

SERVIZIO MANUTENZIONE

**A-170**

STUDIO CASSA PER VOCE



**TEAC®**

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# Test Equipment & General Precautions

The Service Technician is an important link between our engineers and our customers. We, therefore, recognize the obligation we have to the service technicians throughout the world to provide clear, accurate service data. Just as we are continually striving to improve our products, so we are always reviewing the needs of our service personnel to provide the most up to date data available.

Although we appreciate the many favorable comments we receive, we also welcome questions and suggestions from the field. Feel free to contact us at any of the offices

printed on the back cover of this manual if any procedure seems too difficult to do or to understand.

This manual is written to provide a guide for the skilled technician to make the preliminary checks and adjustments on the deck and includes instructions for the replacement of many of the parts and ordering information. A block diagram of the deck is provided to help explain the overall operation and functions of the A-170. A schematic diagram is included to help in detailed trouble-shooting.

The service data in this manual is intended for qualified service personnel and as such

may be more detailed than information contained in advertising material or that found in the Owner's Manual.

The service data is subject to change with the incorporation of future improvements or modifications.

All dB values in these tests refer to 0 dB = 0.775 V. If the test equipment you are using is calibrated for 0 dB = 1 V appropriate compensation should be made. If you are using a meter that does not have a dB scale, refer to the TEAC DECIBEL TABLE distributed previously to obtain conversion of millivolts to dB.

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## Test Equipment & Tools

### Test Tapes

#### For Playback Measurement:

MTT-150 Dolby Level Calibration Tone Tape. (400 Hz)

MTT-111 Tape speed & wow/flutter (3,000 Hz)

MTT-116L for Frequency Response (40 Hz – 10 kHz)

#### For Recording Measurement:

MTT-505 for BIAS 1/EQ 1

MTT-501 for BIAS 2/EQ 2

#### Spring Scale:

0 to 70 g, 0 to 400g

#### Frequency Generator:

range 10 Hz – 100 kHz

**VTVM:** ranges from 0.1mV – 300V

#### Distortion Analyser:

Base frequency: 400 Hz – 1 kHz

**Oscilloscope:** Sensitivity: 10mV/cm division, ranges from DC to 250 kHz

#### Wow & Flutter Meter

Meguro Denpa Co., Model MK-668A,  
D & R Co., FL-4B or equivalent

**Digital Frequency Counter:** 10Hz – 100kHz

**Bandpass Filter:** 1 kHz

#### Other equipment:

Headphone: plug and general tools

## Precaution

\*\* Before performing any maintenance on the unit, all metal parts that the tape will come into contact with must be cleaned and demagnetized.

\*\* For avoiding any damages it is very necessary to check that AC power line voltage of your deck matches with that in your locality.

\*\* Standard Test Tapes and Test Equipment must be used when performing maintenance to insure reliable results.

\*\* Procedures for preliminary checks and adjustments, unless otherwise indicated, are for the left channel.

\*\* The output load must, unless otherwise noted, be 50 kohms or more.

\*\* Input impedance of VTVM that is to be a load to a Dolby test point must always be more than 1 megohms.

## Special Terms

The following defined terms are used in a special sense in the manual.

\*\* **Specified Output Setting** defines the position of the Output control that gives a +3 dB level at the OUTPUT jacks when the MTT-150 test tape (Dolby Level Calibration Tone Tape) is played back and the Dolby Amplifier is set for 580 mV output at the Dolby Test Points. This setting will give a specified output level when playing back any properly recorded tape.

\*\* **Specified Input (RECORD) Setting** defines the position of the Input controls that gives an output of 580 mV at the Dolby Test Points when a -9 dB, 400 Hz sinewave signal is applied to the LINE IN jacks, a -57 dB level is applied to the MIC jack or a -25 dB level is applied to the DIN input connector. The controls position may vary depending on the Input terminals being used. However, measurement performed in this manual are done with the RECORD controls set at the position determined when using the LINE IN jack.

\*\* 0dB refers to a level of 0.775V throughout this manual.

\*\* **THD** denotes total harmonic distortion for overall tape, head and amplifier system measurement.

# Specifications & Service Data

## Specifications

|   |  |
|---|--|
| <b>Track System</b>                     | 1/4-track, 2-channel   |
| <b>Type of Tape</b>                     | Cassette tape, C-60 and C-90 (Philips type)  |
| <b>Tape Speed</b>                       | 4.8 cm/s (1-7/8 ips)   |
| <b>Inputs</b><br>(impedance and level)  | Microphones: Min. input level: -67 dB (0.345 mV) $\pm$ 3 dB (10 Kohms or more, applicable standard: 600 ohms - 10 kohms).<br>Line: Specified input level: -9 dB (274 mV) (50 Kohms or more)<br>Min input level: -19 dB (86 mV) $\pm$ 3 dB<br>* DIN: Min. input level: -35dB (13.7 mV) $\pm$ 2 dB |
| <b>Outputs</b><br>(impedance and level) | Line out: Max. output level: +8 dB (1.94 V) $\pm$ 2 dB (50 Kohms)<br>Specified output level: +3 dB (1.09 V)<br>Headphones: Specified output level: -21 dB (69.0 mV) $\pm$ 3 dB (8 ohms)  |
| <b>Equalization</b>                     | EQ 1: 3180 $\mu$ s +70 $\mu$ s (for CrO <sub>2</sub> tape)<br>EQ 2: 3180 $\mu$ s +120 $\mu$ s (for regular Hi-Fi tape)   |
| <b>Head Configuration</b>               | 1/2-track, 1-channel Erase Head<br>1/4-track, 2-channel Record/Playback Head   |
| <b>Motor</b>                            | DC Servo Motor with F.G. voltage control   |
| <b>Bias Frequency</b>                   | 100 kHz  |
| <b>Operating Position</b>               | Horizontal   |
| <b>Power Requirements</b>               | 100/117/220/240V AC, 50/60 Hz (General Export Models)<br>117V AC 60 Hz (USA/Canada Models)<br>220V AC 50 Hz (Europe Models)  |
| <b>Power Consumption</b>                | 8 W  |
| <b>Dimensions</b>                       | 430 (W) x 136 (H) x 255 (D) mm [16-15/16" (W) x 5-3/8" (H) x 8-7/8" (D)]   |
| <b>Weight</b>                           | 4.5 kg (10 lbs) net, approx.<br>* Pursuant to DIN Standards  |

## Service Data

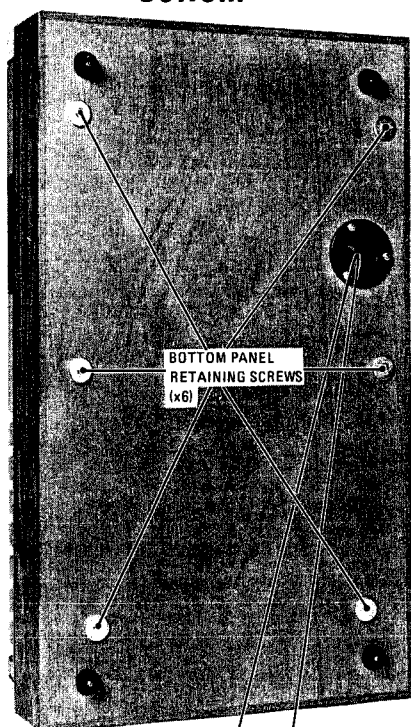
| Mechanical                               |  |
|--|--|
| <b>Tape Speed Deviation</b>              | 3,000 Hz $\pm$ 45 Hz   |
| <b>Wow and Flutter</b>                   | Playback: 0.12% (WRMS)   |
| <b>Pinch Roller Pressure</b>             | 400 g $\pm$ 20 g (14 oz)   |
| <b>Reel Torque</b>                       | Take up: 45 - 70 g (1.5 - 2.5 oz)<br>Fast Forward: 30 g-cm<br>Rewind: 100 g-cm or more                           |
| <b>Fast Winding Time</b>                 | 90 seconds for C-60  |
| <b>End-stop Activate Time</b>            | 4 seconds $\pm$ 2 sec.   |
| Electrical                               |  |
| <b>Frequency Response</b>                | Refer to frequency response limits charts on pp. 11, 13.   |
| <b>Signal to Noise Ratio</b>             | Playback method: 47 dB (minimum)<br>Record/Playback Method: BIAS/EQ 1: 45 dB minimum<br>BIAS/EQ 2: 44 dB minimum |
| <b>Erase Efficiency</b>                  | 65 dB minimum  |
| <b>Channel Separation</b>                | 30 dB minimum (at 1 kHz)   |
| <b>Crosstalk between adjacent tracks</b> | 40 dB minimum (at 125 Hz)  |
| <b>Total Harmonic Distortion</b>         | BIAS/EQ 1: 3.0% (maximum)<br>BIAS/EQ 2: 2.5% (maximum)   |

| BIAS and EQ Switch Setting Chart |    |              |   |
|----------------------------------|----|--------------|---|
| Switch                           |    | Tape Brand   | Tape Designation                                  |
| BIAS                             | EQ |              |   |
| 1                                | 1  | FUJI FILM    | FC-C-60<br>FC-C-90                                |
|                                  |    | MAXELL       | CR-C-60<br>CR-C-90                                |
|                                  |    | TDK          | KR-C-60<br>KR-C-90                                |
|                                  |    | SONY         | C-60-CR   |
|                                  |    | BASF         | Chromdioxid C-60<br>C-90                          |
|                                  |    | AGFA-GEVAERT | Chromdioxid C-60<br>C-90                          |
| 2                                | 2  | SONY         | C-60-HF, C-90-HF<br>C-60, C-90                    |
|                                  |    | TDK          | ED-C-90<br>SD-C-60, SD-C-90<br>D-C-60, D-C-90     |
|                                  |    | FUJI FILM    | FX-C-60, FX-C-90<br>FL-C-60                       |
|                                  |    | MAXELL       | UDXL-C-60<br>UD-C-60, UD-C-90<br>LN-C-60, LN-C-90 |
|                                  |    | BASF         | C-60LH, C-90LH<br>C-60, C-90                      |
|                                  |    | SCOTCH       | LD-C-90   |

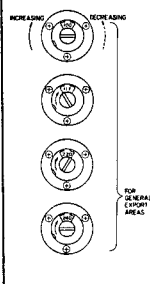
Those tapes listed or, if not available, equivalent tapes are recommended.

# Location of Parts & Controls

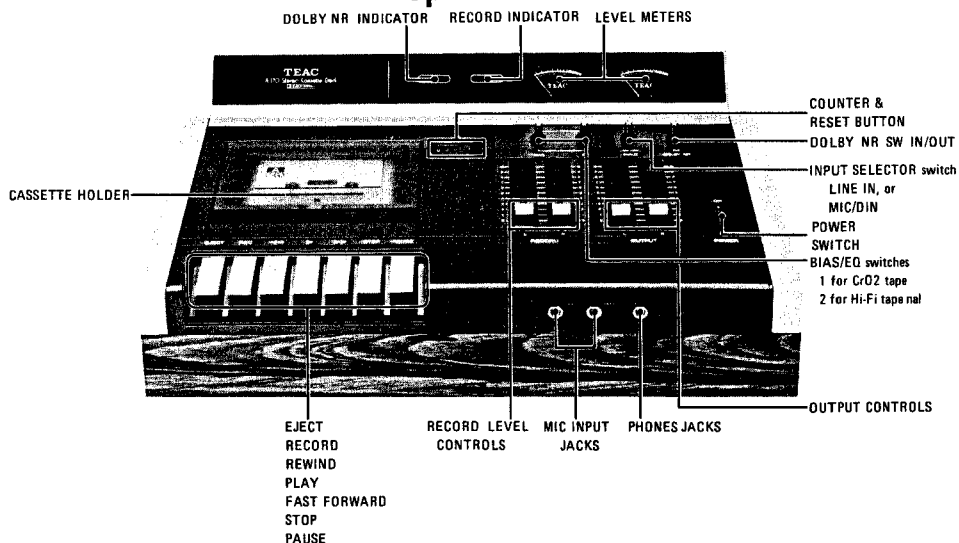
**Bottom**



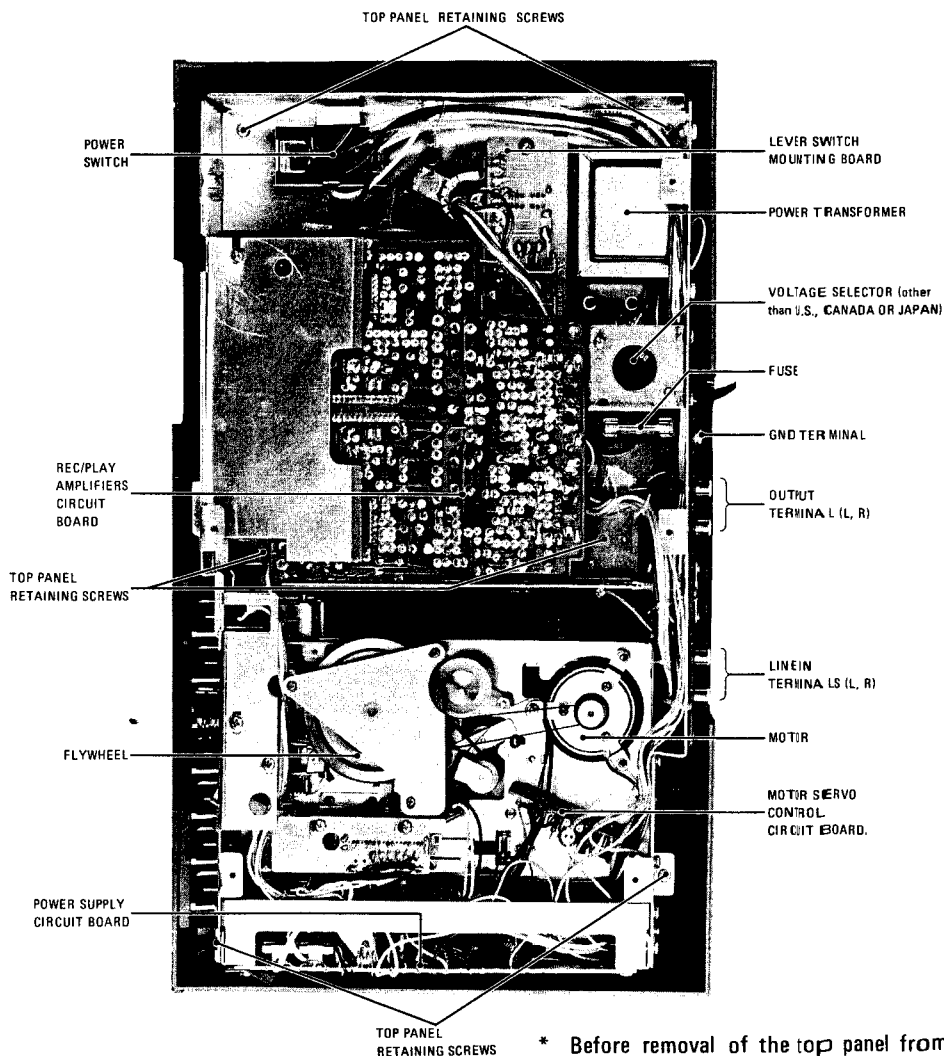
**AC MAINS VOLTAGE SELECTOR**



**Top Panel**



**Bottom View with cover removed**



\* Before removal of the top panel from the deck, be sure to take off both knobs of Record and- Output controls.

