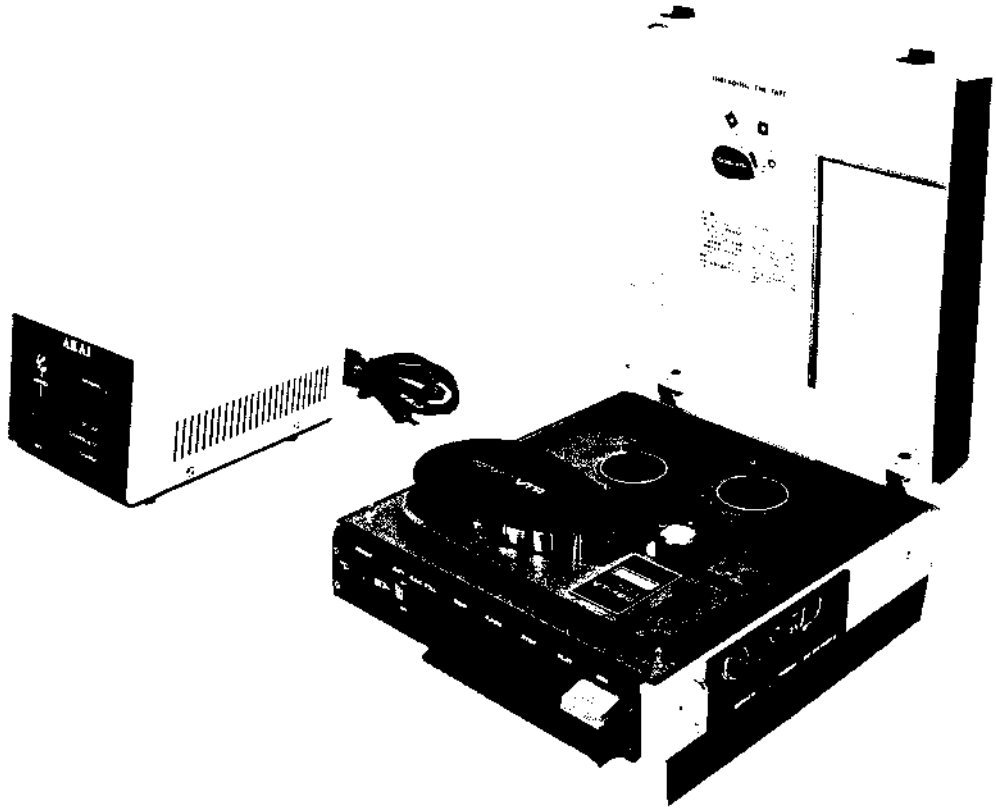
SERVICE MANUAL

PARTS LIST

AKAI PORTABLE VIDEO TAPE RECORDER

MODEL **VT-120**

THIS MANUAL MUST BE USED AS A SET TOGETHER WITH SEPARATELY PUBLISHED VTS-110 SERVICE MANUAL



PORTABLE VIDEO TAPE RECORDER

MODEL VT-120

THIS MANUAL MUST BE USED AS A SET TOGETHER
WITH SEPARATELY PUBLISHED VTS-110 SERVICE MANUAL

SECTION 1

SERVICE MANUAL

THIS MANUAL MUST BE USED AS A SET TOGETHER
WITH SEPARATELY PUBLISHED VTS-110 SERVICE MANUAL

TABLE OF CONTENTS

I. ADJUSTMENT OF TAPE TRANSPORT MECHANISM

1. MECHANISM SPECIFICATIONS

(1)	MAIN PINCH ROLLER PRESSURE			1.5 kg ± 0.1 kg
(2)	SUB PINCH ROLLER PRESSURE			30 to 35g
(3)	SPACE BETWEEN CAPSTAN AND PINCH ROLLER		MAIN	1.5 to 2 mm
			SUB	2 to 3 mm
(4)	TAKE-UP TORQUE	WITH TAPE BEING ROLLED ONTO REEL		60 to 110g
		WITH TAPE BEING ROLLED OFF OF REEL		above value +10 to 20g
(5)	TAPE HOLD-BACK TENSION			8 to 10g
(6)	FAST FORWARD TORQUE	WITH TAPE BEING ROLLED ONTO REEL		200 to 300g
(7)	REWIND TORQUE	WITH TAPE BEING ROLLED ONTO REEL		200 to 300g
(8)	A. E. C. Rewind Torque	WITH TAPE BEING ROLLED ONTO REEL		200 to 300g
(9)	BRAKE TORQUE		SUPPLY SIDE	80 to 130g
			TAKE-UP SIDE	80 to 120g
(10)	DRIVE IDLER PRESSURE			300 to 400g
(11)	REEL TABLE CLEARANCE			0.2 to 0.5 mm
(12)	CAPSTAN SHAFT CLEARANCE			0.2 to 0.5 mm
(13)	SPACE BETWEEN TAKE-UP PULLEY AND TAKE-UP DRUM			about 1 mm
(14)	SPACE BETWEEN BRAKE SHOE AND TAKE-UP DRUM			about 1 mm
(15)	TAPE SPEED DEVIATION	1000 HZ TAPE PLAYBACK		Less than ± 0.5%
(16)	WOW AND FLUTTER	3000 HZ TAPE PLAYBACK		Less than 0.17 r.m.s.

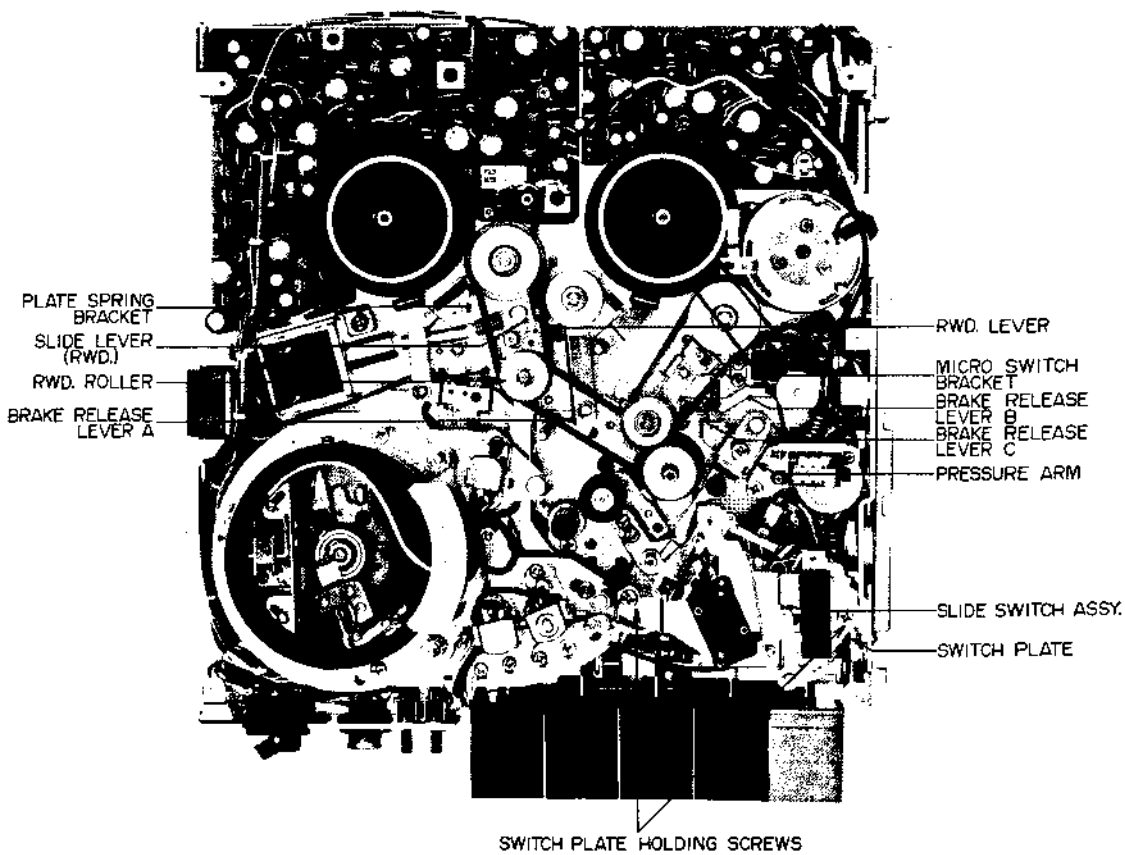


Fig. 1-1

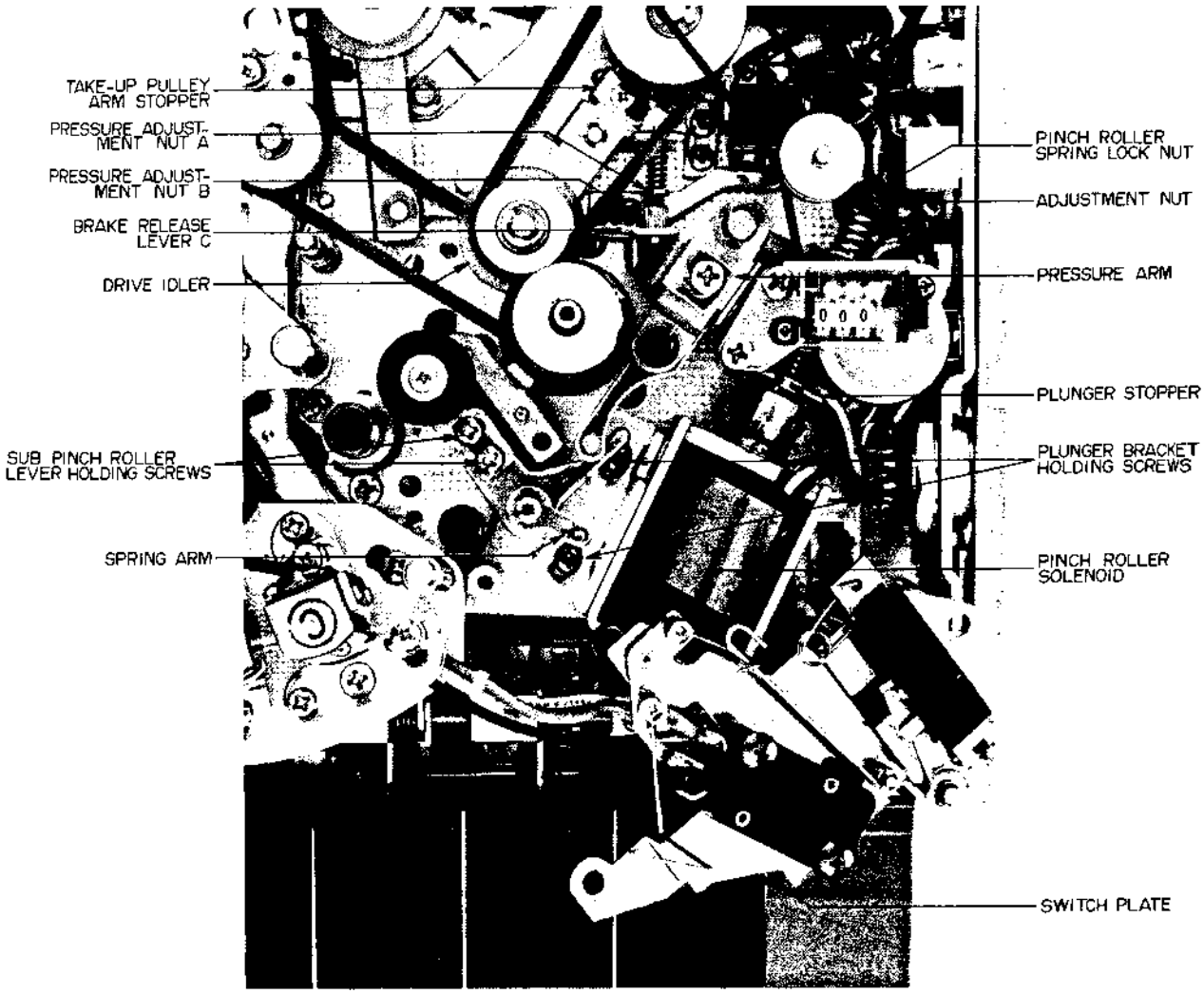


Fig. 1-2

2. MECHANICAL ADJUSTMENT

(1) MAIN PINCH ROLLER PRESSURE ADJUSTMENT

a) Remove the two switch plate holding screws (Refer to Fig. 1-1) and move the slide switch assembly as shown in Fig. 1-2.

b) Loosen the pressure arm holding screw and set plunger bracket holding screw to center of oval hole.

c) Set plunger stopper at furtherest position from pinch roller solenoid.

d) As shown in Fig. 1-3, at playback mode, use a 0 to 2 kg. spring gauge and measure the pinch roller pressure when pinch roller rotation stops. Loosen pinch roller spring lock nut and adjust pressure to about 2 kg by turning adjustment nut. Tighten lock nut following adjustment. (When tightening lock nut, be careful not to rotate adjustment nut as this will change the pressure).

e) Adjust plunger stopper position and set so that the space between capstan and pinch roller is about 2 mm and the entire solenoid shaft is rectilineal.

f) Adjust pressure arm position and set so that the space between Drive Idler and Capstan Pulley is about 1 mm.

g) After the above adjustments have been completed, measure pinch roller pressure again as outlined in Item(d) and confirm that it is 1.5 kg ± 0.1 kg. In case pinch roller pressure is not within these specifications, re-adjust with adjustment nut.
When pinch roller pressure is changed, because this also changes the width of the space between the capstan and pinch roller, adjust plunger stopper position according to necessity.

NOTE: The adjustments outlined in times (i) through (f) above are necessary only when replacing the pinch roller solenoid. For adjustment of pinch roller pressue only, make adjustment outlined in iten (g).

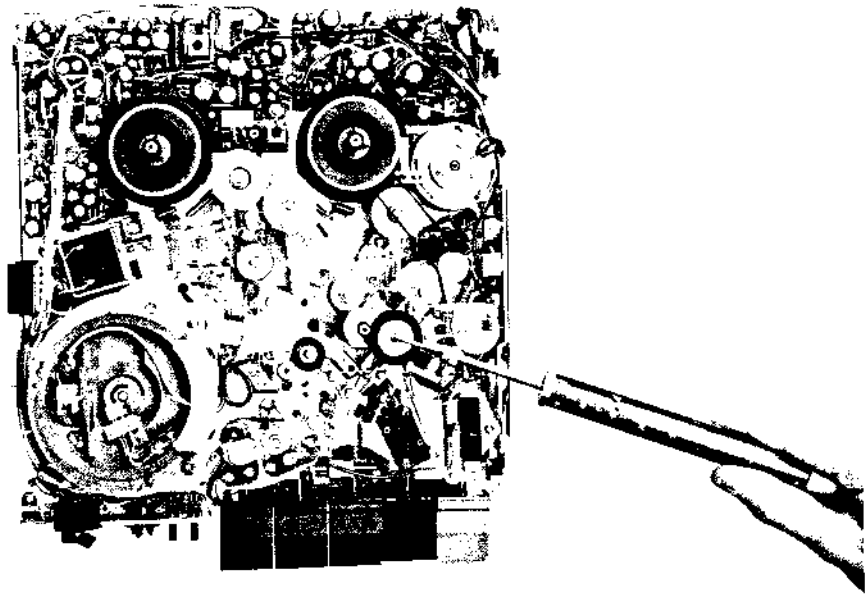


Fig. 1-3

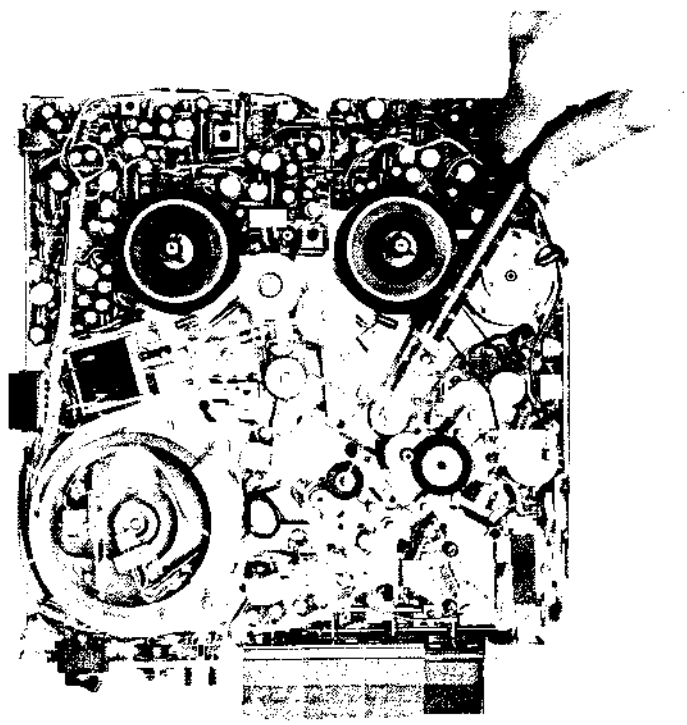


Fig. 1-4

(2) SUB PINCH ROLLER PRESSURE ADJUSTMENT

a) Set sub pinch roller lever holding screw so that at stop mode, the space between sub pinch roller and sub capstan is 2 to 3 mm.

b) As shown in Fig. 1-4, at playback mode, connect a 0 to 50g spring gauge to the sub pinch roller shaft and measure pressure at point at which pinch roller rotation stops.

c) Adjust spring arm for 30 to 35g pressure. (Pressure becomes weaker when spring arm is turned clockwise and stronger when turned counter-clockwise).

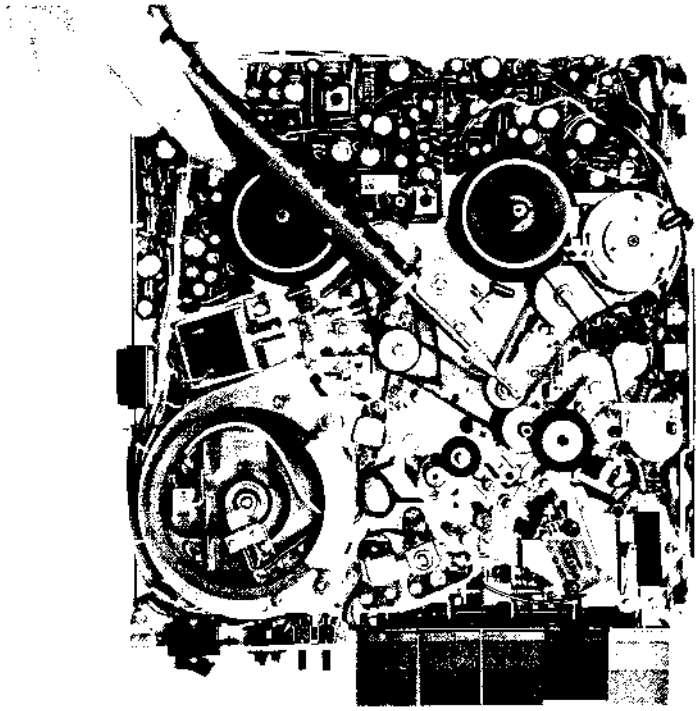


Fig. 1-5

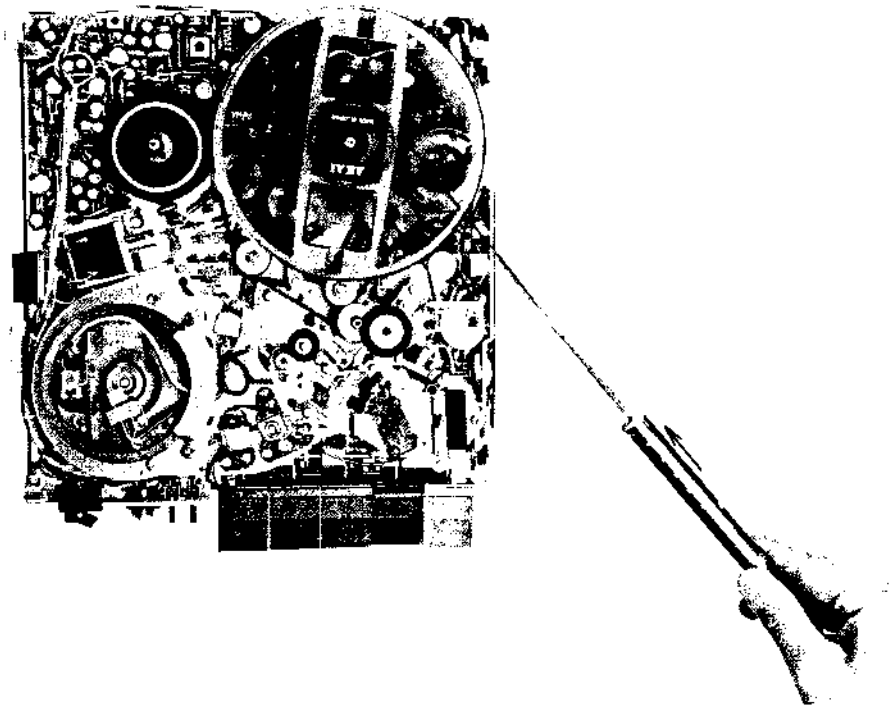
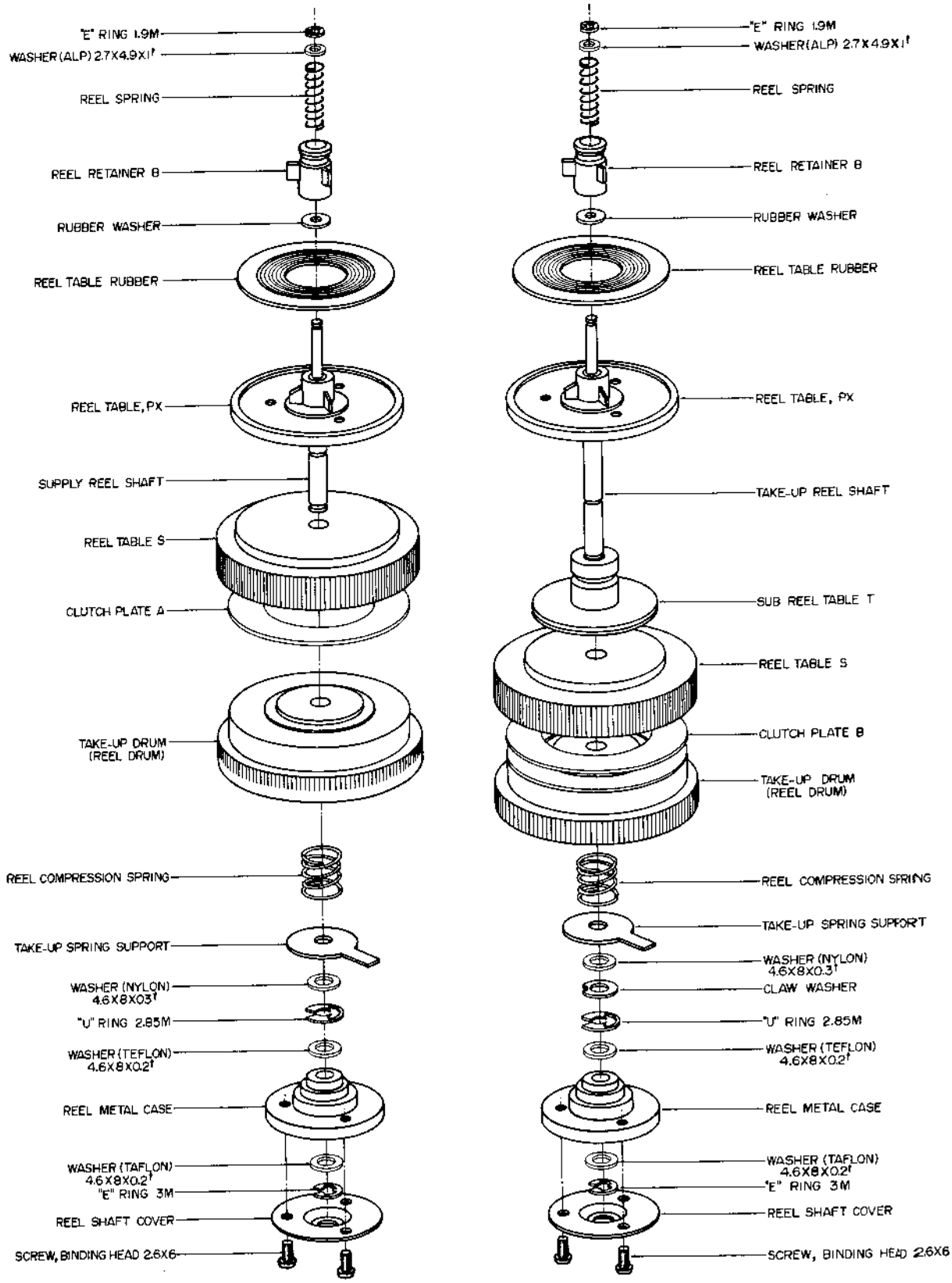


Fig. 1-6



SUPPLY REEL SPINDLE

TAKE-UP REEL SPINDLE

Fig. 1-7

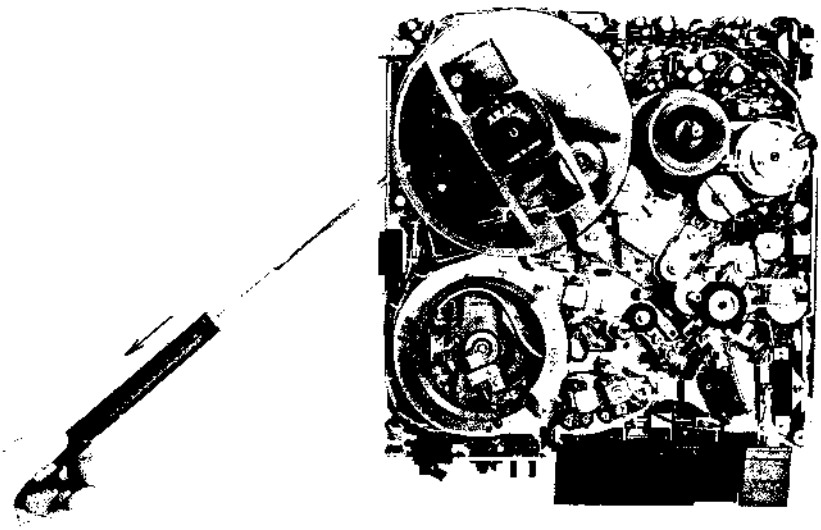


Fig. 1-8

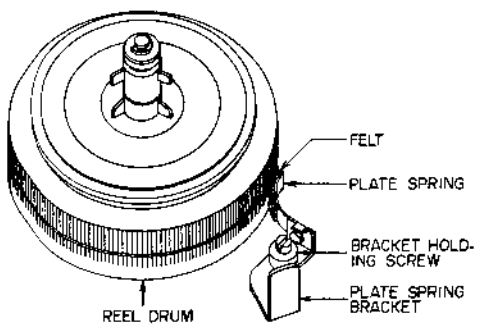


Fig. 1-9

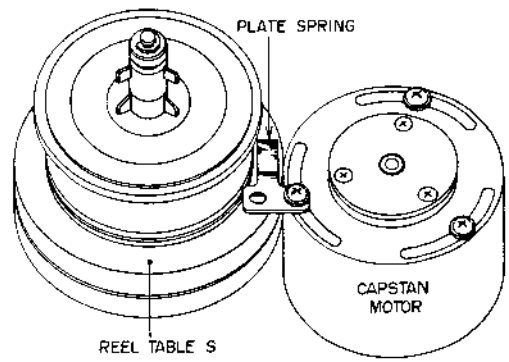


Fig. 1-10

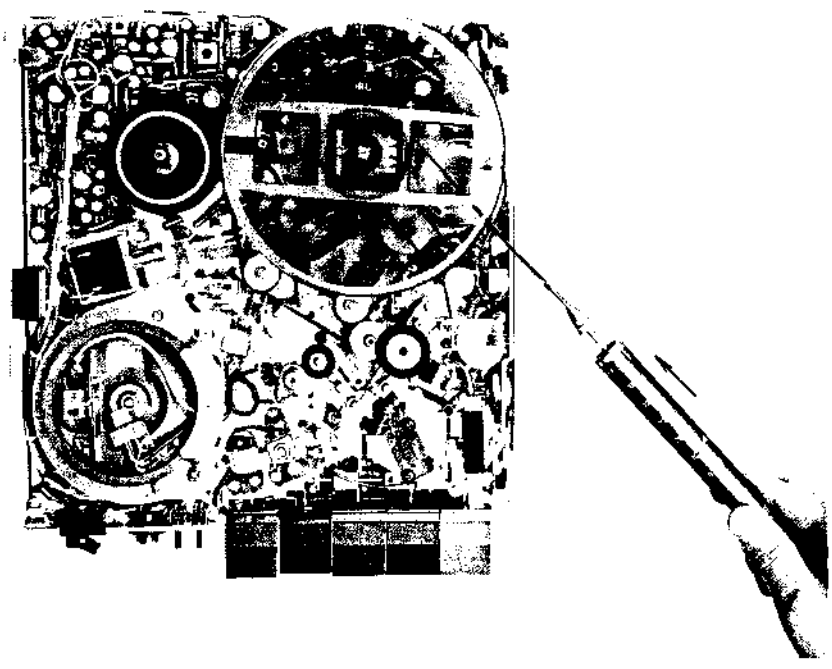


Fig. 1-11

(3) DRIVE IDLER AND TAKE-UP PULLEY ADJUSTMENT

a) At stop mode, confirm that the space between Drive Idler and Capstan Pulley is about 1 mm. (Refer to Part (1), Item (f) above).

b) Adjust take-up pulley arm stopper so that the space between Take-Up Pulley and reel drum of Take-Up Reel Talbe is about 1 mm.

c) As shown in Fig. 1-5, at playback mode, connect a 0 to 500g spring gauge to upper part of the drive idler shaft and measure the pressure when drive idler rotation stops.

d) With pressure adjustment nut "A" at a stabilized position, adjust drive idler pressure to 300 to 400g by turning nut "B".

e) After completing the above adjustments, at playback mode, confirm that when the take-up reel rotation is stopped by hand, the drive idler and take-up pulley rotate smoothly.

(4) BRAKE RELEASE AND MICRO SWITCH ADJUSTMENT

a) Adjust Brake release lever "C" so that at playback mode, the brake shoe separates from the reel table drum by about 1 mm, and at stop mode, brake lever "B" does not touch lever "A". (Refer to Fig. 1-1)
Confirm that at Fast Forward and Rewind modes, the brake shoe separates from the reel table pulley by more than 1 mm.

c) Adjust the micro switch bracket so that brake tension lever "B" pushes the 2 micro switches perfectly at playback mode, and the 2 micro switches are turned off perfectly at stop mode. (Refer to Fig. 1-1)

NOTE: Be careful that at playback mode, lever "B" does not push the micro switches too much.

(5) TAKE-UP TORQUE ADJUSTMENT

a) As shown in Fig. 1-6, use a 50 mm diameter of tape wound on a 5" reel and with 0 to 300g tension gauge, measure the take-up torque at playback mode.

b) It is satisfactory if the value is 60 to 110g with tape being rolled onto reel and this value plus 10 to 20g when the tape is pulled away from the reel table. Because the take-up torque value is determined by the take-up spring inside the take-up reel table, if the torque is not correct, adjust by regulating the strength of this spring. (Refer to Fig. 1-7)

(6) TAPE HOLD-BACK TENSION ADJUSTMENT

a) As shown in Fig. 1-8, using the same reel as described in Paet (5), Item(a), set reel on supply reel table and with a 0 to 50g spring gauge, measure the supply reel table hold-back tension at playback mode.

b) Adjust tension to 8 to 10g by changing the angle of the plate spring bracket. (Refer to Fig. 1-9)

c) Using the measuring method outlined in Item(a) above, set the same reel on the take-up reel table and measure the hold-back tension at rewind mode.

d) Adjust tension to 8 to 10g by changing the angle of the plate spring installed on upper part of capstan motor. (Refer to Fig. 1-10)

(7) FAST FORWARD AND REWIND TORQUE MEASUREMENT

a) As shown in Fig. 1-11, use the same reel described in Part (5), Item (a), and set reel on take-up reel table. Using a 0 to 500g spring gauge, and being careful not to induce tape slack, read gauge value at fast forward mode while the tape is being rolled onto reel. It is satisfactory if fast forward torque is within 200 to 300g.

b) As shown in Fig. 1-12, use the same reel as in Item (a) above and set on supply reel table. Also, using the same method as in Item (a) above, measure torque at rewind mode. It is satisfactory if rewind torque is within 200 to 300g.

c) In case fast forward or rewind torque is insufficient, check for idler slippage, belt stretch, etc.

(8) REWIND PLUNGER ADJUSTMENT

a) Bring the rewind plunger fully to the left and stationary so that the plunger shaft is rectilineal.

b) With VTR at REC mode and A.E.C. Switch at ON position, when Camera/TV Switch is switched from TV to Camera position, the rewind plunger operates for about 2 seconds. Measure rewind torque during plunger operating period. Rewind torque measuring method and specifications are the same as described in Part 7, Item (b) above.

c) A.E.C. rewind torque adjustment is made by changing the angle of the slide lever on the rewind lever.
As shown in Fig. 1-13, when the pin of adjustment driver (Refer to Fig. 1-14) is fitted in hole Ⓐ of rewind lever and the slide lever holding screw is at a slightly loosened condition, rewind torque can be adjusted by turning the adjustment driver and changing the angle of the slide lever. If rewind torque is within specifications, tighten slide lever holding screw.

