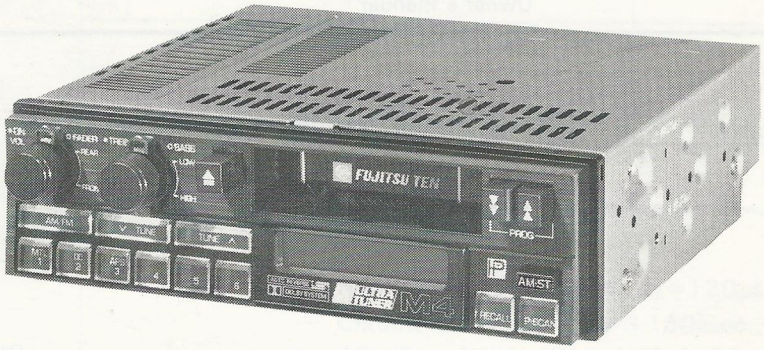
CE-6236 EX1

# FUJITSU TEN SERVICE MANUAL

## AM-FM MPX. RADIO WITH ELECTRONIC TUNER and CASSETTE TAPE PLAYER

## Model M4 (CE-6236EX1)




## TABLE OF CONTENTS


| | PAGE |
|---|---|
| COMPOSITIONS | 2 |
| CONNECTIONS | 2 |
| SPECIFICATIONS | 3 |
| HOOK-UP • PLAYBACK HEAD ADJUSTMENT | 4 |
| SCHEMATIC | 5, 6 |
| WIRING ON PC BOARD | 7, 8 |
| EXPLODED VIEW | 9, 10 |
| ALIGNMENT | 11–13 |
| REPLACEMENT PARTS LIST | 14–18 |



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**FUJITSU TEN LIMITED**

# COMPOSITION

| Stock No. | Description | Q'ty |
|---|---|---|
| CE-6236 | Main unit | 1 |
| RN-MDP-1590 | Escutcheon | 1 |
| RN-MBE-1745 | Bracket | 2 |
| RN-MBE-1746 | Bracket | 1 |
| RN-MBF-11 | Bracket | 1 |
| RN-EWJ-1744 | Wiring sub-assembly | 1 |
| RN-EWJ-3382 | Wiring sub-assembly | 2 |
| RN-EWJ-3408 | Wiring sub-assembly | 1 |
| RN-MSC-1425 | Spring | 2 |
| RN-MBW-C5×10S | Bolt with washer, 5×10mm | 1 |
| RN-MBW-C5×20S | Bolt with washer, 5×20mm | 1 |
| RN-MNR-D5S | Nut, 5mm | 2 |
| RN-MTN-A6×16 | Screw, 6×16mm | 1 |
| RN-MET-1328 | Special screw | 1 |
| F6-SSA-5×8S | Screw, 5×8mm | 4 |
| RN-MZF-4832 | Case | 1 |
| RN-MXK-1003 | Owner's manual | 1 |

# CONNECTIONS

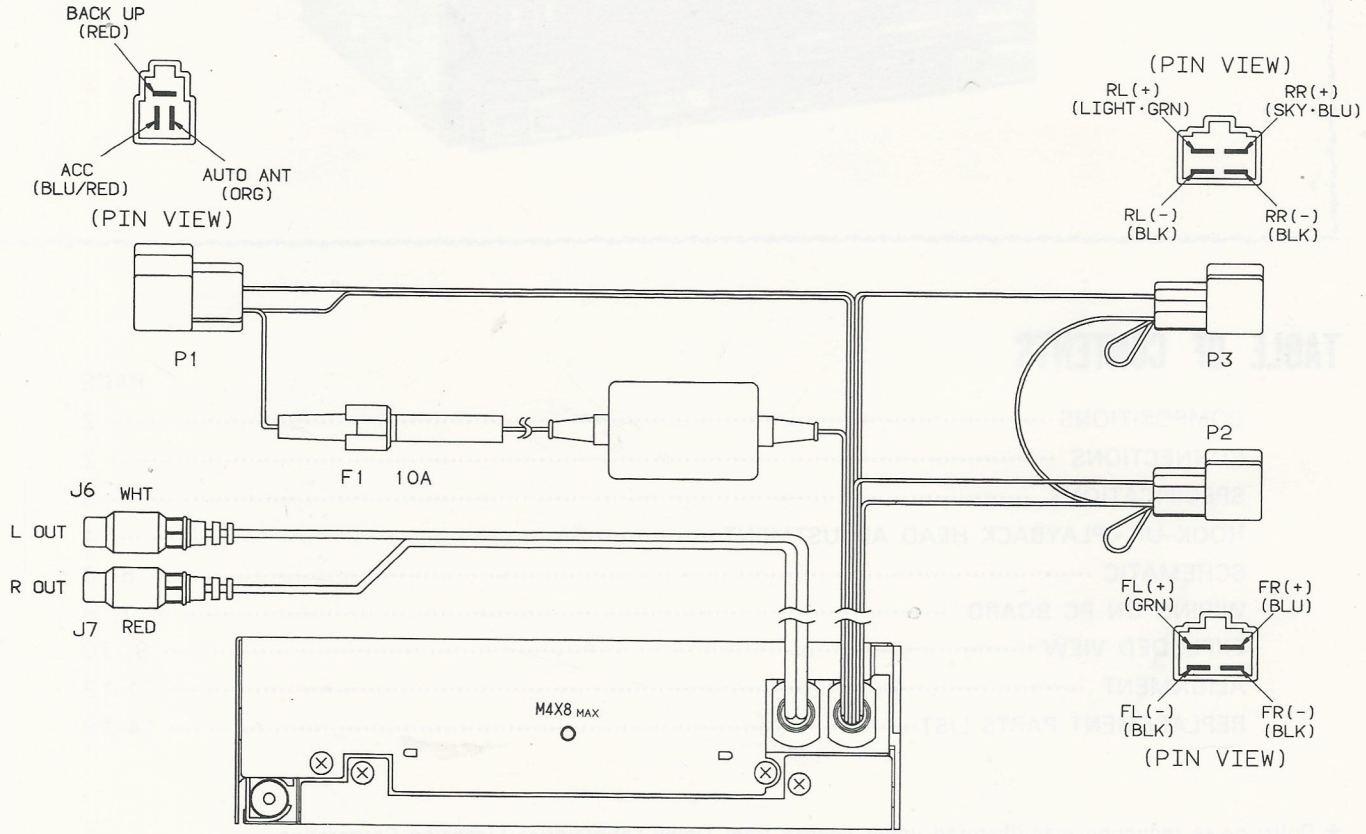
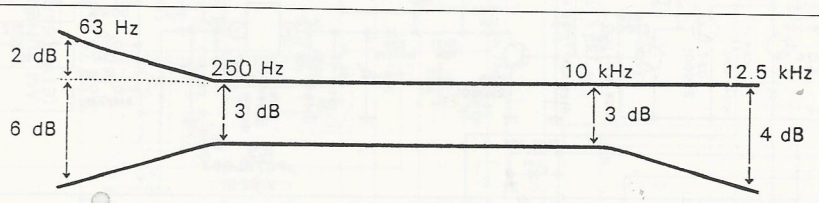
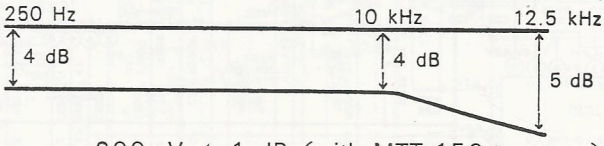



Fig. 1

# SPECIFICATIONS

**SM-619**
**〔CE-6236EX1〕 M4**

| ITEM | M 4 (CE-6236EX1) | |
|---|---|---|
| (RADIO SECTION) | 〔AM〕 | 〔FM〕 |
| TUNING RANGE | 531 to 1611 kHz (9 kHz step) | 87.5 to 108 MHz (100 kHz step) |
| INTERMEDIATE FREQUENCY | 450 kHz | 10.7 MHz |
| SENSITIVITY | 35 dBμ or better | |
| SENSITIVITY AT ELECTRONIC TUNING | Distant: 32 ± 6 dBμ | Distant: 20 ± 6 dBμ |
| LIMITING SENSITIVITY | | 8 ± 6 dBμ |
| SEPARATION | 18 dB or better (at 1 kHz) | 20 dB or better (at 1 kHz) |
| ELECTRICAL FIDELITY | 100 Hz: 0 ± 3 dB<br>(74 dBμ input, Refer. 400 Hz)<br>4 kHz: −10 ± 4 dB<br>(74 dBμ input, Refer. 400 Hz) | 100 Hz: 0 ± 3 dB<br>(54 dBμ input, Refer. 400 Hz)<br>10 kHz: −15 ± 5 dB<br>(54 dBμ input, Refer. 400 Hz) |
| (CASSETTE DECK SECTION) | | |
| NUMBER OF TRACKS | 4-track 2-channels | |
| TAPE CARTRIDGE | Stereo/Monaural compact cassette | |
| TAPE SPEED | 4.76 cm/sec. (1-7/8″, i.p.s.) | |
| WOW & FLUTTER | 0.3% or less (WRMS) | |
| CROSSTALK | 40 dB or better | |
| SEPARATION | 25 dB or better | |
| FREQUENCY RESPONSE |  | |
| EQUALIZATION | Normal: $t_1$=3,180μsec., $t_2$=120μsec.<br>Chrome and metal: $t_1$=3,180μsec., $t_2$=70μsec. | |
| SIGNAL TO NOISE RATIO | 46 dB or better (With MTT-112B test tape) | |
| TAKE-UP TORQUE | 40 to 75 g-cm | |
| DOLBY PROCESSOR FREQUENCY RESPONSE | Level −25 dB and −40 dB<br>  | |
| DOLBY NR LEVEL | 300mV ± 1 dB (with MTT-150 test tape) | |
| (COMMON SECTION) | | |
| LOAD IMPEDANCE | 10k ohm (RCA termi.)<br>4 ohm (Speaker termi.) | |
| OUTPUT POWER | 5 watts×4 (THD=10%) | |
| OUTPUT VOLTAGE | 315 mV (Test tape: −10 dB, 1 kHz RCA termi.) | |
| POWER INPUT | 12-volt car battery, negative terminal to ground | |
| VOLTAGE | 13.2 VDC | |
| CURRENT | Approx. 2.4 ampere (1 watt×4)<br>Approx. 6.2 ampere (Max.) | |
| SEMICONDUCTOR | 13 ICs, 40 Transistors, 32 Diodes | |
| DIMENSIONS | 178(W)×50(H)×150(D)mm (7″, 1-31/32″, 5-29/32″) | |
| WEIGHT | Unit—1.6 kg (3.5 lbs.) | |

