TEAC®

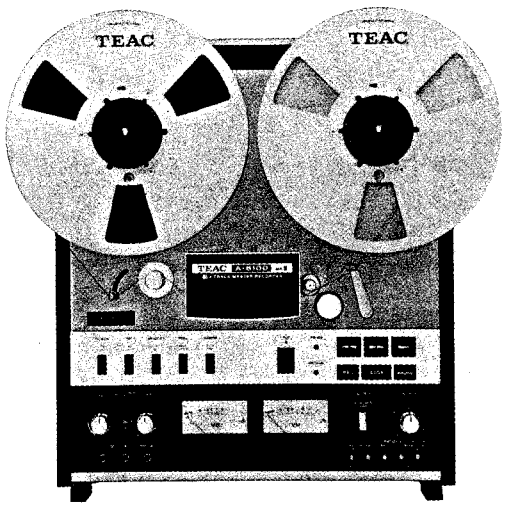
SERVICE MANUAL

A-6100MKII

Stereo Tape Deck

1. GENERAL DESCRIPTION

The TEAC A-6100MKII open reel tape deck is a 1/2 track, 2 channel (stereo) master tape deck which has 1/2 track record/play capability and also 1/4 track play capability. The A-6100MKII operates at two selectable speeds, 15 ips and 7-1/2 ips. It can be used with reels of up to 10-1/2" diameter. Also, this deck provides a choice of 2 output levels (0.3 V and 0.775 V) which are selectable on the rear panel.



– TABLE OF CONTENTS –

2. SPECIFICATIONS AND SERVICE DATA

Track System	1/2-Track, Two-channel Stereo or Mono; 1/4-Track Playback Switchable
Heads	Four: Erase, Record, 2-Track Playback, and 4-Track Playback
Motors	Three: 1 Dual-Speed Hysteresis Synchronous Capstan Motor; 2 Eddy-Current Induction Reel Motors
Reel Size	10-1/2" and 7"
Tape Speed	7-1/2 ips and 15 ips
Input (Level and Impedance)	MIC: Specified; −60 dB (0.775 mV)/10k ohms Minimum; −70 dB (0.245 mV) with ATT 0 dB −50 dB (2.45 mV) with ATT 20 dB LINE: Specified; −8 dB (308 mV)/50k ohms Minimum; −18 dB (97.5 mV)
Output (Level and Load Impedance)	LINE: Specified; −8 dB (308 mV)/50k ohms Maximum; 0 dB (0.775 V) at HIGH LEVEL −5.5 dB (411 mV) at LOW LEVEL Headphone Out; −24 dB (48.9 mV)/8 ohm
Playback Equalization	15 ips: 3180 μ sec + 50 μ sec (NAB) ∞ + 35 μ sec (IEC) 7-1/2 ips: 3180 μ sec + 50 μ sec (NAB)
Bias Frequency	100 kHz ±5 kHz (push-pull oscillator)

Power Requirement and Consumption

Model	Voltage	Frequency	Consumption
U.S.A./ Canada	117 V	60 Hz	145 W
General Export	100, 117, 220, 240 V	50/60 Hz	145 W

Weight	24 kg (53 lbs) net
Dimensions (WHD)	440 x 512 x 210 mm (17-5/16" x 20-3/16" x 8-1/4")

2-2 SERVICE DATA – MECHANICAL –

Tape Speed Deviation and Drift	3.000 Hz, ±30 Hz, within 15 Hz
Wow and Flutter	Playback: 0.10% (RMS) at 15 ips 0.12% (RMS) at 7-1/2 ips Overall: 0.12% (RMS) at 15 ips 0.15% (RMS) at 7-1/2 ips
Pinch Roller Pressure	2.2 kg (4.8 lbs)

Reel Torque

REEL SW	TAKE-UP TORQUE
LARGE	980 to 1030 g-cm (13.7 to 14.4 oz-in.)
SMALL	470 to 490 g-cm (6.6 to 6.9 oz-in.)

BACK TENSION (TAPE TENSION)		
Mode	Horizontal	Vertical
PLAY	45 to 55 g-cm (0.6 to 0.8 oz-in.)	55 to 65 g-cm 0.8 to 0.9 oz-in.)
F.F	45 to 55 g-cm (0.6 to 0.8 oz-in.)	65 to 75 g-cm (0.9 to 1.1 oz-in.)
REW	25 to 35 g-cm (0.4 to 0.5 oz-in.)	35 to 45 g-cm (0.5 to 0.6 oz-in.)

Brake Torque	1.600 to 2.000 g.cm (22.4 to 28.0 oz-inch)
F.F/REW Time	140 seconds for 1800 foot tape

2-3 SERVICE DATA – ELECTRICAL –

Frequency Response — Refer to Frequency Response Limits charts on page 18, 21.

Signal-to-Noise Ratio (Overall)

EQ SW	15 ips	7-1/2 ips
NAB	48 dB	48 dB
IEC	49 dB	—

Erase Efficiency — 68 dB at 1 kHz signal (Measurement with input 10 dB higher than the Specified Input Level)

Stereo Channel Separation — 50 dB Channel to Channel at 1 kHz

Total Harmonic Distortion — Overall: 1.0% at 1 kHz signal at 0 VU

NOTE: As a result of continuing changes and improvements during the production run, minor differences may be found between early and later machines.
Value of "dB" in the manual refers to 0 dB = 0.775V.

DIMENSIONS

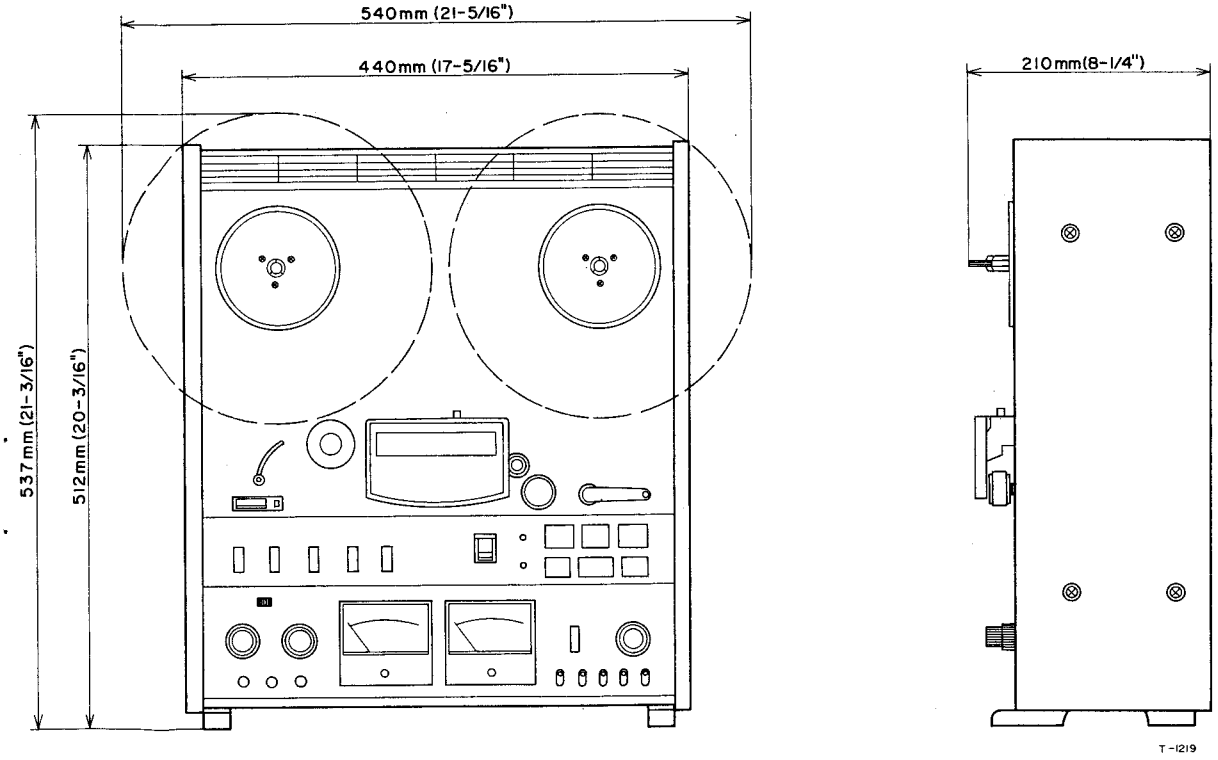


Fig. 2-1 Dimensions

3. TOOLS FOR TESTING AND MAINTENANCE

A minimum of the following tools and test instruments are required for measuring and adjusting to obtain optimum performance. Regular maintenance tools will be adequate for those not listed here. If any test instrument listed here is not available, a close equivalent can be used.

SPRING SCALE . . . . . 0–4 kg (0–8 lbs)
0–300 g (0–10 oz)
FLUTTER METER . . . . . Meguro Denpa Sokki K.K., Model MK-668C
DIGITAL COUNTER . . . . . Range; 0 Hz–100 kHz
BANDPASS FILTER . . . TEAC MODEL M-206A (1 kHz)
VTVM (AC) . . . . . Hewlett-Packard Co., Model 400E
AF OSCILLATOR . . . . . 10 Hz–100 kHz
ATTENUATOR . . . . . General purpose
OSCILLOSCOPE . . . . . General purpose
BLANK TAPE . . . . . TEAC YTT- 8013
TEAC TEST TAPE . . . . YTT-1003 (7-1/2 ips), YTT-1004 (15 ips) for Playback Alignment test
YTT-2003 (7-1/2 ips), YTT-2004 (15 ips) for Tape Speed and Wow and Flutter test
TEAC EMPTY REEL . . . . . RE-702 (2.5" dia, hub)
RE-701 (4" dia, hub)
TOOLS . . . . . General
2 mm nut driver
Hex Head Allen Wrench
Plastic alignment tool
Load resistor non inductive type 8 ohm/1 W
DEMAGNETIZER . . . . . TEAC E-3 or equivalent
TENSION ANALYZER . . . . . TENTELOMETER Type T2-H20-ML, NJS Co. Model ITAI or equivalent

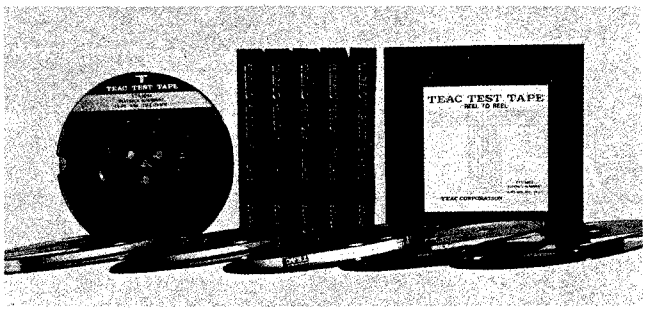


Fig. 3-1 TEAC YTT Test Tape

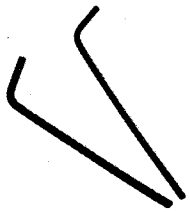


Fig. 3-2 Hex Head (allen) Wrench

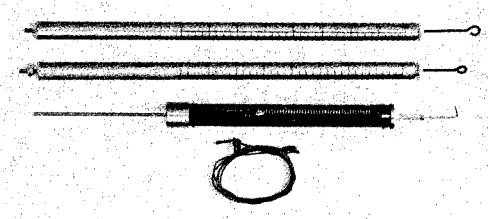


Fig. 3-3 Spring Scales

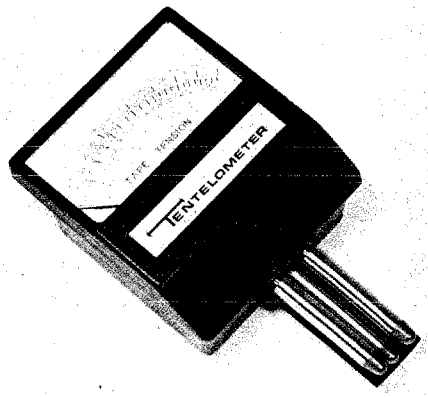


Fig. 3-4 Example of Tension Analyzers

4. PARTIAL DIS-ASSEMBLY

-1 OUTER CASE AND PANEL REMOVAL

emove necessary panels as shown in the illustration.
nplug the power cord before removing any panel or
ıternal parts.

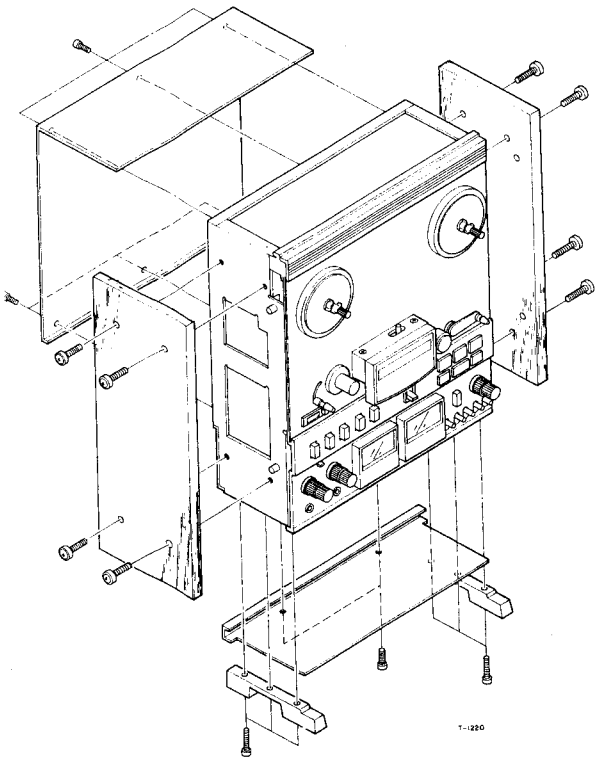


Fig. 4-1 Outer Case and Panel Removal

4-3 FLYWHEEL AND CAPSTAN ASS'Y REMOVAL

1. Unscrew (by hand) the capstan dust cap (F).
2. Remove 3 screws from capstan thrust angle (A) and remove it.
3. Remove flywheel (B) by loosening 2 hex head set screws and removing drive belt (C).
4. Remove arm support plate (D) and capstan ass'y (E) by removing 3 screws.

NOTE: Wheel replacing parts make sure belt and capstan shaft are clean and free of oil. Clean these parts if necessary.

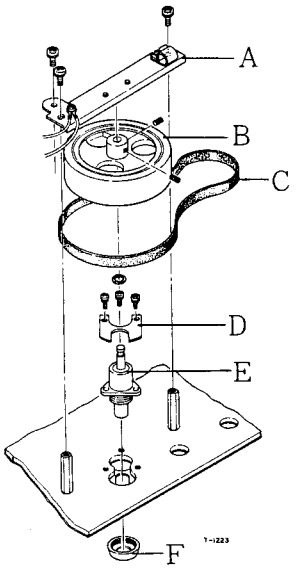


Fig. 4-2 Flywheel and Capstan Ass'y Removal

4-2 HEAD ASSEMBLY REMOVAL

. Remove the 2 screws in the top of the head cover and lift it off.
2. Remove 3 screws holding head base plate (with heads).
3. Remove 2 mounting nuts through access slot in head base plate and dis-connect head wires. See Fig. 6-4.

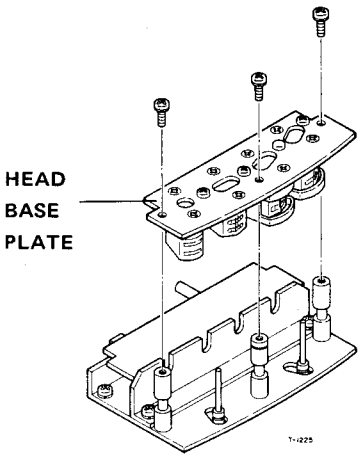


Fig. 4-3 Head Ass'y Removal

4-4 REEL MOTOR REMOVAL

1. Loosen 2 set screws (hex head) in brake drum (A) and 2 in the reel turntable ass'y (D) at front of the reel motor. Lift off these parts.
2. Remove 4 mounting screws securing the brake ass'y (B) to the motor.
   Carefully lift off the brake ass'y (B).
3. Remove 4 mounting screws securing reel motor (C) to chassis through the front panel.

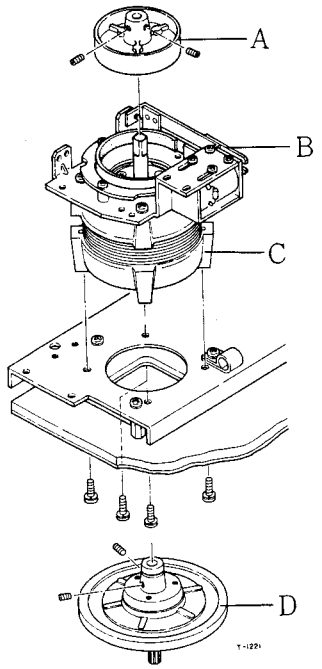


Fig. 4-4 Reel Motor Removal

4-6 LEFT TENSION ARM AND GUIDE REMOVAL

1. Loosen set screws in Impedance Flywheel (E) and remove it .
2. Remove 3 mounting screws securing the Tension Arm bracket (D).
3. Disconnect one end of spring (B).
4. Loosen set screw in TENSION ARM (C) and remove TENSION GUIDE (A). Also, remove TENSION ARM (C) by removing E ring.

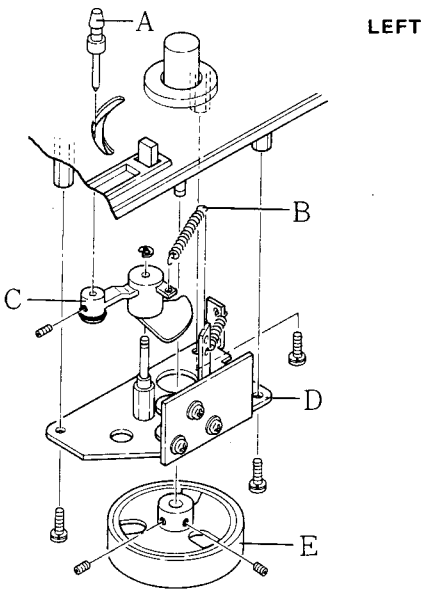


Fig. 4-5 Left Tension Arm and Guide Removal

4-5 RIGHT TENSION ARM REMOVAL

See illustration for complete dis-assembly instructions.

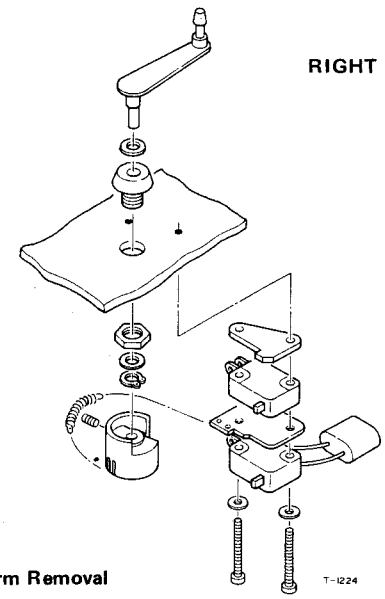


Fig. 4-6 Right Tension Arm Removal

5. TAPE TRANSPORT PARTS LOCATION

— REAR VIEW —

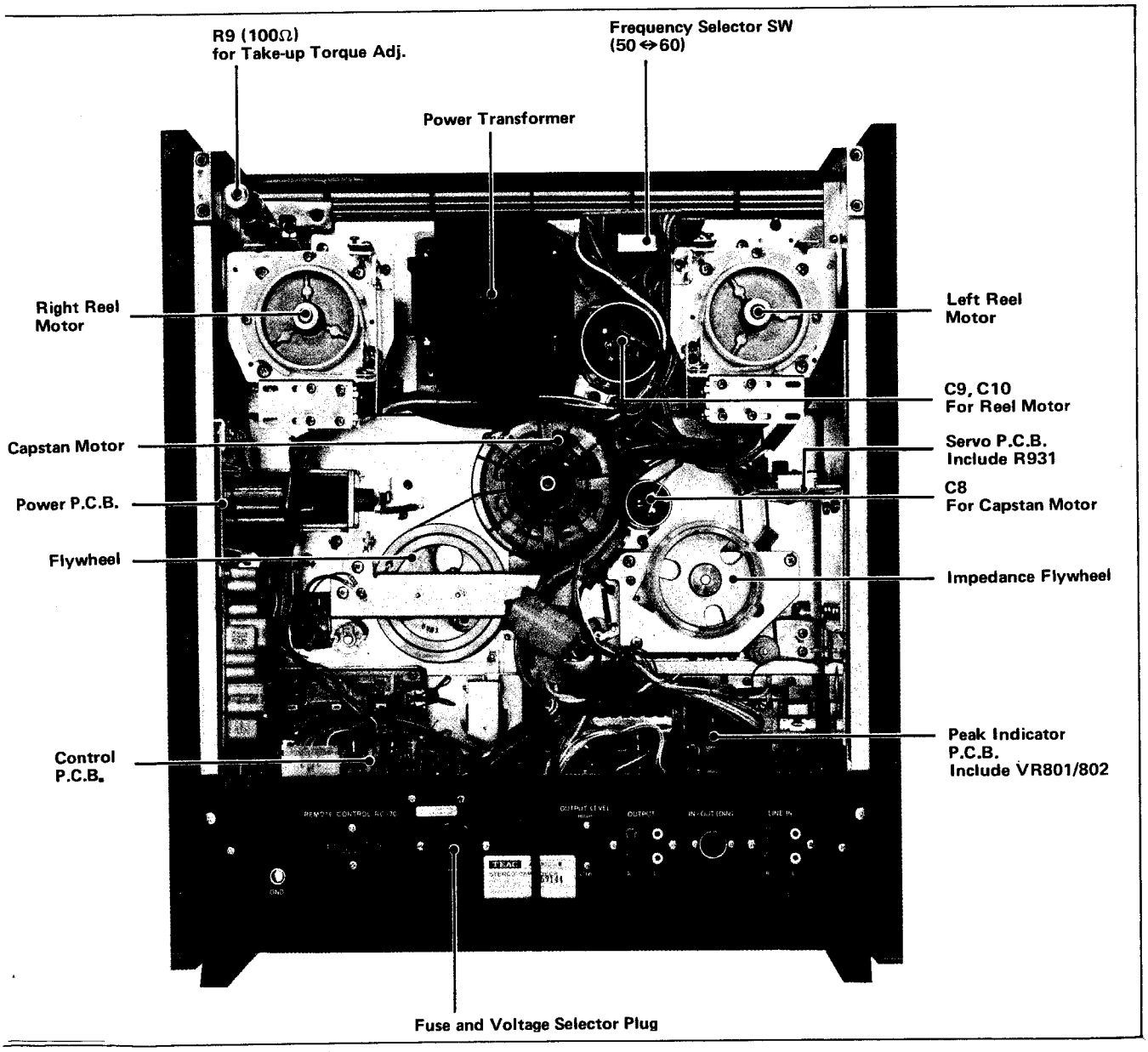


Fig. 5-1 Tape Transport Parts Location

6. HEAD REPLACEMENT AND ALIGNMENT
— MECHANICAL —

6-1 HEAD REPLACEMENT

To replace a single head a special 2 mm nut driver is required. Remove the 2 nuts (A) on the defective head through the access hole provided. This releases the head from the mounting plate. Note the position of the wires on the circuit board. Connect the new head in the same manner. Replace the nuts securing the new head to the plate. Perform head alignment before operation.

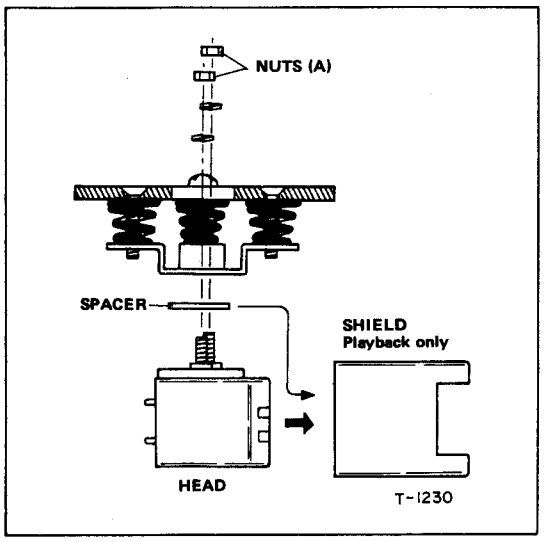
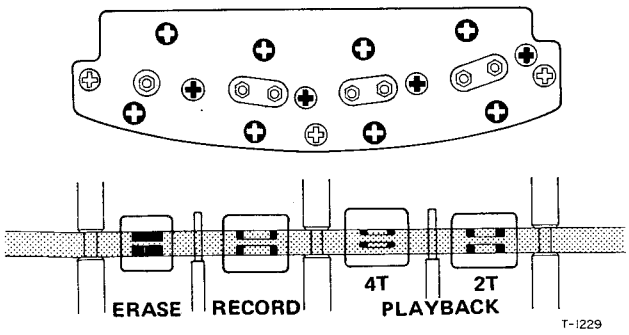


Fig. 6-1 Head Replacement

6-2 HEAD ADJ. SCREWS AND ALIGNMENT



⊕ Azimuth adj. screws

⊕ Height and Tilt adj. screws

◎ Tangency adj. Nuts

Fig. 6-2 Head Adjustment Screws and Alignment

6-3 VISUAL HEAD ALIGNMENT

Since the head alignment critically affects the frequency response on both playback and recording, the head alignment should be done carefully. The head can be adjusted in TILT, TANGENCY, HEIGHT and AZIMUTH.
For head alignment, perform the following coarse adjustments first. Then fine alignment should be accomplished electrically while playing back the Test Tape.

Coarse Adjustment:
Without Tape
TILT . . . . . By Height and Tilt screws
This alignment is performed by viewing from the side without tape threaded.
Check that the head surface is parallel to the tape guide surface.

With Tape
TANGENCY . . . . . By Head mounting nuts
Loosen the head mounting nuts. Adjust the head so that the vertical alignment of the head gap is perpendicular to the surface of the tape, then tighten the head mounting nuts.
HEIGHT . . . . . By Height and Tilt screws
This alignment is checked visually by looking at the position of the head.
The head core for track-1 (inner core) should be even with the inner edge of the tape.
AZIMUTH . . . . . By Azimuth adj. Screw
Adjust the azimuth adj. screw so that the gap of the head is perpendicular to the tape travel.

NOTE: After this coarse adjustment is made, the adj. screws and the Head mounting nuts should be realigned according to electrical head alignment paragraph which follows in this Service Manual.

6-4 MIS-ALIGNMENT OF THE HEADS

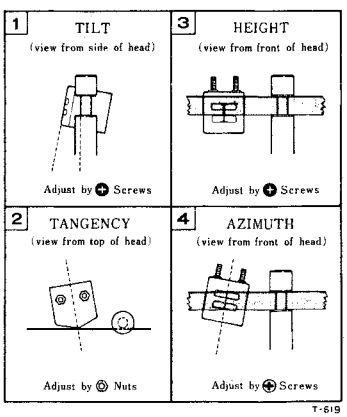


Fig. 6-3 Head Mis-Alignment –Example –

—HEAD WIRING—

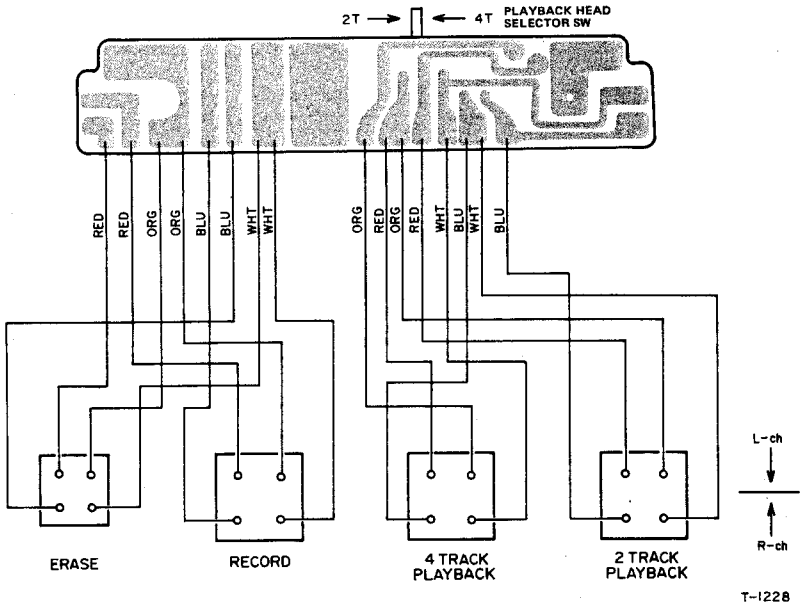


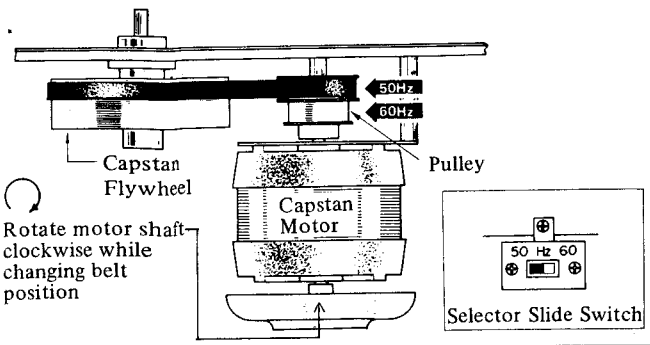
Fig. 6-4 Head Wiring

—VOLTAGE AND FREQUENCY CONVERSION (only General Export Model)

This deck is adjusted to operate on an electric power source of the voltage and frequency specified on the reel tag and packing carton. If it is necessary to change the frequency or voltage requirements of this deck to match your area, use the following procedures.
ALWAYS DISCONNECT POWER LINE CORD BEFORE MAKING THESE CHANGES.

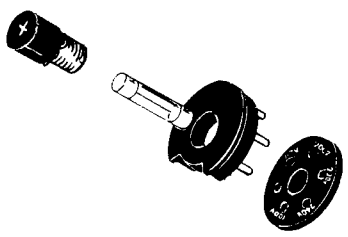
Frequency Conversion:

1. Remove the right side wood panel (4 screws), then the rear/top metal panel (6 screws).
2. Set the power frequency selector slide switch (located next to the capstan motor) to the 50 or 60 position to match the power line frequency in your area.
3. Rotate the center (capstan) motor clockwise with your hand and re-position the belt onto the correct pulley as shown in the motor pulley illustration below.
   The pulley can be seen by looking through the opening in the side panel. Continue to rotate the motor by hand approximately 10 revolutions to verify belt placement before replacing the side and rear covers.



Voltage Conversion:

The deck may be set for 100, 117, 220 or 240 volts. To change the voltage unscrew the fuse in the center of the voltage selector plug. Pull out the plug and reinsert it so the desired voltage shows in the cutout. Reinstall the fuse specified on the label on the rear of the deck.

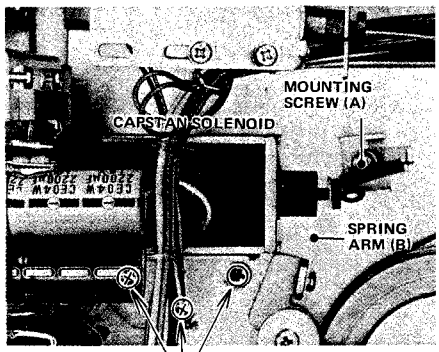


7. MEASUREMENT AND ADJUSTMENT
— MECHANICAL —

7-1 PINCH ROLLER PRESSURE CHECK

NOTE: Pinch roller pressure is supplied by the pinch roller spring arms and it is most important that the solenoid plungers be fully bottomed before taking pressure measurements.

