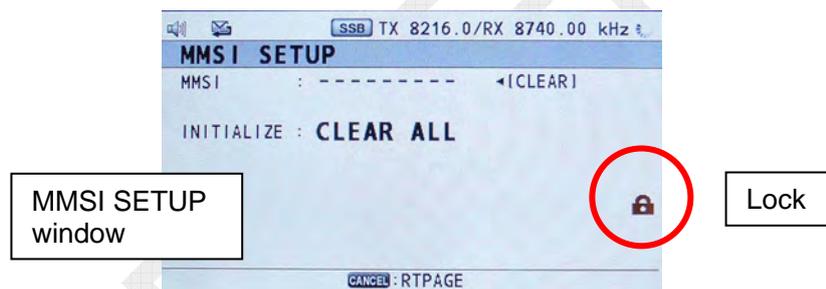
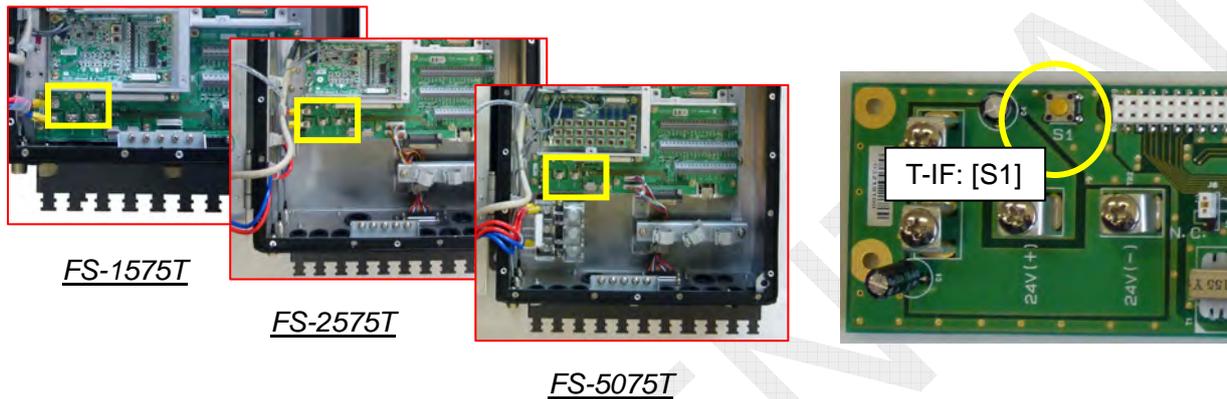
1. To conduct MMSI and CLEAR ALL:
Press and hold [S1] on the T-IF board for a period of four seconds or more, and then enter the password: XXXXXX.
2. To enter Service menu:
Select [MENU] -> Press [TAB] five times -> Select "9. SERVICE" -> Enter the password: XXXXXX.
3. To enter NETWORK setting menu:
Enter the password: XXXXXXXXXX on the NETWORK <View> window.
4. To monitor DSC reception signal:
Enter the password: XXXXXX on the SCAN window, and then select either ROUTINE or DISTRESS SCAN to monitor.
However, note that the "monitor" is outputted according to the setting made by selecting [MENU] -> 7. AUDIO -> 2. OFF HOOK.
5. To clear a received DISTRESS LOG:
 - 1) Select [MENU] -> 9. SERVICE -> 4. RESTORE FACTORY SETTINGS.
 - 2) Press and hold [S1] on the T-IF board for a period of four seconds or more, enter the password: XXXXXX, and then click on "CLEAR ALL."
Note: Since set values return to the default, settings should be made again.
*For items cleared by this operation, refer to information on page 6-21.*DISTRESS messages and DISTRESS ACK messages are automatically cleared after a lapse of 48 or more hours since they are received.
The operation described above also clears "LAST DISTRESS LOG" set by selecting [MENU] -> 9.SERVICE -> 2.DSC SETUP.

4.1 MMSI Setting and CLEAR ALL

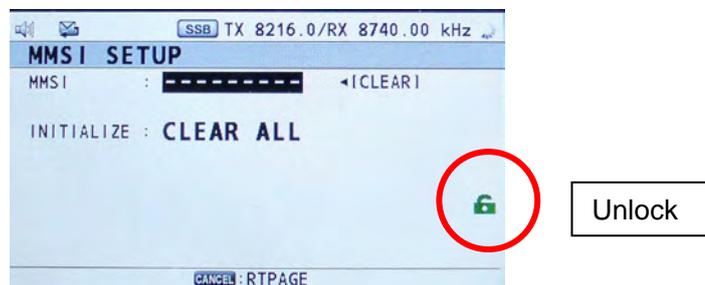
4.1.1 MMSI Setting

Procedure)

1. Press and hold [S1]: MMSI switch on the T-IF board for a period of four seconds or more. The “MMSI SETUP” window will appear.



2. Enter the password: XXXXXX. Unless the password is accepted, no submenu can be opened.

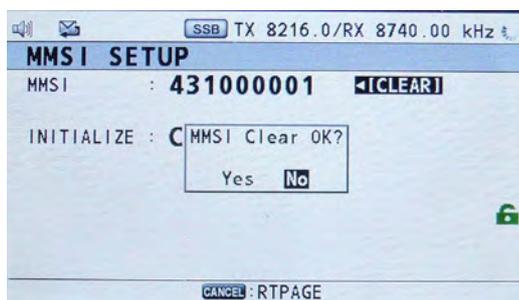


3. Click on “MMSI,” and then press the [ENTER] knob. The MMSI entry box window will appear. Enter MMSI on this window, and then press the [ENTER] knob. When MMSI is already registered, overwrite the MMSI. To exit this window, press the [CANCEL] key.

4.1.2 MMSI CLEAR

Procedure)

1. Press and hold [S1]: MMSI switch on the T-IF board for a period of four seconds or more. The “MMSI SETUP” window will appear.
2. Enter the password: XXXXXX, click on “◀ [CLEAR],” and press the [ENTER] knob.
3. The dialog box “MMSI Clear OK?” will appear. Click “Yes,” and then press the [ENTER] knob. The MMSI setting will be cleared.



4. Click on “MMSI,” enter a new MMSI, and then press the [ENTER] knob. To exit this window, press the [CANCEL] key.

4.1.3 CLEAR ALL

Executing CLEAR ALL will initialize all settings except for MMSI and MAC address settings. When this menu is executed, the said settings should be made again.

Procedure)

1. Press and hold [S1]: MMSI switch on the T-IF board for a period of four seconds or more. The “MMSI SETUP” window will appear.
2. Enter the password: XXXXXX, click on “CLEAR ALL,” and press the [ENTER] knob.
3. The dialog box “MMSI Clear OK?” will appear. Click “Yes,” and then press the [ENTER] knob. The window will fade out to execute the “CLEAR ALL” menu. Subsequently, a message saying “Initializing...” will appear and the RT window will open.

4.2 USER CH

4.2.1 Overview

1. 256 user-specified channels including SSB, NBDP, DSC, and CW mode can be registered. Registered USER channels are saved in the T-CPU board.
To register them, press the [5] key. The “USER CH ENTRY” window will appear.
2. To register USER CH in CW mode, select [MENU] -> 9.SERVICE -> 3.RT SETUP -> 1. SETUP, and then set CW on the SETUP window to “ENABLE.” Submenu-1 “CW” will be added on the “MODE” selection popup window.
3. To call any of the SSB, NBDP, and CW channels registered on the RT window, select MODE first, and then enter a channel number to be called in the “CH” box.
In order to distinguish the USER channels from ITU channels, prefix “0” (zero) to all channel numbers. For example, enter “0201” for channel number 201.

Reference) Handling of “Channel”

- ITU SSB CH: Band (2/4/6/8/12/16/18/22/25) + 00 to xx (401, 1205, etc.)
- ITU TLX CH: Band (2/4/6/8/12/16/18/22/25) + 000 to xxx (4001, 12005, etc.)
- ITU CW CH: Band (4/6/8/12/16/18/22/25) + 000 to xxx (4001, 12005, etc.)
Note) Change the mode to CW, and then enter ITU CH.
- SSB, TLX, and CW User CH: 01 to 29 + 01 to xx (0401, 01205, etc.)
- DSC User CH: Band (2/4/6/8/12/16/18/22/25) + 01 to 04 (0401, 01205, etc.)

4. The registered USER channels are reflected on the windows listed in the following table.

Table 4.2.1 Application of USER CH

USER CH-related Window	SSB	NBDP	DSC	CW
RT Window	✓	✓	N/A	✓
DSC COMPOSE MESSAGE	✓	✓	✓	N/A
MESSAGE FILE ENTRY	✓	✓	✓	N/A
ROUTINE SCAN FREQ SETUP	N/A	N/A	✓	N/A
TX POWER (FREQ)	N/A	N/A	N/A	N/A
TX POWER (USER CH)	✓	✓	✓	✓
Call from NBDP Terminal	N/A	N/A	N/A	N/A

5. Function keys are displayed at the bottom of the USER CH registration window. For example, to register USER CH, press the [5] key.



Table 4.2.2 List of Assigned Keys for USER CH Setting

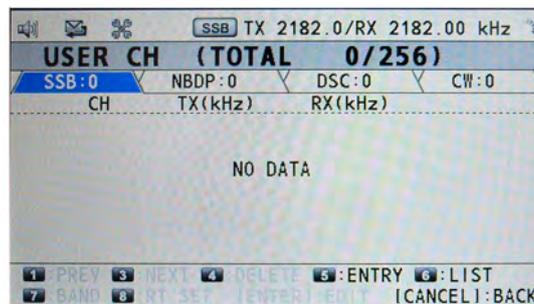
Assigned Key	Function
[1]: PREV	Jumps to the previous page by page scrolling.
[3]: NEXT	Jumps to the next page by page scrolling.
[4]: DELETE	Deletes data. DELETE SELECTION, DELETE LIST, and DELETE ALL LISTS modes are available.
[5]: ENTRY	Registers data.
[6]: LIST	Moves the tab list on the USER CH window.
[7]: BAND	Selects BAND in the selection MODE.
[8]: RT SET	Reflects the SSB USER CH on the RT window.
[ENTER]: EDIT	Edits USER CH selected.
[CANCEL]:BACK	Returns to the previous window.

4.2.2 USER CH Window Operation

1. Registering USER CH [5]: ENTRY

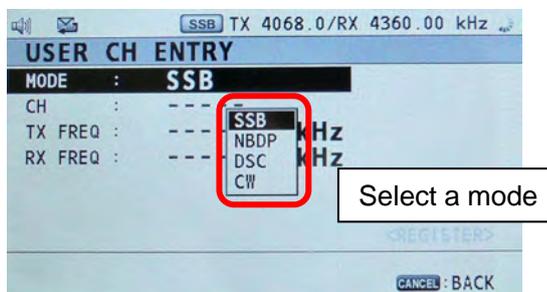
Procedure)

1. Select [MENU] -> USER CH, and then press the [ENTER] knob. The "USER CH" window will appear.



2. Press the [5]: ENTRY key. The "USER CH ENTRY" window will appear.

- Put the cursor on “MODE,” and then press the [ENTER] knob. The “MODE” selection popup window will appear. Select a mode for USER channel, and then press the [ENTER] knob.



- Put the cursor on “CH,” and then press the [ENTER] knob. Subsequently, register a channel. For example, to register Channel 1 on the 2 MHz band, enter “201.” When trying to register an already-registered channel, a message saying “Channel number over laps.” will appear.

Reference)

All BAND and CH numbers except for USER CH in DSC mode are listed for convenience sake.

Frequency to a specified BAND does not necessarily have to be registered to its band. For example, 2575 kHz of SSB frequency can be registered to Channel 1 on the 4 MHz band.

However, since registering a frequency of the band to the BAND makes it easy to organize bands and channels, it would be better to register the channel as “201.”

MODE	BAND	CH	FREQ
SSB	1 - 29	00 - 99	N/A
NBDP	1 - 29	00 - 99	
DSC	2, 4, 6, 8, 12, 16, 18, 22, 25	01 - 04	
CW	1 - 29	00 - 99	

- Put the cursor on “TX FREQ,” and then press the [ENTER] knob. Subsequently, enter a transmission frequency, and then press the [ENTER] knob.
- Put the cursor on “RX FREQ,” and then press the [ENTER] knob. Subsequently, enter a reception frequency, and then press the [ENTER] knob.
- A <REGISTER> icon will appear and the cursor will move to this icon. Then, press the [ENTER] knob. With this, the Channel 1 registration is completed. Repeat the procedure aforementioned to register all other channels.

2. Displaying a LIST of USER CH registered [6]: LIST

Every time the [6]: LIST key is pressed on the “USER CH” window, the MODE tab will be switched to display a list of channels registered in a MODE selected.

The figure shown on the MODE tab represents the number of channels registered in the MODE selected.

CH	TX(kHz)	RX(kHz)
1: 0101	1644.0	1644.0
2: 0201	2394.5	2394.5
3: 0202	2575.0	2575.0
4: 0205	2700.0	2700.0
5: 0401	4100.0	4300.0
6: 0801	8100.0	8700.0
7: 01201	12200.0	13200.0

3. Deleting USER CH registered [4]: DELETE

Press the [4]: DELETE key on the “USER CH” window. A sub window shown below will appear.

CH	TX(kHz)	RX(kHz)
0201	2394.5	2394.5
0202	2575.0	2575.0
0401	4100.0	4300.0

DELETE SELECTION
DELETE LIST
DELETE ALL LISTS

DELETE SELECTION

Select a channel to be deleted in advance. Press the [4]: DELETE key to display the sub window, click on “DELETE SELECTION,” and then press the [ENTER] knob. A message saying “Are you sure?” will appear. Click “YES,” and then press the [ENTER] knob. The channel selected will be cleared.

DELETE LIST

Select a tag to be deleted in advance. Press the [4]: DELETE key to display the sub window, click on “DELETE LIST,” and then press the [ENTER] knob. A message saying “Are you sure?” will appear. Click “YES,” and then press the [ENTER] knob. All channels in the MODE selected will be cleared.

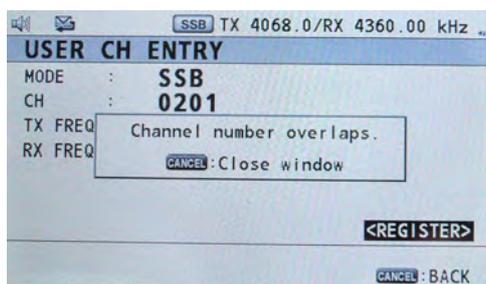
DELETE ALL LISTS

Press the [4]: DELETE key to display the sub window, click on “DELETE ALL LISTS,” and then press the [ENTER] knob. A message saying “Are you sure?” will appear. Click “YES,” and then press the [ENTER] knob. All channels will be deleted.

4. Editing USER CH registered

Procedure)

1. Select a channel to be edited on the “USER CH” window.
2. Press the [ENTER] knob. The “USER CH ENTRY” window will appear.
3. Make a change to the content of registration following the procedure for “1. Registering USER CH,” put the cursor on <REGISTER>, and then press the [ENTER] knob. A message saying “Channel number overlaps.” will appear.



4. Click “Yes,” and then press the [ENTER] knob.
The content of the channel selected will be replaced with that edited.

5. Searching USER CH registered [7]: BAND

Select a MODE to be searched on the “USER CH” window.

Press the [7]: BAND key. A window displaying the following “BAND” will appear.

Select a BAND to be searched, and then press the [ENTER] knob.

The cursor will move to the youngest channel number registered on its BAND. Then, search a channel to be selected with the channel knob.

The screenshot shows the 'USER CH' window with a list of channels. The title bar indicates 'SSB TX 4068.0/RX 4360.00 kHz'. The window title is 'USER CH (TOTAL 8/256)'. The list shows channels 1 through 7 with their respective TX and RX frequencies. A cursor is positioned over channel 1.

CH	TX(kHz)	RX(kHz)
1: 0101	1644	1644.0
2: 0201	2394	2394.5
3: 0202	2575	2575.0
4: 0205	2700	2700.0
5: 0401	4100	4300.0
6: 0801	8100	8700.0
7: 01201	12200	13200.0

At the bottom, there are navigation buttons: PREV, NEXT, DELETE, ENTRY, LIST, EDIT, BAND, RT SET, and CANCEL: BACK.

6. Reflecting channel selected on the RT window [8]: RT SET

On the “USER CH” window, select a channel used to perform communication from the USER CH LIST in SSB mode. Then, press the [8]: RT SET key. The window will be switched to the “RT” window to reflect the channel selected on the RT window.

4.3 SYSTEM

A submenu that should be checked for setting after installation depending on antenna configuration is “ANT SELECT” of Submenu-1 “RT SETUP.” Furthermore, to enter a reception signal in the weather FAX receiver, set “FAX RX” of Submenu-1 “RT SETUP” to “ENABLE.”

Table 4.3.1 List of SYSTEM Menus

Setting Submenu		Set Value	Relevant Page
1. SQ FREQ	500 – 2000Hz	1000	4-11
2. KEY ASSIGN	1. F1: RX FREQ	---, TX/RX FREQ, RX FREQ, MODE, AGC, TX PWR, TX MONITOR, TEST CALL, MSG FILE, DAILY TEST, LOG, INTERCOM, CLARIFIER	4-12
	2. F2: DAILY TEST	<i>Ditto</i>	
	3. F3: TEST CALL	<i>Ditto</i>	
3. PRINT	1. TX MSG	MANUAL, AUTO	4-13
	2. RX MSG	<i>Ditto</i>	
	3. DAILY TEST	<i>Ditto</i>	
4. POSITION	INPUT TYPE	EPFS, MANUAL, NO INFO	4-16
5. DATE/TIME	SOURCE	INTERNAL/EPFS	4-18
	DATE	dd/mm/yyyy	
	TIME	xx:xx UTC	
6. TIME OUT	1. MENU END	10 MIN, NO TIME OUT	4-19
	2. DSC GENERAL	15 MIN, NO TIME OUT	
	3. RX DISTRESS	15 MIN, NO TIME OUT	
	4. SSB	10 SEC, 30 SEC, 10 MIN	
	5. TELEX	10 SEC, 30 SEC, 10 MIN NO TIMEOUT	
	6. FAX	<i>Ditto</i>	
	7. AM	<i>Ditto</i>	
	8. CW	<i>Ditto</i>	
7. RX SETUP	1. FAX RX	DISABLE, ENABLE	4-21
	2. ANT SELECT	RX ANT, TRX ANT	
	3. CLARIFIER	ON, OFF	
8. EXTERNAL ALARM	1. URGENCY	ON, OFF	4-24
	2. SAFETY	<i>Ditto</i>	
	3. ROUTINE	<i>Ditto</i>	
9. NETWORK	<VIEW> IP ADDRESS	172.031.005.003	4-26
	<VIEW> SUBNET MASK	255.255.000.000	
	<VIEW> GATEWAY	000.000.000.000	
	<VIEW> HOST NAME	SSB003, SSB004, SSB005 (depending on model)	

4.3.1 [1. SQ FREQ] Default: 1000

The [3]: SQ key is used to turn ON or OFF the SQ circuit. The default is 1000 Hz. The SQ circuit is enabled in SSB and LSB modes. Changing to any other mode automatically turns OFF the circuit, while returning it to SSB or LSB mode turns ON the circuit.

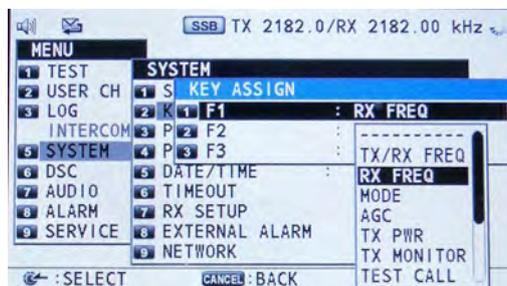
This function is incorporated in FS-2575C and can be set by each unit of FS-2575C. For example, when two units of FS-2575C are installed, No. 1 unit allows for setting SQ FREQ to 1000 Hz with the SQ function turned ON, while No. 2 unit allows for setting SQ FREQ to 800 Hz with the SQ function turned OFF.

The SQ circuit detects the spectrum of audio signal. When the SQ circuit detects a frequency component lower than a set frequency, it will turn ON the AF output. Approximately 70-msec delay time is provided to open the SQ circuit, and approximately 1.5-s delay time is provided to close it.



4.3.2 [2. KEY ASSIGN]

This submenu allows the assignment of specific functions to [1], [4], and [7] keys. The functions to be assigned are as listed in the table shown below. The functions can be set by each unit of FS-2575C.



Note)

When [MENU] -> 9.SERVICE -> 3.RT SETUP -> 1.SETUP -> SELCALL -> ENABLE is selected, F3: [7] key will be automatically assigned to SELCALL and the display of “F3” will be cleared from the “KEY ASSIGN” Key Selection window.

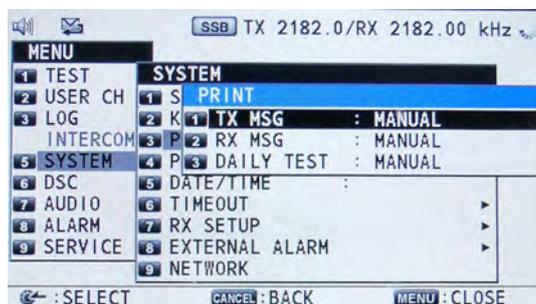
Table 4.3.2 List of KEY ASSIGN Setting Functions

Function	Description
----	Disables the assignment of function keys.
TX/RX FREQ	Displays a popup window used to make TX frequency setting. Once TX frequency has been set, the same frequency is set to RX frequency. This function allows individual RX frequency setting.
RX FREQ	Displays a popup window used to make RX frequency setting. Even if RX frequency is set, TX frequency will remain unchanged. However, once TX frequency has been set, RX frequency also changes.
MODE	Displays a popup window used to select a MODE.
AGC	Displays a popup window used to select AGC.
TX PWR	Displays a popup window used to select TX POWER.
TX MONITOR	Sets transmission frequency to reception frequency every time the key is pressed in case of communications using different frequency band (S-DUP, DUP).
TEST CALL	“2. MSG FILE” window opens when [MENU] -> 6. DSC is selected. TEST is selected in the File tab. To make a test call; 1) select a station to make a TEST CALL from MSG FILE, 2) click on [OTHER DSC MSG] to display the COMPOSE MESSAGE window, 3) put the cursor on “GO TO CALL,” and then press the [ENTER] knob.
MSG FILE	“2. MSG FILE” window opens when [MENU] -> 6. DSC is selected. A tab that opened previously is selected in the FILE tab.
DAILY TEST	Executes “1. DAILY TEST” when [MENU] -> 1. TEST is selected.
LOG	Displays the “LOG” window when [MENU] -> 3 LOG is selected.
INTERCOM	Executes “INTERCOM” when [MENU] -> 4. INTERCOM is selected.
CLARIFIER	Displays “CLARIFIER” regardless of whether CLARIFIER is set to “ON” or “OFF” when [MENU] -> 5.SYSTEM -> 7.RX SETUP -> CLARIFIER is selected. CLARIFIER is enabled in SSB, CW, and LSB MODE.

4.3.3 [3. PRINT]

This submenu is used to make printing mode setting to MANUAL or AUTO. The setting is available for TX MSG, RX MSG, and DAILY TEST.

- TX MSG: Prints out all transmitted messages, the DSC calls of which have been made.
- RX MSG: Prints out all received DSC messages.
- DAILY TEST: Prints out the results of the following tests when conducted.
 - 1) [MENU] -> 1.TEST -> “1.DAILY TEST”
 - 2) [MENU] -> 1.TEST -> “2.TX SELF TEST”
 - 3) [MENU] -> 9.SERVICE -> 3.RT SETUP -> “2.SELF CHECK”



Besides the above, the following items are printed out:

- Individual messages contained in the “RX DISTRESS,” “RX GENERAL,” and “TX” tabs when selecting [MENU] -> 3.LOG
- [MENU] -> 9.SERVICE -> 6.MAINTENANCE LOG -> 2.ERROR LOG
- Messages transmitted using [OTHER DSC MSG]
- Messages transmitted using [DISTRESS MSG], and
- [MENU] -> 9.SERVICE -> 5.TEST -> 1.VERSION

To print out each message, operate the key following the operation guide displayed at the bottom of the relevant window.

Printout Examples

```
***** FS-5075 DAILY TEST RESULT *****
TIME      : 17/JUN/2011 06:02:13
APPLICATION: 0550243-01.01
CPLD     : 0550245-01.01
7BK BOOT : 0550247-00.06
PANEL BOOT: 0550246-01.01
RX       : OK
DSC      : OK
WR1      : OK
WR2      : OK
ALARM UNIT: --
```

Sample: DAILY TEST RESULT
[MENU] -> 1.TEST -> 1.DAILY TEST

```
***** FS-5075 TX SELF TEST RESULT *****
TIME      : 17/JUN/2011 06:02:42
APPLICATION: 0550243-01.01
CPLD     : 0550245-01.01
78K BOOT : 0550247-00.06
```

```
SW REG1 : OK    COMB    : OK
SW REG2 : OK    TX FIL  : OK
CODEC   : OK    COUPLER : OK
TX PLL  : OK
TX      : OK
DRV     : OK
PA      : OK
```

```
TX PLL DETAIL
2MHz : OK    16MHz : OK
4MHz : OK    18MHz : OK
8MHz : OK    22MHz : OK
12MHz : OK   27MHz : OK
```

```
TX FIL DETAIL
1MHz : OK    8MHz : OK
3MHz : OK    12MHz : OK
4MHz : OK    18MHz : OK
6MHz : OK    22MHz : OK
```

```
PA DETAIL
PA1 : OK
PA2 : OK
COMB : OK
```

Sample: TX SELF TEST RESULT
[MENU] -> 1.TEST -> 2.TX SELF TEST

```
***** FS-5075 SERVICE SELF CHECK RESULT *****
TIME      : 17/JUN/2011 06:03:50
APPLICATION: 0550243-01.01
CPLD     : 0550245-01.01
78K BOOT : 0550247-00.06
```

```
VS      :24.7V OK
TX IF IN :1173 OK
TX RF OUT:1275 OK
DRV TEMP : 736
DRV VF   : 208 OK
DRV VR   : 1   OK
```

```
VC PA1 :42.9V OK PA2 :43.4V OK
IC PA1 : 2.3A OK PA2 : 1.5A OK
VF PA1 :1160 OK PA2 :1121 OK
VR PA1 : 53 OK PA2 : 59 OK
TEMP PA1 : 742 PA2 : 743
COMB UNBALANCE: 0 OK
```

```
1M FIL IN VR: 97 ALC: 155 OK
3M FIL IN VR: 96 ALC: 169 OK
4M FIL IN VR: 33 ALC: 179 OK
6M FIL IN VR: 88 ALC: 176 OK
8M FIL IN VR: 72 ALC: 175 OK
12M FIL IN VR: 68 ALC: 149 OK
18M FIL IN VR: 14 ALC: 160 OK
22M FIL IN VR: 60 ALC: 147 OK
```

Sample: SERVICE SELF CHECK RESULT
[MENU] -> 9.SERVICE -> 3.RT SETUP -> 2.SELF CHECK

```
***** FS-5075 ERROR LOG *****
16/JUN/2011 13:38:54 VC ERROR
16/JUN/2011 13:35:22 VC ERROR
16/JUN/2011 13:06:52 VC ERROR
16/JUN/2011 13:06:28 VC ERROR
```

Sample: ERROR LOG
[MENU] -> 9.SERVICE -> 6.MAINTENANCE LOG
-> 2.ERROR LOG

```
***** Send Message *****
DISTRESS ALERT 17/JUN/2011 07:57
DISTRESS ID :183456789
NATURE :UNDESIGNATED
COMM MODE :TELEPHONE
LAT :3512.4565'N
LON/UTC :13412.5654'E/14:25
EDS :NO ACKNOWLEDGED REQUEST
DSC FREQ :2,4,6,8,12,16MHz
```

Sample: Send DISTRESS ALERT Message

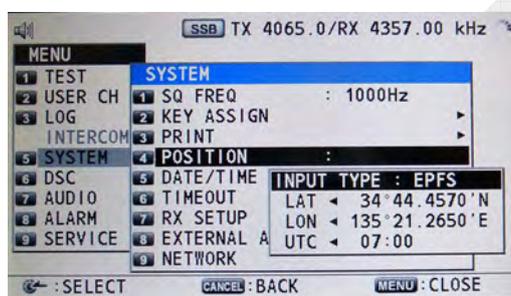
```
***** Received Message *****
DISTRESS ALERT 17/JUN/2011 08:07
DISTRESS ID :987654321
NATURE :UNDESIGNATED
COMM MODE :TELEPHONE
LAT :1912'N
LON/UTC :13556'E/11:45
DISTANCE :0080NM
EDS :NO ACKNOWLEDGED REQUEST
ECC :OK
DSC FREQ : 8414.5kHz
```

Sample: Received DISTRESS ALERT Message

4.3.4 [4. POSITION]

This Sub-menu 1 is used to make setting of positional data input method. Positional data are displayed on the RT window and the SCAN window and also used for the following:

- 1) DISTRESS MESSAGE
- 2) INDIVIDUAL MESSAGE (addressed to Coast)
- 3) RELAY INDIVIDUAL MESSAGE
- 4) PSTN MESSAGE
- 5) ACK BQ (Acknowledgement back) MESSAGE for POSITION CALL
- 6) Reception and responses to AREA MESSAGE
- 7) Reception and responses to RELAY AREA MESSAGE, and
- 8) Calculation of distance to Distress ship



Reference)

Data handling varies with the setting of Sub-menu 2: "FORMAT" in [MENU] -> 9.SERVICE -> 3.RT SETUP -> 1.SETUP -> "FORMAT."

- IEC+NMEA: Accepts sentences compliant with NMEA Ver. 1.5, 2.0., or 3.0 or IEC-61162-1 ed4.0 even if they have no check sum contained in them.
- IEC: Accepts sentence compliant with NMEA-Ver. 3.0 or IEC-61162-1 ed-4.0.

Sentences Used in Positional Data

- 1) There is no priority condition between Manual and EPFS modes. Manually switch between these modes.
- 2) Sentence formatters for positional data: GNS, GGA, RMC, and GLL are accepted in order of priority presented.
Talkers: GN, GP, GA, GL, LC, DE, LA, TR, IN, RA, WI, and II are accepted in order of priority presented.
However, GNS sentences from any talker other than GP, GL, GN, and GA are not received.

Positional Data Handling

Regardless of whether data input mode is set to EPFS or Manual, when positional data is not updated for a period of 23.5 or more hours, positional data included in DSC message will be automatically erased and “NO INFO” will be displayed.

Error messages relating to positional data are as follows:

- ***Lost position!! Position was older than 23.5H. You must update position!***
[CANCEL]: Stop alarm

A warning alarm will sound when the own ship's positional information is not updated for a period of 23.5 or more hours after the last updating. This alarm will be cleared when the [CANCEL] key is pressed.

- ***Position data is not updated! Position was older than 4H. Update it.***
[CANCEL]: Stop alarm

A warning alarm will sound when the own ship's positional data is not updated for a period of four hours after the last updating. This alarm will be cleared when the [CANCEL] key is pressed or the positional information is updated.

Furthermore, the display in the EPFS column on the RT window will change to “EPFS (OLDER).”

- ***EPFS error [CANCEL]: Stop alarm***

A warning alarm will sound when the transmission of positional data from EPFS is lost for a period of 10 minutes.

However, if Submenu-2 “INPUT TYPE” is set to MANUAL, this alarm will not be outputted. The alarm will be cleared when the [CANCEL] key is pressed or the positional information is updated from the EPFS.

Furthermore, the display in the EPFS column on the RT window will change to “EPFS (OLDER).”

Data Switching

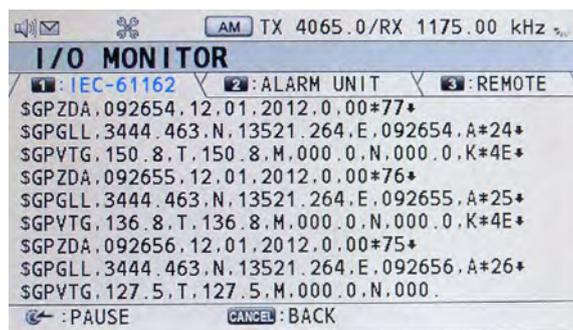
- 1) Data switches from high to low level when it times out.
Timeout time: 3.0 seconds
- 2) Data switches from low to high level on the spot.
Priorities of formatters: GNS > GGA > RMC > GLL

Data Input Checking Method

By selecting [MENU] -> 9.SERVICE -> 6.MAINTENANCE -> 1.I/O MONITOR and opening the “IEC-61162” tab on the I/O MONITOR window, IEC data inputted between TB6-#3 (GNSS RD-A) and #4 (GNSS RD-B) can be monitored.

Monitoring is independent of the following settings:

- [MENU] -> 5.SYSTEM -> 4.POSITION -> POSITION setting
- [MENU] -> 9.SERVICE -> 3.RT SETUP -> 1.SETUP -> FORMAT setting



4.3.5 [5. DATE/TIME]

Date/Time data are used to timestamp on printouts of DSC communication LOG and TEST results. When Date/Time data ZDA or RMC is inputted (in order of priority presented), “EPFS” will be displayed in the [SOURCE] column.

If no data is inputted, “INTERNAL” will be displayed in the [SOURCE] column, and data with date and time set manually will be set to RTC mounted on the T-CPU board. If RTC time deviates from ZDA or RMC time (in order of priority presented) by 10 or more minutes, adjust the RTC time to ZDA or RMC time (in order of priority presented).

GGA and others are not used to update RTC due to a lack of date data.

Reference)

“TIME” included in DISTRESS MESSAGE and “UTC” displayed on the RT window and the SCAN window is positioning time included in positional data in use. ZDA or RMC sentence is used (in order of priority presented) for time data for timestamp data.

However, the handling of RMC data varies with the setting of Submenu-2 “FORMAT” in [MENU] -> 9.SERVICE -> 3.RT SETUP -> 1.SETUP -> “FORMAT.”

- IEC + NMEA: Allows for the use of RMC time as system time.
- IEC: Not allow for the use of RMC time as system time.

4.3.6 [6. TIME OUT]

This submenu is used to make setting of time required for the system to return to a window to which it entered when performing no operation after entering the OPERATION/SETTING window from the RT or SCAN window.

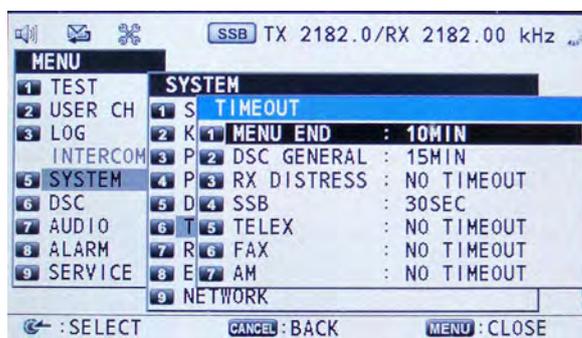


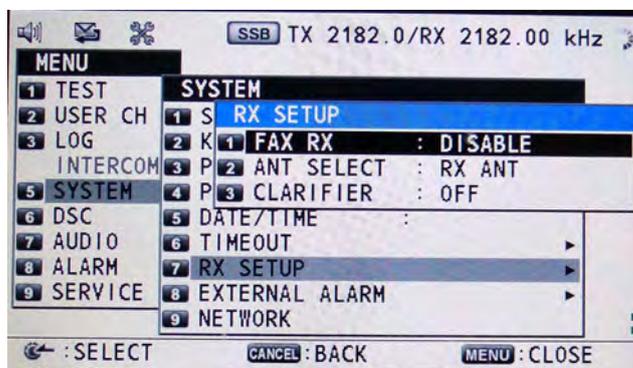
Table 4.3.3 List of TIME OUT Setting Submenus

Submenu	Set Value	Description
1. MENU END	10 MIN	Makes setting of operation timer on the MENU window. Setting this submenu to 10 minutes will return to a window before entering the MENU window as long as no operation is performed for a period of 10 minutes.
	NO TIMEOUT	
2. DSC GENERAL	15 MIN	Makes setting of reception windows except for the DISTRESS ALERT RECEPTION window and the window operation timer.
	NO TIMEOUT	When setting this submenu to 15 minutes, the DSC procedure will be automatically cleared and disappear from the multi-procedure tab area (not from the log) if no operation is performed for a period of 15 minutes.
3. RX DISTRESS	15MIN	Makes setting of the DISTRESS ALERT RECEPTION window and the window operation timer.
	NO TIMEOUT	When setting this submenu to 15 minutes, the display will return to the RT window if no operation is performed for a period of 15 minutes.
4. SSB	10 SEC	Makes setting of operation timer when "emission type" on the RT window is set to SSB or LSB.
	30 SEC	For example, setting this submenu to 10 seconds will make the RT icon mark disappear from the multi-procedure tab area.
	10 MIN	
5. TELEX	10 SEC	Makes setting of operation timer when "emission type" on the RT window is set to TELEX (TLX).
	30 SEC	For example, setting this submenu to 10 seconds will make the RT icon mark disappear from the multi-procedure tab area if no operation is performed for a period of 10 seconds.
	10 MIN	
	NO TIMEOUT	However, during transmission or standby at NBDP frequency, this submenu is set to NO TIMEOUT.

6. FAX	10 SEC	<p>Makes setting of operation timer when “emission type” on the RT window is set to FAX.</p> <p>For example, setting this submenu to 10 seconds will make the RT icon mark disappear from the multi-procedure tab area if no operation is performed for a period of 10 seconds.</p> <p><i>Note) When making setting like [MENU] -> 5. SYSTEM-> 7. RX SETUP -> 3. FAX RX -> ENABLE, Submenu-1 “7. FAX” will be added.</i></p>
	30 SEC	
	10 MIN	
	NO TIMEOUT	
7. AM	10 SEC	<p>Makes setting of operation timer when “emission type” on the RT window is set to AM.</p> <p>For example, setting this submenu to 10 seconds will make the RT icon mark disappear from the multi-procedure tab area if no operation is performed for a period of 10 seconds.</p>
	30 SEC	
	10 MIN	
	NO TIMEOUT	
8. CW	10 SEC	<p>Makes setting of operation timer when “emission type” on the RT window is set to CW.</p> <p>For example, setting this submenu to 10 seconds will make the RT icon mark disappear from the multi-procedure tab area if no operation is performed for a period of 10 seconds.</p> <p><i>Note) When making setting like [MENU] -> 9. SERVICE -> 3. RT SETUP -> 1. SETUP -> CW -> ENABLE, Submenu-1 “8. CW” will be added.</i></p>
	30 SEC	
	10 MIN	
	NO TIMEOUT	

4.3.7 [7. RX SETUP]

This Submenu-1 is used to make setting of Submenu-2 related to reception, including FAX RX, ANT SELECT, and CLARIFIER.



1. FAX RX (DISABLE, ENABLE)

Set this Submenu-2 to “ENABLE” in order to connect to the external input terminal of a weather FAX receiver. Setting it to “ENABLE” will add “FAX” on the MODE SELECTION window.

Reference)

The FAX Reception Signal: 1900 Hz \pm 400 Hz is outputted to “#10 - 11: LINE OUT” of the [REMOTE] terminal.

The level adjustment of this signal is made by selecting [MENU] -> 9.SERVICE -> 3. RT SETUP -> 1.SETUP -> “LINE OUT.” The adjustment range is 0 dBm \pm 10 dBm/600 Ω .

2. ANT SELECT (RX ANT, TRX ANT)

This Submenu-2 is used to select whether to use the T/R ANT as a receiving antenna or to receive with a RX antenna.

For the installation patterns and settings of receiving antenna, refer to “Receiving Antenna Configuration” on page 4-73.

Note)

Unless system setting is made like [MENU] -> 9.SERVICE -> 3.RT SETUP -> 1.SETUP -> “RX ANT” -> “CONNECT,” “ANT SELECTOR” is not displayed.
To set Submenu-2 “ANT SELECT” to “RX ANT,” a RX antenna should be installed. The same should apply to Full-Duplex communications.

Reference)

The RX antenna circuit is switched by the “K1” relay on the RX FIL board. This relay is controlled by setting Submenu-2 “ANT SELECT” to “RX ANT.” Furthermore, when “ANT SELECT” is set to “RX ANT,” the T/R antenna will be connected to the ground through the “K30” relay in the antenna coupler at the time of receiving frequency.

The T/R ANT is also connected to the ground when the power is turned off.

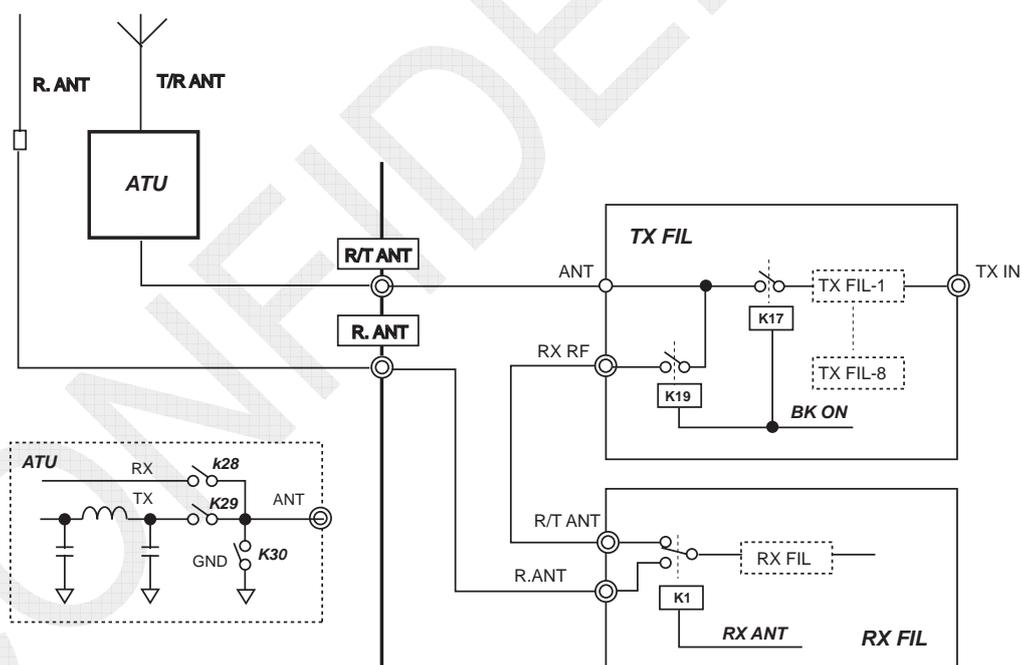


Fig. 4.3.1 ANT SELECTOR

3. CLARIFIER (ON, OFF)

When Submenu-2 "CLARIFIER" is set to "ON," "CLARIFIER: +0.00 kHz" will be displayed under the reception frequency on the RT window.

It is displayed in SSB, LSB, and CW modes. The set value of CLARIFIER is maintained even if the frequency is changed.

The CLARIFIER function can be registered by selecting [MENU] -> 5.SYSTEM -> 2.KEY ASSIGN.

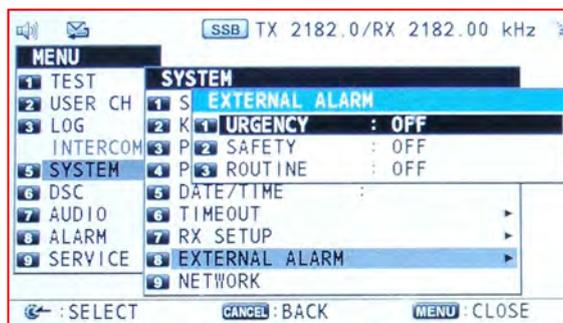
Reference)

By selecting [MENU] -> 9.SERVICE -> 3.RT SETUP -> 1.SETUP ->

"CLARIFIER," variable width can be set in the range of " ± 50 to ± 990 Hz." The frequency control is executed according to DDS frequency data of 1st LO on the RX board.

4.3.8 [8. EXTERNAL ALARM]

This submenu is used to activate EXT ALM output (TB7 #7 - #8) according to the category of DSC message received. In case of Distress alert message, the output will be activated when it is received.



Reference)

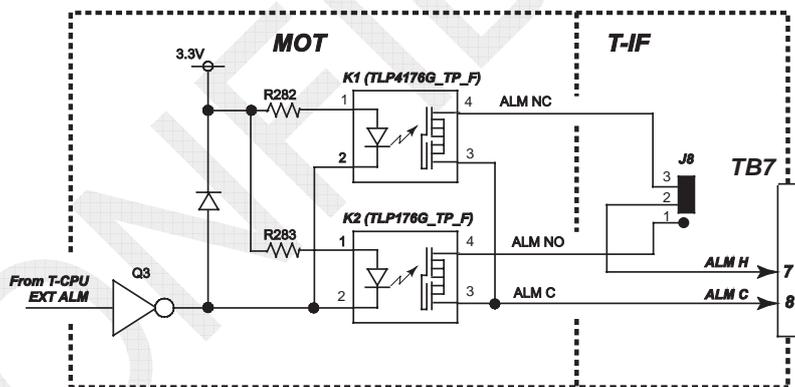
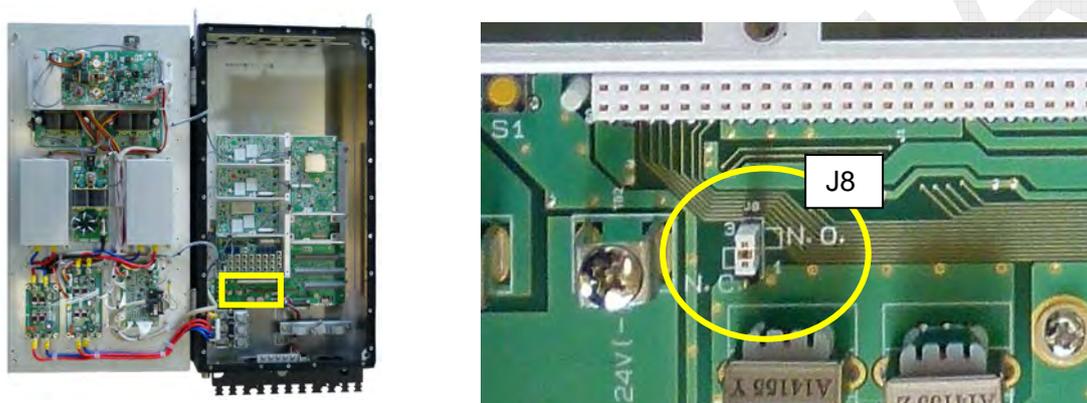
- 1) When ALM ACK input (TB7 #9 - #10) from externally-connected equipment is activated (set to Low level), EXT ALM output (TB7 #7 - #8) will be reset.
- 2) Even if the ALM ACK input is activated, FS-2575C and IC-350 will not stop sounding an alarm. To stop it sounding the alarm, press the [CANCEL] key of the FS-2575C.
- 3) When the [CANCEL] key of the FS-2575C, the EXT ALM output will be reset. The IC-350 will also stop sounding the alarm and turn OFF the DIS RCVED LED. In other words, the cancel operation of the FS-2575C is given the top priority.

- 4) EXTERNAL ALARM is outputted via the contact of photo relay. This contact is normally closed and will be put into an open state when an alarm is outputted. To put the contact into a normally open state, change the jumper [J8] on the T-IF board.

The maximum rating on the output side is 120 mA/350 VDC.

Reference)

The resistance of the EXTERNAL ALARM contact output is approximately 25 ohms (non-polar) when it is closed. The resistance is high when it is open.



J8:
 1 - 2: NORMAL OPEN
 2 - 3: NORMAL CLOSE

Fig. 4.3.2 EXTERNAL ALARM I/F

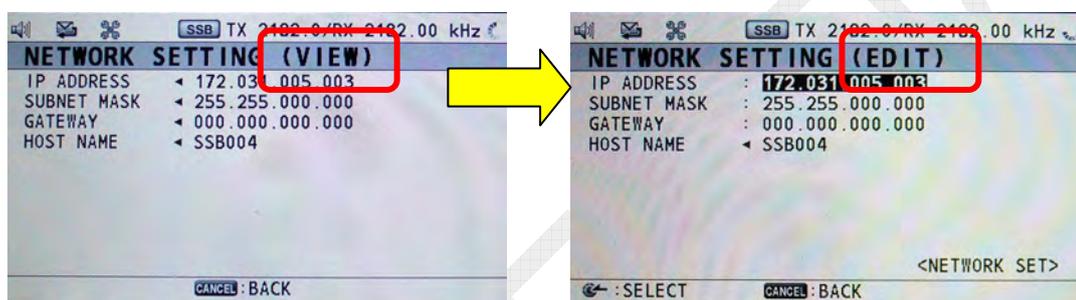
4.3.9 [9. NETWORK]

This submenu allows for checking the network information of this System on the NETWORK window.

To make a network setting change, conduct the following operation:

Procedure)

1. Select [MENU] -> 5.SYSTEM -> 9.NETWORK, and then open the menu.
2. Enter the password: **012345678**. No entry window will appear.
3. The (VIEW) window will be switched to (EDIT) window.



4. Put the cursor on <NETWORK SET>, and then press the [ENTER] key. A popup message saying “RESTART OK?” will appear. Click “Yes,” and then press the [ENTER] knob.



5. The window will fade out to start displaying a message saying “Initializing...” and open the RT window.

MEMO

The HOST NAME column describes the name of this System for convenience sake, but this column is not in use now.

- FS-1575: SSB003
- FS-2575: SSB004
- FS-5075: SSB005

4.4 DSC

This menu is used to make DSC-related settings.

The DSC-related settings can also be made by selecting [MENU] -> 9.SERVICE -> 2.DSC SETUP. For details, refer to information on page 4-51.

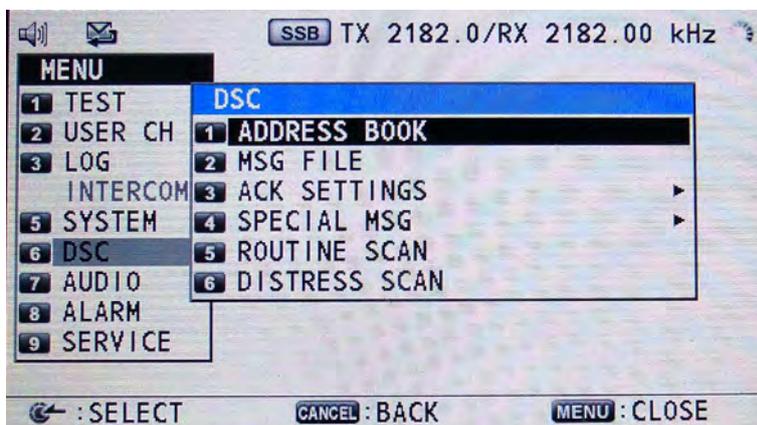


Table 4.4.1 List of DSC Submenus

Submenu	Description	Relevant Page
1. ADDRESS BOOK	Allows for the registration of up to 50 data on SHIP, COAST, and GROUP stations and their MMSI. Registered data can be used on the "DSC COMPOSE MESSAGE" and "MESSAGE FILE ENTRY" windows.	4-28
2. MSG FILE	Allows for the registration of up to 100 INDIVIDUAL, GROUP, PSTN, and TEST DSC messages. DSC calls can be made with the registered messages. For the registration, the other parties can be quoted from ADDRESS BOOK, and COMM FREQ and DSC FREQ can be quoted from frequencies registered with the USER CH menu.	4-33
3. ACK SETTINGS	Selects whether to receive a DSC ACK RQ message in Manual or Auto mode when it is received.	4-37
4. SPECIAL MSG	Selects whether or not to be able to transmit NEUTRAL and MEDICAL messages. Setting this submenu to "ABLE" will activate the SPECIAL MSG submenu of the MSG TYPE menu on the "DSC COMPOSE" window, thus making it possible to select messages set to "ABLE."	4-39
5. ROUTINE SCAN	Selects a DSC ROUTINE SCAN frequency from pre-built in INTL, LOCAL1, LOCAL2, and DIST frequencies as well as DSC FREQ registered on the USER CH window. It is common to select the INTL frequency. It is unable to turn OFF all scanning frequencies.	4-40
6. DISTRESS SCAN	Selects DSC DISTRESS SCAN frequencies, at least 2M and 8M-Band, and other frequencies. However, In case of "MF" with setting made by selecting [MENU] -> 9. SERVICE -> 2. DSC SETUP -> CLASS, the frequency will be fixed to 2187.5kHz."	4-41

4.4.1 [1. ADDRESS BOOK]

This sub-menu allows for the registration of station names and their MMSI. Registered data are saved to the T-CPU board. The data are saved in the SHIP, COAST, or GROUP list according to the configuration of MMSI number up to 50 names and MMSI in total. When the pages of registered data come to two or more, the data will be displayed in alphabetical and numerical order.

- MIDxxxxxx: Data are saved in the SHIP list.
- 00MIDxxxx: Data are saved in the COAST list.
- 0MIDxxxxx: Data are saved in the GROUP list.

Unless a GROUP ID is registered, no group message can be received.

Reference)

When calling a DSC message or opening a received message on the user option: “INFO” window, an icon “[9]: ADDRESS REGISTER” will appear.

Pressing the [9] key will register the MMSI of the other station in the ADDRESS BOOK. In this case, the station NAME is displayed in communication time.

This sub-menu is operated by using the function key number shown at the bottom of the ADDRESS BOOK window.

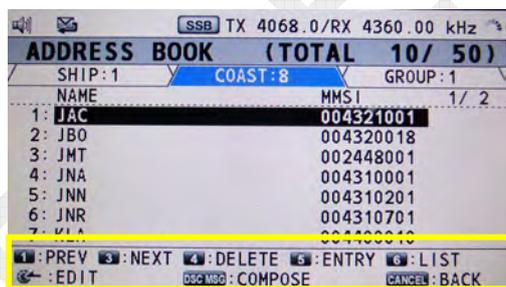
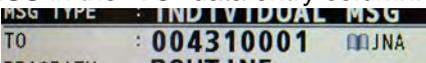


Table 4.4.2 List of Function Keys Assigned for ADDRESS BOOK Setting

Function Key	Function
[1]: PREV	Jumps to the previous page by page scrolling.
[3]: NEXT	Jumps to the next page by page scrolling.
[4]: DELETE	Deletes data. DELETE SELECTION, DELETE LIST, and DELETE ALL LISTS modes are available.
[5]: ENTRY	Registers data. Names are registered in a maximum of 20 characters, while MMSI is registered in a maximum of 9 digits.
[6]: LIST	Moves the SHIP, COAST, and GROUP list tabs.
[ENTER]: EDIT	Edits data selected.
[CANCEL]: BACK	Returns to the previous window.

[DSC MSG]: COMPOSE	Calls the DSC MESSAGE COMPOSE window and reflects a selected ADDRESS in the “TO” data entry column. 
-----------------------	---

1. Registering an address [5]: ENTRY

Procedure)

1. Select [MENU] -> 6.DSC -> 1.ADDRESS BOOK, and then press the [ENTER] knob.

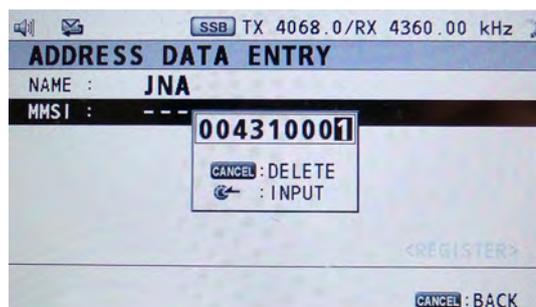
The “ADDRESS DATA” window will appear. Press the [5]: ENTRY key, and the “ADDRESS DATA ENTRY” window will appear.



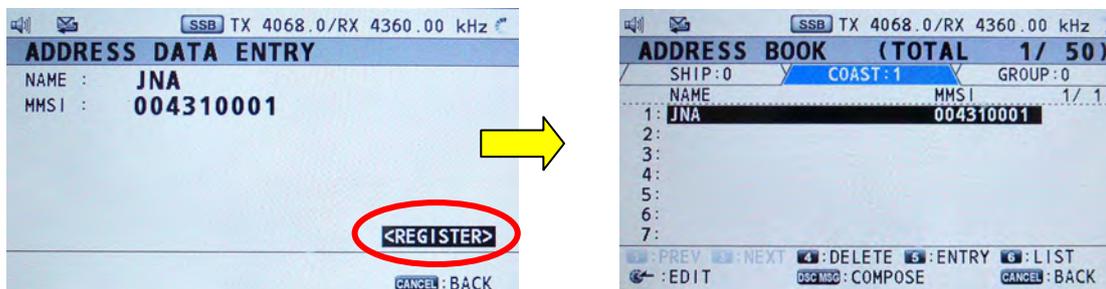
2. Click on “NAME,” and then press the [ENTER] knob. Subsequently, enter a station name, and then press the [ENTER] knob.



3. Click on “MMSI,” and then press the [ENTER] knob. Subsequently, enter MMSI, and then press the [ENTER] knob.

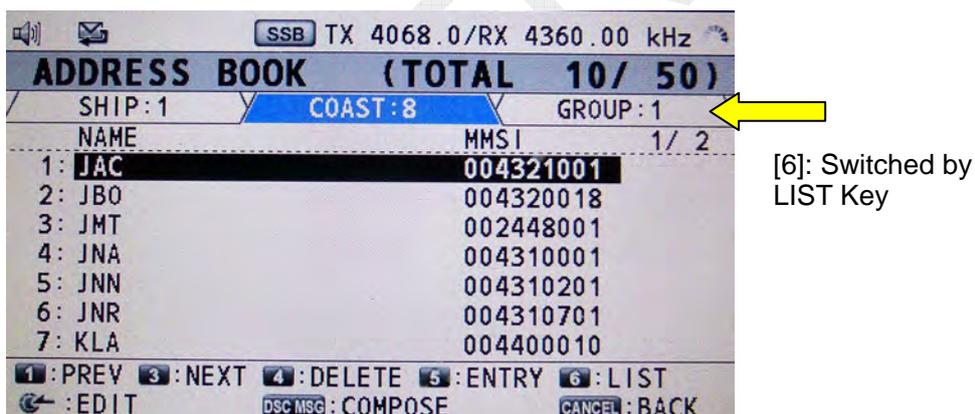


4. A <REGISTER> icon will appear and the cursor will move to this icon. Then, press the [ENTER] knob. With this, the registration of a single address is completed.



2. Displaying a list of addresses registered [6]: LIST

Every time the [6]: LIST key is pressed on the “ADDRESS BOOK” window, the mode tub will be switched to display a list of addresses registered in a mode selected.



3. Deleting address(s) registered [4]: DELETE

Press the [4] DELETE key on the “ADDRESS BOOK” window. A sub window shown below will appear.



DELETE SELECTION

Select an address to be deleted in advance. Press the [4]: DELETE key to display the sub window, click on “DELETE SELECTION,” and then press the [ENTER] knob. A message saying “ARE YOU SURE?” will appear. Click “YES,” and then press the [ENTER] knob. The address selected will be cleared.

DELETE LIST

Select a tag to be deleted in advance. Press the [4]: DELETE key to display the sub window, click on “DELETE LIST,” and then press the [ENTER] knob. A message saying “ARE YOU SURE?” will appear. Click “YES,” and then press the [ENTER] knob. All addresses in the tag selected will be cleared.

DELETE ALL LISTS

Press the [4]: DELETE key to display the sub window, click on “DELETE ALL LISTS,” and then press the [ENTER] knob. A message saying “ARE YOU SURE?” will appear. Click “YES,” and then press the [ENTER] knob. All addresses will be deleted.

4. Editing address registered [ENTER]: EDIT

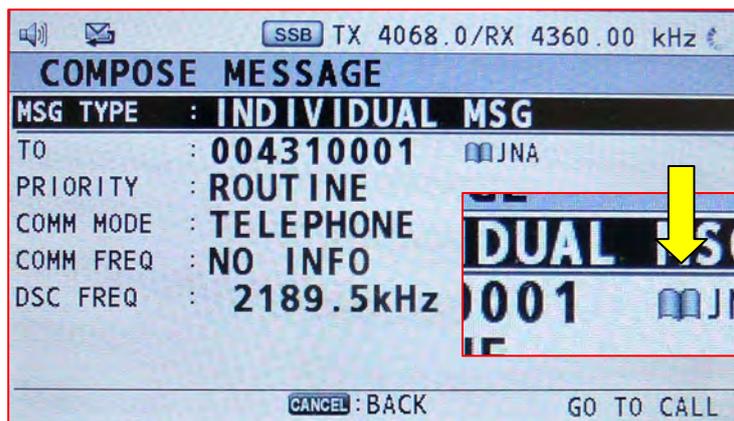
Procedure)

1. Select a channel to be edited on the “ADDRESS BOOK” window.
2. Press the [ENTER] knob. The “ADDRESS BOOK EDIT” window will appear.
3. Make a change to the content of registration following the procedure for “1. Registering an address” on page 4-29, put the cursor on <REGISTER>, and then press the [ENTER] knob. A message saying “Overwrite this Address. Are you sure?” will appear.
4. Click “Yes,” and then press the [ENTER] knob.
The content of the address selected will be replaced with that edited.

5. Reflecting selected address on DSC COMPOSE MESSAGE window [DSC MSG]: COMPOSE

On the “ADDRESS BOOK” window, select an address to be reflected in a transmission DSC message.

Press the [DSC MSG]: COMPOSE. The window will be switched to the “COMPOSE MESSAGE” window to reflect the address selected in the COMPOSE MESSAGE.



Bookmark:
Indicates that data has
come from the address
book.

4.4.2 [2. MSG FILE]

This sub-menu allows for the registration of INDIVIDUAL, GROUP, POSITION, and TEST DSC messages.

These message data are saved to the T-CPU board.

A total of up to 100 messages can be registered. When the pages of registered data come to two or more, the data will be displayed in alphabetical and numerical order.

This sub-menu is operated by using the function key number shown at the bottom of the MESSAGE FILE window.

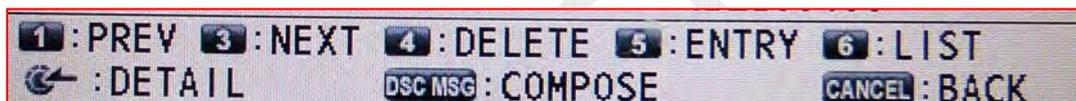
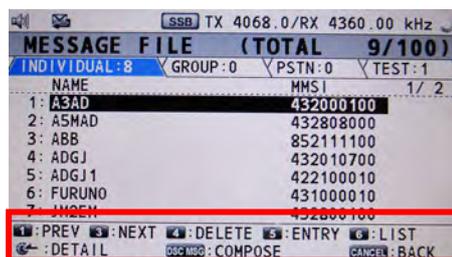


Table 4.4.3 List of Function Keys Assigned for MSG FILE Setting

Function Key	Function
[1]: PREV	Jumps to the previous page by page scrolling.
[3]: NEXT	Jumps to the next page by page scrolling.
[4]: DELETE	Deletes data. DELETE SELECTION, DELETE LIST, and DELETE ALL LISTS modes are available.
[5]: ENTRY	Registers data. FILE NAME is registered in a maximum of 20 characters.
[6]: LIST	Moves the INDIVIDUAL, GROUP, PSTN, AND TEST list tabs.
[ENTER]: EDIT	Edits data selected.
[CANCEL]: BACK	Returns to the previous window.
[DSC MSG]: COMPOSE	Calls the DSC MESSAGE COMPOSE window and reflects a selected address in the "TO" data entry column.



1. Registering a DSC message [5]: ENTRY

Procedure)

1. Select [MENU] -> 6.DSC -> 2.MSG FILE, and then press the [ENTER] knob.
The "MESSAGE FILE" window will appear. Press the [5]: ENTRY key, and the "MESSAGE FILE ENTRY" will appear.
2. Click on "MSG TYPE," and then press the [ENTER] knob. Subsequently, select a message type on the DSC MSG TYPE selection window, and then press the [ENTER] knob.

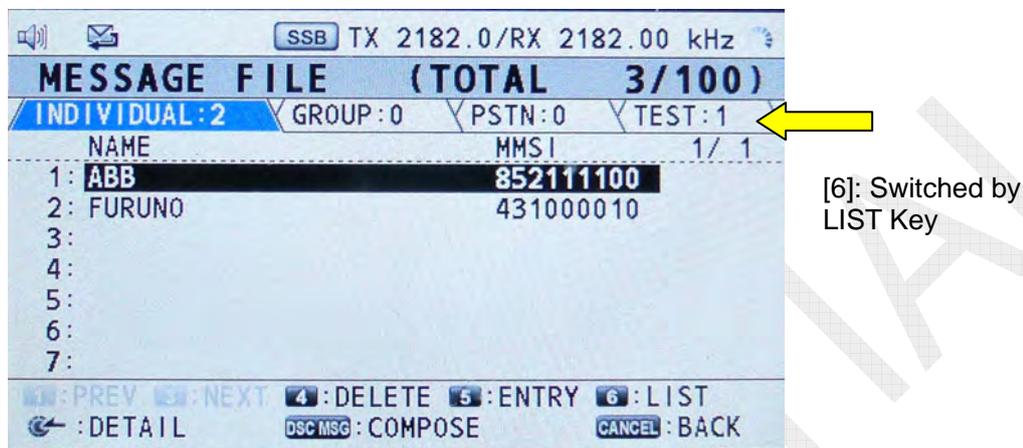


3. Data corresponding to the message type are to be selected and entered.
To enter data in the "TO" and "FREQ" columns, data registered with the sub-menus ADDRESS BOOK and USER CH can be used.
4. A <REGISTER> icon will appear and the cursor will move to this icon. Then, press the [ENTER] knob. With this, the registration of a single MESSAGE FILE is completed.



2. Displaying a LIST of DSC messages registered [6]: LIST

Every time the [6]: LIST key is pressed on the “MESSAGE FILE” window, the mode tab will be switched to display a list of addresses registered in a mode selected.



3. Deleting DSC message(s) registered [4]: DELETE

Press the [4] DELETE key on the “MESSAGE FILE” window. A sub window shown below will appear.



DELETE SELECTION

Select a message file to be deleted in advance. Press the [4]: DELETE key to display the sub window, click on “DELETE SELECTION,” and then press the [ENTER] knob.

A message saying “ARE YOU SURE?” will appear. Click “YES,” and then press the [ENTER] knob. The message file selected will be cleared.

DELETE LIST

Select a tag to be deleted in advance. Press the [4]: DELETE key to display the sub window, click on “DELETE LIST,” and then press the [ENTER] knob.

A message saying “ARE YOU SURE?” will appear. Click “YES,” and then press the [ENTER] knob. All message files in the tag selected will be cleared.

DELETE ALL LISTS

Press the [4]: DELETE key to display the sub window, click on “DELETE ALL LISTS,” and then press the [ENTER] knob. A message saying “ARE YOU SURE?” will appear. Click “YES,” and then press the [ENTER] knob. All message files will be cleared.

4. Editing DSC message registered [ENTER]: DETAIL

Procedure)

1. Select a message file to be edited on the “MESSAGE FILE” window.
2. Press the [ENTER] knob. The “MESSAGE FILE ENTRY” window will appear.
3. Make a change to the content of registration following the procedure for “1. Registering a DSC message,” put the cursor on <REGISTER>, and then press the [ENTER] knob. A message saying “Overwrite this address. Are you sure?” will appear.
4. Click “Yes,” and then press the [ENTER] knob.
The content of the address selected will be replaced with that edited.

5. Reflecting selected message file on DSC COMPOSE MESSAGE window [DSC MSG]: COMPOSE

On the “MESSAGE FILE” window, select a message file to be reflected in a transmission DSC message.

Press the [DSC MSG]: COMPOSE key. The window will be switched to the “COMPOSE MESSAGE” window to reflect the address selected in the COMPOSE MESSAGE.

To transmit this message, click on “GO TO CALL,” and then press the [ENTER] knob.



4.4.3 [3. ACK SETTINGS]

This sub-menu is used to select whether to transmit a DSC ACK BQ message in Manual or Auto mode to a DSC ACK RQ message when it is received.

When this sub-menu is set to “AUTO,” if any PSTN, POSITION, POLLING, or TEST message is received, the system will make an automatic response to the message unless other functions are activated.

For example, if the handset is in the OFF-HOOK state, no automatic response will be made because the RT function is activated.

Furthermore, while in INDIVIDUAL message mode, an automatic response is made to a message involving any condition that disables calling. For details, refer to information on the following page.

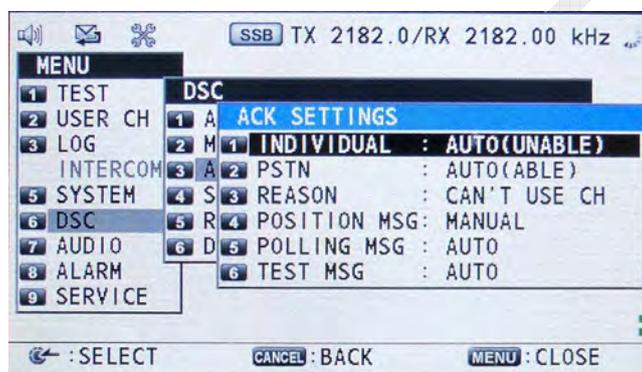


Table 4.4.4 List of ACK SETTINGS Submenus

Sub-menu	Set Value	Meaning
1. INDIVIDUAL	MANUAL	For conditions to make an automatic response, refer to information on the following page.
	AUTO (UNABLE)	
2. PSTN	AUTO (ABLE)	Makes a call to a coast station.
	AUTO (UNABLE)	
3. REASON	NO REASON	Selects a reason not to be able to make a call when INDIVIDUAL is set to AUTO (UNABLE).
	BUSY	
	EQUIP ERROR	
	CAN'T USE CH	
4. POSITION MSG (Safety MSG)	AUTO (ABLE)	When INDIVIDUAL is set to AUTO (UNABLE), no positional data will be included in ACK BQ message.
	AUTO (UNABLE)	
	MANUAL	
5. POLLING MSG (Routine)	AUTO	FS-xx75 is not available to transmit POLLING MSG.
	MANUAL	
6. TEST MSG (Safety MSG)	AUTO	Allows for the transmission of TEST MSG to coast and ship stations. <i>Reference) TEST MESSAGE can be transmitted to ship from ITU-R M.493-11.</i>
	MANUAL	

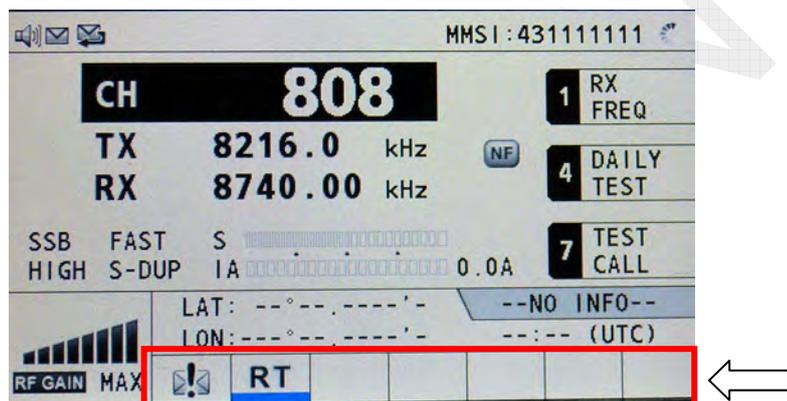
Reference)

Conditions for making an automatic response; ACK while in INDIVIDUAL message mode:

- 1) INDIVIDUAL is set to AUTO (UNABLE)
- 2) "ROUTINE" message
- 3) Nothing is displayed in the session (tab) area and received message is no ECC error.

DSC ACK BQ message is transmitted when any of the following messages is received on the conditions listed above:

- 1) Communication frequency is set to any frequency outside the range of 1605.0 to 27.5 MHz.
- 2) A frequency at which no communication is allowed is set.
For example, SSB mode is set at DSC or NBDP Distress/Safety frequency or TLX mode is set at SSB Distress/Safety frequency.



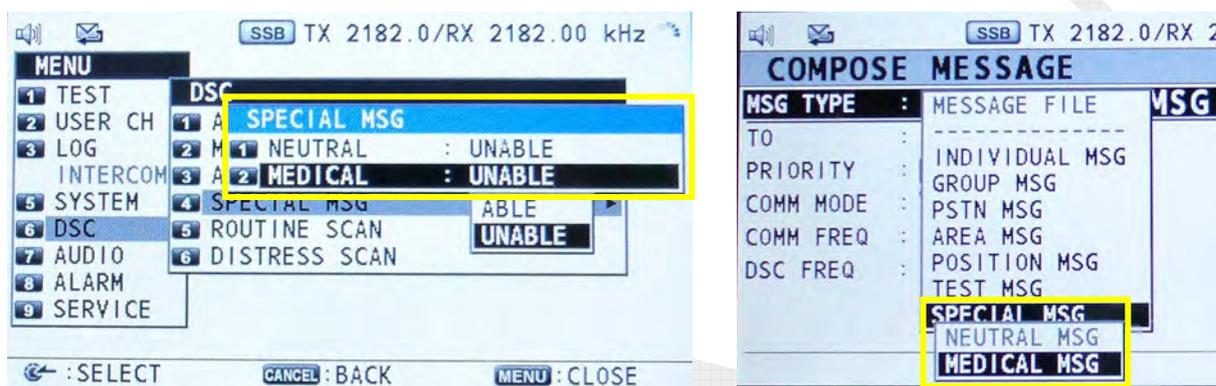
Indicates that blue-underlined ; submenu is currently activated.

Tab area:
Indicates a currently-activated submenu with an icon.
The submenu is selected using the [TAB] key.

4.4.4 [4. SPECIAL MSG]

SPECIAL MSG sub-menu has Sub-menu 2: NEUTRAL and MEDICAL.

Setting these Sub-menus to “ABLE” will activate the SPECIAL MSG sub-menu of the MSG TYPE menu on the “DSC COMPOSE” window, thus making it possible to select messages set to “ABLE.”



Reference)

- NEUTRAL MSG

When navigating a disputed region, this sub-menu is used to give all ships within a sea area designated by “AREA: Geographical coordinate” a notice that the own ship is not a disputing party.

The priority is given to “URGENCY.” The range to give the notice is specified by the area of a CIRCLE or QUADRANT.

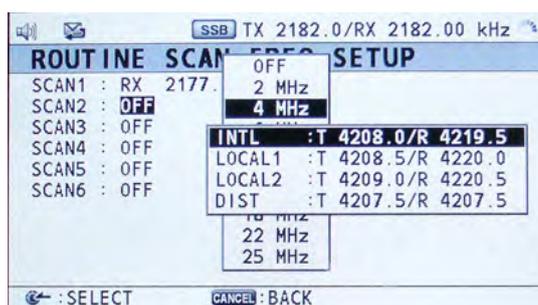
- MEDICAL MSG

This sub-menu is used to give all ships within a sea area designated by “AREA: Geographical coordinate” a notice that the own ship is transporting medical supplies, by means of urgency communication.

The PRIORITY is given to “URGENCY.” The range to give the notice is specified by the area of a CIRCLE or QUADRANT.

4.4.5 [5. ROUTINE SCAN]

This sub-menu is used to make setting of DSC ROUTINE SCAN frequency. DSC SCAN frequencies are received with the WR2 board (Option board) or the RX board of the transceiver unit if no WR2 board is built in. Select DSC scanning frequencies from listed in INTL, LOCAL1, LOCAL2, and DIST frequencies as well as DSC FREQ registered on the USER CH window. Unless otherwise user requested, it is common to select the INTL frequency. It is unable to set all scanning frequencies to OFF.



Reference)

- 1) DSC ACK BQ messages are received with the RX board regardless of PRIORITY condition; provided, however, that ACK BQ messages to DISTRESS RELAY INDIVIDUAL messages are received with the WR1 watch receiver.

- RX board:

This board receives all DSC ACK BQ messages except those to DISTRESS RELAY INDIVIDUAL messages. Frequencies to be set are DSC communication frequencies of currently-activated procedure that is "WAIT FOR ACK."

- WR1:

The WR1 watch receiver constantly scans and receives DSC Distress/Safety frequencies. However, only if DISTRESS RELAY INDIVIDUAL messages are transmitted and the DSC procedure is activated, the WR1 makes setting of DSC communication frequency in order to receive the ACK BQ messages, and stops scanning.

Reference)

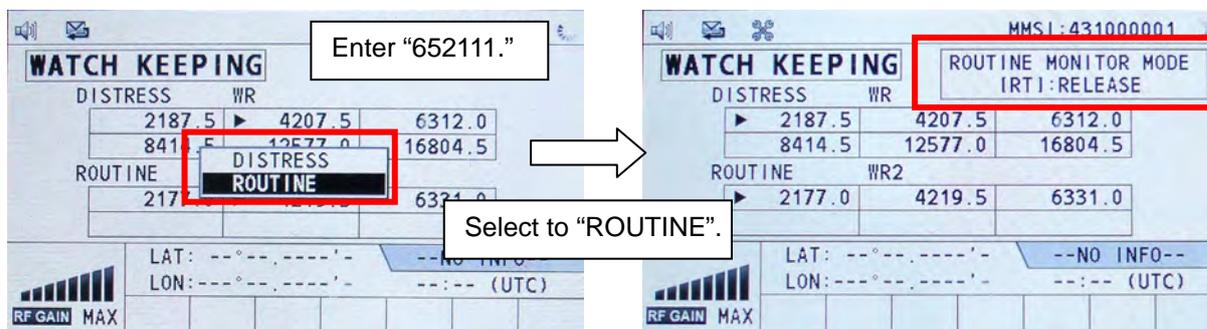
Selecting [MENU] -> 9.SERVICE -> 5.TEST -> 4.TA TEST allows for stopping DISTRESS SCAN.

- WR2:

The WR2 watch receiver scans and receives DSC frequency specified by the ROUTINE scanning table. To stop scanning, press the [SCAN] key. Turning the [ENTER] knob allows for the selection of scanning frequency being stopped.

- 2) To monitor of receiving DSC messages, enter “652111” on the SCAN window, and then select to [ROUTINE].

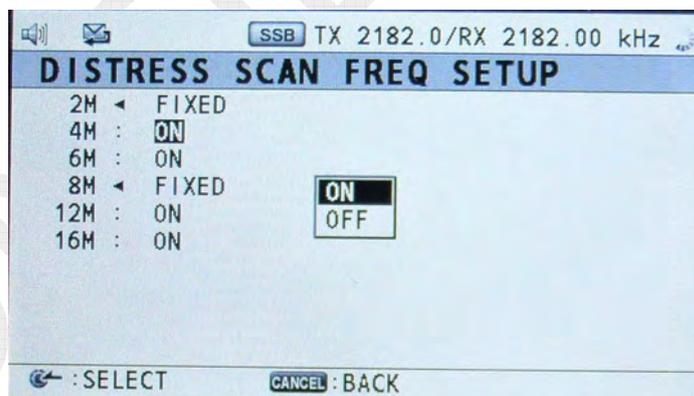
This setting will be disabled when exiting the SCAN window. Monitor output interlocks with the setting of [MENU] -> 7.AUDIO -> 2.OFF HOOK SP.



4.4.6 [6. DISTRESS SCAN]

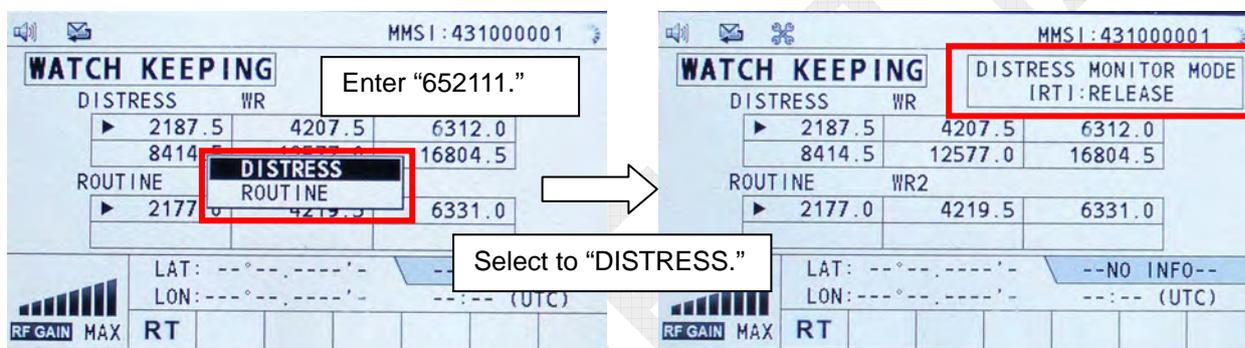
Ships navigating in the A3 and A4 sea areas are required to watch 2 MHz, 8 MHz, and any other one Distress and Safety frequency, and just 2 MHz frequency in the A2 sea area.

In case of a failure of the DSC Distress and Safety frequency Watch receiver (WR1), allows for setting DSC Distress and Safety frequency to the scanning frequency of ROUTINE Scan table.



Reference)

- 1) MF, MF/HF, and NON-GMDSS settings are made by selecting [MENU] -> 9. SERVICE -> 2.DSC SETUP -> CLASS.
 - MF: In the “DISTRESS SCAN” table is fixed to 2187.5 kHz.
 - MF/HF: In the “DISTRESS SCAN” table can be set to 4, 6, 12, and 16 MHz in addition to 2 MHz and 8 MHz.
 - NON-GMDSS: All DSC-related functions are deleted.
- 2) To monitor of receiving DSC messages, enter “652111” on the SCAN window, and then select to [DISTRESS] as described on the preceding page. This setting will be disabled when exiting the SCAN window.
Monitor output interlocks with the setting of [MENU] -> 7.AUDIO -> 2.OFF HOOK SP.



4.5 AUDIO

This menu is used to make AUDIO-related settings.

Sub-menu 2 “5. SIDE TONE” and “6. SIDE TONE LV” will be displayed when “CW” is set to “ENABLE” by selecting [MENU] -> 9.SERVICE -> 3.RT SETUP -> SETUP.

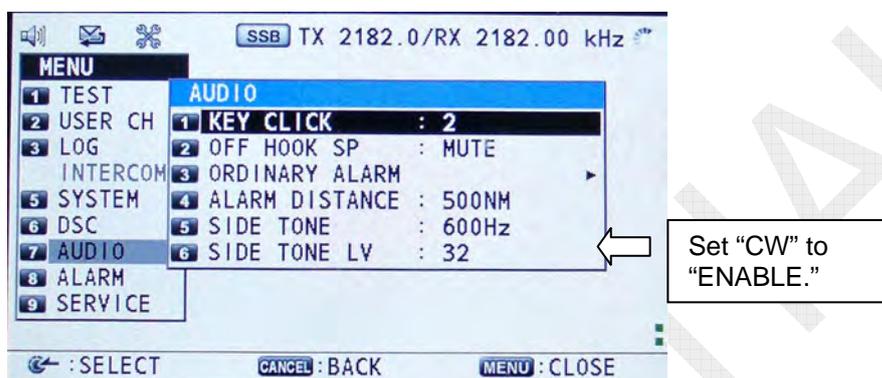


Table 4.5.1 List of Sub-menus of AUDIO

Sub-menu	Set Value	Function	Relevant Page
KEY CLICK	0 – 3 (2)	Makes setting of key clicking sound levels except for that of the [DISTRESS] key.	4-44
OFF HOOK SP	SP ON	Selects whether to turn ON or OFF according to the setting of handset to ON-HOOK or OFF-HOOK. Setting this submenu to “SP ON” will output sound from the speaker regardless of whether the handset is set to ON-HOOK or OFF-HOOK.	4-44
	MUTE		
ORDINARY ALARM	SAFETY	Makes setting of buzzer sound level to alert to the reception of SAFETY or ROUTINE message by DSC message PRIORITY, respectively.	4-45
	ROUTINE		
ALARM DISTANCE	500NM	Makes setting of handling of Distress alert message according to a distance between own ship and Distress ship.	4-46
	OFF		

Reference)

The alarm sound level setting to be outputted when receiving a DISTRESS or URGENCY message can be changed by selecting [MENU] -> 9.SERVICE -> 2.DSC SETUP -> DISTRESS ALARM setting.

However, since the minimum alarm sound level is specified, do not make unnecessary changes to the alarm sound level setting. The standard alarm sound level ranges from 75 dBA to 85 dBA at a distance of 1 meter from a sound source.

4.5.1 [1. KEY CLICK]

This submenu is used to make setting of key clicking sound levels except for that of the [DISTRESS] key.

- When key input is enabled: Pi (2000 Hz/50 ms, Silent/50 ms) × once
- When key input is disabled: Pi-Pi (2000 Hz/50 ms, Silent/50 ms) × twice

4.5.2 [2. OFF HOOK SP]

This submenu is used to make setting to detect whether the handset is set to ON-HOOK or OFF-HOOK and turn ON or OFF the AF signal outputted to internal and external speakers. The handset setting is detected by the use of a hall element mounted to the handset.

The AF signal is used to control U6 (AF AMP) on the C-IF board of FS-2575C. (AMP MUTE-2)

- MUTE: Turns OFF the speaker when the handset is set to OFF-HOOK and turns it ON when the handset is set to ON-HOOK.
- SP ON: Keeps the speaker ON regardless of whether the handset is set to ON- or OFF-HOOK.
The speaker also turns ON for Full-duplex communication with FS-5075. If this causes any problem such as the penetration of receiving signal in the microphone, set the submenu “OFF HOOK SP” to “MUTE.”

Reference)

- 1) DSC ACK operation varies whether the handset is set to ON-HOOK or OFF-HOOK. For AUTO ACK operation, refer to information on page 4-37.
- 2) Monitor output of SCAN frequencies follows the setting of the submenu “OFF HOOK SP.”
For details, refer to information on page 4-42.

4.5.3 [3. ORDINARY ALARM]

This submenu is used to make setting of alarm sound level of internal and external speakers when DSC message PRIORITY receives SAFETY or ROUTINE message. Alarm sound outputted for the level setting is the maximum volume for gradual increase.

Table 4.5.2 Types of Alarms

Reception PRIORITY	Alarm Sound
Distress	Repeats cycles of 2200Hz/250ms and 1300Hz/250ms. (Gradual increase in alarm sound level)
Urgency	Repeats cycles of 2200Hz/250ms and Silent/250ms. (Gradual increase in alarm sound level)
Safety	Repeats cycles of 750Hz/50ms and 650Hz/50ms 10 times (Gradual increase in alarm sound level)
Routine	Repeats cycles of 750Hz/50ms and 650Hz/50ms 10 times (Gradual increase in alarm sound level)

Reference)

Setting of [MENU] -> 5.SYSTEM -> 8.EXTERNAL ALARM is made for the ON/OFF setting of external alarm sound output.

4.5.4 [4. ALARM DISTANCE]

There are cases where own ship cannot be involved in distress even though it received a distance Distress alert.

Setting this submenu [4.ALARM DISTANCE] to “500NM” on the assumption of the above cases makes it possible not to output an alarm sound even if a Distress alert is received.

For example, the reception alarm will not sound when receiving any of the following Distress alert messages in any sea area other than polar regions (within the latitude of ± 70 degrees) and at a distance exceeding 500NM between the Distress ship and the own ship.

However, popup messages will be outputted.

In sea areas outside the latitude of ± 70 degrees, an alarm sound and popup message are forcedly outputted.

[Related reception message]

- DISTRESS
 - DISTRESS ACK
 - DISTRESS CANCEL ACK
 - DISTRESS RELAY AREA
 - DISTRESS RELAY ALL
 - DISTRESS RELAY ALL ACK
- (DISTRESS RELAY INDIVIDUAL and DISTRESS RELAY INDIVIDUAL ACK messages are not included)

Table 4.5.3 When a distance between ships is less than 500NM:

Setting	500NM	OFF
Alarm output	Gradually increases alarm sound while repeating cycles of 2200Hz/250ms and 1300Hz/250ms.	
ALARM LED	Blinks.	
Popup MSG	DISTRESS ALERT message received!	
Printout	Yes	
Reception LOG	Yes	
Re-reception of the same MIS MSG	Possible to receive <ul style="list-style-type: none"> • Popup message saying “DISTRESS ALERT message received!” • Printout: YES • Reception LOG: YES • Alarm output: Repeats cycles of 1300Hz/100ms and Silent/300ms 3 times 	
Reception of different MSG after receiving DIS	Outputs popup MSG and record it in the LOG, but not prints out the LOG.	

Table 4.5.4 When a distance between ships is not less than 500NM:

Setting	500NM	OFF
Alarm output	N/A	Gradually increases alarm sound while repeating cycles of 2200Hz/250ms and 1300Hz/250ms.
ALARM LED	Blinks.	
Popup MSG	DISTRESS ALERT message received!	
Printout	Yes	
Reception LOG	Yes	
Re-reception of the same DIS MSG	Not receives.	Same as that when a distance between ships is less than 500NM
Reception of different MSG after receiving DIS	Outputs popup MSG and record it in the LOG, but not prints out the LOG.	

Notes)

- 1) Independent of the frequency of Distress alert received.
- 2) In case of Distress alert message, an alarm is outputted and the popup message is displayed a minute after the reception of DISTRESS ALERT is completed.
In case of other DISTRESS messages, an alarm sound is outputted and the popup message is displayed as soon as the message is received.
- 3) For re-reception, when the relevant message contains the same MMSI, nature of Distress, communication type, and EOS, the message is considered to have been transmitted from the same Distress alert transmission ship station.
- 4) A distance between ships is calculated from positional data. When no positional data is included in the Distress alert message or no positional data of the own ship is entered, the distance between ships is determined to be less than 500NM.

4.5.5 [5. SIDE TONE]

This submenu is used to make setting of side-tone frequency for CW.

The side-tone frequency can be set in steps of 10 Hz in the range of 400 Hz to 1000 Hz.

Side-tone is outputted to the internal and external speakers.

The submenu [5.SIDE TONE] will appear when selecting [MENU] -> 9.SERVICE -> 3.RT SETUP -> 1.SETUP -> "CW," and then setting "CW" to "ENABLE."

Reference)

Connect a telegraph key between #11 and #12 of TB7 on the T-IF board.



4.5.6 [6. SIDE TONE LV]

This submenu is used to make setting of side-tone frequency level for CW reception in the range of 0 to 63.

The submenu [6.SIDE TONE LV] will appear when selecting [MENU] -> 9.SERVICE -> 3.RT SETUP -> 1.SETUP -> "CW," and then setting "CW" to "ENABLE."

4.6 ALARM

For details, refer to information on page 6-20.

4.7 SERVICE

To enter Service menu, select [MENU], and then press on [TAB] key five times. When the key is properly accepted, a spanner mark will be displayed in the upper left portion of the window.

Subsequently, select on “9. SERVICE,” and then enter the password: XXXXXX.

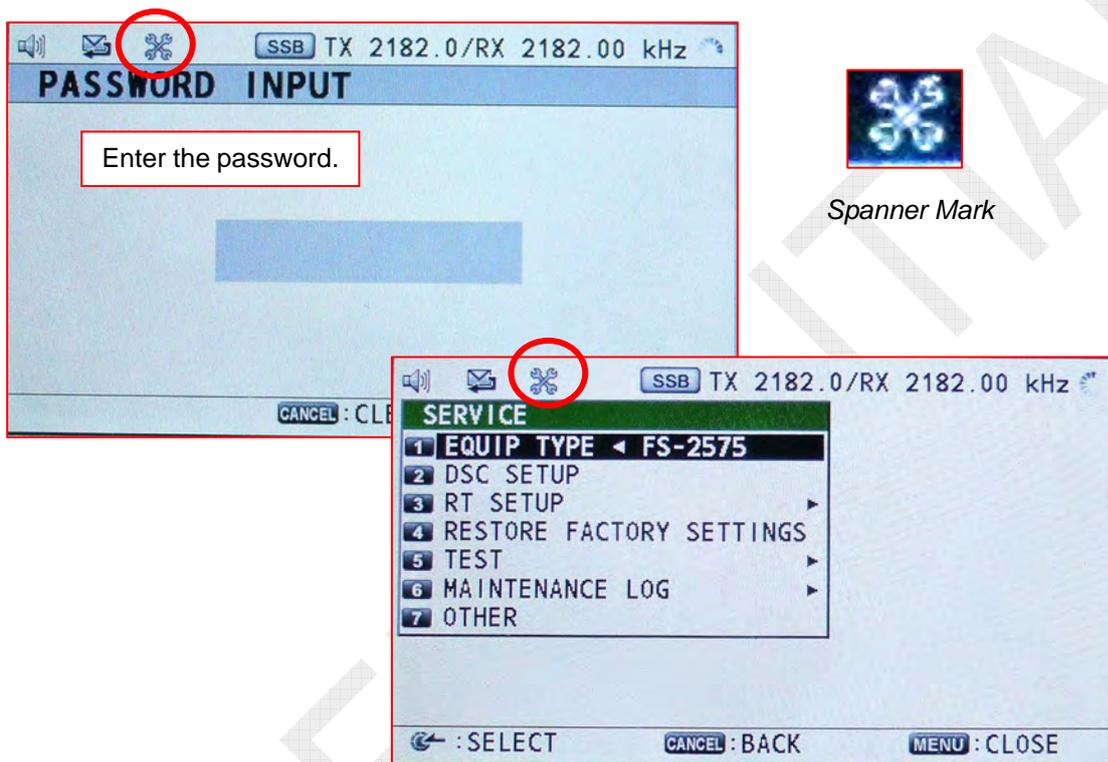


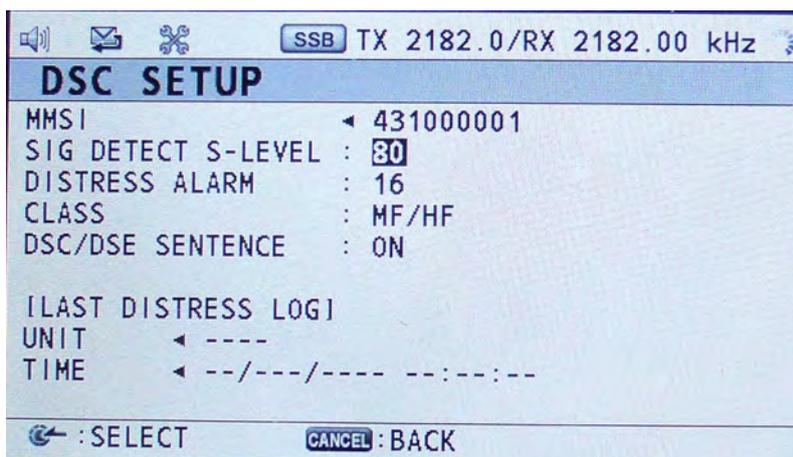
Table 4.7.1 List of SERVICE Submenus

Setting Submenu / Set Value			Relevant Page
1. EQUIP TYPE	FS-xx75		4-51
2. DSC SETUP	MMSI		4-51
	SIG DETECT S-LEVEL		0 – 100 (80) 4-51
	DISTRESS ALARM		0 – 31 (16) 4-52
	CLASS		MF/HF, MF, NON-GMDSS 4-53
	DSC/DSE SENTENCE		ON, OFF 4-59
	[LAST DISTRESS LOG]		UNIT, TIME 4-60
3. RT SETUP	1. SETUP	TX FREQ	ALL FREE, FREE, MARINE/USER, ITU/USER, USER 4-61
		AM MODE	RX ONLY, TX/RX 4-65
		CW	ENABLE, DISABLE 4-66
		LSB	ENABLE, DISABLE 4-66
		SELCALL	ENABLE, DISABLE 4-67
		REF OSC	-127 – 127 (0) 4-68
		CLARIFIER LIMIT	50 – 990Hz (200Hz) 4-68
		TX TUNE	ON, OFF 4-69
		COUPLER THROUGH	OFF, RCVD, DIFF 4-70
		RX ANT	DISCONNECT, CONNECT 4-71
		DIVIDER	ON, OFF 4-79
		LINE IN	-10 – +10 (0) 4-79
		LINE OUT	-10 – +10 (0) 4-79
	FORMAT	IEC, IEC+NMEA 4-79	
	MIF	RS-232C, RS-485 4-80	
	2. SELF CHECK		6-15
	3. DSC TEST		5-31
	4. TX PWR (FREQ) 6. TX PWR (TUNE)	5. TX PWR (USER CH) 7. TX PWR (SEL CALL)	Chapter 5
4. RESTORE FACTORY SETTINGS			6-22
5. TEST	1. VERSION 3. C-CPU PCB 5. DISPLAY TEST	2. T-CPU PCB 4. TA TEST	6-23
6. MAINTENANCE LOG	1. I/O MONITOR 3. SW UPDATE LOG 5. INFORMATION LOG	2. ERROR LOG 4. POWER ON LOG	6-42
7. OTHER	PA		6-47 4-83 to 4-86
	ALARM UNIT		
	P-BROWSER		
	SOFTWARE ERASE		
	DEBUG MODE		

4.7.1 [1. EQUIP TYPE]

Used to identify and display the type of equipment when the FS-xx75 system starts up. For details, refer to information on page 6-29.

4.7.2 [2. DSC SETUP]

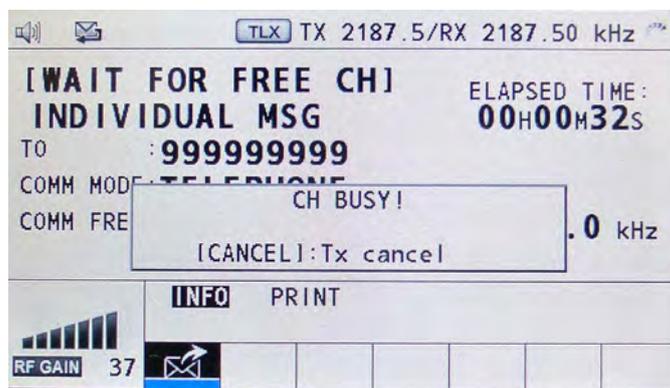


1. MMSI

This Submenu-2 is used to display a set MMSI. For the procedure for making MMSI setting change, refer to information on page 4-3.

2. SIG DETECT S- LEVEL (0 - 100): 80

The system incorporates the “BUSY CHECK function” of monitoring DSC frequencies before transmitting a DSC message and prohibits the transmission of the DSC message if the set frequency is used. If this function gets activated, a popup message saying “CH BUSY!” will be outputted.



The Submenu-2 “SIG DETECT S-LEVEL” is used to make setting of frequency detection levels in order to activate this function. “0” represents the minimum detection level, while “100” represents the maximum level.

For example, setting this Submenu-2 to “0” may activate the “BUSY CHECK function” due to noise to disable the transmission of DSC message. In this case, cancel the transmission of the message once, and then retransmit it.

- The BUSY CHECK function is not available to transmit a Distress alert.
- Forced message transmission from the “CH BUSY !” status is not allowed. Cancel the transmission of the message once and transmit it again.
- Frequency is monitored with the RX board regardless of DSC transmission frequency.

Reference)

To monitor frequency, temporarily set the DSC transmission frequency to the reception frequency of the RX board, mode to TLX, and RF GAIN to Max.

3. DISTRESS ALARM (0 - 31)

This Submenu-2 is used to make alarm sound setting that is outputted when receiving a DISTRESS or URGENCY message.

Even if this Submenu-2 is set to “0,” an alarm sound will be outputted.

The standard alarm sound level ranges from 75 dBA to 85 dBA at a distance of 1 meter from a sound source. Do not make unnecessary changes to the alarm sound level setting.

4. CLASS (MF, MF/HF, NON-GMDSS)

Switching the Submenu-2 “CLASS” will automatically restart the system. Even if it is switched from MF/HF to MF mode or from MF to MF/HF mode, LOG files as well as registered settings of ADDRESS BOOK and MSG FILE will not be cleared.

MF/HF

This mode is used to make setting of MF/HF DSC frequencies used in A3 and A4 sea areas and allows for watching of WR1 SCAN frequencies of 2, 4, 6, 8, 12, and 16 MHz.

MF

This mode is used to make setting of MF DSC frequencies used in A2 sea area. The WR1 SCAN frequency is fixed to 2 MHz.

For Distress alert transmission, default is a “SINGLE” frequency of 2 MHz.

NON-GMDSS

This mode operate with the radiotelephone function without activating the DSC function.

NON-GMDSS mode is not available to register MMSI of the own ship and display the following DSC-related popup messages:

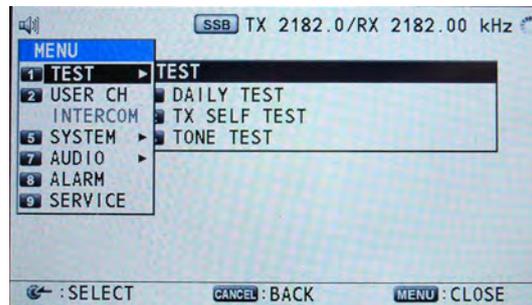
- CAUTION: The unit will not transmit any DSC call until own ship's MMSI is entered.
- EPFS offline”
- Position data is not updated!
- Lost position!

DSC-related submenus are cleared from the main menu. When setting “CLASS” to NON-GMDSS and setting it back to MF/HF or MF mode, previously-registered MMSI as well as USER CH of DSC and LOG files will be cleared. However, data on settings of ADDRESS BOOK and MSG FILE will remain.

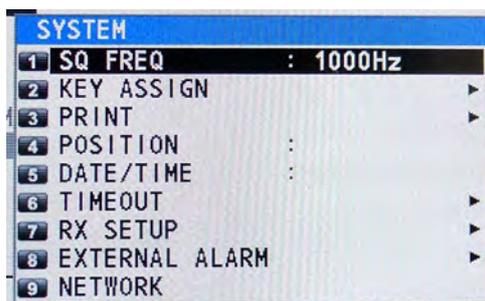
Differences in menu configuration



MF, MF/HF Mode: Main Menu



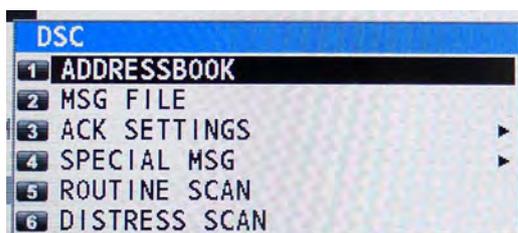
NON-GMDSS Mode: Main Menu



MF, MF/HF Mode: SYSTEM Menu



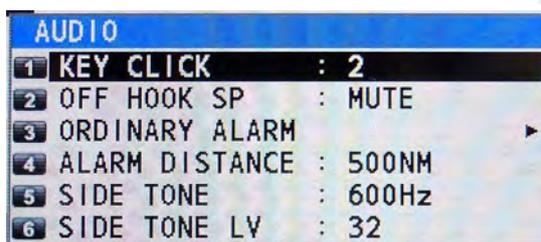
NON-GMDSS Mode: SYSTEM Menu



MF/HF Mode: DSC Menu



MF Mode: DSC Menu



MF, MF/HF Mode: AUDIO Menu^{See Note)}



NON-GMDSS Mode: AUDIO Menu^{See Note)}

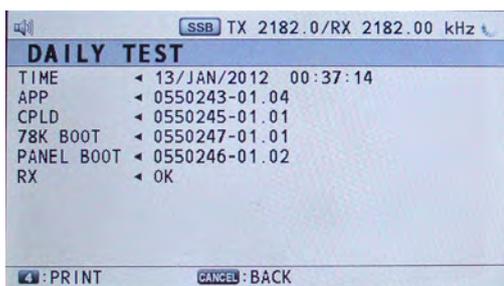
Note)

Based on menu setting made to [MENU] -> 9.SERVICE -> 3.RT SETUP -> 1.SETUP -> CW -> "ENABLE."

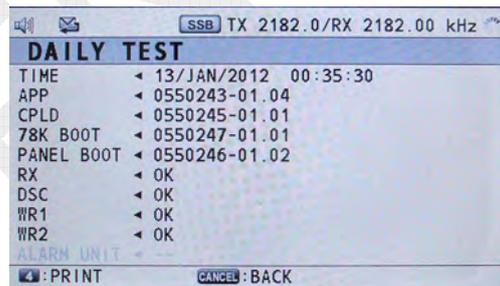
MEMO

- 1) MMSI registration
 - MF, MF/HF mode
 - Allows for MMSI setting of the own ship.
 - NON-GMDSS mode:
 - Not allow for MMSI setting of the own ship. The MMSI display column on the window goes blank.
 - The MMSI non-registration error message saying "CAUTION: The unit will not transmit any DSC call until own ship's MMSI is entered." is not displayed.
 - Furthermore, when "CLASS" setting is switched to NON-GMDSS mode, the own ship's MMSI information will be put into a nonregistered state.

- 2) NBDP communications
 - MF, MF/HF mode:
Allows for NBDP communications.
 - NON-GMDSS mode:
Allows for NBDP communications.
- 3) Key assign function
 - MF, MF/HF mode:
Allows for the registration of DSC-related TEST CALL, MSG FILE, and LOG.
 - NON-GMDSS mode:
Not allow for the registration of DSC-related TEST CALL, MSG FILE and LOG.
- 4) DAILY TEST
 - MF, MF/HF mode:
Conducts DSC-related DSC, WR1, WR2, and ALARM UNIT tests.
 - NON-GMDSS mode:
Not conduct DSC-related tests described above.



NON-GMDSS Mode: DAILY TEST



MF, MF/HF Mode: DAILY TEST

- 5) DSC LOG
 - MF, MF/HF mode:
Allows for using the DSC LOG function.
 - NON-GMDSS mode:
Making the “CLASS” setting from MF/HF or MF mode to NON-GMDSS mode will delete [MENU] ->3.LOG menu, disabling access to the DSC Log function and also not displaying “Unread icon” on the window.

6) DSC AUTO ACK

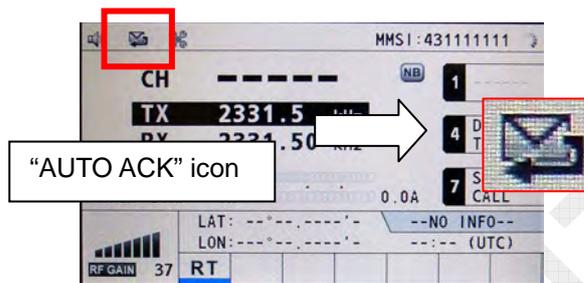
- MF, MF/HF mode:

Displays an “AUTO ACK” icon in the upper left portion of the window.

- NON-GMDSS mode:

Not display the “AUTO ACK” icon on the operation display block.

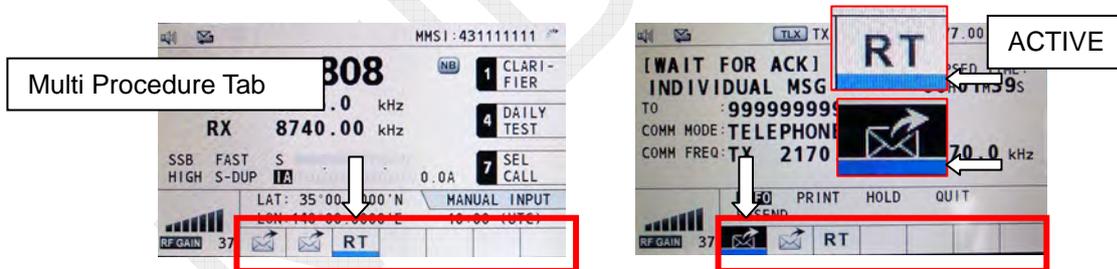
Note) The “AUTO ACK” icon will be displayed when making setting to [MENU] -> 6.DSC -> 3.ACK SETTINGS -> INDIVIDUAL -> “AUTO (UNABLE).”



7) Multi procedure

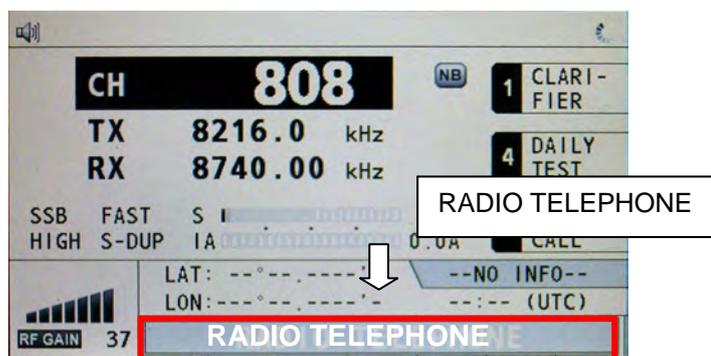
- MF, MF/HF mode:

There is a multi-procedure tab area on the RT window of the operation display block. Access to the tab area is given by using the “TAB” key. When the [ENTER] knob is pressed while “NO ACTIVE” submenu is displayed, the submenu will become “ACTIVE.” When it becomes “ACTIVE,” a “Blue line” will be shown below the tab.

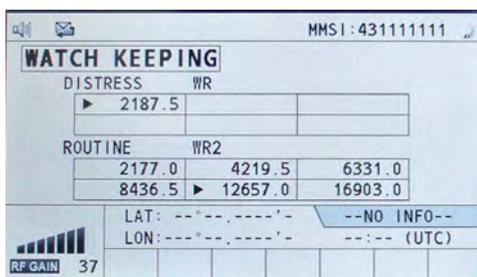


- NON-GMDSS mode:

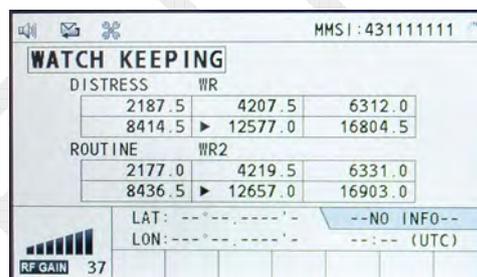
There is no multi-procedure tab area on the RT window of the operation display block and [RADIO TELEPHONE] is displayed in place.



- 8) DSC communications
- MF, MF/HF mode:
Allows for making DSC communications.
 - NON-GMDSS mode:
Not allow for making DSC communications.
- 9) DSC SCAN
- MF/HF mode:
Allows WR1 to scan DSC frequencies of 2, 4, 6, 8, 12, and 16 MHz.
 - MF mode:
Allows WR1 to serve as a 2 MHz DSC frequency watch receiver. WR2 (RT) is designed to the same specification as that for MF/HF mode.
 - NON-GMDSS mode:
Not allows for switching to the DSC SCAN window even by pressing the [SCAN] key, disabling scanning of DSC frequencies.



MF Mode: [SCAN]



MF/HF Mode: [SCAN]

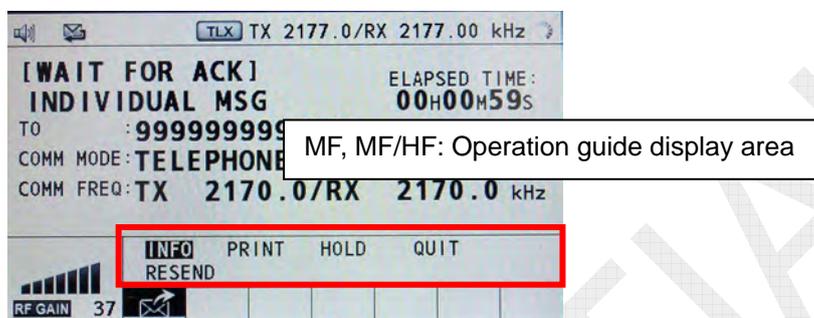
- 10) DSC DISTRESS CALL
- MF/HF mode:
For Distress alert transmission, default is “MULTI.”
 - MF mode:
For Distress alert transmission, default is a “SINGLE” frequency of 2 MHz. This default can be changed to a different frequency. In addition, AUTO- and MULTI-frequency Distress alert transmission is enabled.
 - NON-GMDSS mode:
Disables the [DISTRESS] key not to allow for the transmission of Distress alerts.

- 11) DSC COMPOSE
 - MF, MF/HF mode:
Allows for the creation of a DSC message.
 - NON-GMDSS mode:
Disables the [COMPOSE DSC MSG] key, not allowing for the creation of a DSC message.
Deletes the DSC menu when selecting [MENU] -> 6.DSC Menu, not allowing for the creation of a MSG FILE.
- 12) USER CH
 - MF, MF/HF mode:
Allows for the registration of user-specified channels in SSB, NBDP, DSC, and CW modes when selecting [MENU] -> 2.USER CH and also for the use of the USER CH registered.
 - NON-GMDSS mode:
Deletes the DSC tab when selecting [MENU] -> 2.USER CH, not allowing for the registration of USER CH in DSC mode. Furthermore, when switching the "CLASS" setting from MF or MF/HF mode to NON-GMDSS mode, registered DSC USER CH will be deleted.
- 13) MSG FILE
 - MF, MF/HF mode:
Allows for calling a DSC message registered when selecting [MENU] -> 6.DSC -> 2.MSG FILE, allowing for the transmission of this message.
 - NON-GMDSS mode:
Deletes the DSC menu when selecting [MENU] -> 6.DSC Menu, not allowing for the creation of MSG FILE.
- 14) Alarms related to positional data
 - MF, MF/HF mode:
Activates the alarm function related to positional data, including
 - EPFS offline error;
 - Position data is not updated! Position was older than 4H. Update it.; and
 - Lost position! Position was older than 23.5H. You must update position!
 - NON-GMDSS mode:
Not activate the alarm function related to positional data listed above, but displays the positional data when it is entered.

15) Display of operation guide (user option)

- MF, MF/HF mode:

Displays an operation guide on the DSC message transmission and standby window.



- NON-GMDSS mode:

Not display the “operation guide” shown above.

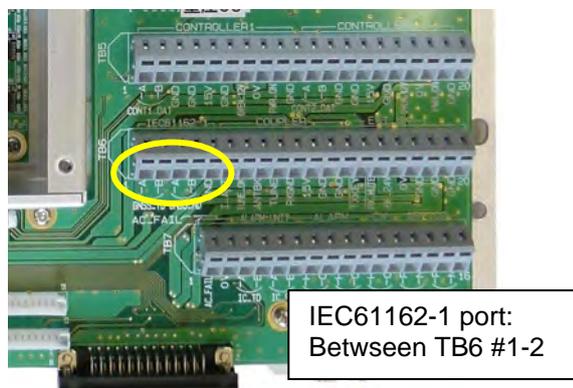
5. DSC/DSE SENTENCE (ON, OFF)

This Submenu-2 is used to output DSC/DSE sentences when receiving every DSC message.

For example, the sentences are outputted in order to display Distress alert messages on the equipment connected.

The sentences are outputted to “TB6 #1(TD-A) - #2(TD-B)” (IEC61162-1 Port) on the T-IF board of the FS-xx75T system. The talker name is “CT.”

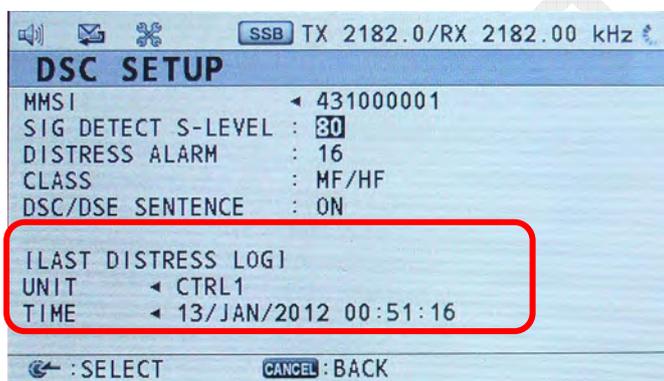
- DSC : Digital Selective Calling Information (Received DSC message)
- DSE : Expanded Digital Selective Calling (Expanded DSC message)



6. LAST DISTRESS LOG

This Submenu-2 is used to display the latest Distress alert transmission LOG.

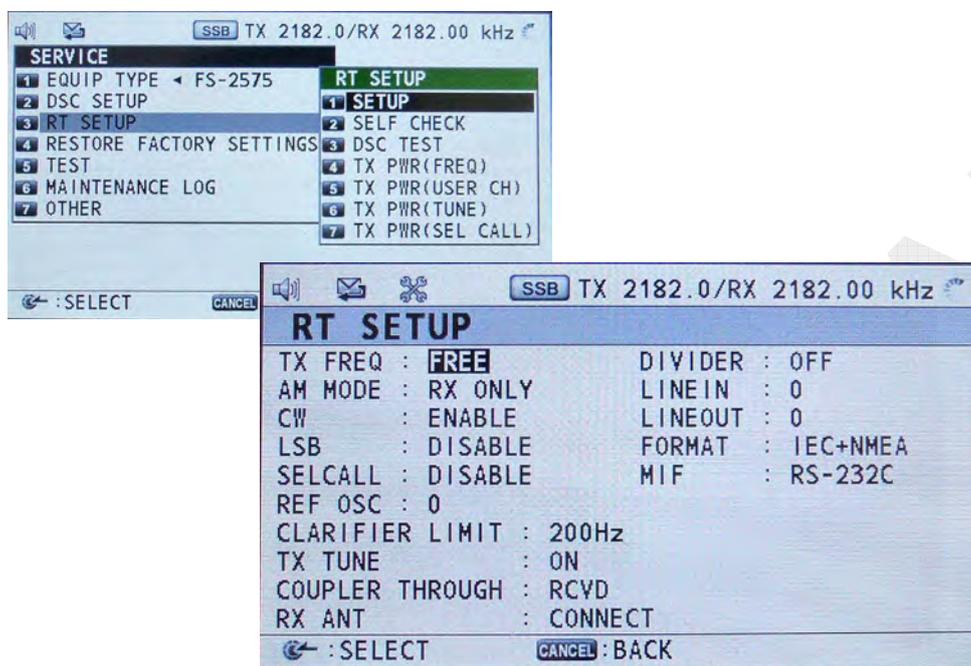
- **UNIT:** When “CNTRL 1” is displayed, this indicates that the Distress alert was transmitted from No.1 FS-2575C.
When “CNTRL 2” is displayed, this indicates that the Distress alert was transmitted from No.2 FS-2575C.
When “ALARM UNIT” is displayed, this indicates that the Distress alert was transmitted from IC-350.
- **TIME:** Displays a time stamp indicating when the Distress alert was transmitted. This time stamp is a ZDA data sentence. If this data is not available, data set by selecting [MENU] -> 5.SYSTEM -> 5.DATE/TIME is used.



Reference)

To delete this transmission LOG, select [MENU] -> 9.SERVICE -> 4.RESTORE FACTORY SETTINGS, or press and hold the [S1] key on the T-IF board for more than 4 seconds, enter the password: XXXXXX, and then click on “CLEAR ALL.”

4.7.3 [3. RT SETUP]



1. TX FREQ (ALL FREE, FREE, MARINE/USER, ITU/USER, USER)

This Submenu-3 is used to make setting of applicable transmission frequency. Reception frequency can be set to any frequency in the range of 100.0 kHz to 29,999.9 kHz regardless of the setting of this Submenu.

Reference)

- 1) The reception frequency range is from 100.0 kHz to 29,999.9 kHz regardless of the setting of the Submenu-3 "TX FREQ."
- 2) Setting this Submenu-3 to "ITU/USER" or "USER" will not allow for the selection of [MENU] -> 5.SYSTEM -> 2.KEY ASSIGN -> "TRX FREQ." If KEY ASSIGN is registered, it will be deleted.

Table 4.7.2 Transmittable Frequency Range

Operation Setting	Frequency (1.605 MHz to 27.5 MHz)	Marine Band	ITU CH	User CH
ALL FREE	Yes	Yes	Yes	Yes
FREE	Yes (Except limit frequency)	Yes	Yes	Yes
MARINE/USER	No	Yes	Yes	Yes
ITU/USER	No	No	Yes	Yes
USER	No	No	No	Yes

1) ALL FREE

Setting TX FREQ to “ALL FREE” allows for the use of any transmission frequency in the range of 1605.0 kHz to 27500.0 kHz, regardless of the setting of TX FREQ.

2) FREE

Setting TX FREQ to “FREE” causes a different frequency available for setting with the setting of TX FREQ.

- For DSC COMPOSE messages:
 - COMM MODE: Allows for the transmission of frequencies in the range of 1605.0 kHz to 27500.0 kHz.
 - DSC FREQ: Needs to register frequencies with USER CH.
This setting does not allow for the manual entry of DSC frequency.
- In SSB mode:
 - Allows for the transmission of any frequency other than the Distress/Safety frequencies listed in the table below and MSI (Marine Safety Information) transmission frequencies in the range of 1605.0 kHz to 27500.0 kHz.

Table 4.7.3 Limit Frequencies for FREE-SSB Setting

3023.0 (AERO-SAR)	2187.5 (DSC)	2174.5 (NBDP-COM)
4209.5 (MSI:NAVTEX)	4207.5 (DSC)	4177.5 (NBDP-COM)
4210.0 (MSI-HF)	6312.0 (DSC)	6268.0 (NBDP-COM)
5680.0 (AERO-SAR)	8414.5 (DSC)	8376.5 (NBDP-COM)
6314.0 (MSI-HF)	12577.0(DSC)	12520.0 (NBDP-COM)
8416.5 (MSI-HF)	16804.5 (DSC)	16695.0 (NBDP-COM)
12579.0 (MSI-HF)	/	
16806.5 (MSI-HF)		
19680.5 (MSI-HF)		
22376.0 (MSI-HF)		
26100.5(MSI-HF)		

- In NBDP mode:

Allows for the transmission of any frequency other than the Distress/Safety frequencies listed in the table below and MSI transmission frequencies in the range of 1605.0 kHz to 27500.0 kHz.

Table 4.7.4 Limit Frequencies for FREE-NBDP Setting

3023.0 (AERO-SAR)	2182.0 (RTP-COM)	2187.5 (DSC)
4209.5 (MSI:NAVTEX)	4125.0 (RTP-COM)	4207.5 (DSC)
4210.0 (MSI-HF)	6215.0 (RTP-COM)	6312.0 (DSC)
5680.0 (AERO-SAR)	8291.0 (RTP-COM)	8414.5 (DSC)
6314.0 (MSI-HF)	12290.0 (RTP-COM)	12577.0 (DSC)
8416.5 (MSI-HF)	16420.0 (RTP-COM)	16804.5 (DSC)
12579.0 (MSI-HF)	/	
16806.5 (MSI-HF)		
19680.5 (MSI-HF)		
22376.0 (MSI-HF)		
26100.5 (MSI-HF)		

- In CW, AM, and LSB modes:

Allows for the transmission of any frequency other than the Distress/Safety frequencies listed in the table below and MSI transmission frequencies in the range of 1605.0 kHz to 27500.0 kHz.

Table 4.7.5 Limit Frequencies for FREE-CW, AM, LSB Settings

3023.0 (AERO-SAR)	2182.0 (RTP-COM)	2187.5 (DSC)	2174.5 (NBDP-COM)
4209.5 (MSI:NAVTEX)	4125.0 (RTP-COM)	4207.5 (DSC)	4177.5 (NBDP-COM)
4210.0 (MSI-HF)	6215.0 (RTP-COM)	6312.0 (DSC)	6268.0 (NBDP-COM)
5680.0 (AERO-SAR)	8291.0 (RTP-COM)	8414.5 (DSC)	8376.5 (NBDP-COM)
6314.0 (MSI-HF)	12290.0 (RTP-COM)	12577.0 (DSC)	12520.0 (NBDP-COM)
8416.5 (MSI-HF)	16420.0 (RTP-COM)	16804.5 (DSC)	16695.0 (NBDP-COM)
12579.0 (MSI-HF)	/		
16806.5 (MSI-HF)			
19680.5 (MSI-HF)			
22376.0 (MSI-HF)			
26100.5 (MSI-HF)			

Note)

When trying to transmit a frequency not available for the transmission, a popup message shown below will appear on the RT window.

The frequency
For distress and
Safety communications!

[CANCEL]: Close window

3) MARINE/USER

- Setting TX FREQ to “MARINE/USER” allows the transmission of any frequency listed in the table shown below.
- Registering frequencies ranging from 1605.0 kHz to 27500.0 kHz including those outside the range listed in the table below in the user channel allows for calling this channel to transmit.

Table 4.7.6 Marine Band Frequency Range

1605.0 to 4000.0 kHz	16360.0 to 17410.0 kHz
4063.0 to 4438.0 kHz	18780.0 to 19800.0 kHz
6200.0 to 6525.0 kHz	22000.0 to 22855.0 kHz
8195.0 to 8815.0 kHz	25070.0 to 26175.0 kHz
12230.0 to 13200.0 kHz	

4) ITU/USER

The cursor skips the TX FREQ.

- Allows for the transmission frequency called by the ITU channel in SSB or NBDP mode.
 - SSB ITU CH: Band (2/4/6/8/12/16/18/22/25) + 00 to xx (401, 1205, etc.)
 - TLX ITU CH: Band (2/4/6/8/12/16/18/22/25) + 000 to xxx (4001, 12005, etc.)
 - CW ITU CH: Band (4/6/8/12/16/18/22/25) + 001 to xxx (4001, 12005, etc.)
- Allows for the registration of frequencies with the user channel and for the transmission of them. The range of registerable transmission frequencies is from 1605.0 kHz to 27500.0 kHz.
 - SSB, TLX, CW User CH: 01 to 29 + 01 to xx (0401, 1205, etc.)
 - DSC User CH: Band (2/4/6/8/12/16/18/22/25) + 01 to 04 (0401, 01205, etc.)

Note) Channels that can be called on the RT window cover user channels registered in SSB, NBDP, and CW modes. DSC channels can be called on the COMPOSE MESSAGE window.

Reference)

SSB Distress/Safety Frequency Channels

Channel	Frequency	Channel	Frequency
200	2182.0	800	8291.0
400	4125.0	1200	12290.0
600	6215.0	1600	16420.0

5) USER

The cursor skips the TX FREQ. This setting allows for the registration of frequencies with the user channel and for the transmission of them. The range of registerable transmission frequencies is from 1605.0 kHz to 27500.0 kHz.

- If no frequencies are registered with the user channel, even a Distress/Safety frequency cannot be transmitted. Furthermore, a 2182 kHz cannot be called even by pressing the [2182] key.
- Even if a frequency not registered with the user channel is entered on the DSC COMPOSE window, COMM FREQ will be set to the frequency entered. In other words, no restriction is put on transmission frequencies and a restriction is put only on the RT window.

Reference)

- 1) The reception frequency range is from 100.0 kHz to 29,999.9 kHz regardless of the setting of the Submenu-3 "TX FREQ."
- 2) Setting this Submenu-3 to "ITU/USER" or "USER" will not allow for the selection of [MENU] -> 5.SYSTEM -> 2.KEY ASSIGN -> "TRX FREQ." If key assignment is registered, it will be deleted.

2. AM MODE (RX ONLY, TX/RX)

This Submenu-3 is used to make setting of the availability of AM (H3E) mode for use.

- RX ONLY: Allows only AM reception.
- TX/RX: Allows AM transmission and reception.

Reference)

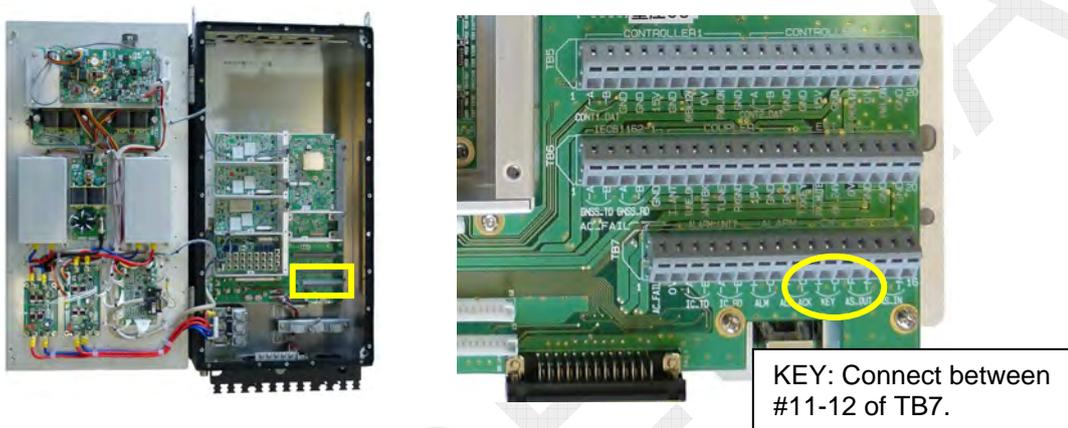
When setting to [MENU] -> 9.SERVICE -> 3.RT SETUP -> SETUP -> SELCALL -> "ENABLE" with AM MODE set to "AM RX ONLY," the transmission of SEL CALL frequency of "H2B/2331.5 kHz" will be allowed.

3. CW (ENABLE, DISABLE)

This Submenu-3 is used to make setting of the availability of CW mode for use. Connect a telegraph key between #11 and #12 of TB7 on the T-IF board.

Setting CW to “ENABLE” will

- add a submenu “CW” on the MODE popup window on the RT window;
- add submenus “5.SIDE TONE” and “6.SIDE TONE LV” to “7.AUDIO” menu by selecting [MENU] -> 7.AUDIO; and
- allow for the registration of user channels in CW mode by selecting [MENU] -> 2. USER CH.



4. LSB

This Submenu-3 is used to make setting of the availability of LSB mode for use. Setting LSB to “ENABLE” will add a submenu “LSB” on the MODE popup window on the RT window.

5. SELCALL (ENABLE, DISABLE)

This Submenu-3 is used to make setting of the availability of SELCALL frequency of “H2B/2331.5 kHz” for use.

Setting SELCALL to “ENABLE” assigns “7: SEL CALL” to [7] key, allowing for calling and transmission of the frequency of “H2B/2331.5 kHz.”

This transmission is independent of the setting of [MENU] -> 9.SERVICE -> 3. RT SETUP -> 1.SETUP -> “RX MODE.”



Reference)

- 1) Connection to SELCALL equipment system
 - Select LINE IN -> [REMOTE] port, and then connect the system between #12: LINE_IN_H and #13: LINE_IN_C of the port.
 - Select KEY -> [REMOTE] port, and then connect the system between #14: REM_TXKEY_N and #7: GND of the port.
- 2) LINE IN specification: 0dBm/600Ω
- 3) LINE IN level adjustment
Make level adjustment by selecting [MENU] -> 9.SERVICE -> 3.RT SETUP -> 1. SETUP -> “LINE IN” in the adjustment range of 0 dBm ± 10 dBm.



[REMOTE]
 #12: LINE_IN_H , #13: LINE_IN_C
 #14: REM_TX KEY_N #7: GND

6. REF OSC (-127~+127): 0

This Submenu-3 is used to make setting of frequency of the reference oscillator: 36 MHz VCTCXO on the TX board. If transmission frequency deviation does not fall within the specified range (i.e., within ± 10 Hz), make frequency adjustment using the Submenu-3 “REF OSC.”

This frequency should be any of the PLL reference frequencies of TX, RX, WR1, and WR2 boards.

For detail, refer to information on page 5-29.

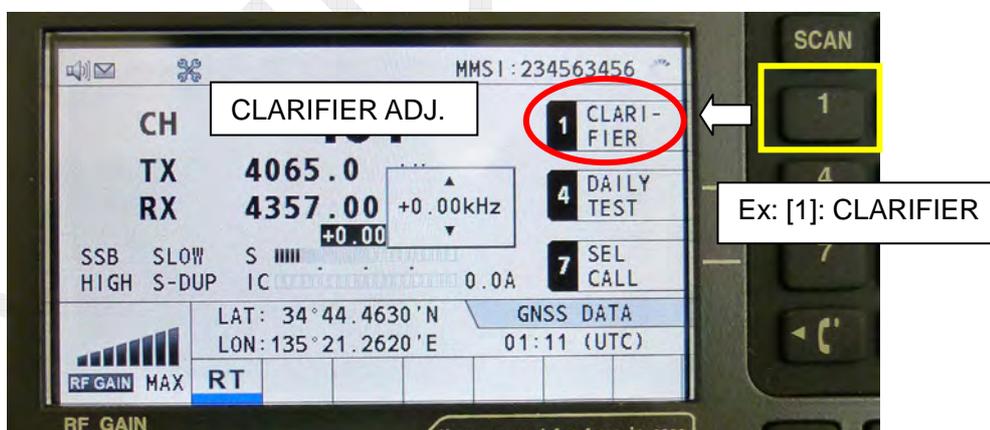
7. CLARIFIER LIMIT (50Hz~990Hz): ± 200 Hz

This Submenu-3 is used to make setting of variable range of the clarifier.

To use the clarifier,

- select [MENU] -> 5.SYSTEM -> 7.RX SETUP -> 3.CLARIFIER, and then set “CLARIFIER” to “ON”; or
- select [MENU] -> 5.SYSTEM -> 2.KEY ASSIGN, and then assign “CLARIFIER” to the function key.

- 1) The clarifier is enabled in SSB, LSB, and CW modes, making reception frequency variable in steps of 10 Hz.
- 2) When the clarifier gets activated, even if the reception frequency or mode (SSB, LSB, or CW) is changed, the set clarifier value will remain valid.



Reference)

For the set value of the clarifier, DDS frequency data of 1st Lo on the RX board is changed and displayed.

8. TX TUNE (ON, OFF)

This Submenu-3 is used to select whether or not to transmit a TUNE start signal to AT-5075/AT-1575 when transmitting.

Setting TX TUNE to “ON” will start the TUNE operation with “TX KEY” is activated, “PTT” to “ON”, and press and hold the [0:TUNE] key.

Reference)

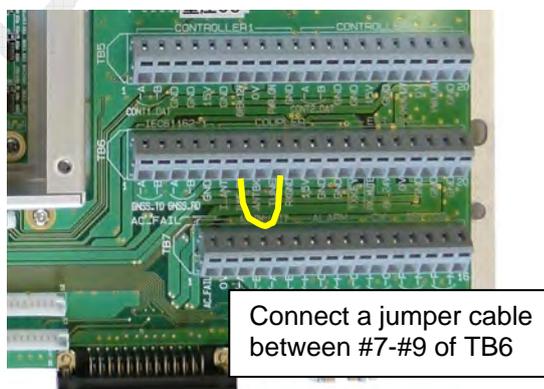
- 1) Even if the tuning operation fails, TX output power will be automatically reduced.
 - FS-5075: LOW2
 - FS-2575/1575: LOW

- 2) If the tuning operation fails, the matching circuit of the Antenna coupler will go into a through state.

Note)

The term “through state” means that all coils (L) in the matching circuit are in a short-circuited state and input/output capacitors (C) in the matching circuit are in an open state.

- 3) To check the FS-xx75T system for TX output power by connecting a dummy load load,
 - set TX TUNE to “OFF,” and no tuning signal will be outputted, and
 - connect between #7 (TUNE OK) and #9 (TUNE) of TB6 on the T-IF board using a jumper wire, and the matching circuit will be constantly kept in the “TUNE OK” state.



9. COUPLER THROUGH (OFF, RCVD, DIFF)

The Submenu-3 “COUPLER THROUGH” is used to select whether or not pass a received signal through the matching circuit of the Antenna coupler.

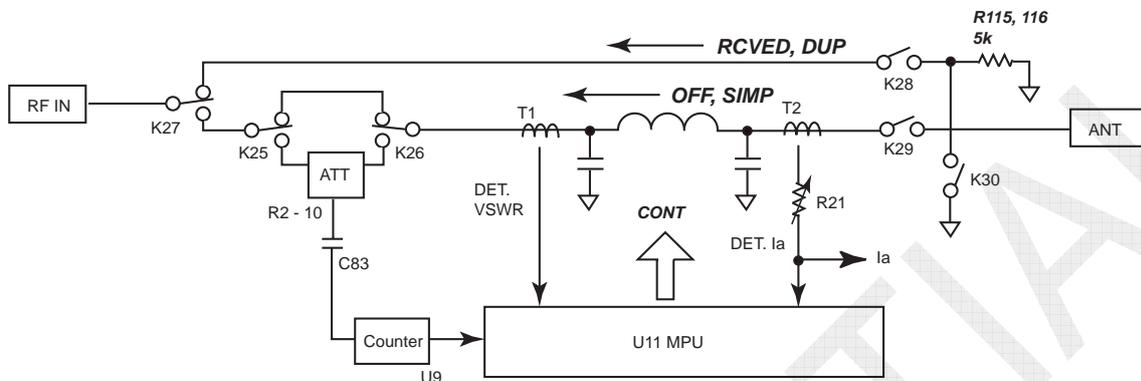


Fig. 4.7.1 Antenna Coupler Through Circuit

- OFF

Allows a received signal to pass through the matching circuit. When receiving a frequency higher than transmission frequency, the received signal may attenuate to cause a drop in receiver sensitivity.
- RCVD

Serves as a “through circuit” that allows no received signal to pass through the tuned circuit.
- DIFF

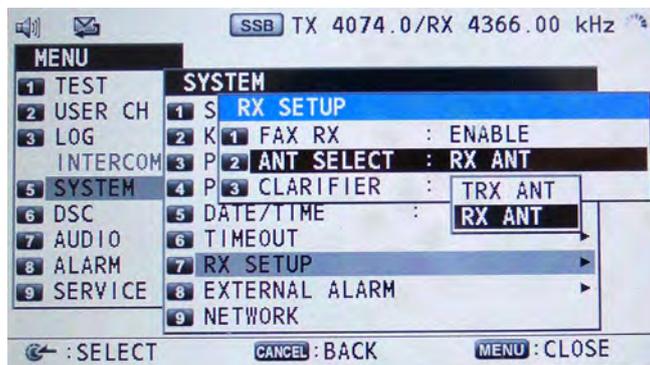
Allows no received signal to pass through the tuned circuit if the transmission frequency is different from the reception frequency. A through circuit is established on the following conditions:

 - 1) Reception frequencies are equal to or less than 1.6 MHz;
 - 2) Transmission and reception frequencies are not more than 4 MHz and not the same (Simplex communication); and
 - 3) Transmission and reception frequencies are not less than 4 MHz and the reception frequencies are not less than 1.2 MHz away from the transmission frequencies.

10. RX ANT (CONNECT, DISCONNECT)

Make setting of this Submenu-3 depending on whether or not a RX antenna is installed. Setting RX ANT to “CONNECT” will allow for the setting of [MENU] -> 5.SYSTEM -> 7.RX SETUP -> “ANT SELECT.”

Refer to “Receiving Antenna Configuration” on page 4-73.



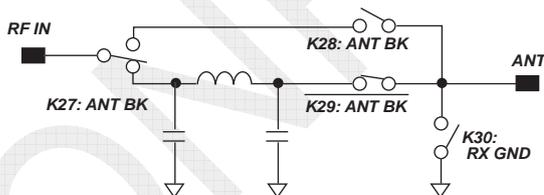
Reference)

When selecting [MENU] -> 5.SYSTEM -> 7.RX SETUP -> 2.ANT SELECT and setting “2.ANT SELECT” to “RX ANT,” the T/R antenna will be grounded with the antenna coupler when receiving.

The connection to the ground is made through the “K30” relay on the COUP board. In other words, the setting of RX ANT interlocks with the K30 relay on the COUP board.

The following section shows matching circuits configured by combined use of the Submenus “COUPLER THROUGH” and “RX ANT”.

Condition: Receiving
Through: OFF
RX ANT: DISCONNECT



Condition: Transmitting
Through: OFF
RX ANT: DISCONNECT

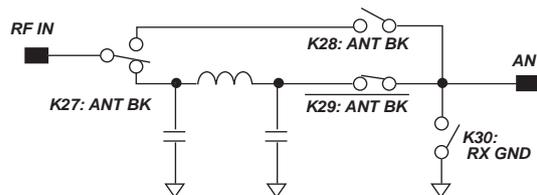
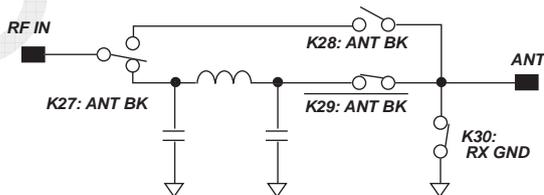


Fig. 4.7.2

Condition: Receiving
Through: OFF
RX ANT: RX ANT



Condition: Transmitting
Through: OFF
RX ANT: RX ANT

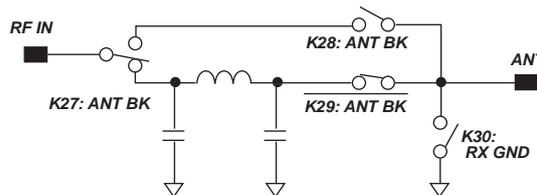
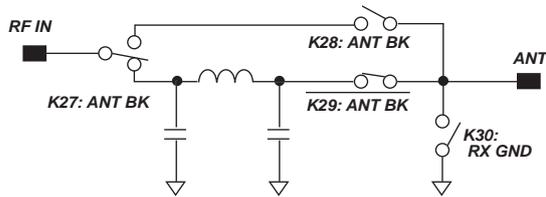


Fig. 4.7.3

Condition: Receiving
Through: OFF
RX ANT: TR ANT



Condition: Transmitting
Through: OFF
RX ANT: TR ANT

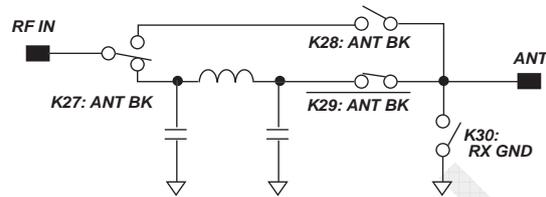
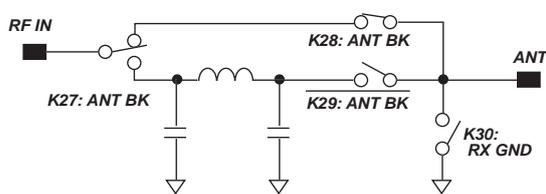


Fig. 4.7.4

Condition: Receiving
Through: RCVD
RX ANT: DISCONNECT



Condition: Transmitting
Through: RCVD
RX ANT: DISCONNECT

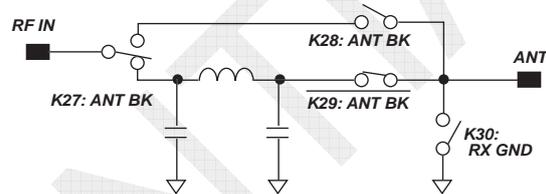
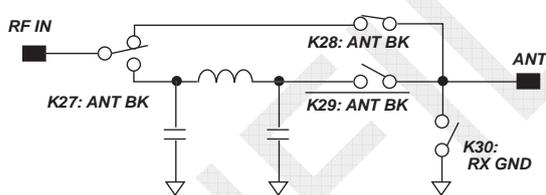


Fig. 4.7.5

Condition: Receiving
Through: RCVD
RX ANT: RX ANT



Condition: Transmitting
Through: RCVD
RX ANT: RX ANT

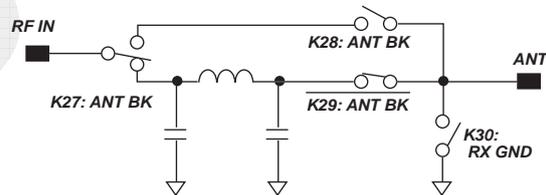
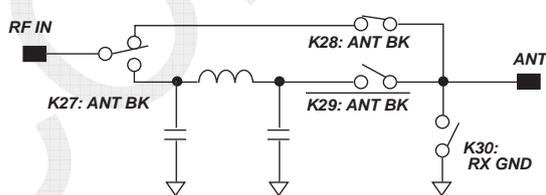


Fig. 4.7.6

Condition: Receiving
Through: RCVD
RX ANT: TR ANT



Condition: Transmitting
Through: RCVD
RX ANT: TR ANT

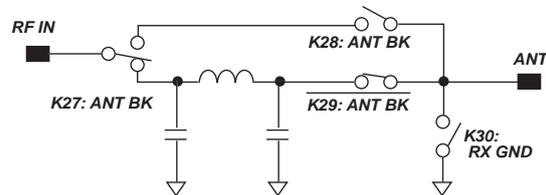


Fig. 4.7.7

*** Receiving Antenna Configuration ***

Installation-1)

FS-1575, 2575, 5075 (S-DUP): Installation with Antennas Separated

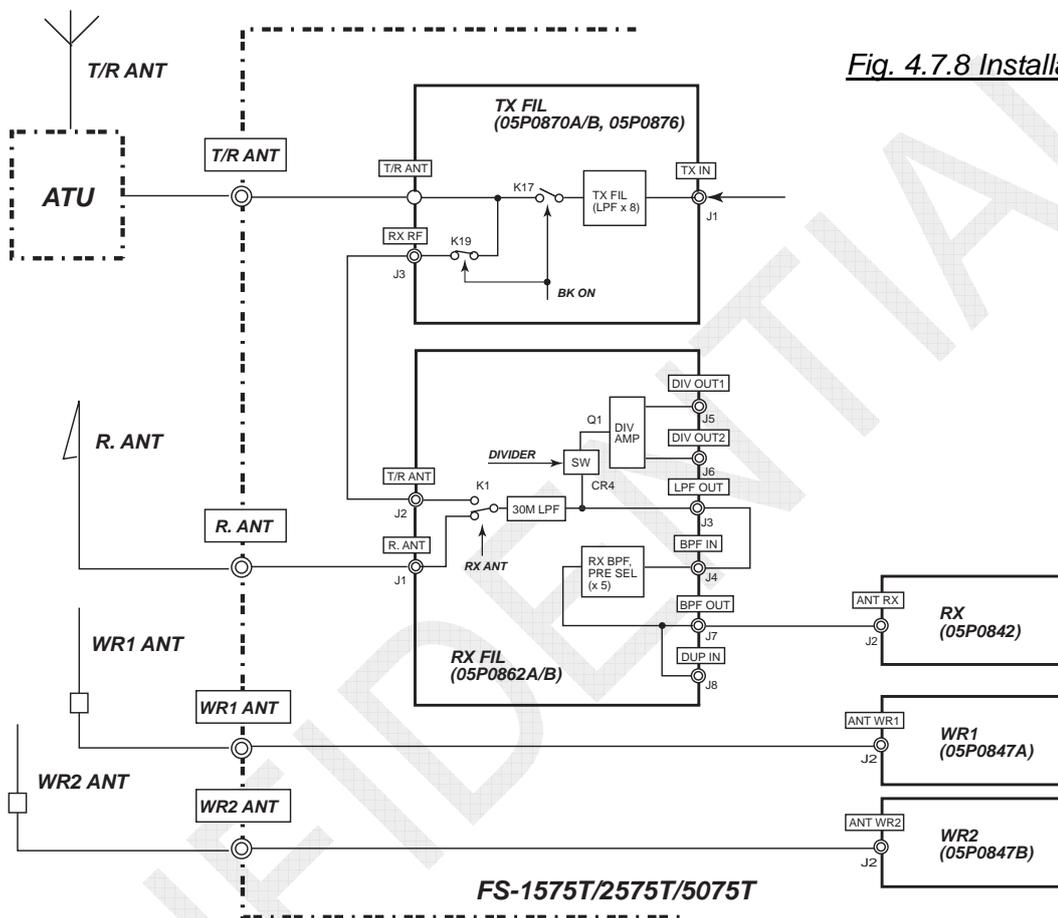


Fig. 4.7.8 Installation-1

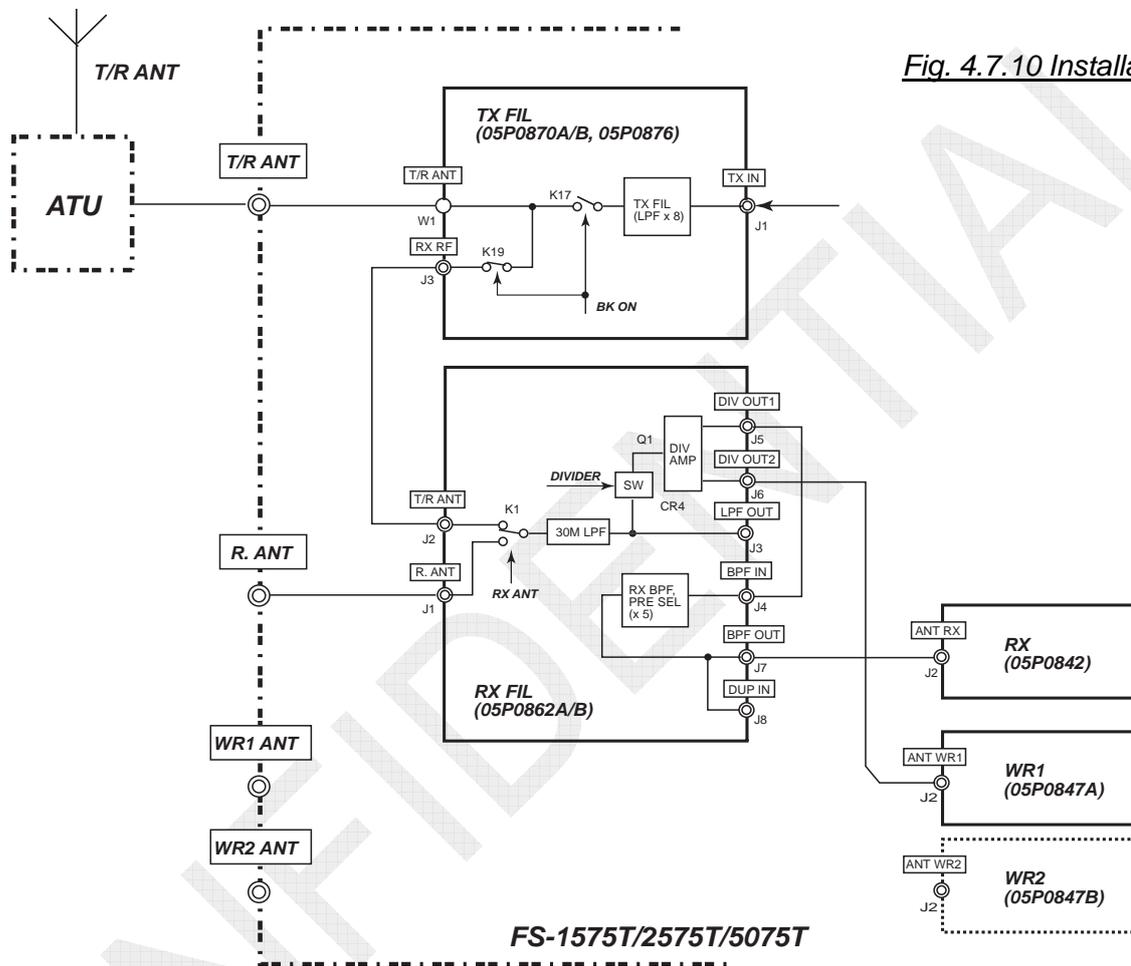
Setting Submenu	Setting
[MENU] -> 9.SERVICE -> 4.RT SETUP -> 1.SETUP -> <u>RX ANT</u>	CONNECT Note) T/R antenna connected to the ground
[MENU] -> 5.SYSTEM -> 7.RX SETUP -> <u>2.ANT SELECT</u>	RX ANT or T/RX ANT
[MENU] -> 9.SERVICE -> 4.RT SETUP -> 1.SETUP -> <u>DIVIDER</u>	OFF
WR1, 2 Jumper [J3]	WR1, 2: Active/Wire

Board	Signal Name	Control Relay	Operation
TX FIL	BK ON	K17, K19	Switches; TX, RX state.
RX FIL	RX ANT	RX FIL: K1 (ATU: K30)	Switches to RX ANT on the following conditions: • [MENU]-> 9.SERVICE -> 4.RT SETUP -> 1.SETUP -> RX ANT -> <u>CONNECT</u> • [MENU]-> 5.SYSTEM -> 7.RX SETUP -> 2.ANT SELECT -> <u>RX ANT</u>
	DIVIDER	CR24	[MENU] -> 9.SERVICE -> 4.RT SETUP -> 1.SETUP -> DIVIDER -> <u>ON</u>

Installation-3)

FS-1575, 2575, 5075 (S-DUP): Installation with T/R ANT Shared -2

To distribute a signal received with T/R ANT through DIV AMP and input it in RX and WR1:



Setting Submenu	Setting
[MENU] -> 9. SERVICE -> 4.RT SETUP -> 1.SETUP -> RX ANT	DISCONNECT
[MENU] -> 4.SYSTEM -> 7.RX SETUP -> 2.ANT SELECT	Setting not permitted (Fixed to T/RX ANT)
[MENU] -> 9.SERVICE -> 4.RT SETUP -> 1.SETUP -> DIVIDER	ON
WR1 Jumper [J3]	WR1: Wire

Board	Signal Name	Control Relay	Operation
TX FIL	BK ON	K17, K19	Switches; TX, RX state.
RX FIL	RX ANT	RX FIL: K1 (ATU: K30)	Switches to RX ANT on the following conditions: • [MENU]-> 9.SERVICE -> 4.RT SETUP -> 1.SETUP -> RX ANT -> CONNECT • [MENU]-> 5.SYSTEM -> 7.RX SETUP -> 2.ANT SELECT -> RX ANT
	DIVIDER	CR24	[MENU] -> 9.SERVICE -> 4.RT SETUP -> 1.SETUP -> DIVIDER -> ON

Installation-4)

FS-5075 (FULL DUP): Installation with Antennas Separated

The DUP FIL board should be incorporated. In order to enable DUP mode, it is required to incorporate the DUP FIL board, set “RX ANT” to “CONNECT,” and set “ANT SELECT” to “RX ANT.”