# Checks & Adjustments -Mechanical-

## Pinch Roller Pressure Measurement

1. Apply the AC power and depress the PLAY button without loading a cassette tape to let the head and capstan assembly protrude for easy servicing.
2. Attach a suitable spring scale as illustrated in Fig. 6-1 to the pinch roller shaft and gently move the scale away (in the direction of the arrow) until the capstan and pinch roller are separated.
3. Move the scale slowly toward the opposite direction of the arrow and check and read the scale at the instant the pinch roller is about to rotate.

**Requirement:** standard shall be 400 g  $\pm$  20 g. (14 oz)

4. If measured value is not within these limits it is necessary to replace the pinch roller spring or pinch roller assembly.

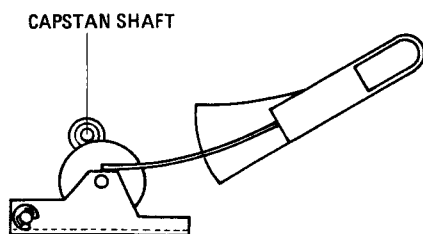


Fig. 6-1 PINCH ROLLER PRESSURE MEASUREMENT

## Take-up Reel Torque Measurement

1. Remove the top panel and then apply AC power to the deck under test.
2. Attach the spring scale and special reel adaptor to the reel table as shown in Fig. 6-2.
3. Depress play button to setup playback mode with no cassette tape loaded.
4. Allow the spring scale to be slowly and smoothly drawn toward the hub. Read the scale (before end-stop function activates).
5. Calculate the torque reading using the formula torque = force x radius.

Torque value should be 45 to 70 g.cm

6. If calculated value does not meet this specification, clean the reel table and tension pulley shaft with the cleaning kit (TEAC TZ-261B) or replace tension pulley ass'y.

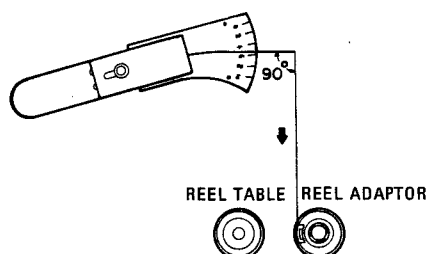


Fig. 6-2 TAKE UP and F.F. REEL TORQUE MEASUREMENT

## Note concerning torque procedures.

Torque measurements are calculated using the formula:

$$\text{Torque (in g.cm)} = \text{Force (in grams)} \times \text{radius (in cm)}$$

Force is the measurement in grams read directly from the spring scale.

The reel adaptor in this procedure is a stack of 4 to 6 reels from old cassettes which have a radius of 1.1 cm.

The torque measurements may also be taken with a calibrated cassette torque gauge, in which case the torque measurement may be read directly on the torque gauge.

The torque measurements can be easily done by use of the Cassette Torque Meter indicated below.

For take-up torque measurement, 0 to 70 grams gauge, at least, is required.

For F.F. and REW torque measurements: 0 - 160g.cm

By this use, it is possible to directly obtain

the torque value without calculation, and to do the measurement simply with no removal of any parts.

If necessary, repair with the cabinet and the front panel removed.

Load the meter on the deck and read the pointer indication on the dial scale.



EXAMPLE OF THE QUICK-CHECK "CASSETTE TORQUE METER"

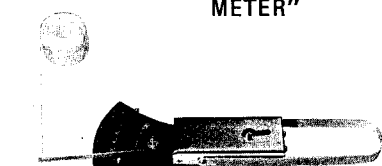


Fig. 3 REEL ADAPTOR & SPRING SCALE TORQUE GAUGE

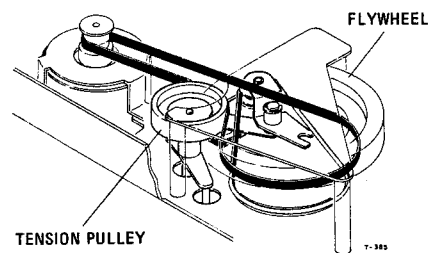


Fig. 6-4 TENSION PULLEY SECTION

## F.F. & Rewind Torque

1. Attach the spring scale and reel adaptor to the left or right reel table as shown. Refer to Fig. 6-2 for F.F., Fig. 6-5 for REW.
  2. Select F.F. or REW. Allow the spring scale to be slowly drawn toward the reel table. Read the scale when the reading becomes steady.
  3. Calculate the torque value using the formula torque = force x radius
- Requirement:** value should be 80 g.cm or more for F.F., 100 g.cm or more for REW.
4. If calculated value does not meet this specification, clean the reel table and idler with the cleaning kit (TZ-261B) See Fig. 6.6

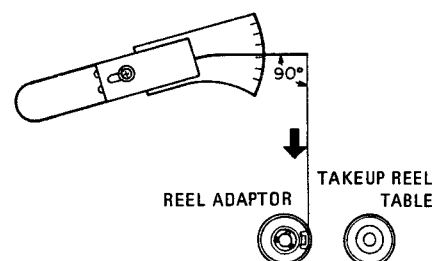


Fig. 6-5 REWIND TORQUE MEASUREMENT

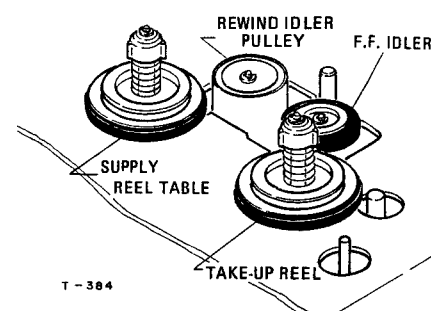
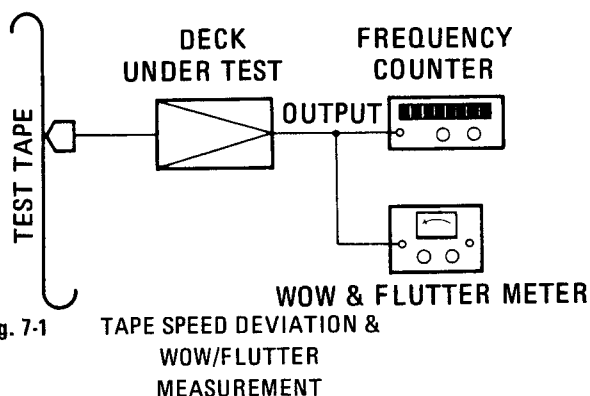


Fig. 6-6 REEL TABLE & IDLER

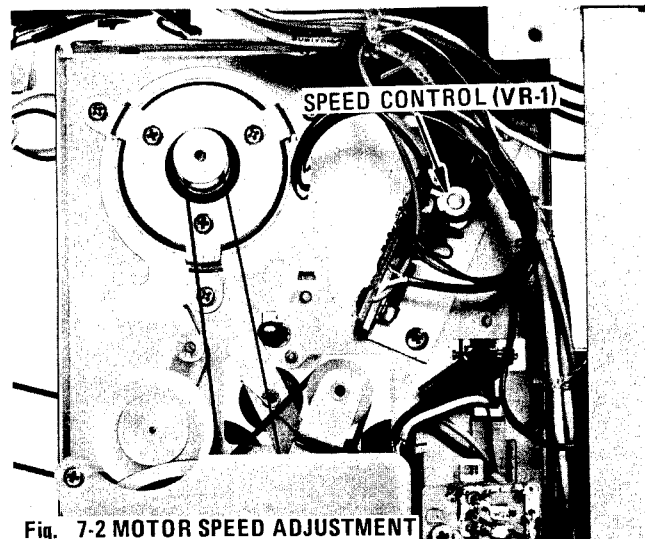
### Tape Speed Deviation & Wow/Flutter Measurement

1. Connect a wow/flutter meter and digital frequency counter to the OUTPUT terminals as illustrated in Fig. 7-1.
2. Load and play a TEAC Test Tape MTT-111 (a 3,000 Hz pre-recorded signal).

**Requirement:** indication on the digital frequency counter should read 3000 Hz  $\pm 45$  Hz.



3. To adjust: VR-1 the semi-fixed resistor control for the motor speed adjustment. see Fig. 7-2.
  4. Read and determine the indication on the wow/flutter meter.
- Requirement:** 0.12% WRMS or less.



## Partial Dis-assembly & Re-assembly Guide

### Disassembly Precautions

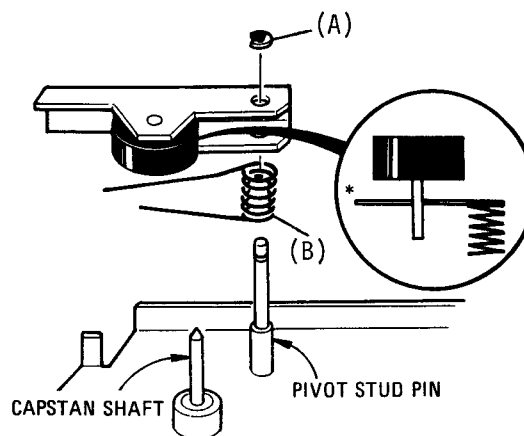
- Use the right tools. Demagnetize the tools before use.
- If any screws that were coated with locking paint are moved or adjusted, relock them using locking paint after they are set or adjusted to prevent them moving due to vibration or handling of the deck.
- Do not attempt partial adjustment of the factory adjusted ass'y.
- When mounting or removing a spring, pay heed to the position (direction) of the anchor or hook. The wrong position may result in a change in the tension.

### Pinch Roller Ass'y

1. Remove top panel, see Fig. 5-3 on page 5 for screws to be removed.
2. Set the deck under test to STOP mode.
3. Remove the E-ring (A) from pivot stud pin.
4. Gently lift up pinch roller ass'y from pivot.
5. Take off spring (B).

### Note:

- When removing E-ring pay special attention not to lose it.
- Be careful not to bend, scratch or otherwise damage capstan shaft.
- During reassembly, place top end of spring (B) as illustrated behind pivot stud pin, and use special care that \* marked portion is firmly anchored.



T-429

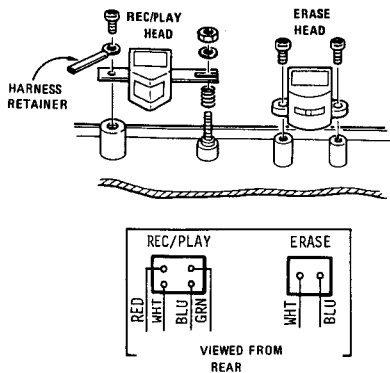
Fig. 8-1 REMOVAL OF PINCH ROLLER ASS'Y

## Head Ass'y

1. Remove top panel.
2. Unsolder lead wires from the head.
3. Lift up REC/PLAY head or erase head as in Fig. 8-2.

### Note:

Refer to color code identifier if necessary. When remounting REC/PLAY head, be sure to confirm the head physical alignment to tape by using cassette tape run test. Then check head alignment using procedure on page 11.



T-430

Fig. 8-2

HEAD ASSY

## Motor Ass'y

1. Unplug the AC power to the deck.
2. Take out drive belt (D) from motor pulley.
3. Remove grounding lug (C) from motor clamp.
4. Unsolder the red and the black wires from the motor servo circuit board.
5. Loosen and take off 3 retaining nuts (B) which fastened the clamp.
6. Unscrew 2 retaining screws from motor servo circuit board.
7. Lift up the motor body and the servo circuit board together out of the chassis.

### Note:

- Never forget to clean the pulley after taking off the belt (TZ-261 TEAC Cleaner kit).
- When re-attaching drive belt to the pulley pay attention to avoid twisting belt.
- Belt should always be attached right in predetermined place.

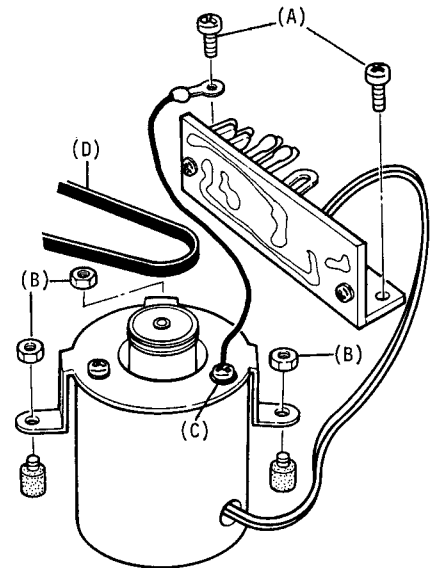


Fig. 8-3 MOTOR ASSY

T-433

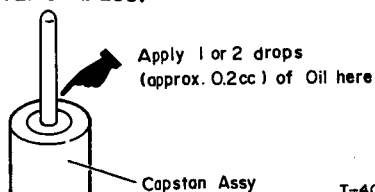
## Capstan Ass'y and Drive Belt

1. Prepare by removing bottom panel and set the deck in the STOP mode.
2. Loosen 3 screws out of (A) flywheel bearing plate ass'y.
3. Take off two drive belts (C) and (D).
4. Gently lift and take out capstan ass'y (B) from capstan shaft bearing stud (G).

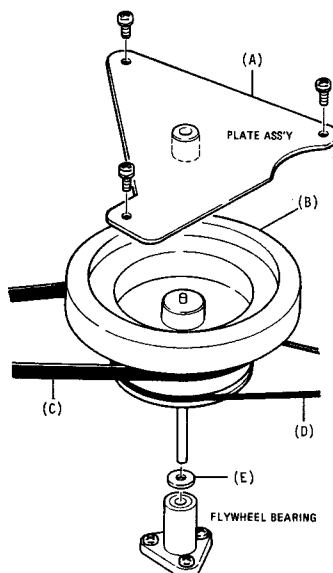
### 3 "don't's": Be careful of the following:

- do not bend capstan shaft as this will increase wow/flutter or speed deviation.
- during re-assembly do not re-attach twisted drive belt.
- do not forget to insert washer (E) when remounting parts.

**Lubrication:** Generally, it is necessary only once in every 1000 hours of use. However, when required apply one or two drops (about 0.2 cc) of good quality oil e.g., TEAC TZ-255.



