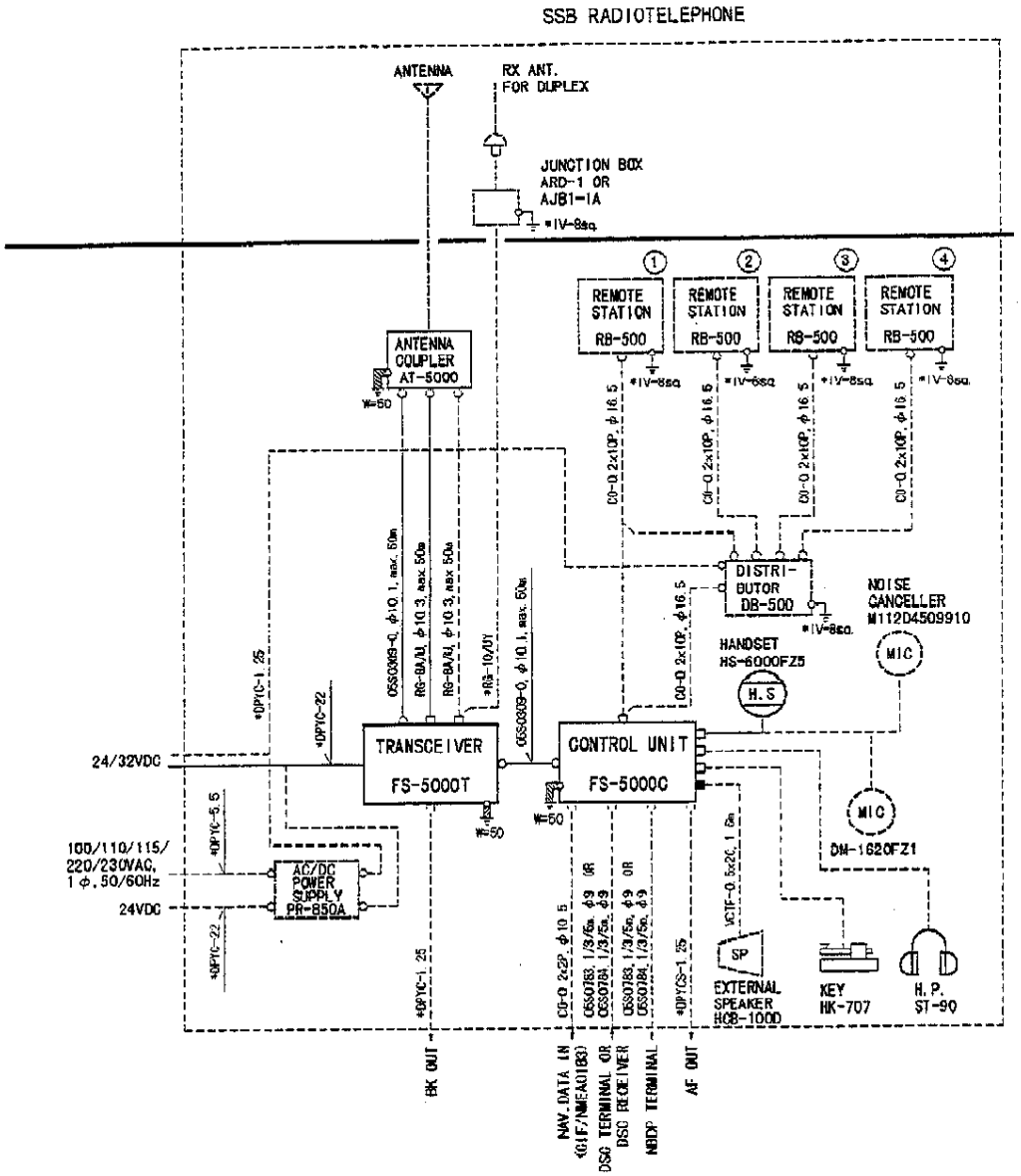
1. Connection

The below installation is the connected for FS-5000.



Note) FS-8000

Transceiver unit	: FS-8000T
Control unit	: FS-5000C
AC/DC Power supply	: PR-850A x 2sets

2. System settings

Change the specifications with the following key sequence.

1. Press [STO] key.
2. Enter item number (system setting No.), and press [ENT] key.
3. Setting number desired, and press [ENT] key.

Ex)
[STO] [9] [9] [0] [1] [ENT] [0] [ENT]

Reference;
A power supply is only connected with the controller unit (FS-5000C), while pressing and holding the [ENT] key, turn on the power. Controller working individually. and system settings of FS-5000 can be done.

2.1 System Channel List

The default settings are shown in a screened cell of setting item.

Ver-21

Channel No.	Function	System setting No.				
		0	1	2	3	4
9900	Model	FS-5000	FS-2500	FS-1600	FS-8000	
9901	TX freq. Selection	Free	Limited	ROM	Marine	
9902	N.C.					
9903	Output power of transceiver unit on MF band	400W	150W	50W		
9904	Class of emission on 2182kHz	AM	SSB	SSB FIX		
9905	TX tune	Enable	Disable	Auto (Tuning is done when setting TX freq.)		
9906	Scan of TX channel	Enable	Disable			
9907	Time display format	Japan	USA	Europe		
9908	Second unit display	Enable	Disable			
9909	Display of class of emission	NOR(SSB)	ITU(J3E)			
9910	Numerical display of check meter data	Disable	Enable			
9911	Test alarm	RX	TX			
9912	Test alarm freq.	2191kHz (Selectable)				
9913	TX delay time	10ms 30ms (Selectable:5-99ms) Note) FS-8000:10ms				
9914	Alarm sending time	45sec (Selectable:1-9999s)				
9915	Check meter items	Full	Short			
9916	Keyboard lock (controlled by [*]key)	OFF	Lock	Intercom		

