

TEAC®

SERVICE MANUAL

A-510/A-500

Stereo Cassette Deck with Dolby® System



NOTE

If any of the adjustments or repairs seem too complicated or are difficult 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 of this manual.

When ordering replacement parts, please refer to the PARTS LIST which is printed separately from this manual and included as an insert.

TEAC CORPORATION

51032580

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1 PARTS LOCATION

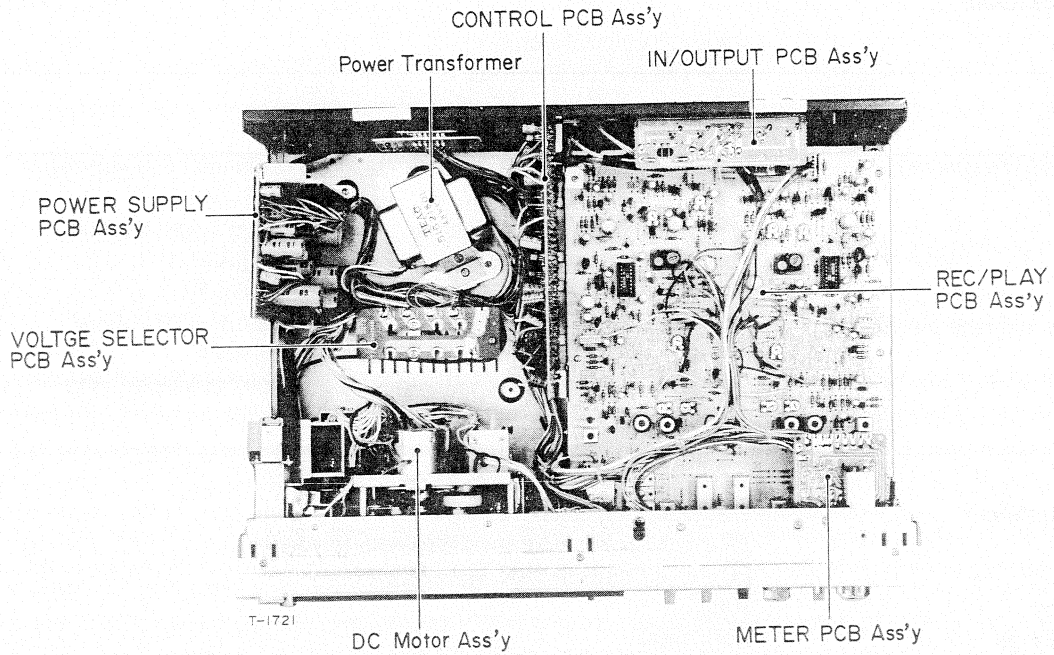


Fig. 1-1 Top View

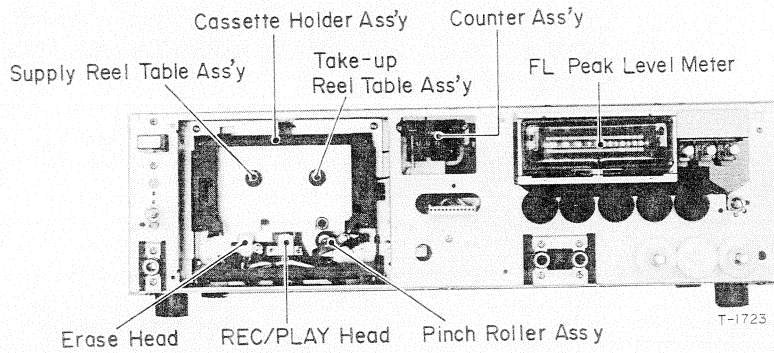


Fig. 1-2 Front View

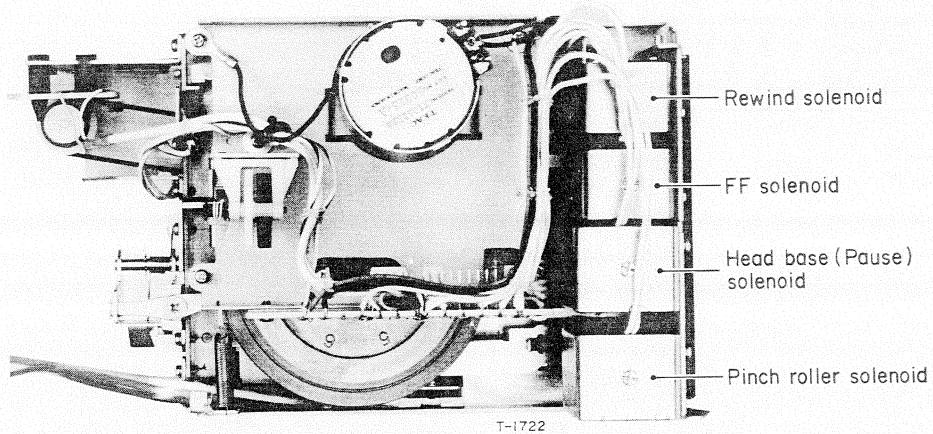


Fig. 1-3 Rear View of Transport Chassis

2 SPECIFICATIONS AND 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)
Input (level and impedance)	MIC: Specified input level: -57 dB (1.09 mV)/(10 kohms) Min. input level: -67 dB (345 μ V) LINE IN: Specified input level: -9 dB (274 mV)/(50 kohms) Min. input level: -19 dB (86 mV) DIN*: Min. input level: -35 dB (13.8 mV)
Outputs (level and load impedance)	OUTPUT: Max. output level: -3 dB (548 mV)/(50 kohms) Specified output level: -5 dB (435 mV) Headphones: Specified output level: -21 dB (69.0 mV)/(8 ohms)
Equalization	CrO ₂ : 3180 μ s + 70 μ s FeCr: 3180 μ s + 70 μ s NORMAL: 3180 μ s + 120 μ s
Head Configuration	1/2-track, 1-channel Erase Head 1/4-track, 2-channel Record/Playback Head
Motor	FG Servo Controlled DC Motor
Bias Frequency	100 kHz
Operation Position	Horizontal
Power Requirements	100/117/220/240 V AC, 50/60 Hz, 29W, 25 W for A-500 (General Export Model) 117 V AC, 60 Hz, 27 W, 23 W for A-500 (U.S.A./Canada Model) 220 V AC, 50 Hz, 27 W, 23 W for A-500 (Europe Model) 240 V AC, 50 Hz, 28 W, 24 W for A-500 (U.K./Aus. Model)
Weight	9 kg (20 lbs.) net

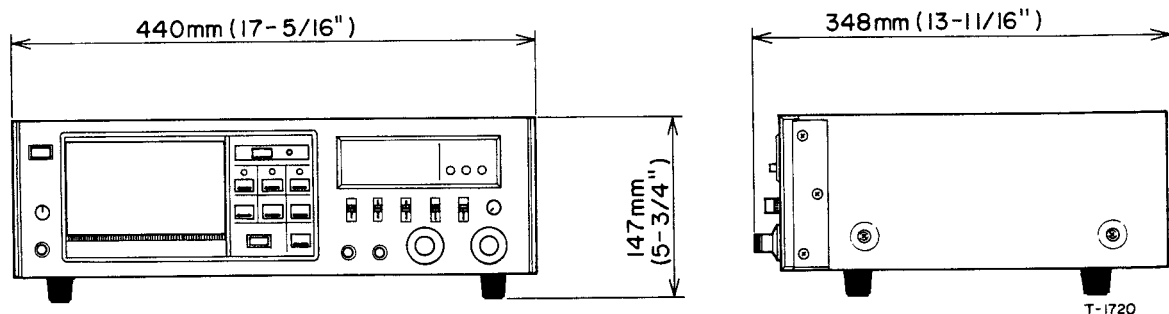


Fig. 2-1 Dimmensions

SERVICE DATA

Mechanical

Tape Speed Deviation	3,000 Hz \pm 45 Hz
Tape Speed Drift	45 Hz
Wow and Flutter	Playback: 0.07% (WRMS) 0.15% (RMS)
	Record/Playback: 0.20% (RMS)
Pinch Roller Pressure	350 g to 450 g (12.3 oz. to 15.9 oz.)
Reel Torque	Take-up: 40 to 60 g.cm (0.6 to 0.8 oz-inch) Supply: 2 to 6 g.cm (0.03 to 0.08 oz-inch) Fast Forward: 80 to 150 g.cm (1.1 to 2.1 oz-inch) Rewind: 100 to 150 g.cm (1.4 to 2.1 oz-inch)
Fast Winding Time	90 seconds for MTT-501 (C-60)

Electrical

Frequency Response	Refer to frequency response limits charts on page 16 and 20.
Signal to Noise Ratio	Playback method: NORMAL tape: 48 dB (min.) Record/Playback method: CrO ₂ & FeCr tapes: 48 dB (min.) NORMAL tape: 46 dB (min.) With Dolby Noise Reduction 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 min.
Channel Separation	30 dB min. (at 1 kHz)
Crosstalk Between Adjacent Tracks	40 dB min. (at 125 Hz)
Total Harmonic Distortion	2.0% or less w/3 types of tape

- 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 Tape Set or AC Voltmeter calibrated to 0 dB = 1 V is to be used, appropriate compensation should be made.

3 TEST EQUIPMENT

NOTE: When ordering special tools, jigs and test tapes, allow for the longer delivery time that is required for them.

3-1 ORDINARY TOOLS AND EQUIPMENT

1. Spring scale: For pinch roller pressure check, 0 to 500 g (1.1 lbs)
2. Wow/flutter meter: MEGRO DENPA SOKKI K.K., Model MK-668A, or D & R Co., Model FL-4B
3. Frequency counter: Digital type, capable of 10 Hz to 100 kHz indication
4. AF oscillator: 10 Hz to 100 kHz
5. AC voltmeter: 0.1 mV to 300 V
6. Attenuator: General purpose
7. Distortion analyzer: Bias frequency 400 Hz/1 kHz
8. Oscilloscope: General purpose
9. Band-pass filter: 1 kHz narrow band-pass type
10. Test load resistor: Non inductive type 8 ohm/1 W
11. Plastic alignment tool:
12. Head demagnetizer: TEAC E-3 or equivalent
13. Cleaner: TEAC TZ-261 tape recorder cleaner kit or pure alcohol
14. Oil: TEAC TZ-255 oil kit or equivalent
15. Bulk tape eraser: TEAC E-2 or equivalent

3-2 SPECIAL TOOLS AND JIGS

1. Cassette torque meter: For take-up and supply torque checks, 0 to 100 g.cm (0 to 1.4 oz-inch)
2. Cassette torque meter: For fast forward and rewind torque checks, 0 to 160 g.cm (0 to 2.2 oz-inch)
3. Mirror-equipped tape path test tape:

3-3 TEAC TEST TAPES

Remarks: 0 dB = DIN reference level (333 Hz)

For tape speed and wow/flutter test

1. MTT-111: ● For playback method ● 3,000 Hz/−10 dB
2. MTT-501: ● For record/playback method (blank tape)

For playback performance alignment

3. MTT-150: ● For Dolby level calibration ● Dolby B-type tone (400 Hz tone), 200 nWb/m
4. MTT-316: ● For frequency response test for EQ, CrO₂ and FeCr ● 3,180 μs + 70 μs
● 315 Hz/−4 dB, 31.5 Hz to 14 kHz/−24 dB
5. MTT-216: ● For frequency response test for EQ, NORMAL ● 3,180 μs + 120 μs
● 315 Hz/−4 dB, 31.5 Hz to 14 kHz/−24 dB

For record performance alignment (blank tape)

6. MTT-506 or similar: ● For BIAS/EQ, CrO₂
7. MTT-504 or similar: ● For BIAS/EQ, FeCr
8. MTT-501 or similar: ● For BIAS/EQ, NORMAL

