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TEAC®



SERVICE MANUAL

X-7R/X-7

Stereo Tape Deck

1 SPECIFICATIONS AND SERVICE DATA

SPECIFICATIONS

Track System ¼-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 (7-½ ips) and 9.5 cm/s (3-¾ 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

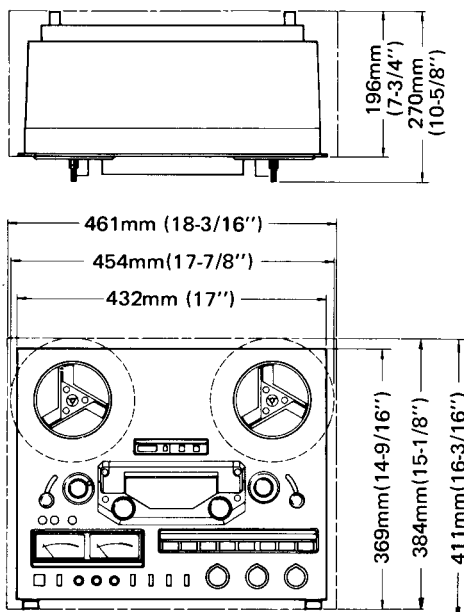
100/117/220/240V, AC 50/60Hz, 77W, 72W for X-7
(General export model)

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 9.5 cm/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.

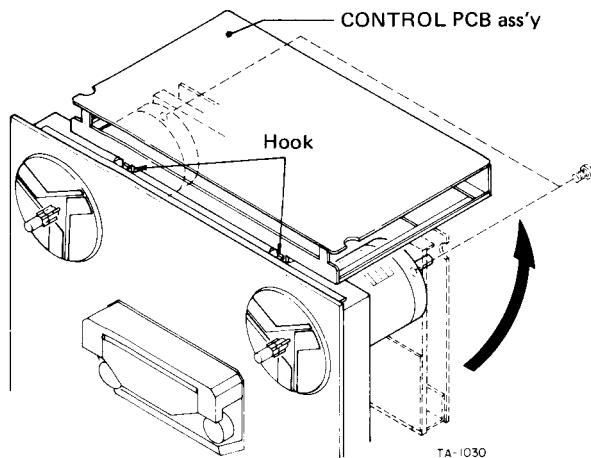


Fig. 2-1

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.

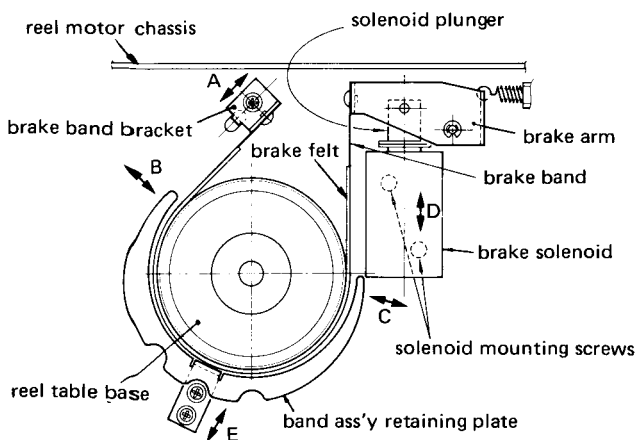
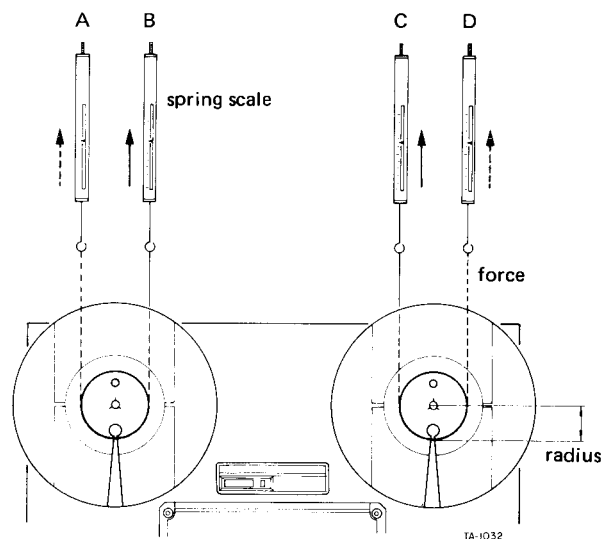


Fig. 2-2

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.

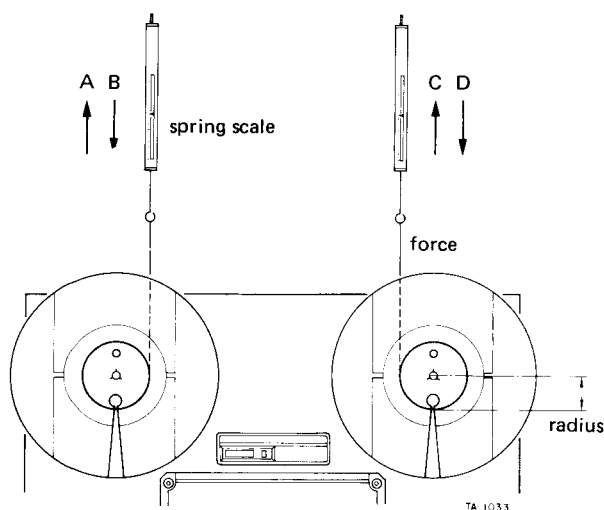
Torque calculating formulas:

- (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-cm x 0.0139 = 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: (B) in REV (D) in FWD	260 ± 40 g-cm (3.1~4.2 oz-inch)
Back tension: (A) in FWD (C) in REV	180 ± 40 g-cm (1.9~3.1 oz-inch)

Fast winding mode

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

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

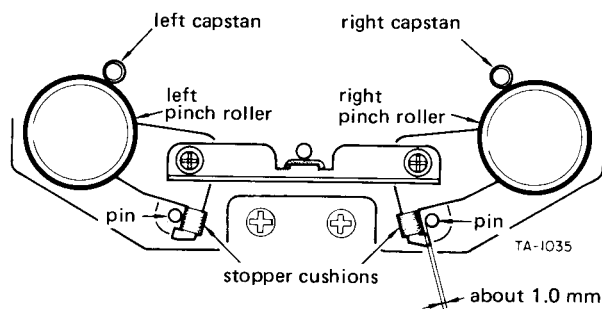
Fig. 2-4

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.

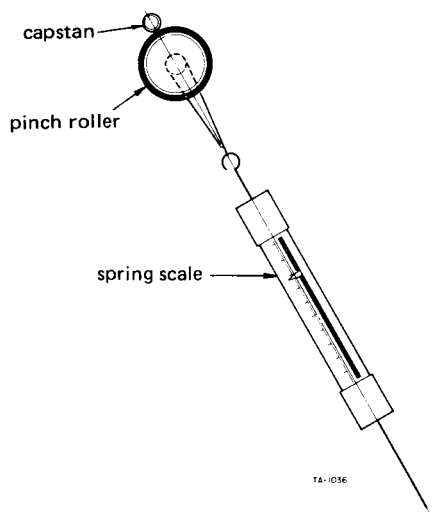


Fig. 2-7

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

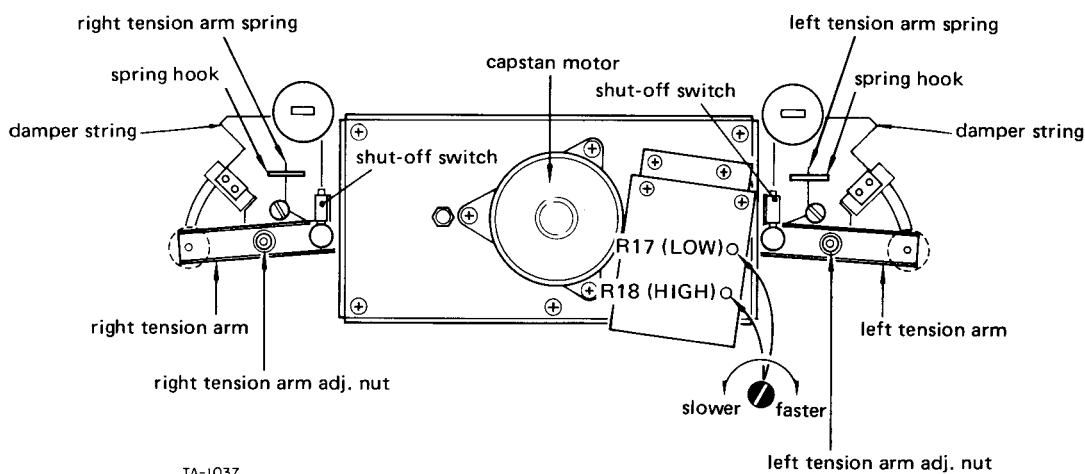
NOTE: The description below applies to both left and right sides.

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.

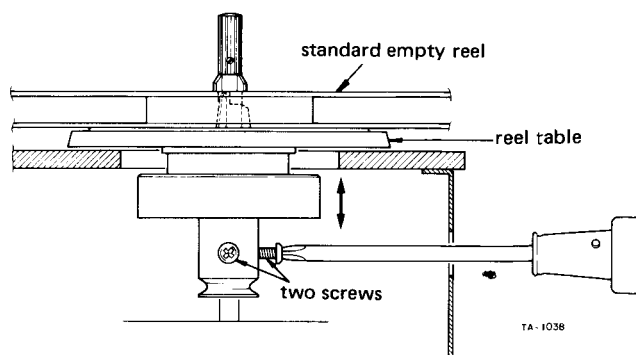


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Fig. 2-8 Tension arm height, tension arm force, damper function, and tape speed

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.



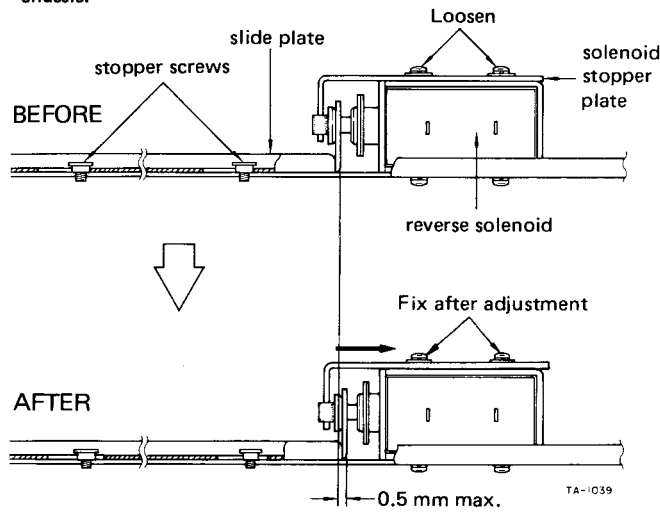
TA-1038

Fig. 2-9

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

1. 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.



Adjustment range is 0.5 mm max. in solenoid-off condition.

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:	0 (spring type)
Tension arm:	0 (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

1. When the capstan motor is replaced, install it with its lead wires and washers as shown.
2. 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.

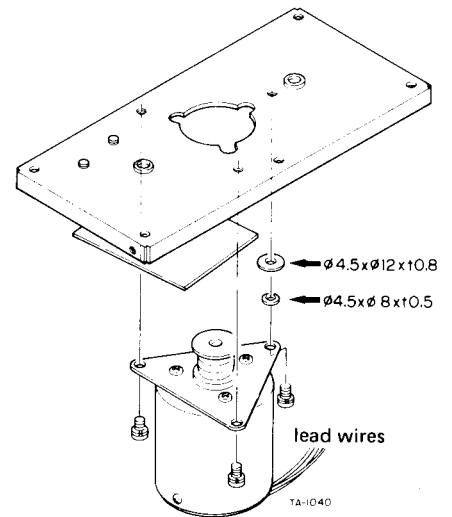


Fig. 2-11

2-14 TAPE SPEED ADJUSTMENT

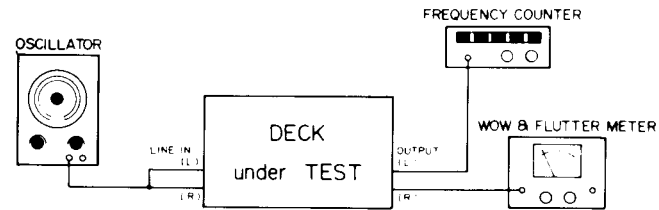


Fig. 2-12

- NOTES:**
1. Conduct all the following in both forward and reverse play modes.
 2. 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 ± 5 Hz.
 4. Check the following at the beginning and the end of the tape.
- Specifications:
- Tape Speed deviation. 3,000 Hz ± 30 Hz
 Tape speed drift. 15 Hz
 FWD/REV tape speed differential . . . 30 Hz (X-7R only)

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- $\frac{1}{2}$ ips), or a TEAC YTT-2002 test tape for LOW speed (9.5 cm/s or 3- $\frac{3}{4}$ 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.

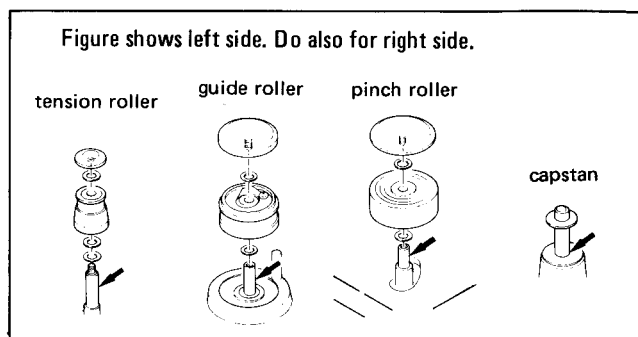


Fig. 2-14

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

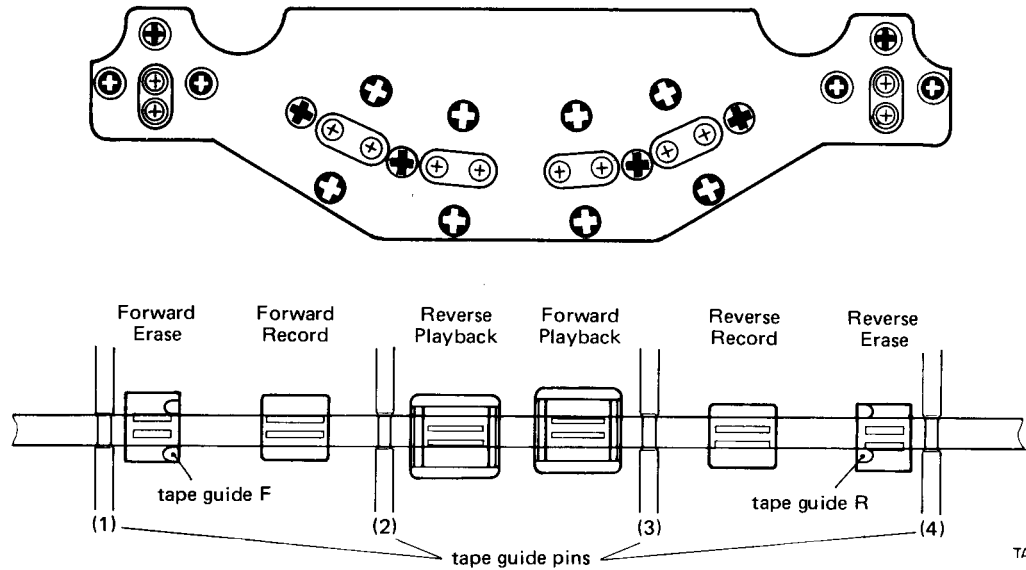


Fig. 2-15 Head arrangement

2-18-2 HEAD REGULATION ELEMENTS

Adjust each head to satisfy each of the following:

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

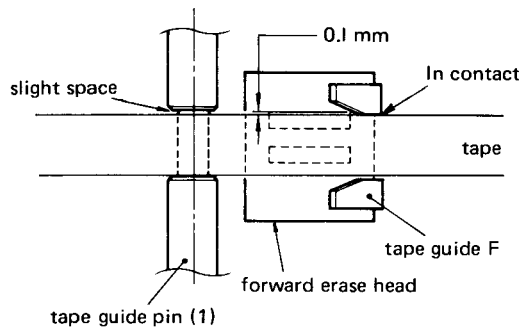
Fig. 2-16 Head regulation elements

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 μm). 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.



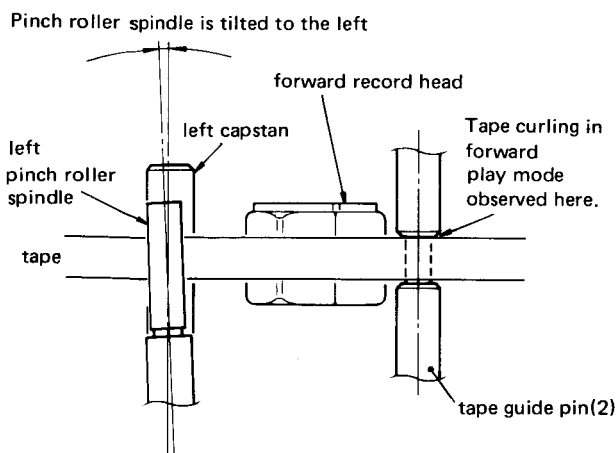
NOTE: In the case of the reverse erase head the tape should contact the upper tape guide plate and the tape guide pin lower surface in the same way.

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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' 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).

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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!

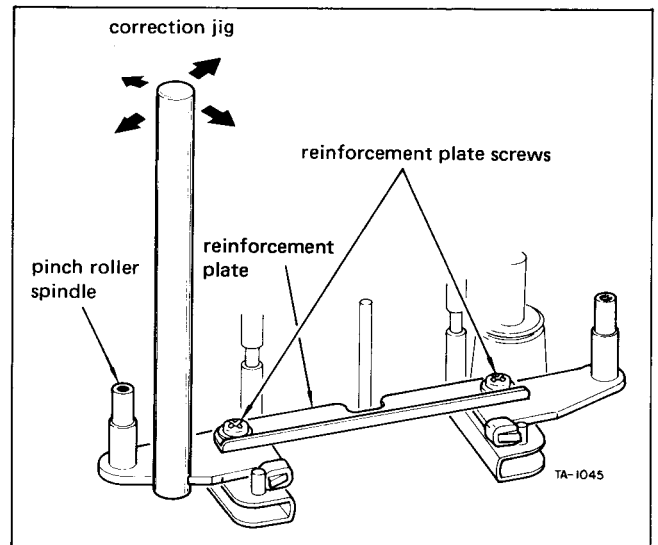


Fig. 2-19 Correction of pinch roller/capstan non-parallelism.

