

ADJUSTMENT

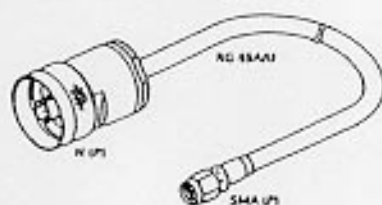
REQUIRED TEST EQUIPMENT

- 1. Stabilized Power Supply**
 - ① The supply voltage can be changed between 3V and 16V and the current is 1A or more.
 - ② The standard voltage is 13.8V.
- 2. DC Ammeter (DC.A)**
 - ① Class 1 ammeter (17 ranges and other features)
 - ② The full scale can be switched between 300mA and 3A.
 - ③ A cable with low internal loss must be used.
- 3. Frequency Counter (f. counter)**
 - ① Frequencies of up to 1 GHz or so can be measured.
 - ② The sensitivity can be changed to 250 MHz or below and measurements are highly stable and accurate (about 0.2 ppm).
- 4. Power Meter (terminal type)**
 - ① Measurable frequency: Up to 500 MHz
 - ② Impedance: 50Ω, unbalanced
 - ③ Measuring range: Full scale of 10W
 - ④ The specified special connection cable must be used.
- 5. RF VTVM (RF V.M)**
 - ① Measurable frequency: Up to 500 MHz or so
- 6. Linear Detector**
 - ① Measurable frequency: Up to 500 MHz
 - ② Characteristic is flat and CN is 60 dB or more.
- 7. Digital Voltmeter**
 - ① Voltage range: FS = 18V or so
 - ② Input resistance: 1MΩ or more
- 8. Oscilloscope**
 - ① Measuring range: DC to 30 MHz
 - ② Provides highly accurate measurements for 5 to 25 MHz
- 9. AF Voltmeter (AF V.M)**
 - ① Measurable frequency: 50 Hz to 1 MHz
 - ② Maximum sensitivity: 1mV or more
- 10. Spectrum Analyzer**
 - ① Measuring range: DC to 1GHz or more
- 11. Standard Signal Generator (SSG)**
 - ① Maximum frequency: 500MHz or more
 - ② Output: -133 dBm (0.05 μV) to -13 dBm (50mV)
 - ③ Output impedance: 50Ω
- 12. Tracking Generator**
 - ① Center frequency: 50 kHz to 200 MHz
 - ② Frequency deviation: ±35 MHz
 - ③ Output voltage: 100 mV or more
- 13. Dummy Load**
 - ① 8Ω, 3W or more

Preparations

- Use a non-conductive rod such as a Bakelite rod for adjustment (especially of trimmers and coils).
- To protect the SSG, do not send out signals while adjusting the receiving unit.
- The SSG output levels give the values are for maximum output. Also, unless otherwise specified, use the standard modulation (modulation: 1 kHz, deviation: ± 3 kHz).

Adjustment service jig



Antenna cable (length 1m)
(E30-3226-05)

Using the "SET mode"

The SET mode is used to adjust the TH-D7A/E. In this mode, the following items can be set:

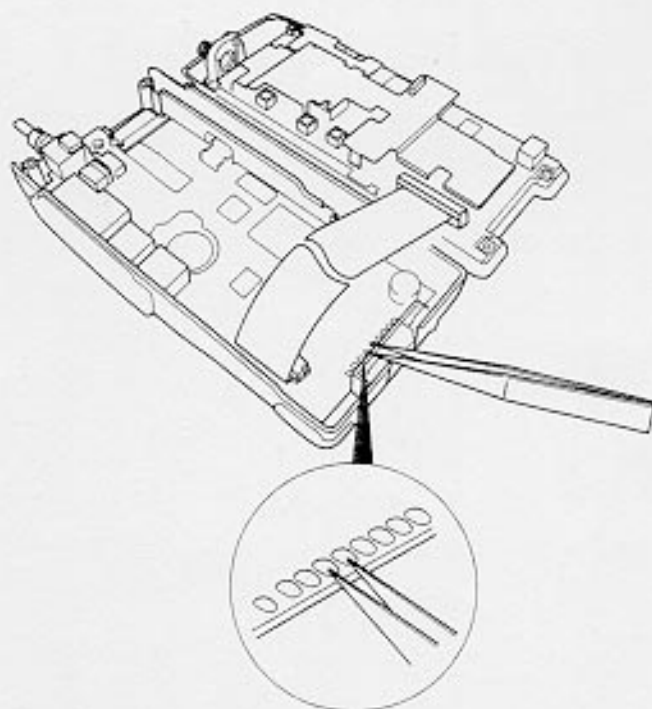
1. Squelch critical point in each band
2. First segment ON/all segments ON of the S meter in each band
3. Hi/Lo transmission output in each band
4. Reference voltage for overvoltage warning (13.8 V)


