



**TEAC**<sup>®</sup>

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**SERVICE MANUAL**

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**X-7R/X-7**

**Stereo Tape Deck**

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# 1 SPECIFICATIONS AND SERVICE DATA

## SPECIFICATIONS

**Track System** 1/4-track, 2-channel stereo

### Head System

**X-7R:** 6 heads: forward erase, forward record, reverse playback, forward playback, reverse record, reverse erase.

**X-7:** 3 heads: erase, record, playback

**Reel Size** 7"

**Tape Speed** 19 cm/s (7-1/2 ips) and 9.5 cm/s (3-3/4 ips)

### Inputs (level and impedance)

**MIC:** Specified input level: -60dB (0.775mV)/10kohms  
Min. input level: -70dB (245μV)

**LINE IN:** Specified input level: -12dB (195mV)/50kohms  
Min. input level: -22dB (61.5mV)

### Outputs (level and impedance)

**OUTPUT:** Specified output level: -5dB (436mV)/10kohms  
Max. output level: +1dB (0.869V)

**PHONES:** Specified output level: -24dB (48.9mV)/8ohms

### Playback Equalization

19cm/s: 3,180μs + 50μs (NAB)

9.5cm/s: 3,180μs + 90μs (NAB)

### Motors

**Capstan motor:** DC brush motor with FG servo

**Reel motor:** 2 DC slotless motors

**Bias Frequency** 100kHz

**Operating Position** Vertical, horizontal, angled

### Power Requirements

100/117/220/240V, AC 50/60Hz, 77W, 72W for X-7

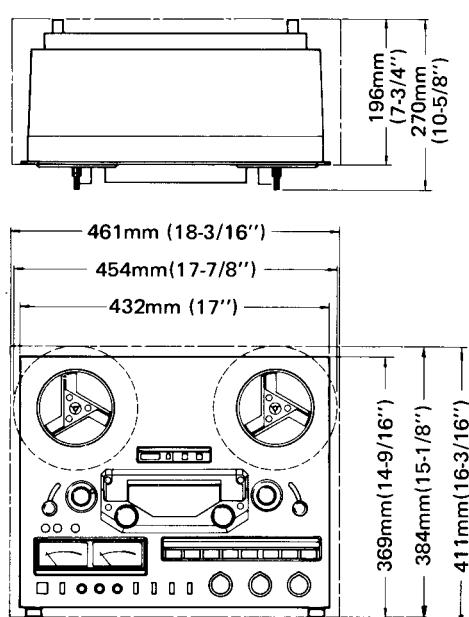
(General export model)

220V AC 50Hz, 77W, 72W for X-7 (Europe model)

240V AC 50Hz, 77W, 72W for X-7 (U.K./Australia model)

117V AC 60Hz, 77W, 72W for X-7 (U.S.A./Canada model)

**Weight** 18kg (39-11/16 lbs.) net



Dashed line indicates General Export Models for Limited Areas.

Fig. 1-1 Dimensions

## SERVICE DATA

### MECHANICAL

**Tape Speed Deviation** 3,000Hz ± 30Hz

**Tape Speed Drift** 15Hz

**FWD/RED Tape Speed Differential (X-7R only)** 30Hz

### Wow and Flutter

**Playback:** 0.05% (WRMS), 0.10% (RMS) at 19cm/s  
0.07% (WRMS), 0.12% (RMS) at 9.5cm/s

**Record/Playback:** 0.12% (RMS) at 19cm/s  
0.15% (RMS) at 9.5cm/s

**Pinch Roller Pressure** 1.35kg ~ 1.9kg (3.0 lbs ~ 4.2 lbs)

### Reel Torque

**Play mode:**

Take-up 260 ± 40 g-cm (3.1 ~ 4.2 oz-inch)

Back tension 180 ± 40 g-cm (1.9 ~ 3.1 oz-inch)

### Fast winding mode:

Take-up: 1100 g-cm (15.3 oz-inch)

Back tension: 50 g-cm (0.7 oz-inch)

### Brake Torque

Forward direction: 800 ~ 1400g-cm (11 ~ 19oz-inch)

Reverse direction: 500g-cm (6.9oz-inch) or less

Left/right deviation: 200g-cm (2.8 oz-inch) or less

**Fast Winding Time** 150 seconds or less for 550m (1800 feet)

**Pitch Control** Standard tape speed ±6% or more

**FWD/REV Change Time (X-7R only)** 3.5 sec. ±0.5 sec.

**TIMER Activate Time** 4 sec. ±2 sec.

## ELECTRICAL

**Frequency Response** Playback: 40Hz ~ 22kHz ±3dB at 19cm/s  
40Hz ~ 14kHz ±3dB at 9.5cm/s

Overall: 40Hz ~ 20kHz ±3dB at 19cm/s  
40Hz ~ 16kHz ±3dB at 9.5cm/s

**Signal to Noise Ratio** Playback: 50dB min. at 19cm/s  
49dB min. at 9.5cm/s

Overall: 48dB min. at 19cm/s  
46dB min. at 9.5cm/s

**Erase Efficiency** 68dB min. at 1kHz (measured with input  
10dB higher than the specified input level)

**Channel Separation** 50dB min. at 1kHz

**Adjacent Track Crosstalk** 40dB min. at 125Hz

**Total Harmonic Distortion** 0.8% or less at 1kHz

- Improvements may result in SPECIFICATIONS AND SERVICE DATA changes.

- Value of "dB" in the data refers to 0dB (0.775V), except where specified.

▲ Parts marked with this sign are safety critical components.  
They must always be replaced with identical components -  
refer to the TEAC Parts List and ensure exact replacement.

• dbx noise reduction system made under license from dbx, Incorporated. The word dbx and the dbx Symbol are trademarks of dbx, Incorporated.

## 2 MECHANICAL ADJUSTMENTS AND CHECKS

**NOTE:** All the explanations are for the X-7R. But unless specified they can also be applied to the X-7 except for those in relation to the REVERSE direction.

### 2-1 CONTROL PCB ASSY CHECK

Hooking CONTROL PCB ass'y as shown facilitates this check.

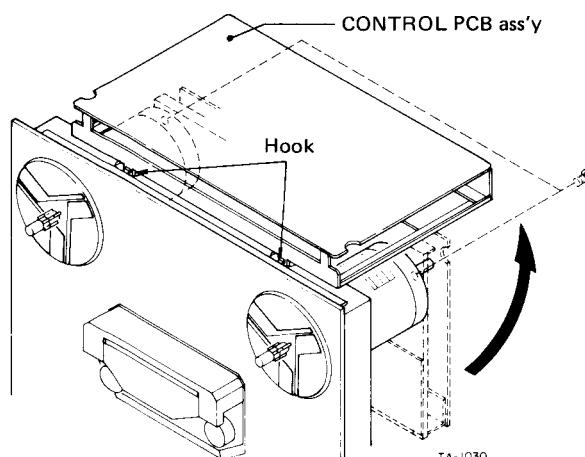


Fig. 2-1

### 2-2 BRAKE ADJUSTMENT

**NOTE:** The explanation and figure in this paragraph are for the left side brake, similar checks and adjustments are applicable for the right side one.

1. Adjust by moving the brake band bracket in either direction (arrow (A)) so that the reel motor chassis is in parallel with the brake arm, and so that the brake band makes proper clearance equally all around the reel table base.
2. Adjust by moving the brake solenoid in either direction (arrow (D)) so that the stroke of the solenoid plunger is about 2 mm.
3. Adjust by moving the band ass'y retaining plate as shown in (B, C, E) so that, when the plunger is pushed in the direction of the solenoid housing, the reel table base is not rubbed by the brake band and is properly spaced.

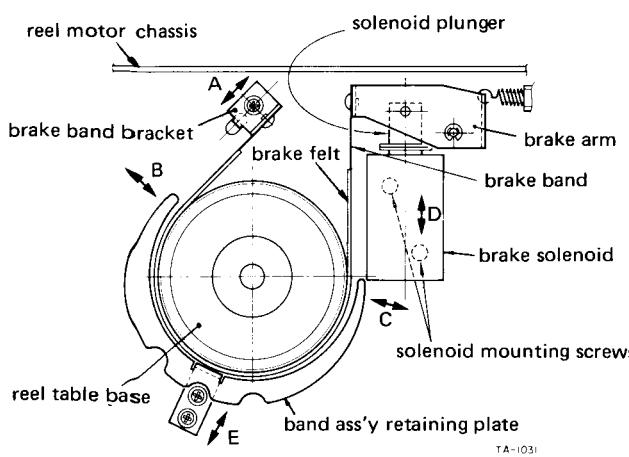
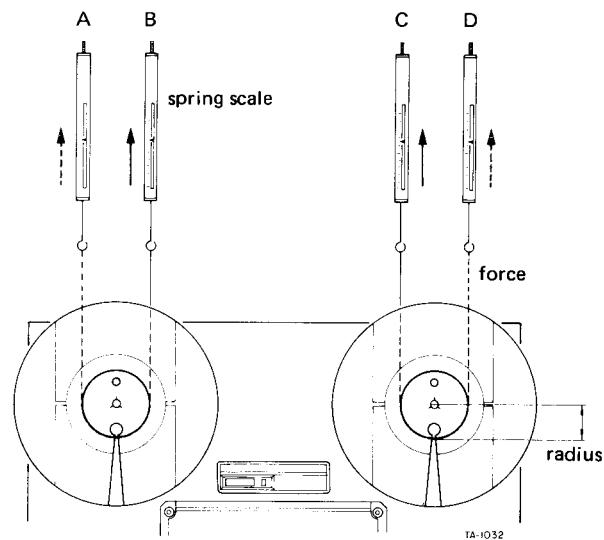


Fig. 2-2

### 2-3 BRAKE TORQUE MEASUREMENT

1. Place an empty 7" reel, connected to a spring scale by a string, on the reel table.
2. Pull the scale away from the reel and read the scale indication only when the reel table is steady motion.
3. Do steps 1 and 2 for each measuring condition, (A) through (D) in Fig. 2-3.
4. The values are as chart in Fig. 2-3.



|                             |                                   |
|-----------------------------|-----------------------------------|
| ↑ Forward direction (B) (C) | 800 to 1400g-cm (11 to 19oz-inch) |
| ↑ Reverse direction (A) (D) | 500g-cm (6.9oz-inch) or less      |
| Left/right deviation        | 200g-cm (2.8oz-inch) or less      |

**NOTES:** 1. The reverse direction values are reference.  
2. The specification of left/right deviation only applies for forward direction torques.

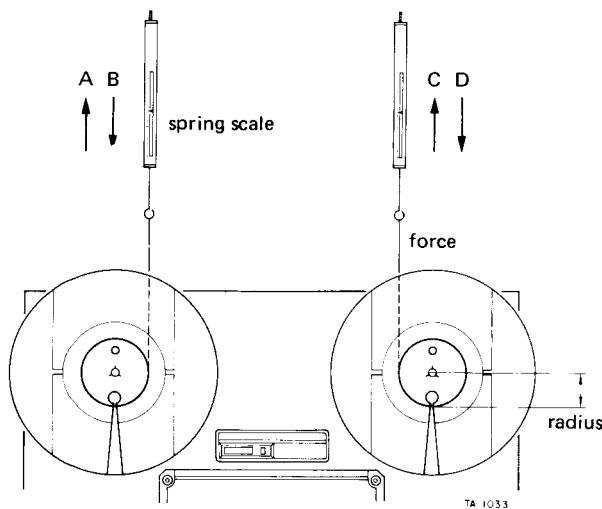
Torque calculating formulas:

- (1) Torque (in g-cm or oz-inch)  
= Force or Weight (in g or oz) x Radius (in cm or inch)
- (2) Conversion of g-cm to oz-inch:  
 $g\text{-cm} \times 0.0139 = \text{oz-inch}$

Fig. 2-3

## 2-4 REEL MOTOR TORQUE MEASUREMENT

1. Hold both left and right tension arms in the upper position using rubber bands.
2. See Fig. 2-4. Measure torques for each operating mode with the conditions specified in the chart.
3. Since all the torque values are reference values, it is allowable that the take-up torque during the fast forward or rewind mode is 1 kg-cm or more, and that the back tension torque during these mode is good unless the left or right tension arms are shut-off.
4. There is no specially provided adjustment, so if any torque correction are needed, repair or replace defective part(s) and/or circuit(s).



Reel torque reference value

Play mode

| Mode                                       | Torque                              |
|--|-------------------------------------|
| Take-up:<br>(B) in REV<br>(D) in FWD       | $260 \pm 40$ g-cm (3.1~4.2 oz-inch) |
| Back tension:<br>(A) in F.F.<br>(C) in REV | $180 \pm 40$ g-cm (1.9~3.1 oz-inch) |

Fast winding mode

| Mode                                  | Torque                   |
|---------------------------------------|--------------------------|
| Take-up: (B) in REV, (D) in F.F.      | 1100 g-cm (15.3 oz-inch) |
| Back tension: (A) in F.F., (C) in REV | 50 g-cm (0.7 oz-inch)    |

NOTE : For torque calculation, refer Fig. 2-3.

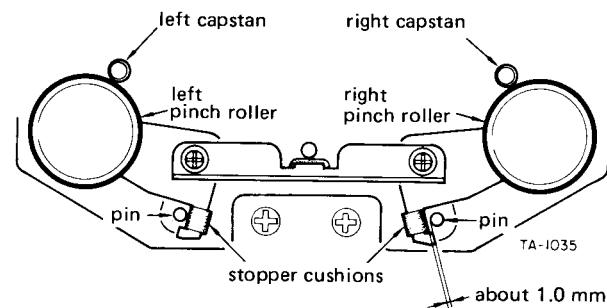
Fig. 2-4

## 2-5 PINCH ROLLER PRESSURE STROKE ADJUSTMENT

1. Set the deck in the forward or reverse play mode.
2. Adjust by turning the pressure stroke adj. nut (Fig. 2-5) so that the clearance between the pin and the stopper cushion is about 1.0 mm.
3. Since the clearance is produced at one side (left or right), adjustment for this side only is permissible.



Fig. 2-5 Pinch roller pressure stroke adjustments



Either the left or right should have a clearance of about 1.0 mm.

Fig. 2-6

## 2-6 PINCH ROLLER PRESSURE MEASUREMENT

NOTES: 1. The explanation below applies to both the left and right pinch rollers.

2. Both pinch roller pressures are automatically set with equal value.

1. Hold both the left and right tension arms in the upper positions using rubber bands, string etc.
2. Set the deck in either play mode with no tape loaded.
3. Attach the spring scale to the pinch roller as shown in the figure.
4. Draw the pinch roller away from the capstan shaft (in the direction of a line intersecting the centers of the capstan shaft and the pinch roller) until the capstan shaft and the pinch roller are separated.
5. Return the scale back until the pinch roller just begins to turn. The scale should then be reading as follow.  
Reference value: 1.35 kg to 1.9 kg. (3.0 lbs to 4.2 lbs)
6. If the reading is out of specification, replace defective part(s). There are no adjustable parts.

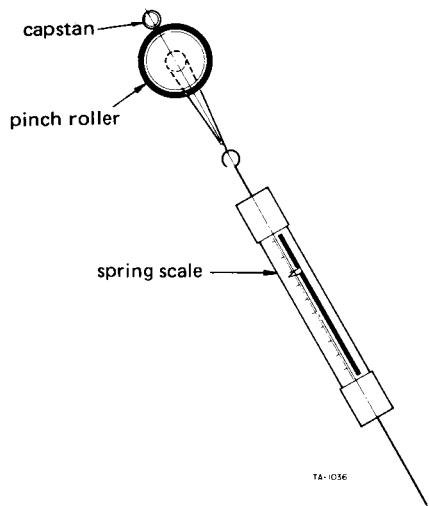


Fig. 2-7

## 2-7 TENSION ARM HEIGHT ADJUSTMENT

1. Thread any standard tape on the deck using a standard empty reels such as TEAC RE-702.
2. Set the deck in the forward or reverse play mode.
3. Stop left (right) guide roller's rotation by hand. Adjust by turning the left (right) tension arm adjusting nut (refer Fig. 2-8) so that the tape moves in the center of the guide roller.

4. Release the guide roller. Fine-adjust the adjusting nut again until there is no tape curling at the tape guide pin between the erase head and the left (right) guide roller.
5. After adjusting the height of both left and right tension arms, check that the tape running condition is good by repetition of fast forward and rewind modes.
6. If the tape running position is different when the guide roller stops and when it turns, the condition when the guide roller is rotating has priority.

## 2-8 TENSION ARM FORCE ADJUSTMENT

**NOTE:** The description below applies to both left and right sides.

1. Check the shut-off switch operates correctly with the deck in the horizontal and vertical positions.
2. Adjustment can be done by changing the hooking position of the tension arm spring against the spring hook.

## 2-9 DAMPER FUNCTION CHECK

**NOTE:** The explanation below applies to both left and right sides.

1. Check that the damper string begins to function after the tension arm has moved 10 to 15 mm from the lowest position, while the damping function is working, there is a feeling of resistance.
2. Check that the tension arm returns freely from the above position to the lowest position.

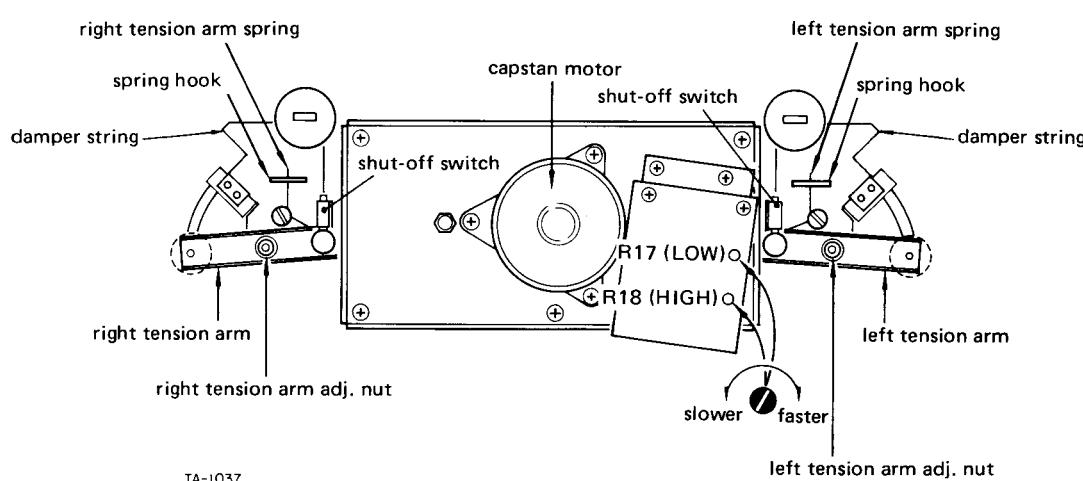


Fig. 2-8 Tension arm height, tension arm force, damper function, and tape speed

## 2-10 REEL TABLE HEIGHT ADJUSTMENT

1. Adjust the tension arm height beforehand. (See 2-7)
2. Check each reel table height using a TEAC RE-702 empty reel and letting the tape run in each tape operating mode.
3. If the tape rubs against the reel flanges, adjust the reel table height by means of the two reel table mounting screws.

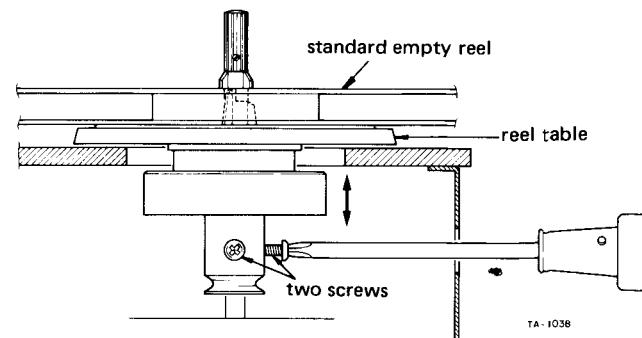
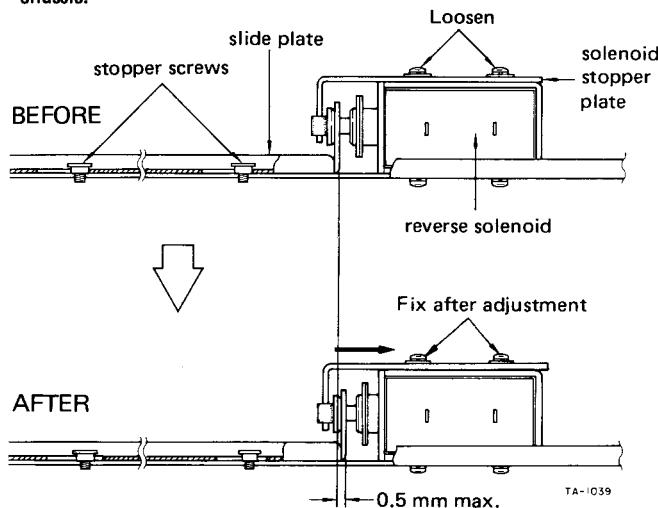


Fig. 2-9

## **2-11 REVERSE SOLENOID ADJUSTMENT (X-7R ONLY)**

- When the reverse solenoid releases, if the slide plate hits the stopper screw/s noisily, the solenoid stopper plate may be adjusted in the direction of the solenoid housing. See illustration.

**Parts below are accessible from the rear of the amplifier chassis.**



**Fig. 2-10**

## 2-12 ROTATING PART THRUST CLEARANCE CHECKS

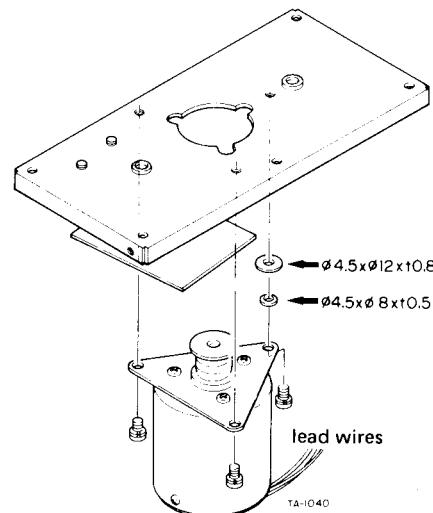
## Reference values

- Capstan shaft:** 0.1 mm to 0.25 mm (magnefloat type)  
**Guide roller:** 0.05 mm to 0.3 mm  
**Tension arm guide roller:** 0.05 mm to 0.3 mm  
**Reel motor:** O (spring type)  
**Tension arm:** O (spring type)

**NOTE:** Since the capstan shaft is a magnefloat type, check that it is forced towards the rear of the deck while rotating.

## **2-13 CAPSTAN MOTOR REPLACEMENT**

- When the capstan motor is replaced, install it with its lead wires and washers as shown.
  - Check that, when the deck is operated by repeating the forward and reverse play modes, the capstan drive belt changes position on the flywheels smoothly.



**Fig. 2-11**

## 2-14 TAPE SPEED ADJUSTMENT

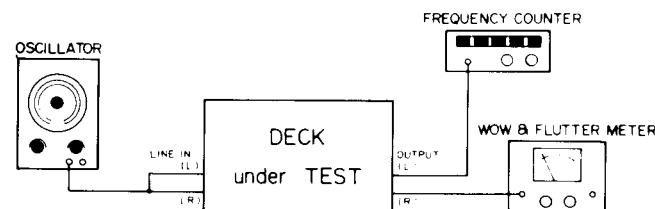


Fig. 2-12

**NOTES:** 1. Conduct all the following in both forward and reverse play modes.

- When ordering test tapes, allow for the longer delivery time that is required for them.

1. Connect a frequency counter to either OUTPUT terminal.
  2. Load a TEAC YTT-2003 test tape. Set the SPEED switch—HIGH, and PITCH CONT knob—OFF.
  3. Play the tape. Adjust R18 (see Fig. 2-8) for a reading of 3,000 Hz  $\pm$  5 Hz.
  4. Check the following at the beginning and the end of the tape:

5. Change the test tape to a TEAC YTT-2002, and SPEED switch setting to LOW.
6. Repeat steps 3 through 4. Adjust R17 if necessary.
7. Pull the PITCH CONT knob out. Set SPEED switch HIGH. Play a YTT-2003 tape.
8. Check if the speed variation of at least 3,000 Hz  $\pm$ 180 Hz is obtained when the PITCH CONT knob is rotated fully in both directions.
9. Change the test tape to YTT-2002, SPEED switch setting to LOW. Repeat step 8.

## 2-15 WOW AND FLUTTER CHECKS

- NOTES:**
1. All the following apply to both forward and reverse play modes.
  2. The following measurements should be made at the beginning and the end of the tape.
  3. When ordering test tapes, allow for the longer delivery time that is required for them.

### Playback

1. Connect the test equipment to the deck as shown in Fig. 2-12.
2. Load and play a TEAC YTT-2003 test tape for HIGH speed (19 cm/s or 7-1/2 ips), or a TEAC YTT-2002 test tape for LOW speed (9.5 cm/s or 3-3/4 ips).
3. Read the indication on the wow and flutter meter.

### Specifications:

HIGH speed: 0.05% WRMS  
0.10% RMS

LOW speed: 0.07% WRMS  
0.12% RMS

### Overall

4. Load a TEAC YTT-8013 test tape (blank). Apply and record a 3,000 Hz signal.
5. During simultaneous tape monitoring (playing) the recorded signal, read the wow and flutter meter display.

### Specifications:

HIGH speed: 0.12% RMS  
LOW speed: 0.15% RMS

## 2-16 VOLTAGE CONVERSION (FOR GENERAL EXPORT MODELS)

Always disconnect the power line cord before making these adjustments.

### Frequency Conversion

Since the X series uses DC motors, frequency conversion is not necessary.

### Voltage Conversion

1. First remove the two feet by removing the screws in each one.
2. Unscrew the left and right sides of the cabinet.
3. Locate the voltage selector to the right of the power transformer as seen from the rear of the deck.
4. Turn the slotted center post of the selector with a screw-driver until the desired voltage numerals appear in the cut-out section of the selector.
5. Replace the cabinet and feet.

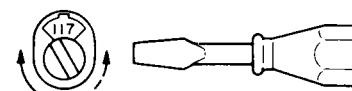


Fig. 2-13

## 2-17 LUBRICATION

Oiling is needed after every 1,000 hours of operation or once a year if the deck is infrequently used. For this purpose, TEAC spindle oil (from TEAC TZ-255 oil kit), Mobil D.T.E. Oil Light, etc are recommended. Lubrication is normally not necessary except at the points shown.

1. Place the deck in the horizontal position.
2. Apply a few drops of oil to the respective spindles shown, excluding capstans, then spread the oil evenly on the spindle surfaces using a cotton cloth, etc.
3. For capstans, apply a few drops to the indicated position.
4. After oiling all the points, leave the deck for 1 to 2 hours until the oil is thoroughly absorbed.

Figure shows left side. Do also for right side.

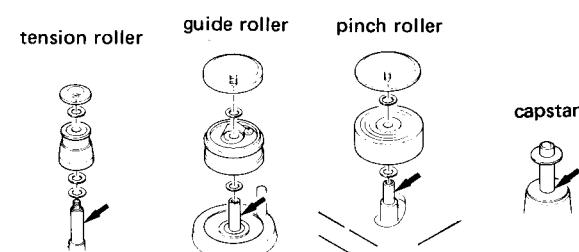


Fig. 2-14

## 2-18 HEAD AND TAPE PATH ALIGNMENTS

- NOTES:**
1. The head and tape path alignments for the X-7R and X-7 are the same. The procedure for the X-7R is given below.
  2. For detailed alignment principles, refer to the book "Audio Fundamental -TAPE DECK-, 8. Mechanical Adjustments" published by TEAC CORPORATION.

### 2-18-1 HEAD ARRANGEMENT (for X-7R)

| Head adjusting screws |                     |
|-----------------------|---------------------|
| Erase                 | Record and playback |
| Ⓐ Tilt                | Ⓐ Azimuth           |
| Ⓐ Height and azimuth  | Ⓐ Height and tilt   |
| Ⓐ Tangency            | Ⓐ Tangency          |

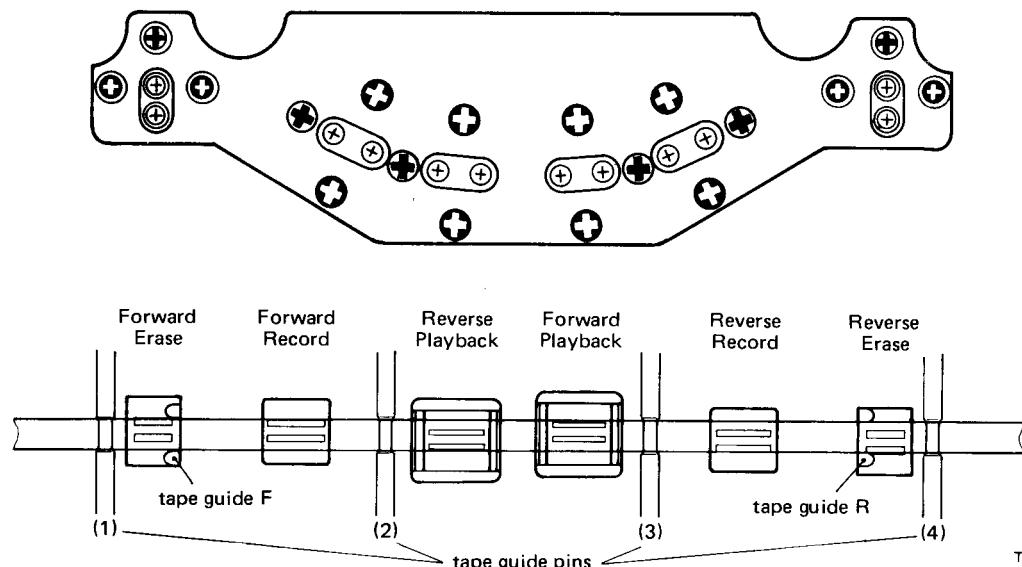


Fig. 2-15 Head arrangement

### 2-18-2 HEAD REGULATION ELEMENTS

Adjust each head to satisfy each of the following:

|  |  |
|--|--|
| <b>TILT</b><br>The head surface should be parallel to the tape guide pin surface.                            |  |
| <b>AZIMUTH</b><br>The gap of the head core should be perpendicular to the tape travel.                       |  |
| <b>HEIGHT</b><br>The upper (lower) core of the head should be level with the upper (lower) edge of the tape. |  |
| <b>TANGENCY</b><br>The dotted line should be perpendicular to the surface of the tape.                       |  |

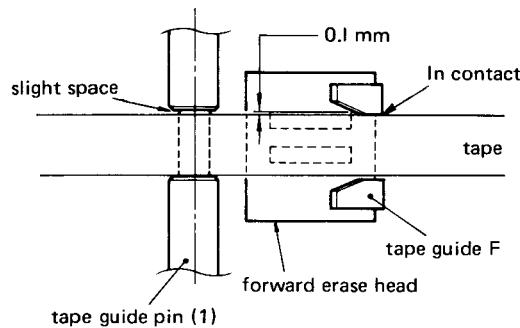
Fig. 2-16 Head regulation elements

### 2-18-3 ALIGNMENT PROCEDURE (for X-7R)

1. Visually make the tilt adjustment of each record and playback head based on nearest tape guide pin.
2. Make coarse azimuth adjustments of the record and playback heads by viewing each head from in front (without tape).