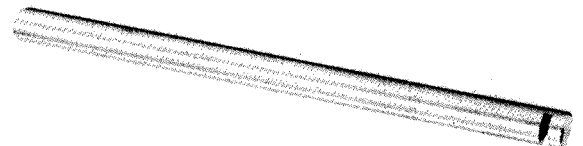


Fig. 2-20 Correction jig (TEAC P/N 5736000100)

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

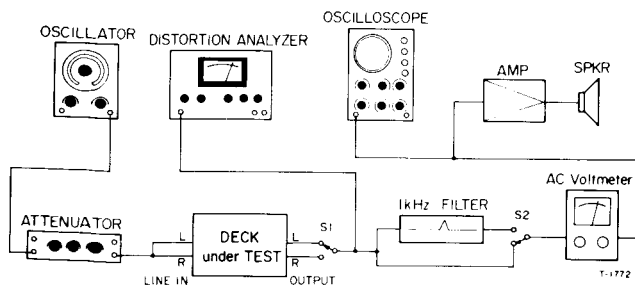


Fig. 3-1 Basic connection

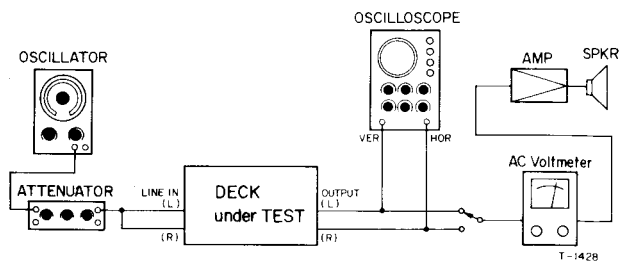


Fig. 3-2 Connection

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/ INSTRUCTION	SIGNAL SOURCE	ADJUST (or CHECK)	OUTPUT	REMARKS
4. Playback head azimuth	4-1 Fig. 3-2	Do for both FWD & REV heads MONITOR sw.—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) R315/R316 (REV)	−5 dB (436 mV)	Spec. PB condition
	5-2 "	OUTPUT cont.—MAX	"	Check	+1 dB \pm 2 dB (690 mV \sim 1.09 V)	Max. output level
	5-3 "	OUTPUT cont.—CAL	"	—	−5 dB (436 mV)	Spec. PB condition IMPORTANT: 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) R329/R330 (REV)	40 Hz \sim 22 kHz \pm 3 dB	Reference: 400 Hz
	7-2 "	" SPEED-LOW	YTT-1002	R333/R334 (FWD) R335/R336 (REV)	40 Hz \sim 14 kHz \pm 3 dB	
8. Phase shift	8-1 Fig. 3-2	FWD & REV SPEED-HIGH	YTT-1003	Check	Phase: within 45° on oscilloscope (50 Hz \sim 18 kHz) (Fig. 3-3)	
	8-2 "	" SPEED-LOW	YTT-1002	"	" (50 Hz \sim 10 kHz)	
9. Headphone output level	9-1 Fig. 3-4	Spec. PB condition	YTT-1003 (400 Hz/0 dB)	Check	−24 dB \pm 2 dB (38.8 mV \sim 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 Use fully erased tape (Use bulk tape eraser)	YTT-8013	Check	HIGH, 50 dB min. ratio LOW 49 dB min. ratio	-Ratio of spec.—5 dB and noise -Change-over the polarity of the AC Line plug. The worse reading should be within spec.

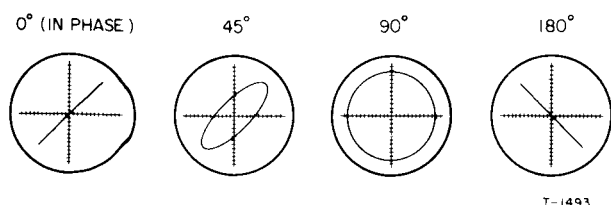


Fig. 3-3 Confirming phase relationship

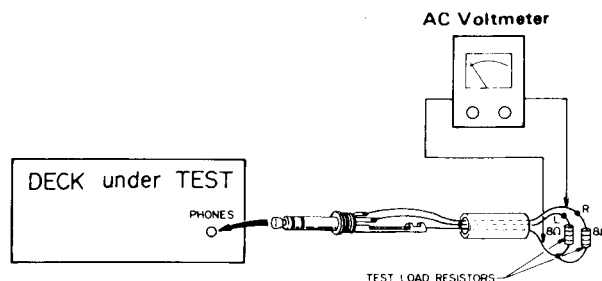


Fig. 3-4 Connection

3-3 RECORDING PERFORMANCE

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

ITEM	CONNECTION	MODE/ INSTRUCTION	SIGNAL SOURCE	ADJUST (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 \pm 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) C395/C396 (REV)	Over-bias value 3.5 dB \pm 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) 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 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 μ V or less) (68 dB min. ratio)	-Reference output level: +5 dB -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 -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) L307/L308 (REV)	40 Hz~16 kHz \pm 3 dB	Reference: 400 Hz
	19-2	"	"	SPEED— HIGH 40 Hz~20 kHz/ -32 dB	Check	40 Hz~20kHz \pm 3 dB	

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

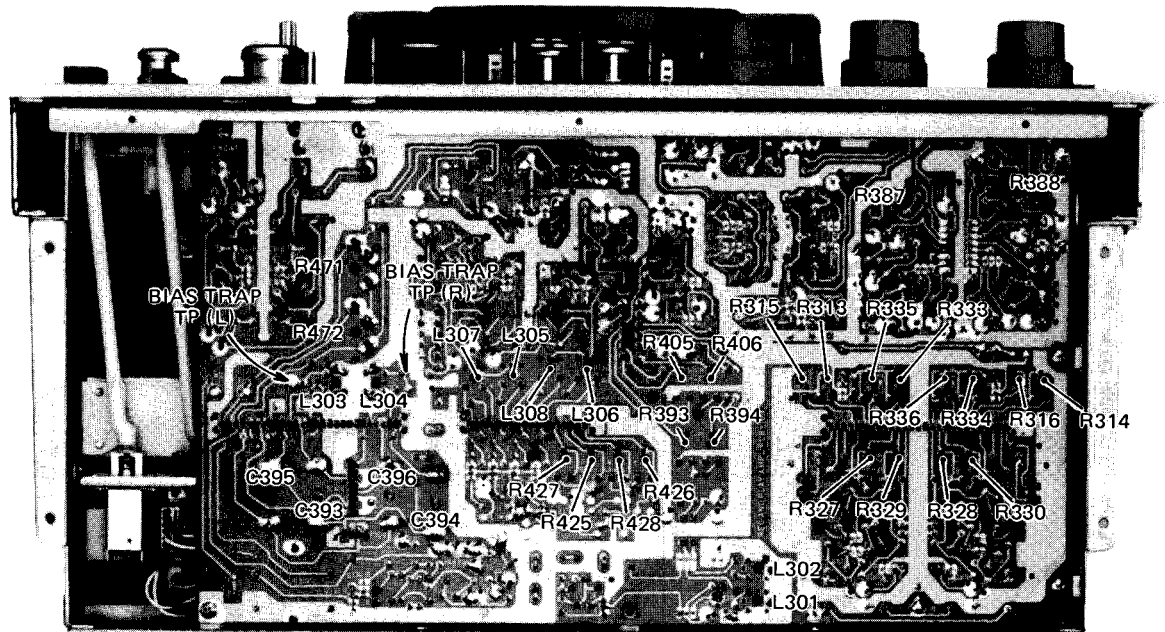
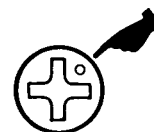


Fig. 3-5

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

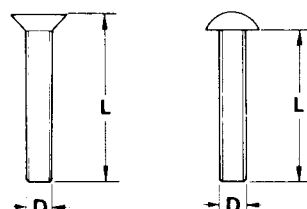
All screws conform to ISO standards, and have crossrecessed heads, unless otherwise noted. ISO screws have the head inscribed with a point as in the figure to the right.



FOR EXAMPLE:

B M 3 x 6

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

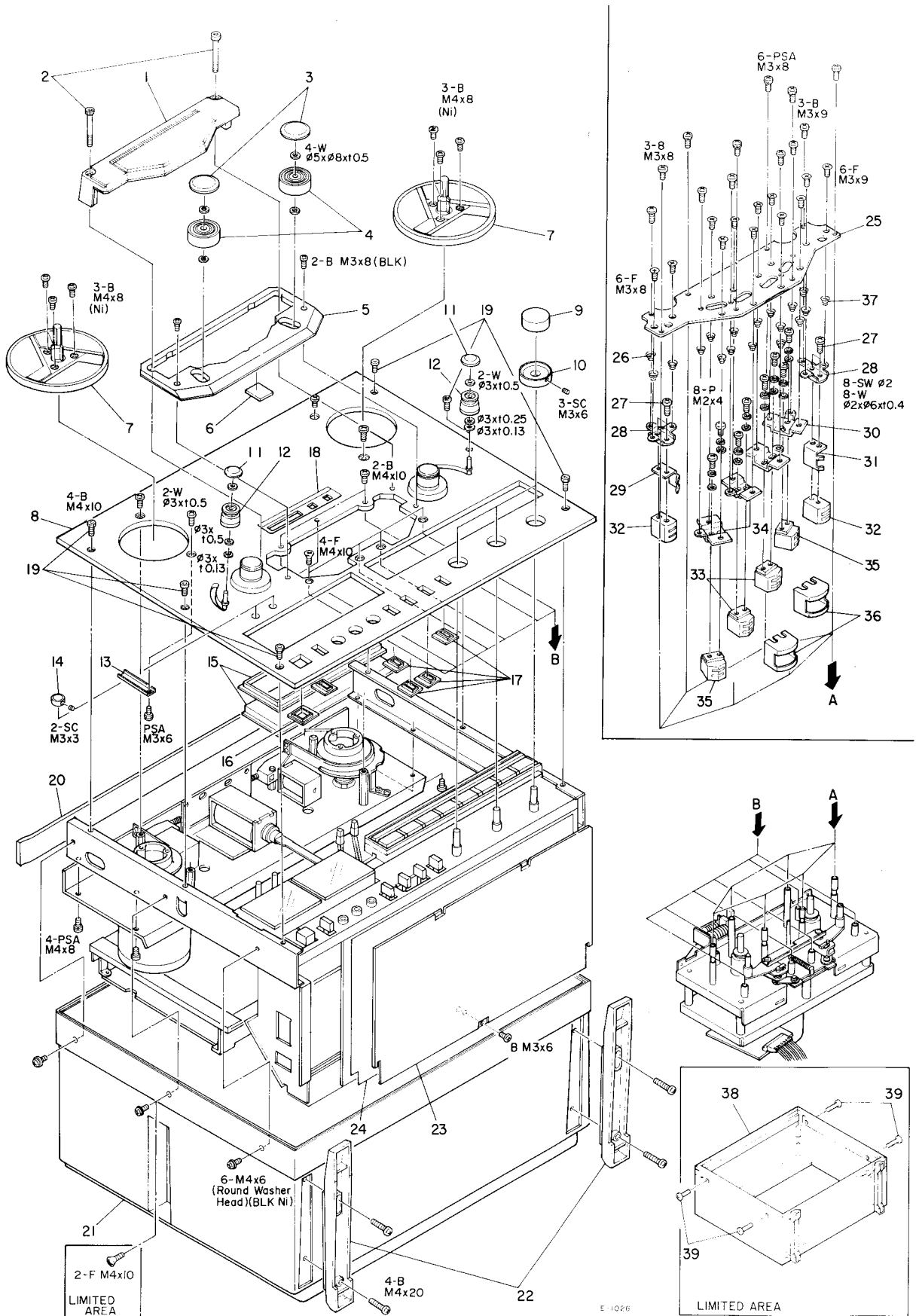


* Inner dia. for washers and nuts

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

4 EXPLODED VIEWS AND PARTS LIST

EXPLODED VIEW - 1 (X-7R)



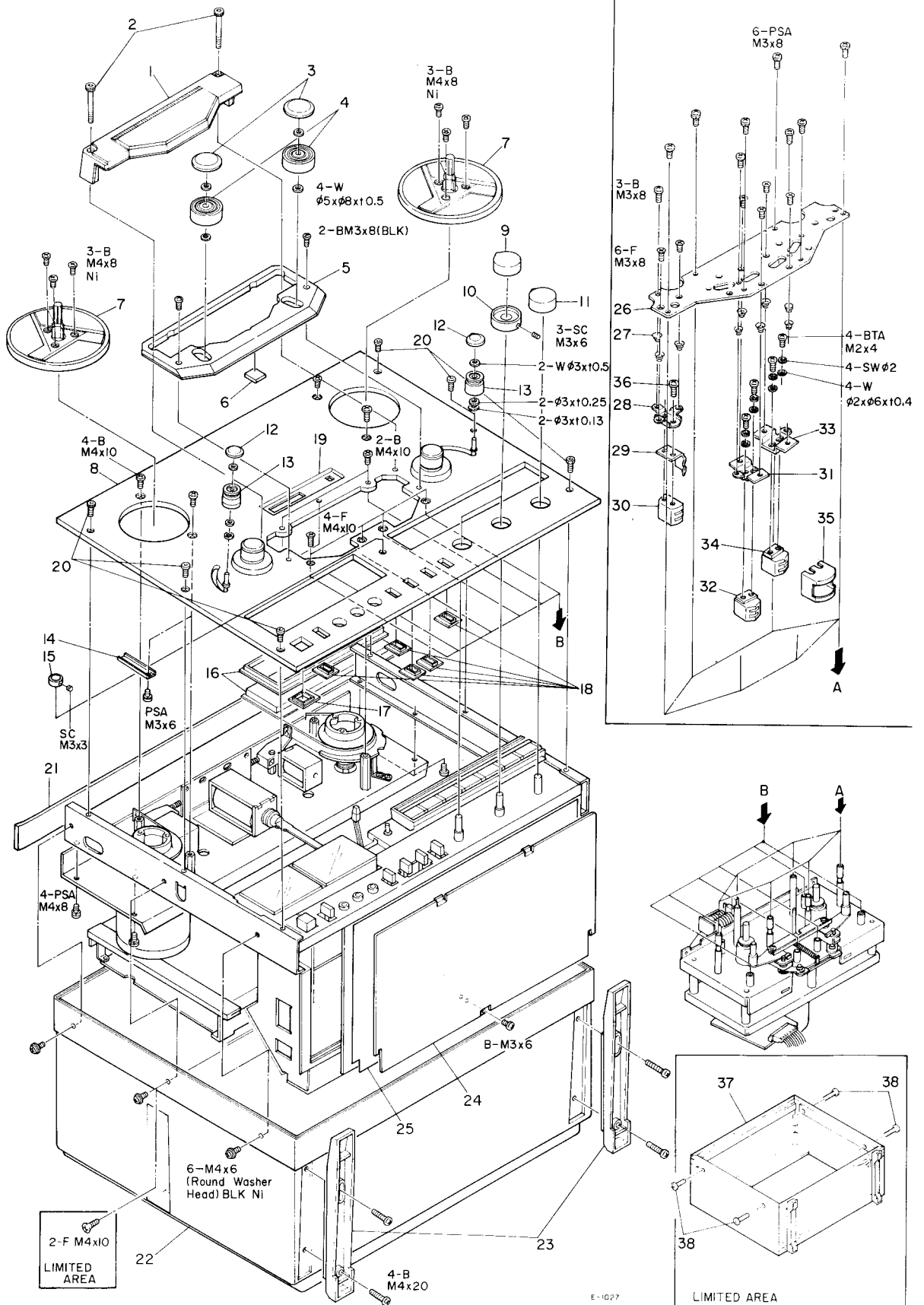
Parts marked with *require longer delivery time than regular parts.

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	
	5027288000	Sensing Foil	X-7R
	5101337100	Open Reel Supplement	U.S.A.
	5101708000	Open Reel Supplement	All except JAPAN, U.S.A.
	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)

