

# ADJUSTMENT

## 1) Required Test Equipment

### 1. Digital Multimeter

### 2. Regulated Power Supply

Supply voltage: 13.8VDC  
Current: 15A or more

### 3. Oscilloscope

Measurable frequency: Audio Frequency

### 4. Spectrum Analyzer

Measuring range: Up to 2GHz or more

### 5. Tracking Generator

Output frequency: Up to 2GHz or more

### 6. Dummy Load

Measurable frequency: Up to 500MHz  
Impedance: 50Ω  
Power: 50W or more

### 7. Speaker

Impedance: 8Ω

### 8. SSG

Output frequency: Up to 1GHz  
Output level: -20dB/0.1μV to 120dB/1V  
Modulation: AM/FM

### 9. Transceiver Tester

Up to 500MHz

#### a. Frequency Counter

#### b. Power Meter

Impedance: 50Ω  
Measuring range: 50W or more

#### c. Audio Voltmeter

Measurable frequency: 50Hz ~ 10kHz  
Sensitivity: 1mV ~ 10V

#### d. Distortion Meter

Measurable frequency: 1kHz  
Input level: Up to 40dB  
Distortion level: 1% ~ 100%

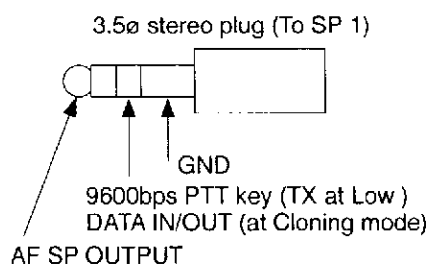
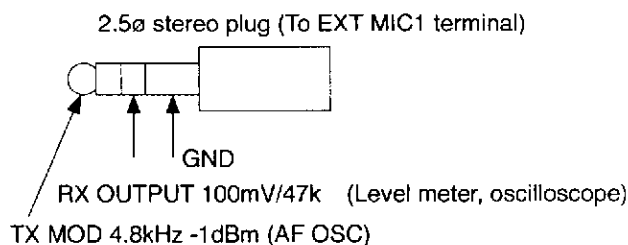
#### e. Audio Generator

Output frequency: 1kHz ~ 10kHz  
Output impedance: 600Ω

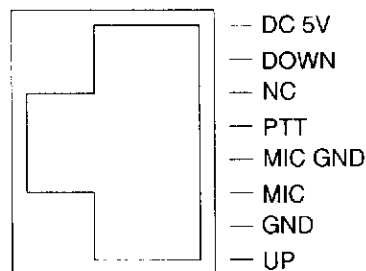
#### f. Linear Detector

## 10. 9600bps Hi-Speed Packet Testing

While holding the FUNC key down, press the VHF knob. "9600" is shown on the sub-band frequency display.



Mic terminal



## Test Equipment

1. All SSG output is indicated by EMF.
2. AG output level connecting with the load is measured.
3. Standard Modulation: 1kHz  $\pm$ 3.5kHz/DEV
4. Audio Output level: 50mW~100mW at 8 $\Omega$
5. Test Equipment level filter: HPF (30Hz~50Hz), LPF (10kHz~15kHz)
6. Coaxial cable: 5D2W 1m

## Note:

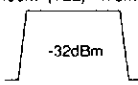
1. Power supply voltage is 13.8V.  
Power switch is off.
2. Turn the volume knobs counterclockwise.
3. SQ volume (press VHF or UHF after pressing FUNC key)      S0=squelch is open. S9=tight is closed.
4. Press and hold the "F" key, then turn the power switch on.  
The display lights full.

## 2) UHF PLL Adjustment

Item	Condition	Measurement			Adjustment			Specifications
		Equipment	Unit	Terminal	Unit	Parts	Method	
Reference Frequency	f=435.00 TX	Freq. Counter Power Meter	Back	UHF ANT	VHF Main	TC1	435.0000MHz	$\pm$ 100Hz
PLL VCO	f=440.00 RX(T, E)	Digital Multimeter	UHF Main	TP3	UHF VCO	L606	3.40V (Adjust)	3.4V $\pm$ 0.2V
	f=410.00 RX(TE1)						2.50V (Adjust)	2.5V $\pm$ 0.2V
	f=460.00 RX(TE2)						3.20V (Adjust)	3.2V $\pm$ 0.2V
	f=440.00 TX(T, E)						5.50V (Check)	5.0V~6.0V
	f=410.00 TX(TE1)						4.50V (Check)	3.8V~5.2V
	f=460.00 TX(TE2)						5.30V (Check)	4.7V~6.0V