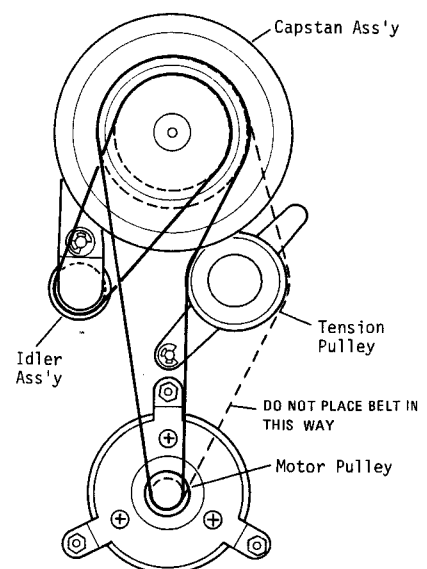
T-408



T-431

Fig. 8-4 CAPSTAN ASSY & DRIVE BELTS

## REATTACHING DRIVE BELT

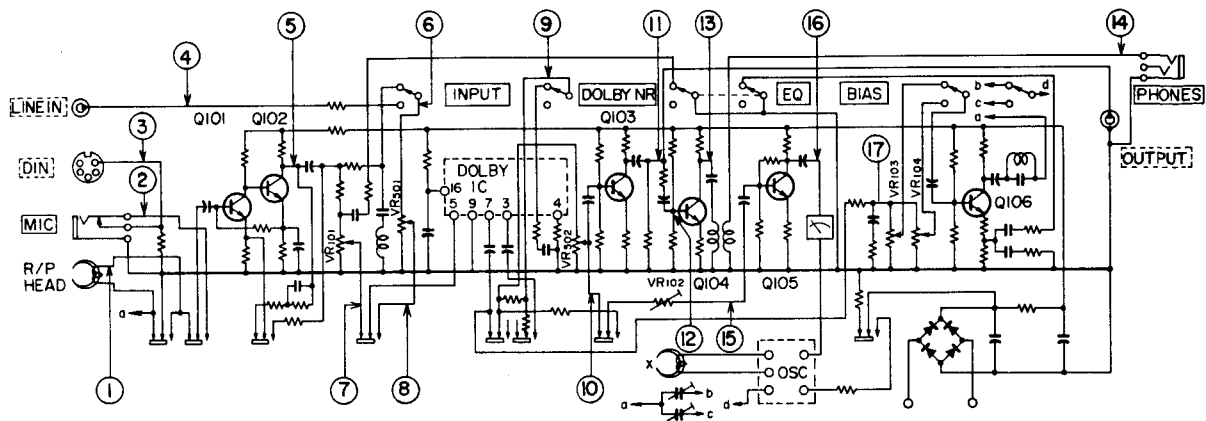


T-432

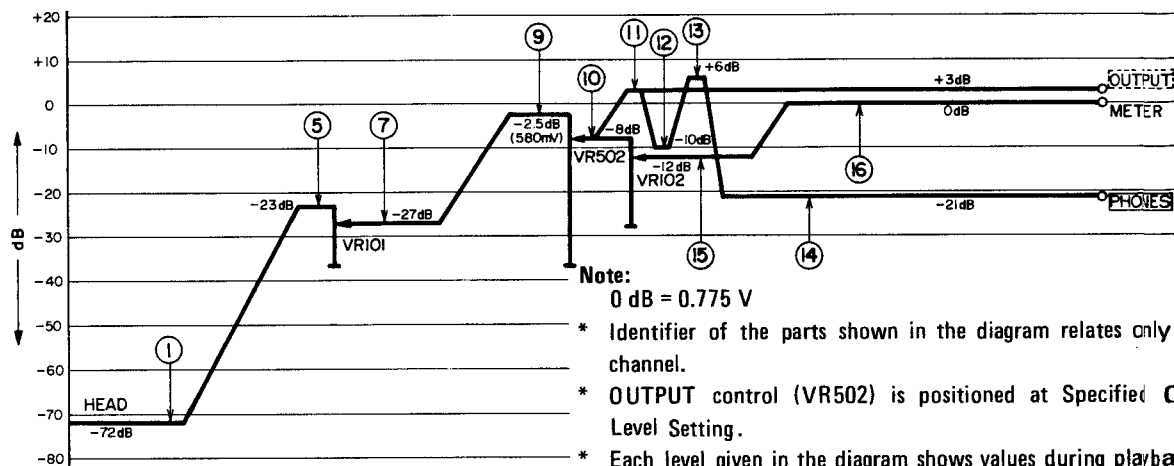
Fig. 8-5 RE-ATTACHING DRIVE BELTS



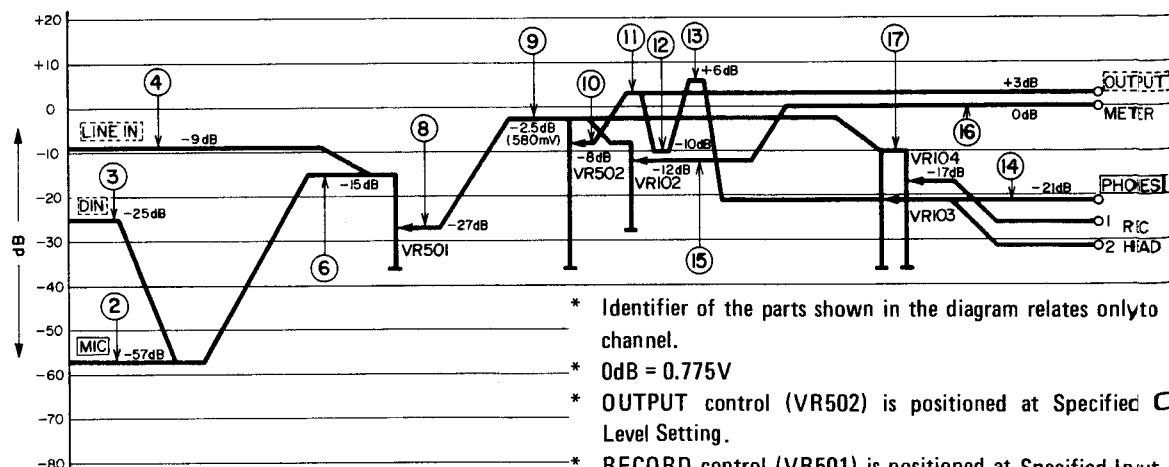
# Level Diagram



## Playback System



## Recording & Playback System



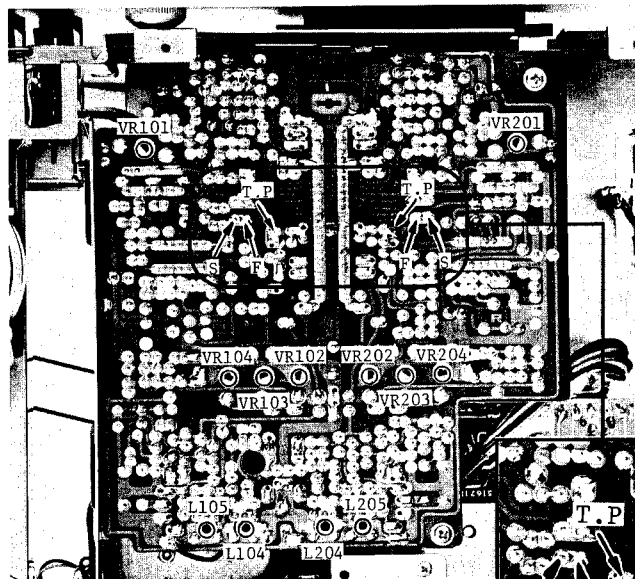
# Checks & Adjustments -Electrical-

## Monitoring System

### Minimum Required Input Level

1. Turn the RECORD level controls to maximum and apply a 400 Hz signal into each input terminal (MIC, DIN, LINE IN) successively.
  2. Confirm the input signal level which produces a 580mV output at the Dolby Test Point (see Fig. 10-2).
- Standards specified must be values listed below.

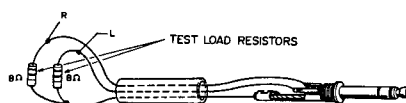
| Input Terminals | Minimum Input Level Required |
|-----------------|------------------------------|
| LINE IN         | -19dB $\pm$ 3dB              |
| MIC             | -67dB $\pm$ 3dB              |
| DIN             | -35dB $\pm$ 3dB              |



**Fig. 10-1 REC/PLAY AMP ADJ. POINT**  
Checking the Headphone Output Standard

\*This check should be done after confirming the specified output level on next page.

1. With the Specified Input Level setup (see preceding paragraph above), connect a phone plug with 8 ohms load resistors as illustrated, to the PHONES jack.

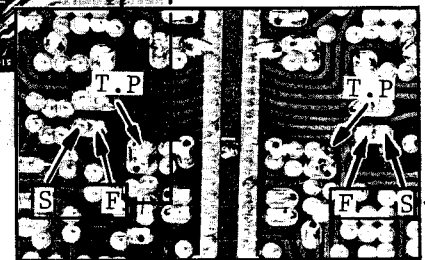


**Fig. 10-4 HEADPHONE PLUG WITH LOAD RESISTORS**

\* Input impedance of VTVM that is to be load to a Dolby test point must always be more than 1 megohms.  
\* 0dB = 0.775 V

**Note:**  
Short these two terminals if the L-chan is reading higher.

Short these two terminals if the R-chan is reading higher.



**Fig. 10-2 DOLBY T.P.**

2. Measure level across resistors to determine output voltages on each channel.  
**Requirement:** Standard -21 dB  $\pm$  2 dB (69 mV)

### Gain Alignment on Dolby IC Amplifier

On checking the preceding Minimum Required Input Level, if a 1.5dB or more difference between left and right channel is found, solder together (short) the two terminals indicated in Fig. 10-2 for the higher reading channel.

After aligning levels of both channels, re-confirm that the specified minimum input levels are exactly within the limits specified above.

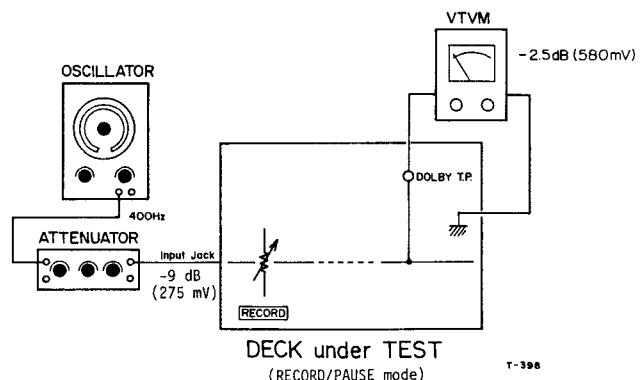
### Calibration of Input Level Meter Indication

With the Specified Input Level, set as previously described, align VR102/202 so that a +3VU reading (  $\square$  ) is obtained on the level meter.

### Specified Input (RECORD) Level Setting

1. Load an MTT-505 Test tape.
2. Apply a 400 Hz, -9dB signal to the LINE IN jacks and select the REC/PAUSE mode. Fig. 10-3.
3. Set the RECORD control (L. channel) so that a voltage of 580 mV appears at the Dolby T.P. Fig. 10-2.
4. Repeat procedure for the right channel.

**Note:** After this setup, do not move RECORD controls until all adjustments are made.



**Fig. 10-3 SPECIFIED INPUT LEVEL**

## Checks & Adjustments -contd-

### Playback System

**General:** To achieve alignments of playback system stages, BIAS and EQ switches must always be set in position 2 and Dolby NR switch set to OUT.

#### Record/playback Head Azimuth Alignment

##### Channel Phase Difference

1. Set up the test connections for the deck under test with the scope and VTVM as illustrated.
2. Playback the MTT-150 test tape and confirm that displayed phase of L & R channels on scope is kept within the 45 degrees standard with the 400 Hz tone.

##### Optimum Azimuth for Maximized Output

1. Connect VTVM to the Line OUTPUT terminal (first L-channel then R-channel) of the deck under test.
2. Play the 10kHz portion of the MTT-116L test tape.
3. Align the azimuth screw to obtain a maximum reading on VTVM. Check both channels and compromise the setting if necessary to get the optimum reading for both channels.

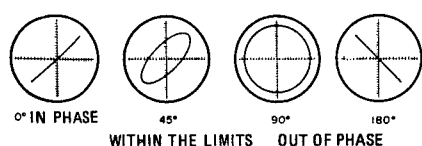


Fig. 11-1 CHANNEL PHASE DIFFERENCE

##### REC/PLAY HEAD AZIMUTH ADJ.

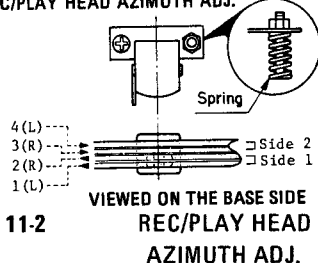


Fig. 11-2

#### Setup of Specified Standard Output Level

1. Load and playback the MTT-150 test tape. Connect the VTVM to the Dolby Test Point and adjust VR101/201 to obtain the specified voltage of 580mV.
2. Connect the VTVM to the OUTPUT jack of the deck under test.

3. Set the OUTPUT controls to maximum and confirm that +8 dB  $\pm$  1 dB is obtained at OUTPUT jacks.
4. Set OUTPUT controls again for +3 dB (1.09 V) specified level.

**Note:** After this setup, do not move OUTPUT controls until all amplifier adjustments are made.

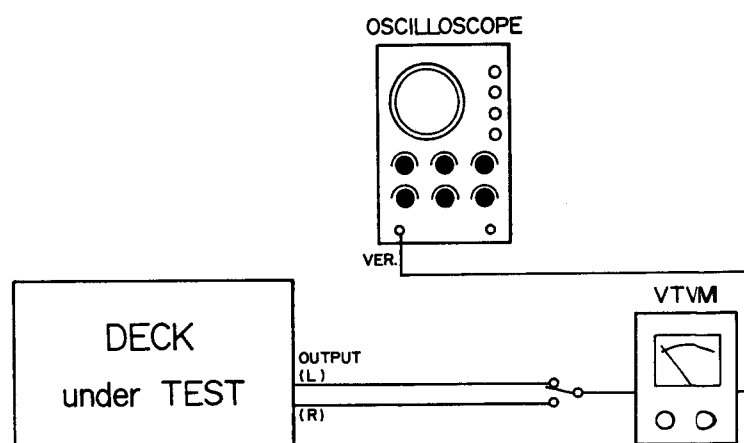


Fig. 11-3 SPECIFIED OUTPUT LEVEL

#### Checking Level Meter Indication

After setting up the Standard Output Level, confirm that the VU meters read +3 VU  $\pm$  1.5 VU.

#### Checking the Frequency Response - Playback -

1. Make connections as shown in Fig. 11-3
2. Play the MTT-116L test tape.
3. With the 333Hz/-10dB signal of the test tape as a reference, confirm the output level of each frequency from 40Hz to 10kHz is within the limits shown on the chart. Fig. 11-4

#### Signal-to-noise Ratio - Playback -

1. Make the connections shown in Fig. 11-3 and set the deck in the Play/PAUSE mode.
2. Measure the noise at the OUTPUT jacks.
3. Compare this to the specified output level of +3 dB and obtain the signal to noise ratio.

**Note:** If the polarity of the plug when connected to the wall outlet affects this reading, the inferior reading in this test must be within the specified values below.

**Requirement:** better than 41dB. Difference between channels must be 5dB or less.

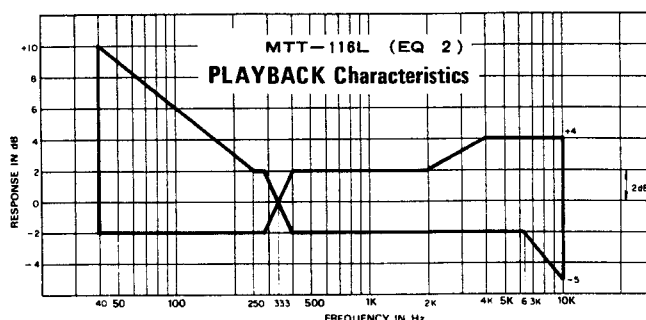


Fig. 11-4 Frequency Response - Playback -

## Checks & Adjustments -contd-

### Recording System

#### Setting up Recording Bias

##### Bias Trap Adjustment

1. Load an MTT-505 Test Tape.
2. Connect VTVM between the junction of L104/204 and C139/239 and ground of the deck under test.
3. Set the deck in the REC/PAUSE mode with no signal applied.
4. Align L104/204 for minimum output reading on the VTVM.
5. See P.C. board photo below. fig. 12-4

##### Setting up Specified Recording Level

1. Make the connections as illustrated in Fig. 12-1.
2. Record a 400 Hz, -12 dB (194 mV) signal on the MTT-505 or MTT-501 test tape.

