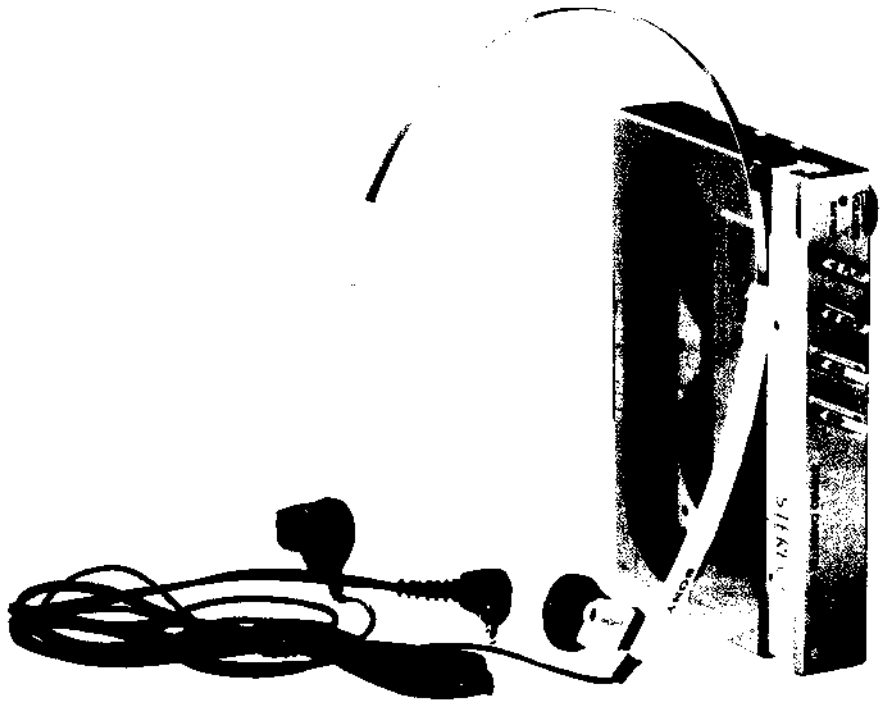
# WM-20

# SERVICE MANUAL

**Refer to MDR-W30L Service Manual issued previously for information of headphones supplied with this set.**

*AEP Model*
*UK Model*
*E Model*



## SPECIFICATIONS

Tape track: 4-track 2-channel stereo
Fast winding time: Approx. 2 min. with Sony cassette C-60
Frequency response (DOLBY NR OFF)
  40 - 15,000 Hz (with the TAPE selector set to $\frac{CrO_2}{METAL}$)
  40 - 15,000 Hz (with the TAPE selector set to NORM)
Power output: 5 mW × 2 (max.)
  5 mW × 2 (at 10% harmonic distortion) at dc operation
Power requirements: 1.5 V dc
  Size AA battery (IEC designation R6)
  External batteries (used in the optional battery case EBP-10): size AA (IEC designation R6) × 2
  DC IN 1.5 V jack accepts: Sony AC-D1 ac power adaptor (optional) for use on 120 V ac or Sony DCC-70 car battery cord (optional) for use with 12 V car battery.
Battery life (continuous playback hours):
  Approx. 2.5 hours with supplied Sony SUM-3 (NS) New Super battery
  Approx. 5 hours with Sony Eveready AM3 alkaline battery
  For maximum performance we recommend the use of alkaline battery
Dimensions: Approx. 69.5 × 109.5 × 17.6 mm (w/h/d) ($2^{3}/_{4} \times 4^{3}/_{8} \times {}^{23}/_{32}$ inches) not incl. projecting parts and controls
Weight: Approx. 180 g (6.4 oz) incl. battery, not incl. other accessories

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## STEREO CASSETTE PLAYER

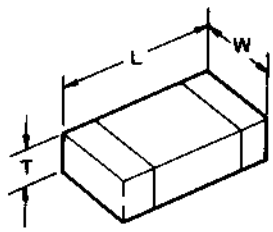
SONY®

TC

MICROFILM

- **Chip components**

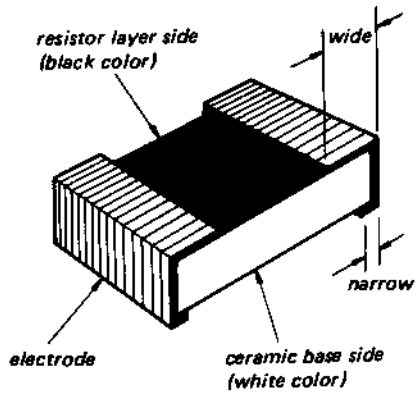
Chip components include resistors, capacitors, transistors, diodes, coil and adjustable resistors.
In this section, the types of resistors, ceramic capacitors, transistors and diodes which are used most frequently will be described.
Dimension of transistors and capacitors



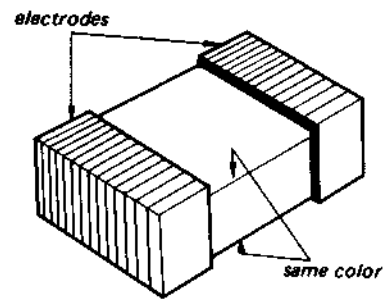

(Unit: mm)

| Type | L | W | T |
|---|---|---|---|
| 3216 | 3.2 | 1.6 | 0.45 ~ 0.6 |
| 2125 | 2.0 | 1.25 | 0.35 ~ 0.5 |

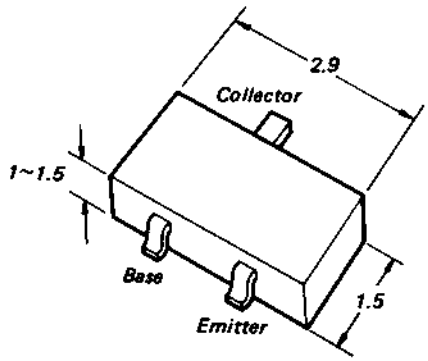
**Identification**



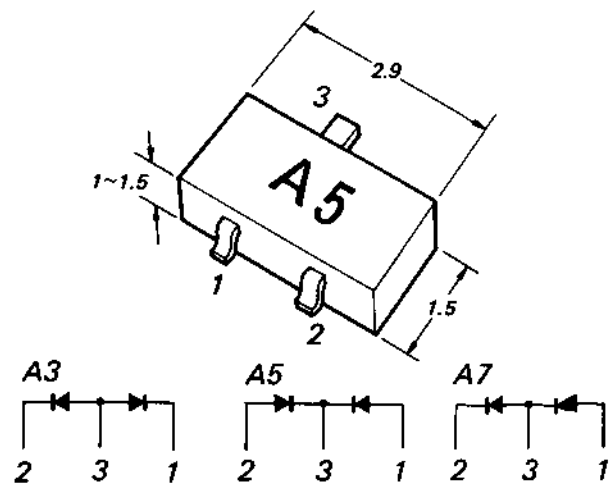

**Resistor**




**Laminated Ceramic Capacitor**




**Transistor**




**Diode**

**Replacing chip components**

All chip components should be connected and disconnected, using a tapered soldering iron [temperature of the iron tip: less than 280°C (536°F)], a pair of tweezers and braided wire.

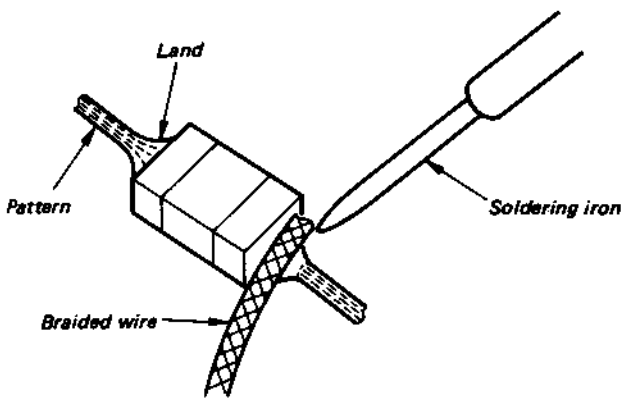
**Precautions for replacement**

1. **Do not disconnect the chip component forcefully. Otherwise, the pattern may peel off.**
2. **Never re-use a disconnected chip component. Dispose of all old chip components.**
3. **To protect the chip component, heating time for attaching the component should be within 3 seconds.**

○ **Removing chip components**

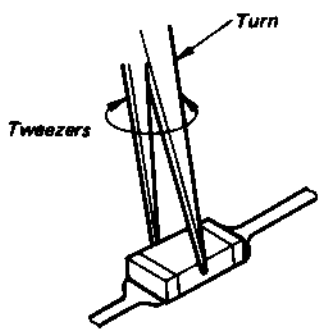
**(1) Removing solder at electrode**

Remove the solder at the electrode, using a thin braided wire. Do not remove the solder of the part (chip component) attached adjacent to the electrode.




**(2) Disconnecting chip components**

Turn the tweezers with the soldering iron alternately applied to both electrodes, and the chip component will be disconnected. Take careful precautions while disconnecting, because if the chip component is forcefully removed the land may peel off.
Never re-use a disconnected chip component.




**(3) Smoothing the soldered surface**

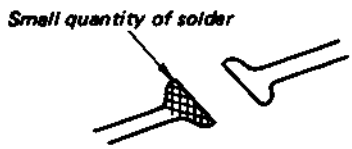
After disconnecting the chip component, remove the solder by using a braided wire to smooth the land surface.

○ **Connecting chip components**

The value of chip components is not displayed on the main body. Take due precautions to avoid mixing new chip components with other ones.

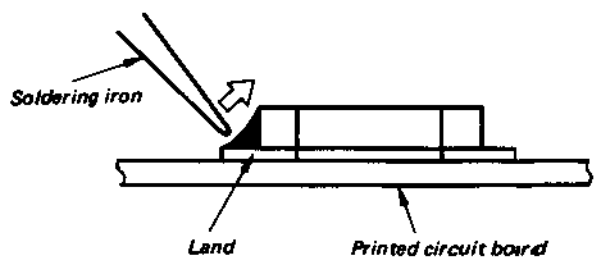
**(1) Applying solder to land on one side**

Apply a thin layer of solder to the land on one side where the chip component is to be connected. Too much solder may cause bridging.




**(2) Speedy soldering**

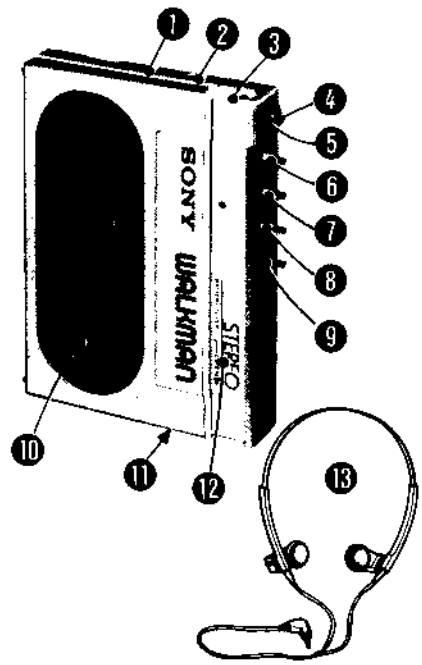
Hold the chip component at the desired position, using tweezers, and apply the soldering iron in the arrow-marked direction. To protect the chip component, heating time should be within 3 seconds.




**(3) Speedy soldering of electrode on the other side**

Solder the electrode on the other side in thesame way as in (2) above.