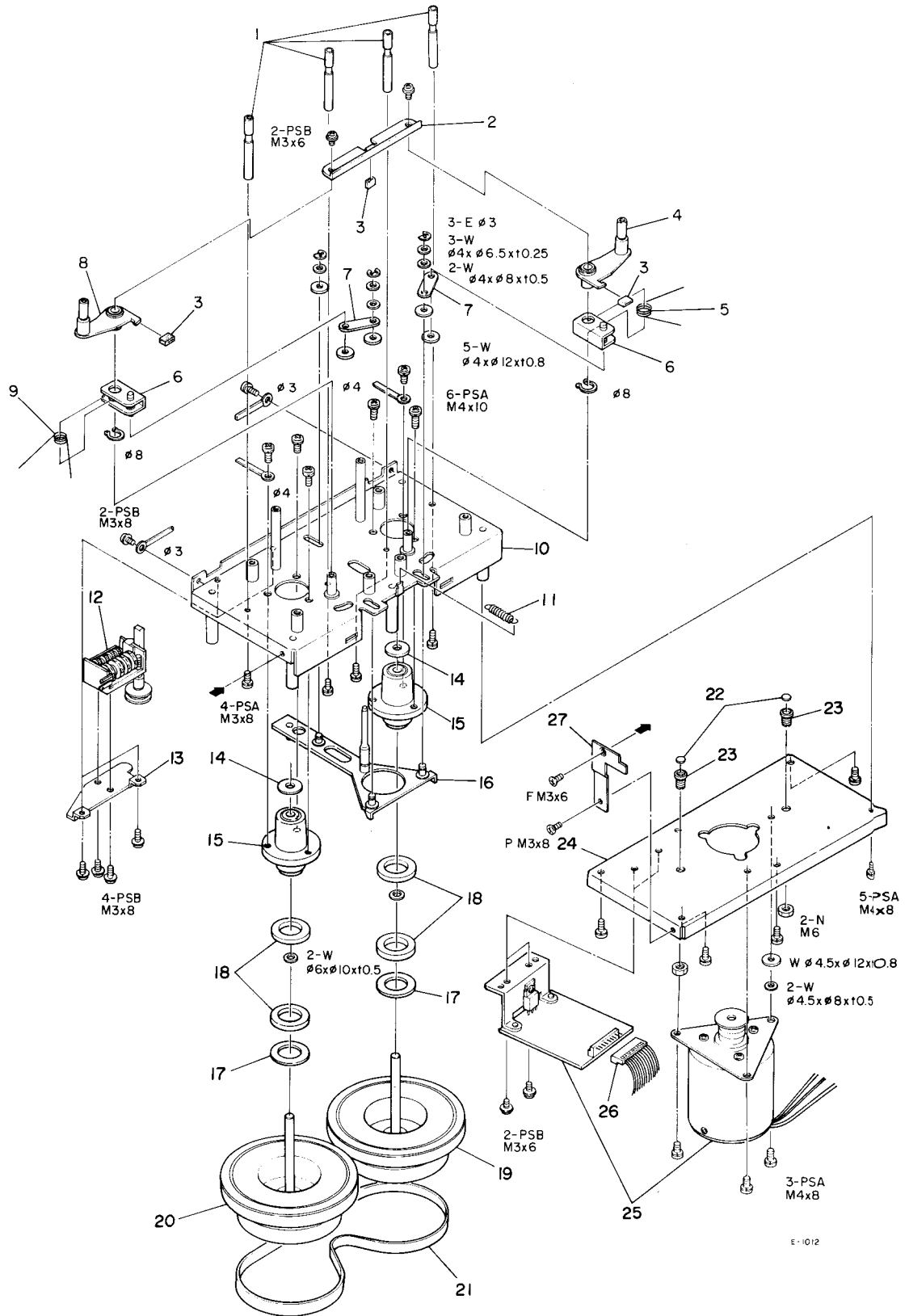


E-1027

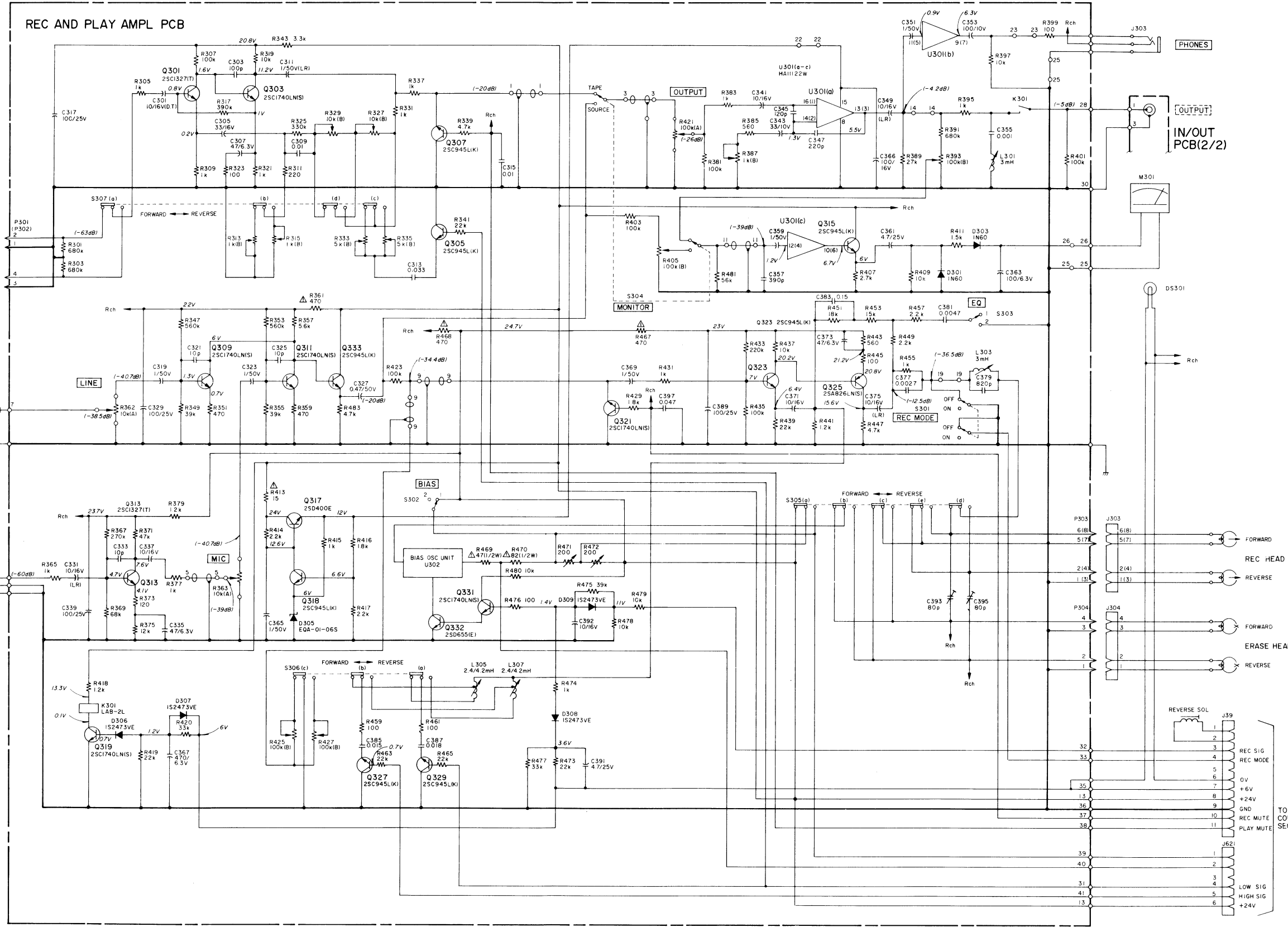
Parts marked with *require longer delivery time than regular parts.

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, Botton	
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

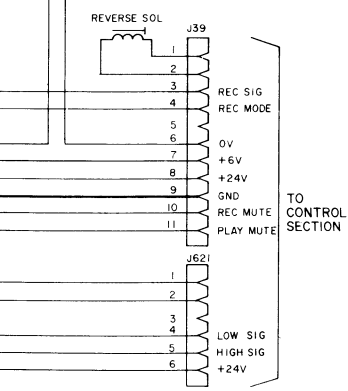
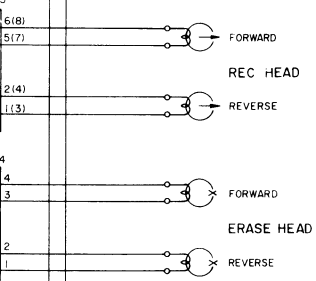
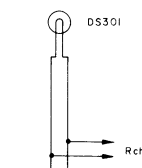
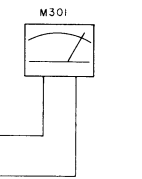
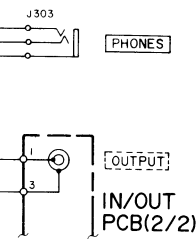
EXPLODED VIEW - 3



A
B
C
D
E



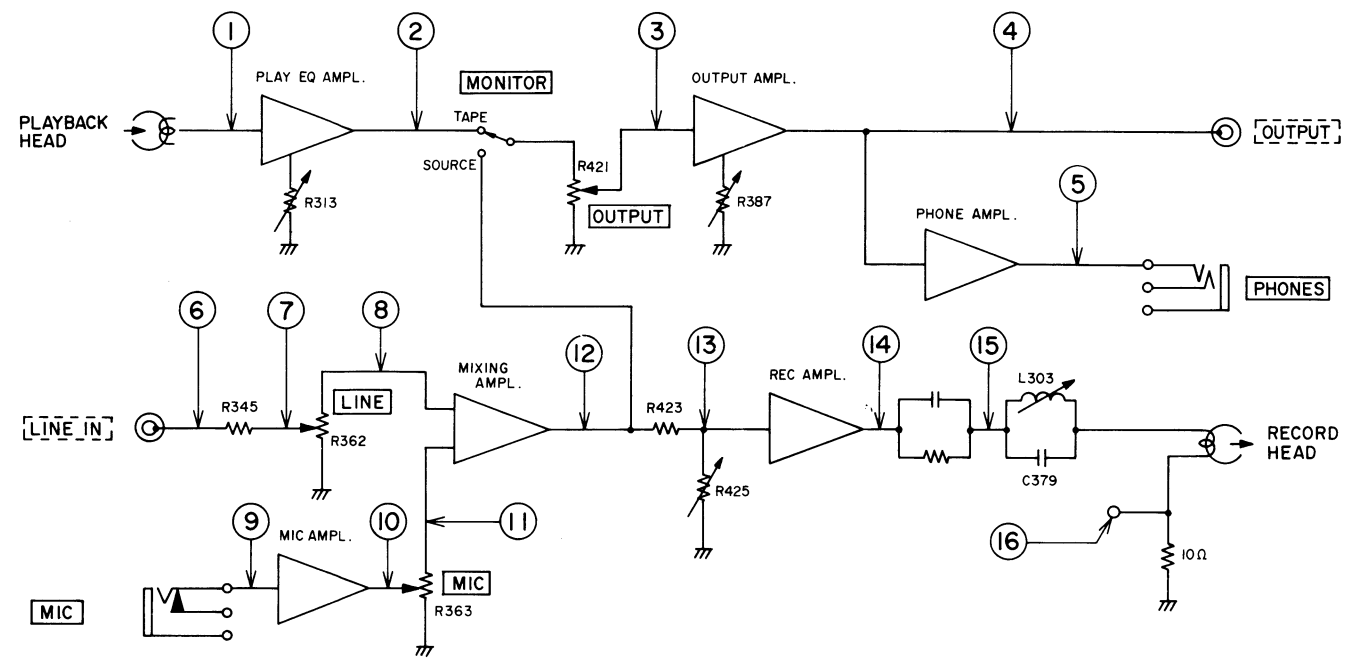
- NOTES**
1. ALL RESISTORS ARE IN OHMS UNLESS OTHERWISE SPECIFIED
 2. ALL CAPACITOR VALUES ARE IN P.F. UNLESS OTHERWISE SPECIFIED
 3. SCHEMATIC DIAGRAM SHOWS THE LOCATION OF SOME OF THE COMPONENTS OF THE CONTROL SECTION
 4. DC VOLTAGES WERE MEASURED AT THE POINTS MARKED WITH AN ARROW UNLESS OTHERWISE SPECIFIED
 5. PARTS MARKED WITH A TRIANGLE ARE NOT STANDARD COMPONENTS - REFER TO THE PARTS LIST FOR EXACT REPLACEMENT



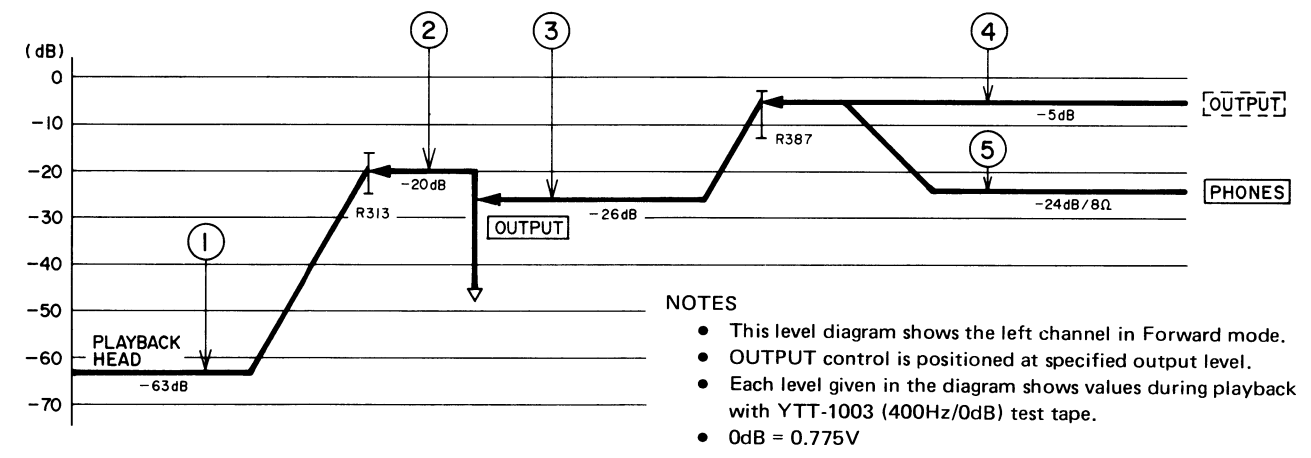
NOTES

1. ALL RESISTORS ARE 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 (μ = PICO FARADS).
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. ΔPARTS 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.

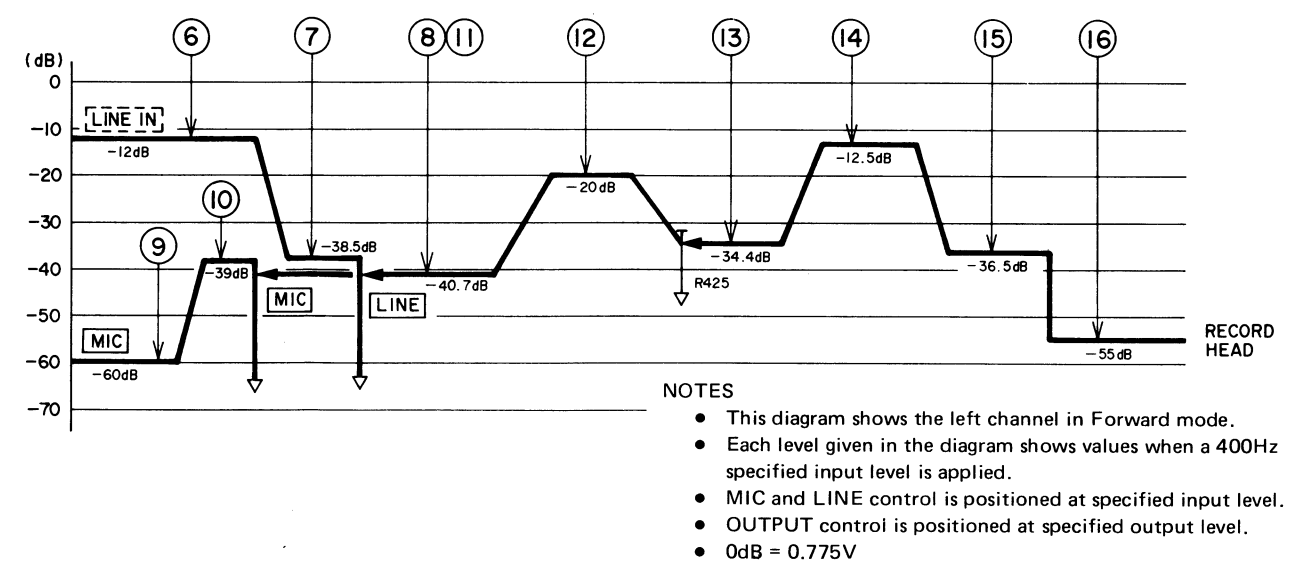
LEVEL DIAGRAM



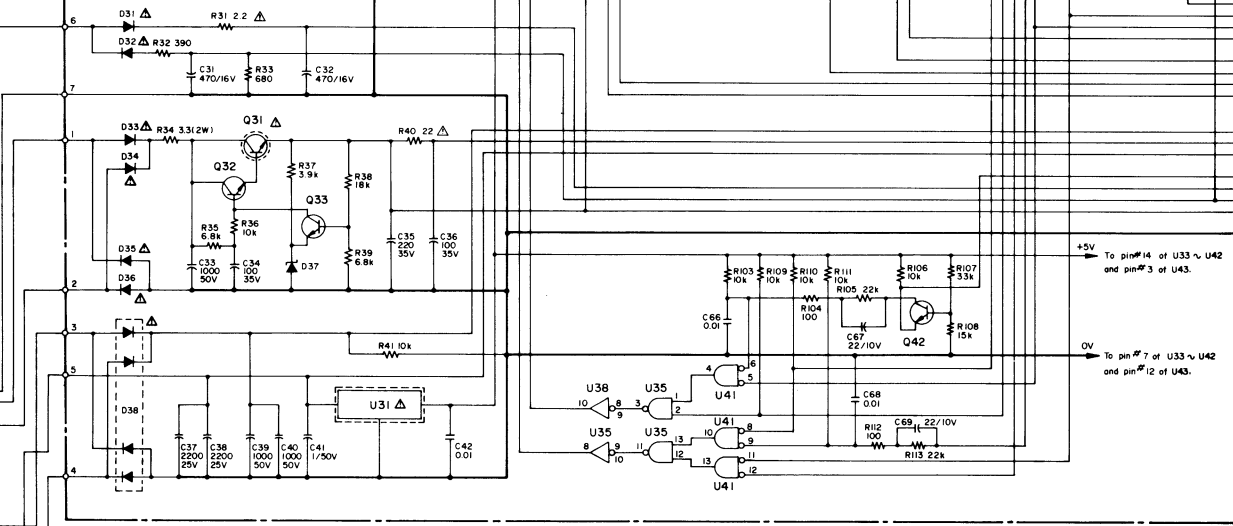
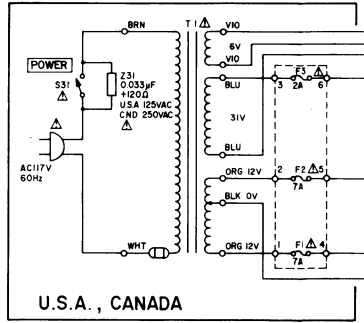
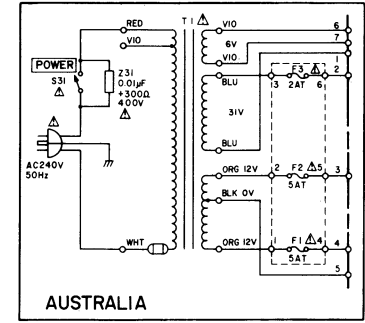
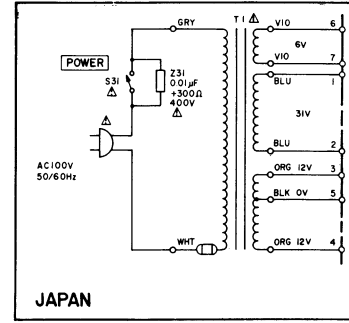
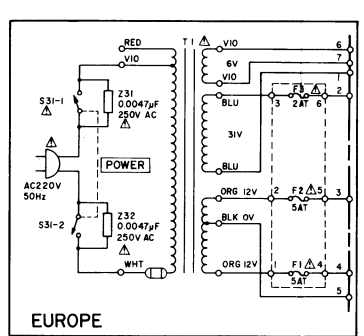
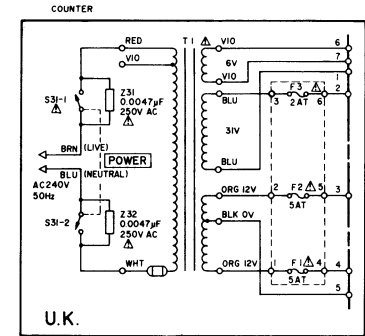
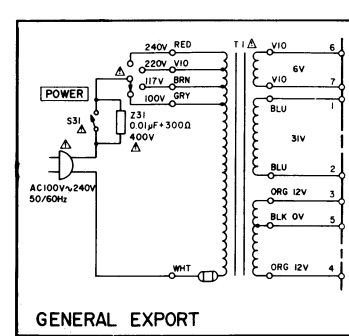
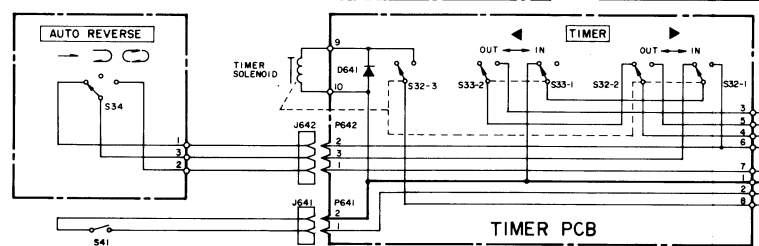
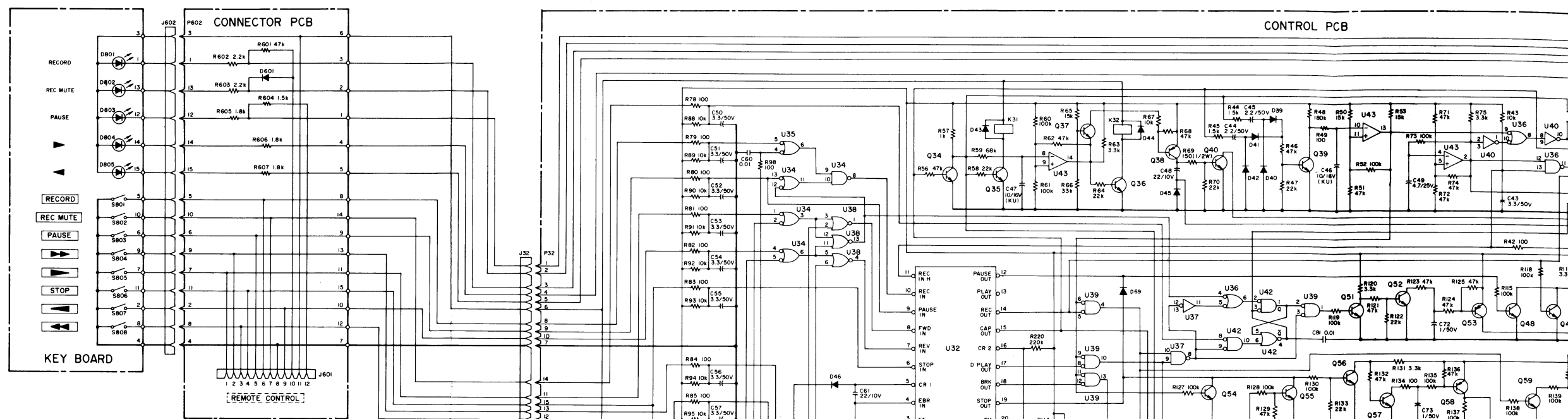
PLAYBACK SYSTEM



