

# SERVICE MANUAL

# PARTS LIST

AKAI SURROUND STEREO TAPE DECK

MODEL **2020-SS**



## SURROUND STEREO TAPE DECK

### MODEL 202D-SS

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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 4-channel stereo system<br>4-track 2-channel stereo system   |
| TAPE SPEED               | 7-1/2 ips (19 cm/sec.) $\pm 0.8\%$<br>3-3/4 ips (9.5 cm/sec.) $\pm 1\%$  |
| WOW AND FLUTTER          | Less than 0.08%(*0.12%) RMS at 7-1/2 ips<br>Less than 0.12%(*0.25%) RMS at 3-3/4 ips   |
| TOTAL WOW AND FLUTTER    | Less than 0.18% RMS at 7-1/2 ips<br>(SCOTCH #175 TAPE, 3,000 Hz recording and playback)  |
| FREQUENCY RESPONSE       | S.R.T. TAPE<br>40 to 25,000 Hz $\pm 3$ dB at 7-1/2 ips<br>40 to 15,000 Hz $\pm 3$ dB at 3-3/4 ips<br>REGULAR TAPE<br>40 to 22,000 Hz $\pm 3$ dB at 7-1/2 ips<br>40 to 13,000 Hz $\pm 3$ dB at 3-3/4 ips  |
| TOTAL DISTORTION FACTOR  | Less than 1.5%<br>*Less than 3% at 1,000 Hz O VU recording   |
| OUTPUTS                  | LINE OUTPUT<br>1.228V(4 $\pm$ 1 dB) at FWD mode, 4 $\pm$ 1.5 dB at REV mode, using a 250 Hz O VU pre-recorded tape/7-1/2 ips<br>DIN OUTPUT<br>610 mV(-2 dB), using a 250 Hz pre-recorded tape  |
| INPUTS                   | MIC INPUT<br>More than 0.5 mV(*0.6 mV)<br>LINE INPUT<br>More than 100 mV<br>DIN INPUT<br>More than 5 mV(low)<br>More than 100 mV(high)   |
| RECORDING PLAYBACK LEVEL | 1.228V(4 $\pm$ 2 dB) at 7-1/2 ips, 1,000 Hz O VU recording   |
| S/N RATIO                | Better than 50 dB<br>*Better than 47 dB at 7-1/2 ips<br>*Better than 46 dB at 3-3/4 ips  |
| TOTAL S/N RATIO          | Better than 45 dB at 7-1/2 ips   |
| CROSS TALK               | Better than 43 dB(*40 dB) at 1,000 Hz 3 VU recording   |
| ERASE RATIO              | Better than 70 dB  |
| RECORDING BIAS FREQUENCY | 82 $\pm$ 5 kHz   |
| BIAS LEAK                | Less than -30 VU (4 channel)<br>Less than -20 VU (2 channel)   |
| REVERSING TIME           | 2 to 3 seconds   |
| RECORDING CAPACITY       | 45 min. 4 channel stereo recording, using a 1,800 ft. tape at 7-1/2 ips  |
| F. FWD AND RWD TIME      | 110/90 sec., using a 1,800 ft. tape at 50/60 Hz  |
| MOTORS                   | CAPSTAN MOTOR<br>2 speed Hysteresis Synchronous Motor<br>Type: HM2-16MC (winterized) 4-8 pole<br>Revolutions: 1,500/1,800 r.p.m. at 50/60 Hz<br>750/900 r.p.m. at 50/60 Hz<br>REEL MOTORS<br>Two 6-pole eddy current outer rotor motors<br>Type: 24XO-MR<br>Revolutions: 930/1,120 r.p.m. at 50/60 Hz  |
| HEADS                    | FULL TRACK ERASE HEAD<br>Type: EF-210<br>Gap: 0.2 mm W Gap<br>Impedance: 360 $\Omega$ $\pm$ 10% at 100 kHz<br>D.C. Resistance: 2.8 $\Omega$<br>4 TRACK ERASE HEAD<br>Type: E4-260<br>Gap: 0.2 mm W Gap<br>Impedance: 195 $\Omega$ $\pm$ 10% at 100 kHz<br>D.C. Resistance: 1.6 $\Omega$<br>4 TRACK RECORDING/PLAYBACK HEAD<br>Type: P4-50<br>Gap: 2 microns<br>Impedance: 1,200 $\Omega$ $\pm$ 15% at 1 kHz<br>D.C. Resistance: 160 $\Omega$ |
| TRANSISTORS              | 2SC711(E)(F) ... 19      2SC1098(L) ... 1      2SC1312(G)(H) ... 16  |
| DIODES                   | 1N34A ... 5      1S2473VE ... 10      10D05 ... 4<br>10D2 ... 1      10D4 ... 1      WZ713 ... 1   |
| ZENER DIODES             | WZ240 ... 1      YZ088A ... 4  |
| POWER SUPPLY             | 100 to 240V A.C. 50/60 Hz  |
| POWER CONSUMPTION        | 100W   |
| DIMENSIONS               | 391(W) x 442 (H) x 231 (D) mm (15.4" x 17.4" x 9.1")   |
| WEIGHT                   | 18 kg (39.6 lbs.)  |

NOTE: Specifications subject to change without notice.

## II. MEASURING METHOD

### 1. TAPE SPEED DEVIATION

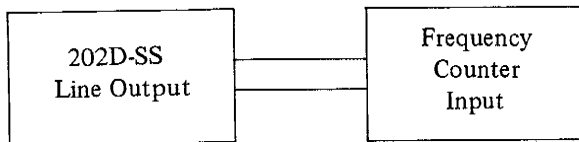


Fig. 1

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

### 2. WOW AND FLUTTER

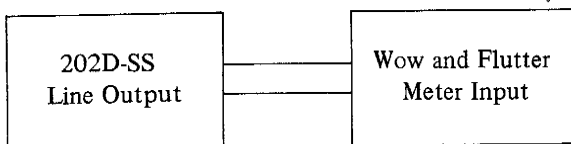


Fig. 2

#### Method A

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

#### Method B

Supply a 3,000 Hz sine wave signal from an Audio Frequency Oscillator and make a recording on a blank tape at the beginning, middle, and end of tape winding. Rewind and playback the resultant signals. 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

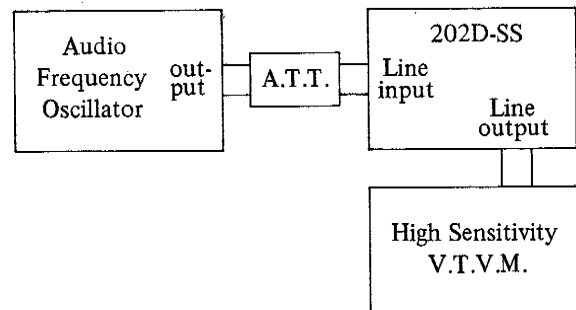


Fig. 3

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

- 1) Supply a 2,000 Hz sine wave signal to the Line input from an Audio Frequency Oscillator through an Attenuator.
- 2) Set tape deck to recording mode and turn recording level control volume to maximum. Adjust attenuator to obtain a +4 dB V.T.V.M. reading.
- 3) Under conditions described in 2) above, re-adjust attenuator so that the Line output is -16 dB, and record 30 to 23,000 Hz at 7-1/2 ips spot frequencies.
- 4) Rewind the 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

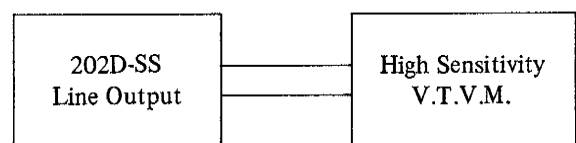


Fig. 4

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

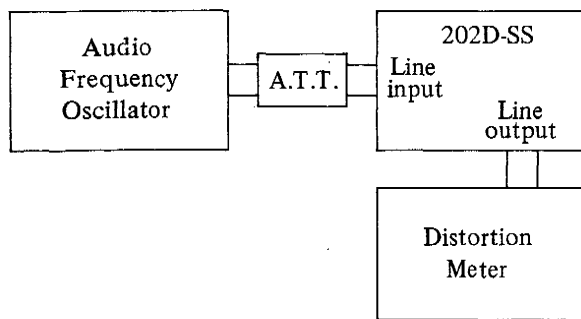


Fig. 5

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 channels)

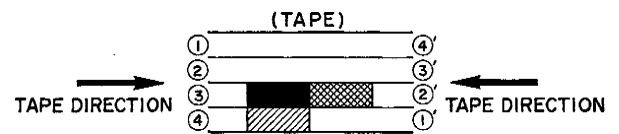


Fig. 6

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 (reversed condition of tape) 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. 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 VU, 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:

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

where,  $E_r$  = Desired erase ratio (dB)

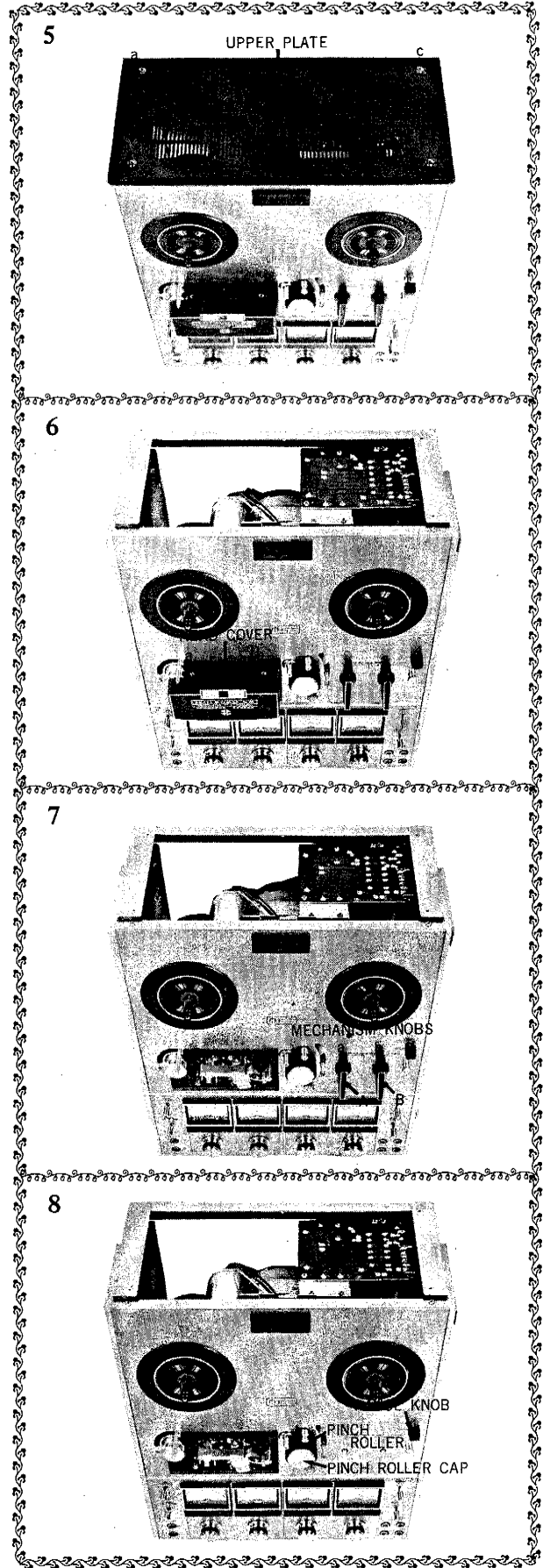
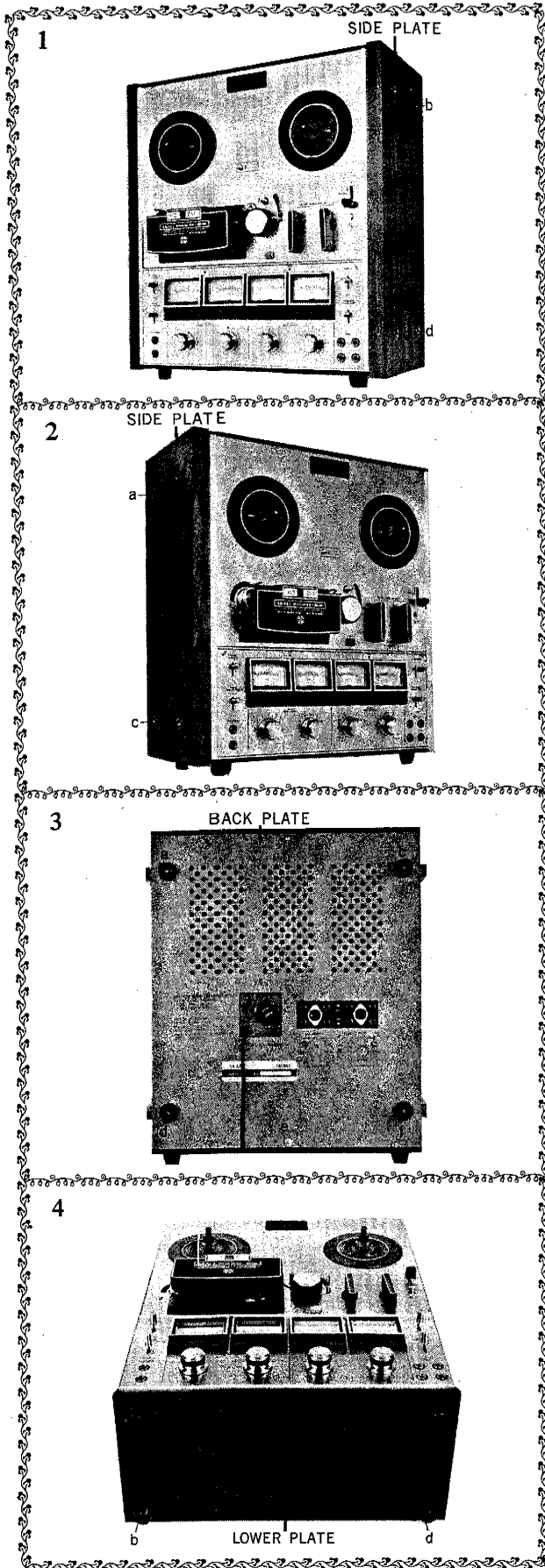
$E_0$  = 1,000 Hz signal output level

$E_2$  = Non-input signal recorded level

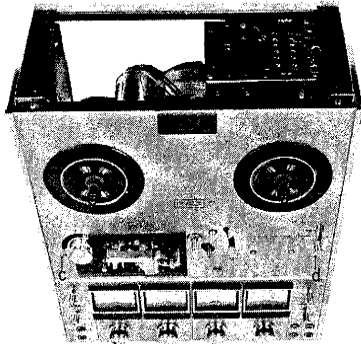
$E_1$  = Virgin tape noise output level

### III. DISMANTLING OF UNIT

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



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SCREWS

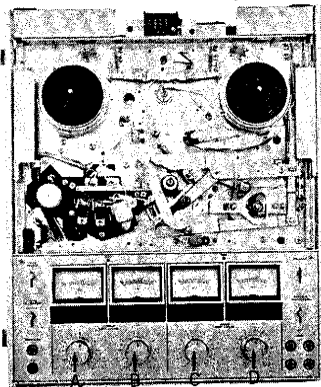
10

MECH. PANEL



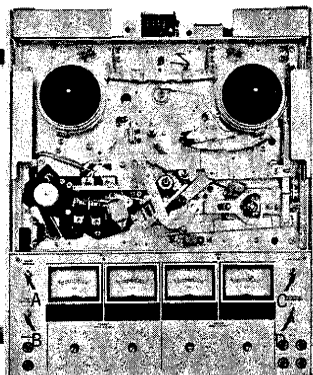
SHIELD PLATE

11



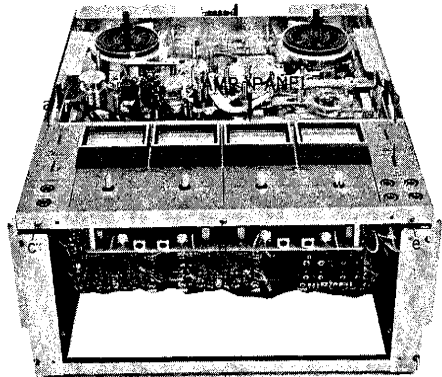
CONTROL KNOBS

12

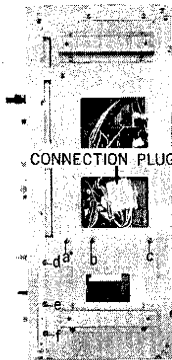


LEVER SW. KNOBS

13



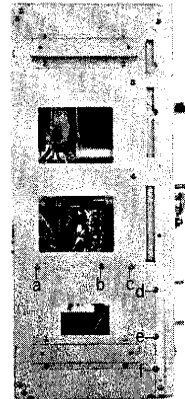
14



CONNECTION PLUG

SCREWS

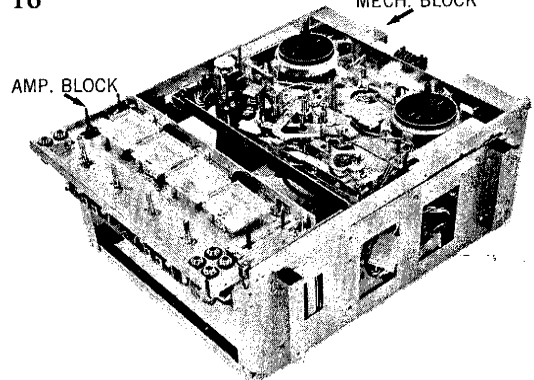
15



SCREWS

16

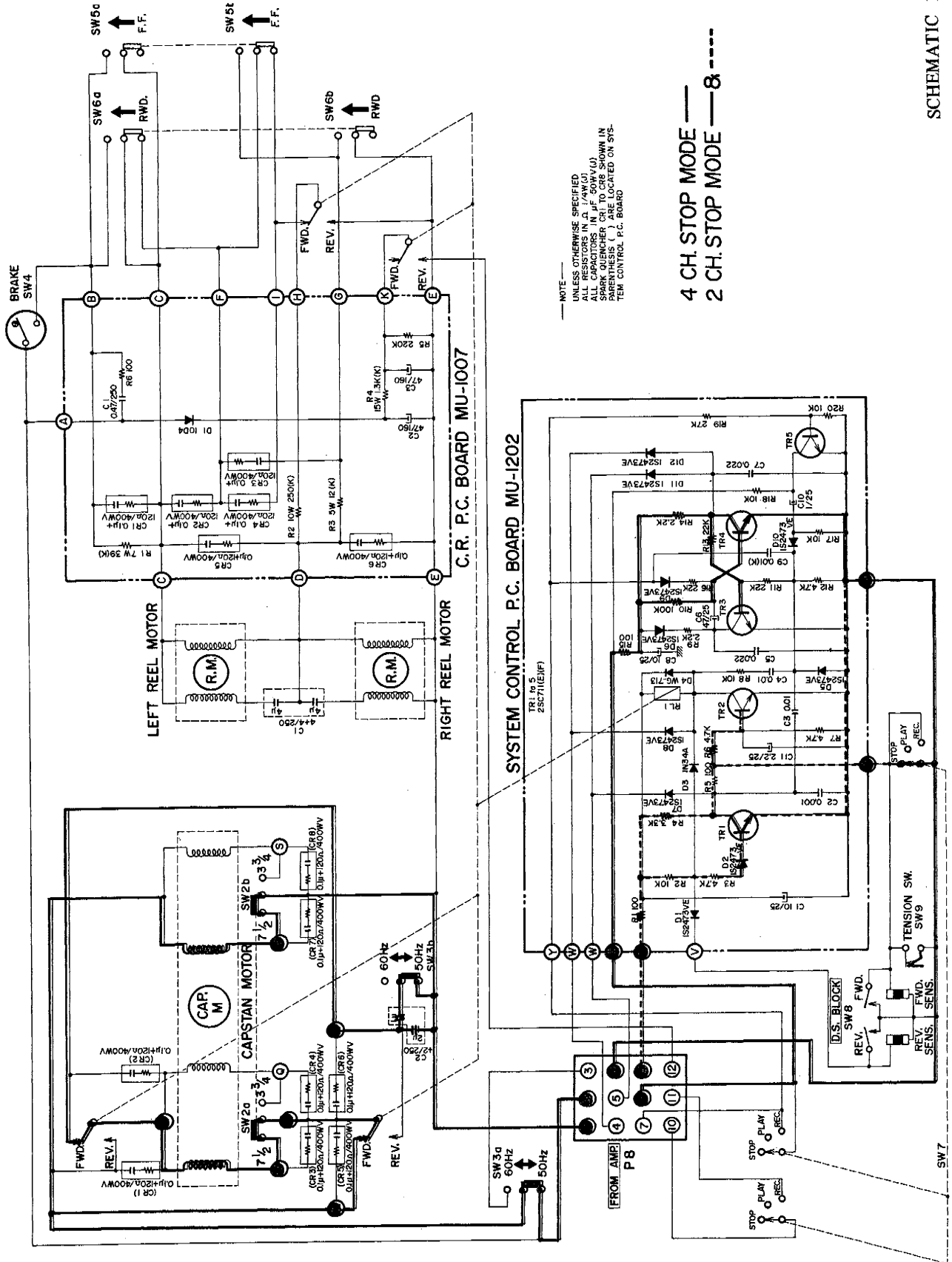
MECH. BLOCK



AMP. BLOCK



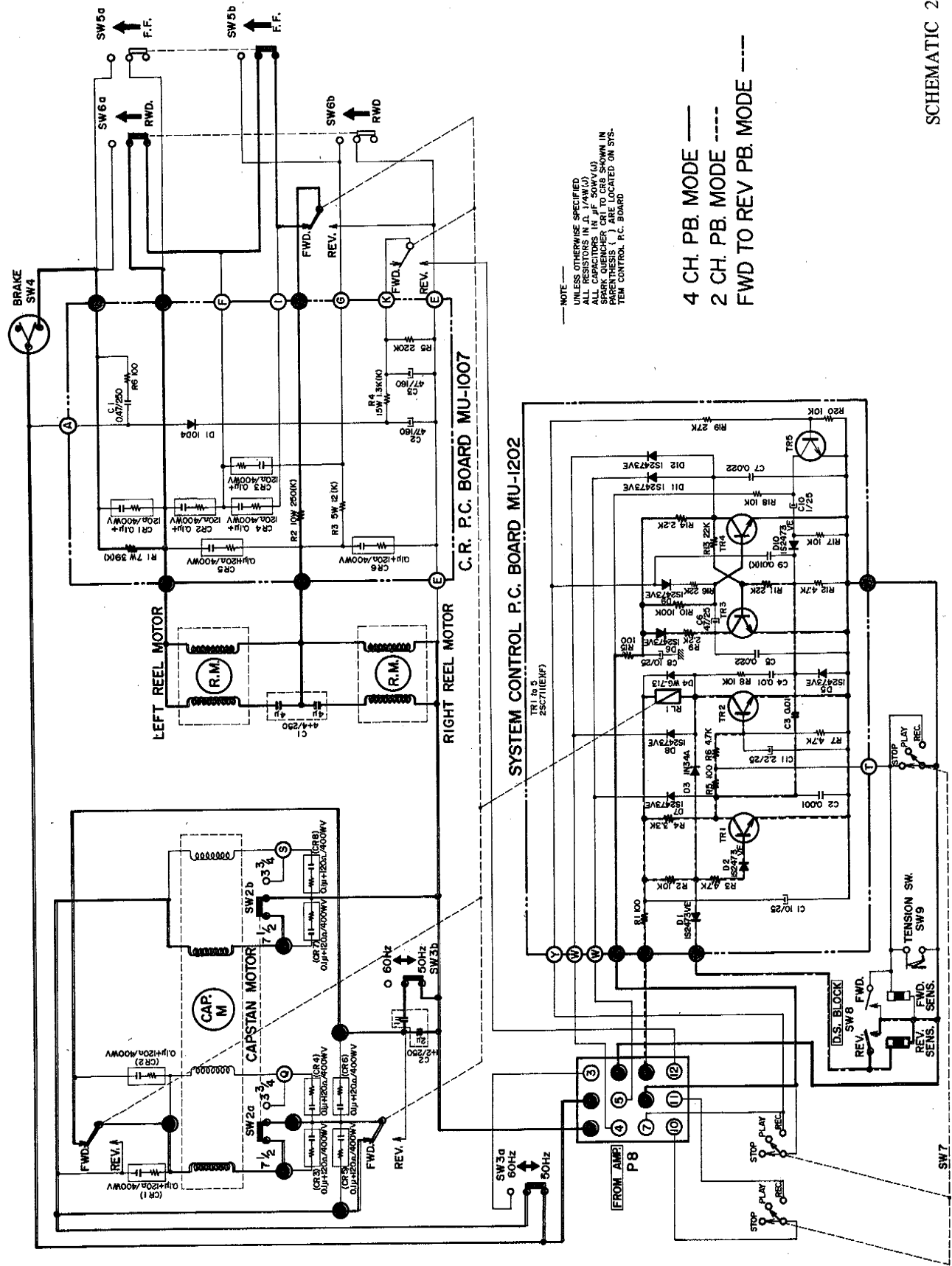
# IV. SYSTEM CONTROL CIRCUIT OPERATION

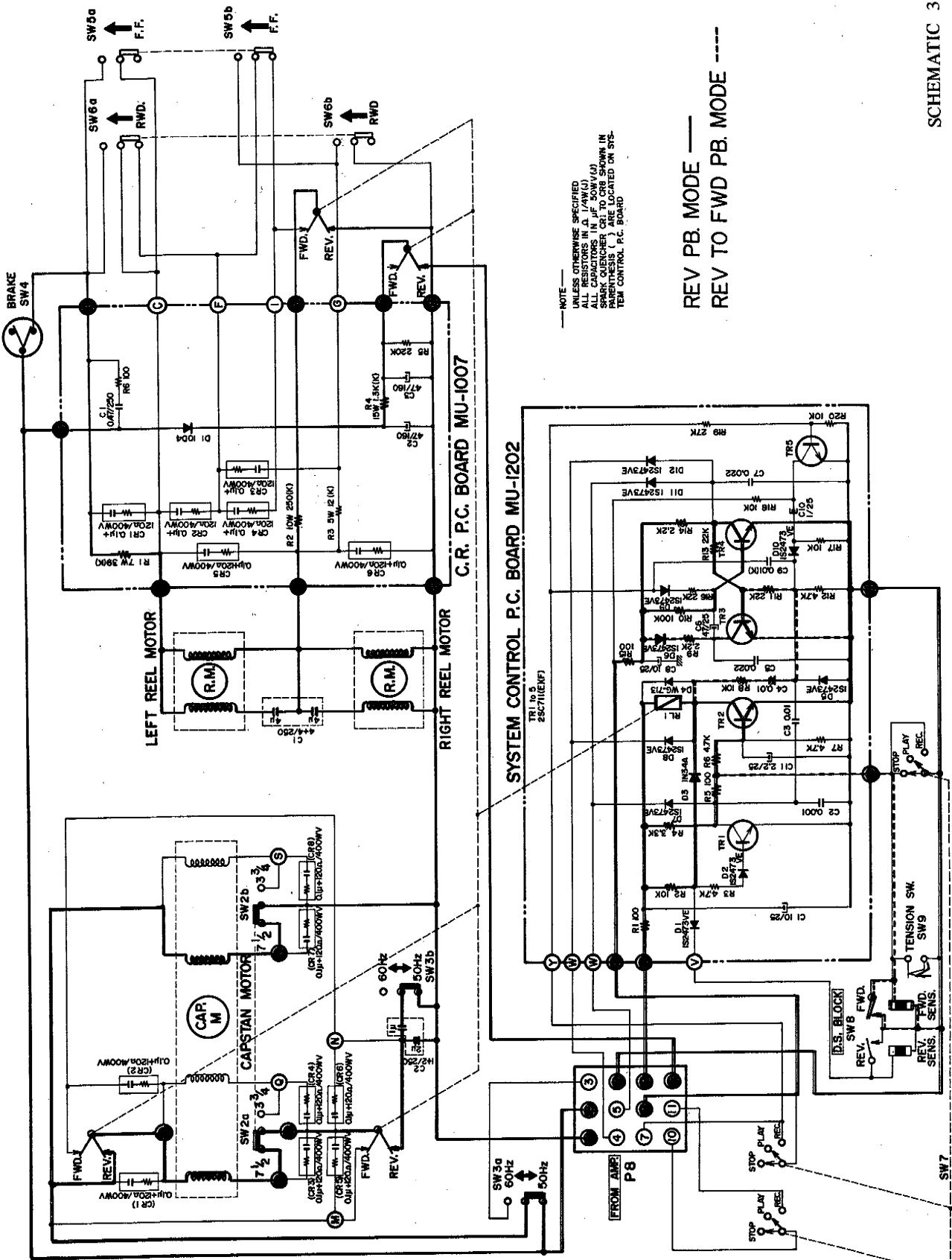


NOTE: UNLESS OTHERWISE SPECIFIED ALL RESISTORS IN Ω, 1/4W (U) ALL CAPACITORS IN μF 50WV (U) SPARK QUENCHER CRT TO GND SHOWN IN PARENTHESIS AND LOCATED ON SYSTEM CONTROL P.C. BOARD