Channel No.	Function	Setting No.				
		0	1	2	3	4
9917	50 ohm BK. relay	ON/OFF	ON (Fixed)			
9918	Time adj. (Clock)	Auto	Manual			
9919	Control unit priority	NO	1 (Local)	2 (Remote)		
9920	Beep sound ON/OFF	OFF	ON (Fixed)			
9921	Beep sound level	6 (Selectable:0-10)				
9922	Beep sound freq.	2000Hz (Selectable:100-3000Hz)				
9923	Dummy	Enable	Disable	Shortening capacitor		
9924	Freq. rang in which shortening capacitor tunes on. (9923 should be set at "2")	Lower limit 2500kHz				
9925		Upper limit 3999.9kHz				
9926	Test tone	Enable	Disable			
9927	Power reduction on 2182/2187.5kHz	Enable	Disable			
9928	Minimum output power	Less then 60W	60W or more			
9930	Data to "REM1" terminal	MIF (4800bps)	TBUS	CIF	NMEA	MIF 2 (1200bps)
9931	Data to "REM2" terminal	MIF (4800bps)	TBUS	CIF	NMEA	MIF 2 (1200bps)
9932	Data to "REM3" terminal	MIF (4800bps)	TBUS	CIF	NMEA	MIF 2 (1200bps)
9933	Data to "CIF" terminal	MIF (4800bps)	TBUS	CIF	NMEA	MIF 2 (1200bps)
9934	Class of emission of TX/RX, when unit connected to "REM1" is once keyed.	No change	SSB	AM	TLX	
9935	Class of emission of TX/RX, when unit connected to "REM2" is once keyed.	No change	SSB	AM	TLX	
9936	Class of emission of TX/RX, when unit connected to "REM3" is once keyed.	No change	SSB	AM	TLX	
9937	Class of emission of TX only while unit connected to "REM1" is keyed.	No change	SSB	AM	TLX	
9938	Class of emission of TX only while unit connected to "REM2" is keyed.	No change	SSB	AM	TLX	
9939	Class of emission of TX only while unit connected to "REM3" is keyed.	No change	SSB	AM	TLX	

Channel No.	Function	Setting No.				
		0	1	2	3	4
9940	Receiver bandwidth in kHz : SSB (Changeable thru keyboard)	6kHz	3kHz	0.3kHz		
9941	Receiver bandwidth in kHz : CW (Changeable thru keyboard)	6kHz	3kHz	0.3kHz		
9942	Receiver bandwidth in kHz : TLX (Changeable thru keyboard)	6kHz	3kHz	0.3kHz		
9943	Receiver bandwidth in kHz : AM (Changeable thru keyboard)	6kHz	3kHz	0.3kHz		
9944	Receiver bandwidth in kHz : R3E (Changeable thru keyboard)	6kHz	3kHz	0.3kHz		
9945	Receiver bandwidth in kHz : FAX (Changeable thru keyboard)	6kHz	3kHz	0.3kHz		
9946	Receiver bandwidth in kHz : LSB (Changeable thru keyboard)	6kHz	3kHz	0.3kHz		
9947	Squelch on telex mode	No change	OFF			
9948	Noise blanker on telex mode	No change	OFF			
9949	AGC on telex mode	No change	FAST			
9950	Duplex mode on telex mode	No change	Disable			
9951	Receiving antenna on telex mode (Only when optional R.ANT SEL board is installed.)	Main (Not used)	Dup (Used)			
9952	Tx antenna status at reception	OFF (No change)	ON (To GND)			
9953	Operation on AM mode	T/RX	RX only	Disable	2182kHz only	
9954	Operation on R3E mode	T/RX	RX only	Disable		
9955	Operation on FAX mode	T/RX	RX only	Disable		
9956	Operation on LSB mode	T/RX	RX only	Disable		
9957	Cypher communication (Vs Enable control signal ON/OFF on TB2-10 in FS-5000C unit)	Disable	Enable			
9960	Recall of 27MHz SSB/DSB freq.	Disable	Enable			
9961	ITU freq. Table selection	Standard	USA	Europe		
9962	MF band : 405-526.5kHz transmission (When optional MF tuner : AT-410 is installed.)	Disable	Enable			

Channel No.	Function	Setting				
		0	1	2	3	4
9963	User channel programming	Enable	Disable			
9964	FS-8000 only check meter indication for both upper & lower transceiver unit	No	Yes			
9965	Scan response time (DSC/NBDP)	Standard	Fast			
9966	The transmission of AM tow-tone alarm is restricted or not.	Free	Limited	Disable		
9980	Select default setting for each country	Enter international telephone country code 0:standerd 1:USA 31Holland 44:Europe 47:Norway 81:Japan				
9981	Dummy load installation (Both functions of 9911 and 9923 are determined.)	NO 9911:RX, 9923:Disable	Yes 9911:TX, 9923:Enable			
9982	ANT BK. relay or RX ANT installation (Both functions of 9913 and 9917 are determined.)	NO 9913:30ms, 9917:ON/OFF	Yes 9913:10ms, 9917:ON			
9989	Power default setting (When old type Ant. coupler is installed.)		Europe	Norway		
9997	All user CH clear		Clear			
9998	System Lock (Important system setting are not changeable.)	[OFF/ON]: Enter "present time" to change setting.				
9999	System initialization (Default)	Disable	Enable			

Important)
When the ROM change, should be changing both the ROMs of same version number in Control unit and Transceiver unit.

