

## ADJUSTMENTS

### 1. Before adjustment

- 1) After the power switch is pushed on, wait for 5 minutes before measuring, to be sure of the most stable operation.
- 2) Adjust the OSC coil and IFT with a nonferrous screw driver.
- 3) Set the switches to the following positions.  
 TUNING MODE ..... AUTO  
 IF MODE ..... AUTO  
 HI BLEND ..... OFF  
 MODE ..... AUTO STEREO
- 4) Proceed with the AM section adjustments after having finished the FM section adjustment.
- 5)  $0\text{dB}\mu = 1\mu\text{V}$       Ex:  $60\text{dB}\mu = 1\text{mV}$

### 2. Measuring instruments abbreviation

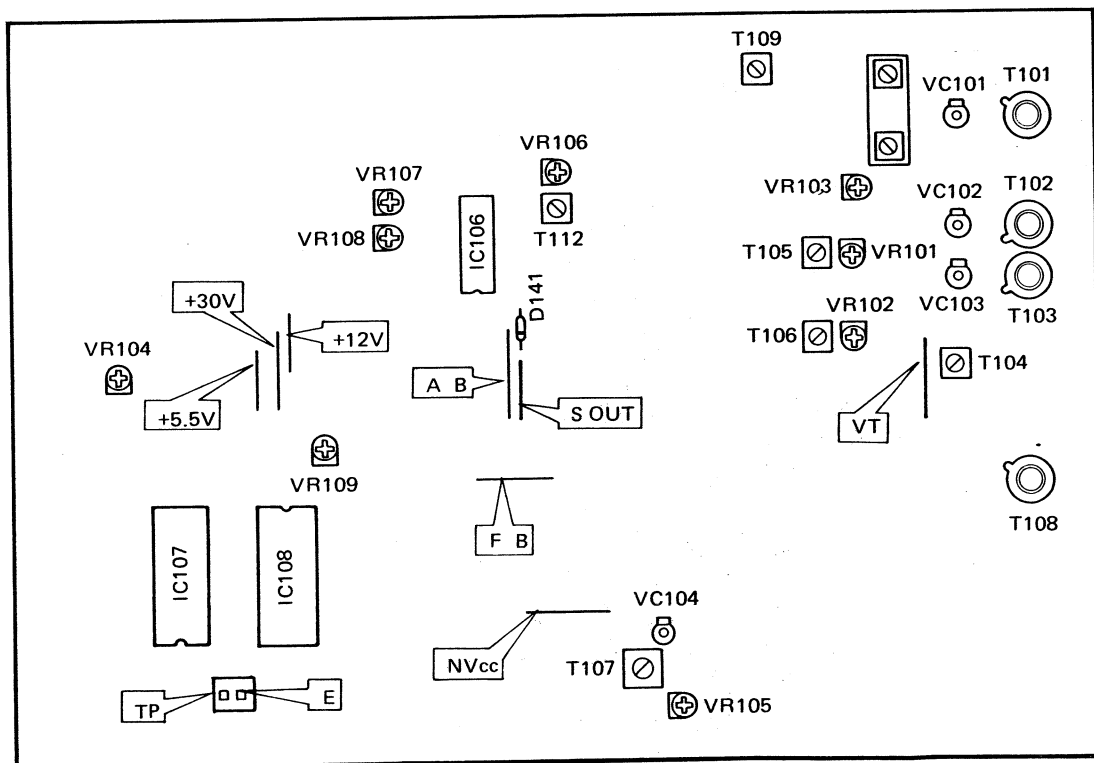
- FM SG : FM signal generator  
 SSG : Stereo signal generator  
 AM SG : AM signal generator  
 DIST. M : Distortion meter  
 A C V M : AC voltmeter  
 D C V M : DC voltmeter  
 OSC : Oscilloscope

## POWER SUPPLY SECTION

Check that the following voltages are obtained respectively across each test point and ground on tuner circuit.

