CM 1A
Car radio cassette player CM 2A

Service
Service
Service

Service Manual

FOUR TRACK AUTO REVERSE STEREO CASSETTE PLAYER WITH AM/FM/FM-STEREO RADIO

12 V

PRODUCED FOR AUSTRALIAN MOTOR INDUSTRIES FOR FITMENT TO TOYOTA CORONA XT130 AND XT131

SPECIFICATIONS

TUNING RANGE	AM 515 to 1620 kHz FM 88 to 108 MHz
INTERMEDIATE FREQUENCY	AM 455 kHz FM 10.7 MHz
TAPE SPEED	4.76 cm/sec.
PINCHROLLER PRESSURE	300 – 400g
TAKE UP TORQUE	45 – 60 g.cm
POWER OUTPUT	3 WATTS PER CHANNEL
SPEAKER IMPEDANCE	4 ohms PER CHANNEL
POWER SUPPLY	12 VOLTS NEGATIVE TO EARTH
CURRENT	APPROX. 0.6 amp (at 0.5 WATT OUTPUT)
SEMICONDUCTORS	10 IC's 5 TRANSISTORS 10 DIODES 2 LED's

PHILIPS

Subject to modification

4802 725 17039

PHILIPS

PLAYBACK HEAD ADJUSTMENT (Azimuth)

Normally, the adjustment is precisely set at the factory and further adjustment should not be required unless the playback head or its mounting components are replaced.

Incorrect adjustment will cause a reduction in performance.

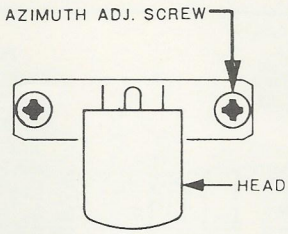


Fig. 1

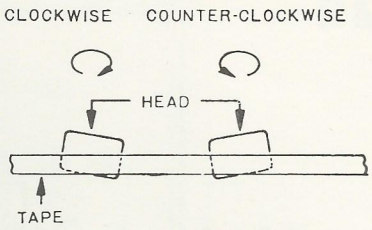


Fig. 2

If the azimuth is moved, then carefully adjust the azimuth screw as shown in Fig. 1

Using a Test Tape for Azimuth Adjustment

Insert a test tape and set the control knobs as follows:

VOLUME CONTROL KNOB (VOL)	Normal Volume
BALANCE CONTROL KNOB (BAL)	In Centre Position
TONE CONTROL KNOB (TONE)	Turn Fully Clockwise

Carefully adjust the azimuth adjustment screw for maximum volume and treble tones. It is recommended that a VTVM or Circuit Tester is connected to the speaker terminals for obtaining the maximum value because the test tape for azimuth adjustment is recorded in high treble tones.

If a test tape is not available, use a stereo music tape with some high treble tones (piano or violin music) and follow the same procedure as above.

CLEANING

After extended use, a layer of iron-oxide from the tape can build-up on the tape playback head and the drive capstan. The oxide layer prevents the tape from making full contact with the playback head, resulting in a gradual loss of high frequency response and an increased noise level. In the case of the capstan, the oxide deposit can cause slippage (wow) which might be mistaken for a more serious mechanical problem. To clean the head, a swab moistened with alcohol should be used.

WARNING – Do not use a solvent such as lighter fluid or thinners as these may cause damage to plastic parts or instrument finish.

First, using the end of a pencil, press the rod in the cassette door back until it clicks into position and then thoroughly clean the playback head, capstan and pinchroller.

After cleaning, press the eject button to return the rod to its original position.

DEMAGNETISATION

The playback head may become magnetised over a period of time. A magnetised head will record noise on a tape, even when it is being used for playback, so it is important that the head be periodically demagnetised. This can be done with a commercial demagnetiser (or degausser).

ADJUSTMENT FOR TAKE-UP TORQUE

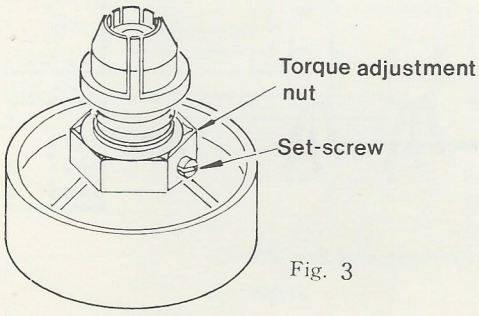
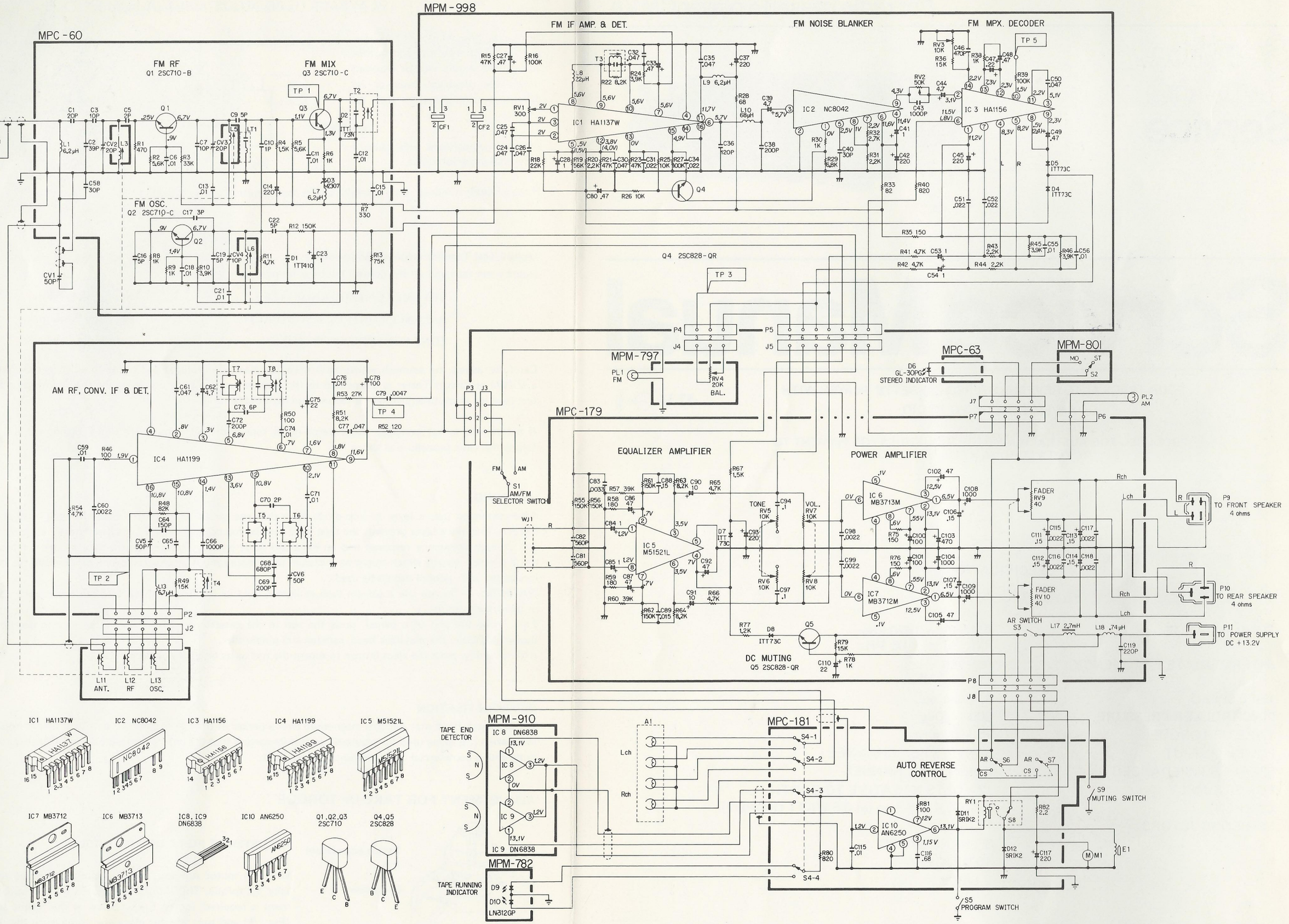