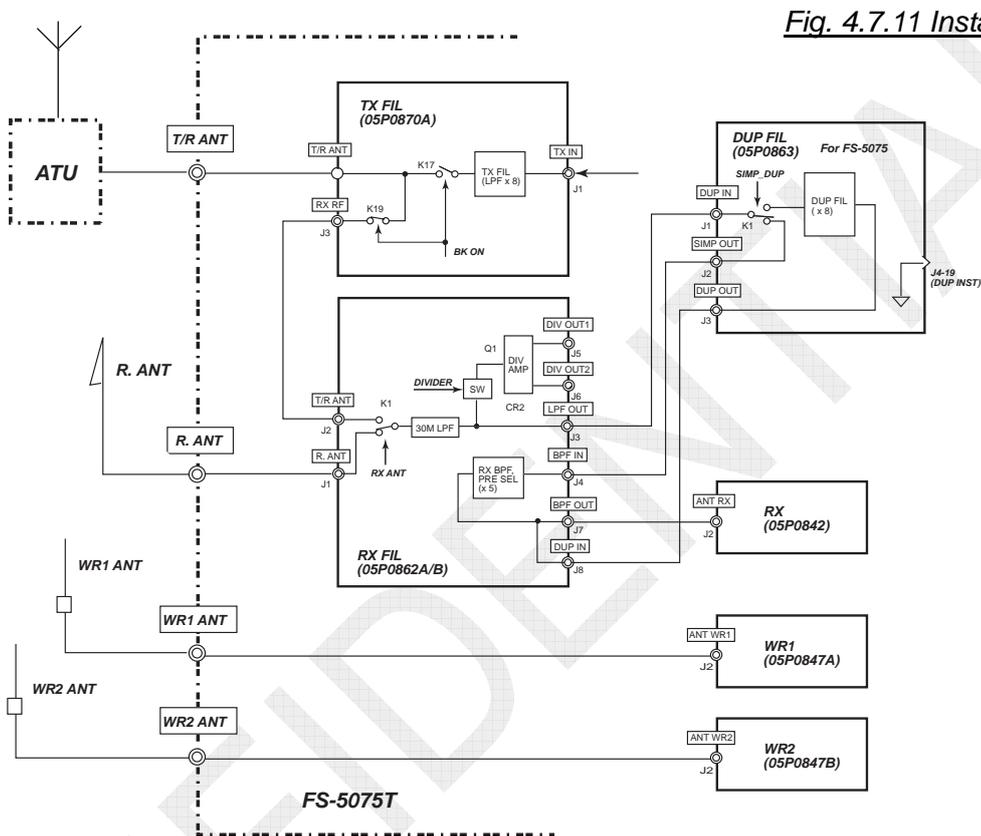


Fig. 4.7.11 Installation-4

Setting Submenu	Setting
[MENU] -> 9.SERVICE -> 4.RT SETUP -> 1.SETUP -> <u>RX ANT</u>	CONNECT Note) T/R antenna connected to the ground
[MENU] -> 5.SYSTEM -> 7.RX SETUP -> <u>2.ANT SELECT</u>	RX ANT
[MENU] -> 9.SERVICE -> 4.RT SETUP -> 1.SETUP -> <u>DIVIDER</u>	OFF
WR1, 2 Jumper [J3]	WR1, 2: Active/Wire

Board	Signal Name	Control Relay	Operation
TX FIL	BK ON	K17, K19	Switches; TX, RX state.
RX FIL	RX ANT	RX FIL: K1 (ATU: K30)	Switches to RX ANT on the following conditions: • [MENU]-> 9.SERVICE -> 4.RT SETUP -> 1.SETUP -> RX ANT -> <u>CONNECT</u> • [MENU]-> 5.SYSTEM -> 7.RX SETUP -> 2.ANT SELECT -> <u>RX ANT</u>
	DIVIDER	CR24	[MENU] -> 9.SERVICE -> 4.RT SETUP -> 1.SETUP -> DIVIDER -> <u>ON</u>
DUP-FIL	SIMP_DUP	K1	DUP/SIMP switching allowed on the RT window on the condition that the DUP FIL board is incorporated, RX ANT is set to “ON” and DUP is set to “CH.”

Installation-5)

FS-5075 (FULL DUP): ANT Installation with RX ANT and WR2 Shared - 1

To distribute a signal received with R. ANT through DIV AMP and input it in RX and WR2:

The DUP FIL board should be incorporated. In order to enable DUP mode, it is required to incorporate the DUP FIL board, set “RX ANT” to “CONNECT,” and set “ANT SELECT” to “RX ANT.”

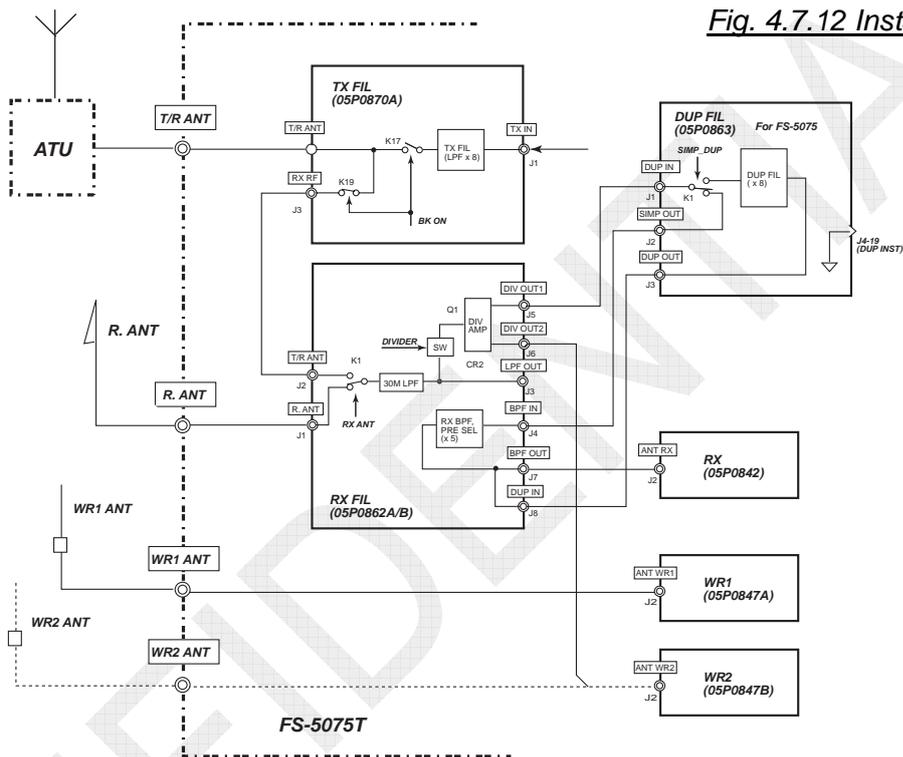


Fig. 4.7.12 Installation-5

Setting Submenu	Setting
[MENU] -> 9.SERVICE -> 4.RT SETUP -> 1.SETUP -> <u>RX ANT</u>	CONNECT <i>Note) T/R antenna connected to the ground</i>
[MENU] -> 5.SYSTEM -> 7.RX SETUP -> <u>2.ANT SELECT</u>	RX ANT
[MENU] -> 9.SERVICE -> 4.RT SETUP -> 1.SETUP -> <u>DIVIDER</u>	ON
WR1, 2 Jumper [J3]	WR1: Active/Wire, WR2: Wire

Board	Signal Name	Control Relay	Operation
TX FIL	BK ON	K17, K19	Switches; TX, RX state.
RX FIL	RX ANT	RX FIL: K1 (ATU: K30)	Switches to RX ANT on the following conditions: • [MENU]-> 9.SERVICE -> 4.RT SETUP -> 1.SETUP -> RX ANT -> <u>CONNECT</u> • [MENU]-> 5.SYSTEM -> 7.RX SETUP -> 2.ANT SELECT -> <u>RX ANT</u>
	DIVIDER	CR24	[MENU] -> 9.SERVICE -> 4.RT SETUP -> 1.SETUP -> <u>DIVIDER -> ON</u>
DUP-FIL	SIMP_DUP	K1	DUP/SIMP switching allowed on the RT window on the condition that the DUP FIL board is incorporated, RX ANT is set to “ON” and DUP is set to “CH.”

Installation-6)

FS-5075 (FULL DUP): ANT Installation with RX ANT and WR1 Shared - 2

To distribute a signal received with R. ANT through DIV AMP and input it in RX and WR1:

The DUP FIL board should be incorporated. In order to enable DUP mode, it is required to incorporate the DUP FIL board, set “RX ANT” to “CONNECT,” and set “ANT SELECT” to “RX ANT.”

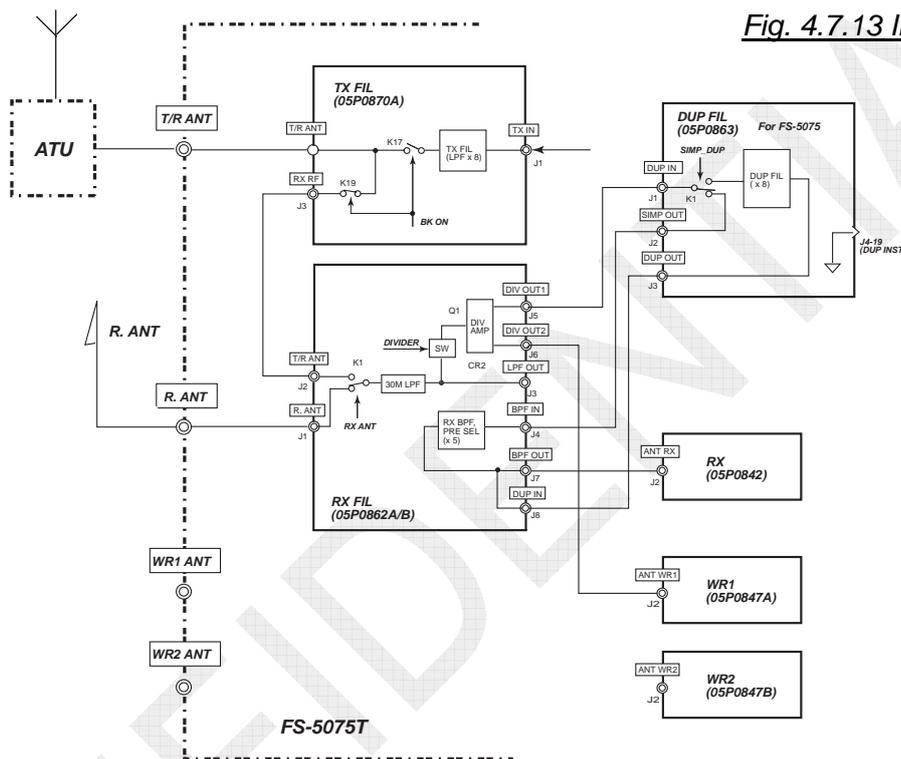


Fig. 4.7.13 Installation-6

Setting Submenu	Setting
[MENU] -> 9.SERVICE -> 4.RT SETUP -> 1.SETUP -> <u>RX ANT</u>	CONNECT Note) T/R antenna connected to the ground
[MENU] -> 5.SYSTEM -> 7.RX SETUP -> <u>2.ANT SELECT</u>	RX ANT
[MENU] -> 9.SERVICE -> 4.RT SETUP -> 1.SETUP -> <u>DIVIDER</u>	ON
WR1 Jumper [J3]	2-3: Wire

Board	Signal Name	Control Relay	Operation
TX FIL	BK ON	K17, K19	Switches; TX, RX state.
RX FIL	RX ANT	RX FIL: K1 (ATU: K30)	Switches to RX ANT on the following conditions: • [MENU]-> 9.SERVICE -> 4.RT SETUP -> 1.SETUP -> RX ANT -> <u>CONNECT</u> • [MENU]-> 5.SYSTEM -> 7.RX SETUP -> 2.ANT SELECT -> <u>RX ANT</u>
	DIVIDER	CR24	[MENU] -> 9.SERVICE -> 4.RT SETUP -> 1.SETUP -> <u>DIVIDER -> ON</u>
DUP-FIL	SIMP_DUP	K1	DUP/SIMP switching allowed on the RT window on the condition that the DUP FIL board is incorporated, RX ANT is set to “ON” and DUP is set to “CH.”

11. DIVIDER

The Submenu-3 “DIVIDER” is used to select whether to set the DIVIDER circuit incorporated in the RX FIL board to ON or OFF.

To connect the DIVIDER circuit from [DIV OUT-1, 2] of the RX FIL board to WR1, WR2, and the antenna input port of the RX board, set “DIVIDER” to “ON.” In this case, be sure to make a change to the RX ANT connection path.

Refer to “Receiving Antenna Configuration” on page 4-73.

Note) When “DIVIDER” is set to “ON,” do not use the [LPF OUT] output. Doing so will result in a decreased reception level.

12. LINE IN (-10/+10) 0

The Submenu-3 “LINE IN” is used to make adjustment of #6: LINE-IN level of the [REMOTE] port. For example, connect AF signal from the SELCALL system to the LINE-IN signal. The input level adjustment range is 0 dBm/600 Ω ± 10 dBm.

13. LINE OUT (-10/+10) 0

The Submenu-3 “LINE OUT” is used to make adjustment of #6: LINE-OUT level of the [REMOTE] port. For example, connect the LINE-OUT signal to the input terminal of external receiver of the FAX receiver. The output level adjustment range is 0 dBm/600 Ω ± 10 dBm.

14. FORMAT (IEC+NMEA, IEC)

The Submenu-3 “FORMAT” is used to make setting of specification for sentences input between #7 (TD) and #8 (RD) of TB7 on the T-IF board of the FS-xx75T.

Regardless of setting of this Submenu, the formatter handles GNS, GGA and RMC, and GLL and ZDA in order of priority presented.

Furthermore, P-sentences can be transmitted and received regardless of this setting.

- IEC

Accepts IEC-61162-1 ed-4.0 compatible data.

The data is imported when the positional data status is “valid,” but not imported while in DR, MANUAL, or SIMULATOR mode, or when checking of the checksum of the sentence, if any, results in an error.

- IEC+NMEA

Imports data compatible with IEC-61162-1 ed-4.0 and NMEA-0183 ver.-1.5, 2.0, and 3.0, even while in DR or MANUAL mode, and further regardless of whether checksum is provided.

However, the data is not imported when checking of the checksum of the sentence, if any, results in an error.

15. MIF (RS-232C, RS-485)

The Submenu-3 “MIF” allows for the remote control of the FS-xx75 system using the MIF command from the terminal software of a PC such as hyper terminal or Tera Term. MIF setting is used to determine electrical specifications for the data Tx line. For example, setting “MIF” to “RS-232C” activates the RS-232C terminal of the [REMOTE] port and deactivates the RS-485 terminal.

Setting	[REMOTE] Port Pin No.			
RS-232C	#2: SD		#3: RD	
RS-485	#21: REM_TD-A	#22: REM_TD-A	#23: REM_RD-C (Current Loop)	#24: REM_RD-H (Current Loop)

Reference)

- 1) MIF specification
 - Transmission system: Serial
 - Synchronous system: Asynchronous system
 - Communication system: Half-duplex
 - Transmission rate: 4800 bps
 - Signal format:

Start bit: 1 bit	Data bit: 7 bits
Parity bit: 1 bit (Even)	Stop bit: 2 bits
Signal end: <CR>, <LF>	
- 2) Examples of MIF commands

Table 4.7.7 Example of MIF Command List

Control Setting Item	Command	Parameter
TX frequency	FT	Composed of 6/7 digits with the last digit on the order of 10 Hz (e.g. FT218200).
RX frequency	FR	Composed of 6/7 digits with the last digit on the order of 10 Hz (e.g. FR218200).
Type of radio wave	EM	0=LSB, 1=SSB (J3E), 2=AM (H3E), 3=Not used 4=CW (A1A), 5=TELEX (J2B), 6=FAX (F3C)
AGC	AG	0=OFF, 1=SLOW, 2=FAST
SQ	SQ	S=ON, R=OFF
NB	NB	S=ON, R=OFF
SP	SP	S=ON, R=OFF
TX start/stop	TX	S=ON, R=OFF
TUNE	TU	—
RF GAIN	RF	00 - FF
TX POWER	PO	FS-1575:1=LOW, 2=MID, 3=HIGH FS-2575/5075:0=LOW2, 1=LOW1, 2=MID, 3=HIGH
ITU channel	CH	1 + Band (2 digits) + CH (3 digits) (e.g. CH104001)
DUP MODE	DU	0=SIMPLEX, 1=SEMI-DUPLEX, 2=FULL-DUPLEX

RT Lock	FZ	S=MIF Priority mode, R=MIF Non-priority mode
Recall TX frequency	CAFT	—
Recall RX frequency	CAFR	—
Model name acquisition	CAID	—

Note)

Enter commands in ASCII capital letters and add CR or LF to the end of data.

3) Response

- When the command is properly executed, “*” will be outputted.
- If the command is wrong or an error occurs while the command is in execution, “?” will be outputted.

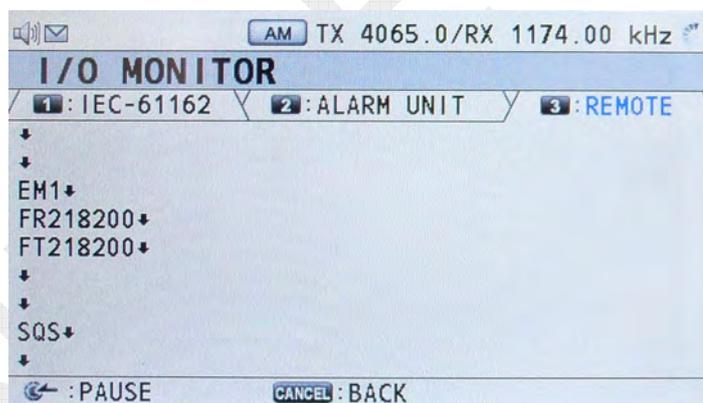
4) Commands received can be monitored.

To monitor commands received, select [MENU] -> 9.SERVICE -> 6.

MAINTENANCE LOG -> 1.I/O MONITOR -> “REMOTE.”

Monitoring is independent of the settings of [MENU] -> 9.SERVICE -> 3. RT SETUP -> 1.SETUP -> MIF: RS-232C, RS-485.

- RS-232C -> [REMOTE] - #2(SD), #3(RD)
- RS-485 -> [REMOTE] - #21/#22(TD-A/B), #23/ #24(RD-A/B)



4.7.4 [4. RESTORE FACTORY SETTINGS]

For details, refer to information on page 6-22.

4.7.5 [5. TEST]

For details, refer to information on page 6-23.

4.7.6 [6. MAINTENANCE LOG]

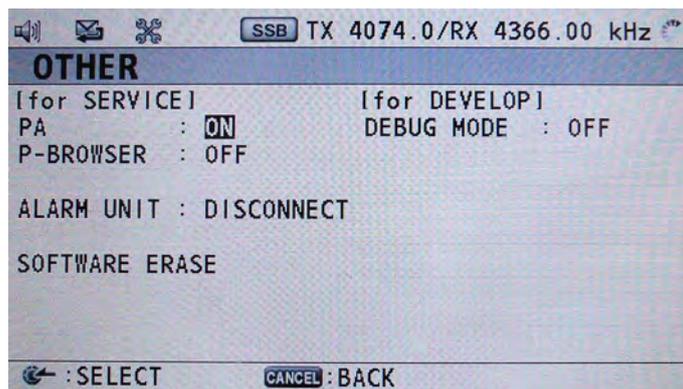
For details, refer to information on page 6-42.

CONFIDENTIAL

4.7.7 [7. OTHER]

Select [MENU] -> 9.SERVICE -> 7.OTHER. "7.OTHER" includes Submenu-2: "PA," "P-BROWSER," "ALARM UNIT," "SOFTWARE ERASE," and DEBUG MODE (for R&D).

Refer to "Appendix-1" for "P-BROWSER" and information on page 6-47 for "SOFTWARE ERASE."



1. PA (ON, OFF)

The Submenu-2 "PA" is used to stop transmission operation. This provides a convenient function for explaining the system operation.

When any change is made to this submenu setting, the changed setting will not be reflected unless the power supply is turned ON again.

When "PA" is set to "OFF," the FS-xx75 system will not be put into a transmission ready state even if the PTT key of the handset is pressed. Furthermore, when transmitting a DSC message, the system will initiate transmitting operation, but not transmit the message. The same applies to NBDP messages.

Signals controlled by "PA" are TX ON, DRV ON, PA ON, and BK ON.

2. ALARM UNIT (CONNECT, DISCONNECT)

To connect IC-350, set this Submenu-2 "ALARM UNIT" to "ON." Setting "ALARM UNIT" to "ON" and selecting [MENU] -> 1.TEST -> 1.DAILY TEST will conduct a test on the "ALARM UNIT".

However, even if "ALARM UNIT" is set to "DISCONNECT," a Distress alert can be transmitted by pressing the Distress Alert button on the IC-350. A distress alert reception alarm is also outputted.

Reference)

To connect the IC-350, not only set “ALARM UNIT” to “CONNECT,” but also make setting of the PANEL board and the MAIN board of the IC-350.

- 1) Make setting of S101 bits on the PANEL board of the IC-350.
All the bits are set to “OFF” at the factory.

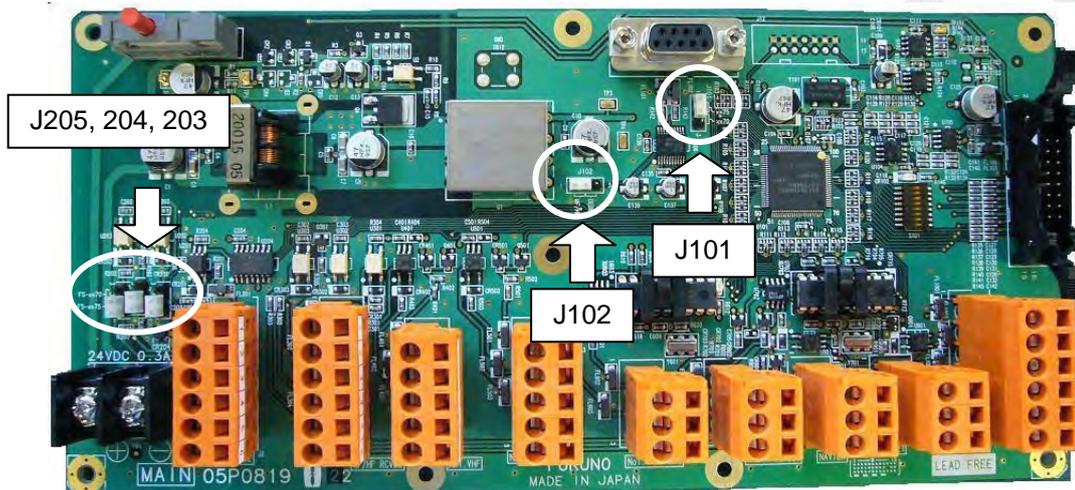
Table 4.7.8 IC-350 S101 Settings

S101 Bit	Connected Device	OFF	ON
1	No.1 VHF	ENABLE	DISABLE
2	No.2 VHF	ENABLE	DISABLE
3	MF/HF	ENABLE	DISABLE
4	No.1 INMARSAT	ENABLE	DISABLE
5	No.2 INMARSAT	ENABLE	DISABLE
6	NAVTEX	ENABLE	DISABLE
7	NAVTEX SEL	N.C. (NX-700)	N.O. (NX-500)
8	VERCHK	OFF	ON



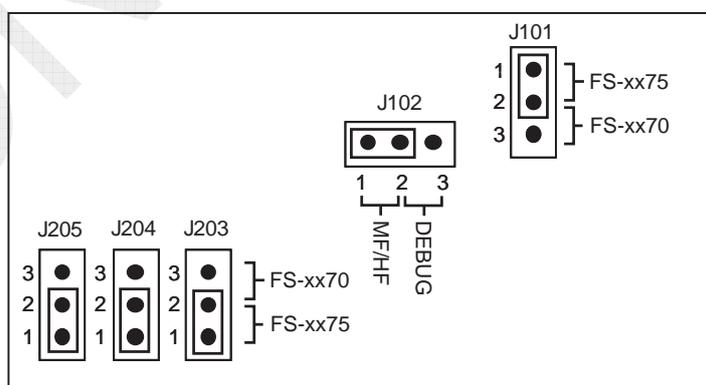
2) Make setting of jumpers on the MAIN board.

- MAIN board: 05P0819-11
Since the board has no jumper pin, no setting is required.
- MAIN board: 05P0819-22 and later
The board has jumper pins to support the connection of FS-1575/2575/5075. To connect a MF/HF radiotelephone, the setting of jumper pins on the MAIN board should be made according to the type of the radiotelephone.



Jumper Pin	J101/J203/J204/J205	J102
[1-2]	FS-xx75	Normal operation
[2-3]	FS-xx70	Program updating

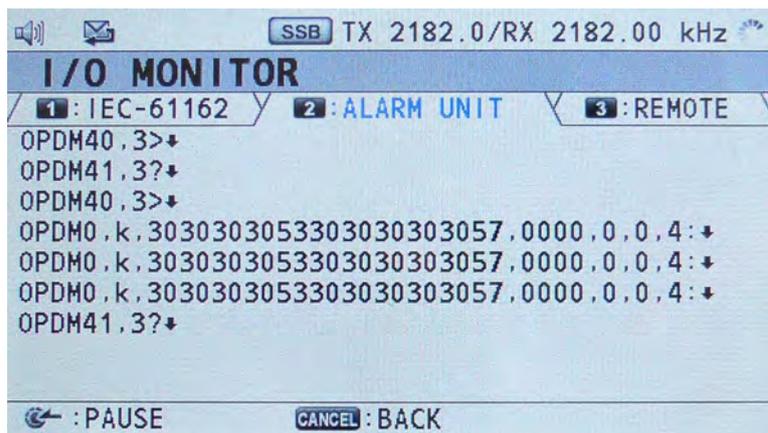
Set J101/203/204/205 to [1-2] and J102 to [1-2].



- 3) Communications between the FS-xx75 and the IC-350 can be monitored.
 Select [MENU] -> 9.SERVICE -> 6.MAINTENACE LOG -> 1.I/O MONITOR
 -> “ALARM UNIT.”

When pressing the [DISTRESS] button or the [TEST] button on the [MF/HF] of the IC350, data from the IC-350 will be displayed.

Selecting [MENU] -> 9.SERVICE -> 7.OTHER -> “ALARM UNIT” -> “DISCONNECT” also makes it possible to monitor the communications.



3. P-BROWSER

The Parameter Browser is software used to make settings of the FS-xx75 system and save setting data from a PC. Connect the PC: Parameter Browser to the LAN port of the FS-xx75T. For details, refer to Appendix-1.

4. SOFTWARE ERASE

This mode is used to delete C-CPU application program for the FS-2575C system. For details, refer to information on page 6-47.

5. DEBUG MODE (ON, OFF)

This mode is used by R & D and displays debug information, mainly a TIMEOUT counter.

4.8 Mounting of WR2 Board

Mounting an option board “WR2 board” allows for watching general DSC frequencies even while on the radiotelephone. The antenna for the WR2 board is able to use “FAX-5 + 2.6 m whip antenna”, or distribute signals received from the T/R antenna or RX antenna. Note that in case of FAX-5+2.6 m antenna is used, set JP1 on the WR2 board to [ACTIVE] side.

** Parts name: Watch Receiver Kit, Type: OP05-123, Code No. 001-135-610 **

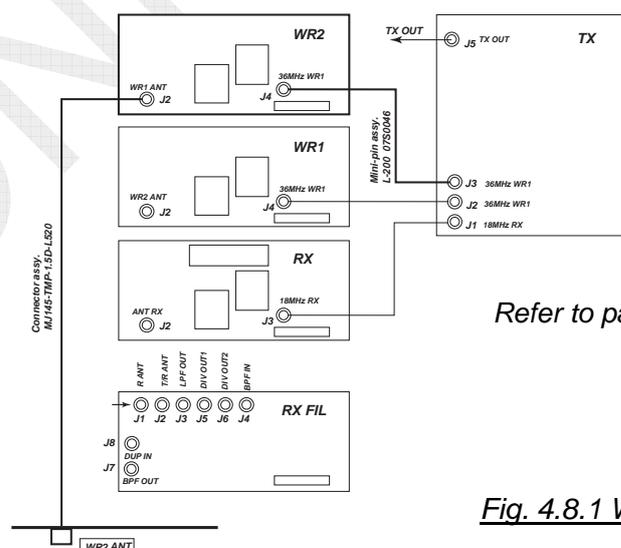
Name	Type	Code No.	Qty
WR2 board	05P0847B(LF)	001-137-100	1
Binding head screw	M3*8 C2700W MBCR2	000-163-485-10	4
Mini-pin assembly	L-200 07S0046	000-165-847-10	1
Connector assembly	MJ145-TMP-1.5D-L520	000-175-320-10	1

1. In case of FAX-5+2.5m antenna

For antenna circuit diagram, refer to “Receiving Antenna Configuration” on page 4-73.

Procedure)

- 1) Mount the WR2 board with four screws.
- 2) Mount the connector assembly.
Put the MJ connector onto [WR2 ANT] pin of the housing and the mini-pin in [J2] on the WR2 board.
- 3) Put the mini-pin connector (L-200) in [J4] on the WR2 board and [J3] on the TX board, respectively.
- 4) When FAX-5 is used as the WR antenna, set JP1 on the WR2 board to [ACTIVE] side.



Refer to page 4-73.

Fig. 4.8.1 WR2 Cable Connection -1

2. To share with T/R ANT

For antenna circuit diagram, refer to “Receiving Antenna Configuration” on page 4-73.

Procedure)

- 1) Mount the WR2 board with four screws.
- 2) Put the mini-pin connector (L-200) in [J4] on the WR2 board and [J3] on the TX board, respectively.
- 3) Relocate the mini-pin connector on the RX FIL board from between [J3: LPF OUT] and [J4: BPF IN] to between [J4: BPF IN] and [J5: DIV OUT 1].
- 4) Put the mini-pin connector (L-380: standard supply) in [J2] on the WR2 board and [J6: DIV OUT 2] on the RX FIL board, respectively.
- 5) Set JP1 on the WR2 board to [WIRE] side.
- 6) Select [MENU] -> 9.SERVICE -> 3.RT SETUP -> 1.SETUP -> DIVIDER -> “ON.”

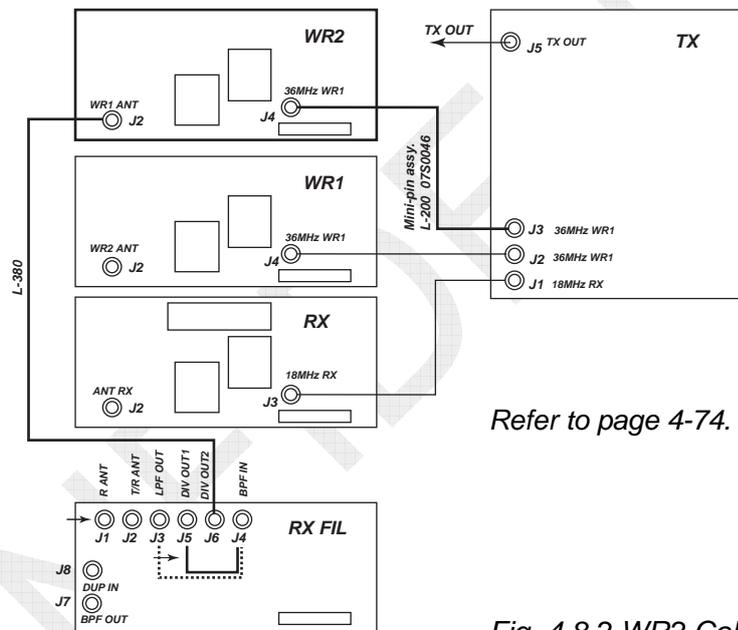


Fig. 4.8.2 WR2 Cable Connection -2

3. To share with RX ANT (for DUPLEX communication)

For antenna circuit diagram, refer to “Receiving Antenna Configuration” on page 4-73.

Procedure)

- 1) Mount the WR2 board with four screws.
- 2) Put the mini-pin connector (L-200) in [J4] on the WR2 board and [J3] on the TX board, respectively.
- 3) Relocate the mini-pin connector on the RX FIL board from between [J3: LPF OUT] and [J4: BPF IN] to between [J4: BPF IN] and [J5: DIV OUT 1].
- 4) Put the mini-pin connector (L-380) in [J2] on the WR2 board and [J6: DIV OUT 2] on the RX FIL board, respectively.
- 5) Set JP1 on the WR2 board to [WIRE] side.
- 6) Select [MENU] -> 9.SERVICE -> 3.RT SETUP -> 1.SETUP -> DIVIDER -> “ON.”
- 7) Select [MENU] -> 9.SERVICE -> 3.RT SETUP -> 1.SETUP -> RX ANT -> “CONNECT.”
- 8) Select [MENU] -> 5.SYSTEM -> 7.RX SETUP -> “RX ANT.”

Reference)

For reception antenna can be selected through [MENU] -> 5.SYSTEM -> 7.RX SETUP -> ANT SELECT -> “TRX ANT” or “RX ANT.”

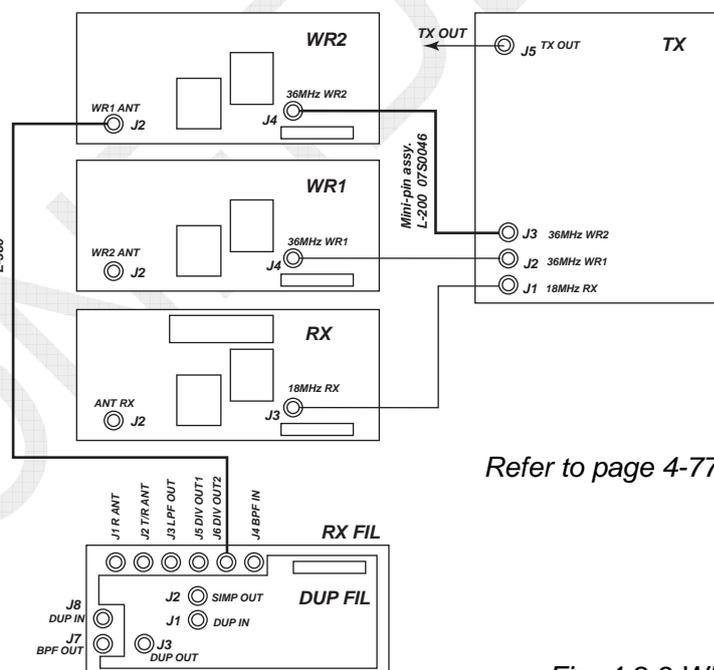


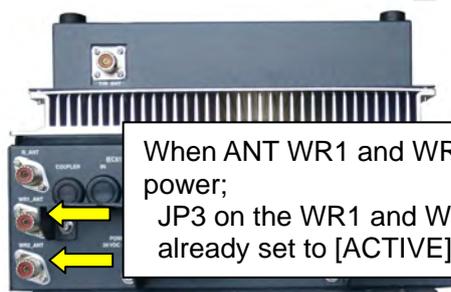
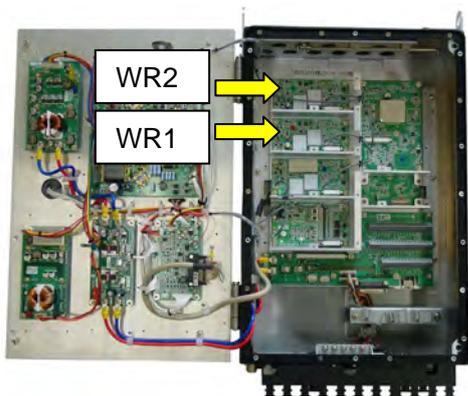
Fig. 4.8.3 WR2 Cable Connection -3

4.9 WR1 and WR2 Board Jumper Setting

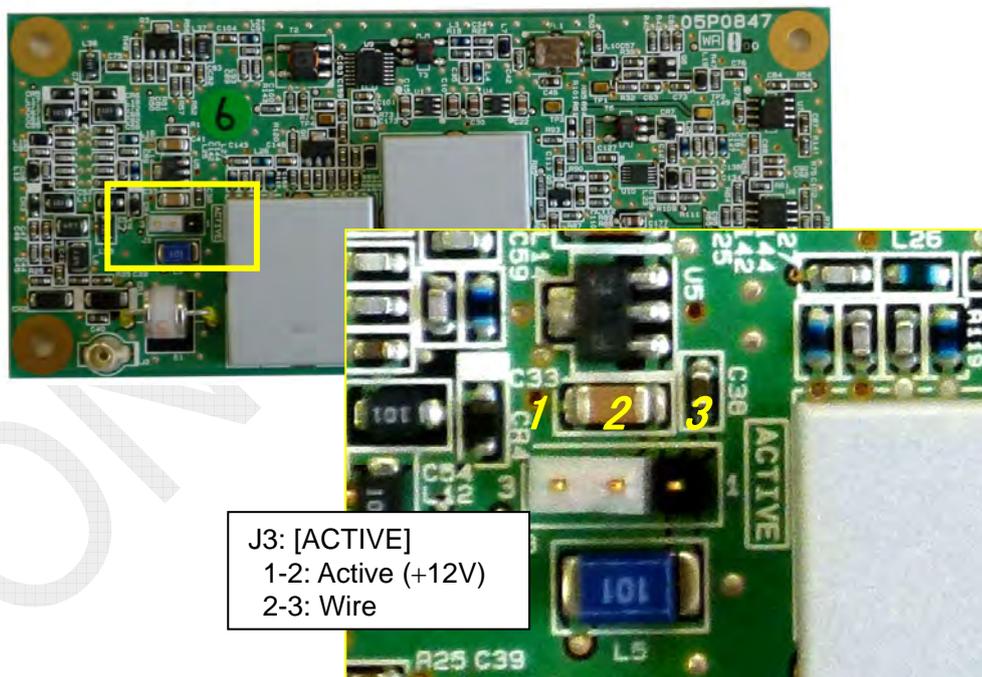
To Use FAX-5: pre-amplifier unit to WR1 and WR2 antenna, be sure to set JP3 on the WR1 and WR2 boards to [ACTIVE] side and supply +12V power to the FAX-5.

The factory set is [WIRE].

- WR1: DSC watch receiver
- WR2: General DSC frequency watch receiver (Option)



When ANT WR1 and WR2 output +12V power; JP3 on the WR1 and WR2 boards are already set to [ACTIVE], respectively.



J3: [ACTIVE]
 1-2: Active (+12V)
 2-3: Wire

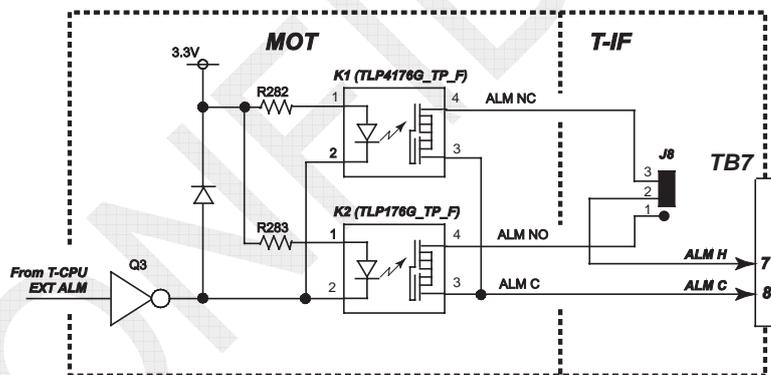
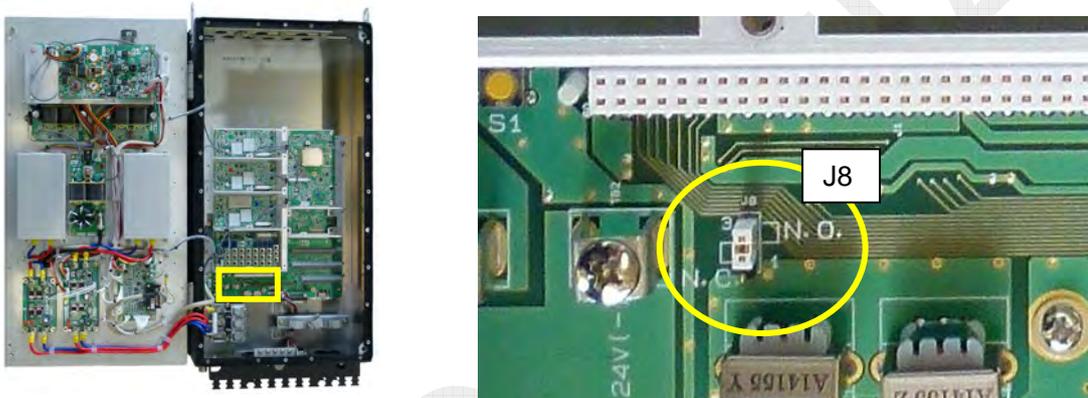
4.10 EXTERNAL ALM Output Setting (N.C, N.O)

When a DSC message is received, EXT ALM output (#7: H - #8: C of TB7) will be activated. The EXT ALM output type can be set to “Normally Closed” or “Normally Open.” The factory set is “Normally closed.”

Reference)

EXT ALM output (#7: H - #8: C of TB7):

When the ALM contact is closed, the output resistance is approximately 25 ohms (nonpolar). When it is open, the resistance is high.



J8:
 1 - 2: Normally Open
 2 - 3: Normally Closed

Fig. 4.10.1 EXTERNAL ALARM I/F Circuit

4.11 Mounting of DUP FIL Board

Only the FS-5075 system is available for FULL DUPLEX communications. Performing FULL DUPLEX communications requires a RX antenna to be installed and a DUP FIL board (05P0863) to be mounted. Furthermore, system setting changes should be made. For antenna circuit diagram, refer to “Receiving Antenna Configuration” on page 4-73.

*** Parts name: Full Duplex Kit, Type No. OP05-125, Code No. 001-135-630 ***

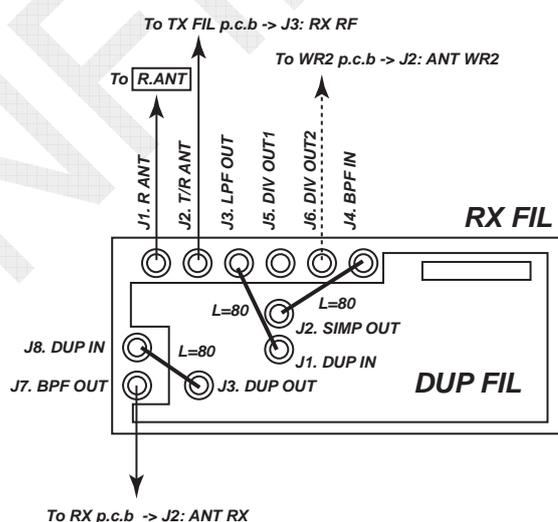
Name	Type	Code No.	Qty
DUP-FIL Board	05P0863(LF)	001-137-900	1
Mini-pin assembly	L-80	000-165-835-10	3
Spacer	SQ-15	000-159-299-10	4

Procedure)

- 1) Replace the screws that fix the RX FIL board with spacers, and then mount the DUP FIL board on the spacers with four screws.
- 2) Interconnect the mini-pin connectors as shown in the figure below.
- 3) Make the following settings:
 - [MENU] -> 9.SERVICE -> 3.RT SETUP -> 1.SETUP -> RX ANT -> “CONNECT”
 - [MENU] -> 5.SYSTEM -> 7.RX SETUP -> “RX ANT”

Reference)

To share the WR2 board with RX ANT, select [MENU] -> 9.SERVICE -> 3.RT SETUP -> 1.SETUP -> DIVIDER -> “ON.”



4.12 AT-5075 Setting

To connect the AT-5075 Antenna Coupler to the FS-2575 or FS-5075 system, connect or disconnect the jumper pins “J10: RX GND” and “J11: ANT BK” to or from between #2 of J10 and J11, in order to prevent the use of these signals.

The J10 and J11 settings are made in consideration of connection to a radiotelephone not supporting RX GND and ANT BK control signal that control the antenna coupler.

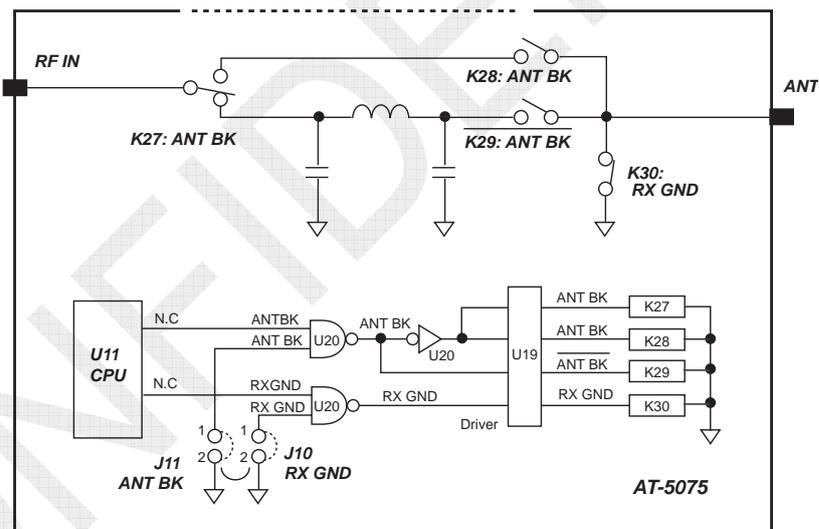
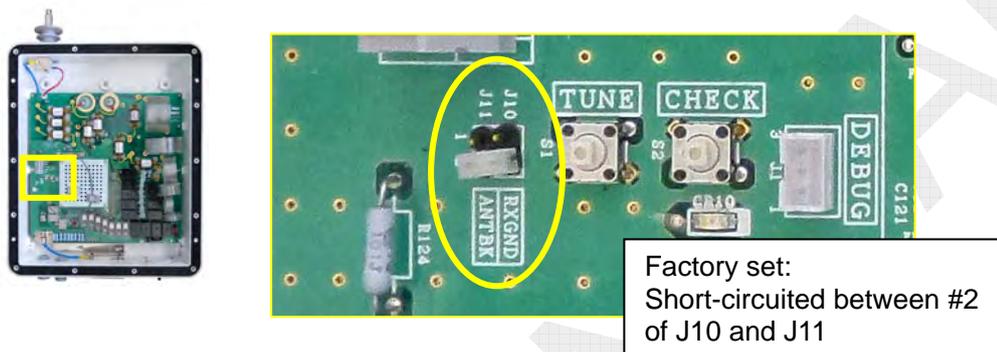


Fig. 4.12.1 AT-5075 Jumper Setting Circuit

Table 4.12.1 AT-5075 Jumper Setting

Jumper	Setting	Operation
J10: RX GND	Open (Factory set)	Controlled by control signal from FS-xx75 system
	Short-circuited	K30: Always open
J11: ANT BK	Open (Factory set)	Controlled by control signal from FS-xx75 system
	Short-circuited	K27 and K29 connected to the matching circuit side regardless of transceiving
J10, J11	Short-circuited	K27 and K29 connected to the matching circuit side regardless of transceiving K30: Always open

Reference)

To connect AT-5075 to the FS-5000 Series FS-5070 system:

Make interconnection as shown below using jumper between #1 and #2 of J10 and J11. TX and RX signals always pass through the matching circuit.

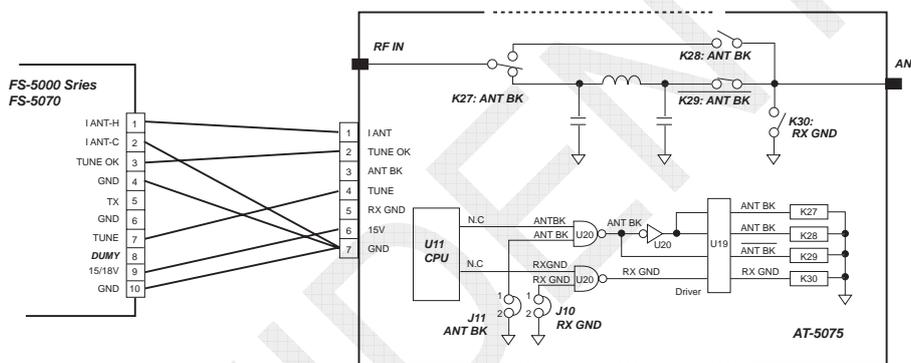


Fig. 4.12.2 Connection between the FS-5000 Series FS-5070 and AT-5075

To connect AT-5075 to FS-2570:

Make interconnection as shown below using jumper between #1 and #2 of J10 and J11. TX and RX signals always pass through the matching circuit.

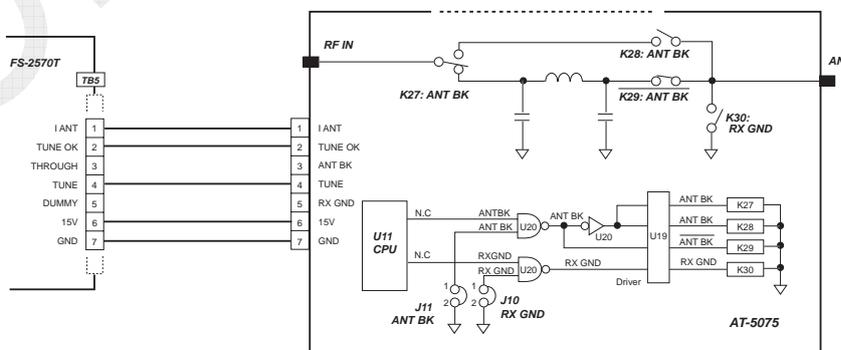


Fig. 4.12.3 Connection between FS-2570 and AT-5075

4.13 AT-1575 Setting

To connect the AT-1575 Antenna Coupler to the FS-1575 system, connect or disconnect the jumper pins “J4: ANT BK” and “J5: RX ANT” to or from between #2 and #4 of J4, in order to prevent the use of these signals.

The J4 setting is made in consideration of connection to a radiotelephone not supporting RX GND and ANT BK control signal that control the antenna coupler.

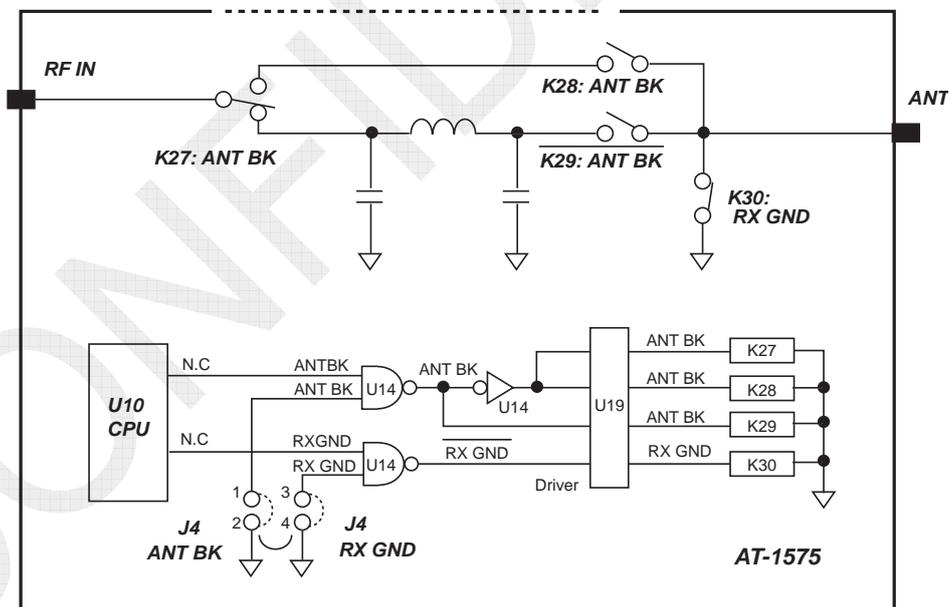


Fig. 4.13.1 AT-1575 Jumper Setting Circuit

Table 4.13.1 AT-1575 Jumper Setting

Jumper	Setting	Operation
J4 #3-4 RX GND	Open (Factory set)	Controlled by control signal from FS-xx75 system
	Short-circuited	K30: Always open
J4 #1-2 ANT BK	Open (Factory set)	Controlled by control signal from FS-xx75 system
	Short-circuited	K27 and K29 connected to the matching circuit side regardless of transceiving
J4, J5	Short-circuited	K27 and K29 connected to the matching circuit side regardless of transceiving K30: Always open

Reference) To connect AT-1575 to FS-1570 system:

Make interconnection as shown below using jumper between #1 - #2 and #3 - #4 of J4. TX and RX signals always pass through the matching circuit.

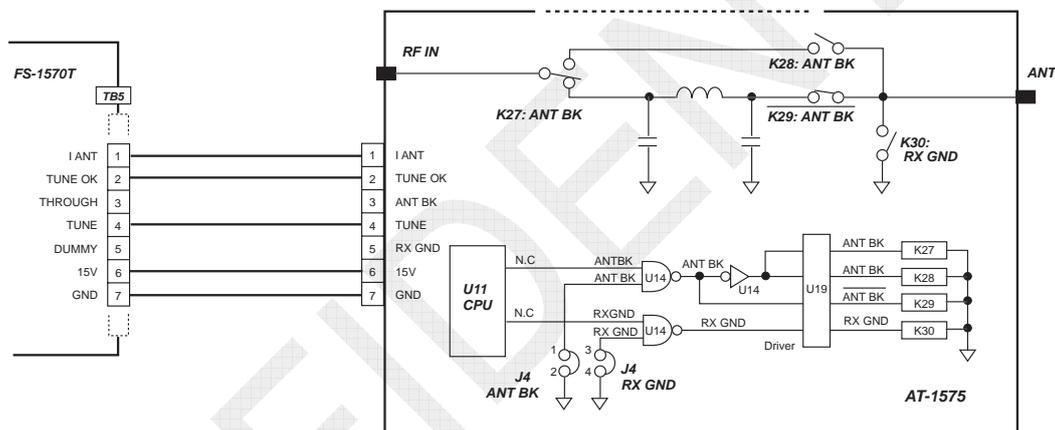


Fig. 4.13.2 Connection between FS-1570 and AT-1575

4.14 IB-583 Setting

4.14.1 List of Setting Menus

The following table shows a list of related setting menus.

Table 4.14.1 List of Setting Menus

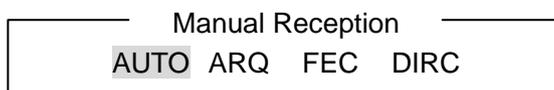
	Setting Menu	Factory Set	Set Value	Remark
F3: Operate	6. Manual Reception	AUTO	AUTO, ARQ, FEC, DIRC	
F5: Station	5. Answerback Code Entry	—	MMSI+CS(4digit)+X	Changed PASSWORD ^{See Note)} "ANSWER CODE"
	6. Group ID Entry (4/5 digit)	—		Changed PASSWORD ^{See Note)} "ID CODE"
	7. Group ID Entry (9 digit)	—		
	8. Select ID Entry (4/5 digit)	—	Sell call number	
	9. Select ID Entry (9 digit)	—	MMSI	
F6: System	Slave Delay	8 msec	0 to 50msec	Changed PASSWORD ^{See Note)} "DP6" <u>Leave "Slave Delay" set to 8 msec!!</u>
	TX/RX MSG Save	OFF	ON, OFF	
	Edit before sending	OFF	ON, OFF	
	Time System	UTC	OFF, UTC, SMT, JST	
	Time & Date			Calibrated with RTC time data.
	** Window color	-	Window color setup Default	
Fn+F1	Language	Normal	Normal, Norway, Sweden, UK	Changed PASSWORD ^{See Note)} "DP6"
	Printer	PP-510	PP-510, OTHER	

Note)

Enter the changed password in capital letter. (in "caps lock" mode).

4.14.2 Making Setting of Submenu “6. Manual Reception” of “F3: Operate” Menu

Press the [F3] key, and then the [6] key. The “6. Manual Reception” window will appear. Then, click on “AUTO.”



Overview of setting

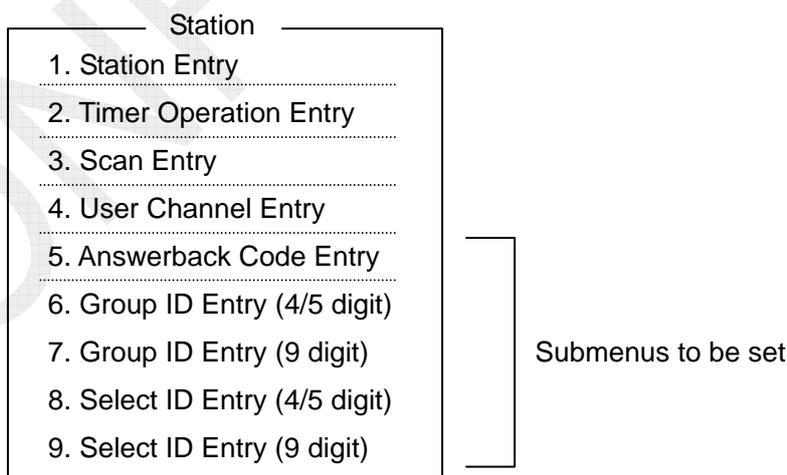
- AUTO: Automatically switches between ARQ mode and FEC mode according to reception mode.
- ARQ: Receives messages only in ARQ mode.
- FEC: Receives messages only in FEC mode.
- DIRC: Receives messages only in DIRC mode.

The set statuses listed above are known from the status display “Comm. Mode” of the terminal unit. When this Submenu is set to “AUTO,” the AUTO window will also switch to the display of a mode being in communication.

For example, the “AUTO” window displays [ARQ] while in ARQ communication mode, [CFEC] while in FEC-Collective mode, and [SFEC] while in FEC-Selective mode.

4.14.3 Making setting of “F5: Station” Menu

Submenus to be set are answerback code and ID number. Pressing the [F5] key will display the window shown below.



2. Registering an ID number

Registration and deletion procedure for the menus from “6. Group ID Entry (4/5 digit)” to “9. Select ID Entry (9 digit)” is the same as that specified below. If “Group ID,” etc. are not given, no registration is required.

Procedure)

- 1) Select the registration number of the relevant ID, and then enter the ID number. For example, In case of a nine-digit ID (MMSI), select “9. Select ID Entry (9 digit),” and then enter a nine-digit number.

Select ID Entry Select ID Code (9) 431456789
--

- 2) When the number is properly entered, press the [Enter] key. A command prompt window saying “OK/Cancel” will appear. Select “OK,” and then press the [Enter] key.

Select ID Entry Select ID Code (9) 431456789	<table border="1"> <tr> <td>OK</td> </tr> <tr> <td>Cancel</td> </tr> </table>	OK	Cancel
OK			
Cancel			

- 3) The following confirmation message will appear. Then, press the [Enter] key again.

Caution Confirm the “CODE” before pressing ENTER key. You cannot change the CODE once it has been entered.

- 4) The display will return to the normal window. With this, the re-registration is completed.

Re-registering a registered ID number

Display the ID Registration window to be deleted, and then type “ID _{space} CODE” *in capital letter*.

The registered ID number will be deleted. Re-register the ID number following the procedure specified above.

4.14.4 Making Setting of “F6: System” Menu

Pressing the [F6]: System will display the window shown below.

To make “Slave Delay” setting and return this menu to “Default,” the password should be entered.

When the “Default” menu is executed, the set values of “System” will return to the default.

Setup	Lock	Change	Default
Slave Delay	8 msec (0 - 50msec)		
TX/RX MSG Save	OFF	ON	
Edit Before sending	OFF	ON	
Time System	OFF	UTC	STM JST
Time & Date	2012 / 01 / 13		12:10:10
Window Color			
Self Test			

Setting Procedure)

- 1) Press the [F6] key to display the System menu.
- 2) Put the cursor on [Change], and then move down the cursor to a Submenu to be set to make setting of this Submenu. However, “Slave Delay” cannot be selected.

Procedure for making “Slave Delay” setting and returning the setting to “Default”)

- 1) Press the [F6] key to display the System menu.
- 2) Type the password: “DP6” *in capital letter*.
- 3) To make “Slave Delay” setting, put the cursor on [Change].
To return the “System” setting to the factory set, put the cursor on [Default], and then press the [Enter] key.

Meaning of Each Item

- Slave Delay

When operating in the ARQ mode, the called station employs a constant time interval between the end of the received signal and the start of the transmitted signal. It can be arbitrarily set in the range of 0 to 50 msec, but **leave the setting as default. “8 msec”**

- **TX/RX MSG Save (OFF)**
This setting decides whether received messages are automatically saved in FDD, or not.
- **Edit Before sending (OFF)**
To perform a real-time communication, i.e., to create a message in advance and then perform a telex communication in such a way as to have a conversation with the other station without transmitting the message, set this Submenu to “OFF.” This setting allows for transmitting characters one by one every time it is typed.
Setting the Submenu to “ON” will transmit a message at a time by pressing the [Enter] key after typing the sentences. Consequently, this setting allows for correcting words and sentences before pressing the [Enter] key, and then transmitting the message.
However, this feature is applicable just to a single line.
- **Time System**
Setting this Submenu to “OFF” will not display time. UTC stands for Universal Time, Coordinated SMT stands for Ship Marine Time, and JST stands for Japan Standard Time. Specified time is normally time displayed in the upper right portion of the window.
- **Time & Date**
Setting this Submenu to “SMT” will allow for making date and time setting.
However, when it is set to “UTC” or “JST,” RTC data on the transceiver unit side will be imported by turning ON and OFF the power supply of the IB-583 display. As a result, since this date and time are used, no setting change is allowed.
- **Window color**
Window colors can be set on the “Window color setup” window. To return the set value to the default, select the “Default color” submenu.

Window	Foreground Color	Background Color
Base window	Black	White
Back scroll	Green	Gray
Edit-1	Cyan	L-Blue
Edit-2	Red	L-Green
Function	Magenta	L-Cyan
Sub menu-1	Brown	L-Red
Sub menu-2	White	L-Magenta
Sub menu-3	Gray	L-White
Message	L-Blue	Yellow
	L-Green	Blue
	L-Cyan	Green
	L-Red	Cyan
	L-Magenta	Red
	L-White	Magenta
	Yellow	Brown

4.14.5 Making Printer and Language Setting

Press the [F1] key while pressing the [Fn] key. The Printer & Language Setup window will appear. Typing the password: “DP6” *in capital letter*. It will allow for making printer and language setting.

Set up			
Language	<u>Normal</u>	Norway	Sweden UK
Printer	<u>PP-510</u>	OTHER	

To make language setting, assign the local character code to a specific key. To send “%” in UK mode, use the [] key. To send “@” also in UK mode, use the [] key. To create a micro command, use the [Shift] and [2] keys.

Key Language	[` \]	[}]	[{]
Normal	—	—	—
Norway		Å / å	Æ / æ
Sweden	Ö / ö	Å / å	Ä / ä
UK	£		@

Note) Unless DIP sw1 – #5 of PP-510 is set to “ON,” Norway characters and “Æ” are not printed out.

4.14.6 Switching between English and Russian Modes

Switching to Russian mode

Turn ON the power supply while pressing the [R] key. The [R] key should be pressed and held until the window is displayed in “Russian”. To switch the language of message to be transmitted, hold down the [Shift] key and press the [Alt] key. English and Russian letters are automatically identified and displayed.

Switching Russian mode back to English mode

Turn ON the power supply while pressing the [E] key. The [E] key should be pressed and held until the window is displayed in English.

Mode: Switching language		Language of message to be transmitted	Language of message received
English	None	English	English
Russian	Switches using the [Shift] and [Alt] keys.	English	Automatically identifies between English and Russian (according to the shift code received).
		Russian	

4.14.7 Making Brightness Setting

Holding down the [Alt] key and pressing the [F6] key will reduce the brightness on a scale of 1 to 8. To raise brightness, press the [F7] key. When turning ON the power supply again, the brightness will come to the maximum.

4.14.8 Special Operation

1. Tone Test

Tone Test	
1: Tone Test 1	(All Char)
2: Tone Test 2	(Fox)
3: Tone Test 3	(Beta)

4: Tone Test 4	(Mark)
5: Tone Test 5	(Space)
6: Tone Test 6	(BY)

Tone signal transmission procedure)

- 1) Make transceiving frequency setting with the IB-583 Terminal Unit.
- 2) Select "Selftest" from the [F6]: System Menu.
- 3) Hold down the [Shift] key and press the [↓] key.
- 4) The Tone Test window will appear. Select a tone signal to be transmitted from "4. Tone Test 4 (Mark)," "5. Tone Test 5 (Space)," and "6. Tone Test 6 (BY)," and then press the [Enter] key.
 - 4. Tone Test 4 (Mark): Generates a tone signal of 1625 Hz with the FS-xx75 system and transmits this signal.
 - 5. Tone Test 5 (Space): Generates a tone signal of 1785 Hz with the FS-xx75 system and transmits this signal.
 - 6. Tone Test 6 (BY): Generates a tone signal of 1700 ± 85 Hz and 100 bps transmits this signal.

Specific character transmission procedure)

- 1) Connect a line: to coast/ship station.
- 2) Select "Selftest" from the [F6]: System Menu.
- 3) Hold down the [Shift] key and press the [↓] key.

- 4) The Tone Test window will appear. Select characters to be transmitted from “1: Tone Test 1(All Char),” “2: Tone Test 2 (Fox),” or “2: Tone Test 2 (Fox),” and then press the [Enter] key.
- 1: Tone Test 1 (All Char): Selecting this mode with the line connected generates all characters with the FS-xx75 system and transmits these characters.
“ABC-- YZ123---890-?(),.’=/+ABCD----UVW”
 - 2: Tone Test 2 (Fox): Selecting this mode with the line connected generates the following characters with the FS-xx75 system and transmits these characters; QBF.
“THE QUICK BROWN FOX ----- 7890”
 - 3: Tone Test 3 (Beta): Selecting this mode with the line connected generates a beta signal (line control signal) with the FS-xx75 system and transmits these characters.

2. Checking detailed software version

For details, refer to information on page 8-13.

Procedure)

- 1) Select “Selftest” from the [F6]: System Menu, and then press the [Enter] key.
- 2) “Selftest” will be executed and the results will be displayed.
- 3) Hold down the [Alt] and [Fn] keys and press the [F1] key. Detailed version will be displayed.

4.14.9 List of IB-583 Menus

Table 4.14.2 List of IB-583 Menus

F1:File	F2:Edit	F3:Operate	F4:Window	F5:Station	F6:System
1: New	1: Undo	1: Call Station	1: Calendar	1: Station Entry	Slave Delay
2: Open	2: Cut	2: Macro Operation	2: Distress Frequency Table	2: Timer Operation Entry	TX/RX MSG Save
3: Close	3: Copy	3: File to Send		3: Scan Entry	Edit Before sending
4: Delete	4: Paste	4: Cancel Sending		4: User Channel Entry	Time System
5: Rename	5: Select All	5: Scan (Start/Stop)		5: Answerback Code Entry	Time & Date
6: Real Time Printing	6: Search	6: Manual Reception		6: Group ID Entry (4/5 digit)	Window color
7: File to Print	7: Replace	7: Timer Operation		7: Group ID Entry (9 digit)	Self Test
8: Cancel Printing	8: Go to Top	8: Manual Calling		8: Select ID Entry (4/5 digit)	
9: Clear Buffer	9: Go to Bottom	9: Set Frequency		9: Select ID Entry (9 digit)	
0: Floppy Disk Format	0: Go to Line				
	A: Change Text				

4.15 IB-585 Setting

4.15.1 List of Setting Menus

The following table shows a list of related setting menus.

Table 4.15.1 List of Setting Menus

	Setting Menu	Factory Set	Set Value	Remark
F3:Operate	6. Manual Reception	AUTO	AUTO, ARQ, FEC	
F5:Station	4. Answerback Code Entry	—	MMSI+CS(4digit) +X	Changed PASSWORD ^(See Note) “ANSWER CODE”
	5. Group ID Entry (4/5 digit)	—		Changed PASSWORD ^(See Note) “ID CODE”
	6. Group ID Entry (9 digit)	—		
	7. Select ID Entry (4/5 digit)	—	Sell call number	
	8. Select ID Entry (9 digit)	—	MMSI	
F6:System	Slave Delay	12 msec	10-50msec	Changed PASSWORD ^(See Note) “DP6” <u>Leave “Slave Delay” set to 12 msec!!</u>
	TX/RX MSG Save	OFF	ON, OFF	
	Edit before sending	OFF	ON, OFF	
	TX Power		HIGH - LOW	
	Header/Footer	OFF	ON, OFF	Setting to “ON” will initiate communication and display communication information upon completion.
	Time System	UTC	OFF, UTC, SMT, JST	
	Time & Date			Calibrated with RTC time data of FS-xx75
	** Window color	-	Window color setup Default	
F1:Setup	Language	Normal	Normal, Norway, Sweden, UK	Changed PASSWORD ^(See Note) “DP6”
	Printer Indent	OFF	ON, OFF	
	All clear			
	Import Settings			
	Export Settings			
	Error Count	Disp	Disp, None	

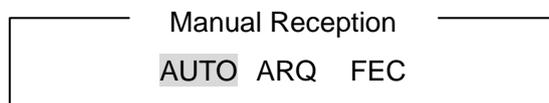
Note) • Enter the changed password in capital letter. (in “caps lock” mode).

• To save set value to a SD card, execute “Export Settings” of [F11] Menu.

To incorporate the set value saved to the SD card in the IB-585, execute “Import Settings.”

4.15.2 Making Setting of Submenu “6. Manual Reception” of “F3: Operate” Menu

Press the [F3] key, and then the [6] key. The “6. Manual Reception” window will appear. Then, select on “AUTO.”



Overview of setting

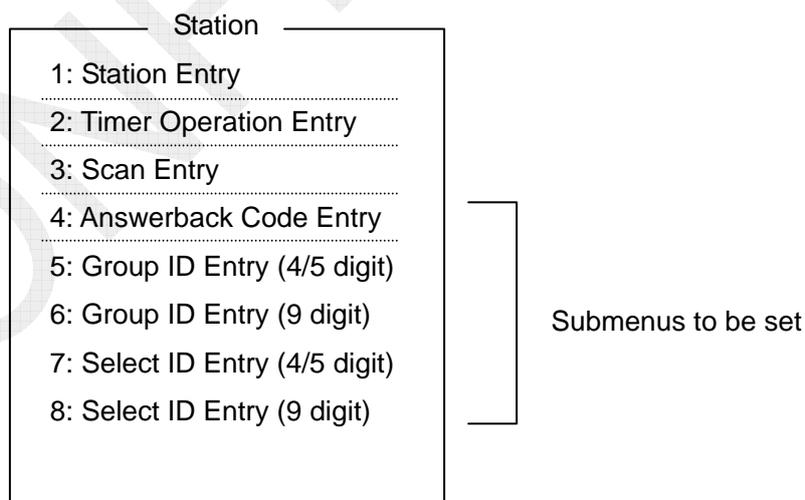
- AUTO: Automatically switches between ARQ mode and FEC mode according to reception mode.
- ARQ: Receives messages only in ARQ mode.
- FEC: Receives messages only in FEC mode.

The set statuses listed above are known from the status display “Comm. Mode” of the terminal unit. When this Submenu is set to “AUTO,” the AUTO window will also switch to the display of a mode being in communication.

For example, the “AUTO” window displays [ARQ] while in ARQ communication mode, [CFEC] while in FEC-Collective mode, and [SFEC] while in FEC-Selective mode.

4.15.3 Making setting of “F5: Station” Menu

Submenus to be set are answerback code and ID number. Pressing the [F5] key will display the window shown below.



2. Registering an ID number

Registration and deletion procedure for the menus from “5. Group ID Entry (4/5 digit)” to “8. Select ID Entry (9 digit)” is the same as that specified below. If “Group ID,” etc. are not given, no registration is required.

Procedure)

- 1) Select the registration number of the relevant ID, and then enter the ID number. For example, In case of a nine-digit ID (MMSI), select “8. Select ID Entry (9 digit),” and then enter a nine-digit number.

Select ID Entry
Select ID Code (9)
431456789

- 2) When the number is properly entered, press the [Enter] key. A command prompt window saying “OK/Cancel” will appear. Click “OK,” and then press the [Enter] key.

Select ID Entry
Select ID Code (9)
431456789

OK
Cancel

- 3) The following confirmation message will appear. Then, press the [Enter] key again.

Caution
Confirm the “CODE” before pressing ENTER key.
You cannot change the CODE once it has been entered.

- 4) The display will return to the normal window. With this, the re-registration is completed.

Re-registering a registered ID number

Display the ID Registration window to be deleted, and then type “ID _{space} CODE” *in capital letter*.

The registered ID number will be deleted. Re-register the ID number following the procedure specified above.

4.15.4 Making Setting of “F6: System” Menu

Pressing the [F6]: System will display the window shown below.

To make “Slave Delay” setting and return this menu to “Default,” the password should be entered.

When the “Default” menu is executed, the set values of “System” will return to the default.

System	
Setup	Lock Change Default
Slave Delay	12 msec (0 - 50 msec)
TX/RX MSG Save	OFF ON
Edit before Sending	OFF ON
TX Power	HIGH MID LOW
Header / Footer	OFF ON
Time System	OFF UTC SMT JST
Time & Date	16-Nov-2011 14:42:40
Window Color	
Self Test	

Setting procedure)

- 1) Press the [F6] key to display the System menu.
- 2) Put the cursor on [Change], and then move down the cursor to a Submenu to be set to make setting of this Submenu. However, “Slave Delay” cannot be selected.

Procedure for making “Slave Delay” setting and returning the setting to “Default”)

- 1) Press the [F6] key to display the System menu.
- 2) Type the password: “DP6” *in capital letter*.
- 3) To make “Slave Delay” setting, put the cursor on [Change].
To return the “System” setting to the factory set, put the cursor on [Default], and then press the [Enter] key.

Meaning of Each Item in System menu

- **Slave Delay**
When operating in the ARQ mode, the called station employs a constant time interval between the end of the received signal and the start of the transmitted signal. It can be arbitrarily set in the range of 0 to 50 msec, but **leave the setting as default. “12 msec”**
- **TX/RX MSG Save (OFF)**
Setting this Submenu to “ON” will automatically save transceived messages on a SD card.
- **Edit Before sending (OFF)**
To perform a real-time communication, i.e., to create a message in advance and then perform a telex communication in such a way as to have a conversation with the other station without transmitting the message, set this Submenu to “OFF.” This setting allows for transmitting characters one by one every time it is typed. Setting the Submenu to “ON” will transmit a message at a time by pressing the [Enter] key after typing the sentences. Consequently, this setting allows for correcting words and sentences before pressing the [Enter] key, and then transmitting the message. However, this feature is applicable just to a single line.
- **TX Power**
Used to display power setting from the FS-xx75 system. Power set with this Submenu is reflected in the FS-xx75 system. It is reflected when the System window is closed.
- **Header/Footer**
Setting this Submenu to “ON” will display “Header” when the line is connected and “Footer” when the communication is terminated. The Header and Footer are printed out like message sentences and also recorded to the SD card.

```

ex; Header
  == TX Start 23:28 SMT  15-Nov-2011  TX: 2174.50kHz  Rx: 2174.50kHz =====
Body
  THE QUICK BROWN  -----
  THE QUICK BROWN  -----
Ex; Footer
  == End 23:40 SMT  15-Nov-2011  Volume: 315byte  Error rate: 2.0%  (Normal)Note)

```

Note)

- Normal: Termination the line when receiving [F10]: Break operation or EOS.
- Error: Termination the line when counting errors 32 or more times.
- Abort: Termination the line upon forced end due to the operation of the control unit.

- Time System

Setting this Submenu to “OFF” will not display time. UTC stands for Universal Time, Coordinated SMT stands for Ship Marine Time, and JST stands for Japan Standard Time. Specified time is normally time displayed in the upper right portion of the window.

- Time & Date

Setting this Submenu to “SMT” will allow for making date and time setting. However, when it is set to “UTC” or “JST,” RTC data on the transceiver unit side will be imported by turning ON and OFF the power supply of the IB-585 display. As a result, since this date and time are used, no setting change is allowed.

- Window color

Window colors can be set on the “Window Color Setup” window. To return the set value to the default, select the “Load Default” submenu.

Window	Foreground/Background Color	
Base window	Black	L-Blue
Back scroll	Green	L-Green
Edit-1	Cyan	L-Cyan
Edit-2	Red	L-Red
Function	Magenta	L-Magenta
Sub menu-1	Blue	L-White
Sub menu-2	White	L- Yellow
Sub menu-3	Gray	
Message	Yellow	

Note)

Combinations with the same foreground and background colors are not allowed.

4.15.5 Switching between English and Russian Modes

Switching to Russian mode

Turn ON the power supply while pressing the [R] key. The [R] key should be pressed and held until the window is displayed in Russian. To switch the language of message to be transmitted, hold down the [Shift] key and press the [Alt] key. English and Russian letters are automatically identified and displayed.

Switching Russian mode back to English mode

Turn ON the power supply while pressing the [E] key. The [E] key should be pressed and held until the window is displayed in English.

Mode; Switching language		Language of message to be transmitted	Language of message received
English	None	English	English
Russian	Switches using the [Shift] and [Alt] keys.	English	Automatically identifies between English and Russian (according to the shift code received).
		Russian	

4.15.6 [F11]: Setup Menu

To go to Setup Menu, press the [F11] key. The “Setup” window will appear. Typing the password: “DP6” *in capital letter*. It will allow for making Setup menu setting.

Setup				
Language	Normal	Norway	Sweden	UK
Printer Indent	<input type="checkbox"/> OFF	ON		
All Clear				
Export Settings				
Import Settings				
Error Count	<u>Disp</u>	None		

Meaning of Each Item in Setup menu

Language: Normal, Norway, Sweden, UK

To make language setting, assign the local character code to a specific key.

To send “%” in UK mode, use the [] key. To send “@” also in UK mode, use the [] key. To create a micro command, use the [Shift] and [2] keys.

Key Language	[` \]	[}]	[{]
Normal	—	—	—
Norway		Å / å	Æ / æ
Sweden	Ö / ö	Å / å	Ä / ä
UK	£		@

Note) Unless DIP sw1 – #5 of PP-510 is set to “ON,” Norway characters; “£” are not printed out.

Printer Indent: OFF, ON

Normally, this Submenu is not used.

To use PP-510 printer, set this Submenu to “OFF.” Line feeds are inserted when reaching 69 figures for messages and 80 figures for print screens. Setting it to “ON” will activate the indent function to disable normal printouts.

All Clear

Used to return all set values of MMSI, ID, AAB, etc. to the default.

- F1-6: Real Time Print
- F6: System
- F5: Station

Export Settings: All Settings, System Settings, Station Lists, ID Settings

Select data to be imported and save it to the SD card.

Selection Data	File Name	Contents
All Settings	\$IB-585.SET	All setting menus
System Settings		F6: System, F1-6: Real Time Print
Station Lists		F5-1: Station Entry, F5-2: Timer Operation Entry, F5-3: Scan Entry
ID Settings		F5-4~F5-8: ID Entry

Note)

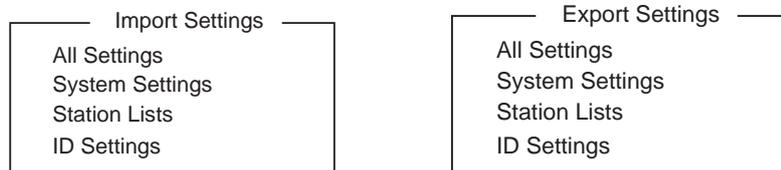
Files of data exported to the SD card are not displayed even by trying to open them with the IB-585. To check for any file, use a PC. Data are saved in the “\$IB-585.SET” file.

Data files are saved in this file regardless of data to be saved.

Do not edit the file. Editing the file with incorrect data will disable normal operation.

Import Settings: All Settings, System Settings, Station Lists, ID Settings

Used to incorporate set values saved in the SD card by executing “Export.” Select data to be imported to incorporate the set values in the IB-585.

**Error Count**

Used to select whether or not to display “Error Count” on the Communication window.

4.15.7 Making Brightness Setting

Holding down the [Alt] key and pressing the [F6] key will reduce the brightness on a scale of 1 to 11. To raise brightness, press the [F7] key.

When turning ON the power supply again, the brightness will return to the preset level.

To make presetting, select [F6] -> Window Color -> Brightness. To make brightness setting, hold down the [Alt] key and press the [F6] and [F7] keys or [->] and [<-] keys.

4.15.8 Removing SD Card

To safely remove the SD card, follow the procedure specified below.

Procedure)

- 1) Select “A: Remove SD card” from the [F1] Menu, and then press the [Enter] key.
- 2) Click “Yes,” and then press the [Enter].

Note)

Unless the SD card is removed and inserted once after the completion of the procedure shown above, no write and read to and from the SD card are allowed.

4.15.9 Special Operation

1. Tone Test

Tone Test	
1: Tone Test 1	(All Char)
2: Tone Test 2	(Fox)
3: Tone Test 3	(Beta)

4: Tone Test 4	(Mark)
5: Tone Test 5	(Space)
6: Tone Test 6	(BY)

Tone signal transmission procedure)

- 1) Make transceiving frequency setting with the IB-585 Terminal Unit.
- 2) Select “Selftest” from the [F6]: System Menu and type “DP6” in capital letters.
- 3) Hold down the [Shift] key and press the [↓] key.
- 4) The Tone Test window will appear. Select a tone signal to be transmitted from “4. Tone Test 4 (Mark),” “5. Tone Test 5 (Space),” or “6. Tone Test 6 (BY),” and then press the [Enter] key.
 - 4. Tone Test 4 (Mark): Generates a tone signal of 1625 Hz with the FS-xx75 system and transmits this signal.
 - 5. Tone Test 5 (Space): Generates a tone signal of 1785 Hz with the FS-xx75 system and transmits this signal.
 - 6. Tone Test 6 (BY): Generates a tone signal of 1700 ± 85 Hz, 100 bps and transmits this signal.

Specific character transmission procedure)

- 1) Connect a line: to coast/ship station.
- 2) Select “Selftest” from the [F6]: System Menu and type “DP6” in capital letters.
- 3) Hold down the [Shift] key and press the [↓] key.
- 4) The Tone Test window will appear. Select characters to be transmitted from “1: Tone Test 1(All Char),” “2: Tone Test 2 (Fox),” or “2: Tone Test 2 (Fox),” and then press the [Enter] key.
 - 1: Tone Test 1 (All Char): Selecting this mode with the line connected generates all characters below with the FS-xx75 system and transmits these characters.
“ABC-- YZ123---890-?()., ’=/+ABCD----UVW”

- 2: Tone Test 2 (Fox): Selecting this mode with the line connected generates the following characters with the FS-xx75 system and transmits these characters; QBF.
“THE QUICK BROWN FOX ----- 7890”
- 3: Tone Test 3 (Beta): Selecting this mode with the line connected generates a beta signal (line control signal) with the FS-xx75 system and transmits.

2. Checking detailed software version

For details, refer to information on page 8-16.

Procedure)

- 1) Select “Selftest” from the [F6]: System Menu, and then press the [Enter] key.
- 2) “Selftest” will be executed and the results will be displayed. Check for the display in the Software Ver column of the IB-585.

Reference)

Hold down the [Alt] and [F11] keys to display the version information for developers.

4.15.10 List of IB-585 Menus

Table 4.15.2 List of IB-585 Menus

F1:File	F2:Edit	F3:Operate	F4:Window	F5:Station	F6: System	F11: Service
1: New	1: Undo	1:Call Station	1: Calendar	1: Station Entry	Slave Delay	Language
2: Open	2: Cut	2: Macro Operation	2: Distress Frequency Table	2: Timer Operation Entry	TX/RX MSG Save	Printer Indent
3: Close	3: Copy	3: File to Send	3: Screen Saver	3: Scan Entry	Edit Before sending	ALL Clear
4: Delete	4: Paste	4: Cancel Sending		4: Answerback Code Entry	TX Power	Export Settings
5: Rename	5: Select All	5: Scan (Start/Stop)		5: Group ID Entry (4/5 digit)	Header/ Footer	Import Settings
6: Real Time Printing	6: Search	6: Manual Reception		6: Group ID Entry (9 digit)	Time System	Error Count
7: File to Print	7: Replace	7: Timer Operation		7: Select ID Entry (4/5 digit)	Date & Time	
8: Cancel Printing	8: Go to Top	8: Manual Calling		8: Select ID Entry (9 digit)	Window color	
9: Clear Buffer	9: Go to Bottom	9: Set Frequency			Self Test	
0: SD Card Format	0: Go to Line	0: Set Channel				
A: Remove SD Card	A: Change Text					
B: New Macro						

4.16 AC/DC Power Unit Setting

4.16.1 PR-850A

Make changes to the input power supply voltage cable connections of the transformer according to the ship's main power supply. The input power supply voltage can be set to 100, 110, 120, 200, 220, or 240VAC. The factory set is 220VAC. When the input voltage is changed, replace the label indicating the input voltage.

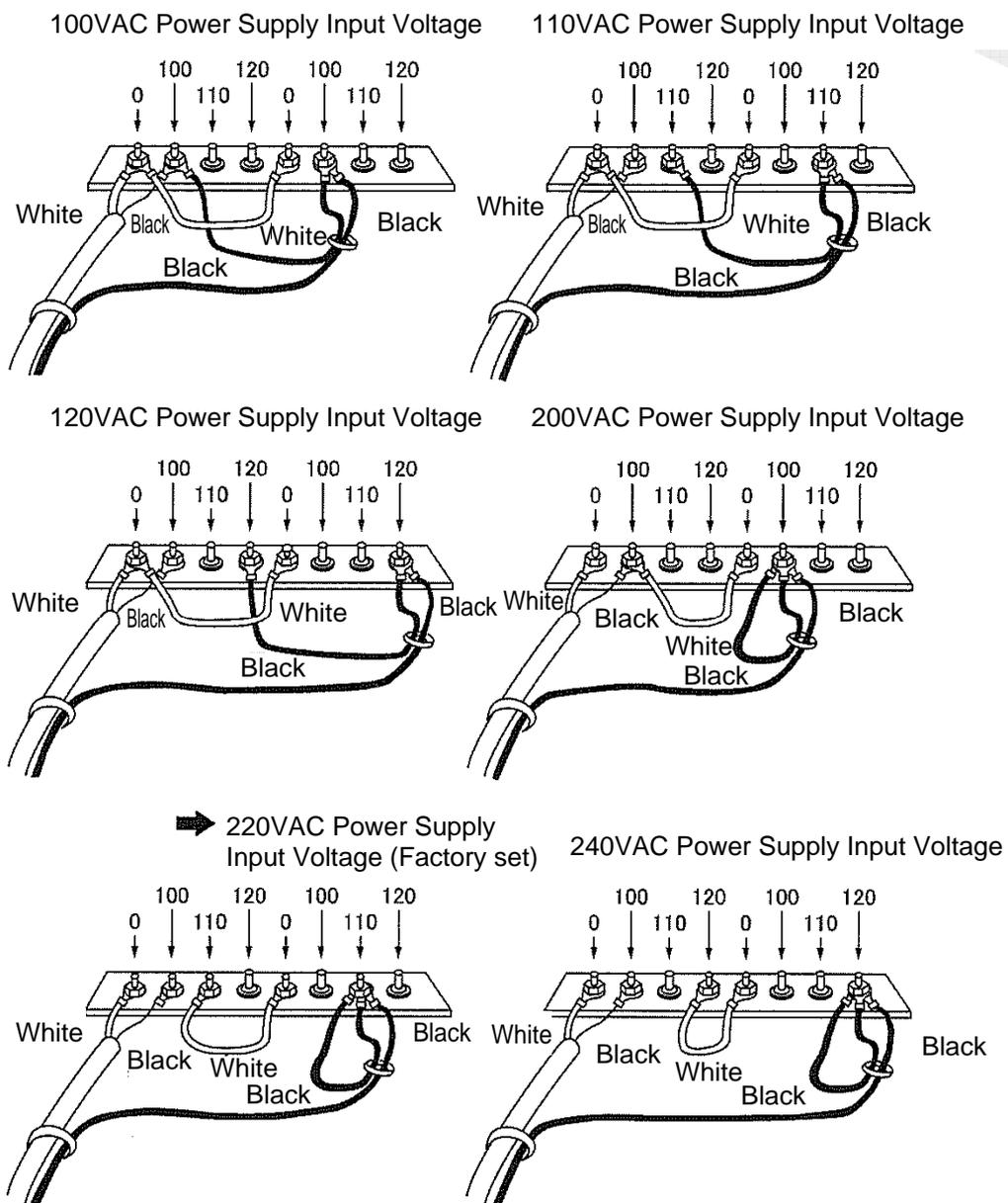
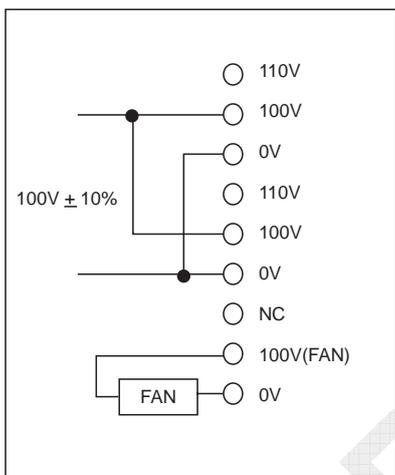


Fig. 4.16.1 PR-850A Input Power Supply Voltage

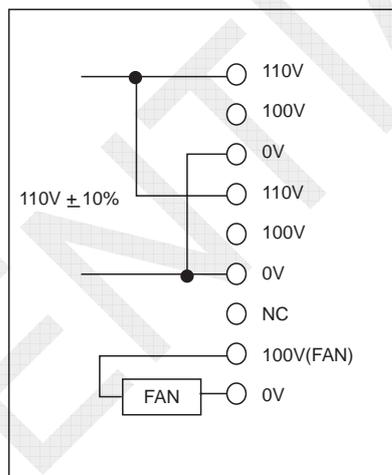
4.16.2 PR-300

Make changes to the input power supply voltage cable connections (taps) of the transformer according to the ship's main power supply. The input power supply voltage can be set to 100, 110, 200, or 220VAC. Furthermore, replace the fuse located on the front panel of the control unit.

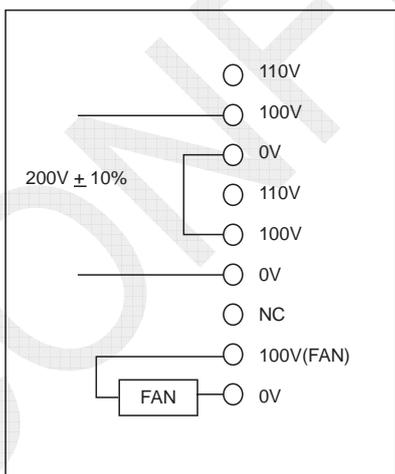
- 100/110VAC: 10A
- 200V/220VAC: 5A



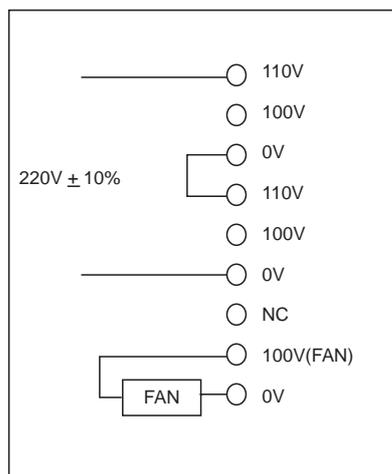
100VAC Power Supply Input Voltage



110VAC Power Supply Input Voltage



200VAC Power Supply Input Voltage



220VAC Power Supply Input Voltage

Fig. 4.16.2 PR-300 Input Voltage Setting

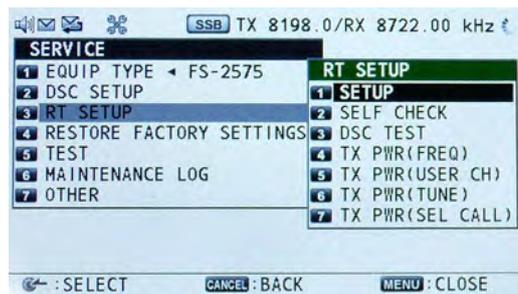
Chapter 5. Adjustment and Measurement

5.1 Overview of Output Power Adjustment

5.1.1 Overview

To check for the TX output power and frequency of SSB mode, select [MENU] -> 1. TEST -> 3.TONE TEST. For details, refer to information on page 5-32.

Make TX output power adjustment with power data. To make this adjustment, select [MENU] -> 9.SERVICE -> 3.RT SETUP -> 4.TX PWR (FREQ), 5.TX PWR (USER CH), 6.TX PWR (TUNE), or 7.TX PWR (SEL CALL).



- 4. TX PWR (FREQ)

This Sub-menu allows for making TX output power adjustment in steps of 1 MHz while in SSB, DSC, NBDP, or CW mode. Setting this Submenu to <LOAD DEFAULT> will return the adjustment to the default.

- 5. TX PWR (USER CH)

This Sub-menu allows for making output power adjustment by user-specified channel registered.

If frequencies and modes registered on the “USER CH” window fall within the frequency band for which output power adjustment was made with the Sub-menu “TX PWR (FREQ)” and the modes match each other, the relevant will be set as the default of USER CH power data.

Conducting <LOAD DEFAULT> of this Sub-menu will return the adjustment to that set with the Sub-menu “TX PWR (FREQ).”

- 6. TX PWR (TUNE)

This Sub-menu is common to all bands.

Note) Do not make unnecessary adjustment.

Conducting <LOAD DEFAULT> of this Sub-menu will return the adjustment to the default of TUNE power data. TUNE power ranges from 10 to 15W.

- 7. TX PWR (SEL CALL)

This Sub-menu allows for making output power adjustment only with 2331.5 kHz.

Conducting <LOAD DEFAULT> of this Sub-menu will return the adjustment to the default of SEL CALL power data.

Table 5.1.1a SSB Power Data Defaults

BAND	FS-1575			FS-2575			FS-5075			
	LOW	MID	HIGH	LOW	MID	HIGH	LOW2	LOW1	MID	HIGH
1MHz-2MHz	185	205	240	140	150	205	130	150	170	190
2MHz-3MHz	180	200	240	150	170	215	130	150	180	195
3MHz-4MHz	180	200	240	160	180	225	130	150	180	205
4MHz-6MHz	180	200	240	160	180	225	140	170	210	225
6MHz-12MHz	180	200	240	160	180	240	140	170	210	235
12MHz-16MHz	180	200	240	160	180	240	140	170	210	240
16MHz-18MHz	180	200	240	160	180	240	140	170	210	235
18MHz-25MHz	180	200	240	160	180	240	140	170	210	240
25MHz-27MHz	180	200	240	160	180	245	140	170	210	240
27MHz-30MHz	180	200	205	160	180	245	140	170	210	240
TUNE PWR	85			75			60			
SEL CALL	150			140			140			

Table 5.1.1b DSC Power Data Defaults

BAND	FS-1575			FS-2575			FS-5075			
	LOW	MID	HIGH	LOW	MID	HIGH	LOW2	LOW1	MID	HIGH
1MHz-2MHz	185	205	245	140	150	205	130	150	170	190
2MHz-3MHz	180	200	245	150	170	230	130	150	180	205
3MHz-4MHz	180	200	245	160	180	235	130	150	180	205
4MHz-6MHz	180	200	245	160	180	240	140	170	210	240
6MHz-25MHz	180	200	245	160	180	240	140	170	210	240
25MHz-27MHz	180	200	245	160	180	245	140	170	210	240
27MHz-30MHz	180	200	205	160	180	245	140	170	210	240
TUNE PWR	85			75			60			
SEL CALL	150			140			140			

Table 5.1.1c NBDP Power Data Defaults

BAND	FS-1575			FS-2575			FS-5075			
	LOW	MID	HIGH	LOW	MID	HIGH	LOW2	LOW1	MID	HIGH
1MHz-2MHz	185	200	240	140	150	205	130	150	170	190
2MHz-3MHz	180	200	240	150	170	230	130	150	180	205
3MHz-4MHz	180	200	240	160	180	235	130	150	180	205
4MHz-6MHz	180	200	240	160	180	240	140	170	210	240
6MHz-25MHz	180	200	240	160	180	240	140	170	210	240
25MHz-27MHz	180	200	240	160	180	245	140	170	210	240
27MHz-30MHz	180	200	205	160	180	245	140	170	210	240
TUNE PWR	85			75			60			
SEL CALL	150			140			140			

Table 5.1.1d CW Power Data Defaults

BAND	FS-1575			FS-2575			FS-5075			
	LOW	MID	HIGH	LOW	MID	HIGH	LOW2	LOW1	MID	HIGH
1MHz-2MHz	180	200	240	140	150	205	130	150	170	190
2MHz-3MHz	180	200	240	150	170	230	130	150	180	205
3MHz-4MHz	180	200	240	160	180	235	130	150	180	205
4MHz-6MHz	180	200	240	160	180	240	140	170	210	240
6MHz-25MHz	180	200	240	160	180	240	140	170	210	240
25MHz-27MHz	180	200	240	160	180	245	140	170	210	240
27MHz-30MHz	180	200	205	160	180	245	140	170	210	240
TUNE PWR	85			75			60			
SEL CALL	150			140			140			

Table 5.1.2 TX Output Power of FS-xx75

Mode	Band	FS-1575			FS-2575			FS-5075			
		HIGH	MID	LOW	HIGH	MID	LOW	HIGH	MID	LOW1	LOW2
SSB	MF	150W			250W			400W			
	HF	150W	100W	70W	250W	125W	90W	500W	350W	200W	110W
F1B	MF	150W			250W			400W			
	HF	150W			250W			500W			
CW	MF	150W			250W			400W			
	HF	150W			250W			500W			
SEL CALL											

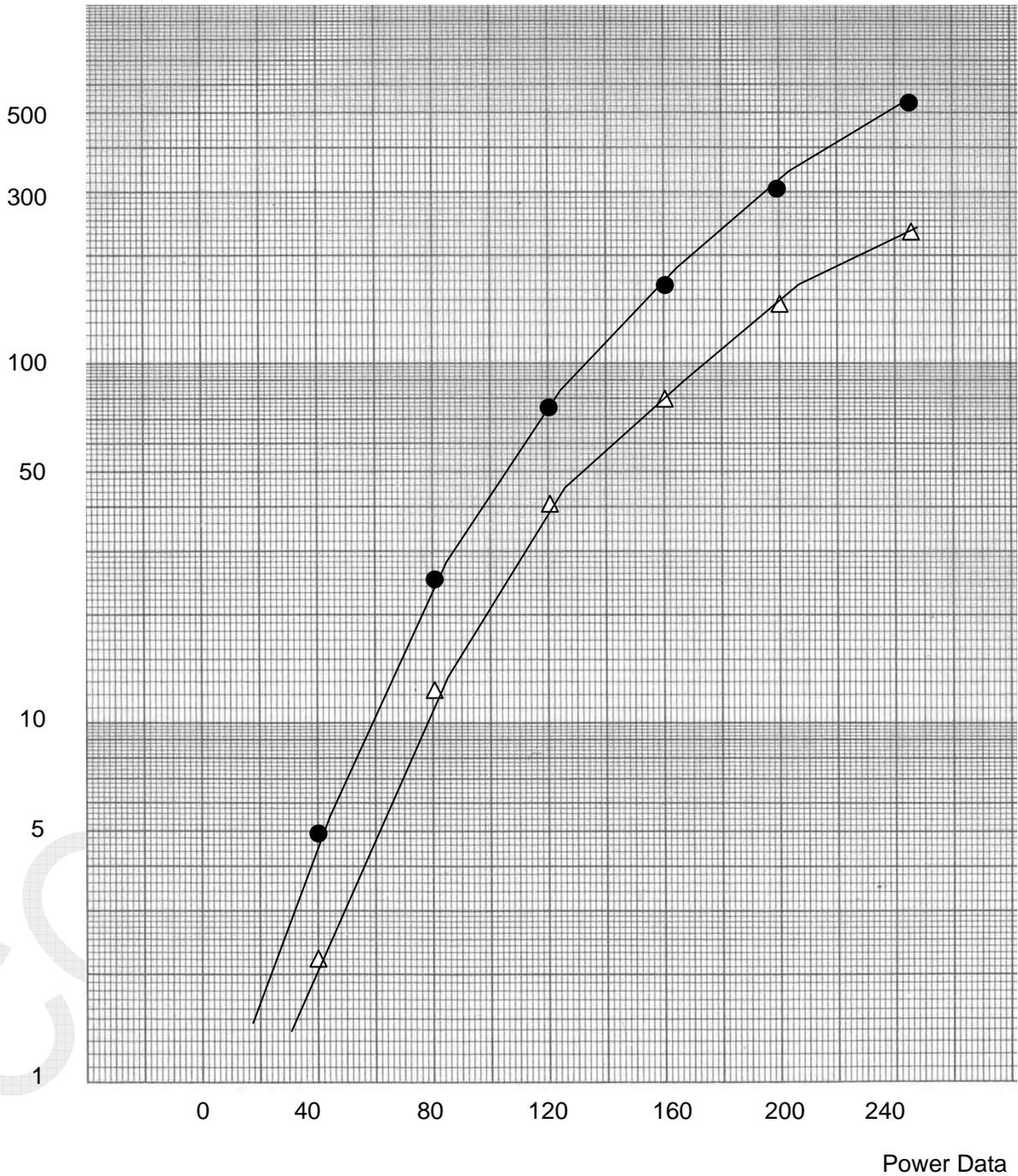
The above table shows the TX output power of transceiver unit. The data for SSB mode shows 2-tone TX output power. Power deviation is $\pm 1.5\text{dB}$. However, that of the FS-5075 system in the MF band is $400\text{W}+0/-1.5\text{dB}$.

5.1.2 Output Power Characteristics

1. FS-5075: Power data vs. RT Output Power

Fig. 5.1.1 Power data vs. RT Output Power

T/R Output Power (W)

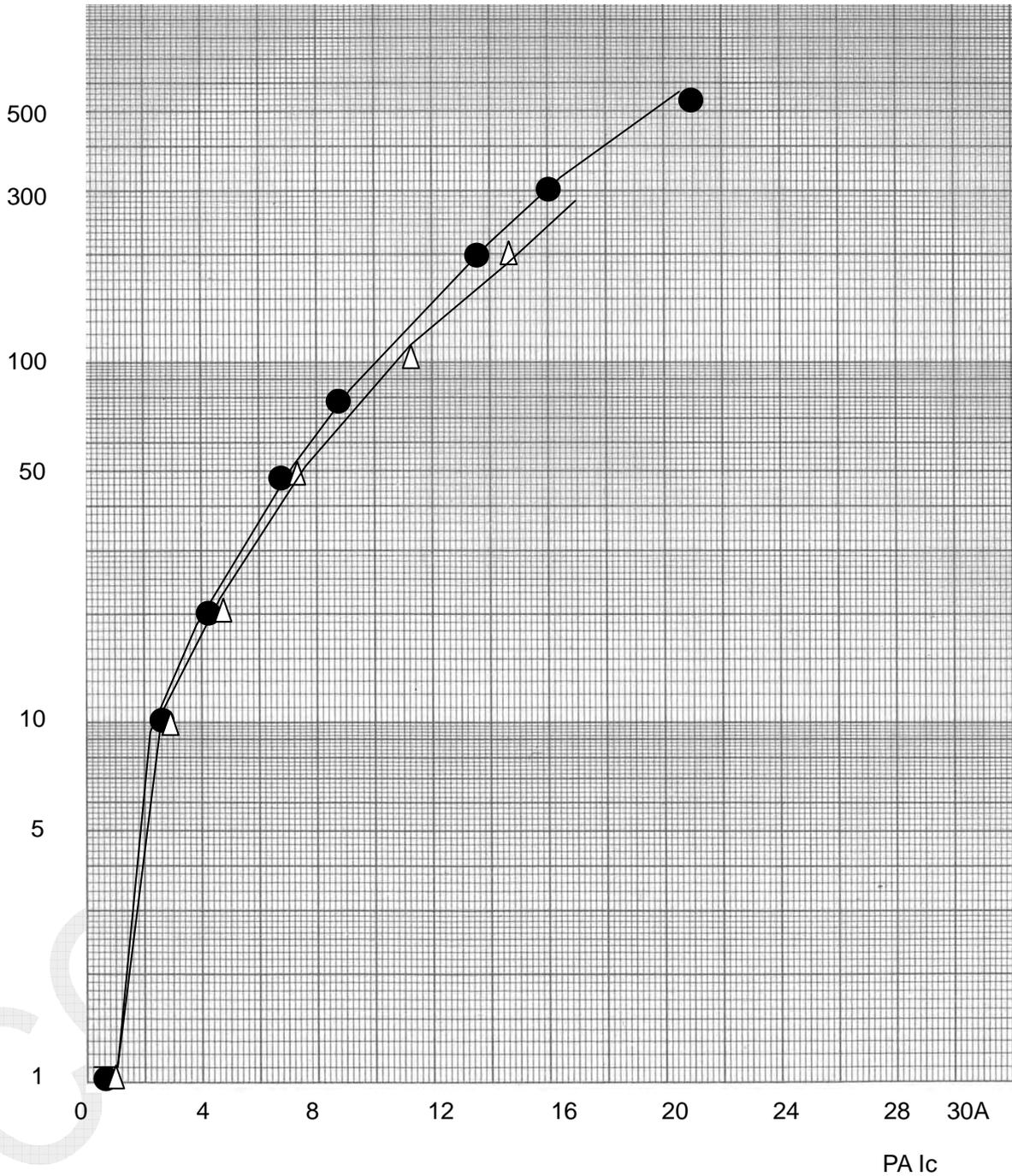


● : 4.2MHz, 1500Hz 1-toneMOD.
 △: 4.2MHz, 1100/1700Hz 2-tone MOD.

2. FS-5075: RT Output Power vs. PA Ic

Fig. 5.1.2 RT Output Power vs. PA Ic

T/R Output Power (W)

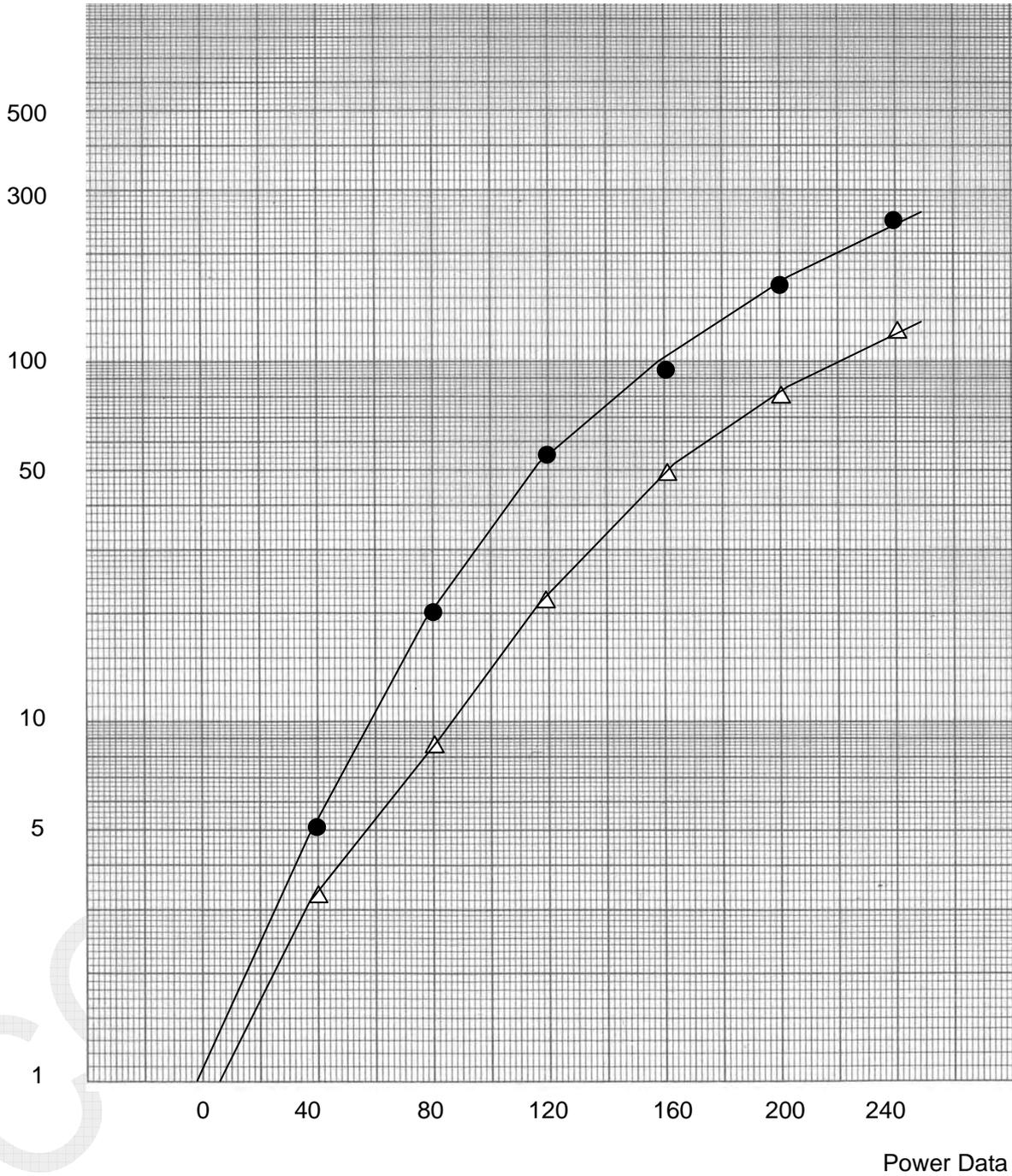


● : 4.2MHz, 1500Hz 1-tone MOD.
 △ : 4.2MHz, 1100/1700Hz 2-tone MOD.

3. FS-2575: Power data vs. RT Output Power

T/R Output Power (W)

Fig. 5.1.3 Power Data vs. RT Output Power

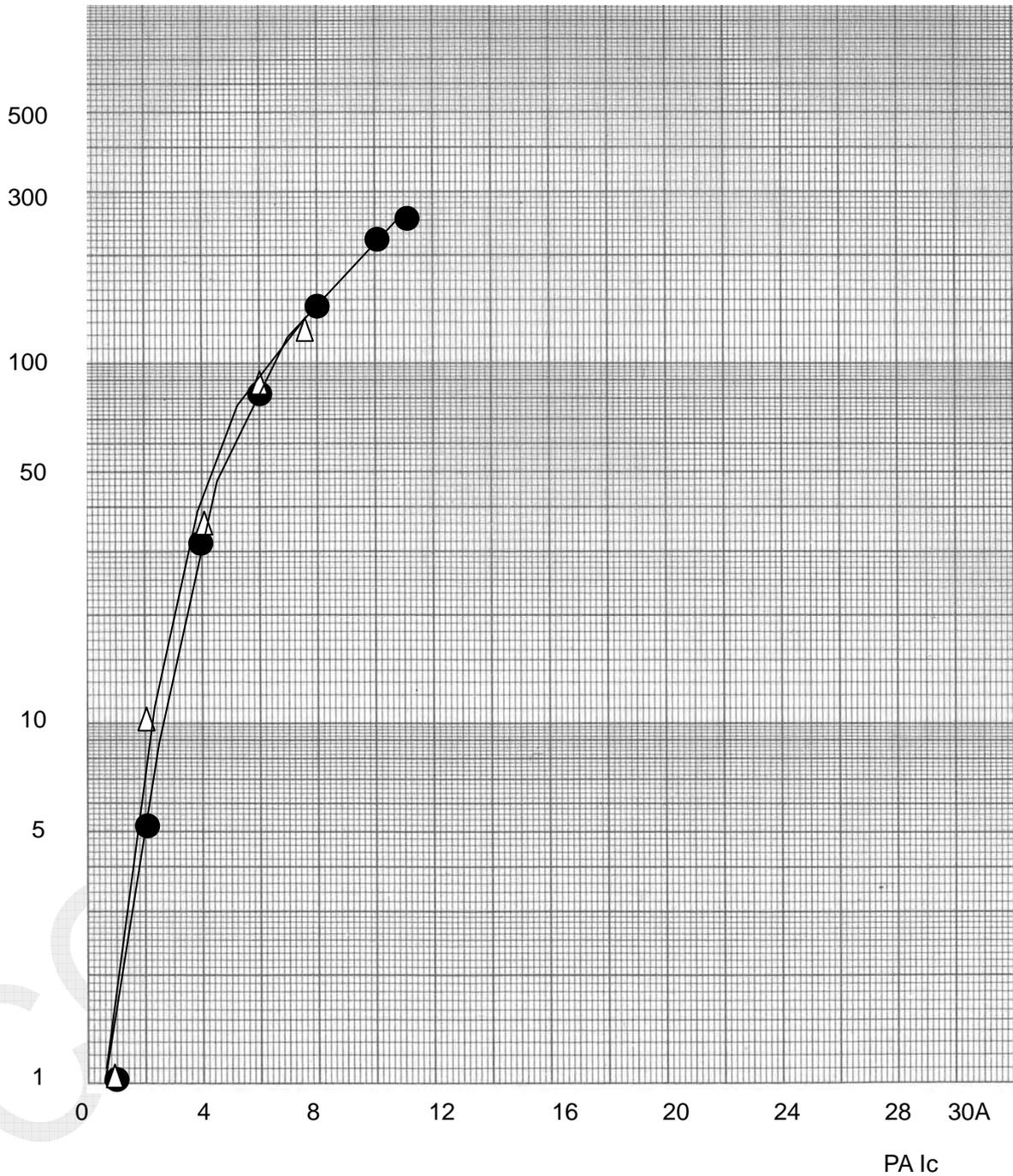


● : 4.2MHz, 1500Hz 1-tone MOD.
 △ : 4.2MHz, 1100/1700Hz 2-tone MOD.

4. FS-2575: RT Output Power vs. PA Ic

Fig. 5.1.4 RT Output Power vs. PA Ic

T/R Output Power (W)

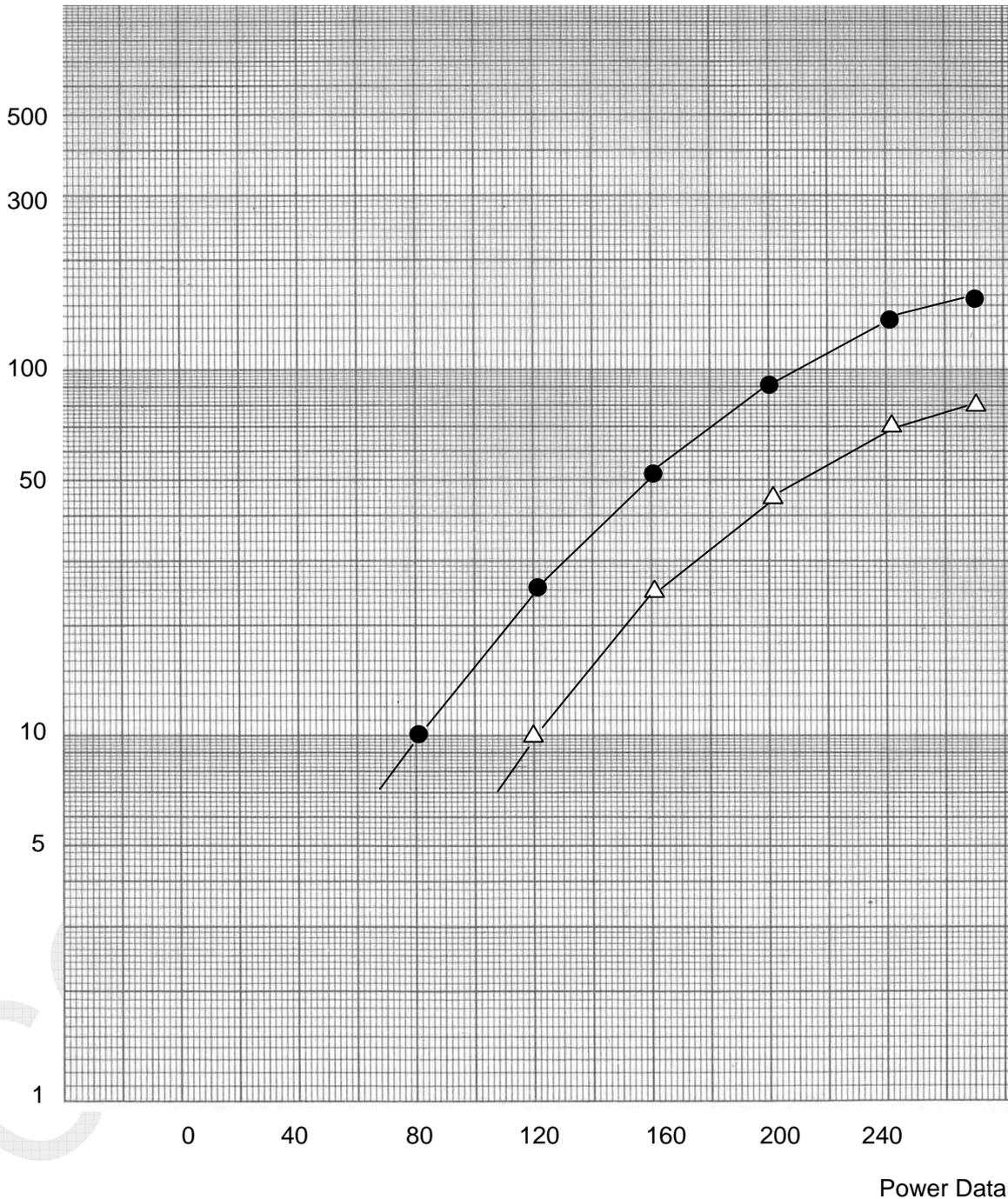


● : 4.2MHz, 1500Hz 1-tone MOD.
 △ : 4.2MHz, 1100/1700Hz 2-tone MOD.

5. FS-1575: Power data Vs RT Output Power

Fig. 5.1.5 Power data Vs RT Output Power

T/R Output Power (W)

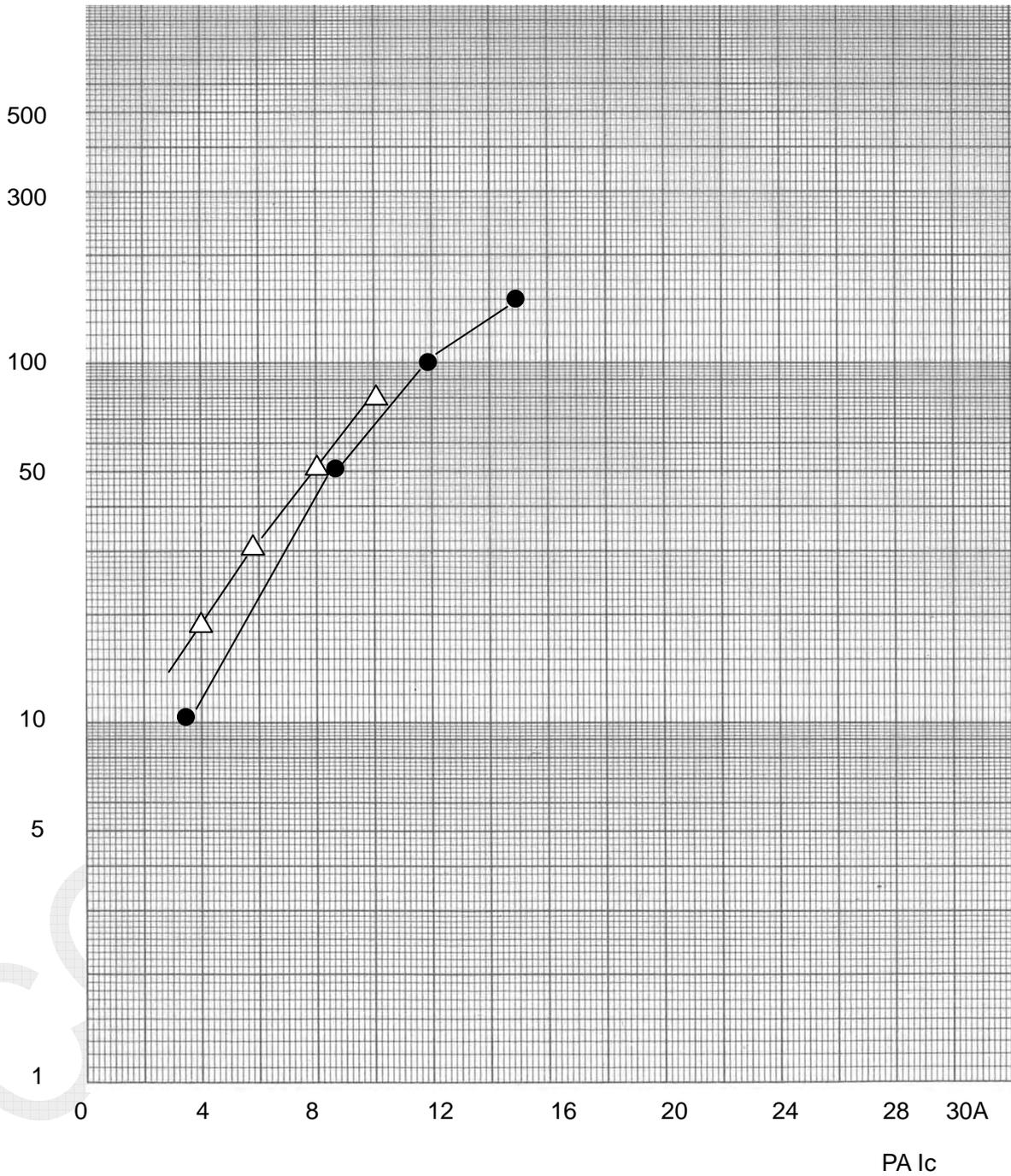


- : 4.2MHz, 1500Hz 1-tone MOD.
- △ : 4.2MHz, 1100/1700Hz 2-tone MOD.

6. FS-1575: RT Output Power Vs PA Ic

Fig. 5.1.6 RT Output Power Vs PA Ic

T/R Output Power (W)

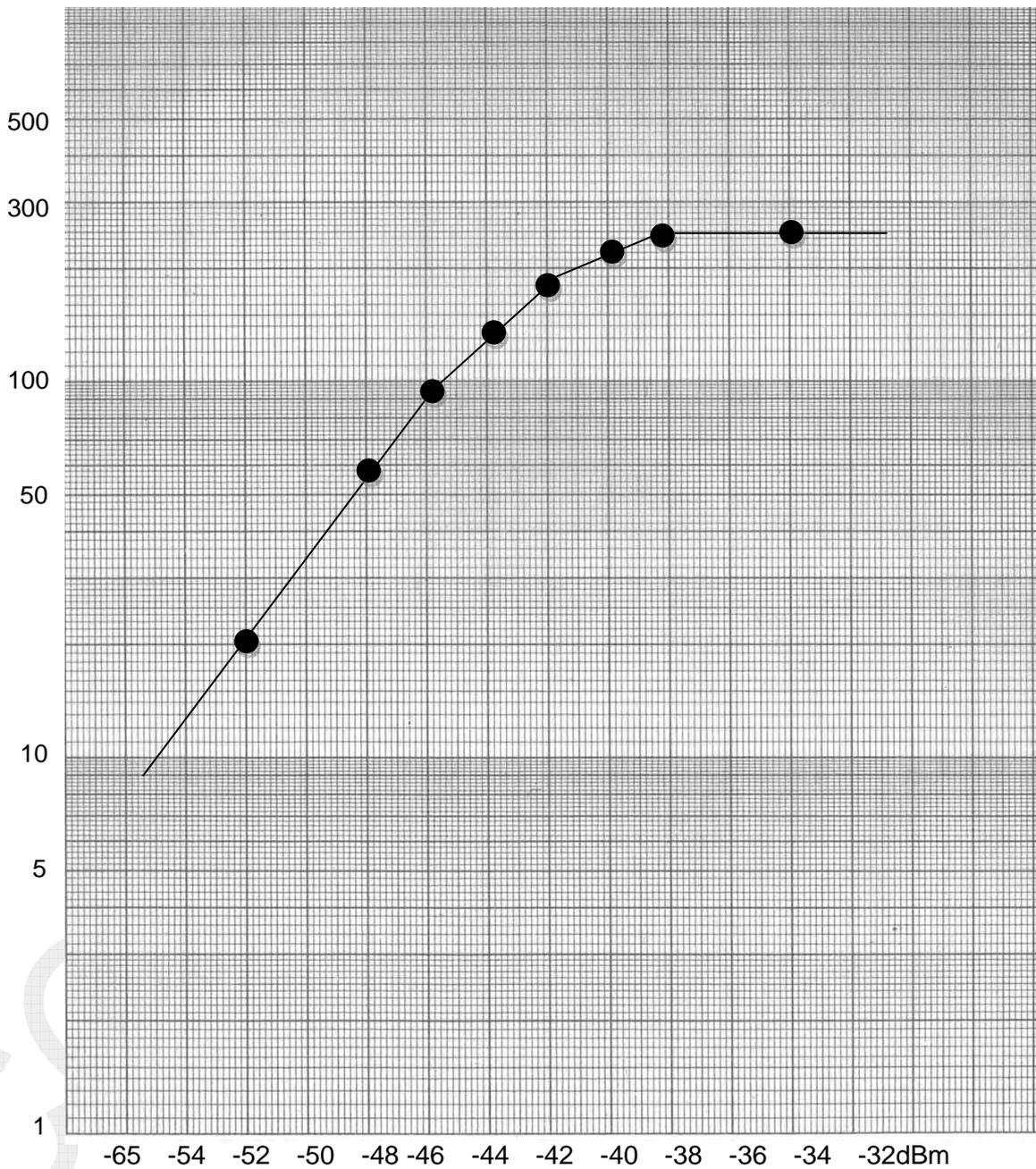


● : 4.2MHz, 1500Hz 1-tone MOD.
 △: 4.2MHz, 1100/1700Hz 2-tone MOD.

7. FS-2575: RT Output Power vs. MIC INPUT

Fig. 5.1.7 RT Output Power vs. MIC INPUT

T/R Output Power (W)



MIC INPUT

●: 4.2MHz, 1500Hz 1-tone MOD.

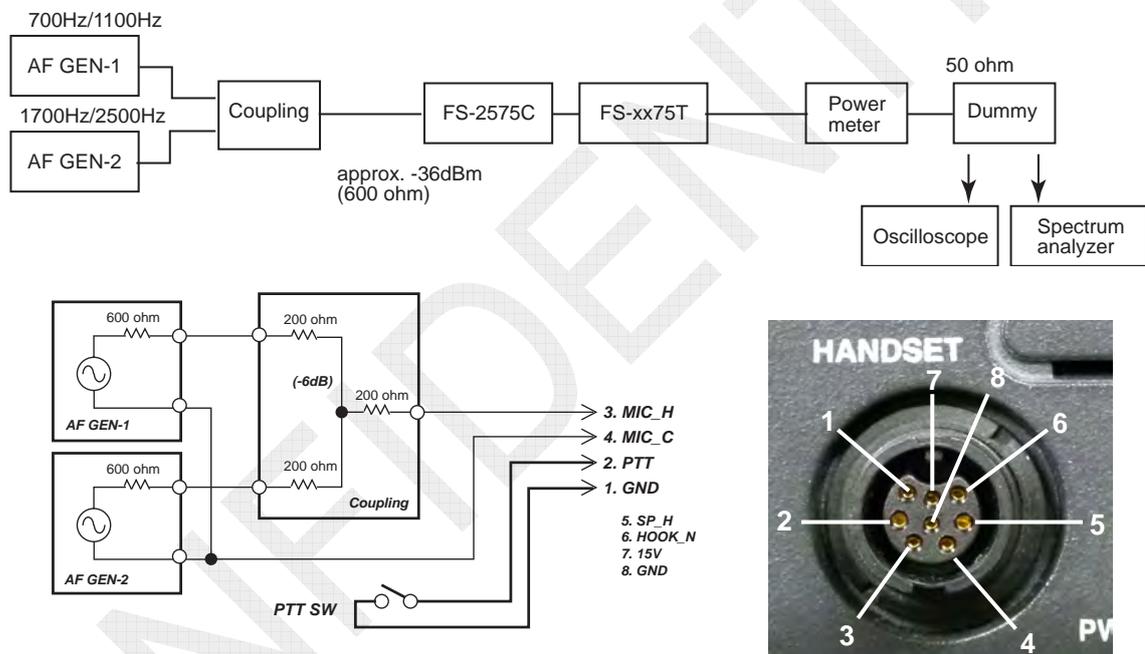
5.1.3 SSB Power Measurement

The power of the SSB (J3E) transmitter is defined by peak envelope power. Peak envelope power is the average power supplied to the antenna by a transmitter during one radio frequency cycle at the crest of the modulation envelope, under normal operating conditions.

1. Output power measurement by 2-tone signal

Procedure)

1. Set the frequency of the AF GEN-1 and -2 to 700 Hz and 1700 Hz or 1100 Hz and 2500 Hz, respectively, and then make adjustment of output level of the AF GEN so that the two AF GEN will come to the equal transmission spectrum.



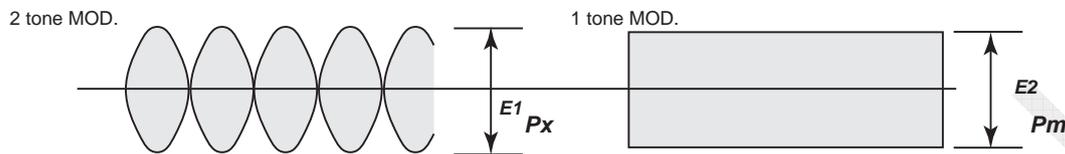
Note)

In order to input a microphone rating of -36 dBm, set the output power of AF GEN-1 and -2 to “ -36 dBm + 6 dB = -30 dBm” taking into account the insertion loss resulting from two signal pads.

Fig. 5.1.1 2-Tone Measurement Circuit

2. Modulate power at a specified input level to ensure that the 3rd IMD component is not more than -25 dB for the transmission spectrum.
3. Read “Peak envelope voltage-1: E1” in the said state on the oscilloscope.

4. Disconnect the output of the AF GEN -2, and then find the “Average power (Pm)” of TX output from the power meter. Furthermore, read “Peak envelope voltage-2: E2” on the oscilloscope.



5. Find peak power “Px” from the following equation.

$$P_x = \text{Average power (Pm)} \times (\text{Peak envelope voltage-1: E1} / \text{Peak envelope voltage-2: E2})^2$$

For example, when average 2-tone modulated output power is 100W, peak power to be obtained doubles to 200W. This is about equal to 1-tone modulated output power (saturated power).

2. Output power measurement by 1-tone signal

This function determines the TX output power of SSB mode based on TX output power saturated by increasing input level. Saturated power is recognized as peak power.

Procedure)

1. Set the output frequency of the AF GEN to 1500 Hz.

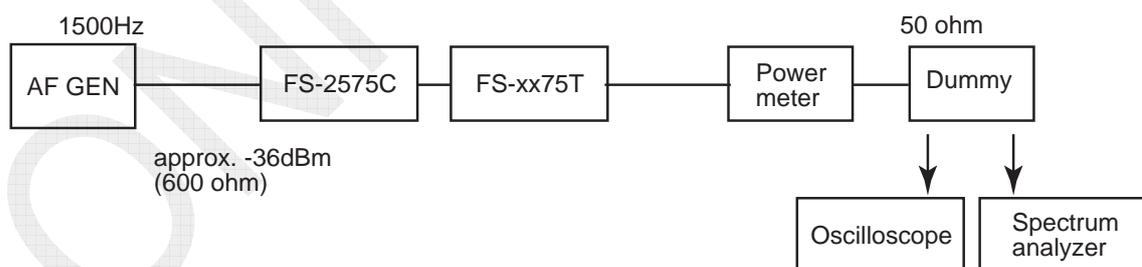
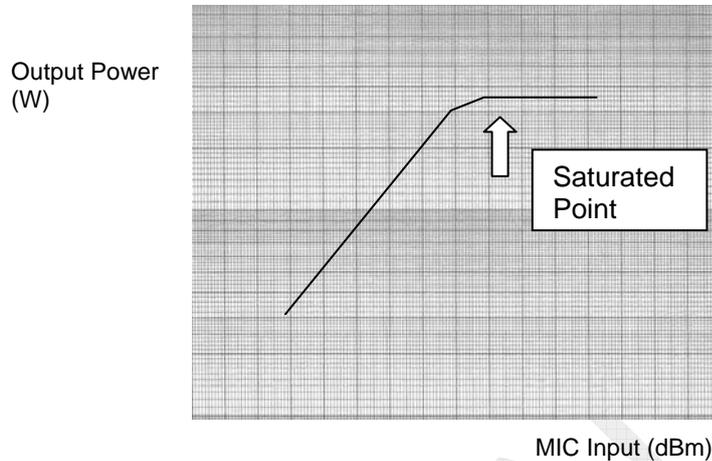


Fig. 5.1.2 1-Tone Measurement Circuit

2. Make measurement of TX output power by sequentially increasing input level at a 1500 Hz frequency starting from several 10 percent of nominal input level. Continue this measurement until the TX output power becomes saturated.

3. Make a graph of “MIC Input level vs. TX output power” from the measurement results to read saturated power. This TX output power is the peak power to be obtained.



This system can make measurement of modulated output power with single and double test tones.
Since both test tones are set to a specified modulation level, the system facilitates the measurement of TX output power.

5.2 T/R Unit Output Power Adjustment and Measurement

5.2.1 Preparation

1. Connection

As shown below, connect a 50 ohm power meter to the [T/R ANT] terminal of the FS-xx75T system.

Select a dummy load with appropriate power capacity according to TX power. In this case, select a non-inductive resistor. The dummy load should have power capacity twice as much as TX output power to be measured.

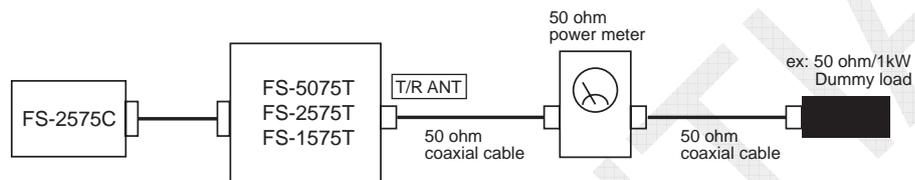


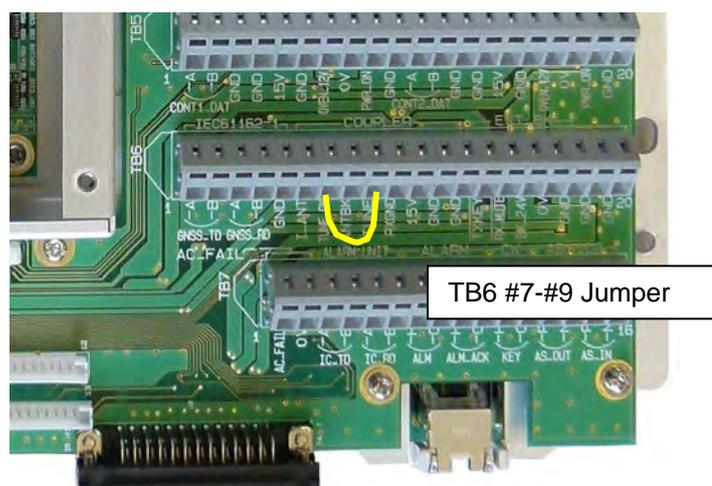
Fig. 5.2.1 Output Power Measurement Circuit of Transceiver Unit

2. Preparation for measurement

Since no Antenna coupler; ATU is connected, TUNE ERROR occurs when transmitting. To prevent this error,

- select [MENU] -> 9.SERVICE -> 3.RT SETUP -> 1.SETUP -> TX TUNE -> “OFF,” or
- connect a jumper between “#7: TUNE OK” and “#9: TUNE” of TB6 on the T-IF board.

Be sure to restore the setup upon completion of adjustment.



5.2.2 TX PWR (FREQ)

The Sub-menu “TX PWR (FREQ)” allows for making TX output power adjustment in steps of 1 MHz.

Reference)

If frequencies and modes registered on the “USER CH” window fall within the frequency band for which TX output power adjustment was made with the Sub-menu “TX PWR (FREQ)” and the modes match each other, the relevant will be set as the default of USER CH power data.

Procedure)

1. Select [MENU] -> 9.SERVICE -> 3.RT SETUP -> 4.TX PWR (FREQ), and then press the [ENTER] knob.
2. The “TX POWER (FREQ)” window will appear.

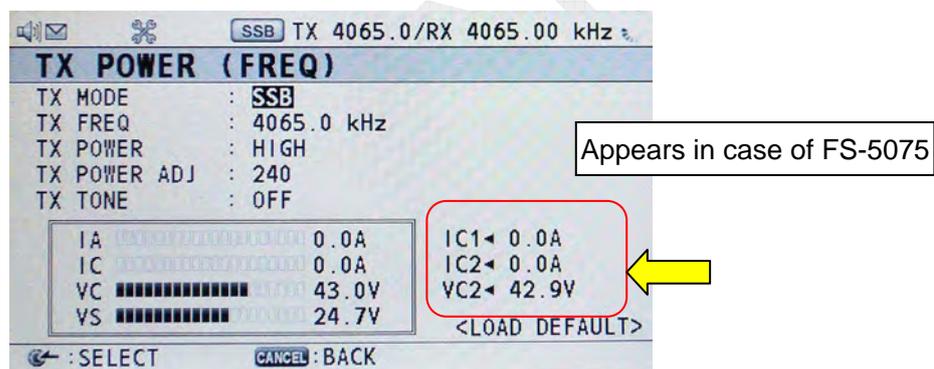


Table 5.2.1 Sub-menus of TX POWER (FREQ)

Sub-menu	Setting Parameter	Remark	
TX MODE	SSB	Selects a mode of frequency to be transmitted. CW: Appears when selecting [MENU] -> 9. SERVICE -> 3. RT SETUP -> 1. SETUP -> CW -> “ENABLE.”	
	DSC		
	NBDP		
	CW		
TX FREQ	1605.0 to 27500.0	Independent of selection of [MENU] -> 9. SERVICE -> 3. RT SETUP -> TX FREQ.	
TX POWER	FS-5075	FS-2575, 1575	Selects an output reduction setting level.
	HIGH	HIGH	
	MID	MID	
	LOW1	LOW	
	LOW2		

TX POWER ADJ	0 to 255			Displays power data. This Sub-menu is used to make adjustment of TX output power in the range of 0 to 255.
TX TONE	SSB	DSC, NBDP	CW	Select tone signal.
	OFF	OFF	OFF	
	1500Hz	1615Hz	TONE	
	1100Hz/1700Hz	1785Hz		
	700Hz/1700Hz	DOT		
<LOAD DEFAULT>	Yes/No			Returns power data to the default.

3. Select on “TX MODE,” and then press the [ENTER] knob. The “TX MODE” popup window will appear. For example, to make SSB frequency, select on “SSB,” and then press the [ENTER] knob.
4. Select on “TX FREQ,” and then press the [ENTER] knob. The “TX FREQ” popup window used to enter frequency to be adjusted will appear. For example, enter 4100.0kHz, and then press the [ENTER] knob.
5. Select on “TX POWER,” and then press the [ENTER] knob. The “TX POWER” popup window will appear. For example, to make adjustment of high TX output power, select on “HIGH,” and then press the [ENTER] knob.
6. Select on “TX TONE,” and then press the [ENTER] knob. The “TX TONE” popup window will appear, click on “SSB” -> “1500Hz,” and then press the [ENTER] knob.
7. Select on “TX POWER ADJ,” and then press the [ENTER] knob. The “TX POWER ADJ” popup window will appear and display the current set power data.
8. Press the PTT on the handset. Transmission will be initiated to display IA, IC, and VC set values on the window.

Note)

Pressing the PTT will clear the display of Sub-menus that were selected on the “TX MODE,” “TX FREQ,” and “TX POWER” popup windows.

9. Turn the knob to make power data setting so that output power will come to a specified level.
10. Press the [ENTER] knob. The relevant power data will be registered.
Return to Step 3 of this procedure for setting any other mode or frequency band.

Returning power data in the registered frequency band to the default

1. Select on <LOAD DEFAULT> on the “TX POWER (FREQ)” window, and then press the [ENTER] knob.
2. A message saying “Default Setting OK?” will be popped up. Select “YES,” and then press the [ENTER] knob. All data registered on the “TX POWER (FREQ)” window will return to the default. For detail, refer to “Table 5.1.1 Power Data Defaults.”

5.2.3 TX PWR (USER CH)

The Sub-menu “TX PWR (USER CH)” is used to make adjustment of output power for user-specified channels registered on the USER CH window. For the procedure for registering on the USER CH window, refer to information on page 4-5.

Reference)

If frequencies and modes registered on the “USER CH” window fall within the frequency band for which output power adjustment was made with the Sub-menu “TX PWR (FREQ)” and the modes match each other, the relevant will be set as the default of USER CH power data.

Procedure)

1. Select [MENU] -> 9.SERVICE -> 3.RT SETUP -> 5.TX PWR (USER CH), and then press the [ENTER] knob.
2. The “TX POWER (FREQ)” window will appear.

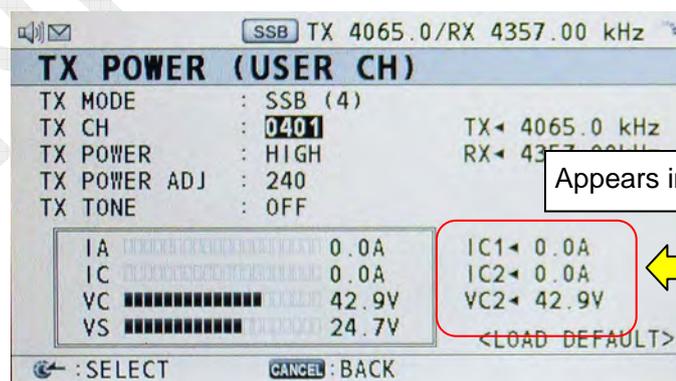
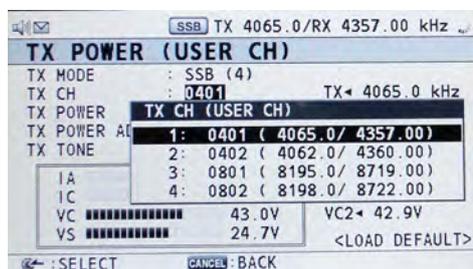


Table 5.2.2 Sub-menus of TX POWER (USER CH)

Sub-menu	Setting Parameter	Remark		
TX MODE	SSB	Selects a mode of channel registered and display the mode and the number of user-specified channels registered. <i>CW: Appears when selecting [MENU] -> 9. SERVICE -> 3. RT SETUP -> 1. SETUP -> CW -> "ENABLE."</i>		
	DSC			
	NBDP			
	CW			
TX CH	xxx	Selects a channel registered. Turning the knob will switch the channel.		
TX POWER	FS-5075	FS-2575, 1575	Selects a TX output power reduction setting level.	
	HIGH	HIGH		
	MID	MID		
	LOW1	LOW		
	LOW2			
TX POWER ADJ	0 to 255	Displays power data. This Sub-menu is used to make adjustment of TX output power in the range of 0 to 255.		
TX TONE	SSB	DSC, NBDP	CW	Selects tone signal
	OFF	OFF	OFF	
	1500Hz	1615Hz	TONE	
	1100Hz/1700Hz	1785Hz		
	700Hz/1700Hz	DOT		
<LOAD DEFAULT>	Yes/No	Returns power data to the default.		

3. Select on "TX MODE," and then press the [ENTER] knob. The "TX MODE" popup window will appear. For example, to adjust user channels of SSB, select on "SSB," and then press the [ENTER] knob.
4. Select on "TX CH," and then press the [ENTER] knob. A channel selection popup window will appear. Select a channel on this window, and then press the [ENTER] knob.



5. Select on "TX POWER," and then press the [ENTER] knob. The "TX POWER" popup window will appear. For example, to make adjustment of high TX output power, select on "HIGH," and then press the [ENTER] knob.

6. Select on “TX TONE,” and then press the [ENTER] knob. The “TX TONE” popup window will appear, select on “SSB” -> “1500Hz,” and then press the [ENTER] knob.
7. Select on “TX POWER ADJ,” and then press the [ENTER] knob. The “TX POWER ADJ” popup window will appear and display the current set power data.
8. Press the PTT on the handset. Transmission will be initiated to display IA, IC, and VC set values on the window.
Note) Pressing the PTT will clear the display of Sub-menus that were selected on the “TX MODE,” “TX FREQ,” and “TX POWER” popup windows.
9. Turn the knob to make power data setting so that output power will come to a specified level.
10. Press the [ENTER] knob. The relevant power data will be registered.
Return to Step 3 of this procedure for setting any other mode or frequency band.

Returning power data of the registered user-specified channel to the default

1. Select on <LOAD DEFAULT> on the “TX POWER (USER CH)” window, and then press the [ENTER] knob.
2. A message saying “Default Setting OK?” will be popped up. Select “YES,” and then press the [ENTER] knob. All data registered on the “TX POWER (USER CH)” window will return to the default.

Note)

The default of TX POWER (USER CH) means power data set with TX POWER (FREQ).

5.2.4 TX PWR (TUNE)

The Sub-menu “TX PWR (TUNE)” is used to make TX output power adjustment for automatic tuning operation. A frequency to be adjusted is any single radio wave. Tuning power has been set to 10 to 15W regardless of models and frequency bands. Basically, no field adjustment is required. Be noted that setting tuning output power to too high level may cause the control relay of the matching circuit to burn out while in automatic tuning operation.

Procedure)

1. Select [MENU] -> 9.SERVICE -> 3.RT SETUP -> 4.TX PWR (TUNE), and then press the [ENTER] knob.
2. The “TX POWER (TUNE)” window will appear.

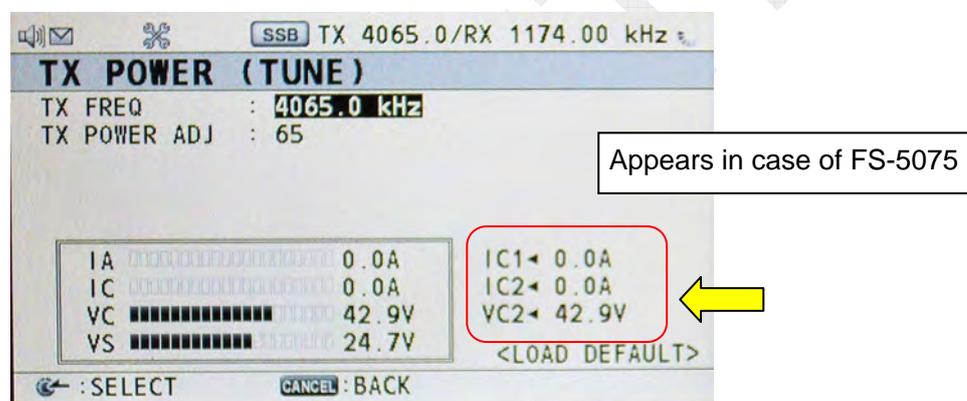


Table 5.2.3 Sub-menus of TX POWER (TUNE)

Sub-menu	Setting Parameter	Remark
TX FREQ	1605.0 to 27500.0	Makes setting to any frequency in the range shown to the left.
TX POWER ADJ	0 to 140	Displays power data. This Sub-menu is used to make adjustment of TX output power in the range of 0 to 140.
<LOAD DEFAULT>	Yes/No	Returns power data to the default.

3. Select on “TX FREQ,” and then press the [ENTER] knob. The “TX FREQ” popup window used to enter frequency to be adjusted will appear. For example, enter 4100.0 kHz, and then press the [ENTER] knob.
4. Select on “TX POWER ADJ,” and then press the [ENTER] knob. The “TX POWER ADJ” popup window will appear and display the current set power data.

5. Press the PTT on the handset. Transmission will be initiated to display IA, IC, and VC set values on the window.
6. Turn the knob to make power data setting so that output power will come to a specified level.
7. Press the [ENTER] knob. The relevant power data will be registered.

Returning power data of the registered TUNE to the default

1. Select on <LOAD DEFAULT> on the “TX POWER (TUNE)” window, and then press the [ENTER] knob.
2. A message saying “Default Setting OK?” will be popped up. Select “YES,” and then press the [ENTER] knob. TUNE power data will return to the default.

5.2.5 TX PWR (SEL CALL)

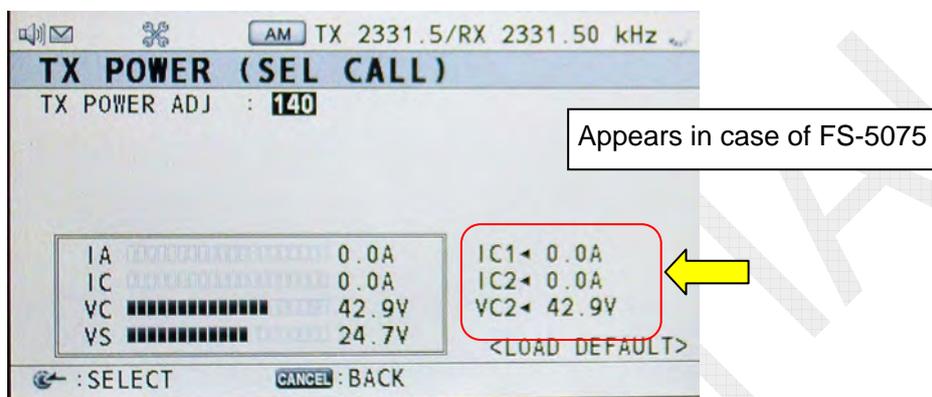
The Sub-menu “TX PWR (SEL CALL)” is used to make TX output power for SEL CALL at a 2331.5 kHz frequency.

The points of TX output power adjustment for SEL CALL are as follows:

- 1) No modulation is performed. This Sub-menu is used to make adjustment of carrier wave power.
Reference)
The carrier wave power is 1/4 W of the rated output power of SSB wave.
- 2) Output power adjustment can be made regardless of setting of [MENU] -> 9. SERVICE -> 3.RT SETUP -> 1.SETUP -> “SELCALL” or “AM MODE.”
- 3) Even if the frequency on the RT window is set to any level, the frequency will be set to “2331.5 kHz” and the mode will be set to “AM” when entering the “TX PWR (SEL CALL)” window.
- 4) The adjustment of modulation of SEL CALL wave is made by line output from the SEL CALL system or by selecting [MENU] -> 9.SERVICE -> 3.RT SETUP -> 1. SETUP -> “LINE IN.” The line-in level is 0 dBm / 600 ohms and adjustable in the range of 0 ± 10 dBm.

Procedure)

1. Select [MENU] -> 9.SERVICE -> 3.RT SETUP -> 4.TX PWR (SEL CALL), and then press the [ENTER] knob.
2. The “TX POWER (SEL CALL)” window will appear.



3. Select on “TX POWER ADJ,” and then press the [ENTER] knob. The “TX POWER ADJ” popup window will appear and display the current set power data.
4. Press the PTT key on the handset. Transmission will be initiated to display IA, IC, and VC set values on the window.
5. Turn the knob to make power data setting so that output power will come to a specified level.
6. Press the [ENTER] knob. The relevant power data will be registered.

Returning power data of the registered SEL CALL to the default

1. Select on <LOAD DEFAULT> on the “TX POWER (SEL CALL)” window, and then press the [ENTER] knob.
2. A message saying “Default Setting OK?” will be popped up. Select “YES,” and then press the [ENTER] knob. SEL CALL power data will return to the default.

5.3 ATU Output Power

For the procedure for making adjustment of TX output power, refer to information in “5.2 T/R Unit Output Power Adjustment and Measurement” on page 5-14.

5.3.1 Connecting Dummy load to ATU

As shown in Fig. 5.3.1 below, connect dummy load to ATU.

Connect a 50 ohm Dummy load for the HF band and a 10ohm + 250 pF antenna for the MF band using a non-inductive resistor, respectively.

Furthermore, activate the automatic tuning function by selecting [MENU] -> 9. SERVICE -> 3.RT SETUP -> 1.SETUP -> TX TUNE -> “ON.”

