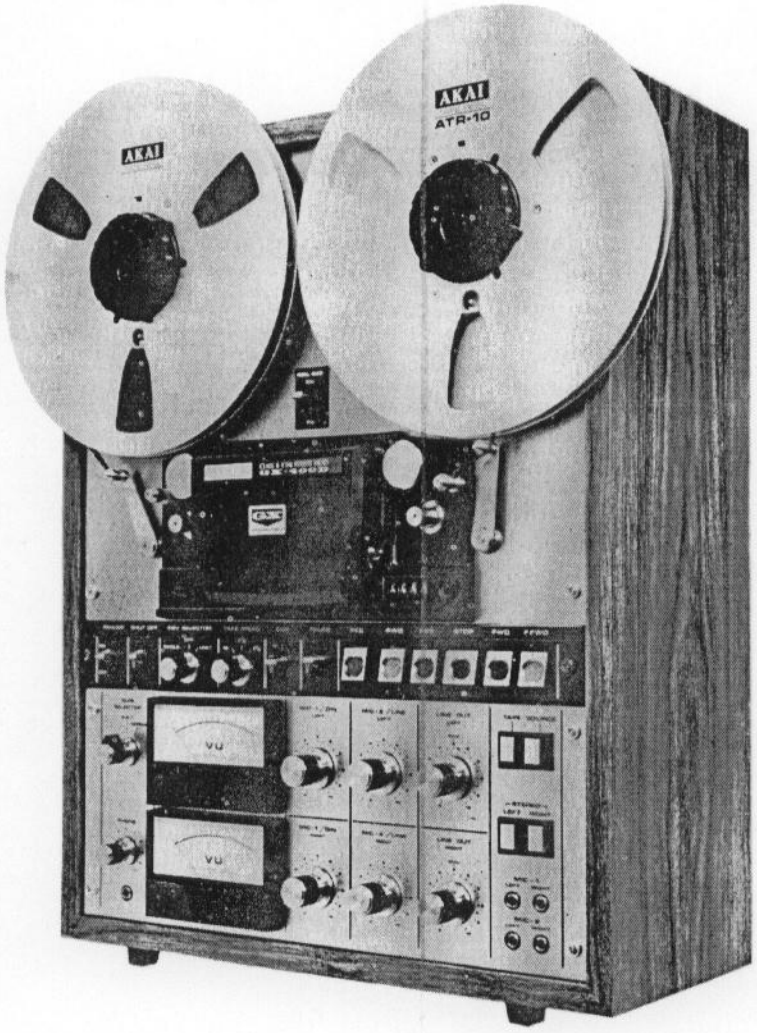


STEREO TAPE DECK

MODEL GX-400D

ALSO APPLICABLE TO MODEL GX-400D·PRO
STEREO TAPE DECK

SECTION 1

SERVICE MANUAL

TABLE OF CONTENTS

I. SPECIFICATIONS

1. MODEL: GX-400D

An asterisk next to a figure indicates the minimum guaranteed performance.

TRACK SYSTEM		4 track 2 channel stereo, monaural Recording/Playback
TAPE SPEED		15, 7-1/2 and 3-3/4 ips.±0.5%(*1.5%)
WOW AND FLUTTER		Less than 0.035%(*0.06%) R.M.S. at 15 ips. Less than 0.05%(*0.09%) R.M.S. at 7-1/2 ips. Less than 0.08%(*0.15%) R.M.S. at 7-1/2 ips.
FREQUENCY RESPONSE	S.R.T. Tape	20 to 30,000 Hz(*30 to 27,000 Hz±3 dB) at 15 ips. 20 to 28,000 Hz(*30 to 24,000 Hz±3 dB) at 7-1/2 ips. 30 to 20,000 Hz(*30 to 17,000 Hz±3 dB) at 3-3/4 ips.
	Normal Tape	20 to 28,000 Hz(*30 to 24,000 Hz±3 dB) at 15 ips. 20 to 26,000 Hz(*30 to 22,000 Hz±3 dB) at 7-1/2 ips. 30 to 19,000 Hz(*30 to 15,000 Hz±3 dB) at 3-3/4 ips.
DISTORTION		*Less than 2% at 15 ips. 1,000 Hz "0" VU recording *Less than 2% at 7-1/2 ips. 1,000 Hz "0" VU recording *Less than 3% at 3-3/4 ips. 1,000 Hz "0" VU recording
OUTPUTS	Line Output	0±1 dB(O VU), 6±1.5 dB(VR Max.)
	Din Output	390 mV
	Head Phone Output	50±10 mV 8Ω load 1,000 Hz O VU Head Phone Volume maximum
INPUTS	Mic Input	0.7 mV
	Line Input	70 mV
	Din Input	15 mV(low), 300 mV(high)
RECORDING/PLAYBACK LEVEL		0±1.5 dB
SIGNAL TO NOISE RATIO		Better than 54 dB(*48 dB)
CROSS TALK	Stereo	*Better than 45 dB at 1,000 Hz 3 VU recording
	Monaural	Better than 70 dB *Better than 60 dB at 1,000 Hz 3 VU recording
ERASE RATIO		Better than 70 dB
RECORDING BIAS FREQUENCY		100±5 kHz
BIAS LEAK	Stereo	Less than -30 VU
	Monaural	Less than -20 VU
HIGH FREQUENCY DEVIATION		0±1.5 dB, using a 15,000 Hz test tape at 15 ips.
REVERSING TIME		Within 4 sec. at 15 ips. Within 3 sec. at 7-1/2, 3-3/4 ips.
RECORDING CAPACITY		90 min. stereo recording, using a 3,600 ft. tape at 15 ips.
F.FWD AND RWD TIME		120/100 sec., using a 2,400 ft. tape at 50/60 Hz
MOTORS	Capstan Motor	4 pole eddy current A.C. servo motor Type: SCM3-16TW Revolutions: 800 r.p.m. at 15 ips. 400 r.p.m. at 7-1/2 ips. 200 r.p.m. at 3-3/4 ips.
	Reel Motor	Two 6 pole eddy current inner rotor motors Type: IM1-24TW Revolutions: 1,000/1,200 r.p.m. at 50/60 Hz
HEADS	Combo Recording/ Erase Head	Type: RE4-6 Gap: 3.5 to 5.5 microns(Rec.) 0.2 mm x2 W Gap(Erase) Impedance: 1,400Ω±25% at 100 kHz(Rec.) 130Ω±7% at 100 kHz(Erase) D.C. Resistance: 5.5Ω Rec.(approx.) 2.3Ω Erase(approx.)
	Playback Head	Type: P4-220 Gap: 0.5 to 2 microns Impedance: 1.2 kΩ±25% at 1 kHz D.C. Resistance: 160Ω(approx.)

TRANSISTORS	2SA564(Q)(R) . . . 3 2SA628(D)(F) . . . 3 2SA640(L) . . . 10 2SA733(R) . . . 2 2SC458LG(C) . . . 2 2SC711(D)(E) . . . 32 2SC792 . . . 1 2SC945(Q)(R) . . . 8	2SC971 . . . 1 2SC1014(C)(D) . . . 1 2SC1098(L)(M) . . . 2 2SC1211(C)(D) . . . 1 2SC1222(E)(F) . . . 12 2SC1247A(B)(V) . . . 12 2SD234(O)(R) . . . 1
F.E.T.	2SK30(O) . . . 2	
DIODES	1N34A . . . 4 WG713 . . . 5 1S1588 . . . 52 10D05 . . . 9 10D1 . . . 7	10D4 . . . 7 10DC-2(Blk) . . . 1 10DC-2(Red) . . . 1 5B2 . . . 1
ZENER DIODES	RD7A(L)(N) . . . 3 RD9A . . . 2	WZ085 . . . 2
THERMISTER	31D26 . . . 1	
POWER SUPPLY	100 to 240VA.C. 50/60Hz	
POWER CONSUMPTION	160W maximum	
INSULATION RESISTANCE	More than 50 MΩ	
DIMENSIONS	457(W)x590(H)x240(D) mm (18"x23.2"x9.5")	
WEIGHT	31.2 kg(68.7 lbs.)	

NOTE: Specifications subject to change without notice.

2. MODEL: GX-400D·PRO

An asterisk next to a figure indicates the minimum guaranteed performance.

TRACK SYSTEM		2 track 2 channel stereo Recording/Playback 4 track 2 channel stereo Playback
TAPE SPEED		15, 7-1/2 and 3-3/4 ips.±1.5%
WOW AND FLUTTER		Less than 0.035%(*0.06%) R.M.S. at 15 ips. Less than 0.09% R.M.S. at 7-1/2 ips. Less than 0.15% R.M.S. at 3-3/4 ips.
FREQUENCY RESPONSE	S.R.T. Tape	30 to 27,000 Hz±3 dB at 15 ips. 30 to 24,000 Hz±3 dB at 7-1/2 ips. 30 to 18,000 Hz±3 dB at 3-3/4 ips.
	Normal Tape	30 to 24,000 Hz±3 dB at 15 ips. 30 to 22,000 Hz±3 dB at 7-1/2 ips. 30 to 16,000 Hz±3 dB at 3-3/4 ips.
DISTORTION		*Less than 2% at 15 ips. 1,000 Hz 0 VU recording *Less than 2% at 7-1/2 ips. 1,000 Hz 0 VU recording *Less than 3% at 3-3/4 ips. 1,000 Hz 0 VU recording
OUTPUTS	Line Output	0±1 dB(0 VU), 6±1.5 dB(VR Max.)
	Din Output	390 mV
	Head Phone Output	50±10 mV 8Ω load 1,000 Hz 0 VU Head Phone Volume maximum
INPUTS	Mic Input	0.5 mV
	Line Input	50 mV
	Din Input	10 mV(low), 250 mV(high)
RECORDING PLAYBACK LEVEL		0±1.5 dB
SIGNAL TO NOISE RATIO		Better than 58 dB
	2 Track	*Better than 53 dB
	4 Track	*Better than 48 dB
CROSS TALK		Better than 45 dB(*43 dB) at 1,000 Hz 3VU recording
ERASE RATIO		Better than 70 dB
RECORDING BIAS FREQUENCY		160±10 kHz
BIAS LEAK		Less than -30 VU
HIGH FREQUENCY DEVIATION	2 Track	0±1.5 dB, using, a 15,000 Hz test tape at 15 ips.
	4 Track	0±3 dB, using a 15,000 Hz test tape at 15 ips.
RECORDING CAPACITY		45 min. stereo recording, using a 3,600 ft. tape at 15 ips.
F. FWD AND RWD TIME		120/100 sec., using a 2,400 ft. tape at 50/60 Hz
MOTORS	Capstan Motor	4 pole eddy current A.C. servo motor Type: SCM3-16TW Revolutions: 800 r.p.m. at 15 ips. 400 r.p.m. at 7-1/2 ips. 200 r.p.m. at 3-3/4 ips.
	Reel Motor	Two 6 pole eddy current inner rotor motors Type: IM1-24TW Revolutions: 1,000/1,200 r.p.m. at 50/60 Hz
HEADS	Erase Head	Type EF-210 Gap: 0.2mm x2 W Gap Impedance: 360Ω±10% at 100 kHz D.C. Resistance: 2.8Ω(approx.)
	2 Track Recording Head	Type: R2-100 Gap: 4.5±1 microns Impedance: 3 kΩ±20% at 100 kHz D.C. Resistance: 8Ω(approx.)
	2 Track Playback Head	Type: P2-100 Gap: 0.5 to 1 microns Impedance: 1.9 kΩ±20% at 1 kHz D.C. Resistance: 250Ω(approx.)
	4 Track Playback Head	Type: P4-220 Gap: 0.5 to 2 microns Impedance: 1.2 kΩ±25% at 1 kHz D.C. Resistance: 160Ω(approx.)

TRANSISTORS	2SA564(Q)(R) . . . 3	2SC971 . . . 1
	2SA628(D)(F) . . . 2	2SC1014(C)(D) . . . 1
	2SA640(L) . . . 10	2SC1098(L)(M) . . . 2
	2SA733(R) . . . 2	2SC1211(C)(D) . . . 1
	2SC458LG(C) . . . 2	2SC1222(E)(F) . . . 12
	2SC711(D)(E) . . . 30	2SC1247A(B)(V) . . . 10
	2SC792 . . . 1	2SD234(O)(R) . . . 1
	2SC945(Q)(R) . . . 8	
F.E.T.	2SK30(O) . . . 2	
DIODES	1N34A . . . 4	10D4 . . . 7
	WG713 . . . 5	10DC-2(Blk) . . . 1
	1S1588 . . . 36	10DC-2(Red) . . . 1
	10D05 . . . 7	5B2 . . . 1
	10D1 . . . 7	
ZENER DIODES	RD7A(L)(N) . . . 3	WZ085 . . . 3
	RD9A . . . 2	
THERMISTER	31D26 . . . 1	
POWER SUPPLY	100 to 240VA.C. 50/60 Hz	
POWER CONSUMPTION	160W maximum	
INSULATION RESISTANCE	More than 50 MΩ	
DIMENSIONS	457(W)x590(H)x258(D) mm (18"x23.2"x10.2")	
WEIGHT	30.5 kg(67.2 lbs.)	

NOTE: Specifications subject to change without notice.

II. MEASURING METHOD

1. TAPE SPEED DEVIATION

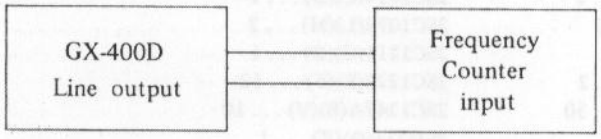


Fig. 1

As shown in Fig. 1, connect a Frequency Counter to the Line output of Model GX-400D. Playback a 1,000 Hz pre-recorded test tape. Take a Frequency Counter reading at the beginning, middle, and end of tape winding during playback. The maximum value of these respective readings will represent tape speed deviation.

2. WOW AND FLUTTER

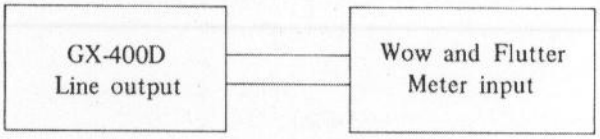


Fig. 2

Method A

As shown in Fig. 2, connect the Line output of Model GX-400D to the input of a Wow and Flutter Meter. Playback a 3,000 Hz pre-recorded test tape and take a Wow and Flutter Meter reading at the beginning, middle, and end of tape winding. The maximum value of these respective readings will represent the Wow and Flutter.

Method B

Supply a 3,000 Hz sine wave signal from an Audio Frequency Oscillator and make a recording on a blank tape at the beginning, middle, and end of tape winding. Rewind and playback the resultant signal. Measure Wow and Flutter with a Wow and Flutter Meter. (The Wow and Flutter value of Method B will be close to $\sqrt{2}$ times of value of Method A.)

3. FREQUENCY RESPONSE

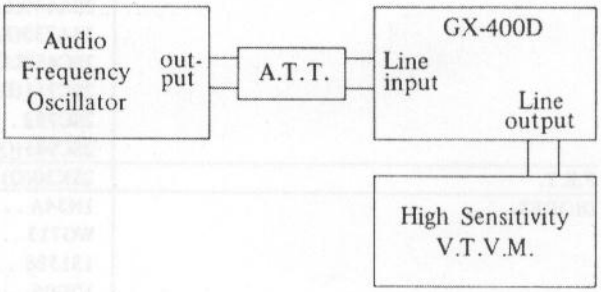


Fig. 3

For measuring Frequency Response, connect instruments as shown in Fig. 3 and proceed as follows:

1) Supply a 1,000 Hz sine wave signal to the Line input of Model GX-400D from an Audio Frequency Oscillator through an Attenuator.
2) Set recorder to recording mode and turn recording level control volume to maximum. Adjust Attenuator to obtain a 0 dB V.T.V.M. reading.
3) Under conditions described in 2) above, readjust Attenuator so that the Line output is -20 dB, and record 30 to 27,000 Hz spot frequencies.
4) Rewind tape and playback from the beginning. Take V.T.V.M. spot frequency readings and plot values on a graph.

NOTE: When measuring Frequency Response, new tape should be used.

4. SIGNAL TO NOISE RATIO

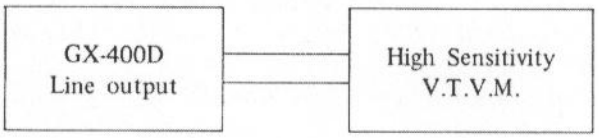


Fig. 4

As shown in Fig. 4, connect a High Sensitivity V.T.V.M. to the Line output of Model GX-400D. Playback a 700 Hz "0" VU pre-recorded test tape and measure the output. Then remove the tape and measure the noise level under the same condition. Convert each of the measured values into decibels.

5. TOTAL HARMONIC DISTORTION

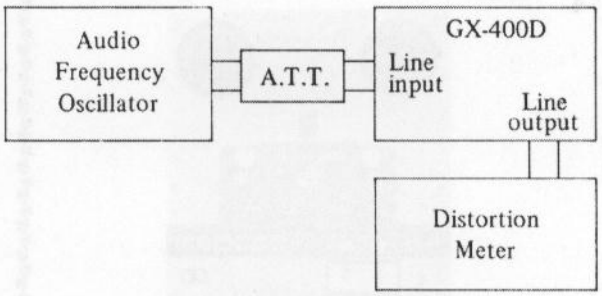


Fig. 5

Connect the measuring instruments as shown in Fig. 5 and record a 1,000 Hz sine wave signal at "0" VU. Playback the resultant signal and measure the overall distortion factor.

NOTE: 1) At this time, Distortion of the Audio Frequency Oscillator must be sufficiently small.
2) When measuring the distortion factor, new tape should be used.

6. CROSS TALK (Cross talk between the tracks)

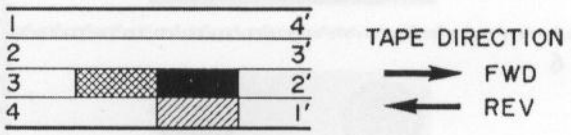


Fig. 6

As shown in Fig. 6 first record a 1,000 Hz sine wave signal on track No. 3 at +3 VU level. Next, record under a non-input condition. Then playback the tape on track No. 3 and 1' (reversed condition of tape) through the B.P.F. (1,000 Hz Band Pass Filter, sensitivity 1,000 Hz, ratio 1:1) and obtain the ratio from the following formula.

$$C = 20 \log \frac{E_0}{E_2 - E_1} \quad (dB)$$

where, C = Desired cross talk ratio (dB)
E_0 = 1,000 Hz signal output level (V)
E_2 = 1,000 Hz cross talk level (V)
E_1 = Non-input cross talk level (V)

7. ERASE RATIO

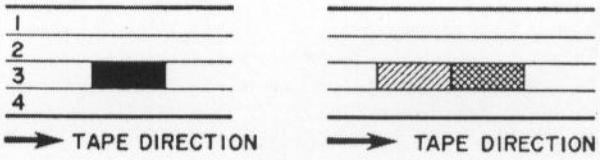


Fig. 7

As shown in Fig. 7 using a virgin tape first record a 1,000 Hz sine wave signal on track No. 3 at +3 VU level, then playback this recorded signal and take a V.T.V.M. reading at the output level. Next, erase this recorded portion and playback the erased part through the B.P.F. (1,000 Hz sensitivity 1:1) and take readings of the erased signal. Obtain a ratio between the two from the following formula:

$$E_r = 20 \log \frac{E_0}{E_2 - E_1} \quad (dB)$$

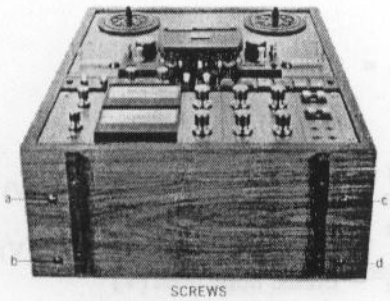
where, E_r = Desired erase ratio
E_0 = 1,000 Hz signal output level (V)
E_2 = Erased 1,000 Hz signal and noise level (V)
E_1 = Erased noise level (V)

NOTE: When measuring cross talk and erase ratio virgin tape should be used.

III. DISMANTLING OF UNIT

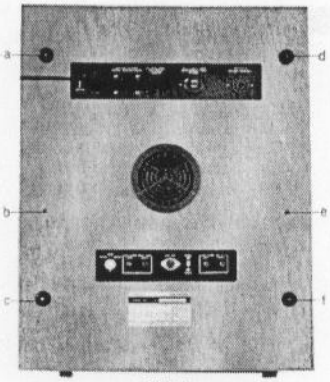
In case of trouble, etc. necessitating disassembly, please disassemble in the order shown in photographs. Reassemble in reverse order.

1



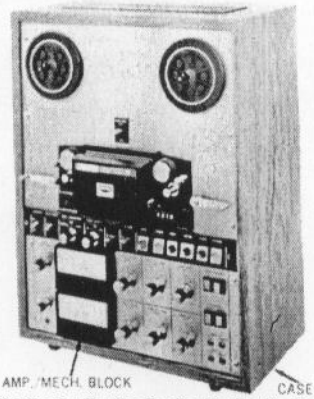
SCREWS

2



SCREWS

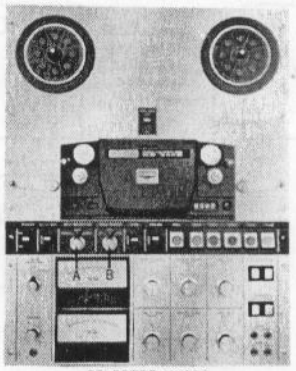
3



AMP./MECH. BLOCK

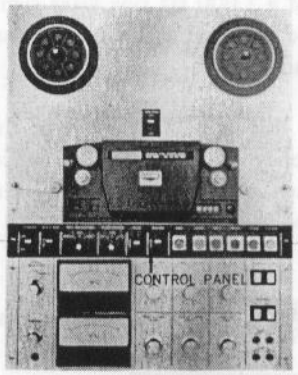
CASE BLOCK

4



SELECTOR KNOBS

5



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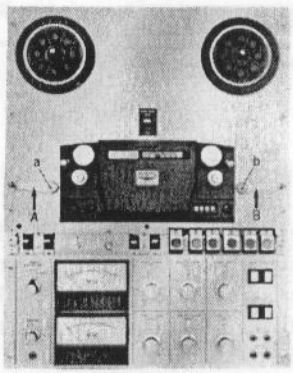
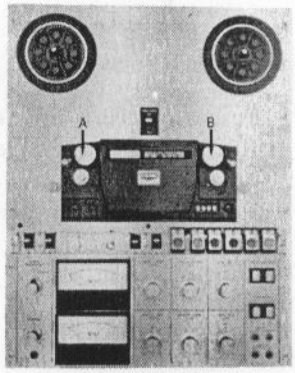


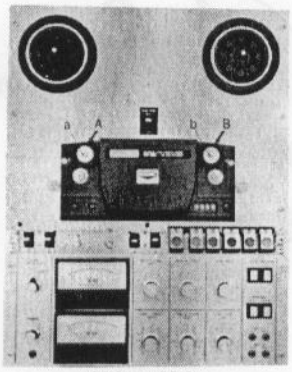
TENSION ARMS

7



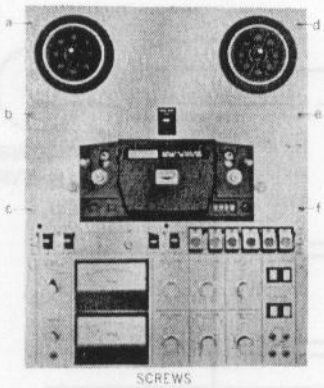
PINCH WHEEL CAPS

8



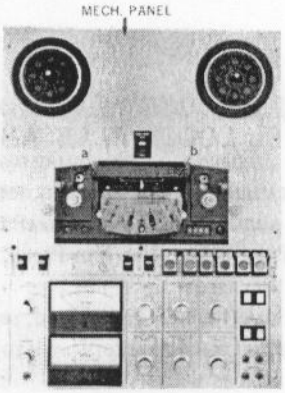
PINCH WHEELS

9



SCREWS

10



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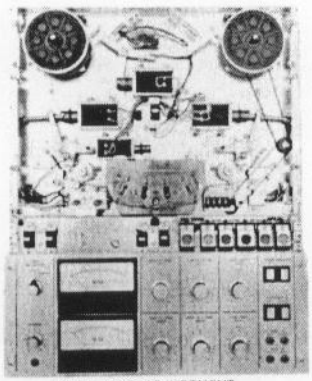
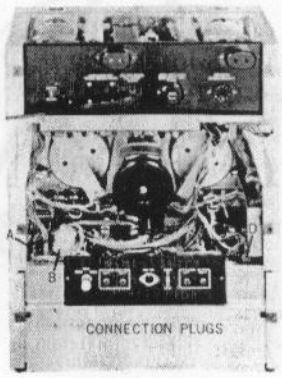


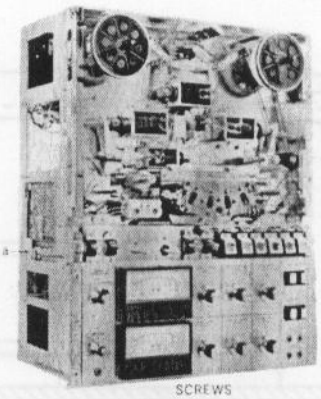
MECH. AMP. ADJUSTMENT

12



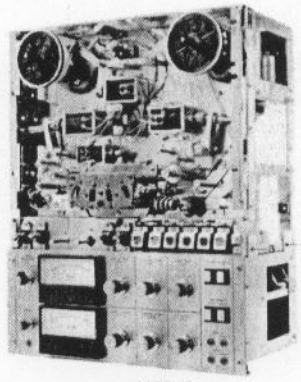
CONNECTION PLUGS

13



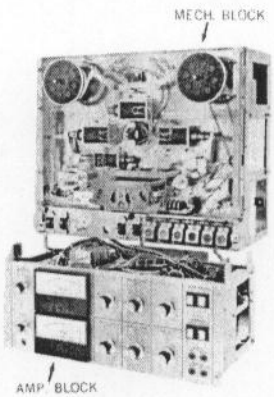
SCREWS

14



SCREWS

15



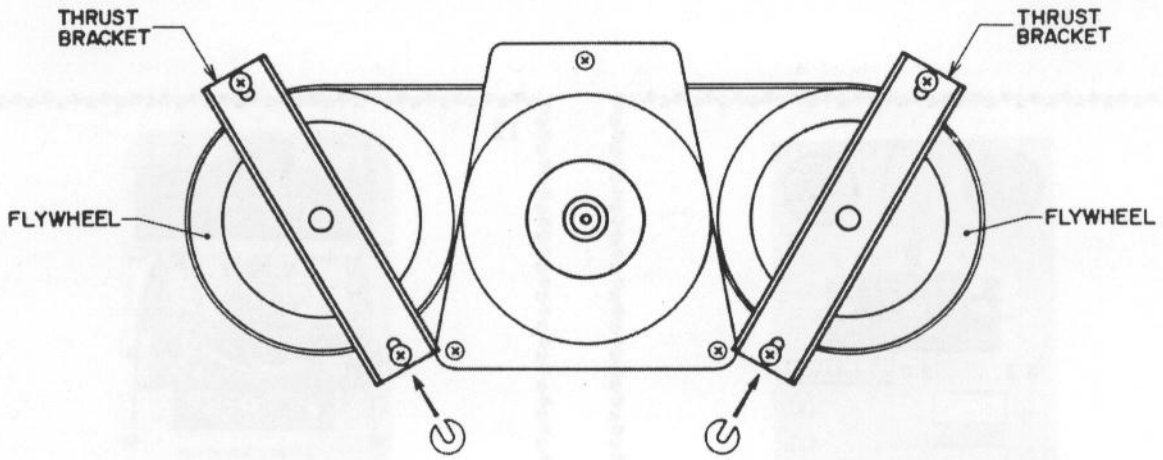


Fig. 8

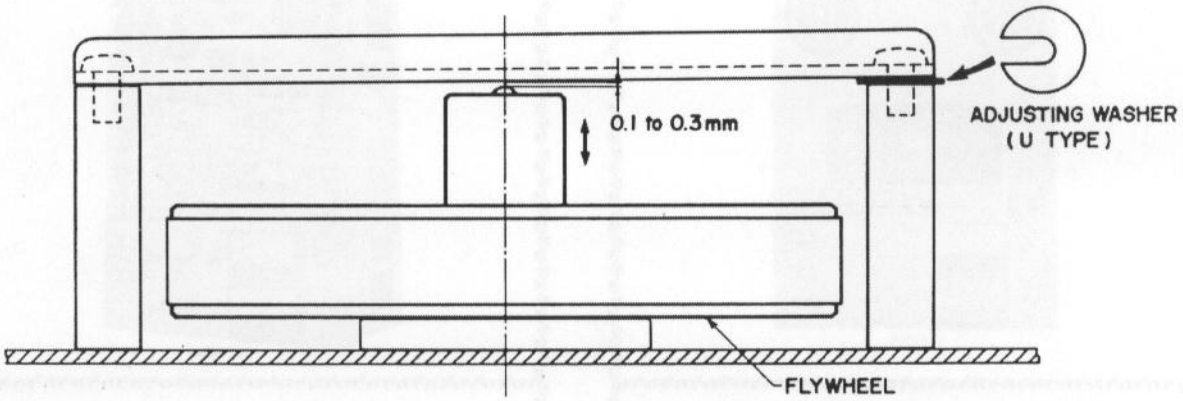


Fig. 9

1. FLYWHEEL LOOSE PLAY ADJUSTMENT

Adjust by inserting an Adjusting washer (U type) at the places indicated in Fig. 8 to obtain a 0.1 to 0.3 mm loose play when the flywheel is moved in the direction of the arrow shown in Fig. 9.

NOTE: When the flywheel is replaced, replace only with one of the same rank.

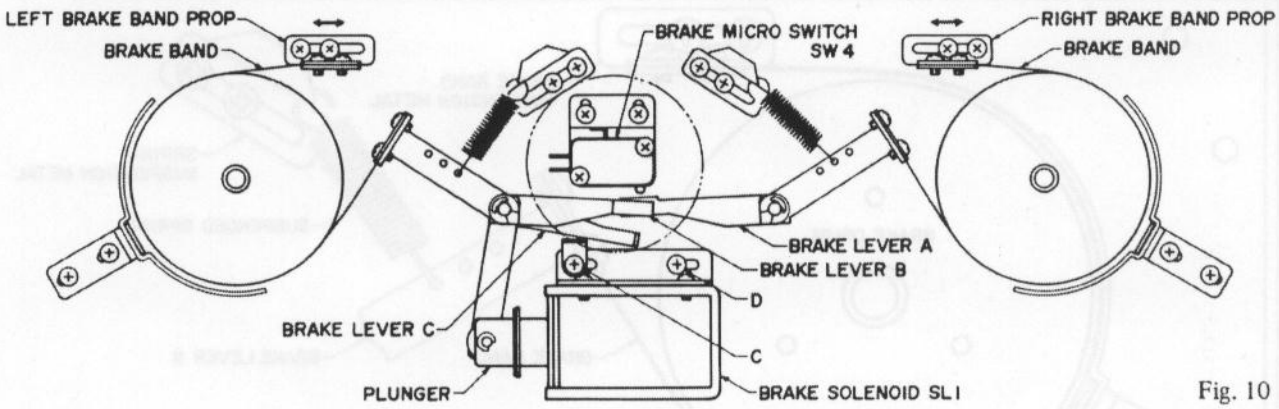


Fig. 10

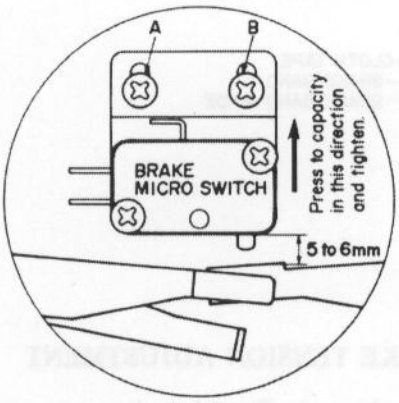


Fig. 11

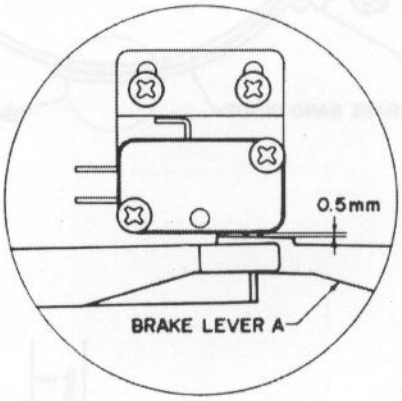


Fig. 12

2. BRAKE SOLENOID POSITION ADJUSTMENT

1) As shown in Fig. 11, press brake micro switch as far as it will go toward the top of the mechanical frame, and tighten screws A and B.
2) Move the Right Brake Band Prop shown in Fig. 10 so that the gap between Brake Lever A and the body of Brake Micro Switch is 5 to 6 mm (See Fig. 11).
3) Move the Left Brake Band Prop shown in Fig. 10 so that Brake Lever B and Brake Lever A are simultaneously operated by Brake Lever C.
4) As shown in Fig. 12, when the plunger is pulled, tighten Brake Solenoid Screws C and D at position at which the gap between Brake Lever A and the body of Brake Micro Switch is 0.5 mm at the narrowest place.

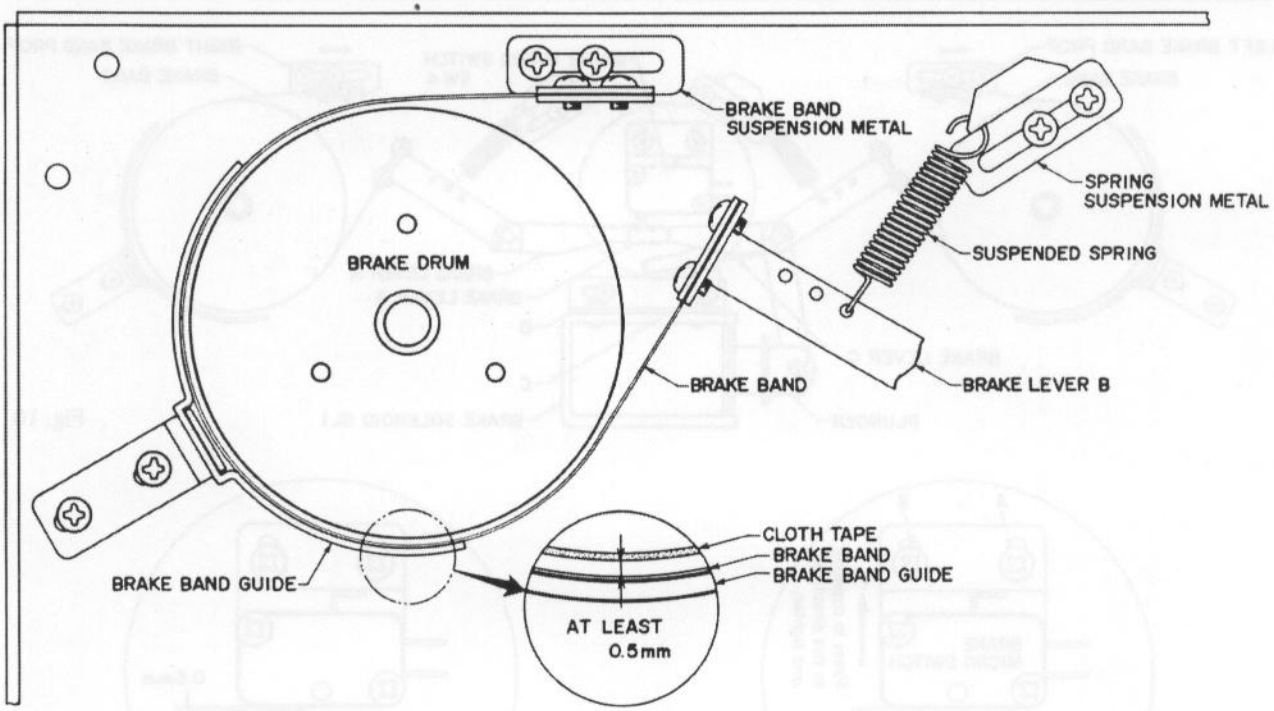


Fig. 13

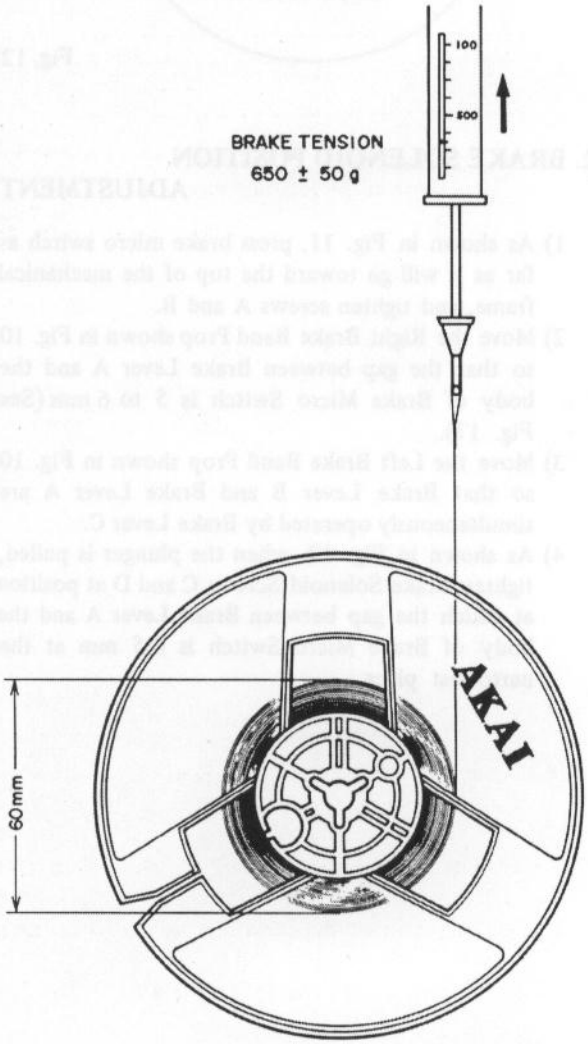


Fig. 14

3. BRAKE TENSION ADJUSTMENT

1) As shown in Fig. 14, brake tension is measured with a spring gauge using a 60 mm diameter tape wound on a 5" reel. Ideal brake tension is 650±50 gr, and left/right deviation allowance should be within 50 gr.
2) Methods for brake tension adjustment are as follows: (See Fig. 13)
   Method A: Change position of suspended spring.
   Method B: Adjust position of spring suspension metal.

NOTE: Following Brake Tension Adjustment, confirm that when the machine is set to each of the various modes (except stop mode), the brake band separates from the cloth tape on the brake drum by at least 0.5 mm. (See Fig. 13)

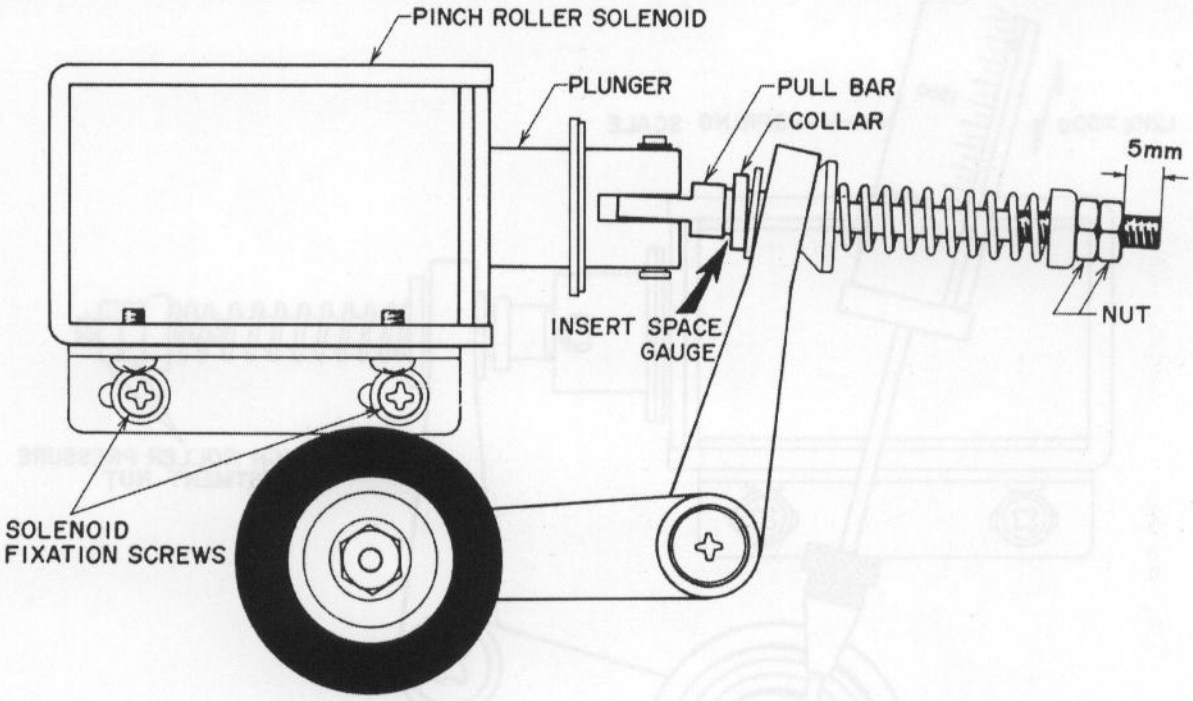


Fig. 15

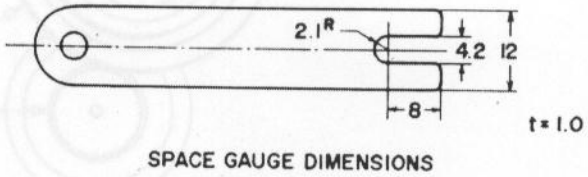


Fig. 16

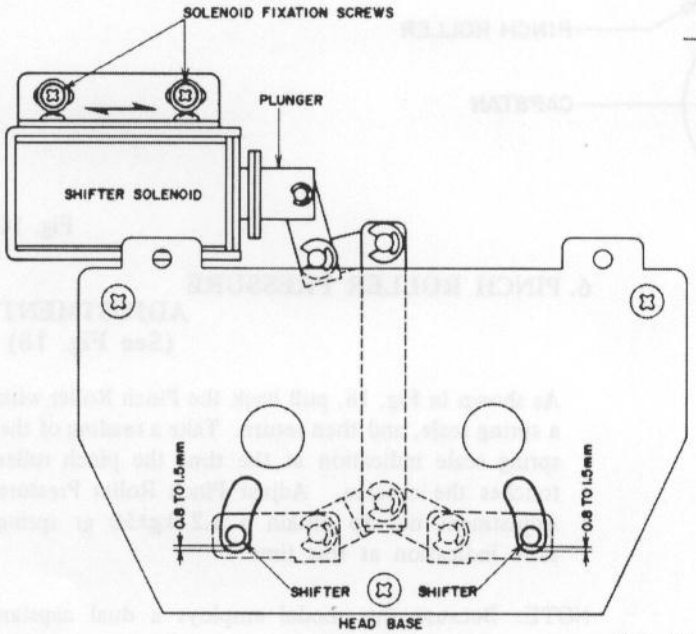


Fig. 17

4. PINCH ROLLER SOLENOID POSITION ADJUSTMENT

Set nut so that the screw part of the pull bar extends 5 mm further than the nut, and insert a space gauge of which the dimensions are the same as shown in Fig. 16 between the collar and pull bar shown in Fig. 15, and fix at position at which the pinch roller rests against the capstan. Set left and right to same degree.

5. SHIFTER SOLENOID POSITION ADJUSTMENT (See Fig. 17)

Adjust the position of the Shifter Solenoid so that when the plunger is pulled, the gap of the shifter and oblong hole of the head base is 0.8 to 1.5 mm.

NOTE: The tape must definitely not touch the head.

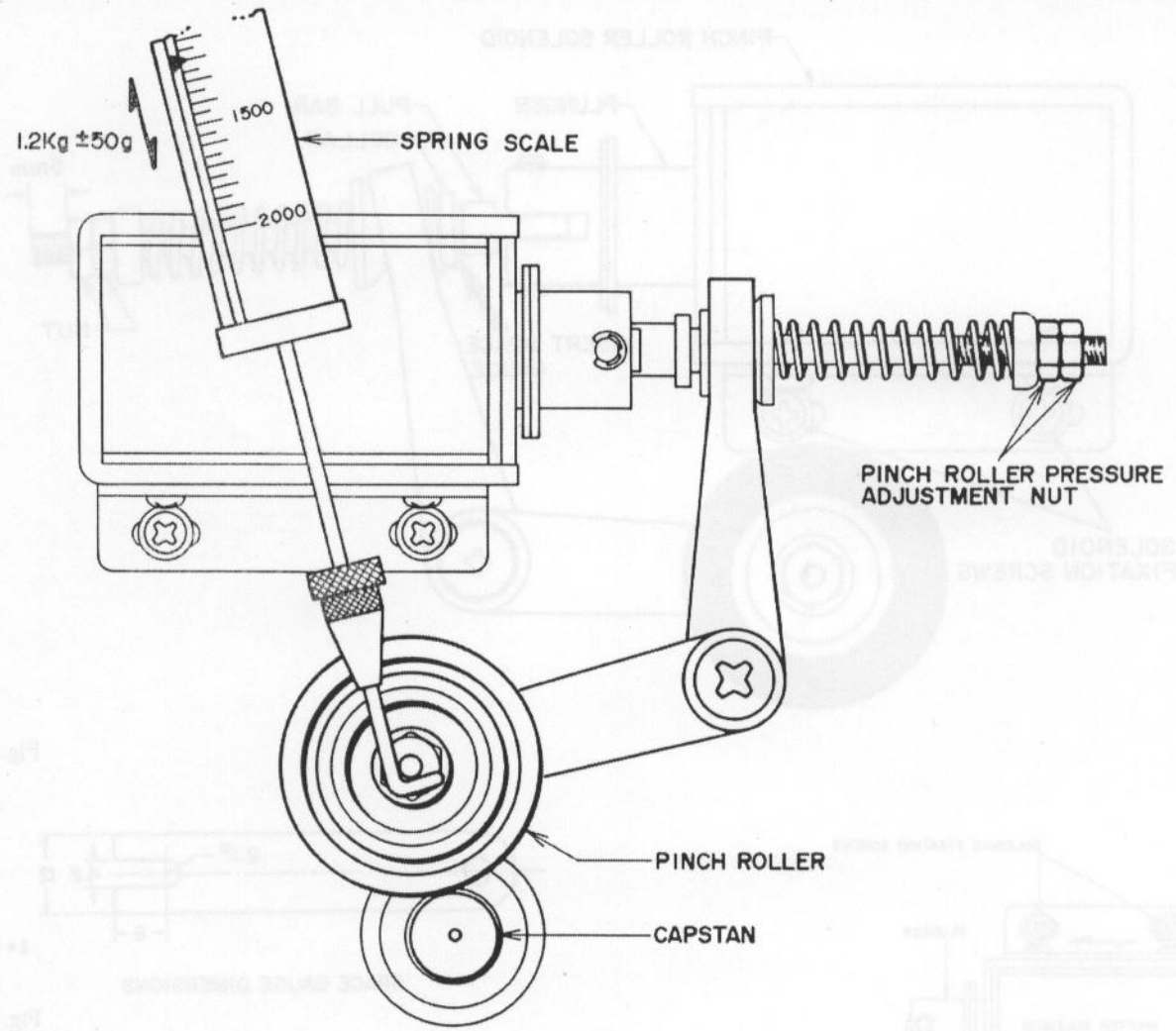


Fig. 18

6. PINCH ROLLER PRESSURE ADJUSTMENT (See Fig. 18)

As shown in Fig. 18, pull back the Pinch Roller with a spring scale, and then return. Take a reading of the spring scale indication at the time the pinch roller touches the capstan. Adjust Pinch Roller Pressure Adjustment nut to obtain a 1.2 kg±50 gr spring scale indication at this time.