The levels set in the SET mode are written into the EEPROM. Therefore, the data stored in the EEPROM is retained after the power is shut down or reset.

If the EEPROM is replaced, all items must be written (set) into the new EEPROM.

Setting procedure

Open the main unit, turn the power on, and momentarily short the SET point on the component side of the TX-RX unit (B/4) (with tweezers, etc.). (See the figure below.)



The beeper sounds and the  mark on the display flashes to indicate that the SET mode is effective.

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Operation

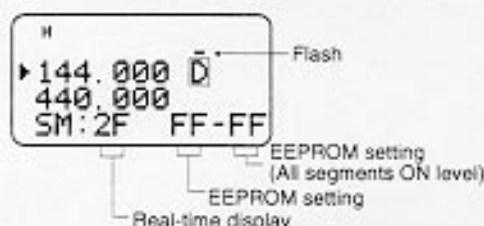
1. Setting the squelch critical point

- Set the squelch adjustment screen on which 'SQ' is shown at the bottom of the display with the \updownarrow key, and select the band and frequency with the **BAND** key and encoder.
- Send a prescribed signal to the ANT terminal from the SSG.
- Press the \rightarrow key to set the squelch critical point.
- Set the squelch critical point in all the receive bands in the same way.



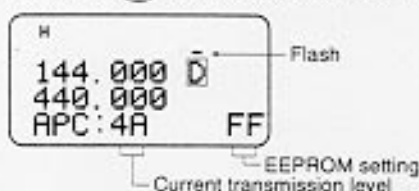
2. S meter setting

- Set the S meter adjustment screen on which 'SM' is shown at the bottom of the display with the \updownarrow key, and select the band and frequency with the **BAND** key and encoder.
- Send a prescribed signal to the ANT terminal from the SSG.
- Set the first segment ON level with the \leftarrow key and set the all segments ON level with the \rightarrow key.
- Set the levels in all the receive bands in the same way.



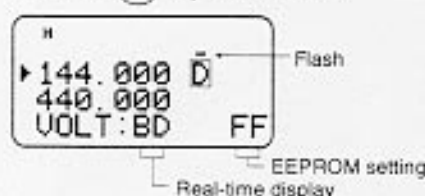
3. APC (RF power) setting

- Set the RF power adjustment screen on which 'APC' is shown at the bottom of the display with the \updownarrow key, and select the band and frequency with the **BAND** key and encoder.
- Connect the power meter to the ANT terminal, select HI/LO power with the **F** and **LOW** keys and press the **PTT** key.
- Adjust the transmission power to the prescribed output using the \updownarrow key and encoder.
- Press the \rightarrow key to set the selected value as the power.



4. Overvoltage warning reference voltage setting

- Set the overvoltage warning reference voltage adjustment screen on which 'VOLT' is shown at the bottom of the display with the \updownarrow key.
- Apply terminal voltage $13.8 \text{ V} \pm 0.05 \text{ V}$ to the external power terminal (DC IN) from the stabilized power supply.
- Press the \rightarrow key to set 13.8 V .



Prescribed input values

Enter the SSG level for each band from the ANT terminal and press the appropriate key. (See the table below.)

