TEAC®

SERVICE MANUAL

A-480

Stereo Cassette Deck with Dolby* System

GENERAL INTRODUCTION

This Service Manual is designed to provide up-to-date information to assist the skilled technicial to properly repair, adjust and maintain the TEAC A-480 Stereo Cassette Tape Deck.

The A-480 is a highly reliable deck which features an easy to use push button control panel, has a Dolby NR system, REC MUTE, TIMER and MEMORY facilities. It has MIC/LINE Mixing capability, PEAK LEVEL indicators, MPX FILTER and L/MONO microphone recording features as well as many of the standard TEAC features that have kept TEAC a leader in the tape recorder industry.

If any of the adjustments or repairs seem too complicated or are difficult for you to accomplish, please contact the nearest TEAC Factory Service Department or write directly to a TEAC office, the addresses of which are printed on the back cover.

NOTE: When ordering replacement parts, please refer to the PARTS LIST which is printed separately from this manual.

* Noise reduction circuit made under license from Dolby Laboratories Inc. The word "Dolby" and the Double-D symbol are trademarks of Dolby Laboratories Inc.

TEAC CORPORATION

51031920

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1. TEST EQUIPMENT REQUIRED

Cassette Torque Meter:	For take-up torque check:	0 – 100 g·cm (0 – 1.4 oz·inch)
	For fast forward & rewind torque checks:	0 – 160 g·cm (0 – 2.2 oz·inch)
Spring scale:	For Pinch Roller pressure check:	0 – 1 kg (2.2 lbs)
Wow/flutter meter:	MEGURO DENPA SOKKI K.K., Model MK-668A or D & R Co., Model FL-4B.	
Frequency counter:	Digital type, capable of 10 Hz to 100 kHz indication.	
AF oscillator:	10 Hz – 100 kHz	
AC VTVM:	0.1 mV – 300 V	
Attenuator:	General Purpose	
Distortion analyzer:	Basic frequency 400 Hz/1 kHz	
Oscilloscope:	General Purpose	
Band-pass filter:	1 kHz narrow band-pass type	
Test load resistor:	Non inductive type 8 ohm/1 W	
Plastic alignment tool:		
Head demagnetizer:	TEAC E-3 or equivalent	
Cleaner:	TEAC TZ-261 Tape Recorder Cleaner kit or pure alcohol	
Oil:	TEAC TZ-255 Oil kit or equivalent	

NOTE: When ordering the Cassette Torque Meter, allow for the longer delivery time that is required for it.

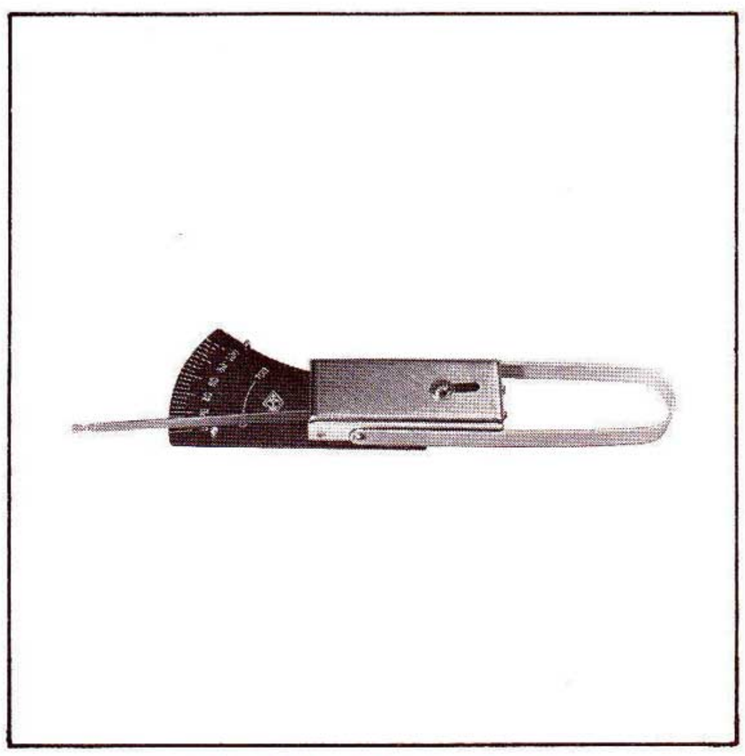


Fig. 1-1 Spring Scale

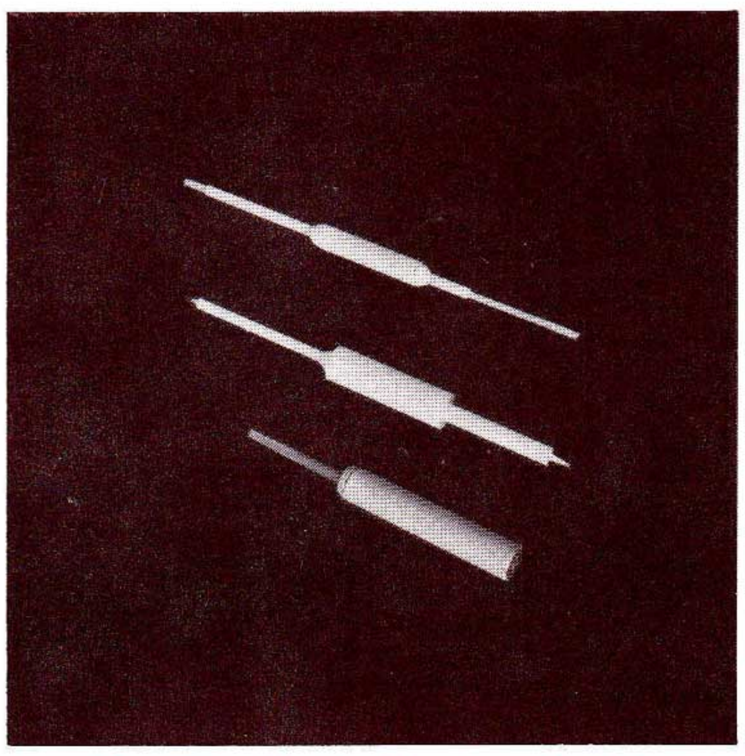


Fig. 1-2 Plastic Alignment Tool

Fig. 1-3 E-3 Head Demagnetizer

Fig. 1-4 TZ-261 Tape Recorder Cleaner Kit

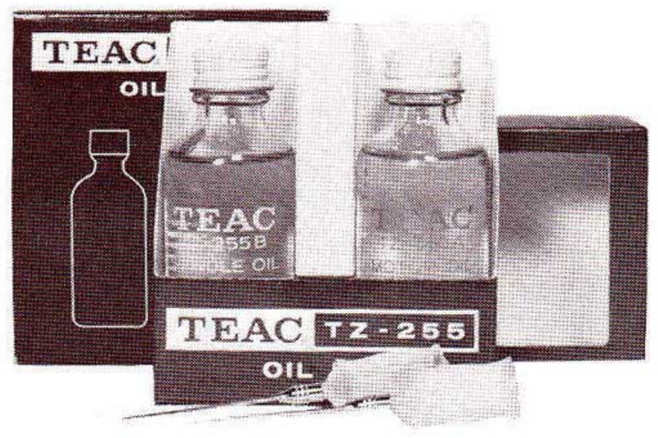


Fig. 1-5 TZ-255 Oil Kit

2. SPECIFICATIONS & SERVICE DATA

SPECIFICATIONS

Track System	4-track, 2-channel stereo
2 Heads	Erase and Record/Playback
Type of Tape	Cassette tape, C-60 and C-90 (Philips Type)
Tape Speed	4.8 cm/s (1-7/8 ips)
Inputs (level and impedance)	Microphones: Min. Input Level: –70 dB (244 μV/10k ohms or more) Line: Specified Input Level: –8 dB (308 mV/97k ohms) Min. Input Level: –22.5 dB (58.0 mV) DIN*: Min. Input Level: –35 dB (13.7 mV)
Outputs (level and impedance)	Line Out: Max. Output Level: +1 dB (0.869 V into 50k ohms) Specified Output Level: –5 dB (435 mV) Headphones: Specified Output Level: –16 dB (122 mV/8 ohms)
Equalization	EQ: CrO_2 : 3,180 μs + 70 μs (for CrO_2 tape) EQ: NORMAL: 3,180 μs + 120 μs (for NORMAL tape)
Head Configuration	1/2-track, 1-channel Erase Head 1/4-track, 2-channel Record/Playback Head
Motor	DC Servo Motor (FG type)
Bias Frequency	100 kHz
Operating Position	Horizontal
Power Requirement	100/117/220/240 VAC, 50/60 Hz (General Export Models) 117 VAC, 60 Hz (USA/Canada Models) 220/240 VAC, 50 Hz (Europe Models) 240 VAC, 50 Hz (Australia Model)
Power Consumption	11.5 W
Weight	11 kg (24¼ lbs) net
Dimensions	(see chart on page 5)

* Pursuant to DIN Standards

TEAC TEST TAPES

For Playback Performance Alignment

MTT-150: Dolby Level Calibration Tone (Dolby B type tone, 400 Hz recorded at 200 nW/m level)

MTT-111: Tape Speed and Wow and Flutter Test (3,000 Hz Tone at –10 dB level)

MTT-116U: For NORMAL EQ setting for Frequency Response test (315 Hz, –4 dB reference level; 31.5 Hz to 14 kHz signals at –24 dB; 3,180 μs + 120 μs)

MTT-116K: For CrO_2 EQ setting for Frequency Response test (315 Hz reference level at –4 dB; 31.5 Hz to 14 kHz signal at –24 dB; 3,180 μs + 70 μs)

For Record Performance Alignment

MTT-505TB: For BIAS/EQ at CrO_2

MTT-501: For BIAS/EQ at NORMAL

MTT-502: For Wow and Flutter Measurement

NOTE: The TEAC Test Tapes require longer delivery time than regular parts.

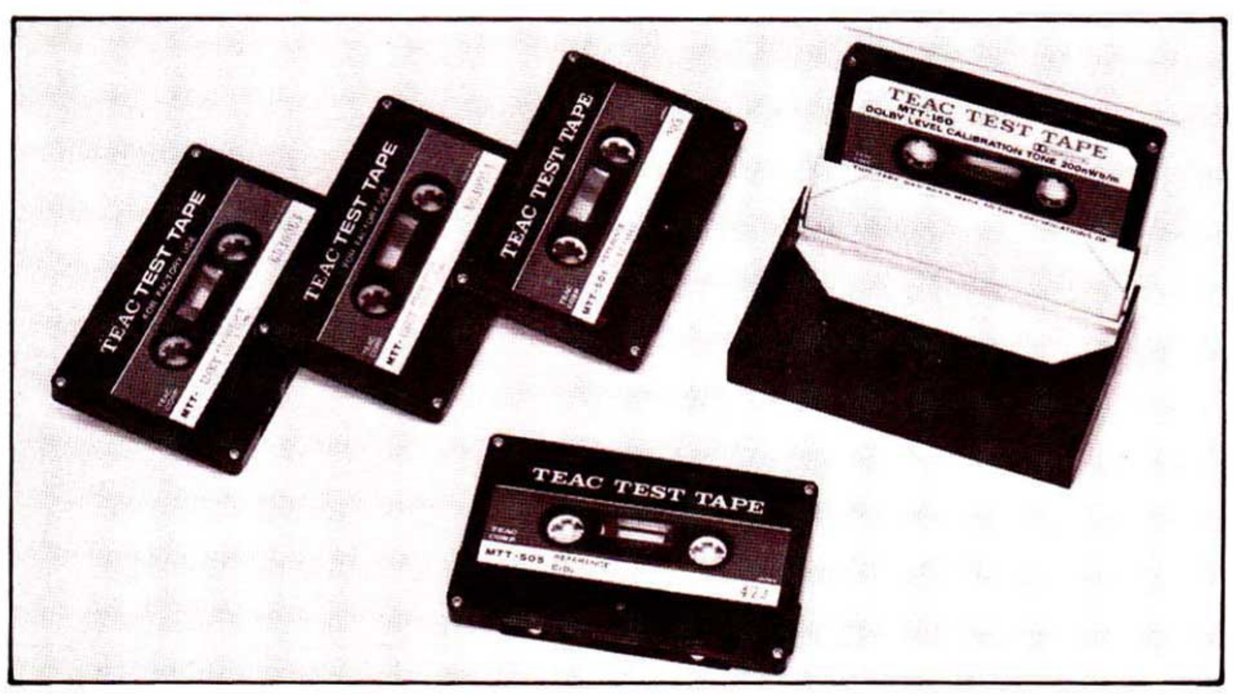


Fig. 2-1 TEAC Test Tape

SERVICE DATA

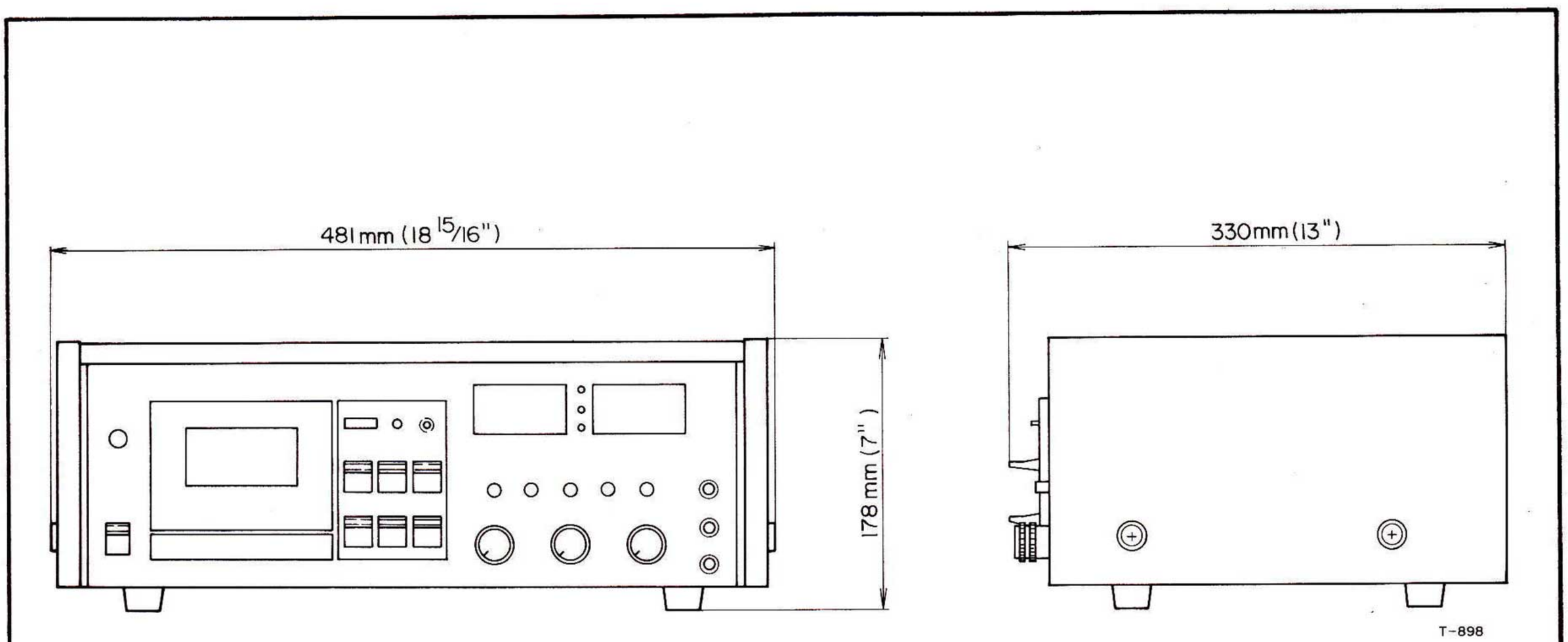
Mechanical

Tape Speed Deviation	3,000 Hz ± 30 Hz
Tape Speed Drift	30 Hz
Wow and Flutter	Playback: 0.10% (WRMS) Record/Playback: 0.20% (RMS)
Pinch Roller Pressure	400 g ± 50 g (12.3 ~ 15.9 oz)
Reel Torque	Take Up: 40 to 60 g·cm (0.6 ~ 0.9 oz·inch) Fast Forward: 105 to 165 g·cm (1.4 ~ 2.3 oz·inch) Rewind: 105 to 165 g·cm (1.4 ~ 2.3 oz·inch)
Fast Winding Time	100 seconds for C-60
End-stop Activate Time	4 seconds or less

Electrical

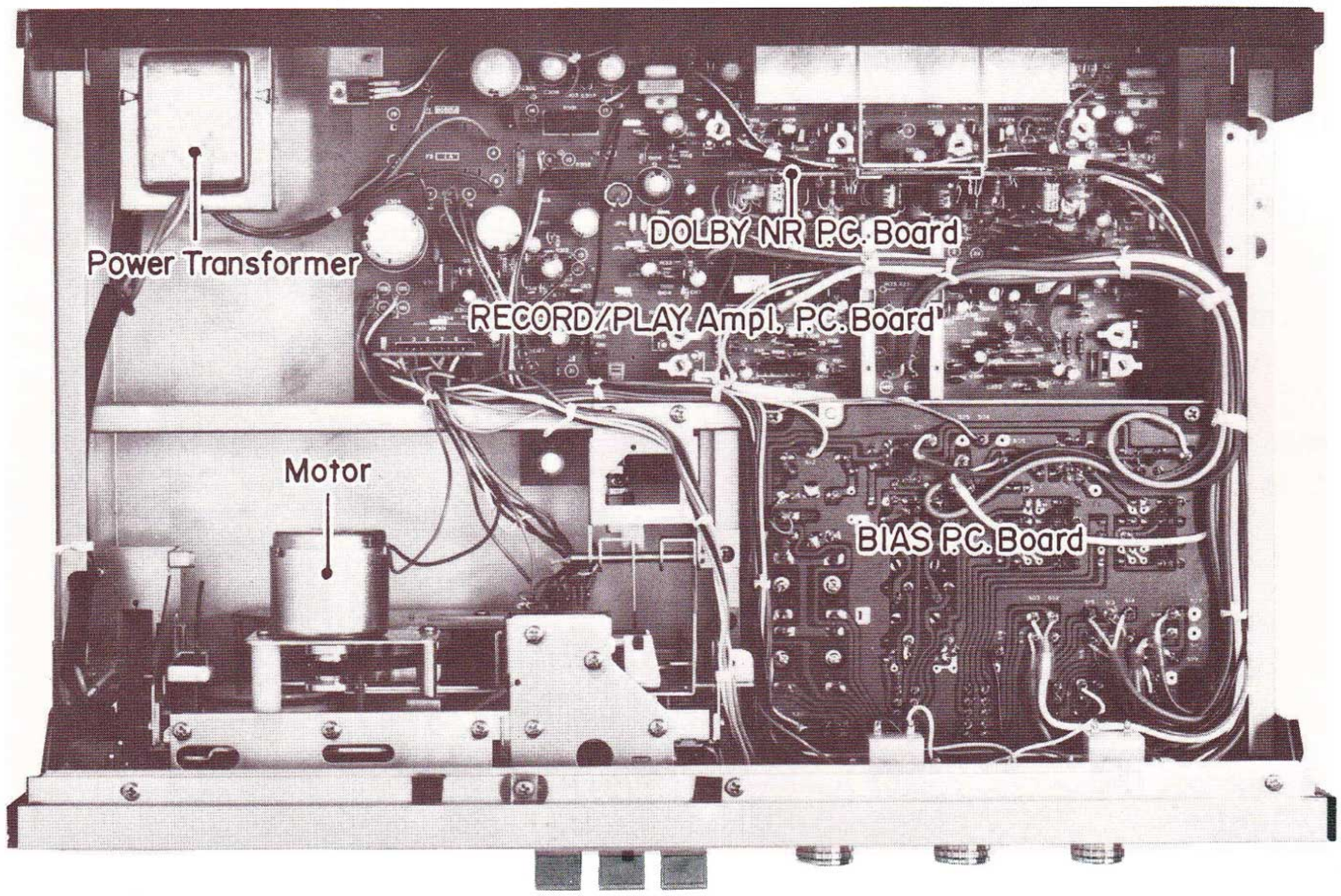
Frequency Response	Refer to Frequency Response Limits charts on page 15 and 18.
Signal to Noise Ratio	Playback Method: NORMAL Tape: 47 dB (min) Record/Playback Method: BIAS/EQ CrO_2: 47 dB (min) BIAS/EQ NORMAL: 45 dB (min) With Dolby NR used for recording and playback, S/N ratio is improved by 5 dB at 1 kHz and 10 dB at frequencies over 5 kHz.
Erase Efficiency	65 dB minimum
Channel Separation	30 dB minimum (at 1 kHz)
Crosstalk Between Adjacent Tracks	40 dB minimum (at 125 Hz)
Total Harmonic Distortion	BIAS/EQ, CrO_2: 3.0% (maximum) BIAS/EQ, NORMAL: 2.5% (maximum)

NOTE:
- Improvements may result in Specifications and Service Data changes.
- Value of dB in the Data refers to 0 dB = 0.775 V, except where specified. If a Test Set or VTVM calibrated to 0 dB = 1 V is to be used, appropriate compensation should be made.