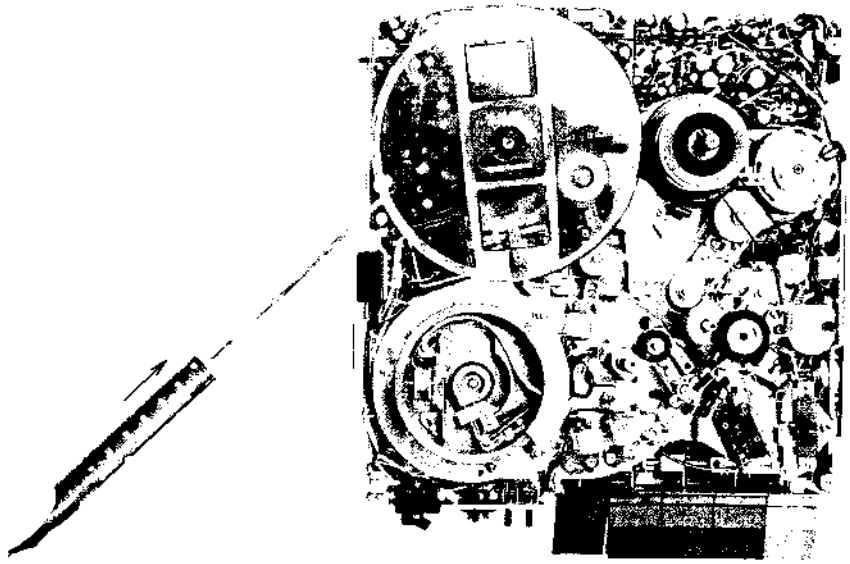


Fig. 1-12

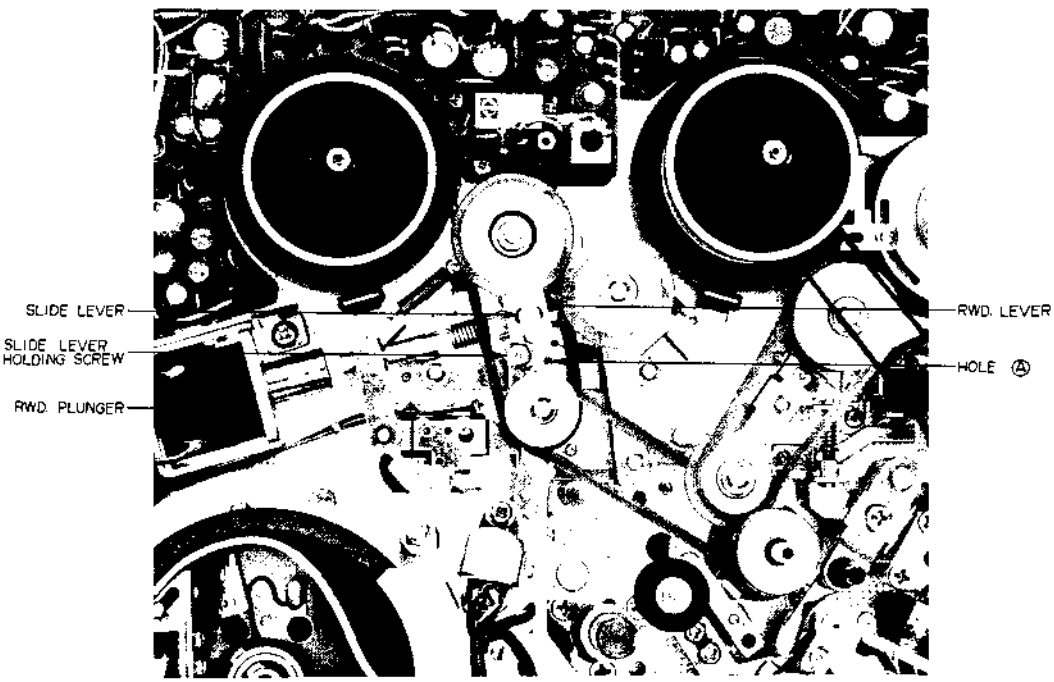


Fig. 1-13

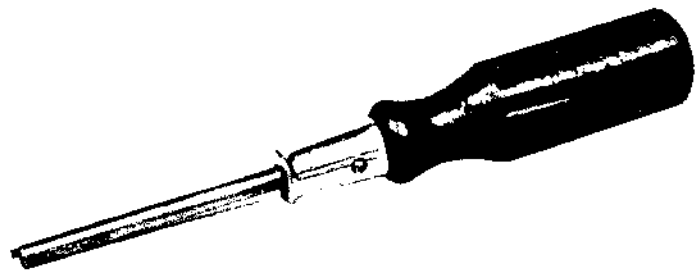


Fig. 1-14

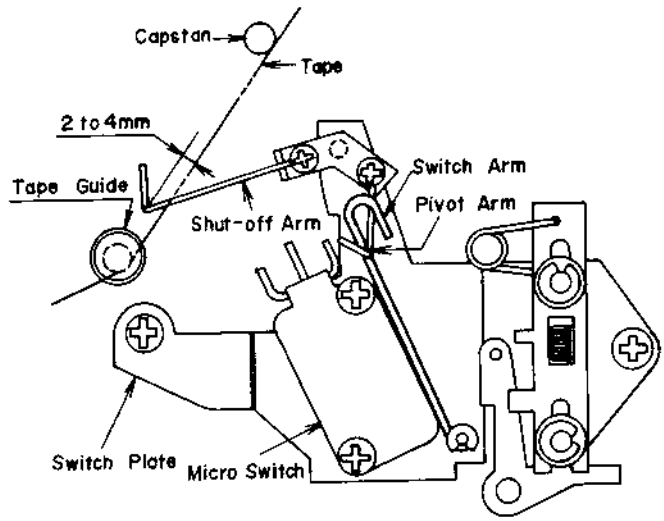


Fig. 1-15

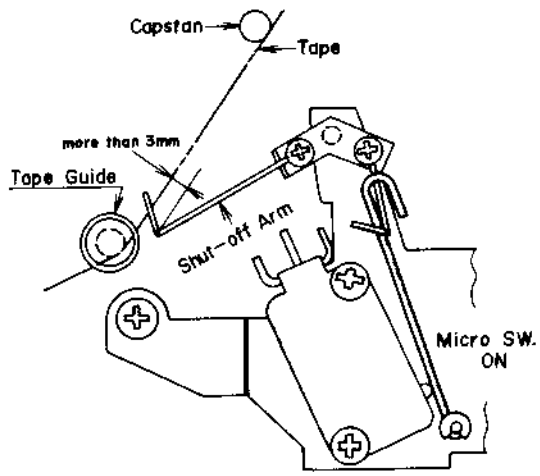


Fig. 1-16

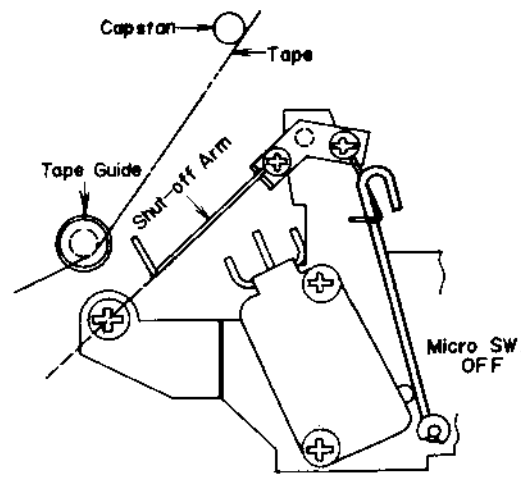


Fig. 1-17

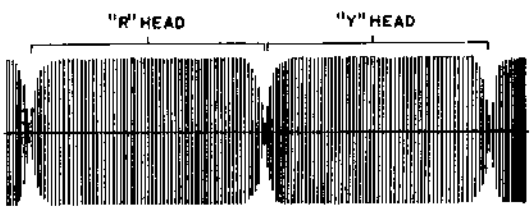


Fig. 1-18

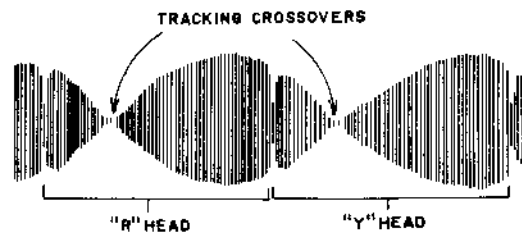


Fig. 1-19

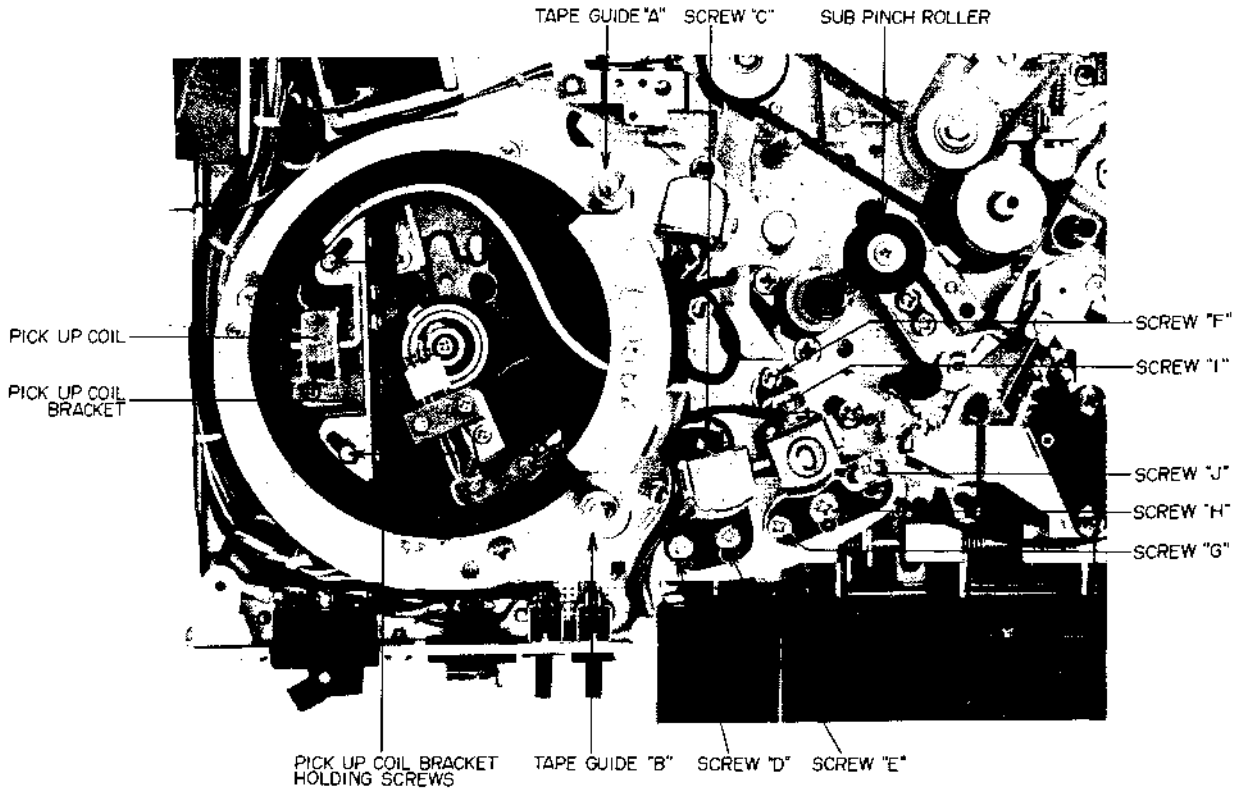


Fig. 1-20

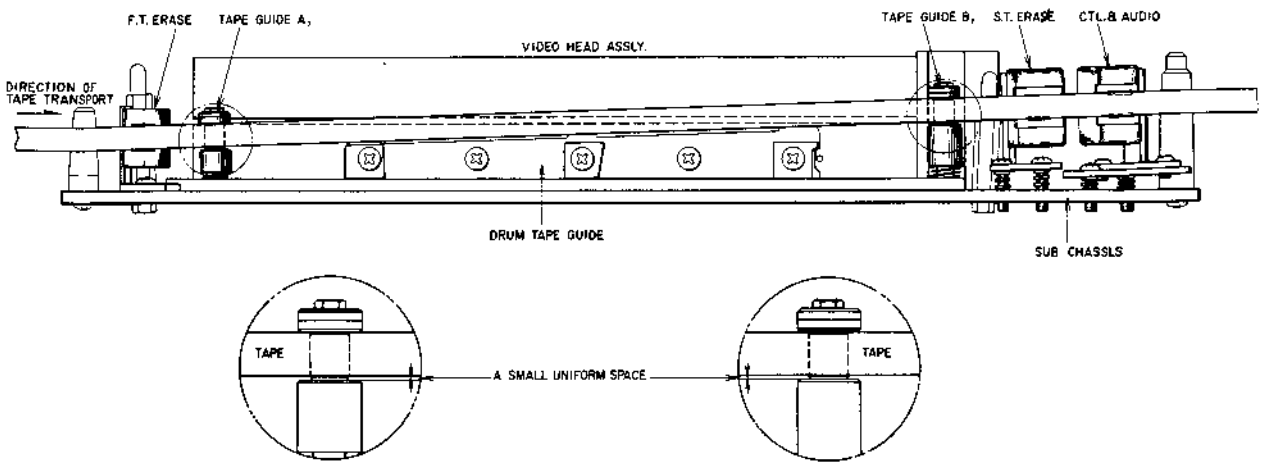
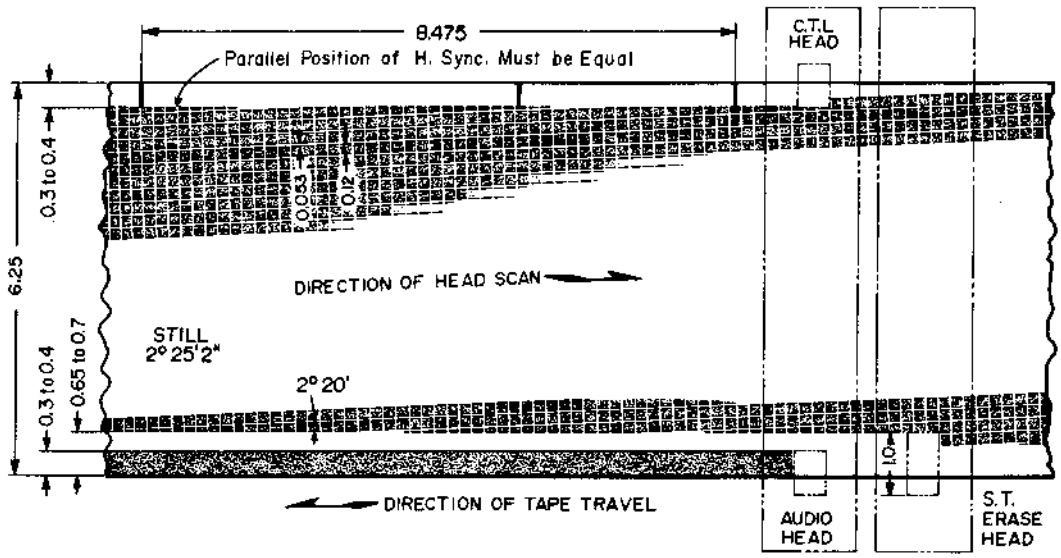


Fig. 1-21

(9) BRAKE TORQUE MEASUREMENT

a) At stop mode, measure the supply reel and take-up reel brake torque using the same reel as in Part (5), Item (a). The supply reel side should be 80 to 130g and the take-up side 80 to 120g.

b) As brake torque is determined by the strengh of the take-up spring inside the reel assembly. adjust take-up spring according to necessity. (Refer to Fig. 1-7)



RECORDED PATTERN OF VIDEO TAPE
(Viewed From Center of Head Drum)

Fig. 1-22

(10) SHUT-OFF MECHANISM ADJUSTMENT

a) Adjust pivot arm so that the position of the shut-off arm is 2 to 4 mm from the tape surface when the micro switch is depressed by the switch arm. (Refer to Fig. 1-15)

b) Return shut off switch to OFF position and move gently by hand. Confirm that the micro switch is turned ON at a distance of more than 3 mm before the shut-off arm reaches the tape surface (Refer to Fig. 1-16).
Next, remove your hand after the shut-off arm has reached the tape surface and confirm that the position of the shut-off arm when the micro switch is turned OFF is in the vicinity of the center of the left hand side switch plate holding screw. (Refer to Fig. 1-17)
In case switch ON and OFF positions are not as described above, adjust by slightly moving position of micro switch.

(11) TAPE TRAVEL AND HEAD HEIGHT ADJUSTMENT

a) Sub pinch roller shaft angle adjustment
Load a tape and adjust angle of sub pinch roller shaft so that the tape runs in the same position on the pinch roller at all modes (fast forward, rewind, and playback). Also confirm that at playback mode, the tape travels over the tape guide smoothly and without causing up and down movement of the center of the head drum.

b) Connect an oscilloscope to video amp P.C. Board test point TP-5 (Refer to Fig. 2-30) Playback a video reference tape and while ovserving RF Envelope, adjust the height of tape guides "A" and "B" (Refer to Fig. 1-20) to obtain as square a waveform as possible as shown in Fig. 1-18.

c) Loosen screws "I" and "J" (Refer to Fig. 1-20). Move CTL head to left and right and fix at position at which RF Envelope displays maximum amplitude and is square. If even by adjustment of the CTL head, tracking cross-over appears as shown in Fig. 1-19, readjust tape guides "A" and "B".

d) In case RF Envelope amplitude fluctuation exists even after the above adjustments have been made, because tape travel is causing vertical movement of the tape guide band on the outer circumference of the head drum, adjust the angle of sub pinch roller or the forward and backward slant of the side track erase head and/or CTL head so that the tape contacts the upper part of tape guides "A" and "B" as shown in Fig. 1-21 and runs smoothly on the tape guide band. When making this adjustment, at the same time adjust tape guides "A" and "B" to obtain a square RF Envelope. RF Envelope fluctuation must be within 10% of peak to peak value.

e) For side track erase head and CTL and audio head height adjustment, adjust the respective head holding screws (screws C,D,E, and F,G,H) and set to obtian pattern shown in Fig. 1-22.

f) Record and playback a test pattern signal and confirm that RF Envelope output is stabilized (does not fluctuate). R.F. Envelope amplitude must exceed 0.6V peak to at recording/playback and the difference in amplitude of the two heads should be less than 3dB.

II. P. C. BOARD ADJUSTMENT

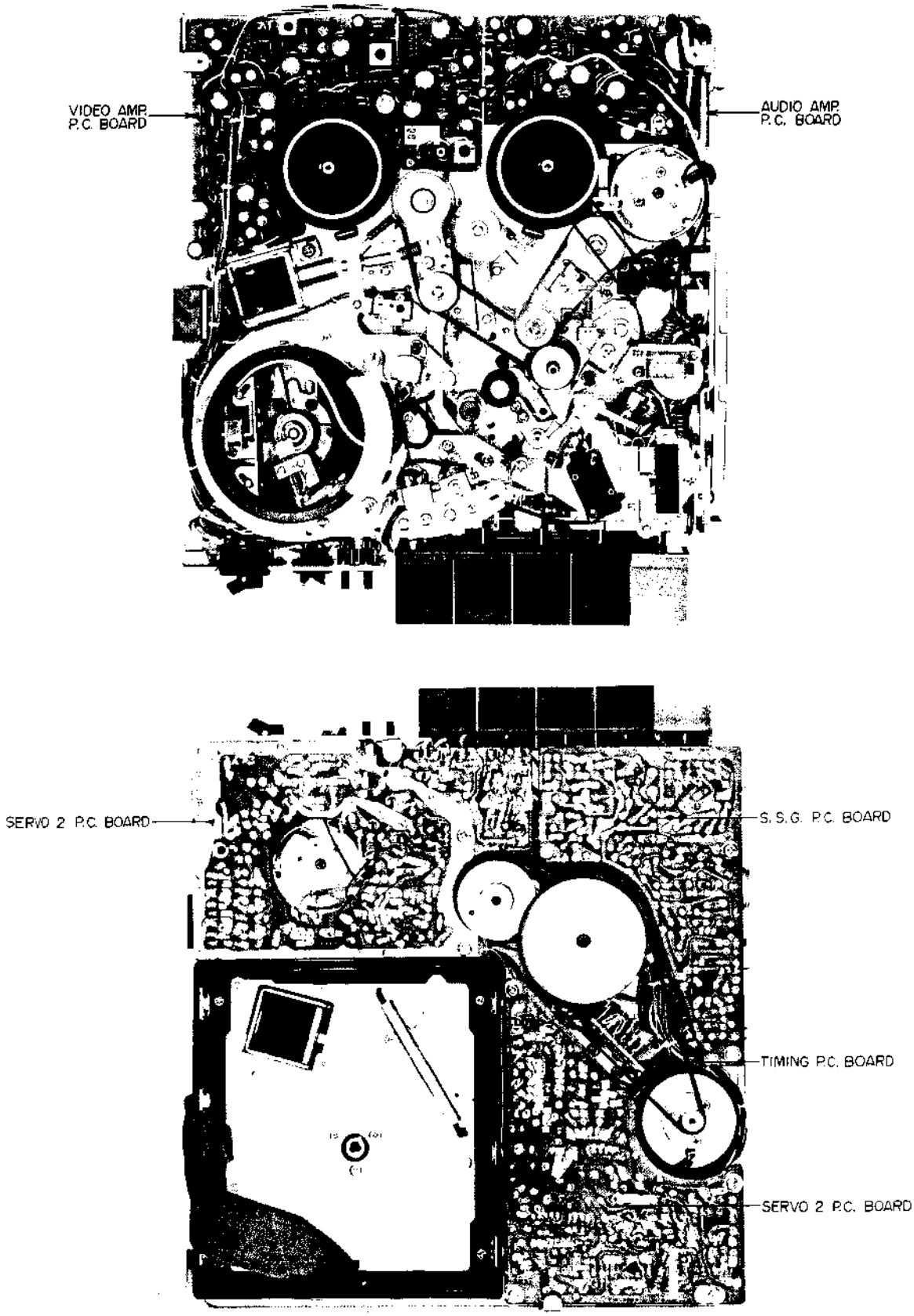


Fig. 2-1 P.C. BOARD LOCATION.

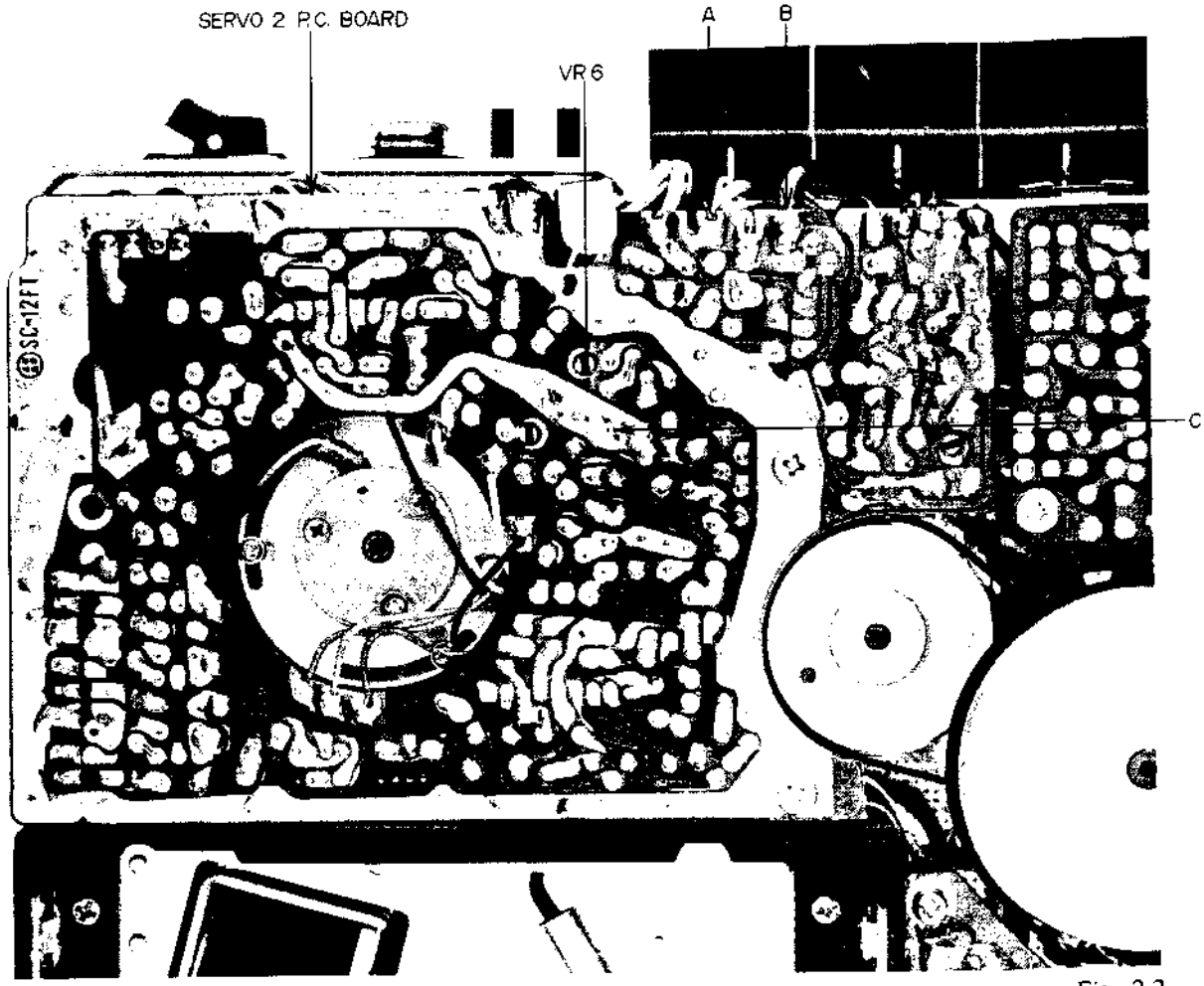

SERVO 2 P.C. BOARD
A
B
VR 6
C
SC-12FT

Fig. 2-2

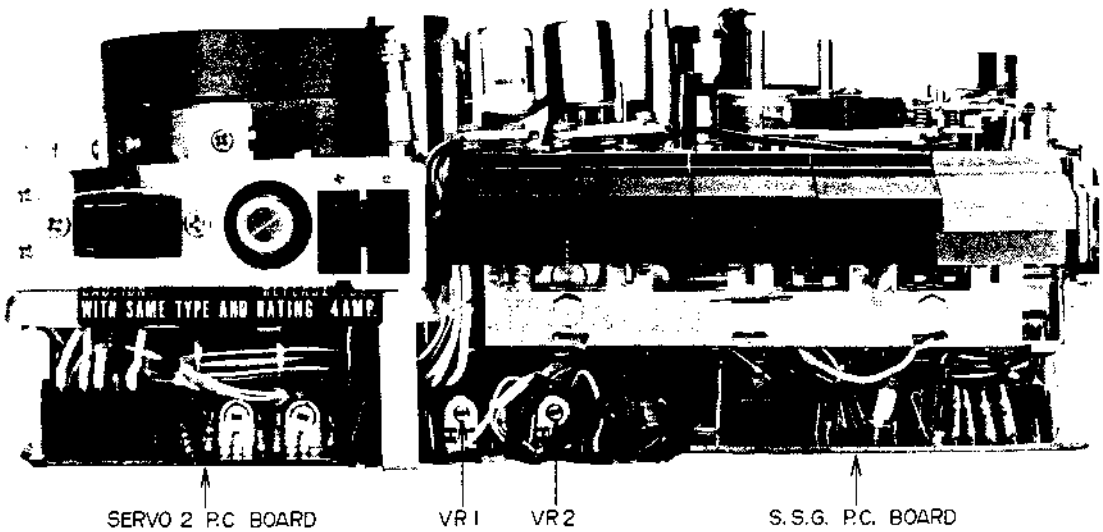

WITH SAME TYPE AND RATING 4AMP.
SERVO 2 P.C BOARD
VR 1
VR 2
S.S.G. P.C. BOARD

Fig. 2-3

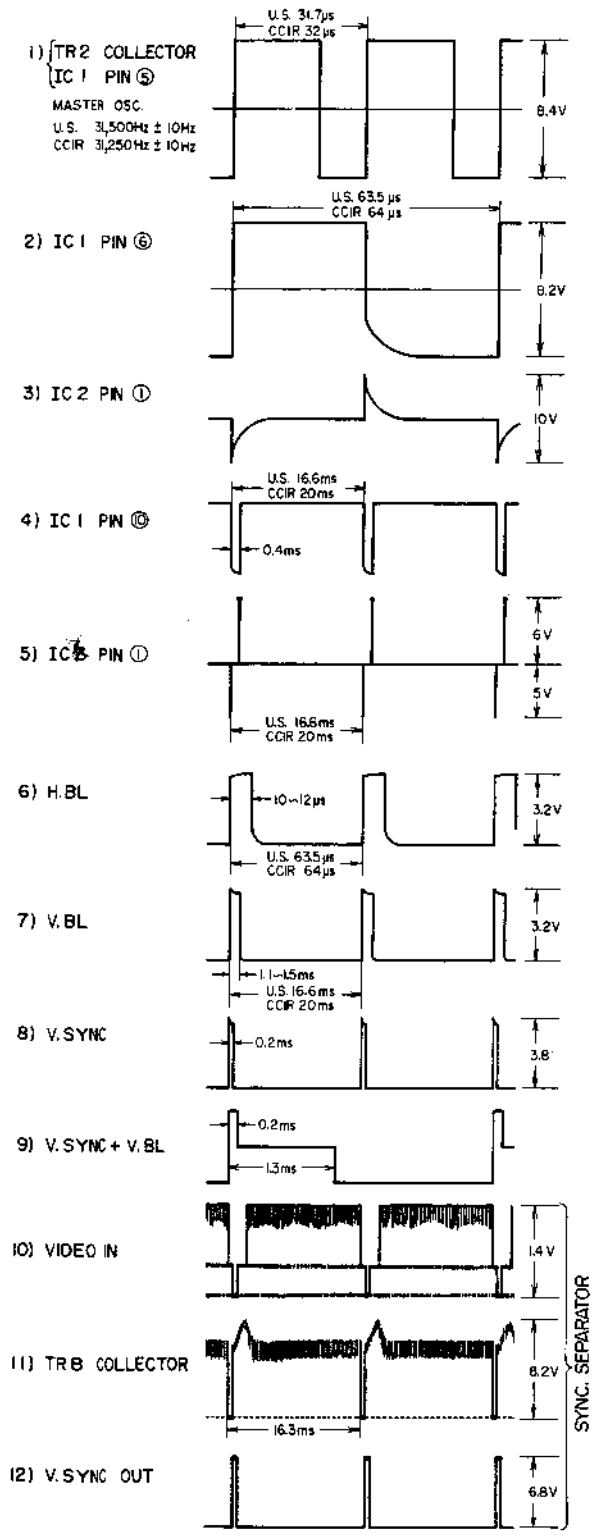


Fig. 2-4 S.S.G. CIRCUIT REFERENCE WAVEFORM.

1. POWER SUPPLY CIRCUIT

(Refer to Figs. 2-2 and 2-3)

(1) Connect AC Adapter VA-110 to VTR and connect a D.C. Voltmeter to A point of Servo 2 P.C. Board. Adjust VA-110 semi-fixed volume VR-1 (Refer to VT-110 Service Manual) so that the voltage at this point is 12V ± 0.2V.

(2) Next, connect the D.C. Voltmeter to B point of Servo 2 P.C. Board and adjust Servo 2 P.C. Board VR2 so that the voltage at this point is $9V \pm {}^{0.2}_{0}V$. Then, connect D.C. Voltmeter to C point and adjust VR6 in the same way until C point voltage is 9V ± 0.2V.

(3) Connect the D.C. Voltmeter to A point again and adjust VA-110 VR-1 until the voltage is 11V ± 0.2V. At this condition, adjust Servo 2 P.C. Board VR1 so that the Battery Level Meter indication is in the center between red and green.
Following this adjustment, reset A point voltage to 12V.

2. S.S.G. P.C. BOARD

Because the S.S.G. P.C. Board employs IC's, there are no adjustable items except the oscillation frequency of the Master Oscillator.

S.S.G. Circuit reference waveform is shown in Fig. 2-4.

(1) Confirmation of Master Oscillator Frequency
Connect a frequency counter to Pin ⑤ of IC I and confirm that the oscillation frequency is 31,500 Hz (CCIR 31,250 Hz) ±10 Hz. If frequency differs, adjust to specifications by turning the core of Transformer T1.

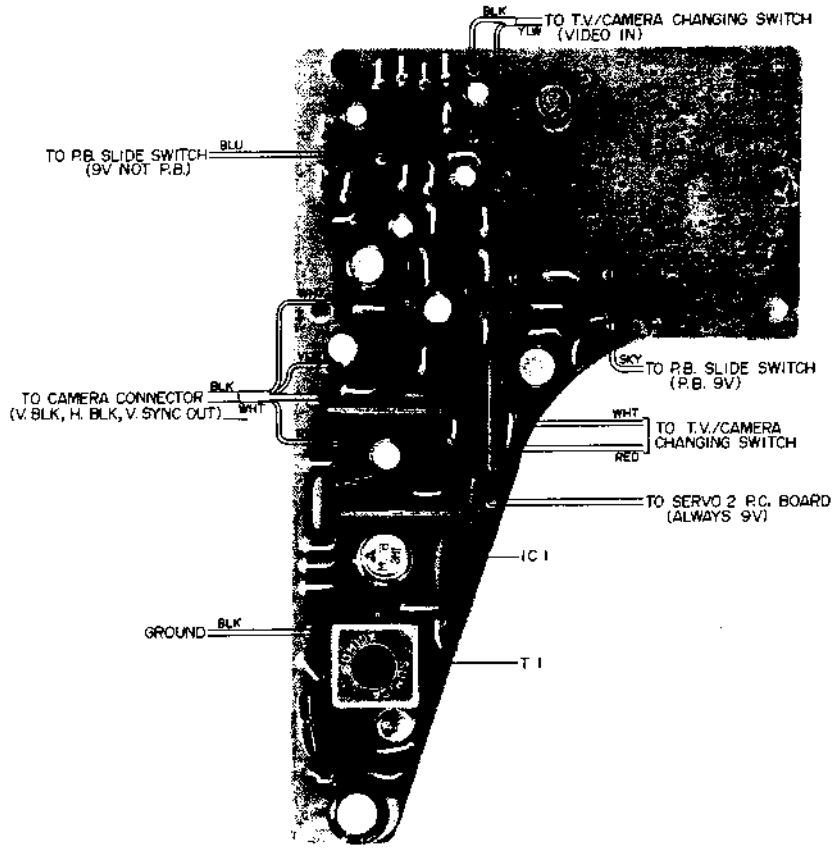

BLK
YLW
TO T.V./CAMERA CHANGING SWITCH (VIDEO IN)
TO P.B. SLIDE SWITCH (9V NOT P.B.)
BLU
SKY
TO P.B. SLIDE SWITCH (P.B. 9V)
TO CAMERA CONNECTOR (V. BLK, H. BLK, V. SYNC OUT)
BLK
WHT
WHT
RED
TO T.V./CAMERA CHANGING SWITCH
TO SERVO 2 P.C. BOARD (ALWAYS 9V)
IC 1
GROUND
BLK
T 1

Fig. 2-5

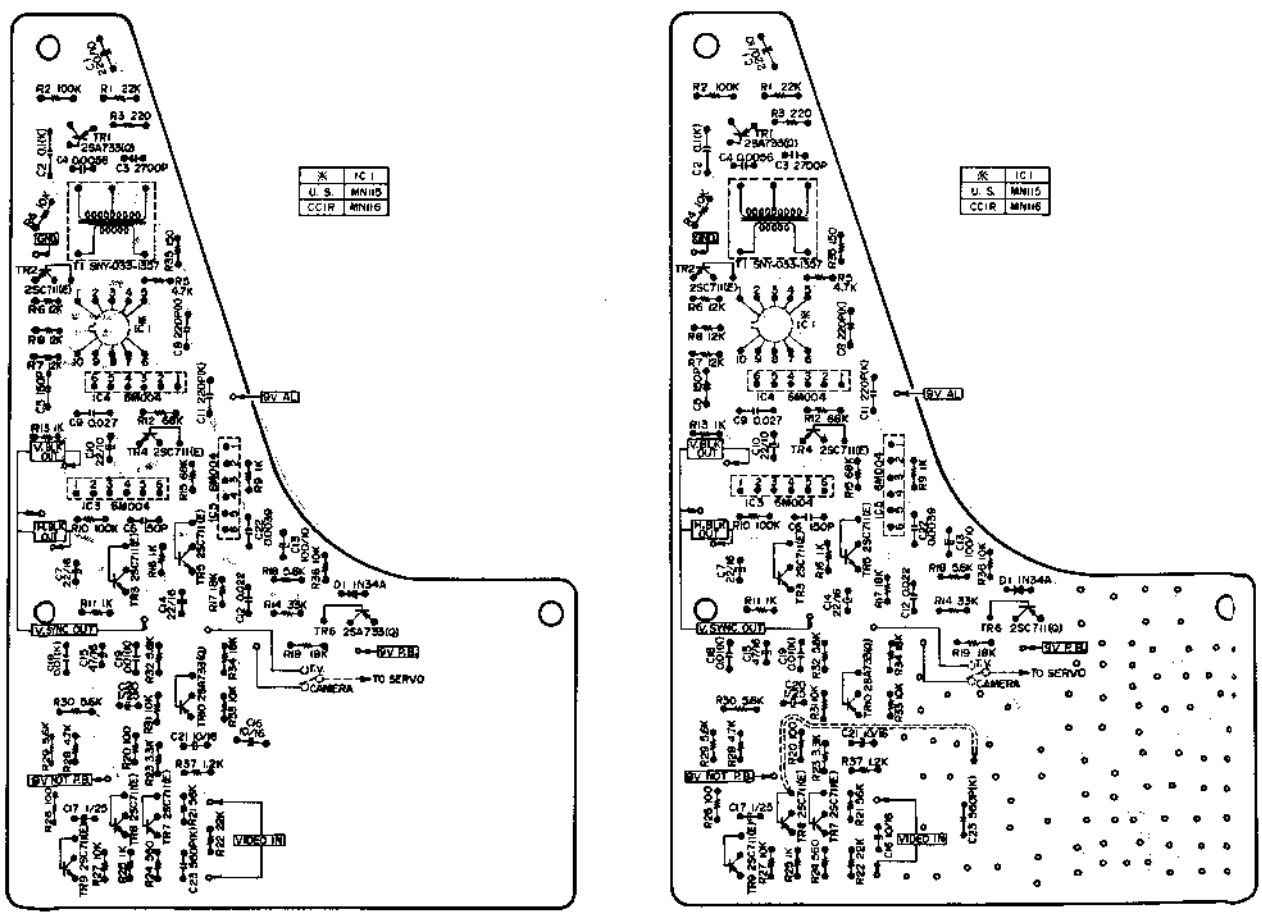


Fig. 2-6

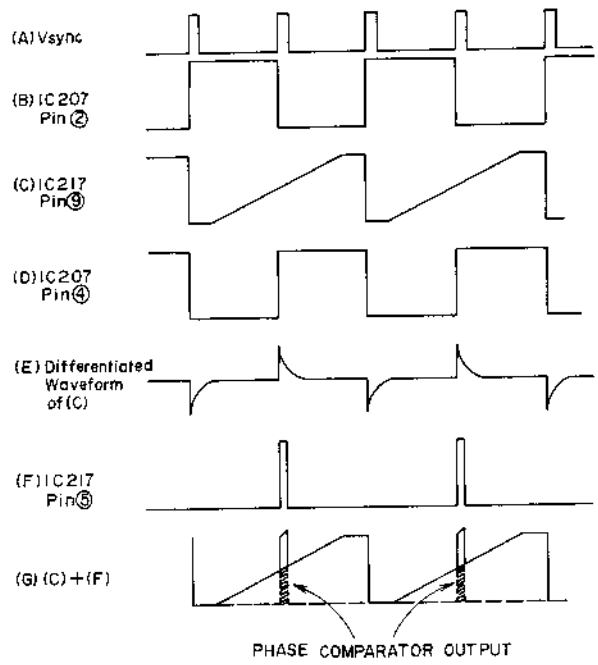


Fig. 2-7

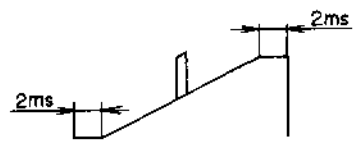


Fig. 2-8

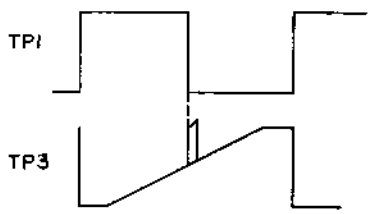


Fig. 2-9

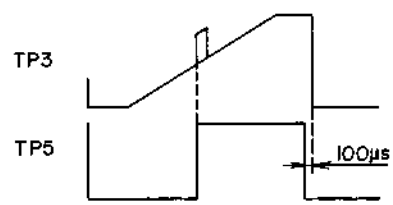


Fig. 2-10

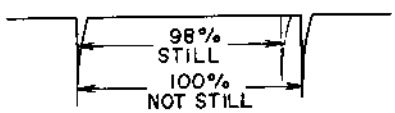


Fig. 2-11

Fig. 2-12

3. SERVO CIRCUIT

(1) Operating Principles (Refer to Schematic Diagrams No.5-2 1500845A and No.5-3 1500846A).