##### Position 1 (CrO<sub>2</sub> tape)

1. Connect the deck under test as illustrated in Fig. 12-1.
2. Place BIAS and EQ switches in position 1.
3. Load a MTT-505 test tape and set the deck in RECORD mode.
4. Apply two tone signals of 1 kHz, -42dB (6.2mV) and 10 kHz -42 dB, in turn, into LINE IN jacks and record each signal for several seconds.
5. Rewind and playback the tape to compare output levels of 1 kHz and 10 kHz signals.
6. Check and adjust for a 2 dB lower output for the 10 kHz than that of 1 kHz signal.
7. Repeat procedure to adjust PC301/303, if necessary, to achieve this.

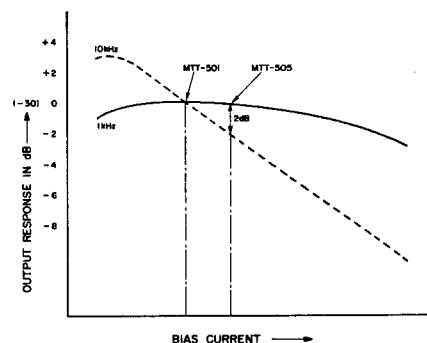


Fig. 12-2 BIAS CURRENT vs OUTPUT RESPONSE CHART

##### Position 2 (Hi-Fi Tape)

1. Set BIAS/EQ switches in position 2.
2. Apply two frequency signals; 1 kHz, -42 dB and 10 kHz, -42 dB into the LINE IN jacks.
3. Record the signals on the MTT-501 Test Tape this time.
4. Playback and check these signals. There should be no difference in playback level between these two signals.
6. Repeat procedure to adjust PC302/304, if necessary, to achieve this.

Note: PC301/302/303/304 affect record, therefore, if any of these adjustments are made the tape should be recorded and then played back to check effects of adjustment.

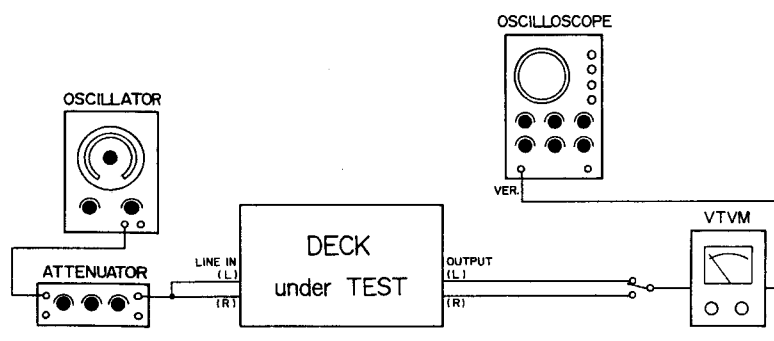


Fig. 12-1 SPECIFIED RECORDING LEVEL

3. Rewind the tape and play it back.
4. Check to see if a 0 dB output is obtained on OUTPUT jacks.
5. Adjust the semi-adjustable resistors VR103/203 for position 1 (BIAS/EQ for MTT-505) and VR104/204 for position 2 (of BIAS/EQ switches for MTT-501) until this specified output is obtained.

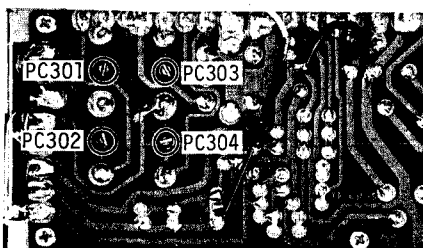


Fig. 12-3 POWER SUPPLY P.C. BOARD (51671760)

#### Location of the Adjustment Controls

##### Designation of Controls

- VR101/201: Playback level  
 VR102/202: calibration of meter indication  
 VR103/203: recording level (1)  
 VR104/204: recording level (2)  
 L104/204: bias trap tuned tank  
 L105/205: record equalizer  
 PC302/304: bias (2)  
 PC301/303: bias (1)

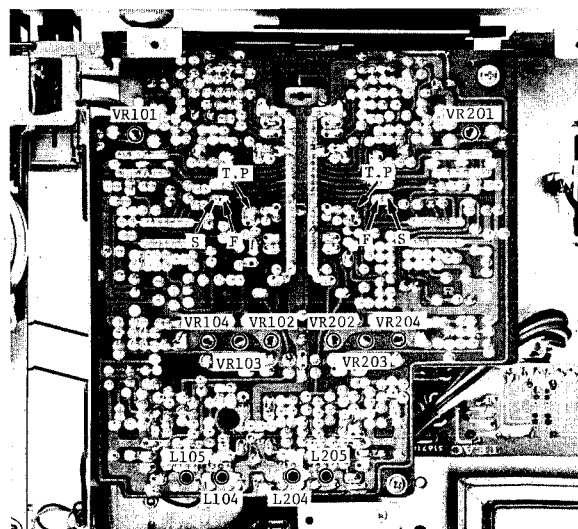


Fig. 12-4 RECORD/PLAYBACK AMPLIFIER P.C. BOARD (51671750)

## Checks & Adjustments -contd-

### Recording System

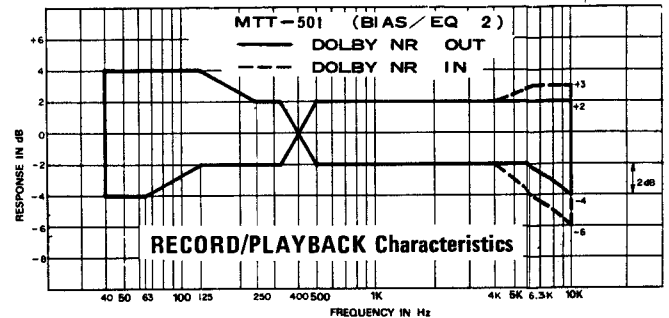
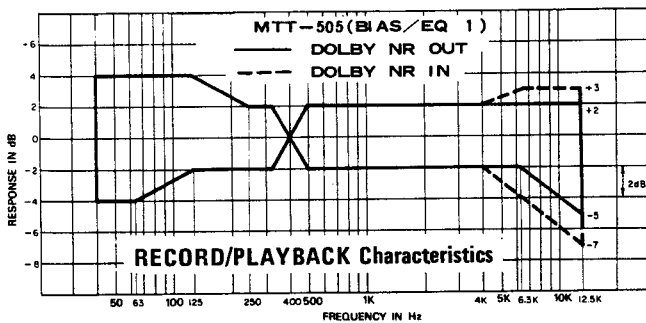
#### Frequency Response (overall)

This test should be run on MTT-505 and MTT-501 test tapes or equivalent. See the chart. Set the BIAS/EQ Switches as noted:  
 MTT-505 BIAS/EQ 1  
 MTT-501 BIAS/EQ 2 positions.  
 Dolby NR switch OUT and IN.

1. Apply a 400 Hz signal at  $-42$  dB (6.2 mV) level (for reference level).
2. Begin recording and sweep the signal generator from 40 Hz to 12.5 kHz (for MTT-505) or from 40 Hz to 10 kHz (for MTT-501).

3. Rewind the tape to the beginning of the recording and playback the tape.
4. Output signal shall be within limits shown on applicable chart (Fig. 13-1, 13-2) (in ref. to 400 Hz level).
5. If frequency response is not within limits shown in chart, adjust L105/205 for fine high frequency tuning.

Fig. 13-1 FREQUENCY RESPONSE LIMIT CHART Fig. 13-2



#### Total Harmonic Distortion Measurement

1. Connect a distortion analyser to the OUTPUT jacks of the deck under test as illustrated.
2. Apply a 400 Hz/ $-12$  dB (194 mV) sine wave signal at LINE IN terminals.
3. Record and playback on each of the test

tapes listed below and check that the distortion is within the limits listed below.

##### Requirement:

- BIAS/EQ 1: 3.0% or less with MTT-505 tape  
 BIAS/EQ 2: 2.5% or less with MTT-501 tape

#### Channel Separation Test

1. Apply a 1 kHz signal at  $-9$  dB (274 mV) to the LINE IN L jack and record this signal.
2. Rewind the tape and play it back.
3. Measure the OUTPUT of the L channel through a 1 kHz bandpass filter for a reference level.
4. Measure the OUTPUT of the R channel through the same band pass filter (leakage from the left channel).
5. Compare the levels between steps 3. & 4. for separation factor.

Requirement: greater than 30 dB separation factor.

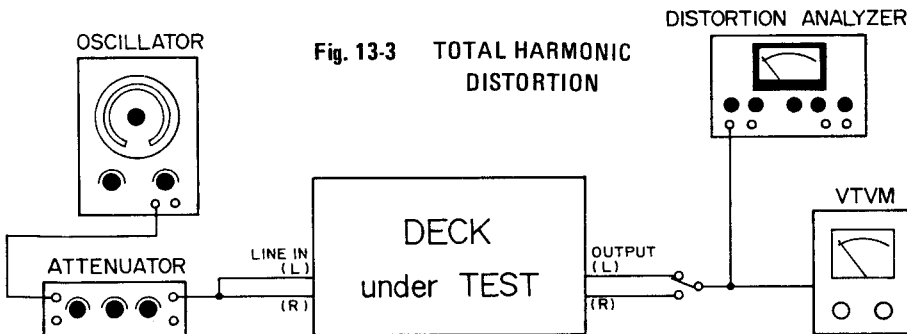


Fig. 13-3 TOTAL HARMONIC DISTORTION

#### Erase Efficiency

1. Set BIAS & EQ switches to position 1.
2. Apply a 1 kHz,  $+1$  dB (or 869 mV) signal to the LINE IN terminal and record it on MTT-505 test tape for about 30 seconds.
3. Rewind the tape halfway back through the previously recorded signal and record again over the last half of the original portion without applying any input signal (only to erase the portion). Rewind the tape to the beginning of the original recording.
4. Connect the OUTPUT through a 1 kHz bandpass filter to a VTVM.

5. Playback the tape. Use the original signal (unerased portion) as a reference level. When the tape reaches the erased portion (recorded with no input signal) the level will suddenly decrease. Measure this level

and compare it with the reference level.  
 Requirement: difference should be greater than 65 dB.

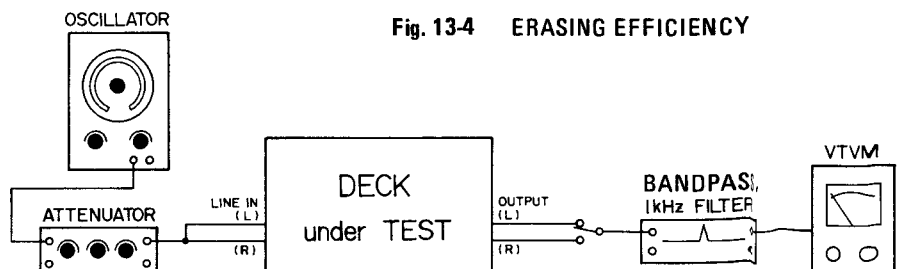
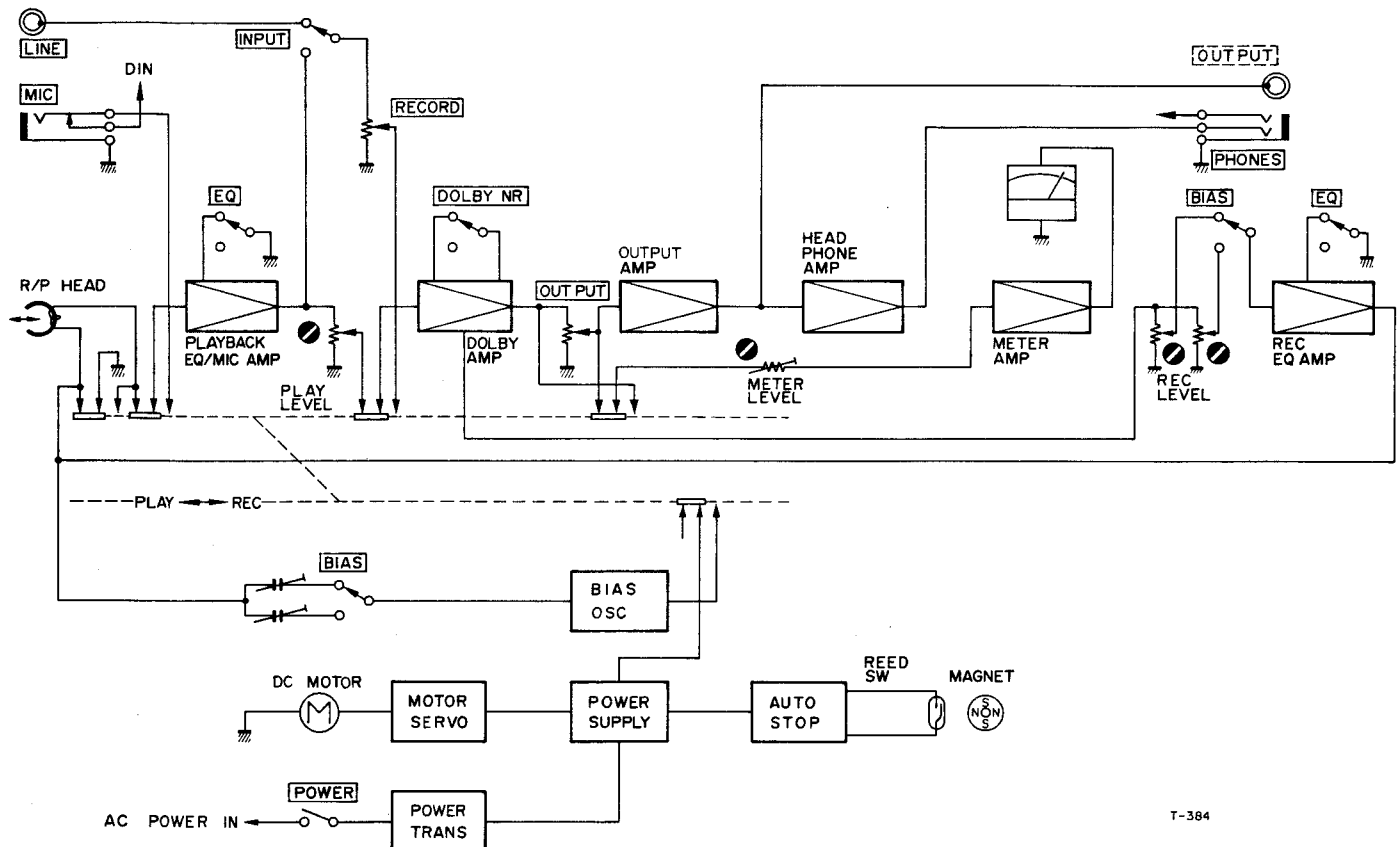


Fig. 13-4 ERASING EFFICIENCY

# System Functional Diagram



T-384

## Checks & Adjustments -contd- Recording System

### Dolby NR Effect Measurement

1. Set the **RECORD** level controls to the Specified Input level setting.
2. Apply a 1 kHz at -29 dB (27 mV) signal to the **LINE IN** terminal of the deck.
3. Set the Dolby NR switch to **OUT** position and record this signal.
4. Play the tape back and check the level difference when turning the Dolby NR switch from **IN** to **OUT** position in turn. Read indication on VTVM at same time.

**Requirement:** allowable difference level standard must be within 3.5 dB - 7.5 dB. Repeat the above procedure using a 10 kHz signal.

**Requirement:** difference must be 8 - 12 dB.

### Signal to Noise Ratio (overall)

1. Record on each of the designated test tapes with no input signal.
2. Play the recorded portion back and obtain a ratio compared to the Standard specified Output Level (+3 dB or 1.09 V).

