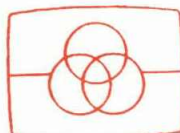


# Service Manual



Free service manuals

Gratis schema's

Portable cassette Recorder

74 PMD 222/02B

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# marantz®

## model PMD 222

First issue: 1991

4822 725 50945

## MARANTZ DESIGN AND SERVICE

Using superior design and selected high grade components, MARANTZ company has created the ultimate in stereo sound.

Only **original MARANTZ parts** can insure that your MARANTZ product will continue to perform to the specifications for which it is famous.

Parts for your MARANTZ equipment are generally available to our National Marantz Subsidiary or Agent.

### ORDERING PARTS:

Parts can be ordered either by mail or by telex. In both cases, correct part number has to be specified.

The following information must be supplied to eliminate delays in processing your order:

1. Complete address
2. Complete part numbers and quantities required
3. Description of parts
4. Model number for which part is required
5. Way of shipment
6. Signature: any order form or telex must be signed otherwise such part order will be considered as null and void.

### PARTS ORDERING

Parts may be ordered at the following addresses:

|                                                                                                                                                         |                                                                                                                     |                                                                                                                                                                     |                                                                                                                                         |                                                                                                                        |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| <b>AUSTRIA</b><br>HORNYPHON<br>Vertriebsgesellschaft GmbH<br>Wienerbergstrasse 1<br>A 1101 Wien<br>Austria<br>Telex: 132.332                            | <b>FINLAND</b><br>MARANTZ<br>DIVISION OF OY PHILIPS Ab<br>Kaivokatu 8<br>00100 Helsinki<br>Finland<br>Telex: 124811 | <b>GREAT BRITAIN</b><br>MARANTZ AUDIO U.K. Ltd<br>Unit 15/16<br>Saxon Way Industrial Estate<br>Moor Lane<br>Harmondsworth UB7 0LW<br>Great Britain<br>Telex: 935196 | <b>SAUDI ARABIA</b><br>AL ALAMIAH ELECTRONICS<br>P.O.Box 5954<br>University Street<br>Riyadh 11432<br>Saudi Arabia<br>Telex: 401530     | <b>SWITZERLAND</b><br>MARANTZ<br>Technischer Service<br>Duenstrasse 3<br>3186 Düringen<br>Switzerland                  |
| <b>BELGIUM</b><br>SVD DIVISION MARANTZ<br>Industrialaan 1<br>1720 Groot-Bijgaarden<br>Belgium<br>Telex: 24466                                           | <b>FRANCE</b><br>MARANTZ FRANCE<br>4 Rue Bernard Palissy<br>92600 Asnières<br>France<br>Telex: 611651               | <b>GREECE</b><br>SHERTON ELECTRONICS S.A.<br>P.O.Box 21025<br>Hippocrates Street 188<br>Athens 11471<br>Greece<br>Telex: 216.795                                    | <b>SOUTH AFRICA</b><br>MARANTZ<br>DIVISION OF PHILIPS S.A.<br>Main Road Martindale<br>P.O. Box. 58088<br>Newville 21114<br>South Africa | <b>TURKEY</b><br>DOGRUOL Ltd.<br>I.M.C.<br>6 Blok N°6310<br>Unkapani<br>Istanbul<br>Turkey<br>Telex: 22085             |
| <b>CHILE</b><br>MARANTZ<br>DIVISION OF PHILIPS S.A.<br>AV. Santa Maria, 0760<br>Casilla 2687<br>Santiago<br>Telex: 240.239                              | <b>GERMANY</b><br>MARANTZ GERMANY GmbH<br>Alexanderstrasse 1<br>2000 Hamburg<br>Germany                             | <b>JAPAN</b><br>MARANTZ JAPAN, Inc.<br>35-1, 7-chome, Sagamiono<br>Sagamihara-shi, Kanagawa<br>Japan                                                                | <b>SPAIN</b><br>PHONO S.A.<br>Ignacio Iglesias 10<br>Badalona (Barcelona)<br>Spain<br>Telex: 59355                                      | <b>MALTA</b><br>CACHIA & GALEA<br>Republic Street, 68D<br>Valetta<br>Telex: 1682                                       |
| <b>DENMARK</b><br>MARANTZ<br>DIVISION OF PHILIPS<br>SERVICE A/S<br>Prags Boulevard 80<br>Postbox 1919<br>DK-2300 København S<br>Denmark<br>Telex: 31201 | <b>THE NETHERLANDS</b><br>Elpro Marantz<br>Wint Hontlaan 28<br>3526 KV Utrecht<br>The Netherlands<br>Telex: 4748    | <b>KUWAIT</b><br>AL ALAMIAH ELECTRONICS<br>Ussama Building<br>Fahd al Saleem Street<br>P.O.Box 23781<br>Safat-Kuwait<br>Telex: 22694                                | <b>SWEDEN</b><br>MARANTZ<br>DIVISION OF PHILIPS<br>Försäljning AB<br>Tegeluddsvägen 1<br>S-115 84 Stockholm<br>Sweden<br>Telex: 14060   | <b>PORTUGAL</b><br>MARANTZ<br>Divisao philips S.A. service<br>Outurela-carnaxide<br>2795 LinDA-A-VELHA<br>Telex: 43906 |
|                                                                                                                                                         | <b>NORWAY</b><br>MARANTZ<br>DIVISION OF PHILIPS A/S<br>Sandstuveien 40<br>0680 Oslo 6<br>Norway<br>Telex: 72640     | <b>ITALY</b><br>MARANTZ ITALIANA S.P.A.<br>Via Chiese, 74<br>20126 Milano<br>Italy                                                                                  |                                                                                                                                         | <b>CANADA</b><br>NORESCO<br>50 Wingold Avenue<br>Toronto, Ontario<br>Canada M6B 1P7                                    |

All of the above locations are fully equipped to take care of your total service needs. Because various countries have differing configuration requirements, it is necessary that you contact the service facility in your particular country. In the event that there is no service location listed for your country, please, contact the nearest facility for the necessary assistance.

In case of difficulties, do not hesitate to contact the Technical Department at abovementioned address.

1. TECHNICAL SPECIFICATIONS

Tape Drive System . . . . . Single Capstan Drive  
Cartridge . . . . . Philips type compact cassette  
Track System . . . . . 2-track 1-channel  
Tape Speed . . . . . 1-7/8 ips and 15/16 ips  
Heads . . . . . 3 Head System

Record: Super Hard Metal Alloy  
Playback: Super Hard Metal Alloy  
Erase: Dual Gap Metal Alloy  
DC Servo Motor

Motor . . . . .

Frequency Response:

|                                 | Standard Speed<br>1-7/8 ips (±3 dB) | Long Play<br>15/16 ips (±3 dB) |
|---------------------------------|-------------------------------------|--------------------------------|
| Normal Tape . . . . .           | 40 Hz ~ 12.5 kHz                    | 40 Hz ~ 6.5 kHz                |
| CrO <sub>2</sub> Tape . . . . . | 40 Hz ~ 14 kHz                      | 40 Hz ~ 7.5 kHz                |
| Metal Tape . . . . .            | 40 Hz ~ 15 kHz                      | 40 Hz ~ 8.5 kHz                |

Signal to Noise Ratio:

|                                 |       |
|---------------------------------|-------|
| Normal Tape . . . . .           | 55 dB |
| CrO <sub>2</sub> Tape . . . . . | 57 dB |
| Metal Tape . . . . .            | 57 dB |

Wow and Flutter (WRMS)

|                                    |       |
|------------------------------------|-------|
| Standard Speed 1-7/8 ips . . . . . | 0.12% |
| Long Play 15/16 ips . . . . .      | 0.15% |

Output Level/Impedance

|                     |                 |
|---------------------|-----------------|
| Line . . . . .      | 650 mV/2 k ohms |
| Headphone . . . . . | 280 mV/8 ohms   |

Input Sensitivity/Impedance

|                      |                 |
|----------------------|-----------------|
| Line . . . . .       | 40 mV/56 kohms  |
| Microphone . . . . . | 0.3 mV/9 k ohms |

General:

|                                                              |                                              |
|--------------------------------------------------------------|----------------------------------------------|
| Power Requirements . . . . .                                 | 120 V, 50/60 Hz                              |
| Battery Requirements (RB430 Battery Pack Optional) . . . . . | 3 D Cells or RB430 Rechargeable Battery Pack |

Battery Life

With Alkaline Batteries

|                                          |           |
|------------------------------------------|-----------|
| Playback Time . . . . .                  | 7.5 Hours |
| Recording Time with Metal Tape . . . . . | 5.5 Hours |

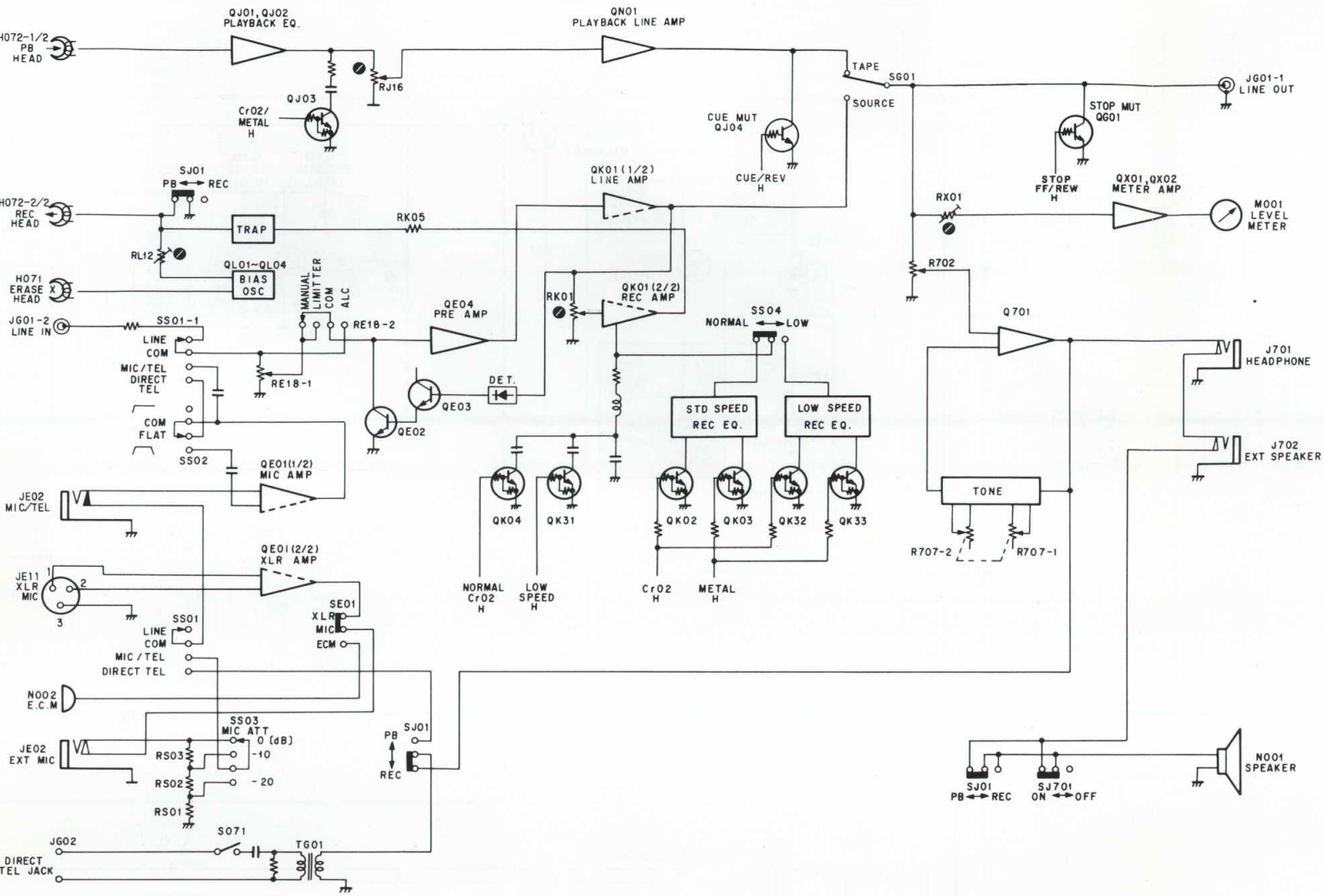
With RB430 Battery Pack (optional)

|                                          |           |
|------------------------------------------|-----------|
| Playback Time . . . . .                  | 4.5 Hours |
| Recording Time with Metal Tape . . . . . | 4.0 Hours |