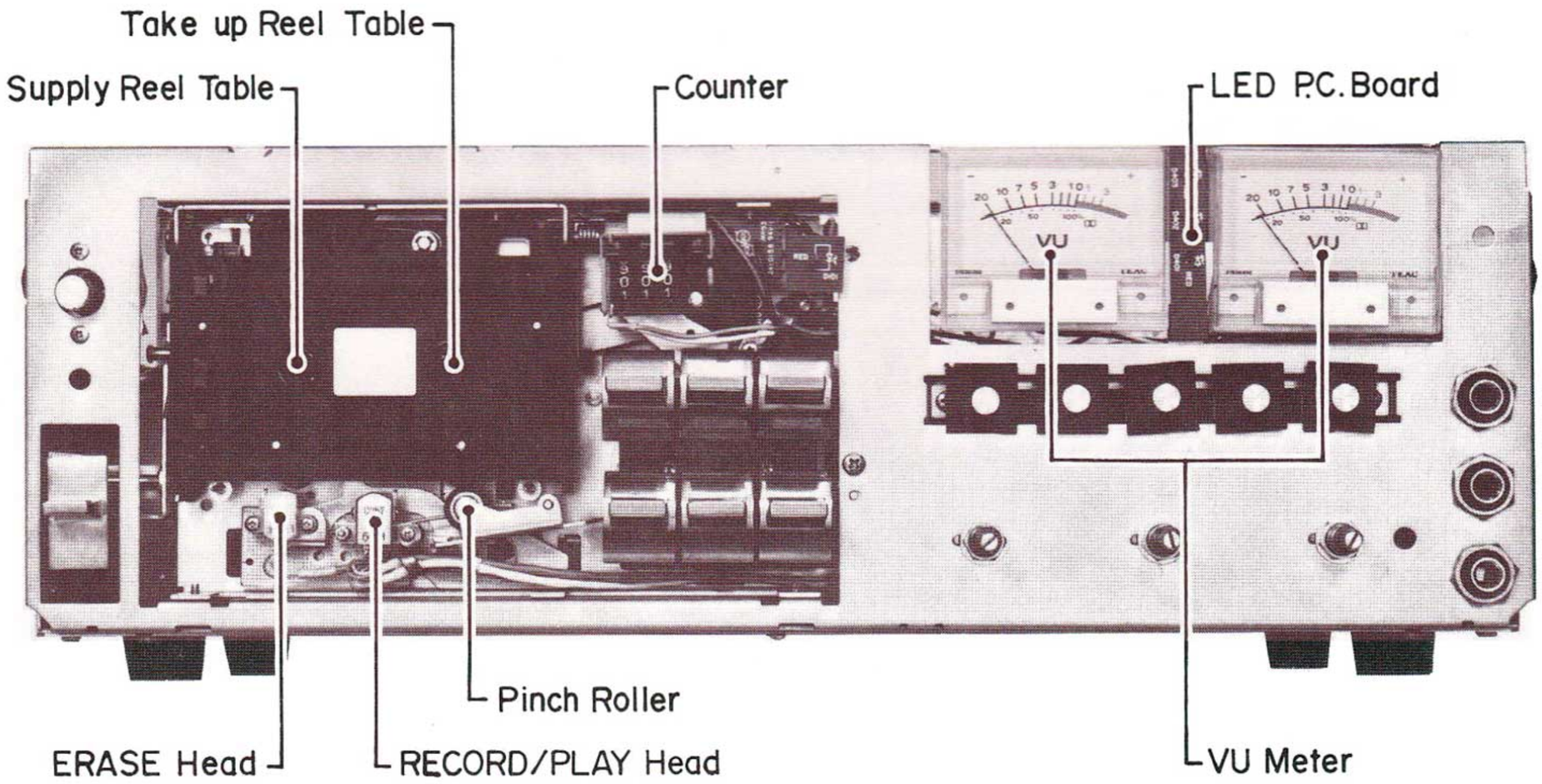


DIMENSIONS

3. PARTS LOCATION



Viewed from Top



Viewed from Front

4. PARTS REMOVAL/REPLACEMENT PROCEDURE

NOTE

1. Use the proper tools. Demagnetize the tools before use.
2. 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.
3. When reassembling, don't forget to reinstall all hardware such as springs and washers, etc.
4. For assembling hardware shape identification, see ASSEMBLING HARDWARE CODING LIST in the Parts List.

4-1 External Parts (Wood Panel, Bonnet, Bottom cover, transport section).

1. Remove four mounting screws (A) and remove the wooden panel (1) (if included) and the bonnet (2).
2. Remove cassette cover (3).
3. Pull off knobs (4) and (5).
4. Remove mounting screws (B) and (C) and remove front panel (6).
5. Remove mounting screws (D) and remove bottom panel (7).
6. Remove mounting screws (E), (F), (G) and remove transport chassis (9) from the front chassis (8).

CAUTION: Do not remove the power switch by force. First remove the screw (H) to remove the power switch.

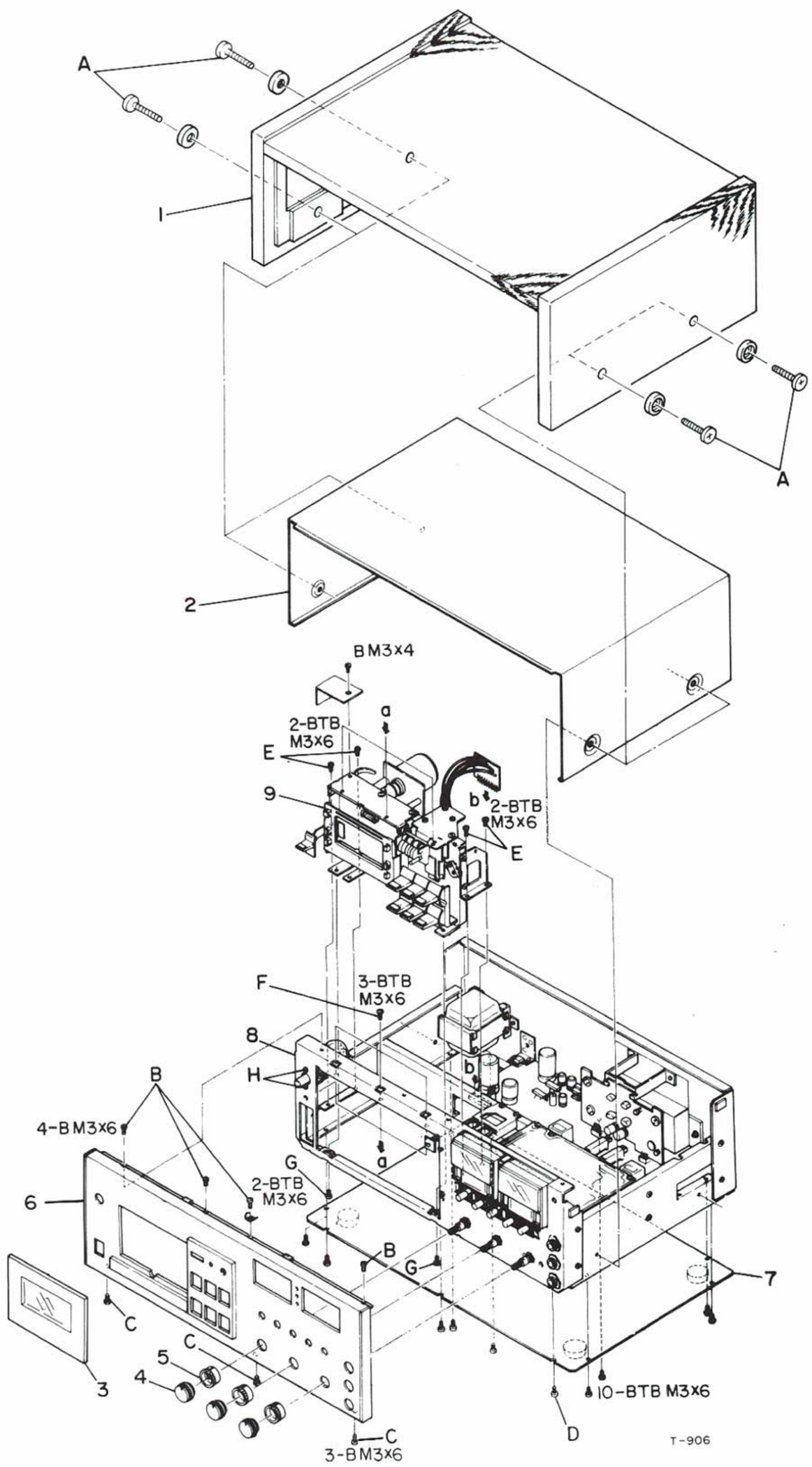


Fig. 4-1 External Parts

4-2 Cassette Holder

1. Remove the transport chassis (1) from the front chassis.
2. Remove screws (A) and disconnect the cassette holder assy from lever assy (3).
   Remove shield paper (4) together with the screws (A).

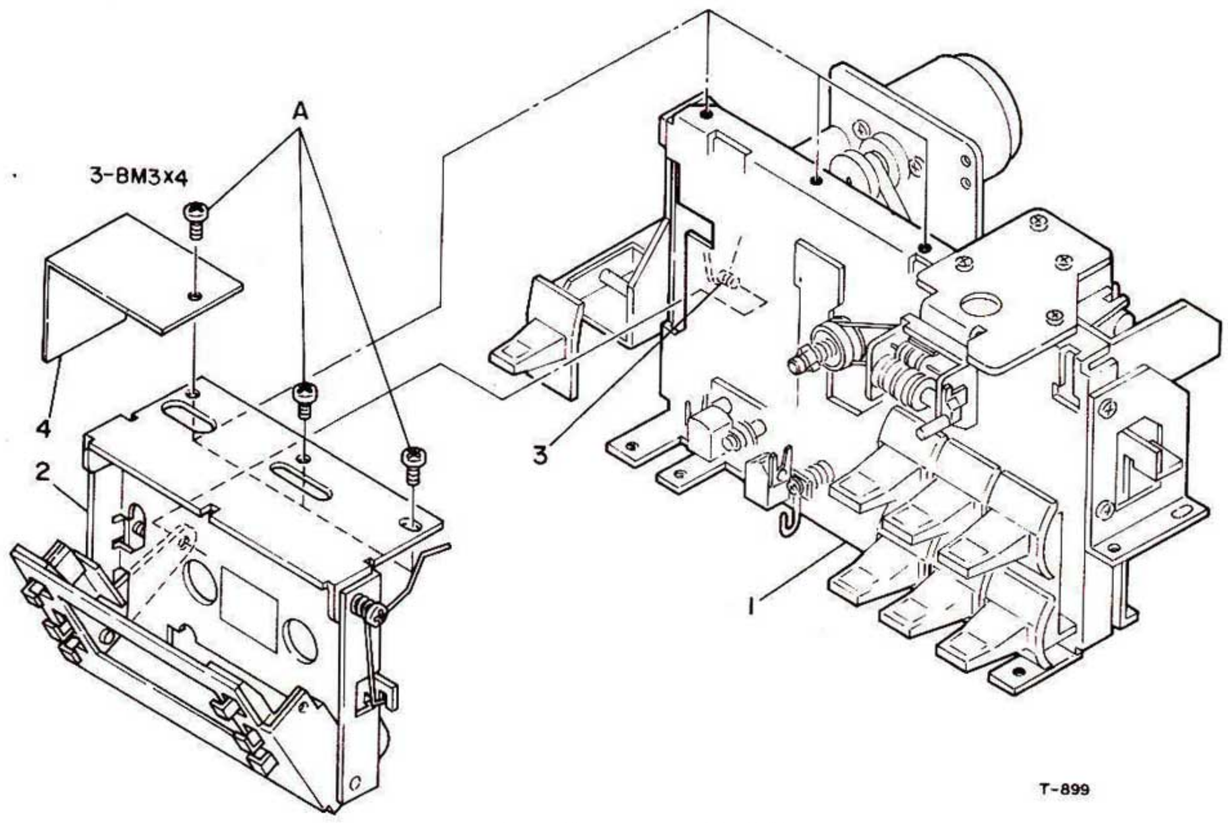


Fig. 4-2 Cassette Holder

4-3 Head and Pinch Roller

1. Remove transport chassis (1) from the front chassis.
2. Remove the cassette holder assy from the transport chassis (1).
3. Remove the R/P head (2) together with spring A (3) and spring B (4) by removing mounting screw (A) and nut (B).
4. Remove the erase head (5) together with adjusting lever (6) by removing mounting screws (C). Spring (7) must be disconnected from adjusting lever (6).
5. Pinch Roller (8) can be removed by removing E-ring (D).

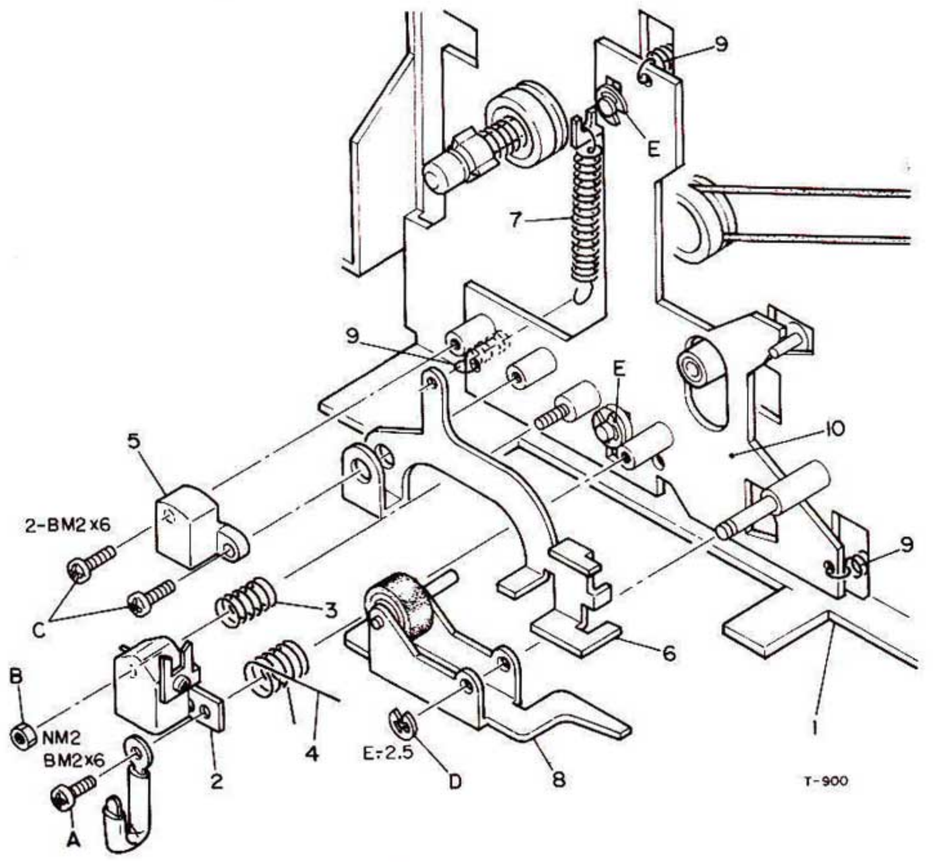


Fig. 4-3 Head and Pinch Roller

4-4 Brake Arm and Brake Shoe

1. Remove the transport chassis (1) from the front chassis.
2. Remove the cassette holder assy from the transport chassis (1).
3. Remove the head mounting plate (10 in Fig. 4-3).
4. After the head mounting plate is removed, remove the brake arm (2) from the lever assy (3).
5. Remove brake shoes (4) from the Brake Arm.

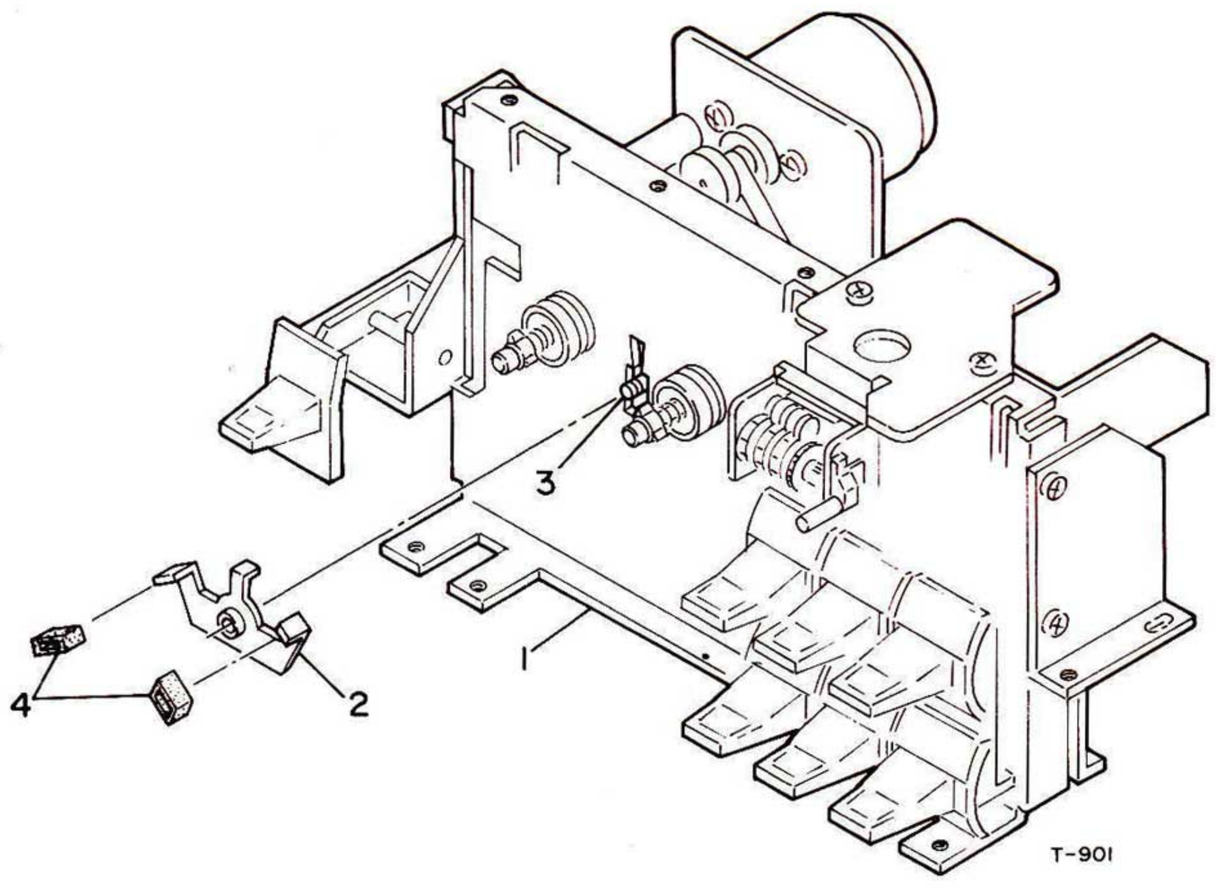


Fig. 4-4 Brake Arm and Brake Shoe

4-5 Motor and Capstan

1. Remove the transport chassis (1) from the front chassis.
2. Motor Section
   a. When screws (A) and spring D (2) are removed, the motor mounting plate (3) can be removed.
   b. When mounting screws (B) are removed, the motor can be removed from the motor mounting plate.
3. Capstan Flywheel Section
   a. Flywheel retaining plate (6) can be removed by removing screws (C) and disconnecting springs D (5).
   b. Remove flywheel (7) and belt (8).
   c. Bearing (9) can be removed by removing the three screws (D).