Note)

Select Dummy load with appropriate power capacity according to transmission power.

- 1) Dummy resistors should have power capacity twice or more as much as TX output power to be measured.
- 2) Capacitors should withstand a voltage of 10 kV or more.
- 3) Make the ground of the dummy load for the HF band as short as possible using a copper band of 50 mm or more in width.
- 4) Particularly for the dummy load for the MF band, minimize impedance between the antenna connection point and the ground connection point.

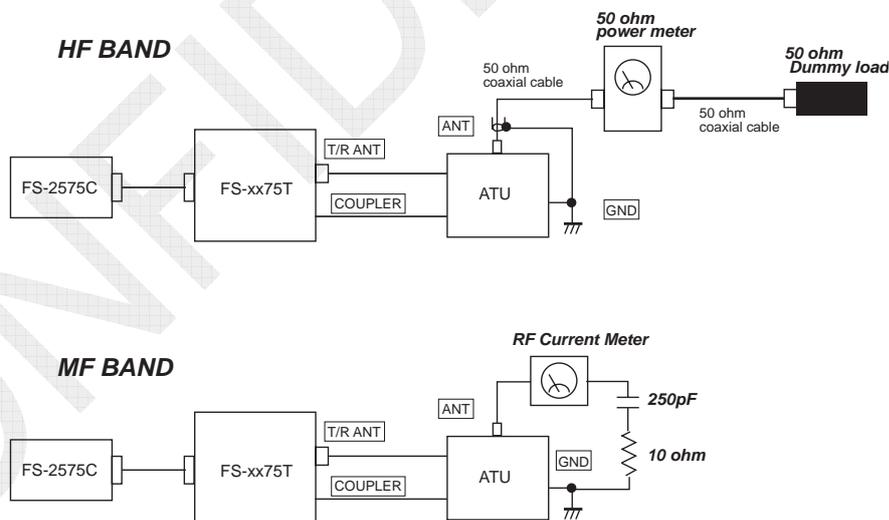


Fig. 5.3.1 Output Power Measurement circuit-1

Reference)

ATU output power in the MF band

Calculate power by the equation: $P_a = I_a^2 \times R_a$.

I_a: Antenna current flowing through the dummy load

R_a: Dummy load resistance = 10 ohms

The efficiency of the ATU comes to 70 to 80% with 10-ohm + 250 pF dummy load.

For example, if the FS-2575T outputs 250 W, power outputted from the ATU will reduce to 175 to 200 watts. As a result, I_a comes to 4.1 to 4.5A.

$$I_a = \sqrt{P_a/R_a}$$

ATU output power in the HF band: Power meter reading

The efficiency of the ATU comes to 80 to 95% although it depends on frequency bands. As the frequency becomes higher, the power dissipation increases.

For example, if the FS-2575T outputs 250 W in the 4 MHz band, power outputted from the ATU will reduce to 200 to 240 W.

5.3.2 Connecting Antenna to ATU

Connect a power meter or SWR meter between the FS-xx75T and ATU to make measurement of P_f and P_r.

If P_r is high even though tuning is OK, for example if the P_r is 20% or more, check for the antenna, the axial cable connectors, grounding of ATU, and antenna connection as well as for burnout of and leakage in the ATU. Furthermore, ensure that the antenna does not come into contact with structure.

If the P_r is high in a specific frequency band, it is supposed that antenna impedance is extremely high or low. In this case, if the situation is changed by changing the length of lead-in wire of the antenna, this problem is related to the antenna impedance. If it is physically difficult to change the length of the lead-in wire of the antenna, it will be wise to reduce the TX output power within a specified range.

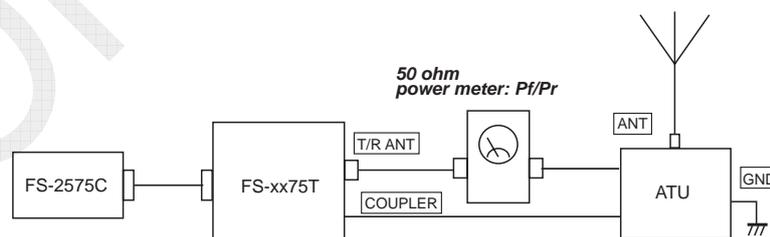


Fig. 5.3.2 Output Power Measurement circuit-2

Table 5.3.1 SWR Chart

VSWR	Reflection coefficient $ \Gamma $	Reflection loss (dB)	Reflection power (%)	Transmission power (%)	Transmission loss (dB)
1.00	0.0000	∞	0.000	100.00	0.000
1.10	0.0476	26.45	0.227	99.973	0.010
1.30	0.1304	17.70	1.700	98.300	0.074
1.50	0.2000	13.98	4.000	96.000	0.177
2.00	0.3333	9.54	11.11	88.89	0.511
2.50	0.4286	7.36	18.37	81.63	0.882
3.00	0.5000	6.02	25.00	75.00	1.250
4.00	0.6000	4.44	36.00	64.00	1.938

5.3.3 Power Measurement by Calculating Efficiency

Approximate ATU output power can be calculated from PA Ic and PA Vc reading, and efficiency “ η ” set forth in the Factory Test Data.

The Test Data has found ATU output power using 50 ohm dummy load for the HF band and 10ohm + 250 pF dummy load for the MF band. Since actual antenna impedance varies with frequency bands, the efficiency also varies. Consequently, the calculation by efficiency only produces approximate ATU output power.

$$P_o = V_c \times I_c \times \eta$$

As a guide, take the following efficiency for “ η ” although it depends on frequency bands.

MF: 30 to 40%, HF: 40 to 50%

Adjustment of TX output power

Calculate ATU output power from PA Ic and PA Vc reading, and efficiency “ η ” in the factory Test Data, using the following equations;

$$P_o = V_c \times I_c \times \eta$$

$$I_c = P_o / (V_c \times \eta)$$

For example, when adjusting ATU output power to 250 watts in the 4 MHz band, supposing that Vc is 42.0V and the factory Test Data is 50%, PA Ic to be adjusted is given as:

$$I_c = 480W / (42V \times 50\%) = 11.9A$$

Then, adjust power data so that PA Ic will come to 11.9A.

5.4 Frequency Measurement and Adjustment

5.4.1 Transmission Frequency Measurement

- Preheat time: Preheat for a period of 20 minutes or more.
- Frequency counter: Thoroughly preheat the counter.
- Frequency deviation: Within ± 10 Hz for SSB, DSC, NBDP, and CW
- Frequency adjustment: Select [MENU] -> 9.SERVICE -> 3.RT SETUP -> 1. SETUP -> "REF OSC"
- SSB output frequency = Set TX frequency + 1500 Hz (one-tone)
- DSC / NBDP output frequency = Set TX frequency + 85 Hz (Space Tone: 1785 Hz)
- CW output frequency = Set TX frequency

1. Connection point of frequency counter

- 1) Induce RF signal in the vicinity of the ATU terminal with a pickup coil, and then input this RF signal in the frequency counter. For this purpose, fabricate a $\phi 50$ mm pickup coil of 4 to 6 turns using suitable wire.
- 2) Connect a frequency counter to a RX antenna installed in the vicinity of R/T antenna. However, since frequency pickup levels vary with frequency bands, there are cases in which no frequency measurement can be made.
- 3) Connect a frequency counter to the FAX-5 antenna of WR1 (2). However, since frequency pickup levels vary with frequency bands, there are cases in which no frequency measurement can be made.

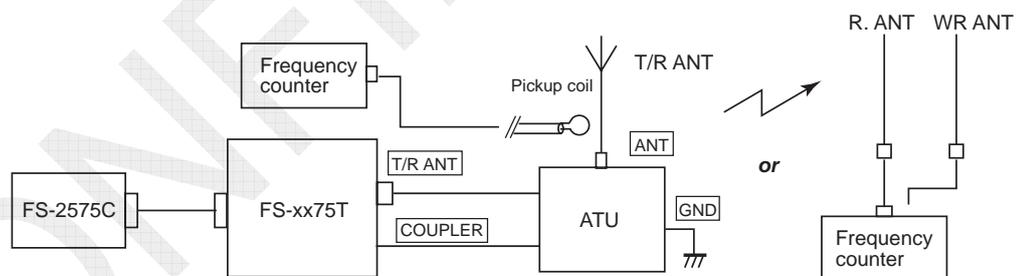
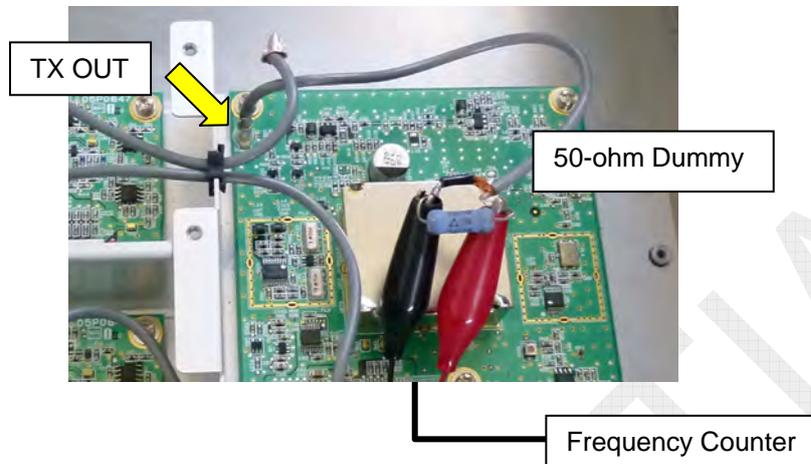


Fig. 5.4.1 Frequency Measurement Circuit

- 4) Connect a 50 ohm dummy load to the [TX OUT] of the TX board, and then connect a frequency counter to each end of the dummy load.



2. Frequency measurement procedure

SSB frequency measurement procedure)

1. Select [MENU] -> 9.SERVICE -> 3.RT SETUP -> 4.TX PWR (FREQ), and then press the [ENTER] knob. The TX POWER (FREQ) window will appear.
2. Select on “TX MODE,” and then press the [ENTER] knob. The “TX MODE” popup window will appear. Select on “SSB,” and then press the [ENTER] knob.
3. Select on “TX FREQ,” and then press the [ENTER] knob. The “TX FREQ” popup window will appear. For example, enter 4100.0 kHz, and then press the [ENTER] knob.
4. Select on “TX POWER,” and then press the [ENTER] knob. The “TX POWER” popup window will appear. Select on “LOW,” and then press the [ENTER] knob.
5. Select on “TX TONE,” and then press the [ENTER] knob. The “TX TONE” popup window will appear, select on “SSB” -> “1500 Hz,” and then press the [ENTER] knob.

Reference)

When selecting [MENU] -> 7.AUDIO -> 2.OFF HOOK SP -> “SP ON,” 1500 Hz tone signal will be outputted from the speaker. This allows for making TONE frequency measurement.

6. Press the PTT on the handset. Transmission will be initiated. Then, make transmission frequency measurement. The frequency deviation is within ± 10 Hz.

$$\underline{\text{SSB output frequency}} = \text{Set TX frequency} + 1500 \text{ Hz (Tone)}$$

Reference) Besides the above procedure, the frequency measurement can be made following the procedure described in “5.6 TONE TEST” on page 5-32.

DSC / NBDP frequency adjustment procedure)

1. Select [MENU] -> 9.SERVICE -> 3.RT SETUP -> 4.TX PWR (FREQ), and then press the [ENTER] knob. The TX POWER (FREQ) window will appear.
2. Select on “TX MODE,” and then press the [ENTER] knob. The “TX MODE” popup window will appear. Select on “DSC” or “NBDP,” and then press the [ENTER] knob.
3. Select on “TX FREQ,” and then press the [ENTER] knob. The “TX FREQ” popup window will appear. For example, enter 4100.0 kHz, and then press the [ENTER] knob.
4. Select on “TX POWER,” and then press the [ENTER] knob. The “TX POWER” popup window will appear. Then, pressing the [ENTER] knob will display the “TX POWER” Selection window. Select on “LOW,” and then press the [ENTER] knob.
5. Select on “TX TONE,” and then press the [ENTER] knob. The “TX TONE” popup window will appear, select on “DSC” or “NBDP” -> “1785Hz” (Space Tone), and then press the [ENTER] knob.

Note)

When selecting [MENU] -> 7.AUDIO -> 2.OFF HOOK SP -> “SP ON,” a 1785 Hz space tone signal will be outputted from the speaker. This allows for making tone frequency measurement. Tone frequency deviation is ± 0.5 Hz.

6. Press the PTT on the handset. Transmission will be initiated. Then, make transmission frequency measurement. The frequency deviation is within ± 10 Hz.

$$\underline{\text{DSC / NBDP output frequency} = \text{Set TX frequency} + 85 \text{ Hz}}$$

Reference)

Besides the above procedure, the frequency measurement can be made following the procedure described in “5.5 DSC TEST” on page 5-31.

CW frequency measurement procedure)

Like the SSB, DSC, and NBDP frequency measurement procedures, CW frequency measurement can be made on the “TX POWER (FREQ)” window. In addition, making CW frequency setting on the RT window and then pressing the telegraph key will initiate transmission. This allows for making frequency measurement. Frequency deviation is within ± 10 Hz.

$$\underline{\text{CW output frequency} = \text{Set TX frequency}}$$

5.4.2 Frequency Adjustment

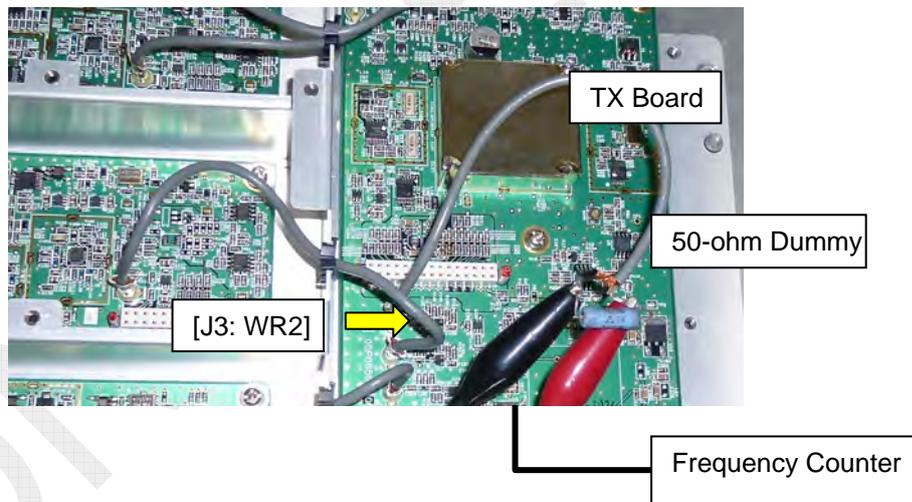
The reference oscillator circuit is incorporated in the TX board. The PLL reference frequency is 36 MHz.

This is taken as the reference frequency for the PLL circuit of TX, RX, WR1, and WR2. To make frequency adjustment, select [MENU] -> 9.SERVICE -> 3.RT SETUP -> 1.SETUP -> "REF OSC."



Procedure)

1. Terminate the [J3: 36MHz WR2] on the TX board with a 50 ohm dummy load, and then connect a frequency counter to each end of the dummy load.



2. Make measurement of 36 MHz frequency deviation.
3. Adjust "REF OSC" in [MENU] -> 9.SERVICE -> 3.RT SETUP -> 1.SETUP to set the frequency deviation to "within ± 10 Hz," and then press the [ENTER] knob.

Reference)

Make offset adjustment with R143 on the TX board so that oscillator output will come to 36 MHz when the Sub-menu “REF OSC” is set to “0.” For details, refer to information on page 5-46.

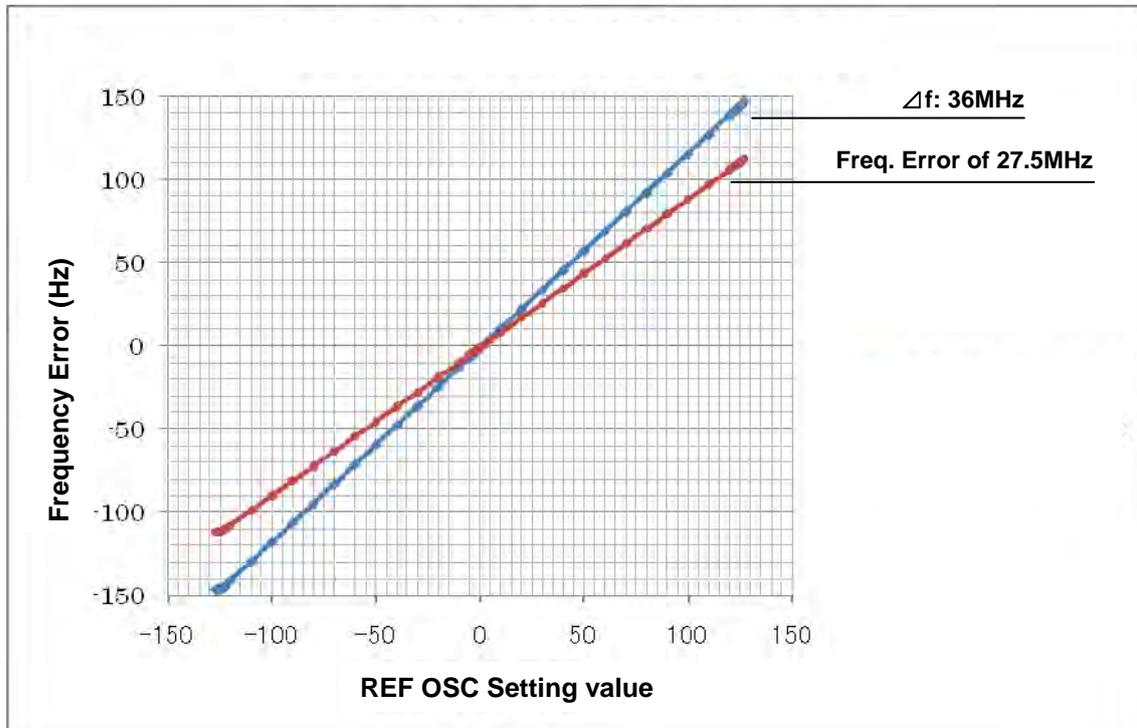


Fig. 5.4.2 Example of REF OSC Characteristics

5.5 DSC TEST

Select [MENU] -> 9.SERVICE -> 3.RT SETUP -> 3.DSC TEST to open the Sub-menu "DSC TEST." This menu allows for making measurement of TX output power and frequency by converting the DSC modulating signal.

Selecting [MENU] -> 9.SERVICE -> 3.RT SETUP -> 4.TX POWER (FREQ) also allows for making the said measurement.



Table 5.5.1 Sub-menus of DSC TEST

Sub-menu	Setting Parameter	Remark
TX TYPE	DOT	Outputs power at 1785 ± 85 Hz, 100 bps.
	SPACE	Outputs power at $1785 + 85$ Hz
	MARK	Outputs power at $1785 - 85$ Hz.
TX FREQ	1605.0 to 27500.0	Makes setting of frequency to be allocated.
TX KEY	ON	Makes setting of TX KEY to ON or OFF.
	OFF	

DSC TX frequency measurement

- Set "TX TYPE" to "SPACE," and then "TX KEY" to "ON."
TX frequency will be set to "Fc + 85 Hz" with a deviation of ± 10 Hz or less.
- Set "TX TYPE" to "MARK," and then "TX KEY" to "ON."
Transmission frequency will be set to "Fc - 85 Hz" with a deviation of ± 10 Hz or less.

DSC TX output power measurement

Setting "TX TYPE" to "DOT," and then "TX KEY" to "ON" will allow for making measurement of DSC TX output power; J2B.

TX output power can be reduced by setting "TX POWER" on the "RT SETUP" window to "HIGH," "MID," or "LOW."

Note)

Even when "TX TYPE" is set to "SPACE" or "MARK," the speaker will not output selected TONE. To make TONE frequency measurement, use the Sub-menu "TX POWER (FREQ)."

5.6 TONE TEST

Select [MENU] -> 1.TEST -> 3.TONE TEST to open the Sub-menu "TONE TEST." "TONE TEST" is more convenient than "TX POWER (xxx)" of the Service menu for ensuring the setting of the TX output power and frequency of SSB mode.

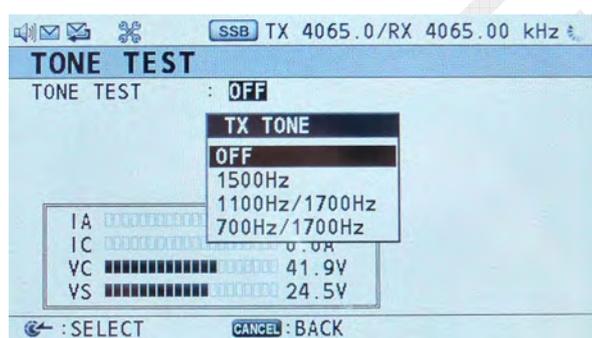
Procedure)

1. On the "RT SETUP" window, make setting of SSB frequency and output power level to "HIGH," "MID," or "LOW."
2. Select [MENU] -> 1.TEST -> 3.TONE TEST to open the Sub-menu "TONE TEST."

Note)

Unless "MODE" is set to "SSB," the Sub-menu "TONE TEST" does not open.

3. Open the Sub-menu "TONE TEST," and then select on "TX TONE." To make measurement of TX output power and frequency at a time, select on "1500Hz."



1-Tone: 1500Hz

2-Tone: 1100/1700Hz, 700/1700Hz

Note) TX output power by 2-Tone signal comes to approx. half that of 1-tone signal.

4. Press the PTT on the handset. Transmission will be initiated. Then, ensure the setting of the TX output power and frequency. The frequency deviation is within ± 10 Hz.

SSB output frequency = Set TX frequency + 1500 Hz (one-tone)

5. Press the PTT on the handset. Transmission will be initiated. Then, ensure the setting of transmission frequency. The frequency deviation is within ± 10 Hz.

Reference)

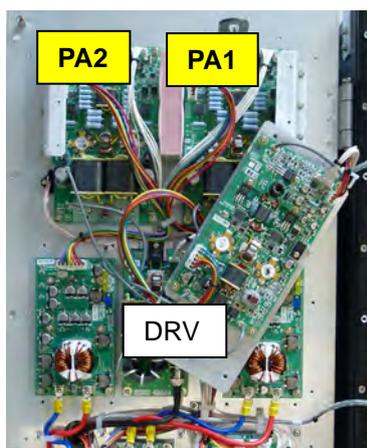
When selecting [MENU] -> 7.AUDIO -> 2.OFF HOOK SP -> "SP ON," 1785 Hz space tone signal will be outputted from the speaker. This allows for ensuring the setting of tone frequency.

5.7 Board Adjustment

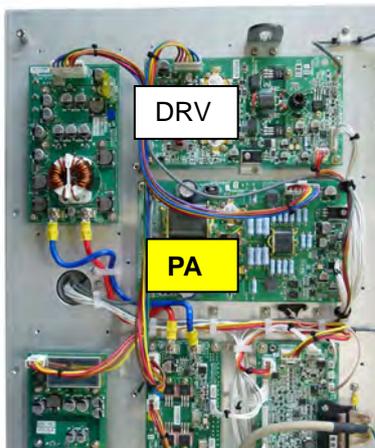
5.7.1 PA Board Adjustment (FS-1575, -2575, and -5075)

Table 5.7.1 List of Adjustment Points on PA Board

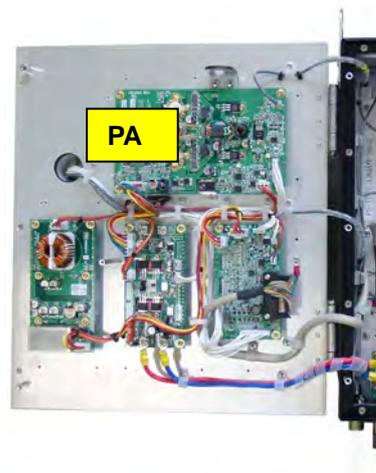
Model	Type of PA Board	Adjustment VR	Function	Adjusted Value
FS-5075	05P0867A	R41	PA IC indicator adjustment	
		R51	PA bias adjustment	400 mA at 42V
		R47	PA Vc indicator adjustment	
FS-2575	05P0867B	Ditto	Same as above	Same as above
FS-1575	05P0868	R79	PA(Q4-Q5) bias adjustment	400 mA at 24V
		R80	PRE-DRIV (Q1) bias adjustment	75 mV at R11/87
		R81	DRIV (Q3-Q4) bias adjustment	40 mV at R23
		R82	PA IC indicator adjustment	
		R85	PA Vc indicator adjustment	



FS-5075 PA Board Arrangement



FS-2575 PA Board Arrangement



FS-1575 PA Board Arrangement

Fig. 5.7.1 PA Board Arrangement

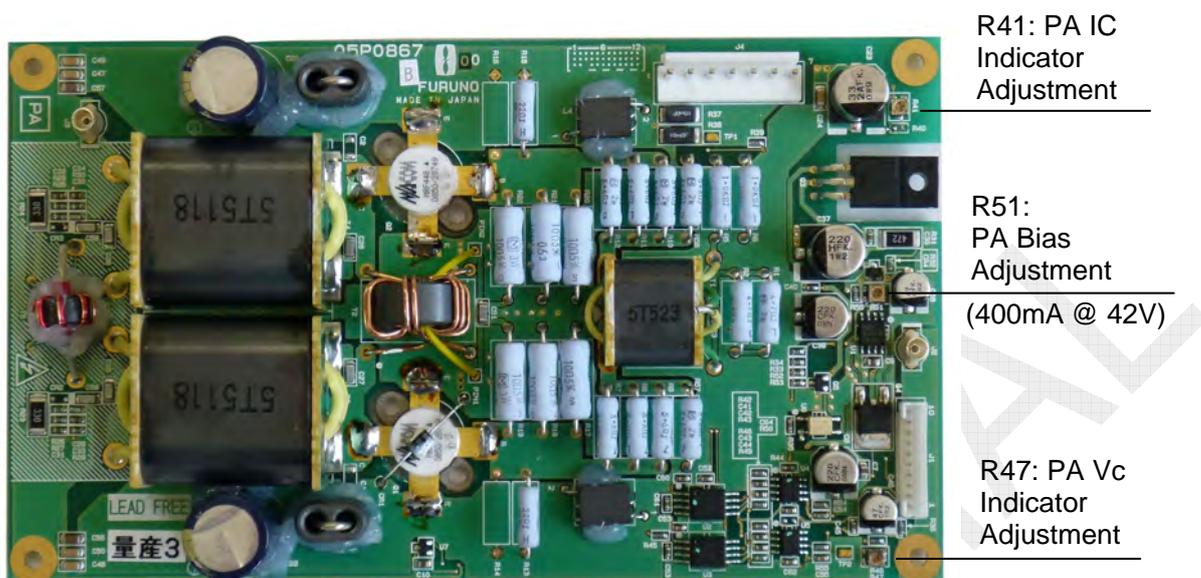


Fig. 5.7.2 FS-5075, FS-2575 PA Board (05P0867A, B)

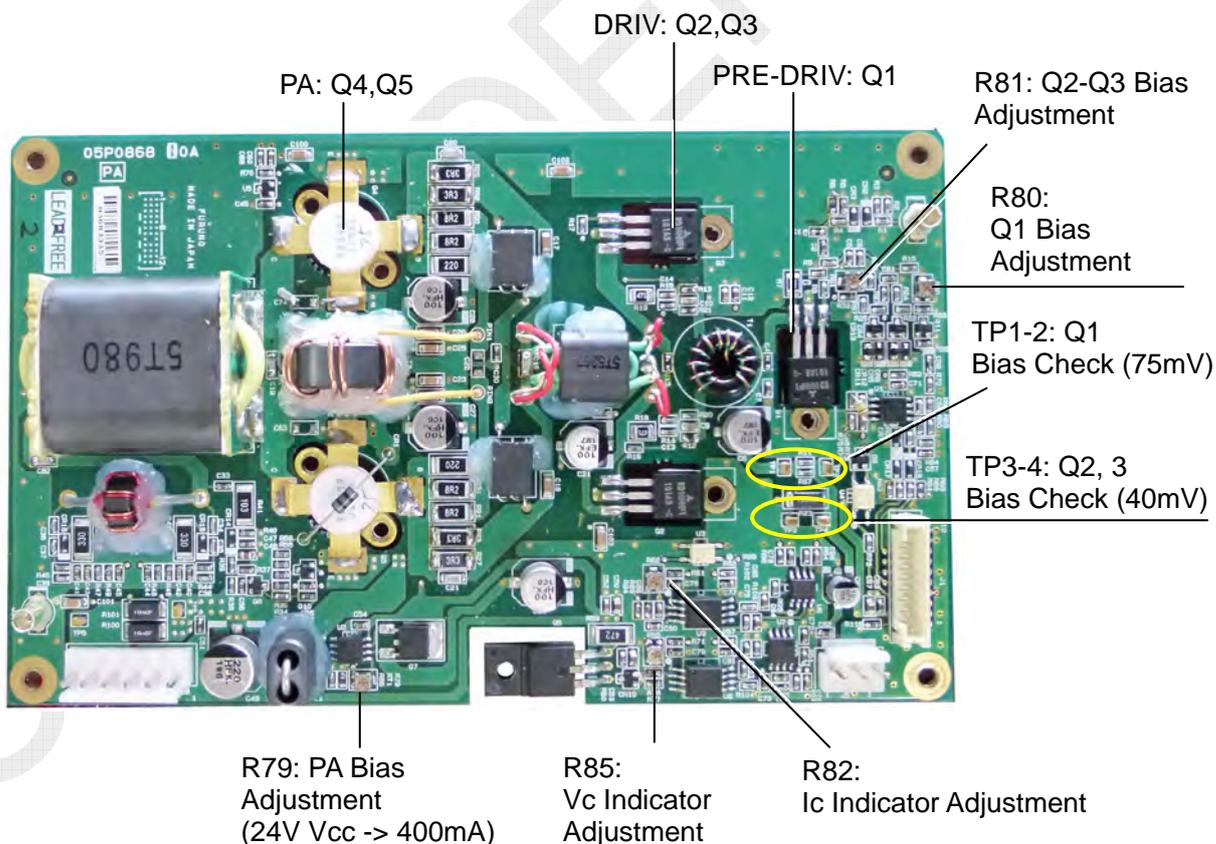


Fig. 5.7.3 FS-1575 PA Board (05P0868)

1. PA Board: PA transistor BIAS adjustment (FS-1575, -2575, -5075)

Procedure)

1. Turn OFF the power supply, and then connect a 1- to 2A/ DC ammeter to the 42V(FS-1575: 24V) line of PA Vcc connector.

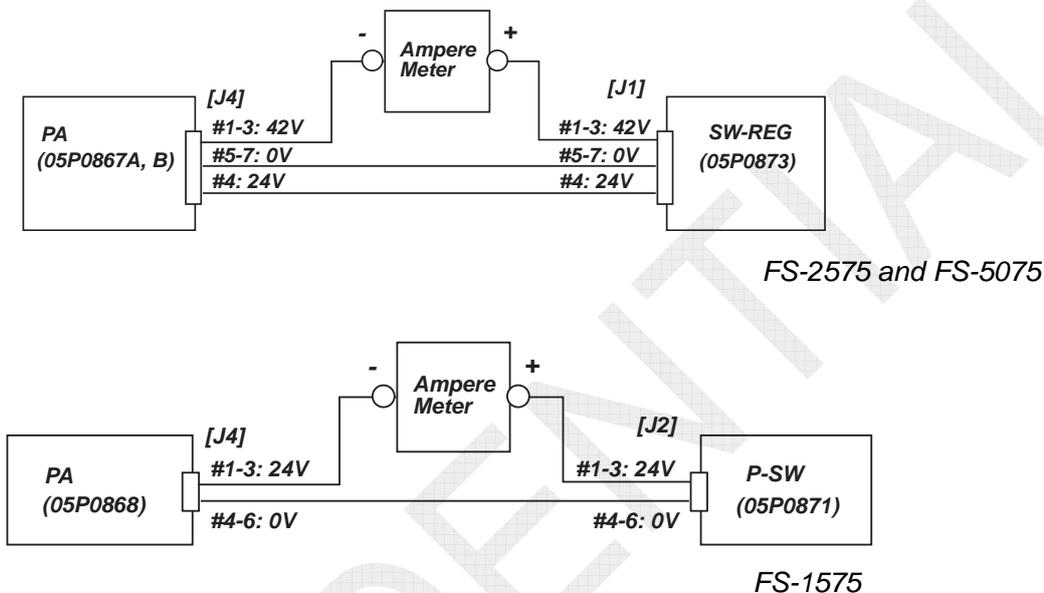


Fig. 5.7.4 PA IC BIAS Measurement Circuit

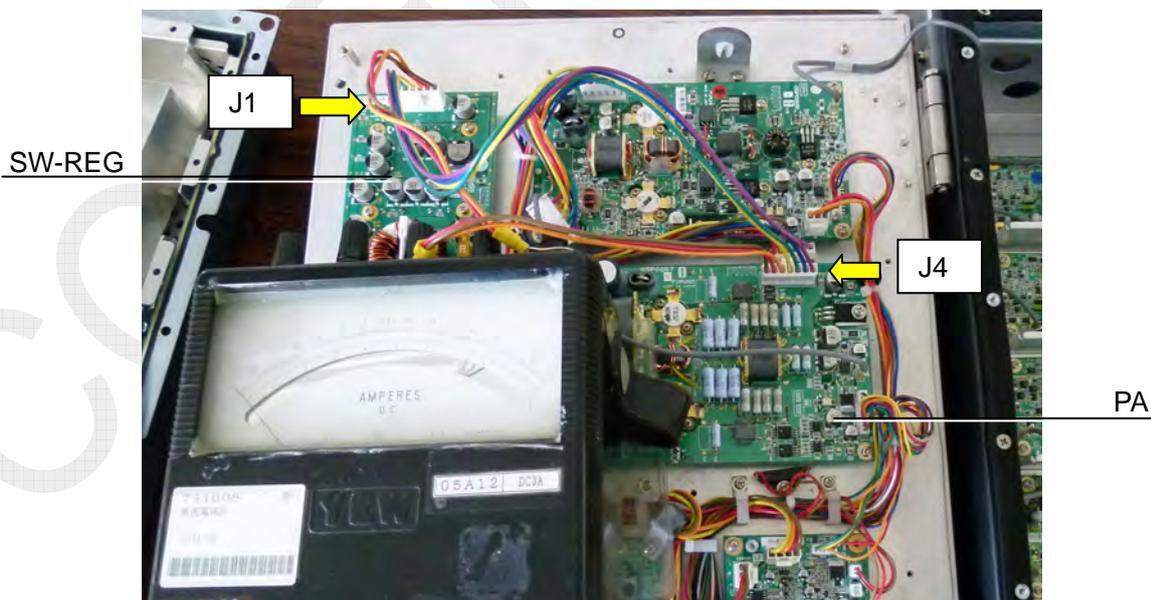


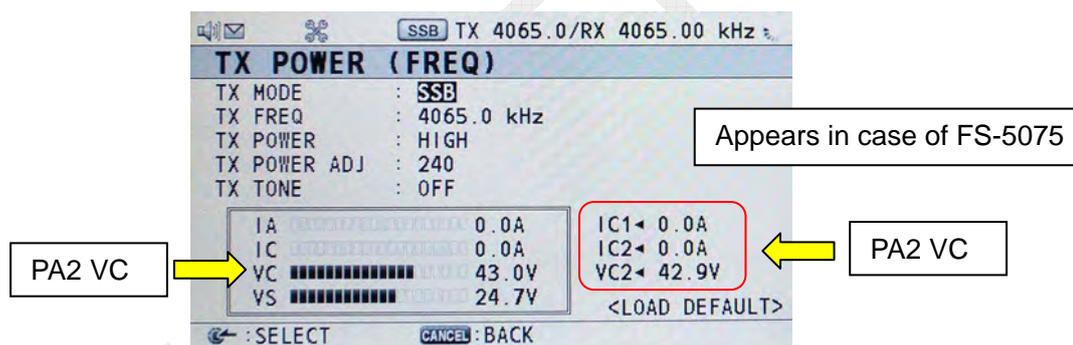
Fig. 5.7.5 FS-2575: Example of Ammeter Connection

2. Disconnect the [J1: TX OUT] connector from the TX board.
3. Turn ON the power supply, and then press the PTT on the handset to put the system into a TX state.
4. Make adjustment of the PA BIAS variable resistor so that PA BIAS current (i.e., DC ammeter reading) will come to a specified BIAS current.
 - FS-2575 and FS-5075:
Adjust R51 to 400 mA (for TP3 - TP4 40-mV line) and 500 mA (for 42 V line).
 - FS-1575:
Adjust R75 to 400 mA (for 24V line).

2. PA Board: PA Vc check meter reading adjustment (FS-1575, -2575, -5075)

Procedure)

1. Select [MENU] -> 9.SERVICE -> 3.RT SETUP -> 4.TX POWER (FREQ) to open the “TX POWER (FREQ)” window.



2. Make measurement of voltage between the Collector and Emitter of the PA transistors.
 - FS-2575 and FS-5075: Q1 and Q2
 - FS-1575: Q4 and Q5
3. Make adjustment of the Vc reading adjusting variable resistor so that the reading will come to the voltage measured.

FS-5075 has two PA boards. Make the above adjustment for each PA board.

 - FS-2575 and FS-5075: R47
 - FS-1575: R85

Reference)

VC reading displayed on the “RT SETUP” window of the FS-5075 is “VC1.”

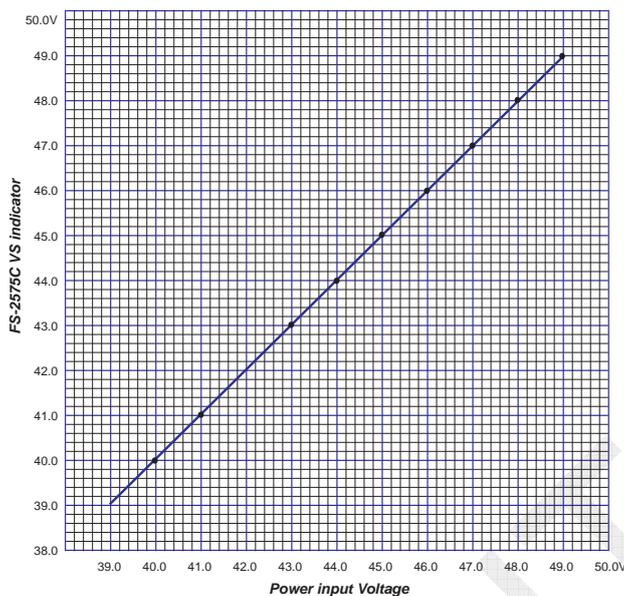


Fig. 5.7.6 FS-2575: Example of Vc Reading Characteristics

3. PA Board: PA Ic reading adjustment (FS-1575, -2575, -5075)

Procedure)

1. Turn OFF the power supply, and then connect a 50 ohm power meter or dummy load to the [T/R ANT] terminal of the FS-xx75T.
2. Connect a 10A/DC ammeter to the 42V/24V PA Vcc line. Measurement circuit is the same as that shown in the “1. PA transistor BIAS adjustment” section on page 5-35.

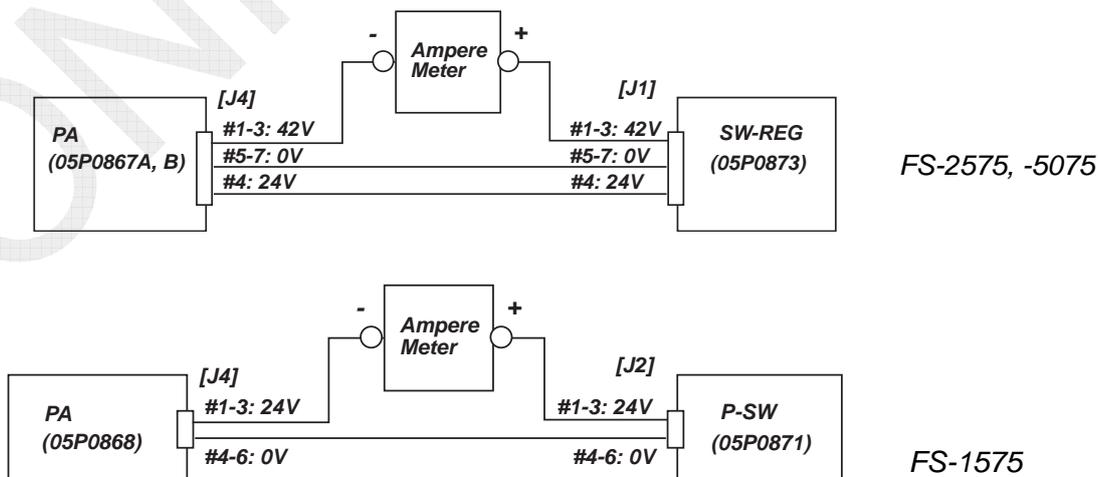
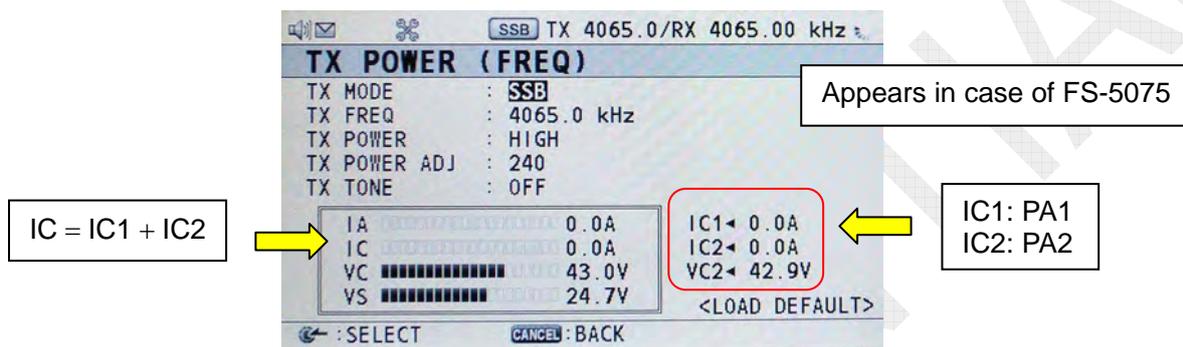


Fig. 5.7.7 PA IC Reading Adjustment Circuit

3. Turn ON the power supply, and then select [MENU] -> 9.SERVICE -> 3.RT SETUP -> 1.SETUP -> "TX TUNE" -> "OFF."
4. Select [MENU] -> 9.SERVICE -> 3.RT SETUP -> 4.TX POWER (FREQ) to open the "TX POWER (FREQ)" window, and then make setting as shown below on this window:
 - TX MODE to "SSB"
 - TX FREQ to "4100 kHz"
 - TX POWER to "LOW" or "LOW2"
 - TX TONE to "1500 Hz"



5. Press the PTT on the handset. Make adjustment of the Ic reading adjusting variable resistor so that the reading will come to that of the DC ammeter. FS-5075 has two PA boards. Make the above adjustment for each PA board.

- FS-2575 and FS-5075: R41
- FS-1575: R82

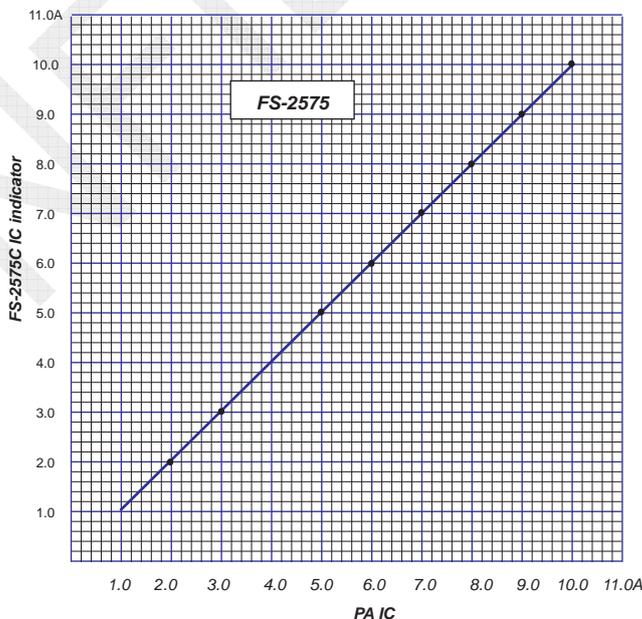


Fig. 5.7.8 FS-2575: Example of PA IC Reading Characteristics

4. PA Board: DRIV transistor Q2-Q3 BIAS adjustment (FS-1575)

Procedure)

1. Turn OFF the power supply, and then disconnect the [J1: TX OUT] connector from the TX board.
2. Turn ON the power supply, and then press the PTT on the handset to put the system into a TX state.
3. Make adjustment of the “R81” DRIV BIAS adjusting variable resistor so that voltage between TP3 and TP4 will come to “40 mVDC.”

$$\text{BIAS current: } 40 \text{ mV}/0.1\Omega = 400 \text{ mA}$$

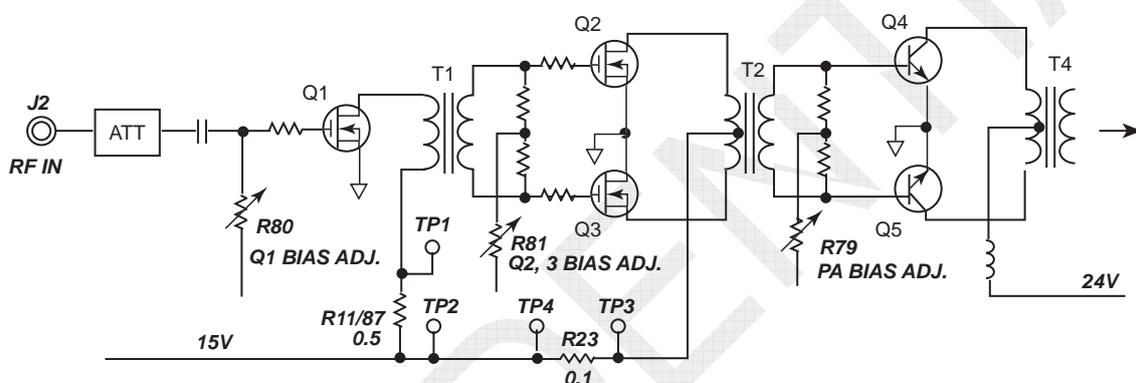


Fig. 5.7.9 FS-1575 PA Board (05P0868): Q2-Q3 BIAS Circuit Block Diagram

5. PA Board: PRE-DRIV transistor Q1 BIAS adjustment (FS-1575)

Procedure)

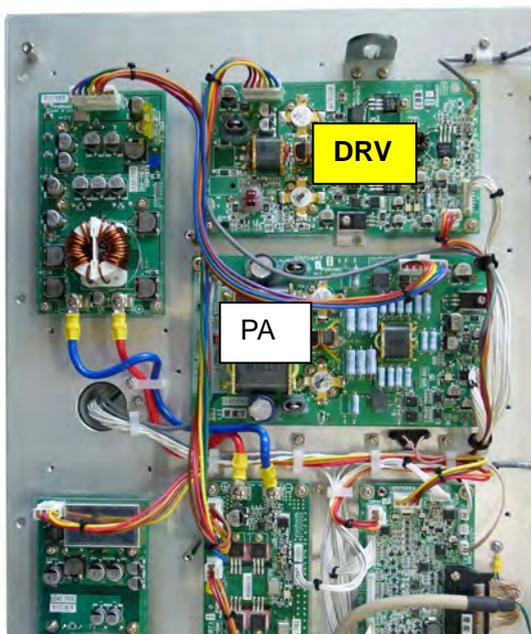
1. Turn OFF the power supply, and then disconnect the [J1: TX OUT] connector from the TX board.
2. Turn ON the power supply, and then press the PTT on the handset to put the system into a TX state.
3. Make adjustment of the “R80” PRE-DRIV BIAS adjusting variable resistor so that voltage between TP1 and TP2 will come to “75 mVDC.”

$$\text{BIAS current: } 75 \text{ mV}/0.5 \Omega = 150 \text{ mA}$$

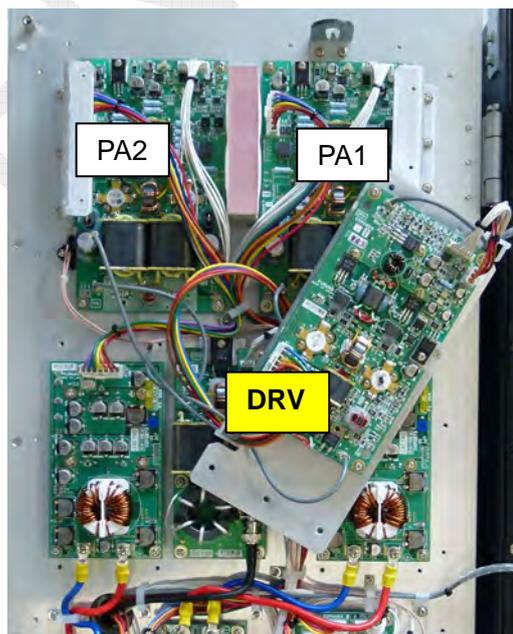
5.7.2 DRV Board Adjustment (FS-2575, -5075)

Table 5.7.2 List of Adjustment Points on DRV Board

Model	Type of PA Board	Adjustment VR	Function	Adjusted Value
FS-5075	05P0866A	R79	PA IC bias adjustment	500 mA at 24V
		R78	DRIV (Q2-Q3) bias adjustment	100 mV at R21
		R77	PRE-DRIV (Q1) bias adjustment	75 mV at R11/87
FS-2575	05P0866B	Same as above	Same as above	Same as above



FS-2575 DRV Board Arrangement



FS-5075 DRV Board Arrangement

Fig. 5.7.10 DRV Board Arrangement

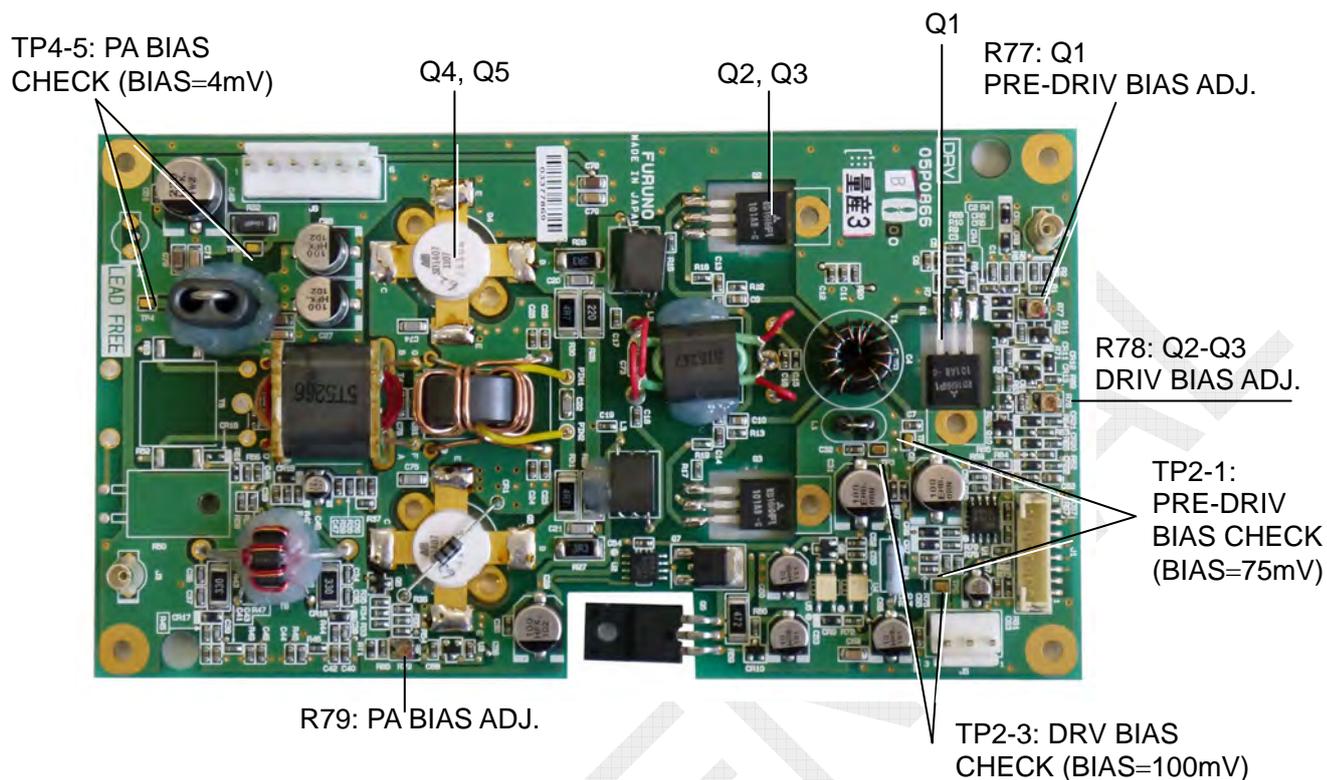


Fig. 5.7.11 DRV Board (05P0866A, B)

1. DRV Board: PA transistor (Q4-Q5) BIAS adjustment (FS-2575, -5075)

Procedure-1) Making measurement with ammeter

1. Turn OFF the power supply, and then connect a 1A/DC ammeter to the 24V line between #1 and #3 of J6 of the PA Vcc connector.

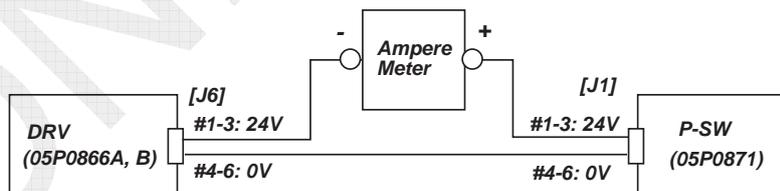


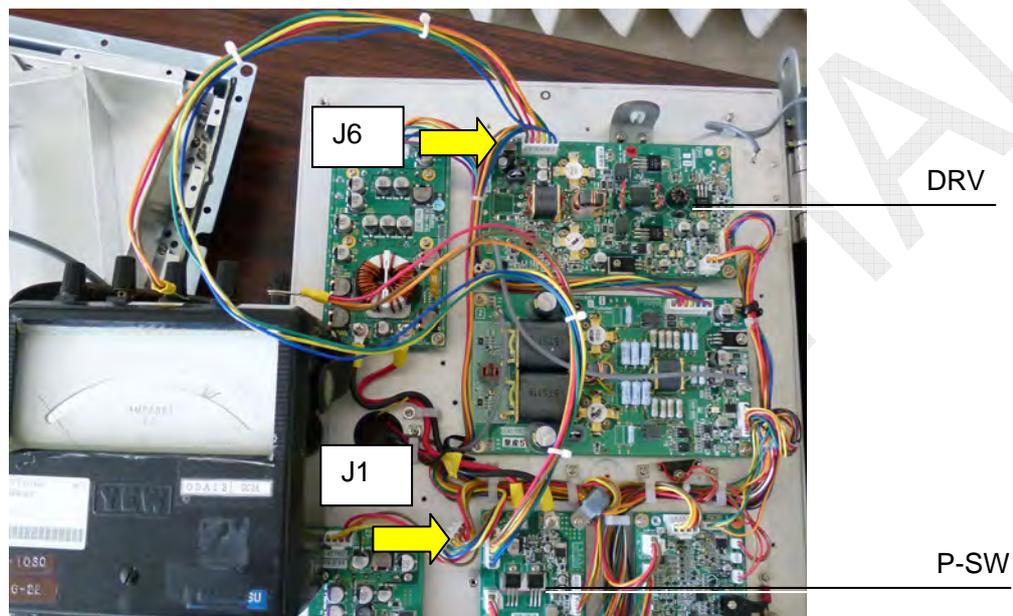
Fig. 5.7.12 DRV Board: Q4-Q5 BIAS Measurement Circuit

2. Disconnect the [J1: TX OUT] connector from the TX board.
3. Turn ON the power supply, and then press the PTT on the handset to put the system into a TX state.

4. Make adjustment of the “R79” variable resistor so that PA BIAS current (i.e., DC ammeter reading) will come to “500 mA.”

Note)

Required BIAS current is 400 mA. However, adjust the “R79” to 500 mA taking into account a current flowing through the BIAS circuit.



Procedure-2) Converting voltage to current

Bias current can be converted from a voltage applied to the “R32” series resistor in the PA Vcc line instead of using the said ammeter.

1. Turn OFF the power supply, and then disconnect the [J1: TX OUT] connector from the TX board.
2. Turn ON the power supply, and then press the PTT on the handset to put the system into a TX state.

3. Make measurement of voltage between TP4 and T5, and then make adjustment of the “R32” so that the voltage will come to 4mVDC.

Reference)

For the voltage between TP4 and TP5, a voltage applied to the 0.01 ohm resistor “R32” is measured.

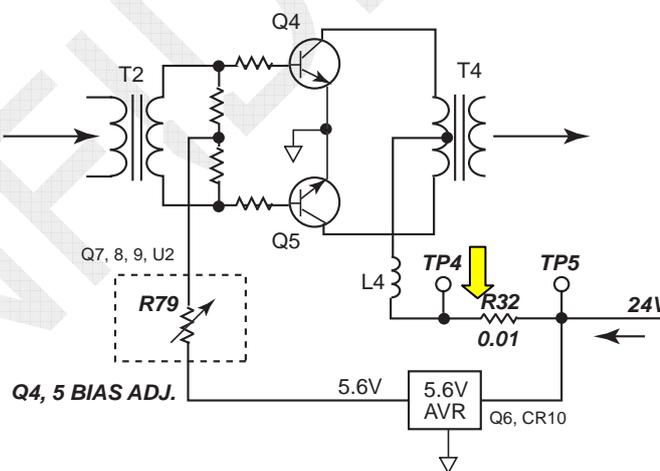
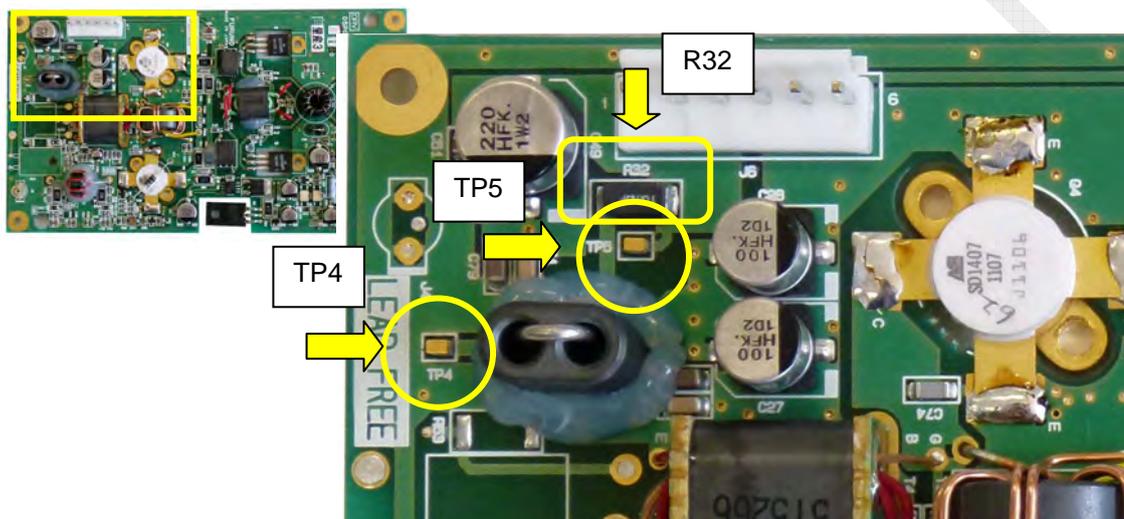


Fig. 5.7.13 DRV Board: Q4-Q5 BIAS Circuit

2. DRV Board: DRV transistor (Q2-Q3) BIAS adjustment (FS-2575, -5075)

Procedure)

1. Turn OFF the power supply, and then disconnect the [J1: TX OUT] connector from the TX board.
2. Turn ON the power supply, and then press the PTT on the handset to put the system into a TX state.
3. Make measurement of voltage between TP2 and TP3, and then make adjustment of the “R78” so that the voltage will come to 100 mVDC. BIAS current is 450 mA.

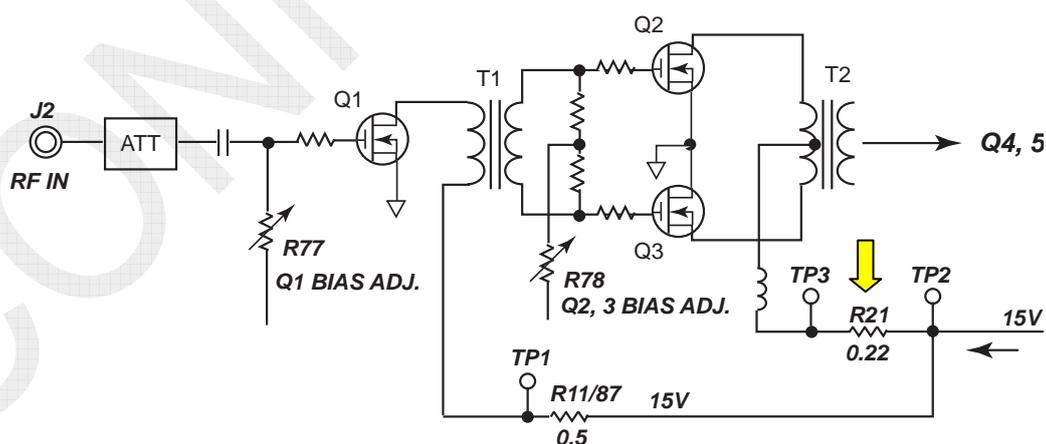
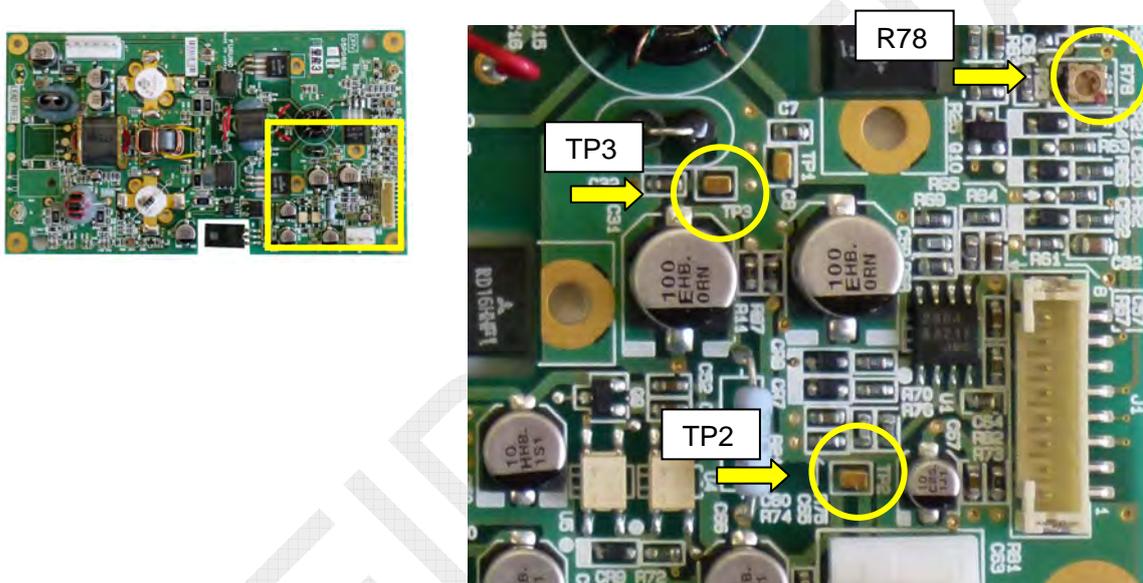


Fig. 5.7.14 DRV Board: Q2-Q3 BIAS Circuit

3. DRV Board: PRE-DRV transistor (Q1) BIAS adjustment (FS-2575, -5075)

Procedure)

1. Turn OFF the power supply, and then disconnect the [J1: TX OUT] connector from the TX board.
2. Turn ON the power supply, and then press the PTT on the handset to put the system into a TX state.
3. Make measurement of voltage between TP1 and TP2, and then make adjustment of the “R77” so that the voltage will come to 75 mVDC. BIAS current is 150 mA.

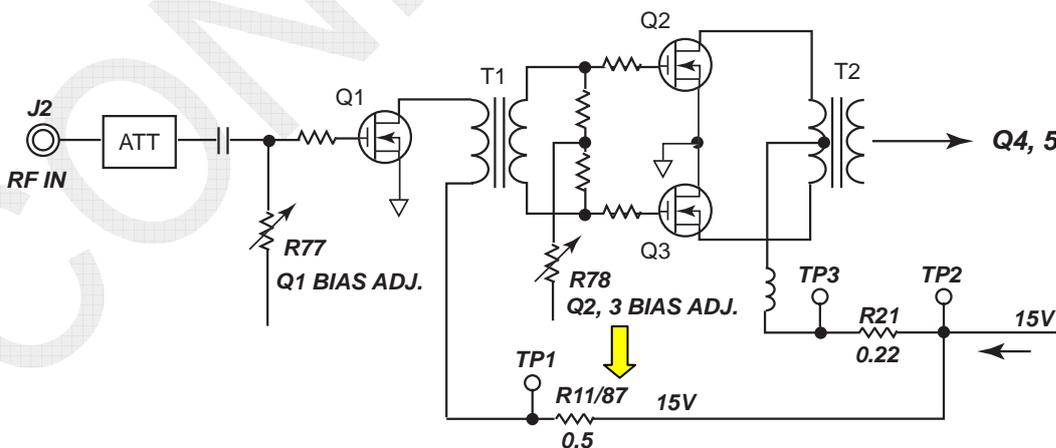
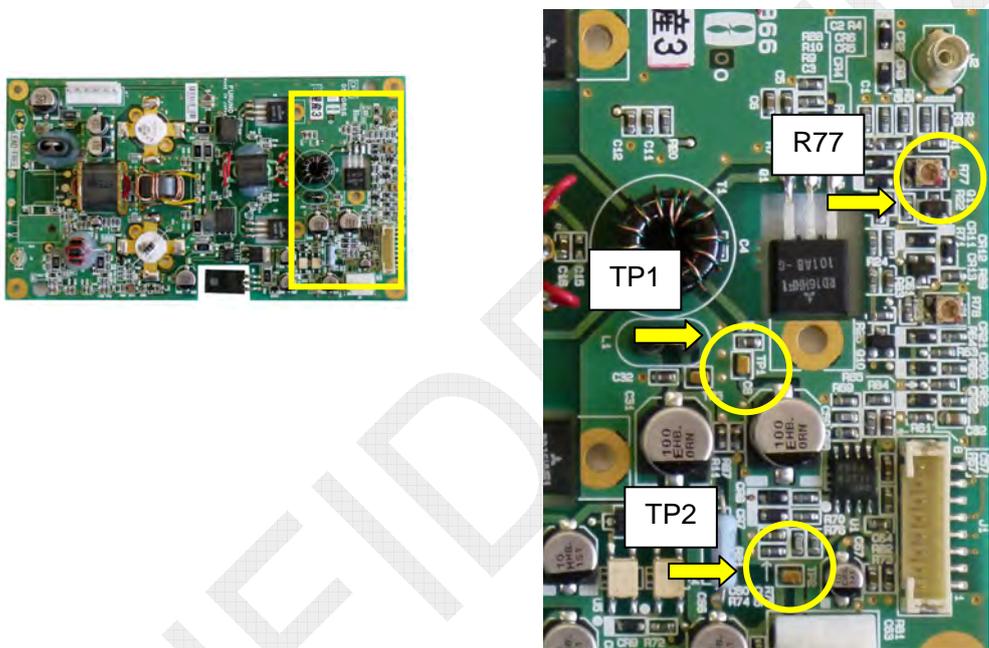


Fig. 5.7.15 DRV Board: Q1 BIAS Circuit

5.7.3 TX Board Adjustment: 05P0856 (FS-1575, -2575, -5075)

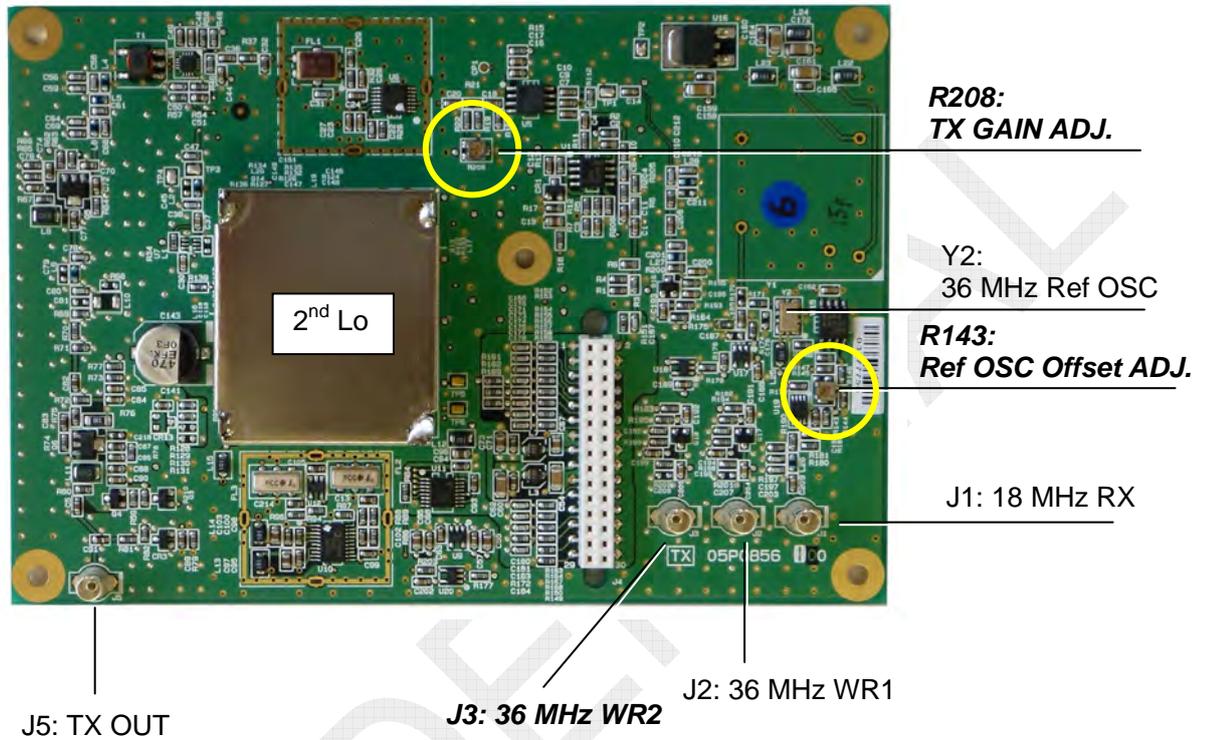


Fig. 5.7.16 TX Board (05P0856)

1. 36 MHz REF OSC frequency offset adjustment: R143

The 36 MHz REF OSC (reference oscillator) circuit is incorporated in the TX board and the reference oscillating frequency is taken as the reference frequency for the PLL circuit of TX, RX, WR1, and WR2.

“R143” is pre-adjusted by setting “REF OSC” to “0” so that the 36 MHz REF OSC output frequency will come to “36 MHz ± 1 Hz.” To make field adjustment of frequency, select [MENU] -> 9.SERVICE -> 3.RT SETUP -> 1.SETUP -> “REF OSC.”

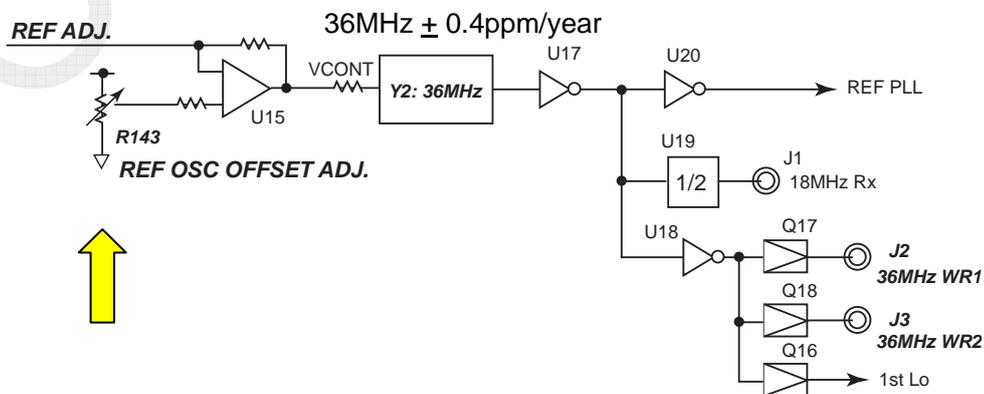


Fig. 5.7.17 REF OSC Block Diagram

Procedure)

1. Terminate the [J3: 36MHz WR2] on the TX board with a 50 ohm dummy load, and then connect a frequency counter to each end of the dummy resistor. It is also accepted to terminate the [J2: 36MHz WR1] instead of the [J3: 36MHz WR2].
2. Select [MENU] -> 9.SERVICE -> 3.RT SETUP -> 1.SETUP -> "REF OSC" -> "0."



3. Make adjustment of "R143" so that frequency will come to "36 MHz \pm 1 Hz."

Reference)

Output power level at a 36 MHz frequency from [J3: 36MHz WR2] and [J2: 36MHz WR1] is 400 mVp-p with a 50 ohm load, and output power level at a 18 MHz frequency from [J1: 18MHz RX] is also 400 mVp-p.

2. TX GAIN adjustment: R208

Make MIC gain adjustment so that the FS-xx75T will output power of one-fourth of the rated output power in the 12 MHz frequency range of SSB mode when the MIC input level is "-46 dBm/600 ohms."

The rated output of microphone is "-36 dBm/600 ohms."

Rated output adjustment is made with the "R43" ALC variable resistor on the TX FIL board.

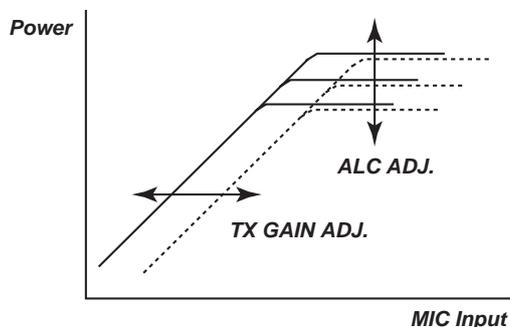
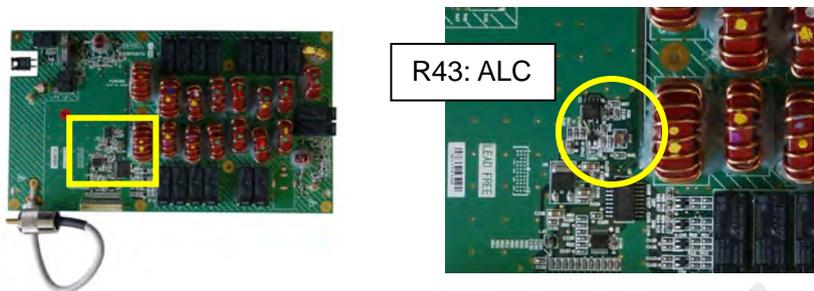


Fig. 5.7.18 Relationship between ALC and TX GAIN

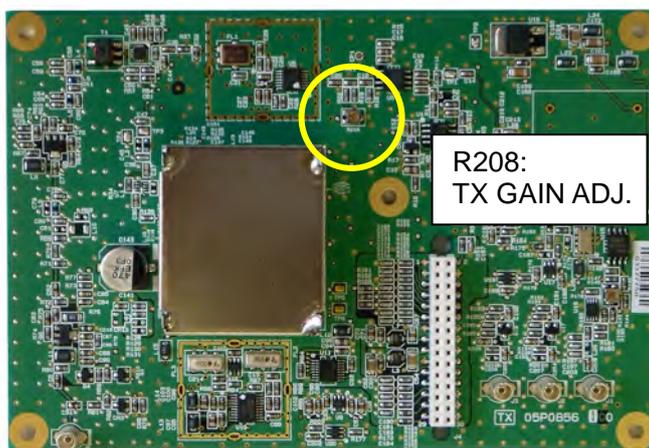
9. Make adjustment of TX output power to the rated output power with the “R43” ALC variable resistor on the TX FIL board.



TX FIL Board for FS-2575 and FS-5075



TX FIL Board for FS-1575



Board for FS-1575, FS-2575, and FS-5075

Fig. 5.7.20 TX FIL Board and TX Board

5.7.4 TX FIL Board Adjustment

- 05P0870A: FS-5075
- 05P0870B: FS-2575
- 05P0876: FS-1575

Make adjustment of the “R43” ALC variable resistor so that the output power of the FS-xx75 will come to the rated output power.

After completion of the ALC adjustment, ensure the TX GAIN adjustment.

For details, refer to “2. TX GAIN adjustment” in “5.7.3 TX Board Adjustment” on page 5-46.

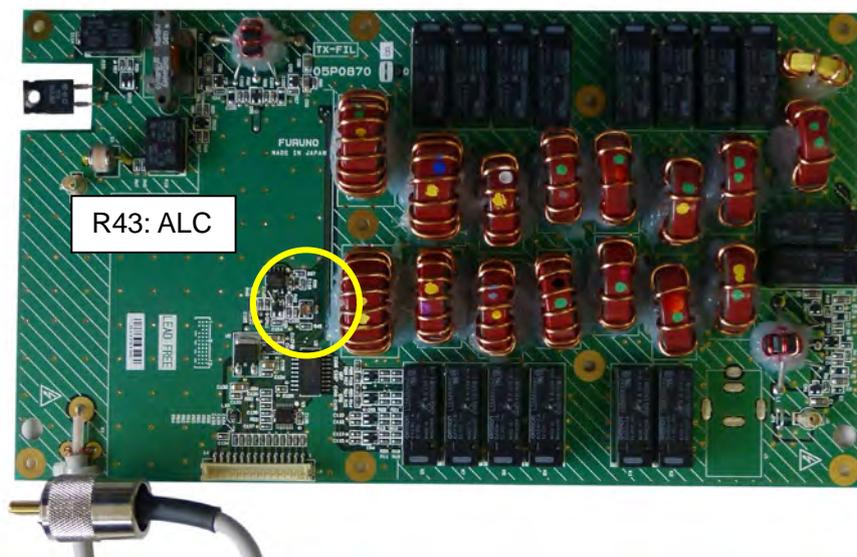


Fig. 5.7.21 TX FIL Board (05P0870A, B): FS-2575 and FS-5075

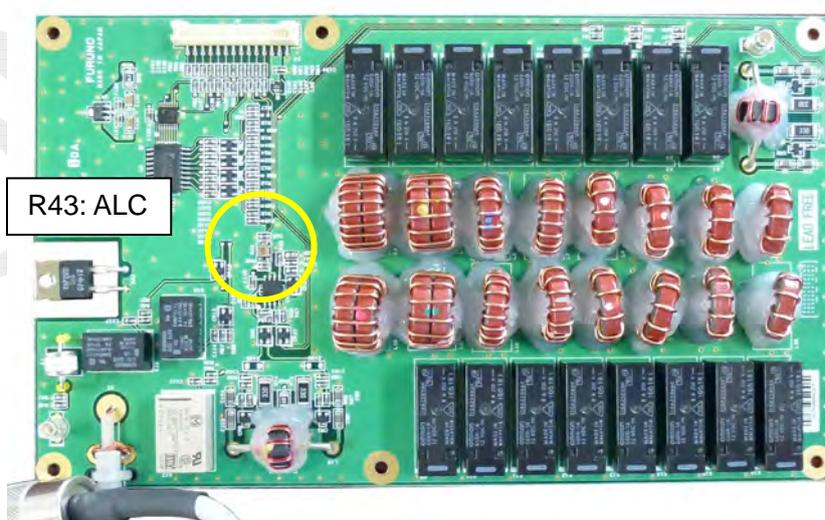
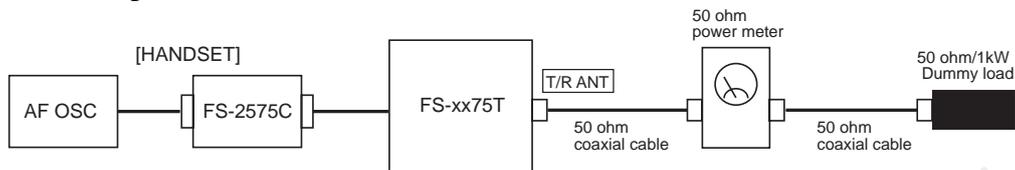


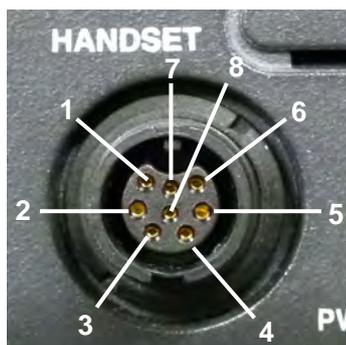
Fig. 5.7.22 TX FIL Board (05P0876): FS-1575

Procedure)

1. Connect a power meter and AF GEN as shown below.



1. GND
2. PTT
3. MIC_H
4. MIC_C
5. SP_H
6. HOOK_N
7. 15V
8. GND



To transmit, short-circuit between 1: Ground and 2: PTT of the handset connector.

Fig. 5.7.23 ALC Adjustment Circuit

2. Select [MENU] -> 9.SERVICE -> 3.RT SETUP -> 1.SETUP -> "TX TUNE" -> "OFF."
3. Select [MENU] -> 9.SERVICE -> 3.RT SETUP -> 4.TX POWER (FREQ) to open the "TX POWER (FREQ)" window, and then make setting as shown below on this window:
 - TX MODE to "SSB"
 - TX FREQ to "12.5 MHz"
 - TX POWER to "HIGH"
 - TX POWER ADJ to "240" (Factory set)
 - TX TONE to "OFF"
4. Set the "R43" ALC variable resistor on the TX FIL board to Max. (CW to Max. power) and the TX GAIN variable resistor "R208" on the TX board to Min. (CW to Min. power).
5. Set AF GEN output to "1500 Hz/-46 dBm", and start transmitting (PTT ON).
6. Make adjustment of transmission output power with the "R208" TX GAIN variable resistor on the TX board so that it will come to one-fourth of the rated output power.
7. Set the "R43" ALC variable resistor on the TX FIL board to Min. (CW to Min. power).
8. Set AF GEN output to "1500 Hz/-36 dBm/600 ohms", and start transmitting (PTT ON).
9. Make adjustment of transmission output power to the rated output power with the "R43" ALC variable resistor on the TX FIL board.

Field Adjustment

When making field adjustment, if no AF GEN is available, it is acceptable to make TX output power adjustment by selecting [MENU] -> 9.SERVICE -> 3.RT SETUP -> 4.TX POWER (FREQ) -> TX TONE -> “1500 Hz”.

Procedure)

1. Connect a power meter to the [T/R ANT] terminal of the FS-xx75T.
2. Select [MENU] -> 9.SERVICE -> 3.RT SETUP -> 4.TX POWER (FREQ) to open the “TX POWER (FREQ)” window, and then make setting as shown below on this window:
 - TX MODE to “SSB”
 - TX FREQ to “12.5 MHz”
 - TX POWER to “HIGH”
 - TX POWER ADJ to “240” (Factory set)
 - TX TONE to “1500Hz”
3. Press the PTT on the handset to transmit.
4. At this time, make adjustment of the “R43” ALC variable resistor on the TX FIL board so that the output power of the FS-xx75 will come to the rated output power.

Reference)

Make ALC adjustment in the 12 MHz frequency range with low PA gain.

In frequency ranges with high PA gain, the ALC works to suppress the gain of IF AMP on the TX board in order to maintain set TX output power.

Consequently, if TX output power adjustment is made through the adjustment of ALC, TX output power will fluctuate in all frequency bands. It can be said that the ALC adjustment is effective in making general adjustment of TX output power.

Furthermore, to make adjustment of TX output power in a specific frequency band, select [MENU] -> 9.SERVICE -> 3.RT SETUP -> “TX POWER (FREQ)” or “TX POWER (USER CH).”

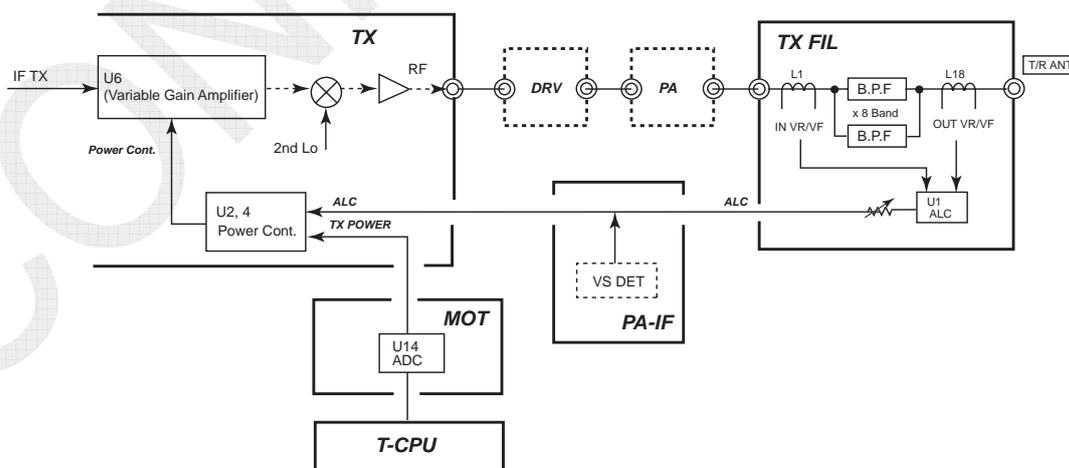


Fig. 5.7.24 ALC Control Circuit Diagram

5.7.5 PA-IF Board Adjustment

- 05P0846: FS-2575 and FS-5075
- 05P0846A: FS-1575

The “R3” on the PA-IF board is used to make adjustment of reading of power supply input voltage “VS.”

Make adjustment of the “R3” so that “VS” reading will come to the power supply input voltage of the FS-xx75T.

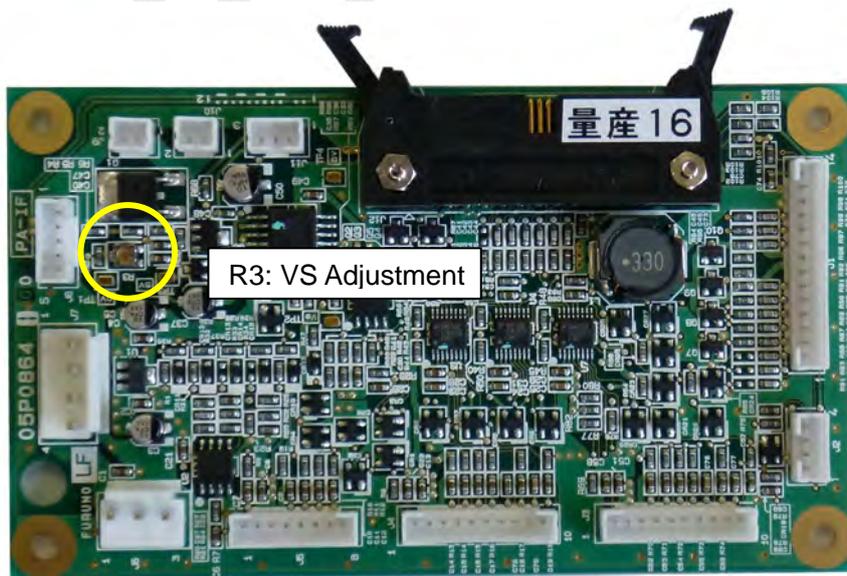
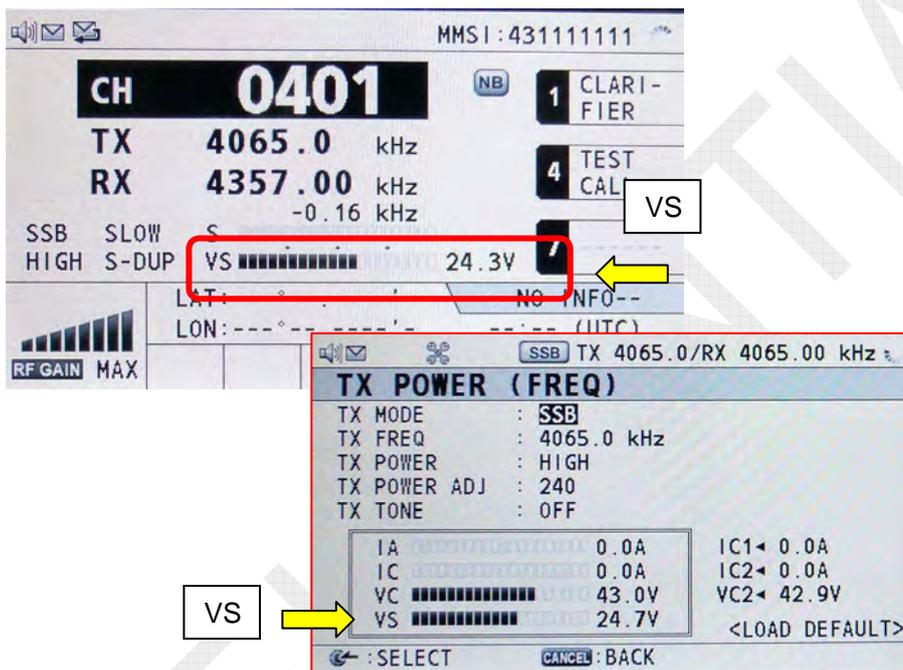


Fig. 5.7.25 PA-IF Board

5.7.6 COUP: 05P0875 (FS-2575 and FS-5075)

Variable resistors on the COUP boards of the ATU are used to make adjustment of “IA” ; antenna current.

Connect a 10 ohm + 250 pF dummy load to the ATU, and then make adjustment of the “R21” IA ADJ. variable resistor so that an Antenna current flowing through the dummy load in the 2 MHz will come to the IA reading.

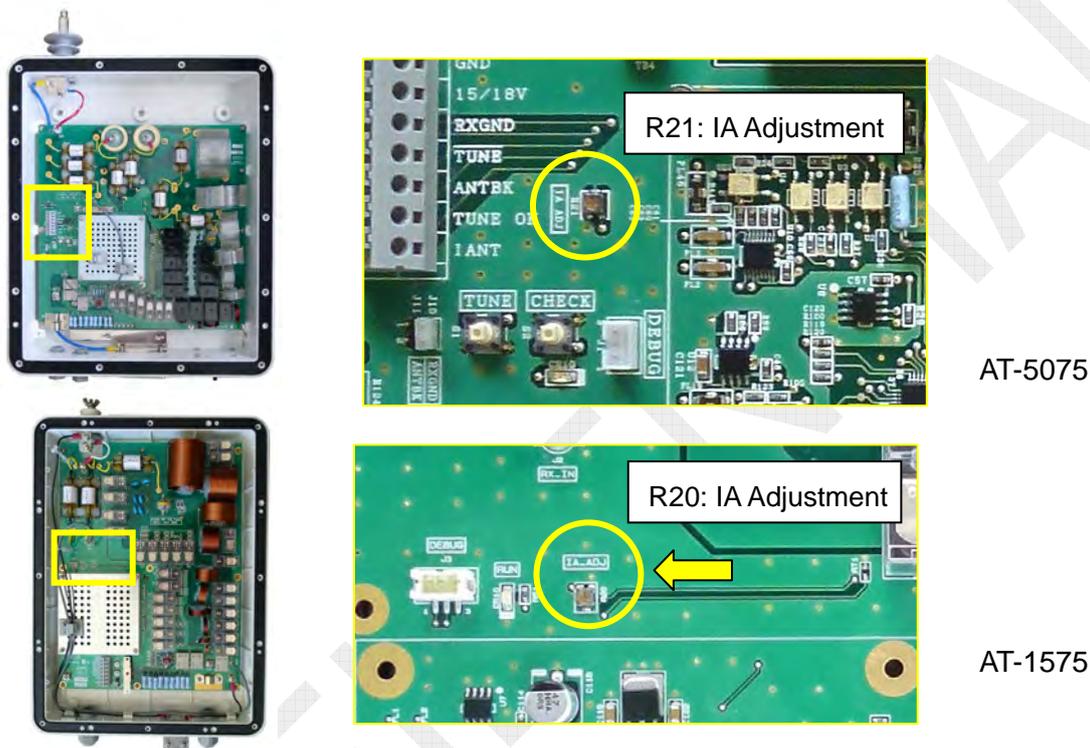


Fig. 5.7.26 Location of ATU IA ADJ. Variable Resistors

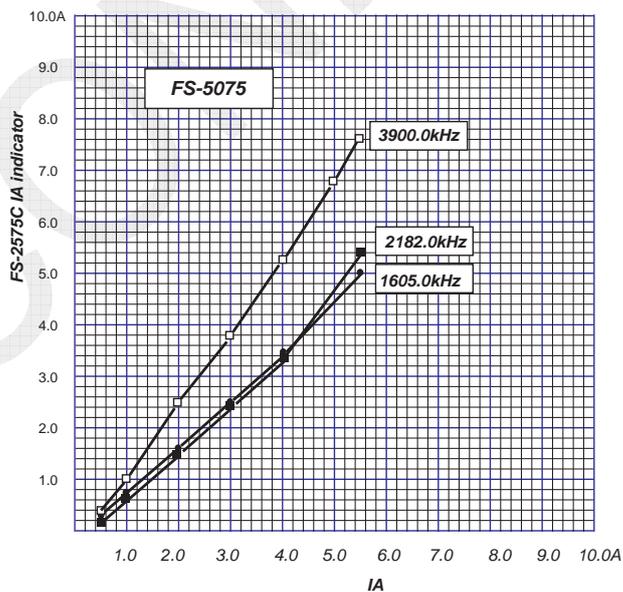


Fig. 5.7.27 Example of IA Reading Characteristics

5.8 Reception Testing

5.8.1 Reception Gain and S/N Ratio Measuring

1. J3E reception gain measuring

- 1) Set a frequency to be measured, and then set RF gain to Max., AF gain to Max., and AGC to ON (FAST).
- 2) Add a “Measured frequency + 1 kHz” signal generated by SSG to find a SSG signal level at which the AF signal will come to standard output of 1 watt.

2. J3E S/N 20dB measuring

If no distortion meter is available, connect a low-frequency voltmeter in place of distortion meter to make measurement of “S/N 20dB sensitivity” which is almost the same measurement value as SINAD.

To make measurement of “S/N (20dB) = $20\log_{10} V_{\text{signal}} / V_{\text{noise}}$,”

- 1) Set a frequency to be measured, set RF gain to Max. and AGC to ON (FAST), and then make adjustment of AF gain to set noise level output to 100 mVrms.
- 2) Add a “Measured frequency + 1 kHz” signal generated by SSG to find a SSG signal level at which the AF signal output power will come to 1V.

3. J3E AGC measuring

- 1) Set a frequency to be measured, set RF gain to Max. and AGC to ON (FAST), and then make adjustment of AF gain to set AF signal to an appropriate level.
- 2) Add a “Measured frequency + 1 kHz” signal generated by SSG to find a SSG signal level at which the AF signal output power will no longer increase.

5.8.2 Measurement Circuits

Signal receiving paths vary with system settings. For details, refer to information on page 4-73.

1. When not passing signal through DIVIDER circuit on RX FIL board

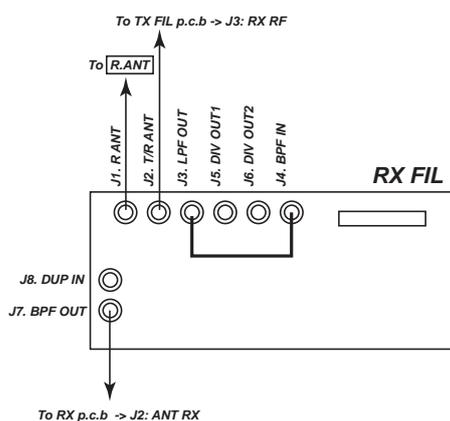


Fig. 5.8.1 FS-1575, -2575, -5075

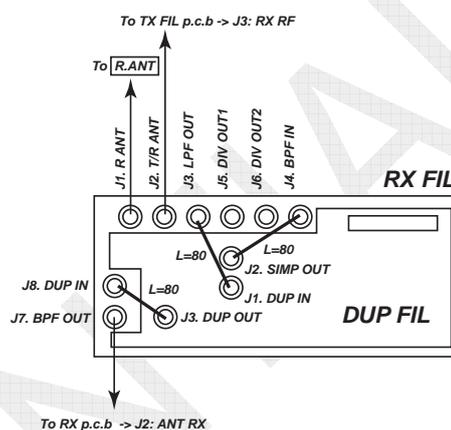


Fig. 5.8.2 FS-5075 DUPLEX

1.1) When receiving from [T/R ANT]: FS-1575, -2575, -5075

Setting Procedure	Setting
[MENU] -> 9. SERVICE -> 3. RT SETUP -> 1. SETUP -> <u>RX ANT</u>	DISCONNECT
[MENU] -> 5. SYSTEM -> 7. RX SETUP -> 2. ANT SELECT	Not allowed
[MENU] -> 9. SERVICE -> 3. RT SETUP -> 1. SETUP -> <u>DIVIDER</u>	OFF

1.2) When receiving from [T/R ANT]: FS-1575, -2575, -5075

Setting Procedure	Setting
[MENU] -> 9. SERVICE -> 3. RT SETUP -> 1. SETUP -> <u>RX ANT</u>	CONNECT
[MENU] -> 5. SYSTEM -> 7. RX SETUP -> 2. ANT SELECT	TRX ANT
[MENU] -> 9. SERVICE -> 3. RT SETUP -> 1. SETUP -> <u>DIVIDER</u>	OFF

1.3) When receiving from [R. ANT]: FS-1575, -2575, -5075

Setting Procedure	Setting
[MENU] -> 9. SERVICE -> 3. RT SETUP -> 1. SETUP -> <u>RX ANT</u>	CONNECT
[MENU] -> 5. SYSTEM -> 7. RX SETUP -> <u>2. ANT SELECT</u>	RX ANT
[MENU] -> 9. SERVICE -> 3. RT SETUP -> 1. SETUP -> <u>DIVIDER</u>	OFF

2. When passing signal through DIVIDER circuit on RX FIL board

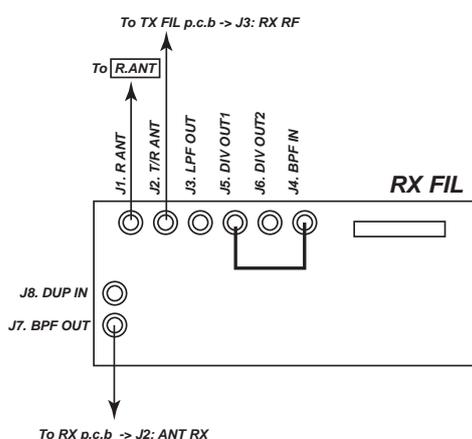


Fig. 5.8.3 FS-1575, -2575, -5075

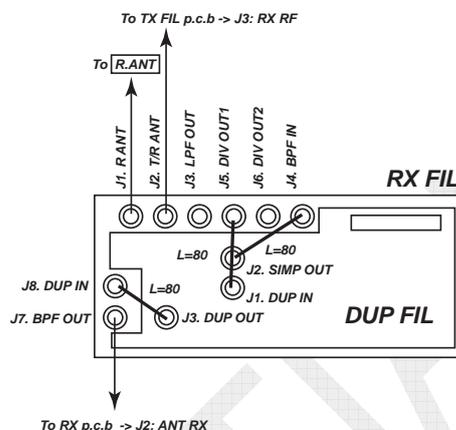


Fig. 5.8.4 FS-5075 DUPLEX

Note)

Circuits are the same for DIVIDER output level 1 and 2. When “DIVIDER” is set to “ON,” the [LPF OUT] output level will drop. Consequently, the [LPF OUT] cannot be used as received signal input port.

2.1) When receiving from [T/R ANT]: FS-1575, -2575, -5075

Setting Procedure	Setting
[MENU] -> 9. SERVICE -> 3. RT SETUP -> 1. SETUP -> <u>RX ANT</u>	DISCONNECT
[MENU] -> 5. SYSTEM -> 7. RX SETUP -> 2. ANT SELECT	Not allowed
[MENU] -> 9. SERVICE -> 3. RT SETUP -> 1. SETUP -> <u>DIVIDER</u>	OFF

2.2) When receiving from [T/R ANT]: FS-1575, -2575, -5075

Setting Procedure	Setting
[MENU] -> 9. SERVICE -> 3. RT SETUP -> 1. SETUP -> <u>RX ANT</u>	CONNECT
[MENU] -> 5. SYSTEM -> 7. RX SETUP -> 2. ANT SELECT	TRX ANT
[MENU] -> 9. SERVICE -> 3. RT SETUP -> 1. SETUP -> <u>DIVIDER</u>	OFF

2.3) When receiving from [R. ANT]: FS-1575, -2575, -5075

Setting Procedure	Setting
[MENU] -> 9. SERVICE -> 3. RT SETUP -> 1. SETUP -> <u>RX ANT</u>	CONNECT
[MENU] -> 5. SYSTEM -> 7. RX SETUP -> <u>2. ANT SELECT</u>	RX ANT
[MENU] -> 9. SERVICE -> 3. RT SETUP -> 1. SETUP -> <u>DIVIDER</u>	OFF

5.8.3 Reception Specifications

Regardless of whether or not passing signal through the DIVIDER circuit on the RX FIL board, the reception specifications are about the same.

Table 5.8.1 Reception Specification with DIVIDER set to "OFF"

Item	Input Port	Standard	Condition
J3E Reception Gain	T/R ANT	5dBuV or less	AF Output (4 ohm load): Find SSG level at which output power comes to 1 watt. <ul style="list-style-type: none"> • Frequency (F): 4.1MHz • AF, RF Gain VR Max. • AGC ON (FAST) • SSG output: F+1kHz
	R.ANT	5dBuV or less	
	R.ANT DUP	13dBuV or less	
J3E 20dB SINAD	T/R ANT	7dBuV or less	Make adjustment of AF gain VR to set AF output power (with 4 ohm load applied) to 0.5 watts, and then make measurement of 20dB SINAD or 20dB S/N. <ul style="list-style-type: none"> • Frequency: 4.1MHz • RF Gain VR Max. • AGC ON (FAST) • SSG output: F+1kHz
	R.ANT	7dBuV or less	
	R.ANT DUP	15dBuV or less	
J3E AGC Operating Point	T/R ANT	7dBuV	Find SSG level at which the pointer of S-meter starts swinging. <ul style="list-style-type: none"> • Frequency: 4.1MHz • RF Gain VR Max. • AF Gain VR ADJ. • AGC ON(FAST) • SSG output: F+1kHz
	R.ANT	7dBuV	
	R.ANT DUP	15dBuV	

Chapter 6. Maintenance

6.1 [MENU] -> TEST

There are the following three types of self tests.

- [MENU] -> 1. TEST -> 1. DAILY TEST
- [MENU] -> 1. TEST -> 2. TX SELF TEST
- [MENU] -> 9. SERVICE -> 3. RT SETUP -> 2. SELF CHECK

When selecting “2. SELF CHECK” from the SERVICE menu, data detected from TX SELF TEST will be displayed.

Table 6.1.1 Overview of Self-test

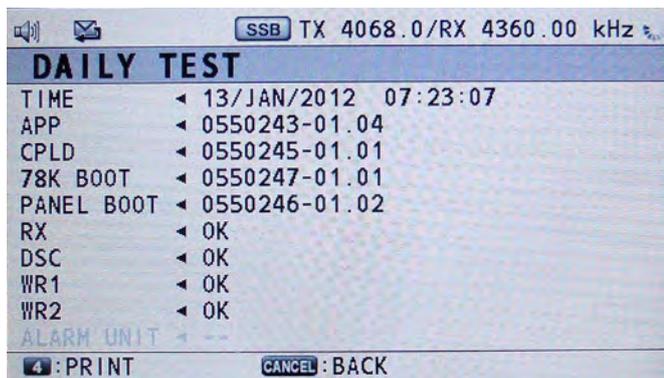
Test Item	DAILY TEST	TX SELF TEST	SELF CHECK	Board to be Checked	FS-1575	FS-2575	FS-5075	Remark
RX	Yes	No	No	RX	Yes	Yes	Yes	
DSC	Yes	No	No	T-CPU	Yes	Yes	Yes	
WR1	Yes	No	No	WR1	Yes	Yes	Yes	
WR2	Yes	No	No	WR2	Yes	Yes	Yes	Conduct tests when WR2 is mounted.
ALARM UNIT	Yes	No	No	IC-350	Yes	Yes	Yes	Conduct tests when IC-350 is connected.
SW_REG1	No	Yes	Yes	SW-REG		YES	Yes	
SW_REG2	No	Yes	Yes	SW-REG			Yes	
CODEC	No	Yes	Yes	TX	Yes	Yes	Yes	
TX PLL	No	Yes	No	TX	Yes	Yes	Yes	
TX	No	Yes	Yes	TX	Yes	Yes	Yes	
DRV	No	Yes	Yes	DRV		Yes	Yes	
PA	No	Yes	Yes	PA-1	YES	Yes	Yes	
		Yes	Yes	PA-2			Yes	
COMB	No	Yes	Yes	COMB			Yes	
TX-FIL	No	Yes	Yes	TX FIL	Yes	Yes	Yes	
COUPLER	No	Yes	No	COUP	Yes	Yes	Yes	Check cables for continuity.
VS	No	No	Yes	PA-IF	Yes	Yes	Yes	Check for power supply input voltage.

Besides the tests listed above, selecting [MENU] -> 9.SERVICE -> 5.TEST -> 6. MAINTENANCE LOG allows for checking I/O MONITOR and related maintenance log.

Test items are implemented following the verification of model. Models are verified when turning ON the power supply in accordance with the presence or absence of COMB board (for FS-5075) and the type of PA-IF board (05P0864 for FS-2575/5075 05P0864A for FS-1575) in combination.

6.1.1 DAILY TEST

To open the “DAILY TEST” menu window, select [MENU] -> 1.TEST -> 1.DAILY TEST. DAILY TEST is conducted in descending order displayed on the window. Even if “NG” is detected in the course of any daily test, the test in progress will be conducted to the end.



To print out daily test results, press the [4] key.

Table 6.1.2 Programs Displayed on DAILY TEST Window

Program Name	Function
TIME	Displays date and time on and at which the DAILY TEST was conducted.
APP	Displays the version of FS-xx75 application program.
CPLD: Complex Programmable Logic Device	Displays the program version of a device that converts serial data from T-CPU into parallel format to control circuits. This program is incorporated in the T-CPU board. The version remains unchanged even if the program is updated. The program is written at factory and not allowed for any change.
78K BOOT	Displays the version of backup BOOT program for 78K CPU (used for NBDP). This program is incorporated in the T-CPU board. The version remains unchanged even if the program is updated. The program is written at factory and not allowed for any change.
PANEL BOOT	Displays the version of C-CPU backup BOOT program for C-CPU used for the FS-2575C unit. This program is incorporated in the C-CPU board. The version remains unchanged even if the program is updated. The program is written at factory and not allowed for any change.
RX	Displays self-test results, respectively. For details, refer to information on the following page.
DSC	
WR1	
WR2	
ALARM UNIT	

Reference)

Program versions can also be verified by selecting [MENU] -> 9.SERVICE -> 5.TEST -> 1.VERSION. For details, refer to information on page 6-23.

1. RX

The output frequency of the 1st Local signal in J2B mode is “ $F_c + 53.964 \text{ MHz}$.” When conducting a DAILY TEST, F_c is set to “0 MHz” to output a frequency of “ $0 \text{ MHz} + (53.964 \text{ MHz} \pm 85 \text{ Hz})$.” Consequently, since the output frequency of the 2nd Local signal is 54 MHz, the 2nd IF (IF RX) signal is given as “ $36 \text{ kHz} \pm 85 \text{ Hz}$.” These two signals, i.e., mark tone signal and space tone signal, are inputted in the T-CPU board. The receiver is determined to be OK when both tone signals can be detected by the RX test. The signals are checked at a level of approximately 60 dBuV in antenna input equivalent.

Note) The above means that the test on the 1st IF signal is conducted with the 1st Local signal leakage. Consequently, a circuit from the RX board antenna input to the 1st MIX is not checked.

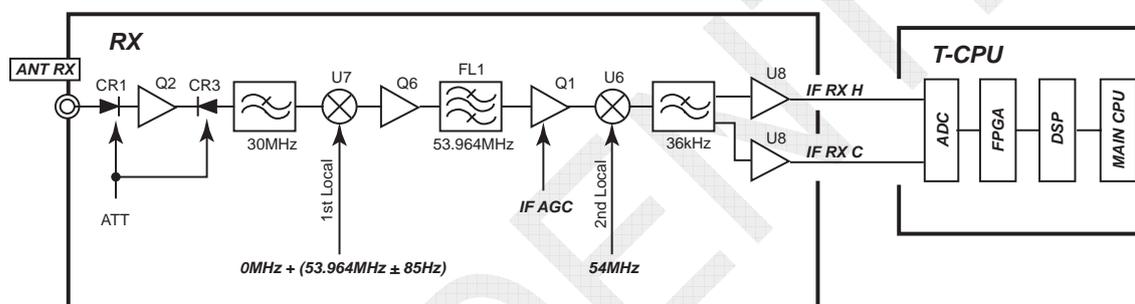


Fig. 6.1.1 RX Test Circuit Diagram

2. DSC

This test menu is used to check for communications between the DSP (digital signal processor) and the MAIN CPU. DSC test is determined to be OK when data from the DSP is detected in the MAIN CPU.

3. WR1

The output frequency of the 1st Local signal is “ $F_c + 35.964 \text{ MHz}$.” When conducting a daily test, F_c is set to “0 MHz” to output a frequency of “ $0 \text{ MHz} + (35.964 \text{ MHz} \pm 85 \text{ Hz})$.” Consequently, since the output frequency of the 2nd Local signal is 36 MHz, the 2nd IF (IF RX) signal is given as “ $36 \text{ kHz} \pm 85 \text{ Hz}$.” These two signals, i.e., mark tone signal and space tone signal, are inputted in the T-CPU board. The WR1 watch receiver is determined to be OK when both tone signals can be detected by the WR1 test. The signals are checked at a level of approximately 60 dBuV in antenna input equivalent.

Note)

The above means that the tests on the 1st IF signal are conducted with the 1st LOCAL signal leakage. Consequently, a circuit from the WR1 board antenna RF circuit to the 1st MIX circuit is not checked.

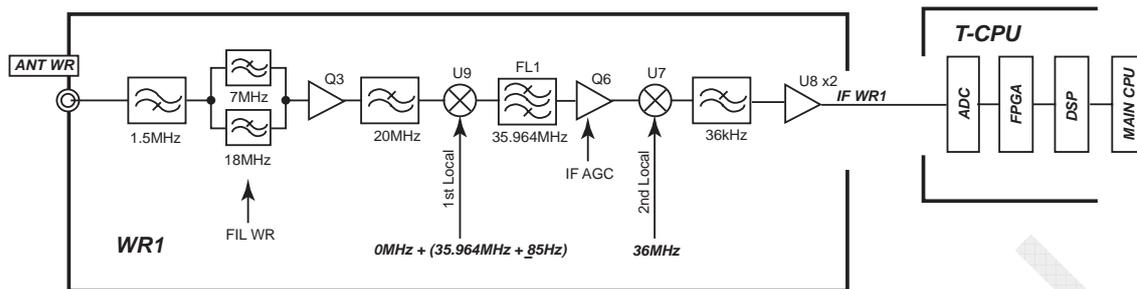


Fig. 6.1.2 WR1 Test Circuit Diagram

4. WR2

The output frequency of the 1st Local signal is “Fc + 44.964 MHz.”

When conducting a daily test, Fc is set to “0” MHz to output a frequency of “0 MHz + (44.964 MHz ± 85 Hz).”

Since the output frequency of the 2nd local signal is 45 MHz, the 2nd IF (IF RX) signal is given as “36 kHz ± 85 Hz.”

These two signals, i.e., mark tone signal and space tone signal, are inputted in the T-CPU board. The WR2 watch receiver is determined to be OK when both tone signals can be detected by the WR2 test. The signals are checked at a level of approximately 60 dBuV in antenna input equivalent.

Note)

The above means that the tests on the 1st IF signal are conducted with the 1st LOCAL signal leakage. Consequently, a circuit from the WR2 board antenna RF circuit to the 1st MIX is not checked.

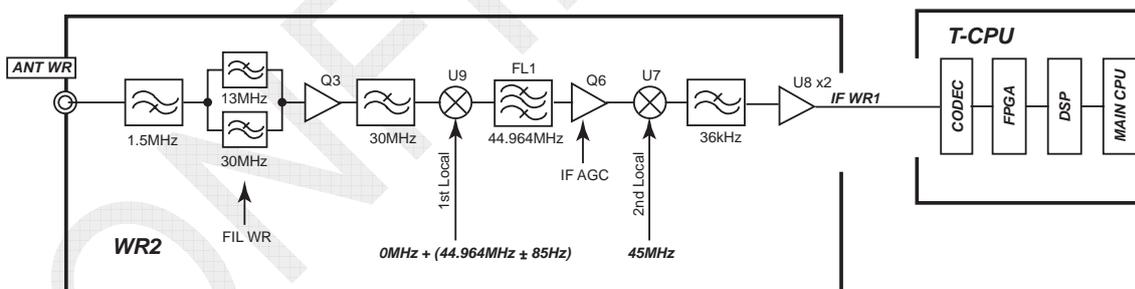


Fig. 6.1.3 WR2 Test Circuit Diagram

5. ALARM UNIT: IC-350

This test menu will be enabled when selecting [MENU] -> 9.SERVICE -> 7.OTHER -> 2.ALARM UNIT -> “CONNECT.”

The alarm unit : the IC-350 tests are conducted to ensure communication between IC-350 and T-CPU. The IC-350 is determined to be OK when the T-CPU transmits the “OPTD200” command to the IC-350 and the IC-350 responds to this command.

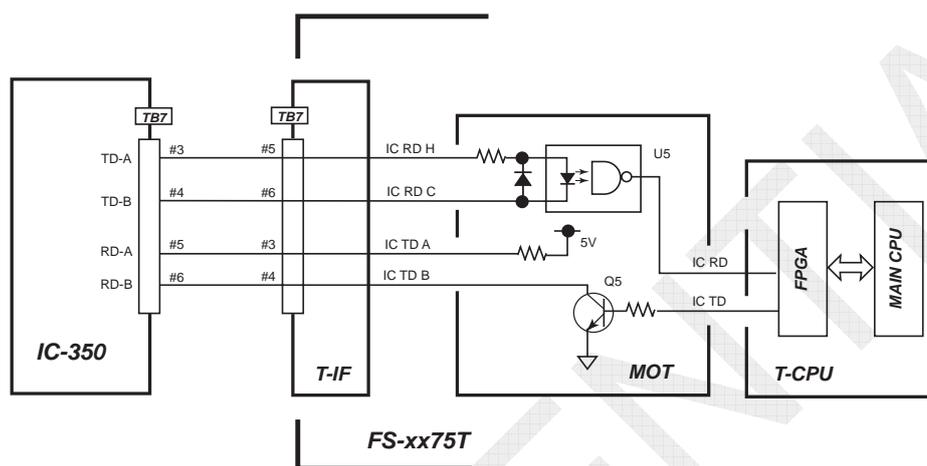


Fig. 6.1.4 ALARM UNIT Test Circuit Diagram

6.1.2 TX SELF TEST

TX SELF TEST is conducted in descending order displayed on the window. Even if “NG” is detected in the course of the self-test, the self-test in progress will be conducted to the end.

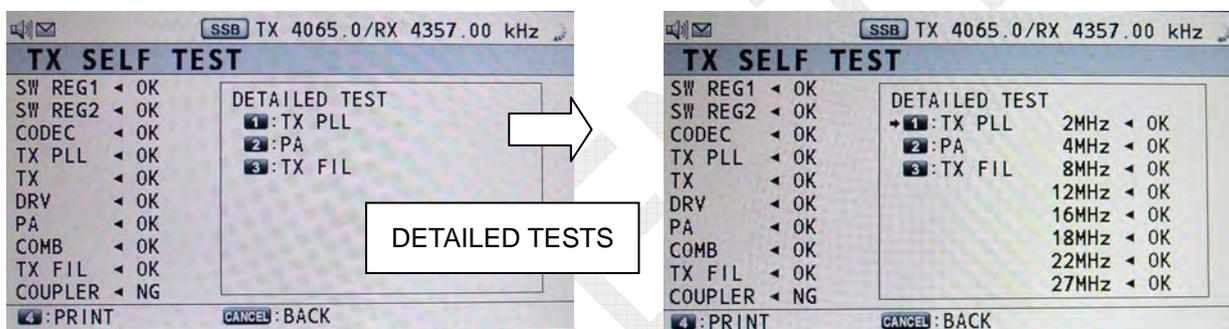
When clicking on any of the test item numbers displayed in the “DETAILED TEST” box on the “TX SELF TEST” window, the details of the test will appear in the box.

To check for detected level on the test, select [MENU] -> 9.SERVICE -> 3.RT SETUP -> 2.SELF CHECK.

For detailed acceptance thresholds, refer to information on page 6-15.

“FS-5075 TX SELF TEST” Window

Note) On the FS-1575 and FS-2575 TX SELF TEST windows, items not to be checked are left blank.



List of Check Items

Check Item	FS-1575	FS-2575	FS-5075
SW_REG1		✓	✓
SW_REG2			✓
CODEC	✓	✓	✓
TX_PLL	✓	✓	✓
TX	✓	✓	✓
DRV		✓	✓
PA-1(PA)	✓	✓	✓
PA-2			✓
COMB			✓
TX-FIL	✓	✓	✓
COUPLER	✓	✓	✓

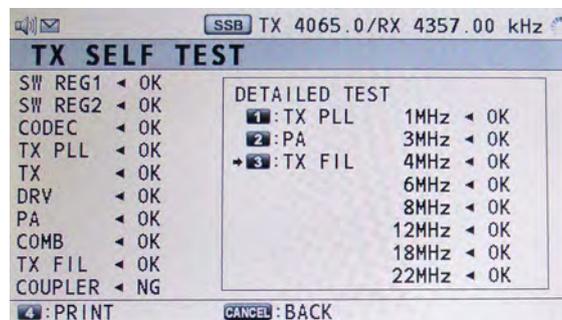
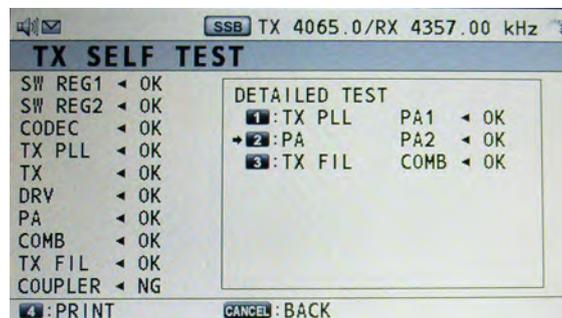


Table 6.1.3 States at SELF TEST

Check Item	Set Value						Set Value			
	TX ON (TX)	DA ON (DRV)	PA ON (PA1, 2)	BK ON (TX FIL)	CHECK ON (TX FIL)	TUNE (ATU)	PWR Data	MODE	IF TX	FREQ.
CODEC	OFF	OFF	OFF	OFF	ON	OFF	-	J2B	36kHz	-
TX PLL	OFF	OFF	OFF	OFF	ON	OFF	-	J2B	OFF	2, 4, 8, 12, 16, 18, 22, 27MHz
TX	ON	OFF	OFF	OFF	ON	OFF	240	J2B	36kHz	4MHz
DRV	ON	ON	ON	OFF	ON	OFF	FS-5075: 70 FS-2575: 80 FS-1575: xx (Equivalent to 20W)	J2B	36kHz	4MHz
SW REG 1 SW REG 2	OFF	OFF	OFF	OFF	ON	OFF		J2B	36kHz	4MHz
PA 1 PA 2	ON	ON	ON	OFF	ON	OFF		J2B	36kHz	4MHz
COMB	ON	ON	ON	OFF	ON	OFF		J2B	36kHz	4MHz
TX FIL	ON	ON	ON	OFF	ON	OFF		J2B	36kHz	1, 3, 4, 6, 8, 12, 18, 22MHz
COUPLER	OFF	OFF	OFF	OFF	ON	ON		-	J2B	OFF

Reference)

- 1) CHECK ON signal: 50 ohm Dummy Load ON

In order to up the accuracy of self-tests on the transmission circuit and prevent the radiation of radio waves, TX FIL output power is connected to the “R44” 51 ohm 35 W dummy load when conducting a self-test.

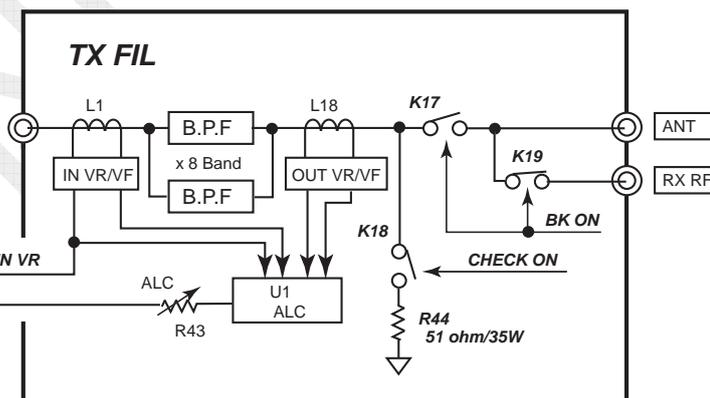


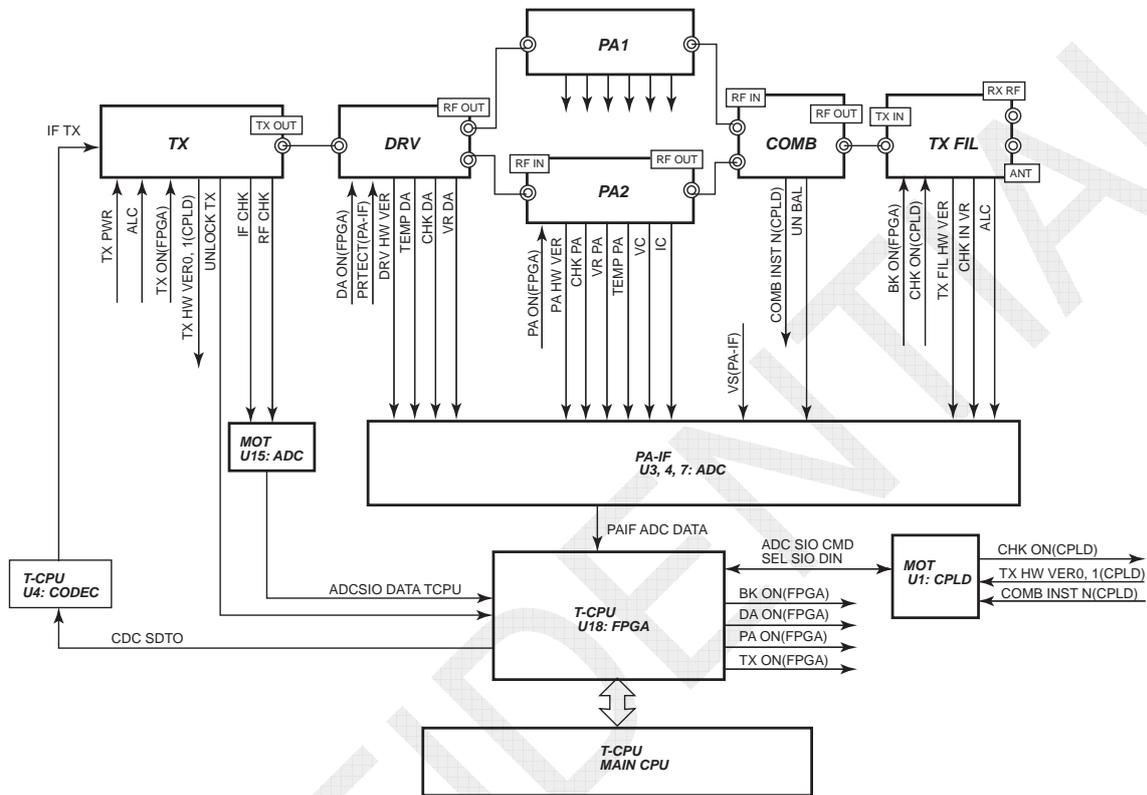
Fig. 6.1.5 TX FIL board CHK signal

- 2) TX ON, DA ON, PA ON signals

The “TX ON” signal puts the TX board into a transmission-ready state. The “DA ON” and “PA ON” signals turn ON the BIAS circuit of the DRV and PA boards.

The diagrams below show signals detected by the TX SELF TEST on the FS-5075 system.

The FS-2575 system has no PA2 and COMB boards, while the FS-1575 system has no DRV, PA2, and COMB boards.



- | | | |
|---------------------------|-------------------|--------------------|
| IN0 TX FIL: TX FIL HW VER | IN0 PA1: TEMP PA1 | IN0 PA2 : TEMP PA2 |
| IN1 PA1 : PA1 HW VER | IN1 PA1 : CHK PA1 | IN1 PA2 : CHK PA2 |
| IN2 PA2 : PA2 HW VER | IN2 PA1 : VC1 | IN2 PA2 : VC2 |
| IN3 DRV : DRV HW VER | IN3 PA1 : IC1 | IN3 PA2 : IC2 |
| IN4 : N.C | IN4 PA1 : VR PA1 | IN4 PA2 : VR PA2 |
| IN5 TX FIL : ALC | IN5 : N.C | IN5 DRV : TEMP DA |
| IN6 TX FIL : CHK IN VR | IN6 : VS | IN6 DRV : CHK DA |
| IN7 COMB : UN BAL | IN7 : N.C | IN7 DRV : VR DA |

PA-IF board

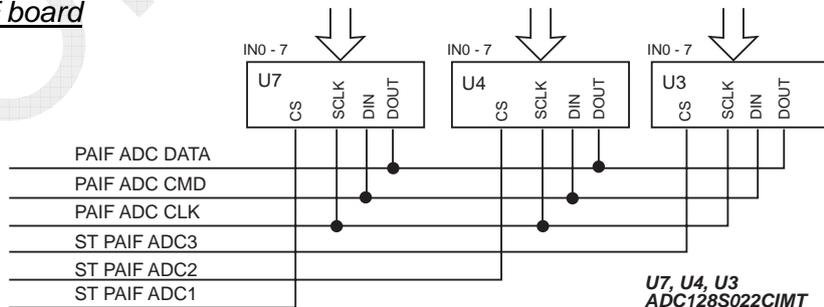


Fig. 6.1.6 Signals Detected by TX SELF TEST

1. CODEC

The “TX IF: 36 kHz (F1B)” signal is outputted from “U4: CODEC” on the T-CPU board and detected on the TX board. A signal to be detected is “TX IF CHECK.” The CODEC is determined to be OK when the detected signal level is not lower than a specified level.

The detected level can be checked by selecting [MENU] -> 9.SERVICE -> 3.RT SETUP -> 1.SETUP -> 2.SELF CHECK -> “TX IF IN.”

For example, if the signal is accepted by the CODEC testing, but no audio modulation is enabled in SSB mode, this will be supposed to have been caused by a failure in the Handset.

Reference)

The “36kHz IF” signal modulated with CODEC of the T-CPU board varies in IF frequencies with the types of emission. Frequencies are 34.5 kHz for USB, 36.0 kHz for J2B (F1B), and 36.0 kHz for CW.

The input level in the TX board is approximately 1.5Vp-p / 600 ohms.

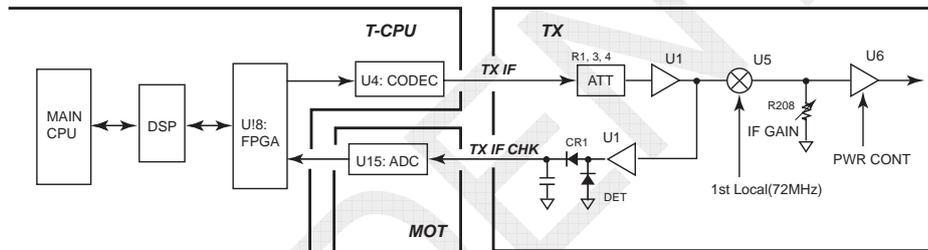


Fig. 6.1.7 IF CHK Circuit Diagram

2. TX PLL

This test menu is used to conduct the TX board tests with “TX OFF.”

This checks whether the 2nd Local PLL circuit of the TX board is unlocked or locked. Frequency bands to be tested are 2, 4, 8, 12, 16, 18, 22, and 27 MHz in each band of VCO.

Even if it is detected, during the test, that the circuit is unlocked, all bands will be checked without stopping checking them in progress.

If the circuit checking result is “NG,” replace the TX board.

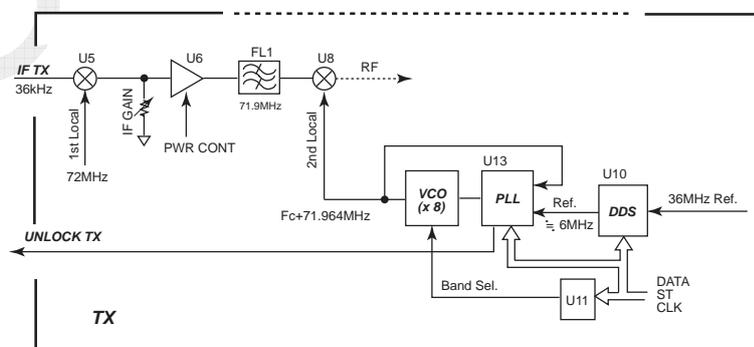


Fig. 6.1.8 TX PLL CHK Circuit Diagram

3. TX

This test menu is used to conduct the TX board tests in the 4 MHz band.

The “TX” tests are conducted with “TX IF signal: 3 kHz” outputted from CODEC, mode set to “J2B,” and power data set to “240.”

The TX board is determined to be OK when the detected “RF CHK” signal level is not lower than a specified level.

The detected level can be checked by selecting [MENU] -> 9.SERVICE -> 3.RT SETUP -> 1.SETUP -> 2.SELF CHECK -> “TX RF OUT.”

In order to prevent the radiation of radio waves, the DRV and PA boards are set to transmission “OFF,” and the TX FIL board output is terminated with the 50 ohm dummy load.

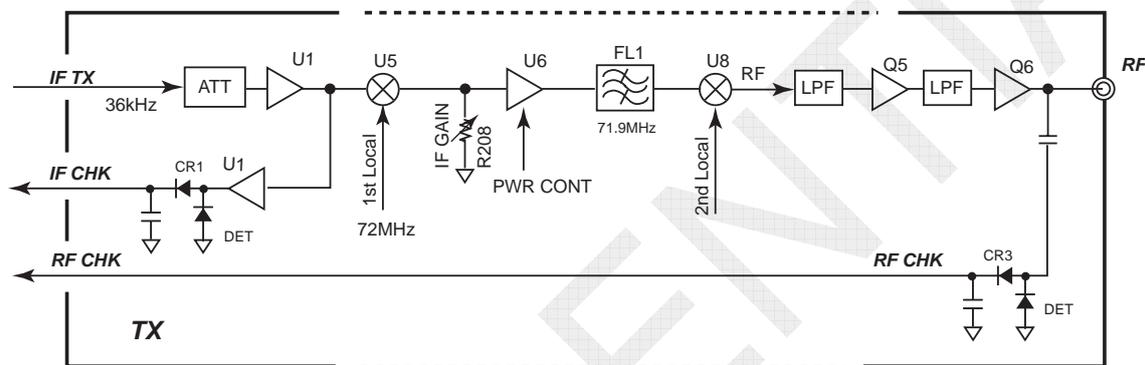


Fig. 6.1.9 TX RF CHK Circuit Diagram

4. DRV (FS-2575 and FS-5075)

This test menu is used to conduct the DRV board tests in the 4 MHz band.

The “DRV” tests are conducted with “TX IF signal: 36 kHz” outputted from CODEC, mode set to “J2B,” power data set according to the model of the system in use, and output power of approximately 20 W.

The DRV board is determined to be OK when the detected “CHK DA: VF” signal level is not lower than a specified level.

Note) “VR DA” is not used.

The detected level can be checked by selecting [MENU] -> 9.SERVICE ->

3.RT SETUP -> 1.SETUP -> 2.SELF CHECK -> “DRV VF” or “DRV VR.”

Furthermore, the TX, DRV, and PA boards are set to transmission “ON,” and the TX FIL board output is terminated with the 50 ohm dummy load.

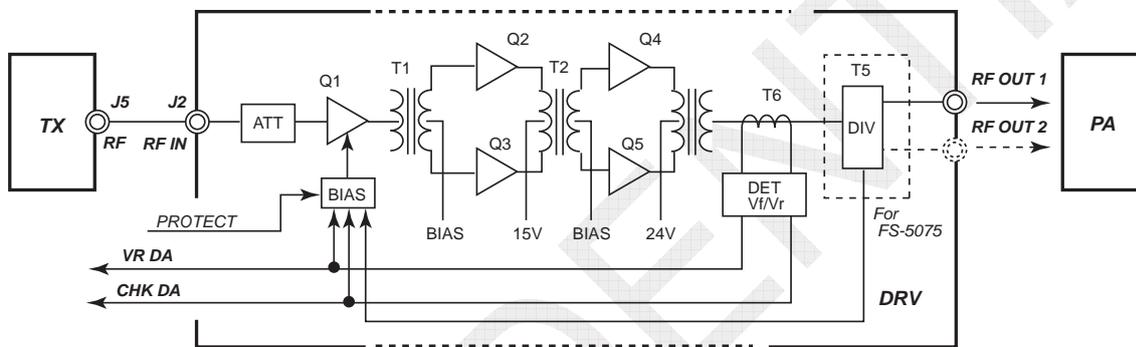


Fig. 6.1.10 DRV CHK Circuit Diagram

5. SW-REG 1 and SW-REG 2 (FS-2575 and FS-5075)

The FS-2575 system has no check items for SW-REG 2.

“SW-REG1” and “SW-REG2” are used to check for the TX ON, DA ON, and PA ON control signals in the OFF state.

These items check for the collector voltage (42 VDC) of the PA transistor on the PA board.

The check point is the VC check signal on the PA board. The switching regulator is determined to be OK when the detected level is not lower than a specified level.

6. PA (FS-1575, FS-2575, and FS-5075)

This test menu is used to conduct the PA board tests in the 4 MHz band.

The “PA” tests are conducted with “TX IF signal: 36 kHz” outputted from CODEC, mode set to “J2B,” power data set according to the model of the system in use, and output power of approximately 20 W.

The PA board is determined to be OK when all the detected levels of the “CHK PA” and “IC” signals of the PA board and the “UN_BAL” signal of the COMB board are not lower than their specified level. However, the FS-1575 and -2575 systems have no COMB UNBALANCE signal.

The detected level can be checked by selecting [MENU] -> 9.SERVICE -> 3.RT SETUP -> 1.SETUP -> 2.SELF CHECK -> “PA VF (CHK PA),” “PA IC,” or “COMB UNBALANCE (UN BAL).”

The “COMB UNBALANCE (UN_BAL)” signal level will increase if PA1 and PA2 output power becomes imbalanced, for example, either of these two PA boards causes a failure.

Furthermore, the TX, DRV, and PA boards are set to transmission “ON,” and the TX FIL board output is terminated with the 50 ohm dummy load

Check Item	Acceptance Threshold		
	FS-5075	FS-2575	FS-1575
PA1_IC, PA2_IC	1A or more	1A or more	1A or more
PA1_VF, PA2_VF	372 or more	372 or more	372 or more
COMB_UNBAL	621 or less	621 or less	621 or less
PA1_VR, PA2_VR	621 or less	621 or less	621 or less

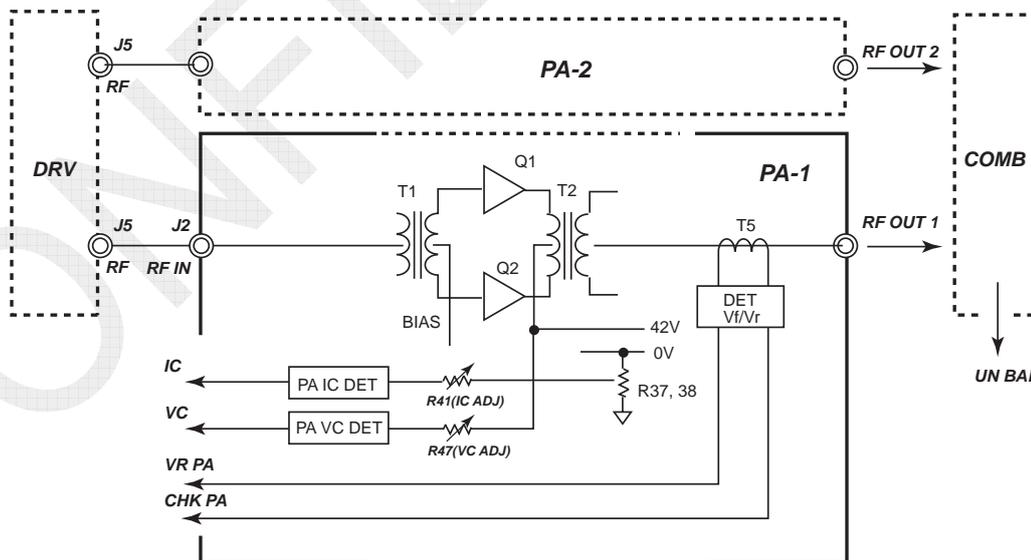


Fig. 6.1.11 PA CHK Circuit Diagram

7. COMB (FS-5075)

This test menu is used to conduct the COMB board tests in the 4 MHz band.

The “COMB” tests are conducted with “TX IF signal: 36 kHz” outputted from CODEC, mode set to “J2B,” power data set according to the model of the system in use, and output power of approximately 20 W. The COMB board is determined to be OK when the detected level of the “VR PA” signals of both PA-1 and PA-2 boards is not higher than a specified level.

The detected level can be checked by selecting [MENU] -> 9.SERVICE -> 3.RT SETUP -> 1.SETUP -> 2.SELF CHECK -> “PA -> VR” or “COMB UNBALANCE.”

The I/O: input/output impedance of the PA and COMB boards is 50 ohms. If the COMB and PA boards cause a mismatch in their I/O impedance, for example, due to burnout, wire disconnection, or short circuit in the COMB board, this will result in an error in input impedance to increase the reflected voltage of VR PA, allowing for making an acceptance judgment of the COMB board. If the COMB board test results in NG, the PA check will definitely result in “NG.”

Furthermore, the TX, DRV, and PA boards are set to transmission “ON,” and the TX FIL board output is terminated with the 50 ohm dummy load.

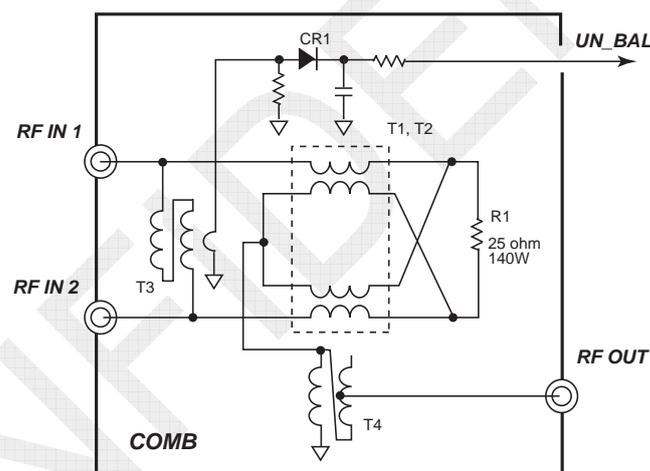


Fig. 6.1.12 COMB Board Block Diagram

8. TX FIL (FS-1575, FS-2575, and FS-5075)

This test menu is used to conduct the TX FIL board tests by switching the band to 1, 3, 4, 6, 8, 12, 18, and 22 MHz.

The “TX FIL” tests are conducted with “TX IF signal: 36 kHz” outputted from CODEC, mode set to “J2B,” and power data set according to the model of the system in use.

The TX FIL board is determined to be OK when the detected level of the “CHECK IN VR (FIL-IN VR)” signal is not higher than a specified level in all bands of the TX FIL board and that of the ALC has reached above their specified level.

The detected level can be checked by selecting [MENU] -> 9.SERVICE -> 3.RT SETUP -> 1.SETUP -> 2.SELF CHECK -> “FILTER.”

Furthermore, the TX, DRV, and PA boards are set to transmission “ON,” and the TX FIL board output is terminated with the 50 ohm dummy load.

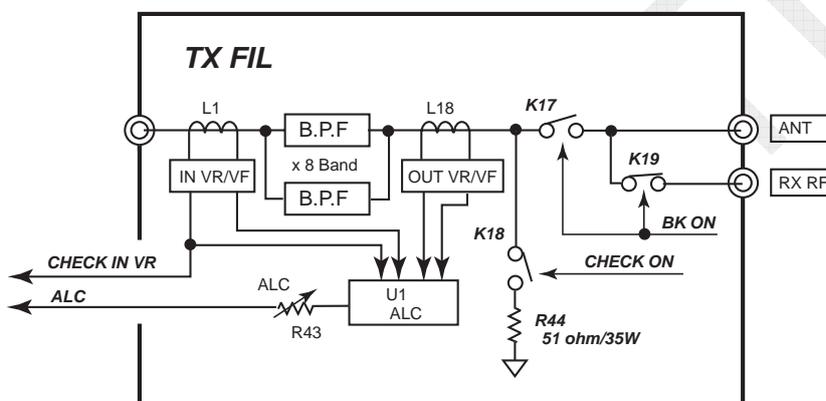


Fig. 6.1.13 TX FIL CHK Circuit Diagram

9. COUPLER (FS-1575, FS-2575, and FS-5075)

This test menu allows for conducting coupler test without using the RF signal.

The coupler is determined to be “OK” when the TUNE signal is sent to the ATU and the TUNE OK signal from the ATU results in “ERROR.” In other words, this test is conducted to check for the connection of the coupler.

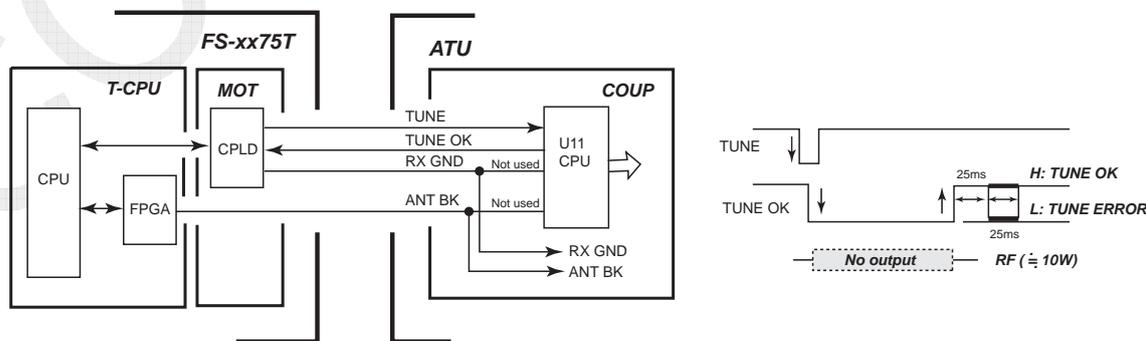


Fig. 6.1.14 COUP CHK Circuit Diagram

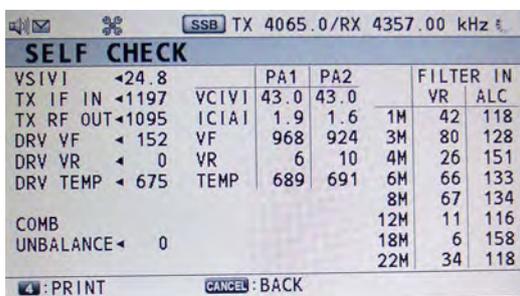
6.2 SERVICE: SELF CHECK

To open the “SELF CHECK” menu window, select [MENU] -> 9.SERVICE -> 3.RT SETUP -> 2.SELF CHECK.

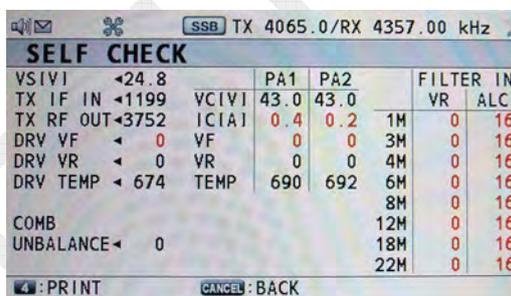
When selecting [MENU] -> 1.TEST -> 2.TX SELF TEST, the “SELF CHECK” window will display detected values that serve as the basis of determining the TX SELF CHECK to be OK or NG. The conditions for SELF CHECK are the same as those for TX SELF CHECK. For details, refer to information on page 6-6.

If the detected level does not meet the threshold, it will be displayed in “red,” and the TX SELF CHECK result will be displayed as “NG.” However, the detected levels of “DRV TEMP” and “PA TEMP” are not displayed in “red.”

Items not to be checked by the SELF CHECK are left blank. The FS-2575 system has just a single PA board and no COMB board. Consequently, the PA2 and COMB: UNBALANCE check items are left blank.



FS-5075 SELF CHECK Window (OK)



FS-5075 SELF CHECK Window (NG)

Table 6.2.1 SELF CHECK Threshold Levels

Check Item	OK Criteria	ADC Value (Analog Value)			Conversion Calculation Equation
		FS-5075	FS-2575	FS-1575	
VS	Min.	496 (16V)	469 (16V)	469(16V)	ADC value × (3.3/4096) × 40
PA1_VC, PA2_VC	Min.	1086 (35V)	1086 (35V)	PA1:496(16V) PA2:none	ADC value × (3.3/4096) × 40
TX_IF_CHK	Min.	124 (0.1V)	124 (0.1V)	124(0.1V)	ADC value × (3.3/4096)
TX_RF_CHK	Min.	99 (0.08V)	99 (0.08V)	99(0.08V)	ADC value × (3.3/4096)
DRV_VF	Min.	40 (0.032V)	60 (0.048V)		ADC value × (3.3/4096)
DRV_VR	Max.	124 (0.1V)	124 (0.1V)		ADC value × (3.3/4096)
PA1_IC, PA2_IC	Min.	62 (1A)	62 (1A)	62(1A)	ADC value × (3.3/4096) × 20
PA1_VF, PA2_VF	Min.	372 (0.3V)	372 (0.3V)	372(0.3V)	ADC value × (3.3/4096)
COMB_UNBAL	Max.	621 (0.5V)	621 (0.5V)		ADC value × (3.3/4096)
PA1_VR, PA2_VR	Max.	621 (0.5V)	621 (0.5V)	621(0.5V)	ADC value × (3.3/4096)
TX_FIL_VR	Max.	149 (0.12V)	149 (0.12V)	169(0.136V)	ADC value × (3.3/4096)
TX_FIL_ALC	Min.	40 (0.032V)	99 (0.08V)	99(0.08V)	ADC value × (3.3/4096)

Example of FS-5075 SELF CHECK Results

SSB TX 4065.0/RX 4357.00 kHz							
SELF CHECK							
VSIVI	←24.8	PA1	PA2	FILTER IN			
TX IF IN	←1197	VCIVI	43.0	43.0	VR	ALC	
TX RF OUT	←1095	ICIAI	1.9	1.6	1M	42	118
DRV VF	← 152	VF	968	924	3M	80	128
DRV VR	← 0	VR	6	10	4M	26	151
DRV TEMP	← 675	TEMP	689	691	6M	66	133
					8M	67	134
COMB					12M	11	116
UNBALANCE	← 0				18M	6	158
					22M	34	118
[4] : PRINT				CANCEL : BACK			

Example of FS-2575 SELF CHECK Results

SSB TX 4068.0/RX 4360.00 kHz							
SELF CHECK							
VSIVI	←24.5	PA1	FILTER IN				
TX IF IN	←1185	VCIVI	41.9	VR	ALC		
TX RF OUT	←1428	ICIAI	2.6	1M	64	206	
DRV VF	← 149	VF	1579	3M	115	221	
DRV VR	← 0	VR	125	4M	30	229	
DRV TEMP	← 680	TEMP	687	6M	74	224	
				8M	23	228	
				12M	33	218	
				18M	9	252	
				22M	39	238	
[4] : PRINT				CANCEL : BACK			

Example of FS-1575 SELF CHECK Results

SSB TX 8291.0/RX 8291.00 kHz							
SELF CHECK							
VSIVI	←24.3	PA1	FILTER IN				
TX IF IN	←1196	VCIVI	24.1	VR	ALC		
TX RF OUT	← 709	ICIAI	2.9	1M	76	186	
		VF	1059	3M	125	199	
		VR	182	4M	73	200	
		TEMP	695	6M	91	199	
				8M	118	203	
				12M	102	201	
				18M	118	184	
				22M	66	202	
[4] : PRINT				CANCEL : BACK			

1. VS [V]

This self-check menu is used to check for 24V power supply voltage inputted in the FS-xx75T unit. The voltage is detected in the detection circuit of the PA-IF board. If the detected voltage level is not higher than the threshold, it will be displayed in “red.” The “VS [V]” column displays a voltage converted from an ADC value.

2. TX IF IN

This self-check menu is the same as “CODEC” of the “TX SELF TEST” menu and used to numerically display the detected IF CHK signal of the TX board. If the detected signal level is not higher than the threshold, it will be displayed in “red.”

For details, refer to information on page 6-9.

3. TX RF OUT

This self-check menu is the same as “TX” of the “TX SELF TEST” menu and used to numerically display the detected RF CHK signal of the TX board. If the detected signal level is not higher than the threshold, it will be displayed in “red.”

For details, refer to information on page 6-10.

4. DRV VF

This self-check menu is the same as “DRV” of the “TX SELF TEST” menu and used to numerically display the detected CHK DA signal of the DRV board. If the detected signal level is not higher than the threshold, it will be displayed in “red.”

For details, refer to information on page 6-11.

5. DRV VR

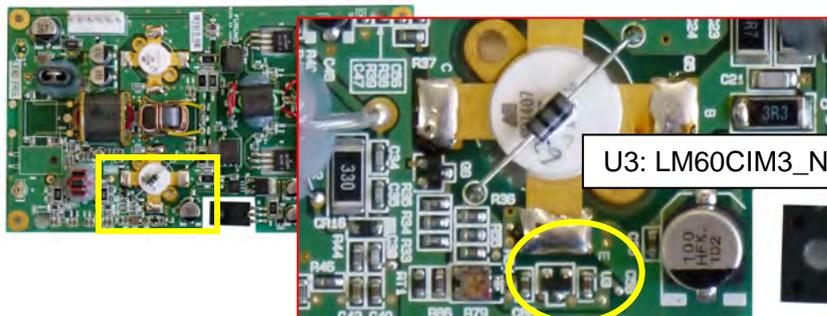
This self-check menu is the same as “DRV” of the “TX SELF TEST” menu and used to numerically display the detected VR DA signal of the DRV board. If the detected signal level is not higher than the threshold, it will be displayed in “red.”

For details, refer to information on page 6-11.

6. DRV TEMP

This self-check menu is used to detect temperature with U3 mounted in the vicinity of the PA transistor on the DRV board and numerically display this detected temperature level. The signal name is “TEMP DA” in the circuit diagram.

The numerical display color does not change.



*** Calculation Equation ***

$$V = 3.3 \times (\text{ADC value}/4096)$$

$$^{\circ}\text{C} = \{(V \times 1000) - 424\}/6.25$$

7. UNBALANCE

This self-check menu is used to numerically display the UNBALANCE signal of the COMB circuit as part of the PA board test. If the detected signal level is not lower than the threshold, it will be displayed in “red.”

For details, refer to information on page 6-13.

8. VC [V]

This self-check menu is used to display the collector voltage of PA transistor of the PA board. The voltage is detected in the detection circuit of the PA board. If the detected voltage level is not higher than the threshold, it will be displayed in “red.”

The “VC [V]” column displays a voltage converted from an ADC value.

9. IC [A]

This self-check menu is used to display the collector current of PA transistor of the PA board. The current is detected in the detection circuit of the PA board. If the detected current level is not higher than the threshold, it will be displayed in “red.”

The “IC [A]” column displays a current converted from an ADC value. For details, refer to information on page 6-12.

