

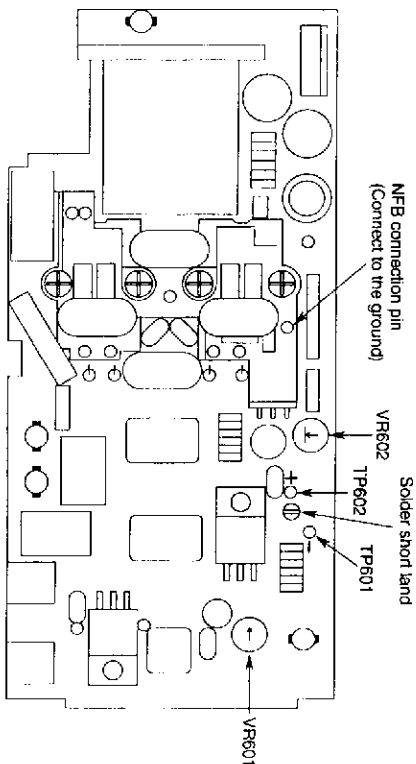
ADJUSTMENT

1) PA unit Adjustment

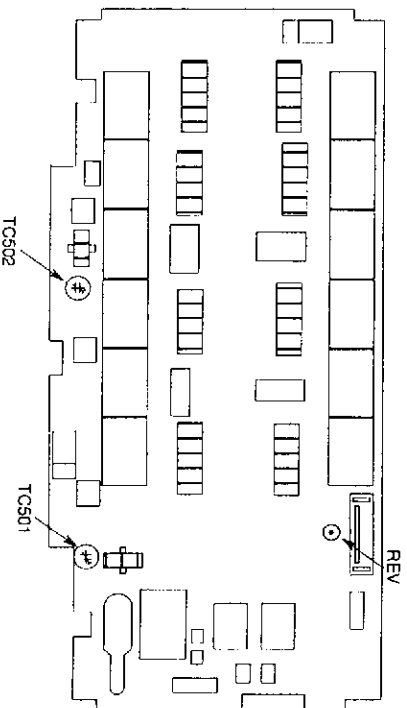
Required Test Equipment

1. Digital voltage meter
 2. DC current meter
 3. DC regulated power supply
 4. Power meter
 5. Linear detector
 6. SG or RF generator
- 300~500mA
3A
13.80V 25A or more
(should be equipped with 20~25A current limit and current meter)
100W (1.9~30MHz)
1.9~60MHz, -10~+10dBm

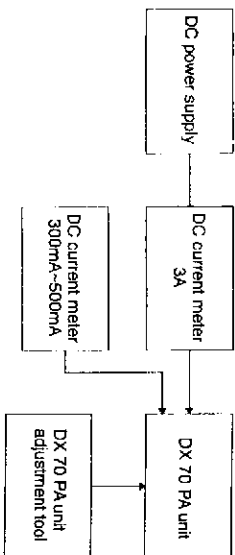
PA Unit Adjustment Points



Filter Unit Adjustment Points

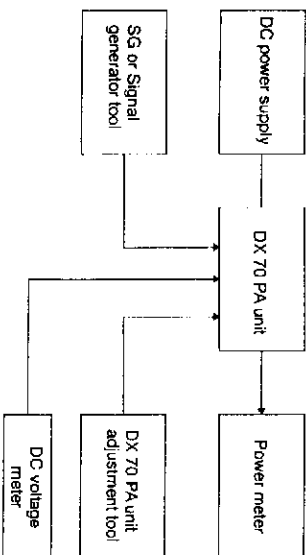


Idle Current Adjustment Setting



Adjustment the idle current without input signal.

SWR Adjustment Setting



Adjust SWR at approximately 50W.

PA Adjustment

Item	Condition	Measurement			Adjustment	
		Equipment	Terminal	Unit	Parts	Method
Idling current 2SC1972 x 2	SSG: OFF Mode: USB	Current Meter	TP601 ⊖ TP602 ⊕	PA	VR601	Disconnect the short-land Connect the current meter between TP601 and TP602, then adjust VR601 to 100mA.
	VR601, 602: min.	300~500mA			VR602	Solder the short-land
Idling current 2SC2904 x 2	SSG: OFF Mode: USB	Current Meter	CN605 unit total current		VR602	Connect terminal pin of NFB unit to the ground, check the total current in transmission mode. Then remove terminal pin from ground, adjust VR602 to increase 300mA.
	Connect TP1 and TP2 by soldering after adjusting.	3A				
SWR detection	t=1.9MHz SG =>PA unit	Voltage Meter	REV	Filter	TC501	Adjust the output power to 50W, then adjust the TC501 so that REV voltage is min.
	t=52MHz				TC502	Adjust the output power to 5W, then adjust the TC501 so that REV voltage is min.