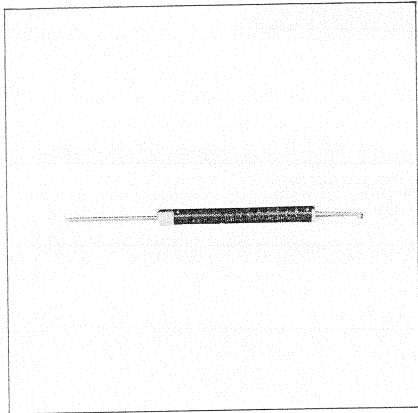


Fig. 3-1 Spring Scale

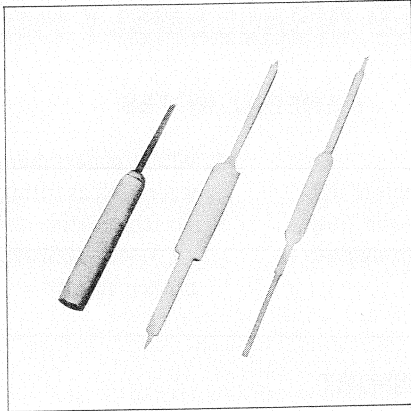


Fig. 3-2 Plastic Alignment Tools

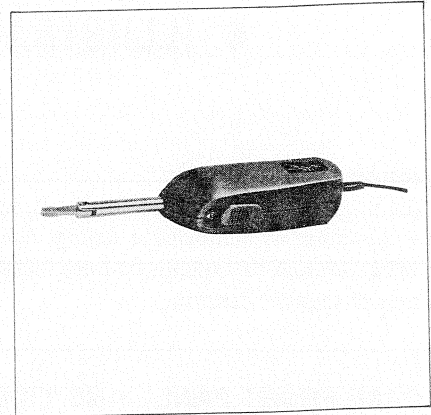


Fig. 3-3 Head Demagnetizer



Fig. 3-4 TZ-261 Tape Recorder Cleaner Kit



Fig. 3-5 TZ-255 Oil Kit

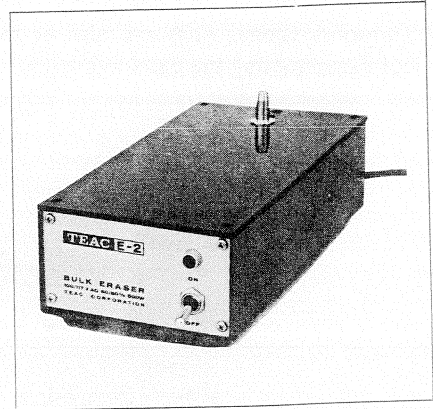


Fig. 3-6 E-2 Bulk Tape Eraser

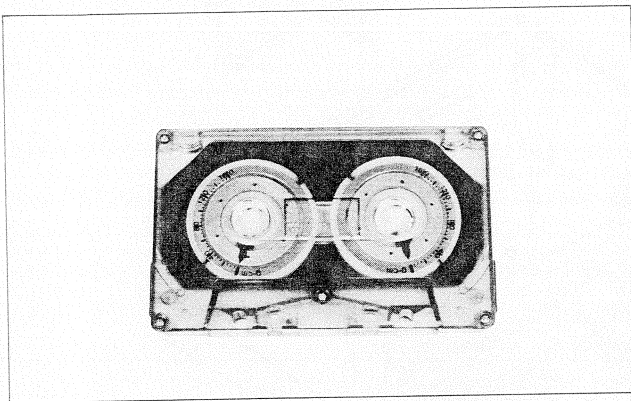


Fig. 3-7 Cassette Torque Meter



Fig. 3-8 Mirror-equipped Tape Path Test Tape

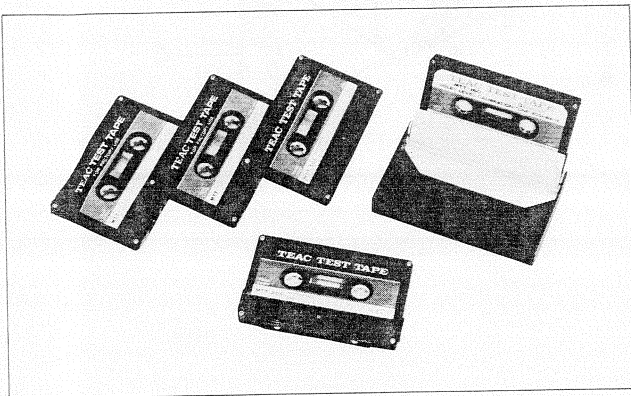


Fig. 3-9 TEAC Test Tapes

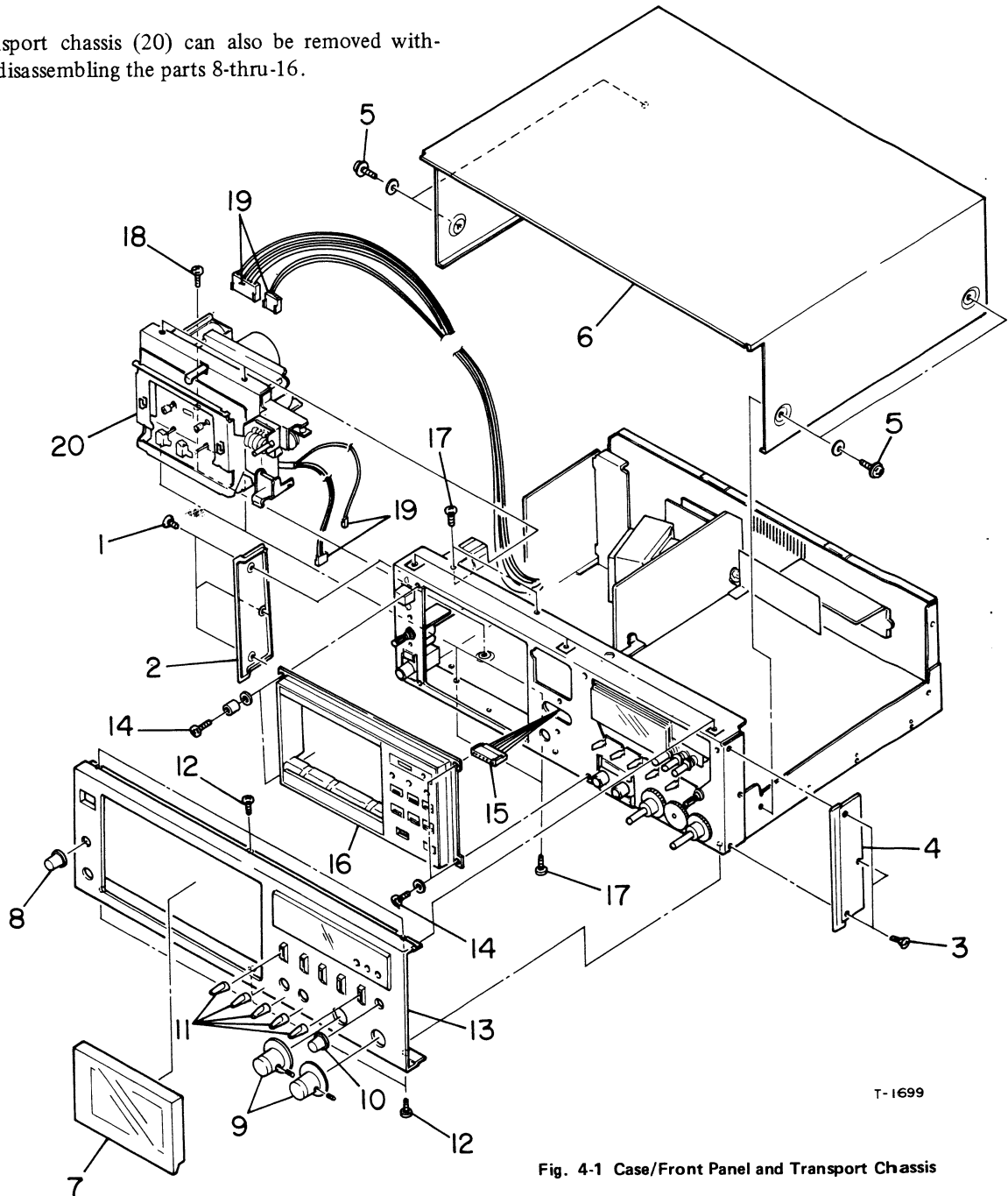
4 ILLUSTRATED DISASSEMBLY PROCEDURES

GENERAL NOTES

1. Disassemble in number-order.
2. Use the proper tools. Demagnetize the tools before use.
3. When mounting or removing a spring, check the position (direction) of the anchor or hook. The wrong position may change the tension.
4. When reassembling, don't forget to reinstall all hardware such as spring and washers etc.
5. To check the shape of assembling hardware (screws, etc.) see ASSEMBLING HARDWARE CODING LIST in the parts list.

4-1 CASE/FRONT PANEL AND TRANSPORT CHASSIS

NOTE: Transport chassis (20) can also be removed without disassembling the parts 8-thru-16.



T-1699

Fig. 4-1 Case/Front Panel and Transport Chassis

4-2 CASSETTE HOLDER ASS'Y

Preparation

Remove in number-order.

1. Fig. 4-1, 1-thru-16.

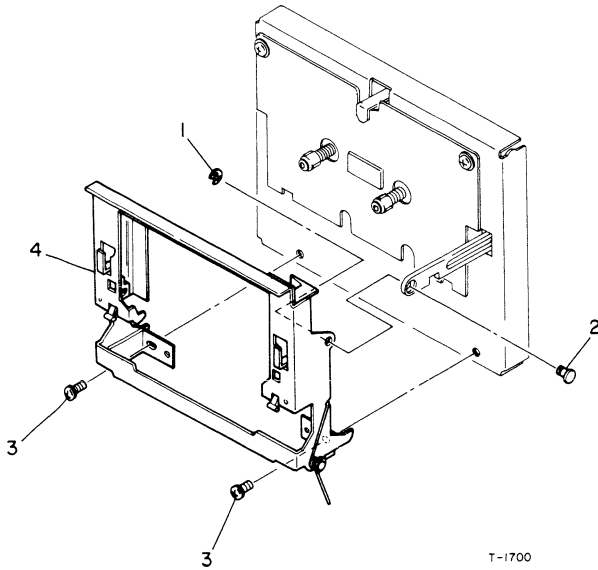


Fig. 4-2 Cassette Holder Ass'y

T-1700

4-3 CASSETTE DAMPER (DAMPER CORD STRING)

Preparation

Remove in number-order.

1. Fig. 4-1, 1-thru-6.

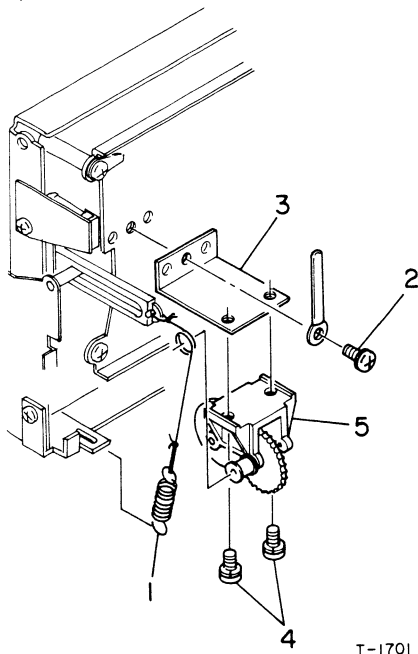


Fig. 4-3 Cassette Damper

T-1701

4-4 HEADS

Preparation

Remove in number-order.