10. PA-VF

This self-check menu is used to display V-SWR: “VF” on the PA output side of the PA board. If the detected voltage level is not higher than the threshold, it will be displayed in “red.” For details, refer to information on page 6-12.

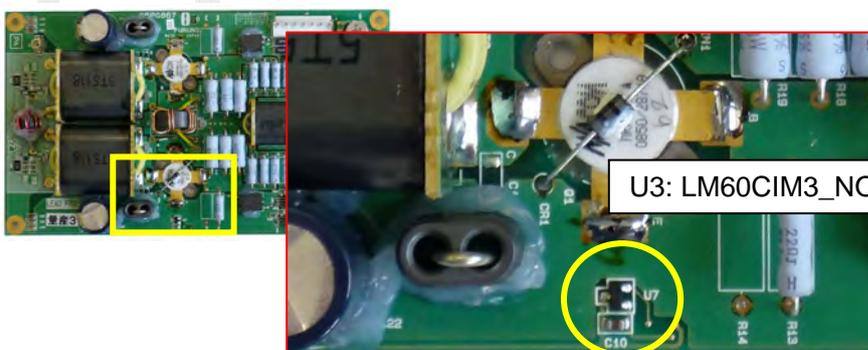
11. PA-VR

This self-check menu is used to display V-SWR: “VR” on the PA output side of the PA board. If the detected voltage level is not lower than the threshold, it will be displayed in “red.” For details, refer to information on page 6-12.

12. PA-TEMP

This self-check menu is used to detect temperature with U7 mounted in the vicinity of the PA transistor on the PA board and numerically display this detected temperature level. The signal name is “TEMP PA” in the circuit diagram.

The numerical display color does not change.



*** Calculation Equation ***
 $V = 3.3 \times (\text{ADC value}/4096)$
 $^{\circ}\text{C} = \{(\text{V} \times 1000) - 424\}/6.25$

13. FILTER VR

This self-check menu is used to display V-SWR: “CHK IN VR” on the input side of the TX FIL board. If the detected voltage level is not lower than the threshold, it will be displayed in “red.”

For details, refer to information on page 6-14.

14. FILTER ALC

This self-check menu is used to display the ALC signal of the TX FIL board. The ALC signal controls TX output power. If the detected signal level is not higher than the threshold, it will be displayed in “red.”

For details, refer to information on page 6-14.

6.3 ALARM

Alarms that are currently occurring can be checked by selecting [MENU] ->

8. ALARM.

Alarms displayed on the window will be automatically cleared when the relevant event is eliminated.

To check for the ALARM LOG, select [MENU] -> 9.SERVICE -> 6.MAINTENANCE LOG -> 2.ERROR LOG. For details, refer to information on page 6-43.

Table 6.3.1 Alarm List

ERROR	Condition	Countermeasure
TX PLL UNLOCK	Occurs when the PLL circuit of the TX board becomes unlocked.	Replace the TX board.
RX PLL UNLOCK	Occurs when the PLL circuit of the RX board becomes unlocked.	Replace the RX board.
WR1 PLL UNLOCK	Occurs when the PLL circuit of the WR1 board becomes unlocked.	Replace the WR1 board.
WR2 PLL UNLOCK	Occurs when the PLL circuit of the WR2 board becomes unlocked.	Replace the WR2 board.
MAIN AMP HEATED	Occurs when a temperature not lower than the threshold is detected on any of the DRV, PA1, and PA2 boards (see pages 7-20, -23, and -25). <i>Note)</i> There is no information available to verify the relevant board.	Wait until the temperature falls below the threshold.
SHIP'S MAIN FAILURE	Occurs when AC power supply to the AC/DC power supply unit is down and 24VDC input is switched to the radio battery. ** When the "#1: AC FAIL" terminal of TB7 on the T-IF board becomes active.** <i>Note)</i> The AC FAIL signal is outputted from the AC/DC power supply unit.	
VC ERROR	FS-2575 and -5075: Occurs when "PA VC" voltage goes to or below 35V. FS-1575: Occurs when "PA VC" voltage goes to or below 18V.	Check for 24V power supply input voltage,

Tip;

Reference frequency supplied to the PLL circuit of each board is distributed from the TX board.

If the PLL circuit of any of the TX, RX, WR1, and WR2 boards becomes unlocked, replace the TX board.

6.4 SERVICE: RESTORE FACTORY SETTINGS

To restore factory settings, select [MENU] -> 9.SERVICE -> 4.RESTORE FACTORY SETTINGS.

6.4.1 Types of Memory Clear Menus

Memory clear menus include “MMSI CLEAR,” “RESTORE FACTORY SETTINGS,” and “CLEAR ALL.”

Table 6.4.1 Types of Memory Clear Menus

Clear Menu	Function	Clear Operation
RESTORE FACTORY SETTINGS	Returns to factory settings, except clearing of the following: <ul style="list-style-type: none"> • MMSI • Adjusted values^{See Note)} • MAC address 	Select [MENU] -> 9.SERVICE -> 4. RESTORE FACTORY SETTINGS, and then return to factory setting.
CLEAR ALL	Clears all memories except MMSI and MAC addresses.	Press the [S1: MMSI] switch on the T-IF board, and then enter the password.
MMSI CLEAR	Clears MMSI.	Press the [S1: MMSI] switch on the T-IF board, and then enter the password.

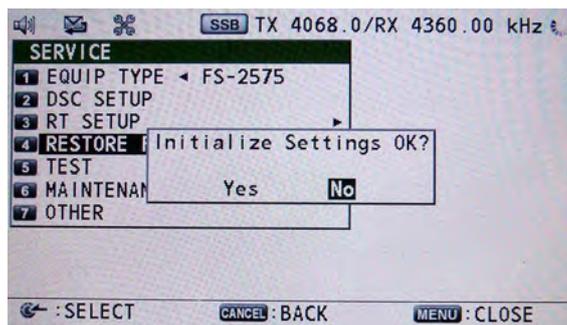
Note) Adjusted values:

- 1) Set value of power data
 Select [MENU] -> 9. SERVICE -> 3.RT SETUP -> Any of the following:
 4.TX PWR (FREQ), 5.TX. PWR (USER CH),
 6. TX PWR (TUNE), 7.TX PWR (SELCALL)
- 2) Set value of REF OSC
 Select [MENU] -> 9.SERVICE -> 3.RT SETUP -> REF OSC.
- 3) Set value of LINE IN / LINE OUT
 Select [MENU] -> 9.SERVICE -> 3.RT SETUP -> LINE IN or LINE OUT.
- 4) Set value of DISTRESS ALARM
 Select [MENU] -> 9.SERVICE -> 2.DSC SETUP -> DISTRESS ALARM.
 ** FS-2575C: Individually back up the set value. **

6.4.2 Clear Procedure

1. RESTORE FACTORY SETTINGS

- 1) Select [MENU] -> 9.SERVICE -> 4.RESTORE FACTORY SETTINGS, and then press the [ENTER] knob.
- 2) A message saying “Initialize Settings OK?” will appear on the window. Click “Yes,” and then press the [ENTER] knob.



- 3) The window will fade out to restore factory settings. Subsequently, a message saying “Initializing...” will appear, and then the “RT SETUP” window will open.

2. CLEAR ALL

For details, refer to information on page 4-4.

3. MMSI CLEAR

For details, refer to information on page 4-4.

6.5 SERVICE: TEST

6.5.1 VERSION

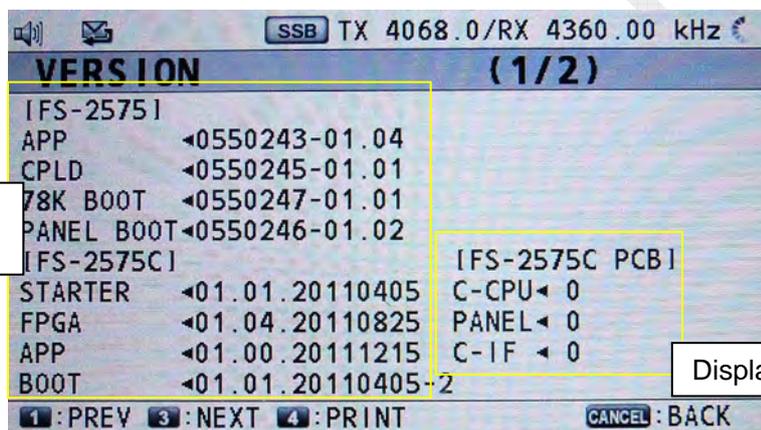
1. Verifying Program Version

Selecting [MENU] -> 9.SERVICE -> 5.TEST -> 1.VERSION allows for verifying all program versions. For details, refer to information on the following page.

Program version to be controlled is the version of "APP: 0550243-01.xx" that is displayed by selecting [MENU] -> 1.TEST -> 1.DAILY TEST.

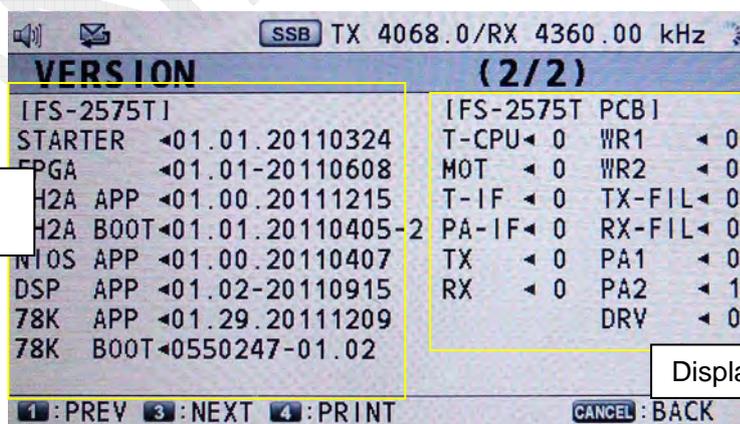
The [FS-2575C PCB] and [FS-2575T] popup windows also allow for verifying the versions of boards used in the system, respectively. For details, refer to information on page 6-27.

Furthermore, pressing the [4]: PRINT key allows for printing out information shown on the window.



Displays program version.

Displays board version.



Displays program version.

Displays board version.

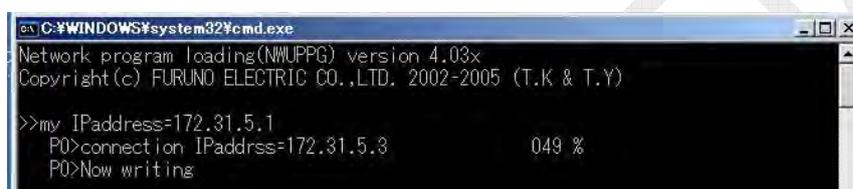
Table 6.5.1 Verifying Program Version

Program Name	Function	Write Availability	Load-1 (PC) ^{See Note 3)}	Load-2 (CONT) ^{See Note 4)}	Load-3 (NBDP) ^{See Note 5)}
[FS-xx75] (1/2) Page					
APP	Displays the same program number as that of “APP” of “DAILY TEST.” <i>Note) 0550243-xx.xx</i>	Yes	Yes	No	No
CPLD	Displays the same program number as that of “CPLD” of “DAILY TEST.” <i>Note) 0550245-xx.xx</i> <i>Tip) The version remains unchanged even if the program is updated. The program is written at factory and not allowed for any change.</i>	No	No	No	No
78K BOOT	Displays the same program number as that of “78K BOOT” of “DAILY TEST.” <i>Note) 0550247-xx.xx</i> <i>Tip) The version remains unchanged even if the program is updated. The program is written at factory and not allowed for any change.</i>	No	No	No	No
PANEL BOOT	Displays the same program number as that of “PANEL BOOT” of “DAILY TEST.” <i>Note) 0550246-xx.xx</i> <i>Tip) The version remains unchanged even if the program is updated. The program is written at factory and not allowed for any change.</i>	No	No	No	No
[FS-2575C] (1/2) Page					
STARTER	Displays the version number of C-CPU STARTER program of the FS-2575C unit. <i>Note) Displays updated version and date.</i> <i>Example: 01.03.20110805</i> <i>Tip) The version remains unchanged even if the program is updated. The program is written at factory and not allowed for any change.</i>	No	No	No	No
FPGA	Displays the version number of C-CPU FPGA program of the FS-2575C unit. <i>Note) Displays updated version and date.</i> <i>Example: 01.03.20110805</i>	Yes	Yes	Yes	No
APP	Displays the version number of C-CPU APP program of the FS-2575C unit. <i>Note) Displays updated version and date.</i> <i>Example: 01.03.20110805</i>	Yes	Yes	Yes	No
BOOT	Displays the version number of C-CPU BOOT program. C-CPU includes two BOOT programs; starter program and backup program. The BOOT program displayed in this column is a program that is started up each time. If this program has a problem, the backup BOOT program will run. The BOOT program to be updated is the starter program. <i>Note) Displays updated version and date.</i> <i>Example: 01.03.20110805</i>	Yes	Yes	Yes	No

[FS-XX75T] (2/2) Page					
STARTER	Displays the version number of T-CPU STARTER program. <i>Note) Displays updated version and date.</i> <i>Example: 01.03.20110805</i> <i>Tip) The version remains unchanged even if the program is updated. The program is written at factory and not allowed for any change.</i>	No	No	No	No
FPGA	Displays the version number of T-CPU FPGA program. When the program is updated, the version number will also be updated. <i>Note) Displays updated version and date.</i> <i>Example: 01.03.20110805</i>	Yes	Yes	No	No
SH-2A APP	Displays the version number of SH-2A CPU application program for T-CPU. When the program is updated, the version number will also be updated. <i>Note) Displays updated version and date.</i> <i>Example: 01.03.20110805</i>	Yes	Yes	No	No
SH-2A BOOT	Displays the version number of SH-2A CPU BOOT program for T-CPU. When the program is updated, the version number will also be updated. <i>Note) Displays updated version and date.</i> <i>Example: 01.03.20110805</i>	Yes	Yes	No	No
NIOS APP	Displays the version number of NIOS CPU application program for T-CPU. This program is mainly used to control LAN-to-LAN communications. When the program is updated, the version number will also be updated. <i>Note) Displays updated version and date.</i> <i>Example: 01.03.20110805</i>	Yes	Yes	No	No
DSP APP	Displays the version number of DSP CPU application program for T-CPU. This program is mainly used to control signal processing. When the program is updated, the version number will also be updated. <i>Note) Displays updated version and date.</i> <i>Example: 01.03.20110805</i>	Yes	Yes	No	No
78K APP	Displays the version number of 78K CPU application program for T-CPU. This program is mainly used to control NBDP communications. When the program is updated, the version number will also be updated. <i>Note) Displays updated version and date.</i> <i>Example: 01.03.20110805</i>	Yes	Yes	No	Yes
78K BOOT	Displays the version number of 78K CPU BOOT program for T-CPU. The 78K CPU includes two BOOT programs; starter program and backup program. The BOOT program displayed in this column is a program that is started up each time. If this program has a problem, the backup BOOT program will run. The BOOT program to be updated is the starter program. <i>Note) 0550247-xx.xx</i>	Yes	Yes	No	Yes

Note)

- 1) NIOS APP and DSP APP programs for the FS-xx75T unit are loaded from the main CPU when turning ON the power supply.
- 2) Programs with “Yes” put in the “Write Availability” column are automatically updated when the program is updated. Programs with “No” put in the column are not available for writing on field. These programs are written by the manufacturer. The version number remains unchanged even if the program is updated.
- 3) Programs with “Yes” put in the “Load-1” column are updated from a PC to the SH-2A CPU of the T-CPU board. The following window shows a program in the course of updating.

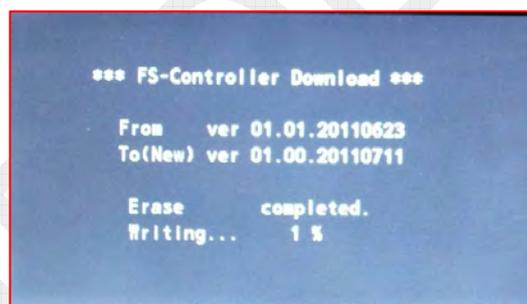


```

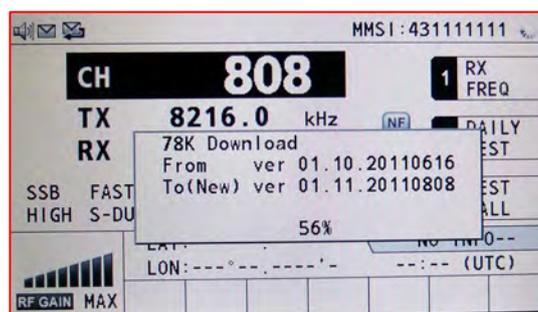
C:\WINDOWS\system32\cmd.exe
Network program loading(NWUPPG) version 4.03x
Copyright(c) FURUNO ELECTRIC CO.,LTD. 2002-2005 (T.K & T.Y)

>>my IPAddress=172.31.5.1
PO>connection IPAddrss=172.31.5.3          049 %
PO>Now writing
  
```

- 4) Programs with “Yes” put in the “Load-2” column are updated from the SH-2A CPU of the T-CPU board used in the FS-xx75T unit to the FS-2575C unit. The following window shows a program in the process of updating.



- 5) Programs with “Yes” put in the “Load-3” column are automatically updated from the SH-2A CPU to the 78K CPU. The following window shows a program in the process of updating.



2. Verifying Board Version

The “VERSION (1/2)” and “VERSION (2/2)” windows displays board versions. When turning ON the power supply, T-CPU will load the versions.

Even if there is a discrepancy in the combination of a board version and program, the board version control allows for verifying the board version to be used to run the program and achieve operation corresponding to the board.

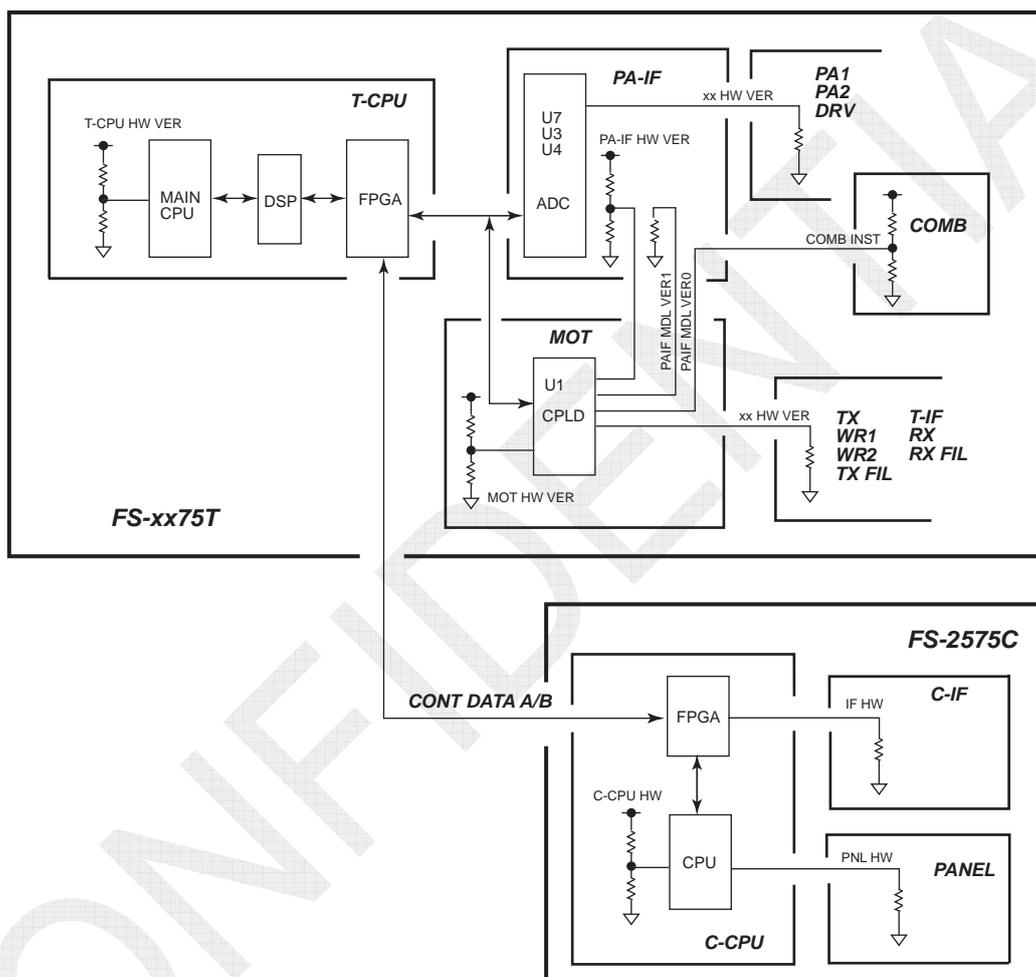


Fig. 6.5.1 Version Verification Circuit Diagram for FS-5075

Table 6.5.2 List of HW VER Verification Bits

Board Name	Number of Bits	Board Name	Number of Bits
TX: 05P0856	2	T-IF: 05P0861	2
DRV: 05P0866A, B	1	T-IF: 05P0861A	2
PA: 05P0867A, B	1	MOT: 05P0860	2
PA: 05P0868	1	WR1, 2: 05P0847A, B	2 1: INST
COMB: 05P0869	1: INST	PWR: 05P0874	–
TX FIL: 05P0870A, B	1	SW REG: 05P0873	–
TX FIL: 05P0876	1	FET: 05P0872	–
PA-IF: 05P0864	2 (H, H)	P-SW: 05P0871	–
PA-IF: 05P0864A	2 (L, L)	PANNEL: 05P0884	2
RX: 05P0842	2	C-IF: 05P0853	3
DUP-FIL: 05P0863	1: INST	C-CPU: 05P0852	3
RX-FIL: 05P0862A, B	2	COUP: 05P0875	–
T-CPU: 05P0859	2		

Note) INST signal is outputted from the WR1, WR2, COMB, and DUP FIL boards.

3. Verification of model: Board INST signal

The INST signal is used to verify whether or not the WR1, WR2, DUP FIL, and COMB boards are mounted.

This signal not only verifies the model of a system in use, but also performs operation that matches the specification of the system.

The INST signal is loaded by T-CPU when turning ON the power supply.

Like the hardware versions, the model of a system is detected by pulling up or down the INST signal line on the relevant board side.

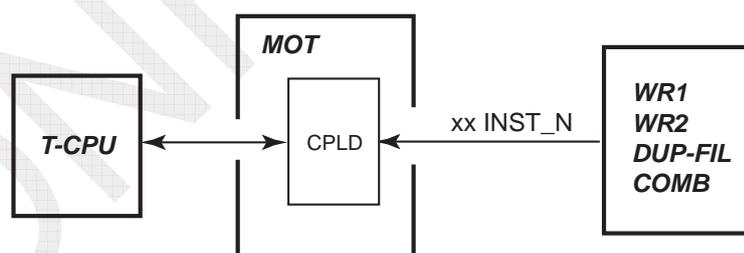


Fig. 6.5.2 INST Signal

Use of INST signal

1) WR1 board: WR1 INST N

This signal is not in use.

2) WR2 board: WR2 INST N

The WR2 INST signal is used to select whether to use the WR2 board or the RX board in order to watch SCAN upon receiving general DSC frequency.

If the WR2 INST signal is detected, the WR2 board will be used to watch SCAN upon receiving general DSC frequency. If not, the RX board will be used to watch the same.

3) DUP FIL board: DUP INST N

The DUP INST signal is one of parameters used to set communication mode to DUP.

Conditions to allow the operation of the system in FULL DUP mode are as follows:

- The DUP FIL board is mounted (to detect the DUP INST signal).
- Menu settings are made as [MENU] -> 9.SERVICE -> 3.RT SETUP -> 1.SETUP -> "RX ANT" -> "CONNECT."
- Menu settings are made as [MENU] -> 5.SYSTEM -> 7.RX SETUP -> 2.ANT SELECT -> "RX ANT."
- Tx/Rx frequencies on the SSB/HF band differ in a specified range.
- The FS-5075 system is in use. (Verification of model)

4) COMB board: COMB INST N

The COMB INST signal is used to verify the model of a system.

The model of a system is verified by the combined use of the INST signal of the COMB board and the "R67" PAIF MDL VER1 signal of the PA-IF board. To display the model, select [MENU] -> 9. SERVICE -> 1. EQUIP TYPE.

The model is verified when turning ON the power supply.

Model	PA-IF Board: R67	COMB (COMB INST N)	PA-IF Board
FS-1575	Mounted	Not mounted	05P0864A
FS-2575	Not mounted	Not mounted	05P0864
FS-5075	Not mounted	Mounted	05P0864

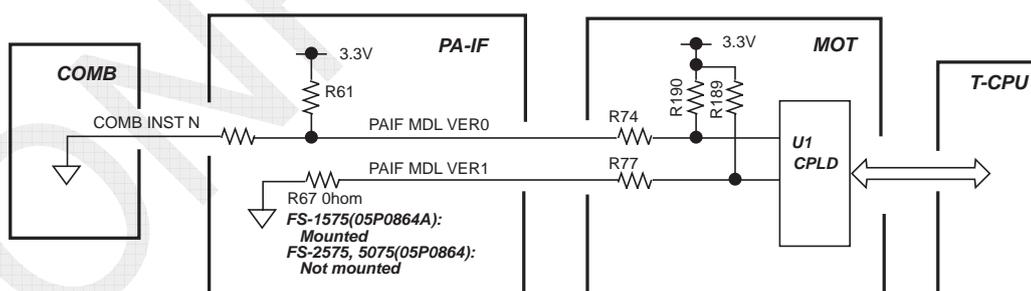


Fig. 6.5.3 INST Signal of COMB / PA-IF Board

The following functions vary with models verified:

- 1) Set value of power data to conduct a SELF TEST
- 2) Default of power data
- 3) Test items of “TX SELF TEST” and “SELF TEST” sub-menus
- 4) Power reduction steps: HIGH, MID, LOW / HIGH, MID, LOW1, LOW2
- 5) PA IC meter scale and IC reading
 - IC meter scale: 20 A for FS-1575 and -2575, Meter reading up to 66A
40 A for FS-5075, Meter reading up to 132 A
 - FS-1575 and -2575 read IC1, while FS-5075 reads IC1+IC2
- 6) VC meter scale and reading
 - FS-1575, -2575, and -5075 all read VC1 value.
 - VC meter scale: 60 V for FS-1575, -2575, and -5075, Meter reading up to 132 V
- 7) VS meter scale and reading
 - VS meter scale: 40 V for FS-1575, -2575, and -5075
- 8) Availability for FULL DUP mode: FS-5075 is available for Full Duplex mode, FS-1575 and -2575 are available for SEMI-DUP mode.
- 9) Host names
 - FS-1575: SSB003, FS-2575: SSB004, and FS-5075: SSB005
- 10) Thresholds for VC self-tests
 - FS-1575: 16 VDC
 - FS-2575 and -5075: 35 VDC
- 11) PA heating error

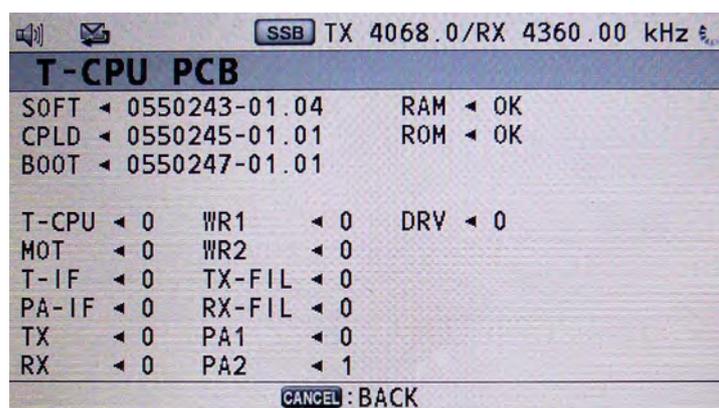
	FS-5075				FS-2575		
	Hi	MID	LOW1	LOW2	Hi	MID	LOW
77°C or over	MID	MID	LOW1	LOW2	MID	MID	LOW
77°C to 84°C	LOW1	LOW1	LOW1	LOW2	LOW	LOW	LOW
84°C or over	LOW2	LOW2	LOW2	LOW2	LOW	LOW	LOW

- 12) Contents of PFEC, pidat sentence
 - PFEC, pidat sentence is used to output a model category and program control version at the time of startup.
 - The output port is #1 to #2 (TD A/B) of TB6 on the T-IF board.

6.5.2 T-CPU PCB Test

To conduct T-CPU PCB tests, select [MENU] -> 9.SERVICE -> 5.TEST -> 2.T-CPU PCB, and then press the [ENTER] knob.

The versions of program installed to the T-CPU board and boards mounted to the FS-xx75T unit will be displayed.



1. SOFT, CPLD, BOOT

Program numbers can also be verified by selecting [MENU] -> 1.TEST -> 1.DAILY TEST or [MENU] -> 9.SERVICE -> 5.TEST -> 1.VERSION.

In this case, however, replace the program number displayed in the “SOFT” column with that of APP program and the program number displayed in the “BOOT” column with that of 78K BOOT program.

Note)

The “SOFT (or APP)” column displays the program packaged number of the FS-xx75 system.

2. RAM, ROM

“RAM” refers to U21 / U23 SDRAM and “ROM” refers to U22 Flash ROM, both on the T-CPU board. The column displays the results of Read/Write tests, respectively.

3. T-CPU, MOT, through DRV

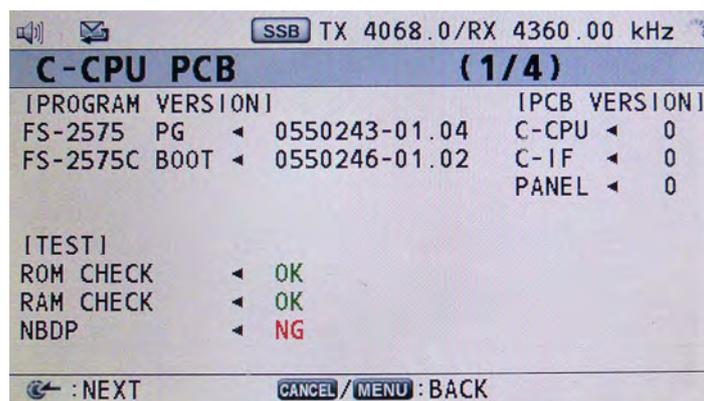
These columns display the version of board mounted to the FS-xx75T unit, respectively. For details, refer to information on page 6-27.

6.5.3 C-CPU PCB Test

To conduct C-CPU PCB tests, select [MENU] -> 9.SERVICE -> 5.TEST -> 3.C-CPU PCB, and then press the [ENTER] knob.

The versions of program installed to the C-CPU board and boards mounted to the FS-2575C unit will be displayed.

Furthermore, pressing the [ENTER] key will conduct tests on import of LCD backlight and panel key setting data, and screen color tests.



Step-1) C-CPU PCB (1/4) Window

1. [PROGRAM VERSION]

Replace the program number displayed in the "FS-xx75 PG" column with that of APP program and the program number displayed in the "BOOT" column with that of PANEL BOOT program.

Program numbers can also be verified by selecting [MENU] -> 1. TEST -> 1.DAILY TEST or [MENU] -> 9.SERVICE -> 5.TEST -> 1.VERSION.

For details, refer to information on page 6-23.

Note)

"FS-xx75 PG" is the program package number of the FS-xx75 system.

2. [TEST]: ROM, RAM

"ROM" refers to U6 Flash ROM and "RAM" refers to U4 SD-RAM, both on the C-CPU board. The column displays the results of Read/Write tests, respectively.

3. [TEST]: NBDP

This test menu is used to conduct loop-back tests on the [NBDP] port and communication tests with NBDP terminal.

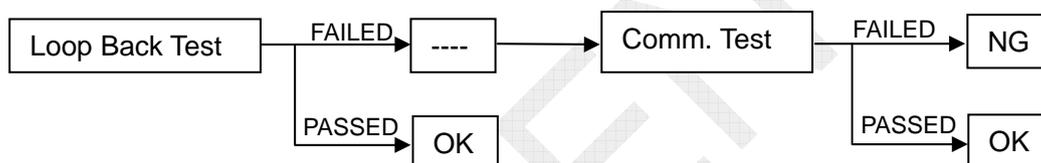
Start the tests with a loop-back test. When the port passed the test, "OK" will be displayed. When failed, "---" will be displayed.

Note) Loop-back test:

Cause a short circuit between "#2: NBDP SD" and "#3: NBDP RD" of the [NBDP] port.

When "NG" is displayed, start a communication test. When the port passed the test, "OK" will be displayed. When failed, "NG" will be displayed.

For example, when conducting a communication test with the [NBDP] terminal connected, "---" will be displayed because the terminal failed the loop-back test, proceeding with the subsequent communication test. When the terminal passed this test, "OK" will be displayed. When failed, "NG" will be displayed in red.



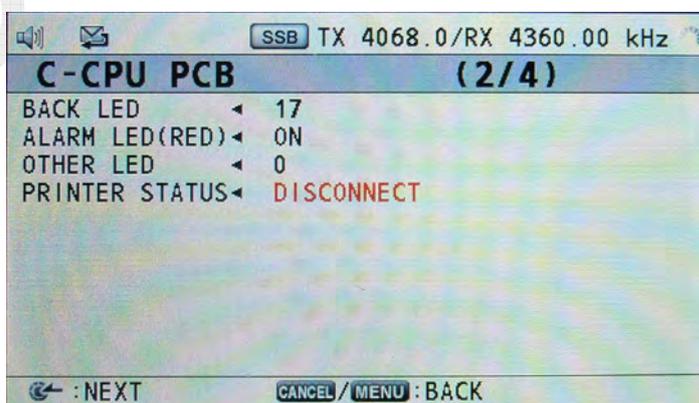
4. [PCB VERSION]

This test menu is used to display the version of board mounted to the FS-2575C unit, respectively.

For details, refer to information on page 6-27.

Step-2) C-CPU PCB (2/4) Window

Pressing the [ENTER] knob will switch the display to the (2/4) window and automatically conduct LED tests.



5. BACK LED

This test menu is used to change the brightness of the screen backlight from the maximum “17” to the minimum “0.”

6. ALARM LED (RED)

This test menu is used to turn the ALARM LED (RED) from ON to OFF.

7. OTHER LEDS

This test menu is used to change the brightness of the ALARM LED (GREEN), OVEN LED (GREEN), DISTRESS LED, and KEY LED changes from the minimum “0” to the maximum “17,” and then returns to the minimum “0.” Finally, the ALARM LED (RED) is set to the maximum brightness.

8. PRINTER STATUS

This test menu is used to conduct printer connection tests. When the printer is normally connected, the following characters will be printed out.

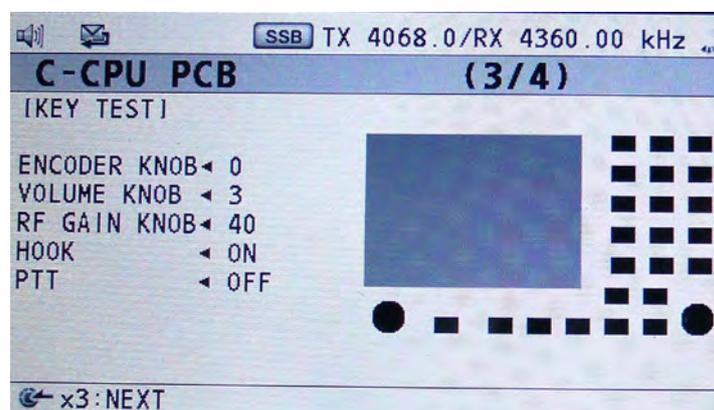
0123456789 ABCDEFGHIJKLMNOPQRSTUVWXYZ abcdefghijklmnopqrstuvwxyz
--

The following messages are displayed in the “PRINTER STATUS” column:

- OK : Normally connected with printer.
- DISCONNECT : Not connected with printer.
- PAPER FEEDER : Detected the printer is out of paper.
- BUSY ERROR ! : Printer line is OFF.

Step-3) C-CPU PCB (3/4) Window

Pressing the [ENTER] knob will switch the display to the (3/4) window and conduct key tests.

**9. ENCODER KNOB**

Turning the [ENTER] knob will change the loop from “0” to “65535” in steps of “1”.

10. VOLUME KNOB

Turning the volume dial will change the volume from “0” to “510//520.” An analog voltage value from the volume knob is converted into a digital value.

11. RF GAIN KNOB

Turning the RF gain knob will change the gain from “0” to “40” in steps of “1.”

12. HOOK

This test menu is used to detect whether the handset is put on or off the hook. ON- or OFF-hook is detected with a magnet built in the handset hanger and a magnet switch built in the handset.

13. PTT

This test menu is used to detect whether the handset PTT key is set to ON or OFF.

14. KEY mark

Pressing the KEY will turn the key display in question from black to blue.

Step-4) C-CPU PCB (4/4) Window**15. LCD TEST**

Pressing the [ENTER] knob three times will switch the display to the (4/4) window and put the system into LCD test mode.

To exit from the LCD test mode, press the [MENU] key twice. To conduct LCD tests, press the [ENTER] knob.



The LCD tests are conducted in the order shown on the above window every time the [ENTER] knob is pressed.

Red -> Green -> Blue -> Red gradation -> Green gradation ->
Blue gradation -> White -> Black -> White gradation -> Gray^{See Note)}

Note)

Since the last color "Gray" is shown by arranging white and black by dot, it looks like a "Gray" color.

Upon completion of the LCD tests, the display will return to the LCD TEST window shown above.

Then, press the [MENU] key twice to exit from the C-CPU test mode.

6.5.4 TA TEST

To conduct TA TEST, select [MENU] -> 9.SERVICE -> 5.TEST -> 4.TA TEST, and then press the [ENTER] knob.

The TA TEST is conducted mainly to check for the connection of external terminals.

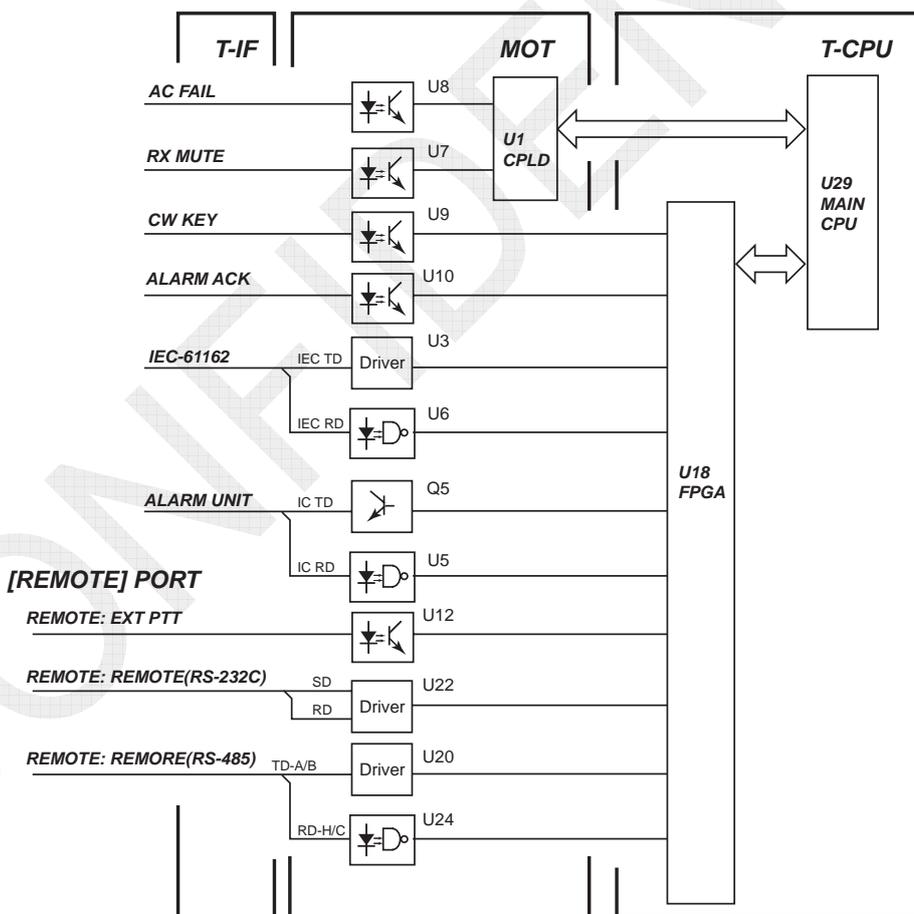
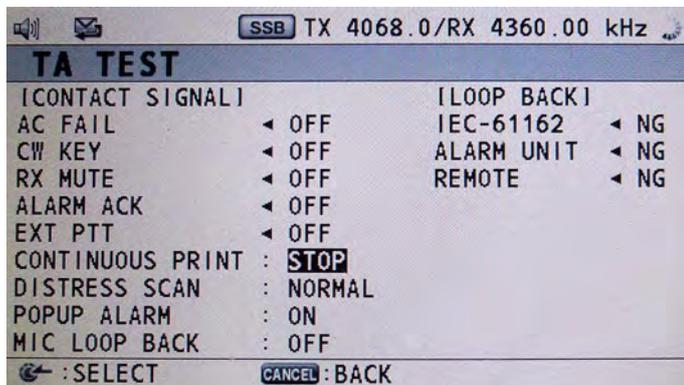


Fig. 6.5.4 CONTACT SIG and LOOP BACK Signal Circuit Diagram

1. AC FAIL

This test menu is used to ensure the input of the AC FAIL signal between #1 (AC FAIL) and #2 (0V) of TB7 on the T-IF board. Causing a short circuit between the said AC FAIL terminals will display “ON” in the AC FAIL column.

When the AC FAIL signal is detected, a popup message saying “Tx power reduced. Ship’s main failure.” will appear on the window and an alarm sound will be outputted.

2. CW KEY

This test menu is used to ensure the input of the KEY signal between #11 (KEY-H) and #12 (KEY-C) of TB7 on the T-IF board. Causing a short circuit between the said KEY terminals will display “ON” in the CW KEY column if normal.

3. RX MUTE

This test menu is used to ensure the input of the RX MUTE signal between #15 (RX MUTE N) and #17 (0V) of TB6 on the T-IF board. Setting the RX MUTE to “L” level will display “ON” in the RX MUTE column if normal. The signal ringtone will definitely be muted.

4. ALARM ACK

This test menu is used to ensure the input of the ALARM ACK signal between #9 (ALM ACK H) and #10 (ALM ACK C) of TB7 on the T-IF board.

Causing a short circuit between the said ALARM ACK terminals will display “ON” in the ALARM ACK column if normal.

5. EXT PTT

This test menu is used to ensure the input of the REM TX KEY signal between #14 (REM TX KEY N) and #9 (GND) of TB7 on the [REMOTE] port.

Setting the REM TX KEY signal to “L” level will display “ON” in the EXT PTT column if normal.

6. CONTINUOUS PRINT

This test menu is used to conduct a printer test. Selecting this menu will display the “START / STOP” popup window.

Clicking on “START” will print “0123456789” on each line.

To stop printing, click on “STOP.”

7. DISTRESS SCAN

This test menu is used to make setting so as to stop scanning Distress alert. Of course, it is possible to receive the Distress alert at a frequency at which scanning was stopped. This setting will be canceled when turning on the power again, receiving Distress alert at the frequency at which scanning was stopped, or switching the SCAN window to any different window.

8. POPUP ALARM

This test menu is used to make setting so as to disable an alarm to sound during a popup message is displayed.

For example, if the PLL circuit of the RX board causes a failure, a message saying "RX PLL UNLOCK!" will appear and an alarm will sound. Setting "POPUP ALARM" to "OFF" will disable the alarm to sound.

This setting will be canceled when turning on the power supply again.

9. MIC LOOP BACK

This test menu is used to conduct loop-back tests on the HANDSET. Audio signals from the HANDSET microphone are outputted to the Panel speaker and EXT speaker. Audio signals are looped back not from the FS-xx75T unit, but within the FS-2575C unit.

Note)

Loop-back tests are independent of "HOOK SP" and "SP OFF" settings.

This setting will be canceled when turning on the power again

10. IEC-61162

This test menu is used to conduct loop-back-tests on the IEC-61162 signal. The IEC-61162 signal is determined to be OK when a specific command is transmitted and it can be received.

To implement this menu, cause a short circuit between GNSS TD and RD on the T-IF board as shown below:

- Between #1 (TD-A) and #3 (RD-A) of TB6
- Between #2 (TD-B) and #4 (RD-B) of TB6

11. ALARM UNIT

This menu is used to conduct loop-back-tests on the ALARM UNIT connection terminals. The ALARM UNIT connection terminals are determined to be OK when a specific command is transmitted and it can be received.

To implement this menu, cause a short circuit between IC TD and RD on the T-IF board as shown below:

- Between #3 (IC TD-A) and #5 (IC RD-A) of TB7
- Between #4 (IC TD-B) and #6 (IC RD-B) of TB7

12. REMOTE

This menu is used to conduct loop-back tests on the TX and RX data lines of the [REMOTE] port. The TX and RX data lines are determined to be OK when a specific command is transmitted and it can be received.

The [REMOTE] port has two data lines, that is, RS-232C and RS-485. Conduct individual loop-back tests on each data line.

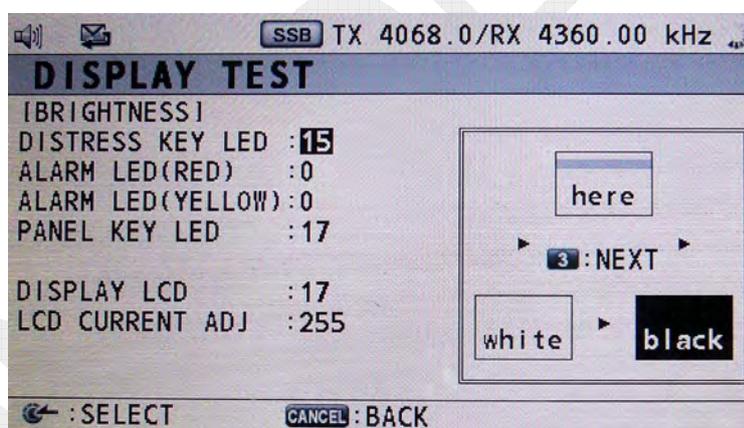
To select either one of the two data lines, select [MENU] -> 9.SERVICE -> 3.RT SETUP -> 1.SETUP -> "MIF."

MIF Setting	Location of Jumper	
RS-232C	#2 (SD) and #3 (RD)	
RS-485	#21 (REM TD-A) and #23 (REM R D-H)	#22 (REM TD-B) and #24 (REM R D-C)

6.5.5 DISPLAY TEST

To conduct DISPLAY TEST, select [MENU] -> 9.SERVICE -> 5.TEST -> "5. DISPLAY TEST," and then press the [ENTER] knob.

The display tests are conducted to check for the brightness of LEDs.



1. DISTRESS KEY LED

This test menu is used to check for the brightness of LED in the DISTRESS key. The brightness is variable in the range of "0" to "17."

2. ALARM LED (RED)

This test menu is used to check for the brightness of ALARM LED (RED). The brightness is variable in the range of "0" to "17."

3. ALARM LED (YELLOW)

This test menu is used to check for the brightness of ALARM LED (YELLOW). The brightness is variable in the range of "0" to "17."

4. PANEL KEY LED

This test menu is used to check for the brightness of LED in the panel key. The brightness is variable in the range of “0” to “17.”

5. DISPLAY LCD

This test menu is used to check for the brightness of the LCD. The brightness is variable in the range of “0” to “17.”

6. LCD CURRENT ADJ

This test menu is used to adjust current flowing through the LCD. The current is adjustable in the range of “0” to “255.”

7. [3]: NEXT

Every time the [3] key is pressed, the LCD window changes to “White” -> “Black” -> “Previous window.”

6.6 MAINTENANCE LOG

6.6.1 I/O MONITOR

To monitor IEC-61162, ALARM UNIT, and data received at the REMOTE port, select [MENU] -> 9.SERVICE -> 6.MAINTENANCE LOG -> "1. I/O MONITOR," and then press the [ENTER] knob.

1. IEC-61162

For details, refer to information on page 4-18.

2. ALARM UNIT

For details, refer to information on page 4-83.

3. REMOTE

For details, refer to information on page 4-80.

6.6.2 ERROR LOG

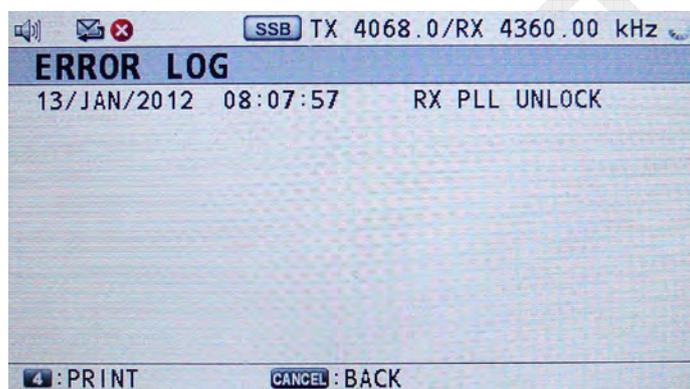
A maximum of 10 error logs are recorded and, when the number of error logs recorded exceeds “10,” the logs are erased in the order in which they were recorded. Errors that are currently occurring can be checked by selecting [MENU] -> 8.ALARM.

All error logs contain the same items to be detected and displayed. For details, refer to information on page 6-20.

Errors that are displayed on [MENU] -> 8.ALARM window are automatically erased when the relevant event is eliminated. However, the ERROR LOG is not erased.

To erase any error log, select

- [MENU] -> 9.SERVICE -> 4.RESTORE FACTORY SETTINGS, or
- CLEAR ALL (Set “S1” on the T-IF board to “ON,” and then enter the password.)



The ERROR LOG window displays the date of ZDA or RTC (ZDA is given priority) and errors. Errors to be detected and displayed are as follows:

- TX PLL UNLOCK
- WR1 PLL UNLOCK
- MAIN AMP HEATED
- VC ERROR
- RX PLL UNLOCK
- WR2 PLL UNLOCK
- SHIP'S MAIN FAILURE

6.6.3 SOFTWARE UPDATE LOG

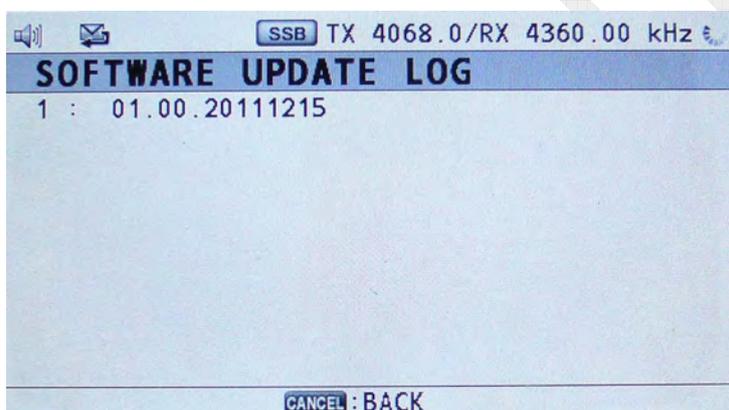
This menu is used to record updates of the programs of the FS-2575C unit every time the program is updated. A maximum of 10 update logs are recorded and, when the number of update logs recorded exceeds “10,” the logs are erased in the order in which they were recorded.

Reference)

When a combination of programs of the T-CPU of the FS-xx75T unit is different from that of programs of the C-CPU of the FS-2575C unit, the programs of the C-CPU will be replaced so that they will automatically come to the combination of programs of the T-CPU.

To erase SOFTWARE UPDATE LOG, select

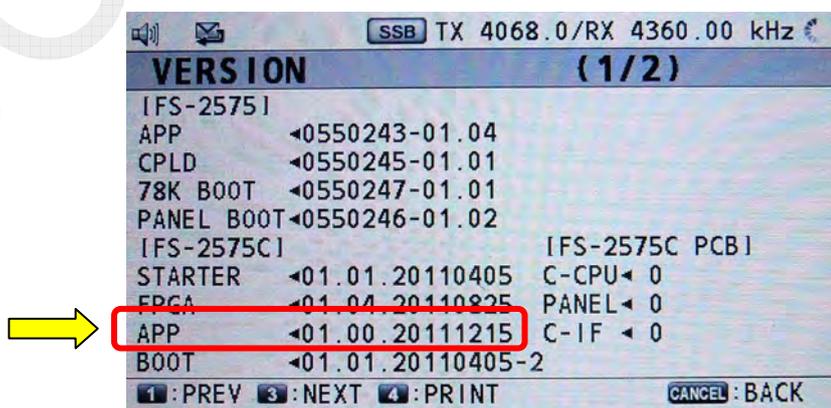
- [MENU] -> 9.SERVICE -> 4.RESTORE FACTORY SETTINGS, or
- CLEAR ALL (Set “S1” on the T-IF board to “ON,” and then enter the password.)



The SOFTWARE UPDATE LOG window displays a serial number (1 to 10) and the “APP” version of the FS-2575C unit. The “APP” version represents that selected by [MENU] -> 9.SERVICE -> 5.TEST -> 1.VERSION -> [FS-2575C] -> “APP.”

Note)

In the version configuration, a number like “ --- 20111215” that represents a date is given just for convenience sake.



6.6.4 POWER ON LOG

This menu is used to record a maximum of 10 logs of date and time on and at which the power turned ON and, when the number of logs recorded exceeds “10,” the logs are erased in the order in which they were recorded.

To erase POWER ON LOG, select

- [MENU] -> 9.SERVICE -> 4.RESTORE FACTORY SETTINGS, or
- CLEAR ALL (Set “S1” on the T-IF board to “ON,” and then enter the password.)

POWER ON LOG			
13/JAN/2012	04:37:21	POWER ON	0x00
13/JAN/2012	01:48:22	POWER ON	0x00
13/JAN/2012	01:25:59	POWER ON	0x00
13/JAN/2012	00:52:16	POWER ON	0x00
13/JAN/2012	00:38:37	POWER ON	0x00
13/JAN/2012	00:36:55	POWER ON	0x00
13/JAN/2012	00:26:43	POWER ON	0x00
12/JAN/2012	09:00:08	POWER ON	0x00
12/JAN/2012	08:38:46	POWER ON	0x00

CANCEL : BACK

The POWER ON LOG displays date and time on and at which ZDA or RTC (ZDA is given priority) was powered ON and “0x00.”

“0x00” represents in hex notation where the error was detected at and where the system restarted operation from.

Code	Startup	Remark
0x00	Normal startup	
0x01	Startup from SH-2A MAIN CPU	SH-2A is MAIN CPU that controls the whole system.
0x02	Restart from DSP	DSP handles modulation, demodulation, and audio processing.
0x04	Restart from Nios2	Nios2 is mounted on FPGA chip and mainly performs LAN communication.
0x08	Restart from 78K CPU	Controls NBDP communication.

Reference)

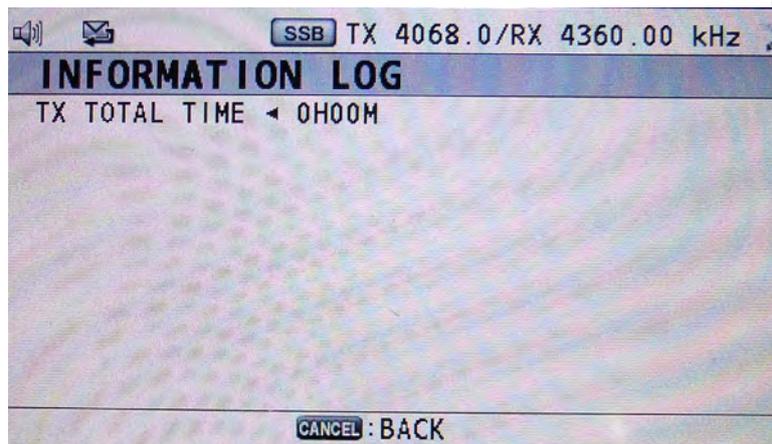
Watchdogs monitor the programs of MAIN CPU, DSP, Nios2, and 78K CPU of the T-CPU board whether they have any error in operation. When an error is detected, the system will restart.

6.6.5 INFORMATION LOG

This menu is used to display cumulative time during which TX is kept ON.

To erase the TX TOTAL LOG, select

- [MENU] -> 9.SERVICE -> 4.RESTORE FACTORY SETTINGS or
- CLEAR ALL (Set "S1" on the T-IF board to "ON," and then enter the password.)



6.7 Erasing FS-2575C Software

Clicking on “SOFTWARE ERASE” on the “OTHER” window will erase backup data saved in the C-CPU application program “APP” and in the flash ROM of C-CPU of the FS-2575C unit and return set values to their default.

Furthermore, software can be erased by FS-2575C unit.

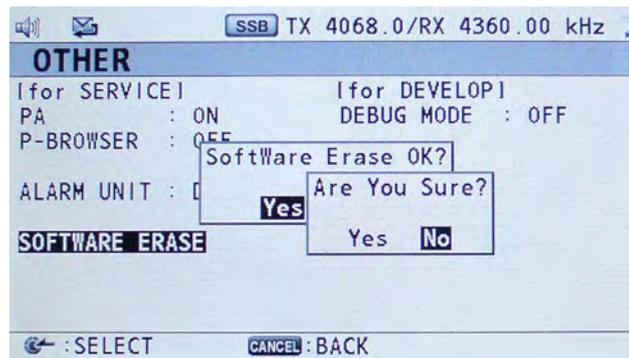
Clicking on “SOFTWARE ERASE” will automatically install C-CPU programs from T-CPU.

Table 6.7.1 FS-2575C Data to be erased

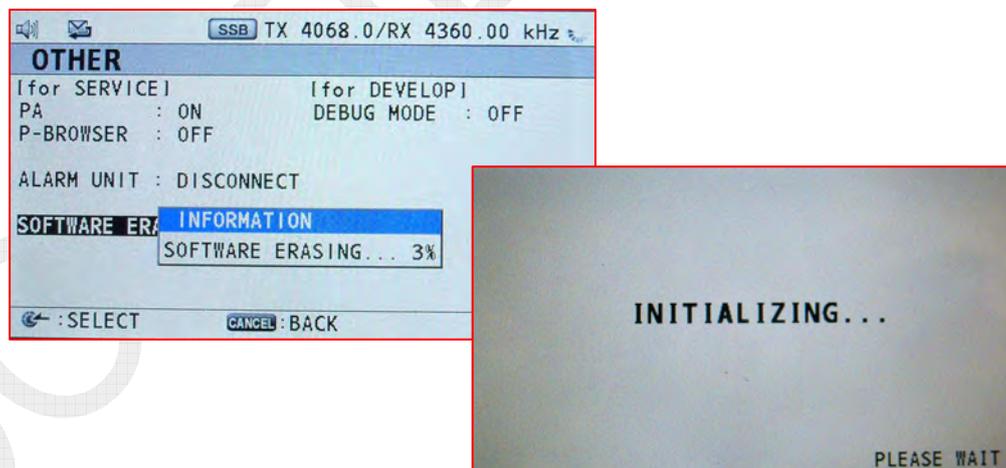
No.	Data To Be Erased	Default	Setting Item
1	SQ setting	OFF	ON/OFF
2	5.SYSTEM -> 1.SQ FREQ.	1000Hz	500Hz to 2000Hz
3	5.SYSTEM -> 2.KEY Assign -> F1	TX / RX FREQ	· TX/RX FRE · RX FREQ · MODE
4	5.SYSTEM -> 2.KEY Assign -> F2	DAILY TEST	· AGC · TX PWR · TX MONITOR
5	5.SYSTEM -> 2.KEY Assign -> F3	TEST CALL	· TEST CALL · MSG FILE · DAILY TEST · LOG · INTERCOM · CLARIFIER
6	RT SETUP window check meter	IA	IA / IC / VC / RF / VS
7	5.SYSTEM -> 3.PRINT -> 1.TX MSG	MANUAL	AUTO / MANUAL
8	5.SYSTEM -> 3.PRINT -> 2.RX MSG	MANUAL	AUTO / MANUAL
9	5.SYSTEM -> 3.PRINT -> 3.DAILY TEST	MANUAL	AUTO / MANUAL
10	Handset volume setting	10	1 to 20
11	7.AUDIO -> 1.KEY CLICK	2	0 to 3
12	7.AUDIO -> 3.ORDINARY ALARM -> 1.SAFETY	5	0 to 5
13	7.AUDIO -> 3.ORDINARY ALARM -> 2.ROUTINE	5	0 to 5
14	7.AUDIO -> 2.OFF HOOK SP	MUTE	SP ON / MUTE
15	7.AUDIO -> 5.SIDE TONE	600	400 to 1000
16	7.AUDIO -> 6.SIDE TONE LV	32	0 to 63
17	9.SERVICE -> 2.DSC SETUP -> DISTRESS ALARM	16	0 to 31
18	9.SERVICE -> 6.MAINTENANCE LOG -> 3.SW UPDATE LOG	deleted	
19	NIGHT MODE, DAY MODE LED & LCD setting	DAY mode	Day mode: Max.

Procedure)

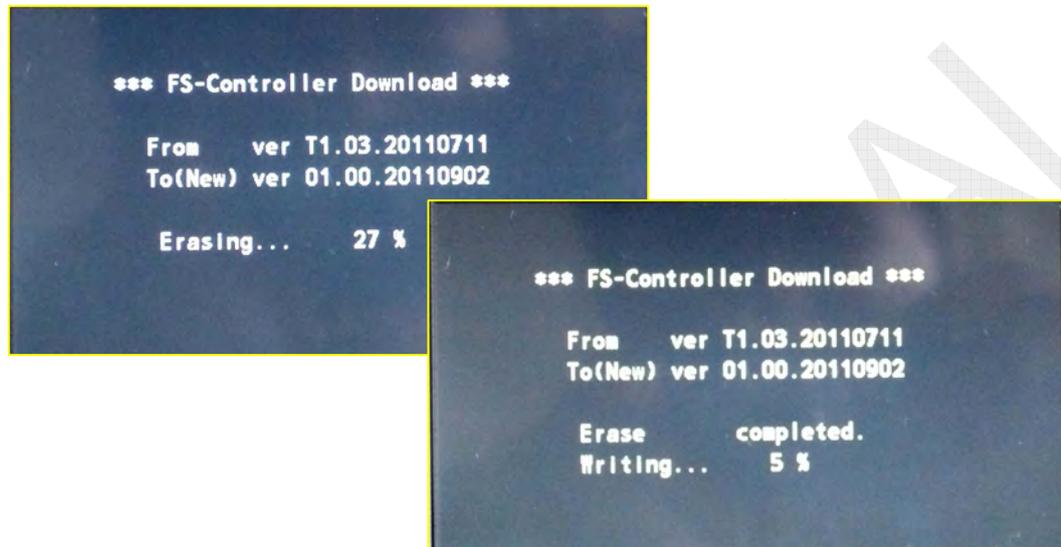
1. Select [MENU] -> 9.SERVICE -> 7.OTHER -> "SOFTWARE ERASE," and then press the [ENTER] knob.
2. A popup message saying "SoftWare Erase OK?" will appear. Click "Yes," and then press the [ENTER] knob.
Further, a popup message saying "Are You Sure?" will appear. Click "Yes," and then press the [ENTER] knob.



3. A popup window saying "SOFTWARE ERASING...xx%" will appear. When the erasing rate reaches 100%, the window will fade out to display the "INITIALIZING..." window. This state continues for a while.



4. After a while, the “*** FS-Controller Download ***” window appears to initiate erasing an application program while indicating the erasing rate in the “Erasing xx%” column. Upon completion of erasing, the unit initiates writing while indicating the writing rate in the “Writing xx%” column.



5. Upon completion of writing, the window fades out, and then the display returns to the normal RT SETUP window.

Note)

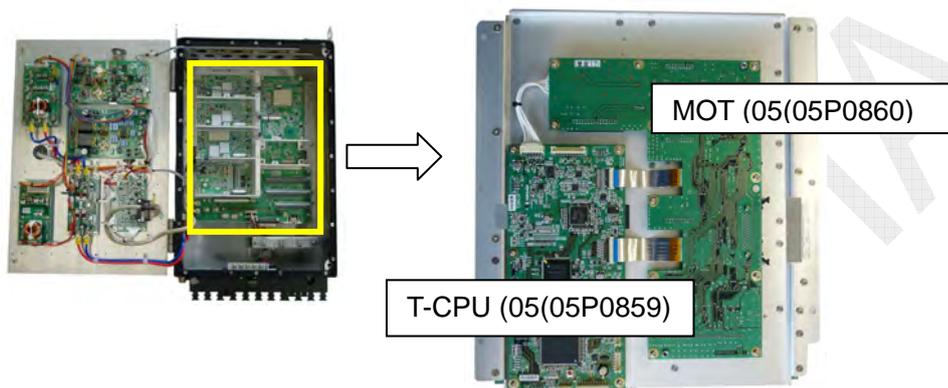
The SOFTWARE UPDATE LOG records update when an application program that has been installed in the C-CPU installs a different version of the application program.

Consequently, even if the application program for the C-CPU is automatically reinstalled by clicking on “SOFTWARE ERASE,” this will not be recorded in the software update log.

6.8 LED Check

6.8.1 LEDs for FS-xx75T Unit

LEDs for the FS-xx75T unit are mounted on the T-CPU and MOT boards. These boards are mounted on the back of the board mounting chassis. This causes difficulty in checking for the operation of the LEDs.



1. T-CPU Board (05P0859)

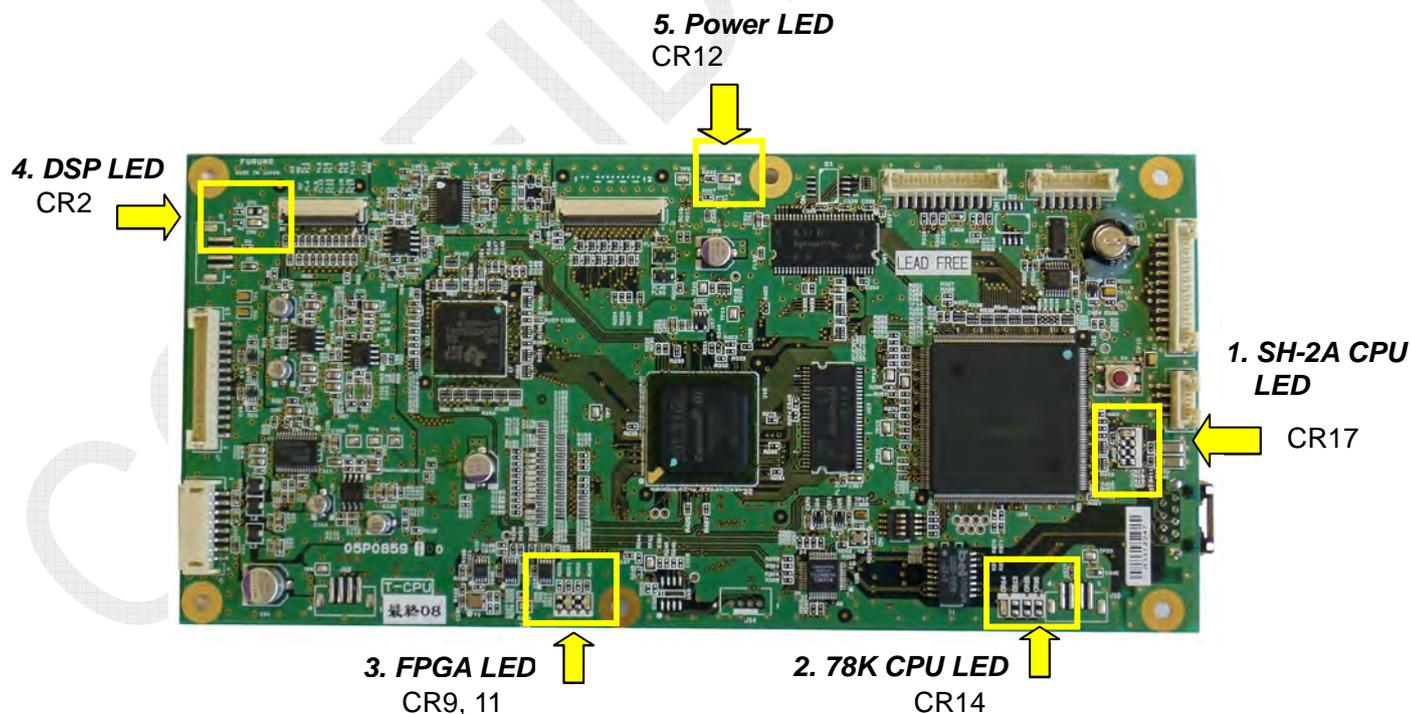


Table 6.8.1 LEDs on T-CPU Board

No.	Name	LED	Function
1	SH-2A CPU LED	CR17	Controlled by the SH-2A CPU of the control unit. Blinks in 500-msec period by performing the serial communication reception analysis task.
2	78K CPU LED	CR14	Controlled by the 78K CPU of the NBDP transceiver unit. Blinks according to the data transfer rate while a program is being updated from the SH-2A CPU to the 78K CPU or in 1-second period while in other normal operation modes.
3	FPGA LED	CR9	Controlled by the FPGA and the internal Nios II (LAN transceiver control unit). · From the startup of power supply to the completion of FPGA configuration: The LED normally turns ON. · From the completion of FPGA configuration to cancellation of FPGA resetting: The LED normally turns ON. · After cancellation of FPGA resetting: The LED repeated turning ON and OFF in 1-second period.
		CR11	Controlled by the FPGA and the internal CPU (Nios II). Blinks in 250-msec period by performing the idle task of the Nios II processor.
4	DSP LED	CR2	Controlled by the DSP (C5502) of the signal processing unit. Blinks in 1-second period.
5	Power LED	CR12	Connected to the power supply line (DC+3.3V). Not controlled by software.

2. MOT Board (05P0860)

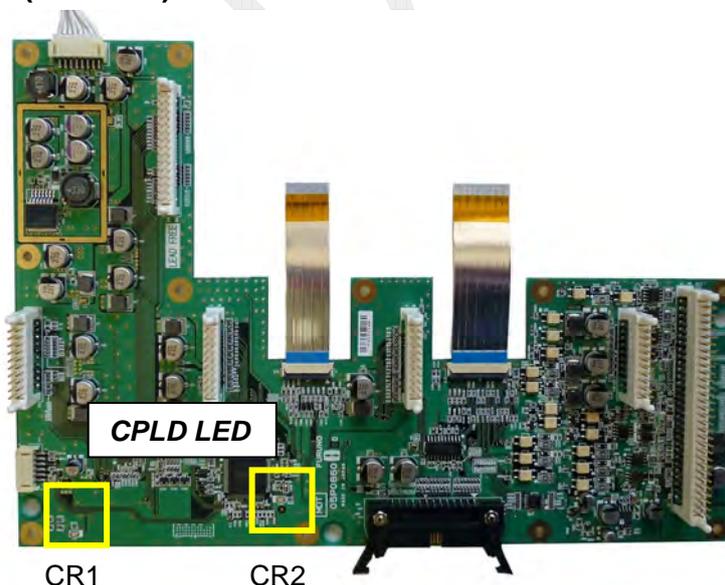


Table 6.8.2 LEDs on MOT Board

Name	LED	Function
CPLD LED	CR1	Controlled by CPLD. Turns ON when CPLD is in operation (when power supply turns ON).
	CR2	

6.8.2 LEDs for FS-xx75C Unit

LEDs for the FS-xx75C unit are mounted on the C-CPU board.

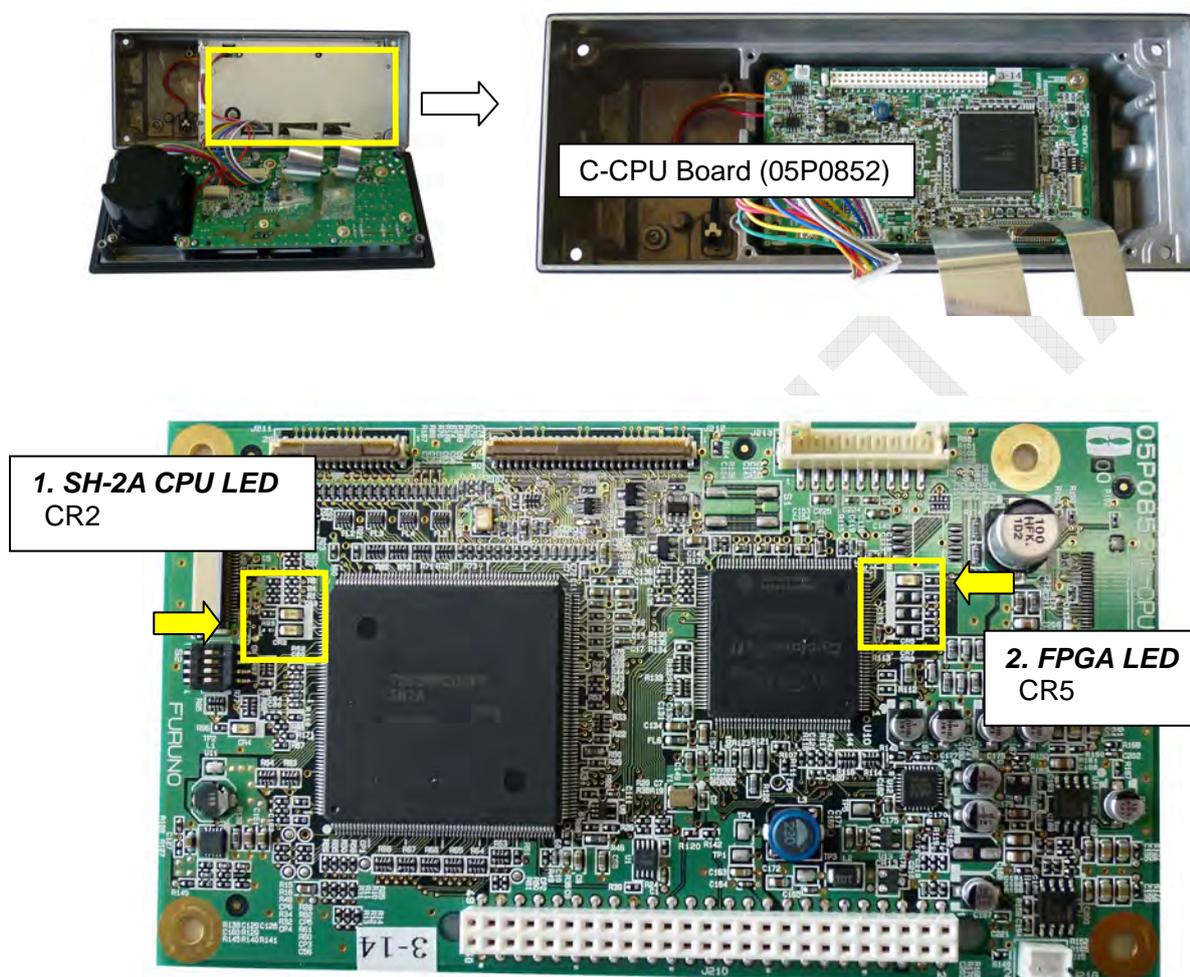
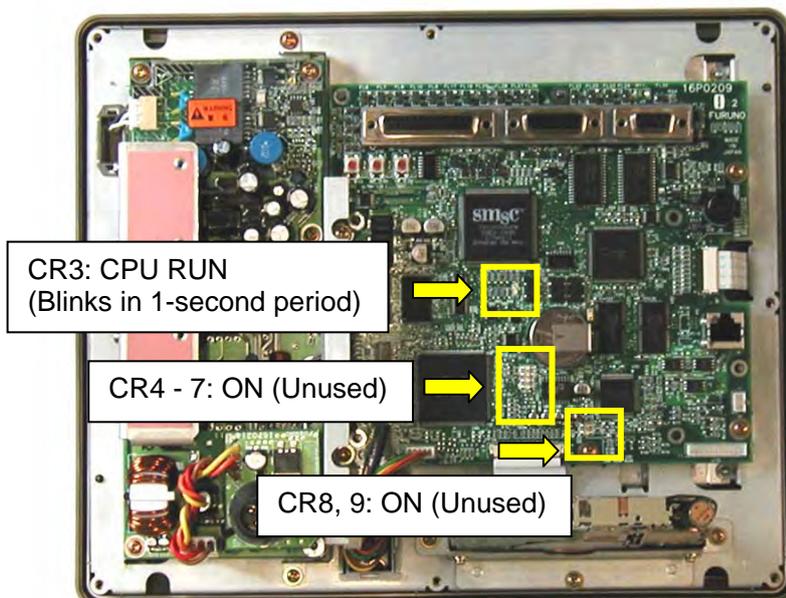


Table 6.8.3 LEDs on C-CPU Board

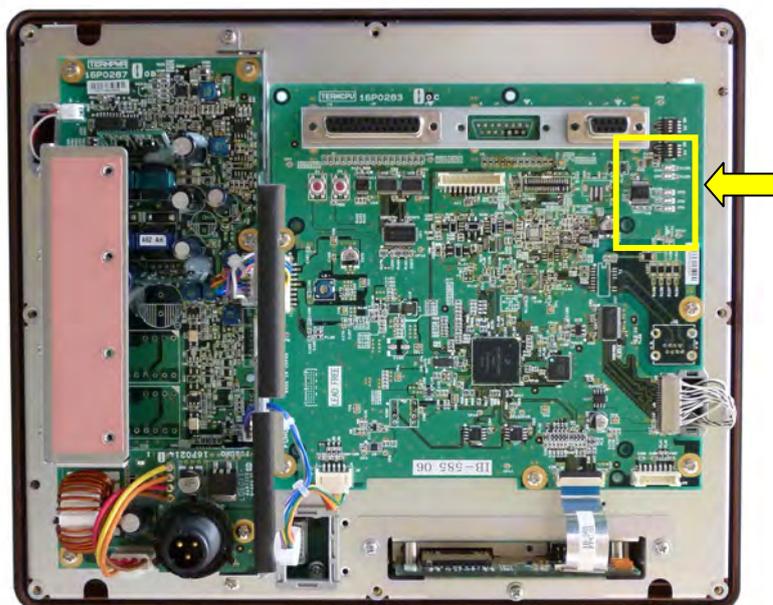
No.	Name	LED	Function
1	SH-2A CPU LED	CR2	Blinks in 1-second period by performing the least significant task after startup.
2	FPGA LED	CR5	Normally turns OFF.

6.8.3 LEDs for NBDP Terminal

1. IB-583



2. IB-585



CR1
Note) CR2, 3, 5, and 6 are not mounted

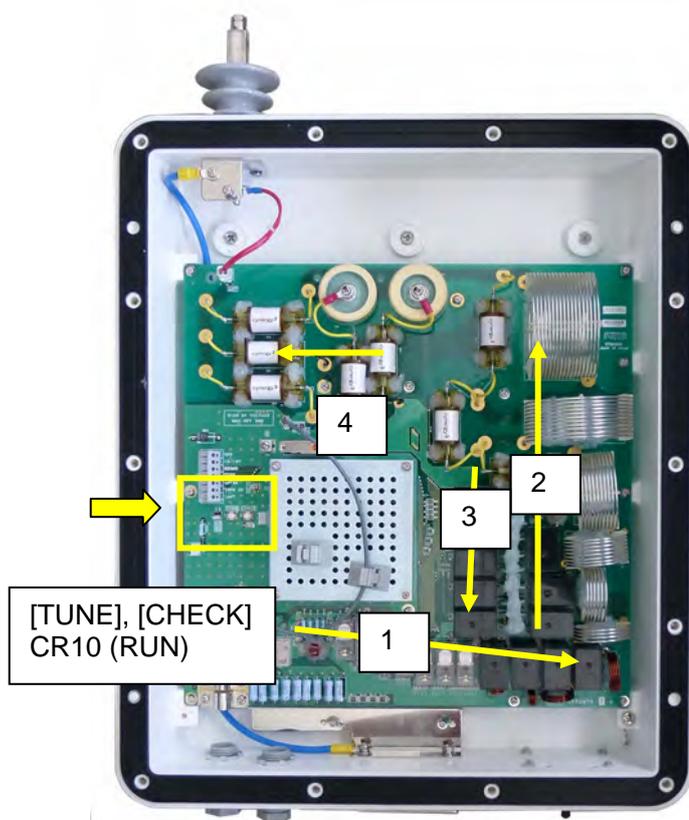
- CR1:
- While the starter program is running:
Normally turns ON.
 - While the boot program is running:
Blinks fast.
 - While the application program is running:
Blinks slow.

6.9 Checking Antenna Coupler

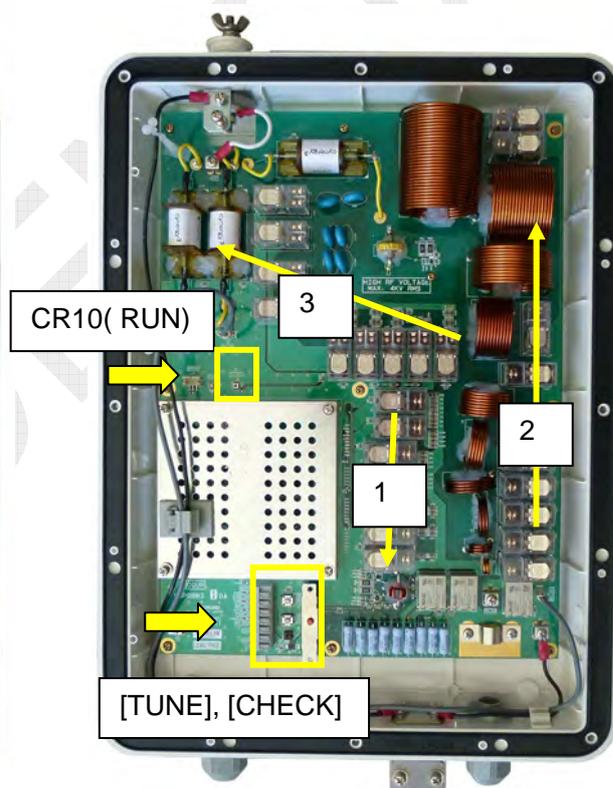
6.9.1 Self-test

When the [CHECK] is pressed, The AT-1575/AT-5075 Antenna coupler initiates self-tests following the procedure shown below:

1. Turn OFF all relays.
2. Turn ON and OFF capacitor control relays and coil control relays on the input side as well as capacitor control relays on the output side, one after another.
3. Check ROM, RAM, and ADC that are built in the CPU.
4. Upon completion of checking, return the antenna coupler to its original state.



AT-5075



AT-1575

1. Checking for matching circuit relays

Interval of time at which a relay turns ON and OFF varies with a period of time to press and hold the [CHECK] push button switch.

As for a period of time to press and hold the [CHECK] push button switch, a period of 100 msec. is taken as 1 step and a maximum of 10 steps are allowed. Even if the [CHECK] push button switch is pressed and held for a period of 1 sec. or more, it is considered to have pressed and held for a period of 1 sec. Interval of time at which a single relay is checked is defined as “50 msec. × Number of steps × 2” based on the number of steps in which the key was pressed.

For example, when the [CHECK] push button switch is pressed and held for a period of 1 second or more, the relay will turn ON and OFF at intervals of “50 msec. × 10 × 2 = 1 sec.” because the number of steps is 10.

When the [CHECK] push button switch is pressed and held for a period of 100 msec. or less, the relay will turn ON and OFF at intervals of “50 msec. × 1 × 2 = 100 msec.” because the number of steps is 1.

Note)

- 1) Normally, CR10 (CPU RUN LED) turns ON and OFF in 2-sec period.
When the [CHECK] push button switch is pressed with the CR10 turned ON, the CR10 will be kept ON until the self-test is completed. When the key is pressed with the CR10 turned OFF, it will be kept OFF until the self-test is completed.
- 2) Even if tuning is initiated during the self-test, the “TUNE” control signal will be ignored and an error message saying “ERROR: TUNE NG” will appear.
- 3) To cancel the self-test when the relay is being checked, press the [CHECK] push button switch again. The antenna coupler will return to the original state.

2. Checking ROM

ROM is built in the CPU chip.

Upon completion of checking relays, the ROM is checked through a checksum in a specific address section. If a ROM error is detected, the CR10 blinks once (for a period of 100 msec).

3. Checking RAM

RAM is built in the CPU chip.

Upon completion of checking the ROM, the RAM is checked through a Read/Write check in a specific address section. If a RAM error is detected, the CR10 blinks twice (in 100-msec period).

4. Checking ADC

ADC is built in the “U1” CPU chip.

Upon completion of checking the RAM, the ADC is checked through checking the values of VF, VR, IA, and TEMP. If an abnormal value (threshold value) is detected, the CR10 blinks four times (in 100-msec period).

6.9.2 Checking Antenna Coupler

1. Checking for running of CPU

When the CR10 on the COUP board turns ON and OFF in 2-sec. period, this means that the CPU is running. If the CR10 does not turn ON and OFF, replace the COUP board.

2. Checking self-test

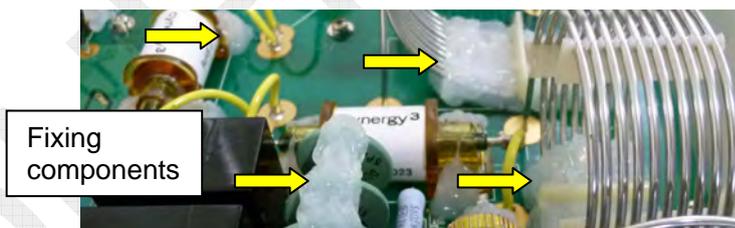
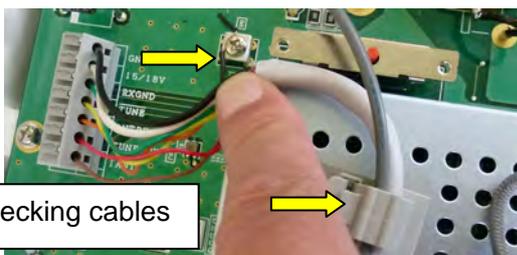
When the [CHECK] push button switch on the COUP board is pressed, relays that control the capacitors and coils of the matching circuit will turn ON and OFF one after another. If any of the relays does not turn ON and OFF, replace the COUP board. It can be checked visually or by hearing sound whether the relay turns ON and OFF.

3. Ensuring finish of cables and mounting of components

Ensure that coils and capacitors are fixed with silicone rubber, and that screws fixing disc-shaped titanium oxide capacitors and leads are securely fastened.

Ensure that relay leads come into touch with nowhere.

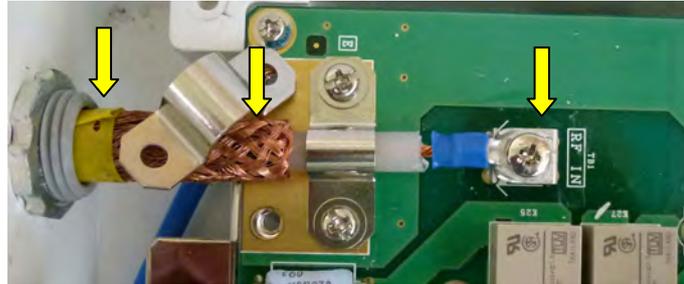
Connect the shield wires of control cable to the ground terminal and fix the cable with cable clamps.



4. Ensuring connection of coaxial cable

Ensure that the coaxial cable is securely fixed. Particularly to finish the coaxial cable shield, bend back the shield once, and then fix the portion bent back with a larger clamp.

Furthermore, tape the end of the shield that was bent back.



5. Ensuring mounting of copper grounding band and fastening of gland

Make the copper grounding band as short as possible. Conduct grounding work so as not to fracture the band due to vibration, and ensure that screws fixing the band are securely fastened.

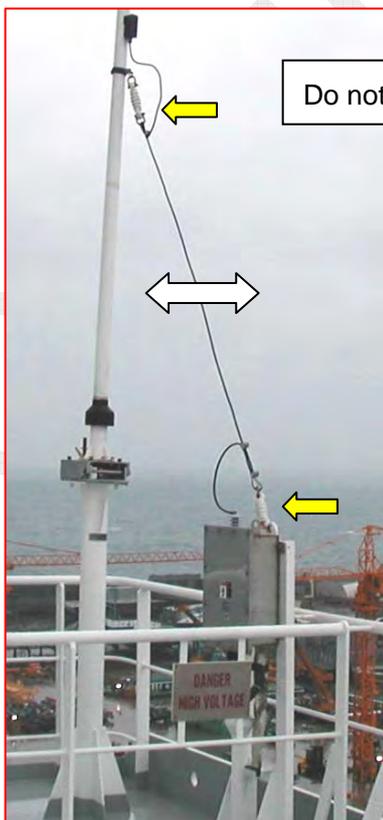
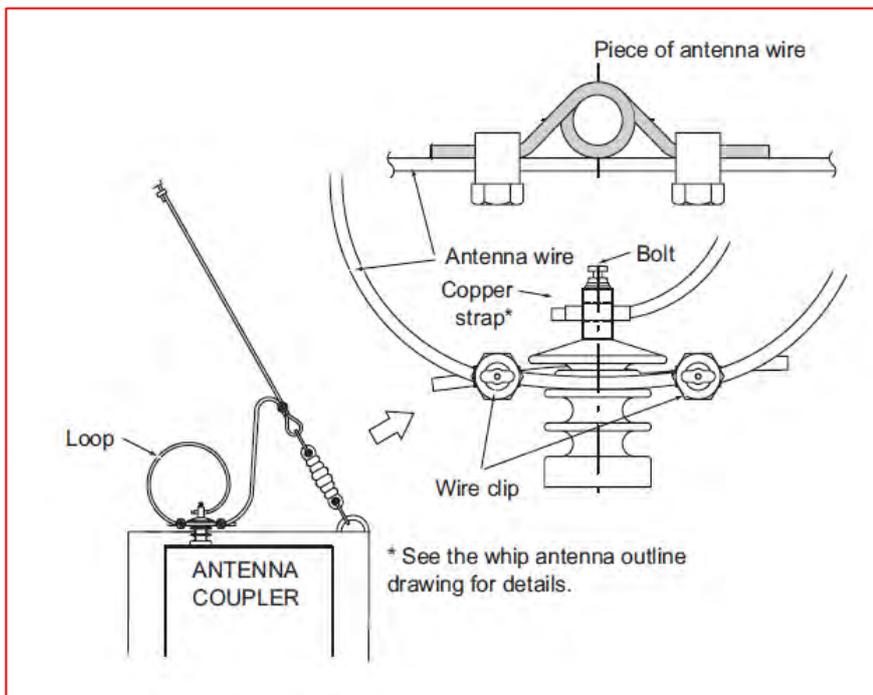
Ensure that the cable gland is securely fastened. Furthermore, apply a coating of silicone rubber to the clearance of the cable gland and the ground mounting plate and screws.



Since the welded parts of copper band may be broken by swinging of wind, shorten the copper band. The copper band should be as short as possible.

6. Ensuring antenna connection

A tension value of the lead-in wire can be determined by considering its flexure due to the swinging of the Antenna. Too strong tension may cause breaking at the connection base of the lead-in wire, while too weak tension may cause a touch between the lead-in wire and other structures.



Do not use any insulator.



Breaking the connection of lead-in wire may cause burning-out of the Antenna coupler or RT breakdown.

6.9.3 Troubleshooting for TUNE NG

Causes of “TUNE NG” (tuning failure) are supposed that RF signal is not inputted in the ATU, the impedance of an antenna is extremely high or low, and the ATU has a trouble.

1. Is the LED “CR10 (CPU RUN)” on the COUP board blinking? If NOT, the COUP board has a trouble. Replace the COUP board.
2. Conduct tuning operation. If the ATU shows no reaction to it, check for the connection between the ATU and the FS-xx75T unit, and check whether power is supplied to the ATU.
3. Select [MENU] -> 9.SERVICE -> 3.RT SETUP -> 1.SETUP -> “TX TUNE,” and ensure that “TX TUNE” is set to “ON.”
4. Select [MENU] -> 1.TEST -> 2.TX SELF TEST -> “COUPLER.” If the coupler fails the self-test, check for the connection between the ATU and the FS-xx75T unit
5. Conduct tuning operation. If the ATU shows no reaction to it, cause a short circuit between #7 (TUNE OK) and #9 (TUNE) of TB6 on the T-IF board. If “TUNE OK” appears on the window, the ATU or control cable has a trouble. If “TUNE NG” appears on the window, the T-TF, MOT, or T-CPU board has a trouble.
6. If “TUNE NG” appears on the window as soon as tuning operation is initiated, the RF signal has not been inputted. In this case, check for the coaxial cable between the ATU and the FS-xx75T unit. TX output power for tuning operation ranges from 10 to 15 watts. Ensure that it has fallen within the said range. Furthermore, check whether the volume of TUNE POWER Data has been reduced.
7. Conduct tuning operation. If the system initiates tuning and fails it in a specific frequency band,
 - 1) check for any burnout in the matching circuit;
 - 2) conduct a self-test on the ATU and check for any relay with burned out contact;
 - 3) check whether the antenna is breaking or touch with a structure;
 - 4) ensure that the ground wire of the ATU is securely connected;
 - 5) ensure that the shield side of the RF coaxial cable to be connected to the ATU is securely connected to the COUP board;
 - 6) ensure that the connector of the RF coaxial cable to be connected to the ATU is securely mounted;
 - 7) ensure that RF coaxial cable to be connected to the ATU has no corrosion or water leakage; and
 - 8) change the length of the antenna lead-in wire.

6.10 Replacement of Boards

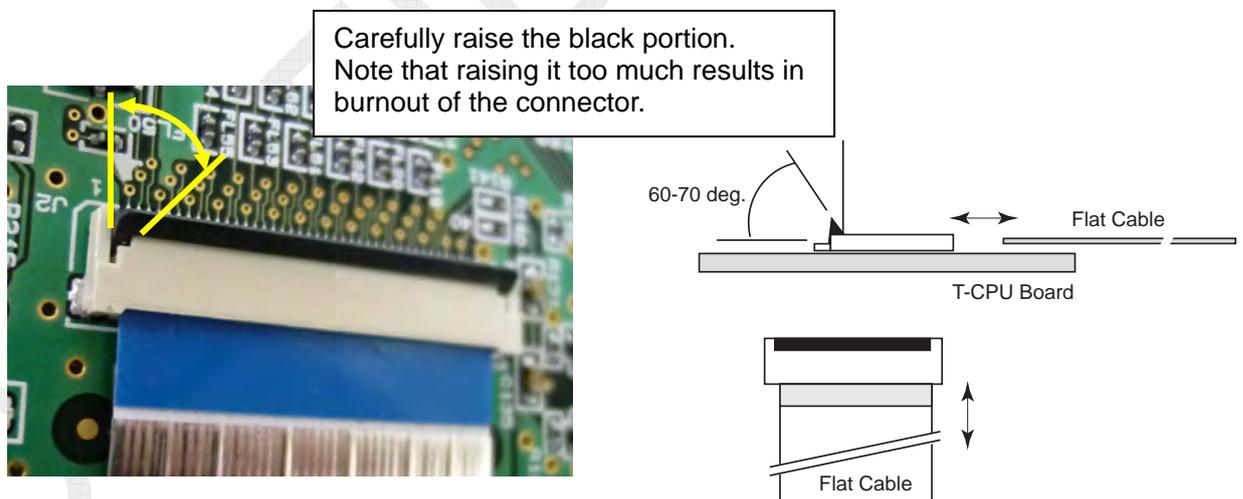
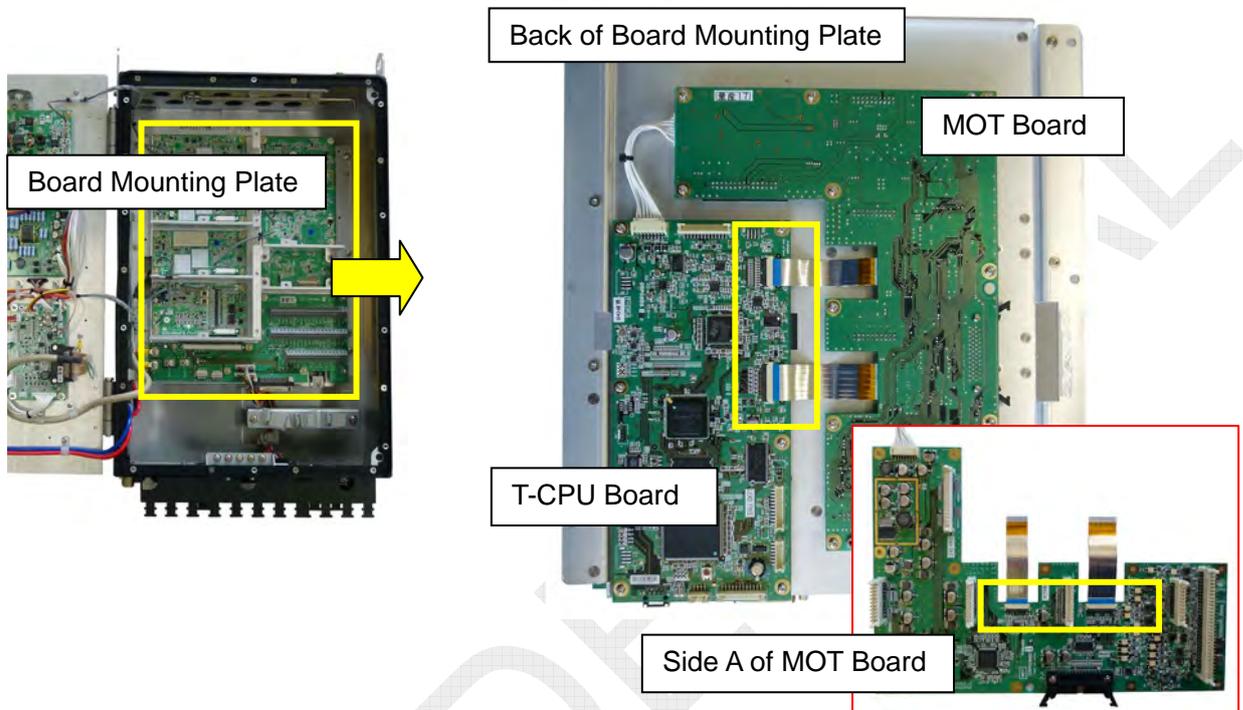
6.10.1 List of Boards

Table 6.10.1 List of Boards

Name	Type	FS-1575	FS-2575	FS-5075	Note
Transceiver unit: FS-2575T, 5075T					
WR1	05P0847A	✓	✓	✓	For DSC Distress/Safety RX
WR2	05P0847B	✓	✓	✓	Option: For DSC Routine Rx
TX	05P0856	✓	✓	✓	
DRV	05P0866A			✓	
	05P0866B		✓		
PA	05P0867A			✓	
	05P0867B		✓		
	05P0868	✓			
COMB	05P0869			✓	
TX FIL	05P0870A			✓	
	05P0870B		✓		
	05P0876	✓			
PA-IF	05P0864		✓	✓	
	05P0864A	✓			
RX	05P0842	✓	✓	✓	
DUP-FIL	05P0863			✓	Option
RX FIL	05P0862A			✓	
	05P0862B	✓	✓		
MOT	05P0860	✓	✓	✓	
T-CPU	05P0859	✓	✓	✓	
T-IF	05P0861		✓	✓	
	05P0861A	✓			
FET	05P0872			✓	
P-SW	05P0871	✓	✓	✓	
PWR	05P0874	✓	✓	✓	
SW REG	05P0873		✓	✓	
Control unit: FS-2575C					
PANEL	05P0844	✓	✓	✓	
C-IF	05P0853	✓	✓	✓	
C-CPU	05P0852	✓	✓	✓	
Antenna Coupler unit					
COUP	05P0875		✓	✓	AT-5075
	05P0883	✓			AT-1575

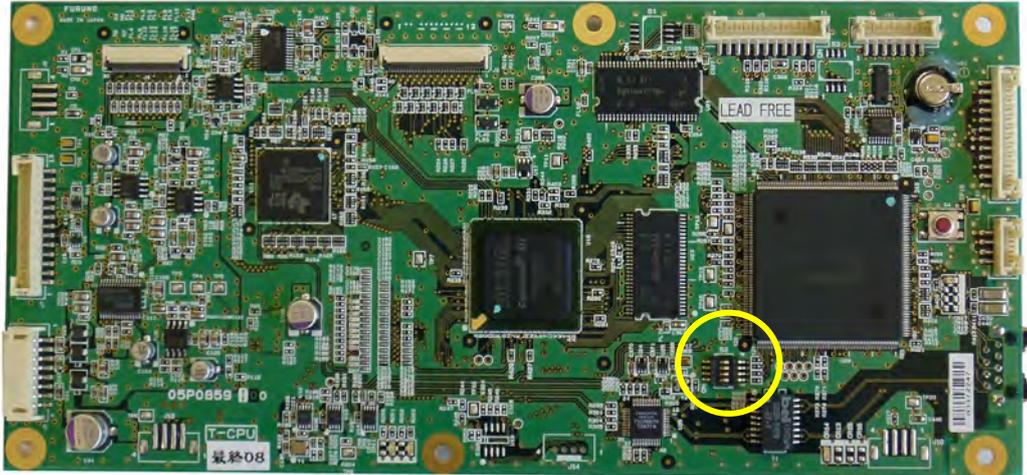
6.10.2 Precautions for Replacing Board

1. Replacing T-CPU board



Ensuring the setting of DIP switch on the T-CPU board

Set the “S2” DIP switch all to “OFF.” The DIP switch setting is a function provided for R & D engineer.

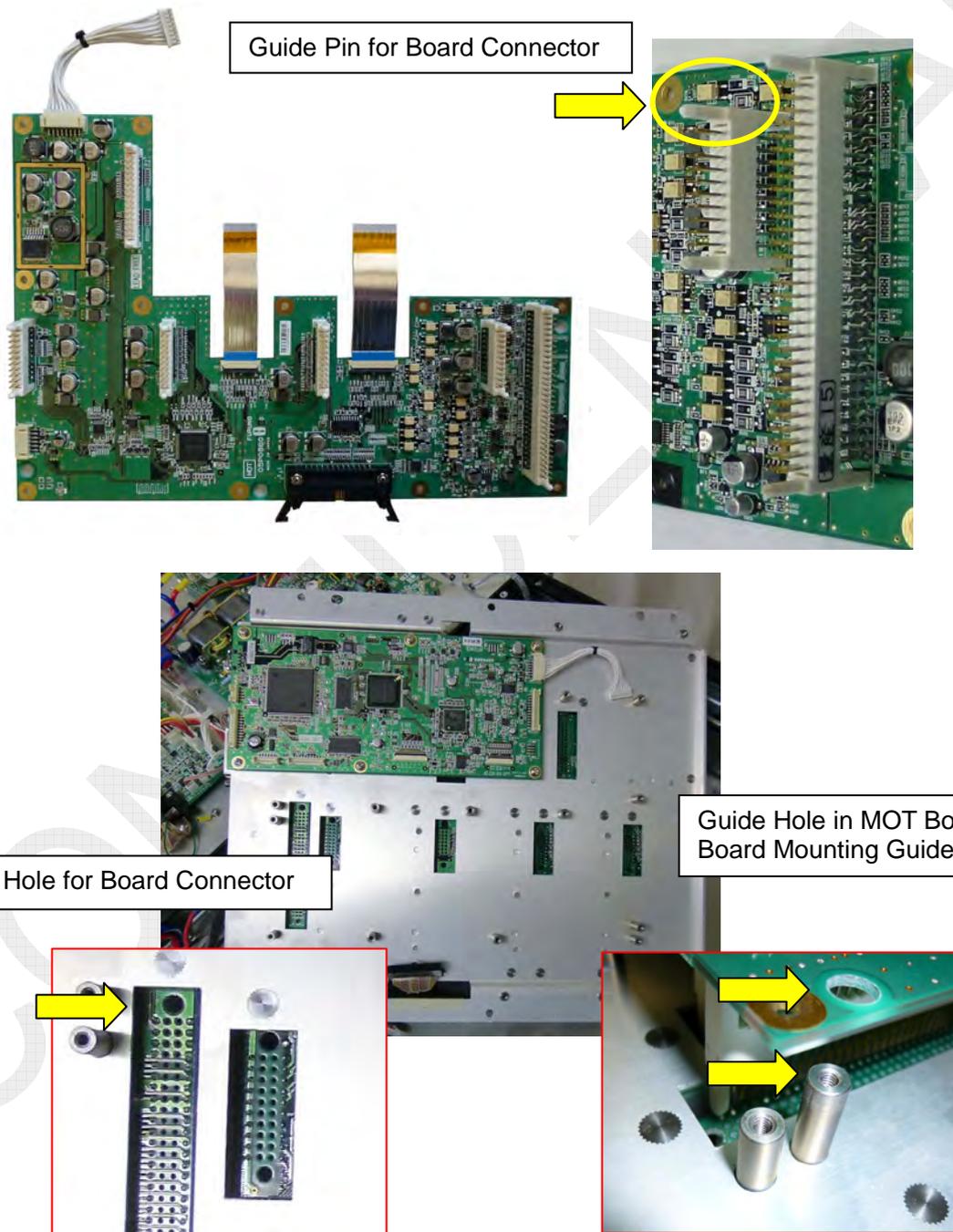


Function	S2-#1	S2-#2	S2-#3	S2-#4
Prohibiting automatic update	N/A	N/A	N/A	ON
MAC address write mode	ON	OFF	OFF	N/A
Disabling FPGA configuration (Stopping FPGA operation)	ON	ON	OFF	N/A
Disabling watchdog	OFF	OFF	ON	N/A
Not displaying VC error popup message	ON	ON	ON	N/A

2. Replacing MOT board

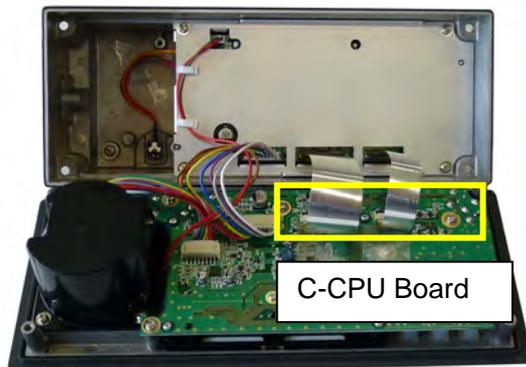
The method for connecting and disconnecting the flat cable is the same as that for T-CPU.

The MOT board is connected to other boards with the binding-post type pin connector. To mount the MOT board, align the guide pin for the connector of the MOT board with the guide hole for other boards as well as the guide of the board mounting plate with the guide hole in the MOT board.



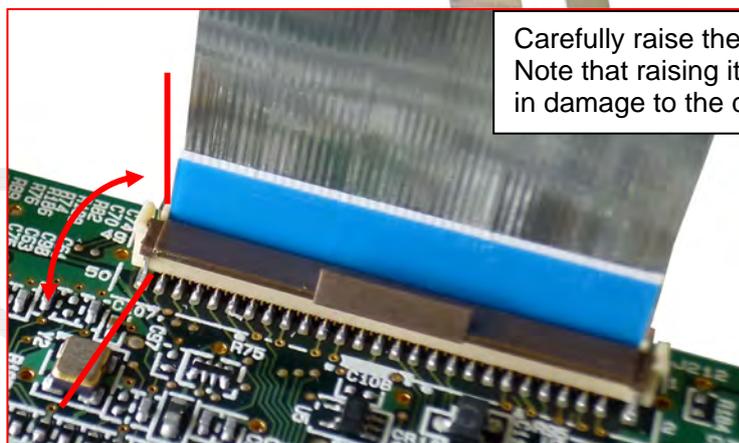
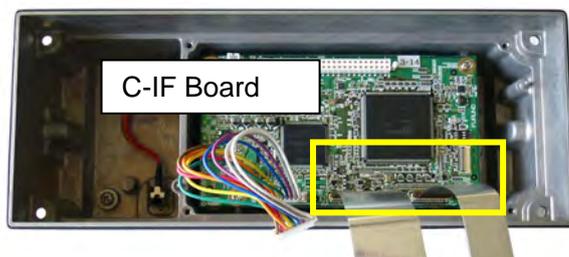
3. Replacing C-CPU board

The method for connecting and disconnecting the flat cable is the same as that for T-CPU.

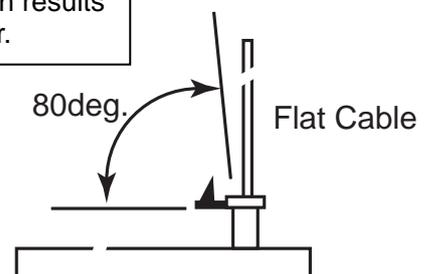


4. Replacing C-IF Board

Disconnect the flat cable and J313 connector from the C-CPU board and the speaker connector on the C-IF board side, and then dismount the C-IF shield plate.



Carefully raise the black portion.
Note that raising it too much results in damage to the connector.



Ensuring the setting of DIP switch on the C-CPU board

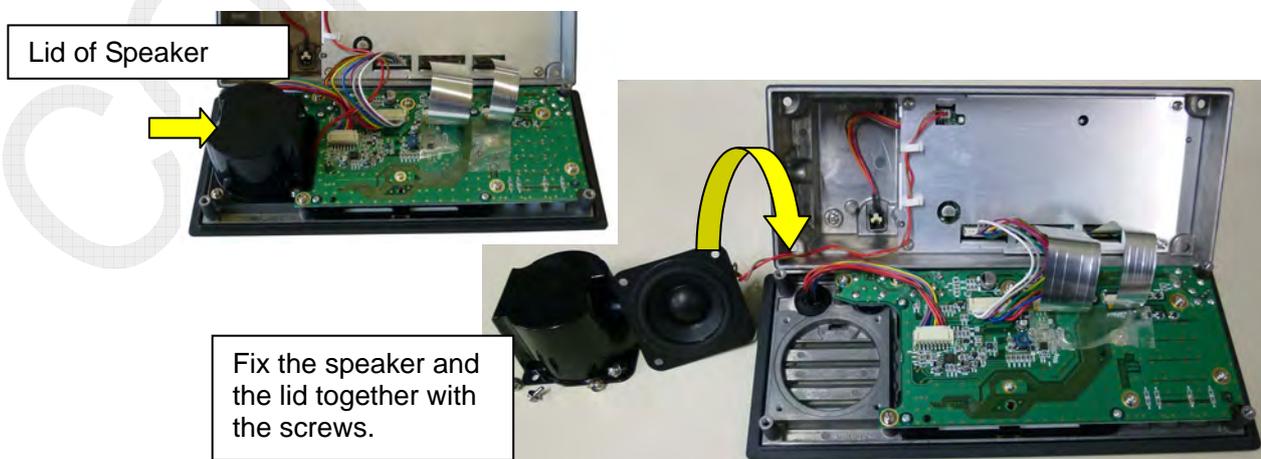
Set the “S2” DIP switch all to “OFF.” The DIP switch setting is a function provided for R & D engineer.



Function	S2-#1	S2-#2	S2-#3	S2-#4
Displaying debug information in the lower right-hand corner of the window.	OFF	OFF	OFF	ON
Unused	N/A	N/A	N/A	OFF

5. Replacing speaker

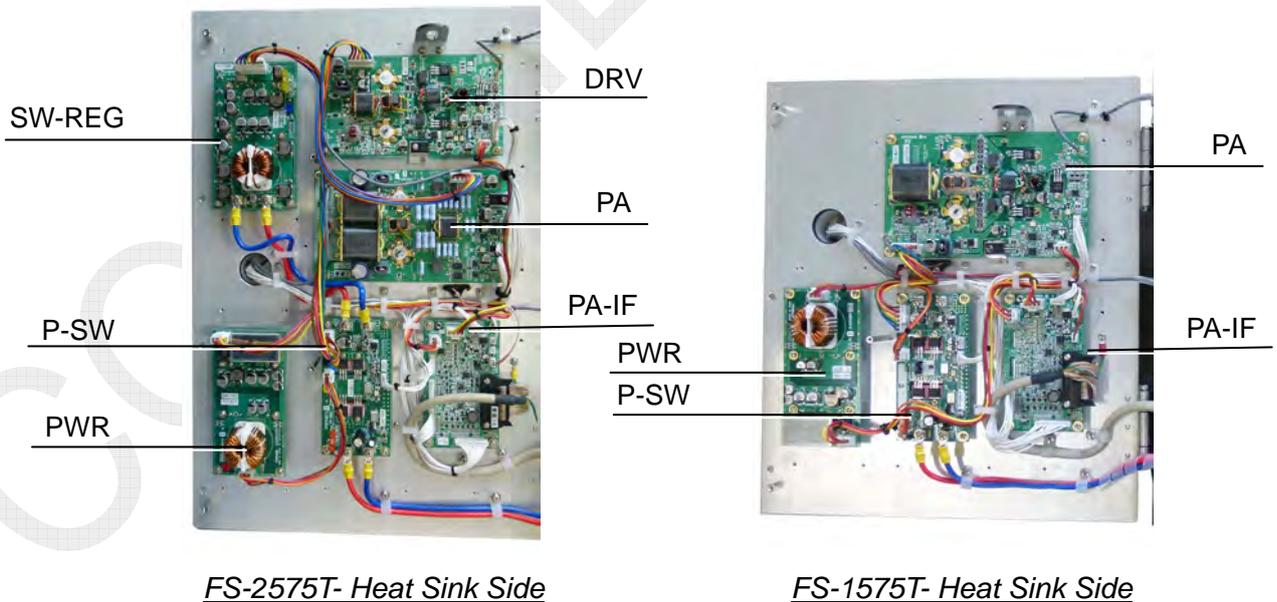
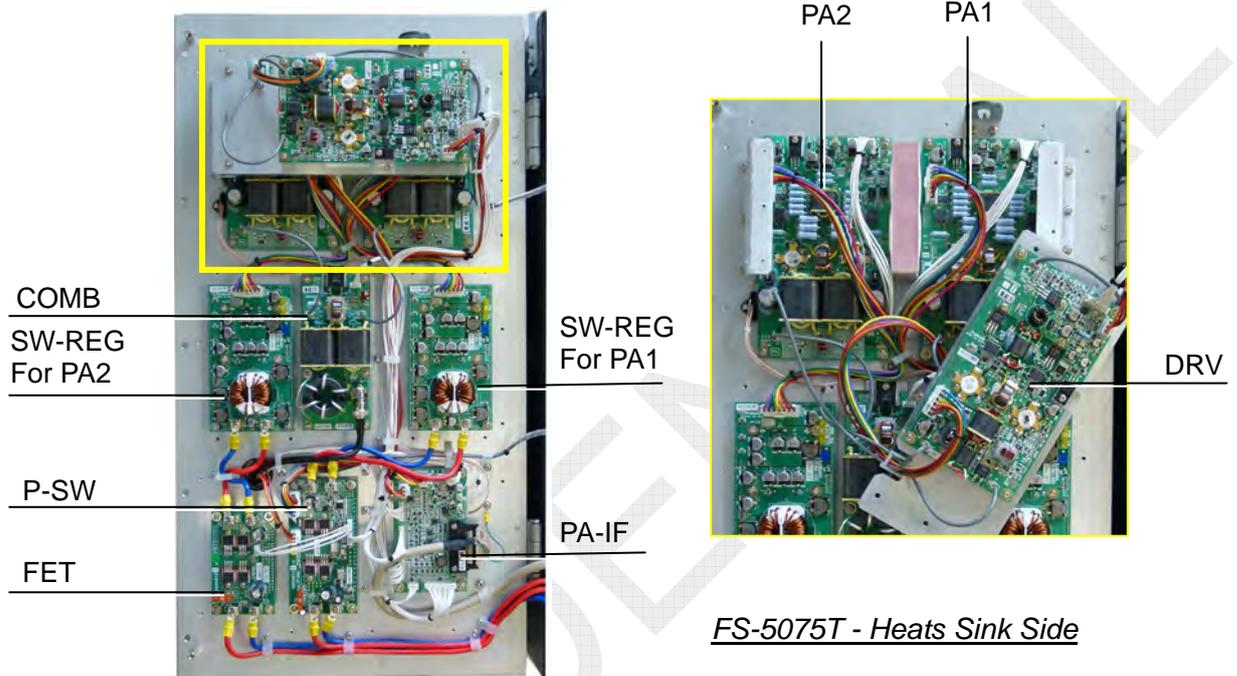
Open the FS-2575C unit, and then dismount the lid from the speaker. The lid and the speaker are fixed together with 3-mm pan head screws. Mount the speaker so that the speaker terminal will come to the panel board side. Ensure that the lid does not catch the speaker cable, and then fix the lid to the speaker with the pan head screws.



6. Applying a coating of silicones compound

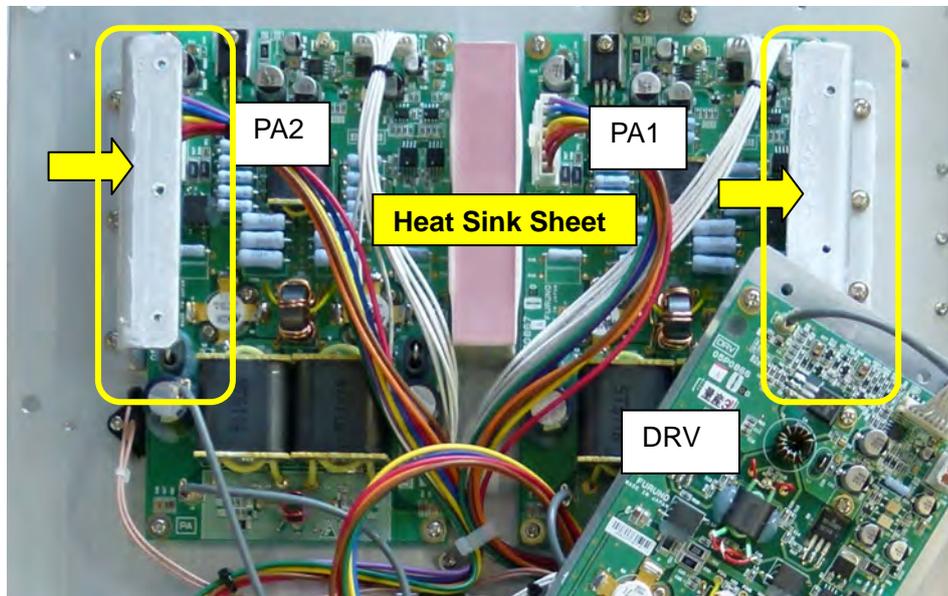
To replace the PA board and the DRV board, apply a coating of silicone compound to specified locations, including PA transistor. Not doing so may cause damage to the transistor due to heat.

Type of silicone compound: YG-6260 / Code Number: 000-803-229

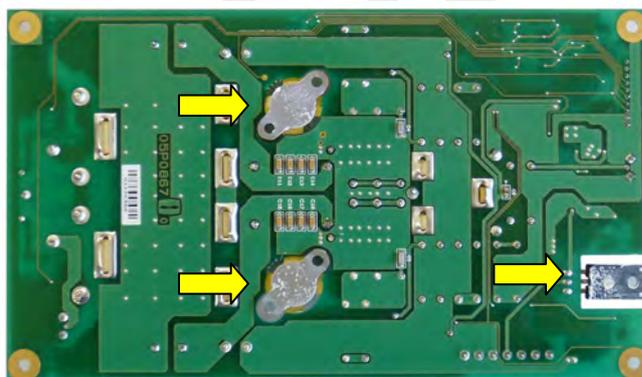


Apply a coating of silicone compound to the locations indicated by arrows.

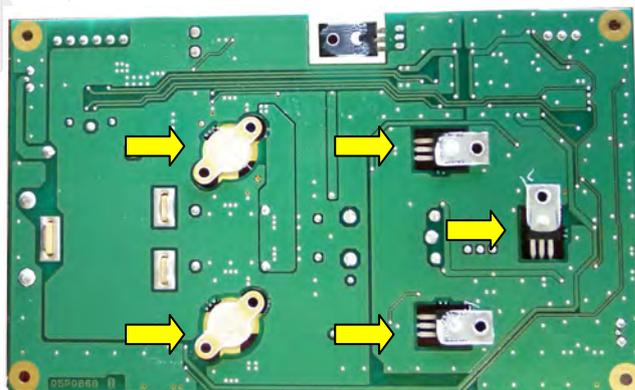
1) FS-5075T DRV board mounting block



2) PA board

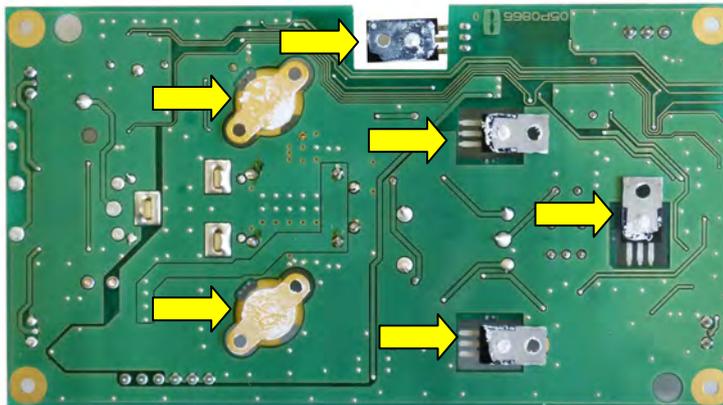


FS-5075: 05P0867A
 FS-2575: 05P0867B

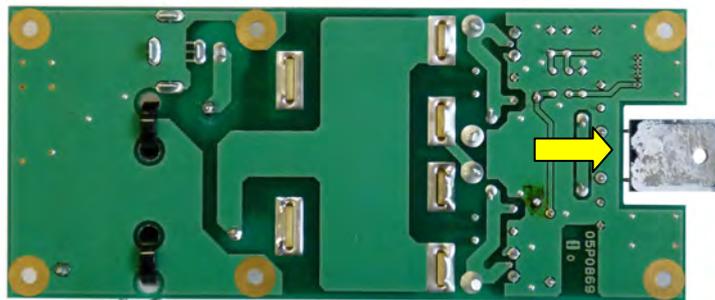


FS-1575: 05P0868

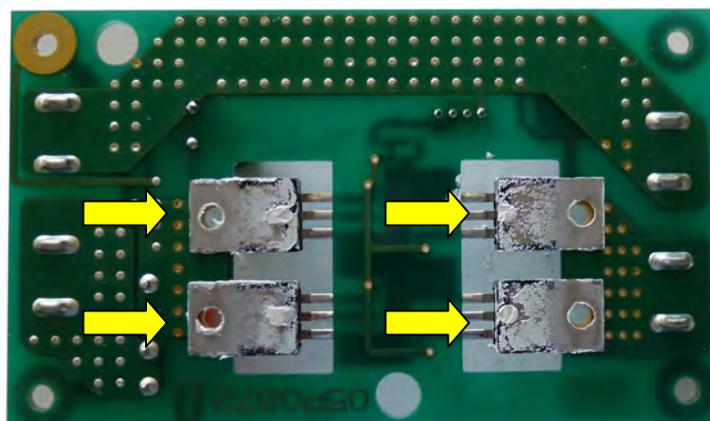
3) DRV board (FS-5075: 05P0866A, FS-2575: 05P0866B)



4) COMB board (FS-5075: 05P0869)



5) FET board (FS-5075: 05P0872)



6.10.3 Actions to be taken after Replacing Boards

Make certain settings of the following boards after replacement.

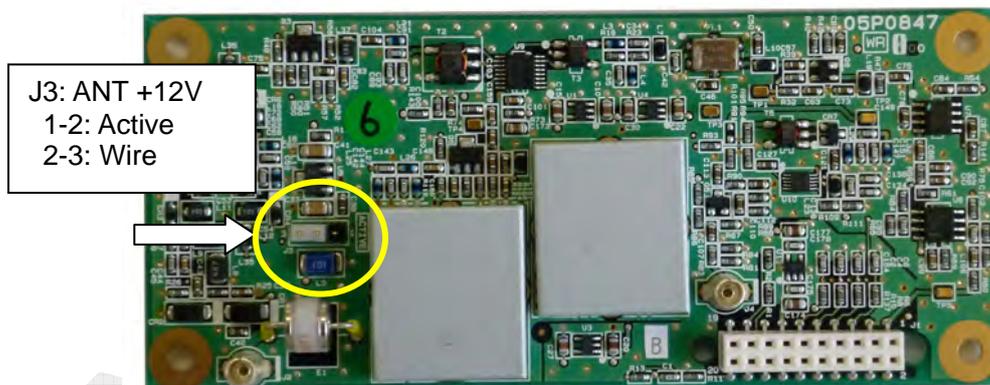
Basically, check for the boards following the procedure shown below upon completion of replacement:

- 1) Select [MENU] -> 1.TEST -> 1.DAILY TEST.
- 2) Select [MENU] -> 1.TEST -> 2.TX SELF TEST.
- 3) Select [MENU] -> 9.SERVICE -> 3.RT SETUP -> 2.SELF TEST.
- 4) Check Tx output power.
- 5) Check RX sensitivity.
- 6) Conduct practical communication tests (DSC TEST CALL, Voice communication, and NBDP communication tests).

1. WR1 / WR2 boards: 05P0847A / 05P0847B (FS-1575, -2575, and -5075)

Ensure the J3 jumper setting.

- When a FAX-5 + 2.6m whip antenna is connected, set J3 to “1-2: Active.”
12 VDC power is supplied to [WR-1, 2 ANT] terminal.
- When a wire antenna is connected, set J3 to “2-3: Wire.”
12 VDC power is not supplied to [WR-1, 2 ANT] terminal.



2. TX board: 05P0856 (FS-1575, -2575, -5075)

The TX board has a built-in reference oscillator circuit.

Check for Tx frequency. To make frequency adjustment, select [MENU] -> 9. SERVICE -> 3.RT SETUP -> 1.SETUP -> “REF OSC.” For details, refer to information on page 5-29.

Furthermore, check for Tx output power. If necessary, make ALC adjustment referring to actions to be taken to replace the TX FIL board. For the adjustment procedure, refer to information on page 5-50.

3. DRV board: 05P0866A, 05P0866B (FS-5075, -2575)

Check for Tx output power.

If necessary, make ALC adjustment referring to actions to be taken to replace the TX FIL board. Prior to making the adjustment, ensure that power data is set to default. For the adjustment procedure, refer to information on page 5-50.

Note) Apply a coating of silicone compound to locations specified.

4. PA board: 05P0866A, 05P0866B, 05P0868 (FS-5075, -2575, -1575)

Check for Tx output power.

If necessary, make ALC adjustment referring to actions to be taken to replace the TX FIL board. Prior to making the adjustment, ensure that power data is set to default. For the adjustment procedure, refer to information on page 5-50.

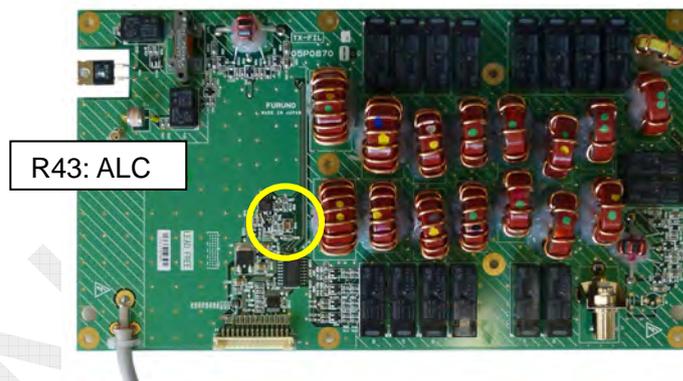
Note) Apply a coating of silicone compound to locations specified.

5. TX FIL board: 05P0870A, 05P0870B, 05P0876 (FS-5075, -2575, -1575)

Check for TX output power.

Make adjustment of the “R43” ALC to set the TX output power to a specified level. For the adjustment procedure, refer to information on page 5-50. Prior to making the adjustment, ensure that power data is set to default.

Apply a coating of silicone compound to the dummy load resistor.

**6. COMB board: 05P0869 (FS-5075)**

No setting is required.

Apply a coating of silicone compound to the dummy load resistor.

7. PA-IF board: 05P0864, 05P0864A (FS-5075/-2575, -1575)

No setting is required.

8. RX board: 05P0842 (FS-5075, -2575, -1575)

No setting is required.

9. DUP-FIL board: 05P0863 (FS-5075)

No setting is required.

10. RX FIL board: 05P0862A, 05P0862B (FS-5075, -2575/-1575)

No setting is required.

11. MOT board: 05P0860 (FS-5075, -2575, -1575)

No setting is required.

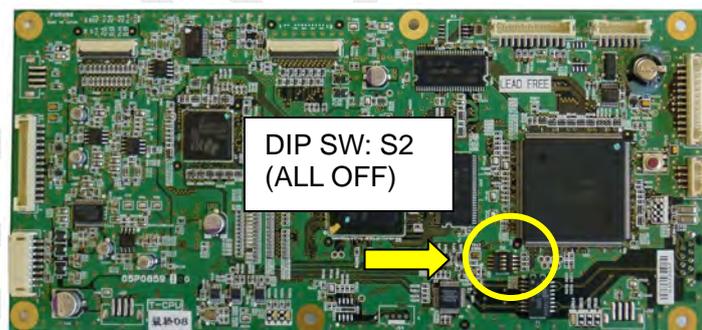
12. T-CPU board: 05P0859 (FS-5075, -2575, -1575)

When a combination of programs installed to the T-CPU board is different from that of programs installed to the C-CPU board of the FS-2575C unit, programs will be automatically loaded from the T-CPU into the C-CPU.

1) Make system settings as listed in the table below.

Setting Item	Menu
MMSI setting (Must)	Set "S1" on the T-IF board to "ON," and then enter the password.
Registration of USER CH	[MENU] -> 2.USER CH
Entry of POSITION	[MENU] -> 5.SYSTEM -> 4.POSITION
Selection of RX ANT	[MENU] -> 5.SYSTEM -> 7.RX SETUP -> 2.ANT SELECT
Availability of FAX RX	[MENU] -> 5.SYSTEM -> 7.RX SETUP -> 1.FAX RX
Selection of DSC CLASS	[MENU] -> 9.SERVICE -> 2.DSC SETUP -> CLASS
RT SETUP setting	[MENU] -> 9.SERVICE -> 3.RT SETUP -> All Sub-menus
TX POWER	[MENU] -> 9.SERVICE -> 4.TX PWR (FREQ)
IC-350 connection setting	[MENU] -> 9.SERVICE -> 7.OTHER -> ALARM UNIT

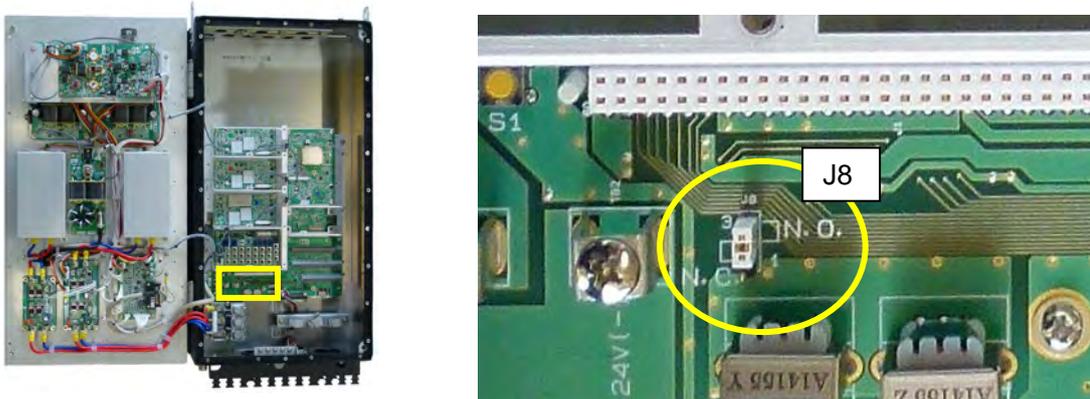
2) Set the "S2" DIP switch all to "OFF."



13. T-IF board: 05P0861, 05P0861A (FS-5075/-2575, -1575)

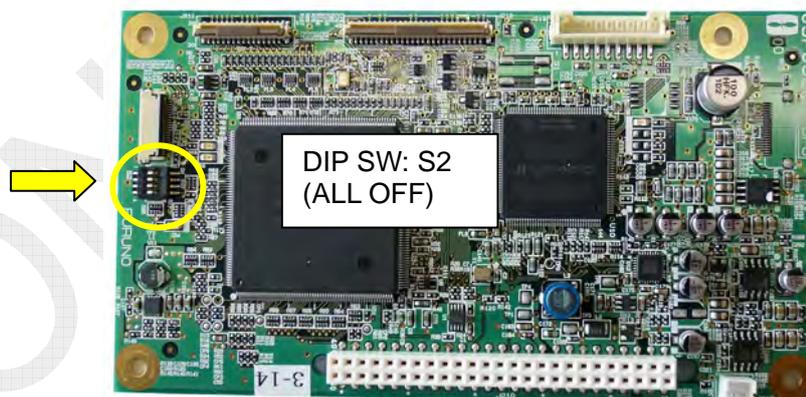
Ensure the J8 jumper setting.

This setting is made to select “N.C.” (2-3: Normally Closed) or “N.O.” (1-2: Normally Open) for ALM output (contact output).

**14. C-CPU board: 05P0852**

When a combination of programs installed to the T-CPU board is different from that of programs installed to the C-CPU board of the FS-2575C unit, programs will be automatically loaded from the T-CPU into the C-CPU.

- 1) Ensure setting items saved in the C-CPU.
For setting items, refer to information on page 6-47.
- 2) Set the “S2” DIP switch all to “OFF.”



15. PANEL board: 05P0844

No setting is required.

16. C-IF board: 05P0853

No setting is required.

17. FET board: 05P0872

No setting is required.

18. P-SW board: 05P0871

No setting is required.

19. PWR board: 05P0874

No setting is required.

20. SW REG board: 05P0873

No setting is required.

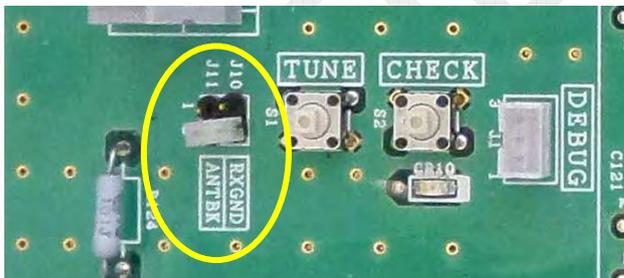
21. COUP board: 05P0875 (AT-5075), 05P0883 (AT-1575)

- AT-5075: Ensure the settings of the J10 (RX GND) and J11 (ANT BK) jumpers.

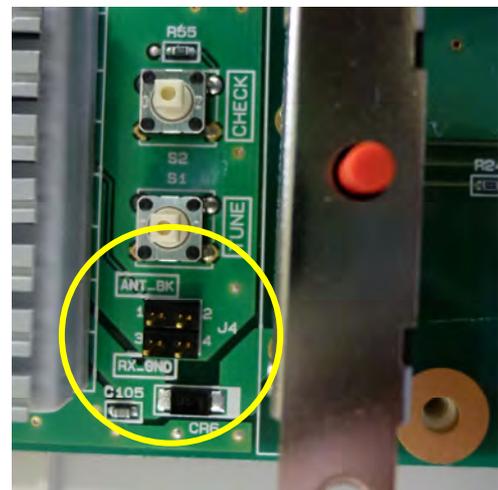
- AT-1575: Ensure the settings of the J5 (RX GND) and J4 (ANT BK) jumpers.

When connecting the COUP board to FS-1575, -2575, or -5075, no jumpers above are used. Mount a jumper pin between J10 (or J5) and J11 (or J4).

For details, refer to information on page 4-93.



AT-5075

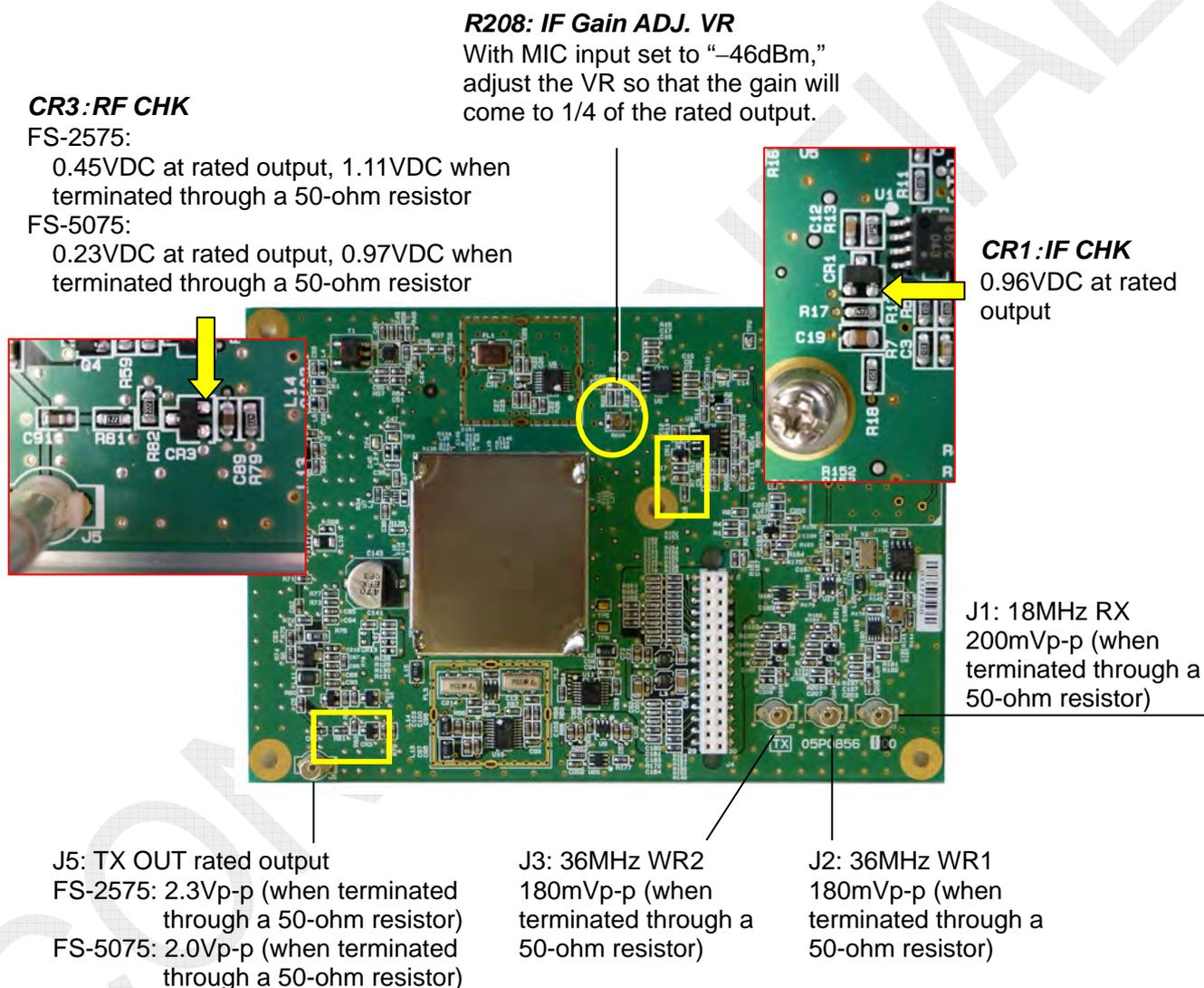


AT-1575

6.11 Level Check

RF output power measurement is made with power data set to default value, SSB to 4.2 MHz and internal tone to 1500 Hz. Variations in output power among models result from IF GAIN (MIC gain) adjustment and ALC adjustment in the overall Tx adjustment. In other words, the variations result from the overall gain of the transmission circuit.

1. TX board: 05P0856



J1, J2, and J3 output are outputted from VCTCXO. If no signal is outputted to all, the VCTCXO circuit has a trouble.

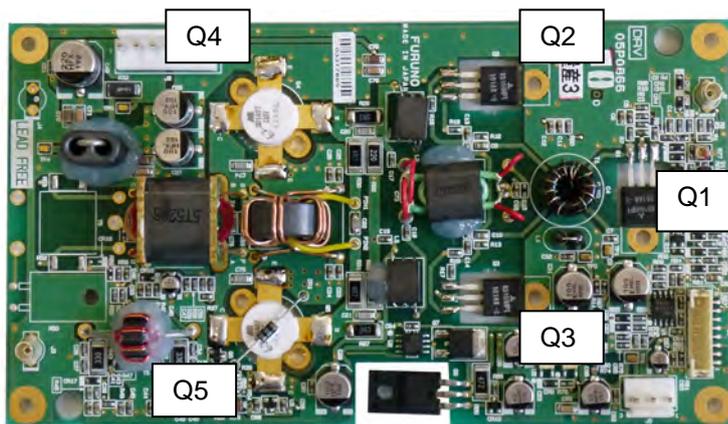
In case of no 18-MHz RX output frequency to J1, an error message saying “RX PLL UNLOCK” will be outputted.

In case of no 36-MHz output frequency from WR1 to J2 and from WR2 to J3, an error message saying “WR1, 2 PLL UNLOCK” will be outputted.

2. DRV board: 05P0866A, B (FS-5075, -2575)

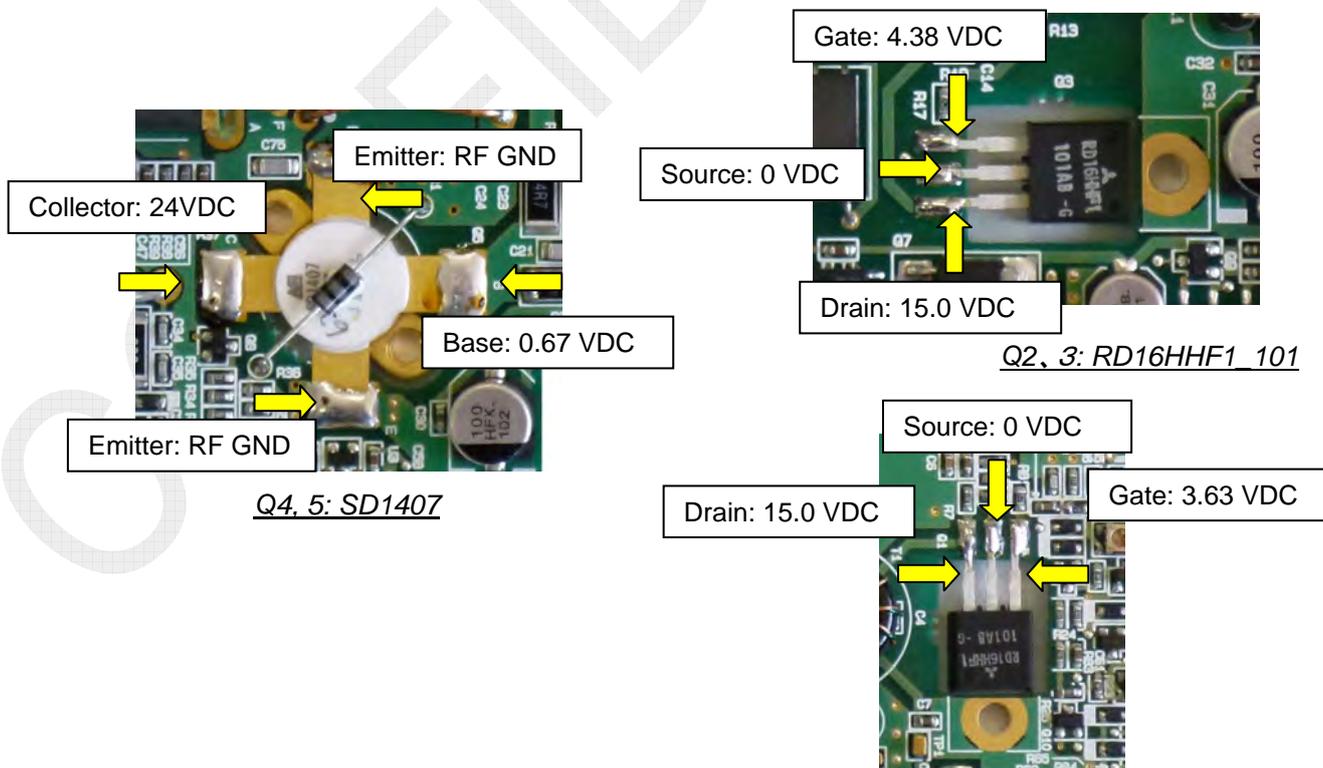
The DRV board has a built-in V-SWR detection circuit to output “Vf: CHK DA (J1-#5) and “Vr: VR DA (J1-#7)” signals.

Making measurement of these signal levels allows for determining whether the DRV board outputs power. In addition, making measurement of the base bias voltage of the PA transistor allows for making acceptance judgment of the PA transistor and the PA bias circuit.



Example: FS-2575
@4M, +5dBm input,
Output; 10W

To make measurement of bias voltage, disconnect the “J2: RF IN” from the DRV board. The RF ground of the PA transistor is different from the ground of housing. For this reason, be sure to make measurement between the bias voltage and the RF ground.



CHK DA, VR DA VS RT Output Power (SSB 4.2MHz /1500Hz Tone)

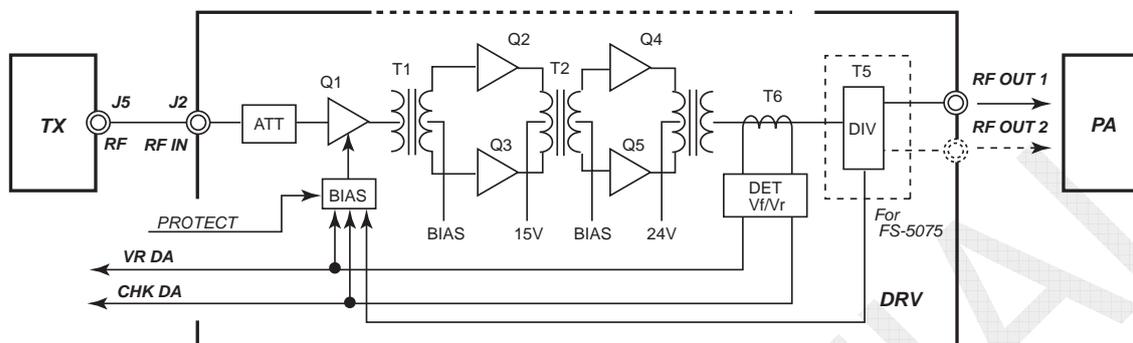


Fig. 6.11.1 DRV Board Block Diagram

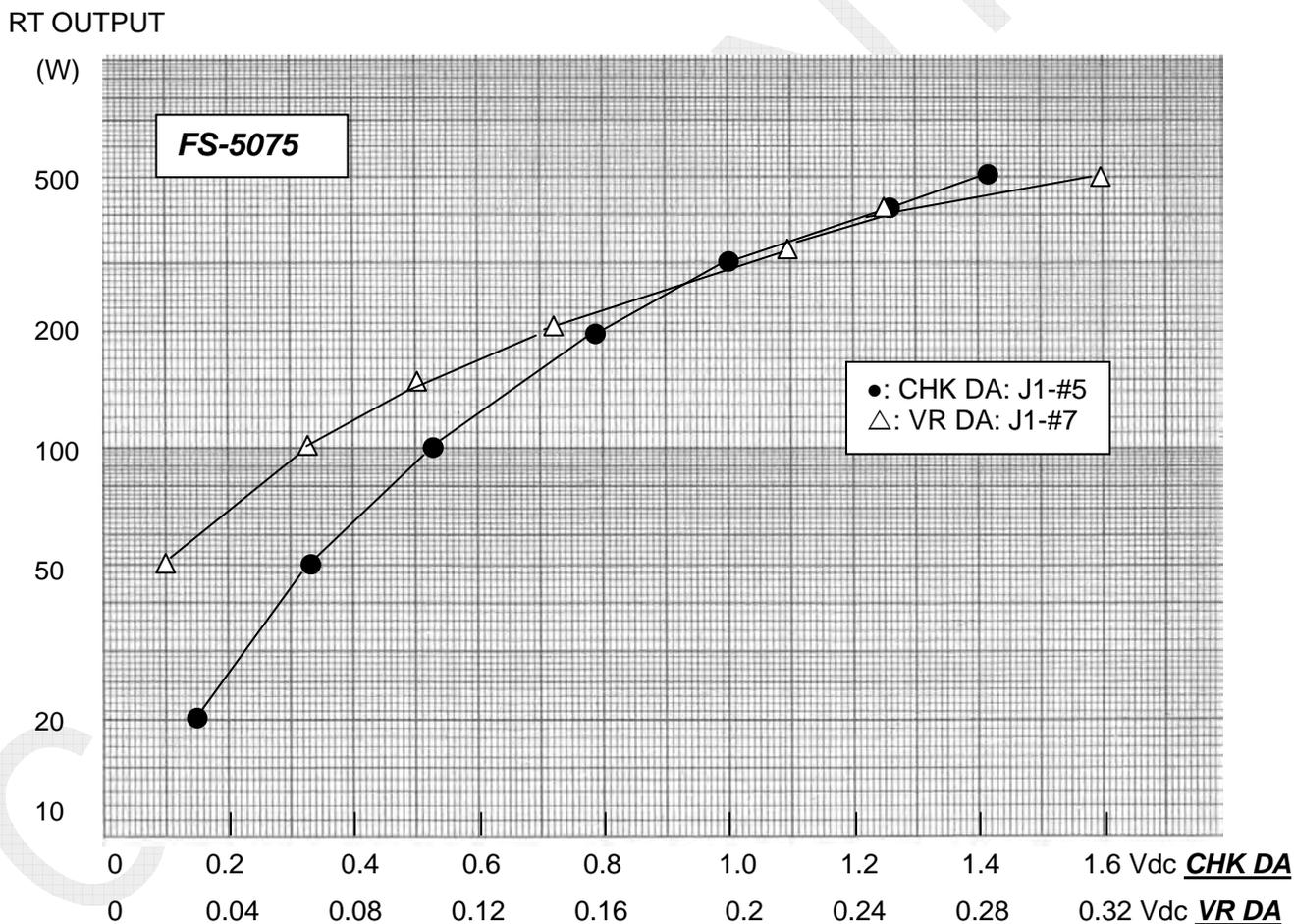


Fig. 6.11.2 FS-5075 DRV Board - Example of CHK DA, VR DA vs. Power Characteristics

RT OUTPUT

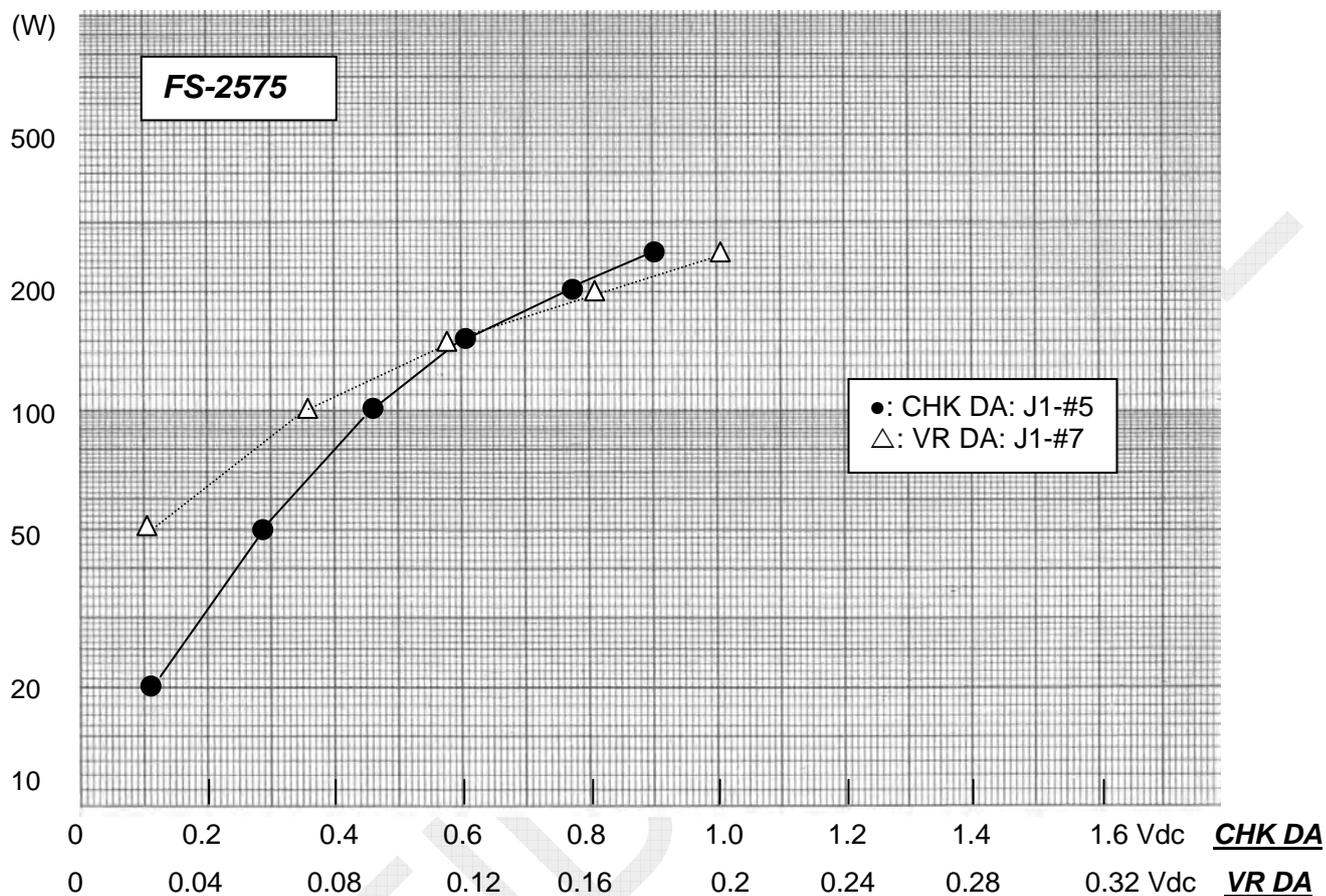


Fig. 6.11.3 FS-2575 DRV Board - Example of CHK DA, VR DA vs. Power Characteristics

To check for output power using the DRV board alone, the SSG signal can be used as an input signal. Output values are just for reference.