Fig. 3

ADJUSTMENT FOR TAKE UP TORQUE

With the motor running, use an appropriate gauge to measure the take up torque. This should be between 45 and 55 g-cm. If adjustment is required, loosen the set screw in the torque adjustment nut (Fig. 3) and turn the nut clockwise to increase the torque or anti-clockwise to decrease it. Tighten the set screw.

SCHEMATIC
CM 2



NOTES: 1. All resistance in ohms, K=10^3 M=10^6

2. All capacitance in μF, P=$\mu\mu$F

Fig. 4

3. DC voltages against chassis measured with 100k ohm/volt meter, power supply set at +13.2 VDC no signal input.

WIRING ON PC BOARD
CM 2

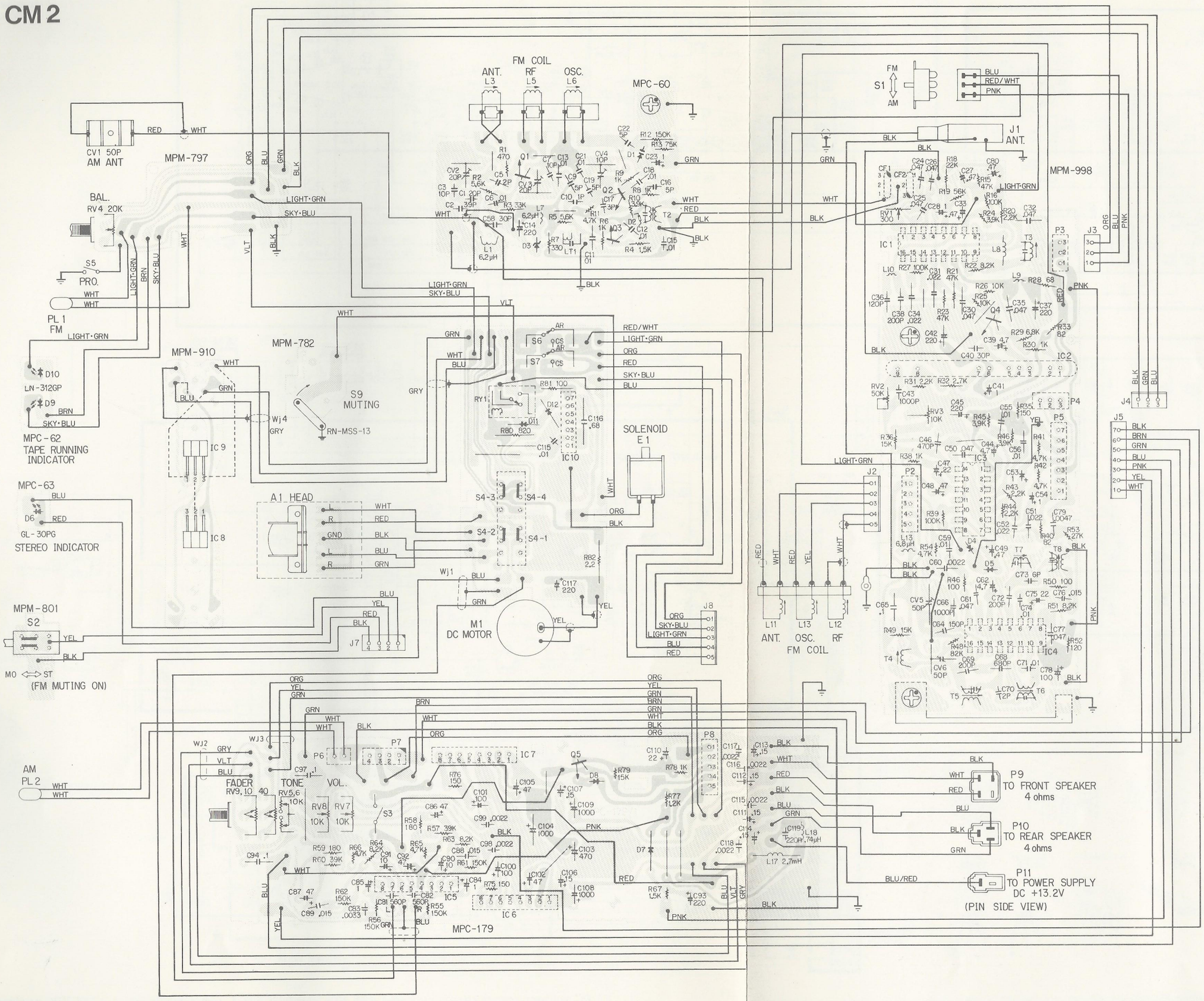


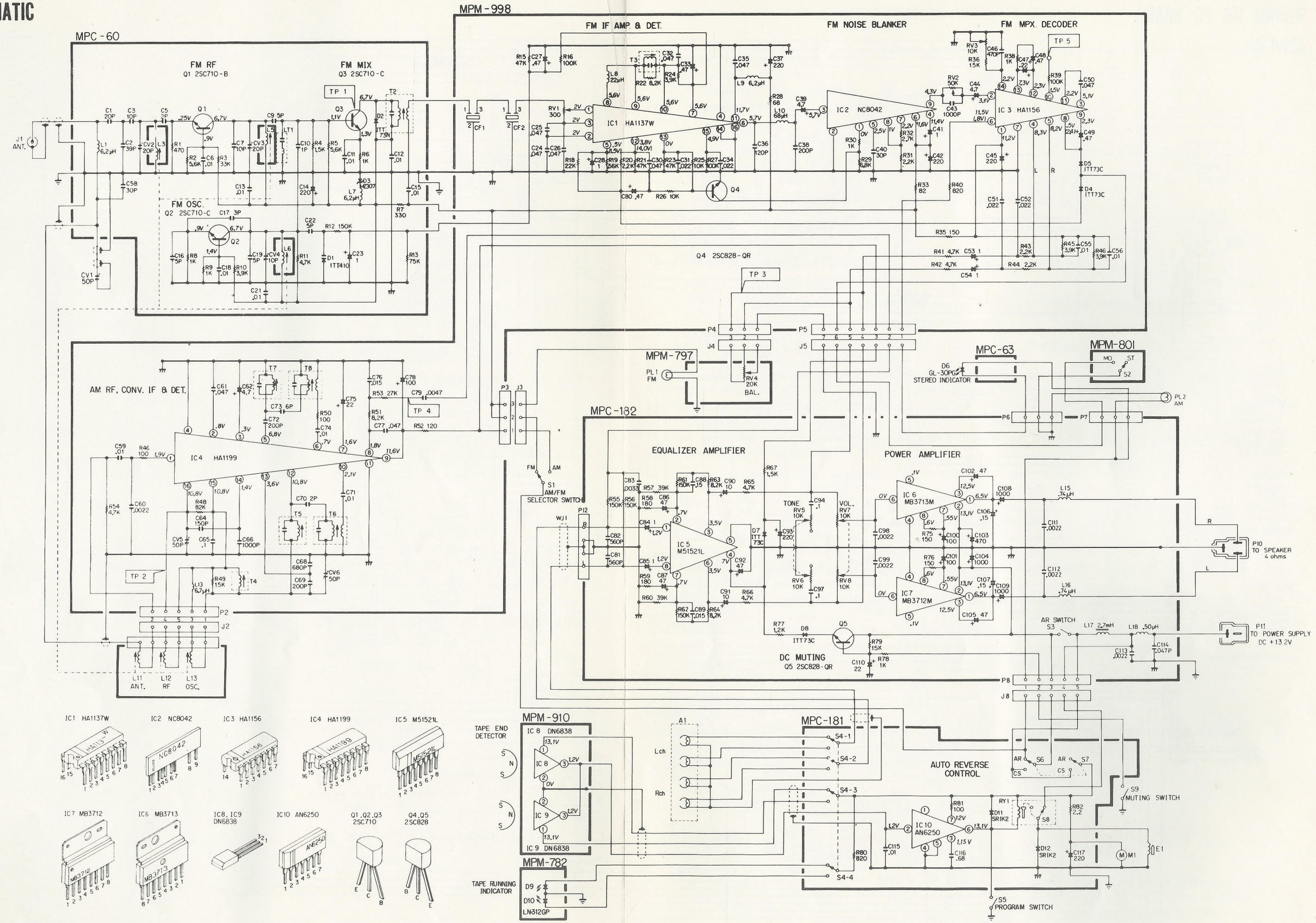
Fig. 5

Tr. No. \ Pin No.	B	C	E
Q 1	0.9V	6.7V	0.25V
Q 2	1.4V	6.7V	0.9V
Q 3	1.3V	6.7V	1.1V

( ) FM STEREO

Operation mode AM	FM	MC	S	IC No. \ Pin No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	○			IC 1	2.0V	2.0V	2.0V	0V	0.5V (1.5V)	5.7V	5.6V	5.6V	5.6V	5.6V	11.7V	3.8V (4.0V)	0V	0V	4.9V	0V
	○			IC 2	0V	0V	5.7V	11.4V	2.5V	11.6V	2.2V	1.0V	4.3V		2.2V	2.3V	2.3V	2.2V		
		○		IC 3	11.2V	3.1V	5.1V	8.3V	8.2V	11.5V (0.8V)	0V	0.5V (2.4V)	2.3V	1.5V	0V	10.8V	3.6V	1.4V	10.8V	10.8V
			○	IC 4	1.9V	0.8V	0.3V	0V	6.8V	0.7V	1.6V	1.8V	11.6V	2.1V						
		○	○	IC 5	1.2V	0.7V	3.5V	7.0V	0V	3.5V	0.7V	1.2V								
		○	○	IC 6, 7	6.5V	13.1V	12.5V	0V	0.1V	0V	0.55V	0.6V								
			○	IC 8, 9	13.1V	0V	1.2V													
			○	IC 10	2.3V	1.2V	1.15V	0V	0V	13.1V	12.0V	12.0V								