## PARTS IDENTIFICATION

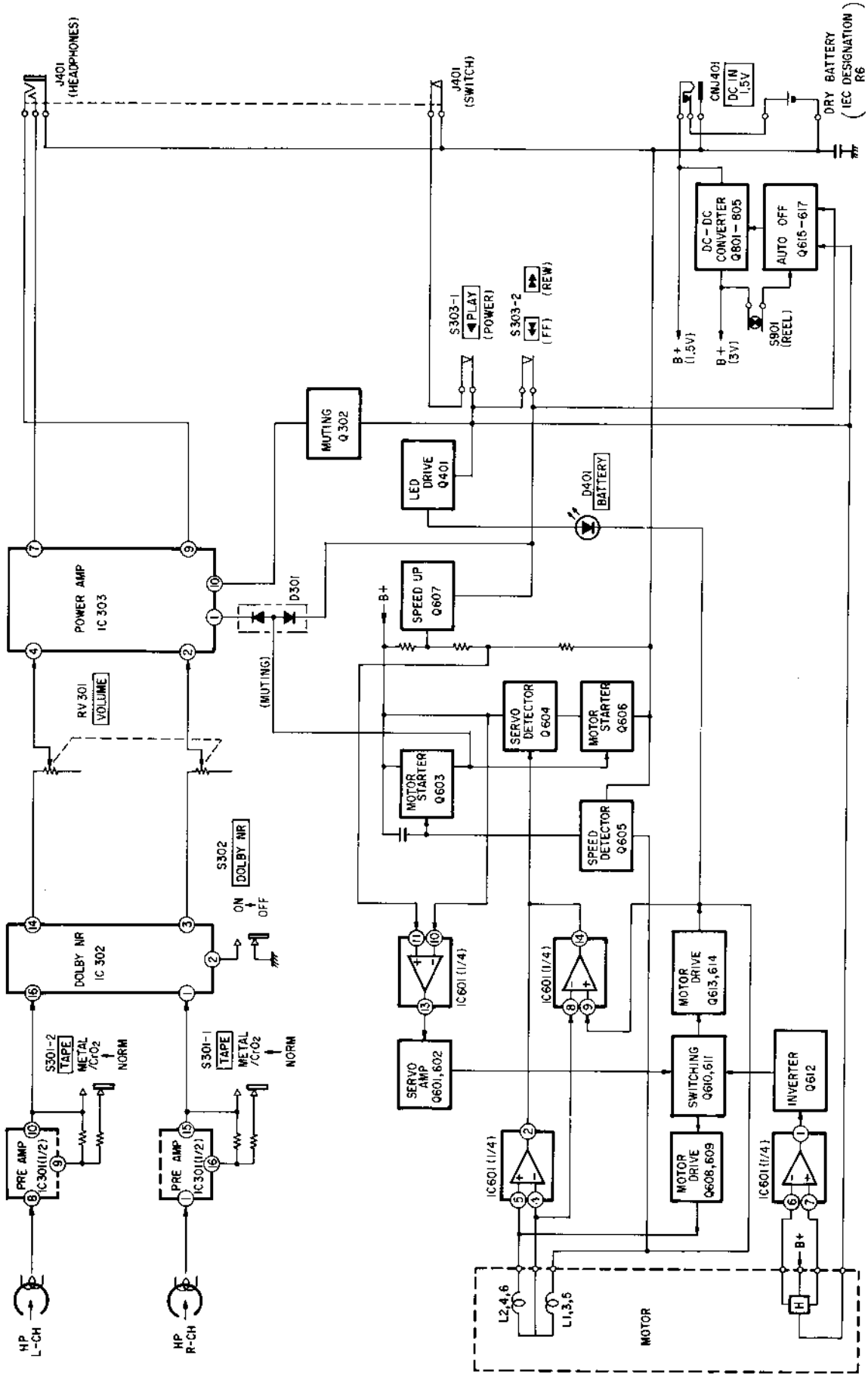



❶ TAPE selector ❷ DOLBY NR switch ❸ Headphones jack
❹ VOLUME control ❺ Battery indicator ❻ ◄ PLAY button
❼ ■ STOP button ❽ ◄◄ button ❾ ►► button
❿ Cassette holder ⓫ DC IN 1.5 V (external power input) jack
⓬ Battery compartment ⓭ Stereo headphones (supplied)

MEMO

# SECTION 1
# OUTLINE

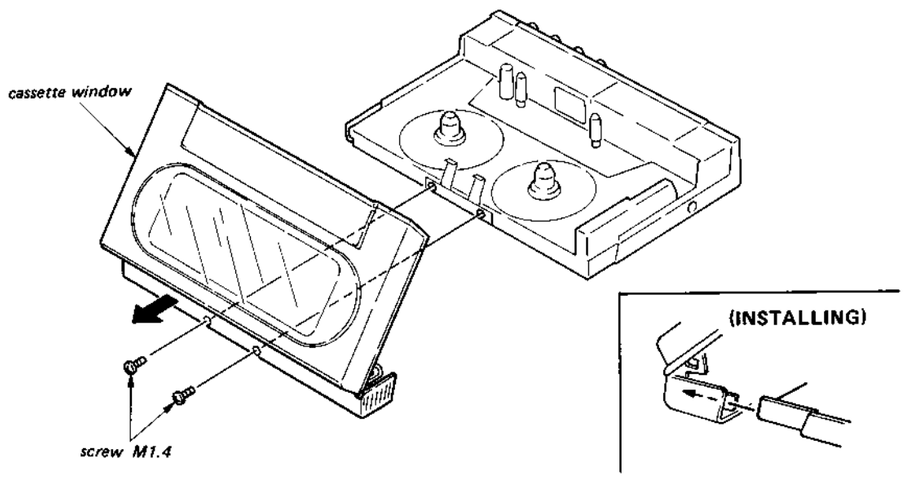
## 1-1. BLOCK DIAGRAM



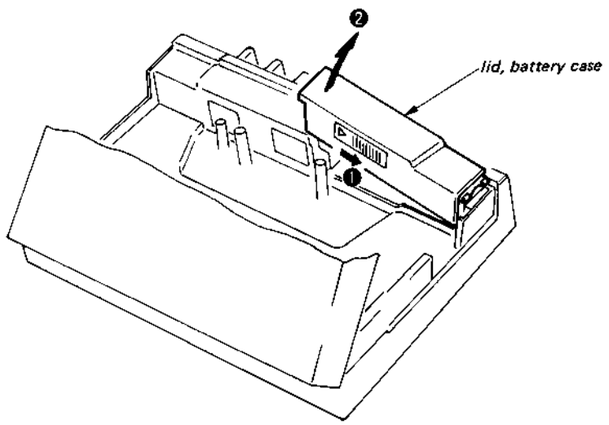
## SECTION 2
## DISASSEMBLY

**Note:** Follow the disassembly procedure in the numerical order given.

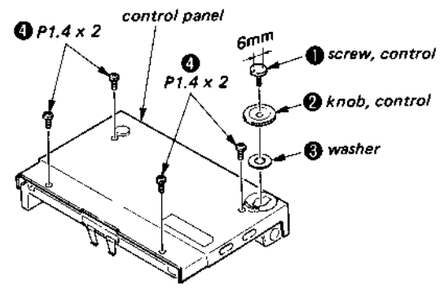
### CASSETTE WINDOW

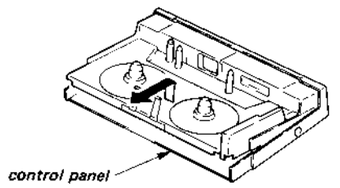



### LID, BATTERY CASE

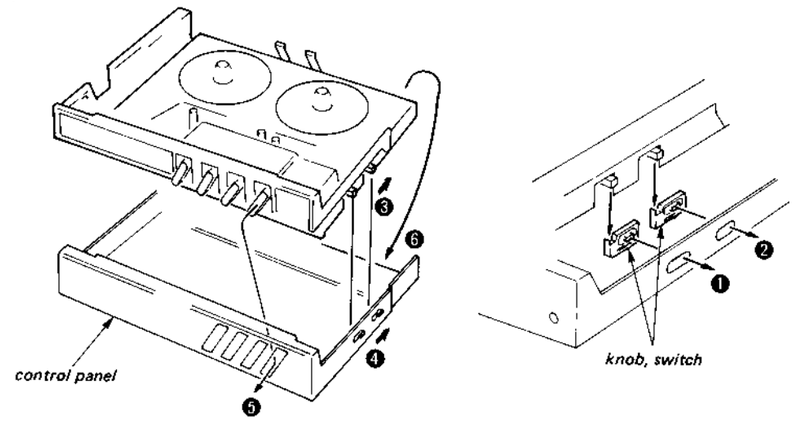



### CONTROL PANEL

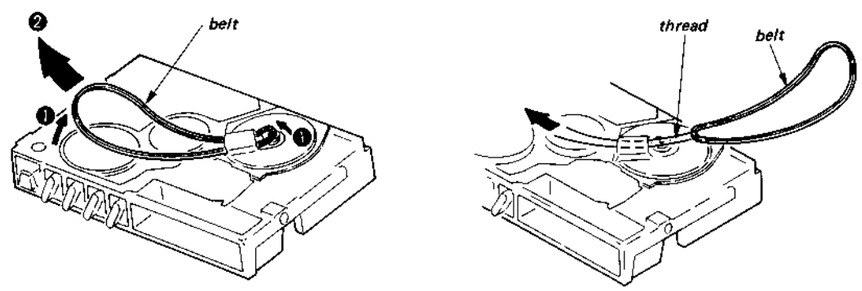



(ASSEMBLING)