NOTE: Because this model employs a dual capstan system, adjust so that the difference in pinch roller pressure between left and right is within 50 gr.

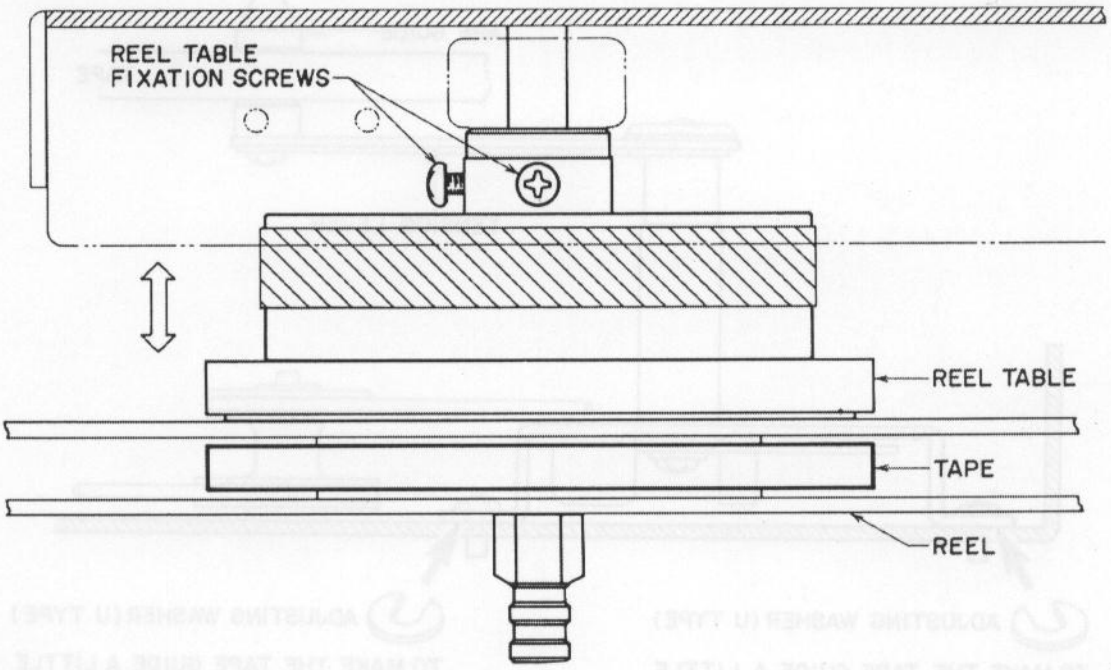


Fig. 19

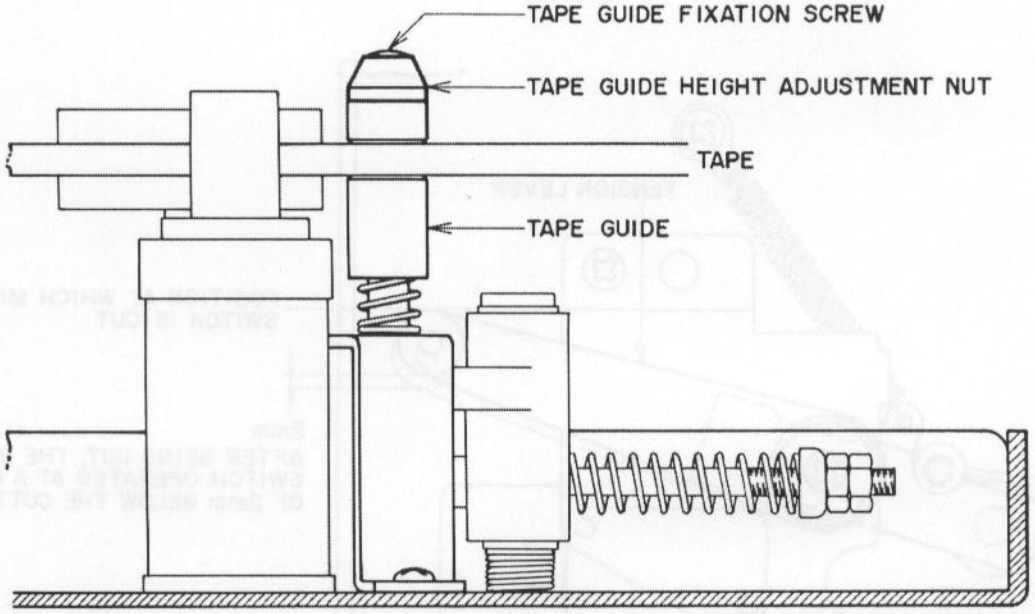


Fig. 20

7. REEL TABLE HEIGHT ADJUSTMENT (See Fig. 19)

Load a tape (left and right reel tables), but do not thread tape through left/right tape guides and tension levers. Set to F.Fwd, and Rwd mode and adjust the position of reel tables in direction of arrow mark so that the tape winds in the center of the reels. Tighten reel table fixation screws at most ideal position.

NOTE: Tape should wind in center of reel regardless of type of reel used.

8. TAPE GUIDE HEIGHT ADJUSTMENT (See Fig. 20)

Thread tape over left and right tape guides, but do not thread over left and right tension levers. Loosen tape guide fixation screws and adjust left and right tape guide height adjustment nuts so that at Fwd and Rev modes, the tape runs on the center of the tape guides. Tighten tape guide fixation screws to maintain this condition.

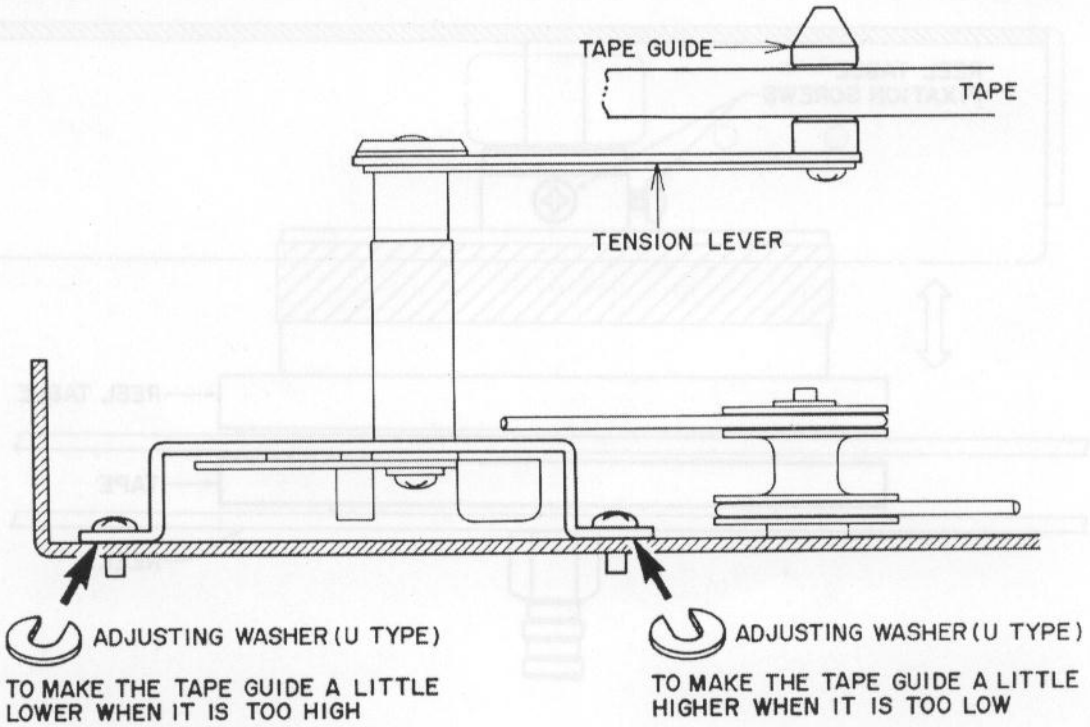

TAPE GUIDE
TAPE
TENSION LEVER
ADJUSTING WASHER (U TYPE)
TO MAKE THE TAPE GUIDE A LITTLE LOWER WHEN IT IS TOO HIGH
ADJUSTING WASHER (U TYPE)
TO MAKE THE TAPE GUIDE A LITTLE HIGHER WHEN IT IS TOO LOW

Fig. 21

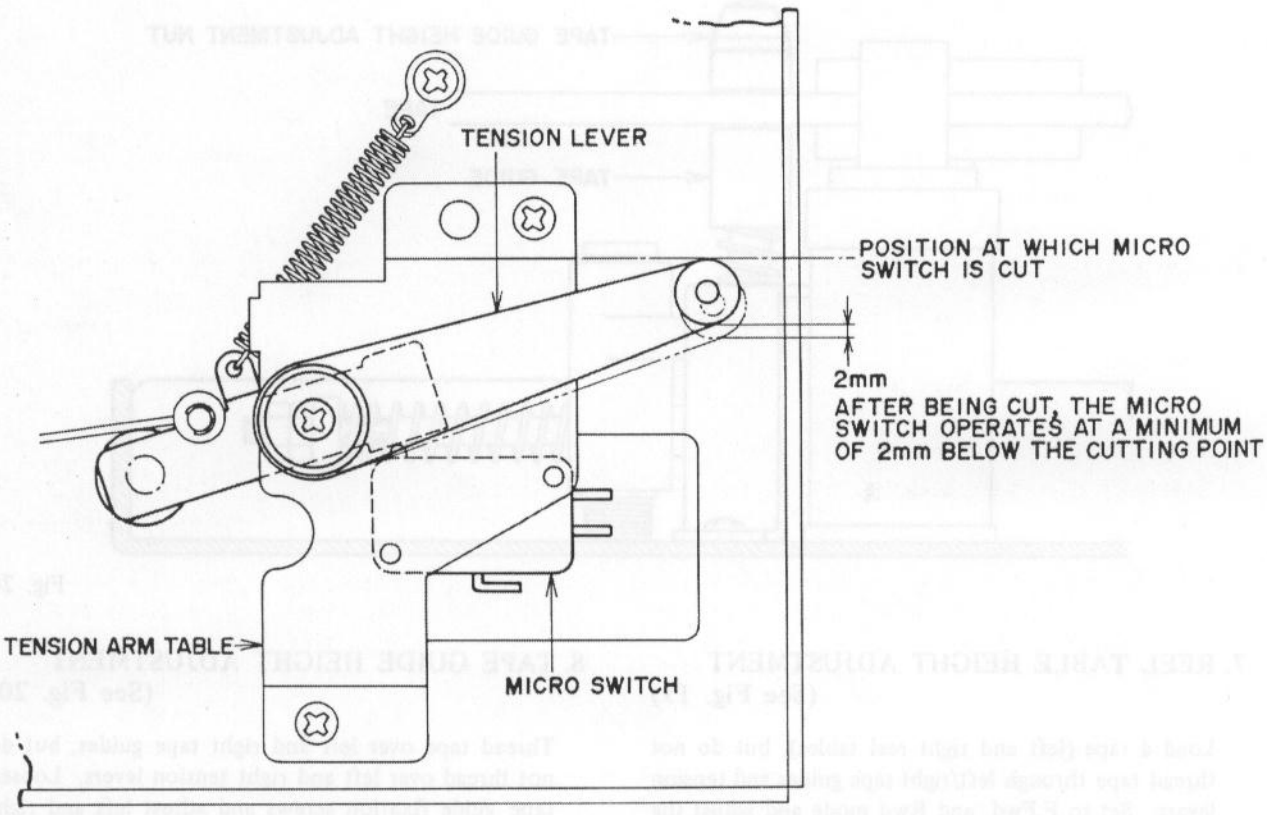

TENSION LEVER
POSITION AT WHICH MICRO SWITCH IS CUT
2mm
AFTER BEING CUT, THE MICRO SWITCH OPERATES AT A MINIMUM OF 2mm BELOW THE CUTTING POINT
TENSION ARM TABLE
MICRO SWITCH

Fig. 22

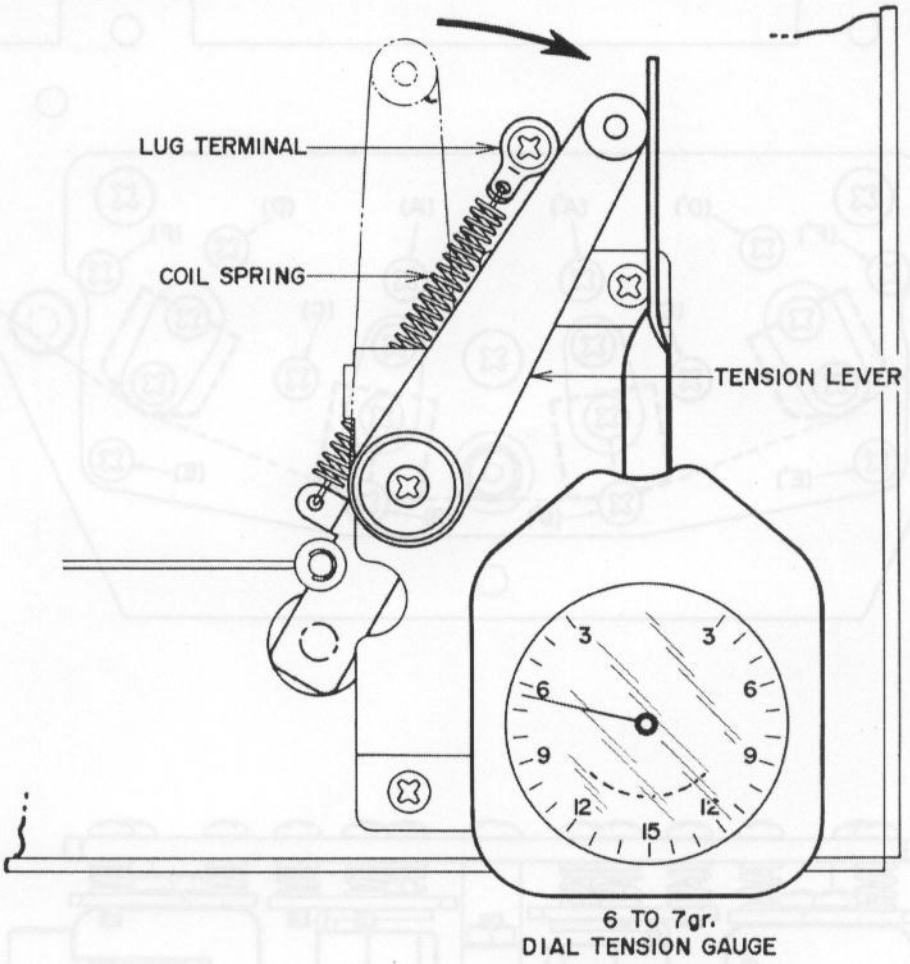


Fig. 23

9. TENSION LEVER HEIGHT ADJUSTMENT (See Fig. 21)

Thread tape over left and right tension levers and over the left and right tape guides properly. Adjust tension lever height by inserting an Adjusting washer (U type) as shown in Fig. 21 so that at Fwd and Rev modes, the tape travels on the center of the tape guide.

NOTE: The right hand side tape guide is shown in Fig. 21, but when making the left hand side tension lever height adjustment, the screw on the left is used to make the tape guide higher, and the screw on the right is used to make the tape guide lower.

10. CONFIRMATION OF POINT AT WHICH LEFT AND RIGHT TENSION ARMS OPERATE

Confirm that the left and right micro switches operate at the positions indicated in Fig. 22.

11. TENSION ARM RETURN TENSION ADJUSTMENT

Bend the oval shaped lug terminal and adjust the strength of coil spring so that as shown in Fig. 23, when the tension arm returns in the direction of the arrow the tension registered with a tension gauge is 6 to 7 gr.

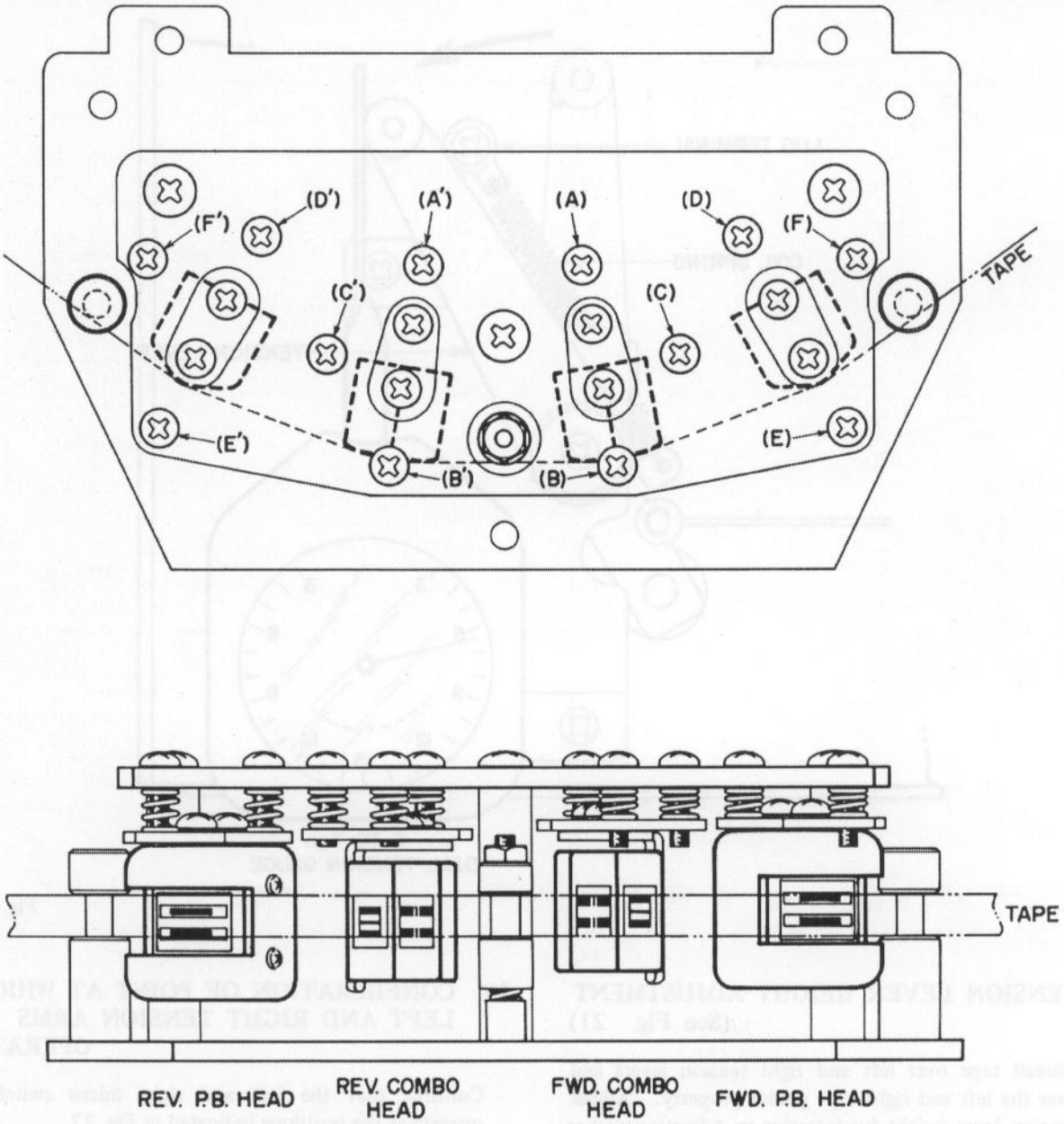

(D')
(A')
(A)
(D)
(F')
(F)
TAPE
(C')
(C)
(E')
(E)
(B')
(B)
TAPE
REV. P.B. HEAD
REV. COMBO HEAD
FWD. COMBO HEAD
FWD. P.B. HEAD

Fig. 24

1. MODEL: GX-400D

Adjustment Item	Test Tape. Supply Signal	Measuring Instrument Connection	Mode	Tape Speed	Adjustment Screw	Ref. Diagram	Remarks
FWD P.B. Head Height Adjustment	Optional		FWD	Optional	(D)(E)(F)	Fig. 24	Even Upper Edge of Ch. 1 Head Core and Upper Edge of Tape
FWD Combo Head Height Adjustment	Optional		FWD	Optional	(A)(B)(C)	Fig. 24	Even Upper Edge of Ch. 1 Rec. Head Core and Upper Edge of Tape
REV P.B. Head Height Adjustment	Optional		REV	Optional	(D')(E')(F')	Fig. 24	Even Lower Edge of Ch. 1 P.B. Head Core and Lower Edge of Tape
REV Combo Head Height Adjustment	Optional		REV	Optional	(A')(B')(C')	Fig. 24	Even Lower Edge of Ch. 1 Rec. Head Core and Lower Edge of Tape
FWD P.B. Head Azimuth Alignment Adjustment	15,000 Hz (15 ips) Test Tape	High Sensitivity V.T.V.M. to Line Output	FWD	15 ips	(F)	Fig. 24	Maximum Line Output, Both Channels
REV P.B. Head Azimuth Alignment Adjustment	15,000 Hz (15 ips) Test Tape	High Sensitivity V.T.V.M. to Line Output	REV	15 ips	(F')	Fig. 24	Maximum Line Output, Both Channels
FWD Combo Head Azimuth Alignment Adjustment	15,000 Hz -20 dB Signal to Line Input	High Sensitivity V.T.V.M. to Line Output	FWD REC	15 ips	(C)	Fig. 24	Maximum Line Output, Both Channels
REV Combo Head Azimuth Alignment Adjustment	15,000 Hz -20 dB Signal to Line Input	High Sensitivity V.T.V.M. to Line Output	REV REC	15 ips	(C')	Fig. 24	Maximum Line Output, Both Channels

Chart 1

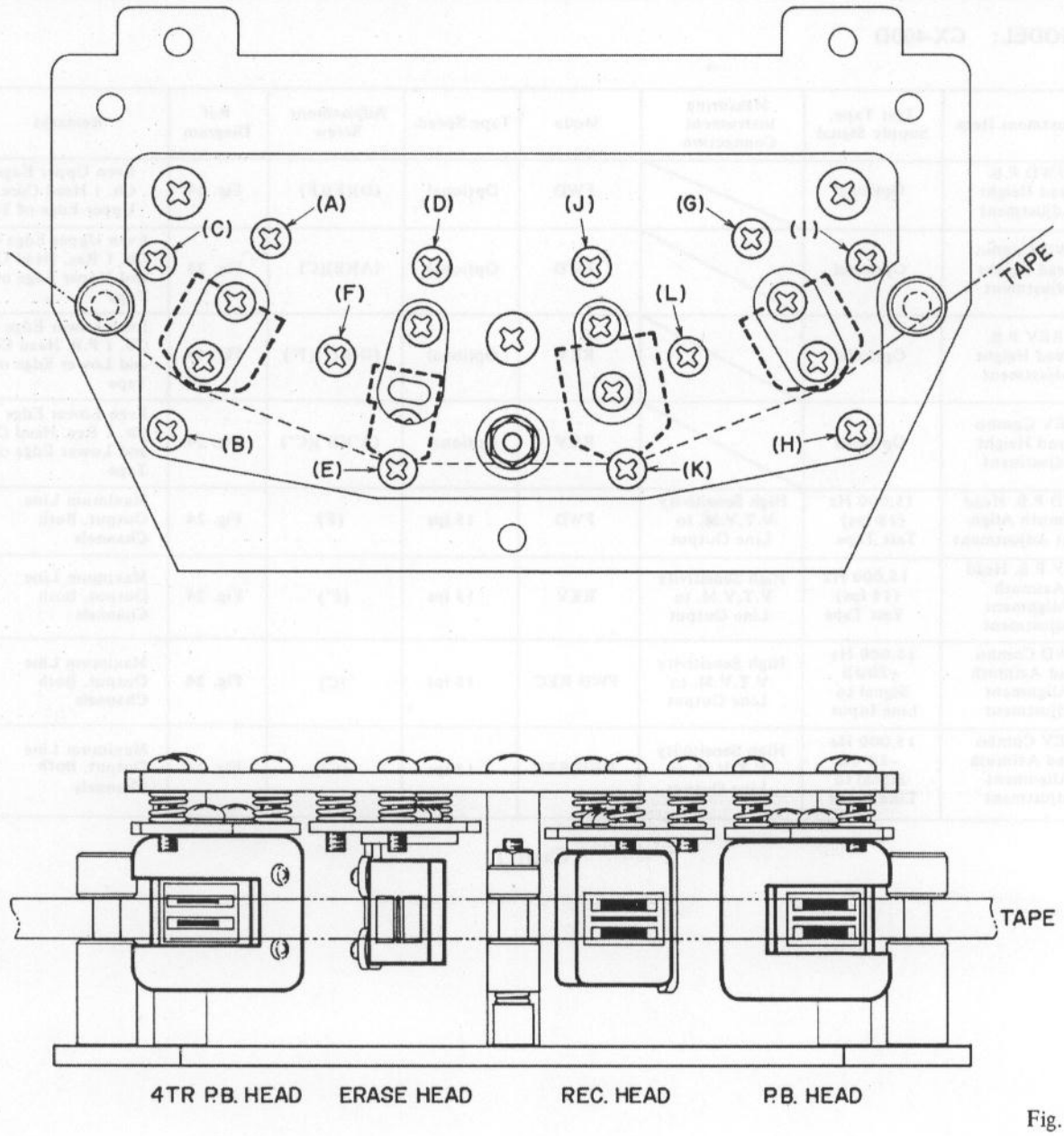
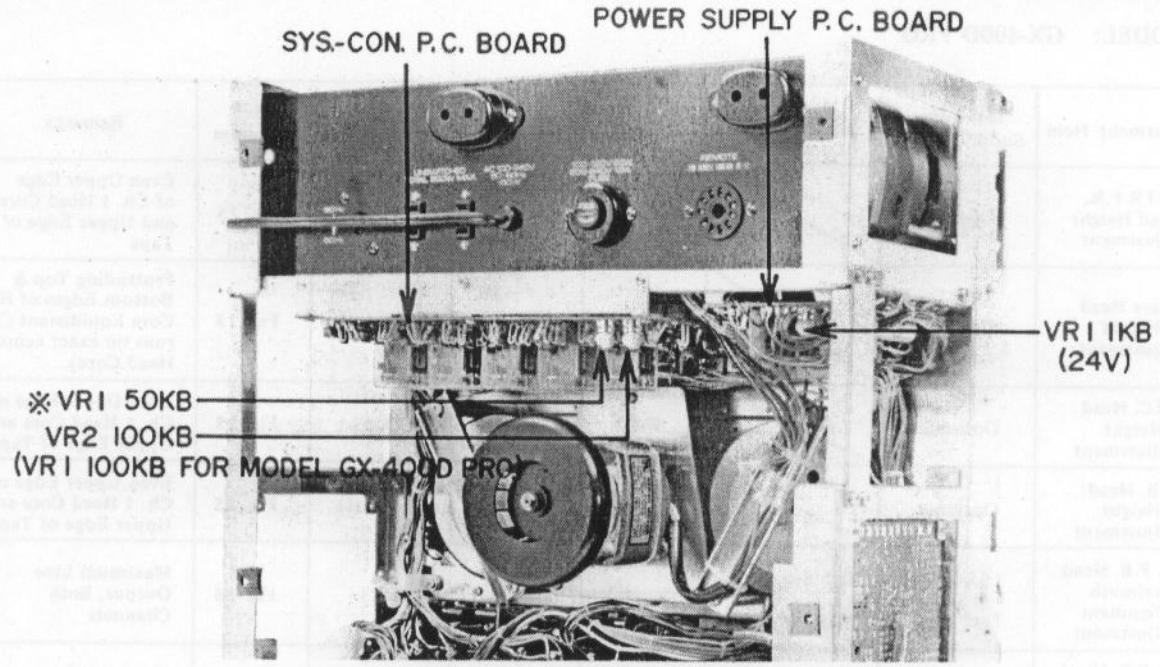

(A)
(C)
(D)
(J)
(G)
(I)
TAPE
(F)
(L)
(B)
(E)
(K)
(H)
TAPE
4TR P.B. HEAD
ERASE HEAD
REC. HEAD
P.B. HEAD

Fig. 25

2. MODEL: GX-400D PRO

Adjustment Item	Test Tape, Supply Signal	Measuring Instrument Connection	Mode	Tape Speed	Adjustment Screw	Ref. Diagram	Remarks
4TR P.B. Head Height Adjustment	Optional		FWD	Optional	(A)(B)(C)	Fig. 25	Even Upper Edge of Ch. 1 Head Core and Upper Edge of Tape
Erase Head Height Adjustment	Optional		FWD	Optional	(D)(E)(F)	Fig. 25	Protruding Top & Bottom Edges of Head Core Equidistant (Tape runs on exact center of Head Core)
REC. Head Height Adjustment	Optional		FWD	Optional	(J)(K)(L)	Fig. 25	Even Upper Edge of Ch. 1 Head Core and Upper Edge of Tape
P.B. Head Height Adjustment	Optional		FWD	Optional	(G)(H)(I)	Fig. 25	Even Upper Edge of Ch. 1 Head Core and Upper Edge of Tape
4TR P.B. Head Azimuth Alignment Adjustment	15,000 Hz (15 ips) Test Tape	High Sensitivity V.T.V.M. to Line Output	FWD/4TR	15 ips	(C)	Fig. 25	Maximum Line Output, Both Channels
2TR P.B. Head Azimuth Alignment Adjustment	15,000 Hz (15 ips) Test Tape	High Sensitivity V.T.V.M. to Line Output	FWD/4TR	15 ips	(T)	Fig. 25	Maximum Line Output, Both Channels
REC. Head Azimuth Alignment Adjustment	15,000 Hz -20 dB Signal to Line Input	High Sensitivity V.T.V.M. to Line Output	FWD REC/2TR	15 ips	(L)	Fig. 25	Maximum Line Output, Both Channels

Chart 2



NOTE: THE SEMI-FIXED RESISTOR MARKED WITH ※ IS NOT USED IN MODEL GX-400D PRO.

Fig. 26

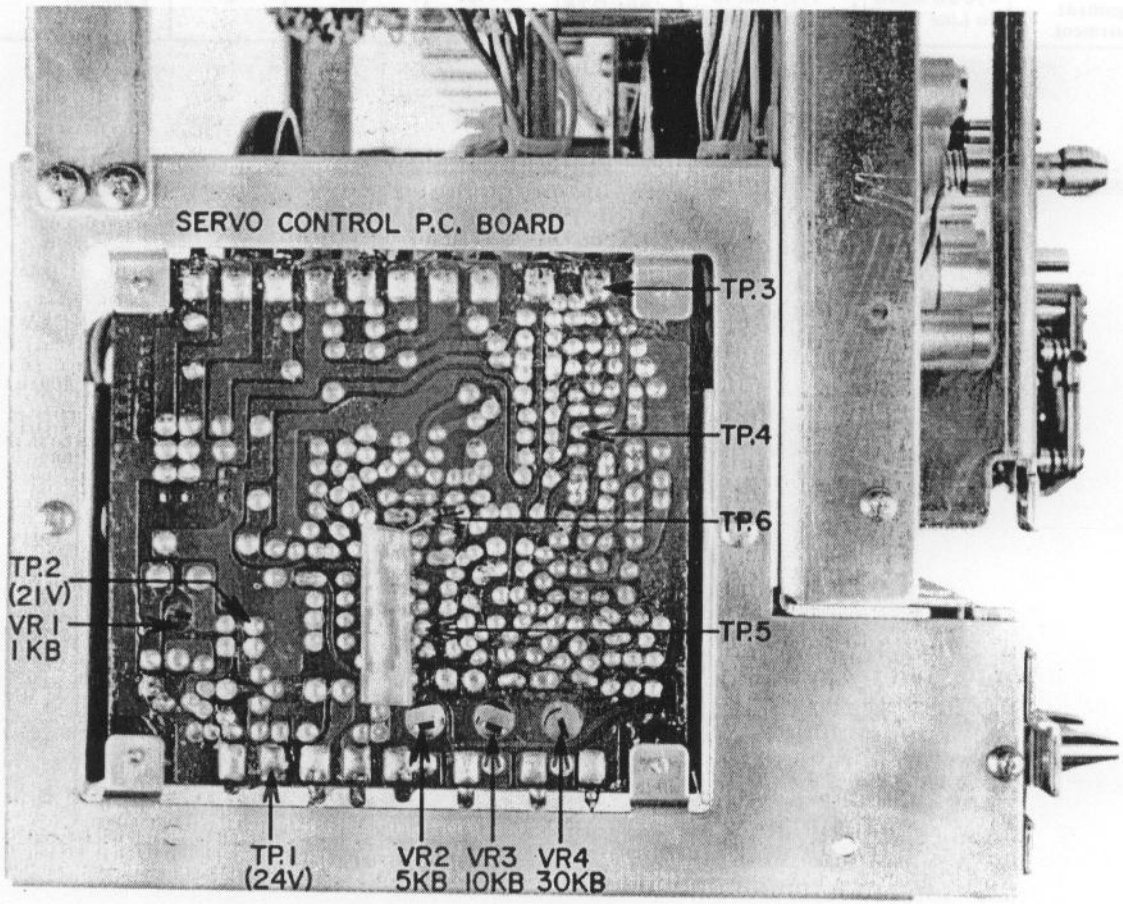


Fig. 27

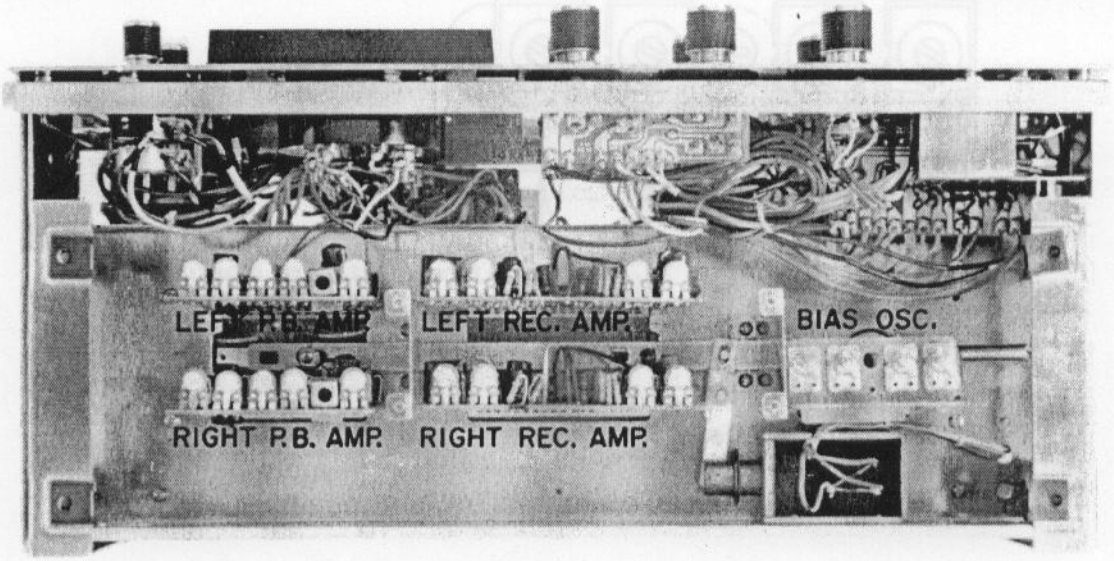
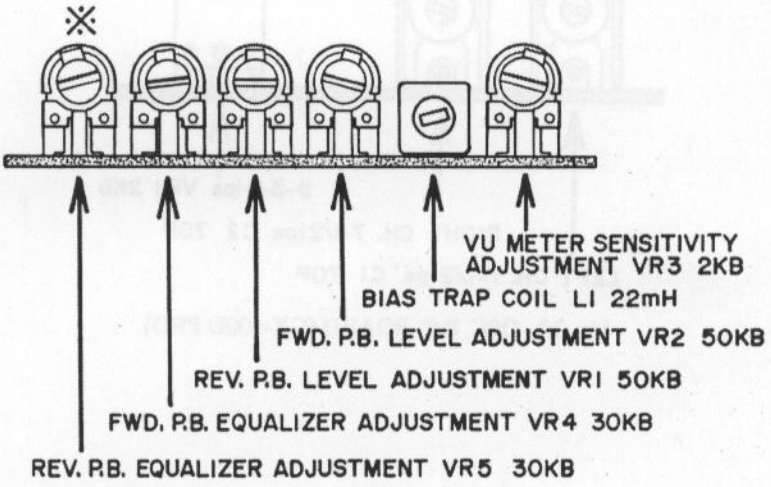
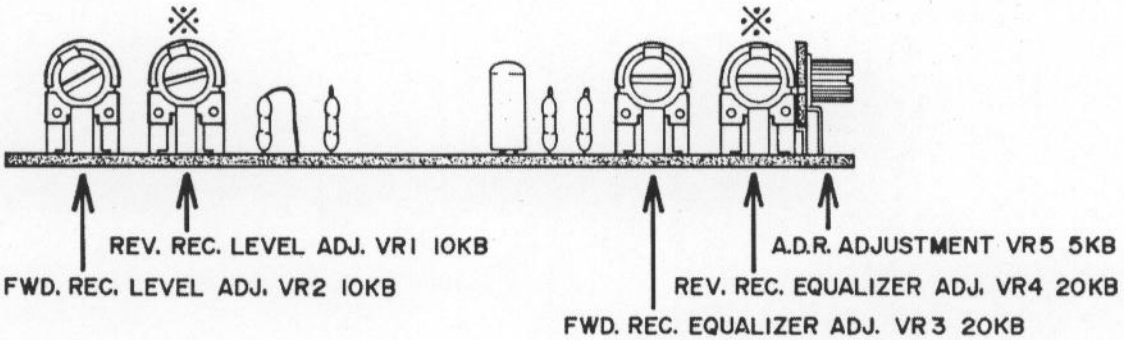


Fig. 28 Arrangement of Each Amp. System P.C. Board



NOTE: THE SEMI-FIXED RESISTOR MARKED WITH ※ ARE NOT USED IN MODEL GX-400D PRO.

Fig. 29 PLAYBACK AMP. P.C. BOARD



NOTE: THE SEMI-FIXED RESISTORS MARKED WITH ※ ARE NOT USED IN MODEL GX-400D PRO.

Fig. 30 RECORDING AMP. P.C. BOARD

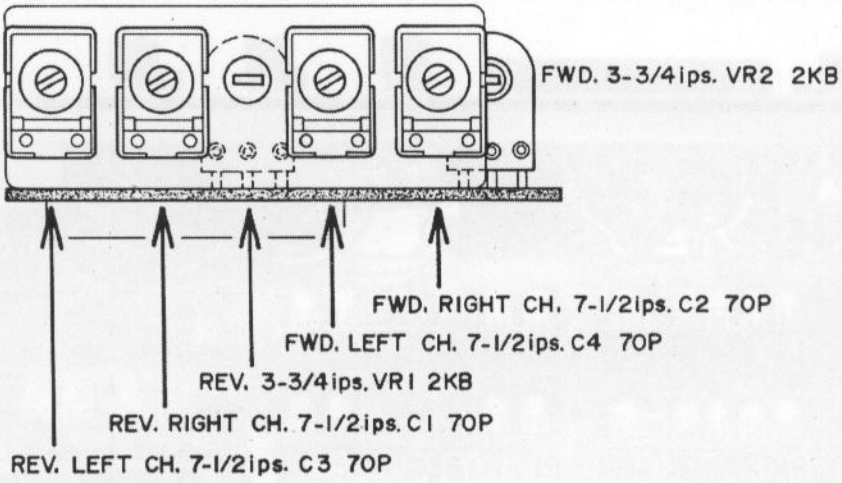


Fig. 31 OSC. P.C. BOARD (GX-400D)

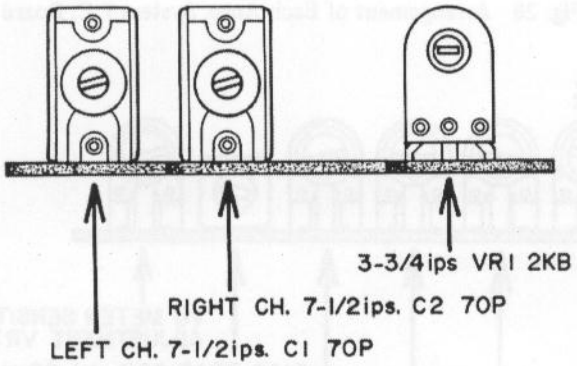


Fig. 32 OSC. P.C. BOARD (GX-400D PRO)

1. MODEL: GX-400D

Adjustment Item	Test Tape, Supply Signal	Measuring Instrument Connection	Mode	Tape Speed	Adjustment	Result	Ref. Diagram	Remarks
Power Source Circuit Voltage Adjustment		V.T.V.M. or Tester between Test Point TP-1 and Ground	STOP		VR1 1kB	24.0V	Fig. 26	TP-1 (See Fig. 27)
Servo Control Circuit Voltage Adjustment		V.T.V.M. or Tester between Test Point TP-2 and Ground	STOP		VR1 1kB	21.0V	Fig. 27	Must first be adjusted to 24V
15 ips (38cm/sec.) Tape Speed Adjustment	1,000 Hz 7-1/2 ips Test Tape	Frequency Counter to Line Output	FWD	15 ips	VR2 5kB	2,000Hz ±1.5%	Fig. 27	
7-1/2 ips (19cm/sec.) Tape Speed Adjustment	1,000 Hz 7-1/2 ips Test Tape	Frequency Counter to Line Output	FWD	7-1/2 ips	VR3 10kB	1,000 Hz ±1.5 %	Fig. 27	
3-3/4 ips (9.5cm/sec.) Tape Speed Adjustment	1,000 Hz 7-1/2 ips Test Tape	Frequency Counter to Line Output	FWD	3-3/4 ips	VR3 30kB	500Hz ±1.5%	Fig. 27	
FWD Playback Level Adjustment	700Hz 15 ips Test Tape	High Sensitivity V.T.V.M. to Line Output	FWD	15 ips	VR2 50kB	0(0.775V) ±1dB	Fig. 29	
REV Playback Level Adjustment	700Hz 15 ips Test Tape	High Sensitivity V.T.V.M. to Line Output	REV	15 ips	VR1 50kB	0(0.775V) ±1dB	Fig. 29	
VU Meter Sensitivity Adjustment	700Hz 15 ips Test Tape	High Sensitivity V.T.V.M. to Line Output	FWD	15 ips	VR3 2kB	OVU	Fig. 29	
FWD Playback Equalizer Adjustment	15,000Hz 15 ips Test Tape	High Sensitivity V.T.V.M. to Line Output	FWD	15 ips	VR4 30kB	+1dB	Fig. 29	
REV Playback Equalizer Adjustment	15,000Hz 15 ips Test Tape	High Sensitivity V.T.V.M. to Line Output	REV	15 ips	VR5 30kB	+1dB	Fig. 29	
FWD 7-1/2 ips (19cm/sec.) Recording Bias Adjustment	1,000Hz -46dB(4mV) to Mic Input	Audio Frequency Oscillator to Line Input, High Sensitivity V.T.V.M. to Line Output	FWD REC	7-1/2 ips	C4 70P(left) C2 70P(right)	Maxi-mum	Fig. 31	1,000Hz-20dB Recording
REV 7-1/2 ips (19cm/sec.) Recording Bias Adjustment	1,000Hz -46dB(4mV) to Mic Input	Audio Frequency Oscillator to Line Input, High Sensitivity V.T.V.M. to Line Output	REV REC	7-1/2 ips	C3 70P(left) C1 70P(right)	Maxi-mum	Fig. 31	1,000Hz-20dB Recording
FWD 7-1/2 ips (19cm/sec.) Recording Equalizer Adjustment	1,000Hz, 15,000Hz -46dB(4mV) to Mic Input	Audio Frequency Oscillator to Line Input, High Sensitivity V.T.V.M. to Line Output	FWD REC	7-1/2 ips	VR3 20kB	0dB/ 1,000Hz +1dB/ 15,000Hz	Fig. 30	1,000Hz-20dB Recording If A.D.R. Adjust-ment is necessary, refer to Section VII.

