

ADJUSTMENT

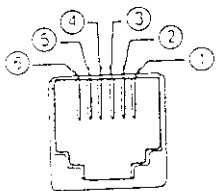
Test equipment required for alignment

Test Equipment		Major Specifications	
1.	Standard Signal Generator (SSG)	Frequency range Modulation Output	400~512MHz Frequency modulation and external modulation. 0.1μV to greater than 1mV
2.	Power meter	Input impedance Operation frequency Measurement capability	50 ohms 400 to 512MHz or more. Vicinity of 50W.
3.	Deviation meter	Frequency range	400~512MHz
4.	Digital Volt Meter	Measuring range Accuracy	1~10V DC. High input impedance for minimum circuit loading. DC through 30MHz.
5.	Oscilloscope	Frequency range	10Hz to 600MHz.
6.	High sensitivity frequency counter	Frequency stability	0.2 ppm or less.
7.	Ammeter		15A.
	AF Volt Meter (AFVTVM)	Frequency range Voltage range	50Hz to 10kHz. 3mV to 3V.
9.	Audio Generator (AG)	Frequency range Output	50Hz to 5kHz or more. 0 and 1V.
10.	Distortion meter	Capability Input level	3% or less at 1kHz. 50mV to 10Vrms.
11.	Voltmeter	Measuring range Input impedance	10~1.5V DC or less. 50 kohms/V or greater.
12.	4 ohm dummy load		Approx. 4 ohm, 3W.

The set has been adjusted for the frequencies shown in the following table. When required, re-adjust them following the adjustment procedure to obtain the frequencies you want in actual operation.

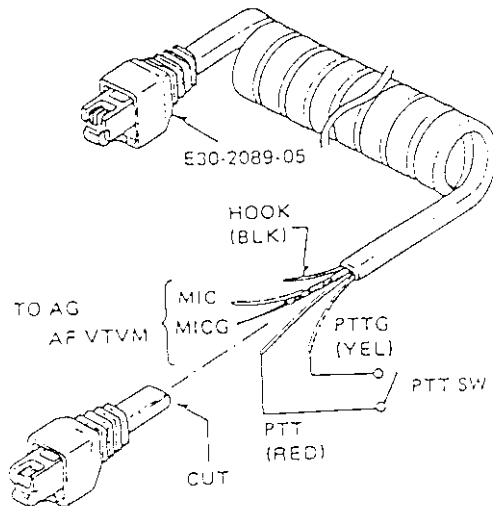
		RX freq' (MHz)	TX freq' (MHz)
TKR-820	K	469.900	464.900
TKR-820	K2	489.900	484.900
TKR-820	K3	511.900	506.900
TKR-820	K4	429.900	424.900

MIC connector
front view



- ① SB
- ② PTTG
- ③ PTT
- ④ MICG
- ⑤ MIC
- ⑥ HOOK

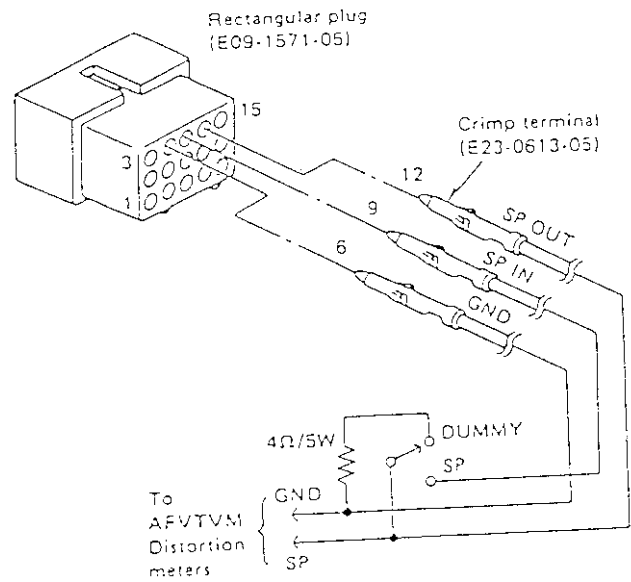
- The following test cables are recommended.