1. Load tape or block the shut-off arm in the ON position.
2. Attach a suitable spring scale to the pinch roller shaft.
3. Place the deck in the Play (▶) mode, and holding the spring scale as illustrated, slowly draw it away from the pinch roller.
4. Do not allow the spring to rub against the pinch roller.
5. Note the reading on the spring scale at the instant the pinch roller stops rotating.
6. The scale should indicate 2.1 to 2.3 kg (4.6 to 5.0 lbs).
7. If adjustment is necessary, loosen the 3 screws on the capstan solenoid and position the solenoid for optimum pressure.
8. Adjust solenoid-limit position so that the gap between capstan shaft and pinch roller is approx. 7mm when solenoid is not actuated. Also make sure pinch roller shaft does not contact Spring Arm (B). Limit is adjusted by loosening the mounting screw (A), then sliding limit until proper position is obtained.



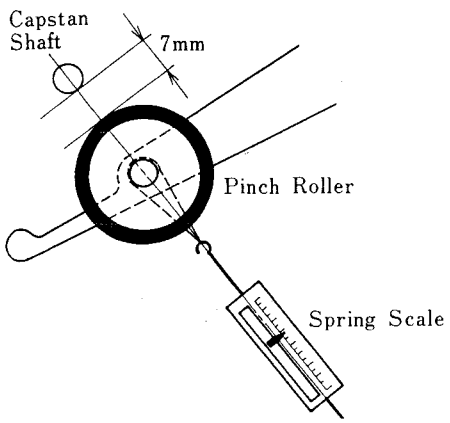


Fig. 7-1 Pressure Measurement and Adj. Location

7-2 BRAKE TORQUE MEASUREMENT

Brake torque measurement is made with Power OFF.

NOTE: The brake torque is actuated mechanically. Torque is set by the variable Leaf Spring Force. While making these measurements and adjustments, be careful not to be bend the brake bands.

Preliminary Adjustments

1. Loosen the screws marked (A) and (B) in the figure and then push the solenoid plunger until it is fully bottomed in the solenoid. At this time adjust the Brake Solenoid for minimum clearance between Brake Arm and Solenoid Plunger. Then tighten four screws (B). Then, while the plunger is fully bottomed, adjust the position of the Brake Band Space Ass'y so that there is a clearance between the Brake Band and the surface of the Brake Drum. Then tighten two screws (A).

Fine Adjustment

2. Place an empty large hub reel on the left reel table, and fasten one end of a 30" length of string to the reel anchor.
3. Wind several turns of string counter clockwise around the hub and attach a suitable spring scale to the free end of the string.
4. Pull on the spring scale and take a reading only when the reel is in steady motion since the force required to overcome static friction will produce a false, excessively high initial reading.
5. The reading should be 1,600 to 2,000 g-cm (22.4 to 28.0 oz inch).
6. If adjustment is required, loosen the 3 screws marked (C) shown and position the brake for optimum pressure.
7. The adjustment of the right brake is the same with the exception that rotations are clockwise. (wind string CLOCKWISE around reel hub)

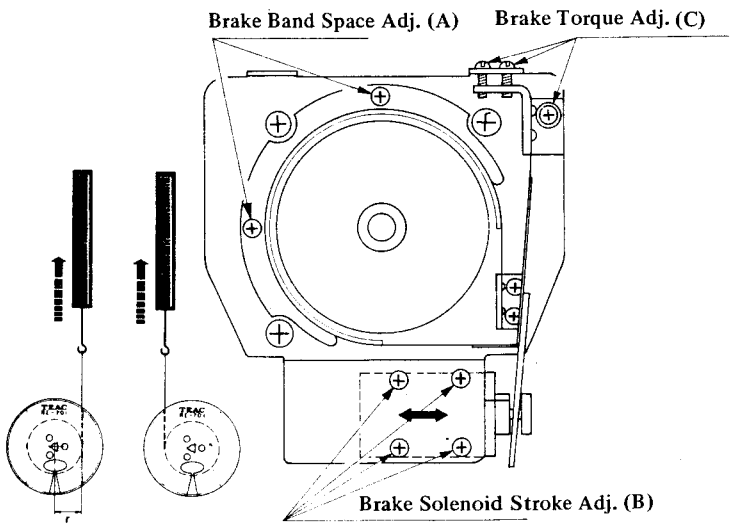


Fig. 7-2 Torque Measurement and Adj. Location

TORQUE MEASUREMENT PROCEDURE

OTE: The following torque measurements should be made with a spring scale that is calibrated to read torque in gram-cm. for a 7" reel with a small reel hub. If the spring scale you are using is calibrated to read Force or Weight in grams the torque must be calculated using the Formula:

Torque (in gm-cm or oz-in) =
Weight or Force (in gr. or oz.) x
radius of hub (in cm or inches)

f you are using a reel with other than the standard 2.5" or .0 cm (approx.) diameter hub, the torque must be calcuated using the same formula and substituting the actual adius and Weight or Force reading.

Torque measurements must be made with the automatic hut-off switch (right tension arm) held in the ON position. Brake Torque Measurement should be made using large hub eel with a hub diameter of 4" or 10.2 cm.

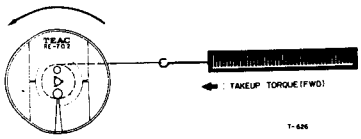


Fig. 7-3 Torque Measurement

7-3 TAKE-UP TORQUE

1. Place the empty reel on the right reel table and attach spring scale.
2. Place the deck in the Play mode.
3. Allow the rotation of the reel to slowly draw the scale toward the hub.
4. Hold the spring scale with enough force to allow a steady reading.
5. The reading or calculated value should be approx.:

REEL SW	TAKE-UP TORQUE
LARGE	980 to 1030 g-cm (13.7 to 14.4 oz-in.)
SMALL	470 to 490 g-cm (6.6 to 6.9 oz-in.)

Adjustment Location (Take-up only)
If necessary, adjust slider of the resistors until you have the correct scale reading for optimum torque.
Refer to adj. location below.

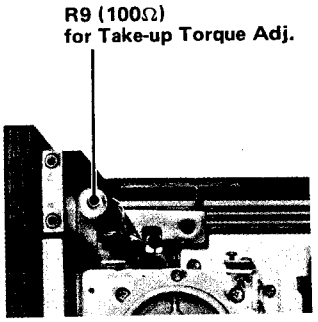


Fig. 7-4 Take-up Adj. Location

7-4 TAPE TENSION ADJUSTMENTS (BACK TENSION)

1. Place the deck in the horizontal position.
2. Attach the tension analizer as shown in Fig. 7–5.
3. Place the deck in the Play mode.
   (Use 7" reels and play tape at the beginning).
4. Check that the left tension guide (arm) is positioned approx. 7 mm above its fully down (lowest) position as shown in Fig. 7–5.
5. If adjustment is necessary, adjust R931 on Servo P.C.B. See Fig. 7–6.
6. Also check for the tape tension values given in the chart below.
7. If adjustment is necessary, adjust the screw shown in Fig. 7–7.

NOTE: Vertical and F.F/REW value is for reference only.

BACK TENSION (TAPE TENSION)		
Mode	Horizontal	Vertical
PLAY	45 to 55 g-cm (0.6 to 0.8 oz-in.)	55 to 65 g-cm 0.8 to 0.9 oz-in.)
F.F	45 to 55 g-cm (0.6 to 0.8 oz-in.)	65 to 75 g-cm (0.9 to 1.1 oz-in.)
REW	25 to 35 g-cm (0.4 to 0.5 oz-in.)	35 to 45 g-cm (0.5 to 0.6 oz-in.)

BACK TENSION MEASUREMENT AND ADJUSTMENT LOCATION

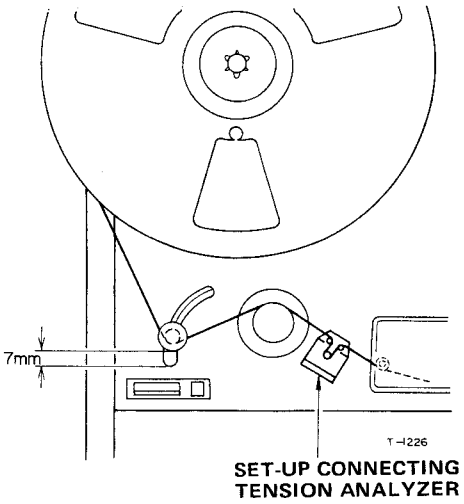


Fig. 7-5 Set-up Connecting Tension Analyzer

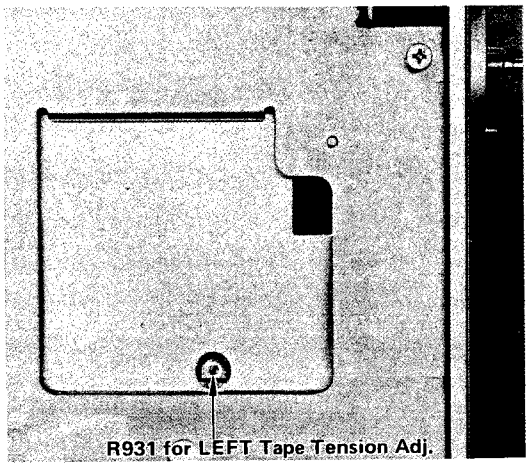


Fig. 7-6 Left Tension Guide (Arm) Position Adj. Location

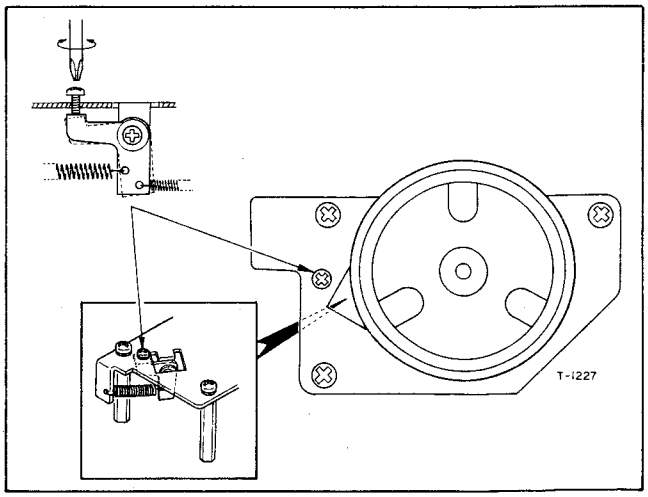


Fig. 7-7 Back Tension Adj. Screw Location

-5 TENSION GUIDE HEIGHT ADJUSTMENT

Check that there is a clearance of approx. 1 mm between tension arm and surface of the tape deck face plate.
Thread Tape on the deck and run it in both directions to check that tape moves in the center of the guide.
If adjustment is necessary, loosen the screw and move tension arm. Then tighten screw and repeat step 1 and 2.

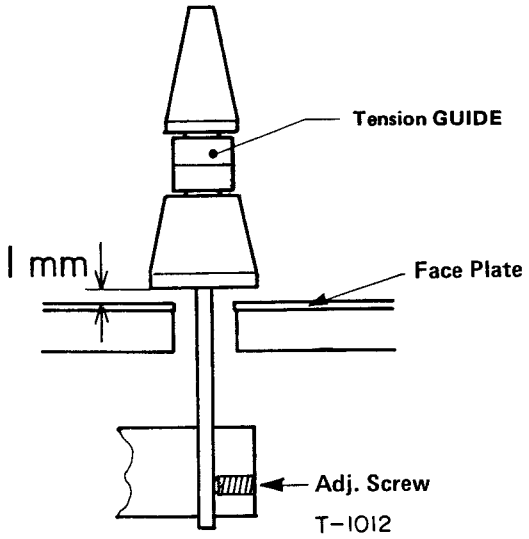


Fig. 7-8 Tension Guide (Arm) Height Adj.

7-6 REEL TABLE HEIGHT ADJUSTMENT

Reel height adjustment is required only if a motor has been replaced or if tape rubs excessively against the reel flanges. Adjustment is accomplished by loosening the reel set screws and moving the reel table on the motor shaft as shown in Fig. 7-9.
Remove the wooden side board on the left or right of the unit for access to the Set Screws (2) in the reel motor shaft. Reel table should be adjusted using standard NAB 10" reels. With a tape loaded on the machine, position the reel table height for smooth tape travel. Be sure to tighten the Set Screws after each adjustment is made.

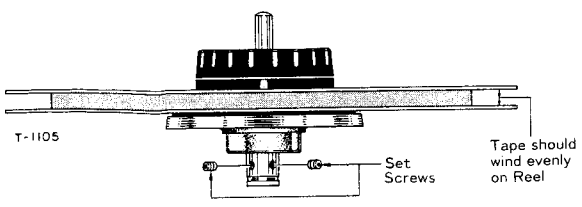


Fig. 7-9 Reel Table Height Adj.

7-7 TAPE SPEED CHECK

The tape speed should be measured using TEAC flutter free tape, Model YTT-2003 (7-1/2 ips) and YTT-2004 (15 ips). These tapes contain a highly accurate 3,000 Hz tone. Connect a digital frequency counter to either line OUTPUT jack. See Fig. 7-10. The indicated frequency should be 3,000 Hz (±30 Hz) for all speeds during playback of the tape.

7-8 WOW AND FLUTTER CHECK

NOTE: Before performing this measurement, clean the heads and Tape run guides, also check pinch roller pressure, etc.
Use new Test Tape if possible for following checks. Values obtained with different standards of equipment cannot be compared.

PLAYBACK

1. Connect Test equipment to the deck as shown Fig. 7-10. (Except oscillator).
2. Load TEAC YTT-2003 (for 7-1/2 ips) or YTT-2004 (for 15 ips) and playback tape.
3. Read the indication on the Wow and Flutter meter.
4. The Wow and Flutter should be:

0.12% (RMS) or less for 7-1/2 ips
0.10% (RMS) or less for 15 ips

OVERALL

1. Connect Test equipment to the deck as shown Fig. 7-10.
2. Load TEAC YTT-8013 (blank tape) Test Tape on the deck and Record a 3,000 Hz input signal.
3. Rewind and playback the recorded signal.
4. The reading on the Meter should be:

0.15% (RMS) or less for 7-1/2 ips
0.12% (RMS) or less for 15 ips

NOTE: These figures apply to any tape position (such as full take-up reel, full supply reel or about mid-point). Also examine the tape counter ass'y for evenness of operation.

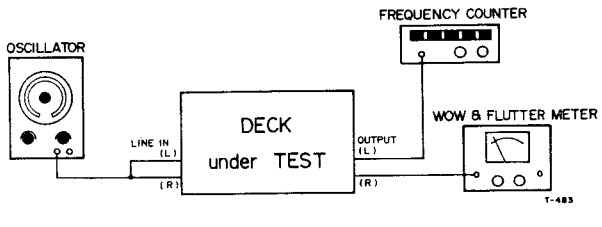


Fig. 7-10 Test Connections for Wow/Flutter and Tape Speed Test

8. MEASUREMENT AND ADJUSTMENT
— ELECTRICAL —

- Before performing maintenance on this deck, thoroughly clean and demagnetize the entire Tape path. TEAC maintenance equipment to be used:
  TEAC TZ-261 A/B for cleaning
  TEAC E-3 or equivalent for demagnetizing
- Service Data were determined using TEAC YTT Series Test Tape.
- The deck must be matched to the voltage and frequency of your locality.
- Most amplifier checks and adjustments can be made from the bottom with the (bottom) metal panel removed.
- The procedures for checks and adjustments are normally done for the left and right channels and at both speeds. The adjustment locations such as R263/264 indicate left channel/right channel adjustments.

8-1 ADJUSTMENT LOCATIONS AND ADJUSTMENT POINTS

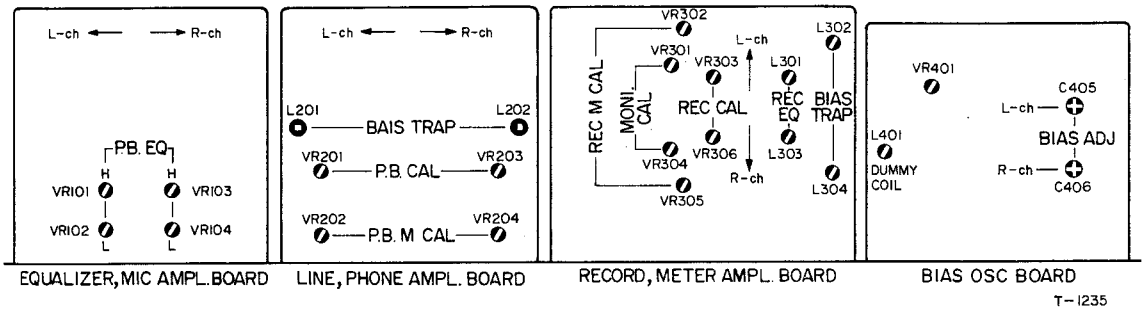


Fig. 8-1 Adjustment Locations and Adj. Points

8-2 ADJUSTMENT SEQUENCE CHART

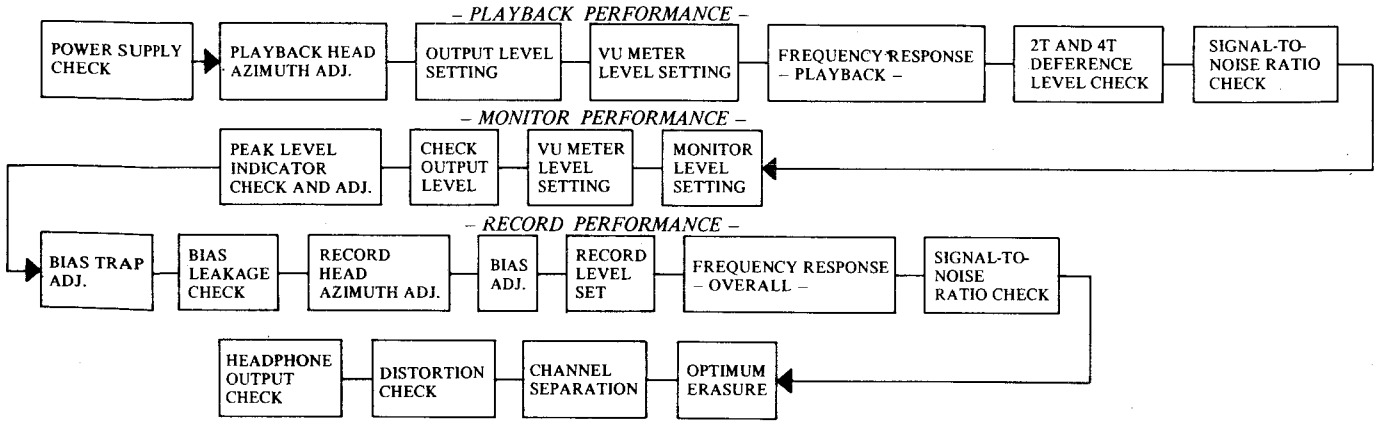


Fig. 8-2 Adjustment Sequence Chart

-3 POWER SUPPLY CHECK

. Remove Bottom panel of the deck for access to the Power Supply Test Points.
. Depress POWER SW to ON.
. Connect a VTVM between the BIAS OSC P.C. Board. Check across Test Points:
Test Point No. 13 and ground for +24V (±1V) DC
Test Point No. 7 and ground for +7V (±1V) DC
. Check only. No adjustment is provided.

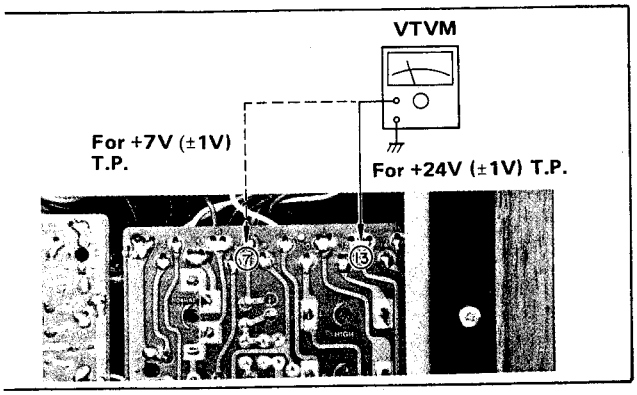


Fig. 8-3 Power Supply Check Points

– PLAYBACK PERFORMANCE –

8-4 PLAYBACK HEAD AZIMUTH ADJ.

NOTE: Before proceeding with the following head alignments be sure that heads have been properly mounted as to HEIGHT, TILT and TANGENCY. See page 10.

PREPARATION

OUTPUT LEVEL SW (on rear panel) . LOW
TIMER SW . . . . . OUT
MEMORY SW . . . . . OFF
REEL SW . . . . . SMALL
Tape SPEED SW . . . . . LOW
OUTPUT SW . . . . . TAPE
Playback Head Selector SW 2T
EQ (15 ips) SW . . . . . NAB

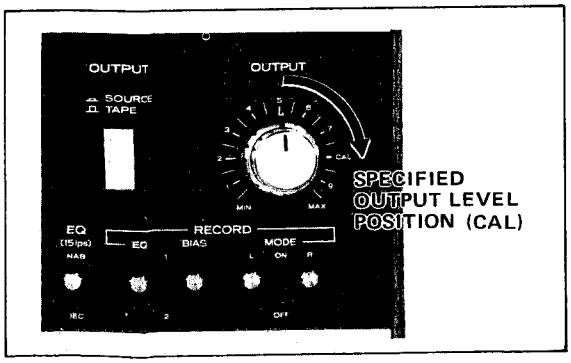


Fig. 8-4 Front Panel SW Location and Specified Output Level Position

– FINE ADJUSTMENT –

1. Connect a VTVM to either OUTPUT jack.
2. Fold up the Head Cover.
3. Thread the TEAC YTT-1003 Test Tape on the deck.
4. Play the 16 kHz/–10 dB Test Tone in section 2 of the Test Tape.
5. Slowly rotate the Azimuth screw until maximum signal is read on the VTVM.
6. Connect an Oscilloscope to the OUTPUT jacks.
7. Adjust the Azimuth screw (if necessary) until the Oscilloscope shows that the signals are less than 45° out of phase for 50 Hz to 10 kHz signals. Check these signals from the frequency response section of the Test Tape.
8. Secure the screw with a drop of locking paint.

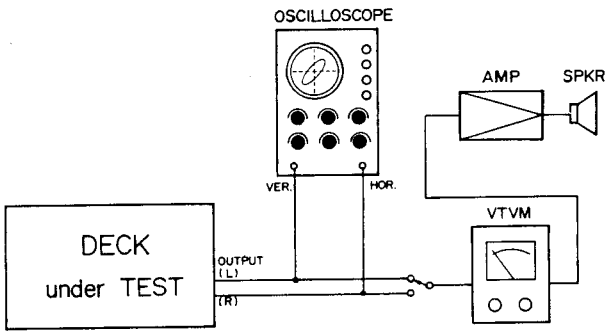


Fig. 8-5 Head Alignment Fine Adj, Set-up and Test Connections (PLAYBACK)

8-5 OUTPUT LEVEL SETTING

– SPECIFIED OUTPUT LEVEL –

9. Play the 400 Hz/0 dB tone in section 1 of the YTT-1003 Test Tape.
10. Set the reference mark of the OUTPUT level Control to the click (CAL) position.
11. Adjust PB CAL VR201/203 for –8 dB (308 mV) at OUTPUT jacks.

– MAX. OUTPUT LEVEL CHECK –

12. Turn the OUTPUT Level Controls fully clockwise (MAX) and check for –5.5 dB ±2 dB (367 mV to 461 mV) at OUTPUT jacks.
13. Reduce OUTPUT Level Controls until –8 dB (308 mV) is obtained on the output VTVM.

NOTE: This is the Specified Output Level setting. Do not disturb this setting until the remaining adjustments have been completed.

8-6 VU METER LEVEL SETTING

14. Adjust PB M CAL VR202/204 for 0 VU reading on VU Meters.

8-7 FREQUENCY RESPONSE – PLAYBACK –

15. Thread TEAC YTT-1003 on the deck.
16. Play Tape and compare reading on VTVM with the response limits given in Fig. 8-6 (A) (B).
17. If adjustments is required, adjust PB EQ VR102/104 for LOW speed.

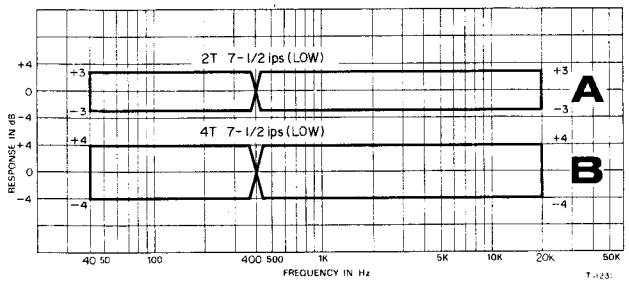


Fig. 8-6 Frequency Response (A) (B) – PLAYBACK –

Tape SPEED SW . . . . . HIGH

18. Thread TEAC YTT-1004 on the deck.
19. Play Tape and compare reading on VTVM with the response limits given in Fig. 8-7 (C) (D).
20. If adjustment is required, adjust PB EQ VR101/103 for HIGH speed.

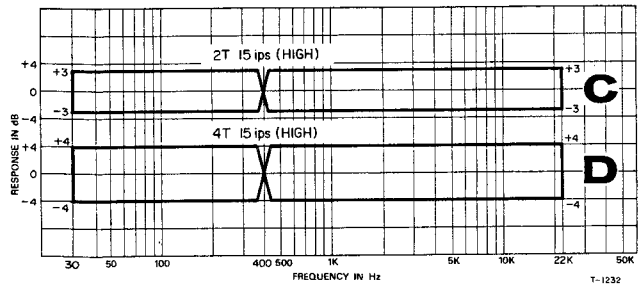


Fig. 8-7 Frequency Response (C) (D) – PLAYBACK –

EQ (15 ips) SW . . . . . IEC

21. Also check that IEC Frequency Response is within −3 dB ±2 dB at 10 kHz.

NOTE: If the response is not uniform, the head should be checked for accumulated dirt or oxide. If clean, head azimuth must be readjusted.

8-8 DIFFERENCE LEVEL CHECK 2T PLAY AND 4T PLAY

22. With the controls set as described in item 8-5, Check that the difference in the playback level between 2T and 4T play is within the following limits;
    4.5 dB or less. Also check that the difference between channels is within 2.0 dB or less at 4T.

8-9 SIGNAL-TO-NOISE RATIO – PLAYBACK –

23. OUTPUT Level Control should be at the Specified (CAL) Output Level setting.
24. Remove Test Tape from deck. Hold Shut-off arm in ON position.
25. Depress the Play (▶) button.
26. The VTVM connected to the OUTPUT jacks should indicate listed value below.

TRACK	EQ	HIGH (15 ips)	LOW (7-1/2 ips)
2T	NAB	−60 dB, or more	−58 dB, or more
	IEC	−61 dB, or more	—
4T	NAB	−56 dB, or more	−56 dB, or more
	IEC	−57 dB, or more	—

NOTE: This corresponds to Signal-to-Noise Ratio of 52 dB (for NAB, HIGH): Difference between residual noise of −60 dB and Specified Output level of −8 dB.

8-10 MONITOR LEVEL SETTING

OUTPUT SW . . . . . SOURCE
LINE Level Controls . . . . . MAX.
MIC Level Controls . . . . . MIN

1. Apply a 400 Hz/–18 dB (97.5 mV) signal from AF Oscillator to LINE IN jacks.
2. Adjust MONI CAL VR301 for –8 dB (308 mV) at LEFT OUTPUT jack.
3. Reduce both INPUT Level controls so that L channel output level decreases by 10 dB.
4. Increase AF Oscillator Output level to –8 dB (308 mV).
5. Adjust MONI CAL VR304, if necessary, for –8 dB (308 mV) Output at R channel.

NOTE: This is the specified setting of the LINE Level Controls. Do not move this setting until the adjustment procedure is finished. Set marker ring to mark specified setting of LINE Level Controls.

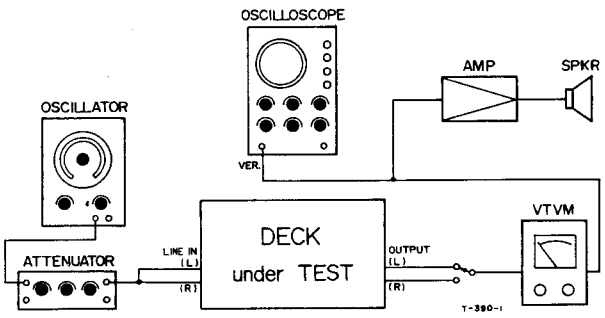


Fig. 8-8 Test Connections for Monitor Check

8-11 VU METER LEVEL SETTING

6. With the Controls set as described in 8-10.
   Adjust REC M CAL VR302/305 for 0 VU reading on VU Meters.

8-12 CHECK OUTPUT LEVEL (SELECTOR SW on REAR PANEL)

7. Set the controls as described in 8-10 (Specified Input Level –8 dB).
8. Switch OUTPUT LEVEL SW on Rear Panel from LOW (normal position) to HIGH position.
9. Check that reading changes from the –8 dB (LOW) to 0 dB ±1 dB (HIGH) at output. At the same time note that indication on VU Meter should be ±0.5 VU or less. Also, after check set OUTPUT LEVEL Selector SW to LOW position.

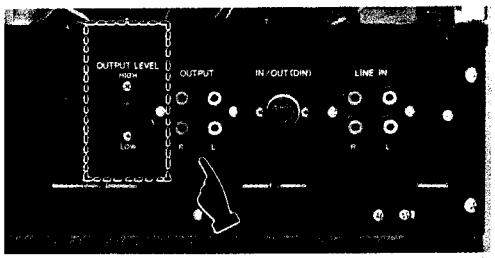


Fig. 8-9 Output Level Selector SW Location

8-13 PEAK LEVEL INDICATOR CHECK AND ADJ.

10. With the Controls set as described in 8 – 10.
11. Apply the following level 400 Hz signals to LINE IN jack.
12. Adjust VR801/802 for PEAK Level indicator Lights at full intensity.

Tape SPEED	INPUT LEVEL
HIGH (15 ips)	+4 dB
LOW (7-1/2 ips)	+2 dB

NOTE: 1. Apply to one channel only.
2. LOW speed has no adjustment. Check only.
3. Also check that the PEAK Level lamp goes out when the level is decreased by 0.5 dB below Full Intensity Input Level.

8-14 BIAS TRAP ADJUSTMENT

OUTPUT SW . . . . . TAPE
EQ, BIAS SW 1
RECORD MODE SW (L, R) . . . . . ON

1. Remove all Input signals.
2. Thread Blank Test Tape on the deck and depress RECORD and PAUSE button.
3. Connect a VTVM or oscilloscope from ground to the junction of L302 and C321 (L-ch) and from ground to the junction of L304 and C344 (R-ch). See Fig. 8-10.
4. Adjust BIAS TRAP L302 (L-ch) and L304 (R-ch) for minimum reading on scope or VTVM. Use plastic alignment tool.