1. Fig. 4-1, 1-thru-16.

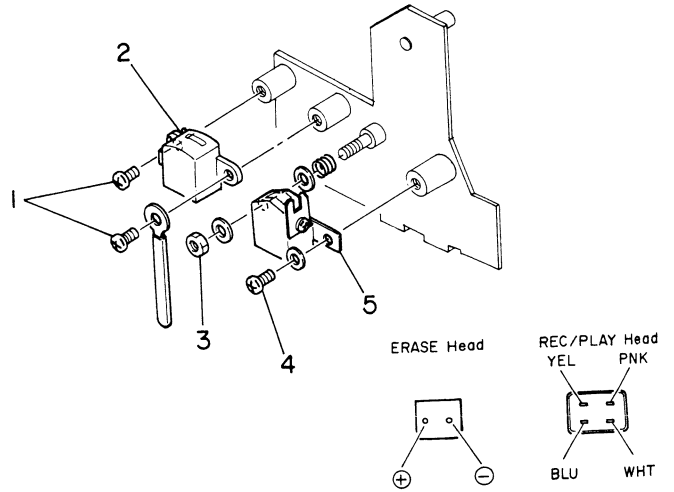


Fig. 4-4 Heads

T-1702

- NOTES:**
1. After replacing the head(s), always adjust the head alignment and then secure the nuts with a drop of locking paint.
 2. Solder the wires to the head terminal pins quickly (to prevent breaking of internal wires of the head due to overheating).

4-5 PINCH ROLLER

Preparation

Remove in number-order.

1. Fig. 4-1, 1-thru-16.

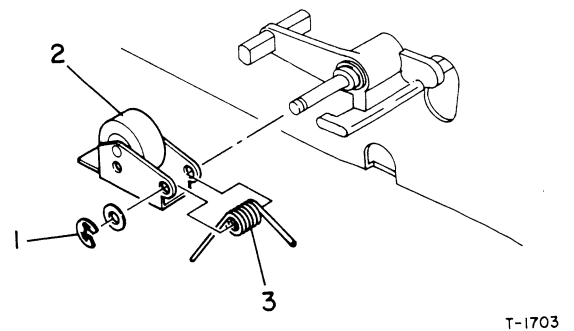


Fig. 4-5 Pinch Roller

T-1703

- NOTE:** After replacement, always clean the driving surface of the Pinch roller with the TEAC TZ-261B rubber cleaner or with pure alcohol, then go directly to the PINCH ROLLER PRESSURE adjustment section.

4-6 REEL TABLES

Preparation

Remove in number-order.

1. Fig. 4-1, 1-thru-16.

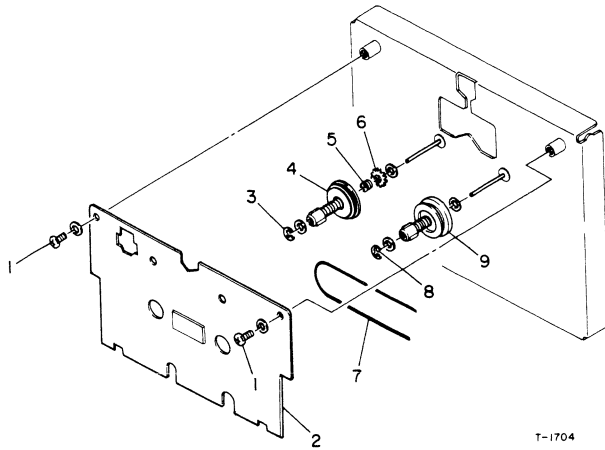


Fig. 4-6 Reel Tables

4-7 BRAKE PLATE ASS'Y

Preparation

Remove in number-order.

1. Fig. 4-1, 1-thru-16.
2. Fig. 4-6, 1, 2.

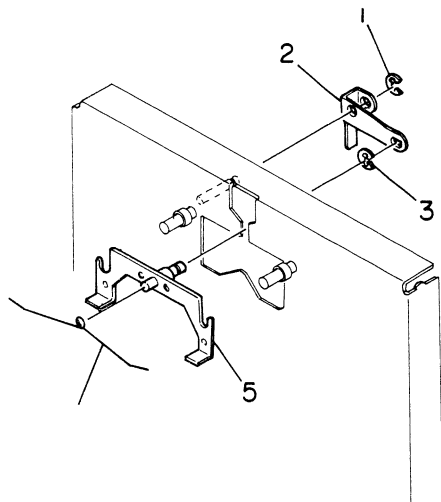


Fig. 4-7 Brake Plate Ass'y

4-8 MOTOR

Preparation

Remove in number-order.

1. Fig. 4-1, 1-thru-7, 17-thru-20.
2. Fig. 4-3, 1.

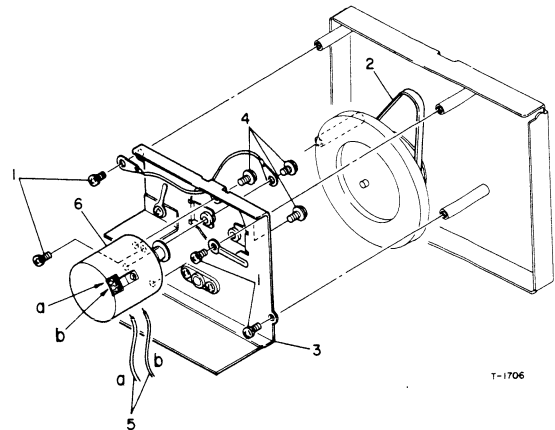


Fig. 4-8 Motor

- NOTES:**
1. When re-assembling, clean the pulley and the Belt with TEAC TZ-261 Cleaner kit ("A" for the Pulley, "B" for the Belt) or with pure alcohol.
 2. Take off or remount the Motor Ass'y taking care not to scratch or otherwise damage the Motor Pulley.
 3. When re-attaching the Drive Belt to the Pulley do not twist or stretch the belt.

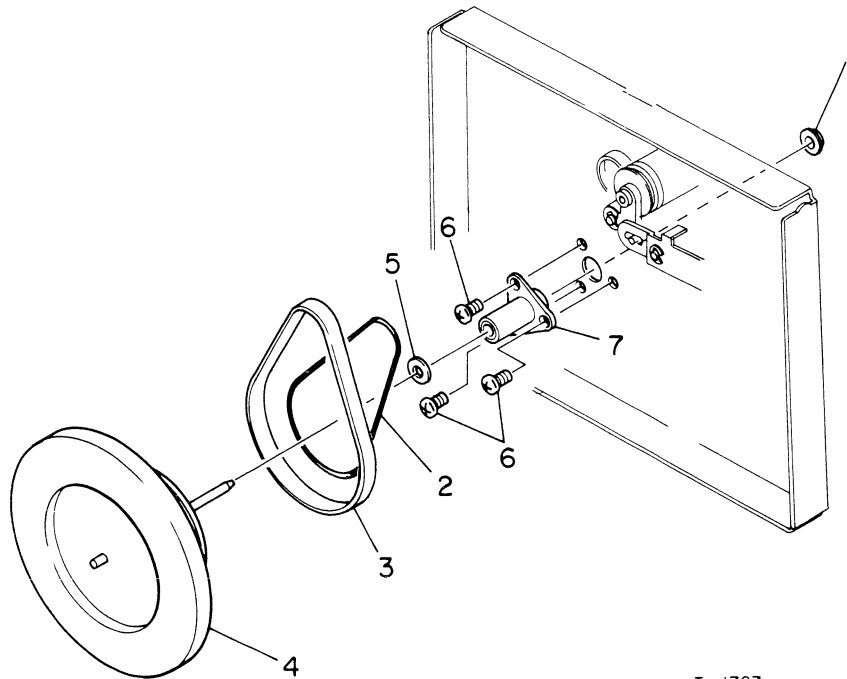
4-9 CAPSTAN DRIVE ASS'Y

Preparation

Remove in number-order.

1. Fig. 4-1, 1-thru-7, 17-thru-20.
2. Fig. 4-3, 1.
3. Fig. 4-8, 1-thru-3.

- NOTES:**
1. It is impossible to remove part (2) completely.
 2. Clean all driving surfaces of the Flywheel and the Drive Belt with TEAC TZ-261 Cleaner kit ("A" for the Flywheel, "B" for the Belt) or with pure alcohol.



T-1707

Fig. 4-9 Capstan Drive Ass'y

4-10 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.

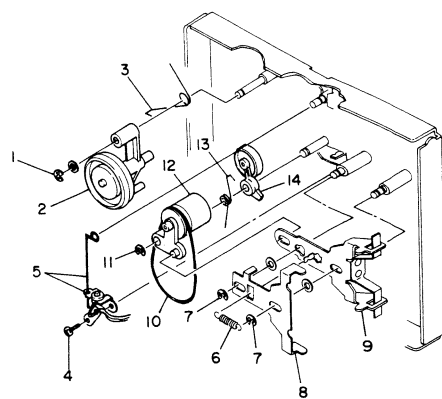
1. Apply a drop of a light machine oil of good quality (e.g.: TEAC TZ-255) with an oil applicator to the shaft of the Flywheel and spread oil evenly over the shaft with a flannel cloth. After installing the Flywheel, be sure to clean the tape moving portion of shaft with TEAC TZ-261 A Head Cleaner or 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.

4-11 TENSION PULLEY ASS'Y/FF ARM ASS'YS

Preparation

Remove in number-order.

1. Fig. 4-1, 1-thru-7, 17-thru-20.
2. Fig. 4-3, 1.
3. Fig. 4-7, 1-thru-3.
4. Fig. 4-8, 1-thru-3.
5. Fig. 4-9, 1-thru-4.



T-1708

Fig. 4-10 Tension Pulley Ass'y/FF Arm Ass'ys

NOTE: When remounting these parts, clean the driving surface of the idler with the TEAC TZ-261B rubber cleaner or with pure alcohol.

5 MECHANICAL CHECKS AND ADJUSTMENTS

5-1 PINCH ROLLER PRESSURE

Specification: 350 g to 450 g (12.3 oz. to 15.9 oz.)

1. Switch on POWER.
2. Place the deck in the PLAY mode with no tape loaded.
3. Attach the spring scale to the hole in the Pinch Roller Ass'y as shown.
4. Gently draw the Pinch Roller away from the Capstan shaft (in a direction parallel to a line that intersects the centers of the capstan shaft and the Pinch Roller) until the Capstan shaft and the Pinch Roller are completely separated.
5. Gradually return the scale back until the Pinch Roller just begins to rotate. The scale should then be reading approximately 350 g to 450 g (12.3 oz. to 15.9 oz.).

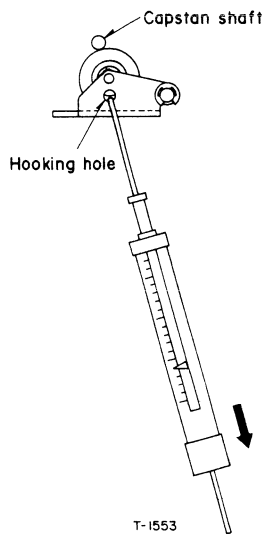


Fig. 5-1 Pinch Roller Pressure

5-2 REEL TORQUE CHECKS

Specifications:

- Take-up: 40 to 60g.cm (0.6 to 0.8 oz.-inch)
- Supply: 2 to 6 g.cm (0.03 to 0.08 oz.-inch)
- Fast Forward: 80 to 150 g.cm (1.1 to 2.1 oz.-inch)
- Rewind: 100 to 150 g.cm (1.4 to 2.1 Oz.-inch)

1. Load the cassette torque meter on the deck and read the pointer indication on the dial scale for each tape movement operation.

5-3 HEAD BASE PLATE POSITION ADJUSTMENT

1. Set the deck in the PLAY mode.
2. Push the Head Base Plate in the direction of the arrow by the hand to check whether there is any clearance between the Head Base Plate and the stopper portion of the mechanism chassis.
3. If there is any clearance, loosen the two screws on the PAUSE (HEAD BASE) solenoid and position the solenoid so that there is no clearance.