# HOOK-UP

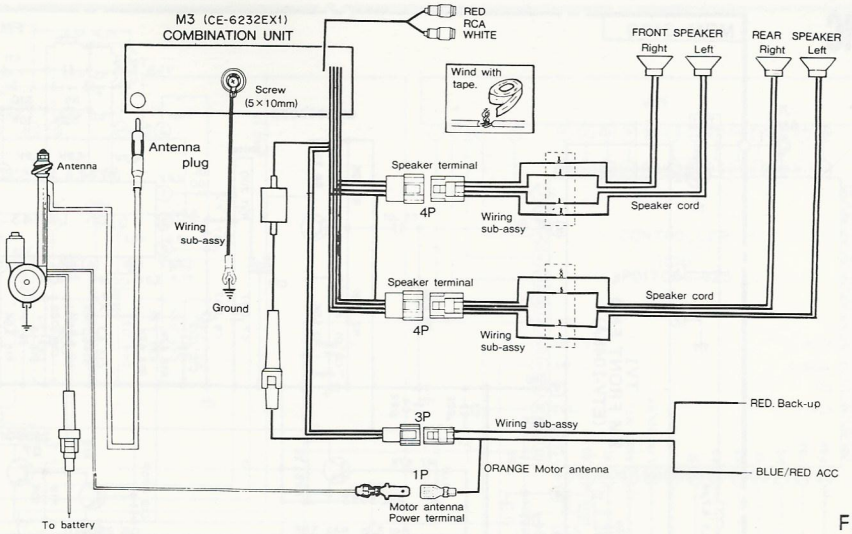



Fig. 2

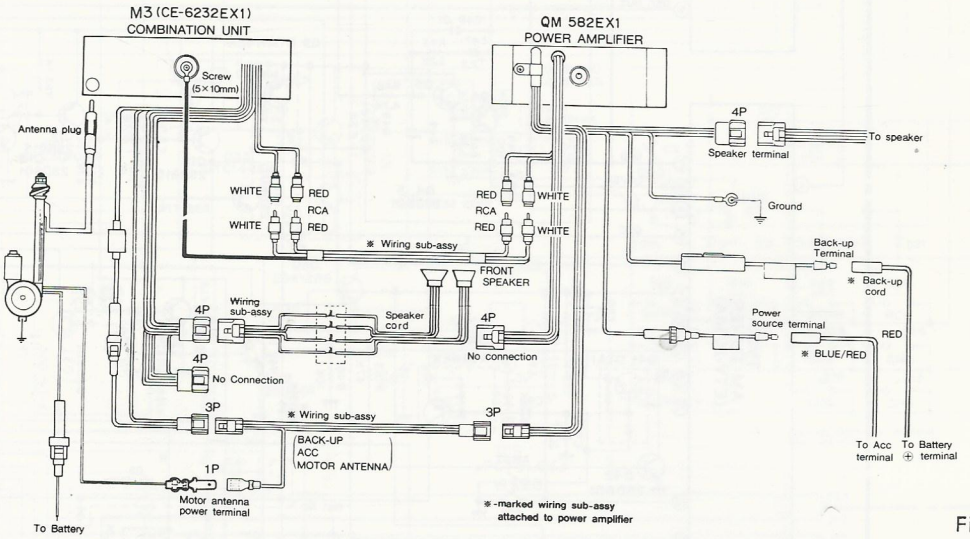



Fig. 3

# PLAYBACK HEAD ADJUSTMENT (Azimuth)

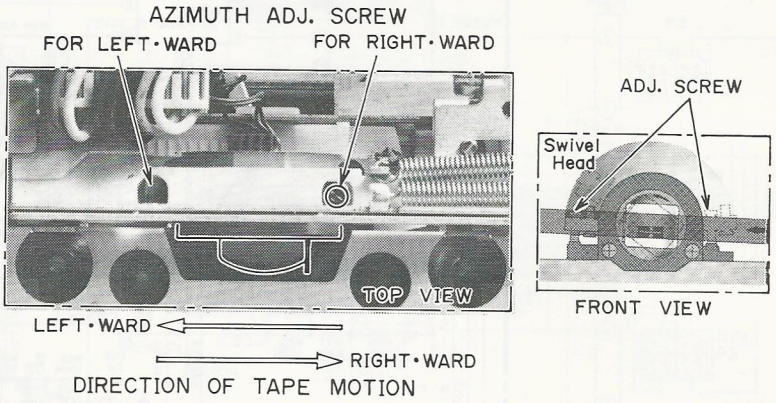



Fig. 4

Normally the playback head is precisely aligned at the factory and further adjustment should not be required unless the playback head or its mounting components are replaced. Beware of excessive adjustment. because improper adjustment results in inferior performance. If the azimuth is unnecessarily varied, the angle gets out of order, which cause lowering of tonal quality. Carefully adjust the azimuth adjust screw as shown in Fig. 4. Always use the test tape for azimuth adjustment because improper adjuustment would cause bad effect on the Dolby level adjustment. Dolby level should be readjusted after azimuth adjustment.

a. Connections : Refer to Fig. 9.

b. Power supply : 13.2 VDC

c. Test tape : MTT-114N (10 kHz, −10 dB Full track recording)

**Alignment Prodedure**

Insert a test tape for the azimuth adjustment and drive the screw a little once.

Adjust the playback head so as to get equal and maximum output or right and left channel in either track, loosening the screw.

# EXPLODED VIEW

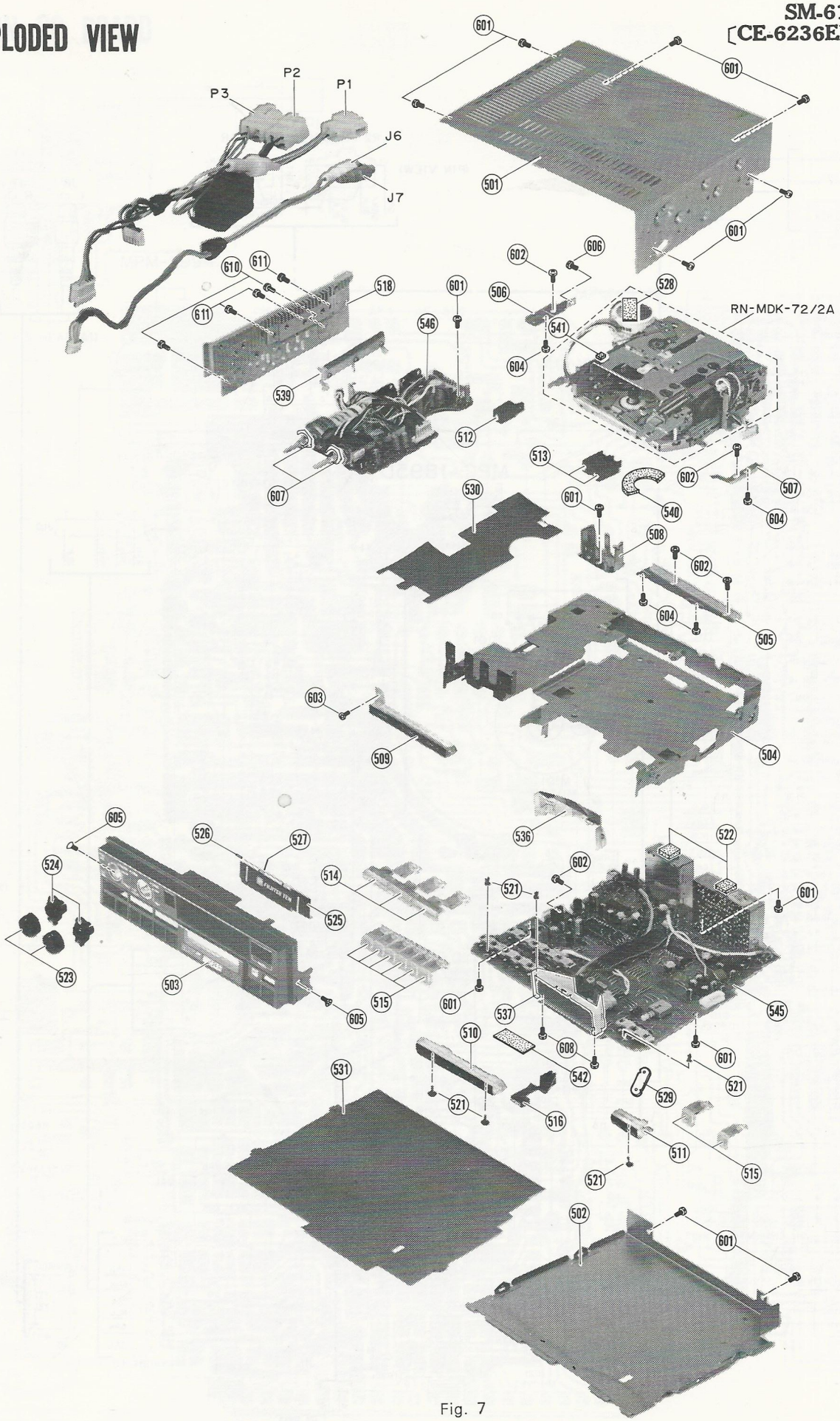



Fig. 7

NOTE : Printed circuit board does not include component parts to be mounted.