RECORDING SYSTEM



A
B
C
D
E

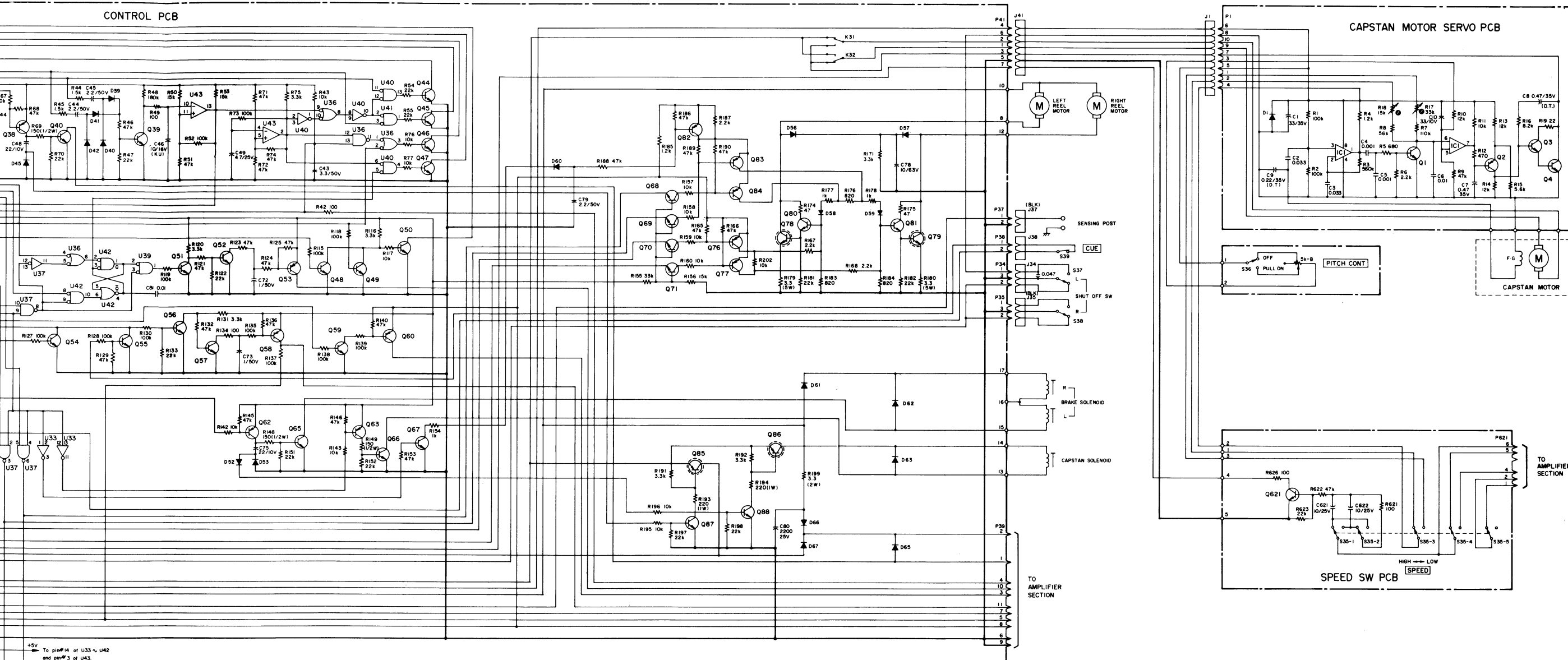


CONTROL PCB

U31	NJM78M05A	Q31, Q78, Q79	2503131(E)	D31
U32	AM9251	Q32, Q80, Q81, Q87, Q88	25C1318(S)	D36
U33	HD7400P or SN7400N	Q33~Q37, Q39, Q42, Q44~Q52	25C1316(F)	D65
U38	U42	Q54~Q57, Q59, Q67~Q71	25C1316(F)	D38
U43	NJM2901N	Q38, Q53, Q58, Q60, Q62	25A7331(P)	D39
		Q76, Q77, Q82~Q84, Q85	25C1016(C)	D61
		Q40, Q65, Q66	25C1016(C)	D37
		Q85, Q86	25B507(E)	

CONTROL PCB

CAPSTAN MOTOR SERVO PCB



+5V To pin#14 of U33 ~ U42 and pin#3 of U43

OV To pin#7 of U33 ~ U42 and pin#12 of U43

CONTROL PCB		CONNECTOR PCB		CAPSTAN MOTOR SERVO PCB		STOP SENSOR PCB		TIMER PCB		SPEED SW PCB	
U31	NJM78M05A	Q31, Q78, Q79	250313(E)	D31 ~ D36, D43, D44	D31 ~ D36, D43, D44	D31 ~ D36, D43, D44	D31 ~ D36, D43, D44	D31 ~ D36, D43, D44	D31 ~ D36, D43, D44	D31 ~ D36, D43, D44	D31 ~ D36, D43, D44
U32	AM6251	Q32, Q80, Q81, Q87, Q88	25C138(S)	Q56, Q57, Q62, Q63	Q56, Q57, Q62, Q63	Q56, Q57, Q62, Q63	Q56, Q57, Q62, Q63	Q56, Q57, Q62, Q63	Q56, Q57, Q62, Q63	Q56, Q57, Q62, Q63	Q56, Q57, Q62, Q63
U33	HD7400P or SN7400N	Q33 ~ Q37, Q39, Q42, Q44 ~ Q52	065 ~ D67	Q65 ~ D67	Q65 ~ D67	Q65 ~ D67	Q65 ~ D67	Q65 ~ D67	Q65 ~ D67	Q65 ~ D67	Q65 ~ D67
U38	U42	HD7402P or SN7402N	Q54 ~ Q57, Q59, Q67 ~ Q71	25C536(F)	D38	M4C-51	Q39 ~ Q42, D45 ~ D47	IS2473HJ	Q39 ~ Q42, D45 ~ D47	IS2473HJ	Q39 ~ Q42, D45 ~ D47
U43	NJM2901N	Q38, Q53, Q58, Q60, Q62	25A733(P)	Q38, Q53, Q58, Q60, Q62	Q38, Q53, Q58, Q60, Q62	Q38, Q53, Q58, Q60, Q62	Q38, Q53, Q58, Q60, Q62	Q38, Q53, Q58, Q60, Q62	Q38, Q53, Q58, Q60, Q62	Q38, Q53, Q58, Q60, Q62	Q38, Q53, Q58, Q60, Q62
		Q76, Q77, Q82 ~ Q84, Q85	25C1016(C)	Q76, Q77, Q82 ~ Q84, Q85	Q76, Q77, Q82 ~ Q84, Q85	Q76, Q77, Q82 ~ Q84, Q85	Q76, Q77, Q82 ~ Q84, Q85	Q76, Q77, Q82 ~ Q84, Q85	Q76, Q77, Q82 ~ Q84, Q85	Q76, Q77, Q82 ~ Q84, Q85	Q76, Q77, Q82 ~ Q84, Q85
		Q40, Q65, Q66	25C1016(C)	Q40, Q65, Q66	Q40, Q65, Q66	Q40, Q65, Q66	Q40, Q65, Q66	Q40, Q65, Q66	Q40, Q65, Q66	Q40, Q65, Q66	Q40, Q65, Q66
		Q85, Q86	25B507(E)	Q85, Q86	Q85, Q86	Q85, Q86	Q85, Q86	Q85, Q86	Q85, Q86	Q85, Q86	Q85, Q86

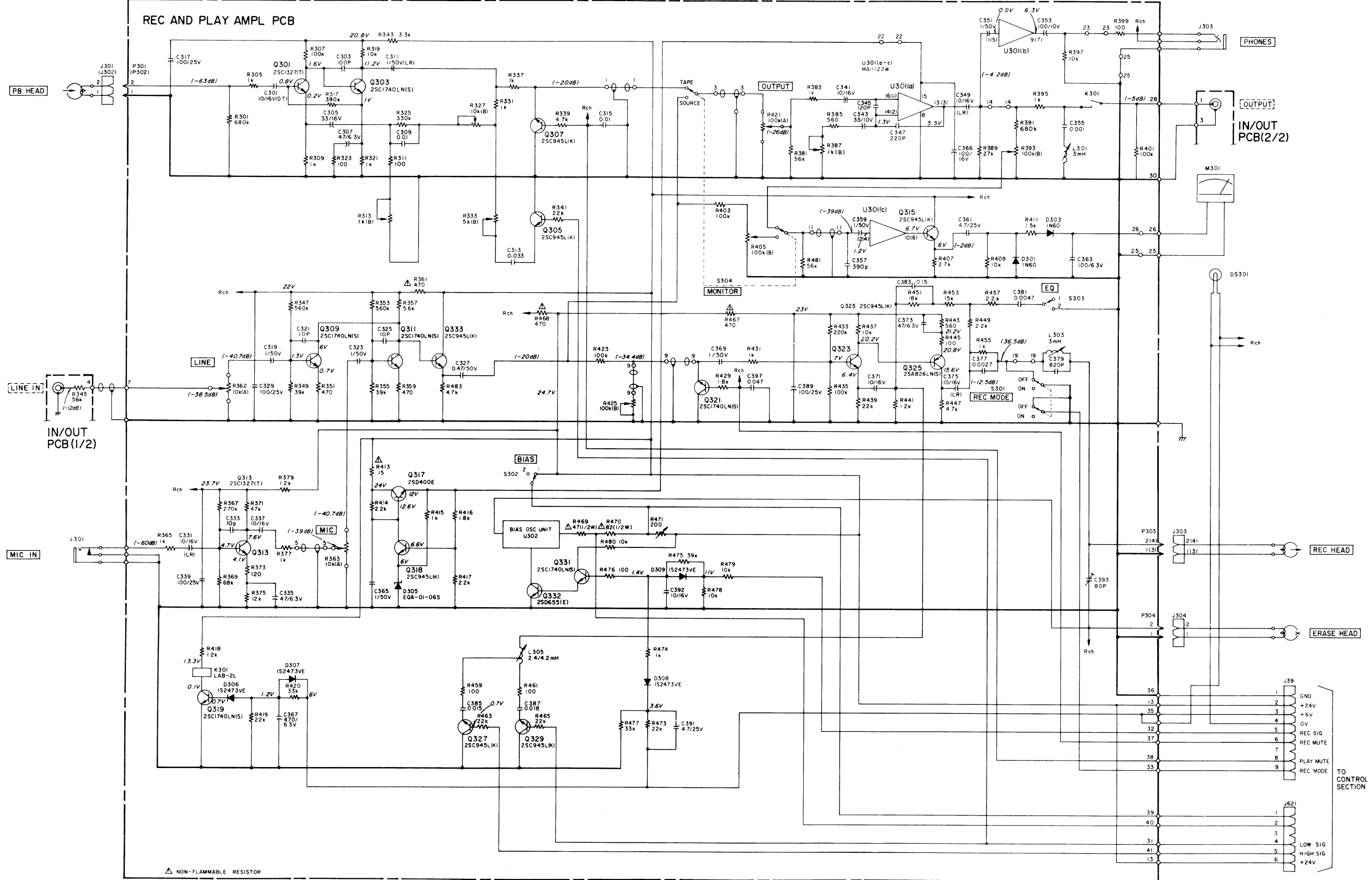
NOTES

1. ALL RESISTORS ARE 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. 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.

A
B
C
D
E

1 2 3 4 5 6 7

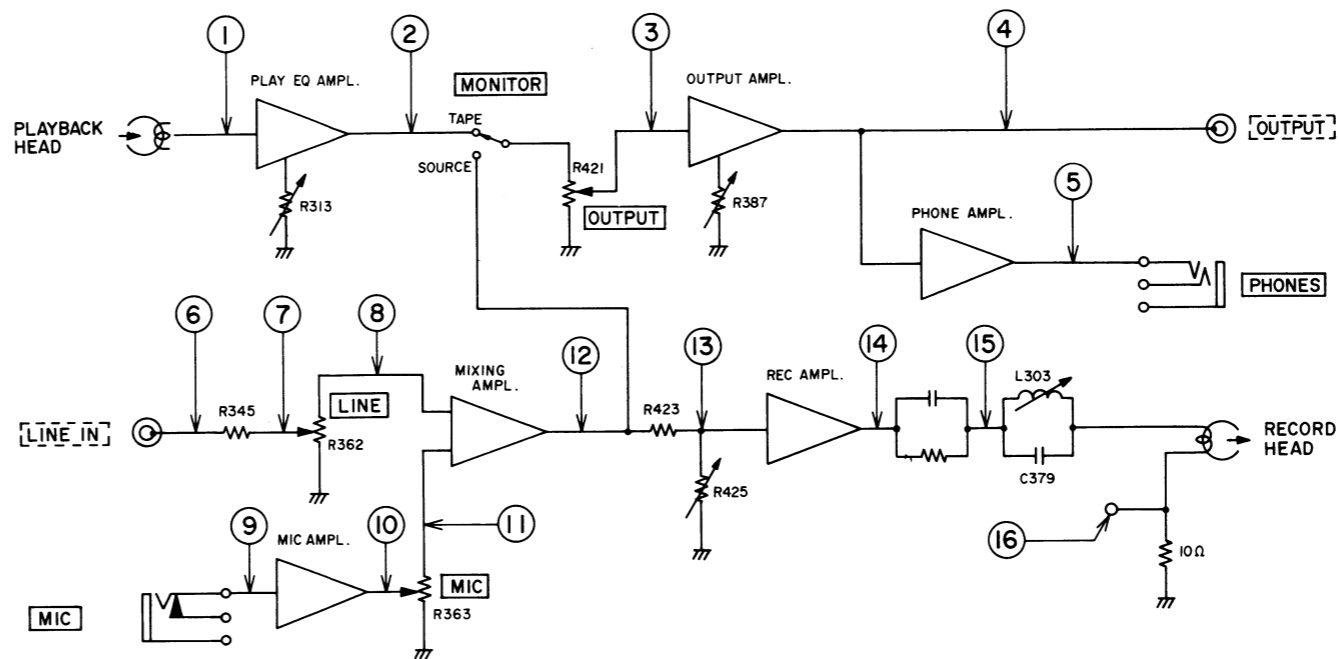
REC AND PLAY AMPL PCB



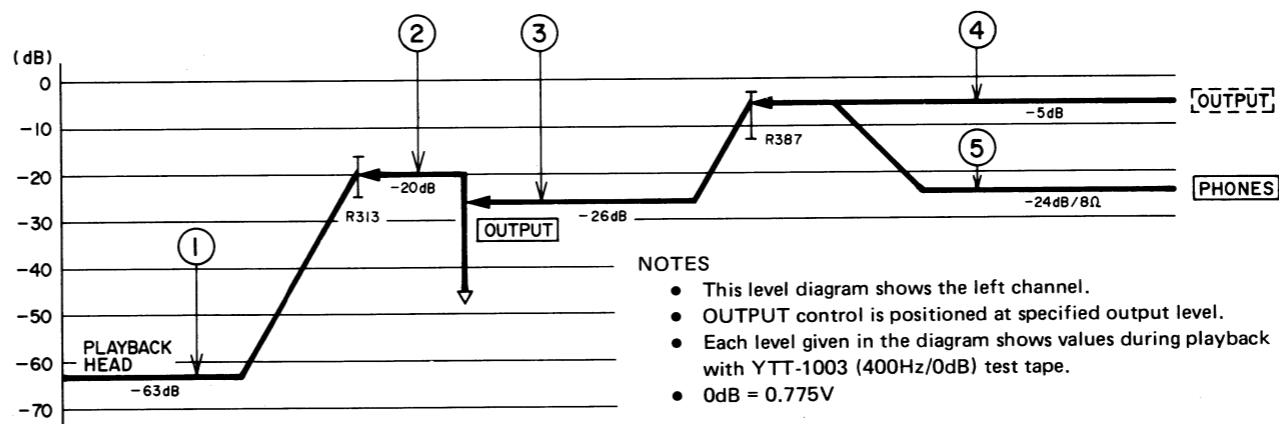
△ NON-FLAMMABLE RESISTOR

TO CONTROL SECTION

LEVEL DIAGRAM

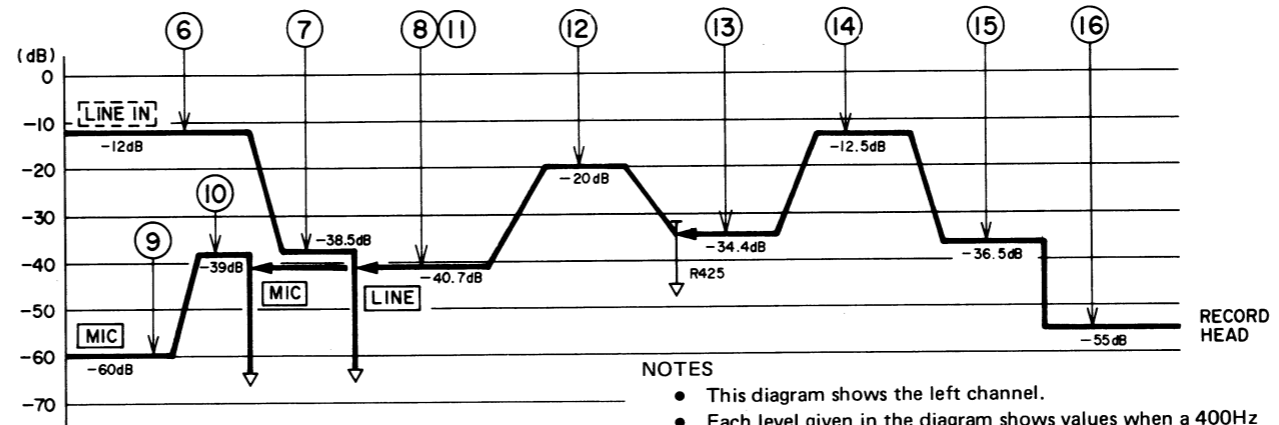


PLAYBACK SYSTEM



- NOTES
- This level diagram shows the left channel.
 - 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