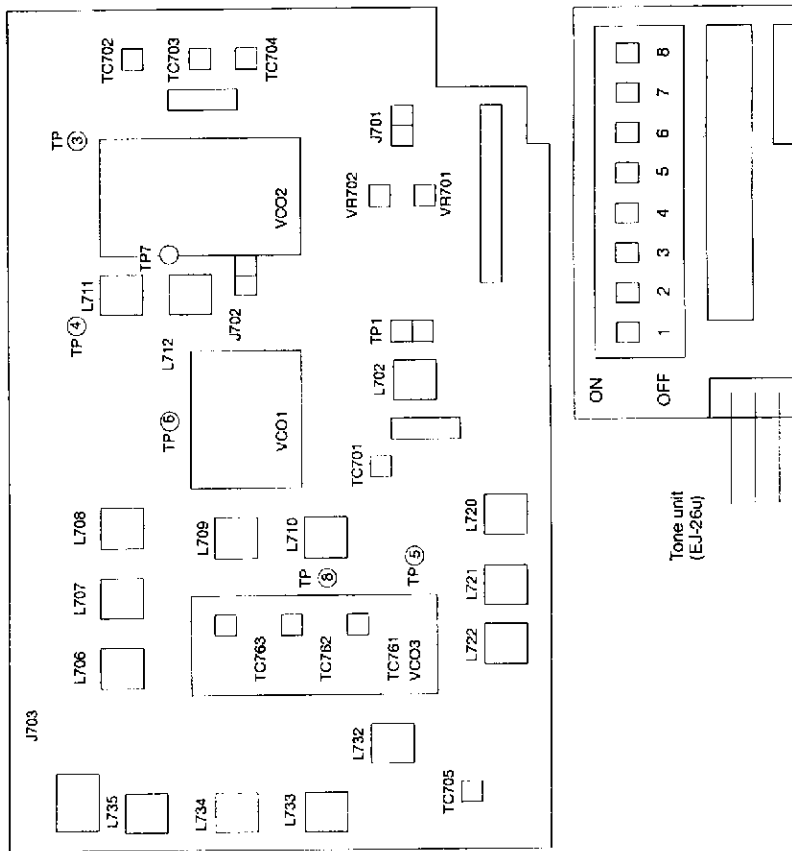
When you adjust the finished goods, set the mode to SSB, adjust the input level of microphone, and set the output power to about 50W. (to protect from accidental damage). Then proceed to "9) Transmission Adjustment".

2) PLL Adjustment

Required Test Equipment

1. Digital voltage meter
2. DC regulated power supply 13.80V 5A or more
3. Frequency counter 500MHz or more
4. Spectrum Analyzer 1GHz or more
5. Oscilloscope 100MHz or more

