ALIGNMENT PROCEDURE

PLL ADJUSTMENT

1. Sub VCO Frequency Adjustment (110.000 MHz)
   Receive 108.000 MHz. Connect the frequency counter with Pin No.13 of IC103 (SO42P) and adjust the trimmer (TC-102) for 110.000 MHz ±100 Hz.

2. VHF Local Frequency Adjustment
   Set the Fine Tuning volume to the center position and connect the frequency counter with VC01 of Tuner P.C. Board.

Receive Freq.	IF	Local Freq.	Adjustment
26.000 MHz	+10.7	36.700	TC-103
44.995	+10.7	55.695	
45.000	+10.7	55.700	
57.995	+10.7	68.695	
58.000	−10.7	47.300	TC-104
88.000	−10.7	77.300	

3. VHF (High), UHF Local Frequency Adjustment
   Connect the frequency counter with VC02 of Tuner P.C. Board.

Receive Freq.	IF	Local Freq.	Adjustment
108.000 MHz	+10.7	118.700	
139.995	+10.7	150.695	
140.000	+10.7	150.700	
180.000	+10.7	190.700	
380.000	(380 + 10.7)/3	130.233	TC-105
514.000	(514 + 10.7)/3	174.900	

VCO ADJUSTMENT

Apparatus used: Digital Multi-Tester (DC Range)
Connection Method: Connect with VC line of VCO P.C. Board.

1. 26.000 MHz ～ 44.995 MHz

Receive Freq.	Adjustment	Voltage adjusted & allowance
26.000 MHz	L204	0.65 V ±0.1 V
44.995 MHz	TC-204	12.1 ±0.5

2. 45.000 MHz ～ 57.995 MHz

45.000 MHz	L205	3.7 V ±0.1 V
57.995 MHz	TC-205	11.3 ±0.1

3. 58.000 MHz ～ 88.000 MHz

58.000 MHz	L206	0.6 V ±0.1 V
88.000 MHz	TC-206	12.0 ±0.1

4. 108.000 MHz ～ 139.995 MHz

108.000 MHz	L203	0.58 V ±0.1 V
139.995 MHz	TC-203	9.65 ±0.2

5. 140.000 MHz ～ 180.000 MHz

140.000 MHz	L202	0.8 V ±0.05 V
180.000 MHz	TC-202	10.7 ±0.1

6. 380.000 MHz ～ 514.000 MHz

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380.000 MHz	L201	0.65 V ±0.05 V
514.000 MHz	TC-201	12.4 ±0.1

Remarks: Voltage of low frequency shall be adjusted at L-000 (Coils) first, then adjust voltage of high frequency by TC-000 (Trimmers).

If voltage of low frequency varies after voltage adjustment of high frequency, several time adjustment is required.

RECEIVER ADJUSTMENT

Apparatus used: SSG 26 MHz ~ 514 MHz (This should be available for both AM and FM modulation.),

IF GENE-SCOPE, OSCILLOSCOPE, MILLI VOLT METER.

1. Connection Diagram
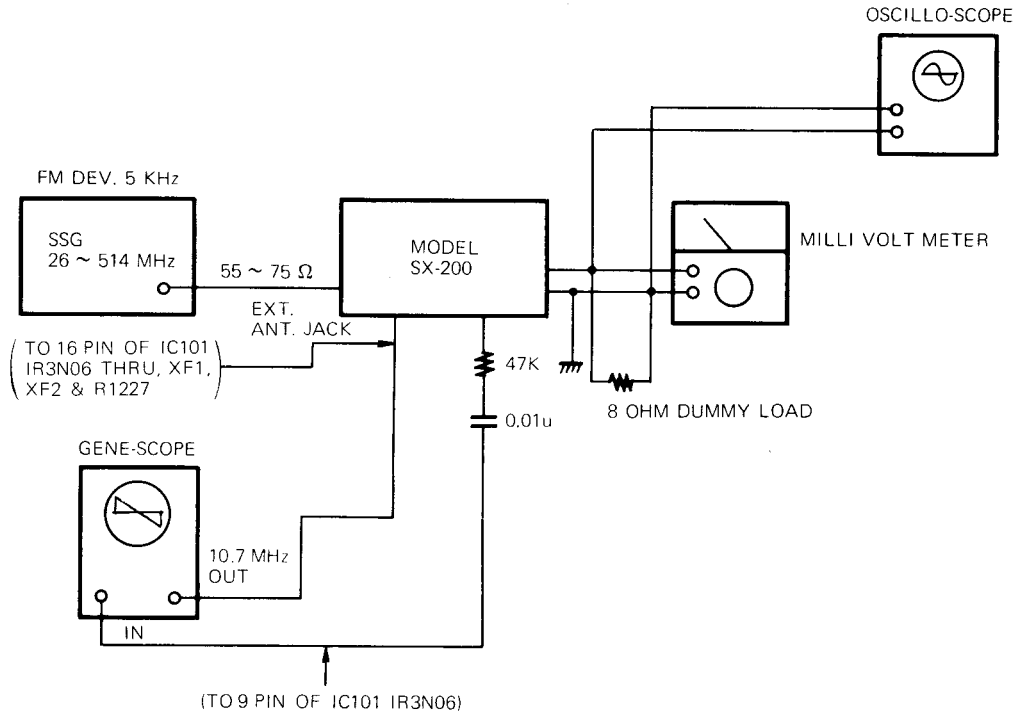
a. Connect "OUT" of Genescop (10.7 MHz) with Pin No. 9 of IC101 (IR3N06) through Crystal Filters (XF1 & 2) and R1227 (2.2K ohms).