The servo circuit is comprised of Servo 1 P.C. Board and Servo 2 P.C. Board Drive Amplifier Circuit.

Because of the built in A.E.C. (automatic editing control) system, both the Head Motor and the Capstan Motor are controlled by V.Sync as the basic signal at recording and playback mode.

At recording mode the V. Sync from the S.S.G. P.C. Board is amplified at IC6 and becomes the differential waveform and enters IC7 Flip Flop circuit. Here the 60 Hz (50Hz-CCIR) V.Sync becomes the 30 Hz (25Hz-CCIR) square waves and is emitted from IC7 pins ② and ④ The 30 Hz (25Hz-CCIR) square wave to Pin ② enters the IC9 trapezoid wave generator circuit and a 30 Hz (25Hz-CCIR) trapezoid wave is produced. This trapezoid wave is sent to the head motor phase comparator IC2 and the capstan motor phase comparator IC17.

The square wave from Pin ② is also supplied to the CTL head through IC8 REC CTL pulse amp and is recorded on the tape as the control signal. The square wave from IC7 Pin ④ (the same as the waveform to Pin ②, but reverse phased) is differentiated and is amplified at IC10, passes the "not P.B. Pulse Amp" and is sent to IC17 phase comparator pulse generator circuit. This pulse and the trapezoid wave which entered Pin ⑨ is phase compared at IC17 and the emitted phase comparator output is sent to the Capstan Motor Drive Amp. Because both the sampling pulse produced at the pulse generator and the trapezoid wave to Pin ⑨ were produced from the V. Sync, the sampling pulse appears in the center of the trapezoid wave as shown in Fig. 2-7.

At this condition, the capstan motor rotates at a stabilized speed. At the head motor circuit, the pick-up pulse generated by the pick-up coil is amplified at IC1, sent to IC2 phase comparator, and drives the pulse generator to produce the sampling pulse. Then the trapezoid waveform to IC 2 Pin⑨and the sampling pulse is compared, and when the sampling pulse reaches the center of the trapezoid slope, the Head Motor rotates,maintaining stabilized phase relation and speed.

The various circuit functions at playback mode are the same as at recording mode except for the capstan motor control circuit.

Regarding the Capstan Motor Control Circuit operation at playback mode, the CTL signal picked up by the CTL head passes IC12 Switch circuit (this does not work at recording mode) is amplified at IC13, phase inverted at IC14, and sent to the IC15 Mono Multi Circuit. Because the sampling pulse produced at IC17 Pulse Generator is triggered by the pulse produced at this Mono Multi, the width of the pulse produced at the Mono-Multi is determined by VR-3 in order for the sampling pulse to appear in the center of the trapezoid wave in the same way as at recording mode.

If the head motor or capstan motor phase is "off" at playback mode. The sampling pulse which should be on the center of the trapezoid wave appears before or after the center of the trapezoid wave and the phase comparator output is changed. Then, in accordance with this change, the motor speed is controlled and at the point of in-phase, the sampling pulse again comes to the center of the trapezoid wave and motor speed is stabilized.

Regarding the operating principle of Servo 2 P.C. Board Motor Drive Circuit, because the capstan motor circuit and the head motor circuit are the same, the following explanation of Capstan Motor Drive Circuit is given as the example. TR21, TR22 circuit and TR23, TR24 circuit (the two circuits inside IC2 differential amp) are the phase control amp and the speed control amp circuits respectively. One of the differential amplifier circuits, TR21 and TR22 in IC2, is a phase control amplifier and the other one, TR23 and 24, is a speed control amplifier.

Because of fixed voltage feedback to TR23 base through D4, D5 and D6 from the motor drive amplifier, motor revolutions are adjusted for constant speed by the volume of TR24 base circuit.

At TR21 and 22 circuit, the Servo 1 P.C. Board phase comparator output is applied to the base of TR21 and the volume to TR22 base circuit is adjusted for stabilized motor speed at an in-phase condition.

Ordinarily, the above described condition is maintained. However, in case the motor speed is changed by the influence of fluctuation in power source voltage, or motor load, etc., the voltage from the motor drive amp which passes D4, 5, 6 for feedback at the base of TR23 is changed and also TR24 collector output is changed. For this reason the base voltage of the TR4 200 kHz oscillator circuit is changed, the oscillation output amplitude changes, and motor revolutions are controlled for proper speed.

In the same way, if capstan motor phase is "off", because Servo 1 P.C. Board comparator output is changed, TR21 base voltage changes, and TR22 collector output changes. Then the 200 kHz oscillator output amplitude is controlled, and at this moment only, motor speed changes and when proper phasing occurs TR21 base voltage is locked for phase and speed.

Servo 1 P.C. Board IC3, IC4 circuit is for the purpose of Automatic Editing Control.

Because during automatic editing, if the previously recorded picture and the new recorded picture switching takes place at the vicinity of center of screen, switching noise will become obviously visible, IC7 30 Hz (25Hz-CCIR) output waveform pulse is adjusted at IC3 Mono-Multi circuit for switching a little before vertical blanking.

IC4 is a switch circuit for the purpose of delaying power source supply to the video amp etc. for about the first 0.6 seconds of recording mode when the AEC Swtich is turned on and recording in started.

TR5 inside IC4 circuit is turned OFF for about 0.5 seconds after recording start and TR7 base electrical potential rises. Thus theoretically, there is a possibility of TR7 conducting, but because at this point, TR6 is OFF, conduction cannot take place. However, at this condition, because the pulse produced at IC3 is introduced to TR6, when this pulse reaches rise-up point TR6 is turned ON, collector current flows to TR6 and TR7, TR8 base voltage declines and TR8 is turned ON, and Relay RL1 functions. Then, at this point, +9V is supplied to the Video Amp, Audio Amp etc. and actual recording begins.

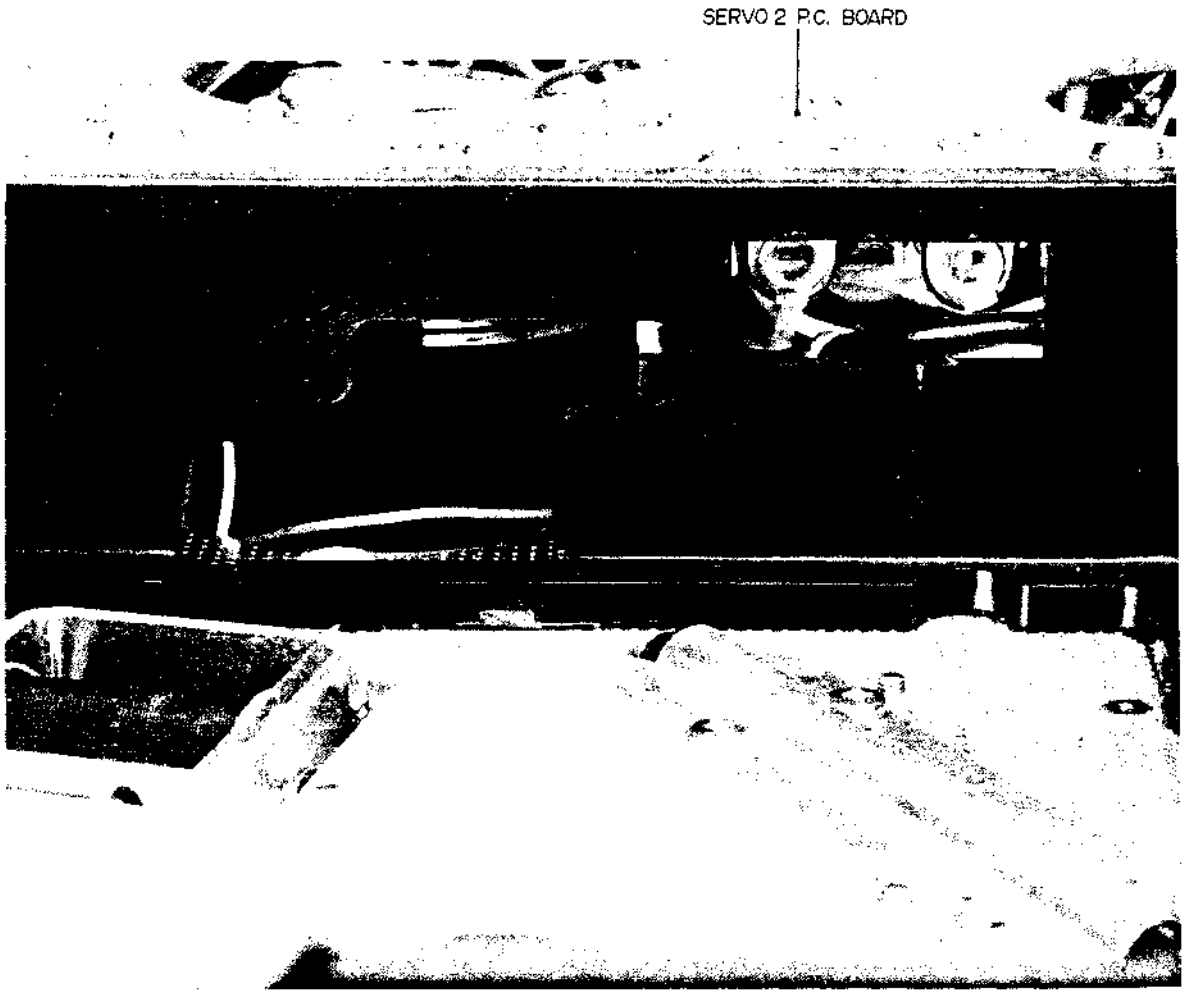


Fig. 2-13

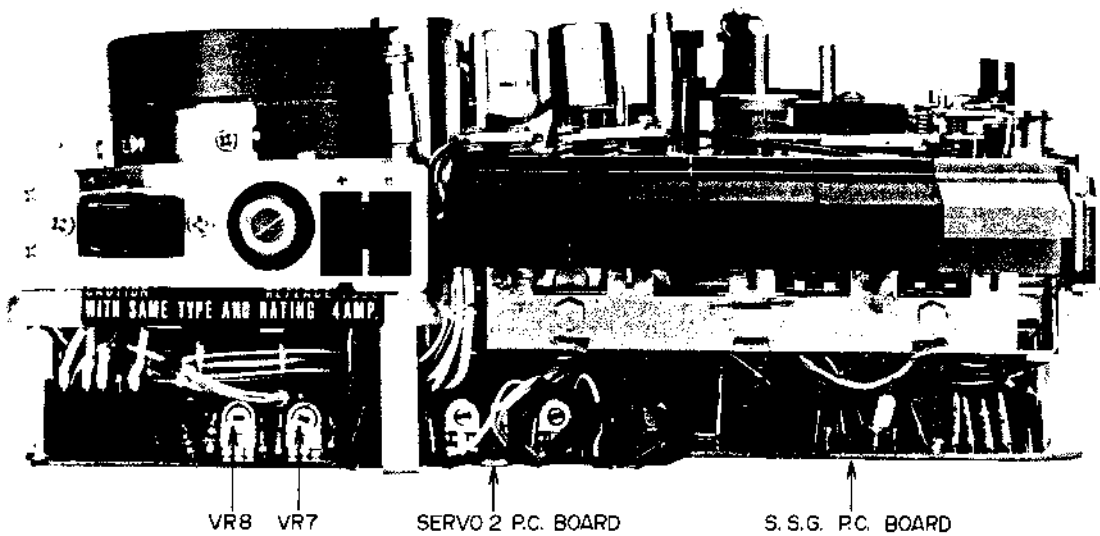


Fig. 2-14

Fig. 2-15

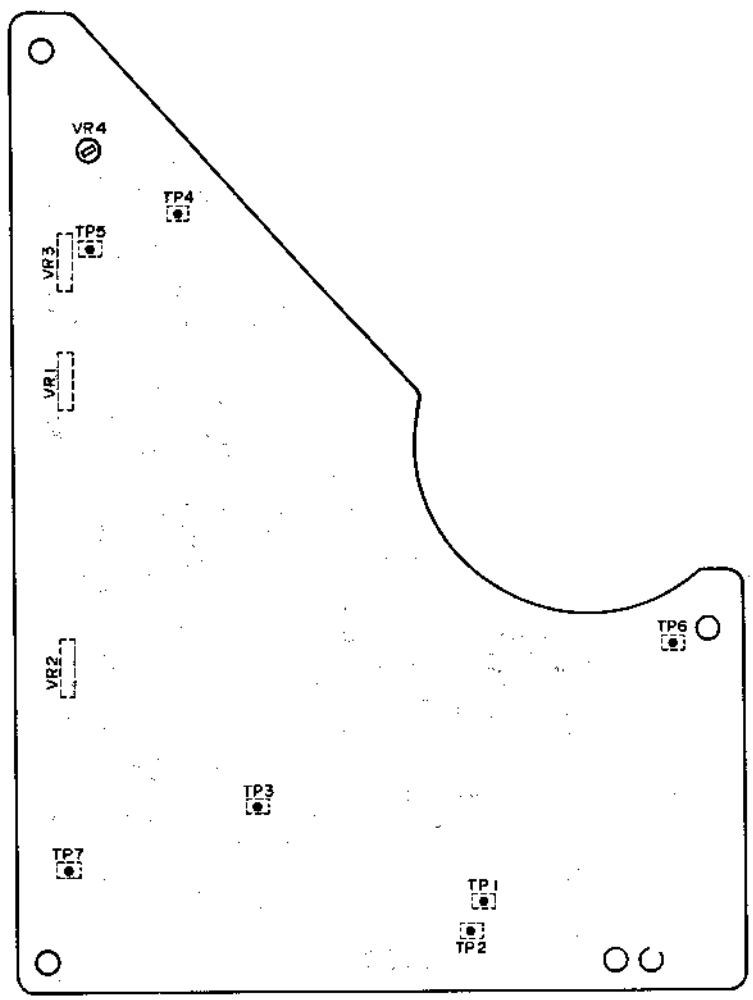


Fig. 2-16

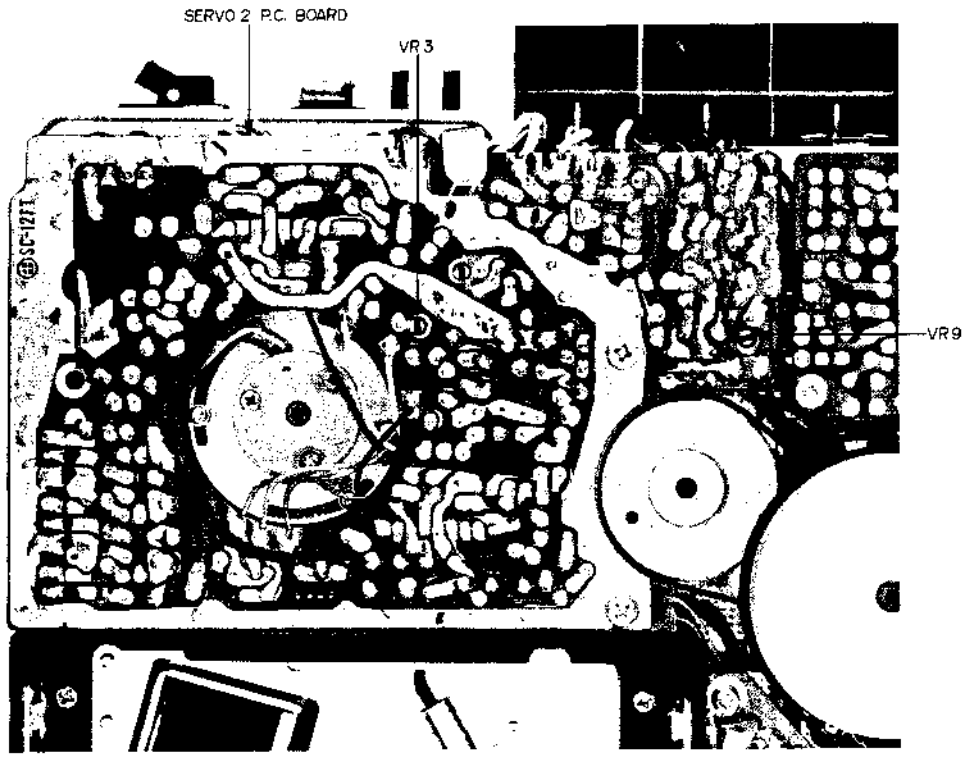


Fig. 2-17

(2) Servo Circuit Adjustment

NOTE: Set Camera/T.V. Switch to Camera prior to making servo circuit adjustments. Also make sure that the Function Switch installed on Servo 2 P.C. Board is correctly positioned during each adjusmtent (Refer to Fig. 2-13).

a) Head Motor Servo Control Circuit Adjustment

i) Connect an Oscilloscope to Servo 1 P.C. Board Test Point TP-3 (Fig. 2-16). Set Servo 2 P.C. Board Function Switch to position A and observe waveform. Adjust Servo 2 P.C. Board VR8 (Fig. 2-14) so that the sampling pulse on the trapezoid wave assumes nearly a stand-still condition.
Next, set Function Switch to M and adjust Servo 1 P.C. Board VR2 (Fig. 2-15) so that the part at the top of trapezoid wave slope is 2 ms ±0.2 ms. At this time confirm that the bottom surface part of the trapezoid wave is 2 ms.

ii) Set Oscilloscope to Dual Trace and connect Ch 1 probe to Servo 1 P.C. Board Test point TP 1 and Ch 2 probe to TP3. Adjust Servo 2 P.C. Board VR 7 (Fig. 2-14) so that the rise up part of the sampling pulse on the trapezoid wave appealing at TP3 displays uniformity in relation to the rise-up part of the pulse appearing at TP1. Deviation must be less than ±100 μs. (Adjustment carried out with Function Switch at M position).

b) A.E.C. Switching Point Adjustment
Connect Oscilloscope to Servo 1 P.C. Board Test Point TP2 and adjust Servo 1 P.C. Board VR1 (Fig. 2-15) so that the pulse width of the minus side of the waveform is 13 ms ±0.2 ms (CCIR 16 ms ±0.2 ms) (Position of Function Swtich irrelevant).

c) Capstan Motor Servo Control Circuit Adjustment

i) Connect a frequency counter to 8P connector Audio Output terminal (pins J and H) and playback a 1 kHz test tape. Set Function Switch to position A and adjust Servo 2 P.C. Board VR5 (Fig.2-13) to obtain a frequency counter indication of 1 kHz ± 5Hz.

ii) Under these same conditions, set Function Switch to position M and adjust VR4 to obtain the same tape speed described in item i).

NOTE: Because the tape speed fluctuates somewhat at beginning, middle, and end of tape winding, adjust to obtain 1 kHz ±5 Hz at all positions.

d) Tracking Adjustment
Use a dual trace oscilloscope and connect Ch 1 and Ch 2 probes to Servo 1 P.C. Board Test Points TP3 and TP5 respectively. Adjust Servo 1 P.C. Board VR3 (Fig. 2-15) so that there is about a 100μ difference in phase between the drop point (where waveform begins to decend) of TP3 trapezoid waveform and TP5 pulse as shown in Fig. 2-10.

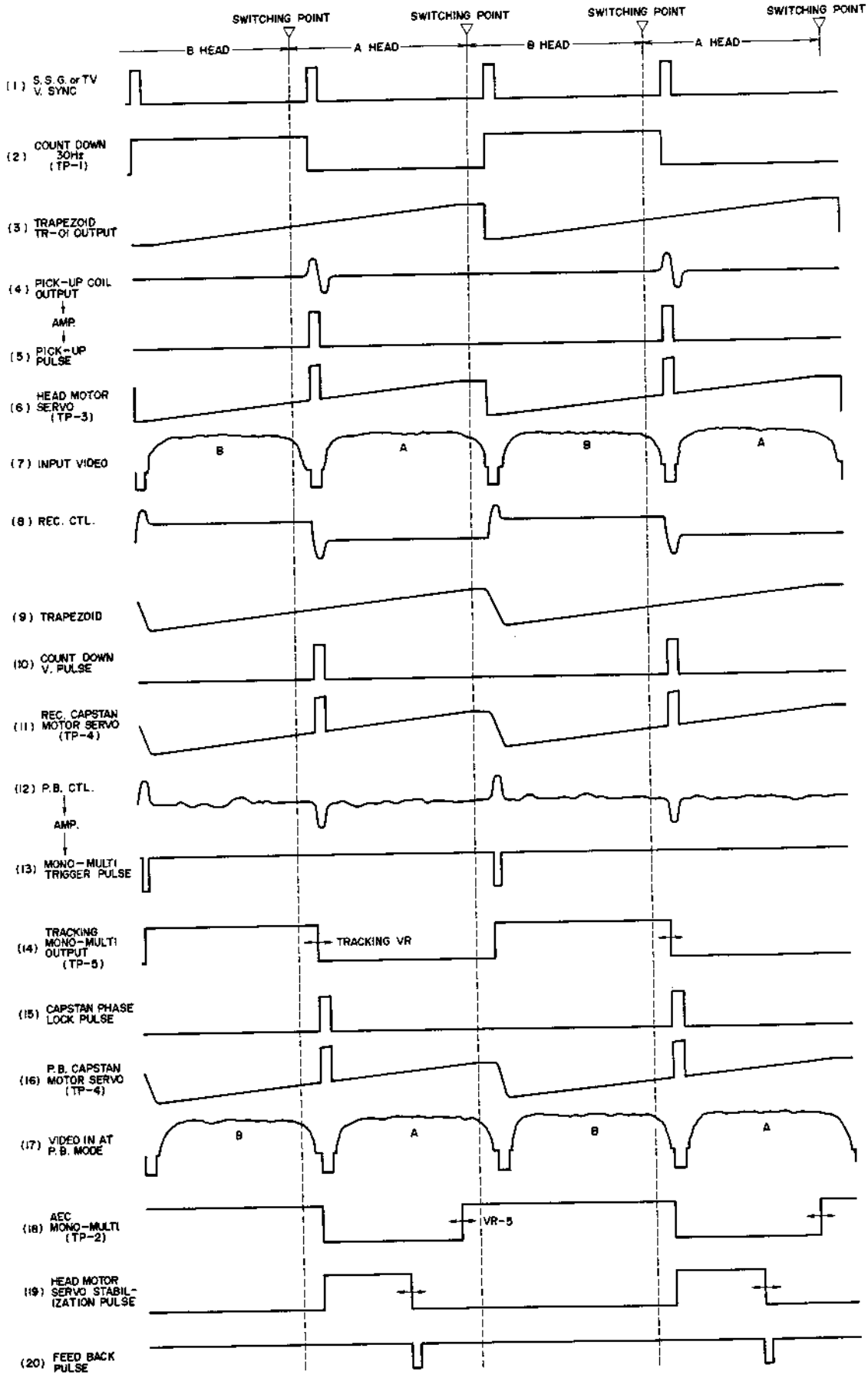

SWITCHING POINT
SWITCHING POINT
SWITCHING POINT
SWITCHING POINT
B HEAD
A HEAD
B HEAD
A HEAD
(1) S.S.G. or TV V. SYNC
(2) COUNT DOWN 30Hz (TP-1)
(3) TRAPEZOID TR-01 OUTPUT
(4) PICK-UP COIL OUTPUT
AMP.
(5) PICK-UP PULSE
(6) HEAD MOTOR SERVO (TP-3)
(7) INPUT VIDEO
B
A
B
A
(8) REC. CTL.
(9) TRAPEZOID
(10) COUNT DOWN V. PULSE
(11) REC. CAPSTAN MOTOR SERVO (TP-4)
(12) P.B. CTL.
AMP.
(13) MONO-MULTI TRIGGER PULSE
(14) TRACKING MONO-MULTI OUTPUT (TP-5)
TRACKING VR
(15) CAPSTAN PHASE LOCK PULSE
(16) P.B. CAPSTAN MOTOR SERVO (TP-4)
(17) VIDEO IN AT P.B. MODE
B
A
B
A
(18) AEC MONO-MULTI (TP-2)
VR-5
(19) HEAD MOTOR SERVO STABILIZATION PULSE
(20) FEED BACK PULSE

Fig. 2-18

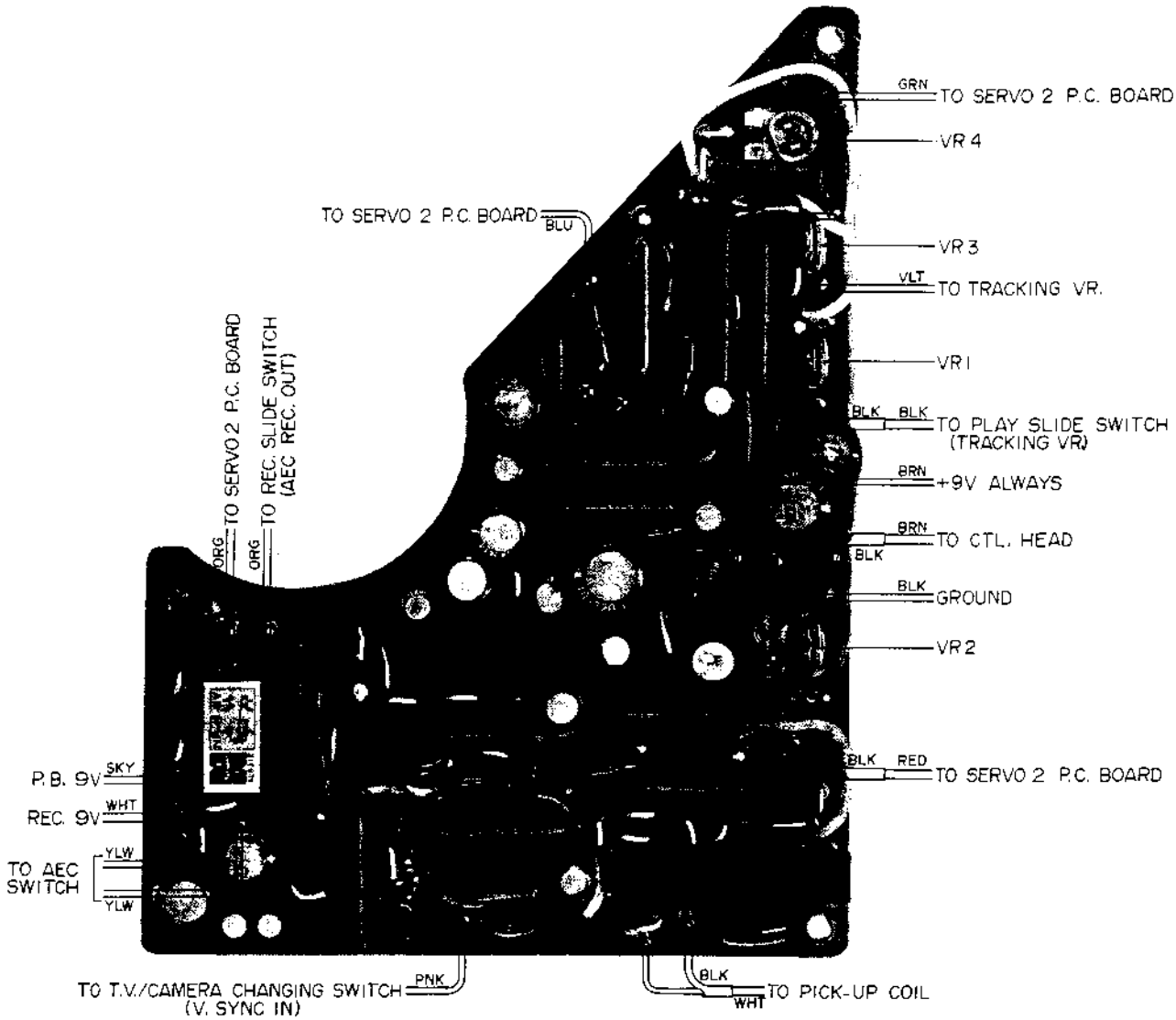


Fig. 2-19

e) Head Motor Speed Adjustment at Still Mode
Connect Oscilloscope to Servo 1 P.C. Board Test Point TP7 and read the pulse period. Next, set Still Swtich to ON position and adjust Servo 2 P.C. Board VR3 (Fig. 2-17) until the pulse period is 2% shorter as shown in Fig. 2-11. (Adjustment carried out with Function Switch at position S).
(Adjustment carried out with Function Swtich at position S).
NOTE: When Making above adjustment, set Oscilloscope Sweep Time to "uncalibration" and at non-still time, adjust so that one pluse period covers the entire horizontal scale. (Refer to Fig. 2-11)

f) Video Head Switching Point Adjustment
Connect Video Camera VC-110 or VC-115 and Monitor TV to the VT-120 and record and playback an idela subject. Loosen pick-up coil bracket holding screw (Fig. 1-20) and adjust and stationary so that the position of the monitor screw switching point is comes to about 10 horizontal lines above the V. Sync. (Adjustment carried out with Function Switch at position S).

g) Capstan Motor Servo Output Balance Adjustment
Connect Oscilloscope to Servo 1 P.C. Board TR4 Emitter (Fig. 2-16, point Ⓐ) and adjust Servo 1 P.C. Board VR4 (Fig. 2-16) so that the output waveform is as shown in Fig. 2-12 Ⓑ.
(Position of Function Switch irrelevant).
NOTE: After Servo Circuit Adjustments have been completed be sure to set Function Switch to Position S.

ASTERISK MARKED (*)	R 9	R19	R21
U . S	33K	24K	15K
C C I R	39K	33K	33K

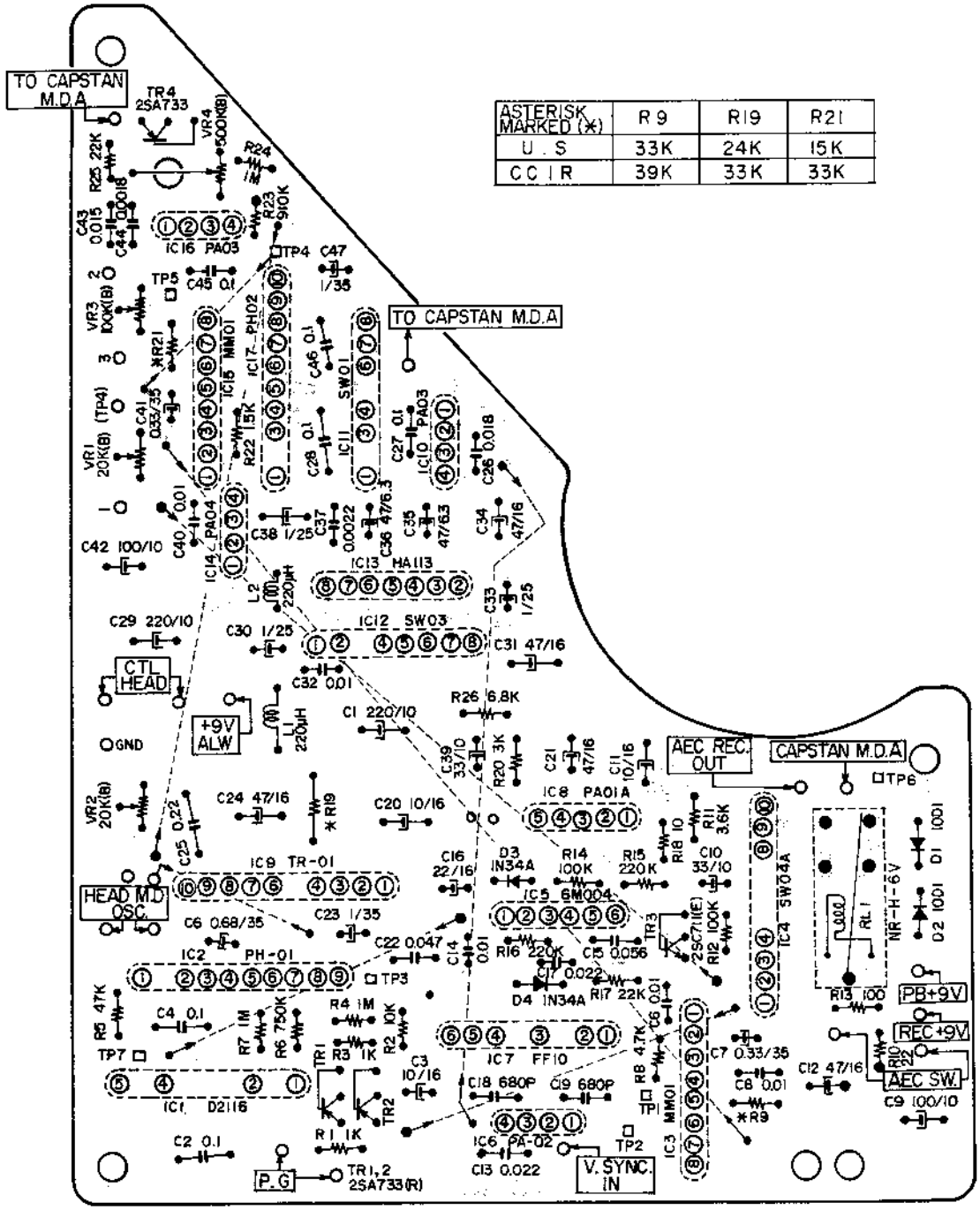


Fig. 2-20

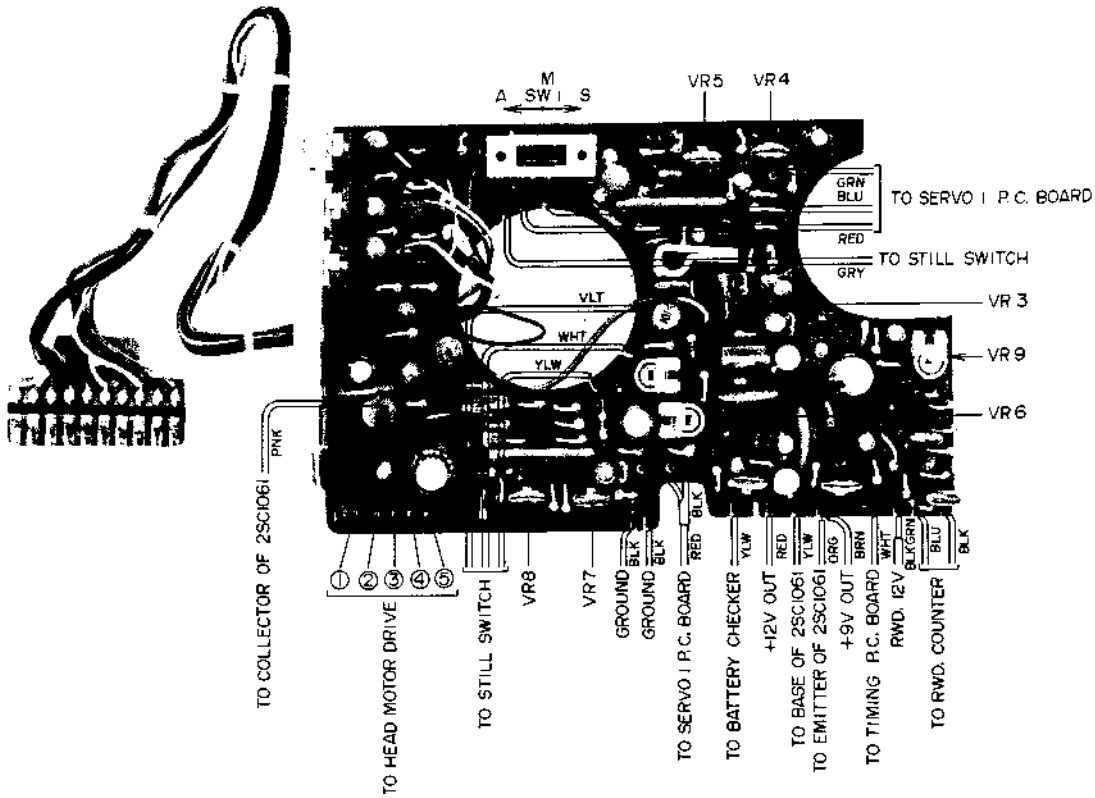


Fig. 2-21

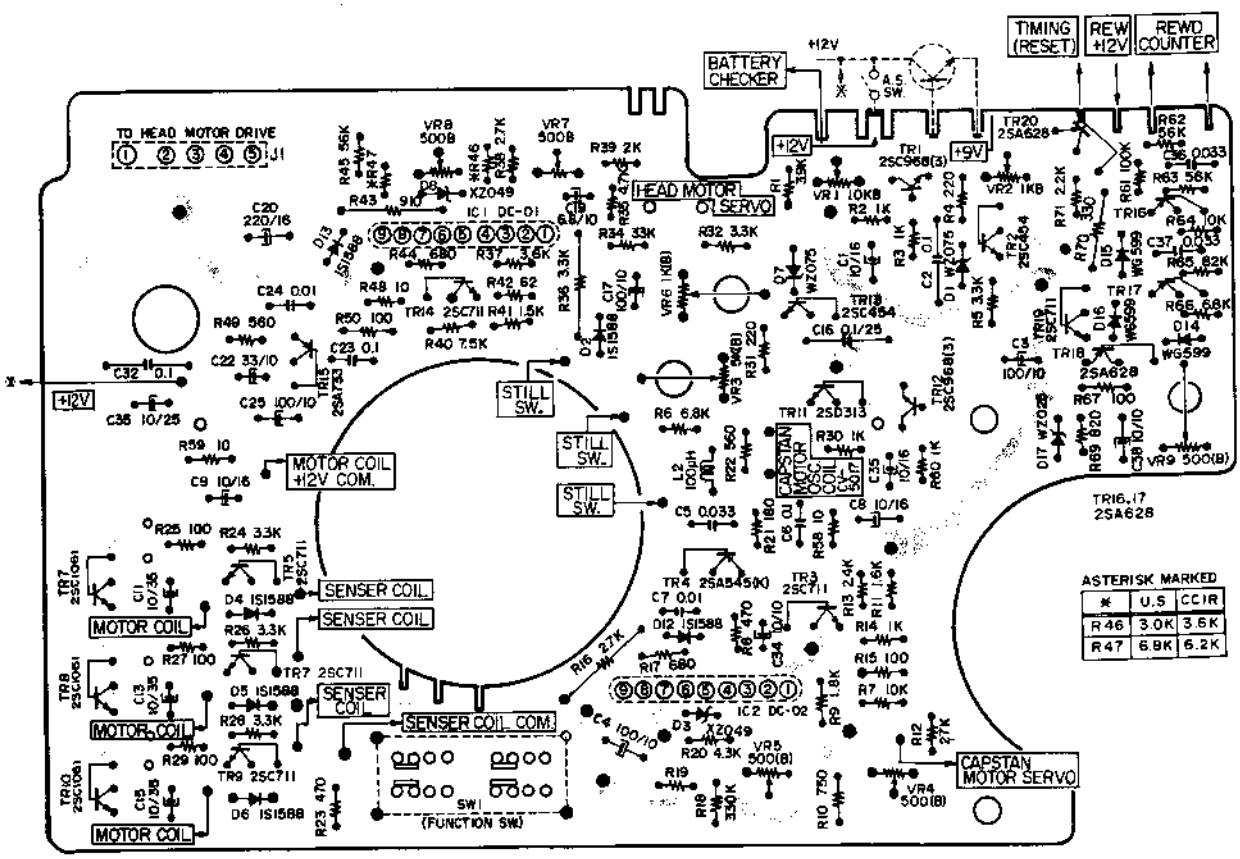


Fig. 2-22

4. TIMING P.C. BOARD AND RWD COUNTER CIRCUIT

(1) Operating Principles (Refer to Schematic Diagram No.5-1 1500844A)

The Timing P.C. Board is the circuit which controls the Play Plunger and RWD Plunger.