PLL Unit Adjustment Points



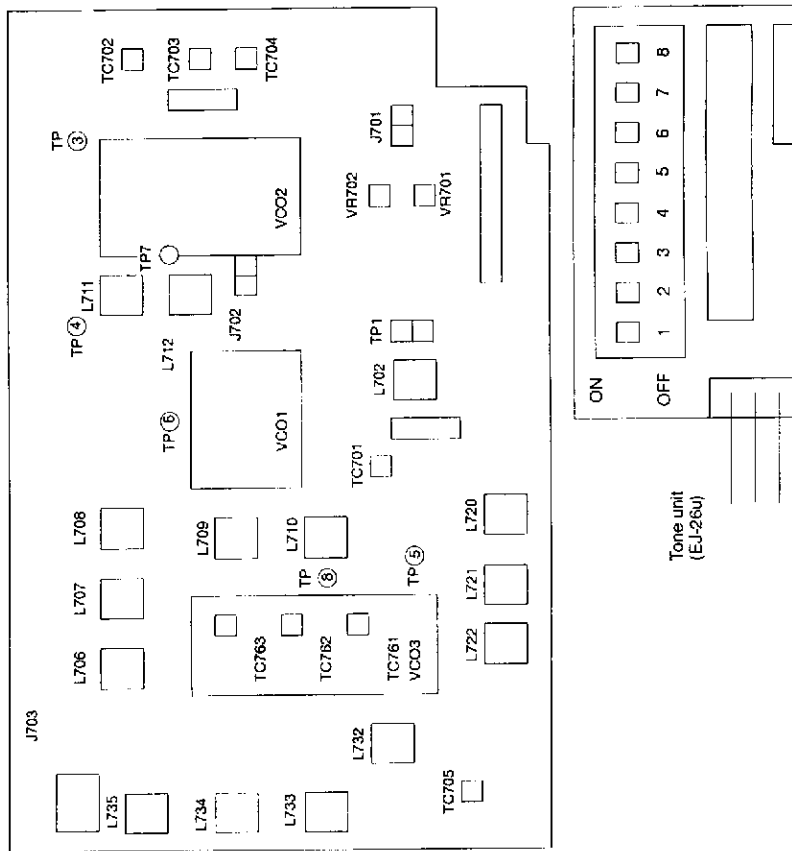
Item	Condition	Measurement			Adjustment		
		Equipment	Unit	Terminal	Unit	Parts	Method
VCO1 Frequency	PD1=1.2V	Freq. Counter	VCO1	CN90 1-3			175MHz or above
	PD1=4.3V						155MHz or below
	PD1=1.5-4V	Freq. Counter	VCO2	CN90 2-4			VCO2 freq.: 71MHz
Attach the VCO to PLL, then adjust the unit after installing the PLL to the unit.							
VCO2 Lock range	f=7.100MHz	Digital tester	PLL	TP7		Check	1.5V-4V
VCO1 Lock range	f=7.0999MHz			TP6			1V-3V
	f=7.1000MHz						3V-4.3V
	f=0.1500MHz			TP8	VCO3	TC961	2.5V
VCO3 Lock range	f=10.4999MHz					TC961	When the voltage is 6.45V or below, adjust the unit to 6.5V again. (6.45V~7.0V)
	f=10.5000MHz					TC962	2.5V
	f=21.4999MHz					TC962	When the voltage is 6.45V or below, adjust the unit to 6.5V again. (6.45V~7.0V)
2nd LO Level	f=21.5000MHz					TC963	2.5V
	f=29.9999MHz					Check	6.5V or below
	f=7.100MHz	Oscilloscope		TP4	PLL	L711 L712	Turn the coils to the max. repeatedly.
1st LO Level	f=7.100MHz			TP5		L709 L710	Turn the coils to the max. repeatedly.
	f=7.100MHz					L706 L707	Turn the coils to the max. repeatedly.
	f=7.100MHz					L708	Turn the coils to the max. repeatedly.

2) PLL Adjustment

Required Test Equipment

1. Digital voltage meter
2. DC regulated power supply 13.80V 5A or more
3. Frequency counter 500MHz or more
4. Spectrum Analyzer 1GHz or more
5. Oscilloscope 100MHz or more

PLL Unit Adjustment Points



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		Equipment	Unit	Terminal	Unit	Parts	Method
VCO1 Frequency	PD1=1.2V	Freq. Counter	VCO1	CN90 1-3			175MHz or above
	PD1=4.3V						155MHz or below
	PD1=1.5~4V	Freq. Counter	VCO2	CN90 2-4			VCO2 freq.: 71MHz
Attach the VCO to PLL, then adjust the unit after installing the PLL to the unit.							
VCO2 Lock range	f=7.100MHz	Digital tester	PLL	TP7		Check	1.5V~4V
VCO1 Lock range	f=7.0999MHz			TP6			1V~3V
	f=7.1000MHz						3V~4.3V
	f=0.1500MHz			TP8	VCO3	TC961	2.5V
VCO3 Lock range	f=10.4999MHz					TC961	When the voltage is 6.45V or below, adjust the unit to 6.5V again. (6.45V~7.0V)
	f=10.5000MHz					TC962	2.5V
	f=21.4999MHz					TC962	When the voltage is 6.45V or below, adjust the unit to 6.5V again. (6.45V~7.0V)
2nd LO Level	f=21.5000MHz					TC963	2.5V
	f=29.9999MHz					Check	6.5V or below
	f=7.100MHz	Oscilloscope		TP4	PLL	L711 L712	Turn the coils to the max. repeatedly.
1st LO Level	f=7.100MHz			TP5		L709 L710	Turn the coils to the max. repeatedly.
	f=7.100MHz					L706 L707	Turn the coils to the max. repeatedly.
	f=7.100MHz					L708	Turn the coils to the max. repeatedly.