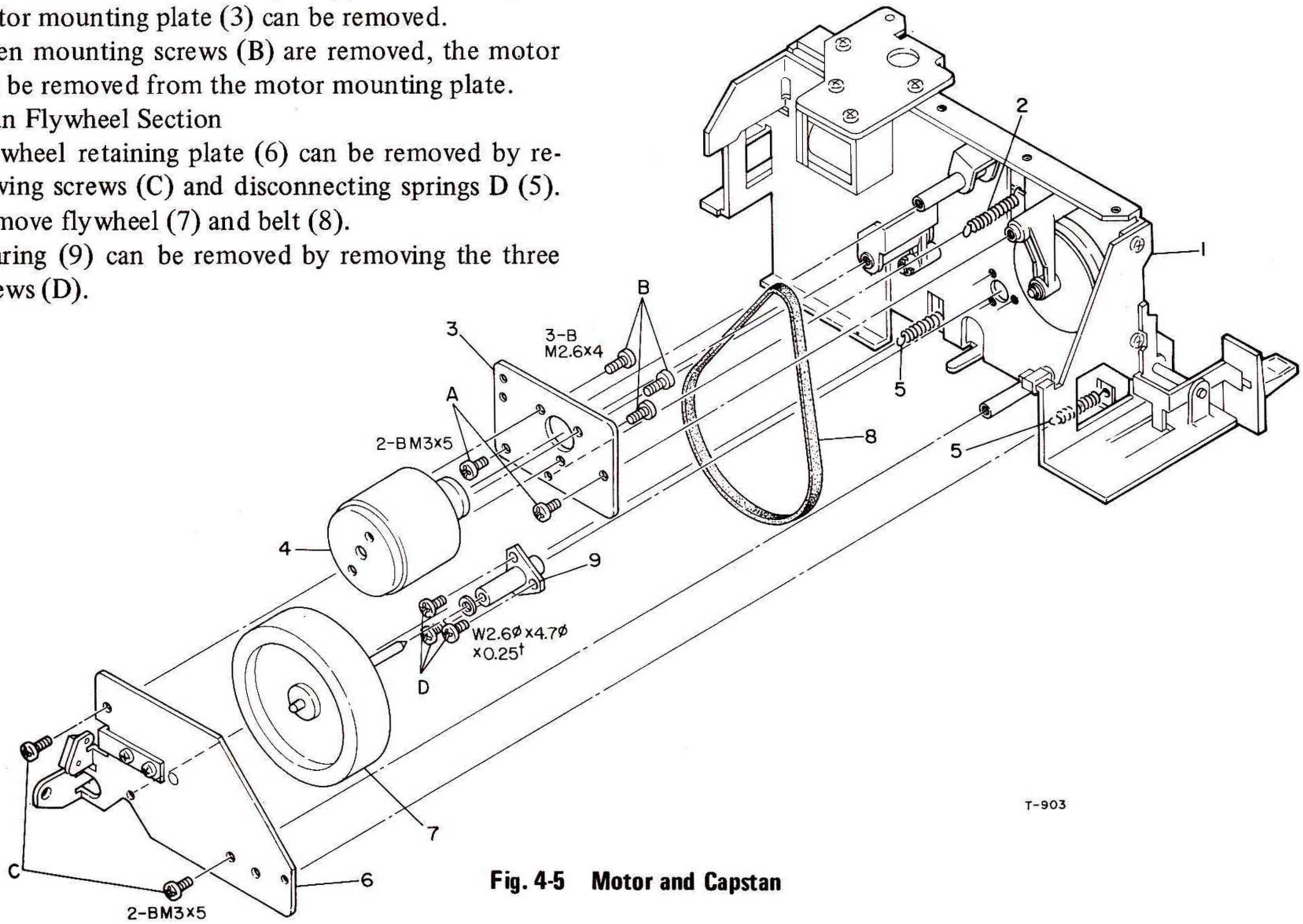


Fig. 4-5 Motor and Capstan

4-6 Pulley and Idler

1. Remove the transport chassis (1) from the front chassis.
2. Remove the motor mounting plate, flywheel retaining plate, flywheel, etc.
3. Remove the take up winding idler (F.F./REW) (2) from the link (3) which is the only part holding the idler.
4. Remove mounting screw (A) and the take up winding pulley (F.F./REW) (4) and the belt (5) can be removed together.
5. Winding Idler (Play)
   a. Remove solenoid (6) by removing the two mounting screws (B).
   b. Remove screws (C) to remove the operation key control plate (7).
   c. Remove spring A (8) and spring B (9).
   d. Remove the record protection lever (10) together with the take up winding idler (11).

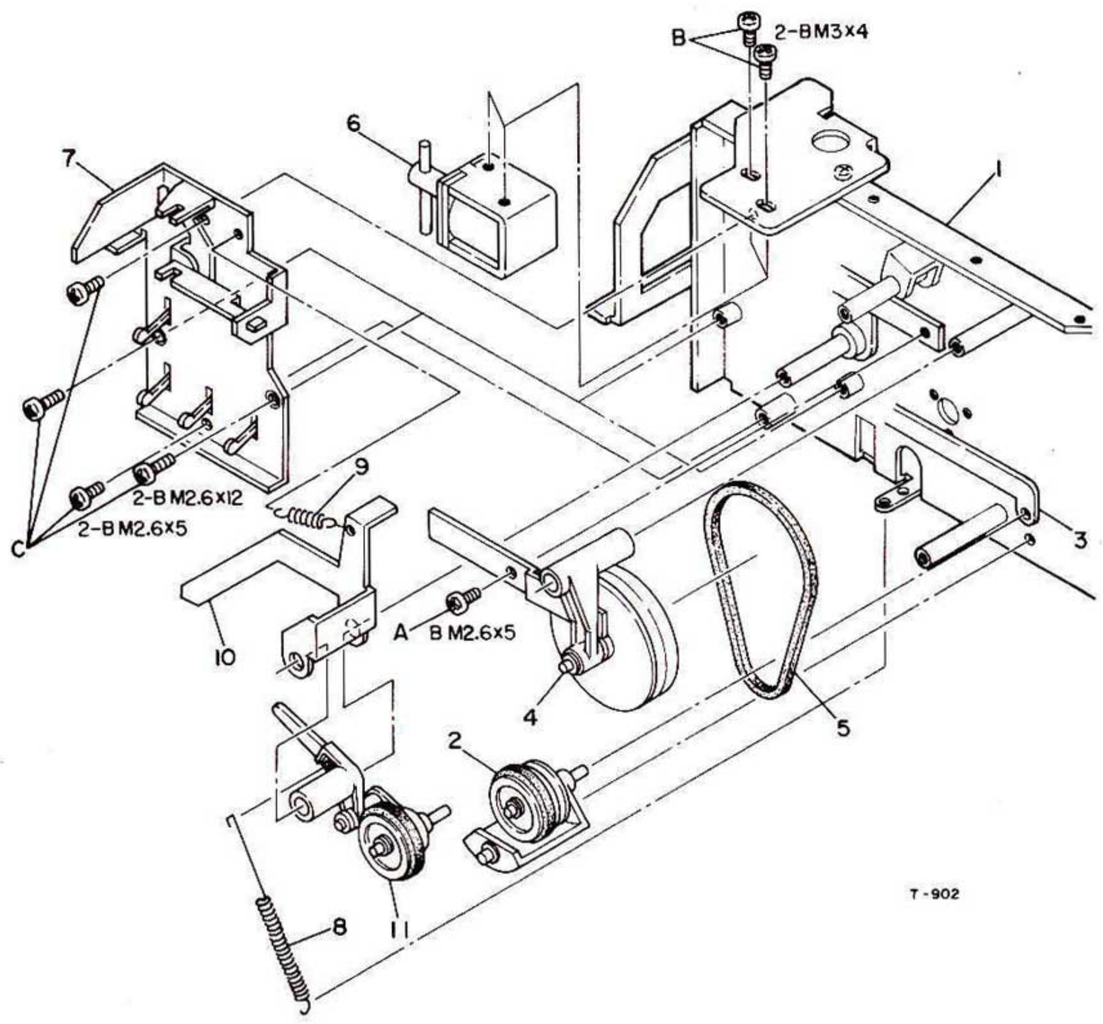


Fig. 4-6 Pulley and Idler

4-7 Reel Table

1. Remove the transport chassis (1) from the front chassis.
2. Remove the motor mounting plate, flywheel retaining plate, flywheel, etc.
3. Remove the take up idler (F.F./REW and Play), winding pulleys, etc.
4. Loosen set screws (A) and the take up pulleys can be removed.
5. Remove the supply reel table (3) and take up reel table (4) together with capstan belt by removing the E-ring (B).
6. Remove the bearing (5) by removing the screws (C).

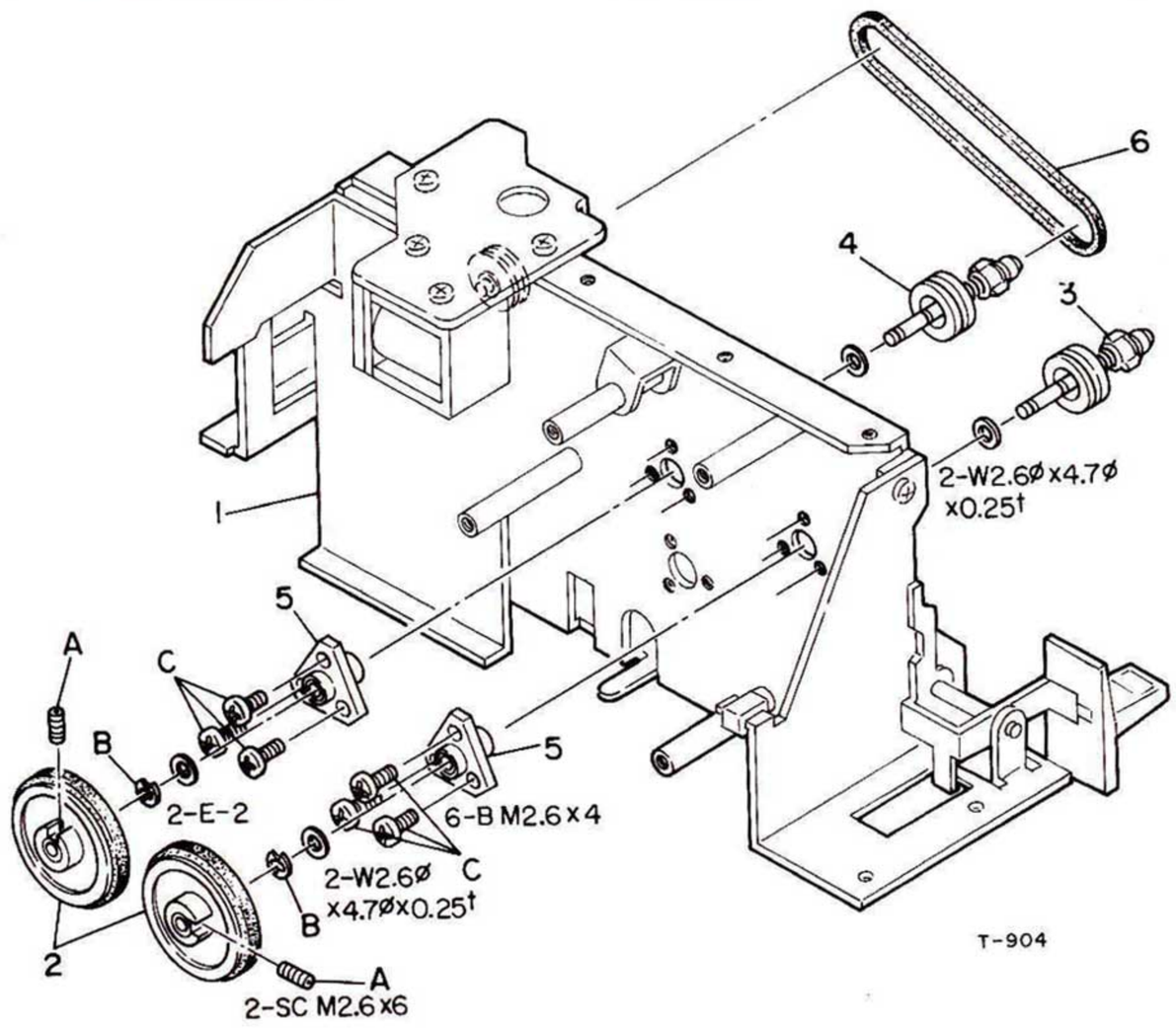


Fig. 4-7 Reel Table

4-8 Lubrication

Lubrication should be generally done at about every 1,000 hours of operating time of the tape deck. Use high quality oil for this purpose.

For efficient oiling, it is recommended that lubrication be done after nearly 1 hour of idling of the deck and while it is still warm.

Normally, it is necessary to lubricate only the areas described below.

1. Apply a drop of a light machine oil of good quality (e.g.: TEAC TZ-255) with an oil applicator to the shaft of the Flywheel (7) and spread oil evenly over the shaft with a flannel cloth. After installing the Flywheel, be sure to clean the tape moving portion of shaft with TEAC TZ-261A Head Cleaner or with pure alcohol.
2. Apply a drop of the proper oil in the same way as above to the innermost area of capstan shaft (next to the Flywheel).
3. Apply a film of light grease to the well of the Flywheel Bearing Plate (6).

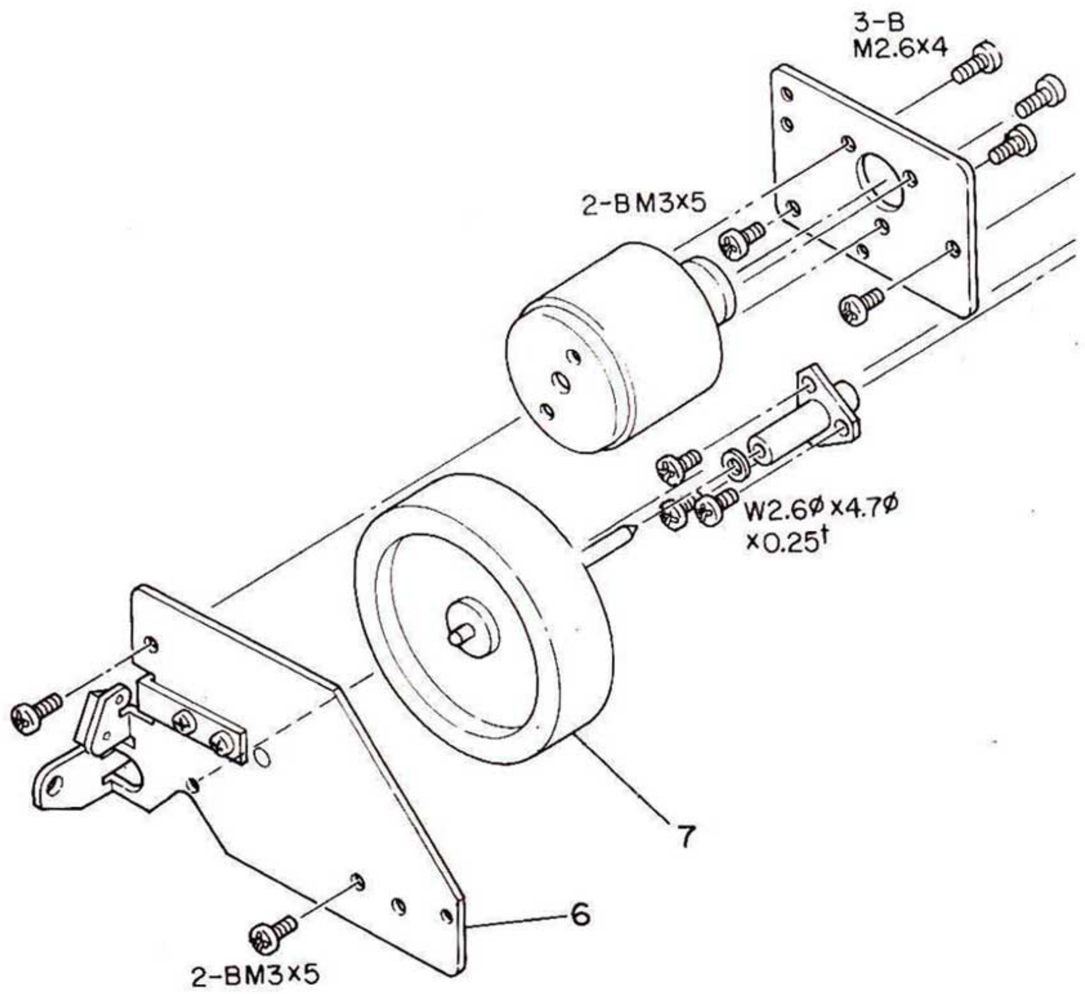


Fig. 4-8 Lubrication

5. MECHANICAL CHECKS AND ADJUSTMENTS

5-1 Pinch Roller Pressure

Specified Value: 400 g ± 50 g (12.3 ~ 15.9 oz)

1. Load a tape and set the deck in Play mode.
2. Set the spring scale against the pinch roller as shown in Fig. 1 and push the pinch roller away from the capstan. When the pinch roller justs stops turning (loses contact with the capstan) read the scale indication. Confirm that this indication meets the specification.
3. If the indicated value does not satisfy the specification, replace the pinch spring that is inserted against the Rec/Play head mounting post.