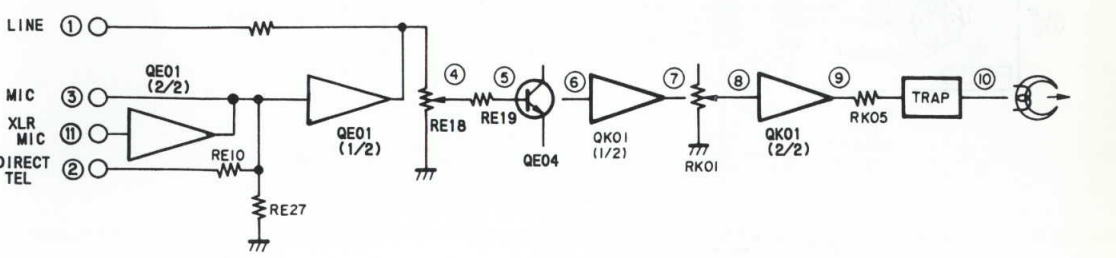
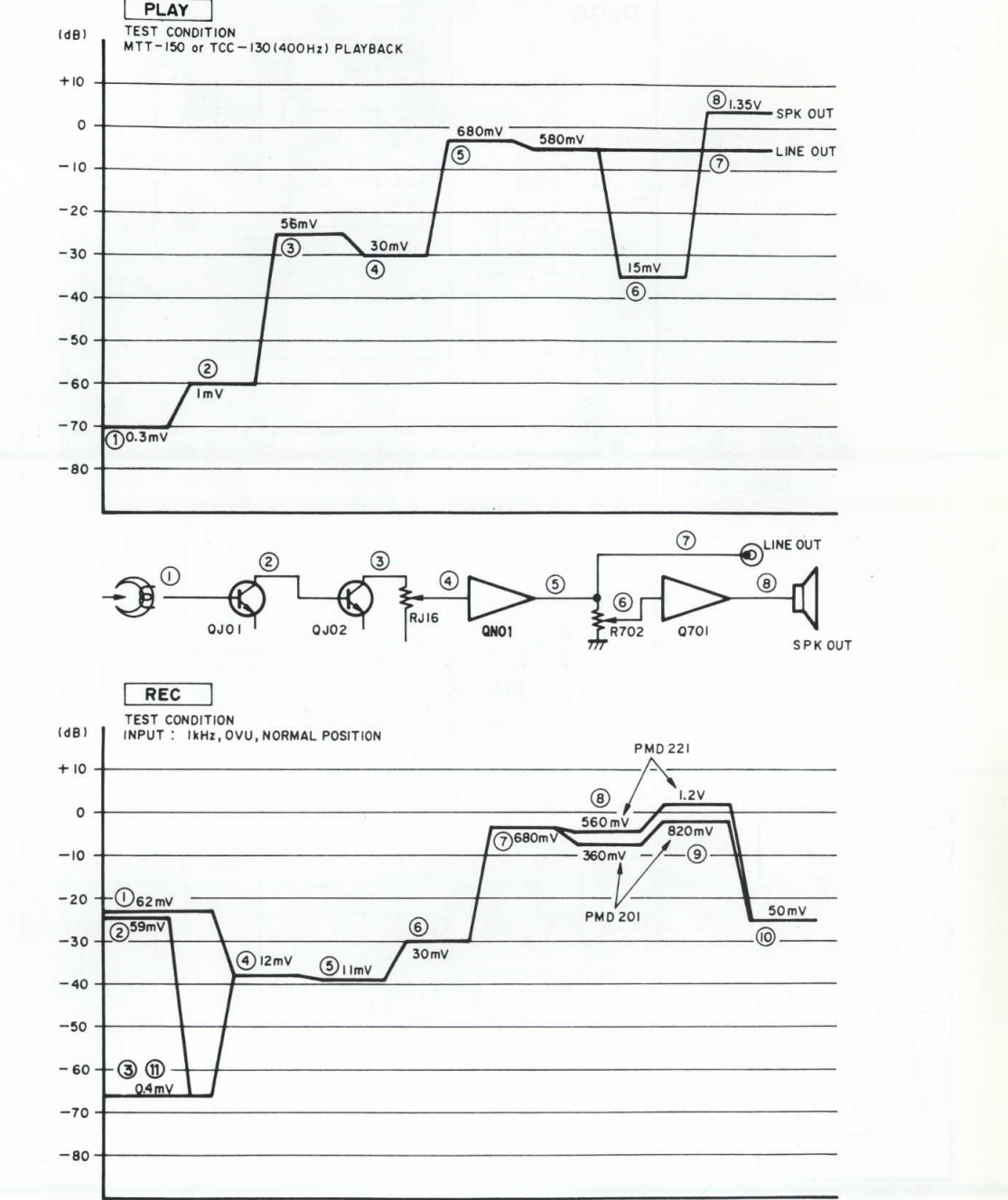
Unit Dimensions and Weight

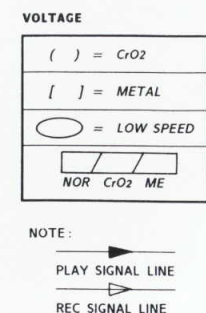
|                  |                    |
|------------------|--------------------|
| Width . . . . .  | 228 mm (9")        |
| Height . . . . . | 51 mm (2")         |
| Depth . . . . .  | 165 mm (6.5")      |
| Weight . . . . . | 1.3 kg (2.87 lbs.) |