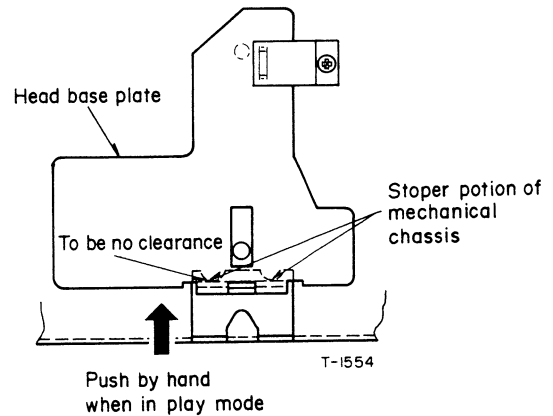


Fig. 5-2 Head Base Plate Positioning

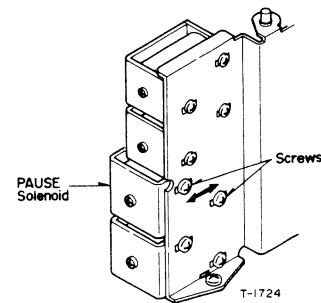


Fig. 5-3 PAUSE Solenoid Positioning

5-4 CAPSTAN ASSEMBLY THRUST ADJUSTMENT

Specification: 0.05 mm to 0.15 mm

NOTE: For newly replaced capstan drive ass'y first lubricate it referring to paragraph 4-10 on page 11 prior to this adjustment.

1. By using a slot screwdriver with small blade, adjust the thrust adjusting screw so that thrust of the capstan shaft in the longitudinal direction is limited to 0.05 to 0.15 mm. This adjustment can be made by pushing the flywheel toward or away from the front of the deck.

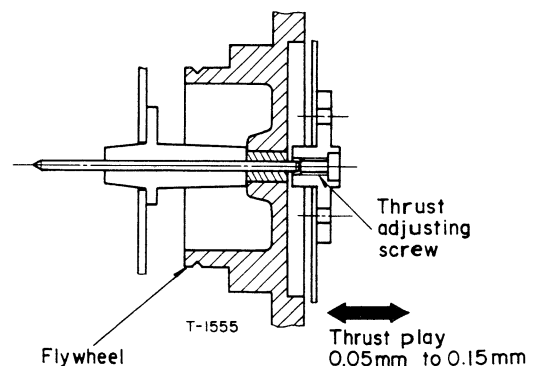


Fig. 5-4 Capstan Ass'y Thrust Adjustment

5-5 TAPE SPEED/WOW AND FLUTTER

Specification:

Tape speed deviation:	3,000 Hz \pm 45 Hz
Tape speed drift:	45 Hz
Wow and flutter:	Playback: 0.07%(WRMS) 0.15%(RMS)
Record/playback:	0.20%(RMS)

- NOTE:** 1. Before making this adjustment, clean all parts in the tape path, particularly the capstans, the pinch rollers and the heads with the appropriate liquid from the TEAC TZ-261 cleaner kit or with pure alcohol.
2. Wow and flutter should be checked in two ways; playback only and record/playback methods. First correct tape speed and wow and flutter using the playback only method. Then measure wow and flutter using record and playback method.
3. As the measured results may vary with respect to location on tape at which it was taken, three points – at beginning, middle and near the end of the tape – should be measured. The worst case reading must satisfy the specification.

5-5-1 TAPE SPEED

1. Connect test equipment to the deck, except the AF oscillator, as shown in Fig.5-5.
2. Set the OUTPUT control on the deck to obtain convenient output.
3. Set the EQ switch to the NORMAL position, and then load and play a TEAC MTT-111 test tape (3,000 Hz signal is recorded).
4. Using a common slotted screwdriver whose handle is completely insulated from the screwdriver blade, adjust the control located at the rear of the motor for reading of $3,000 \pm 5$ Hz on the frequency counter.

NOTE: This tape speed setting should be done after approx. 30 seconds of operating time of the deck.

5. Then, verify that the reading on the frequency counter is within the specified range of $3,000 \text{ Hz} \pm 45 \text{ Hz}$, and the tape speed drift is within 45 Hz at any portion of the tape run.
6. If the tape speed is extremely out of the specification, check the pinch roller pressure and the tape driving function for correctness, and make sure the tape path is clean.

5-5-2 WOW AND FLUTTER

After making the tape speed measurement, perform the wow and flutter test using the playback method and the record/playback method successively.

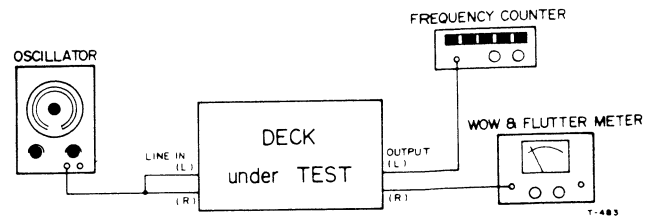


Fig. 5-5 Tape Speed/Wow & Flutter Measurement Setup

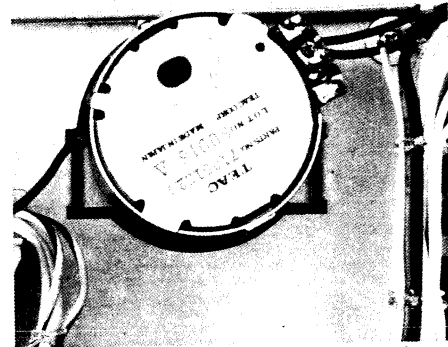


Fig. 5-6 Tape Speed Adjustment Location

PLAYBACK METHOD

1. Set the EQ switch to the NORMAL position, then load and play the MTT-111 test tape.
2. Read the indication on the wow and flutter meter.
3. The wow and flutter value should be 0.07% WRMS, max. or 0.15% RMS, max.
4. If the wow and flutter is out of specification, check the pinch roller pressure and the take-up and supply torques, see that the tape path is clean, and that the drive belts are not stretched or oily.
5. If the above checks are ineffective for excessive wow and flutter correction, repair or replace the pinch roller(s), the drive belt(s) 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.
2. Place the BIAS/EQ switches in the NORMAL position and the INPUT switch in the LINE position.
3. Set RECORD and OUTPUT controls on the deck to obtain convenient input and output levels.
4. Load a TEAC MTT-501 test tape (blank).
5. Apply and record a 3,000 Hz signal.
6. Rewind and play this recorded selection.
7. Read the indication on the wow and flutter meter.
8. The wow and flutter value should be 0.20% RMS max.
9. If the measured value is out of specification, repair using the same methods as stated in steps 4 – 5 in the playback method procedure.

5-6 MICRO SWITCH (A) ASSEMBLY CLEARANCE ADJUSTMENT

1. Insert a blank cassette tape in the cassette holder. Close the cassette holder.
2. Loosen the two screws on the micro switch (A).
3. Move the switch so that actuator of the switch will contact the safety lever.
4. Adjust the switch position to provide a clearance of 0.1 mm to 0.3 mm between the actuator and the bent-tip of the switch bracket.
5. Firmly fasten the two screws.

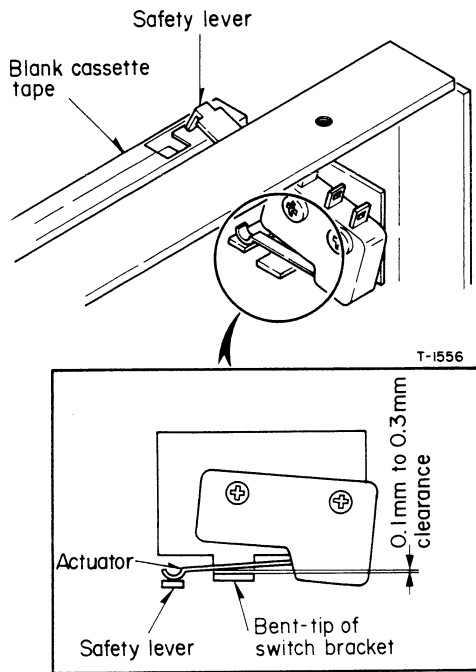


Fig. 5-7 Micro Switch (A) Ass'y Clearance Adjustment

5-7 MICRO SWITCH (B) ASSEMBLY CLEARANCE ADJUSTMENT

1. Push the EJECT button to open the cassette holder.
2. Loosen the two screws on the micro switch (B).
3. Move the switch so that actuator of the switch contacts the bent-projecting portion of the eject lever.
4. Adjust the switch position to provide a clearance of about 1 mm between the actuator and the switch housing.
5. Firmly fasten the two screws.

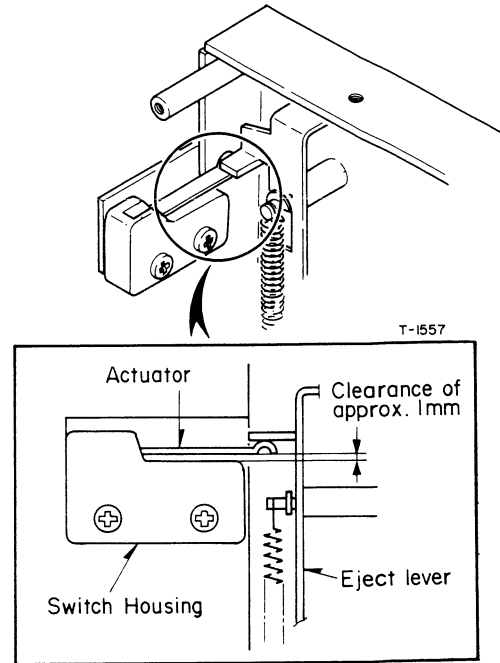


Fig. 5-8 Micro Switch (B) Ass'y Clearance Adjustment

6 ELECTRICAL CHECKS AND ADJUSTMENTS

6-1 GENERAL PRELIMINARY INFORMATION

6-1-1 GENERAL NOTICE

1. Before performing adjustments on the amplifier section of this deck, thoroughly clean and demagnetize the entire tape path, particularly the erase head, record/playback head, capstan shaft and pinch roller.
2. Make sure the deck is properly set for the voltage in your locality.
3. In general, checks and adjustments, other than specified items, are done in the sequence – left channel then right channel. Double REF. Nos. indicate left channel/right channel (example: VR101/VR201).
4. The value of “dB” in the text refers to 0 dB = 0.775 V, except where specified. If an AC voltmeter calibrated to 0 dB = 1 V is to be used, appropriate compensation should be made.
5. The AC voltmeter used in the procedures, including the

measurements at DOLBY test points, must have an input impedance of 1 M-ohms or more.

6. To complete these performance checks correctly, follow the order given in this chapter.

6-1-2 PREPARATIONS

1. For each procedure, make the initial equipment test set up and connections as shown in the associated illustrations.
2. Unless indicated otherwise in the procedures, the basic starting conditions for each test will be as given in the chart below.

Switch	Position
MEMORY:	OFF
BIAS:	CrO ₂
EQ:	CrO ₂
DOLBY NR:	OUT
INPUT:	LINE

6-2 D.C. VOLTAGE ADJUSTMENT

1. Connecting the AC voltmeter to the POWER SUPPLY PCB as shown in Fig. 6-1, adjust R815 on the PCB for +23 V DC.

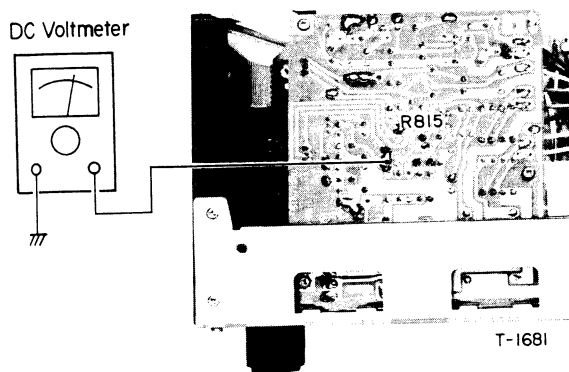


Fig. 6-1 D.C. Voltage Adjustment

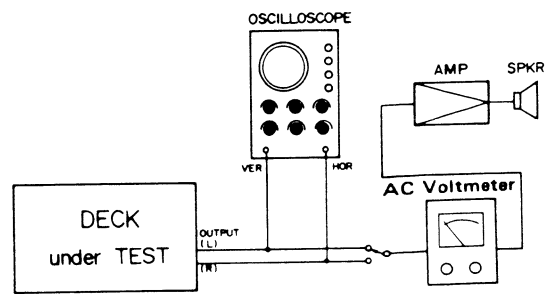


Fig. 6-2 Connection

5. Adjust the azimuth adjusting nut for the greatest output level.
6. After adjustment is made, apply a drop of locking paint to the adjustment nut.