Test cable for Microphone input

SIGNALING

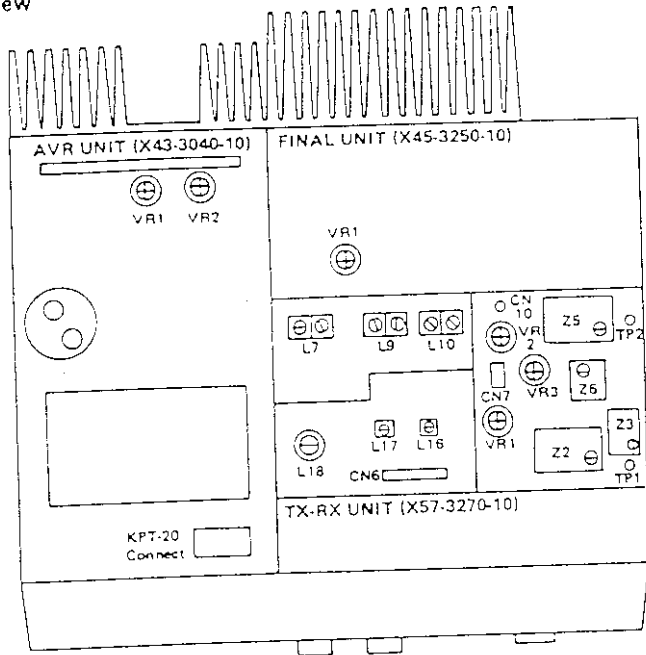
CH	RX		TX	
	QT (Hz)	DQT	QT (Hz)	DQT
1	67		77	
2	192.8		179.9	
3		023		754
4	88.5		167.9	
5	100			351



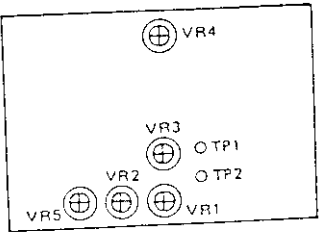
Test cable for Speaker output

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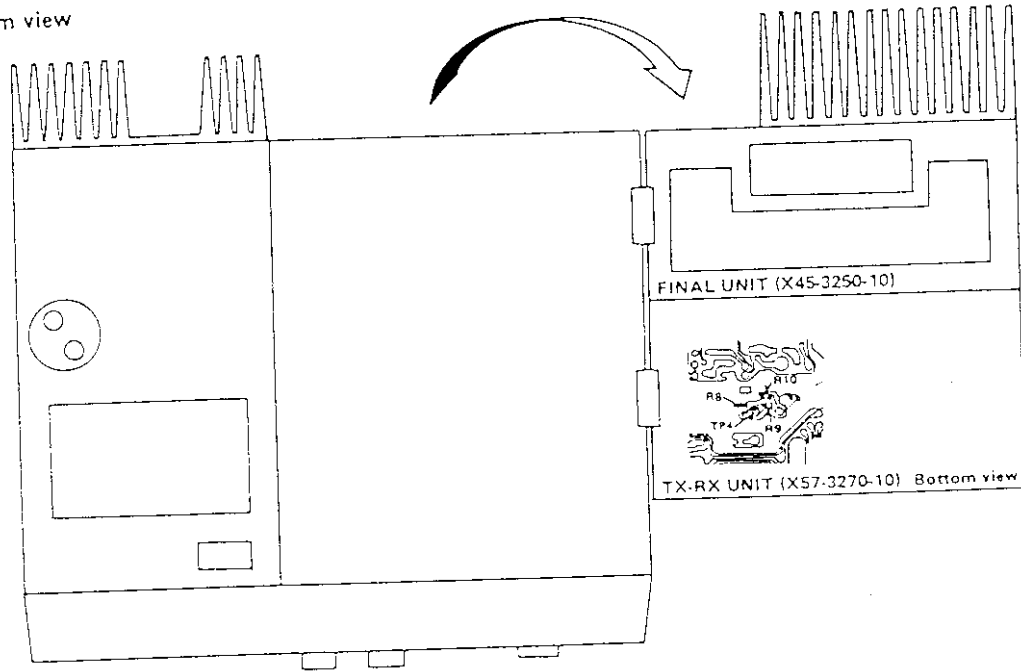
Adjustment location
Top view