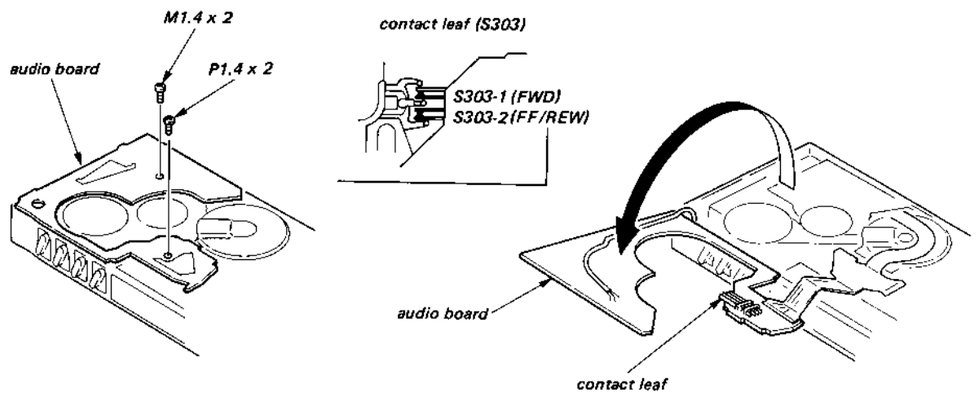



### BELT

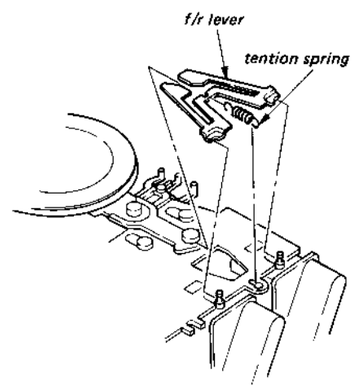


to P. 13 MOTOR BLOCK

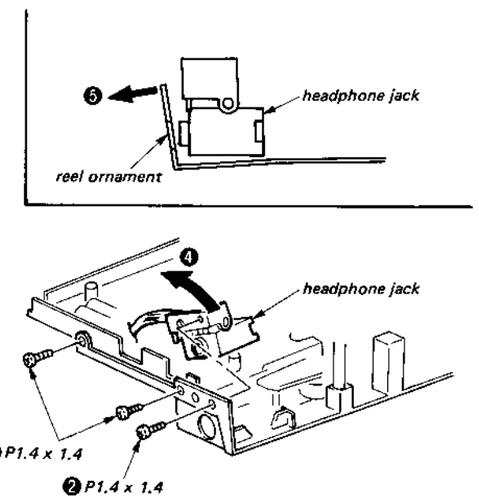
## AUDIO BOARD



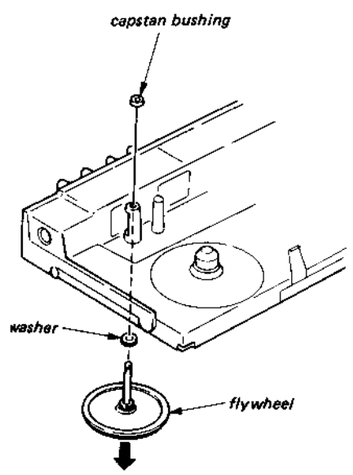

## F/R LEVER



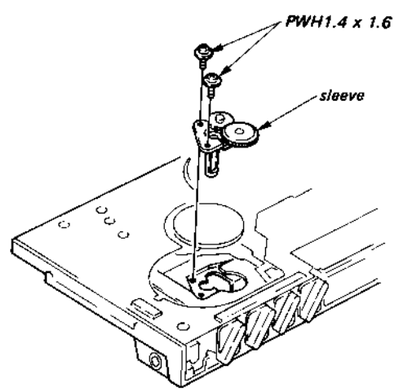

## HEADPHONE JACK



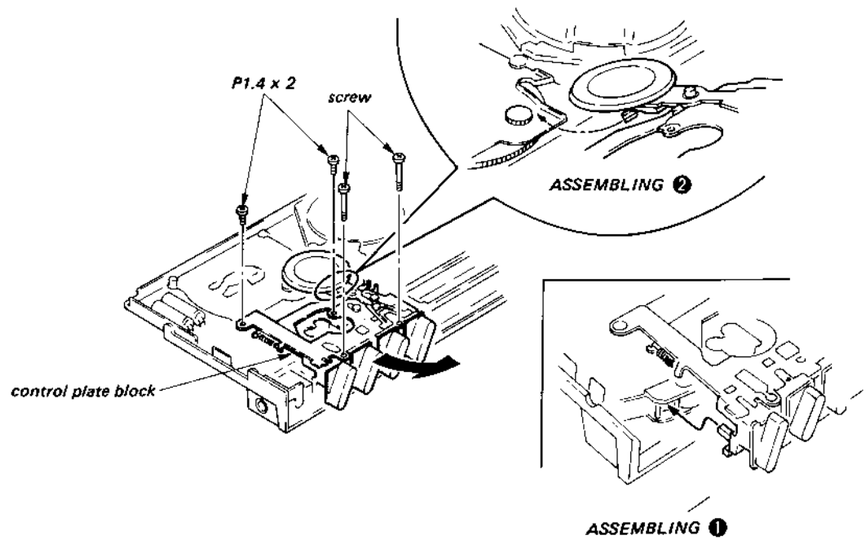

## FLYWHEEL



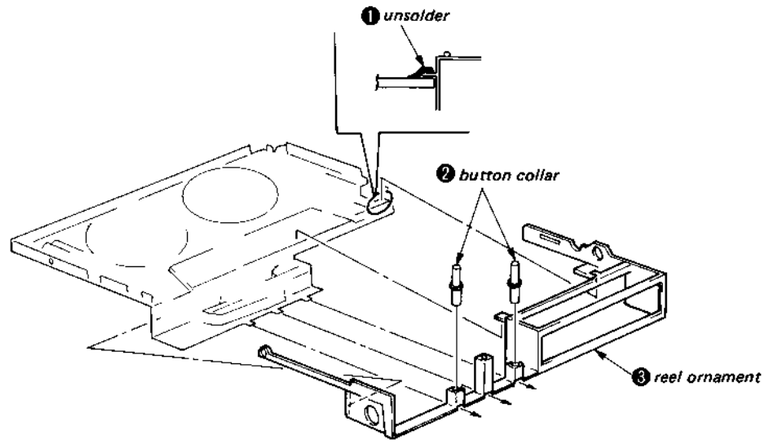

## SLEEVE



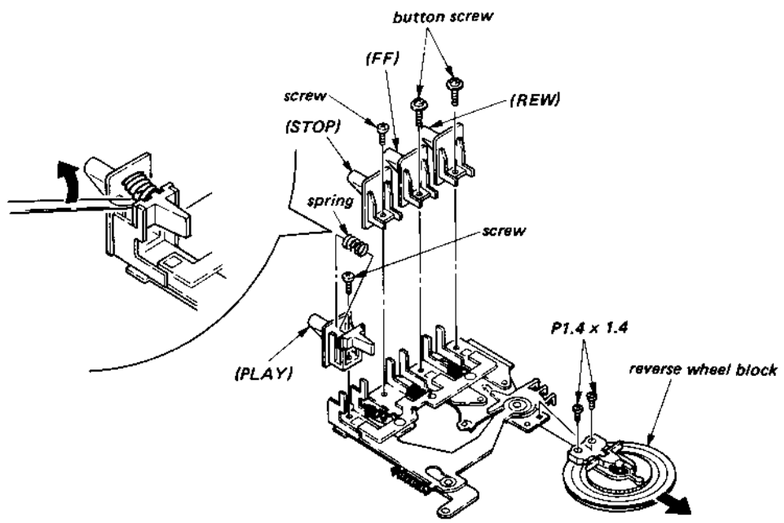

## CONTROL PLATE BLOCK



## REEL ORNAMENT

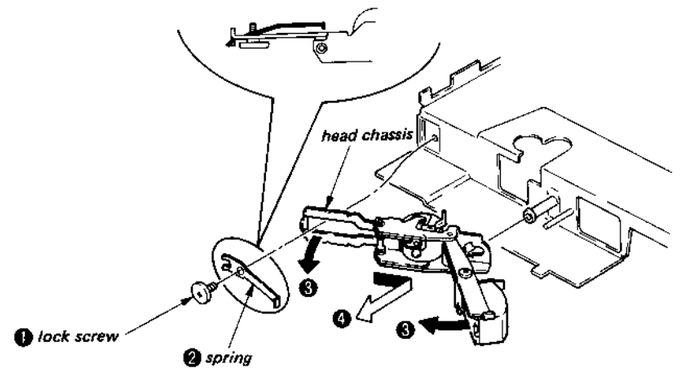



## BUTTON (PLAY, STOP, FF, REW), REVERSE WHEEL BLOCK

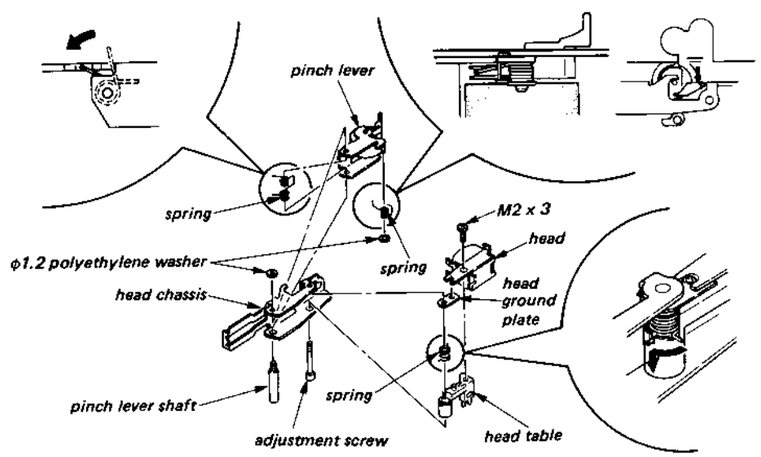




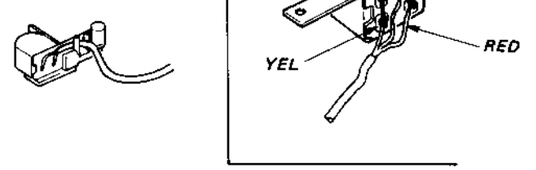

## HEAD CHASSIS




*(ASSEMBLING)*

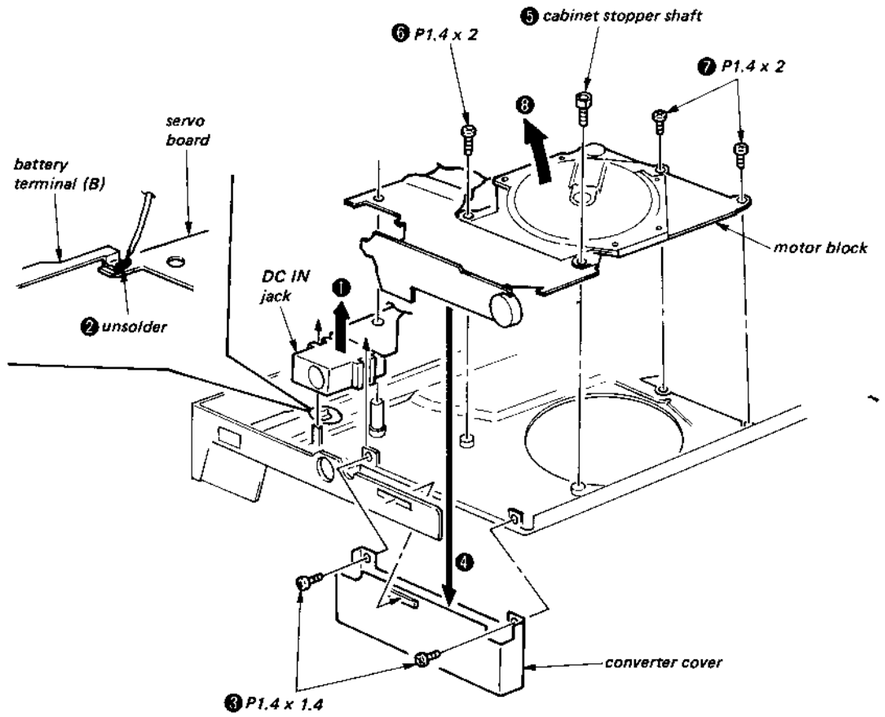



*(HEAD WIRING)*

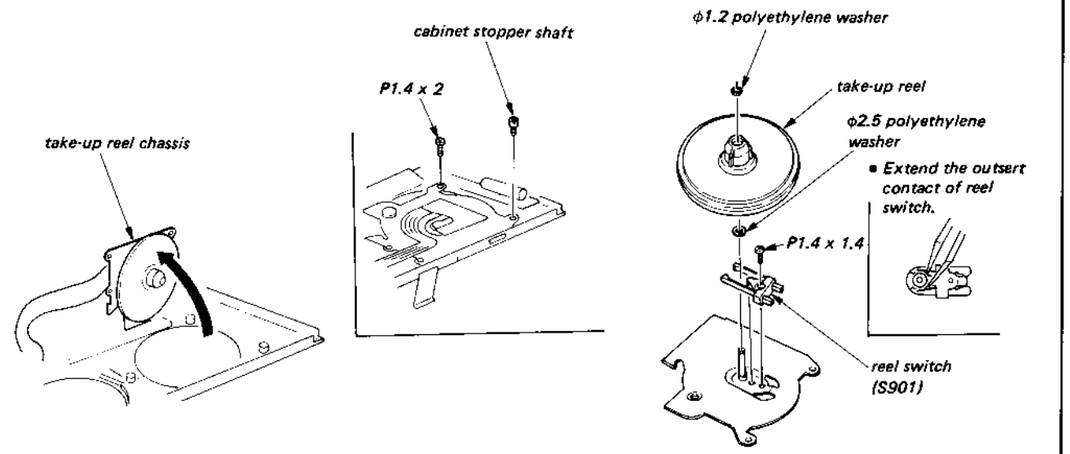


from AUDIO BOARD

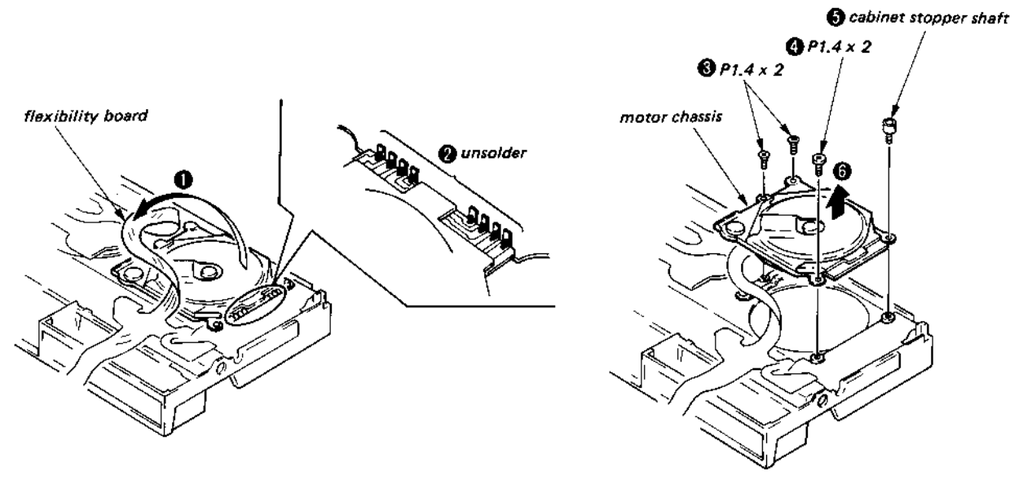
## MOTOR BLOCK




## TAKE-UP REEL




## MOTOR CHASSIS



# SECTION 3
# ADJUSTMENTS

### PRECAUTION

1. Clean the following parts with a denatured-alcohol-moistened swab:

   playback head — pinch roller
   capstan — rubber belts

2. Demagnetize the playback head with a head demagnetizer.
3. Do not use a magnetized screwdriver for the adjustments.
4. After the adjustments, apply suitable locking compound to the parts adjusted.
5. The adjustments should be performed with the rated power supply voltage (1.3V) unless otherwise noted.

## 3-1. MECHANICAL ADJUSTMENTS

**Torque Measurement**

| | Torque meter | Meter reading |
|---|---|---|
| FWD | CQ-102B | 20 – 40 g·cm (0.28 – 0.56 oz·inch) |
| FF, REW | CQ-201B | More than 60 g·cm (More than 0.83 oz·inch) |
| Back Tension | CQ-102B | 0 – 2.5 g·cm (0 – 0.03 oz·inch) |
| Tape Pulling Force | CQ-403 | More than 45 g·cm (More than 0.62 oz·inch) |

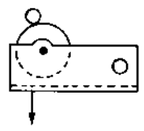
**Pinch Roller Pressure Measurement**

**– Forward Mode –**

1. Pull the spring scale in the direction shown by the arrow.
2. Slowly return the pinch roller and read the spring scale.

**Specification:**

150 ± 20 g (4.6 – 6.0 oz)



**Thrust Clearance Adjustment**

| | Thrust clearance |
|---|---|
| Take-up reel | 0.05 - 0.15mm |
| Supply reel | 0.05 - 0.15mm |
| Reverse wheel | 0.05 - 0.15mm |

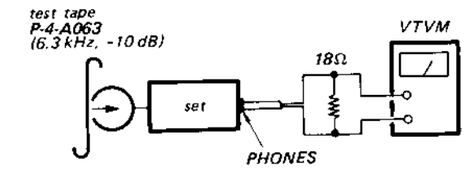


## 3-2. ELECTRICAL ADJUSTMENT

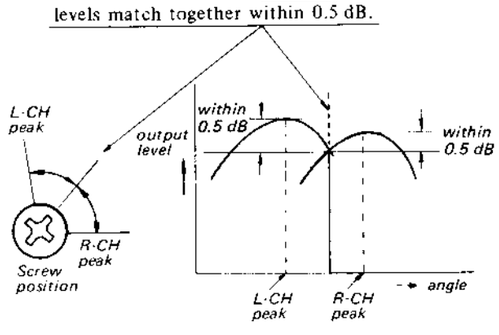
**Playback Head Azimuth Adjustment**

**Procedure:**

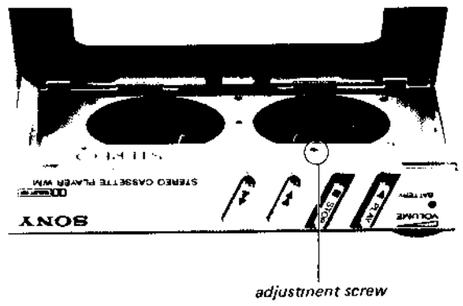
1. Mode: playback




2. Turn the adjustment screw for the maximum output levels. If these levels do not match, turn the adjustment screw until both of output levels match together within 0.5 dB.