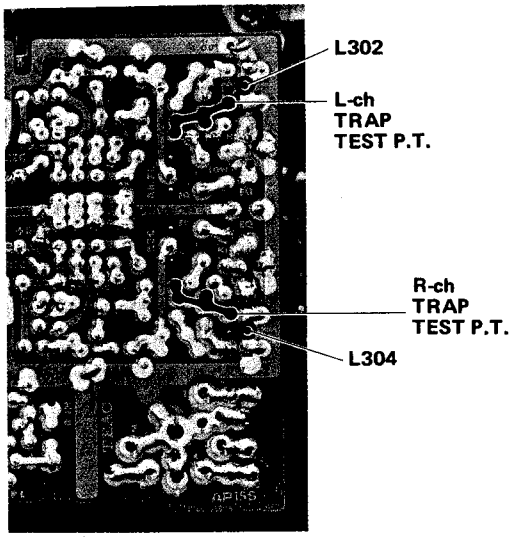


Fig. 8-10 Bias Trap Test Points

8-15 BIAS LEAKAGE CHECK

5. With Output Control and Line Controls at any position Bias Leakage should be the following value at OUTPUT jacks.
   Spec. –45 dB (4.36 mV), or less.
6. If adjustment is necessary, adjust BIAS TRAP L201/202. Check the EQ 1, 2, BIAS 1, 2 and SOURCE, TAPE positions.

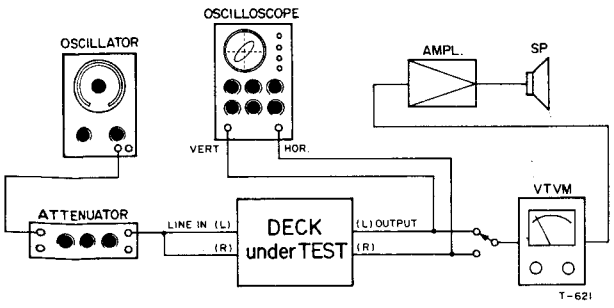


Fig. 8-11 Test Connections for Recording Check

8-16 RECORD HEAD AZIMUTH ADJ.

NOTE: The effect of turning the azimuth screw will register on the VTVM. A slight delay will be noticed. Therefore, the screw must be rotated slightly with a pause to see the effect.

– FINE ADJUSTMENT –

7. Connect a VTVM to the OUTPUT jack and an AF oscillator to the LINE IN jacks. Set the oscillator to 10 kHz at –28 dB (30.8 mV).
8. Begin recording (Depress RECORD and Play buttons).
9. While recording and monitoring the tape play back adjust the azimuth screw for maximum reading on the VTVM.

NOTE: It is absolutely essential to accomplish the above adjustment before performing the following adj. to avoid phase errors greater than 45°.

10. Sweep the oscillator frequency from 40 Hz to 16 kHz (both speeds) and check that phase difference between channels is 45° or less.
11. Secure the screw with locking paint.

8-17 BIAS ADJUSTMENT

Tape SPEED SW . . . . . LOW
EQ, BIAS SW 1

Be sure the Bias Trap has been adjusted per section 8-14 before proceeding.

12. Apply 7 kHz signal at –18 dB (97.5 mV) to the LINE IN jacks.
13. While recording on the YTT-8013 Test Tape, adjust Trimmer Capacitor BIAS ADJ. C405/406 for peak reading on the VTVM, then turn the Trimmer Capacitor clockwise until a decrease of 2.5 dB "Over-bias" from the a peak is obtained. (Adjustment limits, 2 to 4 dB over-bias).

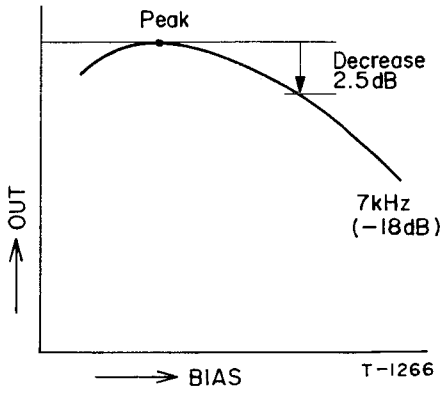


Fig. 8-12 Bias Limits Chart

8-18 RECORD LEVEL SET

Tape SPEED SW . . . . . LOW (7-1/2 ips)

14. Apply 400 Hz signal at –8 dB (308 mV) to the LINE IN jacks. Be sure the line and output level controls are still at their specified positions (See 8-5 and 8-10).
15. Begin recording.
16. Adjust REC CAL VR303/306 for –8 dB (308 mV) at OUTPUT jacks.

8-19 FREQUENCY RESPONSE – OVERALL –

NOTE: To avoid saturation of the tape these checks should be made at 10 dB below (–18 dB for LOW speed) and HIGH speed check at specified input Level –8 dB.
Any Bias signal feeding into the test equipment should be filtered out by adjusting the external Bias Trap.

17. Apply signal swept from 40 Hz to 20 kHz, –18 dB (97.5 mV) to the LINE IN jacks and while recording, monitor the Tape signal and adjust equalization REC EQ L301/303 for reading within the response limits charts. See Fig.8-13(A) below.

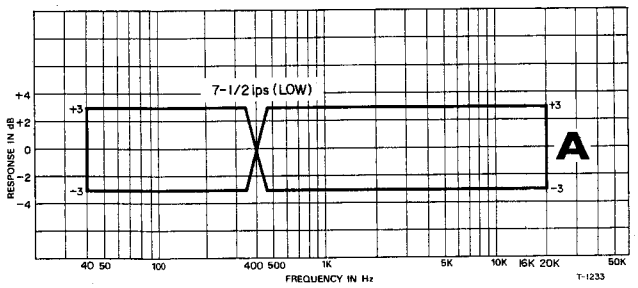


Fig. 8-13 Frequency Response (A) – OVERALL –

Tape SPEED SW . . . . . HIGH (15 ips)

18. Apply signal swept from 30 Hz to 20 kHz –8 dB (308mV) to the LINE IN jacks.
19. Check within the response limits charts (B) below. If L301/303 are adjusted, check LOW speed section again.

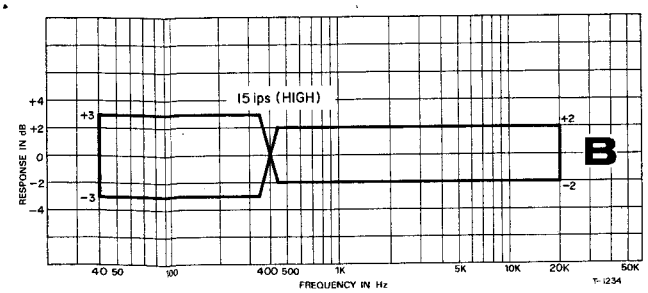


Fig. 8-14 Frequency Response (B) – OVERALL –

EQ SW 1
BIAS SW 2

20. Apply signal swept from 30 Hz to 20 kHz, –8 dB (30.8 mV) to the LINE IN jacks and record on a blank TEAC YTT-8013 Test Tape.
21. Check that the Frequency Response, is within 2 dB ±2 dB at 20 kHz (at 7-1/2 ip SPEED).
22. If adjustment is required, adjust VR 401.

8-20 SIGNAL-TO-NOISE RATIO – OVERALL –

1. Output and Line Controls should be at the specified positions.
2. Remove the AF oscillator from the LINE IN jacks.
3. Thread a Blank Test Tape YTT-8013 on the deck.
4. Place the deck in the Record mode with "no signal" applied.
5. Note the point on the index counter where recording begins.
6. Rewind the recorded tape to the beginning point and play it back.
7. The noise level as indicated on the VTVM should be readings listed below.

–56 dB (1.23 mV) or more . . HIGH (15 ips) NAB
–56 dB (1.23 mV) or more . . LOW (7-1/2 ips) NAB
–57 dB (1.09 mV) or more . . HIGH (15 ips) IEC

NOTE: This –56 dB (for HIGH, NAB) corresponds to a Signal-to-Noise Ratio of 48 dB (minimum): the difference between residual noise of –56 dB and specified output level –8 dB (308 mV). EQ, BIAS 1 or 2, either position.

NOTE: Since this measurement method and the measurement methods used to obtain the Catalog and Owner's manual S/N spec. are different, the values have and in the Catalog and Owner's manual will be different.

8-21 OPTIMUM ERASURE

Tape SPEED SW . . . . . HIGH (15 ips)
Head Selector SW 2T
EQ, BIAS SW 2

1. Thread the YTT-8013 Test Tape on the deck.
2. Apply a 1 kHz signal at 10 dB above the operating Level of −18 dB (97.5 mV) to the LINE IN jack.
3. Make a 30 seconds recording of the above signal while reading and noting the level of output, then rewind to beginning of this recording.
4. Disconnect the 1 kHz signal source (AF oscillator) from the LINE IN jack.
5. Connect a VTVM to the OUTPUT jack, through a 1 kHz Narrow Band Pass Filter.
6. Put deck in the Record mode and "record" (erase) over this previous recording then rewind to beginning again.
7. Put deck in play mode and monitor the output on the VTVM.
8. Difference in Output level, between the 1 kHz signal and the "no signal" section level should be more than 68 dB.

NOTE: Filter loss should be considered.

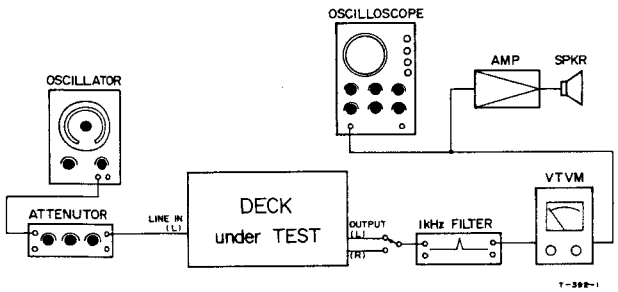


Fig. 8-15 Test Connections for Erase Measurement

8-22 CHANNEL SEPARATION

Tape SPEED SW . . . . . HIGH (15 ips)
EQ, BIAS SW 1

1. Be sure tape YTT-8013 is completely bulk erased prior to doing these checks.
2. Apply a 1 kHz signal at −18 dB (97.5 mV) to L-ch.
3. Place deck in Record mode.
4. While recording measure the OUTPUT on R-ch with VTVM connected through a 1 kHz Band Pass Filter.
5. Reading should be −58 dB, or more.

8-23 DISTORTION CHECK

6. Thread the YTT-8013 Test Tape on the deck.
7. Apply a 1 kHz signal to the LINE IN jacks at 0 VU.
8. With the Line and Output level controls set to the specified position, place the deck in the record mode for approx. 10 seconds.
9. Rewind and play this recorded section of the Tape.
10. The distortion factor read on the distortion analyzer should be 1.0% or less.

8-24 HEADPHONE OUTPUT CHECK

1. OUTPUT Level Controls should be at the specified level setting.
2. Connect an 8 ohm non-inductive resistor across the headphone (PHONES on front panel) jack.
3. Connect VTVM across the resistor. While playing back operating level 400 Hz/−8 dB (308 mV) on Test Tape, VTVM should indicate −24 dB ±2 dB (38.8 mV to 61.5 mV).

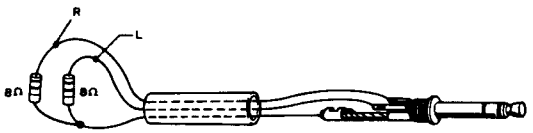


Fig. 8-16 Test Connections for Headphone Output Check

9. SIMPLIFIED SCHEMATIC AND LEVEL DIAGRAMS

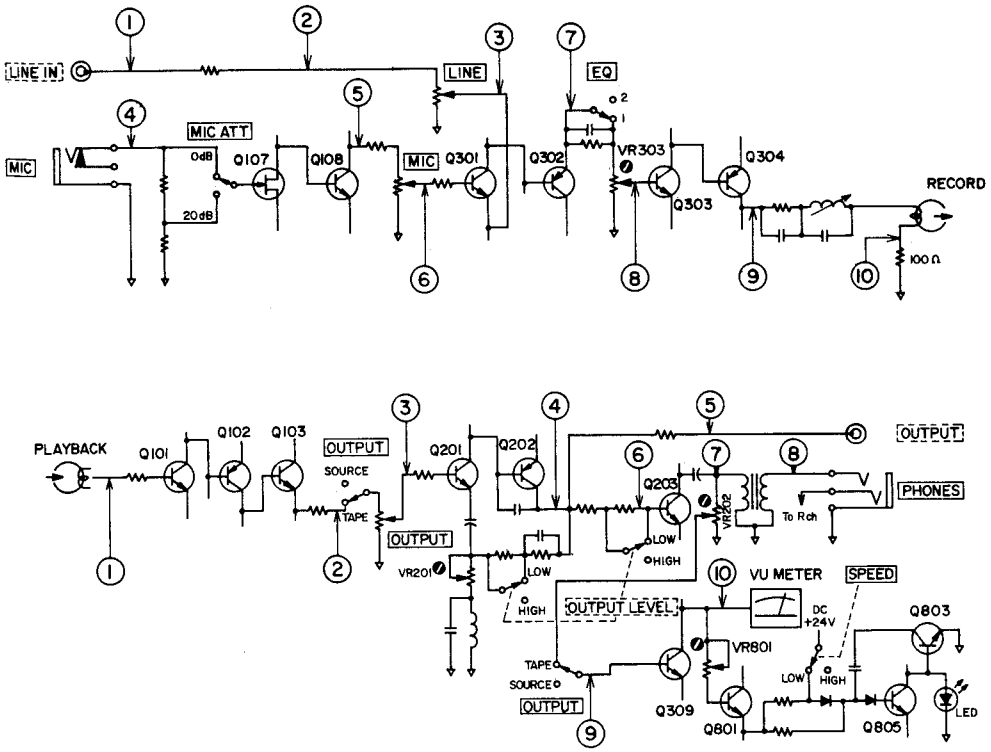


Fig. 9-1 Simplified Schematic Diagrams

PLAYBACK

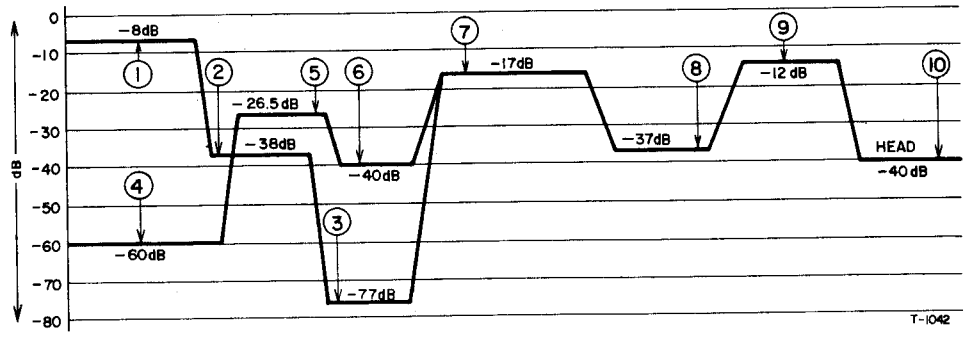


Fig. 9-2 Level Diagram – Playback –

RECORD

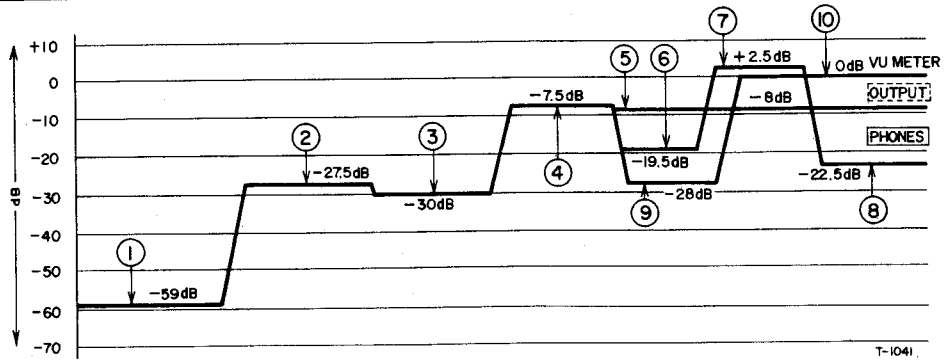


Fig. 9-3 Level Diagram – Record –

10. SERVICING AND MAINTENANCE

10-1 CLEANING:

TEAC TZ-261A for Head cleaning and TZ-261B for Rubber cleaning should be used. Use for following places.

TZ-261A	TZ-261B
Motor pulley Heads, Brake drums Capstan shaft Tape run guides	Pinch roller rubber Capstan belt Counter belt

10-2 LUBRICATION:

Under normal operating conditions, lubrication is required only once each year. Before lubricating, clean the drive belt and drive pulley... etc. Operate the deck for 30 minutes to 1 hour immediately prior to oiling. After oiling, keep the deck in the upright position for 3 to 4 hours to allow thorough absorption of the oil.
Approximately once each year or after 2000 hours of use, apply TEAC TZ-255 Lubricating Oil to the following places only;

- Pinch roller shaft . . . . . 1 drop
- Capstan shaft . . . . . 2 drops
  (Remove the dust cap for access to the oil pit)
- Capstan Motor . . . . . 0.5 cc
  (Maximum to fill oiling tube)

NOTE: Excessive oiling will scatter oil inside the deck. This oil will cause drive belt slippage and other problems. Check for slippage and clean all parts inside the deck before operating after lubrication. Check for oil emission after operation and before returning deck to the customer.

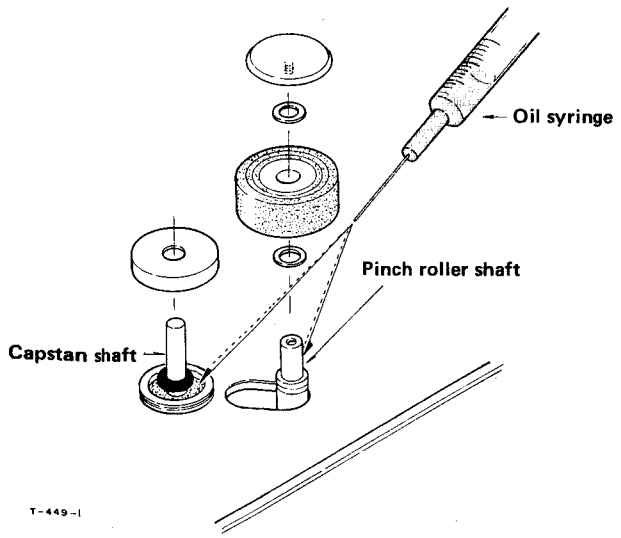


Fig. 10-1 Capstan Shaft and Pinch Roller Shaft Oiling Points

10-3 TEAC MAINTENANCE FLUIDS

Fig. 10-2 TZ-225 Oil Kit

Fig. 10-3 Tape Recorder Kit

10-4 DEMAGNETIZATION OF HEADS

If the Record or Playback heads become magnetized, noise will increase and tonal fidelity will deteriorate. For this reason it is advisable to use non-magnetic tools when working near the heads. If the heads have had any contact with current or magnetized metal parts, demagnetize them with a TEAC E-3 eraser or equivalent.

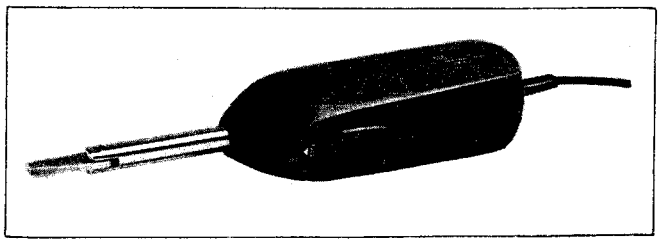


Fig. 10-4 TEAC E-3

11. THEORY OF OPERATION

– TABLE OF CONTENTS –

TAPE TRANSPORT SECTION

AMPLIFIER SECTION

TAPE TRANSPORT CIRCUIT DESCRIPTION

1. CONTROL PCB

Without exception, the initial state for all of the following explanations is the Stop mode.

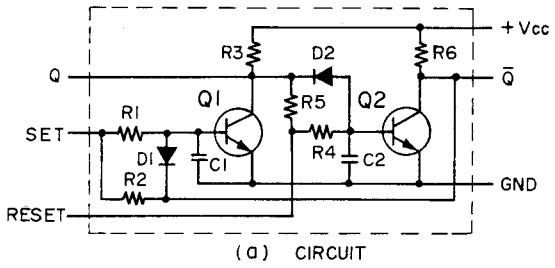
1-1 INDIVIDUAL CIRCUITS

(1) FLIP FLOP (BI-STABLE MUTLIVIBRATOR)

The set-reset type Flip Flops on the Control PCB include four circuits.

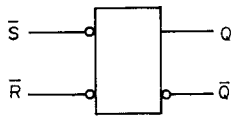
Fig. 1 (a) shows the Flip Flop circuit construction.

Fig. 1 (b) shows the Flip Flop circuit symbol used in the circuit descriptions. Fig. 1 (c) shows the Flip Flop timing chart.

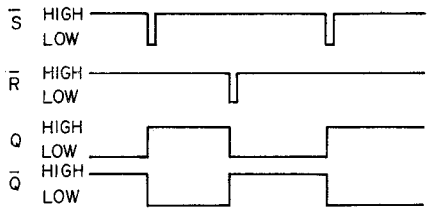


(a) CIRCUIT

FLIP FLOP	Q1	Q2
► (PLAY)	Q701	Q702
►► (F. FWD)	Q703	Q704
◄◄ (REW)	Q705	Q706
REC	Q707	Q708



(b) SYMBOL



(C) TIMING CHART

Fig. 1 Flip Flop

The Flip Flop is a circuit which "remembers" the input signal.

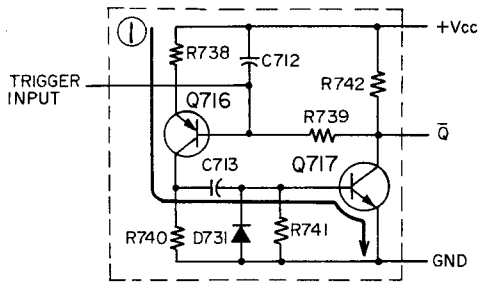
Now, if we assume that Q1 is in the ON state, its Q terminal will be at ground potential (Low level). Since there is no base current flow at this time, Q2 will be in OFF state. Therefore, $\bar{Q}$ terminal will be a High level, Then, since Q1 base current flows through the path of Vcc – R6 – R2 – R1 – Q1, Q1 will be held in ON state. In this condition, if a ground (Low level) is applied, Q1 base current will be stopped and Q1 will go to OFF state. As a result of this, base current will flow through Q2 along the route of Vcc – R3 – R5 – R4 – Q2 and Q2 will go to ON state. Since when Q2 goes to ON state $\bar{Q}$ terminal goes to a Low level and even if the SET terminal is opened, there will be no base current in Q1 and it will remain in the OFF state.

Again, when the RESET terminal is grounded (receives a Low level), by the same process Q2 goes to OFF state, Q1 goes to ON state and is held in that state. In this way, by applying a Low level to both the SET and the RESET terminals, the level at Q and $\bar{Q}$ terminals are reversed and stably maintanined at those levels.

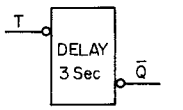
C1 and C2 are capacitors used to prevent mis-operation of the circuit due to noise. D1 and D2 are diodes which are used to prevent mis-operation due to changes in the environment (especially temperature changes).

(2) MONO-STABLE MULTIVIBRATOR

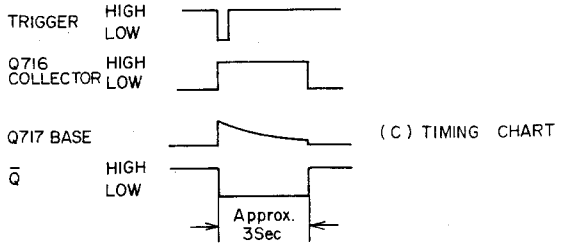
The mono-stable multivibrator is a circuit which when it receives a trigger input signal outputs a signal for a fixed time duration. It is also called a "one-shot" multivibrator. In this deck the circuit is used to supply a delay time for when the deck is changed from either fast mode (Fast Forward or Rewind) to Play mode.



(a) CIRCUIT



(b) SYMBOL



(C) TIMING CHART

Fig. 2 Monostable Multivibrator

he normal condition of the circuit shown in Fig. 2 (a) is
)716 and Q717 both OFF and $\overline{Q}$ output at a High level.
/hen a Low level is applied to the trigger terminal, Q716
/ill go ON. During the time it takes to fully charge C713
ase current flows in Q717 and it goes ON. Due to this,
he collector of Q717 goes to a Low level and $\overline{Q}$ terminal is
lso at a Low level which passes through R739 and makes
he base of Q716 go to a Low level. Therefore, even if the
rigger input is open, Q716 remains ON, C713 finishes
harging, and when current flow through the base of Q717
tops and Q717 goes OFF, Q716 also goes OFF. In this
vay, even when a narrow trigger is applied, a constant width
ow level signal is sent to $\overline{Q}$ output.
'he operating time of the Mono multivibrator is basically
letermined by the values of R738, R741 and C713. This
ime is approximately 3 seconds.
:712 is to prevent mis-operation due to noise.
)731 provides a discharge path for C713.

3) ASTABLE (FREE-RUNNING) MULTIVIBRATOR

An astable multivibrator is a square wave oscillator circuit. This signal causes the Record LED to flash ON and OFF when a REC MODE switch in the amplifier section is ON during any mode except Record/Play and Record/Pause mode.
Refer to Fig. 3 (a)

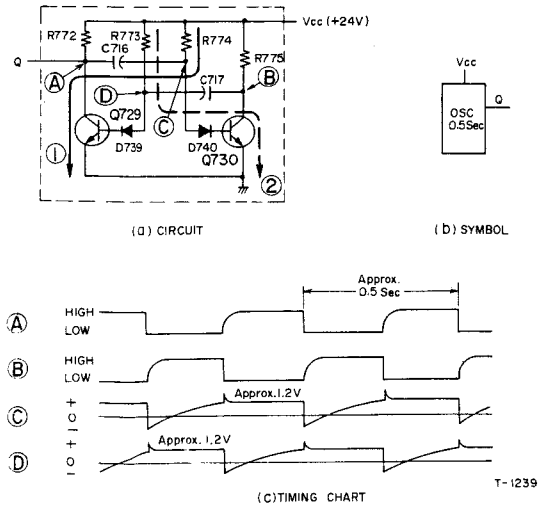


Fig. 3 Astable Multivibrator

Now, if Q729 goes ON, charging current for C716 flows along route 1. When the Q729 goes ON, the potential at point A is a Low level, charging continues and the voltage potential increases. While the voltage potential at point C is Low, Q730 is OFF and point B is at a High level. At this time, point B is at +24V, Point D is approximately 1.2V and C717 is charged to + to – polarity as shown in the Figure above.

As C716 continues to charge and the voltage potential at point C goes to approximately 1.2V (= potential at base-emitter junction of Q730 + the forward voltage drop across D740) Q730 goes ON. Because of this, point B goes to Ground level. At this time, since C717 is charged and the voltage potential at point D was lower than that at point B, point D momentarily becomes a negative voltage and this turns OFF Q729. Then, charging of C717 (+ to –) begins along route 2. C717 continues to charge and when it receives a potential of approximately 1.2V Q729 goes ON and Q730 goes OFF. In this way, Q729 and Q730 go alternately ON and OFF repeatedly. This alternating High-Low level signal is sent out at Q output. The period is determined by R773 and C717 and by R774 and C716. This period is approximately 0.5 seconds. Also, if R773 = R774 and C716 = C717, the High and Low level time will be exactly the same.
D739, D740 are used to prevent unstable operation from occuring due to temperature changes.

1-2 OPERATION

(1) PLAY MODE

When the ▶ (Play) key is pressed the FWD Flip Flop is set and the $\overline{Q}$ output changes from High level to Low level. This circuit operates as explained below.

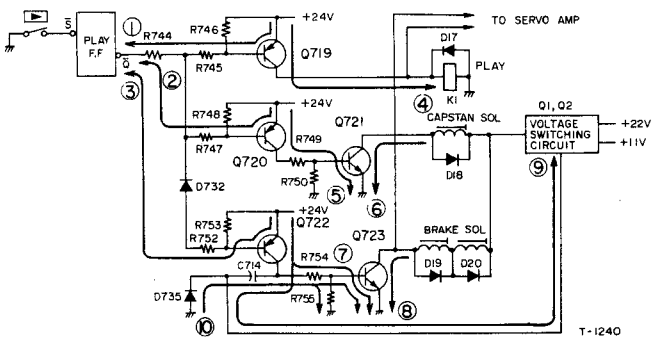


Fig. 4 Play Mode

Route 1 — Base current path for Q719 to turn ON Q719. Collector current of Q719 energizes Play Relay K1 (route 4).
K1 supplies the necessary voltage for take up reel motor.

Route 2 — When base current flows along route 2 Q720 is turned ON, base current of Q721 flows along route 5 and Q721 is turned ON. The collector current through Q721 (route 6) energizes the Capstan Solenoid. The Capstan Solenoid energizes the Pinch Roller and the tape is driven at normal speed.

Route 3 Q722 is turned ON, base current flows in Q723 (route 7) and it is turned ON. When Q723 goes ON, its collector current energizes the Brake Solenoid. Along another path, when Q722 is turned ON, only while C714 is being charged current flows in the drive circuit along route 9. This signal is a control signal which is used to control application of a higher Voltage (+22V) to energize the solenoid. After that a lower voltage (+11V) is applied to hold the solenoid energized (See paragraph 2-1). Refer to paragraph 4-2 (2) for information about the signal which is supplied to the Servo Amplifier from the Play Relay and Brake Solenoid.

(2) RECORD/PLAY Mode

Refer to Fig. 5 for the circuit diagram and to Fig. 7 for the timing chart. If either one (L or R) or both of the REC MODE switches in the Amplifier section are ON, power is supplied to the unstable Multivibrator and it begins oscillating and has a High – Low repeating signal output to its Q output terminal. This signal passes through R771 and D738 to the base of Q728 and causes Q728 to go ON and OFF. Because of this the RECORD LED flashes ON and OFF. Along another path, the voltage from the REC MODE switches passes through R736 and R733 and is supplied to the base of Q713 and it is turned ON and at the same time Q714 is turned OFF. When Q714 goes OFF the reset signal for the REC Flip Flop is removed and it is put in stand-by condition.

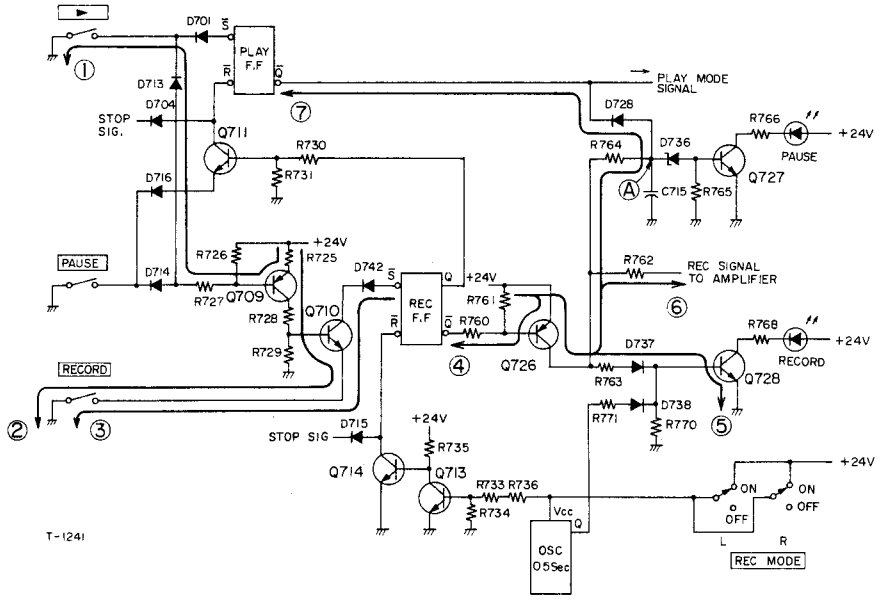


Fig. 5 Record/Play Circuit

If the ▶ (Play) key or the PAUSE key is not depressed Q709 will be in OFF state and the base of Q710 will go to ground level. Therefore, if only the RECORD key is depressed Q710 will remain OFF and the REC Flip Flop will not be set.