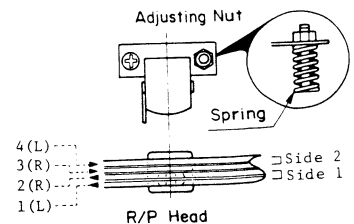


Fig. 6-3 Head Azimuth Adjustment Location

6-3 PLAYBACK PERFORMANCE

6-3-1. RECORD/PLAYBACK HEAD AZIMUTH ADJUSTMENT

1. Load and play a TEAC MTT-150 test tape.
2. Make sure the phase relationship between the 2 signals (left channel and right channel) is within 45° on the oscilloscope.
3. Load a TEAC MTT-316 test tape.
4. Play the 10 kHz signal section of the tape.

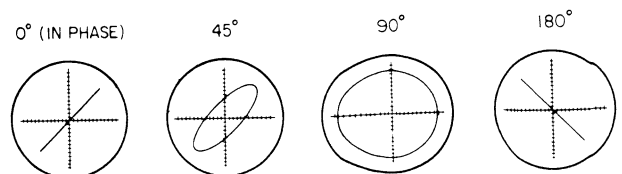


Fig. 6-4 Confirming Phase Relationship

6-3-2 SPECIFIED OUTPUT LEVEL SETTING

Specification:

Specified output level: -5 dB (436 mV)
 Maximum output level: $-3 \text{ dB} \pm 2 \text{ dB}$
 (436 mV to 690 mV)

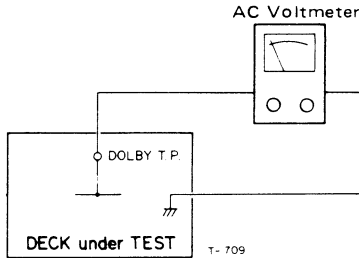


Fig. 6-5 Connection

1. Load and play a TEAC MTT-150 test tape.
2. Adjust R10/R20 for 580 mV (-2.5 dB) on AC Voltmeter connected to the Dolby test points.
3. Change the AC Voltmeter connection to the OUTPUT jacks (Fig. 6-6).
4. Set the OUTPUT controls to maximum and confirm that $-3 \text{ dB} \pm 2 \text{ dB}$ (436 mV to 690 mV) is obtained at OUTPUT jacks.
5. Set the OUTPUT control so that the output of the channel with the lower reading (L-ch or R-ch) reads -5 dB (436 mV).
6. If there is a distinct level difference (more than 1 dB) between channels, adjust R30 or R40 on the channel with the higher reading to reduce the level to within 1 dB or less of the other channel.
7. 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.

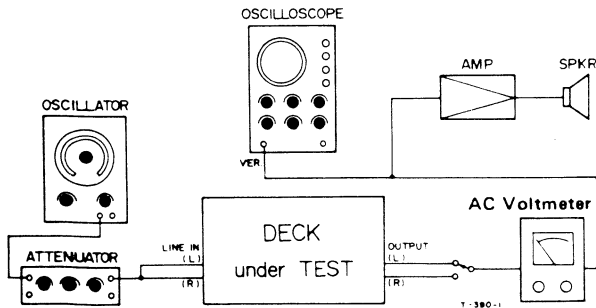


Fig. 6-6 Connection

6-3-3 PEAK LEVEL METER CALIBRATION

Specification: 0 dB

NOTE: The step below can be applied to both conventional type (A-500) and bar-graph type (A-510).

8. With the specified setting in paragraph 6-3-2, play the MTT-150 test tape and adjust R15/R25 for 0 dB indication on the peak level meter.

6-3-4. FREQUENCY RESPONSE

— PLAYBACK —

9. Load a TEAC MTT-316 test tape and play the 4th section of the tape, voice labelled as 315 Hz, and note this reading as a temporary reference level for the following adjustments.
10. While playing the 10 kHz recorded section, adjust R16/R26 so that 10 kHz gives the same level as the previous reference level in order to keep the higher frequency signals within the given response limits.
11. Then play the required signals for comparison with the playback frequency response limits chart.
12. Check that the readings obtained on the AC voltmeter are within the response limits.

NOTE: If the response does not meet the specified response limits, the head should be checked for accumulated oxide or dirt. If no dirt is found, the head azimuth should be readjusted.

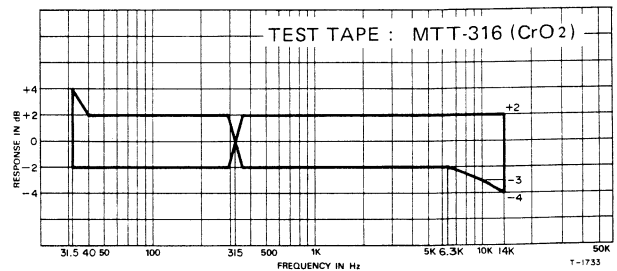


Fig. 6-7 Playback Frequency Response Limits

6-3-5 SIGNAL TO NOISE RATIO

— PLAYBACK —

Specifications:

EQ switch, NORMAL: 48 dB (min.)

NORMAL

1. Connect the deck and the test equipments as shown in Fig. 6-6.
2. Set the EQ switch to NORMAL position.
3. Load and play a TEAC MTT-150 test tape.
4. Confirm that, by reproducing the 400 Hz test tone on the tape, the output from the deck is set to the specified

output level of -5 dB (436 mV). If not, repeat the procedure in paragraph 6-3-2.

5. Change the tape to a TEAC MTT-501 test tape completely demagnetized by a bulk tape eraser (such as the TEAC E-2) and play it.
6. Read the indication on the AC voltmeter.
7. Compare the output reading to the specified output level (-5 dB).
8. A difference of 48 dB or more is required.

6-3-6 HEADPHONE OUTPUT LEVEL CHECKS

Specification: -21 dB ± 3 dB (48.8 mV to 97 mV)

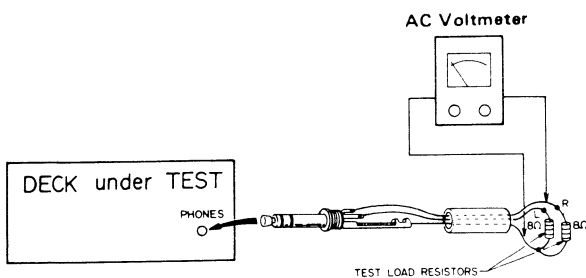


Fig. 6-8 Connection

NOTE: An 8 ohm non-inductive resistor should be used as the test load resistor.

1. Load and play a TEAC MTT-150 test tape.
2. Measure the level across the test load resistor.
3. Level shall be -21 dB ± 3 dB (48.8 mV to 97 mV).

6-4 MONITOR PERFORMANCE

6-4-1 MINIMUM INPUT LEVEL CHECKS

Specification:

- LINE:** -19 dB ± 3 dB (61.5 mV to 123 mV)
- MIC:** -67 dB ± 3 dB (244 μ V to 488 μ V)
- DIN:** -35 dB ± 3 dB (9.75 mV to 19.4 mV)

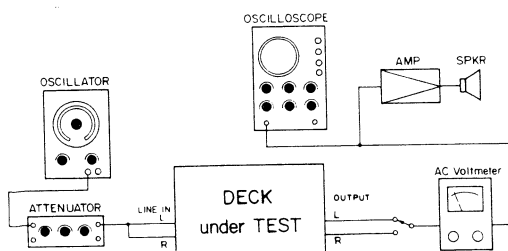


Fig. 6-9 Connection

NOTE: To prevent mis-measurements for the following procedures, any connection cords other than these for the respective input check must be removed. For example: Do not connect the Microphone and the DIN cords to respective input jacks when checking for the LINE inputs.

1. Load any recordable tape.
2. Place the deck in the REC PAUSE mode.
3. Set the RECORD controls to maximum.
4. Apply a 400 Hz signal at -19 dB (86 mV) to the LINE IN jacks and check for -5 dB ± 3 dB (308 mV to 615 mV).
5. If the level difference between channels is more than 2 dB, cut the jumper on the lower reading channel so that the level difference become less than 2 dB. (The output level of the channel whose jumper is cut can be raised to 3 dB) (Minimum Input Level adjustments for the LINE inputs).

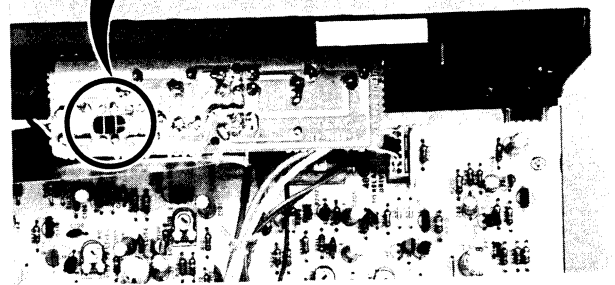
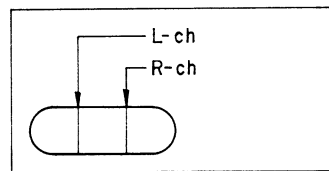


Fig. 6-10 Jumper Location

6. Set the INPUT switch to MIC/DIN.
7. Apply a 400 Hz signal at -67 dB (345 μ V) to the MIC jacks and check for -5 dB ± 3 dB. (Minimum Input Level checks for the MIC jack).
8. Remove the MIC input and apply a 400 Hz signal at -35 dB (13.7 mV) to the input terminals of the DIN connector and check for -5 dB ± 3 dB. (Minimum Input Level checks for the DIN inputs).
9. For the following tests, set the INPUT switch to LINE. At this time, of course, remove the DIN connector and then connect input signal to the LINE IN jacks.

6-4-2 SPECIFIED RECORD CONTROL SETTING

Specification: Specified input level: -9 dB (274 mV)

10. Apply a 400 Hz signal at -9 dB (274 mV) to the LINE IN jacks.
11. Set the RECORD controls to obtain a reading of -5 dB (436 mV).
12. Changing the AC voltmeter connection to the DOLBY test point, check that the output level from this is within 580 mV (-2.5 dB).
13. At this time, the physical position of the RECORD controls indicates the Specified RECORD Control Setting referred to in subsequent procedures.

NOTE: After this setting is done, do not disturb the Specified Control Setting of the RECORD controls until the remaining checks and adjustments are completed.

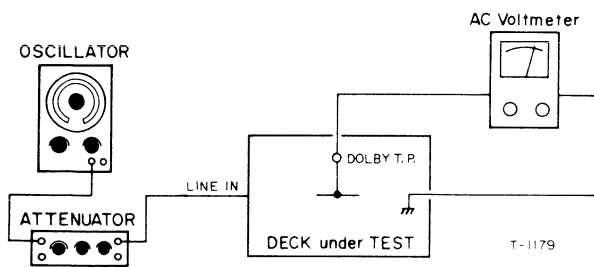


Fig. 6-11 Connection

6-4-3 PEAK LEVEL METER CALIBRATION CHECKS

Specification: 0 dB ± 1 dB

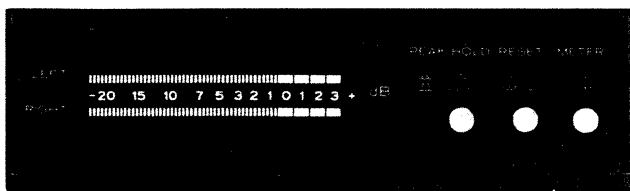


Fig. 6-12 FL Peak Level Meter (A-510)

14. With specified RECORD control setting, make certain that the indication on the peak level meter (applicable for both conventional type of A-500, and bar-graph type of A-510) on the deck is 0 dB ± 1 dB.