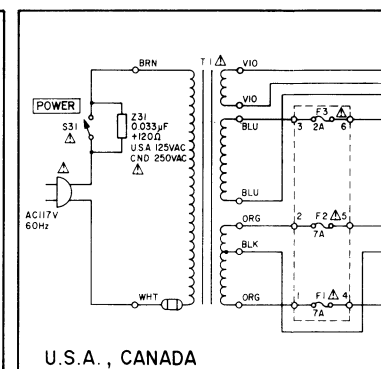
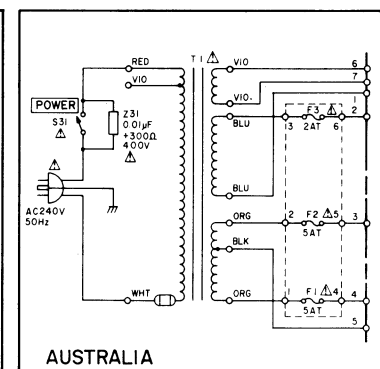
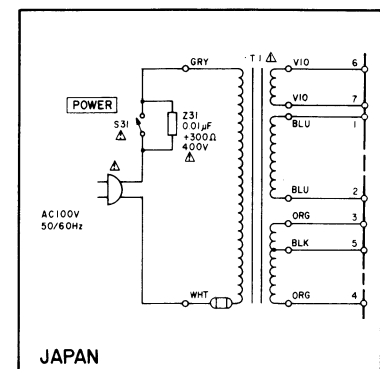
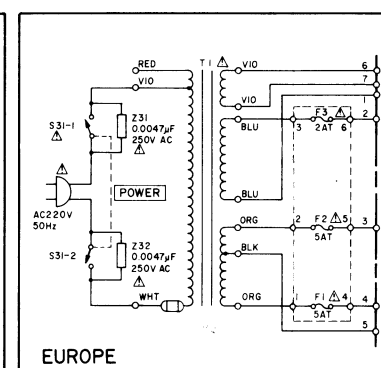
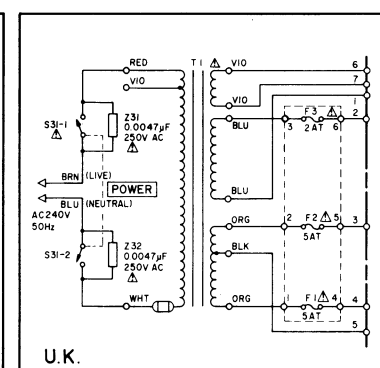
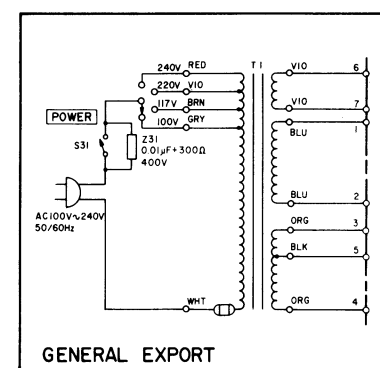
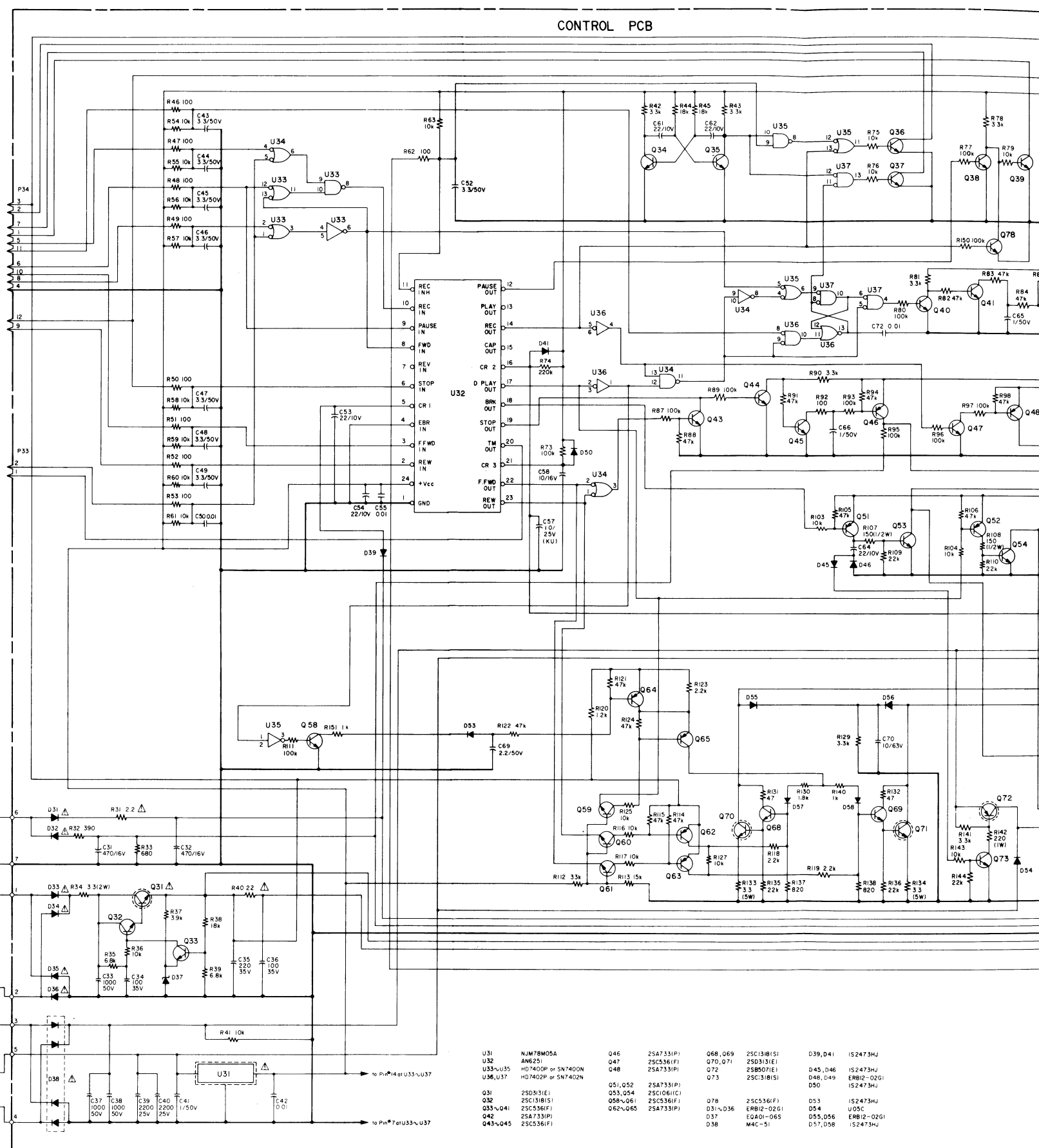
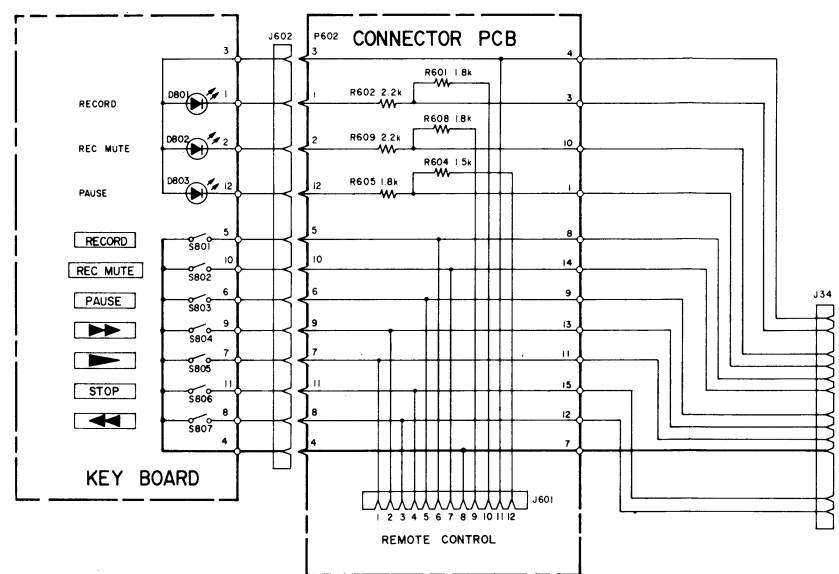


- NOTES
- This diagram shows the left channel.
 - Each level given in the diagram shows values when a 400Hz specified input level is applied.
 - MIC and LINE control is positioned at specified input level.
 - OUTPUT control is positioned at specified output level.
 - 0dB = 0.775V

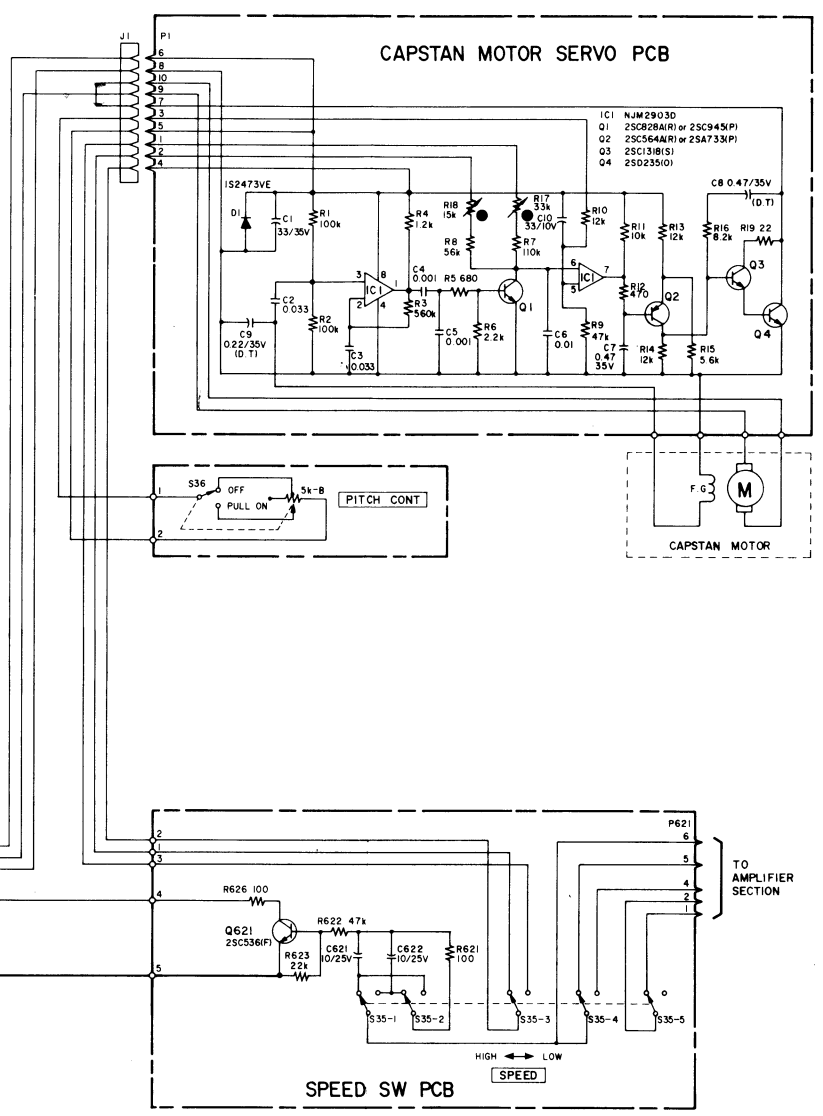
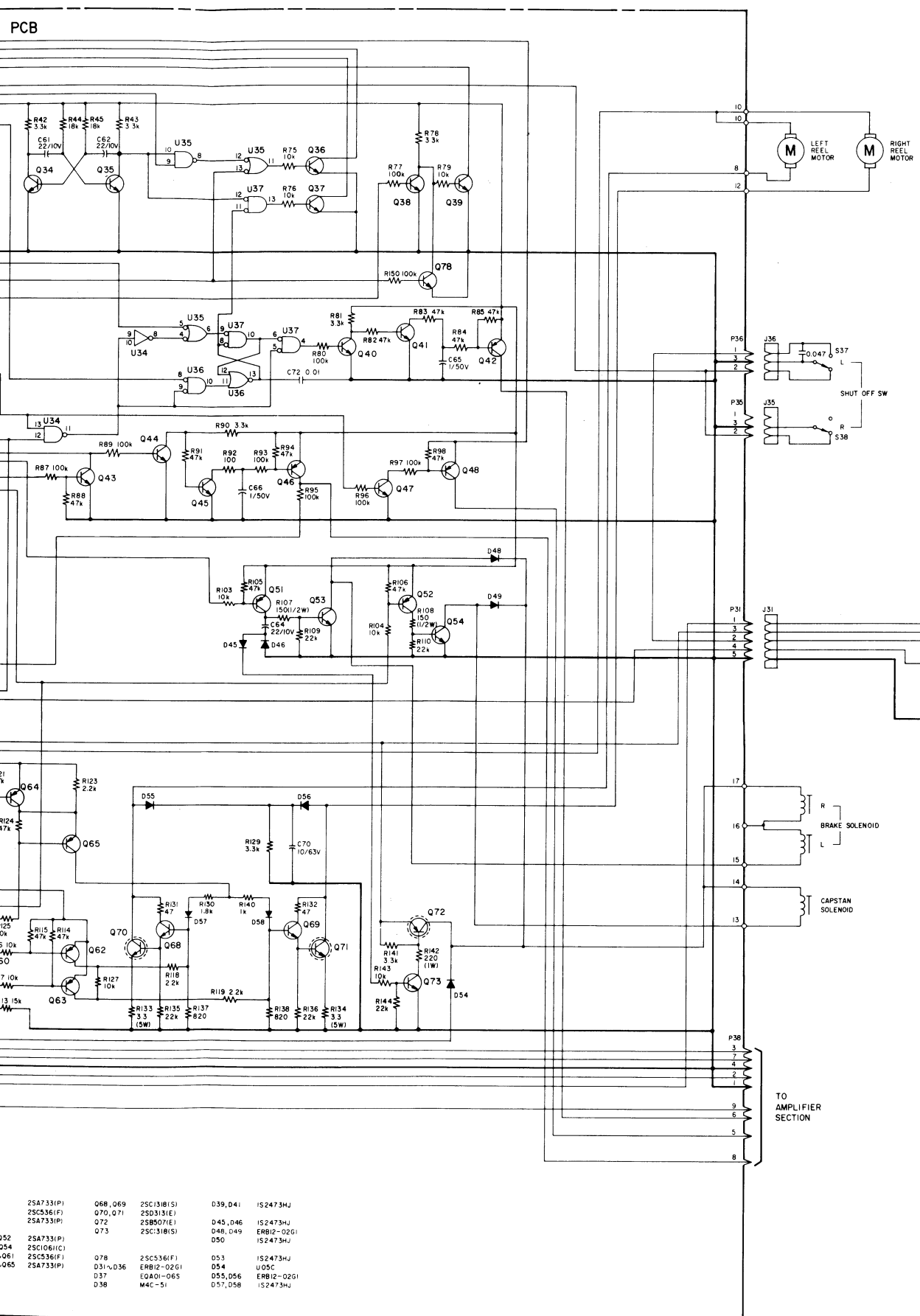
NOTES

1. ALL RESISTORS ARE 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 = PICO FARADS).
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. ΔPARTS 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.