3. Adjust the erase head's azimuth as seen from the front of the head. Then adjust its tilt using an adjacent tape guide pin for reference. Do this for both forward and reverse heads.
4. Temporarily adjust the height of both erase heads visually (with no tape loaded) so that the tape guide on the erase head matches the neighboring tape guide pin. Note that unless the three adjusting screws are turned equally, the tilt and azimuth adjustments (step 3) are likely to be disturbed.
5. Thread a TEAC YTT-8013 test tape (thickness = 35  $\mu\text{m}$ ). With the tape running in the forward direction, fine-adjust the height of the forward erase head so that the upper edge of the tape is just in contact with the upper edge of the tape guide, F, on the head. The lower edge of the tape should just touch the lower edge of the tape guide pin (1). See Fig. 2-17.
6. Check that the forward erase head core protrudes 0.1 mm above the moving tape. If not, adjust its azimuth, and recheck its tilt and height, then correct tilt and height if necessary.
7. Do exactly the same adjustment (steps 5 and 6) for the reverse erase head. Substitute reverse play mode for forward play mode.
8. Check that, by pulling the tape away from the head assembly then setting in either play mode, the tape guide on the erase head has about 1 mm clearance against the pinch roller. Do this for both the left and right sides.

Fig. shows forward erase head.



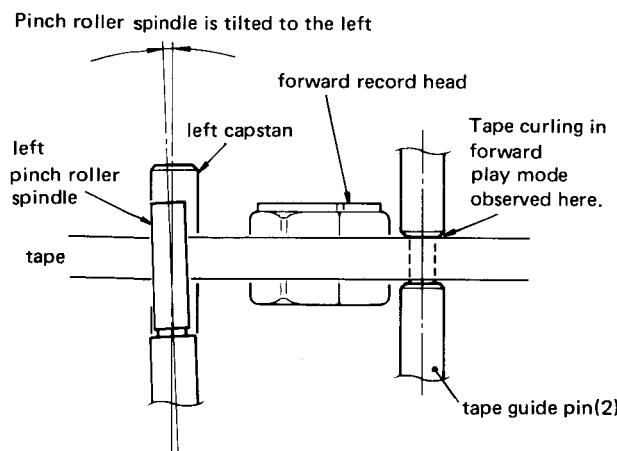
**NOTE:** In the case of the reverse erase head the tape should contact the upper tape guide plate and the tape guide pin lower surface in the same way.

TA-1043

Fig. 2-17 Erase head height fine-adjustment

9. If there is a narrower space, correct the erase head position by loosening the erase heads's tangency adjusting screws and moving the head away from pinch roller.
10. Check to see if there is any tape curling at either tape guide pin in the closed loop portion of the tape (i.e. between the capstans).
11. If, during forward play, there is any tape curling at tape guide pin (2), conduct the following: Unthread the tape from the head assembly front. Remove both pinch rollers. Set the deck in the play mode. Visually line-up the capstan and pinch roller spindles.

Fig. shows left side.



If the pinch roller spindle is tilted to the left (right) side from the capstan shaft, tape curling may occur at the upper (lower) edge of the tape guide pin (2).

TA-1044

Fig. 2-18 Example of non-parallel pinch roller/capstan.

12. If not parallel, loosen the two screws mounting the reinforcement plate then adjust using the correction jig (TEAC P/N 5736000100) as shown in Fig. 2-19.

Note that:

- (1) Use the jig as near as possible to the pinch roller spindle.
- (2) Do not touch the surface of spindle.
- (3) Use no other tool for this adjustment!

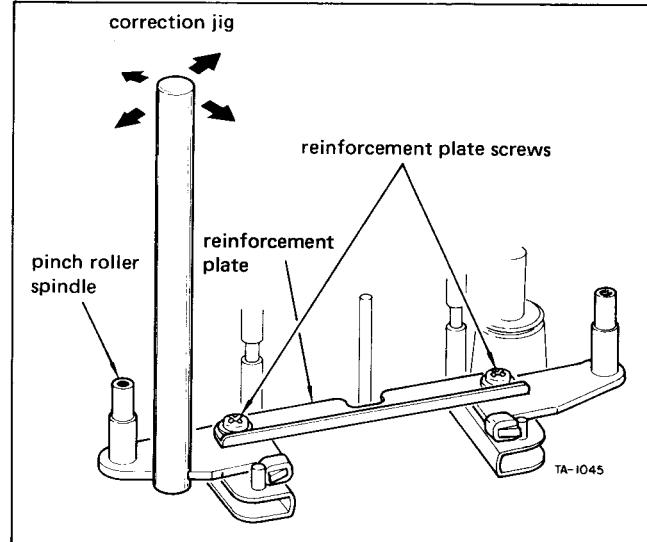


Fig. 2-19 Correction of pinch roller/capstan non-parallelism.

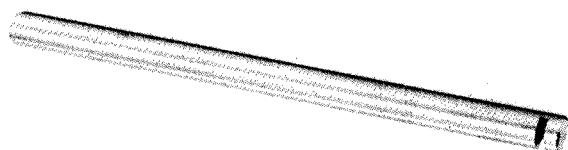


Fig. 2-20 Correction jig (TEAC P/N 5736000100)

13. If the tape curls at tape guide pin (3) in reverse play, correct in the same way (steps 11 and 12).
14. After it is entirely corrected that there is no tape curling condition in the head assembly, fine-adjust each record and playback height so that the brass-colored spacer of forward (reverse) direction purpose head will show above (below) the moving tape. (About as thick as a thin pencil line). Adjustment should be done by equally turning three screws required correction not to disturb tilt and azimuth regulation conducted before.
15. Finally, if necessary, make rough tangency adjustment of respective head with tape running. After doing for erase head/recheck steps 8 and 9 (erase head/pinch roller space).

### 3 ELECTRICAL ADJUSTMENTS AND CHECKS

#### NOTES

- The following data in both the charts and the illustrations are for the X-7R. All the procedures, however, are applicable to the X-7 except for those relating to the REVERSE direction.
- Before performing adjustments and checks, clean and demagnetize the entire tape path.
- Check that the deck is properly set for the voltage in your locality.

- In general, adjustments and checks are done in the order of L-ch then R-ch. Double REF. Nos. indicate L-ch/R-ch. (Example: R405/R406)
- The value of "dB" refers to 0 dB (0.775 V). If an AC voltmeter calibrated to 0 dB (1 V) is to be used, appropriate compensation should be made.
- The AC voltmeter used in the procedures must have an input impedance of 1 M-ohms or more.
- When ordering test tapes, allow for the longer delivery time that is required for them.

#### 3-1 MONITOR PERFORMANCE

| ITEM                    | CONNECTION                           | MODE/<br>INSTRUCTION  | SIGNAL<br>SOURCE                                 | ADJUST<br>(or CHECK) | OUTPUT                   | REMARKS   |
|-------------------------|--------------------------------------|---|--|----------------------|--------------------------|---|
| 1. MONITOR output level | 1-1 Fig. 3-1                         | MONITOR sw.—<br>SOURCE<br>OUTPUT cont.—<br>CAL<br>LINE cont.—MAX<br>MIC cont.—MIN | 400 Hz/—22 dB<br>(61.5 mV)                       | R387<br>(for L-ch)   | —5 dB(436 mV)<br>at L-ch | LINE min. input level (L)   |
|                         | 1-2 "                                | "   | 400 Hz/—12 dB<br>(195 mV)                        | LINE cont.<br>(L/R)  | "                        | LINE spec. input level (L)  |
|                         | 1-3 "                                | LINE spec.<br>input level condition   | "  | R388<br>(for R-ch)   | —5 dB at R-ch            | LINE spec. input level (R)  |
| 2. VU meter             | 2-1 Fig. 3-1                         | LINE spec.<br>input level condition   | 400 Hz/—12 dB<br>(195 mV)                        | R405/R406            | 0 VU<br>on VU meter      |   |
| 3. MIC input level      | 3-1 Fig. 3-1-1, but<br>LINE IN → MIC | LINE cont.—MIN<br>MIC cont.—MAX   | 400 Hz/<br>—70 dB ± 2 dB<br>(195 µV ~<br>308 µV) | Check                | —5 dB(436 mV)            | MIC min. input level  |
|                         | 3-2 "                                | "   | 400 Hz/—60 dB<br>(0.775 mV)                      | MIC cont.<br>(L/R)   | "                        | MIC spec. input level   |
|                         | 3-3 Fig. 3-1                         | LINE cont.—<br>spec. position<br>(Item 1-2)<br>MIC cont.—MIN                      | —  | —                    | —                        | IMPORTANT: Do not<br>disturb these cont's<br>during later checks. |

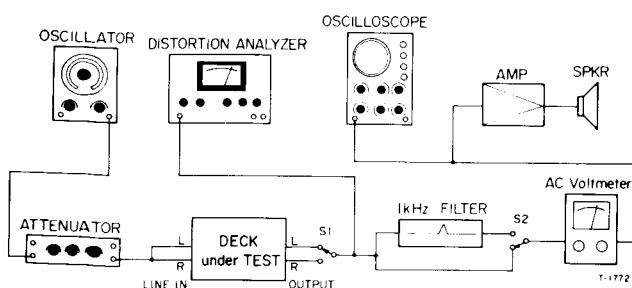


Fig. 3-1 Basic connection

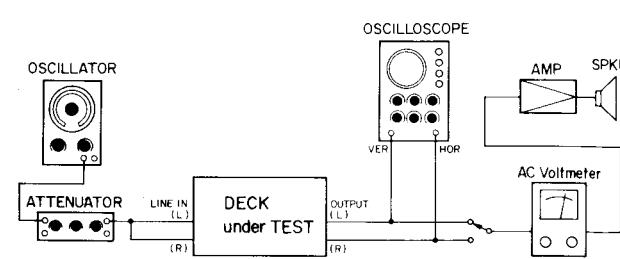


Fig. 3-2 Connection

TEAC test tape: YTT-1002: For playback alignment (9.5 cm/s or 3- $\frac{1}{2}$  ips)  
 YTT-1003: For playback alignment (19 cm/s or 7- $\frac{1}{2}$  ips)  
 YTT-8013: For recording alignment (blank)

### 3-2 PLAYBACK PERFORMANCE

| ITEM                      |      | CONNECTION | MODE/<br>INSTRUCTION   |            | SIGNAL<br>SOURCE         | ADJUST<br>(or CHECK)                     | OUTPUT  | REMARKS  |
|---------------------------|------|------------|--|------------|--------------------------|--|---|--|
| 4. Playback head azimuth  | 4-1  | Fig. 3-2   | Do for both FWD & REV heads<br>MONITOR sw.—<br>TAPE SPEED sw.—HIGH           |            | YTT-1003 (16 kHz/-10 dB) | Azimuth adj. screw/s of head (Fig. 2-15) | Phase: within 45° on oscilloscope (Fig. 3-3)                  |  |
| 5. Playback level         | 5-1  | Fig. 3-1   | FWD & REV OUTPUT cont.—CAL SPEED sw.—HIGH                                    |            | YTT-1003 (400 Hz/0 dB)   | R313/R314 (FWD)<br>R315/R316 (REV)       | -5 dB (436 mV)  | Spec. PB condition   |
|                           | 5-2  | "          | OUTPUT cont.—MAX   |            | "                        | Check                                    | +1 dB ±2 dB (690 mV ~ 1.09 V)                                 | Max. output level  |
|                           | 5-3  | "          | OUTPUT cont.—CAL   |            | "                        | —  | -5 dB (436 mV)  | Spec. PB condition<br><b>IMPORTANT:</b> Do not disturb OUTPUT cont. during later checks.                                   |
| 6. VU meter               | 6-1  | Fig. 3-1   | FWD Spec. PB condition   |            | YTT-1003 (400 Hz/0 dB)   | R393/R394                                | 0 VU on VU meter  |  |
| 7. Frequency response     | 7-1  | Fig. 3-1   | FWD & REV  | SPEED-HIGH | YTT-1003                 | R327/R328 (FWD)<br>R329/R330 (REV)       | 40 Hz ~ 22 kHz ±3 dB  | Reference: 400 Hz  |
|                           | 7-2  | "          | "  | SPEED-LOW  | YTT-1002                 | R333/R334 (FWD)<br>R335/R336 (REV)       | 40 Hz ~ 14 kHz ±3 dB  |  |
| 8. Phase shift            | 8-1  | Fig. 3-2   | FWD & REV  | SPEED-HIGH | YTT-1003                 | Check                                    | Phase: within 45° on oscilloscope (50 Hz ~ 18 kHz) (Fig. 3-3) |  |
|                           | 8-2  | "          | "  | SPEED-LOW  | YTT-1002                 | "  | " (50 Hz ~ 10 kHz)  |  |
| 9. Headphone output level | 9-1  | Fig. 3-4   | Spec. PB condition   |            | YTT-1003 (400 Hz/0 dB)   | Check                                    | -24 dB ±2 dB (38.8 mV ~ 61.5 mV) (at PHONES jack)             | When OUTPUT terminal is at -5 dB   |
| 10. Signal to noise ratio | 10-1 | Fig. 3-1   | FWD & REV Spec. PB condition<br>Use fully erased tape (Use bulk tape eraser) |            | YTT-8013                 | Check                                    | HIGH, 50 dB min. ratio<br>LOW 49 dB min. ratio                | -Ratio of spec. -5 dB and noise<br>-Change-over the polarity of the AC Line plug. The worse reading should be within spec. |

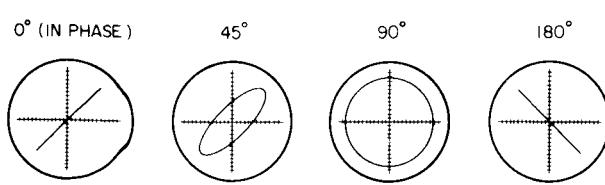


Fig. 3-3 Confirming phase relationship

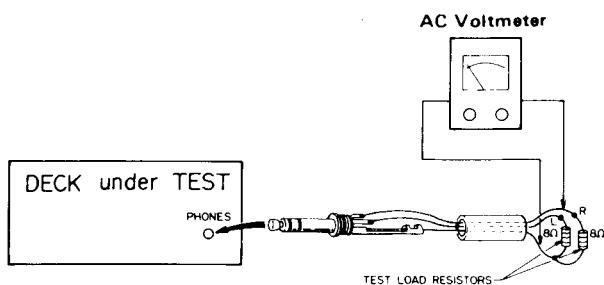


Fig. 3-4 Connection

**3-3 RECORDING PERFORMANCE**

TEAC test tape: YTT-8013: For recording alignment (blank)

| ITEM                         |      | CONNECTION                              | MODE/<br>INSTRUCTION   |            | SIGNAL<br>SOURCE                                 | ADJUST<br>(or CHECK)                     | OUTPUT   | REMARKS   |
|------------------------------|------|---|--|------------|--|--|--|---|
| 11. Bias trap                | 11-1 | AC voltmeter between BIAS TRAP TP & GND | Rec-pause mode   |            | —  | L303/L304                                | Min. reading   | Bias freq.: 100 kHz ±5 kHz  |
|                              | 11-2 | Fig. 3-1                                | Rec-pause mode MONITOR sw.—TAPE OUTPUT cont.—CAL   |            | —  | L301/L302                                | Min. reading (-45 dB or more (4.36 mV or less))              |   |
|                              | 11-3 | "                                       | "  |            | —  | Check                                    | VU: no deflection  |   |
| 12. Record head azimuth      | 12-1 | Fig. 3-2                                | Do for both FWD & REV heads MONITOR sw.—TAPE   |            | 10 kHz/-32 dB (19.5 mV)                          | Azimuth adj. screw/s of head (Fig. 2-15) | Phase: within 45° on oscilloscope (Fig. 3-3)                 |   |
| 13. Record bias (position 1) | 13-1 | Fig. 3-1                                | FWD & REV Test tape: YTT-8013 SPEED sw.—LOW REC BIAS sw.—1 REC EQ sw.—1 MONITOR sw.—TAPE |            | 7 kHz/-22 dB (61.5 mV)                           | C393/C394 (FWD)<br>C395/C396 (REV)       | Over-bias value 3.5 dB ±0.5 dB (from peak)                   | Simultaneous monitoring   |
| 14. Record level             | 14-1 | Fig. 3-1                                | Same as above SPEED sw.—HIGH   |            | 400 Hz/-12 dB (195 mV)                           | R425/R426 (FWD)<br>R427/R428 (REV)       | -5 dB (436 mV)   | Spec. REC condition   |
| 15. Distortion               | 15-1 | Fig. 3-1                                | FWD & REV Spec. REC condition  |            | 1 kHz/-12 dB (195 mV)                            | Check                                    | 0.8% or less   |   |
| 16. Signal to noise ratio    | 16-1 | Fig. 3-1                                | FWD & REV Spec. REC condition SPEED—HIGH & LOW   |            | 1 kHz/-12 dB (195 mV) then No signal recording   | Check                                    | HIGH: 48 dB min. ratio<br>LOW: 46 dB min. ratio              | Ratio of spec. —5 dB and noise  |
| 17. Erase efficiency         | 17-1 | Fig. 3-1 switch on 1 kHz filter         | FWD & REV Spec. REC condition SPEED sw.—HIGH   |            | 1 kHz/-2 dB (615 mV) (+10 VU) then erasing       | Check                                    | OUTPUT: -63 dB or more (548 µV or less) (68 dB min. ratio)   | -Reference output level: +5 dB<br>-The worst value should be within spec. |
| 18. REC MUTE function        | 18-1 | Fig. 3-1 switch on 1 kHz filter         | FWD & REV Spec. REC condition rec-mute mode  |            | 1 kHz/-2 dB (615 mV) (+10 VU) then record muting | Check                                    | OUTPUT: -60 dB or more (0.775 mV or less) (65 dB min. ratio) | -Reference output level: +5 dB<br>-The worst value should be within spec. |
| 19. Frequency response       | 19-1 | Fig. 3-1                                | FWD & REV Spec. REC condition  | SPEED—LOW  | 40 Hz~16 kHz/-32 dB (19.5 mV)                    | L305/L306 (FWD)<br>L307/L308 (REV)       | 40 Hz~16 kHz ±3 dB   | Reference: 400 Hz   |
|                              | 19-2 | "                                       | "  | SPEED—HIGH | 40 Hz~20 kHz/-32 dB                              | Check                                    | 40 Hz~20 kHz ±3 dB   |   |

| ITEM                                  |      | CONNECTION  | MODE/<br>INSTRUCTION  | SIGNAL<br>SOURCE                                       | ADJUST<br>(or CHECK)     | OUTPUT  | REMARKS         |
|---------------------------------------|------|---|---|--|--------------------------|---|-----------------|
| 20. Phase shift                       | 20-1 | Fig. 3-2  | FWD & REV<br>Spec. REC<br>condition<br>SPEED sw.—<br>HIGH   | 40 Hz ~ 16 kHz/<br>-32 dB<br>(19.5 mV)                 | Check                    | Phase:<br>within 45° on<br>oscilloscope<br>(40 Hz ~ 16 kHz)<br>(Fig. 3-3)                     |                 |
| 21. Record<br>Bias<br>(position<br>2) | 21-1 | Fig. 3-1  | FWD & REV<br>Spec. REC<br>condition<br>Test tape—<br>YTT-8013<br>SPEED sw.—<br>HIGH                   | 10 kHz/-32 dB<br>(19.5 mV)                             | R471 (FWD)<br>R472 (REV) | When BIAS/EQ<br>sw's are changed<br>1 → 2,<br>output level<br>should raise<br>+4 dB ±1 dB     |                 |
|                                       | 21-2 | "   | "   | 16 kHz/-32 dB  | Check                    | " +6 dB ±2 dB   |                 |
| 22. Adjacent<br>track<br>crosstalk    | 22-1 | Fig. 3-1  | FWD record.<br>Spec. REC<br>condition<br>SPEED sw.—<br>HIGH<br>REC BIAS sw.<br>-1<br>REC EQ sw.<br>-1 | 125 Hz/-12 dB<br>(195 mV)                              | —                        | —   |                 |
|                                       | 22-2 | "   | REV playback<br>the portion<br>recorded above   | —  | Check                    | At both L-and<br>R-ch<br>125 Hz: -45 dB<br>or more (4.36 mV<br>or less)<br>(40 dB min. ratio) | For FWD record. |
|                                       | 22-3 | "   | Interchange R &<br>L reels then do<br>FWD playback  | —  | "                        | "   |                 |
|                                       | 22-4 | Repeat 22-1 through 22-3, but interchange FWD and REV |   |  |                          |   | For REV record. |
| 23. Channel<br>separation             | 23-1 | Fig. 3-1<br>switch on<br>1 kHz filter                 | Same as 22-1  | L: 1 kHz/-12 dB<br>(195 mV)<br>R: No signal<br>record. | Check                    | R, -55 dB<br>or more<br>(1.38 mV or less)<br>(50 dB min. ratio)                               | For FWD record. |
|                                       | 23-2 | "   | "   | L: No signal<br>record.<br>R: 1 kHz/-12 dB             | "                        | L, "  |                 |
|                                       | 23-3 | Repeat 23-1 and 23-2 with REV recording.              |   |  |                          |   | For REV record. |

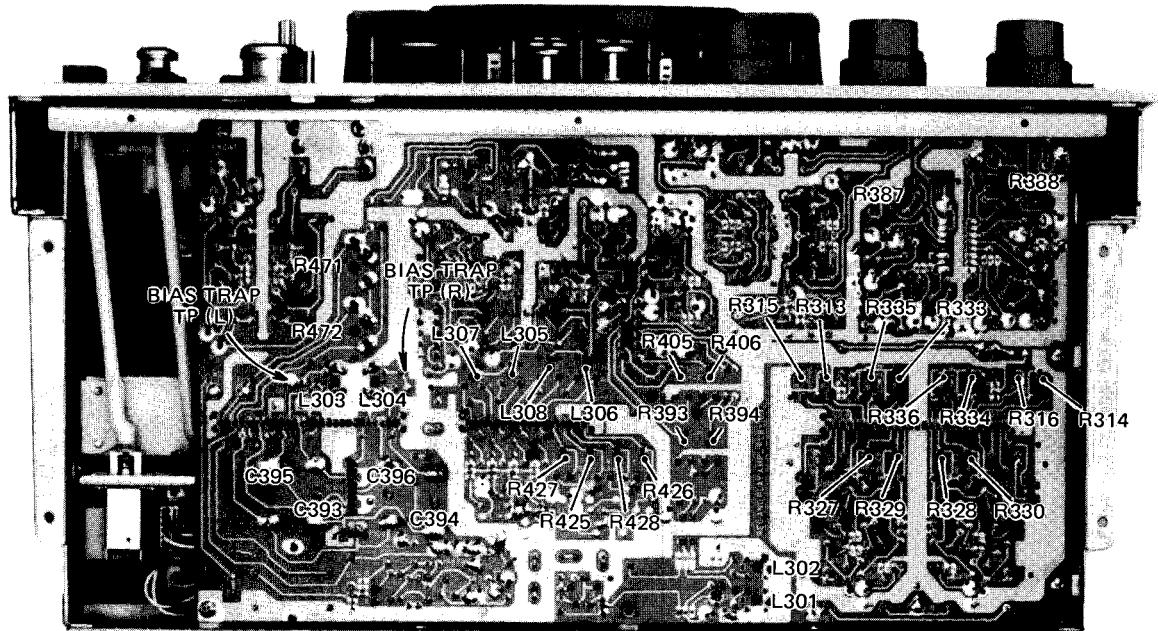
**3-4 ADJUSTMENT AND TEST POINT LOCATIONS**

Fig. 3-5

|           |                        |           |                     |
|-----------|------------------------|-----------|---------------------|
| R313/R314 | Playback level (FWD)   | R425/R426 | Record level (FWD)  |
| R315/R316 | Playback level (REV)   | R427/R428 | Record level (REV)  |
| R327/R328 | Playback EQ (HIGH FWD) | R471      | Record Bias 2 (FWD) |
| R329/R330 | Playback EQ (HIGH REV) | R472      | Record Bias 2 (REV) |
| R333/R334 | Playback EQ (LOW FWD)  | L301/L302 | Bias trap (output)  |
| R335/R336 | Playback EQ (LOW REV)  | L303/L304 | Bias trap (record)  |
| R387/R388 | Output level           | L305/L306 | Record EQ (FWD)     |
| R393/R394 | VU meter (playback)    | L307/L308 | Record EQ (REV)     |
| R405/R406 | VU meter (monitor)     | C393/C394 | Record Bias 1 (FWD) |
|           |                        | C395/C396 | Record Bias 1 (REV) |

## ASSEMBLING HARDWARE CODING LIST

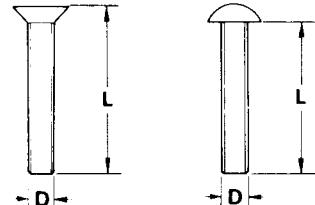
All screws conform to ISO's standards, and have crossrecessed heads, unless otherwise noted.  
ISO screws have the head inscribed with a point as in the figure to the right.



## FOR EXAMPLE:

B M 3 x 6

----- Length in mm (L)  
 ----- Diameter in mm (D) \*  
 ----- Metric System  
 ----- Nomenclature

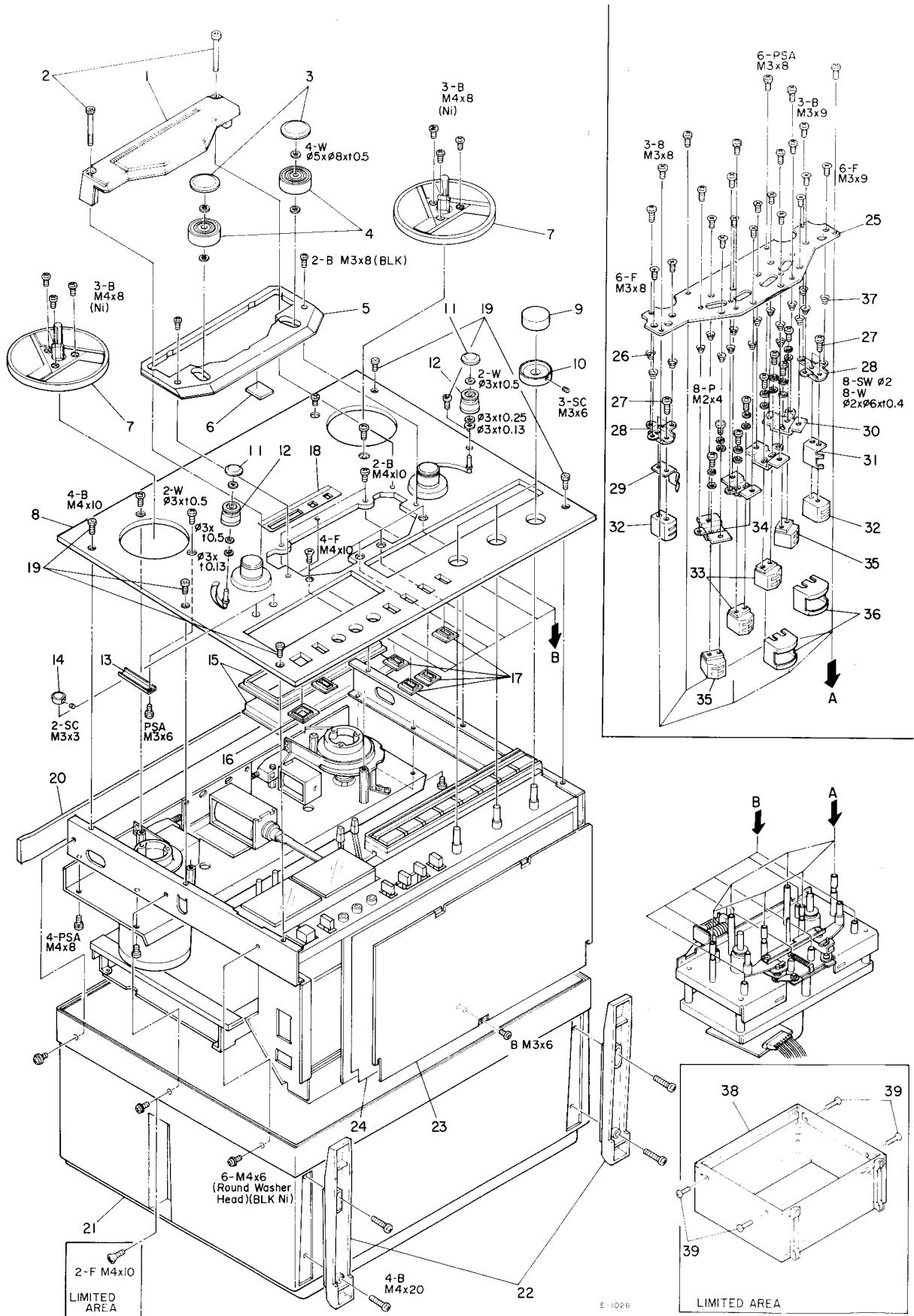


\* Inner dia. for washers and nuts

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

## 4 EXPLODED VIEWS AND PARTS LIST

### EXPLODED VIEW - 1 (X-7R)



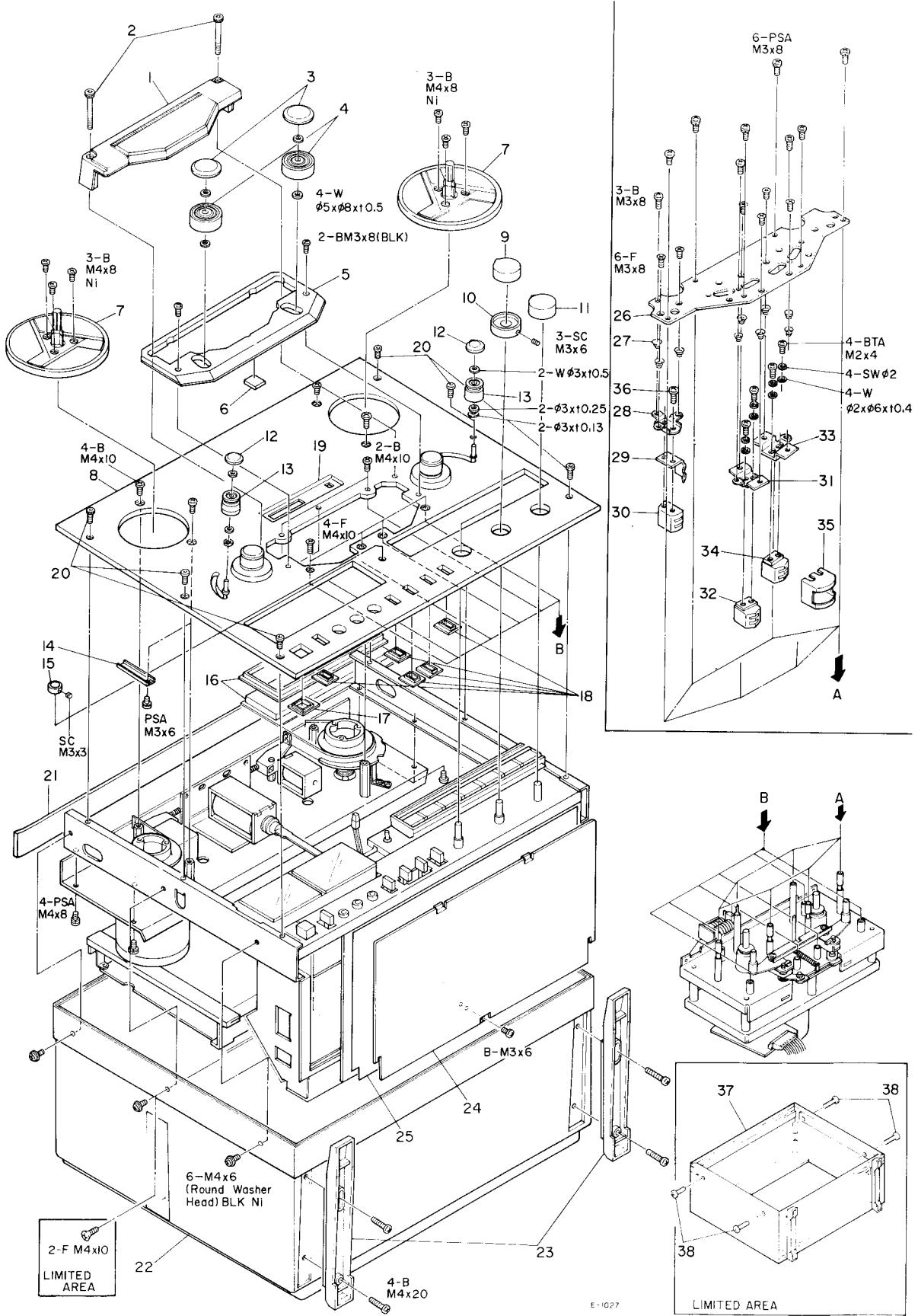
Parts marked with \*require longer delivery time than regular parts.