**Adjustment Location:**



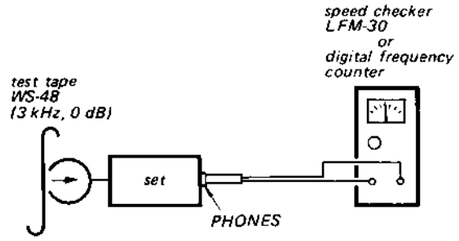

**Tape Speed Adjustment**

**Setting:**

VOLUME control: mechanical mid

**Procedure:**

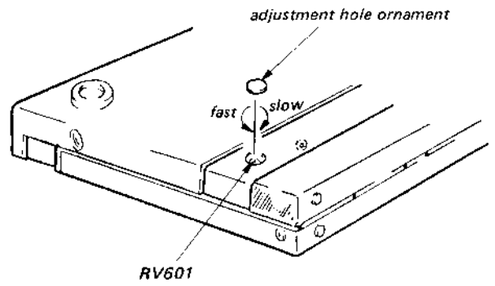
Mode: playback

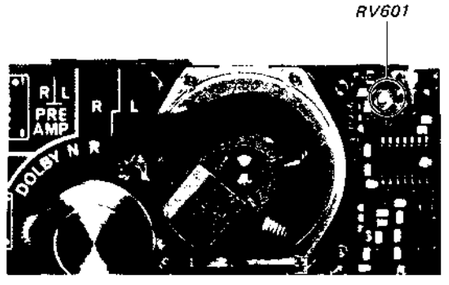



**Specification:**

| Speed checker | Digital frequency counter |
|---|---|
| ± 2% | 2,940 - 3,060 Hz |

**Adjustment Location:**



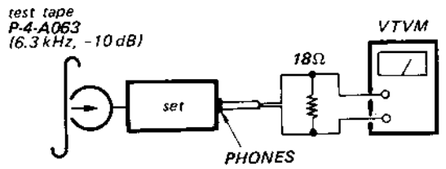



## 3-2. ELECTRICAL ADJUSTMENT

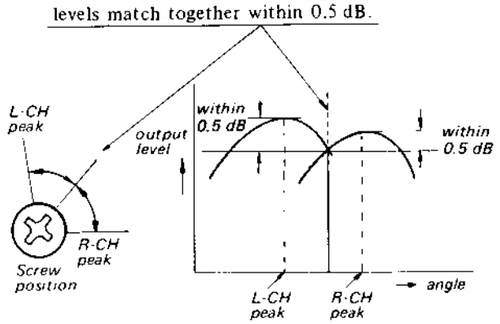
### Playback Head Azimuth Adjustment

Procedure:

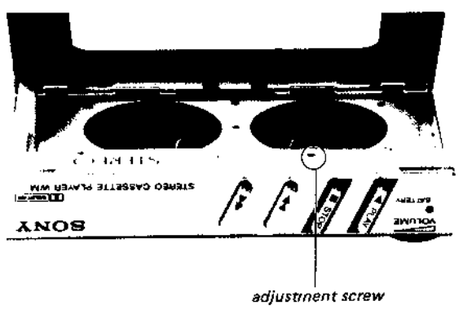
1. Mode: playback




2. Turn the adjustment screw for the maximum output levels. If these levels do not match, turn the adjustment screw until both of output levels match together within 0.5 dB.




Adjustment Location:



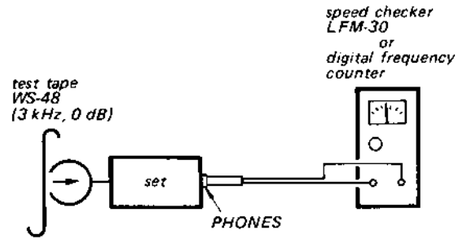

### Tape Speed Adjustment

Setting:

VOLUME control: mechanical mid

Procedure:

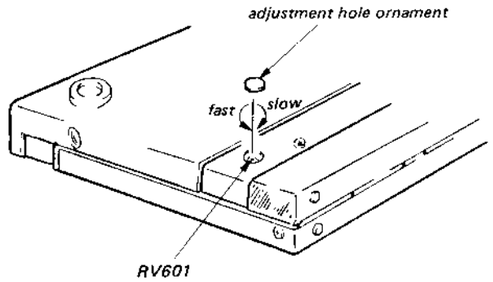
Mode: playback

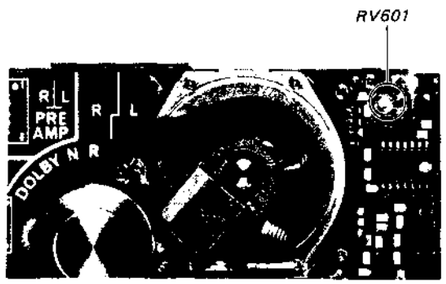



Specification:

| Speed checker | Digital frequency counter |
|---|---|
| ± 2% | 2,940 – 3,060 Hz |

Adjustment Location:

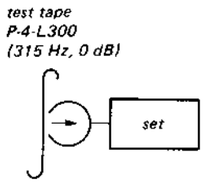



### Dolby NR Level Adjustment

Setting:

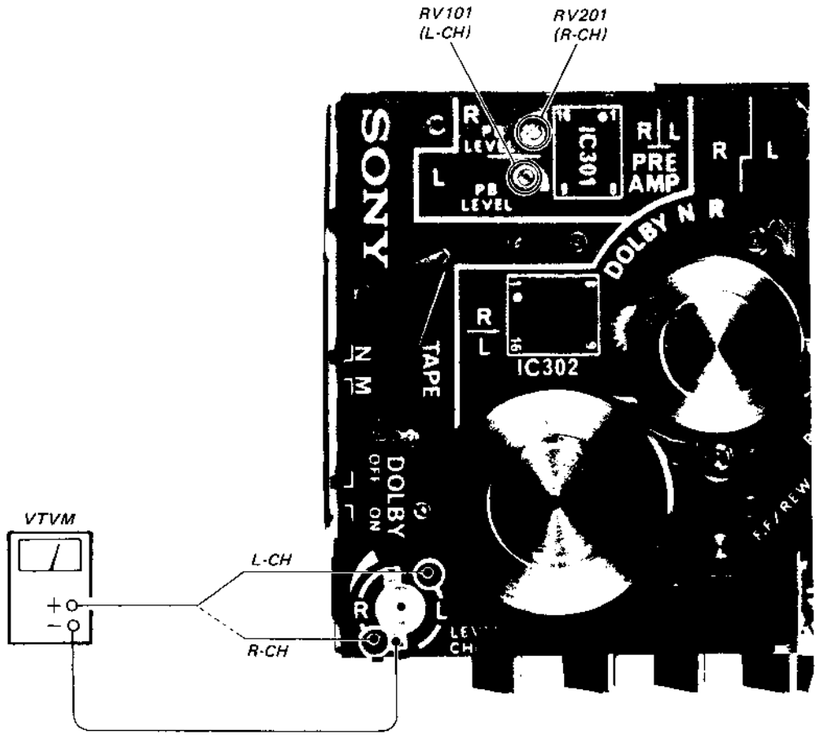
| | |
|---|---|
| TAPE switch: | NORM |
| DOLBY NR switch: | off |
| VOLUME control: | minimum |




Procedure:

Adjust RV101 (L-CH), RV201 (R-CH) to obtain –27.7dB ± 1dB (0.028V to 0.036V) output level.

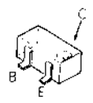
Adjustment Location: audio board



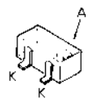
**Note**
**When the headphones are not connected, the unit will not operate.**

**Semiconductor Lead Layouts**

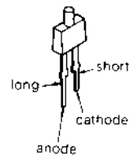
**2SA1162**
**2SA1163**
**2SB624**
**2SC1623**
**DTA114TK**
**DTC114YK**



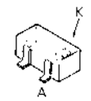

**1S2835**



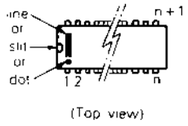

**GL9PR22**




**DA106K**




**BA3304F**
**CX20085**
**CX20089**
**NJM2901MB**




(Top view)

**RD4.3M-B3**


**Note:**

- All capacitors are in μF unless otherwise noted. pF : μμF 50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in ohms, 1/10W unless otherwise noted. kΩ : 1000Ω, MΩ : 1000kΩ
- ▭ : panel designation.
- ▭ : adjustment for repair.
- ——: B+ bus.
- Readings are taken under no-signal conditions with an oscilloscope.

  no mark: [AUDIO BOARD] & [SERVO BOARD (A)] : measured in playback mode without cassette.
  [SERVO BOARD (B)] & [CONVERTER BOARD] : measured play switch (S303-1) is turned on and the motor rotates with no load. (Mooer block is separated from the mechanism.)

  ( ): DOLBY NR (S302) ON
  ≪ ≫: FF/REW mode
- Voltage variations may be noted due to normal production tolerances.

- Switch

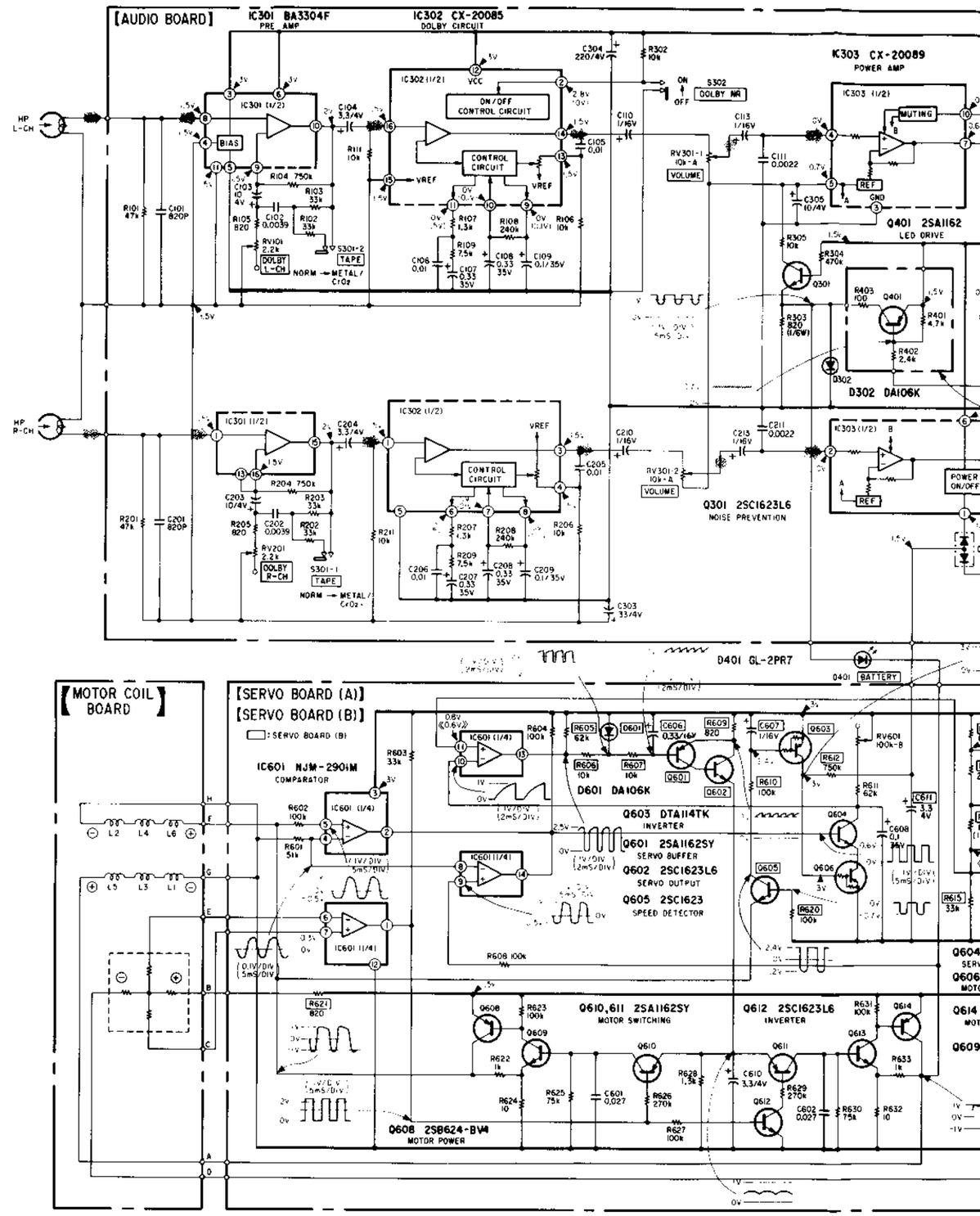
| Ref. No. | Switch | Position |
|---|---|---|
| S301 | TAPE | NORM |
| S302 | DOLBY NR | OFF |
| S303-1 | ◀PLAY | OFF |
| S303-2 | ◀◀/▶▶ (FF/REW) | OFF |
| S901 | Reel | —— |
| J401 | Headphones (switch) | OFF |