SCHEMATIC
CM 1



NOTES: 1. All resistance in ohms, K=10^3 M=10^6

2. All capacitance in μF, P=$\mu\mu$F

Fig. 6

3. DC voltages against chassis measured with 100k ohm/volt meter, power supply set at +13.2 VDC no signal input.

WIRING ON PC BOARD
CM1

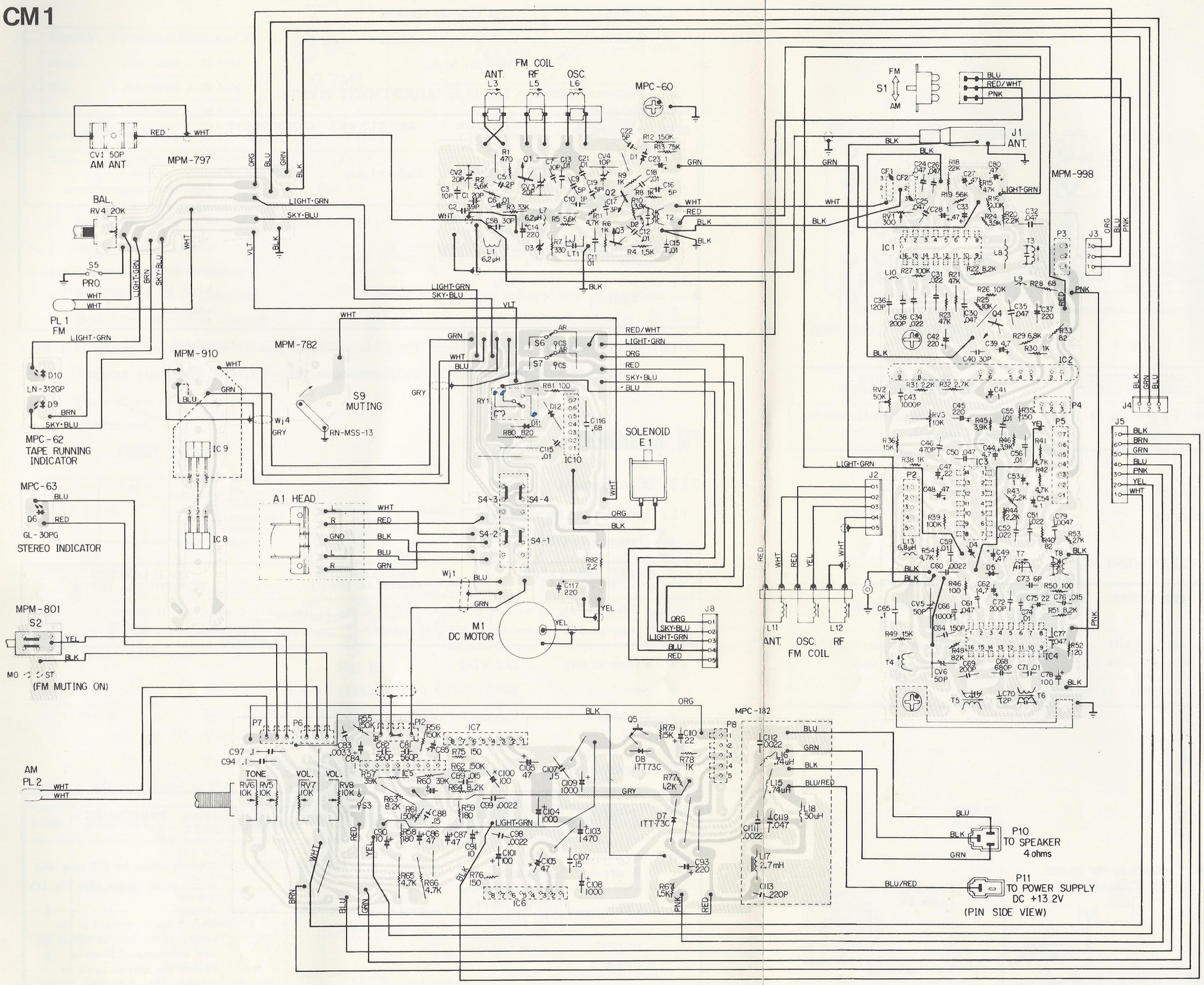


Fig. 7

Tr. No. \ Pin No.	B	C	E
Q 1	0.9V	6.7V	0.25V
Q 2	1.4V	6.7V	0.9V
Q 3	1.3V	6.7V	1.1V

Operation mode AM	FM	MCS	IC No. \ Pin No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	○		IC 1	2.0V	2.0V	2.0V	0V	0.5V (1.5V)	5.7V	5.6V	5.6V	5.6V	5.6V	11.7V	3.8V (4.0V)	0V	0V	4.9V	0V
			IC 2	0V	0V	5.7V	11.4V	2.5V	11.6V	2.2V	1.0V	4.3V	1.5V	2.2V	2.3V	2.3V	2.2V	10.8V	-10.8V
			IC 3	11.2V	3.1V	5.1V	8.3V	8.2V	11.5V (0.8V)	0V	0.5V (2.4V)	2.3V	2.1V	0V	10.8V	3.6V	1.4V	10.8V	-10.8V
		○	IC 4	1.9V	0.8V	0.3V	0V	6.8V	0.7V	1.6V	1.8V	11.6V							
		○	IC 5	1.2V	0.7V	3.5V	7.0V	0V	3.5V	0.7V	1.2V								
		○	IC 6, 7	6.5V	13.1V	12.5V	0V	0.1V	0V	0.55V	0.6V								
			IC 8, 9	13.1V	0V	1.2V													
		○	IC 10	2.3V	1.2V	1.15V	0V	0V	13.1V	12.0V	12.0V								

( ) FM STEREO

AM ALIGNMENT