b. Adjust IFT 101 and IFT 102 to make the waveform symmetrical (for both upper and lower sides) and flat.

TUNER ADJUSTMENT

1. a) Set LO/DX switch to DX position.

b) Set Squelch volume to the right side.

c) Set Fine Tuning to the center position.

d) Set Volume control to the center position.

e) Enter a frequency into memory bank which is going to adjust.

f) Set SG for 5 KHz FM deviation.

Enter the following frequencies into memory bank respectively. To enter a frequency, depress the each button according to the order of, for example . . . . 2 → 6 → ·ST → 0 → 0 → 0 → ENT → MW → M1

M1	26.000 MHz	M2	45.000 MHz	M3	58.000 MHz	M15	410.000 MHz
M4	108.000 MHz	M5	140.000 MHz	M6	380.000 MHz		
M9	44.995 MHz	M10	57.995 MHz	M11	88.000 MHz		
M12	139.995 MHz	M13	180.000 MHz	M14	514.000 MHz		

Hereafter, entered frequencies into memory bank will be called as M number respectively.

2. a) Set SG for 58.000 MHz and push the memory button M3. Adjust L14 and L18 for the wave form to become maximum.

Set SG for 88.000 MHz and push the memory button M11 and make sure there's no sensitivity difference.

b) Set SG for 45.000 MHz and push the memory button M2. Adjust L15 and L19 for the wave form to become maximum.

Set SG for 57.995 MHz and push the memory button M10 and make sure there's no sensitivity difference.

c) Set SG for 26.000 MHz and push the memory button M1. Adjust L16 and L20 for the wave form to become maximum.

Adjust IFT101 for the clear waveform and the maximum sensitivity.

Set SG for 44.995 MHz and push the memory button M9 and make sure there's no sensitivity difference.

d) Set SG for 140.000 MHz and push the memory button M5. Adjust L8, L9 and L11 for the wave form to become maximum.

Set SG for 180.000 MHz and push the memory button M13 and make sure there's no sensitivity difference.

e) Set SG for 108.000 MHz and push the memory button M4. Adjust L7, L10 and L12 for the wave form to become maximum.
Set SG for 139.995 MHz and push the memory button M12 and make sure there's no sensitivity difference.

f) Set SG for 410.000 MHz and push the memory button M15. Adjust TC1, TC2 and TC3 for the waveform to become maximum. Depress memory button M6 and make sure that sensitivity on 380.000 MHz is within the specifications.
Set SG for 450.000 MHz.
Set SG for 510.000 MHz and push the memory button M14 and make sure there's no sensitivity difference.

Remarks: If there is sensitivity difference on 410 MHz and 514 MHz:
a) Rotate TC1, TC2 and TC3 to find out which trimmer condenser is improperly set. Rotate the trimmer condenser improperly set until the sensitivity on 410 MHz and 514 MHz is balanced, and make sure that there's no sensitivity difference.
b) If the sensitivity difference is too big to balance only with trimmer condensers, adjust L1 in combination with TC1, L3 in combination with TC2, or L4 in combination with TC3 to make the sensitivity on 410 MHz and 514 MHz become equal.

3. AM Gain Adjustment
a) Push [FM-AM] switch for AM position.
b) Receive 125 MHz. (Set SG input for 125 MHz.)
c) Set SG input for 100 dB and adjust VR102 to make the signal maximum.
d) Rotate VR102 counterclockwise again until noise appears, if there is no noise between 450 and 480 MHz.

4. Fine Tuning
Receive 26.000 MHz and make sure of ±5 KHz variation, moving the fine tuning control from left side to right side.