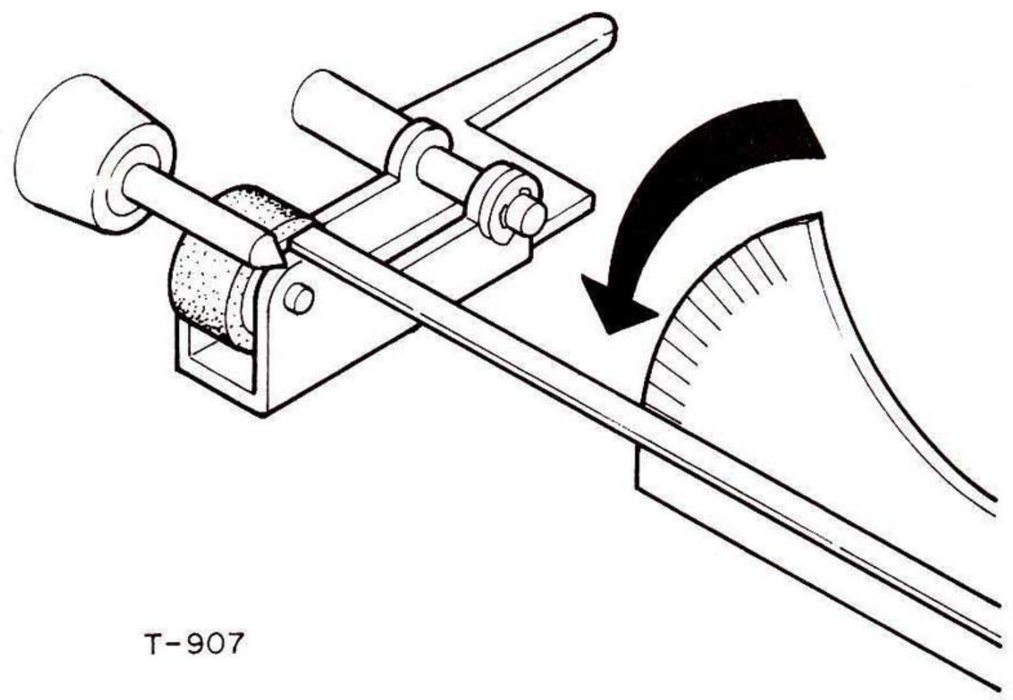


Fig. 5-1 Pinch Roller Pressure Measurement

5-2 Take Up Torque (Play)

Specified: 40 to 60 g·cm (0.6 ~ 0.9 oz·inch)

1. Load the cassette torque meter.
2. Select the Play mode.
3. Check that the torque meter reads within the specified value.
4. If reading does not satisfy the specification, replace the winding idler (play).

5-3 Fast Winding Torque (F.F./REW)

Specified Value: 105 to 165 g·cm (1.4 ~ 2.3 oz·inch)

1. Load the cassette torque meter.
2. Set the deck in the Fast Forward or Rewind mode.
3. Read the torque meter or dial guage when the indicator movement stops.
4. If the reading does not satisfy the specification, replace the winding idler.

5-4 Brake Tension

1. Switch on POWER.
2. Load a TEAC MTT-501 test tape.
3. Check for excess slack or tightness of the tape when operation is changed from play, fast forward and rewind mode to stop mode, respectively.
4. If brake action is too "tight" or "loose", adjust by bending the arms of the Brake Bracket in or out as necessary. See Fig. 4-4 on page 8.

5-5 Torque Measurement Using the Cassette Torque Meter

The torque measurements can be easily done with the Cassette Torque Meter indicated below.

For take-up torque measurement: 0 ~ 100 g·cm (0 ~ 1.4 oz·inch)

For fast forward and rewind torque measurements: 0 ~ 160 g·cm (0 ~ 2.2 oz·inch)

By use of a Cassette Torque Meter, it is possible to directly obtain the torque value without calculation, and to do the measurement simply with no removal of any parts. If repairs are necessary, the external Cases must be removed. Load the Meter on the deck and read the pointer indication on the dial scale for each tape movement operation.

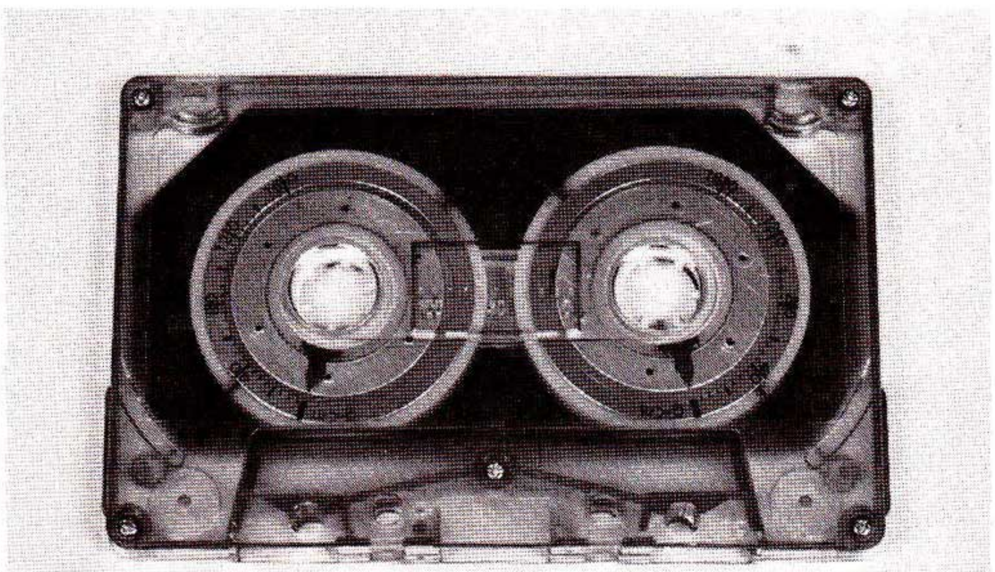


Fig. 5-2 Cassette Torque Meter

5-6 Solenoid Position Adjustment

1. Push the solenoid plunger until it fully bottoms in the solenoid (arrow A).
2. Push the solenoid pin guide as far as possible in the direction of arrow B.
3. Check for a clearance of approx. 0.5 mm between the solenoid plunger pin and the solenoid pin guide. Loosen the two screws C and position solenoid to obtain this clearance.

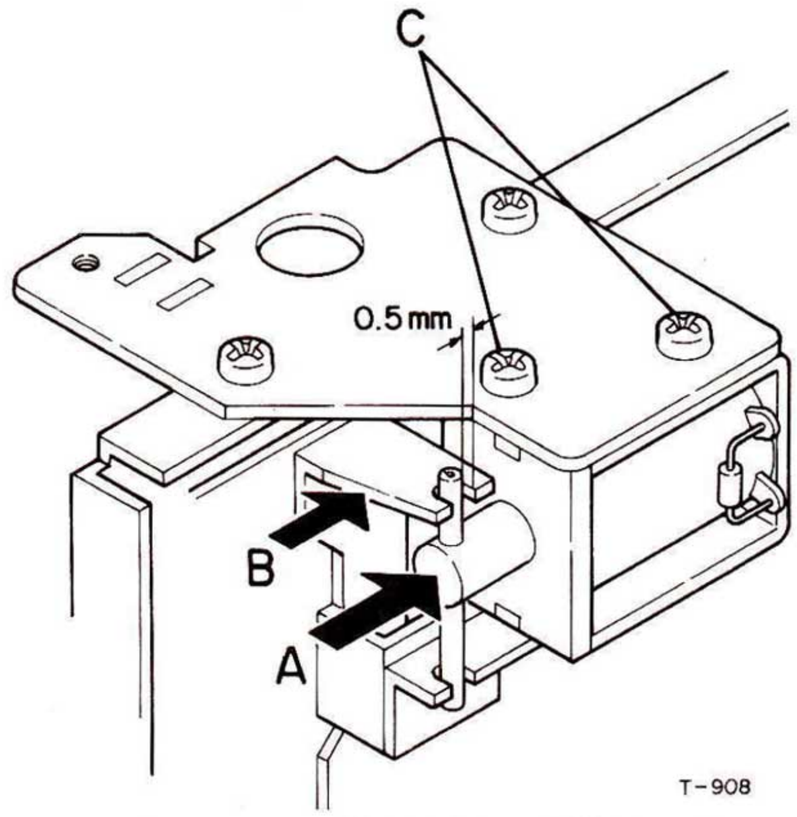


Fig. 5-3 Solenoid Position Adjustment

5-7 Tape Speed Adjustment

Specified Value: 2,970 to 3,030 Hz

1. Load and play the MTT-111 cassette test tape.
2. Connect a frequency counter to the OUTPUT terminals and adjust, if necessary, the speed adjustment screw located at the center of the capstan motor for the specified value.

NOTE: Allow the deck a few minutes of warm up time before making this check and adjustment.

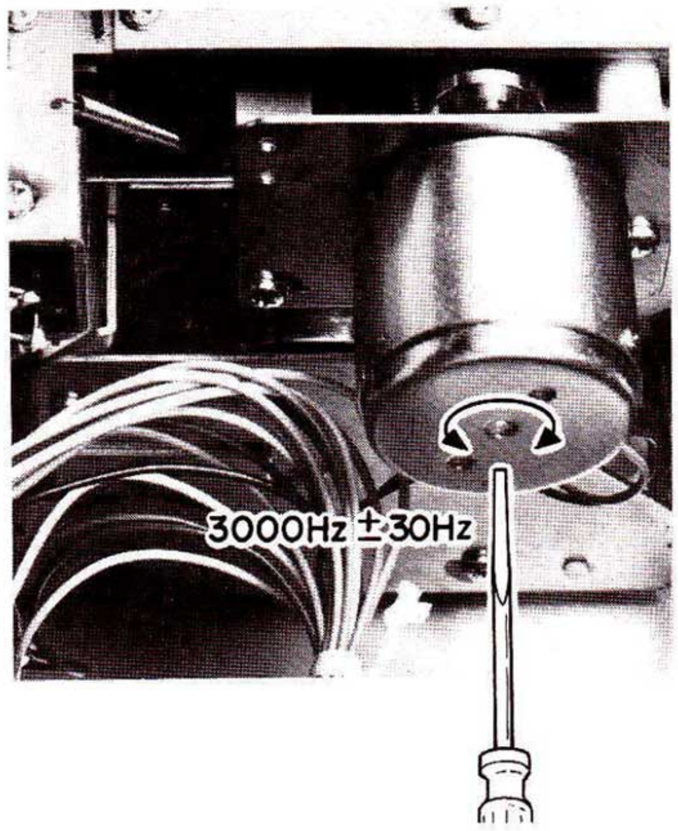


Fig. 5-4 Tape Speed Adjustment

5-8 Wow and Flutter Measurement

Playback Method

1. Play the MTT-111 test tape.
2. Read the indication on the wow and flutter meter.
3. The wow and flutter value should be 0.10% WRMS, max.
4. If the wow and flutter is out of specification, check the Pinch Roller pressure and the take-up torque, see that the tape path is clean, and that the Capstan Belt is not stretched or oily.
5. If the above checks are ineffective for excessive wow and flutter correction, repair or replace the Pinch Roller, the Capstan Belt and/or any other defective parts.

Record/Playback Method

NOTE: When using this method, adopt the maximum wow and flutter value obtained by repeated play and stop modes of operation. This operation is necessary to make sure wow and flutter content between record and playback will not be in phase to create a false reading.

1. Connect test equipment to the deck as shown in Fig. 5-5.

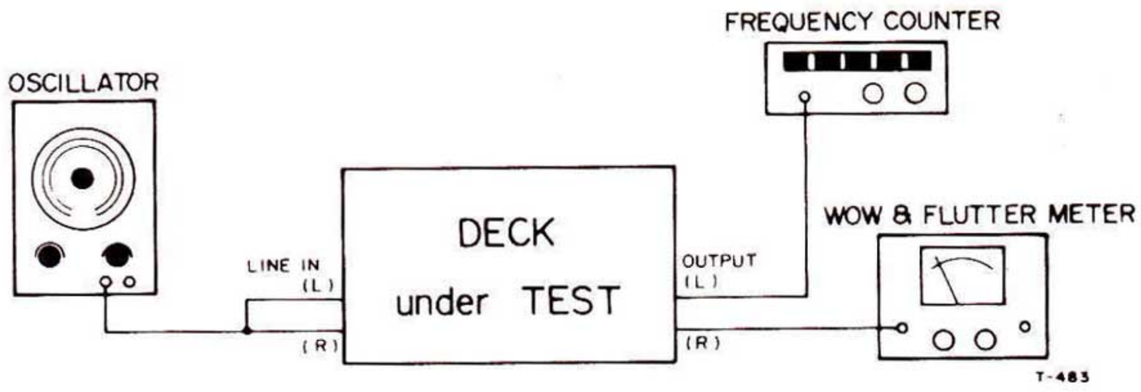


Fig. 5-5 Tape Speed/Wow & Flutter Measurement Setup

2. Set LINE and OUTPUT controls on the deck to obtain convenient input and output levels.
3. Load a TEAC MTT-502 test tape (blank) and set the BIAS/EQ switches in the NORMAL positions.
4. Apply and record a 3,000 Hz signal.
5. Rewind and play this recorded section.
6. Read the indication on the wow and flutter meter.
7. The wow and flutter value should be 0.20% RMS max.
8. If the measured value is out of specification, repair using the same methods as stated in steps 4 – 5 in the Playback Method procedure.

5-9 Record/Play Head Azimuth Alignment

1. Connect an oscilloscope and VTVM to the OUTPUT jacks. Connect the left channel output to the vertical 'scope input and the right channel output to the horizontal 'scope input. See Fig. 5-6.
2. Load and play the 10 kHz/−10 dB section of the MTT-116U test tape.
3. Adjust the azimuth adjusting nut for the greatest output level and to get the two output channels within 45° of each other. See Fig. 5-7 and Fig. 5-8.
4. After adjustment is made, apply a drop of locking paint to the adjustment nut.

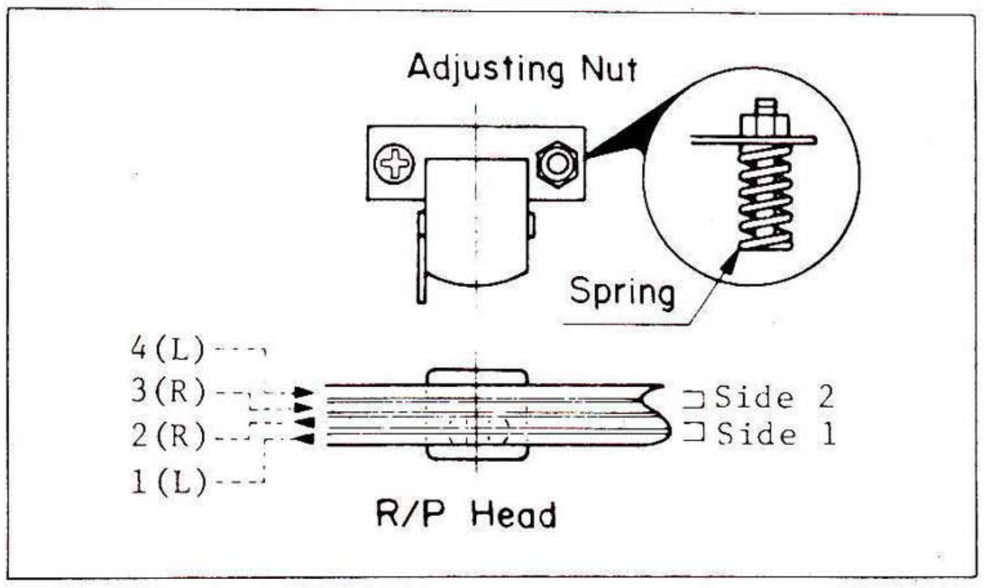


Fig. 5-7 Head Azimuth Adjustment Location

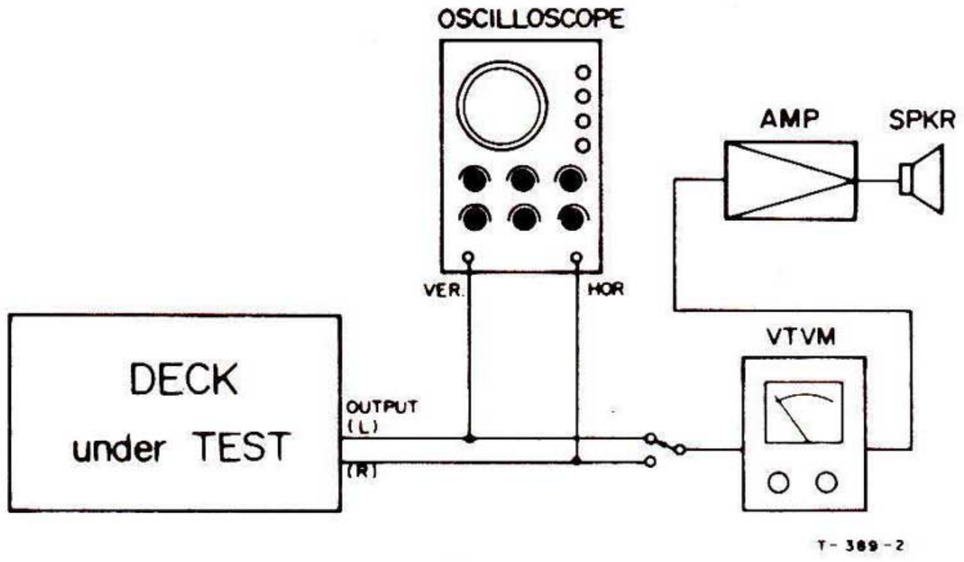


Fig. 5-6 Head Alignment Setup

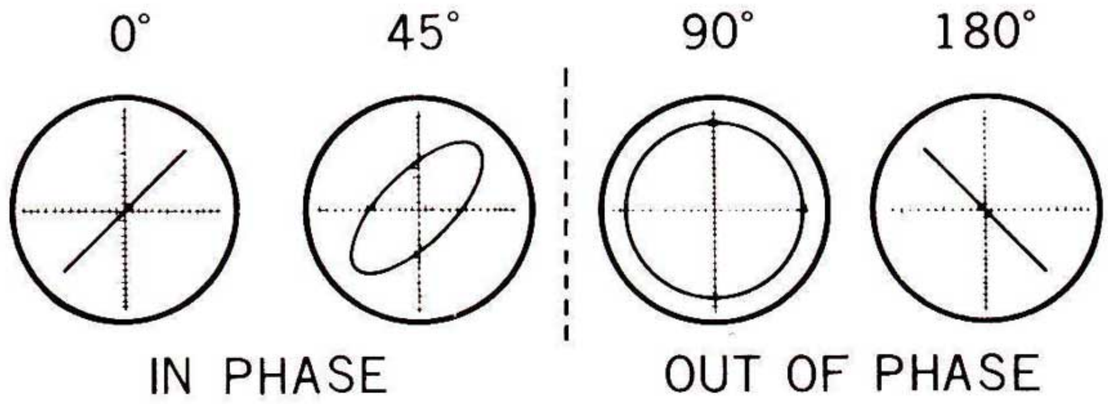


Fig. 5-8 Confirming Phase Relationship

Voltage Conversion Procedure

Your deck has been adjusted at the TEAC factory to be used with the power line voltage shown on the Inspection Card attached to the deck. If the power line voltage in your area does not match the deck, the deck may be converted using the following simple procedure.

1. Disconnect the power cord of the deck from the source.
2. Turn the deck around and locate the voltage selector on the rear of the deck.
3. To increase the selected voltage, turn the slotted center post clockwise using a screwdriver or other suitable tool.
4. To decrease the selected voltage, turn the slotted center post counter-clockwise.
5. The numerals that appear in the cut-out window of the voltage selector indicate the selected voltage.
6. If the desired voltage numerals do not appear in the cut-out window as you turn the slotted center post, your deck must be taken to an authorized TEAC Service Facility for voltage conversion.

NOTE: For cassette deck models with DC Capstan and Reel Motors, no modification is required for change of power line frequency from 60 Hz to 50 Hz and vice versa. Decks sold in some areas do not have voltage conversion capability.