Band (SSG frequency)	Key to press (CURSOR key)		
	SQ level	S1 level (First segment ON)	S9 level (All segments ON)
VHF :145.820MHz	\rightarrow	\leftarrow	\rightarrow
UHF 435.900MHz:E 444.000MHz:K	-126.0dBm	-120.0dBm	-105.0dBm
SUB-VHF:145.820MHz	-126.0dBm	-120.0dBm	-105.0dBm

Note: SSG uses standard modulation.


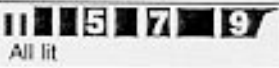
Other information

- The settings are overwritten on previous data, so they can be entered in any order and independently of each other.
- The real-time display is updated every about 200 ms.
- If an item is not set, "FF" is displayed on the EEPROM setting display.
- In the SET mode, the expanded band can be recalled with the **BAND** key even if the receiver is not modified to extend the bands. However, the receiver extension is turned off when the SET mode is canceled.
- Only the 118MHz band can be switched between FM and AM using the **MENU** key. (When AM is selected, the 'MHz dot' becomes a widened point.)
- The SET mode is canceled when the power is turned off.
- Finally, perform "VFO reset".

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Item	Conditions	Measurement			Adjustment			Specifications/Remarks
		Test equipment	Unit	Terminal	Unit	Parts	Method	
2. Lock voltage check	1) Frequency:144.050MHz During transmit and receive	Digital Voltmeter	RF	LV14			Check the voltage	0.7V or more
	2) Frequency:145.950MHz:E :147.950MHz:K During transmit and receive			LV43				5.8V or more
	3) Frequency:430.050MHz:E :438.050MHz:K During transmit and receive							0.7V or more
	4) Frequency:439.975MHz:E :449.975MHz:K During transmit and receive							6.0V or less
3. Adjust the LCD contrast	Only during LCD replacement Normally use Menu Mode 1-1-2.	Digital Voltmeter	CONT	CN505 (4 pin)	CONT	VR500 (Foil Side)	Alignment Method 1. Set for a maximum voltage (display gets darker). Set the voltage at that time as V max (V). 2. Temporarily return to the minimum voltage (display gets lighter) and then align V max to -0.001(V).	

VHF reception section

Item	Conditions	Measurement			Adjustment			Specifications/Remarks
		Test equipment	Unit	Terminal	Unit	Parts	Method	
1. Helical Adjust (BPF)	1) Tracking generating output: -35dBm Center: 145.050 MHz Span:20MHz	Tracking generator Spectrum analyzer	RF	ANT TP	RF	L69 L71 L72	Repeat 2-3 times for maximum level	See Figure 1.
2. Large input S/N check	1) Frequency:145.020 MHz:E 146.020 MHz:K SSG:-53dBm	SSG Oscilloscope AFVM		ANT SP			S/N check (AF-VR:0.63V/8Ω)	35 dB or more.
3. Sensitivity Check	1) Frequency:144.020MHz SSG:-121dBm AF - VR:0.63V/8 Ω 2) Frequency:145.020MHz:E 146.020MHz:K 3) Sub-VHF Frequency:145.05MHz:E Frequency:146.05MHz:K SSG :-117dBm	Distortion meter Ammeter Dummy load					Check	12dB SINAD or more.
4. S meter Check	1) Frequency:144.020MHz SSG:-120dBm±6dBm	SSG Oscilloscope		ANT SP		LCD	Check	 At least one lit
	2) SSG:-105dBm±6dBm						Check	 All lit
5. Squelch Check	1) Frequency:144.020MHz SSG:OFF						Check	Squelch must be closed.
	2) SSG:-122.5dBm						Check	Squelch must be opened.