ACCESSORY CIRCUITS ADJUSTMENT

1. Center Detector Adjustment
a. Set SG for 140.000 MHz (Input 60 db)
b. Receive 140.000 MHz
c. Connect Multi-Tester with Pin No.6 of IC201 (uPC324).
d. Adjust the middle voltage by VR202.
(BETWEEN the voltage that the wave form disappears when VR202 and VR203 are rotated clockwise AND the voltage that the waveform disappears when rotated counterclockwise.)
e. Move the frequency of SG from 140.000 MHz to 140.005 MHz gradually and make sure that the waveform disappears. (140.006 MHz ±1 KHz with VR203)
Then, move the frequency of SG from 140.005 MHz to 149.995 MHz as well and make sure that the wave form disappears. (139.994 MHz ±1 KHz with VR202)

2. Audio Squelch Adjustment
a. Set "SQ" change switch in the rear panel to SQ2.
b. Set SG for 26.000 MHz (Input: 60 db) and receive.
c. Set FM deviation 0.5 KHz.
d. Rotate the screw of VR201 (200 ohms) clockwise until the waveform disappears.
e. Increasing deviation, make sure that the waveform appears within 1 KHz.
f. Set "SQ" change switch in the rear panel to SQ3.
g. Slide the squelch volume to the left side.
h. Set SG for 30.000 MHz, deviation 5 KHz (Input: 60 db)
i. Set the frequency for 29.950 MHz on the SX-200 unit and push "UP" button.
J. Make sure that the frequency stops at 30.000 MHz.
k. Decreasing deviation, make sure that the waveform disappears at 0.5 KHz ~ 0 KHz and seeks.

Remarks: Dev. 0 KHz ~ 0.5 KHz . . . . Audio Squelch – ON
Dev. 0.5 KHz ~ 1.0 KHz . . . . Audio Squelch – OFF

3. Scan Delay Time
a. Connect Multi-Tester with the anode side of D101 (IS953) in the PLL P.C. Board and adjust VR105 (100K) for 0.65 V ±0.1/–0 V.
b. Set "SCAN CONT" switch in the rear panel to 1 position.
c. Seeking frequencies, stop at an optional frequency.
d. When the frequency of SG is moved, make sure that the seeking is made within approximately 2 seconds.
e. Set "SCAN CONT" switch to 2 position.
f. As well as b. operation, make sure that the seeking is made within about 4 seconds.

4. LO/DX
   a. Receive 26.000 MHz and set LO/DX switch to DX position.
   b. Set SG input for 1 uV and output level for 1 V.
   c. Change LO/DX switch to LO position, and set for −6 ～ −7 db.

5. DIMMER
   When the dimmer switch is ON, make sure that the display will be dark.

6. CLOCK
   a. When the clock switch is ON, make sure that the display will show the TIME.
   b. Even the power switch in the front panel is off, the TIME must be displayed.

7. AUX
   a. Connect the tester with AUX. (OHM range)
   b. Short at scanning or seeking (DC resistor: 0.5 Ω ±0.1)
   c. Must be open at stop condition of scan or seek.

8. REC
   a. Receive 26.000 MHz (Dev. 5 KHz)
   b. Connect Milli-Volt Meter (Load: 10 K ohm) with REC jack.
   c. Make the volume in the maximum position.
   d. Output voltage . . . . 0.4 V (±0.1 V)

9. Memory method
   Example: 2 → 6 → ·ST → 0 → 0 → 0 → ENT → MW → M1
   a. Enter optional frequencies into memory bank from M1 to M16.
   b. Push the buttons from M1 to M16 again and make sure the said frequencies are the entered ones into memory.
   c. Put the batteries (1.5 V X 2) in the battery box in the rear panel.
   d. Disconnect the power supply (DC 13.8 V) and then connect it again, and make sure the memory entered.

10. SCAN A
    a. Enter optional frequencies into memory bank from M1 to M16.
    b. Close the squelch.
    c. Push SCAN A button.
    d. Make sure that the scanning operation will be repeated from M1 to M16.
    e. Set SG for optional frequency or enter a frequency into memory beforehand, make sure that the frequency will stop.
    f. When ·ST button is pushed, make sure the scanning will stop.

11. SCAN B
    a. Enter optional frequencies into memory bank from M1 to M16.
    b. Push ·ST → SW → M1 → M9 → M3 → M16 → SCAN B accordingly.
    c. Make sure that the scanning will be made from M1 to M9, M3 and M16 in order.
    d. Push ·ST button and make sure the scanning will stop.

12. LIM
    a. Push the buttons according to the order of;
       2 → 6 → ·ST → 0 → 0 → 0 → ENT → LIM → 3 → 0 → ·ST → 0 → 0 → 0 → ENT → UP
    b. Make sure that the seeking will be made between 26.000 MHz and 30.000 MHz.

13. CK
    a. Push CK button and then MW H button.
    b. Make sure that HOUR figure will be increased, whenever pushing MW H button every one time.
    c. Make sure that MINUTE figure will be increased whenever pushing SW M button every one time.
    d. When MW H button or SW H button is kept pushing respectively, figure must be forwarded quickly.
    e. When MW H button is pushed quickly, the display must be changed from AM to PM (or PM to AM).

14. SP
    a. Set squelch volume all the way to the left side position.
    b. Push UP or DOWN button for seeking.
    c. Push SP button. Then make sure the seeking speed becomes fast.
    d. Push SP button again and make sure that the speed returns to normal one.