| REF. NO. | PARTS NO.   | DESCRIPTION                    | REMARKS      |
|----------|-------------|--------------------------------|--------------|
| 1 - 1    | 5533212000  | Head Housing                   |              |
| 1 - 2    | 5581065000  | Screw, Cap; A                  |              |
| 1 - 3    | 5545014000  | Cap, Pinch Roller              |              |
| 1 - 4    | 5534691100  | Pinch Roller                   |              |
| 1 - 5    | 5532061000  | Cover, Head Base Plate         |              |
| 1 - 6    | *5800002700 | Cushion, Head Base Plate       |              |
| 1 - 7    | 5504744000  | Reel Table Assy                |              |
| 1 - 8    | *5552407000 | Panel, Top; A                  |              |
| 1 - 9    | 5534704000  | Knob, VR; B                    |              |
| 1 - 10   | 5533188000  | Knob, VR; A                    |              |
| 1 - 11   | 5545009000  | Cap, Tension Roller            |              |
| 1 - 12   | 5504718100  | Roller, Tension Assy           |              |
| 1 - 13   | *5555698000 | Plate, Escutcheon Pressure     |              |
| 1 - 14   | 5534722000  | Knob, VR; D                    |              |
| 1 - 15   | *5504748000 | Cover Assy, VU Meter           |              |
| 1 - 16   | *5534707000 | Escutcheon, Power Switch       |              |
| 1 - 17   | *5534706000 | Escutcheon, Botton             |              |
| 1 - 18   | *5534709100 | Escutcheon, Counter; R         |              |
| 1 - 19   | 5581067000  | Screw, Cap; B                  |              |
| 1 - 20   | *5555887000 | Cushion, Case                  |              |
| 1 - 21   | *5531025000 | Case; S                        |              |
| 1 - 22   | 5533190000  | Foot                           |              |
| 1 - 23   | *5553306000 | Plate, Ampl. Sheild            |              |
| 1 - 24   | *5553308001 | Paper, Ampl. Insulating        |              |
| 1 - 25   | *5553289100 | Plate, Head Base               |              |
| 1 - 26   | *5520182000 | Spring, D                      |              |
| 1 - 27   | *5581071000 | Pan Head Taptite Screw, M2 x 4 |              |
| 1 - 28   | *5555674100 | Bracket, Erase Head            |              |
| 1 - 29   | *5555669100 | Guide, Tape; F                 |              |
| 1 - 30   | *5555673000 | Bracket, Head; R               |              |
| 1 - 31   | *5555670100 | Guide, Tape; R                 |              |
| 1 - 32   | 5569209000  | Head, Erase; 4T2ch             |              |
| 1 - 33   | 5569203000  | Head, Playback; 4T2ch          |              |
| 1 - 34   | *5555672000 | Bracket, Head; L               |              |
| 1 - 35   | 5569202000  | Head, Record; 4T2ch            |              |
| 1 - 36   | *5013389100 | Head Shield, A                 |              |
| 1 - 37   | *5022050000 | Spring, B                      |              |
| 1 - 38   | *5502278000 | Case Assy, Wooden              | LIMITED AREA |
| 1 - 39   | *5504499000 | Screw Assy, Case               | LIMITED AREA |

### INCLUDED ACCESSORIES

| REF. NO. | PARTS NO.  | DESCRIPTION                | REMARKS                  |
|----------|------------|----------------------------|--------------------------|
|          | 5128093000 | Cord, In-output Connection |                          |
|          | 5085008300 | Empty Reel, 7 inch         |                          |
|          | 5062962000 | Splicing Tape              | X-7R                     |
|          | 5027288000 | Sensing Foil               | U.S.A.                   |
|          | 5101337100 | Open Reel Supplement       | All except JAPAN, U.S.A. |
|          | 5101708000 | Open Reel Supplement       |                          |
|          | 5101676000 | X-7R Owner's Manual        | JAPAN                    |
|          | 5101673000 | X-7 Owner's Manual         | JAPAN                    |
|          | 5101671000 | X-7R/10R Owner's Manual    | U.S.A.                   |
|          | 5101668000 | X-7/10 Owner's Manual      | U.S.A.                   |
|          | 5101672000 | X-7R/10R Owner's Manual    | All except JAPAN, U.S.A. |
|          | 5101669000 | X-7/10 Owner's Manual      | All except JAPAN, U.S.A. |

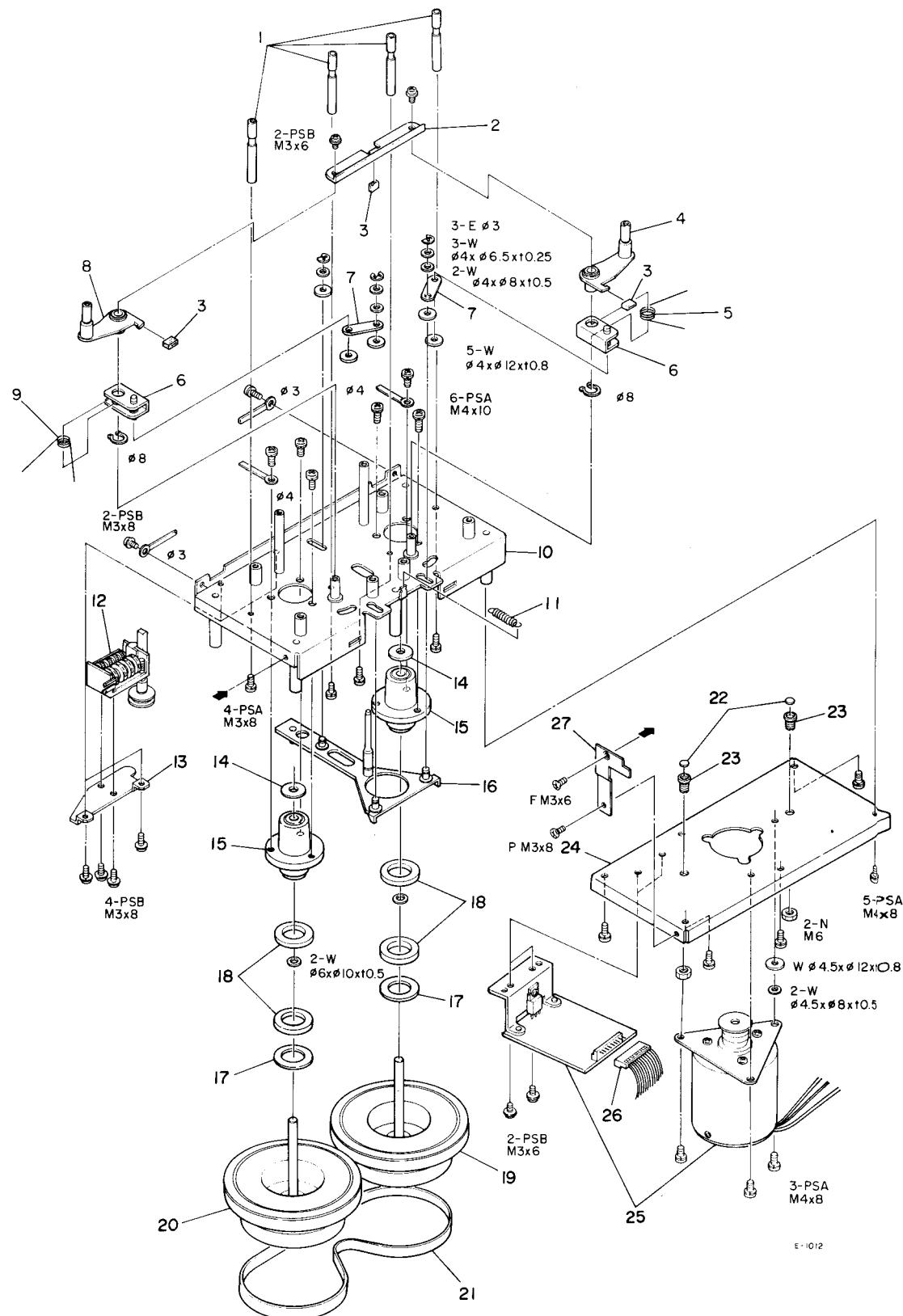
## EXPLODED VIEW - 2 (X-7)



E-1027

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

| REF. NO. | PARTS NO.   | DESCRIPTION                    | REMARKS      |
|----------|-------------|--------------------------------|--------------|
| 2 - 1    | 5533209000  | Head Housing                   |              |
| 2 - 2    | 5581065000  | Screw, Cap; A                  |              |
| 2 - 3    | 5545014000  | Cap, Pinch Roller              |              |
| 2 - 4    | 5534691100  | Pinch Roller                   |              |
| 2 - 5    | 5532061000  | Cover, Head Base Plate         |              |
| 2 - 6    | *5800002700 | Cushion, Head Base Plate       |              |
| 2 - 7    | 5504744000  | Reel Table Assy                |              |
| 2 - 8    | *5552406000 | Screw, Top Panel; B            |              |
| 2 - 9    | 5534704000  | Knob, VR; B                    |              |
| 2 - 10   | 5533188000  | Knob, VR; A                    |              |
| 2 - 11   | 5533230000  | Knob, VR; E                    |              |
| 2 - 12   | 5545009000  | Cap, Tension Roller            |              |
| 2 - 13   | 5504718100  | Roller, Tension Assy           |              |
| 2 - 14   | *5555698000 | Plate, Escutcheon Pressure     |              |
| 2 - 15   | 5534705000  | Knob, VR; C                    |              |
| 2 - 16   | *5504748000 | Cover Assy, VU Meter           |              |
| 2 - 17   | *5534707000 | Escutcheon, Power Switch       |              |
| 2 - 18   | *5534706000 | Escutcheon, Bottom             |              |
| 2 - 19   | *5534721001 | Escutcheon, Counter; P7        |              |
| 2 - 20   | 5581067000  | Screw, Cap; B                  |              |
| 2 - 21   | *5555887000 | Cushion, Case                  |              |
| 2 - 22   | *5531025000 | Case, S                        |              |
| 2 - 23   | 5533190000  | Foot                           |              |
| 2 - 24   | *5553306000 | Plate, Ampl. Shield            |              |
| 2 - 25   | *5553308001 | Paper, Ampl. Insulating        |              |
| 2 - 26   | *5553289100 | Plate, Head Base               |              |
| 2 - 27   | *5520182000 | Spring, D                      |              |
| 2 - 28   | *5555674100 | Bracket, Erase Head            |              |
| 2 - 29   | *5555669100 | Guide, Tape; F                 |              |
| 2 - 30   | 5569209000  | Head, Erase; 4T2ch             |              |
| 2 - 31   | *5555672000 | Bracket, Head; L               |              |
| 2 - 32   | 5569202000  | Head, Record; 4T2ch            |              |
| 2 - 33   | *5555673000 | Bracket, Head; R               |              |
| 2 - 34   | 5569203000  | Head, Playback; 4T2ch          |              |
| 2 - 35   | *5013389100 | Head Shield, A                 |              |
| 2 - 36   | *5581071000 | Pan Head Taptite Screw, M2 x 4 |              |
| 2 - 37   | *5502278000 | Case Assy, Wooden              | LIMITED AREA |
| 2 - 38   | *5504499000 | Screw Assy, Case               | LIMITED AREA |

**EXPLODED VIEW - 3**

E-1012

1

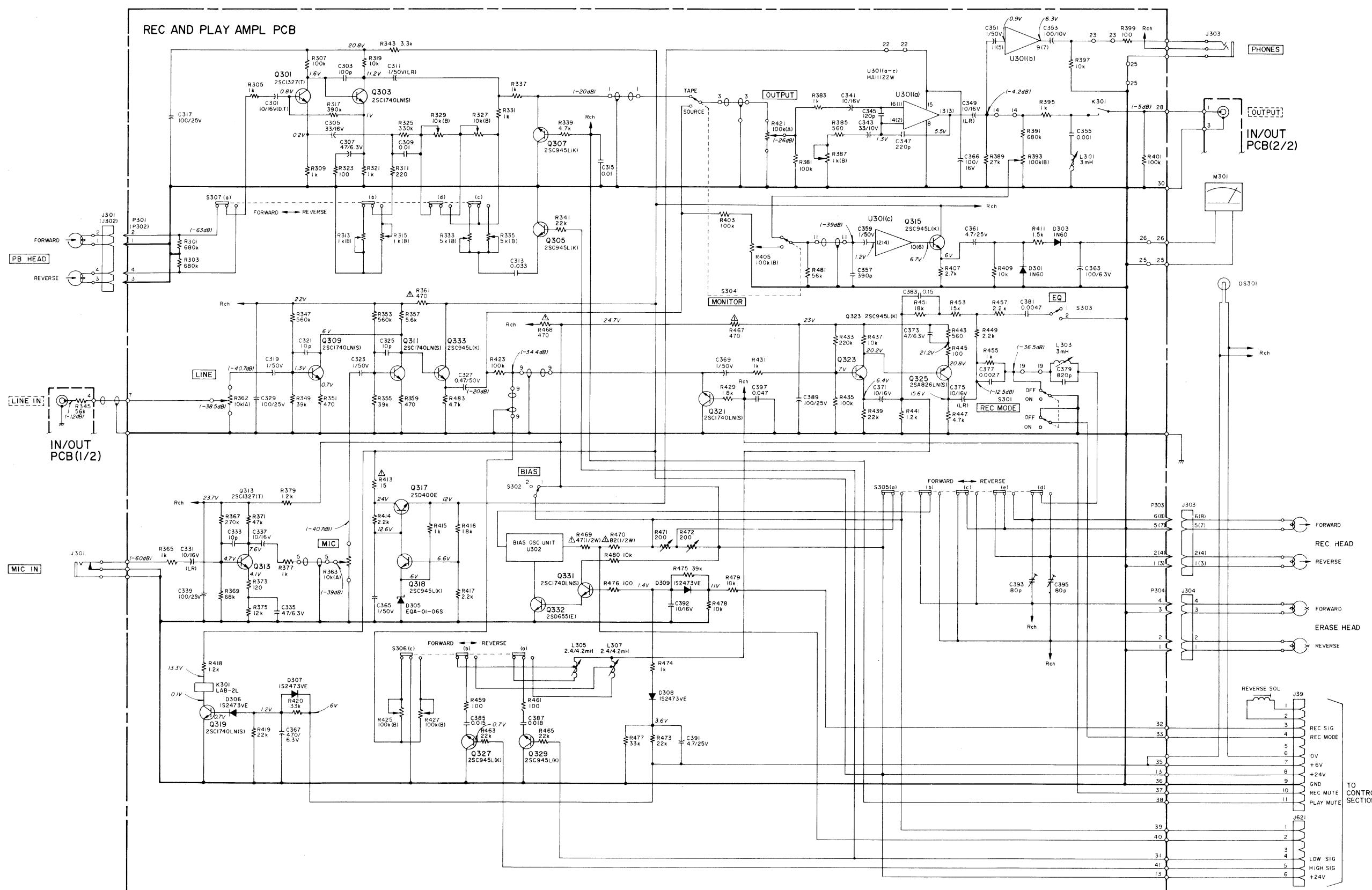
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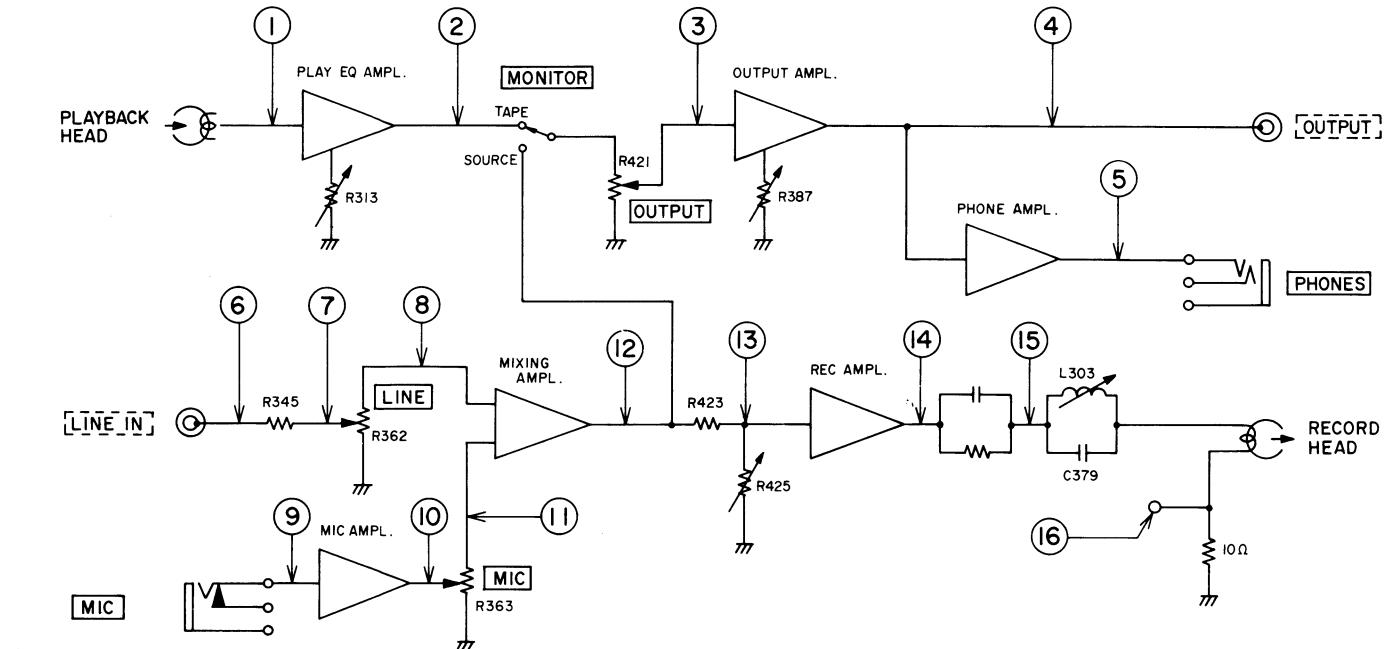
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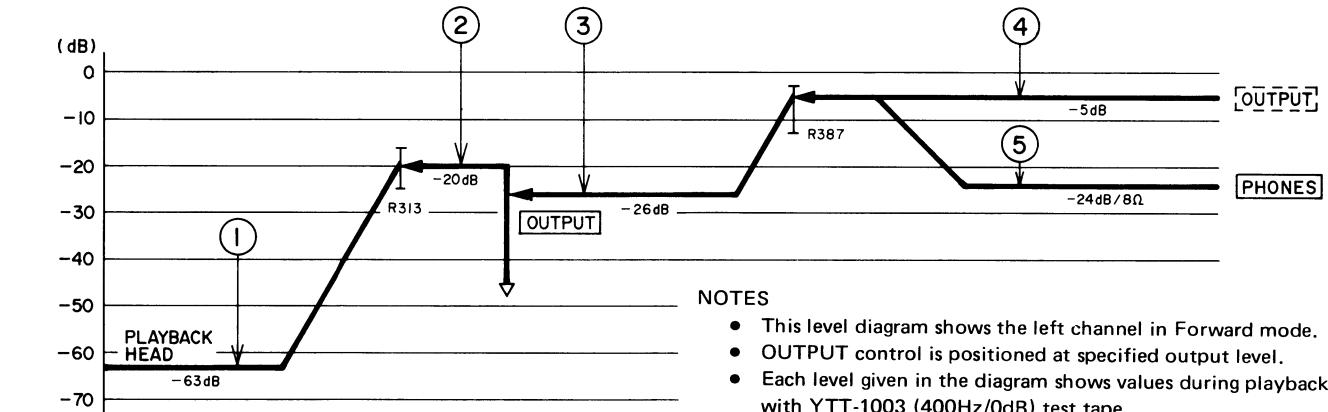
## NOTES

1. ALL RESISTORS ARE IN SERIES. THE RESISTOR VALUES ARE STATED ON THE SCHEMATIC.
  2. ALL CAPACITOR VALUES ARE STATED ON THE SCHEMATIC.
  3. SCHEMATIC DIAGRAMS SHOW SOME OF THE COMMON CIRCUIT SYMBOLS.
  4. DC VOLTAGES WERE NOT STATED UNLESS OTHERWISE INDICATED.
  5. △ PARTS MARKED WITH THIS SYMBOL ARE NOT COMPONENTS. THEY MUST BE EXACT REPLACEMENTS.

## LEVEL DIAGRAM

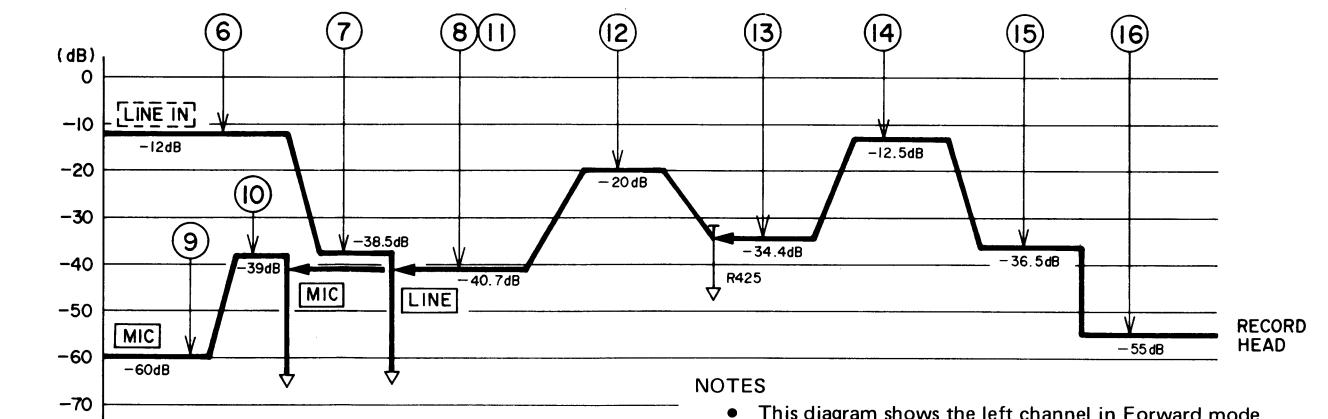


## PLAYBACK SYSTEM



- This level diagram shows the left channel in Forward mode.
- OUTPUT control is positioned at specified output level.
- Each level given in the diagram shows values during playback with YTT-1003 (400Hz/0dB) test tape.
- 0dB = 0.775V

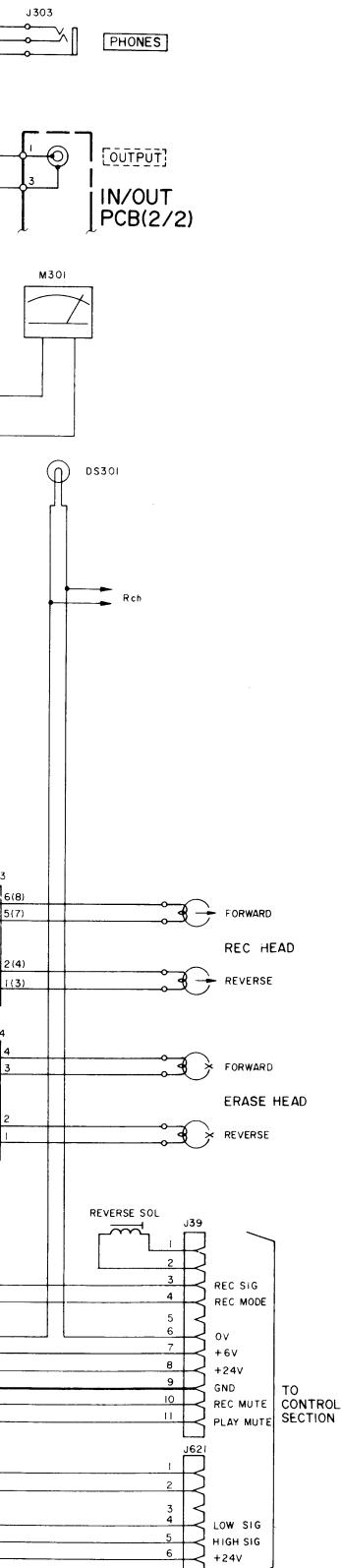
## RECORDING SYSTEM

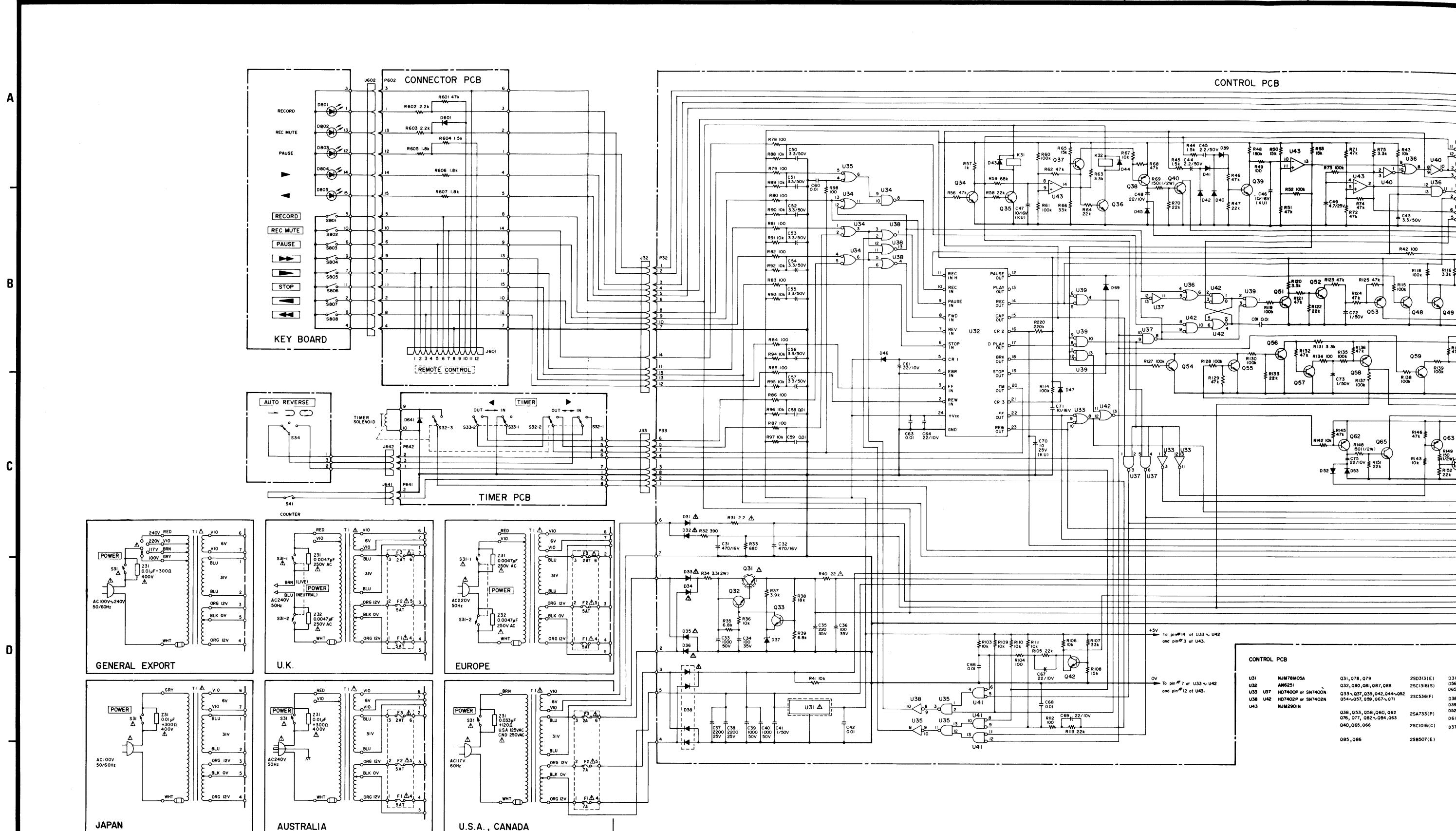


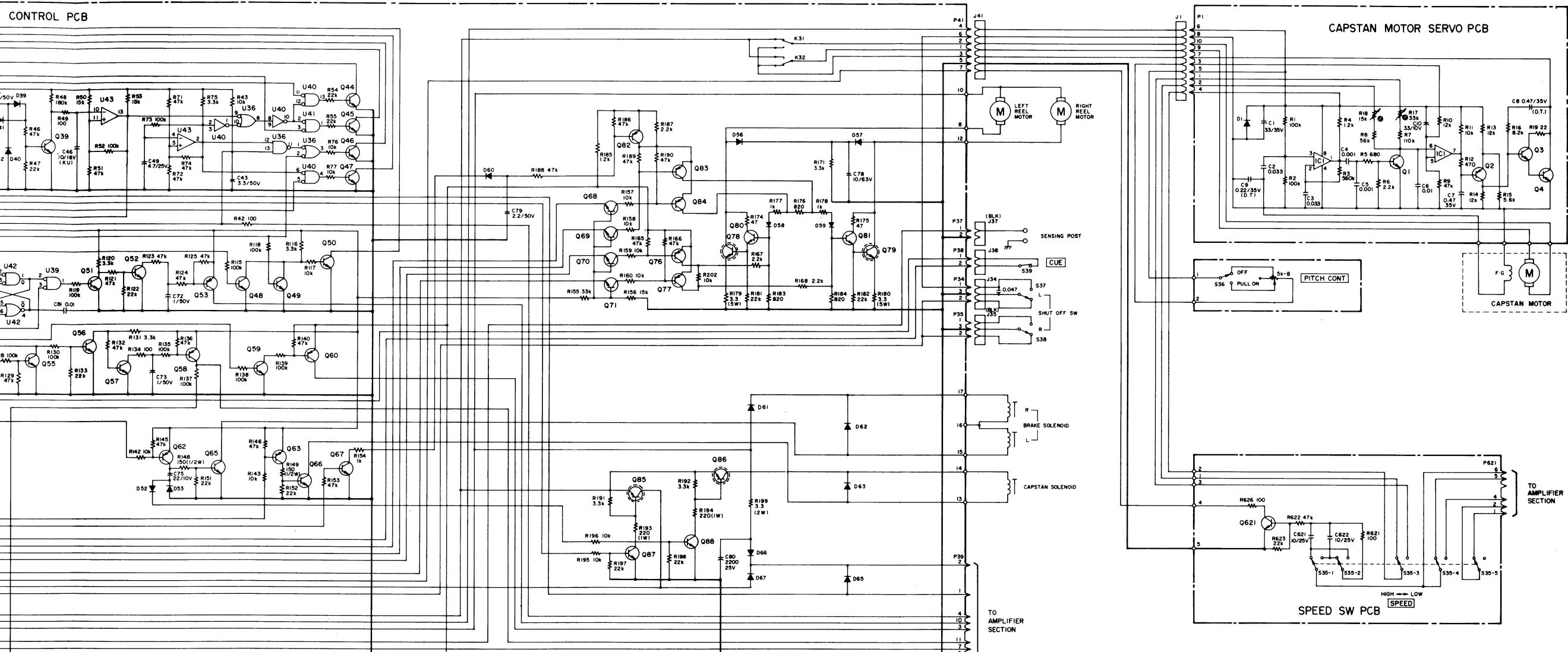
- This diagram shows the left channel in Forward mode.
- Each level given in the diagram shows values when a 400Hz specified input level is applied.
- MIC and LINE control is positioned at specified input level.
- OUTPUT control is positioned at specified output level.
- 0dB = 0.775V