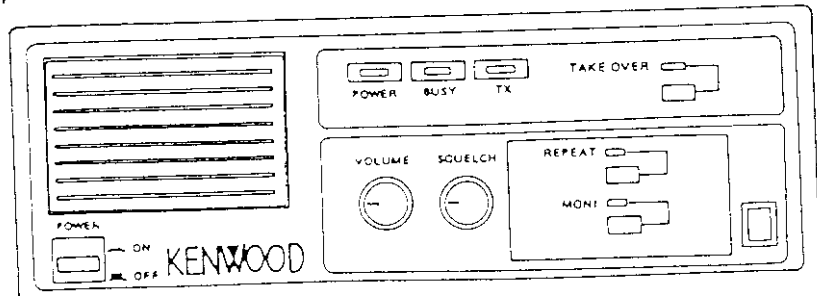
Adjustment points
SIGNALING UNIT (X52-3140-10)



Bottom view



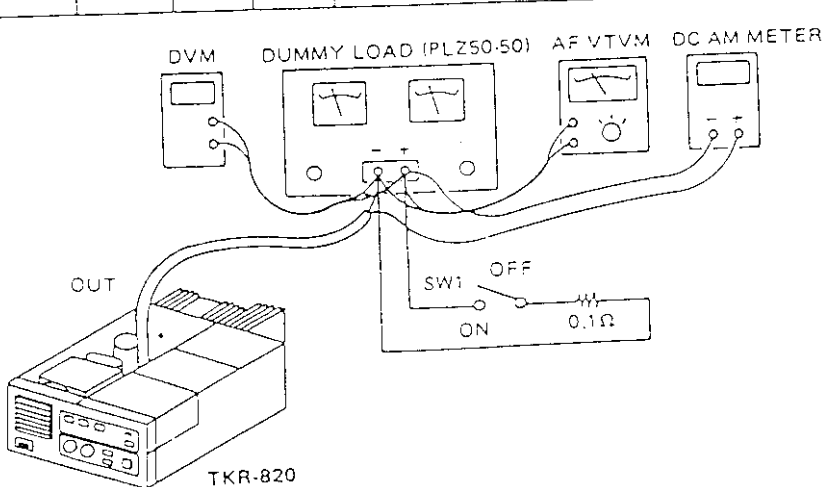
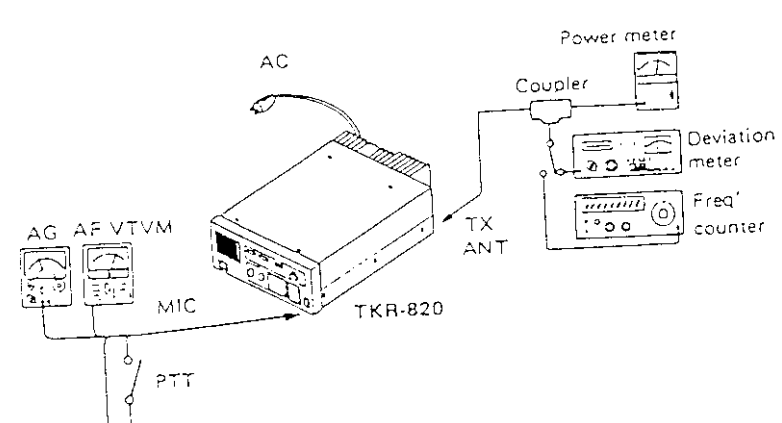
Front panel view



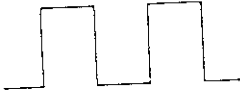
TKR-820

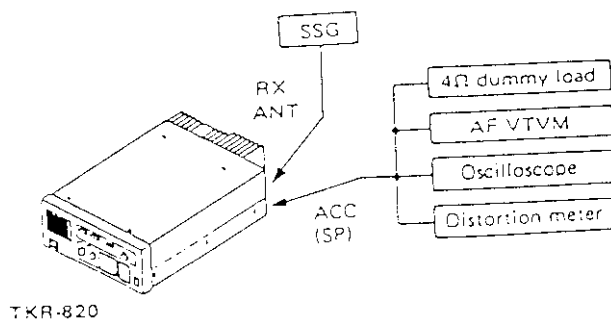
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Alignment