〔1〕 IF Alignment

(1) Preparations for alignment

a. Connections

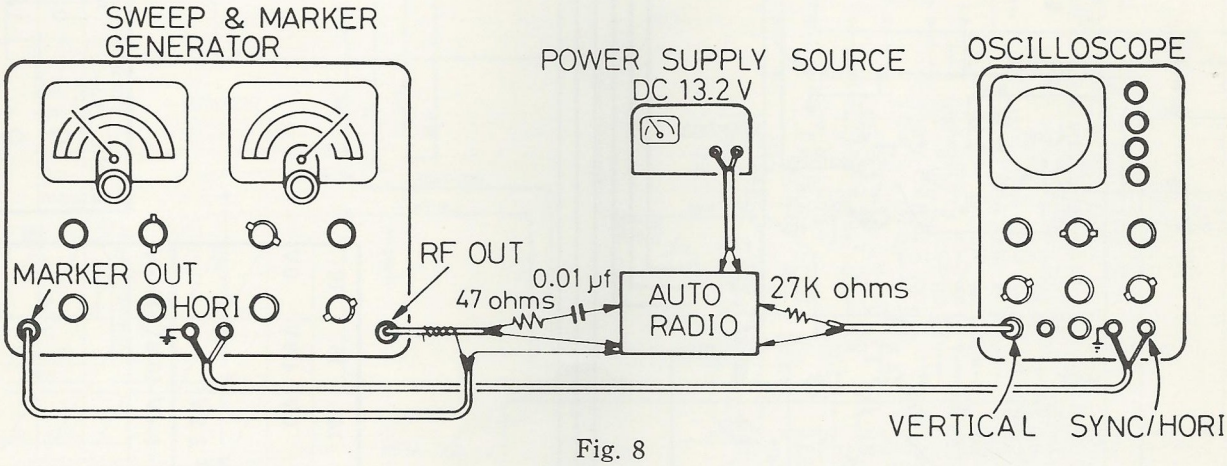


Fig. 8

SWEEP GENERATOR OUTPUT	OSCILLOSCOPE VERTICAL INPUT	OSCILLOSCOPE HORIZONTAL INPUT
Connect TP2 in Fig. 13 through 0.01 μF capacitor & 47 ohm resistor	Connect TP3 in Fig. 13 through 27k-ohm resistor	Connect with HORIZONTAL terminal of sweep generator

b. Power supply : 13.2 VDC

c. Switch : Band selector for AM

d. Controls : Volume for minimum
Tone for high

(2) Alignments (Refer to Fig. 13 for ADJUSTMENT POINTS.)

STEP	PURPOSE	SWEEP GENERATOR FREQUENCY	SET TUNER TO	ADJUSTMENT POINTS	PROCEDURE
1	IF	455 kHz	Near 1,000 kHz no signal exists	T_5 to T_8	Get maximum IF curve and best symmetry on both sides.
2	Repeat STEP 1 until no further gain in output can be obtained.				

〔2〕 Tracking Alignment

(1) Preparations for alignment

a. Connections

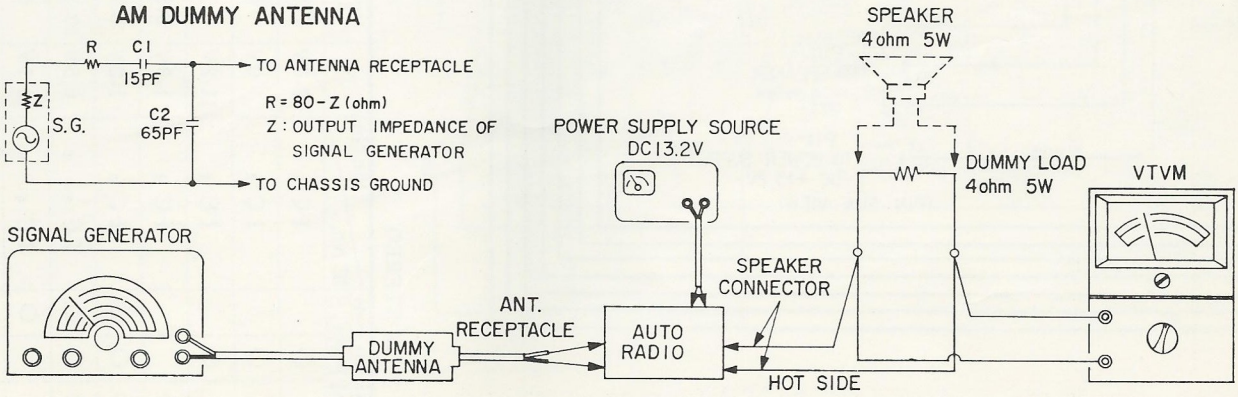


Fig. 9

b. Power supply : 13.2 VDC

c. Switch : Band selector for AM

d. Controls : Volume for maximum

Tone for high

(2) Alignment (Refer to Fig. 13 for ADJUSTMENT POINTS.)

