

SERVICE MANUAL

PARTS LIST

AKAI STEREO TAPE RECORDER

MODEL 1731W

ALSO APPLICABLE TO MODELS 1731L, 1731D



STEREO TAPE RECORDER

MODEL 1731W

**ALSO APPLICABLE TO MODEL 1731L STEREO TAPE
RECORDER AND 1731D STEREO TAPE DECK**

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SECTION 1

SERVICE MANUAL

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I. SPECIFICATIONS

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

TRACK SYSTEM	4-track 2-channel stereo/monaural system
REEL CAPACITY	Up to 7" reel
TAPE SPEED	7-1/2 and 3-3/4 ips $\pm 1\%$ (* $\pm 1.5\%$)
WOW AND FLUTTER	Less than 0.12% (*0.15%) RMS at 7-1/2 ips Less than 0.15% (*0.2%) RMS at 3-3/4 ips
FREQUENCY RESPONSE	AKAI SRT Tape
	30 to 24,000 Hz (*40 to 24,000 Hz) ± 3 dB at 7-1/2 ips 30 to 16,000 Hz (*40 to 15,000 Hz) ± 3 dB at 3-3/4 ips 30 to 22,000 Hz (*40 to 22,000 Hz) ± 3 dB at 7-1/2 ips 30 to 15,000 Hz (*40 to 14,000 Hz) ± 3 dB at 3-3/4 ips
	Regular Tape
	Better than 50 dB (*48 dB) at 7-1/2 ips Batter than 47 dB at 3-3/4 ips
SIGNAL TO NOISE RATIO	
HUM AND NOISE	Less than 5 mV at minimum volume
DISTORTION	Less than 1.5% (*2.5%) at 1,000 Hz "O" VU recording
CROSS TALK	Better than 70 dB (*60 dB) monaural Better than 50 dB (*45dB) stereo
ERASE RATIO	Better than 70 dB
INPUTS	Mic input Line input Din input
	0.8 mV (*1 mV) Impedance 30 k Ω 100 mV Impedance 100 k Ω 10 mV (*20 mV)
OUTPUTS	Line output Din output Phone output Speaker output
	1.228V (4 dB ± 1.5 dB) using a 250 Hz "O" VU recorded tape 0.4V 30 mV at 8 Ω 20W total music power at 8 Ω 14W (*10W) continuous power at 8 Ω
BIAS FREQUENCY	103 kHz $\pm 5\%$
BIAS LEAK	Less than -20 VU
HIGH FREQUENCY DEVIATION	Within 3 dB using an 8,000 Hz 3-3/4 ips recorded tape at 7-1/2 ips
RECORDING CAPACITY	60 min. stereo recording using a 1,200 ft. tape at 7-1/2 ips
FAST FORWARD AND REWIND TIME	80/100 sec., using a 1,200 ft. tape at 60/50 Hz
MOTOR	2-4 pole Hysteresis synchronous 2-speed motor type: HM2-16SX Revolution: 3,600/3,000 r.p.m. at 60/50 Hz (High speed) 1,800/1,500 r.p.m. at 60/50 Hz (Low speed)
HEADS	Recording Head Type: P4-154 Gap: 1 micron Impedance: 95 Ω $\pm 15\%$ at 1,000 Hz In-Line 4-track 2-channel playback head Type: P4-150 Gap: 1 micron Impedance: 1,250 Ω $\pm 15\%$ at 1,000 Hz In-Line 4-track 2-channel erase head Type: E4-200 Gap: 0.6 mm Impedance: 200 Ω $\pm 5\%$ at 100 kHz
TRANSISTORS	6... 2SC458 LG (C) 2... 2SC971 (2) (3) (red) 2... 2SC871 (E) (F) 1... 2SC1098 (L) (M)
IC	4... LD-3141 2... STK-011 (A) 1731W/L only
DIODES	4... V06B 1731W/L only 2... IN34A 1... 10DC-1 blk
VARISTOR	1... RD-24AM
POWER SUPPLY	100 to 240V A.C. 50/60 Hz 120V A.C. 60 Hz for CSA Model
POWER CONSUMPTION	80W (55W... 1731D)
INSULATION RESISTANCE	More than 50 M Ω
INSULATION DURABILITY	1,000V A.C. for more than 1 min. duration
DIMENSIONS/WEIGHT	1731W 428 (W) X 450 (H) X 227 (D) mm (16.9 X 17.7 X 9")/17.2 kg (37.1 lbs.) 1731L 436 (W) X 460 (H) X 250 (D) mm (17.1 X 18 X 9.8")/19 kg (42 lbs.) 1731D 418 (W) X 450 (H) X 227 (D) mm (16.4 X 17.7 X 9")/15.6 kg (34.3 lbs.)

NOTE: Specifications subject to change without notice.

II. MEASURING METHOD

1. TAPE SPEED DEVIATION



Fig. 1

As shown in Figure 1, connect a Frequency Counter to the Line Output of the recorder.

Take a frequency counter reading at the beginning, middle, and end of tape winding during playback. The maximum value of these respective readings will represent tape speed deviation.

2. WOW AND FLUTTER

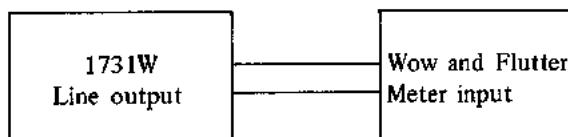


Fig. 2

Method A

As shown in Fig. 2, connect the Line Output of the recorder to the Input of a Wow and Flutter Meter. Use a 3,000 Hz pre-recorded test tape and take a wow and flutter meter reading at the beginning, middle, and end of tape winding. The maximum value of these respective readings will represent the wow and flutter.

Method B

Supply a 3,000 Hz sine wave signal from an Audio Frequency Oscillator and make a recording on a black tape at the beginning, middle, and end of tape winding. Rewind and playback tape. Measure wow and flutter with a Wow and Flutter Meter. (The wow and flutter value of Method B will be close to twice that of Method A.)

3. FREQUENCY RESPONSE

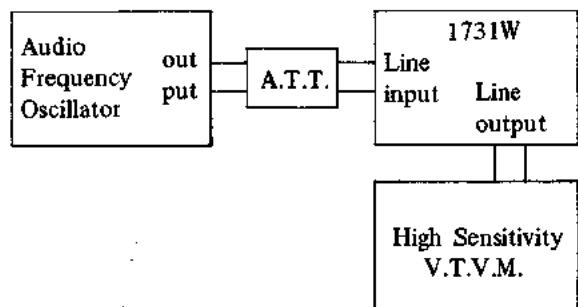


Fig. 3

For measuring frequency response, connect instruments as shown in Fig. 3 and proceed as follows:

- a. Supply a 1,000 Hz sine wave to the Line Input of the recorder from an Audio Frequency Oscillator through an Attenuator. Set recorder to recording mode and turn recording level volume control to maximum. Adjust Attenuator to obtain a +4 dB V.T.V.M. reading.
- b. Under conditions described in a. above, re-adjust Attenuator so that the Line Output is -16 dB, and record 40 to 22,000 Hz spot frequencies.
- c. Rewind tape and playback from the beginning. Take V.T.V.M. spot frequency readings and plot values on a graph.

NOTE: When measuring frequency response, new tape should be used.

4. SIGNAL TO NOISE RATIO

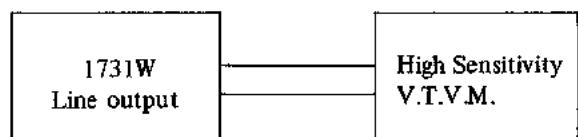


Fig. 4

As shown in Fig. 4, connect a High Sensitivity V.T.V.M. to the Line output of the recorder. Playback a 250 Hz "O" VU pre-recorded test tape and measure the output. Then remove the tape and measure the noise level under the same condition. Convert each of the measured values into decibels.

5. TOTAL HARMONIC DISTORTION FACTOR

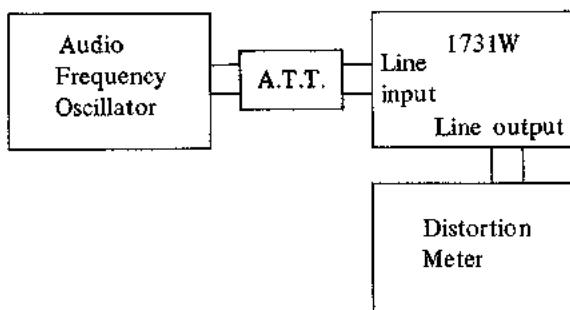


Fig. 5

Connect the measuring instruments as shown in Fig. 5 and record a 1,000 Hz sine wave signal at "0" VU. Playback the resultant signal and measure the overall distortion factor. Measure the noise level of the tape recorder without the tape. Connect the Audio Frequency Oscillator directly to the distortion meter for measurement of the distortion factor of the oscillator. The required distortion factor can be obtained from the results of the above measurement by the following formula:

$$d_0 = d - d_1 - d_2$$

Where, d_0 — Required distortion factor

d — Overall distortion factor

d_1 — Noise level

d_2 — Distortion factor of the oscillator

NOTE: When measuring the distortion factor, new tape should be used.

6. CROSS TALK (Cross talk between the tracks)



Fig. 6

As shown in Fig. 6, first record a 1,000 Hz sine wave signal on Track No. 3 at +3 VU level. Next, record under a non-input condition. Then, playback the tape on Tracks No. 3 and 4 through the B.P.F. (band pass filter sensitivity . . . 1:1) and obtain a ratio between the two from the following formula:

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

Where, C — Desired cross talk ratio (dB)

E_0 — 1,000 Hz signal output level

E_2 — 1,000 Hz cross talk level

E_1 — Non-input signal recorded level

7. ERASE RATIO

As shown in Fig. 4, connect a High Sensitivity V.T.V.M. to the Line Output of the recorder.

Playback a virgin tape and take a V.T.V.M. reading of the output level. Next, record a 1,000 Hz sine wave signal at +3 dB, then playback this recorded signal and take a V.T.V.M. reading of the output level. Next, using this pre-recorded tape, record under a non-input condition and take a reading of the noise level output of the erased signal and obtain a ratio between the two from the following formula:

$$Er = 20 \log \frac{E_0}{E_2 - E_1} \text{ (dB)}$$

Where, Er — Desired erase ratio (dB)

E_0 — 1,000 Hz signal output level

E_2 — Non-input signal recorded level

E_1 — Virgin tape noise output level

8. POWER OUTPUT

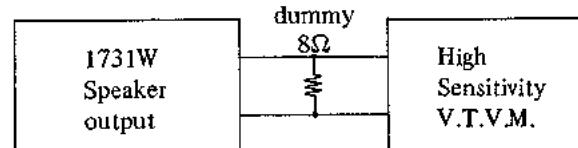


Fig. 7

As shown in Fig. 7, connect an 8Ω dummy load resistor to the speaker output of the recorder and connect this terminal to a High Sensitivity V.T.V.M. Playback a 250 Hz "0" VU pre-recorded test tape and take a V.T.V.M. reading of the output level. The resultant output can be obtained from the results of the above measurement by using the following formula:

$$P = \frac{E^2}{R} \text{ (W)}$$

Where, P — Desired power output (watts)

E — Measured voltage (R.M.S.)

$R = 8\Omega$

III. DISMANTLING OF UNIT

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

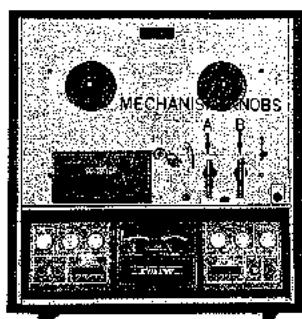
1



4



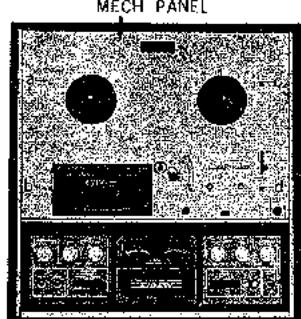
2



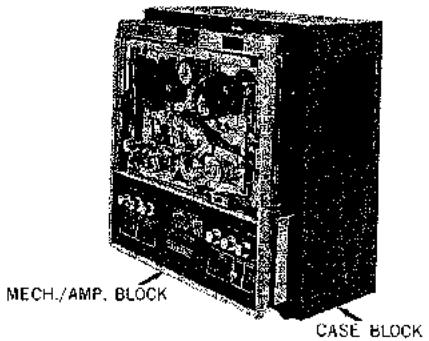
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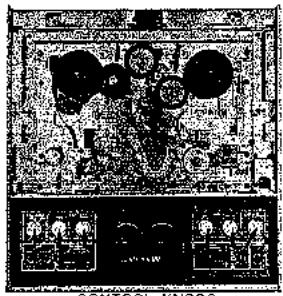
3



6

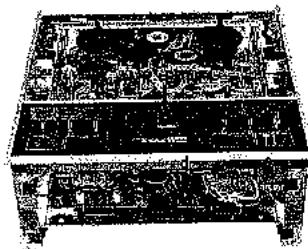


7

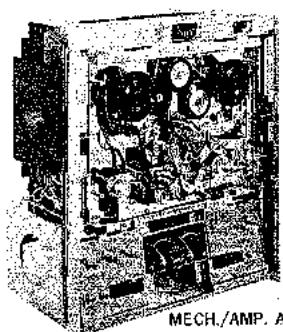


CONTROL KNOBS

8

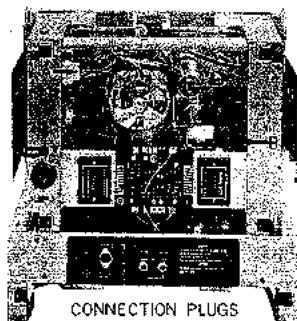


9



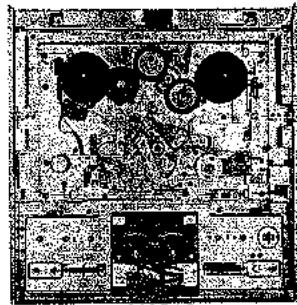
MECH./AMP. ADJUSTMENT

10



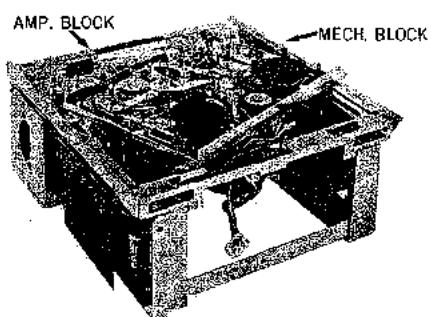
CONNECTION PLUGS

11



SCREWS

12



IV. OPEN REEL MECHANISM ADJUSTMENTS

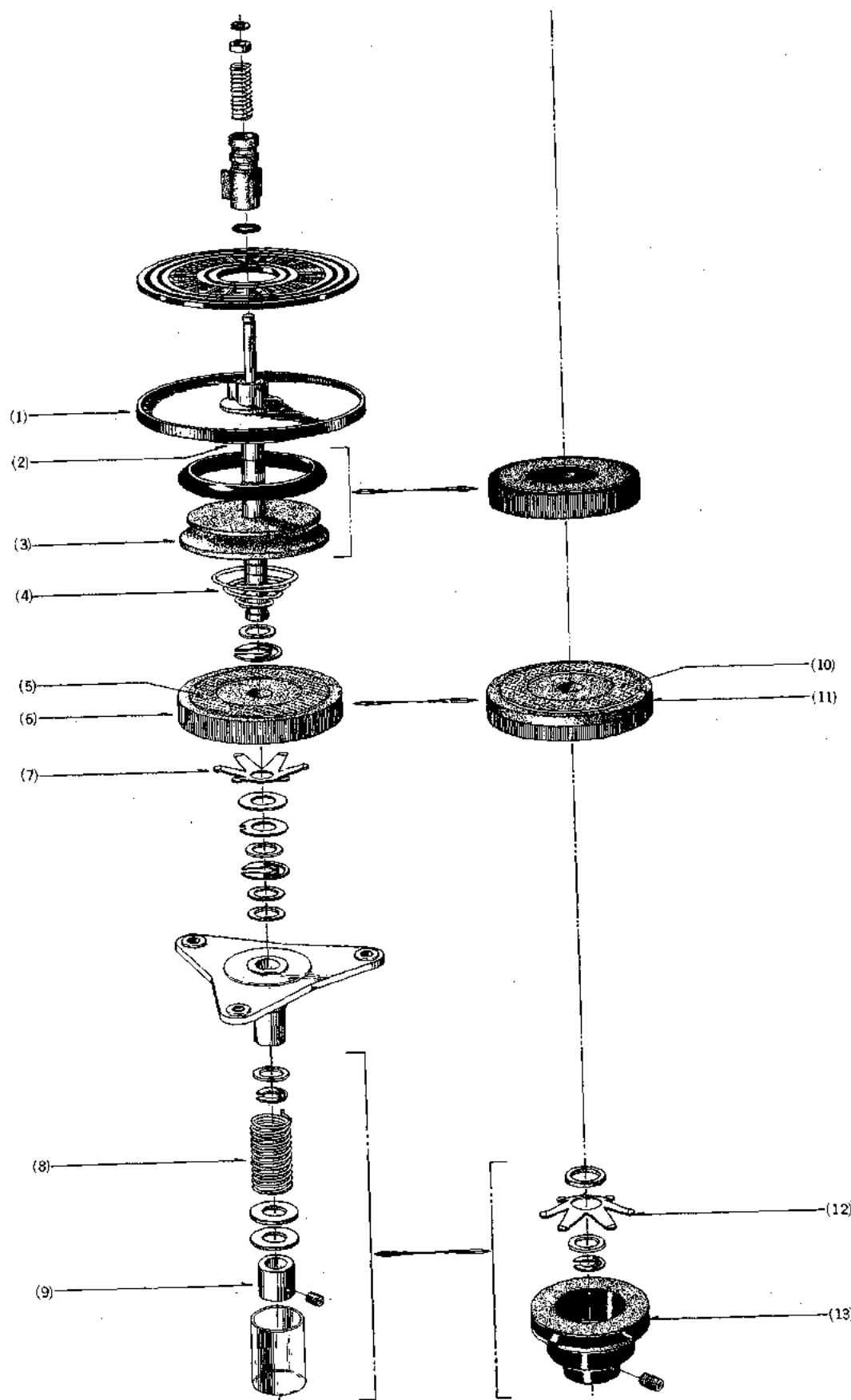


Fig. 8

1. PINCH WHEEL ADJUSTMENT

It is important that the pinch wheel shaft be kept in perfect alignment with the capstan shaft. Proper pinch wheel pressure is between 1,000 and 1,150 grams when the unit is operated at the tape speed of 7½ ips. Any deviation from this specification will result in wow and flutter. Check pinch wheel pressure with a spring scale, and if necessary, adjust the pinch wheel load spring.