2.2 Confirmation of settings

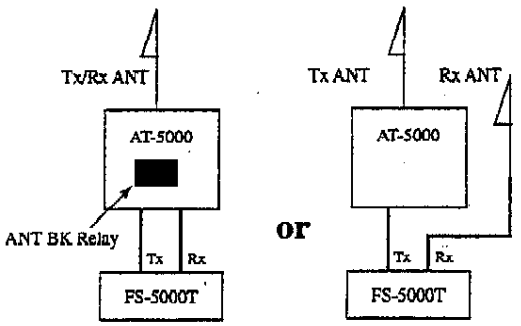
To confirm settings, press ***[RCL] [9] [9] [9] [9] and [ENT]*** in this order.
Then press [ENT] key successively.

System setting for GMDSS

FS-5000)

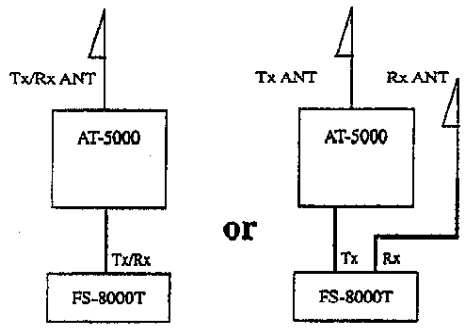
System channel:9982 (A.BK relay or R.ANT) --- **[1]: YES**

Note) 9913:System Delay 10 ms
9917:50 ohm BK Relay 1:ON (Permanently)
*The 50 ohm BK is installed the TX FIL board.



FS-8000)

9913:System Delay 10 ms
9917:50 ohm BK Relay ON or OFF (depend on installation)
*The 50 ohm BK is installed the COMBINER board.



9917: 0 (ON/OFF) ***9917: 1 (ON)***

"BFO" setting frequency

The DSC and NBDP are connected, the BFO frequency should be set to 1700 Hz.

1700 Hz; [BFO] 1700 [ENT]

2.3 System channel description

The following describes about some system channels.

9900

Output power of ITU/DSC channels and direct key-in frequencies are preset as shown below.

Model vs Max. Output Power (*): for Japanese vessels only.

	FS-5000	FS-2500*	FS-1600*	FS-8000
Output Power	400W	250W	150W	800W

9901

Free Any frequencies (1.6065 to 29.9999 MHz) can be transmitted by direct key-in.

Limited The frequencies in the ITU/DSC and user channels can be transmitted.

ROM Only the frequencies stored in the user channel can be transmitted.

Marine Any frequency in the following bands may be transmitted.

1606.5 - 4438 kHz, 5680 kHz
6200 - 6525 kHz,
8100 - 8815 kHz,
12230 - 13200 kHz,
16360 - 17410 kHz,
18780 - 18900 kHz,
19680 - 19800 kHz,
22000 - 22855 kHz,
25070 - 25210 kHz,
26100 - 26175 kHz

9911

To test the transmitter press [TEST] and [START] keys in this order. The dummy load (if equipped) is connected automatically and the test signal of 2191kHz, modulated by two-tone alarm, is sent to the dummy load.

9915

If you select "1" (short), only check data for Ia, Vc, Ic and Pi are displayed repeatedly every pressing of the [CHECK METER] key.

9916

To enable to lock the keys except for [SEND], [START], [2182], and [2187.5] keys, select "1" (ON). Then press the * key to turn on the key lock function. First press of the * key make the keys inactive. (Keyboard Lock [ON]" will be displayed.)

Select "2" (Intercom call), to use the [*] key for intercom call.

Note that the AF board 05P0356-33 in the Control Unit is required.

9917

Used if installation contains a receiving antenna or ANT BK RELAY board (in antenna coupler). For high speed switching between receiving and transmitting (for example, telex) set to "1." Then, TX delay time (system setting 9913) is shortened to "10ms".

9919

For control unit priority, select the same setting numbers for both control units.

*To give priority to No. 1 Control Unit;
No.1 Control Unit: Setting "1"
No.2 Control Unit: Setting "1"

*To give priority to No. 2 Control Unit;
No.1 Control Unit : Setting "2"
No.2 Control Unit : Setting "2"

9923

Setting No.	Contents	LCD Indication	Remarks
"0"(Enable)	Dummy load can be switched by DUMMY key.	DUMMY	With DUMMY LOAD PCB.
"1"(Disable)	DUMMY key is not operative.	—	Without DUMMY LOAD PCB
"2" (Short Cap.)	Shortening capacitor automatically turns on in the range set by 9924/9925. Further, DUMMY key is allowed to turn on/off shortening capacitor.	S.CAP(Shorten-ing capacitor)	With modified DUMMY LOAD PCB

9928

For 1988 SOLAS Convention ships (GMDSS) set this item to "1." Then, minimum output power is automatically set at 60W (power data -- MF:115, HF:110), except for minimum power data already stored into user channel.

9930 - 9932

MIF Furuno Multi Interface for Radio communication. Selected when DP-6, DSC-6 is connected.

TBUS Selected for equipment made by 'Thrane & Thrane A/S" of Denmark. If TBUS data is used, it is not necessary to connect TXD/RXD lines.