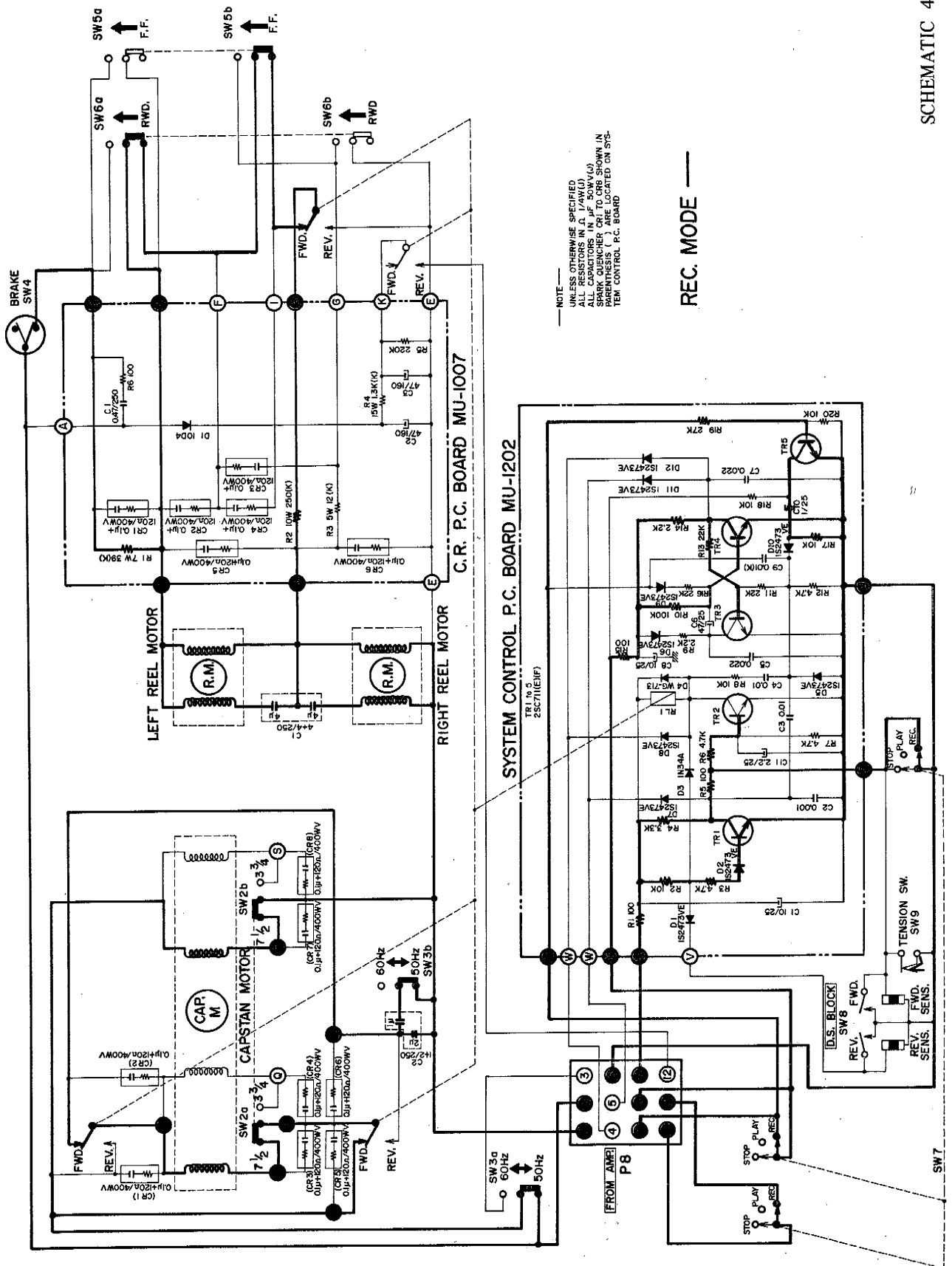
4 CH. STOP MODE ———&-----  
2 CH. STOP MODE ———&-----

SCHEMATIC 1



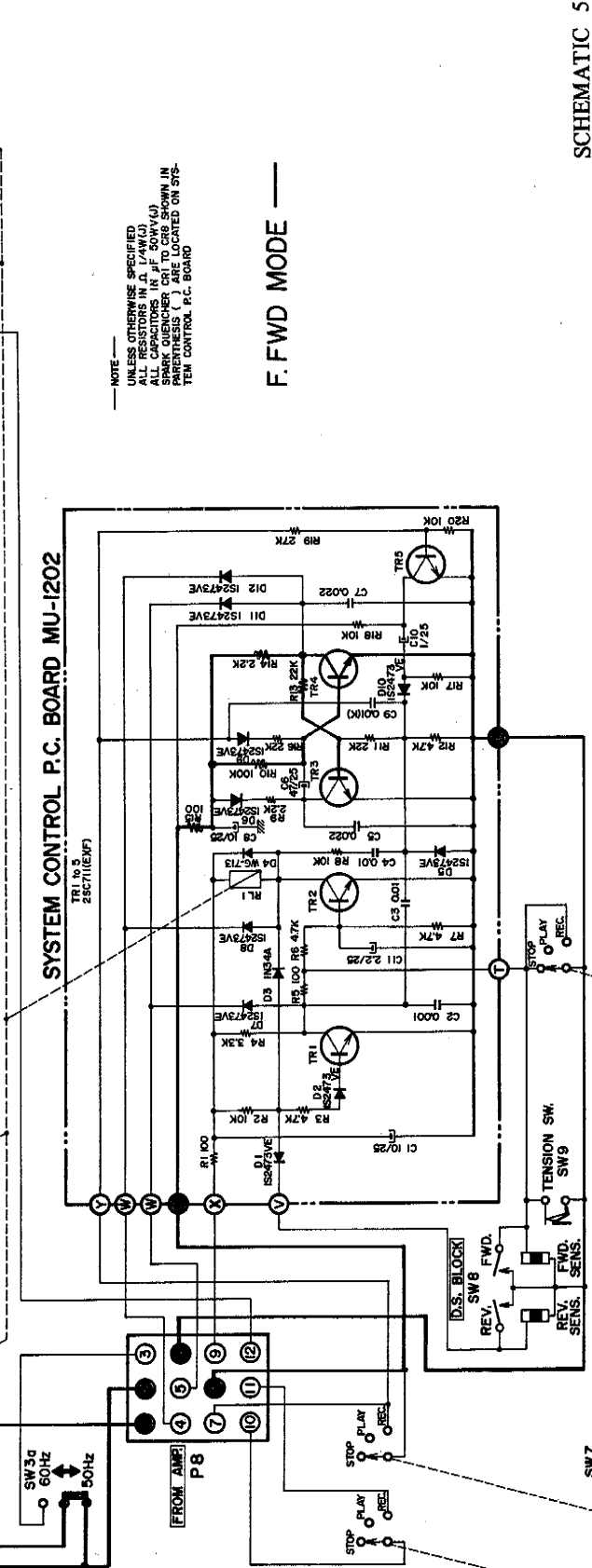
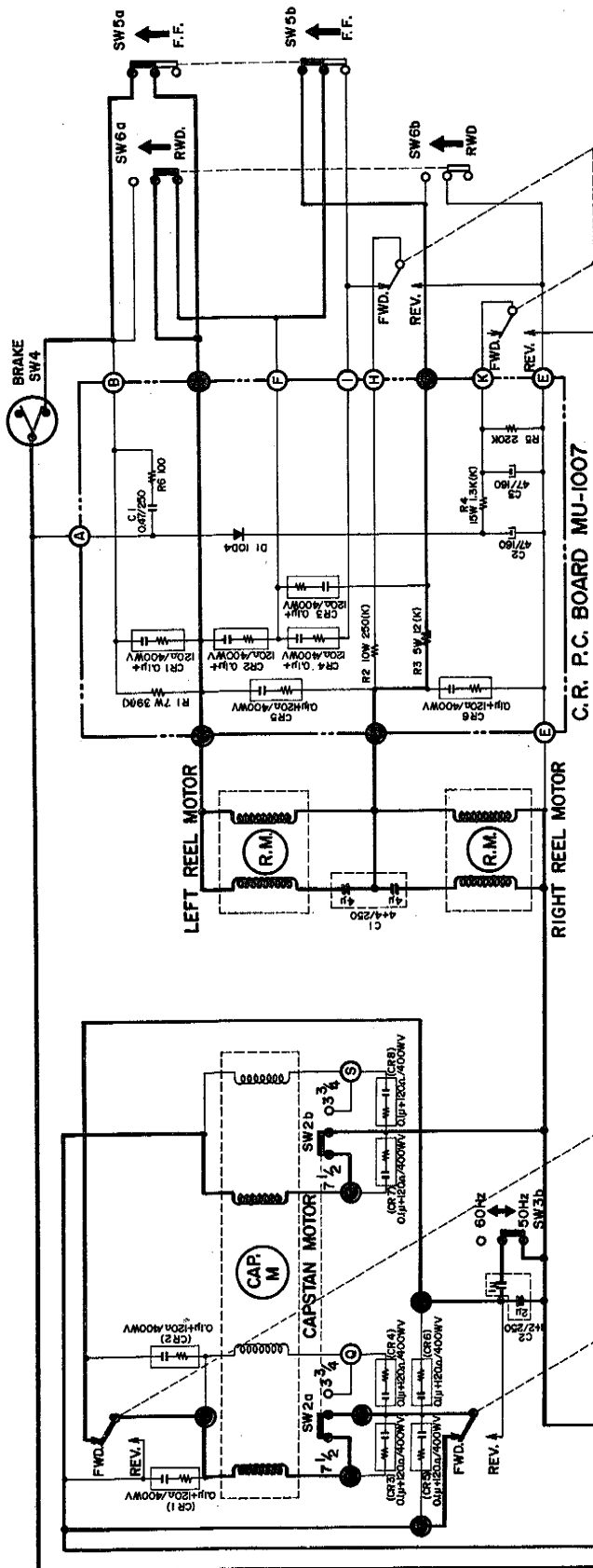


SCHEMATIC 3



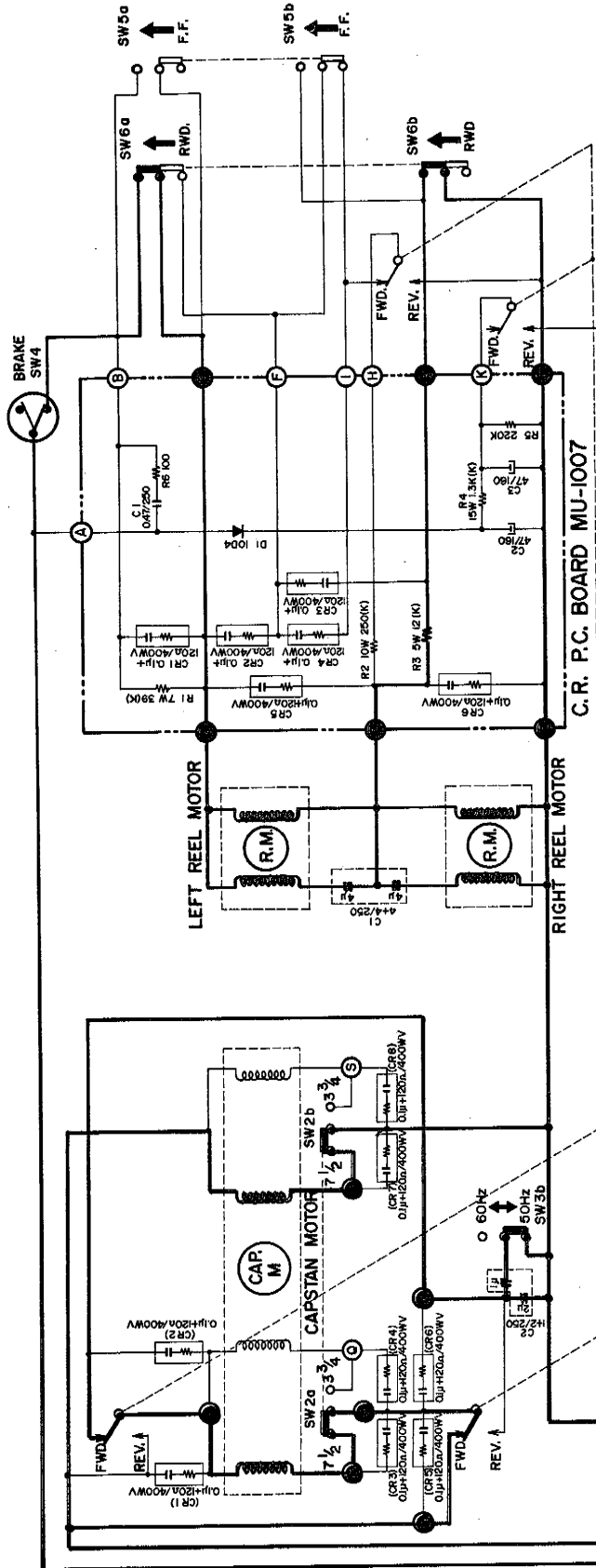
NOTE—  
UNLESS OTHERWISE SPECIFIED  
ALL RESISTORS IN Ω, 1/4W(Ω)  
ALL CAPACITORS IN μF 50WV(Ω)  
SPARK QUENCHER CRT TO CRT SHOWN IN  
THIS SCHEMATIC IS LOCATED ON SYS-  
TEM CONTROL P.C. BOARD

REC. MODE —

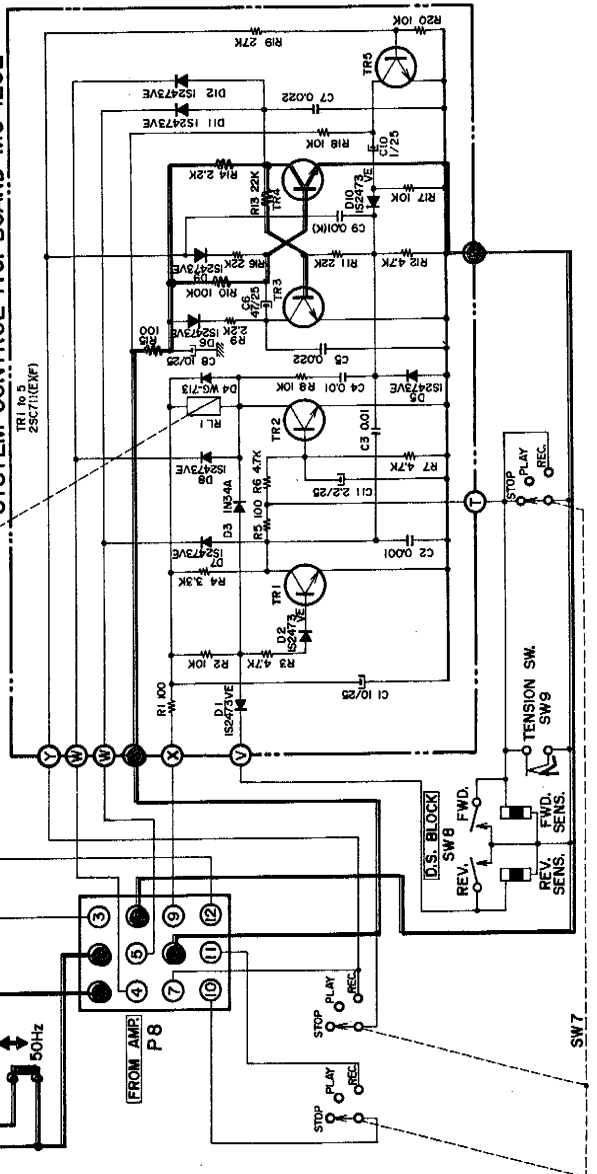


NOTE  
UNLESS OTHERWISE SPECIFIED  
ALL RESISTORS IN Ω, 1/4W(J)  
ALL CAPACITORS IN μF 50V(V, J)  
PARTS NUMBERS FOR TYPICAL SW IN  
PARENTHESES ARE LOCATED ON SYS-  
TEM CONTROL P.C. BOARD

F. FWD MODE —



C.R. P.C. BOARD MU-1007



NOTE  
UNLESS OTHERWISE SPECIFIED  
ALL RESISTORS IN Ω, 1/4W (J)  
ALL CAPACITORS IN μF 50WV (J)  
SPARK QUENCHER GATE TO CR8 SHOWN IN  
REVERSE POSITION AS SHOWN ON P.C.  
ITEM CONTROL P.C. BOARD

RWD MODE —

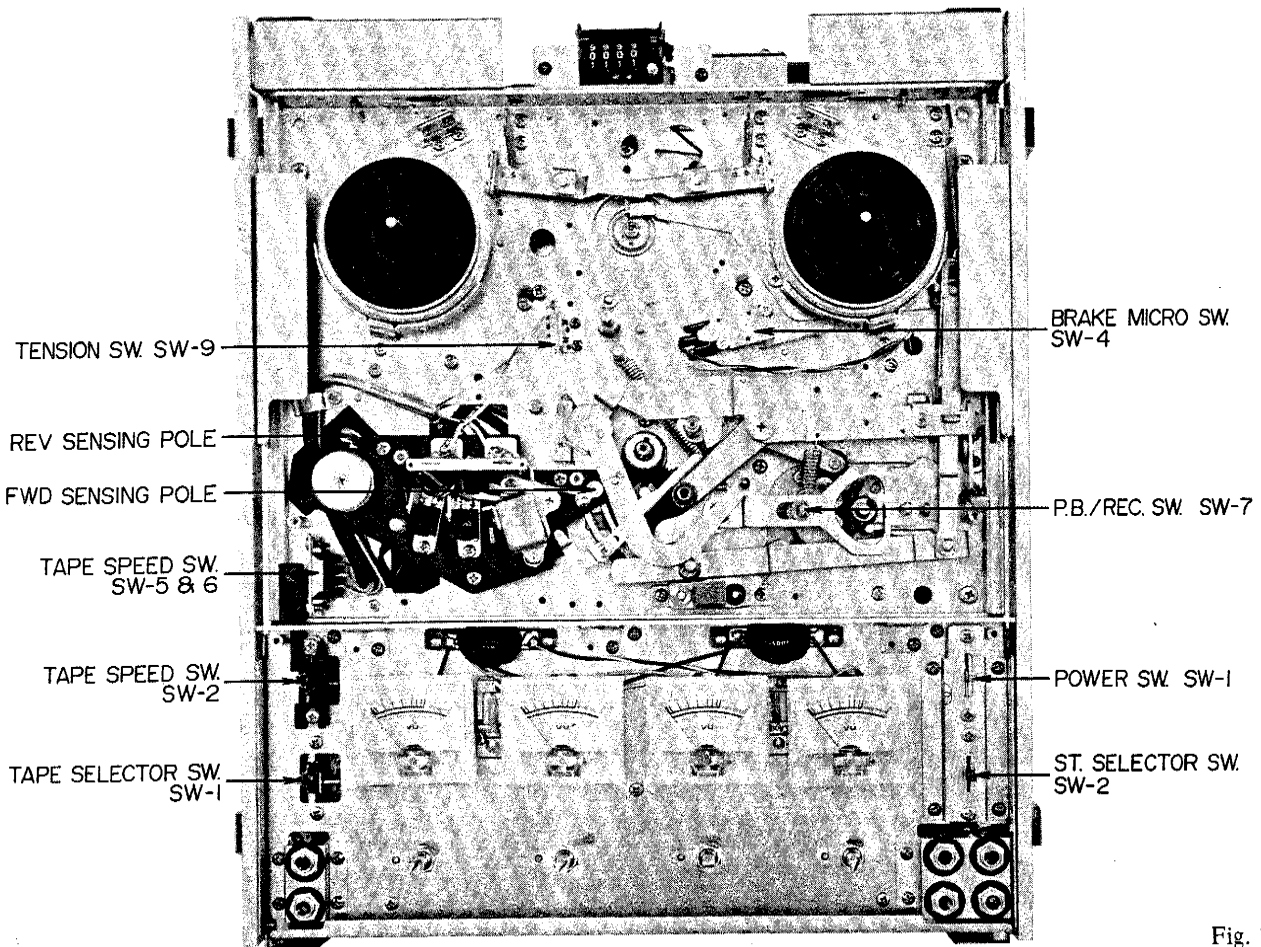


Fig. 7

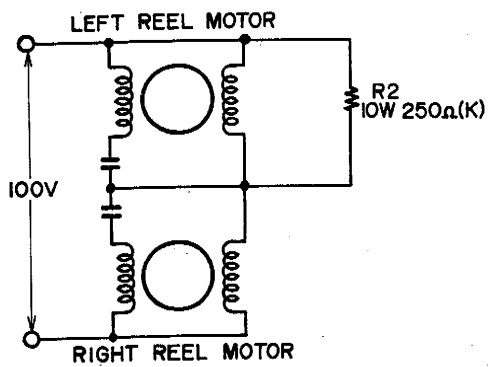


Fig. 8

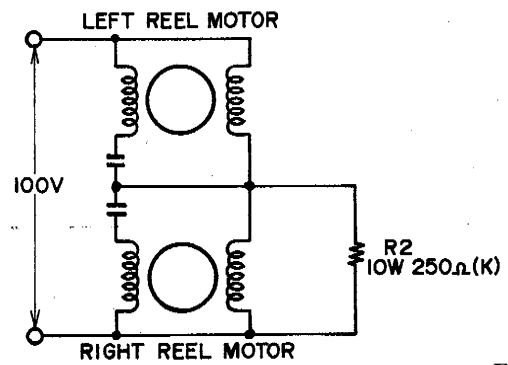


Fig. 9

## 1. STOP MODE (Refer to Schematic 1)

At stop mode, the various system control (hereinafter referred to as SYS.CON. transistors are maintained as follows: TR1(ON), TR2(OFF), TR3(OFF), and TR4(ON). Accordingly, the reverse relay connected to the collector of TR2 is OFF, and capstan motor revolutions are in forward direction. Also as TR4 is ON and TR4 collector voltage is roughly zero, and thus Diode D1 connected to the collector of TR4 (Playback Amp. P.C. Board) is turned OFF, the Playback Amp. Mute Circuit is also turned OFF. Both the supply and take-up reel motors are equipped with a Micro Switch SW4 which is activated to OFF and ON by the operation of the brake lever, and which at Stop Mode are turned OFF. Consequently, no voltage is supplied to either reel motor (both reel motors are connected in series).

When at stop mode, switching by means of P.B./REC Switch SW-7 does not take place because the base of SYS.CON.TR2 is grounded and maintained at OFF condition. That is to say, capstan motor revolutions will not reverse even when a REV Button is depressed. When the tension lever is raised, Tension Switch SW-9 is turned OFF. Thus, when no tape is loaded, this switch is ON. Also, because Tension Switch SW-9 is installed in parallel with P.B./REC Switch SW-7, when SW-7 is at stop mode, if a tape is loaded, but not threaded through the Tension Lever and playback is effected, reverse mode cannot be effected when a REV Button is depressed. And, of course, reverse mode will not be effected when the sensing foil passes the sensing poles.

