

FM TRACKING

Proceed as follows before beginning FM tracking adjustment

- Connect the FM SG (FM signal generator) to the FM ANTENNA 300Ω terminal.
 - Connect the SIGNAL meter or DC voltmeter between Tuner ass'y TP terminal and ground.
 - Switch the FUNCTION switch to the FM position, the FM MUTING switch to the OFF position.
 - The tuning coil in the FM front end does not have an adjusting core. Consequently, tracking adjustment at 90MHz are performed by regulating the gap between rotor and stator of the tuning capacitors (VC1, VC2, and VC3). The expression "adjust VC (VC1, VC2, and VC3)" found in the text means that the two outer rotor blades of each of these tuning capacitors are to be extended outwards with spatula (Part No. G GK-066) as shown in Fig. 7-2.
1. Set the TX-610 dial pointer to a frequency in the 106MHz region so that there will be no input signal.
 2. Adjust core of T3a so that the TUNING meter indicator to dead center.
 3. Next tune more accurately to 106MHz, and set the FM SG output to 106MHz, 60 to 80dB (modulation 400Hz, ± 75 kHz deviation).
 4. Adjust TC1 to obtain maximum deflection of the SIGNAL meter indicator.
 5. Then tune the dial pointer to 90MHz, and set the FM SG output frequency to 90MHz.
 6. Adjust the VC3 to obtain maximum deflection in the SIGNAL meter, and a dead center reading in the TUNING meter.
 7. Repeat steps 3 to 6 above.
 8. Reset the FM SG output level to 20 – 30dB, and adjust TC2 and TC4 at 106MHz, and VC1 and VC2 at 90MHz in the same manner as described above in steps 3 to 7. These adjustments will ensure optimum sensitivity in the 90 to 106MHz range, and minimum difference in sensitivity between the two extreme frequencies.
 9. Set the FM SG output to 98MHz and tune the TX-610 to this position.
 10. Adjust the core of T2 to obtain maximum deflection in the SIGNAL meter.
 11. Retune to a position with no input signal.
 12. Adjust core of T3a again to set the TUNING meter indicator to dead center.
 13. Set the FM SG output to 98MHz and 66dB, and tune the TX-610 to this position.

14. Then adjust the core of T3b to reduce distortion in the demodulator output (OUTPUT) to a minimum.

15. Repeat steps 11 to 14 above until both specifications (center TUNING meter reading in the absence of input signal, and minimum distortion in demodulator output) are satisfactorily met.

FM MPX

- Connect the MPX SG (FM multiplex generator) to the FM SG external modulator terminal.
 - Set the FM MUTING switch to the ON position.
1. Set the FM SG output to 98MHz and 66dB (unmodulated), and tune the TX-610 to this position.
 2. Adjust VR1 to obtain a 19kHz signal at terminal No.8.
 3. Then set the FM SG output level to 85dB, and the modulation mode to external. Then with the MPX SG, set Main to 1kHz, L+R to ± 67.5 kHz deviation, and pilot signal to ± 67.5 kHz deviation, and pilot signal to ± 7.5 kHz deviation.
 4. Rotate the T2 core around by up to 90° in either direction to reduce the demodulator output distortion to a minimum.

REC LEVEL CHECK

- Connect the FM SG to the FM antenna 300Ω terminal.
 - Switch the FUNCTION switch to the FM position.
1. With the FM SG at modulation frequency of 400Hz, 100% modulation, and an output of 80dB, check the output level of TX-610.
 2. Switch the REC REVEL CHECK switch to the ON position, and adjust VR3 so that the output level is -6dB below the level found in step 1 above.