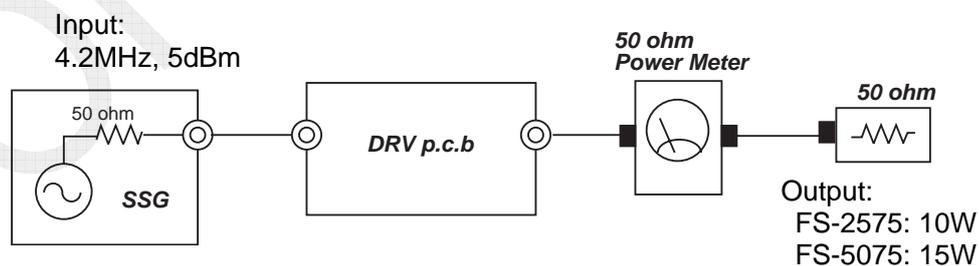


Fig. 6.11.4 Power Check Using DRV Board Alone

3. PA board: 05P0867A, B (FS-2575, -5075)

Like the DRV board, the PA board has a built-in V-SWR detection circuit to output the VF and VR signals from the “J1”. Making measurement of these signal levels allows for determining whether the PA board outputs power. In addition, making measurement of the base bias voltage of the PA transistor allows for making acceptance judgment of the PA transistor and the PA bias circuit.

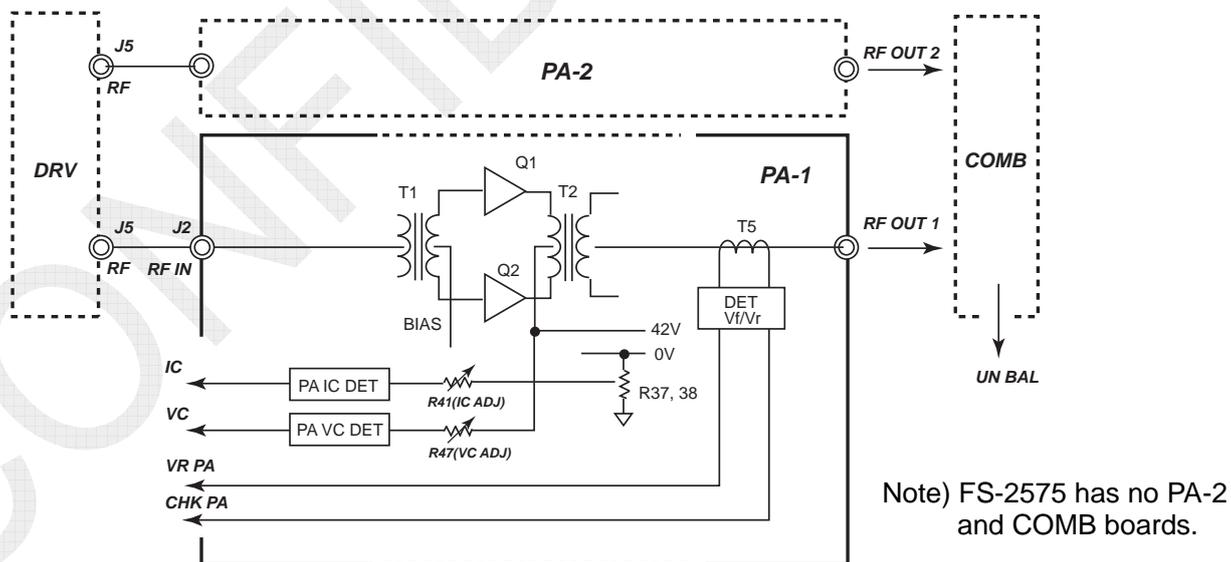
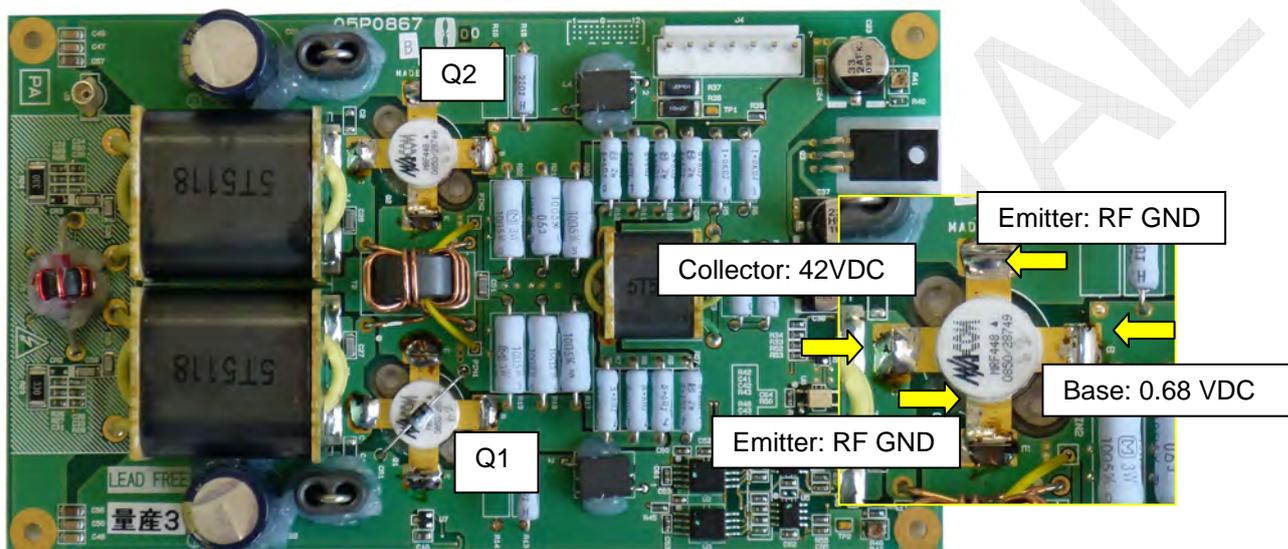


Fig. 6.11.5 FS-2575 and -5075 - PA Board Block Diagram

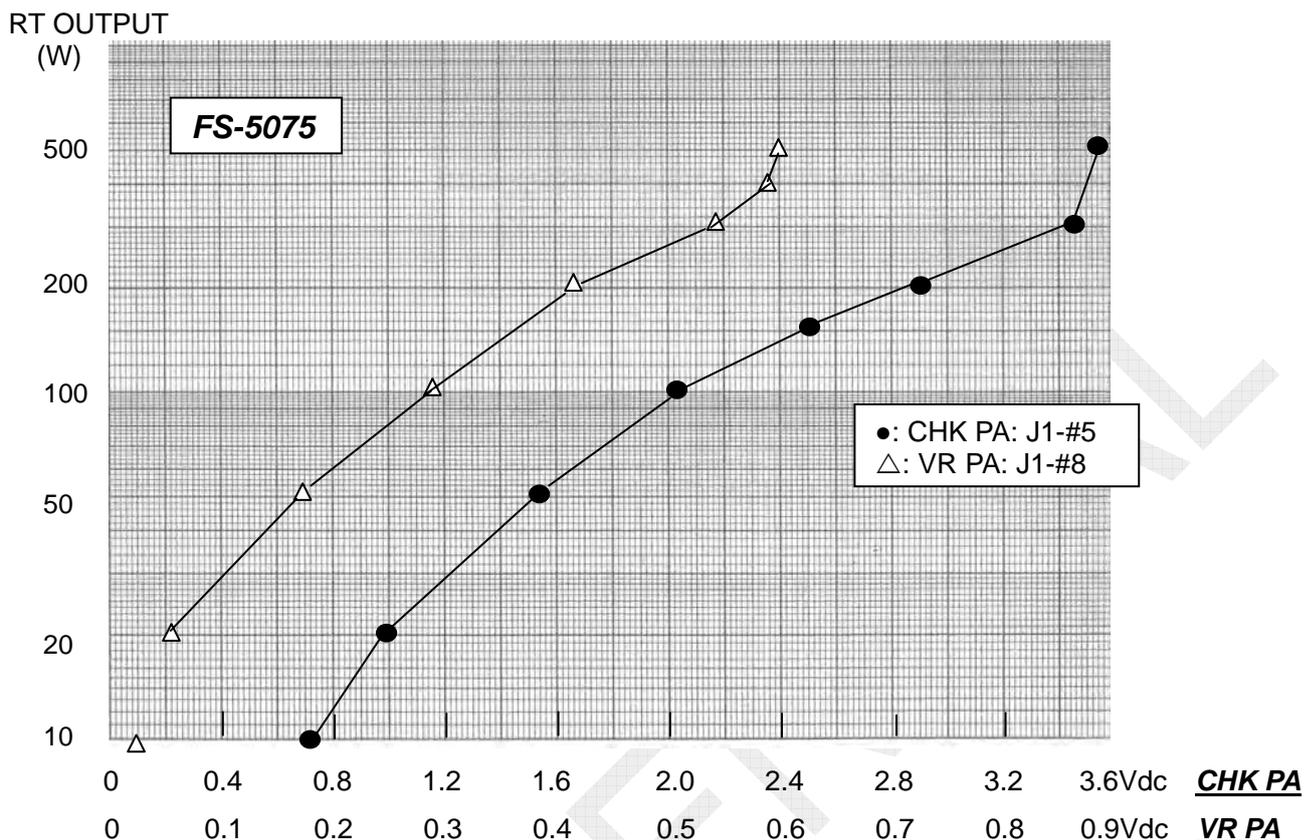


Fig. 6.11.6 FS-5075 PA Board - Example of CHK PA, VR PA vs. Power Characteristics

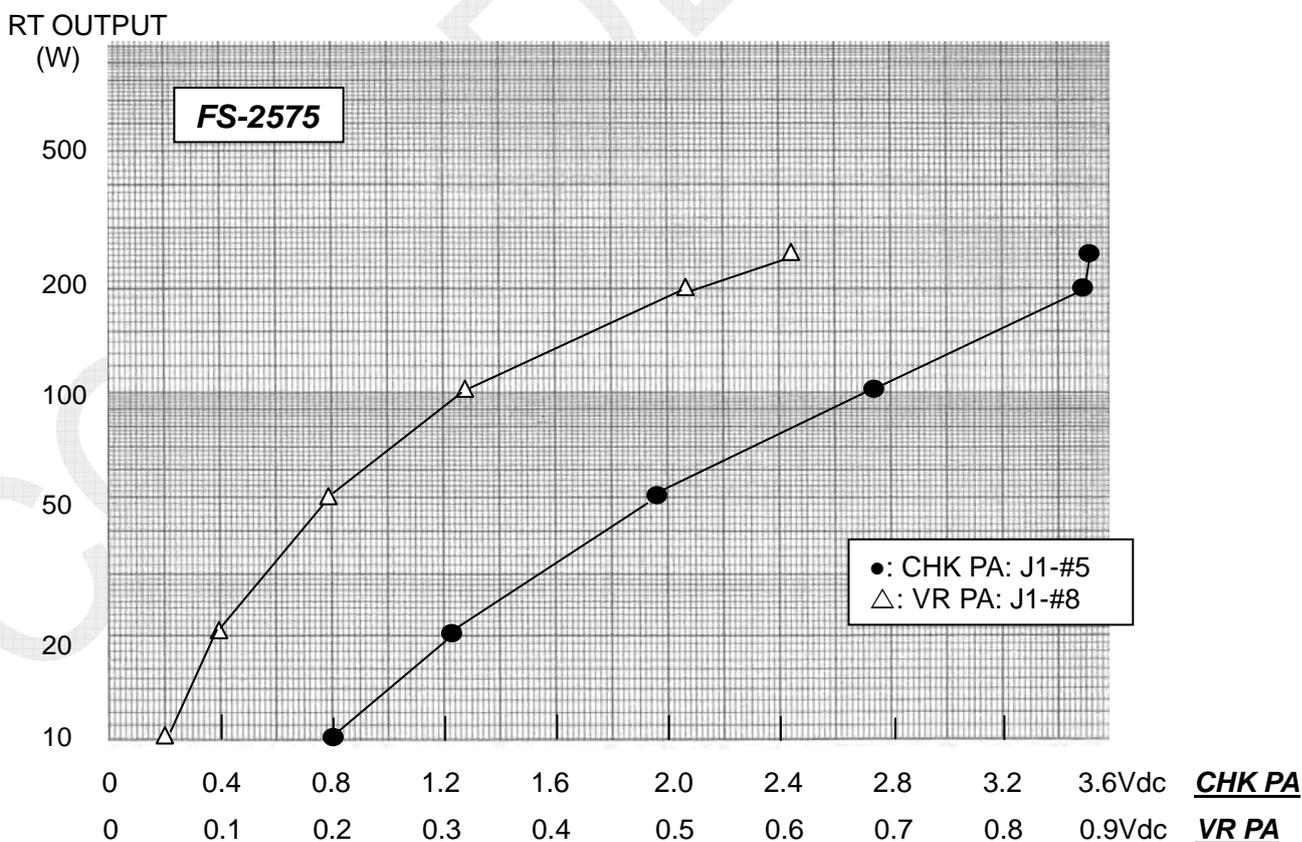


Fig. 6.11.7 FS-2575 PA Board - Example of CHK PA, VR PA vs. Power Characteristics

To check for output power using the DRV board plus the PA board alone, the SSG signal can be used as an input signal. Output values are just for reference.

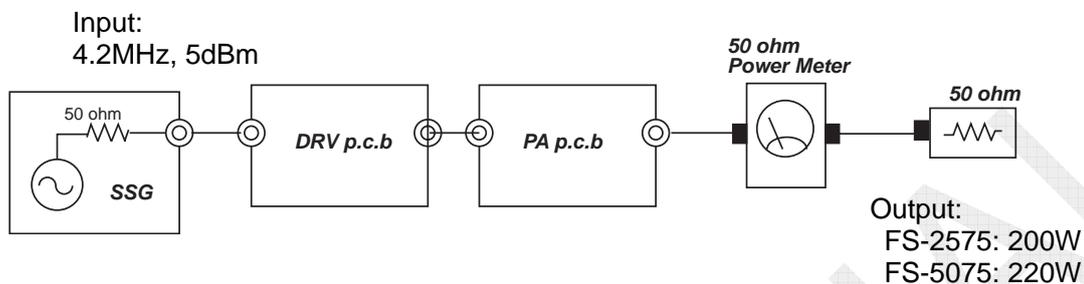


Fig. 6.11.8 FS-2575 and -5075 - Power Check Using DRV Board plus PA Board Alone

4. PA board: 05P0868 (FS-1575)

Like the DRV board, the PA board has a built-in V-SWR detection circuit to output the VF and VR signals from the “J1”. Making measurement of these signal levels allows for determining whether the PA board outputs power.

In addition, making measurement of the base bias voltage of the PA transistor allows for making acceptance judgment of the PA transistor and the bias circuit.

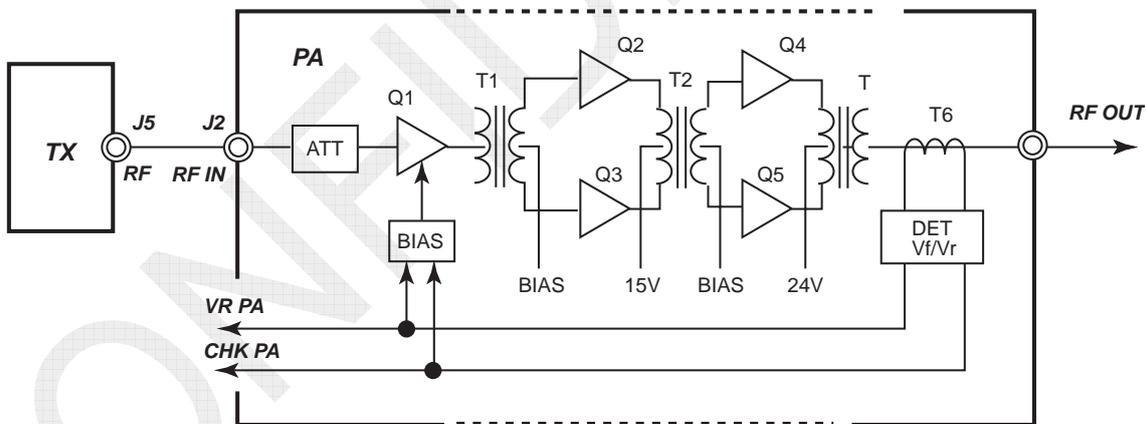
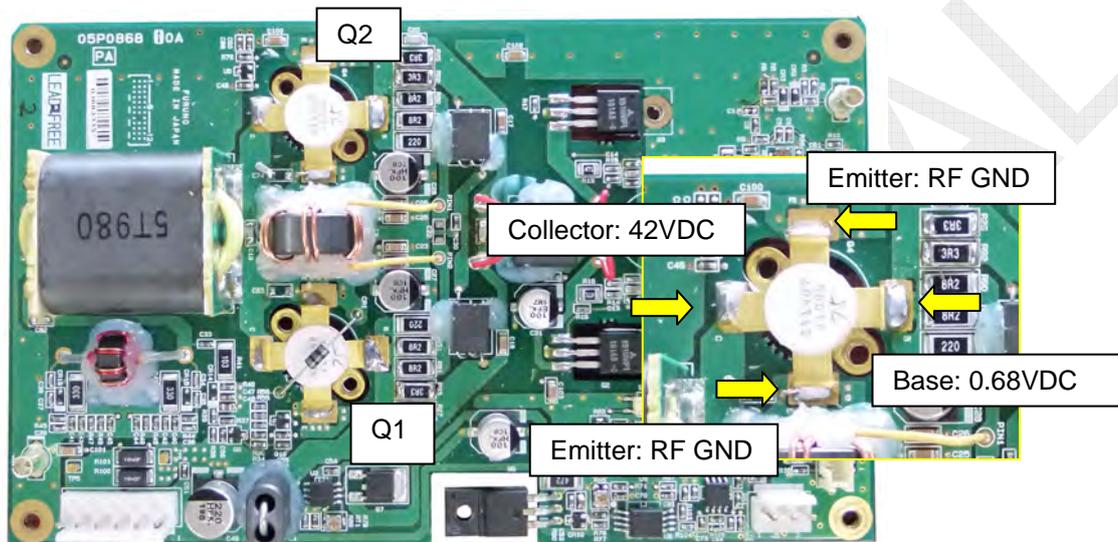


Fig. 6.11.9 FS-1575 - PA Board Block Diagram

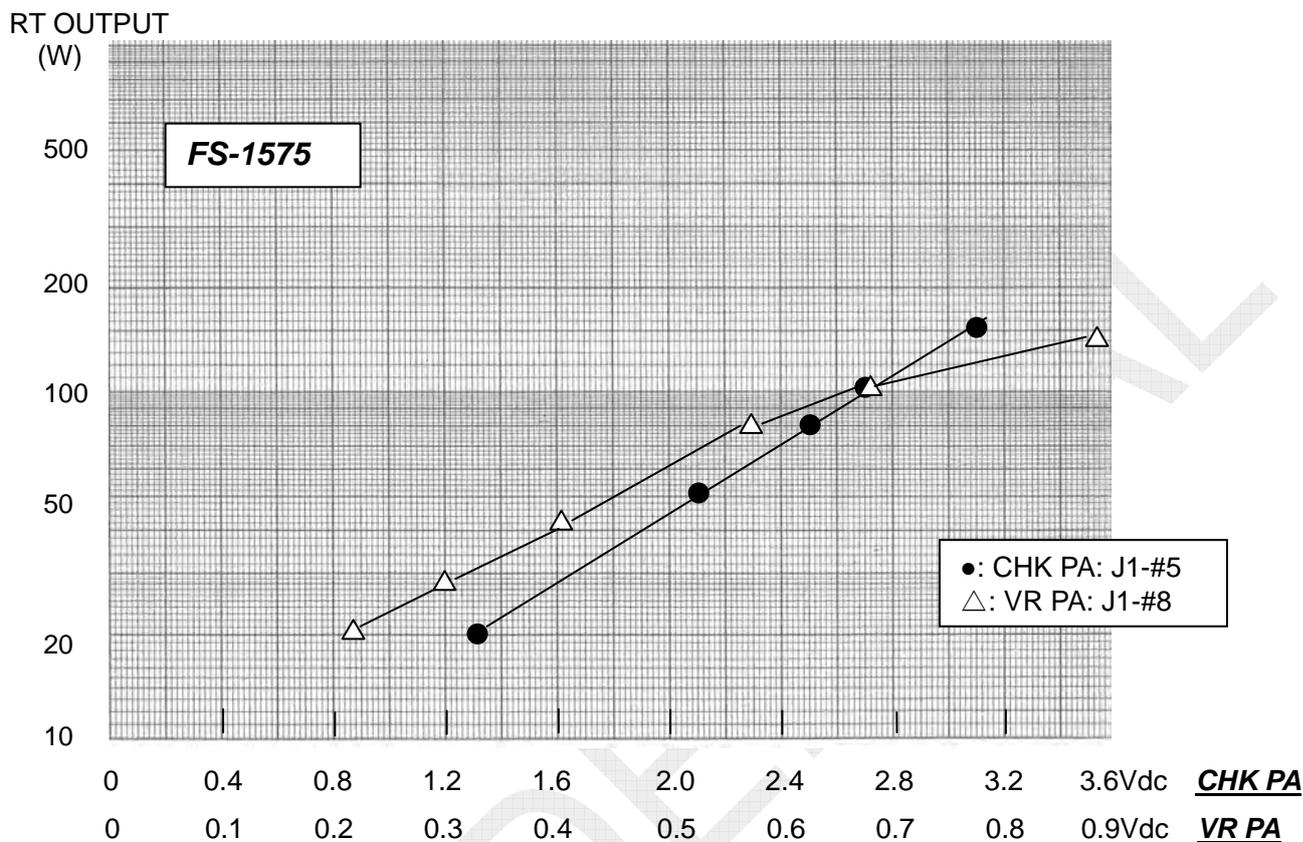


Fig. 6.11.10 FS-1575 PA Board - Example of CHK PA, VR PA vs. Power Characteristics

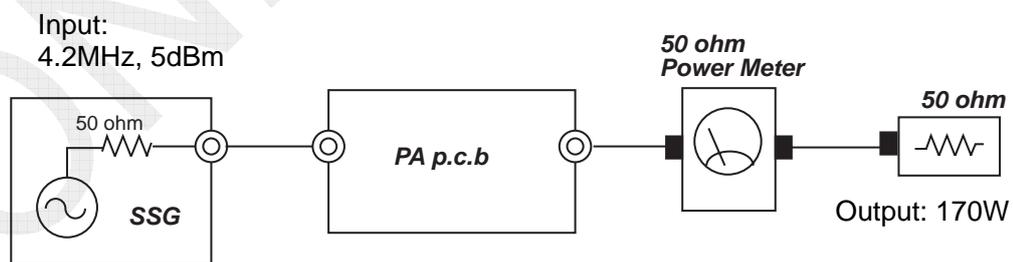


Fig. 6.11.11 FS-1575 - Power Check Using PA Board Alone

5. COMB board: 05P0869 (FS-5075)

The COMB board has a built-in V-SWR detection circuit to output the “VR: UN BAL” signal from #1 of the “J4”.

The UN BAL signal level will increase when PA1 and PA2 input power becomes imbalanced

- When 500W is outputted (normal): 5mVDC
- When [RF output] port is “Open”: 1.77VDC
- When [PA1] or [PA2] port is “Open”: 2.95VDC

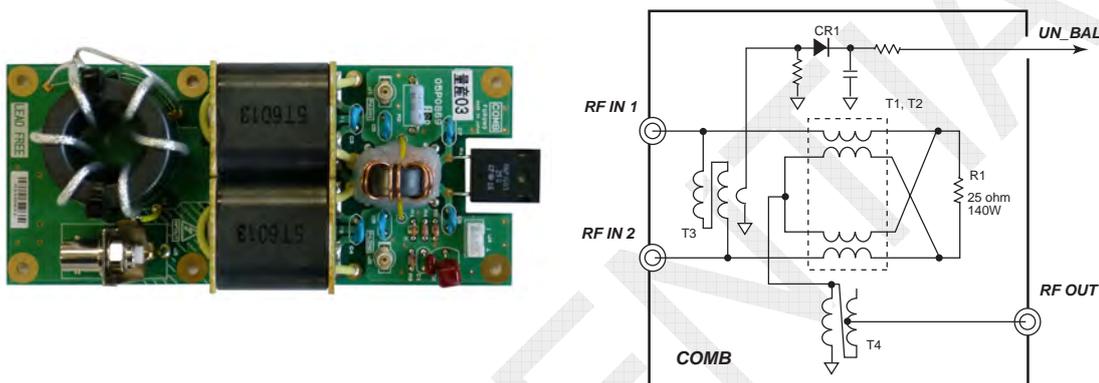


Fig. 6.11.12 FS-5075 - COMB Board Block Diagram

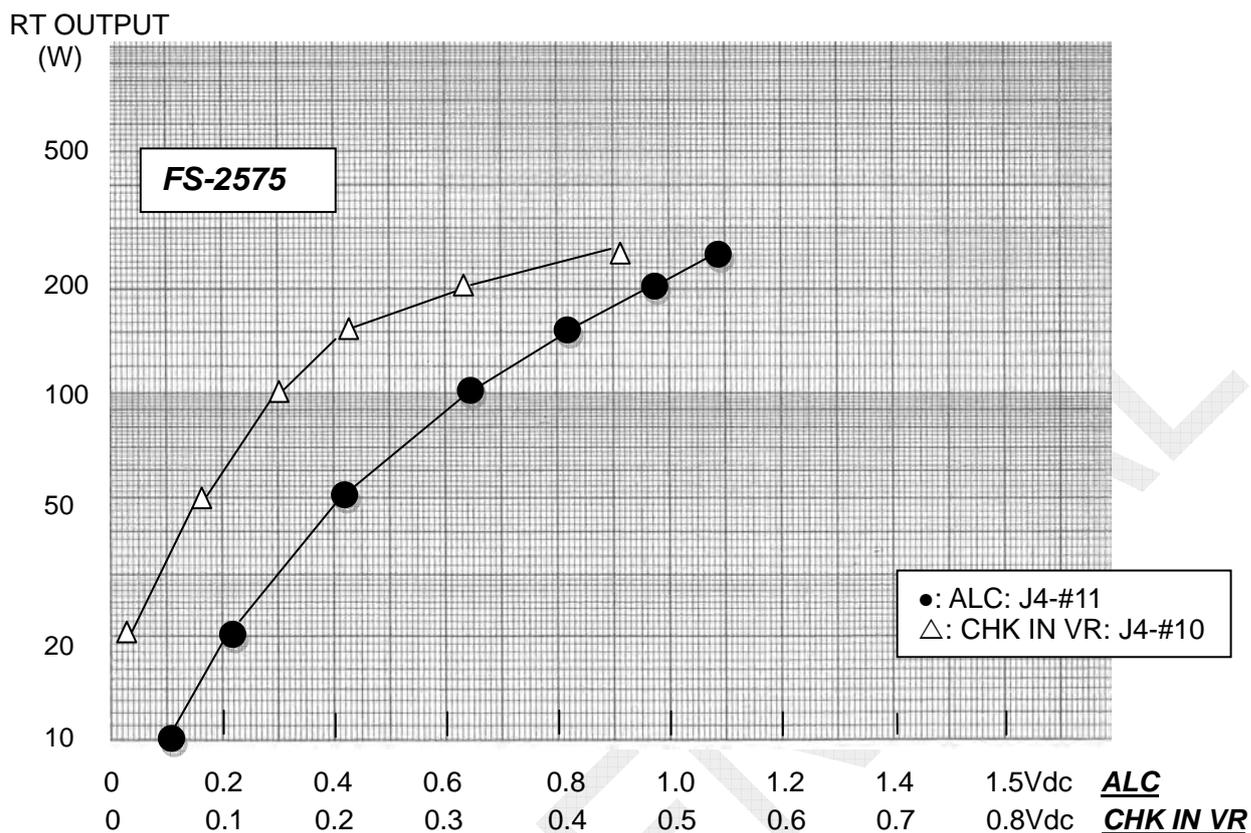


Fig. 6.11.15 FS-2575 TX FIL Board - Example of CHK IN VR, ALC vs. Power Characteristics

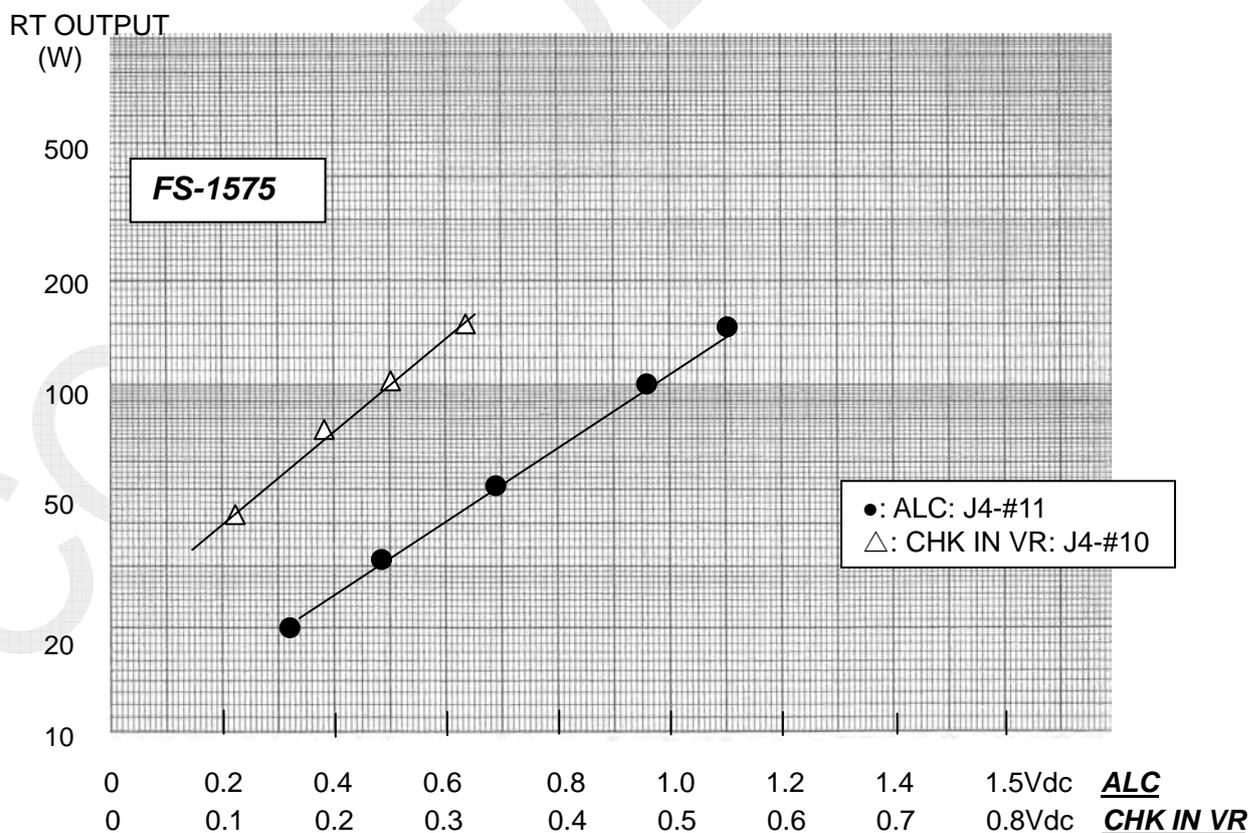


Fig. 6.11.16 FS-1575 TX FIL Board - Example of CHK IN VR, ALC vs. Power Characteristics

Chapter 7. Block Description

7.1 System Configuration

7.1.1 Unit Configuration

The following figure shows the configuration of the FS-5075 system. For the FS-1575 and FS-2575 systems, replace the term “Antenna coupler” with the term “Transceiver unit.” I/O ports for external connection equipment are the same for the said three models.

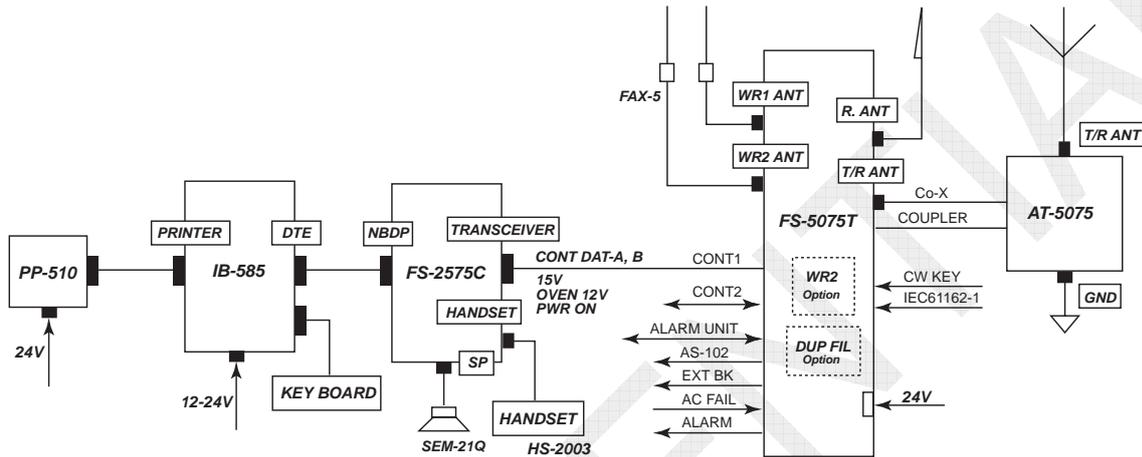


Fig. 7.1.1 FS-5075 System Configuration

“Receiving” and “WR2” antenna used in the FS-xx75 series are available for shared use with T/R antenna, also for reception from a RX antenna. The Duplex communication specification is only available on the FS-5075 system subject to the installation of a RX antenna.

Table 7.1.1 Equipment Specifications

	FS-1575	FS-2575	FS-5075
Transceiver Unit	FS-1575T	FS-2575T	FS-5075T
Controller Unit	FS-2575C (Common to all models)		
Antenna Coupler	AT-1575	AT-5075	AT-5075
NBDP Terminal	IB-583 and IB-585 (Common to all models)		
DUP Specification	No	No	Yes (DUP board is required)
RF Output Power	150 W	250 W	500 W
AC/DC Power Supply	PR-300	PR-850A	PR-850A
Software	Common		
Built-in WR1	Standard		
Built-in WR2	Option		
CW Communication	Allowed		
Receiving Antenna	RX antenna or shared use of T/R antenna		

7.1.2 Unit Configuration

The FS-5075T transceiver unit is supplied with 500 W power generated by dividing DRV board output power into two outputs, inputting each output in two PA boards, respectively and combining power outputted from these boards.

1. Configuration of FS-5075T

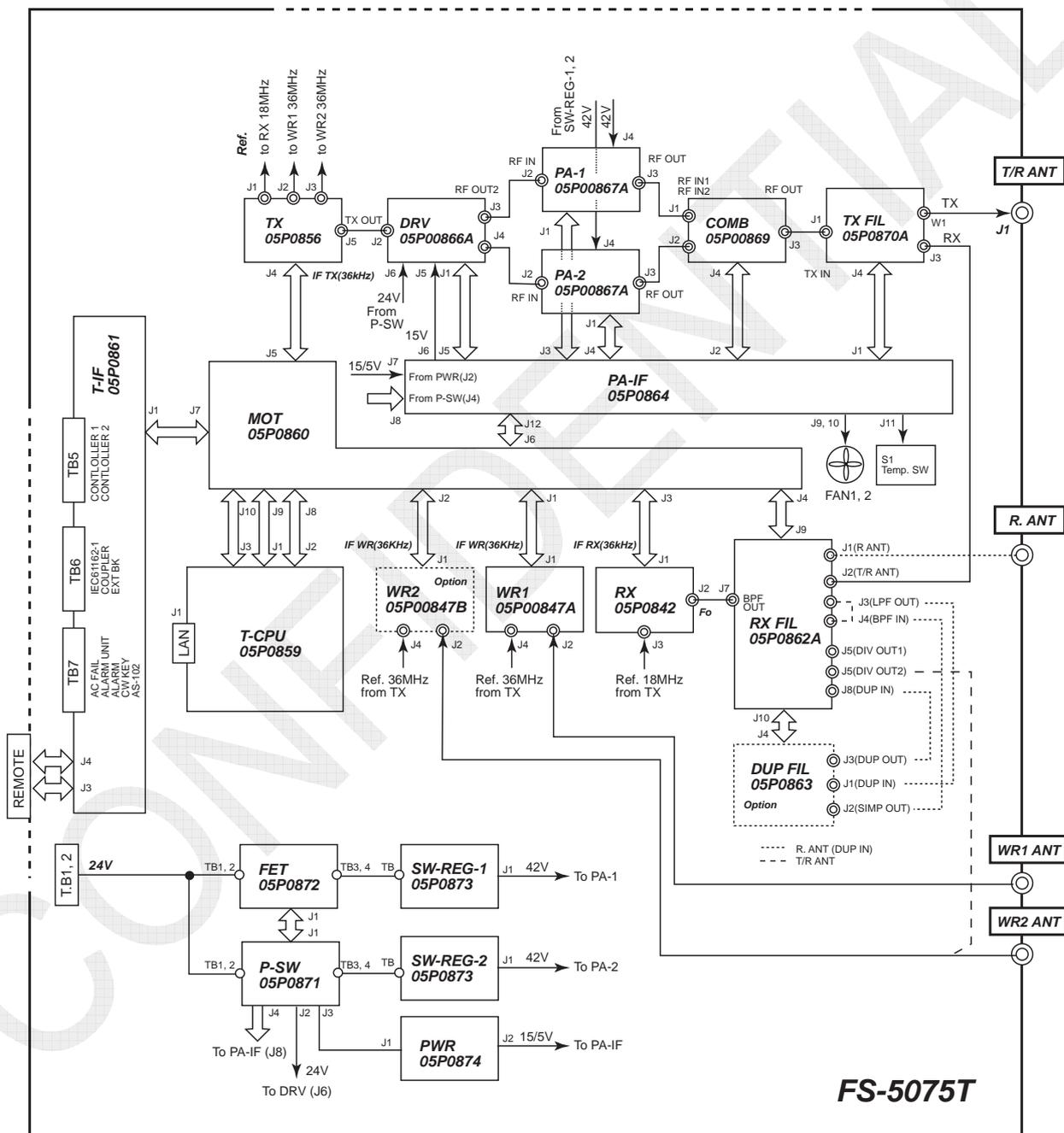


Fig. 7.1.2 Configuration of FS-5075T Transceiver Unit

2. Configuration of FS-2575T

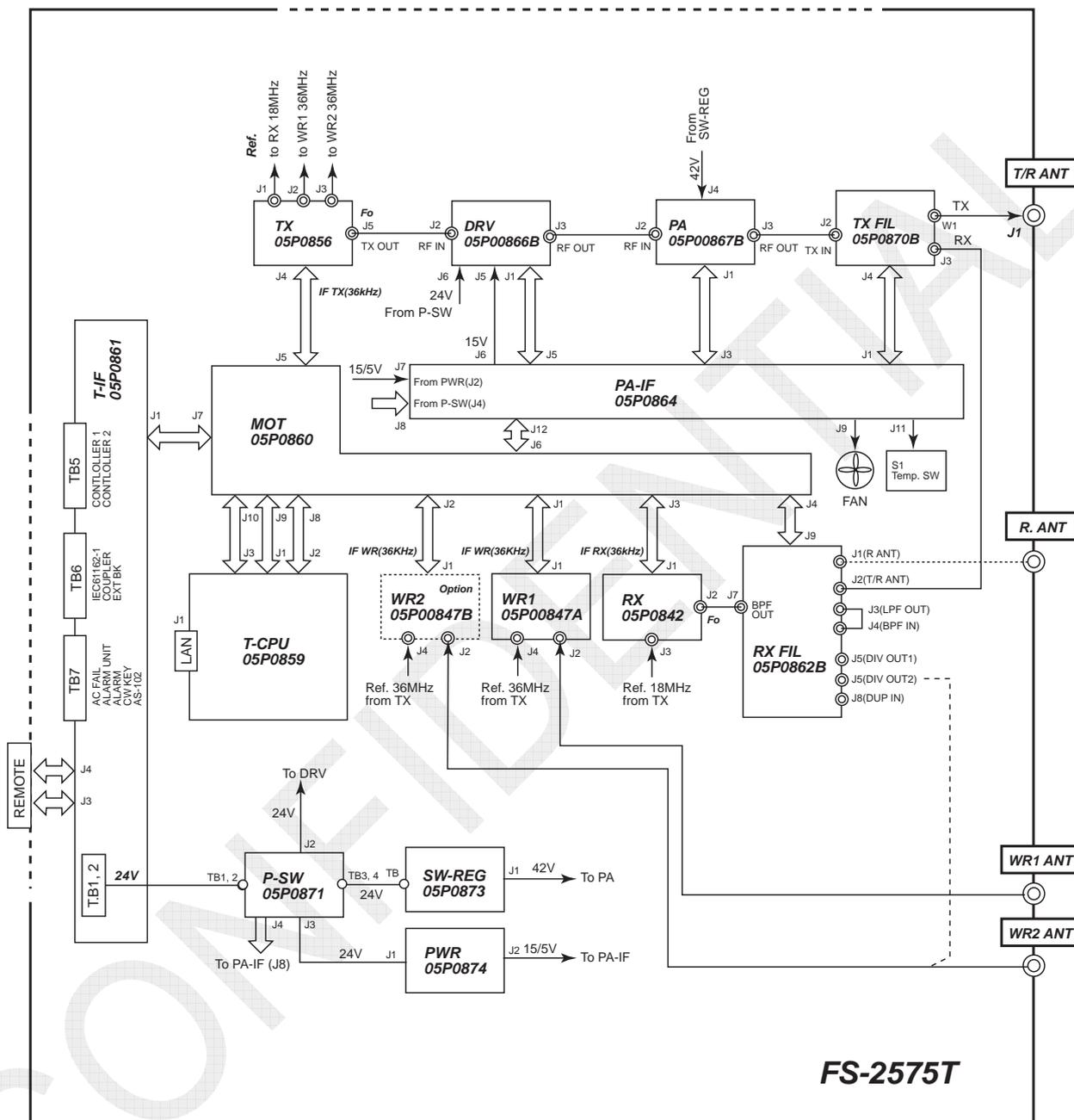


Fig. 7.1.3 Configuration of FS-2575T Transceiver Unit

4. Configuration of FS-2575C

The FS-2575C control unit is common to the three models.

The Control unit and the Transceiver unit are connected with serial; RS-485.

This line contains digitized voice signals and received signals as well as control signals from both units.

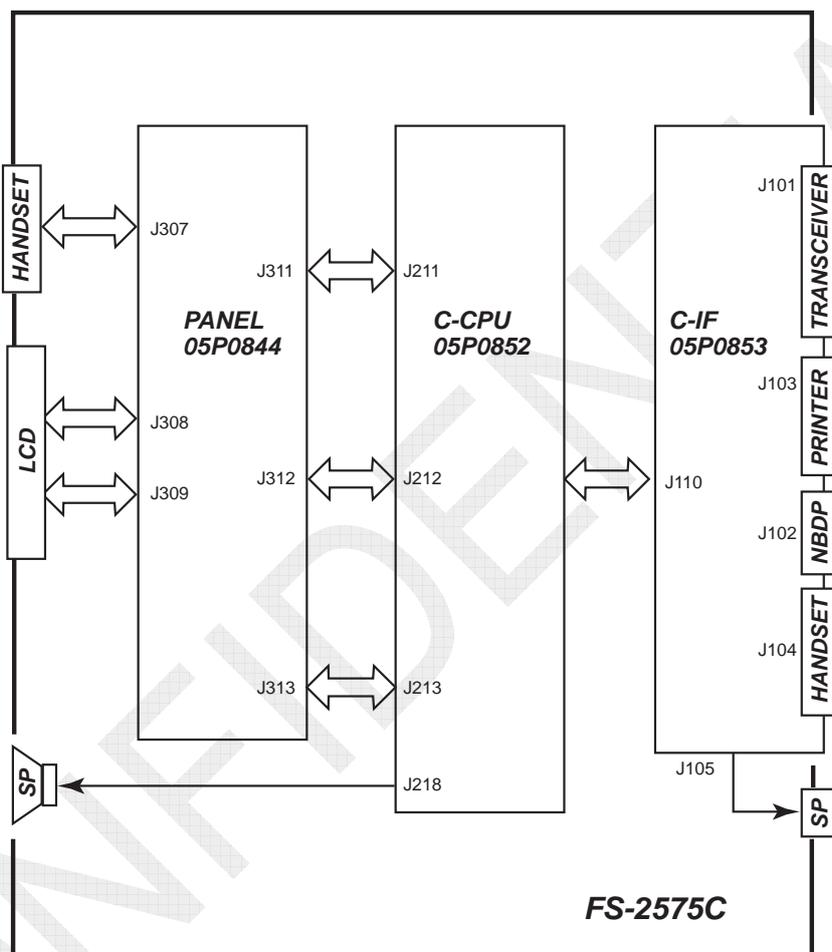


Fig. 7.1.5 Configuration of FS-2575C Control Unit

7.1.3 Major Functions of Boards

1. Transceiver unit: FS-xx75T

Table 7.1.2 Transceiver Unit Built in Boards

Board Name	Type	Applicable Model	Function
TX	05P0856	Common	Converts a 36-kHz IF signal from T-CPU to RF frequency. The maximum output is 12dBm into 50-ohm dummy load. The TX board has a built-in 36-MHz reference oscillator to output this signal to the RX, WR1, and WR2 boards as reference PLL frequency. The TX board is also used to operate the ALC; output power control.
DRV	05P0866A	FS-5075	Divides DRV board output power into two outputs to deliver each one to the PA boards, respectively, at a level of 10 to 20W. The AMP circuit configuration and AMP gain are the same as those for the FS-2575 system. Furthermore, this board has built-in Temp detection circuit, V-SWR detection circuit, divider imbalance detection circuit, and circuit that reduces output power according to the PROTECT signal from the PA-IF board.
	05P0866B	FS-2575	Outputs power to the PA boards at a level of 15 to 25W. The difference from the DRV board used in the FS-5075 system is that the DRV board used in this model has only one DRV output port. Furthermore, this board has no built-in divider imbalance detection circuit.
PA	05P0867A	FS-5075	Outputs power at a level of 250 W. (TX output power: 500W generated by combining two outputs from the PA board in the next COMB board stage.) This PA board has the same AMP circuit configuration and AMP gain as that used in the FS-2575 system. Furthermore, this board has built-in Temp detection circuit, V-SWR detection circuit, and PA IC/PA VC detection circuit.
	05P0867B	FS-2575	Provides the same function as above, except for the type of input transformer. This PA board outputs power at a level of 250W.
	05P0868	FS-1575	Outputs power at a level of 150W. This PA board has built-in Temp detection circuit, V-SWR detection circuit, and PA IC/PA VC detection circuit.
COMB	05P0869	FS-5075	Generates 500W power by combining two outputs of 250W power from the two PA boards. This COMB board has a built-in imbalance detection circuit that detects PA output impedance.
TX FIL	05P0870A	FS-5075	Consists of eight Low-pass filters to reduce harmonic caused by the DRV and PA boards. This TX FIL board has built-in BK relay used to switch between transmitting and receiving signal, I/O V-SWR detection circuit, and 50-ohm dummy load used to conduct self-tests.
	05P0870B	FS-2575	Provides the same function as above, except for the type of input connector.
	05P0876	FS-1575	This TX FIL board has the same circuit configuration as 05P0870A/B, but different in power capacity.

PA-IF	05P0864	FS-2575 FS-5075	Interfaces control signals among the T-CPU, DRV, PA, COMB, and TX FIL boards. This PA-IF board has built-in generation circuit of PROTECT signal that controls DRV board output power using V-SWR and PA IC detected by the PA board and the UNBAL signal from the COMB board, power supply voltage detection circuit, and FAN switch circuit.
	05P0864A	FS-1575	Provides the same function as above. This PA-IF board has the same circuit configuration as that of the 05P0864 type, but is configured by deleting unnecessary parts from it.
WR1	05P0847A	Common	Watches received DSC Distress and Safety frequencies. The WR1 board has the same circuit configuration with that of the WR2 board, but is not available for shared use with it. The first IF is 35.964 MHz and the second IF is 36 kHz, which decodes the received signal with the T-CPU. To connect a FAX-5 + 2.6m whip antenna to WR1, jumper setting for pre-amplifier power supply should be made.
WR2	05P0847B	Common	An option board, which is used to watch received general DSC frequencies. The WR2 board has the same circuit configuration as that of the WR1 board, but is not available for shared use with it. The first IF is 44.964 MHz and the second IF is 36 kHz, which decodes the received signal with the T-CPU. To connect a FAX-5 + 2.6m whip antenna to WR2, jumper setting for pre-amplifier power supply should be made.
RX	05P0842	Common	RX board, which is used to convert a received signal to a 36-kHz IF signal and output it to the T-CPU board. If no WR2 board is mounted, this RX board will watch scan upon receiving general DSC frequency.
DUP-FIL	05P0863	FS-5075	An option board, which has to be built in if the system is configured for Duplex communication. This DUP-FIL board consists of Band-pass filters within the RX frequency range of each band.
RX FIL	05P0862A	FS-5075	This RX FIL board consists of a narrow Band-pass filter in the preselector and four Band-pass filters circuit, and also has a built-in circuit used to divide RX antenna or T/R antenna into the RX board and the WR2 board.
	05P0862B	FS-1575 FS-2575	Provides the same function as above. However, this board is configured by deleting a connector used to connect to the DUP-FIL board from the 05P0862A type.
MOT	05P0860	Common	Serves as a relay board between the T-CPU board and the WR1, WR2, RX, TX, RX-FIL, and PA-IF boards. This MOT board consists of CPLD, ADC, DAC, and interface with external equipment.
T-CPU	05P0859	Common	Controls the Transceiver unit and External interface, and provides LAN connect interface, and also processes modulated and demodulated signals with the use of CODEC, ADC, FPGA, and DSP.

T-IF	05P0861	FS-2575 FS-5075	Serves as a relay board between External equipment and the Transceiver unit. This T-IF board has built-in MMSI switch and jumper that is used to make setting of ALARM contact output (to N.C or N.O).
	05P0861A	FS-1575	Provides the same function as above. A "Remote" connector is mounted on this board.
FET	05P0872	FS-5075	Turns ON and OFF the power supply with the FET power switch. The FET power switch circuit is the same as that on the P-SW board. This FET board outputs 24VDC power. It is supplied to the SW REG board that generates 42VDC power. The FET board is controlled by the P-SW.
P-SW	05P0871	Common	Consists of a power supply ON/OFF circuit with the FET power switch, low voltage (18 to 20VDC) protection circuit, and overvoltage (33VDC) protection circuit. This P-SW board outputs 24VDC power. It is supplied to the SW REG board that generates 42VDC power.
PWR	05P0874	Common	Converts 24V power outputted from the P-SW board to 15VDC/14.3A and 5VDC/2.5A and outputs them as a switching power supply.
SW REG	05P0873	FS-2575 FS-5075	Serves as a non-isolated power supply board that outputs 42VDC/35A power to be supplied from the 24VDC power supply unit to PA. 42VDC power is generated by combining 18V switching power output and 24VDC power input.

2. Control unit: FS-2575C

Table 7.1.3 Control Unit

Board Name	Type	Applicable Model	Function
PANEL	05P0844	Common	Consists of color LCD, LCD backlight, operation key, and Handset interface.
C-IF	05P0853	Common	Consists of Transceiver unit, NBDP terminal unit, interface with Printer, and SP power-amplifier.
C-CPU	05P0852	Common	Performs communications with the Transceiver unit, NBDP terminal unit, and printer, and also controls LCD and panel keys. This C-CPU board consists of MAIN CPU, CODEC, FPGA, SDRAM, and FLASH ROM.

3. Antenna coupler

Table 7.1.4 Antenna Coupler

Board Name	Type	Applicable Model	Function
COUP	AT-5075 05P0875	FS-2575 FS-5075	Serves as an antenna matching circuit.
COUP	AT-1575 05P0883	FS-1575	Provides the same function as above.

7.2 Transmission Circuit

7.2.1 TX Board (05P0856): Common Board

The TX board is common to the three models.

36-kHz voice, DSC, and NBDP TX IF signals modulated with the DSP of the T-CPU board are inputted to the TX board and converted up to RF frequency.

The RF frequency is converted to an IF frequency of 71.964 MHz by the IF signal at a frequency of 72 MHz in the Mixer circuit. The IF frequency of 71.964 MHz is converted to a transmission frequency at Lo frequency in the 2nd Mixer circuit.

Furthermore, this TX board controls TX output power. The TX board outputs power to the PA board in case of the FS-1575 system and to the DRV board in case of FS-2575 and FS-5075 systems.

The maximum TX output power of the TX board is +12dBm into 50-ohm load.

Major built-in circuits of the T-CPU board are TX IF amplifier circuit, power control circuit, frequency conversion circuit, 36-MHz VCTCXO (Voltage Controlled Temperature Crystal Oscillator; reference oscillator), PLL synthesizer circuit, and TX board self-test circuit.

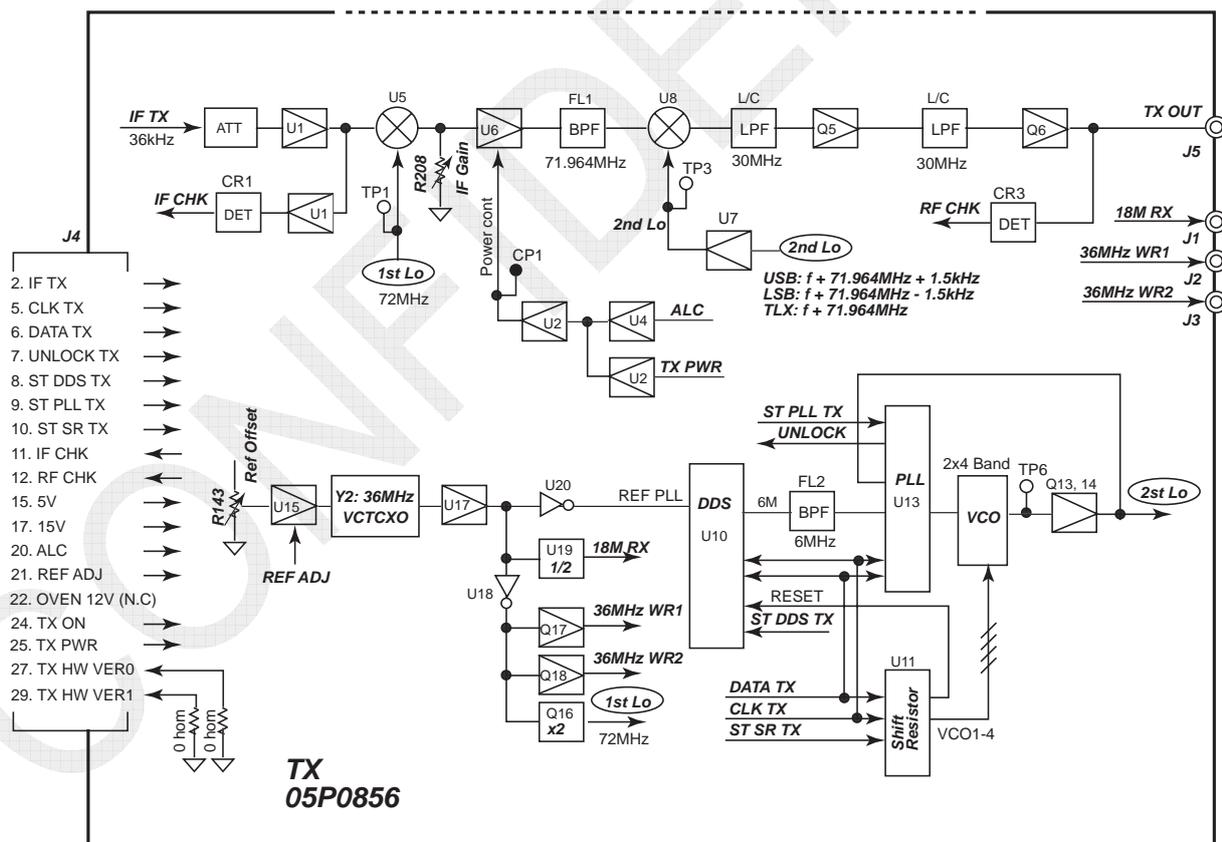


Fig. 7.2.1 TX Board Block Diagram

Table 7.2.1 Major Signals of TX Board

Signal Name	Function
CLK TX	DDS / PLL IC clock signal
DATA TX	Frequency data set to DDS / PLL IC
UNLOCK	Unlock signal of PLL circuit
ST DDS TX	Data set strobe signal to DDS
ST PLL TX	Data set strobe signal to PLL
IF CHK	Detection signal of 36-kHz TX IF signal inputted to the TX board, which is used to conduct self-tests
RF CHK	Detection signal of TX output signal, which is used to conduct self-tests
5V, 15V	Power supply voltage for circuit
ALC	TX output power control signal, which is inputted from the TX FIL board
REF ADJ	Controls a reference oscillation frequency of 36 MHz.
TX ON	Activates the TX circuit.
TX PWR	TX power data outputted from the T-CPU
TX HW VER0, 1	Displays TX board version information when selecting [MENU] -> 9. SERVICE -> 5.TEST -> 1.VERSION.
OVEN 12V	Unused

1. 36kHz TX IF signal

The 36-kHz TX IF signal is generated by modulating voice, DSC, and NBDP signals with the DSP of the T-CPU board and converting the modulated signal to an analog signal with CODEC. This signal varies in the frequency with the type of Emission.

- USB : 34.5 kHz
- J2B (F1B) : 36.0 kHz
- A1A : 36.0 kHz

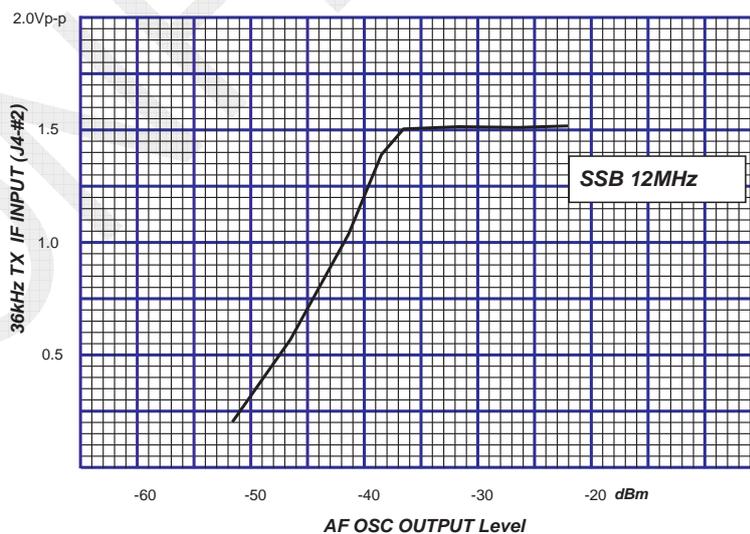


Fig. 7.2.2 SSB TX IF Input vs. Board Output Power Level

2. 36MHz VCTCXO

The 36-MHz reference oscillator is of the voltage controlled, temperature compensated type and provides a high level of frequency stability. This oscillator also allows the control of frequencies with voltage.

Make adjustment of frequency deviation to “±10 Hz” by selecting [MENU] -> 9. SERVICE -> 3.RT SETUP-> 1.SETUP -> “REF OSC.” “R143” is a variable resistor used to make reference offset adjustment. Set “REF OSC” to “0,” and then make “R143” adjustment so that the deviation of a frequency of 36 MHz will come to “±1 Hz.” For the procedure for making frequency adjustment, refer to information on page 5-29.

This reference frequency signal is inputted in the PLL circuit of the TX board, and also outputted to the RX, WR1, and WR2 boards. However, a frequency of 18 MHz, half the frequency of 36 MHz is outputted to the RX board.

- TX board: 36 MHz (72 MHz (36 MHz multiplied by 2) to the 1st local oscillator)
- RX board: 18 MHz (36 MHz divided by 2)
- WR1 and WR2 boards: 36MHz

3. Synthesizer circuit

A circuit used to output the 2nd oscillation frequency consists of DDS and PLL circuits. The DDS circuit outputs a frequency of approximately 6 MHz. This frequency is taken as a reference frequency for the PLL circuit.

The PLL IC (U13) operates in steps of approximately 1 MHz using the “divide-by-6” R-counter and “divide-by-72 to 103” N-counter in combination.

- DDS output frequency: $F_{\text{DDS}} = (L_o / N) \times R$
- PLL output frequency: $F_{\text{VCO}} = (N / R) \times F_{\text{REF}}$

Furthermore, in order to expand the VCO oscillation frequency range (72,065.5 kHz (100 kHz) to 101,965.4 kHz (29,999.9 kHz), the VCO circuit is divided into four bands and each of the four bands are further divided into two subbands.

Table 7.2.2 Division of 2nd Lo Frequency

Band	H/L	2nd Lo Output Freq.	Setting Freq.
1	L	73560.0 to 74963.9kHz	1.605-3MHz
	H	74964.0 to 78163.9kHz	3-6.2MHz
2	L	78164.0 to 81663.9kHz	6.2-9.7MHz
	H	81664.0 to 85363.9kHz	9.7-13.4MHz
3	L	85364.0 to 89263.9kHz	13.4-17.3MHz
	H	89264.0 to 93363.9kHz	17.3-21.4MHz
4	L	93364.0 to 97563.9kHz	21.4-25.6MHz
	H	97564.0 to 99436.0kHz	25.6-27.5MHz

Note) For USB, add a shift frequency of 1.5 kHz to the oscillation frequencies listed above. PLL setting shift frequencies are as follows:

- USB: +1.5 kHz
- H3E, CW, TLX: 0 kHz

4. TX output power control circuit

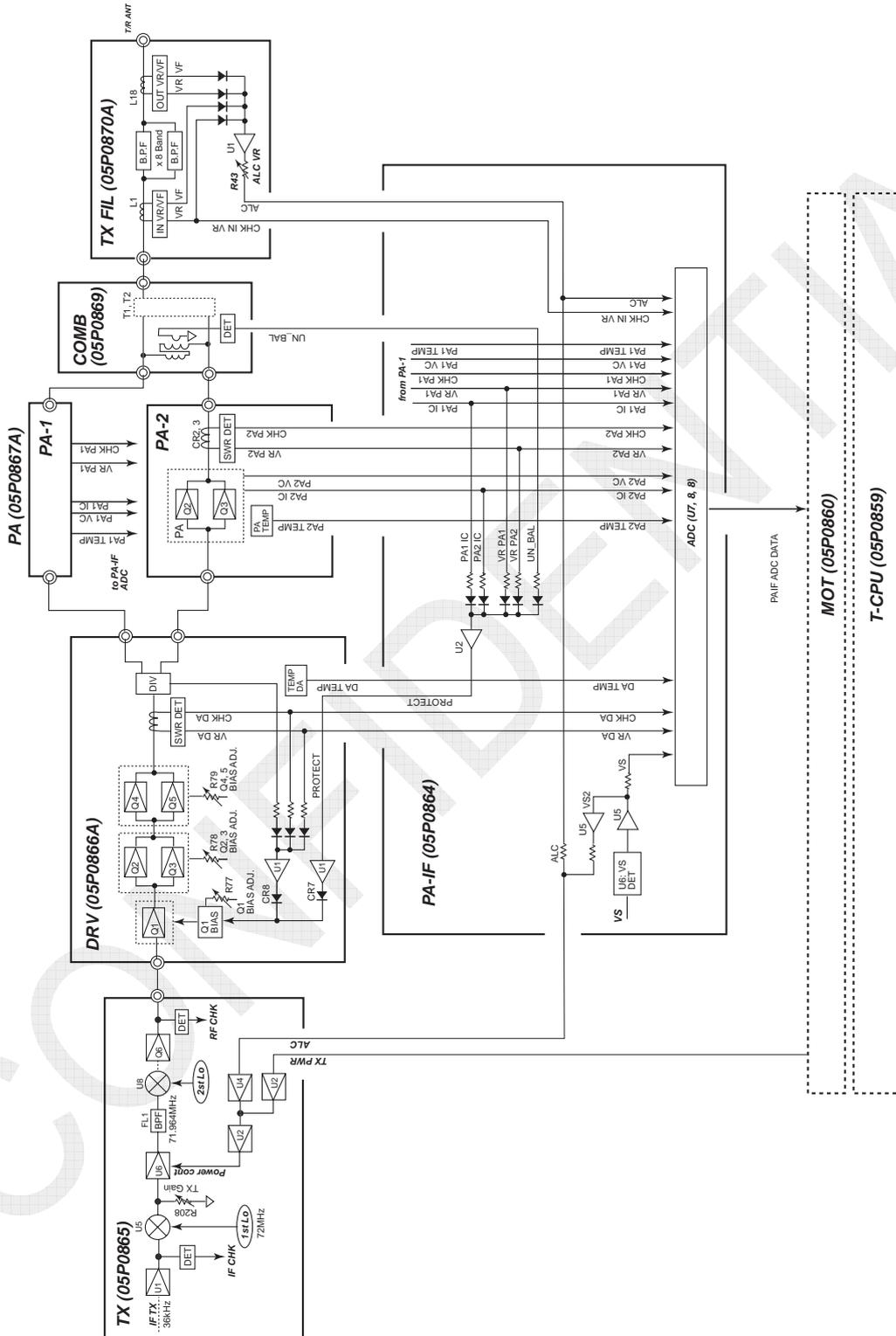


Fig. 7.2.3a FS-5075 Protection Circuit Diagram

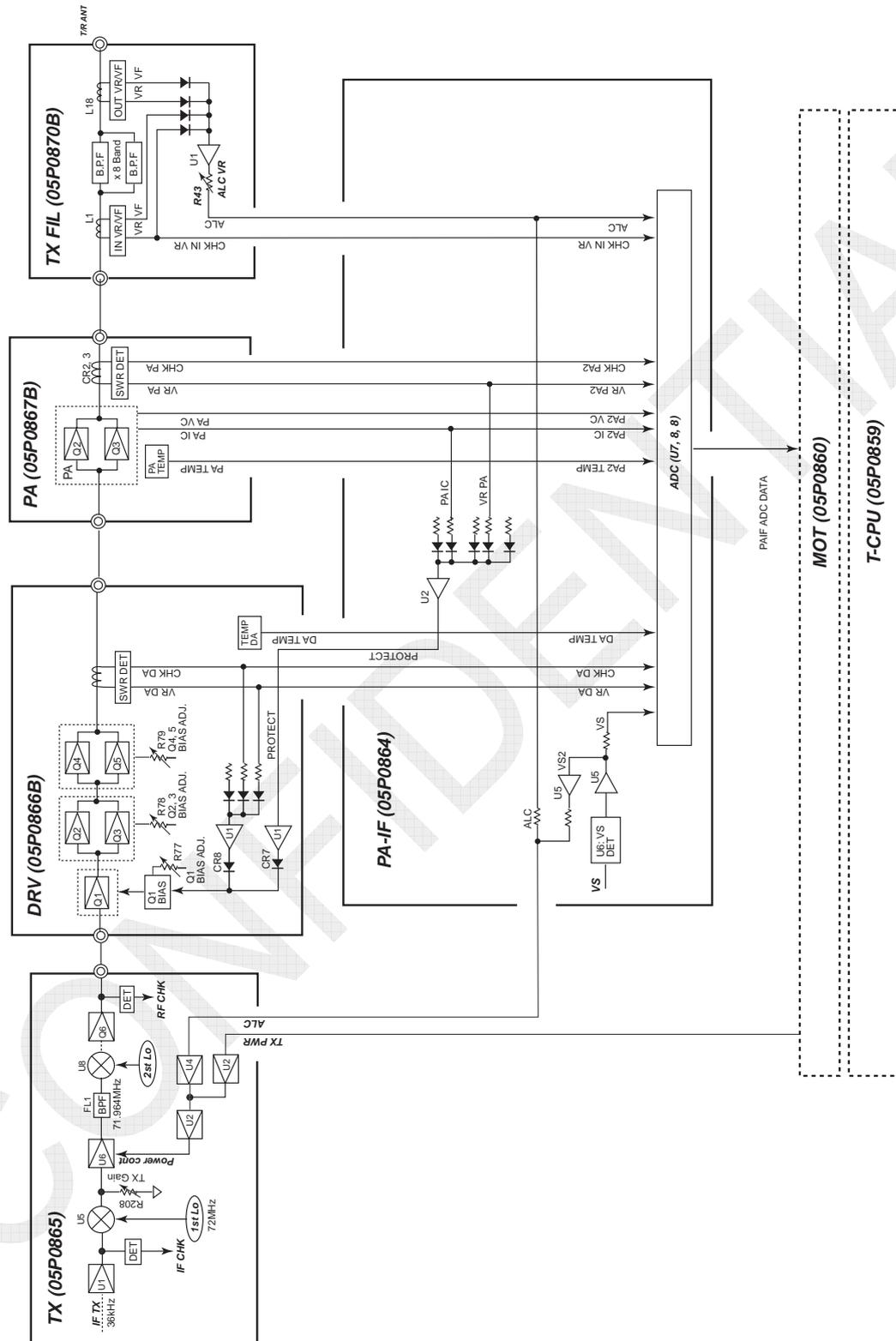


Fig. 7.2.3b FS-2575 Protection Circuit Diagram

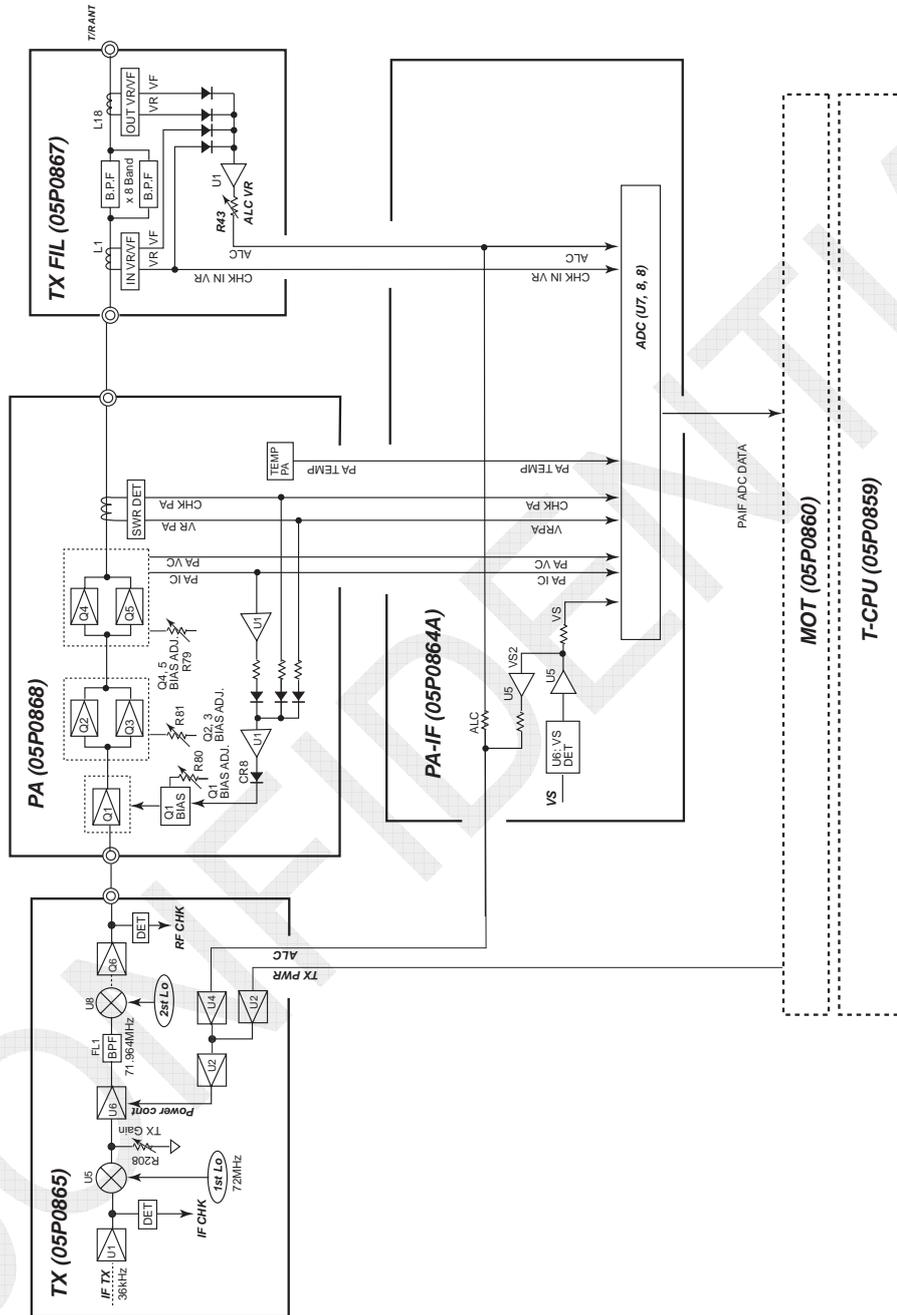


Fig. 7.2.3c FS-1575 Protection Circuit Diagram

TX output power setting is made through the control of the gain of U6 (AD8367ARUZ: Variable Gain Amplifier) according to the ALC signal form the TX FIL board and TX power data.

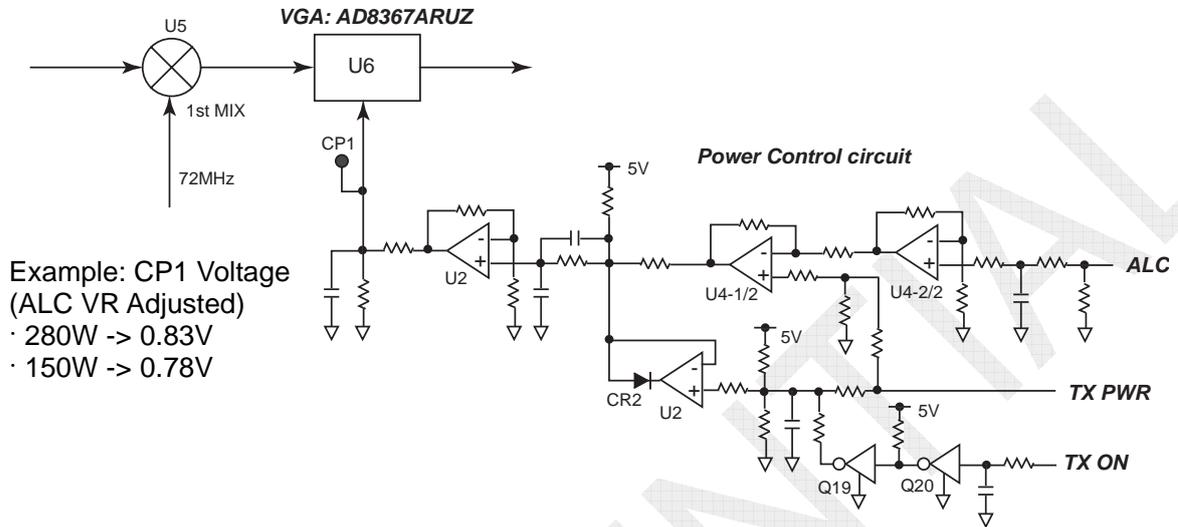


Fig. 7.2.4 TX Board Power Control Circuit

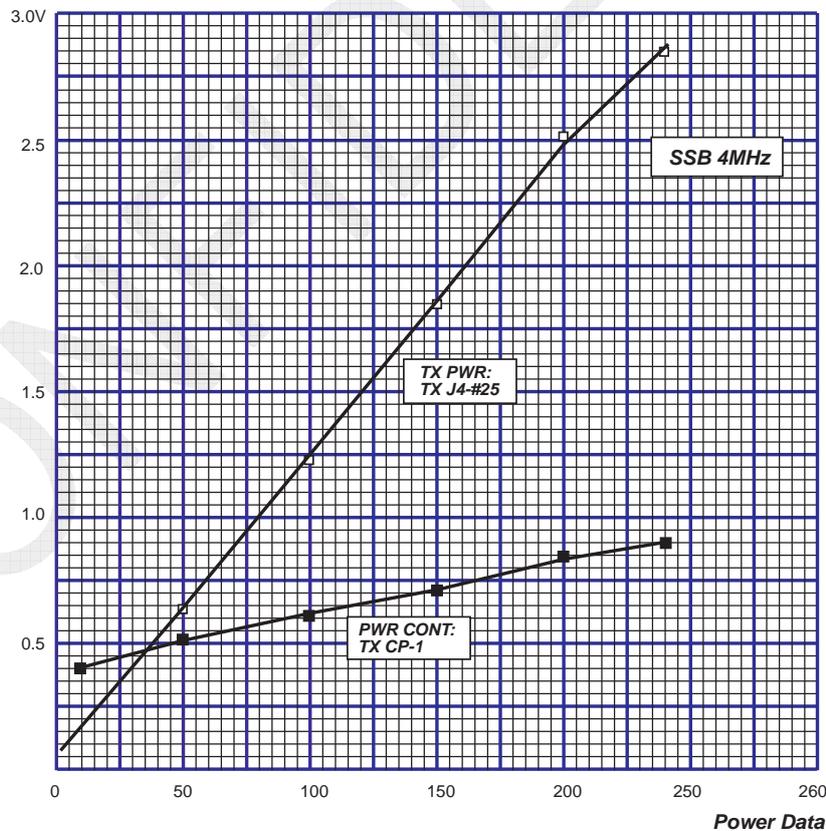


Fig. 7.2.5 Example of FS-2575 Power Control Input vs. Output

Rated TX output power setting is made by the use of the “R43” ALC VR on the TX FIL board. For this setting, set power data to default, modulate it in two tones, and then adjust the “R43” so that the TX output power will come to the rated level.

The TX power control signal outputs by software according to Power data set by selecting [MENU] -> 9.SERVICE -> 3.RT SETUP -> Any of “4. to 7. TX PWR.”

The ALC signal is based on the V-SWR VR signal on the input side and the V-SWR VF, and V-SWR VF signals on the output side of the TX FIL board, and contains a transmission circuit protection function using hardware.

For example, if V-SWR drops, the ALC detection voltage will rise to reduce TX output power.

In order to prevent a rise in the PA IC signal level if the power supply voltage “VS” drops, the VS detection signal is incorporated in the ALC signal. However, since the low rvoltage lockout circuit (18V) in the power supply circuit is activated first, the VS protection is not in practical use.

Output power adjustment of the TX board is made with “R208” TX IF GAIN VR. Make this adjustment so that the output power of the FS-xx75T unit will come to 1/4 of the rated output power wattage in the 12-MHz SSB band at the MIC input level of -46 dBm into 600 ohms.

The rated MIC input level is “-36 dBm into 600 ohms.”

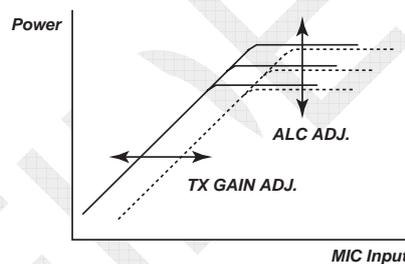


Fig. 7.2.6 Correlation between ALC and TX Gain Adjustment

Reference)

Detection signals from all boards are inputted to the T-CPU through the ADC of the PA-IF board. These signals are displayed on the TX SELF TEST window.

The transmission protection circuit protects the transmission amplifier, according to the PA IC and V-SWR VR signals detected from the DRV, COMB, and PA boards, by controlling the bias of the 1st amplifier “Q1” of the DRV board to reduce it to the threshold when level exceeds the threshold of any of the signals.

However, the circuit and detection signal that caused the protection circuit to be activated cannot be identified. No error messages will be outputted.

To check for which circuit caused the error, select [MENU] -> 1.TEST -> “TX SELF TEST” or [MENU] -> 9.SERVICE -> 3.RT SETUP -> 3.SELF CHECK.

For example, it could be determined that a circuit having a detection signal level displayed in “red” on the SELF CHECK window has caused a certain error.

For details, refer to information on pages 6-6 and 6-15.

Note) Thresholds for the purposes of this Manual represent those for self-tests and differ from those described in the Reference above.

Table 7.2.3 Power Control Signals

Board Name	Transmission Control-related Signal Name	Function	Protection Circuit Control Method
TX FIL	ALC	Controls the ALC circuit of the TX board.	Hardware
	CHK IN VR	Displays numerical values when conducting a self-check.	
COMB FS-5075	UN BAL	Displays numerical values when conducting a self-check. And for the bias control of Q1 of the DRV board.	Hardware
PA FS-2575 FS-5075	PA IC	Displays numerical values on the RT window and when conducting a self-check. And for the bias control of Q1 of the DRV board. <i>Note)</i> FS-2575 -5075: Bias control of Q1 with a 19A or more current	Hardware
	PA VC	Displays numerical values on the RT window and when conducting a self-check.	
	TEMP PA	Displays numerical values when conducting a self-check. And for the power reduction control.	Software
	VR PA	Displays numerical values when conducting a self-check. And for the bias control of Q1 of the PA board.	Hardware
	CHK PA	Displays numerical values when conducting a self-check. And for the bias control of Q1 of the PA board.	Hardware
PA FS-1575	PA IC	Displays numerical values on the window and when conducting a self-check. And for the bias control of Q1 of the PA board. <i>Note)</i> FS-1575: Bias control of Q1 with a 19A current	
	PA VC	Displays numerical values on the RT window and when conducting a self-check.	
	TEMP PA	Displays numerical values when conducting a self-check. And for the power reduction control.	Software
	VR PA	Displays numerical values when conducting a self-check. And the bias control of Q1 of the PA board.	Hardware
	CHK PA	Displays numerical values when conducting a self-check. And the bias control of Q1 of the PA board.	Hardware
DRV FS-2575 FS-5075	VR DA	Displays numerical values when conducting a self-check. And the bias control of Q1 of the DRV board.	Hardware
	CHK DA	Displays numerical values when conducting a self-check. And the bias control of Q1 of the DRV board.	Hardware
	TEMP DA	Displays numerical values when conducting a self-check. And for the power reduction control.	Software

PA-IF	VS	Displays numerical values when conducting a self-check. And for added the ALC circuit of the PA-IF board. <i>Note)</i> Operates at an 18V or less voltage. The low rvoltage lockout function is activated first.	Hardware
T-CPU	Power Data	Controls the ALC circuit of the TX board.	Software

Note)

Although the protection circuit has been designed to be activated first by the PA IC signal, the over current protection (19A) of the SW REG board is actually activated first, resulting in a drop in PA VC (42V).

5. TX board self-test detection circuit

When conducting a self-test, the test results are judged for each circuit and detected signal levels are also displayed. For details, refer to information on pages 6-6 and 6-15.

- 1) IF CHECK
Detection signal of 36-kHz TX IF signal inputted to the TX board
- 2) RF CHECK
Detection signal of output signal from the TX board
- 3) UN-LOCK
PLL circuit “lock or unlock” detection signal. When it detects that the PLL circuit is unlocked, transmission will be stopped and an error message saying “WARNING: TX PLL UNLOCK!” will be outputted.
- 4) TX_HW_VER0, 1
TX board hardware information. This information will be displayed when selecting [MENU] -> 9.SERVICE -> 5.TEST -> 1.VERSION.

7.2.2 DRV Board

DRV board (05P0866A): FS-5075

DRV board (05P0866B): FS-2575

Basically, the DRV board amplifier circuits of the FS-2575 and FS-5075 systems are the same. The differences are that;

- the DRV board “05P0866A” of the FS-5075 system outputs power through the two-port output circuit (divider) to PA1 and PA2; and
- attenuators (ATT) are used in the input circuit to make an output level correction so that the same level of power will be outputted from the output port of the FS-2575 and FS-5075 systems.

The DRV board is able to output power of 30 to 40W or more at maximum with a power gain of not less than 35dB.

For example, when the DRV board inputs power of +10dBm, it will output power of approximately 40W. When it inputs power of +7dBm, it will output power of approximately 20W. At any rate, TX output power is controlled with the ALC. Consequently, although depending on models and TX frequencies, the DRV board normally inputs power of +5 to 8dBm from the TX board and outputs power of 15 to 25W.

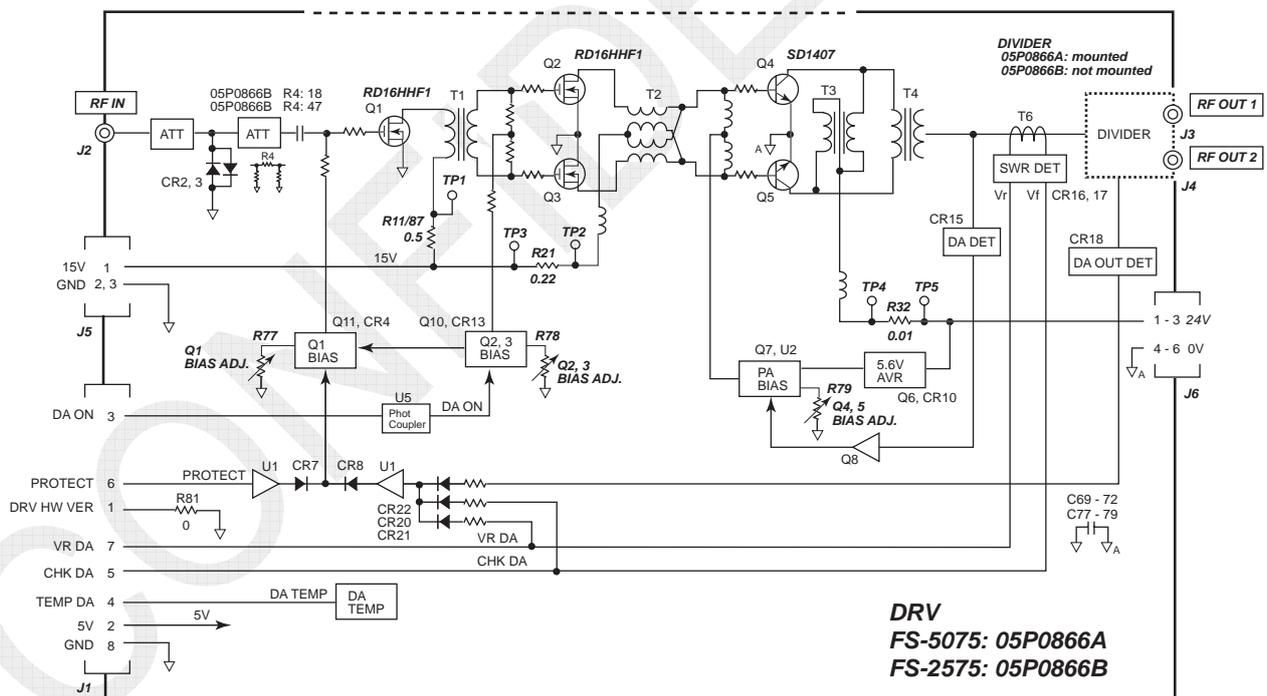
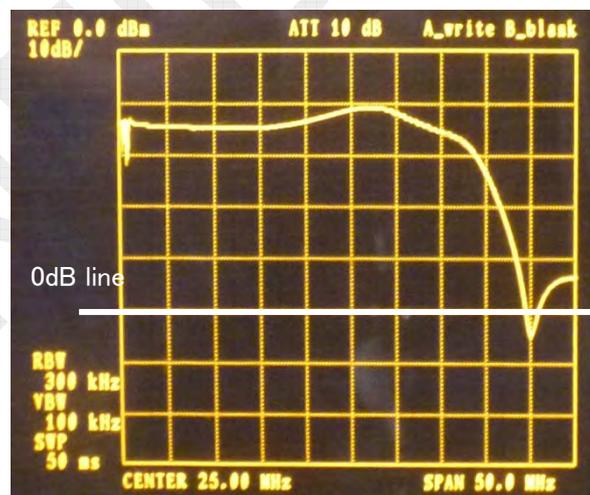


Fig. 7.2.7 DRV Board Block Diagram

Table 7.2.4 Major Signals of DRV Board

Signal Name	Function
24V	Power supply voltage for Q4 and Q5 of the PA board. The 24V power supply (0V) line and the housing are connected via a capacitor to make a RF frequency path.
15V	Power supply voltage for Q1, Q2, and Q3 of the DRV board.
5V	Power supply voltage for the DRV control circuit.
DA ON	Activates the bias circuit in the DRV circuit.
Tx IN	RF signal from the TX board. The maximum input power is +12dBm into 50 ohms. Normally, power of approximately +5 to 8dBm is inputted.
RF OUT	Allows for outputting power of 30 to 40W or more, normally 15 to 25W.
Protect	Controls the bias of the 1st amplifier "Q1" and reduces TX output power when output power exceeds the threshold of any of the VR PA and PA IC signals of the PA board and the UN BAL signal from the COMB board.
VR DA	SWR Vr detection signal outputted from the DRV and PA boards, which controls the bias of the 1st amplifier and reduces transmission output power when output power exceeds the threshold of this signal. Detected value is displayed on the SELF CHECK window.
CHECK DA	SWR Vf detection signal outputted from the DRV and PA boards. Detected value is displayed on the SELF CHECK window.
TEMP DA	Temperature detection signal of the DRV board. When a specified temperature is detected, output power will reduce.
DA HW VER	DRV board hardware information. This information is displayed by selecting [MENU] -> 9. SERVICE -> 5.TEST -> 1.VERSION.



Span: 50MHz
10dB/div
DRV Input: +7dBm

Fig. 7.2.8 Example of DRV Board Frequency Characteristics

1. Protection circuit

- 1) The transmission protection circuit reduces TX output power by detecting the V-SWR VR/VF signals outputted from the Q4 and Q5 and the DIV UNBAL signal (05P0866A: FS-5075) outputted from the DRV board and controlling the bias of the 1st amplifier “Q1.” The PROTECT signal is added to this control line.
- 2) The DIV UNBAL signal (05P0866A: FS-5075) detects the occurrence of a failure in the PA1 and PA2 or a problem with the connector of RF OUT 1 and 2. In other words, this signal detects an error in load of the DRV board.
- 3) The maximum power of the RF signal from the TX board is +12dBm. To prevent the excessive power input in the RF signal, limiters “CR2” and “CR3” are mounted to the input circuit of the DRV board. The limiters will activated when the DRV board input power reaches +8 to +10dBm.
- 4) When PA board temperature remains at the threshold for a period of one minute, output power will automatically reduce and output an error message saying “ERROR: Tx power reduced. Main AMP heated.”

	FS-5075				FS-2575		
	Hi	MID	LOW1	LOW2	Hi	MID	LOW
Lower than 77°C	MID	MID	LOW1	LOW2	MID	MID	LOW
77°C to 84°C	LOW1	LOW1	LOW1	LOW2	LOW	LOW	LOW
84°C or above	LOW2	LOW2	LOW2	LOW2	LOW	LOW	LOW

Note) Output power will reduce when any of temperatures detected by the PA-1, PA-2, and DRV boards remains at the threshold for a period of one minute or more.

2. IMD improvement

As DRV board output power increases, IMD (intermodulation distortion) gets worse. To avoid this problem, the CR15 limiter detects output power from the Q4 and Q5 to reduce the bias of these amplifiers.

3. Bias adjustment

For the adjustment procedure, refer to information on page 5-41. To make check or adjustment of bias current, be sure to disconnect the [TX OUT] connector from the TX board.

Table 7.2.5 Bias Currents of DRV Board

TR/FET	ADJ. Point	Bias Current	Measurement Point
Q4 and Q5	R79	400 mA	TP4 - TP5: 4 mV <i>Note)</i> <i>500 mA for current measurement of the 24V line</i>
Q3 and Q4	R78	450 mA	TP2 - TP3: 100 mV
Q1	R77	150 mA	TP1 - TP2: 75 mV

7.2.3 PA Board-1

05P0867A: FS-5075

05P0867B: FS-2575

Basically, the PA board amplifier circuits of the FS-2575 and FS-5075 systems are the same. The difference between the two PA boards is the type of PA input transformer. The PA board consists of a single-stage push-pull amplifier circuit that is driven by a 42V power supply, V-SWR detection circuit, and bias circuit.

The power gain of the amplifier is 10dB or more. For example, when the PA board inputs power of 25W, it will output power of 250W or more.

The FS-5075 system is supplied with TX output power of 500W by combining power from the PA-1 and PA-2 boards through the COMB board.

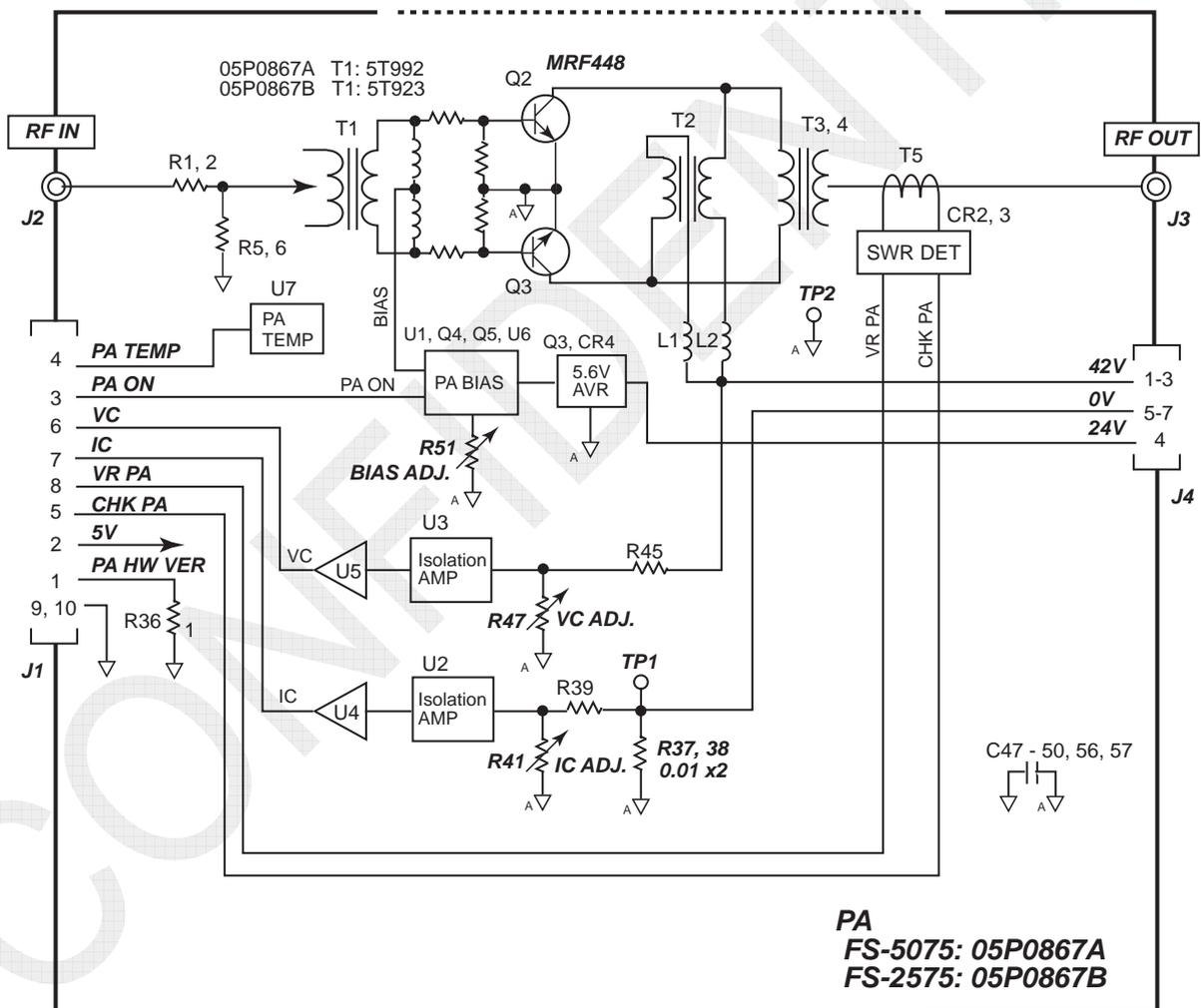


Fig. 7.2.9 FS-2575/FS-5075 PA Board Block Diagram

Table 7.2.6 Major Signals of PA Board

Signal Name	Function
42V	Power supply voltage for Q1 and Q2 push-pull amplifiers of the PA board. The 42V power supply (0V) line and the housing are connected via capacitor to make RF path.
24V	Power supply voltage for the PA board bias circuit. The ground of this circuit is isolated from the 24V power supply line (-). The 24V power supply (0V) line and the housing are connected via capacitor to make RF path.
PA IN	Inputs the RF signal form the DRV board. Normally, power of 15 to 25W is inputted.
PA OUT	Outputs power of 250W. The FS-5075T unit is supplied with 500W power generated by combining power outputted from the PA-1 and PA-2 boards in the next COMB board stage.
TEMP PA	Temperature detection signal of the PA board. When a specified temperature is detected, output power will reduce.
VR PA	V-SWR Vr detection signal outputted from the PA board, which controls the bias of the 1st amplifier of the PA board and reduces TX output power when output power exceeds the threshold of this signal. Detected value is displayed on the SELF CHECK window.
CHK PA	V-SWR Vf detection signal outputted from the PA board. Detected value is displayed on the SELF CHECK window.
IC	PA Tr collector current detection signal, which controls the bias current of the 1st amplifier of the PA board and reduces TX output power when output current exceeds the threshold (19A or more) ^{See Note} . Detected value is displayed on the SELF CHECK window.
VC	PA Tr collector voltage detection signal. Detected value is displayed on the SELF CHECK window and the check meter.
PA HW VER	PA board hardware information. This information is displayed by selecting [MENU] -> 9.SERVICE -> 5.TEST -> 1.VERSION.
PA ON	Activates the bias circuit in the PA circuit.

Note) Although the protection circuit has been designed to be activated first by the PA IC signal, the overcurrent protection (19A) of the SW REG board is actually activated first, resulting in a drop in PA VC (42V).

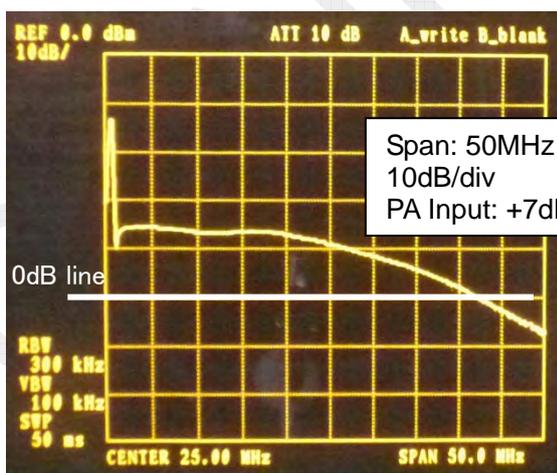


Fig. 7.2.10 Example of PA Board
Frequency Characteristics

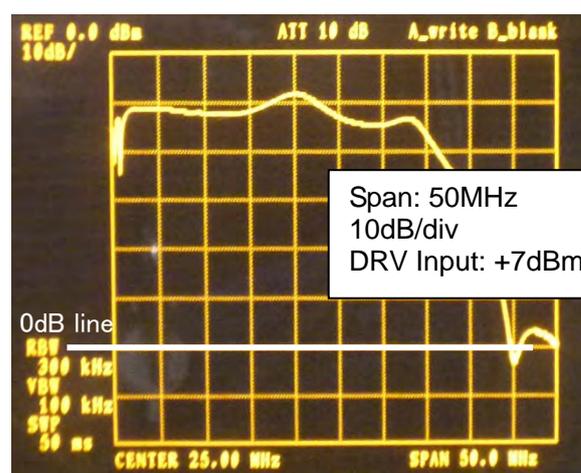


Fig. 7.2.11 Example PA+DRV Boards
Frequency Characteristics

1. Bias adjustment

For the adjustment procedure, refer to information on page 5-35. To make check or adjustment of bias current, be sure to disconnect the [TX OUT] connector from the TX board.

Use “R51” to make adjustment so that the bias current will come to 400 mA.

2. VC reading adjustment

For the adjustment procedure, refer to information on page 5-36.

For example, use “R47” to make adjustment so that VC reading displayed on the RT window or on the TONE TEST window will come to the voltage (42V) between the collector and emitter of the PA transistor when selecting [MENU] -> 1.TEST -> 3. TONE TEST.

3. IC reading adjustment

For the adjustment procedure, refer to information on page 5-37.

For example, use “R41” to make adjustment so that IC reading displayed on the RT window or on the TONE TEST window will come to the collector current of the PA transistor when selecting [MENU] -> 1.TEST -> 3.TONE TEST.

Concretely speaking, insert a DC ammeter in the 42V power supply line of the PA board, and then make measurement of PA IC.

4. TEMP PA

When PA board temperature remains at the threshold for a period of one minute or more, TX output power will automatically reduce and output an error message saying “ERROR: Tx power reduced. Main AMP heated.”

	FS-5075				FS-2575		
	Hi	MID	LOW1	LOW2	Hi	MID	LOW
Less than 77°C	MID	MID	LOW1	LOW2	MID	MID	LOW
77°C to 84°C	LOW1	LOW1	LOW1	LOW2	LOW	LOW	LOW
84°C or above	LOW2	LOW2	LOW2	LOW2	LOW	LOW	LOW

Note)

Output power will reduce when any of temperatures detected by the PA-1, PA-2, and DRV boards remains at the threshold for a period of one minute or longer.

7.2.4 PA Board-2 (05P0868): FS-1575

The PA board-2 consists of a single-stage push-pull amplifier circuit that is driven by a 24V power supply, V-SWR detection circuit, and bias circuit. The power gain of the amplifier is 45dB or more.

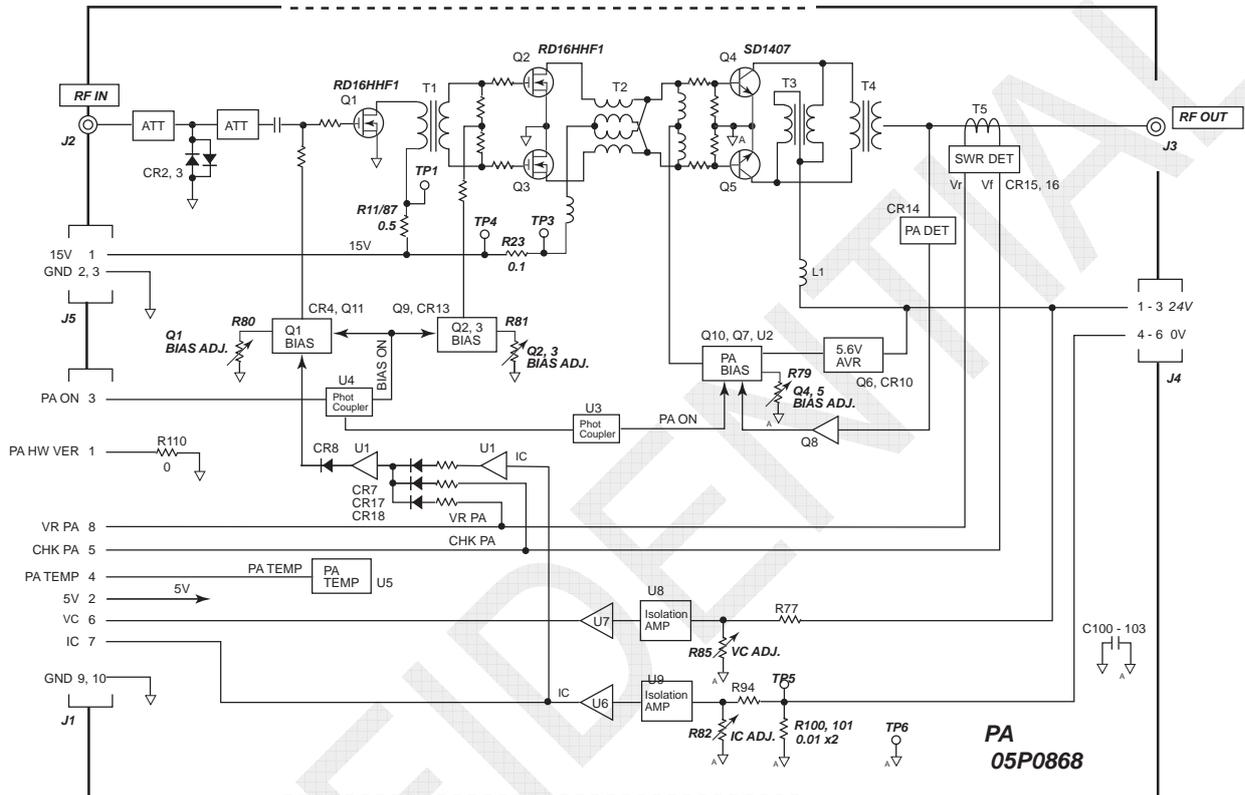


Fig. 7.2.12 FS-1575 PA Board Block Diagram

Table 7.2.7 Major Signals of PA Board

Signal Name	Function
24V	Power supply voltage for Q4 and Q5 push-pull amplifiers of the PA board. The 24V power supply (0V) line and the housing are connected by a capacitor to make RF path.
15V	Power supply voltage for the Q1, Q2, and Q3 of the PA board.
5V	Power supply voltage for the PA control circuit.
RF IN	RF signal from the TX board. The maximum input power is +12dBm/50 ohms. Normally, power of approximately +5 to 8dBm is inputted.
PA OUT	Outputs power of 150W.
TEMP PA	Temperature detection signal of the PA board. When a specified temperature is detected, output power will reduce.
VR PA	V-SWR Vr detection signal outputted from the PA board, which controls the bias of the 1st amplifier of the PA board, when this signal exceeds the threshold, therefore, reduces TX output power. Detected value is displayed on the SELF CHECK window.
CHK PA	V-SWR Vf detection signal outputted from the PA board, which controls the bias of the 1st amplifier of the PA board, when this signal exceeds the threshold, therefore, reduces TX output power. Detected value is displayed on the SELF CHECK window.
IC	PA IC detection signal. Detected value is displayed on the Check meter or the SELF CHECK window. This signal controls the bias current of the 1st amplifier, when PA IC exceeds the threshold (19A or more), therefore, reduces TX output power.
VC	PA Tr collector voltage detection signal. Detected value is displayed on the Check meter and the SELF CHECK window.
PA HW VER	PA board hardware information. This information is displayed by selecting [MENU] -> 9.SERVICE -> 5.TEST -> 1.VERSION.
PA ON	Activates the bias circuit in the PA circuit.

1. Protection circuit

- 1) The transmission protection circuit reduces TX output power by detecting the SWR Vr/Vf signals outputted from the Q4 and Q5 and controlling the bias of the 1st amplifier "Q1."
- 2) To prevent the excessive power input in the RF signal from the TX board, limiters "CR2" and "CR3" are mounted to the input circuit of the PA board. The limiters will be activated when the PA board input power reaches +8 to +10dBm.
- 3) When PA board temperature exceeds the threshold for a period of one minute or more, output power will automatically reduce and output an error message saying "ERROR: Tx power reduced. Main AMP heated."

	Hi	MID	LOW
70°C to 77°C	MID	MID	LOW
77°C or above	LOW	LOW	LOW
84°C or above	LOW	LOW	LOW

2. IMD improvement

As DRV board output power increases, IMD (intermodulation distortion) gets increasingly worse. To avoid this problem, the CR14 limiter detects output power from the Q4 and Q5 to reduce the bias of these amplifiers.

3. Bias adjustment

For the adjustment procedure, refer to information on pages 5-35 and 5-39. To make check or adjustment of bias current, be sure to disconnect the [TX OUT] connector from the TX board.

Table 7.2.8 Bias Currents of PA Board

TR/FET	Adjustment Point	Bias Current	Measurement Point
Q4 and Q5	R79	400 mA	Make measurement of current of the 24V line.
Q3 and Q4	R81	450 mA	TP3 - TP4: 40 mV
Q1	R80	150 mA	TP1 - TP2: 75 mV

4. VC reading adjustment

For the adjustment procedure, refer to information on page 5-36.

Use “R85” to make adjustment so that VC reading displayed on the RT window or on the TONE TEST window will come to the voltage (24V) between the collector and emitter of the PA transistor when selecting [MENU] -> 1.TEST -> 3.TONE TEST.

5. IC reading adjustment

For the adjustment procedure, refer to information on page 5-37. Use “R82” to make adjustment so that IC reading displayed on the RT window or on the TONE TEST window will come to the collector current of the PA transistor when selecting [MENU] -> 1.TEST -> 3.TONE TEST.

Concretely speaking, insert a DC ammeter in the 24V power supply line of the PA board, and then make measurement of PA IC.

7.2.5 COMB Board (05P0869): FS-5075T

The COMB board combines TX output power of 250W from the PA-1 and PA-2 boards to output power of 500W.

If either of the two PA boards fails to conduct normal operation, the COMB board will get an imbalance of input impedance (of 50 ohms). UN_BAL voltage rises as the impedance gets increasingly imbalanced.

Because of this characteristic, UN_BAL voltage is added to part of the control signal of the transmission protection circuit.

For the transmission protection circuit diagram, refer to “4. TX output power control circuit” on page 7-12.

When UN_BAL voltage exceeds the threshold, the DRV and PA boards are protected by controlling the bias of 1st amplifier of the DRV board to reduce output power to the threshold.

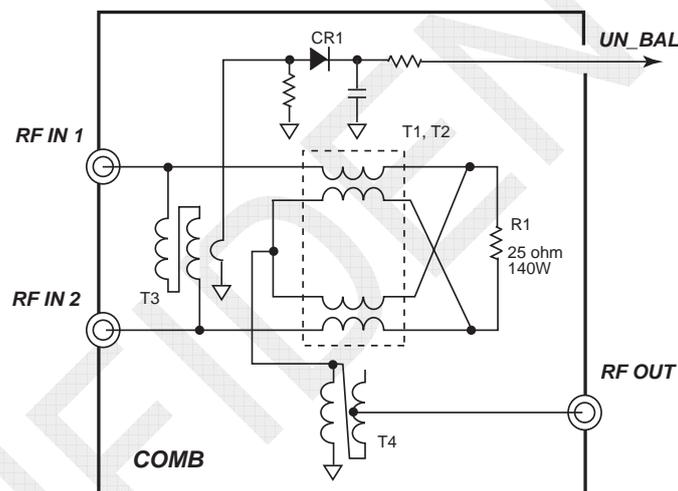


Fig. 7.2.13 COMB Board Block Diagram

7.2.6 TX FIL Board

05P0870A: FS-5075

05P0870B: FS-2575

05P0876: FS-1575

The TX FIL board consists of eight Low-pass filters with a different frequency band between 1605 kHz and 27.5 MHz, a 50-ohm break-in (BK) circuit used to switch the RF transceiver circuit, a 50-ohm dummy load circuit used to conduct self-tests, and V-SWR detection circuit for TX FIL board I/O signals.

Basically, the TX FIL board circuits of the FS-1575, FS-2575, and FS-5075 systems are the same. The differences between the three TX FIL boards are as follows:

- 1) The TX FIL boards of the FS-5075 and FS-2575 systems are different in the types of input connector of the TX FIL board. The 05P0870A uses the BNC type connector, while the 05P0870B used the TMP type connector.
- 2) The TX FIL boards of between FS-1575 and FS-5075, FS-2575 systems are different in the power capacity for the FIL circuit.

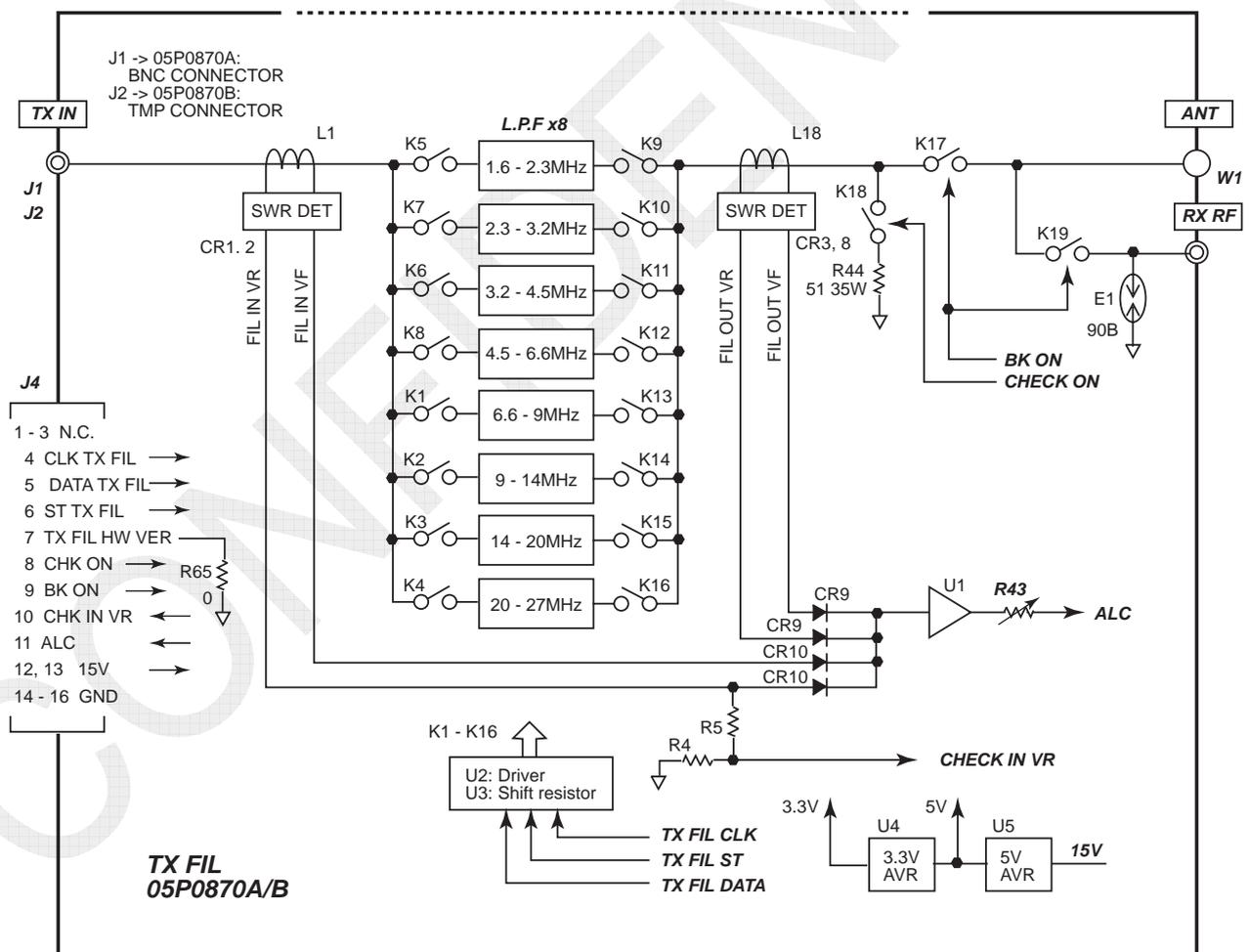


Fig. 7.2.14 TX FIL Board Block Diagram

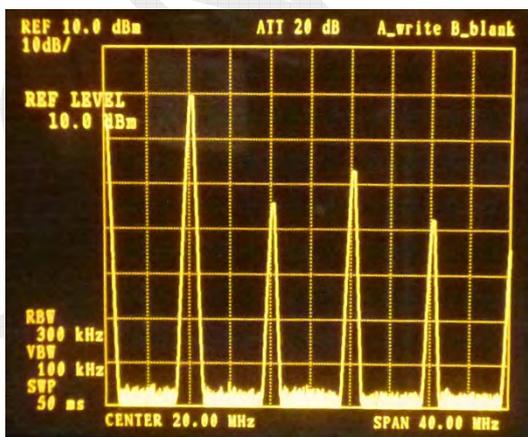
Table 7.2.9 Major Signals of TX FIL Board

Signal Name	Function
15V	Power supply voltage for the TX FIL board.
CLK, DATA, ST	TX FIL board control signals, which are serial signals with the T-CPU.
TX IN	Inputs RF signal transmitted from the PA board with the FS-1575 or FS-2575 system, and that transmitted from the COMB board with the FS-5075 system.
CHECK ON	Control signals, which connects TX FIL output power to the 50-ohm dummy load circuit when conducting a self-test on the transmission block.
IN VR	V-SWR Vr detection signal inputted in the TX FIL board. Detected value is displayed on the SELF CHECK window.
ALC	ALC signal, which maintains TX output power at the specified power level. This signal controls output power from the TX board. Input signals for the ALC detection circuit are V-SWR VR and VF for input/output in/from the TX FIL circuit.
TX_RX ANT	T/R antenna terminal, which is connected to the antenna coupler.
RX ANT	RX antenna terminal, which is connected to the RX board.
BK ON	Controls the 50-ohm break-in (BK) relay.
TX FIL HW VER	TX FIL board hardware information. This information is displayed by selecting [MENU] -> 9.SERVICE -> 5.TEST -> 1.VERSION.

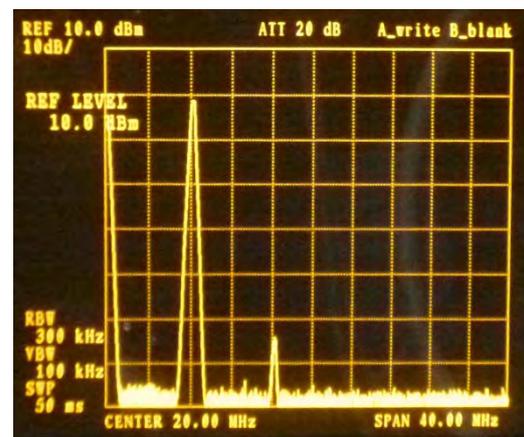
1. LPF circuit

The LPF circuit consists of eight Low-pass filters with a different frequency band between 1605 kHz and 27.5 MHz and reduces spurious emission caused by the DRV and PA boards.

The Low-pass filters provide insertion loss of not more than 0.5dB and stop-band attenuation of not less than 40dB with frequencies more than double the cutoff frequency of each Low-pass filter.



8M: PA OUT



8M: TX FILOUT

2. K17: 50-ohm BK relay circuit

The 50-ohm BK relay switches the T/R antenna circuit in order to use the T/R antenna as a receiving antenna. The operating time of the relay is less than 10 ms.

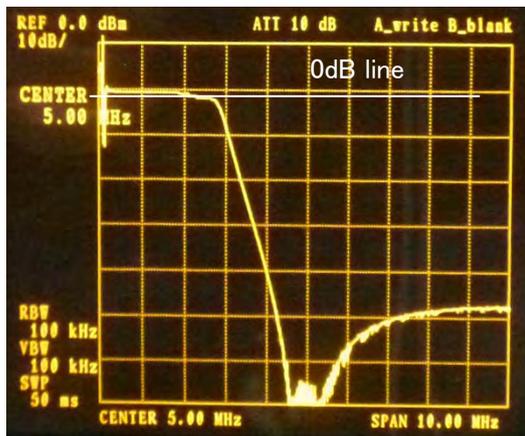
3. R44: 50-ohm dummy load circuit

When conducting a self-test, power outputted from the TX FIL board is connected to the "R44" 51-ohm /35W dummy load. The purpose of this connection is to raise the accuracy of self-tests on the transmission circuit and prevent the radiation of RF signal .

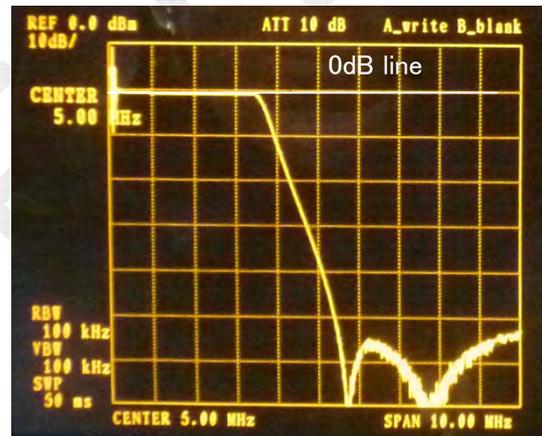
4. SWR detection circuit

The V-SWR detection circuit on the input side is used as a signal to protect the PA board when the TX FIL circuit of the TX FIL board causes a failure. The V-SWR detection circuit on the output side is used as the input signal for the ALC circuit to control TX output power.

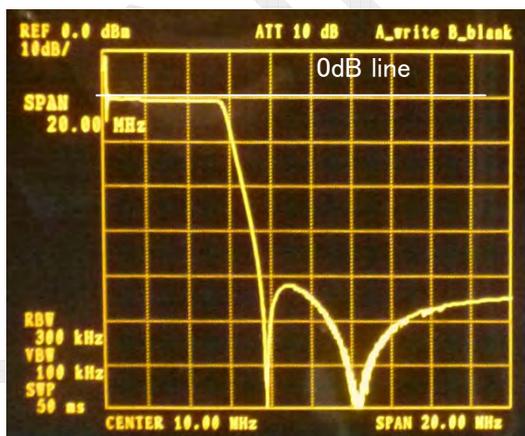
Reference) LPF characteristics



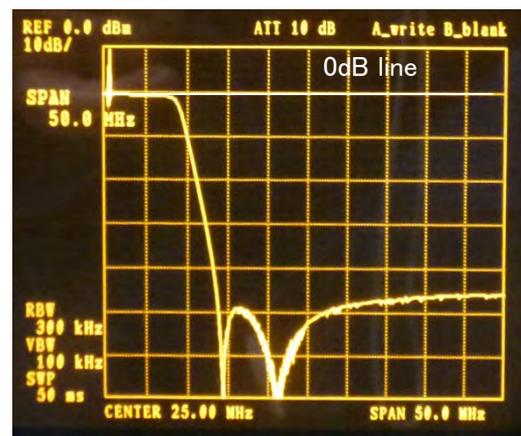
1.6-2.3M LPF



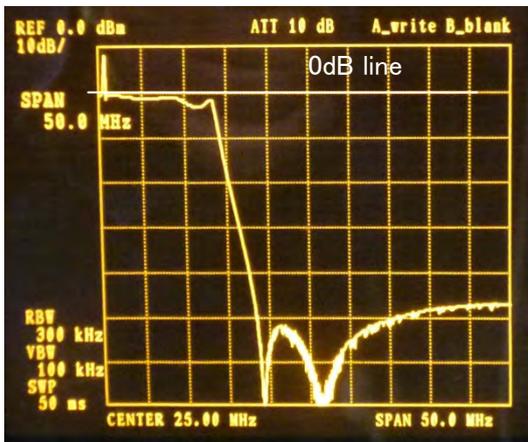
2.3-3.2M LPF



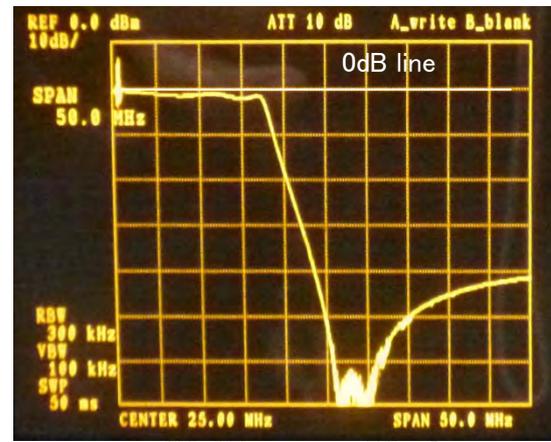
3.2-4.5M LPF



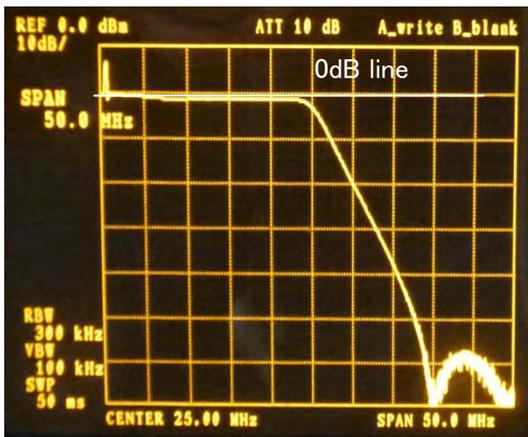
4.5-6.6M LPF



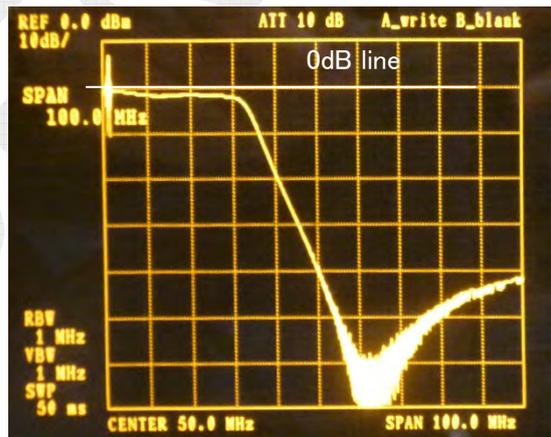
6.6-9M LPF



9-14M LPF



14-20M LPF



20-27M LPF

7.2.7 PA-IF Board 05P0864: FS-2575 and FS-5075 05P0864A: FS-1575

The PA-IF board has the same circuit configuration as that of the 05P0864 and 05P0864A type, but 05P0864A is configured by deleting unnecessary parts from it. These circuits are interface circuits between the T-CPU board and the transmission blocks on the heatsinks of the PA, DRV, and COMB boards. The PA-IF board is used to input check signals from the fan switch control circuit, VS detection circuit, and transmission protection control circuit as well as from the PA, TX-FIL, and DRV boards to the T-CPU board through three ADCs.

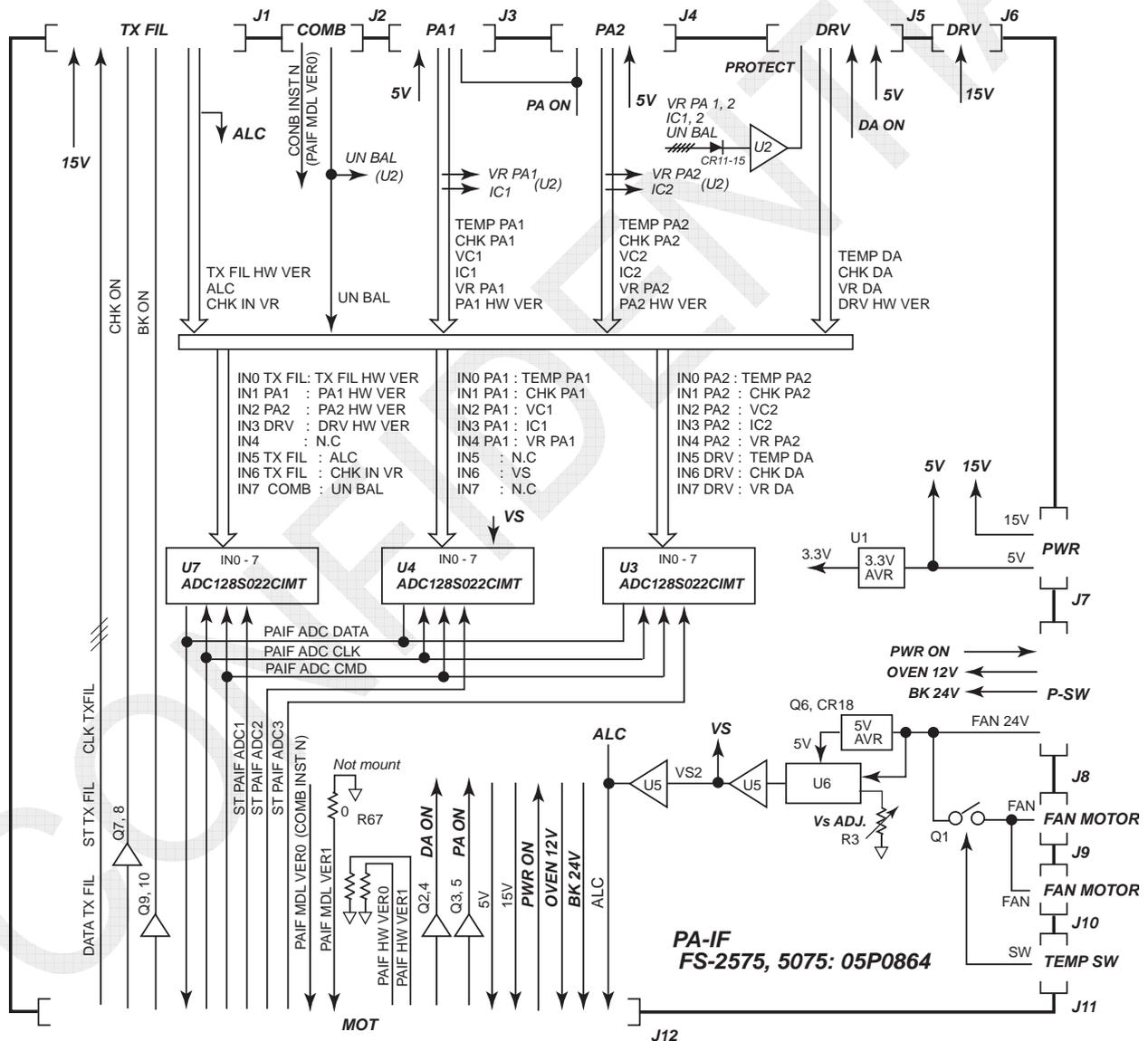


Fig. 7.2.15 PA-IF Board (05P0864) Block Diagram

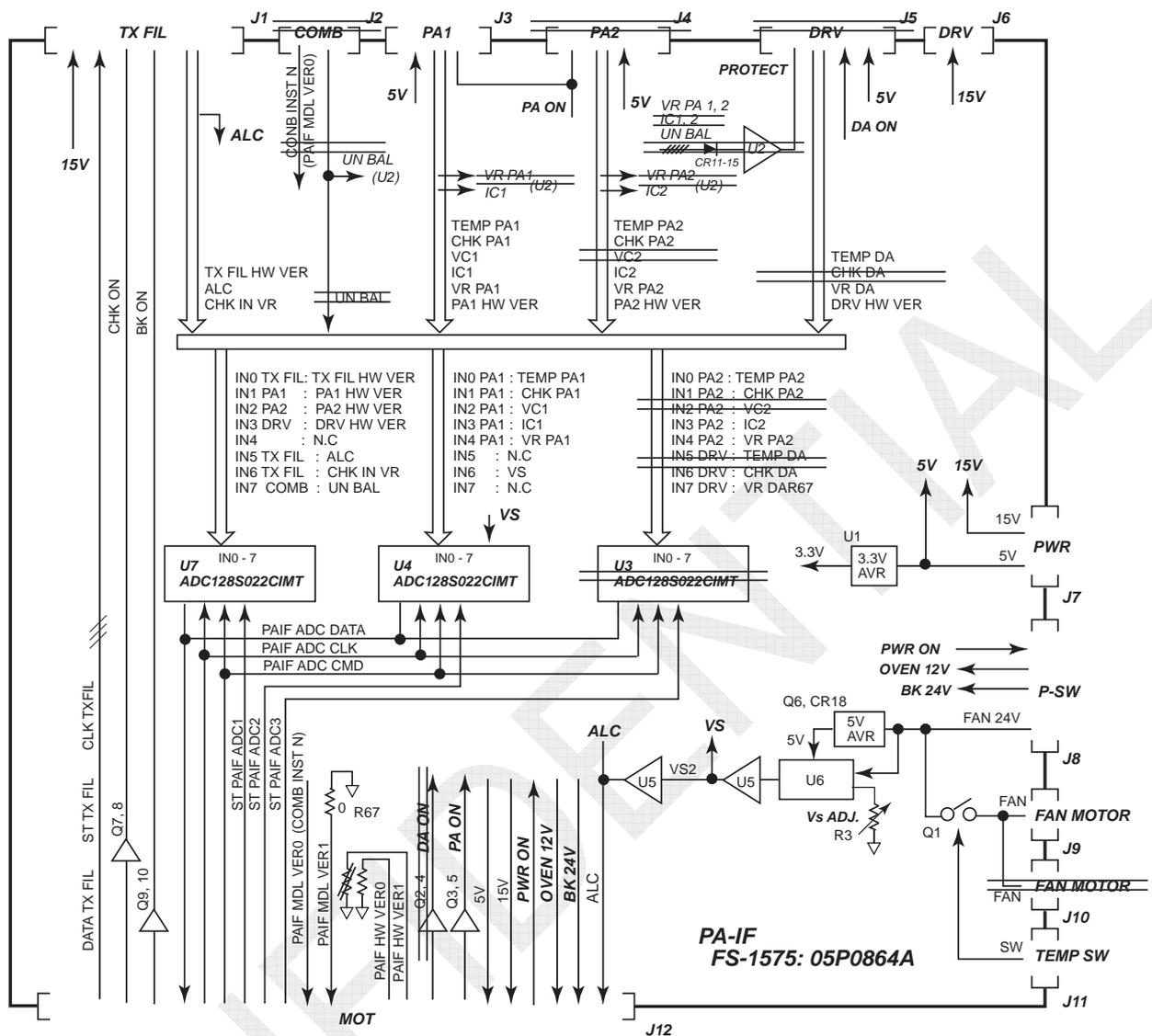


Fig. 7.2.16 PA-IF Board (05P0864A) Block Diagram

Table 7.2.10 Signals Inputted through ADCs of PA-IF Board (05P0864)

ADC	CH	Signal Name	Function
U7	0	TXFIL_HW_VER	Information on versions of the TX-FIL board
	1	PA1_HW_VER	Information on versions of the PA1 board
	2	PA2_HW_VER	Information on versions of the PA2 board
	3	DRV_HW_VER	Information on versions of the DRV board
	4	Spare	
	5	ALC	ALC voltage from the TX-FIL board
	6	CHK_IN_VR	SWR Vr voltage on the input RF side of the TX-FIL board
7	UN_BAL	Voltage to detect imbalance in power outputted from the PA of the COMB board	

U4	0	TEMP_PA1	Voltage to detect the temperature of the PA1 board
	1	CHK_PA1	SWR Vf voltage outputted from the PA of the PA1 board
	2	VC1	Voltage to detect the Vc of PA of the PA1 board
	3	IC1	Voltage to detect Ic of PA of the PA1 board
	4	VR_PA1	V-SWR Vf voltage outputted from the PA of the PA1 board
	5	Spare	
	6	VS	Voltage to detect "VS" input power supply voltage
	7	Spare	
U3	0	TEMP_PA2	Voltage to detect the temperature of the PA2 board
	1	CHK_PA2	V-SWR Vf voltage outputted from the PA of the PA2 board
	2	VC2	Voltage to detect the Vc of PA of the PA2 board
	3	IC2	Voltage to detect Ic of PA of the PA2 board
	4	VR_PA2	V-SWR Vf voltage outputted from the PA of the PA2 board
	5	TEMP_DA	Voltage to detect the temperature of the DRV board
	6	CHK_DA	V-SWR Vf voltage outputted from the PA of the DRV board
	7	VR_DA	V-SWR Vr voltage outputted from the PA of the DRV board

1. VS detection

This signal is used to detect 24V power supply voltage from P-SW with the "U6" ACPL C784 500E (isolation amplifier).

VS adjustment is made using "R3" so that VS reading will come to the power supply voltage.

In addition to the ALC signal detected from the TX FIL board, the VS signal is provided to prevent PA IC from increasing in case of a drop in power supply voltage^{See Note)}.

Note)

Actually, the VS signal is set to operate when the power supply voltage falls to or below 18V. However, since the low voltage protection is activated first, therefore, the activation of the protection circuit will not occur.

2. Verification of model

For details, refer to information on page 6-29.

The FS-5075 system has a built-in COMB board to input the COMB_INST_N (PAIF MDL VER0) signal to the T-CPU board.

The model of the PA-IF model is verified by whether or not the R67 is mounted on it.

The signal used to verify the model is PAIF MDL VER1. Models are verified according to these two signals.

Model	PA-IF Board (R67)	COMB (COMB INST N)	PA-IF Board
FS-1575	Mounted	Not mounted	05P0864A
FS-2575	Not mounted	Not mounted	05P0864
FS-5075	Not mounted	Mounted	05P0864

3. PROTECT signal (FS-2575 and FS-5075)

For details, refer to information on pages 7-12 to -14.

The PA-IF board (05P0864) for the FS-2575 and FS-5075 systems has a built-in TX output power protection circuit. This circuit protects the transmission amplifiers by producing a PROTECT signal on the basis of the PA IC and SWR-VR signals detected from the DRV, COMB, and PA boards, and controlling the bias of 1st amplifier of the DRV board to reduce output power to the threshold when an detected level exceeds the threshold of any of the detection signals.

The PA-IF board (05P0864A) for the FS-1575 system contains no TX output power protection circuit. However, a circuit providing the protection function is incorporated in the PA board.

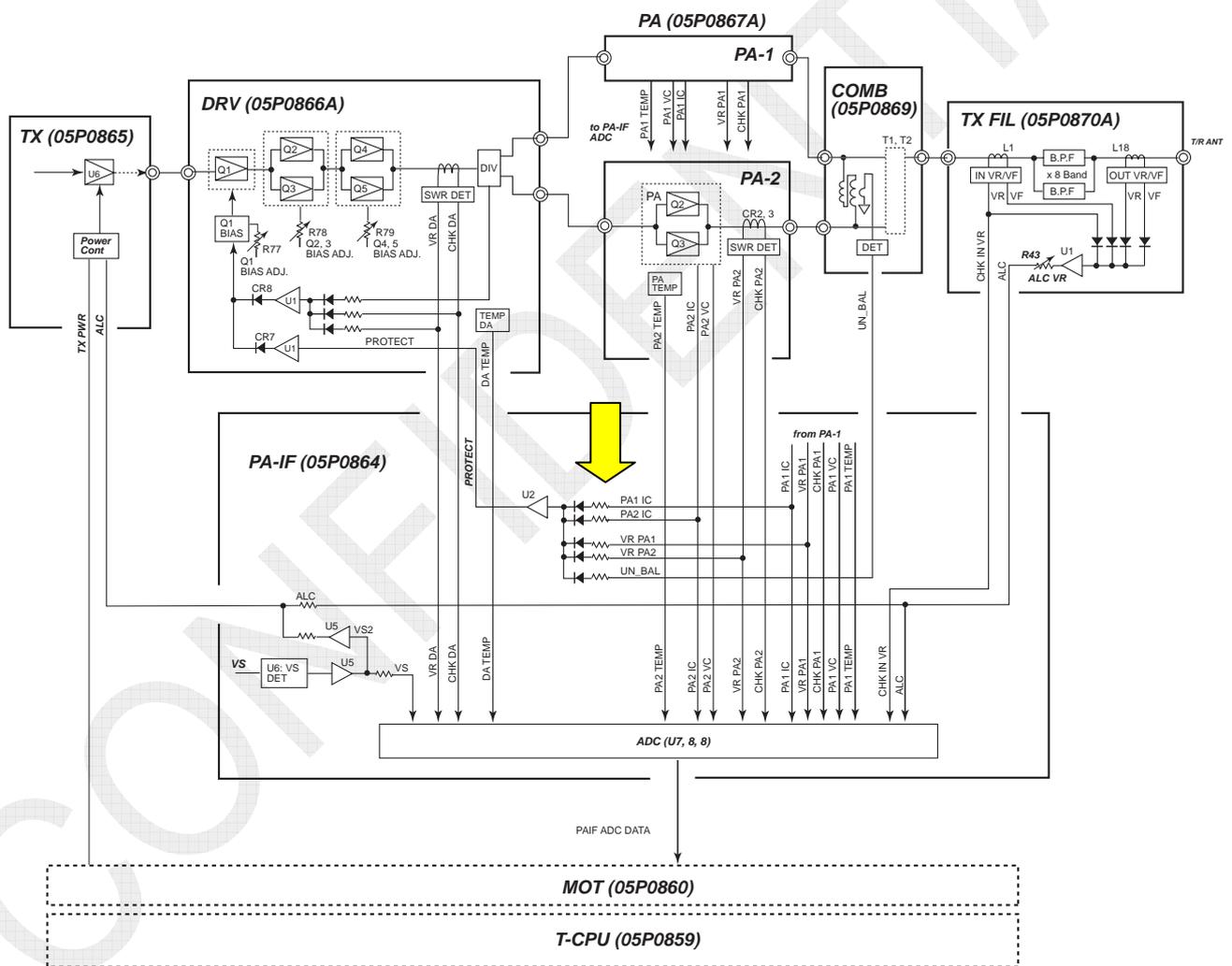


Fig. 7.2.17 PROTECT Signal Circuit Diagram

7.3 Receiver Circuit

7.3.1 RX FIL Board

05P0862A: FS-5075

05P0862B: FS-1575 and FS-2575

The 05P0862B board is mounted on the FS-1575 and FS-2575 systems.
 The 05P0862A board is mounted on the FS-5075 system and equipped with an interface and connector used to mount the DUP FIL board (05P0863).

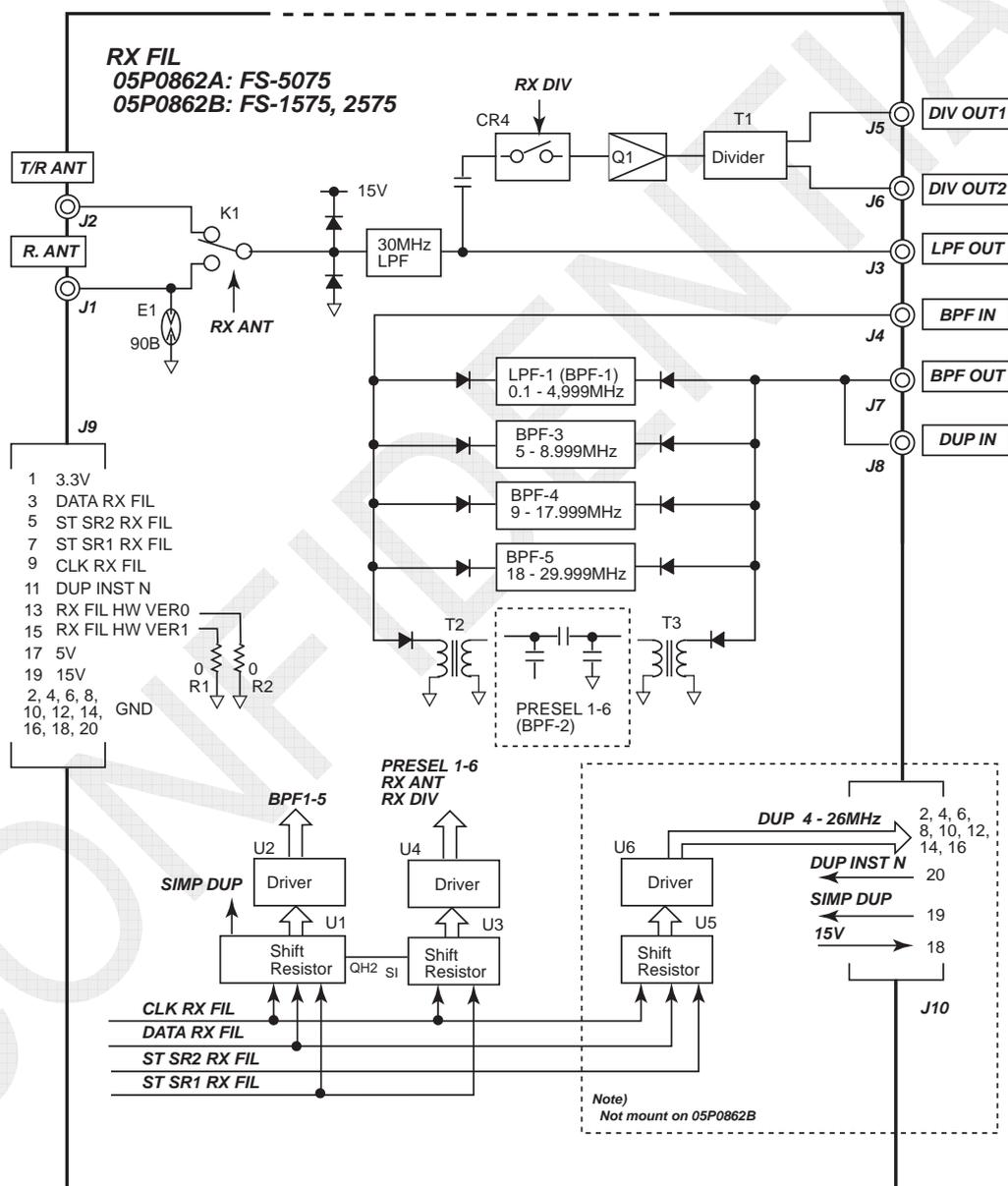


Fig. 7.3.1 RX FIL Board Block Diagram

The RX FIL board provides the following major functions:

- 1) Pre-selector and Band-pass filters to reduce interference.
- 2) Antenna switching circuit between T/R ANT and R. ANT.
- 3) Divider to divide the receiving antenna line into a Receiver circuit and WR2.
- 4) The “R. ANT” input level is designed to withstand 30-Vrms RF signal for a period of five minutes.
- 5) Interface with the DUP-FIL board (05P0863), but the 05P0862B board does not connect to the DUP-FIL board.

The DUP FIL board reduces transmission signals for full-duplex communication.

1. Receiving filters of RX FIL board

Receiving filters are switched as shown in the table below according to received frequency.

Table 7.3.1 Switching of Receiving Filters

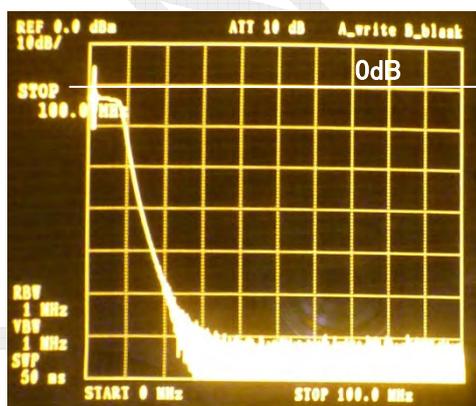
Band	Except DSC and NBDP Modes	DSC and NBDP Mode	Loss (Max.)
1 (LPF)	100 to 1449.9 kHz	100 to 4999.9 kHz ^{See Note 2)}	4.0 dB
2 (PRESEL)	1450 to 4999.9 kHz ^{See Note 1)}		3.1-MHz or more: 4.0 dB 3.0999 MHz or less: 6.0 dB
3 (BPF)	5000 to 7999.9 kHz	5000 to 7999.9 kHz	3.0 dB
4 (BPF)	8000 to 17999.9 kHz	8000 to 17999.9 kHz	4.0 dB
5 (BPF)	18000 to 29999.9 kHz	18000 to 29999.9 kHz	6.0 dB

Note 1) Any mode other than DSC and NBDP modes

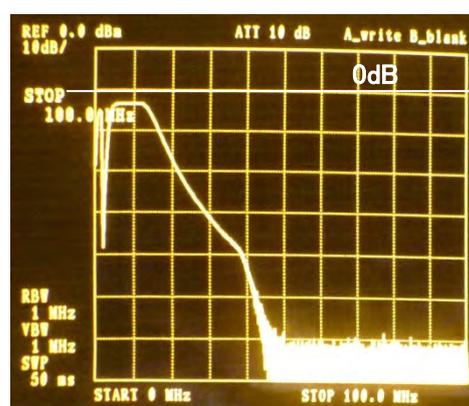
Preselector is used to receive frequencies between 1450 kHz and 4999.9 kHz.

Note 2) DSC and NBDP modes

LPFs in the band 1 are used up to the band of 5 MHz.



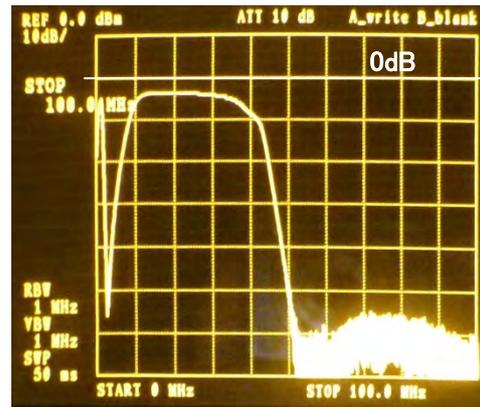
BAND-1: 100 to 1449.9 kHz



BAND-3: 5000 to 7999.9 kHz



BAND-4: 8000 to 17999.9 kHz



BAND-5: 18000 to 29999.9 kHz

2. Pre-selector

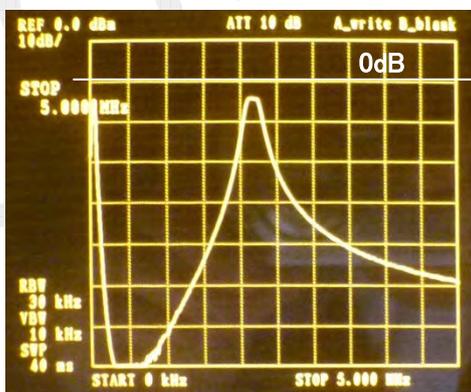
The pre-selector couples the two stages of resonator with a capacitor to configure Band-pass filters with narrow bandwidth.

It switches the capacitance of capacitor inserted parallel to the resonator to tune to the received frequency. For switching, frequencies between 1450 and 4999.9 kHz are divided into 36 bands.

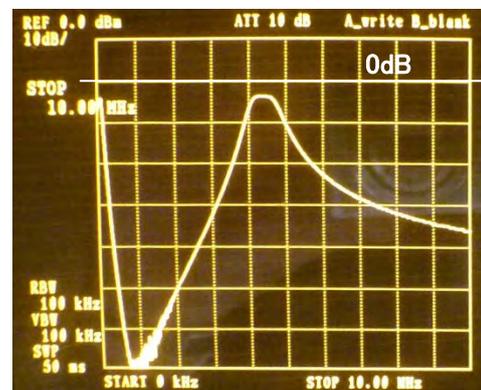
Table 7.3.2 Pre-selector Frequency Division

Pre-selector Frequency Division (kHz)					
1450 to 1499.9	1800 to 1849.9	2150 to 2199.9	2500 to 2549.9	3100 to 3249.9	4550 to 4999.9
1500 to 1549.9	1850 to 1899.9	2200 to 2249.9	2550 to 2599.9	3250 to 3349.9	
1550 to 1599.9	1900 to 1949.9	2250 to 2299.9	2600 to 2699.9	3350 to 3549.9	
1600 to 1649.9	1950 to 1999.9	2300 to 2349.9	2700 to 2799.9	3550 to 3699.9	
1650 to 1699.9	2000 to 2049.9	2350 to 2399.9	2800 to 2899.9	3700 to 3947.9	
1700 to 1749.9	2050 to 2099.9	2400 to 2449.9	2900 to 2999.9	3950 to 4199.9	
1750 to 1799.9	2100 to 2149.9	2450 to 2499.9	3000 to 3099.9	4200 to 4549.9	

Note) Insertion loss is 6dB or less in the band of 3.0999 MHz or less and 4dB or less in the band of 3.1 MHz or more.



PRESEL: 2200 to 2249.9 kHz



PRESEL: 4200 to 4549.9 kHz

3. RX DIV

The R. ANT or T/R ANT allows for shared use of the WR2 antenna and the RX receiving circuit antenna.