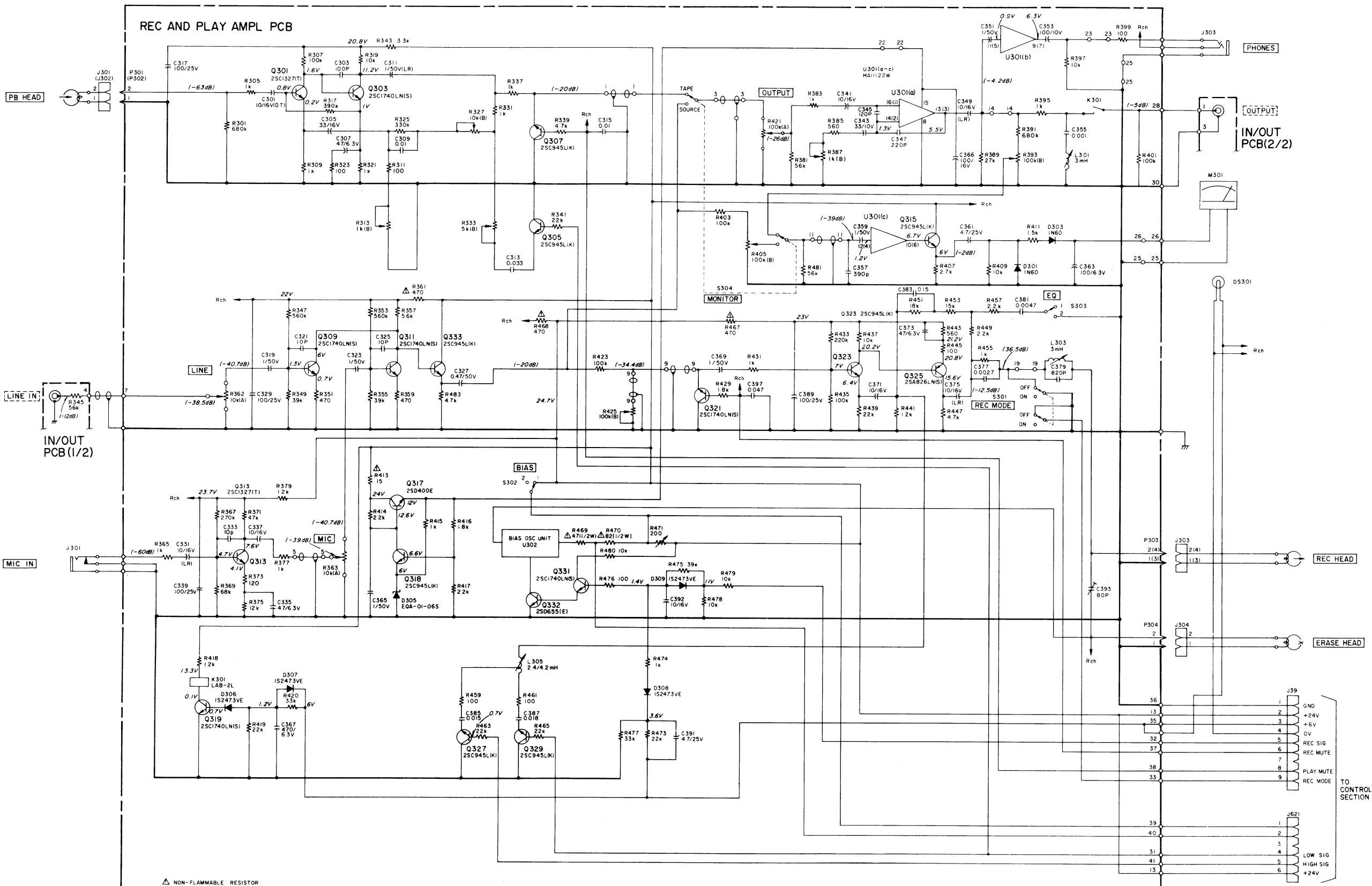
## NOTES

1. ALL RESISTORS ARE  $\frac{1}{4}$  WATT, 5%, UNLESS MARKED OTHERWISE. RESISTOR VALUES ARE IN OHMS ( $k = 1,000$  OHMS,  $M = 1,000,000$  OHMS).
2. ALL CAPACITOR VALUES ARE IN MICROFARADS ( $p =$  PICOFARADS).
3. SCHEMATIC DIAGRAM SHOWN FOR LEFT CHANNEL EXCEPT FOR SOME OF THE COMPONENTS.
4. DC VOLTAGES WERE MEASURED DURING RECORD PAUSE MODE UNLESS OTHERWISE NOTED.
5. ▲ PARTS MARKED WITH THIS SIGN ARE SAFETY CRITICAL COMPONENTS. THEY MUST ALWAYS BE REPLACED WITH IDENTICAL COMPONENTS - REFER TO THE TEAC PARTS LIST AND ENSURE EXACT REPLACEMENT.

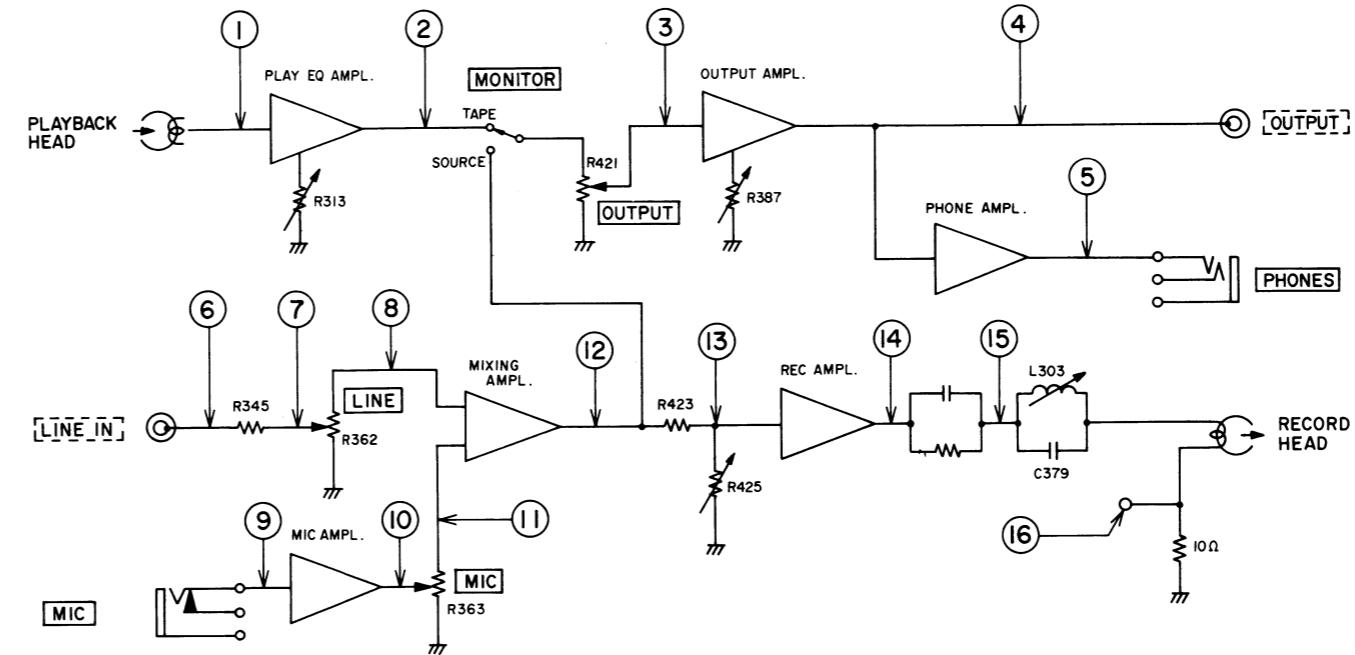




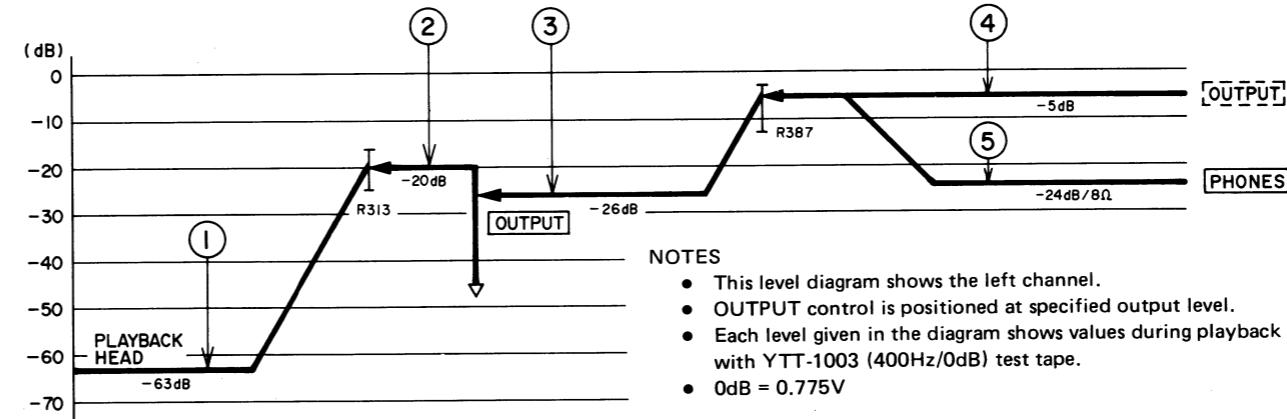




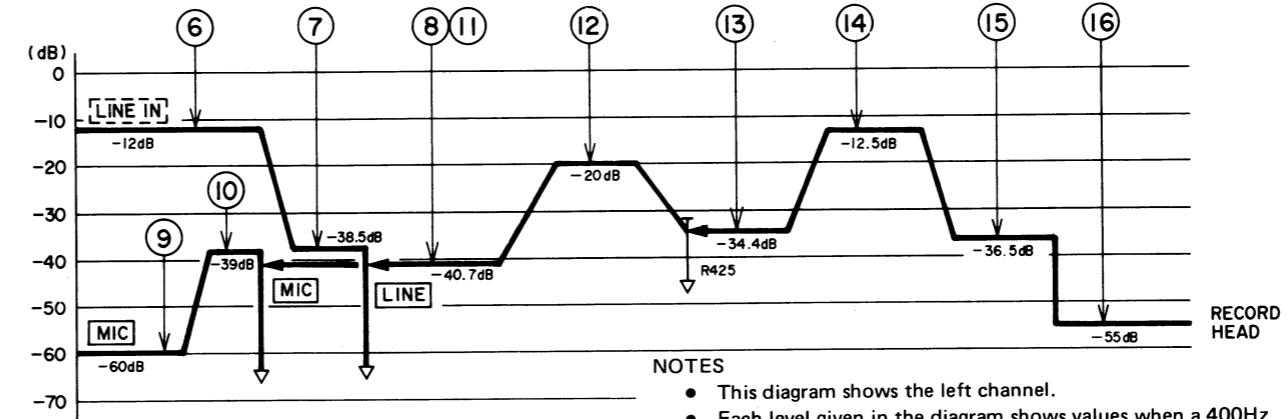
## LEVEL DIAGRAM



## PLAYBACK SYSTEM

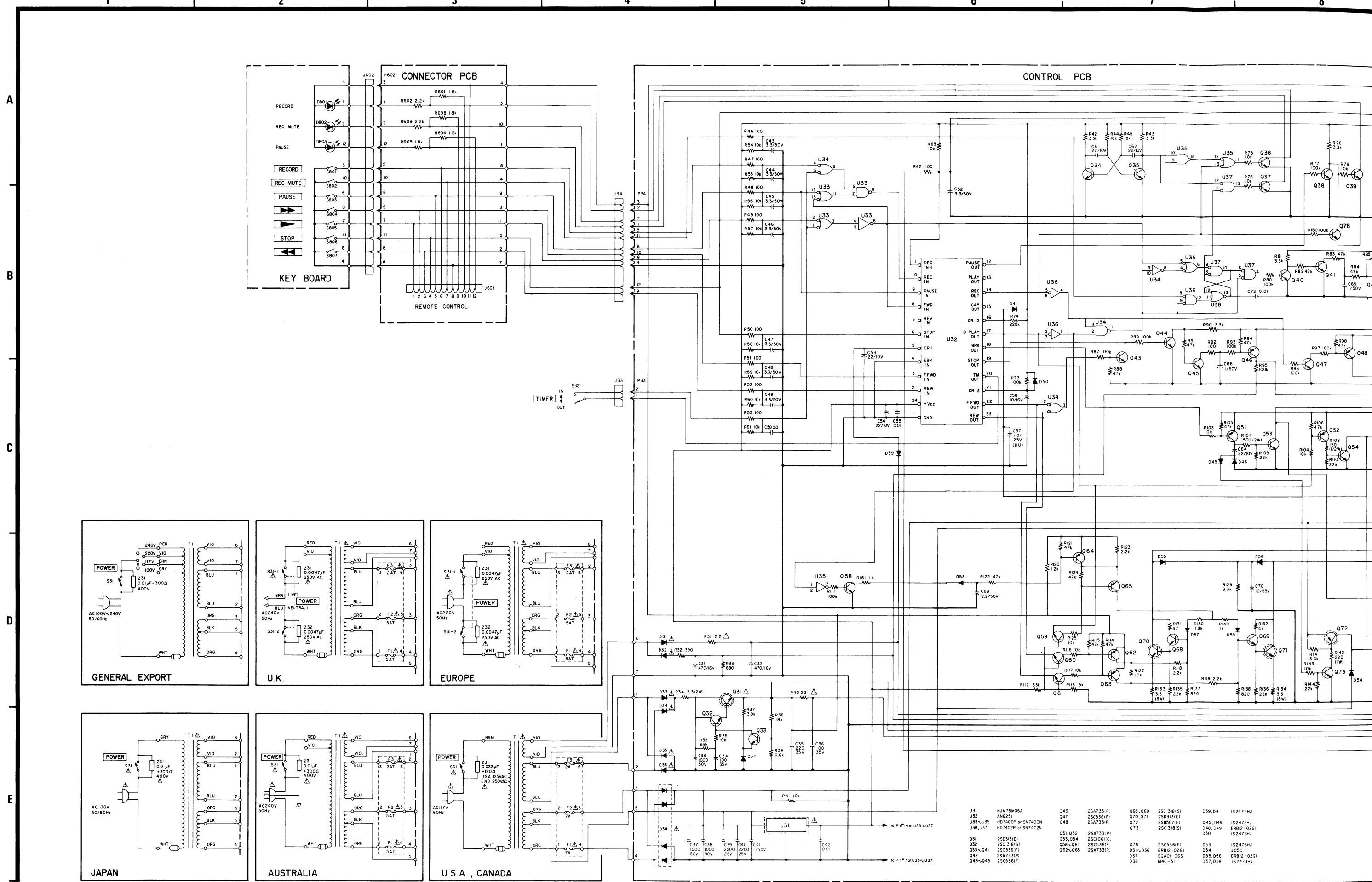


## RECORDING SYSTEM

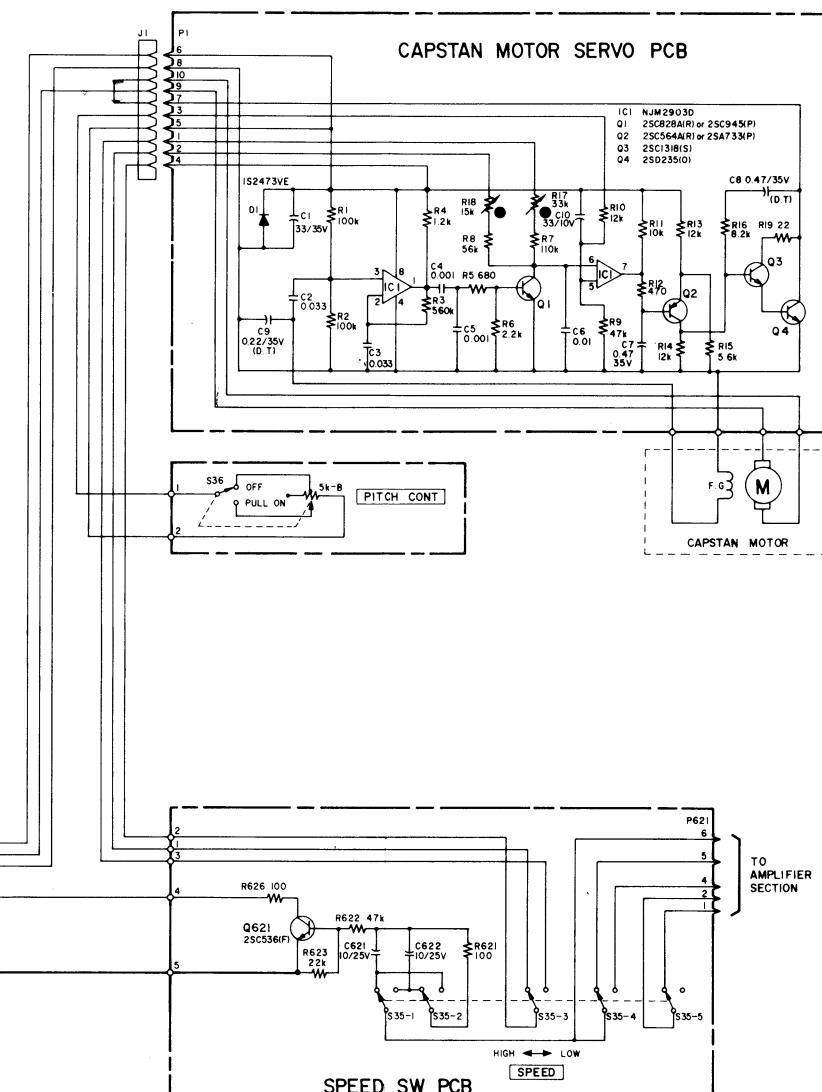
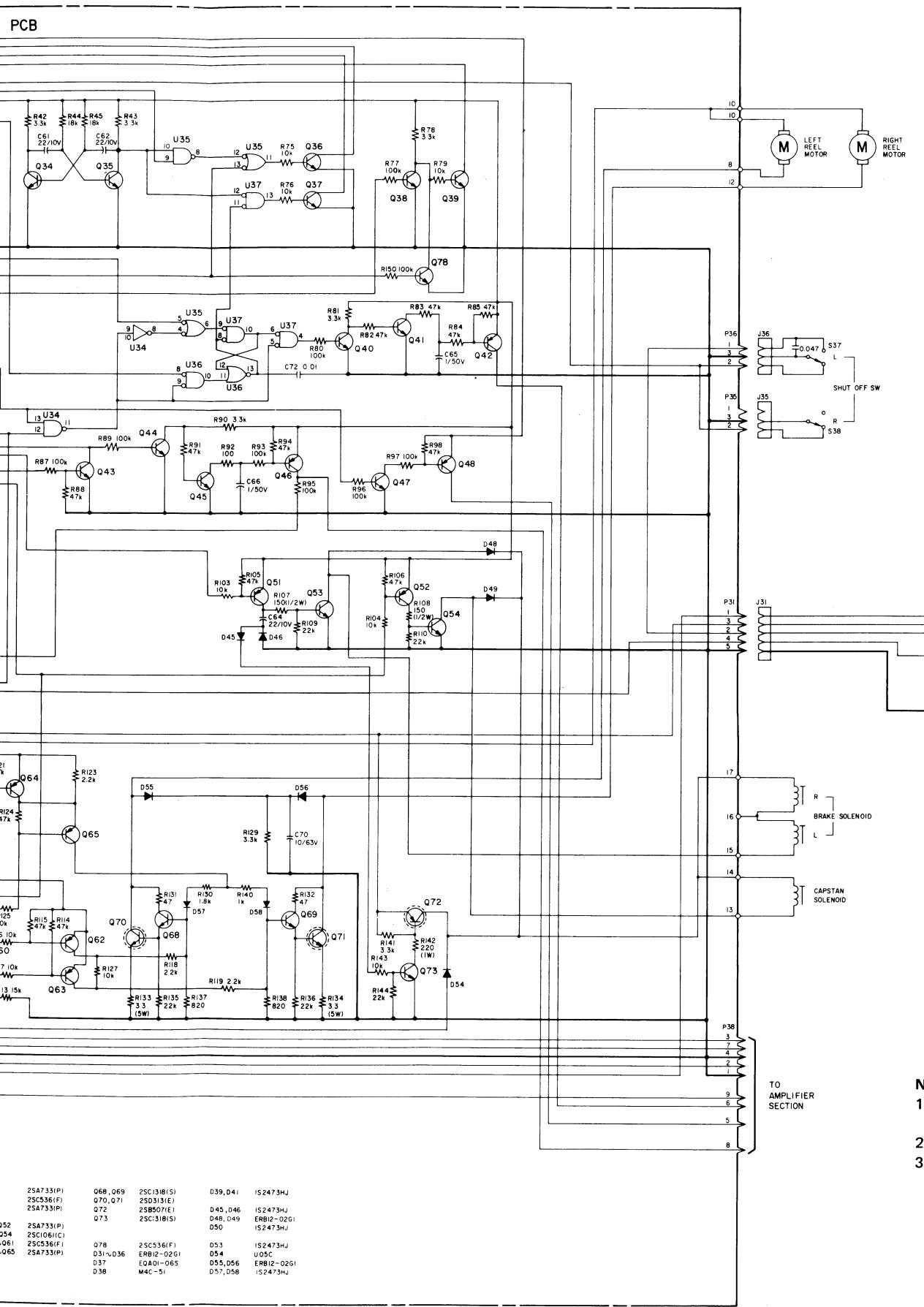


## NOTES

1. ALL RESISTORS ARE  $\frac{1}{4}$  WATT, 5%, UNLESS MARKED OTHERWISE.  
RESISTOR VALUES ARE IN OHMS ( $k = 1,000$  OHMS,  $M = 1,000,000$  OHMS).
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3. SCHEMATIC DIAGRAM SHOWN FOR LEFT CHANNEL EXCEPT FOR SOME OF THE COMPONENTS.
4. DC VOLTAGES WERE MEASURED DURING RECORD PAUSE MODE UNLESS OTHERWISE NOTED.
5. △PARTS MARKED WITH THIS SIGN ARE SAFETY CRITICAL COMPONENTS. THEY MUST ALWAYS BE REPLACED WITH IDENTICAL COMPONENTS - REFER TO THE TEAC PARTS LIST AND ENSURE EXACT REPLACEMENT.



PCB



## NOTES

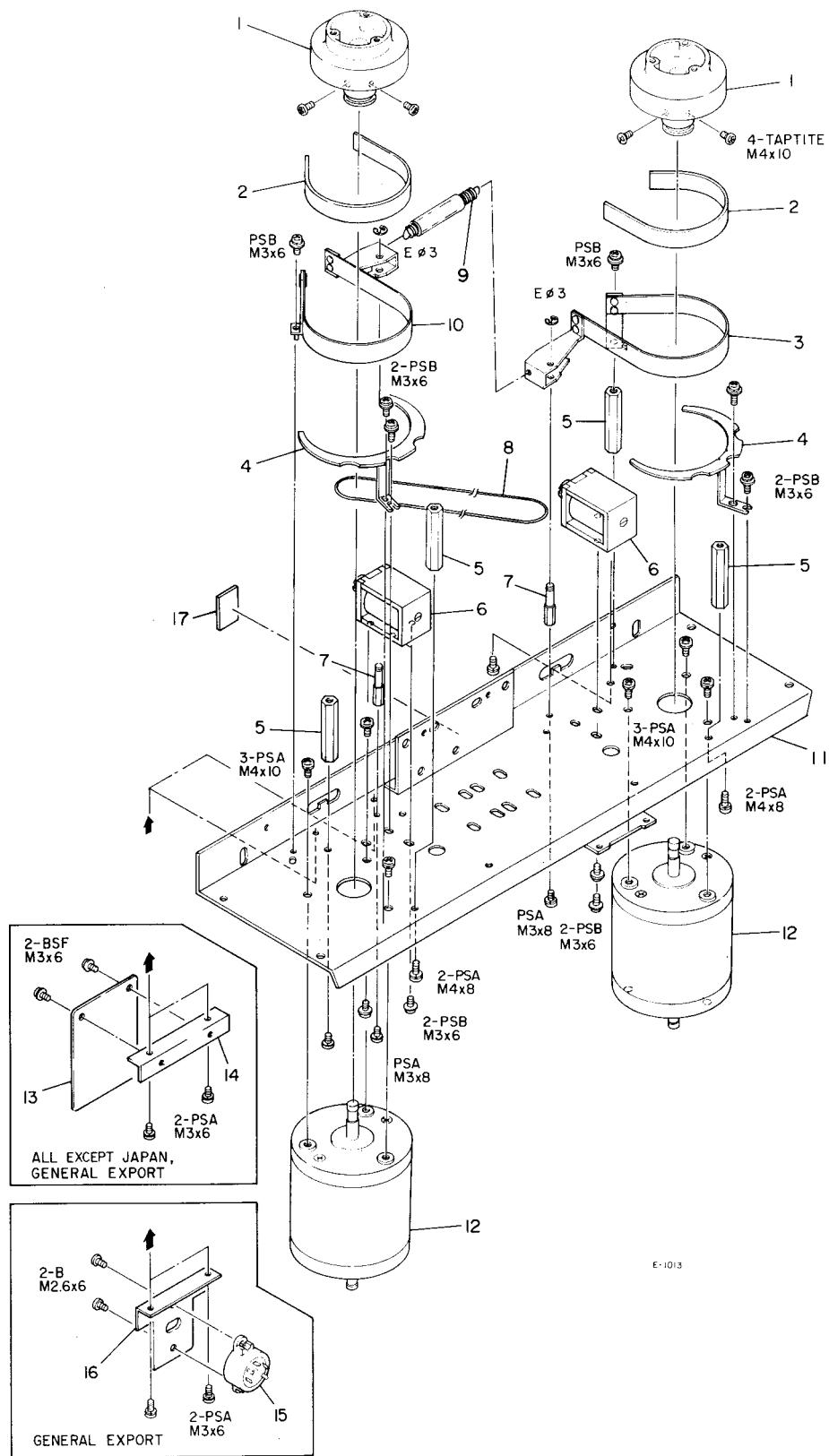
- ALL RESISTORS ARE  $\frac{1}{4}$  WATT, 5%, UNLESS MARKED OTHERWISE. RESISTOR VALUES ARE IN OHMS ( $k = 1,000$  OHMS,  $M = 1,000,000$  OHMS).
- ALL CAPACITOR VALUES ARE IN MICROFARADS ( $p =$  PICOFARADS).
- $\Delta$ PARTS MARKED WITH THIS SIGN ARE SAFETY CRITICAL COMPONENTS. THEY MUST ALWAYS BE REPLACED WITH IDENTICAL COMPONENTS - REFER TO THE TEAC PARTS LIST AND ENSURE EXACT REPLACEMENT.