REV 7-1/2 ips (19cm/sec.) Recording Equalizer Adjustment	1,000Hz, 15,000Hz -46dB(4mV) to Mic Input	Audio Frequency Oscillator to Line Input, High Sensitivity V.T.V.M. to Line Output	REV REC	7-1/2 ips	VR4 20kB	OdB/ 1,000Hz +1dB/ 15,000Hz	Fig. 30	1,000Hz -20dB Recording If A.D.R. Adjustment is necessary, refer to Section VII.
FWD 3-3/4 ips (19cm/sec.) Recording Equalizer Adjustment	1,000Hz, 10,000Hz -46dB(4mV) to Mic Input	Audio Frequency Oscillator to Line Input, High Sensitivity V.T.V.M. to Line Output	FWD REC	3-3/4 ips	VR2 2kB	OdB/ 1,000Hz 1±0.5dB/ 10,000Hz	Fig. 31	1,000Hz -20dB Recording
REV 3-3/4 ips (9.5cm/sec.) Recording Bias Adjustment	1,000Hz, 10,000Hz -46dB(4mV) to Mic Input	Audio Frequency Oscillator to Line Input, High Sensitivity V.T.V.M. to Line Output	REV REC	3-3/4 ips	VR1 2kB	OdB/ 1,000Hz 1±0.5dB/ 10,000Hz	Fig. 31	1,000Hz -20dB Recording
FWD REC Level Adjustment	1,000Hz -46dB(4mV) to Mic Input	Audio Frequency Oscillator to Line Input, High Sensitivity V.T.V.M.to Line Output	REV REC	15 ips	VR2 10kB	0±1.5dB	Fig. 30	1,000Hz 0dB Recording
REV REC Level Adjustment	1,000Hz -46dB(4mV) to Mic Input	Audio Frequency Oscillator to Line Input, High Sensitivity V.T.V.M. to Line Output	REV REC	15 ips	VR1 10kB	0±1.5dB	Fig. 30	1,000Hz 0dB Recording
Bias Leak Adjustment		High Sensitivity V.T.V.M. to Line Output	FWD REC	7-1/2 ips	L1 22mH	Less than -30dB (Stereo) Less than -20dB (Monaural)	Fig. 29	
Direct Function Time Constant Adjustment	1,000Hz -46dB(4mV) to Mic Input		FWD → REV REV → FWD	15 ips	VR1 50kB	Within 4 sec.	Fig. 29	
	1,000Hz -46dB(4mV) to Mic Input		F.FWD or RWD → FWD or REV	15 ips	VR2 100kB	Within 4 sec.	Fig. 26	

Chart 3

2. MODEL: GX-400D PRO

Adjustment Item	Test Tape, Supply Signal	Measuring Instrument Connection	Mode	Tape Speed	Adjustment	Result	Ref. Diagram	Remarks
Power Source Circuit Voltage Adjustment		V.T.V.M. or Tester between Test Point TP-1 and Ground	STOP		VR1 1kB	24.0V	Fig. 26	TP-1 (See Fig. 27)

Servo Control Circuit Voltage Adjustment		V.T.V.M. or Tester between Test Point TP-2 and Ground	STOP		VR1 1kB	21.0V	Fig. 27	Must first be adjusted to 24V
15 ips (38cm/sec.) Tape Speed Adjustment	1,000Hz 7-1/2 ips Test Tape	Frequency Counter to Line Output	FWD	15 ips	VR2 5 kB	2,000Hz ±1.5%	Fig. 27	
7-1/2 ips (19cm/sec.) Tape Speed Adjustment	1,000Hz 7-1/2 ips Test Tape	Frequency Counter to Line Output	FWD	7-1/2 ips	VR3 10kB	1,000Hz ±1.5%	Fig. 27	
3-3/4 ips (9.5cm/sec.) Tape Speed Adjustment	1,000Hz 7-1/2 ips Test Tape	Frequency Counter to Line Output	FWD	3-3/4 ips	VR4 30kB	500Hz ±1.5%	Fig. 27	
2TR Playback Level Adjustment	700Hz 15 ips Test Tape	High Sensitivity V.T.V.M. to Line Output	FWD	15 ips	VR1 50kB	0(0.775V) ±1dB	Fig. 29	
4TR Playback Level Adjustment	700Hz 15 ips Test Tape	High Sensitivity V.T.V.M. to Line Output	FWD	15 ips	VR2 50kB	0(0.775V) ±1dB	Fig. 29	
VU Meter Sensitivity Adjustment	700Hz 15 ips Test Tape	High Sensitivity V.T.V.M. to Line Output	FWD	15 ips	VR3 2kB	OVU	Fig. 29	
Playback Equalizer Adjustment	15,000Hz 15 ips Test Tape	High Sensitivity V.T.V.M. to Line Output	FWD	15 ips	VR4 30kB	+1dB	Fig. 29	
Recording Bias Adjustment 7-1/2 ips (19cm/sec.)	1,000Hz -46dB (4mV) to Mic Input	Audio Frequency Oscillator to Mic Input, High Sensitivity V.T.V.M. to Line Output	REC	7-1/2 ips	C1 70P(left) C2 70P(right)	Maximum	Fig. 32	1,000Hz-20dB Recording
Recording Equalizer Adjustment 7-1/2 ips (19cm/sec.)	1,000Hz, 10,000Hz -46dB(4mV) to Mic Input	Audio Frequency Oscillator to Mic Input. High Sensitivity V.T.V.M. to Line Output	REC	7-1/2 ips	VR3 20kB	0dB/ 1,000Hz +1dB/ 15,000Hz	Fig. 30	1,000Hz-20dB Recording If ADR Adjustment is necessary, refer to Section VII.
Recording Bias Adjustment 3-3/4 ips (9.5cm/sec.)	1,000Hz, 10,000Hz -46dB(4mV) to Mic Input	Audio Frequency Oscillator to Mic Input, High Sensitivity V.T.V.M. to Line Output	REC	3-3/4 ips	VR1 2kB	0dB/ 1,000Hz 1±0.5dB/ 10,000Hz	Fig. 32	1,000Hz -20dB Recording
Recording Level Adjustment	1,000Hz -46dB(4mV) to Mic Input	Audio Frequency Oscillator to Mic Input, High Sensitivity V.T.V.M. to Line Output	REC	15 ips	VR2 10kB	0±1.5dB	Fig. 30	1,000Hz 0dB Recording
Bias Leak Adjustment		High Sensitivity V.T.V.M. to Line Output	REC		L1 22mH	Less than -30VU	Fig. 29	
Direct Function Time Constant Adjustment			F.Fwd or Rwd to Fwd	15 ips	VR1 100kB	Within 4 sec.	Fig. 26	

Chart 4

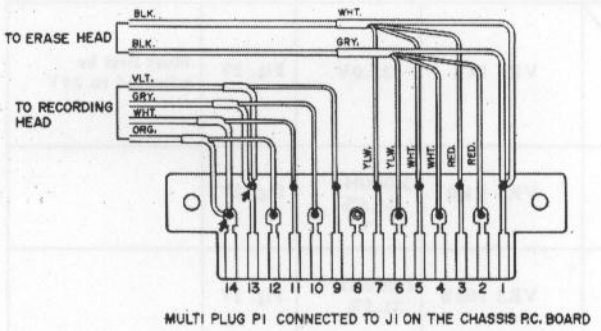


Fig. 33

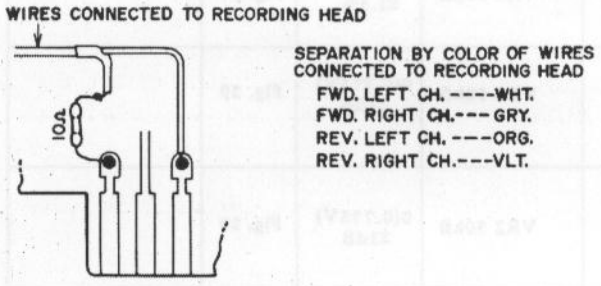


Fig. 34

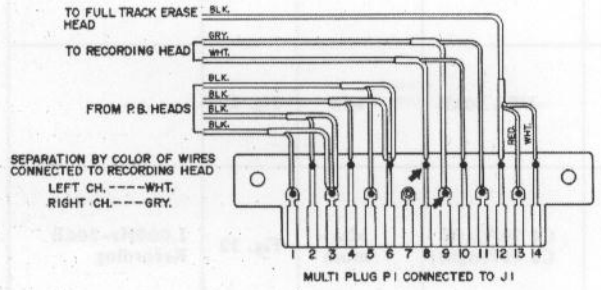


Fig. 35

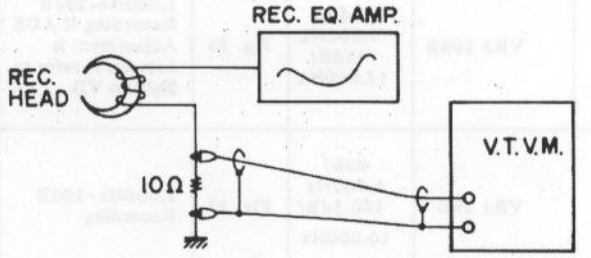


Fig. 36

1. As shown in Figs. 33 and 35, disconnect the ground side wires connected to multi plug recording head, and connect a 10Ω fixed resistor in series between the ground wires as shown in Fig. 34.
2. As shown in Fig. 36, connect a High Sensitivity V.T.V.M. to both terminals of the 10Ω fixed resistor.
3. Temporarily remove the emitter resistor of Oscillator P.C. Board Transistors TR2, 3 (GX-400D) or TR1, 2 (GX-400D PRO), and set deck to recording mode (Bias Voltage is not supplied to Recording Head).
4. Turn ADR Adjustment semi-fixed resistor of Rec. Amp. P.C. Board fully clockwise as shown in Fig. 30. Set Rec. Equalizer Adjustment semi-fixed resistor to 12 o'clock position, and depress SOURCE Button. (ADR does not function)
5. Set tape speed to 3-3/4 ips, and Tape Selector to NORMAL.
6. Supply a 1,000 Hz signal to the Line Input from an audio frequency oscillator, and adjust Recording Level Adjustment volume to obtain a -50 dB V.T.V.M. indication. (This voltage furnishes the 1,000 Hz OVU recording signal current.)
7. Switch to 10,000 Hz frequency, and with Equalizer Adjustment volume, set the 10,000 Hz voltage to -41 dB. (Set 10,000 Hz to +9 dB in relation to 1,000 Hz)
8. In case of Model GX-400D, set machine to FWD and REV modes in Steps 6 and 7.
9. Next, set frequency to 15,000 Hz(GX-400D) or 20,000 Hz(GX-400D PRO), turn ADR Adjustment volume counter-clockwise until the 15,000 Hz voltage is -43dB (or the 20,000 Hz voltage is -45 dB).

NOTE: When making adjustment in Item 9, in case of model GX-400D, the machine can be set to either FWD or REV mode.

10. It is advisable to paint lock Equalizer and ADR Adjustment semi-fixed resistors following adjustment.

Frequency Level Setting According to Model Number

Frequency / Model	1,000 Hz	10,000 Hz	15,000 Hz	20,000 Hz
GX-400D	-50 dB	-41 dB		-45 dB
GX-400D PRO	-50 dB	-41 dB	-43 dB	

Chart 5

VIII. EXPLANATION OF A.C SERVO CONTROL OPERATION

1. CIRCUIT OPERATION (Refer to Schematic Diagram)

1) The A.C. signal which is generated at the detector coil by capstan motor revolutions passes the high pass filter (H.P.F.) and is supplied to the base of TR3.

*It is necessary for the signal generated at the detection coil to pass the H.P.F. because of a hum element included in the signal caused by the 50/60 Hz power source frequency and pulsive noise.

2) At 15 ips motor revolutions, because the A.C. signal generated at the detector coil is a limited level signal of about 800 mVp-p, 1,500 Hz frequency, it is amplified at TR3, 4 until the waveform of the signal is clipped.

3) One of the TR4 output signal enters the differential circuit unchanged and the minus signal is cut at D2. The other output signal is amplified and phase inverted at TR5 and then enters the differential circuit and the minus signal is cut at D3. These two signals are composited at D2, D3 cathodes and becomes twice the frequency generated at the detector coil.

4) The signal composited at Diodes D2, D3 is supplied to the base of TR6 as the TR6, TR7 one-shot multi vibrator trigger signal.

5) While the one-shot multi vibrator is stabilized, TR6 is turned off, TR7 is turned on, and no signal is emitted at TR7 collector.

6) When the positive trigger enters the base of TR6, and TR6 is turned on, TR7 "OFF", the one-shot multi vibrator reverses. TR7 collector voltage increases, and at the same time the charge current which has passed VR2, R59 (at 15 ips) flows to C10. When C10 electrical potential increases and TR7 is turned on, the collector voltage decreases. This operation is repeated by means of the trigger signal to TR6, and accordingly, a pulse output waveform is emitted at TR7 collector.

7) TR7 output is pulse regulated at TR8, TR9 and supplied to the integrated circuit and the output from the integrated circuit is supplied to the base of TR10.

8) Because the level of the signal which passed the integrated circuit is small, it is amplified at TR10, TR12, TR13.

9) Because the ripple part of the collector output signal from TR13 is considerable, it is further passed through the integrated circuit and supplied to the base of TR17.

10) TR17 and Power Transistor TR2 is conversion darlington connected, and TR2 is driven by TR17 emitter current and the impedance of TR2 between C-E is changed.

11) The supply voltage to the capstan motor is changed by the change in impedance between C-E of TR2 and the motor torque is also changed. At this time, a certain load is applied to the capstan motor. However, the voltage applied to the motor is changed according to this load. Therefore, the load is balanced with the torque and stabilized revolutions are maintained.

2. SPEED ADJUSTMENT SYSTEM (Refer to Schematic Diagram)

1) In case the capstan motor revolutions become fast, the output signal frequency of the one-shot multi becomes high, the first integrated circuit output rises, TR10 is turned on further and the collector voltage decreases. When TR10 collector voltage is lowered, TR12 base bias decreases, and TR12 collector voltage rises. When TR12 collector voltage increases, TR13 collector output decreases and the second integrated circuit output voltage decreases. Consequently, TR17 base drive also decreases and the resistance between C-E of Power Transistor TR2 increases, the supply voltage to the motor decreases and the motor torque declines and capstan motor revolutions are reduced.

2) On the other hand, if the capstan revolutions become slow, the output signal frequency of the one-shot multi becomes low, the first integrated circuit output is lowered, TR10 is turned almost off, and the collector voltage increases. When TR10 collector voltage is increased, TR12 base bias increases, and TR12 collector voltage declines. When TR12 collector voltage decreases, TR13 collector output increases and the 2nd integrated circuit output voltage increases. Consequently, TR17 base drive also increases and the resistance between C-E of Power Transistor TR2 decreases, the supply voltage to the motor increases and the motor torque rises and capstan motor revolutions are increased.

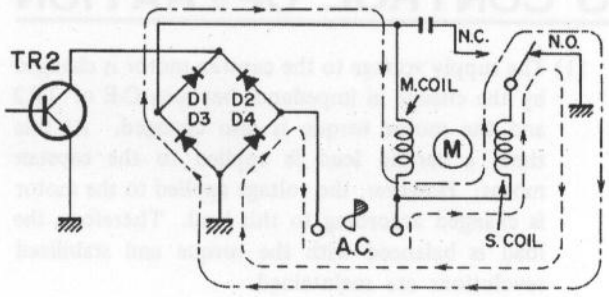


Fig. 37

3. RETARDER CIRCUIT OPERATION

When the Tape Speed Switch is switched from 15 ips to 7-1/2 ips, or from 7-1/2 ips to 3-3/4 ips, capstan motor revolutions are quickly decreased, and in a short time, established motor revolutions are attained.

1) When tape speed is switched from to 15 ips to 7-1/2 ips while switching is taking place, 15 ips revolutions are momentarily retained. The one-shot multi time constant becomes longer and the output pulse width wider. Consequently, the first integrated circuit output increases and in case the revolutions slightly increase over the aforementioned established revolutions, the D.C. amp. operates in the same way as explained above.
2) Accordingly, TR13 collector output decreases, and passes the 2nd stage integrated circuit. TR14 is turned off, TR15 "ON" and TR16 "ON". The collector current flow to relay at TR15 collector load, and the relay operates.
3) When the relay functions, the capstan motor sub coil is grounded, and an A.C. half wave flows as shown in the Fig. 37. The current within the negative half wave does not flow to Diode D4. The power generated at the sub coil passes the D3→ main coil→sub coil closed circuit as shown in the Fig. 37. Consequently, a D.C. magnetic field is formed and braking is applied to the rotor of the motor.
4) When capstan motor revolutions decrease, the voltage necessary for normal revolutions appears at TR13 collector and TR14 is turned on. Also proper bias is applied to the base of TR17 and current flows to the motor through D2→TR2→ D3→motor coil; motor coil→D1→TR2→D4, and normalized motor revolutions are attained.

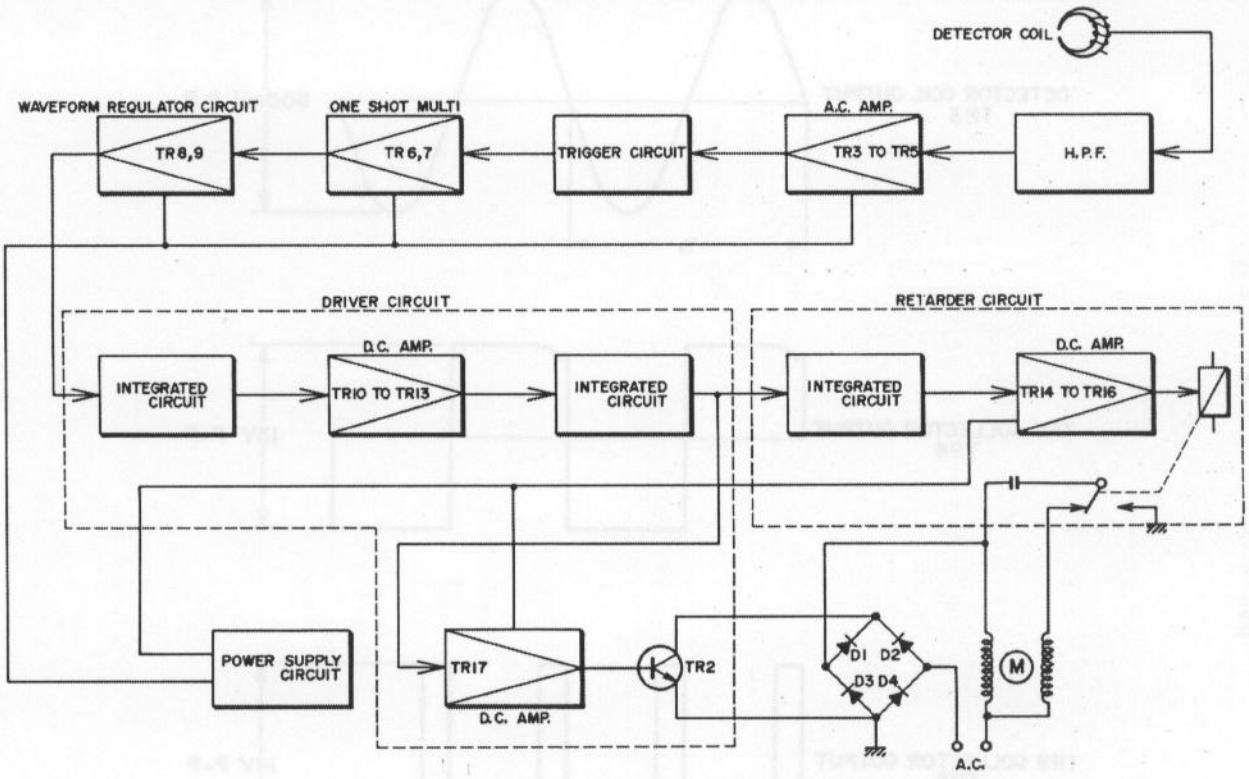


Fig. 38 A.C. SERVO CONTROL SYSTEM BLOCK DIAGRAM

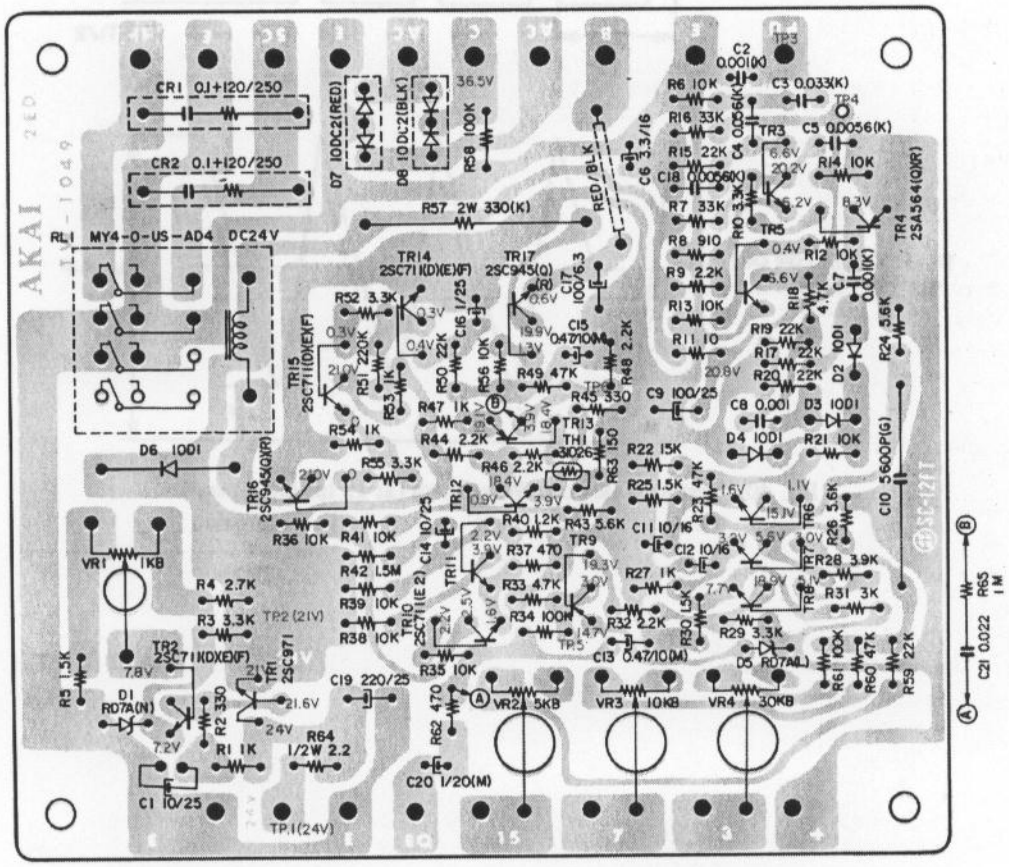


Fig. 39 SERVO CONTROL P.C. BOARD TW-1049
SERVO CIRCUIT TEST POINTS

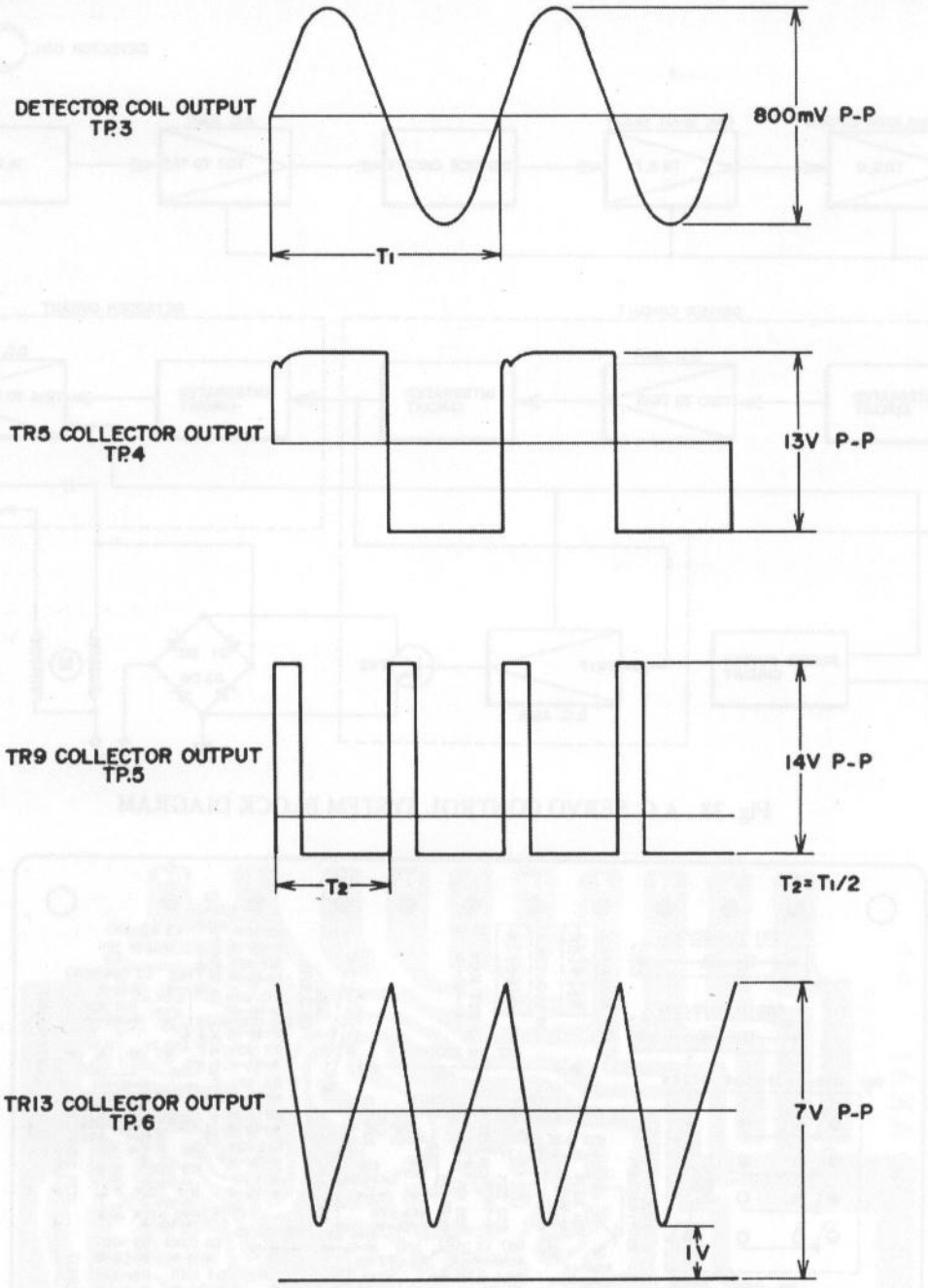


Fig. 40 Various Test Point Waveforms (at 15 ips tape speed)

IX. A.D.R. (AUTOMATIC DISTORTION REDUCTION) OPERATION

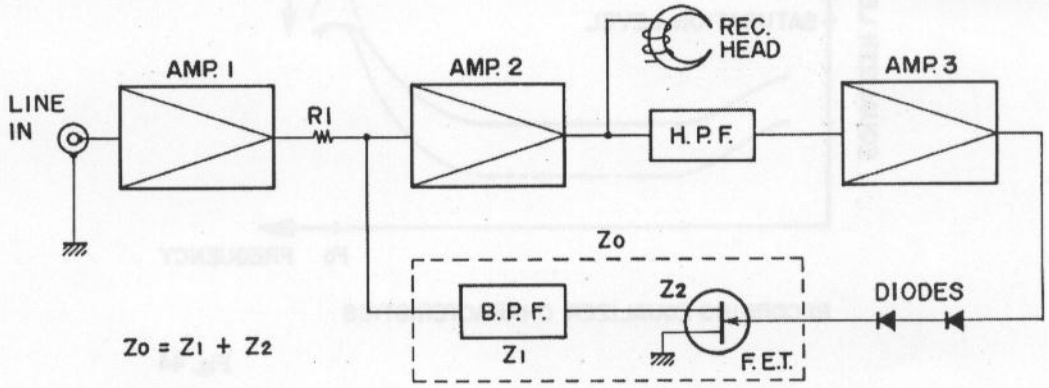
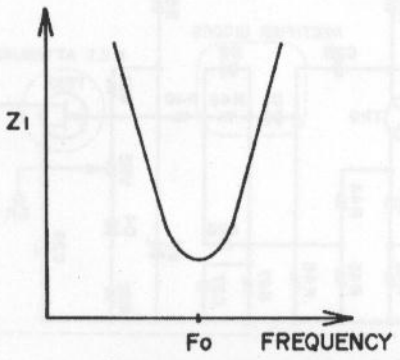


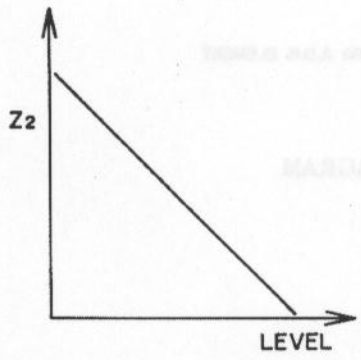
Fig. 41 A.D.R. BLOCK DIAGRAM



Fo: Z1 RESONANCE FREQUENCY

B.P.F. IMPEDANCE CHARACTERISTICS

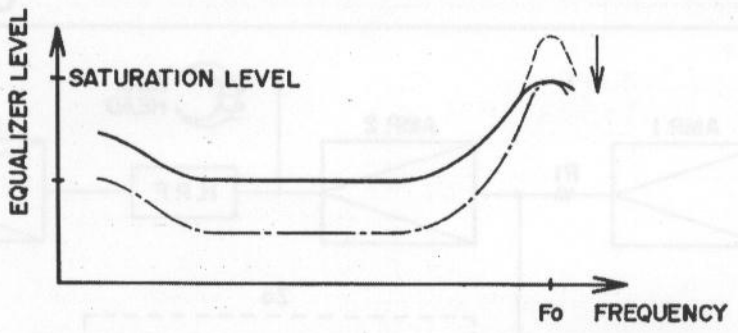
Fig. 42



F.E.T. IMPEDANCE CHARACTERISTICS

Fig. 43

1. The A.D.R. Block Diagram is as shown in Fig. 41, and A.T.T. is comprised of R1 and Z_0.
2. Z_0 impedance is the composite impedance of Z_1 of which the impedance is changed by the frequency and Z_2 which is changed depending upon the signal level. (See Figs. 42, 43)
3. Z_1 impedance resonates at recording equalizer peak point in the vicinity of f_0 (see Fig. 44). At resonance time the impedance of Z_1 is minimum.
4. When a flat and wide frequency band width signal is introduced to the Line Input, it is amplified at Amp. 1 and Amp. 2 and supplied to the recording head.
5. Regarding the flow of signal current to the Rec. Head, as shown in Fig. 44 when comparing the high with the low, the high flow of current is rather large.
6. Accordingly, in attempting to record at a high level, as shown in Fig. 44, there is a relative increase in the recording equalizer level as well, and there are instances in which the saturation level of the magnetic tape is surpassed at the equalizer peak.
7. At this time, as shown in Fig. 41, the Amp. 2 output passes the H.P.F., is amplified at Amp. 3, and this output is rectified at the diodes.
8. The voltage rectified at the diodes is supplied to the F.E.T. drain. Therefore, the impedance between gate & source is lowered and Z_0 impedance is also lowered. However, because at the resonance point vicinity of the recording equalizer Z_1 impedance is minimum, R_1 and Z_0 A.T.T. operates only at high range frequencies.
9. The high range frequency level is decreased at the input stage of Amp. 1 by means of A.T.T. composed of R_1 and Z_0, and after passing Amp. 1 and Amp. 2, the recording current supplied to the recording head, as shown in Fig. 44, becomes below the saturation level of the magnetic tape in the vicinity of f_0 and the signal can be recorded on the magnetic tape without distortion.



RECORDING EQUALIZER CHARACTERISTICS

Fig. 44

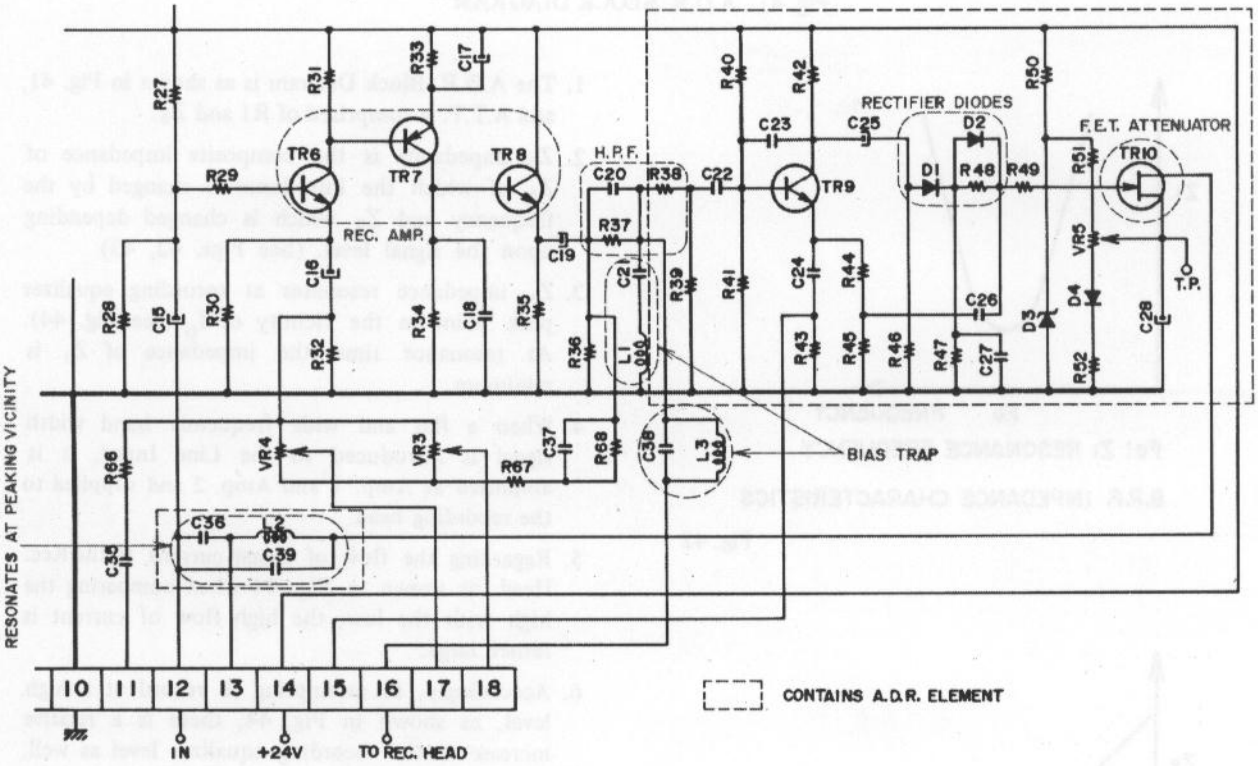


Fig. 45 A.D.R. SECTION SCHEMATIC DIAGRAM

X. TRANSPORT MECHANISM

1. MODEL: GX-400D

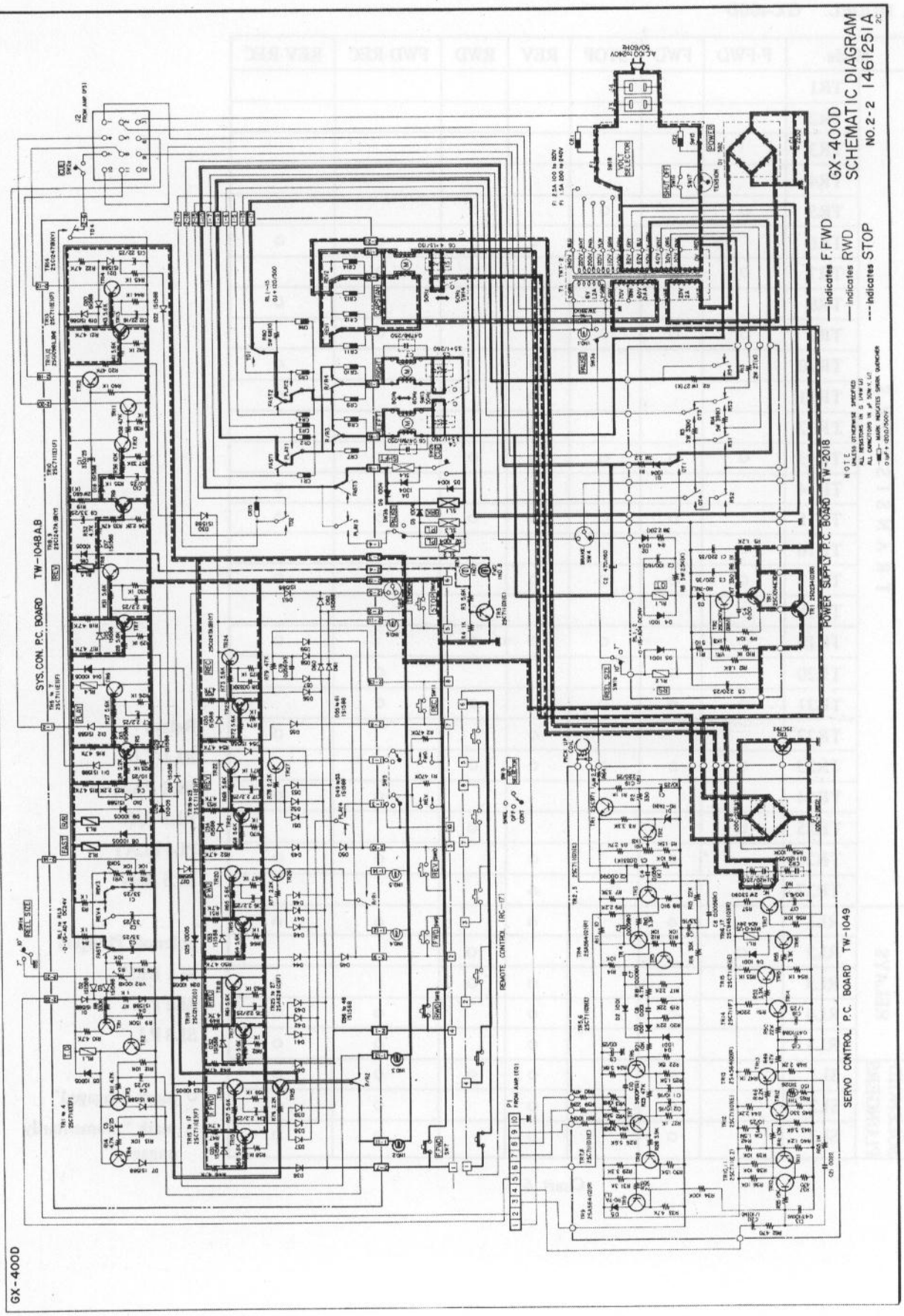
	Mode	F·FWD	FWD	STOP	REV	RWD	FWD·REC	REV·REC
TRANSISTORS	TR1							
	TR2							
	TR3							
	TR4							
	TR5	○		○		○		
	TR6		○		○		○	○
	TR7	○	○	○		○	○	
	TR8				○			○
	TR9	○	○	○		○	○	
	TR10				○			○
	TR11				○			○
	TR12				△			
	TR13	○	○	○	○	○		
	TR14						○	○
	TR15		○	○	○	○	○	○
	TR16	○						
	TR17	○	○	○	○		○	○
	TR18					○		
	TR19	○		○	○	○		○
	TR20		○				○	
	TR21	○	○	○		○	○	
	TR22				○			○
	TR23	○	○	○	○	○		
	TR24						○	○
	TR25	○				○		
	TR26		○		○		○	○
	TR27				△			
RELAYS	RL1		△		△		△	△
	RL2	○				○		
	RL3				○	○		○
	RL4		○		○		○	○
	RL5				○		○	○
SOLENOID PLUNGERS	SL1	○	○		○	○	○	○
	SL2		○		○		○	○
	SL3		○		○		○	○

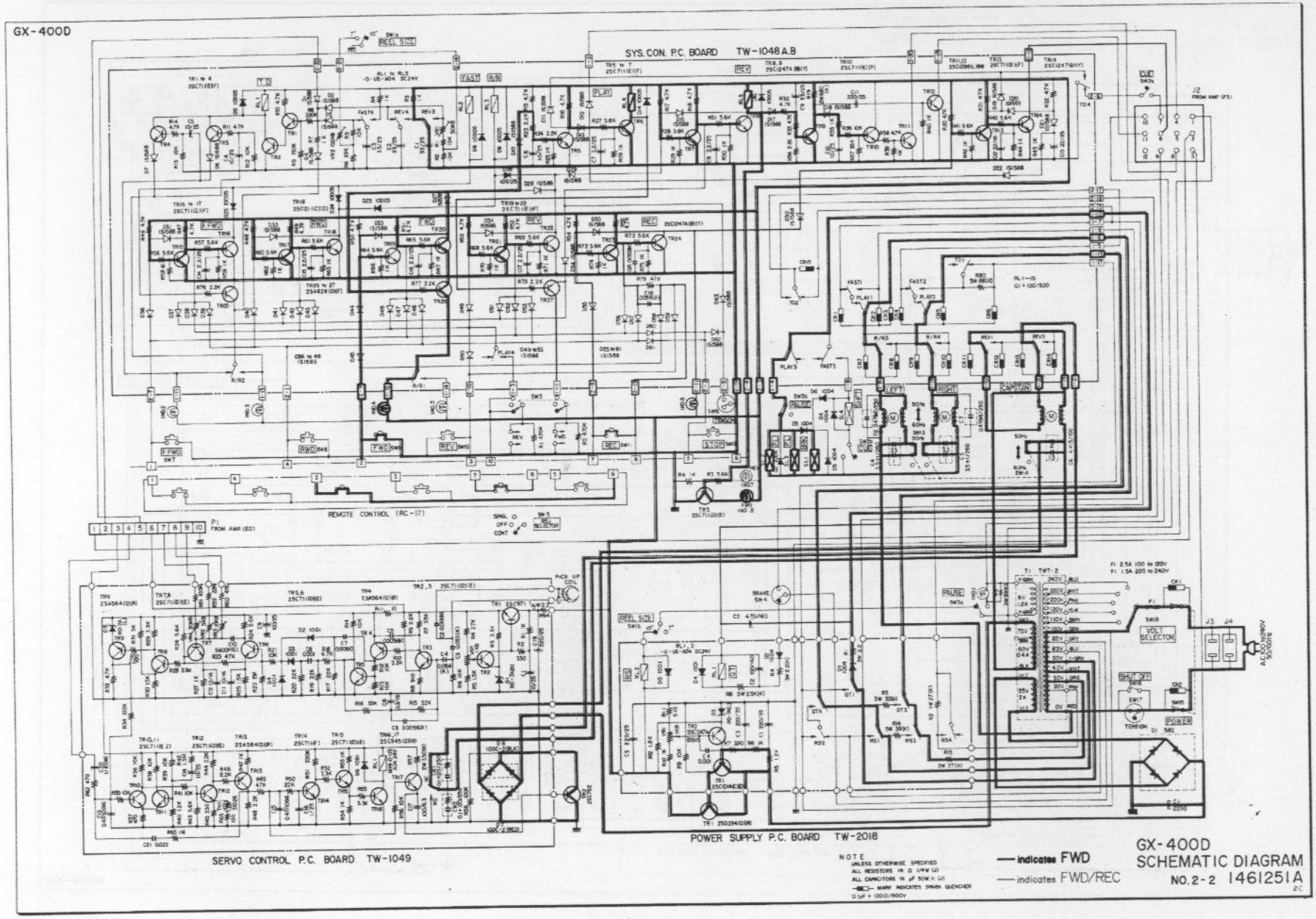
Relays
RL1 T.D
RL2 FAST
RL3 R/R
PL4 PLAY
RL5 REV

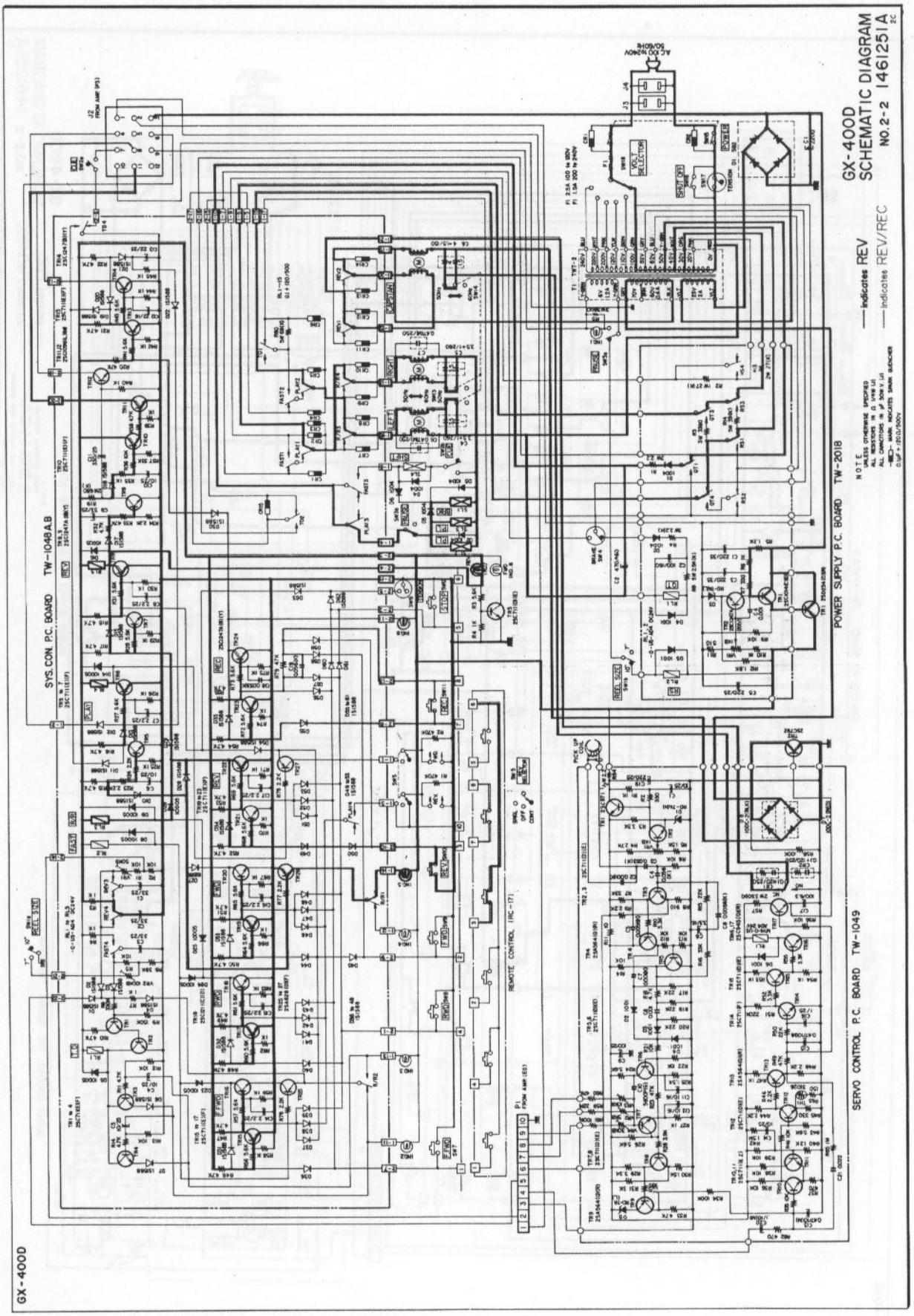
Solenoid Plungers
SL1 BRK
SL2 P.L
SL3 P.L

○ mark "engaged"
△ mark "momentarily engaged"

Chart 6


GX-4000D
SCHEMATIC DIAGRAM
NO.2-2 1461251A
— indicates F.FWD
— indicates RWD
--- indicates STOP
SYS.CON. P.C. BOARD TW-1048A,B
POWER SUPPLY P.C. BOARD TW-2018
SERVO CONTROL P.C. BOARD TW-1049
REMOTE CONTROL (RC-17)


GX-400D
SYS. CON. P.C. BOARD TW-1048 A,B
REMOTE CONTROL (RC-17)
SERVO CONTROL P.C. BOARD TW-1049
POWER SUPPLY P.C. BOARD TW-2018
— indicates FWD
— indicates FWD/REC
GX-400D
SCHEMATIC DIAGRAM
NO.2-2 1461251A


GX-4000D
SCHEMATIC DIAGRAM
NO.2-2 1461251A
SYS.CON. P.C. BOARD TW-1048A,B
SERVO CONTROL P.C. BOARD TW-1049
POWER SUPPLY P.C. BOARD TW-2018
REMOTE CONTROL (RC-17)
indicates REV
indicates REV/REC

2. MODEL: GX-400D PRO

Mode		F·FWD	FWD	STOP	RWD	REC
TRANSISTORS	TR1	○		○	○	
	TR2		○			○
	TR3	○	○	○	○	
	TR4					○
	TR5					
	TR6					
	TR7				△	
	TR8					
	TR9					
	TR10		○	○	○	○
	TR11	○				
	TR12	○	○	○		○
	TR13				○	
	TR14	○		○	○	
	TR15		○			○
	TR16	○	○	○	○	
	TR17					○
	TR18					
	TR19	○	○	○	○	○
	TR20				△	
RELAYS	RL1	○			○	
	RL2				○	
	RL3		○			○
	RL4		△			
SOLENOID PLUNGERS	SL1	○	○		○	○
	SL2		○			○
	SL3		○			○