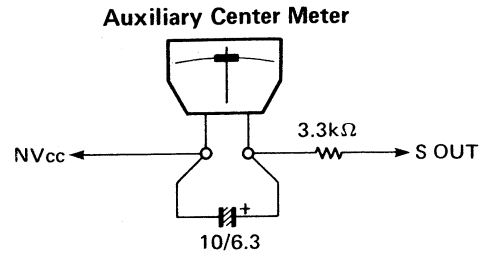
Test Point	Rating or standard	Remark								
+12	$+12.5\text{V} \pm 0.5\text{V}$	Make sure that AC line voltage comes within <table border="1" style="margin: 10px auto; border-collapse: collapse;"> <thead> <tr> <th style="width: 30%;">Models</th> <th style="width: 70%;">AC line voltage</th> </tr> </thead> <tbody> <tr> <td>U, C</td> <td><math>120\text{V} \pm 10\%</math></td> </tr> <tr> <td>G</td> <td><math>220\text{V} \pm 10\%</math></td> </tr> <tr> <td>A, B</td> <td><math>240\text{V} \pm 10\%</math></td> </tr> </tbody> </table>	Models	AC line voltage	U, C	$120\text{V} \pm 10\%$	G	$220\text{V} \pm 10\%$	A, B	$240\text{V} \pm 10\%$
Models	AC line voltage									
U, C	$120\text{V} \pm 10\%$									
G	$220\text{V} \pm 10\%$									
A, B	$240\text{V} \pm 10\%$									
+5.5	$+5.5\text{V} \pm 0.5\text{V}$									
+30	$+30\text{V} \pm 0.3\text{V}$									
FB	A + FM reception mode +12V									
	A + AM reception mode 0V									
AB	A + FM reception mode 0V									
	A + AM reception mode +12V									

### TEST POINTS



**FM TUNER SECTION**

- Use 19kHz L.P.F. to measure the output level.
- On step 1 and 2 connect the auxiliary center meter (ji00036 or similar) to confirm the best tuned point.
- 100% modulation means that the Frequency Deviation is 75kHz.
- Shorting TP and E while set at FM will result in automatic memory of each preset from P1/P11 to P10/P20 as given in the right table. This is convenient when making an adjustment.



P1/P11	P2/P12	P3/P13	P4/P14	P5/P15
AM 630kHz	AM 1080kHz	AM 1440kHz	FM 87.5MHz	FM 95.1MHz
P6/P16	P7/P17	P8/P18	P9/P19	P10/P20
FM 98.1MHz	FM 101.5MHz	FM 108.0MHz	FM 88.0MHz	FM 106.0MHz

Step	Item to be Adjusted	Connection terminal	Instrument required	Adjustment locations	Adjustment method	Rating or standard	Remarks
1	Discriminator balance	NVcc ~ S OUT	Auxiliary center meter	T107	Adjust the pointer of the auxiliary center meter point to "0" at detuned point.		
2	Confirmation of station center set	75Ω FM ANT	FM SG [ 98.1MHz ± 1kHz 70dBμ (81.2dBf, 3.16mV/75Ω) MONO 1kHz 100% MOD ]		Confirm that the auxiliary center meter deflects to "0" when tuned to signal of FM SG.		
		NVcc ~ S OUT	Auxiliary center meter				
3	Local oscillator Coil	75Ω FM ANT	FM SG [ 108MHz ± 1kHz 70dBμ (81.2dBf, 3.16mV/75Ω) MONO 1kHz 100% MOD ]	T108		VT = 25V ± 0.2V	
		VT ~ GND	DCVM				
4	RF 1	75Ω FM ANT	FM SG [ 106MHz ± 1kHz 70dBμ (81.2dBf, 3.16mV/75Ω) MONO 1kHz 100% MOD ]	VC102	Adjust VC102 to the maximum sensitivity.		
		OUTPUT	ACVM				
		75Ω FM ANT	FM SG [ 88MHz ± 1kHz 70dBμ (81.2dBf, 3.16mV/75Ω) MONO 1kHz 100% MOD ]	T102	Adjust T102 to the maximum sensitivity.		
		OUTPUT	ACVM				