# EXPLODED VIEW (CASSETTE DECK) MDK-72/2A

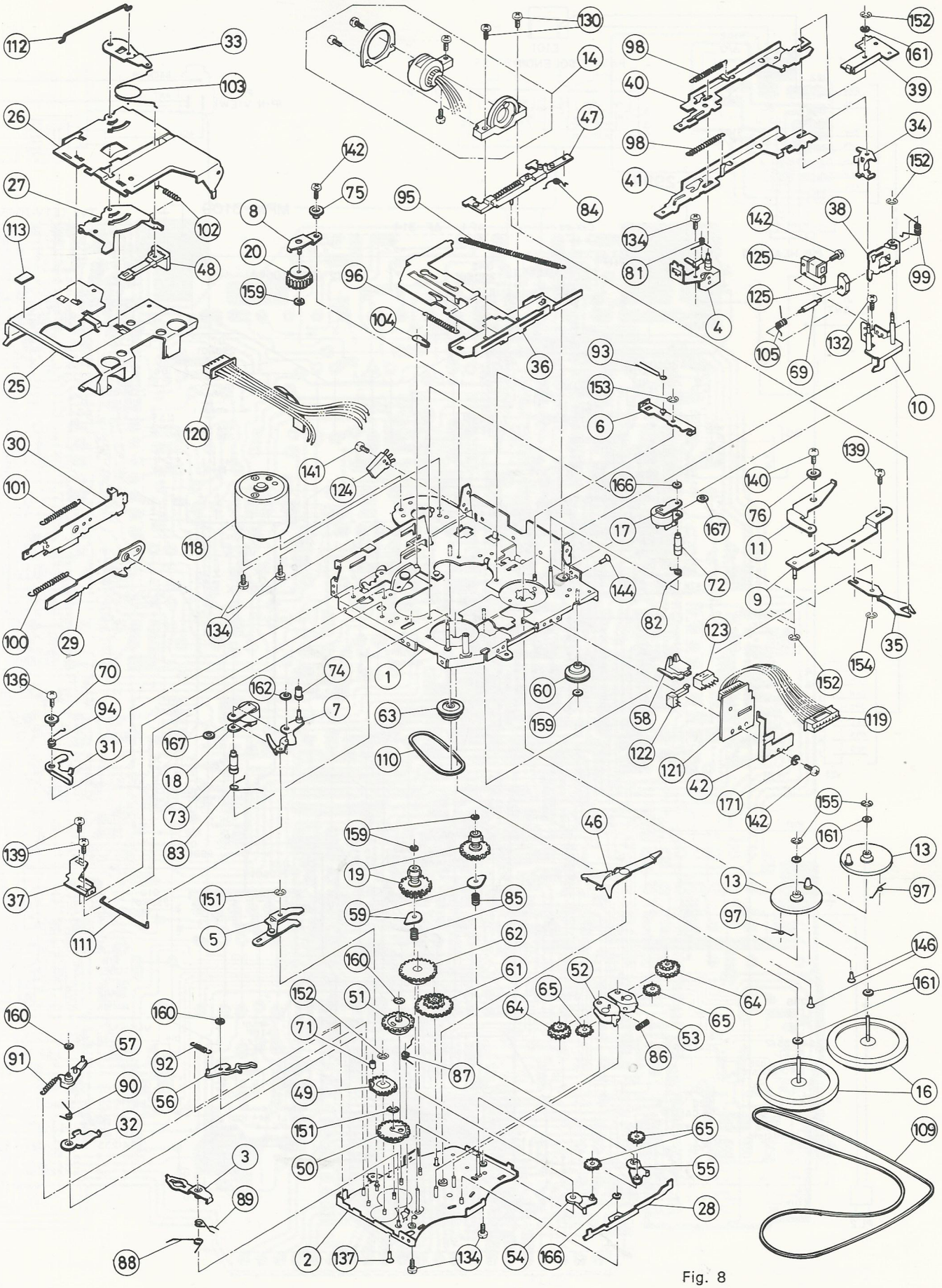



Fig. 8

# FM ALIGNMENT

Standard adjustment condition

a. Power supply ·····13.2V
b. AM/FM changing switch ·····FM
c. DX switch ·····ON
d. Balance ·····Center
e. Bass/treble ·····Center
f. Volume ····· Adjust to get 1.4V output level.
g. Connections

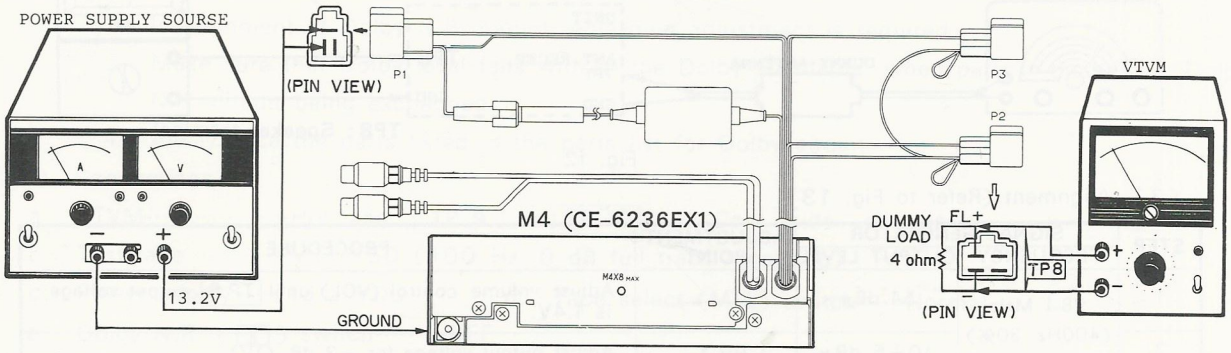



Fig. 9

〔1〕 IF Alignment

(1) Connections

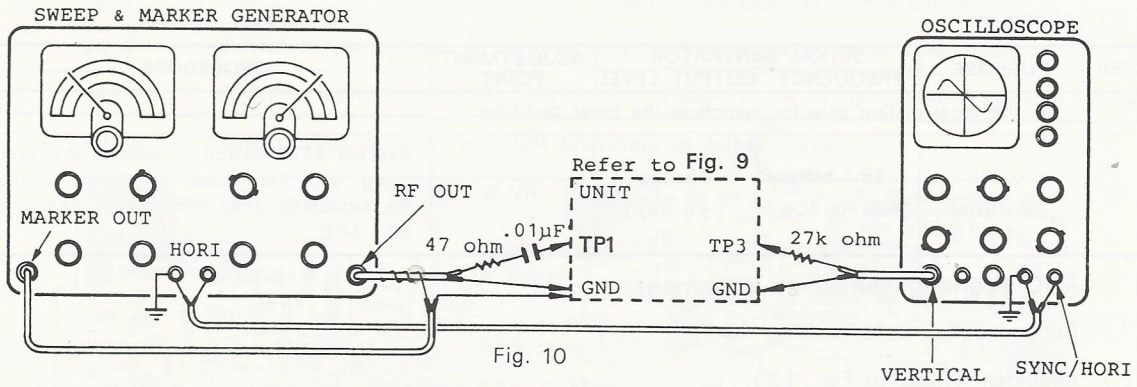



Fig. 10

| SWEEP GENERATOR OUTPUT | OSCILLOSCOPE VERTICAL INPUT | OSCILLOSCOPE HORIZONTAL INPUT |
|---|---|---|
| Antenna receptacle (J1) [TP 1] | Connect [TP 3] in Fig. 13 through 27K-ohm resistor | Connect with HORIZONTAL terminal of sweep generator |

(2) Alignment (Refer to Fig. 13)

| STEP | PURPOSE | SWEEP GENERATOR FREQUENCY | ADJUSTMENT POINTS | PROCEDURE |
|---|---|---|---|---|
| 1 | S curve | 10.7 MHz | T 1 | Adjust for full gain and length of s-curve at linears. (See Fig. 11) |
| 2 | S curve (Center) | SG 10.7 MHz (400 Hz, 30%) | | Fine-adjust the potential difference between IC 1 ⑦ and ⑬ pins for 0V. |

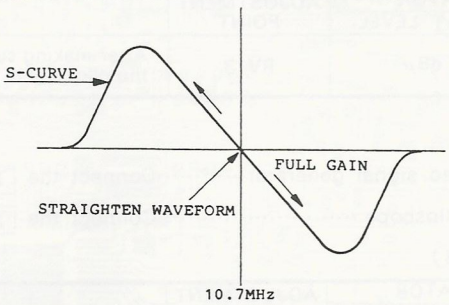



Fig. 11

NOTE: S curve center can be adjusted in the same manner by receiving local FM broadcast near 98.1 MHz.