### 3) UHF RX Adjustment

(\*): f=445.00 (T), f=435.00 (E), f=410.00 (TE1), f=460.00 (TE2)

Item	Condition	Measurement			Adjustment			Specifications
		Equipment	Unit	Terminal	Unit	Parts	Method	
Herical coil	f=435.00 (445.00)	T.G. -30dBm	Back	UHF ANT	UHF Main	TC201 TC202 L218 L219	Max Gain	430M (E) 440M 438M (T) 450M 400M (TE1) 420M 450M (TE2) 470M 
		Spectrum Analyzer	UHF	TP2				
Sensitivity	f=438.00 (T) f=440.00 (T) f=449.99 (T) f=430.00 (E) f=435.00 (E) f=439.99 (E) f=400.00 (TE1) f=410.00 (TE1) f=420.00 (TE1) f=450.00 (TE2) f=460.00 (TE2) f=470.00 (TE2) SSG OUT: -9.0dBμ	SSG Distortion Meter Oscilloscope Level Meter	Back	UHF SP1			Check	SINAD is 12dB or more.
S Meter	f=445.00 (*) SSG OUT: 18.0dBμ	SSG LCD UHF S Meter	Front panel		UHF Main	VR202	Starts lighting "Full."	
	SSG OFF						Check	
SQL level	f=445.00 (*) SSG OFF SQL LEVEL: 1	Digital Multimeter	Main	TP5	UHF Main	VR201	2.05V (Adjust)	2.05V±0.1V  The squelch is closed.
Distortion	f=445.00 (*) SSG OUT: 60.0dBμ	SSG Distortion Meter Level Meter	Back	SP1			Check	4% or below
RX S/N	f=445.00 (*) SSG OUT: 60.0dBμ	SSG Level Meter Oscilloscope	Back	SP1			Check	40dB or more
9600bps Packet Out	f=445.00 (*) SSG OUT: 20.0dBμ f=4.8kHz 2.5kHz/DEV	SSG Level Meter Oscilloscope	Back	MIC1				100mV ±50mVrms /47kΩ

## 4) UHF TX Adjustment

(\*): f=445.00 (T), f=435.00 (E), f=410.00 (TE1), f=460.00 (TE2)

Item	Condition	Measurement			Adjustment			Specifications
		Equipment	Unit	Terminal	Unit	Parts	Method	
High Power	f=445.00 (T) f=435.00 (E) f=410.00 (TE1) f=460.00 (TE2)	Power Meter Current Meter	Back	UHF ANT	UHF Main	VR203	Max	36W or more
	VR203					35W	±1.0W 11A or below	
Low Power	f=445.00 (*)					Check	5±2W	
DEV	f=445.00 (*) AG: 1kHz -30dBm	Linear Det. Oscilloscope Power Meter AG				VR204	4.5kHz /DEV	4.5kHz ±0.2kHz /DEV
MIC Gain	f=445.00 (*) AG: 1kHz -46dBm						VR205	Adjust
CTCSS Tone Level	f=445.00 (*) AG=0 TONE SW ENC 88.5Hz	Linear Det. Oscilloscope Power Meter					Check	0.5~1.3kHz /DEV
Tone Burst Level	f=445.00 (*) AG=0 PTT+DOWN key						Check	3.0kHz ±0.5kHz /DEV
9600bps Packet IN	f=445.00 (*) AG: 4.8kHz -1dBm FUNC+VHF key	Linear Det. Oscilloscope AG					Check	2.0kHz ±0.5kHz /DEV

## 5) VHF PLL Adjustment

Item	Condition	Measurement			Adjustment			Specifications
		Equipment	Unit	Terminal	Unit	Parts	Method	
Reference Frequency	f=145.00 TX	Freq. Counter Power Meter	Back	VHF ANT			Check	±100Hz
PLL VCO	f=145.00 RX(T, E) f=173.99 RX(TE1, 2)	Digital Multimeter	VHF Main	TP1	VHF VCO	L505	2.80V 7.35V	±0.3V ±0.05V
	f=145.00 RX(T, E) f=173.99 RX(TE1, 2)						Check	2.8V±1.0V 7.35V±0.4V