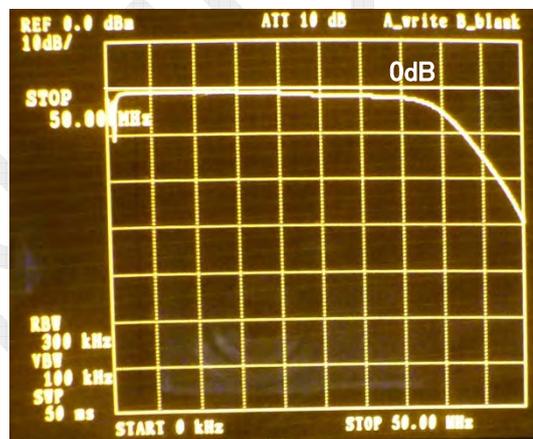
Since a received signal is divided into two channels, the RX FIL board is designed to make a correction to division loss with the Q1 to equalize reception levels inputted to the RX board even if the signal receiving channel is changed, regardless of whether or not to use the “RX DIV: DIVIDER” circuit.

For receiving antenna installation patterns, refer to information on page 4-73.

- To activate DIV OUT-1, -2:
Select [MENU] -> 9.SERVICE -> 3.RT SETUP -> 1.SETUP -> DIVIDER -> “ON.”
** The divider circuit of the RX FIL board will be activated.
- When R. ANT is installed:
Select [MENU] -> 9.SERVICE -> 3.RT SETUP -> 1.SETUP -> RX ANT -> “CONNECT.”
To switch between R.ANT and T/R ANT, select [MENU] -> 5.SYSTEM -> 7. RX SETUP.
** Switch antenna input using “K1” of the RX FIL board. **

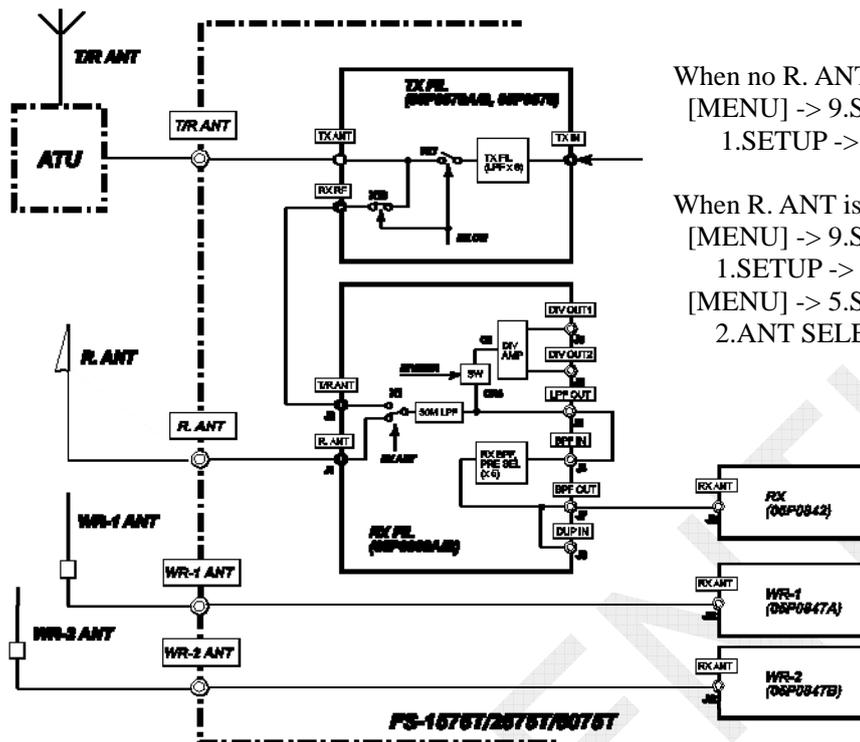
Note)

When the divider circuit is activated, received signals will be outputted via J5 “DIV OUT1” and J6 “DIV OUT2.” In this case, do not use J3 “LPF OUT.”



Input: R.ANT
Output: DIV OUT1

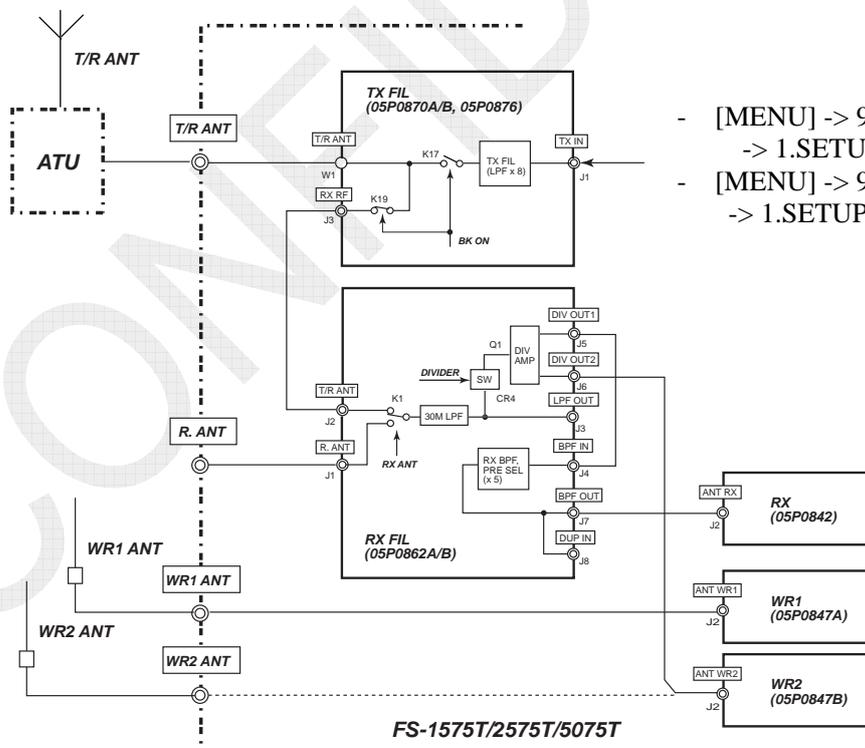
Example of DIV Amplifier Characteristics



When no R. ANT is installed:
 [MENU] -> 9.SERVICE -> 3.RT SETUP ->
 1.SETUP -> DIVIDER -> **OFF**

When R. ANT is installed:
 [MENU] -> 9.SERVICE -> 3.RT SETUP ->
 1.SETUP -> RX ANT -> **CONNECT**
 [MENU] -> 5.SYSTEM -> 7.RX SETUP ->
 2.ANT SELECT -> **R.ANT or T/R ANT**

Fig. 7.3.2 Example of Receiving Antenna Installation Pattern



- [MENU] -> 9.SERVICE -> 3.RT SETUP -> 1.SETUP -> DIVIDER -> **ON**
- [MENU] -> 9.SERVICE -> 3.RT SETUP -> 1.SETUP -> RX ANT -> **DISCONNECT**

Fig. 7.3.3 Example of Receiving Antenna Divider Installation Pattern

7.3.2 DUP FIL Board (05P0836): FS-5075

The DUP FIL board is an option board for the FS-5075 system and mounted on the RX FIL board (05P0862A).

The DUP FIL board is used as Band-pass filters (BPF) to reduce the RF transmission signals for Full Duplex communication.

When the system is set to Simplex mode, the DUP FIL board will be passed through. The DUP FIL board is configured by coupling the three stages of resonator with a capacitor.

The Duplex communication mode will be enabled when

- the FS-5075 system is used;
- the DUP FIL board is mounted; and
- the R. ANT is installed and selected as a receiving antenna by selecting [MENU] -> 9.SERVICE -> 3.RT SETUP -> 1.SETUP -> RX ANT -> **CONNECT**
or
[MENU] -> 5.SYSTEM -> 7.RX SETUP -> 2.ANT SELECT -> **R.ANT**

Reference)

To share the WR2 ANT with the R. ANT, select [MENU] -> 9.SERVICE -> 3.RT SETUP -> 1.SETUP -> DIVIDER -> "ON," connect the WR2 ANT to "DIV OUT2" and "DUP IN" of the DUP FIL board to "DIV OUT 1."

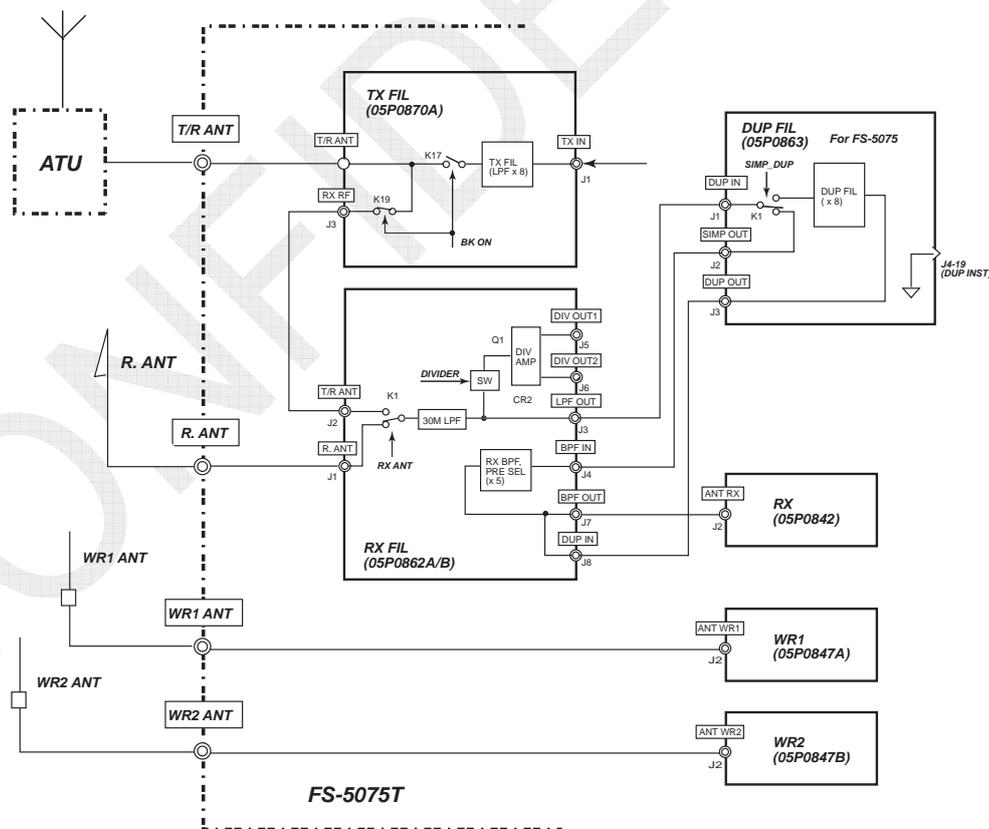


Fig. 7.3.4 Example of Installation Pattern for Duplex Specification

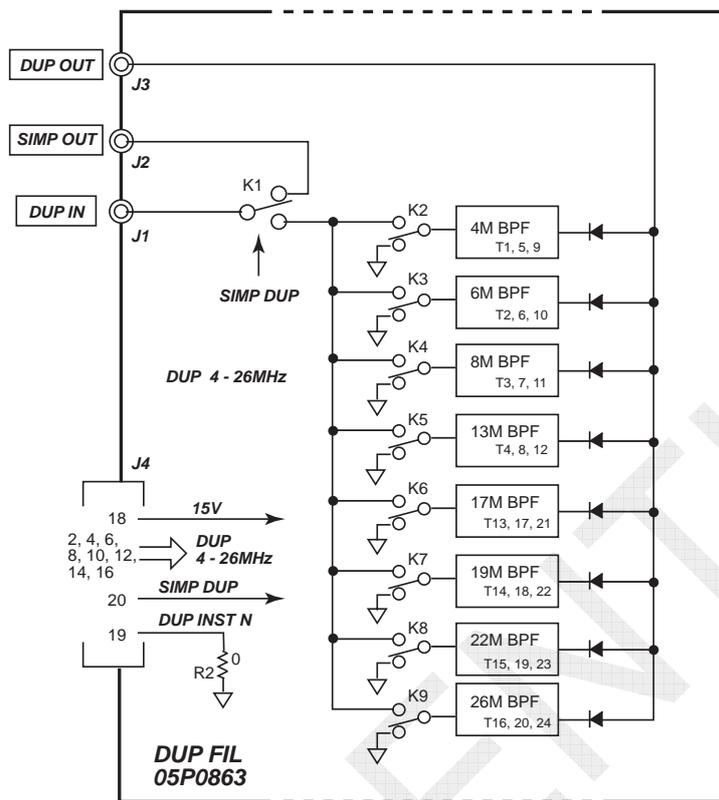
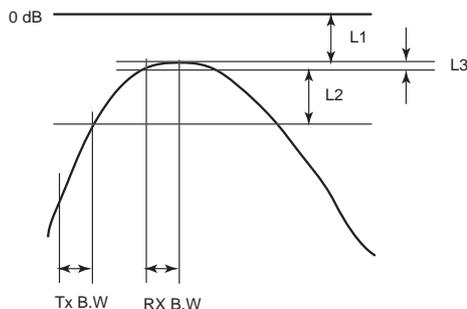


Fig. 7.3.5 DUP FIL Board Block Diagram

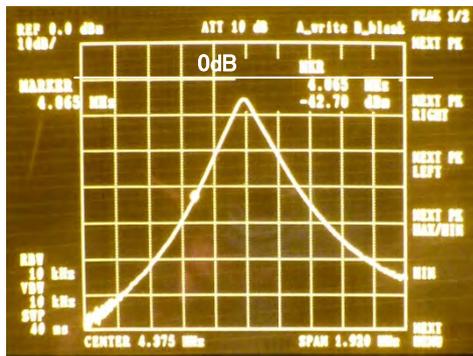
Table 7.3.3 DUP FIL Board Frequency Division

DUP Band	ITU Channel	RX B.W (kHz)	TX B.W (kHz)	L1 Max (dB)	L2 Min (dB)	L3 Min (dB)
4 MHz	401 to 427	4357 to 4435	4065 to 4143	6.0	22.0	0.5
6 MHz	601 to 608	6500 to 6522	6200 to 6221	6.5	23.0	0.8
8 MHz	801 to 832	8719 to 8812	8195 to 8291	6.0	17.5	0.5
12 MHz	1201 to 1241	13077 to 13197	12230 to 12350	7.0	21.0	0.5
16 MHz	1601 to 1656	17242 to 17407	16360 to 16525	8.5	24.0	0.5
18 MHz	1801 to 1805	19755 to 19797	18780 to 18822	9.0	14.0	0.8
22 MHz	2201 to 2253	22696 to 22852	22000 to 22156	7.5	2.5	0.5
25 MHz	2501 to 2510	26145 to 26172	25070 to 25097	7.0	5.5	0.5

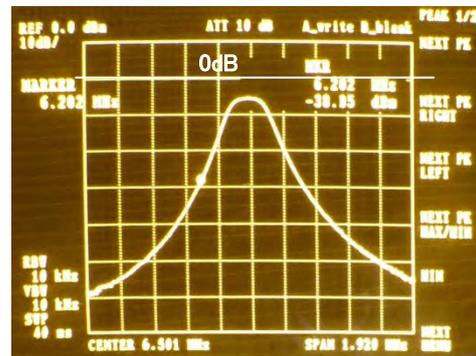


DUP-FIL Characteristics

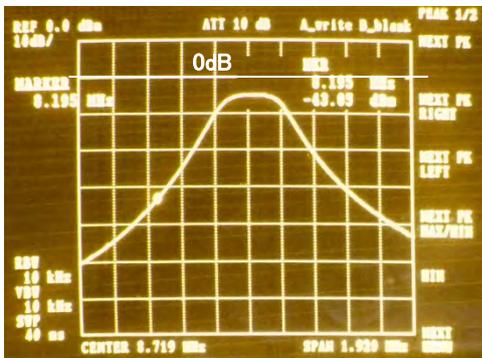
Ref) Examples of DUP FIL Characteristics



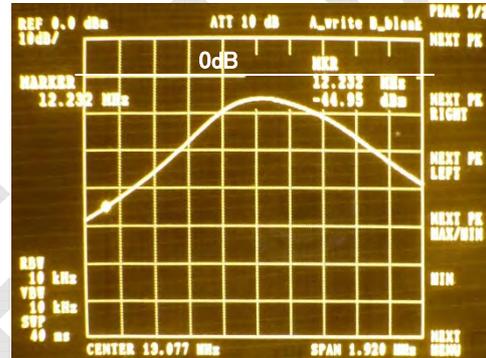
4M DUP FIL/SPAN 2MHz



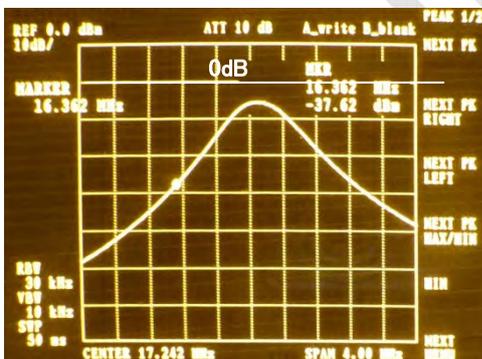
6M DUP FIL/SPAN 2MHz



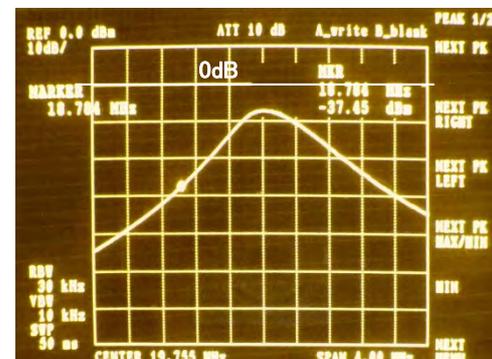
8M DUP FIL/SPAN 2MHz



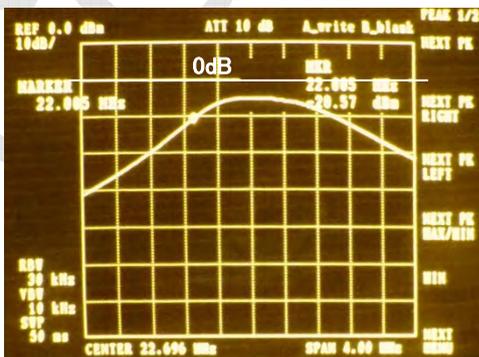
12M DUP FIL/SPAN 2MHz



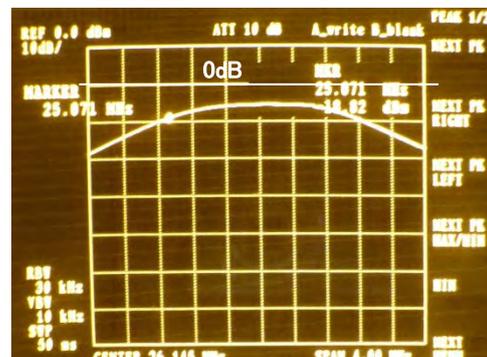
16M DUP FIL/SPAN 4MHz



18M DUP FIL/SPAN 4MHz



22M DUP FIL/SPAN 4MHz



25M DUP FIL/SPAN 4MHz

7.3.3 RX Board (05P0842): Common Board

The RX board consists of a receiving RF circuit, IF circuit, and local oscillation circuit. The RX total gain of the RX board is approximately 50dB or more.

RX board output signal is inputted to the T-CPU board by the 2nd IF signal (36 kHz) and demodulated there. NB, NR, SQ, and AGC control signals are processed by the DSP of the T-CPU board.

Note)

If no WR2 board is mounted, the RX board will watch scan upon receiving general DSC frequency.

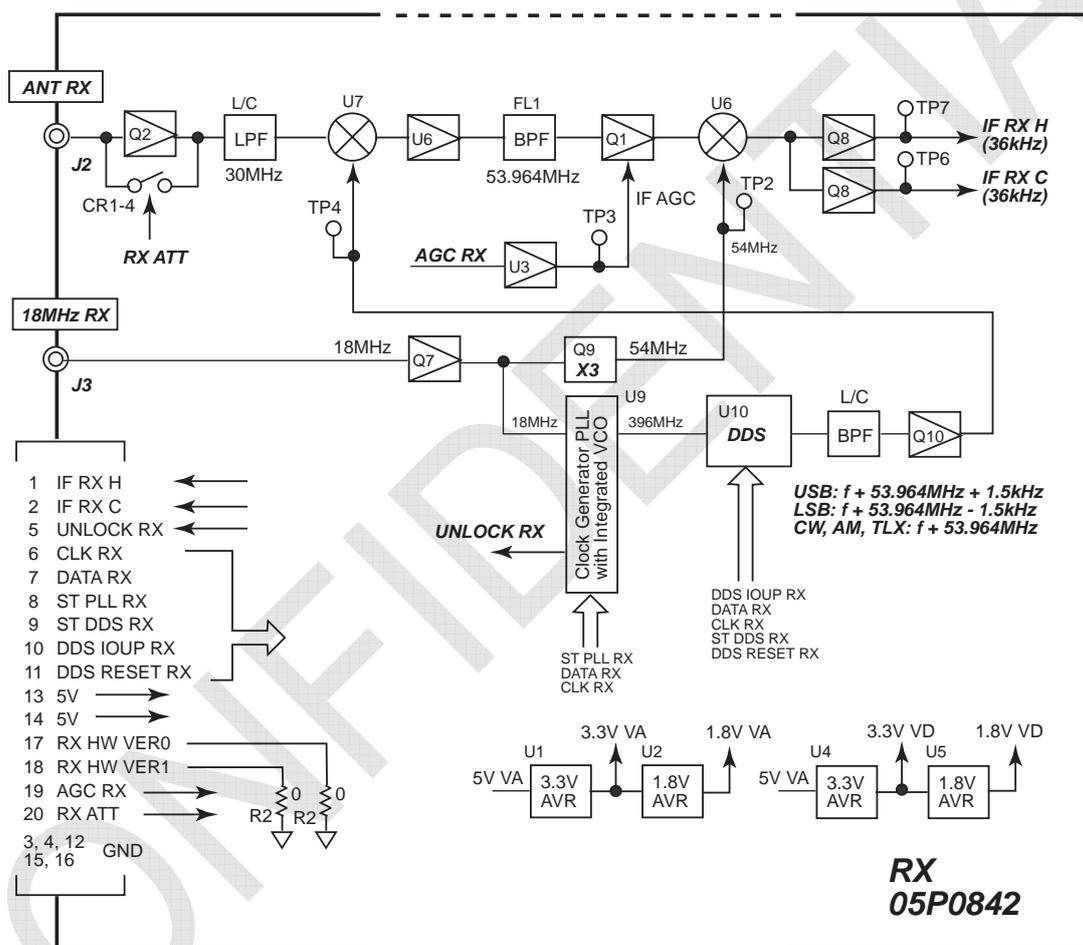


Fig. 7.3.6 RX Board Block Diagram

Table 7.3.4 Correlation of Frequencies of RX Board

RX Frequency		100 kHz to 29999.99 kHz (10 Hz step)
1st Lo	J3E	Fc + 53.964 MHz + 1.5 kHz
	F1B (J2B), A1A, F3C	Fc + 53.964 MHz
	A3E (H3E)	Fc + 53.964 MHz
2nd Lo		54 MHz
2nd IF		36 kHz

Table 7.3.5 Major Signals of RX Board

Signal Name	Function
CLK RX	DDS / PLL IC clock signal/
DATA RX	Frequency data set to DDS / PLL IC
UNLOCK RX	Unlock signal of PLL circuit/
ST DDS RX	Data set strobe signal to DDS/
ST PLL RX	Data set strobe signal to PLL/
DDS IOUP RX	Transfers data to the internal memory of the DDS.
DDS RESET RX	Resets the DDS.
5V	Power supply voltage for circuit.
AGC RX	AGC control voltage under hardware control.
RX ATT	Bypasses the 1st amplifier of the RX board. Setting the RX attenuator to "ON" will drop the reception gain by approximately 10dB.
IF RX H/C	36-kHz IF signal. This signal is demodulated by the DSP of the T-CPU board.
RX HW VER0, 1	Displays RX board version information when selecting [MENU] -> 9.SERVICE -> 5.TEST -> 1.VERSION.

1. 36 kHz IF RX signal

The 36-kHz IF RX signal is inputted to the T-CPU board, and demodulated and processed there. For details, refer to information on page 7-57.

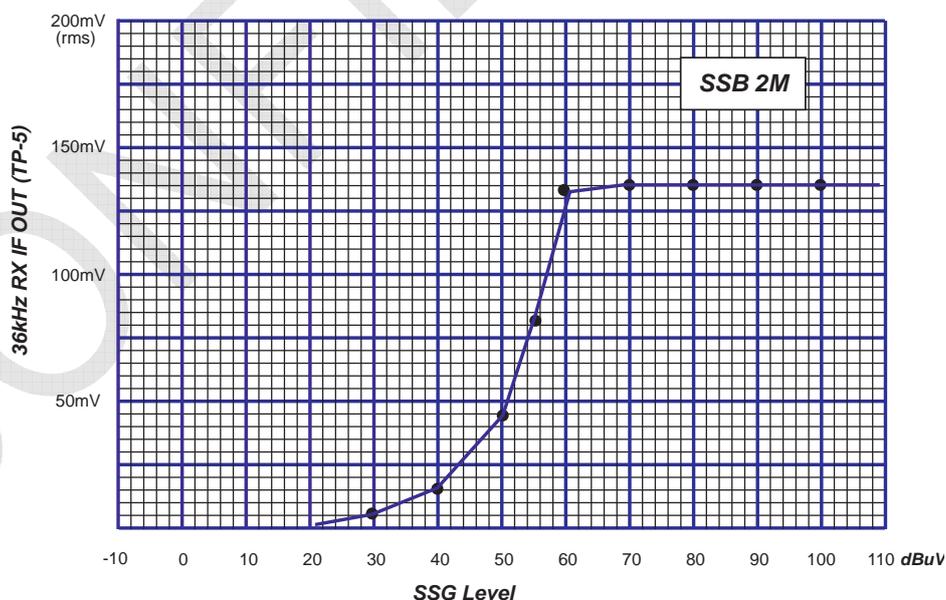


Fig. 7.3.7 Example of 36-kHz RX IF Signal Input vs. Output Characteristics

2. IF AGC

IF AGC automatically controls the gain level of the 2nd IF Q1 with hardware. IF AGC signal is generated on the FPGA of the T-CPU board.

- AGC initiates control from a gain level of -50 to -55 dBuV in reverse gain mode.
- IF AGC is not available for the manual ON/OFF operation of AGC.
- RF gain is incorporated in the IF AGC control voltage.

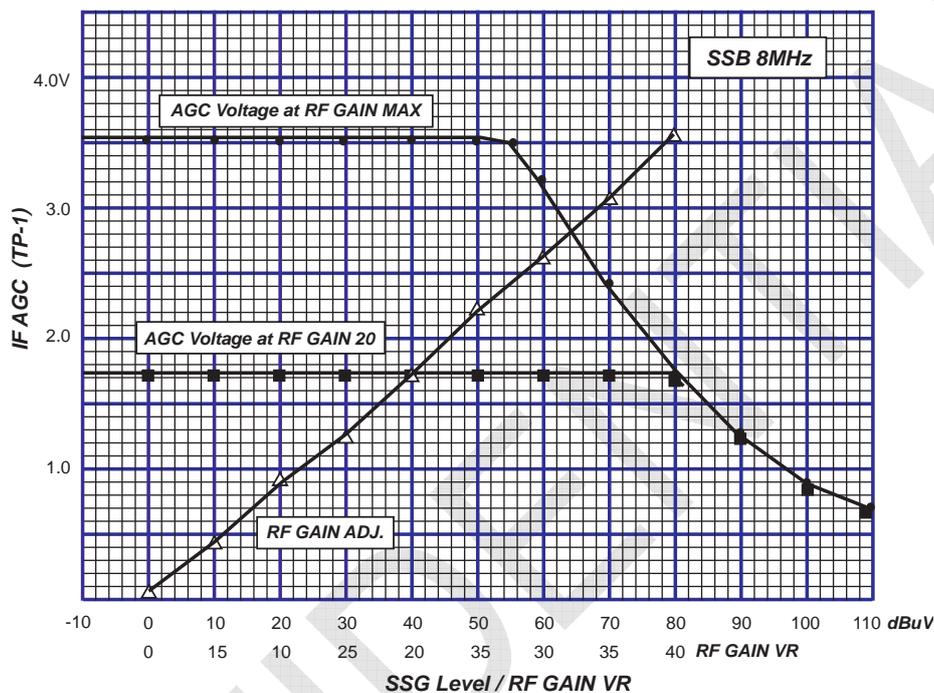


Fig. 7.3.8 Example of IF AGC Characteristics

3. RX ATT

RX ATT (receive attenuator) is effective in preventing the distortion of received signal caused due to its extreme strength.

The RX ATT bypasses the 1st amplifier “Q1” of the RX board. Turning ON the RX ATT will drop the reception gain by approximately 10dB. The RX ATT switches between ON and OFF every time the “RF GAIN” knob is pressed.

In AM mode, the RX ATT is activated to prevent the distortion of strong signal received automatically.

The RX ATT provides hysteresis characteristics so that the RX ATT will turn ON when the signal reception level reaches approximately 85dBuV(30% MOD) and turn OFF when it falls to 55dBuV.

However, even if the RF ATT automatically turns ON, “ATT” will not appear on the RT window.

4. PLL Synthesizer circuit

A circuit that outputs 1st Lo frequency consists of PLL and DDS circuits. An 18 MHz reference frequency from the TX board is inputted to “U9” PLL IC.

The PLL IC converts the 18 MHz reference frequency to a 6 MHz reference frequency to output a 396 MHz frequency. However, in order to avoid spurious reception at a specific reception frequency, it may output a 384 MHz frequency.

A 396 MHz frequency outputted from the PLL circuit is inputted in the DDS circuit, and the 1st Lo frequency is outputted from the DDS circuit according to data on received frequencies up to 10 Hz digits.

The 1st Lo frequency is injected in the “U7” 1st mixer to convert a received signal to the 1st IF signal of $F+54.964$ MHz.

The 2nd Lo frequency is 54 MHz obtained by trebling an 18 MHz frequency from the TX board.

The 2nd Lo frequency is injected in the “U6” 2nd mixer to convert a received signal to the 2nd IF signal of 36 kHz.

5. RX board self-test detection circuit

When conducting a self-test, the test results will be checked with the UN-LOCK and RX HW VER signals.

1) UN-LOCK

PLL circuit “lock or unlock” detection signal. When it detects that the PLL circuit is unlocked, transmission will be stopped and an error message saying “WARNING: TX PLL UNLOCK!” will be outputted.

2) RX HW VER

RX board hardware information. This information will be displayed when selecting [MENU] -> 9.SERVICE -> 5.TEST -> 1.VERSION.

Reference) Example of Reception Characteristics

The following table shows an example of measurement of received signal (of F + 1 kHz) whose SINAD comes to 20dB.

Table 7.3.6 Example of SSB SINAD Measurement

MODE	2M	4M	6M	8M	12M	16M	18M	22M	25M
S-DUP(dBuV)	0.5	0	0	-0.5	-0.5	0	0	0.5	1
DUP(dBuV)	-	6	7	5.5	6.5	7.5	8.5	7.5	7

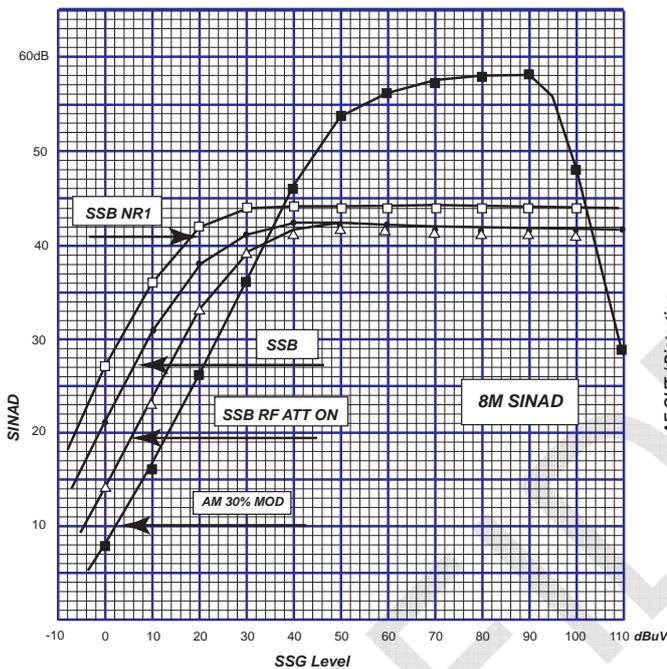


Fig. 7.3.9 SINAD Characteristics

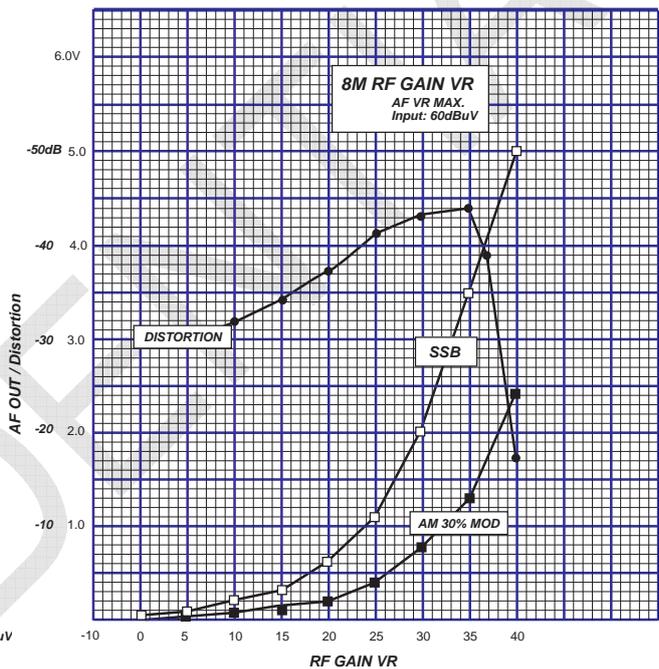


Fig. 7.3.10 RF GAIN VR vs. AF OUTPUT Characteristics

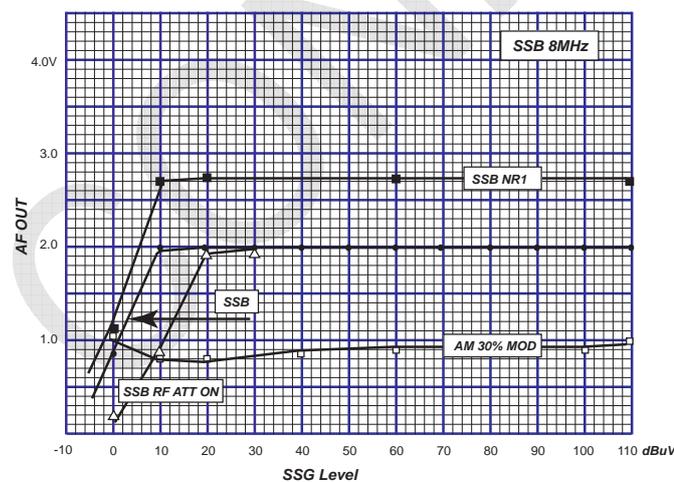


Fig. 7.3.11 AF OUTPUT Characteristics

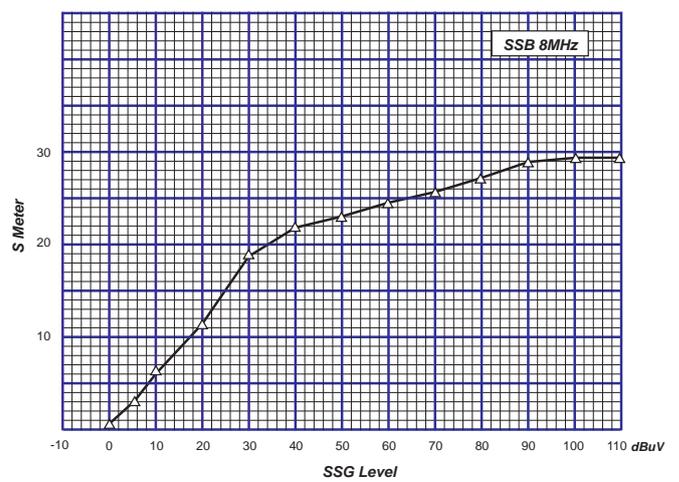


Fig. 7.3.12 S Meter Characteristics

7.4 WR Board

WR1 (DSC Distress/Safety frequency Watch/receive board): 05P0847A
WR2 (DSC General frequency Watch/receive board): 05P0847B

WR1 and WR2 are DSC frequency scan receive boards.

WR1 is a Distress and Safety frequencies receive board, while WR2 (option) is a DSC General frequencies receiver board. The WR1 and WR2 boards are not available for shared use because they are different in IF frequency.

The WR boards consist of a receiving RF circuit, IF circuit, and local oscillation circuit. Received output signal is outputted to the T-CPU board by the 2nd IF signal (36 kHz) and demodulated and decoded there. The receiving total gain of the WR1 and WR2 boards is approximately 50dB or more, respectively.

Note)

When a FAX-5 + 2.6m whip antenna is connected to the WR1 and WR2 boards, respectively, set "J3" of the WR boards to the "active" side, and then supply 12V power to the FAX-5 pre-amplifier.

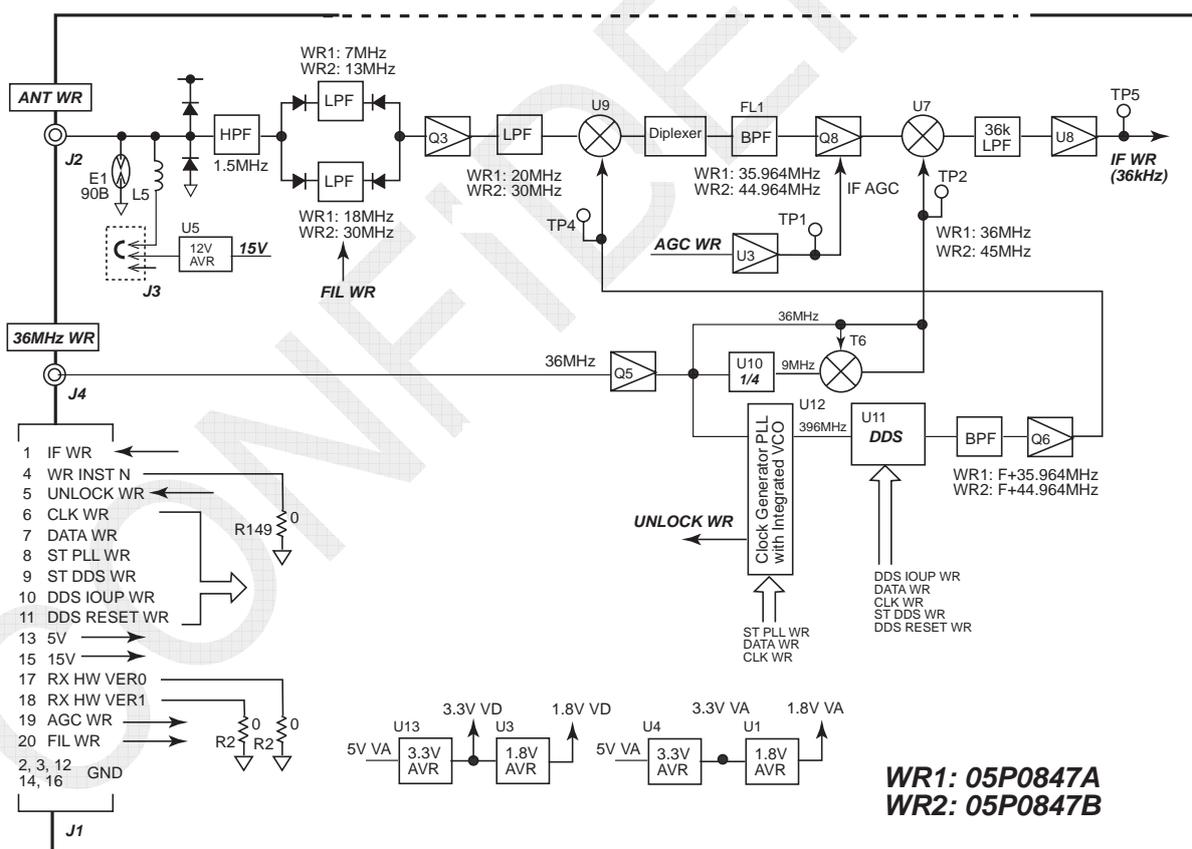


Fig. 7.4.1 WR Board Block Diagram

Table 7.4.1 Major Signals of WR Board

Signal Name	Function
CLK WR	DDS / PLL IC clock signal/
DATA WR	Frequency data set to DDS / PLL IC/
UNLOCK WR	Unlock signal of PLL circuit/
ST DDS WR	Data set strobe signal to DDS/
ST PLL WR	Data set strobe signal to PLL/
DDS IOUP WR	Transfers data to the internal memory of the DDS.
DDS RESET WR	Resets the DDS.
5V, 15V	Power supply voltage for circuit.
AGC WR	AGC control voltage under hardware control.
WR INST	Indicates whether or not the WR board is mounted.
IF WR	36-kHz IF signal. This signal is decoded by the DSP/Main CPU of the T-CPU board.
RX HW VER0, 1	Displays WR board version information when selecting [MENU] -> 9.SERVICE -> 5.TEST -> 1.VERSION.
FIL WR	Switches receiving filters.

1. Differences between WR1 and WR2 boards

The WR1 and WR2 boards are different in the 1st IF frequency. This leads to differences in the 1st and 2nd Lo frequencies between the WR boards.

Furthermore, the WR1 board handles Distress and Safety frequencies of 2, 4, 6, 8, 12, and 16MHz, while the WR2 board handles frequencies ranging from 2 MHz to 25 MHz. For this reason, the RF circuits provide the different width of passband of the filters.

Table 7.4.2 Differences between WR1 and WR2 Boards

	WR1	WR2
1st Lo	F + 35.946 MHz	F + 44.946 MHz
2nd Lo	36 MHz	45 MHz
1st IF	35.946 MHz	44.946 MHz
2nd IF	36 kHz	36 kHz
RF FIL 1	7-MHz LPF	13-MHz LPF
RF FIL 2	18-MHz LPF	30-MHz LPF

2. IF WR

Received DSC signal is decoded by the DSP of the T-CPU board and read by the main CPU. For details, refer to information on page 7-57.

When the deviation of received frequencies falls within the range of ± 50 Hz, DSC messages can be decoded. If any failure that “disables DSC communication” occurs, ensure that the deviation of each communication frequency within the range of ± 10 Hz.

Note)

- 1) If no WR2 board is mounted, the RX board will watch scan upon receiving DSC general frequency.
- 2) To share the WR1 and WR2 with R/T ANT and R. ANT, the RX FIL board divides the receiving signal.

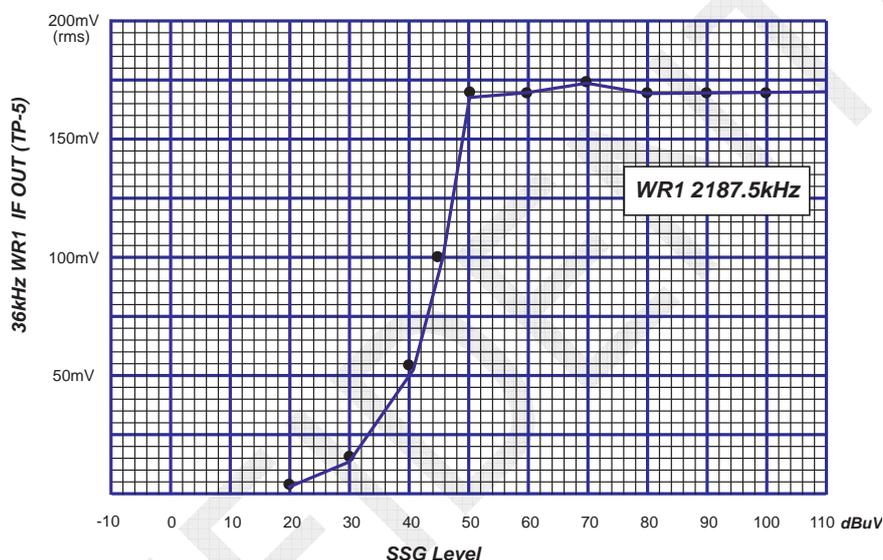


Fig. 7.4.2 Example of 36-kHz WR1 IF Signal Input vs. Output Characteristics

3. IF AGC

IF AGC automatically controls the gain level of the 2nd IF Q8 with hardware. IF AGC signal is generated on the FPGA of the T-CPU board.

The IF AGC characteristics are the same as those of the RX board. AGC initiates control at a gain level of 50 to 55dBm in reverse gain mode. This is the level that TP-1 voltage falls from 3.5V.

4. PLL Synthesizer circuit

A circuit that outputs 1st Lo frequency consists of PLL and DDS circuits.

A 36 MHz reference frequency from the TX board is inputted to “U12” PLL IC. The PLL IC converts the 36 MHz reference frequency to a 6 MHz reference frequency to output a 396 MHz frequency.

A 396 MHz frequency outputted from the PLL circuit is inputted in the DDS circuit (U11), and the 1st Lo frequency is outputted from the DDS circuit according to data on received frequencies up to 10 Hz digits.

The 1st Lo frequency is injected in the 1st mixer to convert a received signal (WR1: F+35.964 MHz, WR2: F+44.964 MHz) to the 1st IF signal.

The 2nd Lo frequency generates a 45 MHz frequency based on the 36 MHz reference frequency from the TX board by adding 36 MHz for the WR1 board and by adding 36 MHz and 9 MHz with U10 and T6 for the WR2 board.

The 2nd Lo frequency is injected in the 2nd mixer to convert a received signal to the 2nd IF signal of 36 kHz.

5. WR board self-test detection circuit

Check signals outputted to the T-CPU board are the UN-LOCK, WR HW VER, and WR INST signals.

- 1) UN-LOCK
PLL circuit “lock or unlock” detection signal. When it detects that the PLL circuit is unlocked, reception will be stopped and an error message saying “WARNING: WR1 (2) PLL UNLOCK!” will be outputted.
- 2) WR HW VER
WR board hardware information. This information will be displayed when selecting [MENU] -> 9.SERVICE -> 5.TEST -> 1.VERSION.
- 3) WR INST
Used to determine whether or not the WR board is mounted.
For example, if no WR2 board is mounted, the RX board will watch scan upon receiving DSC general frequency.

6. Power supply for pre-amplifier

To connect FAX-5 (pre-amplifier) to the WR antenna, 12V power has to be supplied for the preamplifier.

When a FAX-5 + 2.6m whip antenna is connected to the WR1 and WR2 boards, respectively, set “J3” of the WR boards to the “active” side, and then supply 12V power to the FAX-5 pre-amplifier.

7.5 Interface

7.5.1 T-IF Board

05P0861: FS-2575 and FS-5075

05P0861A: FS-1575

The T-IF board is an interface board with external equipment and external signals, and has a MMSI switch “S1” used to make MMSI setting and Clear memories and a jumper “J8” used to Alarm contact setting (to N.O or N.C) mounted on it.

The 05P0861A T-IF board has the [REMOTE] port directly mounted on it, while the 05P0861 –IF board is connected to the [REMOTE] port via “J3” and “J4” jumpers.

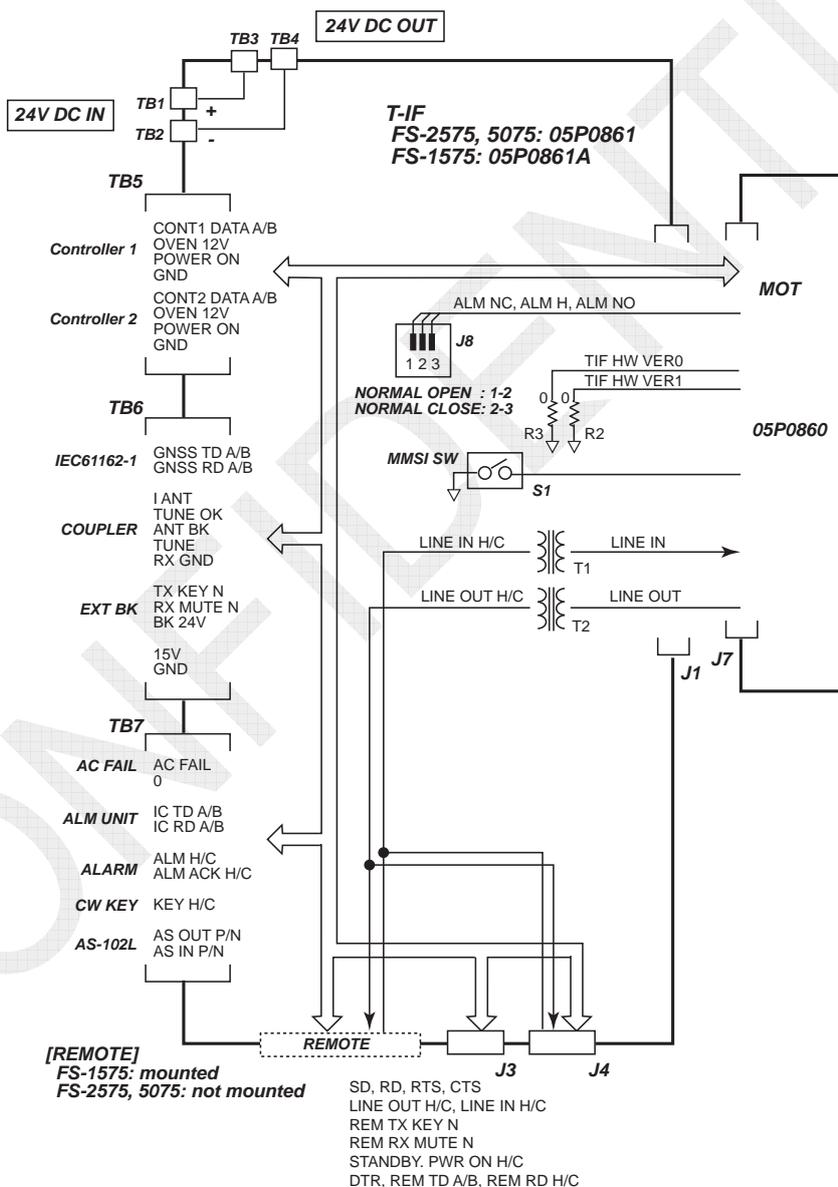


Fig. 7.5.1 T-IF Board Block Diagram

7.5.2 MOT Board (05P0860) for Shared Use

The MOT board is an inter-board interface with the T-CPU board. The circuit is controlled with the FPGA (Field Programmable Gate Array) of the T-CPU board and also with the CPLD (Complex Programmable Logic Device) of the MOT board.

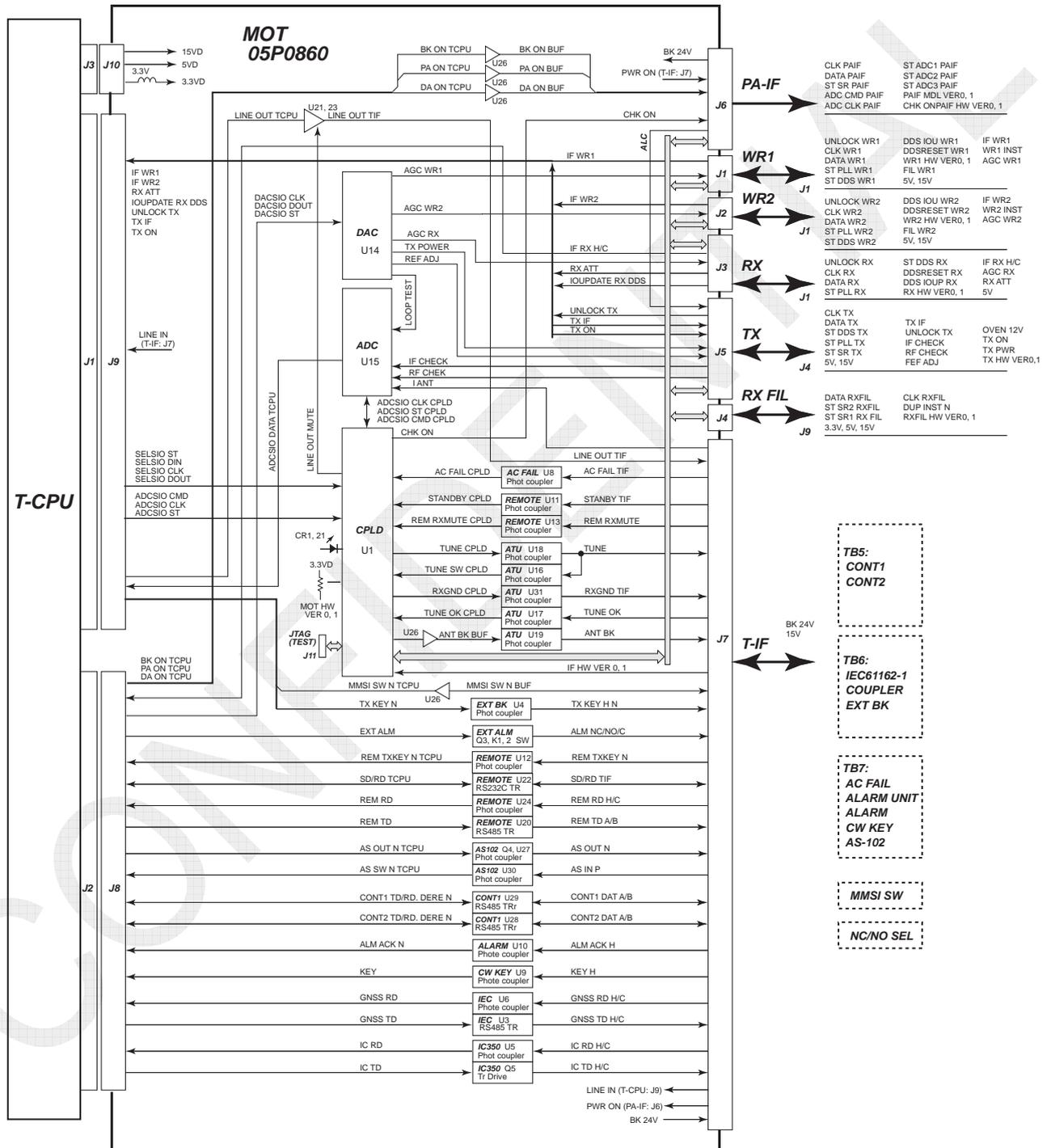


Fig. 7.5.2 MOT Board Block Diagram

7.6 T-CPU

The T-CPU board controls the transceiver unit, and also processes to modulate and demodulate signals with the use of CODEC, ADC, FPGA, and DSP.

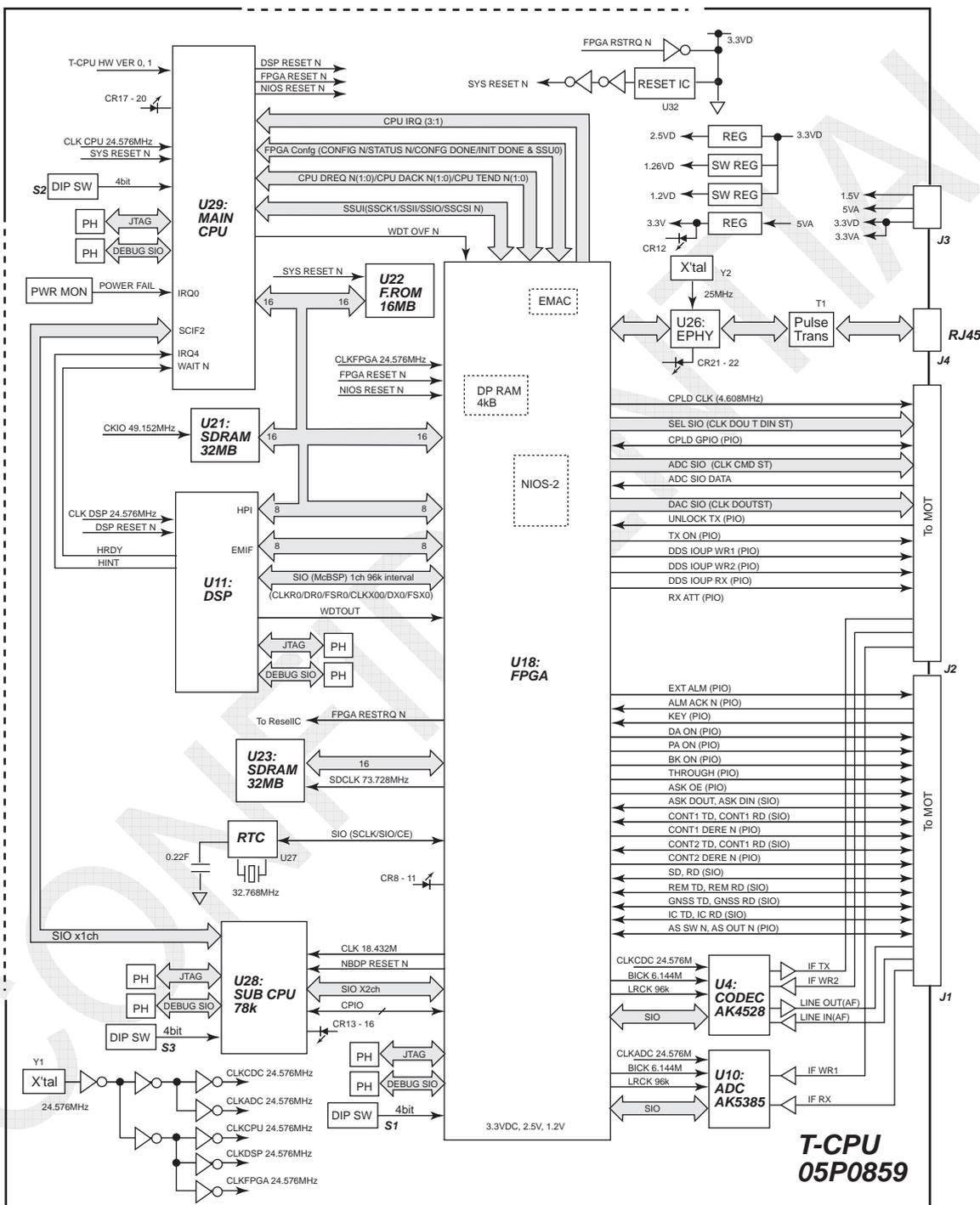


Fig. 7.6.1 T-CPU Board (05P0859) Block Diagram

7.6.1 Signal Route

The following diagram shows the channels of 36-kHz IF signal to the IF TX, RX, WR1, and WR2 boards.

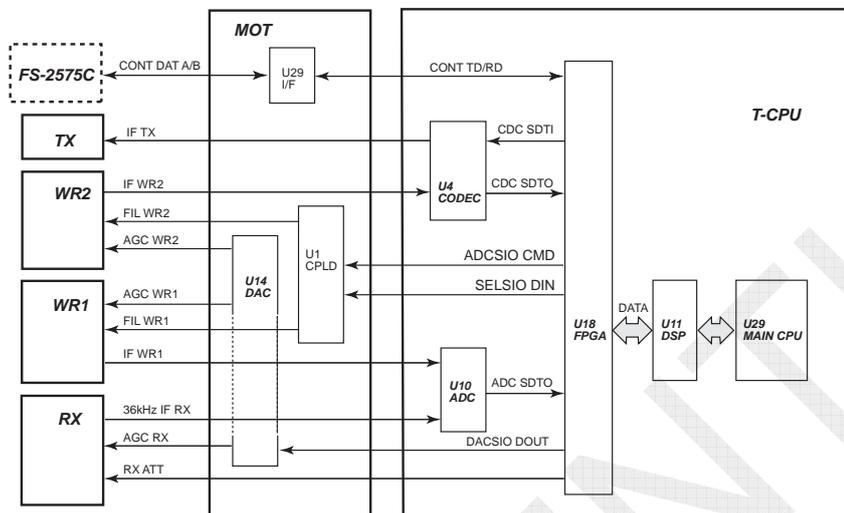


Fig. 7.6.2 Overview of 36-kHz IF Signal Channels

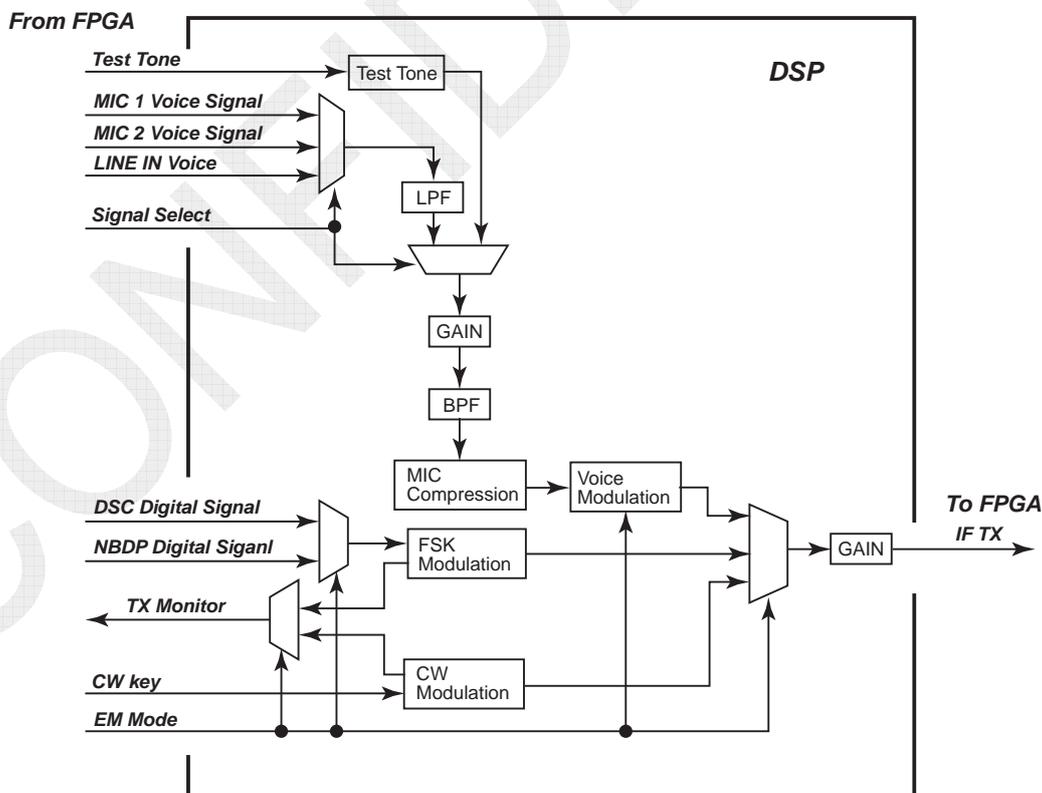


Fig. 7.6.3 Overview of Transmission Processing Circuit within DSP Transmitter

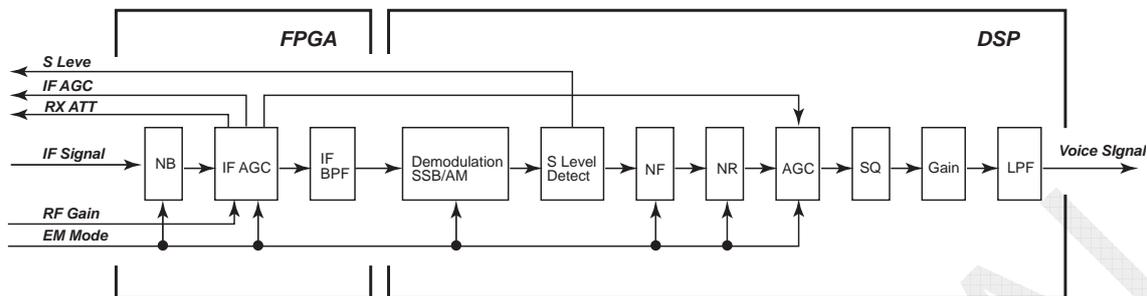


Fig. 7.6.4 Overview of Configuration of Reception/Demodulation Processing Line

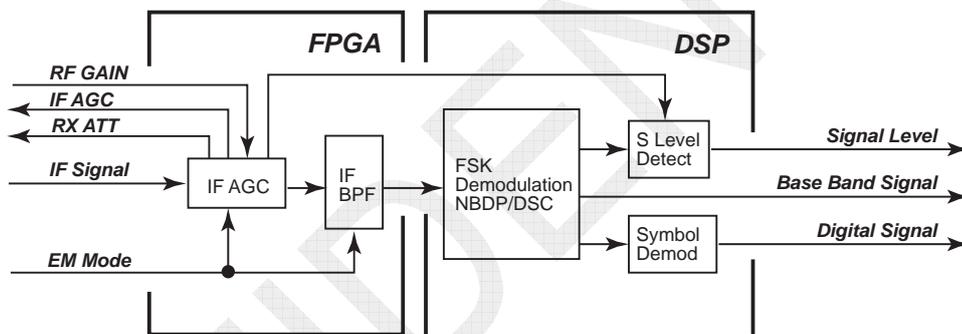


Fig. 7.6.5 Overview of Received DSC/NBDP Signal Processing within DSP

1.1 Overview of transmitted voice signal route

A voice signal from the handset microphone is digitized through the control unit and transmitted to the transceiver unit in a serial data format. The FPGA of the C-CPU board and that on the input side of the T-CPU board control communications between both units. Digitized voice signal from the FPGA of the T-CPU board is transmitted to the DSP. The DSP compresses and modulates the voice signal to input it to the FPGA. The FPGA serves as an interface between the DSP and the CODEC. The CODEC converts the data to a 36-kHz IF TX analog signal and outputs it to the TX board.

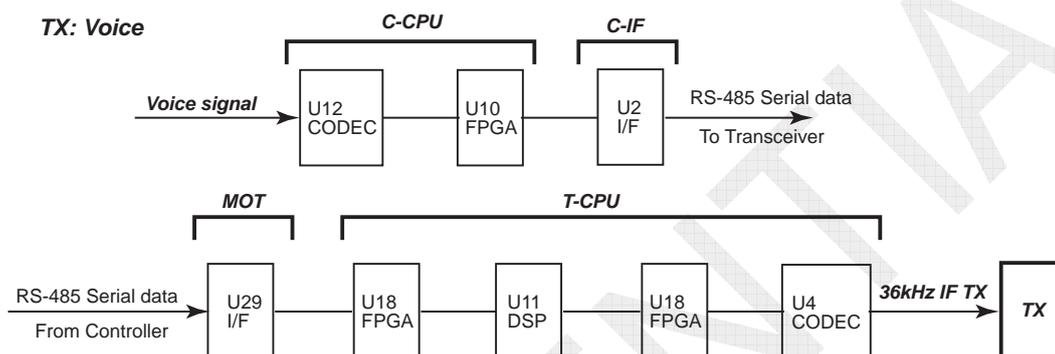


Fig. 7.6.6 Overview Diagram of Transmitted Voice Signal Channel

1.2 Received voice signal route

The 36-kHz IF RX signal outputted from the RX board is converted to a digital signal through the ADC and inputted to the FPGA of the T-CPU board. The FPGA conducts voice band signals necessary, control NB and IF AGC, and outputs these signals to the DSP. The DSP conducts voice signal processing, such as demodulation, NF, NR, and AF AGC.

Data outputted from the DSP is transmitted to the FPGA. The FPGA converts the data into a format that allows communication with the control unit and transmits the converted data to the control unit.

The control unit converts the data to voice signal to output it to the speaker.

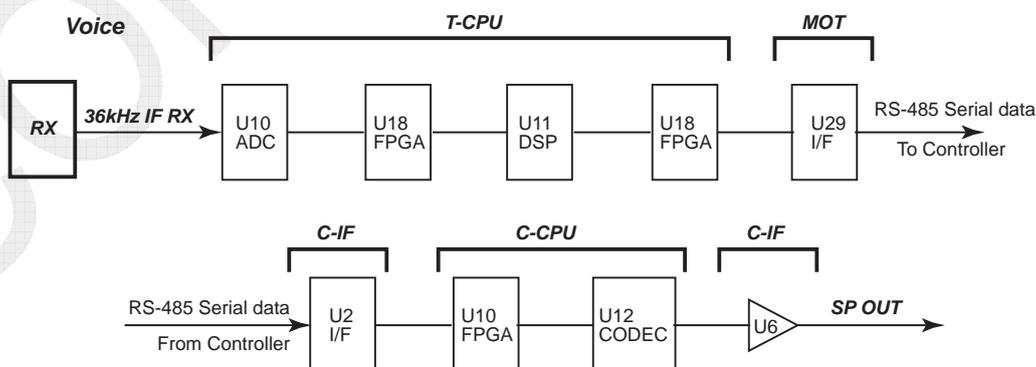


Fig. 7.6.7 Overview Diagram of Received Voice Signal Channel

2.1 Transmitted NBDP signal route

A NBDP message created by the NBDP terminal is transmitted to the transceiver unit in a serial data format. This serial data is transmitted to the 78k CPU through the FPGA of the T-CPU board. The 78k CPU generates a NBDP signal and outputs it to the DSP. The DSP modulates the signal by the FSK method and transmits the modulated signal to the FPGA. The FPGA serves as an interface between the DSP and the subsequent CODEC. The CODEC converts the data to a 36-kHz IF TX analog signal and outputs it to the TX board.

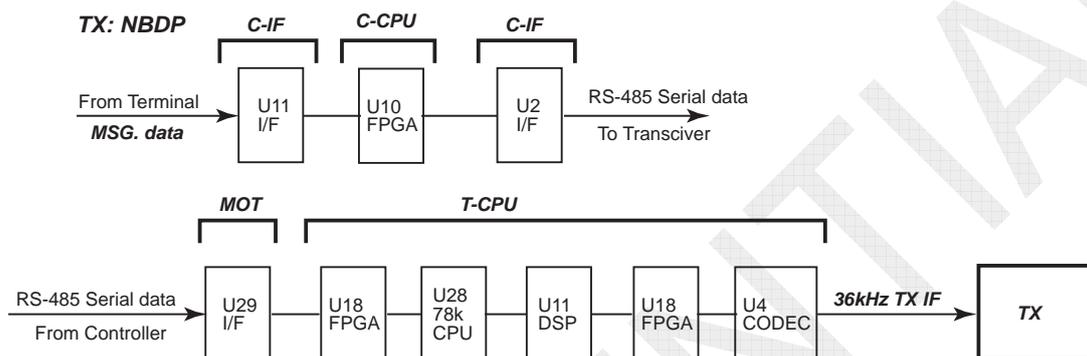


Fig. 7.6.8 Overview Diagram of Transmitted NBDP Signal Channel

2.2 Received NBDP signal route

The 36-kHz IF RX signal outputted from the RX board is converted to a digital signal through the ADC and outputted to the FPGA. The FPGA retrieves NBDP-band signals necessary for the IF AGC control and band-pass filters and outputs these signals to the DSP.

The DSP conducts signal processing, such as demodulation and symbol-by-symbol demodulation, and transmits data to the 78k CPU. The 78k CPU analyzes the data (MSG. data) and transmits the analyzed data to the FPGA.

The FPGA converts the data into a format that allows communication with the control unit and transmits the converted data to the control unit. The control unit transmits the data to the NBDP terminal, and the terminal displays it as a NBDP message.

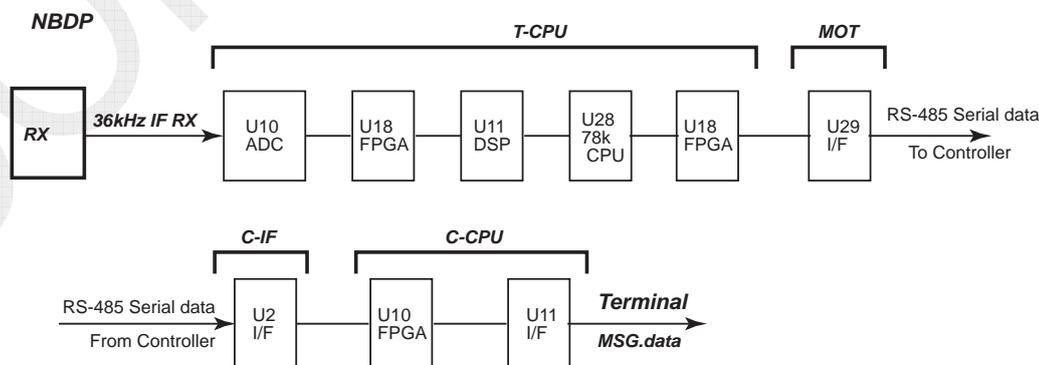


Fig. 7.6.9 Overview Diagram of NBDP RX IF Signal Channel

3.1 Transmitted DSC signal route

The DSC MSG. data created by the control unit is transmitted to the transceiver unit in a serial data format. This serial data is transmitted to the main CPU through the FPGA of the T-CPU board. The main CPU generates a DSC signal and outputs it to the DSP. The DSP modulates the signal by the FSK method and transmits the modulated signal to the CODEC through the FPGA. The CODEC converts the data to a 36-kHz IF TX analog signal and outputs it to the TX board.

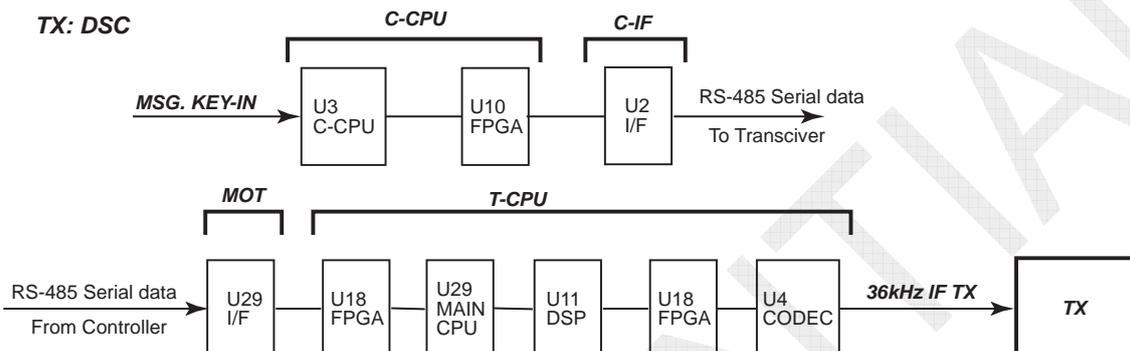


Fig. 7.6.10 Overview Diagram of Transmitted DSC Signal Channel

3.2 Received DSC (WR1) signal route

The 36-kHz IF RX signal outputted from the WR1 board is converted to a digital signal through the ADC and outputted to the FPGA. The FPGA retrieves DSC-band signals necessary for the IF AGC control and band-pass filters and outputs these signals to the DSP.

The DSP conducts signal processing, such as demodulation and symbol-by-symbol demodulation, and transmits data to the main CPU. The main CPU analyzes the data (MSG. data) and transmits the analyzed data to the FPGA.

The FPGA converts the data into a format that allows communication with the control unit and transmits the converted data to the control unit. The control unit displays the data as a DSC message.

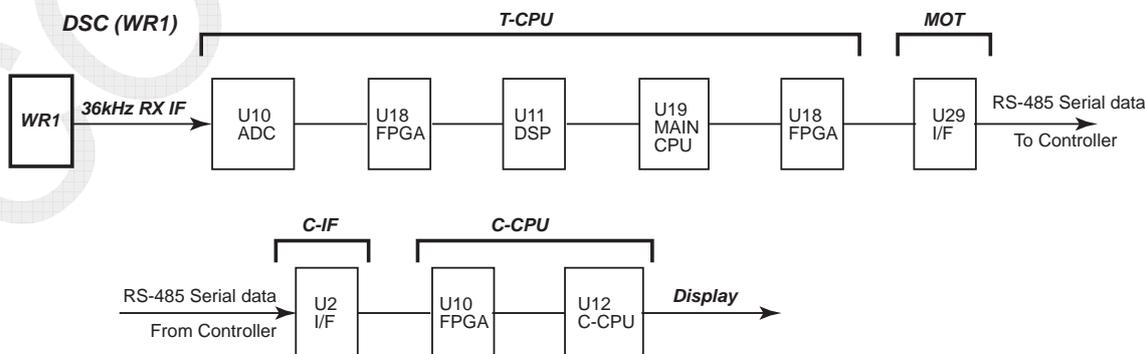


Fig. 7.6.11 Overview Diagram of WR1 IF Signal Channel

3.3 Received DSC (WR2) signal route

The 36-kHz IF RX signal outputted from the WR2 board is converted to a digital signal through the ADC and outputted to the FPGA. The FPGA retrieves DSC-band signals necessary for the IF AGC control and band-pass filters and outputs these signals to the DSP.

The DSP conducts signal processing, such as demodulation and symbol-by-symbol demodulation, and transmits data to the main CPU. The main CPU analyzes the data (MSG. data) and transmits the analyzed data to the FPGA.

The FPGA converts the data into a format that allows communication with the control unit and transmits the converted data to the control unit. The control unit displays the data as a DSC message.

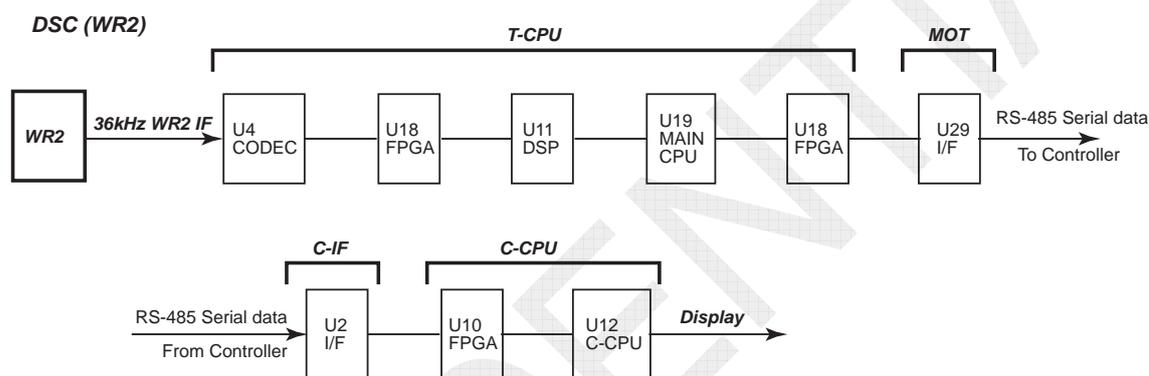


Fig. 7.6.12 Overview Diagram of WR2 Signal Channel

7.6.2 Voice Signal Processing

1. SQ (Squelch)

SQ operates in SSB and LSB modes. When two control units are connected to the system, individual SQ setting can be made to each unit.

The SQ opens and closes in response to frequency of voice signal. The set range of SQ detection frequency is from 500 Hz to 2000 Hz and the default is 1000 Hz. The SQ operation is controlled according to judgment on received frequency component. When the frequency component is lower than the set frequency, the SQ will open. When it is higher than the set frequency, the SQ will close.

The SQ opening and closing operation is controlled by transmitting a frequency counter value that is calculated by the DSP of the T-CPU board to the control unit and comparing the frequency counter value received by the FPGA of C-CPU board used in the control unit with SQ value set by user. This control allows for turning ON or OFF the voice signal output signal by controlling the mute signal of AF amplifier on the C-IF board used in the control unit.

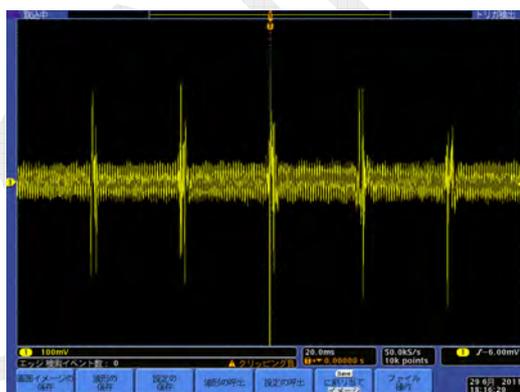
The SQ opening and closing operation is controlled on the following conditions:

- SINAD sensitivity level that allows the SQ control: 3 to 5dB or more
- SQ attack time: Approximately 70 msec.
- SQ decay time: Approximately 1.5 sec.
- SQ control: Internal SP, external SP, and handset SP (Note: Line-out disabled)

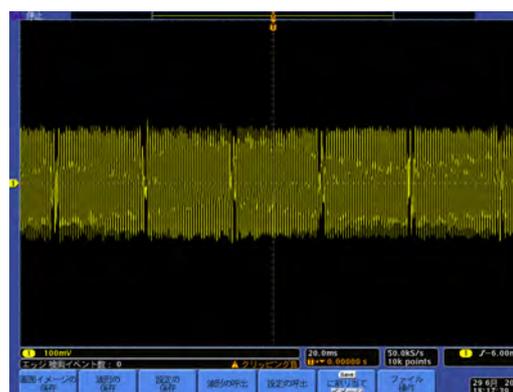
2. NB (Noise Blanker)

NB is processed by the FPGA of the T-CPU board. The NB operates in SSB, LSB, and AM modes. When two control units are connected to the system, common NB setting can be made to each unit.

The NB detects pulse components and mutes noises for a period of time during which the pulse components were detected.



Example of AF Output
with NB set to "OFF" in SSB Mode



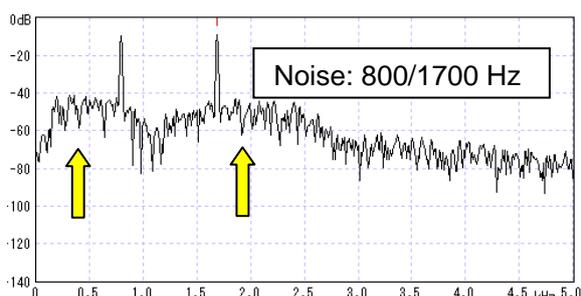
Example of AF Output
with NB set to ON in SSB Mode

3. NR1 and NR2 (Noise Reduction)

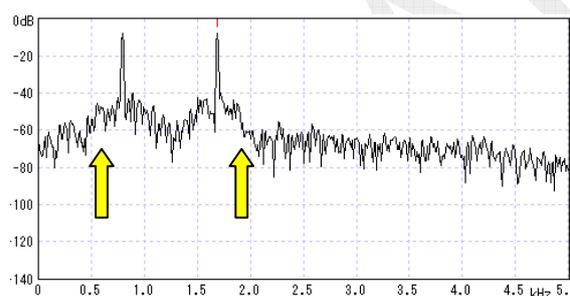
NR is processed by the DSP of the T-CPU board. The NR operates in SSB, LSB, and AM modes. When two control units are connected to the system, common NR setting can be made to each unit.

NR1 (low) filters voice-band components to suppress random noises without having significant effect on voice signal components.

NR2 (high) has set filter parameters that further enhances suppression effect. As a result, voice signals are affected to degrade intelligibility.



Example where NR1 is set to "ON" in SSB mode



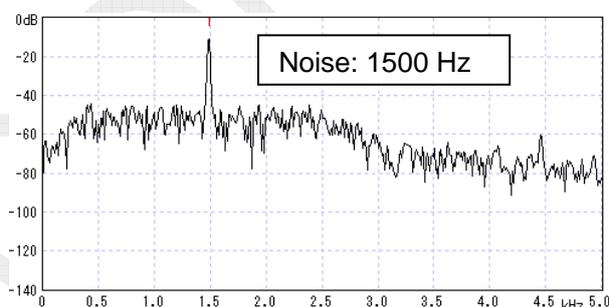
Example where NR2 is set to "ON" in SSB mode

4. NF (Notch Filter)

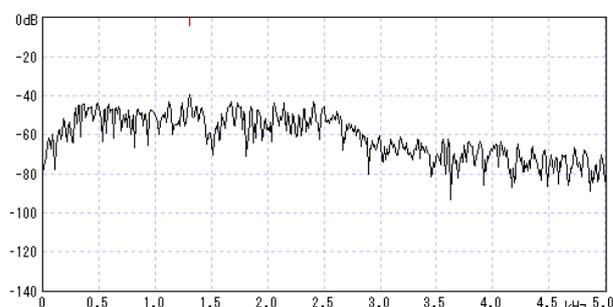
NF is processed by the DSP of the T-CPU board. The NF operates in SSB, LSB, and AM modes. When two control units are connected to the system, common NF setting can be made to each unit.

The NF eliminates the noises of singular signals such as tone frequency. For example, the NF detects a noise range to automatically eliminate the relevant band. Even if the noise range moves, the NF will automatically move there to eliminate noises.

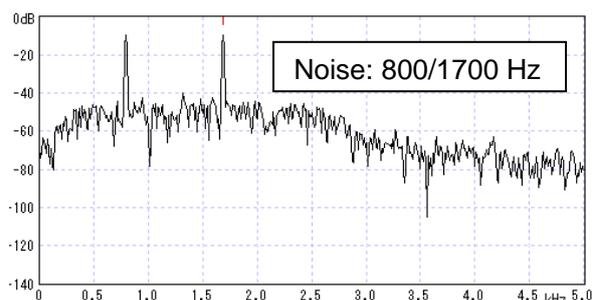
The NF is able to eliminate the noises of a number of signals if they get mixed in the notch.



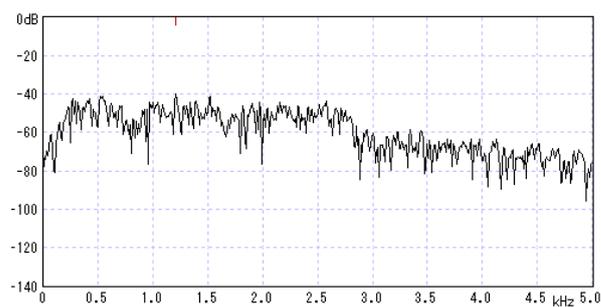
Example where NF is set to "OFF" in SSB mode



Example where NF is set to "ON" in SSB mode



Example where NF is set to "OFF"
in SSB mode



Example where NF is set to "ON"
in SSB mode

7.6.3 Memory

Programs are saved in a flash ROM and transferred to 78K CPU, FPGA, and SD RAM for running.

Furthermore, alarm and communication logs are saved in a flash ROM and transferred to the control unit to turn ON the power supply or on a request basis.

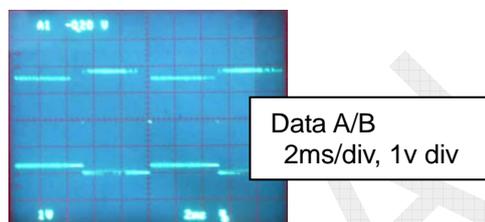
Table 7.6.1 Contents of Memories

Memory	Contents
Internal memory of main CPU	Working memory
Internal memory of 78K CPU	Programs used to run the 78K program
Internal memory of FPGA	Programs used to run the FPGA program
SD RAM	Working memory and programs used to run the main program
FLASH ROM	Programs, DSC transceiving log, and system set values Note) Transferred to SD RAM, FPGA, DSP, and internal memory of 78K CPU when turning ON the power supply.

7.6.4 High-speed Serial Communication

The Transceiver unit and the Control unit are connected with RS-485 half-duplex communication interface. Data transmitted with this interface have command data and FPGA-controlled voice data. Data are transceived in units of packets.

- Baud rate: 768 kbps
- Data length: 16 bits
- Parity: N/A
- Stop bit: 1 bit
- Flow control: N/A



Data transmission is divided into two categories taking 10 ms as one cycle. One category is uplink transmission from the Transceiver unit to the Control unit, and the other is downlink transmission from the Control unit to the Transceiver unit. This transmission is controlled by the FPGA of each unit.

The FPGA of the Transceiver unit transmits downlink voice data after putting an idle period of 20 bits. Subsequently, the FPGA puts a period of idle time again, and then transmits command data. The FPGA of the Transceiver unit switches the RS-485 driver from the transceiving state to the receiving state after completion of transmitting command data.

The FPGA of the control unit treats the command data of downlink voice packets as a pilot signal and initiates transmitting the data from the control unit upon receipt of it.

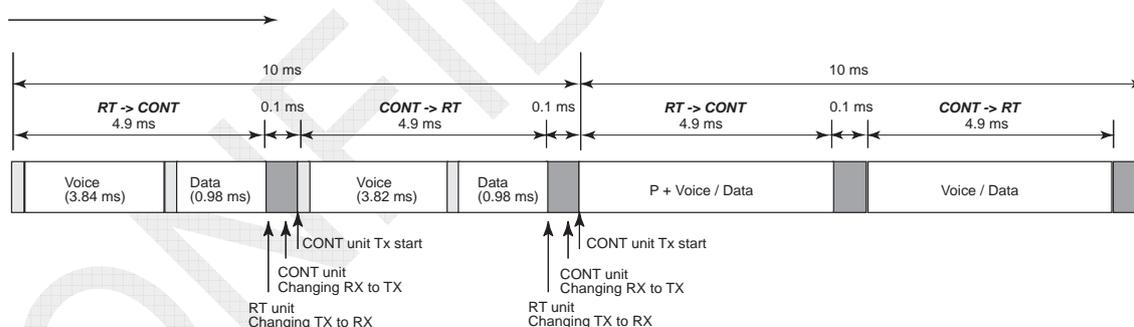


Fig. 7.6.13 High-speed Serial Communication Timing Chart

- Configuration of downlink voice packet: From the Transceiver unit to the Control unit
Model name+Source+Destination+Command (Pilot)+SQ+Voice data (320 bytes)
- Configuration of uplink voice packet: From the Control unit to the Transceiver unit
Model name+Source+Destination+Command+Voice data (320 bytes)
- Configuration of command packet
Model name+Source+Destination+Command+Voice data (80 bytes)

7.7 Power Supply

When two Control units are installed, the system power is turned ON from the No. 1 Control unit. Since “FL41” is not mounted on the T-IF board, the PWR ON signal from the No. 2 Control unit is not connected to the P-SW board, and thereby the system power is not turned ON from the No. 2 Control unit. Consequently, to install two Control units, be sure to install the No. 1 Control unit on the hardware.

Table 7.7.1 Configuration of Power Supply Block

Board Name	Type	Applicable Model		
		FS-1575	FS-2575	FS-5075
FET	05P0872			✓
POWER	05P0874	✓	✓	✓
SW REG	05P0873		✓	✓
P-SW	05P0871	✓	✓	✓

7.7.1 Power Supply Specifications

1. POWER (05P0874): Common

The POWER board uses 24V power outputted from the P-SW board to generate 15V and 5V power with the switching power supply.

The 15V power supply outputs a current up to 14A, while the 5V power supply outputs a current up to 2A.

2. P-SW (05P0871): Common

The P-SW board consists of power supply input ON/OFF (Max. 40A) protection, low-voltage/over-voltage lockout and reverse connection protection circuits for input power supply, and BK 24V power supply and 12V OVEN power supply used to start the power supply block. BK 24V is supplied to the input power supply through the PolySwitch (overcurrent protection switch).

- 1) Reverse connection protection for input power supply: Automatic resetting
- 2) Low voltage lockout for input power supply: 18 to 20V, automatic resetting
- 3) Overvoltage lockout for input power supply: 33V, automatic resetting
- 4) BK24V output: 24VDC / 1A at maximum (PolySwitch)
- 5) 12V OVEN output: 12VDC / 500 mA at maximum

3. SW REG (05P0873): FS-2575 and FS-5075

The SW REG board generates 42V PA VC. This 42V power is generated by adding 24V input power to 18V power outputted from this SW REG board. Furthermore, the SW REG board has a built-in overcurrent (19A) protection circuit.

4. FET (05P0872): FS-5075

Like the P-SW board, the FET board (05P0872) turns ON and OFF the input power supply. Since the FS-5075 system causes higher input power supply current than the FS-2575 system, the FET board is added to switch the input power supply current up to 70A.

7.7.2 Power Supply Circuit Diagram

1. FS-5075 Power supply circuit diagram

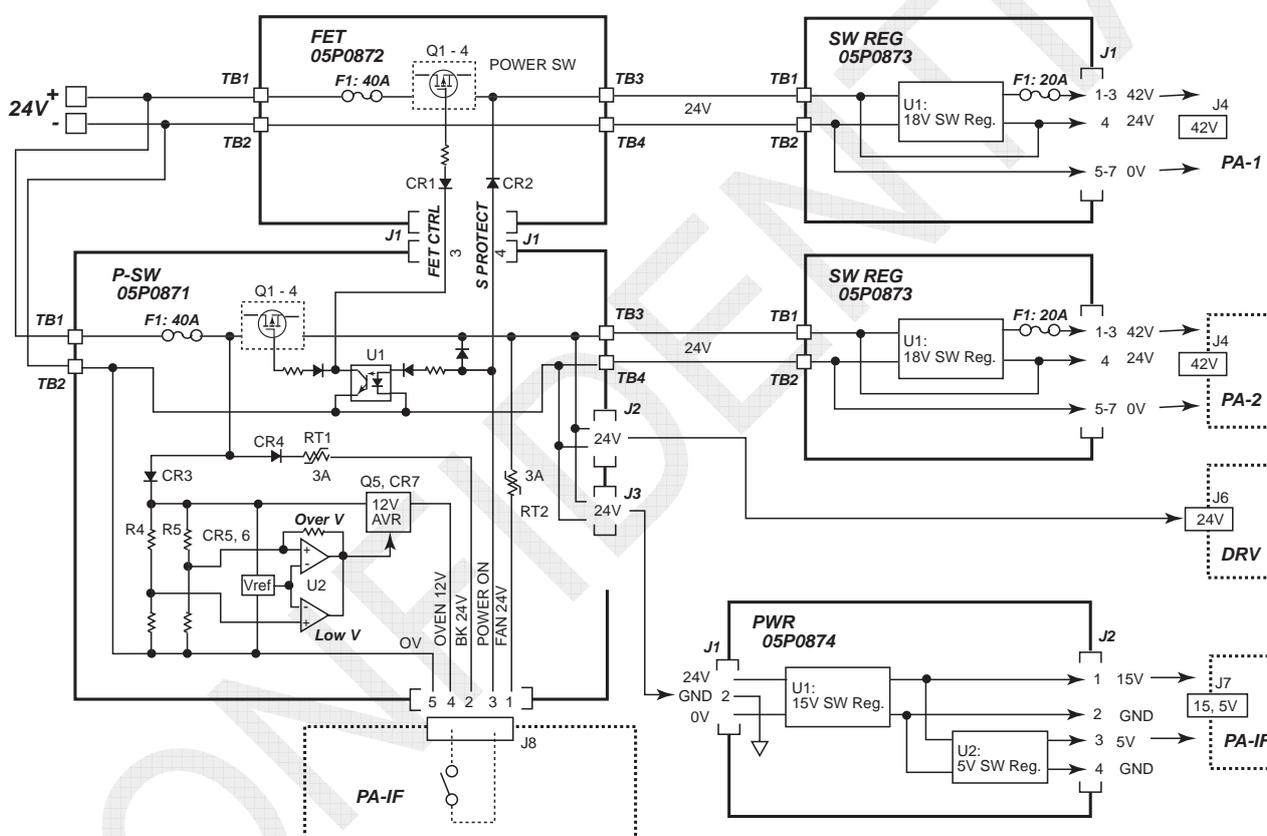


Fig. 7.7.1 FS-5075 Power Supply Circuit Block Diagram

2. FS-2575 Power supply circuit diagram

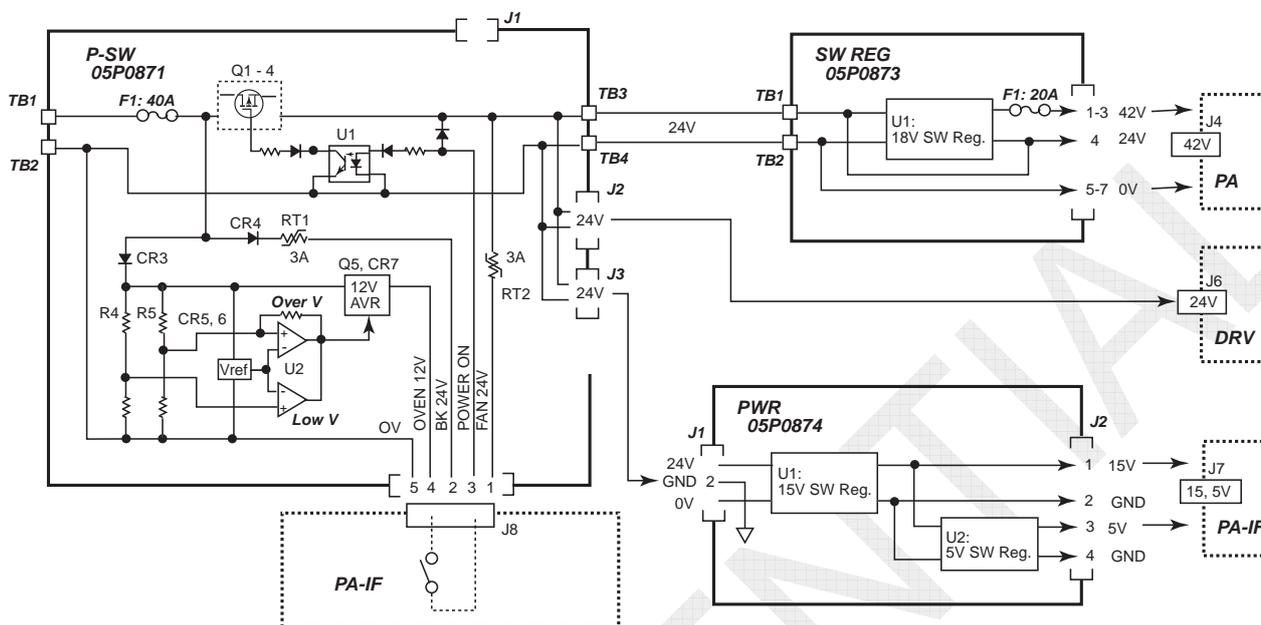


Fig. 7.7.2 FS-2575 Power Supply Circuit Block Diagram

3. FS-1575 Power supply circuit diagram

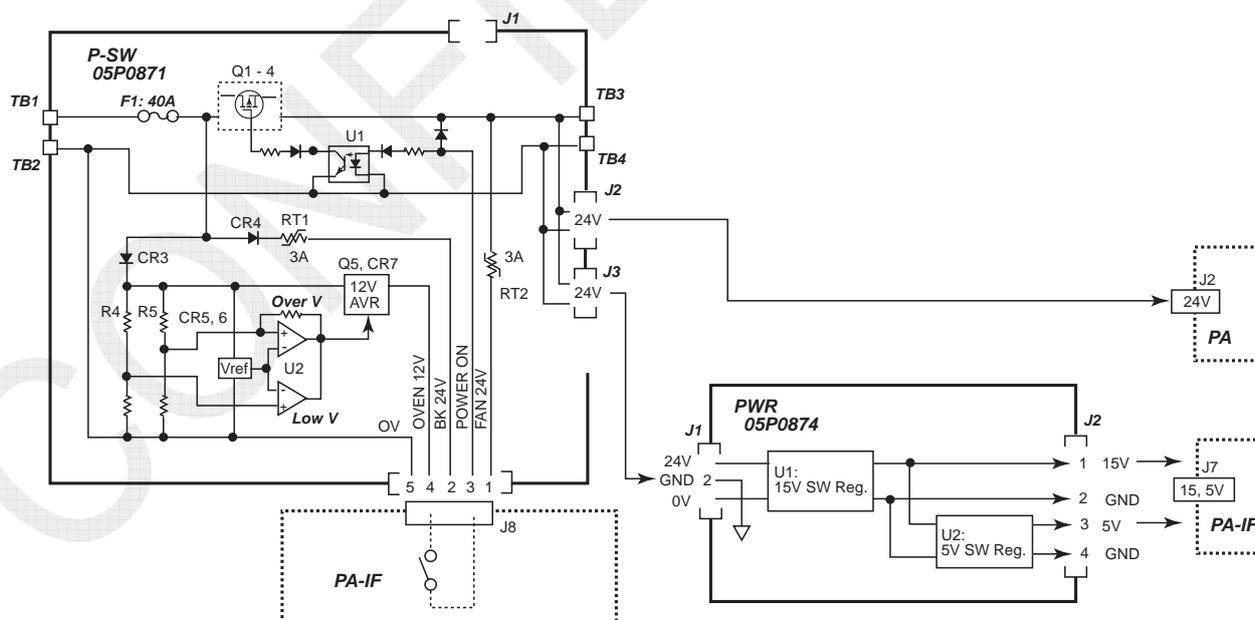


Fig. 7.7.3 FS-1575 Power Supply Circuit Block Diagram

7.8 Control Unit: FS-2575C

This unit consists of the C-CPU, C-IF, and PANEL boards. For communication between the control unit and the Transceiver unit, refer to information on page 7-66.

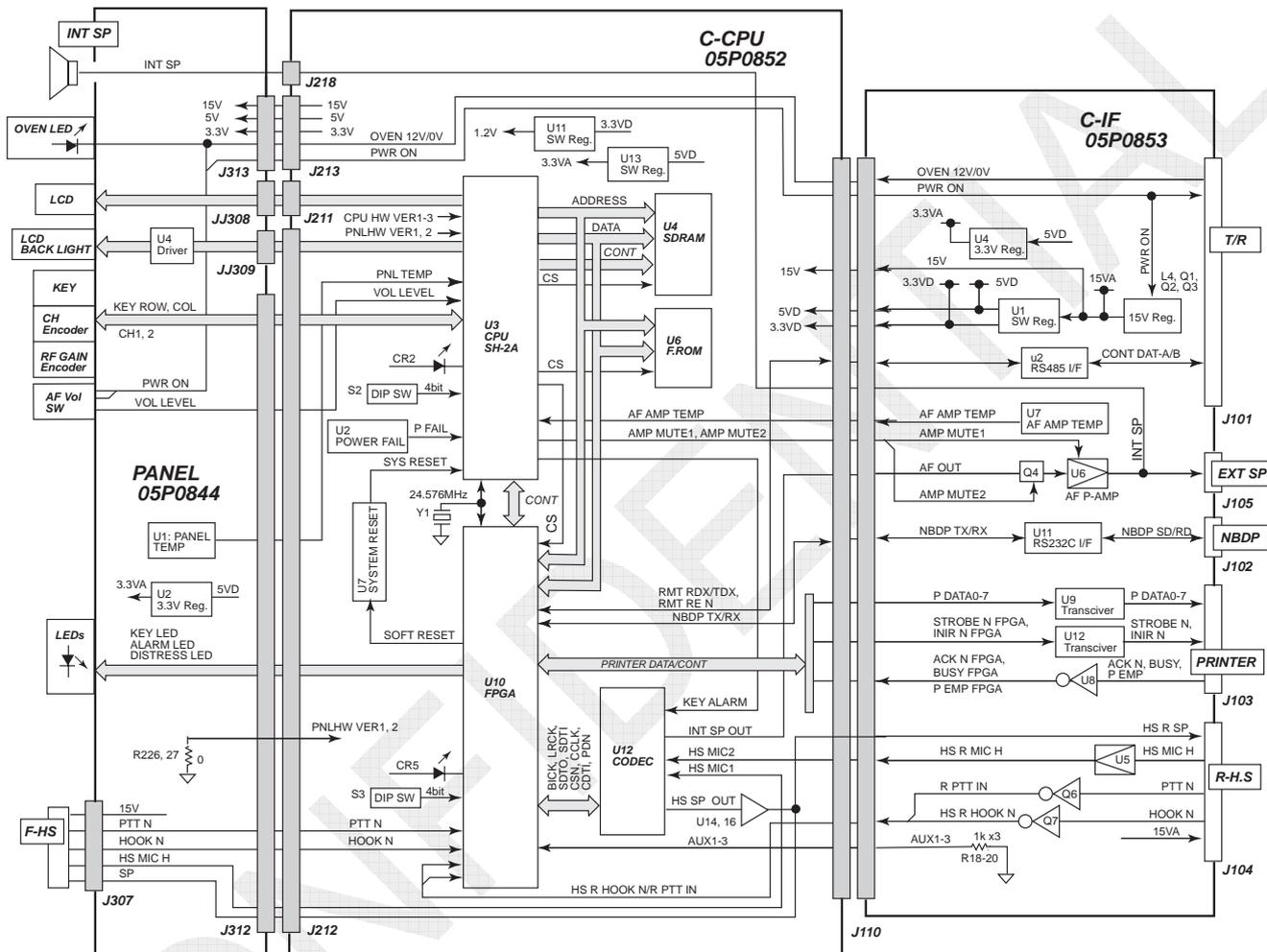
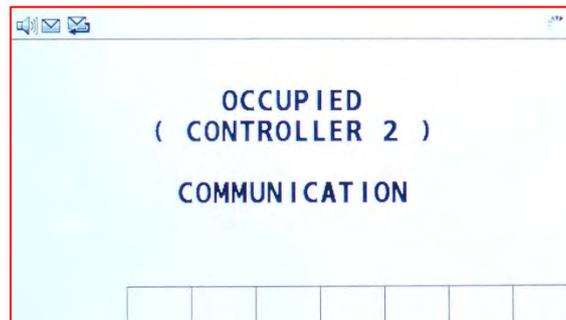


Fig. 7.8.1 FS-2575C Block Diagram

When two Control units are connected, the No. 1 Control unit will turn ON and OFF the system power. The No. 2 Control unit turns ON and OFF its own power. When the handset is set to OFF HOOK mode or any key other than AF VR is in operation, either one of the two Control units will be disabled to display "OCCUPIED." Consequently, the No. 1 Control unit has to be installed in the W/H.



1. C-CPU board: 05P0852

The C-CPU board consists of CPU, Flash ROM, SD RAM, CODEC, and FPGA. The CODEC converts an analog voice signal inputted from the handset MIC to a digital signal and outputs it to the Transceiver unit through the FPGA.

2. C-IF board: 05P0853

The C-IF board interfaces the NBDP terminal, Pinter, and Transceiver unit.

3. PANEL board: 05P0844

The PANEL board detects pressing of keys under the scan control using 5×5 matrix. The volume control knob, sensitivity control knob, and channel knob use a rotary encoder.

4. Set items saved in the control unit

For details, refer to information on page 6-47.

7.9 Antenna Coupler

7.9.1 FS-2575 and FS-5075: AT-5075(05P0875) / FS-1575: AT-1575(05P0883)

The FS-2575 and FS-5075 systems use AT-5075 antenna coupler, and the FS-1575 system uses AT-1575 antenna coupler. These antenna couplers have a built-in COUP board and are the same in the circuit and operation.

The tunable frequency range is between 1605 kHz and 27500 kHz and required antenna length is 10 meters. For example, in case of an 8m whip antenna, install it using a lead-in of 2 m or more in length.

Tuning time is 15 seconds at maximum. Basically, the matching circuit is switched to the gamma-matching circuit on the MF band and to the pi-matching circuit on the HF band. Depending on antenna constants, it is switched to the pi-matching circuit even on the MF band. The matching circuit works to switch between L (inductance) and C (capacitance) using a relay, minimizing VSWR. When VSWR falls below “3,” tuning is determined to be OK.

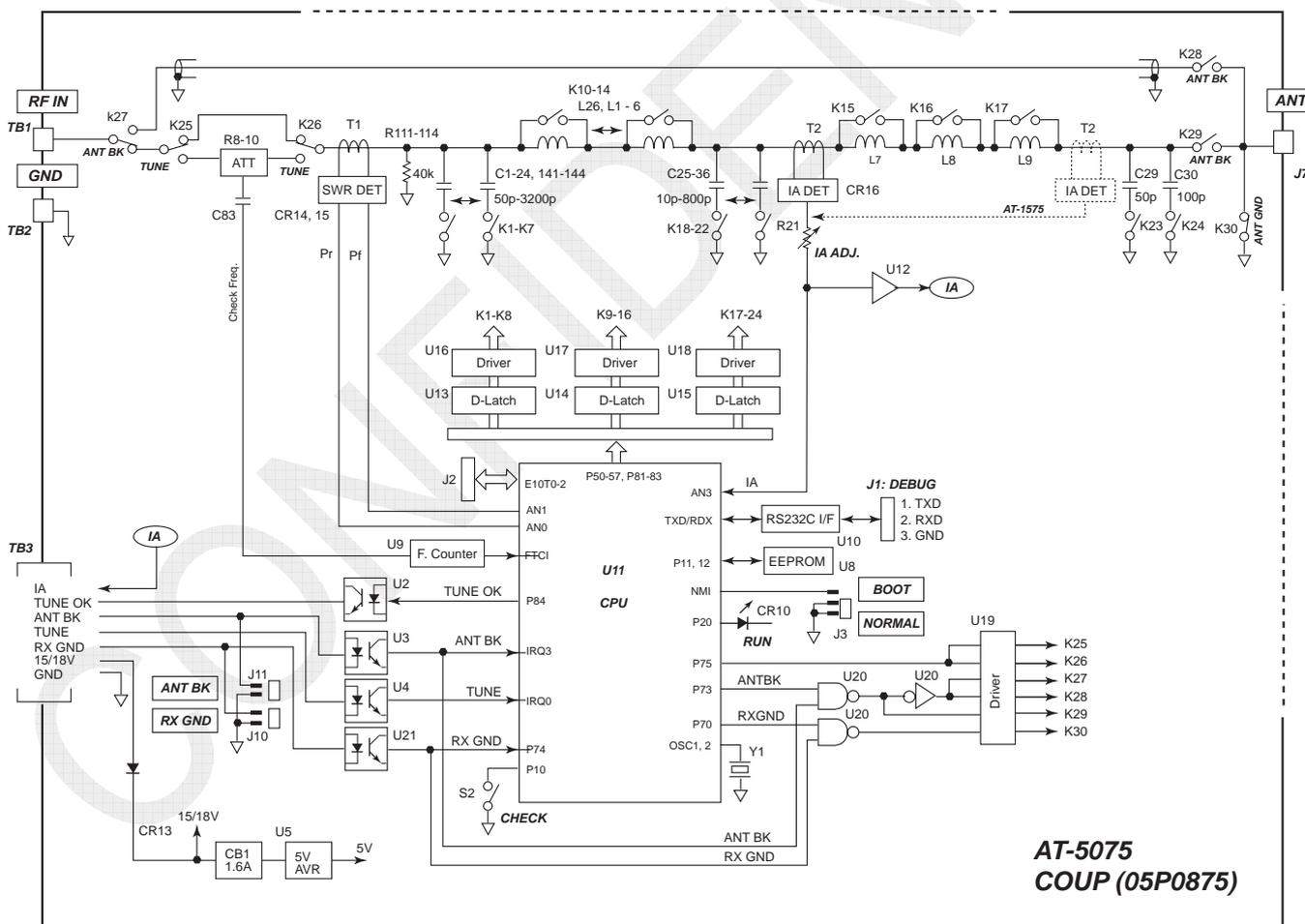


Fig. 7.9.1 COUP Board (05P0875) Block Diagram

1. Control signal timing

The timing circuit consists of an antenna matching circuit and its control circuit. The “TUNE” signal from the Transceiver unit initiates antenna tuning. If no RF signal is outputted after a lapse of 500 msec or more even though the “TUNE” signal is activated, the system will enter tune error mode. In this case, the antenna coupler will be bypassed. When the “TUNE OK” signal is at a high level, tuning will be determined to be OK. When it is at a low level, tuning will be determined to be an error. Pressing the [TUNE] switch on the COUP board will initiate antenna tuning operation, making it possible to check for the operation of the antenna coupler in its installation location.

The following chart shows the control signal operation timing.

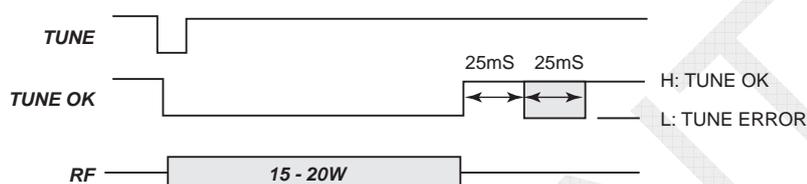


Fig. 7.9.2 TUNE Timing Chart

2. Matching circuit

The detection signals shown in the table below are used to conduct antenna matching. The matching circuit consists of gamma and pi-matching circuits. Antenna constants are switched by the relay.

For transmitted frequencies that have previously succeeded in tuning once, the previous matched value is used as default for the second and later tuning. Matched values are saved in EEPROM.

Successful tuning means that the SWR value falls below “3.”

Table 7.9.1 COUP Board Detection Signal

Detection Signal	Detector	Function
Frequency	U9 (Counter)	Detects input frequency. Used to limit the operating range of the matching circuit (1.6 to 27.5 MHz) and as the memory address of matching constants.
VSWR detection	T1	Detects VSWR of the antenna axial cable line. Used to monitor matching status in antenna matching operation (find the minimum VSWR).
Ia detection	T2	Detects antenna current. Used to display the IA reading on the FS-2575C unit. Not used for the matching procedure.

Table 7.9.2 SWR Conversion Table

VSWR	Return coefficient $ \Gamma $	Return loss (dB)	Reflection power (%)	Transmission power (%)	Transmission loss (dB)
1.00	0.0000	∞	0.000	100.00	0.000
1.10	0.0476	26.45	0.227	99.973	0.010
1.30	0.1304	17.70	1.700	98.300	0.074
1.50	0.2000	13.98	4.000	96.000	0.177
2.00	0.3333	9.54	11.11	88.89	0.511
2.50	0.4286	7.36	18.37	81.63	0.882
3.00	0.5000	6.02	25.00	75.00	1.250
4.00	0.6000	4.44	36.00	64.00	1.938

Matching constants:

- Cin-side capacitor: Variable in steps of 50 pF up to 6350 pF
- L: Variable in steps of 0.05 uH up to 51.15 uH
- Cout-side capacitor: Variable in steps of 10 pF (12.5pF) up to 1587.5 pF

Note) In order to prevent a significant change in SWR on the line in matching operation, an attenuator of -3dB is mounted on the input side of the matching circuit.

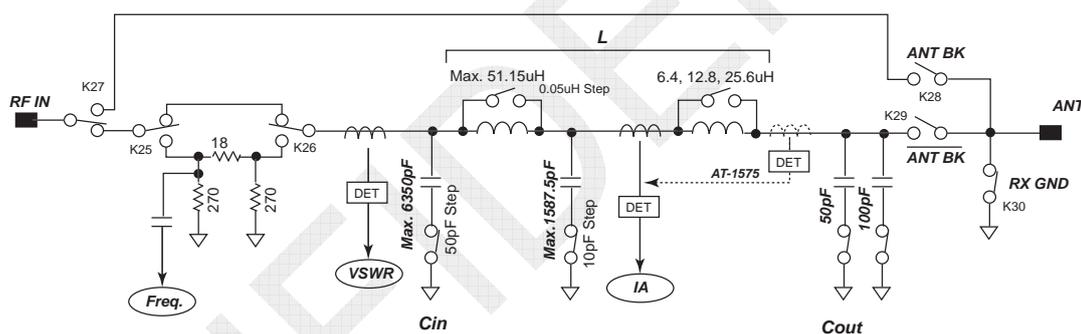


Fig. 7.9.3 Matching Circuit Block Diagram

Find a VSWR by changing the combination of a coil and a capacitor, and then compare the VSWR with the previous ratio to determine the change of the coil and the capacitor. Repeat this sequence to reduce the VSWR close to "1."

$$\text{VSWR} = (V_f + V_r) / (V_f - V_r)$$

When the transmitted frequency is not more than 4 MHz, conduct matching operation basically using the gamma-matching circuit. When VSWR exceeds the threshold level, try to conduct matching operation using the pi-matching circuit.

3. Overview of matching procedure

To define a direction for whether to vary first the coil or the capacitor of the matching circuit in initiating matching operation, it has to be determined from the VSWR whether the antenna reactance is inductive or capacitive. The method is as follows:

- 1) If the dip point of VSWR can be detected by varying “L” (inductance) in series to the antenna, the antenna reactance will be capacitive. In this case, matching operation will be initiated from the gamma matching circuit.
- 2) If no dip-point is detected even by varying the “L,” find the dip-point by adding 50 pF, and 100 pF capacitors on the antenna side and varying the “L” again. Then, if the dip-point can be detected, the antenna reactance will be inductive. In this case, matching operation will be initiated from the pi-matching circuit.

Gamma-matching

In case of capacitive antenna reactance, matching operation will be initiated in the gamma-matching circuit.

Set the Cin-side capacitor to “0,” and then vary “L.” Set the Cin-side capacitor to a calculated value, and then vary “L” near the calculated value. Depending on the calculated value, set “L,” and then vary the Cin-side capacitor. Follow the said procedure to find the minimum VSWR. If successful matching is not achieved, add the Cout-side capacitor to try matching following the same procedure as that aforementioned.

In other words, vary “L” and “Cin” based on a locus that minimizes VSWR in terms of the Smith chart.

Pi-matching

Basically, this method initiates matching operation by setting the Cout-side capacitor to “0” to conduct it following the same procedure as that for gamma-matching.

Burnout prevention

On low transmitted frequency bands, antenna impedance comes to capacitive reactance ($1/j\omega C_a$) with antenna resistance of several ohms and reactance of $-j500$ ohms or more. The shorter the antenna length, the higher the capacitive reactance becomes.

In this case, in order to negate capacitive reactance components, add coils (inductive reactance ($j\omega L$)) in series.

$$1/j\omega C_a = j\omega L$$

In this case, each end of a larger coil located near the antenna side generates a high voltage, possibly causing the matching circuit to burn out.

To prevent burnout, the matching circuit is designed to detect voltage at the antenna connection and choose a matching point within the specified threshold when the voltage exceeds the threshold even if the matching point shows acceptable VSWR.

This operation is conducted in the low transmitted frequency range, i.e., in the capacitive reactance range of the antenna.

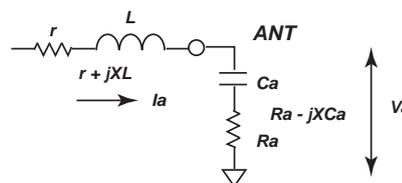
The voltage is given as:

$$V = I_a \times |Z|$$

$$I_a = P / (r + R)$$

$$|Z| = |R - jXL| \cong XL = 1/\omega C_a = \omega L$$

Threshold of AT-1575 and AT-5075: 4.3 kVrms



In order to reduce voltage, i.e., to reduce inductance that negates the capacitive components of the antenna, 50 pF and 100 pF capacitors are added on the antenna side to equivalently increase the capacitive reactance of the antenna.

Memory

When matching results in VSWR of “not more than 3.0,” the matching constant will be saved in EEPROM. This constant is used as default for the subsequent matching data, reducing a period of time required for matching.

The following section shows a range of frequencies to be saved. This is the range of matching frequencies.

- | | |
|------------------------|------------------------------|
| • Less than 1600 kHz: | Outside of setting range |
| • 1600 to 4000 kHz: | 20 kHz bandwidth (120 bands) |
| • 4000 to 8000 kHz: | 40 kHz bandwidth (100 bands) |
| • 8000 to 16000 kHz: | 80 kHz bandwidth (100 bands) |
| • 16000 to 28160kHz: | 160 kHz bandwidth (78 bands) |
| • Not less than 28160: | Outside of setting range |

4. Self-test

AT-1575 and AT-5075 initiates a self-test when the [CHECK] button is pressed.

For details, refer to information on page 6-54.

Self-test procedure:

- 1) Turn OFF all relays.
- 2) Turn ON and OFF the input-side capacitor control relay, coil control relay, and output-side capacitor control relay one after another.
- 3) Check for built-in ROM, RAM, and ADC of the CPU.
- 4) Upon completion of the self-test, the system will return to the original state.

5. Monitoring matching status

J1 (debug port) of the COUP board follows RS232C specification. This allows for monitoring the matching status by the use of communication software, such as Hyper Terminal.

Communication setting:

- Baud rate: 115.200 kbps
- Data length: 7 bits
- Stop bit: 2 bits
- Parity bit: 0 bit

Type “?” A list of commands will appear.

Trace output command for the matching process is outputted by “TR1” and stopped by “TR0.”

The “MEM-CLR” command is used to clear matching data.

1) Monitoring self-test sequence

```
<RELAY interval=200[ms]>
K=01 50pF           K=08 0.05uH       K=18 12.5pF
K=02 100pF          K=09 0.1uH        K=19 25pF
K=03 200pF          K=10 0.2uH        K=20 200pF
K=04 400pF          K=11 0.4uH        K=21 400pF
K=05 800pF          K=12 0.8uH        K=22 800pF
K=06 1600pF         K=13 1.6uH        K=23 *50pF
K=07 3200pF         K=14 3.2uH        K=24 *100pF
----
K=15 *6.4uH         <ROM>
K=16 *12.8uH        checksum=0xD4 memorysum=0xD4
K=17 *25.6uH        OK
----
<RAM>
0xFB80-0xFF7F
OK
<ADC>
```

2) Monitoring matching procedure: For 6200 kHz, 50 ohm load

```
freq=6200[kHz] band=176[ch]
No memory
unit_Ci=10(500pF), unit_L=25(125.00uH), unit_Co=41(512.5pF)
```

CHARENCE_CO:0

driver_shot_L

```
VSWR= 1.896(365 114) IA= 17      Ci: 0   L: 0   Co: 0
VSWR= 2.172(369 135) IA= 16      Ci: 0   L: 5   Co: 0
VSWR= 2.740(374 175) IA= 15      Ci: 0   L: 10  Co: 0
VSWR= 3.120(378 194) IA= 13      Ci: 0   L: 15  Co: 0
VSWR= 3.482(381 212) IA= 13
```

keep fairway.

```
VSWR= 1.904(366 114) IA= 17      Ci: 0   L: 0   Co: 0
```

[CO:0] VSWR=1.896 Ci:0 L:0 Co:0

CHARENCE_CO:10

driver_shot_L

```
VSWR= 1.569(361 80) IA= 17      Ci: 0   L: 0   Co: 10
VSWR= 1.716(365 96) IA= 17      Ci: 0   L: 5   Co: 10
VSWR= 2.087(369 131) IA= 16     Ci: 0   L: 10  Co: 10
VSWR= 2.351(372 150) IA= 15     Ci: 0   L: 15  Co: 10
```

VSWR= 2.623(376 168) IA= 15	Ci: 0	L: 20	Co: 10
keep fairway.			
VSWR= 1.567(362 79) IA= 17	Ci: 0	L: 0	Co: 10
[CO:10] VSWR=1.567 Ci:0 L:0 Co:10			
CHARENGE_CO:20			
driver_shot_L			
VSWR= 1.548(358 76) IA= 17	Ci: 0	L: 0	Co: 20
VSWR= 1.528(360 75) IA= 17	Ci: 0	L: 5	Co: 20
VSWR= 1.620(363 87) IA= 17	Ci: 0	L: 10	Co: 20
VSWR= 1.734(366 97) IA= 17	Ci: 0	L: 15	Co: 20
VSWR= 1.889(367 114) IA= 17	Ci: 0	L: 20	Co: 20
VSWR= 2.240(372 142) IA= 16	Ci: 0	L: 25	Co: 20
keep fairway.			
VSWR= 1.546(358 77) IA= 17	Ci: 0	L: 0	Co: 20
--> approach			
IDEAL Ci=+7(7), L=+11(16)			
VSWR= 2.175(344 128) IA= 13	Ci: 7	L: 5	Co: 20
VSWR= 1.669(355 90) IA= 16	Ci: 2	L: 0	Co: 20
VSWR= 3.388(316 173) IA= 8	Ci: 12	L: 0	Co: 20
VSWR= 2.310(341 136) IA= 13	Ci: 7	L: 0	Co: 20
VSWR= 1.669	Ci: 2 [SKIP]		
VSWR= 1.546(359 78) IA= 17	Ci: 0	L: 0	Co: 20
VSWR= 1.596(357 82) IA= 17	Ci: 1	L: 0	Co: 20
[L:0] VSWR=1.546 Ci:0 Co:20			
VSWR= 1.739(364 99) IA= 17	Ci: 2	L: 16	Co: 20
VSWR= 3.113(327 168) IA= 10	Ci: 12	L: 16	Co: 20
VSWR= 2.162(351 130) IA= 14	Ci: 7	L: 16	Co: 20
VSWR= 1.739	Ci: 2 [SKIP]		
VSWR= 1.741(366 99) IA= 17	Ci: 0	L: 16	Co: 20
VSWR= 1.734(365 97) IA= 17	Ci: 1	L: 16	Co: 20
VSWR= 1.739	Ci: 2 [SKIP]		
VSWR= 1.734	Ci: 1 [SKIP]		
VSWR= 1.741	Ci: 0 [SKIP]		
VSWR= 1.734	Ci: 1 [SKIP]		
[L:16] VSWR=1.734 Ci:1 Co:20			
VSWR= 1.615(358 83) IA= 16	Ci: 2	L: 5	Co: 20
VSWR= 3.210(321 169) IA= 9	Ci: 12	L: 5	Co: 20
VSWR= 2.185(344 128) IA= 14	Ci: 7	L: 5	Co: 20
VSWR= 1.615	Ci: 2 [SKIP]		
VSWR= 1.524(360 75) IA= 17	Ci: 0	L: 5	Co: 20
VSWR= 1.555(359 79) IA= 17	Ci: 1	L: 5	Co: 20
[L:5] VSWR=1.524 Ci:0 Co:20			
VSWR= 1.546	L: 0 [SKIP]		
VSWR= 1.524	L: 5 [SKIP]		
VSWR= 1.644(362 89) IA= 17	Ci: 2	L: 10	Co: 20
VSWR= 3.075(326 166) IA= 10	Ci: 12	L: 10	Co: 20
VSWR= 2.102(349 124) IA= 14	Ci: 7	L: 10	Co: 20
VSWR= 1.644	Ci: 2 [SKIP]		
VSWR= 1.620(364 87) IA= 17	Ci: 0	L: 10	Co: 20
VSWR= 1.620(363 86) IA= 17	Ci: 1	L: 10	Co: 20
[L:10] VSWR=1.620 Ci:0 Co:20			
VSWR= 1.627(361 86) IA= 17	Ci: 2	L: 8	Co: 20
VSWR= 3.088(325 166) IA= 10	Ci: 12	L: 8	Co: 20
VSWR= 2.112(348 125) IA= 14	Ci: 7	L: 8	Co: 20
VSWR= 1.627	Ci: 2 [SKIP]		
VSWR= 1.592(363 83) IA= 17	Ci: 0	L: 8	Co: 20
VSWR= 1.594(362 83) IA= 17	Ci: 1	L: 8	Co: 20

[L:8] VSWR=1.592 Ci:0 Co:20			
VSWR= 1.603(359 83) IA= 17	Ci: 2	L: 6	Co: 20
VSWR= 3.154(323 168) IA= 9	Ci: 12	L: 6	Co: 20
VSWR= 2.150(345 126) IA= 14	Ci: 7	L: 6	Co: 20
VSWR= 1.603	Ci: 2 [SKIP]		
VSWR= 1.524(361 75) IA= 17	Ci: 0	L: 6	Co: 20
VSWR= 1.553(360 77) IA= 17	Ci: 1	L: 6	Co: 20
[L:6] VSWR=1.524 Ci:0 Co:20			
VSWR= 1.615(358 84) IA= 17	Ci: 2	L: 4	Co: 20
VSWR= 3.210(321 169) IA= 9	Ci: 12	L: 4	Co: 20
VSWR= 2.185(344 128) IA= 14	Ci: 7	L: 4	Co: 20
VSWR= 1.615	Ci: 2 [SKIP]		
VSWR= 1.524(361 76) IA= 17	Ci: 0	L: 4	Co: 20
VSWR= 1.555(360 78) IA= 17	Ci: 1	L: 4	Co: 20
[L:4] VSWR=1.524 Ci:0 Co:20			
VSWR= 1.637(357 86) IA= 16	Ci: 2	L: 2	Co: 20
VSWR= 3.297(319 170) IA= 9	Ci: 12	L: 2	Co: 20
VSWR= 2.257(343 132) IA= 13	Ci: 7	L: 2	Co: 20
VSWR= 1.637	Ci: 2 [SKIP]		
VSWR= 1.526(361 76) IA= 17	Ci: 0	L: 2	Co: 20
VSWR= 1.575(359 81) IA= 17	Ci: 1	L: 2	Co: 20
[L:2] VSWR=1.526 Ci:0 Co:20			
VSWR= 1.625(356 86) IA= 16	Ci: 2	L: 3	Co: 20
VSWR= 3.281(319 170) IA= 9	Ci: 12	L: 3	Co: 20
VSWR= 2.241(343 131) IA= 13	Ci: 7	L: 3	Co: 20
VSWR= 1.625	Ci: 2 [SKIP]		
VSWR= 1.526(360 76) IA= 17	Ci: 0	L: 3	Co: 20
VSWR= 1.566(359 80) IA= 17	Ci: 1	L: 3	Co: 20
[L:3] VSWR=1.526 Ci:0 Co:20			
VSWR= 1.524	L: 4 [SKIP]		
VSWR= 1.524	L: 5 [SKIP]		
VSWR= 1.524	L: 6 [SKIP]		
VSWR= 1.603(359 83) IA= 17	Ci: 2	L: 7	Co: 20
VSWR= 3.154(323 167) IA= 9	Ci: 12	L: 7	Co: 20
VSWR= 2.150(345 126) IA= 14	Ci: 7	L: 7	Co: 20
VSWR= 1.603	Ci: 2 [SKIP]		
VSWR= 1.524(361 76) IA= 17	Ci: 0	L: 7	Co: 20
VSWR= 1.553(360 78) IA= 17	Ci: 1	L: 7	Co
[L:7] VSWR=1.524 Ci:0 Co:20			
VSWR= 1.592	L: 8 [SKIP]		
VSWR= 1.625(360 87) IA= 17	Ci: 2	L: 9	Co: 20
VSWR= 3.062(325 166) IA= 10	Ci: 12	L: 9	Co: 20
VSWR= 2.107(348 124) IA= 14	Ci: 7	L: 9	Co: 20
VSWR= 1.625	Ci: 2 [SKIP]		
VSWR= 1.592(363 83) IA= 17	Ci: 0	L: 9	Co: 20
VSWR= 1.604(362 83) IA= 17	Ci: 1	L: 9	Co: 20
[L:9] VSWR=1.592 Ci:0 Co:20			
VSWR= 1.620	L: 10 [SKIP]		
[CO:20] VSWR=1.524 Ci:0 L:5 Co:20			
CHARENGE_CO:30			
driver_shot_L			
VSWR= 1.435(352 63) IA= 17	Ci: 0	L: 0	Co: 30
VSWR= 1.300(353 46) IA= 17	Ci: 0	L: 5	Co: 30
VSWR= 1.232(355 37) IA= 18	Ci: 0	L:10	Co: 30
VSWR= 1.295(358 46) IA= 18	Ci: 0	L:15	Co: 30
VSWR= 1.417(360 63) IA= 18	Ci: 0	L:20	Co: 30
VSWR= 1.747(365 99) IA= 17	Ci: 0	L:25	Co: 30

VSWR= 2.062(369 129) IA= 17 Ci: 0 L: 30 Co: 30

keep fairway.

VSWR= 1.435(351 63) IA= 17 Ci: 0 L: 0 Co: 30

VSWR= 1.260(356 42) IA= 18 Ci: 0 L: 13 Co: 30

VSWR= 1.289(357 44) IA= 18 Ci: 0 L: 14 Co: 30

VSWR= 1.295(357 46) IA= 18 Ci: 0 L: 15 Co: 30

--> approach

IDEAL Ci=+4(4), L=+9(19)

VSWR= 1.432(349 62) IA= 17 Ci: 4 L: 10 Co: 30

VSWR= 1.429(351 63) IA= 17 Ci: 0 L: 1 Co: 30

VSWR= 2.714(325 151) IA= 11 Ci: 9 L: 1 Co: 30

VSWR= 1.870(343 103) IA= 15 Ci: 4 L: 1 Co: 30

VSWR= 1.429 Ci: 0 [SKIP]

VSWR= 1.510(350 72) IA= 16 Ci: 1 L: 1 Co: 30

[L:1] VSWR=1.429 Ci:0 Co:30

VSWR= 1.355(359 54) IA= 18 Ci: 0 L: 19 Co: 30

VSWR= 1.948(342 111) IA= 14 Ci: 9 L: 19 Co: 30

VSWR= 1.426(353 62) IA= 18 Ci: 4 L: 19 Co: 30

VSWR= 1.355 Ci: 0 [SKIP]

VSWR= 1.333(357 52) IA= 18 Ci: 1 L: 19 Co: 30

VSWR= 1.342(356 51) IA= 18 Ci: 2 L: 19 Co: 30

VSWR= 1.333 Ci: 1 [SKIP]

VSWR= 1.355 Ci: 0 [SKIP]

VSWR= 1.333 Ci: 1 [SKIP]

[L:19] VSWR=1.333 Ci:1 Co:30

VSWR= 1.226(355 36) IA= 18 Ci: 0 L: 10 Co: 30

VSWR= 2.049(337 115) IA= 14 Ci: 9 L: 10 Co: 30

VSWR= 1.440(349 62) IA= 17 Ci: 4 L: 10 Co: 30

VSWR= 1.226 Ci: 0 [SKIP]

VSWR= 1.248(353 39) IA= 18 Ci: 1 L: 10 Co: 30

[L:10] VSWR=1.226 Ci:0 Co:30

VSWR= 1.333 L: 19 [SKIP]

VSWR= 1.296(357 45) IA= 18 Ci: 0 L: 15 Co: 30

VSWR= 1.956(340 109) IA= 15 Ci: 9 L: 15 Co: 30

VSWR= 1.402(352 59) IA= 17 Ci: 4 L: 15 Co: 30

VSWR= 1.296 Ci: 0 [SKIP]

VSWR= 1.282(356 44) IA= 18 Ci: 1 L: 15 Co: 30

VSWR= 1.297(355 46) IA= 18 Ci: 2 L: 15 Co: 30

VSWR= 1.282 Ci: 1 [SKIP]

VSWR= 1.296 Ci: 0 [SKIP]

VSWR= 1.282 Ci: 1 [SKIP]

[L:15] VSWR=1.282 Ci:1 Co:30

VSWR= 1.233(354 38) IA= 18 Ci: 0 L: 11 Co: 30

VSWR= 2.036(338 115) IA= 14 Ci: 9 L: 11 Co: 30

VSWR= 1.423(349 62) IA= 17 Ci: 4 L: 11 Co: 30

VSWR= 1.233 Ci: 0 [SKIP]

VSWR= 1.248(354 40) IA= 18 Ci: 1 L: 11 Co: 30

[L:11] VSWR=1.233 Ci:0 Co:30

VSWR= 1.263(353 40) IA= 17 Ci: 0 L: 7 Co: 30

VSWR= 2.326(332 133) IA= 12 Ci: 9 L: 7 Co: 30

VSWR= 1.603(345 80) IA= 16 Ci: 0 [SKIP]

VSWR= 1.263 Ci: 0 [SKIP]

VSWR= 1.316(351 48) IA= 17 Ci: 1 L: 7 Co: 30

[L:7] VSWR=1.263 Ci:0 Co:30

VSWR= 1.226(354 36) IA= 18 Ci: 0 L: 9 Co: 30

VSWR= 2.096(336 119) IA= 14 Ci: 9 L: 9 Co: 30

```

VSWR= 1.459(348 65) IA= 17      Ci: 4    L: 9    Co: 30
VSWR= 1.226                    Ci: 0 [SKIP]
VSWR= 1.248(353 39) IA= 18     Ci: 1    L: 9    Co: 30

[L:9] VSWR=1.226  Ci:0 Co:30
VSWR= 1.233                    L: 11 [SKIP]
VSWR= 1.226                    L: 10 [SKIP]
VSWR= 1.226                    L: 9 [SKIP]
VSWR= 1.219(354 35) IA= 18     Ci: 0    L: 8    Co: 30
VSWR= 2.111(336 119) IA= 14    Ci: 9    L: 8    Co: 30
VSWR= 1.468(347 67) IA= 16    Ci: 4    L: 8    Co: 30
VSWR= 1.219                    Ci: 0 [SKIP]
VSWR= 1.256(353 40) IA= 18    Ci: 1    L: 8    Co: 30

[L:8] VSWR=1.219  Ci:0 Co:30
VSWR= 1.263                    L: 7 [SKIP]
VSWR= 1.270(353 42) IA= 18    Ci: 0    L: 6    Co: 30
VSWR= 2.343(332 133) IA= 13    Ci: 9    L: 6    Co: 30
VSWR= 1.613(345 82) IA= 16    Ci: 4    L: 6    Co: 30
VSWR= 1.270                    Ci: 0 [SKIP]
VSWR= 1.325(351 49) IA= 18    Ci: 1    L: 6    Co: 30

[L:6] VSWR=1.270  Ci:0 Co:30
[CO:30] VSWR=1.219 Ci:0 L:8 Co:30
CHARENGE_CO:40

driver_shot_L
VSWR= 1.806(341 98) IA= 15     Ci: 0    L: 0    Co: 40
VSWR= 1.489(341 67) IA= 15     Ci: 0    L: 5    Co: 40
VSWR= 1.085(341 14) IA= 17     Ci: 0    L: 10   Co: 40
VSWR= 1.000(344 0) IA= 17      Ci: 0    L: 15   Co: 40
VSWR= 1.023(346 2) IA= 17      Ci: 0    L: 20   Co: 40
VSWR= 1.323(353 49) IA= 17     Ci: 0    L: 25   Co: 40
VSWR= 1.684(358 91) IA= 16     Ci: 0    L: 30   Co: 40
VSWR= 1.561(356 79) IA= 17     Ci: 0    L: 35   Co: 40
VSWR= 2.187(364 137) IA= 15    Ci: 0    L: 40   Co: 40
VSWR= 2.600(370 164) IA= 14    Ci: 0    L: 45   Co: 40

keep fairway.
VSWR= 1.806(341 99) IA= 15     Ci: 0    L: 0    Co: 40
VSWR= 1.029(342 2) IA= 17      Ci: 0    L: 13   Co: 40
VSWR= 1.000(344 0) IA= 17      Ci: 0    L: 14   Co: 40
VSWR= 1.000(343 0) IA= 17      Ci: 0    L: 15   Co: 40
VSWR= 1.017(344 1) IA= 17      Ci: 0    L: 16   Co: 40
VSWR= 1.000(344 0) IA= 17      Ci: 0    L: 17   Co: 40
VSWR= 1.000(345 0) IA= 17      Ci: 0    L: 18   Co: 40
VSWR= 1.000(344 0) IA= 17      Ci: 0    L: 19   Co: 40
VSWR= 1.011(346 3) IA= 17      Ci: 0    L: 20   Co: 40

green_on
[AUTO] 8135[ms](145) 6200[kHz] VSWR= 1.000 IA= 17  Ci: 0 L: 19 Co: 40
set_memory
tune_ok
time=8208[ms] turn=145

```

3) Monitoring matching procedure: For 2000 kHz, 10 ohm + 500 pF load

freq=2000[kHz] band=21[ch]

[MEMORY] 486[ms](1) 2000[kHz] VSWR=65.535 IA= 0 Ci: 0 L: 688 Co: 4

unit_Ci=31(1550pF), unit_L=79(395.00uH), unit_Co=127(1587.5pF)

CHARENCE_CO:0

driver_shot_L

VSWR=24.777(348 321)	IA= 10	Ci: 0	L: 0	Co: 0
VSWR=22.000(345 315)	IA= 11	Ci: 0	L: 15	Co: 0
VSWR=20.312(341 309)	IA= 13	Ci: 0	L: 30	Co: 0
VSWR=18.371(340 304)	IA= 14	Ci: 0	L: 45	Co: 0
VSWR=15.750(335 295)	IA= 16	Ci: 0	L: 60	Co: 0
VSWR=14.488(333 290)	IA= 17	Ci: 0	L: 75	Co: 0
VSWR=12.306(326 278)	IA= 20	Ci: 0	L: 90	Co: 0
VSWR=11.423(323 271)	IA= 21	Ci: 0	L: 105	Co: 0
VSWR= 9.500(315 255)	IA= 24	Ci: 0	L: 120	Co: 0
VSWR= 9.862(317 258)	IA= 20	Ci: 0	L: 135	Co: 0
VSWR= 8.223(310 242)	IA= 23	Ci: 0	L: 150	Co: 0
VSWR= 7.243(305 232)	IA= 24	Ci: 0	L: 165	Co: 0
VSWR= 5.906(297 212)	IA= 28	Ci: 0	L: 180	Co: 0
VSWR= 5.301(293 201)	IA= 29	Ci: 0	L: 195	Co: 0
VSWR= 4.415(287 181)	IA= 32	Ci: 0	L: 210	Co: 0
VSWR= 4.200(286 176)	IA= 34	Ci: 0	L: 225	Co: 0
VSWR= 3.931(287 171)	IA= 36	Ci: 0	L: 240	Co: 0
VSWR= 4.232(294 182)	IA= 37	Ci: 0	L: 255	Co: 0
VSWR= 4.051(293 177)	IA= 33	Ci: 0	L: 270	Co: 0
VSWR= 4.735(304 198)	IA= 33	Ci: 0	L: 285	Co: 0
VSWR= 5.520(314 218)	IA= 32	Ci: 0	L: 300	Co: 0
VSWR= 7.225(330 249)	IA= 31	Ci: 0	L: 315	Co: 0
VSWR= 9.208(343 276)	IA= 29	Ci: 0	L: 330	Co: 0

1510[V](I=240)

RE_driver_shot_L

VSWR= 7.600(259 198)	IA= 20	Ci: 53	L: 216	Co: 0
VSWR= 6.909(261 195)	IA= 22	Ci: 53	L: 231	Co: 0
VSWR= 3.905(287 170)	IA= 36	Ci: 53	L: 246	Co: 0
VSWR= 4.436(281 177)	IA= 28	Ci: 53		
VSWR= 2.414(322 134)	IA= 43	Ci: 53	L: 276	Co: 0
VSWR= 1.640(346 85)	IA= 52	Ci: 53	L: 291	Co: 0
VSWR= 1.673(369 94)	IA= 57	Ci: 53	L: 306	Co: 0
VSWR= 2.708(358 166)	IA= 46	Ci: 53	L: 321	Co: 0
VSWR= 4.966(358 238)	IA= 34	Ci: 53	L: 336	Co: 0
VSWR= 7.506(336 258)	IA= 23	Ci: 53	L: 351	Co: 0

1830[V](I=291)

keep fairway.