## [2] Limiting sensitivity alignment

(1) Connections

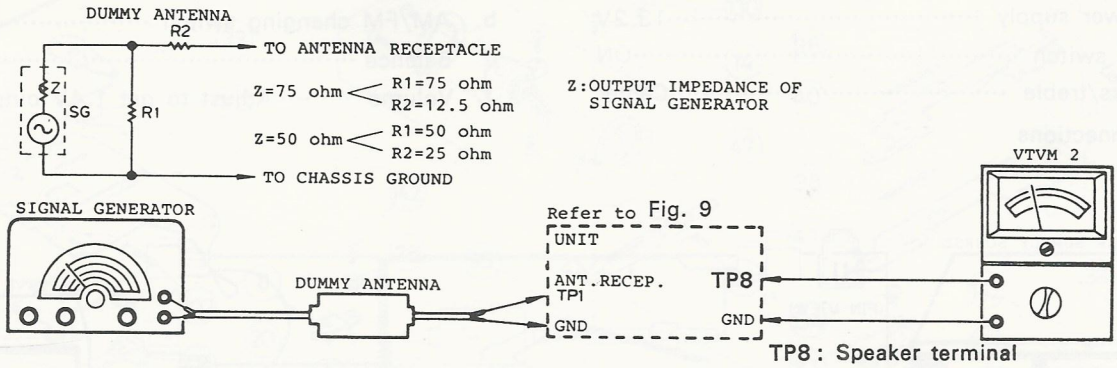



Fig. 12

(2) Alignment (Refer to Fig. 13)

| STEP | SIGNAL GENERATOR FREQUENCY | SIGNAL GENERATOR OUTPUT LEVEL | ADJUSTMENT POINT | PROCEDURE |
|---|---|---|---|---|
| 1 | 98.1 MHz (400Hz, 30%) | 54 dBμ | ——— | Adjust volume control (VOL) until TP 8 output voltage is 1.4V. |
| 2 | | 10±5 dBμ | RV 1 | Adjust output voltage for −3 dB (1V). |

## [3] SEEK Alignment

(1) Connections Refer to Fig. 12

(2) Alignment

| STEP | PURPOSE | SIGNAL GENERATOR FREQUENCY | SIGNAL GENERATOR OUTPUT LEVEL | ADJUSTMENT POINT | PROCEDURE |
|---|---|---|---|---|---|
| 1 | Set the local/distant selector switch in the local position. | | | | |
| 2 | Local sensitivity | 98.1 MHz (400 Hz, 30%) | 45 dBμ (±6 dBμ) | RV 5 | Depress SEEK button to actuate the searching, and then adjust sensitivity so that the searching action may stop nearly at 98.1 MHz. |

## [4] ASC Working sensitivity alignment

(1) Connections Refer to Fig. 12

(2) Alignment (Refer to Fig. 13)

| STEP | SIGNAL GENERATOR FREQUENCY | SIGNAL GENERATOR OUTPUT LEVEL | ADJUSTMENT POINT | PROCEDURE |
|---|---|---|---|---|
| 1 | 98.1 MHz (1 kHz, 30%) | 54 dBμ | ——— | Adjust volume control (VOL) until TP 8 output voltage is 1.4V. |
| 2 | | 30 dBμ | RV 4 | Adjust the separation for 10 dB. |

## [5] Noise blanker alignment

(1) Connections a. Stereo signal generator·····Connect the TP 1

b. Oscilloscope ·····Connect the TP 5

(2) Alignment (Refer to Fig. 13)

| STEP | STEREO SIGNAL GENERATOR FREQUENCY | STEREO SIGNAL GENERATOR OUTPUT LEVEL | ADJUSTMENT POINT | PROCEDURE |
|---|---|---|---|---|
| 1 | 98.1 MHz (Stereo mode, No modulation) | 54 dBμ | RV 3 | After making sure of "STEREO" display, adjust the pilot signal wave (19 kHz) for minimum. |

## [6] Separation alignment

(1) Connections a. Stereo signal generator·····Connect the TP 1

b. Oscilloscope ·····Connect the TP 8 (L-ch)

(2) Alignment (Refer to Fig. 13)

| STEP | STEREO SIGNAL GENERATOR FREQUENCY | STEREO SIGNAL GENERATOR OUTPUT LEVEL | ADJUSTMENT POINT | PROCEDURE |
|---|---|---|---|---|
| 1 | 98.1 MHz (R-ch : 1 kHz, 30% L-ch : no modulation) | 54 dBμ | RV 2 | Adjust L-ch output level for minimum. |

[7] Crystal oscillating frequency adjustment

(1) Connections a. Frequency counter (Resolution : 1 Hz)·····Connect the TP 4

(2) Alignment (Refer to Fig. 13)

| STEP | FREQ. DISPLAY OF UNIT | ADJUSTMENT POINT | PROCEDURE |
|---|---|---|---|
| 1 | 1000 kHz | CV 1 | Adjust CV1 for 1450 kHz at the frequency counter by using a screwdriver. |

# DOLBY NR LEVEL ALIGNMENT

NOTES : 1. Always use the test tape (MTT-150) for alignment.
2. In alignment of Dolby N.R. circuit, only gain adjustment is required.
3. Make sure that Dolby level falls with in the Dolby standards, when parts in the head or Dolby N.R. circuit being exchanged.
4. Always use the parts listed in the parts list for Dolby circuit.

(1) Connections

a. VTVM·····Hot side : TP 9 or TP 10 Cold side : chassis

b. Test tape ·····MTT-150 (400 Hz, 0 dB full track recording)

c. Power supply ·····13.2 VDC d. Tape select (MTL) switch·····Normal

e. Dolby N.R. ( DD ) switch·····OFF

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

| STEP | ADJUSTMENT POINT | PROCEDURE |
|---|---|---|
| 1 | VR 7 | Adjust to get 300 mV (±30 mV) output of left channel with a volt meter. |
| 2 | VR 6 | Adjust to get 300 mV (±30 mV) output of right channel with a volt meter. |
| 3 | ——— | Make sure that the output of left channel is equal to that of right channel, by using a volt meter. |

NOTE : Adjust to get equal output of right and left channels in either track.

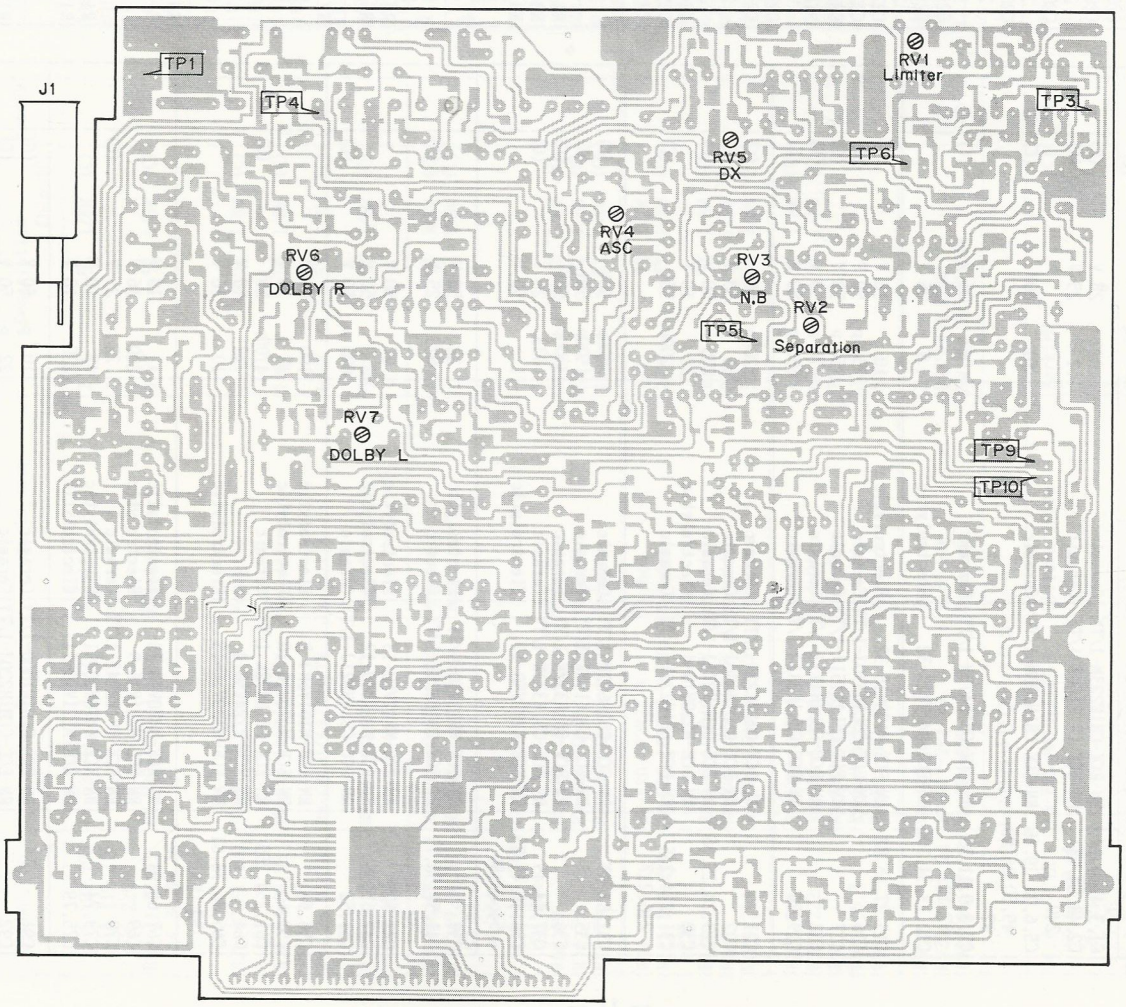



Fig. 13

# REPLACEMENT PARTS LIST

Note:Main replacement parts are marked O in the remarks column.