For A-510 only

15. Check that when the PEAK HOLD switch is pushed to the ON position, the meter retains (holds) the indicated 0 dB (or more) level on the display.

16. Check that with the PEAK HOLD switch ON and with the RESET switch in AUTO, the displayed level will be held on the display for about 0.5 to 1 seconds.
17. Check that when the METER switch is in the BRIGHT position, there is a bright display, and that the DIM position gives a dimmer display.

6-5 RECORDING PERFORMANCE

NOTE: Before making any adjustments of the recording circuit, be sure that all tests in the preceding performance sections have been accomplished. The preceding performance should be properly adjusted, otherwise record calibration will be inaccurate.

6-5-1 BIAS TRAP ADJUSTMENTS

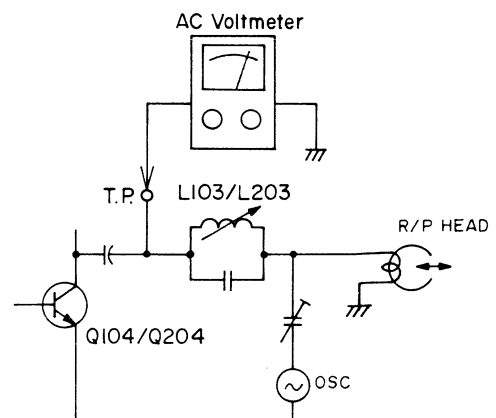


Fig. 6-13 Connection

NOTE: The AC Voltmeter used in this procedure must have input impedance of 1 M ohm or more.

1. Connect the AC Voltmeter to the BIAS TRAP test point.
2. Load any recordable tape.
3. Place the deck in the REC PAUSE mode with no signal applied.
4. Adjust L103/203 for a minimum reading.

6-5-2 RECORD BIAS SETTING

CrO₂

1. Connect the deck and the test equipment as shown in Fig. 6-9.
2. Load a TEAC MTT-506 test tape.
3. Place the deck in the record mode.
4. Apply 2 tone signals, in turn; a 400 Hz tone at -42 dB (6.15 mV) and a 10 kHz tone at -42 dB.
5. Rewind and play this recorded section.
6. Compare the difference between the output level of the 400 Hz signals and that of the 10 kHz signal on the AC Voltmeter.
7. The output level of the 400 Hz signal and that of the 10 kHz signal must be the same value.

8. Adjust C142/242, if necessary, to achieve this.
9. Continue the process of the recording-rewinding-playing-adjusting until the 400 Hz and 10 kHz signals produce the same output level.

NORMAL

10. Set the BIAS/EQ switches to NORMAL position and the DOLBY NR switch to IN position.
11. Load an MTT-501 test tape and repeat the above steps 3 to 9 except adjust C143/C243 until the 10 kHz signal level is +4 dB above the 400 Hz signal.

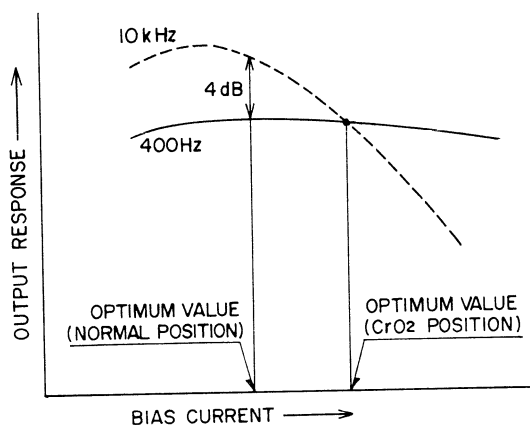


Fig. 6-14 Bias Adjustment

6-5-3 RECORD LEVEL SETTING

CrO₂

12. Load a TEAC MTT-506 test tape, set the BIAS/EQ Switches to the CrO₂ position and DOLBY NR switch OUT.
13. Apply and record a 400 Hz test signal at -12 dB (194 mV).
14. Rewind and play this recorded section.
15. Adjust R12/R22 to obtain -8 dB (308 mV) output level.
16. Continue the process of the recording-rewinding-playing-adjusting until this -8 dB is obtained.

NORMAL

17. Repeat the "CrO₂" procedure, set the BIAS/EQ switches to the NORMAL position, use the MTT-501 test tape and adjust R11/R21.

FeCr

18. Set the BIAS/EQ switches to the FeCr position, and load the MTT-504 test tape.
19. Apply and record a 400 Hz, -8 dB signal and ensure that the output level is within -8 dB ±2 dB (245 mV to 388 mV).

6-5-4 DISTORTION CHECKS

Specification: 2.0% or less (w/3 types of tape)

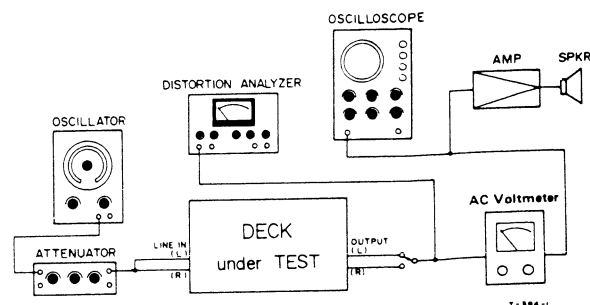


Fig. 6-15 Connection

CrO₂

1. Load a TEAC MTT-506 test tape.
2. Apply and record a 400 Hz test tone at -12 dB (194 mV).
3. Rewind and play this recorded section.
4. Read the indicated value on the distortion analyzer.

FeCr and NORMAL

5. Repeat the "CrO₂" procedure, with the following exceptions.

	FeCr	NORMAL
BIAS/EQ switches:	FeCr	NORMAL
Test tape:	MTT-504	MTT-501

6-5-5 FREQUENCY RESPONSE — OVERALL —

CrO₂

1. Connect the deck and the test equipment as shown in Fig. 6-9.
2. Load a TEAC MTT-506 test tape.
3. Apply and record a test signal, containing the necessary frequencies for comparison with applicable Overall Frequency Response Limits chart, at -42 dB (6.15 mV).
4. Rewind and play this recorded section.
5. Make sure the readings on the AC Voltmeter are within the response limits.
6. In case of any deviation in the high frequency range of the response limits, clean the heads.
7. If this cleaning is ineffective, recheck whether the recording bias setting is correct or not. If wrong, readjust this and then recheck and correct affected procedures.

NORMAL

8. Repeat the "CrO₂" procedure, with the following exceptions.

	FeCr	NORMAL
BIAS/EQ switches:	FeCr	NORMAL
Test tape:	MTT-504	MTT-501

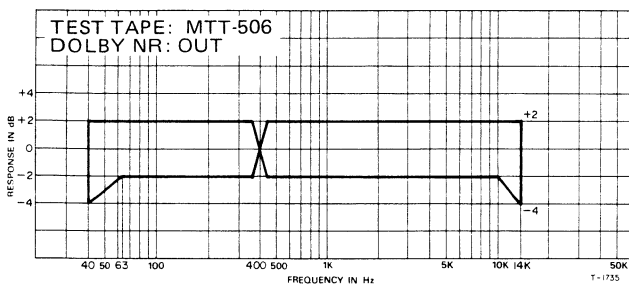


Fig. 6-16 Overall Frequency Response Limits (CrO₂)

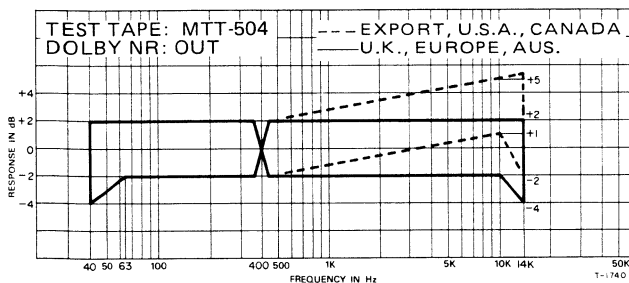


Fig. 6-17 Overall Frequency Response Limits (FeCr)

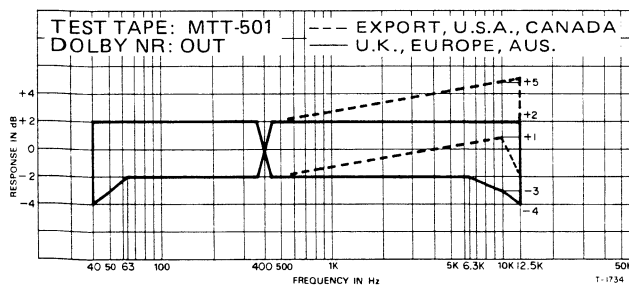


Fig. 6-18 Overall Frequency Response Limits (NORMAL)

6-5-6 SIGNAL TO NOISE RATIO

— OVERALL —

Specifications:

CrO ₂ and FeCr tapes:	48 dB (min.)
NORMAL tape:	46 dB (min.)

CrO₂

1. Connect the deck and the test equipment as shown in Fig. 6-9.
2. Initially make sure that deck is set in the specified recording and playback condition.
3. Load the TEAC MTT-506 test tape.
4. Apply and record specified input level of -9 dB (275 mV) of 1 kHz signal for several seconds.
5. Then continue recording with no signal applied for a few seconds.
6. Rewind the tape to the beginning of the 1 kHz signal recorded portion.
7. Play and obtain the output difference between the 1 kHz signal recorded portion and the no signal recorded portion.

FeCr and NORMAL

8. Repeat the preceding procedures using the following substitutions.

	FeCr tape	NORMAL tape
BIAS/EQ switches:	FeCr position	NORMAL position
Test tape:	MTT-504	MTT-501

6-5-7 ERASE EFFICIENCY

Specification: 65 dB (min.)

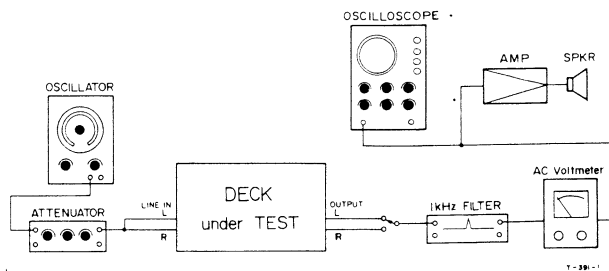


Fig. 6-19 Connection

NOTE: To measure erase efficiency, a 1 kHz narrow band-pass filter should be used. The test signal delivered from the AF oscillator should be tuned to the filter used.

Numbers in parentheses correspond to steps in Fig. 6-20.

1. Load a TEAC MTT-506 test tape.
2. Apply and record a 1 kHz signal at +1 dB (0.869 V) for several seconds. (1)
3. Rewind the tape to the mid-point of the recording and remove the signal from the LINE IN jacks (2)
4. Place the deck in the record mode and record through

- this previously recorded portion with no input signal applied. (3)
5. Rewind the tape to the starting point of the 1 kHz signal recorded portion. (4)
 6. Play the tape and read the indication on the AC Voltmeter to obtain the output level of both the unerased portion and the erased portion of the recorded section (5)
 7. Measure the output level differences between the 2 portions. (5)
 8. A 65 dB difference or more is required.