2. SUPPLY REEL SHAFT ASSEMBLY ADJUSTMENT (See Fig. 8 at left)

Felt clutch material (2) is used between the lower side of the reel table base plate (1) and the rewind pulley (3) to protect recording tape from excessive tension during rewind operation. To check the amount of friction of this part, install a 5-inch reel with a 60 mm diameter tape, and gently pull the end of the tape upward with a spring scale. Adjust the conical spring (4) so that the amount of tension is kept between 400 and 500 grams. Other felt clutch material (5) is attached to the supply roller (6) to provide proper slippage during FWD and REC operation. The procedure for checking friction of this part is the same as the foregoing, and between 80 and 100 grams of tension gives best result. Adjust the spring (7) just under the supply roller (6). When the unit is set to fast forward operation, the amount of friction will decrease to from 15 to 20 grams. Check to see whether this is satisfactory. If not, adjust the spring plate (8) and the pressure of the set sleeve (9).

3. TAKE-UP REEL SHAFT ASSEMBLY ADJUSTMENT (See Fig. 8 at right)

Felt clutch material (2) is attached to the bottom side of the reel table base plate (1) so that the recording tape will not stretch during fast forward operation due to excessive tension. To check the amount of friction of this part, install a 5-inch reel with a 60 mm diameter tape, and gently pull the end of tape upward with a spring scale. Adjust the conical spring (4) so that the amount of tension at this part is kept between 400 and 500 grams. Other felt clutch material (10) is attached to the take-up roller (11). This is to provide proper slippage during FWD or REC operation. The procedure for checking friction of this part is the same as the foregoing, and between 150 and 180 grams of friction provides the best results. Adjust the spring plate (7) just under the take-up roller (11). When the unit is set to rewind operation, the amount of friction of this part will decrease to from 15 to 20 grams. Check to see whether this is satisfactory. If not, adjust the spring (12) and the pressure of the pulley (13).

V. HEAD ADJUSTMENTS

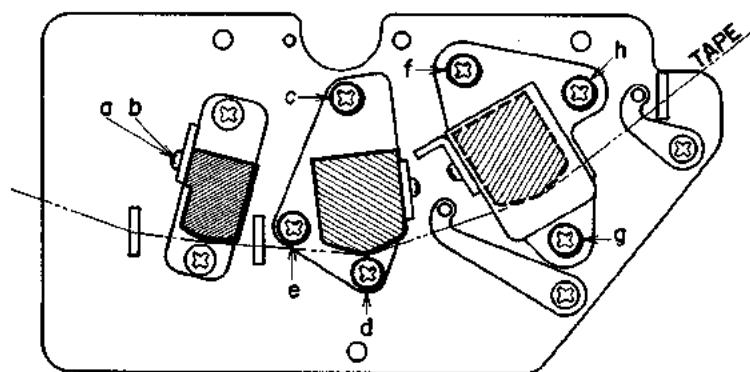


Fig. 9

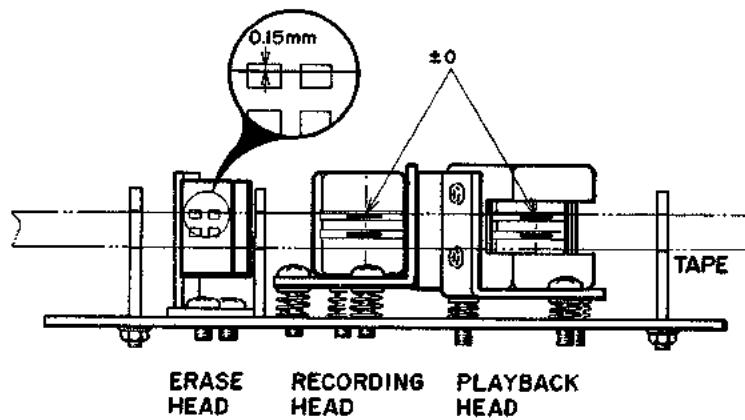


Fig. 10

Since adjustment of the Heads critically affects tape recorder performance, it is essential that Heads be carefully adjusted with precision measuring equipment and suitable recorded tape.

1. HEAD HEIGHT ADJUSTMENTS (See Figs. 9, 10)

a. Erase Head

Adjust height control screws (a), (b) by turning to left and right so that the upper edge of the tape is 0.15 mm lower than the upper edge of the erase head core.

b. Recording Head

Adjust screws (c), (d) by turning to left and right until the width between the upper edge of channel 1 head core and upper edge of the tape is equal.

c. Playback Head

Adjust screws (f), (g) by turning to left and right until the width between the upper edge of channel 1 head core and the upper edge of the tape is equal.

2. HEAD SLANT ADJUSTMENT

(See Figs. 9, 10)

Adjust the screws (Head Height control screw) by turning to left and right so that each head (Erase, Recording and Playback Head) contacts the tape surface at a right angle.

3. HEAD AZIMUTH ALIGNMENT ADJUSTMENTS (See Figs. 9, 10)

a. Playback Head

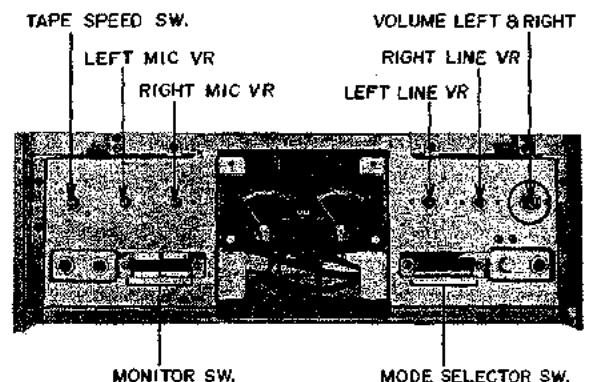
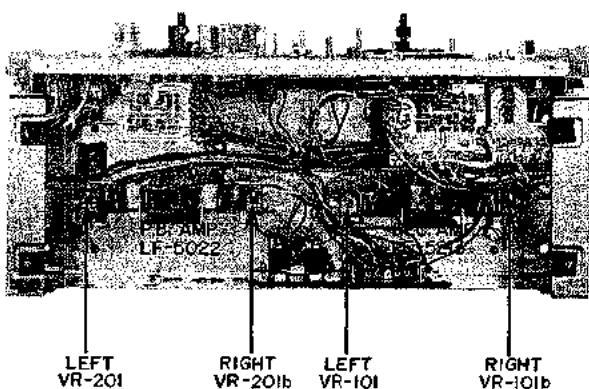
Playback an Ampex Alignment test tape (8,000 Hz 3 1/2 ips.) at 7 1/2 ips. Adjust screw (h) turning to left and right until the various line outputs are maximum.

b. Recording Head

At recording mode, supply a 15,000 Hz sine wave at a -16 dB recording level from an Audio Frequency oscillator to the line input of the 1731W, and set the monitor switch to "TAPE" position. Then adjust screw (e) by turning to left and right until the various line outputs are maximum.

4. Repeat adjustments outlined in Items 1-b to 3, above 2 or 3 times to obtain optimum adjusted condition.

VI. AMPLIFIER ADJUSTMENTS



1. PLAYBACK LEVEL ADJUSTMENT (See Figs. 11, 12)

- Set the monitor switch to "TAPE" position and "TAPE SPEED" switch to 7½ ips.
- Connect a High Sensitivity V.T.V.M. to the line output.
- Playback a 250 Hz pre-recorded test tape at 7½ ips, and adjust semi-fixed resistor VR-201 and VR-201b (10k B) to obtain a 4 dB P.B. level. (VU meter indicates "O" VU)

2. RECORDING LEVEL ADJUSTMENT (See Figs. 11, 12)

- Set the monitor switch to "TAPE" position and "TAPE SPEED" switch to 7½ ips.
- Connect an Audio Frequency Oscillator to the line input and High Sensitivity V.T.V.M. to the line output.
- Load a Scotch-111 blank tape and set recorder to "REC" mode.
- Supply a 1,000 Hz sine wave from an Audio Frequency Oscillator and adjust the line recording level control volumes (VR-1 and VR-3 10 k B) until the line output level reaches -4 dB. (VU meter indicates "O" VU)
- Set the monitor switch to "SOURCE" position.
- Adjust semi-fixed resistor VR-101 and VR-101b (5k B) to obtain 4 dB recording level. (VU meter indicates "O" VU)
- Repeat 2 times in the same way as indicated in Items d. to f. above.

O.S.C. P.C. BOARD LF-5210

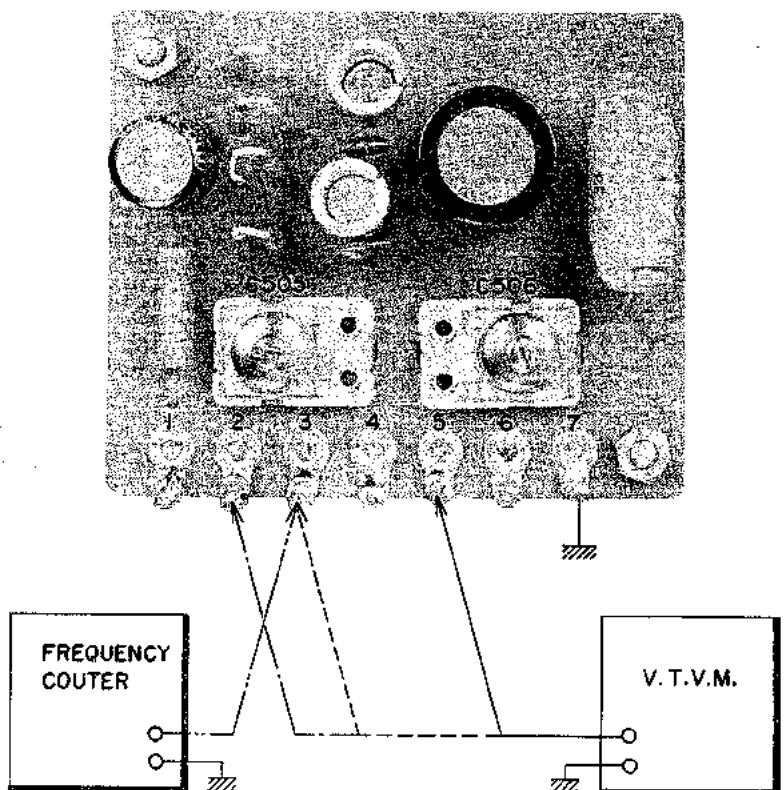


Fig. 13

3. RECORDING BIAS FREQUENCY ADJUSTMENT (See Fig. 13)

- Set the recorder to recording mode.
- Connect a Frequency counter to point (3) in Fig. 13 of the oscillator P.C. Board (LF-5210) and read the frequency indication.
- If the bias frequency is $103 \text{ kHz} \pm 5\%$, the bias frequency is correct.
- If the bias frequency is incorrect, it can be adjusted by changing the value of condenser C509 (5600 PF) of the oscillator P.C. Board (LF-5210).

4. RECORDING BIAS VOLTAGE ADJUSTMENT (FREQUENCY RESPONSE ADJUSTMENT) (See Fig. 13)

- Set the monitor switch to "TAPE" position and "TAPE SPEED" switch to $7\frac{1}{2}$ ips.
- Connect an Audio Frequency Oscillator to the line input through an Attenuator and a High Sensitivity V.T.V.M. to the line output.
- Load a blank test tape "AKAI 100L" (Fuji S-100) and set the recorder to "REC" mode.

d. Turn recording level control volume VR-1 and VR-3 (10k A) to obtain 4 dB V.T.V.M. reading.

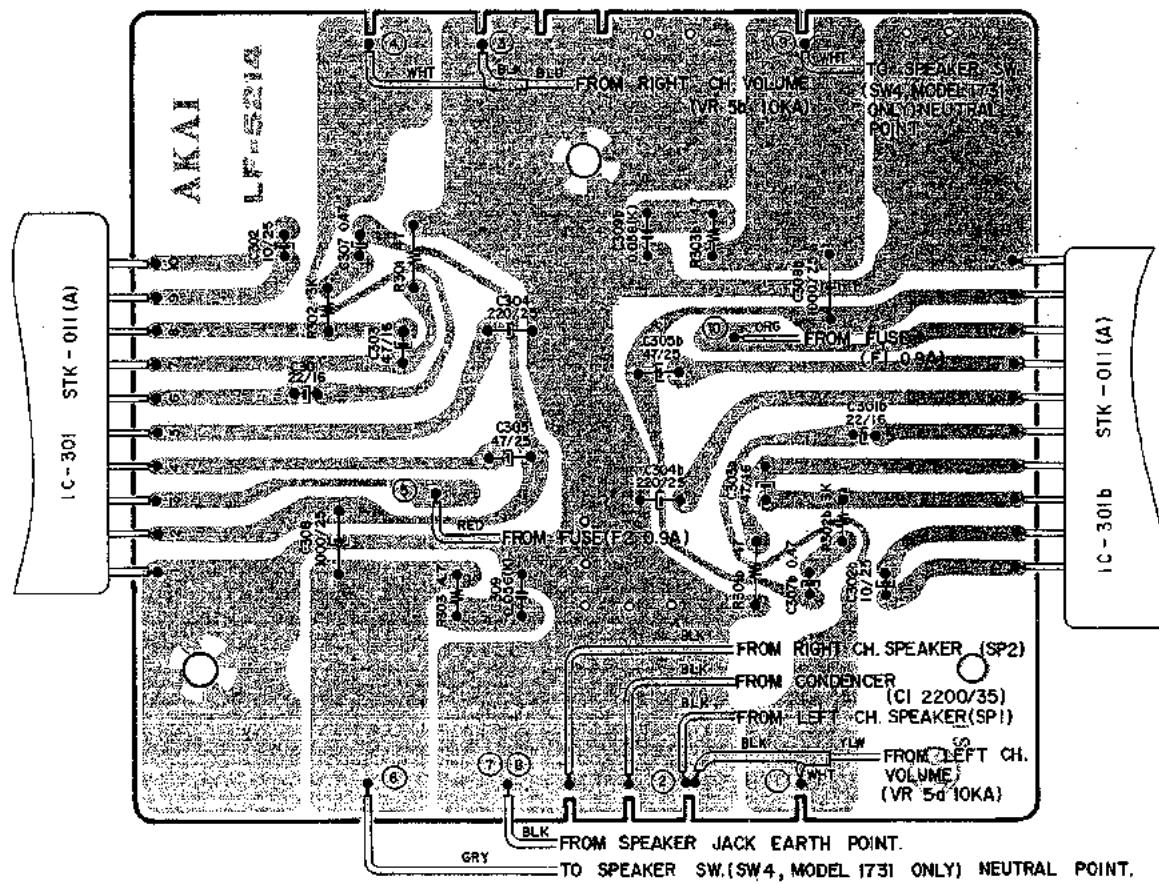
- Under conditions described in Itemd. above, readjust attenuator so that the line output level is -16 dB.
- Record from 40 to 22,000 Hz spot frequencies.
- Adjust Bias Adjustment semi-fixed condenser C505 and C506 (70 PF max.) so that the outputs of 1,000 Hz and 10,000 Hz frequencies are equal.
- The bias voltage at this time is around 7V A.C.