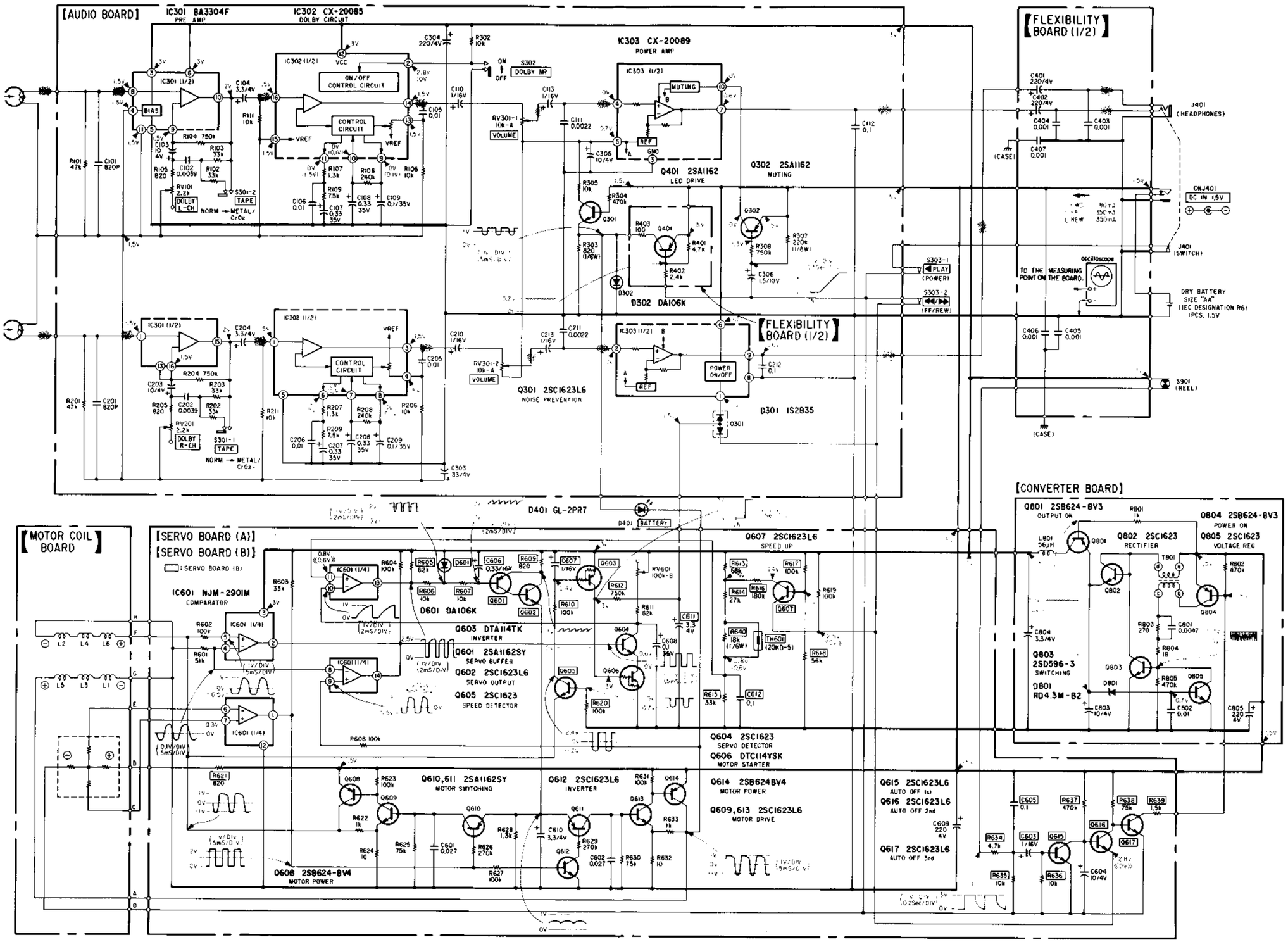
- ■ : signal path.

**Note: Voltages are measured with an oscilloscope.**








[AUDIO BOARD]
IC301 BA3304F
PRE AMP
IC302 CX-20065
DOLBY CIRCUIT
IC303 CX-20089
POWER AMP
ON/OFF CONTROL CIRCUIT
CONTROL CIRCUIT
MUTING
BIAS
VOLUME
S302 DOLBY NR
S301-1 TAPE
S301-2 TAPE
NORM → METAL/CrO2
DOLBY L-CH
DOLBY R-CH
HP L-CH
HP R-CH
Q401 2SA1162
LED DRIVE
Q302 2SA1162
MUTING
Q301 2SC1623L6
NOISE PREVENTION
D302 DA106K
D301 1S2835
[FLEXIBILITY BOARD (1/2)]
S303-1 PLAY (POWER)
S303-2 (FF/REW)
J401 (HEADPHONES)
CN401 DC IN 1.5V
J401 (SWITCH)
S301 (REEL)
DRY BATTERY SIZE "AA" (IEC DESIGNATION R6) 1PCS. 1.5V
TO THE MEASURING POINT ON THE BOARD.
oscilloscope
[CONVERTER BOARD]
Q801 2SB624-BV3
OUTPUT ON
Q802 2SC1623
RECTIFIER
Q804 2SB624-BV3
POWER ON
Q805 2SC1623
VOLTAGE REG
Q803 2SD596-3
SWITCHING
D801 RD4.3M-B2
[MOTOR COIL BOARD]
[SERVO BOARD (A)]
[SERVO BOARD (B)]
: SERVO BOARD (B)
IC601 NJM-2901M
COMPARATOR
D601 DA106K
Q603 DTA114TK
INVERTER
Q601 2SA1162SY
SERVO BUFFER
Q602 2SC1623L6
SERVO OUTPUT
Q605 2SC1623
SPEED DETECTOR
Q607 2SC1623L6
SPEED UP
Q604 2SC1623
SERVO DETECTOR
Q606 DTC114YSK
MOTOR STARTER
Q614 2SB624BV4
MOTOR POWER
Q609,613 2SC1623L6
MOTOR DRIVE
Q610,611 2SA1162SY
MOTOR SWITCHING
Q612 2SC1623L6
INVERTER
Q608 2SB624-BV4
MOTOR POWER
Q615 2SC1623L6
AUTO OFF 1st
Q616 2SC1623L6
AUTO OFF 2nd
Q617 2SC1623L6
AUTO OFF 3rd
D401 GL-2PR7
D401 BATTERY

## 4-2. MOUNTING DIAGRAM

*– Component Side –*

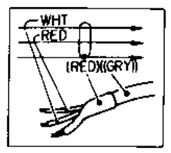
【AUDIO BOARD】

【SERVO(A) BOA

【FLEXIBILITY BOARD】

**Note:**

- Color code of sleeving over the end of the jacket.




- ○— : parts extracted from the component side.
- ⊗ : Through hole.
- : B + pattern
- ▬▬▶ : L-CH signal path
- ▬·▬▶ : R-CH signal path

G H I J K L M N O P Q R S T U V W

301 302 401 IC303 302 301 401 608 610 606 613 609 604 612 IC601 611 614 603 605 617 615 616 601 602 607 801 802 804 805 803 601 801

D
Q · IC

1 2 3 4 5 6 7 8 9 10

【SERVO (A) BOARD】

【SERVO (B) BOARD】

【CONVERTER BOARD】

【FLEXIBILITY BOARD】

S901 (REEL)

J401 (HEADPHONES)

D401 BATTERY

(CHASSIS)

REEL SW
LED
1.5V
POWER ON/OFF
FF/REW
POWER
3V
GND

TO THE MEASURING POINT ON THE BOARD.

OSCILLOSCOPE

BLK
WHT

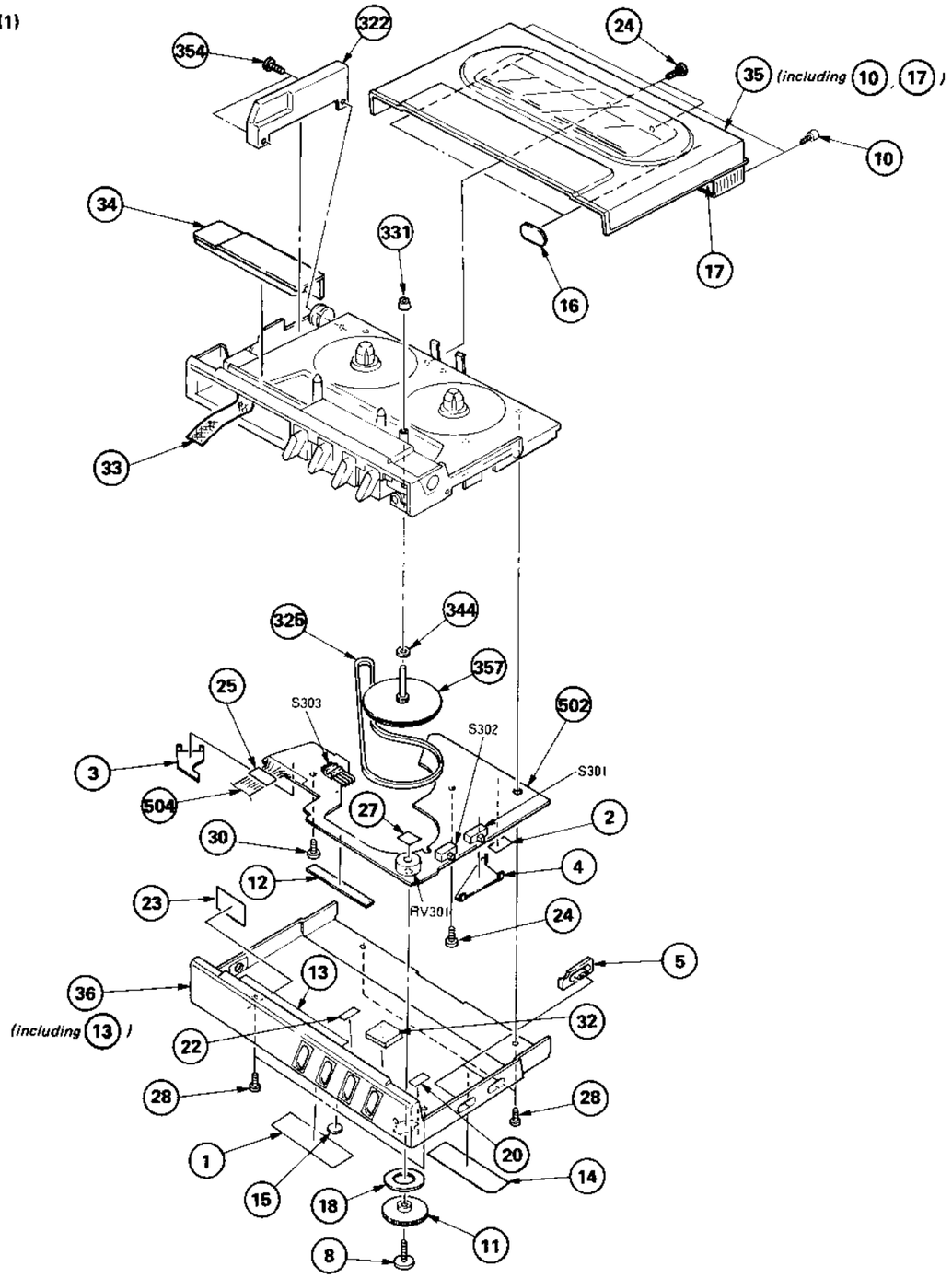
CNJ401 DC IN 1.5V

FWD 180mA
FF 350mA
REW 350mA

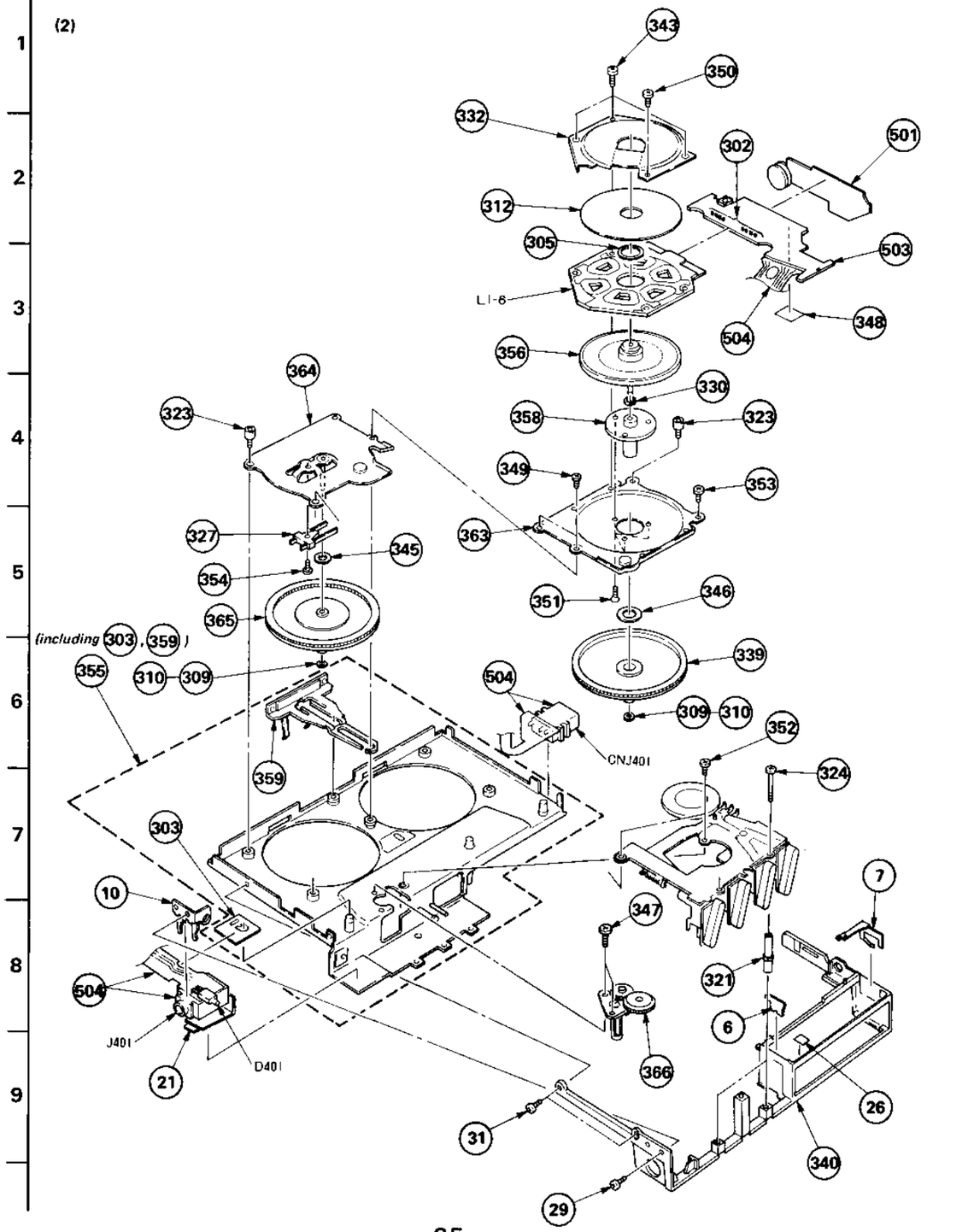
DRY BATTERY SIZE "AA" (IEC DESIGNATION R6) 1PCS. 1.5V