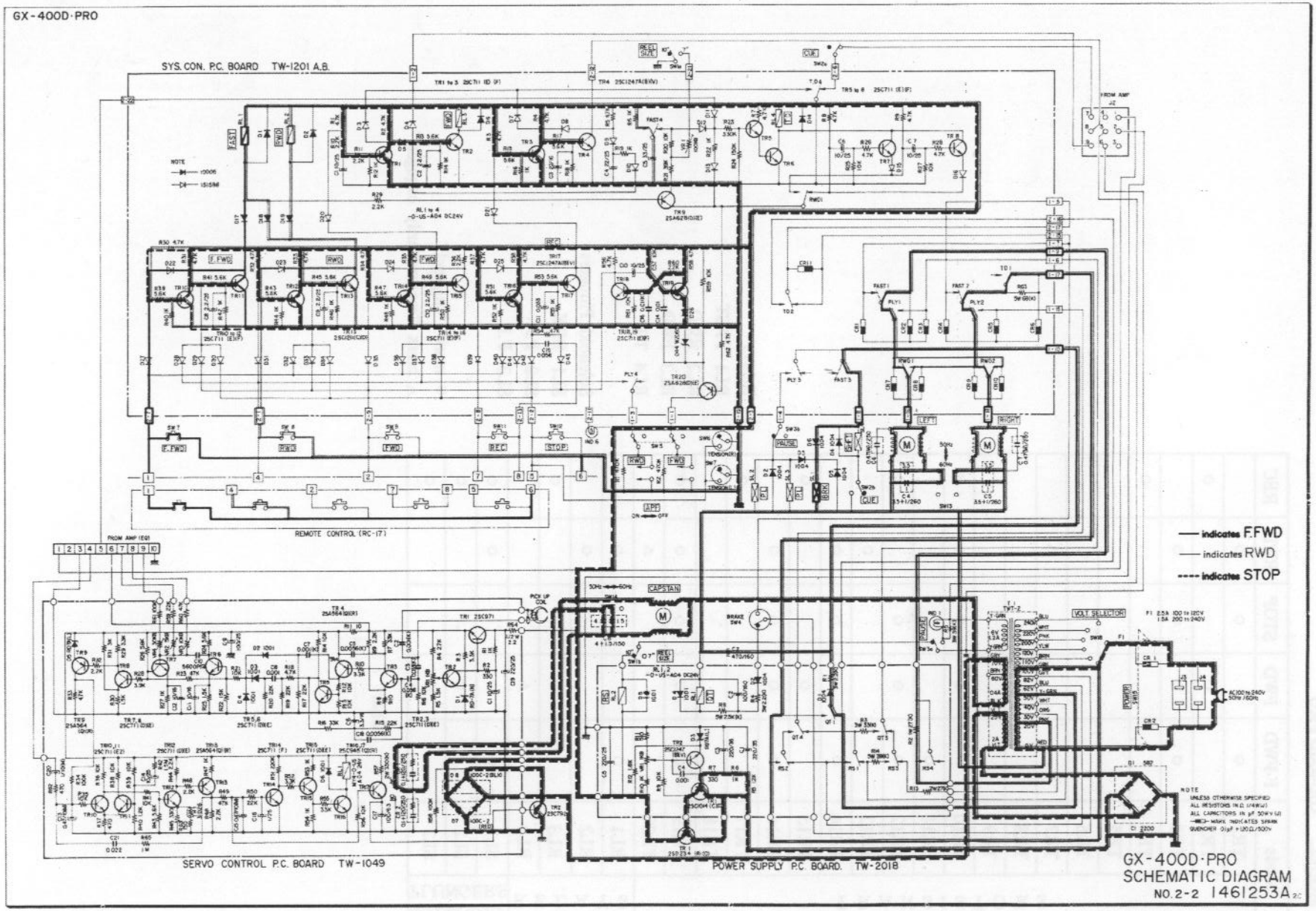
Chart 7

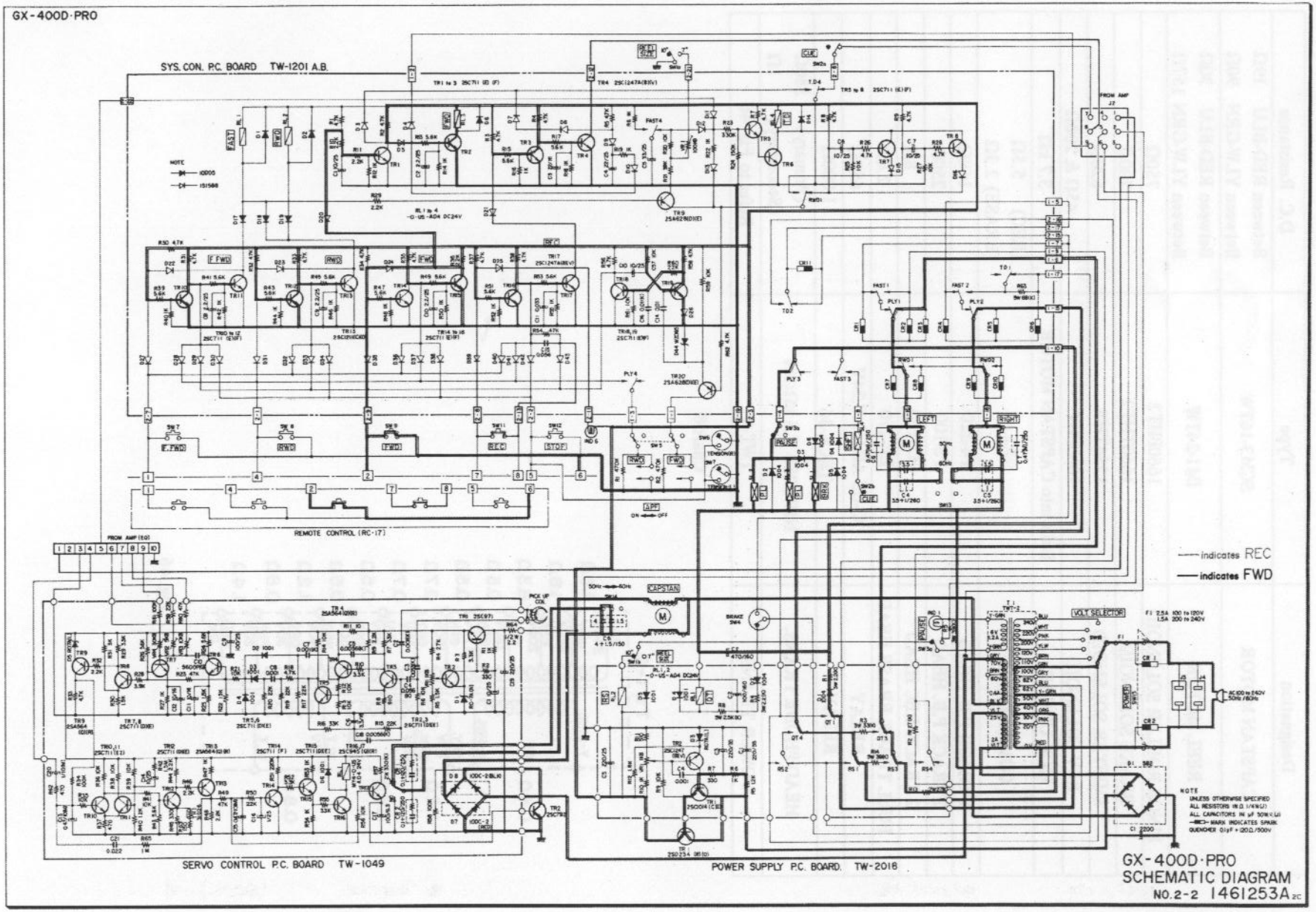
Relays
RL1 FAST
RL2 RWD
RL3 FWD
RL4 T.D

Solenoid Plungers
SL1 BRK
SL2 P.L
SL3 P.L

○ mark "engaged"
△ mark "momentarily engaged"

GX-400D·PRO


SYS. CON. P.C. BOARD TW-1201 A,B.
REMOTE CONTROL (RC-17)
SERVO CONTROL P.C. BOARD TW-1049
POWER SUPPLY P.C. BOARD TW-2018
indicates F.FWD
indicates RWD
indicates STOP
GX-400D·PRO
SCHEMATIC DIAGRAM
NO.2-2 1461253A


GX-400D·PRO
SYS. CON. P.C. BOARD TW-1201 A.B.
REMOTE CONTROL (RC-17)
SERVO CONTROL P.C. BOARD TW-1049
POWER SUPPLY P.C. BOARD TW-2018
indicates REC
indicates FWD
GX-400D·PRO
SCHEMATIC DIAGRAM
NO.2-2 1461253A 2C

XI. D.C. RESISTANCE OF EACH COIL

D.C. resistance value is average value.

Designation	Type	D.C. Resistance
CAPSTAN MOTOR	SCM3-16TW	Between RED-BLU 19Ω Between YLW-GRN 90Ω
REEL MOTOR	IM1-24TW	Between RED-BLU 30Ω Between YLW-GRN 157Ω
PINCH ROLLER SOLENOID	1660PHT2	750Ω
BRAKE SOLENOID	1660THT2	700Ω
SHIFTER SOLENOID	1254THT	620Ω
REV SOLENOID	1660PHT	45Ω & 200Ω
PICK UP COIL	Built into CAPSTAN MOTOR	3.7 kΩ
COMBO HEAD	RE4-6	(REC) 5.5Ω (ERASE) 2.3Ω
4 TRACK P.B. HEAD	P4-220	160Ω
2 TRACK P.B. HEAD	P2-100	250Ω
2 TRACK REC HEAD	R2-100	8Ω
FULL TRACK ERASE HEAD	EF-210	2.8Ω
RELAY	O-US-AD4 D.C.24V	650Ω
RELAY	TECK-36	1,000Ω
HEAD PHONE TRANS.	N19-228S 7.5 kΩ:8Ω	(Primary) 580Ω (Secondary) 1Ω
POWER TRANS.	TWT-2	Refer to Fig. 46

Chart 8

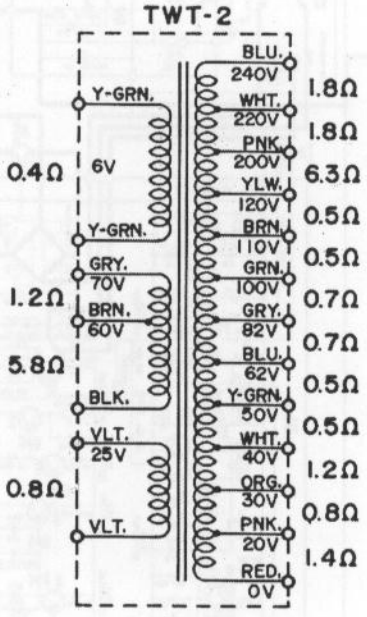
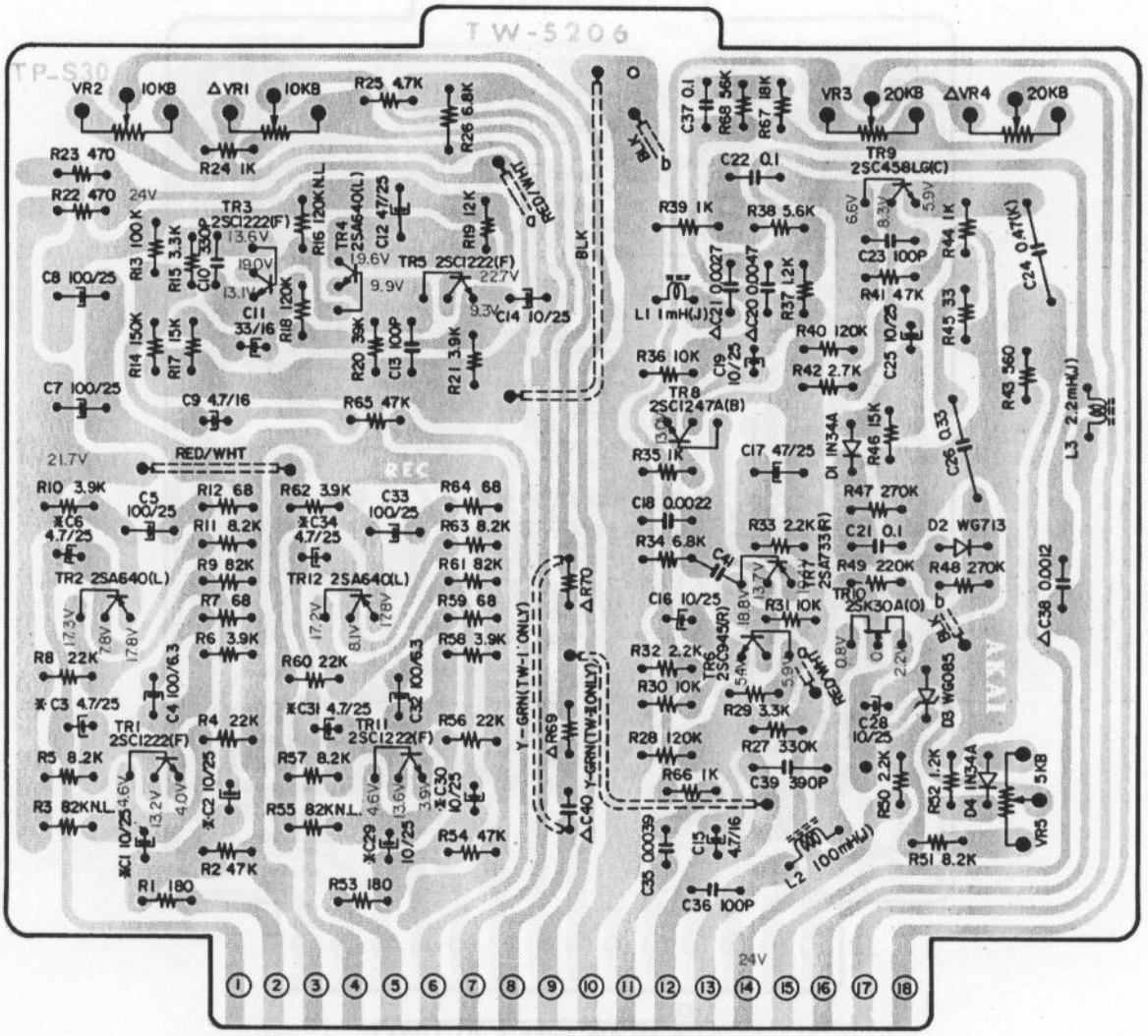


Fig. 46

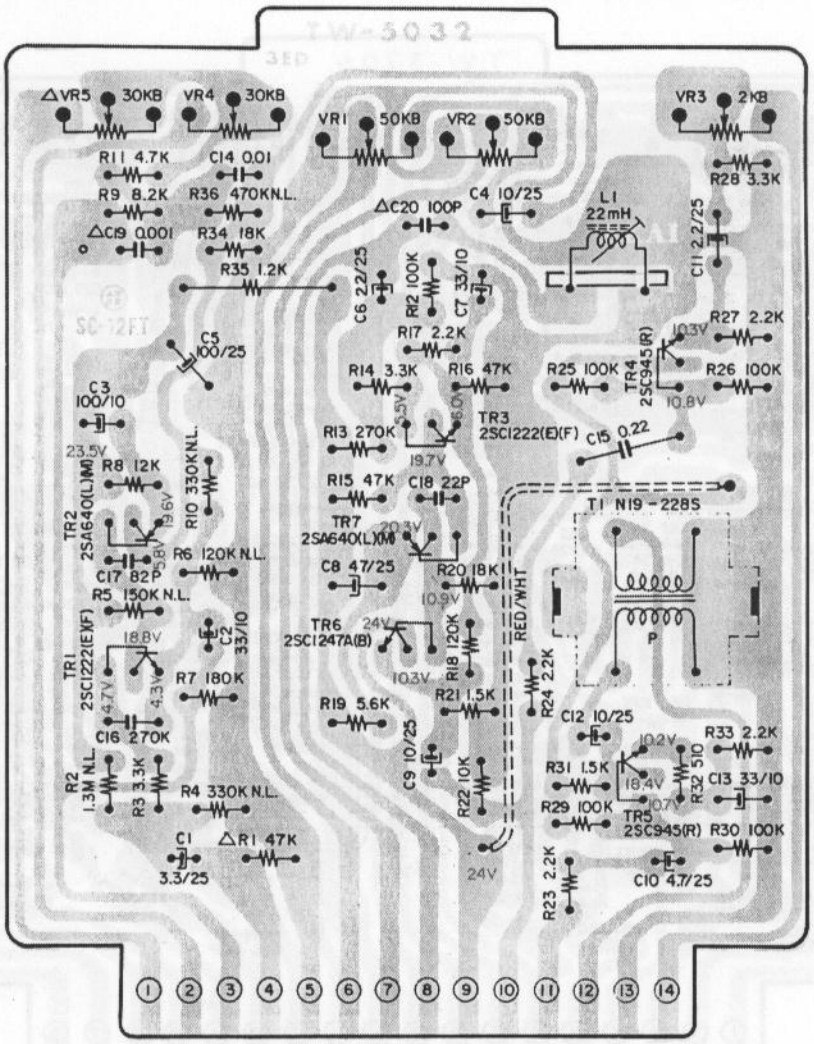
1. REC. AMP. P.C. BOARD TW-5206



NOTE

Δ	C20	C21	C38	C40	C41	R69	R70	VR1	VR4
TW-I	0.0047	0.0027	0.0012					USED	USED
TW-II	0.0056	0.001	430P	0.0027	82P	4.7K	10K		

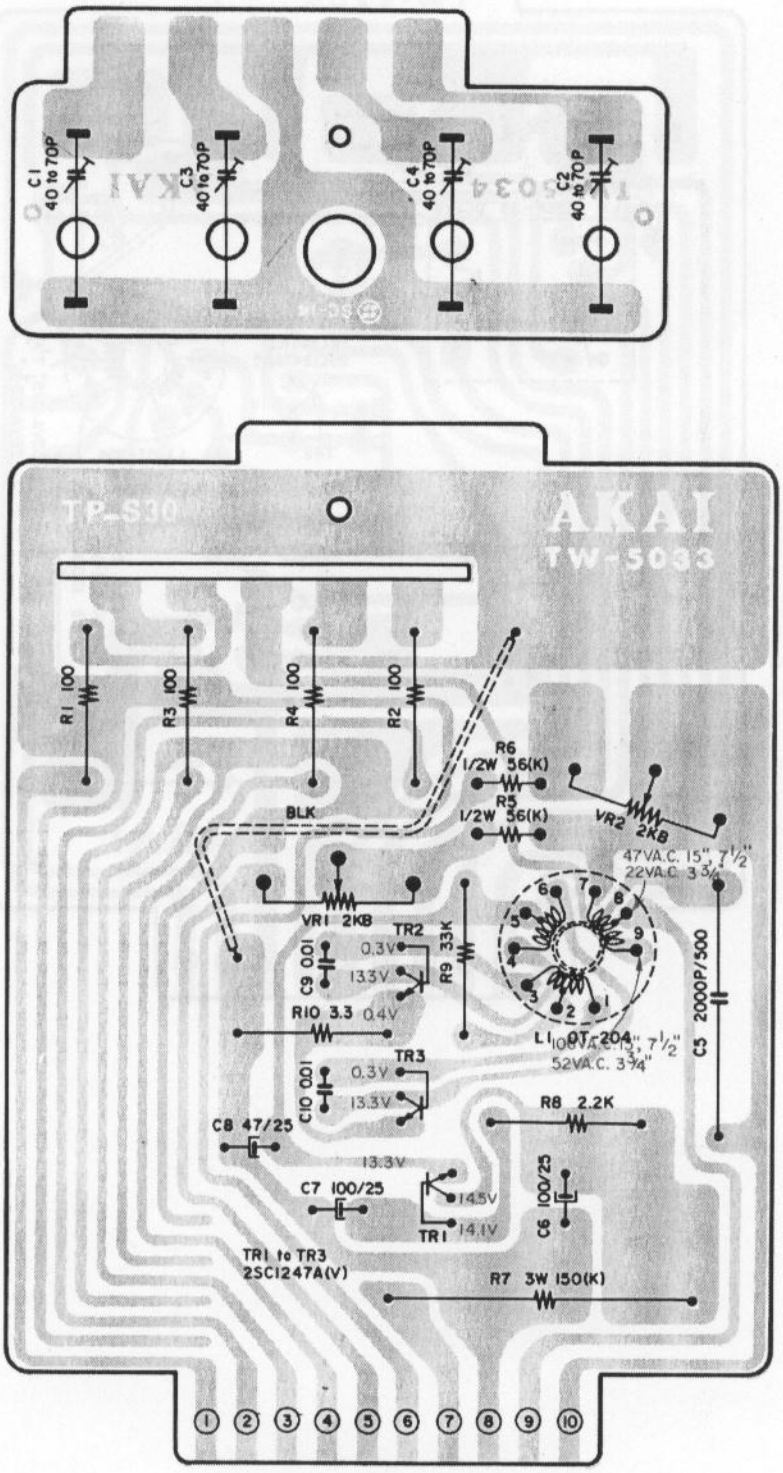
2. P.B. AMP. P.C. BOARD TW-5032



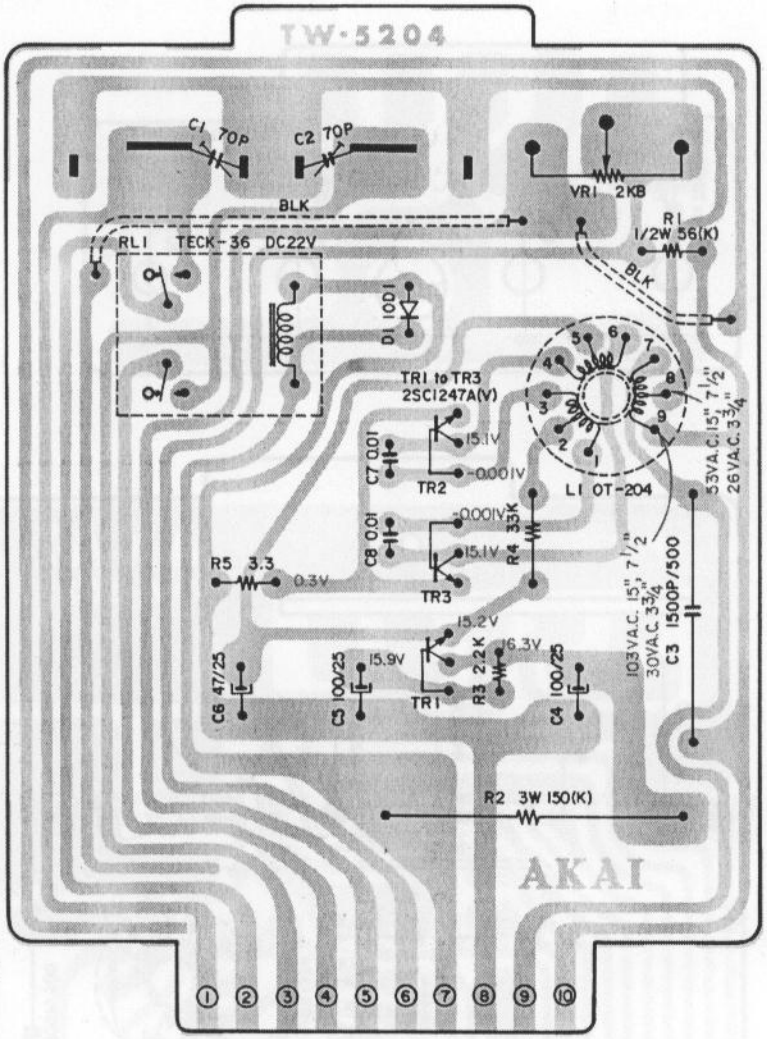
NOTE

△	C19	C20	R1	VR5
TW-I	0.001	100P	47K	USED
TW-II	0.0015	50P	56K	

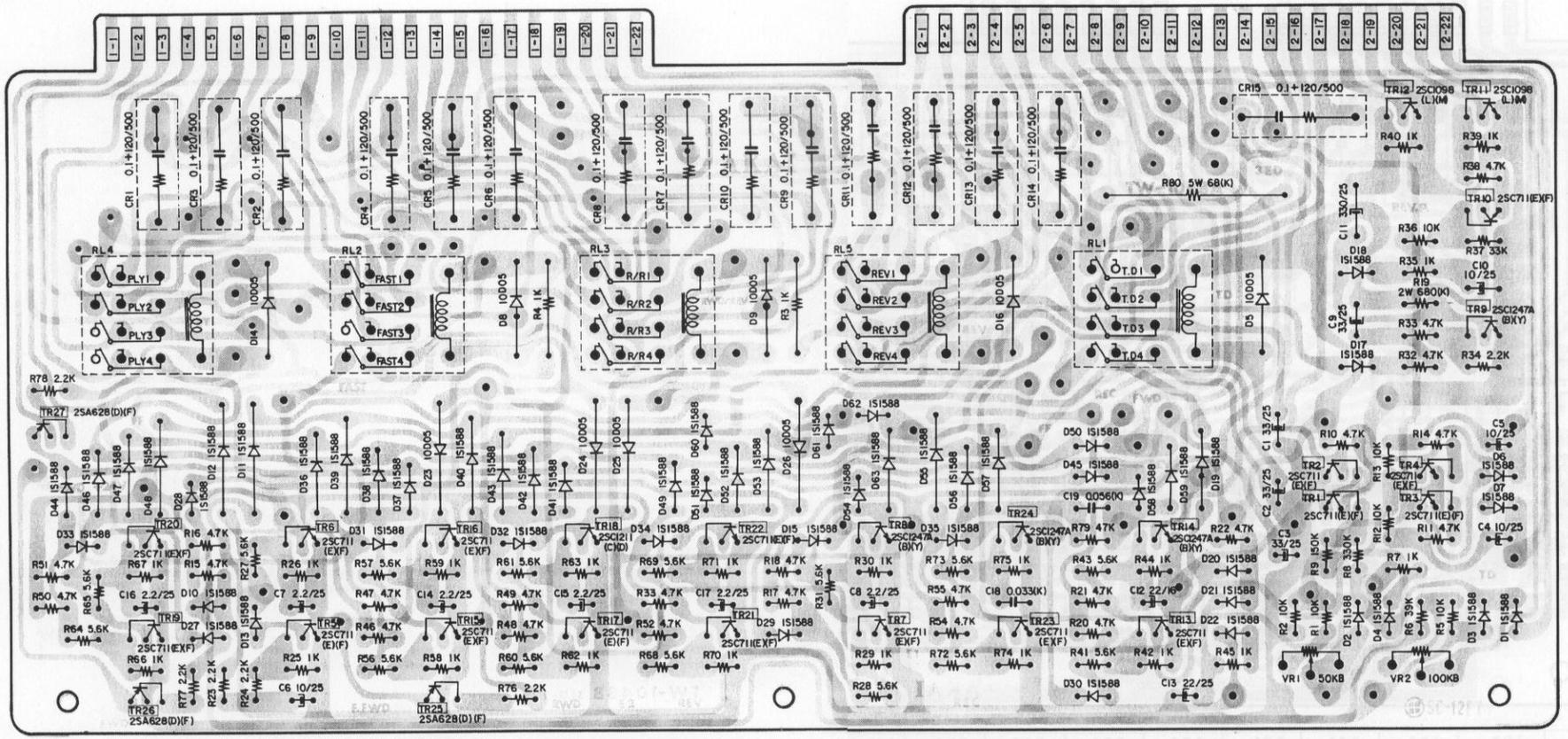
3. OSC. P.C. BOARD TW-5033



4. OSC. P.C. BOARD TW-5204 (PRO)



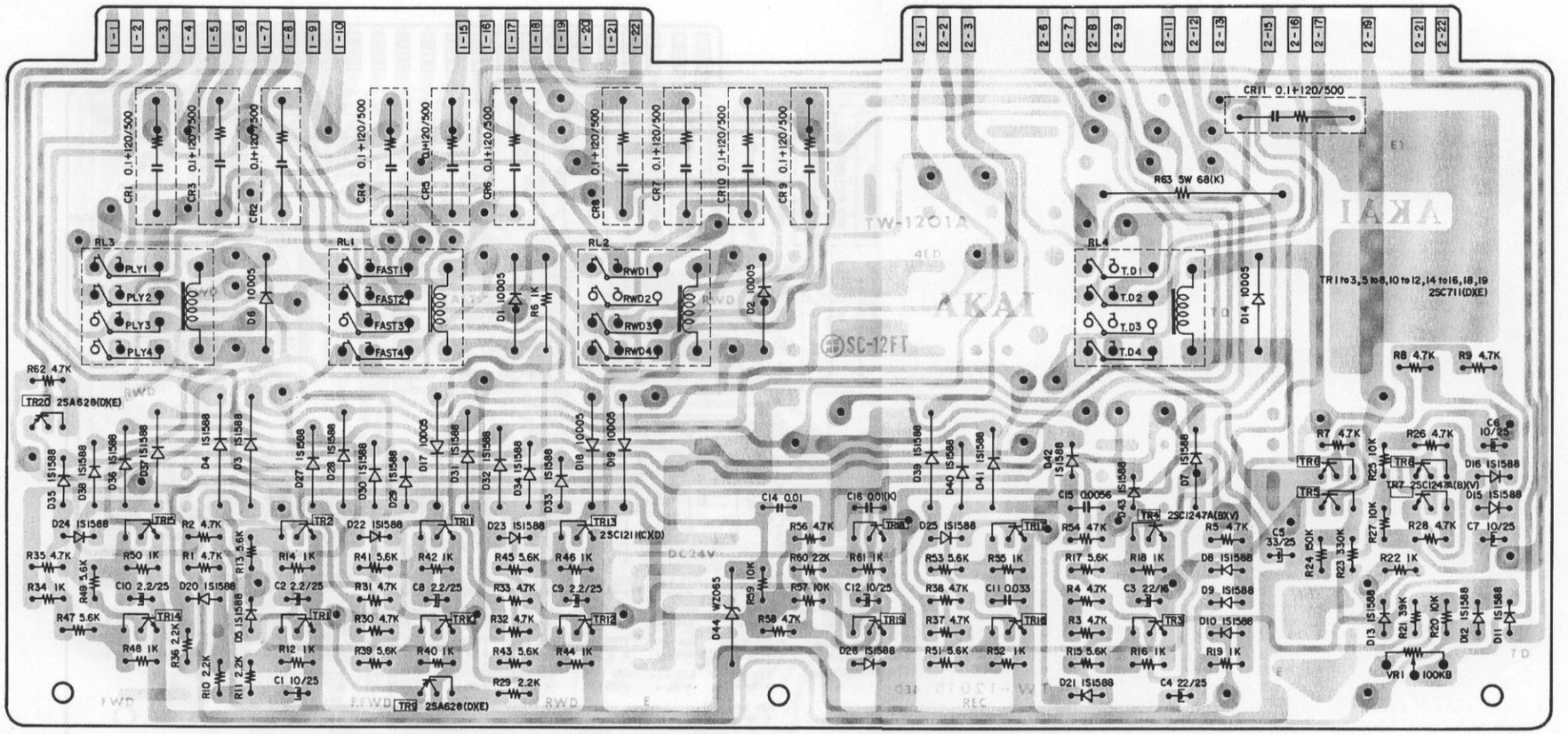
5. SYS. CON. P.C. BOARD TW-1048



	TR1	TR2	TR3	TR4	TR5	TR6	TR7	TR8	TR9	TR10	TR11	TR12	TR13	TR14
E										16.7V(F.F,REV,REC) 0(OTHER)				
C	24V	24V	24V	24V	0.1V(FWD,STOP,RWD) 13V(OTHER)	24V(F.F,STOP,RWD) 0.1V(OTHER)	10V(REV,REC) 0.1V(OTHER)	0.3V(REV,REC) 23.3V(OTHER)	23.6V(REV,REC) 0.1V(OTHER)	24V	0.2V(F.F,REV,REC) 35V(OTHER)	34V(REV,REC) 36V(OTHER)	14.3V(REC) 0.1V(OTHER)	0.2V(REC) 24V(OTHER)
B					0.4V(FWD,STOP,RWD) 0.8V(OTHER)	0.8V(FWD,REV,REC) 0.1V(OTHER)	0.2V(REV,REC) 0.8V(OTHER)	0.8V(REV,REC) 0.1V(OTHER)	0.1V(REV,REC) 0.8V(OTHER)	18V(F.F,REV,REC) 0(OTHER)	0.8V(F.F,REV,REC) 0(OTHER)		0.2V(REC) 0.8V(OTHER)	0.8V(REC) 0(OTHER)

	TR15	TR16	TR17	TR18	TR19	TR20	TR21	TR22	TR23	TR24	TR25	TR26	TR27	
E											2.2V(F.F,RWD) 24V(OTHER)	2.3V(FWD,REV,REC) 24V(OTHER)	10V(REV,REC) 0.1V(OTHER)	
C	13.4V(F.F) 0.1V(OTHER)	0.2V(F.F) 23.6V(OTHER)	13.3V(RWD) 0.1V(OTHER)	0.2V(RWD) 23.6V(OTHER)	13.3V(FWD,REV) 0.1V(OTHER)	0.1V(FWD,REC) 10V(REV,REC) 23V(OTHER)	10V(REV,REC) 0.1V(OTHER)	0.3V(REV,REC) 23.6V(OTHER)	13.4V(REC) 0.1V(OTHER)	0.2V(REC) 24V(OTHER)				
B	0.2V(F.F) 0.8V(OTHER)	0.8V(F.F) 0.1V(OTHER)	0.2V(RWD) 0.8V(OTHER)	0.8V(RWD) 0.1V(OTHER)	0.2V(FWD,REC) 0.8V(OTHER)	1V(F.F,FWD,REC) 0.1V(OTHER)	0.2V(REV,REC) 1V(OTHER)	0.9V(REV,REC) 0.1V(OTHER)	0.2V(REC) 1V(OTHER)	0.8V(REC) 0.1V(OTHER)	1.5V(F.F,RWD) 24V(OTHER)	23V(F.F,RWD,STOP) 2V(OTHER)	24V(F.F,STOP,RWD) 0.1V(OTHER)	

6. SYS. CON. P.C. BOARD TW-1201 (PRO)



	TR1	TR2	TR3	TR4	TR5	TR6	TR7	TR8	TR9	TR10	TR11	TR12	TR13	TR14	TR15	TR16	TR17	TR18	TR19	TR20
E																				6.2V
C	12V(FWD,REC) 0.1V(OTHER)	0.2V(FWD,REC) 24V(OTHER)	14.4V(REC)- 0.1V(OTHER)	0.1V(REC) 24V(OTHER)	24V	24V	24V	24V		13.4V(F.F) 0.1V(OTHER)	0.2V(F.F) 23V(OTHER)	13.5V(RWD) 0.1V(OTHER)	0.1V(RWD) 23.6V(OTHER)	13.3V(FWD,REC) 0.1V(OTHER)	0.1V(FWD,REC) 24V(OTHER)	13.3V(REC) 0.1V(OTHER)	0.1V(REC) 24V(OTHER)	24V	0.8V	6.2V(F.F,RWD) 0.1V(OTHER)
B	0.2V(FWD,REC) 0.8V(OTHER)	0.8V(FWD,REC) 0.1V(OTHER)	0.1V(REC) 0.8V(OTHER)	0.8V(REC) 0.1V(OTHER)						0.2V(F.F) 0.7V(OTHER)	0.8V(F.F) 0.1V(OTHER)	0.2V(RWD) 0.8V(OTHER)	0.8V(RWD) 0.1V(OTHER)	0.2V(FWD,REC) 0.8V(OTHER)	0.8V(FWD,REC) 0.1V(OTHER)	0.2V(REC) 0.8V(OTHER)	0.8V(REC) 0.1V(OTHER)	0.3V	1.5V	5.5V(F.F,RWD) 17.5V(OTHER)

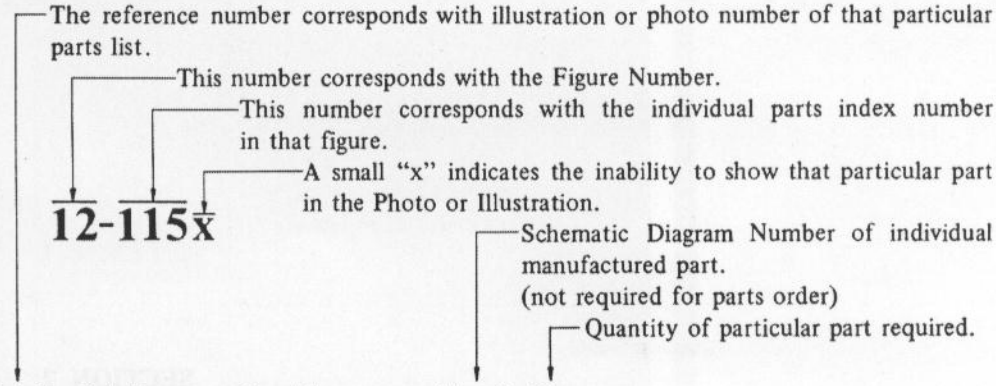
SECTION 2

PARTS LIST

TABLE OF CONTENTS

HOW TO USE THIS PARTS LIST

1. This parts list is compiled by various individual blocks based on assembly process.
2. When ordering parts, please describe parts number, serial number, and model number in detail.
3. How to read list.



Ref. No.	Parts No.	Description	Schematic No.	Q'ty
		FLYWHEEL BLOCK #13		
12-115x	800425	Flywheel Block Assy. Comp.	RDG#13	1
12-116	244506	Flywheel Only	RD-233	1
12-117x	244754	Felt, Flywheel	RD-275	1
12-118	251324	Main Metal Case	RD-236	1
12-119	253080	Main Metal	RD-237	1

4. The symbol numbers shown on the P.C. Board list can be matched with the Composite Views of components of the Schematic Diagram or Service Manual.
5. The indications of Resistors and Capacitors in the photos of P.C. Board are being eliminated.
6. The shape of the parts and parts name, etc. can be confirmed by comparing them with the parts shown on the Electrical Parts Table of P.C. Board.
7. Both the kind of part and installation position can be determined by the Parts Number. To determine where a parts number is listed, utilize Parts Index at end of Parts List.
   It is necessary first of all to find the Parts Number. This can be accomplished by using the Reference Number listed at right of parts number in the Parts Index. (meaning of ref. no. outlined in Item 3 above).
8. Utilize separate "Price List for Parts" to determine unit price. The most simple method of finding parts Price is to utilize the reference number.

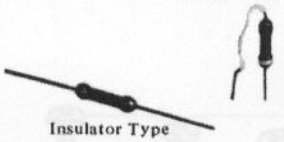
ELECTRICAL PARTS TABLE

Because the indication of resistors and capacitors in the P. C. Board photos are being eliminated, please confirm parts name and shape by comparing them with the parts shown in this table.

1

Solid Resistor

2 Stopper Type



Insulator Type

Carbon Resistor

3

Metal Oxide Film Resistor

4

Cement Resistor

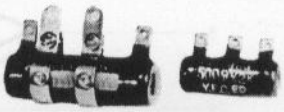
5

Wire-Wound Resistor

6

Thermister

7



Enamel Resistor

1

MP Capacitor (Tubular Type)

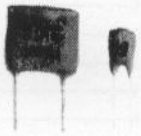
2

Plastic Capacitor

3

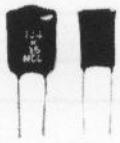
Mylar Capacitor

4



VFM (Hi-Q) Capacitor

5



Mylar Capacitor

6

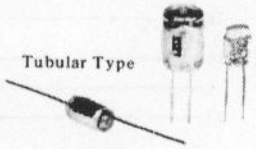
Tantalum Capacitor

7

Oil Capacitor (Tubular Type)

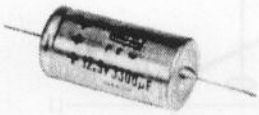
8 Vertical Type

Tubular Type



Styrol Capacitor

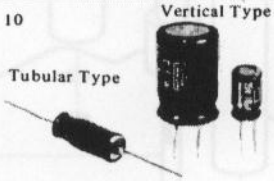
9



Electrolytic Capacitor (Tubular Type)

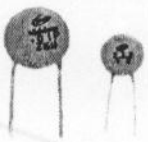
10 Vertical Type

Tubular Type



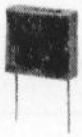
Electrolytic Capacitor

11



Ceramic Capacitor

12

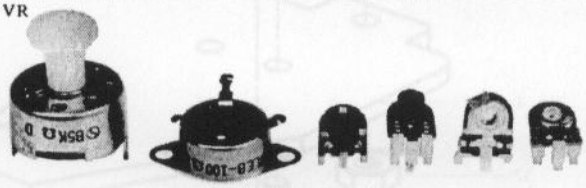


Metalized Mylar (Paper) Capacitor

13

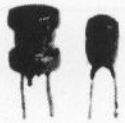
Trimmer Condenser

VR



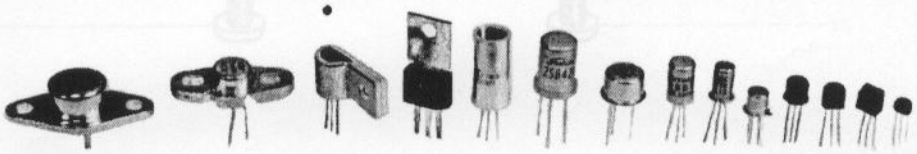
Semi-Fixed Volume

L



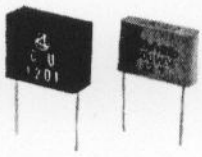
Ferri Inductor

TR



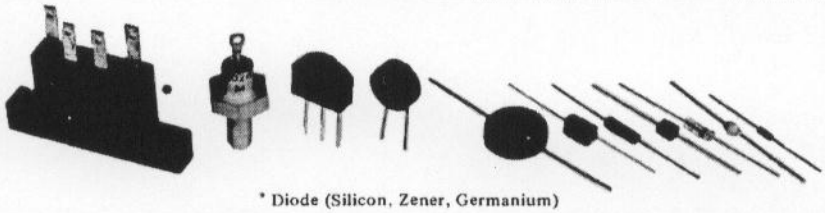
Transistor

CR



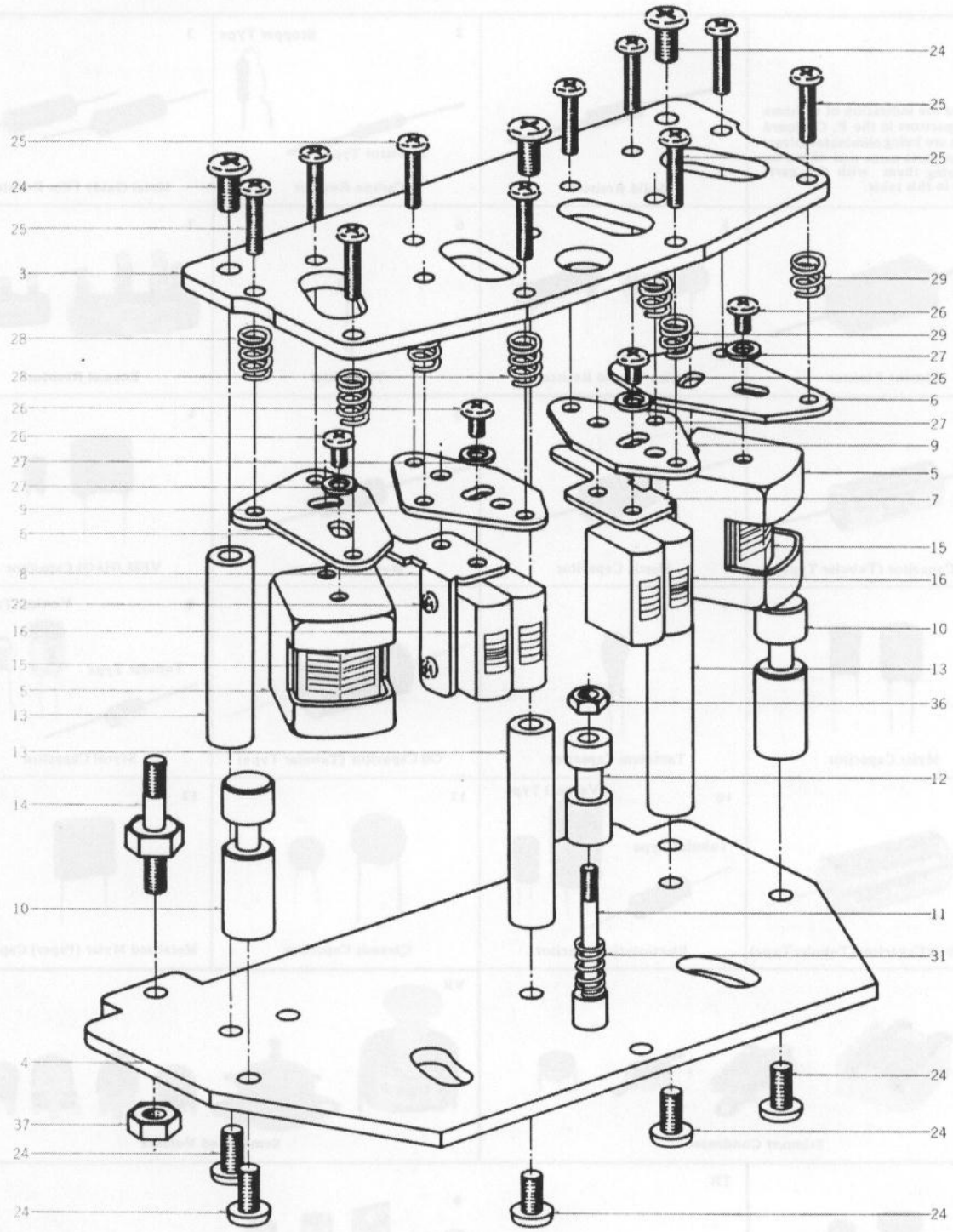
Spark Quencher

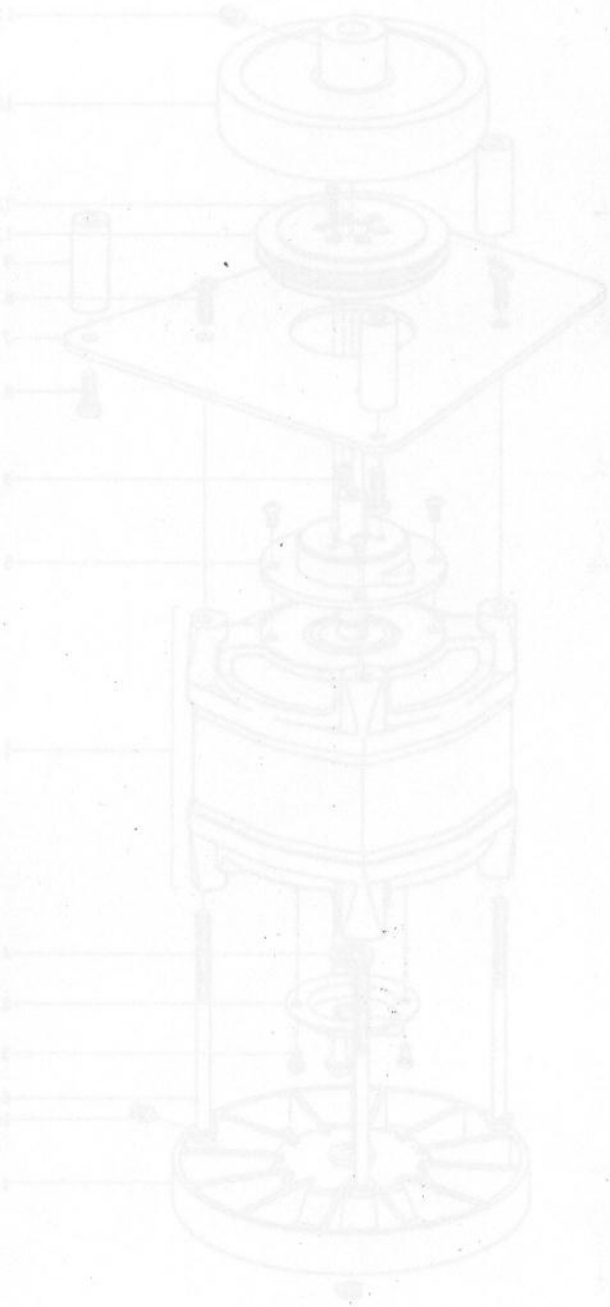
D



* Diode (Silicon, Zener, Germanium)