Because at playback mode and recording mode only each switch operation differs, the example below is at Rec. Mode with A.E.C. Switch at ON position. With TV/Camera Switch at CAMERA, when the Rec. Button is depressed and the Camera Grip Start Button depressed, the Play Plunger ground makes contact and the circuit functions. At starting instant, voltage is supplied to the base of TR3 and TR3 is turned OFF, but when C3 charge current becomes below the fixed value, the base voltage approaches OV, TR3 is turned ON and collector current flows. When this happens, TR4 is turned ON, TR5 is turned ON, a large current flows to a part of the play plunger coil, and the plunger energizes. Because C4 is at the base of TR4, C4 is gradually charged by the base current, TR4 base voltage increases and TR4 is turned OFF, and TR5 is turned OFF. Then, Current flows to the entire coil and the current becomes only the amount necessary to hold the plunger for preventing unnecessary power consumption and burining out the coil.

The slight delaying of plunger operation at TR3 is to prevent tape stretch caused by the play plunger energizing when the play button is depressed at the same time that A.E.C. Rewind plunger is being released.

Play Plunger Micro Switches 1 and 2 are turned ON while the Play Plunger Functions (Schematic diagram shows micro switches at OFF position) and because the Rec. Button is depress, Rec Micro Swtich is also turned ON. Accordingly, during recording, C101 is charged with 9V through Rec. Micro Switch, and Play Plunger Micro Switches 1 and 2. Then, because when the Camera Grip Start Button is released, the play plunger is releases and Micro Switches 1 and 2 return to OFF position, the 9V charged at C101 begins to discharge, and Voltage is supplied to the base of TR2 and TR2 is turned ON. When this happens, because TR1 is also turned ON, 12V flows to the RWD plunger through TR1 and the A.E.C. Switch, and A.E.C. Rewind begins.

When TR1 is turned on, the 12V power source is supplied to the Servo 2 P.C. Board Counter Circuit as Rewind Output from the Timing P.C. Board.

When the tape begins to rewind, the Rwd Counter, which is interconnected with the Sub Pinch Roller Shaft, rotates.

Because 12V is supplied to the Rwd. Counter through R61 100 kΩ, a minus pulse appears at the base of TR16 when the RWD counter is shorted.

This pulse is amplified, rectified, and charged at condenser C38 located at TR18 Emitter. Consequenty, rectified voltage is supplied to TR19 in accordance with the number of pulse, and until this voltage reaches TR19 conducting voltage, TR19 is turned ON and TR20 is also turned ON and detected output is emitted at the collector.

Because TR20 collector is connected to the base of Timing P.C. Board TR1 and TR2 collector through 470Ω respectively, TR1 base voltage is raised and TR1 is turned OFF, and the Rwd Plunger is released.

When it has been determined at what time (after how many pulses produced by the Rwd Counter) the Rewind Plunger is to be released, a fixed amount of tape will be rewound depending upon the number of sub pinch roller revolutions.

The length of rewound tape can be adjusted with VR9 of the RWD Counter Circuit (Servo 2 P.C. Board).

In the manner outlined above, at A.E.C. Recording mode, when the tape is stopped, a fixed amount of tape is automatically rewound, and as was explained in Servo Circuit Operating Principles, when the recording is re-started, playback mode is maintained for about 0.6 sec by means of Servo 1[a] P.C. Board IC3, 4 control circuit. Within this period, capstan motor and Head Motor revolutions become constant with the signal recorded on the tape, and because the actual recording begins after the servo circuit becomes completely synchronized with the previously recorded signal, there is no disturbance where the stopped and restarted picture is joined.

There is no adjustment point at Timing P.C. Board.

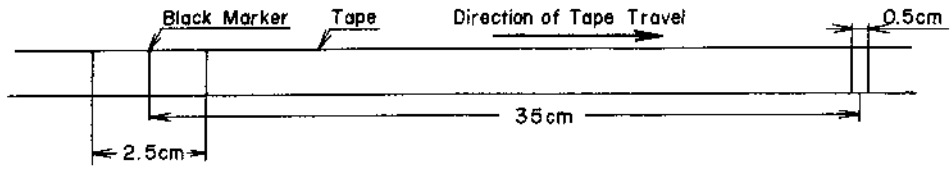


Fig. 2-23

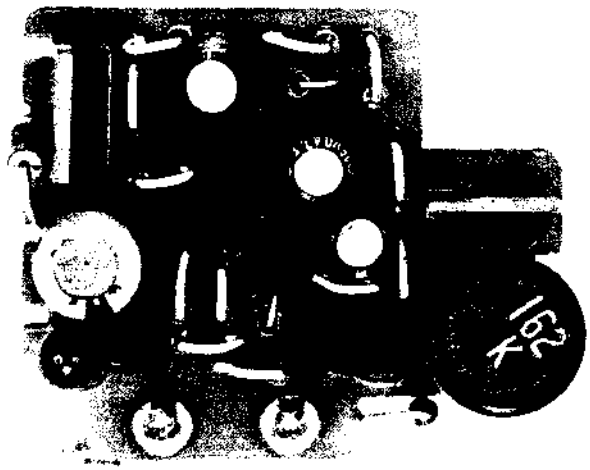


Fig. 2-24

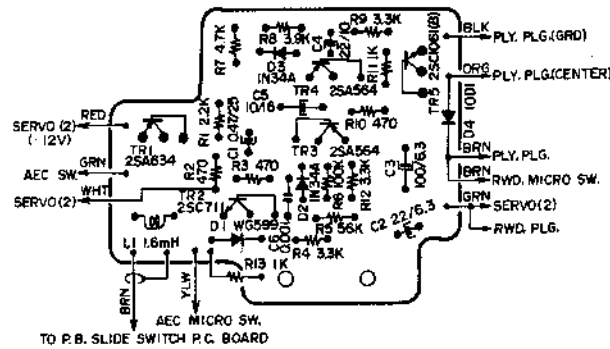


Fig. 2-25

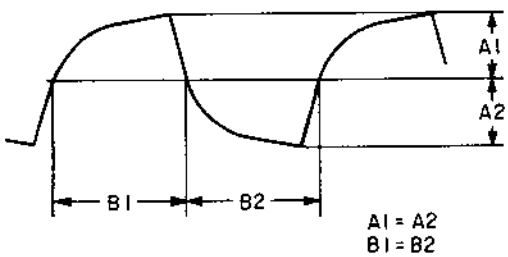


Fig. 2-26

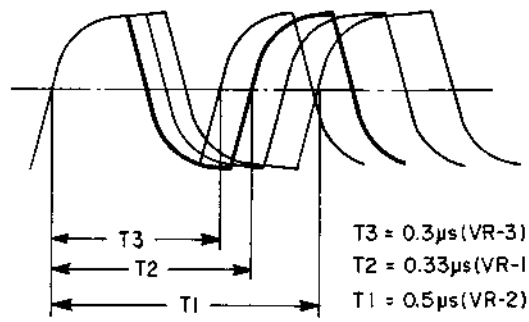


Fig. 2-27

Fig. 2-28

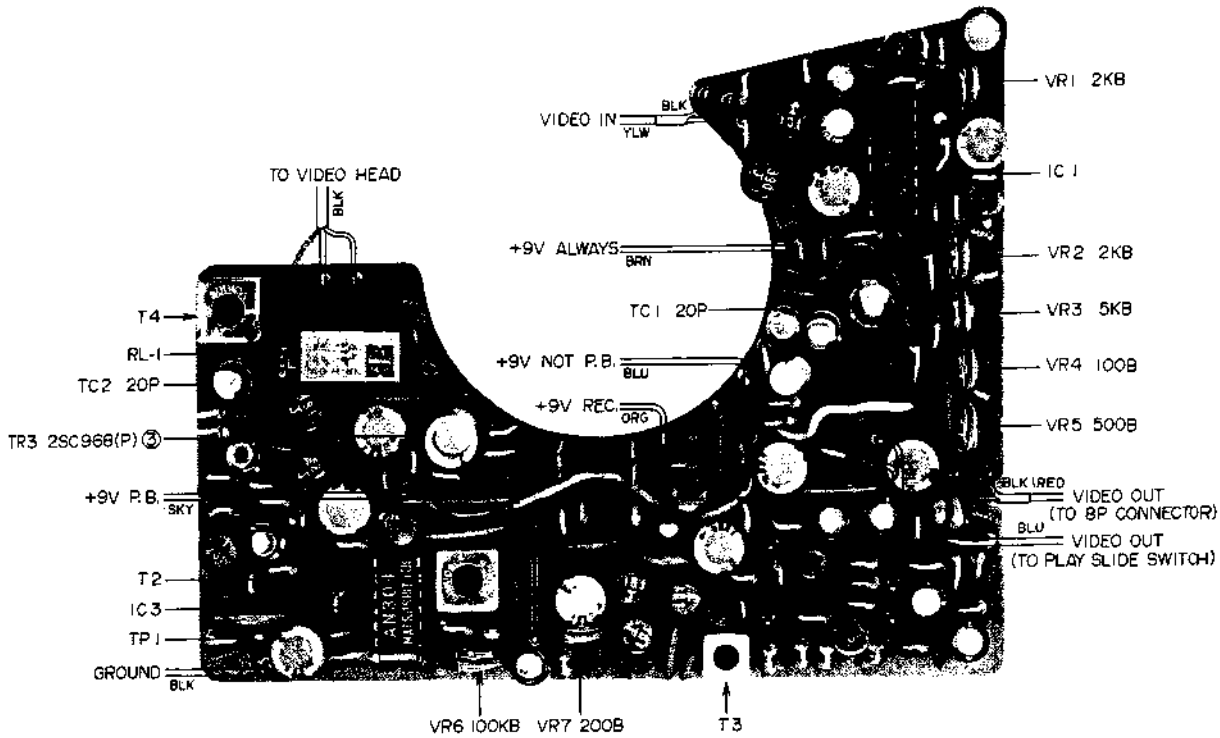


Fig. 2-29

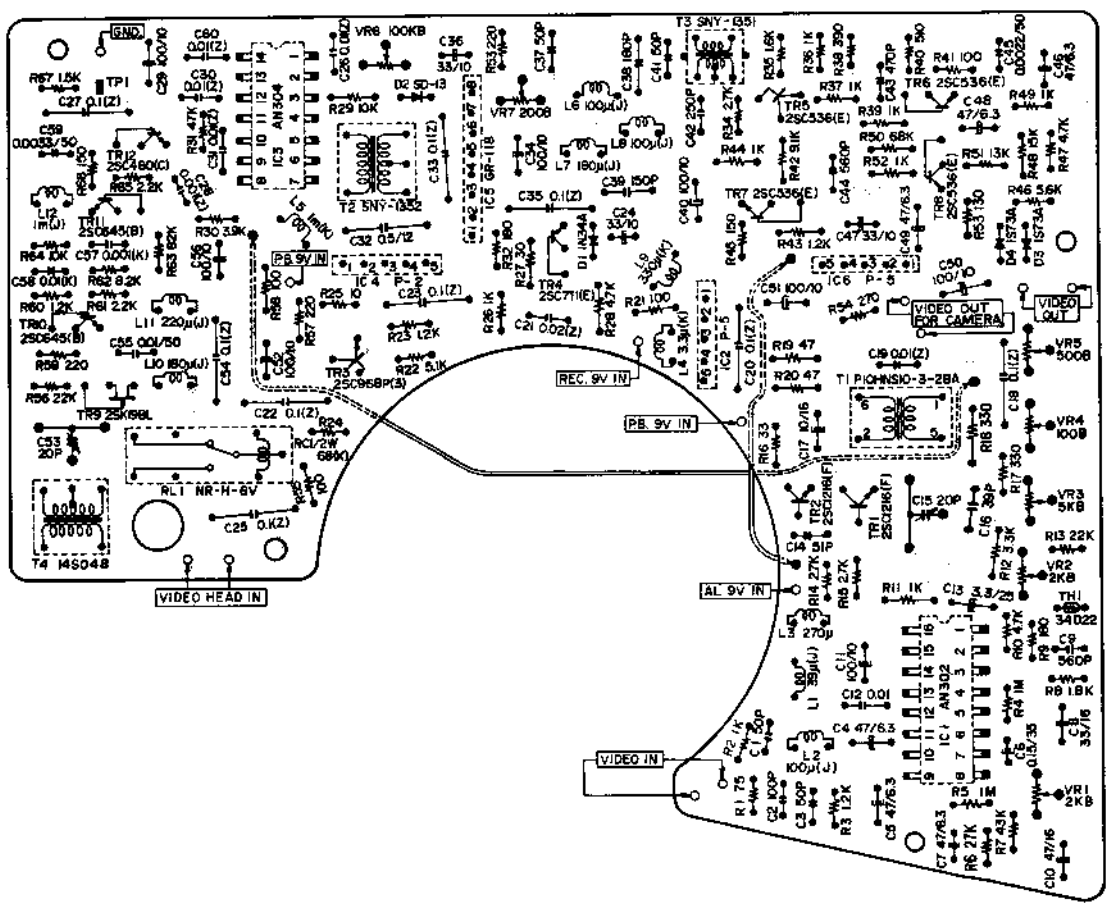


Fig. 2-30

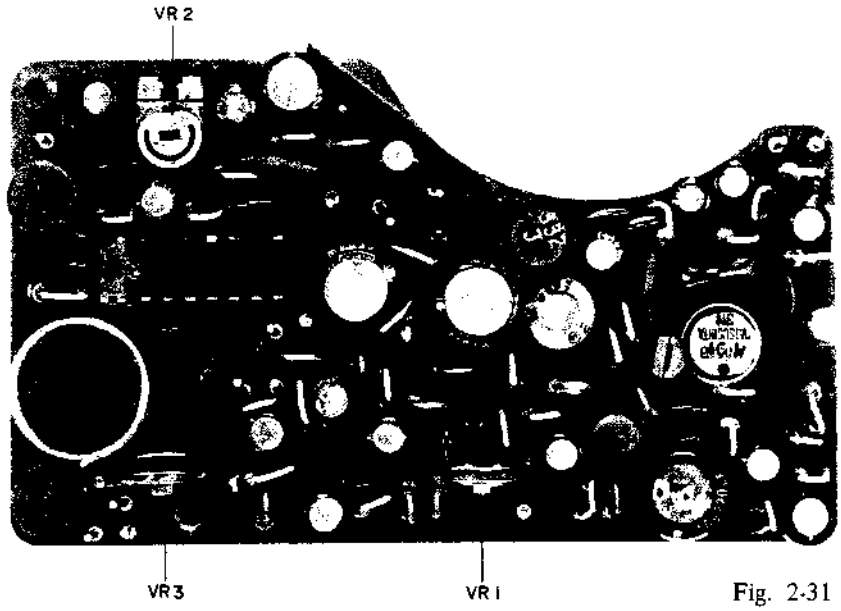


Fig. 2-31

(2) Rewind Counter Circuit Adjustment
For precision Rewind Counter Circuit adjustment, a Strage type counter is used, but practically the same results can be accomplished with the adjustment method described below: As shown in Fig. 2-23, affix a 2.5 cm and an 0.5 cm piece of white splicing tape to the tape at 35 cm apart and make a black mark in the center of the 2.5 cm length of splicing tape. Connect camera to the VTR of Set TV/ Camera Switch to TV. Then load a tape and run at A.E.C. recording mode. When the black mark on the splicing tape comes to the center of the CTL head, stop the tape and allow A.E.C. rewind to take place. Then adjust Servo 2 P.C. Board VR9 (Fig. 2-17) so that when rewind stops, the 0.5 mm length of spling tape is above the CTL head.
After this adjustment, stop and start tape 2 or 3 times and confirm that A.E.C. rewind stops around the same place each time (when depressing the Stop Button to effect stop from A.E.C. Rec. mode, if the Stop Button is depressed when the right edge of the 2.5 cm length of splicing tape is in the vicinity of the center of the CTL head, Rewing should begin at exactly the time the mark reaches the center of the CTL Head).

5. VIDEO AMP P.C. BOARD

(1) MODULATOR BALANCE ADJUSTMENT
(Stop Mode)

a) Connect Oscilloscope to TP1.
b) Turn VR1 fully counter-clockwise and VR3 fully clockwise. Set VR2 and VR4 to center point.
c) Adjust TC1 so that the positive and negative part of waveform is equal as shown in Fig. 2-26.

(2) FREQUENCY DEVIATION ADJUSTMENT
(Stop Mode)

a) Connect a Test Pattern Signal (1.4V p-p) supplied from a monoscope between Pin "B" of Monitor Connector and Chassis (Pin "D"). (If a monoscope is not available, with Vidicon Camera VC-110 or VC-115, photograph the resolution chart. Intensity of chart must be 1,000 lux and video signal 1.4V p-p).
b) Connect Oscilloscope to TP1.
c) Adjust VR2 so that T_1 in Fig. 2-27 is 0.5 μs (2 MHz).
d) Adjust VR1 so that T_2 in Fig. 2-27 is 0.33 μs (3 MHz).
e) Adjust VR3 so that T_3 in Fig. 2 is 0.3 μs (3.3 MHz).

CAUTION: T_3 is white clip level adjustment and because the line which appears on the oscilloscope is extremely thin and hard to see, aim camera at a particularly bright subject and alternately put on and remove lens cover to confirm function of white clip at 0.3 μs.

(3) CARRIER LEAK ADJUSTMENT (Modulator Balance, Limiter Balance, Demodulator Balance)

a) Disconnect Video Input Signal.

b) Connect Oscilloscope to Video Output Terminal or Pin "F" of Monitor Connector (8P). Set Oscilloscope Vertical Gain Control to maximum.

c) Adjust TC1, VR6, and VR7 so that the amplitude of the waveform appearing on oscilloscope is minimum. (It is ideal for the waveform to be a single thin horizontal line).

CAUTION: If carrier leak cannot be adjusted with TC1, VR6, and VR7, try adjusting VR4 also.

(4) VIDEO OUTPUT LEVEL ADJUSTMENT

a) Supply a 1.4V p-p Video Signal from camera or monoscope.

b) Connect Oscilloscope to Video Output Terminal or Pin "F" of Monitor Connector (8P).

c) Adjust core of Demodulator Transformer T2 so that the video output signal amplitude is 1.4V p-p.

CAUTION: In case the video input signal is less than 1.4V p-p, adjust so that video output is the same amplitude as the input signal.

(5) PLAYBACK CIRCUIT EQUALIZATION ADJUSTMENT

a) Connect Oscilloscope to TP1.

b) Play bakc of Standard Video Reference Tape. Adjust TC 2 so that R.F. Envelope Amplitude is maximum and also the error between A_1 (part at which brightness is intense) and A_2 (part at which brightness is faint) is an small as possible (Refer to Fig. 2-28).

c) It is ideal for R.F. Envelope to be more than 0.2V p-p, but this varies depending upon the quality of video head tip and CTL Head adjustment.

(6) RECORDING LEVEL ADJUSTMENT

a) Record and play back a Test Pattern Signal (or photographed Resolution Chart Signal) and adjust recording level so that R.F. Envelope amplitude is maximum.

b) At recording mode, connect Oscilloscope to the Heat Sink of Transistor TR3 (2SC968P (3)) and measure the recording level.

c) With recording waveform amplitude within a 2V to 3V range, adjust VR5 to optimum value.

CAUTION: Adjust recording level so that error between A_1 and A_2 of R.F. envelope shown in Fig. 3 is non-existent.

(7) CARRIER LEAK ADJUSTMENT AT RECORDING AND PLAYBACK MODE

a) Connect VC-110 or VC-115 Vidicon Camera and record and playback a scene in which light and dark difference is considerable and observe whether or not a carrier leak appears on the monitor screen.

b) If a carrier leak appears, at playback mode, attempt to eliminate carrier leak stripe by adjusting both VR6 and VR7 slightly.

c) If VR6 or VR7 is adjusted, make carrier leak adjustment outlined in Item (3) above again.

d) Finally, record and play back a signal supplied from TV or camera and check picture quality.

6. AUDIO P.C. BOARD

(1) RECORDING BIAS VOLTAGE ADJUSTMENT

a) Connect a V.T.V.M. (107 A Type) to the Audio Head Terminal.

b) Adjust VR3 (100 kB) so that at recording mode, the Bias Voltage is 20V rms.

(2) PLAYBACK OUTPUT LEVEL ADJUSTMENT AND NOISE LEVEL CHECK

a) Connect a High Sensitivity V.T.V.M. between Pin "J" of Monitor Connector (8P) and Chassis.

b) Playback an Audio Level Test Tape (1,000 Hz, "O" VU recorded tape) and adjust VR2 so that the V.T.V.M. indication is 1V rms.

c) With tape removed, confirm that at playback mode the noise level is less that -45 dB.

(3) RECORDING LEVEL (AGC Level) ADJUSTMENT

a) Connect an Audio Oscillator to the External Microphone Jack and supply a 1,000 Hz. -60 dB sinewave signal.

b) Connect a High Sensitivity V.T.V.M. between Pin "J" of Monitor Connector (8P) and Chassis.

c) Adjust VR1 (50 dB) so that the V.T.V.M. indication is 1V rms.

d) Under this condition, record, and then playback to check whether or not the V.T.V.M. indication is within a 1V ±0.3V range.
whether or not the V.T.V.M. indication is within a 1V ±0.3V range.
If not within specified range, readjust VR1 and set so that the recording/playback level is within 1V ± 0.3V.

CAUTION: If recording/Playback level is still not within specified value in spite of having adjusted VR1, with VR3, alter the bias voltage somewhat and recheck.

e) Playback the tape recorded in item d) above, with a distortion meter, check whether or not the distortion level is less than 6%

(4) FREQUENCY RESPONSE CHECK

a) Connect an Audio Oscillator to the External Microphone Jack. Record a 1 kHz, a 10 kHz, and 100 Hz sine wave signal (about 10 seconds each) at -60 dB recording level.

b) Rewind and playback tape. Compare the 100 Hz and 10 kHz output level with the 1 kHz output level and check whether or not the error is within a ±5 dB range.

CAUTION: If frequency response is not within specifications, change the Bias Voltage slightly and recheck.

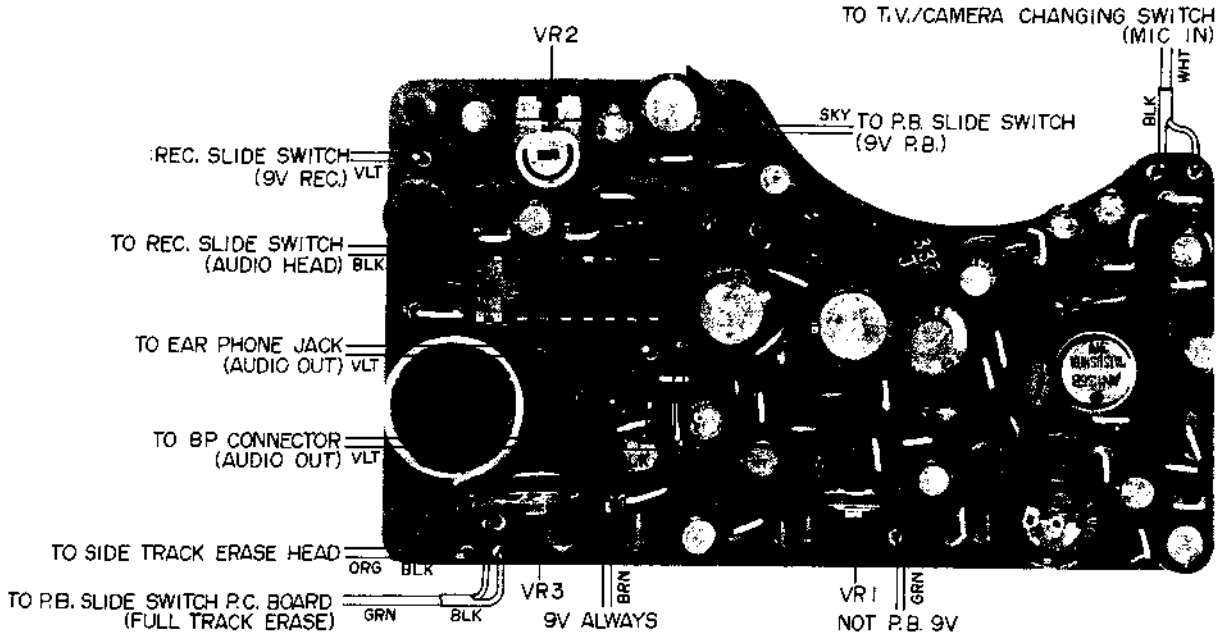


Fig. 2-32

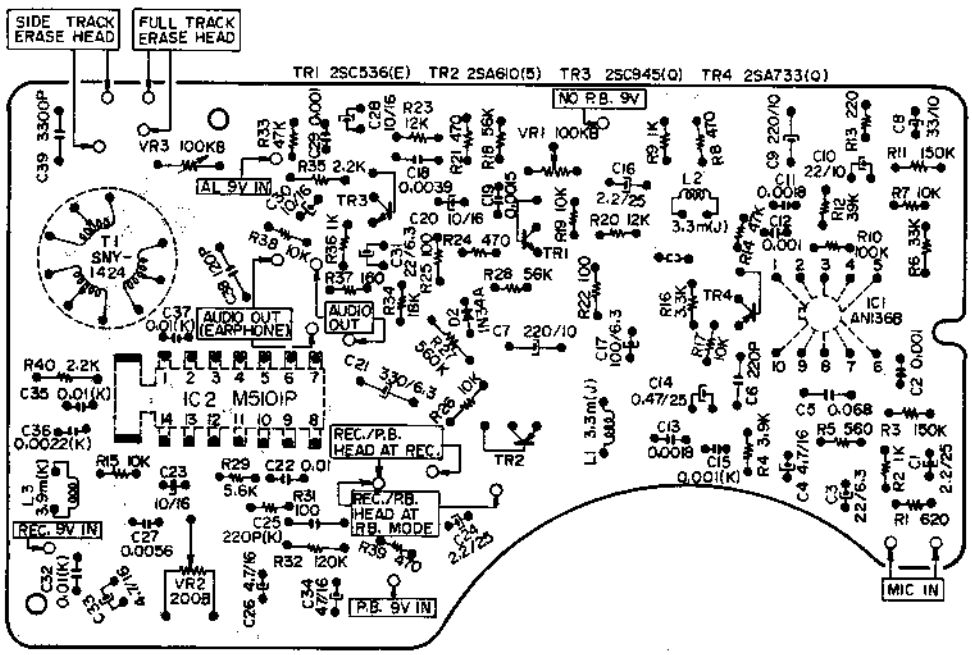


Fig. 2-33

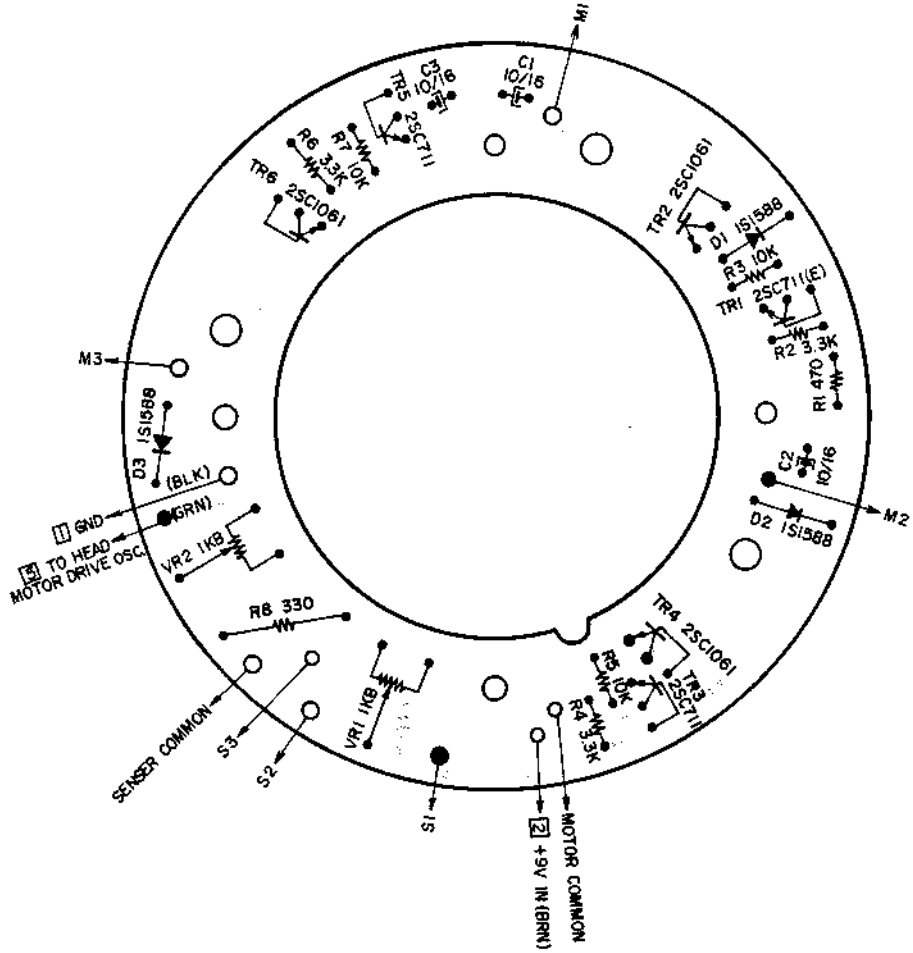


Fig. 2-34

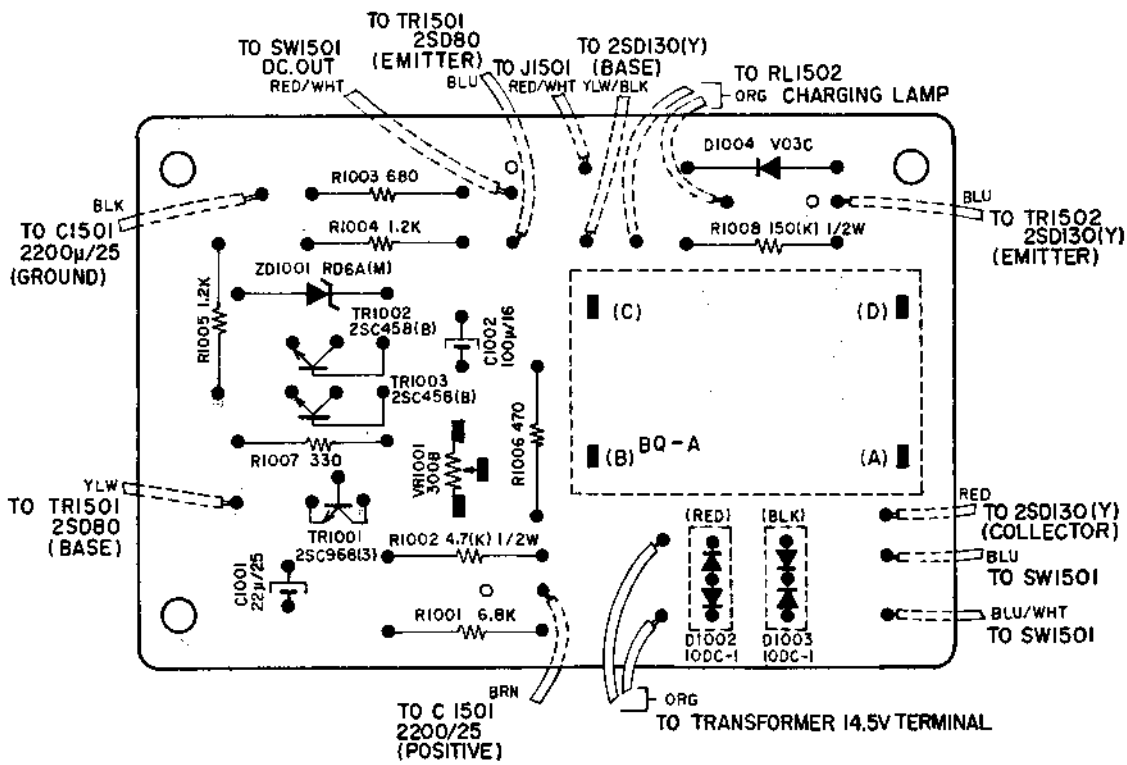


Fig. 2-35

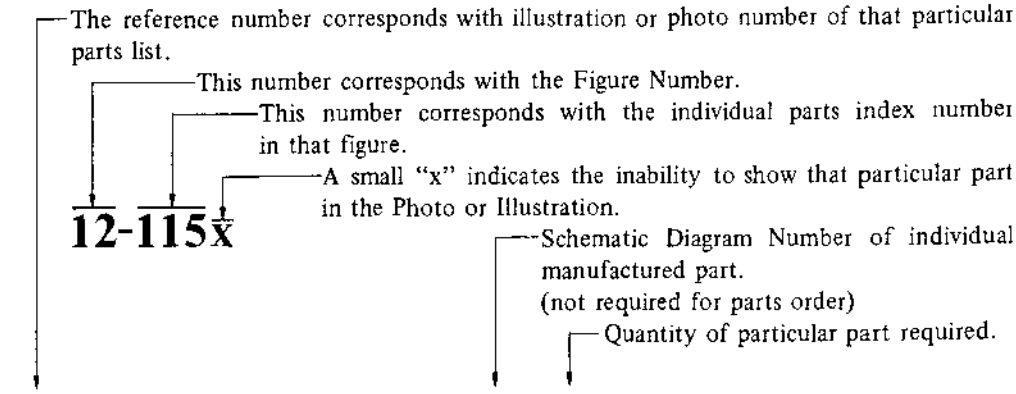
SECTION 2

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

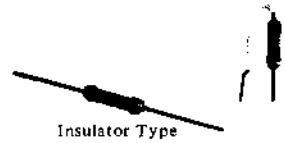
4. The symbol numbers shown on the P.C. Board list can be matched with the Composite Views of components of the Schematic Diagram or Service Manual.
5. The indications of Resistors and Capacitors in the photos of P.C. Board are being eliminated.
6. The shape of the parts and parts name, etc. can be confirmed by comparing them with the parts shown on the Electrical Parts Table of P.C. Board.
7. Please utilize separate "Common List for Service Parts" for Resistor parts orders.
8. 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).
9. 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