5. ERASE VOLTAGE

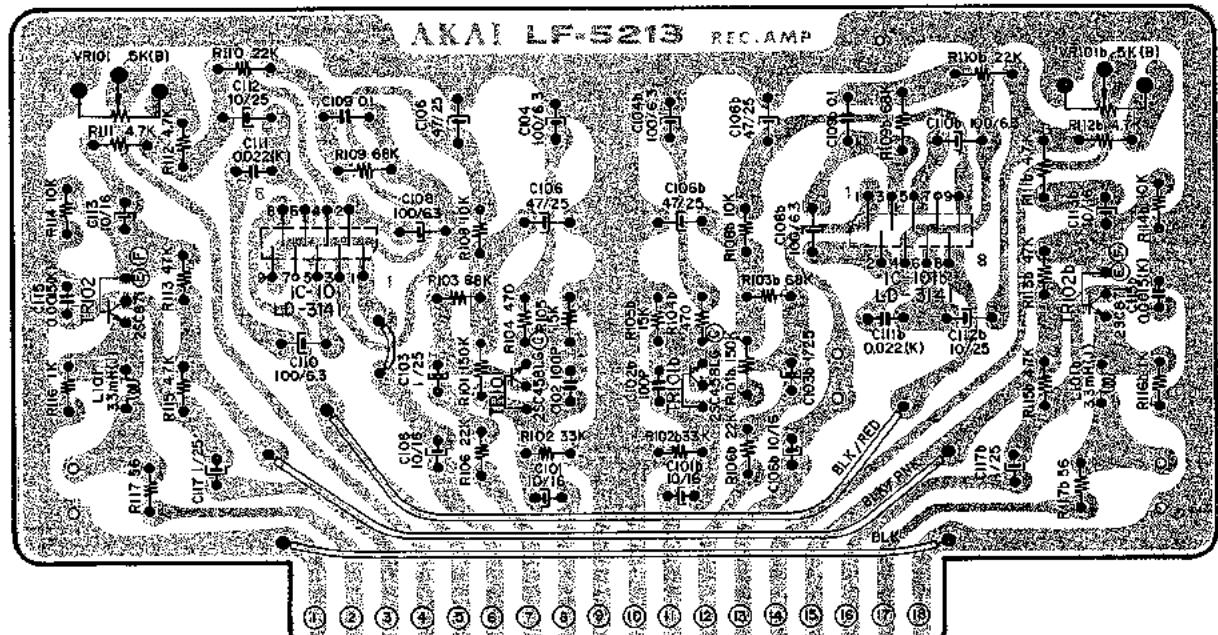
- Set the recorder to "REC" mode.
- Connect a V.T.V.M. to points (6) in Fig. 13 of the oscillator P.C. Board (LF-5210) and read the V.T.V.M. indication.
- The Erase Voltage is around 65V A.C.

VII. COMPOSITE VIEWS OF COMPONENTS

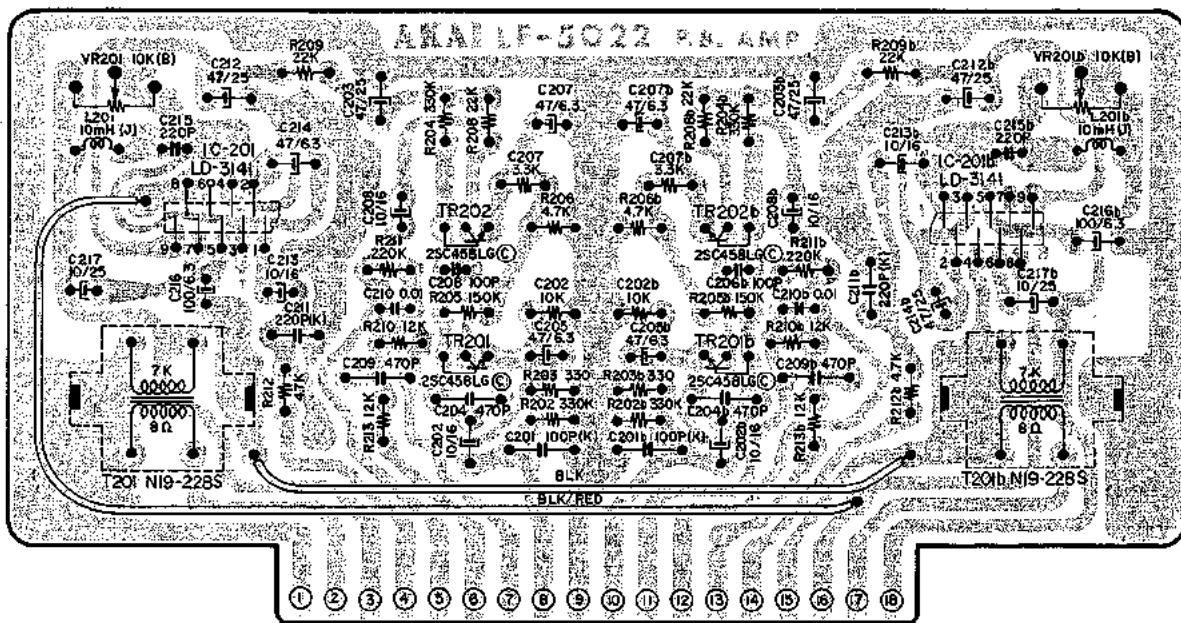
MAIN AMP. P.C. BOARD (LF-5214)



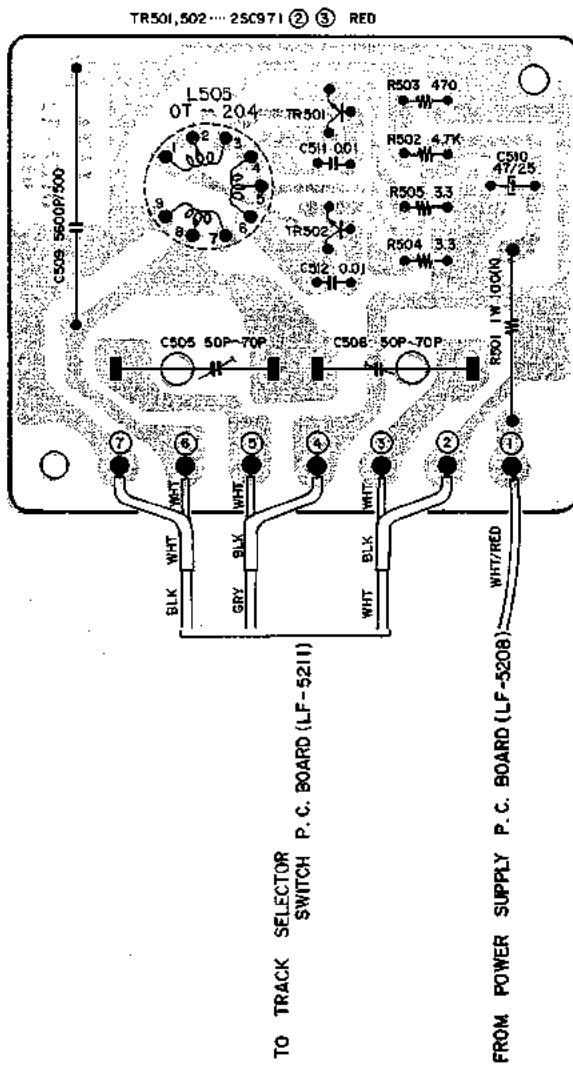
REC. AMP. P.C. BOARD (LF-5213)



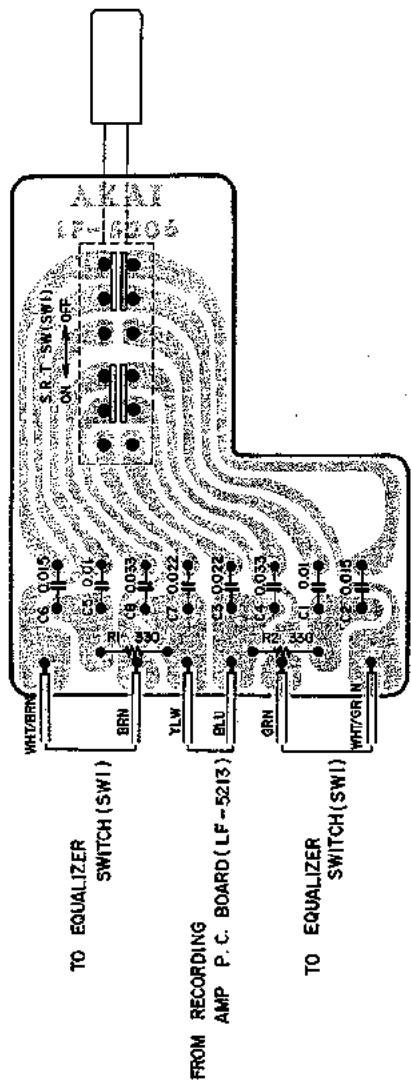
P.B. AMP. P.C. BOARD (LF-5022)



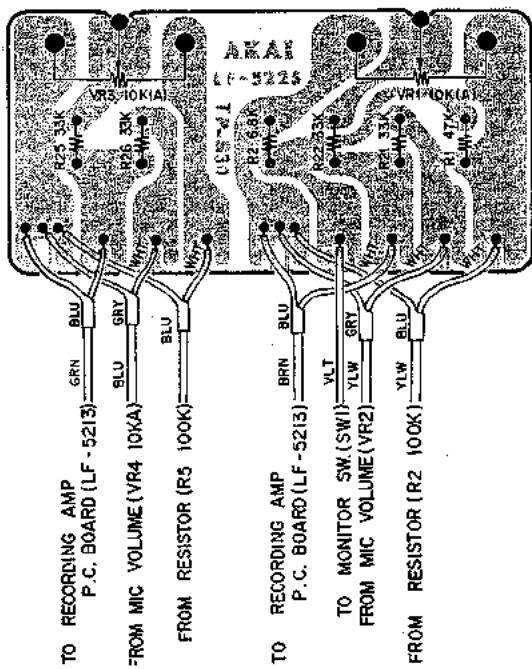
OSC. P.C. BOARD (LF-5210)



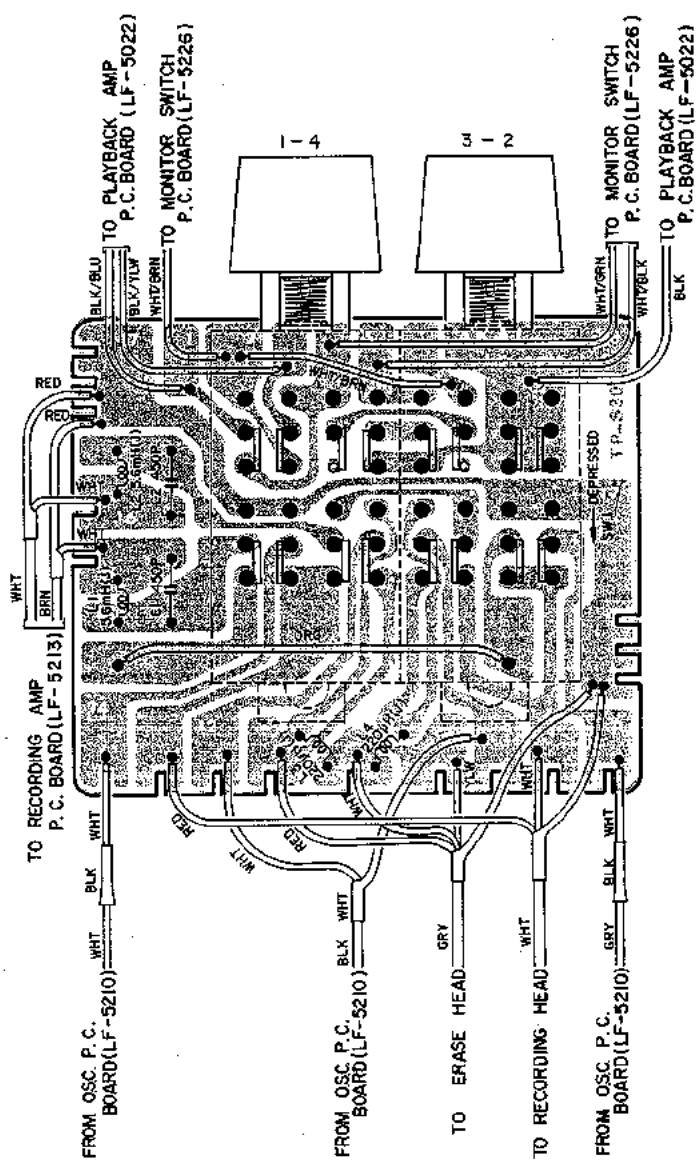
SRT SWITCH P.C. BOARD (LF-5206)



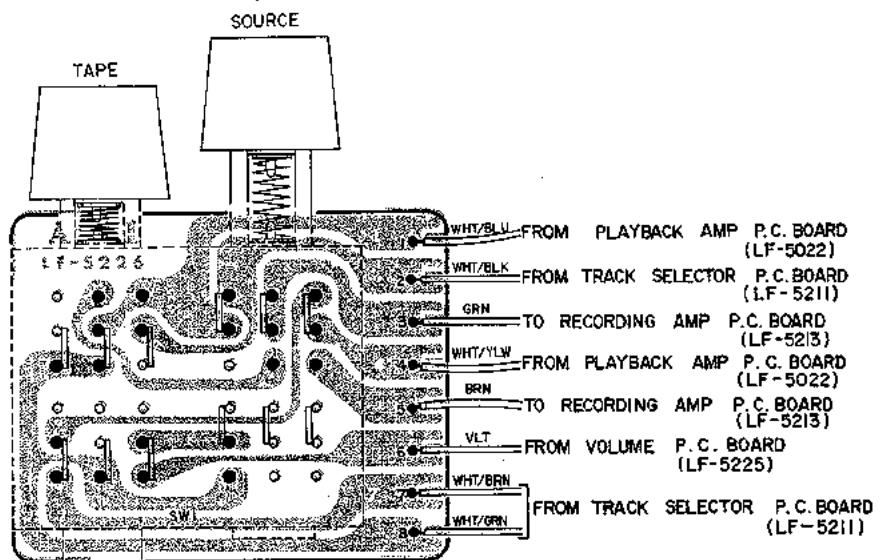
VOLUME P.C. BOARD (LF-5225)



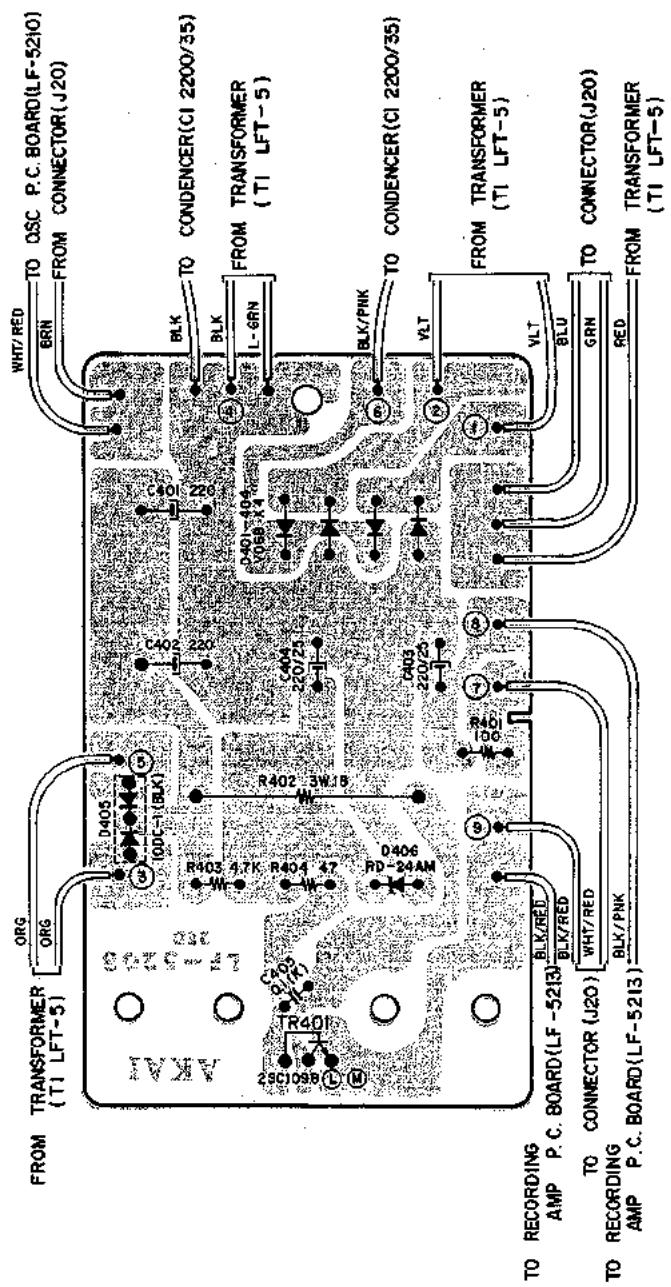
TRACK SELECTOR P.C. BOARD (LF-5211)



MONITOR SWITCH P.C. BOARD (LF-5226)



POWER SUPPLY P.C. BOARD (LF-5208)



SECTION 2

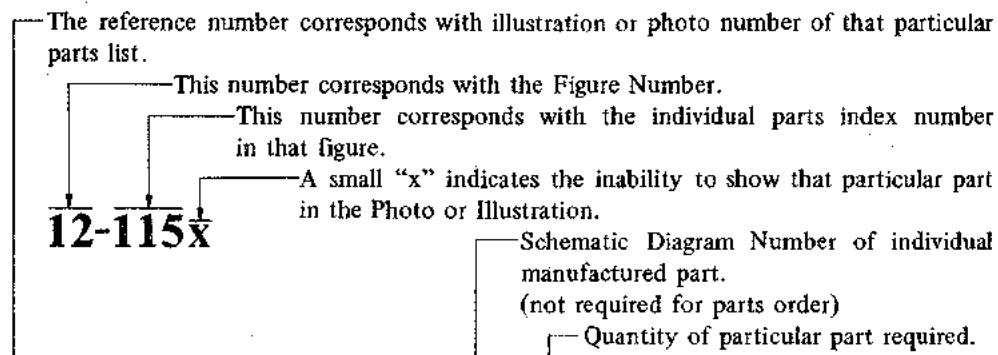
PARTS LIST

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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 List Table of P.C. Board.
7. Both the kind of part and installation position can be determined by the Parts Number. To determine where a parts number is listed, utilize Parts Index at end of Parts List.