9934 – 9936

If you wish to change the class of emission only while the selcall is transmitted and to restore it automatically to previous status after transmission, set the channel Nos. 9934 - 9936 and 9937 to "0" (No change) and "2" (AM), respectively.

EX) Selcall is connected REM 1, set to system channel "9934" to "0" and "9937" to "2"..

9947

The "1": SQ on Telex [1-OFF] setting automatically turns off the SQ (if ON) when class of emission is changed to TELEX. (Note that AF signal to DP-5/6 is not passed through squelch circuit, so this setting is not for DP-5/6 connection.)

9948

The '1": NB on Telex [1-OFF] setting automatically turns off the NB (if ON) when class of emission is changed to TELEX.

9949

AGC on Telex
*The "1" setting sets AGC to FAST when class of emission is changed to TELEX.

9950

Duplex on Telex
*The "1" setting inhibits DUPLEX mode (unnecessary on TELEX) when class of emission is changed to TELEX.

9952

1: ON (Connected to GND)
*This function is available only when the Rx antenna is installed and dummy load board with antenna earth relay is mounted in the coupler. If you want to connect the Tx antenna to ground manually (irrespective of 9952 setting), press the [DUMMY] key. (For HF band of the FS-8000, this function is operative only when the output power is selected for "Low 2" or less.)

9953

2182 --- Transmission 2182 kHz, Reception all frequencies

9961

ITU Freq. Table [0-Standerd, 1-USA, 2-EU]
[2-EU] selection; MF band ITU frequency list added.

9966

In accordance with both the above setting and system setting 9953 (Operation on AM mode), the transmission of two-tone alarm on AM mode is as follows:

System setting:9966	System setting:9953	TX of two-tone alarm on AM mode.
0:FREE (Factory setting)	0: TX/RX	Possible on all frequencies.
	1: RX only	
	2: No	Disabled
	3: 2182	Possible on all frequencies.
1: LIMITED	0: TX/RX	Possible on all frequencies.
	1: RX only	Disabled
	2: No	
	3: 2182	Possible on 2182 kHz only.

9980

Returns to default setting for each country. For example, enter "44" for Europe.

9981

Determines the functions of 9911 and 9923 as follows:

9981	[0] NO	[1] YES
9911: Alarm	0-Receive	1-Transmit
9923 : Dummy	1-Inhibit	0-Enable

9982

Determines the functions of 9913 and 9917 as follows:

9982	[0] NO	[1] YES
9913 : System	30 ms	10 ms
9917: 50 ohms BK Relay	0-on/off	1-Permanently on (fixed)

9989

Power setting for Europe and Norway type [1-EU, 2-NOR]. Setting of power data.

EU (Europe)		Power data		NOR (Norway)	Power data	
1.6-2.5MHz	FS-5000	225		1.6-2.5MHz	FS-5000: 200	FS-8000: 160
	FS-8000	160		2.5-4.0MHz	FS-5000: 210	FS-8000: 160
				4.0-30MHz	FS-5000: 225	FS-8000: 160

9998

Ex) Preset time is 12 : 35.

Press 1235 [ENT] in this order to turn on or off the system lock function.
The following system settings are not changeable when you turn on the system lock function.

* STO FULL (or LOW) Power Adjustment
* STO 9900 Model
9901 Tx freq. selection
9903 Output power of SSB on MF band
9914 Alarm sending time
9960 Recall 27MHz freq.
9999 System initialization

2.4 Default setting for each country

[STO] [9] [9] [8] [0] [ENT] Country code [ENT]
The default settings are shown in a screened cell of setting item. The system channel that it isn't mentioned in the below list is the same as standard setting. Refer to section "2.1 System Channel List".

Country Code List

CH No.	Function	Setting					Country Code					
		0	1	2	3	4	0: Standard	1:USA	31: Holland	44: EU	47: Norway	81: Japan
Types of delivery for each country							-	U	-	S	N	K
9901	TX freq. Selection	Free	Limited	ROM	Marine		0	0	3	0	3	0
9903	Output power of transceiver unit on MF band	400W	150W	50W			0	1	0	0	0	2
9904	Class of emission on 2182kHz	AM	SSB	SSB FIX			2	2	2	2	2	2
9907	Time display format	Japan	USA	Europe			0	1	2	2	2	0
9910	Numerical display of check meter data	Disable	Enable				0	0	0	0	0	1
9913	TX delay time	30ms (Selectable:5-99ms) Note) FS-8000:10ms *Upper:FS-5000 *Lower:FS-8000					30	30	30	30	10	30
							10	10	10	10	10	10
9917	50 ohm BK. relay	ON/OFF	ON (Fixed)				0	0	0	0	1	0
9923	Dummy	Enable	Disable	Shortening capacitor			1	1	1	1	1	1
9926	Test tone	Enable	Disable				0	1	1	1	1	0
9927	Power reduction on 2182/2187.5kHz	Enable	Disable				0	1	1	1	1	0
9928	Minimum output power	Less then 60W	60W or more				0	1	1	1	1	0
9950	Duplex mode on telex mode	No change	Disable				0	0	1	0	0	0
9953	Operation on AM mode	T/RX	RX only	Disable	2182kHz only		1	1	1	1	1	0
9954	Operation on R3E mode	T/RX	RX only	Disable			0	0	1	1	1	1
9955	Operation on FAX mode	T/RX	RX only	Disable			0	0	1	1	1	1
9956	Operation on LSB mode	T/RX	RX only	Disable			0	0	1	1	1	1
9957	Cypher communication (Vs Enable control signal ON/OFF on TB2-10 in FS-5000C unit)	Disable	Enable				0	0	0	0	0	1
9961	ITU freq. Table selection	Standard	USA	Europe			0	1	2	2	2	0