3) Tone Unit Adjustment

- 1 Attach EJ26U to DX70.
- 2 When the subaudible Tone is ON in FM mode, adjust the unit according to following table.
- 3 When the subaudible Tone is OFF in FM mode, the tone should not be emitted.

Item	Condition	Measurement			Adjustment		
		Equipment	Unit	Terminal	Parts	Method	
Frequency (Mode)	RX LSB	Freq. Counter	PLL	TP3	TC702	9873.60kHz +/- 0.02kHz	
	RX USB			TC704	9876.40kHz +/- 0.02kHz		
	RX AM and FM			TC703	9875.00kHz +/- 0.02kHz		
	RX CWU			Check	9875.80kHz +/- 0.3kHz		
	RX CWL				9874.20kHz +/- 0.3kHz		
Frequency (IF Shift)	RX LSB			J701	VR702	453.60kHz +/- 0.1kHz	
	TX LSB				VR701	453.60kHz +/- 0.01kHz	
	RX LT, (IF Shift center)				Check	453.30kHz +/- 0.2kHz	
	TX LT, (IF Shift center)					453.50kHz +/- 0.2kHz	
	RX UT, (IF Shift center)					456.70kHz +/- 0.2kHz	
	TX UT, (IF Shift center)					456.50kHz +/- 0.2kHz	
	Frequency f=7.1000MHz, FM			J703	TC701 L702	78850.00kHz Adjust TC701 at first, then L702 when TC701 can not be adjusted.	
	Level f=7.1000MHz, USB			J701	Check	-6~-0dBm f=455.4kHz	
Level f=7.1000MHz, USB			J702		1~-6dBm f=71.295MHz		
Level f=53.9999MHz			J703	L720 L721 L722	Turn the coils to the max. repeatedly. f=123.75MHz		
Level f=53.9999MHz				L732 L733 L734 L745	Turn the coils to the max. repeatedly f=123.75MHz 1~-6dBm		
Spurious f=53.9999MHz				TC705	Spurious min. (60dB or more)		
Level f=150kHz f=10.400MHz f=10.500MHz f=21.400MHz f=21.500MHz f=29.9999MHz				Check	Level: 2~-6dBm +/-2dB		

Item	Condition	Measurement			Adjustment		
		Equipment	Unit	Terminal	Parts	Method	
Tone Frequency	250.3Hz 1 2 3 4 5 6 7 8 * * * *	Freq. Counter	EJ26 U	CN99 1-1		249.6~251.0Hz	
	156.3Hz 1 2 3 4 5 6 7 8 * * * *	Freq. Counter	EJ26 U	CN99 1-1		156.2~157.2Hz	
Tone Level	156.3Hz 1 2 3 4 5 6 7 8 * * * *	Oscilloscope	EJ26 U	CN99 1-1		1.8~3.0V p-p	
	156.3Hz 1 2 3 4 5 6 7 8 * * * *	Oscilloscope	EJ26 U	CN99 1-1		2.8~3.8V p-p	
Tone Level	156.3Hz 1 2 3 4 5 6 7 8 * * * *	Oscilloscope	EJ26 U	CN99 1-1		3.8~4.8V p-p	
	88.5Hz 1 2 3 4 5 6 7 8 * * * *					Attach to the DX70T after the tone level obtains 88.5Hz.	

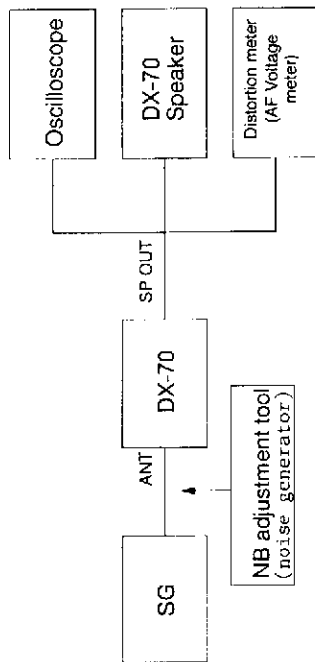
* indicates the number is ON.