## 2. FORWARD PLAYBACK MODE (Refer to Schematic 2)

When the P.B./REC Switch is at PLAY position, the various SYS.CON. transistors are maintained as follows: TR1(ON), TR2(OFF), TR3(OFF), and TR4(ON), i.e., functionally the same as at stop mode. The difference is that the base of TR2 which was grounded by P.B./REC Switch SW-7 is now open. That is to say, when TR1 is turned OFF and TR1 collector voltage increases, bias is supplied to TR2, and TR2 is turned ON.

Accordingly, while TR1 is (ON) and TR2 (OFF) (FWD Playback mode), capstan motor revolutions are in forward direction. Also Micro Switch SW-4 is ON, and voltage is supplied to both reel motors.

At FWD playback mode, an R2(10W, 250Ω) resistor is in parallel with left reel motor winding. That is to say, the left reel motor resistance differs from the right reel motor resistance due to the R2(10W, 250Ω) resistor which is parallel with the left reel motor as shown in Fig. 8. In short, the voltage supplied to the left reel motor is low and FWD playback mode is maintained.

## 3. FROM FWD TO REV PLAYBACK, AND REV PLAYBACK MODE (Refer to Schematic 2, 3)

When the sensing tape passes the reverse sensing poles or when the REV Button is depressed, the base of TR1 is biased at zero electrical potential and TR1 is instantly turned OFF, TR1 collector voltage increases and bias is applied to the base of TR2, TR2 is turned ON, and Reverse Relay RL1 is turned ON. In this TR1 and TR2 circuit, TR1 is maintained at OFF and TR2 at ON by means of Diode D3(IN34A). (Refer to Schematic Diagram-3)

By means of the reverse relay function, current flows from the reverse direction to the capstan motor sub coil, and reverse revolutions begin. Also, at FWD playback time, Resistor R2(10W, 250Ω) connected in parallel with the left reel motor becomes parallel with the right reel motor. (Refer to Fig. 9)

At this condition, reverse playback begins and is maintained, and the capstan motor revolutions begin reversing from forward direction. For normalized and stable revolutions, flywheel inertia at time of forward revolutions and flywheel mass when reverse revolutions begin is applied so that stabilized tape speed is not immediate, for this reason the signal output circuit must be muted until capstan motor speed is stabilized. (Refer to MUTING CIRCUIT OPERATION explanation)

Solenoid Plunger SL-1 also operates to switch Reverse Switch SW-1. In other words, the P.B. Amp. P.C. Board output is switched by means of Reverse Switch SW-1. (Refer to Fig. 10)

## 4. FROM REVERSE TO FORWARD PLAYBACK (Refer to Schematic 3)

When the sensing tape passes the FWD sensing pole or when the FWD Button is depressed and the base of TR2 becomes biased at zero electrical potential, TR2 is instantly turned OFF, and reverse relay RL-1 is also turned OFF.

Diode D3(IN34A) is also inverse biased, TR1 base current passes R2(10 kΩ), R3(4.7 kΩ), and D2 (1S2473VE) and is biased, and TR1 is turned ON and maintained. Consequently, reverse relay RL-1 returns to its original condition (FWD P.B.) and FWD playback mode is effected. Refer to MUTING CIRCUIT OPERATION for mute function during change from REV to FWD playback.

## 5. RECORDING MODE (Refer to Schematic 4)

SYS.CON. operation at recording time is exactly the same as Stop mode.



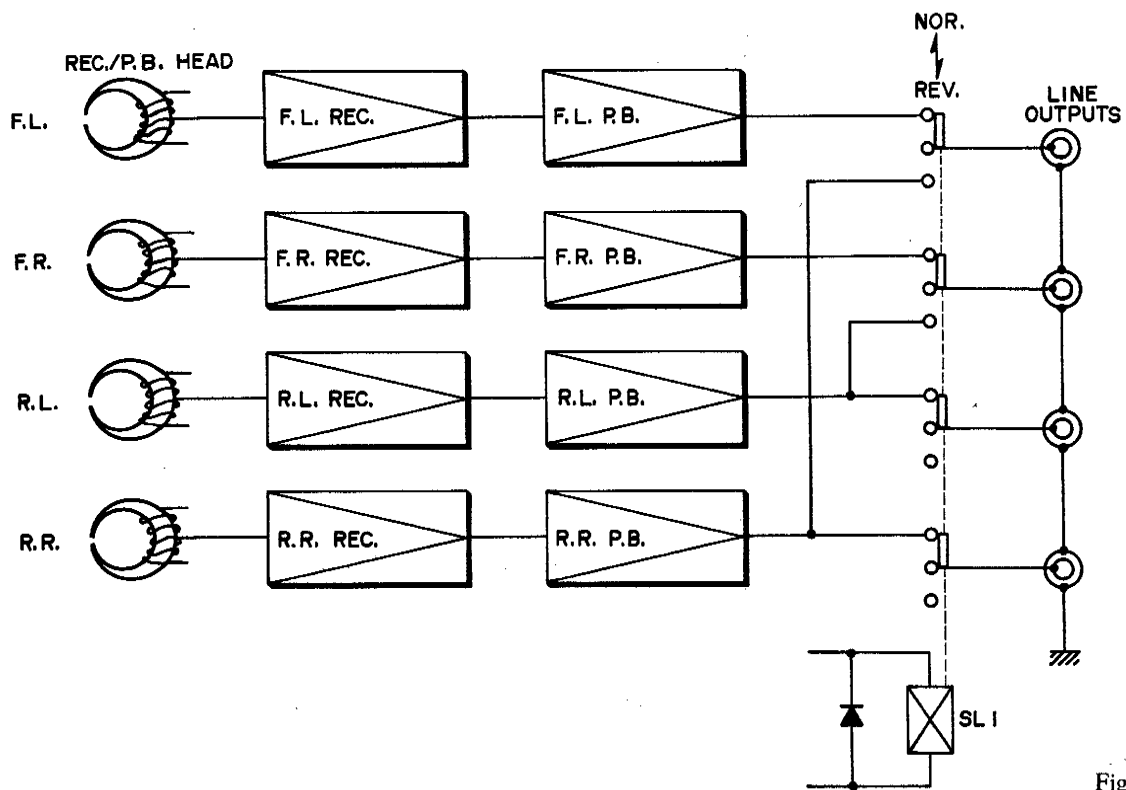
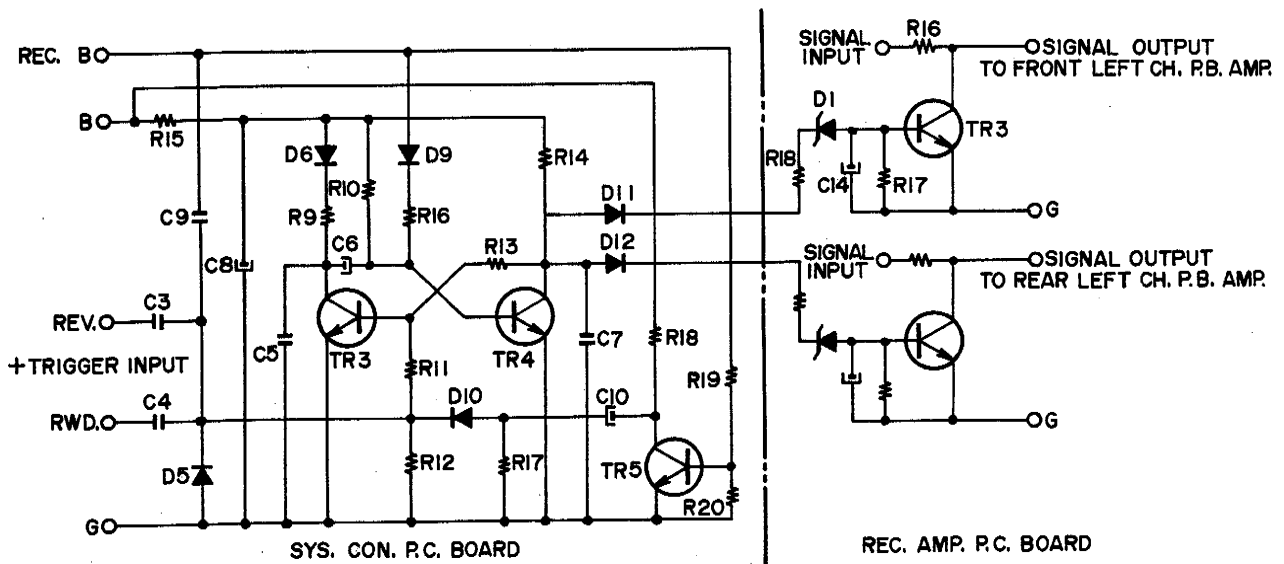


Fig. 10



SCHEMATIC 7

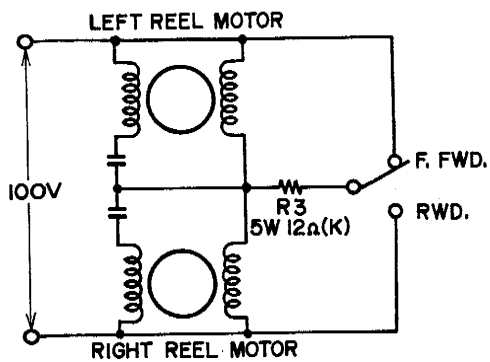


Fig. 11

## 6. FAST FORWARD AND REWIND MODE (Refer to Schematic 5, 6)

In this case, SYS.CON. operation is also exactly the same as Stop mode. However, the voltage supply to both reel motors are as shown in Fig. 11.

## 7. MUTING CIRCUIT OPERATION (Refer to Schematic 2, 3, and 7)

As shown in Schematic Diagram-7, the muting circuit consists of an electronic switch from Recording Amp. P.C. Board Transistor TR3 and a one-shot multi-vibrator comprised of SYS.CON. P.C. Board TR3 and TR4.

When stabilization is attained, TR3 of the one-shot multi-vibrator is turned OFF, and TR4 turned ON. Accordingly, the collector voltage of TR4 is lowered, Zener Diode D1 is biased in reverse direction, and TR3 of Recording Amp. P.C. Board is turned OFF.

If Button SW-8 is now depressed for FWD to REV Playback, or REV to FWD Playback, a charge current flows to condenser C3 or C4. That is to say, the positive direction trigger signal is introduced at the base of TR3 of SYS.CON. P.C. Board and therefore, the one-shot multi-vibrator which is comprised of TR3 and TR4 is inverted and, after a certain period of time (2 to 3 seconds), again returns to its stabilized condition. While this one-shot multi-vibrator is inverted (while TR4 is OFF), because TR4 collector voltage is high, the voltage exceeding the Zener Point of Zener Diode D1 is applied to the cathode of D1 and D1 assumes a lead-through condition. Thus, electronic switch Transistor TR3 is turned ON, and the signal is muted. (The internal resistance of electronic switch TR3 at lead-through time is extremely low.)

At recording time, a charge current flows to condenser C9 in the same way as described above. That is to say, the one-shot multi-vibrator is inverted and the mute circuit functions. Also when stop is effected from recording mode, TR5 is turned OFF, and because a charge current flows to C10 through R18, the mute circuit functions. Thus, at recording time or when returned to stop mode, these functions prevent a click noise from being recorded on the tape.

# V. MECHANISM ADJUSTMENTS

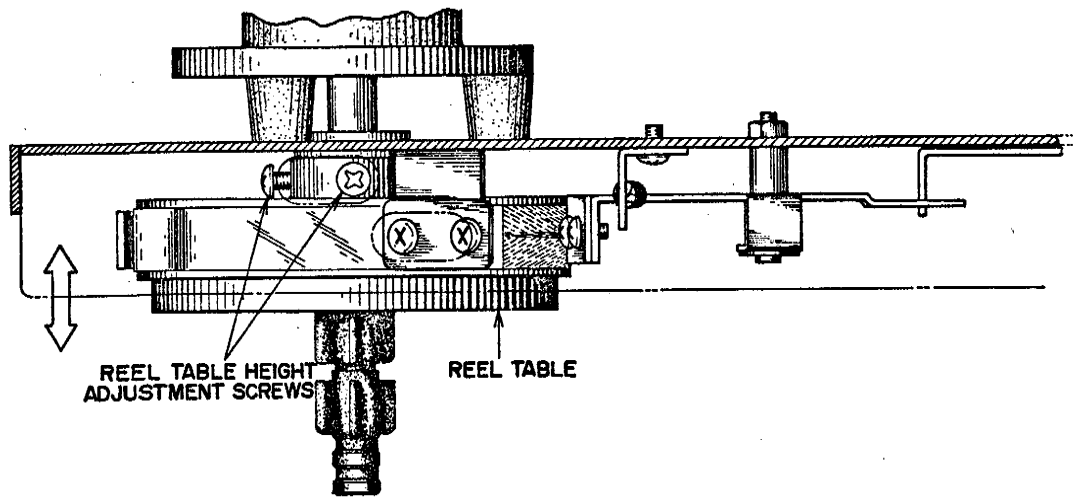


Fig. 12

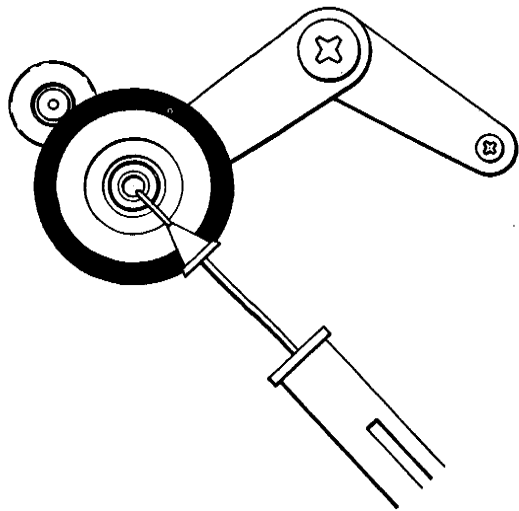


Fig. 13

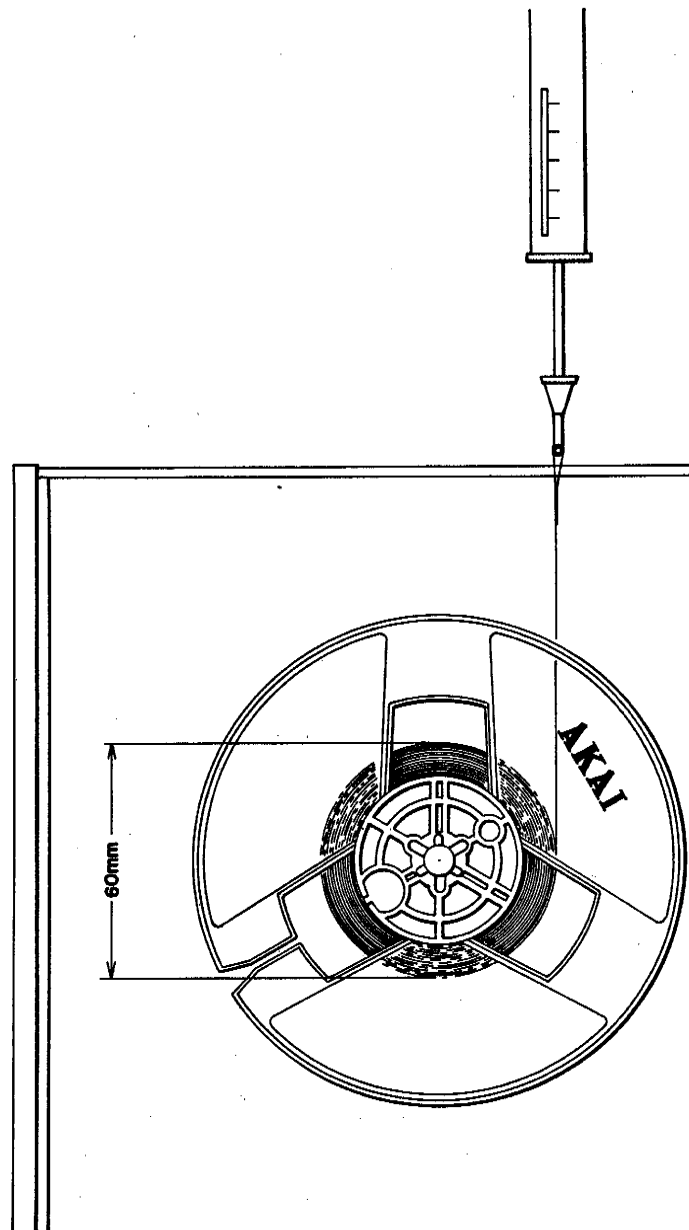


Fig. 14

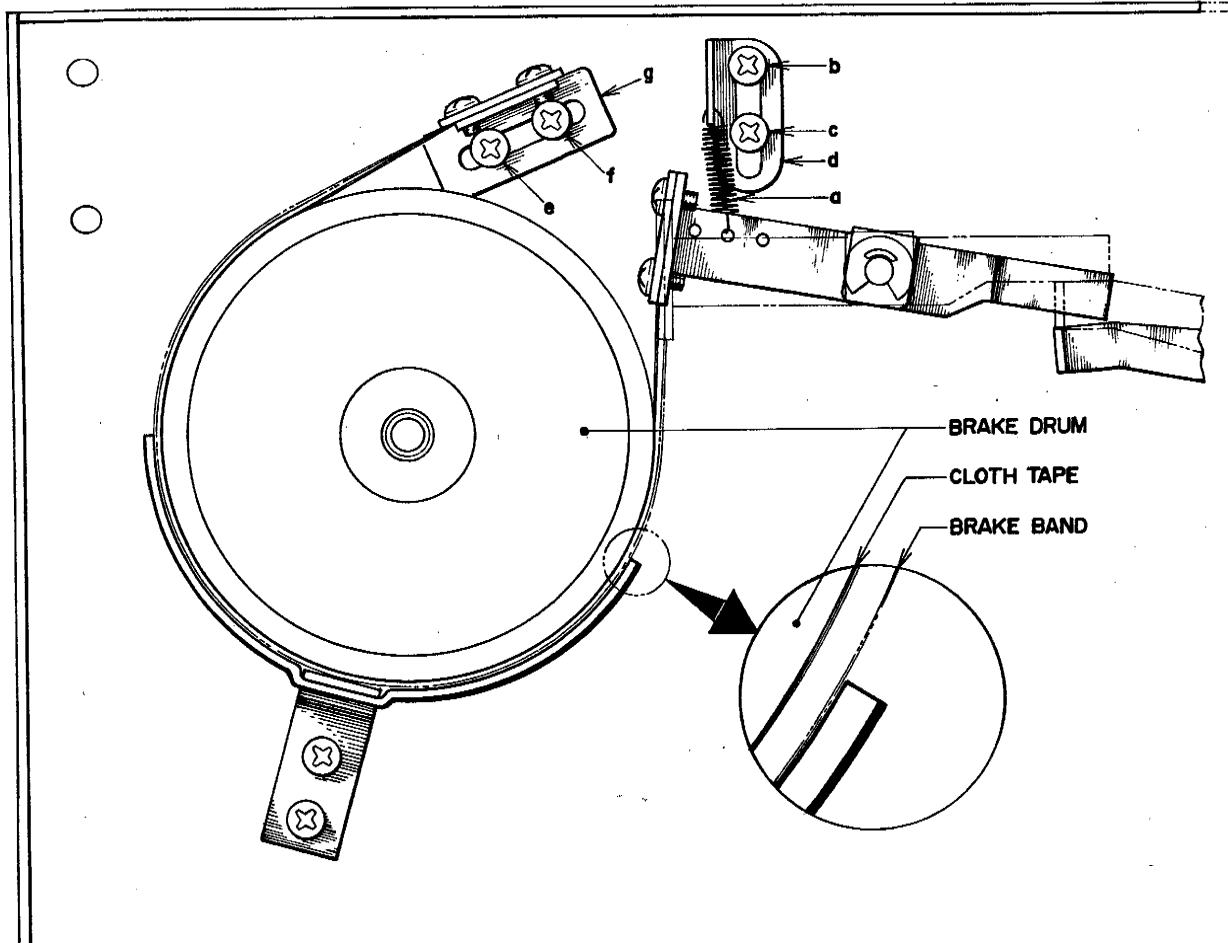


Fig. 15

### 1. REEL TABLE HEIGHT ADJUSTMENT

As shown in Fig. 12, loosen reel table height adjustment screws, and adjust reel table height by moving table in direction of arrow and positioning so that the tape winds in the center of the reel.

### 2. PINCH WHEEL PRESSURE MEASURING METHOD

Measure pinch wheel pressure with a tension gauge as shown in Fig. 13. Read the value on the tension gauge as soon as the pinch wheel separates from the tape and tape travel stops. Ideal pinch wheel pressure is 1.8 kg.

### 3. BRAKE TENSION ADJUSTMENT

- 1) As shown in Fig. 14, use a 60 mm diameter tape wound on a 5" reel and measure the brake tension with a tension gauge. Ideal brake tension is from 300 to 370 grams.
- 2) Brake tension adjustment can be made as follows: (Refer to Fig. 15)
  - a) Change position of suspended spring (a).
  - b) Loosen screws (b) and (c) and adjust the vertical position of spring suspension metal (d).
  - c) Loosen screws (e) and (f) and adjust the horizontal position of brake band suspension metal (g).
  - d) Only the left side is shown in Fig. 15, but the right side must be adjusted in the same way.

**NOTE:** In making brake tension adjustment, at all modes except stop mode, confirm that the brake band completely separates from the cloth tape on the brake drum. (Refer to Fig. 15)

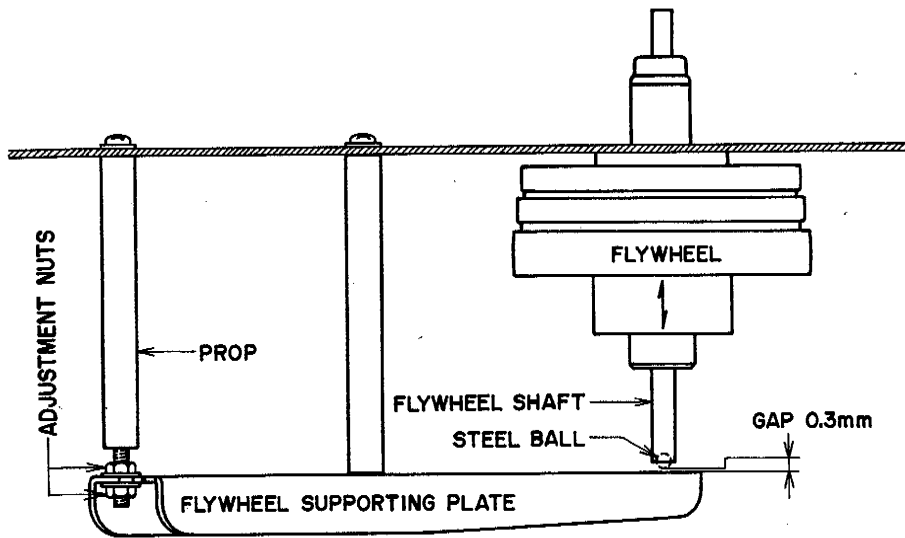


Fig. 16

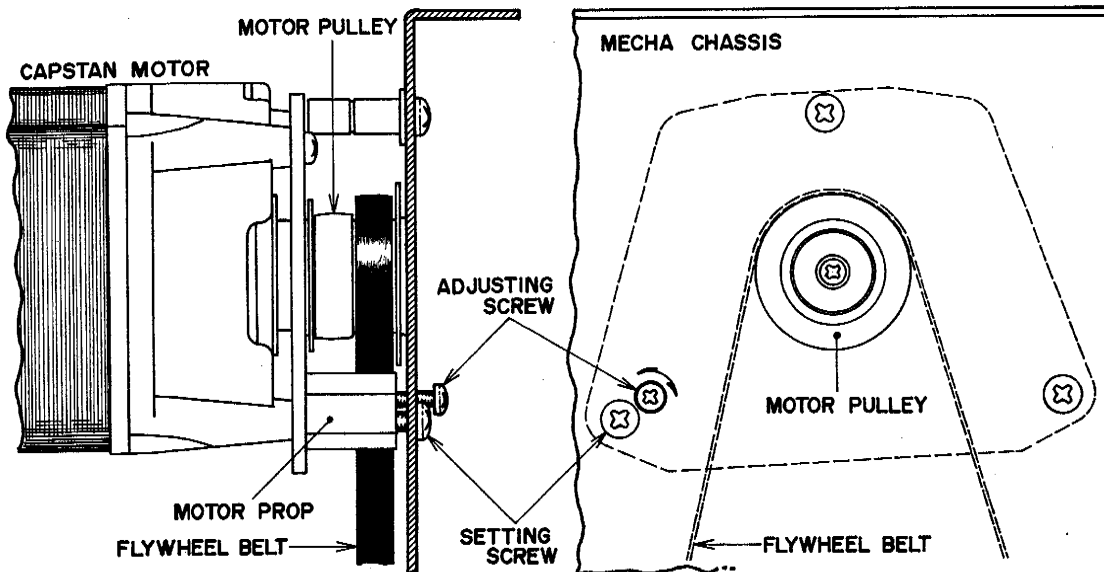


Fig. 17

#### 4. LEFT AND RIGHT REEL MOTOR TENSION AT VARIOUS OPERATING MODES

| Reel Motor Mode | Left Reel Motor | Right Reel Motor |
|-----------------|-----------------|------------------|
| FWD P.B.        | 60g             | 180g             |
| REV P.B.        | 180g            | 60g              |
| F.FWD           | 10g             | 450g             |
| RWD             | 450g            | 10g              |

Chart 1

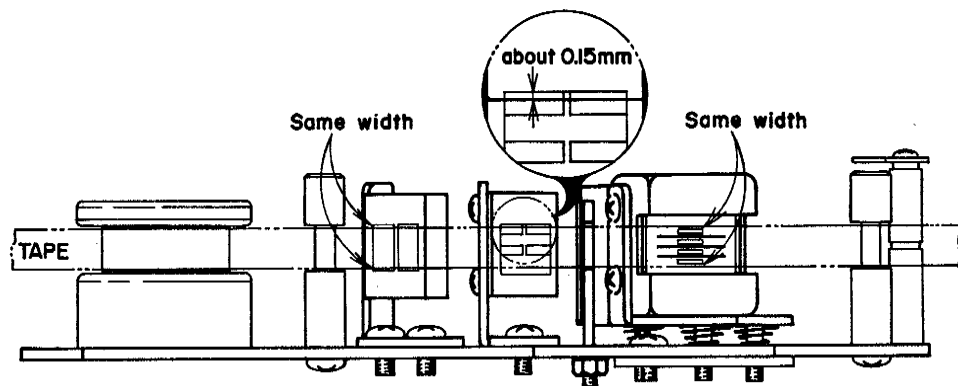
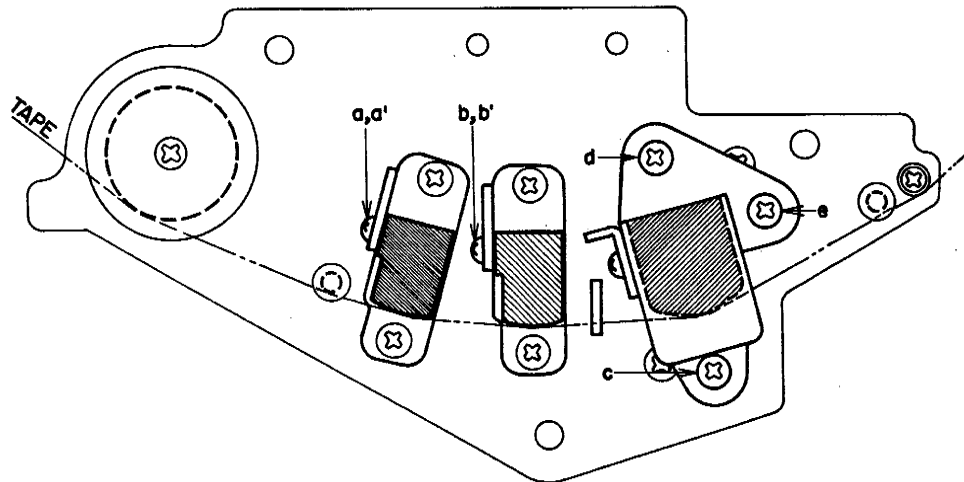
#### 5. FLYWHEEL LOOSE PLAY ADJUSTMENT

Turn the adjustment nuts to obtain a 0.3 mm gap between the steel ball and flywheel supporting plate when the flywheel is moved in the direction of the arrow as shown in Fig. 16.