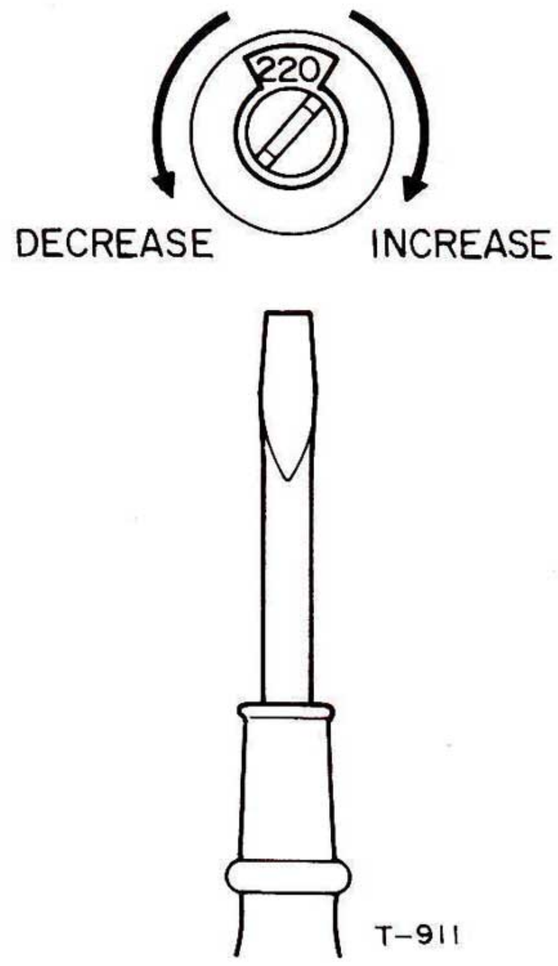
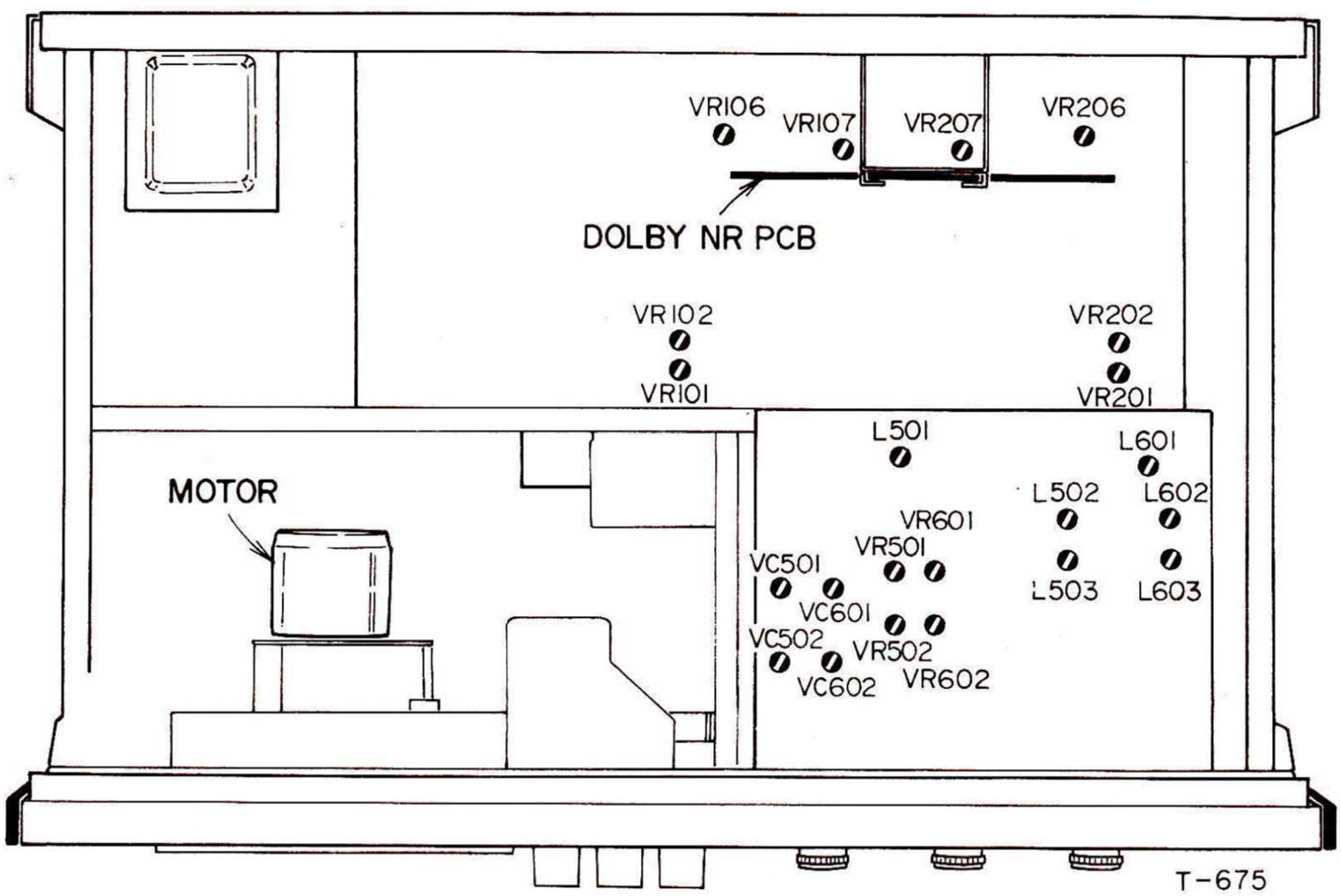


Fig. 5-9 Voltage Conversion

6. ELECTRICAL CHECKS AND ADJUSTMENTS

GENERAL NOTES

1. Before performing adjustments on the amplifier section of this deck, thoroughly clean and demagnetize the entire tape path, particularly erase head, record/playback head, capstan shaft and pinch roller.
2. Make sure the deck is set for the proper voltage for your locality.
3. In general, checks and adjustments for other than specified items, are done in the sequence of left channel then right channel. Double designated REF. NO. indicates left channel/right channel (example: VR 101/201).
4. Value of "dB" in the text refers to 0 dB = 0.775 V, except where specified. If a VTVM calibrated to 0 dB = 1 V is to be used, appropriate compensation should be made.
5. The VTVM used in the procedures, including the measurement at CAL test points, must have load impedance of 1MΩ or more.
6. To correctly complete these performance checks, keep the order as explained in this chapter.



ADJUSTMENT LOCATIONS

VR101/201	Playback EQ
VR102/202	Playback level
VR106/206	VU meter calibration
VR107/207	Peak level indicator adjustment
VR501/601	Record level (CrO_2)
VR502/602	Record level (NORMAL)

L501/601	Bias trap
L502/602	Record EQ (CrO_2)
L503/603	Record EQ (NORMAL)
VC501/601	Bias adjustment (CrO_2)
VC502/602	Bias adjustment (NORMAL)
VR701/801	LAW adjustment (on DOLBY NR Circuit Board)
VR702/802	GAIN adjustment (on DOLBY NR Circuit Board)

6-1 Playback Level Setting

1. Load and play the MTT-150 test tape.
2. Connect the VTVM (with 1 meg ohm or more input impedance) to input terminal B-4 on DOLBY NR circuit board and adjust VR102 for 580 mV ± 35 mV. This is the left channel adjustment.
3. Repeat above using test point C-2 and VR202.

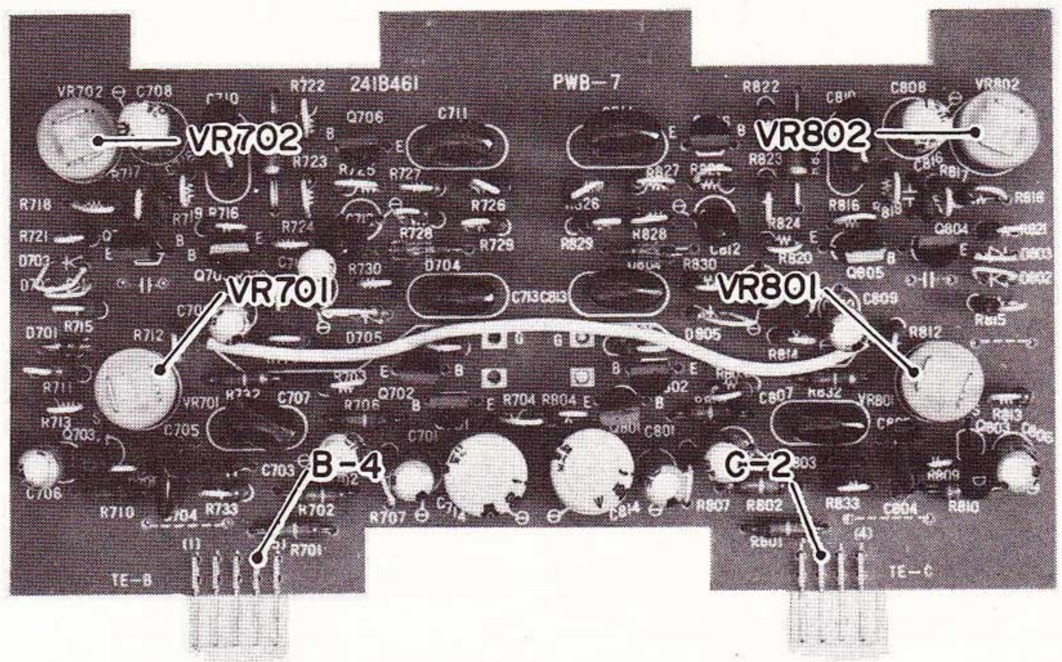


Fig. 6-1 DOLBY NR Circuit Board

6-2 Specified Output Level Setting

Specified Level: –5 dB (435 mV)

1. Connect the VTVM to the OUTPUT jacks.
2. Play the MTT-150 test tape.
3. Set the OUTPUT level controls for –5 dB (435 mV) output level on both channels.
   The position of the OUTPUT controls will now be set to the specified output level setting. Do not change the setting of these controls for the remainder of this procedure unless otherwise indicated.

6-3 VU Meter Indication Adjustment

1. With the specified setting above, play the MTT-150 test tape and confirm that the VU meters read +3 VU ±1 VU. If they do not, adjust VR106/VR206 for the correct indication.

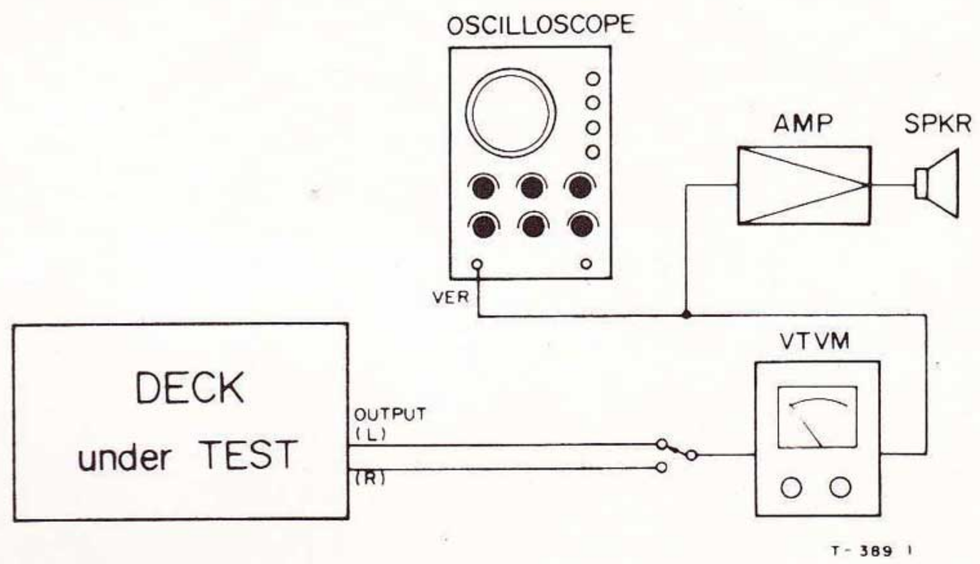


Fig. 6-2 Test Connections for Playback Check

6-4 Playback Frequency Response Adjustment

1. Set the EQ switch to CrO_2.
2. Load and play the MTT-116K test tape.
3. Play the 315 Hz section of the test tape to get a reference level on the VTVM. Then play the 10 kHz section and set VR101/VR201 for output level that is within ±2 dB of the reference level.
4. Play all of the tape signal frequencies and insure that all frequencies are within ±2 dB of the 315 Hz reference level. If they are not, short C135 and C235 to ground and then readjust VR101/VR201 for best frequency response. See Fig. 6-3.

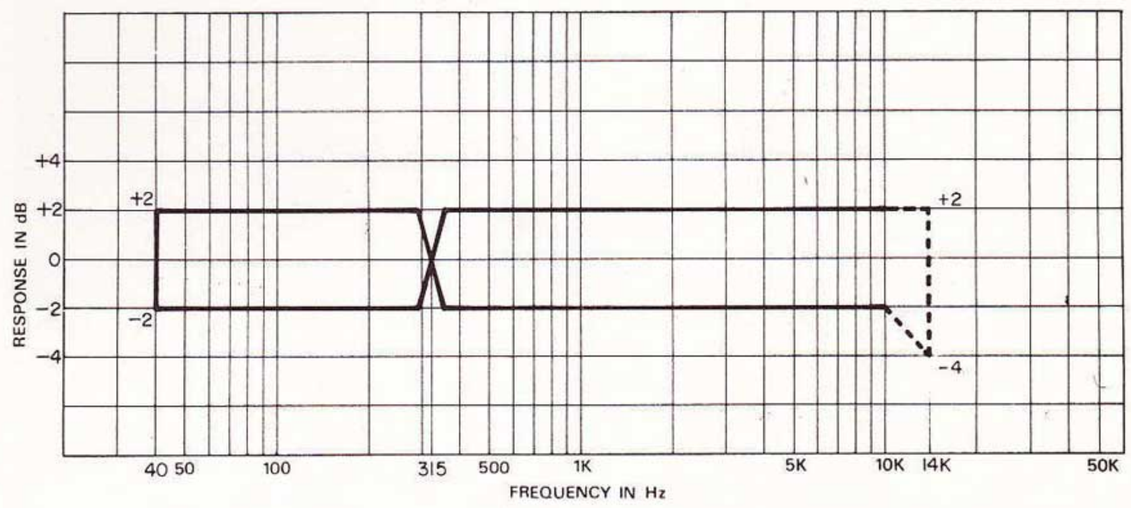


Fig. 6-3 Playback Frequency Response Limits

6-5 Maximum Output Level Check

Specified Value: +1 dB ± 1.5 dB (1.03 mV ~ 730 mV)

1. Load and play the MTT-150 test tape.
2. First note the position of the OUTPUT level controls (for subsequent resetting), then turn both controls fully clockwise.
3. Confirm that the OUTPUT level is 1 dB ± 1.5 dB.
4. After this check, reset the OUTPUT level controls to the specified setting as noted in step 2.

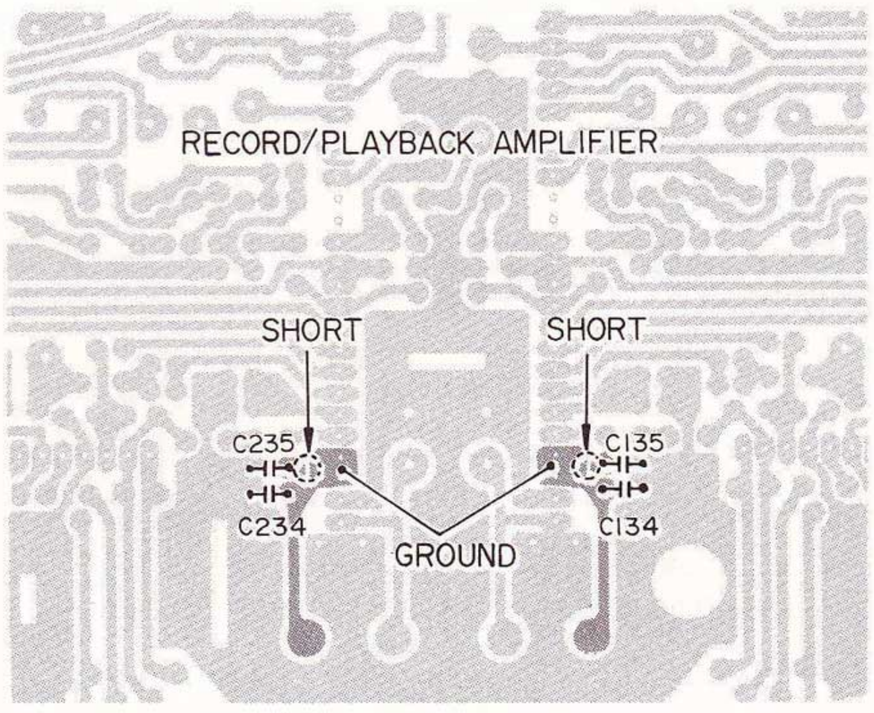


Fig. 6-4 Short Terminals for Frequency Response Adj.

6-6 Playback Signal to Noise Ratio

Specified Value: 47 dB (minimum)

1. Set the deck to Pause mode.
2. Read the output level on the VTVM.
3. Compare this reading to the standard output level of −5 dB. The difference shall be 47 dB or more.

6-7 Headphone OUTPUT Level Check

Specified Value: −16 dB ± 3 dB (86 mV ~ 173 mV)

1. Play the MTT-150 test tape.
2. Load the headphones output terminals with an 8 ohm load resistor and measure the output level.
3. Level shall be −16 dB ±3 dB.

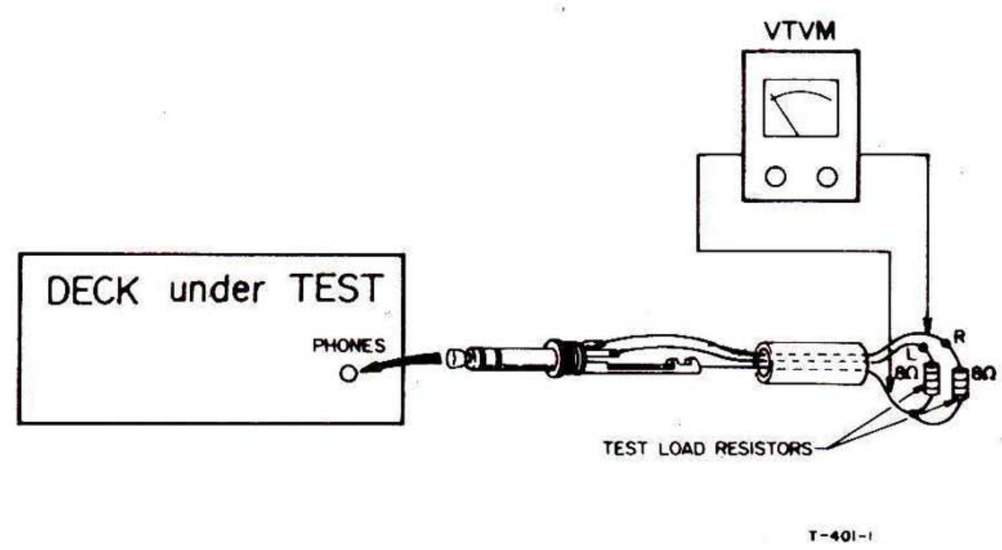


Fig. 6-5 Headphone OUTPUT Level Check

MONITOR SECTION

6-8 Minimum Input Level Check

Minimum Values:

Input Terminal	Minimum Input Level
LINE IN:	−22.5 dB ±3 dB (41 ~ 82 mV)
MIC:	−70 dB ±3 dB (173 ~ 345 μV)
DIN:	−28 dB ±3 dB (22 ~ 44 mV)

Difference between left and right channels shall be within 2 dB.

1. Set the LINE input level controls to Maximum (fully clockwise) position. Set deck in REC PAUSE mode.
2. Connect the oscillator, set to 400 Hz output frequency to the LINE IN jacks.
3. Set the output level of the oscillator (input to the deck) so that the level measured on the VTVM connected to the OUTPUT jacks is −5 dB (435 mV).
4. Measure the level supplied to the LINE IN jacks. This level shall be −22.5 dB ±3 dB (41 ~ 82 mV). Also the level difference between channels shall be less than 2 dB.
5. Repeat this test applying the 400 Hz input signal to the MIC and DIN inputs. Check for the levels given in the chart above.

NOTE: Check the LINE and MIC inputs separately. Set the MIC or LINE control to minimum when they are not being used.