Required Test Equipment

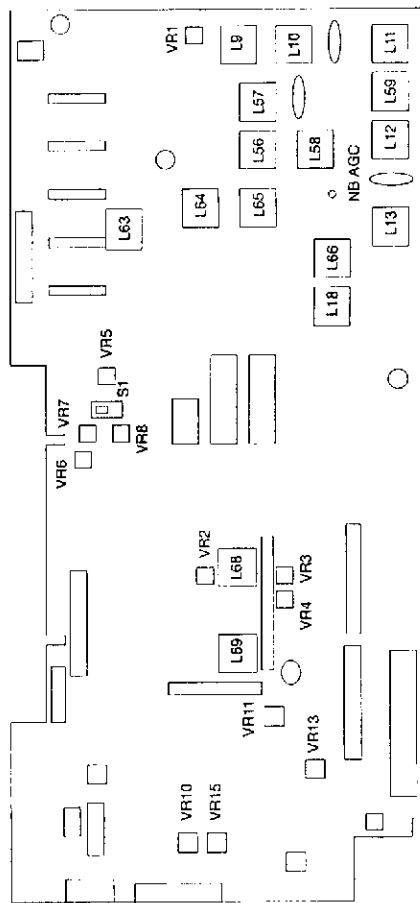
1. Digital voltage meter
2. DC regulated power supply
3. SG
4. Distortion meter, AF voltage meter
5. 8Ω speaker
6. Oscilloscope
7. (NB adjustment tool)

13.80V 3A or more
about 200MHz

Main Unit Adjustment Setting



Main Unit Adjustment Points



4) Sensitivity Adjustment

SG Output Frequency: 14.1000MHz
 Frequency: 14.0993MHz
 AF Gain: +10dB
 Filter: Wide

Connect to HF Antenna Terminal.
 RIT: OFF
 Squeich VR: Turn the knob counter-clockwise fully.

Mode: USB
 Δf: Center
 NB: OFF
 AGC: FAST

Item	Condition	Measurement			Adjustment	
		Equipment	Terminal	Unit	Parts	Method
Tuning	SG output: 0dBμ Mod: OFF AF output: 300mV	Audio Voltmeter	SP	Main	L56 L57 L58 L59 L12 L13 L66 L68 L69	Adjust every following group repeatedly to obtain the maximum receiving signal: L56, 57, 58 L59, 12, 13 L66 L68, L69
	Mode: FM f=14.1000MHz SG output: 0dBμ Mod: 1kHz, 3.5kHzDEV	Distortion Meter			L59 L12 L13	Adjust repeatedly to obtain the maximum SINAD. SINAD should be 13dB or more.
	SG output: 60dBμ 1kHz, 3.5kHzDEV				Check	SINAD should be 30dB or more. If SINAD is below 30dB, adjust L59, L12 and L13 again.
	SG output: -6dBμ Mod: OFF Mode: USB f=14.0993MHz AF output: 300mV	Audio Voltmeter			Check	Make sure that S/N is 10.5dB or more by turning ON/OFF SG output.
	SG output: 10dBμ Mod: 1kHz, 30% Mode: AM f=14.1000MHz	Audio Voltmeter			Check	Make sure S/N is 10dB or more by turning ON/OFF SG modulation.

5) Noise Blanker Adjustment

SG Output Frequency: 14.1000MHz
 Frequency: 14.0993MHz
 RF Gain: +10dB
 Filter: Wide

Connect to HF Antenna Terminal.
 RIT: OFF
 Squelch VR: Turn the knob counterclockwise fully.

Mode: USB
 AGC: FAST
 NB: OFF

ΔIF: Center

Item	Condition	Measurement			Adjustment		
		Equipment	Terminal	Unit	Parts	Method	
Tuning	SG output: 0dBμ Mod: OFF Mode: USB f=14.0993MHz NB: ON RF Gain: +10dB	Oscilloscope	NB AGC (MAIN)	Main	L63 L64 L65	Adjust the coils, and set DC voltage of the terminal to the minimum with the oscilloscope.	