When the ▶ (Play)and the RECORD keys are simultaneously pressed, current via routes 1 and 2 causes Q709 and Q710 to go ON. The result of this is that the REC Flip Flop receives a set signal via route 3 to put it in set state and its $\overline{Q}$ terminal changes from a High level to a Low level. When $\overline{Q}$ terminal goes to a Low level current flows to the base of Q726 along the route 4 and Q726 is turned ON. Due to the current flow along route 5 Q728 is turned ON and the RECORD LED which flashing ON and OFF lights continuously and a High level RECORD signal is sent to the Amplifier section via route 6. This signal activates the BIAS OSC and energizes the REC Relay. At this time since the ▶ (Play) key is also pressed play operation is initiated and the deck goes to the Record/Play mode.

Also, during Record/Play mode since there is current flow along route 7 point A goes to a Low level and Q727 is maintained in OFF state and the PAUSE LED will not light. Additionally, since the Q terminal of the REC Flip Flop is at a High level, the base of Q711 is at a High level and the PAUSE switch is open, Q711 will not go ON and the PLAY Flip Flop cannot be reset.

) RECORD/PAUSE MODE

ɜfer to Fig. 6 and 7.

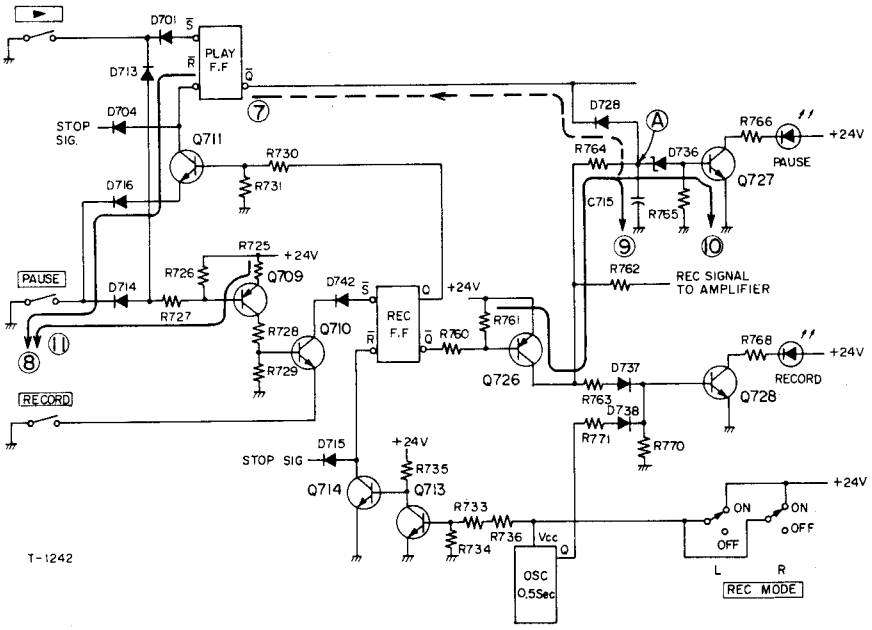


Fig. 6 Record/Pause Mode

)uring Record/Play mode the base of Q711 receives a High ɜvel signal and it goes to a stand-by condition. Therefore, ˙ the PAUSE key is pressed Q711 will be immediately ırned ON and this will reset the Play Flip Flop (route 8). 'lay mode will be released and the tape will stop. When he Play Flip Flop is reset $\overline{Q}$ output will change from a Low ɜvel to a High level. When this happens the current that was lowing along route 7 will change to route 9 and C715 will ɜegin charging. Then, when the voltage potential at point A xceeds approximately 7 V (= zener voltage of D736 + he voltage potential at the base-emitter junction of Q727, V_{BE}) base current will flow in Q727 via route 10 and it will ɟo ON and the PAUSE LED will light. If the PAUSE key s-released the reset signal to the Play Flip Flop along route ɜ disappears and if the ▶ (play) key is pressed the deck will eturn to the Record/Play mode. From the STOP mode, when the PAUSE key and the REC key are pressed at the same time current will flow via route 11 and Q709 will be turned ON and in the same way as explained before the Record/Play, the REC Flip Flop will be set. Even though the REC Flip Flop is set, since the Play Flip Flop is reset by Q711, the deck will be in Record/Pause mode.

During Play mode, if the REC Flip Flop is not set its Q output will be at a Low level and the base of Q711 will also be at a Low level. Therefore, during Play mode even if the PAUSE key is pressed Q711 will not go ON and the Play Flip Flop will not be reset.

C715 in the circuit is provided to prevent the PAUSE LED from momentarily lighting when the power is applied.

D736 is provided to increase the operating voltage potential for Q727.

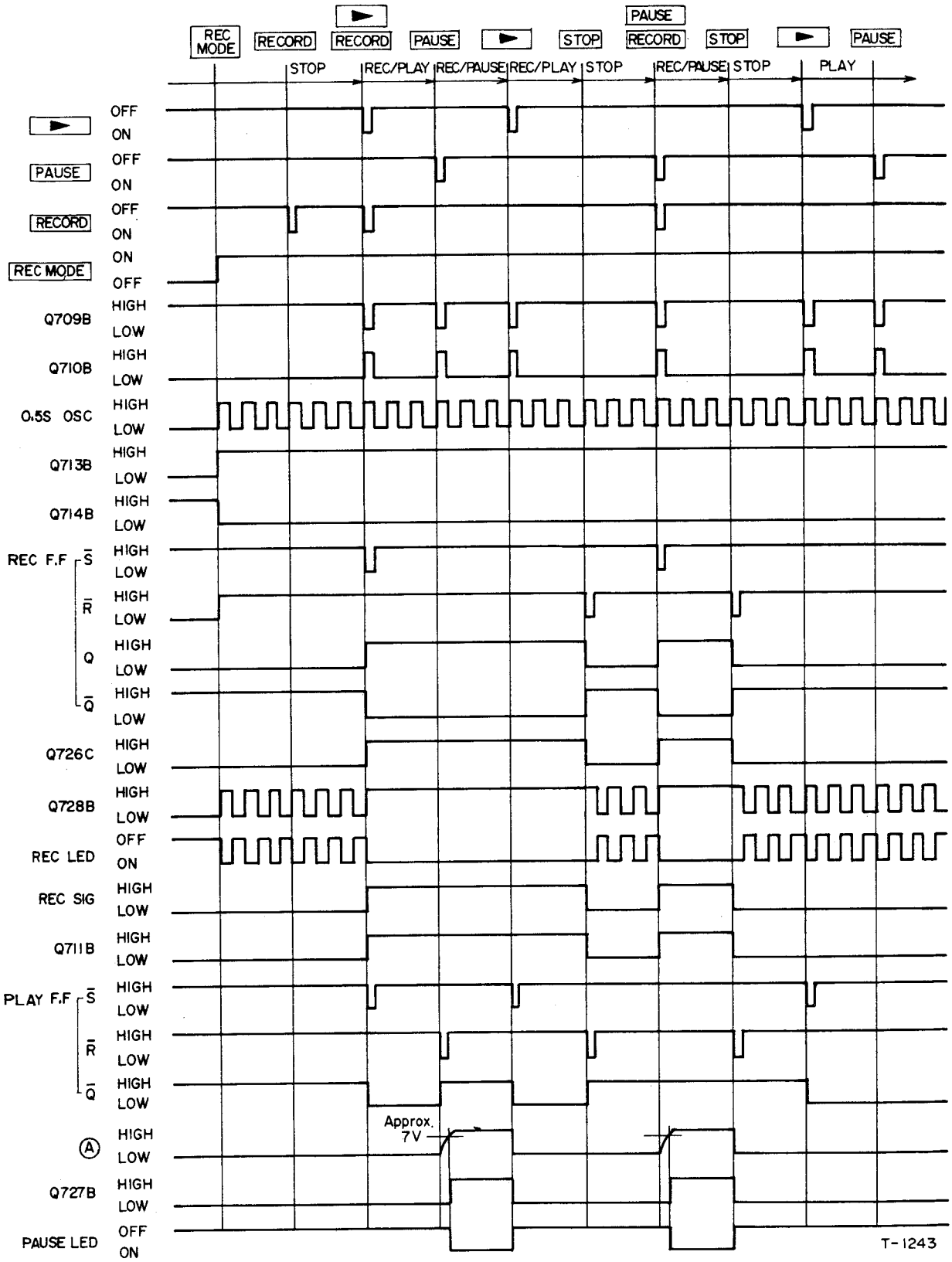


Fig. 7 Rec/Play/Pause Timing Chart

) F. FWD AND REW MODES

:fer to Fig. 8

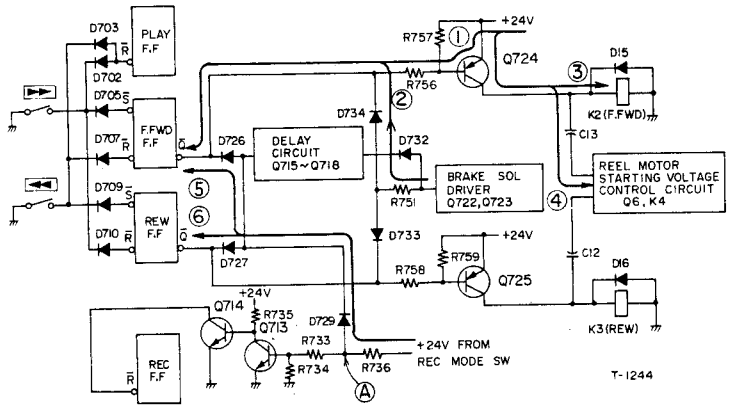


Fig. 8 F. FWD. REW Mode

'hen the ▶▶ (Fast Forward) key is pressed, the Play Flip lop and REW Flip Flop will receive a reset signal. At the ime time, the F. FWD Flip Flop will be set and its $\overline{Q}$ out-ut will become a Low level.

'he base current along route 1 will cause Q724 to go ON nd current flow along route 3 will energize the F. FWD :lay, K2. Relay K2 will supply the necessary operating oltage to the reel motor during take up.

'urrent along route 4 will be sent to the reel motor starting oltage control circuit. Refer to 2-2 (2).

Current along another path on route 2 will turn ON Q722 and Q723 and will energize the Brake Solenoid. The F. FWD and REW circuits are completely symmetrical. Therefore, when the ◀◀(REW) key is pressed the same process occurs as in F. FWD operation and the Brake Solenoid, Relay K3 and Relay K4 will be energized.

During F. FWD or REW mode, even if the REC MODE switches are turned ON, the current along routes 5 and 6 will make point A a Low level. Because of this, Q713 will be OFF, Q714 will be ON and the REC Flip Flop will be held in reset condition.

5) F. FWD (REW)—▶ Play

During F. FWD (REW) mode each circuit section will go to the condition as stated below.

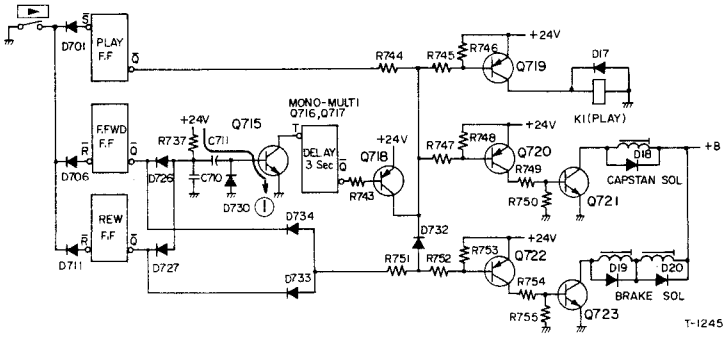


Fig. 9 F. FWD (REW) → Play

?LAY Flip Flop Q output – High, Q719, K1, Q720, Q721 ınd Capstan Solenoid – OFF. F. FWD (REW) Flip Flop $\overline{Q}$ ›utput – Low, Q722, Q723 and Brake Solenoid ON, Q715 ›ase Low, Q715 – OFF, trigger to monostable multivibrator – High, $\overline{Q}$ – High, Q718 – OFF. During F. FWD (REW) ›peration, if the ▶ (Play) key is pressed, the F. FWD (REW) Flip Flop will be reset and its $\overline{Q}$ output will be High level.

Because of this, the base current is stopped and Q722 goes OFF.

Then, Q723 goes OFF and also the Brake Solenoid is de-energized. (Although not shown in Fig. 9, the F. FWD or REW Relay is also de-energized and the Power supplied to the reel motors is cut-off).

When the $\overline{Q}$ output of the F. FWD (or REW) Flip Flop goes to a High level, a momentary current flows through C711 to the base of Q715 (route 1). Because of this Q715 goes ON for a moment which triggers the monostable multivibrator. From the time trigger is received the $\overline{Q}$ output of the multivibrator goes to a Low level for approximately 3 seconds only to provide a delay time. During this time Q718 is ON.

Along another path, if the ▶ (Play) key is pressed the Play Flip Flop will be set and its $\overline{Q}$ output will go to a Low level. But, since Q718 is ON and its collector is at a High level the deck will not go to the Play mode. After the dely time of the monostable multivibrator finishes Q718 will go OFF, then Play mode will begin.

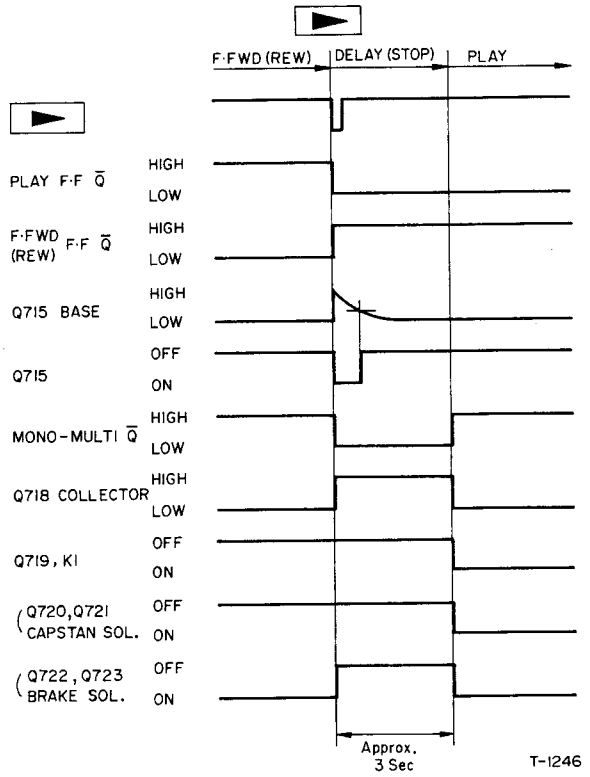


Fig. 10 F. FWD (REW) → Play Timing Chart

(6) STOP MODE

The STOP circuit is constructed as shown in Fig. 11.

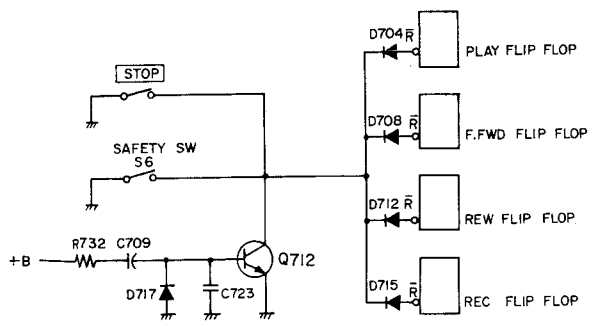


Fig. 11 Stop Mode

When the STOP key is pressed or when the safety switch is closed all of the Flip Flops are reset and the deck will be in Stop condition. Q712 and its associated circuitry form the power reset circuit. This circuit is provided to always stabilize the deck in reset (STOP) condition when power is first applied.

When power is applied base current of Q712 flows from +B – R732 – C709 – to Q712 and during the time it takes to finish charging C709, Q712 will be ON and its collector will be at a Low level which resets all of the Flip Flops.

D717 is provided to allow C709 to quickly discharge when power is turned OFF. C723 is to prevent noise from causing mis-operation of the circuit.

. POWER SUPPLY PCB

-1 SOLENOID DRIVE CIRCUIT (SURGE TYPE)

ːe Fig. 12

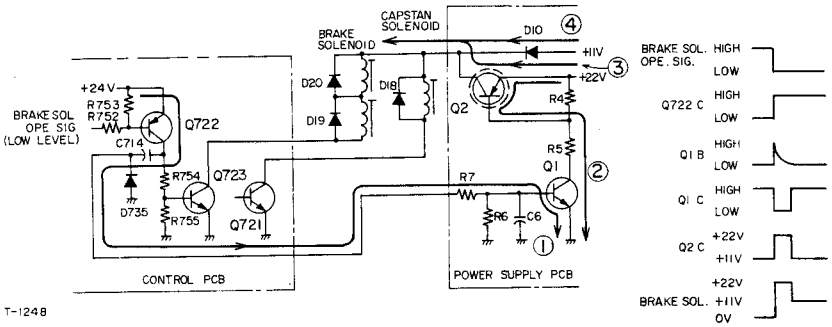


Fig. 12 Solenoid Drive Circuit

ˈ the Brake Solenoid operate signal (Low level) is fed to ıe base of Q722, Q722 and Q723 will go ON and one ɜrminal of the Brake Solenoid will go to ground. When)722 is ON a charging current to C714 will flow along ɔute 1 and during the time that it takes for C714 to finish harging, Q1 will be turned ON. When Q1 is ON base current ʌill flow in Q2 and it will go ON. Due to this, +22 V will be upplied via route 3 to the Brake Solenoid and it will be orcefully energized. After the charging of C714 is completed, when Q1, and then Q2 go OFF, + 11 V will be applied to the Brake Solenoid via route 4. Once the solenoid is energized it can be held energized by a low voltage. By using a lower voltage the amount of heat generated can be held down.

Also, for Play mode, since the Brake Solenoid and the Capstan Solenoid will be energized at the same time, the Capstan Solenoid will also use this drive circuit.

?-2 RELAY CIRCUIT

ˈhe reel motors of this deck are controlled by relay circuits.

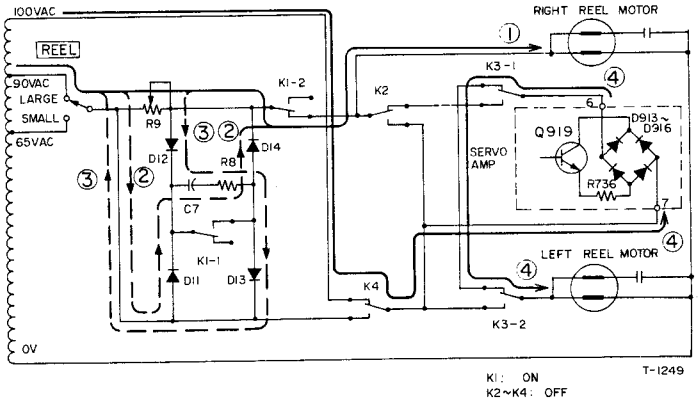


Fig. 13 Relay Circuit

(1) PLAY MODE

When the ▶ (Play) key is pressed, Play Relay K1 is energized (Refer to Fig. 4, Route 1)

Fig. 13 shows Play Relay in its energized condition. (Reel Size switch is set to LARGE)

For normal operation current is supplied to the reel right reel motor (take-up) along route 1. R9 is the fine adjustment resistor for take-up torque.

When K1 is energized (during start) K1-1 contacts are open and charging current C7 flows along routes 2 and 3 (route 2 for the positive half cycle of AC waveform and route 3 for the negative half cycle).

When routes 2 and 3 are used R9 is effectively bypassed (shorted across). Therefore, during motor acceleration a large voltage is momentarily applied to the take-up motor which takes up the slackness in the tape.

Also, power is applied to the left reel motor (Supply motor) via route 4. This voltage is controlled in the Servo Amplifier to provide proper back tension. Refer to paragraph 4 for operation of Servo Control.

When Play mode is released, K1-1 closes and the electric charge on C7 will be discharged to allow restarting of this operation.

(2) F. FWD MODE

First refer to Fig. 14.

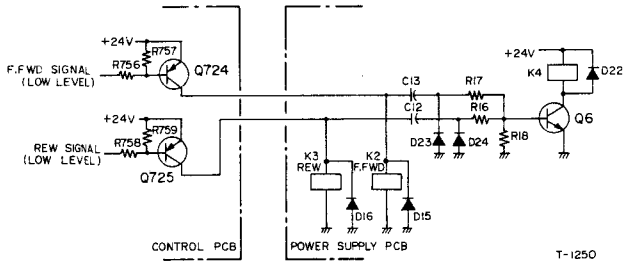


Fig. 14 K2 ~ K4 Relay Circuit

When going to F. FWD (REW) mode Q724 (Q725) will go ON and K2 (K3) will be energized. While Q724 or Q725 is ON base current will flow in Q6 via C13 and R17 or C12 and R16 and until the capacitor has finished charging, Q6 will go ON and K4 will be energized. That is, K4 will be temporarily energized only during acceleration in F. FWD or REW operation.

Next refer to Fig. 15.

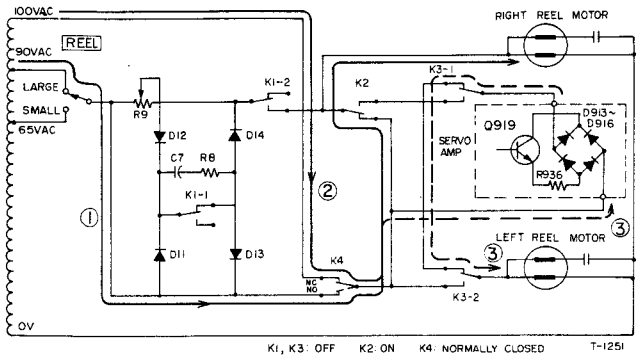


Fig. 15 F. FWD Mode

Since relay K4 is temporarily energized during F. FWD mode acceleration, the right reel motor is supplied 90 V via route 1 (when Reel Size switch is set to LARGE). Next, when K4 is released, the right reel motor is supplied 100 V via route 2. Therefore, the right reel motor torque (take-up torque) during acceleration time is lower. After that it is returned to normal. This operation is done for the following reasons.

Since, if only the Supply reel is servo controlled, during acceleration the reaction of the motor to the operating control commands of the Servo Amplifier (Tension Arm) will be too slow, Sometimes unusually large tape tension may occur. In order to prevent this unusual tape tension from occuring, during acceleration, as explained above, the take-up motor torque is held down.

In order to provide suitable back tension for F. FWD operation the voltage is supplied by the Servo Amplifier to the left reel motor (route 3).

(3) REWIND MODE

Refer to Fig. 16.

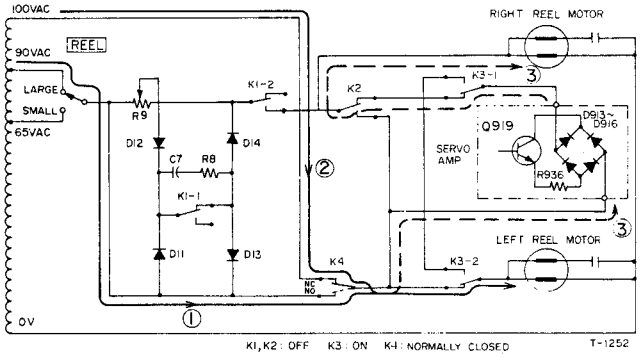


Fig. 16 REW Mode

During rewind mode K3 is energized and the right and left reel motors are connected so that they operate opposite to their operation in F. FWD mode. After the left reel motor is supplied 90 V power along route 1, 100 V is present along route 2.

A controlled back tension voltage applied to the right reel motor via route 3.

3. TIMER PCB

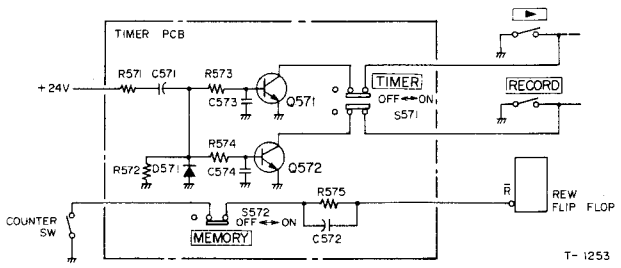


Fig. 17 Timer Memory Circuit

3-1 TIMER

When TIMER switch S571 is set to ON and power is applied, while C571 is being charged transistor base current flows through R573 and R574 and Q571 and Q572 are turned ON. Since the collector of Q571 is connected to the ▶ (Play) key and the collector of Q572 is connected to RECORD key, when the transistors are ON if either key is pressed the operation will be the same. Therefore in this case, the deck will go to Record Play mode.

Since Q571 and Q572 only go ON when power is first applied, even if S571 is set to ON, the condition of the deck will not be changed.

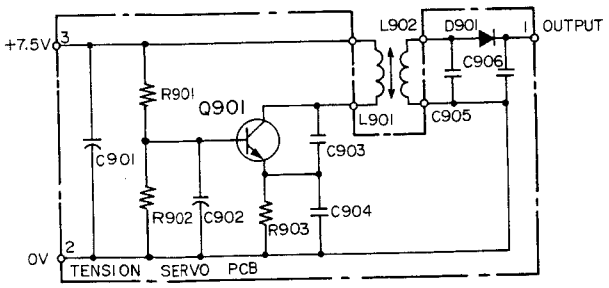
2 MEMORY

e Fig. 17.
ıen the MEMORY switch is ON and the deck is placed
Rewind operation, when the index counter reaches
999" the counter switch will close, current will flow
rough C572 (R575), Rewind Flip Flop will be reset
d the deck will stop. Stopping of the deck when the
dex counter switch is closed occurs only during rewind
ɔde.

. TENSION SERVO CIRCUIT

·1 TENSION SERVO DETECTION CIRCUIT

ıe Tension Servo Detection Section is comprized of an
ːcillator, its output pick-up coil, screening plate and rectify-
g circuit.
901, L901 and C903 form a Colpitts type oscillator cir-
ıit. Its oscillation frequency is approximately 70 kHz.
902 is provided as a pick-up coil for the oscilator output
ɔil L901. The output of L901 is rectified by D901 and
sent to the Servo Amplifier. An aluminum screening plate
hich is connected to the left tension arm is inserted bet-
een coils L901 and L902. When the tape is pulled tightly
ıe tension arm moves and the screening plate is inserted
ıore deeply between coils L901 and L902. Due to this
ːreening the induced signal betwen L901 and L902 is re-
uced and the ouput of L902 is reduced.



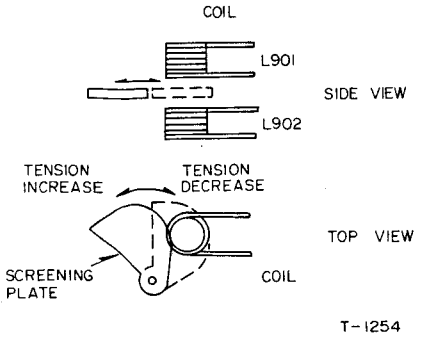


Fig. 18 Tension Servo

When the tape becomes looser the tension arm moves in the opposire direction and the screening plate is withdrawn from between L901 and L902 and the induced signal is increased and the output of L902 is increased.
The output which is detected by D901 is sent as a rectified D.C. voltage to the next stage.

4-2 SERVO AMPLIFIER

(1) OUTPUT CIRCUIT

The Servo Amplifier output circuit is constructed as shown in Fig. 19. The alternating current (motor current) which is supplied to the Bridge Circuit produces current flow in the path indicated by the solid line during the positive half cycle and in the path of the dotted line during the negative half cycle. In either case, there is a large current flow through Q919. The collector current of Q919 is controlled by its base current. Therefore, Q919 acts as a variable resistor which is controlled by the base current of Q919.

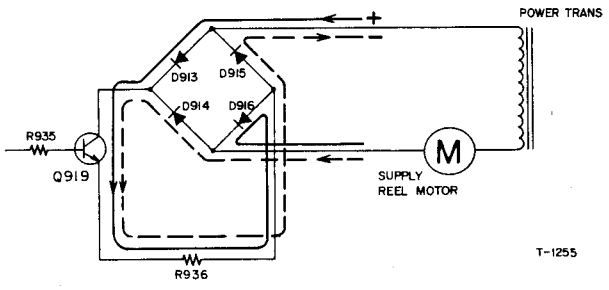


Fig. 19 Output Circuit

(2) CONTROL CIRCUIT

First thread a tape on the deck and set the deck in Play mode. Initially set the left tension arm to its standard stable position and adjust R931 for the standard output voltage of the comparator circuit which is composed of Q914 and Q916. As a result of this, base current flow in Q919 will be controlled and a voltage will be applied to the Supply Reel Motor to provide suitable back tension.
Now if some trouble occurs that causes the tape tension to decrease and the tape to become loose, the following circuit operation occurs to increase the tape tension accordingly.

1. The output voltage of the detection circuit increases. Therefore, the base potential of Q911 increases.
2. The collector current of Q911 increases and its collector voltage decreases.
3. Base current of Q914 decreases and its collector current decreases.
4. Collector current of Q914 decreases, the collector current of Q915 decreases and its collector voltage decreases. Therefore, the emitter potential of Q916 also decreases.
5. Since the base voltage potential of Q916 is constant, if the emitter voltage potential decreases and the Bias becomes deeper, the collector current increases and the collector voltage potential decreases.

6. The base voltage potential decreases and collector current increases. Therefore, the collector voltage potential increases.
7. When the collector voltage potential on Q918 increases, the base voltage potential on Q919 increases and the impedance (resistance value) across the collector-emitter junction decreases.
8. The current to the Supply Reel Motor increases, torque increases and back tension increases.
9. Tape slackness is removed.

When tension is strong and the tape is stretched, the operation of the circuit is reversed.

The emitter resistance RE of Q911 differs according to the mode of the deck.

Play mode →Q913 ON— RE = R913 + R916

REW mode →Q912 ON— RE = R913

F. FWD mode ——————→ RE = R913 + R916 +R917

In this way, the emitter resistance of Q911 is changed for each mode and even if the same voltage is applied to its base, the collector potential changes and the necessary back tension is provided.

When the deck is in STOP mode (Brake Solenoid is not energized) Q917 goes ON.

Due to this, the base of Q916 goes to ground level and Q916 goes completely OFF. This makes Q918 go OFF also and since there is no base current flow in Q919, there is no voltage applied to the Supply Reel Motor.

Since the base current in Q915 is constant, the collector current is also constant. It is a constant current circuit. This circuit works to keep the sum of the emitter currents (= collector currents) of Q914 and Q916 constant. It performs the role of increasing the sensitivity of the comparator circuit. Zener diode D912 is provided to stabilize the standard voltage potential. This voltage potential is also used as power for the oscillator circuit in the detection circuit.