Preparations:

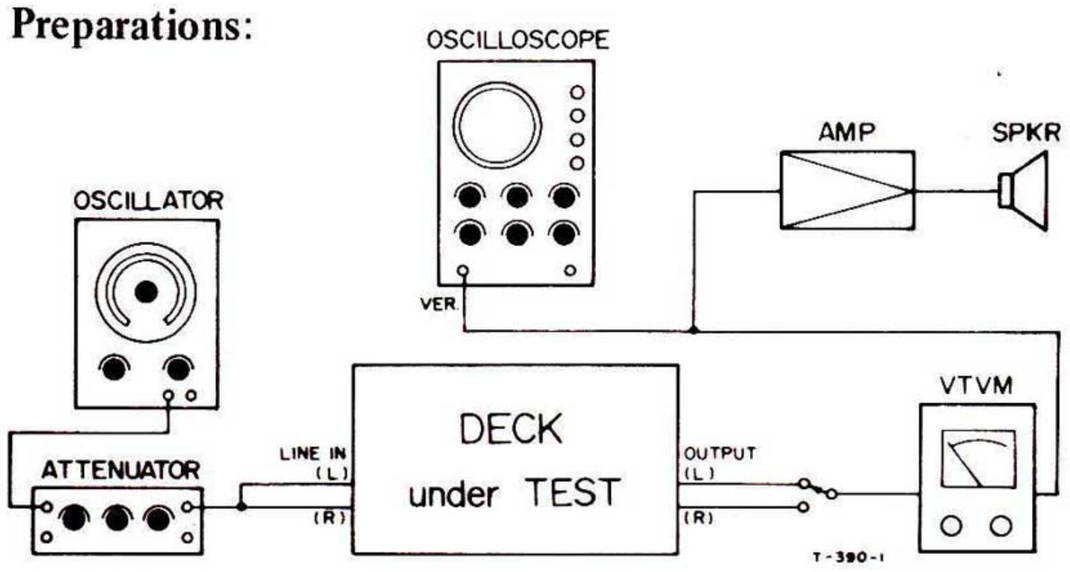


Fig. 6-6 Test Connections for Monitor

6-9 Specified Input Level Setting

Specified Value: −8 dB (308 mV)

1. Connect the 400 Hz/−8 dB level signal to the LINE IN jacks. Set deck in REC/PAUSE mode.
2. Adjust the LINE level controls for −5 dB (435 mV) level at the OUTPUT jacks. This the specified LINE input level setting.

6-10 Peak Level Indicator Setting

1. With the LINE input level controls set to the specified setting, when the input signal is raised to –5 dB (435 mV) the Peak Level Indicator should light. When the signal is decreased to –7 dB (345 mV) the Peak Level Indicator should go out.
2. Adjust VR107/VR207 for these limits.

NOTE: Left and right channels should be checked independently. Connect the input signal to one channel at a time.

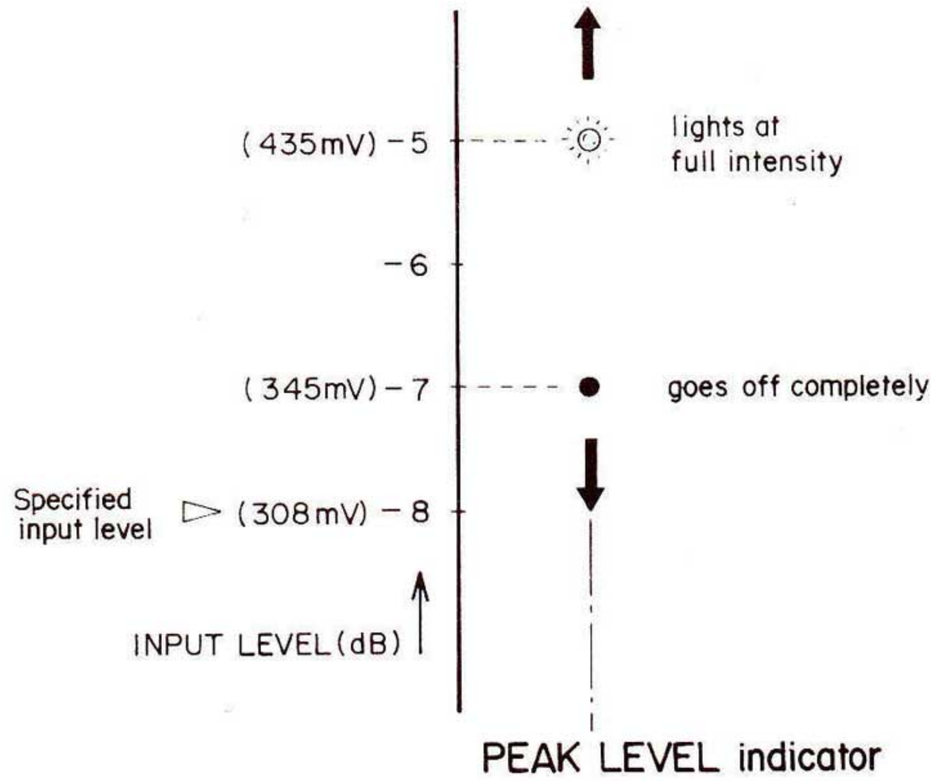


Fig. 6-7 LED Peak Level Indicator Setting

RECORD SECTION

6-11 Bias Trap Adjustment

1. Set the deck in the REC/PAUSE mode with no input signal.
2. Connect the VTVM from the collector T.P. of Q501/Q601 to ground.
3. Adjust L501/L601 for the minimum value reading on the VTVM.

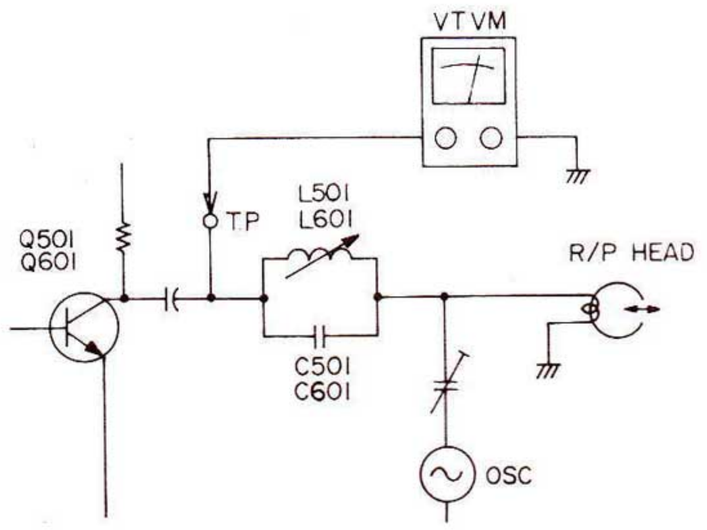


Fig. 6-8 Bias Trap Adjustment Setup

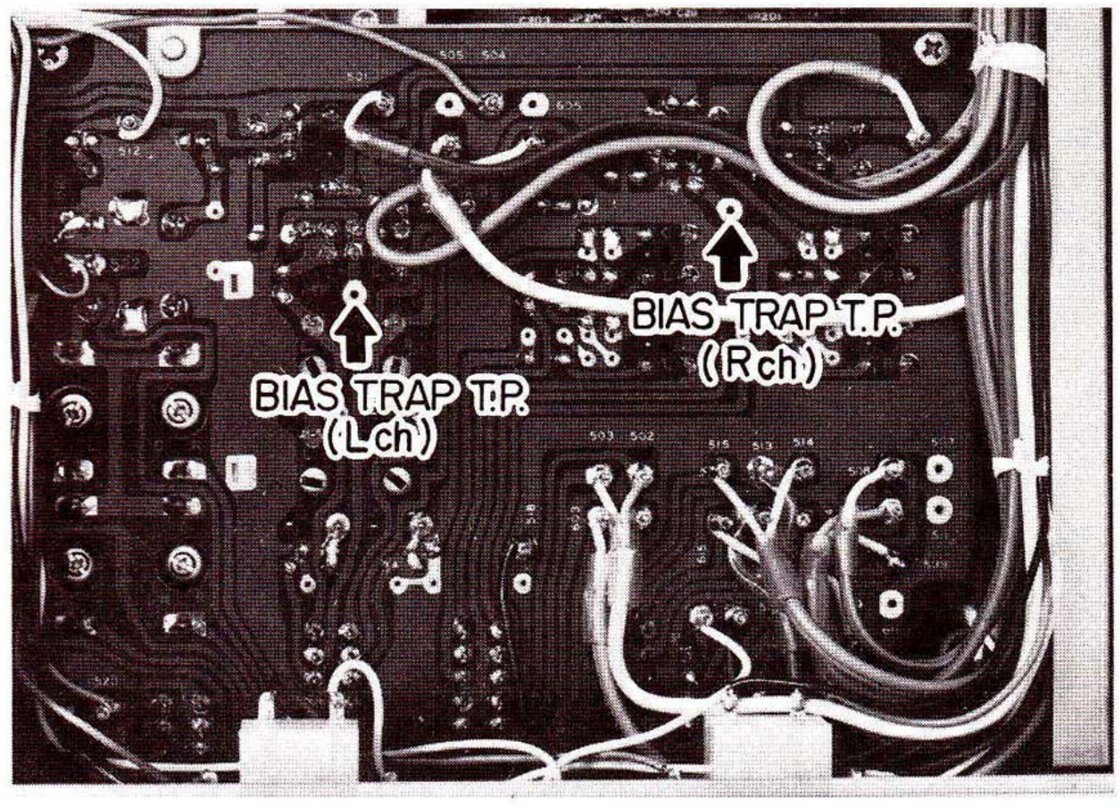


Fig. 6-9 Bias Trap Test Points

6-12 Bias Adjustment

NORMAL position

1. Set BIAS/EQ switches to NORMAL position.
2. Connect a 400 Hz/–38 dB (9.75 mV) signal and a 6.3 kHz/–38 dB (9.75 mV) signal, in turn, to the LINE IN jacks and record these on an MTT-501 test tape.
3. Rewind and play the tape.
4. During playback, check that the OUTPUT level of the 6.3 kHz signal is +2 dB above the 400 Hz signal.
5. If it is not, adjust VC502/602 slightly, re-record, rewind and play these two signals until the 6.3 kHz signal level is +2 dB above the 400 Hz signal.

CrO_2 position

6. Set the BIAS/EQ switches to CrO_2 position.
7. Load an MTT-505TB test tape and repeat the above steps 2 to 5 except adjust VC501/601 until the 400 Hz and 6.3 kHz signal produce the same output level.

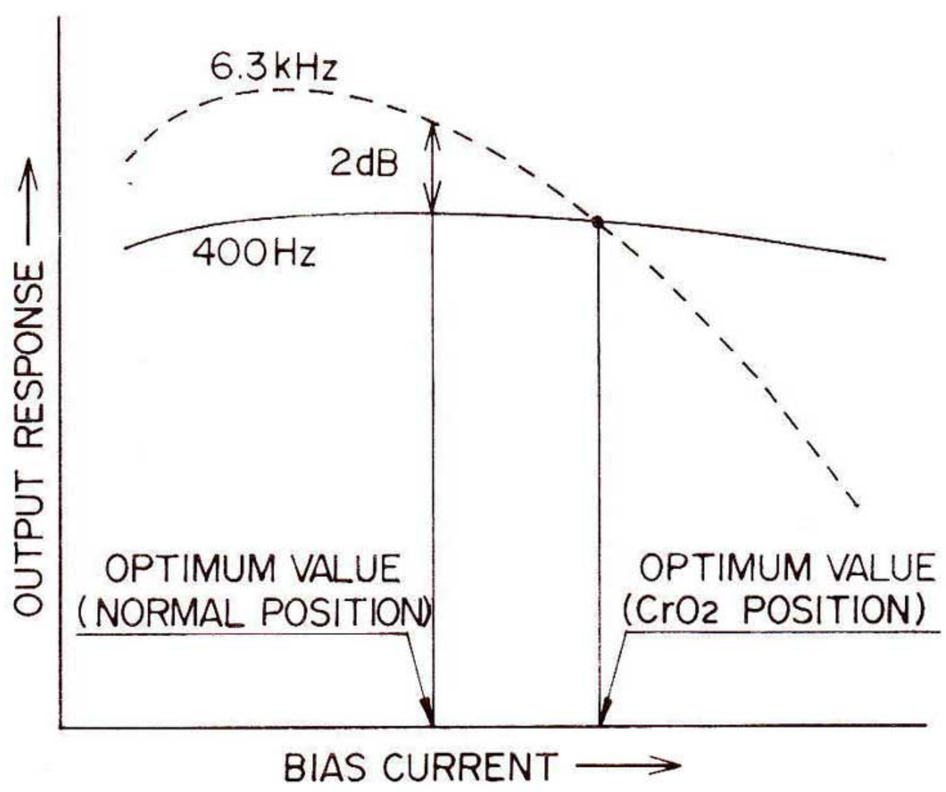


Fig. 6-10 Bias Adjustment

6-13 Record Level Setting

NORMAL position

1. Set BIAS/EQ switches to NORMAL.
2. Apply a 400 Hz/−8 dB (308 mV) signal to the LINE IN jacks and record this signal on an MTT-501 test tape.
3. During playback of this recording adjust VR502/602 for −5 dB (435 mV) OUTPUT level.

CrO_2 position

4. Set BIAS/EQ switches to CrO_2 position and load an MTT-505TB test tape.
5. Record the 400 Hz/−8 dB (308 mV) signal.
6. During playback of this recording adjust VR501/601 for −5 dB (435 mV) OUTPUT level.

6-14 Frequency Response Check and Adjustment

1. Set BIAS and EQ switches to NORMAL position.
2. Set the input level to the LINE IN terminals to −38 dB (9.75 mV).
3. Load and record the MTT-501 test tape.
4. Sweep the frequency of the Input oscillator slowly from 31.5 Hz to 12.5 kHz.
5. After recording, rewind the tape and play it back.
6. Check that the output levels for each frequency are within the level limits shown in Fig. 6-12.
7. If they are not, adjust L503/L603 slightly and then re-record all of the required frequencies again. Rewind and play the tape and again compare the output level against Fig. 6-12.
8. Repeat step 7 until the output signal complies with the limits given in Fig. 6-12.

CrO_2 position of BIAS and EQ switches

9. Set the BIAS and EQ switches to CrO_2 position.
10. Load and record the MTT-505TB test tape.
11. Sweep the oscillator from 31.5 Hz to 14 kHz.
12. Rewind and play the tape.
13. Check that the output levels comply with the limits given in Fig. 6-13.
14. If they do not comply, especially in the high frequency region, adjust L502/L602.
15. Again record and play the desired frequencies and compare the output levels to Fig. 6-13.

Preparations:

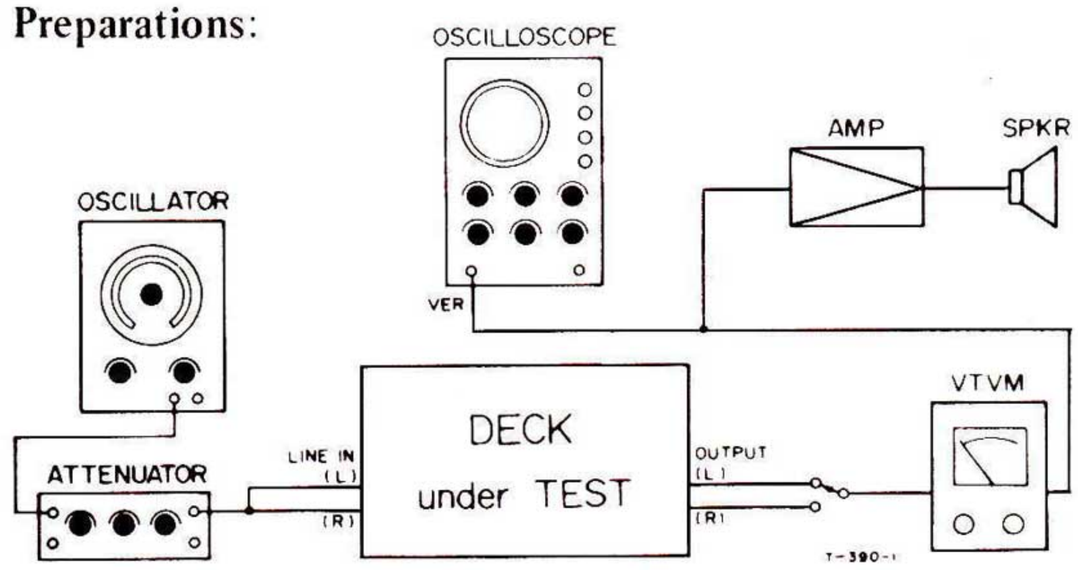


Fig. 6-11 Test Connections for Recording Check

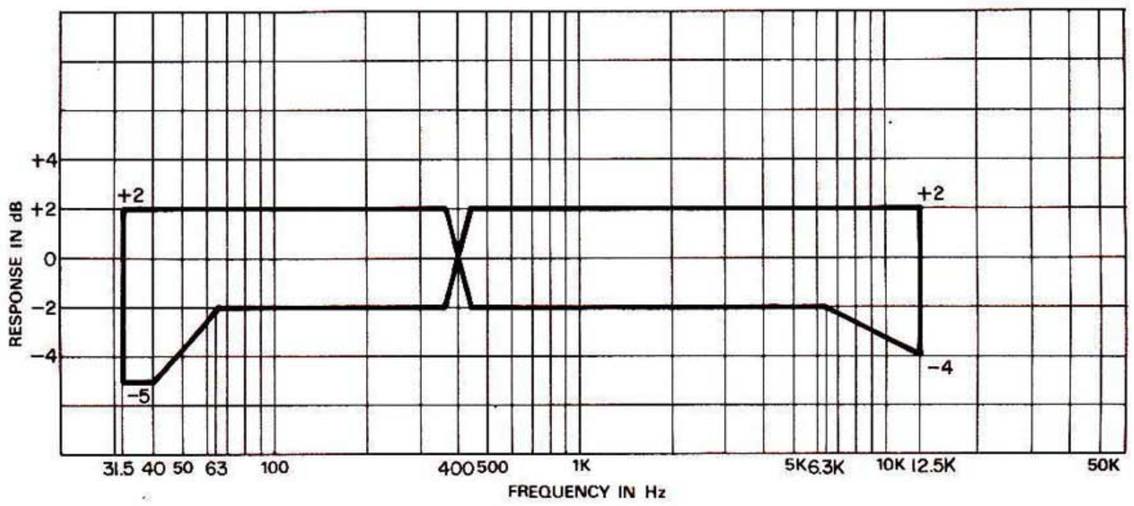


Fig. 6-12 Overall Frequency Response Limits for BIAS/EQ NORMAL

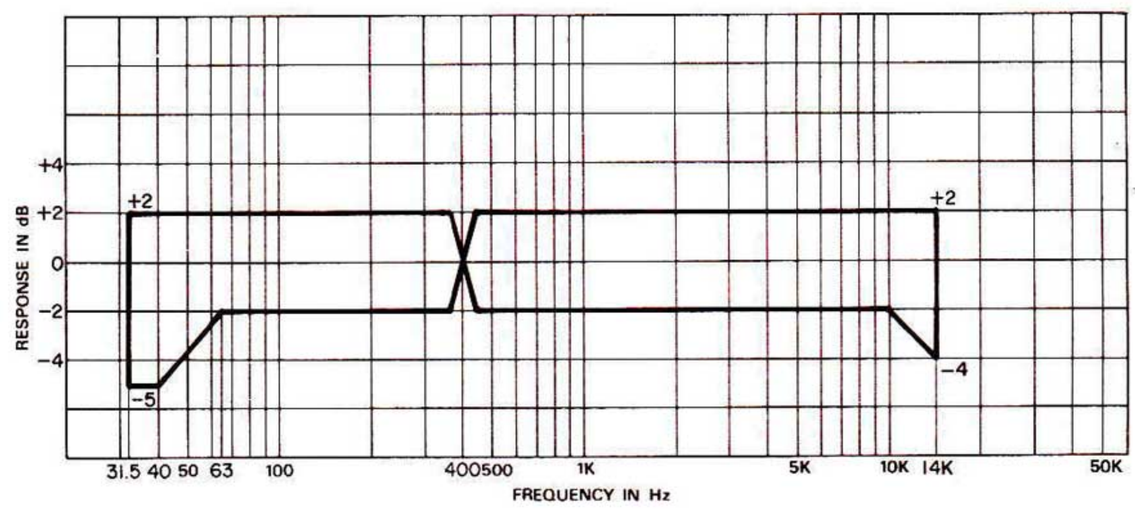


Fig. 6-13 Overall Frequency Response Limits for BIAS/EQ CrO_2

6-15 Distortion Measurement

Specified Values:

BIAS/EQ NORMAL (MTT-501): 2.5% or less
BIAS/EQ CrO_2 (MTT-505TB): 3.0% or less

1. Connect a distortion meter to the OUTPUT jacks.
2. Apply a 400 Hz/–11 dB (218 mV) signal to the LINE IN jacks.
3. Set the BIAS and EQ switches to match the tape being used.
4. Record the tape, rewind and then play the recorded signal.
5. Read the distortion ratio on the distortion meter.