#### 6. FLYWHEEL BELT POSITION ADJUSTMENT

- 1) With capstan motor revolutions operating at Rev. mode, loosen setting screw and turn flywheel belt position adjustment screw until the flywheel belt comes to the center of the motor pulley. (Refer to Fig. 17)
- 2) Tighten setting screw to maintain center positioning of flywheel belt at Rev. mode.
- 3) Confirm that the flywheel belt runs on the center of the motor pulley at Fwd. mode also.

## VI. HEAD ADJUSTMENTS



4-CH. E.H. 2-CH. E.H. REC./RB. HEAD

Fig. 18

### 1. HEAD HEIGHT ADJUSTMENT

(See Fig. 18)

#### 1) Erase Head (2-CH)

Loosen Erase Head Screws (b) (b') and adjust Erase Head height so that the upper edge of the tape is about 0.15 mm lower than the upper Erase Head core.

#### 2) Erase Head (4-CH)

Loosen Erase Head Screw (a) (a') and adjust Erase Head height so that the tape is equidistant in relation to the top and bottom edges of the Erase Head core (width between top edge of tape and top edge of head core is the same as the distance between the bottom edge of the tape and the bottom edge of the head core).

#### 3) Recording/Playback Head

Adjust Recording/Playback Head Height by turning Recording/Playback Head Height Adjustment Screws (c) (d), 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 to the width between the lower edge of Channel 4 Head Core and the lower edge of the tape.

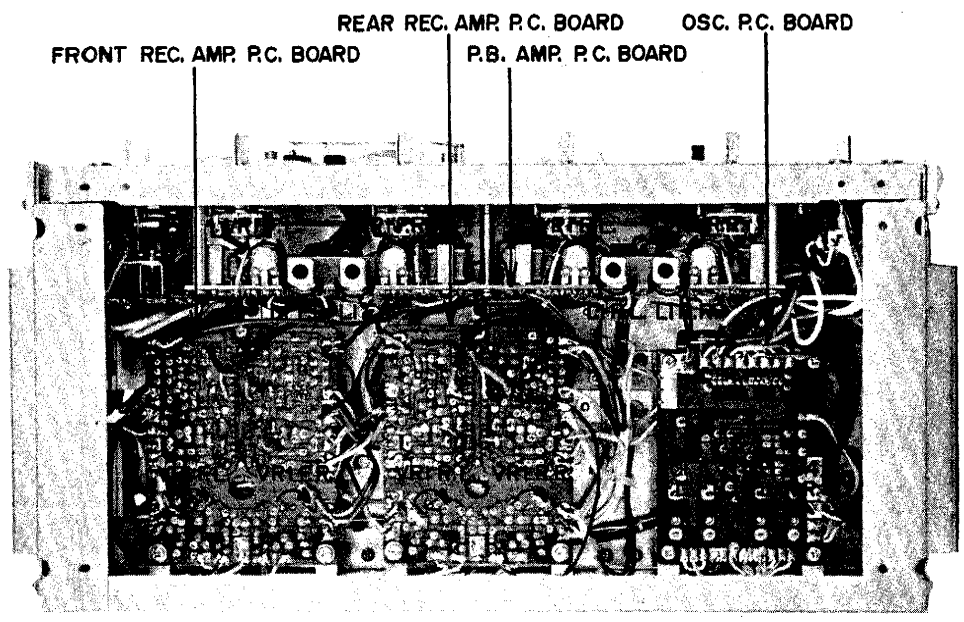
### 2. RECORDING/PLAYBACK HEAD SLANT ADJUSTMENT (See Fig. 18)

By turning Head Height Adjustment Screws (c) (d) to left and right, adjust so that the Recording/Playback Head contacts the tape surface at a right angle (head is at right angle in relation to tape surface).

### 3. RECORDING/PLAYBACK HEAD AZIMUTH ALIGNMENT ADJUSTMENT (See Fig. 18)

Connect a High Sensitivity V.T.V.M. to the Line Output and playback a Head Alignment Test Tape (8,000 Hz, 3-3/4 ips.). Adjust by turning Head Alignment Adjustment Screw (e) to left and right until the various line outputs reach maximum.

### 4. Repeat adjustments outlined in 1-3) as well as 2. and 3. above two or three times to obtain optimum adjusted condition.





REF :   ARROW INDICATES MAX  
 F.L. FRONT LEFT CHANNEL  
 F.R. FRONT RIGHT CHANNEL  
 R.L. REAR LEFT CHANNEL  
 R.R. REAR RIGHT CHANNEL

Fig. 19

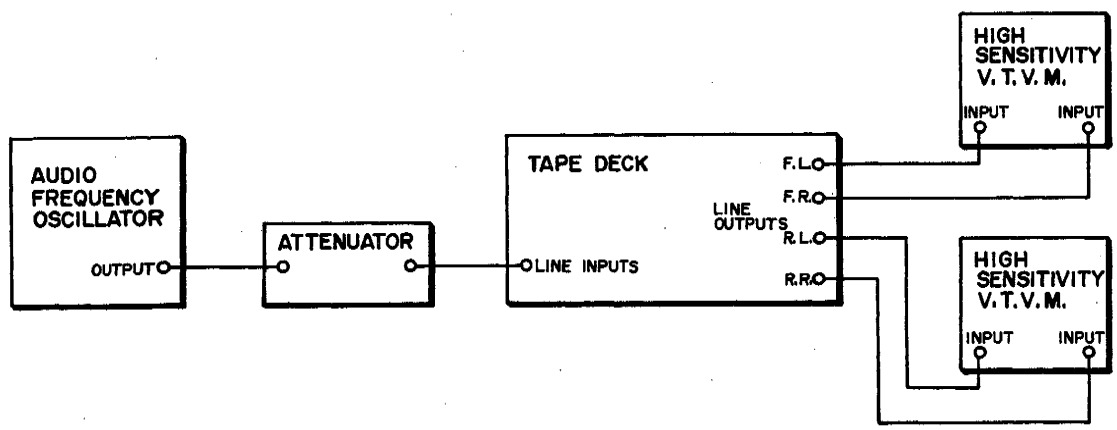


Fig. 20

## VII. AMPLIFIER ADJUSTMENTS

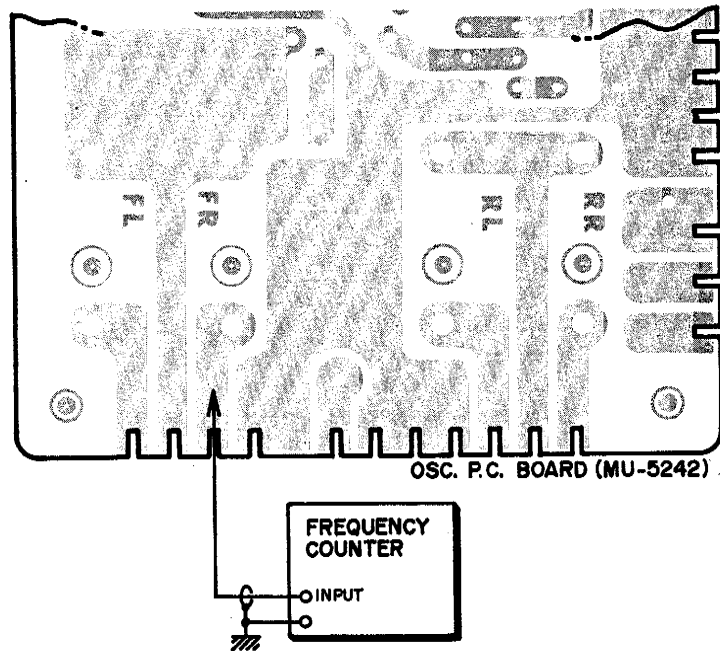


Fig. 21

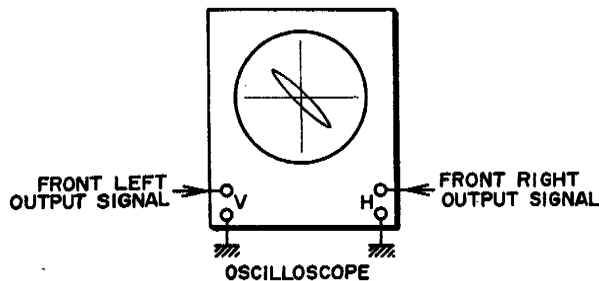


Fig. 22

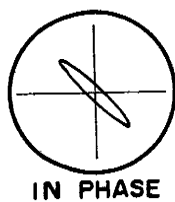


Fig. 23



Fig. 24

Connect the various measuring instruments as shown in Fig. 20.

### 1. PLAYBACK LEVEL ADJUSTMENT

- 1) Set Tape Speed Selector to 7-1/2 ips.
- 2) Set Stereo Selector to 4-CH.
- 3) Playback a 250 Hz 7-1/2 ips. recorded test tape.
- 4) Adjust Playback Amp. P.C. Board semi-fixed resistor VR1 50 kB shown in Fig. 19 to obtain a 4 dB(1.228V) high sensitivity V.T.V.M. output level indication on each channel.

VR1 F.L.: FRONT LEFT CHANNEL  
 VR1 F.R.: FRONT RIGHT CHANNEL  
 VR1 R.L.: REAR LEFT CHANNEL  
 VR1 R.R.: REAR RIGHT CHANNEL

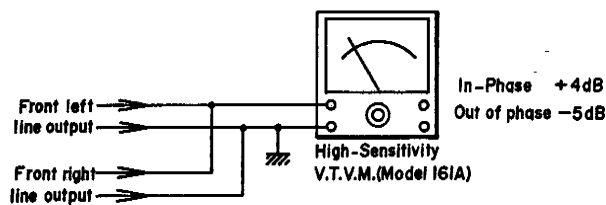


Fig. 25



## 2. RECORDING LEVEL ADJUSTMENT

- 1) Set Tape Speed Selector to 7-1/2 ips.
- 2) Set Stereo Selector to 4-CH.
- 3) Set all 4 Recording Level Controls VR1 through VR4 50 kA (F.L., F.R., R.L., and R.R.) to maximum (fully clockwise) and load a blank tape.
- 4) Set tape deck to recording mode and supply a 1,000 Hz sine wave signal to the line input from the audio frequency oscillator.
- 5) Adjust the attenuator to obtain a 4 dB(1.228V) high sensitivity V.T.V.M. output level indication on all 4 channels.
- 6) Under the condition described above, record a 1,000 Hz 4 dB signal for a few seconds on the blank tape, and playback this recording.
- 7) Adjust Recording Amp. P.C. Board semi-fixed resistor VR1 5 kA shown in Fig. 19 so that at playback time, the high sensitivity V.T.V.M. line output level indication is 4 dB(1.228V) on each channel.

VR1 F.L.: FRONT LEFT CHANNEL  
VR1 F.R.: FRONT RIGHT CHANNEL  
VR1 R.L.: REAR LEFT CHANNEL  
VR1 R.R.: REAR RIGHT CHANNEL

## 3. BIAS LEAK ADJUSTMENT

- 1) Following recording level adjustment, remove the line input and set tape deck to recording mode.
- 2) Switch the high sensitivity V.T.V.M. range to -30 dB range.
- 3) Adjust the core of Playback Amp. P.C. Board Coil L1 22 mH to obtain minimum high sensitivity V.T.V.M. indication on each channel.
- 4) Bias leak must be less than -26 dB at 4-CH, and less than -16 dB at 2-CH.

## 4. FREQUENCY RESPONSE ADJUSTMENT

- 1) Set Tape Speed Selector to 7-1/2 ips.
- 2) Set Stereo Selector to 4-CH.
- 3) Set Tape Selector to NORMAL.
- 4) Turn all Recording Level Controls (VR1 through VR4, 50 kA) to maximum (fully clockwise) and load a blank tape.
- 5) Set tape deck to recording mode and supply a 1,000 Hz sine wave to the line input from Audio Frequency Oscillator and adjust the attenuator to obtain a -16 dB(120 mV) high sensitivity V.T.V.M. line output level indication on all 4 channels.
- 6) Switch the oscillation frequency of the Audio Frequency Oscillator from the condition described in Items 4-5) above to 10,000 Hz.

- 7) Adjust OSC. P.C. Board Trimmer Condensers TC1 through TC4 shown in Fig. 19 to obtain the same V.T.V.M. level indication on all channels at both the 1,000 Hz and 10,000 Hz frequencies.

TC1: FRONT LEFT CHANNEL  
TC2: FRONT RIGHT CHANNEL  
TC3: REAR LEFT CHANNEL  
TC4: REAR RIGHT CHANNEL

## 5. RECORDING BIAS FREQUENCY MEASURING METHOD

As shown in Fig. 21, connect a Frequency Counter to the output side of the trimmer condenser. Set tape deck to recording mode and take a frequency counter reading. Specified recording bias frequency is  $82 \pm 5$  kHz.

## 6. 4-CHANNEL PHASE CHECK

### CHECK A

- 1) Connect front left signal and front right signal line outputs to the vertical and horizontal input of an Oscilloscope. (See Fig. 22)
- 2) Playback a 250 Hz 7-1/2 ips. pre-recorded test tape.
- 3) If front left signal and front right signal is in phase, the waveform on oscilloscope screen will appear as shown in Fig. 23.
- 4) If front left signal and front right signal is out of phase ( $180^\circ$  phase inverted), the waveform on oscilloscope screen will appear as shown in Fig. 24.
- 5) Make the same phase check on front left/rear left and rear left/rear right signals.
- 6) In case out of phase signals exist, head connection is reversed or playback head adjustment is necessary.

### CHECK B

- 1) Playback a 250 Hz 7-1/2 ips. pre-recorded test tape.
- 2) Connect front left signal and front right signal line outputs in parallel and connect to the inputs of a high sensitivity V.T.V.M. (See fig. 25)
- 3) If front left signal and front right signal is in phase, the high sensitivity V.T.V.M. indication will be about 4 dB.
- 4) If front left signal and front right signal is out of phase ( $180^\circ$  phase inverted), the high sensitivity V.T.V.M. indication will be about -5 dB.
- 5) Make the same phase check on front left/rear left and rear left/rear right signals.

## VIII. D. C. RESISTANCE OF VARIOUS COILS

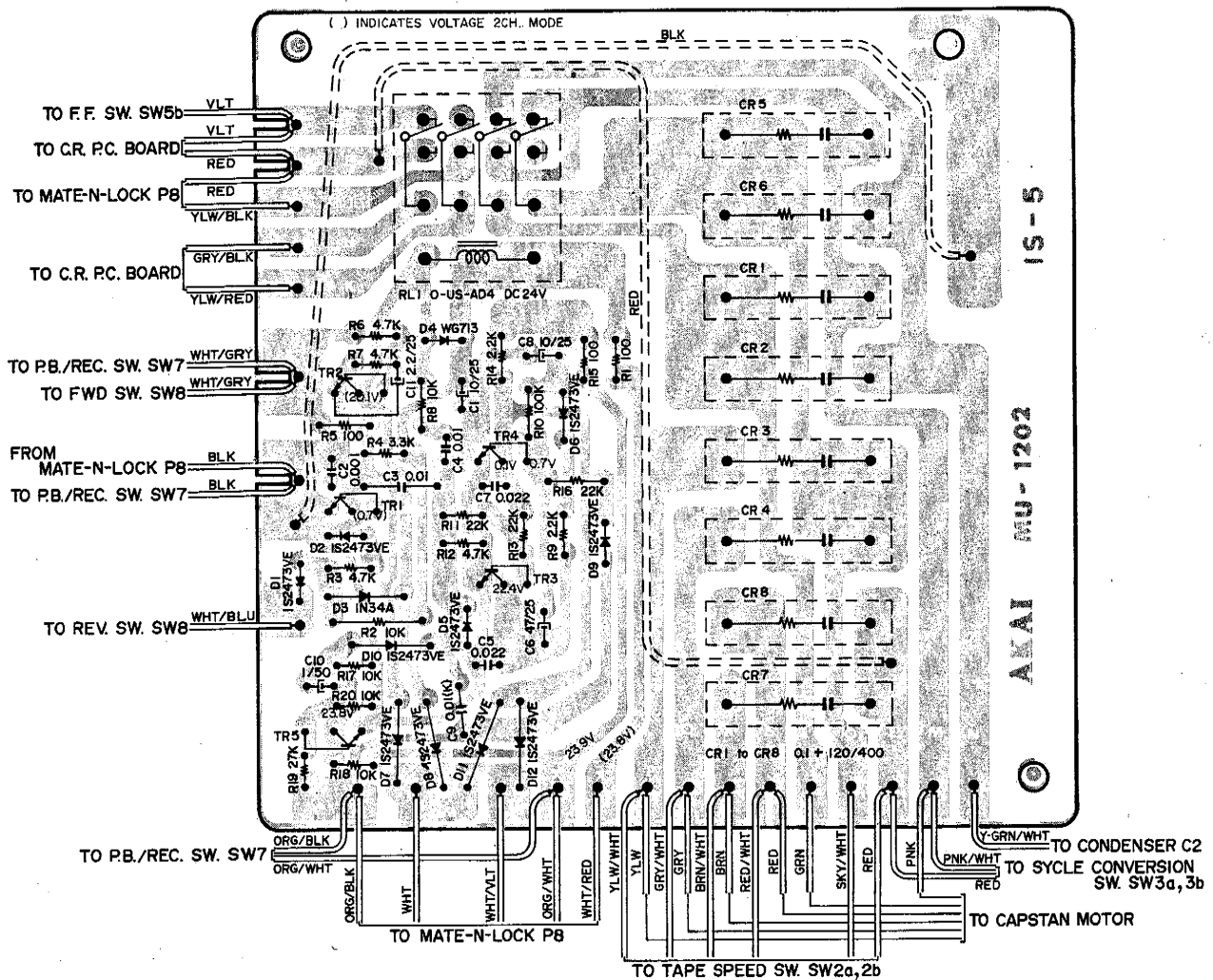
D.C. Resistance shown in chart are average values.

| Parts                           | Designation        | D.C. Resistance  |
|---------------------------------|--------------------|--|
| CAPSTAN MOTOR                   | HM-12-16MC         | Between PNK-RED 130Ω<br>Between PNK-BRN 180Ω<br>Between GRN-GRY 360Ω<br>Between GRN-YLW 370Ω |
| REEL MOTOR                      | 24XO-MR            | Between RED-BLU 74Ω<br>Between GRN-YLW 166Ω  |
| REVERSE SOLENOID                | 0730 TH13          | 290Ω   |
| REVERSE RELAY                   | MY4-O-US-AD4 DC24V | 650Ω   |
| HEADPHONE OUTPUT TRANSFORMER    | N19-5921S          | Primary 230Ω<br>Secondary 0.9Ω   |
| OSCILLATOR COIL                 | OT-204             | Between 1-3 0.3Ω<br>Between 4-6 0.7Ω<br>Between 7-9 8.2Ω                                     |
| FULL TRACK ERASE HEAD           | EF-210             | 2.8Ω   |
| 4 TRACK ERASE HEAD              | E4-260             | 1.6Ω   |
| 4 TRACK RECORDING/PLAYBACK HEAD | P4-50              | 160Ω   |