STEP	PURPOSE	GENERATOR FREQUENCY	SET TUNER TO	ADJUSTMENT POINTS	PROCEDURE
1	Tuning range	1,640 kHz (400 Hz, 30%, AM modulated)	High-end stop	CV_6	Adjust for maximum meter indication.
2		505 kHz (400 Hz, 30%, AM modulated)	Low-end stop	T_4	
3	Repeat STEP 1 and 2 until no further gain in output can be obtained.				
4	Tracking	1,400 kHz (400 Hz, 30%, AM modulated)	Just tune in SG frequency	CV_1	Adjust for maximum meter indication.
5				CV_5	

NOTE: Always readjust antenna trimmer CV_1 when radio or antenna is reinstalled, tuning in a weak station around 1,400 kHz and get maximum volume.

FM ALIGNMENT

[1] IF Alignment

(1) Preparations for alignment

a. Connections (Refer to Fig. 8)

SWEEP GENERATOR OUTPUT	OSCILLOSCOPE VERTICAL INPUT	OSCILLOSCOPE HORIZONTAL INPUT
Connect TP1 in Fig. 13 through 0.01 μF capacitor & 47 ohm resistor	Connect TP3 in Fig. 13 through 27k-ohm resistor	Connect with HORIZONTAL terminal of sweep generator

b. Power supply : 13.2 VDC

c. Switch : Band selector for FM (FM)

d. Controls : Volume for minimum

Tone for high

(2) Alignment (Refer to Fig. 13 for ADJUSTMENT POINTS.)

STEP	PURPOSE	SWEEP GENERATOR FREQUENCY	SET TUNER TO	ADJUSTMENT POINTS	PROCEDURE
1	IF circuit	Center frequency varies according to the color of the ceramic filter (Refer to chart given below)	Near 98 MHz no signal exists	T_2, T_3	S-curve adjust for full gain and length of at linears. (See Fig. 11)
2					
3	Detector circuit				Keep S-curve straight at the center, and adjust waveform for best symmetry of S-curve against the axis as much as possible. (See Fig. 11)
4	Repeat STEP 1 to 3 until no further gain output can be obtained.				

COLOR	CENTER FREQUENCY
Black	10.64 MHz ± 30 kHz
Blue	10.67 MHz ± 30 kHz
Red	10.70 MHz ± 30 kHz
Orange	10.73 MHz ± 30 kHz
White	10.76 MHz ± 30 kHz

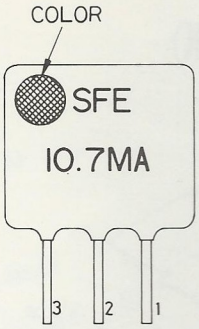


Fig. 10

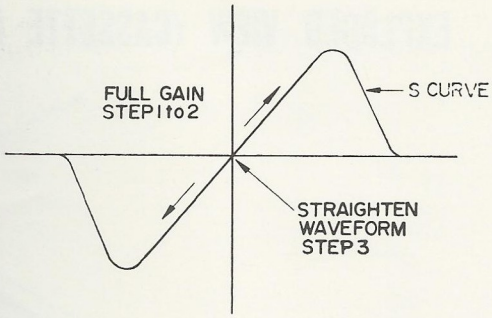


Fig. 11

(3) **Points to watch in replacing ceramic filter**

In the FM circuit there are two ceramic filters. It is important that both filter have the same color (i.e the same center frequency).

a. Readjustment is not necessary if a defective ceramic filter is replaced with one of the same color.

b. Both filters should be changed to the same color if one of them must be replaced with a different colored filter. Readjustment will be necessary because of the changed center frequency.

[2] Tracking alignment (Refer to Fig. 13 for ADJUSTMENT POINTS.)

(1) Preparations for Alignment

a. Connections

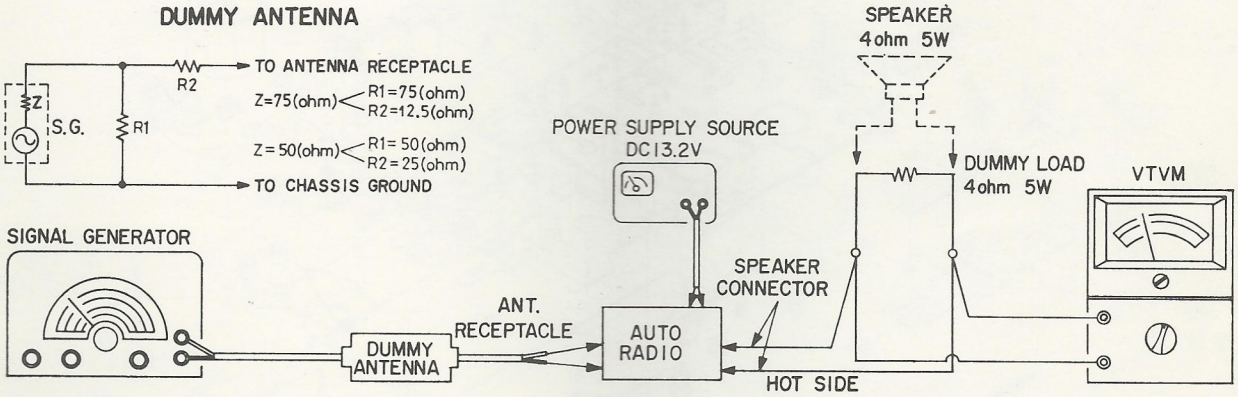


Fig. 12

b. Power supply : 13.2 VDC

c. Switch : Band selector for FM (FM)

d. Controls : Volume for maximum
Tone for high

(2) Alignment (Refer to Fig. 13 for ADJUSTMENT POINTS.)

STEP	PURPOSE	GENERATOR FREQUENCY	SET TUNER TO	ADJUSTMENT POINTS	PROCEDURE
1	Tuning range	87.5 MHz (400 Hz, 30%, FM modulated)	Low-end stop	CV 4	Adjust for maximum meter indication.
2		109 MHz. (400 Hz, 30%, FM modulated)	High-end stop		108.5 MHz must be received.
3	Tracking	98 MHz (400 Hz, 30%, FM modulated)	Just tune in SG frequency	CV 2	Adjust for maximum meter indication.
4				CV 3	

LIMITING SENSITIVITY ADJUSTMENT

For Test set up refer to Fig. 8.

a) Set up the signal generator to 100 MHz. 94 dB. (400 Hz 30% modulated) 0 db = 1 V
b) Tune the receiver to 100 MHz and adjust the tone control for maximum treble.
c) Adjust the volume control to give an output of 0.5 W (1.4 V into 4 ohms)
d) Reduce the signal generator output to 13 dB
e) Adjust RV1 to reduce the receiver output by 3 dB to .25 W (1 V)

With the above adjustment completed, noise output should be approximately 1 V with no signal input and the volume and tone controls at maximum.