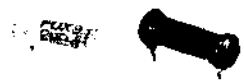
2 Stopper Type

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

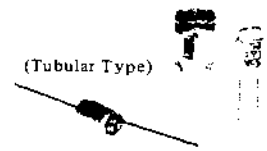
Mylar Capacitor

6

Tantalum Capacitor

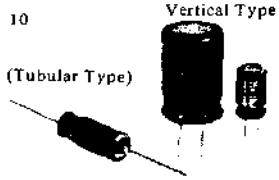
7

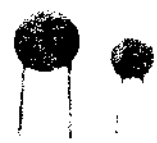

Oil Capacitor (Tubular Type)

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

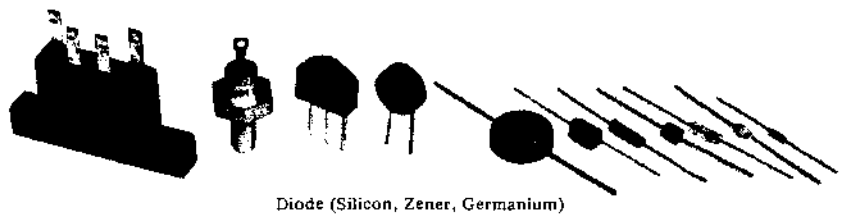
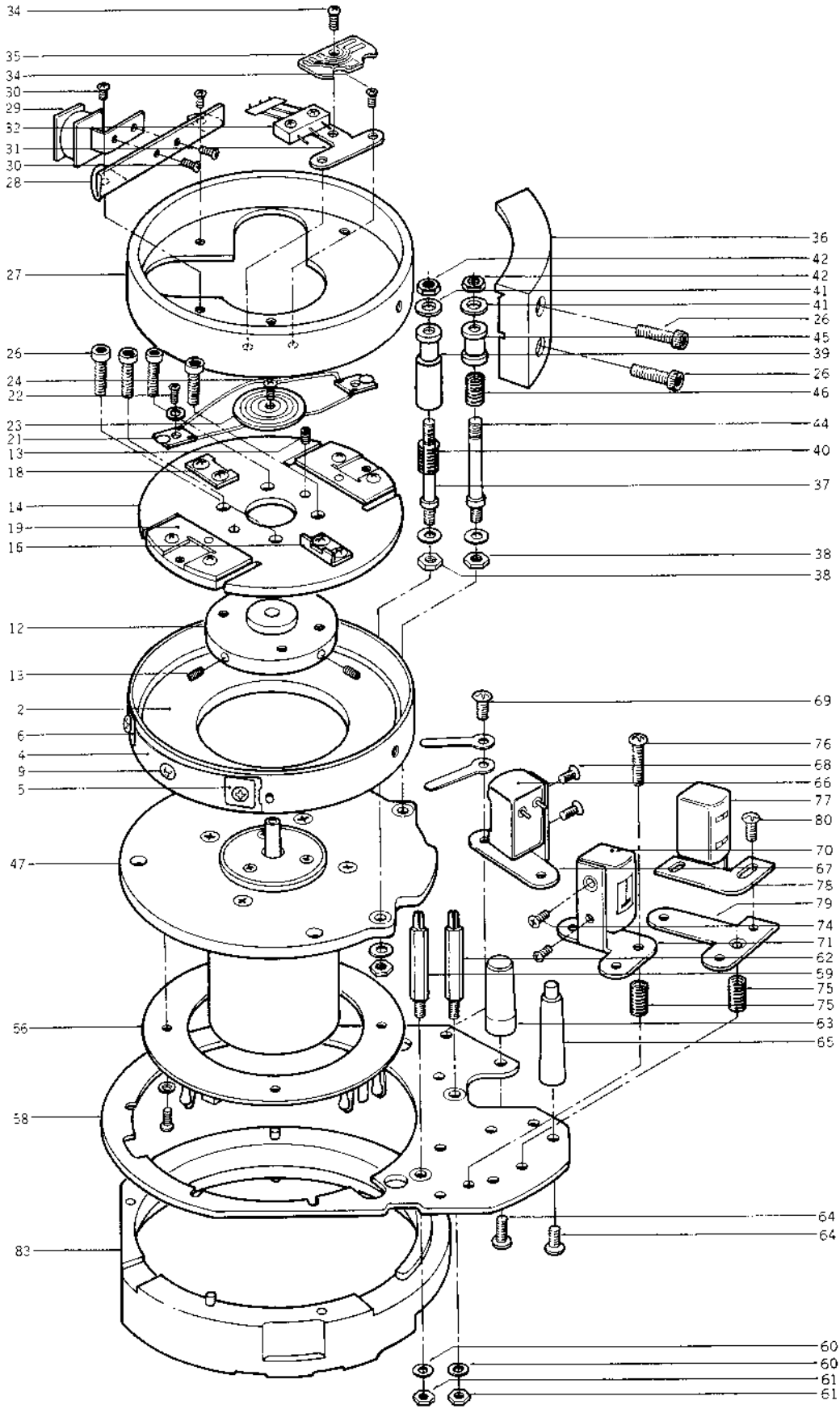
D

Diode (Silicon, Zener, Germanium)

FIG. 1 ILLUSTRATION OF VIDEO HEAD BLOCK



VIDEO HEAD BLOCK

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
	ROTARY HEAD BLOCK			
1-1x	BV573153	Rotary Head Block Comp.	PW	1
1-2	VM361394	Lower Drum	PX-802	1
1-3x	VM362867	Head Plate Mt. Pin	PX-824	1
1-4	VM362878	Drum Tape Guide	RX-809	1
1-5	VM404943	Guard Band Supporting Plate (A), PX	PX-833	1
1-6	VM404954	Guard Band Supporting Plate (B), PX	PX-834	1
1-7x	VM404965	Guard Band Supporting Plate (C), PX	PX-835	1
1-8x	ZW259560	Washer (BSP) D3.3x5.8x0.25t		2
1-9	ZS419927	Screw, round head 3x5		5
1-10x	VM361405	Drum Shield Plate	PX-803	1
1-11x	ZS589770	Screw, pan head 4x8		4
1-12	VM407531	Head Plate Supporter C	PA-838	1
1-13	ZS356804	Set Screw, hexagon socket 3x4 (cup/p.)		4
1-14	VM395425	Head Plate	PX-830	1
1-15x	VM362902	Head Plate pin	RX-820	2
1-16	MZ577394	PU Plate A	PW-8003	1
1-17x	ZS201903	Screw, binding head 2.3x4		4
1-18	MZ577405	PU Plate B	PW-8003	1
1-19	VM362891	Head Table Base	RX-819	2
1-20x	ZS201431	Screw, pan head 2.3x5		4
1-21	HR573164	VIDEO HEAD VH-21	PW	2
1-22	ZS202307	Screw, round head 2.3x6		2
1-23	VM357041	Slip Ring (1400 Type)	52-1-3	1
1-24	ZS419940	Screw, pan head 2.3x6		1
1-25x	ZW273778	Earth Lug M3		3
1-26	ZS419938	Hexagon Socket Bolt, w/hole 3x8		10
1-27	VM595888	Upper orum	PW-8005	1
1-28	EZ577383	Coil Bracket	PW-8002	1
1-29	VM403806	Pick up Coil	23-1-106	1
1-30	ZS201418	Screw, pan head 2.3x4		4
1-31	VM362946	Brush Bracket	RX-811	1
1-32	VM357063	Brush (1330 Type)	52-1-4	1
1-33x	ZS419951	Screw, pan head 2x5		2
1-34	ZS419940	Screw, pan head 2.3x6		3
1-35	EA627996	Brush P.C. Board	PW-8006	1
1-36	VM362700	Drum Support	PX-807	1
1-37	VM375175	Guide Prop T	PX-822	1
1-38	ZW273756	Nut M3		2
1-39	VM375186	Tape Guide T	PX-823	1
1-40	ZG375197	Guide Spring T	PX-824	1
1-41	VM375208	Tape Guide Cap	PX-828	2
1-42	ZW273835	Nut M3 #1		2
1-43x	ZW273745	Spring Washer M3		2
1-44	VM375210	Guide Prop S	PX-825	1
1-45	VM375221	Tape Guide S	PX-826	1
1-46	ZG375232	Guide Spring S	PX-827	1
1-47	BM573175	Drum Motor Block Comp.	PW, CV	1
1-48x	MV590995	Bearing 605ZZSMC2EP6PS2		1
1-49x	ZW577348	Washer 3 (Hicar) D10x13.8x0.5t	PW-7511	1
1-50x	ZW577315	Washer 2 (Mylar) D10x13.8x0.1t	PW-7504	3
1-51x	ZW577304	Washer 1 (Mylar) D10x13.8x0.15t	PW-7504	3
1-52x	MV590984	Bearing 604ZZSMC2EP5PS2		1
1-53x	ZW572815	Motor Washer D8x11.9x0.4t	PX-712	1
1-54x	ZW578902	Motor Washer D8x11.9x0.15t	PX-712	3
1-55x	ZW361337	Motor Washer D8x11.9x0.1t	PX-712	3
1-56	BA575403	motor Drive P.C. Board Comp.	CV-1130	1

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
	HEAD BASE BLOCK			
1-57x	BV573186	Head Base Block Comp.	PW	1
1-58	VM362711	Head Assy. Base	PX-808	1
1-59	VM419297	Head Cover Post A (L=38)	PX-A801	1
1-60	ZW272261	Spring Washer M3		2
1-61	ZW273756	Nut M3		2
1-62	VM419308	Head Cover Post B (L=40)	PX-A801	1
1-63	VM419310	Taper Pole S	PX-A802	1
1-64	ZS423527	Screw, binding head 3x8		2
1-65	VM419321	Taper Pole T	PX-A803	1
1-66	HF358740	FULL TRACK ERASE HEAD	PW, PX	1
1-67	VM419332	Master Erase Mt. Plate	PX-A804	1
1-68	ZS201508	Screw, pan head 2x4		5
1-69	ZS356793	Screw, pan head 3x5		2
1-70	HS358727	SIDE TRACK ERASE HEAD	PW, PX	1
1-71	HZ578542	Side Erase Head Angle	CV-1057	1
1-72x	VM347883	Shield Case	1-09-15	2
1-73x	VM347894	Shield Cover	1-09-14	2
1-74	ZS344351	Screw, countersunk head 2x4		1
1-75	ZG375197	Guide Spring T	PX-824	6
1-76	ZS434610	Screw, pan head 3x13	PW, CV, PX	5
1-77	HC418735	CONTROL/AUDIO HEAD		1
1-78	VM417982	AC Head Angle	VC-0008	1
1-79	VM362812	Audio CTL Head Base	PX-817	1
1-80	ZS410231	Screw, pan head 2.6x5		2
1-81x	ZW355443	Washer (SPC) D3.3x5.8x0.25t		2
1-82x	ZS434621	Screw, countersunk head 3x13		1
1-83	VM394560	Head Assy. Base Talbe B, w/pin	PX-117	1
1-84x	ZS379405	ISO Screw, binding head 3x6		4
1-85x	ZS419804	Set Screw 4x5 (flat/p.)		2

FIG. 2 ILLUSTRATION OF SUB. MAIN CAPSTAN/CAPSTAN MOTOR BLOCK

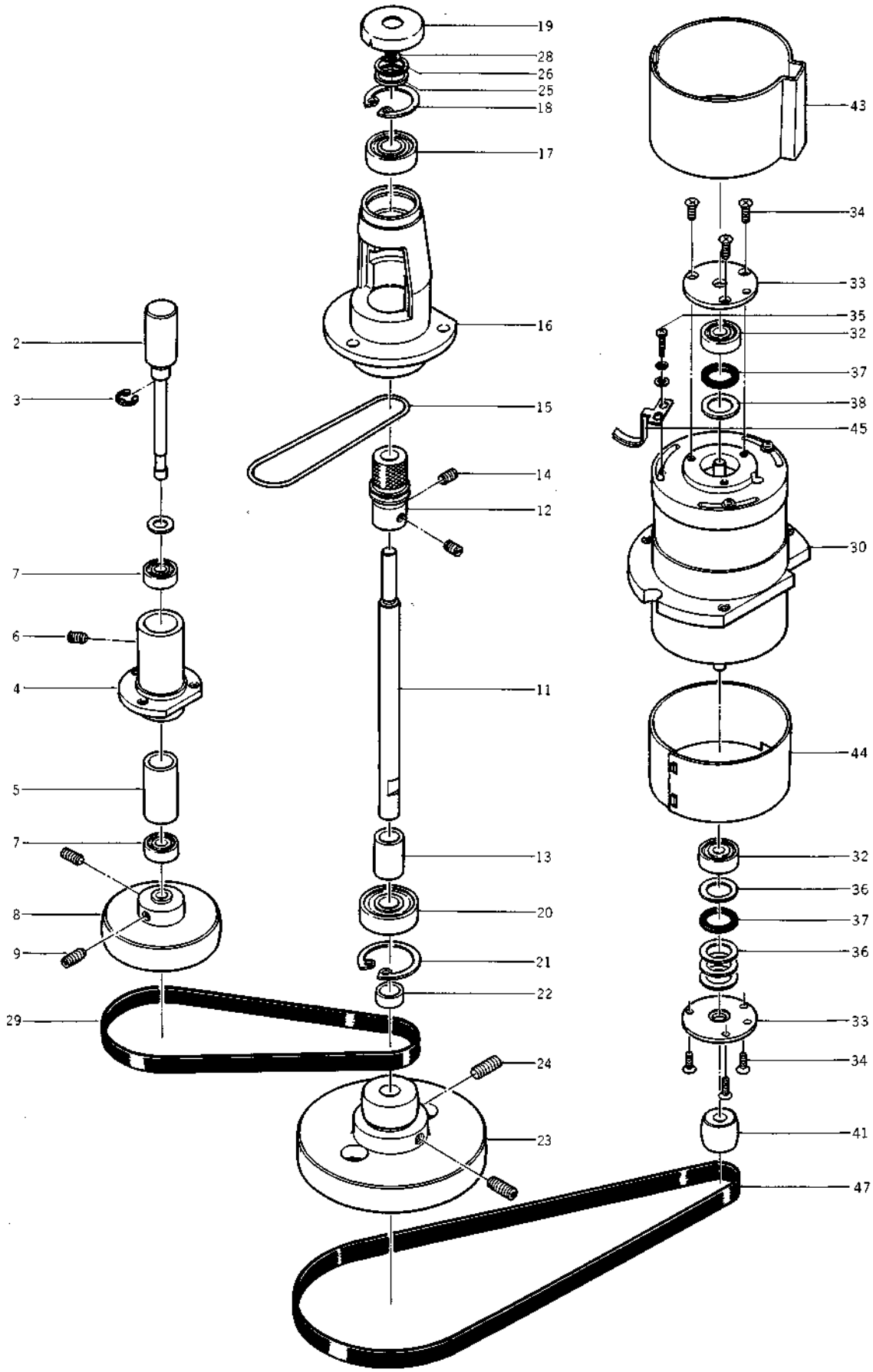


FIG. 3 ILLUSTRATION OF REEL TABLE BLOCK

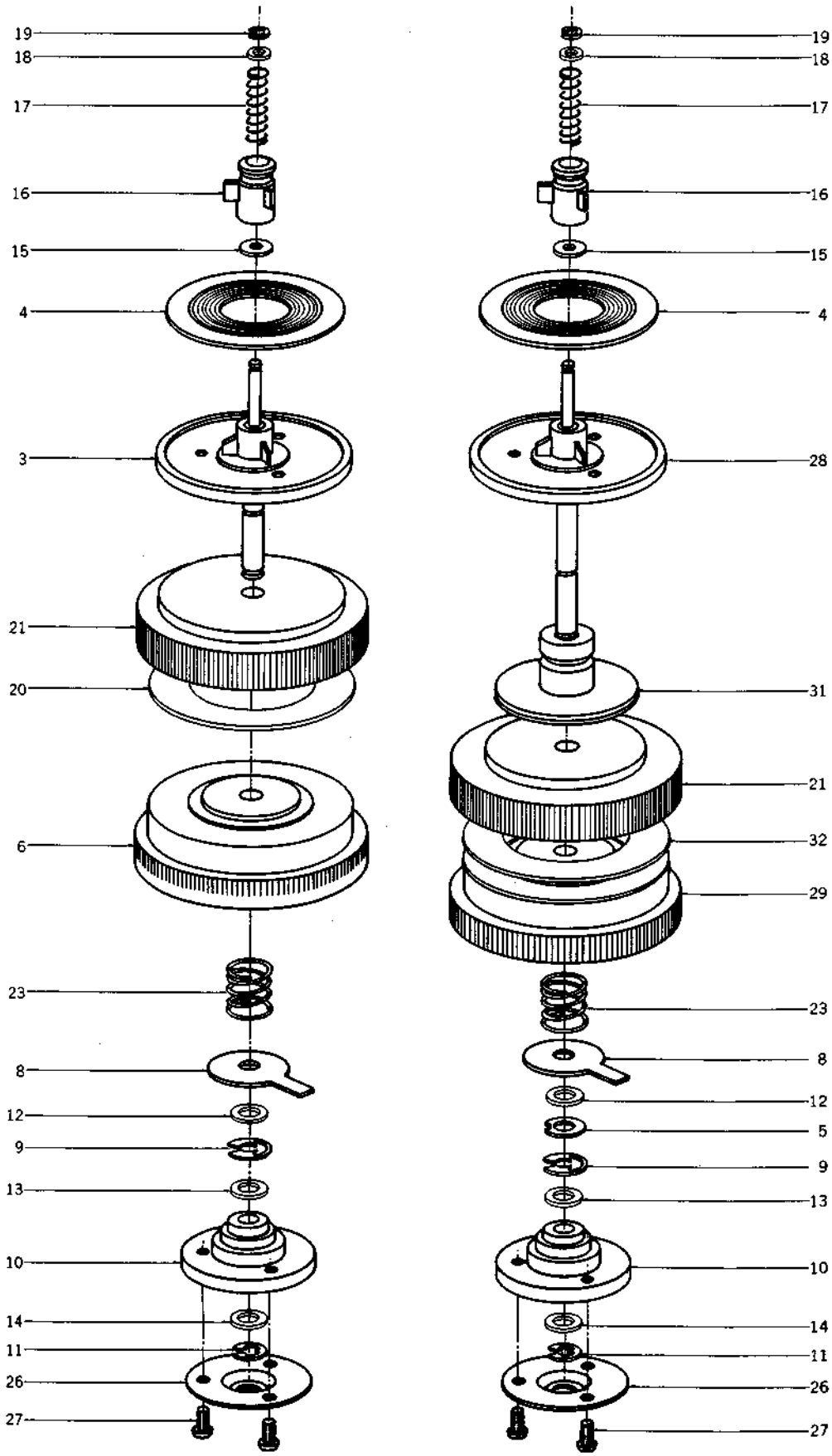
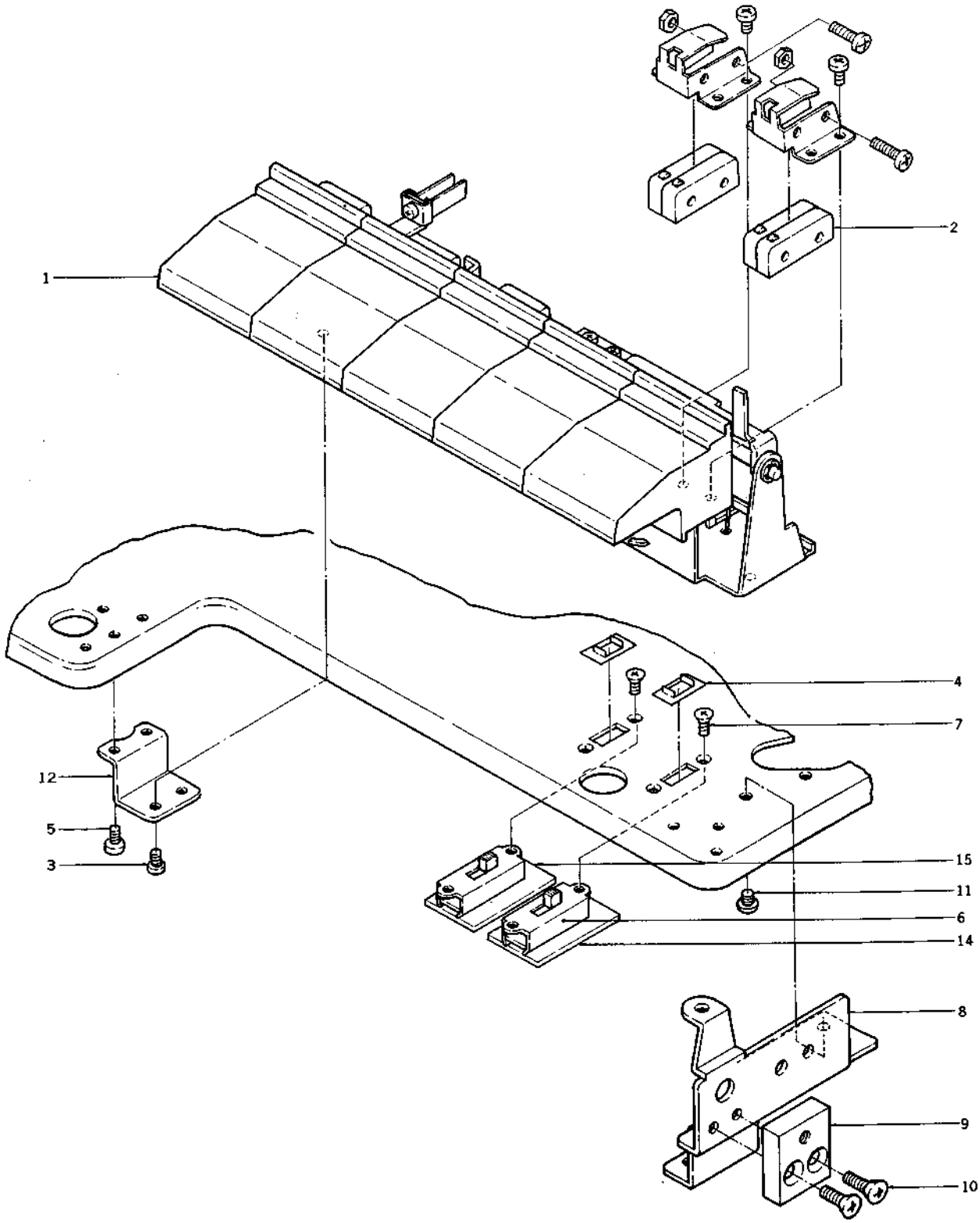


FIG. 4 ILLUSTRATION OF KEYBOARD BLOCK



SUB MAIN CAPSTAN/CAPSTAN MOTOR BLOCK

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
	SUB CAPSTAN BLOCK			
2-1x	BZ589961	Sub Capstan Block Comp.	PW, PX	1
2-2	VM360112	Sub Capstan Shaft	PX-219	1
2-3	ZW270101	'E' Ring 3M	6-1-9	1
2-4	VM585461	Sub Capstan Case	PW-2090	1
2-5	VM360134	Bearing Collar	PX-221	1
2-6	ZS434160	Set Screw, hexagon Socket 3x3 (cup/p.)		1
2-7	MV589915	Bearing 684ZZSMC2EP6PS2		2
2-8	VM360145	Sub Flywheel	PX-222	1
2-9	ZS356815	Set Screw, hexagon Socket 3x6 (cup/p.)		1
	MAIN CPASTAN BLOCK			
2-10x	BV573041	Main Capstan Block Comp.	PW	1
2-11	MY577214	Main Capstan Shaft	PW-2003	1
2-12	MR569812	Cpastan Pulley	PW-2006	1
2-13	MZ577225	Capstan Collar B	PW-2004	1
2-14	ZS609221	Set Screw 3x3 (cup/p.)		2
2-15	MB576123	Rewind Belt A	PW-2007	1
2-16	MZ576753	Bearing Case	PW-2001	1
2-17	MV589926	Bearing 696ZZSMC2EP6PS2		1
2-18	ZW572174	'C' Ring RTW-15		1
2-19	VM435824	Metal Cap	PX-218	1
2-20	MV356624	Bearing 606ZZSMC2P6PS2		1
2-21	ZW356635	'C' Ring (hollow) MFG PTW-17	6-1-2	1
2-22	VM360066	Flywheel Collar	PX-214	1
2-23	VM360044	Main Flywheel	PX-212	1
2-24	ZS444240	Set Screw, hexagon socket 4x8 (cup/p.)		2
2-25	ZW628097	Capstan Spacer B	PW-1097	1
2-26	ZW628053	Washer A, Capstan	PW-1096	1
2-27x	ZW628086	Washer B, Capstan	PW-1096	1
2-28	ZW623283	'E' Ring 4M	6-1-13	1
2-29	MB359886	Sub Capstan Belt D48x5x1	PX-171	1
	CAPSTAN MOTOR BLOCK			
2-30	BM573118	Capstan Motor Block Comp.	PW	1
2-31x	BM573120	Capstan Motor Block Comp. (CCIR)	PW	1
2-32	MV590984	Bearing 604ZZSMC2EP5PS2		2
2-33	VM361247	BRG Plate A	PX-703	2
2-34	ZS355577	Screw, countersunk head 2x6		6
2-35	ZW572804	Screw, pan head 2x10		3
2-36	ZW577282	Washer	PW-7014	3
2-37	ZW361348	Motor Washer D8x11.9x0.5t	PX-712	1
2-38	ZW572815	Motor Washer D8x11.9x0.4t	PX-712	1
2-39x	ZW361326	Motor Washer D8x11.9x0.2t	PX-712	3
2-40x	ZW361337	Motor Washer D8x11.9x0.1t	PX-712	3
2-41	VM361372	Capstan Motor Pulley	PX-715	1
2-42x	VM395370	Capstan Motor Pulley (CCIR)	PX-716	1
2-43	MZ577293	Capstan Motor Shield Plate	PW-7017	1
2-44	MZ412852	Capstan Motor Shield Plate (Lower)	VC-1034	1
2-45	VM611335	Back Tension Plate Spring R	PW-1095	1
2-46x	VM422820	Bakc Tension Felt	PX-A151	2
2-47	MB359875	Flywheel Belt D85x6x1	PX-170	1
2-48x	MB407542	Flywheel Belt D84x6x1 (CCIR)	PX-181	1

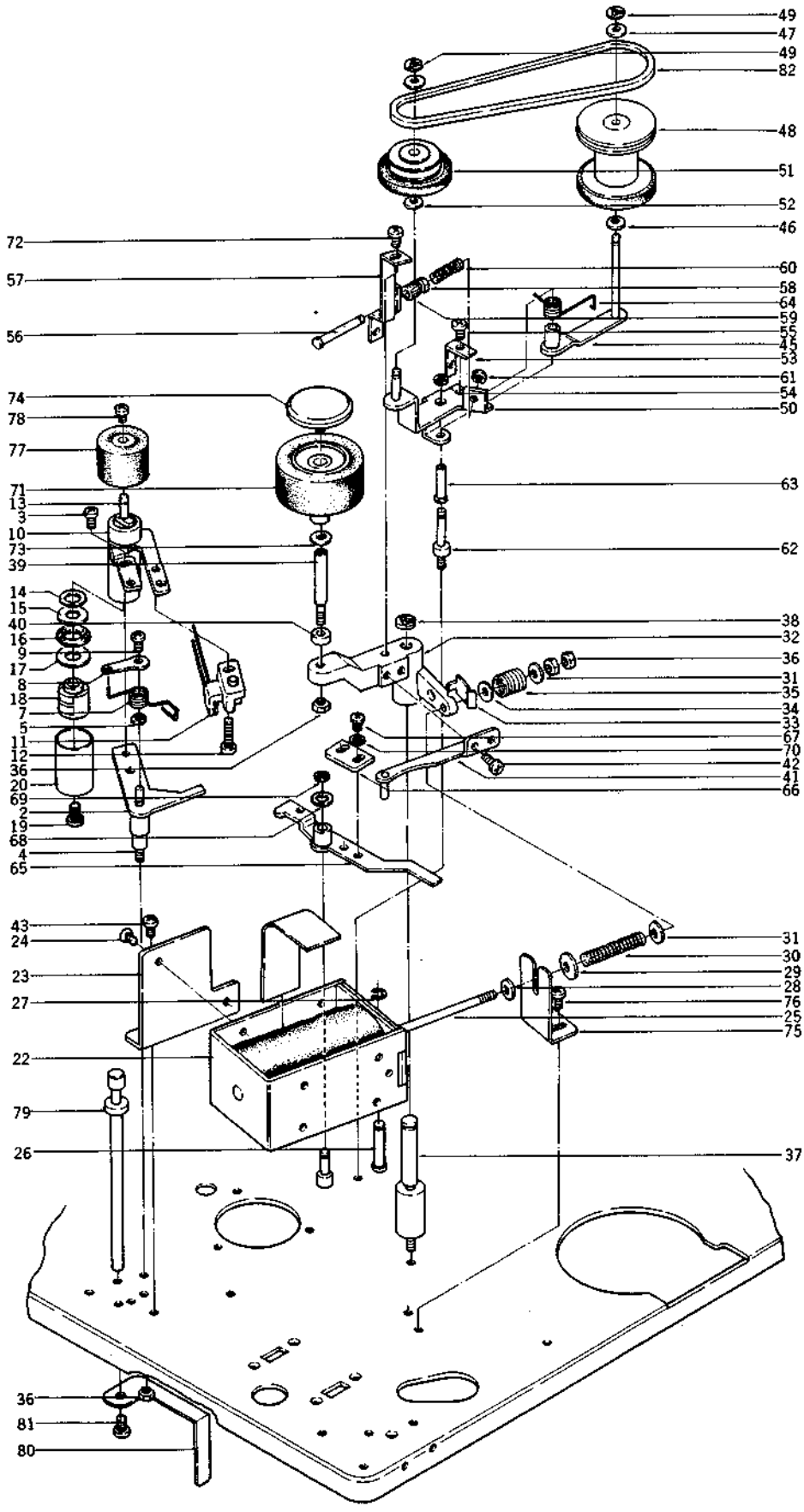
REEL TABLE BLOCK

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
3-1x	BR573131	Supply Reel Table Block Comp.	PW	1
3-2x	BR573142	Take-up Reel Table Block Comp.	PW	1
3-3	VM423483	Supply Reel Shaft, w/reel table	PX-296	1
3-4	VM359932	Reel Table Rubber	PX-203	1
3-5	ZW422742	Washer, w/claw (SUP)	PX-293B	1
3-6	VM456300	Take-up Drum	PX-291	1
3-7x	VM422706	Take-up Felt	PX-293	1
3-8	VM422752	Take-up Spring Support	PX-295	1
3-9	ZW290283	'U' Ring 2.85M	6-1-1	1
3-10	BC446455	Reel Metal Case, w/metal T	PX-297B	1
3-11	ZW270101	'E' Ring 3M	6-1-9	1
3-12	ZW479597	Washer (Nylon) D4.6x8x0.3t		1
3-13	ZW483221	Washer (Teflon) D4.6x8x0.2t		2
3-14	ZW479608	Washer (Luminer) D4.6x8x0.125t		1
3-15	ZW222390	Rubber Washer	BT-113	1
3-16	MT256138	Reel Table B	RT-110	1
3-17	ZG255622	Reel Spring	RT-111	1
3-18	ZW259413	Washer (A1P3) D2.7x4.9x1t	BT-112	1
3-19	ZW270088	'E' Ring 1.9M	6-1-9	1
3-20	MZ577721	Clutch Plate A	PW-2077	1
3-21	MT393200	Reel Table S	PW-2056	1
3-22x	ZW572826	Washer (Luminer) D4.6x7x0.13t		1
3-23	ZG578744	Reel Pressure Spring	PW-2088	1
3-24x	ZW620234	Washer (Nylon) D4.6x13x1t		1
3-25x	ZW620245	Washer (Nylon) D4.6x13x0.5t		2
3-26	VM422831	Reel Shaft Cover	PX-149	1
3-27	ZW555726	Screw, binding head 2.6x6		3
3-28	VM423494	Take-up Reel Shaft, w/reel table	PX-296B	1
3-29	VM493198	Take-up Drum	PX-300	1
3-30x	MT484144	Take-up Felt	PW-2089	1
3-31	MT579655	Sub Reel Table T	CV-1126	1
3-32	MZ583233	Clutch Palte B	PW-2077	1

KEYBOARD BLOCK

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
4-1	ES573311	Keyboard SW. ME-S40	25-5-65	1
4-2	ES356916	Micro SW. SL-2 AC5A 125V	25-1-17	4
4-3	ZS417227	Screw, binding head 2.3x5		2
4-4	VM359864	SW. Retaining Plate	PX-169	2
4-5	ZS379405	ISO Screw, binding head 3x6		3
4-6	ES422447	Slide SW. S-4900	25-3-42	2
4-7	ZS344351	Screw, countersunk head 2x4		4
4-8	MZ576887	Connection Angle D	PW-1015	1
4-9	VM576742	Connection Piece B	PW-1054	1
4-10	ZS414033	Screw, countersunk head 3x8		2
4-11	ZS379350	ISO Screw, pan head 3x6		2
4-12	VM422021	Button Guide Fixing Plate (L)	PX-A134	1
4-13x	ZW562476	Farth Lug M3		1
4-14	EA576461	Rec. SW. P.C. Board	PW-5013	1
4-15	EA577890	PB. SW. P.C. Board	PW-5014	1
4-16x	EA577541	Harness P.C. Board	PW-5018	1
4-17x	EO574187	Ferri Inductor FL5H 100μH(M)	23-1-2	1

