

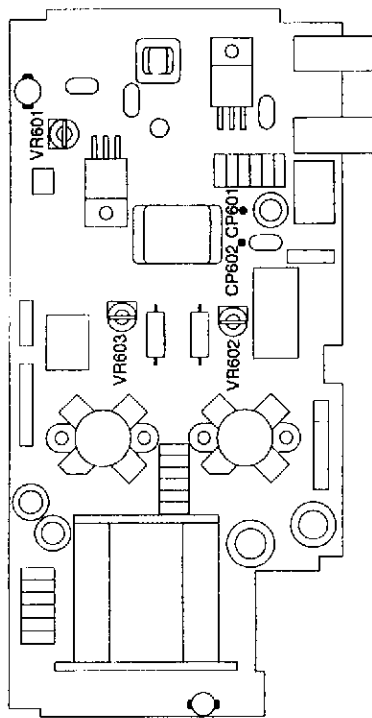
ADJUSTMENT

1) PA unit Adjustment

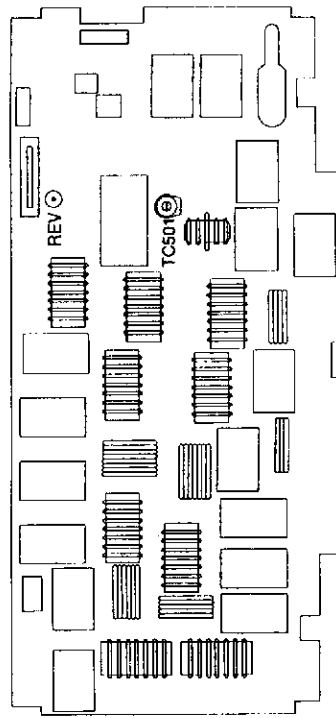
Required Test Equipment

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

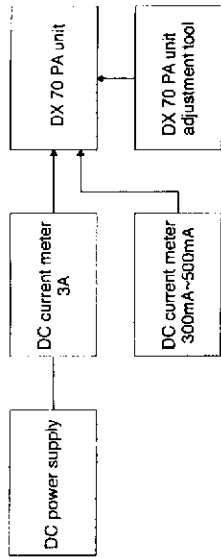
PA Unit Adjustment Points



Filter Unit Adjustment Points

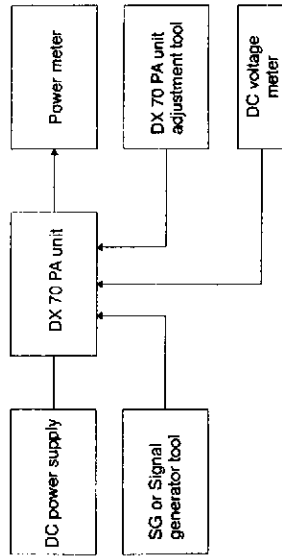


Idle Current Adjustment Setting



Adjustment the idle current without input signal.

SWR Adjustment Setting



Adjust SWR at approximately 50W.

PA Adjustment

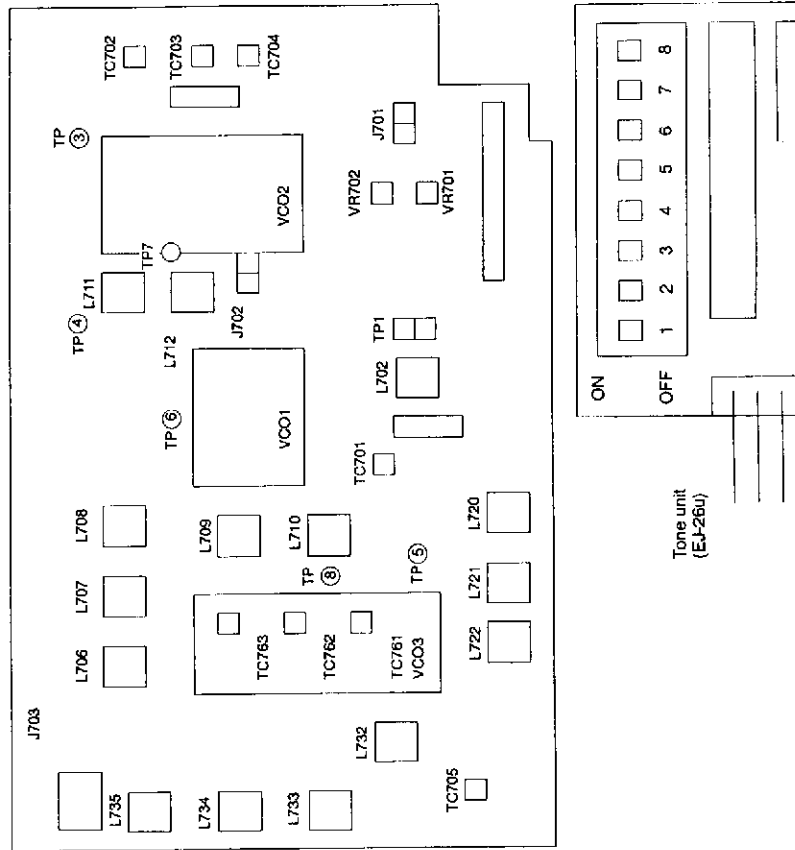
Item	Condition	Measurement		Adjustment		
		Equipment	Terminal	Unit	Parts	Method
Idling current 2SC1972 x 2	SSG: OFF Mode: USB VR601, 602, 603: min.	Current Meter 300-500mA	CP601 ⊖	PA	VR601	Connect the current meter between CP601 and CP602, then adjust VR601 to 100mA.
			CP602 ⊕			
Idling current MRF255 x 2	SSG: OFF Mode: USB	Current Meter 3A	CN605 unit total current	VR602 VR603		Turn VR602 and VR603 counterclockwise fully, check the total current in transmission mode. Turn VR602 clockwise slowly so that the total current increases 400mA. Then turn VR603 clockwise slowly so that the total current increases 400mA. As a result, the total current increases 800mA.
Connect TP1 and TP2 by soldering after adjusting.						
SWR detection	f=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.
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.						