It is necessary first of all to find the Parts Number. This can be accomplished by using the Reference Number listed at right of parts number in the Parts Index. (meaning of ref. no. outlined in Item 3 above).

8. Utilize separate "Price List for Parts" to determine unit price. The most simple method of finding parts Price is to utilize the reference number.

ELECTRICAL PARTS LIST TABLE

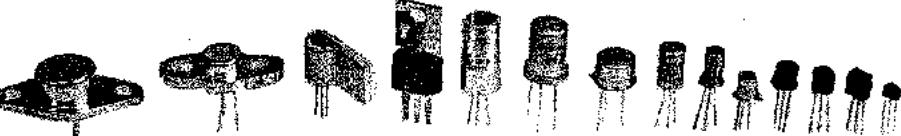
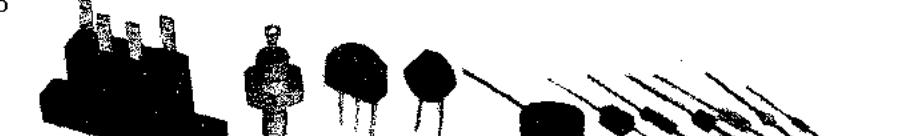
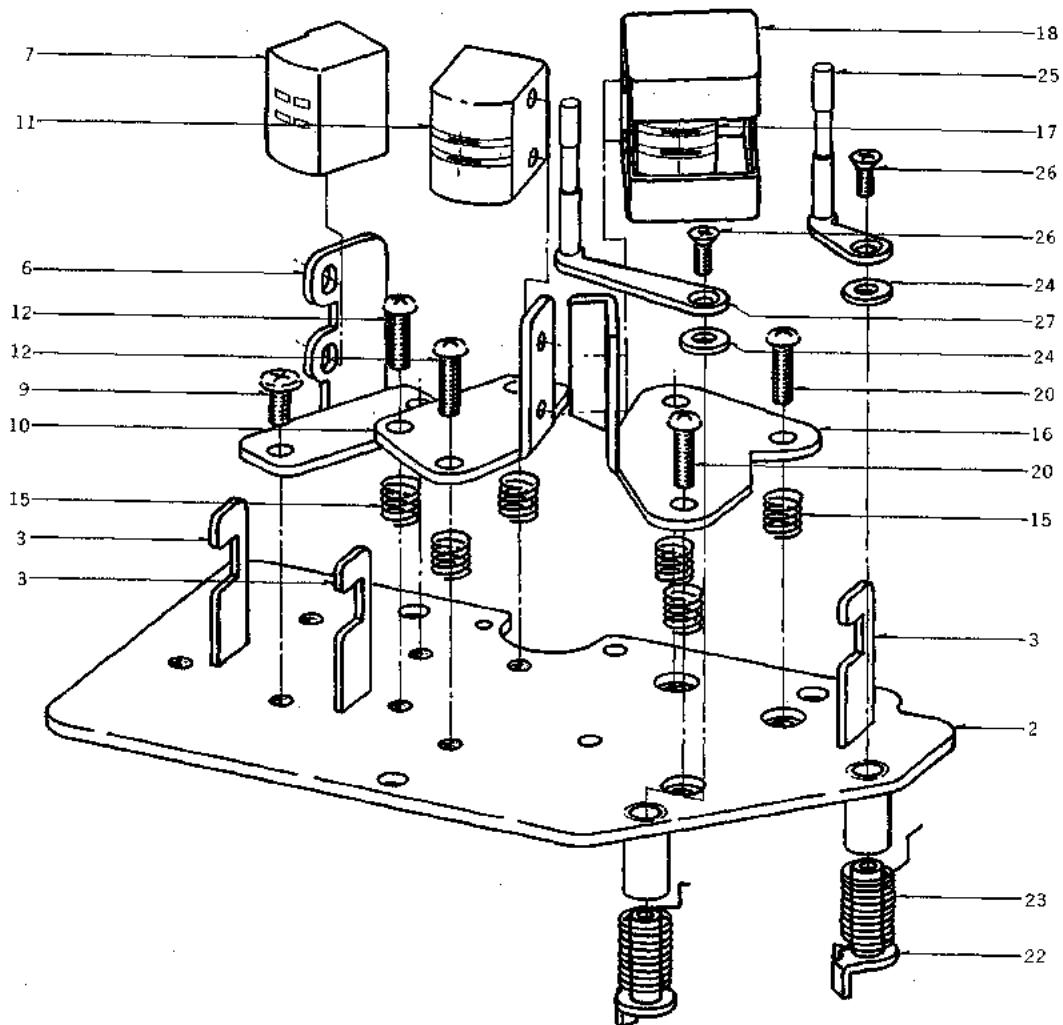
<p>Because the indication of resistors and capacitors in the P. C. Board photos are being eliminated, please confirm parts name and shape by comparing them with the parts shown in this table.</p>	1  Solid Resistor	2  Stopper Type Insulator Type Carbon Resistor	3  Metal Oxide Film Resistor
	4  Cement Resistor	5  Wire-Wound Resistor	6  Thermistor
			7  Enamel Resistor
1  MP Capacitor (Tubler Type)	2  Plastic Capacitor	3  Mylar Capacitor	4  VFM (Hi-Q) Capacitor
5  Mylar Capacitor	6  Tantalum Capacitor	7  Oil Capacitor (Tubler Type)	8  Vertical Type Tubler Type Styrol Capacitor
9  Electrolytic Capacitor (Tubler Type)	10  Vertical Type Tubler Type Electrolytic Capacitor	11  Ceramic Capacitor	12  Metallized 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 HEAD BLOCK



HEAD BLOCK

Ref. No.	Parts No.	Description	Schematic No.	Q'ty	Ref. No.	Parts No.	Description	Schematic No.	Q'ty
1-1x	BH475435	Head Block Comp.	LF-2	1	1-17	HP375131	REC./P.B. HEAD P4-150		
1-2	HZ410973	Head Base, w/metal	LF-0001	1	1-18	BC411017	Head Shield Case	LF-0005	1
1-3	HZ274162	Tape Guide #1	4TR-5	3	1-19x	ZW460440	Screw, pan head 2x4		2
1-4x	ZW273756	M3 Nut		3	1-20	ZW425114	Screw, round head 3x10		3
1-5x	ZW273778	M3 Earth Lug		1	1-21x	HZ393974	I-MK Head Terminal Plate	RC-89	1
1-6	HZ475233	Erase Head Base	LF-0201	1	1-22	HL223503	Shift Lever B, w/shaft	M9-3	2
1-7	HE384693	ERASE HEAD E4-200		1	1-23	ZG312928	Shifter Spring	LD-19	2
1-8x	ZW477876	Screw, pan head 2x3		2	1-24	ZW336846	Washer (SPC)D4.1x7x1.2t		2
1-9	ZW323728	Screw, binding head 3x5		2	1-25	HL223536	Shift Lever C, w/pin	M9-5	1
1-10	HZ410995	Rec. Head Base	LF-0003	1	1-26	ZW468527	Screw, oval countersunk head 2.3x6		
1-11	HR475446	REC. HEAD P4-154		1	1-27	HL312941	Shift Lever, w/pin	LD-15	2
1-12	ZW425114	Screw, round head 3x10		3	1-28x	ZW413155	Screw, binding head 3x6		1
1-13x	HZ486270	I-MK Head Terminal Plate B	LF-0203	1	1-29x	EA382713	Head Connector P.C. Board	RD-A8	1
1-14x	ZW477876	Screw, pan head 2x3		2	1-30x	ZW323728	Screw, binding head 3x5		1
1-15	ZG364656	Angle Adjust Spring C	RD-57	6					
1-16	HZ411006	P.B. Head Table	LF-0004	1					

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

FIG. 2. ILLUSTRATION OF REEL TABLE BLOCK (SUM)