FIG. 1 ILLUSTRATION OF TW HEAD BLOCK

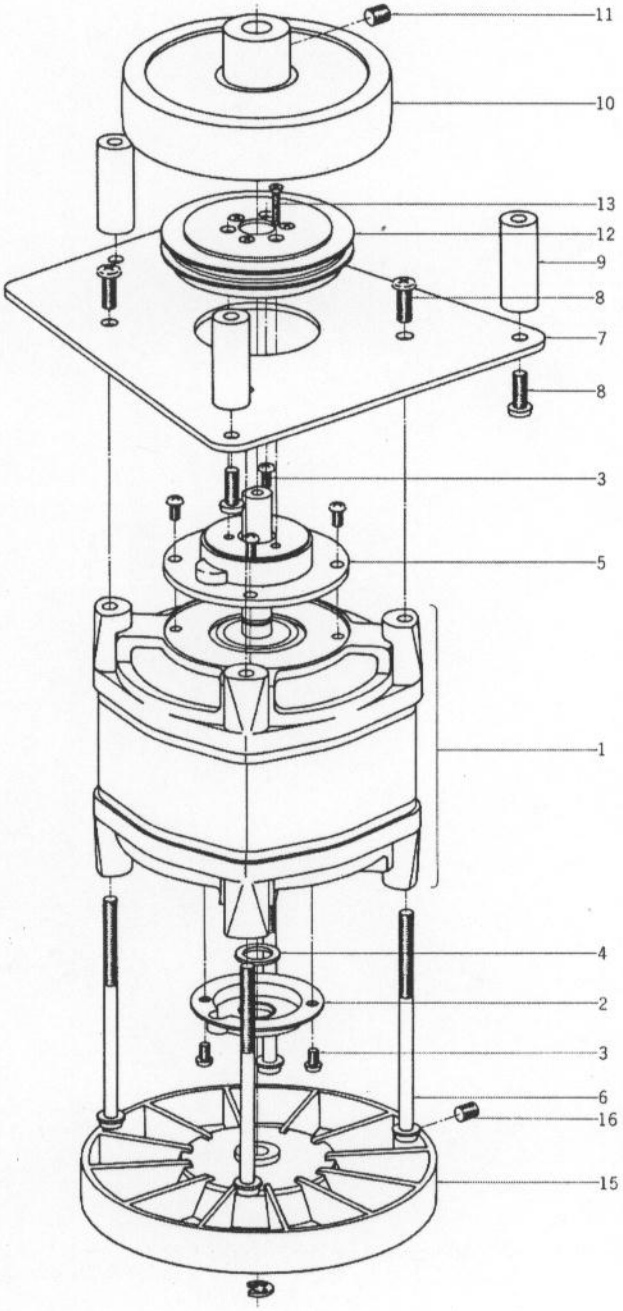




TW HEAD BLOCK

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
1-1x	BH552172	TW Head Block Comp.	TW-1	1
1-2x	BH552183	TW Head Block Comp. (PRO)	TW-2	1
1-3	HZ532664	Head Base A	TW-0001	1
1-4	HZ532675	Head Base B	TW-0002	1
1-5	HZ532776	Shield Case	TW-0011	2
1-6	HZ532765	PH Retaining Base	TW-0010	2
1-7	HZ532743	CH Angle A	TW-0009	1
1-8	HZ532754	CH Angle B	TW-0009	1
1-9	HZ532732	CH Retaining Base	TW-0008	2
1-10	HZ532708	Tape Guide A	TW-0005	2
1-11	HZ532697	Tape Guide Prop A	TW-0004	1
1-12	HZ532710	Tape Guide B	TW-0006	1
1-13	HZ532686	Head Base Prop A	TW-0003	3
1-14	HZ532721	Double-end Screw Prop	TW-0007	2
1-15	HP552194	P.B. HEAD P4-220	TW	2
1-16	HR556582	REC./ERASE HEAD RE4-6	TW-1	2
1-17x	HP552205	P.B. HEAD P2-100 (PRO)	TW-2	1
1-18x	HR552216	REC. HEAD R2-100 (PRO)	TW-2	1
1-19x	HE552914	ERASE HEAD EF-210 (PRO)	TW-2	1
1-20x	HZ533597	RH Angle (PRO)	TW-0201	1
1-21x	HZ533608	EH Angle (PRO)	TW-0202	1
1-22	ZW477876	Screw, pan head 2x3		8
1-23x	HZ540573	Terminal P.C. Board C	RD-A36	4
1-24	ZW537006	Screw, binding head 4x8		9
1-25	ZW536490	Screw, binding head 3x12		12
1-26	ZW396000	Screw, binding head 3x4		8
1-27	ZW430863	Washer (SPC)D3.3x6x0.5t		8
1-28	ZG540584	Angle Adjust Spring G	TW-0025	6
1-29	ZG364656	Angle Adjust Spring C	RD-57	6
1-30x	ZG382757	Angle Adjust Spring D (PRO)	RD-A12	3
1-31	ZG466312	Angle Adjust Spring E	BS-0018	1
1-32x	EZ432088	Nylon Clip HP-6N	2-7-40	1
1-33x	EA382713	Head Connector P.C. Board	RD-A8	1
1-34x	EA222096	Connector P.C. Board	RD-140	1
1-35x	EA432088	Nylon Clip HP-6N (PRO)	2-7-40	1
1-36	ZW516993	Nut M3		2
1-37	ZW416698	Nut M4		2

FIG. 2 ILLUSTRATION OF MAIN MOTOR BLOCK

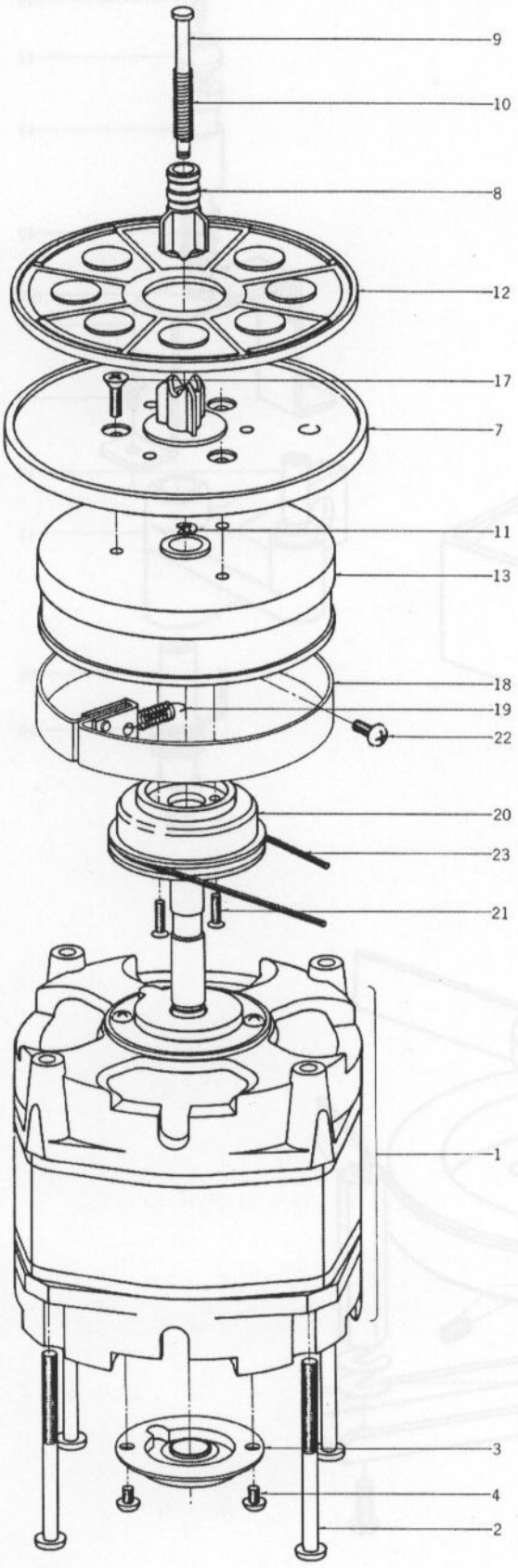


MAIN MOTOR (SCM3-16TW) BLOCK

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
2-1	BM552148	Main Motor (SCM3-16TW) Block Comp.	TW	1
2-2	ZW459167	48 Seal B	BS-7029	1
2-3	ZW384131	Screw, round head 3x5		6
2-4	ZW494741	Washer (Nylon)D7.9x12x1t		1
2-5	MZ532383	Retaining Base A	TW-7011	1
2-6	ZW537941	Screw, pan head 4x65, w/washer	7-1-54	4
2-7	MZ532451	Motor Retaining Plate	TW-7018	1
2-8	ZW424056	Screw, pan head 4x10		7
2-9	ZW532462	Motor Prop	TW-7019	3
2-10	MR532440	Pulley	TW-7017	1
2-11	ZW459033	Set Screw, hexagon socket 5x5(cup)		2
2-12	BZ556694	Detector Gear Block Comp.	TW	1
2-13	ZW537974	Screw, countersunk head 2x12		3
2-14x	ZW334653	'E' Ring 7M	6-1-9	1
2-15	SZ450720	Motor Fan	BS-7015	1
2-16	ZW391476	Set Screw, hexagon socket 4x4(cup)		2

When ordering parts, please describe Parts Number, Serial Number, and Model Number in detail.

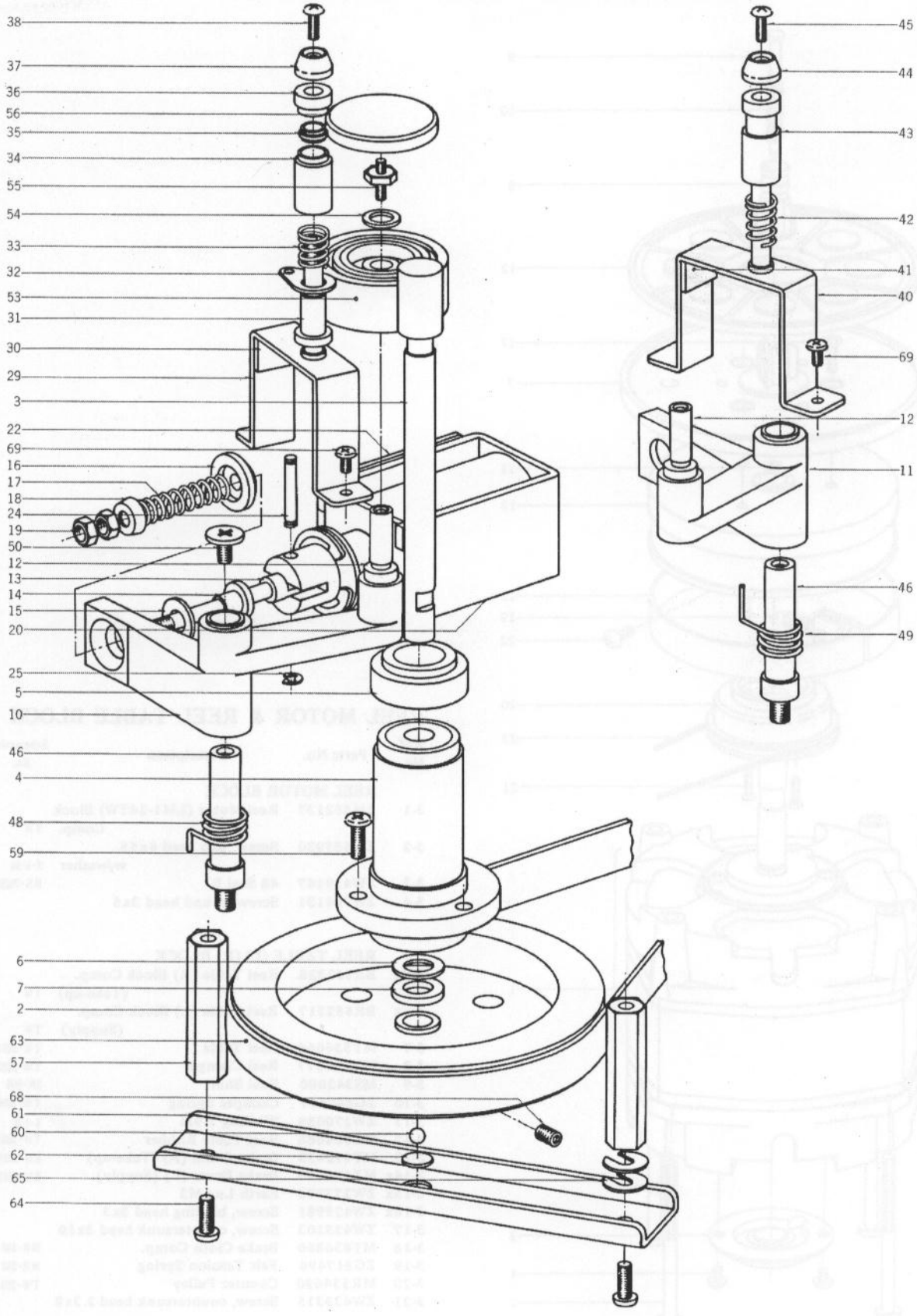
FIG. 3 ILLUSTRATION OF REEL MOTOR & REEL TABLE BLOCK



REEL MOTOR & REEL TABLE BLOCK

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
		REEL MOTOR BLOCK		
3-1	BM552137	Reel Motor (LM1-24TW) Block Comp.	TW	1
3-2	ZW537930	Screw, pan head 4x55, w/washer	7-1-54	4
3-3	ZW459167	48 Seal B	BS-7029	2
3-4	ZW384131	Screw, round head 3x5		4
		REEL TABLE (L) (R) BLOCK		
3-5x	BR552328	Reel Table (R) Block Comp. (Take-up)	TW	1
3-6x	BR552317	Reel Table (L) Block Comp. (Supply)	TW	1
3-7	MT534666	Reel Table	TW-2031	1
3-8	MT534677	Reel Clamper	TW-2032	1
3-9	MS342000	Reel Shaft	3R-108	1
3-10	ZG540617	Clamper Spring	TW-2096	1
3-11	ZW270088	'E' Ring 1.9M	6-1-9	1
3-12	MT534688	Reel Table Rubber	TW-2033	1
3-13	MT473433	Brake Drum (R) (Take-up)	KH-2031	1
3-14x	MT473444	Brake Drum (L) (Supply)	KH-2031	1
3-15x	ZW273778	Earth Lug M3		1
3-16x	ZW425981	Screw, binding head 3x3		1
3-17	ZW425103	Screw, countersunk head 3x10		3
3-18	MT436860	Brake Cloth Comp.	MR-269	1
3-19	ZG317496	Felt Tension Spring	MR-260	1
3-20	MR534690	Counter Pulley	TW-2034	1
3-21	ZW433315	Screw, countersunk head 2.3x8		2
3-22	ZW435273	Screw, binding head 4x10		4
3-23	MB533057	Counter Belt A (D119.1x1.4)	TW-1018	1
3-24x	MB533068	Counter Belt B (D91.8x1.2)	TW-1019	1

FIG. 4 ILLUSTRATION OF FLYWHEEL & PINCH ROLLER ARM BLOCK



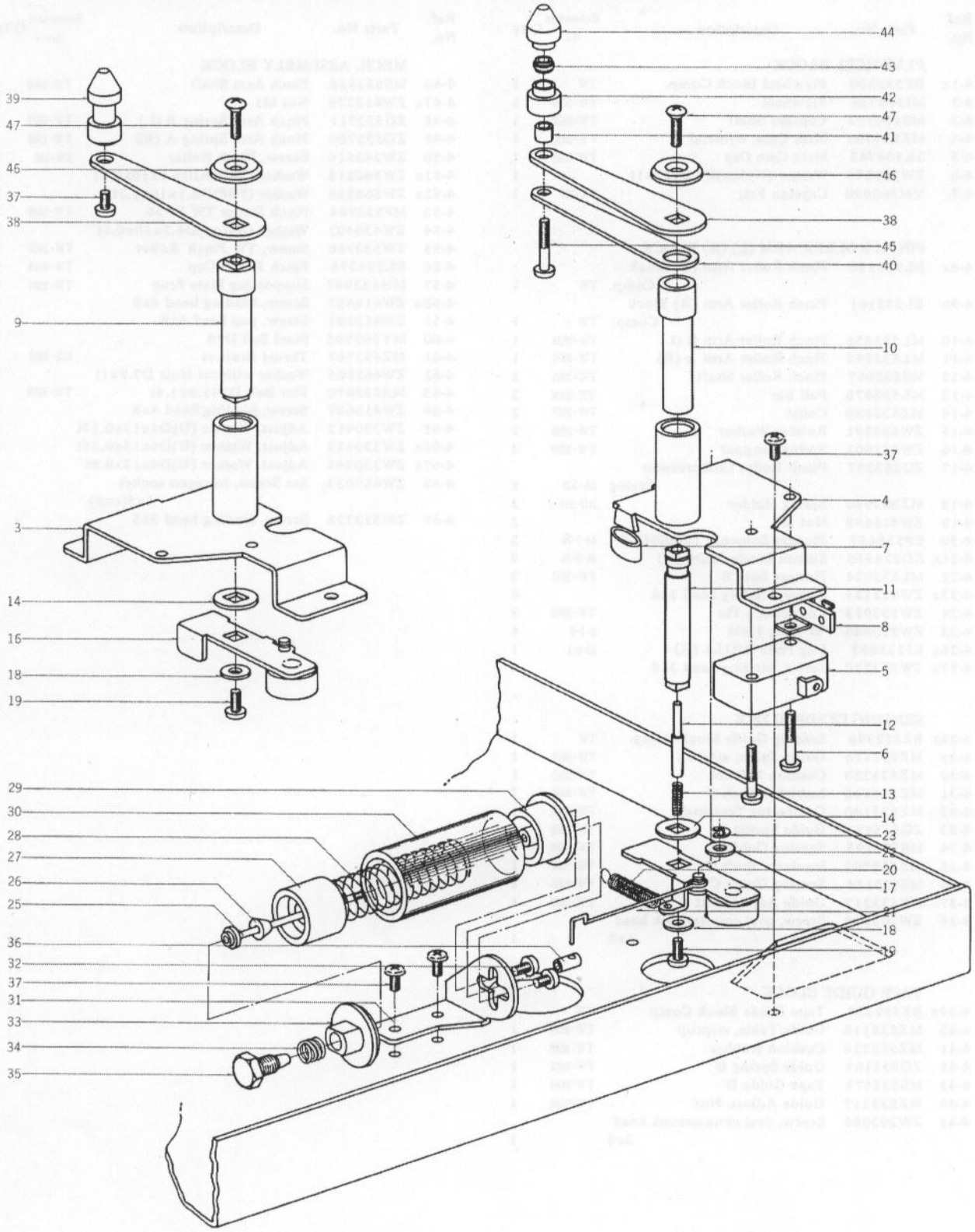
FLYWHEEL & PINCH ROLLER ARM BLOCK

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
	FLYWHEEL BLOCK			
4-1x	BF552330	Flywheel Block Comp.	TW	1
4-2	MI534734	Flywheel	TW-2040	1
4-3	MS534723	Capstan Shaft	TW-2038	1
4-4	MZ534701	Main Case, w/metal	TW-2035	1
4-5	SK534745	Main Case Cap	TW-2042	1
4-6	ZW260245	Washer (Nylon)D7.9x13x1t		1
4-7	VM360090	Capstan Felt	PX-217	1
	PINCH ROLLER ARM (L) (R) BLOCK			
4-8x	BL552150	Pinch Roller Arm (L) Block Comp.	TW	1
4-9x	BL552161	Pinch Roller Arm (R) Block Comp.	TW	1
4-10	ML533856	Pinch Roller Arm B (L)	TW-2003	1
4-11	ML533845	Pinch Roller Arm A (R)	TW-2001	1
4-12	MS533867	Pinch Roller Shaft	TW-2005	2
4-13	ML533878	Pull Bar	TW-2006	2
4-14	MZ533880	Collar	TW-2007	2
4-15	ZW533891	Rubber Washer	TW-2008	2
4-16	ZW533902	Spring Stopper	TW-2009	2
4-17	ZG243257	Pinch Roller Compression Spring	3A-346	2
4-18	MZ802980	Spring Holder	RD-276	2
4-19	ZW416698	Nut M4		2
4-20	EP538457	Plunger Solenoid 1660PHT-2	44-1-56	2
4-21x	ED224550	Silicon Diode 10D4 (R)	45-2-16	3
4-22	ML533924	Plunger Base B	TW-2011	2
4-23x	ZW413155	Screw, binding head 3x6		4
4-24	ZW533913	Connection Pin	TW-2010	2
4-25	ZW270088	'E' Ring 1.9M	6-1-9	4
4-26x	EJ255093	Lug Plate VB1L1 (R)	33-4-1	1
4-27x	ZW323728	Screw, binding head 3x5		1
	SENSING GUIDE BLOCK			
4-28x	BZ552396	Sensing Guide Block Comp.	TW	1
4-29	MZ535116	Guide Table, w/prop	TW-2079	1
4-30	MZ535228	Cushion Rubber	TW-2089	1
4-31	MZ535138	Insulator Bush C	TW-2081	1
4-32	MZ535140	Conductor Terminal	TW-2082	1
4-33	ZG535151	Guide Spring A	TW-2083	1
4-34	MS535195	Sensing Guide D	TW-2086	1
4-35	MZ535206	Insulator Bush D	TW-2087	1
4-36	MS535184	Sensing Guide C	TW-2085	1
4-37	MZ535217	Guide Adjust. Nut	TW-2088	1
4-38	ZW203084	Screw, oval countersunk head 3x8		1
	TAPE GUIDE BLOCK			
4-39x	BZ552385	Tape Guide Block Comp.	TW	1
4-40	MZ535116	Guide Table, w/prop	TW-2079	1
4-41	MZ535228	Cushion Rubber	TW-2089	1
4-42	ZG535162	Guide Spring B	TW-2083	1
4-43	MS535173	Tape Guide D	TW-2084	1
4-44	MZ535217	Guide Adjust. Nut	TW-2088	1
4-45	ZW203084	Screw, oval countersunk head 3x8		1

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
	MECH. ASSEMBLY BLOCK			
4-46	MS532956	Pinch Arm Shaft	TW-1006	2
4-47x	ZW413278	Nut M5		2
4-48	ZG533711	Pinch Arm Spring B (L)	TW-1037	1
4-49	ZG533700	Pinch Arm Spring A (R)	TW-1036	1
4-50	ZW243516	Screw, Pinch Roller	XR-140	2
4-51x	ZW560215	Washer (Teflon)D6.1x10x0.5t		2
4-52x	ZW560226	Washer (PBP)D6.1x10x0.2t		2
4-53	MP533744	Pinch Roller TW D=36	TW-1040	2
4-54	ZW430402	Washer (Nylon)D6.2x10x0.5t		2
4-55	ZW533766	Screw, TW Pinch Roller	TW-1042	2
4-56	SK534374	Pinch Roller Cap	TW-6019	2
4-57	MH532967	Supporting Plate Prop	TW-1007	4
4-58x	ZW416687	Screw, binding head 4x8		4
4-59	ZW413201	Screw, pan head 4x8		6
4-60	MV269965	Steel Ball D=4		2
4-61	MZ453767	Thrust Bracket	BS-1022	2
4-62	ZW462205	Washer without Hole D7.9x1t		2
4-63	MB533070	Flat Belt D241.5x1.6t	TW-1020	1
4-64	ZW416687	Screw, binding head 4x8		4
4-65	ZW330412	Adjust. Washer (U)D4x13x0.13t		2
4-66x	ZW330423	Adjust. Washer (U)D4x13x0.25t		2
4-67x	ZW330445	Adjust. Washer (U)D4x13x0.8t		2
4-68	ZW459033	Set Screw, hexagon socket 5x5(cup)		4
4-69	ZW323728	Screw, binding head 3x5		4

When ordering parts, please describe Parts Number, Serial Number, and Model Number in detail.

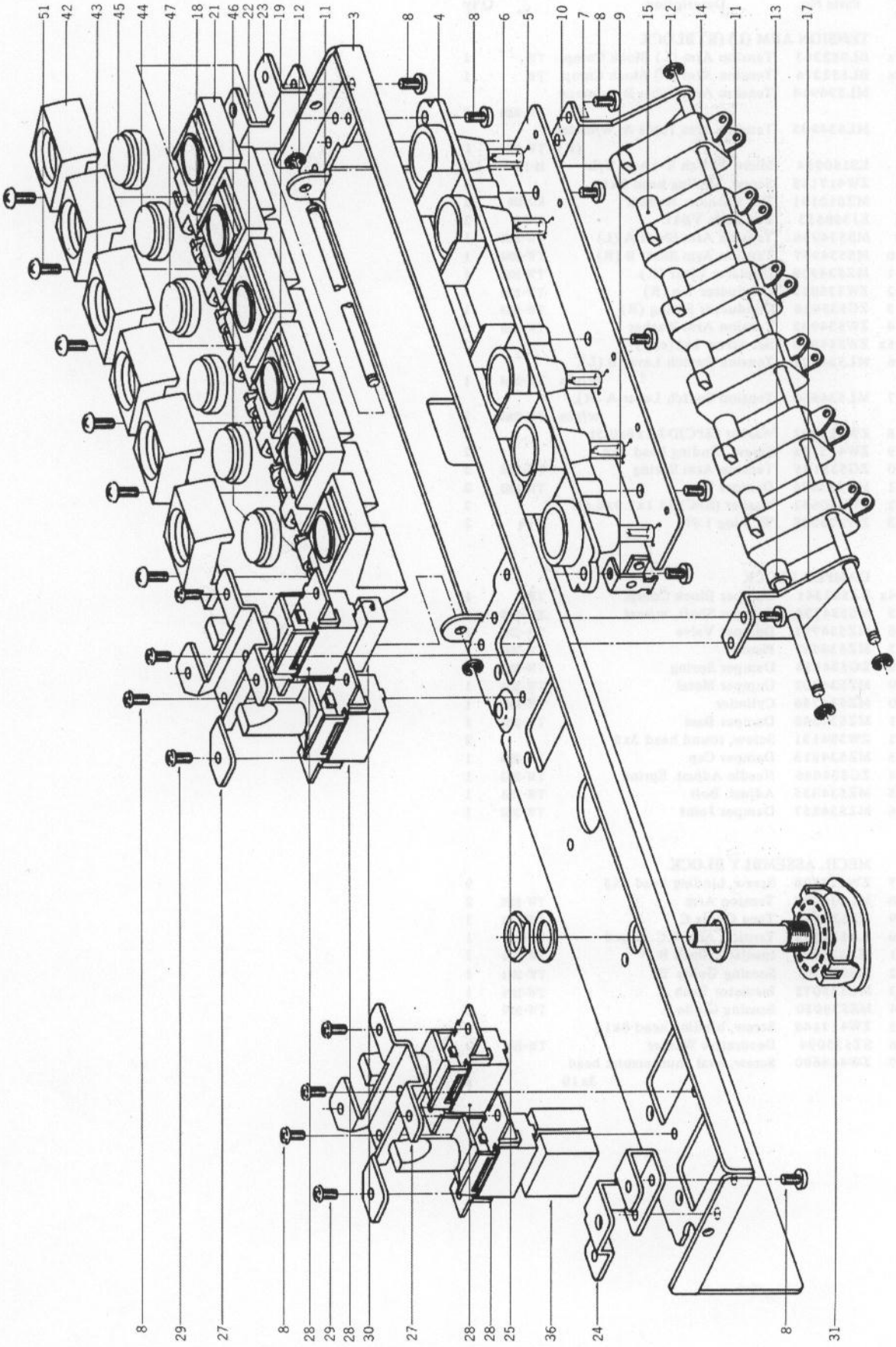
FIG. 5 ILLUSTRATION OF TENSION ARM & DAMPER BLOCK



TENSION ARM & DAMPER BLOCK

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
	TENSION ARM (L) (R) BLOCK			
5-1x	BL552363	Tension Arm (L) Block Comp.	TW	1
5-2x	BL552374	Tension Arm (R) Block Comp.	TW	1
5-3	ML534914	Tension Arm Table B, w/metal (L)	TW-2059	1
5-4	ML534903	Tension Arm Table A, w/metal (R)	TW-2059	1
5-5	ES250064	Micro Switch V-1A44 U/L	25-1-7	2
5-6	ZW417148	Screw, binding head 3x15		4
5-7	MZ810191	RD Cushion Rubber	RD-278	2
5-8	EJ368853	Lug Plate VB1L	33-4-8	2
5-9	MS534936	Tension Arm Shaft A (L)	TW-2061	1
5-10	MS534947	Tension Arm Shaft B (R)	TW-2062	1
5-11	MZ534958	Insulator Liner (R)	TW-2063	1
5-12	ZW535015	Conductor Pin (R)	TW-2068	1
5-13	ZG535026	Conductor Spring (R)	TW-2069	1
5-14	ZW534982	Tension Arm Washer	TW-2065	2
5-15x	ZW554005	Set Screw 2x2(cup)		2
5-16	ML534971	Tension Switch Lever B (L), w/pin	TW-2064	1
5-17	ML534960	Tension Switch Lever A (R), w/pin	TW-2064	1
5-18	ZW425002	Washer (SPC)D3.1x8x0.5t		2
5-19	ZW413155	Screw, binding head 3x6		2
5-20	ZG535105	Tension Arm Spring	TW-2078	2
5-21	MZ533676	Damper Wire	TW-1033	2
5-22	ZW550642	Washer (SPC)D3.1x7.9x0.5t		2
5-23	ZW270088	'E' Ring 1.9M	6-1-9	2
	DAMPER BLOCK			
5-24x	BZ552341	Damper Block Comp.	TW	1
5-25	MS534778	Damper Shaft, w/seat	TW-2045	1
5-26	MZ534791	Damper Valve	TW-2047	1
5-27	MZ534767	Piston	TW-2044	1
5-28	ZG534824	Damper Spring	TW-2050	1
5-29	MZ534802	Damper Metal	TW-2048	1
5-30	MZ534756	Cylinder	TW-2043	1
5-31	MZ534868	Damper Base	TW-2054	1
5-32	ZW384131	Screw, round head 3x5		2
5-33	MZ534813	Damper Cap	TW-2049	1
5-34	ZG534846	Needle Adjust. Spring	TW-2052	1
5-35	MZ534835	Adjust. Bolt	TW-2051	1
5-36	MZ534857	Damper Joint	TW-2053	1
	MECH. ASSEMBLY BLOCK			
5-37	ZW323728	Screw, binding head 3x5		9
5-38	ML535037	Tension Arm	TW-2070	2
5-39	MS533147	Tape Guide C	TW-2072	1
5-40	EA535048	Tension Arm P.C. Board	TW-2071	1
5-41	MZ535083	Insulator Bush B	TW-2076	1
5-42	MS535061	Sensing Guide B	TW-2074	1
5-43	MZ535072	Insulator Bush A	TW-2075	1
5-44	MS535050	Sensing Guide A	TW-2073	1
5-45	ZW417148	Screw, binding head 3x15		1
5-46	SZ535094	Decorative Washer	TW-2077	2
5-47	ZW408690	Screw, oval countersunk head 3x10		2

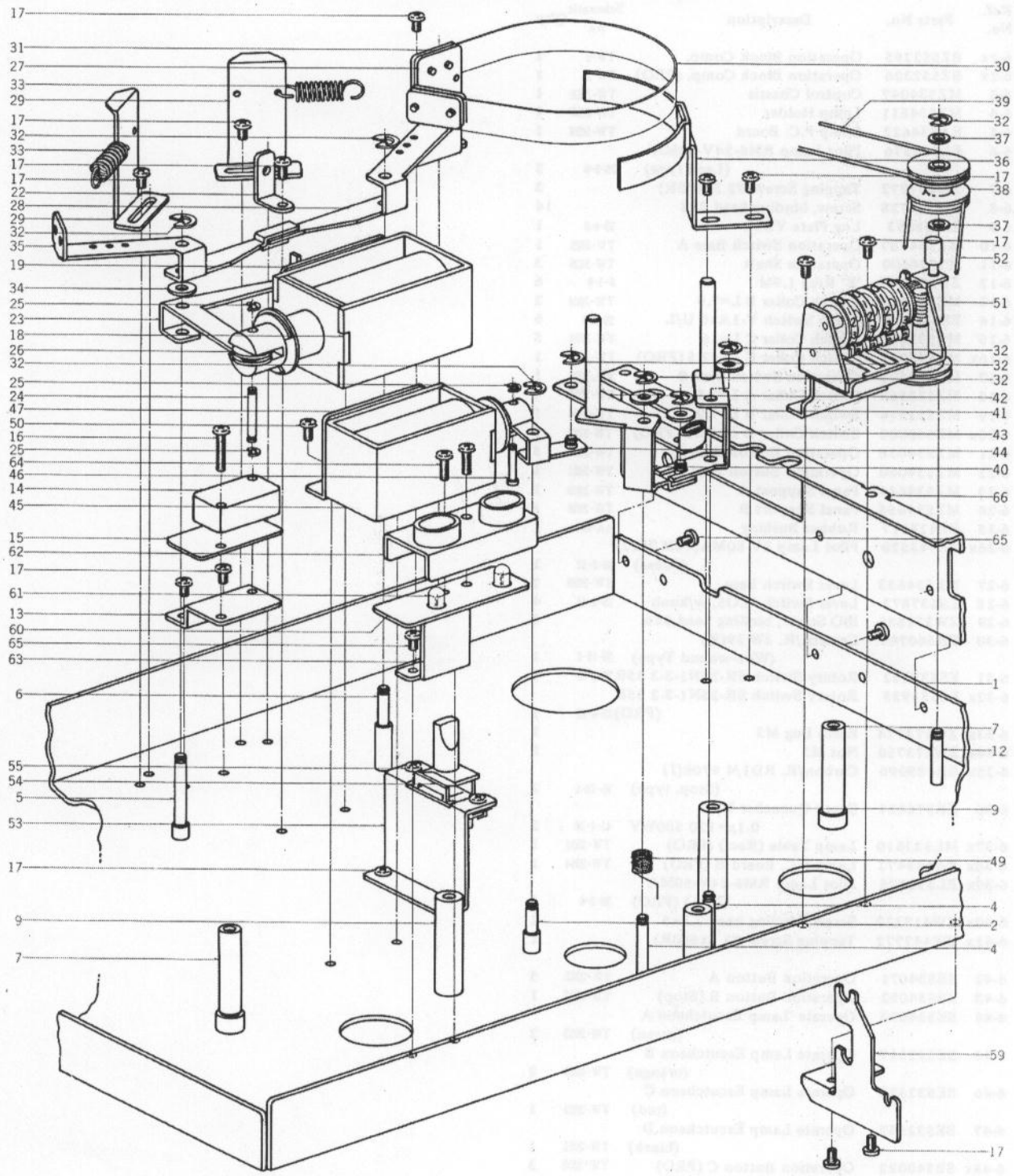
FIG. 6 ILLUSTRATION OF OPERATION BLOCK



OPERATION BLOCK

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
6-1x	BZ552295	Operation Block Comp.	TW-1	1
6-2x	BZ552306	Operation Block Comp. (PRO)	TW-2	1
6-3	MZ534047	Control Chassis	TW-2020	1
6-4	MZ534611	Lamp Holder	TW-2027	1
6-5	EA534622	Lamp P.C. Board	TW-2028	1
6-6	EL390576	Pilot Lamp RM6-24V-50MA (Lead type)	28-2-6	5
6-7	ZW447772	Tapping Screw #2 3x6(BR)		3
6-8	ZW323728	Screw, binding head 3x5		14
6-9	EJ368853	Lug Plate VB1L	33-4-8	1
6-10	MZ534587	Operation Switch Base A	TW-2025	1
6-11	MS534600	Operation Shaft	TW-2026	3
6-12	ZW270088	'E' Ring 1.9M	6-1-9	6
6-13	MZ532574	Switch Collar B L=7.9	TW-2024	2
6-14	ES250075	Micro Switch V-1A10 U/L	25-1-8	6
6-15	MZ532585	Switch Collar C L=16	TW-2024	5
6-16x	MZ540011	Switch Collar E L=42.5 (PRO)	TW-2202	1
6-17	MZ534598	Operation Switch Base B	TW-2025	1
6-18	MZ532563	Switch Collar A L=2.9	TW-2024	4
6-19	MZ532574	Switch Collar B L=7.9	TW-2024	1
6-20x	MZ540000	Switch Collar D L=32.8 (PRO)	TW-2202	1
6-21	MZ534058	Operation Button Base A	TW-2021	5
6-22	MZ534060	Operation Button Base B	TW-2021	1
6-23	MZ534644	Panel Support A	TW-2030	1
6-24	MZ534655	Panel Support B	TW-2030	1
6-25	EZ428117	Rubber Bushing	AA-801	1
6-26x	EL443520	Pilot Lamp 8V 80MA(60M/Mx2) (Pause)	28-2-22	1
6-27	ML534633	Lever Switch Base	TW-2029	2
6-28	ES537873	Lever Switch JLO5, w/knob	25-4-14	4
6-29	ZW371856	ISO Screw, binding head 3x5		8
6-30	ER560744	Cement/R. 3W 39(K) (Wire-wound Type)	35-16-2	1
6-31	ES538132	Rotary Switch SR-25N1-3-3 35R	25-6-49	1
6-32x	ES551935	Rotary Switch SR-25N1-3-2 35R (PRO)	25-6-62	1
6-33x	ZW273778	Earth Lug M3		1
6-34x	ZW273756	Nut M3		1
6-35x	ER429996	Carbon/R. RD1/4 470k(J) (Stop. type)	35-10-1	2
6-36	ER376424	Spark Quencher U/L 0.1μ+120 500WV	41-1-36	2
6-37x	ML533610	Lamp Table (Rec.) (PRO)	TW-2201	1
6-38x	EA549472	Lamp P.C. Board B (PRO)	TW-2204	1
6-39x	EL390576	Pilot Lamp RM6-24V-50MA (Rec.) (PRO)	28-2-6	1
6-40x	ZW417227	Screw, binding head 2.3x5		2
6-41x	ZW447772	Tapping Screw #2 3x6(BR)		1
6-42	SB534071	Operation Button A	TW-2022	5
6-43	SB534082	Operation Button B (Stop)	TW-2022	1
6-44	SE534093	Operate Lamp Escutcheon A (green)	TW-2023	2
6-45	SE532517	Operate Lamp Escutcheon B (orange)	TW-2023	2
6-46	SE532528	Operate Lamp Escutcheon C (red)	TW-2023	1
6-47	SE532552	Operate Lamp Escutcheon D (black)	TW-2023	1
6-48x	SB540022	Operation Button C (PRO)	TW-2203	3
6-49x	SB540033	Operation Button D (Stop) (PRO)	TW-2203	1
6-50x	SB540044	Operation Button E (Rec.) (PRO)	TW-2203	1
6-51	ZW447840	Tapping Screw #2 3x8(BR)		6

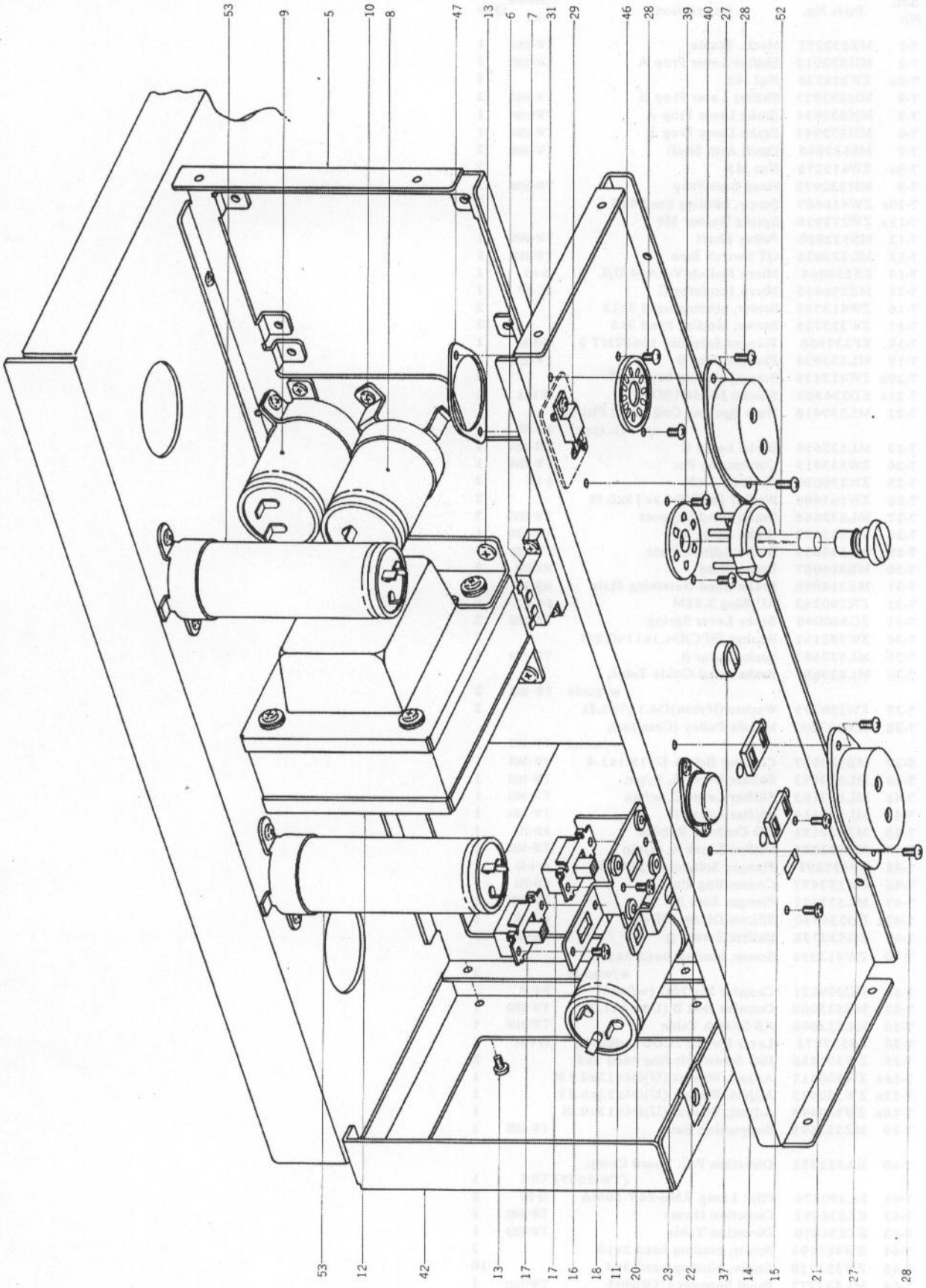
FIG. 7 ILLUSTRATION OF MECHANISM ASSEMBLY BLOCK



MECHANISM ASSEMBLY BLOCK

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
7-1	MZ532271	Mech. Frame	TW-1001	1
7-2	MH532912	Shifter Lever Prop A	TW-1002	1
7-3x	ZW273756	Nut M3		5
7-4	MH532923	Shifter Lever Prop B	TW-1003	2
7-5	MH532934	Brake Lever Prop A	TW-1004	1
7-6	MH532945	Brake Lever Prop B	TW-1005	1
7-7	MS532956	Pinch Arm Shaft	TW-1006	2
7-8x	ZW413278	Nut M5		2
7-9	MH532978	Head Base Prop	TW-1008	3
7-10x	ZW416687	Screw, binding head 4x8		7
7-11x	ZW273914	Spring Washer M4		3
7-12	MS532980	Pulley Shaft	TW-1009	1
7-13	ML533035	QT Switch Base	TW-1015	1
7-14	ES250064	Micro Switch V-1A44 U/L	25-1-7	1
7-15	MZ250413	Micro Insulator C	RC-127	1
7-16	ZW413785	Screw, binding head 3x12		2
7-17	ZW323728	Screw, binding head 3x5		33
7-18	EP537906	Plunger Solenoid 1660THT 2	44-1-54	1
7-19	ML533924	Plunger Base B	TW-2011	1
7-20x	ZW413155	Screw, binding head 3x6		2
7-21x	ED224550	Silicon Diode 10D4	45-2-16	1
7-22	ML237418	Hum Backing Coil Metal Fitting (L type)	M8-103	1
7-23	ML533654	Brake Lever C	TW-1031	1
7-24	ZW533913	Connecting Pin	TW-2010	1
7-25	ZW270088	'E' Ring 1.9M	6-1-9	3
7-26	ZW561486	Washer (BSP)D4.1x13x0.8t		2
7-27	ML533665	Brake Band Support	TW-1032	2
7-28	ML533632	Brake Lever A	TW-1029	1
7-29	ML543025	Brake Adjust. Plate	TW-1061	2
7-30	MB314987	Brake Band	MR-213	2
7-31	MZ314998	Brake Band Retaining Plate	MR-212	4
7-32	ZW290283	'U' Ring 2.85M	6-1-1	6
7-33	ZG540090	Brake Lever Spring	TW-1058	2
7-34	ZW382162	Washer (SPC)D4.1x11x0.25t		1
7-35	ML533643	Brake Lever B	TW-1030	1
7-36	ML533687	Brake Band Guide Table, w/guide	TW-1034	2
7-37	ZW259773	Washer (Nylon)D4.1x7x0.5t		2
7-38	MR533002	Middle Pulley (Counter), w/metal	TW-1012	1
7-39	MB533057	Counter Belt A D119.1x1.4	TW-1018	1
7-40	ML533092	Shifter Lever B, w/pin	TW-1022	1
7-41	ML533103	Shifter Lever C, w/pin	TW-1023	1
7-42	ML533114	Shifter Lever D	TW-1024	1
7-43	MZ810191	RD Cushion Rubber	RD-278	1
7-44	ML533081	Shifter Lever A, w/pin	TW-1021	1
7-45	EP537895	Plunger Solenoid 1254THT	44-1-53	1
7-46	ZW257477	Connecting Pin	RD-211	1
7-47	ML533621	Plunger Base A	TW-1028	1
7-48x	ED224550	Silicon Diode 10D4	45-2-16	1
7-49	ZG533733	Shifter Spring B	TW-1039	1
7-50	ZW413223	Screw, binding head 3x5, w/washer		2
7-51	MC399521	Counter M-470D (w/base)	9-1-14	1
7-52	MB533068	Counter Belt B (D91.8x1.2)	TW-1019	1
7-53	ML533046	RS Switch Table	TW-1016	1
7-54	ES537873	Lever Switch JLO5 (w/knob)	25-4-14	1
7-55	ZW371856	ISO Screw, binding head 3x5		2
7-56x	ZW330412	Adjust. Washer (U)D4x13x0.13t		1
7-57x	ZW330423	Adjust. Washer (U)D4x13x0.25t		1
7-58x	ZW330445	Adjust. Washer (U)D4x13x0.8t		1
7-59	MZ533698	Supporting Base	TW-1035	1
7-60	BA552352	Direction P.C. Board Comp. (TW-2057)	TW-1	1
7-61	EL390576	Pilot Lamp RM6-24V-50MA	28-2-6	2
7-62	EZ534892	Direction House	TW-2058	1
7-63	EZ534870	Direction Table	TW-2055	1
7-64	ZW417194	Screw, binding head 3x10		2
7-65	ZW323728	Screw, binding head 3x5		10
7-66	ML533777	Panel Support C (Right)	TW-1043	1
7-67x	ML533788	Panel Support D (Left)	TW-1043	1