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	CN80 1-3			175MHz or above
	PD1=4.3V						155MHz or below
	PD1=1.5-4V	Freq. Counter	VCO2	CN80 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
VCO3 Lock range	f=0.1500MHz			TP8	VCO3	TC961	2.5V
	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)
	f=21.5000MHz					TC963	2.5V
2nd LO Level	f=7.100MHz	Oscilloscope	PLL	TP4		Check	6.5V or below
	f=7.100MHz			TP5	L711 L712	Turn the coils to the max. repeatedly.	
1st LO Level	f=7.100MHz					L709 L710	Turn the coils to the max. repeatedly.
	f=7.100MHz					L706 L707 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	Unit	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
156.3Hz 1 2 3 4 5 6 7 8 * * * *	Oscilloscope	EJ26 U	CN99 1-1		2.8~3.8V p-p							
						156.3Hz 1 2 3 4 5 6 7 8 * * * *	Oscilloscope	EJ26 U	CN99 1-1		3.8~4.8V p-p	
Final Setting	88.5Hz 1 2 3 4 5 6 7 8 * * * *											

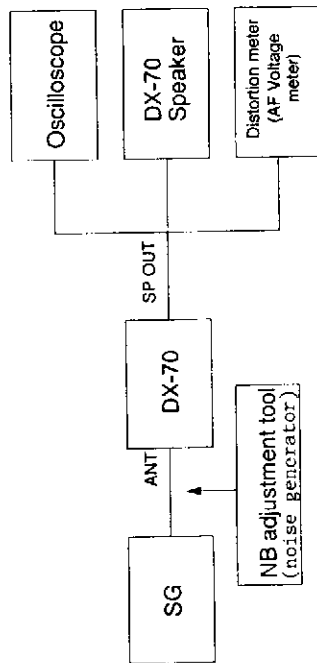
* indicates the number is ON.

Item	Condition	Measurement			Adjustment		
		Equipment	Unit	Terminal	Parts	Unit	Method
Frequency (Mode)	RX LSB	Freq. Counter	PLL	TP3	TC702	PLL	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	Spectrum Analyzer	PLL	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=7.100MHz, USB			J701	Check		-6~-0dBm f=456.4kHz
Level	f=7.100MHz, 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

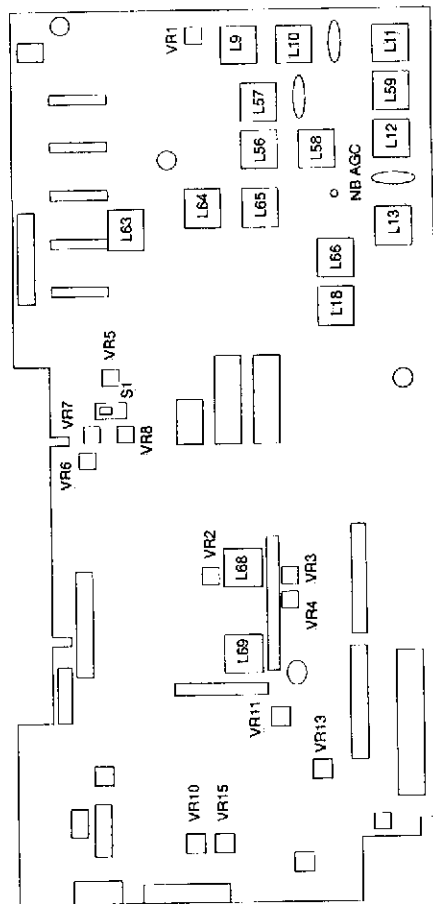
Required Test Equipment

1. Digital voltage meter
2. DC regulated power supply 13.80V 3A or more about 200MHz
3. SG
4. Distortion meter, AF voltage meter
5. 8Ω speaker
6. Oscilloscope
7. (NB adjustment tool (noise generator))