#### Requirement:

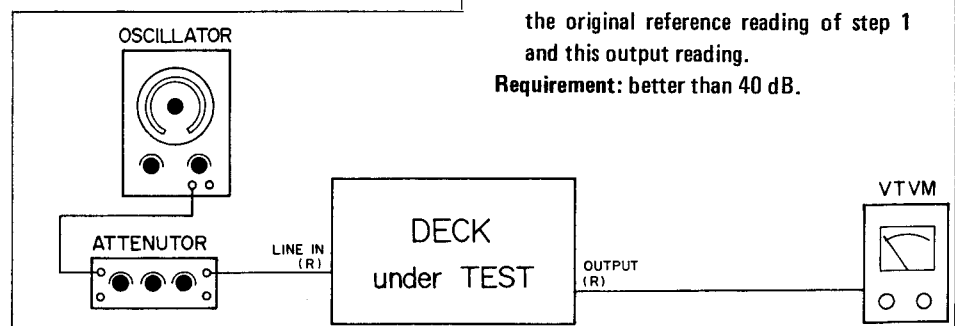
**BIAS/EQ 1:** better than 45 dB with MTT-505

**BIAS/EQ 2:** better than 44 dB with MTT-501

### Crosstalk Measurement

1. Load a bulk erased MTT-505 test tape on the deck.
2. Apply and record a 125 Hz/-9 dB (274 mV) level signal to the **LINE IN R** channel. Then rewind the tape, play it back and measure the R channel for a reference level.
3. Turn over the cassette tape and playback the R channel to obtain a ratio between the original reference reading of step 1 and this output reading.

**Requirement:** better than 40 dB.



# Trouble-shooting Guide

| Malfunction  | Symptom  | Diagnosis  |
|--|--|--|
| <b>Mechanical</b>                                      |  |  |
| 1. Fuse blows when power turned on                     |  | defective power transformer  |
| 2. Inoperative auto-stop from FF or REW                | a) no B+ voltage between pin A and GND of SCR<br>b) no solenoid operation even when A to K of SCR is on<br>c) no solenoid operation even with A-G of SCR shorted | defective R303<br>defective S501 or solenoid<br>defective SCR  |
| 3. Tape winds on capstan                               |  | 1) pinch roller defective or defective take-up reel table assy<br>2) slippage of idler<br>3) mis-aligned tape guide  |
| 4. Excessive wow & flutter                             |  | 1) defective pinch roller itself or incorrect pinching pressure<br>2) defective or oil on capstan drive belt   |
| 5. No rotation of capstan shaft                        |  | 1) capstan drive belt slipped off<br>2) defective motor  |
| 6. Counter does not advance                            |  | 1) insufficiently depressed reset button<br>2) counter drive belt slipped off  |
| <b>Electrical</b>                                      |  |  |
| 1. No playback sound                                   | a) noise heard when lead wires connected to head are touched<br>b) recording monitor operative<br>c) inoperative monitor   | 1) defective soldering<br>2) defective head<br>1) defective REC/PLAY SW<br>2) defective Q101, Q102 or associated parts<br>defective Q101, Q102, Q103, Dolby NR amp., or associated parts   |
| 2. No meter deflection during playback                 |  | 1) defective meter<br>2) defective Q105, VR102 or associated parts   |
| 3. Poor high-frequency region response during playback | a) extremely poor response<br>b) several dB poorer response than normal<br>c) level fluctuations with inferior high-end response with dropouts                   | defective Q102 or EQ stage<br>dirty head or defective head<br>1) poor head-to-tape contact<br>2) defective or dirty tape path  |
| 4. Inferior S/N ratio in playback                      | a) excessive hum<br>b) excessive noise<br>c) erratic wave shape  | eliminated if C101 removed—defective head<br>eliminated if mounting angle changed on REC/PLAY amplifier circuit board—defective power transformer<br>defective head, Q101, Q102 or associated components<br>defective Q102, C102, C108, Q101 or associated parts |
| 5. No recording  | a) resumes if BIAS sw selection changed<br>b) no erasing<br>c) erasure O.K.  | defective BIAS sw, VR103, VR104 or associated parts<br>defective bias oscillator unit assy<br>normal monitoring can be done—dirty head, defective Q106, REC/PLAY slide sw or associated parts  |

**Note:** Described components identifiers are shown only for the L-channel.  
Refer to the schematics and parts list for related R-channel identifiers if necessary.



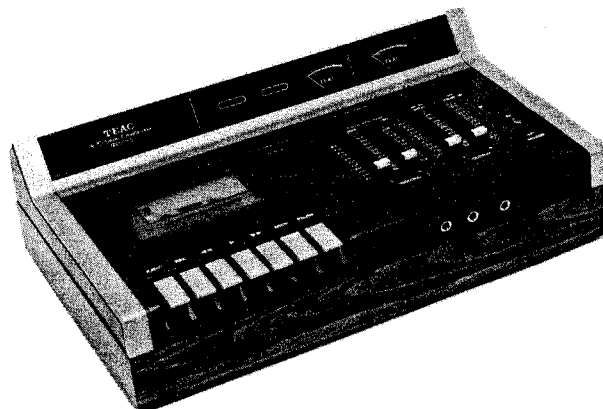


# TEAC®

## A-170

STEREO CASSETTE DECK

### PARTS LIST



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#### PARTS ORDERING INFORMATION

Spare parts are available through your nearest TEAC Authorized Service Center or directly from the TEAC office, the address of which is written on the back cover. When ordering parts, always include the following information:

- |              |                    |
|--------------|--------------------|
| 1. MODEL     | 4. DESCRIPTION     |
| 2. REF. NO.  | 5. UNIT SERIAL NO. |
| 3. PARTS NO. | 6. MANUAL CODE NO. |

#### NOTICE REGARDING PARTS ORDERS

1. Do not order by only REF. NO.
2. In some instances, individual minor parts are not available. In such a case, the entire assembly including the part requested will be sent to you.

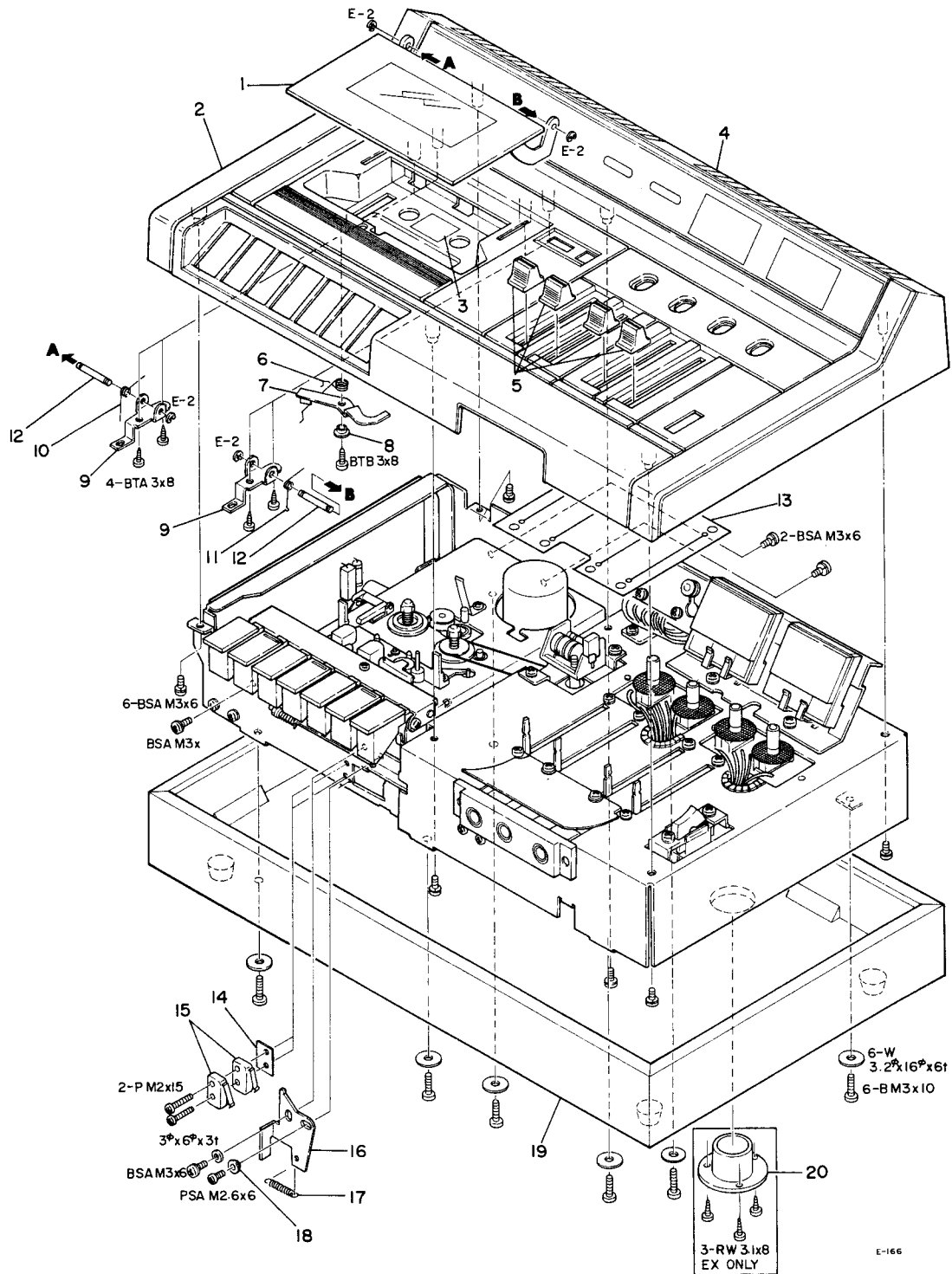
#### PARTS IDENTIFICATION CODING

Parts are identical between the different models with the exceptions as coded by the designations explained below.

- |        |   |
|--------|---|
| DM     | Domestic (Japan) market decks only.               |
| TCA    | TEAC Corporation of America, U.S.A. version only. |
| EUROPE | European market decks (except United Kingdom).    |
| EX     | All decks not specified above (incl. U.K.)        |

# EXPLODED VIEWS AND PARTS LIST

## 1. BASIC DISASSEMBLY



Parts marked with \* require longer delivery time than regular parts.

| REF. NO. | PARTS NO.  | DESCRIPTION                              | REMARKS    |
|----------|------------|--|------------|
| 1- 1     | 55330100   | Cover, Cassette                          |            |
| 1- 2     | * 55310022 | Case, Top                                |            |
| 1- 3     | * 55542530 | Plate, Reflective                        |            |
| 1- 4     | * 55320080 | Name Plate                               |            |
| 1- 5     | 55340900   | Knob, Pot.                               |            |
| 1- 6     | 55240151   | Spring, Cassette Cover Release           |            |
| 1- 7     | * 55542520 | Lever, Hook; Cassette Cover Release      |            |
| 1- 8     | * 55441200 | Washer, Shoulder                         |            |
| 1- 9     | * 55542511 | Bracket, Retaining; Cassette Cover Shaft |            |
| 1-10     | 55240180   | Spring, Cassette Cover                   |            |
| 1-11     | 55202670   | Spring, Cassette Cover; Right            |            |
| 1-12     | * 50828580 | Shaft, Cassette Cover                    |            |
| 1-13     | * 55542500 | Mask, Pot.                               |            |
| 1-14     | * 55500251 | Spacer, Insul. Paper                     |            |
| 1-15     | 50446540   | SW, Micro (S510, S511)                   |            |
| 1-16     | * 55542820 | Lever, Micro SW                          |            |
| 1-17     | 55202580   | Spring, Micro SW                         |            |
| 1-18     | * 55400480 | Washer, Shoulder; Hook Lever Arm         |            |
| 1-19     | * 55020350 | Case Assy, Wooden; B                     | EX, EUROPE |
|          | * 55020330 | Case Assy, Wooden; A                     | DM, TCA    |
| 1-20     | * 55340890 | Cover, Voltage Selector                  | EX, EUROPE |

## INCLUDED ACCESSORIES

| REF. NO. | PARTS NO. | DESCRIPTION                            | REMARKS    |
|----------|-----------|--|------------|
|          | 51280010  | Cords, Input-output Connection, 2 used |            |
|          | 57100300  | Cleaning Stick (TZ-275)                |            |
|          | 50291350  | Silicone Cloth                         |            |
|          | 51013330  | A-170 Owner's Manual                   | DM         |
|          | 51013340  | A-170 Owner's Manual                   | EX, EUROPE |
|          | 51013350  | A-170 Owner's Manual                   | TCA        |
|          | 51013450  | Information Supplement, Cassette       |            |

Figure 1 is a line graph showing the percentage of total energy expenditure (TEE) for different activities over a 24-hour period. The Y-axis is 'Percentage of TEE' (0-100) and the X-axis is 'Time of Day' (0-24). The activities and their approximate percentages are:

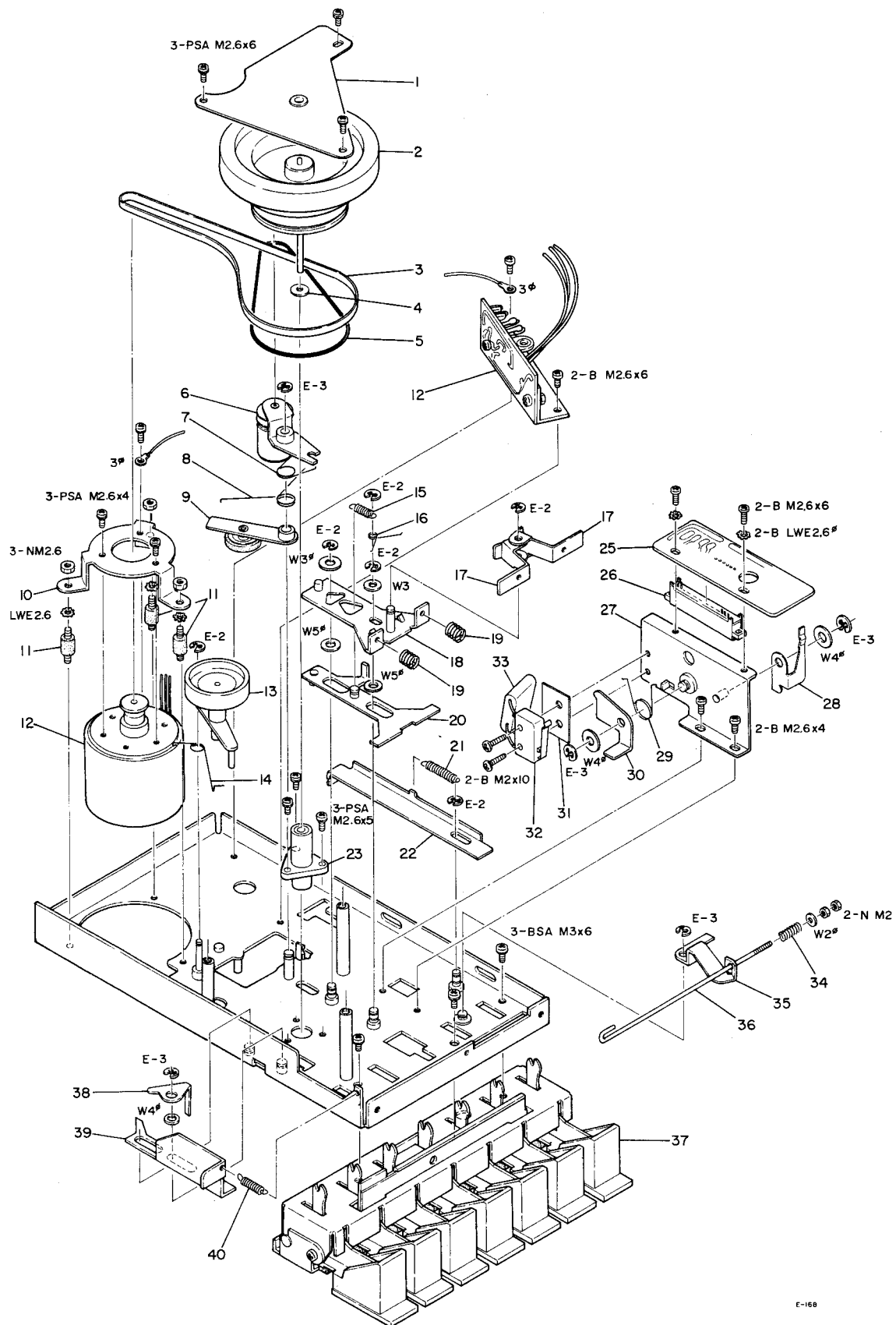
| Time of Day | Sleeping | Resting | Walking | Standing | Sitting | Eating |
|-------------|----------|---------|---------|----------|---------|--------|
| 0           | ~85      | ~10     | ~2      | ~1       | ~2      | ~0     |
| 4           | ~85      | ~10     | ~2      | ~1       | ~2      | ~0     |
| 8           | ~75      | ~15     | ~5      | ~2       | ~5      | ~0     |
| 12          | ~65      | ~20     | ~10     | ~3       | ~10     | ~5     |
| 16          | ~60      | ~25     | ~15     | ~4       | ~10     | ~10    |
| 20          | ~70      | ~20     | ~10     | ~3       | ~10     | ~5     |
| 24          | ~85      | ~10     | ~2      | ~1       | ~2      | ~0     |