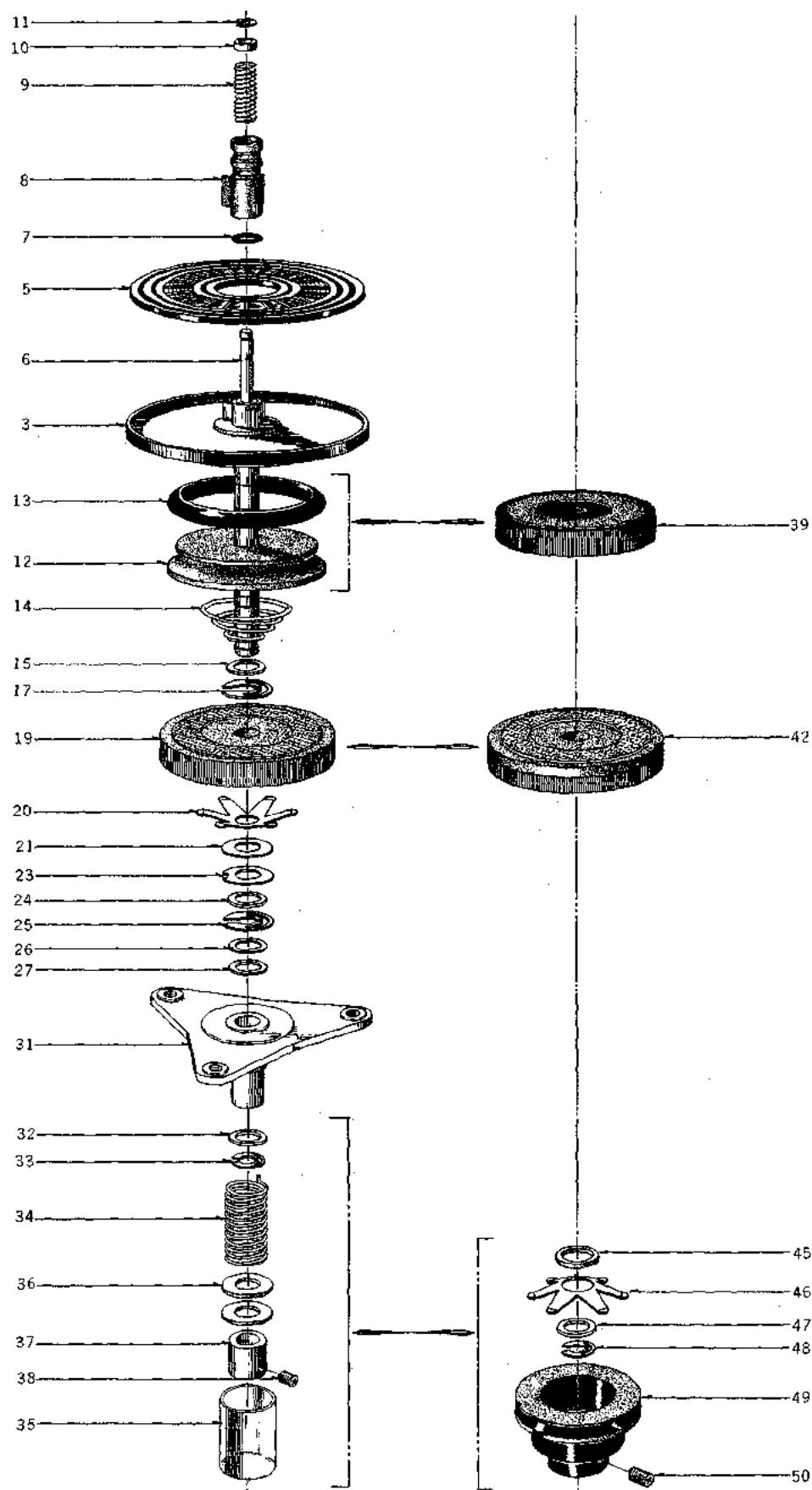


FIG. 3 ILLUSTRATION OF MOTOR/BELT CHANGE LEVER BLOCK

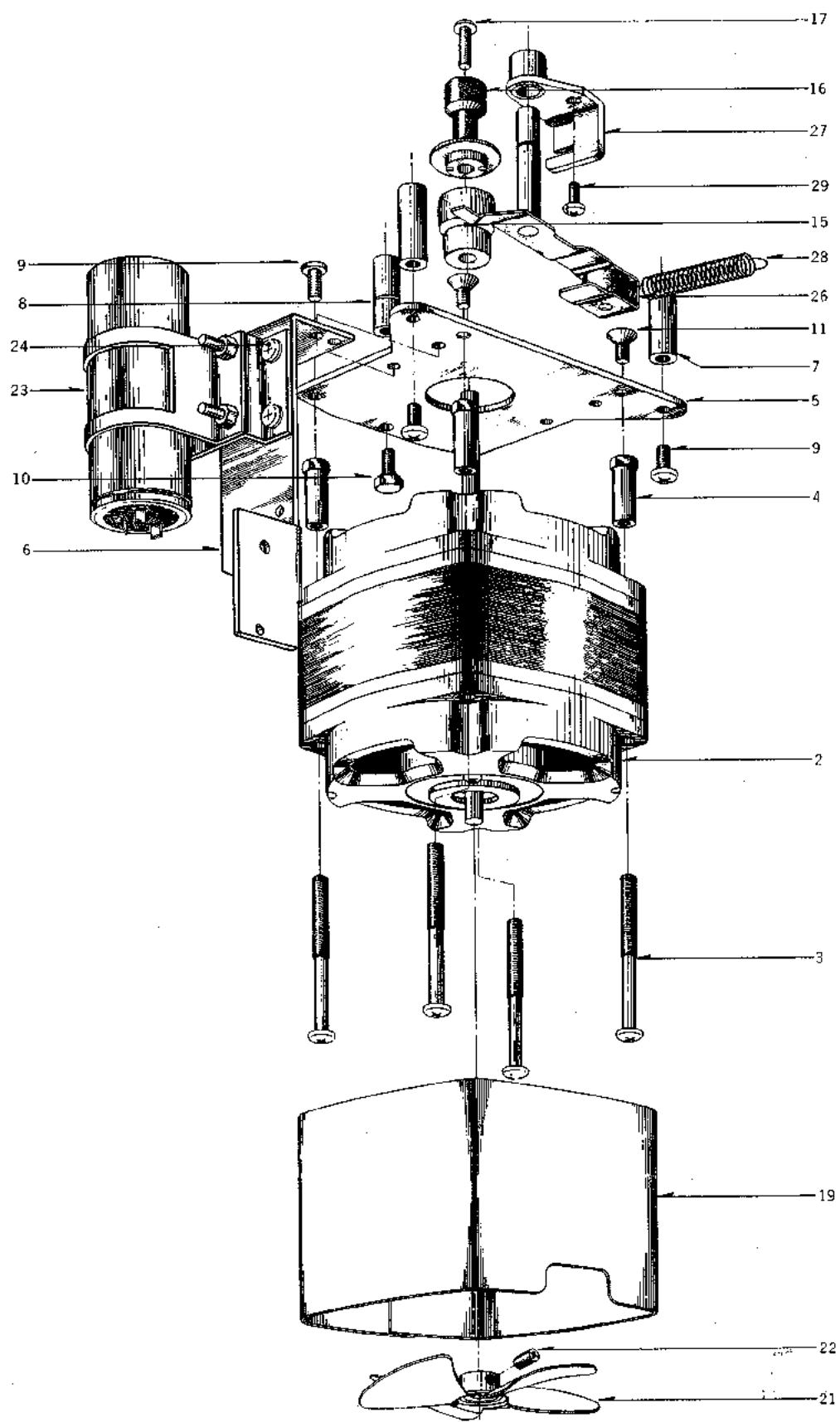
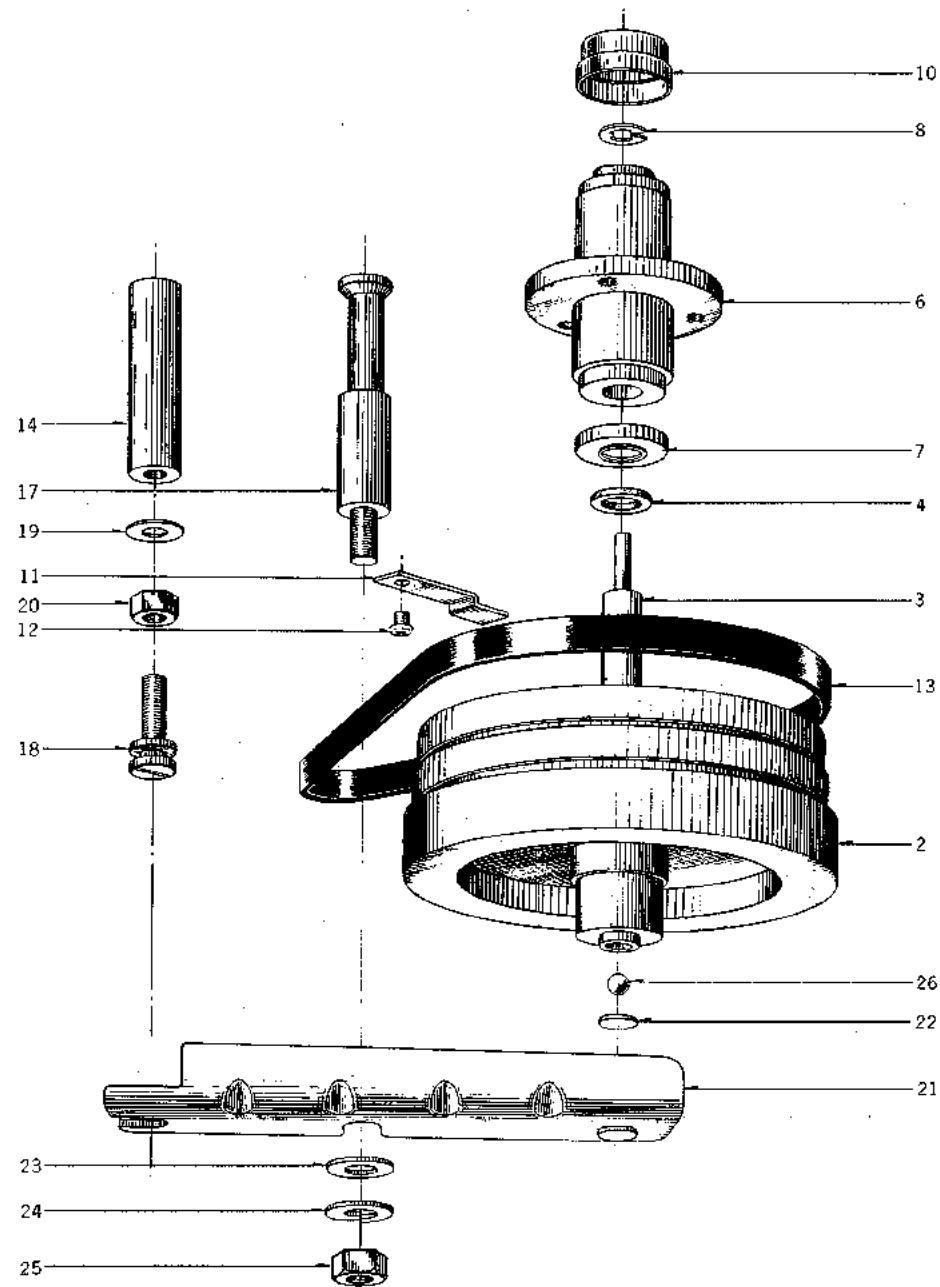


FIG. 4 ILLUSTRATION OF FLYWHEEL BLOCK

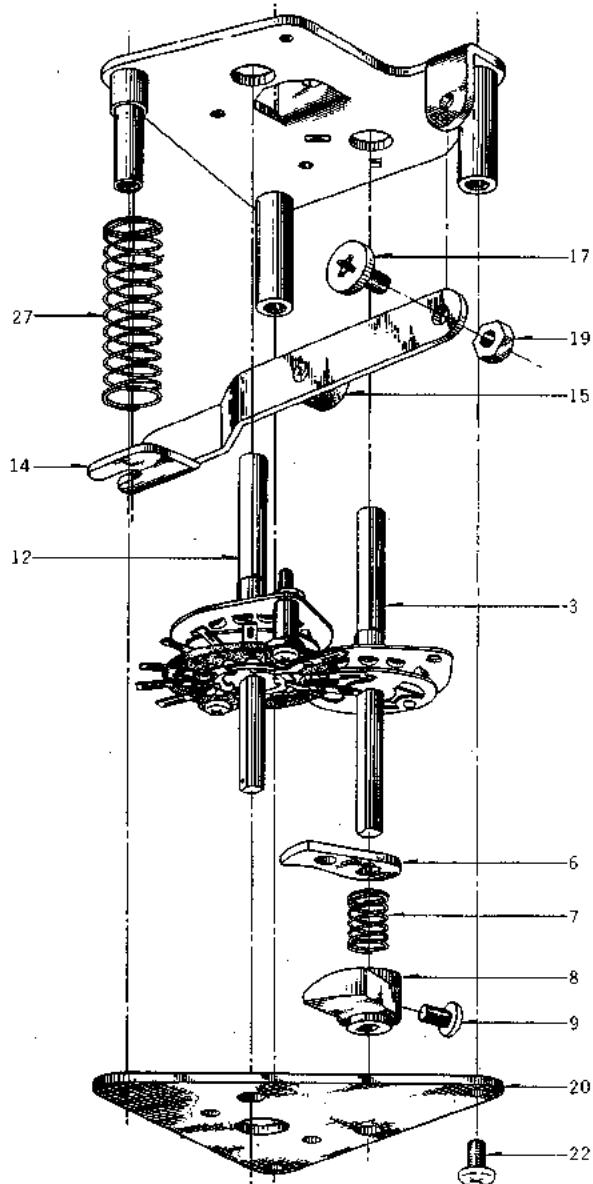


FLYWHEEL BLOCK

Ref. No.	Parts No.	Description	Schematic No.	Q'ty	Ref. No.	Parts No.	Description	Schematic No.	Q'ty
4-1x	BF412143	Flywheel Block Comp.	LF	1	4-12	ZW425981	Screw, binding head 3x3		1
4-2	MZ296245	Flywheel 24	MH-202	1	4-13	MB256590	Double Face Flat Belt D110	100912	1
4-3	MS411592	LF Main Shaft	LF-2001	1	4-14	MZ244631	Flywheel Prop B	4TR-115	1
4-4	ZW447208	Flywheel Thrust B D7.9x13x0.5t 101025		1	4-15x	MZ413201	Screw, pan head 4x8		2
4-5x	ZW373577	Set Screw, hexagon socket 5x6(flat)		2	4-16x	ZW273914	M4 Spring Washer		2
4-6	MZ296267	Main Case B-24 Comp.	1630-205	1	4-17	MZ244664	Flywheel Prop C	U-102	1
4-7	MZ446635	Thrust Cap, Main Metal B2	LF-2006	1	4-18	ZW244574	Flywheel Support Adjust Screw	4TR-114	1
4-8	ZW244710	Flywheel Fixing Pin	900-250	1	4-19	ZW393085	Washer (SUP)D5.1x10.3x0.25t		1
4-9x	MZ244113	Felt D12.5x16x2t		1	4-20	ZW413278	M5 Nut		1
4-10	MZ253113	Main Metal Cap B	MH-208	1	4-21	MZ393221	Flywheel Support Plate D	LS-1005	1
4-11	MZ436847	Flywheel Belt Holding Plate A	LF-1012	1	4-22	ZW392681	Washer, without hole D8x1t		1
					4-23	ZW413998	Washer (SPC)D6.8x12.7x1t		1
					4-24	ZW393232	1/4 Inch Spring Washer		1
					4-25	ZW413208	Inch Nut 1/4 mountain = 20		1
					4-26	MV269965	Steel Ball D4		1

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

**FIG. 5 ILLUSTRATION OF
SWITCH BLOCK (SUM)**



SWITCH BLOCK (SUM)

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
5-1x	BS412132	Switch Block (SUM) Comp.	LF	1
5-2	MZ225641	Switch Table A, w/props	900-201	1
5-3	ES256803	Rewind Shaft RS-1H, w/scratch	25-8-3	1
5-4x	ZW202083	Screw, binding head 3x5, w/washer		1
5-5x	ZW260133	Washer (Fiber)D6.1x10x1t		2
5-6	MZ217067	Cam Trap Plate	900-210	1
5-7	ZG227586	Spring K	900-214	1
5-8	MZ217304	Cam C	900-207	1
5-9	ZW201778	Screw, pan head 4x8		1
5-10x	ZW434215	Washer (Nylon)D6.1x10.3x0.3t		1
5-11x	ZW434193	Washer (Nylon)D6.1x10.3x0.5t		1
5-12	ES228330	S type Play Shaft S-133HB	25-7-3	1
5-13x	ZW273756	M3 Nut		2
5-14	ML257128	Lever I, w/shaft B	900-209	1
5-15	MZ217203	Cam Roller A	900-153	1
5-16x	ZW290283	'U' Ring 2.85M	6-1-1	1
5-17	ZW217877	Pause Lever Set Screw	900-136	1
5-18x	ZW260166	Washer (Nylon)D6.2x13x0.125t		1
5-19	ZW413188	M4 Nut		1
5-20	MZ225720	Switch Table B-2	M9-308	1
5-21x	ZW273881	M4 Earth Lug		1
5-22	ZW413201	Screw, pan head 4x8		3
5-23x	MZ217260	Cam A-2	900-206	1
5-24x	MZ217271	Cam B, without Tap	900-206	1
5-25x	ZW413201	Screw, pan head 4x8		2
5-26x	MV270066	Steel Ball D8		1
5-27	ZG227485	Spring E		1

MECHANISM ASSEMBLY BLOCK (I)

Ref. No.	part No.	Description	Schematic No.	Q'ty
TAPE GUIDE BLOCK #4				
6-1x	BZ300948	Tape Guide Block #4 Comp.	LF.LE. DF.LS	1
6-2	MZ204311	Tape Guide Prop #1700	AT-16	1
6-3	SZ465377	Tape Guide Table A	LC-618	1
6-4	ZW231805	Tape Guide Washer (large)	3A-3\$6	2
6-5	MV248117	Bearing 635AHZZ-CIE-B32		1

6-6 SZ465388 Tape Guide Table B LC-619 1

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

FIG. 6 ILLUSTRATION OF MECHANISM ASSEMBLY BLOCK (I)

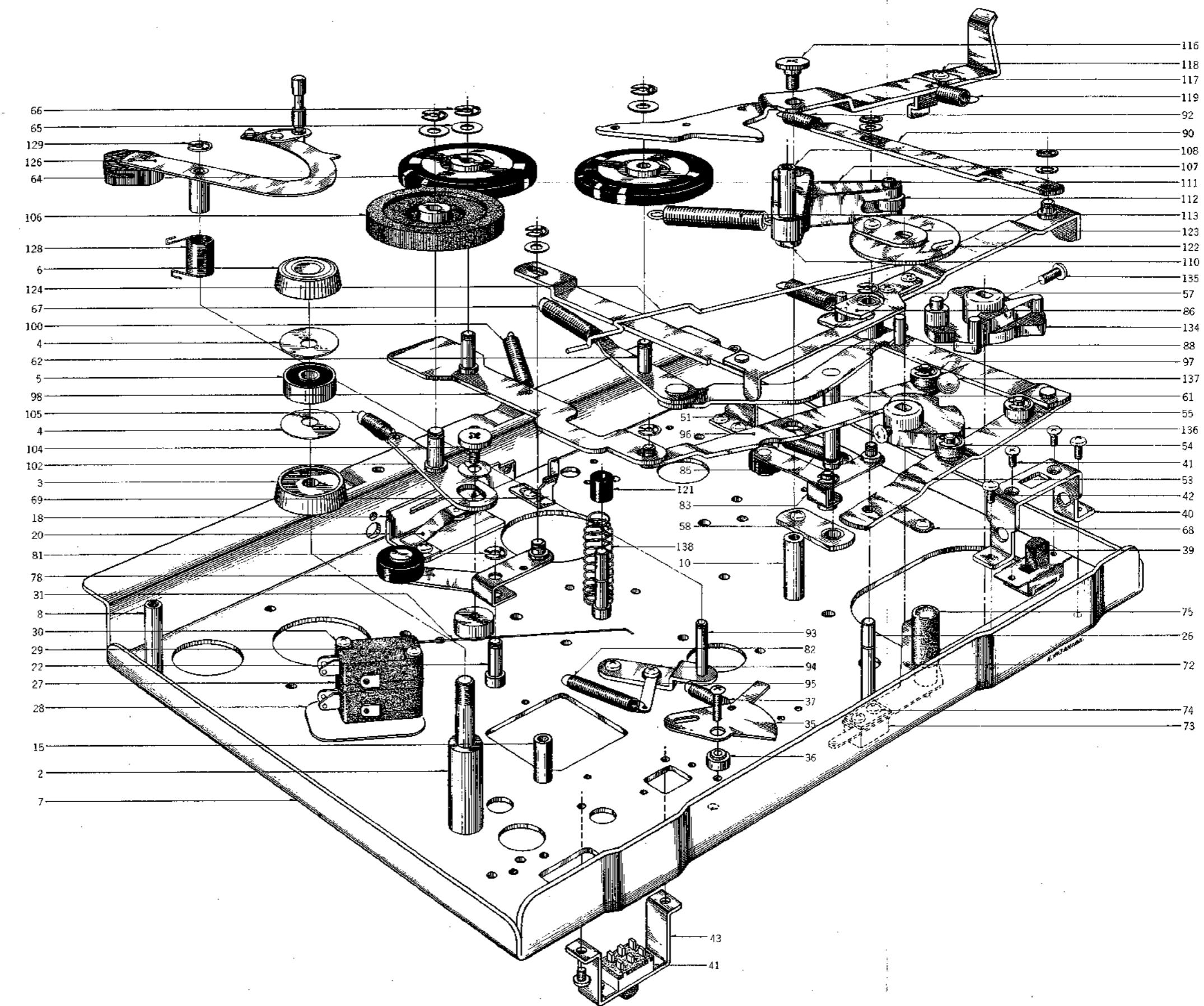
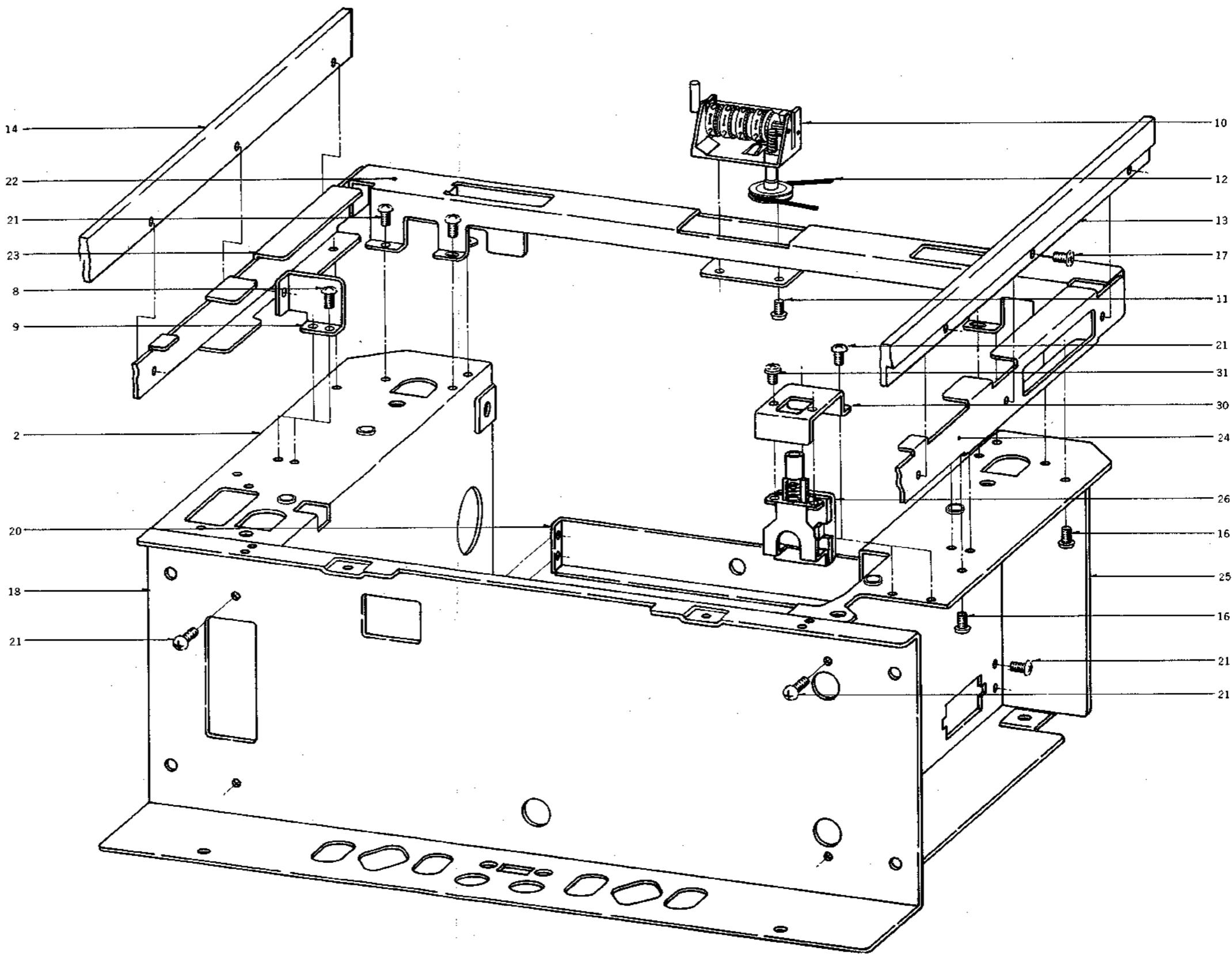