C911 and C912 are used as oscillation preventing capacitors. C913 and R937 are inserted to filter the motor supply voltage.

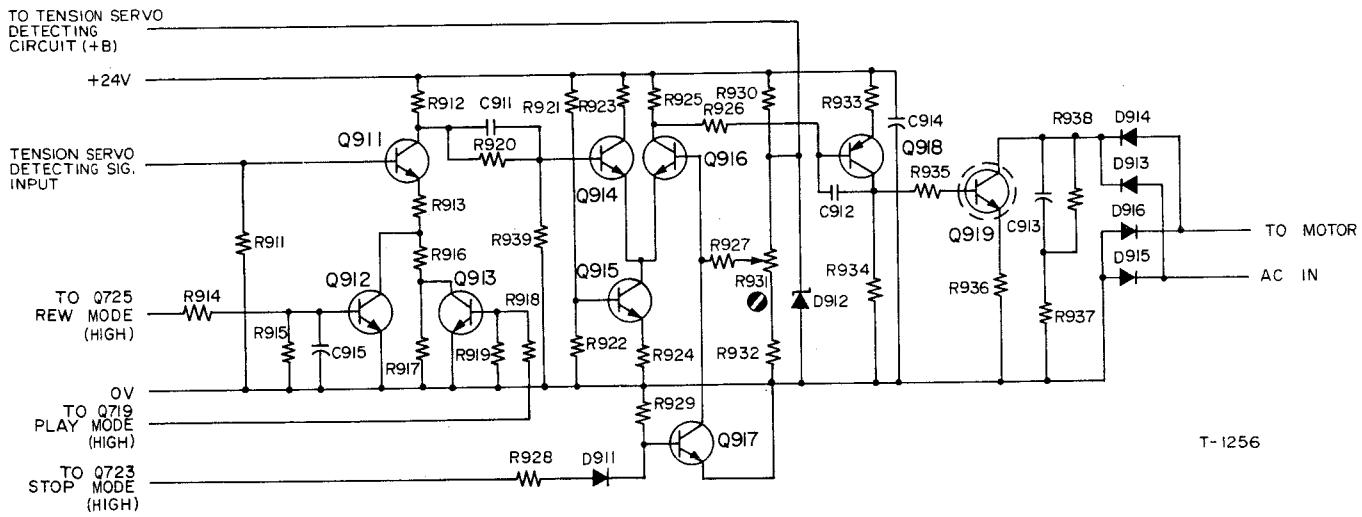
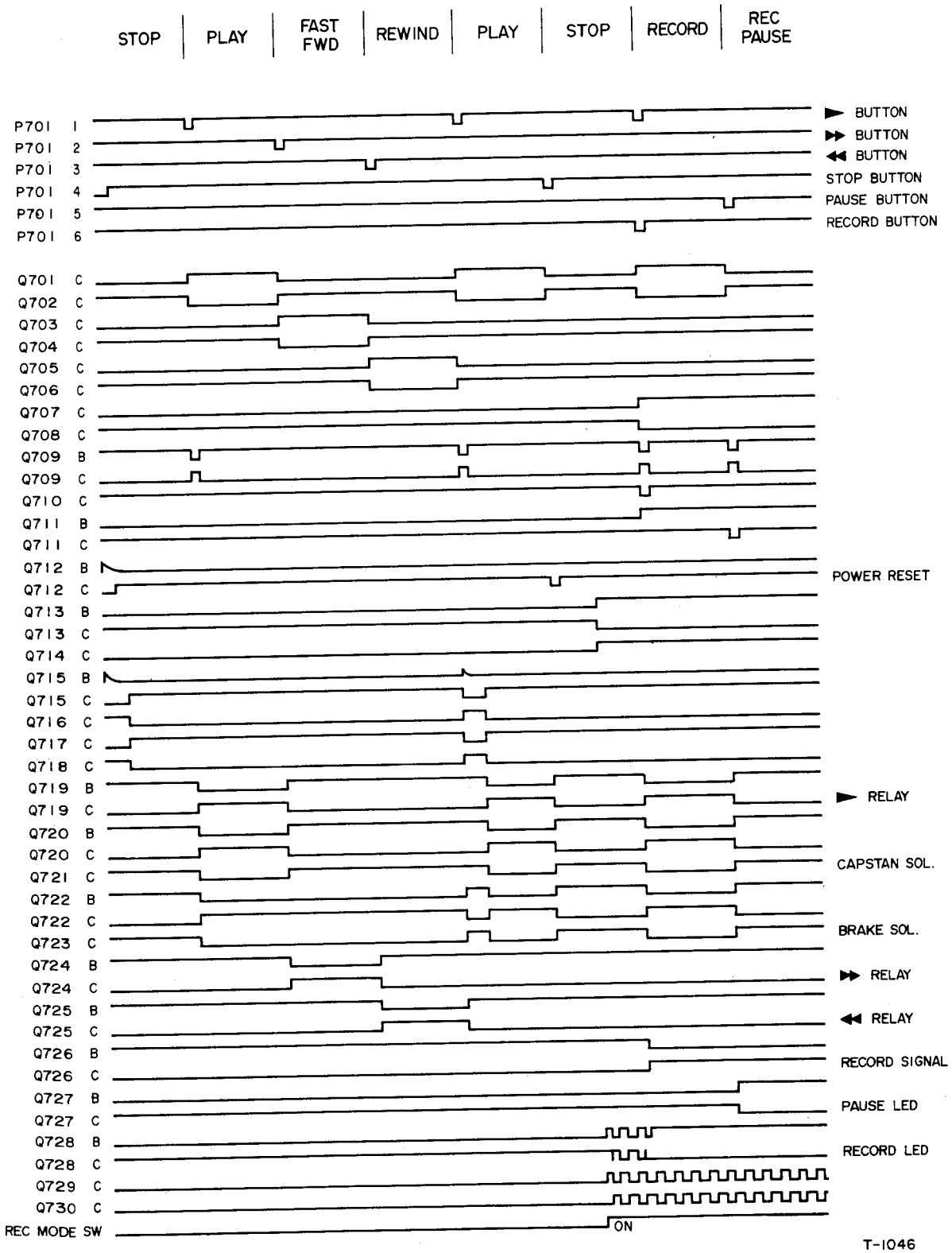


Fig. 20 Servo Ampl.

BASIC TIMING CHART



AMPLIFIER CIRCUIT DESCRIPTION

The distinctive features of the circuits in the amplifier section will be explained. Without exception only the L channel circuits will be explained.

1. PLAYBACK EQUALIZER AMPLIFIER

The Playback Equalizer Amplifier is composed of Q101 – Q103, Fig. 1. In the amplifier, Q101 and Q102 form a 2 stage amplifier and Q103 is an added emitter follower. Together these form a 3 stage amplifier.

Q101 and Q103 are NPN type transistors and Q102 is a PNP type.

In a direct coupled amplifier, if Q101 and Q102 are both NPN types or if they are both PNP types the circuit will operate as shown in Fig. 2 (a) and the front stage will have a direct coupled D.C. operating voltage potential which will go up. Therefore, if preparations for high voltage potentials are not made dynamic range will be narrow and distortion will easily occur. If a circuit which combines both NPN and PNP type transistors is used, the D.C. operating voltage potential will be as shown in Fig. 2 (b). In this case, the power voltage potential can be most efficiently used. Especially since a large voltage potential can be obtained at the collector-emitter junction of the first stage transistor, the dynamic range and distortion point can become an advantage. For this reason, a combined circuit which uses NPN and PNP type transistors is employed.

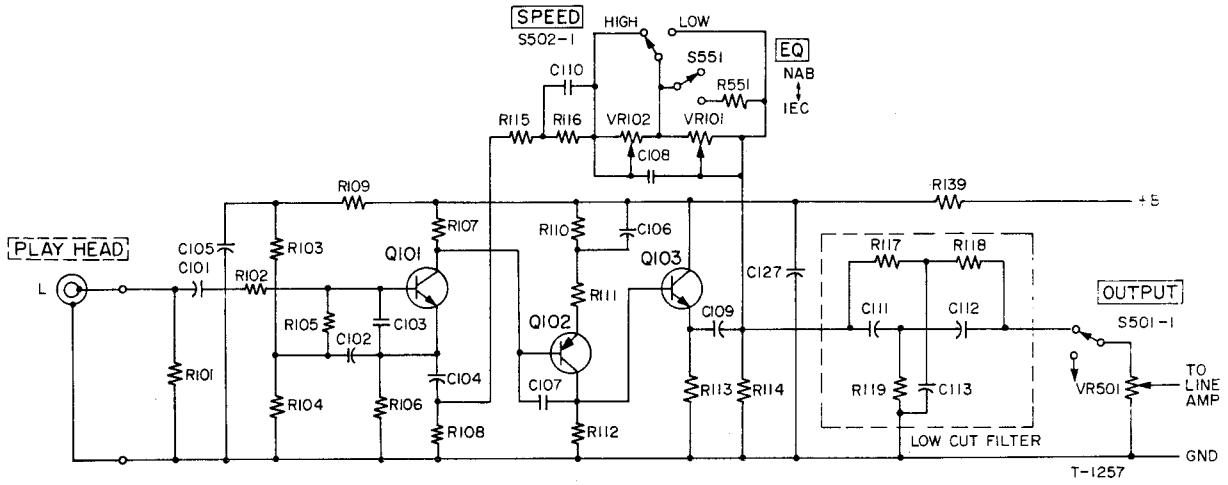


Fig. 1 Playback Equializer Ampl. Circuit

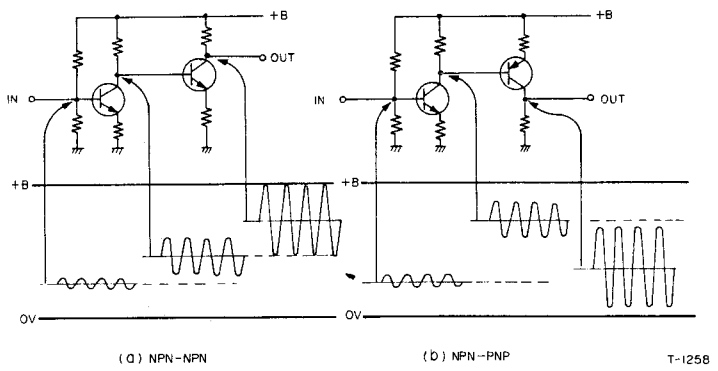


Fig. 2 Two Stage Ampl.

ext let's consider the difference between 2 stage and 3 age direct coupled amplifiers. These circuits are shown in gs. 3 (a) and 3 (b). The low frequency characteristic of rcuits (a) and (b) is determined by the capacitance of C.

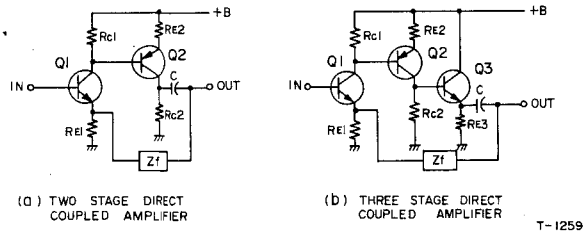


Fig. 3 Direct Coupling Ampl.

1 the case of (a), it can be thought of as the load impedance of Q2 which is the value of the negative feedback ircuit Z_f in parallel with Rc_2. The value of Z_f in the high requency region becomes small. Therefore, the load impedance also becomes small and the amplification (factor) f Q2 is reduced. For this reason, the dynamic range of the ircuit is reduced. In the case of circuit (b) the input impedance of the emitter follower is large enough compared o Rc_2. The load on Q2 can be considered as only Rc_2. lso, since the output impedance of the emitter follower is ery low, the effect of the change in Z_f is reduced.

he negative feedback circuit determines the playback qualization characteristic. As shown in Fig. 1, the low reion time constant T_1 can be considered to be $T_1 = R116 \times$ 110 ($\fallingdotseq 4700\ \mu$ Sec).

t this time turn over frequency $f_1 = 1/2\ \pi\ T_1$ ($\fallingdotseq 39$ Hz) n order to compensate for various losses in the low frequency region, the NAB and IEC specified equalization 3180 μ Sec, 50 Hz) is used to extend the low side.

he high frequency time constant is obtained as explained elow.

EQ Switch	SPEED Switch	
	HIGH (15 ips)	LOW (7½ ips)
IEC	(R101//R551) x C110	R102 x C110
NAB	R101 x C110	R102 x C110

Meanwhile, in the Playback Equalizer Amplifier first stage a "bootstrap" circuit is used to supply positive feedback from the emitter to the base by way of C104, R106. By this circuit the input impedance to Q101 is made very high. At 1 kHz the value becomes more than 4.5 Mohms. Since the amplifier input impedance is very high, the selection of the playback head load resistor can be freely made and the optimum load can be obtained.

At 20 kHz the resistance value of R101 is approximately 10 times the head impedance. As shown in Fig. 1, the twin T type filter which follows the amplifier is a low cut filter which provides approximately 40 dB of attenuation at 2 – 3 Hz frequency.

2. LINE AMPLIFIER/PHONE AMPLIFIER

Since the load on the Playback Amplifier determines the dynamic range and a high impedance is desirable, a playback level control (VR-501) of 100 kohms is used. The impedance of the Line Amplifier which follows VR-501 is ideally more than 2 times the value of VR-501. For this reason, the "bootstrap" circuit is used with the Line Amplifier to increase the input impedance.

The A-6100MKII has 2 output levels, 0.3 V (–8 dB, 0 dB = 0.775 V) and 0.775 V (0 dB, 0 dB = 0.775 V) and these two levels are switch selectable. See Fig. 4.

When the OUTPUT switch is set to HIGH position, R251 is inserted in the negative feedback circuit from Q202 to Q201 and the output level becomes 0.775 V. When the OUTPUT switch is set to LOW R251 is shorted out to increase the amount of negative feedback which decreases the amplification gain and lowers the output level to 0.3 V.

When the OUTPUT switch is set to HIGH, R252 is in series inserted in the input circuit to the VU meters and the input to the VU meter amplifier and head-phones amplifier is maintained at a constant level. The parallel circuit of L201 and C-205 form a bias trap. At audio frequencies the resonante circuit impedance is low and it becomes a short. At the resonant frequency its impedance is high and becomes an open circuit. For this reason the amplifier feedback increases and gain decreases. This is the purpose of the bias trap.

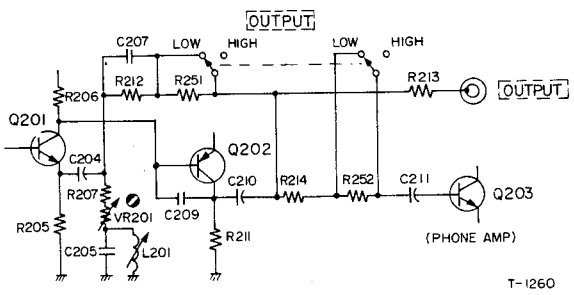


Fig. 4 Line Ampl. Selector Circuit

3. MIC AMPLIFIER

The Mic Amplifier is a 2 stage amplifier which uses an FET in its first stage.

This amplifier has low distortion and high dynamic range compared to the grounded emitter type 1 stage Mic Amplifier.

Since the Mic Amplifier has a mic attenuator at its input to reduce the signal level, if there is DC current leakage when the attenuator is selected, click noise may occur. For this reason, the first stage FET is self-biased with the gate potential at ground potential. This consideration is taken to eliminate DC leakage to the attenuator.

4. RECORD AMPLIFIER

Input circuit is as shown in Fig. 5.

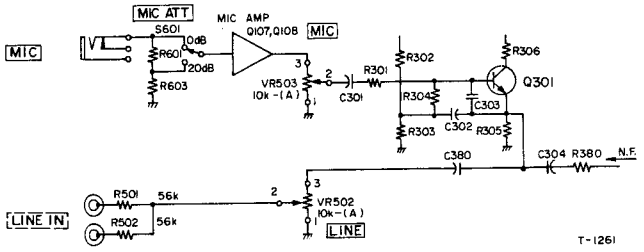


Fig. 5 Record Ampl. Selector Circuit

The output of the Mic Amplifier is fed through the MIC level control (VR503) to the base of Q301 to control its base current.

The LINE input passes through the LINE level control (VR502) and is connected to the negative feedback circuit of the Record Amplifier and controls the emitter current of Q301.

In this way, since the signal connection point and the control current are different, there is almost no mutual interaction between the MIC and LINE controls.

The input and output connections to the MIC level control and the LINE level control are opposite.

Terminal 2 of the LINE level control is the input side and terminal 3 is connected to the negative feedback circuit in order to prevent the gain of the amplifier from changing when the level controls are rotated.

Facing this circuit is a 10 kohm potentiometer. On the input side there are 56 kohm series resistors which make this value high enough. Therefore, no matter what position the potentiometer is set to the resistance connected to the negative feedback circuit can be assumed to be 10 kohms.

When the MIC level control is turned down (CCW) the base of Q301 is connected to ground through only R301 (1 kohms) and no noise remains.

The Rec output circuit is constructed as shown in Fig. 6.

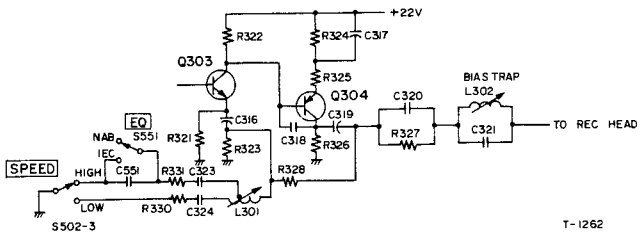


Fig. 6 Rec Ampl. Output Circuit

L301, C323 and C551, and L301 and C324 are series circuits for high frequency compensation.

AT the resonant frequency the circuit impedance becomes lower, the amount of negative feedback is decrease and the amplifier gain is increased. The resonant circuit and the resistors inserted in series (R330 and R311) are to reduce the signal distortion at the resonant frequency. It also has the role of limiting the maximum compensation amount.

Paralle capacitor, C327 helps provide mid-high region compensation.

5. PEAK INDICATOR UNIT

The VU meter indicates the average signal level. But in the case of transients, the VU meter by itself simply transients cannot indicate then.

For this reason, this deck employs a mono multivibrator circuit which lights an LED as a peak indicator. (See Fig. 7)

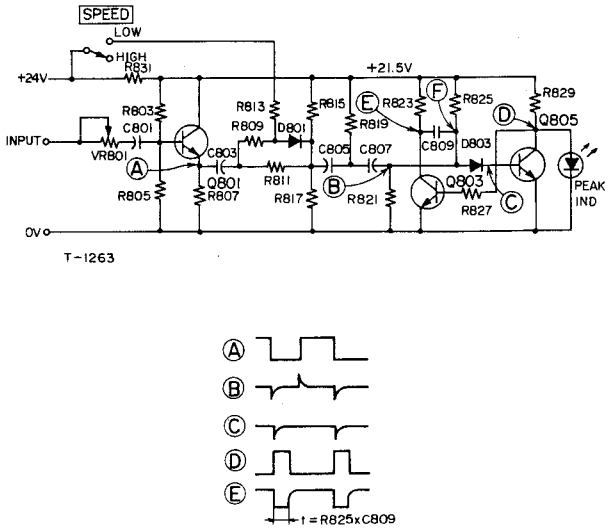


Fig. 7 Peak Ind. Circuit and Timing Chart

803 and Q805 form the mono multivibrator circuit. Dur-
g normal conditions Q803 is OFF and Q805 is ON and
e LED is extinguished. If an excessive signal is applied,
at output passes through C803, R811, C805 and C807
id becomes a differentiated waveform at point B. When
ie waveform at point B is at its negative excursion base
irrent in Q805 does not flow and Q805 goes OFF. For
iis reason, the potential at point D increases and current
ill flow through the LED and it will light. Also, when the
otential at point D increases, at the same time, Q803 goes
N and point E goes to ground potential. At that instant,
oint F is also at ground level. The +21.5 V line, through
ie path of R825, C809 C803 and ground continues to
iarge C809 and the potential at point F gradually rises.
hen the potential rises above approx. 1 V Q805 goes ON.
hen the peak indicator is extinguished. Q803 goes OFF
id normal conditions are reattained. Therefore, the time
iat the peak indicator is lit is determined by the charging
me constant of R825 and C809. The ignition level of the
ED during HIGH speed operation is determined by R811.
uring LOW SPEED operation the +24 V is applied by
801 and passes through R813, and D801 is forward biased
id conducts. For this reason, since R809 is inserted in
arallel with R811, the LED lights at a lower level than at
IGH speed.
i this way the ignition level is changed according to the
ipe speed. This is because the slower the tape speed, espe-
ally at high frequency sounds, the lower the tape satura-
on level will be.

6. BIAS OSCILLATOR

The control circuit for the Bias Oscillator is shown in Fig. 8.

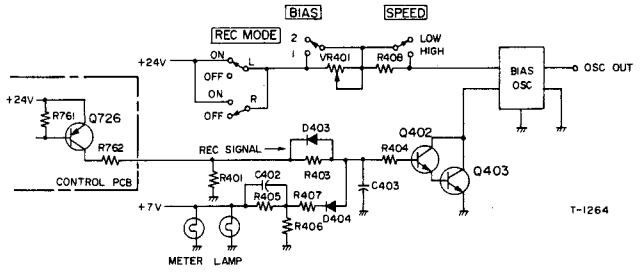


Fig. 8 Bias OSC Control Circuit

If either the L channel or the R channel REC MODE switch is ON, power will be supplied through VR401 and R408. This voltage will vary depending on the setting of the BIAS switch and the SPEED switch. Even if power is supplied to the Bias Oscillator, if the control transistor Q403 is OFF, there will be no oscillation.

When Q726 on the Control PCB goes ON (during record mode) C403 will begin charging through the path of +24 V – Q726 – R762 –R403 – C403 to ground. As the charge on C403 rises Q402 and Q403 will slowly turn ON. This operation does two things; it prevents recording until the tape stabilizes when the transport is changed to REC/PLAY mode and it prevents recording click noise while the bias is building up.

When the deck is changed from REC mode to STOP mode, Q726 is changed to OFF condition. At this time the charge on C403 is smoothly discharged through D403 and R401. When power is applied to the deck C402 is charged up to 7 V. When in Record mode, if power is turned OFF, since the meter lamp is the load on the +7 V power line it goes down quickly.

At this time, C402 and C403 are discharged through the path of C403 – D404 – R407 – C402 – lamp (or +7 V line). Because of this, the base of Q402 goes to a negative potential and Q402 and Q403 go OFF suddenly to prevent recording of power OFF "glitches".

The output of the Bias Oscillator is connected as shown in Fig. 9. Fig. 9 shows the REC MODE for the L channel only. That is, in REC/PLAY mode (REC RELAY K401 is energized).

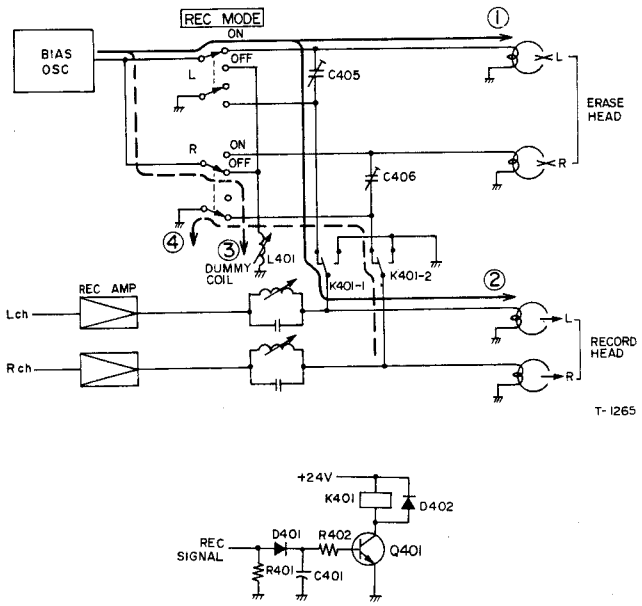


Fig. 9 Bias OSC Output Circuit

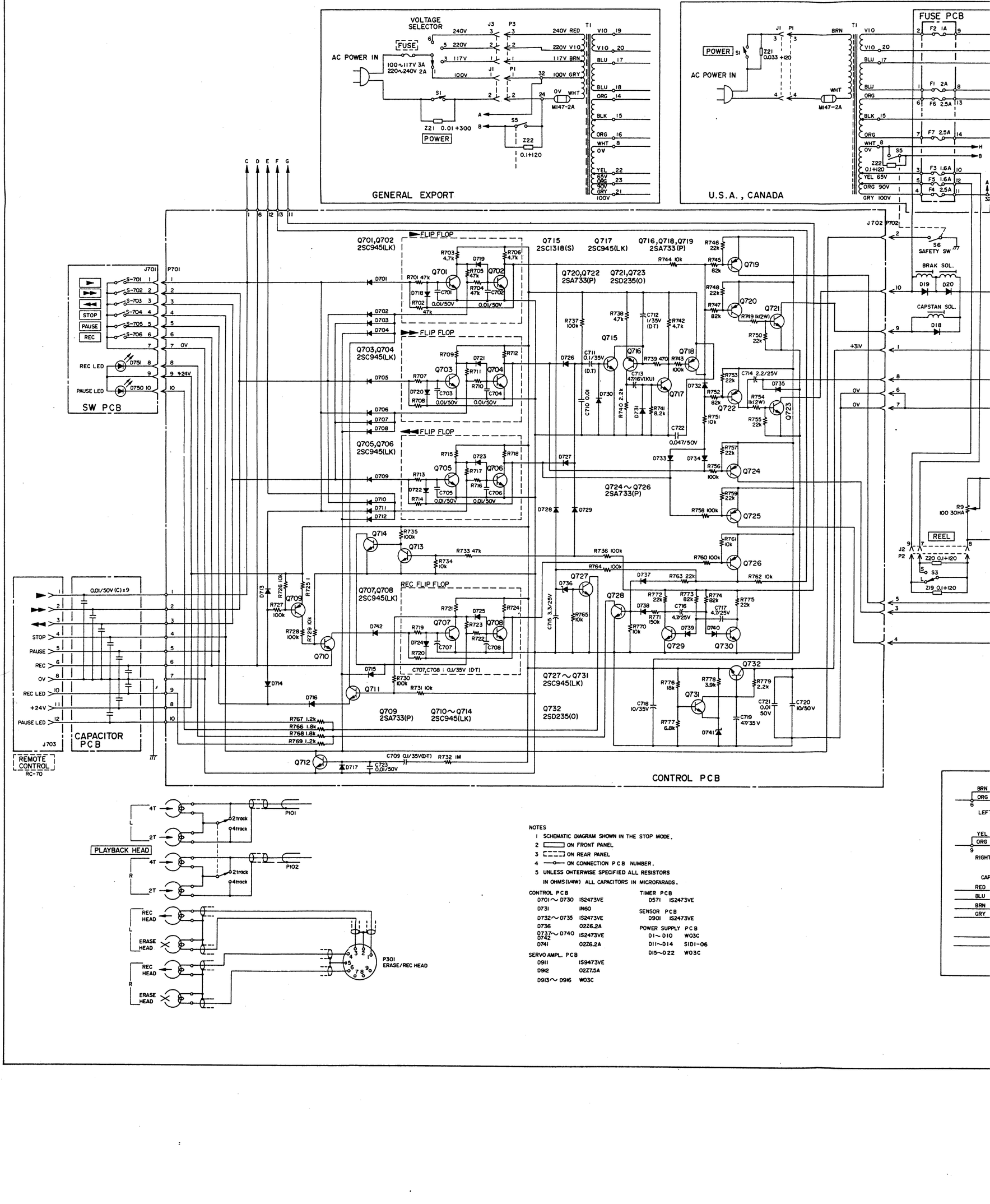
The Bias Oscillator output is divided into three paths, route 1, route 2 and route 3.

Route 1 – The path along this route provides erase current to the L channel erase head.

Route 2 – This path passes through the trimmer capacitor C405 and combines with the output of the REC Amplifier to drive the Record Head.

Route 3 – This path is connected to the dummy coil. For example, when recording only the L channel, since the R channel erase head and record head are not connected, the load on the Bias Oscillator is lightened. If the load varies, this may cause the oscillator frequency and output level to change also.

For this reason, when only one channel is being recorded a dummy load is connected to the other channel to reduce the load variation on the oscillator. Since the erase current to the erase head is much greater compared to that of the record head, the inductance of the dummy coil is almost equal to the inductance of the erase head.



NOTES

1. SCHEMATIC DIAGRAM SHOWN IN THE STOP MODE.
2. ▭ ON FRONT PANEL
3. ┅┅ ON REAR PANEL
4. —o— ON CONNECTION P C B NUMBER.
5. UNLESS OHTERWISE SPECIFIED ALL RESISTORS IN OHMS(1/4W) ALL CAPACITORS IN MICROFARADS.

CONTROL P C B

D701~D730	IS2473VE
D731	IN60
D732~D735	IS2473VE
D736	0Z6.2A
D737~D740 D742	IS2473VE
D741	0Z6.2A

SERVO AMPL. P C B

D911	IS9473VE
D912	0Z7.5A
D913~D916	W03C

TIMER P C B

D571	IS2473VE

SENSOR P C B

D901	IS2473VE

POWER SUPPLY P C B

D1~D10	W03C
D11~D14	SID1-06
D15~D22	W03C

REVISION	DATE	CHANGE NO.
1	06·77	
2	10·77	E-1072
3	07·78	E-1145
4	·	
5	·	
6	·	

TEAC CORPORATION

TAPE TRANSPORT

MODEL NO. A-6100MKII SHEET NO.