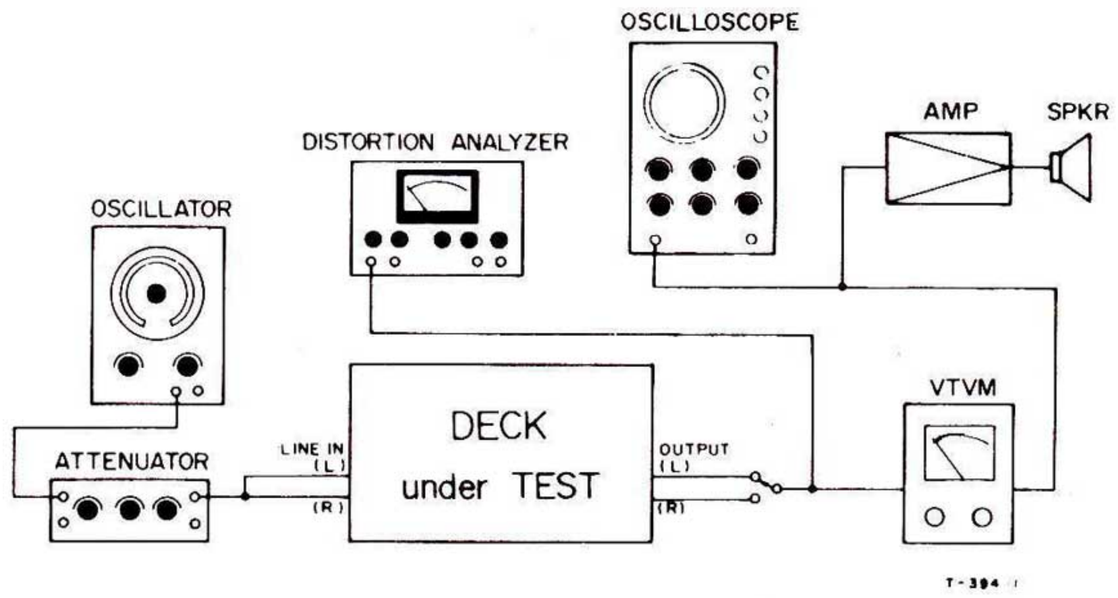


Fig. 6-14 Test Connections for Distortion Measurement

6-16 Overall Signal to Noise Ratio Measurement

Specified Values:

BIAS/EQ NORMAL (MTT-501): 45 dB or greater
BIAS/EQ CrO_2 (MTT-505TB): 47 dB or greater

1. Set the MPX FILTER switch to IN.
2. Record the test tape with no input signal.
3. Rewind and play the tape over the "no-signal" recorded section.
4. Compare the output reading to the specified output level (–5 dB).

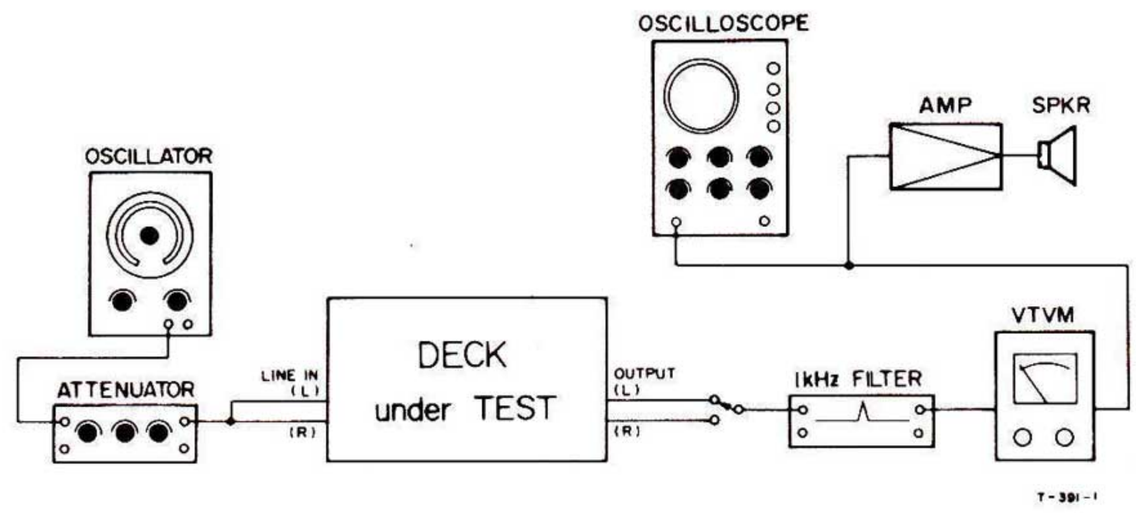


Fig. 6-15 Test Connections for Erase Efficiency Measurement

6-17 Erase Efficiency Measurement

Specified Value: 65 dB or more

1. Set BIAS and EQ switches to CrO_2 position.
2. Connect a 1 kHz/+2 dB (690 mV) signal to the LINE IN jacks.
3. Record this signal on the MTT-505TB test tape. Then rewind and play the tape through a band-pass filter to the VTVM.
4. Measure the output of the band pass filter for a reference level.
5. Rewind the tape to about the center of the recorded 1 kHz signal portion.
6. Record over this section with no input signal (erase).
7. Rewind the tape to the beginning of the 1 kHz recording and then play the tape.
8. Measure the 1 kHz recorded portion for a reference level. Then measure the erased portion. Compare the two levels to obtain the erase efficiency measurement.

NOTE: Set the reference frequency of the oscillator to match the exact frequency of the band pass filter which may be slightly different than 1 kHz.

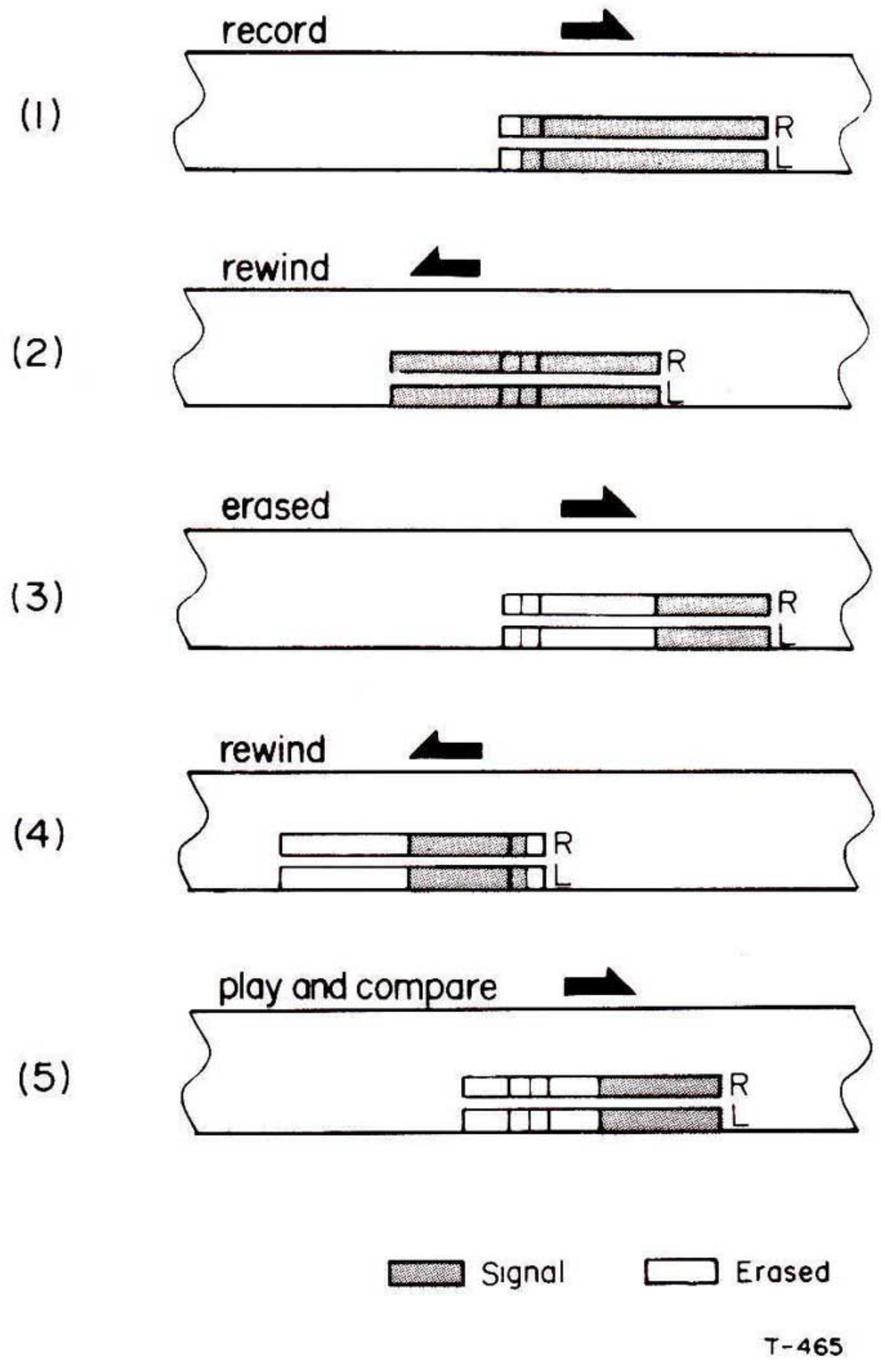


Fig. 6-16 Erase Efficiency Measurement Procedure

6-18 Channel Separation Measurement

Specified Value: 30 dB or more

1. Connect a 1 kHz/–8 dB (308 mV) signal to the left channel LINE IN jack and record this signal on a completely erased (bulk erased) tape.
2. Rewind the tape and play it back through a 1 kHz band-pass filter.
3. Compare the output reading for the left channel to the reading for the right channel. (Right channel output will be feed-through from the left channel).

NOTE: Set the reference frequency of the oscillator to match the exact frequency of the band-pass filter which may be slightly different than 1 kHz.

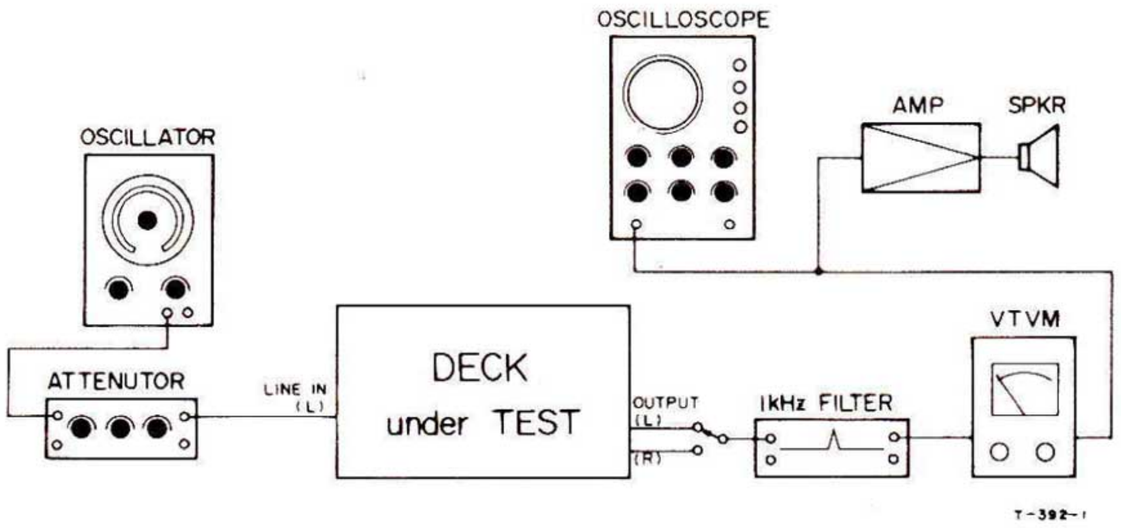


Fig. 6-17 Test Connections for Channel Separation Measurement

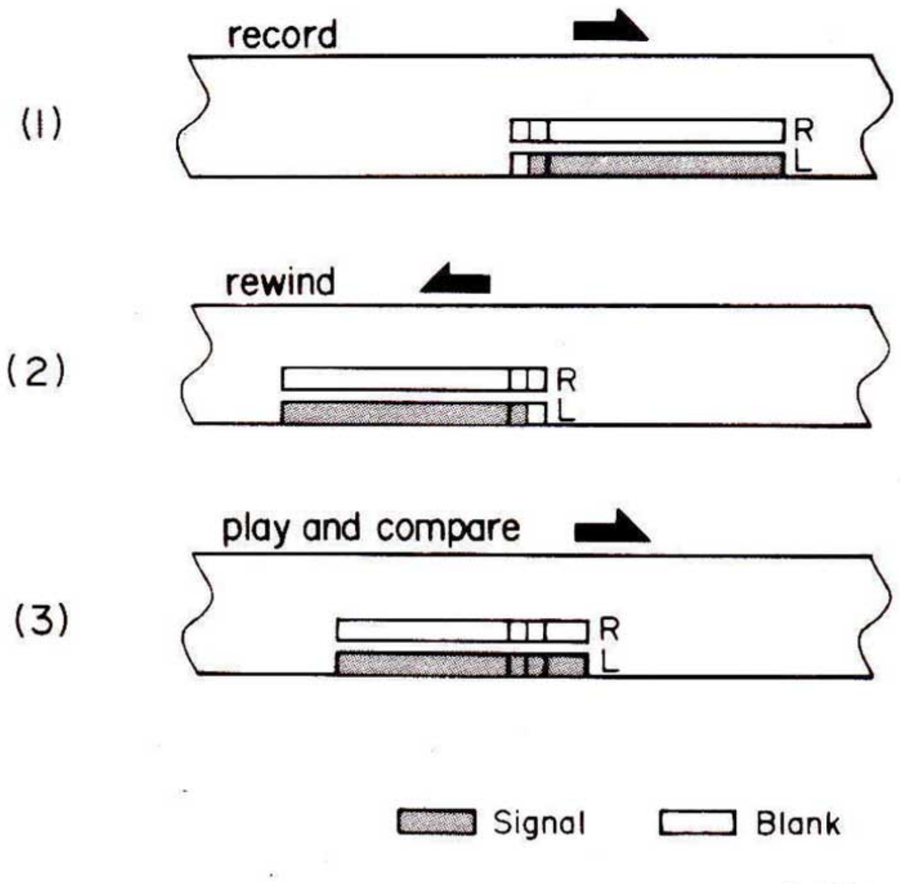


Fig. 6-18 Channel Separation Measurement Procedure

6-19 Adjacent Track Crosstalk Ratio Measurement

Specified Value: 40 dB or more

1. Connect a 125 Hz/–8 dB (308 mV) signal to the right LINE IN jack and record this signal.
2. Rewind the tape and play this signal.
3. Measure the OUTPUT from the right channel as a reference level.
4. Stop the deck, remove the test tape, turn it over and load it in the deck.
5. Play the tape and again measure the right channel output. (This will be the crosstalk signal).
6. Compare the reading of step 3 and step 5 to obtain the Crosstalk Ratio Measurement.

Connection:

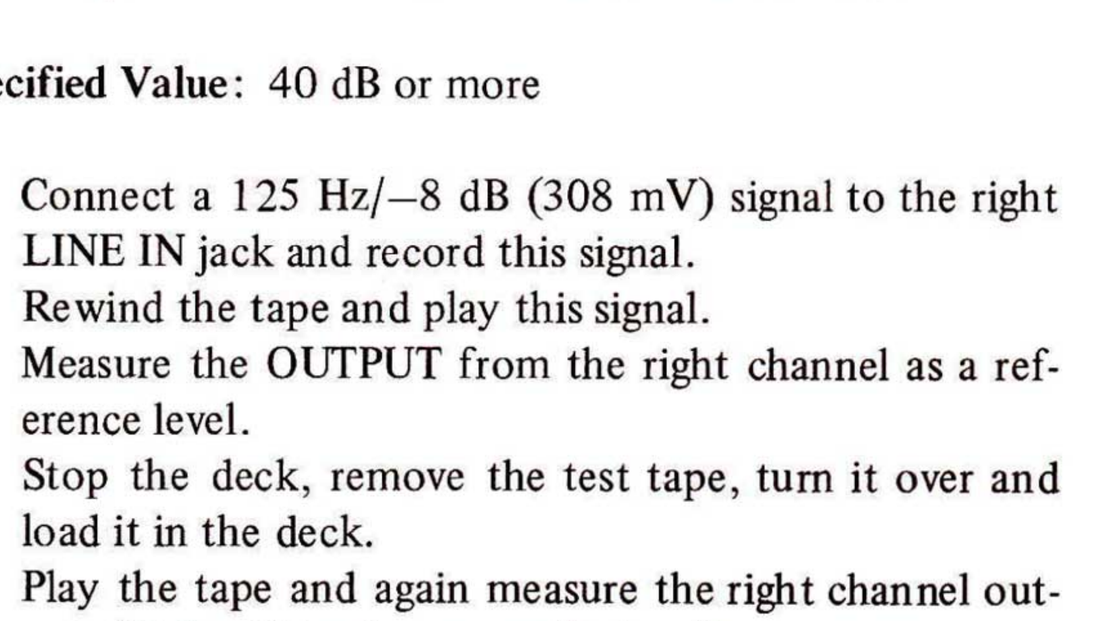


Fig. 6-19 Test Connections for Adjacent Track Crosstalk Ratio Measurement

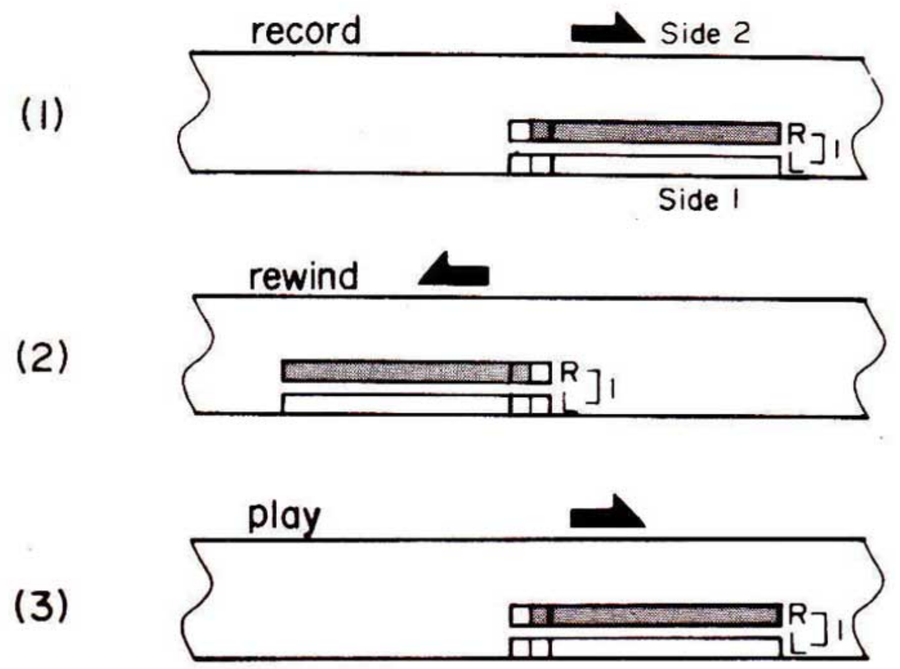


Fig. 6-20 Adjacent Track Crosstalk Measurement Procedure

6-20 Dolby NR Effect Measurement

1. Connect a 1 kHz/–28 dB (30.8 mV) signal to the LINE IN jacks.
2. Set the Dolby NR switch to OUT and record this signal.
3. Rewind the tape and play the recorded section.
4. While playing the tape set the DOLBY NR switch to IN and OUT positions and measure the output level in each position.
5. The change between switch positions shall be 4 dB to 7 dB.
6. Set the input frequency to 10 kHz/–38 dB (9.75 mV).
7. Set the DOLBY NR switch to OUT and record this signal.
8. Rewind the tape and play it back.
9. While playing the tape set the DOLBY NR switch to IN and OUT position and measure the output level in each position.
10. The change between switch positions shall be 8 dB to 10 dB.