FIG. 7 ILLUSTRATION OF MECHANISM ASSEMBLY BLOCK (II)

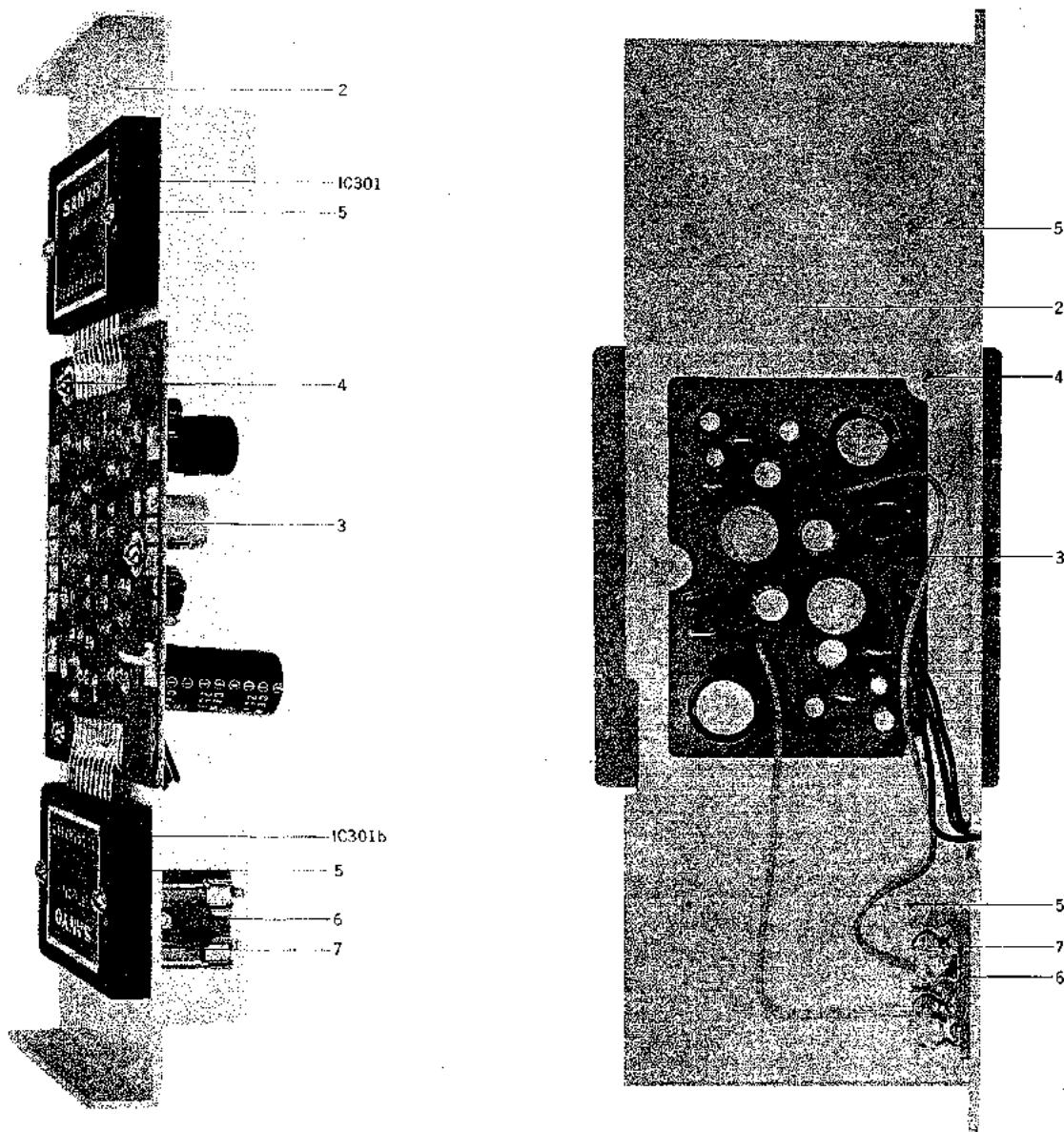


MECHANISM ASSEMBLY BLOCK (II)

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
OSC. FRAME BLOCK				
7-1x	BZ475740	OSC. Frame Block Comp.	LF-2	1
7-2	EZ411535	OSC. Frame, w/props	LF-5015	1
7-3x	MH223097	Prop 590	BT-500	2
7-4x	ZW273756	M3 Nut		2
7-5x	BA475751	OSC. P.C. Board Comp. (LF-5210)		1
7-6x	ZW413728	Screw, binding head 3x6, w/washer		2
7-7x	EZ411546	OSC. Shield Plate	LF-5016	1
7-8	ZW200687	Tapping Screw #2 3x6(round)		4
7-9	EZ411491	Sash Reinforcement Part	LF-5018	1
MECHANISM ASSEMBLY BLOCK				
7-10	MC456006	Counter MP-491-23	9-1-3	1
7-11	ZW379405	Iso Screw, binding head 3x6		2
7-12	MB410310	Counter Belt	LF-6037	1
7-13	SP406067	KD Sash (right)	KD-6006	1
7-14	SZ435014	Sash (left)	KD-6005	1
7-15x	SP436083	Sash (L)	LF-6005	2
7-16	ZW413155	Screw, binding head 3x6		10
7-17	ZW413741	Screw, binding head 3x8		6
7-18	EZ411322	Amp. Chassis, w/side	LF-5001	1
7-19x	MZ2273295	M-9 Mech. Panel Prop	M9-302	4
7-20	EZ411300	Amp. Supporting Plate	LF-5020	1
7-21	ZW447772	Tapping Screw 3x6(BR)		6
7-22	MZ411311	Counter Mt. Plate	LF-5019	1
7-23	EZ411298	Sash Retaining Plate (left)	LF-5021	1
7-24	EZ413864	Sash Retaining Plate (right)	LF-5021	1
7-25	EZ411443	Power Supply Frame	LF-5012	1
7-26	ES468426	Push Switch UEH-12BFN	25-5-58	1
7-27x	ES479395	Push Switch TV-3 JHS (CEE)	25-5-62	1
7-28x	ER376413	Spark Quencher U/L $0.033\mu+120$ 500WV	41-1-37	1
7-29x	SK371621	PTA Knob (black)	ED-615	1
7-30	EZ411467	Switch Retaining Part	LF-5013	1
7-31	ZW349288	Iso Screw, binding head 3x5, w/washer		2

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

FIG. 8 PHOTO OF MAIN AMP. P.C. BOARD (LF-5214)

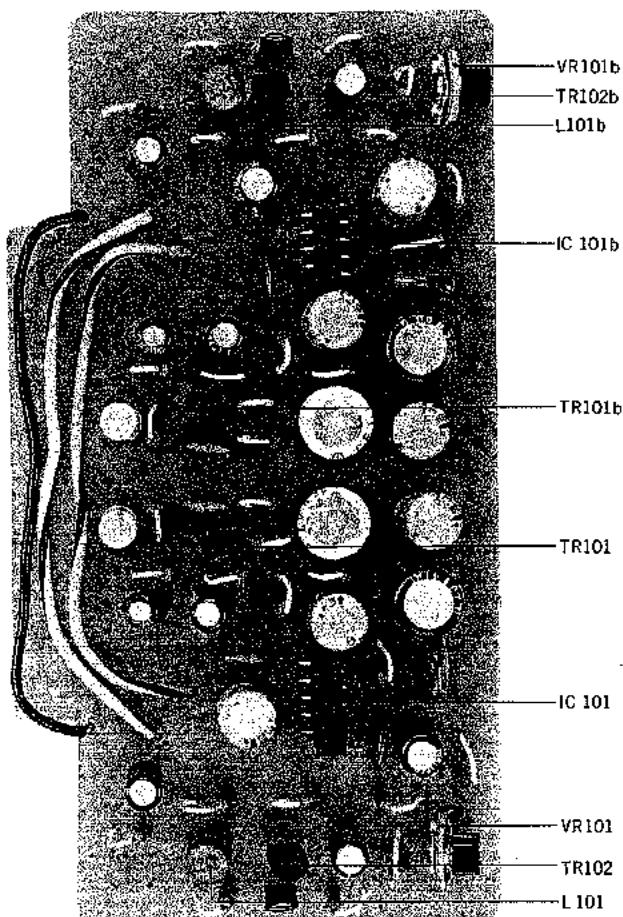


MAIN AMP./MAIN AMP. P.C. BOARD (LF-5214) BLOCK

Symbol No.	Parts No.	Description	Q'ty	Symbol No.	Parts No.	Description	Q'ty
		MAIN AMP. BLOCK				Resistor, Stopper Type	
8-1x	BA475762	Main Amp. Block Comp.	1	8-C303	EC320040	Elect. 47μF 16WV	1
8-2	EZ338040	Main Chassis (LDA)	1	8-C304	EC313121	Elect. 220μF 25WV	1
8-3	BA475773	Main Amp. P.C. Board Comp. (LF-5214)	1	8-C305	EC220678	Elect. 47μF 25WV	1
8-4	ZW447772	Tapping Screw 3x6(BR)	4	8-C307	EC450281	Elect. 0.47μF 50WV	1
8-IC301, b	EI372126	I.C. STK-011(A)	2	8-C308	EC450270	Elect. 1000μF 25WV	1
8-5	ZW447805	Tapping Screw #2 3x12(BR)	4	8-C309	EC251190	Mylar 0.056μF(K) 50WV	1
8-6	EJ338062	2P Fuse Holder B	1	8-C310	EC331705	Elect. 22μF 16WV	1
8-7	EF428815	Fuse 0.9A 0.9 (F1,2)	2	8-C312	EC220994	Elect. 10μF 25WV	1
		MAIN AMP. P.C. BOARD (LF-5214) BLOCK		8-C313	EC320040	Elect. 47μF 16WV	1
8-8x	BA475773	Main Amp. P.C. Board Comp. (LF-5214)	1	8-C314	EC313121	Elect. 220μF 25WV	1
		Capacitor, Vertical Type		8-C315	EC220678	Elect. 47μF 25WV	1
8-C301	EC331705	Elect. 22μF 16WV	1	8-C317	EC450281	Elect. 0.47μF 50WV	1
8-C302	EC220994	Elect. 10μF 25WV	1	8-C318	EC450270	Elect. 1000μF 25WV	1
				8-C319	EC251190	Mylar 0.056μF(K) 50WV	1

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

**FIG. 9 PHOTO OF
REC. AMP. P.C. BOARD (LF-5213)**

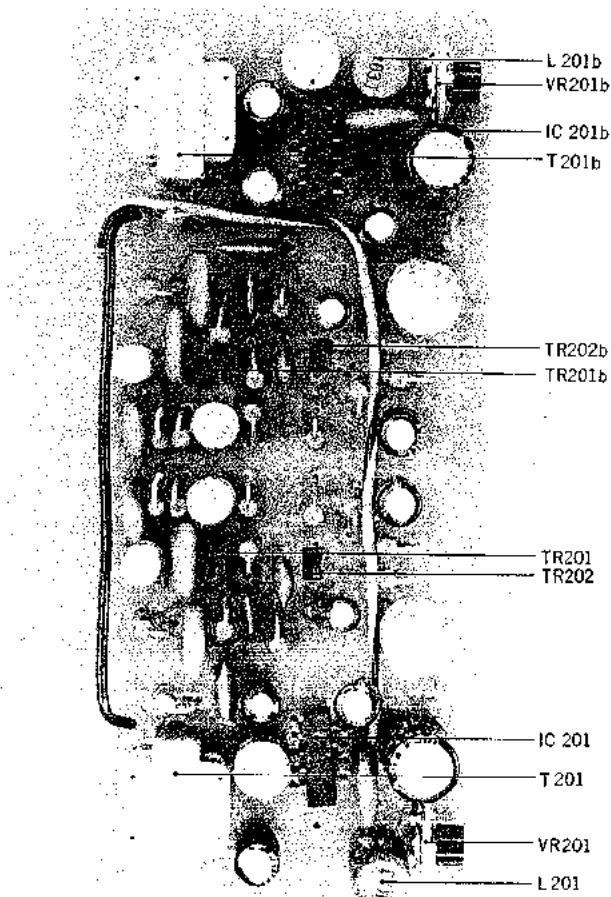


REC. AMP. P.C. BOARD (LF-5213) BLOCK

Symbol No.	Part No.	Description	Q'ty
9-1x	BA475694	Rec. Amp. P.C. Board Comp. (LF-5213)	1
9-IC101	EI412413	Line Amp. I.C. LD-3141	2
9-TR101	ET234854	Transistor 2SC458LG(C)	2
9-TR102	ET398845	Transistor 2SC871(E)(F)	2
9-VR101	EV398812	Semi-fixed Volume V10K-5 5k B	2
9-L101	EO243988	Ferrite Inductor FL7H 3.3MH(J)	2
Capacitor, Vertical Type			
9-C101	EC432810	Elect. 10μF 16WV (noiseless)	2
9-C102	EC290531	VFM 100PF(K) 50WV	2
9-C103	EC450055	Elect. 1μF 25WV	2
9-C104	EC220364	Elect. 100μF 6.3WV	2
9-C105	EC476965	Elect. 47μF 25WV (noiseless)	2
9-C106	EC220678	Elect. 47μF 25WV	2
9-C107	EC320051	Elect. 10μF 16WV	2
9-C108	EC220364	Elect. 100μF 6.3WV	2
9-C109	EC379170	Mylar 0.1μF(J) 50WV	2
9-C110	EC220364	Elect. 100μF 6.3WV	2
9-C111	EC251087	Mylar 0.022μF(K) 50WV	2
9-C112	EC220994	Elect. 10μF 25WV	2
9-C113	EC320051	Elect. 10μF 16WV	2
9-C115	EC304110	Mylar 0.0015μF(K) 50WV	2
9-C117	EC450055	Elect. 1μF 25WV	2
Resistor, Stopper Type			
9-R101	ER357570	Carbon RD1/4 150k(J)	2
9-R102	ER349907	Carbon RD1/4 33k(J)	2
9-R103	ER350100	Carbon RD1/4 68k(J)	2
9-R104	ER304402	Carbon RD1/4 470(J)	2
9-R105	ER306887	Carbon RD1/4 15k(J)	2
9-R106	ER212264	Carbon RD1/4 22k(J)	2
9-R108	ER336442	Carbon RD1/4 10k(J)	2
9-R109	ER350100	Carbon RD1/4 68k(J)	2
9-R110	ER212264	Carbon RD1/4 22k(J)	2
9-R111,2	ER212883	Carbon RD1/4 4.7k(J)	4
9-R113	ER346601	Carbon RD1/4 47k(J)	2
9-R114	ER336442	Carbon RD1/4 10k(J)	2
9-R115	ER212883	Carbon RD1/4 4.7k(J)	2
9-R116	ER211465	Carbon RD1/4 1k(J)	2
9-R117	ER213120	Carbon RD1/4 56(J)	2