A
B
C
D
E



U31	NJM78M05A	Q46	2SA733(P)	Q68, Q69	2SC1318(S)	D39, D41	1S2473HJ
U32	AN6251	Q47	2SC536(P)	Q70, Q71	2SD3131(E)	D45, D46	1S2473HJ
U33-U35	HD74A00P or SN7400N	Q48	2SA733(P)	Q72	2SB507(E)	D48, D49	EBR12-02(G)
U36, U37	HD7402P or SN7402N	Q49	2SC1318(S)	Q73	2SC1318(S)	D50	1S2473HJ
Q31	2SD3131(E)	Q51, Q52	2SA733(P)	Q78	2SC536(P)	D53	1S2473HJ
Q32	2SC1318(S)	Q53, Q54	2SC1061(C)	Q79	2SC536(F)	D54	U05C
Q33-Q41	2SC536(F)	Q58-Q61	2SC536(F)	D31-Q36	ERB12-02(G)	D55, D56	ERB12-02(G)
Q42	2SA733(P)	Q62-Q65	2SA733(P)	D37	EQAD1-06S	D57, D58	1S2473HJ
Q43-Q45	2SC536(F)	Q66-Q67	2SC536(F)	D38	M4C-51		



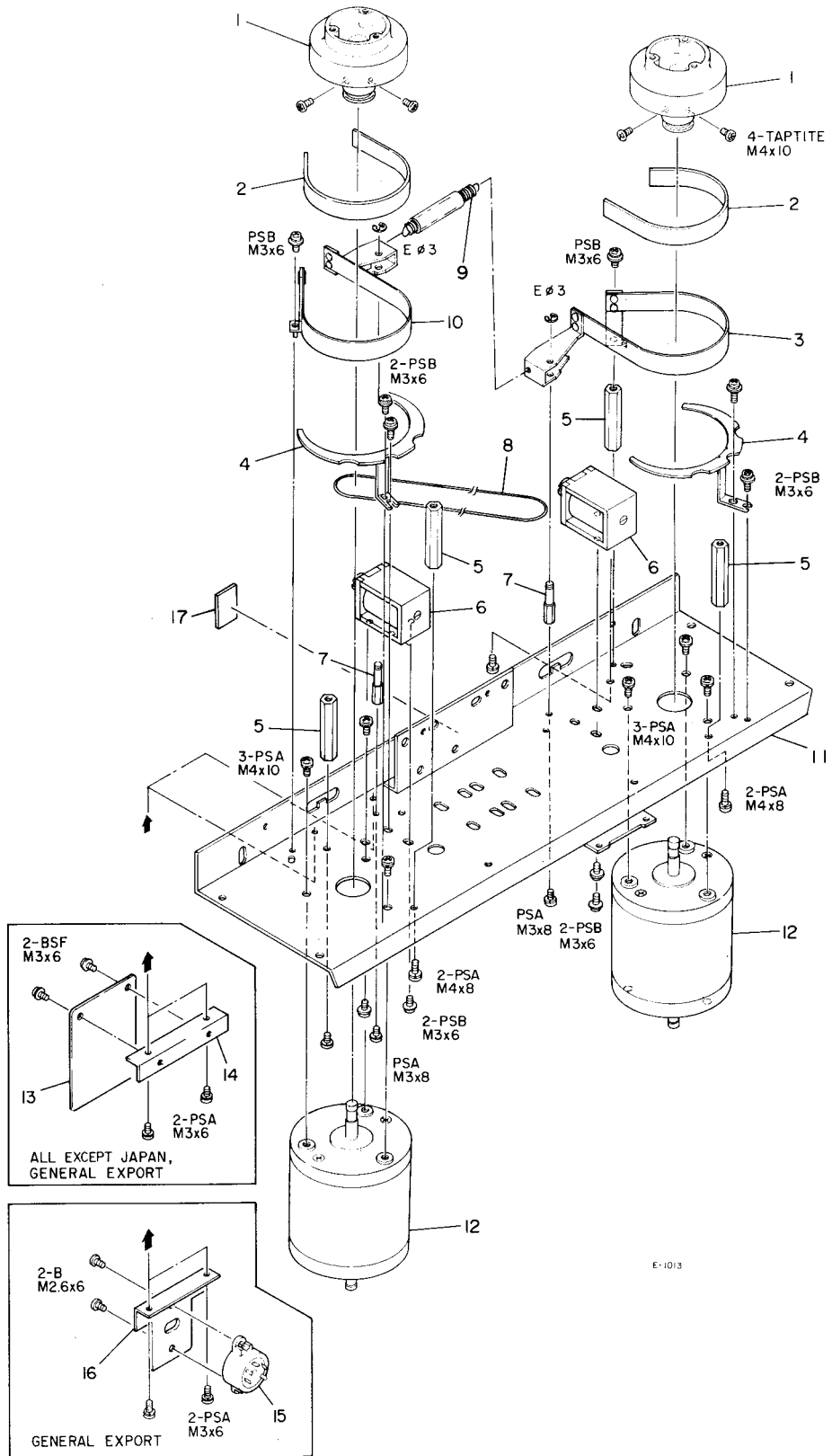
NOTES

1. ALL RESISTORS ARE 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 = PICO FARADS).
3. 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.

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

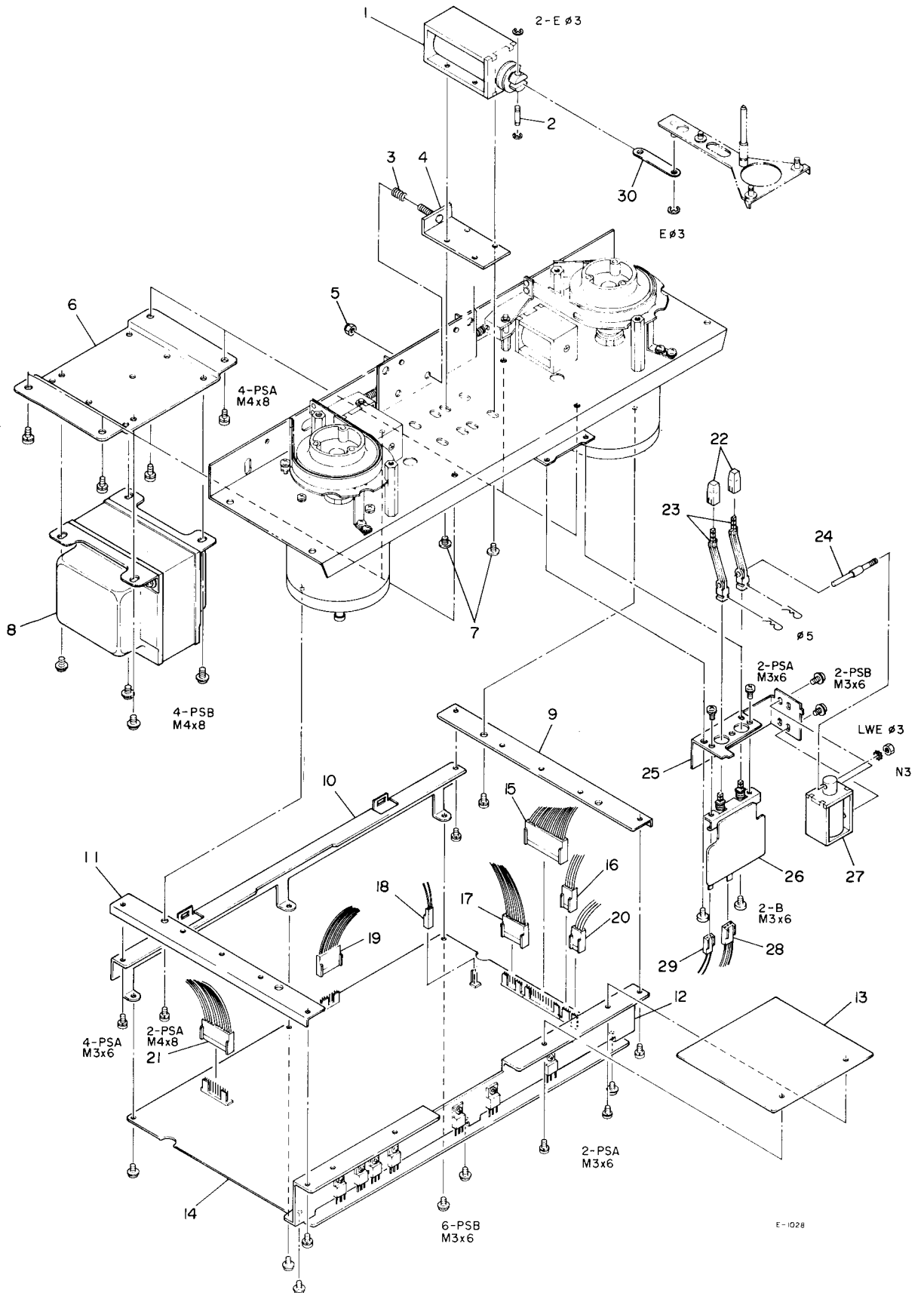


E-1013

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)

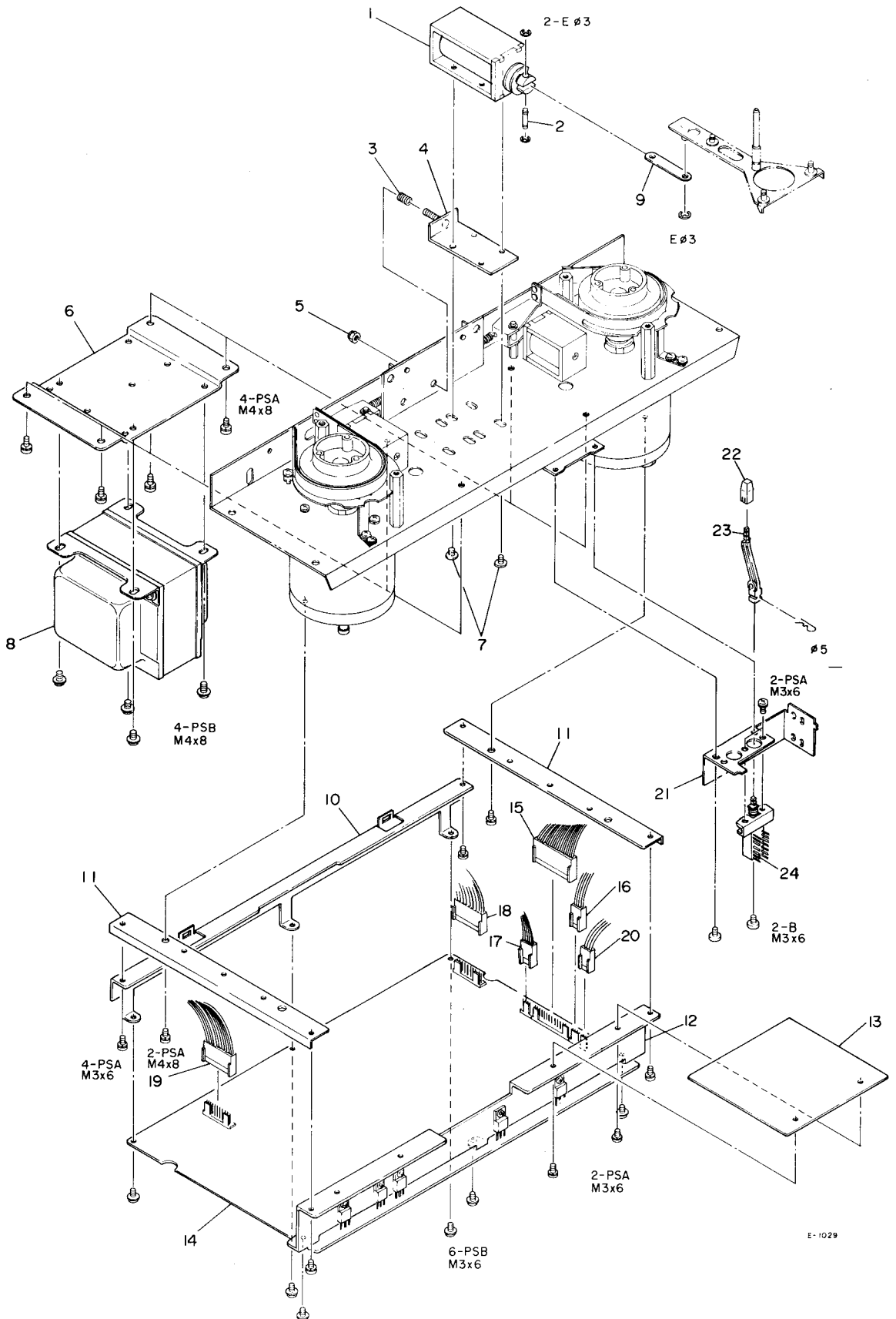


E-1028

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	
	*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	
5 - 28	*5122281000	Connector Socket, 3P (Red)	
5 - 29	*5122164000	Connector Socket, 2P	

EXPLODED VIEW - 6 (X-7)

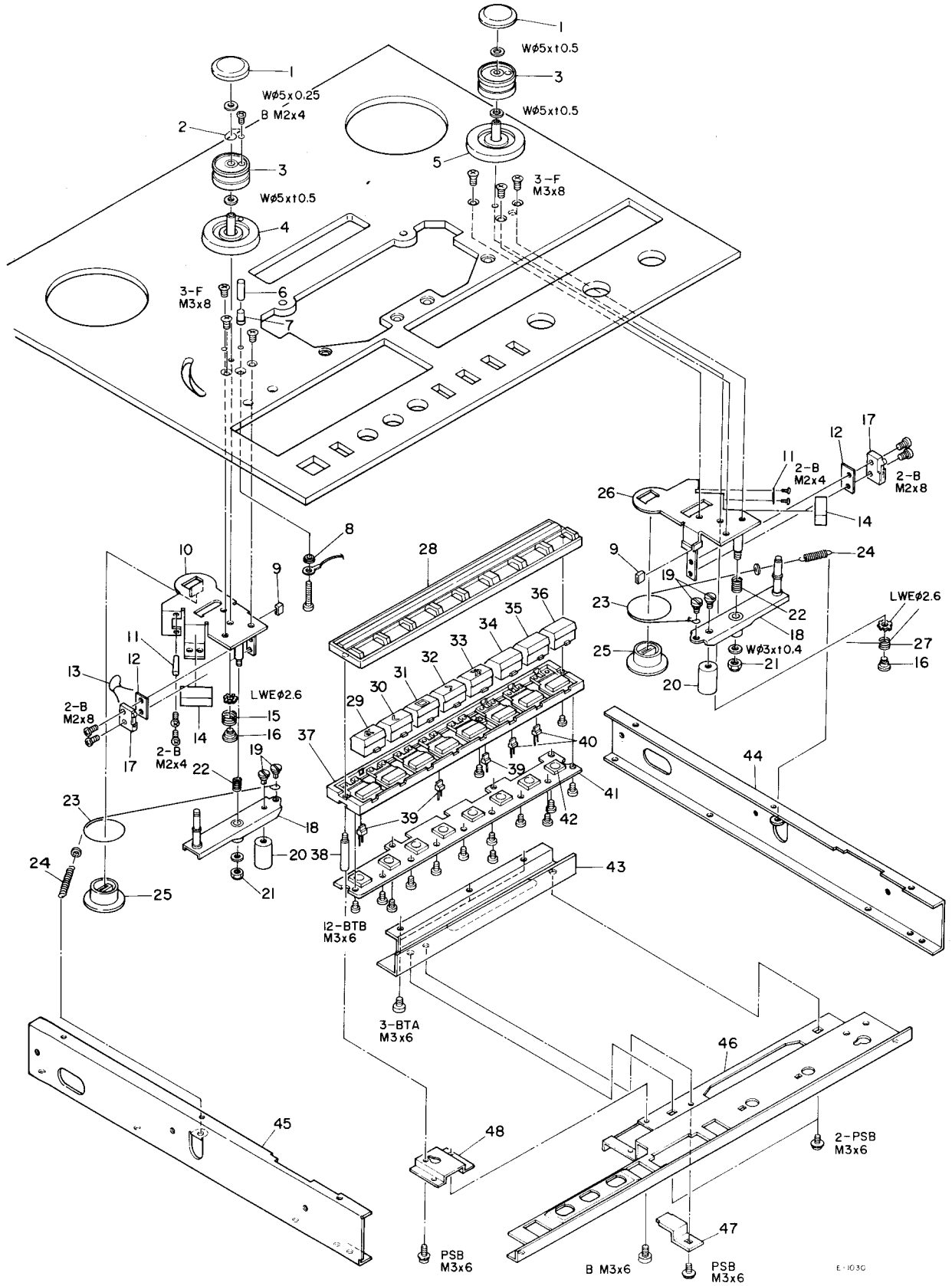


E-1029

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 U.S.A., CANADA GENERAL EXPORT EUROPE, AUSTRALIA, U.K.
	△ 5152225000	Transformer, Power	
	△ 5152226000	Transformer, Power	
	△ 5152239000	Transformer, Power	
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)