## 6) VHF RX Adjustment

Item	Condition	Measurement			Adjustment			Specifications
		Equipment	Unit	Terminal	Unit	Parts	Method	
Gain	f=145.00 (T,E) f=165.00 (TE1) f=165.00 (TE2)	SSG Distortion Meter Oscilloscope Level Meter	Back	VHF SP1	VHF Main	L14 L15 L16 L17	Adjust the SSG output level around 0dBμ, and turn L14~L17 to make the wave form max.	SINAD is 12dB or more.
Sensitivity	f=144.00 (T) f=147.99 (T) f=144.00 (E) f=145.99 (E) f=150.00 (TE1,2) f=162.00 (TE1,2) f=173.99 (TE1,2) SSG OUT: -9.0dBμ	SSG Distortion Meter Oscilloscope Level Meter	Back	VHF SP1	VHF Main	L14~ L17	Adjust the SINAD sensitivity and wave form to the best.	SINAD is 12dB or more.
	f=136.00 SSG OUT: 0dBμ						Check	SINAD is 12dB or more.
S Meter	f=145.00 (T,E) f=165.00 (TE1,2) SSG OUT: 18dBμ	SSG LCD VHF S Meter	Front Panel		VHF Main	VR1	Starts lighting "Full."	
	SSG OFF						Check	Does not light.
SQL level	f=145.00 (T,E) f=165.00 (TE1,2) SSG OFF SQL Level 1	Digital Multimeter	VHF Main	TP4	VHF Main	VR2	2.05V (Adjust)	2.05V±0.1V The squelch is closed.

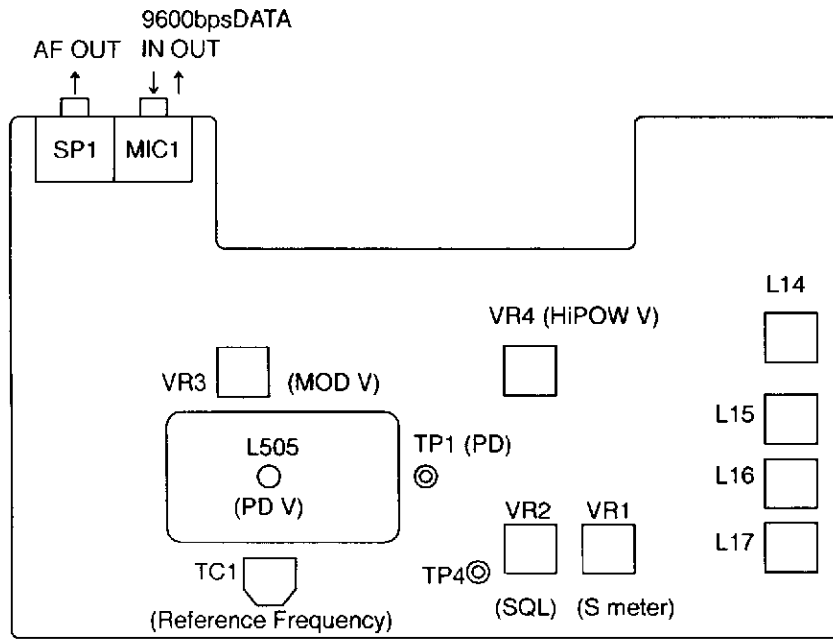
## 7) VHF TX Adjustment

(frequency) = TE1, TE2

Item	Condition	Measurement			Adjustment			Specifications				
		Equipment	Unit	Terminal	Unit	Parts	Method					
High Power	f=145.00 (165.00)	Power Meter Current Meter	Back	VHF ANT	VHF Main	VR4	Max	55W or more (T,E) 45W or more (TE1,TE2)				
	f=144.00 (150.00) f=145.99 (173.99)							±1.0W 11A or below				
	f=173.99 (136.00)						Check	48~55W 7A (T,E) 32~40W 11A (TE1,TE2)				
								Power is output.				
Low Power	f=145.00 (160.00)						Check	3~7W				
DEV	f=145.00 (160.00) AG: 1kHz -30dBm	Linear Det. Oscilloscope Power Meter	Back	VHF ANT	VHF Main	VR3	4.5kHz /DEV	4.5kHz ±0.2kHz /DEV				
MIC Gain	f=145.00 (160.00) AG: 1kHz -46dBm						Check	4.0 kHz ±0.3kHz /DEV				
CTCSS Tone Level	f=145.00 (160.00) AG=0 TONE SW ENC 88.5Hz							0.5~1.3kHz /DEV				
Tone Burst Level	f=145.00 (160.00) PTT+DOWN key							3.0kHz ±0.5kHz /DEV				
9600bps Packet IN	f=445.00 (*) AG: 4.8kHz -1dBm FUNC+VHF key						Check	2.0kHz ±0.5kHz /DEV				
X-BAND Repeater	f=145.00 f=445.00 (T) f=145.00 f=430.00 (E) f=160.00 f=410.00 (TE1) f=160.00 f=460.00 (TE2) XBR ON (VHF+PWR ON)										Check	3.5kHz ±0.5kHz /DEV

# 8) Adjustment Points

## VHF Main Unit



## UHF Main Unit