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

**FIG. 10 PHOTO OF
P.B. AMP. P.C. BOARD (LF-5022)**

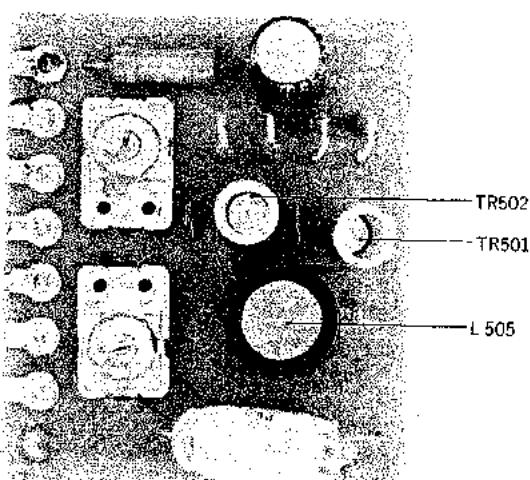


P.B. AMP. P.C. BOARD (LF-5022) BLOCK

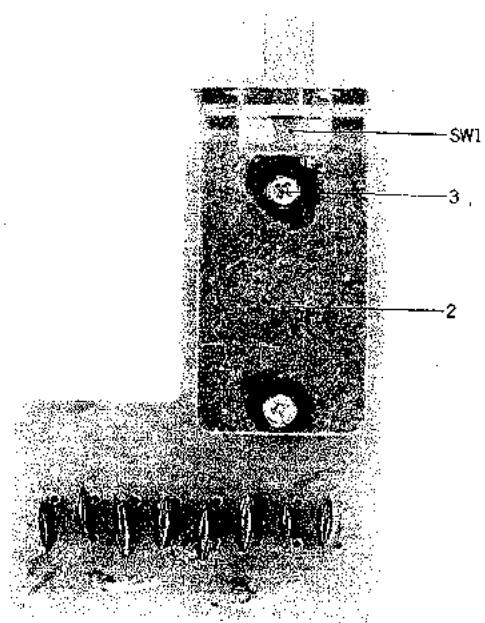
Symbol No.	Part No.	Description	Q'ty
10-1x	BA475705	P.B. AMP. P.C. Board Comp. (LF-5022)	1
10-IC201	EL412413	Line Amp. I.C. LD-3141	2
10-TR201,2	ET234854	Transistor 2SC458LG(C)	4
10-T201	BT247746	Head Phone Trans. N19-228S	2
10-VR201	EV221826	Semi-fixed Volume V10K-5 10k B	2
10-L201	EO244001	Ferri Inductor FL9H 10MH(J)	2
Capacitor, Vertical Type			
10-C201	EC290531	VFM 100PF(K) 50WV	2
10-C202	EC432810	Elect. 10μF 16WV(noiseless)	2
10-C203	EC476965	Elect. 47μF 25WV(noiseless)	2
10-C204	EC404908	Hi-Q 470PF(K) 50WV	2
10-C205	EC477898	Elect. 47μF 6.3WV (noiseless)	2
10-C206	EC290520	VFM 100PF(J) 50WV	2
10-C207	EC329771	Elect. 47μF 6.3WV	2
10-C208	EC320051	Elect. 10μF 16WV	2
10-C209	EC337487	Hi-Q 470PF(J) 50WV	2
10-C210	EC250841	Mylar 0.01μF(J) 50WV	2
10-C211	EC290564	VFM 220PF(K) 50WV	2
10-C212	EC220678	Elect. 47μF 25WV	2
10-C213	EC320051	Elect. 10μF 16WV	2
10-C214	EC329771	Elect. 47μF 6.3WV	2
10-C215	EC329850	VFM 220PF(J) 50WV	2
10-C216	EC220364	Elect. 100μF 6.3WV	2
10-C217	EC220994	Elect. 10μF 25WV	2
Resistor, Stopper Type			
10-R201	ER362485	Carbon RD1/4 330k(J)	2
10-R202	ER336442	Carbon RD1/4 10k(J)	2
10-R203	ER212681	Carbon RD1/4 330(J)	2
10-R204	ER362485	Carbon RD1/4 330k(J)	2
10-R205	ER357570	Carbon RD1/4 150k(J)	2
10-R206	ER212883	Carbon RD1/4 4.7k(J)	2
10-R207	ER212477	Carbon RD1/4 3.3k(J)	2
10-R208, 9	ER212264	Carbon RD1/4 22k(J)	4
10-R210	ER211858	Carbon RD1/4 12k(J)	2
10-R211	ER380711	Carbon RD1/4 220k(J)	2
10-R212	ER212883	Carbon RD1/4 4.7k(J)	2
10-R213	ER211858	Carbon RD1/4 12k(J)	2

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

**FIG. 11 PHOTO OF
OSC. P.C. BOARD (LF-5210)**



**FIG. 12 PHOTO OF
SRT SWITCH P.C. BOARD (LF-5206)**



OSC. P.C. BOARD (LF-5210) BLOCK

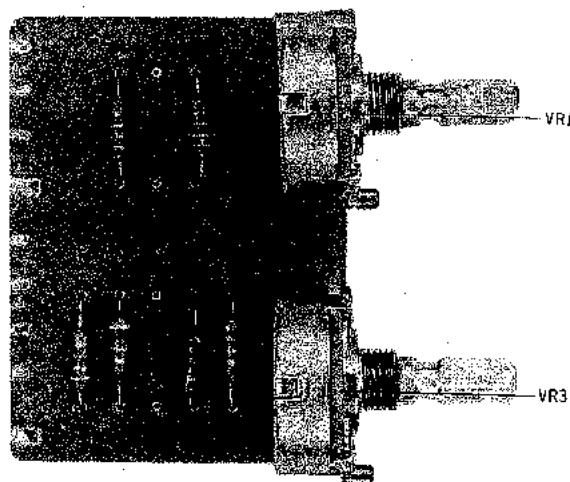
Symbol No.	Parts No.	Description	Q'ty
11-1x	BA475751	OSC. P.C. Board Comp. (LF-5210)	1
11-TR501, 2	ET399824	Transistor 2SC971(2)(red)	2
11-L505	EO383365	OSC. Coil OT-204	1
11-C505, 6	EC398878	Capacitor, Vertical Type Trimmer C-1P-2 50...70PF	2
11-C509	EC383400	Plastic Film 5600PF(J) 500WV	1
11-C510	EC220678	Elect. 47μF 25WV	1
11-C511, 2	EC250841	Mylar 0.01μF(J) 50WV	2
11-R501	ER398856	Resistor, Stopper Type Metal Oxide Film 1W 100(K)	1
11-R502	ER212883	Carbon RD1/4 4.7k(J)	1
11-R503	ER304402	Carbon RD1/4 470(J)	1
11-R504, 5	ER315944	Carbon RD1/4 3.3(J)	2

SRT SWITCH P.C. BOARD (LF-5206) BLOCK

Symbol No.	Parts No.	Description	Q'ty
12-1x	BA475661	SRT Switch P.C. Board Comp. (LF-5206)	1
12-SW1	ES475288	Push Switch UEG-42	1
12-2	EZ475975	SRT Switch Retaining Metal	1
12-3	ZW461935	Screw, round head 2.6x4	2
12-C1	EC250841	Capacitor, Vertical Type Mylar 0.01μF(J) 50WV	1
12-C2	EC250975	Mylar 0.015μF(J) 50WV	1
12-C3	EC368335	Mylar 0.022μF(J) 50WV	1
12-C4	EC379157	Mylar 0.033μF(J) 50WV	1
12-C5	EC250841	Mylar 0.01μF(J) 50WV	1
12-C6	EC250975	Mylar 0.015μF(J) 50WV	1
12-C7	EC368335	Mylar 0.022μF(J) 50WV	1
12-C8	EC379157	Mylar 0.033μF(J) 50WV	1
12-R1, 2	ER212681	Carbon Resistor RD1/4 330(J)	2

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

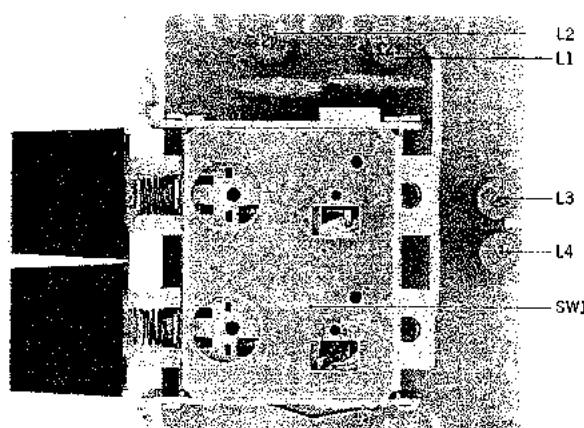
**FIG. 13 PHOTO OF
VOLUME P.C. BOARD (LF-5225)**



VOLUME P.C. BOARD (LF-5225) BLOCK

Symbol No.	Parts No.	Description	Q'ty
13-Jx	BA488542	Volume P.C. Board Comp.	(LF-5225)
13-VR1, 3	EV488520	Volume V24R 10k A	2
13-R1	ER346601	Resistor, Stopper Type Carbon RD1/4 47k(J)	1
13-R2	ER306360	Carbon RD1/4 6.8k(J)	1
13-R21, 22	ER349907	Carbon RD1/4 33k(J)	2
13-R25, 26	ER349907	Carbon RD1/4 33k(J)	2

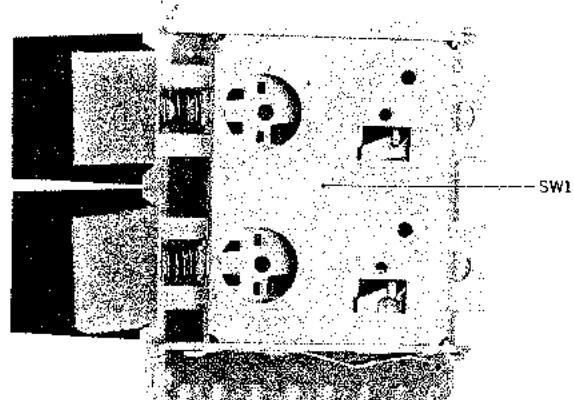
**FIG. 14 PHOTO OF TRACK SELECTOR
P.C. BOARD (LF-5211)**



**TRACK SELECTOR
P.C. BOARD (LF-5211) BLOCK**

Symbol No.	Parts No.	Description	Q'ty
14-Jx	BA475683	Track Selector P.C. Board Comp.	(LF-5211)
14-SW1	ES411805	Push Switch UM21620C	1
14-L1, 2	EO321254	Ferri Inductor FL7H 5.6MH(J)	2
14-L3, 4	EO346500	Ferri Inductor FL7H 220μH(J)	2
14-C1, 2	EC417464	VFM Capacitor 450PF(J) 50WV	2

**FIG. 15 PHOTO OF MONITOR SWITCH
P.C. BOARD (LF-5226)**

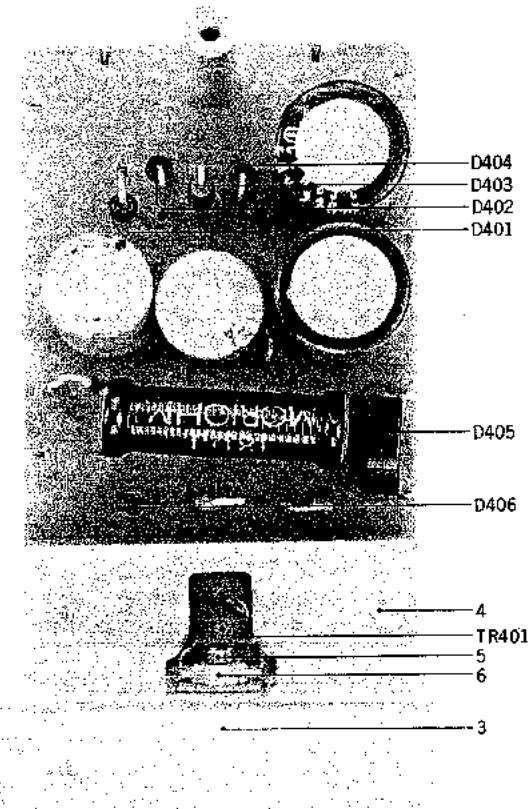


**MONITOR SWITCH
P.C. BOARD (LF-5226) BLOCK**

Symbol No.	Parts No.	Description	Q'ty
15-Jx	BA475672	Monitor Switch P.C. Board Comp.	(LF-5226)
15-SW1	ES245103	Push Switch UM21220J	1

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

**FIG. 16 PHOTO OF POWER SUPPLY
P.C. BOARD (LF-5208)**



**POWER SUPPLY P.C. BOARD
(LF-5208) BLOCK**

Symbol No.	Parts No.	Description	Q'ty
16-1x	BA475738	Power Supply P.C. Board Comp. (LF-5208)	1
16-2x	BA476065	Power Supply P.C. Board Comp. (LF-5208) (Deck)	1
16-3	EZ475334	Heat-sink Plate 1731	1
16-4	ZW447840	Tapping Screw #2 3x8(BR)	2
16-TR401	ET476886	Transistor 2SC1098(L)(M)	1
16-5	ZW413741	Screw, binding head 3x8	1
16-6	ZW273756	M3 Nut	1
16-D401, 2	ED375592	Silicon Diode VO6B	2
16-D403, 4	ED375592	Silicon Diode VO6B	2
16-D405	ED329130	Silicon Diode 10DC-1 (black)	1
16-D406	ED315415	Zener Diode RD-24A (MN)	1
16-7x	EZ411524	P.C. Board Prop	1
16-8x	ZW413223	Screw, binding head 3x5, w/washer	1

Capacitor, Vertical Type

16-C401, 2	EC337533	Elect. 220 μ F 50WV	2
16-C403, 4	EC313121	Elect. 220 μ F 25WV	2
16-C405	EC250604	Mylar 0.001 μ F(K) 50WV	1

Resistor, Stopper Type

16-R401	ER211667	Carbon RD1/4 100(J)	1
16-R402	ER413717	Wire-wound 3WL 18(J) (L type)	1
16-R403	ER212883	Carbon RD1/4 4.7k(J)	1
16-R404	ER361642	Carbon RD1/4 47(J)	1

AMP. ASSEMBLY BLOCK

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
CONTROL PANEL BLOCK				
17-1x	BZ475648	Control Panel Block Comp.	LF	1
17-2x	BZ475640	Control Panel Block Comp. (Deck)	LF	1
17-3	SP411401	Control Panel	LF-5005	1
17-4	EJ433844	Mic. Jack 2PMJ4	31-2-35	2
17-5x	ER364948	Carbon/R. RD1/4 3.3k(J) (Insu. type)	35-9-5	2
17-6	EJ442078	Mic. Jack 3PMJ4	31-2-36	1
17-7x	ZW272722	M9 Toothed Lock Washer D9.3x13x0.5t		1