FIG. 5 ILLUSTRATION OF SUB. MAIN PINCH ROLLER/TAKE-UP ROLLER BLOCK

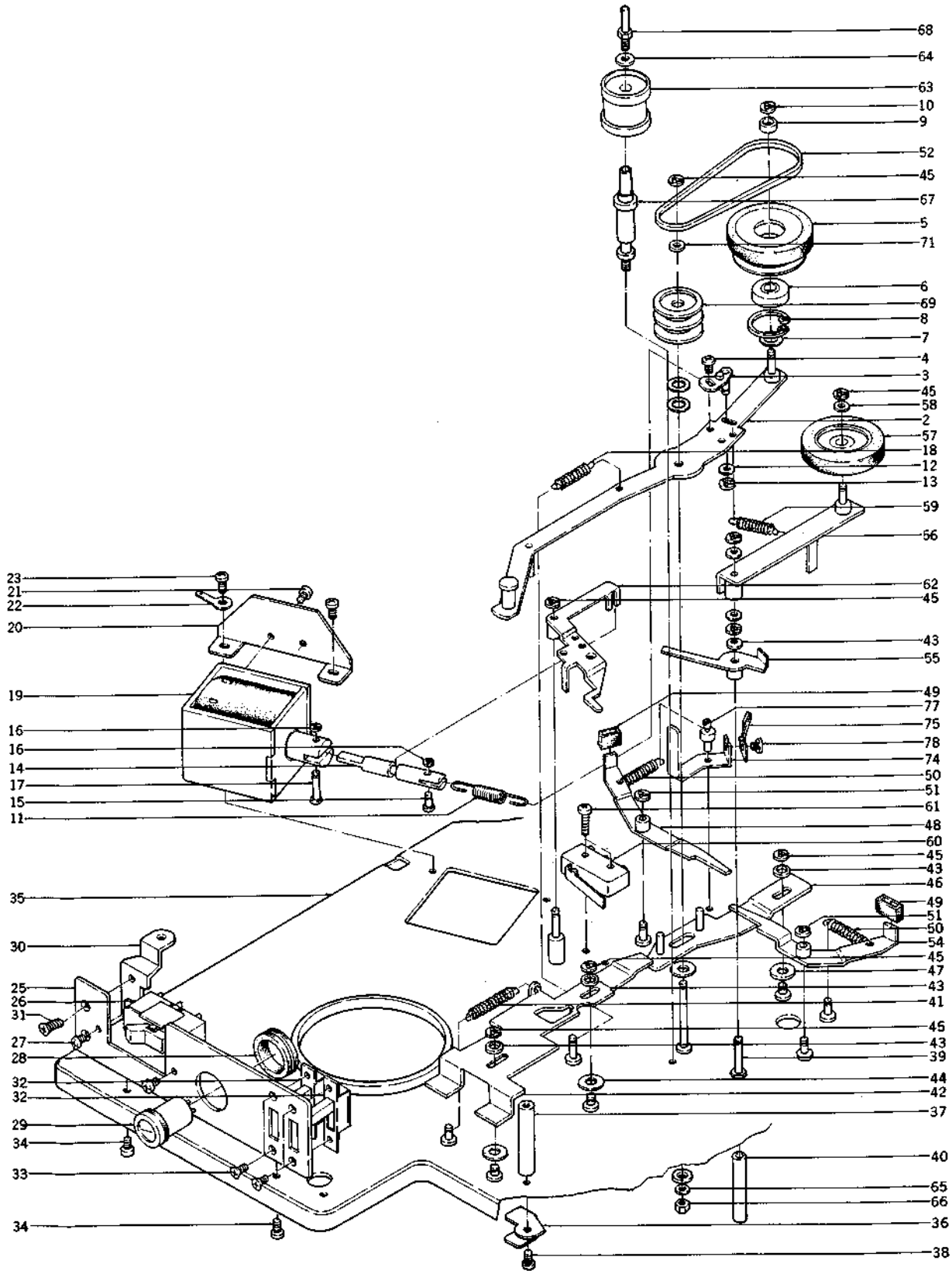


SUB. MAIN PINCH ROLLER/TAKE-UP ROLLER BLOCK

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
	SUB PINCH ROLLER BLOCK			
5-1x	BV573096	Sub Pinch RollerBlock Comp.	PW, CV	1
5-2	MZ576393	Sub Pinch Roller Arm, w/metal	PW-2039	1
5-3	ZS422076	Screw, pan head 3x5		2
5-4	MS576685	Sub Pinch Roller Arm Shaft	PW-2041	1
5-5	ZW270101	'E' Ring 3M	6-1-9	1
5-6x	ZW259738	Washer (Polyslider) D4.1x7x0.25t		1
5-7	ZG359730	Sub Pinch Roller Spring	PX-156	1
5-8	VM359741	Spring Arm	PX-157	1
5-9	ZS417227	Screw, binding head 2.3x5		1
5-10	MZ585472	Sub Pinch Roller Arm, w/metal	CV-1141	1
5-11	VM585630	Brush	CV-1143	1
5-12	ZS417328	Screw, binding head 2.3x10		1
5-13	MS585505	Sub Pinch Roller Shaft	CV-1027	1
5-14	ZW414145	Washer (Polyslider) D4.1x7x0.13t		2
5-15	ZW555693	Washer (SPC) D3.2x8x0.5t		1
5-16	MZ585494	Oil Seal	CV-1145	1
5-17	ZW439604	Washer (SPC) D4.2x9x0.5t		1
5-18	VM585450	Slip Ring	CV-1147	1
5-19	ZS464703	Screw, binding head 2x4		1
5-20	SP585538	Dust Cover	CV-1148	1
	MAIN PINCH ROLLER BLOCK			
5-21x	BV573085	Main Pinch Roler Block Comp.	PW	1
5-22	EP571050	Plunger Solenoid 1240FLT (RGE-AD1114B)	44-1-65	1
5-23	MZ576371	Plunger Bracket	PW-2037	1
5-24	ZS444330	ISO Screw, countersunk head 3x4		2
5-25	VM360246	Pinch Roller Lever	PX-232	1
5-26	MH577631	Pinch Roller Joint Pin	PW-2063	1
5-27	ZW270088	'E' Ring 1.9M	6-1-9	1
5-28	ZW399958	Washer (PBP) D3.1x8x0.5t		1
5-29	ZW572231	Washer (SPC) D3.1x10x0.5t		1
5-30	ZG360292	Pinch Roller Return Spring	PX-234	1
5-31	ZW259503	Washer (Nylon) D3.1x8x0.5t		2
5-32	MZ576360	Main Pinch Roller Arm	PW-2036	1
5-33	MZ577642	Universal Spacer	PW-2064	1
5-34	ZW425002	Washer (SPC) D3.1x8x0.5t		1
5-35	ZG360303	Pinch Roleir Spring	PX-235	1
5-36	ZW273756	Nut M3		3
5-37	MS576382	Pinch Roler Arm Shaft	PW-2038	1
5-38	ZW270123	'E' Ring 4M	6-1-9	1
5-39	VM360167	Pinch Roller Shaft	PX-224	1
5-40	ZW360178	Pinch Roller Washer	PX-225	1
5-41	VM360213	Pinch Roller Plate, w/pin	PX-229	1
5-42	ZS356668	Screw, binding head 2.3x4		2
5-43	ZS417137	Screw, binding head 3x4		2
	TAKE UP ROLLER BLOCK			
5-44x	BV573107	Take-up Roller Block Comp.	PW	1
5-45	VM422548	Take-up Pulley Arm, w/shaft	PX-243	1
5-46	ZW259773	Washer (Nylon) D4.1x7x0.5t		4
5-47	ZW572130	Washer (luminer) D4.1x7x0.1t		2
5-48	VM422605	Take-up Pulley	PX-282	1
5-49	ZW270101	'E' Ring 3M	6-1-9	2
5-50	MZ576426	Take-up Roller Arm, w/shaft	PW-2047	1
5-51	VM360584	Drive idler	PX-262	1
5-52	ZW394086	Washer (Nylon) D4.1x7x1t		1
5-53	VM422572	Take-up Roller Adjust Plate	PX-245B	1
5-54	ZW357164	'E' Ring 2.3M	6-1-9	1
5-55	ZS417251	Screw, binding head 2.3x3		1
5-56	VM360628	Joint Shaft	PX-266	1
5-57	MZ576448	Pressure Arm	PW-2049	1
5-58	ZS360630	Take-up Torque Adjust Screw A (Nut)	PX-267	1
5-59	ZS360641	Take-up Torque Adjust Screw B (Knurling Nut)	PX-268	1

Ref. No.	Part No.	Description	Schematic No.	Q'ty
5-60	ZG360652	Take-up Idler Spring	PX-269	1
5-61	ZW356657	'E' Ring 1.5M	6-1-9	1
5-62	VM427127	Take-up Roller Arm Shaft	PX-A160	1
5-63	VM427116	Take-up Roller Arm Shaft Collar	PX-A161	1
5-64	ZG422550	Take-up Arm Spring A	PX-244	1
	ASSEMBLY BLOCK			
5-65	ML499645	Brake Release Lever B, w/metal	PW-1023	1
5-66	ML576933	Brake Release Lever C	PW-1025	1
5-67	ZS201475	Screw, pan head 2x3		2
5-68	ZW572130	Washer (Luminer) D4.1x7x0.1t		2
5-69	ZW357164	'E' Ring 2.3M	6-1-9	1
5-70	ZW577282	Washer (A1P3-1) D2.1x0.5t	PW-70M	2
5-71	MP360180	Pinch Roller, PX D=25	PX-226	1
5-72	ZS323728	Screw, binding head 3x5		1
5-73	ZW414145	Washer (Polyslider) D4.1x7x0.13t		1
5-74	SK355691	Pinch Roller Cap	PX-605	1
5-75	VM359460	Pinch Roller Lever Stopper	PX-129	1
5-76	ZS201925	Screw, binding head 2.3x5		2
5-77	MP579374	Sub Pinch Roller D=16	CV-1025	1
5-78	ZS355601	Screw, binding head 2x5		1
5-79	VM359291	Tape Guide	PX-114	1
5-80	EZ510366	Wire Support B	PX-109t	1
5-81	ZS421806	Screw, pan head 3x8		1
5-82	MB422627	Take-up Belt D42.3x2x2	PX-182	1

FIG. 6 ILLUSTRATION OF REWIND LEVER/POWER SW. ANGLE BLOCK



REWIND LEVER/POWER SW. ANGLE BLOCK

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
	REWING LEVER BLOCK			
6-1x	BV573063	Rewind Lever Block Comp.	PW, CV	1
6-2	ML499656	Rewind Lever, w/metal	PW-2023	1
6-3	ML577754	Slide Lever, w/pin	PW-2081	1
6-4	ZS442585	Screw, binding head 2.6x4		1
6-5	MI576270	Rewind Roller	PW-2026	1
6-6	MV589948	Bearing 624ZZSMC1EP6PS2		1
6-7	ZW414145	Washer (Polyslider) D4.1x7x0.13t		1
6-8	ZW572185	'C' Ring RTW-13		1
6-9	MZ576292	Rewind Roller Color	PW-2027	1
6-10	ZW270101	'E' Ring 3M	6-1-9	1
6-11	ZS576325	Rewind Spring	PW-2032	1
6-12	ZW572196	Washer (SUP) D3.4x7.8x0.3t		1
6-13	ZW357164	'E' Ring 2.3M	6-1-9	1
6-14	VM576707	Rewind Connection Rod	PW-2031	1
6-15	MH577776	Connection Rod Pin	PW-2083	1
6-16	ZW356657	'E' Ring 1.5M	6-1-9	2
6-17	MH576336	Plunger Pin	PW-2033	1
6-18	ZS576303	Rewind Lever Spring	PW-2028	1
6-19	EP601931	Plunger Solenoid SDC01029THT1	44-1-67	1
6-20	MZ576347	Rewind Plunger Bracket	PW-2034	1
6-21	ZS323728	Screw, binding head 3x5		2
6-22	ZW273778	Earth Lug M3		1
6-23	ZS417137	Screw, binding head 3x4		2
	POWER SW. ANGLE BLOCK			
6-24x	BV573300	Power SW. Angle Block Comp.	PW	1
6-25	MZ576876	Power SW. Angle	PW-1014	1
6-26	ES358097	Seesaw SW. SJ-1253(SA2050N)	25-2-10	1
6-27	ZS323728	ISO Screw, binding head 3x5		2
6-28	VM359831	Checker Fastener	PX-166	1
6-29	EM428670	Battery Checker MO-50 (KL-255A-19)	46-1-13	1
6-30	MZ577135	Setting Angle B	PW-1049	1
6-31	ZS200384	Screw, countersunk head 3x6		2
6-32	ES572220	Slide SW. MFS-201N(Special)	25-3-87	2
6-33	ZS344351	Screw, countersunk head 2x4		2
6-34	ZS379405	ISO Screw, binding head 3x6		2
	ASSEMBLY BLOCK			
6-35	MZ578070	Mech. Frame, w/shaft	PW-1001	1
6-36	EZ610378	Wire Support C	PW-1093	1
6-37	VM421986	Assy. Base Prop	PX-A153	1
6-38	ZS321298	ISO Screw, binding head 3x8		1
6-39	MS576797	Brake Release Shaft	PW-1003	1
6-40	VM359414	P.C. Board Prop A	PX-126	4
6-41	ZG577945	FF Slide Lever Spring	PW-1022	1
6-42	ML578035	Slide Lever A	PW-1021	1
6-43	ZW259773	Washer (Nylon) D4.1x7x0.5t		4
6-44	ZW260201	Washer (Nylon) D6.2x13x1t		3
6-45	ZW270101	'E' Ring 3M	6-1-9	5
6-46	ML576900	Slide Lever B, w/pin	PW-1019	1
6-47	ZW260188	Washer (Nylon) D6.2x13x0.5t		1
6-48	ML499678	Brake Lever A, w/metal	PW-1028	1
6-49	VM422673	Brake Rubber Bush	PX-299	2
6-50	ZG360437	Brake Spring	PX-248	2
6-51	ZW357164	'E' Ring 2.3M	6-1-9	4
6-52	MB577056	Rewind Belt B	PW-1040	1
6-53x	ZW402557	Washer (Nylon) D4.1x7x0.2t		6
6-54	ML499680	Brake Lever B, w/metal	PW-1029	1
6-55	ML499667	Brake Release Lever A, w/metal	PW-1026	1
6-56	ML499691	FF Idler Lever, w/shaft	PW-1031	1
6-57	MI576977	FF Idler	PW-1033	1
6-58	ZW572130	Washer (Luminer) D4.1x7x0.1t		2
6-59	ZS576314	FF Idler Spring	PW-2030	1
6-60	ES477966	Micro SW. SS-5GL	25-1-23	1
6-61	ZS201868	Screw, binding head 2.3x10		2
6-62	ML499702	Rewind Brake Lever, w/metal	PW-2029	1
6-63	VM422087	Guide Roller B	PX-A137	1
6-64	ZW572141	Washer (Luminer) D4.1x7x0.25t		1
6-65	ZW273802	Toothed Lock Washer M3		1
6-66	ZW273756	Nut M3		1
6-67	VM422010	Guide Roller Shaft	PX-A138	1
6-68	ZW606982	Nut, Guide Roller	PX-A191	1
6-69	VM577034	Idler Pulley	PW-1038	1
6-70x	MV589915	Bearing 684ZZSMC2EP6PS2		2
6-71	MZ577045	Idler Pulley Collar	PW-1039	1
6-72x	ZW402557	Washer (Nylon) D4.1x7x0.2t		4
6-73x	ZW620166	Washer (Nylon) D5.5x8.8x0.2t		1
6-74	VM576718	Back Tension Angle	PW-1062	1
6-75	VM576731	Back Tension Spring	PW-1063	1
6-76x	VM576696	Back Tension Felt	PW-1064	1
6-77	VM576720	Angle Point Screw	PW-1065	1
6-78	ZS417251	Screw, binding head 2.3x3		1
6-79x	VM421615	Drum Holder	RX-827	1
6-80x	ZW418511	Protector Retaining Screw	VC-8001	2

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

FIG. 7 ILLUSTRATION OF SLIDE SW./VIDEO CHANGE SW. BLOCK

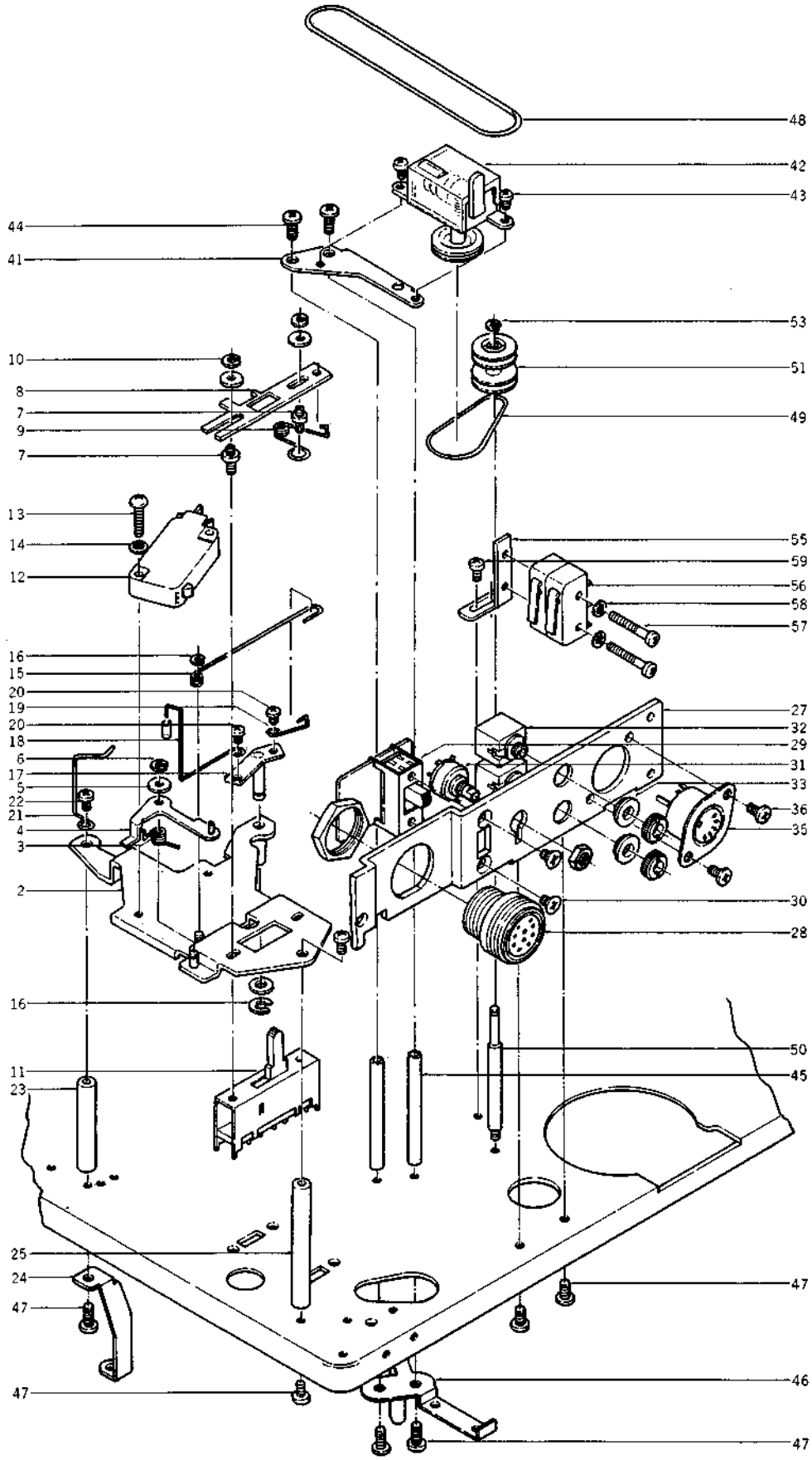


FIG. 8 ILLUSTRATION OF ASSEMBLY BLOCK

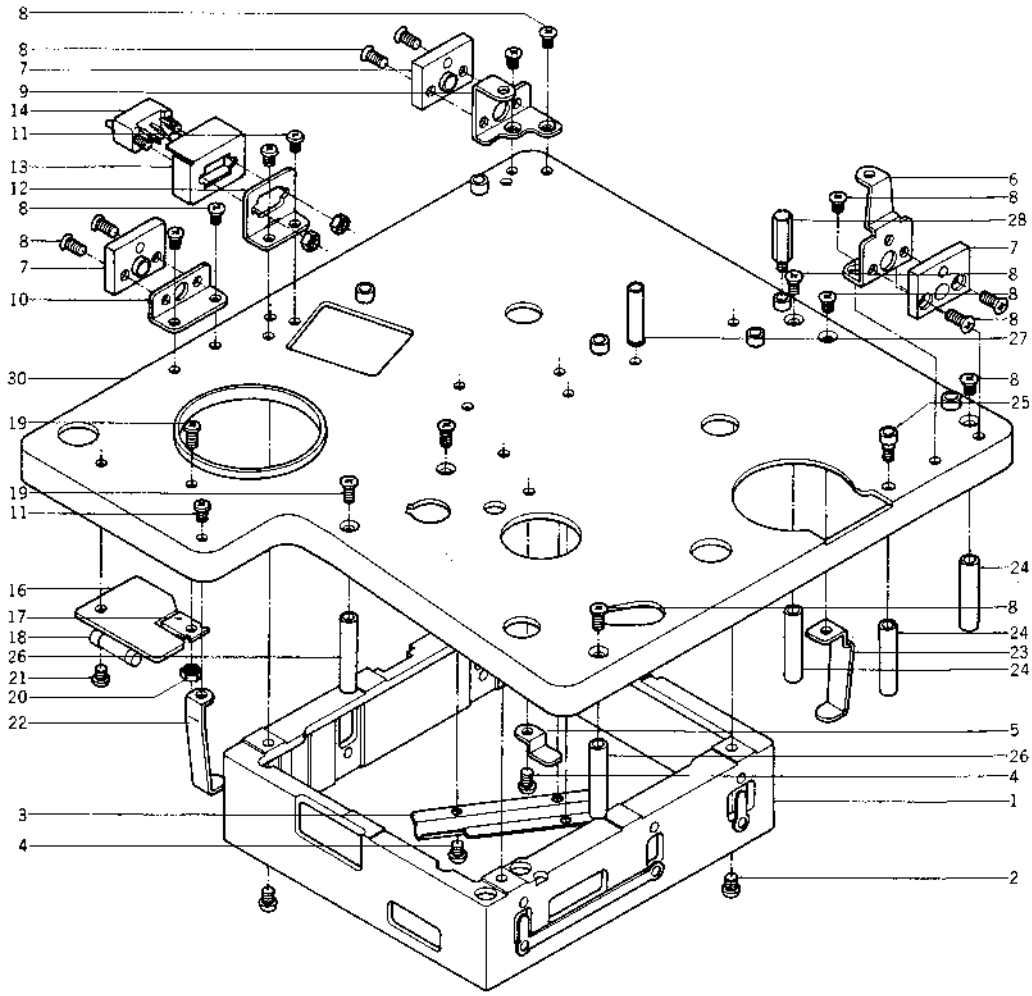
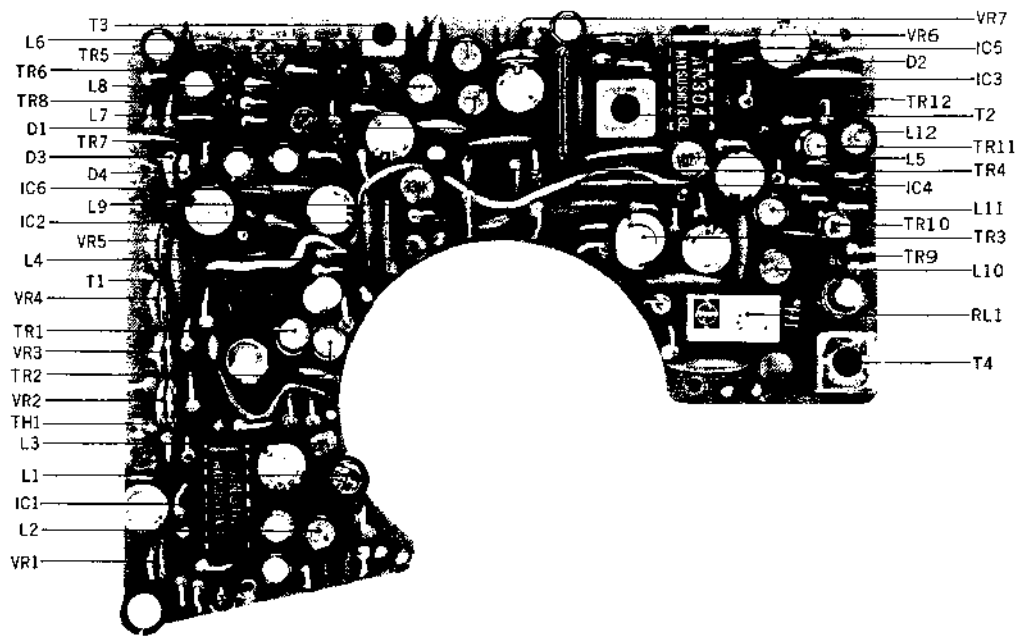


FIG. 9 PHOTO OF VIDEO P.C. BOARD (PW-5002) BLOCK



SLIDE SW./VIDEO CHANGE SW. BLOCK

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
	SLIDE SW. BLOCK			
7-1x	BV573197	Slide SW. Block Comp.	PW	1
7-2	MZ584368	SW. Plate, w/shaft	CV-1043	1
7-3	ZG422368	Lock Arm Spring	PX-A203	1
7-4	MZ577618	Lock Arm, w/pin	PW-2058	1
7-5	ZW430446	Washer (Nylon) D3.1x8x0.25t		3
7-6	ZW270088	'E' Ring 1.9M	6-1-9	1
7-7	VM422381	Slide Plate Shaft	PX-A206	2
7-8	VM422370	Slide Plate	PX-A208	1
7-9	ZG422392	Slide SW. Return Spring	PX-A207	1
7-10	ZW357164	'E' Ring 2.3M	6-1-9	2
7-11	ES510748	Slide SW. SL242B-4DW	25-3-82	1
7-12	ES589972	Micro SW. MT-20	25-1-32	1
7-13	ES393726	SCrew, truss head 3x10		2
7-14	ZW273802	Toothed Lock Washer M3		2
7-15	EZ577574	Micro SW. Arm	PW-2053	1
7-16	ZW356657	'E' Ring 1.5M	6-1-9	2
7-17	ML577585	Shut-off Lever, w/shaft	PW-2054	1
7-18	MZ577956	Shut-off Arm	PW-2057	1
7-19	MZ577607	Pivot Arm	PW-2056	1
7-20	ZS394525	Screw, binding head 2x3		2
7-21	MZ579644	Tape Protector	CV-1125	1
7-22	ZS379405	ISO Screw, binding head 3x6		4
7-23	MH579262	SW. Plate Prop B	CV-1014	1
7-24	MZ576898	Card Angle	PW-1017	1
7-25	MH577168	SW. Plate Prop	PW-1055	1
	VIDEO CHANGING SW. BLOCK			
7-26x	BV573074	Video Changing SW. Block Comp.	PW	1
7-27	SP576358	Connector Panel	PW-2035	1
7-28	EJ499792	10P Connector RD02-15-10S	31-1-87	1
7-29	ES422471	Slide SW. SL-B262B	25-3-38	1
7-30	ZS430413	Screw, countersunk head 2.6x4		2
7-31	EV422482	Vol., w/sw. V12M41S 100 kB	36-25-2	1
7-32	EJ464995	Jack SJ-296	31-2-42	2
7-33	VM422537	Nylon Collar For Jack D3.5	PX-A147	2
7-34x	ZW430402	Washer (Nylon) D6.2x10x0.5t		2
7-35	EJ378990	Jack, 5P Din S-1 8123	31-1-1	1
7-36	ZS202061	Screw, binding head 3x5		2
7-37x	EA577552	SW. P.C. Board	PW-5010	1
7-38x	ER450101	Carbon/R. RD1/4 330k(J) (Insu. Type)	35-9-5	1
7-39x	ZW432347	Washer D6.2x13x0.125t (Luminar)		1
7-40x	ES572220	Slide SW. MFS-201N (Special)	25-3-87	1
	ASSEMBLY BLOCK			
7-41	VM422234	Counter Bracket	PX-A114	1
7-42	MC422280	Counter KMP-3836	9-1-15	1
7-43	ZW572152	Screw, round head 2x4		2
7-44	ZS379350	ISO Screw, pan head 3x6		2
7-45	VM422245	Counter Bracket Column	PX-A106	2
7-46	MZ577203	Relay P.C. Board Parts	PW-1061	1
7-47	ZS379405	ISO Screw, binding head 3x6		6
7-48	MB422267	Counter Belt A D55.6x1.1x1.1	PX-A115	1
7-49	MB422278	Counter Belt B D35.8x1.1x1.1	PX-A116	1
7-50	VM422256	Middle Pulley Shaft	PX-A107	1
7-51	VM422291	Middle Pulley	PX-A113	1
7-52x	ZW374534	Washer (Nylon) D3x5x0.5t		1
7-53	ZW270088	'E' Ring 1.9M	6-1-9	1
7-54x	ZW357658	Nut M2.6		1
7-55	MZ576955	Micro SW. Bracket	PW-1030	1
7-56	ES477966	Micro SW. SS-5GL	25-1-23	2
7-57	ZS356670	Screw, binding head 2.3x15		2
7-58	ZW269785	Toothed Lock Washer M2.3		2
7-59	ZS201925	Screw, binding head 2.3x5		2
7-60x	ER213030	Carbon/R, RD1/4 5.6k(J) (Stop. Type)	35-10-1	1
7-61x	EC320040	Elect./C. 47μF 16WV (Vert. Type)	24-12-9	1

ASSEMBLY BLOCK

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
8-1	BZ430637	Battery Case Comp.	PW, CV, PX	1
8-2	ZS422076	Screw, pan head 3x5		5
8-3	MZ577732	Read Wire Cover	PW-2078	1
8-4	ZS365940	Screw, binding head 2.3x3		3
8-5	EZ610356	Wire Support A	PW-1091	1
8-6	MZ576843	Connection Angle A	PW-1011	1
8-7	MZ615183	Connection Peace C	PW-1094	2
8-8	ZS200384	Screw, countersunk head 3x6		11
8-9	MZ576854	Connection Angle B	PW-1012	1
8-10	MZ576865	Connection Angle C	PW-1013	1
8-11	ZS379405	ISO Screw, binding head 3x6		7
8-12	VM359820	connector Mt. Plate (L)	PX-165	1
8-13	VM359818	Connctor Cover	PX-164	1
8-14	VM358086	Connector 8P MB-8S-7.5A-1	31-1-63	1
8-15x	ZW562476	Earth Lug M3		1
8-16	BA573298	Fuse P.C. Board Comp.	PW-5009	1
8-17	ET375603	Transistor 2SC1061(B)(C)	45-1-96	1
8-18	EF358031	Fuse 125V 4A (Lead Type)	39-1-31	1
8-19	ZS321298	ISO Screw, binding head 3x8		6
8-20	ZW273756	Nut M3		1
8-21	ZS417273	Screw, binding head 2.3x4		1
8-22	MZ577124	Setting Angle A	PW-1048	1
8-23	MZ577146	Setting Angle C	PW-1050	1
8-24	VM359414	P.C. Board Prop A	PX-126	3
8-25	VM359447	P.C. Board Prop E, PX	PX-127	1
8-26	VM359425	P.C. Board Prop B	PX-126	4
8-27	VM359280	Mech. Panel Prop, PX	PX-113	1
8-28	MZ577157	Setting Pole	PW-1051	1
8-29x	ZS344351	Screw, countersunk head 2x4		2
8-30	MZ578070	Mech. Frame, w/shaft	PW-1001	1
8-31x	FZ577686	SW. Shield Cover	PW-2073	1
8-32x	MZ577708	Shield Sheet 1	PW-2075	1
8-33x	MZ577710	Shield Sheet 2	PW-2075	1
8-34x	ZS201925	Screw, binding head 2.3x5		4
8-35x	MZ577113	Video P.C. Board Spacer	PW-1047	1

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

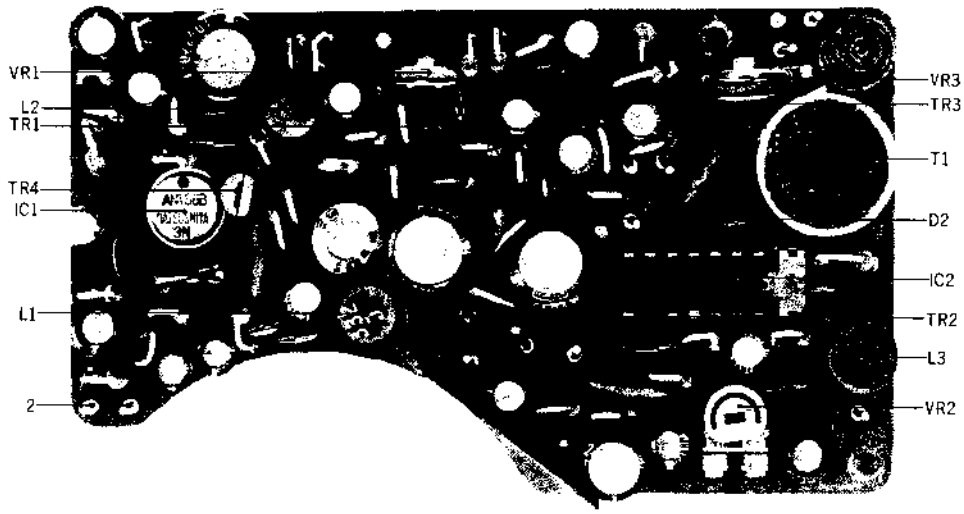
VIDEO P.C. BOARD (PW-5002) BLOCK

Symbol No.	Parts No.	Description	Q'ty
9-1x	BA573276	Video P.C. Board Comp. (PW-5002)	1
9-IC1	EI572681	I.C. AN-302	1
9-IC2	EI357917	I.C. P-5 (AE-163)	2
9-IC3	EI572692	I.C. AN-304	1
9-IC4	EI361462	I.C. P-2	1
9-IC5	EI564298	I.C. GR-118	1
9-IC6	EI357917	I.C. P-5 (AE-163)	2
9-TR1,2	ET572703	Transistor 2SC1216(F)	2
9-TR3	ET475503	Transistor 2SC968P(3)	1
9-TR4	ET380834	Transistor 2SC711(E)	1
9-TR5to8	ET361923	Transistor 2SC536(E)	4
9-TR9	ET423224	FET 2SK19(BL)	1
9-TR10,11	ET350392	Transistor 2SC645(B)	2
9-TR12	ET380430	Transistor 2SC460(C)	1
9-D1	ED219464	Germanium Diode 1N34A	1
9-D2	ED374692	Silicon Diode SD-13	1
9-D3,4	ED572714	Germanium Diode 1S73A	2
9-T1	BT355746	Trans. P10HNS10-3.2BA	1
9-T2	BT361822	Trans. SNY-033-1352	1
9-T3	BT361833	Trans. SNY-033-1351	1
9-T4	EO423235	RF Coil 14SO48	1
9-RL1	EP524801	Relay NR-H-6V	1
9-L1	EO361890	Inductor FS0810S 39μH(J)	1
9-L2	EO357772	Inductor FS0810S 100μH(J)	1
9-L3	EO485504	Ferri Inductor FL5H 270μH(K)	1
9-L4	EO355847	Ferri Inductor FL4H 3.3μH(K)	1
9-L5	EO419635	Ferri Inductor FL7H 1μH(K)	1
9-L6	EO357772	Inductor FS0810S 100μH(J)	1
9-L7	EO361888	Inductor FS0810S 180μH(J)	1
9-L8	EO357772	Inductor FS0810S 100μH(J)	1
9-L9	EO419613	Ferri Inductor FL7H 330μH(K)	1
9-L10	EO361888	Inductor FS0810S 180μH(J)	1
9-L11	EO423246	Inductor FS0810S 220μH(J)	1
9-L12	EO428703	Inductor FS0810S 1μH(J)	1
9-VR1,2	EV464253	Semi-fixed/Vol. V8K1-1 2 kB	2
9-VR3	EV523214	Semi-fixed/Vol. V8K1-1 5 kB	1
9-VR4	EV572747	Semi-fixed/Vol. V8K1-1 100ΩB	1
9-VR5	EV523708	Semi-fixed/Vol. V8K1-1 500ΩB	1
9-VR6	EV522663	Semi-fixed/Vol. V8K1-1 100 kB	1
9-VR7	EV572758	Semi-fixed/Vol. V8K1-1 200ΩB	1
9-TH1	ED572760	Thermister 34D22	1
9-2	EJ350447	Test Terminal	2
9-3	EJ363126	P.C. Board Terminal	2
9-R24	ER361686	Solid/R. RC1/2W 68Ω(K)	1
		Capacitor Vertical Type	
9-C1	EC350616	VFM 50PF(J) 50WV	1
9-C2	EC290520	VFM 100PF(J) 50WV	1
9-C3	EC350616	VFM 50PF(J) 50WV	1
9-C4,5	EC329771	Elect. 47μF 6.3WV	2
9-C6	EC572771	Tantalum 0.15μF(K) 35WV (DTS Type)	1
9-C7	EC572444	Tantalum 47μF(M) 6.3WV (DTS Type)	1
9-C8	EC573322	NP/C. 33μF 16WV	1
9-C9	EC435690	Styrol 560PF(J) 50WV	1
9-C10	EC320040	Elect. 47μF 16WV	1
9-C11	EC220105	Elect. 100μF 10WV	1
9-C12	EC374218	Ceramic TLD07F 0.01μF(Z) 25WV	1
9-C13	EC593065	Tantalum 3.3μF(M) 25WV (DTS Type)	1
9-C14	EC469686	VFM 51PF(J) 50WV	1
9-C15	EC522145	Trimmer/C. DT07D200 20P	1
9-C16	EC402388	VFM 39PF(J) 50WV	1
9-C17	EC320051	Elect. 10μF 16WV	1
9-C18	EC350594	Ceramic TLD14F 0.1μF(Z) 25WV	1
9-C19	EC374218	Ceramic TLD07F 0.01μF(Z) 25WV	1
9-C20	EC350594	Ceramic TLD14F 0.1μF(Z) 25WV	1
9-C21	EC423797	Ceramic TLD08F 0.02μF(Z) 25WV	1
9-C22	EC350594	Ceramic TLD14F 0.1μF(Z) 25WV	1
9-C23	EC350594	Ceramic TLD14F 0.1μF(Z) 25WV	1
9-C24	EC536905	Tantalum 33μF(K) 10WV (DTS Type)	1
9-C25	EC350594	Ceramic TLD14F 0.1μF(Z) 25WV	1
9-C26	EC374218	Ceramic TLD7F 0.01μF(Z) 25WV	1
9-C27	EC350594	Ceramic TLD14F 0.1μF(Z) 25WV	1
9-C28	EC361710	Ceramic TLD04F 0.001μF(Z) 25WV	1
9-C29	EC220105	Elect. 100μF 10WV	1
9-C30,31	EC374218	Ceramic TLD07F 0.01μF(Z) 25WV	2
9-C32	EC361732	Ceramic DD620 BC 0.5μF(Z) 12WV	1
9-C33	EC350594	Ceramic TLD14F 0.1μF(Z) 25WV	1
9-C34	EC220105	Elect. 100μF 10WV	1
9-C35	EC350594	Ceramic TLD14F 0.1μF(Z) 25WV	1
9-C36	EC220590	Elect. 33μF 10WV	1
9-C37	EC350616	VFM 50PF(J) 50WV	1
9-C38	EC350638	VFM 180PF(J) 50WV	1
9-C39	EC451462	VFM 150PF(J) 50WV	1
9-C40	EC220105	Elect. 100μF 10WV	1
9-C41	EC350616	VFM 50PF(J) 50WV	2
9-C42	EC572793	Styrol 250PF(J) 50WV	1
9-C43	EC405898	Styrol 470PF(J) 50WV	1
9-C44	EC435690	Styrol 560PF(J) 50WV	1
9-C45	EC250683	Mylar 0.0022μF(J) 50WV	1
9-C46	EC329771	Elect. 47μF 6.3WV	1
9-C47	EC220590	Elect. 33μF 10WV	1
9-C48,49	EC329771	Elect. 47μF 6.3WV	2
9-C50,51,52	EC220105	Elect. 100μF 10WV	3
9-C53	EC522145	Trimmer DT07D200 20P	1
9-C54	EC350594	Ceramic TLD14F 0.1μF(Z) 25WV	1
9-C55	EC250885	Mylar 0.01μF(K) 50WV	1
9-C56	EC220105	Elect. 100μF 10WV	1
9-C57	EC250604	Mylar 0.001μF(K) 50WV	1
9-C58	EC250885	Mylar 0.01μF(K) 50WV	1
9-C59	EC391004	Mylar 0.0033μF(J) 50WV	1
9-C60	EC374218	Ceramic TLD07F 0.01 F(Z) 25WV	1

Carbon Resistor Omitted.