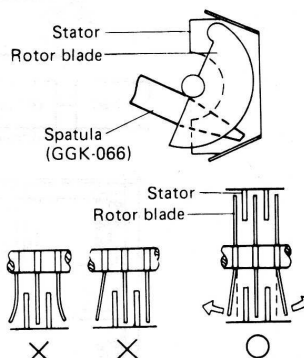


Fig. 7-2 Adjustment of tuning capacitor

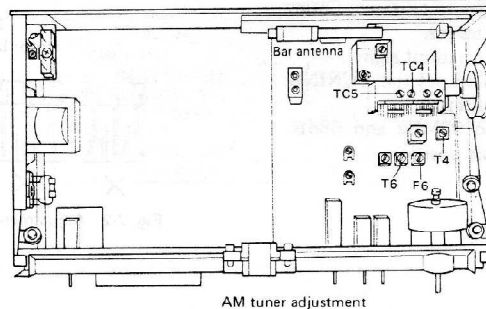
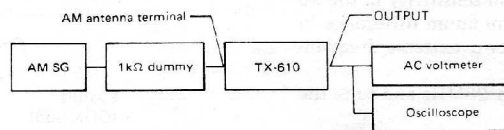
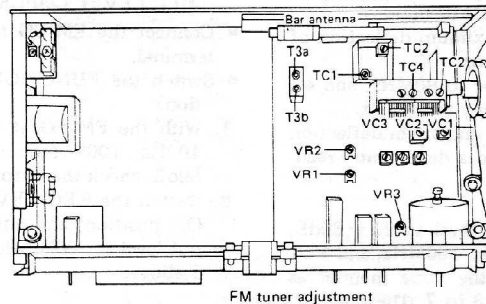
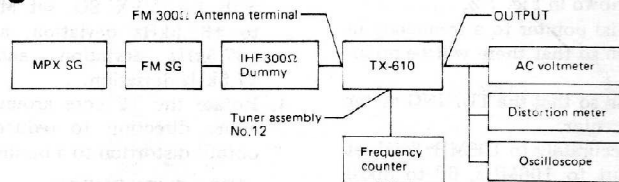
AM TRACKING

- Connect the AM SG (AM signal generator) to the AM antenna terminal via a 1k Ω resistor.
 - Switch the FUNCTION switch to the AM position.
1. Tune the TX-610's dial pointer to 600kHz, and the AM SG output to 600kHz, 100dB (modulation 400Hz, 30%).
 2. Adjust core of T4 to obtain maximum deflection of the SIGNAL meter indicator.
 3. Then tune to 1400kHz, and also set the AM SG output frequency to 1400kHz.
 4. This time adjust TC4 to obtain maximum SIGNAL meter deflection.
 5. Repeat steps 1 to 4 above.
 6. Set the AM SG output level to 30dB, adjust the coil along the bar-antenna and F6 at 600kHz, and TC5 at 1400kHz, in the same manner as described in the above steps. This is the adjustment for optimum sensitivity across the frequency band, and minimum difference in sensitivity at different frequencies.

ADJUSTMENTS

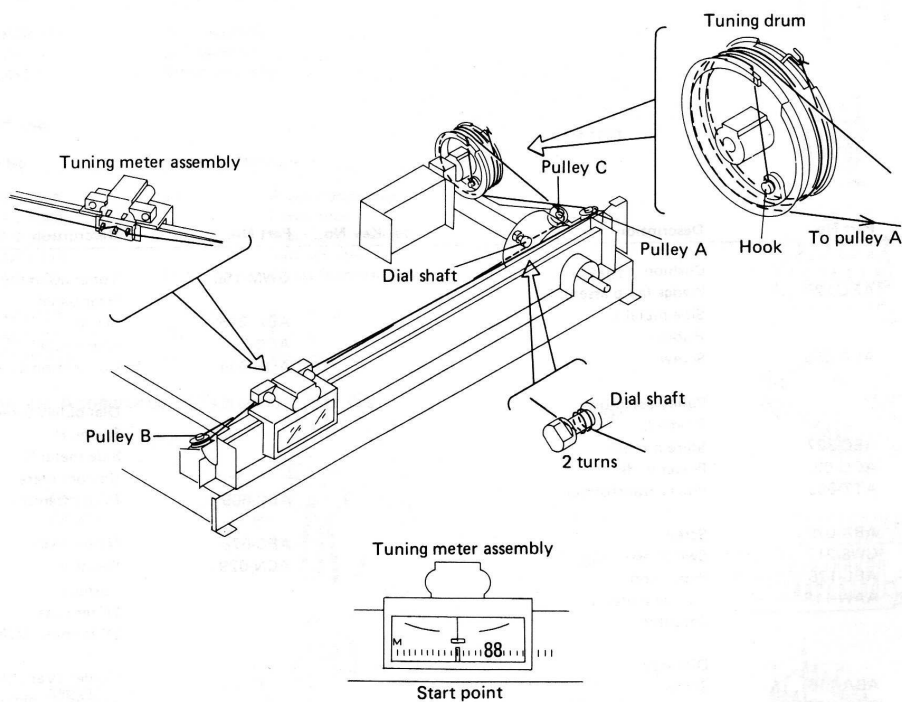
AM TUNING METER

- Connect the AM SG to the AM antenna terminal via 1k Ω resistor.
 - Switch the FUNCTION switch to the AM position.
1. Tune the TX-610's dial pointer to 1000kHz and the AM SG output to 1000kHz, 80dB (modulation 400Hz, 30%).
 2. Adjust the core of T6 so that the TUNING meter indicator to dead center.