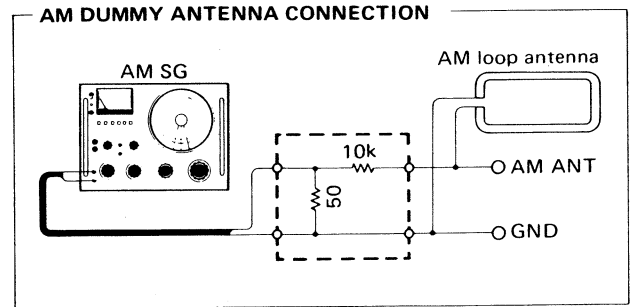
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Step	Item to be Adjusted	Connection terminal	Instrument required	Adjustment locations	Adjustment method	Rating or standard	Remarks
5	RF 2	75Ω FM ANT	FM SG [ 106MHz ± 1kHz 70dBμ (81.2dBf, 3.16mV/75Ω) MONO 1kHz 100% MOD ]	VC103	Adjust VC103 to the maximum sensitivity.		
		OUTPUT	ACVM				
		75Ω FM ANT	FM SG [ 88MHz ± 1kHz 70dBμ (81.2dBf, 3.16mV/75Ω) MONO 1kHz 100% MOD ]	T103	Adjust T103 to the maximum sensitivity.		
		OUTPUT	ACVM				
6	Repeat Steps 4 and 5, and then check again.						
7	ANT	75Ω FM ANT	FM SG [ 106MHz ± 1kHz 70dBμ (81.2dBf, 3.16mV/75Ω) MONO 1kHz 100% MOD ]	VC101	Adjust VC101 to the maximum sensitivity.		
		OUTPUT	ACVM				
		75Ω FM ANT	FM SG [ 88MHz ± 1kHz 70dBμ (81.2dBf, 3.16mV/75Ω) MONO 1kHz 100% MOD ]	T101	Adjust T101 to the maximum sensitivity.		
		OUTPUT	ACVM				
8	Monaural distortion	75Ω FM ANT	FM SG [ 98.1MHz ± 1kHz 70dBμ (81.2dBf, 3.16mV/75Ω) MONO 100Hz 100% MOD ]	VC104 VR105	Reduce distortion to minimum.	Less than -56dB	Reception should be made in WIDE
		OUTPUT L, R	DIST. M L.P.F.				
9	Stereo distortion (WIDE)	75Ω FM ANT	FM SG, SSG [ 98.1MHz ± 1kHz 70dBμ (81.2dBf, 3.16mV/75Ω) STEREO L, R 1kHz, 100% MOD ]	T104 T105 T106 VR101 VR102	Reduce distortion to minimum.	Less than -56dB	Confirm that stereo indicator lights up. Reception should be made in WIDE.
		OUTPUT L, R	DIST. M L.P.F.				
10	Confirmation of stereo distortion (NARROW)	75Ω FM ANT	FM SG, SSG [ 98.1MHz ± 1kHz 70dBμ (81.2dBf, 3.16mV/75Ω) STEREO L, R 1kHz, 100% MOD ]			Less than -46dB	Reception should be made in NARROW.
		OUTPUT L, R	DIST. M L.P.F.				
11	Confirmation of stereo distortion (SUPER NARROW)	75Ω FM ANT	FM SG, SSG [ 98.1MHz ± 1kHz 70dBμ (81.2dBf, 3.16mV/75Ω) STEREO L, R 1kHz, 100% MOD ]			Less than -36dB	Reception should be made in SUPER NARROW.
		OUTPUT L, R	DIST. M L.P.F.				
12	Check again according to Step 8. (MONO 1kHz, 100% MOD)						