VSWR= 5.506(270 187)	IA= 28	Ci: 53	L: 237	Co: 0
VSWR= 2.400(324 133)	IA= 44	Ci: 53	L: 277	Co: 0
VSWR= 2.270(328 128)	IA= 46	Ci: 53	L: 278	Co: 0
VSWR= 2.247(329 126)	IA= 47	Ci: 53	L:	
VSWR= 1.865(341 104)	IA= 52	Ci: 53	L: 280	Co: 0
VSWR= 1.850(343 103)	IA= 52	Ci: 53	L: 281	Co: 0
VSWR= 1.749(346 94)	IA= 53	Ci: 53	L: 282	Co: 0
VSWR= 1.735(346 94)	IA= 53	Ci: 53	L: 283	Co: 0
VSWR= 1.631(350 85)	IA= 54	Ci: 53	L: 284	Co: 0
VSWR= 1.611(350 83)	IA= 55	Ci: 53	L: 285	Co: 0
VSWR= 1.560(353 77)	IA= 56	Ci: 53	L: 286	Co: 0
VSWR= 1.539(354 75)	IA= 56	Ci: 53	L: 287	Co: 0
VSWR= 1.775(344 96)	IA= 53	Ci: 53	L: 288	Co: 0
VSWR= 1.760(346 96)	IA= 53	Ci: 53	L: 289	Co: 0
VSWR= 1.676(349 88)	IA= 55	Ci: 53	L: 290	Co: 0
VSWR= 1.653(349 87)	IA= 55	Ci: 53	L: 291	Co: 0

VSWR= 1.569(353 78)	IA= 56	Ci: 53	L: 292	Co: 0
VSWR= 1.557(354 76)	IA= 56	Ci: 53	L: 293	Co: 0
VSWR= 1.508(355 73)	IA= 57	Ci: 53	L: 294	Co: 0
VSWR= 1.498(356 70)	IA= 57	Ci: 53	L: 295	Co: 0
VSWR= 1.430(361 64)	IA= 58	Ci: 53	L: 296	Co: 0
VSWR= 1.429(362 65)	IA= 58	Ci: 53	L: 297	Co: 0
VSWR= 1.436(364 66)	IA= 59	Ci: 53	L: 298	Co: 0
VSWR= 1.434(365 65)	IA= 59	Ci: 53	L: 299	Co: 0
VSWR= 1.472(367 70)	IA= 59	Ci: 53	L: 300	Co: 0
VSWR= 1.481(367 71)	IA= 59	Ci: 53	L: 301	Co: 0
VSWR= 1.513(368 75)	IA= 58	Ci: 53	L: 302	Co: 0
VSWR= 1.529(368 77)	IA= 58	Ci: 53	L: 303	Co: 0
VSWR= 1.580(369 83)	IA= 58	Ci: 53	L: 304	Co: 0
VSWR= 1.589(369 85)	IA= 58	Ci: 53	L: 305	Co: 0
VSWR= 1.661(370 93)	IA= 58	Ci: 53	L: 306	Co: 0

--> approach

IDEAL Ci=+53(106), L=+33(330)

VSWR= 2.320(331 133)	IA= 44	Ci:106	L: 297	Co: 0
VSWR= 3.816(290 169)	IA= 32	Ci: 91	L: 264	Co: 0
VSWR= 4.240(283 175)	IA= 29	Ci:121	L: 264	Co: 0
VSWR= 4.017(286 172)	IA= 31	Ci:106	L: 264	Co: 0
VSWR= 3.816		Ci: 91 [SKIP]		
VSWR= 3.656(292 167)	IA= 33	Ci: 76	L: 264	Co: 0
VSWR= 3.578(293 165)	IA= 34	Ci: 61	L: 264	Co: 0
VSWR= 3.578(294 166)	IA= 34	Ci: 46	L: 264	Co: 0
VSWR= 3.629(293 167)	IA= 33	Ci: 31	L: 264	Co: 0
VSWR= 3.593(294 167)	IA= 34	Ci: 38	L: 264	Co: 0
VSWR= 3.578(294 165)	IA= 34	Ci: 45	L: 264	Co: 0
VSWR= 3.578(294 165)	IA= 34	Ci: 52	L: 264	Co: 0
VSWR= 3.578(293 166)	IA= 33	Ci: 59	L: 264	Co: 0
VSWR= 3.634(292 166)	IA= 33	Ci: 66	L: 264	Co: 0

[L:264] VSWR=3.578 Ci:61 Co:0

VSWR= 8.064(281 219)	IA= 15	Ci: 91	L: 330	Co: 0
VSWR=13.823(252 218)	IA= 6	Ci:121	L: 330	Co: 0
VSWR=10.688(263 218)	IA= 10	Ci:106	L: 330	Co: 0
VSWR= 6.103(310 222)	IA= 23	Ci: 76	L: 330	Co: 0
VSWR= 3.851(376 221)	IA= 42	Ci: 46	L: 330	Co: 0
VSWR= 4.213(392 241)	IA= 46	Ci: 31	L: 330	Co: 0
VSWR= 3.886(386 228)	IA= 45	Ci: 38	L: 330	Co: 0
VSWR= 3.833(377 222)	IA= 43	Ci: 45		
VSWR= 4.048(367 220)	IA= 40	Ci: 52	L: 330	Co: 0

[L:330] VSWR=3.833 Ci:45 Co:0

VSWR= 1.627(343 82)	IA= 50	Ci: 91	L: 297	Co: 0
VSWR= 3.231(311 165)	IA= 35	Ci:121	L: 297	Co: 0
VSWR= 2.326(331 133)	IA= 43	Ci:106	L: 297	Co: 0
VSWR= 1.627		Ci: 91 [SKIP]		
VSWR= 1.165(354 28)	IA= 57	Ci: 76	L: 297	Co: 0
VSWR= 1.195(361 33)	IA= 59	Ci: 61	L: 297	Co: 0
VSWR= 1.093(358 15)	IA= 59	Ci: 68	L: 297	Co: 0
VSWR= 1.138(355 25)	IA= 58	Ci: 75	L: 297	Co: 0
VSWR= 1.100(356 19)	IA= 58	Ci: 72	L: 297	
VSWR= 1.087(357 15)	IA= 59	Ci: 69	L: 297	Co: 0
VSWR= 1.099(359 18)	IA= 59	Ci: 66	L: 297	Co: 0
VSWR= 1.093(359 16)	IA= 59	Ci: 67	L: 297	Co: 0
VSWR= 1.093		Ci: 68 [SKIP]		
VSWR= 1.087		Ci: 69 [SKIP]		
VSWR= 1.093(357 17)	IA= 58	Ci: 70	L: 297	Co: 0

[L:297] VSWR=1.087 Ci:69 Co:0

VSWR= 3.578			L: 264 [SKIP]	
VSWR= 1.315(339 47)	IA= 54	Ci: 91	L: 280	Co: 0

VSWR= 1.885(328 102)	IA= 47	Ci:121	L: 280	Co: 0
VSWR= 1.516(336 69)	IA= 52	Ci:106	L: 280	Co: 0
VSWR= 1.315		Ci: 91 [SKIP]		
VSWR= 1.366(343 53)	IA= 55	Ci: 76	L: 280	Co: 0
VSWR= 1.311(342 46)	IA= 55	Ci: 83	L: 280	Co: 0
VSWR= 1.312(340 47)	IA= 54	Ci: 90	L: 280	Co: 0
VSWR= 1.304(341 46)	IA= 54	Ci: 87	L: 280	Co: 0
VSWR= 1.304(341 46)	IA= 54	Ci: 84	L: 280	Co: 0
VSWR= 1.318(342 47)	IA= 55	Ci: 81	L: 280	Co: 0
VSWR= 1.310(342 46)	IA= 55	Ci: 82	L: 280	Co: 0
VSWR= 1.311		Ci: 83 [SKIP]		

[L:280] VSWR=1.304 Ci:87 Co:0

VSWR= 1.595(343 79)	IA= 51	Ci: 91	L: 296	Co: 0
VSWR= 3.187(312 163)	IA= 36	Ci:121	L: 296	Co: 0
VSWR= 2.270(333 129)	IA= 45	Ci:106	L: 296	Co: 0
VSWR= 1.595		Ci: 91 [SKIP]		
VSWR= 1.145(353 24)	IA= 57	Ci: 76	L: 296	Co: 0
VSWR= 1.195(360 33)	IA= 59	Ci: 61	L: 296	Co: 0
VSWR= 1.081(357 14)	IA= 58	Ci: 68	L: 296	Co: 0
VSWR= 1.119(354 20)	IA= 57	Ci: 75	L: 296	Co: 0
VSWR= 1.088(355 16)	IA= 58	Ci: 72	L: 296	Co: 0
VSWR= 1.075(357 13)	IA= 59	Ci: 69	L: 296	Co: 0
VSWR= 1.087(359 15)	IA= 59	Ci: 66	L: 296	Co: 0
VSWR= 1.081(358 15)	IA= 59	Ci: 67	L: 296	Co: 0
VSWR= 1.081		Ci: 68 [SKIP]		
VSWR= 1.075		Ci: 69 [SKIP]		
VSWR= 1.075(356 14)	IA= 58	Ci: 70	L: 296	Co: 0
VSWR= 1.081(356 14)	IA= 58	Ci: 71	L: 296	Co: 0

[L:296] VSWR=1.075 Ci:69 Co:0

VSWR= 4.350(313 197)	IA= 31	Ci: 91	L: 312	Co: 0
VSWR= 7.933(268 209)	IA= 15	Ci:121	L: 312	Co: 0
VSWR= 5.975(287 205)	IA= 21	Ci:106	L: 312	Co: 0
VSWR= 3.157(343 179)	IA= 40	Ci: 76	L: 312	Co: 0
VSWR= 2.408(363 151)	IA= 49	Ci: 61	L: 312	Co: 0
VSWR= 2.336(378 152)	IA= 54	Ci: 46	L: 312	Co: 0
VSWR= 3.042(380 192)	IA= 51	Ci: 31	L: 312	Co: 0

turn:2336 > thresh:1075*2

[L:312] VSWR=2.336 Ci:46 Co:0

VSWR= 2.492(339 144)	IA= 44	Ci: 91	L: 304	Co: 0
VSWR= 4.858(290 191)	IA= 26	Ci:121	L: 304	Co: 0
VSWR= 3.517(314 176)	IA= 34	Ci:106	L: 304	Co: 0
VSWR= 2.492		Ci: 91 [SKIP]		
VSWR= 1.771(352 99)	IA= 51	Ci: 76	L: 304	Co: 0
VSWR= 1.484(365 72)	IA= 57	Ci: 61	L: 304	Co: 0
VSWR= 1.803(370 107)	IA= 57	Ci: 46	L: 304	Co: 0
VSWR= 1.573(369 83)	IA= 58	Ci: 53	L: 304	Co: 0
VSWR= 1.491(366 73)	IA= 57	Ci: 60	L: 304	Co: 0
VSWR= 1.528(360 76)	IA= 56	Ci: 67	L: 304	Co: 0
VSWR= 1.496(362 72)	IA= 56	Ci: 64	L: 304	Co: 0
VSWR= 1.484		Ci: 61 [SKIP]		
VSWR= 1.498(367 73)	IA= 58	Ci: 58	L: 304	Co: 0
VSWR= 1.489(365 73)	IA= 57	Ci: 59	L: 304	Co: 0
VSWR= 1.491		Ci: 60 [SKIP]		

[L:304] VSWR=1.484 Ci:61 Co:0

VSWR= 1.075			L: 296 [SKIP]	
VSWR= 1.228(342 35)	IA= 54	Ci: 91	L: 288	Co: 0
VSWR= 1.941(328 105)	IA= 47	Ci:121	L: 288	Co: 0
VSWR= 1.488(337 67)	IA= 52	Ci:106	L: 288	Co: 0
VSWR= 1.228		Ci: 91 [SKIP]		
VSWR= 1.233(345 36)	IA= 56	Ci: 76	L: 288	Co: 0

VSWR= 1.191(344 30)	IA= 56	Ci: 83	L: 288	Co: 0
VSWR= 1.214(341 34)	IA= 54	Ci: 90	L: 288	Co: 0
VSWR= 1.192(342 30)	IA= 55	Ci: 87	L: 288	Co: 0
VSWR= 1.191(343 29)	IA= 56	Ci: 84	L: 288	Co: 0
VSWR= 1.191(344 30)	IA= 56	Ci: 81	L: 288	Co: 0
VSWR= 1.219(345 34)	IA= 56	Ci: 78	L: 288	Co: 0
VSWR= 1.212(344 33)	IA= 55	Ci: 79	L: 288	Co: 0
VSWR= 1.198(344 32)	IA= 56	Ci: 80	L: 288	Co: 0
VSWR= 1.191		Ci: 81 [SKIP]		
VSWR= 1.191(344 30)	IA= 56	Ci: 82	L: 288	Co: 0
VSWR= 1.191		Ci: 83 [SKIP]		
VSWR= 1.191		Ci: 84 [SKIP]		
VSWR= 1.191(343 30)	IA= 55	Ci: 85	L: 288	Co: 0
VSWR= 1.191(343 31)	IA= 55	Ci: 86	L: 288	Co: 0
VSWR= 1.192		Ci: 87 [SKIP]		

[L:288] VSWR=1.191 Ci:83 Co:0

VSWR= 1.177(344 28)	IA= 55	Ci: 91	L: 292	Co: 0
VSWR= 2.250(325 126)	IA= 44	Ci:121	L: 292	Co: 0
VSWR= 1.635(337 82)	IA= 50	Ci:106	L: 292	Co: 0
VSWR= 1.177		Ci: 91 [SKIP]		
VSWR= 1.017(350 1)	IA= 58	Ci: 76	L: 292	Co: 0
VSWR= 1.308(352 47)	IA= 57	Ci: 61	L: 292	Co: 0
VSWR= 1.108(351 18)	IA= 58	Ci: 68	L: 292	Co: 0
VSWR= 1.011(350 1)	IA= 58	Ci: 75	L: 292	Co: 0
VSWR= 1.017(347 4)	IA= 56	Ci: 82	L: 292	Co: 0
VSWR= 1.000(349 0)	IA= 58	Ci: 79	L: 292	Co: 0

drop in the cup.

green_on

[AUTO] 9033[ms](166) 2000[kHz] VSWR= 1.000 IA= 57 Ci: 79 L: 292 Co: 0

set_memory

tune_ok

time=9106[ms] turn=166

4) Monitoring matching procedure: For 2000 kHz, 10 ohm + 100 pF load

freq=2000[kHz] band=21[ch]

No memory q

unit_Ci=31(1550pF), unit_L=79(395.00uH), unit_Co=127(1587.5pF)

CHARENCE_CO:0

driver_shot_L

VSWR=65.535(373 367) IA= 0	Ci: 0	L: 0	Co: 0
VSWR=65.535(373 366) IA= 1	Ci: 0	L: 54	Co: 0
VSWR=65.535(372 365) IA= 2	Ci: 0	L: 108	Co: 0
VSWR=65.535(372 364) IA= 1	Ci: 0	L: 162	Co: 0
VSWR=65.535(370 362) IA= 2	Ci: 0	L: 216	Co: 0
VSWR=65.535(371 362) IA= 2	Ci: 0	L: 270	Co: 0
VSWR=65.535(369 359) IA= 3	Ci: 0	L: 324	Co: 0
VSWR=65.535(366 355) IA= 5	Ci: 0	L: 3	
VSWR=55.153(365 353) IA= 5	Ci: 0	L: 432	Co: 0
VSWR=50.571(361 347) IA= 7	Ci: 0	L: 486	Co: 0
VSWR=50.571(362 347) IA= 6	Ci: 0	L: 540	Co: 0
VSWR=41.000(357 340) IA= 8	Ci: 0	L: 594	Co: 0
VSWR=36.052(353 333) IA= 9	Ci: 0	L: 648	Co: 0
VSWR=26.440(343 318) IA= 13	Ci: 0	L: 702	Co: 0
VSWR=24.259(341 313) IA= 14	Ci: 0	L: 717	Co: 0
VSWR=21.333(335 305) IA= 16	Ci: 0	L: 732	Co: 0
VSWR=20.483(334 302) IA= 18	Ci: 0	L: 747	Co: 0

VSWR=17.111(327 290) IA= 20	Ci: 0	L: 762	Co: 0
VSWR= 3.156(374 190) IA= 8	Ci: 0	L: 777	Co: 0
VSWR= 3.716(382 216) IA= 5	Ci: 0	L: 792	Co: 0
VSWR= 3.775(383 221) IA= 5	Ci: 0	L: 807	Co: 0
VSWR= 3.630(383 220) IA= 6	Ci: 0	L: 822	Co: 0
VSWR= 3.586(383 221) IA= 6	Ci: 0	L: 837	Co: 0
VSWR= 3.800(385 224) IA= 5	Ci: 0	L: 852	Co: 0
VSWR= 1.903(369 143) IA= 13	Ci: 0	L: 867	Co: 0
VSWR= 3.042(380 191) IA= 8	Ci: 0	L: 882	Co: 0
VSWR= 2.837(379 183) IA= 7	Ci: 0	L: 897	Co: 0
VSWR= 3.390(386 228) IA= 5	Ci: 0	L: 912	Co: 0
VSWR= 3.556(383 202) IA= 6	Ci: 0	L: 927	Co: 0
VSWR= 3.929(388 236) IA= 4	Ci: 0	L: 942	Co: 0
VSWR= 2.979(379 174) IA= 8	Ci: 0	L: 957	Co: 0
VSWR= 3.825(387 227) IA= 6	Ci: 0	L: 972	Co: 0
VSWR= 5.442(394 273) IA= 2	Ci: 0	L: 987	Co: 0

4360[V](l=867)

High-V-Error

CHARENCE_CO:4

driver_shot_L

VSWR=65.535(377 365) IA= 1	Ci: 0	L: 0	Co: 4
VSWR=65.535(374 364) IA= 2	Ci: 0	L: 54	Co: 4
VSWR=61.166(373 361) IA= 3	Ci: 0	L: 108	Co: 4
VSWR=65.535(371 361) IA= 3	Ci: 0	L: 162	Co: 4
VSWR=65.535(367 355) IA= 5	Ci: 0	L: 216	Co: 4
VSWR=60.000(367 354) IA= 5	Ci: 0	L: 270	Co: 4
VSWR=50.714(362 348) IA= 7	Ci: 0	L: 324	Co: 4
VSWR=38.444(355 338) IA= 11	Ci: 0	L: 378	Co: 4
VSWR=35.736(349 330) IA= 11	Ci: 0	L: 432	Co: 4
VSWR=25.960(337 312) IA= 16	Ci: 0	L: 486	Co: 4
VSWR=22.642(331 303) IA= 18	Ci: 0	L: 501	Co: 4
VSWR=23.642(344 319) IA= 12	Ci: 0	L: 516	Co: 4
VSWR=25.000(338 312) IA= 14	Ci: 0	L: 531	Co: 4
VSWR=22.857(334 307) IA= 15	Ci: 0	L: 546	Co: 4
VSWR=13.933(336 292) IA= 17	Ci: 0	L: 561	Co: 4
VSWR=19.250(325 291) IA= 18	Ci: 0	L: 576	Co: 4
VSWR=17.000(315 280) IA= 21	Ci: 0	L: 591	Co: 4
VSWR=12.909(307 263) IA= 24	Ci: 0	L: 606	Co: 4
VSWR=13.285(299 258) IA= 26	Ci: 0	L: 621	Co: 4
VSWR=11.170(286 239) IA= 29	Ci: 0	L: 636	Co: 4
VSWR= 2.400(369 155) IA= 12	Ci: 0	L: 651	Co: 4
VSWR= 2.474(359 135) IA= 14	Ci: 0	L: 666	Co: 4
VSWR= 2.012(369 137) IA= 13	Ci: 0	L: 681	Co: 4
VSWR= 2.474(377 156) IA= 10	Ci: 0	L: 696	Co: 4
VSWR= 2.516(378 166) IA= 10	Ci: 0	L: 711	Co: 4
VSWR= 3.010(381 189) IA= 8	Ci: 0	L: 726	Co: 4
VSWR= 3.140(383 197) IA= 7	Ci: 0	L: 741	Co: 4

3456[V](l=681)

RE_driver_shot_L

VSWR= 5.018(332 227) IA= 1	Ci: 31	L: 612	Co: 4
VSWR= 5.775(332 234) IA= 0	Ci: 31	L: 627	Co: 4
VSWR= 5.968(331 235) IA= 0	Ci: 31	L: 642	Co: 4
VSWR= 5.574(333 231) IA= 0	Ci: 31	L: 657	Co: 4
VSWR= 6.118(331 238) IA= 0	Ci: 31	L: 672	Co: 4
VSWR= 6.274(331 240) IA= 0	Ci: 31	L: 687	Co: 4
VSWR= 6.355(332 241) IA= 0	Ci: 31		

3088[V](l=612)

--> approach

IDEAL Ci=+31(62), L=+38(650)

VSWR=22.238(244 223) IA= 3	Ci: 62	L: 612	Co: 4
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VSWR=23.900(249 229) IA= 3	Ci: 47	L: 574	Co: 4
VSWR=33.000(238 224) IA= 0	Ci: 77	L: 574	Co: 4
VSWR=29.250(242 226) IA= 1	Ci: 62	L: 574	Co: 4
VSWR=21.521(259 237) IA= 5	Ci: 32	L: 574	Co: 4
VSWR= 9.645(328 276) IA= 18	Ci: 2	L: 574	Co: 4
VSWR=17.342(324 278) IA= 19	Ci: 0	L: 574	Co: 4
VSWR=18.812(317 285) IA= 19	Ci: 1	L: 574	Co: 4
[L:574] VSWR=9.645 Ci:2 Co:4			
VSWR=20.391(246 223) IA= 7	Ci		
VSWR=28.625(237 222) IA= 2	Ci: 77	L: 650	Co: 4
VSWR=25.666(240 222) IA= 4	Ci: 62	L: 650	Co: 4
VSWR=17.666(252 225) IA= 10	Ci: 32	L: 650	Co: 4
VSWR= 2.610(348 146) IA= 19	Ci: 2	L: 650	Co: 4
VSWR= 2.425(362 146) IA= 13	Ci: 0	L: 650	Co: 4
VSWR= 2.308(354 138) IA= 17	Ci: 1	L: 650	Co: 4
VSWR= 2.635(370 170) IA= 7	Ci: 7	L: 650	Co: 4
[L:650] VSWR=2.308 Ci:1 Co:4			
VSWR=14.000(255 221) IA= 5	Ci: 47	L: 612	Co: 4
VSWR=25.555(239 222) IA= 1	Ci: 77	L: 612	Co: 4
VSWR=24.473(242 224) IA= 3	Ci: 62	L	
VSWR=17.428(258 230) IA= 8	Ci: 32	L: 612	Co: 4
VSWR= 6.075(329 238) IA= 22	Ci: 2	L: 612	Co: 4
VSWR=12.688(309 264) IA= 24	Ci: 0	L: 612	Co: 4
VSWR=14.538(303 264) IA= 23	Ci: 1	L: 612	Co: 4
turn:6075 > thresh:2308*2			
[L:612] VSWR=6.075 Ci:2 Co:4			
VSWR= 2.308	L: 650 [SKIP]		
VSWR= 5.436(274 205) IA= 12	Ci: 47	L: 688	Co: 4
VSWR=19.000(240 216) IA= 9	Ci: 77	L: 688	Co: 4
VSWR=18.280(241 216) IA= 11	Ci: 62	L: 688	Co: 4
VSWR=13.228(249 214) IA= 17	Ci: 32	L: 688	Co: 4
VSWR= 1.700(348 85) IA= 20	Ci: 2	L: 688	Co: 4=01 50pF
K=02 100pF			
K			
VSWR= 1.644(367 105) IA= 14	Ci: 0	L: 688	Co: 4
K=05 800pF			
K=06 1600pF			
VSWR= 5.390(393 271) IA= 2	Ci: 1	L: 688	Co: 4H
K=09 0.1uH			
K=10 0.			
[L:688] VSWR=1.644			
K=12 0.8uH	Ci:0		Co:4
VSWR= 8.540(292 230) IA= 0	Ci: 47	L: 726	Co: 4
K=15 *6.4uH			
K=16 *12.8uH			
VSWR=12.526(257 219) IA= 0	Ci: 77	L: 726	Co: 4
K=18 12.5pF			
K=19 25pF			
VSWR= 9.461(272 220) IA= 0	Ci: 62	L: 726	Co: 4
K=22 800pF			
K=23 *50pF			
VSWR= 5.554(331 231) IA= 0	Ci: 32	L: 726	Co: 4=0xD4 memorysum=0xD4
VSWR= 5.605(393 274) IA= 2	Ci: 2	L: 726	Co: 4DC>
ADC VF=0 VR=0 HOT=539 IA=0			
turn:5554 > thresh:1644*2			
trace_mode on			

[L:726] VSWR=5.554 Ci:32 Co:4]
 VSWR= 7.878(293 227) IA= 0 Ci
 turn:4748 > thresh:1644*2
 VSW

[L:669] VSWR=4.748 Ci:17 Co:40 L: 10 Co: 10
 VSWR= 8.125(292 228) IA= 0 Ci: 47 L: 678 Co:4 150) IA= 15 Ci: 0 L: 15 Co: 10
 VSWR=10.304(260 214) IA= 0 Ci: 77 L: 678 Co: 4 168) IA= 15 Ci: 0 L: 20 Co: 10
 VSWR= 7.761(276 213) IA= 0 Ci: 62 L: 678 Co: 4
 VSWR= 1.567(362 79) IA= 17 Ci: 0 L
 VSWR= 4.627(332 216) IA= 1 Ci: 32 L: 678 Co: 4

[CO:10] VSWR=1.567 Ci:0 L:0 Co:10
 VSWR= 4.090(364 225) IA= 2 Ci: 17 L: 678 Co: 4
 driver_shot_L

VSWR=14.393(254 221) IA= 0 Ci: 77 L: 687 Co: 4
 VSWR= 1.889(
 VSWR=10.208(271 221) IA= 0 Ci: 62 L: 687 Co: 4
 VSWR= 2.240(
 VSWR= 4.596(333 215) IA= 1 Ci: 32 L: 687 Co: 4

keep fairway
 VSWR= 4.237(365 226) IA= 2 Ci: 17 L: 687 Co: 4 L: 0 Co: 20
 VSWR= 4.777(390 257) IA= 2 Ci: 2 L: 687 Co: 47(7), L=+11(16)
 VSWR= 2.
 turn:4237 > thresh:1644*27 L: 5 Co: 20

[L:687] VSWR=4.237 Ci:17 Co:4
 VSWR= 1.669(355 90)
 VSWR= 8.238(292 226) IA= 0 Ci: 47 L: 683 Co: 4

turn:4055 > thresh:1644*2
 VSWR= 1

[L:683] VSWR=4.055 Ci:17 Co:4 16 Co: 20
 VSWR= 7.984(292 227) IA= 0 Ci: 47 L: 679 Co: 4) IA= 10 Ci: 12 L: 16 Co: 20
 VSWR=12.179(257 218) IA= 0 Ci: 77 L: 679 Co: 4) IA= 14 Ci: 7 L: 16 Co: 20
 VSWR= 9.423(272 219) IA= 0 Ci: 62 L: 679 Co: 4 Ci: 2 [SKIP]
 VSWR= 4.807(332 217) IA= 1 Ci: 32 L: 679 Co: 4 0 L: 16 Co: 20

[L:679] VSWR=3.938 Ci:17 Co:41 Ci: 0 [SKI
 VSWR= 8.238(291 227) IA= 0 Ci: 47 L: 675 Co:4 1.734 Ci: 1 [SKIP]
 VSWR=12.837(256 218) IA= 0 Ci: 77 L: 675 Co: 4 Ci:1 Co:20
 VSWR= 1.6
 VSWR= 9.074(272 218) IA= 0 Ci: 62 L: 675 Co: 4
 VSWR= 3.2
 VSWR= 5.000(331 220) IA= 1 Ci: 32 L: 675 Co: 4
 VSWR= 2.1
 VSWR= 4.200(363 225) IA= 2 Ci: 17 L: 675 Co: 4
 VSWR= 1.6
 VSWR= 4.315(388 244) IA= 3 Ci: 2 L: 675 Co: 4
 VSWR= 1.524(360 75) IA
 turn:4200 > thresh:1644*2

[L:675] VSWR=4.200 Ci:17 Co:4
 VSWR= 1.644(362 89) IA= 17 Ci: 2 L: 1
 VSWR= 4.006(363 219) IA= 2 Ci: 17 L: 677 Co: 4
 VSWR= 3.075(326 166) IA= 10 Ci: 12 L: 1
 VSWR= 4.301(388 243) IA= 3 Ci: 2 L: 677 Co: 4
 VSWR= 2.102(349 124) IA= 14 Ci: 7 L: 1
 turn:4006 > thresh:1644*2

[L:677] VSWR=4.006 Ci:17 Co:4 Ci: 2 [SKIP]
 VSWR= 3.938 L: 679 [SKIP]) IA= 17 Ci: 0 L: 10 Co: 20

VSWR= 8.666(290 229) IA= 0 Ci: 47 L: 681 Co: 4) IA= 17 Ci: 1 L: 10 Co: 20
VSWR=13.166(255 219) IA= 0 Ci: 77 L: 681 Co: 4 Ci:0 Co:20

[L:681] VSWR=4.163 Ci:17 Co:4
VSWR= 1.594(362 83) IA= 1
VSWR= 8.238(292 228) IA= 0 Ci: 47 L: 680 Co: 4

[L:8] VSWR=1.592 Ci:0 Co:
VSWR=12.179(257 217) IA= 0 Ci: 77 L: 680 Co: 4) IA= 17 Ci: 2 L: 6 Co: 20
VSWR= 8.750(273 217) IA= 0 Ci: 62 L: 680 Co: 4) IA= 9 Ci: 12 L: 6 Co: 20
VSWR= 4.910(331 219) IA= 1 Ci: 32 L: 680 Co: 4) IA= 14 Ci: 7 L: 6 Co: 20
VSWR= 4.055(364 221) IA= 2 Ci: 17 L: 680 Co: 4 Ci: 2 [SKIP]

[L:6] VSWR=1
VSWR= 3.938 L: 679 [SKIP] 1.615(358 84) IA= 17 Ci: 2 L: 4 Co: 20
VSWR= 4.090 L: 678 [SKIP] 3.210(321 169) IA= 9 Ci: 12 L: 4 Co: 20

CHARENGE_CO:8

driver_shot_L

VSWR= 2.1
VSWR= 9.351(384 309) IA= 4 Ci: 0 L: 0 Co: 8
VSWR= 1.6
VSWR=10.606(383 318) IA= 4 Ci: 0 L: 15 Co: 8
VSWR= 1.524(361 76) IA
VSWR=10.575(383 316) IA= 4 Ci: 0 L: 30 Co: 8
VSWR= 1.555(360 78) IA
VSWR=10.753(382 317) IA= 4 Ci: 0 L: 45 Co: 8

[L:4] VSWR=1.524 Ci:0
VSWR= 9.914(382 312) IA= 5 Ci: 0 L: 60 Co: 8 86) IA= 16 Ci: 2 L: 2 Co: 20
VSWR= 9.732(381 310) IA= 5 Ci:
VSWR= 7.735(380 293) IA= 6 Ci: 0 L: 150 Co: 8

[L:2] VSWR=1.
VSWR= 7.516(380 290) IA= 6 Ci: 0 L: 165 Co: 8 1.625(356 86) IA= 16 Ci: 2 L: 3 Co: 20
VSWR= 6.656(379 280) IA= 7 Ci: 0 L: 180 Co: 8 3.281(319 170) IA= 9 Ci: 12 L: 3 Co: 20
VSWR= 6.132(379 271) IA= 7 Ci: 0 L:195 Co: 8 2.241(343 131) IA= 13 Ci:7 L: 3 Co: 20
VSWR= 5.032(378 252) IA= 7 Ci: 0 L: 210 Co:8 1.625 Ci: 2 [SKIP]
VSWR= 4.712(377 245) IA= 8 Ci: 0 L: 225 Co:8 IA= 17 Ci: 0 L: 3 Co: 20
VSWR= 3.381(379 206) IA= 6 Ci: 0 L: 270 Co: 8
VSWR= 1.524 L:
VSWR= 3.245(380 201) IA= 6 Ci: 0 L: 285 Co: 8
VSWR= 1.524 L:
VSWR= 3.233(382 202) IA= 5 Ci: 0 L: 300 Co: 8
VSWR= 1.603(359 83) IA= 17 Ci: 2 L:
VSWR= 3.388(384 209) IA= 5 Ci: 0 L: 315 Co: 8
VSWR= 3.154(323 167) IA= 9 Ci: 12 L:
VSWR= 3.622(387 221) IA= 5 Ci: 0 L: 330 Co: 8
VSWR= 2.150(345 126) IA= 14 Ci: 7 L:
VSWR= 3.942(389 232) IA= 4 Ci: 0 L: 345 Co: 8
VSWR= 1.603 Ci: 2 [SKIP]
VSWR= 4.165(390 240) IA= 4 Ci: 0 L: 360 Co: 8 1.524(361 76) IA= 17 Ci: 0 L: 7 Co: 20
1880[V](I=300)

RE_driver_shot_LR= 1.553(360 78

VSWR= 6.268(298 216) IA= 0 Ci: 46
VSWR= 2.107(348 124) IA= 14 Ci: 7 L:
VSWR= 6.119(299 215) IA= 0 Ci: 46 L: 345 Co: 8
VSWR= 1.625 Ci: 2 [SKIP]
VSWR= 6.119(299 215) IA= 0 Ci: 46 L: 360 Co: 8 1.592(363 83) IA= 17 Ci: 0 L:9 Co: 20
VSWR= 6.142(300 216) IA= 0 Ci: 46 L: 375 Co: 8 1.604(362 83) IA= 17 Ci:1 L: 9 Co: 20
VSWR= 6.292(299 217) IA= 0 Ci: 46 L: 390 Co: 8 VSWR=1.592 Ci:0 Co:20
VSWR= 6.382(299 218) IA= 0 Ci: 46 L: 405 Co: 8
VSWR= 6.317(300 218) IA= 0 Ci: 46 L: 420 Co: 8

CHARENGE_CO:30

VSWR= 6.071(297 213) IA= 0	Ci: 46	L: 347	Co: 8	2.062(369 129) IA= 17	Ci: 0	L: 30	Co: 30
VSWR= 6.108(295 212) IA= 0	Ci: 46	L: 348	Co: 8	airway.			
VSWR= 1.435(351 63) IA= 17							
VSWR= 6.108(295 212) IA= 0	Ci: 46	L: 349	Co: 8				
VSWR= 1.260(356 42) IA= 18							
VSWR= 6.234(293 212) IA= 1	Ci: 46	L: 350	Co: 8				
VSWR= 1.289(357 44) IA= 18							
VSWR= 6.300(292 212) IA= 0	Ci: 46	L:					
VSWR= 1.429(351 63) IA=							
VSWR= 6.605(289 213) IA= 0	Ci: 46	L: 355	Co: 8				
VSWR= 2.714(325 151) IA=							
VSWR= 6.506(288 212) IA= 0	Ci: 46	L: 356	Co: 8				
VSWR= 1.870(343 103) IA=							
VSWR= 6.578(289 212) IA= 0	Ci: 46	L: 357	Co: 8				
VSWR= 1.429							
VSWR= 6.367(291 212) IA= 1	Ci: 46	L: 358	Co: 8				
VSWR= 1.510(350 72) IA= 16	Ci: 1	L:					
VSWR= 6.435(290 212) IA= 1	Ci: 46	L: 359	Co: 8				
[L:1] VSWR=1.429 Ci:0 Co:30							
VSWR= 6.506(289 212) IA= 1	Ci: 46	L: 360	Co: 8	0	L: 19	Co: 30	
VSWR= 6.578(288 212) IA= 1	Ci: 46	L: 361	Co: 8	9	L: 19	Co: 30	
VSWR= 7.085(283 213) IA= 1	Ci: 46	L: 366	Co: 8				
VSWR= 1.355							
VSWR= 6.626(287 211) IA= 1	Ci: 46	L: 367	Co: 8				
VSWR= 1.333	Ci: 1	[SKIP]					
VSWR= 6.480(288 211) IA= 1	Ci: 46	L: 368	Co: 8	VSWR=1.333	Ci:1	Co:30	
VSWR= 6.480(288 211) IA= 1	Ci: 46	L: 369	Co: 8	30			
VSWR= 6.480(288 211) IA= 1	Ci: 46	L: 370	Co: 8	30			
VSWR= 6.552(287 211) IA= 1	Ci: 46	L: 371	Co: 8	30			
VSWR= 6.060(291 211) IA= 1	Ci: 46	L: 375	Co:8=	1.296(357 45) IA= 18	Ci: 0	L: 15	Co: 30
--> approach							
IDEAL Ci=+46(92), L=+36(411)956(340 109) IA= 15	Ci: 9						
VSWR=14.437(247 215) IA= 0	Ci: 92	L: 375	Co: 8				
VSWR= 1.402(352 59) IA= 17	Ci: 4						
VSWR=13.705(250 217) IA= 0	Ci: 77	L: 339	Co: 8				
VSWR= 1.296	Ci: 0						
VSWR=20.727(240 218) IA= 0	Ci:107	L: 339	Co: 8	SWR= 1.282(356 44) IA= 18	Ci: 1	L: 15	Co: 30
VSWR=19.956(241 218) IA= 0	Ci: 92	L: 339	Co: 8	SWR= 1.297(355 46) IA= 18	Ci: 2	L: 15	Co: 30
VSWR=12.179(257 219) IA= 0	Ci: 62	L: 339	Co:8	SWR= 1.282	Ci: 1	[SKIP]	
VSWR= 6.341(301 220) IA=							
[L:339] VSWR=3.614 Ci:16 Co:8							
VSWR= 2.036(338 115) IA= 14							
VSWR=10.511(259 214) IA= 0	Ci: 77	L: 411	Co: 8				
VSWR= 1.423(349 62) IA= 17							
VSWR=15.827(244 215) IA= 0	Ci:107	L: 411	Co: 8				
VSWR= 1.233							
VSWR=12.888(250 214) IA= 0	Ci: 92	L: 411	Co: 8				
VSWR= 1.248(354 40) IA= 18	Ci: 1	L: 11					
VSWR= 7.698(274 211) IA= 0	Ci: 62	L: 411	Co: 8				
[L:11] VSWR=1.233 Ci:0 Co:30							
VSWR= 4.393(330 207) IA= 2	Ci: 32	L: 411	Co: 80	L: 7	Co: 30		
VSWR= 3.528(361 201) IA= 3	Ci: 17	L: 411	Co: 89	L: 7	Co: 30		
VSWR= 3.209(381 201) IA= 5	Ci: 2	IA= 16					
VSWR= 2.096(336							
VSWR=16.428(244 216) IA= 0	Ci:107	L: 375	Co: 8				
VSWR= 1.459(348							
VSWR=13.228(249 214) IA= 0	Ci: 92	L: 375	Co: 8				
VSWR= 1.226							
VSWR= 8.066(272 212) IA= 0	Ci: 62	L: 375	Co: 8				

VSWR= 1.248(353 39) IA= 18
 VSWR= 4.433(326 206) IA= 2 Ci: 32 L: 375 Co: 8

[L:9] VSWR=1.226 Ci:0 Co:30
 VSWR= 3.353(357 193) IA= 5 Ci: 17 L: 375 Co: 8 L: 11 [SKIP]
 VSWR= 3.000(378 189) IA= 7 Ci: 2 L: 375 Co: 8 L: 10 [SKIP]
 VSWR= 3.096(381 196) IA= 7 Ci: 0 L: Co:
 VSWR= 4.428(323 205) IA= 2 Ci: 32 L: 393 Co: 8
 VSWR= 1.270(353
 VSWR= 3.443(341 219) IA= 6 Ci: 17 L: 393 Co: 8
 VSWR= 2.343(332
 VSWR=14.255(324 294) IA= 14 Ci: 2 L: 393 Co: 8
 VSWR= 1.613(345
 VSWR=23.608(283 260) IA= 7 Ci: 16 L: Co:

[L:6] VSWR=1.270 Ci:0 Co:30
 VSWR= 3.000 L: 375 [SKIP]:0 L:8 Co:30
 CHA
 VSWR=38.500(237 225) IA= 0 Ci: 77 L: 357 Co: 8
 VSWR= 1.806(341 98) IA= 15 Ci: 0 L: 0 Co:
 VSWR=45.400(232 222) IA= 0 Ci:107 L: 357 Co: 8
 VSWR= 1.489(341 67) IA= 15 Ci: 0 L: 5 Co:
 VSWR=41.545(234 223) IA= 0 Ci: 92 L: 357 Co: 8
 VSWR= 1.085(341 14) IA= 17 Ci: 0 L: 10 Co:
 VSWR=36.076(241 228) IA= 0 Ci: 62 L: 357 Co: 8
 VSWR= 1.000(344 0) IA= 17 Ci: 0 L: 15 Co:
 VSWR=28.000(261 243) IA= 3 Ci: 32 L: 357 Co: 8
 VSWR= 1.023(346 2) IA= 17 Ci: 0 L: 20 Co:
 VSWR=31.900(330 309) IA= 13 Ci: 2 L: 357 Co: 8
 VSWR= 1.323(353 49) IA= 17 Ci: 0 L: 25 Co:
 turn:28000 > thresh:3000*2

[L:357] VSWR=28.000 Ci:32 Co:8
 VSWR=38.333(236 224) IA= 0 Ci: 77 L: 384 Co: 8 17 Co: 40
 VSWR=50.333(231 223) IA= 0 Ci:107 L: 384 Co: 8 18 Co: 40
 VSWR=35.923(240 227) IA= 0 Ci: 62 L: 384 Co: 8
 VSWR=27.777(259 241) IA= 2 Ci: 32 L: 384 Co: 8 VSWR= 1.000 IA= 17 Ci: 0 L: 19 Co: 40
 VSWR=28.363(324 302) IA= 13 Ci: 2 L: 384 Co: 8
 turn:27777 > thresh:3000*2

[L:384] VSWR=27.777 Ci:32 Co:8
 VSWR=38.333(236 224) IA= 0 Ci: 77 L: 380 Co: 8
 VSWR=50.333(231 222) IA= 0 Ci:107 L: 380 Co: 8
 VSWR=45.600(233 223) IA= 0 Ci: 92 L: 380 Co: 8
 VSWR=35.923(240 227) IA= 1 Ci: 62 L: 380 Co: 8
 VSWR=27.666(258 240) IA= 5 Ci: 32 L: 380 Co: 8
 VSWR=25.583(319 295) IA= 17 Ci: 2 L: 380 Co: 8
 VSWR=26.166(326 302) IA= 19 Ci: 0 L: 380 Co: 8
 VSWR=27.000(322 299) IA= 18 Ci: 1 L: 380 Co: 8
 turn:25583 > thresh:3000*2

[L:380] VSWR=25.583 Ci:2 Co:8
 VSWR=38.333(236 224) IA= 0 Ci: 77 L: 376 Co: 8
 VSWR=50.333(231 222) IA= 0 Ci:107 L: 376 Co: 8
 VSWR=45.600(233 223) IA= 0 Ci: 92 L: 376 Co: 8
 VSWR=35.923(240 227) IA= 0 Ci: 62 L: 376 Co: 8
 VSWR=27.666(258 240) IA= 4 Ci: 32 L: 376 Co: 8
 VSWR=26.826(321 297) IA= 17 Ci: 2 L: 376 Co: 8

suspended-COUNT[300]
 [AUTO]15750[ms](302) 2000[kHz] VSWR= 1.744 IA= 12 Ci: 0 L: 688 Co: 4
 set_memory
 tune_ok
 time=15824[ms] turn=302

7.9.2 Calculation of Matching Circuit

1. Gamma matching

The gamma-matching circuit is usually used on the MF band.

The following table shows matching constants between capacitor and inductance.

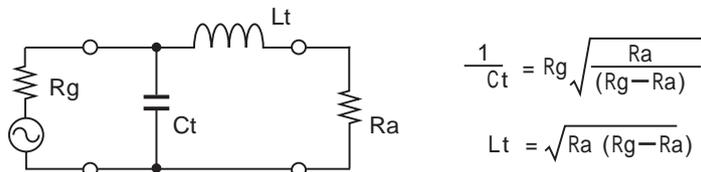


Fig. 7.9.4 Gamma-matching Circuit

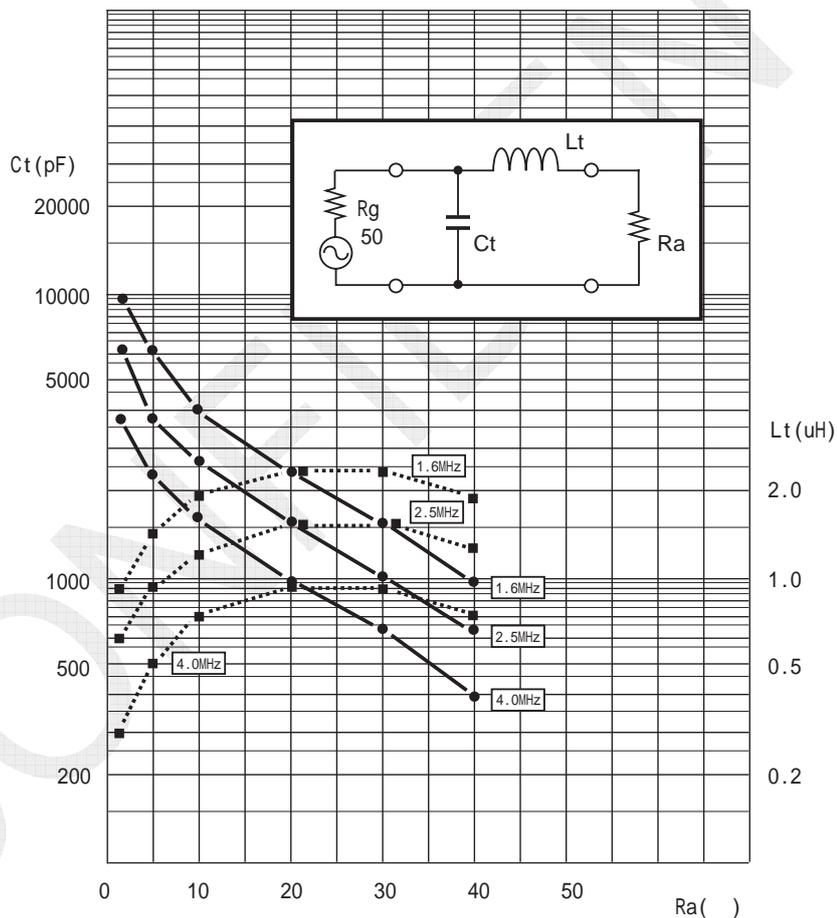


Fig. 7.9.5 Table of Gamma-matching Constants

The antenna circuit contains a resistor “Ra” and also reactance components. Since a wavelength on the MF band is longer than the antenna length, the antenna has capacitive reactance. Consequently, the matching circuit requires reactance that negates this capacitive reactance. It is called a loading coil. The inductance of the matching circuit is the sum of inductance for matching and that of the loading coil.

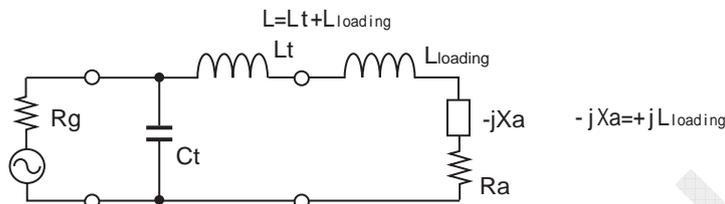


Fig. 7.9.6 Antenna Equivalent Circuit

The following table shows the inductance of loading coil used to negate the capacitive reactance of the antenna.

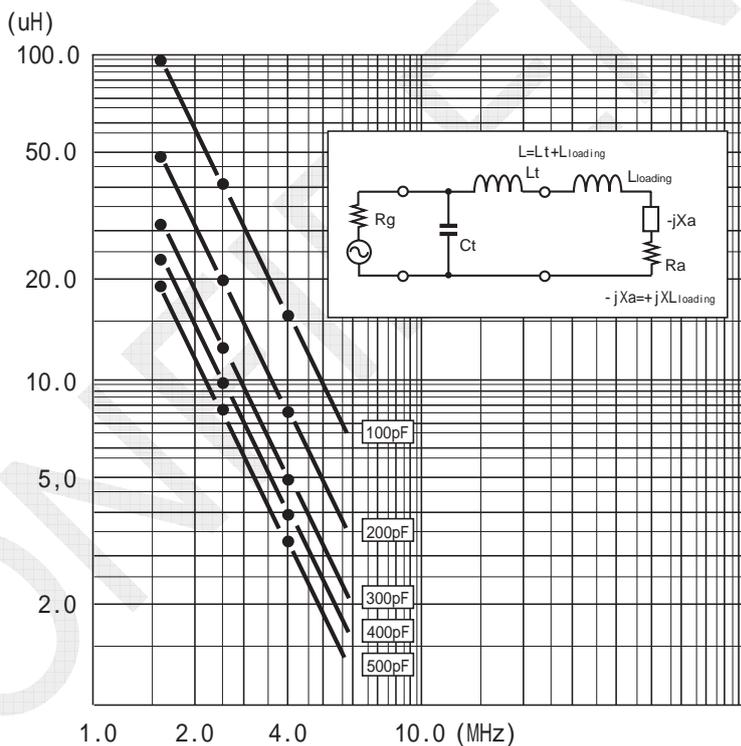


Fig. 7.9.7 Table of Loading Coil Constants

2. Pi-matching

The pi-matching circuit is usually used on the HF band. To calculate the constant of a matching circuit, “L” is divided into two channels and a virtual resistor “R” is mounted to each channel. Two-stage matching circuit is designed centering on these resistors. The circuit on the input side is a matching circuit of R_g and R, while the circuit on the load side is that of R_a and antenna impedance.

With a practical antenna, antenna impedance switches between “capacitive” and “inductive” depending on feed frequency. “C_c” consists of reactance that negates the antenna impedance and matching constant.

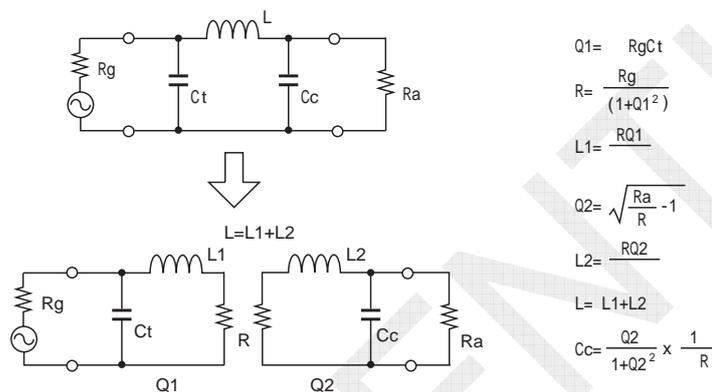


Fig. 7.9.8 Calculation of Pi-matching

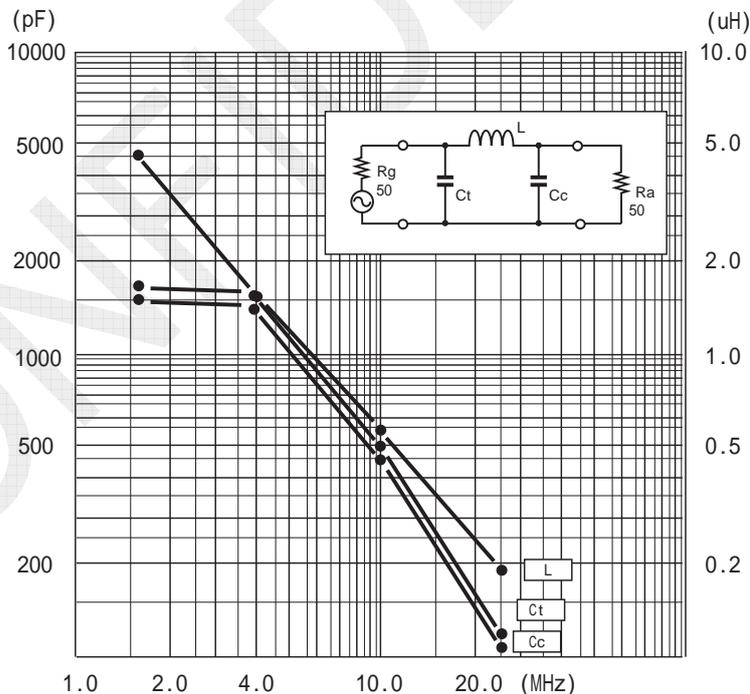


Fig. 7.9.9 Pi-matching Measurement Constant for 50-ohm Loads

Communication with the Control unit (RS-232C, start/stop synchronization, non-procedural protocol)

- Baud rate: 9600 bps
- Data length: 8 bits
- Stop bit: 1 bit
- Parity: N/A
- Flow control: N/A
- Communication control: N/A (Only Tx/Rx data)

Table 7.10.1 Applications of Memories

Type		Application
MPU	MCIMX235CJM4A	Buzzers, LED control, LCD display printer I/F, keyboard I/F, SD card I/F, and serial communication
FLASH ROM-1	W25Q64VCSSIG	Saving of programs
FLASH ROM-2		Saving of set data
SD RAM	MT46H8M16LFBF-6	Working memory

Table 7.10.2 Compatibility between IB-585 and FELCOM 18 Board

Board Name	IB-585	FELCOM 18	Compatibility
TERMCPU	16P0283A	16P0283B	Incompatible
TERMPWR	16P0287A	16P0287B	Incompatible
LCD	SD1040T07-A	SD1040T07-A	Compatible
SD USB	16P0289	16P0289	Compatible
SW	16P0212	16P0294	Incompatible
PWR C	16P0214A	16P0214A	Compatible

2. TERMPWR (16P0287A)

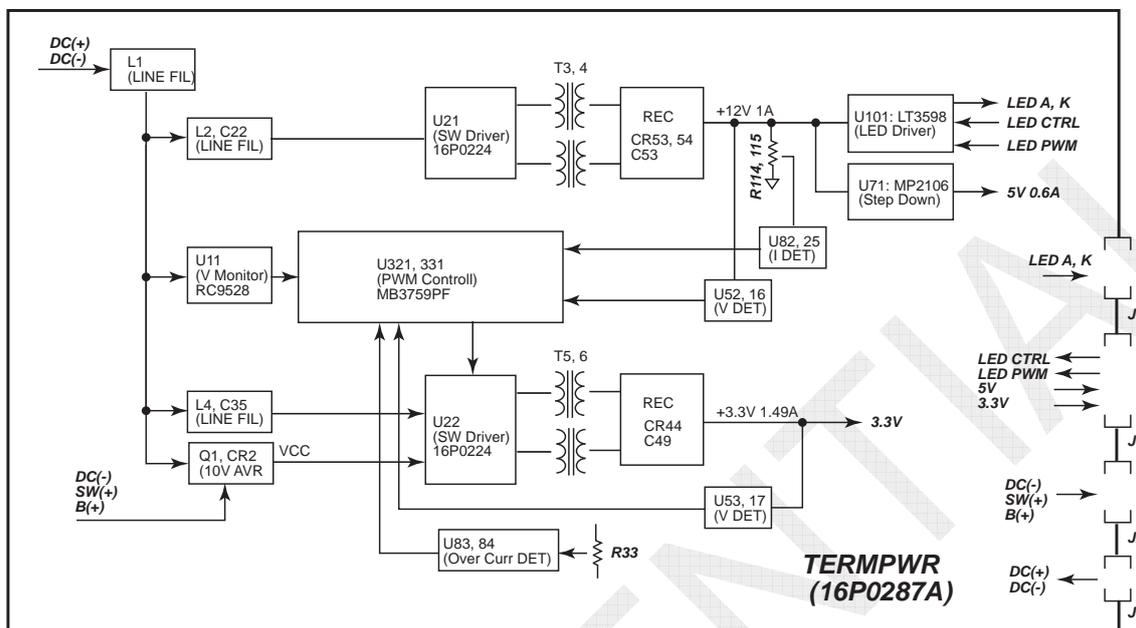


Fig. 7.10.2 TERMPWR Block Diagram

Table 7.10.3 Operating Voltage of Power Supply Protection Circuit

Parameter		Set Value
Low-voltage protection for input power supply	Power supply starting voltage	10V
	Operating voltage	8V
	Hysteresis voltage	1.7V
Over-voltage protection for input power supply	Operating voltage	36V
	Hysteresis voltage	1V
Reverse connection protection for input power supply		Protected by a diode between input power supplies.
Overcurrent output protection	12V	1.5A (Automatic resetting. Protection circuit activated at 1.18A. Overcurrent detected with R114 and R115)
	5V	1.5A (By overcurrent protection function of auto-reset IC)
	3.3V	Automatic resetting (Protection circuit activated at 14.2A. Overcurrent detected with R33)

1. TERMCPU (16P0209A)

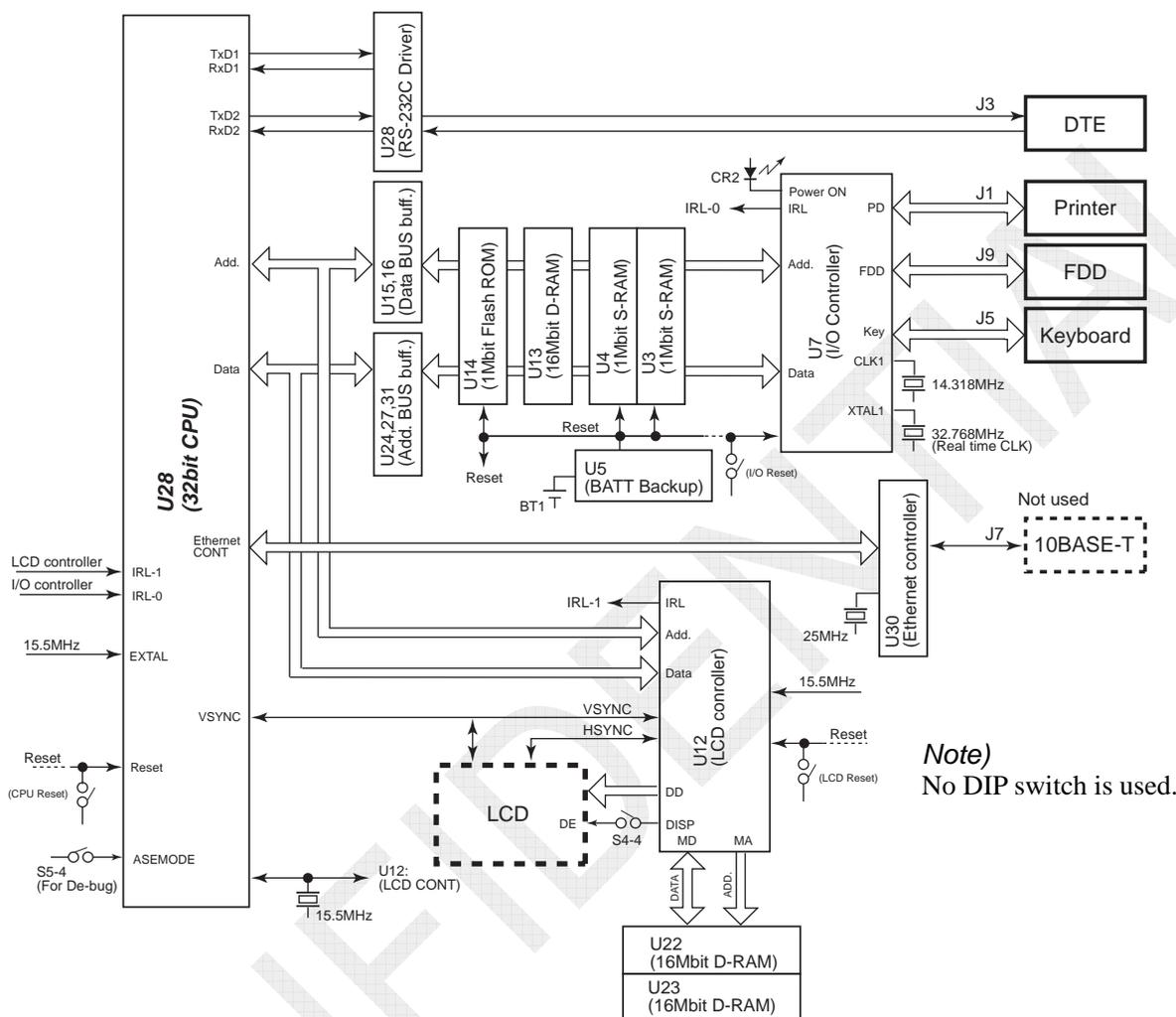


Fig. 7.10.4 TERMCPU Board Block Diagram

Memory contents

The contents of each memory are as listed in the table shown below:

Table 7.10.4 Memory Contents

Memory Contents	
U3 and U4: S-RAM (Backup)	U14: Flash ROM
<ul style="list-style-type: none"> AAB/ID USER CH Station List Scan Group Timer OP System data 	Programs (Including ITU-CH table)

2. PWR (16P0211A)

Input voltage

- Switching power supply with an input voltage range of +10.8 to +31.2V

Output voltage

- +6.5V, +3.3V, and +5.0V
- VH1 and VH2: LCD block power supply

Protection circuit

- Protection against reverse connection of power supply: Provided
 - Mount a diode to the power supply input block to melt down the fuse of power supply cable.
- Over-voltage protection for input power supply: +32 to +37V
- Low-voltage protection for input power supply: +7.5 to +8.5V
- Over-current protection: Provided

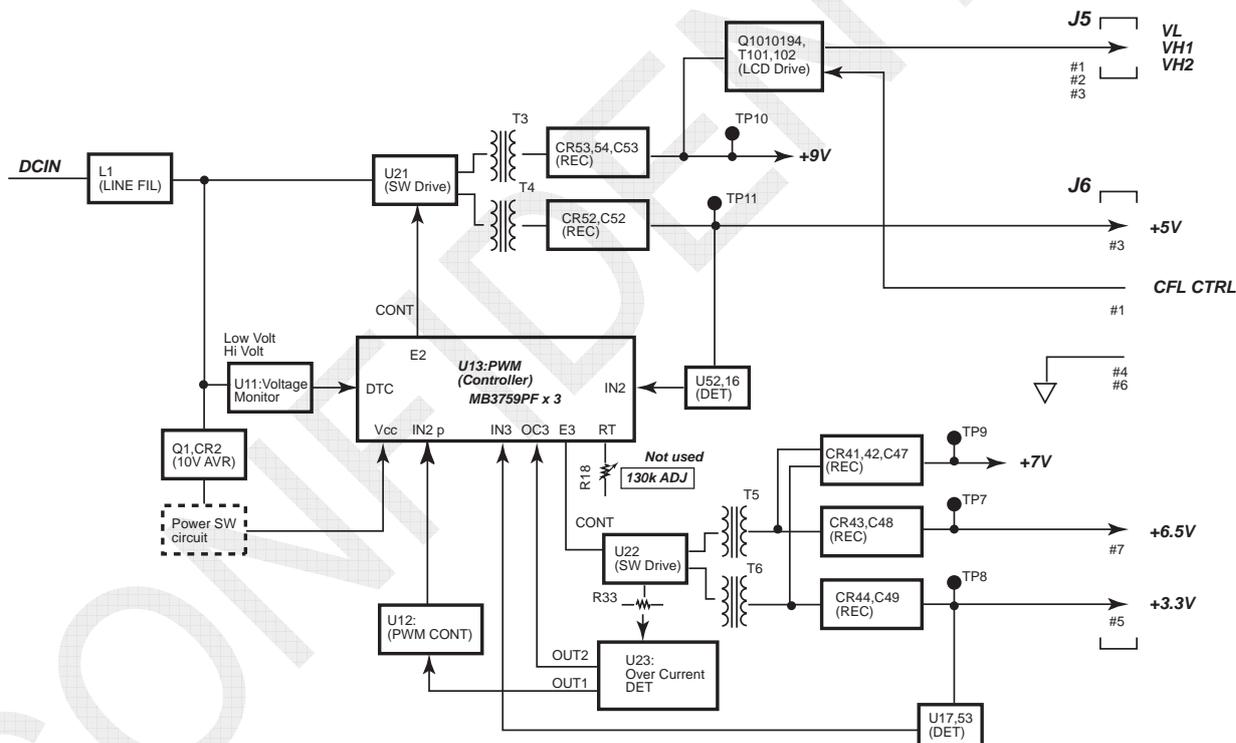


Fig. 7.10.5 PWR Board Block Diagram

Chapter 8. Updating Program

8.1 FS-xx75 Updating Program

8.1.1 Summary for Update

1. Since programs are updated via the LAN port, network connection (IP address) setting should be made. For example, make IP address setting of a PC to be used for the program update as shown below:

- IP address: 172.31.5.1
- Subnet mask: 255.255.0.0
- Default gateway: No setting is needed.

To check for the network address, select [MENU] -> 5.SYSTEM -> 9.NETWORK.

Or program are update via the serial port: NBDP of FS-2575C. See page 8-22.

Note)

Program folder for LAN: LANuppg, for Serial: SIOuppg

2. When two FS-2575C units are installed, programs will be automatically updated in order of No. 1 FS-2575C and No. 2 FS-2575C.
3. Memory clear or other action is not needed. Furthermore, even if a program is updated, saved log files and system set values will not be cleared. However, if any change is made to the file structure, the item changed will be only cleared and a default will be set.
4. If combinations of T-CPU program of FS-xx75T, C-CPU program of FS-2575C, and 78K CPU (for NBDP) program are different, the C-CPU and 78K CPU programs will be automatically downloaded from T-CPU so as to combine programs centering on the T-CPU program.
The C-CPU program is downloaded after completion of updating the T-CPU program or 40 seconds after turning ON the power, and after a lapse of another 40 seconds, the 78K CPU program is downloaded.
*Note)*The 78K CPU program is used for NBDP communication. This program consists of an application program and BOOT program used to boot the system.
5. When programs of the same version are updated, the T-CPU program will be overwritten, but the C-CPU program will not be rewritten.
6. Do not turn OFF the power during program transfer. If the power supply turns OFF, update the program again.
7. To delete the program of the FS-2575C unit, select [MENU] -> 9.SERVICE -> 7. OTHER -> SOFTWARE ERASE.
After a while, T-CPU will download a program to C-CPU.
8. The updated log of the C-CPU program can be checked by selecting [MENU] -> 9. SERVICE -> 6.MAINTENANCE LOG -> 3.SW UPDATE LOG.
The program version and date (e.g. 01.00 20110902) of the C-CPU program are displayed.

8.1.2 List of Program files

The files listed in the table below are saved in the program folder.

Table 8.1.1 List of Files

File Name	Size (Ref.)	Type	Remark
FSXX75.BIN	6,847 kB	BIN File	Application data.
IDCODE.SYS	1 kB	System File	Program used to prevent data transfer to other equipment.
nLD_FS.bin	26 kB	BIN File	Loader program used for the FS-xx75 system to receive and write data.
nUP_FSXX75.bat	1 kB	MS-DOS Bat File	Batch file used to update programs.
nwuppg.exe	96 kB	Application File	Loader program used for a PC to transfer data to the FS-xx75 system.

The following diagram shows the configuration of CPUs and memories of the FS-xx75 system.

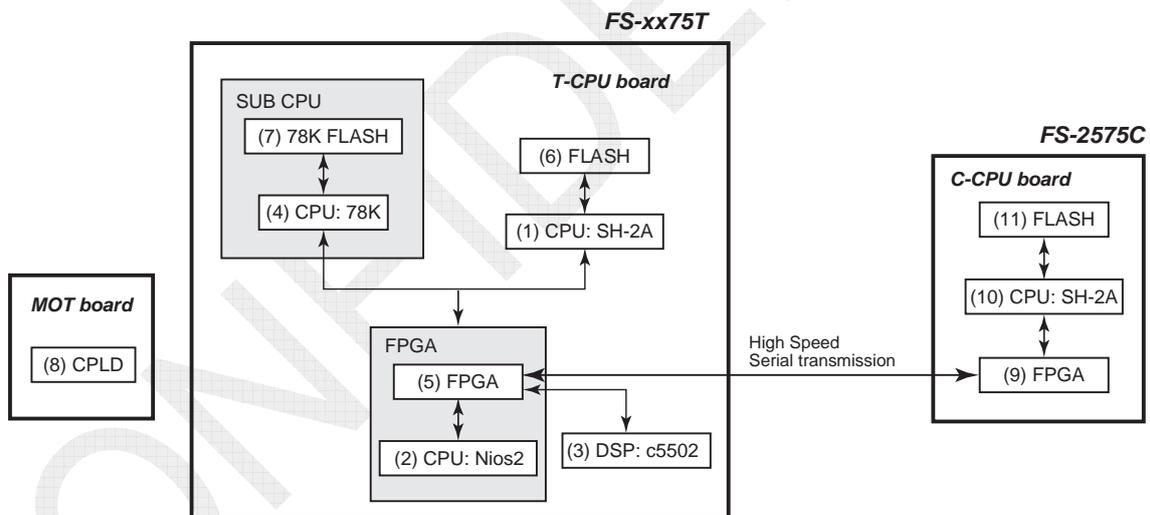


Fig. 8.1.1 CPU and Memory Configuration

The following table describes the functions of individual components shown in Fig. 8.1.1.

Table 8.1.2 List of Components and Functions

No.	Component	Function
1	CPU: SH-2A	CPU, which is mainly used to control the FS-xx75 system.
2	CPU: Nios2	CPU, which is mainly used to control LAN-to-LAN communications. This CPU forms a part of FPGA.
3	DSP (SUB-CPU)	DSP, which is mainly used for signal processing.
4	CPU: 78K	CPU, which is mainly used to control the NBDP communication.
5	FPGA	FPGA of the transceiver unit.
6	FLASH	Flash memory, which is used to save programs that are transferred to it due to LAN driver update. This flash memory also saves programs for SH-2A and FPGA of the control display unit and for Nios2, FPGA, DSP, and 78K CPU of the transceiver unit.
7	78K FLASH (Built in DSP)	Flash memory, which is used to save 78K CPU programs. Programs that are downloaded from SH-2A of the T-CPU and automatically updated are written to this flash memory.
8	CPLD	Chip, which is used to convert serial data from the T-CPU into parallel format and controls circuits.
9	FPGA	FPGA of the control display unit.
10	CPU: SH-2A	CPU of the control display unit, which is mainly used to display programs.
11	FLASH	Flash memory, which is used to save programs of the control display unit. Programs that are downloaded from the transceiver unit and automatically updated are written to this flash memory.

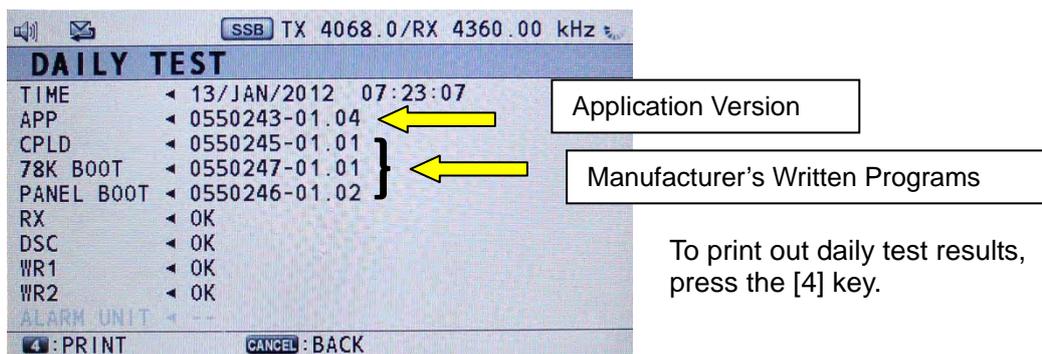
8.1.3 Verifying Program Version

Select [MENU] -> 1.TEST -> 1.DAILY TEST. The number displayed in the “APP” column represents the application program version of the FS-xx75 system.

CPLD, 78K BOOT, PANEL BOOT programs are manufacturer’s written programs. The version number remains unchanged even if the program is updated on site.

Reference)

Program version can also be verified by selecting [MENU] -> 9.SERVICE -> 5. TEST -> 1.VERSION.



The DAILY TEST window displays the following items:

Table 8.1.3 Items Displayed on DAILY TEST Window

Item	Function
TIME	Displays date and time on and at which the daily test was conducted.
APP	Displays the version of FS-xx75 application program.
CPLD (Complex Programmable Logic Device)	Displays the program version of a chip that converts serial data from T-CPU into parallel format to control circuits. This program is incorporated in the MOT board. The version remains unchanged even if the program is updated. The CPLD program is written at factory and not allowed for any change on site.
78K BOOT	Displays the BOOT program control version for CPU (used for NBDP). This program is incorporated in the T-CPU board. The version remains unchanged even if the program is updated. The 78K BOOT program is written at factory and not allowed for any change on site. The CPU used for NBDP includes two BOOT programs. The BOOT program displayed in this column is a backup program that will run if the other program has a problem. Normally, this BOOT program is not used to boot the system.
PANEL BOOT	Displays the BOOT program control version for C-CPU (CPU name: SH-2A) of the FS-2575C unit. This program is incorporated in the C-CPU board. The version remains unchanged even if the program is updated. The PANEL BOOT program is written at factory and not allowed for any change. The C-CPU of the control display unit (FS-2575C) includes two BOOT programs. The boot program displayed in this column is a backup program that will run if the other program has a problem. Normally, this boot program is not used to boot the system.
RX	Displays self-test results, respectively. For details, refer to information in Chapter 6.
DSC	
WR1	
WR2	
ALARM UNIT	

Reference)

Information on programs other than those listed in the table above can be verified by selecting [MENU] -> 9.SERVICE -> 5.TEST -> 1.VERSION.

For details, refer to information on page 6-23.

8.1.4 Program Updating Procedure

Update a program according to the following procedure:

Step-1)

Make setting of network connection (IP address) of a PC, and then connect the PC to the FS-xx75 system with a LAN cable.

Step-2)

Click on “BAT File: nUP_FSXX75.bat,” and then turn ON the power of the FS-xx75 system. It takes 40 seconds at maximum to establish the network connection between the PC and the FS-xx75 system.

Step-3)

A program will be transferred from the PC to the T-CPU of the FS-xx75T unit and the program of the T-CPU will be updated.

Step-4)

After a lapse of approximately 40 seconds, the program of the T-CPU will be updated to that of the C-CPU of the No. 1 FS-2575C unit. Upon completion, the program of C-CPU of the No. 2 FS-2575C unit will be updated. However, if the C-CPU program in the updated programs is the same as the program of the C-CPU connected, this step will be skipped.

Step-5)

After a lapse of another 40 seconds or so, the program of the T-CPU will be updated to that of the 78K CPU (used for NBDP) mounted on the T-CPU. However, if the 78K CPU program in the updated programs is the same as the program of the 78K CPU installed, this step will be skipped.

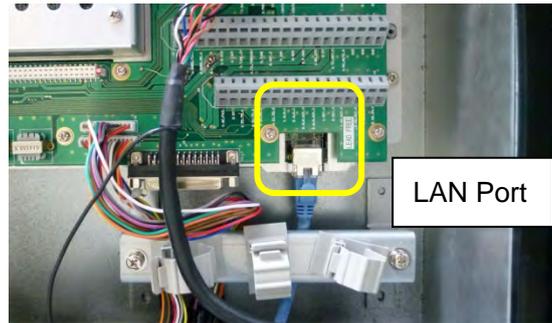
It takes approximately 8 minutes to update all programs aforementioned.

Procedure)

1. Turn OFF the power of the FS-xx75 system.
2. Connect the PC to the LAN port of the FS-xx75 system with a LAN cable.

Reference)

A straight or crossover LAN cable can be used. The T-CPU has the built-in Auto-MDIX function that automatically identifies the LAN cable.

FS-2575T and FS-5075TFS-1575T

3. Make setting of network connection (IP address) of the PC as shown below:
 - IP address: 172.31.5.1
 - Subnet mask: 255.255.0.0
 - Default gateway: No setting is needed.

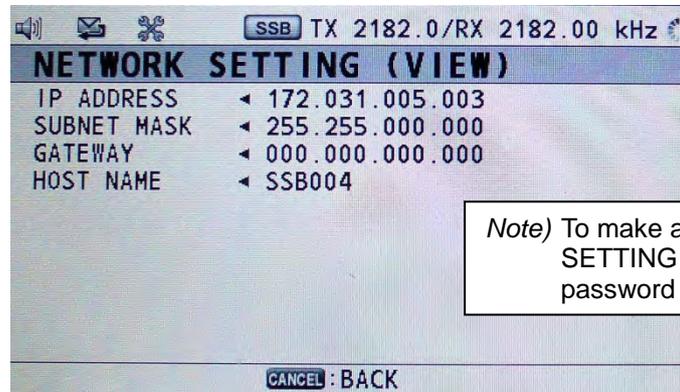
Reference)

Set the last block of the IP address to “1” to “254” except “3.”

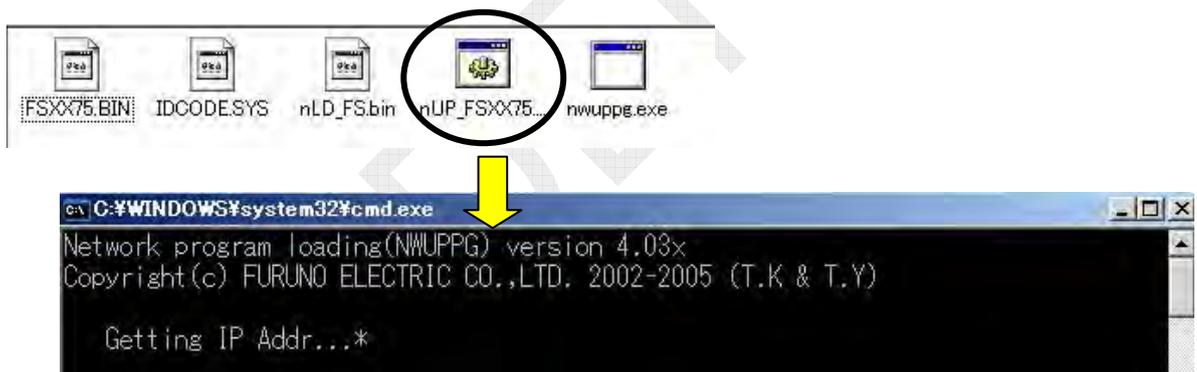
“172.31.5.3” represents the IP address set to the FS-xx75 system.

If the IP address of the FS-xx75 system is changed, make IP address setting of the PC according to the set network address.

To verify the IP address of the FS-xx75 system, select [MENU] -> 5.SYSTEM
-> 9.NETWORK.



4. Open the program folder, and then double-click on "nUP_FSXX75.bat."
The Command Prompt window shown below will appear.



5. Turn ON the power of the FS-xx75 system. If No. 2 FS-2575C unit is connected, turn ON the power of this unit as well.

6. Data will be transferred from the PC to the T-CPU, and the Command Prompt window will be switched to a window shown below. The data transfer takes approximately one minute.

```

C:\WINDOWS\system32\cmd.exe
Network program loading(NWUPPG) version 4.03x
Copyright(c) FURUNO ELECTRIC CO.,LTD. 2002-2005 (T.K & T.Y)

>>my IPaddress=172.31.5.1
P0>connection IPaddress=172.31.5.3

C:\WINDOWS\system32\cmd.exe
Network program loading(NWUPPG) version 4.03x
Copyright(c) FURUNO ELECTRIC CO.,LTD. 2002-2005 (T.K & T.Y)

>>my IPaddress=172.31.5.1
P0>connection IPaddress=172.31.5.3          049 %
P0>Now writing
  
```

Note)

- 1) An error message saying “**---error (UDP_snd_dat)**” may appear in red under “>>my IPaddress=172.31.5.1”. However, this presents no problem with program updates. Wait for a while. “P0>connection IPaddress=172.31.5.3” will appear to initiate a program update.

```

C:\WINDOWS\system32\cmd.exe
Network program loading(NWUPPG) version 4.03x
Copyright(c) FURUNO ELECTRIC CO.,LTD. 2002-2005 (T.K & T.Y)

>>my IPaddress=172.31.5.1
  
```

- 2) If an error message shown below appears on the FS-2575C window after initiating the program update, press the [CANCEL] key to clear the message.



- 3) If the IP address “P0>Connection IPAddress=172.31.5.3” of the FS-xx75 system does not appear even after a lapse of 40 seconds or more since the power of the FS-xx75 system turns ON, the LAN connection between the PC and the FS-xx75 system has not been established.

In this case, check for the LAN connector and verify the IP address of the FS-xx75 system. To check for the LAN connection, it is useful to use the Ping command (ping 172.31.5.3).

```

コマンド プロンプト (2)
Microsoft Windows XP [Version 5.1.2600]
Copyright 1985-2001 Microsoft Corp.

C:\Documents and Settings\installuser>ping 172.31.5.3

Pinging 172.31.5.3 with 32 bytes of data:

Reply from 172.31.5.3: bytes=32 time=1ms TTL=32

Ping statistics for 172.31.5.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 1ms, Average = 1ms

C:\Documents and Settings\installuser>ping 172.31.5.3

Pinging 172.31.5.3 with 32 bytes of data:

Destination host unreachable.
Destination host unreachable.
Destination host unreachable.
Destination host unreachable.

Ping statistics for 172.31.5.3:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
  
```

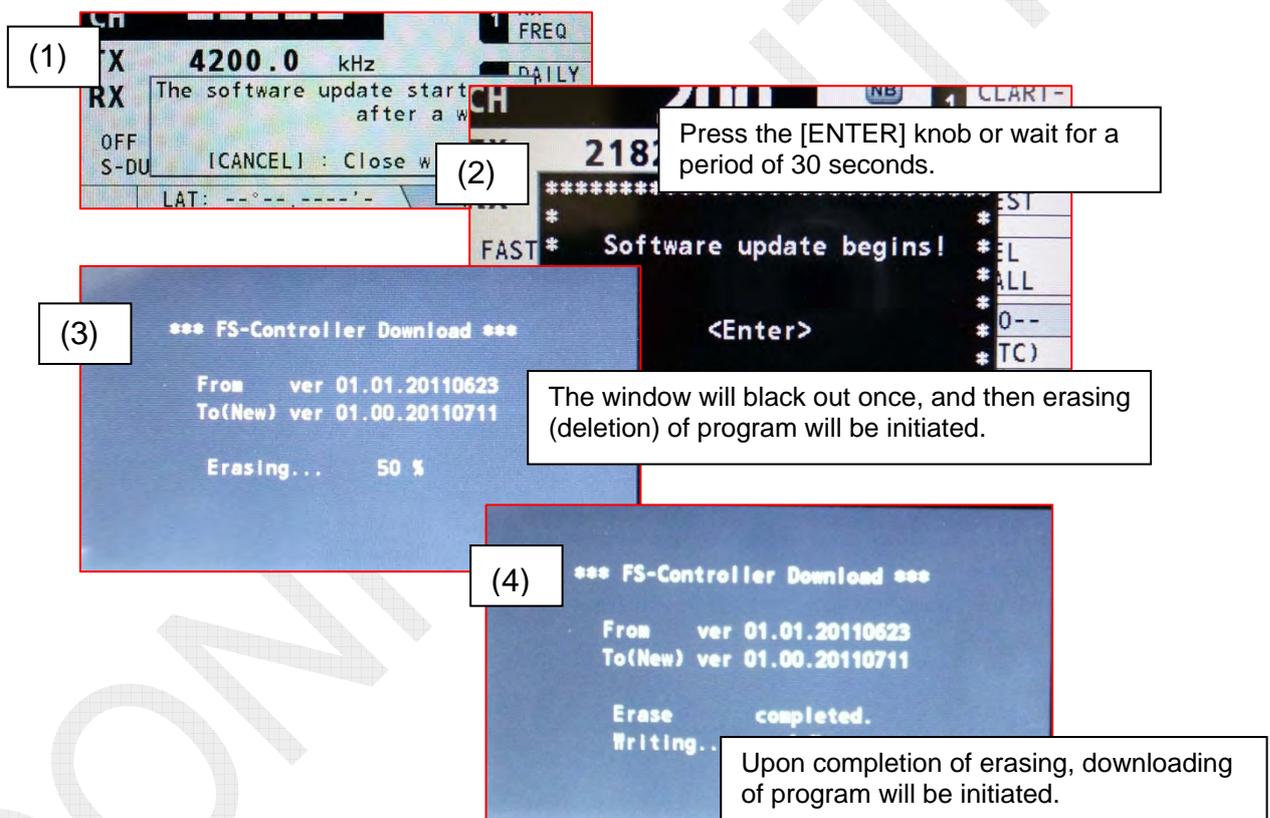
7. Upon completion of data transfer from the PC to the T-CPU, the following window will appear. Then, press the [ENTER] key on the PC. The Command Prompt window will disappear.

```

C:\WINDOWS\system32\cmd.exe
Network program loading(NWUPPG) version 4.03x
Copyright(c) FURUNO ELECTRIC CO.,LTD. 2002-2005 (T.K & T.Y)

>>my IPAddress=172.31.5.1
P0>connection IPAddr=172.31.5.3 100 %
P0>finish upload program. (size=7010854)
C:\Documents and Settings\installuser\デスクトップ\0550243-01-02\LANuppg>pause
続行するには何かキーを押してください...
  
```

8. The procedure up to Step 7 describes data transfer and writing from the PC to the T-CPU.
If the C-CPU program of the FS-2575C unit connected does not correspond to the updated program, the system will proceed to Step 9 to initiate a program update. If the program corresponds to the updated program, the system will exit from the program update.
9. Upon completion of data transfer to the T-CPU, the popup window (1) shown below will appear on the FS-2575C window, shortly followed by the popup window (2). Then, press the [ENTER] knob on the FS-2575C unit. Even if the [ENTER] knob is not pressed, the FS-2575C program update will automatically be initiated after a lapse of 30 seconds.



Note)

The “ver” number displayed on the above window does not correspond to the “Ver: 0550243-xx.xx” to be updated. This number represents the APP number of the FS-2575C unit that is displayed when selecting [MENU] -> 9.SERVICE -> 5.TEST -> 1.VERSION.

Furthermore, the verification of programs to be downloaded to the C-CPU program is performed for APP, BOOT, and FPGA in the [FS-2575C] column of this menu.

10. The message saying “Writing---” will switch to “Completed.” With that, the FS-2575C program update is completed.
The window will black out once, and then the “Initializing...” popup window will automatically appear to display the RT window.
11. **In case of an improper combination of the 78K CPU program of the T-CPU and the updated program, the popup window will appear (1) and, after a lapse of 40 seconds, the update of 78K CPU program will be initiated (2). In case of a proper combination, the program update is completed.**



Note)

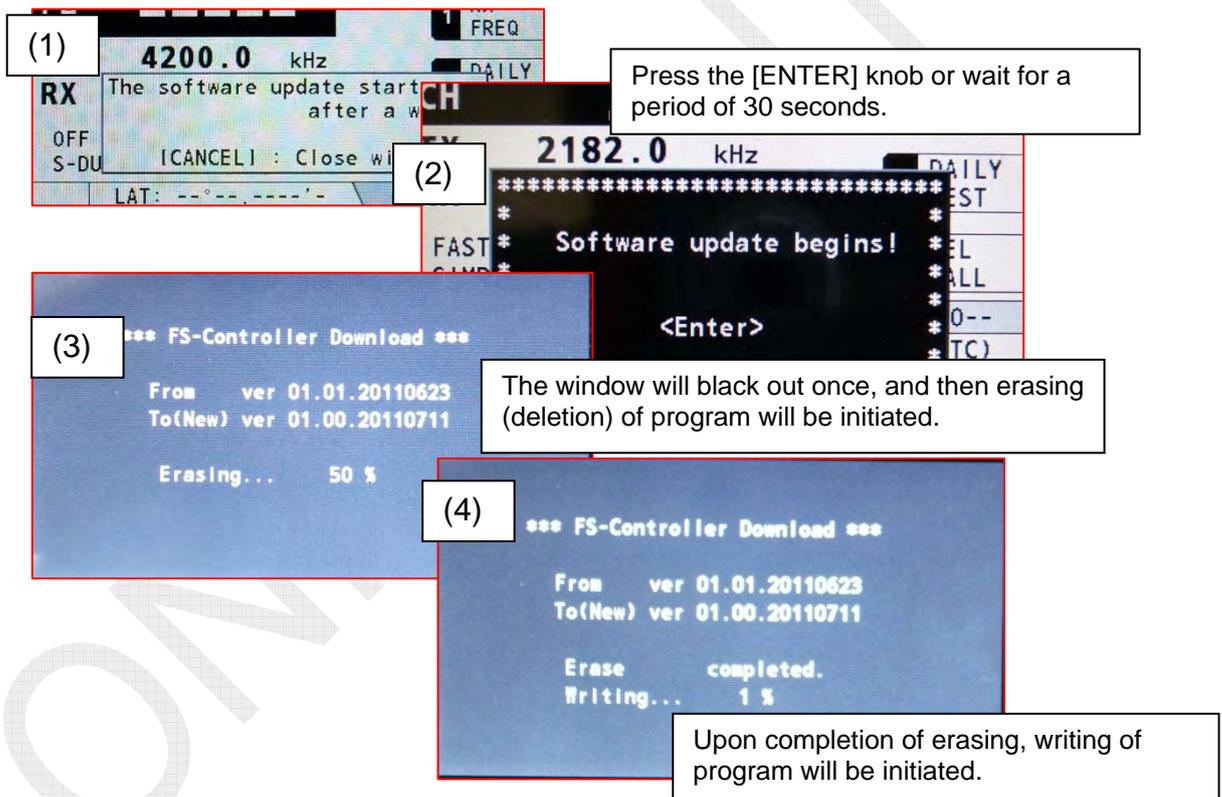
Programs to be downloaded in Step 11 cover the 78K BOOT program and 78K application program. Downloading of these programs can be verified by selecting [MENU] -> 9.SERVICE -> 5.TEST -> 1.VERSION -> [FS-2575T] -> “78K BOOT” and “78K APP.”

12. When the “78K Download” popup window shows “100%,” the update of the CPU program is completed.
The window will black out once, and then the “Initializing...” popup window will automatically appear to display the RT window.

8.1.5 When program version is different between T-CPU and C-CPU

When the system consisting of a combination of different program version between the FS-xx75T and FS-2575C units is connected, the C-CPU program will automatically be downloaded to the C-CPU program saved in the T-CPU after a lapse of approximately 40 seconds since the power turns ON.

- 1) Turn ON the power. When the “Initializing...” popup window disappears, the popup window (1) shown below will appear on the FS-2575C window, shortly followed by the popup window (2). Then, press the [ENTER] knob on the FS-2575C unit. Even if the [ENTER] knob is not pressed, the FS-2575C program update will automatically be initiated after a lapse of 30 seconds.



- 2) The message saying “Writing---” will switch to “Completed.” With that, the FS-2575C program update is completed. The window will black out once, and then the “Initializing...” popup window will automatically appear to display the RT window.

8.2 NBDP Terminal Updating Program

NBDP Terminal	Program	Remark
IB-583	0550209-xx	Common program for FS-xx70 and FS-xx75
IB-585	0550251-xx	Only available for FS-xx75

Reference)

Method for switching IB-583/585 between English and Russian

- English version: Hold down the [E] key and turn ON the power of IB-583/585.
- Russian version: Hold down the [R] key and turn ON the power of IB-583/585.

8.2.1 IB-583 Updating Program

1. Verifying IB-583 program version

Procedure)

1. Select "Selftest" from the [F6]: System Menu. Program versions will be displayed.
2. Hold down the [Alt] key and [Fn] key, and press the [F1] key. Detailed program versions will be displayed.

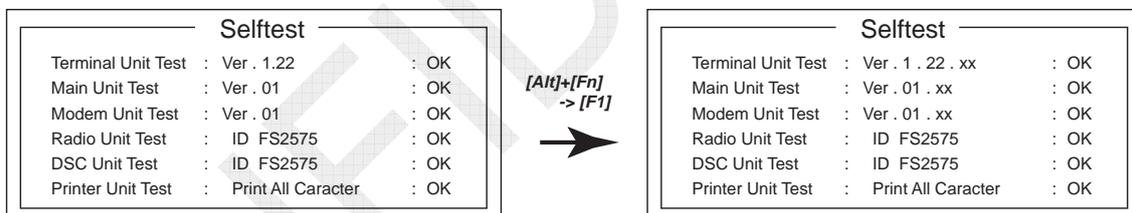


Table 8.2.1 Correspondence between Test Results and Program Displayed

Test Result	Display
Terminal Unit Test	Displays programs of the IB-583 terminal unit.
Main Unit Test	Displays programs of the FS-xx75 system.
Modem Unit Test	Displays programs of the FS-xx75 system (same as those of the Main Unit Test).
Radio Unit Test	Displays the results of communication tests with the FS-xx75 system (Displays the model connected).
DSC Unit Test	Displays the results of communication tests with the FS-xx75 system (Displays the model connected).
Printer Unit Test	Displays the results of communication tests with the printer.

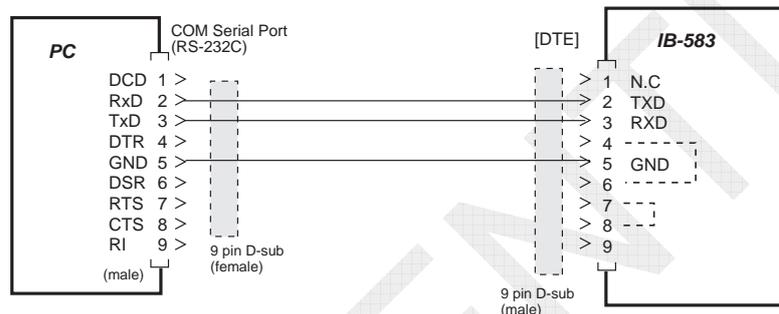
2. IB-583 updating program

IB-583 programs can be updated from the [DTE] port or the floppy disk drive of the IB-583 terminal unit.

*** Updating from the [DTE] port ***

Procedure)

1. Turn OFF the power of the IB-583 terminal unit.
2. Connect the serial port of the PC to the [DTE] port of the IB-583 terminal unit with 9-pin D-sub straight cable.



3. Double-click the icon of the batch file “UP583.BAT” of the program to be updated.
4. When the “[Waiting For Target Wake up ...] Time : x (sec)” popup window appears on the Command Prompt Window of the PC, turn ON the power of the IB-583 terminal unit within a period of 25 seconds after the popup window appears. After a lapse of 25 seconds, an error message saying “Time Out Error !” will appear. In this case, hold down the [Ctrl] key and press the [C] key to exit from the Command Prompt window once, and then follow the procedure from Step 3 again to update the program.
5. The program update will automatically be initiated.
6. Upon completion of the program update, a message saying “Update Complete” will appear, followed by the normal NBDP window.
7. Turn OFF the power once to reset the system.

***** Updating from the Floppy Disk Drive *****

Procedure)

1. Turn OFF the power of the IB-583 terminal unit.
2. Put a floppy disk containing programs in the floppy disk drive of the IB-583 terminal unit.
3. Turn ON the power supply of the IB-583 terminal unit.
4. The boot program will automatically be run to display the following message.

```
FD BOOT Ver.2.01
Update IB583 TERM
Boot From FD? (Yes/No)___
```
5. Press the [Y] key. The following message will appear.

```
Loading : Load.bin ____ xx sec
```
6. When the count comes to “0,” the following message will appear.

```
FS-X575 NBDP Term Software Update
Are you sure update? (Y/N) _
```
7. Press the [Y] key. The following message will appear and the program update will automatically be initiated.

```
Now erasing:
Now updating program
Update xx % (last xx sec)
```
8. When the “Update xx %” column displays “100%,” the program update has been completed and the normal NBDP window will appear.
9. Turn OFF the power once to reset the system.

8.2.2 IB-585 Updating Program

1. Verifying IB-585 program version

Procedure)

1. Select “Selftest” from the [F6]: System Menu. Program versions will be displayed.
2. Hold down the [Alt] key and press the [F11] key. Detail program versions will be displayed.

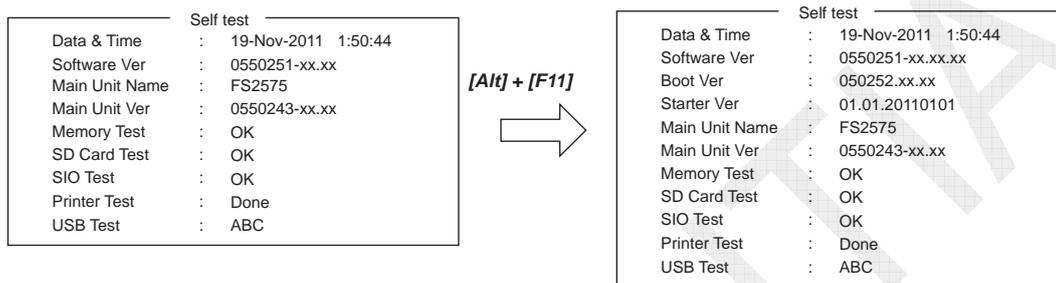


Table 8.2.2 Correspondence between Test Results and Program Displayed

Detailed Test Result	Normal Test Result	Display
Date & Time	Date & Time	Displays date and time on and at which the daily test was conducted.
Software Ver	Software Ver	Displays the application program version of the IB-585 terminal unit.
Boot Ver	-	Displays the boot program version of the IB-585 terminal unit.
Starter Ver	-	Displays the starter program version of the IB-585 terminal unit.
Main Unit Name	Main Unit Name	Displays the name of model connected.
Main Unit Ver	Main Unit Ver	Displays the application program version of the FS-xx75 system.
Memory Test	Memory Test	Displays the results of memory tests on the terminal CPU.
SD Card Test	SD Card Test	Displays the results of SD card R/W tests.
SIO Test	SIO Test	Displays the results of connection tests between the FS-xx75 system and the IB-585 terminal unit.
Printer Test	Printer Test	Displays the results of communication tests with the printer. Specific characters are printed out.
USB Test	USB Test	Displays the results of keyboard tests. Enter any three alphanumeric characters.

2. IB-585 updating program

IB-585 programs can be updated from the [DTE] port or the SD card of the IB-585 terminal unit.

Note) Even if the program is updated, no system set values will be cleared.
Furthermore, the [F11] “ALL Clear” needs not to be pressed.

*** Updating from the [DTE] port ***

The program folder is “uppg_eva2.” This folder has saved the following files:

- ALOADER.bin
- IB585APL.BIN
- up585.bat
- uppg.exe

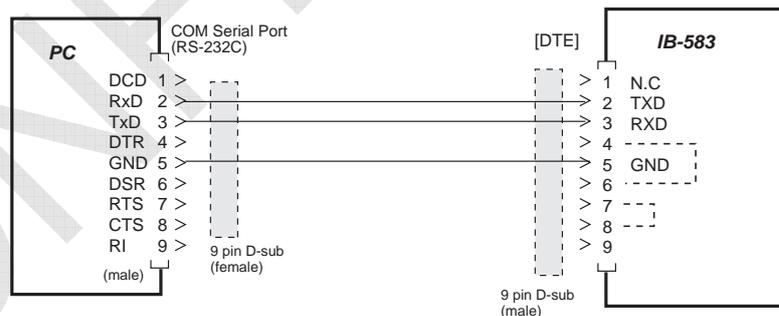
COM port number to be updated is set to “COM-1.” If the COM port of the PC used for program update is set to any number other than “1,” open the “up585.bat,” and then rewrite the following data, and then clobber and save it:

```
uppg ALOADER.bin IB585APL.BIN 0 0 200 1 1:115200 0
```

↑ Specify a COM port number.

Procedure)

1. Turn OFF the power of the IB-585 terminal unit.
2. Connect the serial port of the PC to the [DTE] port of the IB-585 terminal unit with 9-pin D-sub straight cable.



3. Double-click the icon of the batch file “UP585.BAT” of the program to be updated. The Command Prompt window will appear to display the following message.

```

C:\Documents and Settings\hiroyukicg\desktop\update\eval\app\uppg>uppg ALOA
DER.bin F18TERM.BIN 0 0 50 1 1:115200 0
Program upload utility Version 9.04
Copyright(c) FURUNO ELECTRIC CO.,LTD. 1997-2006 (T.K)
uppg infile1 infile2 p1 p2 p3 p4 p5 p6 p7
p1: Deletion waiting time.
p2: Waiting time to write.
p3: Password output interval.
p4: ID number.
p5: Port number.(1,2...):[Baudrate.]
p6: New wait time to write.
p7: Other options.
LD[t]/[r]: t/r:Loader sending wait Time[ms]/Records.
ES[s]      : s      :ROM erase sectors.
TF2[f]     : f      :target file2 which will be selected by "P1" command
CPURSTOFF : Not send  "PFEC,cprst,id*hh<CR><LF>"
NOINFO     : Not display UPPG's Infomation.
RTSCTL:[o]: o      :SIO RTS controll option(set 0 to 3).
NOCHECK_ROMTYPE : Not check FlashROM TYPE(Top/Bottom).
Erase Wait time:0sec
Write Wait time:0msec
Password output interval:50msec
Port no. = 1
Baudrate:115200bps
New wait time:0msec
- ROM erase sectors:
- Loader sending wait time:0msec/0records
RTS controll option : RTS_CONTROL_DISABLE
TARGET POWER ON.

```

4. When the “TARGET POWER ON.” appears on the Command Prompt Window of the PC, turn ON the power of the IB-585 terminal unit.
5. The program update will automatically be initiated.

```

Execute STEP1
Execute STEP2
1053140Byte transfer
>>JumpLoader
>>param=81C1FFF0
>>channel=0
>>Now Erasing
>>Erase End
>>Loading Program
012 % completed.

```

6. Upon completion of the program update, the NBDP window will automatically appear.

***** Updating from the SD card *****

The program folder is “IB585update.” This folder has saved the following files:

- BOOT.INI
- IB585APL.BIN
- SDLOADER.BIN

Procedure)

1. Turn OFF the power of the IB-585 terminal unit.
2. Put a SD card containing programs in the IB-585 terminal unit.
3. Turn ON the power supply of the IB-585 terminal unit.
4. The boot program will automatically be run to display the following message.

```

Program update mode. (SD-Card)

[FILE]           : IB585APL.BIN (2012/01/119 16:03:10)
[MSG]            : IB-583 Ver. 0550215-xx
[COMMENT]        : THIS IS THE UPDATE DISK FOR IB-585

Do you update APPLICATION PROGRAM ?
Hit keyboard     ( Y or N )

```

5. Pressing the [Y] key will initiate the program update.

```

Program update mode. (SD-Card)

[FILE]           : IB585APL.BIN (2012/01/119 16:03:10)
[MSG]            : IB-583 Ver. 0550215-xx
[COMMENT]        : THIS IS THE UPDATE DISK FOR IB-585

Done. Erasing Flash-Memory.
---->           Updating APPLICATION PROGRAM.
                  Verifying Check-SUM.

Processing  xx%
< 0000000000_____>

```


Additional information: Updating Program via Serial Port

1. Program file

Program folder (SIOuppg) and their contents are indicated in the table below.

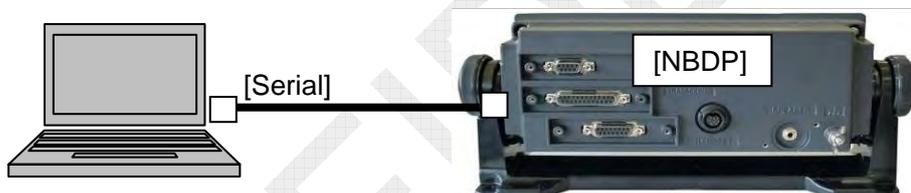
Table.1 Program File List

File	Size	Category	Note
FSXX75.BIN	7,019 kB	BIN File	Application file
LDALL576.BIN	24 kB	BIN File	Loader program For receiving and writing data in FS-xx75
upALL57600.bat	1 kB	MS-DOS Bat File	Batch file For updating the program
uppg.exe	84 kB	Application File	Loader program For transmitting data from PC to FS-xx75

2. Connection

Connect the PC to FS-2575C (No.1) unit.

9 Pin D-sub cable wiring between PC [Serial] port and Control unit [NBDP] port as shown in below.



Note)

- (1) Connect the PC to FS-2575C (No.1).
- (2) If PC is connected to FS-2575C (No.2), the program cannot be updated.

3. Serial Port

If the serial port on the PC is anything other than [COM-1], change the specified COM port to [COM-1] on the PC, or edit the batch file “upFPGA57600.bat” as shown in below.

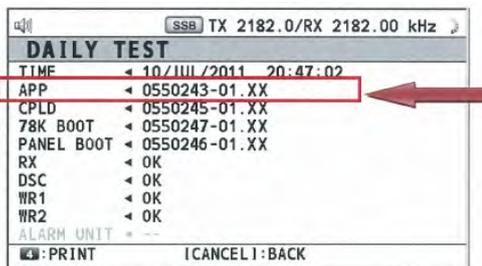
UPPG.exe LDALL576.BIN FSXX75.BIN 0 0 0 1 1



COM port number

5. Checking the program version number

Select [MENU] -> [TEST] -> [DAILY TEST] and the following “DAILY TEST” window appears. Check the program version number.



CONFIDENTIAL

Q1. Required antenna?

A1. You need to install an antenna with capacitance over 100 pF at 1.6 MHz, that is, an antenna of not less than 10 m in length. For example, an 8 m whip antenna needs to be installed with a lead-in wire of 2 m in length.

Q2. How to verify software version?

See Chapter 8

A2. You should conduct daily tests. The version number “0550243-0xx.xx” displayed in the “APP” column represents the application program version of the FS-xx75 system. This version number is used to control the program for the FS-2575C and 78K CPU (for NBDP).

Q3. How to update program for the FS-2575C?

See Chapter 8

A3. The program for the FS-2575C needs not to be updated. If a combination of program for T-CPU of the Transceiver unit is different from that of C-CPU of the Control unit, programs will be automatically transferred from the T-CPU to the C-CPU to update.

Q4. Do I need to take any measures when program is updated?

See Chapter 8

A4. Memory clear or other operation is not needed. If you update the program, set values will remain unchanged. If program substantially changes to invite set value changes, we will give you a notice of such change using technical information.

Q5. When initiating a program update, an error message saying “--error (UDP_snd_dat)” is displayed. How to deal with this error?

See Chapter 8

A5. This presents no problem with program updates. After a while, Communication IP Address is displayed to automatically initiate the program update.

Q6. When initiating a program update, an error message saying “Communication error!” is displayed.

See Chapter 8

A6. This presents no problem with program updates. Please press the [CANCEL] key to cancel the error and continue the program update.

Q7. Can I use any control unit?

A7. Yes, you can use it without causing any problem. In case of a different combination with the program of T-CPU of the Transceiver unit to be connected, the program for the Control unit will automatically be initiated and updated several minutes after turning ON the power.

Q8. How to register MMSI?

See page 4-3

A8. You should press and hold the [S1] switch on the T-IF board for a period of four or more seconds, and then enter the password “XXXXXX.”
You can also register MMSI from the Parameter Browser.

Q9. How to enter SERVICE menu?

See page 4-49

A9. You should click on [MENU] -> [TAB] five times -> 9.SERVICE, and then enter the password "XXXXXX." The password is the same as that for the FS-2570.

Q10. Is there any board available for use in both the FS-xx70 and FS-xx75?

A10. No.

Q11. I would like to know the power supply specification of PR-850A.

A11. Output current is 30A for continuous operation and the peak current is 60A (within 1 minute). AC input current is 30A at an AC input voltage of 100VAC and output current of 60A.

Q12. I would like to know the power supply specification of PR-300.

A12. Output current is 7.5A for continuous operation and the peak current is 20A. AC input current is not more than 4.1A at an AC input voltage of 100VAC.

Q13. I would like to know the specification of BC-6158.

A13. This battery charger is of the full-wave rectification type and the output current is 30A at maximum. AC input current is not more than 15A at an AC input voltage of 100VAC and output current of 30A.

Q14. Is the FS-2575 system available for Duplex communications?

See page 4-76

A14. Duplex communications are only available for the FS-5075 system. To perform Duplex communications, you should install a RX antenna and mount the DUP-FIL board, and also make the following settings:

- [MENU] -> 9.SERVICE -> 3.RT SETUP -> 1.SETUP -> RX ANT -> "CONNECT"
- [MENU] -> 5.SYSTEM -> 7.RT SETUP -> 2.ANT SELECT -> "RX ANT"

Q15. When turning OFF the power, is the T/R antenna grounded?

See page 4-71

A15. Yes, the T/R antenna is grounded through "K30" relay of ATU. Furthermore, when "ANT SELECT" is set to "RX ANT," the T/R antenna will also be grounded at receiving.

Q16. Does the system support telegraphy?

A16. Yes, it does. For telegraphy, please select [MENU] -> 9.SERVICE -> 3.RT SETUP -> 1.SETUP -> CW -> "ENABLE."
Setting "CW" to "ENABLE" will enable you to select [MENU] -> 7.AUDIO -> "5.SIDE TONE" or "6.SIDE TONE LV."

Q17. Can I operate the system only with the radiotelephone function?

See page 4-53

A17. Yes, you can, but you need to select [MENU] -> 9.SERVICE -> 2.DSC SETUP -> CLASS -> "NON-GMDSS." No alarm message will be outputted even without registration of MMSI or entry of positional data.

Q18. Are alarms outputted with the output contact set to “N.C” or “N.O?”

See page 4-25

A18. Factory setting is “Normally Closed.” The output contact can also be set to “Normally Open” with the [J8] jumper of the T-IF board.

An alarm is definitely outputted for Distress alert message. If you want to output an alarm for alerts in different categories, you should select [MENU] -> 8.

EXTERNAL ALARM.

Q19. Is it possible to turn ON the speaker even with the Handset set to “OFF HOOK?”

See page 4-44

A19. Yes, it is, but you need to select [MENU] -> 7.AUDIO -> 2.OFF HOOK -> “SP ON.” The speaker is kept ON regardless of the Hook setting.

Q20. Is the parameter browser of the FS-2570 system available for use? Is it possible to make MMSI setting from the parameter browser?

See API-1

A20. The parameter browser of the FS-xx70 system is not available for use with the FS-xx75 system.

The parameter browser of the FS-xx75 system can also make and register MMSI setting when you set the browser to SERVICE MENU -> MMSI SETUP -> MMSI.

Q21. Is the system provided with the Main Fail (Power Fail) function?

A21. The FS-1575, -2575, and -5075 are all provided with the Main Fail function. The main fail function circuit is connected between #1 (AC FAIL) and #2 (0V) of TB7 on the T-IF board. If a short circuit is caused between #1 and #2, the main fail function will get activated to output a message saying “TX Power reduced. Ship main failure,” automatically reducing TX output power. Therefore, you should adjust reduced transmission output power to 60W or more to meet GMDSS requirements.

Note:

The PR-850A AC/DC power supply for the FS-2575 and FS-5075 systems outputs the Power Fail signal, but the PR-300 AC/DC power supply for the FS-1575 does not.

Q22. Where to connect a telegraph key?

A22. The telegraph key is to be connected between #11(KEY-H) and #12(KEY-C) of TB7 on the T-IF board.

To use CW mode, you need to select [MENU] -> 9.SERVICE -> 3.RT SETUP -> 1.SETUP -> CW -> “ENABLE.”

Then, the following setting menus are added:

[MENU] -> 7.AUDIO -> 5.SIDE TONE and 6.SIDE TONE LV

Q23. Is it possible to connect a SELCALL (Selective Calling) System?

See page 4-67

A23. Yes, it is. You can connect a SELCALL system between #12 (H) and #13 (C) of LINE IN (0 dBm/600 ohms) and between #14 and #9 (GND) of REM TX KEY of [REMOTE] port.

For this purpose, you need to select [MENU] -> 9.SERVICE -> 3.RT SETUP -> 1.SETUP -> SELCALL -> "ENABLE." The SELCALL function is assigned to the [7] key. Pressing the [7] key will set to 2331.5 kHz/AM.

LINE input level adjustment is made by selecting [MENU] -> 9.SERVICE -> 3.RT SETUP -> 1.SETUP -> "LINE IN" in the range of 0dBm \pm 10dBm.

Q24. I would like to know the ALC adjustment method.

See page 5-50

A24. You can make ALC adjustment for TX output power on all bands by setting "power data" to "default data" and using the 2-tone adjustment circuit.

Q25. I would like to know how to make frequency adjustment.

See page 5-26

A25. You can make frequency adjustment by selecting [MENU] -> 9.SERVICE -> 3.RT SETUP -> 1.SETUP -> "REF OSC."

Frequency deviation is \pm 10 Hz for all modes.

Q26. What is allowable deviation of NBDP and DSC frequencies?**Up to how much deviation can messages be decoded?**

See page 5-26

A26. Frequency deviation is to be within \pm 10 Hz. Deviation of up to \pm 50 Hz allows the decoding of messages. Of course, error increases.

Q27. How to verify the model of a system?

See page 6-29

A27. No model setting parameter is provided. The model of a system in use is verified the PA-IF board type A, B and COMB board is mounted, when turning ON the power supply.

To ensure the verification result, you should select [MENU] -> 9.SERVICE -> 1.EQUIP TYPE.

Q28. Using the RX antenna resulted in reduced receiver sensitivity.**What is the cause of this problem?**

See page 4-71

A28. Did you make system setting to use the RX antenna? You should ensure that the setting has been made as follows:

1) [MENU] -> 9.SERVICE -> 3.RT SETUP -> 1.SETUP -> RX ANT -> "CONNECT"

2) [MENU] -> 5.SYSTEM -> 7.RT SETUP -> 2.ANTSELECT -> "RX ANT"

Q29. What do the figures shown in red on the SELF CHECK window mean?

See page 6-15

A29. These figures deviate from the threshold for self-checks. There is a problem with the relevant circuit.

Q30. Which of the GNSS and Manual modes is given priority to enter data?

See page 4-16

A30. There is no priority condition between GNSS and Manual modes. You need to switch between two modes by selecting [MENU] -> 5.SYSTEM -> 4.POSITION -> 1.INPUT TYPE.

Q31. No positional data is displayed.

See page 4-16

A31. GNS, GGA, RMC, and GLL sentence formatters for positional data are accepted in order of priority presented.

You should ensure that you have made system setting as follows:

- [MENU] -> 5.SYSTEM -> 4.POSITION -> INPUT TYPE -> GNSS; and
- [MENU] -> 9.SERVICE -> 3.RT SETUP -> 1.SETUP -> FORMAT -> "IEC+NMEA."

Then, you should select [MENU] -> 9.SERVICE -> 6.MAINTENACE LOG -> 1. I/O MONITOR -> "IEC" to monitor data.

Q32. Can I change IP address of System?

See page 4-26

A32. Yes, you can. You select [MENU] -> 5.SYSTEM -> 9.NETWORK, and then enter the password "012345678." The display will switch from the NETWORK SETTING (VIEW) window to "EDIT" window.

Q33. I would like to know the sequence to voice signal between the Control unit and the Transceiver unit.

See page 7-66

A33. The Control unit and the Transceiver unit are connected with RS-485 half-duplex communication interface (768 kbps) to perform intercommunications between these two units.

Since this voice signal contains command data and voice data, no LINE IN/OUT signal line is provided.

Q34. Is it possible to turn ON the power from No. 2 control unit?

A34. No it isn't. The system power supply can only be turned ON from No. 1 Control unit. The reason is that, since FL 41 is not mounted on the T-IF board, the PWR ON signal from the No. 2 Control unit is not connected to the P-SW board.

Q35. Is there any method available to monitor the matching status of ATU?

See page 7-77

A35. You can monitor the matching status from the [DEBUG] port (serial port).

The specification of the serial port is as follows:

- Baud rate: 115.200 kbps
- Data length: 7 bits
- Stop bit: 2 bits
- Parity bit: 0 bit

When you type "?", a list of commands will appear. To display the monitoring process, please type "TR1." Executing the TUNE will display the matching process.

Q36. I would like to know the size of a cable used to connect between the Transceiver unit and the power supply unit. See page 1-7

A36. The size of a power supply cable size should be determined by its length. You should select a power supply cable capable of maintaining a voltage drop in the cable within 5%.

For example, if the cable is 10m in line length, approx. 30A of current passes through the FS-2575 and approx. 55A of current through the FS-5075. As a result, the suitable cable size will be 10 or 16 square mm for the FS-2575 and 16 or 25 square mm for the FS-5075.

As for power supply input voltage, it is more advantageous to apply 220VAC than 100VAC because 220VAC can keep input current at low level.

Q37. I would like to know the size of a cable used to connect between the battery and the battery charger. See page 1-7

A37. The FS-5075 and FS-2575 systems use the PR-850A power supply unit to output the Main Fail signal. When the main fail function gets activated, the FS-5075 outputs 25A of current, while the FS-2575 outputs 15A of current. The maximum charge current of BC-6158 is 30A. Consequently, you should select a power supply cable capable of maintaining a current level at 30A and voltage drop in the cable within 5%. The suitable size will be not less than 25 square mm if the cable is 20m in line length, or not less than 35 square mm if it is 30m in line length.

Q38. I would like to know precautions for using a copper band for grounding ATU.

A38. Basically, you should use a copper band with iron plate to ground the ATU. You should make the grounding copper band as short as possible to prevent it from swaying due to vibration or wind pressure, resulting in fracture. Furthermore, it should be considered that the grounding copper band becomes eroded to cause fracture.

To be more precise, you should weld a 6-mm bolt near to the ATU mounting section and connect the copper band to the bolt with IV cable of 25 square mm in size. With this, user can facilitate temporary grounding work. It's just recommend.

Q39. How much collector current passes through PA at the rated output?

See AP4-1

A39. Approximate TX output power can be calculated by using the equation

$$P_o = P_A I_C \times P_A V_C \times \eta$$

	PA VC	PA IC (1-tone)	Efficiency (η) (1-tone)	Input Current at 24V	Power Supply
FS-5075(500W)	42V	18 to 25A	60 to 45%	45 to 55A	PR-850A (60A)
FS-2575(250W)	42V	9 to 14A	60 to 45%	25 to 30A	PR-850A (40A)
FS-1575(150W)	24V				PR-300 (20A)

Q40. TX output power has dropped just in 8M. Which board has a trouble that resulted in the drop in output power?

A40. If TX output power on a specific band has dropped, this resulted from a trouble with the TX FIL board. In this case, you should focus on the filter switching frequency of the TX FIL board.

To make a general examination on the trouble, you should select [MENU] -> 1. TEST -> 2.TX SELF TEST and conduct self-tests. To make further examination on it, you should select [MENU] -> 9.SERVICE -> 3.RT SETUP -> 2.SELF CHECK and conduct self-checks. If any abnormal values are detected as a result of them, these values will be displayed in “red.”

Q41. During the adjustment of TX output power, the system stopped outputting power and displayed an error message saying “Communication error!.”

A41. Supposed causes and measures:

You should reduce the TX power output to check for the output conditions. If OK, there may be RF interference in the data line between the Control unit and the Transceiver unit.

Have you grounded the Transceiver unit and the Control unit? Have you connected the shielded wires of the signal cable between these units to the housing? Please add EMI cores to cables between the units. If only small EMI cores are available, please add them to the DATA-A and -B lines. Furthermore, make twist the each pair wires.

Q42. During checking for TX power output, the power supply turned OFF and the system started with a message saying “Initializing...” again.

A42. You should try to take the same measures as those described in Q41.

Q43. TUNE NG occurred. I would like to know the procedure for taking measures against the TUNE NG problem. See page 6-59

A43. You should follow the procedure shown below:

- Check for the connections of antenna lead-in wire and grounding ATU.
- Check for the connections of coaxial cable and connectors connected to the ATU.
- Check for any burnout in the ATU.
- Check for TX output power. TX output power ranges from 10W to 15W for tuning. The system initiates tuning even at several watts.
- Conduct self-tests on the ATU and TX self-tests.
- If TUNE NG occurs on a specific band, check for TX output power on the relevant band.
- If TUNE NG occurs on a specific band, change the antenna length. Add a cable of several meters in length to the ATU, and then check for TX output power. If output power is OK, TUNE NG has resulted from extremely high or low antenna impedance, or ATU failure.

Q44. Is transmission enabled even when TUNE NG occurs?

A44. Yes. The system is reduced TX output power automatically. In this case, the ATU is in a through state.

Q45. What is the rated input signal level of the Handset?

A45. It is -36dBm/600 ohms.

The rated input level of the handset used to be -46dBm/600 ohms for the FS-2570 system. Since the MIC level was defined by the sound pressure level of the MIC, it was changed.

Q46. Power supply turned ON, but the window remained blacked out. See OM

A46. You should check whether the display is set to Night mode and the brightness or contrast of the LCD decreased. Please press the [BRILL] -> [1] keys, and then immediately turn the knob clockwise. The window is put into Day mode. The background color of the window is black in Night mode and white in Day mode.

Q47. When turning ON the power, a message saying “Initializing...” remains displayed. I would like to know the causes.

A47. No communications are performed between the Transceiver unit and the Control unit. You should check for the connections of the communication line between the Control unit and the Transceiver unit.

Faulty boards related to this problem are T-CPU board, MOT board with I/F circuit mounted, C-CPU board, and C-IF board with I/F circuit mounted.

Q48. I would like to know whether No.2 Control unit is available to perform NBDP communication.

A48. The NBDP terminal unit can only be connected to No. 1 Control unit. Even if the NBDP terminal unit is connected to No. 2 Control unit, no communications can be performed between the Transceiver and Control units.

Q49. I would like to know conditions for DSC AUTO ACK. See page 4-37

A49. If any PSTN, POSITION, POLLING, or TEST message is received, the system will make an automatic response to the message unless other functions are activated.

Furthermore, while in Individual message mode, an automatic response is made to a message involving any condition that disables calling.

Q50. Is there any method for monitoring the ringtones of DSC messages?

See page 4-41

A50. To monitor the ringtones of DSC messages, you should enter the password: XXXXXX on the SCAN window, and then click on “ROUTINE” or “DISTRESS” to select a scanning and receiving frequency to be monitored. To output monitor tones, you should select [MENU] -> 7.AUDIO -> 2.OFF HOOK -> “SP ON.”

Q51. Is there any method for stopping DISTRESS SCAN mode? See page 6-39

A51. You can stop DISTRESS SCAN mode at a specific scanning frequency by selecting [MENU] -> 9.SERVICE -> 5.TEST -> 4.TA TEST -> DISTRESS SCAN. Of course, you can receive Distress alert at this frequency.

Q52. Is it possible to stop ROUTINE SCAN mode? See OM

A52. ROUTINE SCAN mode is stopped by pressing the [SCAN] key. By turning the knob, you can select a scanning frequency at which ROUTINE SCAN mode should stop. Of course, you can receive Routine messages at the scanning frequency selected.

Q53. Is it possible to check whether or not a Distress alert was transmitted?

See page 4-60

A53. Yes, it is. To check that, you should select [MENU] -> 9.SERVICE -> 2.DSC SETUP -> [LAST DISTRESS LOG]. You will know not only the time at which the Distress alert was transmitted, but also the unit from which it was transmitted through the indication in the UNIT column (“CNTRL 1”: No. 1 control unit, “CNTRL 2”: No. 2 control unit, “ALARM UNIT”: IC-350).

Q54. The Distress alarm did not sound as soon as a Distress alert was received.

Is this normal?

See OM

A54. It is normal. The alarm sounds approximately 30 seconds after the Distress alert message is received. This sequence is intended to support multi-transmission that continuously transmits Distress alerts by switching frequencies from 2 MHz to 16 MHz sequentially.

Q55. I would like to know how to cancel Distress alert.

See OM

A55. When you transmit a Distress alert and then set User Option to “CANCEL,” a Distress alert cancel message saying ‘Select “Yes” to send a cancel message of own DISTRESS call. DSC FREQ: xxMHz’ will appear on the window. Then, you should click “Yes.” The cancel message will be automatically transmitted at all frequencies at which the Distress alert was transmitted. Subsequently, the Distress alert is canceled by voice. This cancel by voice should be broadcasted to all ships at all related SSB frequencies by which the Distress alert was transmitted.

Q56. AUTO, MULTI, and SINGLE modes are available to transmit a Distress alert. What is the difference?

See OM

A56. In AUTO mode, a Distress alert message is transmitted on 2M, 8M, 16M, 4M, 12M, and 6M bands in the order described at intervals of 3.5 to 4.5 minutes, five times each. This operation continues until receipt of the Distress ACK. Upon receipt of the Distress ACK, the alert communication will be initiated on the relevant band.

While in MULTI mode, a Distress alert message is transmitted by switching alert frequencies at 2M, 8M, 16M, 4M, 12M, and 6M bands in the order described consecutively once for each. If no Distress ACK can be received, this operation will be automatically performed once again after a lapse of 3.5 to 4.5 minutes and continue until receipt of the Distress ACK. Upon receipt of the Distress ACK, the

alert communication will be initiated on the relevant band.

While in SINGLE mode, a Distress alert is transmitted five times at a selected Distress frequency. If no Distress ACK can be received, this operation will be automatically performed once again at the same frequency after a lapse of 3.5 to 4.5 minutes and continue until receipt of the Distress ACK. Upon receipt of the Distress ACK, the alert communication will be initiated on the relevant band.

Q57. What happens if I accidentally transmitted a Distress alert and turned OFF the power supply on the way? **See OM**

A57. If you turned OFF the power in the sequence of Distress alert, and then turned it ON again, a message saying “DISTRESS ALERT message has not normally ended.” will appear. Clicking on “Finish” will delete this message and return the display to the RT window. Then, clicking on “Resend” will retransmit the Distress alert.

Q58. Is protection circuit built in the system? **See page 7-12**

A58. Yes, it is. The FS-2575 and FS-5075 systems protect transmission by feeding back the V-SWR signal from the TX-FIL board, PA IC value and PA output V-SWR from the PA board, and UN_BAL signal from the COMB board (only for the FS-5075) to the bias circuit of the 1st amplifier on the DRV board. The FS-1575 system protects transmission by feeding back V-SWR and PA IC value from the PA board to the bias circuit of the 1st amplifier on the PA board.

Q59. I would like to know how to measure tone frequency. **See page 5-32**

A59. TONE signal is outputted to the speaker.
You should select [MENU] -> 7.AUDIO -> 2.OFF HOOK SP -> “SP ON,” and then select [MENU] -> 1.TEST -> 3.TONE TEST -> “1500Hz” to transmit the tone frequency.

Q60. Are front and rear handsets the same in the MIC gain?

A60. The front and rear handsets are designed to provide the same MIC gain. The rated signal level of the handset port is -36dBm/600 ohms.
The MIC level of the front handset is amplified through U3 of the PANEL board, while that of the rear handset is amplified through U5 of the C-IF board.

Q61. What is the cause of low receiver sensitivity on a specific band?

See page 7-37

A61. You should ensure the band range of the RX-FIL board.
In addition, please bypass the RX FIL board to connect the antenna directly to the RX antenna input port of the RX board. If this increased the sensitivity, the low receiver sensitivity resulted from faulty RX-FIL board.

Q62. Is there any limit put on the capacity of SD card of the IB-585 terminal unit?

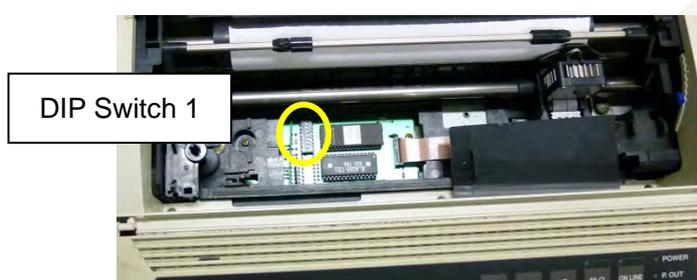
A62. The IB-585 terminal unit can be used with SD-HC cards. However, since a SD card is limited to a file size of 16kB and 512 files, the memory capacity available for the IB-585 is “16kB × 512 = 8MB.”

As a result, 16GB and 32GB SD cards will not make sense if they are used exclusively in the IB-585 terminal unit.

The number of files available with the IB-583 terminal unit is “224.”

Q63. No Norwegian characters and “£” are printed out with the IB-585.

A63. You should make language setting with the [F11] key of the IB-585 terminal unit and set #5 of the DIP switch 1 of the PP-510 Printer to “ON.”



Q64. I implemented the Screen Print menu of the IB-585, but could not print the screen as shown.

A64. You should set #4 of the DIP switch 1 of the PP-510 printer to “ON.” This is intended to make setting of the printer’s leftmost margin. Setting the #4 to “OFF” leaves a six-character margin, while setting it to “ON” leaves zero-character margin.

Q65. No five-digit ID has been given with NBDP. Is it possible to communicate with a coast station having four-digit ID?

A65. No communications can be performed unless the ID has been registered. However, entering “*****” to the five-digit ID allows communications.

Q66. Does the PP-510 printer include the self-test function?

A66. When you turn ON the power of the PP-510 and set it to [NLQ] mode, DIP switch setting guidance will be printed out.

When you turn ON the power of the PP-510 and set it to [LF] mode, the self-test will be initiated to print out the test results.

Q67. Is any battery used in the system?

A67. No, it isn’t. The backup power for the RTC on the T-CPU board uses a super capacitor (C421). The backup period is about one week, but it will deteriorate to about three days in seven years’ time due to deterioration with age.

Q68. I would like to know the procedure for making DSC test calls. See OM

A68. Since DSC test calls are categorized into the Safety call, Distress and Safety frequencies is used. Voice calls after DSC test call is not allowed.

Japan Tokyo Sea Patrol Radio: 004310001

Shanghai, China: 004122100

Chilung, Taiwan: 004162019

Hong Kong: 004773500

Guangzhou, China: 004123100

Charleville/Wiluna, Australia: 005030001

Lyngby, Denmark: 002191000

Procedure)

1. Click on the [OTHER DSC MSG] key.
2. Set "MSG TYPE" to "TEST MSG."
3. Enter the MMSI of the other party of calling in the "TO" column.
4. Set "DSC FREQ" to Distress and Safety frequency ranging from 2 to 16 MHz in consideration of calling distance.
5. Put the cursor on "GO TO CALL," and then press the [ENTER] knob. Transmission will be initiated.
6. Upon completion of transmission, the display will switch to the "WAIT FOR ACK" window to wait for a response from the other party.
7. When receiving a response from the other party, a message saying "TEST ACK received!" will appear on the window. Then, review the response received and complete the test call.
8. If no response from the counter party is received even after a lapse of five minutes or more from the transmission, select a different frequency to make a test call again.

Reference)

For test calls, it is recommended to monitor the ACK reception signal referring to information on page 4-41. You can check communication state.

If no response from the other party, check for TX output power and frequency, and change the frequency or Radio station.

Q69. I would like to know the procedure for conducting Test calls with NBDP.

See OM

A69. You communicate with a radio station handling public communications. When you receive a response from the Coast radio station, you enter an automatic response command such as "TEST+" or "HELP+" to receive a routine message. Of course, you can call an operator with the "OPR+" command to communicate with the operator. In this case, you should ensure the AAIC, CS, and Ship's name beforehand because you will be asked by the operator for the registration with the Coast radio station.

Procedure)

1. Ensure that the reception mode of the NBDP terminal is set to "AUTO."
*** [F3] -> [6]: Manual Reception ***
2. Ensure that the NBDP terminal is set to "Print" mode. In "Print" mode "Print" is displayed on the window.
*** [F1] -> [6]: Real Time Printing ***
3. Set the RF gain of RT to the maximum.
4. Enter a transceiver communication frequency from the NBDP terminal.
*** [F3] -> [9]: Set Frequency ****
5. Select [F3] -> [8] Manual Calling, and then set "MODE" to "ARQ" and "ID" to the ID number of the Coast radio station.
6. Press the [Enter] key. The "Channel Busy Check. To forcibly transmit a call, press the ENTER key." popup window will appear. Ensure that no communication is performed through this channel, and then press the [Enter] key. Calling will be initiated.
7. Upon receipt of a response from the Coast radio station, the "GA+" will be received after automatically exchanging AAB.
8. Type "TEST+" or "HELP+".
9. A routine message will automatically be transmitted from the Coast radio station.
10. If it is ensured that the routine message can normally be received, the test is completed. Press the [F10] Break key to exit from the communication.

Station	CS	MMSI/SC No	ITU CH
Shanghai Radio Station	XSG	2010/004122100	819, 12118, 12142
Guangzhou Radio Station	XSQ	2017/004123100	838, 1268,
Tokyo Sea Patrol Radio Station	JNA	2400/004310001	414, 614, 807, 1222, 1611

Reference)

If no response from the other party, check for TX output power and frequency, and change the frequency or radio station.

Q70. I would like to know DSC frequencies.

A70. Please refer to the table shown below.

TX (kHz)	Rx (kHz)	Remarks	File name
2187.5	2187.5	Distress and safety Frequency	
4207.5	4207.5		
6312.0	6312.0		
8414.5	8414.5		
12577.0	12577.0		
16804.5	16804.5		
458.5	455.5	International Frequency	INTL-0.4M *1
2189.5	2177.0		INTL-2M
4208.0	4219.5		INTL-4M
6312.5	6331.0		INTL-6M
8415.0	8436.5		INTL-8M
12577.5	12657.0		INTL-12M
16805.0	16903.0		INTL-16M
18898.5	19703.5		INTL-18M
22374.5	22444.0		INTL-22M
25208.5	26121.0		INTL-25M
4208.5	4220.0	Local-1 Frequency	LOCAL1-4M
6313.0	6331.5		LOCAL1-6M
8415.5	8437.0		LOCAL1-8M
12578.0	12657.5		LOCAL1-12M
16805.5	16903.5		LOCAL1-16M
18899.0	19704.0		LOCAL1-18M
22375.0	22444.5		LOCAL1-22M
25209.0	26121.5		LOCAL1-25M
4209.0	4220.5	Local-2 Frequency	LOCAL2-4M
6313.5	6332.0		LOCAL2-6M
8416.0	8437.5		LOCAL2-8M
12578.5	12658.0		LOCAL2-12M
16806.0	16904.0		LOCAL2-16M
18899.5	19704.5		LOCAL2-18M
22375.5	22445.0		LOCAL2-22M
25209.5	26122.0		LOCAL2-25M

Note:

The DSC frequency for Ship-to-ship Routine calling is 2177.0 kHz for both TX and RX.

**1: Not available*

Appendix 1. Parameter Browser

General Menu Manager: Parameter Browser installed onto the PC is software capable of browsing set values of the FS-xx75 system and making the system settings.

The program control number of the FS-xx75 system that allows the use of General Menu Manager is to be APL: 0550243-01.03 or later.

Summary

1. Make a LAN connection between the PC and the FS-xx75T unit. The system does not support serial connections.
2. To boot General Menu manager and make a LAN connection to the FS-xx75 system, be sure to select [MENU] -> 9.SERVICE -> 7.OTHER -> P-BROWSER -> "ON." When turning ON the power supply again, "P-BROWSER" will be set back to "OFF." To exit General Menu Manager, turn OFF the power of the FS-xx75 system.
3. Follow the IP address set to the FS-xx75 system to make IP address setting used to make a LAN connection Between the PC and the system.
4. Connection to the FX-xx75 system is only allowed through the TCP Port "10999."

Dest Addr	▶	
TCP Port	▶	10999
Connect		

5. The password to be entered in General Menu Manager is "XXXXXX." No user ID is required.
6. When the Communication mode of General Manu Manager is set to "Local mode," operation to be performed when the [SET] key is pressed varies. The Local mode is edit mode with the PC.
 - When Local mode is to "ON":
Internal memory of General Menu Manager will be updated. An XML file in which setting parameters are saved will not be updated. To update the XML file, select "Main -> Save As" to save the parameters.
 - When Local mode is set to "OFF" and LAN connection to "CONNECT":
Set values will be uploaded onto the FS-xx75 system.

AP1-1

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AP1.1 Installation

AP1.1.1 Installation

1. Click on “GMMSetup.msi.”

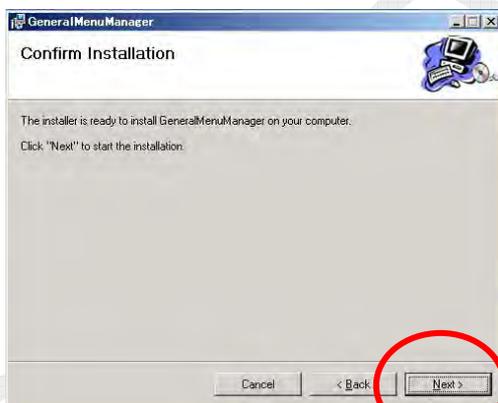
The “General Menu Manager Setup Wizard” window will open. Run the setup wizard following the guide displayed on the Wizard window.



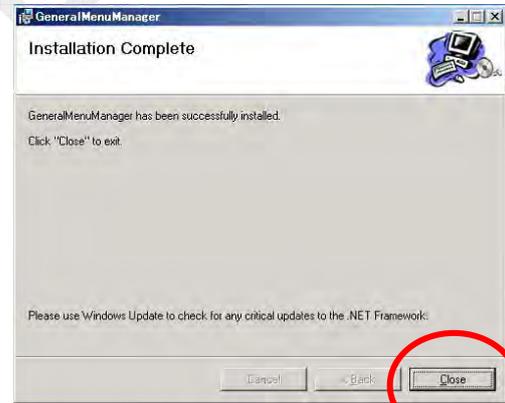
Step-1



Step-2



Step-3



Step-4

2. “Furuno” folder is created at the destination. “General Menu Manager” and “IF-NMEA2K1” files are saved in this folder. The “General Menu Manager” file is used as “Parameter Browser.” The “IF-NMEA2K1” file will not be used.

Note)

When you reinstall a General Menu Manager program, delete this program first.

AP1-2

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AP1.2 Booting General Menu Manager

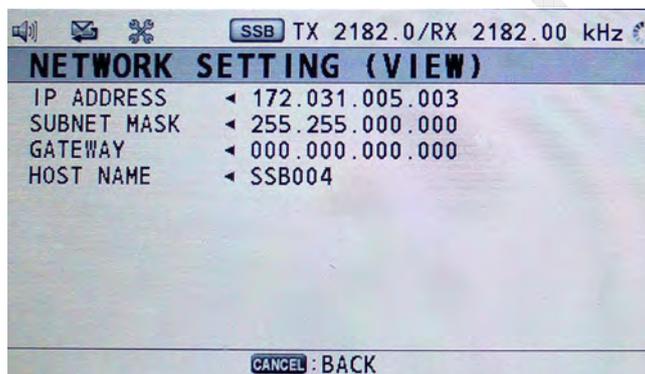
Procedure)

1. Make a LAN connection between the PC and the FS-xx75 unit.
Follow the IP address set to the FS-xx75 system to make IP address setting used to make a LAN connection between the PC and the system.

	Factory set FS-xx75 Network Setting	Example of PC IP Address Setting
IP ADDRESS	172.031.005.003	172.031.005.001
SUBNET MASK	255.255.000.000	255.255.000.000
GATEWAY	000.000.000.000	N/A

Reference)

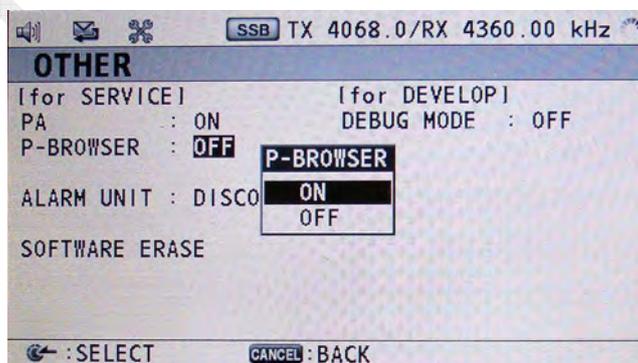
To ensure the FS-xx75 network setting, select [MENU] -> 5.SYSTEM -> 9.NETWORK.



2. Select [MENU] -> 9.SERVICE -> 7.OTHER -> P-BROWSER -> “ON.”

Note)

“P-BROWSER” will be set back to “OFF” when turning ON the power again.

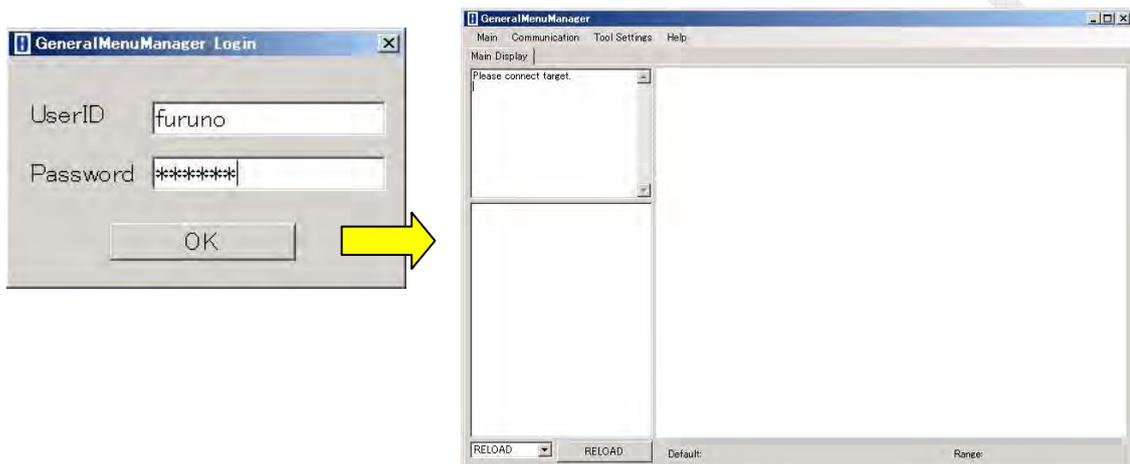


AP1-3

3. Open the “Furuno” to boot “General Menu Manager.” The “Login” will appear.

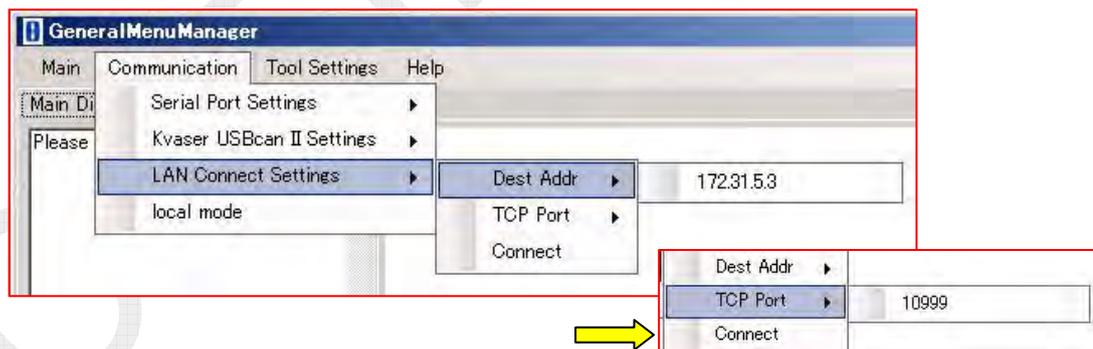
- UserID : It is acceptable to enter any user ID or enter nothing.
- Password : Enter “XXXXXX.”

Then, click [OK]. The “General Menu Manager” window will appear.



4. Click on “LAN Connect Settings” in the “Communication” bar menu, and then click on “Connect.”

- Dest Addr : Set to 172.31.5.3 (IP address set to the FS-xx75 system)
- TCP Port : Set to 10999



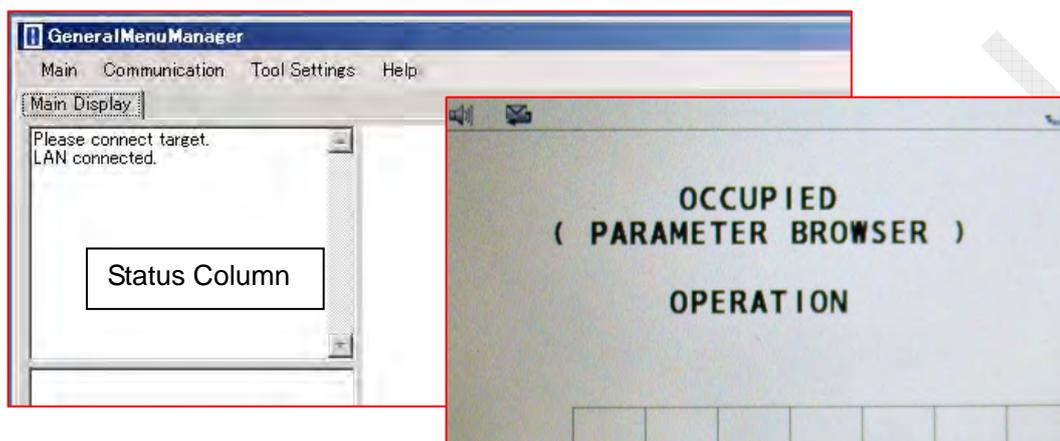
AP1-4

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- Click on “Connect.” A message saying “LAN connected.” message will be displayed in the Status Column on the “Main Display” window. The Status Column is used to display status information on a certain operation. Furthermore, the FS-2575C display switches to the “OCCUPIED (PARAMETER BROWSER) OPERATION” window.



Example of Status Display on the “Main Display” Window

In case of Normal Connection/Operation	Indication
Please connect target.	Request for connection to FS-xx75
LAN connected.	Execution of a LAN connection
Connect Target Start	Execution of a connection to Connect Target
Reload Start	Initiation of reloading.
Reload End	Completion of reloading.
Set Start (50600000)	Initiation of setting.
Completed. (FAX RX(50600000))	Execution of setting.
Set End (50600000)	Completion of setting.
Reload Start (50800000)	Initiation of reloading.
Completed. (IP ADDRESS(50800000))	Execution of reloading.
Reload End (50800000)	Completion of reloading.
Set Start (50800000)	Initiation of setting.
Completed. (IP ADDRESS(50800000))	Execution of setting.
Set End (50800000)	Completion of setting.
In case of Faulty LAN Connection	Indication
LAN disconnected	Execution of and failure in a LAN connection.
Connect Target Start	Execution of Connect Target.
Data kind error (middle) Time out error! (XML REQUEST)	Failure in connection to Connect Target

Note) The numbers such as “50800000” is the ID number of parameters internally processed.

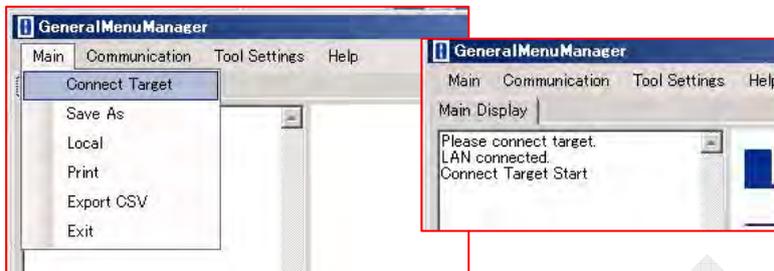
AP1-5

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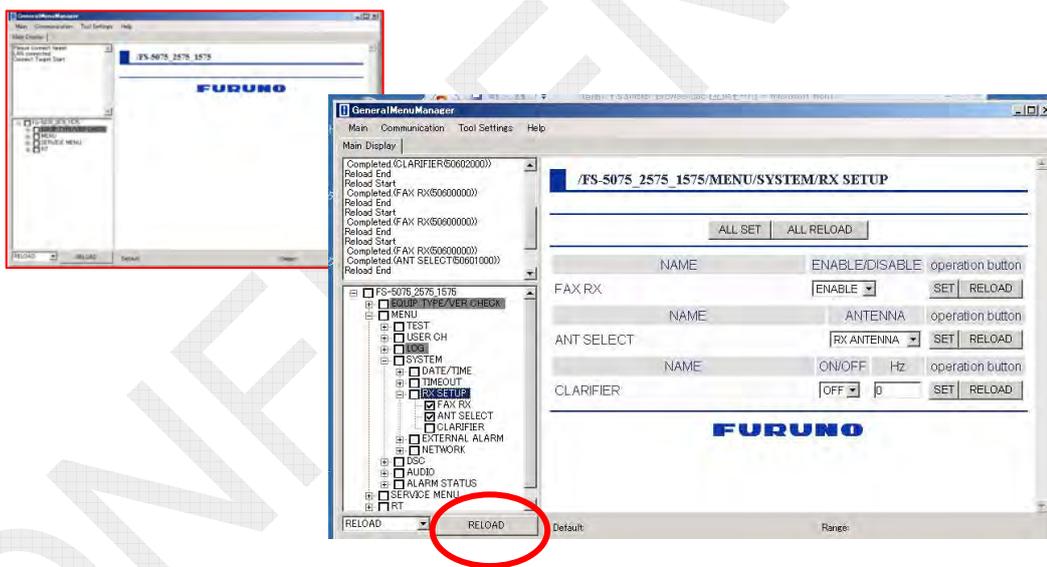
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- Open “Main” in the bar menu, and then click on “Connect Target.” A message saying “Connect Target Start” will be displayed in the Status Column. Upon completion of the connection, a menu tree of the FS-xx75 system will be displayed.



- Click on a menu item in the menu tree. The popup window of the menu item will appear on the Main window. Note that the window just displays menus, but parameters are not up to date. To update them, press the [RELOAD] key.



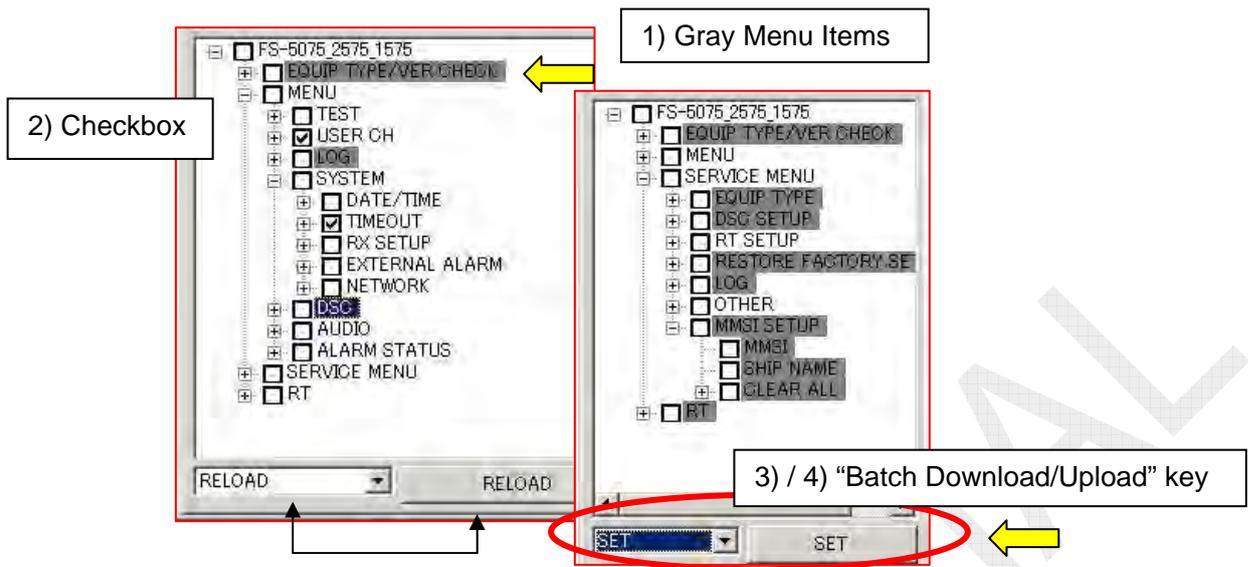
AP1-6

AP1.3 Display

AP1.3.1 Display

The screenshot shows the 'General Menu Manager' application window. On the left is a tree view of menu items, including 'FAX RX', 'ANT SELECT', and 'CLARIFIER'. The main window displays the configuration for the selected 'FAX RX' menu, with fields for 'ENABLE/DISABLE', 'ANTENNA', 'ON/OFF', and 'Hz'. At the bottom, there are 'RELOAD' buttons and 'Default'/'Range' fields. Annotations include:

- ALL RELOAD:** Reloads all menus on the Main Display in a batch.
- ALL SET:** Makes setting of all menus on the Main Display in a batch.
- RELOAD:** Reloads menus on the Main Display.
- SET:** Makes setting of menus on the Main Display.
- Displays statuses:** Points to the status log on the left.
- Displays a Menu Trees:** Points to the menu tree on the left.
- Main Window: Displays the contents of a menu selected.** Points to the main configuration area.
- Batch Download/Upload key:** Points to the 'RELOAD' button at the bottom left.
- Parameter Information:** Points to the 'Default' and 'Range' fields at the bottom.



1. Menu tree display window

1) Gray Menu Items

It is indicated that the menu items shown in gray are not covered by the reloading and setting functions.

2) Check box

When a checkbox is checked, the relevant menu will be covered by the “Batch Download/Upload” key.

For example, when the “Batch Download/Upload” key is pressed in “SET” mode, all parameters contained in the checked menu item will be set (uploaded) to the FS-xx75 system.

3) When the “Batch Download/Upload” key is pressed in “RELOAD” mode:

Data will be loaded from the FS-xx75 system to General Menu Manager.

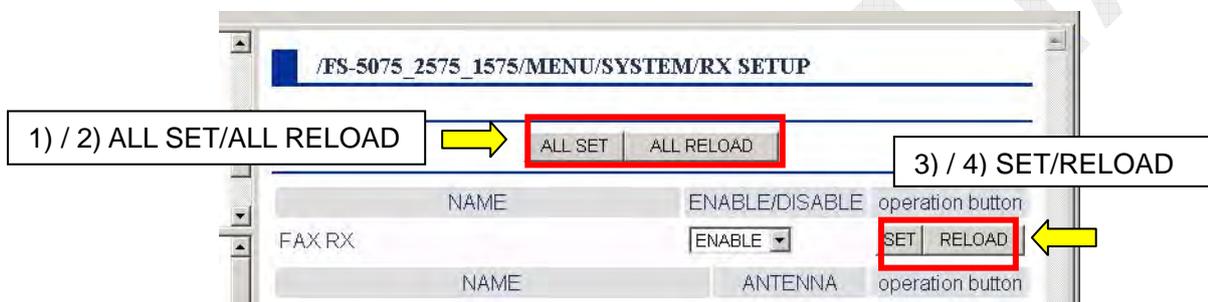
Set the list box to “RELOAD,” and then click on the [RELOAD] key. The FS-xx75 setting information will be downloaded to General Menu Manager. Setting information on all parameters checked on the route of Menu Tree window will be downloaded in a batch.

- 4) When the “Batch Download/Upload” key is pressed in “SET” mode:
 Data will be loaded from General Menu Manager to the FS-xx75 system.
 Set the list box to “SET,” and then press the [SET] key. The General Menu Manager setting information will be uploaded to the FS-xx75 system. Setting information on all parameters checked on the Menu Tree window will be uploaded in a batch.

Note)

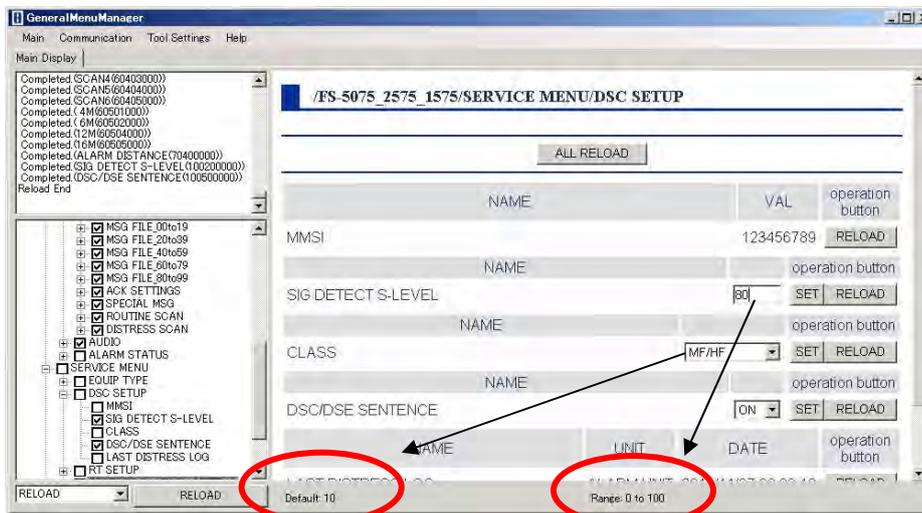
An XML file in which setting parameters are saved will not be updated. To update the XML file, select Main -> Save As to save the parameters.
 When General Menu Manager is set to “Local mode,” only the [SET] key will be enabled.

2. Main window



- 1) ALL SET
 This key is used to upload all settings displayed on the Main window in a batch from General Menu Manager to the FS-xx75 system.
- 2) ALL RELOAD
 This key is used to download all set values of a parameter displayed on the Main window in a batch from the FS-xx75 system to General Menu Manager and, subsequently, update the contents of the window.
- 3) SET
 This key is used to upload only the setting of the parameter displayed on the left from General Menu Manager to the FS-xx75 system.
- 4) RELOAD
 This key is used to download only the setting of the parameter displayed on the left from the FS-xx75 system and, subsequently, update the contents of the window.

3. Parameter information



- 1) Parameter Information Bar: Default
When the cursor is put on the list box on the Main window, the default of the relevant parameter will be displayed on the Main window.
- 2) Parameter Information Bar: Range
When the cursor is put on the edit box on the Main window, the settable range of the relevant parameter will be displayed on the Main window.

AP1.3.2 Menu Tree

Bar Menu	Sub Menu			Function
Main	Connect Target			When a LAN connection has been made with the FS-xx75 system, clicking on this sub menu will download setting parameter information of the FS-xx75 to the PC side. When the information is successfully downloaded, a menu tree will be displayed on the Menu Tree Window. <i>Note) The LAN connection has to be made beforehand by selecting Communication -> LAN Connect Settings -> Connect.</i>
	Save As			Saves setting parameter information displayed on General Menu Manager in the PC as an XML file. This PC allows for editing data saved in the XML file.
	Local			Loads the XML file saved in the PC into General Menu Manager. <i>Note) Check the "Local mode" checkbox in the Communication menu beforehand.</i>
	Print			Prints out the settings displayed on the Main window.
	Export CSV			Saves setting parameter information displayed on General Menu Manager in the PC as a CSV file. <i>Note-1) The function of saving information in the CSV file is only intended to browse the information and does not allow for reloading it in General Menu Manager using the CSV file in which it was saved. To reload the information, it has to be saved in an XML file format.</i> <i>Note-2) All setting parameters are forcedly written to the CSV file.</i>
	Exit			Exits from General Menu Manager.
Communi- cation Cont'd	Serial Port Settings	COM Port		Not used with the FS-xx75. Used with other models.
		Baud Rate	1200 - 115200	
	Kvsar USBcan Settings			Not used with the FS-xx75. Used with other models.
	LAN Connect Settings Cont'd	Dest Addr	172.31.5.3	Makes setting of network IP address of the FS-xx75. <i>Note) The IP address of the FS-xx75 can be verified by selecting [MENU] -> 5. SYSTEM -> 9.NETWORK -> IP ADDRESS.</i>

Communi- -cation	LAN Connect Settings	TCP Port	10999	Enters a port number to make a LAN connection. Connection to the FS-xx75 system is only allowed through the TCP Port "10999." Do not make any change to the port number.	
		Connect/ Disconnect		Initiates or terminates making a LAN connection between General Menu Manager and the FS-xx75 system. "Connect" is displayed when the LAN connection is not made. "Disconnect" is displayed when it is made.	
	Local mode		<p>Allows for switching between LOCAL MODE and NORMAL MODE. When this checkbox is checked, communications will be performed in Local mode. If Not, communications will be performed in NORMAL MODE.</p> <ul style="list-style-type: none"> ▪ LOCAL MODE: Loads setting parameter information from the XML file without connecting with the FS-xx75 to allow for editing the contents with General Menu Manager. ▪ NORMAL MODE: Performs operation by connecting with the FS-xx75. 		
Tool Settings	Auto Reload		<p>Clicking on "Auto Reload" will switch the auto reload function setting between "ON" and "OFF."</p> <ul style="list-style-type: none"> ▪ When the auto reload function is set to "ON": When a LAN connection has been made with the FS-xx75, General Menu Manager will automatically reload the setting parameters of the FS-xx75 every time the window switches. ▪ When the auto reload function is set to "OFF": When a LAN connection has been made with the FS-xx75, General Menu Manager will not automatically reload the setting parameters of the FS-xx75 even if the window switches. Unless user presses the [RELOAD] key, the setting parameters will not be reloaded. 		
Help	Version Information		Displays the software version information of General Menu Manager.		

XML

XML (Extensible Markup language) is one of markup languages used to describe the meanings and structures of documents and data.

The markup language describes contents as well as additional information using specific codes in the text file. Since XML allows for creating markup languages with unique meanings and structures while using a unified notation, the XML defines data formats used to exchange communications and information between software as well as file formats used to save various types of data.

XML File

For the purposes of this Document, the term "XML file" means files that save parameters set to the FS-xx75 system in an XML format.

AP1-12

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AP1. 4 Operation

LOCAL MODE and NORMAL MODE:

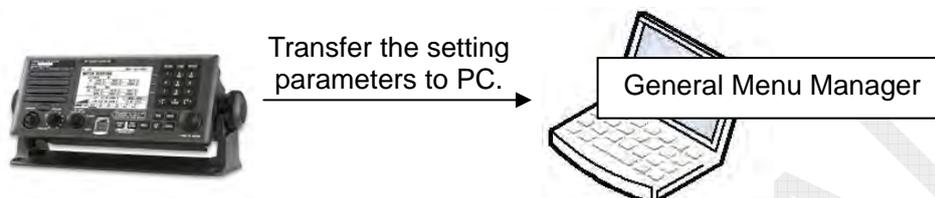
General Menu Manager is available in two modes: “LOCAL MODE” and “NORMAL MODE.” These modes can be switched by clicking on “Communication” in the menu bar, and then on “local mode.”



- **LOCAL MODE;**
This mode is used to edit the contents of the XML file loaded into General Menu Manager. To incorporate the edited results into the XML file, the results should be saved by clicking on “Main” in the bar menu, and then on “Save As.”
- **NORMAL MODE;**
This mode is used to make General Menu Manager edit the setting parameters of the FS-xx75 system. To incorporate the edited results into the FS-xx75 system, the results should be uploaded by clicking on the [SET] key.

AP1.4.1 RELOAD

Procedure for displaying the setting parameters of the FS-xx75 on General Menu Manager



Procedure)

1. Boot General Menu Manager, and then connect it to the FS-xx75 system.
 - 1) Select [MENU] -> 9.SERVICE -> 7.OTHER -> P-BROWSER -> "ON";
 - 2) Select Communication -> LAN Connect Settings -> Connect
 - 3) Select Main -> Connect Target.
2. Select "RELOAD" from the list box of the "Batch Download/Upload" key, and then click on the [RELOAD] key.
3. The FS-xx75 system will initiate downloading the setting parameters. Data transfer status is displayed on the "Main Display" window. When the "Main Display" window stops displaying the status, i.e., the reload of data is completed, the download of the setting parameters is completed.