S-167

GENERAL EXPORT

B (SAFETY SW)
A (100V)
H (0V)
CAPSTAN MOTOR
LEFT REEL MOTOR
RIGHT REEL MOTOR

SPEED

B (SAFETY SW)
A (100V)
H (0V)
CAPSTAN MOTOR
RIGHT REEL MOTOR
LEFT REEL MOTOR

POWER SUPPLY PCB

2SC1318(S)
2SC1318 (AS) or 2SC1318 (S)
2SA490(Y)
2SD313(E)
2SC536(F)
2SC1318(S)
2SC536(F) or 2SC945(L,K)
2SA666(I,S)
2SC945(L,K)
2SA666(I,S)
2SD66E

SERVO AMPL. PCB

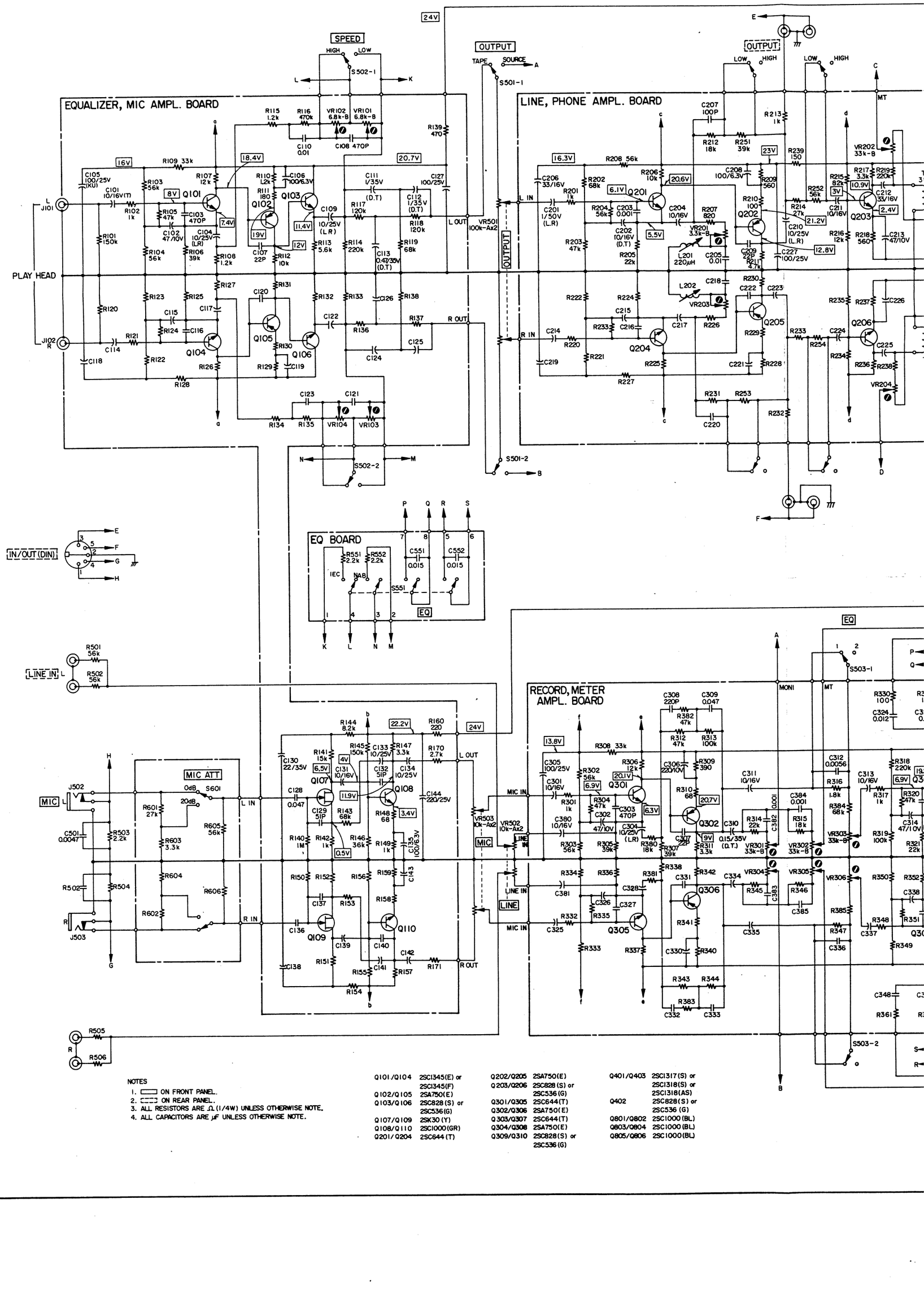
TENSION SERVO PCB

TIMER PCB

FUSE PCB

TO CONTROL PCB
TO AMPL.
REC MODE
REC SIG
COUNTER SW
MEMORY
TIMER
CAPSTAN SOL.
BRAK SOL.
REEL
SAFETY SW

S.A., CANADA



NOTES

1. ▭ ON FRONT PANEL.
2. ▭▭ ON REAR PANEL.
3. ALL RESISTORS ARE Ω (1/4W) UNLESS OTHERWISE NOTE.
4. ALL CAPACITORS ARE μF UNLESS OTHERWISE NOTE.

Q101/Q104	2SC1345(E) or 2SC1345(F)	Q202/Q205	2SA750(E)	Q401/Q403	2SC1317(S) or 2SC1318(S) or 2SC1318(AS)
Q102/Q105	2SA750(E)	Q203/Q206	2SC828(S) or 2SC536(G)	Q402	2SC828(S) or 2SC536(G)
Q103/Q106	2SC828(S) or 2SC536(G)	Q301/Q305	2SC644(T)	Q801/Q802	2SC1000(BL)
Q107/Q109	2SK30(Y)	Q302/Q306	2SA750(E)	Q803/Q804	2SC1000(BL)
Q108/Q110	2SC1000(GR)	Q303/Q307	2SC644(T)	Q805/Q806	2SC1000(BL)
Q201/Q204	2SC644(T)	Q304/Q308	2SA750(E)		
		Q309/Q310	2SC828(S) or 2SC536(G)		

REVISION	DATE	CHANGE NO.
1	06·77	
2	10·77	E-1072
3	07·78	E-1145
4		
5		
6		

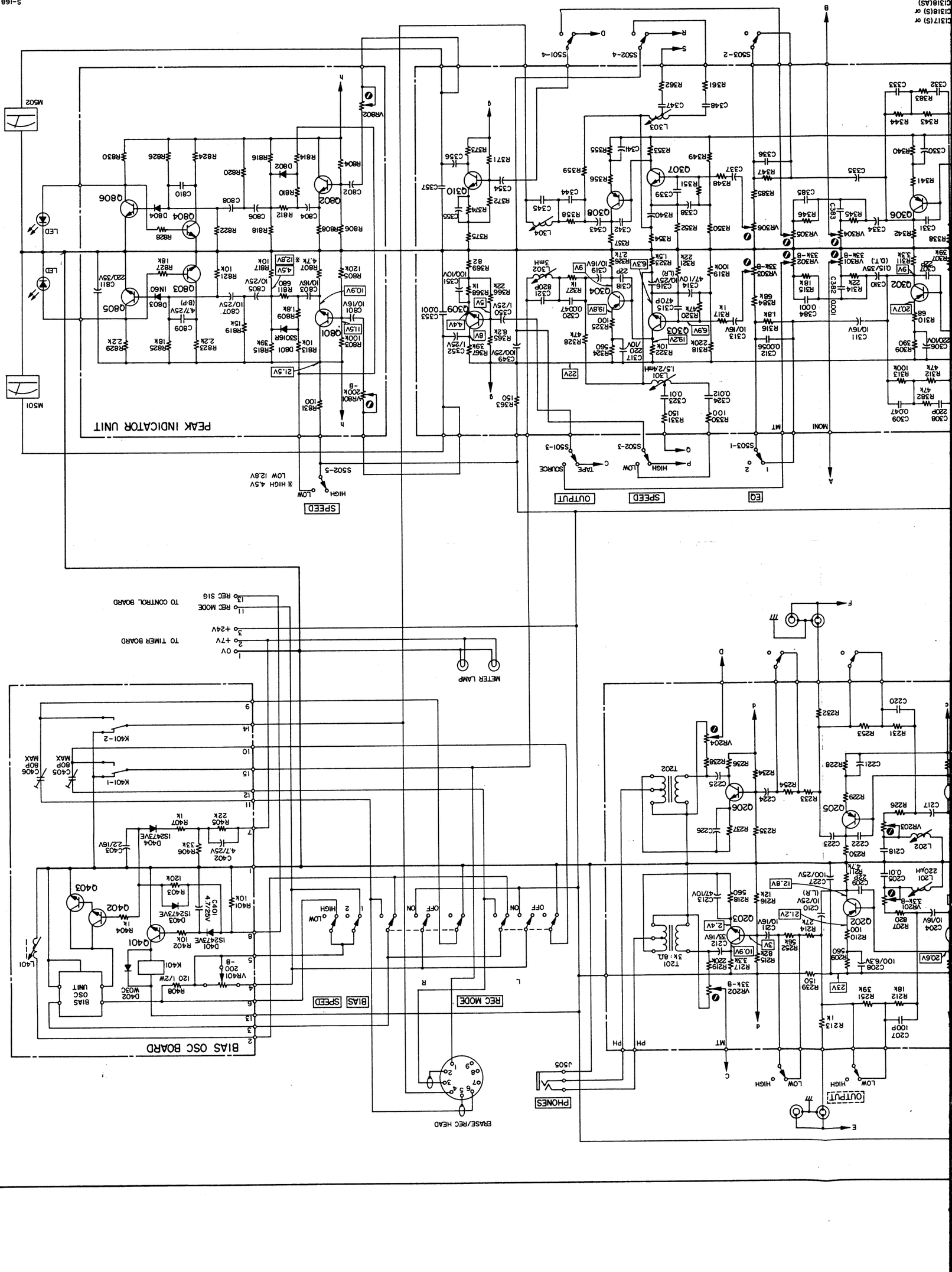
TEAC CORPORATION

MODEL NO. A-6100MKII SHEET NO.

PREAMPLIFIER

S-168

C1317(S) or
C1318(S) or
C1318(AS)
C828(S) or
C536 (G)
C1000(BL)
C1000(BL)
C1000(BL)
C1000(BL)



TEAC®

PARTS LIST

A-6100MKII

Stereo Tape Deck

TABLE OF CONTENTS

PARTS ORDERING INFORMATION

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

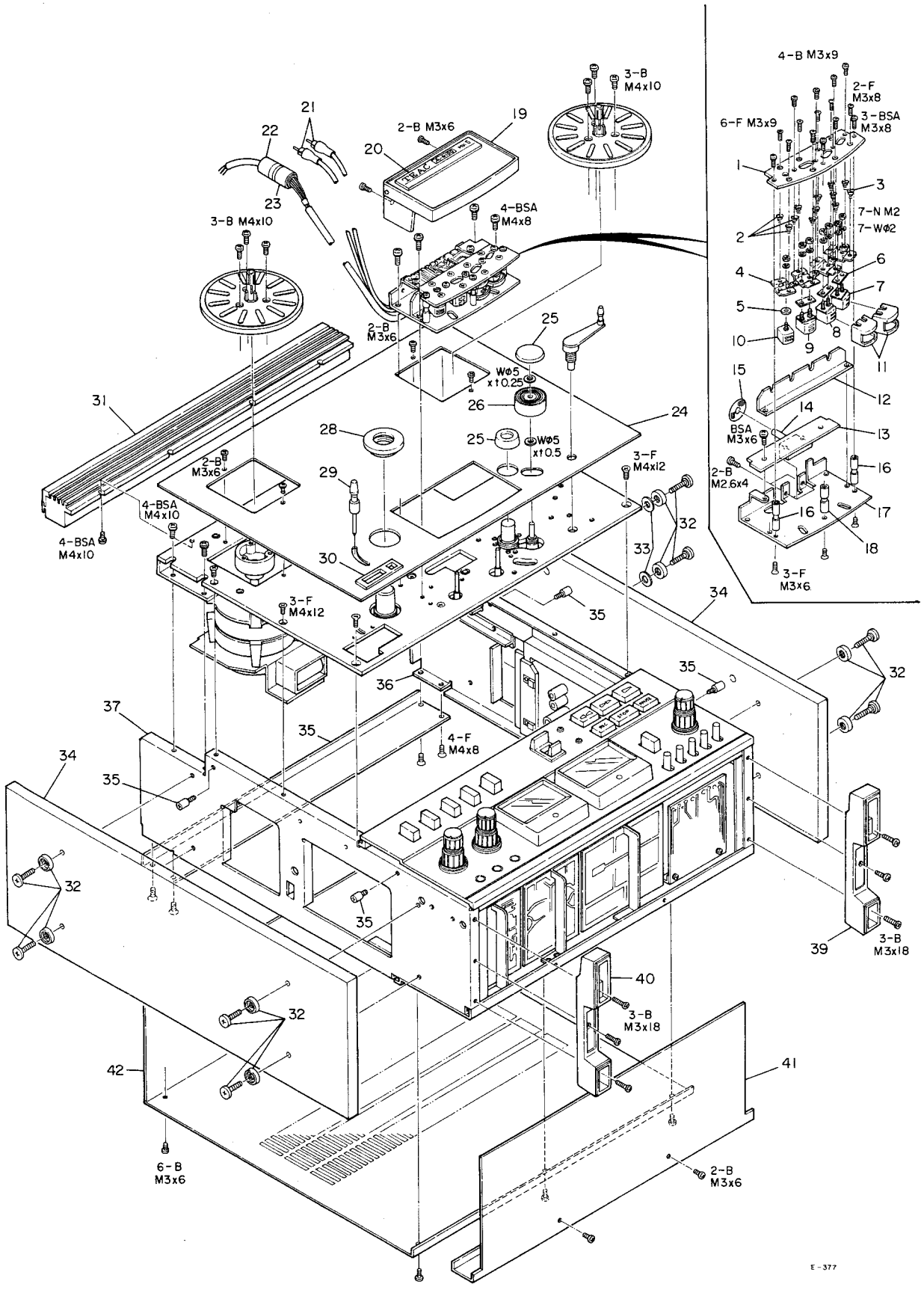
1. MODEL
2. REF. NO.
3. PARTS NO.
4. DESCRIPTION
5. UNIT SERIAL NO.
6. MANUAL CODE NO.

NOTICE REGARDING PARTS ORDERS

1. Do not order by only REF. NO.
2. In some instances, individual minor parts are not available In such a case, the entire assembly including the part requested will be sent to you.
3. Parts are identical between the different models with the exceptions as coded by the designations in the REMARKS column.
4. PC Boards shown viewed from foil side.
5. Parts marked with * require longer delivery time than regular parts.

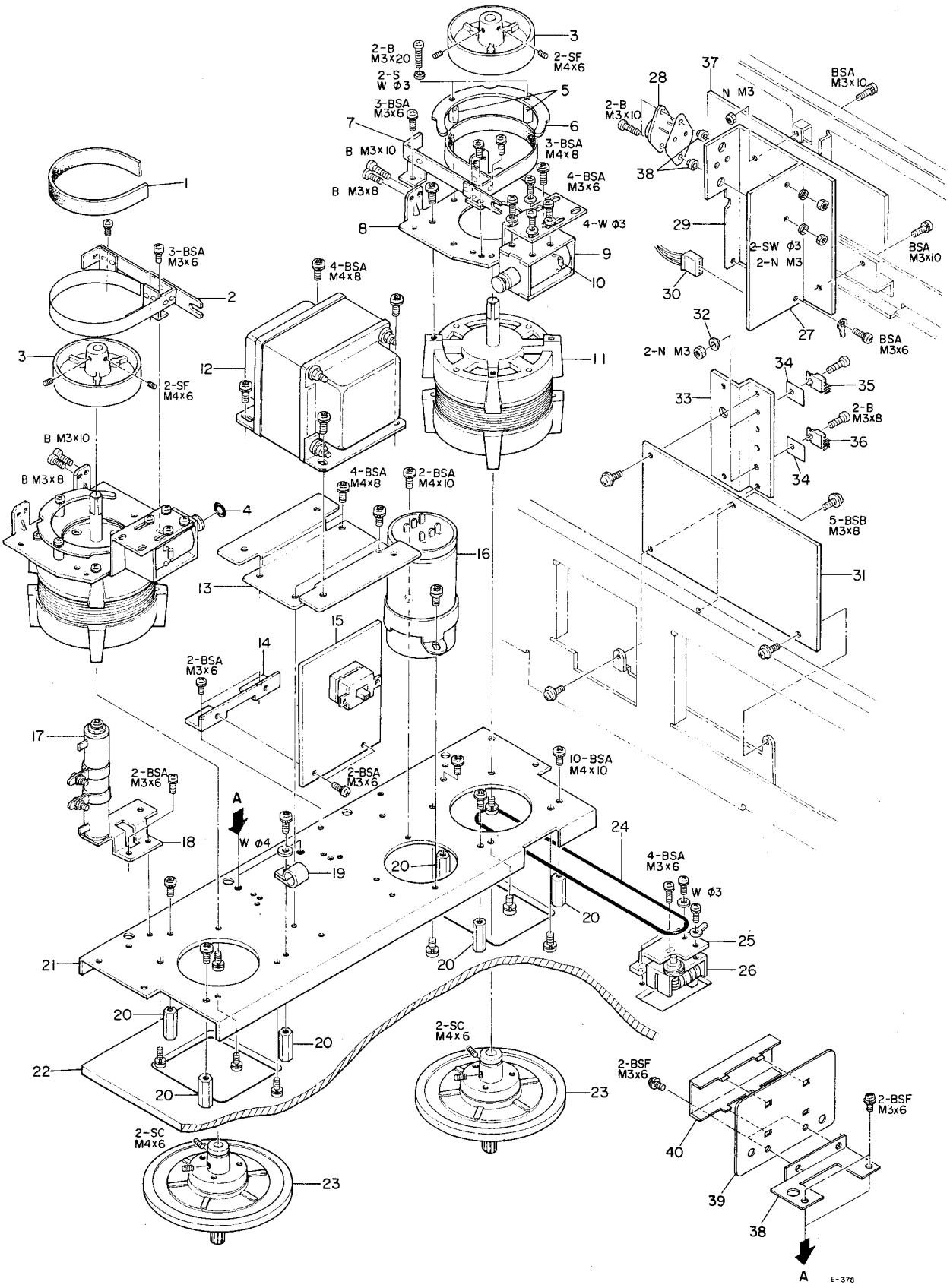
1. EXPLODED VIEWS AND PARTS LIST SECTION

EXPLODED VIEW-1



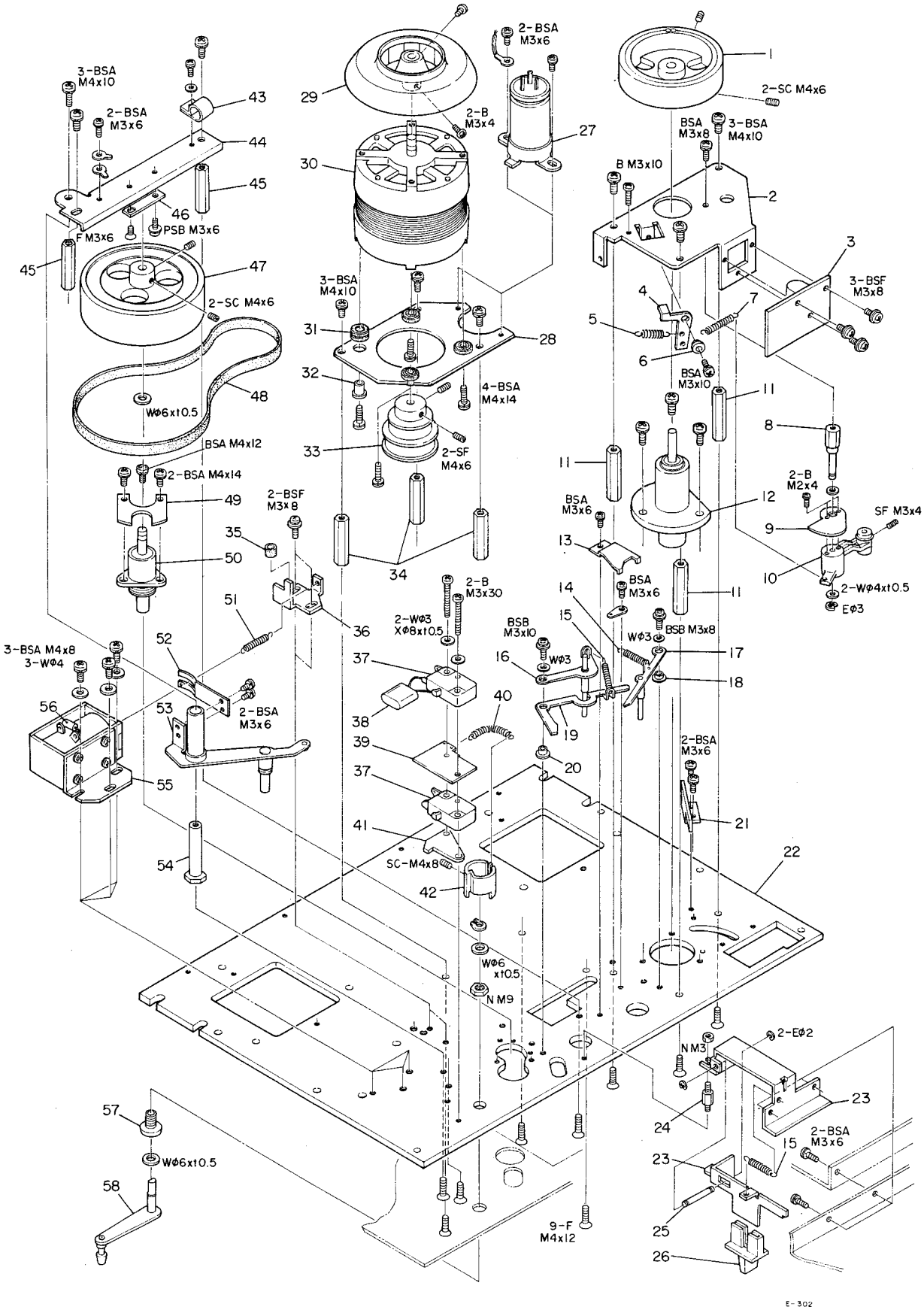
REF. NO.	PARTS NO.	DESCRIPTION	REMARKS
1 - 1	*55501331	Plate, Head Base	
1 - 2	50220500	Spring, Head; B	
1 - 3	55201820	Spring, Head; D	
1 - 4	*50134371	Plate, E.R.P Head	
1 - 5	*50136540	Spacer, Erase Head	
1 - 6	*55501511	Spacer, Head; A	
1 - 7	50664530	Head, Playback (2T - 2CH)	
1 - 8	50664560	Head, Playback (4T - 2CH)	
1 - 9	50664520	Head, Record (2T - 2CH)	
1 - 10	50662090	Head, Erase (2T - 2CH)	
1 - 11	*50133891	Shield, Head; A	
1 - 12	*55541060	Bracket, Protector; B	
1 - 13	*51681390	PC Board Assy, Head	
1 - 14	50444720	Switch, Slide	Part of 1 - 13
1 - 15	*50829850	Mask, Switch	
1 - 16	50182672	Pin, Tape Guide	
1 - 17	*55530130	Plate, Housing Base	
1 - 18	*55444650	Tape Guide, Center	
1 - 19	*55031180	Head Housing Assy	
1 - 20	*55550120	Plate, Housing; A	
1 - 21	*50477740	Cord Assy Playback Head	
1 - 22	*50435080	Connector, Socket; 9P	
1 - 23	*50432740	Connector, Plug; 9P	
1 - 24	*55521720	Panel, Trim; C	
1 - 25	50142180	Cap, Pinch Roller	
1 - 26	50141751	Pinch Roller	
1 - 27	55440200	Cap, Dust; ϕ12	
1 - 28	55445550	Cap, Roller	
1 - 29	55044460	Tension Guide Assy	
1 - 30	*50277020	Escutcheon, Counter	
1 - 31	*50112980	Grille Assy, Top	
1 - 32	*55044110	Screw Assy, Sideboard	
1 - 33		(Not used)	
1 - 34	*55430110	Sideboard	
1 - 35	*55810370	Screw, Guide	
1 - 36	*55031081	Panel Assy, Side; R	
1 - 37	*55031070	Panel Assy, Side; L	
1 - 38	*50235312	Angle, Rear Cover	
1 - 39	*55330180	Leg, R	
1 - 40	*55330190	Leg, L	
1 - 41	*55040134	Cover Assy, Bottom	
1 - 42	*55530181	Cover, Rear	

EXPLODED VIEW-2



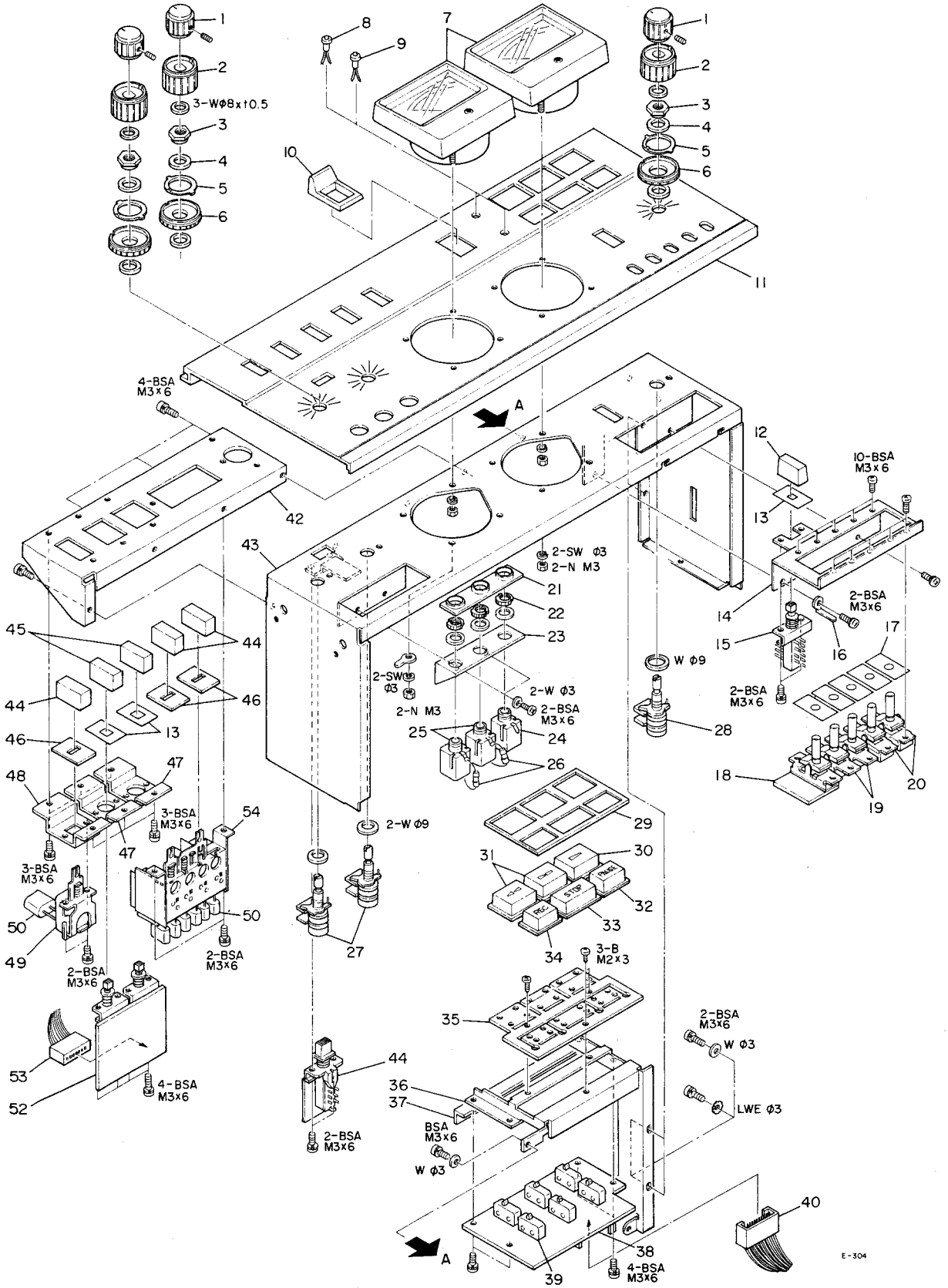
REF. NO.	PARTS NO.	DESCRIPTION	REMARKS
2 - 1	55552740	Shoe, Brake	
2 - 2	50173393	Brake Band Assy, R	
2 - 3	50173571	Drum, Brake	
2 - 4	*55302510	"0" Ring	
2 - 5	*50173490	Spacer, Brake Shaping Retainer	
2 - 6	*55552720	Retainer, Brake Shaping	
2 - 7	50173333	Brake Band Assy, L	
2 - 8	*50173601	Plate, Brake	
2 - 9	50616770	Solenoid, Brake	
2 - 10	*50422570	Diode; SIB01—06	
2 - 11	71041071	Motor, Reel	
2 - 12	*51521550	Transformer, Power	GENERAL EXPORT
	*51521540	Transformer, Power	U.S.A., CANADA
2 - 13	*55554980	Plate, Transformer	
2 - 14	*50332573	Bracket, PC Board	
2 - 15	*51685050	PC Board Assy, Connection	GENERAL EXPORT
	*51687520	PC Board Assy, Connection	U.S.A., CANADA
	*50444610	Switch, Slide (Part of 2 - 15)	GENERAL EXPORT
	51675050	PC Board (Part of 2 - 15)	
2 - 16	*51700050	Capacitor, MP; (7 + 1.5 mfd) x 2	GENERAL EXPORT
	*51714600	Capacitor, MP; 7 mfd x 2	U.S.A., CANADA
2 - 17	*50524412	Resistor, Wire Wound; 100 ohm 30 HA	
2 - 18	*55540571	Bracket, Resistor	
2 - 19	*55340410	Retainer, Cord	
2 - 20	*50161950	Stud, Reel Motor	
2 - 21	*55520101	Chassis, Reel Motor	GENERAL EXPORT
	*55523520	Chassis, Reel Motor; A	U.S.A., CANADA
2 - 22	*55521700	Panel, Top; A	
2 - 23	*55040871	Reel Table Assy	
2 - 24	55343710	Belt, Counter	
2 - 25	*55549430	Bracket, Counter	
2 - 26	50585150	Counter, Index	
2 - 27	*51684732	PC Board Assy, Servo Ampl.	
2 - 28	*51450810	Transistor; 2SD665	Part of 2 - 27
2 - 29	*55550151	Heat Sink, B	Part of 2 - 27
2 - 30	*51221140	Connector, Plug; 4P	Part of 2 - 27
2 - 31	*51687740	PC Board Assy, Power Supply	
2 - 32	*50332950	Washer, Insulating	Part of 2 - 31
2 - 33	*55550140	Heat Sink, A	Part of 2 - 31
2 - 34	*50332910	Plate, Insulating	Part of 2 - 31
2 - 35	*50425460	Transistor; 2SA490 (Y)	Part of 2 - 31
2 - 36	*50426250	Transistor; 2SC1318 (S)	Part of 2 - 31
2 - 37	*55552190	Heat Sink, Sub	
2 - 38	*55551611	Bracket, Fuse PC Board	U.S.A., CANADA
2 - 39	*51687860	PC Board Assy, Fuse	U.S.A., CANADA
	51676860	PC Board (Part of 2 - 39)	U.S.A., CANADA
	50412370	Holder, Fuse x 16 (Part of 2 - 39)	U.S.A., CANADA
	50411450	Fuse, 1A 250V AC (F2) (Part of 2 - 39)	U.S.A., CANADA
	51421130	Fuse, 1.6A 250V AC (F3, F5) (Part of 2 - 39)	U.S.A., CANADA
	51411440	Fuse, 2A 250V AC (F1) (Part of 2 - 39)	U.S.A., CANADA
	51421140	Fuse, 2.5A 250V AC (F4, F6, F7) (Part of 2 - 39)	U.S.A., CANADA
2 - 40	*55344560	Cover, Fuse	U.S.A., CANADA