| Symbol. No. | Stock No. | Parts name | Description Chip:(C) | Remark |
|---|---|---|---|---|
| CAPACITORS | | | Unit:μF, P=pF | |
| C1,3,4,10,14 | RN-ECK-CB1E223M-1/TY | Ceramic | .022 25 V (C) | |
| C2,48,84,98 249 | RN-ECK-CF1E104Z-1/TY | Ceramic | .1 25 V (C) | |
| C5,6,28,29,46 49,50,86,90 97 | RN-ECK-CB1H103M-1/TY | Ceramic | .01 50V (C) | |
| C7,8,9,11,33 87,101 | RN-ECK-CB1E473M-1/TY | Ceramic | .047 25 V (C) | |
| C12,13,34,100 | RN-ECE-M4R7V25-32 | Electrolytic | 4.7 25 V | |
| C15,27,85,88 | RN-ECE-M100V16-32 | Electrolytic | 10 16 V | |
| C16 | RN-ECC-CSL1H330J-1/TY | Ceramic | 33 p 50 V (C) | |
| C17 | RN-ECC-CSL1H151J-1/TY | Ceramic | 150 p 50 V (C) | |
| C18 | RN-ECC-CSL1H471J-1/TY | Ceramic | 470 p 50 V (C) | |
| C19,20 | RN-ECC-CSL1H681J-1/TY | Ceramic | 680 p 50 V (C) | |
| C21 | RN-ECK-CB1H122K-1/TY | Ceramic | 2200p 50V (C) | |
| C22 | RN-ECC-CSL1H680J-1/TY | Ceramic | 68 p 50 V (C) | |
| C23,24,25,26 | RN-ECC-CCH1H271J-1/TY | Ceramic | 270 p 50 V (C) | |
| C30 | RN-ECE-M220V10-4 | Electrolytic | 22 10 V | |
| C31,214,215 216,217 | RN-ECK-CB1H222K-1/TY | Ceramic | 2200p 50V (C) | |
| C32,82,83 | RN-ECK-CB1H682M-1/TY | Ceramic | 6800p 50V (C) | |
| C35 | RN-ECK-CB1H152K-1/TY | Ceramic | 1500p 50V (C) | |
| C36 | RN-ECK-CB1H332K-1/TY | Ceramic | 3300p 50V (C) | |
| C37,44,45 | RN-ECK-CB1E333K-1/TY | Ceramic | .033 25 V (C) | |
| C38,40,43,53 54,80,89 | RN-ECE-M1R0V50-12 | Electrolytic | 1 50 V | |
| C39 | RN-ECE-MR22V50-9/TT | Electrolytic | .22 50 V | |
| C41,57,58,71 72 | RN-ECK-CB1E223K-1/TY | Ceramic | .022 25 V (C) | |
| C42,62 | RN-ECE-MR47V50-13 | Electrolytic | .47 50 V | |
| C47,63,65 | RN-ECE-M2R2V50-12 | Electrolytic | 2.2 50 V | |
| C51,52 | RN-ECC-CSL1H821J-1/TY | Ceramic | 820 p 50 V (C) | |
| C55,56 | RN-ECE-M101V6R3-2 | Electrolytic | 100 6.3V | |
| C59,60 | RN-ECE-M470V16-16 | Electrolytic | 47 16 V | |
| C61,254,255 | RN-ECK-CB1H472K-1/TY | Ceramic | 4700p 50V (C) | |
| C64 | RN-ECH-R224V50-4 | M.P. | .22 50 V | |
| C66,76,78,81 93 | RN-ECE-M100V16-15 | Electrolytic | 10 16 V | |
| C67,68,98 | RN-ECE-M470V10-18 | Electrolytic | 47 10 V | |
| C69 | RN-ECE-M221V16-9 | Electrolytic | 220 16 V | |
| C70 | RN-ECK-CF1E224Z-1/TY | Ceramic | .22 25 V (C) | |
| C73,74 | RN-ECE-M470V10-51 | Electrolytic | 47 10 V | |
| C75,79 | RN-ECE-M221V10-11 | Electrolytic | 220 10 V | |
| C91 | RN-ECC-CCH1H100D-1/TY | Ceramic | 10 p 50 V (C) | |
| C92 | RN-ECC-CCH1H220J-1/TY | Ceramic | 22 p 50 V (C) | |
| C96 | RN-ECE-M221V10-41 | Electrolytic | 220 10 V | |
| C201,202 | RN-ECC-CSL1H102K-1/TY | Ceramic | 1000p 50 V (C) | |
| C203,204,205 206 | RN-ECE-M4R7V25 | Electrolytic | 4.7 25 V | |
| C207,218,219 226,227 | RN-ECE-M101V10-12 | Electrolytic | 100 10 V | |
| C208,209,244 248 | RN-ECK-CB1E103K-2/TY | Ceramic | .01 25 V (C) | |
| C210,211 | RN-ECE-MR47V50-32 | Electrolytic | .47 50 V | |
| C212,213,220 221 | RN-ECE-M1R0V50-51 | Electrolytic | 1 50 V | |
| C222,223 | RN-ECE-M470V10-4 | Electrolytic | 47 10 V | |
| C224,225 | RN-ECH-R104V50-2 | M.P. | .1 50 V | |
| C228,229,230 231,232,233 | RN-ECH-R224V50-2 | M.P. | .22 50 V | |
| C234,235 | RN-ECE-M152V16-1 | Electrolytic | 1500 16 V | |
| C236,237,238 239,240,241 242,243 | RN-ECC-CSL1H221J-1/TY | Ceramic | 220 p 50 V (C) | |
| C245 | RN-ECE-M470V16-14 | Electrolytic | 47 16 V | |
| C250,251 | RN-ECE-M1R0V50-6 | Electrolytic | 1 50 V | |
| CV1 | RN-ECV-A20-70 | Trimmer | 20 p | |
| RESISTORS | | | Unit:ohm, K=kohm | |
| R1,6,211,212 | RN-ERG-IC331J-1/TY | Metallic | 330 5% 1/8W (C) | |
| R2,36,37,41 | RN-ERG-IC332J-1/TY | Metallic | 3.3K 5% 1/8W (C) | |
| R3,10,18,19 48,62,90,91 92,105,106 107,116,130 131,150,207 208 | RN-ERG-IC103J-1/TY | Metallic | 10 K 5% 1/8W (C) | |
| R4,8,44,94 | RN-ERG-IC101J-1/TY | Metallic | 100 5% 1/8W (C) | |
| R5 | RN-ERG-IC152J-1/TY | Metallic | 1.5K 5% 1/8W (C) | |
| R7,12,13,52 55,56,57,58 59,60,85,86 87,108,125 126,127,128 139,141,142 144 | RN-ERG-IC473J-1/TY | Metallic | 47 K 5% 1/8W (C) | |
| R9,129 | RN-ERG-IC562J-1/TY | Metallic | 5.6K 5% 1/8W (C) | |
| R11,95,132 133,134,135 136,137 | RN-ERG-IC224J-1/TY | Metallic | 220K 5% 1/8W (C) | |
| R14,16,27 | RN-ERG-IC223J-1/TY | Metallic | 22 K 5% 1/8W (C) | |
| R15,31,42,45 138 | RN-ERG-IC392J-1/TY | Metallic | 3.9K 5% 1/8W (C) | |
| R17,24,25,32 43,63,64,70 71,83,89,100 | RN-ERG-IC222J-1/TY | Metallic | 2.2K 5% 1/8W (C) | |

| Symbol. No. | Stock No. | Parts name | Description Chip:(C) | Remark |
|---|---|---|---|---|
| 101,102,103 118,119,215 216,225 | RN-ERG-IC222J-1/TY | Metallic | 2.2K 5% 1/8W (C) | |
| R20,21,22,23 34,38,39,46 96,97,111,11 113 | RN-ERG-IC472J-1/TY | Metallic | 4.7K 5% 1/8W (C) | |
| R26,80,81,120 123 | RN-ERG-IC272J-1/TY | Metallic | 2.7K 5% 1/8W (C) | |
| R28,84,88,93 124,145 | RN-ERG-IC104J-1/TY | Metallic | 100K 5% 1/8W (C) | |
| R29,76,77,201 202 | RN-ERG-IC682J-1/TY | Metallic | 6.8K 5% 1/8W (C) | |
| R30,35,109 151,152 | RN-ERG-IC563J-1/TY | Metallic | 56 K 5% 1/8W (C) | |
| R33,66,67 | RN-ERG-IC153J-1/TY | Metallic | 15 K 5% 1/8W (C) | |
| R40,49,50,51 53,54,61,65 98,104,114 115,117,148 203,204 | RN-ERG-IC102J-1/TY | Metallic | 1 K 5% 1/8W (C) | |
| R68,69 | RN-ERG-IC822J-1/TY | Metallic | 8.2K 5% 1/8W (C) | |
| R74,75 | RN-ERG-IC680J-1/TY | Metallic | 68 5% 1/8W (C) | |
| R78,79 | RN-ERG-IC154J-1/TY | Metallic | 150K 5% 1/8W (C) | |
| R99 | RN-ERD-DF2R2J-3 | Carbon | 2.2 5% 1/2W | |
| R121,122,219 225 | RN-ERG-IC273J-1/TY | Metallic | 27 K 5% 1/8W (C) | |
| R140 | RN-ERG-IC124J-1/TY | Metallic | 120K 5% 1/8W (C) | |
| R143 | RN-ERG-IC821J-1/TY | Metallic | 820 5% 1/8W (C) | |
| R213,214 | RN-ERG-IC390J-1/TY | Metallic | 39 5% 1/8W (C) | |
| R217,218 | RN-ERG-IC4R7J-1/TY | Metallic | 4.7 5% 1/8W (C) | |
| R221,222 | RN-ERG-IC473J-1/TY | Metallic | 47 K 5% 1/8W (C) | |
| RV1 | RN-ERV-ON1-307 | Variable | 300 | |
| RV2,4,6,7 | RN-ERV-ON1-312 | Variable | 20 K | |
| RV3 | RN-ERV-ON1-313 | Variable | 50 K | |
| RV5 | RN-ERV-ON1-309 | Variable | 2 K | |
| RV21,22,23,24 | RN-ERV-2P4-30 | Variable | BASS/TRE,LOUD | ○ |
| RV25,26,27,28 | RN-ERV-2P7-2 | Variable | SW,VOL,BAL,FADER | ○ |
| SEMICONDUCTORS | | | | |
| D1,4,6,7,12 15,16,17,18 20,21,22,23 25,26 | RN-EDS-MA151K/TY | Silicon diode | Mark:MH (C) | ○ |
| D2,3,5,8,9,11 14,24 | RN-EDS-MA151WK/TY | Silicon diode | Mark:MT (C) | ○ |
| D10,13 | RN-EDT-RD9R1EB3 | Zener diode | 9.1V | ○ |
| D19 | RN-EDS-MA151A/TY | Silicon diode | Mark:MA (C) | ○ |
| D27 | RN-EDS-1S1555 | Silicon diode | | ○ |
| D28 | RN-EDS-1SS211 | Silicon diode | | ○ |