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

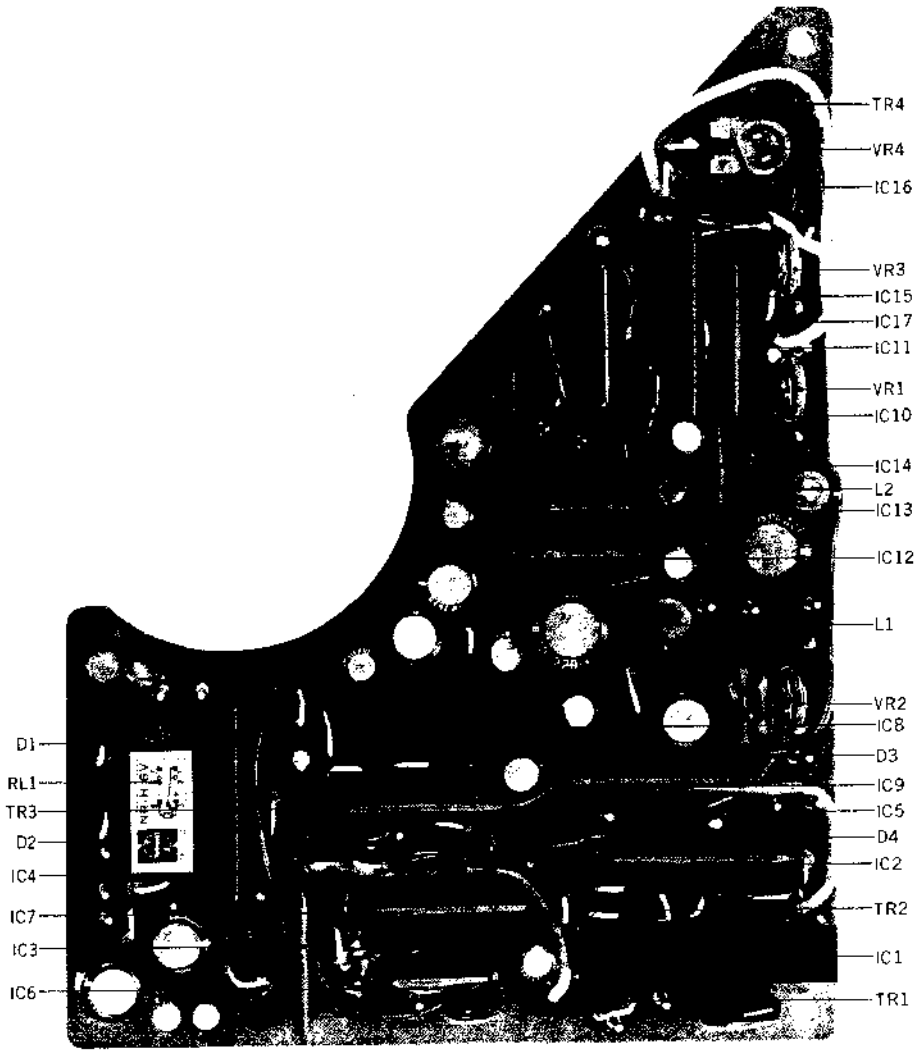
FIG. 10 PHOTO OF AUDIO P.C. BOARD (PW-5001) BLOCK



AUDIO P.C. BOARD (PW-5001) BLOCK

Symbol No.	Parts No.	Description	Q'ty
10-1x	BA573265	Audio P.C. Board Comp. (PW-5001)	1
10-IC1	EI329207	I.C., Line Amp. AN136B(Q)	1
10-IC2	EI361934	I.C. M5101P	1
10-TR1	ET361923	Transistor 2SC536(E)	1
10-TR2	ET564974	Transistor 2SA610(5)	1
10-TR3	ET399846	Transistor 2SC945(Q)	1
10-TR4	ET522268	Transistor 2SA733(Q)	1
10-D2	ED219464	Germanum Diode 1N34A	1
10-L1	EO362092	Inductor FS1012S 3.3MH(J)	1
10-L2	EO243988	Ferri Inductor FL7H 3.3MH(J)	1
10-L3	EO572670	Ferri Inductor FL9H 3.9MH(K)	1
10-VR1	EV522663	Semi-fixed/Vol. V8K1-1 100kB	1
10-VR2	EV589408	Semi-fixed/Vol. V8K4-1 200ΩB	1
10-VR3	EV362081	Semi-fixed/Vol. EVL-TOA 100 kB	1
10-T1	BT362114	Trans, SNY-1424	1
10-2	EJ363126	P.C. Board Terminal	17
10-3	MZ576527	Audio Shield Plate A	1
		Capacitor, Vertical Type	
10-C1	EC220432	Elect.2.2μF 25WV	1
10-C2	EC250604	Mylar 0.001μF(K) 50WV	1
10-C3	EC220465	Elect. 22μF 6.3WV	1
10-C4	EC350706	Elect. 4.7μF 16WV	1
10-C5	EC313323	Mylar 0.068μF(K) 50WV	1
10-C6	EC290564	VFM 220PF(K) 50WV	1
10-C7	EC329782	Elect. 220μF 10WV	1
10-C8	EC220590	Elect. 33 μF 10WV	1
10-C9	EC329782	Elect. 220μF 10WV	1
10-C10	EC523271	Elect. 22μF 10WV	1
10-C11	EC424708	Mylar 0.0018μF(J) 50WV	1
10-C12	EC250841	Mylar 0.01μF(J) 50WV	1
10-C13	EC424708	Mylar 0.0018μF(J) 50WV	1
10-C14	EC368256	Elect. 0.47μF 25WV	1
10-C15	EC250604	Mylar 0.001μF(K) 50WV	1
10-C16	EC220432	Elect. 2.2μF 25WV	1
10-C17	EC336104	Elect. 100μF 6.3WV	1
10-C18	EC357232	Mylar 0.0039μF(K) 50WV	1
10-C19	EC250661	Mylar 0.0015μF(K) 50WV	1
10-C20	EC320051	Elect. 10μF 16WV	1
10-C21	EC343236	Elect. 330μF 6.3WV	1
10-C22	EC250841	Mylar 0.01μF(J) 50WV	1
10-C23	EC320051	Elect. 10μF 16WV	1
10-C24	EC220432	Elect. 2.2μF 25WV	1
10-C25	EC290564	VFM 220PF(K) 50WV	1
10-C26	EC350706	Elect. 4.7μF 16WV	1
10-C27	EC362125	Mylar 0.0056μF(K) 50WV	1
10-C28	EC320051	Elect. 10μF 16WV	1
10-C29	EC250604	Mylar 0.001μF(K) 50WV	1
10-C30	EC320051	Eelct. 10μF 16WV	1
10-C31	EC220465	Elect. 22μF 6.3WV	1
10-C32	EC250885	Mylar 0.01μF(K) 50WV	1
10-C33	EC350706	Elect. 4.7μF 16WV	1
10-C34	EC320040	Elect. 47μF 16WV	1
10-C35	EC250885	Mylar 0.01μF(K) 50WV	1
10-C36	EC250716	Mylar 0.0022μF(K) 50WV	1
10-C37	EC250885	Mylar 0.01μF(K) 50WV	1
10-C38	EC571061	FM 120PF(K) 500WV	1
10-C39	EC375456	Plastic Film 3300PF(J) 250WV	1
		Carbon Resistor Omitted.	

FIG. 11 PHOTO OF SERVO P.C. BOARD (1) (PW-5004) BLOCK



SERVO P.C. BOARD (1) (PW-5004) BLOCK

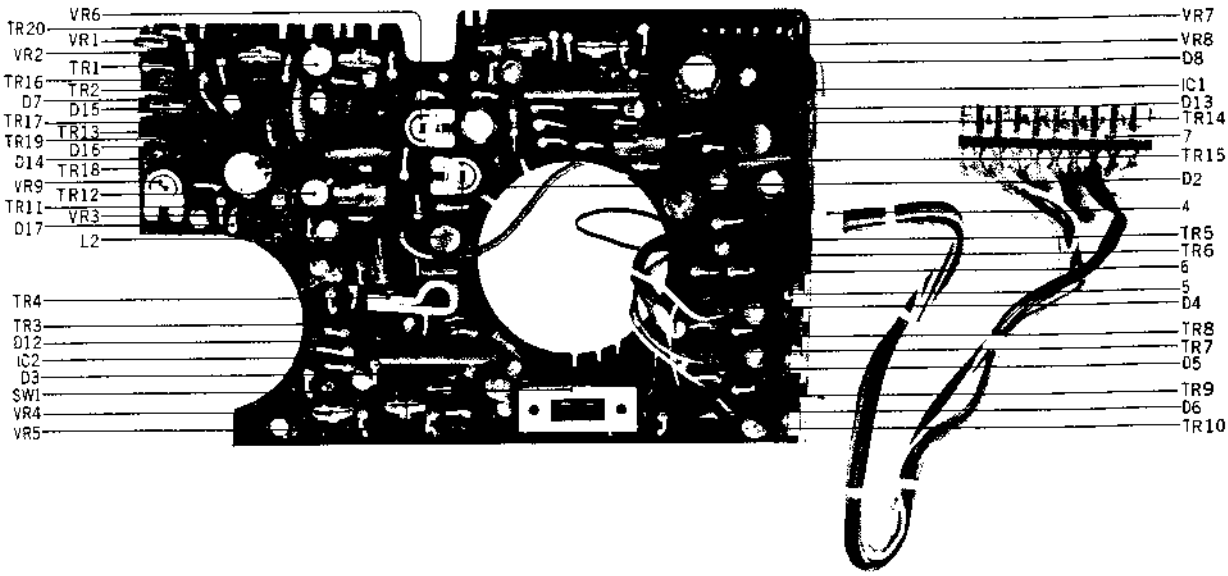
Symbol No.	Parts No.	Description	Q'ty
11-1x	BA573208	Servo P.C. Board (1) Comp. (PW-5004)	1
11-2x	BA573210	Servo P.C. Board (1) Comp. (PW-5004)(PAL)	1
11-IC1	EI362395	I.C. D-2116	1
11-IC2	EI572308	I.C. PH-01	1
11-IC3	EI572321	I.C. MM-01	1
11-IC4	EI572310	I.C. SW-02	1
11-IC5	EI476796	I.C. 6M004	1
11-IC6	EI572275	I.C. PA-02	1
11-IC7	EI362362	I.C. FF-10	1
11-IC8	EI575065	I.C. PA-01A	1
11-IC9	EI572286	I.C. TR-01	1
11-IC10	EI572264	I.C. PA-03	1
11-IC11	EI572332	I.C. SW-01	1
11-IC12	EI572343	I.C. SW-03	1
11-IC13	EI564287	I.C. HA-113	1
11-IC14	EI572253	I.C. PA-04	1
11-IC15	EI572321	I.C. MM-01	1
11-IC16	EI572264	I.C. PA-03	1
11-IC17	EI572297	I.C. PH-02	1
11-TR1,2	ET538378	Transistor 2SA733(R)	1
11-TR3	ET380834	Transsistor 2SC711(E)	1
11-TR4	ET538378	Transistor 2SA733(R)	1
11-D1,2	ED224526	Silicon Diode 10D1	2
11-D3,4	ED219464	Germanium Diode 1N34A	2
11-VR1,2	EV572422	Semi-fixed/Vol. V8K1-1 20 kB	2
11-VR3	EV522663	Semi-fixed/Vol. V8K1-1 100 kB	1
11-VR4	EV572433	Semi-fixed/Vol. V8K4-1 500 kB	1
11-L1,2	EO374681	Ferri Inductor FL7H 220μH(K)	2
11-RL1	EP124801	Relay NR-H-6V	1
11-3	EJ363126	P.C. Board Terminal	22
11-4	EJ363150	Test Terminal	6
		Capacitor, Vertical Type	
11-C1	EC329782	Elect. 220μF 10WV	1
11-C2	EC251291	Mylar 0.1μF(K) 50WV	1
11-C3	EC320051	Elect. 10μF 16WV	1
11-C4	EC251291	Mylar 0.1μF(K) 50WV	1
11-C5	EC496901	Tentalum 0.6μF(K) 35WV (DTS Type)	1
11-C6	EC250885	Mylar 0.01μF(K) 50WV	1
11-C7	EC522753	Tantalum 0.33μF(K) 35WV	1
11-C8	EC250885	Mylar 0.01μF(K) 50WV	1
11-C9	EC220105	Elect. 100μF 10WV	1
11-C10	EC536905	Tantalum 33μF(K) 10WV (DTS Type)	1
11-C11	EC320051	Elect. 10μF 16WV	1
11-C12	EC320040	Elect. 47μF 16WV	1

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

Symbol No.	Parts No.	Description	Q'ty
11-C13	EC251087	Mylar 0.022μF(K) 50WV	1
11-C14	EC250885	Mylar 0.01μF(K) 50WV	1
11-C15	EC251190	Mylar 0.056μF(K) 50WV	1
11-C16	EC331705	Elect. 22μF 16WV	1
11-C17	EC251087	Mylar 0.022μF(K) 50WV	1
11-C18,19	EC572455	Ceramic 680PF(K) 50WV	2
11-C20	EC320051	Elect. 10μF 16WV	1
11-C21	EC320040	Elect. 47μF 16WV	1
11-C22	EC379214	Mylar 0.047μF(J) 50WV	1
11-C23	EC536207	Tantalum 1μF(K) 35WV (DTS Type)	1
11-C24	EC320040	Elect. 47μF 16WV	1
11-C25	EC334620	Mylar 0.22μF(K) 50WV	1
11-C26	EC389485	Mylar 0.018μF0J) 50WV	1
11-C27,28	EC251291	Mylar 0.1μF(K) 50WV	2
11-C29	EC329782	Elect. 220μF 10WV	1
11-C30	EC450055	Elect. 1μF 25WV	1
11-C31	EC320040	Elect. 47μF 16WV	1
11-C32	EC250885	Mylar 0.01μF(K) 50WV	1
11-C33	EC450055	Elect. 1μF 25WV	1
11-C34	EC320040	Elect. 47μF 16WV	1
11-C35,36	EC572444	Tantalum 47μF(M) 6.3WV (DTS Type)	1
11-C37	EC250716	Mylar 0.0022μF(K) 50WV	1
11-C38	EC450055	Elect. 1μF 25WV	1
11-C39	EC220590	Elect. 33μF 10WV	1
11-C40	EC250885	Mylar 0.01μF(K) 50WV	1
11-C41	EC522753	Tantalum 0.33μF(K) 35WV (DTS Type)	1
11-C42	EC220105	Elect.100μF10WV	1
11-C43	EC250975	Mylar 0.015μF(J) 50WV	1
11-C44	EC424708	Mylar 0.0018μF(J) 50WV	1
11-C45,46	EC251291	Mylar 0.1μF(K) 50WV	1
11-C47	EC536207	Tantalum 1μF(K) 35WV (DTS Type)	1

Carbon Resistor Omitted.

FIG. 12 PHOTO OF SERVO P.C. BOARD (2) (PW-5005) BLOCK



SERVO P.C. BOARD (2) (PW-5005) BLOCK

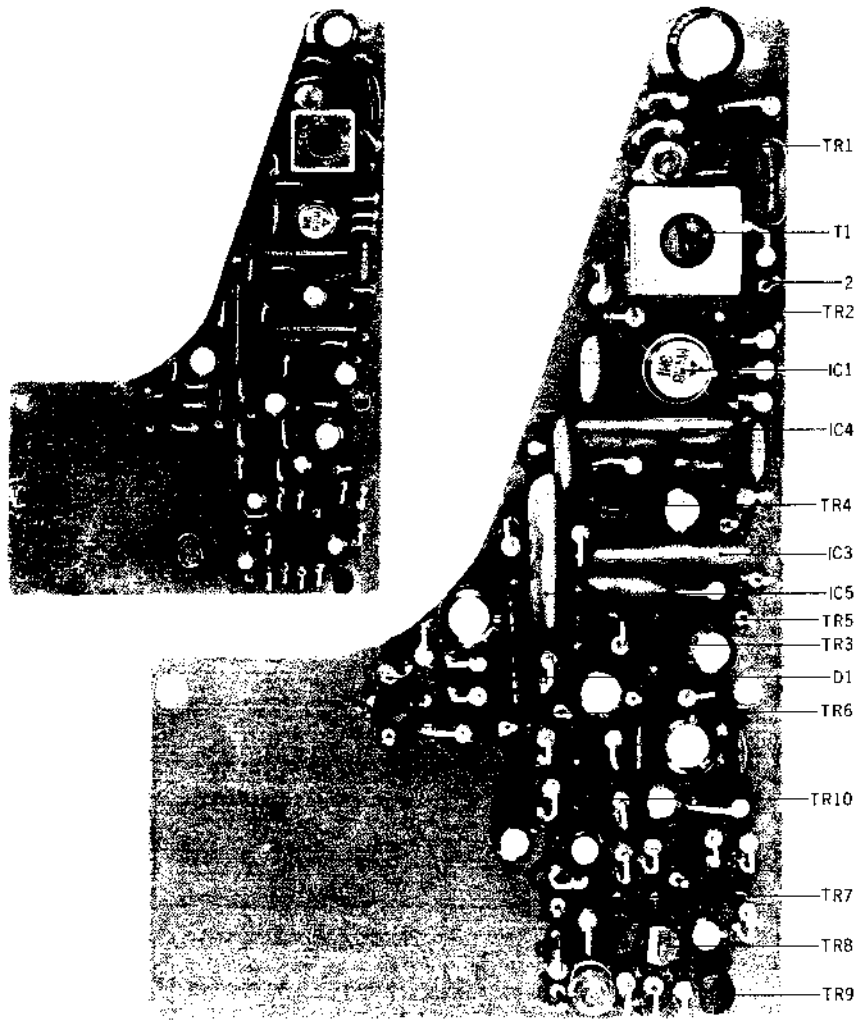
Symbol No.	Parts No.	Description	Q'ty
12-1x	BA573221	Servo P.C. Board (2) Comp. (PW-5005)	1
12-2x	BA573232	Servo P.C. Board (2) Comp. (PW-5005)(CCIR)	1
12-IC1	EI572477	I.C. D4532	1
12-IC2	EI572488	I.C. D4533	1
12-TR1	ET338894	Transistor 2SC968(3)	1
12-TR2	ET345802	Transistor 2SC454(B)	1
12-TR3	ET380834	Transistor 2SC711(E)	1
12-TR4	ET572466	Transistor 2SA545(K)	1
12-TR5	ET380834	Transistor 2SC711(E)	1
12-TR6	ET362261	Transistor 2SC1061(B)	1
12-TR7	ET380834	Transistor 2SC711(E)	1
12-TR8	ET362261	Transistor 2SC1061(B)	1
12-TR9	ET380834	Transistor 2SC711(E)	1
12-TR10	ET362261	Transistor 2SC1061(B)	1
12-TR11	ET522911	Transistor 2SD313(D)(E)(F)	1
12-TR12	ET338894	Transistor 2SC968(3)	1
12-TR13	ET345802	Transistor 2SC454(B)	1
12-TR14	ET380834	Transistor 2SC711(E)	1
12-TR15	ET522268	Transistor 2SA733(Q)	1
12-TR16to18	ET523056	Transistor 2SA628(D)	3
12-TR19	ET380834	Transistor 2SC711(E)	1
12-TR20	ET523056	Transistor 2SA628(D)	1
12-D1	ED570475	Zener Diode WZ-075	1
12-D2	ED557447	Silicon Diode 1S1588	1
12-D3	ED570521	Zener Diode XZ-049	1
12-D4,5,6	ED557447	Silicon Diode 1S1588	3
12-D7	ED570475	Zener Diode WZ-075	1
12-D8	ED570521	Zener Diode XZ-049	1
12-D12,13	ED557447	Silicon Diode 1S1588	2
12-D14to16	ED514721	Silicon Diode WG-599	3
12-D17	ED591030	Zener Diode WZ-052	1
12-VR1	EV475470	Semi-fixed/Vol. V8K1-1 10kB	1
12-VR2	EV522404	Semi-fixed/Vol. V8K1-1 1 kB	1
12-VR3	EV464207	Semi-fixed/Vol. V8K4-1 5 kB	1
12-VR4, 5	EV522404	Semi-fixed/Vol. V8K1-1 1 kB	2
12-VR6	EV478686	Semi-fixed/Vol. V8K4-1 1 kB	1
12-VR7, 8	EV522404	Semi-fixed/Vol. V8K1-1 1 kB	2
12-VR9	EV523620	Semi-fixed/Vol. V8K4-1 500ΩB	1
12-L2	EO575651	Ferri Inductor FL7H 100μH(K)	1
12-SW1	ES572624	Slide SW. SSC243C	1

Symbol No.	Parts No.	Description	Q'ty
12-J1	EJ575425	Pin Connector 128-05-10-2819	1
12-3	EJ363126	P.C. Board Terminal	3
12-4	EZ577822	Heat-sink Plate	1
12-5	ZS421806	Screw, pan head 3x8	3
12-6	ZW273756	Nut M3	3
12-7	BA577877	Relay P.C. Board	1
		Capacitor, Vertical Type	
12-C1	EC320051	Elect. 10μF 16WV	1
12-C2	EC523530	Ceramic TLD14F 0.1μF(Z) 25WV	1
12-C3	EC220105	Elect. 100μF 10WV	1
12-C4	EC522562	Tantalum 100μF (K) 10WV (DT Type)	1
12-C5	EC379157	Mylar 0.033μF(J) 50WV	1
12-C6	EC379170	Mylar 0.1μF(J) 50WV	1
12-C7	EC250841	Mylar 0.01μF(J) 50WV	1
12-C8,9	EC572613	Tantalum 10μF(M) 16WV (DTS Type)	2
12-C11	EC588418	Tantalum 10μF(M) 25WV (DT Type)	1
12-C13	EC588418	Tantalum 10μF(M) 25WV (DT Type)	1
12-C15	EC588418	Tantalum 10μF(M) 25WV (DT Type)	1
12-C16	EC523530	Ceramic TLD14F 0.1μF(Z) 25WV	1
12-C17	EC220105	Elect. 100μF 10WV	1
12-C19	EC572578	Tantalum 68μF(K) 10WV (DT Type)	1
12-C20	EC321208	Elect. 220μF 16WV	1
12-C22	EC536905	Tantalum 33μF(K) 10WV (DTS Type)	1
12-C23	EC379170	Mylar 0.1μF(J) 50WV	1
12-C24	EC250841	Mylar 0.01μF(J) 50WV	1
12-C25	EC522786	Tantalum 100μF,(M) 10WV (DT Type)	1
12-C32	EC523530	Ceramic TLD14F 0.1μF(Z) 25WV	1
12-C33	EC220994	Elect. 10μF 25WV	1
12-C34	EC575436	Tantalum 10μF(K) 10WV (DTS Type)	1
12-C35	EC320051	Elect. 10μF 16WV	1
12-C36,37	EC379157	Mylar 0.033μF(J) 50WV	2
12-C38	EC574075	Tantalum 10μF(M) 10WV (DTS Type)	1

Carbon Resistor Omitted.

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

FIG. 13 PHOTO OF S.S.G. P.C. BOARD (PW-5003) BLOCK

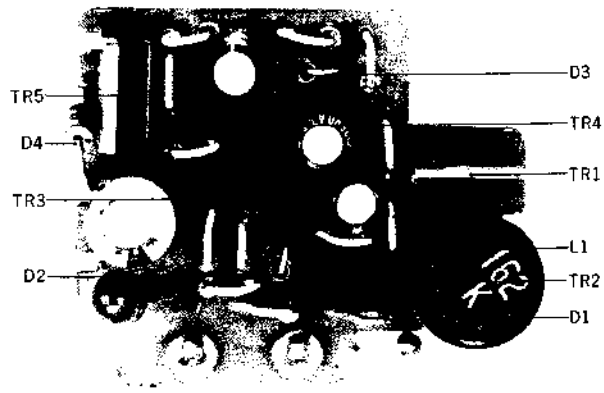


S.S.G. P.C. BOARD (PW-5003) BLOCK

Symbol No.	Parts No.	Description	Q'ty
13-1x	BA573243	S.S.G. P.C. Board Comp. (PW-5003)	1
13-2x	BA573254	S.S.G. P.C. Board Comp. (CCIR)	1
13-IC1	EI476818	I.C. MOS MN-115	1
13-IC1	EI572657	I.C. MOS MN-116(CCIR)	1
13-IC3,4,5	EI476796	I.C. 6MOO4	3
13-TR1	ET522268	Transistor 2SA733(Q)	1
14-TR2 to 5	ET380834	Transistro 2SC711(E)	4
13-TR6	ET522268	Transistor 2SA733(Q)	1
13-TR7,8,9	ET380834	Transistor 2SC711(E)	3
13-TR10	ET522268	Transistor 2SA733(Q)	1
13-D1	ED219464	Germanium Diode 1N34A	1
13-T1	BT362147	Trans. SNY-033-1357	1
13-3	EJ363126	P.C. Board Terminal	12

Symbol No.	Parts No.	Description	Q'ty
		Capacitor, Vertical Type	
13-C1	EC329782	Elect. 220μF 10WV	1
13-C2	EC251291	Mylar 0.1μF(K) 50WV	1
13-C3	EC412615	Styrol 2700PF(J)50WV	1
13-C4	EC329883	Mylar 0.0056μF(J) 50WV	1
13-C5, 6	EC451462	VFM 150PF(J) 50WV	2
13-C7	EC331705	Elect. 22μF 16WV	1
13-C8	EC290564	VFM 220PF(K) 50WV	1
13-C9	EC329861	Mylar 0.027μF(J) 50WV	1
13-C10	EC331705	Elect. 22μF 16WV	1
13-C11	EC290564	VFM 220PF(K) 50WV	1
13-C12	EC251087	Mylar 0.022μF(K) 50WV	1
13-C13	EC220105	Elect. 100μF 10WV	1
13-C14	EC331705	Elect. 22μF 16WV	1
13-C15	EC320040	Elect. 47μF 16WV	1
13-C16	EC320051	Elect. 10μF 16WV	1
13-C17	EC450055	Elect. 1μF 25WV	1
13-C18, 19	EC250885	Mylar 0.01μF(K) 50WV	1
13-C20	EC450055	Elect. 1μF 25WV	1
13-C21	EC320051	Elect. 10μF 16WV	1
13-C22	EC379787	Mylar 0.0039μF(J) 50WV	1
13-C23	EC515834	Styrol 560PF(K) 50WV	1
		Carbon Resistor Omitted.	

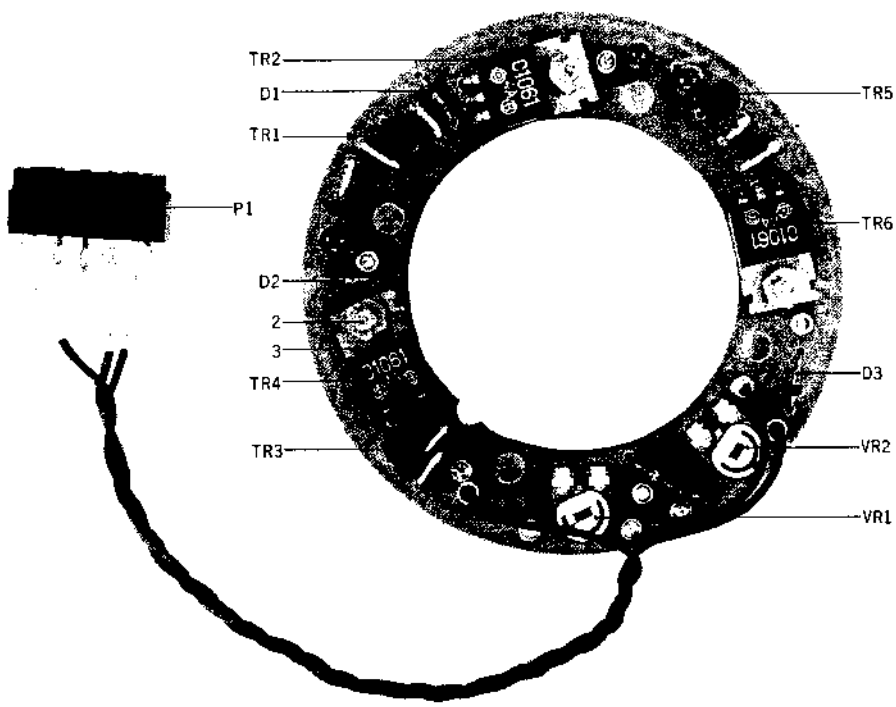
FIG. 14 PHOTO OF TIMING P.C. BOARD (PW-5007) BLOCK



TIMING P.C. BOARD (PW-5007) BLOCK

Symbol No.	Parts No.	Description	Q'ty
14-1x	BA573287	Timing P.C. Board Comp. (PW-5007)	1
14-TR1	ET453600	Transistor 2SA634(L)(K)	1
14-TR2	ET380834	Transistor 2SC711(E)	1
14-TR3,4	ET350335	Transistor 2SA564(Q)	2
14-TR5	ET362261	Transistor 2SC1061(B)	1
14-D1	ED516420	Silicon Diode WG-599	1
14-D2, 3	ED219464	Germanium Diode 1N34A	2
14-D4	ED224526	Silicon Diode 10D1	1
14-L1	EO572938	Inductor FS1215S 1.6MH(K)	1
14-2	MZ577833	Timing P.C. Board Angle	1
14-3	ZS417273	Screw, binding head 2.3x4	2
		Capacitor, Vertical Type	
14-C1	EC368256	Elect. 0.47μF 25WV	1
14-C2	EC575188	Tantalum 22μF(M) 16WV (DTS Type)	1
14-C3	EC336104	Elect. 100μF 6.3WV	1
14-C4	EC220465	Elect. 22μF 6.3WV	1
14-C5	EC320051	Elect. 10μF 16WV	1
14-C6	EC302264	Mylar 0.001μF(K) 50WV	1
		Carbon Resistor Omitted.	

FIG. 15 PHOTO OF MOTOR DRIVE P.C. BOARD (CV-1130) BLOCK



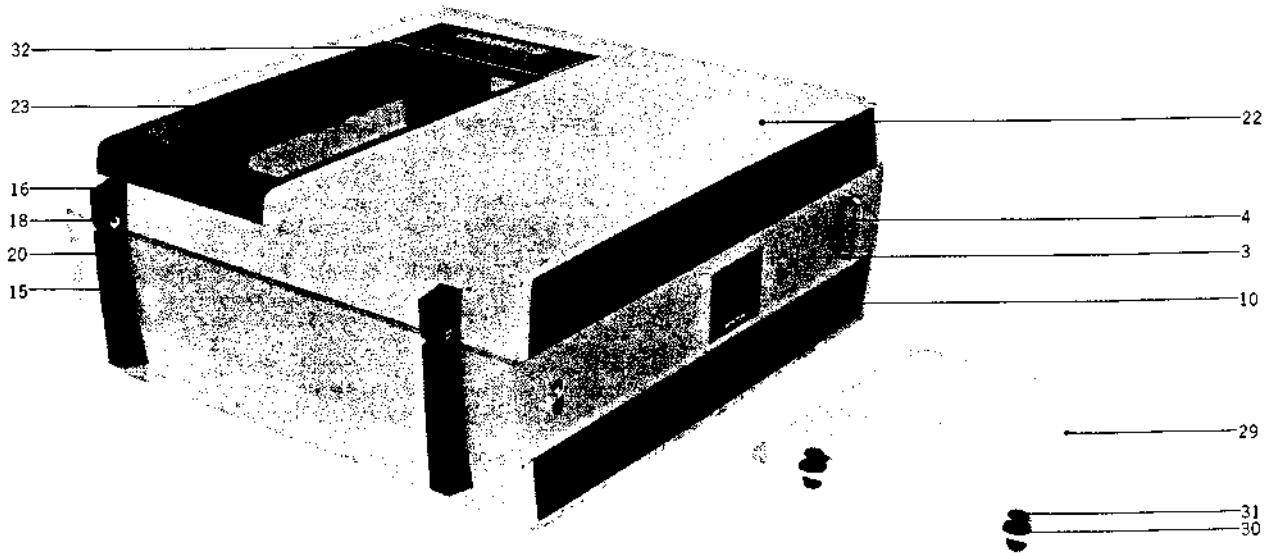
MOTOR DRIVE P.C. BOARD (CV-1130) BLOCK

Symbol No.	Parts No.	Description	Q'ty
1S-1x	BA575403	Motor Drive P.C. Board Comp. (CV-1130)	1
1S-TR1	ET380834	Transistor 2SC711(E)	1
1S-TR2	ET362261	Transistor 2SC1061(B)	1
1S-TR3	ET380834	Transistor 2SC711(E)	1
1S-TR4	ET362261	Transistor 2SC1061(B)	1
1S-TR5	ET380834	Transistro 2SC711(E)	1
1S-TR6	ET362261	Transistor 2SC1061(B)	1
1S-D1,2,3	ED557447	Silicon Diode 1S1588	3
1S-P1	EJ575381	Pin Connector 128-05-10-281S	1

Symbol No.	Paets No.	Description	Q'ty
15-VR1,2	EV478686	Semi-fixed/Vol. V8K4-1 1kB	2
15-2	ZC575392	Screw, pan head 2.6x8	3
15-3	ZW609322	Nut M2.6 #1	3
		Capacitor, DTS Type	
15-C1,2,3	EC572613	Tantalum 10μF(M) 16WV	3
15-C4	EC522516	Tantalum 1μF(M) 25WV	1
15-D5,6,7	EC251087	Mylar 0.022μF(K) 50WV (Vert Type)	3
		Carbon Resistor Omitted.	