NOTE: The receiver will not operate with RV1 turned fully clockwise.

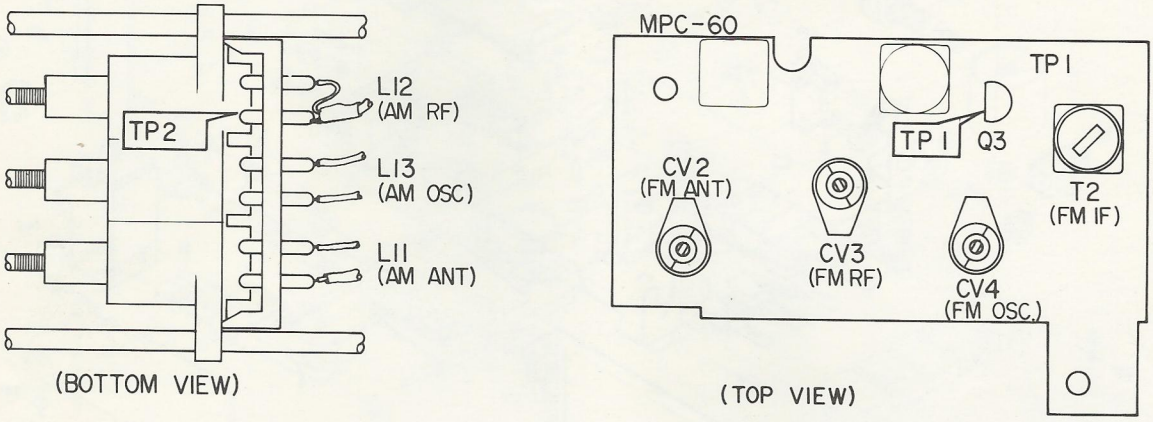
STEREO DETECTOR ADJUSTMENT

Connect a frequency counter to TP5 (Fig. 13) and adjust RV3 to obtain a reading of 19 kHz ± 100 Hz. If a frequency counter is not available, tune in to an FM stereo broadcast and adjust RV3 until the stereo indicator lights up. Continue adjusting RV3 in the same direction until the L.E.D. goes out and then set RV3 to the mid position of the lighting range.

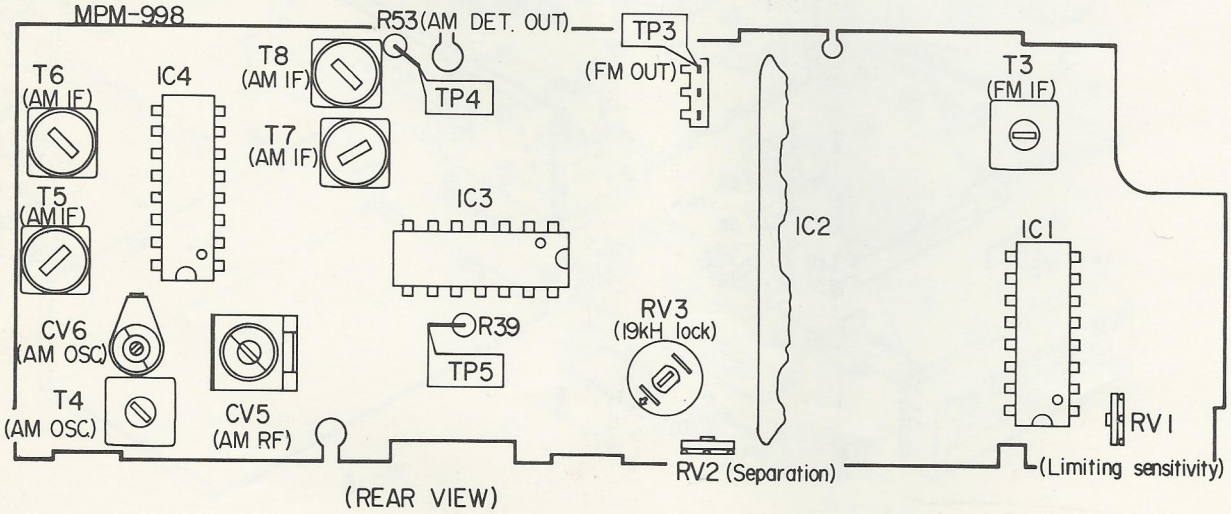
SEPARATION ADJUSTMENT

a) Connect an FM stereo signal generator to the radio (as per Fig. 12). Set it to no signal for the L.H. Channel and 1 kHz 30% modulated for the R.H. Channel. Increase the output of the signal generator until the stereo L.E.D. lights up.
b) Connect a voltmeter to TP3 and adjust RV2 to obtain the minimum reading.

If a signal generator is not available, tune in to a stereo broadcast and use headphones to gauge the maximum stereo effect which can be obtained by adjusting RV2.



(a)



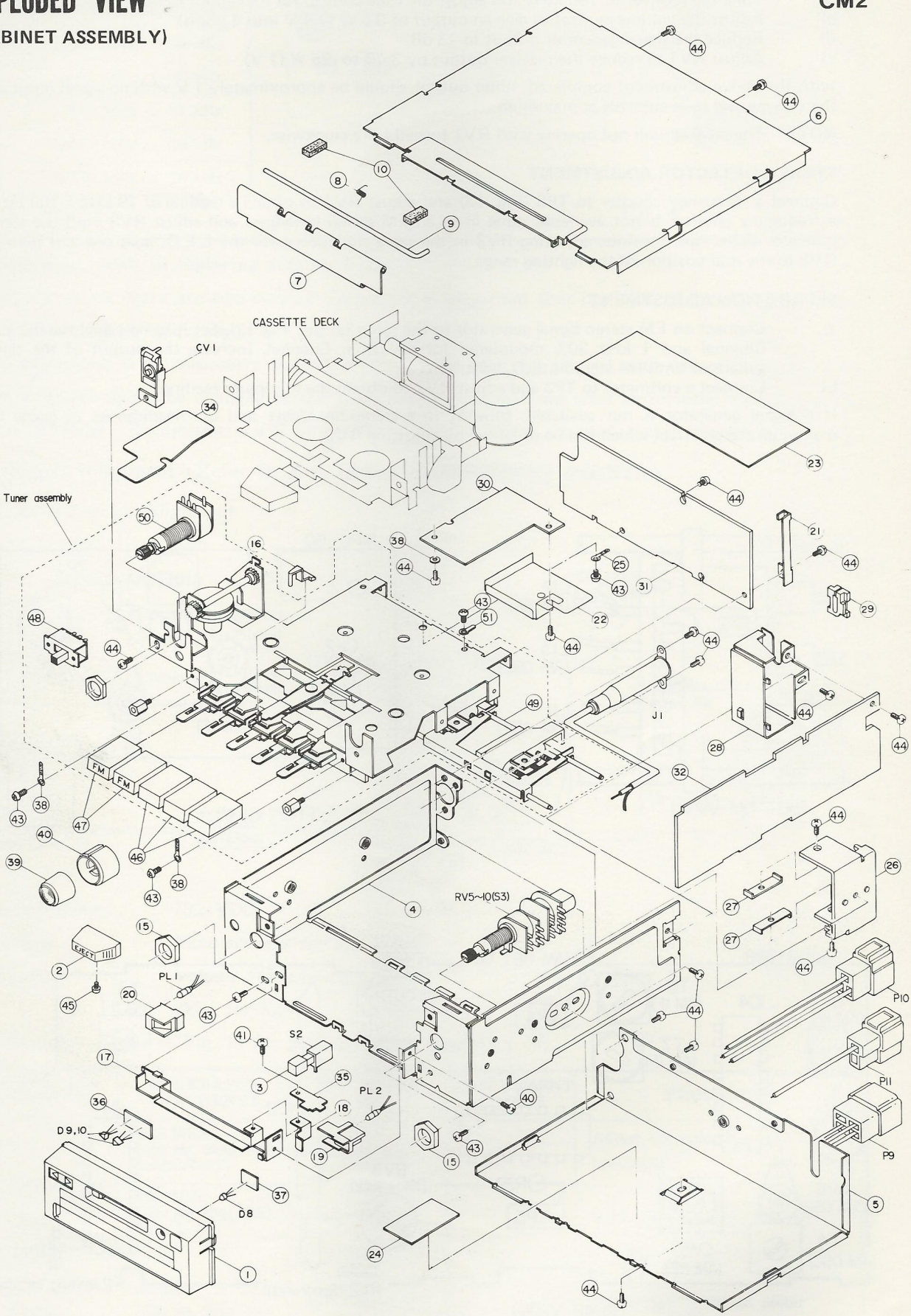
(b)