| Symbol. No. | Stock No. | Parts name | Description Chip:(C) | Remark |
|---|---|---|---|---|
| D101,102 | RN-EDS-10E1 | Silicon diode | | ○ |
| D103 | RN-EDS-S5566B/TP | Silicon diode | | ○ |
| IC1 | RN-EIC-LA1143 | Linear-monolithic IC | FM IF amp.~Q.DET. | ○ |
| IC2 | RN-EIC-LA2113 | Linear-monolithic IC | Noise blanker | ○ |
| IC3 | RN-EIC-LA3433 | Linear-monolithic IC | MPX.decoder | ○ |
| IC4 | RN-EID-M4052BP | Digital-monolithic IC | | ○ |
| IC5 | RN-EIC-LA3161 | Linear-monolithic IC | Equalizer amp. | ○ |
| IC6 | RN-EIC-LA2010 | Linear-monolithic IC | APS | ○ |
| IC7 | RN-EIE-UHN011101 | Hybrid IC | Dolby NR | ○ |
| IC8 | RN-EIC-AN6540 | Linear-monolithic IC | V.Regulator | ○ |
| IC9 | RN-EIC-UPC78L05J | Linear-monolithic IC | V.Regulator | ○ |
| IC10 | RN-EIM-UPD1708G-625 | Digital-monolithic IC | Controller | ○ |
| IC21 | RN-EIE-MH-1993 | Hybrid IC | BASS/TRE. | ○ |
| IC22,23 | RN-EIC-TA7280P | Linear-monolithic IC | Power amp. | ○ |
| Q1,2 | RN-EVS-2SC3053-CD/TY | Silicon transistor | Mark:FC,FD (C) | ○ |
| Q4,5,6,7,8,10 13,14,15,16 24,25,26,27 28,29,33,36 42 | RN-EVS-2SD601-QR/TY | Silicon transistor | Mark:YQ,YR (C) | ○ |
| Q9,17,41 | RN-EVS-DTA114EK/TY | Silicon transistor | Mark:14 (C) | ○ |
| Q11,12,21,34 | RN-EVS-2SB815-67/TY | Silicon transistor | Mark:B6,B7 (C) | ○ |
| Q18,35 | RN-EVS-DTC144EK/TY | Silicon transistor | Mark:26 (C) | ○ |
| Q19,23 | RN-EVS-2SD638-QR | Silicon transistor | | ○ |
| Q20,31,32 | RN-EVS-2SD1048-678/TY | Silicon transistor | Mark:X6,X7,X8 (C) | ○ |
| Q20 44 | RN-EVS-2SB873-QR | Silicon transistor | | ○ |
| Q22,37 | RN-EVS-DTC114EK/TY | Silicon transistor | Mark:24 (C) | ○ |
| Q30,38,39,40 | RN-EVS-2SA1235-EF/TY | Silicon transistor | Mark:ME,MF (C) | ○ |
| Q41 | RN-EVS-DTA114TK/TZ | Silicon transistor | Mark:94 (C) | ○ |
| Q43 | RN-EVS-DTA144EK/TY | Silicon transistor | Mark:16 (C) | ○ |
| Q101,102 | RN-EVS-2SD1328-RST/TZ | Silicon transistor | Mark:1DR,1DS,1DT (C) | ○ |
| MISCELLANEOUS ELECTRICAL | | | | |
| AF1 | RN-EFA-E-AF-314 | Active filter | | |
| CF1 | RN-EFC-F2-114 | Ceramic filter | | |
| CI1,2 | RN-ECI-A271-1 | Filter | 270 pF | |
| J1 | RN-EJA-1001 | Antenna receptacle | | |
| J6,7,8 | RN-EWJ-4373 | Lead assembly | RCA coad | |
| J9,10,11 | RN-EWJ-4374B | Lead assembly | 8P-5P-4P | |
| J12,13 | RN-EWJ-4369A | Lead assembly | 10P-9P | |
| J14,15 | RN-EWJ-4370 | Lead assembly | 4P-3P | |
| J23 | RN-EWJ-4378 | Lead assembly | | |
| J26 | RN-EWJ-3845 | Lead assembly | | |
| J27 | RN-EWJ-4377 | Lead assembly | | |
| J28 | RN-EWJ-3736 | Lead assembly | | |
| L1,2 | RN-ELH-C6R8-KAL | Choke | 6.8μH | |
| L3 | RN-ELH-C4R7-KAL/TP | Choke | 4.7μH | |
| L4 | RN-ELH-C102-6 | Choke | 1mH | |

| Symbol. No. | Stock No. | Parts name | Description · Chip:(C) | Remark |
|---|---|---|---|---|
| L51 | RN-ELL-1035 | Choke | | |
| NL1 | RN-EPN-1002 | Neon lamp | | |
| P1,2,3,J4,5 | RN-EWJ-4372B | Lead assembly | OUTPUT | |
| P4 | RN-EJU-S05V-256 | Connector | 5P | |
| P5 | RN-EJU-S07V-258 | Connector | 7P | |
| P8 | RN-EJU-S04V-563 | Connector | 4P | |
| P13 | RN-EJU-S09V-957 | Connector | 9P | |
| P14 | RN-EJU-S03V-574 | Connector | 3P | |
| P15 | RN-EJU-S05V-576 | Connector | 5P | |
| P21 | RN-EJU-S07V-955 | Connector | 7P | |
| PL1 | RN-EPM-1228A | Lamp assembly | | |
| PL2 | RN-EPM-1227 | Lamp assembly | | |
| PL201 | RN-EPM-1226 | Lamp assembly | | |
| S11-16 | RN-ESD-6N-166 | Push switch | | ○ |
| S17,18,19 | RN-ESD-3N-165 | Push switch | | ○ |
| S20,22 | RN-ESD-2N-164 | Push switch | | ○ |
| S23 | RN-ESB-2L2-183 | Push switch | | ○ |
| T1 | RN-ETF-1004A | FM IF transformer | | |
| TV1 | RN-ETV-1048A | Front end | FM | |
| TV2 | RN-ETV-1064A | Front end | AM ST | |
| VE1 | RN-EVE-1021-MNCO2TN | Liquid crystal element | | ○ |
| VS1 | RN-EVV-C10DK220 | Varistor | | ○ |
| X2 | RN-EXC-1036 | Crystal | | |
| XB1 | RN-EXB-CSB456FG15 | Ceramic oscillator | | |