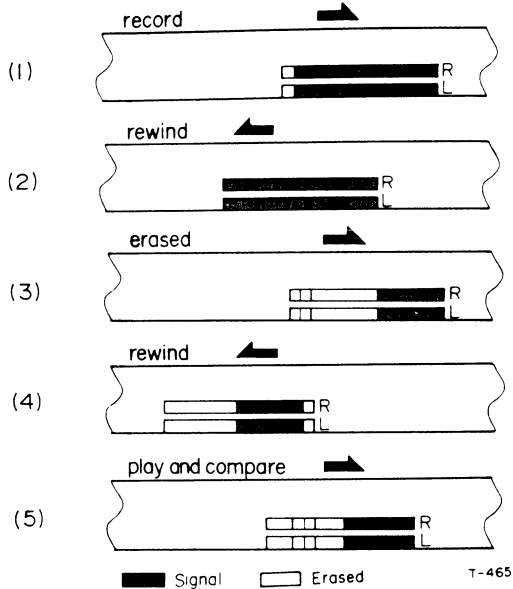


Fig. 6-20 Erase Efficiency Check Procedure

6-5-8 REC MUTE FUNCTION CHECK

Specification:

Difference between specific recorded portion and erased internal portion: 65 dB (min.)

NOTE: For this check, a 1 kHz narrow bandpass filter should be used. This test signal delivered from the AF oscillator should be tuned to the filter used.

1. Connect the deck and the test equipment as shown in Fig. 6-19.
2. Load a TEAC MTT-506 test tape.
3. Apply and record a 1 kHz signal at +1 dB (0.869 mV) for several seconds.
4. Push the REC MUTE button so that it will cause the tape to run with no incoming signal recording for several seconds.
5. Push the forward button again to make normal recording for a short duration.
6. Rewind the tape to the original starting point of the 1 kHz signal recorded portion.
7. Play the tape and obtain the output level of both the recorded portion and the created no signal portion.
8. Measure the output level difference between the portions.
9. A 65 dB difference or more is required.

6-5-9 CHANNEL SEPARATION

Specifications: 30 dB (min.)

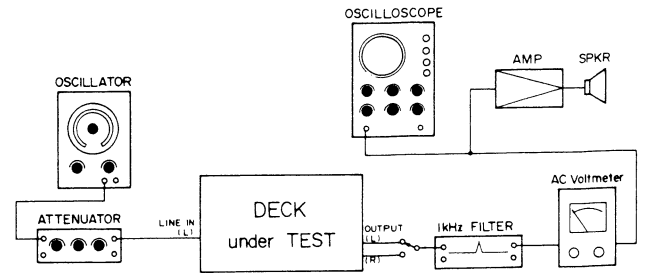


Fig. 6-21 Connection

NOTE: To check channel separation (cross talk between channels), a 1 kHz narrow bandpass filter should be used. The test signal delivered from an AF oscillator should be tuned to the filter used.

Numbers in parentheses correspond to steps in Fig. 6-22.

1. Load a TEAC MTT-506 test tape.
2. Apply a 1 kHz test tone at -9 dB (274 mV) into the left channel.
3. Place the deck in the record mode for about 30 seconds. (1)
4. Rewind the tape to the starting point of recording. . . (2)
5. Play the tape and measure the output level differences between the left and right channels. (3)
6. A 30 dB difference or more is required.

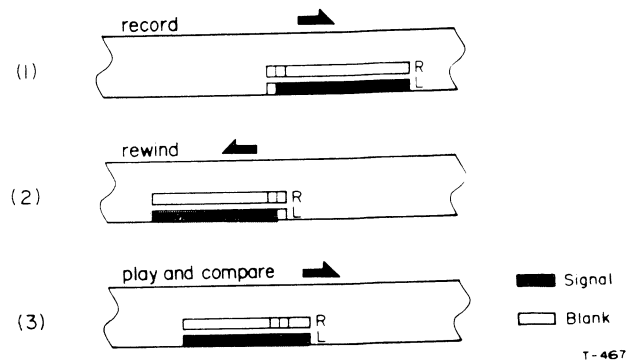


Fig. 6-22 Channel Separation Check Procedure

6-5-10 DOLBY NR EFFECT MEASUREMENT

Specifications:

Variation from reference at 1 kHz: 3 dB to 8 dB
 Variation from reference at 10 kHz: 8 dB to 12 dB

1. Connect the deck and the test equipment as shown in Fig. 6-9.
2. Load a TEAC MTT-506 test tape.
3. Apply and record a 1 kHz signal at -29 dB (27.5 mV).
4. Rewind and play this recorded section.
5. During playback, read the indication on the AC Voltmeter and note it for temporary reference level for the following measurement.
6. Set the DOLBY NR switch to IN.
7. Ensure the reading reduces 3 dB to 8 dB from the reference level.
8. Apply and record a 10 kHz signal at -39 dB (8.69 mV) with DOLBY NR to OUT.
9. In the same manner as step 4 to 7, ensure the reading reduces 8 dB to 12 dB when the DOLBY NR Switch is set to IN.

6-5-11 ADJACENT TRACK CROSSTALK MEASUREMENT

Specification: 40 dB (min.)

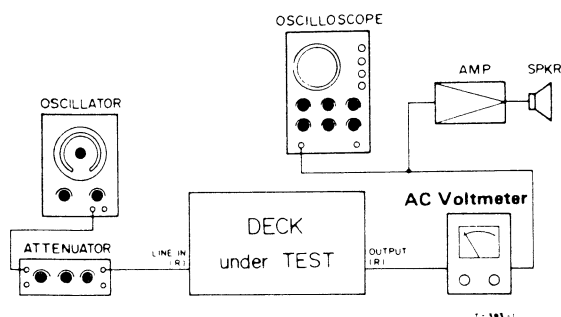


Fig. 6-23 Connection

NOTE: The tape must be completely erased or demagnetized prior to this procedure.

Numbers in parentheses correspond to steps in Fig. 6-24.

1. Load a TEAC MTT-506 test tape.
2. Apply a 125 Hz test signal at -9 dB (274 mV).
3. Place the deck in the record mode for about 30 seconds.(1)
4. Rewind the tape to the starting point of recording. . .(2)
5. Play the tape and measure the output level of the recorded portion. Note this reading for temporary reference level for the following measurements.(3)
6. Remove the test tape, turn it over and replace it in the deck.(4)
7. Play the tape back and read the output level.(5)

8. Get the difference between this reading and the reading previously measured for the 125 Hz signal.
9. A 40 dB difference or more is required

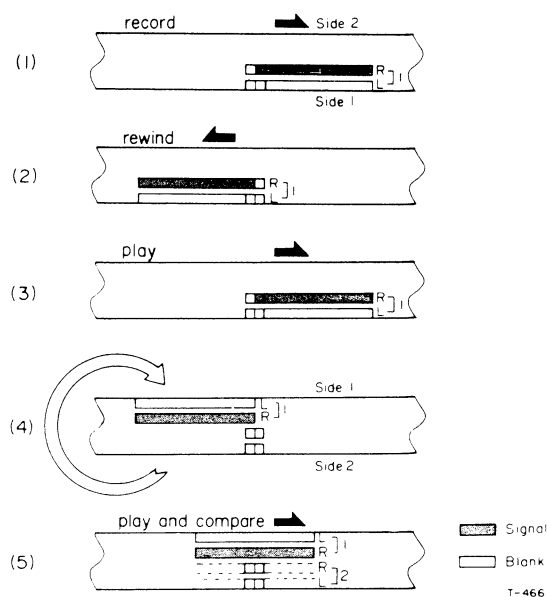


Fig. 6-24 Adjacent Track Crosstalk Measurement Procedure

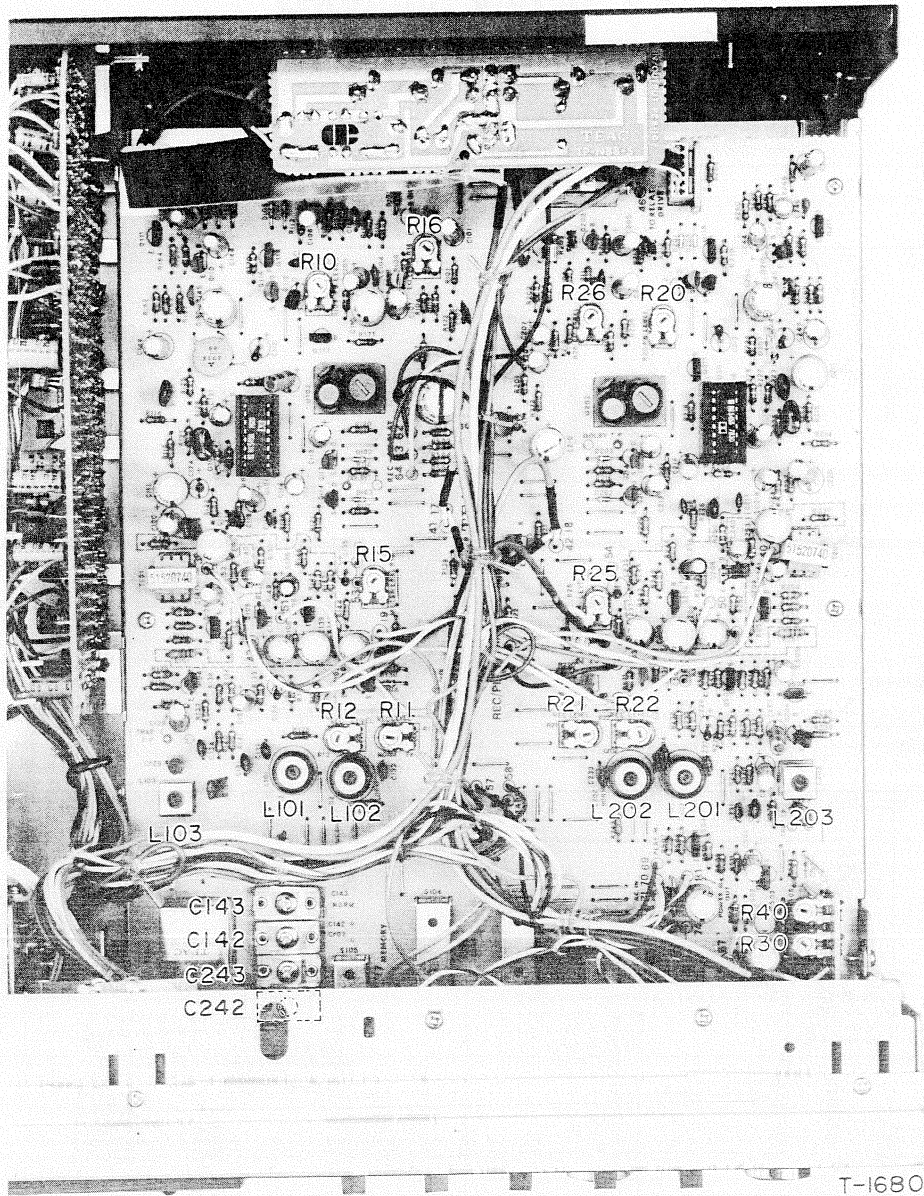
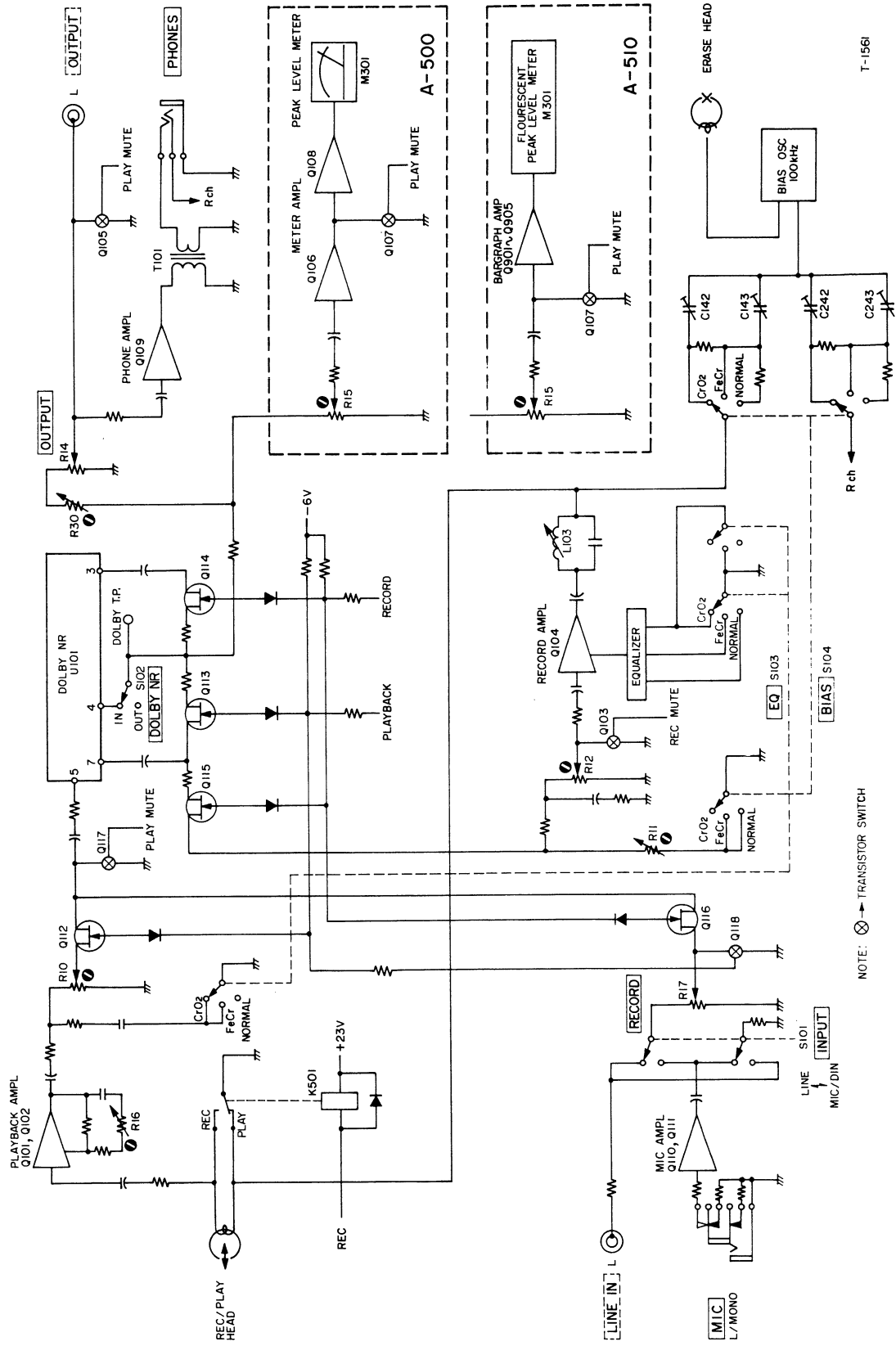