Parts marked with \* require longer delivery time than regular parts.

| REF. NO. | PARTS NO.  | DESCRIPTION                      | REMARKS |
|----------|------------|----------------------------------|---------|
| 2- 1     | 50660470   | Head, Erase                      |         |
| 2- 2     | * 50279870 | Retainer, Head Lead; D           |         |
| 2- 3     | 50660210   | Head, R/P                        |         |
| 2- 4     | 50845540   | Spring, R/P Head                 |         |
| 2- 5     | 55040700   | Pinch Roller Assy                |         |
| 2- 6     | 55202590   | Spring, Pinch Roller             |         |
| 2- 7     | * 50845631 | Shaft, Head Actuator             |         |
| 2- 8     | 50845620   | Spring, Head Actuator            |         |
| 2- 9     | * 55040690 | Plate Assy, Head Base            |         |
| 2-10     | * 50845610 | Plate, Head Base Actuator        |         |
| 2-11     | 50846241   | Spring, Head Base                |         |
| 2-12     | * 55441160 | Shaft, Cassette Lifting; B       |         |
| 2-13     | * 55340790 | Arm, Cassette Lifting; A         |         |
| 2-14     | * 55542330 | Lever, Cassette Lifting; C       |         |
| 2-15     | * 55542320 | Bracket, Cassette Lifting; B     |         |
| 2-16     | * 55441150 | Shaft, Cassette Lifting; A       |         |
| 2-17     | * 55400480 | Washer, Shoulder; Hook Lever Arm |         |
| 2-18     | * 55542260 | Lever, Stopper                   |         |
| 2-19     | * 55040730 | Lever Assy, Cassette Lifting; E  |         |
| 2-20     | 55240110   | Spring, Lever                    |         |
| 2-21     | 55040720   | Reel Table Assy                  |         |
| 2-22     | 55340850   | Belt, Counter                    |         |
| 2-23     | * 55542220 | Bracket, Safety; B               |         |
| 2-24     | 55240120   | Spring, Safety Bracket           |         |
| 2-25     | * 55542210 | Bracket, Safety; A               |         |
| 2-26     | * 55441080 | Shaft, Safety Bracket            |         |
| 2-27     | 50845452   | Spring, Brake Lever              |         |
| 2-28     | * 55542230 | Bracket, Brake Retainer          |         |
| 2-29     | * 50845430 | Lever, Brake; Left               |         |
| 2-30     | * 50845440 | Lever, Brake; Right              |         |
| 2-31     | 55240130   | Plate, Spring                    |         |
| 2-32     | * 55340750 | Cassette Guide                   |         |
| 2-33     | 50845502   | Tension Spring, Pause Lock       |         |
| 2-34     | 50846431   | Plate, Pause Lock                |         |
| 2-35     | * 55020302 | Chassis Assy                     |         |

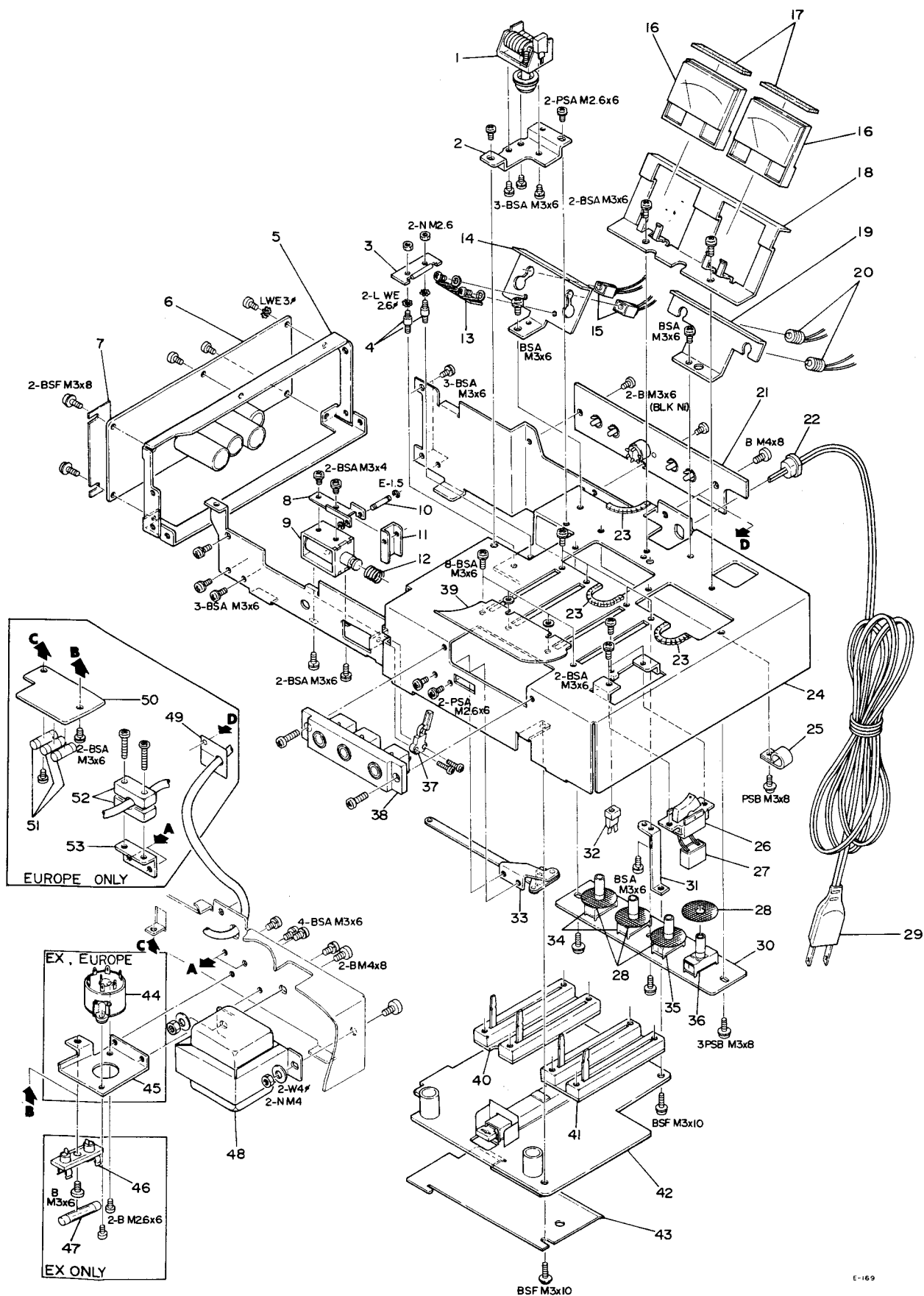
### 3. TRANSPORT SECTION B -BOTTOM VIEW-



Parts marked with \* require longer delivery time than regular parts.

| REF. NO. | PARTS NO.  | DESCRIPTION   | REMARKS |
|----------|------------|---|---------|
| 3- 1     | * 55040710 | Plate Assy, Flywheel Bearing                        |         |
| 3- 2     | 55040800   | Flywheel Assy                                       |         |
| 3- 3     | 55340930   | Belt, Capstan                                       |         |
| 3- 4     | * 55500310 | Washer, Thrust                                      |         |
| 3- 5     | 55340951   | Belt, Fast Wind                                     |         |
| 3- 6     | 55040942   | Idler Assy, A                                       |         |
| 3- 7     | 55202620   | Spring, Idler; A                                    |         |
| 3- 8     | 55202560   | Spring, Idler; B                                    |         |
| 3- 9     | 55040950   | Idler Assy, B                                       |         |
| 3-10     | * 55542280 | Plate, Mount.; DC Motor                             |         |
| 3-11     | 71111900   | Cushion, Rubber                                     |         |
| 3-12     | 71051060   | DC Motor Assy                                       |         |
| 3-13     | 55040780   | Pulley Assy, Tension                                |         |
| 3-14     | 50846191   | Spring, Tension Pulley                              |         |
| 3-15     | 55202610   | Spring, Actuator Lever Return                       |         |
| 3-16     | 55202601   | Spring, Fast Wind Return                            |         |
| 3-17     | * 55542170 | Lever, Fast Wind Actuator                           |         |
| 3-18     | * 55040660 | Plate Assy, Fast Wind                               |         |
| 3-19     | 55202580   | Spring, Fast Wind                                   |         |
| 3-20     | * 55040671 | Plate Assy, SW Actuator                             |         |
| 3-21     | 55240110   | Spring, Lever                                       |         |
| 3-22     | * 55542180 | Plate, Record Mode Lock Out                         |         |
| 3-23     | 55040910   | Capstan Housing Assy                                |         |
| 3-24     | * 50182152 | Cushion, Tension Arm                                |         |
| 3-25     | 51681790   | PC Board Assy, Muting                               |         |
| 3-26     | * 51310300 | SW, Slide (S504)                                    |         |
| 3-27     | * 55040770 | Plate Assy, SW                                      |         |
| 3-28     | * 55542750 | Lever, Slide SW                                     |         |
| 3-29     | 55240160   | Spring, Micro SW Lever                              |         |
| 3-30     | * 55542740 | Lever, Micro SW                                     |         |
| 3-31     | * 55500251 | Spacer, Insul. Paper                                |         |
| 3-32     | 50446540   | SW, Micro (S501)                                    |         |
| 3-33     | 50529050   | Spark Killer 0.1 $\mu$ F + 120 $\Omega$ 400V (C502) |         |
| 3-34     | 50845420   | Spring, Wire Linkage                                |         |
| 3-35     | * 55542190 | Lever, Record                                       |         |
| 3-36     | * 50845412 | Wire Linkage  |         |
| 3-37     | 55020312   | Pushbutton Assy                                     |         |
| 3-38     | * 55542250 | Arm, Pause  |         |
| 3-39     | * 55542240 | Lever, Pause  |         |
| 3-40     | 55240140   | Spring, Pause Lever                                 |         |

## 4. MAIN CHASSIS



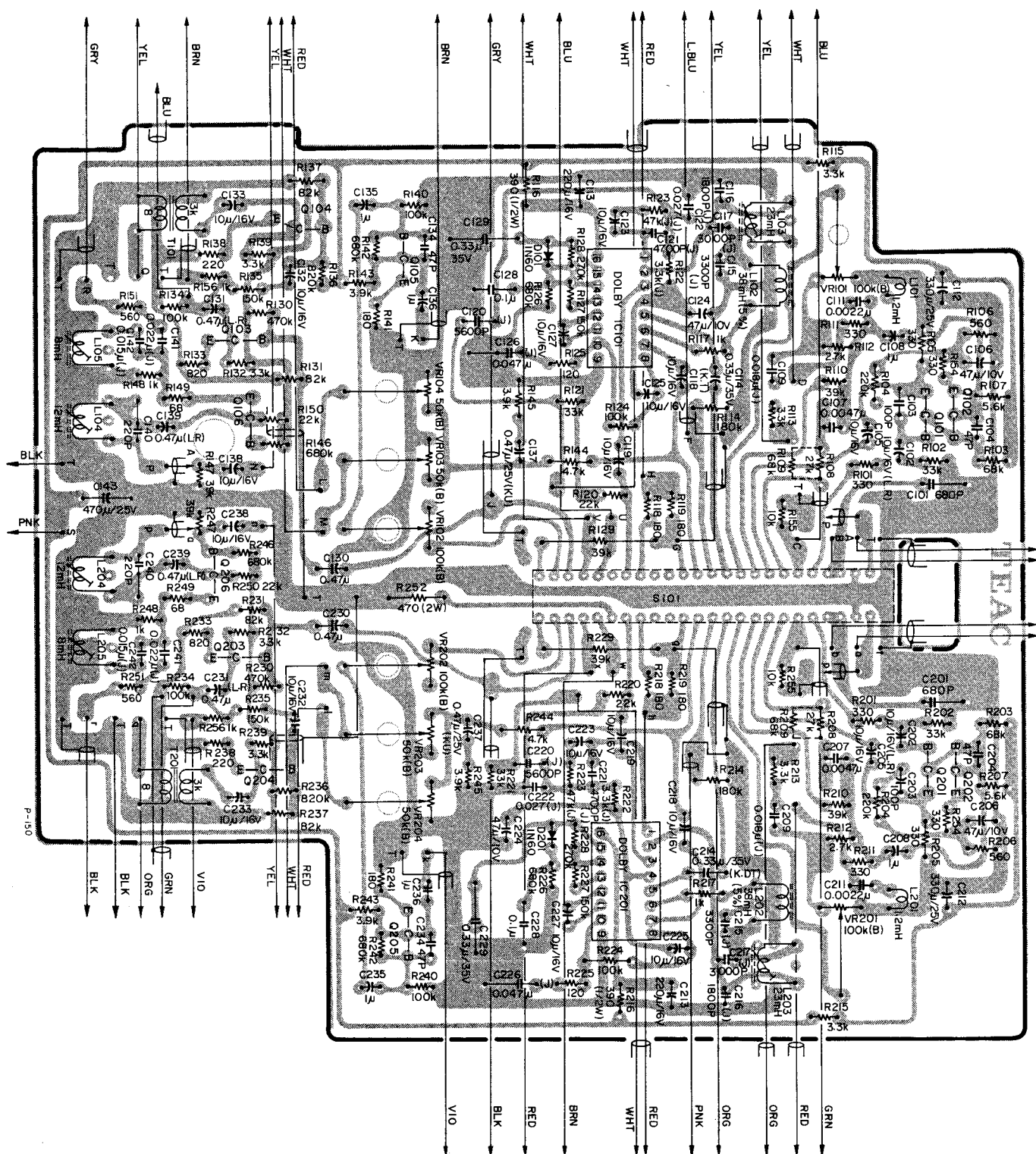


Parts marked with \* require longer delivery time than regular parts.