DIAL CORD STRINGING

1. Remove the top cover and front panel.
2. Remove the tuning drum from the shaft of the tuning capacitor.
3. Tie one end of the cord to the hook located inside the tuning drum.
4. Rotate the tuning capacitor right around until the rotor blades are fully intermeshed.
5. Secure the tuning drum back onto the tuning capacitor shaft, making sure that the securing screw faces directly upward.
6. Pass the cord out through the small opening in the circumference of the tuning drum (see diagram), make half a turn around the tuning drum, and then pass the cord around pulleys A and B in that order. Next make 3 turns around the dial shaft, then pass around pulley C, make 2 more turns around the tuning drum (along the tuning drum groove), and finally tie the cord to the spring, checking that there is a certain amount of tension in the cord.
7. Rotate the tuning drum to check that the cord moves freely and smoothly. Then cut off any excess cord.
8. Next rotate the dial shaft in the counter clockwise direction (i.e. tuning capacitor rotor blades fully intermeshed). Align the dial pointer with the tuning dial "start point", and then attach it to the cord.
9. Finally apply "paint lock" to the spots where the dial pointer is attached to the cord in order to secure the connection.



Parts List

NOTES:

- Parts without part number cannot be supplied.
- The $\frac{1}{2}$ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.

Key No.	Part No.	Description
	ANE-291	Bonnet case
	ABA-079	Screw
	AAD-200	Lever Knob
	GWX-456	LED assembly
	ANB-849	Front panel assembly
	ABA-066	Screw
	AAA-063	Knob

Key No.	Part No.	Description	Key No.	Part No.	Description
	AFL-129	Cushion Wedge lamp assembly Side metal L		GWM-156	Tuner assembly Rear panel
		Rubber		ABA-246	Screw
	ABA-066	Screw		AEC-337	Strain relief
		Pulley assembly Frame L		ADE-034	Connection code
	AEC-327	Strain relief			Dial pulley assembly Frame R
	ADG-023	Power code			Side metal R
	ATT-663	Power transformer		AEC-609	Bottom plate Foot assembly
	ABA-079	Screw		AEC-678	Nylon rivet
	GWS-217	Switch assembly		ACN-029	Resistor
	AEL-128	Pilot lamp			Cushion
	AAW-118	Tuning meter			2P terminal
		Smoother			2P terminal (GND)
	ABA-116	Dial stay			Holder (Variable capacitor)
	GWX-456	Screw LED assembly Dial scale hold metal Dial scale board		ABA-067	Terminal holder
		Dial scale hold metal B Shaft hold metal		RN2P 0R5K	Serial plate
	B22-016	Washer			Screw
	B71-004	Nut 9φ			Resistor
	AXA-256	Dial shaft assembly			

SCHEMATIC DIAGRAMS, P.C. BOARD PATTERNS AND PARTS LIST

MISCELLANEA

NOTES:

- When ordering resistors, first convert resistance values into code form as shown in the following examples.

Ex. 1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J = 5%, and K = 10%).

560Ω 56 × 10¹ 561 RD¼PS 561J
47kΩ 47 × 10³ 473 RD¼PS 473J
0.5Ω 0R5 RN2H 0R5K
1Ω 010 RSIP 010K

Ex. 2 When there are 3 effective digits (such as in high precision metal film resistors).

5.62kΩ 562 × 10¹ 5621 RN¼SR 5621F

Miscellaneous Parts List

ASSEMBLY

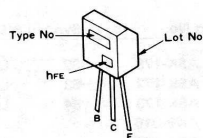
Part No.	Symbol & Description
GWM-156	Tuner assembly
GWX-456	LED assembly
GWS-217	Switch assembly

OTHERS

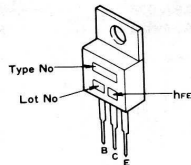
Part No.	Symbol & Description
ATT-663	T1 Power transformer
ADG-023	Power code
ANB-849	Front panel assembly
AAW-118	Tuning meter
AEL-129	PL3 Wedge lamp assembly
AEL-128	PL1, PL2 Pilot lamp
ACN-029	R1 Resistor
RN2P 0R5K	R2 Resistor