|           |          |            |          |           |
|-----------|----------|------------|----------|-----------|
| 2SA733(P) | 068, 069 | 2SC1310(S) | D39, D41 | IS2473HJ  |
| 2SC536(F) | 070, 071 | 2SD313(E)  |          |           |
| 2SA733(P) | 072      | 2SB507(E)  | D45, D46 | IS2473HJ  |
|           | 073      | 2SC310(S)  | D48, D49 | ERB12-02G |
|           |          |            | D50      | IS2473HJ  |
| 2SA733(P) | 078      | 2SC536(F)  | D53      | IS2473HJ  |
| 2SC536(F) | 079      | 2SC536(F)  | D54      | U05C      |
| 2SC536(F) | 081      | ERB12-02G  | D55, D56 | ERB12-02G |
| 2SC536(F) | 085      | ERB12-02G  | D57, D58 | IS2473HJ  |
| 2SC536(F) | 086      | ERB12-02G  | D59      |           |
| 2SC536(F) | 088      | ERB12-02G  | D60      |           |
| 2SC536(F) | 089      | ERB12-02G  | D61      |           |
| 2SC536(F) | 090      | ERB12-02G  | D62      |           |
| 2SC536(F) | 091      | ERB12-02G  | D63      |           |
| 2SC536(F) | 092      | ERB12-02G  | D64      |           |
| 2SC536(F) | 093      | ERB12-02G  | D65      |           |
| 2SC536(F) | 094      | ERB12-02G  | D66      |           |
| 2SC536(F) | 095      | ERB12-02G  | D67      |           |
| 2SC536(F) | 096      | ERB12-02G  | D68      |           |
| 2SC536(F) | 097      | ERB12-02G  | D69      |           |
| 2SC536(F) | 098      | ERB12-02G  | D70      |           |
| 2SC536(F) | 099      | ERB12-02G  | D71      |           |
| 2SC536(F) | 100      | ERB12-02G  | D72      |           |
| 2SC536(F) | 101      | ERB12-02G  | D73      |           |
| 2SC536(F) | 102      | ERB12-02G  | D74      |           |
| 2SC536(F) | 103      | ERB12-02G  | D75      |           |
| 2SC536(F) | 104      | ERB12-02G  | D76      |           |
| 2SC536(F) | 105      | ERB12-02G  | D77      |           |
| 2SC536(F) | 106      | ERB12-02G  | D78      |           |
| 2SC536(F) | 107      | ERB12-02G  | D79      |           |
| 2SC536(F) | 108      | ERB12-02G  | D80      |           |
| 2SC536(F) | 109      | ERB12-02G  | D81      |           |
| 2SC536(F) | 110      | ERB12-02G  | D82      |           |
| 2SC536(F) | 111      | ERB12-02G  | D83      |           |
| 2SC536(F) | 112      | ERB12-02G  | D84      |           |
| 2SC536(F) | 113      | ERB12-02G  | D85      |           |
| 2SC536(F) | 114      | ERB12-02G  | D86      |           |
| 2SC536(F) | 115      | ERB12-02G  | D87      |           |
| 2SC536(F) | 116      | ERB12-02G  | D88      |           |
| 2SC536(F) | 117      | ERB12-02G  | D89      |           |
| 2SC536(F) | 118      | ERB12-02G  | D90      |           |
| 2SC536(F) | 119      | ERB12-02G  | D91      |           |
| 2SC536(F) | 120      | ERB12-02G  | D92      |           |
| 2SC536(F) | 121      | ERB12-02G  | D93      |           |
| 2SC536(F) | 122      | ERB12-02G  | D94      |           |
| 2SC536(F) | 123      | ERB12-02G  | D95      |           |
| 2SC536(F) | 124      | ERB12-02G  | D96      |           |
| 2SC536(F) | 125      | ERB12-02G  | D97      |           |
| 2SC536(F) | 126      | ERB12-02G  | D98      |           |
| 2SC536(F) | 127      | ERB12-02G  | D99      |           |
| 2SC536(F) | 128      | ERB12-02G  | D100     |           |
| 2SC536(F) | 129      | ERB12-02G  | D101     |           |
| 2SC536(F) | 130      | ERB12-02G  | D102     |           |
| 2SC536(F) | 131      | ERB12-02G  | D103     |           |
| 2SC536(F) | 132      | ERB12-02G  | D104     |           |
| 2SC536(F) | 133      | ERB12-02G  | D105     |           |
| 2SC536(F) | 134      | ERB12-02G  | D106     |           |
| 2SC536(F) | 135      | ERB12-02G  | D107     |           |
| 2SC536(F) | 136      | ERB12-02G  | D108     |           |
| 2SC536(F) | 137      | ERB12-02G  | D109     |           |
| 2SC536(F) | 138      | ERB12-02G  | D110     |           |
| 2SC536(F) | 139      | ERB12-02G  | D111     |           |
| 2SC536(F) | 140      | ERB12-02G  | D112     |           |
| 2SC536(F) | 141      | ERB12-02G  | D113     |           |
| 2SC536(F) | 142      | ERB12-02G  | D114     |           |
| 2SC536(F) | 143      | ERB12-02G  | D115     |           |
| 2SC536(F) | 144      | ERB12-02G  | D116     |           |
| 2SC536(F) | 145      | ERB12-02G  | D117     |           |
| 2SC536(F) | 146      | ERB12-02G  | D118     |           |
| 2SC536(F) | 147      | ERB12-02G  | D119     |           |
| 2SC536(F) | 148      | ERB12-02G  | D120     |           |
| 2SC536(F) | 149      | ERB12-02G  | D121     |           |
| 2SC536(F) | 150      | ERB12-02G  | D122     |           |
| 2SC536(F) | 151      | ERB12-02G  | D123     |           |
| 2SC536(F) | 152      | ERB12-02G  | D124     |           |
| 2SC536(F) | 153      | ERB12-02G  | D125     |           |
| 2SC536(F) | 154      | ERB12-02G  | D126     |           |
| 2SC536(F) | 155      | ERB12-02G  | D127     |           |
| 2SC536(F) | 156      | ERB12-02G  | D128     |           |
| 2SC536(F) | 157      | ERB12-02G  | D129     |           |
| 2SC536(F) | 158      | ERB12-02G  | D130     |           |
| 2SC536(F) | 159      | ERB12-02G  | D131     |           |
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| 2SC536(F) | 168      | ERB12-02G  | D140     |           |
| 2SC536(F) | 169      | ERB12-02G  | D141     |           |
| 2SC536(F) | 170      | ERB12-02G  | D142     |           |
| 2SC536(F) | 171      | ERB12-02G  | D143     |           |
| 2SC536(F) | 172      | ERB12-02G  | D144     |           |
| 2SC536(F) | 173      | ERB12-02G  | D145     |           |
| 2SC536(F) | 174      | ERB12-02G  | D146     |           |
| 2SC536(F) | 175      | ERB12-02G  | D147     |           |
| 2SC536(F) | 176      | ERB12-02G  | D148     |           |
| 2SC536(F) | 177      | ERB12-02G  | D149     |           |
| 2SC536(F) | 178      | ERB12-02G  | D150     |           |
| 2SC536(F) | 179      | ERB12-02G  | D151     |           |
| 2SC536(F) | 180      | ERB12-02G  | D152     |           |
| 2SC536(F) | 181      | ERB12-02G  | D153     |           |
| 2SC536(F) | 182      | ERB12-02G  | D154     |           |
| 2SC536(F) | 183      | ERB12-02G  | D155     |           |
| 2SC536(F) | 184      | ERB12-02G  | D156     |           |
| 2SC536(F) | 185      | ERB12-02G  | D157     |           |
| 2SC536(F) | 186      | ERB12-02G  | D158     |           |
| 2SC536(F) | 187      | ERB12-02G  | D159     |           |
| 2SC536(F) | 188      | ERB12-02G  | D160     |           |
| 2SC536(F) | 189      | ERB12-02G  | D161     |           |
| 2SC536(F) | 190      | ERB12-02G  | D162     |           |
| 2SC536(F) | 191      | ERB12-02G  | D163     |           |
| 2SC536(F) | 192      | ERB12-02G  | D164     |           |
| 2SC536(F) | 193      | ERB12-02G  | D165     |           |
| 2SC536(F) | 194      | ERB12-02G  | D166     |           |
| 2SC536(F) | 195      | ERB12-02G  | D167     |           |
| 2SC536(F) | 196      | ERB12-02G  | D168     |           |
| 2SC536(F) | 197      | ERB12-02G  | D169     |           |
| 2SC536(F) | 198      | ERB12-02G  | D170     |           |
| 2SC536(F) | 199      | ERB12-02G  | D171     |           |
| 2SC536(F) | 200      | ERB12-02G  | D172     |           |
| 2SC536(F) | 201      | ERB12-02G  | D173     |           |
| 2SC536(F) | 202      | ERB12-02G  | D174     |           |
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| 2SC536(F) | 208      | ERB12-02G  | D180     |           |
| 2SC536(F) | 209      | ERB12-02G  | D181     |           |
| 2SC536(F) | 210      | ERB12-02G  | D182     |           |
| 2SC536(F) | 211      | ERB12-02G  | D183     |           |
| 2SC536(F) | 212      | ERB12-02G  | D184     |           |
| 2SC536(F) | 213      | ERB12-02G  | D185     |           |
| 2SC536(F) | 214      | ERB12-02G  |          |           |

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

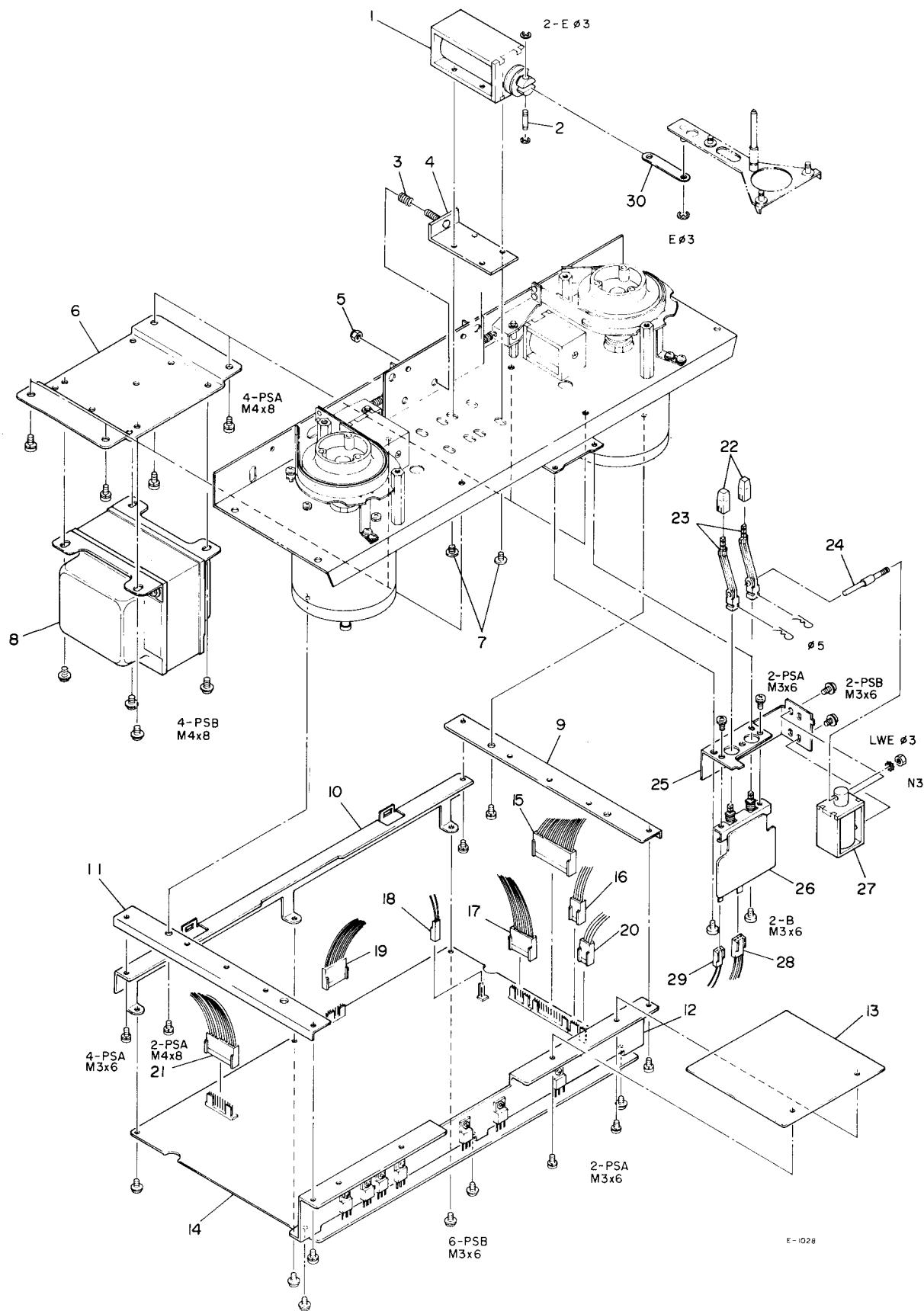
| REF. NO. | PARTS NO.   | DESCRIPTION                    | REMARKS |
|----------|-------------|--------------------------------|---------|
| 3 - 1    | *5545023000 | Pin, Tape Guide                |         |
| 3 - 2    | *5555666000 | Plate, Reinforcement           |         |
| 3 - 3    | *5534694000 | Cushion, Stopper               |         |
| 3 - 4    | *5504729000 | Arm Assy, Pinch Roller; R      |         |
| 3 - 5    | *5524216000 | Spring, Pinch Roller; R        |         |
| 3 - 6    | *5564731000 | Bracket Assy, Pinch Roller Arm |         |
| 3 - 7    | *5555667000 | Plate, Joint                   |         |
| 3 - 8    | *5504730000 | Arm Assy, Pinch Roller; L      |         |
| 3 - 9    | *5524217000 | Spring, Pinch Roller; L        |         |
| 3 - 10   | *5503196000 | Chassis, Capstan               |         |
| 3 - 11   | *5524219000 | Spring, Slide Plate            |         |
| 3 - 12   | 5504724000  | Counter Assy, Index; A         | X - 7R  |
|          | 5504725000  | Counter Assy, Index; B         | X - 7   |
| 3 - 13   | *5555665000 | Bracket, Counter Assy          |         |
| 3 - 14   | *5534695000 | Washer, Oil Retaining          |         |
| 3 - 15   | 5504726100  | Housing Assy, Capstan Flywheel |         |
| 3 - 16   | *5504733000 | Plate Assy, Slide              |         |
| 3 - 17   | *5555704000 | Tape, Adhesive                 |         |
| 3 - 18   | *5534715000 | Ring, Magnet; Thrust           |         |
| 3 - 19   | 5504727000  | Flywheel Assy, Capstan; R      |         |
| 3 - 20   | 5504728000  | Flywheel Assy, Capstan; L      |         |
| 3 - 21   | 5534692000  | Belt, Capstan Drive; 4T        |         |
| 3 - 22   | *5555703000 | Bearing                        |         |
| 3 - 23   | *5544003000 | Screw, Bearing                 |         |
| 3 - 24   | *5553290000 | Bracket, Motor Mounting        |         |
| 3 - 25   | 7105018000  | DC Motor Assy, Capstan         |         |
| 3 - 26   | *5122172000 | Connector Socket, 10P          |         |

**EXPLODED VIEW - 4**



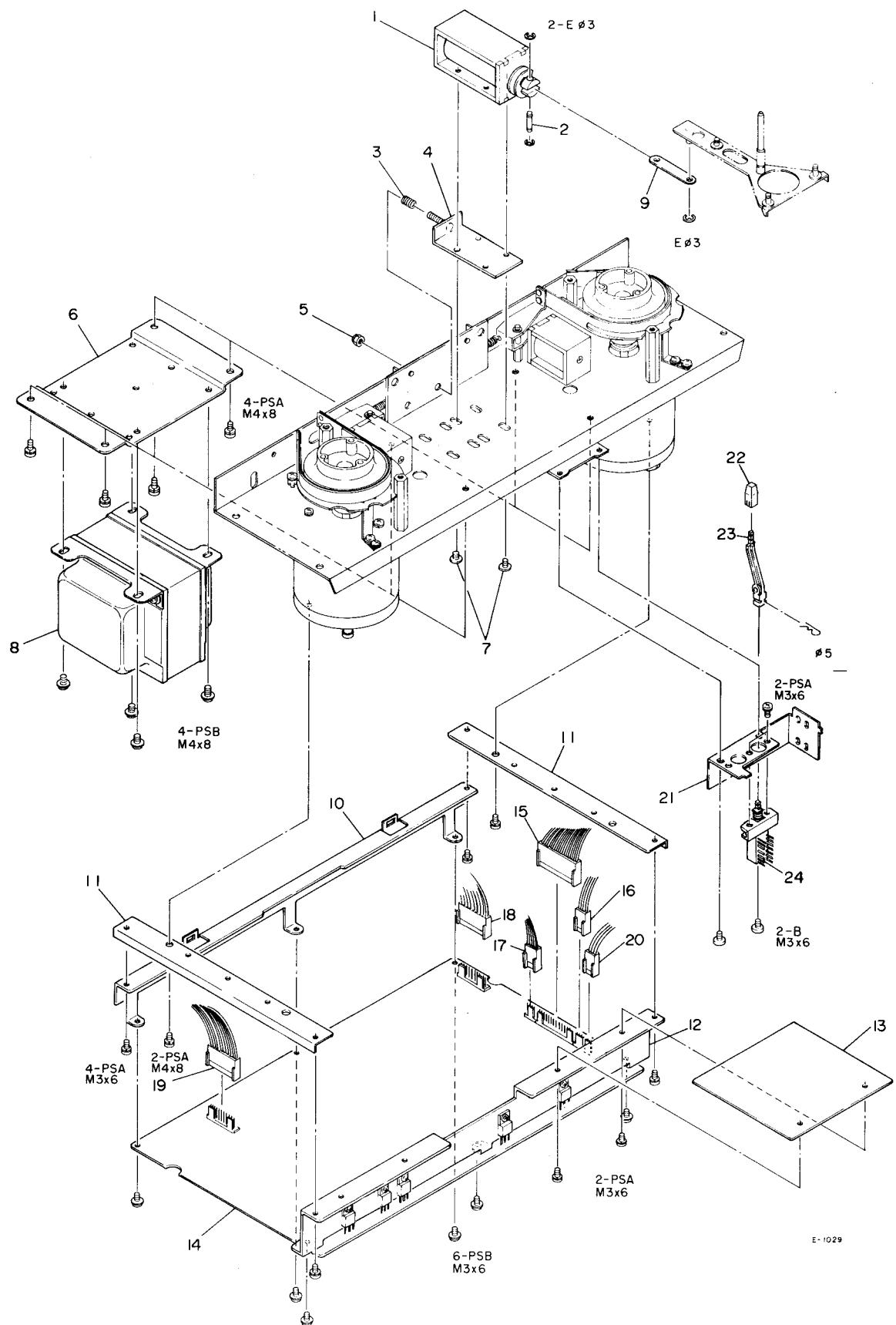
Parts marked with \*require longer delivery time than regular parts.

| REF. NO. | PARTS NO.   | DESCRIPTION                | REMARKS                 |
|----------|-------------|----------------------------|-------------------------|
| 4 - 1    | *5533189000 | Base Assy, Reel Table      |                         |
| 4 - 2    | 5555274000  | Shoe, Brake                |                         |
| 4 - 3    | 5504736000  | Band Assy, Brake; R        |                         |
| 4 - 4    | *5555685000 | Plate, Band Assy Retaining |                         |
| 4 - 5    | *5544916000 | Stay, Top Panel            |                         |
| 4 - 6    | 5163044000  | Solenoid, Brake            |                         |
| 4 - 7    | *5545033000 | Shaft, Brake Band          |                         |
| 4 - 8    | 5027759000  | Belt, Counter              |                         |
| 4 - 9    | *5524296000 | Spring, Brake; I           |                         |
| 4 - 10   | 5504735000  | Band Assy, Brake; L        |                         |
| 4 - 11   | *5503194001 | Chassis, Reel Motor        |                         |
| 4 - 12   | 7105019000  | DC Motor, Reel             |                         |
| 4 - 13   | *5168997000 | PCB Assy, FUSE             | U.S.A., CANADA          |
|          | *5167997000 | PCB, FUSE                  |                         |
|          | 5142117000  | Fuse, 125V 7A              |                         |
|          | 5041144000  | Fuse, 250V 2A              |                         |
|          | *5041237000 | Holder, Fuse               |                         |
|          | *5158105000 | PCB Assy, FUSE             | EUROPE, AUSTRALIA, U.K. |
|          | *5157105000 | PCB, FUSE                  |                         |
|          | 5142193000  | Fuse, 250V 5AT             |                         |
|          | 5042189000  | Fuse, 250V 2AT             |                         |
|          | *5142087000 | Holder, Fuse               |                         |
| 4 - 14   | *5555789000 | Bracket, FUSE PCB Assy     |                         |
| 4 - 15   | 5131007000  | Voltage Selector           | GENERAL EXPORT          |
| 4 - 16   | *5555790000 | Bracket, Switch            | GENERAL EXPORT          |
| 4 - 17   | *5555570000 | Cushion                    |                         |

**EXPLODED VIEW - 5 (X-7R)**

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

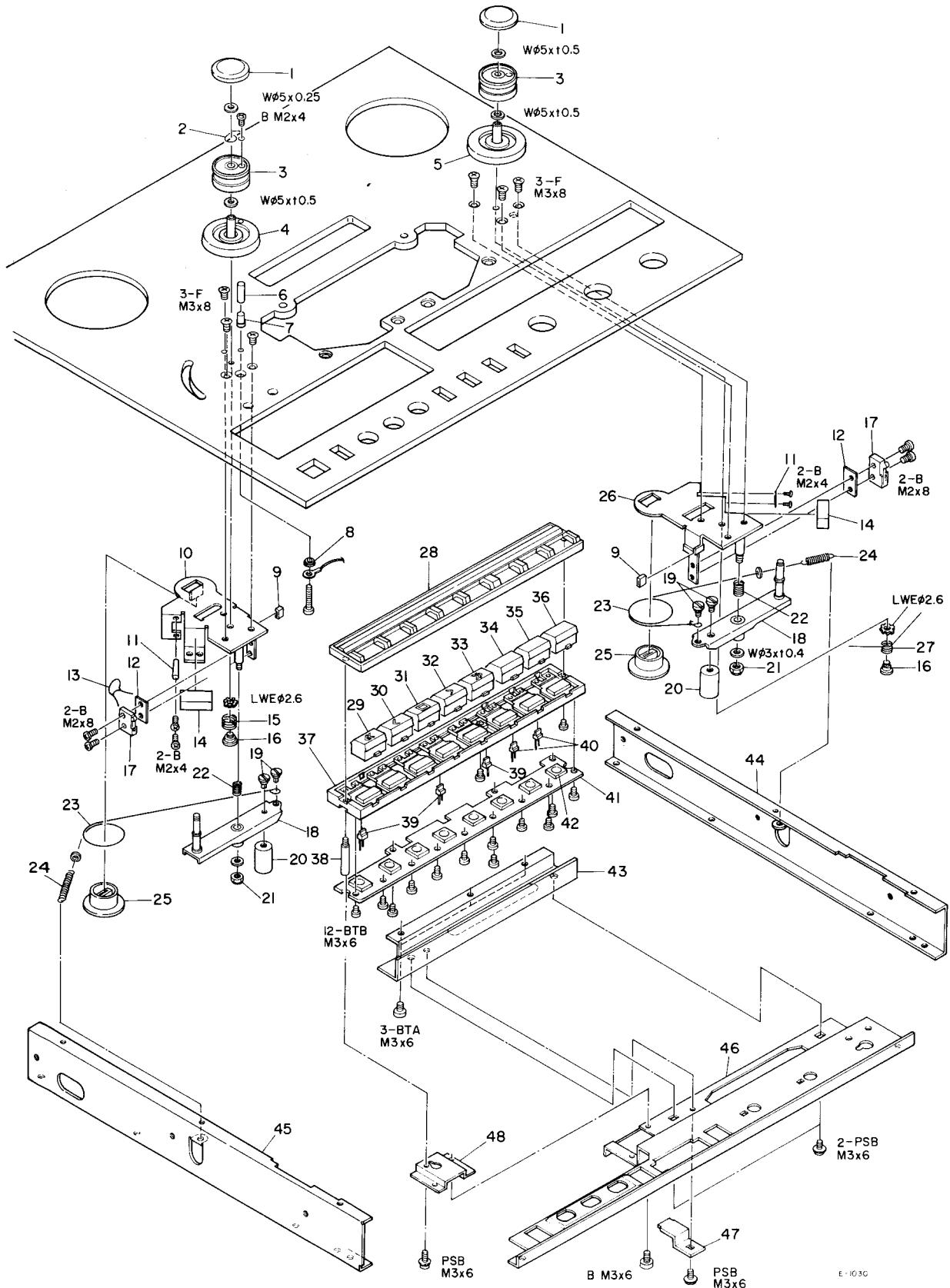
| REF. NO. | PARTS NO.    | DESCRIPTION                          | REMARKS                 |
|----------|--------------|--------------------------------------|-------------------------|
| 5 - 1    | 5163041000   | Solenoid, Pinch Roller               |                         |
| 5 - 2    | *5545022000  | Pin, Solenoid                        |                         |
| 5 - 3    | *5524218000  | Spring, Pinch Roller Pressure        |                         |
| 5 - 4    | *5504732000  | Plate Assy, Solenoid                 |                         |
| 5 - 5    | *5581066000  | Nut, Nylon; M4                       |                         |
| 5 - 6    | *5555681100  | Bracket, Power Transformer           |                         |
| 5 - 7    | *5800002600  | Screw, Shoulder; F                   |                         |
| 5 - 8    | △ 5152192000 | Transformer, Power                   | JAPAN                   |
|          | △ 5152225000 | Transformer, Power                   | U.S.A., CANADA          |
|          | △ 5152226000 | Transformer, Power                   | GENERAL EXPORT          |
|          | △ 5152239000 | Transformer, Power                   | EUROPE, AUSTRALIA, U.K. |
| 5 - 9    | *5555676000  | Plate, B                             |                         |
| 5 - 10   | *5552390000  | Frame, PCB                           |                         |
| 5 - 11   | *5553296000  | Frame, Joint                         |                         |
| 5 - 12   | *5552391000  | Frame, HS                            |                         |
| 5 - 13   | *5555888000  | Heat Sink, C                         |                         |
| 5 - 14   | *5168992000  | PCB Assy, CONTROL                    |                         |
| 5 - 15   | *5122177000  | Connector Socket, 15P                |                         |
| 5 - 16   | *5122165000  | Connector Socket, 3P                 |                         |
| 5 - 17   | *5122170000  | Connector Socket, 8P                 |                         |
| 5 - 18   | *5122221000  | Connector Socket, 2P (Black)         |                         |
| 5 - 19   | *5122169000  | Connector Socket, 7P                 |                         |
| 5 - 20   | *5122222000  | Connector Socket, 3P (Black)         |                         |
| 5 - 21   | *5127173000  | Connector Socket, 11P                |                         |
| 5 - 22   | 5534714000   | Button, B                            |                         |
| 5 - 23   | *5534685000  | Rod, Switch                          |                         |
| 5 - 24   | *5545024000  | Shaft, Timer Solenoid                |                         |
| 5 - 25   | *5555671100  | Bracket, Timer Switch                |                         |
| 5 - 26   | *5168926100  | PCB Assy, TIMER; A                   | Part of 5 - 26          |
|          | *5167260000  | PCB, TIMER                           | Part of 5 - 26          |
|          | *5143243000  | Diode, ERB12-02G1 (D641)             | Part of 5 - 26          |
|          | *5122145000  | Connector Plug, 2P (P641)            | Part of 5 - 26          |
|          | *5122146000  | Connector Plug, 3P (P642)            | Part of 5 - 26          |
|          | 5134090000   | Push Switch, 2-gang; DP4T (S32, S33) | Part of 5 - 26          |
| 5 - 27   | 5163045000   | Solenoid, Timer                      | Part of 5 - 26          |
| 5 - 28   | *5122281000  | Connector Socket, 3P (Red)           |                         |
| 5 - 29   | *5122164000  | Connector Socket, 2P                 |                         |

**EXPLODED VIEW - 6 (X-7)**

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

| REF. NO. | PARTS NO.    | DESCRIPTION                   | REMARKS                 |
|----------|--------------|-------------------------------|-------------------------|
| 6 - 1    | 5163041000   | Solenoid, Pinch Roller        |                         |
| 6 - 2    | *5545022000  | Pin, Solenoid                 |                         |
| 6 - 3    | *5524218000  | Spring, Pinch Roller Pressure |                         |
| 6 - 4    | *5504732000  | Plate Assy, Solenoid          |                         |
| 6 - 5    | *5581066000  | Nut, Nylon; M4                |                         |
| 6 - 6    | *5555681100  | Bracket, Power Transformer    |                         |
| 6 - 7    | *5800002600  | Screw, Shoulder; F            |                         |
| 6 - 8    | △ 5152192000 | Transformer, Power            | JAPAN                   |
|          | △ 5152225000 | Transformer, Power            | U.S.A., CANADA          |
|          | △ 5152226000 | Transformer, Power            | GENERAL EXPORT          |
|          | △ 5152239000 | Transformer, Power            | EUROPE, AUSTRALIA, U.K. |
| 6 - 9    | *5555676000  | Plate, B                      |                         |
| 6 - 10   | *5552390000  | Frame, PCB                    |                         |
| 6 - 11   | *5553296000  | Frame, Joint                  |                         |
| 6 - 12   | *5552391000  | Frame, HS                     |                         |
| 6 - 13   | *5555888000  | Heat Sink                     |                         |
| 6 - 14   | *5168993000  | PCB Assy, CONTROL             |                         |
| 6 - 15   | *5122174000  | Connector Socket, 12P         |                         |
| 6 - 16   | *5122222000  | Connector Socket, 3P (Black)  |                         |
| 6 - 17   | *5122221000  | Connector Socket, 2P (Black)  |                         |
| 6 - 18   | *5122167000  | Connector Socket, 5P          |                         |
| 6 - 19   | *5127171000  | Connector Socket, 9P          |                         |
| 6 - 20   | *5122165000  | Connector Socket, 3P          |                         |
| 6 - 21   | *5555671100  | Bracket, Timer Switch         |                         |
| 6 - 22   | *5534714000  | Button, B                     |                         |
| 6 - 23   | *5534685000  | Rod, Switch                   |                         |
| 6 - 24   | 5134115000   | Switch, Push; DPDT            |                         |

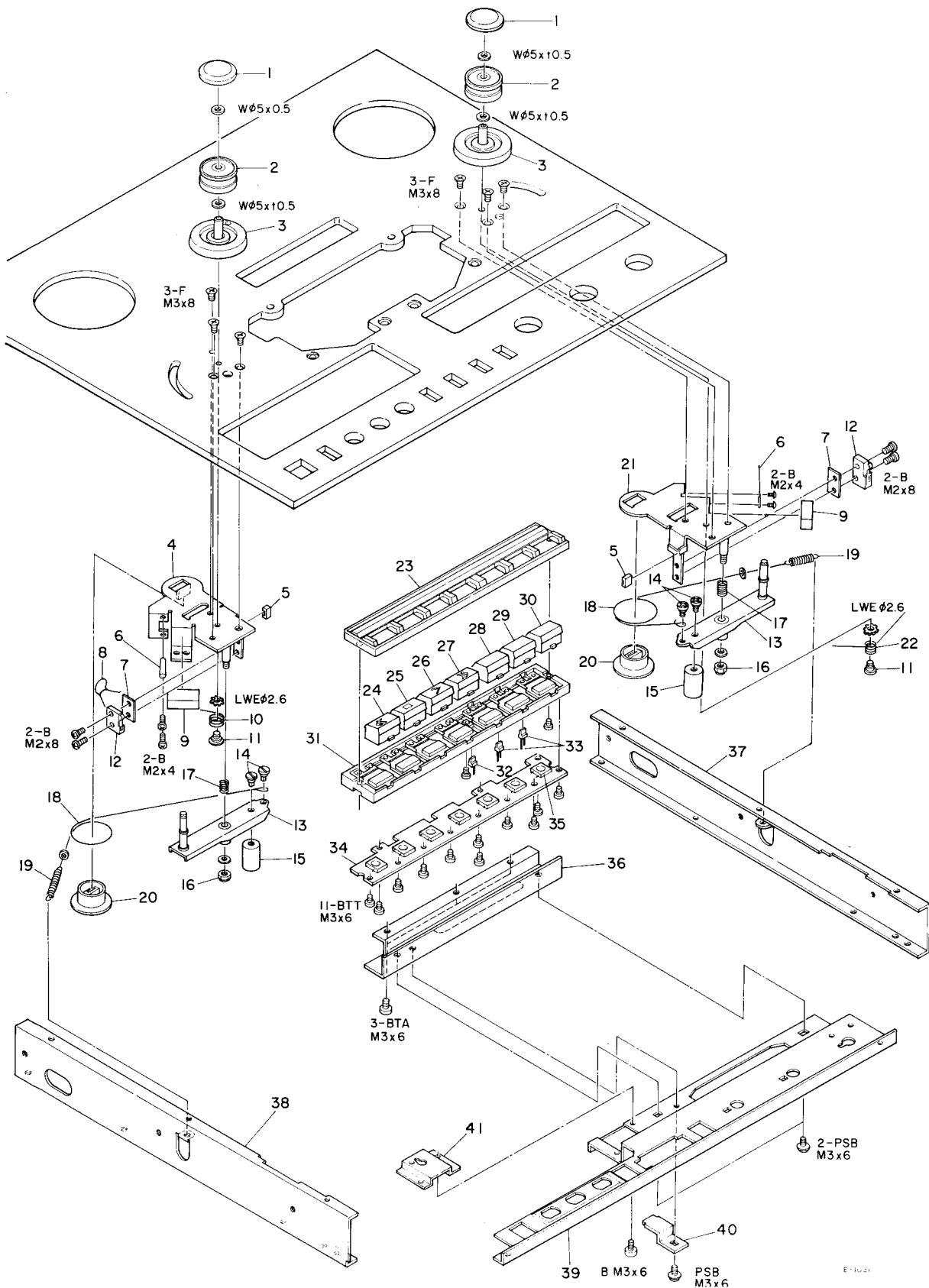
**EXPLODED VIEW - 7 (X-7R)**



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

| REF. NO. | PARTS NO.   | DESCRIPTION                      | REMARKS |
|----------|-------------|----------------------------------|---------|
| 7 - 1    | 5545037000  | Cap, Roller                      |         |
| 7 - 2    | *5524225000 | Spring, GND                      |         |
| 7 - 3    | 550474000   | Roller Assy, A                   |         |
| 7 - 4    | *5504739000 | Base Assy, Roller; A             |         |
| 7 - 5    | *5504742000 | Base Assy, Roller; B             |         |
| 7 - 6    | 5545042000  | Post, Sensing                    |         |
| 7 - 7    | *5534716000 | Post, Insulating                 |         |
| 7 - 8    | *5534368100 | Washer, Insulating               |         |
| 7 - 9    | 5027699000  | Collar, Rubber                   |         |
| 7 - 10   | *5504719101 | Base Assy, Shut off; L           |         |
| 7 - 11   | *5524215000 | Wire, String Stopper             |         |
| 7 - 12   | *5550025100 | Plate, Insulating                |         |
| 7 - 13   | *5054230000 | Capacitor, Ceramic 0.047 mfd 50V |         |
| 7 - 14   | *5534686001 | Cushion                          |         |
| 7 - 15   | *5524229001 | Spring, Tension Arm; L           |         |
| 7 - 16   | *5581064000 | Screw, Shoulder; E               |         |
| 7 - 17   | 5130003000  | Switch, Micro                    |         |
| 7 - 18   | 5504723000  | Arm Assy, Tension                |         |
| 7 - 19   | *5800002600 | Screw, Shoulder; F               |         |
| 7 - 20   | *5545010000 | Weight, Counter                  |         |
| 7 - 21   | *5581045000 | Nut, Nylon; M3                   |         |
| 7 - 22   | *5524069000 | Spring, Roller Arm               |         |
| 7 - 23   | *5504721000 | String Assy, Damper              |         |
| 7 - 24   | *5524183000 | Spring, Motor Switch Lever       |         |
| 7 - 25   | *5534684000 | Drum, Damper                     |         |
| 7 - 26   | *5504720101 | Base Assy, Shut off; R           |         |
| 7 - 27   | *5524230001 | Spring, Tension Arm; R           |         |
| 7 - 28   | *5533192000 | Escutcheon, Button; Operation    |         |
| 7 - 29   | 5533196000  | Button, D                        |         |
| 7 - 30   | 5533194000  | Button, B                        |         |
| 7 - 31   | 5533197000  | Button, E                        |         |
| 7 - 32   | 5533193000  | Button, A                        |         |
| 7 - 33   | 5533195000  | Button, C                        |         |
| 7 - 34   | 5533198000  | Button, F                        |         |
| 7 - 35   | 5533219000  | Button, H                        |         |
| 7 - 36   | 5533199000  | Button, G                        |         |
| 7 - 37   | *5503204000 | Base Assy, Button                |         |
| 7 - 38   | *5545166000 | Stay, Button Escutcheon          |         |
| 7 - 39   | *5143139000 | LED (Green)                      |         |
| 7 - 40   | *5143140000 | LED (Red)                        |         |
| 7 - 41   | *5168929000 | PCB Assy, OPERATION SW           |         |
|          | *5167929000 | PCB, OPERATION SW                |         |
| 7 - 42   | 5138011000  | Switch, Tact                     |         |
| 7 - 43   | *5553321000 | Angle, Button Base; B            |         |
| 7 - 44   | *5552404000 | Angle, Side; R                   |         |
| 7 - 45   | *5552405000 | Angle, Side; L                   |         |
| 7 - 46   | *5552403100 | Chassis, Ampl.; B                |         |
| 7 - 47   | *5555720000 | Bracket, Stopper                 |         |
| 7 - 48   | *5555719100 | Bracket, Variable Resistor       |         |