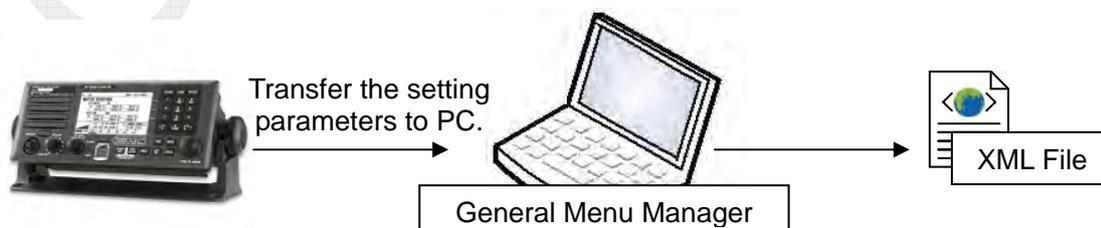
Reference)

- "RELOAD" menu allows for downloading only the setting parameters of menus whose checkboxes in the menu tree were checked.
- The checkbox of "LOG" in the menu tree cannot be checked.

AP1.4.2 Save As

Procedure for saving the setting parameters of the FS-xx75 in a file

This procedure is used to save information on setting parameters that were loaded from the FS-xx75 into General Menu Manager in the PC file. The file in which the setting parameters were saved is referred to as the "XML file."



Procedure)

1. With reference to information in “AP1.4.1 RELOAD,” download the setting parameter information of the FS-xx75 system to General Menu Manager.
2. Click on “Main” in the bar menu, and then on “Save As.”
3. The File Save window will appear. Then, enter a file name to save the setting parameter information. Be sure to use “.xml” as the file identifier.
The contents displayed on General Menu Manager will be saved in the XML file.

AP1.4.3 Upload

Procedure for uploading the settings of General Menu Manager onto the FS-xx75

This procedure is used to edit the setting parameters after loading them from the FS-xx75, and subsequently upload the edited contents to the FS-xx75.



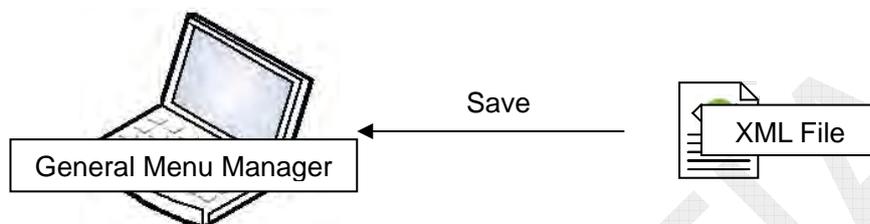
Procedure)

1. With reference to information in “AP1.4.1 RELOAD,” download the setting parameter information of the FS-xx75 system to General Menu Manager.
2. Select a parameter to be edited from the Menu Tree window, and then display the relevant menu on the Main window.
3. Use the list box or the edit box to edit the contents to be set.
4. Press any of the following three [SET] keys to upload the contents of the setting. However, be noted that parameters to be uploaded vary with the [SET] key pressed.
 - [SET] key on the Main window (Uploading the contents by individual parameter)
 - [ALL SET] key on the Main window (Uploading the contents displayed on the Main window)
 - [SET] key for the “Batch Download/Upload” key in NORMAL MODE

AP1.4.4 Local Mode

Procedure for loading the contents of the XML file to General Menu Manager and editing them

This procedure is used to load parameters described in the XML file to General Menu Manager and edit them.



Procedure)

1. Boot General Menu Manager, and subsequently click on “Main” in the menu bar, and then on “Local.”
2. Select an “XML file” to be loaded from the “File Select” window, and then click “OK.”
3. Click on “Communication” in the menu bar, and then on “local mode.” General Menu Manager will be set to “LOCAL MODE.”
4. Select a parameter to be edited from the Menu Tree window, edit the parameter, and then click on the [SET] key or [ALL SET] key of the relevant parameter.

Note)

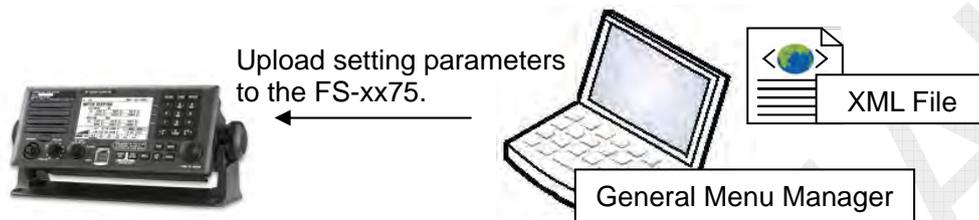
At this point, the contents of the internal memory of General Menu Manager are changed. This never means that the contents of the XML file have been changed.

5. Upon completion of editing, the “XML file” edited is saved by selecting “Main” in the menu bar, and then on “Save As”.

AP1.4.5 Uploading XML File to FS-xx75

Procedure for uploading the contents of XML file from General Menu Manager to the FS-xx75

This procedure is used to upload the set contents of the “XML file” from General Menu Manager to the FS-xx75 system



Procedure)

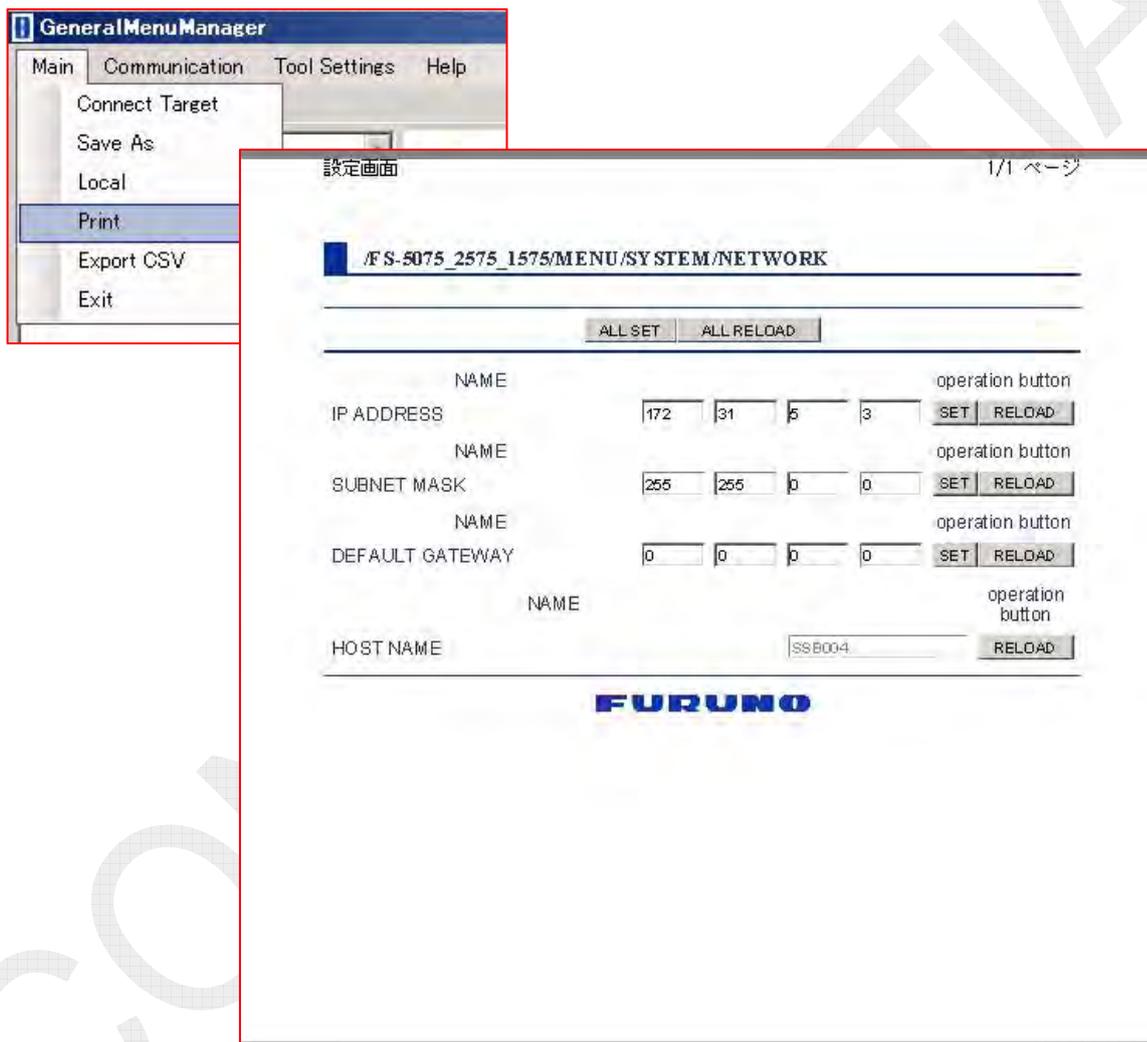
1. Boot General Menu Manager, and then connect it to the FS-xx75 system.
 - 1) Select [MENU] -> 9.SERVICE -> 7.OTHER -> P-BROWSER -> “ON”;
 - 2) Select Communication -> LAN Connect Settings -> Connect
 - 3) Select Main -> Connect Target.
2. Ensure that General Menu Manager is set to “NORMAL MODE.” If not, click on “Communication” in the menu bar, and then on “local mode” to switch General Menu Manager to “NORMAL MODE.”
3. Click on “Main” in the menu bar, and then on “Local.”
4. Select an “XML file” to be loaded from the “File Select” window, and then click “OK.”
5. Press any of the following three [SET] keys to upload the contents of the setting. However, be noted that parameters to be uploaded vary with the [SET] key pressed.
 - [SET] key on the Main window (Uploading the contents by individual parameter)
 - [ALL SET] key on the Main window (Uploading the contents displayed on the Main window)
 - [SET] key for the “Batch Download/Upload” key in NORMAL MODE

AP1.5 Other Operations

AP1.5.1 Printing out data displayed

Display a menu to be printed out, and click on “Main” in the menu bar, and then on “Print.”

The Preview window will appear. Click on the Print key to print out the menu.

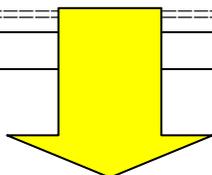


AP1.5.2 Saving All Parameters in CSV File Format

To save all parameters in a CSV file format, click on “Main” in the menu bar, and then on “Export CSV.”

It is not allowed to edit and write the parameters onto the FS-xx75 system using this file.

/FS-5075_2575_1575									
=====FS-5075_2575_1575=====									
=====EQUIP TYPE/VER CHECK=====									
EQUIP TYPE/VER CHECK									
=====MENU=====									
=====TEST=====									
=====DAILY TEST=====									
DAILY TEST	TEST END.								
=====DAILY TEST RESULT=====									
INFO	2011/10/5 7:16	FURUNO	123456789						
APPLICATION	0550243-01.03								
CPLD	0550245-01.01								
78K BOOT	0550245-01.01								
TRX	OK								
DSC	OK								
WR1	OK								
WR2	OK								
ALARM UNIT	-								
=====TX SELF TEST=====									
TX SELF TEST	TEST END.								
=====TX SELF TEST RESULT=====									
INFO	2011/10/5 7:15	FURUNO	123456789						
SWREG1	OK								
SWREG2	-								
CODEC	OK								
PLL	OK	OK	OK	OK	OK	OK	OK	OK	OK
TX	OK								
DRV	OK								
PA	OK	OK	-	NG					
COMB	-								
TX_FIL	OK	OK	OK	OK	OK	OK	OK	OK	OK
COUPLER	OK								
=====USER CH=====									
=====00-99=====									
0									



AP1.5.3 Registering Name

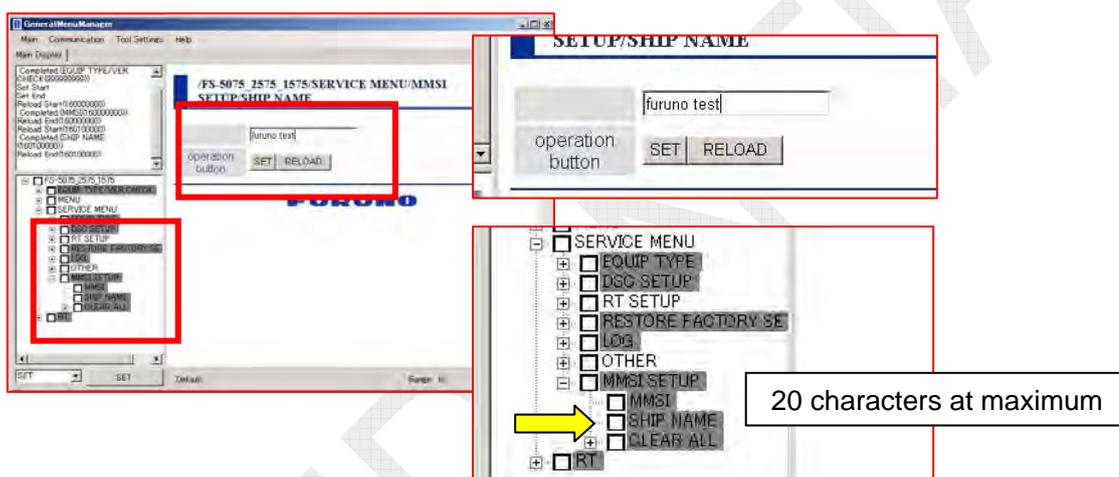
This menu allows for conducting tests, such as DAILY TEST and TX SELF-TEST on General Menu Manager and adding a registered name, such as a ship name, to the test results.

Registration of ship name:

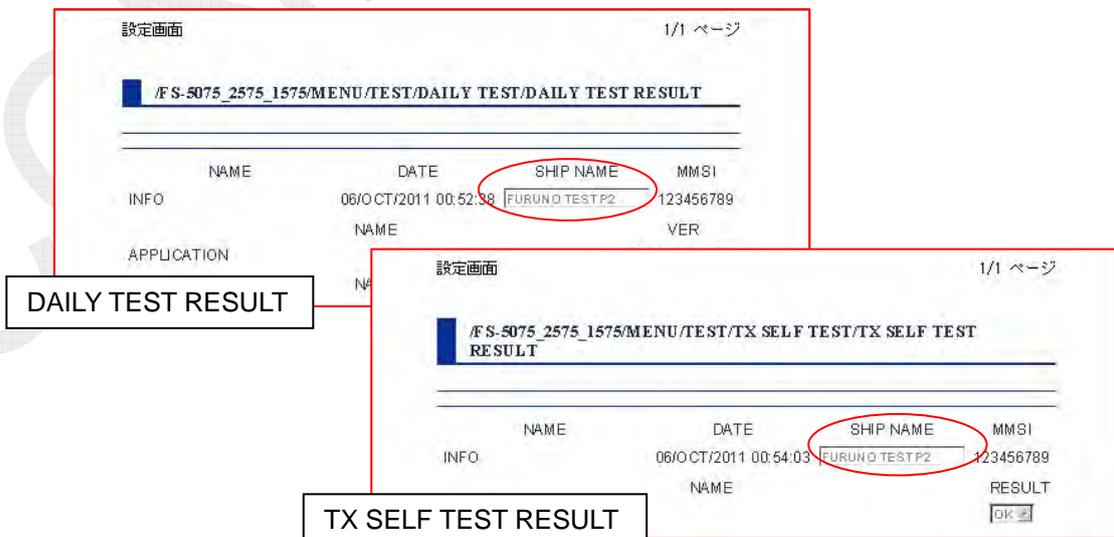
General Menu Manager: SERVICE MENU -> MMSI SETUP -> SHIP NAME

Note)

No ship name will be displayed even if the results of self-check, which were conducted by selecting [MENU] -> 9.SERVICE -> 3.RT SETUP -> 4.SELF CHECK, are printed out.



Since this registration is temporarily saved in the internal memory of General Menu Manager, it will be deleted when General Menu Manager is rebooted. Consequently, registering the ship name prior to conducting the tests will identify the ship to which the self-test results belong.



AP1-20

Procedure)

1. Boot General Menu Manager, and then connect it to the FS-xx75 system.
 - 1) Select [MENU] -> 9.SERVICE -> 7.OTHER -> P-BROWSER -> “ON”;
 - 2) Select Communication -> LAN Connect Settings -> Connect
 - 3) Select Main -> Connect Target.
2. Ensure that General Menu Manager is set to “NORMAL MODE.”
3. Click on SERVICE MENU in the menu tree -> MMSI SETUP -> “SHIP NAME.”
A ship name will be displayed on the Main window.

Reference)

Clicking on the [RELOAD] key on the Main window will reload the ship name set to the FS-xx75 system.

4. Enter a ship name to be newly set, and then click on the [SET] key.

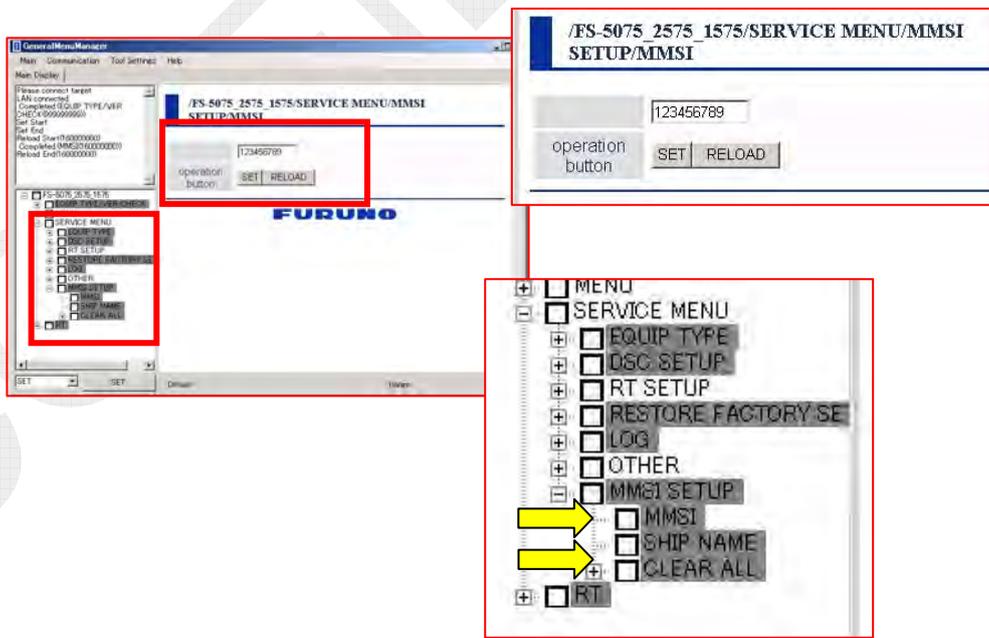
AP1.5.4 Making MMSI Setting

Normally, to make MMSI setting, press the [S1] key on the T-IF board of the FS-xx75T unit, and then enter the password.

General Menu Manager allows for making MMSI setting without performing the operation aforementioned.

MMSI registration:

General Menu Manager: SERVICE MENU -> MMSI SETUP -> MMSI



Procedure)

1. Boot General Menu Manager, and then connect it to the FS-xx75 system.
 - 1) Select [MENU] -> 9.SERVICE -> 7.OTHER -> P-BROWSER -> "ON";
 - 2) Select Communication -> LAN Connect Settings -> Connect
 - 3) Select Main -> Connect Target.
2. Ensure that General Menu Manager is set to "NORMAL MODE."
3. Click on SERVICE MENU in the menu tree -> MMSI SETUP -> "MMSI."
MMSI will be displayed on the Main window.

Reference)

Clicking on the [RELOAD] key on the Main window will reload the MMSI set to the FS-xx75 system.

4. Enter MMSI, and then click on the [SET] key.
5. Reboot the power supply of the FS-xx75 again to ensure that the MMSI setting has been properly made.

AP1.5.5 Executing CLEAR ALL

Normally, to execute the CLEAR ALL menu, press the [S1] key on the T-IF board of the FS-xx75T unit, and then enter the password.

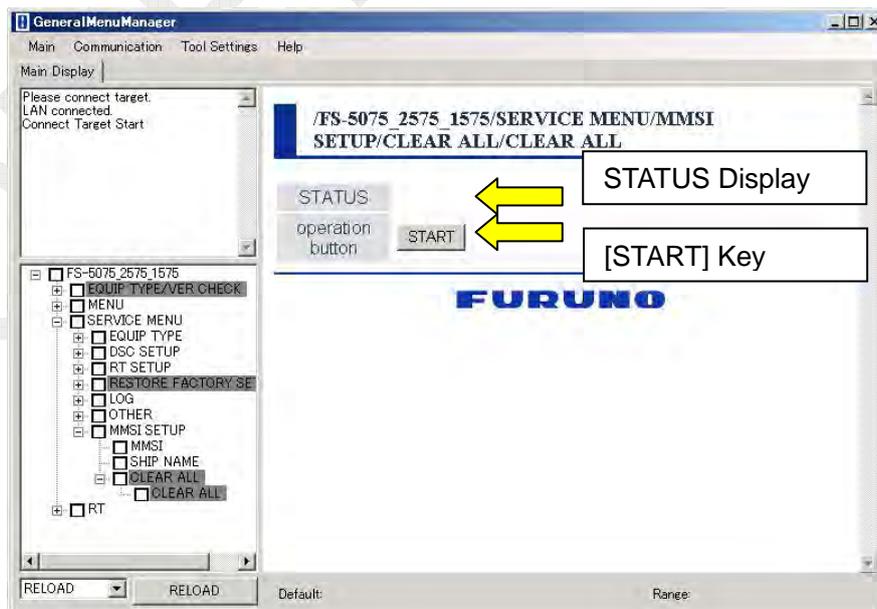
General Menu Manager allows for executing the CLEAR ALL menu without performing the operation aforementioned.

CLEAR ALL:

General Menu Manager: SERVICE MENU -> MMSI SETUP -> CLEAR ALL

Procedure)

1. Boot General Menu Manager, and then connect it to the FS-xx75 system.
 - 1) [MENU] -> 9.SERVICE -> 7.OTHER -> P-BROWSER -> ON;
 - 2) Communication -> LAN Connect Settings -> Connect
 - 3) Main -> Connect Target
2. Ensure that General Menu Manager is set to “NORMAL MODE.”
3. Click on SERVICE MENU in the menu tree -> MMSI SETUP -> “CLEAR ALL.” “operation button” for the CLEAR ALL menu will be displayed on the Main window.
4. Click on the [START] key on the Main window.
5. When the “STATUS” display switches to “CLEAR END,” the CLEAR ALL menu is completed.
6. Set values except MMSI and MAC address are cleared. Make setting of these values again.

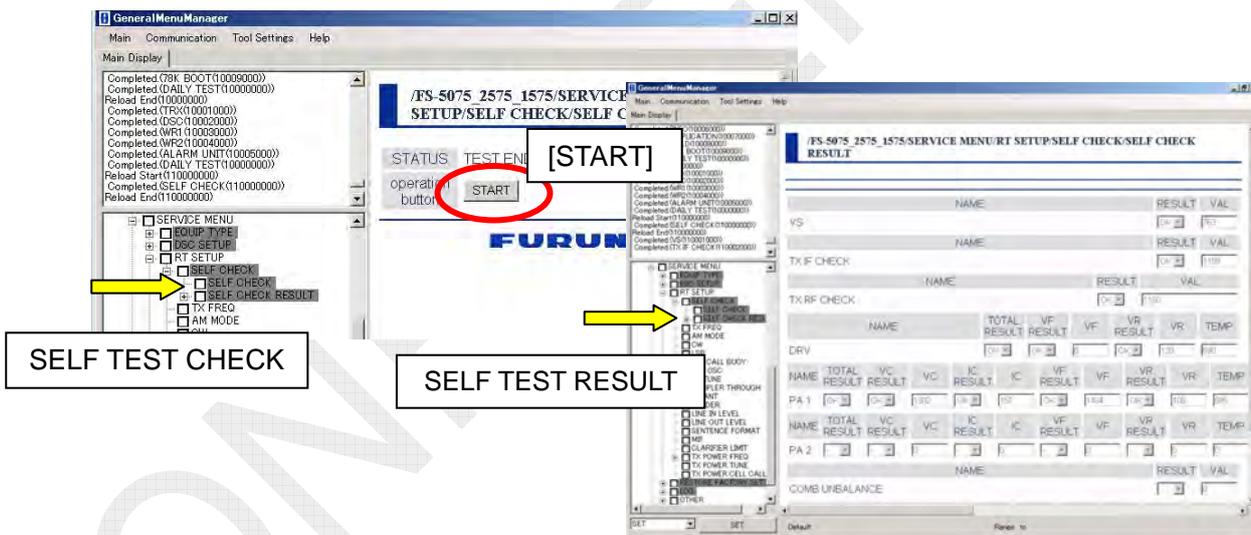


AP1.5.6 Conducting DAILY TEST, SELF-TEST, and SELF-CHECK

General Menu Manager allows for conducting DAILY TEST, SELF-TEST, and SELF-CHECK.

Procedure)

1. Boot General Menu Manager, and then connect it to the FS-xx75 system.
 - 1) [MENU] -> 9.SERVICE -> 7.OTHER -> P-BROWSER -> ON;
 - 2) Communication -> LAN Connect Settings -> Connect
 - 3) Main -> Connect Target
2. Ensure that General Menu Manager is set to “NORMAL MODE.”
3. Select a test item to be conducted from the menu tree.
4. Click on the [START] key on the Main window.
5. When the “STATUS” display switches to “Completed (xxxxx),” the test is completed.
6. To display the test results, click on “xxxx Result” shown below the test item.

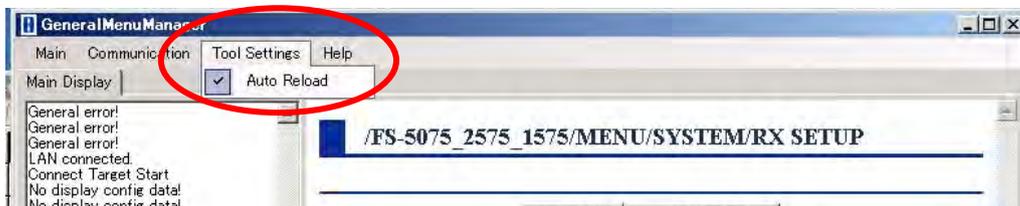


Reference)

Registering a ship name in the “AP1.5.3 Registering Name” beforehand will display the ship name on the DAILY TEST/SELF TEST Results window.

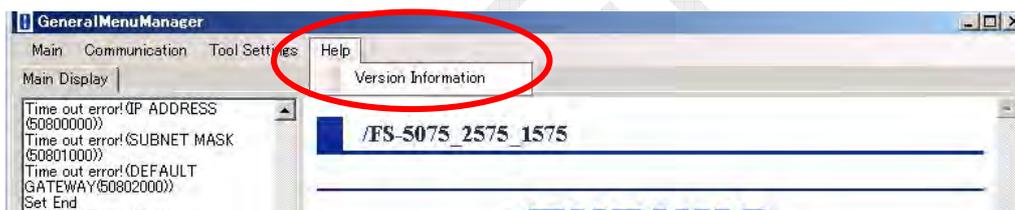
AP1.5.7 Making AUTO RELOAD Setting

To automatically reload data from the FS-xx75 system when a menu is opened, click on “Tool Settings” in the bar menu, and then check “Auto Reload.”



AP1.5.8 Verifying Version of General Menu Manager

To verify the version of software of General Menu Manager, click on “Help” in the bar menu, and then on “Version Information.”



Appendix 2. Message List

AP2.1 Messages related to DSC Call

1. *Sending DISTRESS ALERT*

Indicates that a DSC Distress alert is being transmitted. The condition under which this message is deleted is that the transmission of the Distress alert is completed or failed.

2. *Resend DISTRESS ALERT* *[ENTER]: Pause RESEND TIMER* *[CANCEL]: Stop alarm*

A warning alarm sound goes off. It goes off when the remaining time before the Distress alert is retransmitted comes to 10 seconds. The condition for stopping this alarm sound is that the [ENTER] knob or the [CANCEL] key is pressed.

3. *DISTRESS ALERT message received!* *[CANCEL]: Stop alarm*

A Distress alarm sound goes off. It goes off when a Distress alert message is received. The condition for stopping this alarm sound is that the [CANCEL] key is pressed.

4. *DISTRESS ACK received!* *[CANCEL]: Stop alarm*

A Distress alert acknowledgement alarm sound goes off. It is outputted when a Distress alert acknowledgement for the first Distress alert from own or other ship is received. The condition for stopping this alarm sound is that the [CANCEL] key is pressed.

5. *DISTRESS ACK received!* *[CANCEL]: Stop alarm*

A self-terminating alarm sound goes off. It goes off when a Distress alert acknowledgement for any already-received Distress alert acknowledgement (from own or other ship) other than the first acknowledgement is received. The condition for stopping this alarm sound is that the [CANCEL] key is pressed.

6. *DISTRESS CANCELLATION message received!* *[CANCEL]: Stop alarm*

A Distress alert acknowledgement alarm sound goes off. It goes off when a Distress Cancellation message is received. The condition for stopping this alarm sound is that the [CANCEL] key is pressed.

7. *RELAY INDIVIDUAL message received!* *[CANCEL]: Stop alarm*

A Distress alarm sound goes off. It goes off when a Relay Individual message is received. The condition for stopping this alarm sound is that the [CANCEL] key is pressed.

8. *RELAY INDIVIDUAL ACK received!* *[CANCEL]: Stop alarm*

A Distress alert acknowledgement alarm sound goes off. It goes off when Relay Individual acknowledgement is received. The condition for stopping this alarm sound is that the [CANCEL] key is pressed.

9. RELAY AREA message received! [CANCEL]: Stop alarm

Distress alarm or self-terminating alarm sound goes off. It goes off when a Relay Area message is received. The condition for stopping this alarm sound is that the [CANCEL] key is pressed.

10. RELAY ALL message received! [CANCEL]: Stop alarm

Distress alarm or self-terminating alarm sound goes off. It goes off when a Relay All message is received. The condition for stopping this alarm sound is that the [CANCEL] key is pressed.

11. RELAY ALL ACK received! [CANCEL]: Stop alarm

Distress alert acknowledgement alarm or self-terminating alarm sound goes off. It goes off when a Relay All Acknowledgement is received. The condition for stopping this alarm sound is that the [CANCEL] key is pressed.

12. NEUTRAL message received! [CANCEL]: Stop alarm

An Urgency alarm sound goes off. It goes off when a Neutral message is received. The condition for stopping this alarm sound is that the [CANCEL] key is pressed.

13. MEDICAL message received! [CANCEL]: Stop alarm

An Urgency alarm sound goes off. It goes off when a Medical message is received. The condition for stopping this alarm sound is that the [CANCEL] key is pressed.

14. URGENCY AREA message received! [CANCEL]: Stop alarm

An Urgency alarm sound goes off. It goes off when an Area (Urgency) message is received. The condition for stopping this alarm sound is that the [CANCEL] key is pressed.

15. SAFETY AREA message received! [CANCEL]: Stop alarm

An ordinary alarm sound goes off. It goes off when an Area (Safety) message is received. The condition for stopping this alarm sound is that the [CANCEL] key is pressed.

16. GROUP message received! [CANCEL]: Stop alarm

An ordinary alarm sound goes off. It goes off when a GROUP message is received. The condition for stopping this alarm sound is that the [CANCEL] key is pressed.

17. URGENCY INDIVIDUAL message received! [CANCEL]: Stop alarm

An Urgency alarm sound goes off. It goes off when an Individual (Urgency) message is received. The condition for stopping this alarm sound is that the [CANCEL] key is pressed.

- 18. SAFETY INDIVIDUAL message received! [CANCEL]: Stop alarm**
An ordinary alarm sound goes off. It goes off when an Individual (Safety) message is received. The condition for stopping this alarm sound is that the [CANCEL] key is pressed.
- 19. ROUTINE INDIVIDUAL message received! [CANCEL]: Stop alarm**
An ordinary alarm sound goes off. It goes off when an Individual (Routine) message is received. The condition for stopping this alarm sound is that the [CANCEL] key is pressed.
- 20. URGENCY INDIVIDUAL ACK received! [CANCEL]: Stop alarm**
An Urgency acknowledgement alarm sound goes off. It goes off when an Individual (Urgency) acknowledgement is received. The condition for stopping this alarm sound is that the [CANCEL] key is pressed.
- 21. SAFETY INDIVIDUAL ACK received! [CANCEL]: Stop alarm**
An ordinary acknowledgement alarm sound goes off. It goes off when an Individual (Safety) acknowledgement is received. The condition for stopping this alarm sound is that the [CANCEL] key is pressed.
- 22. ROUTINE INDIVIDUAL ACK received! [CANCEL]: Stop alarm**
An ordinary acknowledgement alarm sound goes off. It goes off when an Individual (Routine) acknowledgement is received. The condition for stopping this alarm sound is that the [CANCEL] key is pressed.
- 23. POSITION message received! [CANCEL]: Stop alarm**
An ordinary acknowledgement alarm sound goes off. It goes off when a Position message is received. The condition for stopping this alarm sound is that the [CANCEL] key is pressed.
- 24. POSITION ACK received! [CANCEL]: Stop alarm**
An ordinary acknowledgement alarm sound goes off. It goes off when a Position acknowledgement is received. The condition for stopping this alarm sound is that the [CANCEL] key is pressed.
- 25. TEST message received! [CANCEL]: Stop alarm**
An ordinary acknowledgement alarm sound goes off. It goes off when a Test message is received. The condition for stopping this alarm sound is that the [CANCEL] key is pressed.
- 26. TEST ACK received! [CANCEL]: Stop alarm**
An ordinary acknowledgement alarm sound goes off. It goes off when a Test acknowledgement is received. The condition for stopping this alarm sound is that the [CANCEL] key is pressed.

- 27. POLLING message received! [CANCEL]: Stop alarm**
An ordinary acknowledgement alarm sound goes off. It goes off when a Polling message is received. The condition for stopping this alarm sound is that the [CANCEL] key is pressed.
- 28. PSTN message received! [CANCEL]: Stop alarm**
An ordinary acknowledgement alarm sound goes off. It goes off when a Position message is received. The condition for stopping this alarm sound is that the [CANCEL] key is pressed.
- 29. URGENCY INDIVIDUAL ACK received! An ACK we quit waiting for [CANCEL]: Stop alarm**
An Urgency acknowledgement alarm sound goes off. It goes off when an Individual (Urgency) acknowledgement is received, where the system is not in a waiting state for the Individual (Urgency) acknowledgement. The condition for stopping this alarm sound is that the [CANCEL] key is pressed.
- 30. SAFETY INDIVIDUAL ACK received! An ACK we quit waiting for [CANCEL]: Stop alarm**
An ordinary acknowledgement alarm sound goes off. It goes off when an Individual (Safety) acknowledgement is received, where the system is not in a waiting state for the Individual (Safety) acknowledgement. The condition for stopping this alarm sound is that the [CANCEL] key is pressed.
- 31. ROUTINE INDIVIDUAL ACK received! An ACK we quit waiting for [CANCEL]: Stop alarm**
An ordinary acknowledgement alarm sound goes off. It goes off when an Individual (Routine) acknowledgement is received, where the system is not in a waiting state for the Individual (Routine) acknowledgement. The condition for stopping this alarm sound is that the [CANCEL] key is pressed.
- 32. TEST ACK received! An ACK we quit waiting for ordinary ACK Alarm [CANCEL]: Stop alarm**
An ordinary acknowledgement alarm sound goes off. It goes off when a Test (Safety) acknowledgement is received, where the system is not in a waiting state for the Test (Safety) acknowledgement. The condition for stopping this alarm sound is that the [CANCEL] key is pressed.
- 33. Position ACK received! An ACK we quit waiting for ordinary ACK Alarm [CANCEL]: Stop alarm**
An ordinary acknowledgement alarm sound goes off. It goes off when a Position (Routine) acknowledgement is received, where the system is not in a waiting state for the Position (Routine) acknowledgement. The condition for stopping this alarm sound is that the [CANCEL] key is pressed.

- 34. DUPLICATE RELAY ALL message received! [CANCEL]: Stop alarm**
An alarm sound goes off when a Relay All message is received. The condition for stopping this alarm sound is that the [CANCEL] key is pressed.
- 35. DUPLICATE RELAY AREA message received! [CANCEL]: Stop alarm**
An alarm sound goes off when an Area Relay message is received. The condition for stopping this alarm sound is that the [CANCEL] key is pressed.

AP2.2 Messages related to Setting Errors

- 36. The unit will not transmit any DSC call until own ship's MMSI is entered. [CANCEL]: Stop alarm**
A warning alarm sound goes off. It goes off when the system starts up or a DSC call is transmitted without making MMSI setting. The condition for stopping this alarm sound is that the [CANCEL] key is pressed.
- 37. Lost position!! Position was older than 23.5H. You must update position! [CANCEL]: Stop alarm**
A warning alarm sound goes off. It goes off when 23.5 hours or more have elapsed after the last update of the own ship's positional information. The condition for stopping this alarm sound is that the [CANCEL] key is pressed.
- 38. Position data is not updated! Position was older than 4H. Update it. [CANCEL]: Stop alarm**
A warning alarm sound goes off. It goes off when four hours have elapsed after the last update of the own ship's positional information. The condition for stopping this alarm sound is that the [CANCEL] key is pressed or the positional information is updated.
- 39. EPFS error [CANCEL]: Stop alarm**
A warning alarm sound goes off. It goes off when the transmission of positional information from GNSS is lost for a period of 10 minutes.
However, when "INPUT TYPE" is set to "Manual," this alert will not go off. The condition for stopping this alarm sound is that the [CANCEL] key is pressed or the positional information from GNSS is updated.
- 40. Cannot Print. Check Printer. [CANCEL]: Stop alarm**
A warning alarm sound goes off. It goes off when printing paper runs out during printing, anyone tries to print without setting printing paper on the printer, or a print request for data size exceeding the allowable range of the printer is transmitted to make the printer buffer full. The condition for stopping this alarm sound is that the [CANCEL] key is pressed.

41. Continuous NBDP tone signal generating [CANCEL]: Stop alarm

A warning alarm sound goes off. It goes off when a test tone (Mark/Space) is transmitted on the NBDP frequency for a period of 30 or more consecutive seconds. The condition for stopping this alarm sound is that the [CANCEL] key is pressed or the transmission of test tone is stopped.

AP2.3 Messages related to Hardware Errors

42. Communication error! [CANCEL]: Stop alarm

A warning alarm sound goes off. It goes off when communication between the FS-xx75T and the FS-2575C is lost (for a period of 30 seconds). This error is detected by each control unit. The condition for stopping this alarm sound is that the [CANCEL] key is pressed or the communication is resumed.

43. TX PLL UNLOCK [CANCEL]: Stop alarm

A warning alarm sound goes off. It goes off when the PLL of the TX board cannot be locked at the preset frequency. The condition for stopping this alarm sound is that the [CANCEL] key is pressed.

44. RX PLL UNLOCK [CANCEL]: Stop alarm

A warning alarm sound goes off. It goes off when the PLL of the RX board cannot be locked at the preset frequency. The condition for stopping this alarm sound is that the [CANCEL] key is pressed.

45. WR1 PLL UNLOCK [CANCEL]: Stop alarm

A warning alarm sound goes off. It goes off when the PLL of the WR1 board cannot be locked at the preset frequency. The condition for stopping this alarm sound is that the [CANCEL] key is pressed.

46. WR2 PLL UNLOCK [CANCEL]: Stop alarm

A warning alarm sound goes off. It goes off when the PLL of the WR2 board cannot be locked at the preset frequency. The condition for stopping this alarm sound is that the [CANCEL] key is pressed.

47. Tx power reduced. Main AMP heated [CANCEL]: Stop alarm

A warning alarm sound goes off. It goes off when any output level of temperature sensors mounted on PA, PA-1, PA-2 and DRV boards exceeds the threshold continuing for a period of one minute or more and the TX output power has been automatically reduced. The condition for stopping this alarm sound is that the [CANCEL] key is pressed.

48. Tx power reduced. Natural tune [CANCEL]: Stop alarm

A warning alarm sound goes off. It goes off when natural tune occurs. At this time, TX output power automatically reduces until it falls below the threshold. The term “natural tune” means that antenna current flows at a level higher than the specified level, i.e., the impedance of the antenna is exceedingly low.

The condition for stopping this alarm sound is that the [CANCEL] key is pressed.

- Antenna current is 8A at a transmission frequency of not less than 6 MHz.
- Antenna current is 9A at a transmission frequency of less than 6 MHz.

49. Tx power reduced. Ship's main failure [CANCEL]: Stop alarm

A warning alarm sound goes off. It goes off when the Main source switches to the Reserve source and the TX output power has been automatically reduced. The condition for stopping this alarm sound is that the [CANCEL] key is pressed.

50. TUNE NG [CANCEL]: Stop alarm

A warning alarm sound goes off. It goes off when the ATU causes a tune error.

The condition for stopping this alarm sound is that the [CANCEL] key is pressed.

51. VC error! Please power off [CANCEL]: Stop alarm

A warning alarm sound goes off. It goes off when, with the FS-2575 and FS-5075 systems, PA VC lower than 35V continues for a period of three seconds or more. The condition for stopping this alarm sound is that the [CANCEL] key is pressed or VC exceeds the threshold.

With the FS-1575 system, the warning alarm sound goes off when PA VC lower than 18V continues for a period of three seconds or more.

52. INTERCOM calling [CANCEL]: Cancel call

An extension call Ring-back tone goes off. It goes off when one control unit is calling the other control unit using the extension call function.

The condition for stopping this Ring-back tone is that the [CANCEL] key is pressed.

53. INTERCOM incoming Pick up HANDSET: Connect [CANCEL]: Reject

An extension call Ring-back tone goes off. It goes off when one control unit is receiving an extension call from the other control unit. The condition for stopping this Ring-back tone is that the [CANCEL] key is pressed.

AP2.4 Status Messages

54. *TUNING*

This message goes off when the [0/TUNE] key is pressed and held for a period of one second or more and the ATU is in the process of tuning.

55. *TUNE OK*

This message goes off when the ATU is put into a Tuning OK status. It is deleted after a lapse of a given period of time.

56. *Tx*

This message goes off when the PTT key is pressed.

57. *System was rebooted.*

This message goes off when the watchdog timer for any of the SH-2A, DSP, Nios2, and 78K CPU of T-CPU used in the FS-xx75T gets activated to reboot the system. It is deleted after a lapse of a given period of time.

58. *NBDP connecting [CANCEL]: Close window*

This message goes off when the system initiates NBDP connection processing. The condition for deleting the message is that the [CANCEL] key is pressed or the system completes NBDP connection processing.

59. *NBDP disconnecting [CANCEL]: Close window*

This message goes off when the system initiates NBDP disconnection processing. The condition for deleting the message is that the [CANCEL] key is pressed or the system completes NBDP disconnection processing.

60. *CH BUSY! [CANCEL]: Tx cancel*

This message goes off when any DSC message other than a Distress alert cannot be outputted because the transmission frequency is in use. The condition for deleting the message is that the [CANCEL] key is pressed. To retransmit this message, cancel the transmission of the message once, and then transmit it.

61. *Tx power reduced. Continuous operation over one minute on FEC Mode.*

[CANCEL]: Close window

This message goes off when NBDP communication continues for a period of one minute or more in FEC mode with Tx power set to "High." The condition for deleting the message is that the [CANCEL] key is pressed or the system exits from FEC mode. At this time, transmission output power automatically reduces. With the FS-5075 system, it reduces to the LOW 2 level.

62. *PSTN connecting [CANCEL]: Close window*

This message goes off when the system received a PSTN message and is conducting signal strength level tests. The condition for deleting the message is that the [CANCEL] key is pressed or the system receives signal strength test acknowledgement from the coast radio station.

63. Are you sure to send DISTRESS ACK?**ACK normally done by coast station. <Yes / No>**

This message goes off when “ACK” is selected on the DISTRESS ALERT Reception window to try to transmit an Acknowledgement message.

The condition for deleting the message is that the [CANCEL] key is pressed or any of the user options is selected, and then the [ENTER] knob is pressed.

64. 3 minutes have not passed from DISTRESS ALERT received.**Are you sure to send DISTRESS RELAY? <Yes / No>**

This message goes off when User Option is set to “RELAY” before three minutes elapse after the receipt of a Distress alert.

The condition for deleting the message is that the [CANCEL] key is pressed or User Option is set to any menu, and then the [ENTER] knob is pressed.

65. Do you select RELAY AREA?**RELAY AREA normally done by coast station. <Yes / No>**

This message goes off when RELAY Option is set to any menu other than “AREA.” The condition for deleting the message is that the [CANCEL] key is pressed or User Option is set to any menu, and then the [ENTER] knob is pressed.

66. Select "Yes" to send a cancel message of own distress call.**DSC FREQ:2,4,6,8,12,16 MHz <Yes / No>**

This message goes off when User Option is set to “CANCEL” on the DISTRESS ALERT ACK Wait window or User Option is set to “CANCEL” during a Distress alert is being transmitted.

The condition for deleting the message is that the [CANCEL] key is pressed or User Option is set to any menu, and then the [ENTER] knob is pressed.

67. DISTRESS ALERT message has not normally ended. <Finish / Resend>

This message goes off when the system is rebooted after the abnormal end of transmission of a Distress alert due to power supply shutdown during the transmission. The condition for deleting the message is that User Option is set to any menu, and then the [ENTER] knob is pressed.

68. Sequence completed. Transmit again? <Yes / No>

This message goes off when any message requiring no acknowledgement (such as Area or Group message) is retransmitted. The condition for deleting the message is that the [CANCEL] key is pressed or User Option is set to any menu, and then the [ENTER] knob is pressed.

69. Do you finish this sequence? <Yes / No>

This message goes off when User Option is set to “QUIT” before the completion of radiotelephone, PSTN calling, or NBDP communication.

The condition for deleting the message is that the [CANCEL] key is pressed or User Option is set to any menu, and then the [ENTER] knob is pressed.

70. INACTIVITY TIMER! Closing sequence! count down 30s.***DISTRESS RX DISTRESS ACK FROM xxxxxxxxx <Agree / Pause>***

A discrete alarm sound goes off. It goes off when a given period of time elapses without performing any operation after the procedure is initiated and the remaining procedure survival time comes to 30 seconds. The RT procedure is an exception and automatically completed without indication.

The condition for deleting this message is that the cursor is put on “Agree” of User options to press the [ENTER] knob or a period of 30 seconds elapses after the popup message appears.

71. Change COM FREQ! Count down XXs. <Agree / Disagree>

This message goes off when any Distress alert or Distress alert acknowledgement message other than messages that “make a change to communication frequency without waiting for User Option setting is received.

The condition for deleting the message is that User Option is set to any menu, and then the [ENTER] knob is pressed, or the countdown display reaches “0” second.

72. Are you sure to send ALL ACK? ALL ACK normally done by coast station.***<Yes / No>***

This message goes off when ACK TYPE setting is changed to “ALL” on the window used to create acknowledgement for Relay Individual message. The condition for deleting the message is that the [CANCEL] key is pressed or User Option is set to any menu, and then the [ENTER] knob is pressed.

73. Are you sure to disconnect NBDP? <Yes / No>

This message goes off when performing operation that puts the NBDP communication procedure into a hold state or a quit state, or performing operation that puts other procedure into an active state, or trying to switch to the MENU window, while NBDP communication is in progress.

The condition for deleting the message is that the [CANCEL] key is pressed or User Option is set to any menu, and then the [ENTER] knob is pressed.

74. Are you sure to quit one session? <Yes / No>

This message goes off when performing operation that boots the new RT procedure at the maximum size of the procedure tab.

The condition for deleting the message is that the [CANCEL] key is pressed or User Option is set to any menu, and then the [ENTER] knob is pressed.

75. Are you sure to disconnect PSTN? <Yes / No>

This message goes off when the [CANCEL] key is pressed during a PSTN call or the User Option “END CALL” key is pressed. The condition for deleting the message is that the [CANCEL] key is pressed or User Option is set to any menu, and then the [ENTER] knob is pressed.

76. PSTN calling! Pick up HANDSET!

A PSTN call ringtone goes off. This message goes off when the system is connected to PSTN with the handset hooked off. The condition for deleting the message is that the handset is hooked off and PSTN connection time-out is completed or PSTN connection is completed.

77. Auto ack of PSTN failed . [CANCEL]: Close window

This message goes off when the transmission of automatic acknowledgement of PSTN is failed. The condition for deleting the message is that the [CANCEL] key is pressed.

78. PSTN disconnected because of timeout. [CANCEL]: Close window

This message goes off when a carrier wave cannot be detected during a PSTN call to cut off the call. The condition for deleting the message is that the [CANCEL] key is pressed.

79. PSTN connection will be cut. [CANCEL]: Close window

This message goes off when performing operation to end a PSTN call. The condition for deleting the message is that the [CANCEL] key is pressed.

80. The session is maximum. Quit it any. [CANCEL]: Close window

This message goes off when the procedure tab reaches its maximum number or the system transmits DSC message with the maximum size of procedure tab. The condition for deleting the message is that the [CANCEL] key is pressed.

81. Enter frequency for routine communication. [CANCEL]: Close window

This message goes off when Distress frequency (TEL or NBDP) is entered in "COMM FREQ" (communication frequency) on the Routine Message Compose window or when any out of communication frequency range is entered in "COMM FREQ" on the DSC Message Compose window. The condition for deleting the message is that the [CANCEL] key is pressed.

82. New COMM FREQ Suggested [CANCEL]: Close window

This message goes off when received ACK COMM FREQ (acknowledgement communication frequency) has been changed from COMM FREQ specified by DSC transmission message. The condition for deleting the message is that the [CANCEL] key is pressed.

83. Sent CANCEL MSG. Go to VOICE CANCELLATION <Enter>

This message goes off upon completion of the transmission of Distress Cancellation message. Even if a Distress alert is transmitted at multiple frequencies, this notice will be displayed every time the cancellation is completed at each frequency.

The condition for deleting this message is that the [ENTER] knob is pressed.

- 84. All stations. (Repeat 3 times) This is (Own ship name & call sign).
MMSI xxxxxxxxx. Our position is 50°00.0000'N,120°00.0000'E. Cancel my
DISTRESS ALERT in 05/JUN/2010.21:00. [ENTER] : Selecting next
frequency**
This message goes off when the [ENTER] knob is pressed while a message saying
“Sent CANCEL MSG. Go to VOICE CANCELLATION” is displayed.
The condition for deleting this message is that the [ENTER] knob is pressed or the
handset is hooked on (the cancellation of call is completed).
- 85. There is finished session. [CANCEL]: Close window**
This message goes off when a new procedure is booted due to the reception of
DSC message with the maximum size of procedure tab, and the lowest-priority
procedure is automatically deleted. The condition for deleting the message is that
the [CANCEL] key is pressed.
- 86. ADDRESS BOOK registered [CANCEL]: Close window**
This message goes off when DSC message is registered in the address-book by
pressing the [9] key on the DSC INFO window. The condition for deleting the
message is that the [CANCEL] key is pressed.
- 87. Wait for TX end.**
This message goes off when the subsequent transmission is performed while DSC
message is being transmitted.
The condition for deleting the message is that the previous transmission is
completed.
- 88. Unacceptable! Frequency not within usable range. [CANCEL]: Close window**
This message goes off when User Option on the Individual (Routine) Message
Reception window is set to “Accept” and alert/safety frequency is suggested as
“COMM FREQ.” The condition for deleting the message is that the [CANCEL]
key is pressed.
- 89. Cannot ACK option Received message: invalid [CANCEL]: Close window**
This message goes off when User Option on the DSC Message Reception window
is set to “ACK.” This case occurs when part of data of received DSC message is
destroyed to disable the transmission of acknowledgement message. The condition
for deleting the message is that the [CANCEL] key is pressed.
- 90. Cannot RELAY option Received message: invalid [CANCEL]: Close window**
This message goes off when User Option on the Distress Alert Reception window
is set to “RELAY.” This case occurs when part of data of received DSC message is
destroyed to disable the transmission of acknowledgement message. The condition
for deleting the message is that the [CANCEL] key is pressed.

91. VOICE CANCELLATION has already done in this band.**[ENTER]: Close window**

This message goes off when a frequency band marked with “*” is selected on the Voice Cancellation Transmission Frequency Selection window. The condition for deleting the message is that the [ENTER] knob is pressed.

92. Coast station MMSI cannot be input. [CANCEL]: Close window

This message goes off when MMSI of the coast radio station is inputted in the wrong input box of the MMSI of the coast radio station, and then the [ENTER] knob is pressed. The condition for deleting the message is that the [CANCEL] key is pressed.

93. Group MMSI cannot be input. [CANCEL]: Close window

This message goes off when MMSI not created in the group MMSI format is inputted in the MMSI input box, and then the [ENTER] knob is pressed. The condition for deleting the message is that the [CANCEL] key is pressed.

94. Ship station MMSI cannot be input. [CANCEL]: Close window

This message goes off when MMSI not created in the ship station’s MMSI format is inputted in the MMSI input box, and then the [ENTER] knob is pressed. The condition for deleting the message is that the [CANCEL] key is pressed.

95. Change ACK received! But proposed frequency not within usable range.**[CANCEL]: Close window**

This message goes off when receiving a “CHANGE ACK” message that takes a frequency outside the communication frequency range as suggested frequency. The condition for deleting the message is that the [CANCEL] key is pressed.

96. The message which overflowed was deleted from history. Please confirm log to display the message which disappeared. [CANCEL]: Close window

This message goes off when ninth message is received to cause overflow while the HISTORY window containing the maximum number of messages (eight messages) is being displayed, or when the HISTORY window is displayed after receiving nine or more related messages.

The condition for deleting the message is that the [CANCEL] key is pressed.

97. Enter frequency for selected COMM MODE. [CANCEL]: Close window

This message goes off when a frequency is entered in “COMM FREQ” that can be used on the Urgency/Safety DSC Message Compose window. The condition for deleting the message is that the [CANCEL] key is pressed.

98. The band of the communication channel shall be in the band of the DSC message. <Enter>

This message goes off when a frequency on a band different from the DSC transmission frequency band is entered in “COMM FREQ” (communication frequency) on the DSC Message Compose window. The condition for deleting the message is that the [CANCEL] key is pressed.

99. The frequency for distress and safety communications!**[CANCEL]: Close window**

This message goes off when Distress/safety frequency is set to “TX FREQ” on the RT window.

The condition for deleting the message is that the [CANCEL] key is pressed.

100. PSTN calling! <ENTER>

A PSTN call ring-tone goes off. This message goes off when the PSTN call is received with the handset hooked off. The condition for deleting the message is that the [ENTER] knob is pressed, PSTN connection time-out is completed, or PSTN connection is completed.

101. Unable to transmit! Antenna switch is in GND position. Check antenna switch.**[CANCEL]: Close window**

This message goes off when transmission is performed using the switch on the AS-102 side with the RX antenna grounded. The condition for deleting the message is that the [CANCEL] key is pressed.

102. Unable to transmit! Hardware error occurs. Check alarm status.**[CANCEL]: Close window**

This message goes off when transmission is performed while a VC error or TX PLL Unlock error is occurring. The condition for deleting the message is that the [CANCEL] key is pressed.

103. Overwrite this channel. Are you sure? <Yes / No>

This message goes off when “REGISTER” is selected on the User Channel Data Edit window after editing user channel data.

The condition for deleting the message is that the [ENTER] knob or [CANCEL] key is pressed with the cursor put on any Option.

104. Channel number overlaps. [CANCEL]: Close window

This message goes off when “REGISTER” is selected by entering a registered user channel number in the user channel data on the User Channel Data Register window or entering a registered user channel number in the user channel data on the User Channel Data Edit window. The condition for deleting the message is that the [CANCEL] key is pressed.

105. Delete this channel. Are you sure? <Yes / No>

This message goes off when “DELETE SELECTION” is selected on the User Channel Data Delete Selection popup window. The condition for deleting the message is that the [ENTER] knob or [CANCEL] key is pressed with the cursor put on any Option.

106. Delete all mode lists. Are you sure? <Yes / No>

This message goes off when “DELETE ALL LIST” is selected on the User Channel Data Delete Selection popup window.
The condition for deleting the message is that the [ENTER] knob or [CANCEL] key is pressed with the cursor put on any Option.

107. Delete mode list. Are you sure? <Yes / No>

This message goes off when “DELETE MODE LIST” is selected on the User Channel Data Delete Selection popup window.
The condition for deleting the message is that the [ENTER] knob or [CANCEL] key is pressed with the cursor put on any Option.

108. MMSI number overlaps. [CANCEL]: Close window

This message goes off when “REGISTER” is selected by entering a registered MMSI number in the address-book on the “Address Book Register” window or entering a registered MMSI number in the address-book on the “Address Book Edit” window. The condition for deleting the message is that the [CANCEL] key is pressed.

109. File name overlaps. [CANCEL]: Close window

This message goes off when “REGISTER” is selected by entering a registered file name in the message file on the “Message File Register” window or entering a registered file name in the message file on the “Message File Edit” window. The condition for deleting the message is that the [CANCEL] key is pressed.

110. Overwrite this address. Are you sure? <Yes / No>

This message goes off when “REGISTER” is selected on the “Address Book Data Edit” window after editing address-book data. The condition for deleting the message is that the [ENTER] knob or [CANCEL] key is pressed with the cursor put on any Option.

111. Overwrite this file. Are you sure? <Yes / No>

This message goes off when “REGISTER” is selected on the “Message File Data Edit” window after editing message file data. The condition for deleting the message is that the [ENTER] knob or [CANCEL] key is pressed with the cursor put on any Option.

Appendix 3. Specifications

1. MF/HF DIGITAL RADIOTELEPHONE

1.1 GENERAL

- 1.1.1 Communication system
FS-1575 Semi-duplex or simplex
FS-2575 Semi-duplex or simplex
FS-5075 Full-duplex (option required), semi-duplex or simplex
- 1.1.2 Class of emission
J3E: Telephone
F1B (J2B): DSC and NBDP
H3E: reception only
A1A, F3C: requires settings for communications
- 1.1.3 Number of channel
User programmable: 256 TX/RX pairs
All ITU channels incorporated (include DSC/NBDP),
SSB, TLX, CW
- 1.1.4 Warming up
1 minute approx. (oven 15 minutes approx.)

1.2 TRANSMITTER

- 1.2.1 Frequency range
1,605 kHz to 27.5 MHz (100 Hz step)
- 1.2.2 RF output power
FS-1575 MF: 100 Wpep, HF: 150 Wpep
FS-2575 MF: 250 Wpep, HF: 250 Wpep
FS-5075 MF: 400 Wpep, HF: 500 Wpep
- 1.2.3 Frequency error
Within ± 10 Hz
- 1.2.4 Modulation
350 Hz to 2.7 kHz (within 6 dB)
- 1.2.5 MIC in sensitivity
1kHz, 94 dBA maximum power: -9 dB to -3 dB
- 1.2.6 Line in sensitivity
1kHz, -16 dBm maximum power: -9 dB to -3 dB

1.3 RECEIVER

- 1.3.1 Receiving system
Double-conversion superheterodyne
- 1.3.2 Frequency range
100 kHz-29,999.99 kHz (10 Hz step)
- 1.3.3 Sensitivity (SINAD 20 dB)

Frequency Range	J3E
100 kHz to 300 kHz	35 dB μ V
300 kHz to 1.6 MHz	25 dB μ V
1.6 MHz to 4.0 MHz	13 dB μ V
4.0 MHz to 30 MHz	7 dB μ V

- 1.3.4 Intermediate frequency
1st: 53.964 kHz, 2nd: 36 kHz
- 1.3.5 Spurious response
Better than 60 dB
- 1.3.6 Audio output power
Speaker: 3 W/4 ohm
Handset: 10 mW/150 ohm
Line output: 0 dBm/600 ohm
- 1.3.7 Standard features
AGC, Noise Blanker, Voice-activated squelch,
Noise reduction

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2. DSC/WATCH KEEPING RECEIVER

2.1 DIGITAL SELECTIVE CALLING

2.1.1	Frequency shift	Space: F-85 Hz, Mark: F+85 Hz (F: assigned frequency)
2.1.2	Baud rate	100 bps \pm 30 x 10 ⁻⁶
2.1.3	Protocol	Complies with ITU-R Rec.493-13, 541-9
2.1.4	Modulation	FSK

2.2 DSC/WATCH RECEIVER (DISTRESS)

2.2.1	Frequency range	2187.5/ 8414.5 and 4207.5/ 6312/12577/16804.5 kHz
2.2.2	Class of emission	F1B (J2B)
2.2.3	Antenna impedance	50 ohm
2.2.4	Sensitivity	0 dB or less
2.2.5	Intermediate frequency	1st: 35.964 MHz, 2nd: 36 kHz
2.2.6	Frequency stability	\pm 10 Hz
2.2.7	Output power for preamp	12VDC: 0.15A or less
2.2.8	Spurious response	60 dB or more

2.3 DSC/WATCH RECEIVER (GENERAL FREQUENCY, OPTION)

2.3.1	Frequency range	1605 kHz to 27.5 MHz
2.3.2	Class of emission	F1B (J2B)
2.3.3	Antenna impedance	50 ohm
2.3.4	Sensitivity	0 dB or less
2.3.5	Intermediate frequency	1st: 44.964 MHz, 2nd: 36 kHz
2.3.6	Output power for preamp	12VDC: 0.15A or less
2.3.7	Spurious response	60 dB or more

3. NBDP FUNCTION (OPTION)

3.1	Communication mode	ARQ, FEC
3.2	Protocol	ITU-R M625-3, M476-5, M490, M491-1, M492-6
3.3	Modulation	FSK

4. DISPLAY UNIT

4.1	Display system	4.3-inch color dot matrix
4.2	Pixel	480 x 272 dots
4.3	Brilliance	16 steps (off to maximum brightness)
4.4	Inner speaker	4 ohms
4.5	Alarm volume	80 to 85 dB(A)

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5. ANTENNA COUPLER: AT-1575, AT-5075

5.1	Tuning system	CPU controlled fully automatic tuning system
5.2	Frequency range	1605 kHz to 27.5 MHz
5.3	Input impedance	50 ohm
5.4	Antenna	10 m to 18 m wire or 10 m whip antenna, or 8 m whip antenna + horizontal feeder 2m or more
5.5	Tuning time	Within 15 seconds

6. TERMINAL UNIT (OPTION)

6.1 IB-583

6.1.1	Display	10.4" color TFT LCD, 640 x 480 dots
6.1.2	Keyboard	IBM PS/2

6.2 IB-585

6.2.1	Display	10.4" color TFT LCD, 800x 600 dots
6.2.2	Keyboard	USB

7. INTERFACE

7.1	Input data sentences	IEC 61162-1
	Ship's Position (L/L)	GGA, GLL, GNS, RMC
	Time	ZDA
7.2	LAN	Ethernet 10Base-T/100Base-TX

8. POWER SUPPLY

8.1 FS-1575

8.1.1	Transceiver/control unit	24 VDC: 5 A (RX), 20 A max. (TX)
8.1.2	Terminal unit (IB-583/585)	12 VDC – 24 VDC: 0.5 A - 0.3 A
8.1.3	Printer (PP-510, option)	24 VDC: 1.5 A
8.1.4	AC/DC power supply unit (PR-300, option)	100/110/200/220 VAC, 1 phase, 50/60 Hz

8.2 FS-2575

8.2.1	Transceiver/control unit	24 VDC: 5A (RX), 40A max. (TX)
8.2.2	Terminal unit (IB-583/585)	12 VDC – 24 VDC: 0.5 A - 0.3 A
8.2.3	Printer (PP-510, option)	24 VDC: 1.5 A
8.2.4	AC/DC power supply unit (PR-850A, option)	100/110/120/200/220/240 VAC, 1 phase, 50/60 Hz

Reference only

1. FS-1575
2. FS-2575
3. FS-5075

<u>Mode FS- 1575</u> <u>No. -</u> <u>Date of measurement / /</u>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 5px;">Approved</td> <td style="width: 50%; padding: 5px;">Measured by</td> </tr> <tr> <td style="height: 50px;"></td> <td style="height: 50px;"></td> </tr> </table>	Approved	Measured by		
Approved	Measured by				

RF Power (W)	FREQ. kHz	MODE	MIC Input	Power Supply		Final stage Collector		Input (W)	Efficiency (%)	Antenna RF Output		MIC Gain J/4 (-dBm)	Sensitivity (dBμ)
				Volt (V)	CURR (A)	Volt (V)	CURR (A)			CURR (A)	Power (W)		
50	2182	J3E (SSB)	1TONE	24.0	9.6	23.7	7.8	184.8	26.1	2.2	48.4	-48.0	
75	2182	J3E (SSB)	1TONE	24.0	11.6	23.5	9.8	230.3	31.6	2.7	72.9	-47.5	
			2TONE	24.0	8.0	23.8	6.2	147.5	27.1	2.0	80.0		
	2187.5	F1B (TELEX)		24.0	11.5	23.5	9.8	230.3	31.6	2.7	72.9		
150	2182	J3E	1TONE	24.0	16.0	23.4	14.1	329.9	41.5	3.7	137.0	-47.0	+1.0
			2TONE	24.0	10.9	23.6	9.1	214.7	33.9	2.7	145.8		
	2187.5	F1B (TELEX)		24.0	15.8	23.4	14.0	327.6	41.8	3.7	137.0		
2182 Power reduction		J3E	1TONE	24.0	11.6	23.4	9.8	229.3	31.7	2.7	72.9		

1. Measured on the lowest frequency in each band
2. Final stage transistor (**MRF_448**)
3. Dummy Load Antenna: MF BAND (10 ohm + 250pF)
HF BAND (50 ohm)
4. Test method complies with Japanese Radio Regulation
5. 1TONE · · 1500Hz 2 TONE · · 700Hz/1700Hz
6. ■ : N/A

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FREQ. kHz	MODE	MIC Input	Power Supply		Final stage Collector		Input (W)	Effi- ciency (%)	RT Output	Anten na RF Output (W)	MIC Gain J/4 (-dBm)	Sensi- Tivity (dBμ)
			Volt (V)	CURR (A)	Volt (V)	CURR (A)						
4065 (ITU 401)	J3E (SSB)	1TONE	24.0	15.4	23.5	13.2	310.2	46.2		144.0	-47.0	+1.0
		2TONE	24.0	9.8	23.6	7.8	184.0	36.9	68.0	122.4		
	F1B (TELEX)	24.0	15.4	23.5	13.2	310.2	46.2		144.0			
6200 (ITU 601)	J3E (SSB)	1TONE	24.0	13.6	23.5	11.7	274.9	52.3		144.0	-47.0	+1.0
		2TONE	24.0	9.3	23.6	7.4	174.6	38.9	68.0	122.4		
	F1B (TELEX)	24.0	4.0	23.5	12.1	284.3	50.6		144.0			
8195 (ITU 801)	J3E (SSB)	1TONE	24.0	12.2	23.5	10.2	239.7	60.0		144.0	-47.5	+1.0
		2TONE	24.0	8.6	23.6	6.8	160.4	42.3	68.0	122.4		
	F1B (TELEX)	24.0	12.6	23.5	10.5	246.7	58.3		144.0			
12230 (ITU 1201)	J3E (SSB)	1TONE	24.0	11.6	23.6	10.9	257.2	55.9		144.0	-47.5	+1.0
		2TONE	24.0	8.3	23.6	7.2	169.9	40.0	68.0	122.4		
	F1B (TELEX)	24.0	11.3	23.6	11.2	264.3	54.4		144.0			
16360 (ITU 1601)	J3E (SSB)	1TONE	24.0	10.1	23.5	10.1	237.3	60.6		144.0	-48.0	+1.0
		2TONE	24.0	7.7	23.6	7.6	179.3	37.9	68.0	122.4		
	F1B (TELEX)	24.0	10.1	23.5	11.3	265.5	54.2		144.0			
18780 (ITU 1801)	J3E (SSB)	1TONE	24.0	12.8	23.4	13.8	322.9	43.3		140.0	-48.0	+2.0
		2TONE	24.0	9.5	23.5	9.5	223.2	30.4	68.0	122.4		
	F1B (TELEX)	24.0	12.8	23.3	14.2	330.8	42.3		140.0			
22000 (ITU 2201)	J3E (SSB)	1TONE	24.0	15.3	23.2	13.5	313.2	40.2		126.0	-48.0	+2.0
		2TONE	24.0	10.8	23.5	9.1	213.8	28.0	60.0			
	F1B (TELEX)	24.0	15.7	23.2	13.9	322.4	39.0		126.0			
25070 (ITU 2501)	J3E (SSB)	1TONE	24.0	14.1	23.3	12.3	286.5	43.9		126.0	-48.0	+2.0
		2TONE	24.0	10.1	23.5	8.3	195.0	30.7	60.0			
	F1B (TELEX)	24.0	14.2	23.5	13.8	324.3	38.8		126.0			
LOW 4065 (ITU401)	J3E	1TONE	24.0	10.6	23.5	8.8	206.8	31.1		65.0		

AP4-3

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<u>Mode FS- 2575</u> <u>No. -</u> <u>Date of measurement / /</u>	Approved	Measured by

RF Power (W)	FREQ. kHz	MODE	MIC Input	Power Supply		Final stage Collector		Input (W)	Efficiency (%)	Antenna RF Output		MIC Gain J/4 (-dBm)	Sensitivity (dBμ)
				Volt (V)	CURR (A)	Volt (V)	CURR (A)			CURR (A)	Power (W)		
50	2182	J3E (SSB)	1TONE	23.9	14.5	41.1	5.6	230.1	22.9	2.3	52.9	-48.0	
75	2182	J3E (SSB)	1TONE	23.9	16.7	41.0	6.5	266.6	27.3	2.7	72.9	-48.0	
			2TONE	23.9	12.5	41.2	4.6	189.5	21.1	2.0	80		
	2187.5	F1B (TELEX)		23.9	16.7	41.0	6.5	266.6	27.3	2.7	72.9		
100	2182	J3E	1TONE	23.9	19.3	40.9	7.7	314.9	30.5	3.1	96.1	-48.0	+1.0
			2TONE	23.9	14.1	41.1	5.4	221.9	21.8	2.2	96.8		
	2187.5	F1B (TELEX)		23.9	19.2	40.8	7.6	310.0	31.0	3.1	96.1		
200	2182	J3E	1TONE	23.6	28.6	40.6	11.6	470.9	42.9	4.5	202.5	-47.5	
			2TONE	23.7	19.6	40.8	7.8	318.2	34.2	3.3	217.8		
	2187.5	F1B (TELEX)		23.5	29.9	40.2	12.2	490.4	39.4	4.4	193.6		
2182 Power reduction		J3E	1TONE	23.9	19.3	40.9	7.7	314.9	30.5	3.1	96.1		

1. Measured on the lowest frequency in each band
2. Final stage transistor (**MRF_448**)
3. Dummy Load Antenna: MF BAND (10 ohm + 250pF)
HF BAND (50 ohm)
4. Test method complies with Japanese Radio Regulation
5. 1TONE · · 1500Hz 2 TONE · · 700Hz/1700Hz
6. ■ : N/A

AP4-4

Reference only

FS-2575

FREQ. kHz	MODE	MIC Input	Power Supply		Final stage Collector		Input (W)	Effi- ciency (%)	RT Output	Antenna RF Output (W)	MIC Gain J/4 (-dBm)	Sensi- Tivity (dBμ)
			Volt (V)	CURR (A)	Volt (V)	CURR (A)						
4065 (ITU 401)	J3E (SSB)	1TONE	23.8	27.0	40.6	11.2	454.7	53.4		243	-47.5.	+1.0
		2TONE	23.8	18.2	40.9	7.2	294.4	42.7	140w	252		
	F1B (TELEX)	23.5	27.2	40.5	11.3	457.6	53.0		243			
6200 (ITU 601)	J3E (SSB)	1TONE	23.5	30.8	40.2	12.8	514.5	43.7		225	-47.5.	+1..0
		2TONE	23.5	20.8	40.8	8.6	350.8	32.0	125w	225		
	F1B (TELEX)	23.5	31.0	40.2	12.9	518.5	43.3		225			
8195 (ITU 801)	J3E (SSB)	1TONE	23.8	22.2	40.7	9.5	386.6	58.1		225	-47.0	+1.0
		2TONE	23.7	15.5	41.1	6.8	279.4	40.2	125w	225		
	F1B (TELEX)	23.8	22.3	40.7	9.5	386.6	58.1		225			
12230 (ITU 1201)	J3E (SSB)	1TONE	23.6	27.7	40.4	11.7	476.1	47.2		225	-47.5.	+1.0
		2TONE	23.8	19.9	40.8	8.0	326.4	33.0	120w	216		
	F1B (TELEX)	23.6	27.8	40.4	11.3	458.7	49.0		225			
16360 (ITU 1601)	J3E (SSB)	1TONE	23.7	23.4	40.6	10.4	422.2	53.2		225	-47.0	+1.0
		2TONE	23.7	17.5	40.9	7.6	310.8	34.7	120w	216		
	F1B (TELEX)	23.7	23.4	40.6	10.5	426.3	52.7		225			
18780 (ITU 1801)	J3E (SSB)	1TONE	23.6	28.5	40.3	13.1	527.9	42.6		225	-47.0	+1.0
		2TONE	23.7	20.2	40.8	8.9	363.1	29.7	120w	216		
	F1B (TELEX)	23.6	27.9	40.4	12.8	517.1	42.5		220			
22000 (ITU 2201)	J3E (SSB)	1TONE	23.5	28.1	40.3	11.6	467.4	48.1		225	-47.0	+2.0
		2TONE	23.8	19.2	40.8	7.8	318.2	33.9	120w	216		
	F1B (TELEX)	23.5	27.7	40.4	11.3	456.5	48.1		220			
25070 (ITU 2501)	J3E (SSB)	1TONE	23.6	28.7	40.5	12.0	486.0	45.2		220	-47.0	+2.0
		2TONE	23.7	19.7	40.9	7.9	323.1	33.4	120w	216		
	F1B (TELEX)	23.5	28.9	40.5	12.0	486.0	44.4		216			
LOW 4065 (ITU401)	J3E	1TONE	23.9	15.5	41.0	6.0	246.0	40.6		100		

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<u>Mode FS- 5075</u> <u>No. -</u> <u>Date of measurement / /</u>	Approved	Measured by

RF Power (W)	FREQ. kHz	MODE	MIC Input	Power Supply		Final stage Collector		Input (W)	Efficiency (%)	Antenna RF Output		MIC Gain J/4 (-dBm)	Sensitivity (dBμ)
				Volt (V)	CURR (A)	Volt (V)	CURR (A)			CURR (A)	Power (W)		
50	2182	J3E (SSB)	1TONE	24.1	21.3	42.2	8.5	358.7	14.7	2.3	52.9	-47.5	
75	2182	J3E (SSB)	1TONE	24.0	23.2	42.0	9.3	390.6	18.6	2.7	72.9		
			2TONE	24.2	16.2	42.3	6.2	262.2	13.7	1.9	72.2		
	2187.5	F1B (TELEX)		24.0	23.3	42.0	9.4	394.8	18.4	2.7	72.9		
100	2182	J3E	1TONE	23.9	27.4	42.0	11.2	470.4	21.7	3.2	102.4	-47.0	+1.0
			2TONE	24.0	18.9	42.3	7.4	313.0	16.9	2.3	105.8		
	2187.5	F1B (TELEX)		23.9	27.7	42.2	11.4	481.0	21.2	3.2	102.4		
200	2182	J3E	1TONE	23.9	37.9	41.5	15.7	651.5	31.0	4.5	202.5	-47.0	
			2TONE	23.7	25.5	42.0	10.4	436.8	23.4	3.2	204.8		
	2187.5	F1B (TELEX)		23.8	38.1	41.6	15.8	657.2	30.8	4.5	202.5		
2182 Power reduction		J3E	1TONE	23.9	27.4	42.0	11.2	470.4	21.7	3.2	102.4		

1. Measured on the lowest frequency in each band
2. Final stage transistor (**MRF_448**)
3. Dummy Load Antenna: MF BAND (10 ohm + 250pF)
HF BAND (50 ohm)
4. Test method complies with Japanese Radio Regulation
5. 1TONE · · 1500Hz 2 TONE · · 700Hz/1700Hz
6. ■ : N/A

AP4-6

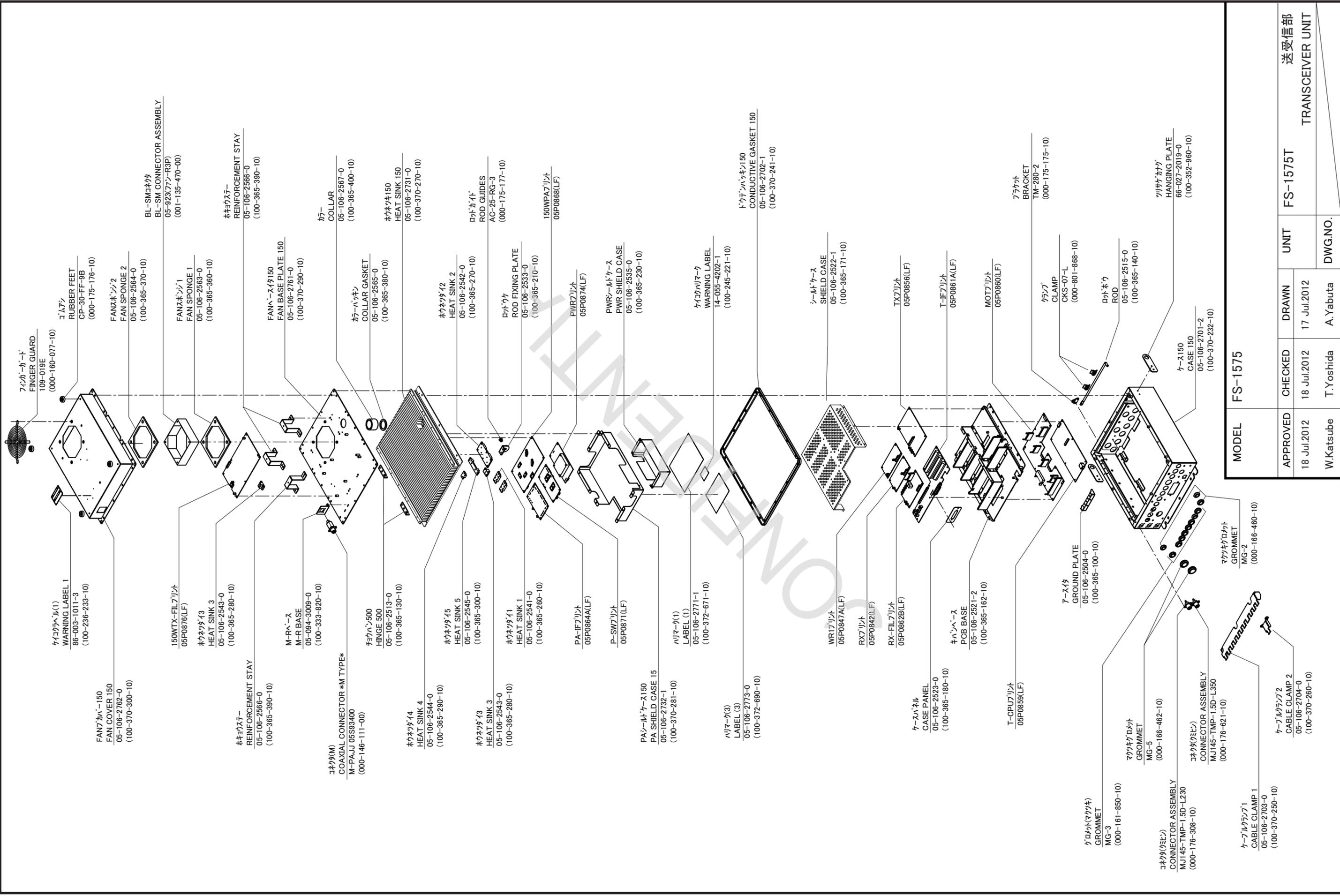
FREQ. kHz	MODE	MIC Input	Power Supply		Final stage Collector		Input (W)	Effi- ciency (%)	RT Output	Antenna RF Output (W)	MIC Gain J/4 (-dBm)	Sensi- Tivity (dBμ)
			Volt (V)	CURR (A)	Volt (V)	CURR (A)						
4065 (ITU 401)	J3E (SSB)	1TONE	23.7	44.4	41.1	18.5	760.3	63.1		480	-48.0	0.0
		2TONE	23.8	28.9	42.0	11.9	499.8	46.0	230w	414		
	F1B (TELEX)	23.7	45.5	41.1	19.0	780.9	61.4		480			
6200 (ITU 601)	J3E (SSB)	1TONE	23.2	48.8	40.8	20.3	824.1	60.6		500	-48.0	0.0
		2TONE	23.8	31.1	41.7	12.8	533.7	43.0	230w	414		
	F1B (TELEX)	23.4	49.4	40.8	20.6	840.4	57.1		480			
8195 (ITU 801)	J3E (SSB)	1TONE	23.6	45.3	41.2	19.0	782.8	61.3		480	-48.0	+1.0
		2TONE	23.8	29.4	41.8	12.0	501.6	45.8	230w	414		
	F1B (TELEX)	23.6	45.3	41.5	19.6	813.4	59.0		480			
12230 (ITU 1201)	J3E (SSB)	1TONE	23.4	49.9	41.0	20.7	848.7	56.5		480	-48.0	+1.0
		2TONE	23.6	34.5	41.6	14.1	586.5	42.6	250w	450		
	F1B (TELEX)	23.3	50.2	41.0	20.8	852.8	56.2		480			
16360 (ITU 1601)	J3E (SSB)	1TONE	23.3	54.8	40.8	25.1	1024.0	46.8		480	-48.0	+1.0
		2TONE	23.5	37.8	41.5	17.1	709.6	35.2	250w	450		
	F1B (TELEX)	23.2	56.7	40.6	26.0	1055.6	45.7		480			
18780 (ITU 1801)	J3E (SSB)	1TONE	23.6	43.3	41.2	20.4	840.4	57.1		480	-48.0	+1.0
		2TONE	23.7	29.9	41.8	13.8	576.8	41.6	240w	432		
	F1B (TELEX)	23.5	44.0	41.2	20.7	852.8	56.2		480			
22000 (ITU 2201)	J3E (SSB)	1TONE	23.4	49.6	40.9	23.4	957.0	50.1		480	-47.5	+2.0
		2TONE	23.9	33.3	41.7	14.5	604.6	39.6	240w	432		
	F1B (TELEX)	23.4	46.0	41.0	22.1	906.1	52.9		480			
25070 (ITU 2501)	J3E (SSB)	1TONE	23.4	49.0	41.2	25.6	1054.7	45.5		480	-47.5	+2.0
		2TONE	23.5	33.5	41.7	16.5	688.0	34.8	240w	432		
	F1B (TELEX)	23.4	49.8	41.2	25.8	1062.9	45.1		480			
LOW2 4065 (ITU401)	J3E	1TONE	24.0	22.5	42.1	9.1	383.1	28.7		110		

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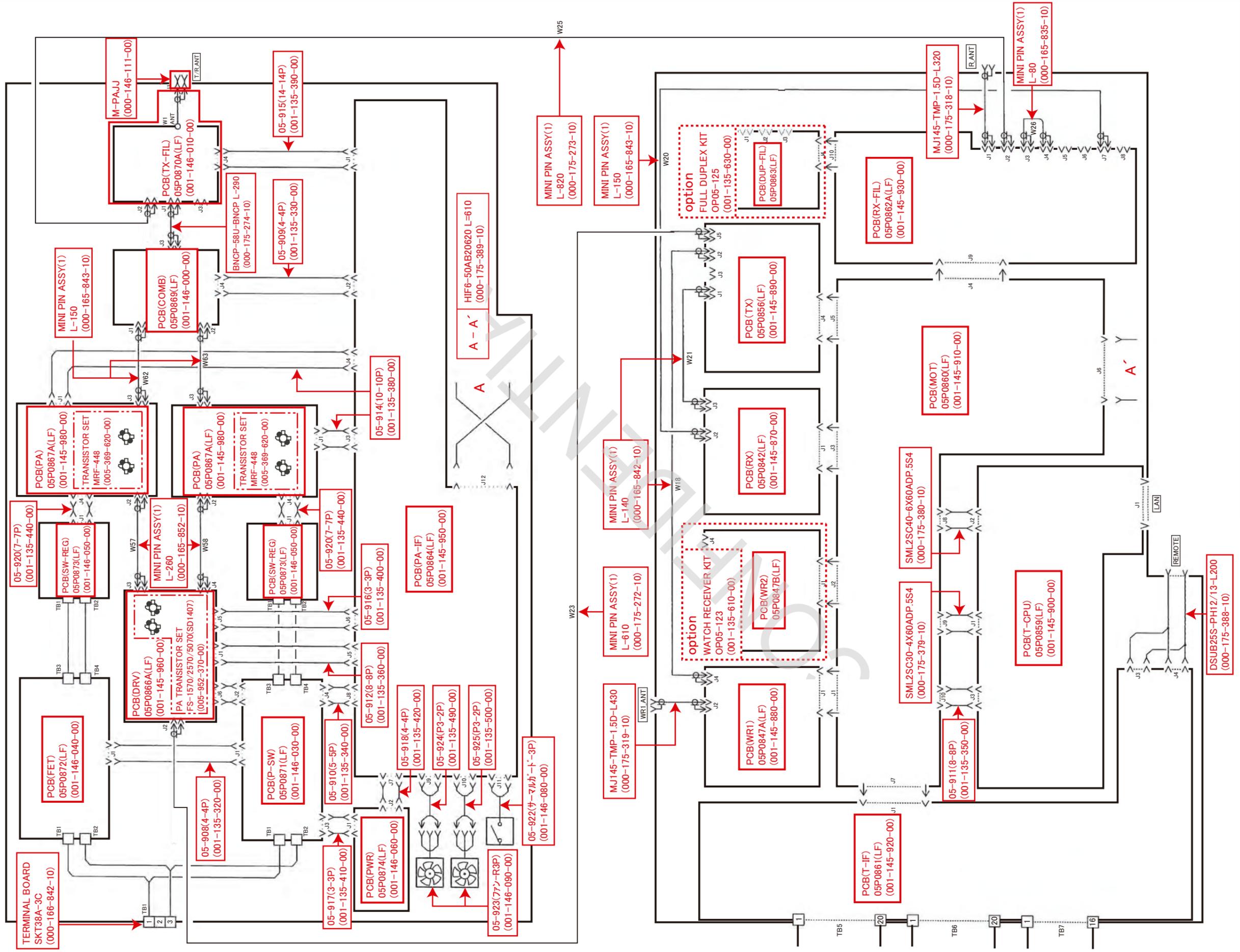
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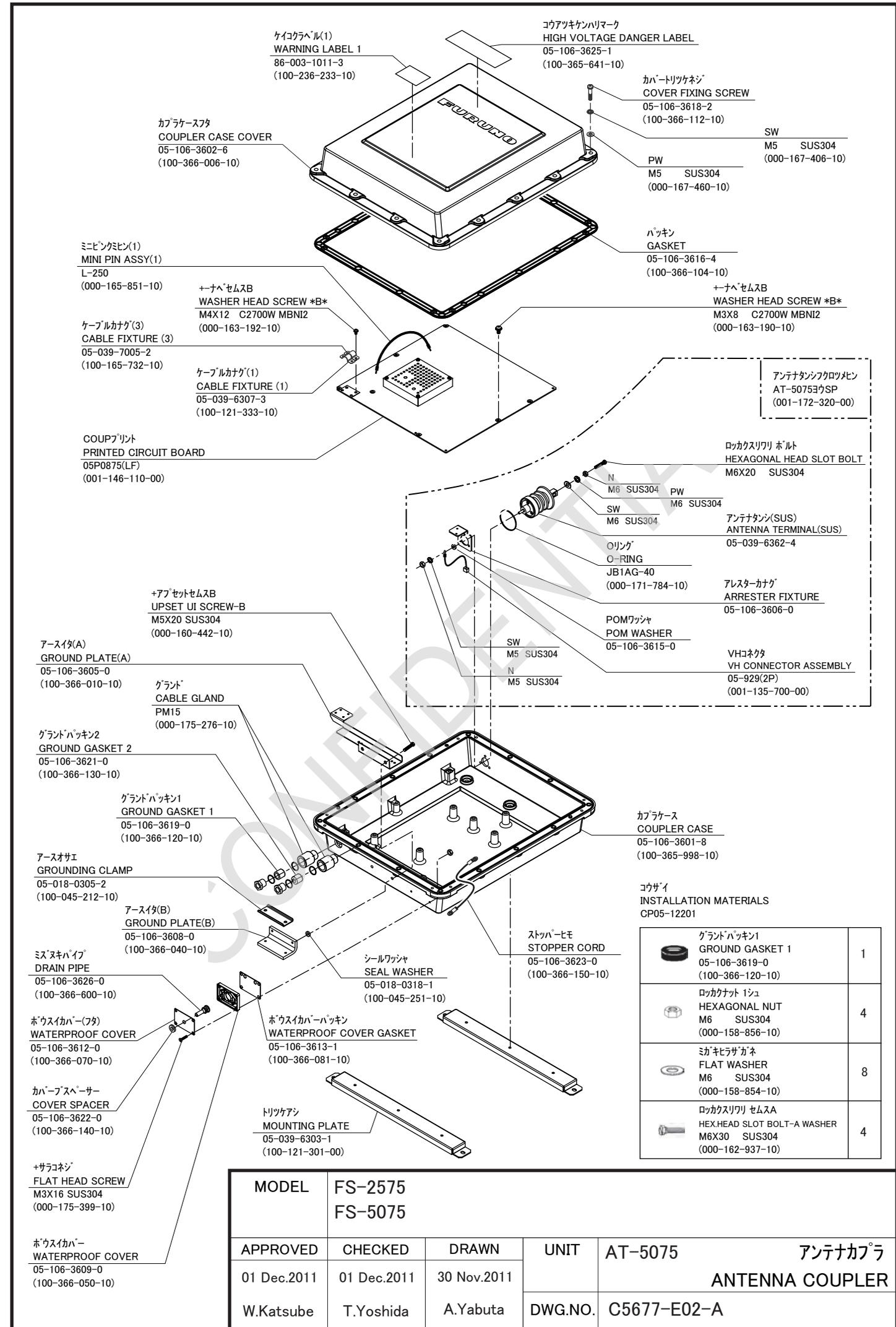


MODEL FS-1575

APPROVED	CHECKED	DRAWN	UNIT	送受信部
18 Jul.2012	18 Jul.2012	17 Jul.2012	FS-1575T	TRANSCIVER UNIT
W.Katsube	T.Yoshida	A.Yabuta	DWG.NO.	



MODEL		FS-5075T	
APPROVED	CHECKED	DRAWN	UNIT
08 Feb.2012	08 Feb.2012	07 Feb.2012	FS-5075T (2/2)
W.Katsube	T.Yoshida	A.Yabuta	TRANSMITTER UNIT
		DWG.NO.	C5678-E02-A
		送受信部	



ケイコラベル(1)
WARNING LABEL 1
86-003-1011-3
(100-236-233-10)

カプラケース
COUPLER CASE COVER
05-106-3602-6
(100-366-006-10)

ミニピンコン(1)
MINI PIN ASSY(1)
L-250
(000-165-851-10)

ケーブルカナグ(3)
CABLE FIXTURE (3)
05-039-7005-2
(100-165-732-10)

ケーブルカナグ(1)
CABLE FIXTURE (1)
05-039-6307-3
(100-121-333-10)

COUPプリント
PRINTED CIRCUIT BOARD
05P0875(LF)
(001-146-110-00)

アーナベセムSB
WASHER HEAD SCREW *B*
M4X12 C2700W MBNI2
(000-163-192-10)

アーナベセムSB
WASHER HEAD SCREW *B*
M3X8 C2700W MBNI2
(000-163-190-10)

コウツキケンハリマーク
HIGH VOLTAGE DANGER LABEL
05-106-3625-1
(100-365-641-10)

カバーリツケネジ
COVER FIXING SCREW
05-106-3618-2
(100-366-112-10)

SW M5 SUS304 (000-167-406-10)

PW M5 SUS304 (000-167-460-10)

パッキン
GASKET
05-106-3616-4
(100-366-104-10)

アンテナタンシフコロツピン
AT-5075ヨウSP
(001-172-320-00)

ロックスリワリ ホルト
HEXAGONAL HEAD SLOT BOLT
M6X20 SUS304

N M6 SUS304 PW M6 SUS304
SW M6 SUS304

アンテナタンシ(SUS)
ANTENNA TERMINAL(SUS)
05-039-6362-4

オリング
O-RING
JB1AG-40
(000-171-784-10)

アレスターカナグ
ARRESTER FIXTURE
05-106-3606-0

POMワッシャ
POM WASHER
05-106-3615-0

SW M5 SUS304 N M5 SUS304

VHコネクタ
VH CONNECTOR ASSEMBLY
05-929(2P)
(001-135-700-00)

アアセットセムSB
UPSET UI SCREW-B
M5X20 SUS304
(000-160-442-10)

アースイタ(A)
GROUND PLATE(A)
05-106-3605-0
(100-366-010-10)

グラント
CABLE GLAND
PM15
(000-175-276-10)

グラントパッキン2
GROUND GASKET 2
05-106-3621-0
(100-366-130-10)

グラントパッキン1
GROUND GASKET 1
05-106-3619-0
(100-366-120-10)

アースオサエ
GROUNDING CLAMP
05-018-0305-2
(100-045-212-10)

アースイタ(B)
GROUND PLATE(B)
05-106-3608-0
(100-366-040-10)

ミススキパイプ
DRAIN PIPE
05-106-3626-0
(100-366-600-10)

ホウスイカバ(フタ)
WATERPROOF COVER
05-106-3612-0
(100-366-070-10)

ホウスイカバパッキン
WATERPROOF COVER GASKET
05-106-3613-1
(100-366-081-10)

シールワッシャ
SEAL WASHER
05-018-0318-1
(100-045-251-10)

ストップヒモ
STOPPER CORD
05-106-3623-0
(100-366-150-10)

カプラケース
COUPLER CASE
05-106-3601-8
(100-365-998-10)

コウザイ
INSTALLATION MATERIALS
CP05-12201

	グラントパッキン1 GROUND GASKET 1 05-106-3619-0 (100-366-120-10)	1
	ロックスリワリ 1シユ HEXAGONAL NUT M6 SUS304 (000-158-856-10)	4
	ミガキヒラサガネ FLAT WASHER M6 SUS304 (000-158-854-10)	8
	ロックスリワリ セムSA HEX HEAD SLOT BOLT-A WASHER M6X30 SUS304 (000-162-937-10)	4

MODEL	FS-2575 FS-5075				
APPROVED	CHECKED	DRAWN	UNIT	AT-5075 アンテナカプラ ANTENNA COUPLER	
01 Dec.2011	01 Dec.2011	30 Nov.2011			
W.Katsube	T.Yoshida	A.Yabuta	DWG.NO.	C5677-E02-A	

Contents of Drawings

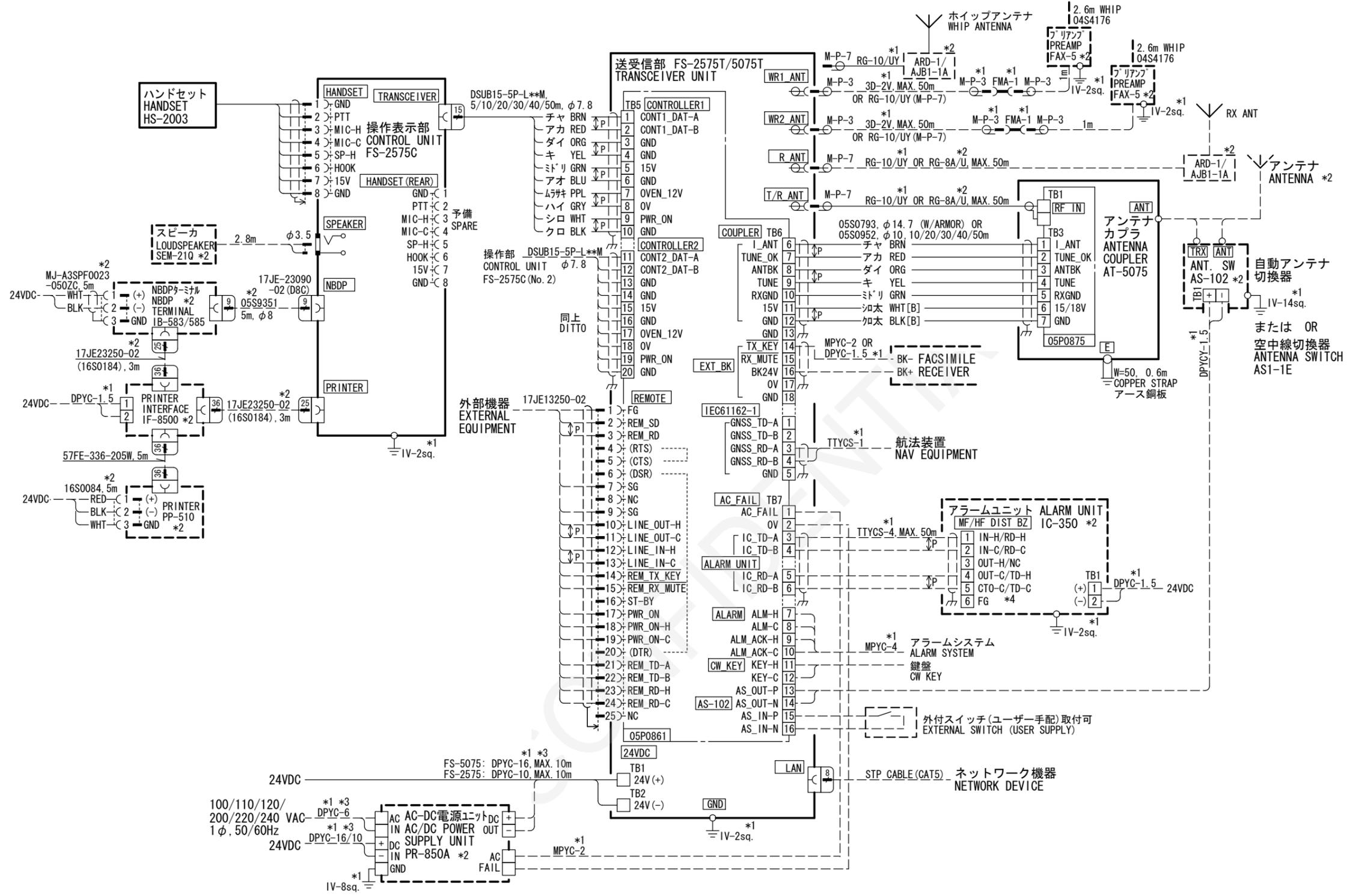
Name	Type	Dwg. No.	Page
<i>FS-2575/5075 INTERCONNECTION DIAGRAM</i>	<i>FS-2575/5075</i>	<i>C5678-C01</i>	<i>S-1</i>
<i>FS-1575 INTERCONNECTION DIAGRAM</i>	<i>FS-1575</i>	<i>C5676-C01</i>	<i>S-2</i>
<i>BK INTERFACE INTERCONNECTION DIAGRAM</i>	<i>BK-300</i>	<i>C5083-C03</i>	<i>S-3</i>
<i>FS-xx75T: TRANSCEIVER UNIT</i>			
<i>SCHEMATIC DIAGRAM (TRANSCEIVER UNIT)</i>	<i>FS-1575/2575/5075 (1/4)</i>	<i>C5678-K52</i>	<i>S-4</i>
	<i>FS-1575/2575/5075 (2/4)</i>	<i>C5678-K53</i>	<i>S-5</i>
	<i>FS-1575/2575/5075 (3/4)</i>	<i>C5677-K01</i>	<i>S-6</i>
	<i>FS-1575/2575/5075 (4/4)</i>	<i>C5676-K04</i>	<i>S-7</i>
<i>FS-2575C: CONTROLLER UNIT</i>			
<i>SCHEMATIC DIAGRAM (CONTROLLER UNIT)</i>	<i>FS-2575C</i>	<i>C5677-K02</i>	<i>S-8</i>
<i>ANTENNA COUPLER UNIT</i>			
<i>SCHEMATIC DIAGRAM (ANTENNA COUPLER UNIT)</i>	<i>AT-5075</i>	<i>C5678-K-56</i>	<i>S-9</i>
	<i>AT-1575</i>	<i>C5676-K05</i>	<i>S-10</i>
<i>IB-585: NBDP TERMINAL UNIT</i>			
<i>SCHEMATIC DIAGRAM (IB-585)</i>	<i>IB-585</i>	<i>C5678-K54</i>	<i>S-11</i>
<i>IB-583: NBDP TERMINAL UNIT</i>			
<i>SCHEMATIC DIAGRAM (IB-583)</i>	<i>IB-583</i>	<i>C5636-K06</i>	<i>S-12</i>
<i>IF-8500: INTERFACE</i>			
<i>SCHEMATIC DIAGRAM (IF-8500)</i>	<i>IF-8500</i>	<i>C6503-K10</i>	<i>S-13</i>

A

B

C

D



- 注記
- * 1) 造船所手配。
 - * 2) オプション。
 - * 3) 長さに応じて芯線太さを変更する。
 - * 4) 内部スイッチ設定が必要。

- NOTE
- *1: SHIPYARD SUPPLY.
 - *2: OPTION.
 - *3: CHANGE WIRE THICKNESS ACCORDING AS CABLE LENGTH.
 - *4: INTERNAL SWITCH SETTING REDUIRED.

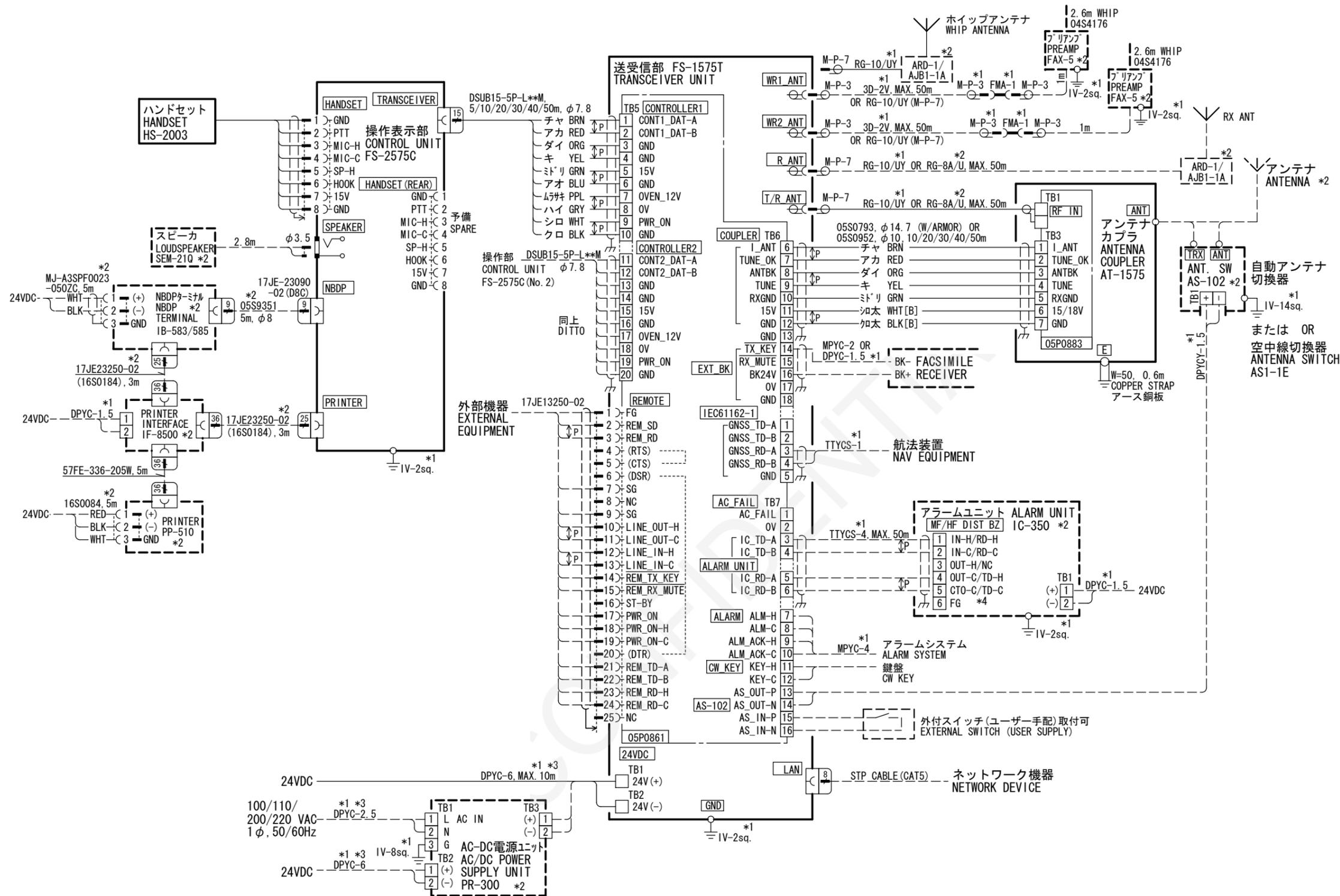
DRAWN	8/Dec/2011 T. YAMASAKI	TITLE	FS-2575/5075
CHECKED	8/Dec/2011 H. MAKI	名称	SSB送受信機
APPROVED	8/Dec/2011 Y. NISHIYAMA		相互結線図
SCALE	MASS	NAME	SSB RADIOTELEPHONE
DWG. No.	C5678-C01- D	REF. No.	INTERCONNECTION DIAGRAM

A

B

C

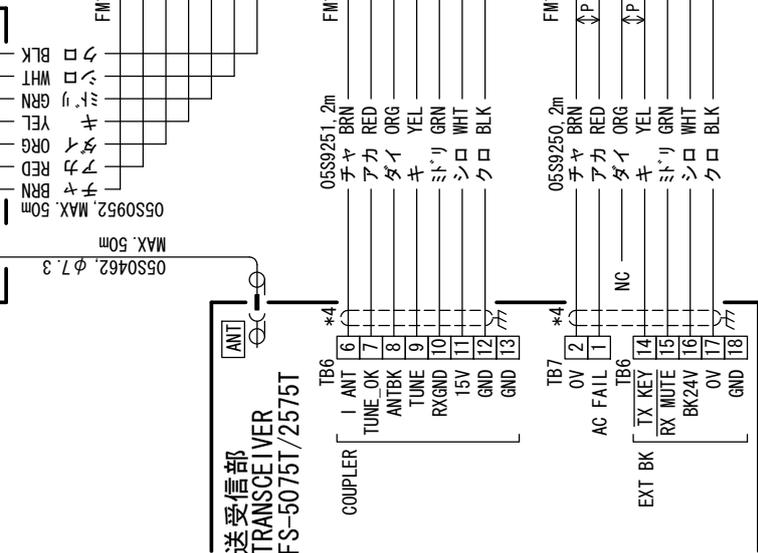
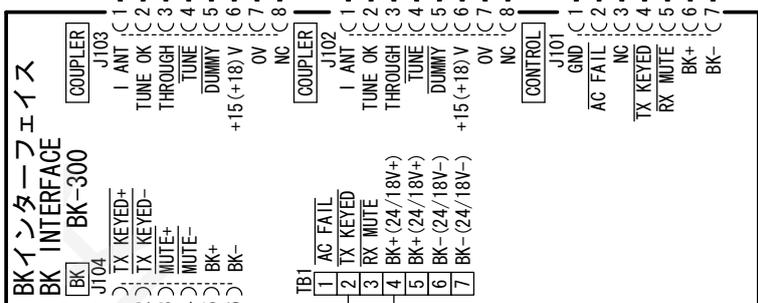
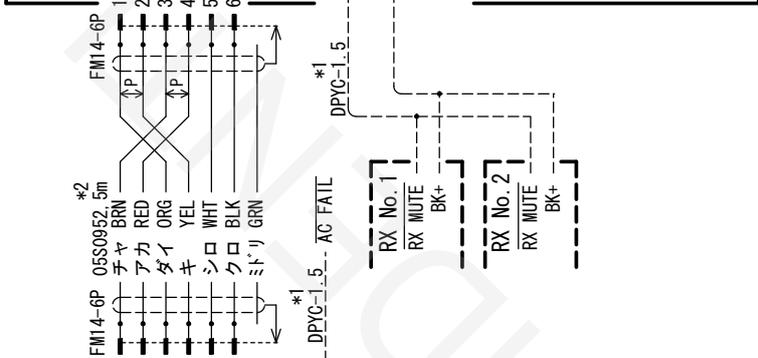
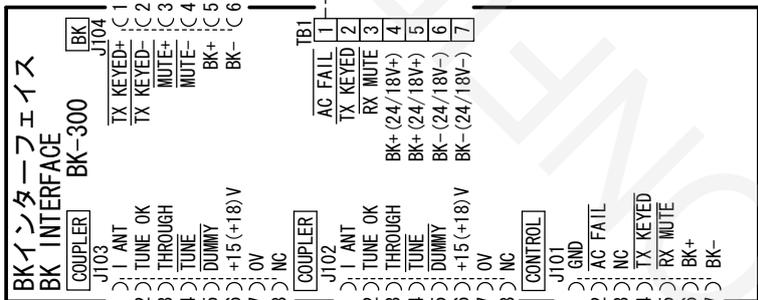
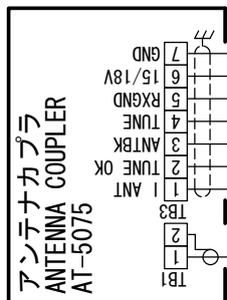
D



- 注記
- * 1) 造船所手配。
 - * 2) オプション。
 - * 3) 長さに応じて芯線太さを変更する。
 - * 4) 内部スイッチ設定が必要。

- NOTE
- *1: SHIPYARD SUPPLY.
 - *2: OPTION.
 - *3: CHANGE WIRE THICKNESS ACCORDING AS CABLE LENGTH.
 - *4: INTERNAL SWITCH SETTING REDUIRED.

DRAWN	8/Dec/2011	T. YAMASAKI	TITLE	FS-1575
CHECKED	8/Dec/2011	H. MAKI	名称	SSB送受信機
APPROVED	8/Dec/2011	Y. NISHIYAMA		相互結線図
SCALE	MASS		NAME	SSB RADIOTELEPHONE
DWG. No.	C5676-C01- A		REF. No.	INTERCONNECTION DIAGRAM



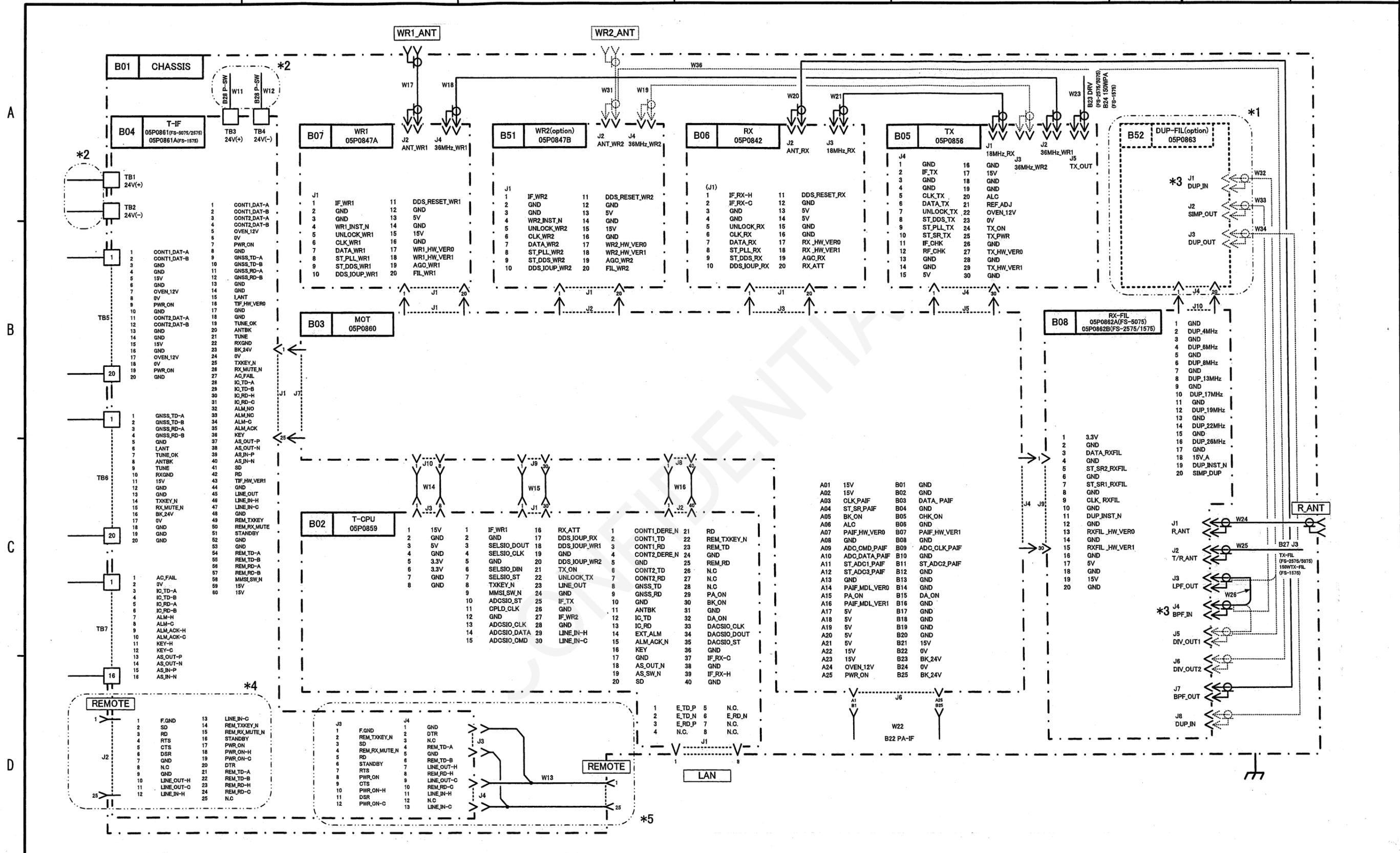
注記

- * 1) 造船所手配
- * 2) オプション。
- * 3) コネクタは工場にて取付済み。
- * 4) プラグを切断して芯線をコネクタピンに接続する。

NOTE

- *1: SHIPYARD SUPPLY.
- *2: OPTION
- *3: CONNECTOR PLUGS FITTED AT FACTORY.
- *4: CONNECT WIRES TO PIN CONNECTOR AFTER PLUG REMOVED.

DRAWN	4/Jul/2011	T. YAMASAKI	TITLE	BK-300 (FS-5075 ser.)
CHECKED	4/Jul/2011	H. MAKI	名称	BK インターフェイス
APPROVED	5/Jul/2011	Y. NISHIYAMA	相互結線図	
SCALE	MASS	kg	NAME	BK INTERFACE
DWG No.	C5083-C03-A		INTERCONNECTION DIAGRAM	

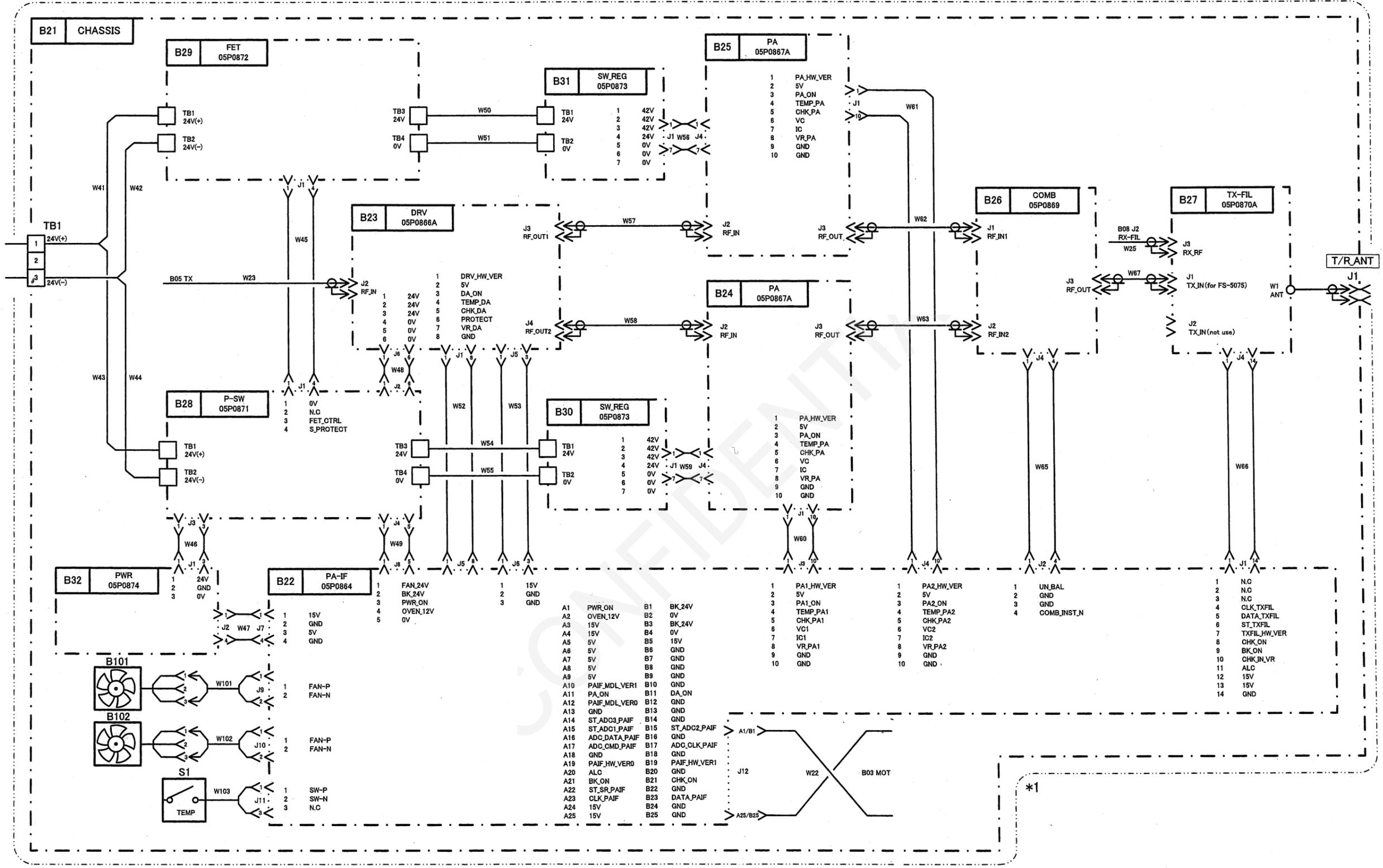


A

B

C

D



DRAWN 09. Feb. 2012 T. TAKENO	TYPE FS-5075T
CHECKED 14. Feb. 2012 T. Asami	名称 送受信部 (2 / 4)
APPROVED 16. Feb. 2012 Y. Honda	回路図
SCALE MASS	MODEL BLOCK No.
Dwg No. C5678-K53-A	REF. No. 05-106-2001-2
	NAME TRANSCEIVER UNIT (2/4)
	SCHMATIC DIAGRAM

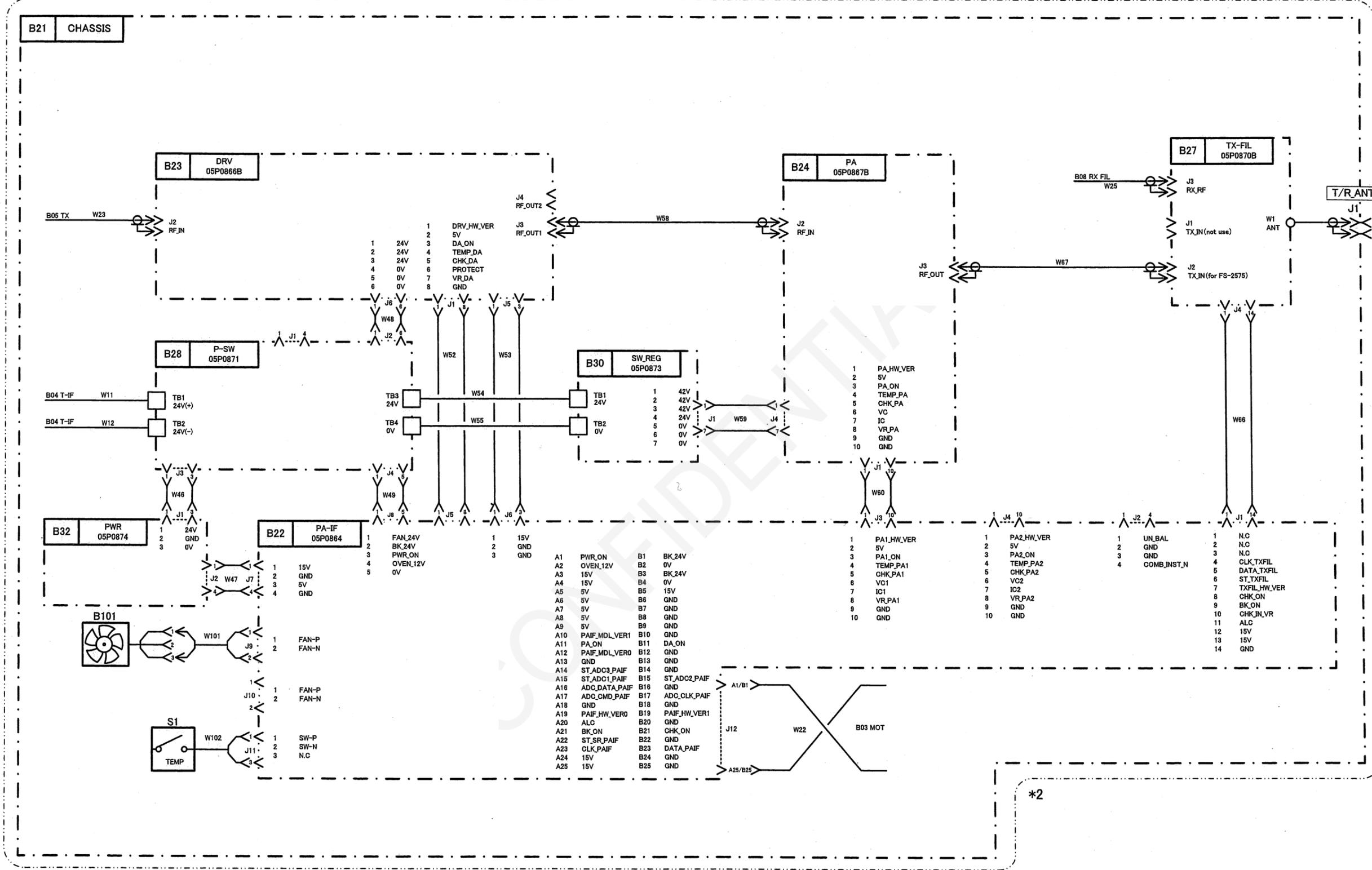
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A

B

C

D



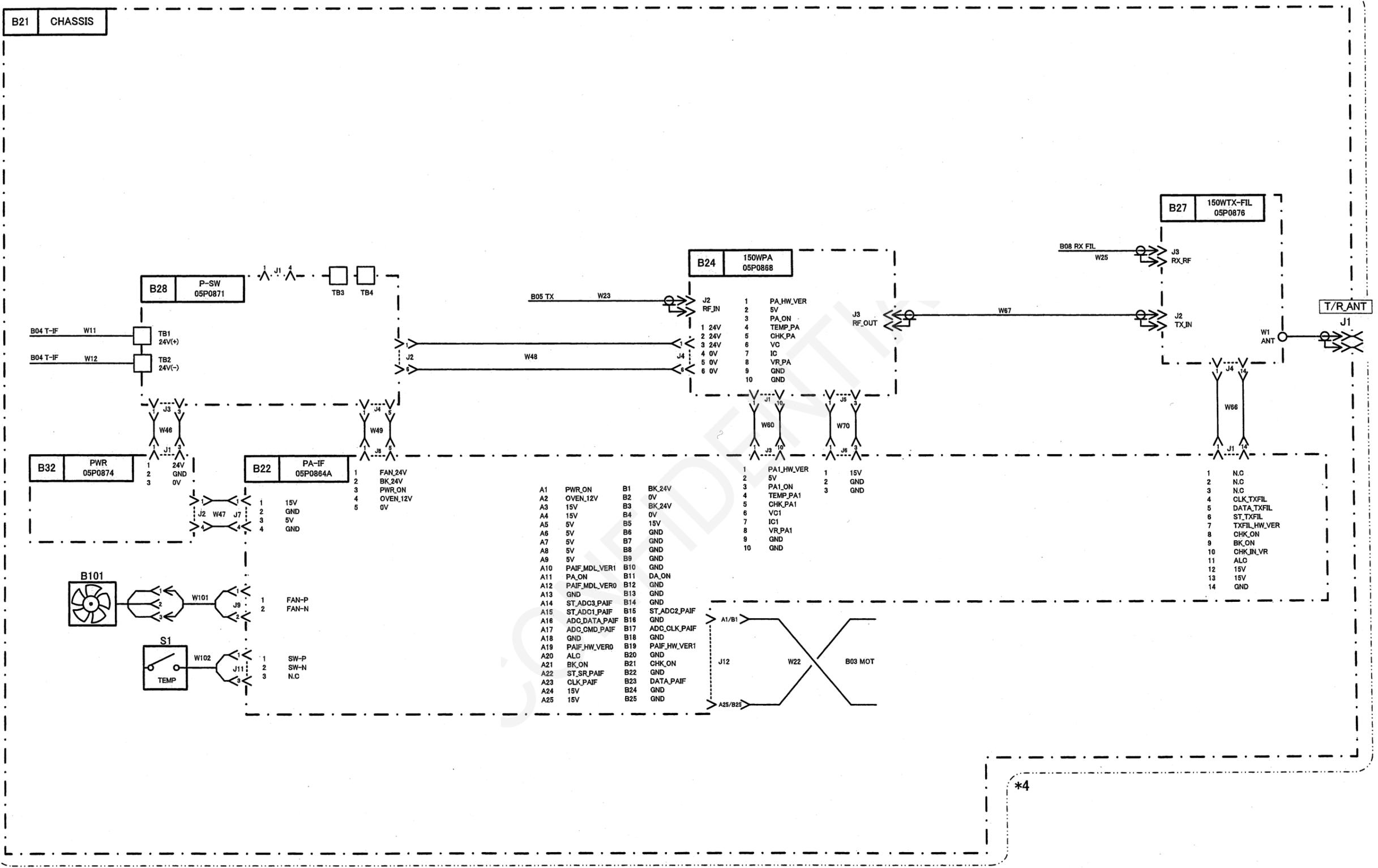
DRAWN 09 Feb. 2012 T. TAKENO	TYPE FS-2575
CHECKED 14 Feb. 2012 T. Asami	名称 送受信部 (3 / 4)
APPROVED 16 Feb. 2012 Y. Honda	回路図
SCALE MASS	MODEL BLOCK No.
Dwg No. C5677-K01-A	REF. No. 05-106-2002-2
	NAME TRANSCEIVER UNIT (3/4)
	SCHMATIC DIAGRAM

A

B

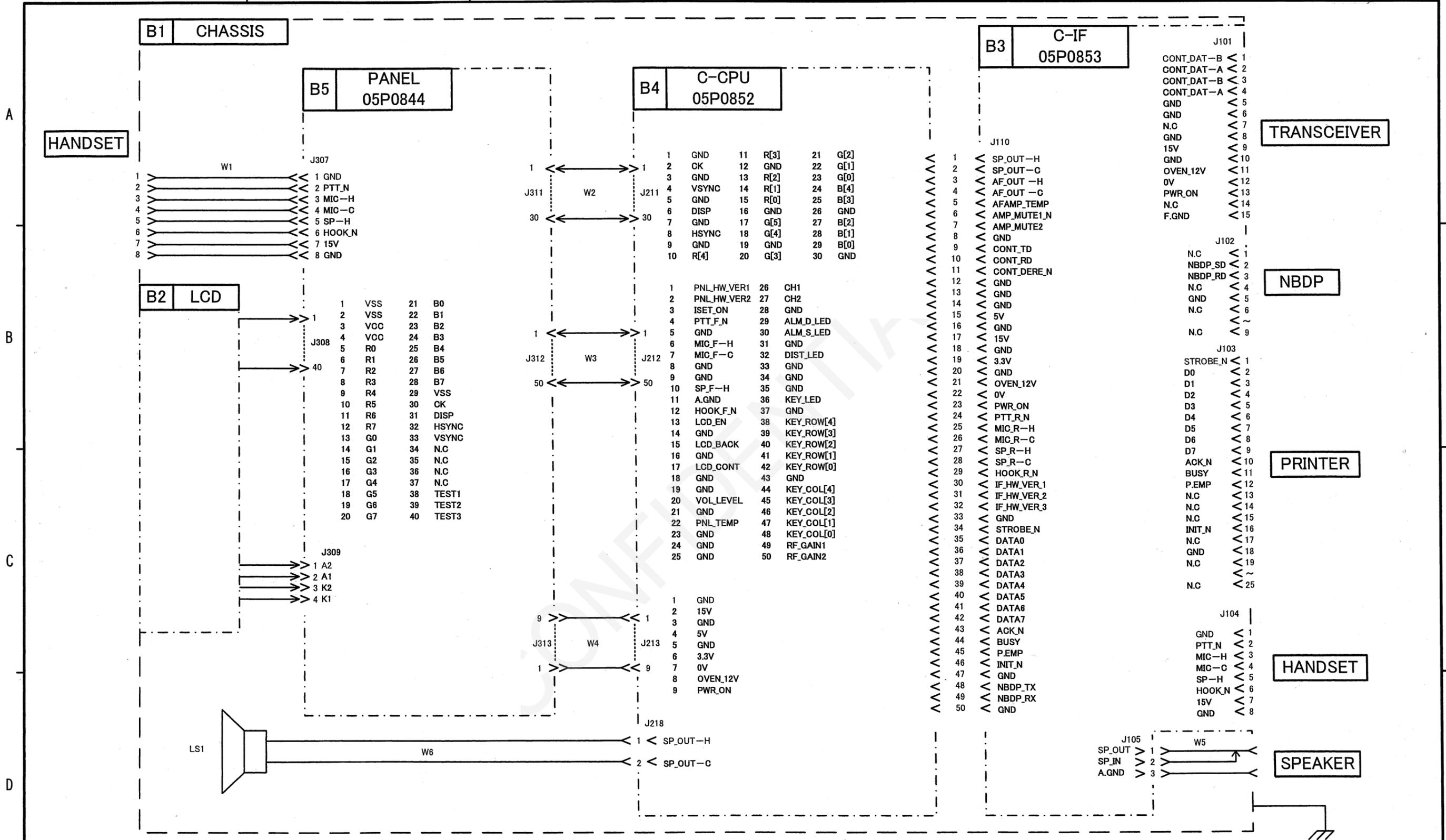
C

D

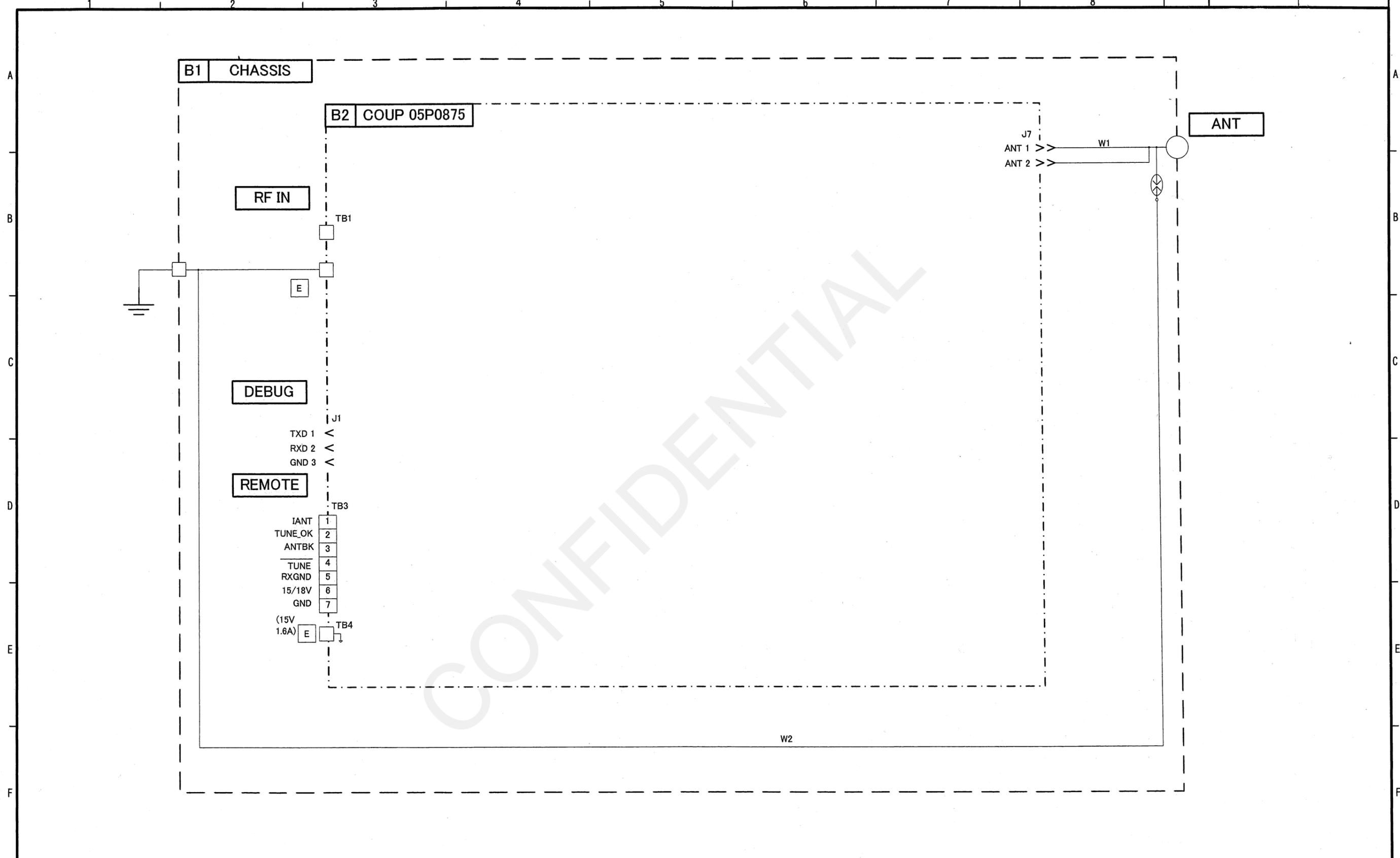


*4

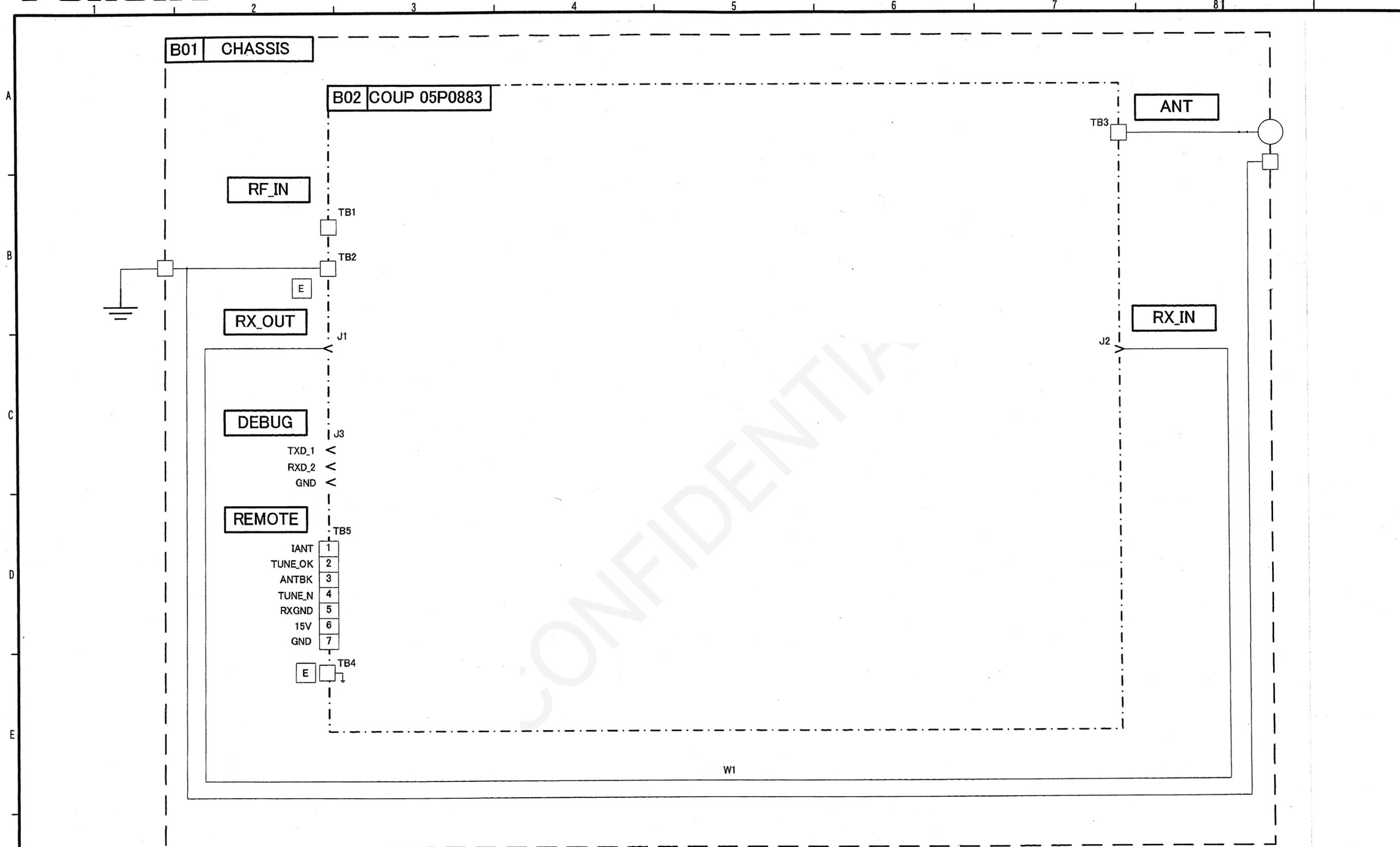
DRAWN 09. Feb. 2012 T. TAKENO	TYPE FS-1575T
CHECKED 14 Feb. 2012 T. Asami	名称 送受信部 (4 / 4)
APPROVED 16 Feb. 2012 Y. Honda	回路図
SCALE MASS	MODEL BLOCK No.
Dwg No. C5676-K04-A	REF. No. 05-106-2003-2
	NAME TRANSCEIVER UNIT (4/4)
	SCHMATIC DIAGRAM



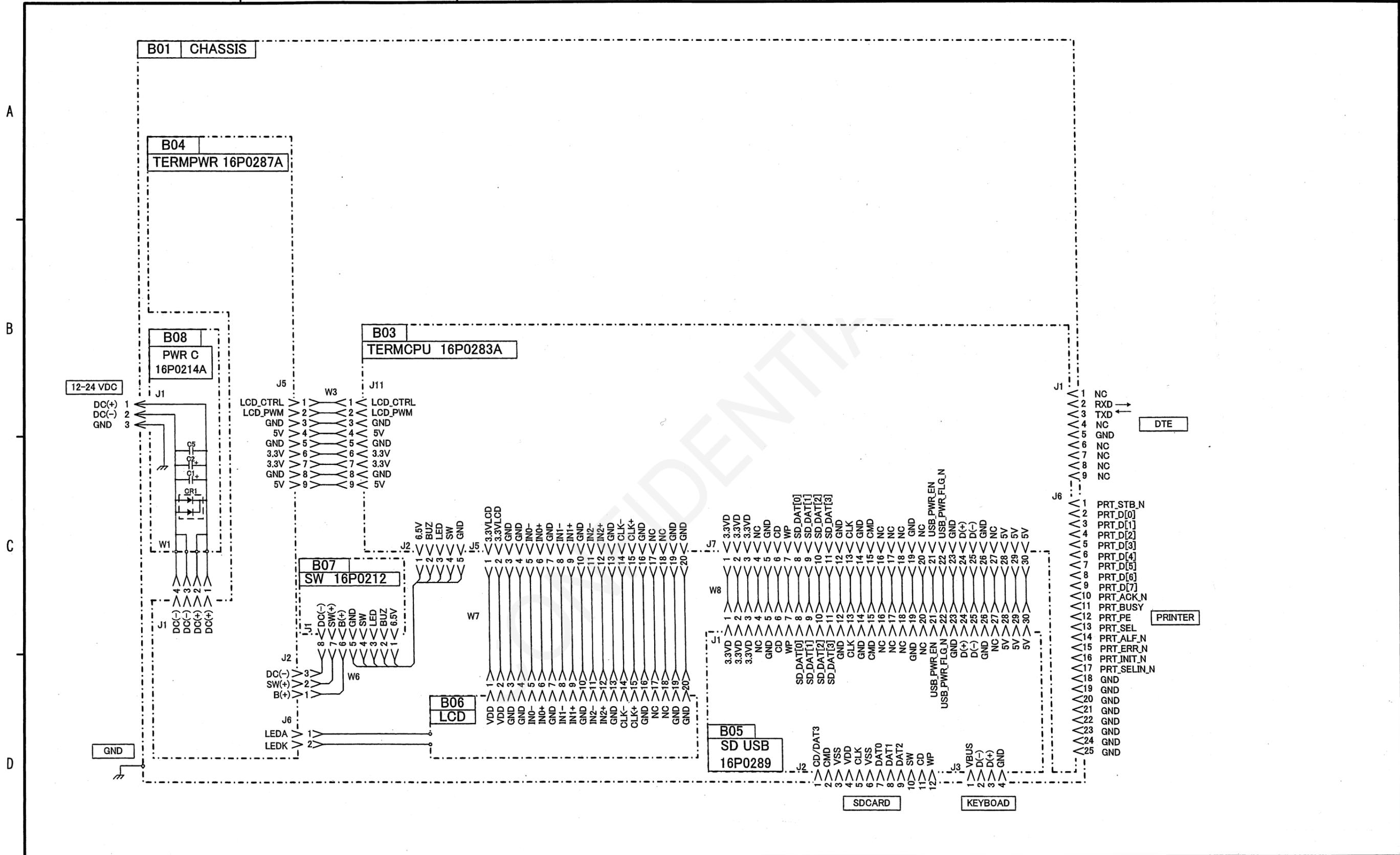
DRAWN 09.Feb.2012 T. TAKENO	FS-1575	TYPE FS-2575C
CHECKED 21.Feb.2012 T. Asami	FS-2575	名称 コントロールユニット
APPROVED 21.Feb.2012 Y. Honda	FS-5075	回路図
SCALE MASS	MODEL	BLOCK No.
Dwg No. C5677-K02-A	REF. No. 05-106-5001-0	NAME CONTROL UNIT
		SCHMATIC DIAGRAM



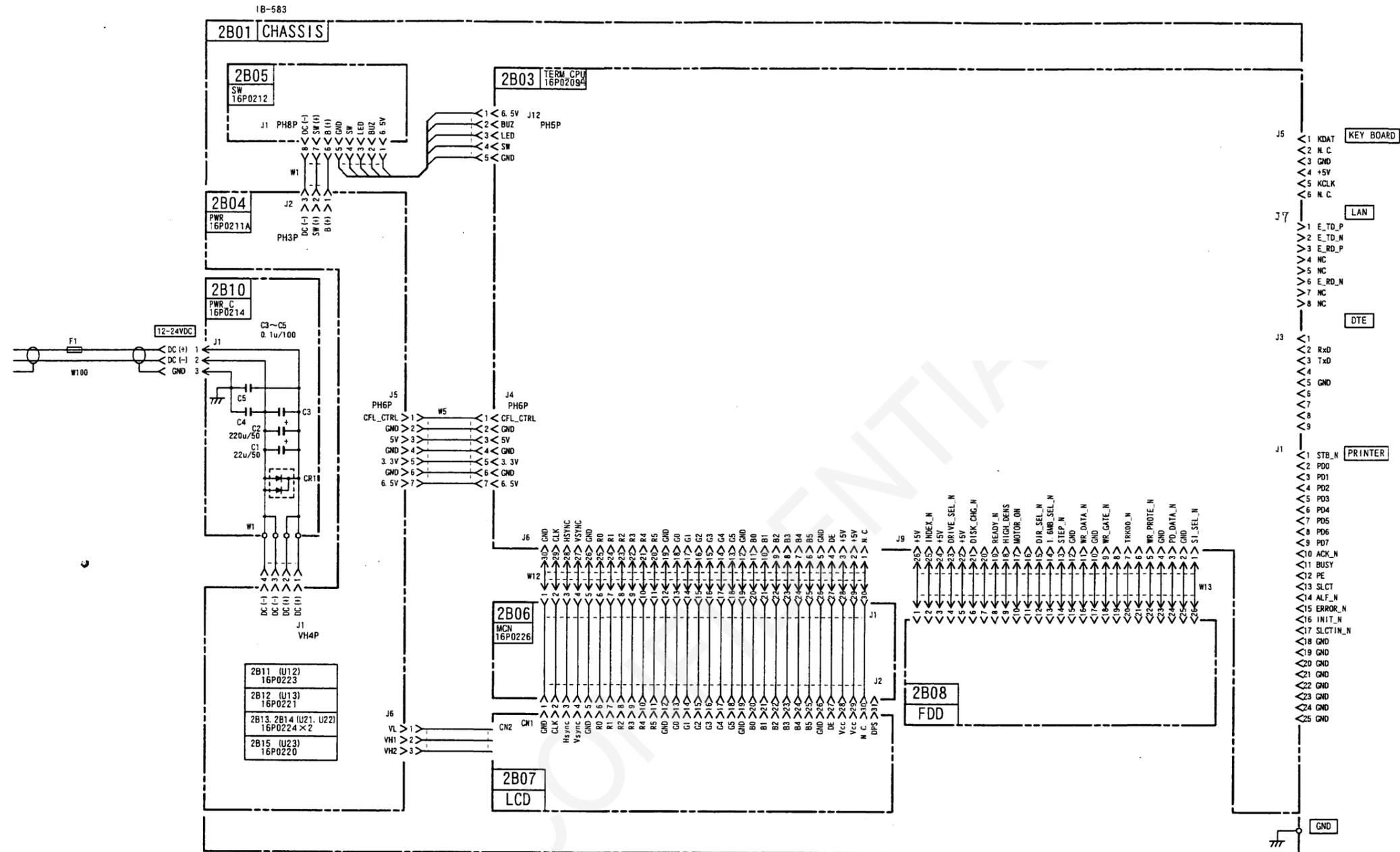
DRAWN 14. Feb. 2012 T. TAKENO		TYPE AT-5075
CHECKED 16. Feb. 2012 T. Asami	FS-2575	名称 アンテナカプラ
APPROVED 19 Feb. 2012 Y. Honda	FS-5075	回路図
SCALE MASS	MODEL	BLOCK No. NAME ANTENNA COUPLER
Dwg No. C5678-K55-A	REF. No. 05-106-3301-0	SCHEMATIC DIAGRAM



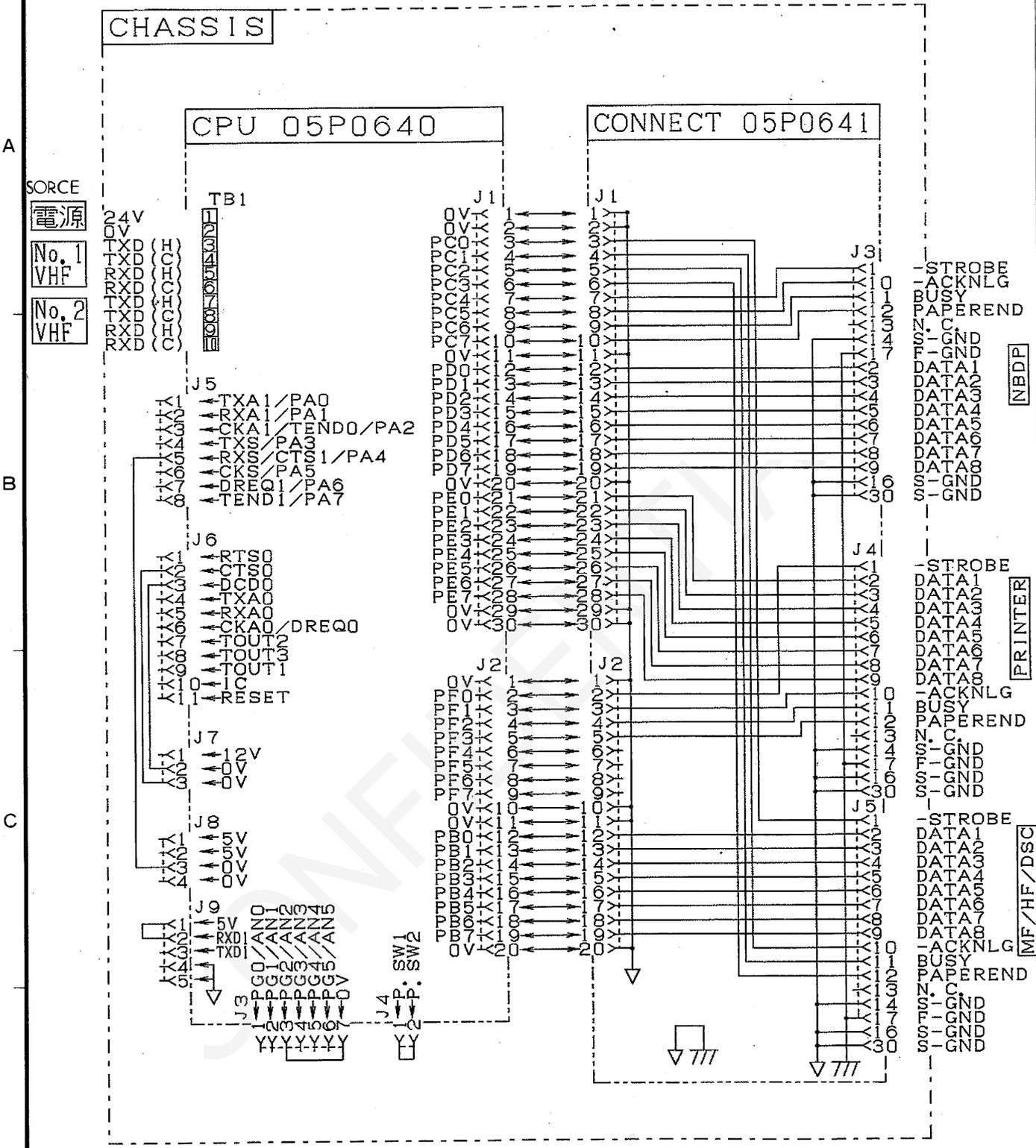
DRAWN 14. Feb. 2012 T. TAKENO	TYPE AT-1575
CHECKED 2012.3.2 C. Suzuki	名称 アンテナカプラ
APPROVED 05. Mar. 2012 M. Asano	回路図
SCALE MASS	MODEL FS-1575
	BLOCK No.
Dwg No. C5676-K05-A	NAME ANTENNA COUPLER
REF. No. 05-106-3002-0	SCHMATIC DIAGRAM



DRAWN 14 Feb. 2012 T. TAKENO	FELCOM 18	TYPE IB-585/IC-218
CHECKED 14 Feb. 2012 T. Asami	FS-1575/2575	名称 ターミナルユニット
APPROVED 16 Feb. 2012 Y. Honda	FS-5075	回路図
SCALE MASS	MODEL	BLOCK No.
Dwg No. C5678-K54-A	REF. No. 05-106-4001-0	NAME TERMINAL UNIT
		SCHMATIC DIAGRAM



DRAWN 02/09/05 T. YAMASAKI	TYPE IB-583
CHECKED 02/9/05 Y. Kim	名称 ターミナル部
APPROVED 02/9/05 Y. Kim	FELCOM 16
SCALE MASS	FS-1570/2570
Dwg No. C5636-K06- A	MODEL BLOCK No. NAME 16-001-3219-0 TERMINAL UNIT
	回路図 SCHEMATIC DIAGRAM



DRAWN 08/08/08 T. YAMASAKI	TYPE IF-8500
CHECKED Aug 12 '08 T. Takano	名称 インターフェイス
APPROVED Aug 12 '08 R. Terui	回路図
SCALE MASS	NAME INTERFACE
MODEL	BLOCK No.
Dwg No. C5603-K10-C	REF. No.
SCHEMATIC DIAGRAM	