External Appearance of Transistors and ICs

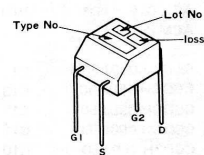
2SC461
2SC535



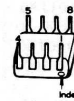
2SD712



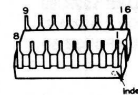
3SK73



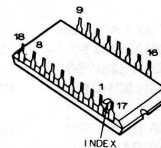
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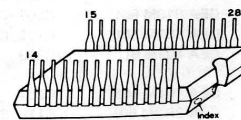
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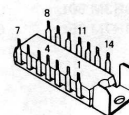
PA3007



PA4006



LB1416



PARTS LIST OF P.C. BOARD ASSEMBLY

Parts List of Tuner Assembly (GWM-156)

TRANSFORMER AND COILS

Part No.	Symbol & Description
ATB-623	T1 Bar-antenna assembly
ATE-039	T2 FM matching coil
ATE-045	T3 FM detector transformer
ATB-066	T4 AM oscillator coil
ATB-061	T5 AM detector transformer
ATB-062	T6 AM detector transformer
ATF-053	F1, F2 FM ceramic filter
ATF-089	F3, F4 Low pass filter
ATF-076	F5 AM ceramic filter
ATF-038	F6 455kHz filter
T24-028	L5 RF choke coil

CAPACITORS

Part No.	Symbol & Description
ACK-012	VC1 Variable resistor
ACM-006	TC1 Ceramic trimmer
CCDUJ 090J 50	C1
CCDCH 150J 50	C13
CCDCH 330J 50	C12
CCDCH 080D 50	C11
CCDPH 150J 50	C10
CCDUJ 120J 50	C4
CCDSL 101J 50	C5, C106
CCDSL 060D 50	C6, C302
CCDXL 120J 50	C315
CGB R47K 500	C9
CCDSL 221J 50	C110, C111
CKDYB 102K 50	C307, C308
CKDYB 122K 50	C321
CKDYX 473M 25	C409
CKDYF 103Z 50	C2, C3, C7, C8, C14, C109, C113, C301, C303, C310-C313, C316
CKDYF 223Z 50	C101, C102, C105, C108, C114, C116, C117, C201, C317, C322
CKDYF 473Z 50	C103, C104, C304, C305
CQMA 472J 50	C203, C204
CQMA 823K 50	C408
CQSH 331K 50	C314
CEA R22M 50L	C323, C324
CEA R47M 50L	C210, C410, C411
CEA 010M 50L	C207, C208, C212, C213, C406
CEA 100M 16L	C112, C306, C325, C407
CEA 101M 6L	C309
CEA 101M 10L	C202
CEA 2R2M 50L	C115, C205, C206
CEA 220M 10L	C214
CEA 3R3M 50L	C320
CEA 4R7M 35L	C211, C319

Part No.	Symbol & Description
CEA 470M 10L	C107
CEA 471M 16L	C401, C402
CEA 471M 25L	C403
CEA 221M 25L	C404
CEA 101M 16L	C405
CEA 010M 50L	C318
ACG-018	C209