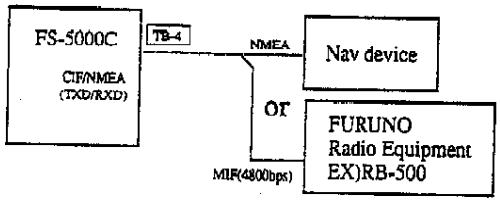
3. Jumper settings

3.1 For NAV data format selecting, CIF or NMEA

Jumper wire setting on AF board selects data format to be received. Referring to next page.
In addition, system setting for "9933:Data to CIF terminal" port must be set.

[STO] 9 9 3 3 [ENT]

0: MIF(4800bps) 1: TBUS 2: CIF
3: NMEA 4: MIF2(1200bps)



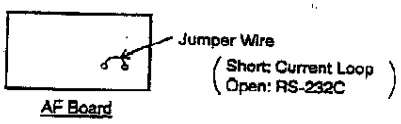
3.2 When using C.Loop between FS-5000/8000 and DB-500.

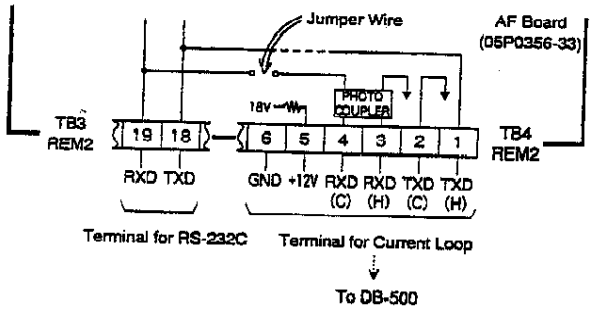
Put a jumper wire on the AF board to use current loop format. Refer to the next page for locatin of parts on AF board having suffix number -33 and after.
In addition confirm the system setting for "9931:Data to REM 2 terminal" port.
To connect with the DB-500 (C.Loop) or RB-500, setting should be as below.

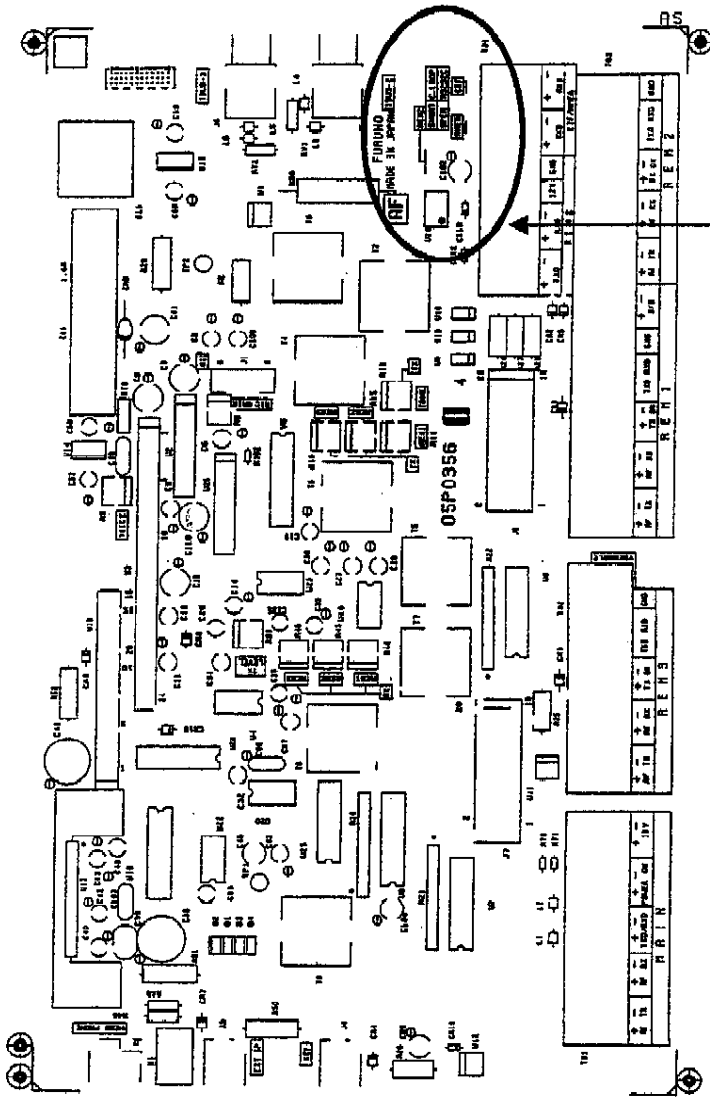
[STO] 9 9 3 1 [ENT]

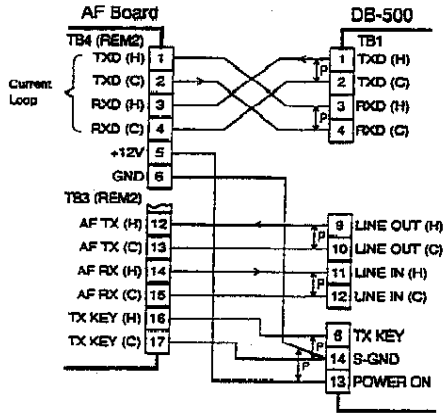
0: MIF(4800bps) 1: TBUS 2: CIF
3: NMEA 4: MIF2(1200bps)