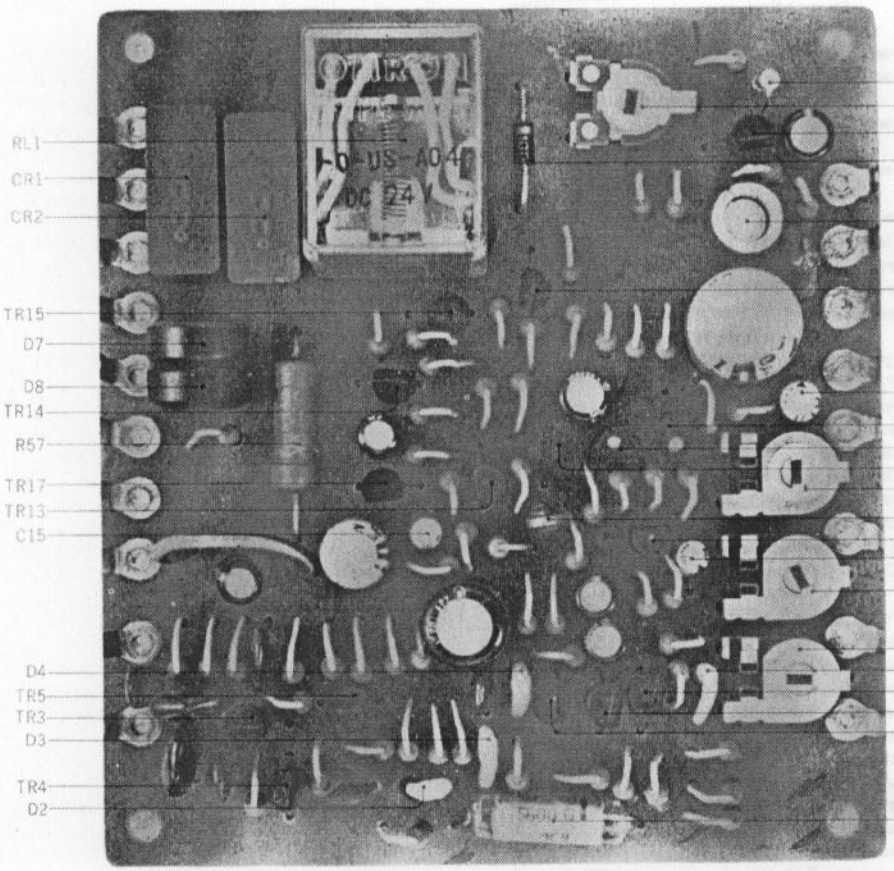
FIG. 8 ILLUSTRATION OF POWER SUPPLY BLOCK



POWER SUPPLY BLOCK

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
8-1x	BP552227	Power Supply Block Comp.	TW-1	1
8-2x	BP552240	Power Supply Block Comp. (3 core)	TW-1	1
8-3x	BP552238	Power Supply Block Comp. (PRO)	TW-2	1
8-4x	BP552251	Power Supply Block Comp. (PRO 3 core)	TW-2	1
8-5	MZ533935	Power Chassis	TW-2012	1
8-6	ED224572	Silicon Diode 5B2	45-2-20	1
8-7	ZW413741	Screw, binding head 3x8		6
8-8	ED557190	Elect./C. 470μF 16WV(Lug type)	24-10-88	1
8-9	EC368695	Elect./C. 2200μF 50WV (Lug type)	24-10-45	1
8-10	ZW447772	Tapping Screw #2 3x6(BR)		13
8-11	EC538018	MP/C. 4+1.5μF 150WV	24-9-71	1
8-12	BT538020	Power Trans. TWT-2	38-4-223	1
8-13	ZW416687	Screw, binding head 4x8		8
8-14	MZ533968	Rear Plate A	TW-2014	1
8-15	EJ378944	U/L AC Socket S-I 9122	31-1-47	2
8-16	EZ397304	Cycle Change Switch Plate A	KD-2043	1
8-17	ES479485	Slide Switch S-1	25-3-66	2
8-18	ZW371856	ISO Screw, binding head 3x5		2
8-19x	ZW327835	ISO Screw, countersunk head 3x5		2
8-20	EZ397124	Cycle Change Switch Plate B	KD-1055	1
8-21	ZW201150	Screw, truss head 3x6(black)		2
8-22	ET538007	Transistor 2SC792	45-1-139	1
8-23	ZW417194	Screw, binding head 3x10		2
8-24x	ZW273778	Earth Lug M3		2
8-25x	ZW273745	Spring Washer M3		1
8-26x	ZW273756	Nut M3		3
8-27	EZ534025	Transistor Cover	TW-2017	2
8-28	ZW201150	Screw, truss head 3x6(black)		4
8-29	ET393557	Transistor 2SD234(R)(O)	45-1-81	1
8-30x	EZ409836	Insulator Plate AC-221	45-1-90	1
8-31	EA534036	Transistor P.C. Board	TW-2019	1
8-32x	ZW413741	Screw, binding head 3x8		1
8-33x	ZW323728	Screw, binding head 3x5		10
8-34x	EW540112	AC Cord 2.5M(CUL)	26-3-19	1
8-35x	EZ315448	Australia Cord (3 core)	26-3-11	1
8-36x	EW524845	AC Cord 2.5M(J)	26-3-31	1
8-37	EZ382263	Strain Relief SR-4K-4	2-7-12	1
8-38x	EZ246936	Strain Relief SR-6W-1(3 core)	2-7-8	1
8-39	EJ233370	Power Plug Socket S-18010	40-2-3	1
8-40	ZW372025	ISO Screw, truss head 3x6		2
8-41x	MZ533946	Mech. Side Plate A (Left)	TW-2013	1
8-42	MZ533957	Mech. Side Plate B (Right)	TW-2013	1
8-43x	EZ534003	Connector Angle	TW-2015	1
8-44x	EJ347670	22P Multi-jack-3 3250-022-001S	31-4-13	2
8-45x	EJ364915	10P Multi-jack PB01-10S-24E2G	31-4-15	1
8-46	EJ222748	Sub Magnale Socket #311SG	31-1-39	1
8-47	MZ302400	Remo. Con. Socket Mt. Plate	RX-515	1
8-48x	EJ293073	12P Mate-N-Lock Plug Housing 1-480275-0	52-1-1	1
8-49x	EJ373634	Socket Contact 61115-1	52-1-1	17
8-50x	EJ368796	9P Mate-N-Lock Plug Housing 1-480274-0	52-1-2	1
8-51x	EJ205986	Cramp Terminal 2-SD	32-1-8	2
8-52	EF424811	Fuse ST-2 2.5A	39-1-26	1
8-53	EC537884	MP/C. 3.5+1μF 260WV (Lug type)	24-9-76	2

FIG. 9 PHOTO OF SERVO P.C. BOARD (TW-1049)

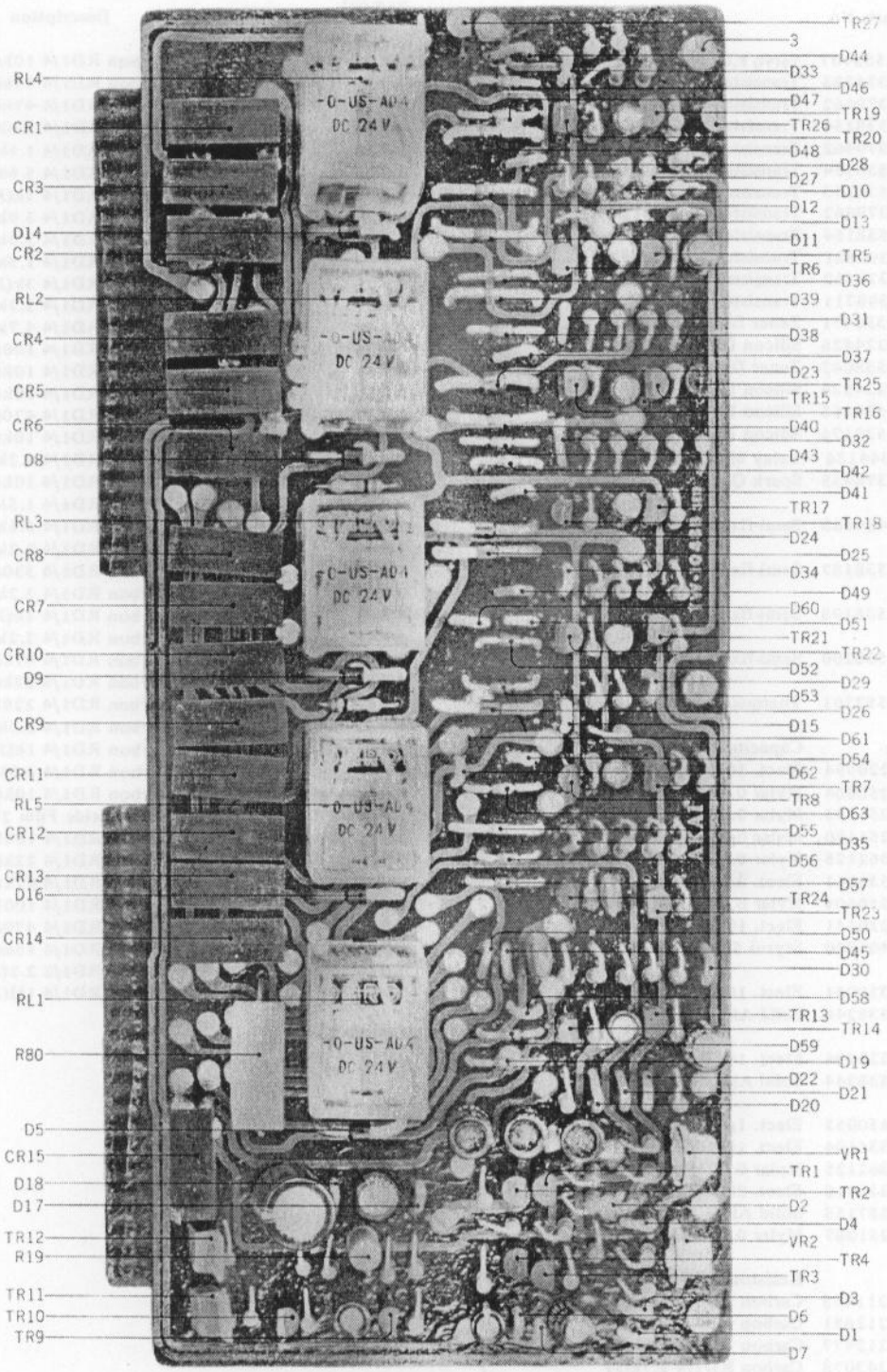


SERVO P.C. BOARD (TW-1049) BLOCK

Symbol No.	Parts No.	Description	Q'ty
9-1x	BA552407	Servo P.C. Board Comp.(TW-1049)	1
9-TR1	ET334383	Transistor 2SC971	1
9-TR2, 3	ET379462	Transistor 2SC711(D)(E)	2
9-TR4	ET538154	Transistor 2SA564(Q)(R)	1
9-TR5 to 8	ET379462	Transistor 2SC711(D)(E)	4
9-TR9	ET538154	Transistor 2SA564(Q)(R)	1
9-TR10, 11	ET538143	Transistor 2SC711 (E2-Special)	2
9-TR12	ET379462	Transistor 2SC711(D)(E)	1
9-TR13	ET538154	Transistor 2SA564(Q)(R)	1
9-TR14	ET399881	Transistor 2SC711(F)	1
9-TR15	ET379462	Transistor 2SC711(D)(E)	1
9-TR16, 17	ET398711	Transistor 2SC945(Q)(R)	2
9-D1	ED350471	Zener Diode RD-7A(N)	1
9-D2, 3, 4	ED224526	Silicon Diode 10D1	3
9-D5	ED538042	Zener Diode RD-7A(L)	1
9-D6	ED224526	Silicon Diode 10D1	1
9-D7	ED538165	Silicon Diode 10DC-2(red)	1
9-D8	ED538176	Silicon Diode 10DC-2(black)	1
9-RL1	EP344136	Relay MY4-0-US-AD4-24V	1
9-CR1, 2	ER376435	Spark Quencher U/L 0.1μ+120 250WV	2
9-VR1	EV484863	Semi-fixed Volume V10K8-4-2 1 kB	1
9-VR2	EV538187	Semi-fixed Volume V10K4H-4-2 5 kB	1
9-VR3	EV538198	Semi-fixed Volume V10K4H-4-2 10 kB	1
9-VR4	EV538200	Semi-fixed Volume V10K4H-4-2 30 kB	1
9-TH1	ED557201	Thermister 31D26	1
		Capacitor, Vertical Type	
9-C1	EC220994	Elect. 10μF 25WV	1
9-C2	EC250604	Mylar 0.001μF(K) 50WV	1
9-C3	EC251155	Mylar 0.033μF(K) 50WV	1
9-C4	EC251190	Mylar 0.056μF(K) 50WV	1
9-C5	EC362125	Mylar 0.0056μF(K) 50WV	1
9-C6	EC538211	Elect. 3.3μF 16WV	1
9-C7, 8	EC250604	Mylar 0.001μF(K) 50WV	2
9-C9	EC220151	Elect. 100μF 25WV	1
9-C10	EC406800	Styrol 5600PF(G) 50WV (Tub. type)	1
9-C11, 12	EC320051	Elect. 10μF 16WV	2
9-C13	EC538244	Solid Aluminum 0.47μF(M) 10WV	1
9-C14	EC220994	Elect. 10μF 25WV	1
9-C15	EC538244	Solid Aluminum 0.47μF(M) 10WV	1
9-C16	EC450055	Elect. 1μF 25WV	1
9-C17	EC336104	Elect. 100μF 6.3WV	1
9-C18	EC362125	Mylar 0.0056μF(K) 50WV	2
9-C19	EC336115	Elect. 220μF 25WV	1
9-C20	EC557155	Solid Aluminum 1μF(M) 10WV	1
9-C21	EC251087	Mylar 0.022μF(K) 50WV	1
		Resistor, Stopper Type	
9-R1	ER211465	Carbon RD1/4 1k(J)	1
9-R2	ER212681	Carbon RD1/4 330(J)	1
9-R3	ER212477	Carbon RD1/4 3.3k(J)	1
9-R4	ER343078	Carbon RD1/4 2.7k(J)	1
9-R5	ER211320	Carbon RD1/4 1.5k(J)	1
9-R6	ER336442	Carbon RD1/4 10k(J)	1
9-R7	ER349907	Carbon RD1/4 33k(J)	1
9-R8	ER430108	Carbon RD1/4 910(J)	1
9-R9	ER357456	Carbon RD1/4 2.2k(J)	1
9-R10	ER212477	Carbon RD1/4 3.3k(J)	1
9-R11	ER304290	Carbon RD1/4 10(J)	1
9-R12,13,14	ER336442	Carbon RD1/4 10k(J)	3
9-R15	ER212264	Carbon RD1/4 22k(J)	1
9-R16	ER349907	Carbon RD1/4 33k(J)	1
9-R17	ER212264	Carbon RD1/4 22k(J)	1
9-R18	ER212883	Carbon RD1/4 4.7k(J)	1
9-R19, 20	ER212264	Carbon RD1/4 22k(J)	2

Symbol No.	Parts No.	Description	Q'ty
9-R21	ER336442	Carbon RD1/4 10k(J)	1
9-R22	ER306887	Carbon RD1/4 15k(J)	1
9-R23	ER346601	Carbon RD1/4 47k(J)	1
9-R24	ER213030	Carbon RD1/4 5.6k(J)	1
9-R25	ER211320	Carbon RD1/4 1.5k(J)	1
9-R26	ER213030	Carbon RD1/4 5.6k(J)	1
9-R27	ER211465	Carbon RD1/4 1k(J)	1
9-R28	ER352045	Carbon RD1/4 3.9k(J)	1
9-R29	ER212477	Carbon RD1/4 3.3k(J)	1
9-R30	ER211320	Carbon RD1/4 1.5k(J)	1
9-R31	ER346544	Carbon RD1/4 3k(J)	1
9-R32	ER357456	Carbon RD1/4 2.2k(J)	1
9-R33	ER212883	Carbon RD1/4 4.7k(J)	1
9-R34	ER211757	Carbon RD1/4 100k(J)	1
9-R35	ER336442	Carbon RD1/4 10k(J)	1
9-R36	ER336442	Carbon RD1/4 10k(J)	1
9-R37	ER304402	Carbon RD1/4 470(J)	1
9-R38, 39	ER336442	Carbon RD1/4 10k(J)	2
9-R40	ER306843	Carbon RD1/4 1.2k(J)	1
9-R41	ER336442	Carbon RD1/4 10k(J)	1
9-R42	ER430007	Carbon RD1/4 1.5M(J)	1
9-R43	ER213030	Carbon RD1/4 5.6k(J)	1
9-R44	ER357456	Carbon RD1/4 2.2k(J)	1
9-R45	ER212681	Carbon RD1/4 330(J)	1
9-R46	ER357456	Carbon RD1/4 2.2k(J)	1
9-R47	ER211465	Carbon RD1/4 1k(J)	1
9-R48	ER357456	Carbon RD1/4 2.2k(J)	1
9-R49	ER346601	Carbon RD1/4 47k(J)	1
9-R50	ER212264	Carbon RD1/4 22k(J)	1
9-R51	ER380711	Carbon RD1/4 220k(J)	1
9-R52	ER212477	Carbon RD1/4 3.3k(J)	1
9-R53, 54	ER211465	Carbon RD1/4 1k(J)	2
9-R55	ER212477	Carbon RD1/4 3.3k(J)	1
9-R56	ER336442	Carbon RD1/4 10k(J)	1
9-R57	ER427241	Metal Oxide Film 2W 330(K)	1
9-R58	ER211757	Carbon RD1/4 100k(J)	1
9-R59	ER212264	Carbon RD1/4 22k(J)	1
9-R60	ER346601	Carbon RD1/4 47k(J)	1
9-R61	ER211757	Carbon RD1/4 100k(J)	1
9-R62	ER304402	Carbon RD1/4 470(J)	1
9-R63	ER212016	Carbon RD1/4 150(J)	1
9-R64	ER554681	Carbon RD1/2 2.2(J) (Insu. type)	1
9-R65	ER419040	Carbon RD1/4 1M(J)	1

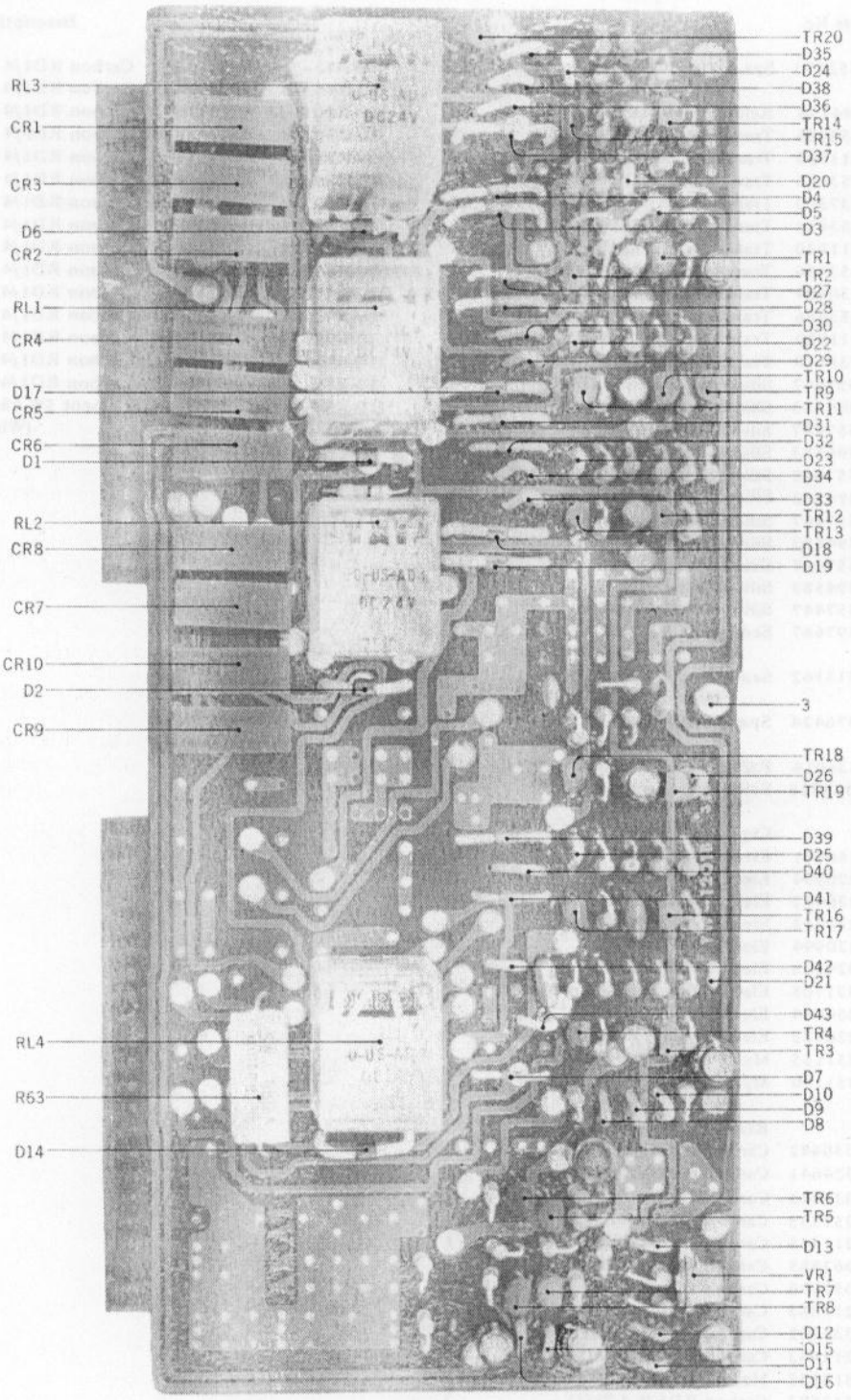
FIG. 10 PHOTO OF SYS. CON. P.C. BOARD (TW-1048)



SYS. CON. P.C. BOARD (TW-1048) BLOCK

Symbol No.	Parts No.	Description	Q'ty
10-1x	BA552273	Sys. Con. P.C. Board Comp. (TW-1048)	1
10-RL1 t0 5	EP344136	Relay MY4-O-US-AD4-24V	5
10-TR1 to 7	ET453486	Transistor 2SC711(E)(F)	7
10-TR8, 9	ET511920	Transistor 2SC1247A(B)(V)	2
10-TR10	ET453486	Transistor 2SC711(E)(F)	1
10-TR11, 12	ET537300	Transistor 2SD361(D)(E)	2
10-TR13	ET453486	Transistor 2SC711(E)(F)	1
10-TR14	ET511920	Transistor 2SC1247A(B)(V)	1
10-TR15,16,17	ET453486	Transistor 2SC711(E)(F)	3
10-TR18	ET430907	Transistor 2SC1211(C)(D)	1
10-TR19 to23	ET453486	Transistor 2SC711(E)(F)	5
10-TR24	ET511920	Transistor 2SC1247A(B)(V)	1
10-TR25,26,27	ET538110	Transistor 2SA628(D)(E)	3
10-D1 to 4	ED557447	Silicon Diode 1S1588	4
10-D5	ED494583	Silicon Diode 10D05	3
10-D6,7	ED557447	Silicon Diode 1S1588	2
10-D8, 9	ED494583	Silicon Diode 10D05	2
10-D10 to 13	ED557447	Silicon Diode 1S1588	4
10-D14	ED494583	Silicon Diode 10D05	1
10-D15	ED557447	Silicon Diode 1S1588	1
10-D16	ED494583	Silicon Diode 10D05	1
10-D17 to 22	ED557447	Silicon Diode 1S1588	6
10-D23 to 26	ED494583	Silicon Diode 10D05	4
10-D27 to 63	ED557447	Silicon Diode 1S1588	37
10-VR1	EV497687	Semi-fixed Volume V10K8-1-5 50 kB(4US)	1
10-VR2	EV513562	Semi-fixed Volume V10K8-1-5 100 kB(4US)	1
10-CR1 to 15	ER376424	Spark Quencher U/L 0.1μ+120 500WV	15
10-2x	EZ534014	P.C. Board Angle	1
10-3	ZW323728	Screw, binding head 3x5	3
		Capacitor, Vertical Type	
10-C1,2,3	EC456041	Elect. 33μF 25WV	3
10-C4,5,6	EC220994	Elect. 10μF 25WV	3
10-C7, 8	EC220432	Elect. 2.2μF 25WV	2
10-C9	EC220612	Elect. 33μF 25WV	1
10-C10	EC220994	Elect. 10μF 25WV	1
10-C11	EC324538	Elect. 330μF 25WV	1
10-C12	EC331705	Elect. 22μF 16WV	1
10-C13	EC350684	Elect. 22μF 25WV	1
10-C14 to 17	EC220432	Elect. 2.2μF 25WV	4
10-C18	EC251155	Mylar 0.033μF(K) 50WV	1
10-C19	EC251190	Mylar 0.056μF(K) 50WV	1
		Resistor, Stopper Type	
10-R1, 2	ER336442	Carbon RD1/4 10k(J)	2
10-R3, 4	ER324641	Carbon RD1/4 1k(J) (Insu. type)	2
10-R5	ER336442	Carbon RD1/4 10k(J)	1
10-R6	ER357535	Carbon RD1/4 39k(J)	1
10-R7	ER211465	Carbon RD1/4 1k(J)	1
10-R8	ER362485	Carbon RD1/4 330k(J)	1
10-R9	ER357570	Carbon RD1/4 150k(J)	1
10-R10, 11	ER212883	Carbon RD1/4 4.7k(J)	1
10-R12, 13	ER336442	Carbon RD1/4 10k(J)	2
10-R14 to 18	ER212883	Carbon RD1/4 4.7k(J)	5
10-R19	ER515125	Metal Oxide Film 2W 680(K)	1
10-R20,21,22	ER212883	Carbon RD1/4 4.7k(J)	3
10-R23, 24	ER357456	Carbon RD1/4 2.2k(J)	2
10-R25, 26	ER211465	Carbon RD1/4 1k(J)	2
10-R27, 28	ER213030	Carbon RD1/4 5.6k(J)	2
10-R29, 30	ER211465	Carbon RD1/4 1k(J)	2
10-R31	ER213030	Carbon RD1/4 5.6k(J)	1
10-R32, 33	ER212883	Carbon RD1/4 4.7k(J)	2
10-R34	ER357456	Carbon RD1/4 2.2k(J)	1
10-R35	ER211465	Carbon RD1/4 1k(J)	1
10-R36	ER336442	Carbon RD1/4 10k(J)	1
10-R37	ER349907	Carbon RD1/4 33k(J)	1
10-R38	ER212883	Carbon RD1/4 4.7k(J)	1
10-R39, 40	ER211465	Carbon RD1/4 1k(J)	2
10-R41	ER213030	Carbon RD1/4 5.6k(J)	1
10-R42	ER211465	Carbon RD1/4 1k(J)	1
10-R43	ER213030	Carbon RD1/4 5.6k(J)	1
10-R44, 45	ER211465	Carbon RD1/4 1k(J)	2
10-R46 to 55	ER212883	Carbon RD1/4 4.7k(J)	10
10-R56, 57	ER213030	Carbon RD1/4 5.6k(J)	2
10-R58, 59	ER211465	Carbon RD1/4 1k(J)	2
10-R60, 61	ER213030	Carbon RD1/4 5.6k(J)	2
10-R62, 63	ER211465	Carbon RD1/4 1k(J)	2
10-R64, 65	ER213030	Carbon RD1/4 5.6k(J)	2
10-R66, 67	ER211465	Carbon RD1/4 1k(J)	2
10-R68, 69	ER213030	Carbon RD1/4 5.6k(J)	2
10-R70, 71	ER211465	Carbon RD1/4 1k(J)	2
10-R72, 73	ER213030	Carbon RD1/4 5.6k(J)	2
10-R74, 75	ER211465	Carbon RD1/4 1k(J)	2
10-R76,77,78	ER357456	Carbon RD1/4 2.2k(J)	3
10-R79	ER346601	Carbon RD1/4 47k(J)	1
10-R80	ER551924	Cement 5W 68(K) (Wire-wound type)	1

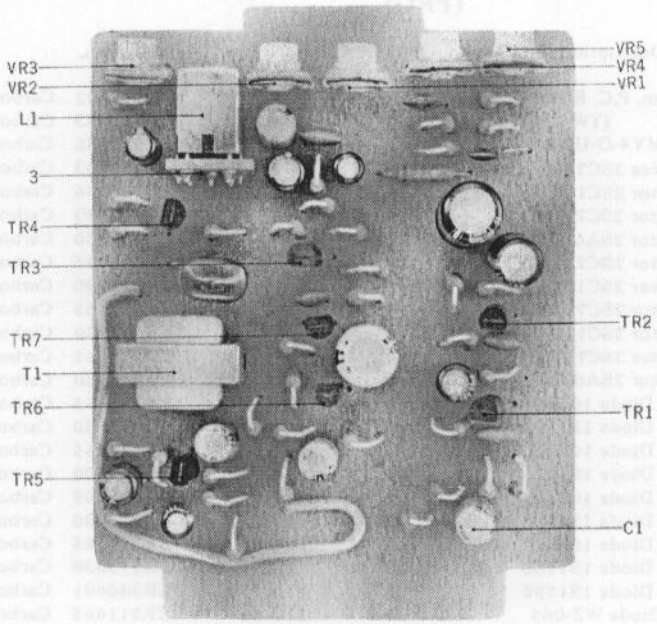
FIG. 11 PHOTO OF SYS. CON. P.C. BOARD (TW-1201) (PRO)



SYS. CON. P.C. BOARD (TW-1201) BLOCK (PRO)

Symbol No.	Parts No.	Description	Q'ty
11-1x	BA552284	Sys. Con. P.C. Board Comp. (TW-1201) (PRO)	1
11-RL1 to 4	EP344136	Relay MY4-O-US-AD4-24V	4
11-TR1,2,3	ET453486	Transistor 2SC711(E)(F)	3
11-TR4	ET511920	Transistor 2SC1247A(B)(V)	2
11-TR5 to 8	ET453486	Transistor 2SC711(E)(F)	4
11-TR9	ET538110	Transistor 2SA628(D)(E)	1
11-TR10,11,12	ET453486	Transistor 2SC711(E)(F)	3
11-TR13	ET430907	Transistor 2SC1211(C)(D)	1
11-TR14,15,16	ET453486	Transistor 2SC711(E)(F)	3
11-TR17	ET511920	Transistor 2SC1247A(B)(V)	1
11-TR18, 19	ET453486	Transistor 2SC711(E)(F)	2
11-TR20	ET538110	Transistor 2SA628(D)(E)	1
11-D1, 2	ED494583	Silicon Diode 10D05	2
11-D3,4,5	ED557447	Silicon Diode 1S1588	3
11-D6	ED494583	Silicon Diode 10D05	1
11-D7 to 13	ED557447	Silicon Diode 1S1588	7
11-D14	ED494583	Silicon Diode 10D05	1
11-D15, 16	ED557447	Silicon Diode 1S1588	2
11-D17,18,19	ED494583	Silicon Diode 10D05	3
11-D20 to 39	ED557447	Silicon Diode 1S1588	20
11-D42, 43	ED557447	Silicon Diode 1S1588	2
11-D44	ED555895	Zener Diode WZ-065	1
11-VR1	EV513562	Semi-fixed Volume V10K8-1-5 100 kB(4US)	1
11-CR1 to 10	ER376424	Spark Quencher U/L 0.1μ+120 500WV	10
11-2x	EZ534014	P.C. Borad Angle	1
11-3	ZW323728	Screw, binding head 3x5	3
		Capacitor, Vertical Type	
11-C1	EC220994	Elect. 10μF 25WV	1
11-C2	EC220432	Elect. 2.2μF 25WV	1
11-C3	EC331705	Elect. 22μF 16WV	1
11-C4	EC350684	Elect. 22μF 25WV	1
11-C5	EC456041	Elect. 33μF 25WV	1
11-C6, 7	EC220994	Elect. 10μF 25WV	2
11-C8,9,10	EC220432	Elect. 2.2μF 25WV	3
11-C11	EC251155	Mylar 0.033μF(K) 50WV	1
11-C12	EC220994	Elect. 10μF 25WV	1
11-C14	EC250885	Mylar 0.01μF(K) 50WV	1
11-C15	EC251190	Mylar 0.056μF(K) 50WV	1
11-C16	EC250885	Mylar 0.01μF(K) 50WV	1
		Resistor, Stopper Type	
11-R1 to 5	ER212883	Carbon RD1/4 4.7k(J)	5
11-R6	ER324641	Carbon RD1/4 1k(J)(Insu. type)	1
11-R7,8,9	ER212883	Carbon RD1/4 4.7k(J)	3
11-R10, 11	ER357456	Carbon RD1/4 2.2k(J)	2
11-R12	ER211465	Carbon RD1/4 1k(J)	1
11-R13	ER213030	Carbon RD1/4 5.6k(J)	1
11-R14	ER211465	Carbon RD1/4 1k(J)	1
11-R15	ER213030	Carbon RD1/4 5.6k(J)	1
11-R16	ER211465	Carbon RD1/4 1k(J)	1
11-R17	ER213030	Carbon RD1/4 5.6k(J)	1
11-R18, 19	ER211465	Carbon RD1/4 1k(J)	2
11-R20	ER336442	Carbon RD1/4 10k(J)	1
11-R21	ER357535	Carbon RD1/4 39k(J)	1
11-R22	ER211465	Carbon RD1/4 1k(J)	1
11-R23	ER362485	Carbon RD1/4 330k(J)	1
11-R24	ER357570	Carbon RD1/4 150k(J)	1
11-R25	ER336442	Carbon RD1/4 10k(J)	1
11-R26	ER212883	Carbon RD1/4 4.7k(J)	1
11-R27	ER336442	Carbon RD1/4 10k(J)	1
11-R28	ER212883	Carbon RD1/4 4.7k(J)	1
11-R29	ER357456	Carbon RD1/4 2.2k(J)	1
11-R30 t0 35	ER212883	Carbon RD1/4 4.7k(J)	6
11-R36	ER357456	Carbon RD1/4 2.2k(J)	1
11-R37, 38	ER212883	Carbon RD1/4 4.7k(J)	2
11-R39	ER213030	Carbon RD1/4 5.6k(J)	1
11-R40	ER211465	Carbon RD1/4 1k(J)	1
11-R41	ER213030	Carbon RD1/4 5.6k(J)	1
11-R42	ER211465	Carbon RD1/4 1k(J)	1
11-R43	ER213030	Carbon RD1/4 5.6k(J)	1
11-R44	ER211465	Carbon RD1/4 1k(J)	1
11-R45	ER213030	Carbon RD1/4 5.6k(J)	1
11-R46	ER211465	Carbon RD1/4 1k(J)	1
11-R47	ER213030	Carbon RD1/4 5.6k(J)	1
11-R48	ER211465	Carbon RD1/4 1k(J)	1
11-R49	ER213030	Carbon RD1/4 5.6k(J)	1
11-R50	ER211465	Carbon RD1/4 1k(J)	1
11-R51	ER213030	Carbon RD1/4 5.6k(J)	1
11-R52	ER211465	Carbon RD1/4 1k(J)	1
11-R53	ER213030	Carbon RD1/4 5.6k(J)	1
11-R54	ER346601	Carbon RD1/4 47k(J)	1
11-R55	ER211465	Carbon RD1/4 1k(J)	1
11-R56	ER212883	Carbon RD1/4 4.7k(J)	1
11-R57	ER336442	Carbon RD1/4 10k(J)	1
11-R58	ER212883	Carbon RD1/4 4.7k(J)	1
11-R59	ER336442	Carbon RD1/4 10k(J)	1
11-R60	ER212264	Carbon RD1/4 22k(J)	1
11-R61	ER336442	Carbon RD1/4 10k(J)	1
11-R62	ER212883	Carbon RD1/4 4.7k(J)	1
11-R63	ER551924	Cement 5W 68(K) (Wire-wound type)	1

FIG. 12 PHOTO OF P.B. AMP. P.C. BOARD (TW-5032)



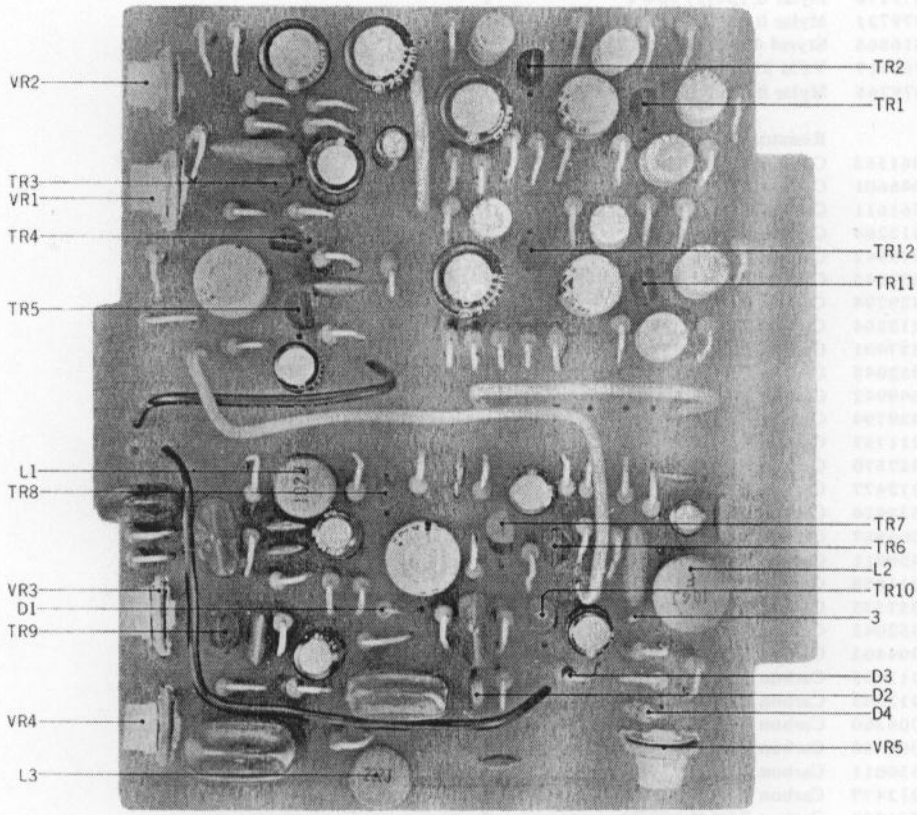
P.B. AMP. P.C. BOARD (TW-5032) BLOCK

Symbol No.	Parts No.	Description	Q'ty
12-1x	BA552532	P.B. Amp. P.C. Board Comp. (TW-5032)	1
12-2x	BA552543	P.B. Amp. P.C. Board Comp. (TW-5032) (PRO)	1
12-TR1	ET459810	Transistor 2SC1222(E)(F)	1
12-TR2	ET460912	Transistor 2SA640(L)(M)	1
12-TR3	ET459810	Transistor 2SC1222(E)(F)	1
12-TR4, 5	ET398788	Transistor 2SC945(R)	2
12-TR6	ET520277	Transistor 2SC1247A(B)	1
12-TR7	ET460912	Transistor 2SA640(L)(M)	1
12-VR1, 2	EV497687	Semi-fixed Volume V10K8-1-5 50 kB(4US)	2
12-VR3	EV498060	Semi-fixed Volume V10K8-1-5 2 kB(4US)	1
12-VR4, 5	EV538402	Semi-fixed Volume V10K8-1-5 30 kB(4US)	2
12-L1	EO346230	Inductor RX 22MH	1
12-T1	BT247746	Head Phone Trans. N19-228S	1
12-3	EA496258	Inductor P.C. Board	1
		Capacitor, Vertical Type	
12-C1	EC557166	Solid Aluminum 3.3μF 25WV	1
12-C2	EC220590	Elect. 33μF 10WV	1
12-C3	EC220105	Elect. 100μF 10WV	1
12-C4	EC220994	Elect. 10μF 25WV	1
12-C5	EC220151	Elect. 100μF 25WV	1
12-C6	EC450527	Elect. 4.7μF 25WV	1
12-C7	EC220590	Elect. 33μF 10WV	1
12-C8	EC336126	Elect. 47μF 25WV	1
12-C9	EC220994	Elect. 10μF 25WV	1
12-C10	EC450527	Elect. 4.7μF 25WV	1
12-C11	EC220432	Elect. 2.2μF 25WV	1
12-C12	EC220994	Elect. 10μF 25WV	1
12-C13	EC220590	Elect. 33μF 10WV	1
12-C14	EC250841	Mylar 0.01μF(J) 50WV	1
12-C15	EC538435	Mylar 0.22μF(J) 50WV	1
12-C16	EC336194	VFM 270PF(J) 50WV	1
12-C17	EC392332	VFM 82PF(J) 50WV	1
12-C18	EC399565	VFM 22PF(J) 50WV	1
12-C19	EC350875	Mylar 0.001μF(J) 50WV	1
12-C19	EC389474	Mylar 0.0015μF(J) 50WV (PRO)	1
12-C20	EC290520	VFM 100PF(J) 50WV	1
12-C20	EC350616	VFM 50PF(J) 50WV (PRO)	1

Symbol No.	Parts No.	Description	Q'ty
		Resistor, Stopper Type	
12-R1	ER346601	Carbon RD1/4 47k(J)	1
12-R1	ER361528	Carbon RD1/4 56k(J) (PRO)	1
12-R2	ER538413	Carbon RD1/4 1.3M(J)NL	1
12-R3	ER212477	Carbon RD1/4 3.3k(J)	1
12-R4	ER427083	Carbon RD1/4 330k(J)NL	1
12-R5	ER424855	Carbon RD1/4 150k(J)NL	1
12-R6	ER538424	Carbon RD1/4 120k(J)NL	1
12-R7	ER361563	Carbon RD1/4 180(J)	1
12-R8	ER211858	Carbon RD1/4 12k(J)	1
12-R9	ER349942	Carbon RD1/4 8.2k(J)	1
12-R10	ER427083	Carbon RD1/4 330k(J)NL	1
12-R11	ER212883	Carbon RD1/4 4.7k(J)	1
12-R12	ER211757	Carbon RD1/4 100k(J)	1
12-R13	ER426857	Carbon RD1/4 270k(J)	1
12-R14	ER212477	Carbon RD1/4 3.3k(J)	1
12-R15, 16	ER346601	Carbon RD1/4 47k(J)	2
12-R17	ER357456	Carbon RD1/4 2.2k(J)	1
12-R18	ER450011	Carbon RD1/4 120k(J)	1
12-R19	ER213030	Carbon RD1/4 5.6k(J)	1
12-R20	ER346994	Carbon RD1/4 18k(J)	1
12-R21	ER211320	Carbon RD1/4 1.5k(J)	1
12-R22	ER336442	Carbon RD1/4 10k(J)	1
12-R23, 24	ER357456	Carbon RD1/4 2.2k(J)	2
12-R25, 26	ER211757	Carbon RD1/4 100k(J)	2
12-R27	ER357456	Carbon RD1/4 2.2k(J)	1
12-R28	ER212477	Carbon RD1/4 3.3k(J)	1
12-R29, 30	ER211757	Carbon RD1/4 100k(J)	2
12-R31	ER211320	Carbon RD1/4 1.5k(J)	1
12-R32	ER213096	Carbon RD1/4 510(J)	1
12-R33	ER357456	Carbon RD1/4 2.2k(J)	1
12-R34	ER346994	Carbon RD1/4 18k(J)	1
12-R35	ER364961	Carbon RD1/4 1.2k(J)(Insu. type)	1
12-R36	ER550607	Carbon RD1/4 470k(J)NL	1

When ordering parts, please describe Parts Number, Serial Number, and Model Number in detail.

FIG. 13 PHOTO OF REC. & ADR P.C. BOARD (TW-5206)



REC. & ADR P.C. BOARD (TW-5206) BLOCK

Symbol No.	Parts No.	Description	Q'ty
13-1x	BA552510	Rec. & ADR P.C. Board Comp. (TW-5206)	1
13-2x	BA552521	Rec. & ADR P.C. Board Comp. (TW-5206) (PRO)	1
13-TR1	ET495437	Transistor 2SC1222(F)	1
13-TR2	ET444003	Transistor 2SA640(L)	1
13-TR3	ET495437	Transistor 2SC1222(F)	1
13-TR4	ET444003	Transistor 2SA640(L)	1
13-TR5	ET495437	Transistor 2SC1222(F)	1
13-TR6	ET398788	Transistor 2SC945(R)	1
13-TR7	ET538378	Transistor 2SA733(R)	1
13-TR8	ET520277	Transistor 2SC1247A(B)	1
13-TR9	ET234854	Transistor 2SC458LG(C)	1
13-TR10	ET550798	FET 2SK30A	1
13-TR11	ET495437	Transistor 2SC1222(F)	1
13-TR12	ET444003	Transistor 2SA640(L)	1
13-D1	ED219464	Germanium Diode 1N34A	1
13-D2	ED515790	Silicon Diode WG713	1
13-D3	ED491130	Zener Diode WZ085	1
13-D4	ED219464	Germanium Diode 1N34A	1
13-VR1, 2	EV538380	Semi-fixed Volume V10K8-1-5 10 kB(4US)	2
13-VR2	EV538380	Semi-fixed Volume V10K8-1-5 10 kB(4US) (PRO)	1
13-VR3, 4	EV497698	Semi-fixed Volume V10K8-1-5 20 kB(4US)	2
13-VR5	EV497700	Semi-fixed Volume V10K8-1-5 5 kB(4US)	1
13-L1	EO443722	Ferri Inductor FL9H 1MH(J)	1
13-L2	EO538391	Ferri Inductor FL11H 100MH(J)	1
13-L3	EO455883	Ferri Inductor FL9H 2.2MH(J)	1
13-3	EJ350447	Test Terminal	1

Symbol No.	Parts No.	Description	Q'ty
		Capacitor, Vertical Type	
13-C1, 2	EC517138	Elect. 10μF 25WVNL	2
13-C3	EC514708	Elect. 4.7μF 25WVNL	1
13-C4	EC220364	Elect. 100μF 6.3WV	1
13-C5	EC220151	Elect. 100μF 25WV	1
13-C6	EC514708	Elect. 4.7μF 25WVNL	1
13-C7, 8	EC220151	Elect. 100μF 25WV	2
13-C9	EC350706	Elect. 4.7μF 16WV	1
13-C10	EC336216	VFM 330PF(J) 50WV	1
13-C11	EC450066	Elect. 33μF 16WV	1
13-C12	EC336126	Elect. 47μF 25WV	1
13-C13	EC290520	VFM 100PF(J) 50WV	1
13-C14	EC220994	Elect. 10μF 25WV	1
13-C15	EC350706	Elect. 4.7μF 16WV	1
13-C16	EC220994	Elect. 10μF 25WV	1
13-C17	EC336126	Elect. 47μF 25WV	1
13-C18	EC250683	Mylar 0.0022μF(J) 50WV	1
13-C19	EC220994	Elect. 10μF 25WV	1
13-C20	EC337500	Mylar 0.0047μF(J) 50WV	1
13-C20	EC329883	Mylar 0.0056μF(J) 50WV(PRO)	1
13-C21	EC379765	Mylar 0.0027μF(J) 50WV	1
13-C21	EC350875	Mylar 0.001μF(J) 50WV(PRO)	1
13-C22	EC379170	Mylar 0.1μF(J) 50WV	1
13-C23	EC290520	VFM 100PF(J) 50WV	1
13-C24	EC336521	Mylar 0.47μF(K) 50WV	1
13-C25	EC220994	Elect. 10μF 25WV	1
13-C26	EC454961	Mylar 0.33μF(J) 50WV	1
13-C27	EC379170	Mylar 0.1μF(J) 50WV	1
13-C28	EC220994	Elect. 10μF 25WV	1
13-C29, 30	EC517138	Elect. 10μF 25WVNL	2
13-C31	EC514708	Elect. 4.7μF 25WVNL	1
13-C32	EC220364	Elect. 100μF 6.3WV	1
13-C33	EC220151	Elect. 100μF 25WV	1
13-C34	EC514708	Elect. 4.7μF 25WVNL	1
13-C35	EC379787	Mylar 0.0039μF(J) 50WV	1

When ordering parts, please describe Parts Number, Serial Number, and Model Number in detail.