2. BLOCK DIAGRAM

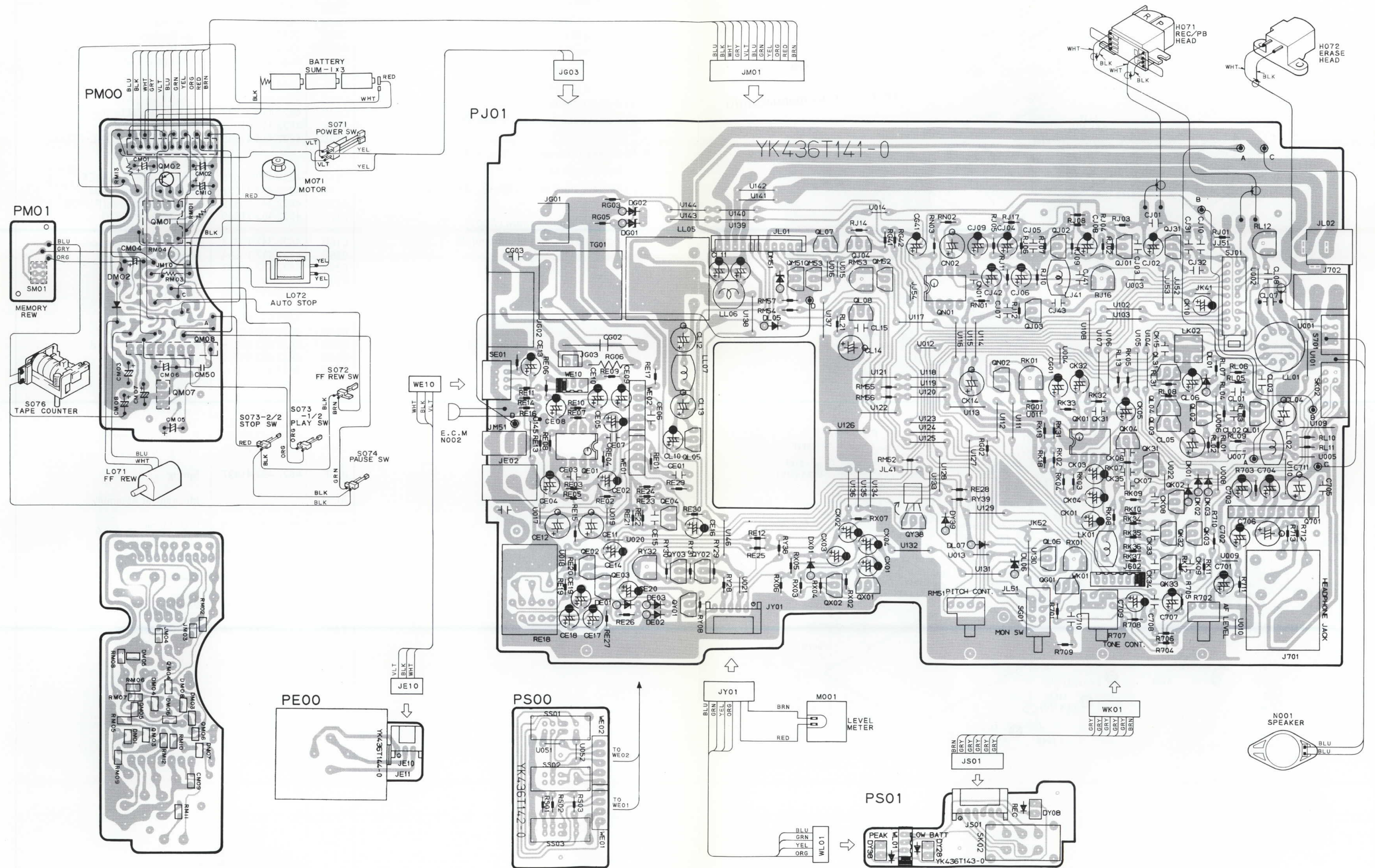


3. LEVEL DIAGRAM

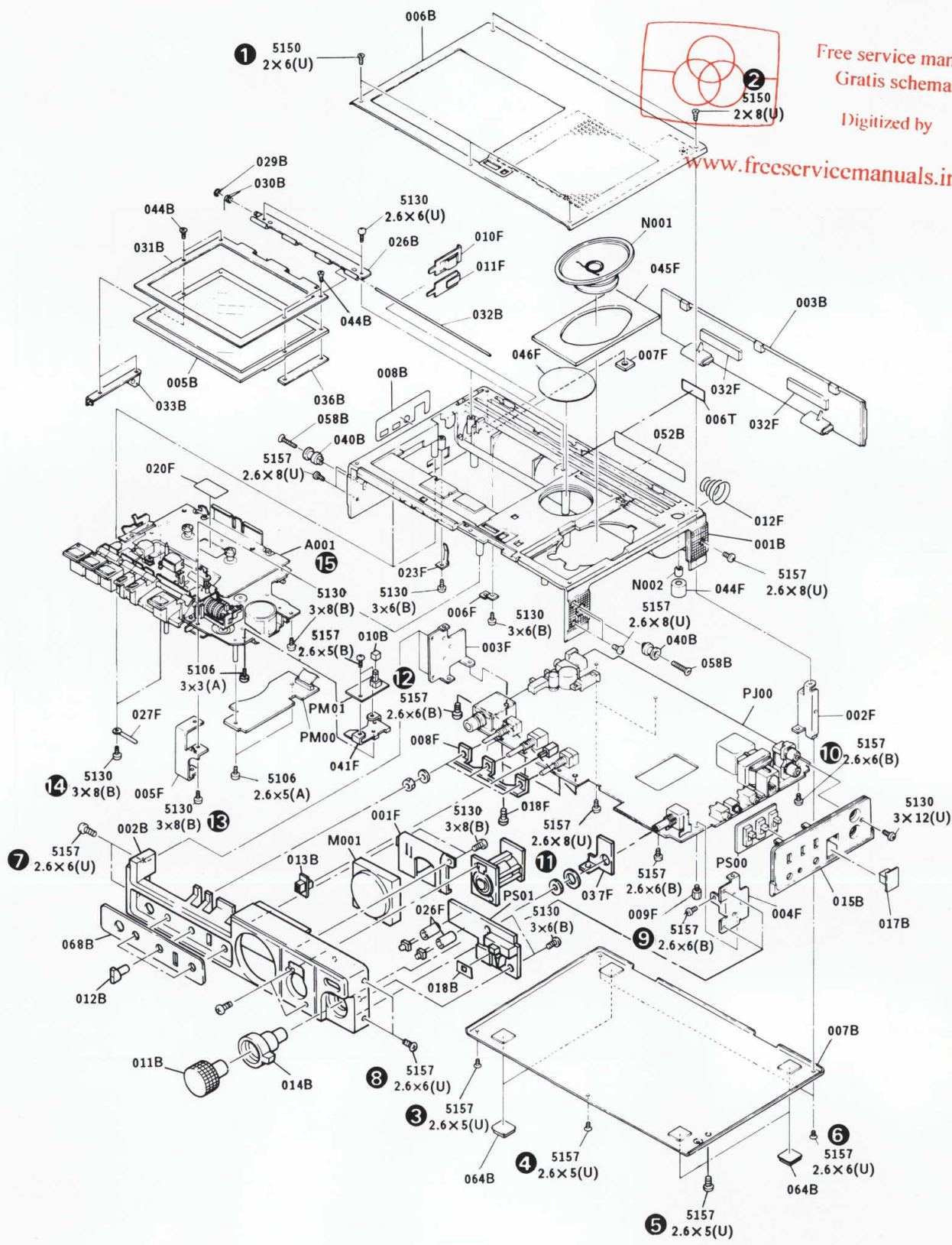




## 5. CIRCUIT BOARD DIAGRAM



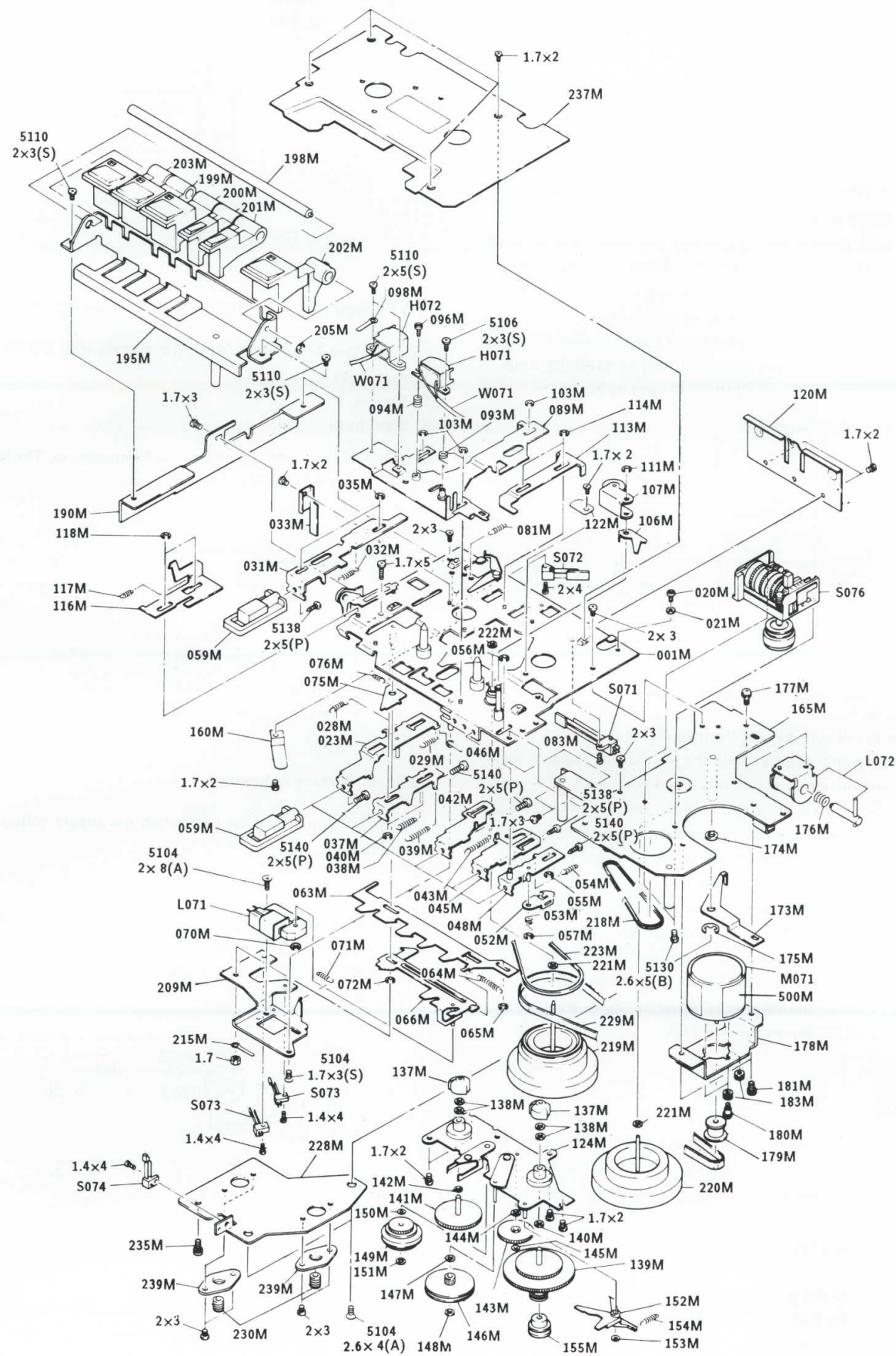
6. EXPLODED VIEW/DISASSEMBLY AND PARTS LIST



DISASSEMBLY

1. Removing the cover(A) : Top (006B)  
Remove the 5 screws 1 and 2.
2. Removing the cover(B) : Bottom (007B)  
Remove the 5 screws 3, 4, 5 and 6.
3. Removing the front panel (002B)  
1) Remove the knob (011B), (014B) and (012B).  
2) Remove the 4 screws 7 and 8.
4. Removing the main P.C. Board (PJ00)  
1) Remove the stud (009F)  
2) Remove the 6 screws 9, 10, 11 and 12.
5. Removing the mechanism (A001)  
Remove the 4 screws 13, 14 and 15.

| REF. DESIG. | PART NO.       | DESCRIPTION                        |
|-------------|----------------|------------------------------------|
| 001B        | 4822 443 40888 | Case (A), Top                      |
| 002B        | 4822 443 41009 | Front Panel                        |
| 003B        | 4822 426 50757 | Lid, Battery                       |
| 005B        | 4822 443 63337 | Lid, (C) Cassette                  |
| 006B        | 4822 443 63335 | Cover (A), Top                     |
| 007B        | 4822 443 63336 | Cover (B), Bottom                  |
| 008B        | 4822 459 11037 | Label, Case (A)                    |
| 010B        | 4822 410 61337 | Memory REW Button                  |
| 011B        | 4822 413 41656 | Knob, REC Level                    |
| 012B        | 4822 413 41655 | Knob, LEVEL, TONE, PITCH, REC MODE |
| 013B        | 4822 412 20076 | Knob, TAPE, SOURCE                 |
| 014B        | 4822 413 41657 | Knob REC mode mold                 |
| 015B        | 4822 347 10312 | Indicator, For Side(R)/02B         |
| 017B        | 4822 462 71649 | Cap, Indicator/02B                 |
| 018B        | 4822 347 10313 | Indicator For Tape speed           |
| 026B        | 4822 417 10854 | Hinge Ass'y (A)                    |
| 029B        | 4822 532 11301 | RG Ring, E                         |
| 030B        | 4822 492 41426 | Spring                             |
| 031B        | 4822 417 10853 | Hinge (B)                          |
| 040B        | 4822 532 11254 | Collar                             |
| 044B        | 4822 502 12163 | F.H.M. Screw F2 x 4                |
| 058B        | 4822 502 13776 | F.H.M. Screw F3 x 18               |
| 064B        | 4822 462 40869 | Leg, Cover (B)                     |
| 068B        | 4822 347 10309 | Indicator Front                    |
| 010F        | 4822 290 60593 | Terminal (+)                       |
| 011F        | 4822 290 60594 | Terminal                           |
| 012F        | 4822 290 40212 | Terminal (-)                       |
| 018F        | 4822 502 30401 | P. Tapped Screw P2.6 x 4           |
| 020F        | 4822 380 20226 | Reflector                          |
| 023F        | 4822 492 41427 | Spring                             |
| A001        |                | Mechanism Assembly                 |
| M001        | 4822 347 10303 | V.U. Meter                         |
| N001        | 4822 240 30543 | Speaker 4Ω 0.5W                    |
| N002        | 4822 242 30206 | Mic Unit, ECM                      |
| 001T        | 4822 736 21138 | User Manual                        |
| 001V        | 4822 498 20097 | Strap                              |
| ZA01        | 4822 263 50114 | A.C. Adaptor/02B                   |



| REF. DESIG. | PART NO.       | DESCRIPTION                     |
|-------------|----------------|---------------------------------|
| 020M        | 4822 502 13773 | Screw                           |
| 021M        | 4822 532 11285 | Washer                          |
| 025M        | 4822 403 70395 | STOP/EJECT Select Cam           |
| 026M        | 4822 535 93241 | FIX S/E Select Cam              |
| 028M        | 4822 492 41462 | Spring, S/F Select Cam          |
| 029M        | 4822 492 33146 | Spring, Stop Lever              |
| 032M        | 4822 492 33149 | Spring, REC Lever               |
| 034M        | 4822 502 13774 | REC SW S1.7 x 2                 |
| 035M        | 4822 532 52213 | RG Ring, REC Lever              |
| 038M        | 4822 492 33152 | Spring, Head Base               |
| 039M        | 4822 492 41463 | Spring, FWD Lever               |
| 040M        | 4822 532 52213 | RG Ring, FWD Lever              |
| 043M        | 4822 492 41465 | Spring, REW Lever               |
| 046M        | 4822 492 41658 | Spring, FF Lever                |
| 052M        | 4822 403 40299 | Arm, Pause Lock Cam             |
| 053M        | 4822 492 41424 | Spring, Pause Lock Cam          |
| 054M        | 4822 492 33147 | Spring, Pause Lever             |
| 055M        | 4822 532 52213 | RG Ring, Pause Lever            |
| 056M        | 4822 532 52212 | RG Ring, Pause Lever            |
| 057M        | 4822 532 52213 | RG Ring, Pause Cam              |
| 063M        | 4822 522 31987 | Cam, Lock Plate                 |
| 064M        | 4822 492 41429 | Spring, Lock Plate              |
| 065M        | 4822 532 52213 | RG Ring, Lock Plate             |
| 066M        | 4822 522 31988 | Cam, QMS Lock Plate Ass'y       |
| 070M        | 4822 532 52213 | RG Ring, E                      |
| 071M        | 4822 492 41466 | Spring, QMS Lock Plate          |
| 072M        | 4822 532 52212 | RG Ring, Lock Plate             |
| 076M        | 4822 492 41467 | Spring, REC Inter Lock          |
| 081M        | 4822 492 33151 | Spring, REC Safety              |
| 083M        |                | F.H.M. Screw F1.7 x 3           |
| 093M        | 4822 492 33273 | Spring, Pinch Roller            |
| 094M        | 4822 492 41432 | Spring, Azimuth                 |
| 096M        | 4822 502 13595 | Screw, Azimuth                  |
| 103M        | 4822 532 52213 | RG Ring, Head Base              |
| 107M        | 4822 403 53998 | Arm Ass'y, Pinch Roller         |
| 111M        | 4822 532 52213 | RG Ring, Pinch Arm              |
| 114M        | 4822 532 52213 | RG Ring, Switch C/R Lever       |
| 117M        | 4822 492 41468 | Spring, Hook Lever              |
| 118M        | 4822 532 52213 | RG Ring, Hook Lever             |
| 120M        | 4822 492 41418 | Spring, Cassette Back           |
| 137M        | 4822 528 10777 | Hub, Take-Up & S Reel Cap       |
| 138M        | 4822 532 11286 | Washer, Under Reel Cap          |
| 139M        | 4822 522 31989 | Gear, Take-Up Reel Gear Ass'y   |
| 140M        | 4822 532 11285 | Washer, Under Clutch            |
| 141M        | 4822 522 31991 | Gear, Supply Reel Gear Ass'y    |
| 142M        | 4822 532 11285 | Washer, Under Supply Reel Ass'y |
| 143M        | 4822 522 31994 | Gear, FF                        |
| 144M        | 4822 532 11285 | Washer, Under FF Gear           |
| 145M        | 4822 532 52209 | Washer, FF Gear                 |
| 146M        | 4822 528 50198 | Pulley, FWD Idler               |
| 147M        | 4822 532 11291 | Washer, Under FWD Idler         |
| 148M        | 4822 532 52208 | Spacer, FWD Idler               |
| 149M        | 4822 528 50199 | Center Pulley Ass'y             |
| 150M        | 4822 532 52207 | Spacer, Under C Clutch          |
| 151M        | 4822 532 52208 | Spacer, C Pulley Ass'y          |