Jumper wire: Short (Current Loop)






CIF/NMEA
*CIF NMEA: Open, CIF: Short
*NMEA NMEA:Short, CIF: Open
REM2
*C.Loop Short
*RS-232C Open
05P0956
REM1
REM2
PRIN


AF Board
DB-500
TB4 (REM2)
TXD (H) 1
TXD (C) 2
RXD (H) 3
RXD (C) 4
Current Loop
+12V 5
GND 6
TB3 (REM2)
AF TX (H) 12
AF TX (C) 13
AF RX (H) 14
AF RX (C) 15
TX KEY (H) 16
TX KEY (C) 17
TB1
1 TXD (H)
2 TXD (C)
3 RXD (H)
4 RXD (C)
9 LINE OUT (H)
10 LINE OUT (C)
11 LINE IN (H)
12 LINE IN (C)
8 TX KEY
14 S-GND
13 POWER ON

4. User (Preset) Channel Programming

The 'TX freq. selection" (9901) is set to "1" (Free), so you may store frequencies by recalling the ITU/DSC channels or by keying in a frequency through the keyboard. Select class of emission, bandwidth, and frequency, then press the following keys to store the frequencies (class of emission & BW as well) into the user channel.

[STO] (User CH No.) [ENT] [ENT]
**User CH No. : 1 to 8999 CH (storage capacity: 400 CH)*

Execute the following key sequence to store ITU frequencies (class of emission & BW as well) into the user channel.

[ITU] (ITU CH No.) [ENT]
[STO] (User CH No.) [ENT] [ENT]

Note)
To see stored user channels, press [RCL] 9998 [ENT].

To erase a user channel, press [STO] "User CH No." [ENT] [0] [ENT].

5. Power Adjustment

When precise power adjustment is required, adjust the "power data" referring to the procedure below.

Channel & Resolution of Memory

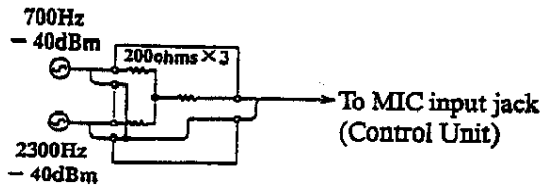
Channel	Resolution of Memory
User channel	Each channel
Free direct key-in ITU Channel DSC Channel	MF --- 500 kHz steps HF --- 1 MHz steps

Note 1. If the "Model name setting (9900)" is correctly made, maximum power data will be "255" (MAX).

2. If the error message "Excessive Ic on PA." (when Ic exceeds 25A) appears during transmission, output power is reduced automatically from "FULL" to "LOW1" → "LOW2 —." In this case, reduce the output power to prevent overcurrent from flowing into the power amp, by following the steps from 6 to 9 shown below.

Procedure

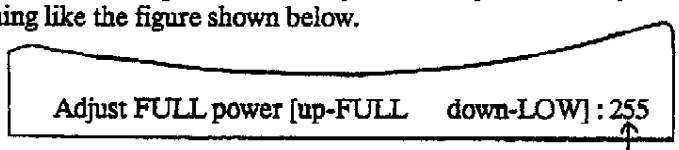
1. Connect a power meter (input impedance 50 ohms, measurable range 500 W ave. for FS-5000, 800 W ave. for FS-8000.) to the TX ANT jack on the transceiver unit.
2. To display the numeral check meter data on the screen, press **STO 9 9 1 0 ENT 1 ENT** in this order.
3. Press the **CHECK METER** key successively until the "Collector Current (A)" can be monitored.
4. Connect two AF oscillators to the MIC input jack as below, and then press PTT switch.



5. Read the meter indication.

Model	Meter ind.	(Output power)
FS-5000	200 W	(400 W pep)
FS-8000	400 W	(800 W pep)

6. Stop transmission and press the **STO** key followed by the **FULL** key. The screen should look something like the figure shown below.



Max. Power data (0 to 255)

7. To decrease the output power, decrease the "power data" by pressing and holding the **LOW** key.

8. Transmit again and check that the output power is as desired and Ic on the LCD is lower than 24.5A (the indication "FULL" remains).

9. If the power is decreased excessively, increase the power by pressing and holding the **FULL** key.

10. **Repeat steps 6 to 9 until desired power is obtained.**

The relationship between power data and output power of the transceiver unit is as follows. Refer to pages AP2-11 and AP2-11a.

Power Data & Output Power

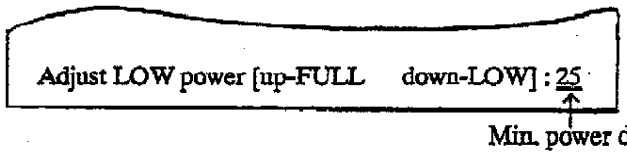
Power data	Output power (approx.)	
	FS-5000	FS-8000
255	400W	800W
200	250W	500W
175	200W	370W
150	150W	280W
80	50W	110W
25	10W	30W
0	5W	10W

MINIMUM POWER SET

If necessary, you may change the minimum output power.