| Illus. No. (Fig. 7) | Stock No. | Parts name | Description | Q'ty | Remark |
|---|---|---|---|---|---|
| MECHANICAL | | | | | |
| 501 | RN-MTD-1241B | Chassis | Top | 1 | |
| 502 | RN-MTD-1240B | Chassis | Bottom | 1 | |
| 503 | RN-MDP-1763 | Escutcheon | | 1 | ○ |
| 504 | RN-MHE-1700A | Holder | | 1 | |
| 505 | RN-MHE-1701B | Holder | DECK R | 1 | |
| 506 | RN-MHE-1702A | Holder | DECK F.L | 1 | |
| 507 | RN-MHE-1703A | Holder | DECK F.R | 1 | |
| 508 | RN-MHE-1714A | Holder | CORD | 1 | |
| 509 | RN-MLF-1168A | Filter | A/F,TUNE | 1 | |
| 510 | RN-MLF-1171A | Filter | Pre-set | 1 | |
| 511 | RN-MLF-1174A | Filter | RECALL | 1 | |
| 512 | RN-MYB-1965A | Button | EJE | 1 | ○ |
| 513 | RN-MYB-1966 | Button | FF,REW | 2 | ○ |
| 514 | RN-MYB-1967 | Button | A/F,TUNE | 3 | ○ |
| 515 | RN-MYB-1968 | Button | SET,RECALL,SCAN | 8 | ○ |
| 516 | RN-MYB-2162 | Button | AM·ST | 1 | ○ |
| 518 | RN-MRE-1140B | Heat-sink | | 1 | |
| 521 | RN-MHT-1004 | Rivet | | 3 | |
| 522 | RN-MSE-1601 | Spacer | | 2 | |
| 523 | RN-MYC-1064 | Knob | VOL·TRE | 2 | ○ |
| 524 | RN-MYD-1082 | Knob | BASS·BAL·FADER | 2 | ○ |
| 525 | RN-MCV-1665A | Door | | 1 | |
| 526 | RN-MSI-1054 | Pin | | 1 | |
| 527 | RN-MSC-1201 | Spring | | 1 | |
| 528 | RN-MSE-1651A | Spacer | | 1 | |
| 529 | RN-MIP-1479 | Insulater | | 1 | |
| 530 | RN-MIP-1466 | Insulater | | 1 | |
| 531 | RN-MIP-1469A | Insulater | | 1 | |
| 536 | RN-MHE-1704A | Holder | | 1 | |
| 537 | RN-MHE-1705 | Holder | | 1 | |
| 539 | RN-MHE-1547A | Holder | | 2 | |
| 540 | RN-MSE-1675 | Spacer | | 1 | |
| 541 | RN-MSE-1676 | Spacer | | 1 | |
| 542 | RN-MSE-1677 | Spacer | | 1 | |
| 545 | RN-MPM-3109A | PC board | Main (No parts mounted) | 1 | |
| 546 | RN-MPC-1895D | PC board | Amp. (No parts mounted) | 1 | |
| 601 | F6-SBD-3X6S | Screw | 3X6mm | 14 | |
| 602 | F6-SNA-3X6S | Screw | 3X6mm | 4 | |
| 603 | F6-SBD-2X6S | Screw | 2X6mm | 1 | |
| 604 | F6-SBD-2.6X3S | Screw | 2.6X3mm | 4 | |
| 605 | F6-SSA-3X6S-M-ZN2A | Screw | 3X6mm (BLK) | 2 | |
| 607 | RN-MSN-1 | Nut | VOL | 2 | |
| 608 | RN-MTJ-2B2.6X6 | Screw | 2.6x6mm | 2 | |
| 610 | F6-SSA-3X6S | Screw | 3X6mm | 2 | |
| 611 | F6-SBD-3X16S | Screw | 3X16mm | 3 | |

NOTE : Specifications subject to change without prior notice.

# CASSETTE DECK (RN-MDK-72/2A)

| Illus.No. (Fig. 8) | Stock No. | Description | Q'ty | Remark |
|---|---|---|---|---|
| MECHANICAL | | | | |
| 1 | RN-MAS-1068 | Chassis,main | 1 | |
| 2 | RN-MYT-1308 | Sub-chassis | 1 | |
| 3 | RN-MUL-1388 | Lever | 1 | |
| 4 | RN-MHE-1775 | Holder | 1 | |
| 5 | RN-MUL-1389 | Lever | 1 | |
| 6 | RN-MUL-1390 | Lever | 1 | |
| 7 | RN-MUL-1391 | Lever | 1 | |
| 8 | RN-MHE-1776 | Holder | 1 | |
| 9 | RN-MUL-1392 | Lever | 1 | |
| 10 | RN-MHE-1777 | Holder | 1 | |
| 11 | RN-MUL-1393 | Lever | 1 | |
| 13 | RN-MHE-1778 | Holder | 2 | |
| (A1) 14 | RN-MHE-1779 | Holder,(includes P.B Head) | 1 | ○ |
| 16 | RN-MUF-1026 | Flywheel | 2 | |
| 17 | RN-MKR-1217 | Pinchroller assembly(F) | 1 | |
| 18 | RN-MKR-1218 | Pinchroller assembly(R) | 1 | |
| 19 | RN-MKS-1027 | Slip mechanism | 2 | ○ |
| 20 | RN-MKS-1028 | Slip mechanism | 1 | ○ |
| 25 | RN-MKi-1027 | Slide plate assembly | 1 | |
| 26 | RN-MHE-1780 | Holder | 1 | |
| 27 | RN-MUL-1394 | Lever | 1 | |
| 28 | RN-MUL-1395 | Lever | 1 | |
| 29 | RN-MUL-1396 | Lever | 1 | |
| 30 | RN-MUL-1381 | Lever | 1 | |
| 31 | RN-MUL-1397 | Lever | 1 | |
| 32 | RN-MUC-1036 | Cum | 1 | |
| 33 | RN-MYT-1309 | Sub-chassis | 1 | |
| 34 | RN-MUL-1398 | Lever | 1 | |
| 35 | RN-MUL-1399 | Lever | 1 | |
| 36 | RN-MYT-1310 | Sub-chassis | 1 | |
| 37 | RN-MUL-1400 | Lever | 1 | |
| 38 | RN-MYT-1311 | Sub-chassis | 1 | |
| 39 | RN-MHE-1781 | Holder | 1 | |
| 40 | RN-MUL-1401 | Lever | 1 | |
| 41 | RN-MUL-1402 | Lever | 1 | |
| 42 | RN-MHE-1747 | Holder | 1 | |
| 46 | RN-MUL-1403 | Lever | 1 | |
| 47 | RN-MUG-1195 | Gear | 1 | |
| 48 | RN-MUL-1404 | Lever | 1 | |
| 49 | RN-MUG-1196 | Gear | 1 | |
| 50 | RN-MUG-1197 | Gear | 1 | |
| 51 | RN-MUG-1198 | Gear | 1 | |
| 52 | RN-MHE-1782 | Holder | 1 | |
| 53 | RN-MHE-1783 | Holder | 1 | |
| 54 | RN-MHE-1784 | Holder | 1 | |
| 55 | RN-MHE-1785 | Holder | 1 | |

| Illus.No. (Fig. 8) | Stock No. | Description | Q'ty | Remark |
|---|---|---|---|---|
| 56 | RN-MUC-1037 | Cum | 1 | |
| 57 | RN-MUL-1405 | Lever | 1 | |
| 58 | RN-MHE-1786 | Holder | 1 | |
| 59 | RN-MUC-1038 | Cum | 2 | |
| 60 | RN-MRP-1132 | Roller | 1 | |
| 61 | RN-MUG-1199 | Gear | 1 | |
| 62 | RN-MUG-1200 | Gear | 1 | |
| 63 | RN-MRP-1133 | Roller | 1 | |
| 64 | RN-MUG-1201 | Gear | 2 | |
| 65 | RN-MUG-1202 | Gear | 4 | |
| 69 | RN-MSi-1109 | Shaft | 1 | |
| 70 | RN-MST-1125 | Spacer | 1 | |
| 71 | RN-MST-1126 | Spacer | 1 | |
| 72 | RN-MST-1127 | Spacer | 1 | |
| 73 | RN-MST-1128 | Spacer | 1 | |
| 74 | RN-MST-1129 | Spacer | 1 | |
| 75 | RN-MST-1130 | Spacer | 1 | |
| 76 | RN-MST-1131 | Spacer | 1 | |
| 81 | RN-MSC-1439 | Spring | 1 | |
| 82 | RN-MSC-1440 | Spring | 1 | |
| 83 | RN-MSC-1441 | Spring | 1 | |
| 84 | RN-MSC-1442 | Spring | 1 | |
| 85 | RN-MSC-1443 | Spring | 2 | |
| 86 | RN-MSC-1444 | Spring | 1 | |
| 87 | RN-MSC-1445 | Spring | 1 | |
| 88 | RN-MSC-1446 | Spring | 1 | |
| 89 | RN-MSC-1447 | Spring | 1 | |
| 90 | RN-MSC-1448 | Spring | 1 | |
| 91 | RN-MSC-1449 | Spring | 1 | |
| 92 | RN-MSC-1450 | Spring | 1 | |
| 93 | RN-MSC-1451 | Spring | 1 | |
| 94 | RN-MSC-1452 | Spring | 1 | |
| 95 | RN-MSC-1453 | Spring | 1 | |
| 96 | RN-MSC-1454 | Spring | 1 | |
| 97 | RN-MSC-1455 | Spring | 2 | |
| 98 | RN-MSC-1456 | Spring | 2 | |
| 99 | RN-MSC-1457 | Spring | 1 | |
| 100 | RN-MSC-1458 | Spring | 1 | |
| 101 | RN-MSC-1459 | Spring | 1 | |
| 102 | RN-MSC-1460 | Spring | 1 | |
| 103 | RN-MSC-1461 | Spring | 1 | |
| 104 | RN-MSE-1669 | Spacer | 1 | |
| 105 | RN-MSC-1462 | Spring | 1 | |
| 109 | RN-MUB-1046 | Belt | 1 | ○ |
| 110 | RN-MUB-1047 | Belt | 1 | ○ |
| 111 | RN-MSW-1013 | Spring | 1 | |
| 112 | RN-MSW-1014 | Spring | 1 | |
| 113 | RN-MSE-1670 | Spacer | 1 | |

| Illus.No. (Fig. 8) | Stock No. | Description | Q'ty | Remark |
|---|---|---|---|---|
| M101(118) | RN-EDM-1089 | Motor | 1 | ○ |
| J22(119) | RN-EWj-4379 | 7P connector and lead assembly | 1 | ○ |
| J16(120) | RN-EWj-4452 | 5P connector and lead assembly | 1 | |
| 121 | RN-MPM-2994 | PC board | 1 | |
| S103(122) | RN-ESL-1047 | Leaf switch,FF/REW | 1 | ○ |
| S102(123) | RN-ESS-1070 | Slide switch | 1 | ○ |
| S101(124) | RN-ESM-1017 | Micro switch,AR/CS | 1 | ○ |
| E101(125) | RN-EEM-1048 | Plunger solenoid | 1 | |
| 130 | RN-MET-1356 | Special screw | 2 | |
| 132 | RN-MET-1357 | Special screw | 1 | |
| 134 | RN-MET-1358 | Special screw | 5 | |
| 136 | RN-MET-1359 | Special screw | 1 | |
| 137 | RN-MET-1360 | Special screw | 1 | |
| 139 | RN-MET-1361 | Special screw | 3 | |
| 140 | RN-MET-1362 | Special screw | 1 | |
| 141 | RN-MET-1363 | Special screw | 1 | |
| 142 | RN-MET-1364 | Special screw | 3 | |
| 144 | RN-MET-1365 | Special screw | 1 | |
| 146 | RN-MET-1366 | Special screw | 2 | |
| 151 | F6-ER-1.2 | E-type ring,1.2mm | 2 | |
| 152 | F6-ER-1.5 | E-type ring,1.5mm | 4 | |
| 153 | F6-ER-2 | E-type ring,2mm | 1 | |
| 154 | F6-ER-2.5 | E-type ring,2.5mm | 1 | |
| 155 | F6-ER-1.5 | E-type ring,1.5mm | 2 | |
| 159 | RN-MWP-1114 | Washer | 4 | |
| 160 | RN-MWP-1115 | Washer | 3 | |
| 161 | RN-MWP-1116 | Washer | 5 | |
| 162 | RN-MWP-1117 | Washer | 1 | |
| 166 | RN-MWP-1118 | Washer | 2 | |
| 167 | RN-MWP-1119 | Washer | 2 | |
| 171 | RN-MWS-1053 | Washer | 1 | |