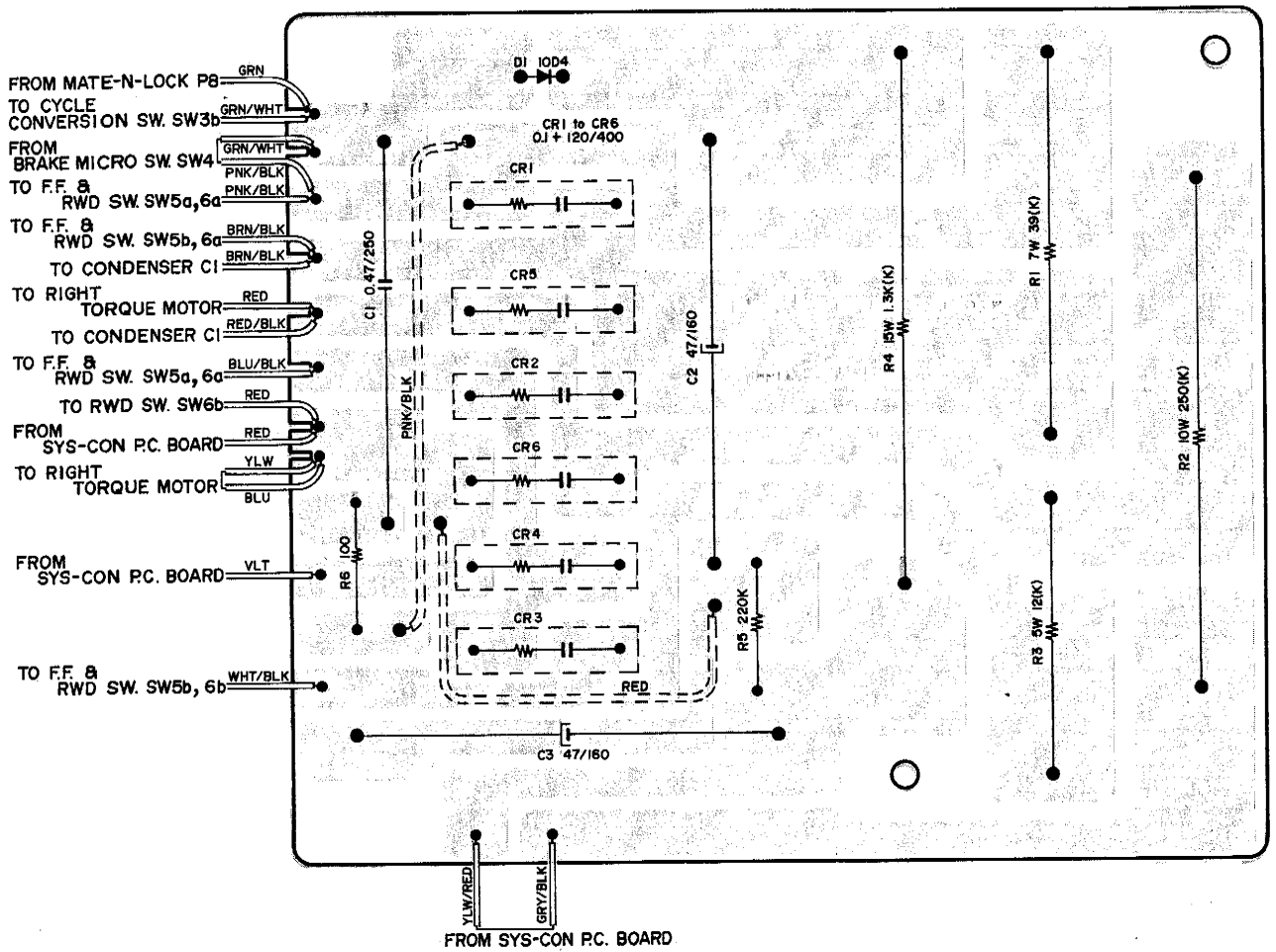
Chart 2

# IX. COMPOSITE VIEWS OF COMPONENTS

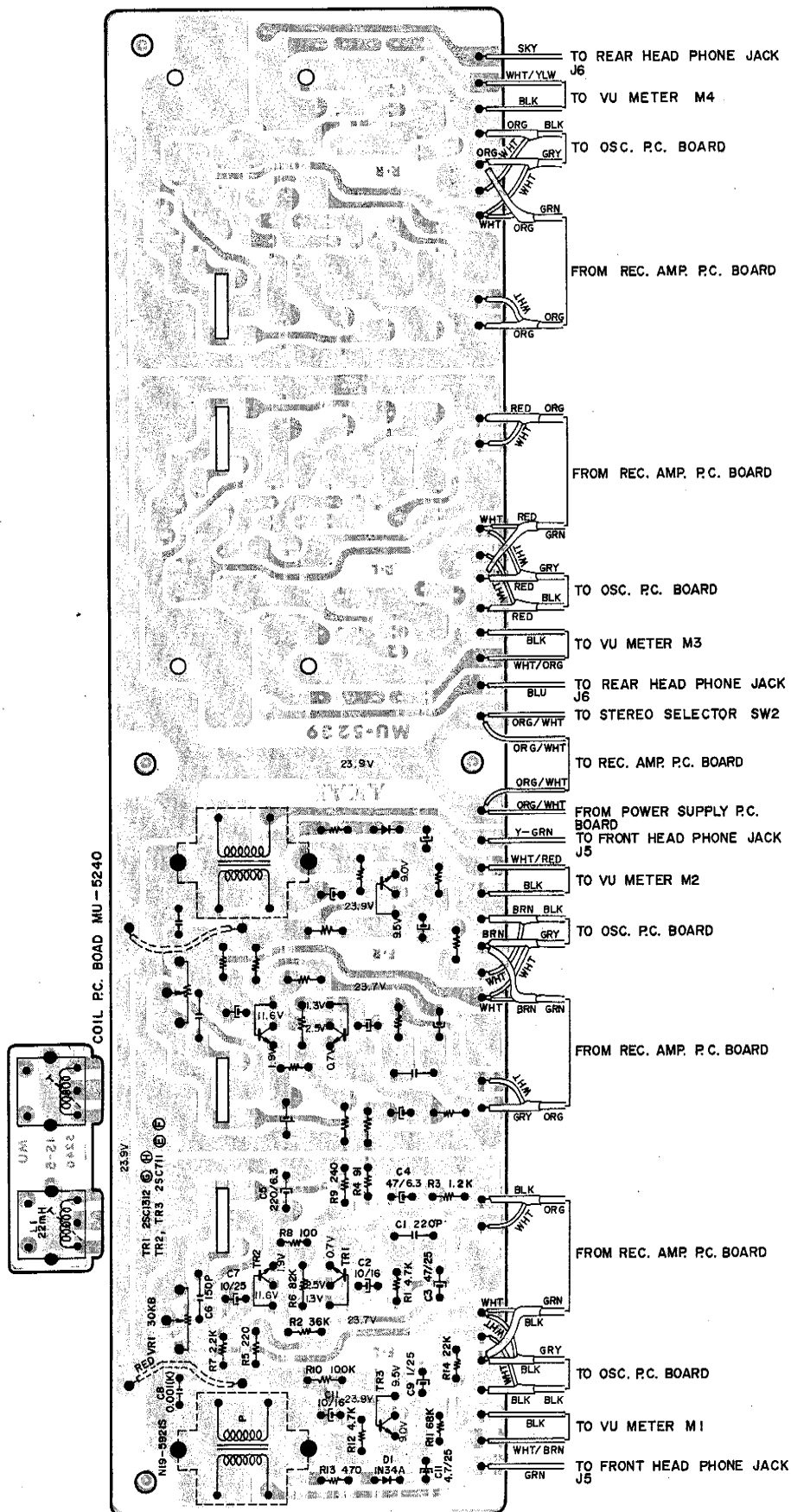
## 1. SYSTEM CONTROL P.C. BOARD MU-1202



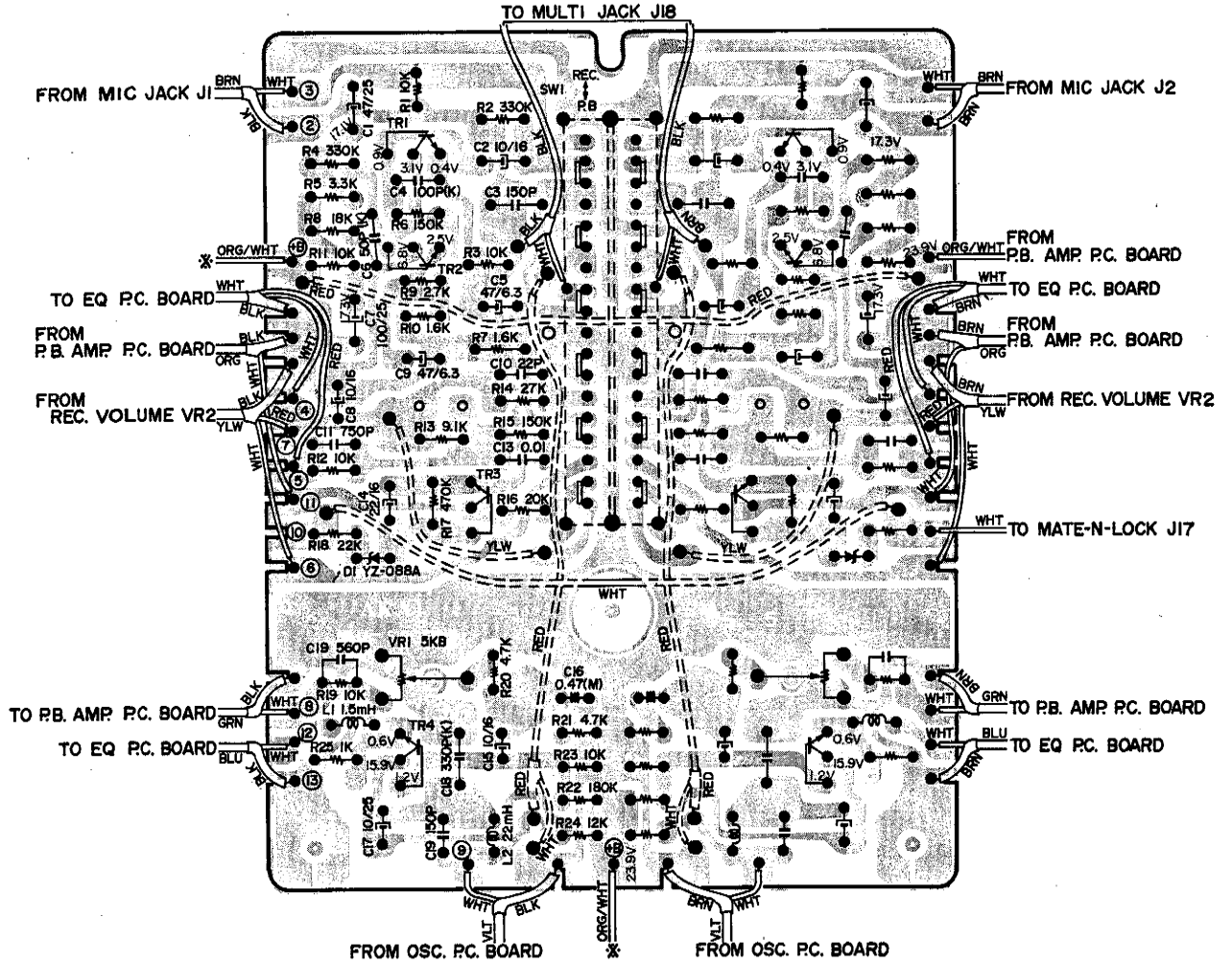
## 2. CR P.C. BOARD MU-1007



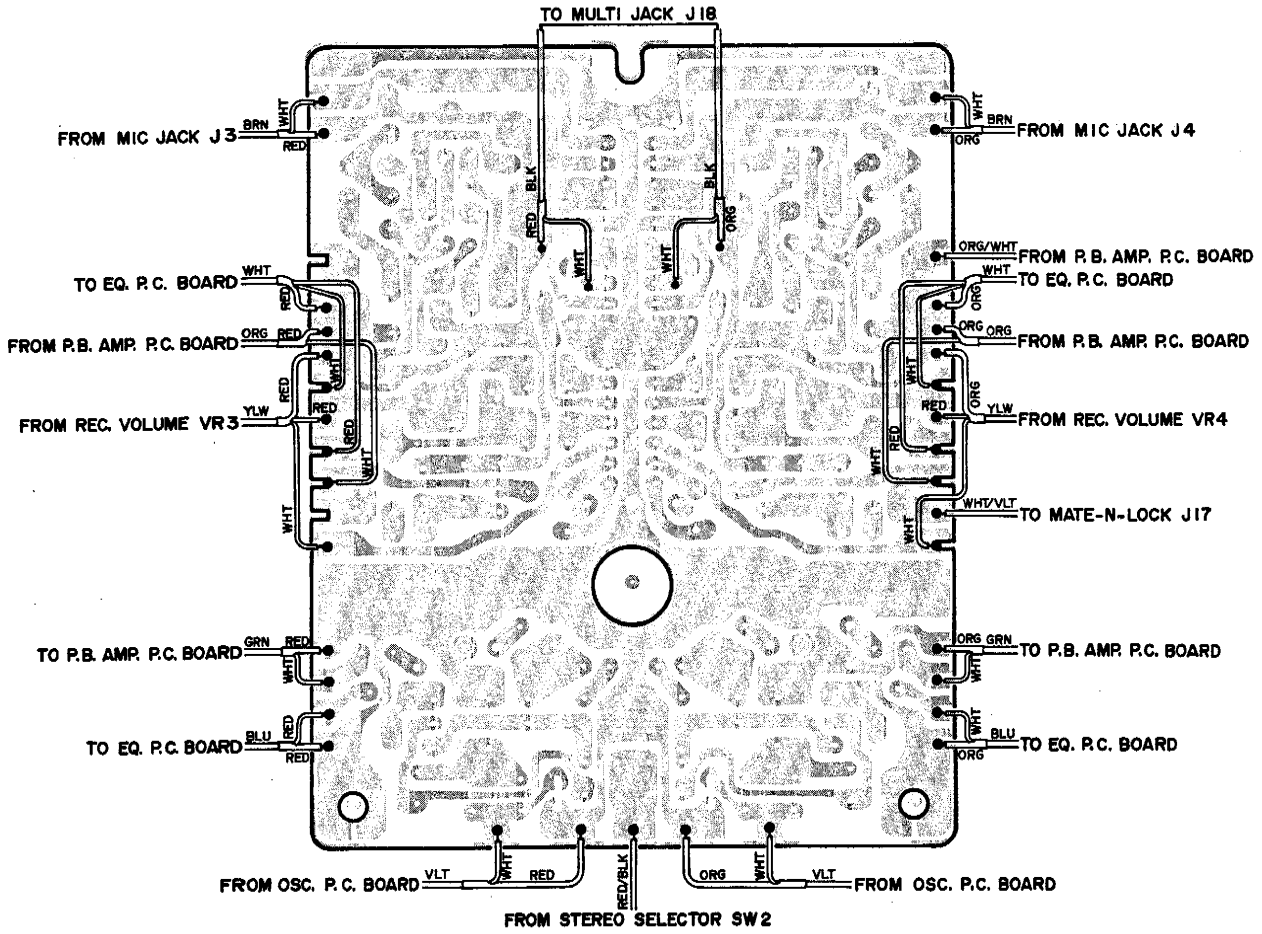
3. PB. AMP. P.C. BOARD MU-5239



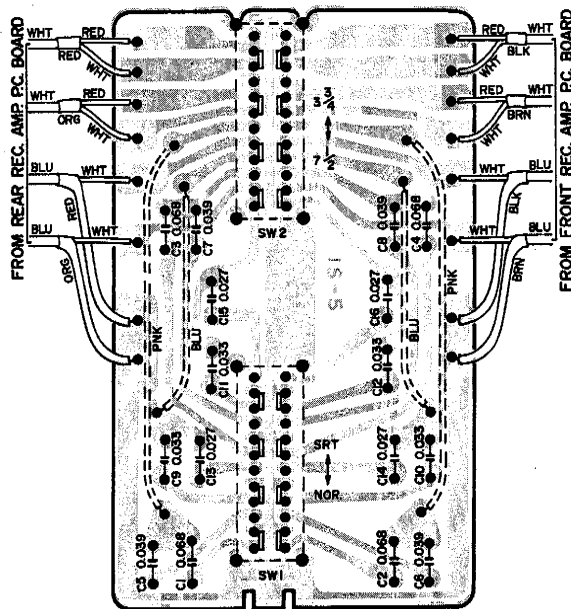
4. REC. AMP. P.C. BOARD MU-5238 (FRONT)



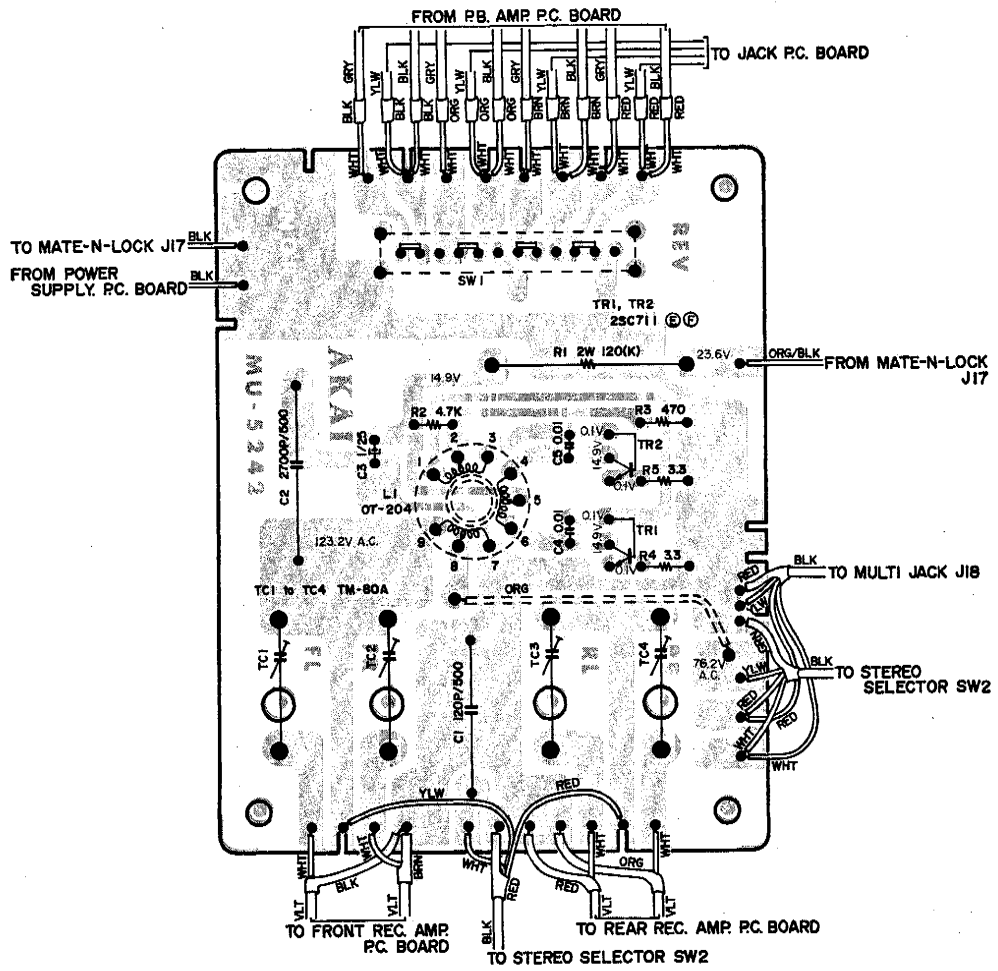
5. REC. AMP. P.C. BOARD MU-5238 (REAR)



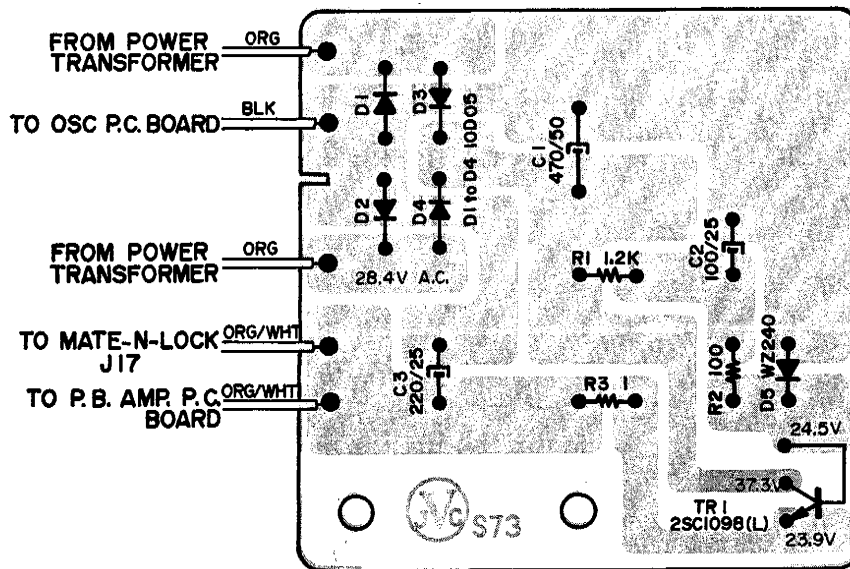
6. EQ. P.C. BOARD MU-5241



7. OSC. P.C. BOARD MU-5242

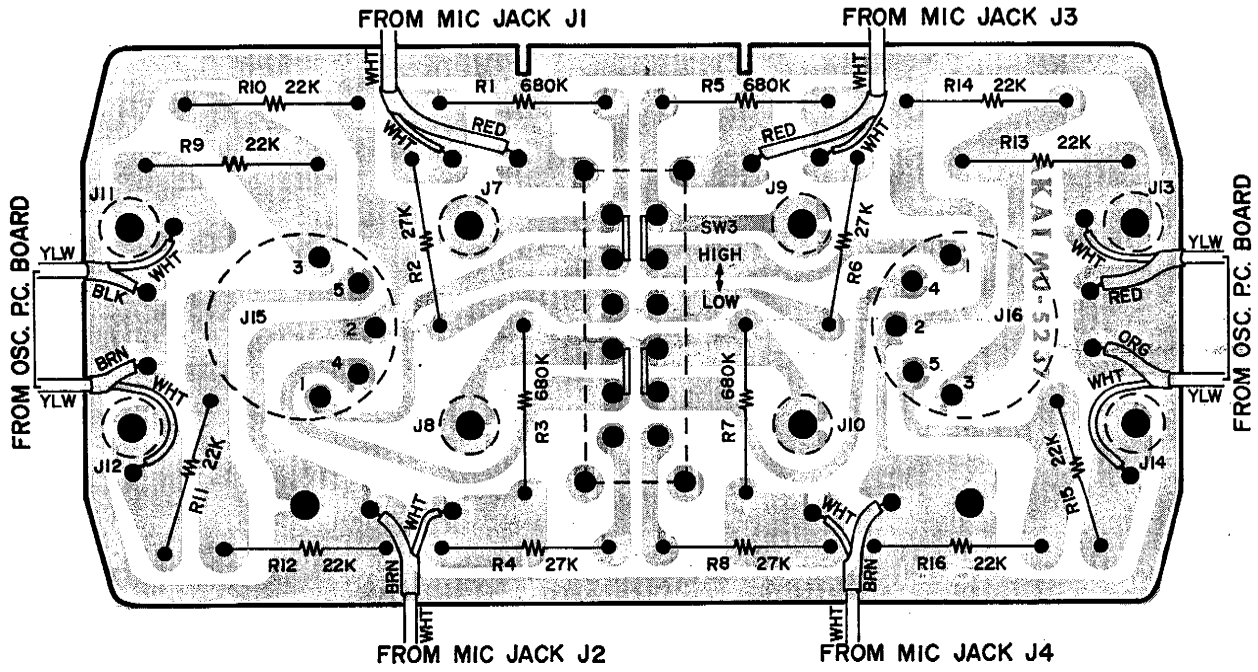


8. POWER SUPPLY P.C. BOARD MU-5017





9. JACK P.C. BOARD MU-5237



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SECTION 2

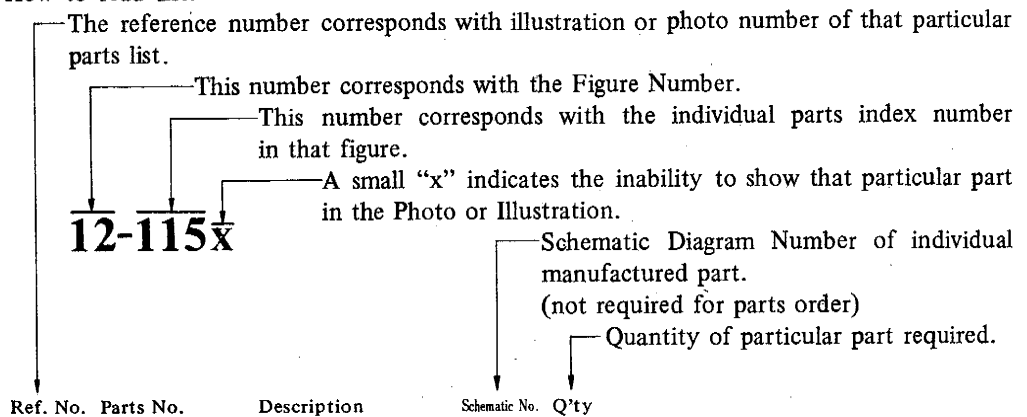
**PARTS LIST**

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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 |
|---------------------------|-----------|----------------------------|---------------|------|
| <b>FLYWHEEL BLOCK #13</b> |           |                            |               |      |
| 12-115x                   | 800425    | Flywheel Block Assy. Comp. | RDG #13       | 1    |
| 12-116                    | 244506    | Flywheel Only              | RD-233        | 1    |
| 12-117x                   | 244754    | Felt, Flywheel             | RD-275        | 1    |
| 12-118                    | 251324    | Main Metal Case            | RD-236        | 1    |
| 12-119                    | 253080    | Main Metal                 | RD-237        | 1    |

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

## ELECTRICAL PARTS TABLE

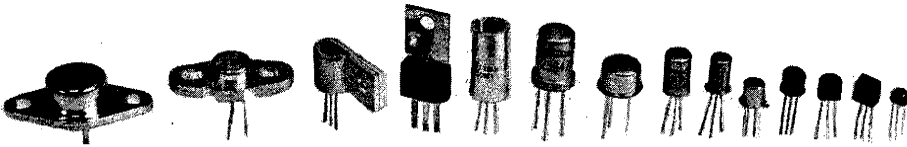
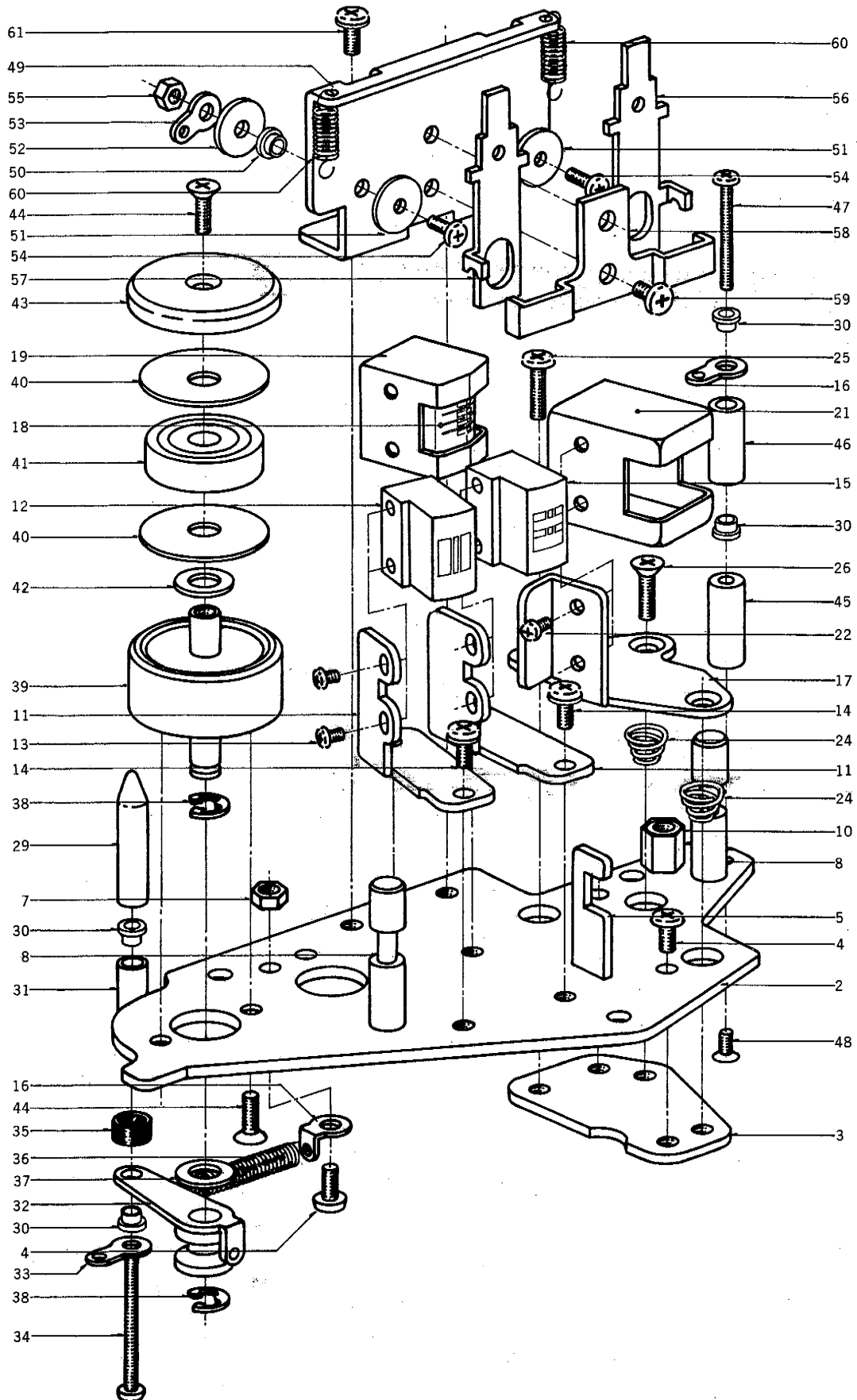
|   |   |   |  |
|---|---|---|--|
| <p>Because the indication of resistors and capacitors in the P. C. Board photos are being eliminated, please confirm parts name and shape by comparing them with the parts shown in this table.</p> | <p style="text-align: center;">1</p>  <p style="text-align: center;">Solid Resistor</p>  | <p style="text-align: center;">2</p> <p style="text-align: right;">Stopper Type</p>  <p style="text-align: center;">Insulator Type</p> <p style="text-align: center;">Carbon Resistor</p> | <p style="text-align: center;">3</p>  <p style="text-align: center;">Metal Oxide Film Resistor</p>  |
| <p style="text-align: center;">4</p>  <p style="text-align: center;">Cement Resistor</p>                           | <p style="text-align: center;">5</p>  <p style="text-align: center;">Wire-Wound Resistor</p>   | <p style="text-align: center;">6</p>  <p style="text-align: center;">Thermister</p>  | <p style="text-align: center;">7</p>  <p style="text-align: center;">Enamel Resistor</p>  |
| <p style="text-align: center;">1</p>  <p style="text-align: center;">MP Capacitor (Tubular Type)</p>               | <p style="text-align: center;">2</p>  <p style="text-align: center;">Plastic Capacitor</p>   | <p style="text-align: center;">3</p>  <p style="text-align: center;">Mylar Capacitor</p>  | <p style="text-align: center;">4</p>  <p style="text-align: center;">VFM (Hi-Q) Capacitor</p>   |
| <p style="text-align: center;">5</p>  <p style="text-align: center;">Mylar Capacitor</p>                         | <p style="text-align: center;">6</p>  <p style="text-align: center;">Tantalum Capacitor</p>  | <p style="text-align: center;">7</p>  <p style="text-align: center;">Oil Capacitor (Tubular Type)</p>   | <p style="text-align: center;">8</p> <p style="text-align: right;">Vertical Type</p> <p style="text-align: left;">(Tubular Type)</p>  <p style="text-align: center;">Styrol Capacitor</p> |
| <p style="text-align: center;">9</p>  <p style="text-align: center;">Electrolytic Capacitor (Tubular Type)</p>   | <p style="text-align: center;">10</p> <p style="text-align: right;">Vertical Type</p> <p style="text-align: left;">(Tubular Type)</p>  <p style="text-align: center;">Electrolytic Capacitor</p> | <p style="text-align: center;">11</p>  <p style="text-align: center;">Ceramic Capacitor</p>   | <p style="text-align: center;">12</p>  <p style="text-align: center;">Metalized Mylar (Paper) Capacitor</p>   |
| <p style="text-align: center;">13</p>  <p style="text-align: center;">Trimmer Condenser</p>                      |   | <p style="text-align: center;">VR</p>  <p style="text-align: center;">Semi-Fixed Volume</p>   |  |
| <p style="text-align: center;">L</p>  <p style="text-align: center;">Ferri Inductor</p>                          | <p style="text-align: center;">TR</p>  <p style="text-align: center;">Transistor</p>  |   |  |
| <p style="text-align: center;">CR</p>  <p style="text-align: center;">Spark Quencher</p>                         | <p style="text-align: center;">D</p>  <p style="text-align: center;">Diode (Silicon, Zener, Germanium)</p>  |   |  |