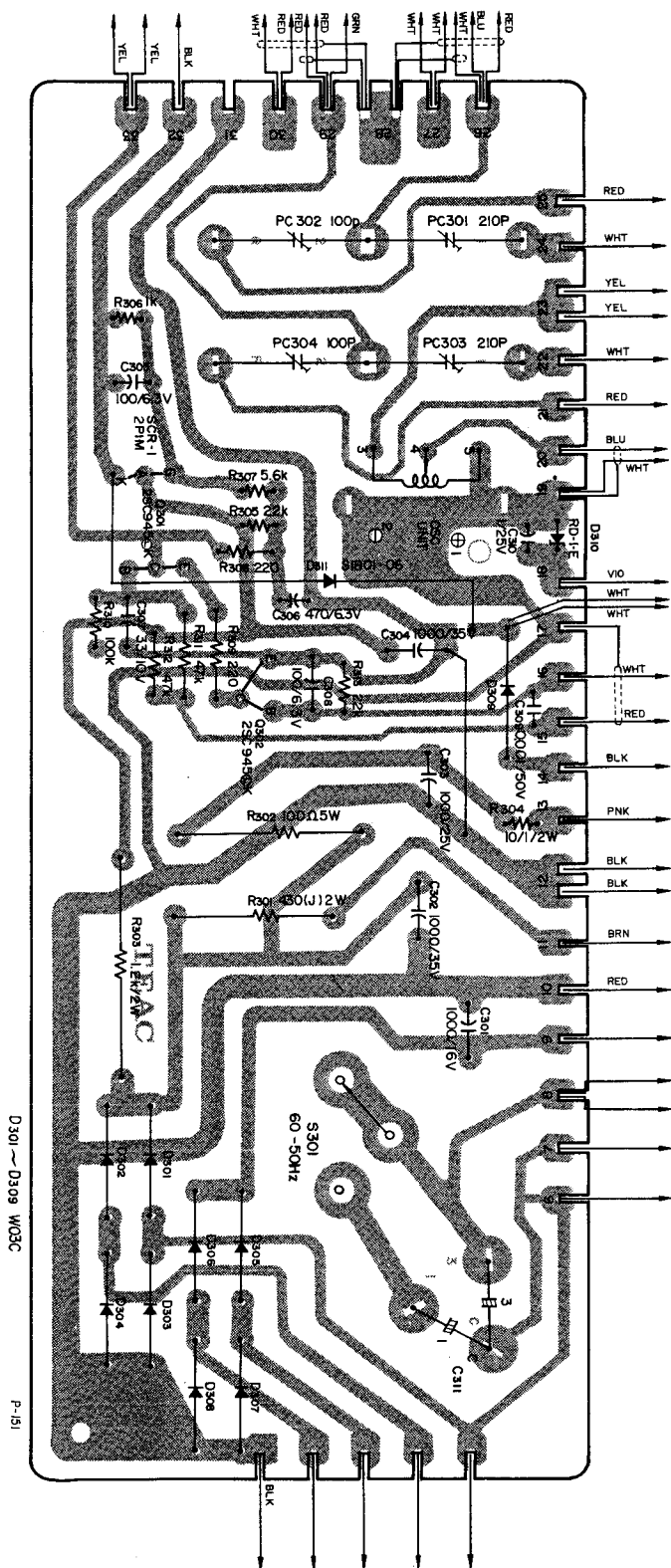
| REF. NO. | PARTS NO.  | DESCRIPTION   | REMARKS    |
|----------|------------|---|------------|
| 4- 1     | 55030250   | Counter Assy  |            |
| 4- 2     | * 55542491 | Plate, Counter  |            |
| 4- 3     | * 51681890 | PC Board Assy, Reed SW                                |            |
| 4- 4     | 71111900   | Cushion, Rubber                                       |            |
| 4- 5     | * 55530370 | Bracket, Power Supply PC Board Assy                   |            |
| 4- 6     | 51681760   | PC Board Assy, Power Supply                           |            |
| 4- 7     | * 55542900 | Shield Paper, Side                                    |            |
| 4- 8     | * 55542410 | Base Plate, Auto Stop                                 |            |
| 4- 9     | 50630070   | Solenoid  |            |
| 4-10     | * 50845211 | Shaft, Auto Stop Lever                                |            |
| 4-11     | * 55542420 | Lever, Auto Stop                                      |            |
| 4-12     | 50846200   | Spring, Solenoid                                      |            |
| 4-13     | * 50452530 | Terminal Strip (2L3P)                                 |            |
| 4-14     | * 55542450 | Bracket, Lamp: B                                      |            |
| 4-15     | 51420920   | Lamp, Pilot   |            |
| 4-16     | 51650030   | VU Meter  |            |
| 4-17     | * 55305400 | Dust Sealing Tape                                     |            |
| 4-18     | * 55530380 | Plate, VU Meter                                       |            |
| 4-19     | * 55542440 | Bracket, Lamp; A                                      |            |
| 4-20     | 51420860   | Lamp (VU Meter)                                       |            |
| 4-21     | * 50451280 | Plate, Connector Assy                                 |            |
| 4-22     | * 55300470 | Strain Relief, AC Cord                                |            |
| 4-23     | * 50332850 | Grommet, Plastic                                      |            |
| 4-24     | * 55510040 | Chassis Assy, Main                                    |            |
| 4-25     | * 55340410 | Clamp, Wire; A  |            |
| 4-26     | 51380000   | SW, Rocker; Power (S502)                              | DM, EX     |
|          | 51380010   | SW, Rocker; Power (S502)                              | TCA        |
|          | 51380020   | SW, Rocker; Power (S502)                              |            |
| 4-27     | 50529050   | Spark Killer, 0.1 $\mu$ F + 120 $\Omega$ 400V (C501)  | DM         |
|          | 50529060   | Spark Killer, 0.1 $\mu$ F + 120 $\Omega$ 400V (C501)  | TCA        |
|          | 50529070   | Spark Killer, 0.01 $\mu$ F + 300 $\Omega$ 400V (C501) | EX         |
|          | 51890010   | Spark Killer, 4700pF (C501)                           | EUROPE     |
| 4-28     | * 55500790 | Boot, Control Switch                                  |            |
| 4-29     | * 50471652 | Cord, AC  | DM, EX     |
|          | * 50471661 | Cord, AC  | TCA        |
|          | * 51280170 | Cord, AC  | EUROPE     |
| 4-30     | * 51681800 | PC Board Assy, Lever SW                               |            |
| 4-31     | * 55542430 | Angle, PC Board                                       |            |
| 4-32     | * 51260140 | Terminal, Power Cord Connecting                       |            |
| 4-33     | * 55040740 | Lever Assy, SW Actuator                               |            |
| 4-34     | 51320080   | SW, Lever; BIAS, EQ (S507, S508)                      |            |
| 4-35     | 51320070   | SW, Lever; INPUT (S505)                               |            |
| 4-36     | 51320090   | SW, Lever; DOLBY NR (S506)                            |            |
| 4-37     | 50446530   | SW, Sensing (S503)                                    |            |
| 4-38     | 51240150   | Jack Assy   |            |
| 4-39     | * 55542580 | Shield Paper, Jack Assy                               |            |
| 4-40     | 51501140   | Pot., Slide Type; 100k $\Omega$ A x 2 RECORD          |            |
| 4-41     | 50535231   | Pot., Slide Type; 20k $\Omega$ A x 2 OUTPUT           |            |
| 4-42     | 51681750   | PC Board Assy, Record/Playback Ampl.                  |            |
| 4-43     | * 55542571 | Shield Paper, Record/Playback Ampl.                   |            |
| 4-44     | * 51330080 | Voltage Selector                                      | EX         |
|          | * 51330040 | Voltage Selector                                      | EUROPE     |
| 4-45     | * 55542470 | Plate, Voltage Selector                               | EX, EUROPE |
| 4-46     | * 50412340 | Holder, Fuse  | EX         |
| 4-47     | 50411010   | Fuse, 1A (F501)                                       | EX         |
|          | 50411130   | Fuse, 0.5A (F501)                                     | EX         |
| 4-48     | 51520320   | Transformer, Power (T501)                             | DM         |
|          | 51520330   | Transformer, Power (T501)                             | TCA        |
|          | 51520350   | Transformer, Power (T501)                             | EX         |
|          | 51520360   | Transformer, Power (T501)                             | EUROPE     |
| 4-49     | * 55542590 | Sheet, Insulating                                     |            |
| 4-50     | * 51681780 | PC Board Assy, Fuse                                   |            |
| 4-51     | 51420880   | Fuse, Miniature; 250mA 250V                           |            |
| 4-52     | * 55340840 | Clamp, AC Cord  |            |
| 4-53     | * 55542460 | Bracket, Clamp  |            |

### PC BOARD SECTION (Diagram)

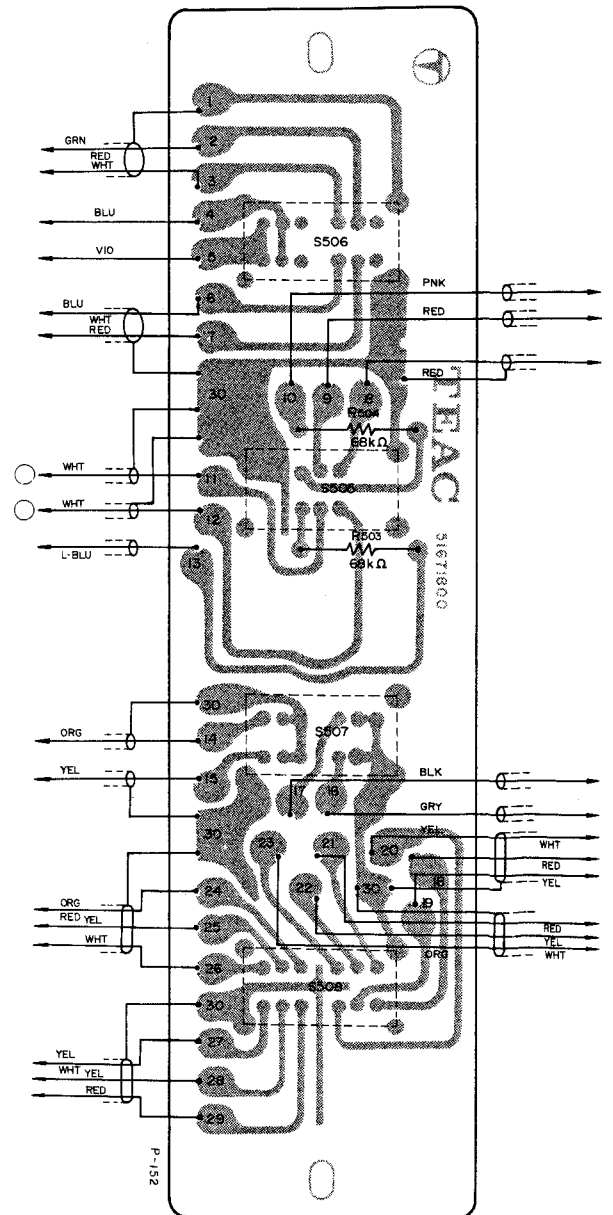
## 1. RECORD / PLAYBACK AMPLIFIER



## 2. POWER SUPPLY



## 3. LEVER SWITCH



# PC BOARD SECTION (Parts List)

## 1. RECORD / PLAYBACK AMPLIFIER

| REF. NO.   | PARTS NO. | DESCRIPTION     |
|--|-----------|-----------------|
|  | 51681750  | PC Bd. Assy     |
|  | 51671750  | PC Board (only) |
| <b>DOLBY IC's</b>  |           |                 |
| IC101/IC201  | 50427280  | NE545B          |
| <b>TRANSISTORS</b>   |           |                 |
| Q101/Q201  | 51450340  | 2SC900-UA       |
| Q102/Q202  | 51450340  | 2SC900-UA       |
| Q103/Q203  | 51450360  | 2SC945L-K       |
| Q104/Q204  | 51450360  | 2SC945L-K       |
| Q105/Q205  | 51450360  | 2SC945L-K       |
| Q106/Q206  | 51450360  | 2SC945L-K       |
| <b>DIODES</b>  |           |                 |
| D101/D202  | 50422130  | IN60            |
| <b>CARBON RESISTORS</b>  |           |                 |
| All resistors are rated $\pm 5\%$ tolerance, 1/4 watt and of carbon type unless otherwise noted. |           |                 |
| R101/R201  | 50570700  | 330 $\Omega$    |
| R102/R202  | 50571180  | 33k $\Omega$    |
| R103/R203  | 50571260  | 68k $\Omega$    |
| R104/R204  | 50571370  | 220k $\Omega$   |
| R105/R205  | 50570700  | 330 $\Omega$    |
| R106/R206  | 50570760  | 560 $\Omega$    |
| R107/R207  | 50571000  | 5.6k $\Omega$   |
| R108/R208  | 50571160  | 27k $\Omega$    |
| R109/R209  | 50571260  | 68k $\Omega$    |
| R110/R210  | 50571200  | 39k $\Omega$    |
| R111/R211  | 50570700  | 330 $\Omega$    |
| R112/R212  | 50570920  | 2.7k $\Omega$   |
| R113/R213  | 50570940  | 3.3k $\Omega$   |
| R114/R214  | 50571340  | 180k $\Omega$   |
| R115/R215  | 50570940  | 3.3k $\Omega$   |
| R116/R216  | 50516290  | 390 $\Omega$    |
| R117/R217  | 50570810  | 1k $\Omega$     |
| R118/R218  | 50570640  | 180 $\Omega$    |
| R119/R219  | 50570640  | 180 $\Omega$    |
| R120/R220  | 50571140  | 22k $\Omega$    |
| R121/R221  | 50571180  | 33k $\Omega$    |
| R122/R222  | 50570940  | 3.3k $\Omega$   |
| R123/R223  | 50571220  | 47k $\Omega$    |
| R124/R224  | 50571300  | 100k $\Omega$   |
| R125/R225  | 50570600  | 120 $\Omega$    |
| R126/R226  | 50571500  | 680k $\Omega$   |
| R127/R227  | 50571340  | 150k $\Omega$   |
| R128/R228  | 50571400  | 270k $\Omega$   |
| R129/R229  | 50573200  | 39k $\Omega$    |
| R130/R230  | 50571460  | 470k $\Omega$   |
| R131/R231  | 50571280  | 82k $\Omega$    |
| R132/R232  | 50570940  | 3.3k $\Omega$   |
| R133/R233  | 50570800  | 820 $\Omega$    |
| R134/R234  | 50571300  | 100k $\Omega$   |