Main Unit Adjustment Setting



Main Unit Adjustment Points



TX Adjustment

4) Sensitivity Adjustment

SG Output Frequency: 14.1000MHz Connect to HF Antenna Terminal.
 Frequency: 14.0993MHz Mode: USB RIT: OFF AGC: FAST NB: OFF
 RF Gain: +10dB ΔIF: Center Squech VR: Turn the knob counterclockwise fully.
 Filter: Wide

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
 Mode: USB
 AGC: FAST
 Squelch VR: Turn the knob counterclockwise fully.

NB: OFF
 AGC: FAST
 Center

Item	Condition	Measurement		Adjustment		
		Equipment	Terminal	Unit	Parts	Method
Tuning	SG output: 0dB μ 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: 40dB μ 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: 20dB μ Mod: OFF SG output: 40dB μ	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
 Mode: USB
 AGC: FAST
 Squelch VR: Turn the knob counterclockwise fully.

NB: OFF
 AGC: FAST
 Center

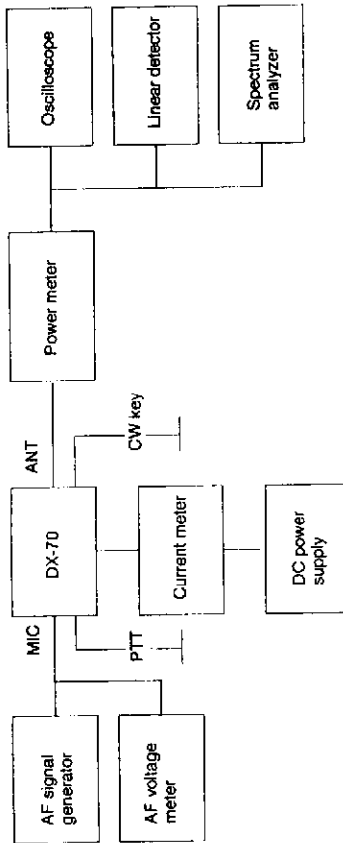
Item	Condition	Measurement		Adjustment		
		Equipment	Terminal	Unit	Parts	Method
AGC	SG output: 40dB μ Output: ON/OFF Mod: OFF		S Meter		Check	Switch AGC. When SG is turned OFF, the meter moves slowly in SLOW, and fast in FAST.
RF GAIN	SG output: 40dB μ		S Meter		Check	Switch the RF GAIN from +10dB orderly, 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: -6dB μ 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: -10dB μ 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: -4dB μ Mod: 1KHz, 3.5kHz Dev 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 (should be equipped with 25-30A current limit)
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

20-30A
13.80V 25A or more
(should be equipped with 25-30A current limit)
100W (1.9-60MHz)

TX Adjustment Setting



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. AG output: -50dBm	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: OFF Mode: FM Set VR7 to 9 o'clock. Set VR6 to 3 o'clock.	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.	
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.				VR5	Turn VR5 to obtain the power of 50W.	
	Slide S1 to rear panel side. Operate TUNE with tool.				VR8	Turn VR8 to obtain the power of 10W.	
	f: 52.0000MHz Mode: FM		50MHz Antenna Terminal	Filter	Check	That the power to 10W or approximate value. 100W ± 10W	
FM Frequency Deviation	AG output: -30dBm f: 52.0000MHz Mode: FM	Linear Detector		Main	VR13	Adjust the maximum frequency deviation to 4.3kHz.	
	FM-TONE: ON (only the unit equipped with TONE)				Check	The frequency deviation is increased. (Approx. 5kHz)	

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

Item	Condition	Measurement		Adjustment		
		Equipment	Terminal	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
	AG output: OFF Mode: FM Band (MHz): 1.9, 3.5, 10, 14, 18, 21, 24, 28		HF Antenna Terminal			
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	Monitor Transceiver			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.				Check	-60dB or below

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	Parts	Method
Filter Tuning	AG output: -30dBm Mode: FM FM-TONE: OFF	Oscilloscope (Linear Detector)	50MHz Antenna Terminal	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.
CW Wave Form	Mode: CW-L/CW-U Electronic-keyer (dot): approx. 20ms			VR11 Check	Make sure of the wave form. The wave form of rise and fall should be symmetry. (The inclination is approx. 3ms.) The side tone of CW is should be heard from speaker.
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, 50			Check	Make sure that the power is 80-110W.