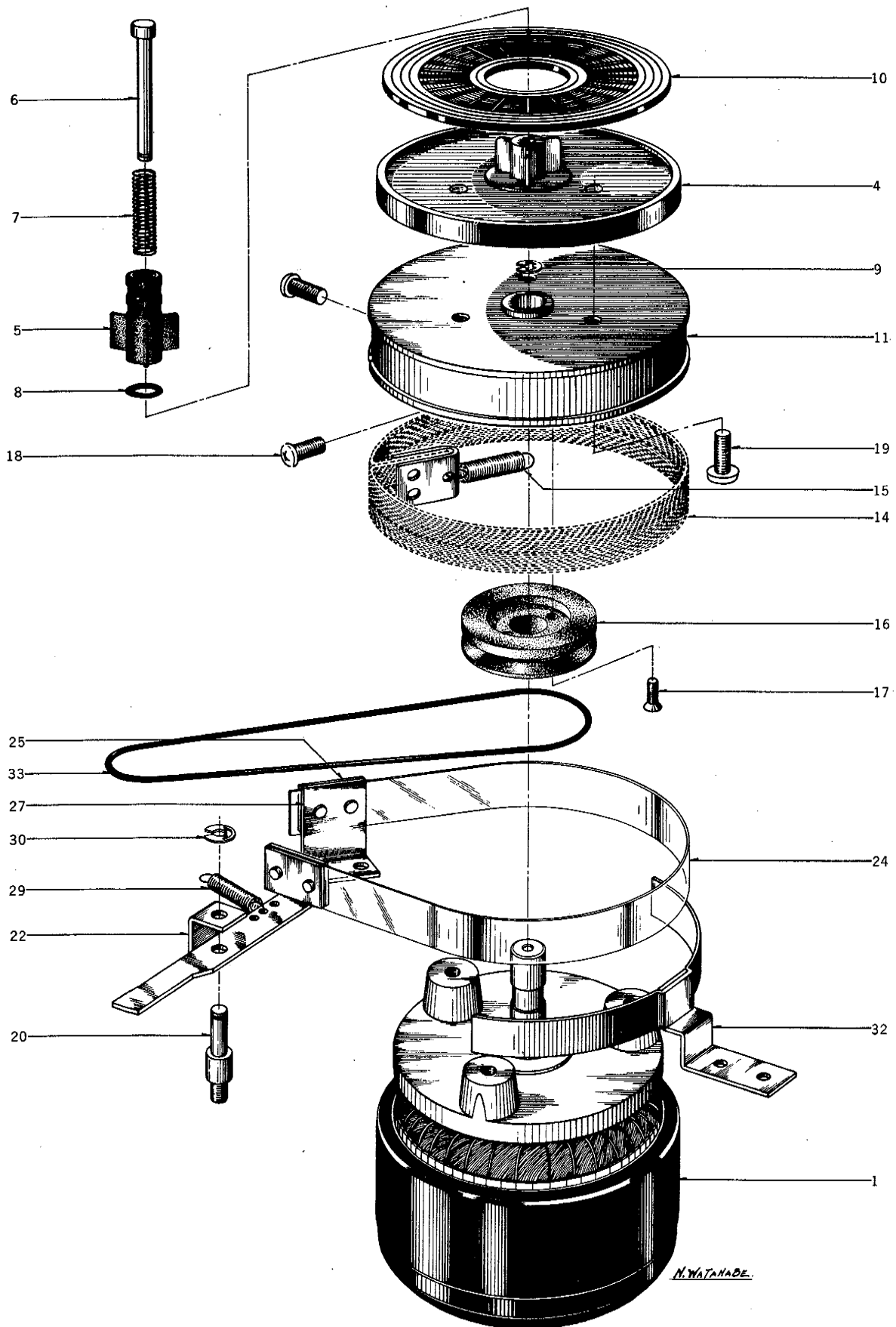
FIG. 1 ILLUSTRATION OF HEAD BLOCK



## HEAD BLOCK

| Ref. No.                    | Parts No. | Description                          | Schematic No. | Q'ty |
|-----------------------------|-----------|--------------------------------------|---------------|------|
| 1-1x                        | BH563545  | Head Block Comp.                     | MU-2          | 1    |
| 1-2                         | HZ548717  | Head Base                            | MU-0201       | 1    |
| 1-3                         | HZ548291  | Head Base Support                    | MU-0202       | 1    |
| 1-4                         | ZS413155  | Screw, binding head 3x6              |               | 4    |
| 1-5                         | HZ274162  | Tape Guide #1                        | 4TR-5         | 1    |
| 1-6x                        | ZW273802  | Toothed Lock Washer M3               |               | 2    |
| 1-7                         | ZW273756  | Nut M3                               |               | 2    |
| 1-8                         | HZ317597  | Tape Guide A, MR                     | MR-4          | 2    |
| 1-9x                        | ZS200384  | Screw, countersunk head 3x6          |               | 1    |
| 1-10                        | HZ541170  | Panel Support                        | MC-0209       | 1    |
| 1-11                        | HZ410984  | Erase Head Base                      | LF-0002       | 2    |
| 1-12                        | HE552914  | ERASE HEAD EF-210                    |               | 1    |
| 1-13                        | ZS201475  | Screw, pan head 2x3                  |               | 4    |
| 1-14                        | ZS403301  | Screw, binding head 3x6,<br>w/washer |               | 5    |
| 1-15                        | HE563220  | ERASE HEAD E4-260                    |               | 1    |
| 1-16                        | ZW273778  | Earth Lug M3                         |               | 3    |
| 1-17                        | HA445116  | P.B. Head Angle                      | DF-0002       | 1    |
| 1-18                        | HP412165  | P.B. HEAD P4-50                      |               | 1    |
| 1-19                        | HZ411085  | 4QP Shield Case                      | LF-0014       | 1    |
| 1-20x                       | HZ411074  | 4QP Back-shield                      | LF-0013       | 1    |
| 1-21                        | HZ411017  | Head Shield Case                     | LF-0005       | 1    |
| 1-22                        | ZS201508  | Screw, pan head 2x4                  |               | 2    |
| 1-23x                       | EZ437736  | Head Terminal Plate (LF)             | LF-0028       | 1    |
| 1-24                        | ZG396538  | Cone Spring                          | KD-0010       | 3    |
| 1-25                        | ZS345914  | Screw, round head 3x10               |               | 1    |
| 1-26                        | ZS455231  | Screw, countersunk head 3x10         |               | 2    |
| 1-27x                       | EA222096  | Connector P.C. Board                 | RD-140        | 1    |
| 1-28x                       | HZ411030  | Wire Fitting Metal                   | LF-0007       | 1    |
| 1-29                        | HZ541181  | Sensing Post B                       | MC-0210       | 1    |
| 1-30                        | HZ317632  | Insulator Collar A                   | MR-36         | 4    |
| 1-31                        | HZ318047  | Sensing Collar A                     | MR-35         | 1    |
| 1-32                        | HZ318036  | Tension Arm, w/pulley                | MR-37         | 1    |
| 1-33                        | ZW316800  | Earth Lug M2.6                       |               | 1    |
| 1-34                        | ZS554962  | Screw, pan head 2.3x25               |               | 1    |
| 1-35                        | HZ467010  | Cushion Rubber, MC                   | MC-0004       | 1    |
| 1-36                        | ZG317114  | Tension Lever Spring                 | MR-39         | 1    |
| 1-37                        | ZW364803  | Washer (Nylon)D5.1x10.3x0.1t         |               | 1    |
| 1-38                        | ZW270123  | 'E' Ring 4M                          | 6-1-9         | 2    |
| 1-39                        | HZ547751  | Tape Guide Table A, w/shaft          | MU-0015       | 1    |
| 1-40                        | ZW231805  | Tape Guide Washer (large)            | 3A-356        | 2    |
| 1-41                        | MV248117  | Bearing 635AHZM1ERB32                |               | 1    |
| 1-42                        | ZW326463  | Washer (PBP)D5.1x10.3x0.2t           |               | 1    |
| 1-43                        | HZ317092  | Tape Guide Table B                   | MR-32         | 1    |
| 1-44                        | ZS414033  | Screw, countersunk head 3x8          |               | 3    |
| 1-45                        | HZ455962  | Sensing Collar B                     | MC-1019       | 1    |
| 1-46                        | HZ455973  | Sensing Collar A                     | MC-1018       | 1    |
| 1-47                        | ZS554916  | Screw, binding head 2.3x20           |               | 1    |
| 1-48                        | ZS558134  | Screw, countersunk head 2.3x5        |               | 1    |
| <b>MECH. ASSEMBLY BLOCK</b> |           |                                      |               |      |
| 1-49                        | ML544285  | DS. Table                            | MU-0011       | 1    |
| 1-50                        | MZ316822  | Insulator Collar B                   | MR-225        | 2    |
| 1-51                        | HZ542092  | Insulator Washer (Mylar)             | MC-0213       | 2    |
| 1-52                        | ZW563218  | Washer (Bake)D3.2x10x1t              |               | 2    |
| 1-53                        | ZW316800  | Earth Lug M2.6                       |               | 2    |
| 1-54                        | ZS464692  | Screw, binding head 2.3x6            |               | 2    |
| 1-55                        | ZW273688  | Nut M2.3                             |               | 2    |
| 1-56                        | HL541168  | DS. Lever A                          | MC-0208A      | 1    |
| 1-57                        | HL542687  | DS. Lever B                          | MC-0208B      | 1    |
| 1-58                        | HL541157  | DS. Lever Support                    | MC-0207       | 1    |
| 1-59                        | ZS417137  | Screw, binding head 3x4              |               | 2    |
| 1-60                        | ZG317777  | Pull Spring                          | MR-47         | 2    |
| 1-61                        | ZS558101  | Screw, pan head 3x6, w/washer        |               | 2    |

FIG. 2 ILLUSTRATION OF REEL MOTOR & REEL TABLE BLOCK



## REEL MOTOR & REEL TABLE BLOCK

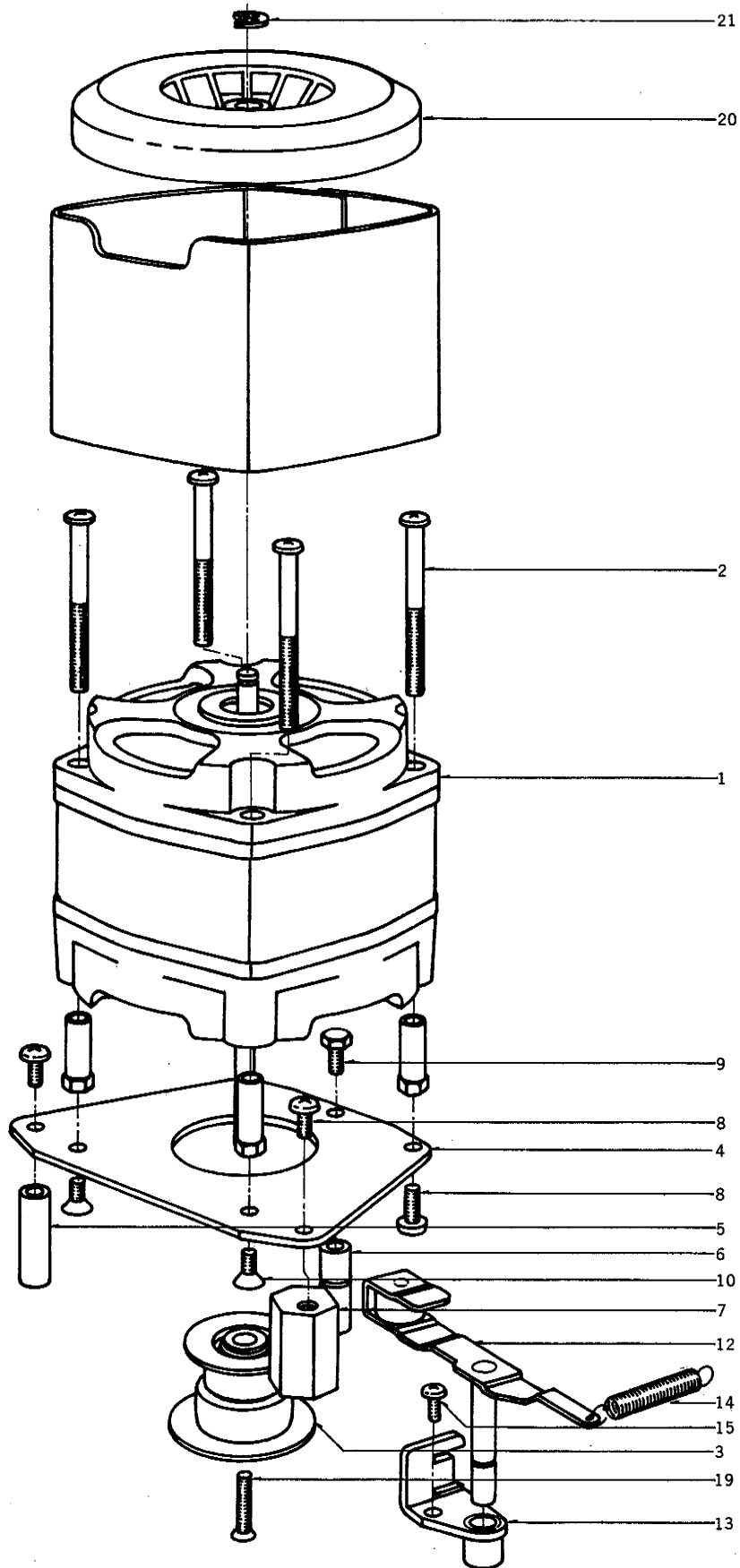
| Ref. No. | Parts No. | Description               | Schematic No.  | Q'ty |
|----------|-----------|---------------------------|----------------|------|
| 2-1      | BM314741  | Reel Motor Block (24X0-2) | MC, MS, MR, KD | 1    |
|          |           | Comp.                     |                |      |
| 2-2x     | BR317395  | Supply Reel Table Comp.   | MU, MC, MR     | 1    |
| 2-3x     | BR317384  | Take-up Reel Table Comp.  | MU, MR         | 1    |
| 2-4      | MT317441  | Reel Table, MR            | MR-215         | 1    |
| 2-5      | MT255420  | Reel Retainer             | 3R-102         | 1    |
| 2-6      | MS342000  | Reel Shaft                | 3R-108         | 1    |
| 2-7      | ZG255633  | Reel Spring               | 3R-109         | 1    |
| 2-8      | MT297663  | 3R 'O' Ring 2.9x1.65M     | 3R-139         | 1    |
| 2-9      | ZW270088  | 'E' Ring 1.9M             | 6-1-9          | 1    |
| 2-10     | MT317463  | Reel Table Rubber, MR     | MR-250         | 1    |
| 2-11     | MT317452  | Brake Drum (R) (Take-up)  | MR-216         | 1    |
| 2-12x    | MT325473  | Brake Drum (L) (Supply)   | MR-216         | 1    |
| 2-13x    | ZW273778  | Earth Lug M3              |                | 1    |
| 2-14     | MT436860  | Brake Cloth Comp.         | MR-269         | 1    |
| 2-15     | ZG317496  | Felt Tension Spring       | MR-260         | 1    |
| 2-16     | MR317507  | Counter Pulley (Take-up)  | MR-217         | 1    |
| 2-17     | ZS365973  | Screw, countersunk head   |                |      |
|          |           | 2.3x12                    |                | 2    |
| 2-18     | ZS424056  | Screw, pan head 4x10      |                | 2    |
| 2-19     | ZS413785  | Screw, binding head 3x12  |                | 3    |

### MECH. ASSEMBLY BLOCK

|       |          |                            |         |   |
|-------|----------|----------------------------|---------|---|
| 2-20  | MH317373 | Brake Lever Prop           | MR-102  | 2 |
| 2-21x | ZW416698 | Nut M4                     |         | 2 |
| 2-22  | ML314976 | Brake Lever A (Take-up)    | MR-210  | 1 |
| 2-23x | ML396810 | Brake Lever B (Supply)     | KD-1038 | 1 |
| 2-24  | MT314987 | Brake Band                 | MR-213  | 2 |
| 2-25  | MZ314998 | Brake Band Retaining Plate | MR-212  | 4 |
| 2-26x | ZS417137 | Screw, binding head 3x4    |         | 6 |
| 2-27  | MZ315000 | Brake Band Support         | MR-214  | 2 |
| 2-28x | ZS425981 | Screw, binding head 3x3    |         | 2 |
| 2-29  | ZG315011 | Brake Lever Spring         | MR-116  | 2 |
| 2-30  | ZW290283 | 'U' Ring 2.85M             | 6-1-1   | 2 |
| 2-31x | ZS323728 | Screw, binding head 3x5    |         | 8 |
| 2-32  | MZ317406 | Brake Band Guide, w/base   | MR-120  | 2 |
| 2-33  | MB527556 | Counter Belt D93x1.5       | ND-1022 | 1 |



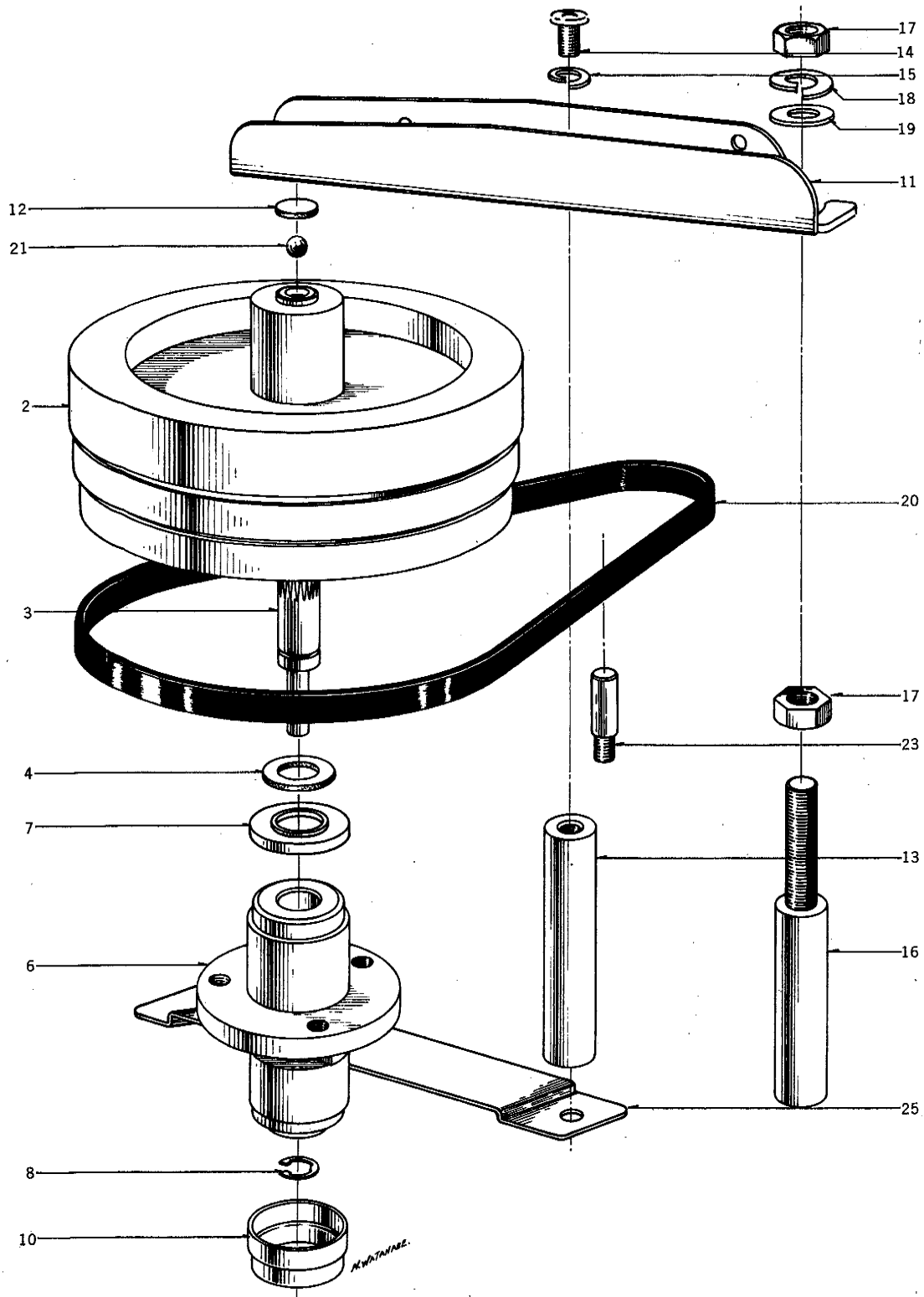
FIG. 3 ILLUSTRATION OF MAIN MOTOR BLOCK



## MAIN MOTOR BLOCK

| Ref. No.                       | Parts No. | Description                           | Schematic No. | Q'ty |
|--------------------------------|-----------|---------------------------------------|---------------|------|
| <b>MAIN MOTOR BLOCK</b>        |           |                                       |               |      |
| 3-1                            | BM563196  | Main Motor Block (HM2-16MU)<br>Comp.  | MU            | 1    |
| 3-2                            | ZS427037  | Screw, pan head 4x50,<br>w/washer     |               | 4    |
| 3-3                            | MR540876  | Motor Pulley Comp.                    | MC-7201       | 1    |
| 3-4                            | MZ316293  | Motor Mt. Plate, MR                   | MR-717        | 1    |
| 3-5                            | MH254160  | Motor Prop A                          | 24X-730       | 1    |
| 3-6                            | MZ254182  | Motor Prop B                          | 24X-731       | 1    |
| 3-7                            | MH316304  | Motor Prop, MR                        | MR-706        | 1    |
| 3-8                            | ZS424056  | Screw, pan head 4x10                  |               | 4    |
| 3-9                            | ZS272395  | Motor Prop Retaining Screw,<br>M-7    | 24X-732       | 1    |
| 3-10                           | ZS427026  | Screw, countersunk head 4x10          |               | 2    |
| <b>BELT CHANGE LEVER BLOCK</b> |           |                                       |               |      |
| 3-11x                          | BL555344  | Belt Change Lever Block Comp.         | MU, MC-2      | 1    |
| 3-12                           | ML540990  | Belt Change Lever, w/roller           | MC-1207       | 1    |
| 3-13                           | ML541001  | Belt Change Lever Stopper,<br>w/metal | MC-1208       | 1    |
| 3-14                           | ZG217337  | Belt Return Spring                    | 4TR-224       | 1    |
| 3-15                           | ZS417150  | Screw, pan head 4x6                   |               | 1    |
| 3-16x                          | ZG217394  | Belt Change Spring B                  | MH-125        | 1    |
| 3-17x                          | ZW260054  | Washer (SUP)D6.1x10x0.25t             |               | 1    |
| 3-18x                          | ZW290283  | 'U' Ring 2.85M                        | 6-1-1         | 1    |
| 3-19                           | ZS203016  | Screw, oval countersunk head<br>3x15  |               | 1    |
| 3-20                           | SZ529108  | Main Motor Fan                        | ND-7010       | 1    |
| 3-21                           | ZW270134  | 'E' Ring 5M                           | 6-1-9         | 1    |