Step	Item to be Adjusted	Connection terminal	Instrument required	Adjustment locations	Adjustment method	Rating or standard	Remarks
13	Separation	75Ω FM ANT	FM SG SSG [ 98.1MHz ± 1kHz ] 70dBμ (81.2dBf, 3.16mV/75Ω) STEREO L, R 1kHz 100% MOD ]	VR107 (Lch) VR108 (Rch)	Provide stereo signal for R and L channels individually. ● R channel alone: adjust OUTPUT Rch VR107 until output is increased to maximum. ● R channel alone: adjust OUTPUT Lch VR108 until output is increased to maximum.	Separation: more than 40dB	Reception should be made in WIDE.
		OUTPUT	LPF ACVM OSC				
14	Pilot cancel	75Ω FM ANT	FM SG SSG [ 98.1MHz ± 1kHz ] 70dBμ (81.2dBf, 3.16mV/75Ω) Pilot signal 9% MOD only ]	T112 VR106	Observe with oscilloscope and reduce 19kHz carrier leak level to minimum.	Less than -50dB	
		OUTPUT	Remove LPF ACVM OSC				
15	Check again according to Step 1, and if the result is unsatisfactory, start from Step 1 all over again for readjustment.						
16	Full-scale signal quality level	75Ω FM ANT	FM SG, SSG [ 98.1MHz ± 1kHz ] 75dBμ (86.2dBf, 5.62mV/75Ω) STEREO L, R 1kHz, 100% MOD ]	VR104	Adjust so that all signal quality indicators light up. (Reception should be made in WIDE.)		Confirm that all signal quality indicators goes out at detuned point.
17	Confirmation of BLEND	75Ω FM ANT	FM SG SSG [ 98.1MHz ± 1kHz ] 70dBμ (81.2dBf, 3.16mV/75Ω) STEREO L, R 1kHz 100% MOD ]		① Press HI BLEND. ② Confirm that separation is down.		Confirm that HI BLEND indicator lights up.
		OUTPUT	LPF ACVM OSC				
18	IF offset	75Ω FM ANT	FM SG [ 98.1MHz ± 1kHz ] 70dBμ (81.2dBf, 3.16mV/75Ω) Un modulation ]	VR109	By shorting across terminals T.P and E, the frequency display shifts 1 digit. Therefore, adjust VR109 until 10kHz digit becomes 1 or 0.		Reception should be made in CSL. After adjustment open across TP and E.
		TP ~ E	Short				
19	Confirmation of auto search reception	75Ω FM ANT	FM SG SSG [ 98.1MHz ± 1kHz ] 15dBμ (26.2dBf, 5.6μV/75Ω) G only 18dBμ (29.2dBf, 7.9μV/75Ω) STEREO L, R 1kHz, 30% MOD ]		Confirm that auto search reception is possible with the tuning key.		Confirm that muting is performed at auto reception.

**AM TUNER SECTION**

- Connect the AM loop antenna to the AM ANT terminals.
- Connect the AM dummy antenna for adjustment.



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Step	Item to be Adjusted	Connection terminal	Instrument required	Adjustment locations	Adjustment method	Rating or standard	Remarks
1	AM IFT	AM ANT	AM SG AM dummy antenna [ 630kHz ± 0.1kHz 50dBμ (61.2dBf, 316μV/75Ω) 400Hz, 30% MOD ]	T109	Adjust T109 to maximize detector output.		
		OUTPUT	ACVM				
2	Confirmation of sensitivity	AM ANT	AM SG. ACVM AM dummy antenna [ 630kHz ± 0.1kHz 1080kHz ± 0.1kHz 1440kHz ± 0.1kHz 400Hz, 30% MOD ]		Obtain AM SG output level where distortion become 10%.	Less than 58dBμ (69.2dBf, 794μV/75Ω)	
		OUTPUT	DIST. M.				
3	Full-scale signal quality level	AM ANT	AM SG. AM dummy antenna [ 1080kHz ± 0.1kHz 70dBμ (81.2dBf, 3.16mV/75Ω) 400Hz, 30% MOD ]	VR103	Adjust VR103 until all signal quality indicators light up.		Confirm that all signal quality indicators goes out at detuned point.
		ME ~ GND	DCVM				
4	Confirmation of auto search reception	AM ANT	AM SG AM dummy antenna [ 1080kHz ± 0.1kHz 60dBμ (71.2dBf, 1mV/75Ω) 400Hz, 30% MOD ]		Confirm the auto search reception with the tuning key		Confirm that muting is performed at auto reception.