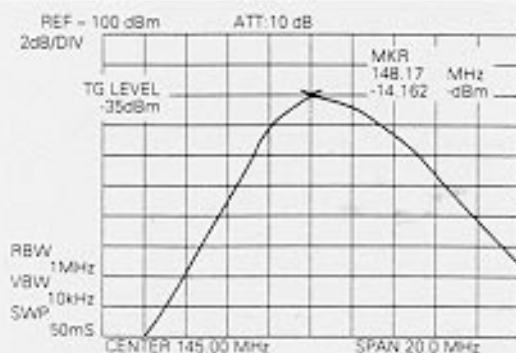
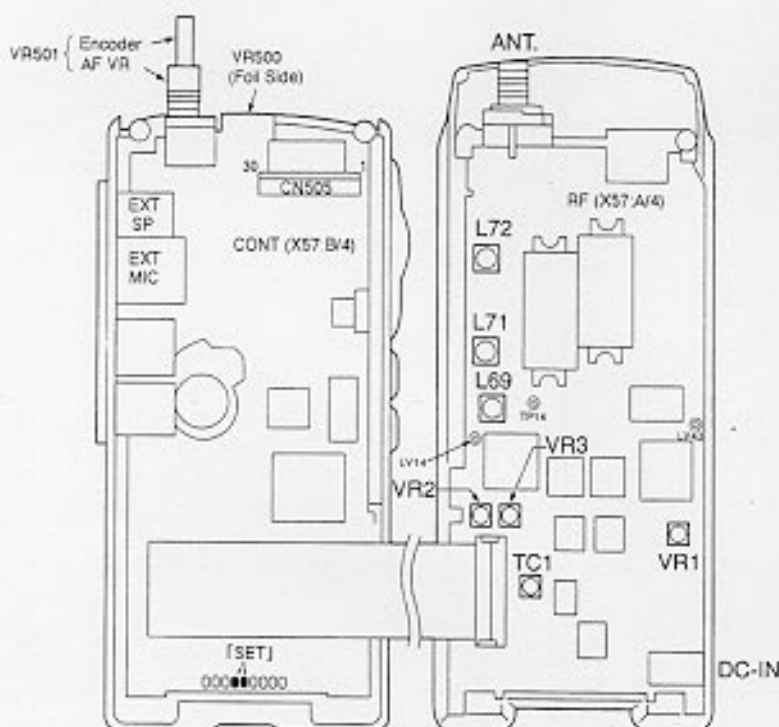


Figure 1 Helical (BPF) Adjust waveform

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Adjustment Points



CONT UNIT (X57:B/4)
 [SET] : SET mode test points.
 VR500 : LCD Contrast
 (Adjust only when
 replacing the LCD.)



RF UNIT (X57:A/4)
 L69, 71, 72 : VHF Helical
 TC1 : UHF transmit frequency
 VR1 : UHF DEV
 VR2 : VHF DEV (Wide):K
 VR3 : VHF DEV (Narrow):E
 TP14 : Helical alignment spectrum
 analyzer point
 LV14 : VHF Lock voltage point
 LV43 : UHF Lock voltage point

Section common to transmission and reception

Item	Conditions	Measurement			Adjustment		Specifications/Remarks	
		Test equipment	Unit	Terminal	Unit	Parts		Method
1. Setting and reset	1) External power supply connection DC-IN terminal voltage: 13.8V	 LCD all-lit display						
	2) All-lit display check While pressing the F key, switch the POWER switch ON.							
	3) RESET Use Partial (VFO) Reset to initialize all settings except the memory channels, the Call channel, the DTMF channels, and Memory Channel Lockout. Use Full Reset to initialize all settings that you have customized.							
	3-1) Press [F]+ POWER ON. • "RESET?" appears. • You can also use Menu 1-5-7 (TH-D7A) or Menu 1-5-9 (TH-D7E).							
	3-2) Press [UP]/ [DWN] to select Partial (VFO) Reset or Full Reset.							
3-3) Press [OK]. • A confirmation message appears.						Default setting display after all reset		
3-4) Press [UP]/ [DWN] to select Yes (or No).								
3-5) Press [OK].								