| REF. DESIG. | PART NO.       | DESCRIPTION                 |
|-------------|----------------|-----------------------------|
| 152M        | 4822 403 40219 | Arm, Shut Off               |
| 153M        | 4822 532 52211 | Washer, Shut OFF Arm        |
| 154M        | 4822 492 41422 | Spring, Shut OFF Arm        |
| 155M        | 4822 528 50193 | Pulley, Counter Pulley      |
| 160M        | 4822 492 41419 | Spring, Leaf                |
| 174M        | 4822 532 11396 | Washer, Auto Stop Link      |
| 175M        | 4822 532 11296 | RG Ring, Auto Stop Link     |
| 176M        | 4822 492 41421 | Spring, Auto Stop Solenoid  |
| 177M        | 4822 502 12426 | L. Washer Screw L2.6 x 4    |
| 179M        | 4822 528 50326 | Motor Pulley 2400RPM        |
| 180M        | 4822 502 13775 | Screw, Motor                |
| 181M        | 4822 502 12426 | L. Washer Screw L2.6 x 4    |
| 183M        | 4822 532 11956 | Bushing, Motor              |
| 199M        | 4822 410 24504 | Button, Stop                |
| 200M        | 4822 410 24505 | Button, FWD                 |
| 201M        | 4822 410 24506 | Button, REW & FF            |
| 202M        | 4822 410 24507 | Button, Pause               |
| 203M        | 4822 410 24508 | Button, REC                 |
| 205M        | 4822 532 52212 | RG Ring, Button Shaft       |
| 218M        | 4822 358 30523 | Belt, Counter               |
| 219M        | 4822 528 60319 | Flywheel Ass'y, Main        |
| 220M        | 4822 528 60234 | Flywheel Ass'y, Sub         |
| 221M        | 4822 532 11291 | Washer, Under Flywheels     |
| 222M        | 4822 532 51805 | Spacer, Oil Fence           |
| 223M        | 4822 358 30533 | Belt, Drive                 |
| 229M        | 4822 358 30522 | Belt, Main                  |
| 230M        | 4822 403 52724 | Adjuster                    |
| 235M        | 4822 502 12426 | L. Washer Screw L2.6 x 4    |
| 239M        | 4822 403 52968 | Retainer                    |
| H071        | 4822 249 10436 | REC/Play Head               |
| H072        | 4822 249 40194 | Erase Head                  |
| L071        | 4822 281 30176 | Solenoid Coil, QMS Auto REW |
| L072        | 4822 281 30179 | Solenoid Coil, Auto Stop    |
| M071        | 4822 361 60338 | D.C. Motor                  |
| S071        | 4822 271 30701 | Mini Switch, Motor          |
| S072        | 4822 276 11618 | Mini Switch, F/R            |
| S073        | 4822 271 30699 | Mini Switch, Play/Stop      |
| S074        | 4822 271 30699 | Mini Switch, Pause          |
| S076        | 4822 349 50232 | Counter                     |

7. SHOCK, FIRE HAZARD SERVICE TEST

CAUTION: After servicing this appliance and prior to returning to customer, measure the resistance between either primary AC cord connector pins (with unit NOT connected to AC mains and its Power switch ON), and the face or front Panel of product and controls and chassis button.

Any resistance measurement less than 1 Megohms should cause unit to be repaired or corrected before AC power is applied, and verified before return to user/customer.

Ref. UL Standard NO. 1270. Para 66. 3. D (Mandatory Test after servicing Electrical Appliances, effective 7-1-83).

8. P.C. BOARDS

As can be seen from the circuit diagram, the chassis of your Cassette Recorder consists of the following units. Each unit mounted on a printed circuit board is described within the square enclosed by a bold dotted line on the circuit diagram.

1. Rec/Play Amp
2. Switch Board
3. Mecha Control
4. Speed Switch
5. Memory Switch
6. XLR Connector
- Mounted on P.C. Board PJ00
- Mounted on P.C. Board PS00
- Mounted on P.C. Board PM00
- Mounted on P.C. Board PS01
- Mounted on P.C. Board PM01
- Mounted on P.C. Board PE00

9. TEST EQUIPMENT REQUIRED FOR SERVICING

For measuring or checking your Cassette Deck, the following instruments and materials are necessary:

- VTVM
- Audio Oscillator (AF OSC)
- Attenuator (600 Ω)
- Oscilloscope
- Bandpass Filter (1 kHz)
- IEC A-Curve Filter
- Wow and Flutter Meter
- Torque Meter (Cassette Type)
- Digital Frequency Counter
- Distortion Meter
- Blank Tapes (Completely erased with bulk eraser)
- TDK AC-224 (Normal)
- TDK AC-513 (Special/CrO<sub>2</sub>)
- TDK AC-712 (Metal)

NOTE:  
If any doubt is noted in a measured value, use new tape.

- Test Tapes

(New Tape)

TCC-111•MTT-111

Wow and Flutter, Tape Speed

MTT-111-SP

Low Speed

TCC-140•MTT-112B

Signal-to-Noise Ratio

TCC-130•MTT-150

Adjustment of Output Level

TCC-161•MTT-256

Frequency Response (for Normal)

TCC-261•MTT-356

Frequency Response (for Special/CrO<sub>2</sub> and Metal)

TCC-192•MTT-121

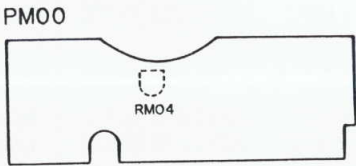
Cross Talk

TCC-194•MTT-141

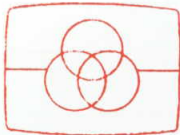
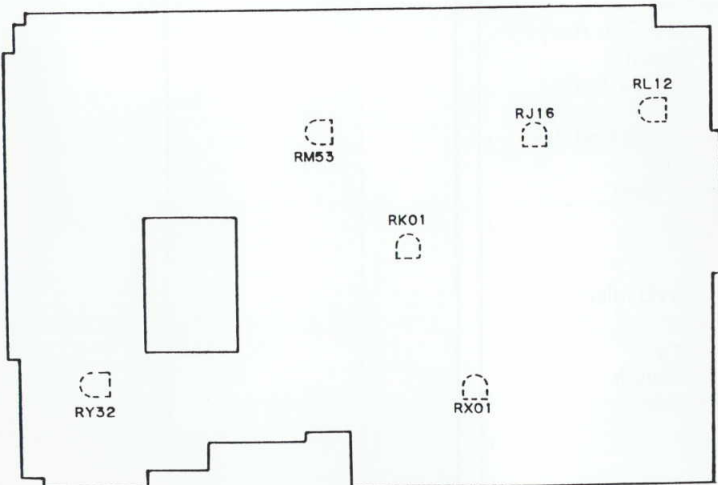
Channel Separation

(A-BEX)•(TEAC)

Alignment Points



PJ00



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10. MECHANISM AND CIRCUIT DESCRIPTION

10.1 Muting System

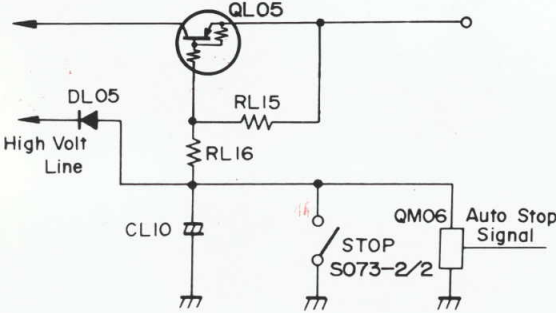
The muting circuit is provided to reduce the pops noise when generates on the Line Out at power ON/OFF.

1) When power is turned on . . . . .

As the emitter voltage of QL05 is higher than the base voltage during the charge current flows to CL10 through RL15 & RL16, QL05 is ON and it sends the muting voltage. CL10 has been charged up, both the base and the emitter voltages of QL05 are equal. QL05 is OFF and the muting is released.

2) When the STOP button is depressed . . . . .

When the stop switch S073-2/2 is ON, the base current flows through. Also discharging CL10, QL05 is ON instantly, the muting system operates to reduce the pops noise at power ON/OFF. QM06 provides to discharge CL10 on AUTO STOP. QM06 provides to discharge CL10 on FF and REW.



10.2 Auto Play and Automatic Rewind Stop

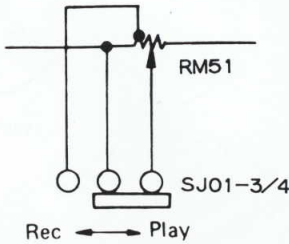
With SS01 set to ON during PLAY, the rewind button will lock when pressed. When counter reaches 999, the rewind lock releases and the PLAY operation resumes. In this condition, both CUE and REVIEW buttons do not operate and both buttons are locked. Also, when the FF button is pressed and locked in place, the lock releases when the counter reaches "900" and the PLAY mode is entered. When the tape has finished winding in both modes before the counter reaches the respective positions, the AUTO STOP function and all buttons are released. Also when the REWIND button alone is locked, the tape rewinds and rewind stops when the counter reaches "999". The same applies for fast forward operation which stops at "900". When the counter is between "900" and "999", both REWIND and FF buttons do not lock.

10.3 Auto Stop

The AUTO STOP function which detects the end of the tape is carried out by hole IC (QM07). The signal from QM07 is added to the pin ④ of QM08, while the auto stop duration is designated inside QM08. The time it takes for the auto stop function to activate after the tape stops, is determined in CM08. At this time TE is TE = 75 x CM08 (μF)mSec, while TW is TW = 30 x CM07 (μF)mSec as long as the auto stop function is operating. When it does not shut off the first time, TE--TW--TE--TW is repeated until it shuts off.

10.4 Pitch Control

The pitch control is used to vary the tape speed for playback operation. During recording, it is automatically set to the RM51 center position by SJ01-3/4

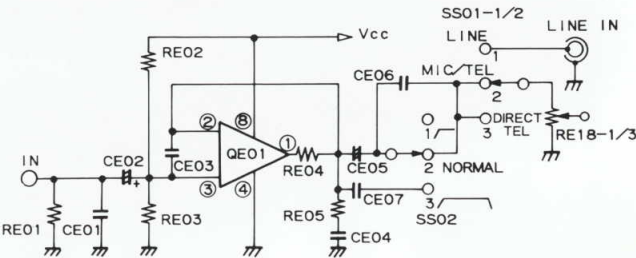


10.5 Ambient Noise Control (ANC)

ANC changes the bandwidth of the signals with the Mic Amp.

1. High pass
2. Normal
3. Band pass

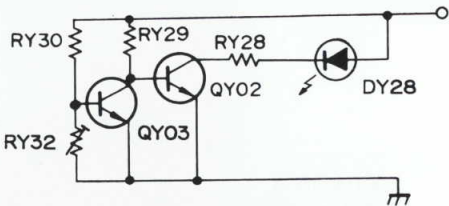
CE06 and RE18-1/3 determine the Low Frequency cut. The NF volume of CE07 determines the High Frequency cut.



10.6 Low Battery Indicator

This circuit illuminates the LED when the supply voltage level is attenuated.

The dividing ratio for RY30 and RY32 determines the voltage at which the light is illuminated. LED (DY28) is lit up when the base voltage of QY03 is less than about 0.6V.



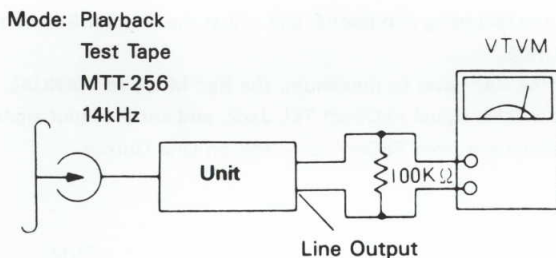
## 11. ELECTRICAL ADJUSTMENTS

### Precautions for Adjustment and Measurement

1. Before playing back the test tape, thoroughly demagnetize the heads, capstan and similar metal parts using an eraser, as the test tape-recorded tone is easily erased.
2. Do not place the test tape on any measuring instrument.
3. Do not put the test tape near a place where the eraser is used.
4. Method of Demagnetization: Turn the eraser power switch on at a position far away from the heads. Bring the eraser close to the heads, capstan and other parts to be demagnetized, and move it up and down four or five times to demagnetize. Slowly separate the eraser far away from the parts, and turn the power switch off.
5. Do not use any magnetized adjusting tool. If necessary, demagnetize with a bulk eraser from time to time in the course of each adjustment.
6. Do not turn semi-fixed resistor or coil more than needed.
7. Measure speed and wow and flutter in the normal operating state.
8. Do not apply locking bond excessively.