Procedure

1. Press the **STO** key followed by the **LOW** key. The screen should look something like the figure shown below.



2. Press and hold the **FULL** or **LOW** key to increase or decrease power data, respectively.

3. To memorize power data, press the **ENT** key.

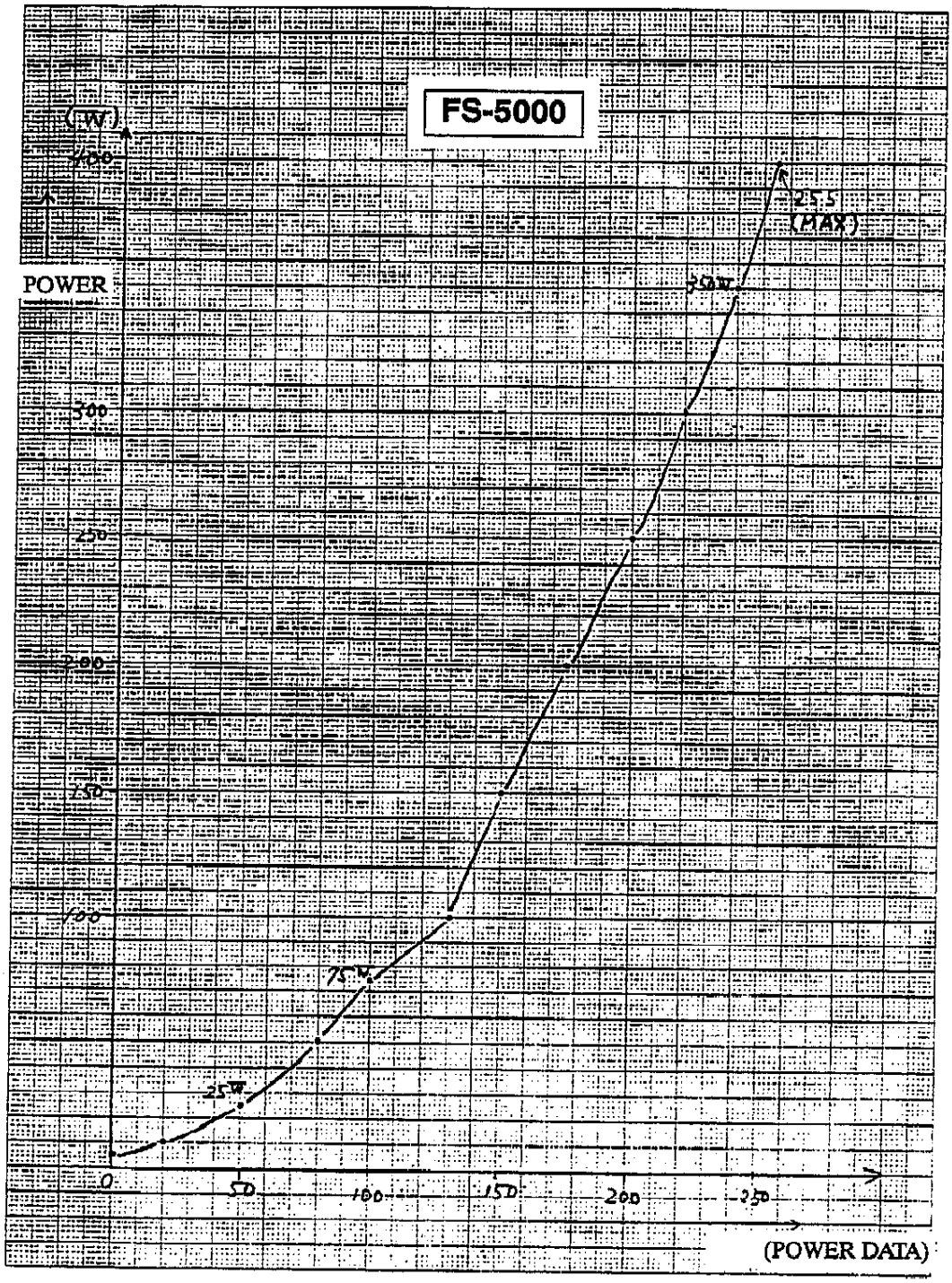
POWER DATA FOR POWER REDUCTION

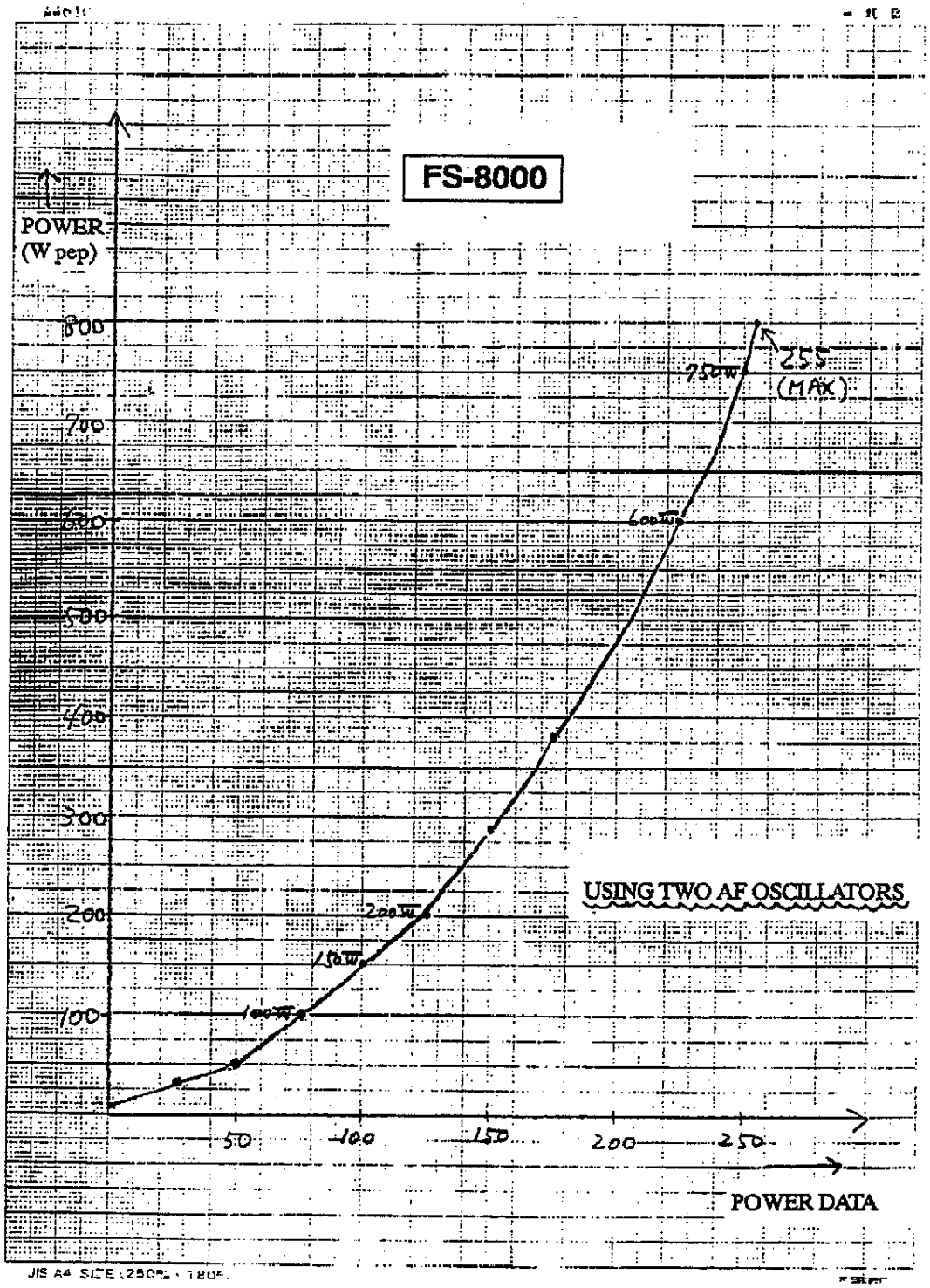
For every press of the **LOW** key in normal operation, the power indication on the screen changes from "FULL" to "LOW1" → "LOW2" — "LOW5." The relationship between power indication and "power data" is as follows.

Power Indication & Power Data

Power Indication	Power data	Output power (approx.)	
		FS-5000	FS-8000
"FULL"	255	400W	800W (400W)
"LOW1"	205	260W	520W (200W)
"LOW2"	155	160W	310W (80W)
"LOW3"	105	80W	150W (25W)
"LOW4"	55	30W	50W
"LOW5"	Minimum power data		

Note: Number in parentheses is output power on frequencies below 4 MHz.


FS-5000
(W)
POWER
300
250
200
150
100
0
50
100
150
200
250
25W
75W
150W
25.5
(MAX)
(POWER DATA)


FS-8000
POWER
(W pep)
800
700
600
500
400
300
200
100
255
(MAX)
950W
600W
200W
150W
100W
50
100
150
200
250
USING TWO AF OSCILLATORS
POWER DATA

6. Self test

6.1 Transceiver unit

To execute a self test, press the [RCL] key, enter a test number and hit the [ENT] key. The LCD displays an appropriate indication during testing, and, after completion of the test, the results, either OK or an error message.

To escape from a self test, press any key after the test is completed.