## DIGITAL CONTROL SECTION

Step	Confirmation item	Connection terminal	Instrument required	Operation key	Confirmation method
1	Preset memory	75Ω FM ANT	FM SG, SSG 98.1MHz ± 1kHz 70dBμ (81.2dBf, 3.16mV/75Ω) STEREO L, R 1kHz, 100% MOD	FM/AM key TUNING MODE key TUNING key (UP or DOWN) MEMORY key PRESET STATION key P1-P10/P11-P20	①Receive FM 98.1MHz by means of auto search. ②Set P1-P10 → P1-P10 indicator lights. ③Press MEMORY key → MEMORY indicator flashes about 5 seconds. ④Press P1 → MEMORY indicator goes OFF P1 of PRESET STATION indicator lights.
		AM ANT	AM SG AM dummy antenna 1080kHz ± 0.1kHz 80dBμ 400Hz, 30% MOD		⑤Receive AM 1080kHz ⑥Press MEMORY key → MEMORY indicator flashes about 5 seconds. ⑦Press P2 → MEMORY indicator goes OFF P2 of PRESET STATION indicator lights.
		75Ω FM ANT AM ANT	FM SG, SSG  AM SG AM dummy antenna		⑧Press P1 and P2 and check that content is read out. → P1 and P2 of PRESET STATION indica- tor lights. ⑨Press P2 → Receive AM 1080kHz ⑩Set P11-P20 → P11-P20 indicator flashes. ⑪Press MEMORY key → MEMORY indicator flashes. ⑫Press P11 → MEMORY indicator goes OFF. P11-P20 indicator lights. P11 indicator lights. ⑬Press P11 and check that content is read out.
2	Tuning mode	Same as step 1	Same as step 1	FM/AM key TUNING MODE key TUNING key (UP or DOWN)  PRESET STATION key P1, P2	Tune to FM 98.1MHz and AM 1080kHz, and check that when receiving MAN'L/MONO, FM reception become forced mono AUTO TUNING indicator → Goes out FM STEREO indicator → Goes out  Check that tuning operation stops when tuned while AUTO searching. AUTO TUNING indicator → lights up FM STEREO indicator → lights up
3	Fine Tuning	Same as step 1	Same as step 1	PRESET STATION key P1, P2 FINE TUNING key	①Press P1 and content is read out (FM 98.1MHz) ②Press FINE TUNING key → FINE TUNING indicator lights. ③Press TUNING key and check that 10kHz step search. Note: U, C, R models → 10kHz digit becomes 0 ④Press P2 and content is read out (AM 1080kHz) ⑤Press TUNING key and check that 1kHz step search.
4	IF mode	Same as step 1	Same as step 1	FM PROGRAMMABLE FUNCTIONS key	①Press P1 and content is read out (FM 98.1MHz) ②Press AUTO/MAN'L key → AUTO indicator lights. ③Press ◀ or ▶ key → The IF mode changes to MANUAL automatically. Also, indicators light as each key is operated.  ④Set to the WIDE receiving state. → WIDE indi- cator lights. ⑤Lower the antenna input level gradually. → The IF mode changes from WIDE to NARROW and SUPER NARROW in that order.
5	Last channel memory			POWER key	①Read out P1. ②Turn OFF POWER Switch. ③Turn ON POWER Switch after 5 seconds. ④P1 content should come out. P1 of PRESET STATION indicator lights.