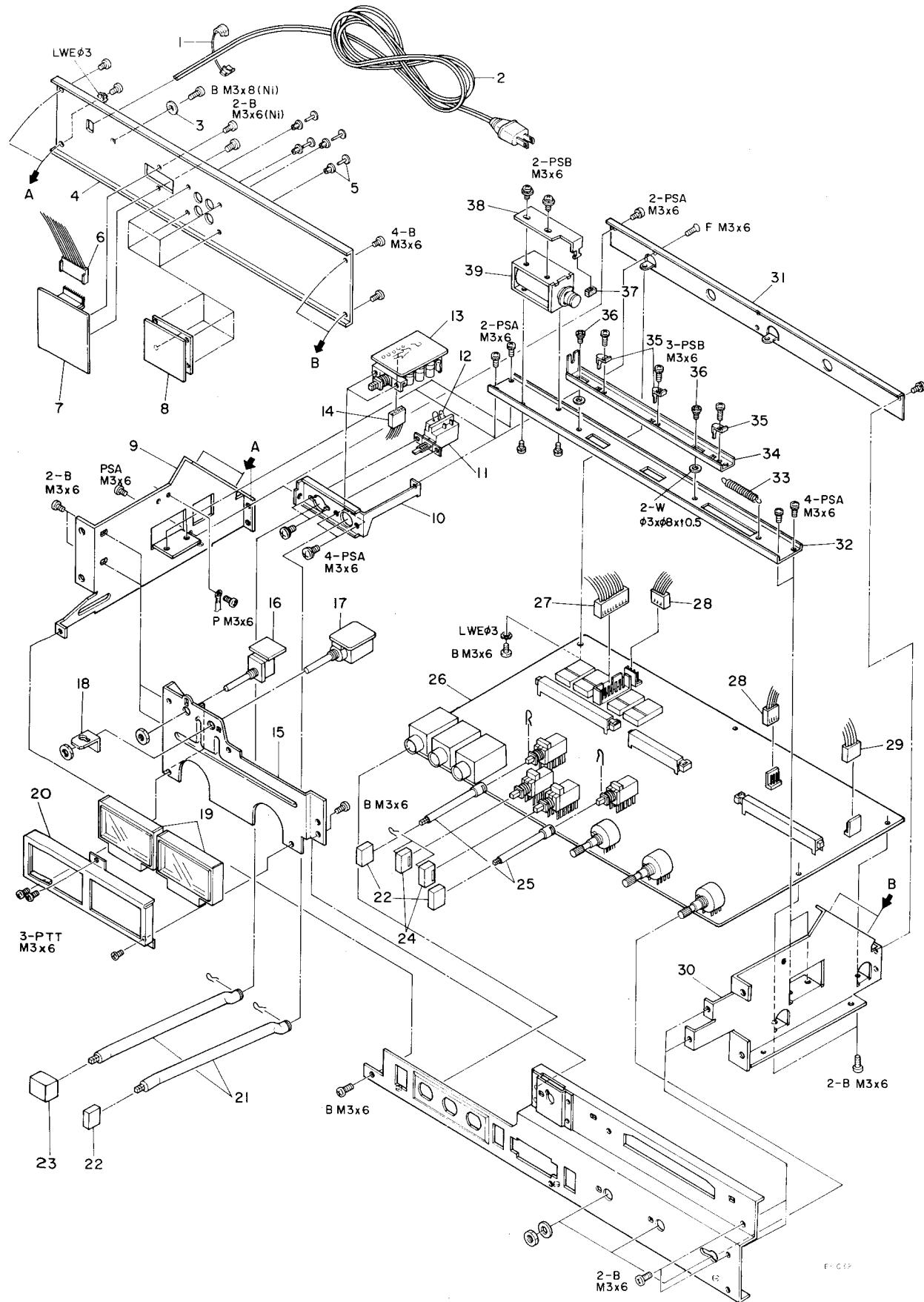
**EXPLODED VIEW - 8 (X-7)**



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

| REF. NO. | PARTS NO.   | DESCRIPTION                      | REMARKS |
|----------|-------------|----------------------------------|---------|
| 8 - 1    | 5545037000  | Cap, Roller                      |         |
| 8 - 2    | 5504743000  | Roller Assy, B                   |         |
| 8 - 3    | *5504742000 | Base Assy, Roller; B             |         |
| 8 - 4    | *5504719101 | Base Assy, Shut off; L           |         |
| 8 - 5    | *5027699000 | Collar, Rubber                   |         |
| 8 - 6    | *5524215000 | Wire, String Stopper             |         |
| 8 - 7    | *5550025100 | Plate, Insulating                |         |
| 8 - 8    | *5054230000 | Capacitor, Ceramic 0.047 mfd 50V |         |
| 8 - 9    | *5534686001 | Cushion                          |         |
| 8 - 10   | *5524229001 | Spring, Tension Arm; L           |         |
| 8 - 11   | *5581064000 | Screw, Shoulder; E               |         |
| 8 - 12   | *5130003000 | Switch, Micro                    |         |
| 8 - 13   | 5504723000  | Arm Assy, Tension                |         |
| 8 - 14   | *5800002600 | Screw, Shoulder; F               |         |
| 8 - 15   | *5545010000 | Weight, Counter                  |         |
| 8 - 16   | *5581045000 | Nut, Nylon; M3                   |         |
| 8 - 17   | *5524069000 | Spring, Roller Arm               |         |
| 8 - 18   | *5504721000 | String Assy, Damper              |         |
| 8 - 19   | *5524183000 | Spring, Motor Switch Lever       |         |
| 8 - 20   | *5534684000 | Drum, Damper                     |         |
| 8 - 21   | *5504720101 | Base Assy, Shut off; R           |         |
| 8 - 22   | *5524230001 | Spring, Tension Arm; R           |         |
| 8 - 23   | *5533191000 | Escutcheon, Button; Operation    |         |
| 8 - 24   | 5533196000  | Button, D                        |         |
| 8 - 25   | 5533197000  | Button, E                        |         |
| 8 - 26   | 5533193000  | Button, A                        |         |
| 8 - 27   | 5533195000  | Button, C                        |         |
| 8 - 28   | 5533198000  | Button, F                        |         |
| 8 - 29   | 5533219000  | Button, H                        |         |
| 8 - 30   | 5533199000  | Button, G                        |         |
| 8 - 31   | *5503205000 | Base Assy, Button                |         |
| 8 - 32   | *5143139000 | LED (Green)                      |         |
| 8 - 33   | *5143140000 | LED (Red)                        |         |
| 8 - 34   | *5168930000 | PCB Assy, OPERATION SW           |         |
|          | *5167930000 | PCB OPERATION SW                 |         |
| 8 - 35   | 5138011000  | Switch, Tact                     |         |
| 8 - 36   | *5553321000 | Angle, Button Base; B            |         |
| 8 - 37   | *5552404000 | Angle, Side; R                   |         |
| 8 - 38   | *5552405000 | Angle, Side; L                   |         |
| 8 - 39   | *5552403100 | Chassis, Ampl.; B                |         |
| 8 - 40   | *5555720000 | Bracket, Stopper                 |         |
| 8 - 41   | *5555719100 | Bracket, Variable Resistor       |         |

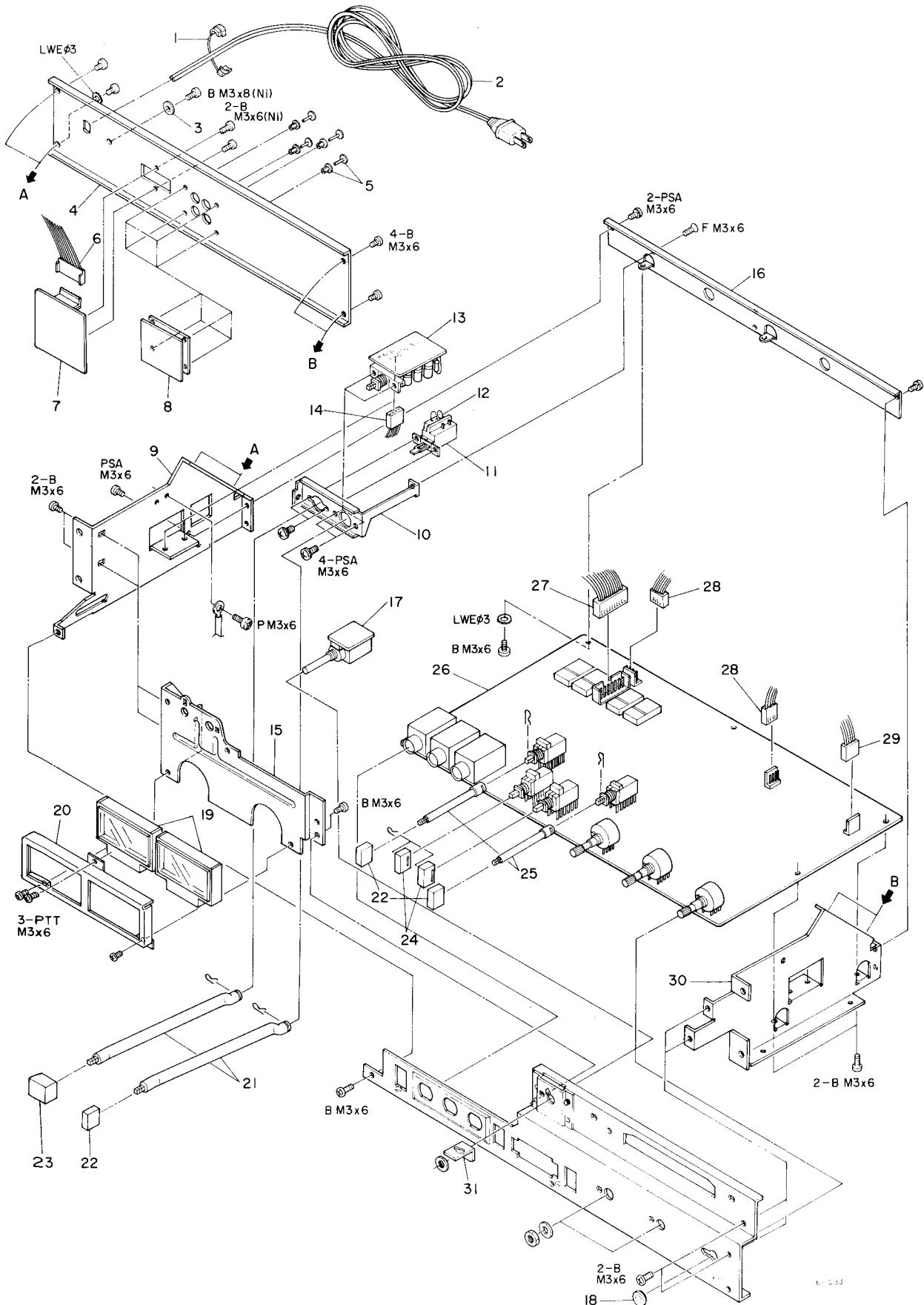
**EXPLODED VIEW - 9 (X-7R)**



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

| REF. NO. | PARTS NO.  | DESCRIPTION  | REMARKS  |
|----------|--|--|--|
| 9 - 1    | *5534660000<br>*5534663000<br>*5534661000                                    | Strain Relief, AC Power Cord<br>Strain Relief, AC Power Cord<br>Strain Relief, AC Power Cord   | All except AUSTRALIA, U.K.<br>AUSTRALIA<br>U.K.                        |
| 9 - 2    | △*5128027000<br>△*5128075000<br>△*5128018000<br>△*5128031000<br>△*5128047000 | Cord, AC Power<br>Cord, AC Power<br>Cord, AC Power<br>Cord, AC Power<br>Cord, AC Power   | JAPAN, GENERAL EXPORT<br>CANADA, U.S.A.<br>EUROPE<br>AUSTRALIA<br>U.K. |
| 9 - 3    | *5555063000  | Washer, GND  | All except U.K. and EUROPE   |
| 9 - 4    | *5552402000  | Panel, Ampl.; Rear   |  |
| 9 - 5    | *5534118000  | Push Rivet   |  |
| 9 - 6    | *5122177000  | Connector Socket, 15P  |  |
| 9 - 7    | *5168931000<br>*5167931000   | PCB Assy, CONNECTOR; A<br>PCB, CONNECTOR   | Part of 9 - 7  |
| 9 - 8    | *5168937201<br>*5167937101<br>*5124058000                                    | PCB Assy, IN/OUTPUT<br>PCB, IN/OUTPUT<br>Jack, Pin; 4P   | Part of 9 - 8<br>Part of 9 - 8<br>Part of 9 - 8                        |
| 9 - 9    | *5553304000  | Carbon Res. 56 k ohm 1/4W 5%   |  |
| 9 - 10   | *5555718000  | Frame, Ampl.; L  |  |
| 9 - 11   | △ 5134036000<br>△ 5134018000<br>△ 5134011000                                 | Bracket, Push Switch<br>Push Switch, POWER<br>Push Switch, POWER   | JAPAN, GENERAL EXPORT<br>CANADA, U.S.A., AUSTRALIA<br>EUROPE, U.K.     |
| 9 - 12   | △ 5052910000<br>△ 5052907000<br>△ 5052911000<br>△ 5052908000                 | Spark Killer, 0.033 mfd + 120 ohm 125V AC<br>Spark Killer, 0.01 mfd + 300 ohm 400V AC<br>Spark Killer, 0.033 mfd + 120 ohm 200V AC<br>Spark Killer, 4700 pF 250 V AC x 2 | U.S.A.<br>JAPAN, GENERAL EXPORT, AUSTRALIA<br>CANADA<br>EUROPE, U.K.   |
| 9 - 13   | *5158001000  | PCB Assy, SPEED SW   |  |
| 9 - 14   | *5127168000  | Connector Socket, 6P   |  |
| 9 - 15   | *5553307000  | Bracket, Meter; B  |  |
| 9 - 16   | *5168928000<br>*5167928000<br>5133013000                                     | PCB Assy, SWITCH<br>PCB, SWITCH<br>Switch, Rotary  | Part of 9 - 16<br>Part of 9 - 16                                       |
| 9 - 17   | *5168938000<br>*5167938000<br>5150239000                                     | PCB Assy, PITCH CONT<br>PCB, PITCH CONT<br>Resistor, Variable 5 k ohm (w/Switch)   | Part of 9 - 17   |
| 9 - 18   | *5800003000  | Bracket, Variable Resistor   |  |
| 9 - 19   | 5165068000   | Meter, VU  |  |
| 9 - 20   | *5553293000  | Plate, Meter   |  |
| 9 - 21   | *5534723000  | Rod, A   |  |
| 9 - 22   | 5534701000   | Button   |  |
| 9 - 23   | 5534702000   | Button, Switch   |  |
| 9 - 24   | 5800000100   | Button, Loose; B   |  |
| 9 - 25   | *5534712000  | Rod, B   |  |
| 9 - 26   | *5168998001  | PCB Assy, REC AND PLAY AMPL  |  |
| 9 - 27   | *5122170000  | Connector Socket, 8P   |  |
| 9 - 28   | *5122166000  | Connector Socket, 4P   |  |
| 9 - 29   | *5122282000  | Connector Socket 4P (Red)  |  |
| 9 - 30   | *5553305000  | Frame, Ampl.; R  |  |
| 9 - 31   | *5553297100  | Frame, Connector   |  |
| 9 - 32   | *5553298000  | Bracket, Solenoid  |  |
| 9 - 33   | *5524222000  | Spring, Return   |  |
| 9 - 34   | *5555694000  | Plate, Slide   |  |
| 9 - 35   | *5524224000  | Spring, Plate; Change  |  |
| 9 - 36   | *5581056000  | Screw, Shoulder; A   |  |
| 9 - 37   | *5534116000  | Cushion  |  |
| 9 - 38   | *5555701000  | Plate, Solenoid Stopper  |  |
| 9 - 39   | 5163043000   | Solenoid, Reverse  |  |

**EXPLODED VIEW - 10 (X-7)**



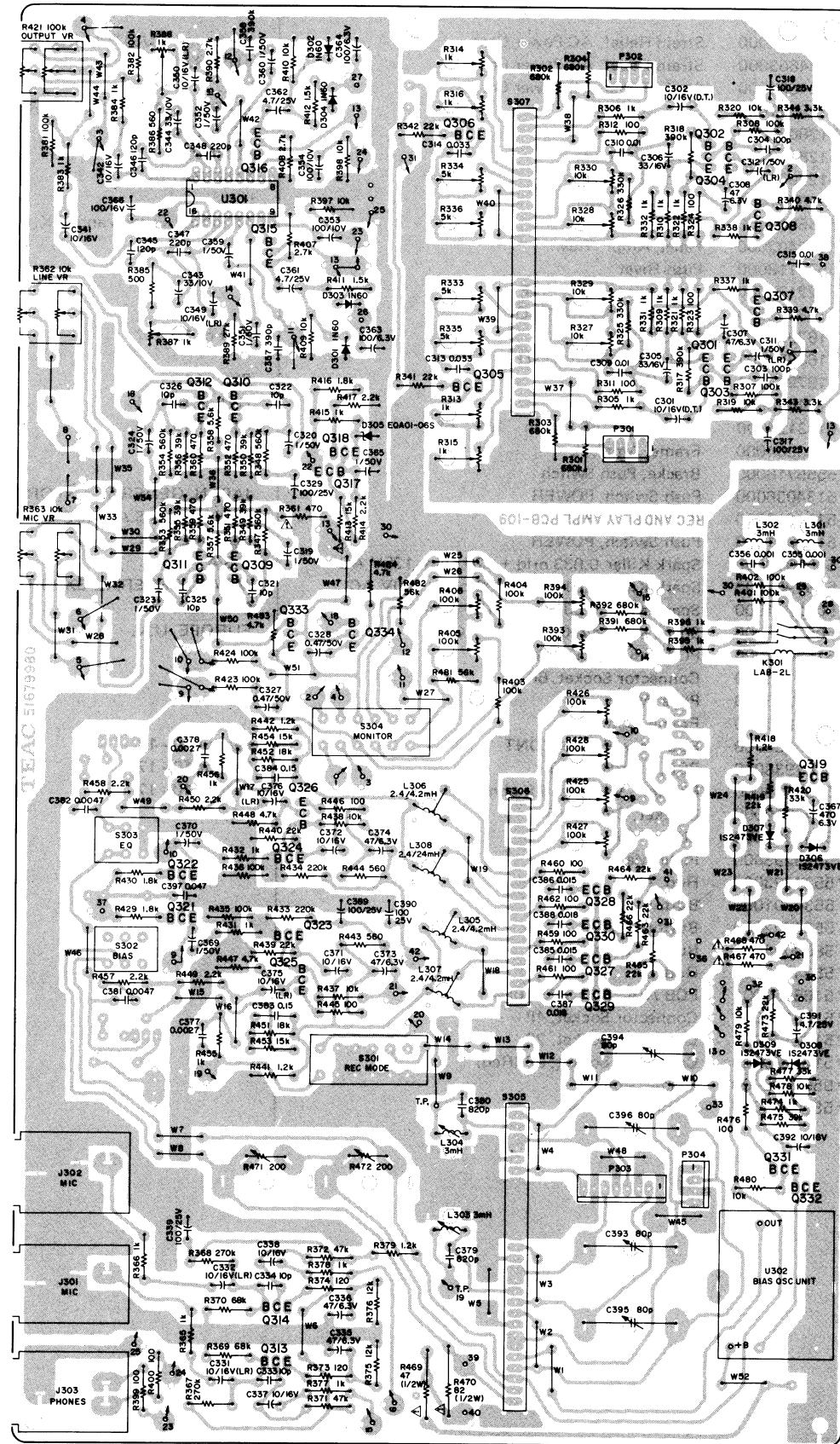
Parts marked with \*require longer delivery time than regular parts.

| REF. NO. | PARTS NO.   | DESCRIPTION   | REMARKS  |
|----------|---|---|--|
| 10 - 1   | *5534660000<br>*5534663000<br>*5534661000                                   | Strain Relief, AC Power Cord<br>Strain Relief, AC Power Cord<br>Strain Relief, AC Power Cord  | All except AUSTRALIA, U.K.<br>AUSTRALIA<br>U.K.                              |
| 10 - 2   | △5128027000<br>△*5128075000<br>△*5128018000<br>△*5128031000<br>△*5128047000 | Cord, AC Power<br>Cord, AC Power<br>Cord, AC Power<br>Cord, AC Power<br>Cord, AC Power  | JAPAN, GENERAL EXPORT<br>CANADA, U.S.A.<br>EUROPE<br>AUSTRALIA<br>U.K.       |
| 10 - 3   | *5555063000   | Washer, GND   | All except Europe and U.K.   |
| 10 - 4   | *5552402000   | Panel, Ampl.; Rear  |  |
| 10 - 5   | *5534118000   | Push Rivet  |  |
| 10 - 6   | *5122174000   | Connector Socket, 12P   |  |
| 10 - 7   | *5158002000<br>*5167931000<br>*5168937201<br>*5167937101<br>*5124058000     | PCB Assy, CONNECTOR; B<br>PCB, CONNECTOR<br>PCB Assy, IN/OUTPUT<br>PCB, IN/OUTPUT<br>Jack, Pin; 4P  | Part of 10 - 7   |
| 10 - 8   | *5183124000<br>*5553304000<br>*5555718000                                   | Carbon Res. 56 k ohm 1/4W 5%<br>Frame, Ampl.; L<br>Bracke, Push Switch  | Part of 10 - 8<br>Part of 10 - 8<br>Part of 10 - 8                           |
| 10 - 9   | △ 5134036000  | Push Switch, POWER  |  |
| 10 - 10  | △ 5134018000  | Push Switch, POWER  |  |
| 10 - 11  | △ 5134011000  | Push Switch, POWER  |  |
| 10 - 12  | △ 5052910000<br>△ 5052907000<br>△ 5052911000<br>△ 5052908000                | Spark Killer 0.033 mfd + 120 ohm 125V AC<br>Spark Killer 0.01 mfd + 300 ohm 400V AC<br>Spark Killer 0.033 mfd + 120 ohm 200V AC<br>Spark Killer 4700 pF 250V AC x 2 | JAPAN, GENERAL EXPORT<br>CANADA, U.S.A., AUSTRALIA<br>EUROPE, U.K.<br>U.S.A. |
| 10 - 13  | *5158001000   | PCB Assy, SPEED SW  |  |
| 10 - 14  | *5127168000   | Connector Socket, 6P  |  |
| 10 - 15  | *5553293000   | Plate, Meter  |  |
| 10 - 16  | *5553297100   | Frame, Connector  |  |
| 10 - 17  | *5168938000<br>*5167938000<br>5150239000                                    | PCB Assy, PITCH CONT<br>PCB, PITCH CONT<br>Resistor, Variable 5 k ohm (w/Switch)  | Part of 10 - 17<br>Part of 10 - 17<br>Part of 10 - 17                        |
| 10 - 18  | *5545049000   | Bracket, Collar; VR   |  |
| 10 - 19  | 5165068000  | Meter, VU   |  |
| 10 - 20  | *5553293000   | Plate, Meter  |  |
| 10 - 21  | *5534723000   | Rod, A  |  |
| 10 - 22  | 5534701000  | Button  |  |
| 10 - 23  | 5534702000  | Button, Switch  |  |
| 10 - 24  | 5800000101  | Button, Loose; B  |  |
| 10 - 25  | *5534712000   | Rod, B  |  |
| 10 - 26  | *5168999001   | PCB Assy, REC AND PLAY AMPL   |  |
| 10 - 27  | *5122166000   | Connector Socket, 4P  |  |
| 10 - 28  | *5122164000   | Connector Socket, 2P  |  |
| 10 - 29  | *5122280000   | Connector Socket, 2P (Red)  |  |
| 10 - 30  | *5553305000   | Frame, Ampl.; R   |  |
| 10 - 31  | *5800003000   | Bracket, Solenoid   |  |

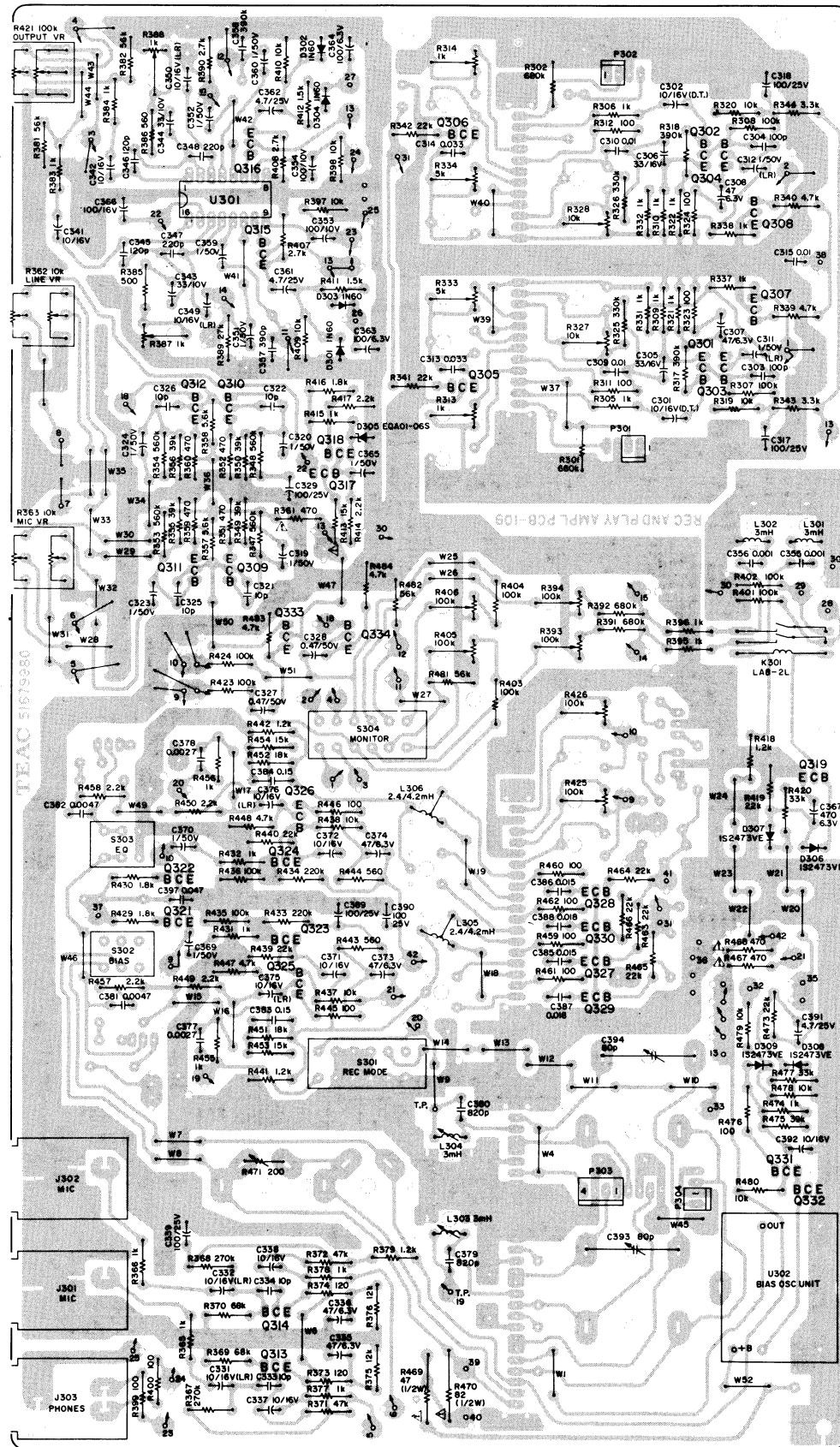
## 5 PC BOARDS AND PARTS LIST

**PC Boards shown viewed from foil side.**

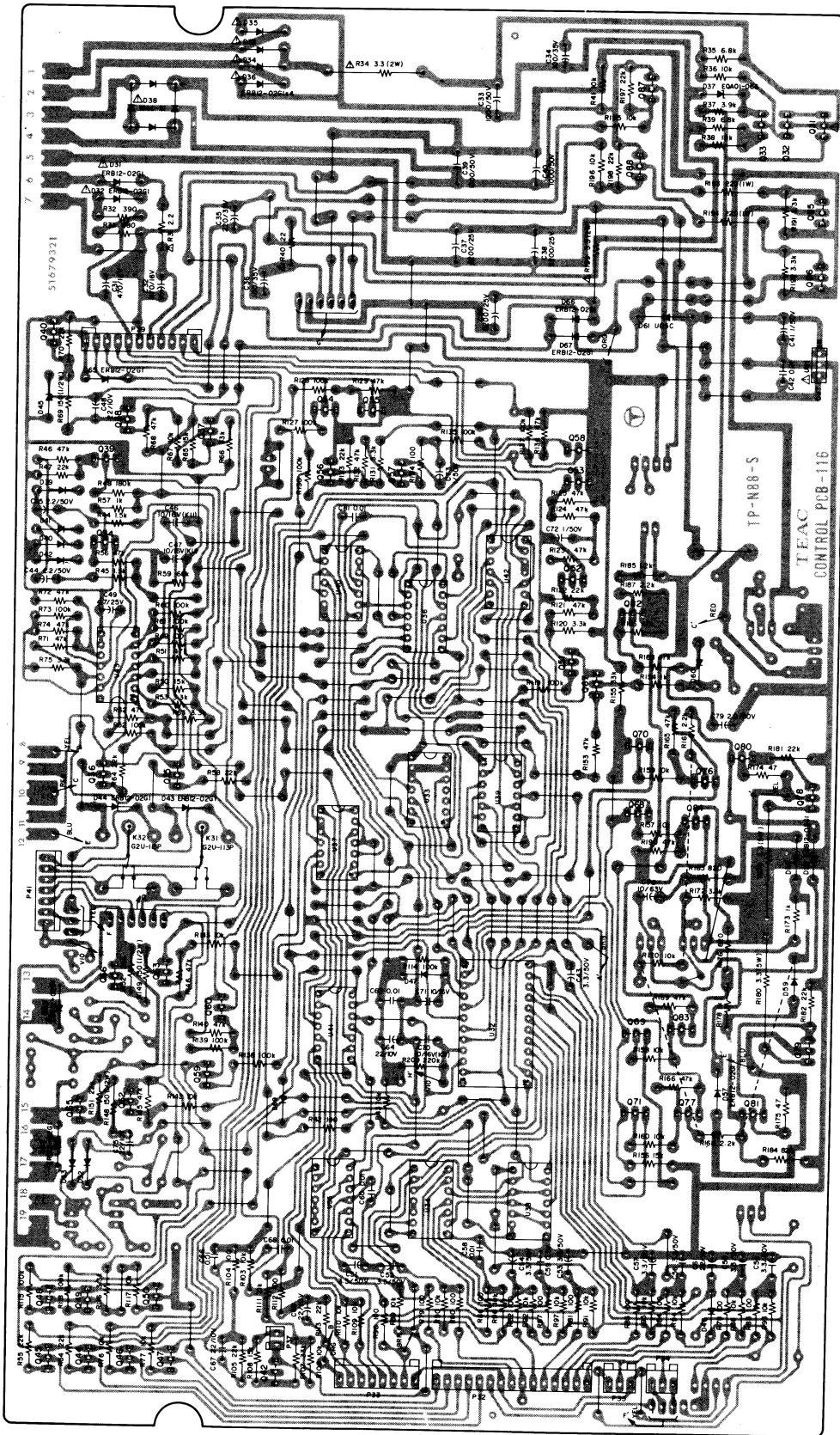
## **REC AND PLAY AMPL PCB ASSY (X-7R)**