6) S Meter Adjustment

Item	Condition	Measurement			Adjustment		
		Equipment	Terminal	Unit	Parts	Method	
RX Total Gain	SG output: 40dBμ Mod: OFF Mode: USB f=14.0993MHz RF Gain: 0dB	AF Voltmeter	SP	Main	VR2	Adjust SP output by setting the AF gain to about 1V. The output level should be 0dB. Adjust only the noise output to -28dB by turning OFF SG output.	
S Meter	SG output: 20dBμ Mod: OFF SG output: 40dBμ	S Meter	S Meter		VR10 VR15	The indicator between first and second digits is turned ON. The 9th digit starts flashing. Adjust VR10 and VR15 repeatedly.	
	SG: OFF				Check	S Meter is not turned ON.	
Squelch	SG: OFF		BUSY RX LED (Green) AF output		Check	Turn the Squelch VR to make sure that the squelch closes at about 10 o'clock.	

7) Receiving Function Adjustment

SG Output Frequency: 14.1000MHz
 Frequency: 14.0993MHz
 RF Gain: +10dB
 Filter: Wide

Connect to HF Antenna Terminal.
 RIT: OFF
 Squelch VR: Turn the knob counterclockwise fully.

Mode: USB
 AGC: FAST
 NB: OFF

ΔIF: Center

Item	Condition	Measurement			Adjustment		
		Equipment	Terminal	Unit	Parts	Method	
AGC	SG output: 40dBμ Output: ON/OFF Mod: OFF		S Meter		Check	Switch AGC. When SG is turned OFF, the meter moves slowly in SLOW, and fast in FAST.	
RF GAIN	SG output: 40dBμ		S Meter		Check	Switch the RF GAIN from +10dB orderly, the meter swings shorter and shorter.	
FILTER Switching	Output: OFF Mode: USB, AM, CW				Check	Switch the FILTER in every mode (except FM), the noise sound should be changed.	
Band Sensitivity	SG output: -6dBμ f=1.9000MHz f=3.6000MHz f=7.0000MHz f=10.1000MHz f=21.1000MHz f=28.1000MHz Mode: USB or LSB	Audio Voltmeter		SP	Check	In USB mode, SG frequency is -700Hz. In LSB mode, SG frequency is +700Hz. Make sure that S/N is 10dB or more.	
50MHz Sensitivity	Connect SG to 50MHz antenna terminal. SG output: -10dBμ SG freq.: 52.1000MHz Mode: USB f=52.0993MHz				Check	S/N is 10.5dB or more when turning ON/OFF SG output.	
	SG output: -4dBμ Mod: 1kHz, 3.5kHzDev Mode: FM f=52.0000MHz	Distortion Meter			Check	SINAD: 13dB or more	

Required Test Equipment

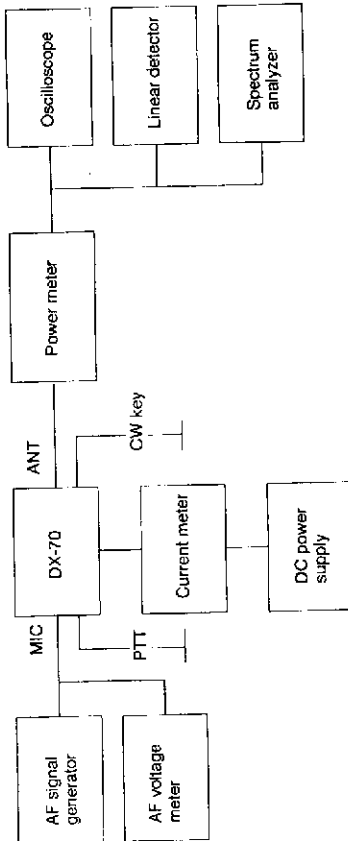
1. Digital voltage meter
2. DC current meter
3. DC regulated power supply
4. Power meter
5. Linear detector
6. AF generator (600Ω)
7. AF voltage meter
8. Oscilloscope
9. Electronic keyer (CW telegraphy key)
10. TUNE operation tool