EXPLODED VIEW-3



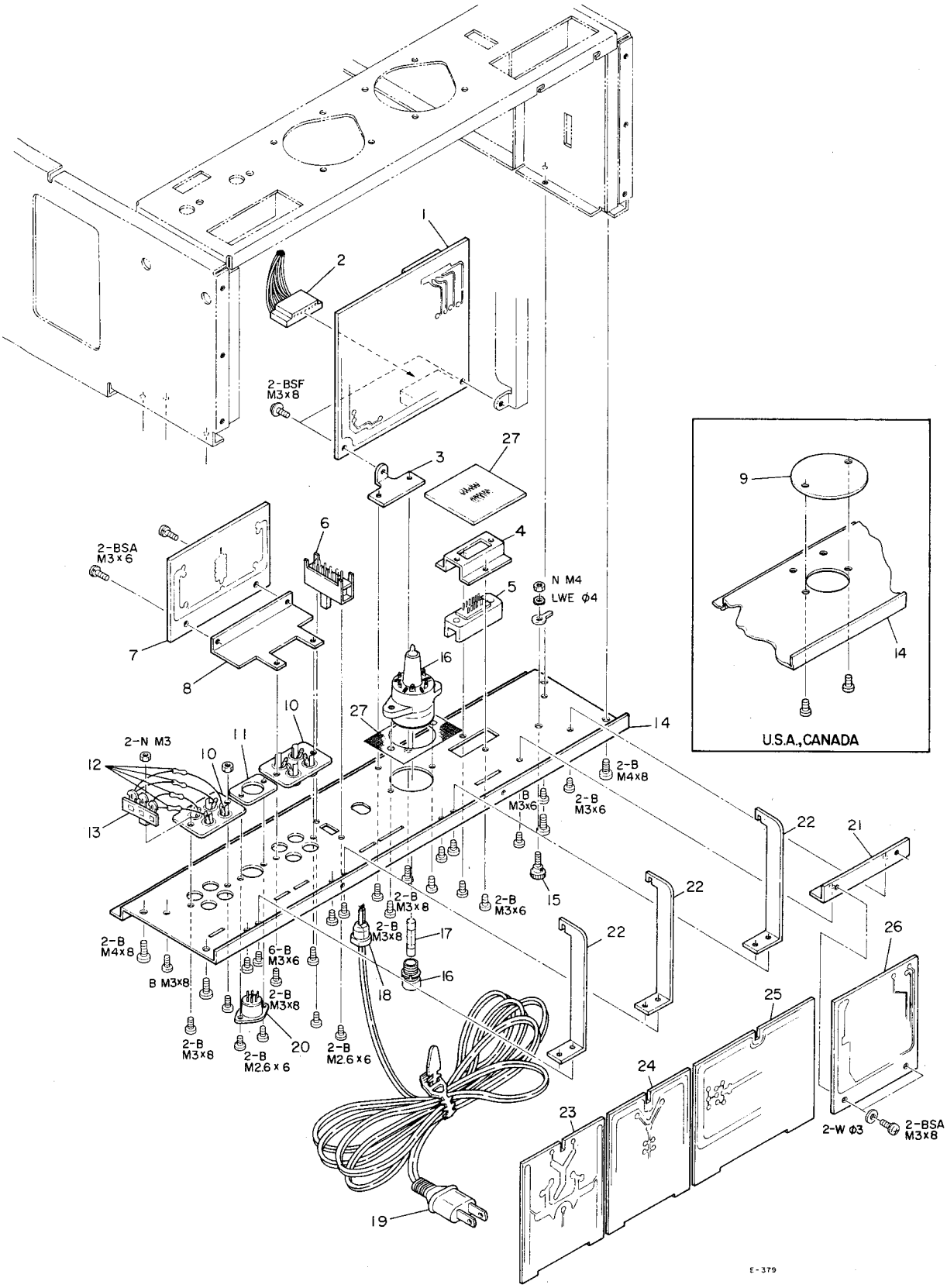
REF. NO.	PARTS NO.	DESCRIPTION	REMARKS
3 - 1	*55305060	Impedance Wheel	
3 - 2	*55539360	Bracket, Tension Arm	
3 - 3	*51684720	PC Board Assy, Tension Servo Detecting	
3 - 4	*55549410	Arm, Adjusting	
3 - 5	*55203230	Spring, Adjusting	
3 - 6	*55445650	Collar, C	
3 - 7	*55203240	Spring, Tension Servo	
3 - 8	*55445481	Shaft, Tension Arm; L	
3 - 9	*55550230	Plate, Shield	
3 - 10	*55343731	Arm, Tension; L	
3 - 11	*55445510	Stud, Tension Arm	
3 - 12	55044120	Impedance Roller Assy	
3 - 13	*55541120	Plate, Lifter; B	
3 - 14	*50221100	Spring, A	
3 - 15	55200030	Spring, Pinch	
3 - 16	*55040190	Lifter Assy, Cue	
3 - 17	55000740	Arm Assy, Lifter; R	
3 - 18	*50152501	Shaft, Lifter Arm	
3 - 19	*55541180	Arm, Cue	
3 - 20	*55440220	Shaft, Lifter Arm	
3 - 21	*55549420	Stopper, Tension Arm	
3 - 22	*55521700	Panel, Top; A	
3 - 23	*55044550	Cue Assy	
3 - 24	*55440230	Stud, Cue	
3 - 25	*55440330	Shaft, Guide	
3 - 26	*55305151	Lever, Cue	
3 - 27	50545650	Capacitor, MP; 2 + 0.8 mfd 250V	
3 - 28	*50237521	Plate, Capstan Motor	
3 - 29	*50123984	Fan	
3 - 30	50701341	Motor, Capstan	
3 - 31	*50706211	Cushion, Rubber	
3 - 32	*50332790	Spacer, Rubber Cushion	
3 - 33	*50124003	Pulley, Motor; 50Hz/60Hz	GENERAL EXPORT
	*50125121	Pulley, Motor; 60Hz	U.S.A., CANADA
3 - 34	*50123850	Stud, Capstan Motor	
3 - 35	50275690	Cushion, Rubber	
3 - 36	*55551910	Stopper, Pinch Roller	
3 - 37	51300010	Switch, Micro	
3 - 38	50529050	Spark Killer; 0.1 mfd + 120 ohm 400V	
3 - 39	*50183932	Spacer, Insulator Paper	
3 - 40	55203110	Spring, Tension Arm; R	
3 - 41	50182731	Limiter, Tension Arm	
3 - 42	*50183921	Drum, Tension Arm	
3 - 43	*55340410	Retainer, Cord; A	
3 - 44	*55540580	Angle, Thrust; B	
3 - 45	*50123860	Stud, Flywheel	
3 - 46	*50277233	Plate, Thrust	
3 - 47	*50123802	Flywheel	
3 - 48	*50125340	Belt, Capstan	
3 - 49	*50142190	Plate, Arm Support	
3 - 50	55044270	Capstan Assy	
3 - 51	*55240080	Spring, Return	
3 - 52	*55200621	Plate Spring, B	
3 - 53	*55040161	Arm Assy, Pinch Roller	
3 - 54	*50141821	Shaft, Roller Arm	
3 - 55	51630040	Solenoid, Pinch Roller	
3 - 56	50422570	Diode; SIB01-06	
3 - 57	55300831	Holder; Arm; C	
3 - 58	55000720	Arm Assy, Tension	

EXPLODED VIEW-4



REF. NO.	PARTS NO.	DESCRIPTION	REMARKS
4 - 1	*55440582	Knob, Upper	
4 - 2	*55040351	Knob, B	
4 - 3	*55400821	Lock Nut	
4 - 4	*55200610	Washer, Wave	
4 - 5	*55202271	Spring, Preset	
4 - 6	*55340130	Guide, Memory Marker	
4 - 7	51650440	VU Meter	
4 - 8	51430540	LED (Green)	
4 - 9	51430530	LED (Red)	
4 - 10	*55305300	Hook, Cue Lever	
4 - 11	*55522780	Panel, Ampl. Trim	
4 - 12	*55300800	Button, Monitor	
4 - 13	*55501280	Mask, Switch	
4 - 14	*55501192	Bracket, Lever Switch	
4 - 15	*50443960	Switch, Push	
4 - 16	*55810380	Retainer, Cord; A	
4 - 17	*55500790	Mask, Lever Switch	
4 - 18	*51685110	PC Board Assy, EQ	
	*51675110	PC Board	Part of 4 - 18
	51812900	Resistor, Carbon; 2.2k ohm 1/4W 5% x 2	Part of 4 - 18
	50548870	Capacitor, Mylar; 0.015 mfd 50V 5% x 2	Part of 4 - 18
	50447430	Switch, Lever	Part of 4 - 18
4 - 19	50447220	Switch, Lever	
4 - 20	50447210	Switch, Lever	
4 - 21	*55300760	Insulator Mask, Jack	
4 - 22	*55810420	Nut, Jack	
4 - 23	*55300771	Bracket, Jack Mounting	
4 - 24	*50432450	Jack, PHONES	
4 - 25	*50430240	Jack, MIC	
4 - 26	*50572900	Resistor, Carbon; 2.2k ohm 1/4W 5%	
4 - 27	51501470	Var. Res.; 10k ohm A x 2	
4 - 28	*50537250	Var. Res.; 100k ohm A x 2	
4 - 29	*55343750	Rubber Protector	
4 - 30	50237201	Button; A	
4 - 31	50237211	Button; B	
4 - 32	55300741	Button; PAUSE	
4 - 33	50237221	Button; STOP	
4 - 34	55300731	Button, REC	
4 - 35	*55343740	Holder, Button	
4 - 36	*55539400	Bracket, Button Holder	
4 - 37	*55551770	Bracket, Switch PC Board	
4 - 38	*51675040	PC Board, Switch	
4 - 39	50446330	Switch, Micro	
4 - 40	*51220120	Connector, Plug; 10P	
4 - 41	*51685090	PC Board Assy, Attenuator	
4 - 42	*55539390	Bracket, Switch	
4 - 43	*55021500	Chassis Assy, Ampl.	
4 - 44	50253530	Button, D	
4 - 45	*55340140	Button	
4 - 46	*50253880	Mask, Switch	
4 - 47	*55540650	Bracket, Switch	
4 - 48	*55501161	Bracket, Power Switch	
4 - 49	51340210	Switch, Power	
4 - 50	*50529070	Spark Killer, 0.01 mfd + 300 ohm 400V AC	GENERAL EXPORT
	50529060	Spark Killer, 0.033 mfd + 120 ohm 125V AC	U.S.A.
	50529110	Spark Killer, 0.033 mfd + 120 ohm 250V AC	CANADA
4 - 51	50443902	Switch Assy, Selector	
4 - 52	*51685060	PC Board Assy, Timer	
4 - 53	*50438470	Connector Housing; 6P	

EXPLODED VIEW-5



REF. NO.	PARTS NO.	DESCRIPTION	REMARKS
5 - 1	*51685020	PC Board Assy, Control	
5 - 2	*50438480	Connector Housing; 10P	
5 - 3	*55549450	Bracket, PC Board	
5 - 4	*55540990	Bracket, Connector	
5 - 5	*50438411	Connector, Socket; 12P	
5 - 6	*50440000	Switch, Slide	
5 - 7	*51686040	PC Board Assy, Peak Level Indicator Ampl.	
5 - 8	*55540681	Bracket, PC Board	
5 - 9	*55554830	Plate, Mask	U.S.A., CANADA
5 - 10	50436580	Jack, Pin; 4P	
5 - 11	*50233530	Plate, DIN Connector	
5 - 12	*50571240	Resistor, Carbon; 56k ohm 1/4W 5%	
5 - 13	*50452060	Terminal Strip; 1L - 2P	
5 - 14	*55021511	Panel, Rear Connection; A	
5 - 15	*50454071	Post, Grounding	
5 - 16	*50435030	Voltage Selector	GENERAL EXPORT
5 - 17		Fuse, 3A (100-117V area)	GENERAL EXPORT
	50311140	Fuse, 2A (220-240V area)	GENERAL EXPORT
5 - 18	*55300470	Strain Relief, AC Power Cord	
5 - 19	*50471652	Cord, AC Power	GENERAL EXPORT
	*51280760	Cord, AC Power	U.S.A., CANADA
5 - 20	*50430010	Connector, DIN	
5 - 21	*55501240	Bracket, PC Board	
5 - 22	*50233760	Plate, PC Board	
5 - 23	*51685370	PC Board Assy, MIC/Playback EQ Ampl.	
5 - 24	*51681082	PC Board Assy, Line Out/Phone Ampl.	
5 - 25	*51685390	PC Board Assy, Record/Meter Ampl.	
5 - 26	*51685080	PC Board Assy, Bias Oscillator	
5 - 27	55501500	Mask, Fuse	GENERAL EXPORT

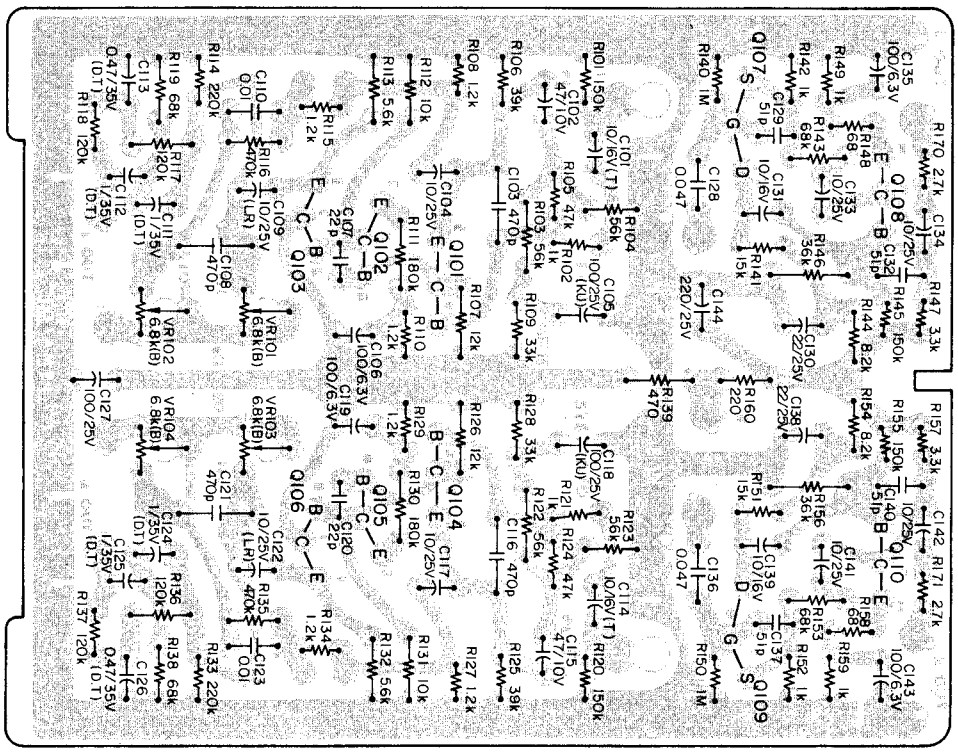
INCLUDED ACCESSORIES

REF. NO.	PARTS NO.	DESCRIPTION	REMARKS
	51280010	Cords, Input-output Connection x 2	
	* RE-1002	Empty Reel, 10 inch	
	55980250	Adapters, Reel Clamp x 2	
	50291860	Oil and Applicator	
	50276971	Rubber Feet x 4	
	50629620	Splicing Tape	
	51422110	Fuse, 3A (100-117V area)	GENERAL EXPORT
	50411140	Fuse, 2A (220-240V area)	GENERAL EXPORT
	51013371	Open Reel Supplement	U.S.A., CANADA
	51015460	Owner's Manual	GENERAL EXPORT
	51015450	Owner's Manual	U.S.A., CANADA

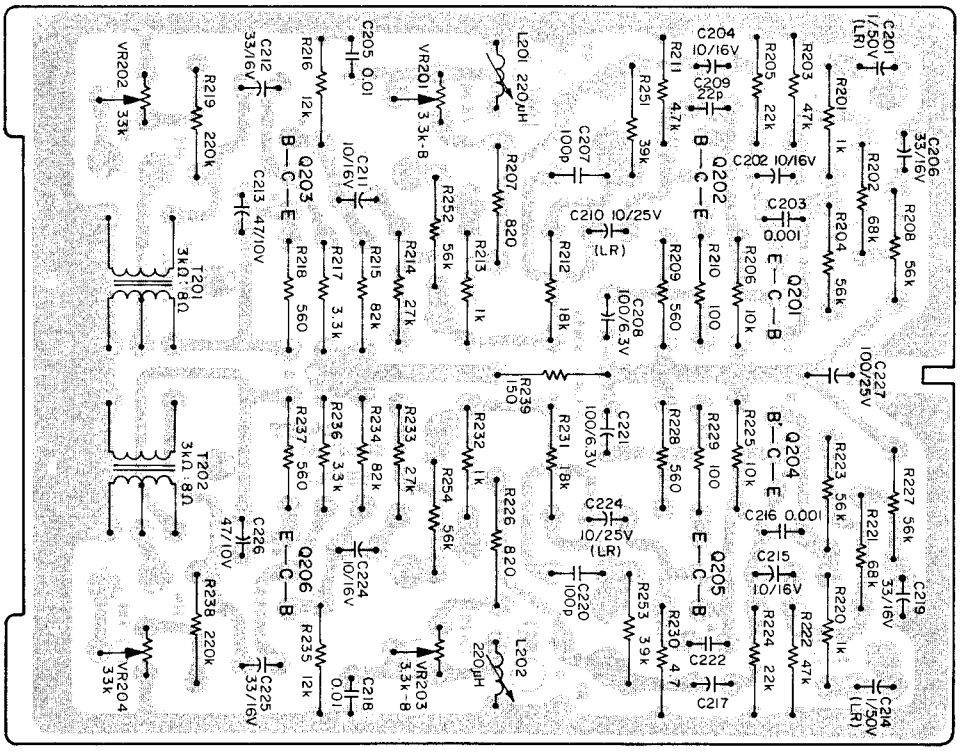
NOTE: * The Empty Reel is available as an Optional Accessory and thus is not assigned a special TEAC parts number. Please order this by the MODEL CODE NUMBER (RE-1002). This number is included on the package.

2. PC BOARD SECTION(Diagram)

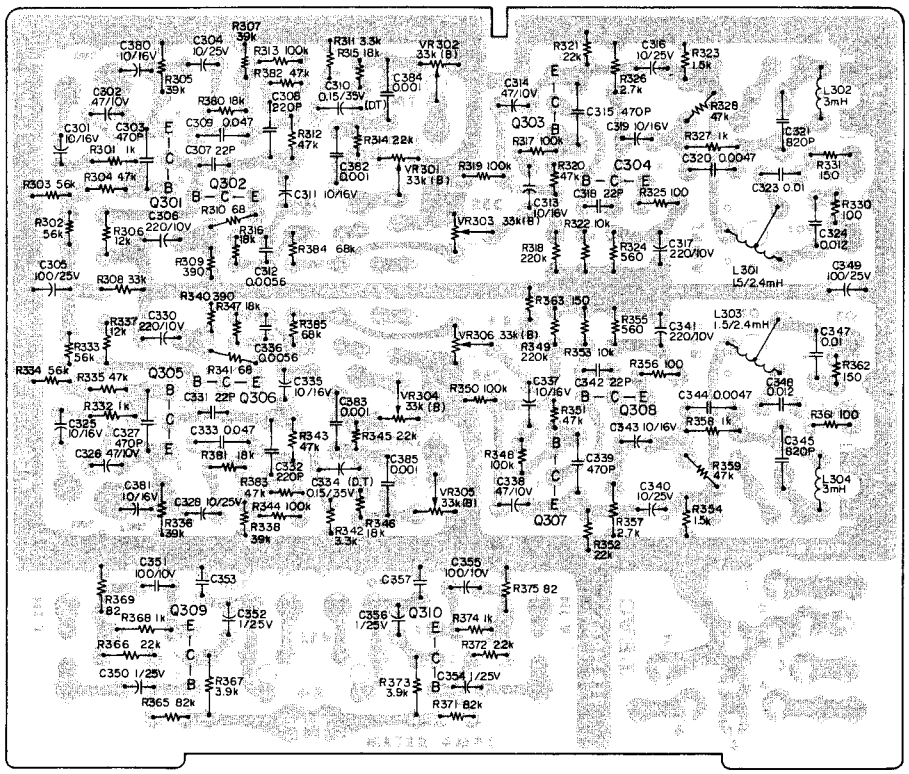
2-1. PLAYBACK EQ/MIC AMPL.



2-2. LINE/PHONE AMPL.

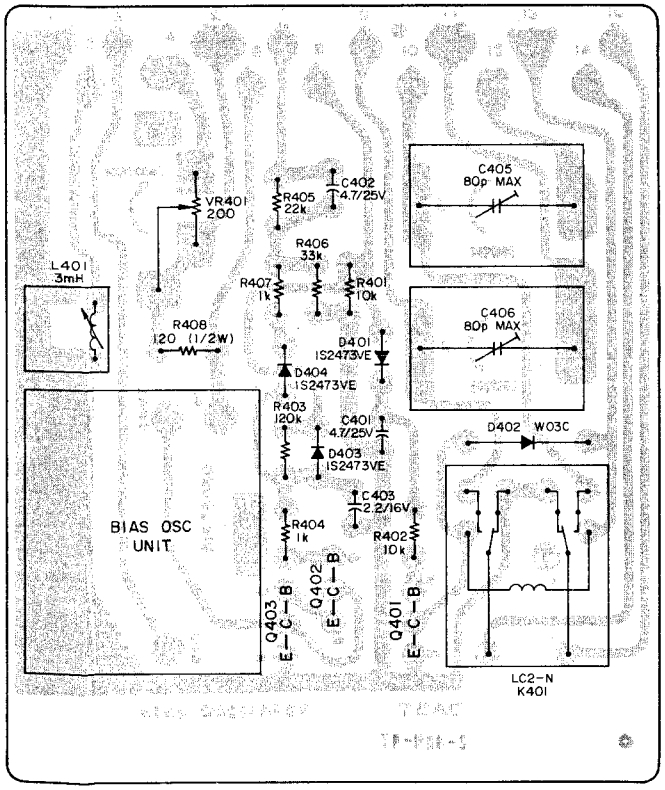


2-3. RECORD/METER AMPL. PC BOARD



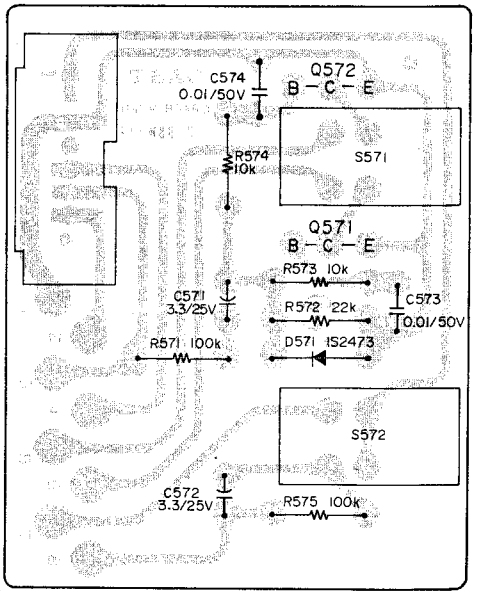
P-353

2-4. BIAS OSCILLATOR PC BOARD



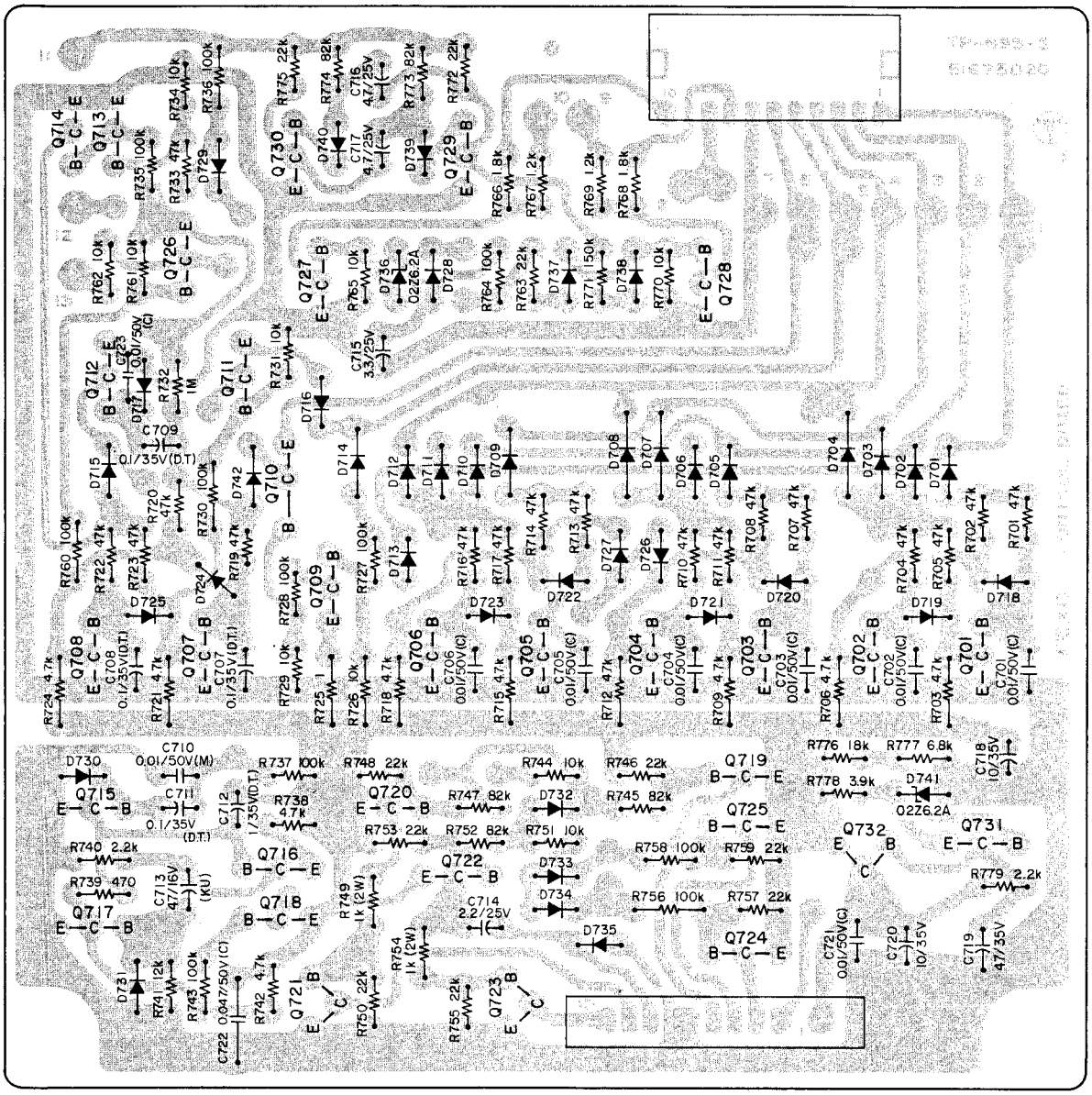
P-355-1

2-5. TIMER PC BOARD



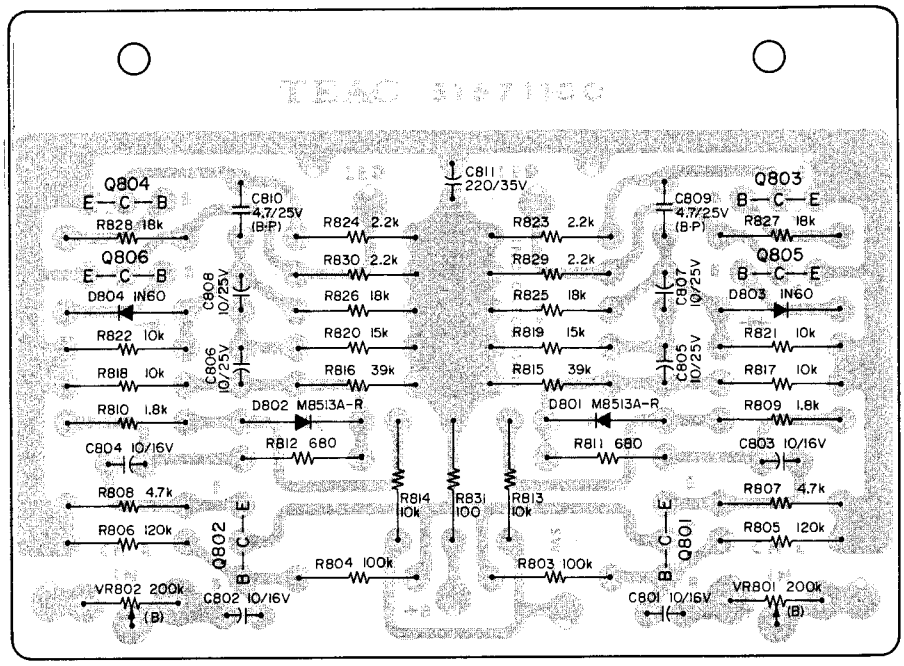
P-357-1

2-6. CONTROL PC BOARD



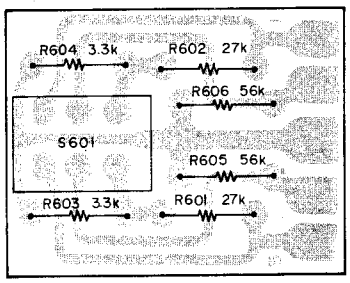
P-358-1

2-7. PEAK INDICATOR PC BOARD



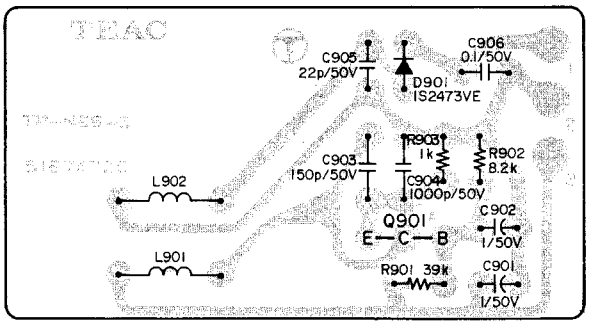
P-360

2-8. ATTENUATOR PC BOARD



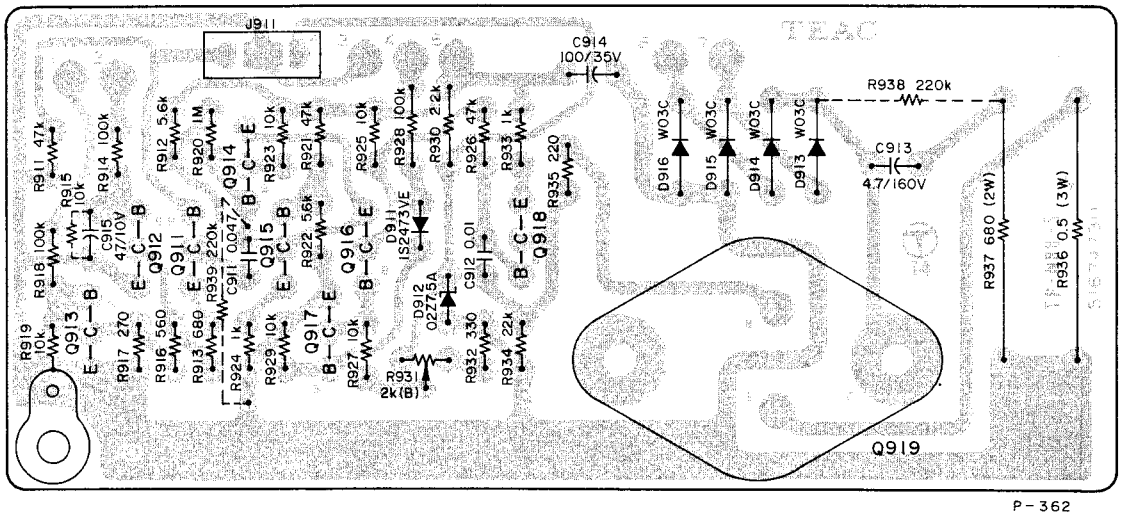
P-361

2-9. TENSION SERVO PC BOARD



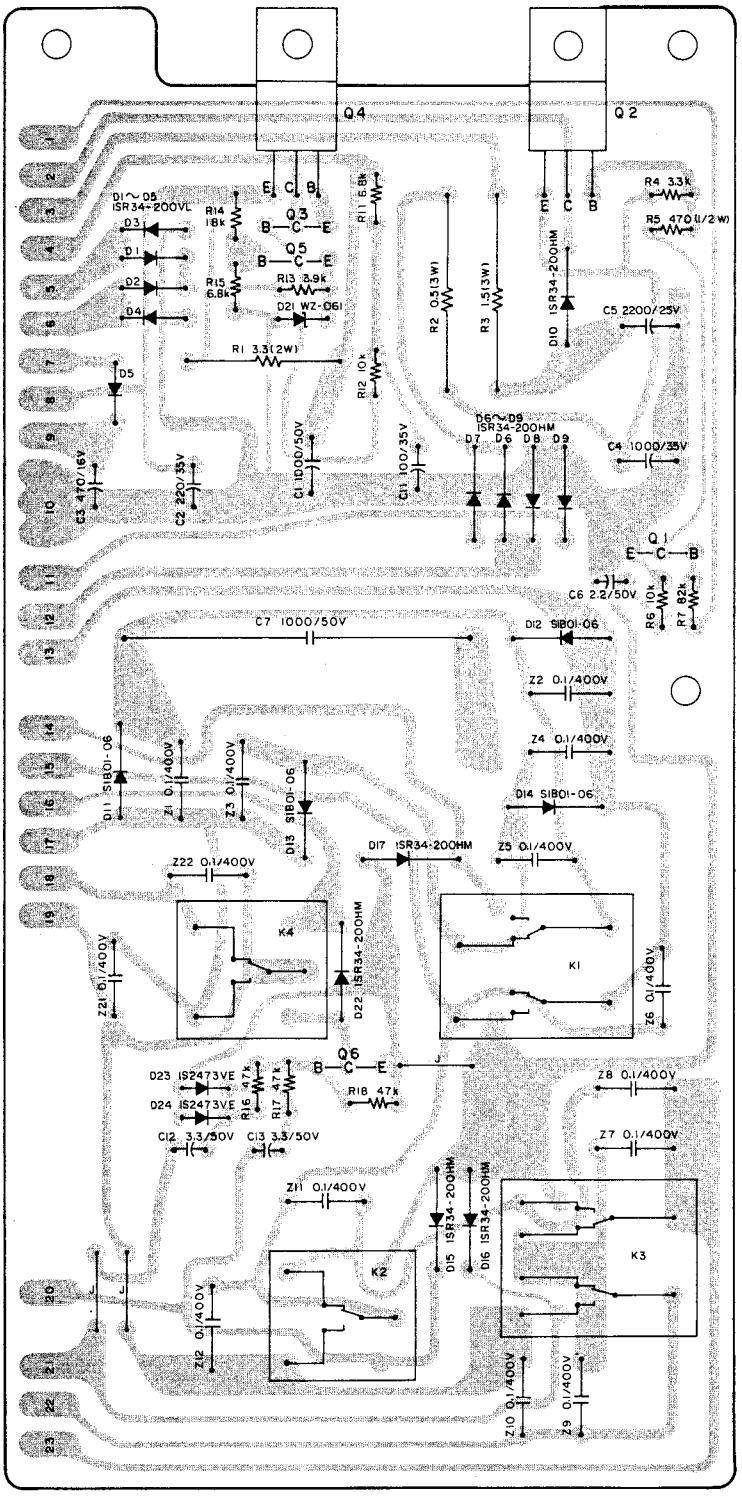
P-347

2-10. SERVO PC BOARD



P-362

2-11. POWER SUPPLY PC BOARD



2. PC BOARD SECTION(Parts List)

2-1. PLAYBACK EQ/MIC AMPL.