Test No.	Test	Indication During Testing
9900	All self tests except the key/LCD test	
TRANSCEIVER UNIT		
9910	Consecutive execution of tests 9911 to 9916	
9911	TX synthesizer on the EXC Board (PLL)	Checking Tx Local OSC
9912	MIC Input/Output on EXC Board Vc/Ic on PA Board SWR detection on TX FIL Board	Checking Tx board
9913	RX synthesizer on the RX Board (PLL)	Checking Rx Local OSC
9914	RX Board	Checking Rx board
9915	ROM (U10) on CPU Board	Checking TRx ROM
9916	RAM (U12) on CPU Board	Checking TRx RAM
CONTROL UNIT		
9920	Consecutive execution of tests 9921-9925	
9921	Key Check The name of each key appears on the LCD. Press each key one by one, and its corresponding indication will be highlighted if the key is functioning properly.	
9922	LCD Check Properly functioning LCD segments appear in highlight.	
9923	AF Board	Checking AF board
9924	ROM (U9) on the CPU Board	Checking Control ROM
9925	RAM (U15/U21) on the CPU Board	Checking Control RAM
Connection between Transceiver Unit and Antenna Coupler		
9930	Connection between Transceiver Unit and Antenna Coupler	Checking ATU

6.2 Antenna Coupler unit

To check the Antenna Coupler for proper operation, press the [CHECK] button (S2) on the COUPLER Board. The relays start chattering and LEDs CR37 to CR57 blink one by one in ascending order. If device failure is found, an appropriate LED lights to indicate the offending device:

Device	LED
ROM (U3)	CR37
RAM (U4)	CR38
A/D Converter IC (U8)	CR39