FIG. 4 ILLUSTRATION OF FLYWHEEL BLOCK



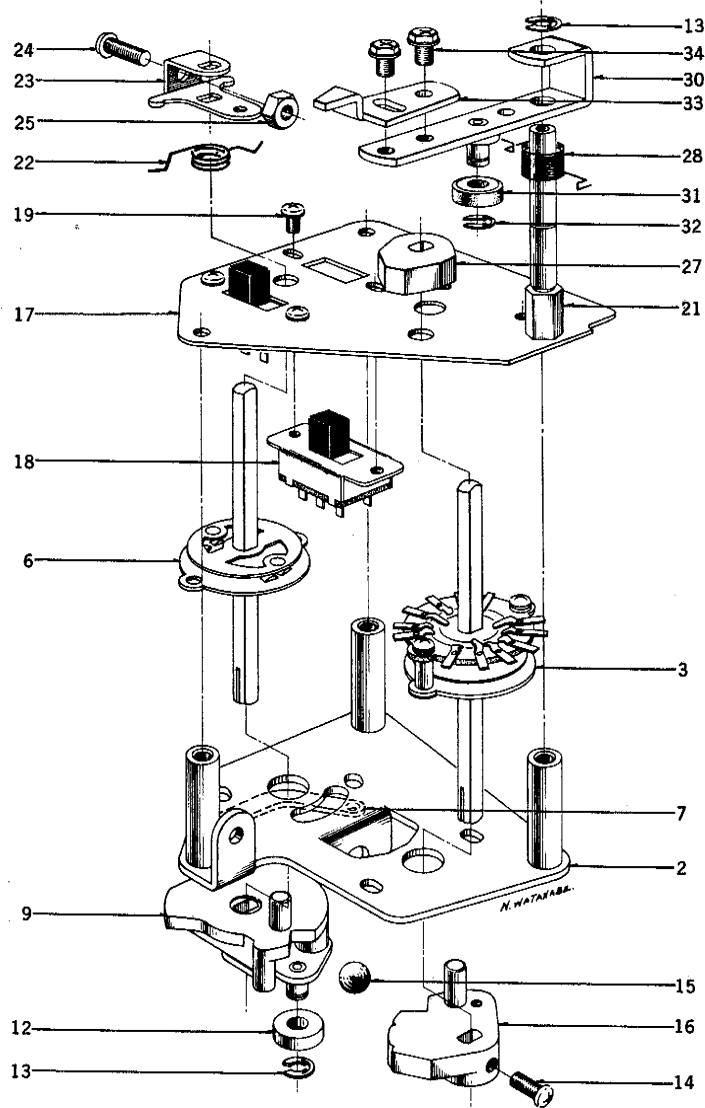
## FLYWHEEL BLOCK

| Ref. No. | Parts No. | Description               | Schematic No.   | Q'ty |
|----------|-----------|---------------------------|-----------------|------|
| 4-1x     | BF476550  | Flywheel Block Comp.      | MS-2,3,<br>MR-2 | 1    |
| 4-2      | MI296245  | Flywheel 24               | MH-202          | 1    |
| 4-3      | MS476572  | Main Shaft, D6            | MR-2005         | 1    |
| 4-4      | ZW447208  | Flywheel Thrust B         |                 |      |
|          |           | D7.9x13x0.5t              | 101025          | 1    |
| 4-5x     | ZS373577  | Set Screw, hexagon socket |                 |      |
|          |           | 5x6(flat)                 |                 | 2    |
| 4-6      | MZ296256  | Main Case A 24, w/metal   | MH-206          | 1    |
| 4-7      | MZ446635  | Thrust Cap, Main Metal B2 | LF-2006         | 1    |
| 4-8      | MH244710  | Flywheel Fixing Pin       | 90-250          | 1    |
| 4-9x     | MZ244113  | Felt D12.5x16x2t          |                 | 1    |
| 4-10     | MZ253113  | Main Metal Cap B          | MH-208          | 1    |

## MECH. ASSEMBLY BLOCK

|       |          |                                       |         |   |
|-------|----------|---------------------------------------|---------|---|
| 4-11  | MZ314897 | Flywheel Support Plate, MR            | MR-121  | 1 |
| 4-12  | ZW392681 | Washer (Nylon)D8x1t<br>(without hole) |         | 1 |
| 4-13  | MH273036 | Flywheel Prop A, M-9                  | M9-310  | 1 |
| 4-14  | ZS413201 | Screw, pan head 4x8                   |         | 1 |
| 4-15  | ZW273914 | Spring Washer M4                      |         | 3 |
| 4-16  | MH273047 | Flywheel Prop B, M-9                  | M9-311  | 1 |
| 4-17  | ZW413280 | Inch Nut 1/4" mountain 20             |         | 2 |
| 4-18  | ZW393232 | Spring Washer 1/4"                    |         | 1 |
| 4-19  | ZW413998 | Washer (SUP)D6.8x12.7x1t              |         | 1 |
| 4-20  | MB541012 | Drive Belt (flat).D116.9x1.6x7        | MC-1209 | 1 |
| 4-21  | MV269965 | Steel Ball D4                         |         | 1 |
| 4-22x | ZS424056 | Screw, pan head 4x10                  |         | 2 |
| 4-23  | MH248343 | Belt Guide Pin                        | 4TR-109 | 1 |
| 4-24x | ZW416698 | Nut M4                                |         | 1 |
| 4-25  | MZ439525 | Flywheel Belt Holding Plate B         | MS-1014 | 1 |
| 4-26x | ZS439514 | Screw, binding head 3x18              |         | 1 |
| 4-27x | ZW273756 | Nut M3                                |         | 1 |

FIG. 5 ILLUSTRATION OF SWITCH BLOCK



**SWITCH BLOCK**

| Ref. No.            | Parts No. | Description                          | Schematic No. | Q'ty | Ref. No.                  | Parts No. | Description                | Schematic No. | Q'ty |
|---------------------|-----------|--------------------------------------|---------------|------|---------------------------|-----------|----------------------------|---------------|------|
| <b>SWITCH BLOCK</b> |           |                                      |               |      |                           |           |                            |               |      |
| 5-1x                | BS558336  | Switch Block Comp.                   | MU-1, 2       | 1    | 5-21                      | MH317046  | Rec. Lever Prop            | MR-206        | 1    |
| 5-2                 | HZ402390  | SW. Table A-2, MR (w/prop)           | MR-201        | 1    | 5-22                      | ZG225516  | SW. Spring                 | MR-255        | 1    |
| 5-3                 | ES316923  | Play Shaft (Y type) Y-133            | 25-8-6        | 1    | 5-23                      | MZ317024  | SW. Cam                    | MR-204        | 1    |
| 5-4x                | ZW273802  | Toothed Lock Washer M3               |               | 2    | 5-24                      | ZS424056  | Screw, pan bead 4x10       |               | 1    |
| 5-5x                | ZW273756  | Nut M3                               |               | 2    | 5-25                      | ZW416698  | Nut M4                     |               | 1    |
| 5-6                 | ES316934  | Rewind Shaft (Y type)                | 25-8-5        | 1    | 5-26x                     | ZS323728  | Screw, binding head 3x5    |               | 3    |
| 5-7                 | MZ316945  | Nut Plate                            | MR-245        | 1    | 5-27                      | MZ317068  | Amp. SW. Cam B             | MR-243        | 1    |
| 5-8x                | ZS413728  | Screw, binding head 3x6,<br>w/washer |               | 2    | 5-28                      | ZG227564  | Spring H                   | 900-120       | 1    |
| 5-9                 | MZ316956  | Cam A-3                              | MR-242        | 1    | <b>SWITCH LEVER BLOCK</b> |           |                            |               |      |
| 5-10x               | ZW259942  | Washer (Fiber)D5.1x10.3x0.5t         |               | 1    | 5-29x                     | BL204480  | Switch Lever Block Comp.   | #2-MR         | 1    |
| 5-11x               | ZW376402  | Washer (Fiber)D5.1x10.3x1t           |               | 2    | 5-30                      | ML226080  | SW. Lever A, w/shaft B     | 900-255       | 1    |
| 5-12                | MR269730  | Cam Roller D $\frac{1}{2}$           | 900-213       | 1    | 5-31                      | MR217203  | Cam Roller A (Nylon)D12    | 900-153       | 1    |
| 5-13                | ZW290283  | 'U' Ring 2.85M                       | 6-1-1         | 2    | 5-32                      | ZW290283  | 'U' Ring 2.85M             | 6-1-1         | 1    |
| 5-14                | ZS413201  | Screw, pan head 4x8                  |               | 3    | 5-33                      | ML226124  | SW. Lever B                | 900-256       | 1    |
| 5-15                | MV270066  | Steel Ball D8                        |               | 1    | 5-34                      | ZS437545  | Hexagon Bolt 4x7, w/washer |               | 2    |
| 5-16                | MZ405483  | Cam B-1, w/tap                       | 900-206       | 1    |                           |           |                            |               |      |
| 5-17                | MZ544364  | Control Chassis                      | MU-2001       | 1    | 5-35x                     | MZ256814  | Rewind Shaft Spacer        | M9-124        | 2    |
| 5-18                | ES479485  | Slide SW. S-1                        | 25-3-66       | 2    |                           |           |                            |               |      |
| 5-19                | ZS371856  | ISO Screw, binding head 3x5          |               | 4    |                           |           |                            |               |      |
| 5-20x               | ZS559045  | Screw, binding head 4x8,<br>w/washer |               | 2    |                           |           |                            |               |      |

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

FIG. 6a ILLUSTRATION OF MECHANISM ASSEMBLY BLOCK

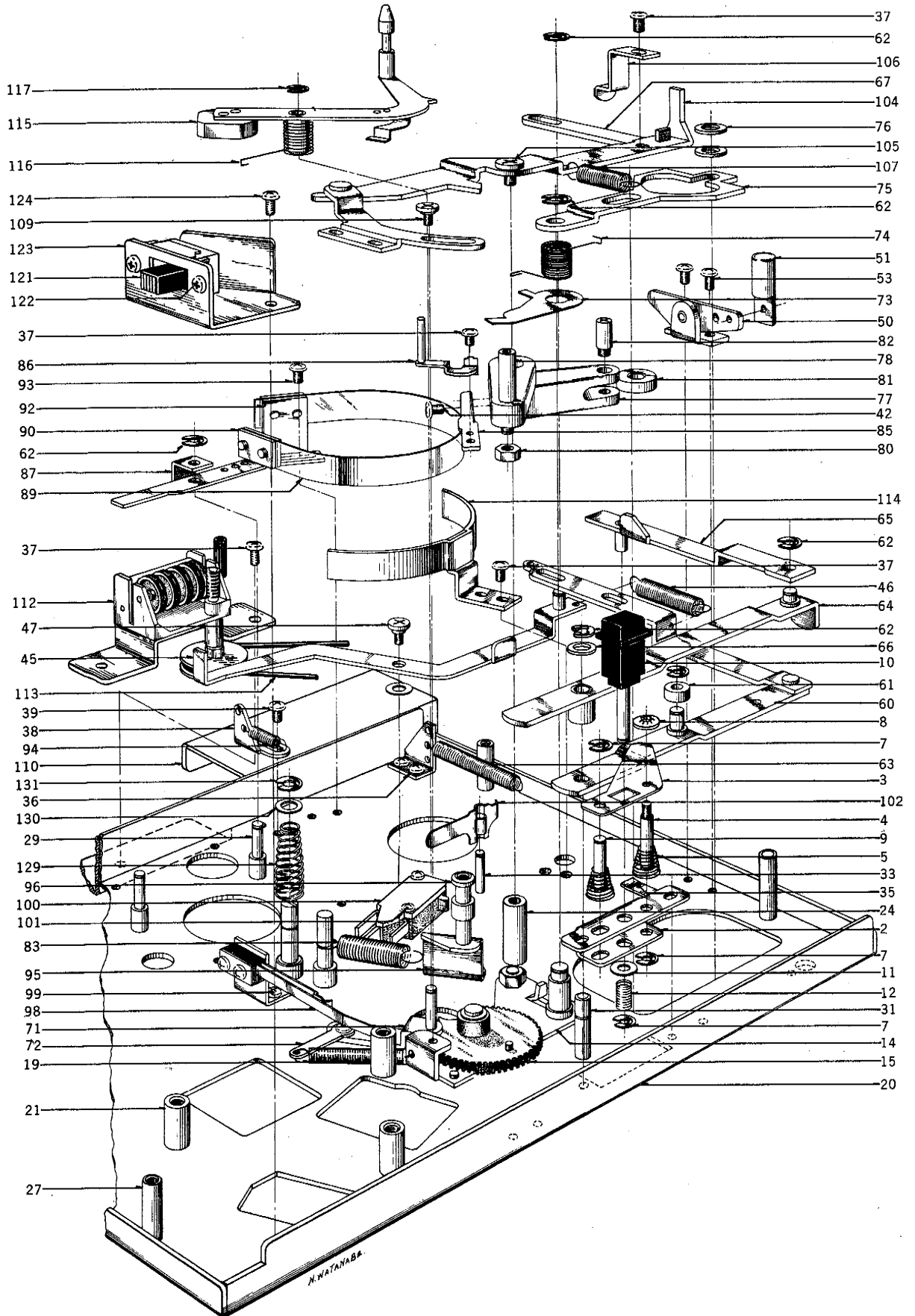
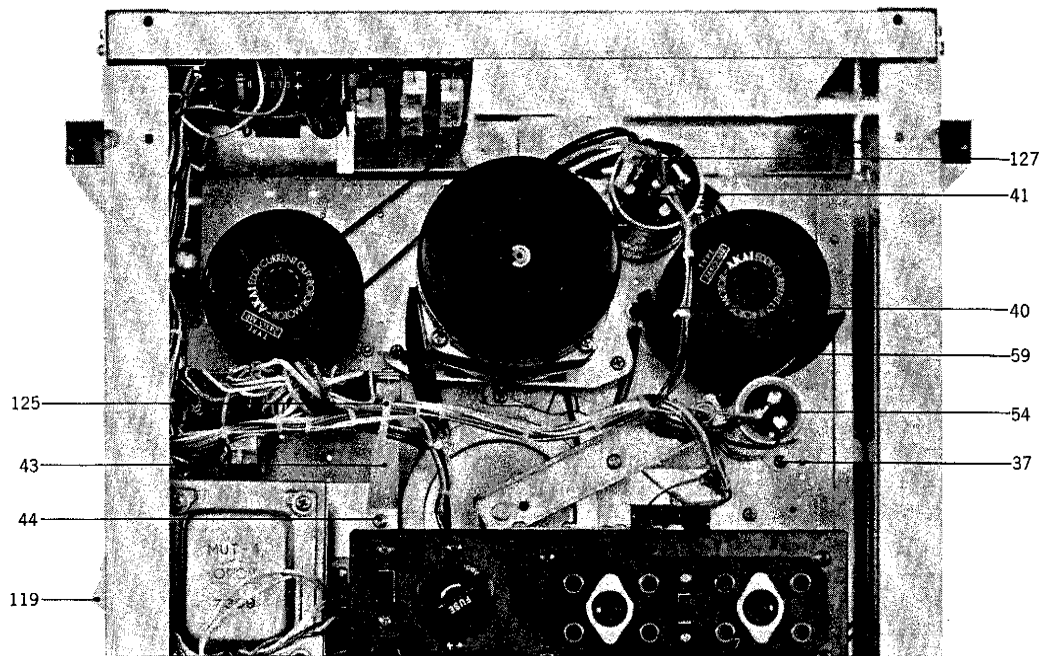


FIG. 6b PHOTO OF MECHANISM ASSEMBLY BLOCK



**MECHANISM ASSEMBLY BLOCK**

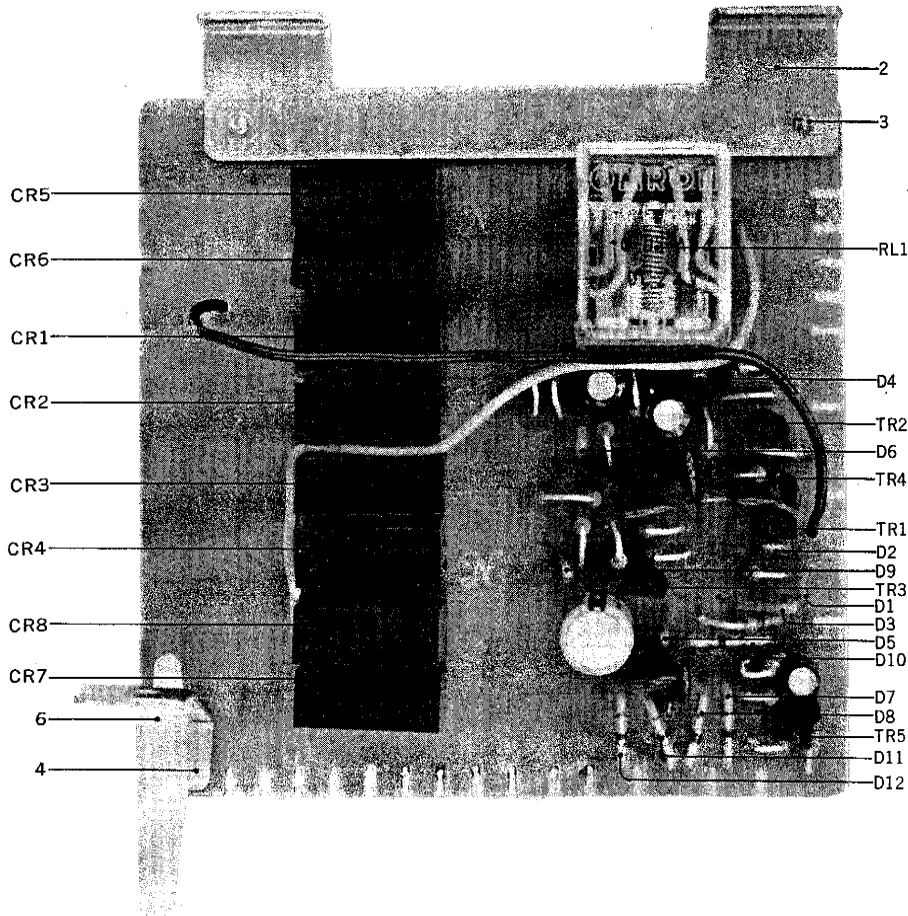
| Ref. No.                    | Parts No. | Description                   | Schematic No.     | Q'ty | Ref. No. | Parts No. | Description                                 | Schematic No. | Q'ty |
|-----------------------------|-----------|-------------------------------|-------------------|------|----------|-----------|---|---------------|------|
| <b>REC. BUTTON BLOCK</b>    |           |                               |                   |      |          |           |   |               |      |
| 6-1x                        | BZ558347  | Rec. Button Block Comp.       | MU-1, 2           | 1    | 6-38     | MZ314605  | Spring Rack, MR                             | MR-104        | 2    |
| 6-2                         | MZ316708  | Stopper Table                 | MR-219            | 1    | 6-39     | ZS425981  | Screw, binding head 3x3                     |               | 4    |
| 6-3                         | MZ316710  | Cam Stopper                   | MR-220            | 1    | 6-40     | ZS413212  | Screw, binding head 3x5, w/lug              |               | 1    |
| 6-4                         | MS316721  | Stopper Shaft                 | MR-221            | 1    | 6-41     | EC520626  | MP/C. (3+1) $\mu$ Fx2 250WVAC<br>(Lug type) | 24-9-74       | 1    |
| 6-5                         | ZG316732  | Cone Spring                   | MR-244            | 2    | 6-42     | ZS413223  | Screw, binding head 3x5,<br>w/washer        |               | 6    |
| 6-6x                        | ZW322525  | Washer (PBP)D4.1x7x0.2t       |                   | 1    | 6-43     | MZ544331  | P.C. Board Holder B                         | MU-1004       | 1    |
| 6-7                         | ZW290283  | 'U' Ring 2.85M                | 6-1-1             | 4    | 6-44     | ZS413155  | Screw, binding head 3x6                     |               | 2    |
| 6-8                         | ZW432944  | Push Nut 3x10x0.3t            |                   | 1    | 6-45     | ML314684  | Brake Lever C, w/pin                        | MR-227        | 1    |
| 6-9                         | MS316776  | Stopper Shaft B               | MR-259            | 1    | 6-46     | ZG314706  | Spring IB                                   | MR-115        | 1    |
| 6-10                        | SK543857  | Rec. Button B                 | MR-222            | 1    | 6-47     | ZS314717  | Graduated Screw, MR                         | MR-254        | 1    |
| 6-11                        | ZW419646  | Washer (SPC)D4.5x9.8x0.5t     |                   | 1    | 6-48x    | ZW432347  | Washer (Luminar)<br>D6.2x13x0.125t          |               | 1    |
| 6-12                        | ZG316765  | Rec. Button Spring            | MR-252            | 1    | 6-49x    | ZW273756  | Nut M3                                      |               | 1    |
| <b>ECCENTRIC GEAR BLOCK</b> |           |                               |                   |      |          |           |   |               |      |
| 6-13x                       | BZ248027  | Eccentric Gear Block Comp.    | MC, MS,<br>M9, MR | 1    | 6-50     | ML226258  | Start Lever A, w/lever B-2                  | 4TR-122       | 1    |
| 6-14                        | MZ248016  | Eccentric Gear Table, w/shaft | 4TR-243           | 1    | 6-51     | SB425777  | Start Button D                              | MS-1002       | 1    |
| 6-15                        | MZ248005  | Eccentric Gear                | 4TR-245           | 1    | 6-52x    | ZW314728  | Cotter Pin 1.6x8                            |               | 1    |
| 6-16x                       | ZW861344  | Washer (PBP)D6.1x10x0.4t      |                   | 1    | 6-53     | ZS425788  | Screw, round head 3x4                       |               | 2    |
| 6-17x                       | ZW260144  | Washer (Nylon)D6.1x10x0.3t    |                   | 1    | 6-54     | EC442056  | MP/C. 2+1 $\mu$ F 250WVAC<br>(Lug type)     | 24-9-61       | 1    |
| 6-18x                       | ZW290283  | 'U' Ring 2.85M                | 6-1-1             | 1    | 6-55x    | ZW330412  | Adjust Washer (U)<br>D4x13x0.13t            |               | 1    |
| 6-19                        | ZG437253  | Eccentric Gear Return Spring  | MS-2022           | 1    | 6-56x    | ZW330423  | Adjust Washer (U)<br>D4x13x0.25t            |               | 1    |
| <b>MECH. ASSEMBLY BLOCK</b> |           |                               |                   |      |          |           |   |               |      |
| 6-20                        | MZ317340  | MR Mech. Frame, w/pin         | MR-101            | 1    | 6-57x    | ZW330434  | Adjust Washer (U) D4x13x0.5t                |               | 1    |
| 6-21                        | MH247533  | Head Prop E                   | 100012            | 3    | 6-58x    | ZW330445  | Adjust Washer (U) D4x13x0.8t                |               | 1    |
| 6-22x                       | ZS413201  | Screw, pan head 4x8           |                   | 2    | 6-59     | MZ314673  | Reel Motor Shield                           | MR-123        | 1    |
| 6-23x                       | ZS414044  | Screw, countersunk head 4x8   |                   | 1    | 6-60     | ML314763  | Lever B, MR (w/lever D)                     | MR-122        | 1    |
| 6-24                        | MS317362  | Pinch Roller Arm Shaft        | MR-125            | 1    | 6-61     | MR314785  | Cam Roller D9                               | MR-237        | 1    |
| 6-25x                       | ZW274026  | Spring Washer M5              |                   | 1    | 6-62     | ZW290283  | 'U' Ring 2.85M                              | 6-1-1         | 9    |
| 6-26x                       | ZW413278  | Nut M5                        |                   | 1    | 6-63     | ZG314818  | D Lever Spring                              | MR-114        | 1    |
| 6-27                        | MH273295  | Mech. Panel Prop, M-9         | M9-302            | 2    | 6-64     | ML234506  | Lever A, MR (w/metal)                       | MR-126        | 1    |
| 6-28x                       | ZS421806  | Screw, pan head 3x8           |                   | 2    | 6-65     | ML314842  | C Lever, MR (w/pin)                         | MR-108        | 1    |
| 6-29                        | MH317373  | Brake Lever Prop              | MR-102            | 2    | 6-66     | ZW419826  | Washer (Fiber)D6.2x10x1t                    |               | 2    |
| 6-30x                       | ZW416698  | Nut M4                        |                   | 2    | 6-67     | ML314864  | IB Lever                                    | MR-111        | 1    |
| 6-31                        | MS260515  | A Lever Shaft                 | 900-126           | 1    | 6-68x    | ZW259705  | Washer (BSP)D4.1x13x1t                      |               | 1    |
| 6-32x                       | ZW413267  | Flange Nut M4                 |                   | 1    | 6-69x    | ZS207314  | Amp. Lever Set Screw                        | 3A-737        | 1    |
| 6-33                        | MS250536  | Micro Lever Shaft             | 3A-239            | 1    | 6-70x    | ZW259885  | Washer (PBP)D5.1x10.3x0.1t                  |               | 1    |
| 6-34x                       | ZW273688  | Nut M2.3                      |                   | 1    | 6-71     | MZ260662  | AS Lever Prop Base, w/prop                  | 4TR-236       | 1    |
| 6-35                        | MZ217697  | Pause Lever Stopper Plate     | M9-113            | 1    | 6-72     | ZS202116  | Screw, binding head 3x5, w/lug              |               | 1    |
| 6-36                        | MZ227340  | Spring Rack B                 | 900-172           | 1    | 6-73     | MZ218125  | Gear Stopper                                | 4TR-120       | 1    |
| 6-37                        | ZS323728  | Screw, binding head 3x5       |                   | 21   | 6-74     | ZG226697  | Stopper Gear                                | 4TR-121       | 1    |
|                             |           |                               |                   |      | 6-75     | ML228868  | Auto. Mech. Control Lever                   | 4TR-125       | 1    |