REF. NO.	PARTS NO.	DESCRIPTION
	51685371	PC Board Assy
	51671070	PC Board
	TRANSISTORS	
Q101/Q104	50424710	2SC1345(E) or (F)
	50424610	2SC1327(T)
Q102/Q105	50424640	2SA721(S)
	51450380	2SA750(E)
Q103/Q106	50424600	2SC828(S)
	50424860	2SC536(G)
Q107/Q109	50423840	FET, 2SK30(Y)
Q108/Q110	50424100	2SC1000(GR)
	CARBON RESISTORS	
	All resistors are rated ±5% tolerance and 1/4 watt.	
R101/R120	50571340	150k ohm
R102/R121	50570820	1k ohm
R103/R122	50571240	56k ohm
R104/R123	50571240	56k ohm
R105/R124	50571220	47k ohm
R106/R125	50571200	39k ohm
R107/R126	50571080	12k ohm
R108/R127	50570840	1.2k ohm
R109/R128	50571180	33k ohm
R110/R129	50570840	1.2k ohm
R111/R130	50570640	180 ohm
R112/R131	50571060	10k ohm
R113/R132	50571000	5.6k ohm
R114/R133	50571380	220k ohm
R115/R134	50570840	1.2k ohm
R116/R135	50571460	470k ohm
R117/R136	50571320	120k ohm
R118/R137	50571320	120k ohm
R119/R138	50571260	68k ohm
R139	51818640	470 ohm Non Flammable
R140/R150	50571540	1M ohm
R141/R151	50571100	15k ohm
R142/R152	50570820	1k ohm
R143/R153	50573260	68k ohm
R144/R154	50571040	8.2k ohm
R145/R155	50571340	150k ohm
R146/R156	50571190	36k ohm
R147/R157	50570940	3.3k ohm
R148/R158	50570540	68 ohm
R149/R159	50570820	1k ohm
R160	51818560	220 ohm Non Flammable
R170/R171	50570920	2.7k ohm
	CAPACITORS	
C101/C114	51700090	Tant. 10 mfd 16V
C102/C115	50555540	Elec. 47 mfd 10V
C103/C116	50547560	Dip. Mica 470 pfd 50V
C104/C117	51700820	Elec. 10 mfd 25V (LR)
C105/C118	50549740	Elec. 100 mfd 25V (KU)
C106/C119	50554230	Elec. 100 mfd 6.3V
C107/C120	50543820	Dip. Mica 22 pfd 50V
C108/C121	50547560	Dip. Mica 470 pfd 50V
C109/C122	51700820	Elec. 10 mfd 25V (LR)
C110/C123	50548020	Mylar 0.01 mfd 50V

REF. NO.	PARTS NO.	DESCRIPTION
C111/C124	50546701	Dip. Tant. 1 mfd 35V
C112/C125	50546701	Dip. Tant. 1 mfd 35V
C113/C126	50546682	Dip. Tant. 0.47 mfd 35V
C127	50554170	Elec. 100 mfd 25V
C128/C136	50548270	Mylar 0.047 mfd 50V
C129/C137	50547430	Dip. Mica 51 pfd 50V
C130/C138	50554900	Elec. 22 mfd 35V
C131/C139	50554050	Elec. 10 mfd 16V
C132/C140	50547430	Dip. Mica 51 pfd 50V
C133/C141	50554040	Elec. 10 mfd 25V
C134/C142	50554040	Elec. 10 mfd 25V
C135/C143	50554230	Elec. 100 mfd 6.3V
C144	50554180	Elec. 220 mfd 25V
	VARIABLE RESISTORS	
VR101/VR103	50533580	Semi-fixed, 6.8k ohm - B
VR102/VR104	50533580	Semi-fixed, 6.8k ohm - B
	MISCELLANEOUS	
J101/J102	50435000	Pin Jack

2-2. LINE/PHONE AMPL.

REF. NO.	PARTS NO.	DESCRIPTION
	51681083	PC Board Assy
	51671080	PC Board
	TRANSISTORS	
Q201/Q204	50423770	2SC644(T)
	50424940	2SC900(E)
Q202/Q205	50424640	2SA721(S)
	51450380	2SA756(E)
Q203/Q206	50424600	2SC828(S)
	50424860	2SC536(G)
	CARBON RESISTORS	
	All resistors are rated ±5% tolerance and 1/4 watt.	
R201/R220	50572820	1k ohm
R202/R221	50573260	68k ohm
R203/R222	50573220	47k ohm
R204/R223	50573240	56k ohm
R205/R224	50573140	22k ohm
R206/R225	50573060	10k ohm
R207/R226	50572800	820 ohm
R208/R227	50573240	56k ohm
R209/R228	50572760	560 ohm
R210/R229	50572580	100 ohm
R211/R230	50572980	4.7k ohm
R212/R231	50573120	18k ohm
R213/R232	50572820	1k ohm
R214/R233	50573160	27k ohm
R215/R234	50573280	82k ohm

2-3. RECORD/METER AMPL. PC BOARD

REF. NO.	PARTS NO.	DESCRIPTION		
R216/R235	50573080	12k ohm		
R217/R236	50572940	3.3k ohm		
R218/R237	50572760	560 ohm		
R219/R238	50573380	220k ohm		
R239	51818520	150 ohm	Non Flammable	
R251/R253	50573200	39k ohm		
R252/R254	50573240	56k ohm		
	CAPACITORS			
C201/C214	51700860	Elec.	1 mfd	50V (LR)
C202/C215	50546561	Dip. Tant.	10 mfd	16V
C203/C216	50548320	Mylar	0.001 mfd	50V
C204/C217	50554050	Elec.	10 mfd	16V
C205/C218	50548020	Mylar	0.01 mfd	50V
C206/C219	50554260	Elec.	33 mfd	16V
C207/C220	50547440	Dip. Mica	100 pfd	50V
C208/C221	50554230	Elec.	100 mfd	6.3V
C209/C222	50543820	Dip. Mica	22 pfd	50V
C210/C223	51700820	Elec.	10 mfd	25V (LR)
C211/C224	50554050	Elec.	10 mfd	16V
C212/C225	50554260	Elec.	33 mfd	16V
C213/C226	50555540	Elec.	47 mfd	10V
C227	50554170	Elec.	100 mfd	25V
	VARIABLE RESISTORS			
VR201/VR203	50533590	Semi-fixed, 3.3k ohm - B		
VR202/VR204	50533960	Semi-fixed, 33k ohm - B		
	COILS			
L201/L202	50566640	Choke, 220μH		
	TRANSFORMERS			
T201/T202	50562141	Output, 3k ohm : 8 ohm		
	50563410	Output, 3k ohm : 8 ohm		

REF. NO.	PARTS NO.	DESCRIPTION	
	51685391	PC Board Assy	
	51671092	PC Board	
	TRANSISTORS		
Q301/Q305	50423770	2SC644(T)	
	50424940	2SC900(E)	
Q302/Q306	50424640	2SA721(S)	
	51450380	2SA750(E)	
Q303/Q307	50423770	2SC644(T)	
	50424940	2SC900(E)	
Q304/Q308	50424640	2SA721(S)	
	51450380	2SA750(E)	
Q309/Q310	50424600	2SC828(S)	
	50424860	2SC536(G)	
	CARBON RESISTORS		
	All resistors are rated ±5% tolerance and 1/4 watt.		
R301/R332	50570820	1k ohm	
R302/R333	50571240	56k ohm	
R303/R334	50571240	56k ohm	
R304/R335	50571220	47k ohm	
R305/R336	50571200	39k ohm	
R306/R337	50571080	12k ohm	
R307/R338	50571200	39k ohm	
R308	50571180	33k ohm	
R309/R340	50570720	390 ohm	
R310/R341	50570540	68 ohm	
R311/R342	50570940	3.3k ohm	
R312/R343	50571220	47k ohm	
R313/R344	50571300	100k ohm	
R314/R345	50571140	22k ohm	
R315/R346	50571120	18k ohm	
R316/R347	50570120	1.8k ohm	
R317/R348	50570820	1k ohm	
R318/R349	50571380	220k ohm	
R319/R350	50571300	100k ohm	
R320/R351	50571220	47k ohm	
R321/R352	50571140	22k ohm	
R322/R353	50571060	10k ohm	
R323/R354	50570860	1.5k ohm	
R324/R355	50570760	560 ohm	
R325/R356	50570580	100 ohm	
R326/R357	50570920	2.7k ohm	
R327/R358	50570820	1k ohm	
R328/R359	50571220	47k ohm	
R330/R361	50571260	100 ohm	
R331/R362	50570620	150 ohm	
R363	51818520	150 ohm	Non Flammable
R365/R371	50571280	82k ohm	
R366/R372	50571140	22k ohm	
R367/R373	50570960	3.9k ohm	
R368/R374	50570820	1k ohm	
R369/R375	50570560	82 ohm	
R380/R381	50571120	18k ohm	
R382/R383	50571220	47k ohm	
R384/R385	50571260	68k ohm	

REF. NO.	PARTS NO.	DESCRIPTION		
		CAPACITORS		
C301/C325	50554050	Elec.	10 mfd	16V
C302/C326	50555540	Elec.	47 mfd	10V
C303/C327	50547560	Dip. Mica	470 pfd	50V
C304/C328	51700820	Elec.	10 mfd	25V (LR)
C305	50554170	Elec.	100 mfd	25V
C306/C330	50554910	Elec.	220 mfd	10V
C307/C331	50543820	Dip. Mica	22 pfd	50V
C308/C332	50547450	Dip. Mica	220 pfd	50V
C309/C333	50548270	Mylar	0.047 mfd	50V
C310/C334	50546651	Dip. Tant.	0.15 mfd	35V
C311/C335	50554050	Elec.	10 mfd	16V
C312/C336	50548260	Mylar	0.0056 mfd	50V
C313/C337	50554050	Elec.	10 mfd	16V
C314/C338	50555540	Elec.	47 mfd	10V
C315/C339	50547560	Dip. Mica	470 pfd	50V
C316/C340	51700820	Elec.	10 mfd	25V (LR)
C317/C341	50554910	Elec.	220 mfd	10V
C318/C342	50543820	Dip. Mica	22 pfd	50V
C319/C343	50554050	Elec.	10 mfd	16V
C320/C344	50548130	Mylar	0.0047 mfd	50V
C321/C345	50543440	Polyst.	820 pfd	50V
C323/C347	50548770	Mylar	0.01 mfd	50V
C324/C348	50548950	Mylar	0.012 mfd	50V
C349	50554170	Elec.	100 mfd	25V
C350/C354	50554670	Elec.	1 mfd	25V
C351/C355	50554570	Elec.	100 mfd	10V
C352/C356	50554670	Elec.	1 mfd	25V
C353/C357	50548320	Mylar	0.001 mfd	50V
C380/C381	50554050	Elec.	10 mfd	16V
C382/C383	50548780	Mylar	0.001 mfd	50V 5%
C384/C385	50548780	Mylar	0.001 mfd	50V 5%
		VARIABLE RESISTORS		
VR301/VR304	50533960	Semi-fixed, 33k ohm - B		
VR302/VR305	50533960	Semi-fixed, 33k ohm - B		
VR303/VR306	50533960	Semi-fixed, 33k ohm - B		
		COILS		
L301/L303	50566670	Record EQ, 1.5-2.4mH		
L302/L304	50566300	Trap, 3mH		
	50566590	Trap, 3mH		

2-4. BIAS OSCILLATOR PC BOARD

REF. NO.	PARTS NO.	DESCRIPTION		
	51685080	PC Board Assy		
	51675080	PC Board		
		TRANSISTORS		
Q401	50424670	2SC1317(R) or 2SC1317(S)		
	50426250	2SC1318(S) or 2SC1318A(S)		
Q402	50424600	2SC828(S)		
	50424860	2SC536(G)		
Q403	50424670	2SC1317(R) or 2SC1317(S)		
	50426250	2SC1318(S) or 2SC1318A(S)		
		DIODES		
D401	50425170	1S2473VE		
D402	51430890	W03C		
D403, D404	50425170	1S2473VE		
		CARBON RESISTORS		
		All resistors are rated ±5% tolerance and 1/4 watt unless otherwise noted.		
R401, R402	50571060	10k ohm		
R403	50571320	120k ohm		
R404	50570820	1k ohm		
R405	50571140	22k ohm		
R406	50571180	33k ohm		
R407	50570820	1k ohm		
R408	50574560	120 ohm	1/2W	
		CAPACITORS		
C401, C402	50554530	Elec.	4.7 mfd	25V
C403	50554940	Elec.	2.2 mfd	25V
		VARIABLE RESISTOR		
VR401	50539020	Semi-fixed, 200 ohm - B		
		TRIMMER CAPACITORS		
C405/C406	50547070	80 pfd MAX.		
		RELAY		
K401	50611310	LC2-N, DC24V		
		COIL MISCELLANEOUS		
L401	50566581	Dummy; 3mH		
	50400900	OSC Unit		

2-5. TIMER PC BOARD

REF. NO.	PARTS NO.	DESCRIPTION		
	51685061	PC Board Assy		
	51675061	PC Board		
		TRANSISTORS		
Q571, Q572	50424860	2SC536(G)		
	50424600	2SC828(S)		
		DIODE		
D571	50425500	1S2473		
		CARBON RESISTORS		
		All resistors are rated ±5% tolerance and 1/4 watt.		
R571	51813300	100k ohm		
R572	51813140	22k ohm		
R573, R574	51813060	10k ohm		
R575	51813300	100k ohm		
		CAPACITORS		
C571	50554220	Elec.	3.3 mfd	25V
C572	50554220	Elec.	3.3 mfd	25V
C573, C574	50542040	Ceramic	0.01 mfd	50V
		MISCELLANEOUS		
S571, S572	50443950	Push Switch, DPDT		
J571	51220100	Connector, Plug 6P		

2-6. CONTROL PC BOARD

REF. NO.	PARTS NO.	DESCRIPTION
	51685024	PC Board Assy
	51675022	PC Board
		TRANSISTORS
Q701~Q708	51450360	2SC945(LK)
Q709	50425530	2SA733(P)
Q710~Q714	51450360	2SC945(LK)
Q715	50426250	2SC1318(S)
Q716	50425530	2SA733(P)
Q717	51450360	2SC945(LK)
Q718~Q720	50425530	2SA733(P)
Q721	50423800	2SD235(O)
Q722	50425530	2SA733(P)
Q723	50423800	2SD235(O)
Q724~Q726	50425530	2SA733(P)
Q727~Q731	51450360	2SC945(LK)
Q732	50423800	2SD235(D)

REF. NO.	PARTS NO.	DESCRIPTION
		DIODES
D701~D735	50425170	1S2473VE
D736	50422580	Zener, 02Z6.2A
D737~D740	50425170	1S2473VE
D741	50422580	Zener, 02Z6.2A
D742	50425170	1S2473VE
		RESISTORS
		All resistors are rated ±5% tolerance, 1/4 watt and of carbon type unless otherwise noted.
R701, R702	50571220	47k ohm
R703	50570980	4.7k ohm
R704, R705	50571220	47k ohm
R706	50570980	4.7k ohm
R707, R708	50571220	47k ohm
R709	50570980	4.7k ohm
R710, R711	50571220	47k ohm
R712	50570980	4.7k ohm
R713, R714	50571220	47k ohm
R715	50570980	4.7k ohm
R716, R717	50571220	47k ohm
R718	50570980	4.7k ohm
R719, R720	50571220	47k ohm
R721	50570980	4.7k ohm
R722, R723	50571220	47k ohm
R724	50570980	4.7k ohm
R725	50570100	1 ohm
R726	50571060	10k ohm
R727, R728	50571300	100k ohm
R729	50571060	10k ohm
R730	50571300	100k ohm
R731	50571060	10k ohm
R732	50571540	1M ohm
R733	50571220	47k ohm
R734	50571060	10k ohm
R735~R737	50571300	100k ohm
R738	50570980	4.7k ohm
R739	50570740	470 ohm
R740	50570900	2.2k ohm
R741	50575480	8.2k ohm
R742	50570980	4.7k ohm
R743	50571300	100k ohm
R744	50571060	10k ohm
R745	50571280	82k ohm
R746	50571140	22k ohm
R747	50571280	82k ohm
R748	50571140	22k ohm
R749	50525870	1k ohm 2W Metal Film
R750	50571140	22k ohm
R751	50571060	10k ohm
R752	50571280	82k ohm
R753	50571140	22k ohm
R754	50525870	1k ohm 2W Metal Film
R755	50571140	22k ohm
R756	50571300	100k ohm
R757	50571140	22k ohm
R758	50571300	100k ohm
R759	50571140	22k ohm
R760	50571300	100k ohm
R761, R762	50571060	10k ohm

REF. NO.	PARTS NO.	DESCRIPTION
R763	50571140	22k ohm
R764	50571300	100k ohm
R765	50571060	10k ohm
R766	50570880	1.8k ohm
R767	50570840	1.2k ohm
R768	50570880	1.8k ohm
R769	50570840	1.2k ohm
R770	50571060	10k ohm
R771	50571340	150k ohm
R772	50571140	22k ohm
R773, R774	50571280	82k ohm
R775	50571140	22k ohm
R776	50571120	18k ohm
R777	50571020	6.8k ohm
R778	50570960	3.9k ohm
R779	50570900	2.2k ohm

CAPACITORS

C701~C706	50542040	Ceramic	0.01 mfd	50V
C707~C709	50546641	Dip. Tant.	0.1 mfd	35V
C710	50548020	Mylar	0.01 mfd	50V
C711	50546641	Dip. Tant.	0.1 mfd	35V
C712	50546701	Dip. Tant.	1 mfd	35V
C713	50549800	Elec.	47 mfd	16V (KU)
C714	50554940	Elec.	2.2 mfd	25V
C715	50554220	Elec.	3.3 mfd	25V
C716, C717	50554530	Elec.	4.7 mfd	25V
C718	50554510	Elec.	10 mfd	35V
C719	50554520	Elec.	47 mfd	35V
C720	50554350	Elec.	10 mfd	50V
C721	50542040	Ceramic	0.01 mfd	50V
C722	50542300	Ceramic	0.047 mfd	50V
C723	50542040	Ceramic	0.01 mfd	50V

MISCELLANEOUS

P701	50438450	Connector, Socket	10P
J702	51220120	Connector, Plug	10P

2-7. PEAK INDICATOR PC BOARD

REF. NO.	PARTS NO.	DESCRIPTION
	51686041	PC Board Assy
	51671100	PC Board

TRANSISTORS

Q801/Q802	50424340	2SC1000 (BL)
Q803/Q804	50424340	2SC1000 (BL)
Q805/Q806	50424340	2SC1000 (BL)

DIODES

D801/D802	50422440	S3016R
	50422180	M8513A-R
D803/D804	50422180	1N60

CARBON RESISTORS

All resistors are rated ±5% tolerance and 1/4 watt.

R803/R804	50573300	100k ohm	
R805/R806	50573320	120k ohm	
R807/R808	50572980	4.7k ohm	
R809/R810	50572880	1.8k ohm	
R811/R812	50572780	680 ohm	
R813/R814	50573060	10k ohm	
R815/R816	50573200	39k ohm	
R817/R818	50573060	10k ohm	
R819/R820	50573100	15k ohm	
R821/R822	50573060	10k ohm	
R823/R824	50572900	2.2k ohm	
R825/R826	50573120	18k ohm	
R827/R828	50573120	18k ohm	
R829/R830	50572900	2.2k ohm	
R831	51818480	100 ohm	Non Flammable

CAPACITORS

C801/C802	50554050	Elec.	10 mfd	16V
C803/C804	50554050	Elec.	10 mfd	16V
C805/C806	50554040	Elec.	10 mfd	25V
C807/C808	50554040	Elec.	10 mfd	25V
C809/C810	50559090	Elec.	4.7 mfd	25V (Bi-Polar)
C811	50554380	Elec.	220 mfd	35V

VARIABLE RESISTORS

VR801/VR802	51502030	Semi-fixed, 200k ohm - B

2-8. ATTENUATOR PC BOARD

REF. NO.	PARTS NO.	DESCRIPTION	
	51685090	PC Board Assy	
	51675090	PC Board	
R601/R602	51813160	Carbon Res. 27k ohm	1/4W 5%
R603/R604	51812940	Carbon Res. 3.3k ohm	1/4W 5%
R605/R606	51813240	Carbon Res. 56k ohm	1/4W 5%
S601	51340350	Push Switch 2PDT	

2-9. TENSION SERVO PC BOARD

REF. NO.	PARTS NO.	DESCRIPTION		
	51684720	PC Board Assy		
	51674720	PC Board		
	TRANSISTOR			
Q901	51450360	2SC945 (LK)		
	DIODE			
D901	50425170	1S2473VE		
	CARBON RESISTORS			
R901	50571200	39k ohm	1/4W	5%
R902	50571040	8.2k ohm	1/4W	5%
R903	50570820	1k ohm	1/4W	5%
	CAPACITORS			
C901, C902	50554540	Elec.	1 mfd	50V
C903	50542580	Dip. Mica	150 pfd	50V
C904	50548780	Mylar	0.001 mfd	50V 5%
C905	50543820	Dip. Mica	22 pfd	50V
C906	50549280	Mylar	0.1 mfd	50V
	COILS			
L901, L902	51600380	Sensor		
	MISCELLANEOUS			
P911	51221020	Connector Socket, Housing 4P		

2-10. SERVO PC BOARD

REF. NO.	PARTS NO.	DESCRIPTION		
	51684733	PC Board Assy		
	51674730	PC Board		
	TRANSISTORS			
Q911~Q917	51450360	2SC945 (LK)		
Q918	50424210	2SA666I (S)		
Q919	51450810	2SD665		
	DIODES			
D911	50425170	1S2473VE		
D912	50422640	Zener, 02Z7.5A		
D913~D916	51430890	W03C		
	RESISTORS			
	All resistors are rated ±5% tolerance, 1/4 watt and of carbon type unless otherwise noted.			
R911	50571220	47k ohm		
R912	50571000	5.6k ohm		
R913	50570780	680 ohm		
R914	50571300	100k ohm		
R915	50571060	10k ohm		
R916	50570760	560 ohm		
R917	50570680	270 ohm		
R918	50571300	100k ohm		
R919	50571060	10k ohm		
R920	50571540	1M ohm		
R921	50571220	47k ohm		
R922	50571000	5.6k ohm		
R923	50571060	10k ohm		
R924	50570820	1k ohm		
R925	50571060	10k ohm		
R926	50571220	47k ohm		
R927	50571060	10k ohm		
R928	50571300	100k ohm		
R929	50571060	10k ohm		
R930	50570900	2.2k ohm		
R932	50570700	330 ohm		
R933	50570820	1k ohm		
R934	50571140	22k ohm		
R935	50570660	220 ohm		
R936	50518040	0.5 ohm	3W	Cement
R937	50527390	680 ohm	2W	Metal Film
R938, R939	50571380	220k ohm		
	CAPACITORS			
C911	50547380	Mylar	0.047 mfd	50V
C912	50548770	Mylar	0.01 mfd	50V
C913	51700380	Elec.	4.7 mfd	160V
C914	50554630	Elec.	100 mfd	35V
C915	50555540	Elec.	47 mfd	10V

REF. NO.	PARTS NO.	DESCRIPTION
	VARIABLE RESISTOR	
R931	51501520	Semi-fixed, 2k ohm
	MISCELLANEOUS	
J911	51221140	Connector, Plug 4P
	55550151	Heat Sink B
	55552190	Sub Heat Sink

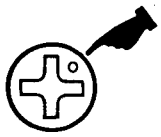
2-11. POWER SUPPLY PC BOARD

REF. NO.	PARTS NO.	DESCRIPTION
	51687740	PC Board Assy
	51677740	PC Board
	TRANSISTORS	
Q1	50426250	2SC1318(S)
Q2	50425460	2SA490(Y)
Q3	50426250	2SC1318(S)
Q4	51450870	2SD313(E)
Q5	50423830	2SC536(F)
Q6	50426250	2SC1318(S)
	DIODES	
D1~D5	51431160	1SR34-200VL
D6~D10	51431130	1SR34-200HM
D15~D17	51431130	1SR34-200HM
D21	50425140	Zener, WZ-061
D22	51431130	1SR34-200HM
D23, D24	50425170	1S2473VE

REF. NO.	PARTS NO.	DESCRIPTION
	RESISTORS	
	All resistors are rated ±5% tolerance, ¼ watt and of carbon type unless otherwise noted.	
R1	51843060	Cement, 3.3 ohm 2W
R2	50518040	Cement, 0.5 ohm 3W
R3	50520340	Cement, 1.5 ohm 3W
R4	50570940	3.3k ohm
R5	50574740	470 ohm ½W
R6	50571060	10k ohm
R7	50571280	8.2k ohm
R8	51843060	Cement, 3.3 ohm 2W
R11	50571020	6.8k ohm
R12	50571060	10k ohm
R13	50570960	3.9k ohm
R14	50571120	18k ohm
R15	50571020	6.8k ohm
R16~R18	50571220	47k ohm
	CAPACITORS	
C1	50555850	Elec. 1000 mfd 50V
C2	50554380	Elec. 220 mfd 35V
C3	50554400	Elec. 470 mfd 16V
C4	51700110	Elec. 1000 mfd 35V
C5	50557148	Elec. 2200 mfd 25V
C6	50554980	Elec. 2.2 mfd 50V
C7	50555700	Elec. 1000 mfd 50V
C11	50554630	Elec. 100 mfd 35V
C12, C13	50555730	Elec. 3.3 mfd 50V
Z1~Z12	50549920	Metalized Mylar 0.1 mfd 400V
Z21, Z22	50549920	Metalized Mylar 0.1 mfd 400V
	RELAYS	
K1	50611310	LC2-N, DC24V
K2	50611340	LC1-N, DC24V
K3	50611310	LC2-N, DC24V
K4	50611340	LC1-N, DC24V
	MISCELLANEOUS	
	50332910	Sheet, Insul.
	50332950	Tube, Insul.
	55550140	Heat Sink, A
	51812080	Jumper, JPW-02-F10

ASSEMBLING HARDWARE CODING LIST

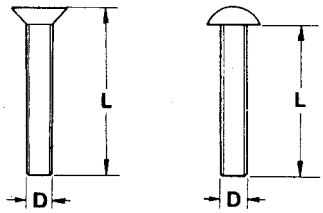
All screws conform to ISO standards, and have crossrecessed heads, unless otherwise noted. ISO screws have the head inscribed with a point as in the figure to the right.



FOR EXAMPLE:

B M 3 x 6

- B — Nomenclature
- M — Metric System
- 3 — Diameter in mm (D) *
- 6 — Length in mm (L)



* Inner dia. for washers and nuts

	Code	Name	Type
MACHINE SCREW	R	Round Head Screw	
	P	Pan Head Screw	
	T	Stove Head Screw (Truss)	
	B	Binding Head Screw	
	F	Flat Countersunk Head Screw	
	O	Oval Countersunk Head Screw	
WOOD SCREW	RW	Round Head Wood Screw	
	FW	Flat Countersunk Wood Screw	
	OW	Oval Countersunk Wood Screw	
SEMS SCREW	BSA	Binding Head SEMS Screw(A Type)	
	BSB	Binding Head SEMS Screw(B Type)	
	BSF	Binding Head SEMS Screw(F Type)	
	PSA	Pan Head SEMS Screw(A Type)	
	PSB	Pan Head SEMS Screw(B Type)	

	Code	Name	Type
TAPPING SCREW	BTA	Binding Head Tapping Screw(A Type)	
	BTB	Binding Head Tapping Screw(B Type)	
	RTA	Round Head Tapping Screw(A Type)	
	RTB	Round Head Tapping Screw(B Type)	
SETSCREW	SF	Hex Socket Setscrew(Flat Point)	
	SC	Hex Socket Setscrew(Cup Point)	
	SS	Slotted Socket Setscrew(Flat Point)	
WASHER	E	E-Ring (Retaining Washer)	
	W	Flat Washer (Plain)	
	SW	Lock Washer (Spring)	
	LWI	Lock Washer (Internal Teeth)	
	LWE	Lock Washer (External Teeth)	
	TW	Trim Washer (Countersunk)	
NUT	N	Hex Nut	

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