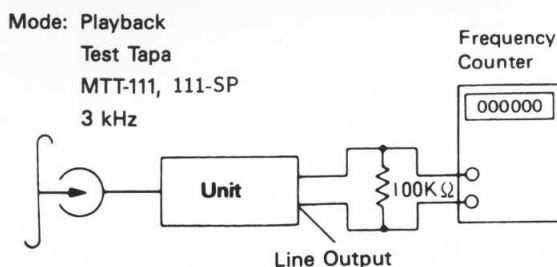
### 11.1 Head Azimuth Adjustment

1. Play the test tape MTT256 back. Adjust the head azimuth adjusting screw for maximum VTVM reading.
2. After adjustment, repeat the playback and stop settings several times to confirm no azimuth deviation.
3. After adjustment, lock the screws with bond.



### 11.2 Tape Speed Adjustment

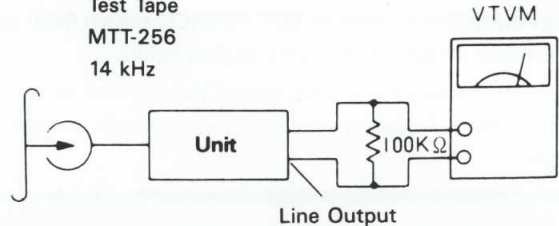
1. Adjust the RM51 to the center position.
2. Play the 3kHz signal of the test tape MTT-111 back.
3. Adjust the adjusting resistor (RM04) on the PM00 P.C. Board so that counter readings are between 2990 — 3010Hz.
4. Then, adjust the Speed Selector Switch to LOW PLAY, and play MTT-111-SP back.
5. Adjust the adjusting resistor (RM53) on the PJ00 P.C. Board so that the counter readings are between 2900 — 3010 Hz.



### 11.3 Playback Equalizer Measurement

1. Adjust the tape selector switch to NORMAL.
2. Play the 315Hz signal of the test tape MTT-256 back. The VTVM at 0dB.
3. Play the 12.5kHz signal of the test tape back. Confirm a frequency response of 0 to 2dB in reference to the 315Hz signal level. Then, play the 12.5kHz signal back. Set the tape selector to CrO<sub>2</sub>, Metal. Confirm the 12.5kHz signal readings at — 4.5dB, ± 1dB.

Mode: Playback  
Test Tape  
MTT-256  
14 kHz

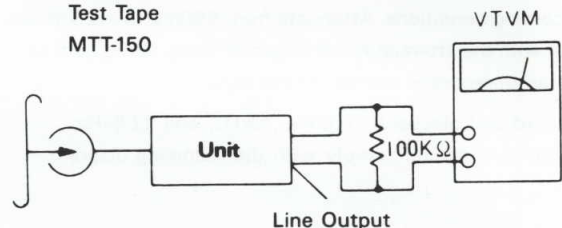


### 11.4 Playback Level Adjustment

1. Adjust the Tape Selector Switch to NORMAL and turn the NR switch OFF.
2. Play the test tape MTT-150 back. Adjust RJ16 on the PJ00 P.C. Board so that the voltage of Line output is 580mV.

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Mode: Playback  
Test Tape  
MTT-150



### 11.5 Level Meter Adjustment

1. Adjust the Tape Selector Switch to NORMAL.
2. Play the test tape MTT-150 back. Adjust RX01 on the PJ00 P.C. Board at 0dB Level Meter reading.

### 11.6 Playback Noise Measurement

1. Set the selector switch to NORMAL.
2. Play back the blank tape and make sure that the noise volume is below 2mV when the REC LEVEL Knob is set to both maximum and minimum.

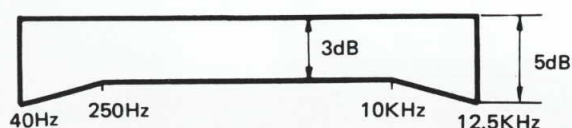
### NOTES:

1. Perform measurements when the power hum is at a minimum.
2. Perform measurements under conditions where induction noise will not affect measurements.

### 11.7 Record/Playback Frequency Response and Recording Level Adjustment

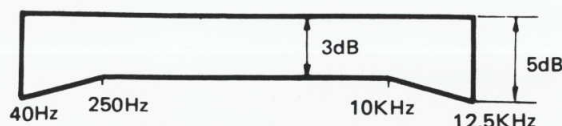
#### [NORMAL]

1. Set the tape selector switch to NORMAL.
2. Insert the AC-224 test tape in the cassette holder and set the recording conditions. (Set the monitor switch to SOURCE) and attenuate from 1kHz, 580mV to -25dB on Line Out.
3. Rewind and play the tape back, then set RL12 so that the level of 1kHz is brought within  $\pm 0.5$ dB.
4. When playing the tape back, set RK01 so that the level of 1kHz is the same as that on the Rec Monitor.  
Change the Monitor Switch to TAPE SOURCE, and set RK01 so that the level of 1kHz is the same as that before.
5. After making these adjustments, record and play back at 1kHz, 10kHz, 12.5kHz. Make sure results comply with the following diagram.



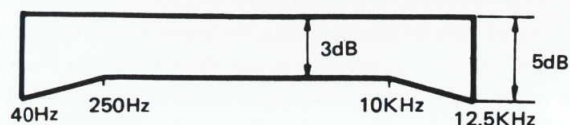
#### [CrO<sub>2</sub>]

1. Set the tape selector switch to CrO<sub>2</sub>.
2. Insert the AC-513 test tape in the cassette holder and set the recording conditions. Attenuate from 580mV to -25dB on Line Out with the attenuator and record at 1kHz, 10kHz, and 12.5kHz on an unrecorded section of the tape.
3. Record and playback at 1kHz, 10kHz, and 12.5kHz.  
Make sure results comply with the following diagram.



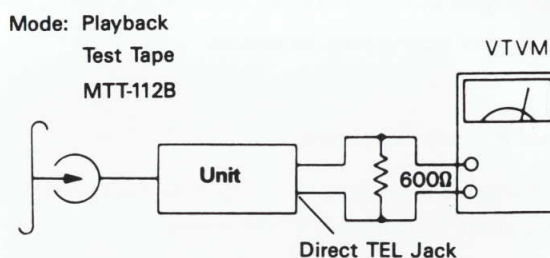
#### [METAL]

1. Adjust the Tape Selector Switch to METAL.
2. Load the test tape AC-712 into cassette holder. Perform measurements as with CrO<sub>2</sub>, and make sure they conform with the Chart.



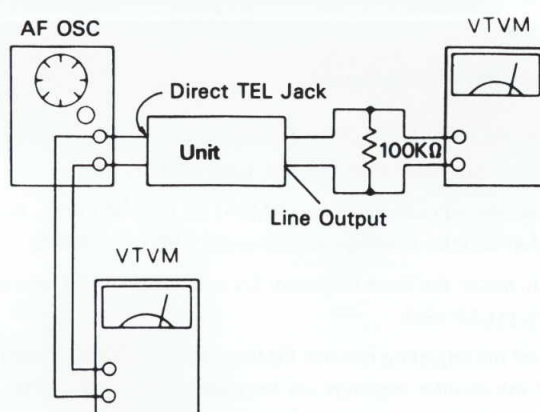
### 11.8 Direct Telephone Output Measurement

1. Play the test Tape MTT-112B back.
2. Perform measurements of the output voltage on the Direct TEL Jack, when the Monitor volume is at the maximum setting.



### 11.9 Direct Telephone Input Measurement

1. Set the recording conditions, and adjust the Monitor Switch to SOURCE.
2. Set the Rec Level to maximum, the Rec Mode to MANUAL.
3. Add a 1kHz signal to Direct TEL Jack, and set the input signal to attenuate from 580mV to -3dB on Line Output.



## 12. ELECTRICAL PARTS LIST

### ASSIGNMENT OF COMMON PARTS CODES.

#### RESISTOR

**R\*\*\***: (1) GD05 --- 140, Carbon film fixed resistor,  $\pm 5\%$ , 1/4W

**R\*\*\***: (2) GD05 --- 160, Carbon film fixed resistor,  $\pm 5\%$ , 1/6W

① — Resistance value

#### Examples

① Resistance value

|                     |                     |                      |                      |
|---------------------|---------------------|----------------------|----------------------|
| 0.1 $\Omega$ ...001 | 10 $\Omega$ ...100  | 1k $\Omega$ ...102   | 100k $\Omega$ ...104 |
| 0.5 $\Omega$ ...005 | 18 $\Omega$ ...180  | 2.7k $\Omega$ ...272 | 680k $\Omega$ ...684 |
| 1 $\Omega$ ...010   | 100 $\Omega$ ...101 | 10k $\Omega$ ...103  | 1M $\Omega$ ...105   |
| 6.8 $\Omega$ ...068 | 390 $\Omega$ ...391 | 22k $\Omega$ ...223  | 4.7M $\Omega$ ...475 |

(Note) Please distinguish 1/4W from 1/6W by the shape of parts used actually.

#### C\*\*\*: CERAMIC CAP.

(1) DD1 --- 370, Ceramic condenser

① ② Disc type

Temp. coeff. P350 ~ N1000, 50V

Capacity value  
Tolerance

#### Examples

① Tolerance (Capacity deviation)

$\pm 0.25\text{pF}$ ...0

$\pm 0.5\text{pF}$ ...1

$\pm 5\%$ ...5

\* Tolerance of COMMON PARTS handled here are as follows:

0.5pF ~ 5pF... $\pm 0.25\text{pF}$

6pF ~ 10pF... $\pm 0.5\text{pF}$

12pF ~ 560pF... $\pm 5\%$

② Capacity value

0.5pF...005 3pF...030 100pF...101

1pF...010 10pF...100 220pF...221

1.5pF...015 47pF...470 560pF...561

#### C\*\*\*: CERAMIC CAP.

(1) DK16 --- 300, High dielectric constant ceramic condenser

① Disc type

Temp. chara. 2B4, 50V

Capacity value

#### Example

② Capacity value

100pF...101 1000pF...102 10000pF...103

470pF...471 2200pF...222

#### C\*\*\*: ELECTROLY CAP. ( $\text{---}$ ), FILM CAP. ( $\text{---}$ )

(1) EA --- 10, Electrolytic condenser

① ② One-way lead type, Tolerance  $\pm 20\%$

Dielectric strength  
Capacity value

#### Examples

① Capacity value

0.1 $\mu\text{F}$ ...104 4.7 $\mu\text{F}$ ...475 100 $\mu\text{F}$ ...107

0.33 $\mu\text{F}$ ...334 10 $\mu\text{F}$ ...106 330 $\mu\text{F}$ ...337

1 $\mu\text{F}$ ...105 22 $\mu\text{F}$ ...226 1100 $\mu\text{F}$ ...108

2200 $\mu\text{F}$ ...228

② Working voltage

6.3V...006 25V...025

10V...010 35V...035

16V...016 50V...050

(2) DF15 --- 350, Plastic film condenser

① One-way type, Mylar  $\pm 5\%$  50V

Capacity value

#### Examples

① Capacity value

0.001 $\mu\text{F}$  (1000pF)...102 0.1 $\mu\text{F}$ ...104

0.0018 $\mu\text{F}$ ...182 0.56 $\mu\text{F}$ ...564

0.01 $\mu\text{F}$ ...103 1 $\mu\text{F}$ ...105

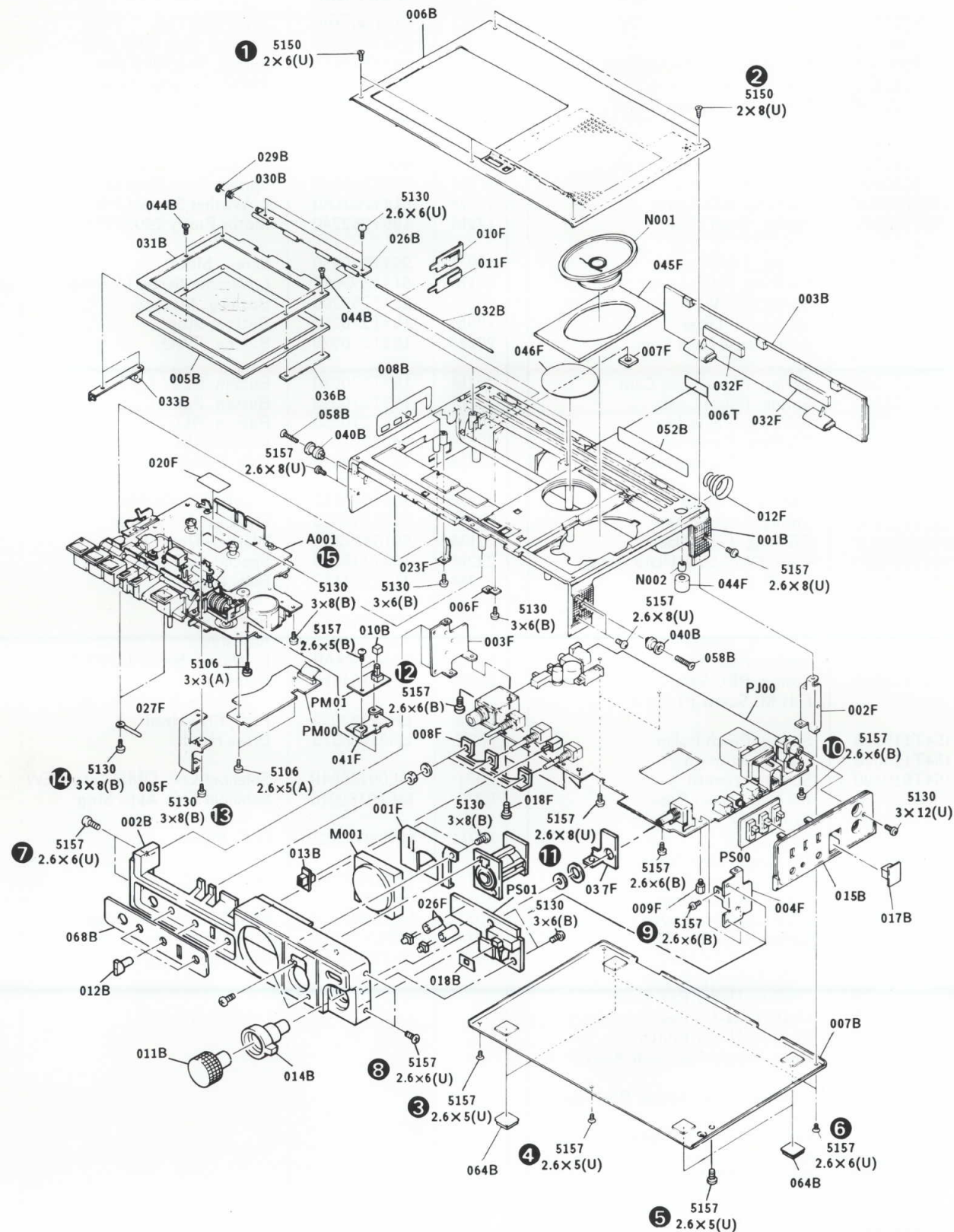
0.015 $\mu\text{F}$ ...153

| REF. DESIG. | PART NO.       | DESCRIPTION                             |
|-------------|----------------|-----------------------------------------|
|             |                | <b>PE00-XLR CONNECTOR CIRCUIT BOARD</b> |
|             |                | <b>PE00-MISCELLANEOUS</b>               |
| JE11        | 4822 267 31358 | Jack XLR Connector                      |
|             |                | <b>PJ00-REC/PLAY AMP CIRCUIT BOARD</b>  |
|             |                | <b>PJ00-CAPACITORS</b>                  |
| CG02        | 4822 121 43655 | Film 0.47 $\mu\text{F}$ $\pm 10\%$      |
| CJ01        | 5322 122 31626 | Ceramic 100pF $\pm 5\%$                 |
| CJ41        | 4822 122 10367 | Ceramic 150pF $\pm 5\%$                 |
| CL07        | 4822 121 42768 | Film 0.012 $\mu\text{F}$ $\pm 5\%$      |
|             |                | <b>PJ00-RESISTORS</b>                   |
| R702        | 4822 100 30096 | 10K $\Omega$ (A) Variable               |
| R707        | 4822 100 30099 | 10K $\Omega$ (W) Variable               |
| RE18        | 4822 101 50283 | 20K $\Omega$ (A) VR-SW Component        |
| RG06        | 4822 050 24701 | 470 $\Omega$ $\pm 5\%$ 1/2W             |
| RJ16        | 4822 100 11352 | 22K $\Omega$ (B) Trimming               |
| RK01        | 4822 100 11352 | 22K $\Omega$ (B) Trimming               |
| RL12        | 4822 100 11471 | 100K $\Omega$ (B) Trimming              |
| RM51        | 4822 100 30098 | 500 $\Omega$ Variable                   |
| RM53        | 4822 100 11386 | 1K $\Omega$ Trimming                    |
| RX01        | 4822 100 11471 | 100K $\Omega$ (B) Trimming              |
| RY32        | 4822 100 11352 | 22K $\Omega$ (B) Trimming               |
|             |                | <b>PJ00-SEMICONDUCTORS</b>              |
| DE01        | 4822 130 33305 | Diode 1SS133                            |
| DE02        | 4822 130 33305 | Diode 1SS133                            |
| DE03        | 4822 130 33305 | Diode 1SS133                            |
| DG01        | 4822 130 80317 | Zener RD-5.1                            |
| DG02        | 4822 130 80317 | Zener RD-5.1                            |
| DK01        | 4822 130 33305 | Diode 1SS133                            |
| DK02        | 4822 130 33305 | Diode 1SS133                            |
| DK03        | 4822 130 33305 | Diode 1SS133                            |
| DL01        | 4822 130 33305 | Diode 1SS133                            |
| DL05        | 4822 130 33305 | Diode 1SS133                            |
| DL06        | 4822 130 33759 | Zener RD-4.7J-B2                        |
| DL07        | 4822 130 33305 | Diode 1SS133                            |
| DM51        | 4822 130 80272 | Zener RD-7.5J-B2                        |
| DX01        | 4822 130 33305 | Diode 1SS133                            |
| DY39        | 4822 130 33305 | Diode 1SS133                            |
| Q701        | 4822 209 62229 | IC BA527                                |
| QE01        | 4822 209 83631 | IC NJM4558 DD                           |
| QE02        | 4822 130 43313 | Transistor 2SC3312(R,S),etc             |
| QE03        | 4822 130 43313 | Transistor 2SC3312(R,S),etc             |
| QE04        | 4822 130 43313 | Transistor 2SC3312(R,S),etc             |
| QG01        | 4822 130 43313 | Transistor 2SC3312(R,S),etc             |

| REF. DESIG.               | PART NO.       | DESCRIPTION                  |
|---------------------------|----------------|------------------------------|
| QJ01                      | 4822 130 43313 | Transistor 2SC3312(R,S),etc. |
| QJ02                      | 4822 130 43313 | Transistor 2SC3312(R,S),etc. |
| QJ03                      | 4822 130 42594 | Transistor,Digital DTC144ES  |
| QJ04                      | 4822 130 61189 | Transistor,Digital DTC114TS  |
| QJ31                      | 4822 130 42594 | Transistor,Digital DTC144ES  |
| QK01                      | 4822 209 83631 | IC, NJM4558 DD               |
| QK02                      | 4822 130 42594 | Transistor,Digital DTC144ES  |
| QK03                      | 4822 130 42594 | Transistor,Digital DTC144ES  |
| QK04                      | 4822 130 42594 | Transistor,Digital DTC144ES  |
| QK31                      | 4822 130 42594 | Transistor,Digital DTC144ES  |
| QK32                      | 4822 130 42594 | Transistor,Digital DTC144ES  |
| QK33                      | 4822 130 42594 | Transistor,Digital DTC144ES  |
| QL01                      | 4822 130 43347 | Transistor 2SD471 L          |
| QL02                      | 4822 130 43347 | Transistor 2SD471 L          |
| QL03                      | 4822 130 43347 | Transistor 2SD471 L          |
| QL04                      | 4822 130 43313 | Transistor 2SC3312(R,S),etc. |
| QL05                      | 4822 130 42682 | Transistor,Digital DTA144ES  |
| QL06                      | 4822 130 42682 | Transistor,Digital DTA144ES  |
| QL07                      | 4822 130 42682 | Transistor,Digital DTA144ES  |
| QL08                      | 4822 130 43347 | Transistor 2SD471 L          |
| QL31                      | 4822 130 61189 | Transistor,Digital DTC114TS  |
| QM51                      | 4822 130 43313 | Transistor 2SC3312(R,S),etc. |
| QM52                      | 4822 130 43313 | Transistor 2SC3312(R,S),etc. |
| QM53                      | 4822 130 43313 | Transistor 2SC3312(R,S),etc. |
| QN01                      | 4822 209 83631 | IC, NJM4558 DD               |
| QN02                      | 4822 130 61189 | Transistor,Digital DTC114TS  |
| QX01                      | 4822 130 43313 | Transistor 2SC3312(R,S),etc. |
| QX02                      | 4822 130 43313 | Transistor 2SC3312(R,S),etc. |
| QY01                      | 4822 130 42594 | Transistor,Digital DTC144ES  |
| QY02                      | 4822 130 43313 | Transistor 2SC3312(R,S),etc. |
| QY03                      | 4822 130 43313 | Transistor 2SC3312(R,S),etc. |
| QY38                      | 4822 130 43313 | Transistor 2SC3312(R,S),etc. |
| <b>PJ00-MISCELLANEOUS</b> |                |                              |
| J701                      | 4822 267 31175 | Jack Headphone               |
| J702                      | 4822 267 31172 | Jack Ext SP                  |
| JE01                      | 4822 267 31172 | Jack Tel Pick up             |
| JG01                      | 4822 267 30604 | Terminal Pin Jack 2P         |
| JG02                      | 4822 267 31173 | Jack TEL                     |
| JG03                      | 4822 265 10111 | Jack Connector               |
| JL01                      | 4822 265 10069 | Jack Connector               |
| JL02                      | 4822 265 10085 | Jack DC IN                   |
| JM51                      | 4822 267 31174 | Jack Remote                  |
| JY01                      | 4822 265 30805 | Jack Connector               |
| LJ41                      | 4822 157 53521 | Choke Coil 22mH              |
| LK01                      | 4822 157 62213 | Choke Coil 5.6mH             |
| LK02                      | 4822 156 10845 | Choke Coil Bias Trap 85kHz   |
| LL01                      | 4822 157 62205 | Osc Transf. Bias Osc Coil    |
| LL02                      | 4822 156 10676 | Choke Coil 47 $\mu$ H        |
| LL05                      | 4822 146 10145 | Osc Transf. DC-DC Converter  |
| LL06                      | 4822 156 10676 | Choke Coil 47 $\mu$ H        |
| LL07                      | 4822 157 62204 | Choke Coil 1mH               |
| S701                      | 4822 277 30749 | Slide Switch, Speaker ON/OFF |
| SG01                      | 4822 276 20355 | Push Switch, T/S             |