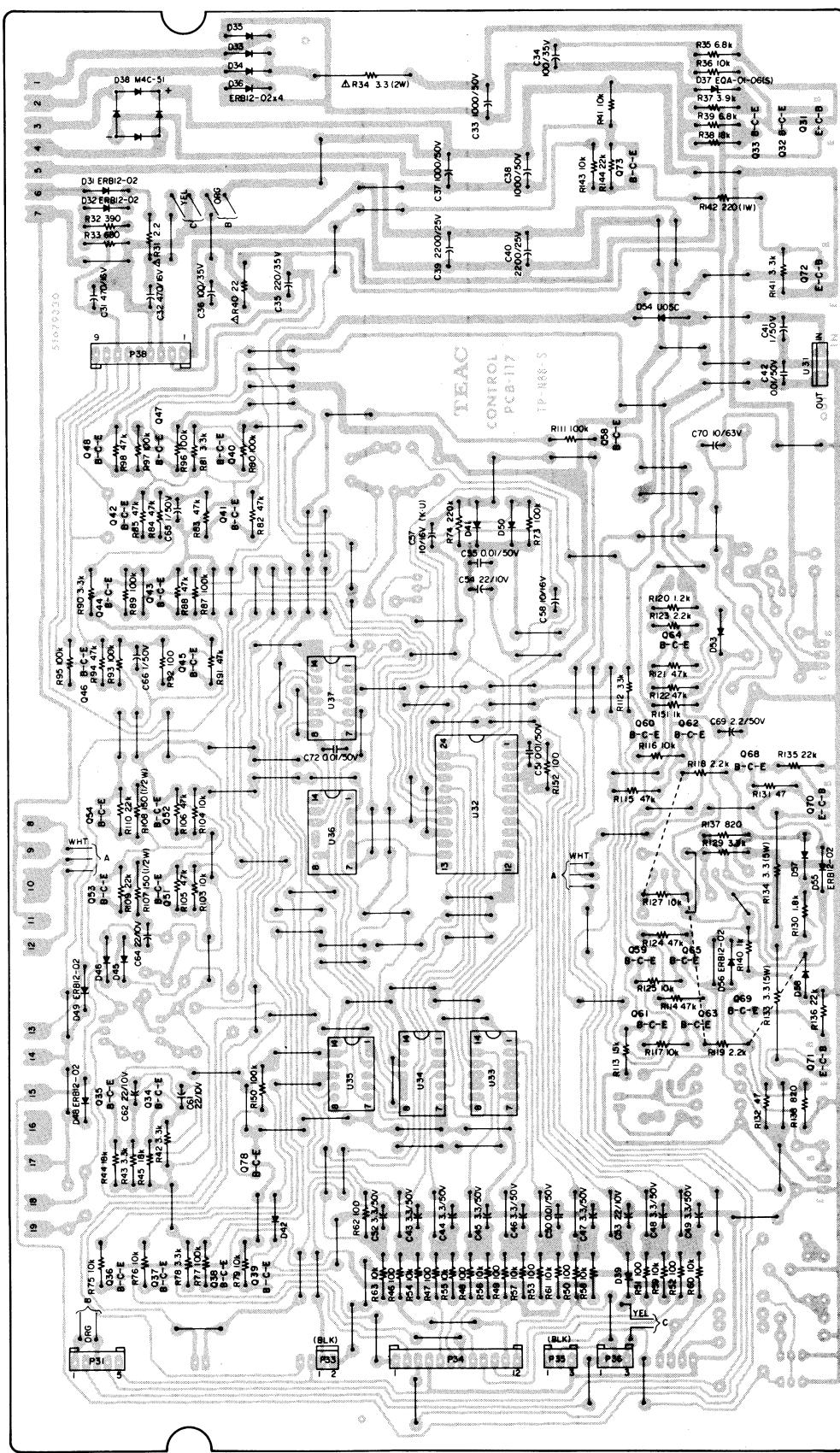
## **REC AND PLAY AMPL PCB ASSY (X-7)**

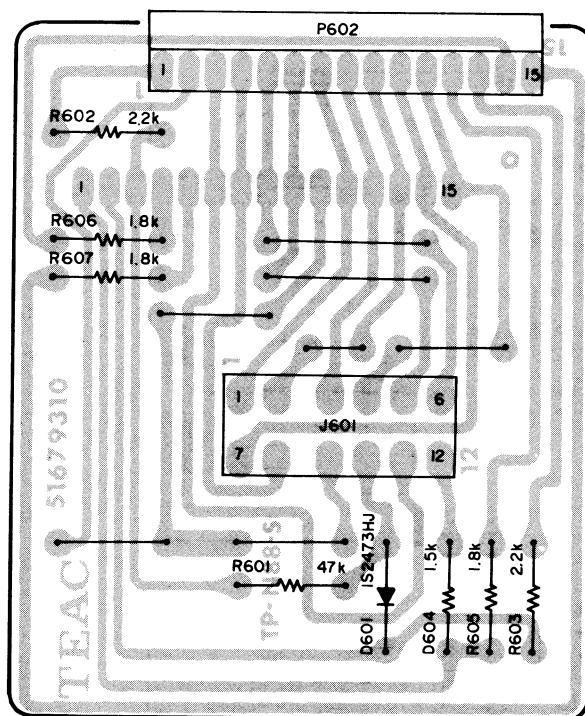


## **CONTROL PCB ASSY (X-7R)**

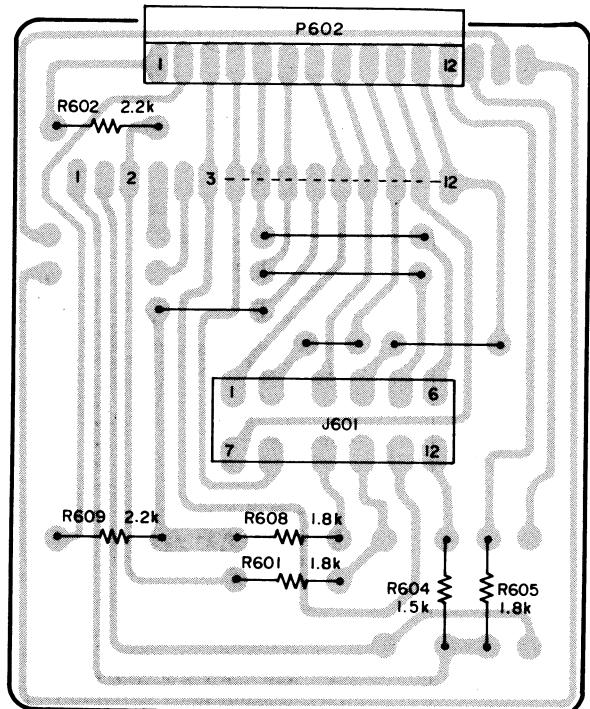


## **CONTROL PCB ASSY (X-7)**

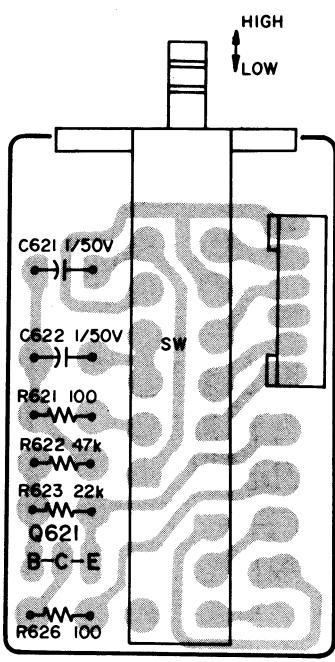


**CONNECTOR PCB ASSY (X-7R)**

P-417

**CONNECTOR PCB ASSY (X-7)**

P-1009

**SPEED SW PCB ASSY**

P-1040

## REC AND PLAY AMPL PCB ASSY (X-7R)

| REF. NO.   | PARTS NO.  | DESCRIPTION           |
|--|------------|-----------------------|
|  | 5168998001 | PCB Assy              |
|  | 5167998000 | PCB                   |
|  | IC         |                       |
| U301   | 5147053000 | HA11122W              |
|  |            | TRANSISTORS           |
| Q301, Q302   | 5042461000 | 2SC1327(T)            |
| Q303, Q304   | 5145092000 | 2SC1740LN(S)          |
| Q305~Q308  | 5145036000 | 2SC945LK              |
| Q309~Q312  | 5145092000 | 2SC1740LN(S)          |
| Q313, Q314   | 5042461000 | 2SC1327(T)            |
| Q315, Q316   | 5145036000 | 2SC945LK              |
| Q317   | 5145135000 | 2SD400(E)             |
| Q318   | 5145036000 | 2SC945LK              |
| Q319   | 5145092000 | 2SC1740LN(S)          |
| Q321, Q322   | 5145092000 | 2SC1740LN(S)          |
| Q323, Q324   | 5145036000 | 2SC945LK              |
| Q325, Q326   | 5145095000 | 2SA826LN(S)           |
| Q327~Q330  | 5145036000 | 2SC945LK              |
| Q331   | 5145092000 | 2SC1740LN(S)          |
| Q332   | 5145185000 | 2SD655(E)             |
| Q333, Q334   | 5145036000 | 2SC945LK              |
|  |            | DIODES                |
| D301~D304  | 5042213000 | 1N-60                 |
| D305   | 5143154000 | Zener, EQA-01-06S     |
| D306~D309  | 5042517000 | 1S2473VE              |
|  |            | RESISTORS             |
| All resistors are rated $\pm 5\%$ tolerance, $\frac{1}{4}$ watt and of carbon type unless otherwise noted. |            |                       |
| R301~R304  | 5181550000 | 680 k ohm             |
| R305, R306   | 5181482000 | 1 k ohm               |
| R307, R308   | 5181530000 | 100 k ohm             |
| R309, R310   | 5181482000 | 1 k ohm               |
| R311, R312   | 5181458000 | 100 ohm               |
| R317, R318   | 5181544000 | 390 k ohm             |
| R319, R320   | 5181506000 | 10 k ohm              |
| R321, R322   | 5181482000 | 1 k ohm               |
| R323, R324   | 5181458000 | 100 ohm               |
| R325, R326   | 5181542000 | 330 k ohm             |
| R331, R332   | 5181482000 | 1 k ohm               |
| R337~R340  | 5181498000 | 4.7 k ohm             |
| R341, R342   | 5181514000 | 22 k ohm              |
| R343, R344   | 5181494000 | 3.3 k ohm             |
| R345, R346   | 5181524000 | 56 k ohm              |
| R347, R348   | 5181548000 | 560 k ohm             |
| R349, R350   | 5181520000 | 39 k ohm              |
| R351, R352   | 5181474000 | 470 ohm               |
| R353, R354   | 5181548000 | 560 k ohm             |
| R355, R356   | 5181520000 | 39 k ohm              |
| R357, R358   | 5181500000 | 5.6 k ohm             |
| R359, R360   | 5181474000 | 470 ohm               |
| R361   | 5184265000 | 470 ohm Non Flammable |
| R365, R366   | 5181482000 | 1 k ohm               |
| R367, R368   | 5181540000 | 270 k ohm             |
| R369, R370   | 5181526000 | 68 k ohm              |
| R371, R372   | 5181522000 | 47 k ohm              |

| REF. NO.   | PARTS NO.   | DESCRIPTION                         |
|------------|-------------|-------------------------------------|
| R373, R374 | 5181460000  | 120 ohm                             |
| R375, R376 | 5181508000  | 12 k ohm                            |
| R377, R378 | 5181482000  | 1 k ohm                             |
| R379       | 5181484000  | 1.2 k ohm                           |
| R381, R382 | 5181530000  | 100 k ohm                           |
| R383, R384 | 5181482000  | 1 k ohm                             |
| R385, R386 | 5181476000  | 560 ohm                             |
| R389, R390 | 5181516000  | 27 k ohm                            |
| R391, R392 | 5181550000  | 680 k ohm                           |
| R395, R396 | 5181482000  | 1 k ohm                             |
| R397, R398 | 5181506000  | 10 k ohm                            |
| R399, R400 | 5181458000  | 100 ohm                             |
| R401~R404  | 5181530000  | 100 k ohm                           |
| R407, R408 | 5181492000  | 2.7 k ohm                           |
| R409, R410 | 5181506000  | 10 k ohm                            |
| R411, R412 | 5181486000  | 1.5 k ohm                           |
| R413       | ▲5184229000 | 15 ohm Non Flammable                |
| R414       | 5181490000  | 2.2 k ohm                           |
| R415       | 5181482000  | 1 k ohm                             |
| R416       | 5181488000  | 1.8 k ohm                           |
| R417       | 5181490000  | 2.2 k ohm                           |
| R418       | 5181484000  | 1.2 k ohm                           |
| R419       | 5181514000  | 22 k ohm                            |
| R420       | 5181518000  | 33 k ohm                            |
| R423, R424 | 5181530000  | 100 k ohm                           |
| R429, R430 | 5181488000  | 1.8 k ohm                           |
| R431, R432 | 5181482000  | 1 k ohm                             |
| R433, R434 | 5181538000  | 220 k ohm                           |
| R435, R436 | 5181530000  | 100 k ohm (All except Japan)        |
| R437, R438 | 5181506000  | 10 k ohm (All except Japan)         |
| R439, R440 | 5181514000  | 22 k ohm                            |
| R441, R442 | 5181484000  | 1.2 k ohm                           |
| R443, R444 | 5181476000  | 560 ohm                             |
| R445, R446 | 5181458000  | 100 ohm                             |
| R447, R448 | 5181498000  | 4.7 k ohm                           |
| R449, R450 | 5181490000  | 2.2 k ohm                           |
| R451, R452 | 5181512000  | 18 k ohm                            |
| R453, R454 | 5181510000  | 15 k ohm                            |
| R455, R456 | 5181482000  | 1 k ohm                             |
| R457, R458 | 5181490000  | 2.2 k ohm                           |
| R459~R462  | 5181458000  | 100 ohm                             |
| R463~R466  | 5181514000  | 22 k ohm                            |
| R467, R468 | ▲5184265000 | 470 ohm Non Flammable               |
| R469       | ▲5181990000 | 47 ohm $\frac{1}{2}W$ Non Flammable |
| R470       | ▲5181996000 | 82 ohm $\frac{1}{2}W$ Non Flammable |
| R473       | 5181514000  | 22 k ohm                            |
| R474       | 5181482000  | 1 k ohm                             |
| R475       | 5181520000  | 39 k ohm                            |
| R476       | 5181458000  | 100 ohm                             |
| R477       | 5181518000  | 33 k ohm                            |
| R478~R480  | 5181506000  | 10 k ohm                            |
| R481, R482 | 5181524000  | 56 k ohm                            |
| R483, R484 | 5181498000  | 4.7 k ohm                           |
|            |             | CAPACITORS                          |
| C301, C302 | 5172110000  | Dip. Tant. 10 mfd 16V               |
| C303, C304 | 5172212000  | Ceramic 100 pfd 50V                 |
| C305       | 5171338000  | Elec. 33 mfd 16V                    |
| C306       | 5171339000  | Elec. 33 mfd 16V                    |
| C307       | 5171345000  | Elec. 47 mfd 6.3V                   |
| C308       | 5171344000  | Elec. 47 mfd 6.3V                   |
| C309, C310 | 5171856000  | Mylar 0.01 mfd 50V 5%               |
| C311, C312 | 5170086000  | Elec. 1 mfd 50V (LR)                |

| REF. NO.                  | PARTS NO.  | DESCRIPTION           |            |          |    |  |
|---------------------------|------------|-----------------------|------------|----------|----|--|
| C313, C314                | 5171864000 | Mylar                 | 0.022 mfd  | 50V      | 5% |  |
| C315                      | 5171856000 | Mylar                 | 0.01 mfd   | 50V      | 5% |  |
| C317, C318                | 5055417000 | Elec.                 | 100 mfd    | 25V      |    |  |
| C319                      | 5171285000 | Elec.                 | 1 mfd      | 50V      |    |  |
| C320                      | 5171284000 | Elec.                 | 1 mfd      | 50V      |    |  |
| C321, C322                | 5172200000 | Ceramic               | 10 pfd     | 50V      |    |  |
| C323, C324                | 5171284000 | Elec.                 | 1 mfd      | 50V      |    |  |
| C325, C326                | 5172200000 | Ceramic               | 10 pfd     | 50V      |    |  |
| C327, C328                | 5171280000 | Elec.                 | 0.47 mfd   | 50V      |    |  |
| C329                      | 5055417000 | Elec.                 | 100 mfd    | 25V      |    |  |
| C331, C332                | 5170077000 | Elec.                 | 10 mfd     | 16V (LR) |    |  |
| C333, C334                | 5172200000 | Ceramic               | 10 pfd     | 50V      |    |  |
| C335, C336                | 5171344000 | Elec.                 | 47 mfd     | 6.3V     |    |  |
| C337, C338                | 5171315000 | Elec.                 | 10 mfd     | 16V      |    |  |
| C339                      | 5055417000 | Elec.                 | 100 mfd    | 25V      |    |  |
| C341, C342                | 5171315000 | Elec.                 | 10 mfd     | 16V      |    |  |
| C343, C344                | 5171337000 | Elec.                 | 33 mfd     | 10V      |    |  |
| C345, C346                | 5172213000 | Ceramic               | 120 pfd    | 50V      |    |  |
| C347, C348                | 5172216000 | Ceramic               | 220 pfd    | 50V      |    |  |
| C349, C350                | 5170077000 | Elec.                 | 10 mfd     | 16V (LR) |    |  |
| C351                      | 5171284000 | Elec.                 | 1 mfd      | 50V      |    |  |
| C352                      | 5171285000 | Elec.                 | 1 mfd      | 50V      |    |  |
| C353, C354                | 5171357000 | Elec.                 | 100 mfd    | 10V      |    |  |
| C355, C356                | 5170352000 | Mylar                 | 0.001 mfd  | 50V      | 5% |  |
| C357, C358                | 5172219000 | Ceramic               | 390 pfd    | 50V      |    |  |
| C359                      | 5171284000 | Elec.                 | 1 mfd      | 50V      |    |  |
| C360                      | 5171285000 | Elec.                 | 1 mfd      | 50V      |    |  |
| C361, C362                | 5171305000 | Elec.                 | 4.7 mfd    | 25V      |    |  |
| C363, C364                | 5171355000 | Elec.                 | 100 mfd    | 6.3V     |    |  |
| C365                      | 5171285000 | Elec.                 | 1 mfd      | 50V      |    |  |
| C366                      | 5173195000 | Elec.                 | 100 mfd    | 16V      |    |  |
| C367                      | 5055460000 | Elec.                 | 470 mfd    | 6.3V     |    |  |
| C369                      | 5171285000 | Elec.                 | 1 mfd      | 50V      |    |  |
| C370                      | 5171284000 | Elec.                 | 1 mfd      | 50V      |    |  |
| C371, C372                | 5171315000 | Elec.                 | 10 mfd     | 16V      |    |  |
| C373, C374                | 5171344000 | Elec.                 | 47 mfd     | 6.3V     |    |  |
| C375, C376                | 5170077000 | Elec.                 | 10 mfd     | 16V (LR) |    |  |
| C377, C378                | 5170362000 | Mylar                 | 0.0027 mfd | 50V      | 5% |  |
| C379, C380                | 5054344000 | Polyst.               | 820 pfd    | 50V      | 5% |  |
| C381, C382                | 5170368000 | Mylar                 | 0.0047 mfd | 50V      |    |  |
| C383, C384                | 5054930000 | Mylar                 | 0.15 mfd   | 50V      | 5% |  |
| C385, C386                | 5171860000 | Mylar                 | 0.015 mfd  | 50V      | 5% |  |
| C387, C388                | 5171862000 | Mylar                 | 0.018 mfd  | 50V      | 5% |  |
| C389, C390                | 5055417000 | Elec.                 | 100 mfd    | 25V      |    |  |
| C391                      | 5171305000 | Elec.                 | 4.7 mfd    | 25V      |    |  |
| C392                      | 5172111000 | Elec.                 | 10 mfd     | 16V      |    |  |
| C397                      | 5171872000 | Mylar                 | 0.047 mfd  | 50V      | 5% |  |
| <b>VARIABLE RESISTORS</b> |            |                       |            |          |    |  |
| R313~R316                 | 5053446000 | Semi-fixed, 1 k ohm   |            |          |    |  |
| R327~R330                 | 5150092000 | Semi-fixed, 10 k ohm  |            |          |    |  |
| R333~R336                 | 5150097000 | Semi-fixed, 5 k ohm   |            |          |    |  |
| R362, R363                | 5150236000 | 10 k ohm A x 2        |            |          |    |  |
| R387, R388                | 5053446000 | Semi-fixed, 1 k ohm   |            |          |    |  |
| R393, R394                | 5150096000 | Semi-fixed, 100 k ohm |            |          |    |  |
| R405, R406                | 5150096000 | Semi-fixed, 100 k ohm |            |          |    |  |
| R421                      | 5150237000 | 100 k ohm A x 2       |            |          |    |  |
| R425~R428                 | 5150096000 | Semi-fixed, 100 k ohm |            |          |    |  |
| R471, R472                | 5053902000 | Semi-fixed, 200 ohm   |            |          |    |  |
| <b>MISCELLANEOUS</b>      |            |                       |            |          |    |  |
| C393~C396                 | 5054707000 | Trimmer Cap., 80 pfd  |            |          |    |  |

| REF. NO.   | PARTS NO.  | DESCRIPTION                 |
|------------|------------|-----------------------------|
| L301~L304  | 5056659000 | Coil, Trap; 3 mH            |
| L305~L308  | 5056637000 | Coil, Record EQ; 2.4/4.2 mH |
| J301, J302 | 5124045000 | Jack, MIC                   |
| J303       | 5124046000 | Jack, PHONES                |
| U302       | 5040090000 | OSC Unit                    |
| K301       | 5061137000 | Relay, Read; 12V            |
| S301, S304 | 5134095000 | Switch, Push; 4PDT          |
| S302, S303 | 5134094000 | Switch, Push; 2PDT          |
| S305       | 5131044000 | Switch, Slide               |
| S306       | 5131045000 | Switch, Slide               |
| S307       | 5131044000 | Switch, Slide               |
| P301, P304 | 5122128000 | Connector Plug, 4P          |
| P302       | 5122301000 | Connector Plug; 4P (Red)    |
| P303       | 5122132000 | Connector Plug; 8P          |

### REC AND PLAY AMPL PCB ASSY (X-7)

| REF. NO.   | PARTS NO.  | DESCRIPTION       |  |  |  |  |
|--|------------|-------------------|--|--|--|--|
|  | 5168999000 | PCB Assy          |  |  |  |  |
|  | 5167999000 | PCB               |  |  |  |  |
|  | IC         |                   |  |  |  |  |
| U301   | 5147053000 | HA11122W          |  |  |  |  |
| <b>TRANSISTORS</b>   |            |                   |  |  |  |  |
| Q301, Q302   | 5042461000 | 2SC1327(T)        |  |  |  |  |
| Q303, Q304   | 5145092000 | 2SC1740LN(S)      |  |  |  |  |
| Q305~Q308  | 5145036000 | 2SC945LK          |  |  |  |  |
| Q309~Q312  | 5145092000 | 2SC1740LN(S)      |  |  |  |  |
| Q313, Q314   | 5042461000 | 2SC1327(T)        |  |  |  |  |
| Q315, Q316   | 5145036000 | 2SC945LK          |  |  |  |  |
| Q317   | 5145135000 | 2SD400(E)         |  |  |  |  |
| Q318   | 5145036000 | 2SC945LK          |  |  |  |  |
| Q319   | 5145092000 | 2SC1740LN(S)      |  |  |  |  |
| Q321, Q322   | 5145092000 | 2SC1740LN(S)      |  |  |  |  |
| Q323, Q324   | 5145036000 | 2SC945LK          |  |  |  |  |
| Q325, Q326   | 5145095000 | 2SA826LN(S)       |  |  |  |  |
| Q327~Q330  | 5145036000 | 2SC945LK          |  |  |  |  |
| Q331   | 5145092000 | 2SC1740LN(S)      |  |  |  |  |
| Q332   | 5145185000 | 2SD655(E)         |  |  |  |  |
| Q333, Q334   | 5145036000 | 2SC945LK          |  |  |  |  |
| <b>DIODES</b>  |            |                   |  |  |  |  |
| D301~D304  | 5042213000 | 1N-60             |  |  |  |  |
| D305   | 5143154000 | Zener, EQA-01-06S |  |  |  |  |
| D306~D309  | 5042517000 | 1S2473VE          |  |  |  |  |
| <b>RESISTORS</b>   |            |                   |  |  |  |  |
| All resistors are rated $\pm 5\%$ tolerance, $\frac{1}{4}$ watt and of carbon type unless otherwise noted. |            |                   |  |  |  |  |
| R301, R302   | 5181550000 | 680 k ohm         |  |  |  |  |
| R305, R306   | 5181482000 | 1 k ohm           |  |  |  |  |
| R307, R308   | 5181530000 | 100 k ohm         |  |  |  |  |
| R309, R310   | 5181482000 | 1 k ohm           |  |  |  |  |

| REF. NO.   | PARTS NO.  | DESCRIPTION           |
|------------|------------|-----------------------|
| R311, R312 | 5181458000 | 100 ohm               |
| R317, R318 | 5181544000 | 390 k ohm             |
| R319, R320 | 5181506000 | 10 k ohm              |
| R321, R322 | 5181482000 | 1 k ohm               |
| R323, R324 | 5181458000 | 100 ohm               |
| R325, R326 | 5181542000 | 330 k ohm             |
| R331, R332 | 5181482000 | 1 k ohm               |
| R337, R338 | 5181482000 | 1 k ohm               |
| R339, R340 | 5181498000 | 4.7 k ohm             |
| R341, R342 | 5181514000 | 22 k ohm              |
| R343, R344 | 5181494000 | 3.3 k ohm             |
| R347, R348 | 5181548000 | 560 k ohm             |
| R349, R350 | 5181520000 | 39 k ohm              |
| R351, R352 | 5181474000 | 470 ohm               |
| R353, R354 | 5181548000 | 560 k ohm             |
| R355, R356 | 5181520000 | 39 k ohm              |
| R357, R358 | 5181500000 | 5.6 k ohm             |
| R359, R360 | 5181474000 | 470 ohm               |
| R361       | 5184265000 | 470 ohm Non Flammable |
| R365, R366 | 5181482000 | 1 k ohm               |
| R367, R368 | 5181540000 | 270 k ohm             |
| R369, R370 | 5181526000 | 68 k ohm              |
| R371, R372 | 5181522000 | 47 k ohm              |
| R373, R374 | 5181460000 | 120 ohm               |
| R375, R376 | 5181508000 | 12 k ohm              |
| R377, R378 | 5181482000 | 1 k ohm               |
| R379       | 5181484000 | 1.2 k ohm             |
| R381, R382 | 5181524000 | 56 k ohm              |
| R383, R384 | 5181482000 | 1 k ohm               |
| R385, R386 | 5181476000 | 560 ohm               |
| R389, R390 | 5181516000 | 27 k ohm              |
| R391, R392 | 5181550000 | 680 k ohm             |
| R395, R396 | 5181482000 | 1 k ohm               |
| R397, R398 | 5181506000 | 10 k ohm              |
| R399, R400 | 5181458000 | 100 ohm               |
| R401~R404  | 5181530000 | 100 k ohm             |
| R407, R408 | 5181492000 | 2.7 k ohm             |
| R409, R410 | 5181506000 | 10 k ohm              |
| R411, R412 | 5181486000 | 1.5 k ohm             |
| R413       | 5180422900 | 15 ohm Non Flammable  |
| R414       | 5181490000 | 2.2 k ohm             |
| R415       | 5181482000 | 1 k ohm               |
| R416       | 5181488000 | 1.8 k ohm             |
| R417       | 5181490000 | 2.2 k ohm             |
| R418       | 5181484000 | 1.2 k ohm             |
| R419       | 5181514000 | 22 k ohm              |
| R420       | 5181518000 | 33 k ohm              |
| R423, R424 | 5181530000 | 100 k ohm             |
| R429, R430 | 5181488000 | 1.8 k ohm             |
| R431, R432 | 5181482000 | 1 k ohm               |
| R433, R434 | 5181538000 | 220 k ohm             |
| R435, R436 | 5181530000 | 100 k ohm             |
| R437, R438 | 5181506000 | 10 k ohm              |
| R439, R440 | 5181514000 | 22 k ohm              |
| R441, R442 | 5181484000 | 1.2 k ohm             |
| R443, R444 | 5181476000 | 560 ohm               |
| R445, R446 | 5181458000 | 100 ohm               |
| R447, R448 | 5181498000 | 4.7 k ohm             |
| R449, R450 | 5181490000 | 2.2 k ohm             |
| R451, R452 | 5181512000 | 18 k ohm              |
| R453, R454 | 5181510000 | 15 k ohm              |
| R455, R456 | 5181482000 | 1 k ohm               |
| R457, R458 | 5181490000 | 2.2 k ohm             |
| R459~R462  | 5181458000 | 100 ohm               |