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

RESISTORS

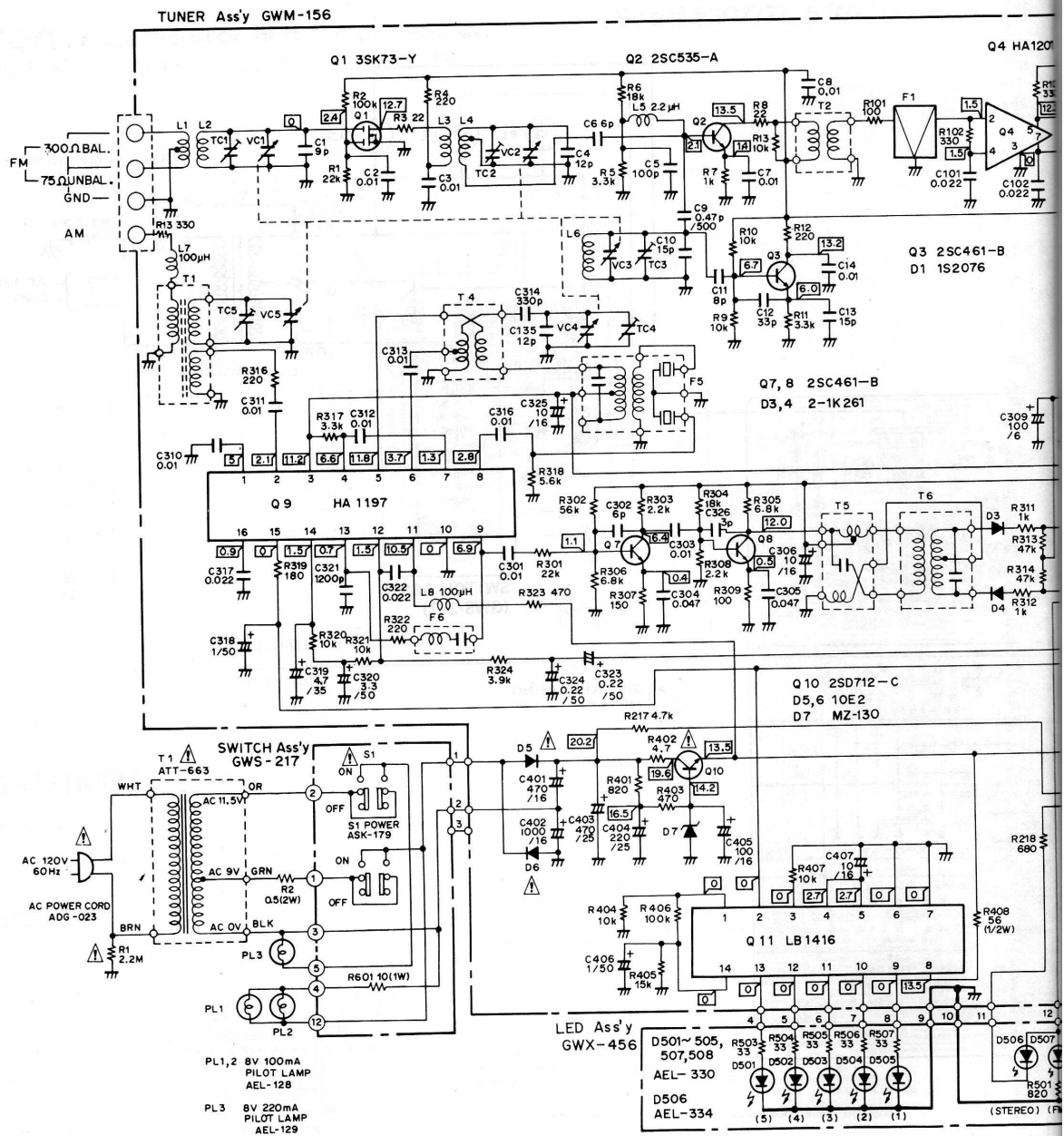
Part No.	Symbol & Description
ACP-082	VR1 Semi fixed 6.8k
ACP-083	VR2, VR3 Semi fixed 33k
RD%PM □□□ J	R1-R12, R101-R121, R201-R213, R215-R218, R301-R324, R401, R403-R407, R409, R410
RD%PQ □□□ J	R214
RD%PM □□□ J	R402
RD%PS □□□ J	R408

SEMICONDUCTORS

Part No.	Symbol & Description
3SK73	Q1
2SC535	Q2
2SC461	Q3, Q7, Q8
HA1201	Q4
PA3007-A	Q5
PA4006-A	Q6
HA1197	Q9
2SD712	Q10
△(2SD313)	
LB1416	Q11
1S2076	D1, D2
(1S2473)	
(1S1555)	
2-K261	D3, D4
10E2	D5, D6
△(SIB01-02)	
KZL-140	D7

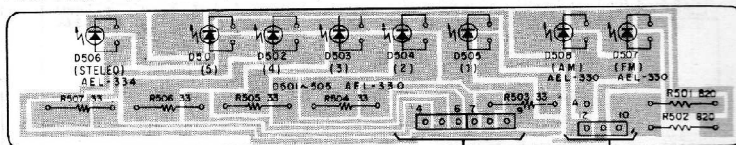
OTHERS

Part No.	Symbol & Description
ASK-178	S2 Lever switch (FUNCTION)
ASK-172	S3 Lever switch (MUTING)
ASK-173	S4 Lever switch (REC LEVEL CHECK)
AKB-016	Terminal (ANTENNA)
ABA-025	Screw
ABA-026	Screw
ABA-082	Screw



y vary

LED ASS'Y (GWX-456)



TUNER ASS'Y (GWM-156)