| REF. DESIG.                                 | PART NO.       | DESCRIPTION                 |
|---------------------------------------------|----------------|-----------------------------|
| SJ01                                        | 4822 277 21391 | Slide Switch, Rec/Play      |
| SK01                                        | 4822 273 10207 | Rotary Switch, Rec Mode     |
| SK02                                        | 4822 277 21388 | Slide Switch, Tape Select   |
| TG01                                        | 4822 140 10387 | Transformer, TEL IN/OUT     |
| <b>PM00-MECHA CONTROL CIRCUIT BOARD</b>     |                |                             |
| <b>PM00-CPACITORS</b>                       |                |                             |
| CM01                                        | 4822 124 21899 | Elect 4.7 $\mu$ F 25V       |
| CM04                                        | 4822 124 21894 | Elect 10 $\mu$ F 16V        |
| CM05                                        | 4822 124 21894 | Elect 10 $\mu$ F 16V        |
| CM06                                        | 4822 124 41242 | Elect 100 $\mu$ F 10V       |
| CM07                                        | 4822 122 32678 | Elect 22 $\mu$ F 6.3V       |
| CM08                                        | 4822 124 41244 | Elect 33 $\mu$ F 6.3V       |
| CM10                                        | 4822 124 21736 | Elect 1 $\mu$ F 50V         |
| <b>PM00-RESISTORS</b>                       |                |                             |
| RM01                                        | 4822 115 90189 | 0.5 $\Omega$ $\pm$ 5% 1/2W  |
| RM03                                        | 4822 115 90191 | 10k $\Omega$ $\pm$ 5% 1/2W  |
| RM04                                        | 4822 101 30706 | 3.3k $\Omega$ (B) Trimming  |
| RM13                                        | 4822 116 60204 | 4.7 $\Omega$ $\pm$ 5% 1W    |
| <b>PM00-SEMICONDUCTORS</b>                  |                |                             |
| DM01                                        | 4822 130 43408 | Diode Chip MA151WK          |
| DM02                                        | 4822 130 32508 | Diode RL103E,etc 200V 1A    |
| DM03                                        | 4822 130 43408 | Diode Chip MA151WK          |
| DM04                                        | 4822 130 43408 | Diode Chip MA151WK          |
| DM05                                        | 4822 130 43408 | Diode Chip MA151WK          |
| DM06                                        | 4822 130 43408 | Diode Chip MA151WK          |
| DM07                                        | 4822 130 43408 | Diode Chip MA151WK          |
| DM08                                        | 4822 130 32874 | Zener MA3075                |
| QM01                                        | 4822 209 83693 | IC AN6612                   |
| QM02                                        | 5322 130 61158 | Transistor 2SA881           |
| QM03                                        | 4822 130 60749 | Transistor 2SD1328 R,S Chip |
| QM04                                        | 4822 130 62236 | Transistor,Digital DTC124EK |
| QM05                                        | 4822 130 60749 | Transistor 2SD1328 R,S Chip |
| QM06                                        | 4822 130 62236 | Transistor,Digital DTC124EK |
| QM07                                        | 4822 209 82278 | IC DN6864                   |
| QM08                                        | 4822 209 83699 | IC BA668                    |
| <b>PM01-MEMORY SW CIRCUIT BOARD</b>         |                |                             |
| <b>PM01-MISCELLANEOUS</b>                   |                |                             |
| SM01                                        | 4822 413 20147 | Push Switch Memory Rew.     |
| <b>PS00-INPUT SELECT CIRCUIT BOARD</b>      |                |                             |
| <b>PS00-MISCELLANEOUS</b>                   |                |                             |
| SS01                                        | 4822 277 21389 | Slide Switch Input Select   |
| SS02                                        | 4822 277 21389 | Slide Switch Anc Select     |
| SS03                                        | 4822 277 21389 | Slide Switch Mic Att.       |
| <b>PS01-TAPE SPEED SELECT CIRCUIT BOARD</b> |                |                             |
| <b>PS01-SEMICONDUCTORS</b>                  |                |                             |
| DY08                                        | 4822 130 81358 | LED Rec Ind. LN228PR        |
| DY28                                        | 4822 130 33173 | LED Batt Ind. LN222RP       |
| DY38                                        | 4822 130 33173 | LED Peak Ind. LN222RP       |
| <b>PS01-MISCELLANEOUS</b>                   |                |                             |
| SS04                                        | 4822 277 30751 | Slide Switch Tape Speed     |

## DISASSEMBLY



1. Removing the cover(A) : Top (006B)  
Remove the 5 screws **①** and **②**.
2. Removing the cover(B) : Bottom (007B)  
Remove the 5 screws **③**, **④**, **⑤** and **⑥**.
3. Removing the front panel (002B)
  - 1) Remove the knob (011B), (014B) and (012B).
  - 2) Remove the 4 screws **⑦** and **⑧**.
4. Removing the main P.C. Board (PJ00)
  - 1) Remove the stud (009F)
  - 2) Remove the 6 screws **⑨**, **⑩**, **⑪** and **⑫**.
5. Removing the mechanism (A001)  
Remove the 4 screws **⑬**, **⑭** and **⑮**.

| REF. DESIG. | PART NO.   | DESCRIPTION                        |
|-------------|------------|------------------------------------|
| 001B        | 153T064060 | Case (A), Top                      |
| 002B        | 436T248010 | Front Panel                        |
| 003B        | 153T257010 | Lid, Battery                       |
| 005B        | 436T257030 | Lid, (C) Cassette                  |
| 006B        | 436T053010 | Cover (A), Top                     |
| 007B        | 436T053020 | Cover (B), Bottom                  |
| 008B        | 196T861110 | Label, Case (A)                    |
| 010B        | 196T270010 | Memory REW Button                  |
| 011B        | 436T154010 | Knob, REC Level                    |
| 012B        | 153T154130 | Knob, LEVEL, TONE, PITCH, REC MODE |
| 013B        | 153T154040 | Knob, TAPE, SOURCE                 |
| 014B        | 436T154020 | Knob REC mode mold                 |
| 015B        | 436T265020 | Indicator, For Side(R)             |
| 018B        | 436T303010 | Indicator For Tape speed           |
| 026B        | 153T153500 | Hinge Ass'y (A)                    |
| 029B        | 64002500R0 | RG Ring, E                         |
| 030B        | 153T115090 | Spring                             |
| 031B        | 153T153020 | Hinge (B)                          |
| 040B        | 153T055010 | Collar                             |
| 044B        | 51840204S0 | F.H.M. Screw F2 × 4                |
| 058B        | 51580318U0 | F.H.M. Screw F3 × 18               |
| 064B        | 153T057000 | Leg, Cover (B)                     |
| 068B        | 436T265010 | Indicator Front                    |
| 010F        | 153T129010 | Terminal (+)                       |
| 011F        | 153T129020 | Terminal                           |
| 012F        | YL11010090 | Terminal (-)                       |
| 018F        | 51592605B0 | P. Tapped Screw P2.6 × 4           |
| 020F        | 251T274010 | Reflector                          |
| 023F        | 153T115100 | Spring                             |
| A001        |            | Mechanism Assembly                 |
| M001        | IM31040030 | V.U. Meter                         |
| N001        | QJ72478010 | Speaker 4Ω 0.5W                    |
| N002        | MS50000150 | Mic Unit, ECM                      |
| 001T        | 436T851210 | User Manual                        |
| 001V        | 153T156010 | Strap                              |
| ZA01        | AA12005020 | A.C. Adaptor                       |



| REF.<br>DESIG. | PART NO.   | DESCRIPTION                 |
|----------------|------------|-----------------------------|
| 152M           | 242T00210R | Arm, Shut Off               |
| 153M           | 254T012230 | Washer, Shut OFF Arm        |
| 154M           | 153T115040 | Spring, Shut OFF Arm        |
| 155M           | 153T262020 | Pulley, Counter Pulley      |
| 160M           | 153T115020 | Spring, Leaf                |
| 174M           | 59050805G9 | Washer, Auto Stop Link      |
| 175M           | 64000400LR | RG Ring, Auto Stop Link     |
| 176M           | 153T115030 | Spring, Auto Stop Solenoid  |
| 177M           | 51442604A0 | L. Washer Screw L2.6 × 4    |
| 179M           | 195T262240 | Motor Pulley 2400RPM        |
| 180M           | 254T010250 | Screw, Motor                |
| 181M           | 51442604A0 | L. Washer Screw L2.6 × 4    |
| 183M           | 254T259200 | Bushing, Motor              |
| 199M           | 153T270010 | Button, Stop                |
| 200M           | 153T270020 | Button, FWD                 |
| 201M           | 153T270030 | Button, REW & FF            |
| 202M           | 153T270040 | Button, Pause               |
| 203M           | 153T270050 | Button, REC                 |
| 205M           | 64000200L0 | RG Ring, Button Shaft       |
| 218M           | 153T264020 | Belt, Counter               |
| 219M           | 153T273110 | Flywheel Ass'y, Main        |
| 220M           | 153T273020 | Flywheel Ass'y, Sub         |
| 221M           | 59163202G9 | Washer, Under Flywheels     |
| 222M           | 153T118110 | Spacer, Oil Fence           |
| 223M           | 242T26412R | Belt, Drive                 |
| 229M           | 153T264010 | Belt, Main                  |
| 230M           | 153T164010 | Adjuster                    |
| 235M           | 51442604A0 | L. Washer Screw L2.6 × 4    |
| 239M           | 153T104010 | Retainer                    |
| H071           | LH82162030 | REC/Play Head               |
| H072           | LH31000570 | Erase Head                  |
| L071           | ME0014004R | Solenoid Coil, QMS Auto REW |
| L072           | ME10180010 | Solenoid Coil, Auto Stop    |
| M071           | MM00450020 | D.C. Motor                  |
| S071           | SM02010180 | Mini Switch, Motor          |
| S072           | SM0101114R | Mini Switch, F/R            |
| S073           | SM0101121R | Mini Switch, Play/Stop      |
| S074           | SM0101121R | Mini Switch, Pause          |
| S076           | 153T052010 | Counter                     |

## 14. ELECTRICAL PARTS LIST (U.S.A. only)

## ASSIGNMENT OF COMMON PARTS CODES.

## RESISTOR

- R\*\*\*:** (1) GD05 --- 140, Carbon film fixed resistor,  $\pm 5\%$ , 1/4W  
**R\*\*\*:** (2) GD05 --- 160, Carbon film fixed resistor,  $\pm 5\%$ , 1/6W

① — Resistance value

## Examples

## ① Resistance value

|                     |                     |                      |                      |
|---------------------|---------------------|----------------------|----------------------|
| 0.1 $\Omega$ ...001 | 10 $\Omega$ ...100  | 1k $\Omega$ ...102   | 100k $\Omega$ ...104 |
| 0.5 $\Omega$ ...005 | 18 $\Omega$ ...180  | 2.7k $\Omega$ ...272 | 680k $\Omega$ ...684 |
| 1 $\Omega$ ...010   | 100 $\Omega$ ...101 | 10k $\Omega$ ...103  | 1M $\Omega$ ...105   |
| 6.8 $\Omega$ ...068 | 390 $\Omega$ ...391 | 22k $\Omega$ ...223  | 4.7M $\Omega$ ...475 |

(Note) Please distinguish 1/4W from 1/6W by the shape of parts used actually.

**C\*\*\*:** CERAMIC CAP.

- (1) DD1 --- 370, Ceramic condenser

Disc type  
Temp. coeff. P350 ~ N1000, 50V

① ②  
Capacity value  
Tolerance

## Examples

## ① Tolerance (Capacity deviation)

|                          |
|--------------------------|
| $\pm 0.25\text{pF}$ ...0 |
| $\pm 0.5\text{pF}$ ...1  |
| $\pm 5\%$ ...5           |

\* Tolerance of COMMON PARTS handled here are as follows:

|                                    |
|------------------------------------|
| 0.5pF ~ 5pF... $\pm 0.25\text{pF}$ |
| 6pF ~ 10pF... $\pm 0.5\text{pF}$   |
| 12pF ~ 560pF... $\pm 5\%$          |

## ② Capacity value

|             |            |             |
|-------------|------------|-------------|
| 0.5pF...005 | 3pF...030  | 100pF...101 |
| 1pF...010   | 10pF...100 | 220pF...221 |
| 1.5pF...015 | 47pF...470 | 560pF...561 |

**C\*\*\*:** CERAMIC CAP.

- (1) DK16 --- 300, High dielectric constant ceramic condenser

Disc type  
Temp. chara. 2B4, 50V

①  
Capacity value

## Example

## ② Capacity value

|             |              |               |
|-------------|--------------|---------------|
| 100pF...101 | 1000pF...102 | 10000pF...103 |
| 470pF...471 | 2200pF...222 |               |

**C\*\*\*:** ELECTROLY CAP. (  $\nabla$  ), FILM CAP. (  $\nabla$  )

- (1) EA --- 10, Electrolytic condenser  
One-way lead type, Tolerance  $\pm 20\%$

① ②  
Dielectric strength  
Capacity value

## Examples

## ① Capacity value

|                           |                          |                           |
|---------------------------|--------------------------|---------------------------|
| 0.1 $\mu\text{F}$ ...104  | 4.7 $\mu\text{F}$ ...475 | 100 $\mu\text{F}$ ...107  |
| 0.33 $\mu\text{F}$ ...334 | 10 $\mu\text{F}$ ...106  | 330 $\mu\text{F}$ ...337  |
| 1 $\mu\text{F}$ ...105    | 22 $\mu\text{F}$ ...226  | 1100 $\mu\text{F}$ ...108 |
|                           |                          | 2200 $\mu\text{F}$ ...228 |

## ② Working voltage

|            |           |
|------------|-----------|
| 6.3V...006 | 25V...025 |
| 10V...010  | 35V...035 |
| 16V...016  | 50V...050 |