| REF. NO.          | PARTS NO. | DESCRIPTION                     |
|-------------------|-----------|---------------------------------|
| R135/R235         | 50571340  | 150k $\Omega$                   |
| R136/R236         | 50571520  | 820k $\Omega$                   |
| R137/R237         | 50571280  | 82k $\Omega$                    |
| R138/R238         | 50570660  | 220 $\Omega$                    |
| R139/R239         | 50570940  | 3.3k $\Omega$                   |
| R140/R240         | 50571300  | 100k $\Omega$                   |
| R141/R241         | 50570640  | 180 $\Omega$                    |
| R142/R242         | 50571500  | 680k $\Omega$                   |
| R143/R243         | 50570960  | 3.9k $\Omega$                   |
| R144/R244         | 50570980  | 4.7k $\Omega$                   |
| R145/R245         | 50570960  | 3.9k $\Omega$                   |
| R146/R246         | 50571500  | 680k $\Omega$                   |
| R147/R247         | 50571200  | 39k $\Omega$                    |
| R148/R248         | 50570820  | 1k $\Omega$                     |
| R149/R249         | 50570540  | 68 $\Omega$                     |
| R150/R250         | 50571140  | 22k $\Omega$                    |
| R151/R251         | 50570760  | 560 $\Omega$                    |
| R252              | 50527050  | Metal Film 470 $\Omega$ 2W      |
| R153/R253         |           | (not used)                      |
| R154/R254         | 50570700  | 330 $\Omega$                    |
| R155/R255         | 50571060  | 10k $\Omega$                    |
| R156/R256         | 50570820  | 1k $\Omega$                     |
| <b>CAPACITORS</b> |           |                                 |
| C101/C201         | 50547470  | Dip. Mica 680pF 50V 10%         |
| C102/C202         | 51700770  | Elec. 10 $\mu$ F 16V (LR)       |
| C103/C203         | 50547440  | Dip. Mica 100pF 50V 10%         |
| C104/C204         | 50547420  | Dip. Mica 47pF 50V 10%          |
| C105/C205         | 50554050  | Elec. 10 $\mu$ F 16V            |
| C106/C206         | 50555540  | Elec. 47 $\mu$ F 10V            |
| C107/C207         | 50548910  | Mylar 0.0047 $\mu$ F 50V 5%     |
| C108/C208         | 50554540  | Elec. 1 $\mu$ F 50V             |
| C109/C209         | 50548970  | Mylar 0.018 $\mu$ F 50V 5%      |
| C110/C210         |           | (not used)                      |
| C111/C211         | 50548450  | Mylar 0.0022 $\mu$ F 50V 10%    |
| C112/C212         | 50554960  | Elec. 330 $\mu$ F 25V           |
| C113/C213         | 50554390  | Elec. 220 $\mu$ F 16V           |
| C114/C214         | 51703000  | Dip. Tant. 0.33 $\mu$ F 35V 10% |
| C115/C215         | 50596800  | Polyst. 3300pF 50V 5%           |
| C116/C216         | 50543990  | Polyst. 1800pF 50V 5%           |
| C117/C217         | 50596810  | Polyst. 3000pF 50V 5%           |
| C118/C218         | 50554050  | Elec. 10 $\mu$ F 16V            |
| C119/C219         | 50554050  | Elec. 10 $\mu$ F 16V            |
| C120/C220         | 50548920  | Mylar 0.0056 $\mu$ F 50V 5%     |
| C121/C221         | 50548910  | Mylar 0.0047 $\mu$ F 50V 5%     |
| C122/C222         | 50548990  | Mylar 0.027 $\mu$ F 50V 5%      |
| C123/C223         | 50554050  | Elec. 10 $\mu$ F 16V            |
| C124/C224         | 50555540  | Elec. 47 $\mu$ F 10V            |
| C125/C225         | 50554050  | Elec. 10 $\mu$ F 16V            |
| C126/C226         | 50547380  | Mylar 0.047 $\mu$ F 50V 5%      |
| C127/C227         | 50554050  | Elec. 10 $\mu$ F 16V            |
| C128/C228         | 50548040  | Mylar 0.1 $\mu$ F 50V 10%       |
| C129/C229         | 51703000  | Dip. Tant. 0.33 $\mu$ F 35V 10% |
| C130/C230         | 50554970  | Elec. 0.47 $\mu$ F 50V          |
| C131/C231         | 51700850  | Elec. 0.47 $\mu$ F 50V (LR)     |
| C132/C232         | 50554050  | Elec. 10 $\mu$ F 16V            |
| C133/C233         | 50554050  | Elec. 10 $\mu$ F 16V            |
| C134/C234         | 50547420  | Dip. Mica 47pF 50V 10%          |
| C135/C235         | 50554540  | Elec. 1 $\mu$ F 50V             |
| C136/C236         | 50554540  | Elec. 1 $\mu$ F 50V             |

| REF. NO.  | PARTS NO. | DESCRIPTION                 |
|-----------|-----------|-----------------------------|
| C137/C237 | 50549650  | Elec. 0.47 $\mu$ F 25V (KU) |
| C138/C238 | 50554050  | Elec. 10 $\mu$ F 16V        |
| C139/C239 | 51700850  | Elec. 0.47 $\mu$ F 50V (LR) |
| C140/C240 | *50547450 | Dip. Mica 220pF 50V 10%     |
| C141/C241 | 50548980  | Mylar 0.022 $\mu$ F 50V 5%  |
| C142/C242 | 50548870  | Mylar 0.015 $\mu$ F 50V 5%  |
| C143      | 50554420  | Elec. 470 $\mu$ F 25V       |

**\*Interchangeable with:**

C140/C240 50543420 Polyst. 220pF 50V 10%

**VARIABLE RESISTORS**

VR101/VR201 50534490 Semi-fixed, 100k $\Omega$ -B  
 VR102/VR202 50534490 Semi-fixed, 100k $\Omega$ -B  
 VR103/VR203 50534480 Semi-fixed, 50k $\Omega$ -B  
 VR104/VR204 50534480 Semi-fixed, 50k $\Omega$ -B

**COILS/TRANSFORMERS**

L101/L201 50566611 Coil, Choke; 1.2mH  
 L102/L202 50566660 Coil, Choke; 38mH 5% (Fixed)  
 L103/L203 50566650 Coil, Choke; 23mH (Adjustable)  
 L104/L204 50566550 Coil, Trap; 12mH  
 L105/L205 50566350 Coil, Record EQ; 8mH  
 T101/T201 50562260 Transformer, Output; 3k $\Omega$ :8 $\Omega$

**MISCELLANEOUS**

S101 51310290 SW, Slide 16PDT  
 57240420 Pin, F3 Type (3 used)  
 55542600 Plate, Shield; A  
 51470160 Socket, IC; 16P

**2. POWER SUPPLY**

| REF. NO.           | PARTS NO. | DESCRIPTION     |
|--------------------|-----------|-----------------|
|                    | 51681760  | PC Bd. Assy     |
|                    | 51671760  | PC Board (only) |
| <b>TRANSISTORS</b> |           |                 |
| Q301,Q302          | 51450360  | 2SC945L-K       |
| <b>SCR</b>         |           |                 |
| SCR-1              | 51430900  | 2P1M            |

| REF. NO.      | PARTS NO. | DESCRIPTION   |
|---------------|-----------|---------------|
| <b>DIODES</b> |           |               |
| D301~D309     | 51430890  | W03C          |
| D310          | 51430860  | Zener, RD-13E |
| D311          | 50422570  | SiB01-06      |

**RESISTORS**

R301 50578730 Metal Film 430 $\Omega$  2W 5%  
 R302 50520290 Cement 100 $\Omega$  5W  
 R303 50527340 Metal Film 1.2k $\Omega$  2W  
 R304 50516090 Carbon 10 $\Omega$  1/2W 10%  
 R305 50571140 Carbon 22k $\Omega$  1/4W 5%  
 R306 50570820 Carbon 1k $\Omega$  1/4W 5%  
 R307 50571000 Carbon 5.6k $\Omega$  1/4W 5%  
 R308,R309 50570660 Carbon 220 $\Omega$  1/4W 5%  
 R310 50571300 Carbon 100k $\Omega$  1/4W 5%  
 R311,R312 50571220 Carbon 47k $\Omega$  1/4W 5%  
 R313 50571140 Carbon 22k $\Omega$  1/4W 5%

**CAPACITORS**

C301 50554890 Elec. 1000 $\mu$ F 16V  
 C302,C304 51700110 Elec. 1000 $\mu$ F 35V (S L)  
 C303 50555580 Elec. 1000 $\mu$ F 25V  
 C305,C308 50554230 Elec. 100 $\mu$ F 6.3V  
 C306 50554600 Elec. 470 $\mu$ F 6.3V  
 C307 50554240 Elec. 33 $\mu$ F 10V  
 C309 50548320 Mylar 0.001 $\mu$ F 50V 10%  
 C310 50546890 Dip. Tant. 1 $\mu$ F 25V

**TRIMMER CAPACITORS**

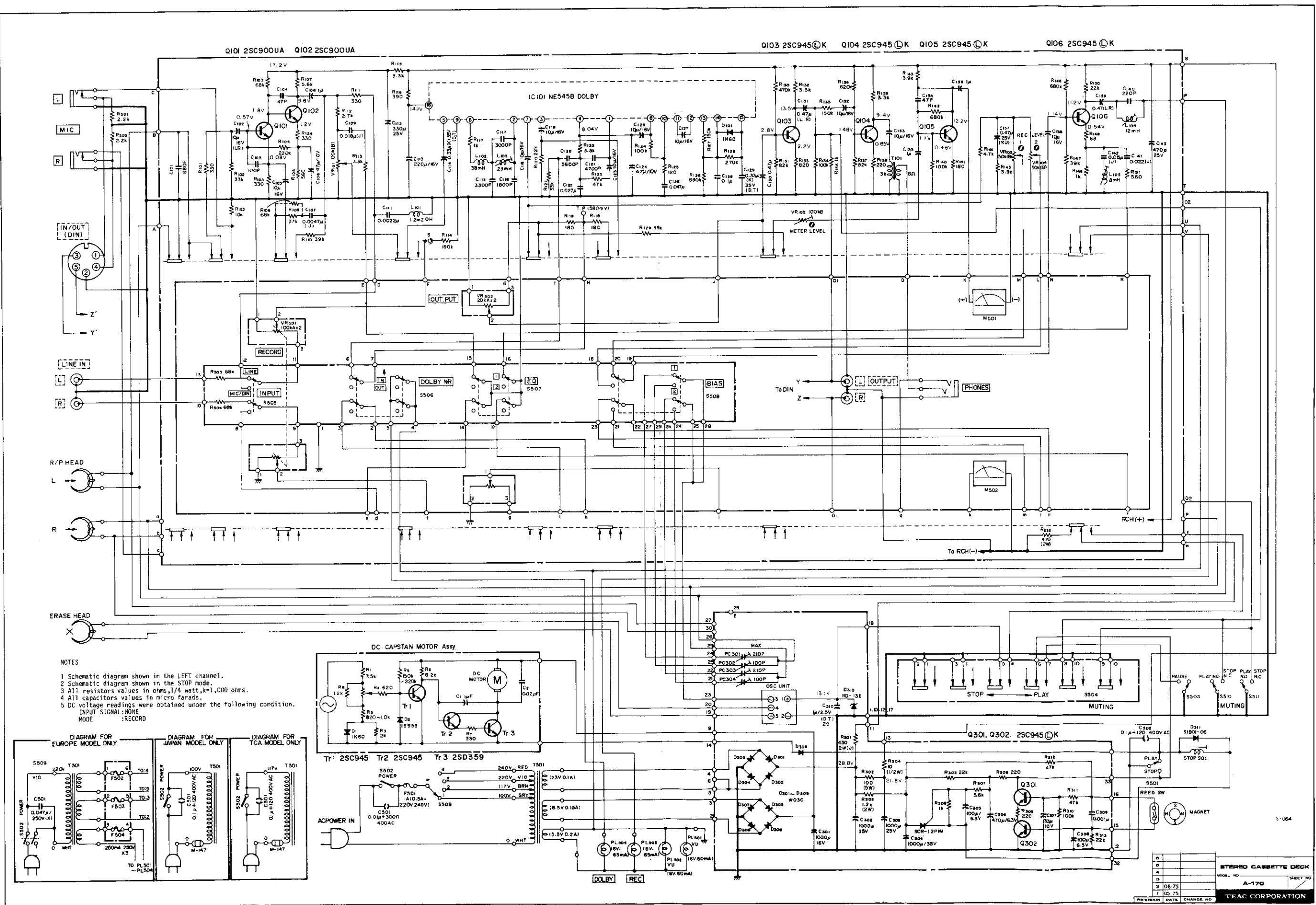
PC301,PC303 50547060 210pF Max.  
 PC302,PC304 50547070 100pF Max.

50400810 Oscillator Unit, 100kHz

**3. LEVER SWITCH**

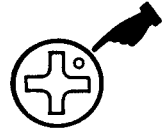
| REF. NO.  | PARTS NO. | DESCRIPTION                 |
|-----------|-----------|-----------------------------|
|           | 51681800  | PC Bd. Assy                 |
|           | 51671800  | PC Board (only)             |
| S505      | 51320070  | Switch, Lever; DPDT         |
| S506      | 51320090  | Switch, Lever; 4PDT         |
| S507,S508 | 51320080  | Switch, Lever; 4PDT         |
| R503,R504 | 50573260  | Carbon 68k $\Omega$ 1/4W 5% |





## ASSEMBLING HARDWARE CODING LIST

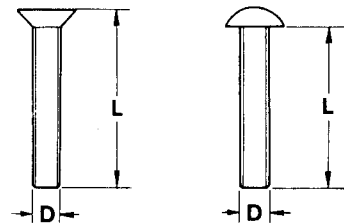
All screws conform to ISO standards, and have cross-recessed heads, unless otherwise noted.  
ISO screws have the head inscribed with a point as in the figure to the right.



FOR EXAMPLE :

**B M3 x 6**

----- Length in mm (L)  
----- Diameter in mm (D)  
----- Type of Head



|               | Code       | Full Name                       | Type |               | Code       | Full Name                           | Type |
|---------------|------------|---------------------------------|------|---------------|------------|-------------------------------------|------|
| MACHINE SCREW | <b>R</b>   | Round Head Screw                |      | TAPPING SCREW | <b>BTA</b> | Binding Head Tapping Screw(A Type)  |      |
|               | <b>P</b>   | Pan Head Screw                  |      |               | <b>BTB</b> | Binding Head Tapping Screw(B Type)  |      |
|               | <b>T</b>   | Stove Head Screw (Truss)        |      |               | <b>RTA</b> | Round Head Tapping Screw(A Type)    |      |
|               | <b>B</b>   | Binding Head Screw              |      |               | <b>RTB</b> | Round Head Tapping Screw(B Type)    |      |
|               | <b>F</b>   | Flat Countersunk Head Screw     |      | SETSCREW      | <b>SF</b>  | Hex Socket Setscrew(Flat Point)     |      |
|               | <b>O</b>   | Oval Countersunk Head Screw     |      |               | <b>SC</b>  | Hex Socket Setscrew(Cup Point)      |      |
| WOOD SCREW    | <b>RW</b>  | Round Head Wood Screw           |      |               | <b>SS</b>  | Slotted Socket Setscrew(Flat Point) |      |
|               | <b>FW</b>  | Flat Countersunk Wood Screw     |      | WASHER        | <b>E</b>   | E-Ring (Retaining Washer)           |      |
|               | <b>OW</b>  | Oval Countersunk Wood Screw     |      |               | <b>W</b>   | Flat Washer (Plain)                 |      |
| SEMS SCREW    | <b>BSA</b> | Binding Head SEMS Screw(A Type) |      |               | <b>SW</b>  | Lock Washer (Spring)                |      |
|               | <b>BSB</b> | Binding Head SEMS Screw(B Type) |      |               | <b>LWI</b> | Lock Washer (Internal Teeth)        |      |
|               | <b>BSF</b> | Binding Head SEMS Screw(F Type) |      |               | <b>LWE</b> | Lock Washer (External Teeth)        |      |
|               | <b>PSA</b> | Pan Head SEMS Screw(A Type)     |      |               | <b>TW</b>  | Trim Washer (Countersunk)           |      |
|               | <b>PSB</b> | Pan Head SEMS Screw(B Type)     |      | NUT           | <b>N</b>   | Hex Nut                             |      |

1-310