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

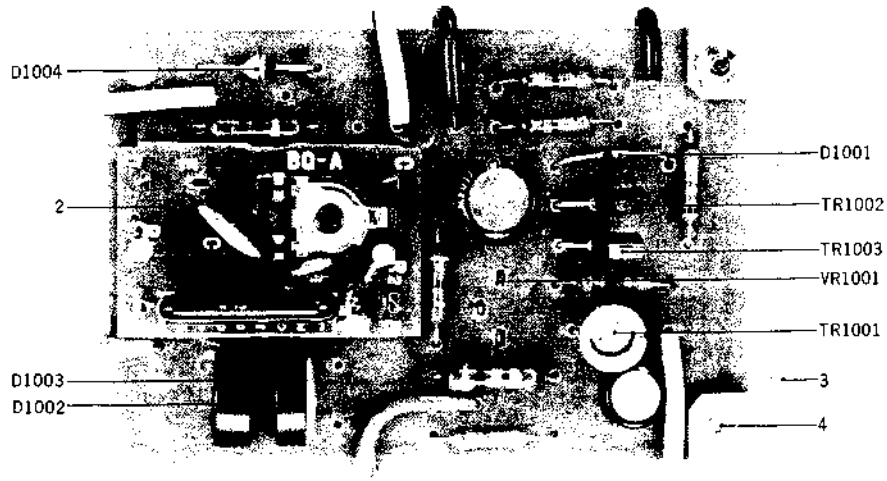
FIG. 16 PHOTO OF FINAL ASSEMBLY BLOCK



FINAL ASSEMBLY BLOCK

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
	CASE BLOCK			
16-1x	BC573006	Case Block Comp.	PW	1
16-2x	BC573017	Case Block Comp. (CCIR)	PW	1
16-3	ZS578430	Frame B-1	PX-A401	1
16-4	VM360988	Belt Holder	PX-402	2
16-5x	ZW273756	Nut M3		4
16-6x	VM360990	Safety Lock Plate	PX-403	1
16-7	SB361001	Safety Button (Rec.)	PX-404	1
16-8x	ZG361012	Safety Spring	PX-405	1
16-9x	VM361023	Lock Shaft	PX-406	1
16-10	VM421931	Case Bottom	PW-6007	1
16-11x	SZ577844	Case Stopper	PW-6004	9
16-12x	ZS444330	IDO Screw, countersunk head 3x4		9
16-13x	ZS379405	ISO Screw, binding head 3x6		2
16-14x	SZ609985	Case Hold Cover	PW-6013	4
16-15	VM361078	Hinge A	PX-411	2
16-16	VM361080	Hinge B	PX-412	2
16-17x	VM361091	Hinge Shaft	PX-413	2
16-18	ZW570374	Screw, binding head 2.6x4		4
16-19x	ZW535882	ISO Screw, binding head 3x10(Black)		2
16-20	ZS421806	Screw, pan head 3x8		2
16-21x	ZS201183	Screw, truss hea 3x8 (Black)		2
16-22	BC578103	Case Cover	PW-6001	1
16-23	BC577484	Acrylic Wind	PW-6003	1
16-24	SM578057	Threading The Tape Illustration	PW-6009	1
16-25	SK361168	Case Knob	PX-420	2
16-26	VM361170	Case Fastener	PX-421	2
16-27	VM361181	Fastener Retaining	PX-422	2
16-28x	ZS434160	Set Screw, hexagon socket 3x3 (cup/p.)		4
16-29	VM471014	Battery Case Cover	PX-A403	1
16-30	VM356580	Nylatch Grommet H322-2-1		2
16-31	EP356591	Nylatch Plunger H323-2-3-1		2
16-32	SM578068	Case Name Plate VT-120	PW-6002	1
16-33x	SM577361	Rear Name Plate VT-120(US)	PW-6010	1
16-34x	SM577372	Rear Name Plate VT-120 (CCIR)	PW-6010	1
	ASSEMBLY BLOCK			
16-35	SE578081	Button Escutcheon B	PW-6012	1
16-36	ZS433934	Screw, countersunk head 3x6 D=5		4
16-37	SP577506	Mech. Panel	PW-6005	1
16-38	VM355680	Panel Post	PX-604	1
16-39x	ZW273690	Nut M2.3		1
16-40x	ZW438557	Washer (BSP) D2.4x6x0.3t		1
16-41	ZW468336	Screw, binding head 2.3x6 w/washer (Black)		2
16-42	ZS201947	Screw, binding head 2.3x6 (Black)		1
16-43	VM355702	Fastener Holder	PX-606	2
16-44x	ZW572128	Washer (BSP) D2.9x7.4x0.5t		2
16-45	SM576641	Panel Name Plate VT-120	PW-6006	1
16-46	SK355691	Pinch Roller Cap	PX-605	1
16-47	SC421863	Guide Roller Cover	PX-A605	1
16-48x	ZS342088	Set Screw, hexagon socket 3x8		1
16-49	SC355724	Head Cover	PX-608	1
16-50	SE421830	Escutcheon R	PX-A604	1
16-51x	SE421841	Escutcheon L	PX-A607	1
16-52	SK458583	Tracking knob	PX-A181	1
16-53x	ZW466773	Screw, countersunk head 1.7x6 P=0.35		1
16-54x	SE577653	SW. Mask B	PW-2069	1
16-55x	SE577664	SW. Mask AEC	PW-2070	2
16-56	SZ577675	Decorative Plate VT-120	PW-2071	1
16-57	ZS356668	Screw, binding head 2.3x4 (Black)		3
16-58	MP360180	Pinch Roler, PX D=25	PX-226	1
16-59x	MP579374	Sub Pinch Roller D=16	CV-1025	1

FIG. 17 PHOTO OF POWER SUPPLY P.C. BOARD (PX-A3008) BLOCK



POWER SUPPLY P.C. BOARD (PX-A3008) BLOCK

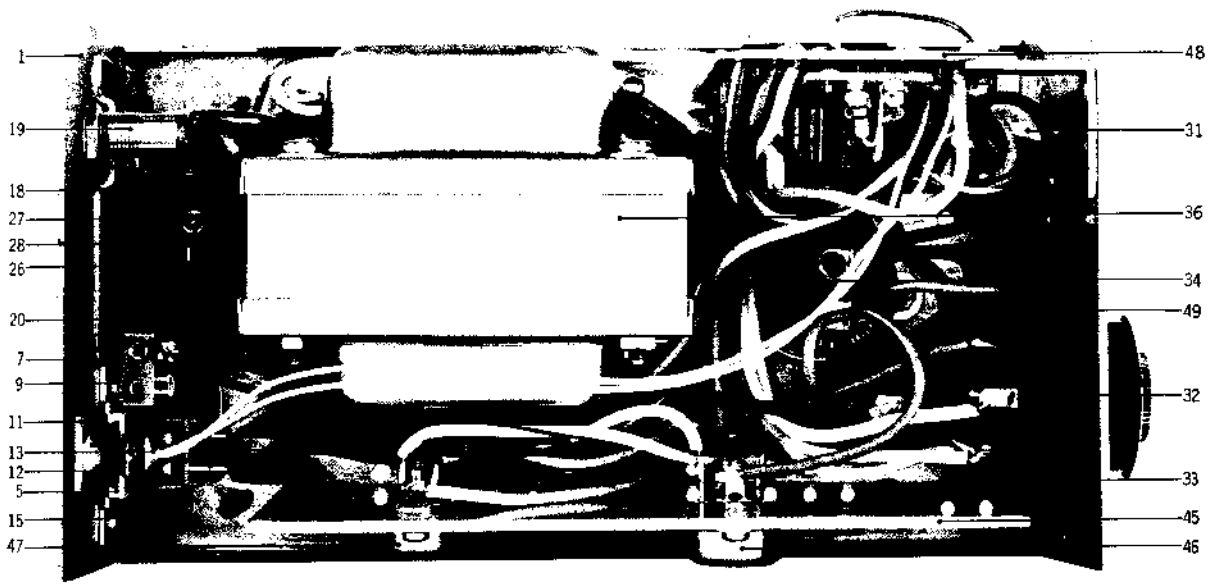
Symbol No.	Parts No.	Description	Q'ty
17-1x	BA423314	Power Supply P.C. Board Comp. (PX-A3008)	1
17-TR1001	ET304255	Transistor 2SC971(2)(3) (Red)	1
17-TR1002,3	ET234753	Transistor 2SC458(B)	2
17-D1001	ED356534	Zener Diode RD-6A(M)	1
17-D1002	ED329128	Silicon Diode 10DC-1 (Red)	1
17-D1003	ED329130	Silicon Diode 10DC-1(Black)	1
17-D1004	ED421795	Silicon Diode VO3C	1
17-VR1001	EV403132	Semi-fixed/Vol. TR12R 300ΩB	1
17-2	BA421762	Charger Unit BQ-A	1
17-3	VM356051	Rec P.C. Board Mt. Metal B	1
17-4	ZS609208	Tapping Screw 3x8 pan head	2
17-5	ZW273802	Toothed Lock Washer M3	2
		Capacitor, Vertical Type	
17-C1001	EC350684	Elect. 22μF 25WV	1
17-C1002	EC220127	Elect. 100μF 16WV	1
		Carbon Resistor Omitted.	

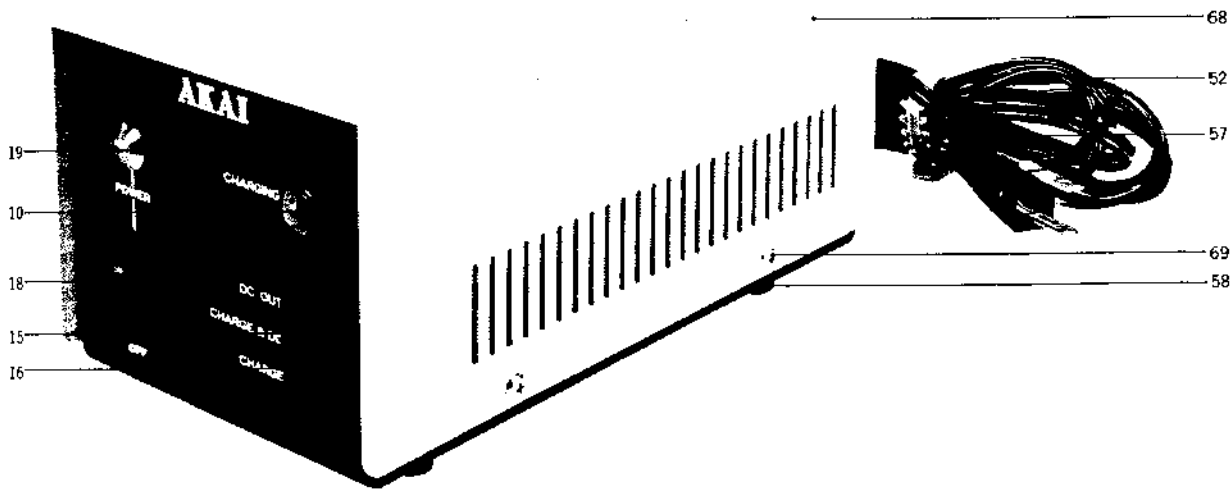
CHARGER ASSEMBLY BLOCK

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
18-1	VM421187	Power Chassis	PX-A3001	1
18-2x	VM628042	Power Chassis C (CSA)	PX-A3001	1
18-3x	VM628031	Power Chassis D (CEE)	PX-A3001	1
18-4x	VM582816	Power Chassis B (JPN)	PX-A3001	1
18-5	VM421198	Lamp Retaining Parts	PX-A3003	1
18-6x	VM454948	Power Lamp Retaining Parts (CEE)	PX-3026	1
18-7	EJ255082	Lug Plate VBL2	33-4-10	1
18-8x	EJ255115	Lug Plate VB2L2 (CEE)	33-4-3	1
18-9	ZS417216	Screw, pan head 3x4		2
18-10	VM421222	Charger Lamp Top Cover (Red)	PX-A3004	1
18-11	ZW421233	Speed Nut	PX-A3006	1
18-12	VM421200	Lamp Holder	PX-A3005	1
18-13	EL421211	Lamp 12V 70MA(190MMx2)	28-2-17	1
18-14x	EZ480925	Fuse Terminal Plate 3 (CSA)	33-2-10	1
18-15	ES356343	Slide SW. ESD-282DU	25-3-34	1
18-16	VM356038	Slide SW. Mask	PX-3011	1
18-17x	ZS422076	Screw, pan head 3x5		4
18-18	ES356365	Seesaw SW. T-127U/L	25-2-9	1
18-19	ED618816	Luminous Diode SLP-710H	45-15-4	1
18-20	ED224526	Silicon Diode 10D1	45-2-11	1
18-21x	EJ459426	VA Fuse Plate B (CEE)	PX-A3013	1
18-22x	EF375658	Fuse 200MAT (T Type) (CEE)		1
18-23x	EF375660	Fuse 1AT (T Type) (CEE)		1
18-24x	EF459437	Fuse 315MAT (T Type) (CEE)		1
18-25x	EF480903	Fuse 1A 125V (JPN)	39-1-44	1
18-26	ED356354	Silicon Diode 5B05	45-2-31	1
18-27	ZW535882	ISO Screw, binding head 3x10		2
18-28	ZW273756	Nut M3		4
18-29x	ER622956	Solid/R. RC1/2W 1.2k (K)	35-5-4	1
18-30x	ER229476	Solid/R. RD1/2W 680Ω(K) (CEE)	35-5-4	1
18-31	EJ299316	Jack, 5P Din	31-1-24	1
18-32	EJ233370	Socket S-18010 (Volt Selector)	40-2-3	1
18-33	ZS201183	Screw, truss head 3x8 (Black)		2
18-34	EC362632	Elect./C. 2200μF 25WV (Lug type)	24-10-57	1
18-35x	ZW535882	ISO Screw, binding head 3x10		2
18-36	BT421244	Power Trans. PXT-7	38-4-118	1
18-37x	BT557346	Power Trans. PXT-10 (CSA)	38-4-232	1
18-38x	BT459448	Power Trans. PXT-8 (CEE)	38-4-139	1
18-39x	BT574975	Power Trans. PXT-12(JPN)	38-4-272	1
18-40x	EZ582772	Heat-sink A (JPN)	PX-A3020	1
18-41x	EZ582783	Heat-sink B (JPN)	PX-A3021	1
18-42x	EZ609917	Heat-sink Retaining Plate (JPN)	PX-A3024	1
18-43x	ZS201341	Screw, truss head 4x8		4
18-44x	ZW413188	Nut M4		4
18-45	VM356062	Transistor Heat-sink Plate	PX-3009	1
18-46	ET377098	Transistor 2SD80, w/accessory	45-1-82	1

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

FIG. 18 PHOTO OF CHARGER ASSEMBLY BLOCK





Ref. No.	Parts No.	Description	Schematic No.	Q'ty
18-47	ET350313	Transistor 2SD130(Y), w/accessory	45-1-46	1
18-48	BA423314	Power Supply P.C. Board Comp. VA-110	PX-A3008	1
18-49	EZ382263	Strain Relief SR-4K-4	2-7-12	1
18-50x	EZ246936	Strain Relief SR-6W-1 (WG, 3 core)	2-7-8	1
18-51x	EZ602313	Strain Relief SR-6N3-4 (CSA)	2-7-44	1
18-52	EW540112	AC Cord 2.5M (CUL)	26-3-19	1
18-53x	EW524845	AC Cord (J) 2.5M (JPN)	26-3-31	1
18-54x	EW315448	Australia Cord (3 core)	26-3-11	1
18-55x	EW571735	Cord (3 core) (CEE)	26-3-38	1
18-56x	EJ602908	AC Cord SJT VM-0033 (CSA)	26-3-36	1
18-57	VM356400	AC Cord Clamp		1
18-58	VM421738	Rubber Foot	3-18-14	4

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
18-59x	ZS421740	Screw, pan bead 3x8 (Black)		4
18-60x	EZ480925	Fuse Terminal Plate 3 (CSA)	33-2-10	1
18-61x	VM421716	Rear Name Plate (VA-110)	PX-A3007	1
18-62x	VM421727	Rear Name Plate (VA-110) (CCIR)	PX-A3007	1
18-63x	SM571702	Rear Name Plate (VA-110) (CSA)	PX-A610	1
18-64x	EF480903	Fuse 1A 125V (CSA)	39-1-44	1
18-65x	EF277402	Fuse ST-2 1A	39-1-26	1
18-66x	EF371698	Fuse ST-4 0.5A	39-1-28	1
18-67x	EF467144	Fuse ST-1 1.2A	39-1-25	1
18-68	VM356073	Power Supply Cover	PX-3012	1
18-69	ZS335147	Screw, truss head 3x5		4
18-70	EJ398935	Terminal Plate ML-3182 5P (T Type) (CSA, CEE)	33-5-3	1

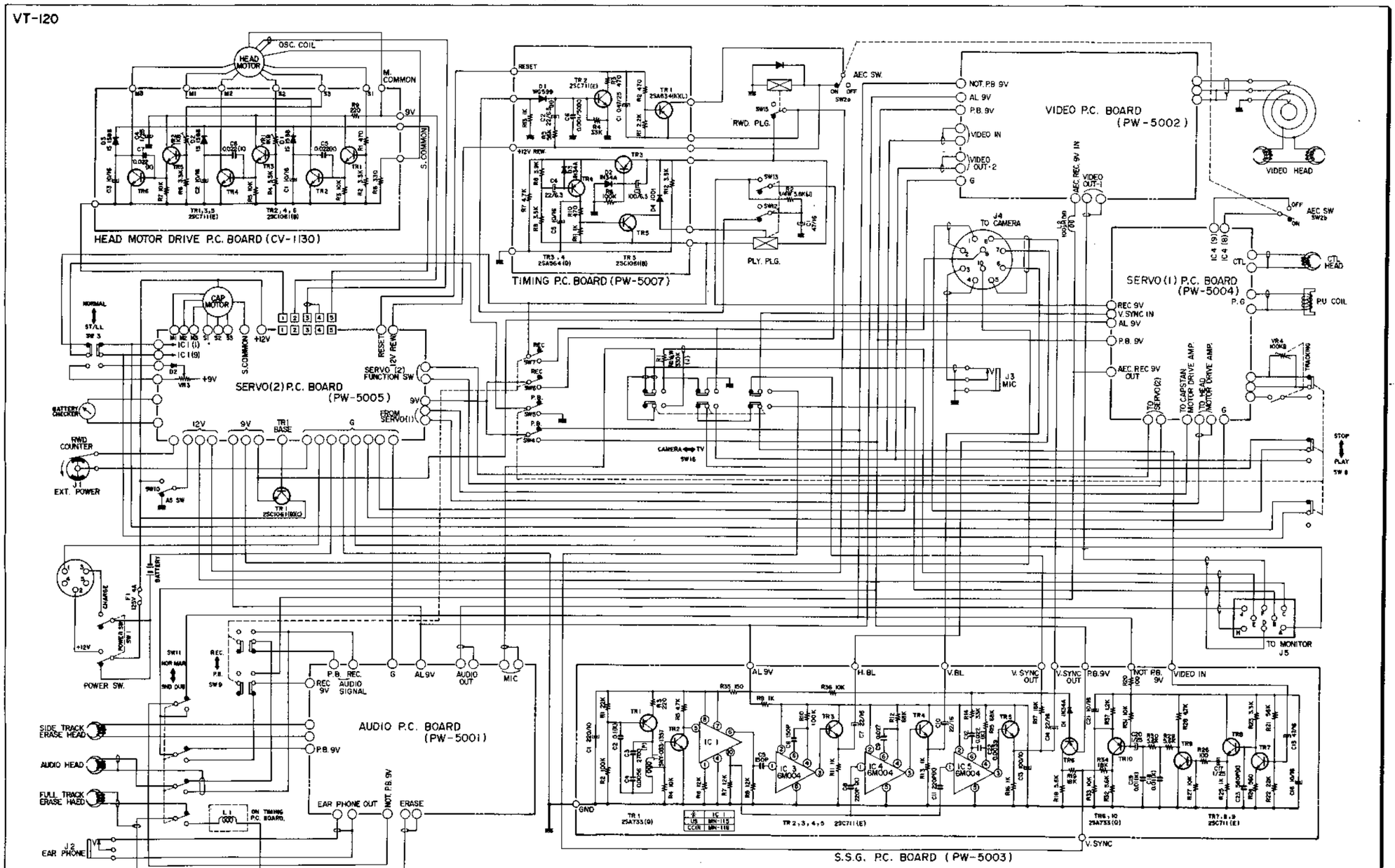
When ordering parts, please describe Parts Number, Serial Number, and Model Number in detail.

INDEX

INDEX

INDEX

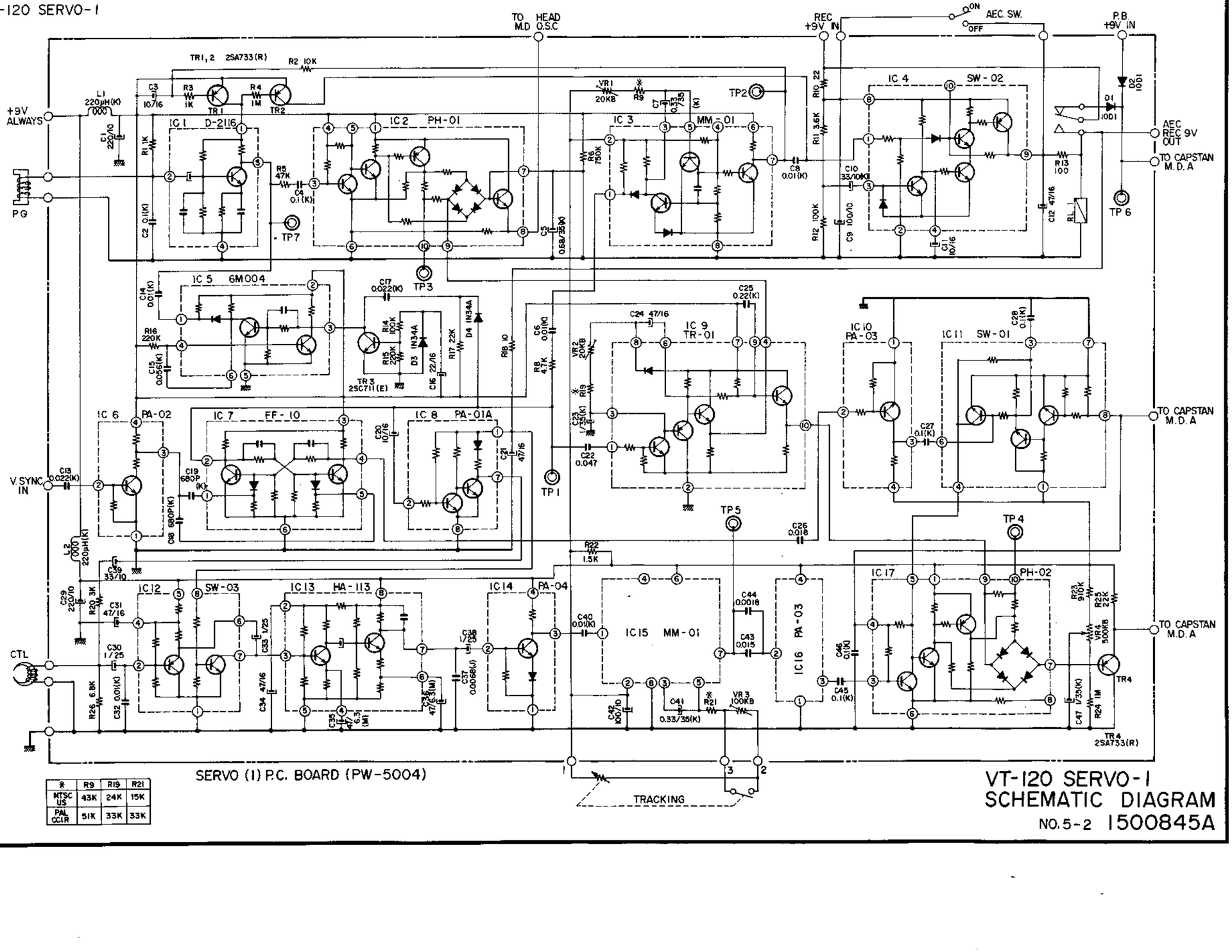
VT-120



VT-120
CONNECTION DIAGRAM

NO. 5-1 1500844A

VT-120 SERVO-1



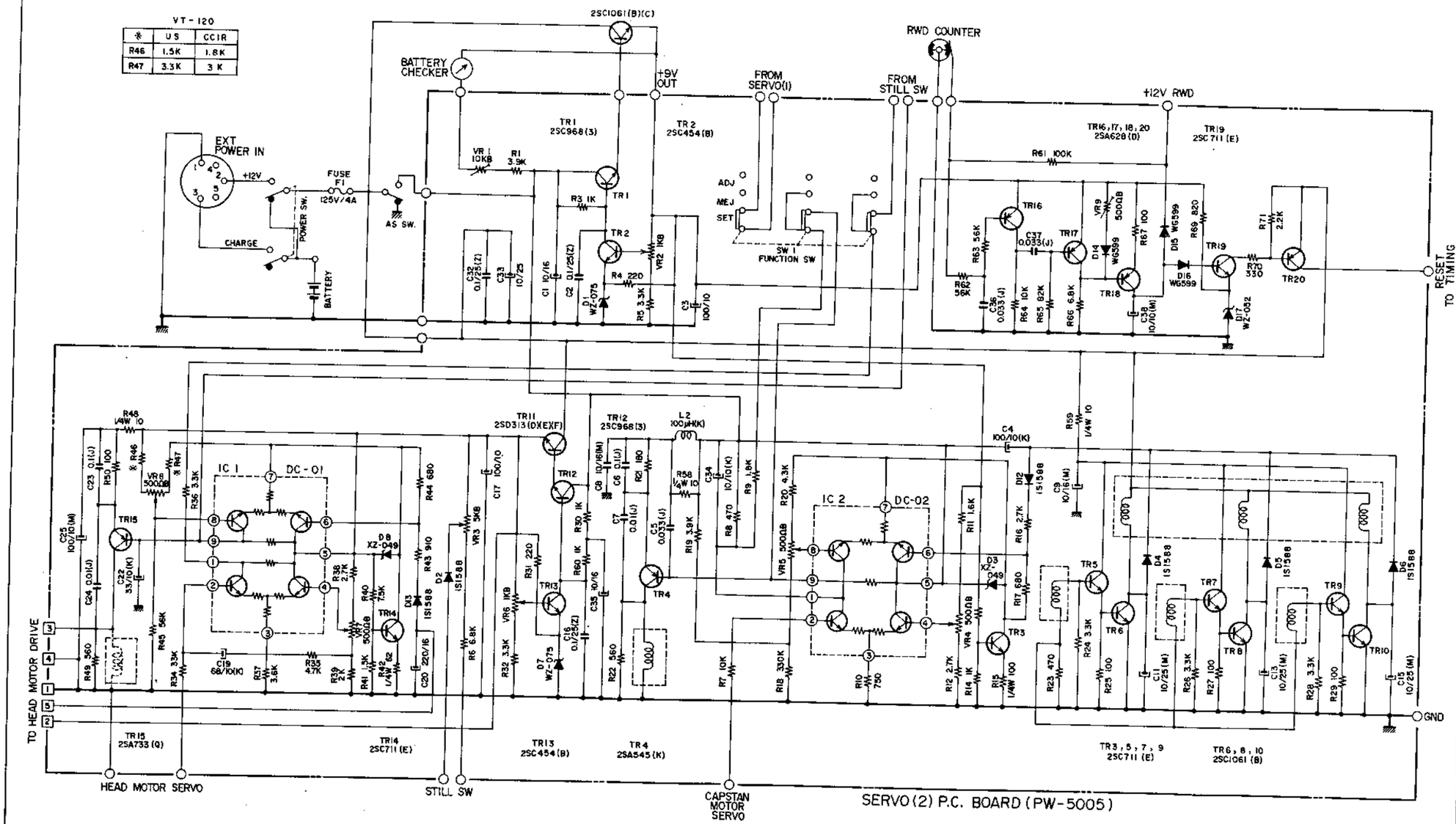
*	R9	R19	R21
NTSC US	43K	24K	15K
PAL CCIR	51K	33K	33K

VT-120 SERVO-1 SCHEMATIC DIAGRAM

NO. 5-2 1500845A

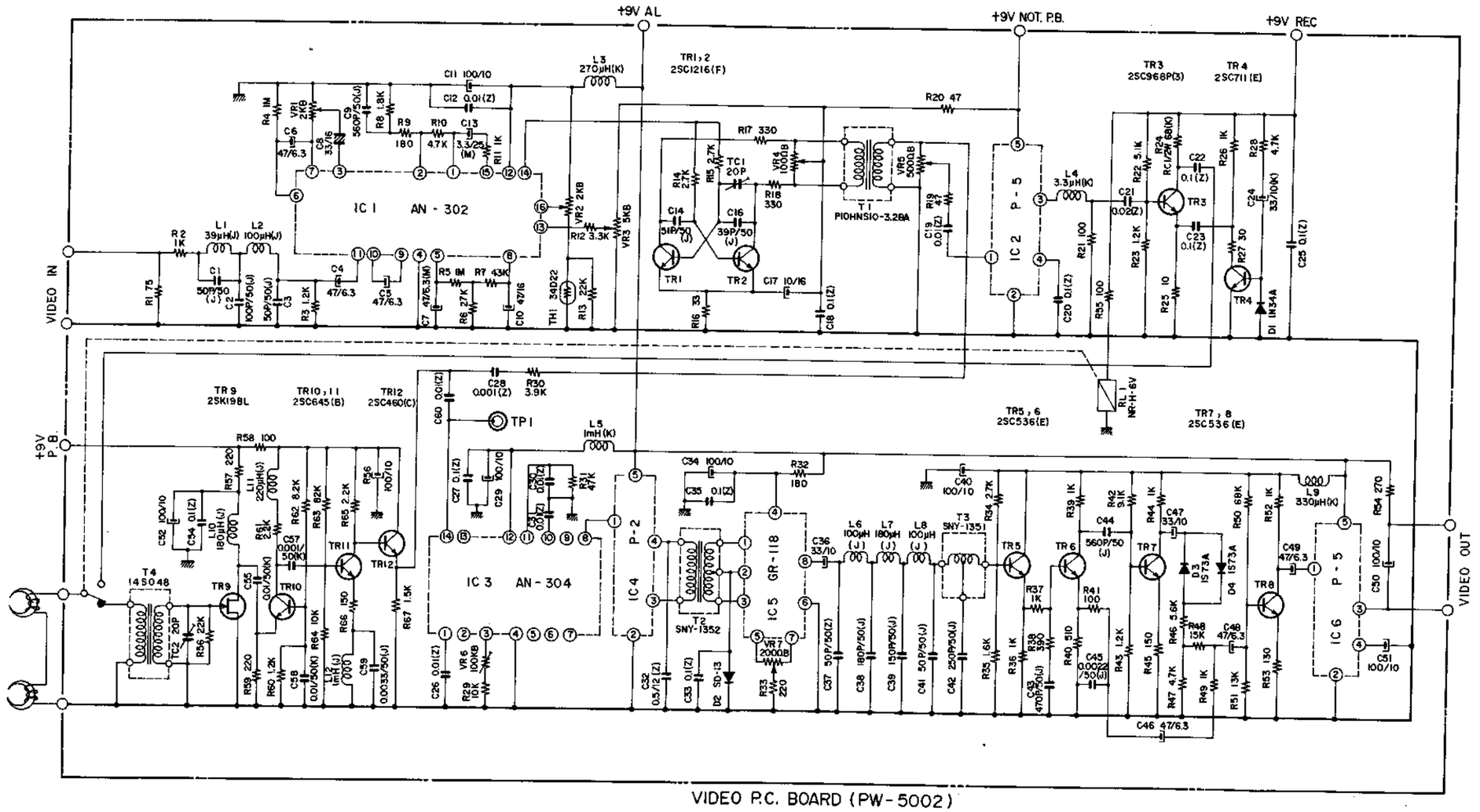
VT-120 SERVO-2

*	US	CCIR
R46	1.5K	1.8K
R47	3.3K	3 K



VT-120 SERVO-2
SCHEMATIC DIAGRAM
NO.5-3 1500846A

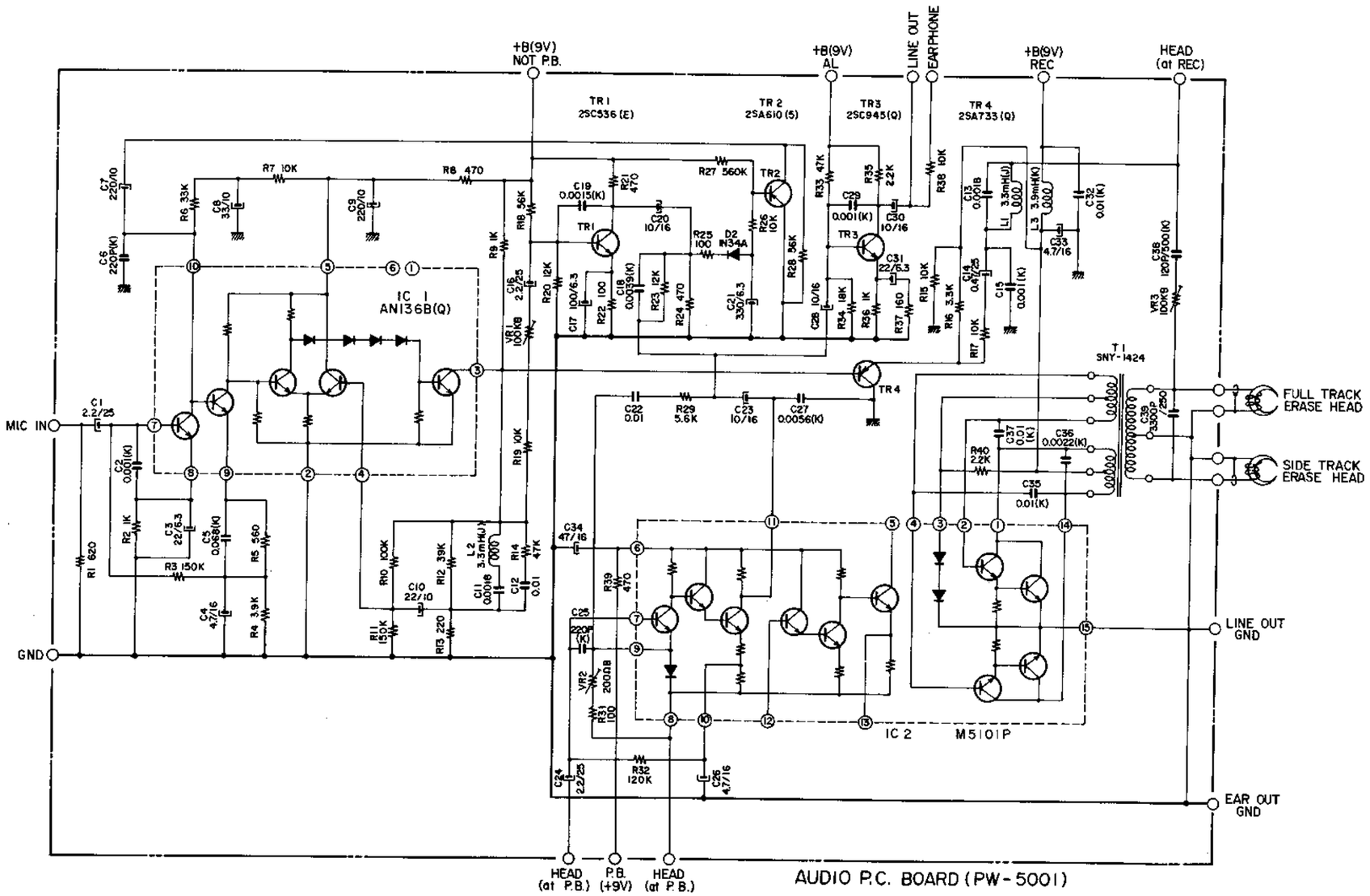
VT-120 VIDEO AMP.



VIDEO P.C. BOARD (PW-5002)

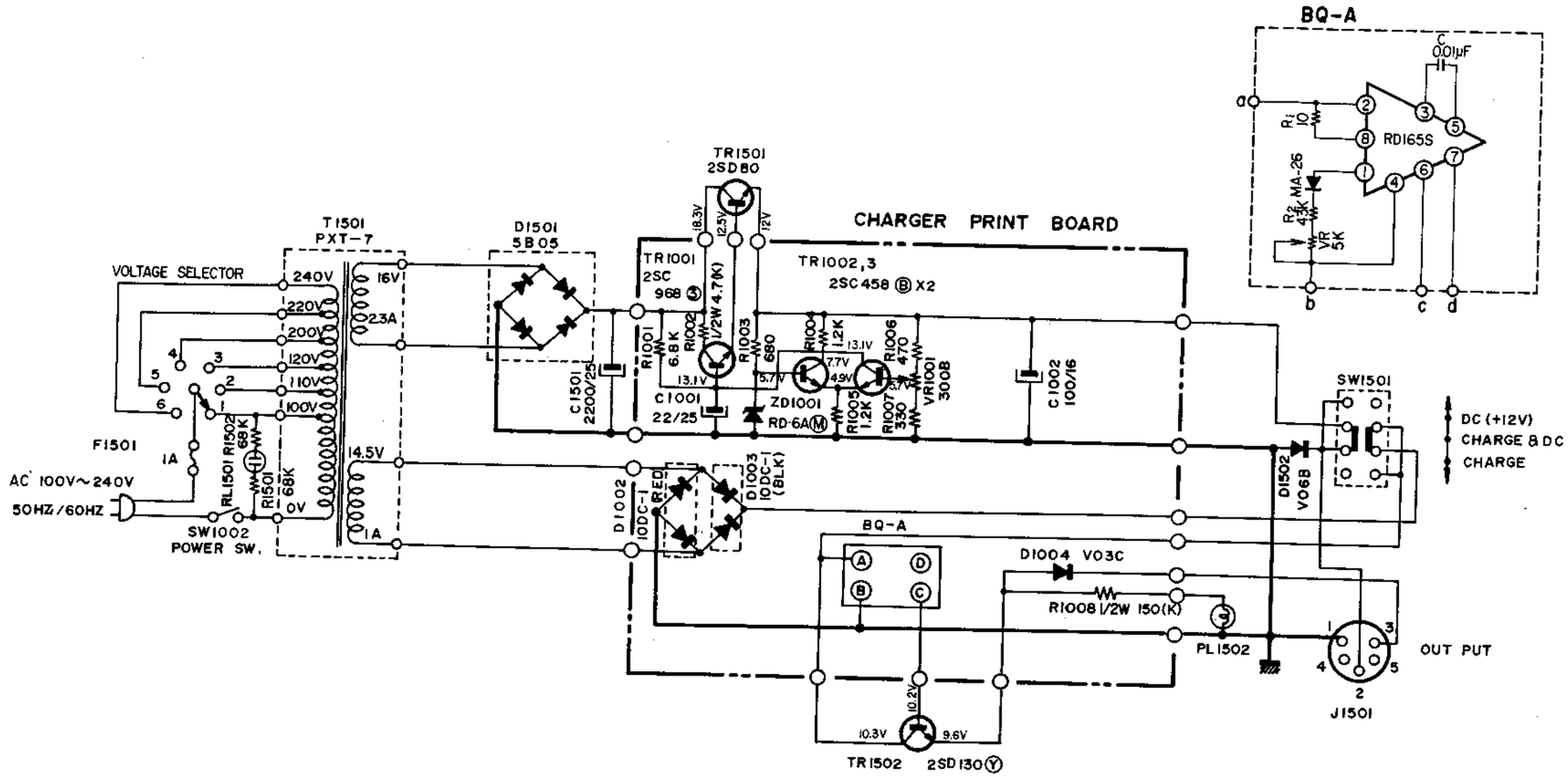
VT-120 VIDEO AMP.
SCHEMATIC DIAGRAM
NO. 5-4 1500847A

VT-120 AUDIO AMP.



VT-120 AUDIO AMP.
SCHEMATIC DIAGRAM
NO. 5-5 1500848A

VA-110 VA-110S VA-100S



NOTE

UNLESS OTHERWISE SPECIFIED

ALL RESISTORS IN OHMS 1/4WJ

ALL CAPACITORS IN MFD. 50WV K

VA-110 (AC. ADAPTOR)
SCHEMATIC DIAGRAM
NO. 1421020A
2C