SECTION 5
EXPLODED VIEWS AND PARTS LIST

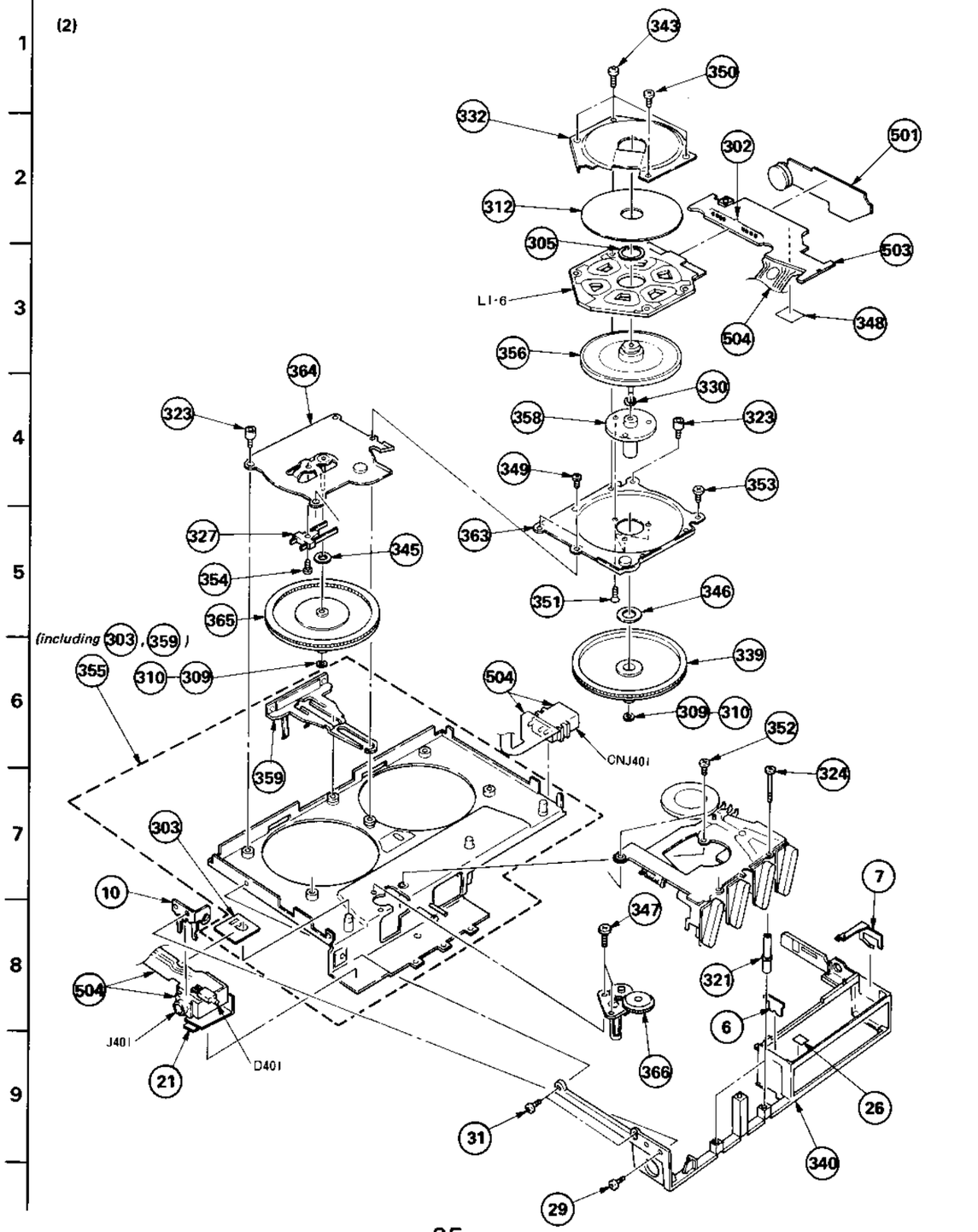
(1)




(2)

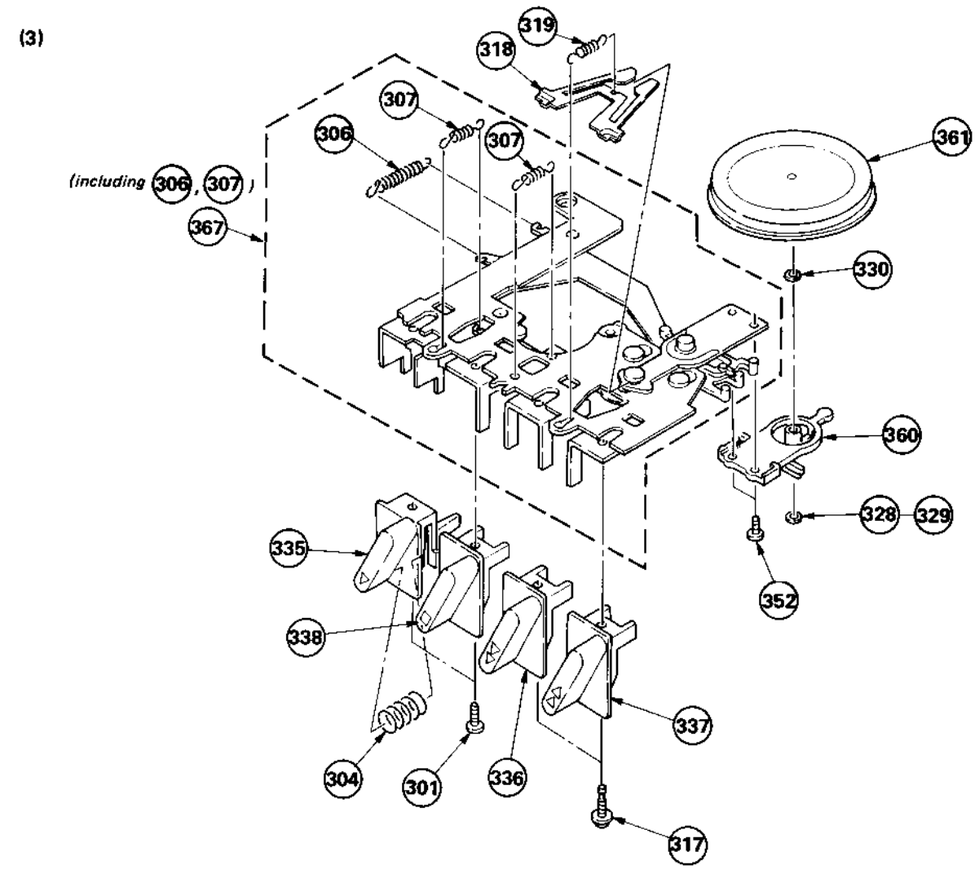


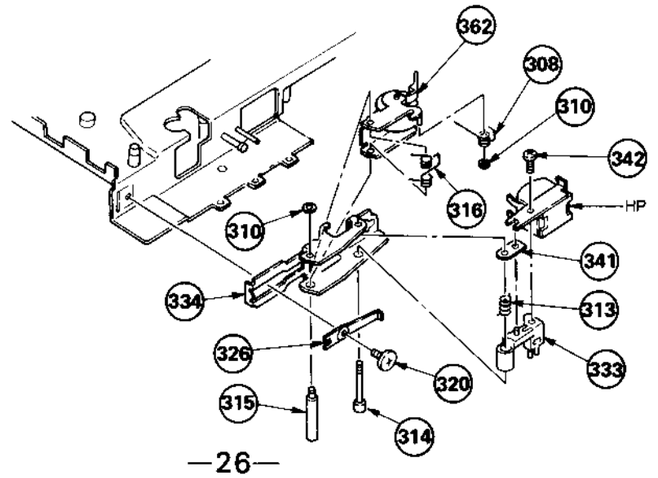
(2)


343
350
332
302
501
312
305
503
LI-6
504
348
356
364
330
323
358
323
349
353
327
345
363
354
351
346
365
339
(including 303, 359)
355
310
309
504
CNJ401
309
310
352
359
324
303
10
7
347
321
504
6
J401
D401
21
366
26
31
340
29



(3)


319
318
307
306
307
361
(including 306, 307)
367
330
360
328
329
335
352
338
337
304
301
336
317


362
308
310
342
316
HP
310
341
334
313
326
320
333
315
314

## GENERAL SECTION

| No. | Part No. | Description |
|---|---|---|
| 1 | 3-305-947-00 | LABEL, DOLBY |
| 1 | 3-305-947-11 | LABEL, DOLBY (FOR BLACK) |
| 2 | ♣;3-312-754-00 | SHEET (A), INSULATING |
| 3 | ♣;3-315-302-00 | TERMINAL BOARD (C), GROUND |
| 4 | ♣;3-315-303-00 | TERMINAL BOARD (B), GROUND |
| 5 | 3-315-305-00 | KNOB, SWITCH |
| 6 | 3-315-306-00 | TERMINAL (A), BATTERY |
| 7 | 3-315-307-00 | TERMINAL (B), BATTERY |
| 8 | 3-315-308-00 | SCREW, CONTROL |
| 9 | ♣;3-315-310-00 | RETAINER, JACK |
| 10 | 3-315-318-00 | SCREW, ORNAMENTAL |
| 11 | 3-315-322-00 | KNOB, CONTROL |
| 12 | ♣;3-315-441-00 | SHEET (A) |
| 13 | 3-315-442-00 | LABEL, POLARITY |
| 14 | 3-315-455-01 | LABEL, MODEL NUMBER (FOR BLACK) |
| 14 | 3-315-455-11 | LABEL, MODEL NUMBER |
| 15 | 3-315-457-01 | ORNAMENT, ADJUSTMENT HOLE |
| 15 | 3-315-457-11 | ORNAMENT, ADJUSTMENT HOLE (FOR BLACK) |
| 16 | 3-315-465-00 | CUSHION, CASSETTE |
| 17 | 3-315-466-00 | SHEET, PANEL |
| 18 | 3-315-467-00 | WASHER, CONTROL |
| 19 | ..... | |
| 20 | 3-553-566-00 | CUSHION |
| 21 | 3-560-308-00 | SHEET (B), INSULATING |
| 22 | 3-570-611-00 | SHEET, PROTECTION, LID |
| 23 | 3-701-999-00 | LABEL, SERIAL NUMBER |
| 24 | 3-703-816-01 | SCREW (M1.4) |
| 24 | 3-703-816-02 | SCREW (M1.4)(FOR BLACK) |
| 25 | 3-831-441-XX | SPACER |
| 26 | 3-831-441-XX | SPACER, 3X10 |
| 27 | 3-831-441-XX | CUSHION |
| 28 | 7-627-551-17 | SCREW, PRECISION +P 1.4X2 |
| 28 | 7-627-551-18 | SCREW, PRECISION +P 1.4X2 (FOR BLACK) |
| 29 | 7-627-551-47 | SCREW, PRECISION +P 1.4X1.4 |
| 30 | 7-627-850-07 | SCREW, PRECISION +P 1.4X2 |
| 31 | 7-627-850-37 | SCREW, PRECISION +P 1.4X1.4 |
| 32 | 9-911-815-01 | CUSHION |
| 33 | 9-911-816-01 | CLOTH, BATTERY DRAWING |
| 34 | X-3315-301-0 | LID ASSY, BATTERY CASE |
| 35 | X-3315-302-0 | PANEL ASSY, CASSETTE (FOR SILVER) |
| 35 | X-3315-319-0 | PANEL ASSY, CASSETTE (FOR BLACK) |
| 35 | X-3315-320-0 | PANEL ASSY, CASSETTE (FOR BLUE) |
| 35 | X-3315-321-0 | PANEL ASSY, CASSETTE (FOR RED) |
| 35 | X-3315-323-0 | PANEL ASSY, CASSETTE (FOR GOLD) |
| 36 | X-3315-339-1 | PANEL ASSY, CONTROL (FOR GOLD) |
| 36 | X-3315-326-1 | PANEL ASSY, CONTROL (FOR SILVER) |
| 36 | X-3315-327-1 | PANEL ASSY, CONTROL (FOR BLACK) |
| 36 | X-3315-328-1 | PANEL ASSY, CONTROL (FOR BLUE) |
| 36 | X-3315-329-1 | PANEL ASSY, CONTROL (FOR RED) |