Fig. 6-25 Adjustment Location

R10/R20	Playback level adjustment
R11/R21	Record level adjustment (NORMAL)
R12/R22	Record level adjustment (CrO ₂)
R15/R25	Peak level meter adjustment
R16/R26	Playback equalization
R30/R40	Playback level balance
C142/C242	Bias adjustment (CrO ₂)
C143/C243	Bias adjustment (NORMAL)
L101/L201	Record equalization (CrO ₂)
L102/L202	Record equalization (NORMAL)
L103/L203	Bias trap adjustment

7 BLOCK DIAGRAM

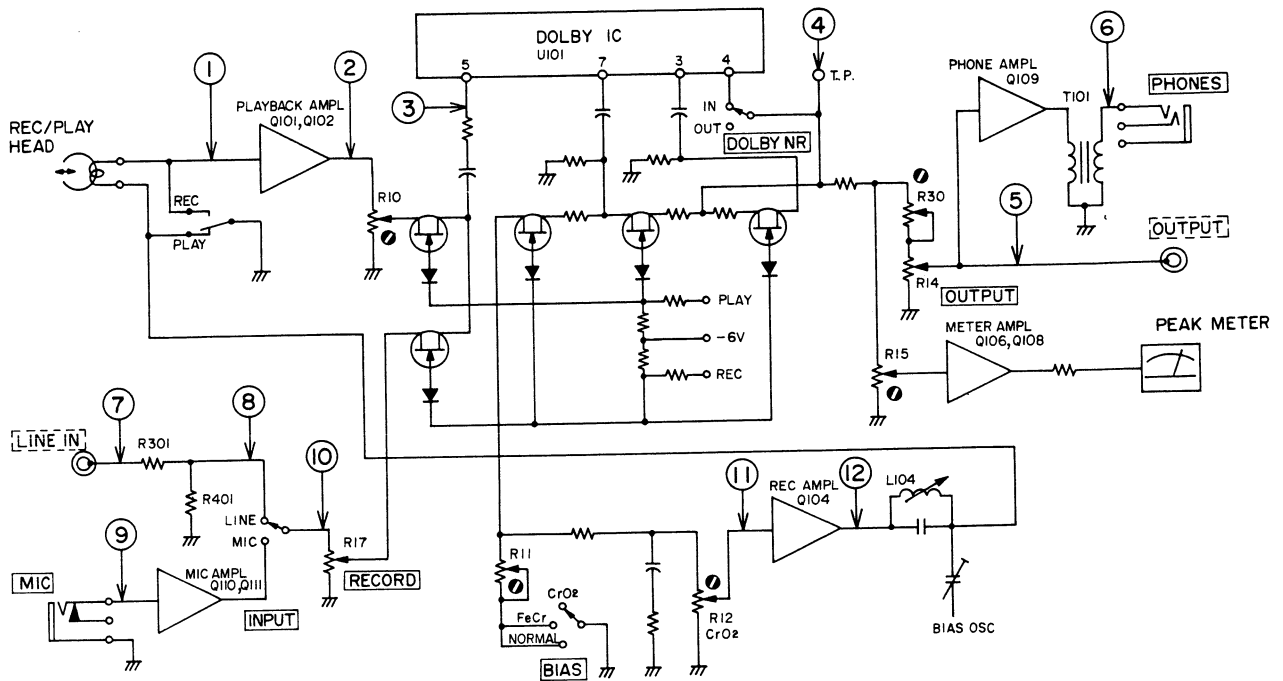


T-1561

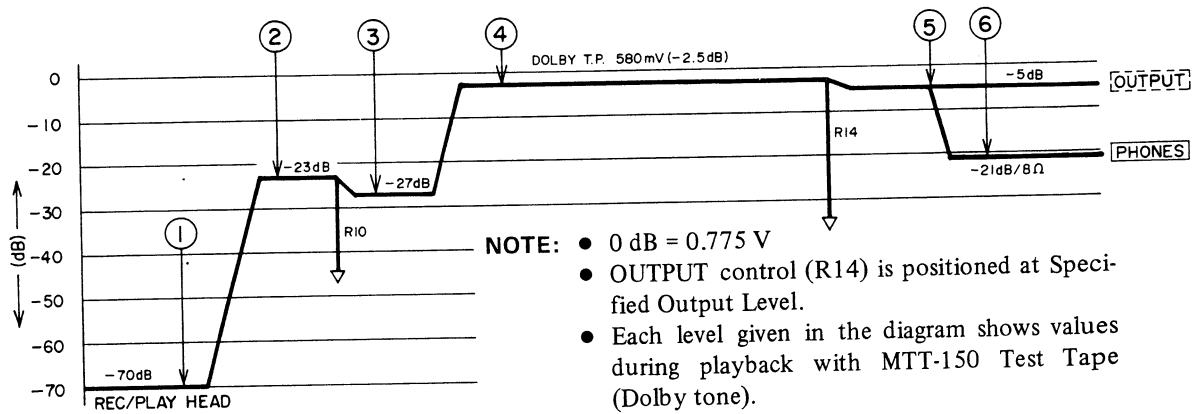
NOTE: ⊗ → TRANSISTOR SWITCH

NOTE: REF. Nos. shown in the diagram relate only to the left channel.

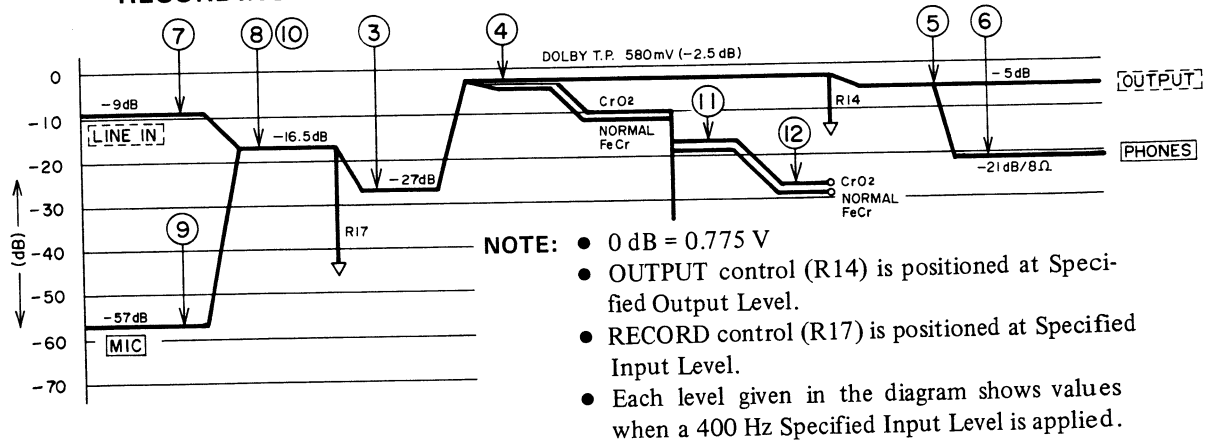
8 LEVEL DIAGRAM



PLAYBACK SECTION



RECORDING SECTION



9 VOLTAGE AND FREQUENCY SETTING

9-1 VOLTAGE SELECTOR SETTING PROCEDURE (FOR GENERAL EXPORT MODELS)

1. Always disconnect the power line cord before making these adjustments.
2. Remove the top cover* of the deck by removing the screws from the sides.
3. Locate the voltage selector, shown in the illustration, to the front of the power transformer.
4. Loosen the two screws in the shorting bar and move the bar so that it shorts across the terminals marked with the required voltage (100, 117, 220 or 240).
5. Retighten the screws and replace the top cover*.

* Decks sold in some limited areas only have a wooden case which must be removed by the screws on the bottom of the deck before setting the voltage selector.

9-2 AC POWER LINE FREQUENCY ADAPTATION

Since the A-510/A-500 employs a DC servo motor, 50 Hz or 60 Hz operation is permitted without power line frequency adaptation.

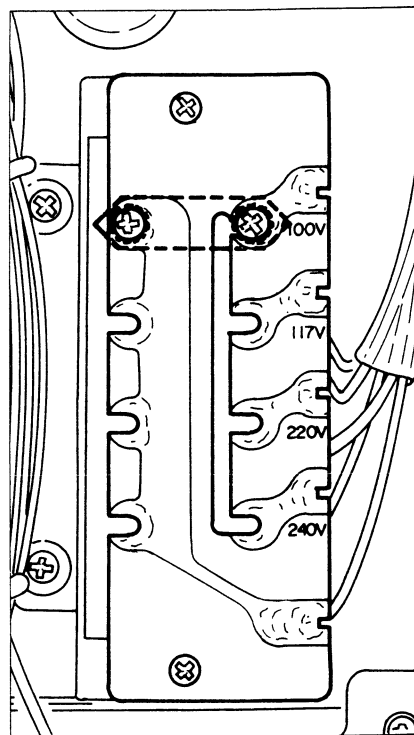


Fig. 9-1 Voltage Selector Setting

A-510/A-500

Stereo Cassette Deck with Dolby System

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