Symbol No.	Parts No.	Description	Q'ty
13-C36	EC290520	VFM 100PF(J) 50WV	1
13-C37	EC379170	Mylar 0.1μF(J) 50WV	1
13-C38	EC379721	Mylar 0.0012μF(J) 50WV	1
13-C38	EC516868	Styrol 430PF(J) 50WV (PRO)	1
13-C39	EC350717	VFM 390PF(J) 50WV	1
13-C40	EC379765	Mylar 0.0027μF(J) 50WV (PRO)	1
		Resistor, Stopper Type	
13-R1	ER361563	Carbon RD1/4 180(J)	1
13-R2	ER346601	Carbon RD1/4 47k(J)	1
13-R3	ER561611	Carbon RD1/4 82k(J)NL	1
13-R4	ER212264	Carbon RD1/4 22k(J)	1
13-R5	ER349942	Carbon RD1/4 8.2k(J)	1
13-R6	ER352045	Carbon RD1/4 3.9k(J)	1
13-R7	ER429794	Carbon RD1/4 68(J)	1
13-R8	ER212264	Carbon RD1/4 22k(J)	1
13-R9	ER357491	Carbon RD1/4 82k(J)	1
13-R10	ER352045	Carbon RD1/4 3.9k(J)	1
13-R11	ER349942	Carbon RD1/4 8.2k(J)	1
13-R12	ER429794	Carbon RD1/4 68(J)	1
13-R13	ER211757	Carbon RD1/4 100k(J)	1
13-R14	ER357570	Carbon RD1/4 150k(J)	1
13-R15	ER212477	Carbon RD1/4 3.3k(J)	1
13-R16	ER538424	Carbon RD1/4 120k(J)NL	1
13-R17	ER306887	Carbon RD1/4 15k(J)	1
13-R18	ER450011	Carbon RD1/4 120k(J)	1
13-R19	ER211858	Carbon RD1/4 12k(J)	1
13-R20	ER357535	Carbon RD1/4 39k(J)	1
13-R21	ER352045	Carbon RD1/4 3.9k(J)	1
13-R22, 23	ER304402	Carbon RD1/4 470(J)	2
13-R24	ER211465	Carbon RD1/4 1k(J)	1
13-R25	ER212883	Carbon RD1/4 4.7k(J)	1
13-R26	ER306360	Carbon RD1/4 6.8k(J)	1
13-R27	ER362485	Carbon RD1/4 330k(J)	1
13-R28	ER450011	Carbon RD1/4 120k(J)	1
13-R29	ER212477	Carbon RD1/4 3.3k(J)	1
13-R30, 31	ER336442	Carbon RD1/4 10k(J)	2
13-R32, 33	ER357456	Carbon RD1/4 2.2k(J)	2
13-R34	ER306360	Carbon RD1/4 6.8k(J)	1
13-R35	ER211465	Carbon RD1/4 1k(J)	1
13-R36	ER336442	Carbon RD1/4 10k(J)	1
13-R37	ER306843	Carbon RD1/4 1.2k(J)	1
13-R38	ER213030	Carbon RD1/4 5.6k(J)	1
13-R39	ER211465	Carbon RD1/4 1k(J)	1
13-R40	ER450011	Carbon RD1/4 120k(J)	1
13-R41	ER346601	Carbon RD1/4 47k(J)	1
13-R42	ER343078	Carbon RD1/4 2.7k(J)	1
13-R43	ER363644	Carbon RD1/4 560(J)	1
13-R44	ER211465	Carbon RD1/4 1k(J)	1
13-R45	ER380913	Carbon RD1/4 33(J)	1
13-R46	ER306887	Carbon RD1/4 15k(J)	1
13-R47, 48	ER426857	Carbon RD1/4 270k(J)	2
13-R49	ER380711	Carbon RD1/4 220k(J)	1
13-R50	ER357456	Carbon RD1/4 2.2k(J)	1
13-R51	ER349942	Carbon RD1/4 8.2k(J)	1
13-R52	ER306843	Carbon RD1/4 1.2k(J)	1
13-R53	ER361563	Carbon RD1/4 180(J)	1
13-R54	ER346601	Carbon RD1/4 47k(J)	1
13-R55	ER561611	Carbon RD1/4 82k(J)NL	1
13-R56	ER212264	Carbon RD1/4 22k(J)	1
13-R57	ER349942	Carbon RD1/4 8.2k(J)	1
13-R58	ER352045	Carbon RD1/4 3.9k(J)	1
13-R59	ER429794	Carbon RD1/4 68(J)	1
13-R60	ER212264	Carbon RD1/4 22k(J)	1
13-R61	ER357491	Carbon RD1/4 82k(J)	1
13-R62	ER352045	Carbon RD1/4 3.9k(J)	1
13-R63	ER349942	Carbon RD1/4 8.2k(J)	1
13-R64	ER429794	Carbon RD1/4 68(J)	1
13-R65	ER346601	Carbon RD1/4 47k(J)	1
13-R66	ER211465	Carbon RD1/4 1k(J)	1
13-R67	ER346994	Carbon RD1/4 18k(J)	1
13-R68	ER361528	Carbon RD1/4 56k(J)	1
13-R69	ER212883	Carbon RD1/4 4.7k(J) (PRO)	1
13-R70	ER336442	Carbon RD1/4 10k(J) (PRO)	1

FIG. 14 PHOTO OF OSC. P.C. BOARD (TW-5033)

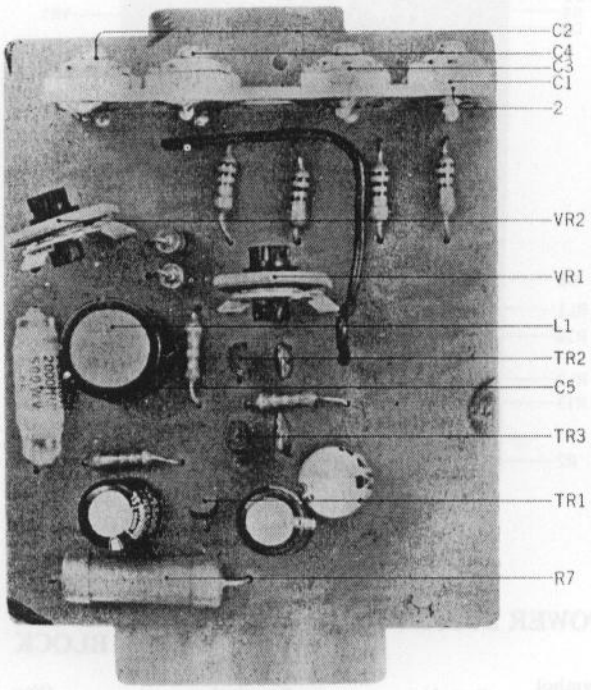
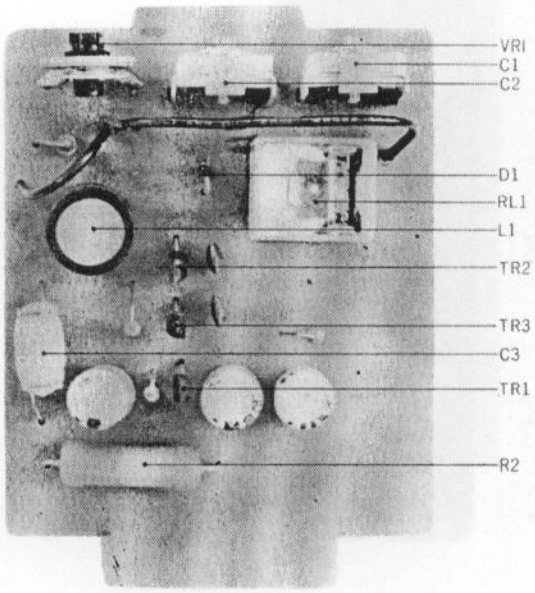


FIG. 15 PHOTO OF OSC. P.C. BOARD (TW-5204) (PRO)



OSC. P.C. BOARD (TW-5033) BLOCK

Symbol No.	Parts No.	Description	Q'ty
14-1x	BA552497	OSC. P.C. Board Comp. (TW-5033)	1
14-TR1,2,3	ET520288	Transistor 2SC1247A(V)	3
14-L1	EO383365	OSC. Coil OT-204	1
14-VR1, 2	EV496271	Semi-fixed Volume V18K32 2 kB(4US)	2
14-2	EA534148	Trimmer P.C. Board	1
		Capacitor, Vertical Type	
14-C1 to 4	EC398878	Trimmer C-1P-2 50 to 70PF	4
14-C5	EC246137	Plastic Film 2000PF(J) 500WV	1
14-C6, 7	EC335452	Elect. 100μF 25WV	2
14-C8	EC336126	Elect. 37μF 25WV	1
14-C9, 10	EC250841	Mylar 0.01μF(J) 50WV	2
		Resistor, Insulator Type	
14-R1 to 4	ER324808	Carbon RD1/4 100(J)	4
14-R5, 6	ER538301	Solid RC1/2 56(K)	2
14-R7	ER538345	Metal Oxide Film 3W 150(K)	1
14-R8	ER329264	Carbon RD1/4 2.2k(J)	1
14-R9	ER324685	Carbon RD1/4 33k(J)	1
14-R10	ER430200	Carbon RD1/4 3.3(J)	1

OSC. P.C. BOARD (TW-5204) BLOCK (PRO)

Symbol No.	Parts No.	Description	Q'ty
15-1x	BA552508	OSC. P.C. Board Comp. (TW-5204) (PRO)	1
15-TR1,2,3	ET520288	Transistor 2SC1247A(V)	3
15-VR1	EV496271	Semi-fixed Volume V18K32 2 kB(4US)	1
15-RL1	EP383321	Relay TECK-36 DC22V1000	1
15-L1	EO383365	OSC. Coil OT-204	1
15-D1	ED224526	Silicon Diode 10D1	1
		Capacitor, Vertical Type	
15-C1, 2	EC425250	Trimmer A-1P3-3 70PF	2
15-C3	EC446242	Plastic Film 1500PF(J) 500WV	1
15-C4, 5	EC335452	Elect. 100μF 25WV	2
15-C6	EC336126	Elect. 47μF 25WV	1
15-C7, 8	EC250841	Mylar 0.01μF(J) 50WV	2
		Resistor, Stopper Type	
15-R1	ER538301	Solid RC1/2 56(K)	1
15-R2	ER538345	Metal Oxide Film 3W 150(K)	1
15-R3	ER357456	Carbon RD1/4 2.2k(J)	1
15-R4	ER349907	Carbon RD1/4 33k(J)	1
15-R5	ER315944	Carbon RD1/4 3.3(J)	1

FIG. 16 PHOTO OF DIRECTION P.C. BOARD (TW-2057)

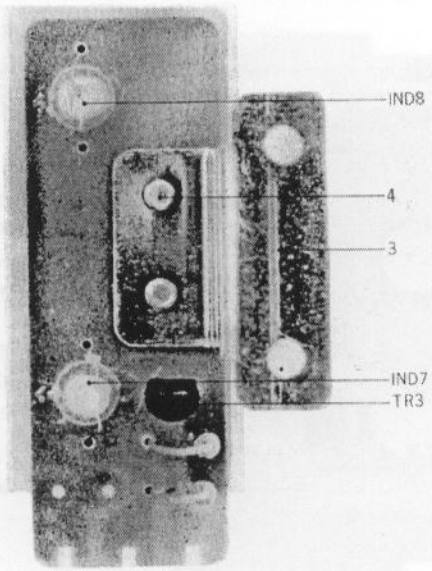
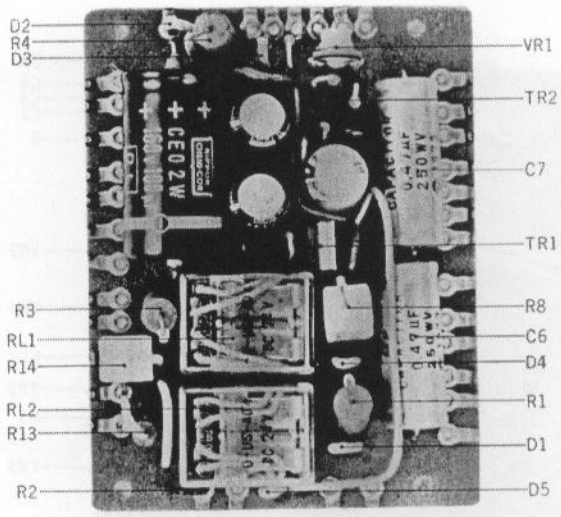


FIG. 17 PHOTO OF POWER SUPPLY P.C. BOARD (TW-2018)



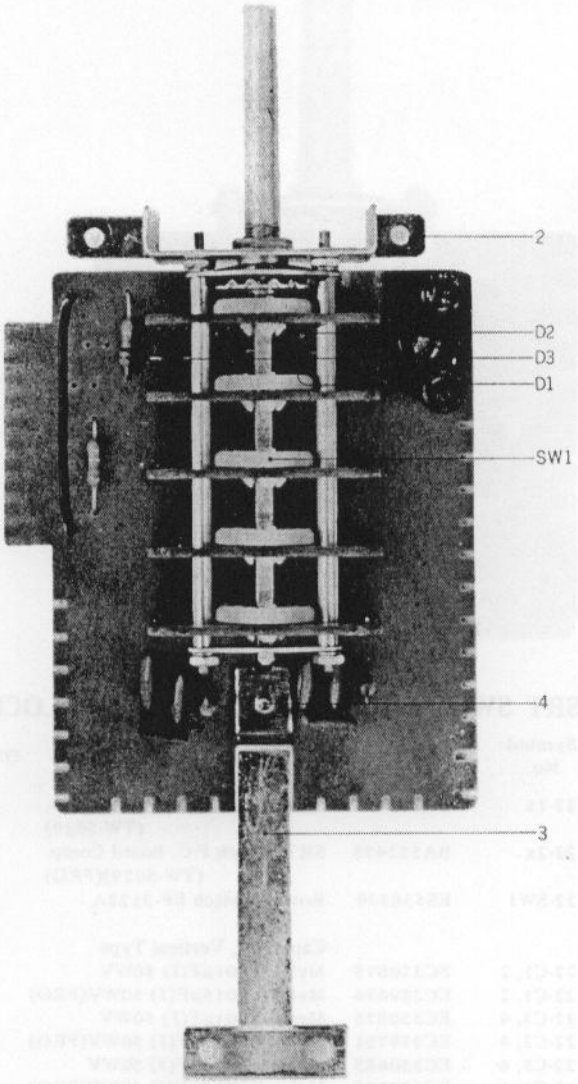
DIRECTION P.C. BOARD (TW-2057) BLOCK

Symbol No.	Parts No.	Description	Q'ty
16-1x	BA552352	Direction P.C. Board Comp. (TW-2057)	1
16-TR3	ET379462	Transistor 2SC711(D)(E)	1
16-IND7, 8	EL390576	Pilot Lamp RM6-24V-50MA (Lead type)	1
16-2x	EZ534892	Direction House	1
16-3	EZ534870	Direction Table	1
16-4	ZW417194	Screw, binding head 3x10	2
		Resistor, Stopper Type	
16-R3	ER213030	Carbon RD1/4 5.6k(J)	1
16-R4	ER211465	Carbon RD1/4 1k(J)	1

POWER SUPPLY P.C. BOARD (TW-2018) BLOCK

Symbol No.	Parts No.	Description	Q'ty
17-1x	BA552262	Power Supply P.C. Board Comp. (TW-2018)	1
17-TR1	ET418871	Transistor 2SC1014(C)(D)	1
17-TR2	ET511920	Transistor 2SC1247A(B)(V)	1
17-D1, 2	ED224550	Silicon Diode 10D4	2
17-D3	ED538042	Zener Diode RD-7A(L)	1
17-D4, 5	ED224526	Silicon Diode 10D1	2
17-VR1	EV498071	Semi-fixed Volume V10K8-1-5 1 kB(4US)	1
17-RL1, 2	EP344136	Relay MY4-O-US-AD4-24V	2
		Capacitor, Vertical Type	
17-C1	EC372148	Elect. 220μF 35WV	1
17-C2	EC316091	Elect. 100μF 160WV(Tub. type)	1
17-C3	EC372148	Elect. 220μF 35WV	1
17-C4	EC350875	Mylar 0.001μF(J) 50WV	1
17-C5	EC336115	Elect. 220μF 25WV	1
17-C6, 7	EC350987	MP 0.47μF(M) 250VAC(Tub. type)	2
		Resistor, Stopper Type	
17-R1	ER538086	Wire-wound 3W 2.2(K)(P type)	1
17-R2	ER551878	Metal Oxide Film 1W 27(K)	1
17-R3	ER539010	Metal Oxide Film 3W 33(K)	1
17-R4	ER538086	Wire-wound 3W 2.2(K)(P type)	1
17-R5	ER306843	Carbon RD1/4 1.2k(J)	1
17-R6	ER211465	Carbon RD1/4 1k(J)	1
17-R7	ER212681	Carbon RD1/4 330(J)	1
17-R8	ER538097	Cement 5W 2.5k(K) (Metal Ox. Film type)	1
17-R9	ER336442	Carbon RD1/4 10k(J)	1
17-R10	ER211465	Carbon RD1/4 1k(J)	1
17-R11	ER213096	Carbon RD1/4 510(J)	1
17-R12	ER362441	Carbon RD1/4 1.8k(J)	1
17-R13	ER550596	Metal Oxide Film 2W 27(K)	1
17-R14	ER554556	Cement 5W 39(K) (Wire-wound type)	1

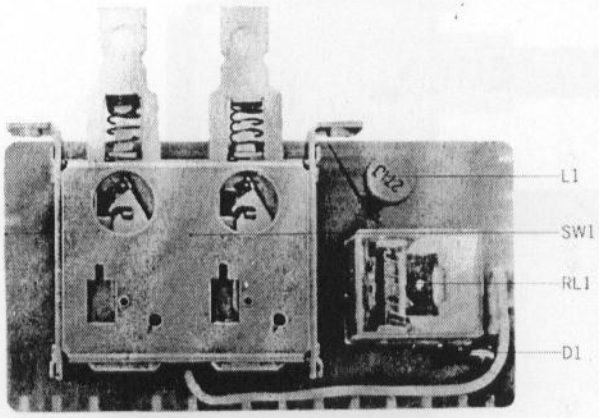
FIG. 18 PHOTO OF EQUALIZER SWITCH P.C. BOARD (TW-5028)



EQUALIZER SWITCH P.C. BOARD (TW-5028) BLOCK

Symbol No.	Parts No.	Description	Q'ty
18-1x	BA552576	Equalizer Switch P.C. Board Comp. (TW-5028)	1
18-D1,2,3	ED515790	Silicon Diode WG713	3
18-SW1	ES538446	Rotary Switch EP-5203	1
18-2	EZ535331	Equalizer Switch Retaining Plate	1
18-3	EZ534172	T type Angle	1
18-4	ZW447772	Tapping Screw #2 3x6(BR)	1
		Capacitor, Vertical Type	
18-C1,2,3	EC456041	Elect. 33μF 25WV	3
18-C5	EC350638	VFM 180PF(J) 50WV	1
18-C6	EC389237	VFM 200PF(J) 50WV	1
18-C7, 8	EC350638	VFM 180PF(J) 50WV	2
18-C9	EC389237	VFM 200PF(J) 50WV	1
18-C10	EC350638	VFM 180PF(J) 50WV	1
		Resistor, Insulator Type	
18-R1	ER345712	Carbon RD1/4 22k(J)	1
18-R2	ER324641	Carbon RD1/4 1k(J)	1
18-R3, 4	ER347073	Carbon RD1/4 200(J) (Stopper Type)	2

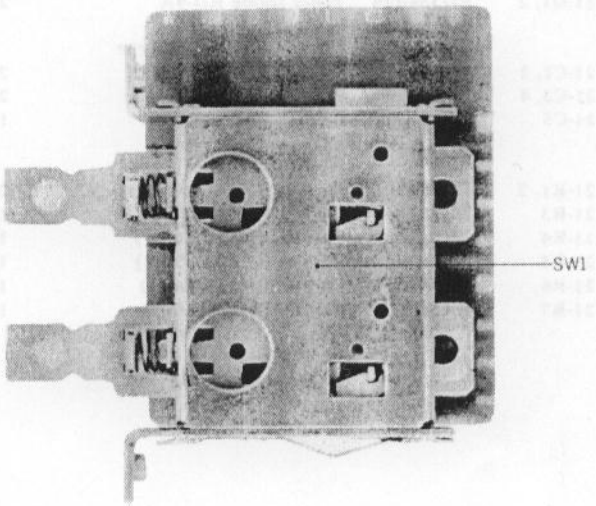
FIG. 19 PHOTO OF T.S. P.C. BOARD (TW-5026)



T.S. P.C. BOARD (TW-5026) BLOCK

Symbol No.	Parts No.	Description	Q'ty
19-1x	BA552442	T.S. P.C. Board Comp. (TW-5026)	1
19-SW1	ES538323	Push Switch SPM-025D	1
19-RL1	EP383321	Relay TECK-36 DC22V1000	1
19-L1	EO488430	Ferri Inductor FL9H 270μH(J)	1
19-D1	ED224526	Silicon Diode 10D1	1

FIG. 20 PHOTO OF P.B. MODE P.C. BOARD (TW-5203)



P.B. MODE P.C. BOARD (TW-5203) BLOCK

Symbol No.	Parts No.	Description	Q'ty
20-1x	BA552453	P.B. Mode P.C. Board Comp. (TW-5203)	1
20-SW1	ES538312	Push Switch SPM-025A21	1

FIG. 21 PHOTO OF MONITOR SWITCH P.C. BOARD (TW-5027)

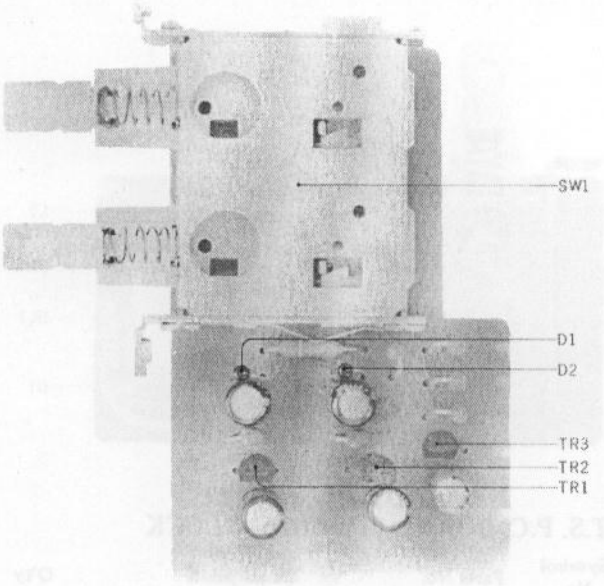
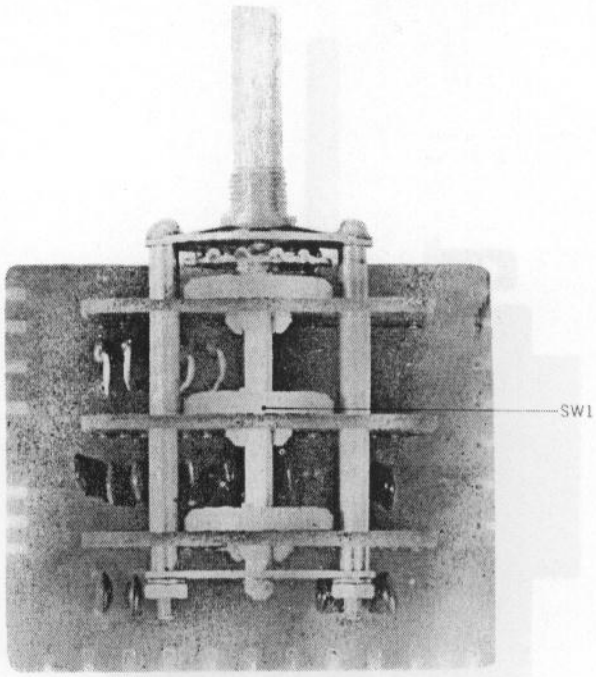


FIG. 22 PHOTO OF SRT SWITCH P.C. BOARD (TW-5029)



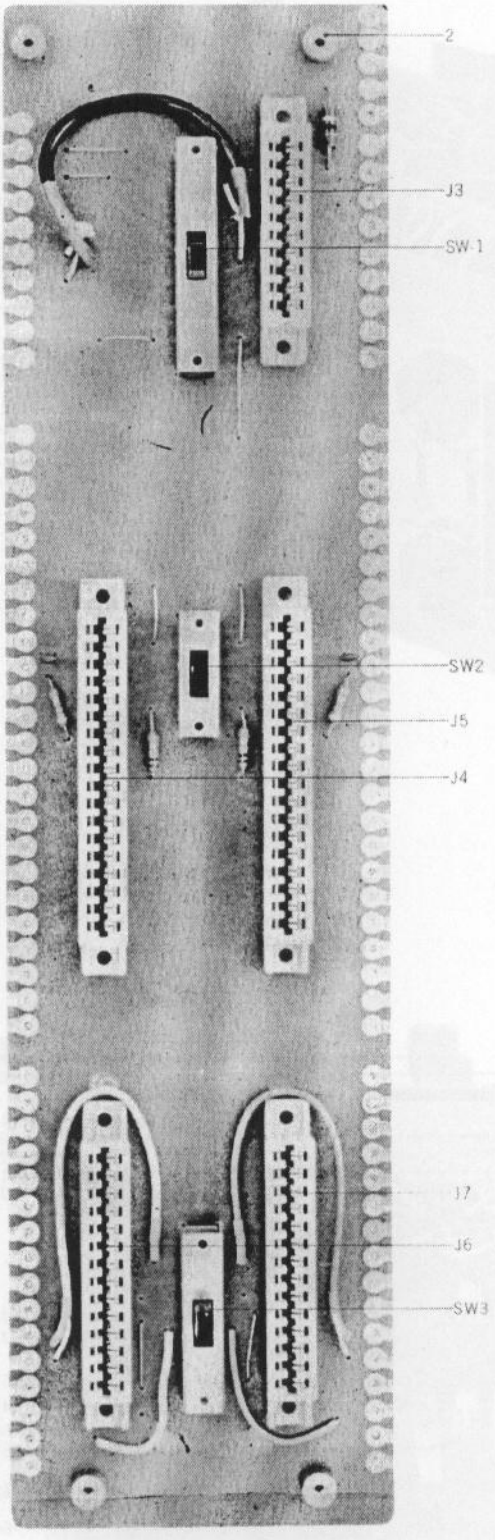
MONITOR SWITCH P.C. BOARD (TW-5027) BLOCK

Symbol No.	Parts No.	Description	Q'ty
21-1x	BA552431	Monitor Switch P.C. Board Comp. (TW-5027)	1
21-SW1	ES538312	Push Switch SPM-025A21	1
21-TR1,2,3	ET380834	Transistor 2SC711(E)	3
21-D1, 2	ED384096	Zener Diode RD-9A	2
		Capacitor, Vertical Type	
21-C1, 2	EC220612	Elect. 33μF 25WV	2
21-C3, 4	EC220994	Elect. 10μF 25WV	2
21-C5	EC450527	Elect. 4.7μF 25WV	1
		Resistor, Stopper Type	
21-R1, 2	ER429996	Carbon RD1/4 470k(J)	2
21-R3	ER211465	Carbon RD1/4 1k(J)	1
21-R4	ER213030	Carbon RD1/4 5.6k(J)	1
21-R5	ER357456	Carbon RD1/4 2.2k(J)	1
21-R6	ER357535	Carbon RD1/4 39k(J)	1
21-R7	ER364994	Carbon RD1/4 39k(J)	1

SRT SWITCH P.C. BOARD (TW-5029) BLOCK

Symbol No.	Parts No.	Description	Q'ty
22-1x	BA552464	SRT Switch P.C. Board Comp. (TW-5029)	1
22-2x	BA552475	SRT Switch P.C. Board Comp. (TW-5029)(PRO)	1
22-SW1	ES538334	Rotary Switch EP-3122A	1
		Capacitor, Vertical Type	
22-C1, 2	EC350875	Mylar 0.001μF(J) 50WV	2
22-C1, 2	EC389474	Mylar 0.0015μF(J) 50WV(PRO)	2
22-C3, 4	EC350875	Mylar 0.001μF(J) 50WV	2
22-C3, 4	EC379721	Mylar 0.0012μF(J) 50WV(PRO)	2
22-C5, 6	EC250683	Mylar 0.0022μF(J) 50WV	2
22-C5, 6	EC424708	Mylar 0.0018μF(J) 50WV(PRO)	2
22-C7, 8	EC337500	Mylar 0.0047μF(J) 50WV	2
22-C7, 8	EC250683	Mylar 0.0022μF(J) 50WV(PRO)	2
22-C9, 10	EC329883	Mylar 0.0056μF(J) 50WV	2
22-C9, 10	EC379765	Mylar 0.0027μF(J) 50WV(PRO)	2
22-C11, 12	EC350875	Mylar 0.001μF(J) 50WV(PRO)	2
		Resistor, Stopper Type	
22-R1, 2	ER213120	Carbon RD1/4 56(J)	2
22-R3, 4	ER433877	Carbon RD1/4 120(J)	2

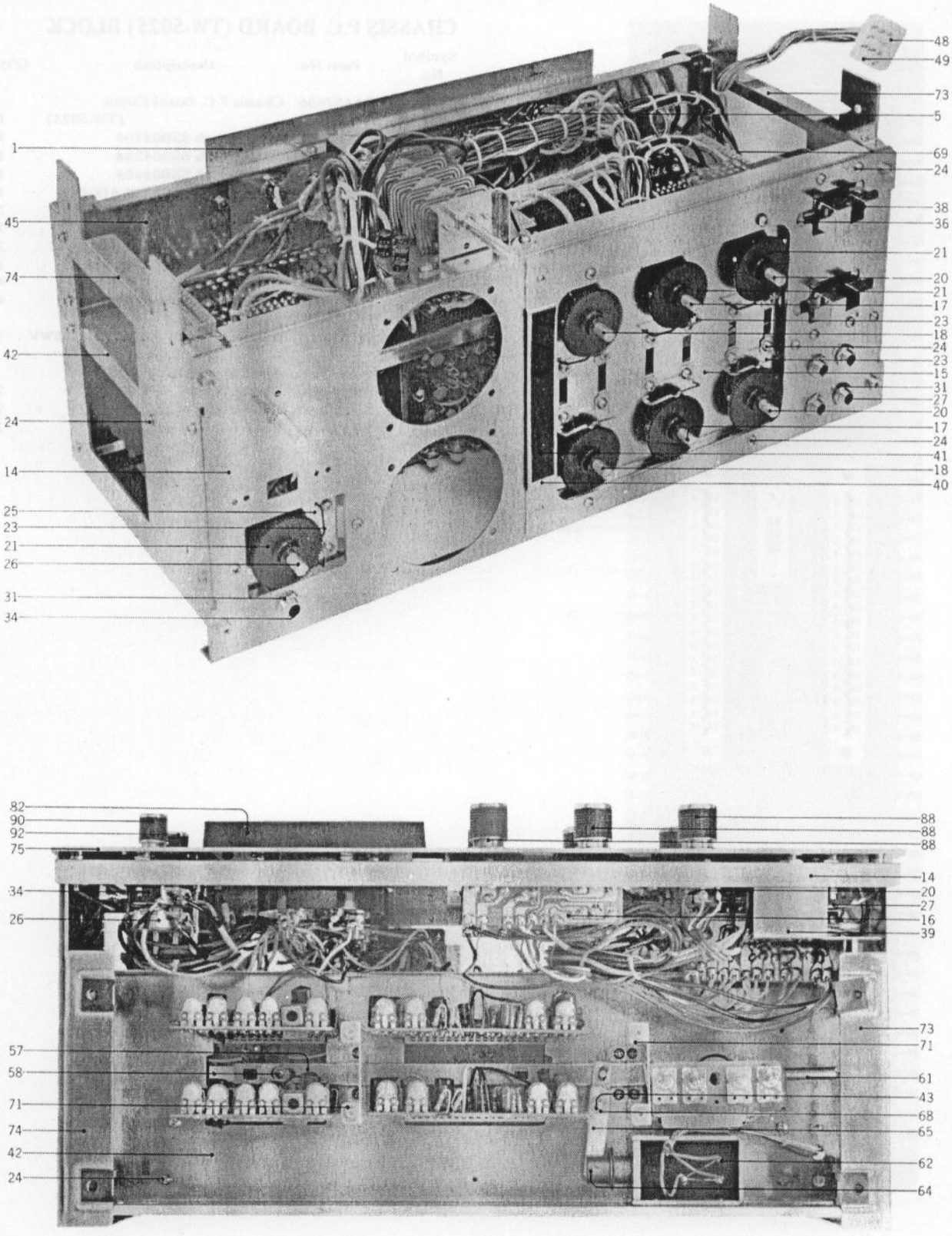
FIG. 23 PHOTO OF CHASSIS P.C. BOARD (TW-5025)



CHASSIS P.C. BOARD (TW-5025) BLOCK

Symbol No.	Parts No.	Description	Q'ty
23-1x	BA552486	Chassis P.C. Board Comp. (TW-5025)	1
23-SW1	ES538277	Slide Switch SSB08204	1
23-SW2	ES538255	Slide Switch SSB04208	1
23-SW3	ES538266	Slide Switch SSB06204	1
23-J1	EJ293084	14P Multi-jack-1 3250-014-098	1
23-J2	EJ292926	10P Multi-jack 3250-014-098	1
23-J3	EJ482793	10P Multi-jack 3250-010-001	1
23-J4, 5	EJ310871	18P Multi-jack J-2 3250-018-001	2
23-J6, 7	EJ368785	14P Multi-jack 3250-014-001	2
23-2	MH534183	Connector Prop.	4
23-3x	ZW413741	Screw, binding head 3x8	4
23-C1, 2	EC379765	Mylar Capacitor 0.0027μF(J) 50WV	2
		Resistor, Insulator Type	
23-R1, 2	ER214290	Carbon RD1/4 4.7k(J)	2
23-R3, 4	ER213647	Carbon RD1/4 10k(J)	2
23-R5	ER538301	Solid RC1/2 56(K)	1

FIG. 24 PHOTO OF AMPLIFIER ASSEMBLY BLOCK

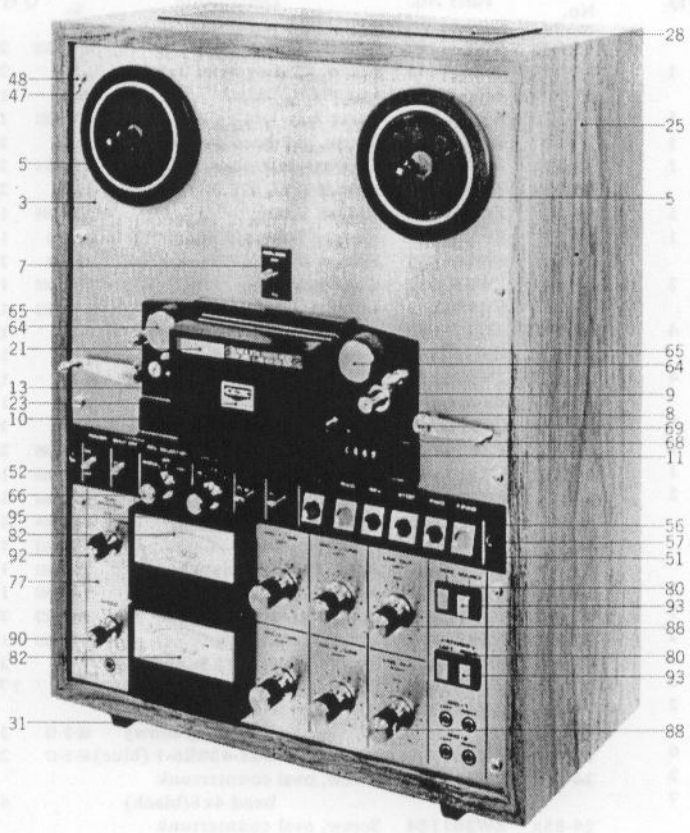


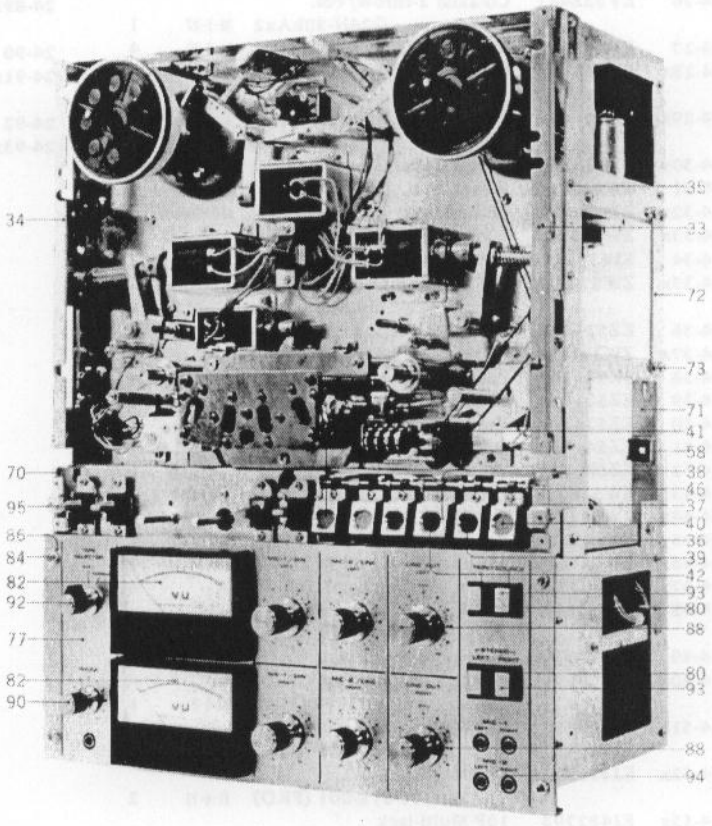
AMPLIFIER ASSEMBLY BLOCK

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
	JACK PLATE BLOCK			
24-1	BZ552554	Jack Plate Block Comp.	TW-1	1
24-2x	BZ552565	Jack Plate Block Comp. (PRO)	TW-2	1
24-3x	EJ457661	Terminal A (PRO)	55-5032	1
24-4x	EJ457637	Terminal B (PRO)	55-5033	1
24-5	ES539177	Rotary Switch SR-25N 1-2-3 12.5S	25-6-60	1
24-6x	SK245182	Brake Change Knob	RD-622	1
24-7x	ER364948	Carbon/R. RD1/4 3.3k(J) (Insu. type)	35-9-5	2
24-8x	ER324685	Carbon/R. RD1/4 33k(J) (Insu. type)	35-9-5	4
24-9x	ER345756	Carbon/R. RD1/4 68k(J) (Insu. type)	35-9-5	4
24-10x	ER213647	Carbon/R. RD1/4 10k(J) (Insu. type)	35-9-5	6
24-11x	ES564748	Slide Switch #101 S-J0282		1
24-12x	EJ255115	Lug Plate VB2L2	33-4-3	1
24-13x	ZW419782	Screw, binding head 2.6x5		2
	AMP. ASSEMBLY BLOCK			
24-14	EZ532293	Amp. Chassis A, w/prop	TW-5001	1
24-15	EZ535410	Volume Chassis A	TW-5016	1
24-16	EA534137	Volume P.C. Board	TW-5030	2
24-17	EV538492	Co-axial 2-throw/Vol. G24R-50kAx2	36-1-30	2
24-18	EV538503	Volume V24R-50 kA	36-2-35	2
24-19x	ER329308	Carbon/R. RD1/4 47k(J) (Insu. type)	35-9-5	6
24-20	EV538514	Volume V24E-50 kB	36-2-36	2
24-21	EZ535432	Click Gear	TW-5018	7
24-22x	ZW434160	Set Screw, hexagon socket 3x3(cup)		14
24-23	ZG535454	Click Spring	TW-5020	7
24-24	ZW447772	Tapping Screw #2 3x6(BR)		56
24-25	EZ535421	Volume Chassis B	TW-5017	1
24-26	EV538481	Co-axial 2-throw/Vol. G24N-50kAx2	36-1-27	1
24-27	EJ437310	Mic. Jack 2PMJ1P	31-2-37	4
24-28x	ER364948	Carbon/R. RD1/4 3.3k(J) (Insu. type)	35-9-5	2
24-29x	ER324641	Carbon/R. RD1/4 1k(J) (Insu. type)	35-9-5	2
24-30x	EZ225180	Nylon Collar, Jack	LD-520	4
24-31	ZW561655	E Jack Nut		5
24-32x	EZ436217	Collar, Jack	MC-5006	5
24-33x	ZW455275	Washer (Fiber)D9.1x18x0.5t		5
24-34	EJ437321	3-P Molded-jack 3PMJ1P	31-2-38	1
24-35x	ZW272722	M9 Toothed Lock Washer D9.3x13x0.5t		1
24-36	EZ535318	Switch Retaining Plate	TW-5006	1
24-37x	ZW371856	ISO Screw, binding head 3x5		8
24-38	SK534161	Push Knob	TW-5037	4
24-39	EZ531854	Shield Box	TW-5040	1
24-40	EZ535307	Panel Support	TW-5005	1
24-41	EZ541451	Amp. Panel Cloth	TW-5051	1
24-42	EZ532304	Amp. Chassis B	TW-5002	1
24-43	ZW535320	Pin A	TW-5007	1
24-44x	ZW273756	Nut M3		1
24-45	EZ535274	Amp. Chassis C	TW-5003	1
24-46x	ZW447805	Tapping Screw #2 3x12(BR)		20
24-47x	ZW323728	Screw, binding head 3x5		6
24-48	EJ293062	12P Mate-N-Lock Cap Housing 1-480278-0	52-1-1	1
24-49	EJ373623	Pin Contact 61116-1	52-1-1	10
24-50x	EJ373691	9P Mate-N-Lock Cap Housing 1-480277-0(PRO)	52-1-2	1
24-51x	EJ368785	14P Multi-jack 3250-014-001 (PRO)	31-4-14	3
24-52x	EJ310871	18P Multi-jack J-2 3250-018-001 (PRO)	31-4-11	2
24-53x	EJ482793	10P Multi-jack 3250-010-001 (PRO)	31-4-21	1
24-54x	MH534183	Connector Prop	TW-5039	2
24-55x	ZW413741	Screw, binding head 3x8		2
24-56x	EJ255115	Lug Plate VB2L2	33-4-3	1
24-57	EZ535364	Lever A, w/pin	TW-5011	1
24-58	ZW553983	Screw, pan head 2.6x6		2
24-59x	ZW535397	Graduated Washer	TW-5014	2
24-60x	ZW550697	Washer (SPC)D2.9x7.5x0.5t		2
24-61	ZG535443	Return Spring	TW-5019	1
24-62	EP538468	Plunger Solenoid 1660PHT	44-1-55	1
24-63x	ED224550	Silicon Diode 10D4	45-2-16	2
24-64	ZW533913	Connecting Pin	TW-2010	1
24-65	EZ535375	Lever B	TW-5012	1
24-66x	ZW270088	'E' Ring 1.9M	6-1-9	1
24-67x	ZW394086	Washer (Nylon)D4.1x7x1t		1
24-68	ZW290283	'U' Ring 2.85M	6-1-1	1
24-69	EZ328320	Nylon Clip HP-5N	2-7-39	1
24-70x	EJ315101	Nylon Clip HP-4N	2-7-38	1
24-71	EZ535342	P.C. Board Retaining Table	TW-5009	2
24-72x	EZ535353	P.C. Board Retainer	TW-5010	1
24-73	EZ535285	Amp. Side Plate (R)	TW-5004	1
24-74	EZ535296	Amp. Side Plate (L)	TW-5004	1
24-75	SP546895	Amp. Panel C	TW-5021	1
24-76x	SP535465	Amp. Panel A (black)	TW-5021	1
24-77x	SP535476	Amp. Panel B (PRO)	TW-5021	1
24-78x	SE535487	Push Button Escutcheon	TW-5023	2
24-79x	EZ535498	Escutcheon Holder	TW-5024	1
24-80x	ZW339502	Tapping Screw #2 3x5(round)		2
24-81x	ZW553972	Washer(Nylon)D6.2x13x0.8t		17
24-82	EM550721	VU Meter R-65-438B10-1 (yellow)	46-2-18	2
24-83x	EM550710	VU Meter R-65-438B6-1 (blue)	46-2-17	2
24-84x	ZW203174	Screw, oval countersunk head 4x8(black)		4
24-85x	ZW301184	Screw, oval countersunk head 4x8		4
24-86x	SZ534385	Panel Washer A	TW-6021	4
24-87x	SZ534396	Panel Washer B (black)	TW-6021	4
24-88	SK534431	Amp. Knob A	TW-6025	6
24-89x	ZW433001	Set Screw, hexagon socket 3x5(cup)		6
24-90	SK534442	Amp. Knob B	TW-6026	1
24-91x	ZW434160	Set Screw, hexagon socket 3x3(cup)		2
24-92	SK534418	Selector Knob B	TW-6023	1
24-93x	ZW462194	Tapping Screw #2 3x8(pan), w/washer		2

When ordering parts, please describe Parts Number, Serial Number, and Model Number in detail.