## ACCESSORY & PACKING MATERIAL

| No. | Part No. | Description |
|---|---|---|
| 51 | 1-528-027-00 | BATTERY, NEW SUPER (SUM-3) |
| 52 | 3-315-444-00 | CUSHION |
| 53 | 3-315-446-00 | INDIVIDUAL CARTON |
| 54 | 3-315-450-00 | BELT, CARRYING |
| 55 | 3-315-949-01 | COVER, WINDOW |
| 56 | 3-701-308-00 | LABEL, PRODUCT COLOR (FOR BLACK) |
| 56 | 3-701-311-00 | LABEL, PRODUCT COLOR (FOR RED) |
| 56 | 3-701-314-00 | LABEL, PRODUCT COLOR (FOR BLUE) |
| 56 | 3-703-729-00 | LABEL (SMALL), COLOR (FOR SILVER) |
| 56 | 3-703-730-00 | LABEL (SMALL), COLOR (FOR GOLD) |
| 57 | 3-701-621-00 | BAG, POLYETHYLENE (FOR CARRYING CASE) |
| 58 | ..... | |
| 59 | 3-703-710-01 | STICKER, SONY SYMBOL (12) |
| 60 | 3-773-511-11 | (AEP,UK)...MANUAL, INSTRUCTION |
| 60 | 3-773-511-41 | (E).....MANUAL, INSTRUCTION |
| 61 | 3-795-723-01 | CARD, ILLUSTRATION |
| 62 | 3-795-751-01 | INSTRUCTION |
| 63 | 8-951-187-90 | HEADPHONE (MDR-W30L) |
| 64 | X-3315-336-0 | CASE ASSY, CARRYING |
| 65 | X-3315-337-0 | SLEEVE & STOPPER ASSY |

## MECHANISM SECTION

| No. | Part No. | Description |
|---|---|---|
| 301 | 3-305-528-11 | SCREW, STOPPER |
| 302 | 3-315-301-00 | TERMINAL BOARD, MOTOR |
| 303 | 3-315-304-00 | TERMINAL BOARD (A), GROUND |
| 304 | 3-315-331-00 | SPRING, COMPRESSION |
| 305 | 3-315-332-01 | SPACER (t=0.05) |
| 305 | 3-315-332-11 | SPACER (t=0.1) |
| 306 | 3-315-341-00 | SPRING, TENSION |
| 307 | 3-315-343-00 | SPRING, TENSION |
| 308 | 3-315-357-00 | SPRING |
| 309 | 3-315-384-01 | WASHER, STOPPER (t=0.13) |
| 310 | 3-315-384-11 | WASHER, STOPPER (t=0.25) |
| 311 | ..... | |
| 312 | 3-315-390-00 | PLATE, HYSTERESIS |
| 313 | 3-315-391-00 | SPRING |
| 314 | 3-315-392-00 | SCREW, ADJUSTMENT |
| 315 | 3-315-393-00 | SHAFT, PINCH LEVER |
| 316 | 3-315-394-00 | SPRING |
| 317 | 3-315-395-00 | SCREW, BUTTON |
| 318 | 3-315-396-00 | LEVER (C), F.R |
| 319 | 3-315-397-00 | SPRING, TENSION |
| 320 | 3-315-398-00 | SCREW, LOCK |
| 321 | 3-315-399-00 | COLLAR, BUTTON |

NOTE:
- Items with no part number and no description are not stocked because they are seldom required for routine service.
- Items marked " ♣ " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- Due to standardization, parts with part numbers (Δ-ΔΔΔ-ΔΔΔ-XX or Δ-ΔΔΔΔ-ΔΔΔ-X) may be different from those used in the set.
- If there are two or more same circuitsin a set such as a stereophonic machine, only typical circuit parts may be indicated and capacitors and resistors in other same circuits may be omitted.

CAPACITORS:
MF:μF, PF:μμF.

RESISTORS
- All resistors are in ohms.
- F : nonflammable

COILS
- MMH : mH, UH : μH

SEMICONDUCTORS
In each case, U : μ, for example:
UA···: μA···, UPA···: μPA···, UPC···: μPC,
UPD···: μPD···



## MECHANISM SECTION

| No. | Part No. | Description |
|---|---|---|
| 322 | 3-315-402-00 | COVER, CONVERTER |
| 323 | 3-315-403-00 | SHAFT (C), STOPPER, CABINET |
| 324 | 3-315-404-00 | SCREW |
| 325 | 3-315-405-00 | BELT |
| 326 | 3-315-406-00 | SPRING |
| 327 | 3-315-412-00 | CONTACT, OUTSERT |
| 328 | 3-315-414-00 | WASHER (t=0.25) |
| 329 | 3-315-414-11 | WASHER (t=0.188) |
| 330 | 3-315-415-00 | WASHER (t=0.075) |
| 331 | 3-315-417-00 | BUSHING, CAPSTAN |
| 332 | ♣;3-315-419-00 | PLATE, SHIELD |
| 333 | 3-315-430-00 | TABLE, HEAD |
| 334 | 3-315-431-00 | CHASSIS, HEAD |
| 335 | 3-315-432-00 | BUTTON, PLAY |
| 336 | 3-315-433-00 | BUTTON, FF |
| 337 | 3-315-434-00 | BUTTON, REW |
| 338 | 3-315-435-00 | BUTTON, STOP |
| 339 | 3-315-436-00 | GEAR (OUTSERT), SUPPLY REEL |
| 340 | 3-315-437-00 | ORNAMENT, REEL |
| 341 | 3-315-463-00 | PLATE, GROUND, HEAD |
| 342 | 3-315-484-02 | SCREW (M2X3), HEAD, WASHER |
| 343 | 3-315-485-01 | SCRWE (M1.4X2.3), PRECISION |
| 344 | 3-315-495-31 | WASHER, 2(t=0.3) |
| 345 | 3-701-438-01 | WASHER (t=0.13) |
| 345 | 3-701-438-11 | WASHER, 2.5 (t=0.25) |
| 346 | 3-317-702-01 | WASHER, 5 (t=0.2) |
| 347 | 3-703-502-01 | SCREW |
| 348 | 3-831-441-XX | CUSHION, CABINET UPPER 10X7X0.3 |
| 349 | ..... | |
| 350 | 7-627-451-87 | SCREW, PRECISION +K 1.4X2.2 |
| 351 | 7-627-455-07 | SCREW, PRECISION +K 1.4X1.4 |
| 352 | 7-627-551-47 | SCREW, PRECISION +P 1.4X1.4 |
| 353 | 7-627-850-07 | SCREW, PRECISION +P 1.4X2 |
| 354 | 7-627-850-37 | SCREW, PRECISION +P 1.4X1.4 |
| 355 | A-3125-003-A | CHASSIS BLOCK ASSY, REEL |
| 356 | A-3133-182-A | WHEEL BLOCK ASSY, MOTOR |
| 357 | X-3315-303-0 | FLYWHEEL ASSY |
| 358 | X-3315-305-0 | SLEEVE ASSY, MOTOR |
| 359 | X-3315-306-0 | BRACKET ASSY, REAR PANEL |
| 360 | X-3315-307-0 | LEVER (B) ASSY, FR |
| 361 | X-3315-308-0 | WHEEL ASSY, REVERSE |
| 362 | X-3315-311-0 | PINCH LEVER ASSY |
| 363 | X-3315-312-0 | CHASSIS ASSY, MOTOR |
| 364 | X-3315-314-0 | CHASSIS ASSY, TAKE-UP REEL |
| 365 | X-3315-315-0 | GEAR ASSY, TAKE-UP REEL |
| 366 | X-3315-316-0 | SLEEVE (COMP) ASSY |
| 367 | X-3315-317-0 | PLATE ASSY, CONTROL |

## ELECTRICAL PARTS

| Ref.No. | Part No. | Description | | |
|---|---|---|---|---|
| 501 | ♣;1-610-702-00 | PC BOARD, CONVERTER | | |
| 502 | ♣;A-3015-198-A | MOUNTED PCB, AUDIO | | |
| 503 | A-3065-035-A | SERVO UNIT | | |
| 504 | A-3089-055-A | PC BOARD ASSY, FLEXIBLE | | |
| C101 | 1-163-008-00 | CERAMIC CHIP 820PF | 10% | 50V |
| C102 | 1-163-016-00 | CERAMIC CHIP 0.0039MF | 10% | 50V |
| C103 | 1-135-104-00 | TANTAL. CHIP 10MF | 10% | 4V |
| C104 | 1-135-103-00 | TANTAL. CHIP 3.3MF | 20% | 4V |
| C105 | 1-163-021-00 | CERAMIC CHIP 0.01MF | 5% | 50V |
| C106 | 1-163-021-00 | CERAMIC CHIP 0.01MF | 5% | 50V |
| C107 | 1-135-073-00 | TANTAL. CHIP 0.33MF | 10% | 35V |
| C108 | 1-135-073-00 | TANTAL. CHIP 0.33MF | 10% | 35V |
| C109 | 1-135-070-00 | TANTAL. CHIP 0.1MF | 10% | 35V |
| C110 | 1-135-091-00 | TANTAL. CHIP 1MF | 20% | 16V |
| C111 | 1-163-013-00 | CERAMIC CHIP 0.0022MF | 10% | 50V |
| C112 | 1-163-038-00 | CERAMIC CHIP 0.1MF | | 25V |
| C113 | 1-135-091-00 | TANTAL. CHIP 1MF | 20% | 16V |
| C201 | 1-163-008-00 | CERAMIC CHIP 820PF | 10% | 50V |
| C202 | 1-163-016-00 | CERAMIC CHIP 0.0039MF | 10% | 50V |
| C203 | 1-135-104-00 | TANTAL. CHIP 10MF | 10% | 4V |
| C204 | 1-135-103-00 | TANTAL. CHIP 3.3MF | 20% | 4V |
| C205 | 1-163-021-00 | CERAMIC CHIP 0.01MF | 5% | 50V |
| C206 | 1-163-021-00 | CERAMIC CHIP 0.01MF | 5% | 50V |
| C207 | 1-135-073-00 | TANTAL. CHIP 0.33MF | 10% | 35V |
| C208 | 1-135-073-00 | TANTAL. CHIP 0.33MF | 10% | 35V |
| C209 | 1-135-070-00 | TANTAL. CHIP 0.1MF | 10% | 35V |
| C210 | 1-135-091-00 | TANTAL. CHIP 1MF | 20% | 16V |
| C211 | 1-163-013-00 | CERAMIC CHIP 0.0022MF | 10% | 50V |
| C212 | 1-163-038-00 | CERAMIC CHIP 0.1MF | | 25V |
| C213 | 1-135-091-00 | TANTAL. CHIP 1MF | 20% | 16V |
| C303 | 1-135-105-00 | TANTAL. CHIP 33MF | 20% | 4V |
| C304 | 1-124-413-00 | ELECT 220MF | 20% | 4V |
| C305 | 1-135-104-00 | TANTAL. CHIP 10MF | 10% | 4V |
| C306 | 1-135-095-00 | TANTAL. CHIP 1.5MF | 20% | 10V |
| C401 | 1-124-413-00 | ELECT 220MF | 20% | 4V |
| C402 | 1-124-413-00 | ELECT 220MF | 20% | 4V |
| C403 | 1-163-009-00 | CERAMIC CHIP 0.001MF | 10% | 50V |
| C404 | 1-163-009-00 | CERAMIC CHIP 0.001MF | 10% | 50V |
| C405 | 1-163-009-00 | CERAMIC CHIP 0.001MF | 10% | 50V |
| C406 | 1-163-009-00 | CERAMIC CHIP 0.001MF | 10% | 50V |
| C407 | 1-163-009-00 | CERAMIC CHIP 0.001MF | 10% | 50V |
| C601 | 1-163-986-00 | CERAMIC CHIP 0.027MF | 10% | 25V |
| C602 | 1-163-986-00 | CERAMIC CHIP 0.027MF | 10% | 25V |
| C603 | 1-135-091-00 | TANTAL. CHIP 1MF | 20% | 16V |
| C604 | 1-135-104-00 | TANTAL. CHIP 10MF | 20% | 4V |
| C605 | 1-163-038-00 | CERAMIC CHIP 0.1MF | | 25V |

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CAPACITORS:
MF:μF, PF:μμF.