NOTE : Specifications subject to change without prior notice.



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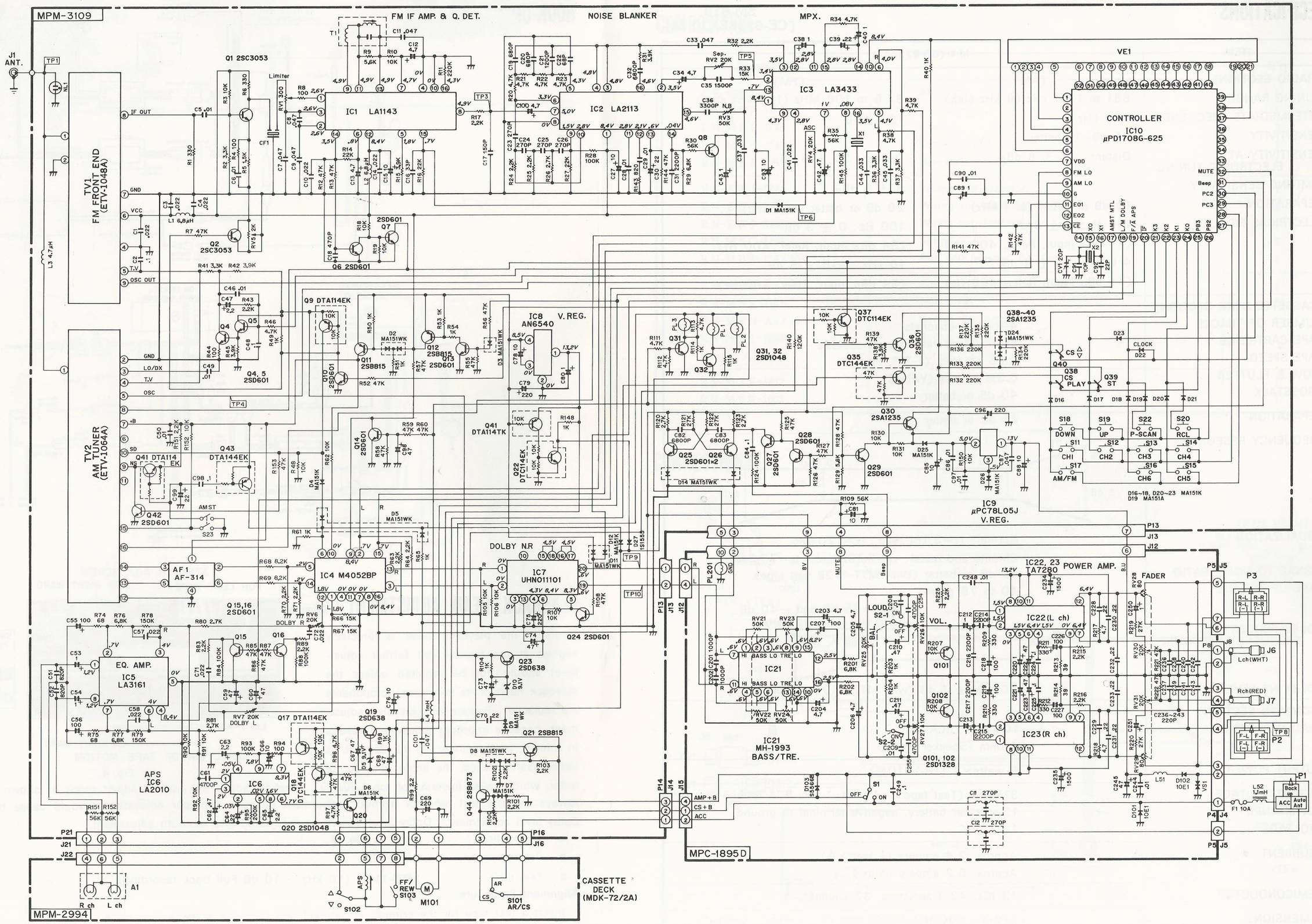
# SCHEMATIC




NOTES: 1. All capacitance in Micro farad, $P=10^{-12}$
2. All resistance in ohm, $K=10^{3}$

Fig. 5

3. All inductance in henry, $m=10^{-3}$, $\mu=10^{-6}$
4. DC voltages against the chassis measured with 10M ohms digital volt meter, power supply set at +13.2 VDC, signal input.

# WIRING ON PC BOARD

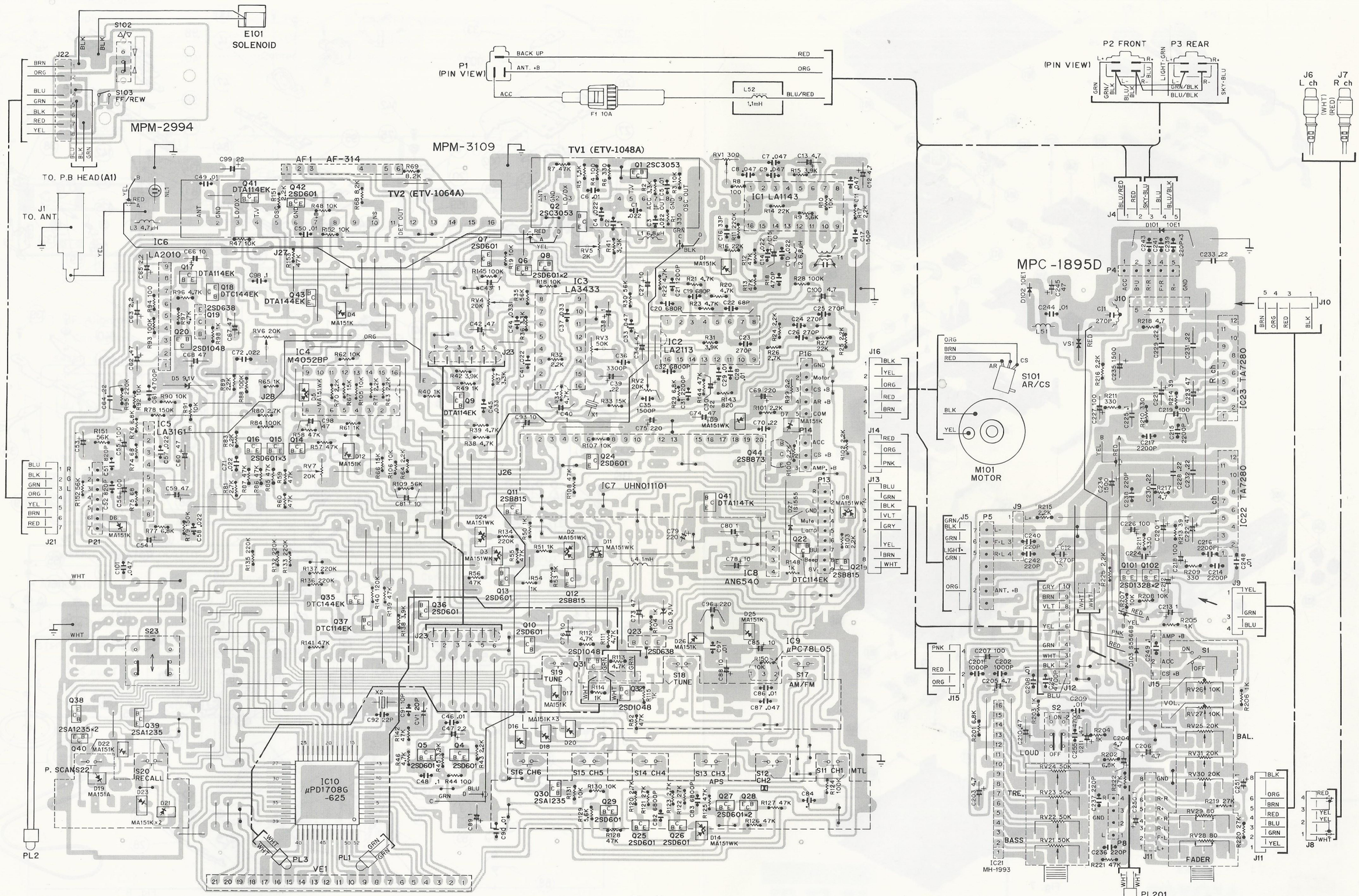



Fig. 6