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UHF reception section

Item	Conditions	Measurement			Adjustment			Specifications/Remarks
		Test equipment	Unit	Terminal	Unit	Parts	Method	
1. Large input S/N check	1) Frequency:430.025MHz:E :440.025MHz:K SSG:-53dBm AF*VR:0.63V/8 Ω	SSG Oscilloscope AFVM Distortion meter	RF	ANT SP			Check	40dB or more.
2. Sensitivity Check	1) Frequency:430.025MHz:E :440.025MHz:K SSG:-121dBm 2) Frequency:435.025MHz:E :445.025MHz:K	Ammeter Dummy load					Check	12dB SINAD or more.
3. S meter Check	1) Frequency:430.025MHz:E :440.025MHz:K SSG:-121dBm±6dBm	SSG Oscilloscope		ANT SP		LCD	Check	
	2) SSG:-105dBm±6dBm							At least one lit
4. Squelch Check	1) Frequency:435.025MHz:E :445.025MHz:K SSG:OFF						Check	
	2) SSG:-122.5dBm							All lit
								Squelch must be closed.
								Squelch must be closed.

UHF transmission section

Item	Conditions	Measurement			Adjustment			Specifications/Remarks
		Test equipment	Unit	Terminal	Unit	Parts	Method	
1. Transmission frequency Adjust	1) Frequency:434.980MHz:E :449.980MHz:K PTT:ON	Power meter F counter	RF	ANT	RF	TC1	Set to display frequency	±200Hz
2. Transmission output Adjust	1) DC-IN:13.8V Frequency:435.050MHz:E :445.050MHz:K Set to SET MODE	Power meter DC-A		ANT	Panel	Display encoder	Turn the encoder and adjust the power meter reading to 4.8 W.	±0.1W
	2) Transmission output switching:HI PTT transmission Press the set key. Return to PTT.							(Less than:2.1A)
	3) Transmission output switching : LO Same method as 2)							Adjust to 0.5W ±0.1W (Less than 0.8A)
	4) Transmission output switching: EL Same method as 2)							Adjust to 50mW ±10mW (Less than 0.5A)
3.DEV Adjust	1) Frequency:434.975MHz:E :444.000MHz:K AG:1kHz/70mV PTT:ON	Power meter Linear detector Oscilloscope		ANT	RF	VR1	Adjust to 4.2 kHz with larger ±.	±100Hz
	2) AG:20dBm down:1 kHz/7 mV PTT:ON	AG AFVM		MIC			Check (mic sensitivity)	±1.8-2.6kHz

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VHF transmission section

Item	Conditions	Measurement			Adjustment			Specifications/Remarks	
		Test equipment	Unit	Terminal	Unit	Parts	Method		
1. Transmission output Adjust	1) DC-IN:13.8V Frequency:145.060MHz:E :146.060MHz:K Set to Set mode.	Power meter DC-A	RF	ANT	Panel	Display encoder	Turn the encoder and adjust the power meter reading to 4.8W.	±0.1W (Less than 1.8A)	
	2) Transmission output switching: HI PTT transmission Press the set key. Return to PTT.							Adjust to 0.5W	±50mW (Less than 0.8A)
	3) Transmission output switching: LO Same method as 2)							Adjust to 50mW	±10mW (Less than 0.5A)
	4) Transmission output switching: EL Same method as 2)								
2.DEV Adjust	1) Frequency:145.060MHz:E :146.060MHz:K AG:1kHz/70mV PTT:ON	Power meter Linear detector Oscilloscope		ANT	RF	VR2	K: Adjust to 4.2 kHz with larger ±.	±100Hz	
	2) AG: 20dB down: (1 kHz/7 mV) PTT:ON		AG AFVM		MIC		VR3	E: Adjust to 2.1 kHz	±2.6~3.5kHz:K ±1.3~1.7kHz:E
3. DTMF DEV check	1) Frequency:145.975MHz:E :147.950MHz:K In transmitted state, press the D key.						DTMF DEV Check	±2.2~4.2kHz	
4. TONE DEV check	1) Frequency:144.800MHz TONE Frequency:88.5Hz PTT:ON						TONE DEV Check	±0.4~1.2kHz	