RESISTORS
- All resistors are in ohms.
- F : nonflammable

COILS
- MMH : mH, UH : μH

SEMICONDUCTORS
In each case, U : μ, for example:
UA···: μA···, UPA···: μPA···, UPC···: μPC,
UPD···: μPD···

ELECTRICAL PARTS

| Ref.No. | Part No. | Description | | | |
|---|---|---|---|---|---|
| C606 | 1-135-073-00 | TANTAL. CHIP | 0.33MF | 10% | 35V |
| C607 | 1-135-091-00 | TANTAL. CHIP | 1MF | 20% | 16V |
| C608 | 1-135-070-00 | TANTAL. CHIP | 0.1MF | 10% | 35V |
| C609 | 1-124-413-00 | ELECT | 220MF | 20% | 4V |
| C610 | 1-135-103-00 | TANTAL. CHIP | 3.3MF | 20% | 4V |
| C611 | 1-135-103-00 | TANTAL. CHIP | 3.3MF | 20% | 4V |
| C612 | 1-163-038-00 | CERAMIC CHIP | 0.1MF | | 25V |
| C801 | 1-163-017-00 | CERAMIC CHIP | 0.0047MF | 10% | 50V |
| C802 | 1-163-021-00 | CERAMIC CHIP | 0.01MF | 10% | 50V |
| C803 | 1-135-104-00 | TANTAL. CHIP | 10MF | 20% | 4V |
| C804 | 1-135-103-00 | TANTAL. CHIP | 3.3MF | 20% | 4V |
| C805 | 1-124-413-00 | ELECT | 220MF | 20% | 4V |
| CNJ401 | 1-507-894-00 | JACK, EXTERNAL POWER | | | |
| D301 | 8-719-100-03 | DIODE 1S2835 | | | |
| D302 | 8-719-908-30 | DIODE DA106K | | | |
| D401 | 8-719-908-40 | DIODE GL-2PR7 | | | |
| D601 | 8-719-908-30 | DIODE DA106K | | | |
| D801 | 8-719-105-65 | DIODE RD4.3M-B3 | | | |
| HP | 8-825-507-10 | HEAD (PP227-3602H) | | | |
| IC301 | 8-759-910-18 | IC BA3304F | | | |
| IC302 | 8-759-908-08 | IC CX20085 | | | |
| IC303 | 8-759-600-67 | IC CX20089 | | | |
| IC601 | 8-759-700-75 | IC NJM2901MB | | | |
| J401 | 1-507-895-00 | JACK, HEADPHONE (WITH SW) | | | |
| JR301 | 1-216-295-00 | METAL CHIP | 0 | 5% | 1/10W |
| JR302 | 1-216-295-00 | METAL CHIP | 0 | 5% | 1/10W |
| JR303 | 1-216-296-00 | METAL CHIP | 0 | 5% | 1/8W |
| JR304 | 1-216-296-00 | METAL CHIP | 0 | 5% | 1/8W |
| JR305 | 1-216-296-00 | METAL CHIP | 0 | 5% | 1/8W |
| JR306 | 1-216-296-00 | METAL CHIP | 0 | 5% | 1/8W |
| JR307 | 1-216-296-00 | METAL CHIP | 0 | 5% | 1/8W |
| JR308 | 1-216-296-00 | METAL CHIP | 0 | 5% | 1/8W |
| JR309 | 1-216-296-00 | METAL CHIP | 0 | 5% | 1/8W |
| JR310 | 1-216-295-00 | METAL CHIP | 0 | 5% | 1/10W |
| JR801 | 1-216-295-00 | METAL CHIP | 0 | 5% | 1/10W |
| L1-6 | 1-462-209-00 | COIL, MOTOR (STATOR) | | | |
| L801 | 1-408-946-00 | INDUCTOR CHIP | 56UH | | |
| Q301 | 8-729-100-66 | TRANSISTOR 2SC1623 | | | |
| Q302 | 8-729-216-22 | TRANSISTOR 2SA1162 | | | |
| Q401 | 8-729-216-22 | TRANSISTOR 2SA1162 | | | |
| Q601 | 8-729-216-22 | TRANSISTOR 2SA1162 | | | |
| Q602 | 8-729-100-66 | TRANSISTOR 2SC1623 | | | |
| Q603 | 8-729-900-51 | TRANSISTOR DTA114TK | | | |

ELECTRICAL PARTS

| Ref.No. | Part No. | Description | | | |
|---|---|---|---|---|---|
| Q604 | 8-729-100-66 | TRANSISTOR 2SC1623 | | | |
| Q605 | 8-729-100-66 | TRANSISTOR 2SC1623 | | | |
| Q606 | 8-729-900-52 | TRANSISTOR DTC114YK | | | |
| Q607 | 8-729-100-66 | TRANSISTOR 2SC1623 | | | |
| Q608 | 8-729-102-44 | TRANSISTOR 2SB624 | | | |
| Q609 | 8-729-100-66 | TRANSISTOR 2SC1623 | | | |
| Q610 | 8-729-216-22 | TRANSISTOR 2SA1162 | | | |
| Q611 | 8-729-216-22 | TRANSISTOR 2SA1162 | | | |
| Q612 | 8-729-100-66 | TRANSISTOR 2SC1623 | | | |
| Q613 | 8-729-102-62 | TRANSISTOR 2SC1623 | | | |
| Q614 | 8-729-102-44 | TRANSISTOR 2SB624 | | | |
| Q615 | 8-729-100-66 | TRANSISTOR 2SC1623 | | | |
| Q616 | 8-729-100-66 | TRANSISTOR 2SC1623 | | | |
| Q617 | 8-729-100-66 | TRANSISTOR 2SC1623 | | | |
| Q801 | 8-729-102-44 | TRANSISTOR 2SB624 | | | |
| Q802 | 8-729-100-66 | TRANSISTOR 2SC1623 | | | |
| Q803 | 8-729-159-64 | TRANSISTOR 2SD596 | | | |
| Q804 | 8-729-102-44 | TRANSISTOR 2SB624 | | | |
| Q805 | 8-729-100-66 | TRANSISTOR 2SC1623 | | | |
| R101 | 1-216-089-00 | METAL CHIP | 47K | 5% | 1/10W |
| R102 | 1-216-085-00 | METAL CHIP | 33K | 5% | 1/10W |
| R103 | 1-216-085-00 | METAL CHIP | 33K | 5% | 1/10W |
| R104 | 1-216-118-00 | METAL CHIP | 750K | 5% | 1/10W |
| R105 | 1-216-047-00 | METAL CHIP | 820 | 5% | 1/10W |
| R106 | 1-216-073-00 | METAL CHIP | 10K | 5% | 1/10W |
| R107 | 1-216-052-00 | METAL CHIP | 1.3K | 5% | 1/10W |
| R108 | 1-216-106-00 | METAL CHIP | 240K | 5% | 1/10W |
| R109 | 1-216-070-00 | METAL CHIP | 7.5K | 5% | 1/10W |
| R111 | 1-216-073-00 | METAL CHIP | 10K | 5% | 1/10W |
| R201 | 1-216-089-00 | METAL CHIP | 47K | 5% | 1/10W |
| R202 | 1-216-085-00 | METAL CHIP | 33K | 5% | 1/10W |
| R203 | 1-216-085-00 | METAL CHIP | 33K | 5% | 1/10W |
| R204 | 1-216-118-00 | METAL CHIP | 750K | 5% | 1/10W |
| R205 | 1-216-047-00 | METAL CHIP | 820 | 5% | 1/10W |
| R206 | 1-216-073-00 | METAL CHIP | 10K | 5% | 1/10W |
| R207 | 1-216-052-00 | METAL CHIP | 1.3K | 5% | 1/10W |
| R208 | 1-216-106-00 | METAL CHIP | 240K | 5% | 1/10W |
| R209 | 1-216-070-00 | METAL CHIP | 7.5K | 5% | 1/10W |
| R211 | 1-216-073-00 | METAL CHIP | 10K | 5% | 1/10W |
| R302 | 1-216-073-00 | METAL CHIP | 10K | 5% | 1/10W |
| R303 | 1-216-047-00 | METAL CHIP | 820 | 5% | 1/10W |
| R304 | 1-216-113-00 | METAL CHIP | 470K | 5% | 1/10W |
| R305 | 1-216-073-00 | METAL CHIP | 10K | 5% | 1/10W |
| R307 | 1-216-254-00 | METAL CHIP | 220K | 5% | 1/8W |
| R308 | 1-216-118-00 | METAL CHIP | 750K | 5% | 1/10W |
| R401 | 1-216-065-00 | METAL CHIP | 4.7K | 5% | 1/10W |

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In each case, U : μ, for example:
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UPD···: μPD···



ELECTRICAL PARTS

| Ref.No. | Part No. | Description | | | |
|---|---|---|---|---|---|
| R402 | 1-216-058-00 | METAL CHIP | 2.4K | 5% | 1/10W |
| R403 | 1-216-025-00 | METAL CHIP | 100 | 5% | 1/10W |
| R601 | 1-216-090-00 | METAL CHIP | 51K | 5% | 1/10W |
| R602 | 1-216-097-00 | METAL CHIP | 100K | 5% | 1/10W |
| R603 | 1-216-085-00 | METAL CHIP | 33K | 5% | 1/10W |
| R604 | 1-216-097-00 | METAL CHIP | 100K | 5% | 1/10W |
| R605 | 1-216-092-00 | METAL CHIP | 62K | 5% | 1/10W |
| R606 | 1-216-073-00 | METAL CHIP | 10K | 5% | 1/10W |
| R607 | 1-216-073-00 | METAL CHIP | 10K | 5% | 1/10W |
| R608 | 1-216-097-00 | METAL CHIP | 100K | 5% | 1/10W |
| R609 | 1-216-047-00 | METAL CHIP | 820 | 5% | 1/10W |
| R610 | 1-216-097-00 | METAL CHIP | 100K | 5% | 1/10W |
| R611 | 1-216-092-00 | METAL CHIP | 62K | 5% | 1/10W |
| R612 | 1-216-118-00 | METAL CHIP | 750K | 5% | 1/10W |
| R613 | 1-216-093-00 | METAL CHIP | 68K | 5% | 1/10W |
| R614 | 1-216-083-00 | METAL CHIP | 27K | 5% | 1/10W |
| R615 | 1-216-085-00 | METAL CHIP | 33K | 5% | 1/10W |
| R616 | 1-216-103-00 | METAL CHIP | 180K | 5% | 1/10W |
| R617 | 1-216-097-00 | METAL CHIP | 100K | 5% | 1/10W |
| R618 | 1-216-091-00 | METAL CHIP | 56K | 5% | 1/10W |
| R619 | 1-216-097-00 | METAL CHIP | 100K | 5% | 1/10W |
| R620 | 1-216-097-00 | METAL CHIP | 100K | 5% | 1/10W |
| R621 | 1-216-047-00 | METAL CHIP | 820 | 5% | 1/10W |
| R622 | 1-216-049-00 | METAL CHIP | 1K | 5% | 1/10W |
| R623 | 1-216-097-00 | METAL CHIP | 100K | 5% | 1/10W |
| R624 | 1-216-001-00 | METAL CHIP | 10 | 5% | 1/10W |
| R625 | 1-216-094-00 | METAL CHIP | 75K | 5% | 1/10W |
| R626 | 1-216-107-00 | METAL CHIP | 270K | 5% | 1/10W |
| R627 | 1-216-097-00 | METAL CHIP | 100K | 5% | 1/10W |
| R628 | 1-216-052-00 | METAL CHIP | 1.3K | 5% | 1/10W |
| R629 | 1-216-107-00 | METAL CHIP | 270K | 5% | 1/10W |
| R630 | 1-216-094-00 | METAL CHIP | 75K | 5% | 1/10W |
| R631 | 1-216-097-00 | METAL CHIP | 100K | 5% | 1/10W |
| R632 | 1-216-001-00 | METAL CHIP | 10 | 5% | 1/10W |
| R633 | 1-216-049-00 | METAL CHIP | 1K | 5% | 1/10W |
| R634 | 1-216-065-00 | METAL CHIP | 4.7K | 5% | 1/10W |
| R635 | 1-216-073-00 | METAL CHIP | 10K | 5% | 1/10W |
| R636 | 1-216-073-00 | METAL CHIP | 10K | 5% | 1/10W |
| R637 | 1-216-113-00 | METAL CHIP | 470K | 5% | 1/10W |
| R638 | 1-216-094-00 | METAL CHIP | 75K | 5% | 1/10W |
| R639 | 1-216-053-00 | METAL CHIP | 1.5K | 5% | 1/10W |
| R640 | 1-216-079-00 | RES, CHIP | 18K | | |
| R801 | 1-216-049-00 | METAL CHIP | 1K | 5% | 1/10W |
| R802 | 1-216-113-00 | METAL CHIP | 470K | 5% | 1/10W |
| R803 | 1-216-035-00 | METAL CHIP | 270 | 5% | 1/10W |

ELECTRICAL PARTS

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|---|---|---|---|---|---|
| R804 | 1-216-007-00 | METAL CHIP | 18 | 5% | 1/10W |
| R805 | 1-216-113-00 | METAL CHIP | 470K | 5% | 1/10W |
| RV101 | 1-230-181-00 | RES, ADJ, METAL GLAZE 2.2K | | | |
| RV201 | 1-230-181-00 | RES, ADJ, METAL GLAZE 2.2K | | | |
| RV301 | 1-230-180-00 | RES, VAR, CARBON 10K/10K (VOLUME) | | | |
| RV601 | 1-230-182-00 | RES, ADJ, METAL GLAZE 100K | | | |
| S301 | 1-554-585-00 | SWITCH, SLIDE (M-N) | | | |
| S302 | 1-554-584-00 | SWITCH, SLIDE (DOLBY) | | | |
| S303 | 1-554-586-00 | SWITCH, LEAF | | | |
| T801 | 1-447-666-00 | TRANSFORMER, DC-DC CONVERTER | | | |
| TH601 | 1-806-715-11 | THERMISTOR | | | |

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