Fig. 13 (ADJUSTMENT POINTS.)

EXPLODED VIEW

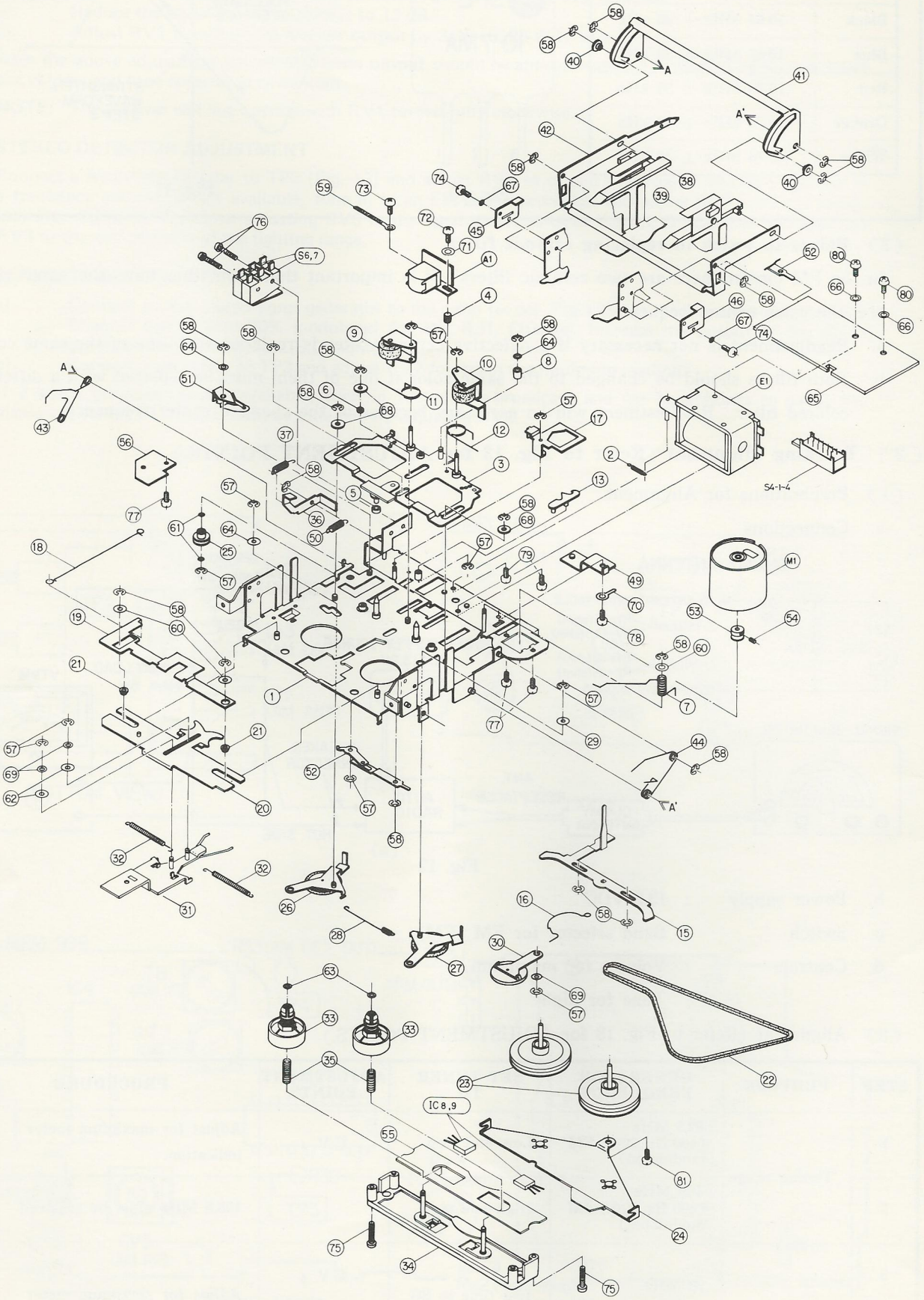
(CABINET ASSEMBLY)

CM2



Note: The CM 1 exploded view is the same as CM 2 above except that it has a different Vol-Tone Control and the P9 Wiring Plug is not required.

EXPLODED VIEW (CASSETTE DECK)



PARTS LIST

REF. NO.

CAPACITORS

Note: All capacitors are standard ceramic, mylar or polycarbonate types unless specified otherwise.

DESCRIPTION				SERVICE CODE
C14	220μF	10V	ELECTRO	4802 124 47006
C23	1μF	50V	ELECTRO	4802 124 47037
C27	.47μF	50V	ELECTRO	4822 124 20585
C28	1μF	50V	ELECTRO	4802 124 47037
C33	.47μF	50V	ELECTRO	4822 124 20585
C37	220μF	16V	ELECTRO	4802 124 47018
C39	4.7μF	25V	ELECTRO	4802 124 47034
C41	1μF	50V	ELECTRO	4802 124 47037
C42,45	220μF	16V	ELECTRO	4802 124 47018
C44	4.7μF	25V	ELECTRO	4802 124 47034
C49	.47μF	50V	ELECTRO	4822 124 20585
C53,54	1μF	50V	ELECTRO	4802 124 47037
C62	4.7μF	25V	ELECTRO	4802 124 47034
C75	22μF	16V	ELECTRO	4802 124 47021
C78	100μF	16V	ELECTRO	4802 124 47049
C80	.47μF	50V	ELECTRO	4822 124 20585
C84,85	1μF	50V	ELECTRO	4802 124 47037
C86,87,92	47μF	10V	ELECTRO	4802 124 47016
C90,91	10μF	16V	ELECTRO	4802 124 47044
C93	220μF	10V	ELECTRO	4802 124 47006
C100,101	100μF	10V	ELECTRO	4822 124 20462
C102	47μF	10V	ELECTRO	4802 124 47016
C103	470μF	16V	ELECTRO	4802 124 47024
C104	1000μF	16V	ELECTRO	4802 124 47051
C105	47μF	10V	ELECTRO	4802 124 47016
C106,107	.15μF	25V	ALOX	4822 124 14061
C108,109	1000μF	10V	ELECTRO	4802 124 47003
C110	22μF	16V	ELECTRO	4802 124 47021
CV1	5-50pF	AM TRIMMER		4802 125 57074
CV2-3	2.5-22.5pF	FM TRIMMER		4802 125 57039
CV4	2-12pF	Osc. TRIMMER		4802 125 57037
CV5	5-55pF	AM Osc. TRIMMER		4802 125 57038
CV6	10-50pF	AM R.F. TRIMMER		4802 125 57075