8) Transmission Adjustment

Connect the power meter to HF antenna terminal.
 Frequency: 7.1000MHz Mode: USB Power: High
 Speech Compressor (SET mode): OFF FM-TONE: OFF

Item	Condition	Measurement		Adjustment		
		Equipment	Terminal	Unit	Parts	Method
Tuning	Slide S1 to rear panel side.	Power Meter	HF Antenna Terminal	Main	L18 L11 L10 L9	Adjust to the maximum power. (Adjust the AG input level so that the power becomes the maximum at about 50W.
	AG output: -50dBm					
Current Limit	AG output: OFF	Current Meter	Power Supply Terminal		VR6	Turn VR6 counterclockwise so that the total current becomes 20A. Be careful not to run much current for short time.
	Mode: FM Set VR7 to 9 o'clock. Set VR6 to 3 o'clock.					
Power	Mode: FM	Power Meter	HF Antenna Terminal		VR7	Turn VR7 clockwise to decrease the power, then adjust to 100W.
	Slide S1 to front panel side.					
	Slide S1 to rear panel side.					
	Operate TUNE with tool.					
FM Frequency Deviation	f: 52.0000MHz Mode: FM	Linear Detector	50MHz Antenna Terminal	Filter	TC502	Set the power to 10W or approximate value. 10W +/- within 1W
	AG output: -30dBm f: 52.0000MHz Mode: FM					
FM-TONE: ON (only the unit equipped with TONE)				Main	VR13	Adjust the maximum frequency deviation to 4.3kHz.

TX Adjustment Setting



9) Spurious Adjustment

Connect the power meter to HF or 50MHz antenna terminal.
 Frequency: 52.000MHz Mode: FM Power: High
 Speech Compressor (SET mode): OFF FM-TONE: OFF

Connect the power meter to 50MHz antenna terminal.
 Frequency: 52.000MHz Mode: USB Power: High
 Speech Compressor (SET mode): OFF FM-TONE: OFF

Item	Condition	Measurement		Adjustment		
		Equipment	Terminal	Unit	Parts	Method
Filter Tuning	AG output: -30dBm Mode: FM FM-TONE: OFF	Oscilloscope (Linear Detector)	50MHz Antenna Terminal	Main	L11 L10 L9	Set the AM modulation factor to the minimum. It should be 5% or below.
Carrier Balance	AG output: OFF f: 7.1000MHz Mode: LSB/USB	Oscilloscope	HF Antenna Terminal		VR3 VR4	Adjust VR3 and VR4 so that the carrier suppression is 50dB (1/300) or below at 100W. The carrier suppression should be decreased in both USB and LSB. Make sure of the wave form. The wave form of rise and fall should be symmetry. (The inclination is approx. 5mS.) The side tone of CW is should be heard from speaker.
CW Wave Form	Mode: CW-L/CW-U Electronic-keyer (dot): approx. 20mS				VR11 Check	
Low Power	Mode: FM Power: Low	Power Meter			Check	Within 10-20W
AM Power	AG output: OFF Mode: AM Power: High				Check	35-50W
Band Power	Mode: FM Band (MHz): 1.9, 3.5, 10, 14, 18, 21, 24, 28				Check	Make sure that the power is 95-105W.

Item	Condition	Measurement		Adjustment		
		Equipment	Terminal	Unit	Parts	Method
Spurious Balance	AG output: OFF Mode: FM FM-TONE: OFF f: 52.0000MHz	ATT + spectrum Analyzer	50MHz Antenna Terminal	Main	VR1	Balance the spurious to obtain the minimum value. -60dB or below
Spurious	AG output: OFF Mode: FM Band (MHz): 1.9, 3.5, 10, 14, 18, 21, 24, 28		HF Antenna Terminal		Check	-52dB or below (-47dB or below in 10MHz band only)
Carrier Balance	AG output: OFF Mode: LSB/USB				L9	Adjust so that the value is within the regulation. (Adjust L9 when the spurious is not -52dB or below in 24/28MHz band.)
Modulation	Mode: CW Keying: OFF f: 53.99MHz				Check (VR3 VR4)	-50dB or below (Adjust VR3 and VR4 when the carrier suppression is not -50dB or below.)
	Mode: FM, AM, USB/LSB Connect the microphone.	Monitor Transceiver			Check	Make sure the modulation sound in every mode.