FIG. 25 PHOTO OF FINAL ASSEMBLY BLOCK





FINAL ASSEMBLY BLOCK

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
		MECH. PANEL BLOCK		
25-1x	BZ552071	Mech. Panel Block Comp.	TW-1	1
25-2x	BZ552082	Mech. Panel Block Comp. (PRO)	TW-2	1
25-3	SP532315	Mech. Panel A	TW-6001	1
25-4x	SP532326	Mech. Panel B (PRO)	TW-6001	1
25-5	SE534194	Roel Table Escutcheon	TW-6002	2
25-6x	ZW323728	Screw, binding head 3x5		8
25-7	SE534205	RS Escutcheon	TW-6003	1
25-8	SE534216	Tension Arm Escutcheon	TW-6004	2
25-9	SC534227	Head Cover Base	TW-6005	1
25-10	SE534238	DL Escutcheon	TW-6006	2
25-11	SE534240	Counter Lens	TW-6007	1
25-12x	ZW413155	Screw, binding head 3x6		5
25-13	SC534251	Head Cover	TW-6008	1
25-14x	SZ534317	Hinge Rod, w/angle	TW-6012	1
25-15x	MV269965	Steel Ball D=4		1
25-16x	ZG249107	Ball Retaining Spring	RD-632	1
25-17x	ZW383883	Set Screw 5x4(flat)		1
25-18x	SZ534306	Hinge Angle C, w/sleeve	TW-6011	1
25-19x	ZW355511	Screw, binding head 3x6		2
25-20x	SZ534543	Cushion Rubber C D6x1t	TW-6039	2
25-21	SM534273	Name Plate GX-400D	TW-6009	1
25-22x	SM534262	Name Plate GX-400DPRO	TW-6009	1
25-23	SZ382285	GX Symbol Plate	RD-A633	1
25-24x	SM540101	PRO Name Plate	TW-6202	1
		CASE BLOCK		
25-25	BC552060	Case Block Comp.	TW	1
25-26x	SZ382217	Fan Grill	RD-A402	1
25-27x	ZW324448	Tapping Screw #1 3x10(truss)		3
25-28	SP535241	Ventilator A	TW-4002	1
25-29x	SZ535252	Ventilator Support	TW-4004	3
25-30x	ZW553994	Tapping Screw #1 3x8(round)		6
25-31	SZ275850	RD Square Foot	RD-402	2
25-32x	ZW479305	Screw, countersunk head 4x20		4
		ASSEMBLY BLOCK		
25-33	ML533777	Panel Support C (Right)	TW-1043	1
25-34	ML533788	Panel Support D (Left)	TW-1043	1
25-35	ZW323728	Screw, binding head 3x5		8
25-36	ZW419736	Screw, binding head 4x6		4
25-37	SB534071	Operation Button A	TW-2022	5
25-38	SB534082	Operation Button B	TW-2022	1
25-39	SE534093	Operate Lamp Escutcheon A (green)	TW-2023	2
25-40	SE532517	Operate Lamp Escutcheon B (orange)	TW-2023	2
25-41	SE532528	Operate Lamp Escutcheon C (red)	TW-2023	1
25-42	SE532552	Operate Lamp Escutcheon D (black)	TW-2023	1
25-43x	SB540022	Operation Button C (PRO)	TW-2203	3
25-44x	SB540033	Operation Button D (Stop) (PRO)	TW-2203	1
25-45x	SB540044	Operation Button E (Rec.) (PRO)	TW-2203	1
25-46	ZW447840	Tapping Screw #2 3x8(BR)		6
25-47	SZ534385	Panel Washer A	TW-6021	6
25-48	ZW550631	Screw, oval countersunk head 4x10		6
25-49x	ZW408835	Cap Nut M4(1 type #1)		2
25-50x	SZ548695	Button Guide	TW-6047	1
25-51	SP534341	Control Panel 1	TW-6015	1
25-52	SE534352	Pilot Lamp Escutcheon	TW-6017	1
25-53x	SP540055	Control Panel 2 (PRO)	TW-6201	1
25-54x	SZ482681	Selector Lamp Mold B (PRO)	DF-6026	1
25-55x	SE436151	Lamp Escutcheon (Rec). (PRO)	DF-6025	1
25-56	SZ534396	Panel Washer B	TW-6021	2
25-57	ZW538470	Screw, oval countersunk head 4x10(black)		2
25-58	ZW290250	U type Speed Nut M4 #1(large)	6-3-2	6

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
25-59x	SZ377190	LM Rubber Foot	LM-404	4
25-60x	ZW419646	Washer (SPC)D4.5x9.8x0.5t		4
25-61x	ZW448288	Tapping Screw #1 4x35(truss)		4
25-62x	ZW560902	Tapping Screw #1 4x50(truss), w/washer		4
25-63x	ZW488327	Tapping Screw #1 4x25(truss), w/washer		2
25-64	SK534374	Pinch Roller Cap	TW-6019	2
25-65	MP533744	Pinch Roller TW D=36	TW-1040	2
25-66	SK534418	Selector Knob B	TW-6023	2
25-67x	ZW434160	Set Screw, hexagon socket 3x3(cup)		2
25-68	SZ535094	Decorative Washer	TW-2077	2
25-69	ZW408690	Screw, oval countersunk head 3x10		2
25-70	MZ533823	Mech. Side Plate C (Left)	TW-1047	1
25-71	MZ533834	Mech. Side Plate D (Right)	TW-1047	1
25-72	MZ533801	Reinforcement Angle	TW-1045	2
25-73	ZW416687	Screw, binding head 4x8		8
25-74x	MZ533812	Servo Shield	TW-1046	1
25-75x	EJ419760	Nylon Clip HP-7N	2-7-41	1
25-76x	EJ205986	Cramp Terminal 2-SD	32-1-8	15
25-77	SP546895	Amp. Panel C	TW-5021	1
25-78x	SP535465	Amp. Panel A (black)	TW-5021	1
25-79x	SP535476	Amp. Panel B (PRO)	TW-5021	1
25-80	SE535487	Push Button Escutcheon	TW-5023	2
25-81x	EZ535498	Escutcheon Holder	TW-5024	1
25-82	EM550721	VU Meter R-65-438B10-1 (yellow)	46-2-18	2
25-83x	EM550710	VU Meter R-65-438B6-1 (blue)	46-2-17	2
25-84	ZW301184	Screw, oval countersunk head 4x8		4
25-85x	ZW203174	Screw, oval countersunk head 4x8(black)		4
25-86	SZ534385	Panel Washer A	TW-6021	4
25-87x	SZ534396	Panel Washer B (black)	TW-6021	4
25-88	SK534431	Amp. Knob A	TW-6025	6
25-89x	ZW433001	Set Screw, hexagon socket 3x5(cup)		6
25-90	SK534442	Amp. Knob B	TW-6026	1
25-91x	ZW434160	Set Screw, hexagon socket 3x3(cup)		2
25-92	SK534418	Selector Knob B	TW-6023	1
25-93	SK534161	Push Knob	TW-5037	4
25-94	EZ436217	Collar, Jack	MC-5006	5
25-95	ES537873	Lever Switch JLO5, w/knob	25-4-14	4
25-96x	EF424811	Fuse ST-2 2.5A	39-1-26	1
25-97x	EF444183	Fuse 1.5A 250V	39-1-41	1
25-98x	SK534453	Amp. Knob A Rubber	TW-6027	6
25-99x	SK534464	Amp. Knob B Rubber	TW-6027	1
25-100x	SK534475	Selector Knob Rubber	TW-6027	3

When ordering parts, please describe Parts Number, Serial Number, and Model Number in detail.

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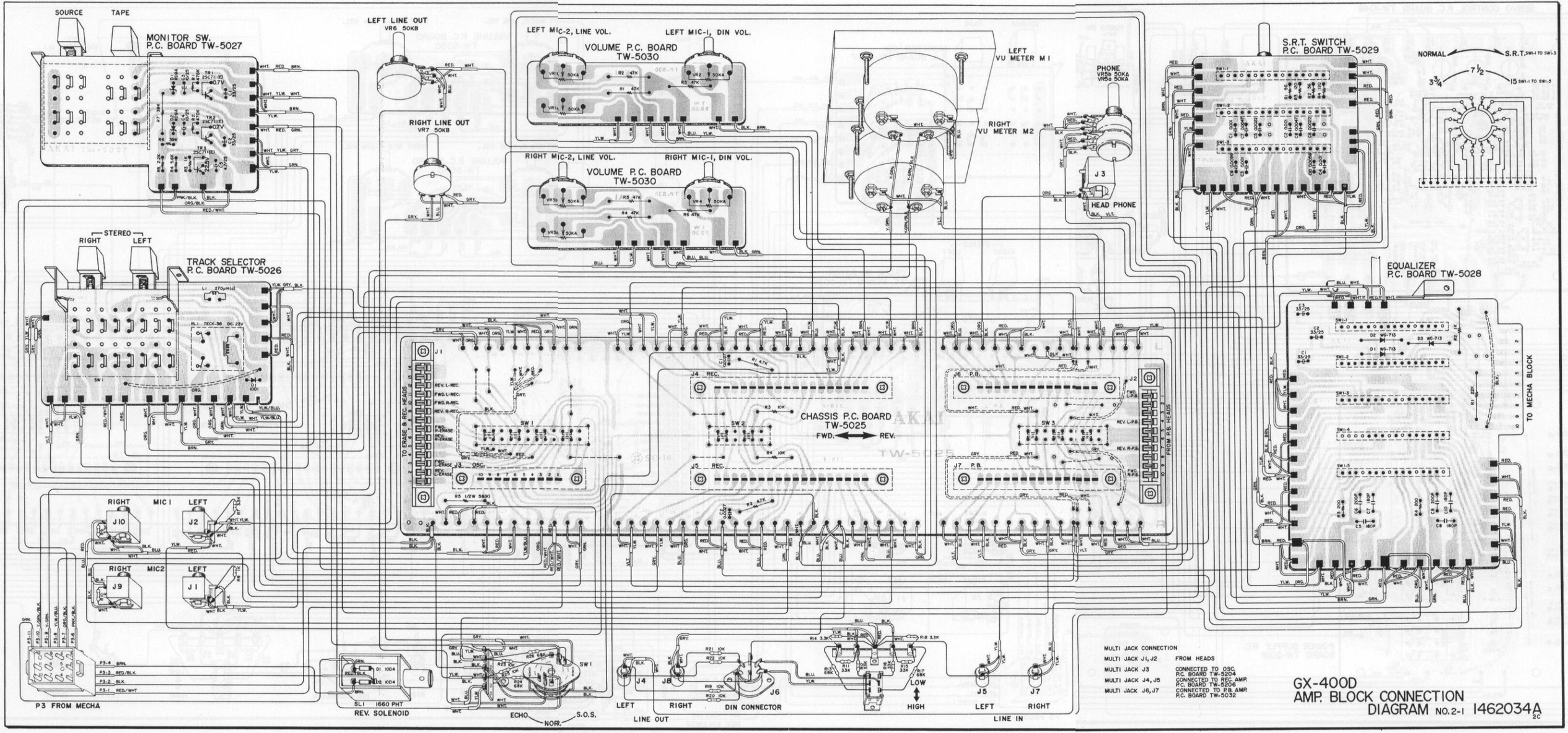
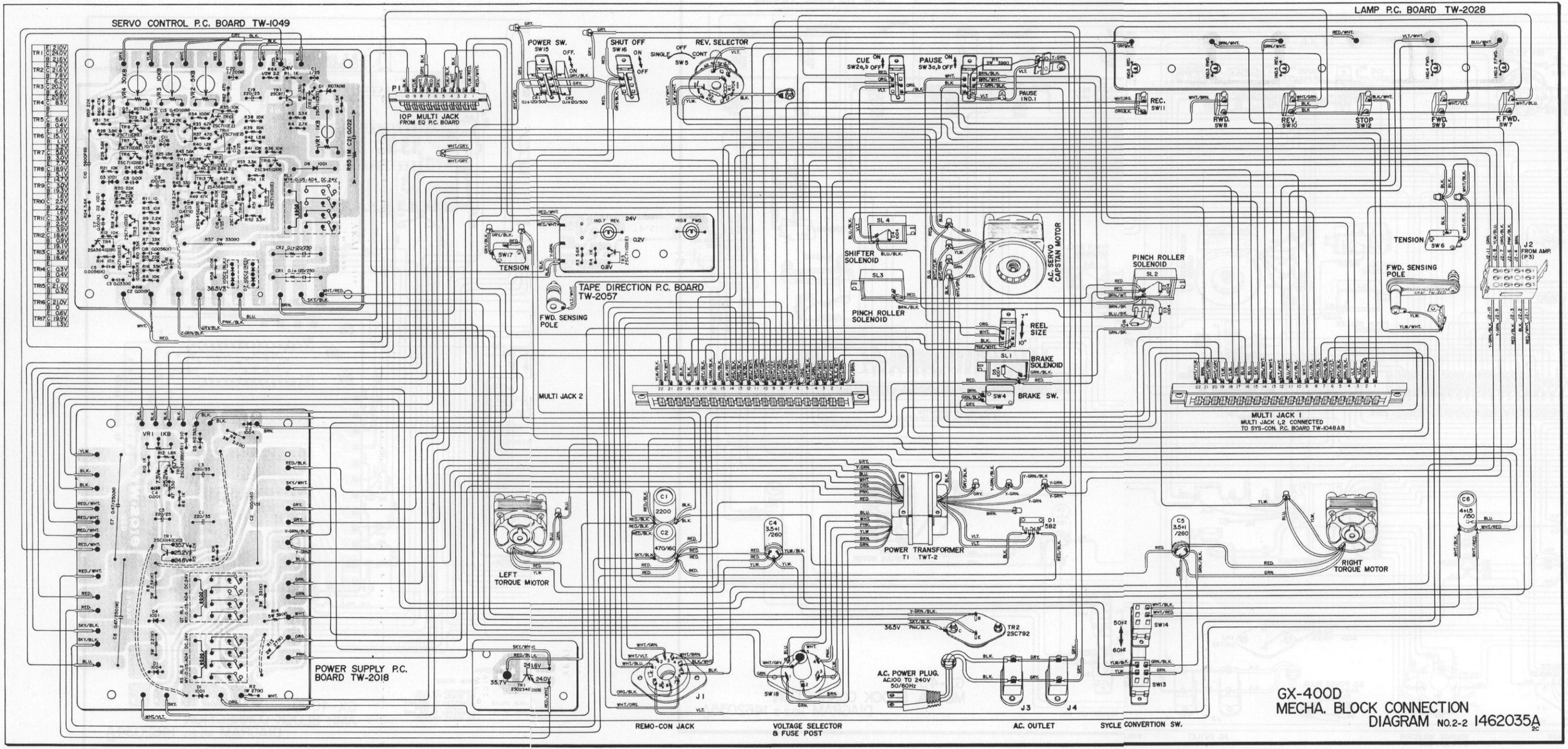

SOURCE
TAPE
MONITOR SW.
P.C. BOARD TW-5027
LEFT LINE OUT
VR6 50KB
RIGHT LINE OUT
VR7 50KB
LEFT MIC-2, LINE VOL.
LEFT MIC-1, DIN VOL.
VOLUME P.C. BOARD
TW-5030
RIGHT MIC-2, LINE VOL.
RIGHT MIC-1, DIN VOL.
VOLUME P.C. BOARD
TW-5030
LEFT
VU METER M1
RIGHT
VU METER M2
PHONE
VR5b 50KA
VR5a 50KA
J3
HEAD PHONE
S.R.T. SWITCH
P.C. BOARD TW-5029
NORMAL
S.R.T.
3¾
7½
15
STEREO
RIGHT
LEFT
TRACK SELECTOR
P.C. BOARD TW-5026
EQUALIZER
P.C. BOARD TW-5028
TO MECHA BLOCK
CHASSIS P.C. BOARD
TW-5025
FWD.
REV.
TO ERASE & REC. HEADS
FROM P.B. HEADS
J1
J3 OSC.
J4 REC.
J5 REC.
J6 P.B.
J7 P.B.
SW1
SW2
SW3
RIGHT MIC1 LEFT
J10
J2
RIGHT MIC2 LEFT
J9
J1
P3 FROM MECHA
SL1 1660 PHT
REV. SOLENOID
ECHO
NOR.
S.O.S.
LEFT
RIGHT
DIN CONNECTOR
J4
J8
J6
LOW
HIGH
J5
J7
LEFT
RIGHT
LINE OUT
LINE IN
MULTI JACK CONNECTION
MULTI JACK J1, J2 FROM HEADS
MULTI JACK J3 CONNECTED TO OSC. P.C. BOARD TW-5204
MULTI JACK J4, J5 CONNECTED TO REC. AMP. P.C. BOARD TW-5206
MULTI JACK J6, J7 CONNECTED TO P.B. AMP. P.C. BOARD TW-5032
GX-400D
AMP. BLOCK CONNECTION
DIAGRAM NO.2-1
1462034A
2C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LAMP P.C. BOARD TW-2028
POWER SUPPLY P.C. BOARD TW-2018
TAPE DIRECTION P.C. BOARD TW-2057
MULTI JACK 2
MULTI JACK 1
MULTI JACK 1,2 CONNECTED TO SYS-CON. P.C. BOARD TW-1048AB
IOP MULTI JACK FROM EQ P.C. BOARD
POWER SW. SW15
SHUT OFF SW16
REV. SELECTOR SW5
CUE ON SW2a,b OFF
PAUSE ON SW3a,b OFF
PAUSE IND.
REC. SW11
RWD. SW8
REV. SW10
STOP SW12
FWD. SW9
F.FWD. SW7
TENSION SW6
TENSION SW17
FWD. SENSING POLE
SHIFTER SOLENOID
PINCH ROLLER SOLENOID
AC. SERVO CAPSTAN MOTOR
REEL SIZE
BRAKE SOLENOID
BRAKE SW.
J2 FROM AMP. (P3)
LEFT TORQUE MIOTOR
RIGHT TORQUE MOTOR
POWER TRANSFORMER T1 TWT-2
REMO-CON JACK
VOLTAGE SELECTOR & FUSE POST
AC. OUTLET
SYCLE CONVERTION SW.
AC. POWER PLUG. AC100 TO 240V 50/60Hz
GX-400D
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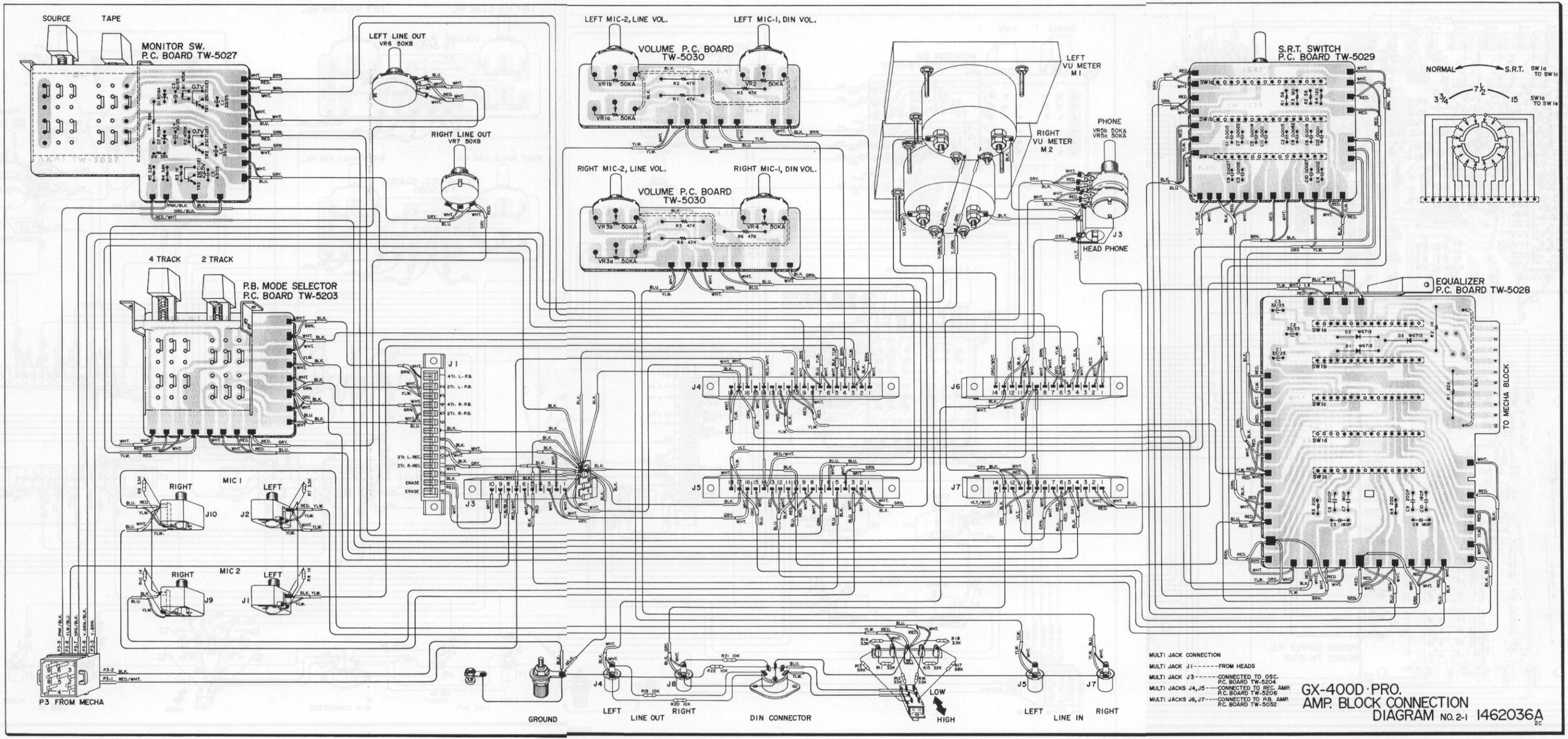
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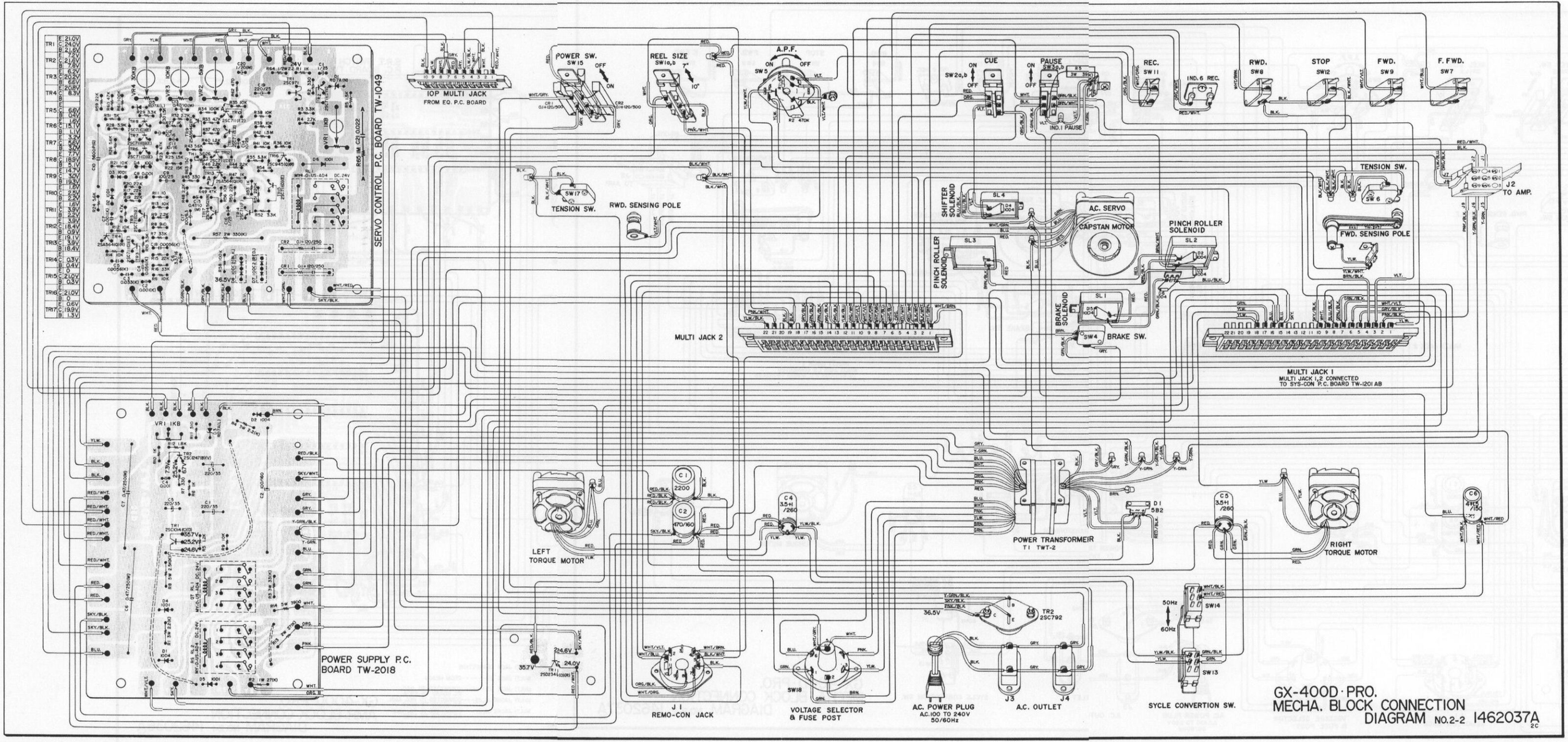
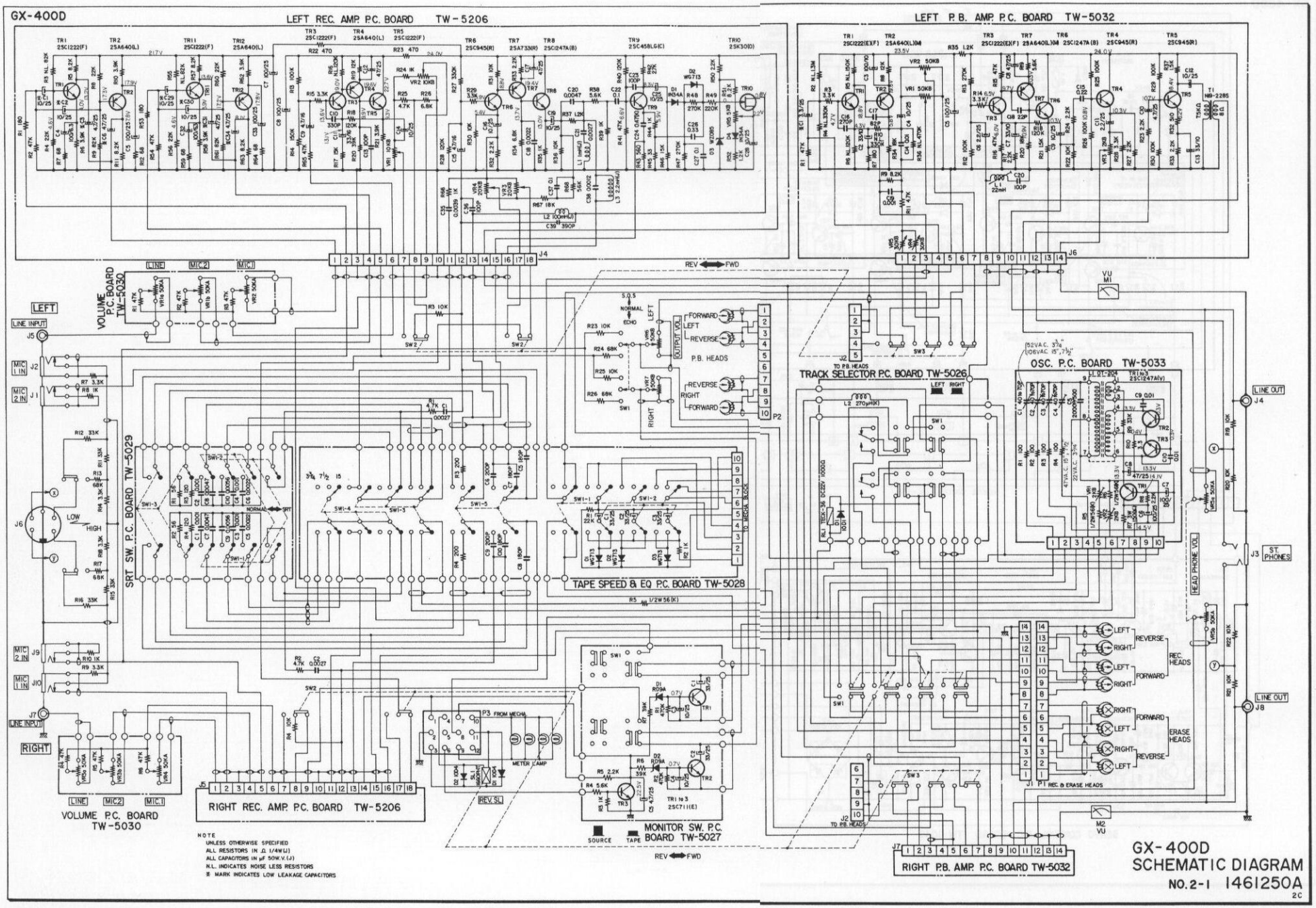
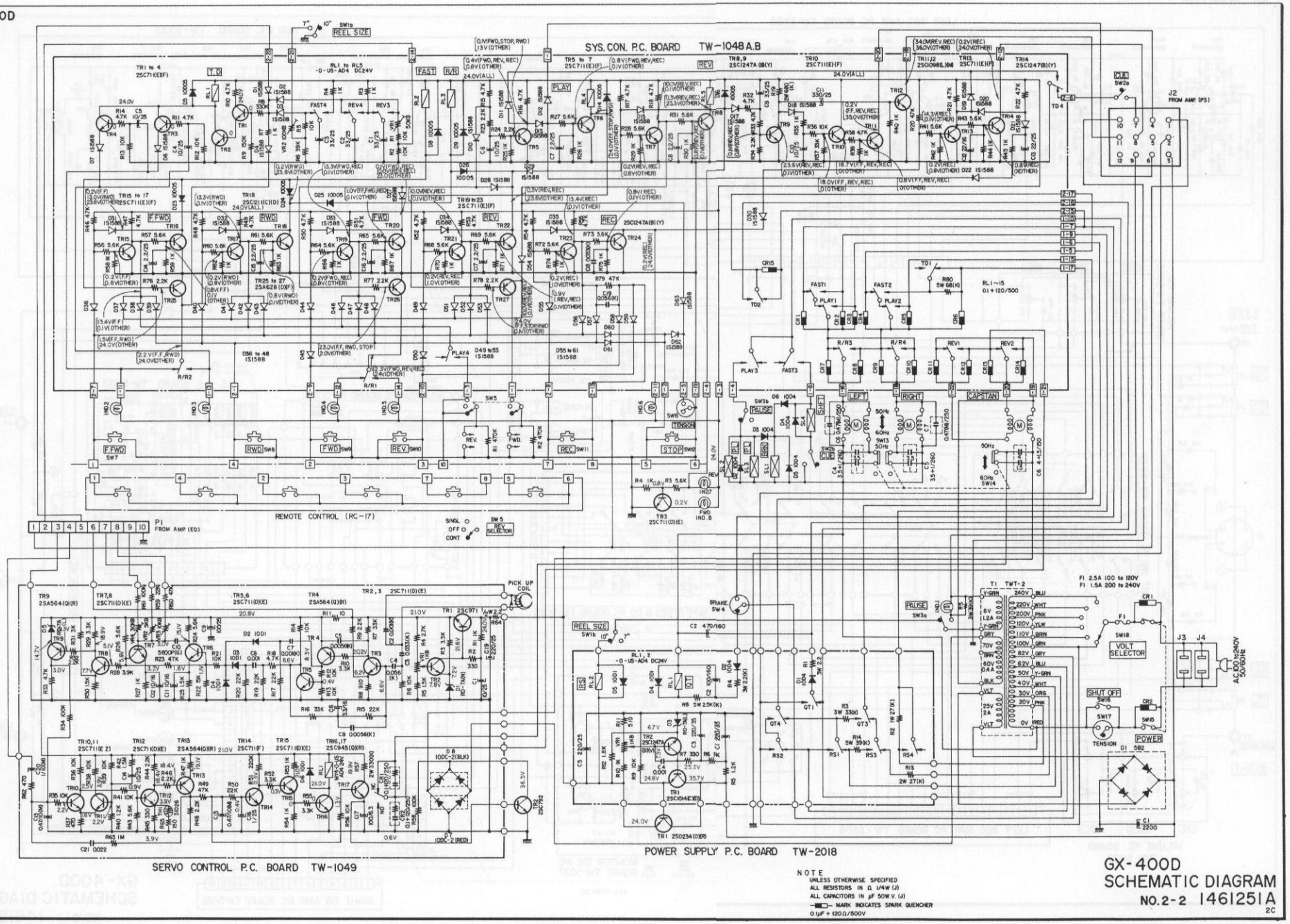
TAPE
MONITOR SW.
P.C. BOARD TW-5027
LEFT LINE OUT
VR6 50KB
RIGHT LINE OUT
VR7 50KB
LEFT MIC-2, LINE VOL.
LEFT MIC-1, DIN VOL.
VOLUME P.C. BOARD
TW-5030
RIGHT MIC-2, LINE VOL.
RIGHT MIC-1, DIN VOL.
VOLUME P.C. BOARD
TW-5030
LEFT
VU METER
M1
RIGHT
VU METER
M2
PHONE
VR5b 50KA
VR5a 50KA
J3
HEAD PHONE
S.R.T. SWITCH
P.C. BOARD TW-5029
NORMAL
S.R.T.
SW1a TO SW1c
SW1a TO SW1a
EQUALIZER
P.C. BOARD TW-5028
TO MECHA BLOCK
4 TRACK
2 TRACK
P.B. MODE SELECTOR
P.C. BOARD TW-5203
J1
4Tr. L-P.B.
2Tr. L-P.B.
4Tr. R-P.B.
2Tr. R-P.B.
2Tr. L-REC
2Tr. R-REC
ERASE
ERASE
J4
J6
J5
J7
MIC 1
RIGHT
LEFT
J10
J2
MIC 2
RIGHT
LEFT
J9
J1
P3 FROM MECHA
GROUND
LEFT
LINE OUT
RIGHT
DIN CONNECTOR
LOW
HIGH
LEFT
LINE IN
RIGHT
MULTI JACK CONNECTION
MULTI JACK J1------FROM HEADS
MULTI JACK J3------CONNECTED TO OSC. P.C. BOARD TW-5204
MULTI JACKS J4,J5---CONNECTED TO REC. AMP. P.C. BOARD TW-5206
MULTI JACKS J6,J7---CONNECTED TO P.B. AMP. P.C. BOARD TW-5032
GX-400D·PRO.
AMP. BLOCK CONNECTION DIAGRAM NO. 2-1
1462036A
2C


SERVO CONTROL P.C. BOARD TW-1049
IOP MULTI JACK
FROM EQ. P.C. BOARD
POWER SW.
SW15
REEL SIZE
SW1a,b
A.P.F.
SW5
CUE
SW2a,b
PAUSE
SW3a,b
IND.1 PAUSE
REC.
SW11
IND.6 REC.
RWD.
SW8
STOP
SW12
FWD.
SW9
F. FWD.
SW7
TENSION SW.
SW17
RWD. SENSING POLE
TENSION SW.
SW6
FWD. SENSING POLE
J2
TO AMP.
SHIFTER SOLENOID
SL4
AC. SERVO
CAPSTAN MOTOR
PINCH ROLLER SOLENOID
SL3
PINCH ROLLER SOLENOID
SL2
BRAKE SOLENOID
SL1
SW4
BRAKE SW.
MULTI JACK 2
MULTI JACK 1
MULTI JACK 1,2 CONNECTED
TO SYS-CON P.C. BOARD TW-1201 AB
VR1 1KB
POWER SUPPLY P.C.
BOARD TW-2018
LEFT
TORQUE MOTOR
POWER TRANSFORMEIR
T1 TWT-2
RIGHT
TORQUE MOTOR
J1
REMO-CON JACK
VOLTAGE SELECTOR
& FUSE POST
AC. POWER PLUG
AC.100 TO 240V
50/60Hz
J3
A.C. OUTLET
J4
SW14
SW13
SYCLE CONVERTION SW.
GX-400D·PRO.
MECHA. BLOCK CONNECTION
DIAGRAM NO.2-2 1462037A
2C

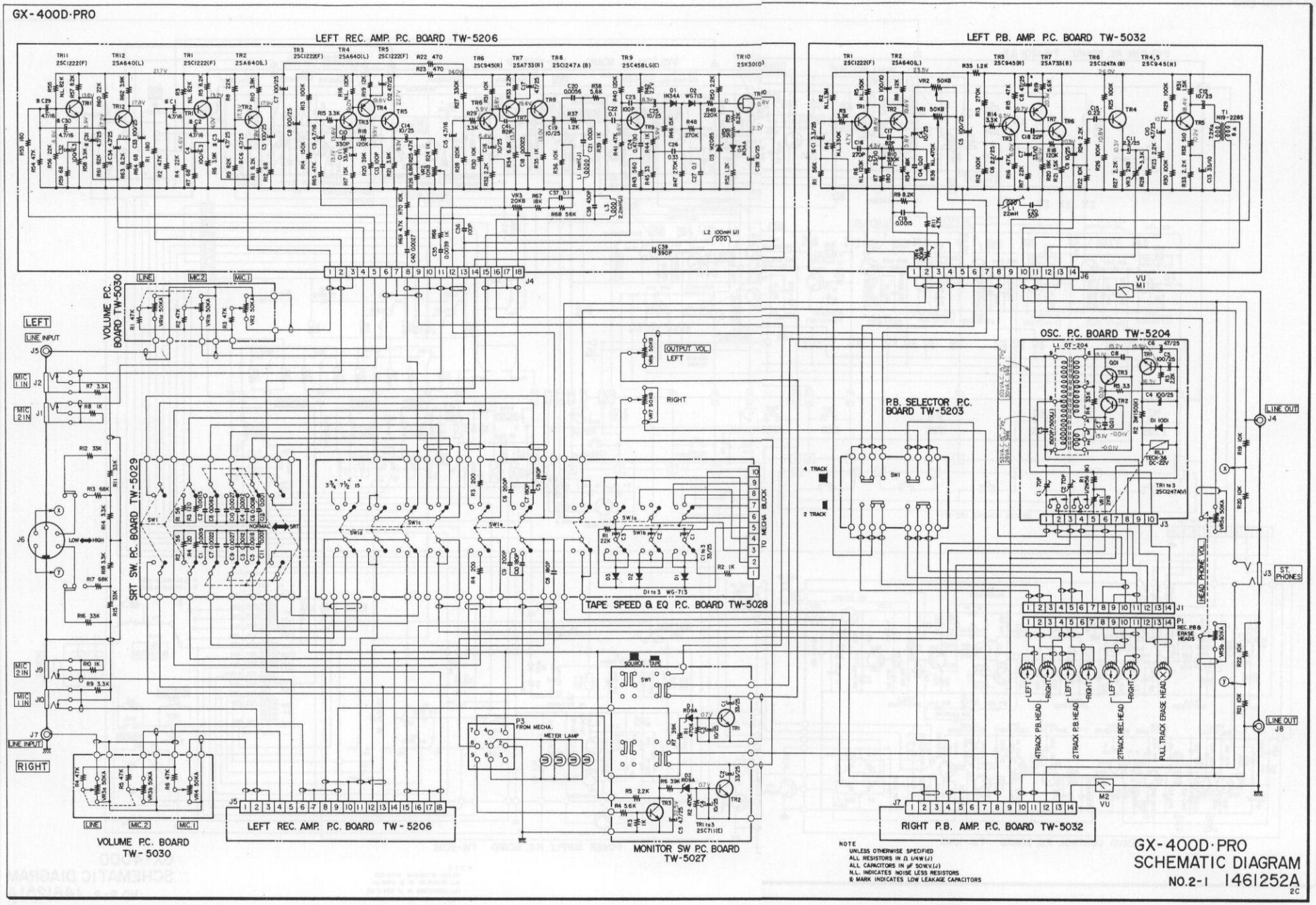

GX-400D
LEFT REC. AMP. P.C. BOARD TW-5206
LEFT P.B. AMP. P.C. BOARD TW-5032
VOLUME P.C. BOARD TW-5030
SRT SW. P.C. BOARD TW-5029
TAPE SPEED & EQ P.C. BOARD TW-5028
TRACK SELECTOR P.C. BOARD TW-5026
OSC. P.C. BOARD TW-5033
MONITOR SW. P.C. BOARD TW-5027
RIGHT REC. AMP. P.C. BOARD TW-5206
RIGHT P.B. AMP. P.C. BOARD TW-5032
VOLUME P.C. BOARD TW-5030
LEFT
RIGHT
LINE INPUT
MIC 1 IN
MIC 2 IN
LINE OUT
ST. PHONES
HEAD PHONE VOL
FORWARD
REVERSE
P.B. HEADS
REC. HEADS
ERASE HEADS
PT REC. & ERASE HEADS
TO P.B. HEADS
SOURCE
TAPE
REV ⟷ FWD
NOTE
UNLESS OTHERWISE SPECIFIED
ALL RESISTORS IN Ω 1/4W(J)
ALL CAPACITORS IN μF 50W.V.(J)
N.L. INDICATES NOISE LESS RESISTORS
※ MARK INDICATES LOW LEAKAGE CAPACITORS
GX-400D
SCHEMATIC DIAGRAM
NO.2-1 1461250A
2C

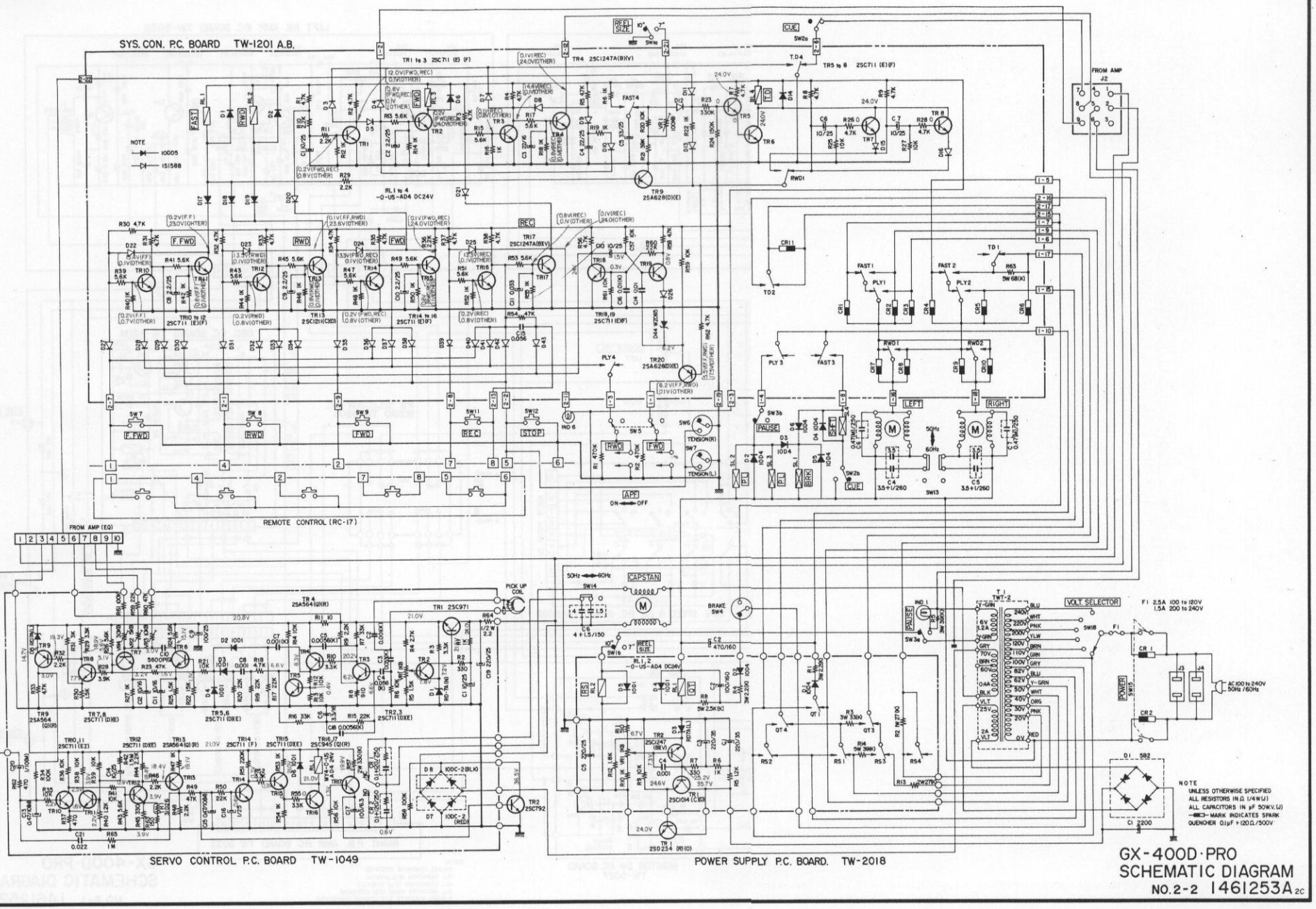
GX-400D



NOTE
UNLESS OTHERWISE SPECIFIED
ALL RESISTORS IN Ω 1/4W (J)
ALL CAPACITORS IN μF 50W.V. (J)
—■— MARK INDICATES SPARK QUENCHER
0.1μF + 120Ω/500V

GX-400D
SCHEMATIC DIAGRAM
NO.2-2 1461251A
2C


GX-400D·PRO
LEFT REC. AMP. P.C. BOARD TW-5206
LEFT P.B. AMP. P.C. BOARD TW-5032
VOLUME P.C. BOARD TW-5030
SRT SW. P.C. BOARD TW-5029
TAPE SPEED & EQ P.C. BOARD TW-5028
P.B. SELECTOR P.C. BOARD TW-5203
OSC. P.C. BOARD TW-5204
MONITOR SW P.C. BOARD TW-5027
RIGHT P.B. AMP. P.C. BOARD TW-5032
LEFT
RIGHT
LINE INPUT
MIC 1 IN
MIC 2 IN
OUTPUT VOL.
LEFT
RIGHT
4 TRACK
2 TRACK
LINE OUT
ST. PHONES
HEAD PHONE VOL.
VU
4TRACK P.B. HEAD
2TRACK P.B. HEAD
2TRACK REC. HEAD
FULL TRACK ERASE HEAD
REC. P.B. & ERASE HEADS
TO MECHA BLOCK
FROM MECHA.
METER LAMP
SOURCE
TAPE
NOTE
UNLESS OTHERWISE SPECIFIED
ALL RESISTORS IN Ω 1/4W (J)
ALL CAPACITORS IN μF 50WV.(J)
N.L. INDICATES NOISE LESS RESISTORS
& MARK INDICATES LOW LEAKAGE CAPACITORS
GX-400D·PRO
SCHEMATIC DIAGRAM
NO.2-1 1461252A
2C


SYS. CON. P.C. BOARD TW-1201 A.B.
REMOTE CONTROL (RC-17)
SERVO CONTROL P.C. BOARD TW-1049
POWER SUPPLY P.C. BOARD. TW-2018
FROM AMP (EQ)
FROM AMP J2
VOLT SELECTOR
NOTE
UNLESS OTHERWISE SPECIFIED
ALL RESISTORS IN Ω 1/4W (J)
ALL CAPACITORS IN μF 50WV (J)
MARK INDICATES SPARK QUENCHER 0.1μF +120Ω/500V
GX-400D·PRO
SCHEMATIC DIAGRAM
NO.2-2 1461253A 2C