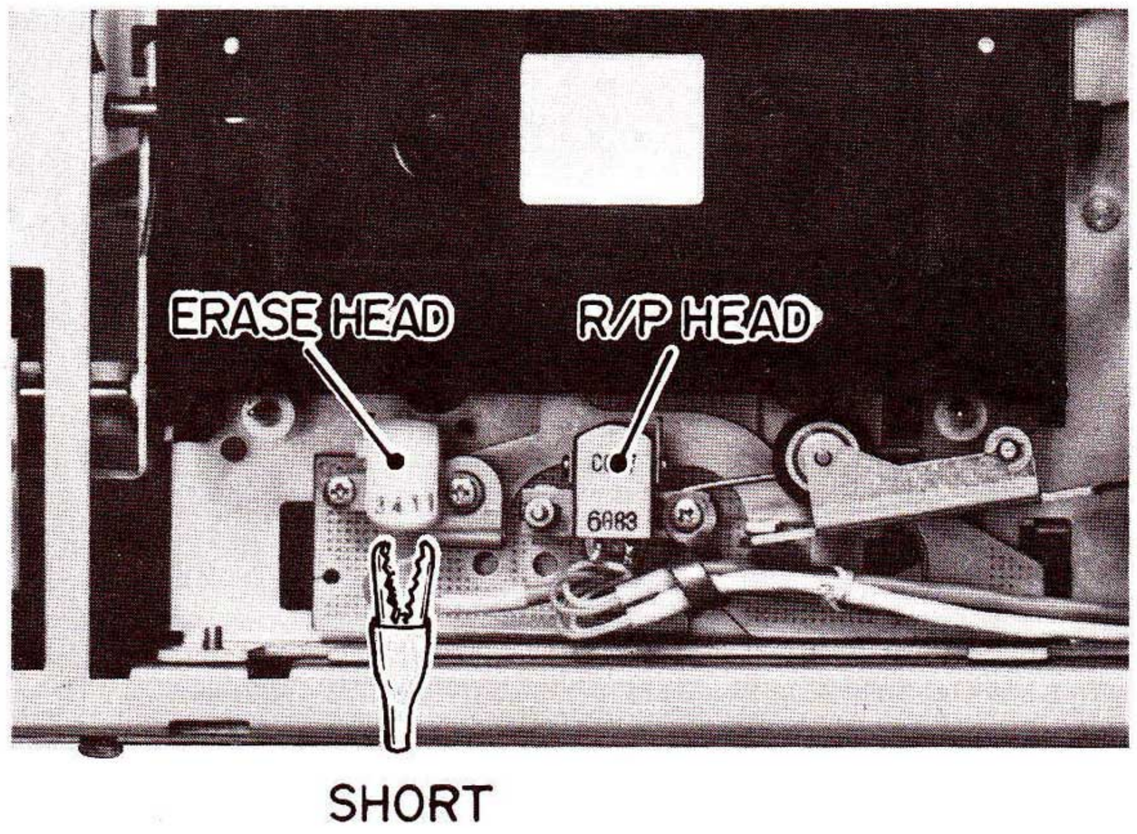


Fig. 6-21 Erase Head Terminals

6-21 Dolby NR Circuit Adjustment

NOTE: Adjustment of the Dolby NR circuit is necessary only when the Dolby Effect measurements do not meet the specification.

Gain Adjustment

1. Set DOLBY NR switch to OUT, turn OFF Bias Oscillator, and set deck in Record/Pause mode. (See note below.)
2. Adjust VR701/VR802 for maximum source voltage to Q703/Q803.
3. Connect a jumper between terminal G on the Dolby NR circuit board and grounding (earth) point.
4. Connect a 5 kHz signal to LINE IN jacks. Connect a VTVM to terminal B-4/C-2 of the Dolby NR circuit. Reduce the input signal level until voltage at this point reads 17.5 mV.
5. Connect the VTVM to B-3/C-3. Indicated value shall be 0 dB (standard).
6. Set the DOLBY NR switch to IN. VTVM indication at B-3/C-3 shall be +10 dB ±0.25 dB above the standard indication. Adjust VR702/VR802, if necessary, to get this reading.

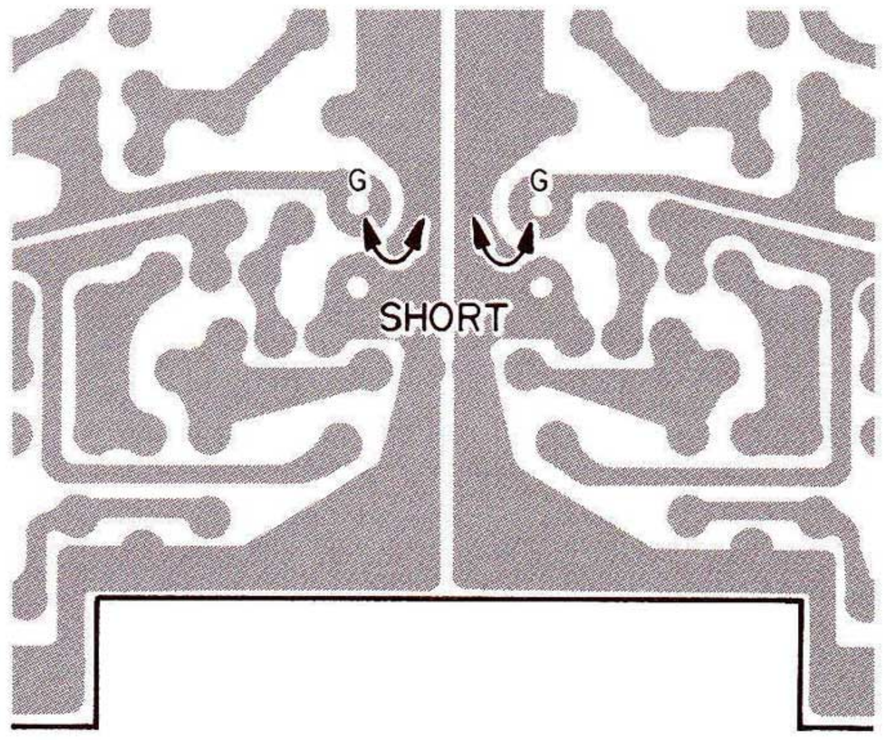


Fig. 6-22 Short Terminals for DOLBY NR Circuit Adjustment

Law Adjustment

1. Remove the jumper between terminal G of the Dolby NR circuit and ground.
2. Adjust VR701/VR801 for a value of 2 dB ±0.25 dB lower than the indication set for GAIN adjustment (+10 dB above standard value) at B-3/C-3 test point.
3. Restart the Bias Oscillator. (Remove short across Erase head terminals.)

NOTE: To disable the Bias Oscillator short across the ERASE head terminals.

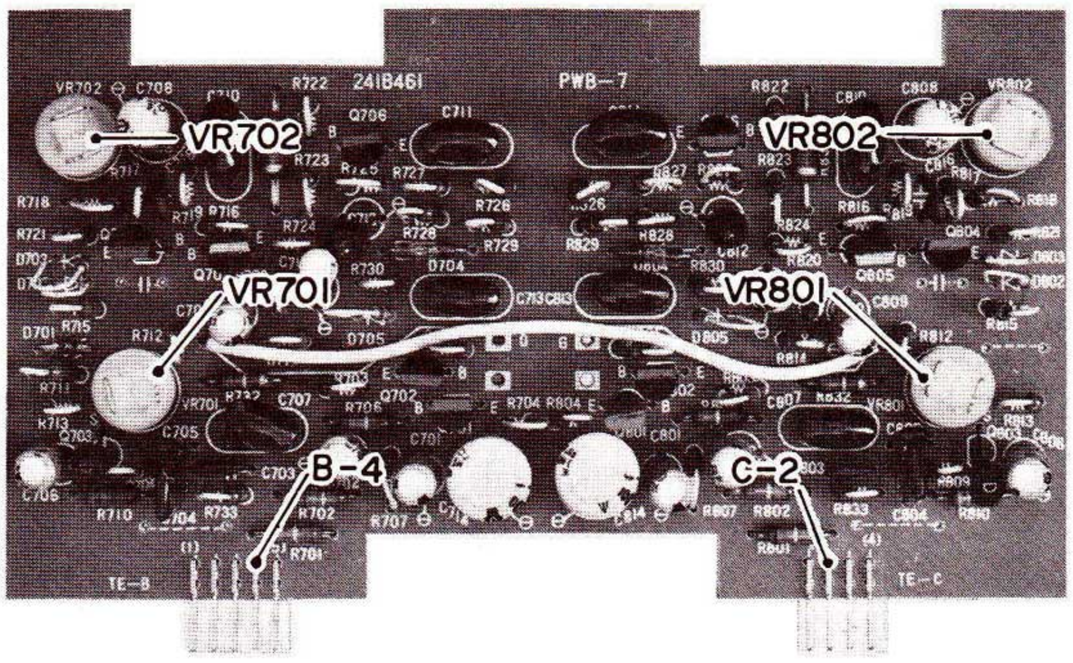
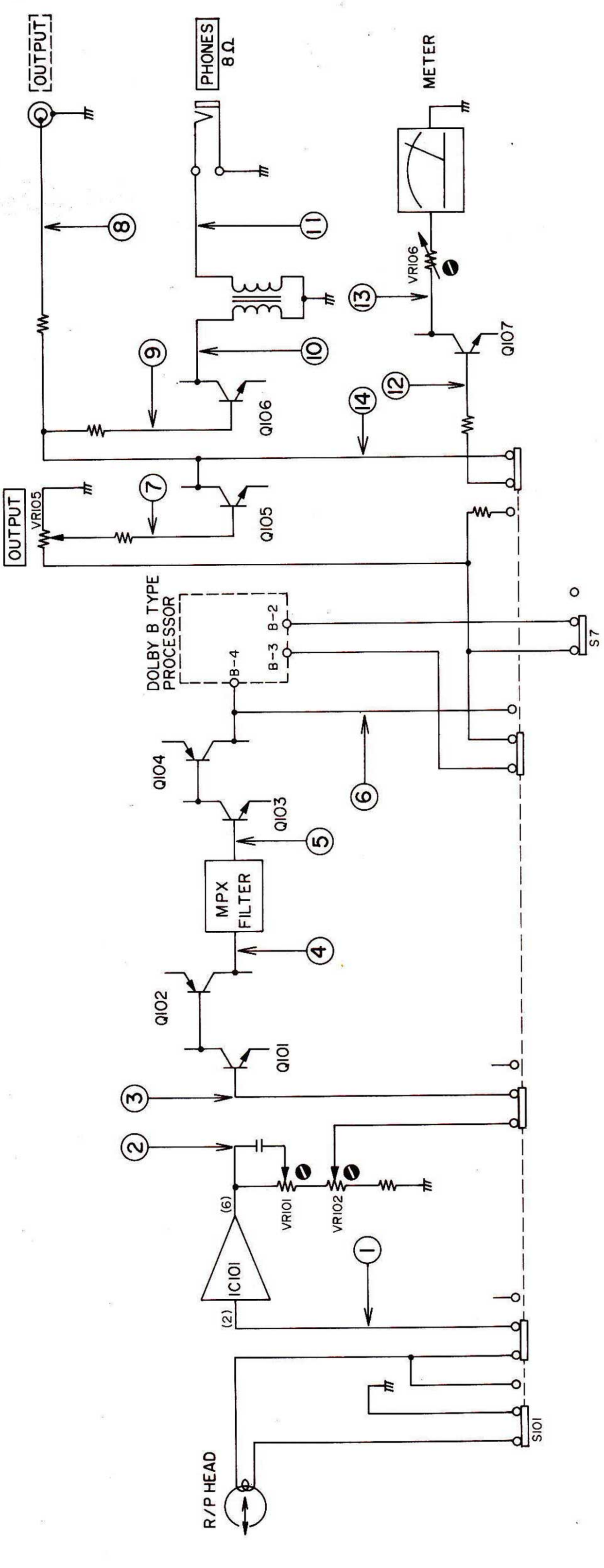


Fig. 6-23 DOLBY NR Circuit Board

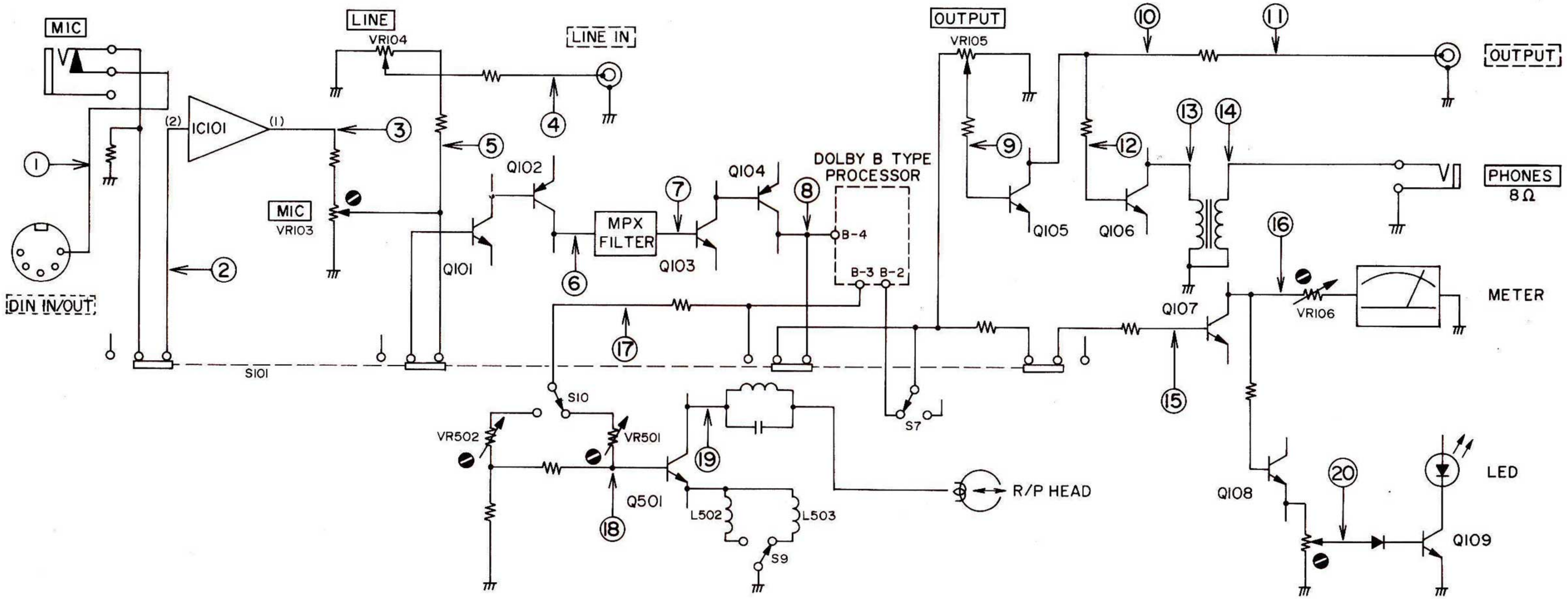
7. LEVEL DIAGRAM

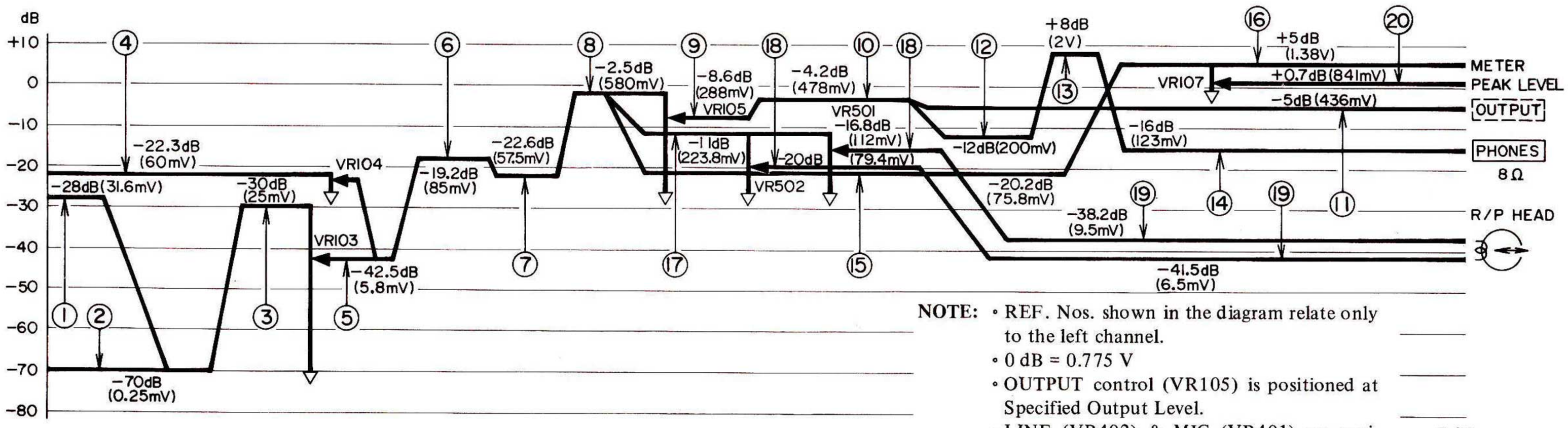
PLAYBACK SECTION



NOTE:
- REF. Nos. shown in the diagram relate only to the left channel.
- 0 dB = 0.775 V
- OUTPUT control (VR105) is positioned at Specified Output Level.
- Each level given in the diagram shows values during playback with MTT-150 Test Tape (Dolby tone).

T-909





NOTE:
- REF. Nos. shown in the diagram relate only to the left channel.
- 0 dB = 0.775 V
- OUTPUT control (VR105) is positioned at Specified Output Level.
- LINE (VR402) & MIC (VR401) are positioned at Minimum Input Level.
- Each level given in the diagram shows values when a 400 Hz Specified Input Level is applied.

T-910

A-480

Stereo Cassette Deck with Dolby System

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