Alignment		Measurement			Adjustment			Specifications/Remarks
Item	Condition	Test equipment	Unit	Terminal	Unit	Part	Method	
1. Setting	1) AC voltage for destination : 120V 2) Connect to the DC output (OUT terminal) and GND of the AVR unit. (•)							
2. Test equipment set-up	1) Function : 0.1Ω resistor Meter : 60A, 60V DC : ON Power : ON SW1 : OFF							
3. Voltage setting	1) Power switch : ON	DVM		Output	AVR	VR1	Adjust the load for 10A.	13.6V ± 0.4V (Verify power indicator lights.)
	2) Vary the load for 2A – 10A draw. (Set to 10A after check.)	DVM AF VTVM						13.6V ± 0.7V DC Less than 30mV AC.
	3) Power switch : OFF							
4. Protection	1) SW1 : ON VR2 : MAX CW. Power switch : ON	DVM		Output	AVR	VR2	0.2V	0.2V ± 0.1V.
	2) SW1 : OFF						Check	13.6V ± 0.4V
5. Setting	1) Write in freq' designed with EEP ROM writer. (For freq' writing, set the power of TKR-820 to ON.) 2) Connect the power cable to the rear panel. 3) Final unit VR1 : MAX CCW. 4) TX-RX unit VR1 : MAX CCW. VR3 : MAX CCW. 5) Power SW : ON							
6. RX PLL Lock Voltage		DVM	TX-RX	TP1	TX-RX	Z2	4.0V ADJ.	±0.1V
			TX-RX	TP2	TX-RX	Z5	4.0V ADJ.	±0.1V
7. TX PLL Lock Voltage								

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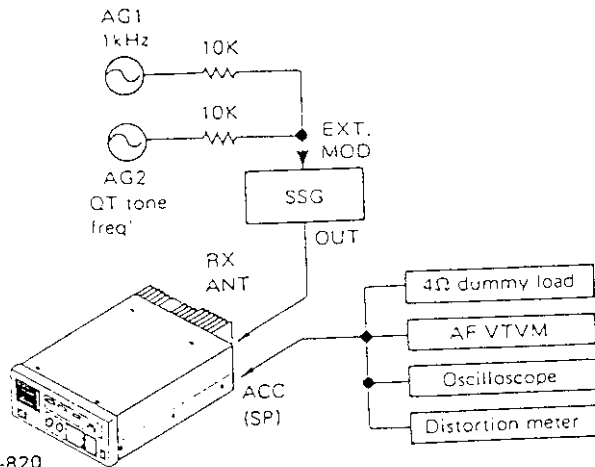
Item	Condition	Measurement			Adjustment			Specifications/Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
8. TCXO Freq. ADJ.	1) PTT : OFF (RX) Note : TCXO is adjusted precisely at 25°C. If it is readjusted, the frequency stability is changed. Do not touch it normally.	Power meter FREQ. counter	TX-RX	TP4 (Foil side)	TX-RX	Z3	f = 21.4MHz ADJ.	±100Hz
9. Power ADJ. (APC)	1) PTT : ON	Power meter	Rear panel	TX ANT	Final	VR1	MAX CW.	26W or more.
		Ammeter					MIN	2W or less.
							25W ADJ.	±1W
10. Transmit Freq. ADJ.	1) PTT : ON	Power meter FREQ. counter	Rear panel	TX ANT	TX-RX	Z6	FREQ. ADJ. of TX.	±100Hz
11. Tone deviation ADJ.	1) QT tone freq. being written. Deviation meter filter : LPF : 3kHz, HPF : OFF. De-emphasis : OFF PTT : ON	Power meter Deviation meter	Rear panel	TX ANT	Signal-ing	VR4	±0.75kHz	±100Hz
12. Maximum deviation ADJ.	1) Connect AG to the MIC terminal. AG : 1kHz/50mV Deviation meter filter : LPF : 20kHz, HPF : 50Hz. De-emphasis : 750μsec. TX-RX unit VR1 : MAX CW. PTT : ON	Power meter Deviation meter	Rear panel	TX ANT	TX-RX	VR2	±2.1kHz ADJ. (±2.4kHz ADJ. in use of signaling.) Adjust one more than the other by switching between -P and +P.	±100Hz
13. MIC sensitivity ADJ.	1) AG : 1kHz/5mV PTT : ON	Power meter Deviation meter	Rear panel	TX ANT	TX-RX	VR1	±1.5 kHz ADJ. (±1.95 kHz ADJ. in use of signaling.)	±100Hz
14. QFT waveform correction	1) Connect AG to the TX-RX (TP3) and enter a square wave of 100Hz, 2Vp-p. Deviation meter filter : OFF PTT : ON	Power meter Deviation meter Oscilloscope			TX-RX	VR3	Make the demodulation waveform neat.	
15. RX sensitivity ADJ.		AF VTVM 4Ω dummy load	Rear panel	EXT.SP	Front panel	AF VOL.	0.78V/4Ω (Noise)	