- (2) DF15 --- 350, Plastic film condenser

One-way type, Mylar  $\pm 5\%$  50V

①  
Capacity value

## Examples

## ① Capacity value

|                                    |                           |
|------------------------------------|---------------------------|
| 0.001 $\mu\text{F}$ (1000pF)...102 | 0.1 $\mu\text{F}$ ...104  |
| 0.0018 $\mu\text{F}$ ...182        | 0.56 $\mu\text{F}$ ...564 |
| 0.01 $\mu\text{F}$ ...103          | 1 $\mu\text{F}$ ...105    |
| 0.015 $\mu\text{F}$ ...153         |                           |

| REF. DESIG. | PART NO.   | DESCRIPTION                                                                                                                                              |
|-------------|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
|             |            | <b>PE00-XLR CONNECTOR CIRCUIT BOARD</b>                                                                                                                  |
|             |            | <b>PE00-MISCELLANEOUS</b><br>Jack XLR Connector                                                                                                          |
|             |            | <b>PJ00-REC/PLAY AMP CIRCUIT BOARD</b>                                                                                                                   |
|             |            | <b>PJ00-CAPACITORS</b><br>Film 0.47 $\mu\text{F}$ $\pm 10\%$<br>Ceramic 100pF $\pm 5\%$<br>Ceramic 150pF $\pm 5\%$<br>Film 0.012 $\mu\text{F}$ $\pm 5\%$ |
|             |            | <b>PJ00-RESISTORS</b><br>10K $\Omega$ (A) Variable<br>10K $\Omega$ (W) Variable                                                                          |
| JE11        | YJ01003480 |                                                                                                                                                          |
| CG02        | DF16474530 |                                                                                                                                                          |
| CJ01        | DD15101300 |                                                                                                                                                          |
| CJ41        | DD15151300 |                                                                                                                                                          |
| CL07        | DF15123550 |                                                                                                                                                          |
| R702        | RK01030520 |                                                                                                                                                          |
| R707        | RM01030270 |                                                                                                                                                          |
| RE18        | BR02030020 | 20K $\Omega$ (A) VR-SW Component                                                                                                                         |
| RG06        | GG05471120 | 470 $\Omega$ $\pm 5\%$ 1/2W                                                                                                                              |
| RJ16        | RA02230780 | 22K $\Omega$ (B) Trimming                                                                                                                                |
| RK01        | RA02230780 | 22K $\Omega$ (B) Trimming                                                                                                                                |
| RL12        | RA01040780 | 100K $\Omega$ (B) Trimming                                                                                                                               |
| RM51        | RK05010060 | 500 $\Omega$ Variable                                                                                                                                    |
| RM53        | RA01020780 | 1K $\Omega$ Trimming                                                                                                                                     |
| RX01        | RA01040780 | 100K $\Omega$ (B) Trimming                                                                                                                               |
| RY32        | RA02230780 | 22K $\Omega$ (B) Trimming                                                                                                                                |
|             |            | <b>PJ00-SEMICONDUCTORS</b>                                                                                                                               |
| DE01        | HD20002000 | Diode 1SS133                                                                                                                                             |
| DE02        | HD20002000 | Diode 1SS133                                                                                                                                             |
| DE03        | HD20002000 | Diode 1SS133                                                                                                                                             |
| DG01        | HD30511000 | Zener RD-5.1                                                                                                                                             |
| DG02        | HD30511000 | Zener RD-5.1                                                                                                                                             |
| DK01        | HD20002000 | Diode 1SS133                                                                                                                                             |
| DK02        | HD20002000 | Diode 1SS133                                                                                                                                             |
| DK03        | HD20002000 | Diode 1SS133                                                                                                                                             |
| DL01        | HD20002000 | Diode 1SS133                                                                                                                                             |
| DL05        | HD20002000 | Diode 1SS133                                                                                                                                             |
| DL06        | HD30471000 | Zener RD-4.7J-B2                                                                                                                                         |
| DL07        | HD20002000 | Diode 1SS133                                                                                                                                             |
| DM51        | HD30751000 | Zener RD-7.5J-B2                                                                                                                                         |
| DX01        | HD20002000 | Diode 1SS133                                                                                                                                             |
| DY39        | HD20002000 | Diode 1SS133                                                                                                                                             |
| Q701        | HC10055210 | IC BA527                                                                                                                                                 |
| QE01        | HC10008090 | IC NJM4558 DD                                                                                                                                            |
| QE02        | HT30002000 | Transistor 2SC3312(R,S),etc                                                                                                                              |
| QE03        | HT30002000 | Transistor 2SC3312(R,S),etc                                                                                                                              |
| QE04        | HT30002000 | Transistor 2SC3312(R,S),etc                                                                                                                              |
| QG01        | HT30002000 | Transistor 2SC3312(R,S),etc                                                                                                                              |

| REF. DESIG. | PART NO.   | DESCRIPTION                  | REF. DESIG. | PART NO.   | DESCRIPTION                                 |
|-------------|------------|------------------------------|-------------|------------|---------------------------------------------|
| QJ01        | HT30002000 | Transistor 2SC3312(R,S),etc. | SJ01        | SS06020570 | Slide Switch, Rec/Play                      |
| QJ02        | HT30002000 | Transistor 2SC3312(R,S),etc. | SK01        | SR02030130 | Rotary Switch, Rec Mode                     |
| QJ03        | BA20012210 | Transistor,Digital DTC144ES  | SK02        | SS02030230 | Slide Switch, Tape Select                   |
| QJ04        | BA20017210 | Transistor,Digital DTC114TS  |             |            |                                             |
| QJ31        | BA20012210 | Transistor,Digital DTC144ES  | TG01        | TO12414010 | Transformer, TEL IN/OUT                     |
| QK01        | HC10008090 | IC NJM4558 DD                |             |            | <b>PM00-MECHA CONTROL CIRCUIT BOARD</b>     |
| QK02        | BA20012210 | Transistor,Digital DTC144ES  |             |            | <b>PM00-CPACITORS</b>                       |
| QK03        | BA20012210 | Transistor,Digital DTC144ES  | CM01        | EJ47502510 | Elect 4.7 $\mu$ F 25V                       |
| QK04        | BA20012210 | Transistor,Digital DTC144ES  | CM04        | EJ10601610 | Elect 10 $\mu$ F 16V                        |
| QK31        | BA20012210 | Transistor,Digital DTC144ES  | CM05        | EJ10601610 | Elect 10 $\mu$ F 16V                        |
| QK32        | BA20012210 | Transistor,Digital DTC144ES  | CM06        | EJ10701010 | Elect 100 $\mu$ F 10V                       |
| QK33        | BA20012210 | Transistor,Digital DTC144ES  | CM07        | EJ22600610 | Elect 22 $\mu$ F 6.3V                       |
| QL01        | HT404711L0 | Transistor 2SD471 L          | CM08        | EJ33600610 | Elect 33 $\mu$ F 6.3V                       |
| QL02        | HT404711L0 | Transistor 2SD471 L          | CM10        | EJ10505010 | Elect 1 $\mu$ F 50V                         |
| QL03        | HT404711L0 | Transistor 2SD471 L          |             |            | <b>PM00-RESISTORS</b>                       |
| QL04        | HT30002000 | Transistor 2SC3312(R,S),etc. | RM01        | NB50052390 | 0.5 $\Omega$ $\pm$ 5% 1/2W                  |
| QL05        | BA10010210 | Transistor,Digital DTA144ES  | RM03        | NB51032200 | 10k $\Omega$ $\pm$ 5% 1/2W                  |
| QL06        | BA10010210 | Transistor,Digital DTA144ES  | RM04        | RA03320600 | 3.3k $\Omega$ (B) Trimming                  |
| QL07        | BA10010210 | Transistor,Digital DTA144ES  | RM13        | GA05047010 | 4.7 $\Omega$ $\pm$ 5% 1W                    |
| QL08        | HT404711L0 | Transistor 2SD471 L          |             |            | <b>PM00-SEMICONDUCTORS</b>                  |
| QL31        | BA20017210 | Transistor,Digital DTC114TS  | DM01        | HZ20001020 | Diode Chip MA151WK                          |
| QM51        | HT30002000 | Transistor 2SC3312(R,S),etc. | DM02        | HD20003000 | Diode RL103E,etc 200V 1A                    |
| QM52        | HT30002000 | Transistor 2SC3312(R,S),etc. | DM03        | HZ20001020 | Diode Chip MA151WK                          |
| QM53        | HT30002000 | Transistor 2SC3312(R,S),etc. | DM04        | HZ20001020 | Diode Chip MA151WK                          |
| QN01        | HC10008090 | IC NJM4558 DD                | DM05        | HZ20001020 | Diode Chip MA151WK                          |
| QN02        | BA20017210 | Transistor,Digital DTC114TS  | DM06        | HZ20001020 | Diode Chip MA151WK                          |
| QX01        | HT30002000 | Transistor 2SC3312(R,S),etc. | DM07        | HZ20001020 | Diode Chip MA151WK                          |
| QX02        | HT30002000 | Transistor 2SC3312(R,S),etc. | DM08        | HZ30003020 | Zener MA3075                                |
| QY01        | BA20012210 | Transistor,Digital DTC144ES  | QM01        | HC10037020 | IC AN6612                                   |
| QY02        | HT30002000 | Transistor 2SC3312(R,S),etc. | QM02        | HT108811Q0 | Transistor 2SA881                           |
| QY03        | HT30002000 | Transistor 2SC3312(R,S),etc. | QM03        | HX413282A0 | Transistor 2SD1328 R,S Chip                 |
| QY38        | HT30002000 | Transistor 2SC3312(R,S),etc. | QM04        | BA2000221R | Transistor,Digital DTC124EK                 |
|             |            | <b>PJ00-MISCELLANEOUS</b>    | QM05        | HX413282A0 | Transistor 2SD1328 R,S Chip                 |
| J701        | YJ01002560 | Jack Headphone               | QM06        | BA2000221R | Transistor,Digital DTC124EK                 |
| J702        | YJ01002160 | Jack Ext SP                  | QM07        | HC10024020 | IC DN6864                                   |
| JE01        | YJ01002160 | Jack Tel Pick up             | QM08        | HC10039210 | IC BA668                                    |
| JG01        | YT02020280 | Terminal Pin Jack 2P         |             |            | <b>PM01-MEMORY SW CIRCUIT BOARD</b>         |
| JG02        | YJ01002430 | Jack TEL                     |             |            | <b>PM01-MISCELLANEOUS</b>                   |
| JG03        | YJ06003020 | Jack Connector               | SM01        | SP02020840 | Push Switch Memory Rew.                     |
| JL01        | YJ06003110 | Jack Connector               |             |            | <b>PS00-INPUT SELECT CIRCUIT BOARD</b>      |
| JL02        | YJ04000840 | Jack DC IN                   |             |            | <b>PS00-MISCELLANEOUS</b>                   |
| JM51        | YJ01002440 | Jack Remote                  | SS01        | SS02030290 | Slide Switch Input Select                   |
| JY01        | YP06004860 | Jack Connector               | SS02        | SS02030290 | Slide Switch Anc Select                     |
| LJ41        | LC22260710 | Choke Coil 22mH              | SS03        | SS02030290 | Slide Switch Mic Att.                       |
| LK01        | LC25650710 | Choke Coil 5.6mH             |             |            | <b>PS01-TAPE SPEED SELECT CIRCUIT BOARD</b> |
| LK02        | LC24760520 | Choke Coil Bias Trap 85kHz   |             |            | <b>PS01-SEMICONDUCTORS</b>                  |
| LL01        | TC10150070 | Osc Transf. Bias Osc Coil    | DY08        | HI10056020 | LED Rec Ind. LN228PR                        |
| LL02        | LC14730040 | Choke Coil 47 $\mu$ H        | DY28        | HI10025020 | LED Batt Ind. LN222RP                       |
| LL05        | TC10200090 | Osc Transf. DC-DC Converter  | DY38        | HI10025020 | LED Peak Ind. LN222RP                       |
| LL06        | LC14730040 | Choke Coil 47 $\mu$ H        |             |            | <b>PS01-MISCELLANEOUS</b>                   |
| LL07        | LC21050710 | Choke Coil 1mH               | SS04        | SS02020760 | Slide Switch Tape Speed                     |
| S701        | SS02020740 | Slide Switch, Speaker ON/OFF |             |            |                                             |
| SG01        | SP02020730 | Push Switch, T/S             |             |            |                                             |