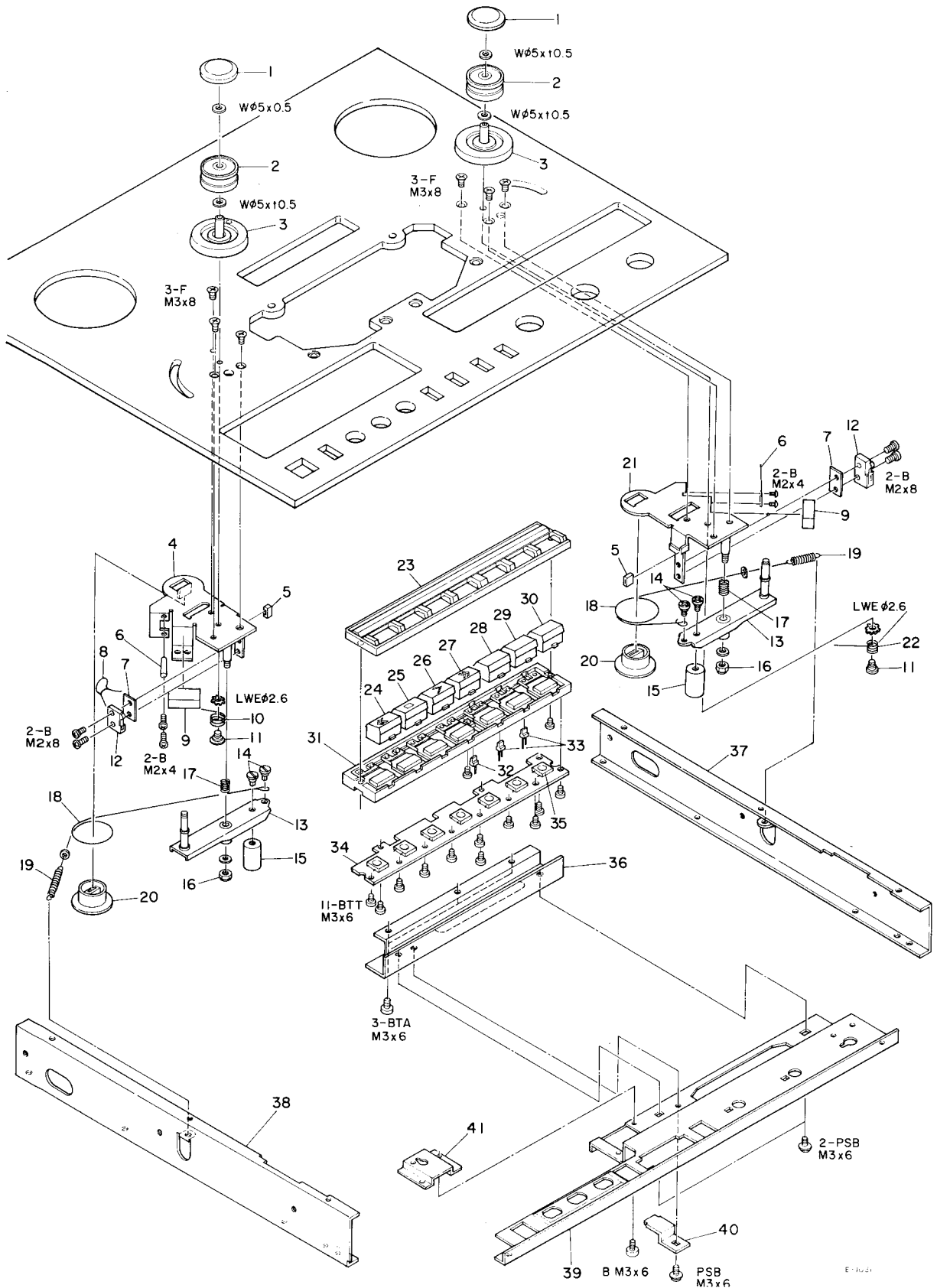


E-1030

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	

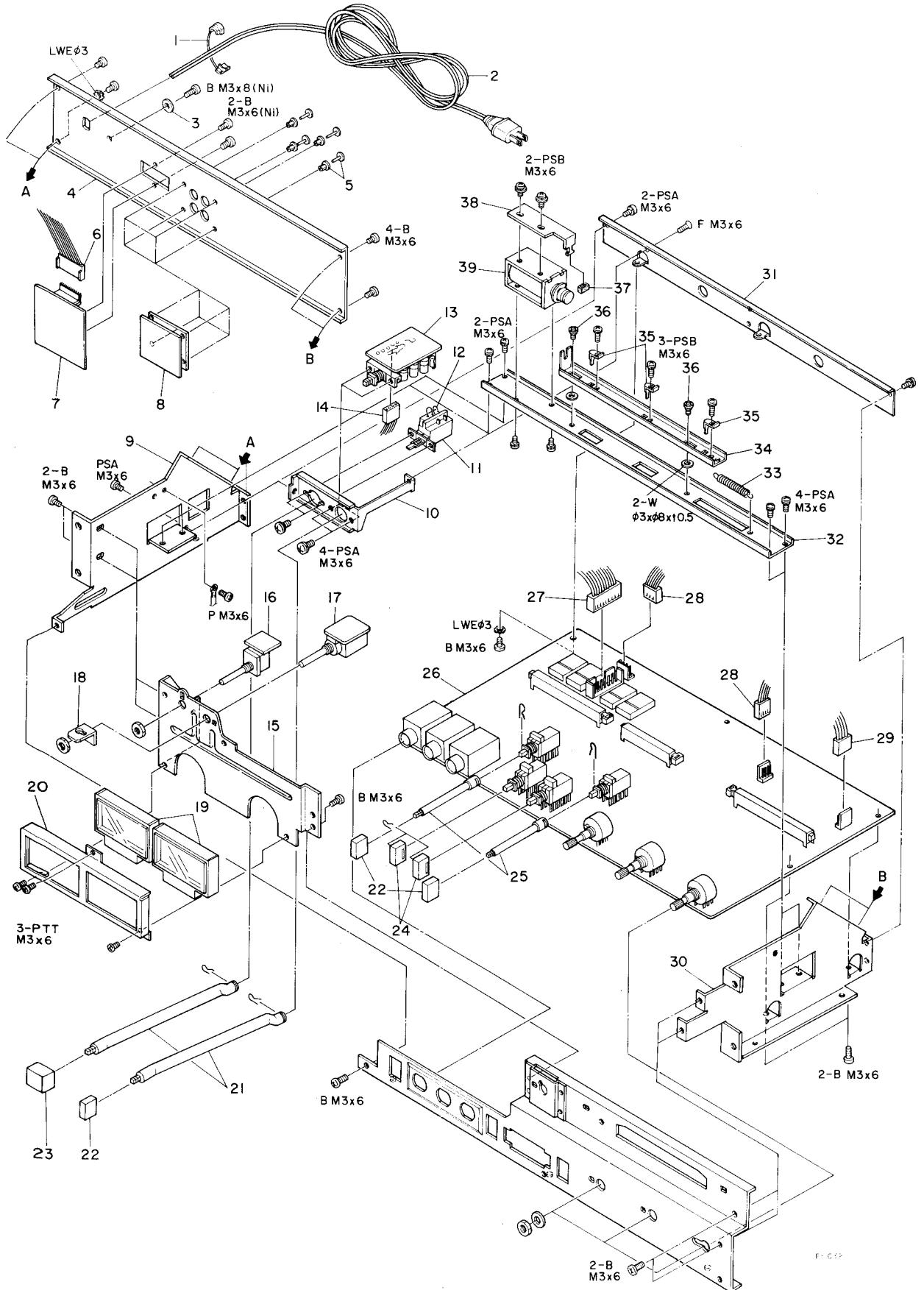
EXPLODED VIEW - 8 (X-7)



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	

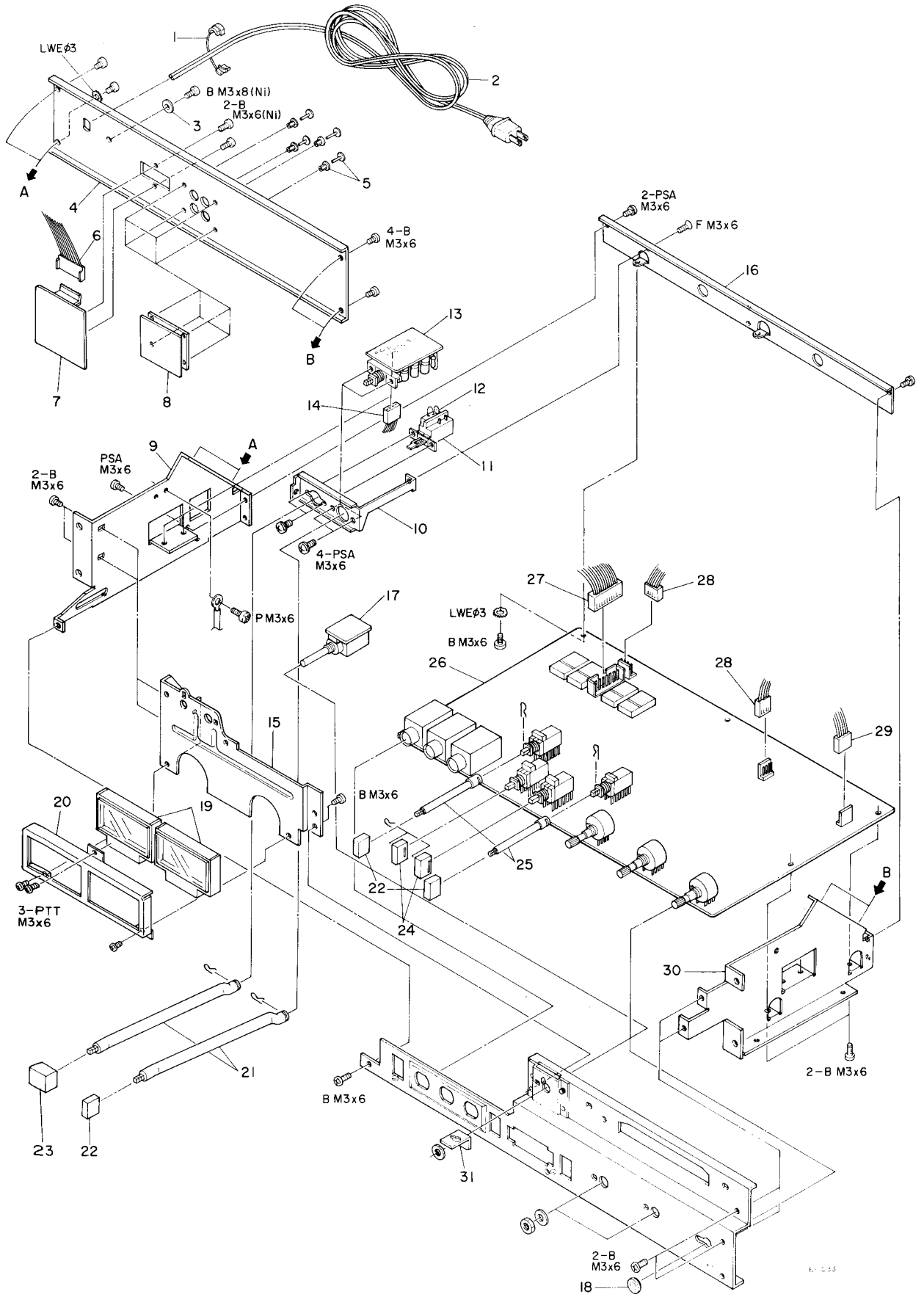
EXPLODED VIEW - 9 (X-7R)



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

REF. NO.	PARTS NO.	DESCRIPTION	REMARKS
9 - 1	*5534660000	Strain Relief, AC Power Cord	All except AUSTRALIA, U.K. AUSTRALIA
	*5534663000	Strain Relief, AC Power Cord	
	*5534661000	Strain Relief, AC Power Cord	
9 - 2	△*5128027000	Cord, AC Power	JAPAN, GENERAL EXPORT CANADA, U.S.A. EUROPE AUSTRALIA U.K.
	△*5128075000	Cord, AC Power	
	△*5128018000	Cord, AC Power	
	△*5128031000	Cord, AC Power	
	△*5128047000	Cord, AC Power	
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	PCB Assy, CONNECTOR; A	Part of 9 - 7
	*5167931000	PCB, CONNECTOR	
9 - 8	*5168937201	PCB Assy, IN/OUTPUT	Part of 9 - 8
	*5167937101	PCB, IN/OUTPUT	
	*5124058000	Jack, Pin; 4P	Part of 9 - 8
	*5183124000	Carbon Res. 56 k ohm ¼W 5%	Part of 9 - 8
9 - 9	*5553304000	Frame, Ampl.; L	
9 - 10	*5555718000	Bracket, Push Switch	
9 - 11	△ 5134036000	Push Switch, POWER	JAPAN, GENERAL EXPORT CANADA, U.S.A, AUSTRALIA EUROPE, U.K.
	△ 5134018000	Push Switch, POWER	
	△ 5134011000	Push Switch, POWER	
9 - 12	△ 5052910000	Spark Killer, 0.033 mfd + 120 ohm 125V AC	U.S.A. JAPAN, GENERAL EXPORT, AUSTRALIA CANADA EUROPE, U.K.
	△ 5052907000	Spark Killer, 0.01 mfd + 300 ohm 400V AC	
	△ 5052911000	Spark Killer, 0.033 mfd + 120 ohm 200V AC	
	△ 5052908000	Spark Killer, 4700 pF 250 V AC x 2	
9 - 13	*5158001000	PCB Assy, SPEED SW	
9 - 14	*5127168000	Connector Socket, 6P	
9 - 15	*5553307000	Bracket, Meter; B	
9 - 16	*5168928000	PCB Assy, SWITCH	Part of 9 - 16
	*5167928000	PCB, SWITCH	
	5133013000	Switch, Rotary	Part of 9 - 16
9 - 17	*5168938000	PCB Assy, PITCH CONT	Part of 9 - 17
	*5167938000	PCB, PITCH CONT	
	5150239000	Resistor, Variable 5 k ohm (w/Switch)	
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)



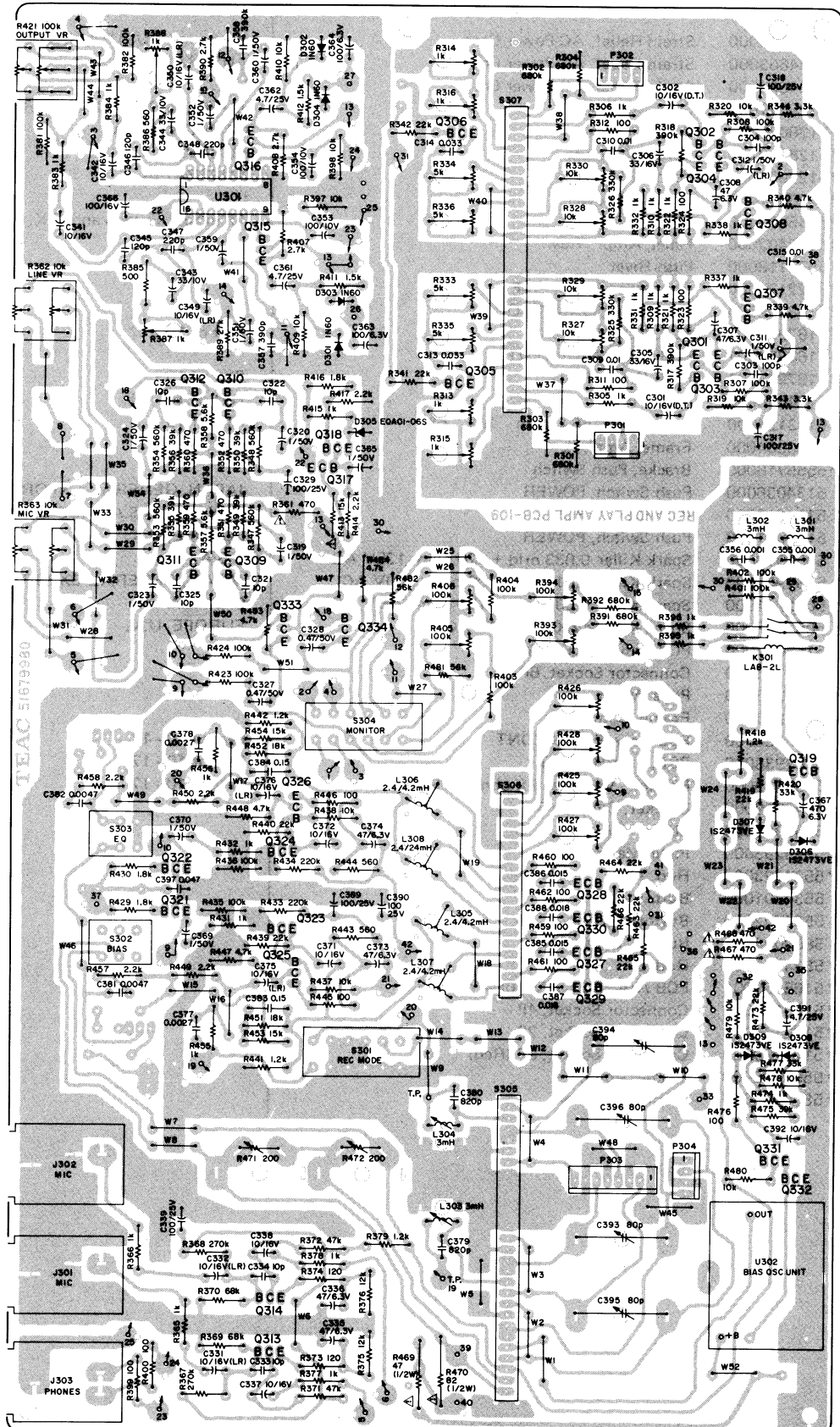
Parts marked with *require longer delivery time than regular parts.

REF. NO.	PARTS NO.	DESCRIPTION	REMARKS
10 - 1	*5534660000	Strain Relief, AC Power Cord	All except AUSTRALIA, U.K.
	*5534663000	Strain Relief, AC Power Cord	AUSTRALIA
	*5534661000	Strain Relief, AC Power Cord	U.K.
10 - 2	△*5128027000	Cord, AC Power	JAPAN, GENERAL EXPORT
	△*5128075000	Cord, AC Power	CANADA, U.S.A.
	△*5128018000	Cord, AC Power	EUROPE
	△*5128031000	Cord, AC Power	AUSTRALIA
	△*5128047000	Cord, AC Power	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	PCB Assy, CONNECTOR; B	
	*5167931000	PCB, CONNECTOR	Part of 10 - 7
10 - 8	*5168937201	PCB Assy, IN/OUTPUT	
	*5167937101	PCB, IN/OUTPUT	Part of 10 - 8
	*5124058000	Jack, Pin; 4P	Part of 10 - 8
	*5183124000	Carbon Res. 56 k ohm ¼W 5%	Part of 10 - 8
10 - 9	*5553304000	Frame, Ampl.; L	
10 - 10	*5555718000	Bracke, Push Switch	
10 - 11	△ 5134036000	Push Switch, POWER	JAPAN, GENERAL EXPORT
	△ 5134018000	Push Switch, POWER	CANADA, U.S.A., AUSTRALIA
	△ 5134011000	Push Switch, POWER	EUROPE, U.K.
10 - 12	△ 5052910000	Spark Killer 0.033 mfd + 120 ohm 125V AC	U.S.A.
	△ 5052907000	Spark Killer 0.01 mfd + 300 ohm 400V AC	JAPAN, GENERAL EXPORT, AUSTRALIA
	△ 5052911000	Spark Killer 0.033 mfd + 120 ohm 200V AC	CANADA
	△ 5052908000	Spark Killer 4700 pF 250V AC x 2	EUROPE, U.K.
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	PCB Assy, PITCH CONT	Part of 10 - 17
	*5167938000	PCB, PITCH CONT	Part of 10 - 17
	5150239000	Resistor, Variable 5 k ohm (w/Switch)	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

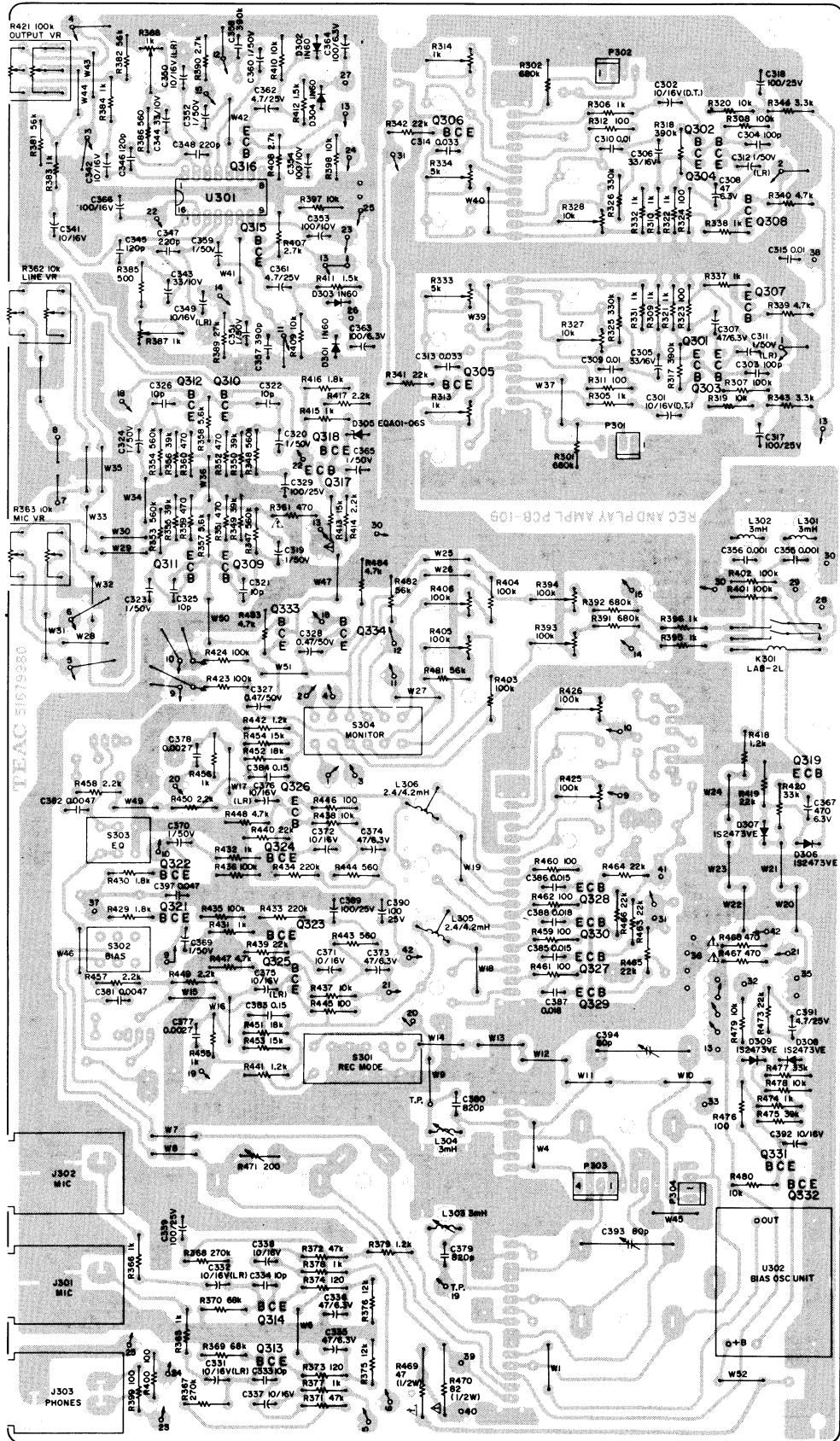
PC Boards shown viewed from foil side.