RESISTORS

Note: All resistors are standard values and tolerances unless specified otherwise.

RV1	300 ohms	Limiting Sensitivity	4802 100 17046
RV2	50 K ohms	Stereo Separation	4802 100 17047
RV3	10 K ohms	Stereo Detector	4802 100 17048
RV4	20 K ohms	(including Tuning Shaft)	4802 535 77156
RV(5-8)S3 For CM1	Tone + Vol + Switch		4802 102 27087
RV(5-10)S3 For CM2	Tone + Vol + Fader + Switch		4802 102 27088

IC's

IC1	HA1137W	4822 209 80378
IC2	NC8042	4802 209 87277
IC3	HA1156	4802 209 87075
IC4	HA1199	4802 209 87122
IC5	M51521L	4802 209 87107
IC6	MB3713M	4802 209 87259
IC7	MB3712M	4802 209 87278
IC8.9	DN6838	4802 209 87209
IC10	AN6250	4802 209 87185

DIODES

D1	iTT410	4802 130 37163
D2	iTT73N (Use IN 914)	5322 130 30009
D3	MZ307	4822 130 30378
D4,5,7,8	iTT73C	4802 130 37033
D6	GL30PG	4802 130 37095
D9,10	LN312GP (Led)	4802 130 37189
D11,12	SR1K	4802 130 37022

TRANSISTORS

Q1	2SC710B (Use BF494)	5322 130 44195
Q2,3	2SC710C (Use BF494)	5322 130 44195
Q4	2SC828R (Use BC547)	4822 130 40965
Q5	2SC828QR	4822 130 40965

TRANSFORMERS

T2	1st FM IF	4802 153 57056
T3	2nd FM IF	4802 153 57077
T4	AM Osc.	4802 156 27084
T5,6	1st AM IF	4802 153 17165
T7,8	2nd AM IF	4802 153 17166

COILS AND CERAMIC FILTERS

LT1	COIL. IF TRAP	4802 153 57126
L1	CHOKE 6.2 μH	4802 158 17103
L7	CHOKE 6.2 μH	4802 158 17103
L8	CHOKE 22 μH	4802 158 17225
L9	CHOKE 6.2 μH	4802 158 17103
L10	CHOKE 68μH	4802 158 17098
L13	CHOKE 6.8μH	4802 158 17205
L15,16	CHOKE .74 μH	4802 158 17077
L17	FILTER 2.7 mH	4802 158 17076
L18	FILTER 50 μH	4802 158 17042
CF1, CF2	CERAMIC FILTER	4802 242 77006

MISCELLANEOUS ELECTRICAL

	TUNER ASSEMBLY, (Includes COILS, P.BUTTONS, SLIDE-SWITCH AND TUNING SHAFT ASSY	4802 210 17107
	PUSH BUTTON AM	4802 411 67099
	PUSH BUTTON FM	4802 411 67101
	TUNING SHAFT (Includes RV4 & S5)	4802 535 77156
A1	PLAYBACK HEAD	4802 249 37011
E1	SOLENOID ASSY	4802 381 57012
M1	MOTOR	4802 361 27046
J1	RECEPTACLE, ANTENNA	4802 267 17014
J2	5P CONNECTOR & LEAD ASSY	4802 321 27207
J3	3P CONNECTOR & LEAD ASSY	4802 321 27208
J4	3P CONNECTOR & LEAD ASSY	4802 321 27209
J5	7P CONNECTOR & LEAD ASSY	4802 321 27211
J8	5P CONNECTOR & LEAD ASSY	4802 321 27212
PL1,2	LAMP	4802 134 47101
S2,3	PUSH SWITCH (MONO-STEREO)	4802 277 67037
S4	PUSH SWITCH PROGRAM	4802 277 67038
S6,7	MICRO SWITCH	4802 271 37008
RY1	RELAY (Includes S8)	4802 280 87005

MISCELLANEOUS MECHANICAL

1	ESCUTCHEON (Includes Dialplate)	4802 459 57068
2	BUTTON STOP/EJECT	4802 410 27227
3	BUTTON STEREO/MONO	4802 410 27228
4	FLAP (Cassette Door)	4802 423 47072
16	POINTER	4802 450 87118
18	FILTER (PL2 GREEN)	4802 480 37203

CASSETTE DECK

2	SPRING (PLUNGER)	4802 492 37384
4	SPRING (AZIMUTH)	4802 492 37385
7	SPRING (SLIDE PLATE)	4802 492 37386
9	PINCHROLLER ASSY (L)	4802 403 47032
10	PINCHROLLER ASSY (R)	4802 403 47034
11	SPRING (PINCHROLLER L)	4802 492 37387
12	SPRING (PINCHROLLER R)	4802 492 37388
16	SPRING	4802 492 37389
22	BELT	4802 358 37051
23	FLYWHEEL & CAPSTAN	4802 528 67065
26	IDLER MEC HANISM (L)	4802 403 47043
27	IDLER MECHANISM (R)	4802 403 47039
28	SPRING (For Item 26,27)	4802 492 37391
30	IDLER MECHANISM	4802 403 47044
32	SPRING	4802 492 37392
33	SLIP MECHANISM	4802 528 17147
35	SPRING	4802 492 37393
37	SPRING	4802 492 37394
38	CASSETTE GUIDE (L)	4802 403 57169
39	CASSETTE GUIDE (R)	4802 403 57171
43	SPRING (Item 42L)	4802 492 37395
44	SPRING (Item 42 R)	4802 492 37396
50	SPRING	4802 492 37397
53	PULLEY	4802 528 87088
55	P.C. BOARD (HALL IC)	4802 214 57097
57	"E" RING 1.5mm	4822 530 70121
58	"E" RING 2 mm	4822 530 70122
66	WASHER 3mm	4822 530 80075
67	WASHER 2mm	4822 532 10331
74	SCREW 2 x 4 mm	4822 502 11059
78	SCREW 2.6 x 4 mm	4822 502 11084
80	SCREW 3 x 5 mm	4822 502 10558

NOTE: When using substitute semiconductors check the base connections before assembling to the PW Board.