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Item	Condition	Measurement			Adjustment			Specifications/Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
	1) SSG output : 500 μ V/-53dBm MOD : OFF	SSG AF VTVM Distortion meter 4 Ω dummy load	Rear panel	EXT.SP	TX-RX	L7 L9 L10	Reduce noise level using L7, L9 and L10. Decrease the SSG output so that noise level is always 20 to 30dB lower than 0.45V Repeat 3 to 4 times.	
	L18					Adjust for maximum AF output.		
	L16 L17					Adjust for maximum SINAD.		
					Front panel	AF VOL.	0.45V/4 Ω ADJ.	
							Check	SINAD 12dB or more.
					Front Panel	AF VOL.	4.0V/4 Ω ADJ.	
	4) SSG output : 500 μ V/-53dBm					Check	S/N 45dB or more. Distortion : 5% or less.	
6. Squelch	1) SSG output : OFF Rotate SQL VR to a point at which noise disappears.	SSG AF VTVM 4 Ω dummy load Oscillo- scope	Rear panel	EXT.SP				SQL index angle 8:00 ~ 10:00
	2) SSG output : 0.2 μ V/-121dBm							Squelch should open.
7. Preset squelch ADJ.	1) Signaling unit VR1 to VR5 : MAX CCW. SSG output : OFF	SSG			Signal- ing	VR1	MAX CW. Rotate VR1 CCW. to a point at which D7 lights.	D7 : LED should light.
	2) SSG output : 0.2 μ V/-121dBm							D7 : LED should go out.
8. Hangup timer ADJ.	1) SSG output : 1.58 μ V/-103dBm The set time can be continuously varied by VR2. 0 ~ 5V $\rightarrow$ 0 ~ 5sec.	DVM	Signal- ing	TP2	Signal- ing	VR2	1.0V	$\pm 0.1V$
	2) SSG output : 501 μ V/-53dBm REPEAT SW : ON	Power meter SSG	Rear panel	TX ANT RX ANT			Check	TX LED should light. REPEAT LED should light.
	3) SSG output : OFF							TX LED should go out about 1 sec. later after turning SSG OFF.
9. T.O.T	1) The set time can be continuously varied by VR3. 0 ~ 0.3V : OFF ~ 0.5V : 30sec. ~ 5V : ~ 5min.	DVM	Signal- ing	TP1	Signal- ing	VR3	Set it to the target time.	
10. Repeater TX deviation	1) SSG output : 501 μ V/-53dBm	Power meter SSG Deviation meter	Rear panel	EXT.SP	Signal- ing	VR5	$\pm 1.5kHz$	$\pm 100Hz$

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Item	Condition	Measurement			Adjustment		Specifications/Remarks	
		Test-equipment	Unit	Terminal	Unit	Parts		Method
21. Signaling squelch	1) SSG output : Turn the SSG output so that the SINAD sensitivity becomes 10dB.	 TKR-820						
	2) SSG MOD SW : EXT. MOD AG1 FREQ' : 1kHz AG2 FREQ' : QT tone freq'.							
	3) AG1 : Power switch OFF. AG2 output : Adjust the output level of AG2 so that SSG deviation becomes 0.75kHz.							
	4) AG1 : Power switch ON. AG1 output : Adjust the output level of AG1 so that the SSG deviation becomes 3.75kHz. (i.e., QT tone frequency/ 0.75kHz deviation, + 1kHz/3kHz deviation) MONITOR SW : OFF							
22. TAKE-OVER			Rear panel	EXT.SP	Signal-ing		Check	Open.
					Front panel	TAKE-OVER switch	Check	The TAKEOVER LED must light on.