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

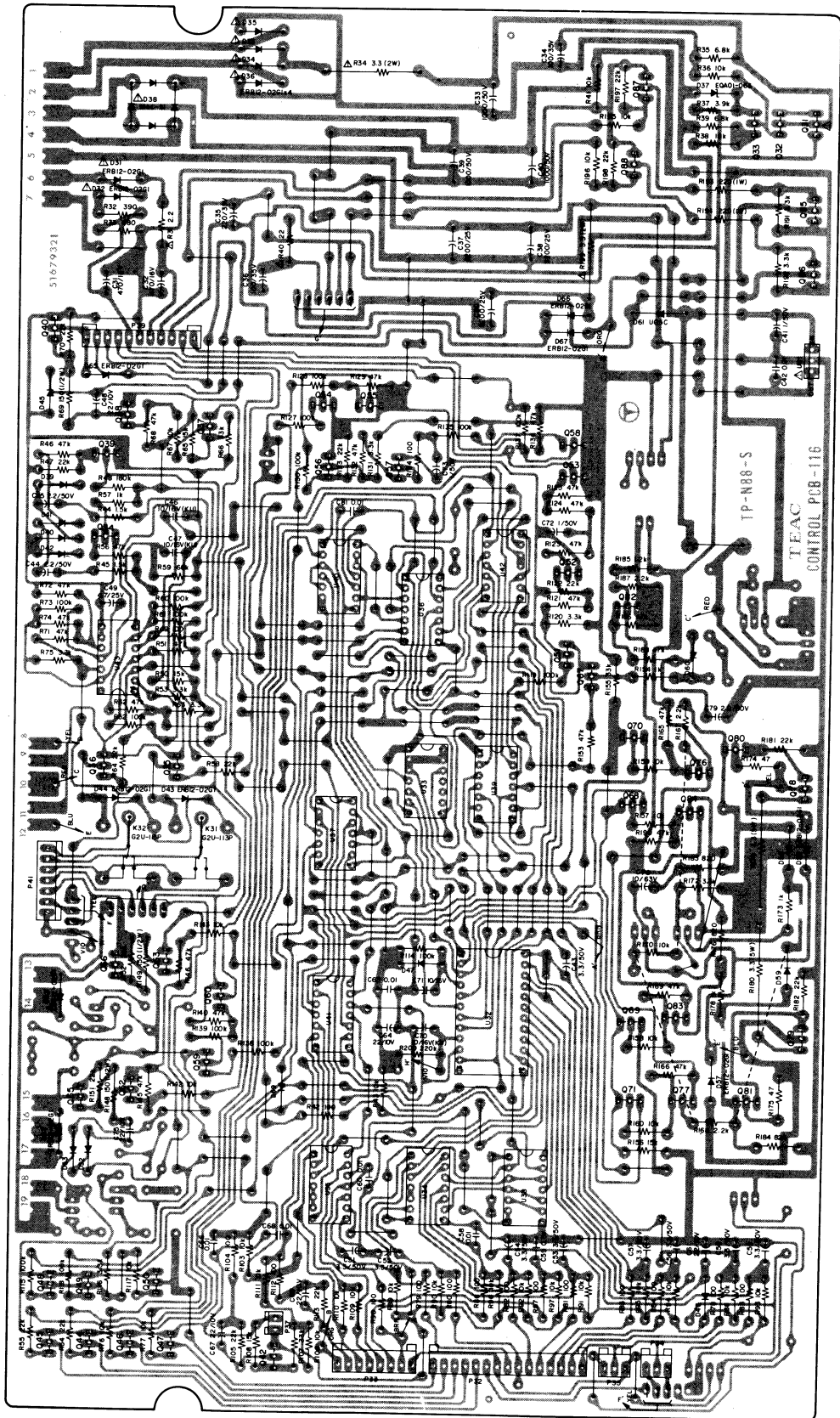


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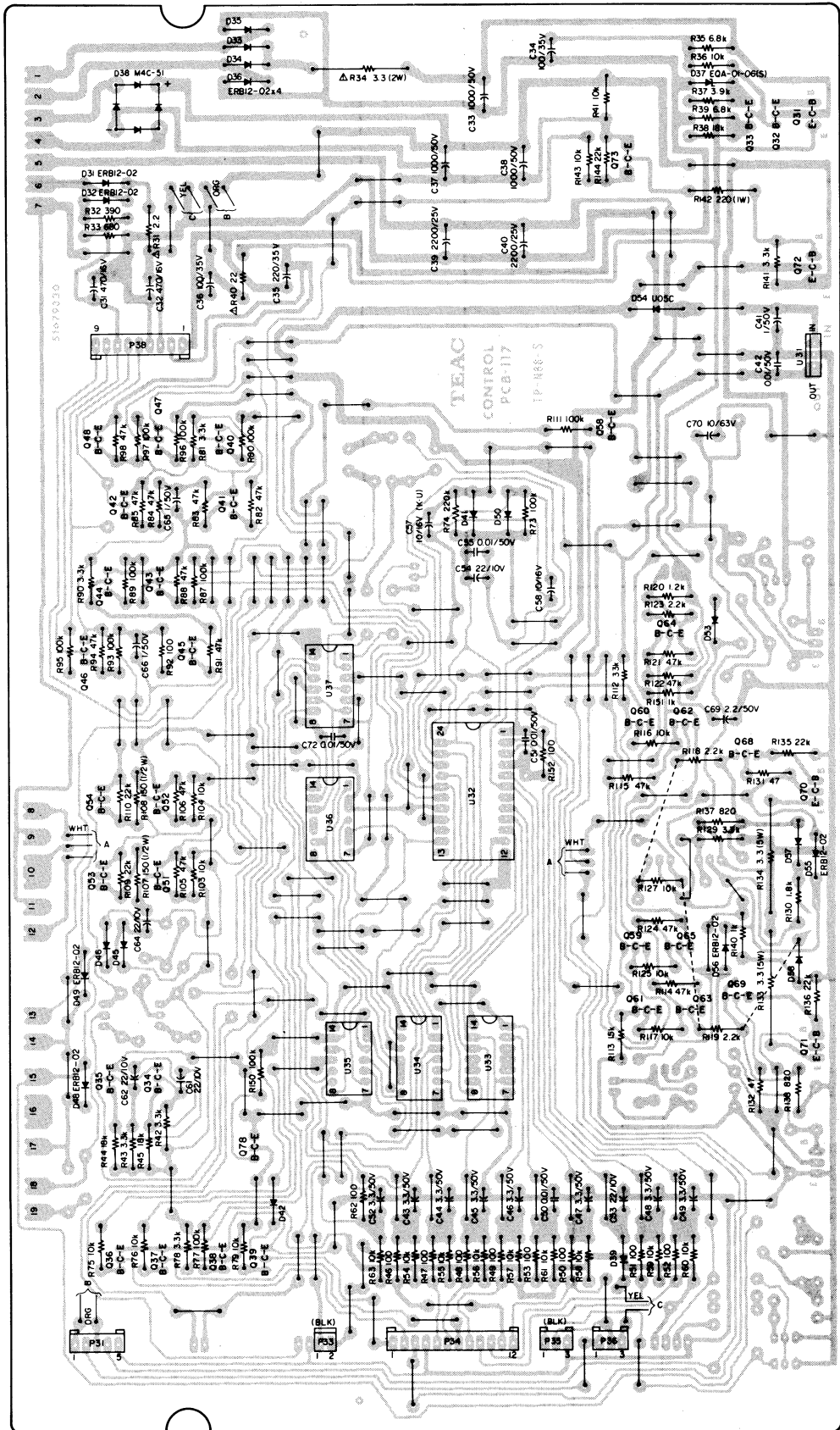
REC AND PLAY AMPL PCB ASSY (X-7)



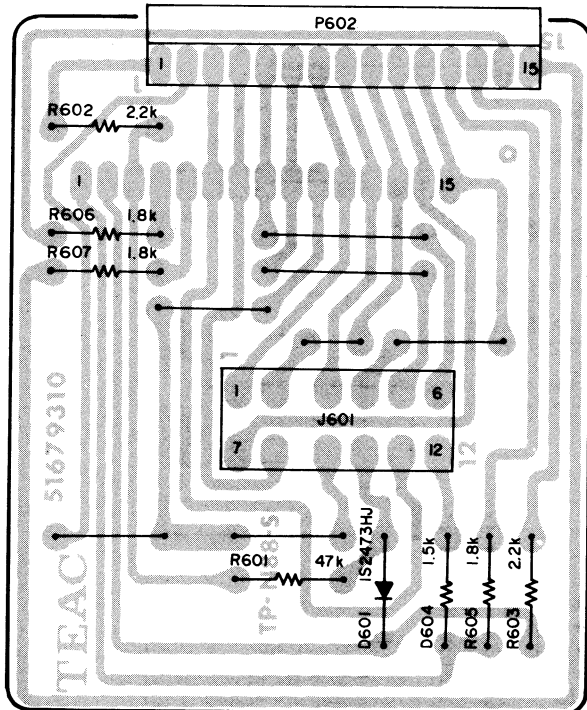
CONTROL PCB ASSY (X-7R)



CONTROL PCB ASSY (X-7)

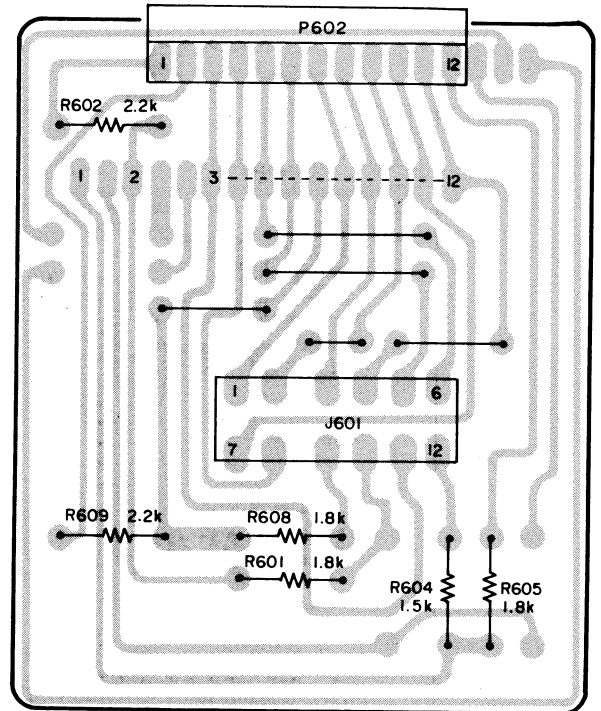


CONNECTOR PCB ASSY (X-7R)



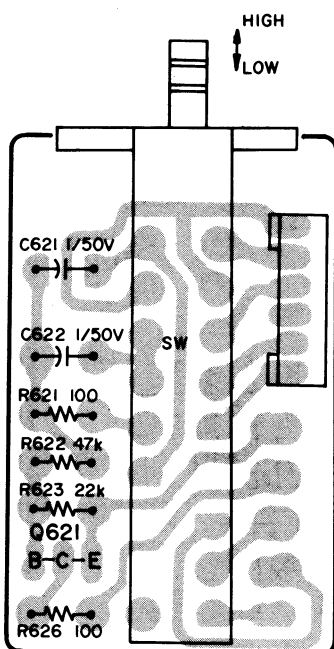
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CONNECTOR PCB ASSY (X-7)



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%

VARIABLE RESISTORS

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

MISCELLANEOUS

C393~C396	5054707000	Trimmer Cap., 80 pfd
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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
	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, 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 1/2W Non Flammable
R470	5181996000	82 ohm 1/2W 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)
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	100 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 $\pm 5\%$ tolerance, $\frac{1}{4}$ 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 ½W
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 ½W
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 5W Cement
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 1W Metal Film

REF. NO.	PARTS NO.	DESCRIPTION
R195, R196	5181506000	10 k ohm
R197, R198	5181514000	22 k ohm
R199	5184306000	3.3 ohm 2W Cement
R200	5181538000	220 k ohm

CAPACITORS

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

MISCELLANEOUS

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
K31, K32	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
ICs		
U31	△5147058000	NJM78M05A
U32	5147054000	AN6251
U33~U35	5147056000	HD7400P
U36, U37	5147057000	HD7402P
TRANSISTORS		
Q31	△5145087000	2SD313(E)
Q32	5042625000	2SC1318(S)
Q33~Q41	5042383000	2SC536(F)
Q42	5042553000	2SA733(P)
Q43~Q45	5042383000	2SC536(F)
Q46	5042553000	2SA733(P)
Q47	5042383000	2SC536(F)
Q48	5042553000	2SA733(P)
Q51, Q52	5042553000	2SA733(P)
Q53, Q54	5042564000	2SC1061(C)
Q55	5042383000	2SC536(F)
Q58~Q60	5042383000	2SC536(F)
Q62~Q65	5042553000	2SA733(P)
Q68, Q69	5042625000	2SC1318(S)
Q70, Q71	5145087000	2SD313(E)
Q72	5145192000	2SB507(E)
Q73	5042625000	2SC1318(S)
Q78	5042383000	2SC536(F)
DIODES		
D31~D36	△5143243000	ERB12-02GI
D37	5143154000	Zener, EQA01-06S
D38	△5143142000	M4C-51
D39	5143118000	1S2473HJ
D41	5143118000	1S2473HJ
D45, D46	5143118000	1S2473HJ
D48, D49	5143243000	ERB12-02GI
D50	5143118000	1S2473HJ
D53	5143118000	1S2473HJ
D54	5143017000	U05C
D55, D56	5143243000	ERB12-02GI
D57, D58	5143118000	1S2473HJ
RESISTORS		
All resistors are rated ±5% tolerance, ¼ watt and of carbon type 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 ohm Non Flammable
R41	5181506000	10 k ohm
R42, R43	5181494000	3.3 k ohm
R44, R45	5181512000	18 k ohm
R46~R53	5181458000	100 ohm
R54~R61	5181506000	10 k ohm
R62	5181458000	100 ohm
R63	5181506000	10 k ohm

REF. NO.	PARTS NO.	DESCRIPTION
R69	5181514000	22 k ohm
R70	5181506000	10 k ohm
R71	5181458000	100 ohm
R72	5181514000	22 k ohm
R73	5181530000	100 k ohm
R74	5181538000	220 k ohm
R75, R76	5181506000	10 k ohm
R77	5181530000	100 k ohm
R78	5181494000	3.3 k ohm
R79	5181506000	10 k ohm
R80	5181530000	100 k ohm
R81	5181494000	3.3 k ohm
R82~R85	5181522000	47 k ohm
R87	5181530000	100 k ohm
R88	5181522000	47 k ohm
R89	5181530000	100 k ohm
R90	5181494000	3.3 k ohm
R91	5181522000	47 k ohm
R92	5181458000	100 ohm
R93	5181530000	100 k ohm
R94	5181522000	47 k ohm
R95~R97	5181530000	100 k ohm
R98	5181522000	47 k ohm
R103, R104	5181506000	10 k ohm
R105, R106	5181522000	47 k ohm
R107, R108	5180062000	150 ohm
R109, R110	5181514000	22 k ohm
R111	5181530000	100 k ohm
R112	5181518000	33 k ohm
R113	5181510000	15 k ohm
R114, R115	5181522000	47 k ohm
R116, R117	5181506000	10 k ohm
R118, R119	5181490000	2.2 k ohm
R120	5181484000	1.2 k ohm
R121, R122	5181522000	47 k ohm
R123	5181490000	2.2 k ohm
R124	5181522000	47 k ohm
R125	5181506000	10 k ohm
R127	5181506000	10 k ohm
R128	5181494000	3.3 k ohm
R131, R132	5181450000	47 ohm
R133, R134	5184410000	3.3 ohm 5W Cement
R135, R136	5181514000	22 k ohm
R137, R138	5181480000	820 ohm
R139	5181488000	1.8 k ohm
R140	5181482000	1 k ohm
R141	5181494000	3.3 k ohm
R142	5184763000	220 ohm 1W Metal Film
R143	5181506000	10 k ohm
R144	5181514000	22 k ohm
R150	5181530000	100 k ohm
R151	5181482000	1 k ohm

CONNECTOR PCB ASSY (X-7)

REF. NO.	PARTS NO.	DESCRIPTION
CAPACITORS		
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

MISCELLANEOUS

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

CONNECTOR PCB ASSY (X-7R)

REF. NO.	PARTS NO.	DESCRIPTION
	5168931000	PCB Assy
	5167931000	PCB
DIODES		
D601	5143118000	1S2473HJ
CARBON RESISTORS		
All resistors are rated $\pm 5\%$ tolerance and $\frac{1}{4}$ 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
MISCELLANEOUS		
	5122158000	Connector, Plug; 15P

REF. NO.	PARTS NO.	DESCRIPTION
	5158002000	PCB Assy
	5167931000	PCB
CARBON RESISTORS		
All resistors are rated $\pm 5\%$ tolerance and $\frac{1}{4}$ 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

MISCELLANEOUS

5122155000 Connector, Plug; 12P

SPEED SW PCB ASSY

REF. NO.	PARTS NO.	DESCRIPTION
	5158001000	PCB Assy
	5157001000	PCB
TRANSISTOR		
Q621	5042383000	2SC536(F)
CARBON RESISTORS		
All resistors are rated $\pm 5\%$ tolerance and $\frac{1}{4}$ watt.		
R621	5057058000	100 ohm
R622	5057122000	47 k ohm
R623	5057114000	22 k ohm
R626	5057058000	100 ohm

CAPACITORS

C621, C622 5055454000 Elec. 1 mfd 50V

MISCELLANEOUS

P621 5122130000 Connector, Plug; 6P
5134093000 Switch, Push; 6PDT