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

FIG. 17 PHOTO OF AMP. ASSEMBLY BLOCK

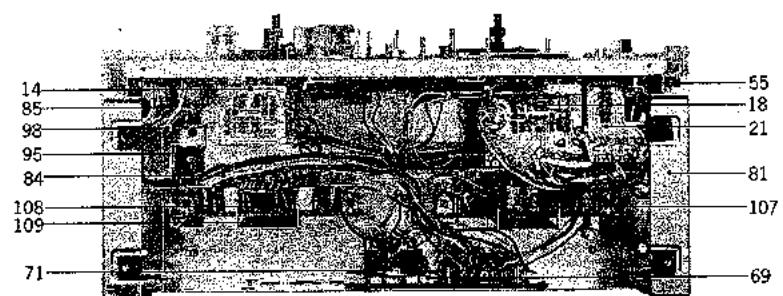
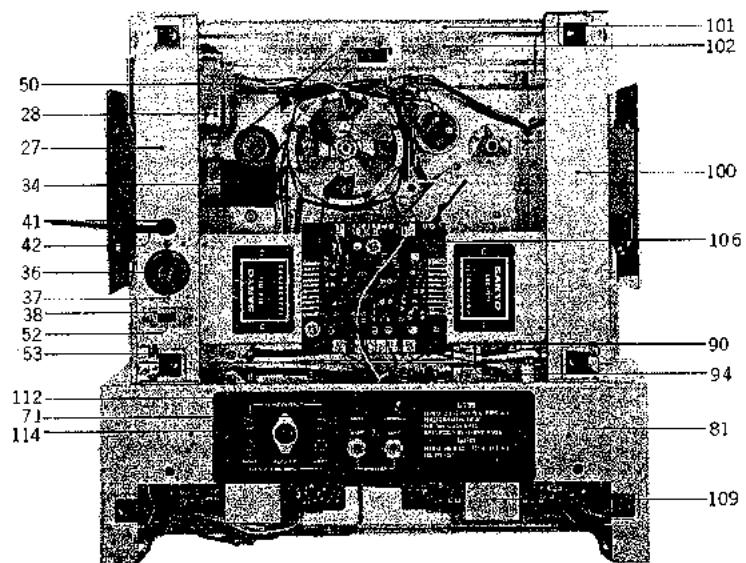
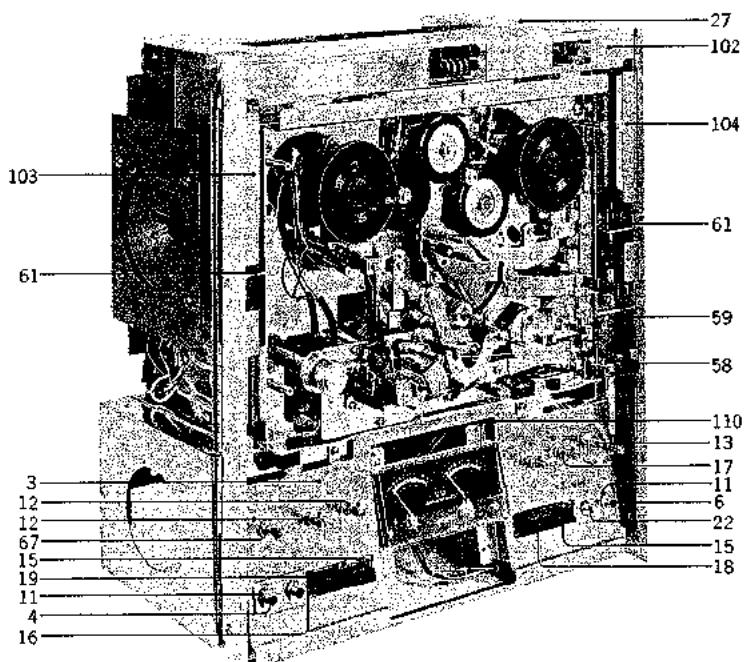
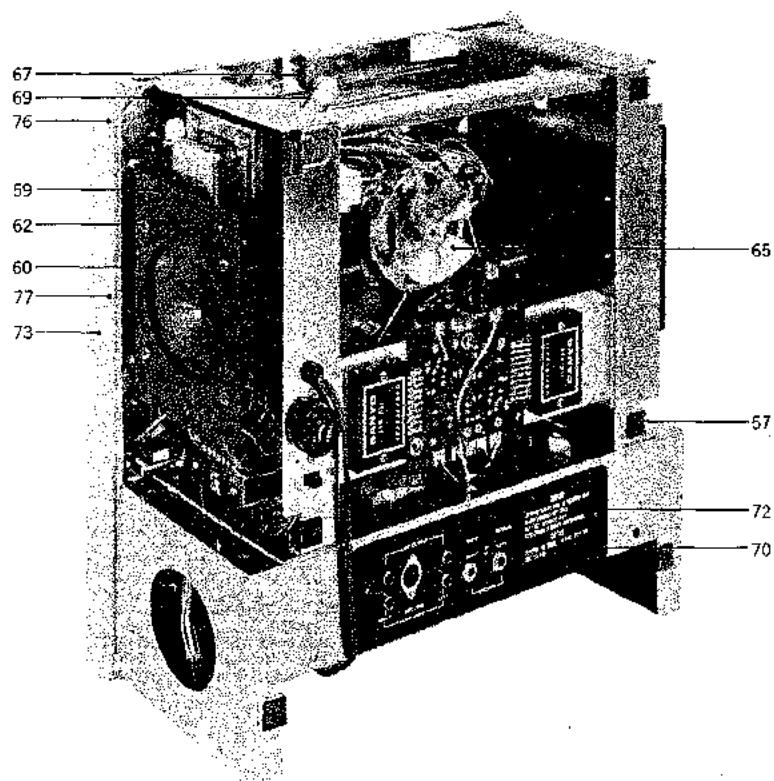


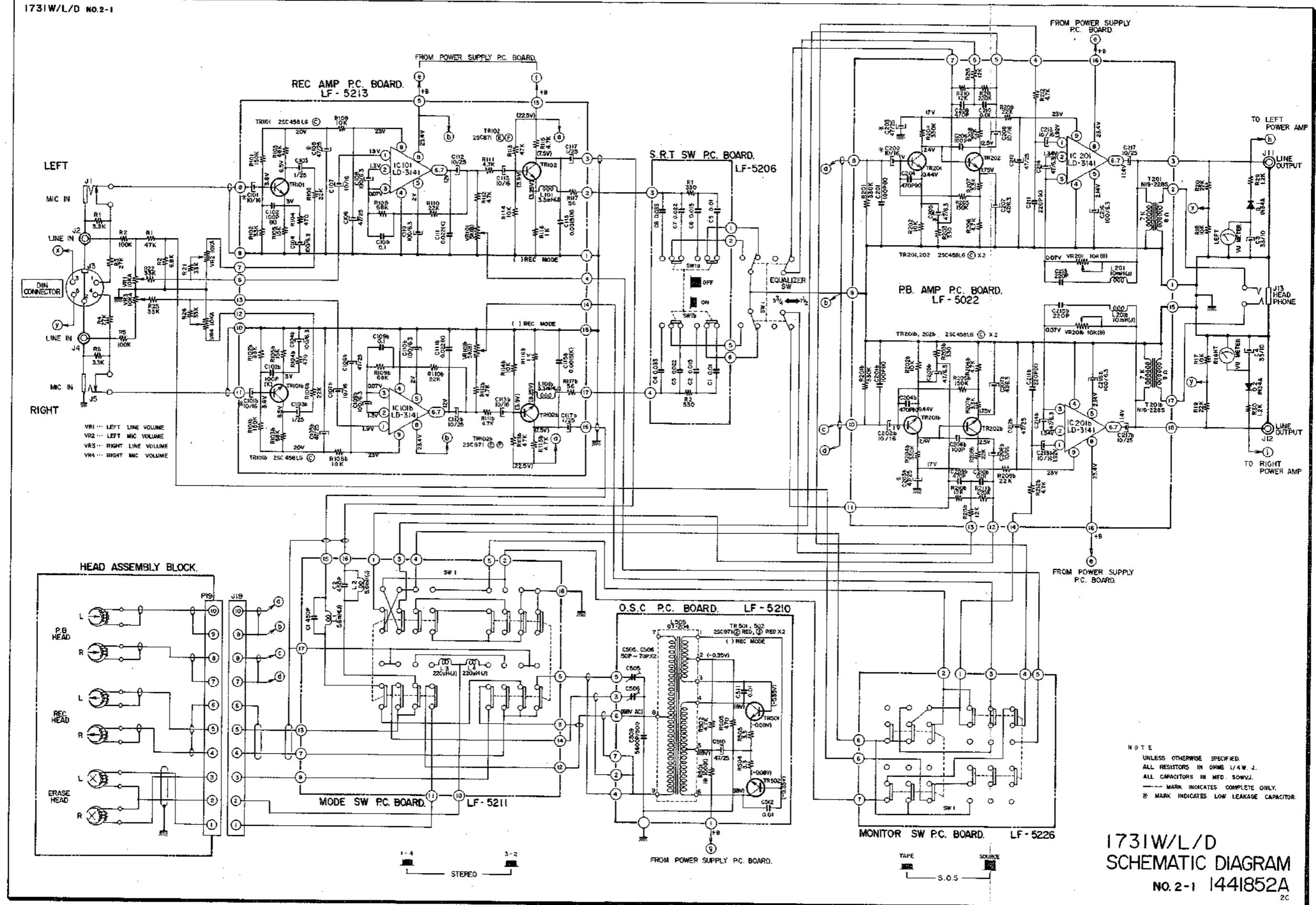
FIG. 18 PHOTO OF FINAL ASSEMBLY BLOCK

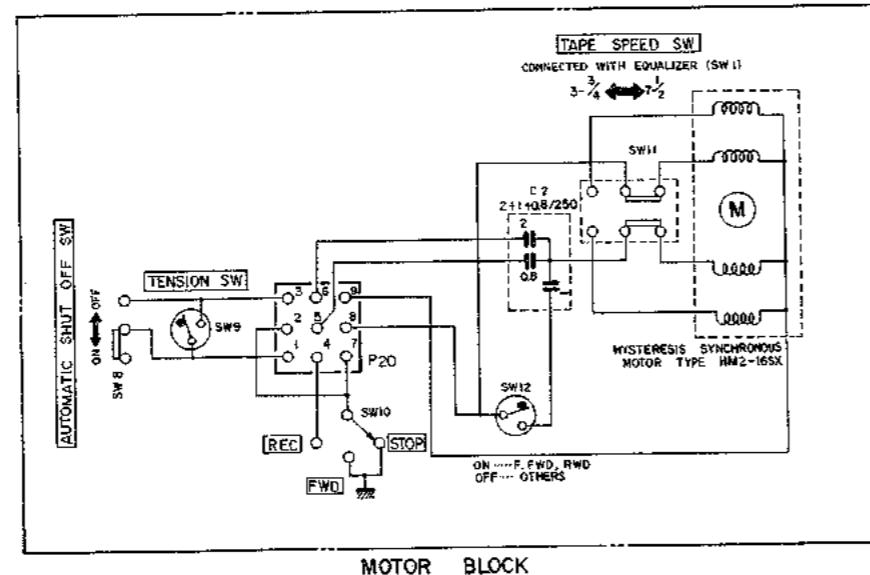
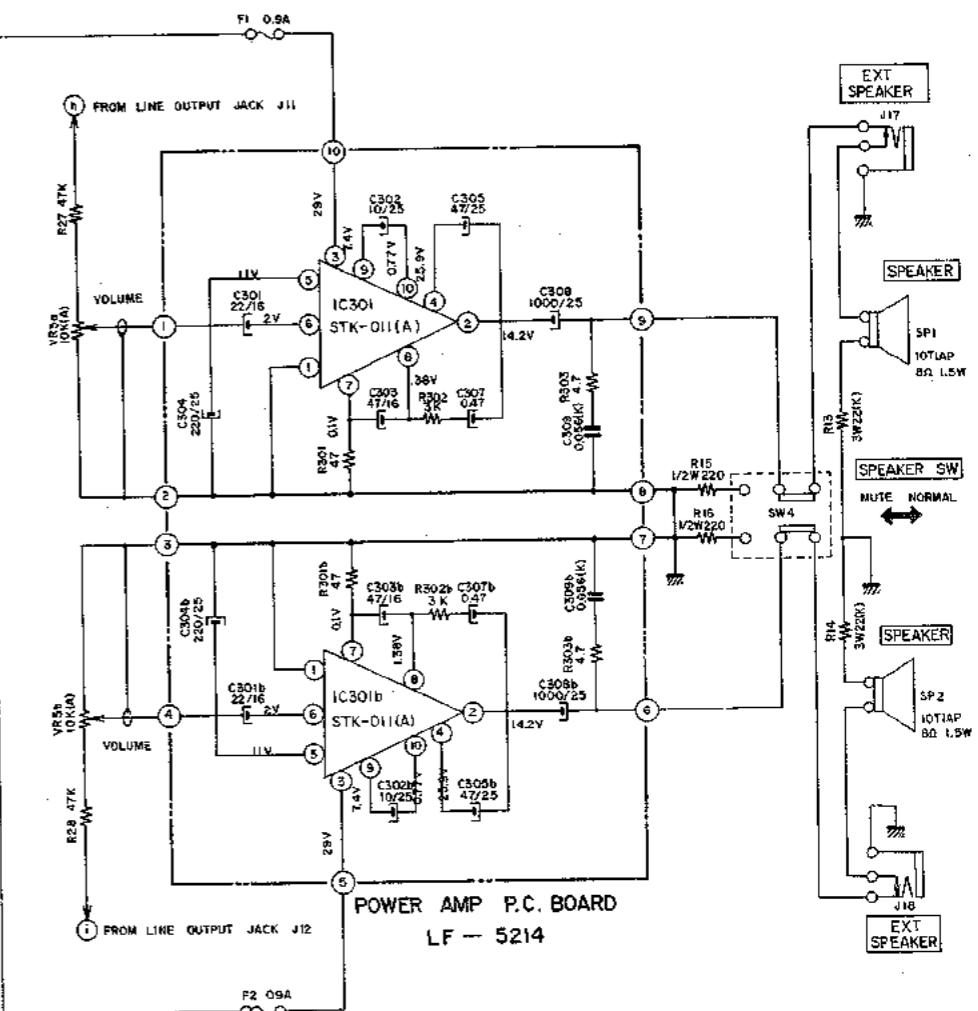
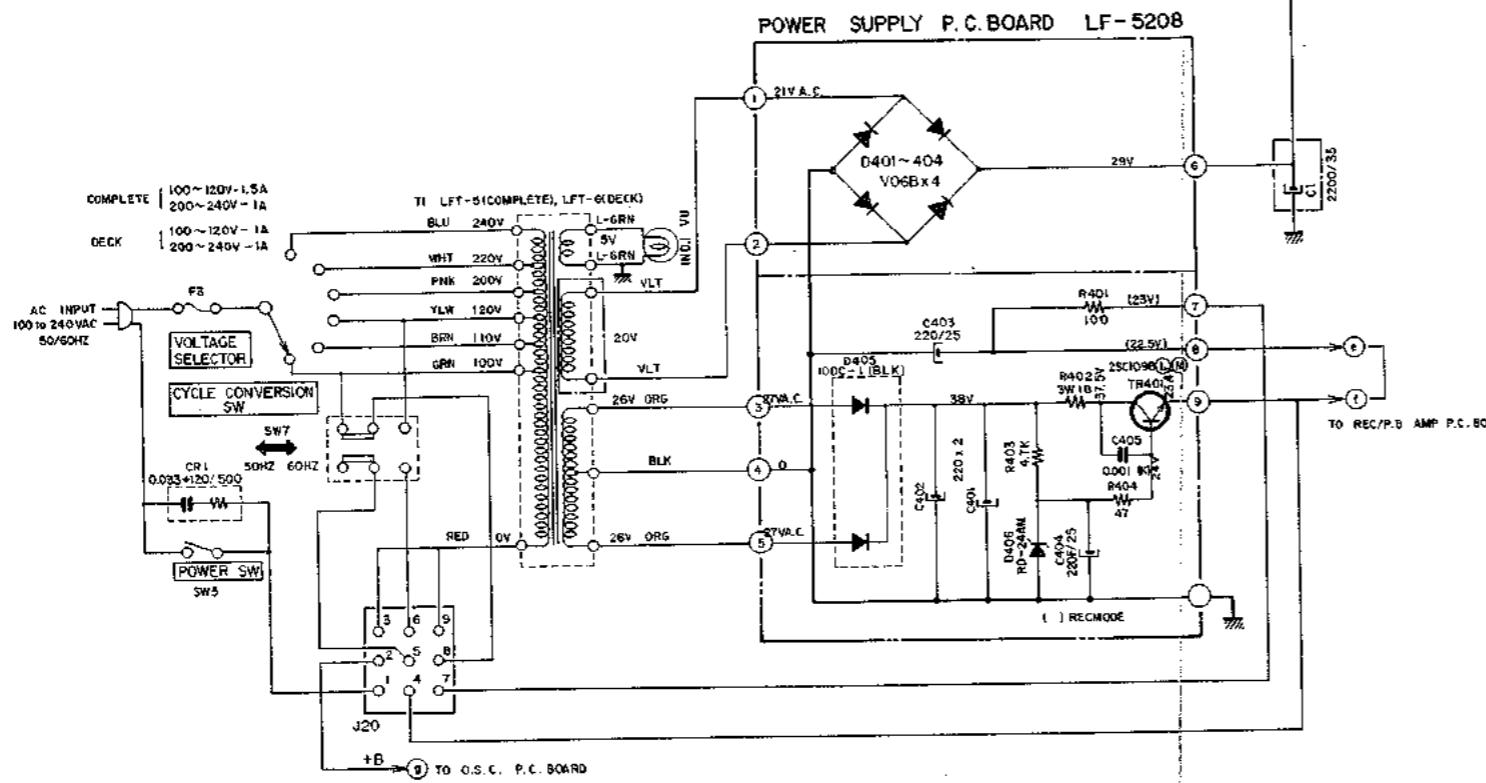


SECTION 3

SCHEMATIC DIAGRAM

1731 W/L/D SCHEMATIC DIAGRAM



**NOTE**

UNLESS OTHERWISE SPECIFIED
ALL RESISTORS IN OHMS 1/4W.J
ALL CAPACITORS IN MFD SONY J
— MARK INDICATES COMPLETE ONLY
X MARK INDICATES LOW LEAKAGE CAPACITOR
POWER TRANSFORMER AND MOTOR BLOCK
THIS IS DIFFERENT ACCORDING TO AREA