| REF. NO.          | PARTS NO.  | DESCRIPTION                         |
|-------------------|------------|-------------------------------------|
| R463~R466         | 5181514000 | 22 k ohm                            |
| R467, R468        | 5184265000 | 470 ohm Non Flammable               |
| R469              | 5181990000 | 47 ohm $\frac{1}{2}W$ Non Flammable |
| R470              | 5181996000 | 82 ohm $\frac{1}{2}W$ Non Flammable |
| R473              | 5181514000 | 22 k ohm                            |
| R474              | 5181482000 | 1 k ohm                             |
| R475              | 5181520000 | 39 k ohm                            |
| R476              | 5181458000 | 100 ohm                             |
| R477              | 5181518000 | 33 k ohm                            |
| R478~R480         | 5181506000 | 10 k ohm                            |
| R481, R482        | 5181524000 | 56 k ohm                            |
| R483, R484        | 5181498000 | 4.7 k ohm                           |
| <b>CAPACITORS</b> |            |                                     |
| C301, C302        | 5172110000 | Dip. Tant. 10 mfd 16V               |
| C303, C304        | 5172212000 | Ceramic 100 pfd 50V                 |
| C305              | 5171338000 | Elec. 33 mfd 16V                    |
| C306              | 5171339000 | Elec. 33 mfd 16V                    |
| C307              | 5171345000 | Elec. 47 mfd 6.3V                   |
| C308              | 5171344000 | Elec. 47 mfd 6.3V                   |
| C309, C310        | 5171856000 | Mylar 0.01 mfd 50V 5%               |
| C311, C312        | 5170086000 | Elec. 1 mfd 50V (LR)                |
| C313, C314        | 5171868000 | Mylar 0.033 mfd 50V 5%              |
| C315              | 5171856000 | Mylar 0.01 mfd 50V 5%               |
| C317, C318        | 5055417000 | Elec. 100 mfd 25V                   |
| C319              | 5171285000 | Elec. 1 mfd 50V                     |
| C320              | 5171284000 | Elec. 1 mfd 50V                     |
| C321, C322        | 5172200000 | Ceramic 10 pfd 50V                  |
| C323, C324        | 5171284000 | Elec. 1 mfd 50V                     |
| C325, C326        | 5172200000 | Ceramic 10 pfd 50V                  |
| C327, C328        | 5171280000 | Elec. 0.47 mfd 50V                  |
| C329              | 5055417000 | Elec. 100 mfd 25V                   |
| C331, C332        | 5170077000 | Elec. 10 mfd 16V (LR)               |
| C333, C334        | 5172200000 | Ceramic 10 pfd 50V                  |
| C335, C336        | 5171344000 | Elec. 47 mfd 6.3V                   |
| C337, C338        | 5171315000 | Elec. 10 mfd 16V                    |
| C339              | 5055417000 | Elec. 100 mfd 25V                   |
| C341, C342        | 5171315000 | Elec. 10 mfd 16V                    |
| C343, C344        | 5171337000 | Elec. 33 mfd 10V                    |
| C345, C346        | 5172213000 | Ceramic 120 pfd 50V                 |
| C347, C348        | 5172216000 | Ceramic 220 pfd 50V                 |
| C349, C350        | 5170077000 | Elec. 10 mfd 16V (LR)               |
| C351              | 5171284000 | Elec. 1 mfd 50V                     |
| C352              | 5171285000 | Elec. 1 mfd 50V                     |
| C353, C354        | 5171357000 | Elec. 100 mfd 10V                   |
| C355, C356        | 5170352000 | Mylar 0.001 mfd 50V 5%              |
| C357, C358        | 5172219000 | Ceramic 390 pfd 50V                 |
| C359              | 5171284000 | Elec. 1 mfd 50V                     |
| C360              | 5171285000 | Elec. 1 mfd 50V                     |
| C361, C362        | 5171305000 | Elec. 4.7 mfd 25V                   |
| C363, C364        | 5171355000 | Elec. 100 mfd 6.3V                  |
| C365              | 5171285000 | Elec. 1 mfd 50V                     |
| C366              | 5173195000 | Elec. 100 mfd 16V                   |
| C367              | 5055460000 | Elec. 470 mfd 6.3V                  |
| C369              | 5171285000 | Elec. 1 mfd 50V                     |
| C370              | 5171284000 | Elec. 1 mfd 50V                     |
| C371, C372        | 5171315000 | Elec. 10 mfd 16V                    |
| C373, C374        | 5171344000 | Elec. 47 mfd 6.3V                   |
| C375, C376        | 5170077000 | Elec. 10 mfd 16V (LR)               |
| C377, C378        | 5170362000 | Mylar 0.0027 mfd 50V 5%             |
| C379, C380        | 5054344000 | Polyst. 820 pfd 50V 5%              |
| C381, C382        | 5170368000 | Mylar 0.0047 mfd 50V 5%             |
| C383, C384        | 5054930000 | Mylar 0.15 mfd 50V 5%               |

| REF. NO.   | PARTS NO.  | DESCRIPTION |           |     |    |  |
|------------|------------|-------------|-----------|-----|----|--|
| C385, C386 | 5171860000 | Mylar       | 0.015 mfd | 50V | 5% |  |
| C387, C388 | 5171862000 | Mylar       | 0.018 mfd | 50V | 5% |  |
| C389, C390 | 5055417000 | Elec.       | 100 mfd   | 25V |    |  |
| C391       | 5171305000 | Elec.       | 4.7 mfd   | 25V |    |  |
| C392       | 5172111000 | Elec.       | 10 mfd    | 16V |    |  |
| C397       | 5171872000 | Mylar       | 0.047 mfd | 50V | 5% |  |

### VARIABLE RESISTORS

|            |            |                       |
|------------|------------|-----------------------|
| R313, R314 | 5053446000 | Semi-fixed, 1 k ohm   |
| R327, R328 | 5150092000 | Semi-fixed, 10 k ohm  |
| R333, R334 | 5150097000 | Semi-fixed, 5 k ohm   |
| R362, R363 | 5150236000 | 10 k ohm A x 2        |
| R387, R388 | 5053446000 | Semi-fixed, 1 k ohm   |
| R393, R394 | 5150096000 | Semi-fixed, 100 k ohm |
| R405, R406 | 5150096000 | Semi-fixed, 100 k ohm |
| R421       | 5150238000 | 100 k ohm A x 2       |
| R425, R426 | 5150096000 | Semi-fixed, 100 k ohm |
| R471       | 5053902000 | Semi-fixed, 200 ohm   |

### MISCELLANEOUS

|            |            |                             |
|------------|------------|-----------------------------|
| C393, C394 | 5054707000 | Trimmer Cap., 80 pfd        |
| L301~L304  | 5056659000 | Coil, Trap; 3 mH            |
| L305, L306 | 5056637000 | Coil, Record EQ; 2.4/4.2 mH |
| J301, J302 | 5124045000 | Jack, MIC                   |
| J303       | 5124046000 | Jack, PHONES                |
| U302       | 5040090000 | OSC Unit                    |
| K301       | 5061137000 | Relay, Read; 12V            |
| S301, S304 | 5134095000 | Switch, Push; 4PDT          |
| S302, S303 | 5134094000 | Switch, Push; 2PDT          |
| P301, P304 | 5122126000 | Connector Plug; 2P          |
| P302       | 5122299000 | Connector Plug; 2P (Red)    |
| P303       | 5122128000 | Connector Plug; 4P          |

### CONTROL PCB ASSY (X-7R)

| REF. NO.    | PARTS NO.   | DESCRIPTION |  |
|-------------|-------------|-------------|--|
|             | 5168992000  | PCB Assy    |  |
|             | 5167932100  | PCB         |  |
| ICs         |             |             |  |
| U31         | ▲5147058000 | NJM78M05A   |  |
| U32         | 5147054000  | AN6251      |  |
| U33~U37     | 5147056000  | HD7400P     |  |
| U38~U42     | 5147057000  | HD7402P     |  |
| U43         | 5147039000  | NJM2901N    |  |
| TRANSISTORS |             |             |  |
| Q31         | ▲5145087000 | 2SD313(E)   |  |
| Q32         | 5042625000  | 2SC1318(S)  |  |
| Q33~Q37     | 5042383000  | 2SC536(F)   |  |
| Q38         | 5042553000  | 2SA733(P)   |  |
| Q39         | 5042383000  | 2SC536(F)   |  |
| Q40         | 5042564000  | 2SC1061(C)  |  |
| Q42         | 5042383000  | 2SC536(F)   |  |
| Q44~Q52     | 5042383000  | 2SC536(F)   |  |
| Q53         | 5042553000  | 2SA733(P)   |  |
| Q54~Q57     | 5042383000  | 2SC536(F)   |  |

| REF. NO. | PARTS NO.  | DESCRIPTION |  |
|----------|------------|-------------|--|
| Q58      | 5042553000 | 2SA733(P)   |  |
| Q59      | 5042383000 | 2SC536(F)   |  |
| Q60      | 5042553000 | 2SA733(P)   |  |
| Q62, Q63 | 5042553000 | 2SA733(P)   |  |
| Q65, Q66 | 5042564000 | 2SC1061(C)  |  |
| Q67~Q71  | 5042383000 | 2SC-536(F)  |  |
| Q76, Q77 | 5042553000 | 2SA-733(P)  |  |
| Q78, Q79 | 5145087000 | 2SD-313(E)  |  |
| Q80, Q81 | 5042625000 | 2SC-1318(S) |  |
| Q82~Q84  | 5142553000 | 2SA-733(P)  |  |
| Q85, Q86 | 5145129000 | 2SB-507(E)  |  |
| Q87, Q88 | 5042625000 | 2SC-1318(S) |  |

### DIODES

|          |             |                  |
|----------|-------------|------------------|
| D31~D36  | ▲5143243000 | ERB12-02GI       |
| D37      | 5143154000  | Zener, EQA01-06S |
| D38      | ▲5143142000 | M4C-51           |
| D39~D42  | 5143118000  | 1S2473HJ         |
| D43, D44 | 5143243000  | ERB12-02GI       |
| D45~D47  | 5143118000  | 1S2473HJ         |
| D52, D53 | 5143118000  | 1S2473HJ         |
| D56, D57 | 5143243000  | ERB12-02GI       |
| D58~D60  | 5143118000  | 1S2473HJ         |
| D61      | 5143017000  | U05C             |
| D62, D63 | 5143243000  | ERB12-02GI       |
| D65~D67  | 5143243000  | ERB12-02GI       |

### RESISTORS

All resistors are rated ±5% tolerance, 1/4 watt and of carbon resistors unless otherwise noted.

|          |             |           |               |
|----------|-------------|-----------|---------------|
| R31      | ▲5184209000 | 2.2 ohm   | Non Flammable |
| R32      | 5181472000  | 390 ohm   |               |
| R33      | 5181478000  | 680 ohm   |               |
| R34      | 5184306000  | 3.3 ohm   | 2W Cement     |
| R35      | 5181502000  | 6.8 k ohm |               |
| R36      | 5181506000  | 10 k ohm  |               |
| R37      | 5181496000  | 3.9 k ohm |               |
| R38      | 5181512000  | 18 k ohm  |               |
| R39      | 5181502000  | 6.8 k ohm |               |
| R40      | ▲5184233000 | 22 k ohm  | Non Flammable |
| R41      | 5181506000  | 10 k ohm  |               |
| R42      | 5181458000  | 100 ohm   |               |
| R43      | 5181506000  | 10 k ohm  |               |
| R44, R45 | 5181486000  | 1.5 k ohm |               |
| R46      | 5181522000  | 47 k ohm  |               |
| R47      | 5181514000  | 22 k ohm  |               |
| R48      | 5181536000  | 180 k ohm |               |
| R49      | 5181458000  | 100 ohm   |               |
| R50      | 5181510000  | 15 k ohm  |               |
| R51      | 5181522000  | 47 k ohm  |               |
| R52      | 5181530000  | 100 k ohm |               |
| R53      | 5181494000  | 3.3 k ohm |               |
| R54, R55 | 5181514000  | 22 k ohm  |               |
| R56      | 5181522000  | 47 k ohm  |               |
| R57      | 5181482000  | 1 k ohm   |               |
| R58      | 5181514000  | 22 k ohm  |               |
| R59      | 5181526000  | 68 k ohm  |               |
| R60, R61 | 5181530000  | 100 k ohm |               |
| R62      | 5181522000  | 47 k ohm  |               |
| R63      | 5181494000  | 3.3 k ohm |               |
| R64      | 5181514000  | 22 k ohm  |               |
| R65      | 5181510000  | 15 k ohm  |               |
| R66      | 5181518000  | 33 k ohm  |               |

| REF. NO.   | PARTS NO.  | DESCRIPTION                      |
|------------|------------|----------------------------------|
| R67        | 5181506000 | 10 k ohm                         |
| R68        | 5181522000 | 47 k ohm                         |
| R69        | 5180062000 | 150 ohm <sup>1/2W</sup>          |
| R70        | 5181514000 | 22 k ohm                         |
| R71, R72   | 5181522000 | 47 k ohm                         |
| R73        | 5181530000 | 100 k ohm                        |
| R74        | 5181522000 | 47 k ohm                         |
| R75        | 5181494000 | 3.3 k ohm                        |
| R76, R77   | 5181506000 | 10 k ohm                         |
| R78~R87    | 5181458000 | 100 ohm                          |
| R88~R97    | 5181506000 | 10 k ohm                         |
| R98        | 5181458000 | 100 ohm                          |
| R103       | 5181506000 | 10 k ohm                         |
| R104       | 5181458000 | 100 ohm                          |
| R105       | 5181514000 | 22 k ohm                         |
| R106       | 5181506000 | 10 k ohm                         |
| R107       | 5181518000 | 33 k ohm                         |
| R108       | 5181510000 | 15 k ohm                         |
| R109~R111  | 5181506000 | 10 k ohm                         |
| R112       | 5181458000 | 100 ohm                          |
| R113       | 5181514000 | 22 k ohm                         |
| R114, R115 | 5181530000 | 100 k ohm                        |
| R116       | 5181494000 | 3.3 k ohm                        |
| R117       | 5181506000 | 10 k ohm                         |
| R118, R119 | 5181530000 | 100 k ohm                        |
| R120       | 5181494000 | 3.3 k ohm                        |
| R121       | 5181522000 | 47 k ohm                         |
| R122       | 5181514000 | 22 k ohm                         |
| R123~R125  | 5181522000 | 47 k ohm                         |
| R127, R128 | 5181530000 | 100 k ohm                        |
| R129       | 5181522000 | 47 k ohm                         |
| R130       | 5181530000 | 100 k ohm                        |
| R131       | 5181494000 | 3.3 k ohm                        |
| R132       | 5181522000 | 47 k ohm                         |
| R133       | 5181514000 | 22 k ohm                         |
| R134       | 5181458000 | 100 ohm                          |
| R135       | 5181530000 | 100 k ohm                        |
| R136       | 5181522000 | 47 k ohm                         |
| R137~R139  | 5181530000 | 100 k ohm                        |
| R140       | 5181522000 | 47 k ohm                         |
| R142, R143 | 5181506000 | 10 k ohm                         |
| R145, R146 | 5181522000 | 47 k ohm                         |
| R148, R149 | 5180062000 | 150 ohm <sup>1/2W</sup>          |
| R151, R152 | 5181514000 | 22 k ohm                         |
| R153       | 5181522000 | 47 k ohm                         |
| R154       | 5181482000 | 1 k ohm                          |
| R155       | 5181518000 | 33 k ohm                         |
| R156       | 5181510000 | 15 k ohm                         |
| R157~R160  | 5181506000 | 10 k ohm                         |
| R165, R166 | 5181522000 | 47 k ohm                         |
| R167, R168 | 5181490000 | 2.2 k ohm                        |
| R170       | 5181506000 | 10 k ohm                         |
| R171       | 5181494000 | 3.3 k ohm                        |
| R174, R175 | 5181450000 | 47 ohm                           |
| R176       | 5181480000 | 820 ohm                          |
| R177, R178 | 5181482000 | 1 k ohm                          |
| R179, R180 | 5184410000 | 3.3 k ohm <sup>5W Cement</sup>   |
| R181, R182 | 5181514000 | 22 k ohm                         |
| R183, R184 | 5181480000 | 820 ohm                          |
| R185       | 5181484000 | 1.2 k ohm                        |
| R186       | 5181522000 | 47 k ohm                         |
| R187       | 5181490000 | 2.2 k ohm                        |
| R188~R190  | 5181522000 | 47 k ohm                         |
| R191, R192 | 5181494000 | 3.3 k ohm                        |
| R193, R194 | 5184763000 | 220 ohm <sup>1W Metal Film</sup> |

| REF. NO.          | PARTS NO.  | DESCRIPTION                  |
|-------------------|------------|------------------------------|
| R195, R196        | 5181506000 | 10 k ohm                     |
| R197, R198        | 5181514000 | 22 k ohm                     |
| R199              | 5184306000 | 3.3 ohm <sup>2W Cement</sup> |
| R200              | 5181538000 | 220 k ohm                    |
| <b>CAPACITORS</b> |            |                              |
| C31, C32          | 5055440000 | Elec. 470 mfd 16V            |
| C33               | 5055585000 | Elec. 1000 mfd 50V           |
| C34               | 5055463000 | Elec. 100 mfd 35V            |
| C35               | 5055438000 | Elec. 220 mfd 35V            |
| C36               | 5055463000 | Elec. 100 mfd 35V            |
| C37, C38          | 5055714800 | Elec. 2200 mfd 25V           |
| C39, C40          | 5055585000 | Elec. 1000 mfd 50V           |
| C41               | 5055454000 | Elec. 1 mfd 50V              |
| C42               | 5054204000 | Ceramic 0.01 mfd 50V         |
| C43               | 5055573000 | Elec. 3.3 mfd 50V            |
| C44, C45          | 5055498000 | Elec. 2.2 mfd 50V            |
| C46, C47          | 5054977000 | Elec. 10 mfd 16V (KU)        |
| C48               | 5055472000 | Elec. 22 mfd 10V             |
| C49               | 5055453000 | Elec. 4.7 mfd 25V            |
| C50~C57           | 5055573000 | Elec. 3.3 mfd 50V            |
| C58~C60           | 5054204000 | Ceramic 0.01 mfd 50V         |
| C61               | 5055472000 | Elec. 22 mfd 10V             |
| C62, C63          | 5054204000 | Ceramic 0.01 mfd 50V         |
| C64               | 5055472000 | Elec. 22 mfd 10V             |
| C66               | 5054204000 | Ceramic 0.01 mfd 50V         |
| C67               | 5055472000 | Elec. 22 mfd 10V             |
| C68               | 5054204000 | Ceramic 0.01 mfd 50V         |
| C69               | 5055472000 | Elec. 22 mfd 10V             |
| C70               | 5054977000 | Elec. 10 mfd 16V (KU)        |
| C71               | 5055405000 | Elec. 10 mfd 16V             |
| C72, C73          | 5055454000 | Elec. 1 mfd 50V              |
| C75               | 5055472000 | Elec. 22 mfd 10V             |
| C78               | 5055910000 | Elec. 10 mfd 63V             |
| C79               | 5055498000 | Elec. 2.2 mfd 50V            |
| C80               | 5055714800 | Elec. 2200 mfd 25V           |
| C81               | 5172236000 | Ceramic 0.01 mfd 50V         |

| REF. NO. | PARTS NO.  | DESCRIPTION                 |
|----------|------------|-----------------------------|
| K31, K32 | 5122127000 | Connector, Plug; 3P         |
|          | 5122139000 | Connector, Plug; 15P        |
|          | 5122131000 | Connector, Plug; 7P         |
|          | 5122132000 | Connector, Plug; 8P         |
|          | 5122135000 | Connector, Plug; 11P        |
|          | 5122183000 | Connector, Plug; 2P (Black) |
|          | 5122184000 | Connector, Plug; 3P (Black) |
|          | 5033291000 | Plate, Insulating           |
|          | 5033295000 | Tube, Insulating            |
|          | 5061144000 | Relay, G2U-113P (24V)       |

**CONTROL PCB ASSY (X-7)**

| REF. NO. | PARTS NO.  | DESCRIPTION |
|----------|------------|-------------|
|          | 5168993000 | PCB Assy    |
|          | 5167933000 | PCB         |

| REF. NO.   | PARTS NO.   | DESCRIPTION           | REF. NO.   | PARTS NO.  | DESCRIPTION           |
|--|-------------|-----------------------|------------|------------|-----------------------|
| <b>ICs</b>   |             |                       |            |            |                       |
| U31  | ▲5147058000 | NJM78M05A             | R69        | 5181514000 | 22 k ohm              |
| U32  | 5147054000  | AN6251                | R70        | 5181506000 | 10 k ohm              |
| U33~U35  | 5147056000  | HD7400P               | R71        | 5181458000 | 100 ohm               |
| U36, U37   | 5147057000  | HD7402P               | R72        | 5181514000 | 22 k ohm              |
| <b>TRANSISTORS</b>   |             |                       |            |            |                       |
| Q31  | ▲5145087000 | 2SD313(E)             | R73        | 5181530000 | 100 k ohm             |
| Q32  | 5042625000  | 2SC1318(S)            | R74        | 5181538000 | 220 k ohm             |
| Q33~Q41  | 5042383000  | 2SC536(F)             | R75, R76   | 5181506000 | 10 k ohm              |
| Q42  | 5042553000  | 2SA733(P)             | R77        | 5181530000 | 100 k ohm             |
| Q43~Q45  | 5042383000  | 2SC536(F)             | R78        | 5181494000 | 3.3 k ohm             |
| Q46  | 5042553000  | 2SA733(P)             | R79        | 5181506000 | 10 k ohm              |
| Q47  | 5042383000  | 2SC536(F)             | R80        | 5181530000 | 100 k ohm             |
| Q48  | 5042553000  | 2SA733(P)             | R81        | 5181494000 | 3.3 k ohm             |
| Q51, Q52   | 5042553000  | 2SA733(P)             | R82~R85    | 5181522000 | 47 k ohm              |
| Q53, Q54   | 5042564000  | 2SC1061(C)            | R87        | 5181530000 | 100 k ohm             |
| Q55  | 5042383000  | 2SC536(F)             | R88        | 5181522000 | 47 k ohm              |
| Q58~Q60  | 5042383000  | 2SC536(F)             | R89        | 5181530000 | 100 k ohm             |
| Q62~Q65  | 5042553000  | 2SA733(P)             | R90        | 5181494000 | 3.3 k ohm             |
| Q68, Q69   | 5042625000  | 2SC1318(S)            | R91        | 5181522000 | 47 k ohm              |
| Q70, Q71   | 5145087000  | 2SD313(E)             | R92        | 5181458000 | 100 ohm               |
| Q72  | 5145192000  | 2SB507(E)             | R93        | 5181530000 | 100 k ohm             |
| Q73  | 5042625000  | 2SC1318(S)            | R94        | 5181522000 | 47 k ohm              |
| Q78  | 5042383000  | 2SC536(F)             | R95~R97    | 5181530000 | 100 k ohm             |
| <b>DIODES</b>  |             |                       |            |            |                       |
| D31~D36  | ▲5143243000 | ERB12-02GI            | R98        | 5181522000 | 47 k ohm              |
| D37  | 5143154000  | Zener, EQA01-06S      | R103, R104 | 5181506000 | 10 k ohm              |
| D38  | ▲5143142000 | M4C-51                | R105, R106 | 5181522000 | 47 k ohm              |
| D39  | 5143118000  | 1S2473HJ              | R107, R108 | 5180062000 | 150 ohm               |
| D41  | 5143118000  | 1S2473HJ              | R109, R110 | 5181514000 | 22 k ohm              |
| D45, D46   | 5143118000  | 1S2473HJ              | R111       | 5181530000 | 100 k ohm             |
| D48, D49   | 5143243000  | ERB12-02GI            | R112       | 5181518000 | 33 k ohm              |
| D50  | 5143118000  | 1S2473HJ              | R113       | 5181510000 | 15 k ohm              |
| D53  | 5143118000  | 1S2473HJ              | R114, R115 | 5181522000 | 47 k ohm              |
| D54  | 5143017000  | U05C                  | R116, R117 | 5181506000 | 10 k ohm              |
| D55, D56   | 5143243000  | ERB12-02GI            | R118, R119 | 5181490000 | 2.2 k ohm             |
| D57, D58   | 5143118000  | 1S2473HJ              | R120       | 5181484000 | 1.2 k ohm             |
| <b>RESISTORS</b>   |             |                       |            |            |                       |
| All resistors are rated $\pm 5\%$ tolerance, $\frac{1}{4}$ watt and of carbon type unless otherwise noted. |             |                       |            |            |                       |
| R31  | ▲5184209000 | 2.2 ohm Non Flammable | R121, R122 | 5181522000 | 47 k ohm              |
| R32  | 5181472000  | 390 ohm               | R123       | 5181490000 | 2.2 k ohm             |
| R33  | 5181478000  | 680 ohm               | R124       | 5181522000 | 47 k ohm              |
| R34  | 5184306000  | 3.3 ohm 2W Cement     | R125       | 5181506000 | 10 k ohm              |
| R35  | 5181502000  | 6.8 k ohm             | R127       | 5181506000 | 10 k ohm              |
| R36  | 5181506000  | 10 k ohm              | R128       | 5181494000 | 3.3 k ohm             |
| R37  | 5181496000  | 3.9 k ohm             | R131, R132 | 5181450000 | 47 ohm                |
| R38  | 5181512000  | 18 k ohm              | R133, R134 | 5184410000 | 3.3 ohm 5W Cement     |
| R39  | 5181502000  | 6.8 k ohm             | R135, R136 | 5181514000 | 22 k ohm              |
| R40  | ▲5184233000 | 22 ohm Non Flammable  | R137, R138 | 5181480000 | 820 ohm               |
| R41  | 5181506000  | 10 k ohm              | R139       | 5181488000 | 1.8 k ohm             |
| R42, R43   | 5181494000  | 3.3 k ohm             | R140       | 5181482000 | 1 k ohm               |
| R44, R45   | 5181512000  | 18 k ohm              | R141       | 5181494000 | 3.3 k ohm             |
| R46~R53  | 5181458000  | 100 ohm               | R142       | 5184763000 | 220 ohm 1W Metal Film |
| R54~R61  | 5181506000  | 10 k ohm              | R143       | 5181506000 | 10 k ohm              |
| R62  | 5181458000  | 100 ohm               | R144       | 5181514000 | 22 k ohm              |
| R63  | 5181506000  | 10 k ohm              | R150       | 5181530000 | 100 k ohm             |
|  |             |                       | R151       | 5181482000 | 1 k ohm               |

## CONNECTOR PCB ASSY (X-7)

| REF. NO.  | PARTS NO.  | DESCRIPTION                 |
|---|------------|-----------------------------|
| <b>CAPACITORS</b>                                 |            |                             |
| C31, C32  | 5055440000 | Elec. 470 mfd 16V           |
| C33   | 5055585000 | Elec. 1000 mfd 50V          |
| C34   | 5055463000 | Elec. 100 mfd 35V           |
| C35   | 5055438000 | Elec. 220 mfd 35V           |
| C36   | 5055463000 | Elec. 100 mfd 35V           |
| C37, C38  | 5055585000 | Elec. 1000 mfd 50V          |
| C39, C40  | 5055714800 | Elec. 2200 mfd 25V          |
| C41   | 5171284000 | Elec. 1 mfd 50V             |
| C42   | 5172236000 | Ceramic 0.01 mfd 50V        |
| C43~C49   | 5171299000 | Elec. 3.3 mfd 50V           |
| C50, C51  | 5172236000 | Ceramic. 0.01 mfd 50V       |
| C52   | 5171299000 | Elec. 3.3 mfd 50V           |
| C53, C54  | 5171325000 | Elec. 22 mfd 10V            |
| C55   | 5172236000 | Ceramic 0.01 mfd 50V        |
| C57   | 5054977000 | Elec. 10 mfd 16V            |
| C58   | 5171314000 | Elec. 10 mfd 16V            |
| C59   | 5172236000 | Ceramic 0.01 mfd 50V        |
| C60   | 5171324000 | Elec. 22 mfd 10V            |
| C61, C62  | 5171325000 | Elec. 22 mfd 10V            |
| C64   | 5171324000 | Elec. 22 mfd 10V            |
| C65, C66  | 5171284000 | Elec. 1 mfd 50V             |
| C69   | 5171291000 | Elec. 2.2 mfd 50V           |
| C70   | 5171323000 | Elec. 10 mfd 63V            |
| C72   | 5172236000 | Ceramic 0.01 mfd 50V        |
| <b>MISCELLANEOUS</b>                              |            |                             |
| P31   | 5122129000 | Connector, Plug; 5P         |
| P33   | 5122183000 | Connector, Plug; 2P (Black) |
| P34   | 5122136000 | Connector, Plug; 12P        |
| P35   | 5122184000 | Connector, Plug; 3P (Black) |
| P36   | 5122127000 | Connector, Plug; 3P         |
| P38   | 5122133000 | Connector Plug; 9P          |
|   | 5147041000 | Socket, IC; 24P             |
|   | 5033291000 | Plate, Insulating           |
|   | 5033295000 | Tube, Insulating            |
| <b>CONNECTOR PCB ASSY (X-7R)</b>                  |            |                             |
| REF. NO.  | PARTS NO.  | DESCRIPTION                 |
|   | 5168931000 | PCB Assy                    |
|   | 5167931000 | PCB                         |
| <b>DIODES</b>                                     |            |                             |
| D601  | 5143118000 | 1S2473HJ                    |
| <b>CARBON RESISTORS</b>                           |            |                             |
| All resistors are rated ±5% tolerance and ¼ watt. |            |                             |
| R601  | 5183122000 | 47 k ohm                    |
| R602, R603  | 5183090000 | 2.2 k ohm                   |
| R604  | 5183086000 | 1.5 k ohm                   |
| R605~R607   | 5183088000 | 1.8 k ohm                   |
| <b>MISCELLANEOUS</b>                              |            |                             |
|   | 5122158000 | Connector, Plug; 15P        |

| REF. NO.  | PARTS NO.  | DESCRIPTION          |
|---|------------|----------------------|
|   | 5158002000 | PCB Assy             |
|   | 5167931000 | PCB                  |
| <b>CARBON RESISTORS</b>                           |            |                      |
| All resistors are rated ±5% tolerance and ¼ watt. |            |                      |
| R601  | 5183088000 | 1.8 k ohm            |
| R602  | 5183090000 | 2.2 k ohm            |
| R604  | 5183086000 | 1.5 k ohm            |
| R605  | 5183088000 | 1.8 k ohm            |
| R609  | 5183090000 | 2.2 k ohm            |
| <b>MISCELLANEOUS</b>                              |            |                      |
|   | 5122155000 | Connector, Plug; 12P |
| <b>SPEED SW PCB ASSY</b>                          |            |                      |
| REF. NO.  | PARTS NO.  | DESCRIPTION          |
|   | 5158001000 | PCB Assy             |
|   | 5157001000 | PCB                  |
| <b>TRANSISTOR</b>                                 |            |                      |
| Q621  | 5042383000 | 2SC536(F)            |
| <b>CARBON RESISTORS</b>                           |            |                      |
| All resistors are rated ±5% tolerance and ¼ watt. |            |                      |
| R621  | 5057058000 | 100 ohm              |
| R622  | 5057122000 | 47 k ohm             |
| R623  | 5057114000 | 22 k ohm             |
| R626  | 5057058000 | 100 ohm              |
| <b>CAPACITORS</b>                                 |            |                      |
| C621, C622  | 5055454000 | Elec. 1 mfd 50V      |
| <b>MISCELLANEOUS</b>                              |            |                      |
| P621  | 5122130000 | Connector, Plug; 6P  |
|   | 5134093000 | Switch, Push; 6PDT   |