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

| Ref. No. | Parts No. | Description                              | Schematic No.     | Q'ty |
|----------|-----------|--|-------------------|------|
| 6-76     | ZW260087  | Washer (Fiber)D6.1x10x0.5t               |                   | 1    |
| 6-77     | ML314932  | Pinch Roller Lever, MR                   | MR-119            | 1    |
| 6-78     | MS243404  | Pinch Roller Shaft C                     | 4TR-102           | 1    |
| 6-79x    | ZW259975  | Washer (SUP)D5.1x10.3x0.8t               |                   | 1    |
| 6-80     | ZW416698  | Nut M4                                   |                   | 1    |
| 6-81     | MR269763  | Cam Roller D13                           | 900-154           | 1    |
| 6-82     | MS582906  | Cam Roller Shaft A-1                     | 7-3-6             | 1    |
| 6-83     | ZG455692  | Pinch Roller Spring, MS                  | MS-1015           | 1    |
| 6-84x    | ZW314943  | Washer (Nylon)D8                         | MR-113            | 1    |
| 6-85     | ML314954  | Shifter Lever A                          | MR-117            | 1    |
| 6-86     | ML549213  | Shifter Lever B, w/pin                   | MC-1215           | 1    |
| 6-87     | ML314976  | Brake Lever A (Take-up)                  | MR-210            | 1    |
| 6-88x    | ML396810  | Brake Lever B (Supply)                   | KD-1038           | 1    |
| 6-89     | MT314987  | Brake Band                               | MR-213            | 2    |
| 6-90     | MZ314998  | Brake Band Retaining Plate               | MR-212            | 4    |
| 6-91x    | ZS417137  | Screw, binding head 3x4                  |                   | 6    |
| 6-92     | MZ315000  | Brake Band Support                       | MR-214            | 2    |
| 6-93     | ZS425981  | Screw, binding head 3x3                  |                   | 2    |
| 6-94     | ZG315011  | Brake Lever Spring                       | MR-116            | 2    |
| 6-95     | HZ315077  | Reverse Guide Base, w/prop               | MR-229            | 1    |
| 6-96     | HZ315090  | Reverse Guide                            | RD-225            | 1    |
| 6-97x    | ZS344463  | Set Screw, hexagon socket<br>4x6(cup)    |                   | 1    |
| 6-98     | ES546794  | Tension SW. Comp. MU                     | MU-1012           | 1    |
| 6-99     | ZS427048  | Screw, round head 3x3                    |                   | 2    |
| 6-100    | ES562465  | Micro SW. K-1                            | 25-1-26           | 1    |
| 6-101    | ZS417148  | Screw, binding head 3x15                 |                   | 2    |
| 6-102    | ML316394  | Operation SW. Lever                      | MR-112            | 1    |
| 6-103x   | ZW270088  | 'E' Ring 1.9M                            | 6-1-9             | 1    |
| 6-104    | ML316427  | Pause Lever, MR (w/lever B)              | MR-233            | 1    |
| 6-105    | ZS217877  | Pause Lever Set Screw                    | 900-136           | 1    |
| 6-106    | MZ316451  | Pause Stopper, M-7                       | MH-126            | 1    |
| 6-107    | ZG301061  | Pause Spring 990A                        | 4TR-128           | 1    |
| 6-108x   | ZW260010  | Washer (PBP)D6.1x10x0.1t                 |                   | 1    |
| 6-109    | ZS207314  | Amp. Lever Set Screw                     | 3A-737            | 1    |
| 6-110    | MZ548728  | Frame Reinforcement Plate                | MU-1201           | 1    |
| 6-111x   | ZS563332  | Tapping Screw #2 4x6(binding)            |                   | 2    |
| 6-112    | MC554826  | Counter MP-490-19                        | 9-1-28            | 1    |
| 6-113    | MB527556  | Counter Belt D93x1.5                     | ND-1022           | 1    |
| 6-114    | MZ317406  | Brake Band Guide, w/base                 | MR-120            | 2    |
| 6-115    | BL316484  | AS Lever Block Comp.                     | MU, MC,<br>MS, MR | 1    |
| 6-116    | ZG260706  | AS Lever Spring                          | 4TR-118           | 1    |
| 6-117    | ZW290294  | 'U' Ring 2.85M                           | 6-1-1B            | 1    |
| 6-118x   | MP271170  | Pinch Roller, LC D=38                    | LC-321            | 1    |
| 6-119    | EJ450573  | Mate-N-Lock Cap Housing 9P<br>1-480277-0 | 52-1-7            | 1    |
| 6-120x   | EJ373623  | Pin Contact 61116-1                      | 52-1-1            | 12   |
| 6-121    | ES375478  | Slide SW. ESD-279DU,<br>w/knob(black)    | 25-3-23           | 1    |
| 6-122    | ZS444273  | ISO Screw, binding head 3x4              |                   | 4    |
| 6-123    | ML544307  | SW. Retaining Plate S                    | MU-1001           | 1    |
| 6-124    | ZS413728  | Screw, binding head 3x6,<br>w/washer     |                   | 1    |
| 6-125    | EJ510333  | Wire Clip 220-JD481610-0104<br>(Nylon)   | 2-7-17            | 1    |
| 6-126x   | MZ219576  | Cord Retainer D                          | M9-123            | 1    |
| 6-127    | EJ205975  | Cramp Terminal 1-SD                      | 32-1-7            | 7    |
| 6-128x   | EJ205986  | Cramp Terminal 2-SD                      | 32-1-8            | 1    |
| 6-129    | ZG217394  | Belt Change Spring B                     | MH-125            | 1    |
| 6-130    | ZW260054  | Washer (SUP)D6.1x10x0.25t                |                   | 1    |
| 6-131    | ZW290283  | 'U' Ring 2.85M                           | 6-1-1             | 1    |



FIG. 7 PHOTO OF SYSTEM CONTROL P.C. BOARD (MU-1202)

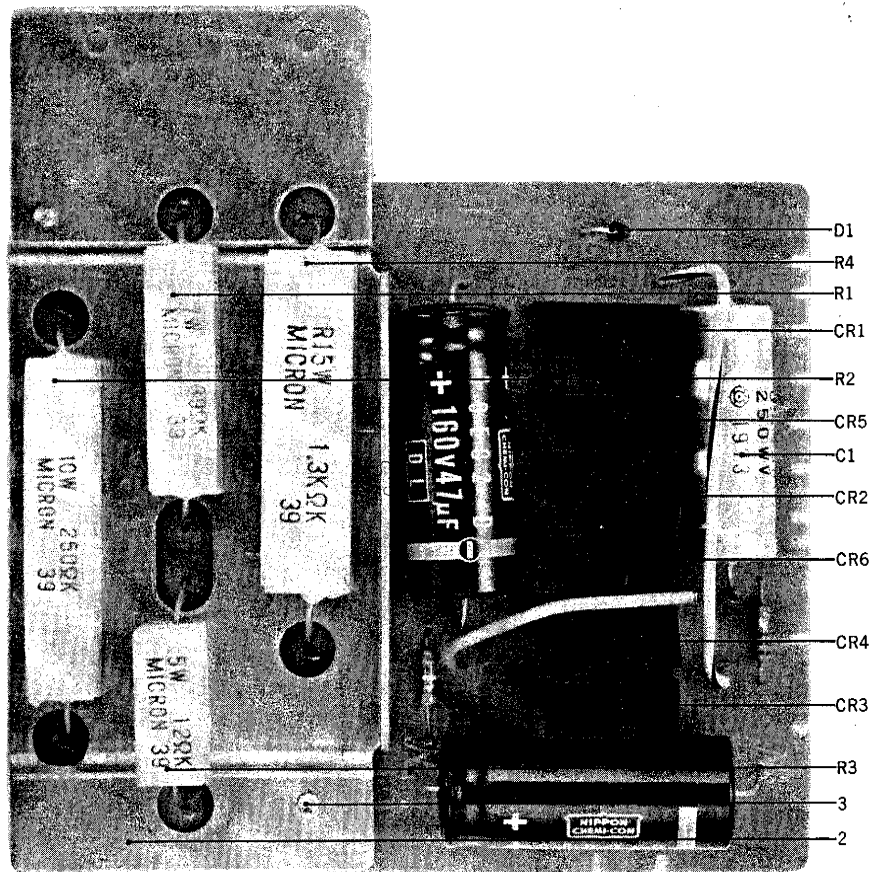


**SYSTEM CONTROL P.C. BOARD (MU-1202)  
BLOCK**

| Symbol No.                      | Parts No. | Description                               | Q'ty | Symbol No.                    | Parts No. | Description          | Q'ty |
|---------------------------------|-----------|---|------|-------------------------------|-----------|----------------------|------|
| 7-1x                            | BA563567  | System Control P.C. Board Comp. (MU-1202) | 1    | <b>Resistor, Stopper Type</b> |           |                      |      |
| 7-TR1to4                        | ET398711  | Transistor 2SC945(Q)(R)                   | 4    | 7-R1                          | ER211667  | Carbon RD1/4 100(J)  | 1    |
| 7-TR5                           | ET453486  | Transistor 2SC711(E)(F)                   | 1    | 7-R2                          | ER336442  | Carbon RD1/4 10k(J)  | 1    |
| 7-D1, 2                         | ED560913  | Silicon Diode 1S2473 VE                   | 2    | 7-R3                          | ER212883  | Carbon RD1/4 4.7k(J) | 1    |
| 7-D3                            | ED219464  | Germanium Diode 1N34A                     | 1    | 7-R4                          | ER212477  | Carbon RD1/4 3.3k(J) | 1    |
| 7-D4                            | ED536062  | Silicon Diode WG-713                      | 1    | 7-R5                          | ER211667  | Carbon RD1/4 100(J)  | 1    |
| 7-D5, 6                         | ED514721  | Silicon Diode WG-599                      | 2    | 7-R6, 7                       | ER212883  | Carbon RD1/4 4.7k(J) | 2    |
| 7-D7to12                        | ED560913  | Silicon Diode 1S2473 VE                   | 6    | 7-R8                          | ER336442  | Carbon RD1/4 10k(J)  | 1    |
| 7-RL1                           | EP344136  | Relay MY4-O-US-AD4 24V                    | 1    | 7-R9                          | ER357456  | Carbon RD1/4 2.2k(J) | 1    |
| 7-CR1to8                        | ER450786  | Spark Quencher U/L 0.1μ+120Ω<br>400WV     | 8    | 7-R10                         | ER211757  | Carbon RD1/4 100k(J) | 1    |
| 7-2                             | EZ544320  | P.C. Board Holder A                       | 1    | 7-R11                         | ER212264  | Carbon RD1/4 22k(J)  | 1    |
| 7-3                             | ZS447772  | Tapping Screw #2 3x6(BR)                  | 2    | 7-R12                         | ER212883  | Carbon RD1/4 4.7k(J) | 1    |
| 7-4                             | MZ544331  | P.C. Board Holder B                       | 1    | 7-R13                         | ER212264  | Carbon RD1/4 22k(J)  | 1    |
| 7-5x                            | ZS413155  | Screw, binding head 3x6                   | 2    | 7-R14                         | ER357456  | Carbon RD1/4 2.2k(J) | 1    |
| 7-6                             | EJ510333  | Wire Clip 220-JD481610-0104<br>(Nylon)    | 1    | 7-R15                         | ER211667  | Carbon RD1/4 100(J)  | 1    |
| <b>Capacitor, Vertical Type</b> |           |   |      | 7-R16                         | ER212264  | Carbon RD1/4 22k(J)  | 1    |
| 7-C1                            | EC220994  | Elect. 10μF 25WV                          | 1    | 7-R17, 18                     | ER336442  | Carbon RD1/4 10k(J)  | 2    |
| 7-C2                            | EC383501  | Mylar 0.001μF(M) 50WV                     | 1    | 7-R19                         | ER342933  | Carbon RD1/4 27k(J)  | 1    |
| 7-C3, 4                         | EC250918  | Mylar 0.01μF(M) 50WV                      | 2    | 7-R20                         | ER336442  | Carbon RD1/4 10k(J)  | 1    |
| 7-C5                            | EC391498  | Mylar 0.022μF(M) 50WV                     | 2    |                               |           |                      |      |
| 7-C6                            | EC220678  | Elect. 47μF 25WV                          | 1    |                               |           |                      |      |
| 7-C7                            | EC391498  | Mylar 0.022μF(M) 50WV                     | 2    |                               |           |                      |      |
| 7-C8                            | EC220994  | Elect. 10μF 25WV                          | 1    |                               |           |                      |      |
| 7-C9                            | EC250885  | Mylar 0.01μF(K) 50WV                      | 1    |                               |           |                      |      |
| 7-C10                           | EC450055  | Elect. 1μF 25WV                           | 1    |                               |           |                      |      |
| 7-C11                           | EC220432  | Elect. 2.2μF 25WV                         | 1    |                               |           |                      |      |

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

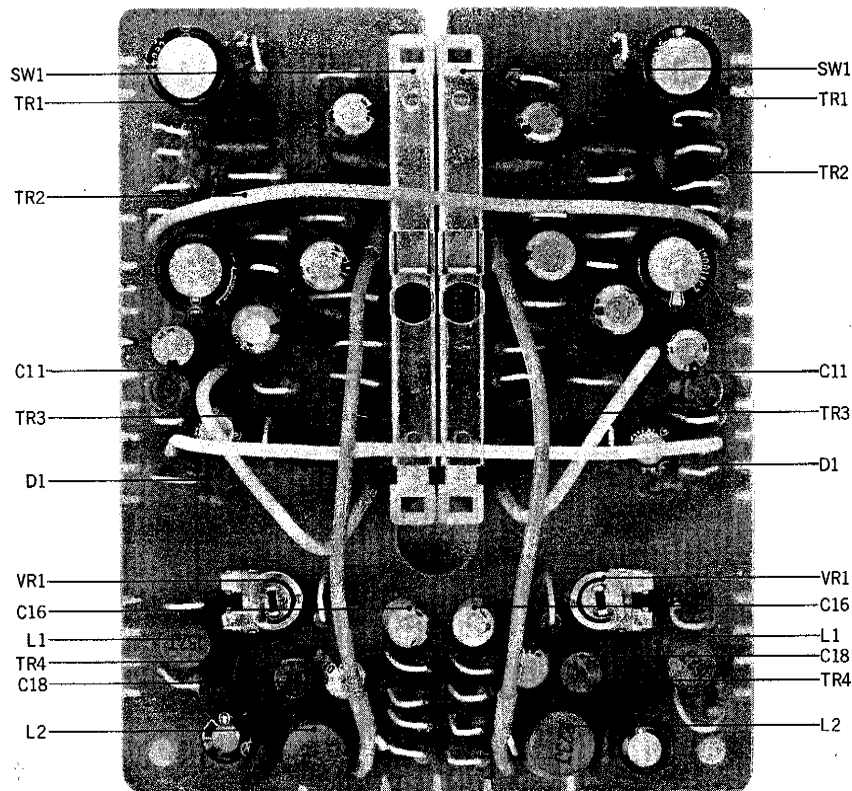
FIG. 8 PHOTO OF CR P.C. BOARD (MU-1007)



**CR P.C. BOARD (MU-1007) BLOCK**

| Symbol No. | Parts No. | Description                                 | Q'ty |
|------------|-----------|---|------|
| 8-1x       | BA563556  | CR P.C. Board Comp. (MU-1007)               | 1    |
| 8-D1       | ED224550  | Silicon Diode 10D4                          | 1    |
| 8-CR1to6   | ER450786  | Spark Quencher U/L 0.1μ+120Ω<br>400WV       | 6    |
| 8-2        | MZ544342  | P.C. Board Holder C                         | 1    |
| 8-3        | ZS447772  | Tapping Screw #2 3x6(BR)                    | 2    |
|            |           | <b>Capacitor, Tubular Type</b>              |      |
| 8-C1       | EC350987  | MP 0.47μF(M) 250VAC                         | 1    |
| 8-C2, 3    | EC316113  | Elect. 47μF 160WV                           | 2    |
|            |           | <b>Resistor, Wire-wound Type</b>            |      |
| 8-R1       | ER554883  | Cement 7W 39(K)                             | 1    |
| 8-R2       | ER554861  | Cement 10W 250(K)                           | 1    |
| 8-R3       | ER554905  | Cement 5W 12(K)                             | 1    |
| 8-R4       | ER565121  | Cement 15W 1.3k(K)<br>(Metal Ox. Film type) | 1    |
| 8-R5       | ER365016  | Carbon RD1/4 220k(J) (Insu. type)           | 1    |
| 8-R6       | ER324808  | Carbon RD1/4 100(J) (Insu. type)            | 1    |

FIG. 9 PHOTO OF REC. AMP. P.C. BOARD (MU-5238)

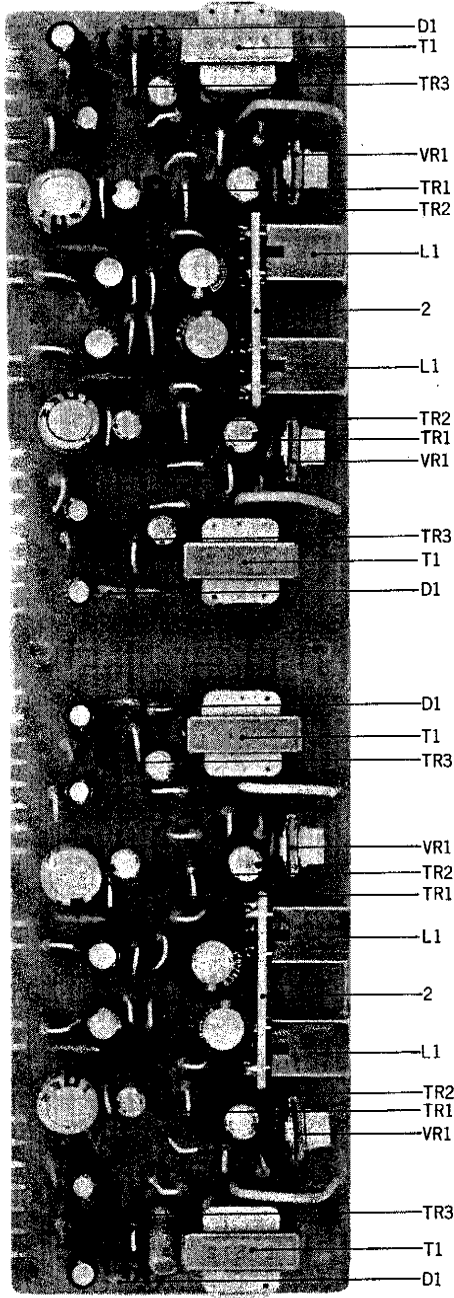


REC. AMP. P.C. BOARD (MU-5238) BLOCK

| Symbol No.                      | Parts No. | Description                             | Q'ty | Symbol No.                    | Parts No. | Description          | Q'ty |
|---------------------------------|-----------|---|------|-------------------------------|-----------|----------------------|------|
| 9-1x                            | BA563591  | Rec. Amp. P.C. Board Comp.<br>(MU-5238) | 1    | <b>Resistor, Stopper Type</b> |           |                      |      |
| 9-TR1, 2                        | ET517263  | Transistor 2SC1312(G) (H)               | 4    | 9-R1                          | ER336442  | Carbon RD1/4 10k(J)  | 2    |
| 9-TR3, 4                        | ET453486  | Transistor 2SC711(E) (F)                | 4    | 9-R2                          | ER362485  | Carbon RD1/4 330k(J) | 2    |
| 9-D1                            | ED520762  | Zener Diode YZ-088A                     | 2    | 9-R3                          | ER336442  | Carbon RD1/4 10k(J)  | 2    |
| 9-SW1                           | ES496642  | Slide SW. CL106B(CL162A25)              | 2    | 9-R4                          | ER362485  | Carbon RD1/4 330k(J) | 2    |
| 9-VR1                           | EV464207  | Semi-fixed Vol. V8K4-1 5 kΩ             | 2    | 9-R5                          | ER212477  | Carbon RD1/4 3.3k(J) | 2    |
| 9-L1                            | EO369178  | Ferri Inductor FL7H 1.5MH(J)            | 2    | 9-R6                          | ER357570  | Carbon RD1/4 150k(J) | 2    |
| 9-L2                            | EO244012  | Ferri Inductor FL9H 22MH(J)             | 2    | 9-R7                          | ER343135  | Carbon RD1/4 1.6k(J) | 2    |
| <b>Capacitor, Vertical Type</b> |           |   |      | 9-R8                          | ER346994  | Carbon RD1/4 18k(J)  | 2    |
| 9-C1                            | EC220678  | Elect. 47μF 25WV                        | 2    | 9-R9                          | ER343078  | Carbon RD1/4 2.7k(J) | 2    |
| 9-C2                            | EC320051  | Elect. 10μF 16WV                        | 2    | 9-R10                         | ER343135  | Carbon RD1/4 1.6k(J) | 2    |
| 9-C3                            | EC451462  | VFM 150PF(J) 50WV                       | 4    | 9-R11,12                      | ER336442  | Carbon RD1/4 10k(J)  | 4    |
| 9-C4                            | EC290531  | VFM 100PF(K) 50WV                       | 2    | 9-R13                         | ER399060  | Carbon RD1/4 9.1k(J) | 2    |
| 9-C5                            | EC329771  | Elect. 47μF 6.3WV                       | 2    | 9-R14                         | ER342933  | Carbon RD1/4 27k(J)  | 2    |
| 9-C6                            | EC357827  | VFM 50PF(K) 50WV                        | 2    | 9-R15                         | ER357570  | Carbon RD1/4 150k(J) | 2    |
| 9-C7                            | EC220151  | Elect. 100μF 25WV                       | 2    | 9-R16                         | ER349828  | Carbon RD1/4 20k(J)  | 2    |
| 9-C8                            | EC320051  | Elect. 10μF 16WV                        | 2    | 9-R17                         | ER429996  | Carbon RD1/4 470k(J) | 2    |
| 9-C9                            | EC329771  | Elect. 47μF 6.3WV                       | 2    | 9-R18                         | ER212264  | Carbon RD1/4 22k(J)  | 2    |
| 9-C10                           | EC399565  | VFM 22PF(J) 50WV                        | 2    | 9-R19                         | ER336442  | Carbon RD1/4 10k(J)  | 2    |
| 9-C11                           | EC562678  | Styrol 750PF(J) 50WV                    | 2    | 9-R20,21                      | ER212883  | Carbon RD1/4 4.7k(J) | 4    |
| 9-C13                           | EC250841  | Mylar 0.01μF(J) 50WV                    | 2    | 9-R22                         | ER212174  | Carbon RD1/4 180k(J) | 2    |
| 9-C14                           | EC331705  | Elect. 22μF 16WV                        | 2    | 9-R23                         | ER336442  | Carbon RD1/4 10k(J)  | 2    |
| 9-C15                           | EC320051  | Elect. 10μF 16WV                        | 2    | 9-R24                         | ER211858  | Carbon RD1/4 12k(J)  | 2    |
| 9-C16                           | EC487157  | NP 0.47μF(M) 50WV                       | 2    | 9-R25                         | ER211465  | Carbon RD1/4 1k(J)   | 2    |
| 9-C17                           | EC220994  | Elect. 10μF 25WV                        | 2    |                               |           |                      |      |
| 9-C18                           | EC516745  | Styrol 330PF(K) 50WV                    | 2    |                               |           |                      |      |
| 9-C19                           | EC451462  | VFM 150PF(J) 50WV                       | 2    |                               |           |                      |      |
| 9-C20                           | EC435690  | Styrol 560PF(J) 50WV                    | 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  
(MU-5239)**



**P.B. AMP. P.C. BOARD (MU-5239) BLOCK**

| Symbol No.                      | Parts No. | Description                             | Q'ty |
|---------------------------------|-----------|---|------|
| 10-1x                           | BA563602  | P.B. Amp. P.C. Board Comp.<br>(MU-5239) | 1    |
| 10-TR1                          | ET517263  | Transistor 2SC1312(G) (H)               | 4    |
| 10-TR2, 3                       | ET453486  | Transistor 2SC711(E) (F)                | 8    |
| 10-D1                           | ED219464  | Germanium Diode 1N34A                   | 4    |
| 10-L1                           | EO346230  | Inductor RX 22MH                        | 4    |
| 10-2                            | EA549246  | Coil P.C. Board (MU-5240)               | 2    |
| 10-VR1                          | EV538402  | Semi-fixed Vol. V10K8-1-5<br>30 kB(4US) | 4    |
| 10-T1                           | BT247768  | Headphone Trans. N19-5921S              | 4    |
| <b>Capacitor, Vertical Type</b> |           |   |      |
| 10-C1                           | EC329850  | VFM 220PF(J) 50WV                       | 4    |
| 10-C2                           | EC320051  | Elect. 10 $\mu$ F 16WV                  | 4    |
| 10-C3                           | EC336126  | Elect. 47 $\mu$ F 25WV                  | 4    |
| 10-C4                           | EC329771  | Elect. 47 $\mu$ F 6.3WV                 | 4    |
| 10-C5                           | EC324516  | Elect. 220 $\mu$ F 6.3WV                | 4    |
| 10-C6                           | EC451462  | VFM 150PF(J) 50WV                       | 4    |
| 10-C7                           | EC220994  | Elect. 10 $\mu$ F 25WV                  | 4    |
| 10-C8                           | EC250604  | Mylar 0.001 $\mu$ F(K) 50WV             | 4    |
| 10-C9                           | EC450055  | Elect. 1 $\mu$ F 25WV                   | 4    |
| 10-C10                          | EC320051  | Elect. 10 $\mu$ F 16WV                  | 4    |
| 10-C11                          | EC450527  | Elect. 4.7 $\mu$ F 25WV                 | 4    |
| <b>Resistor, Stopper Type</b>   |           |   |      |
| 10-R1                           | ER212883  | Carbon RD1/4 4.7k(J)                    | 4    |
| 10-R2                           | ER420322  | Carbon RD1/4 36k(J)                     | 4    |
| 10-R3                           | ER306843  | Carbon RD1/4 1.2k(J)                    | 4    |
| 10-R4                           | ER563455  | Carbon RD1/4 91(J)                      | 4    |
| 10-R5                           | ER357412  | Carbon RD1/4 220(J)                     | 4    |
| 10-R6                           | ER357491  | Carbon RD1/4 82k(J)                     | 4    |
| 10-R7                           | ER357456  | Carbon RD1/4 2.2k(J)                    | 4    |
| 10-R8                           | ER211667  | Carbon RD1/4 100(J)                     | 4    |
| 10-R9                           | ER406912  | Carbon RD1/4 240(J)                     | 4    |
| 10-R10                          | ER211757  | Carbon RD1/4 100k(J)                    | 4    |
| 10-R11                          | ER350100  | Carbon RD1/4 68k(J)                     | 4    |
| 10-R12                          | ER212883  | Carbon RD1/4 4.7k(J)                    | 4    |
| 10-R13                          | ER304402  | Carbon RD1/4 470(J)                     | 4    |
| 10-R14                          | ER212264  | Carbon RD1/4 22k(J)                     | 4    |

FIG. 11 PHOTO OF EQ. P.C. BOARD  
(MU-5241)

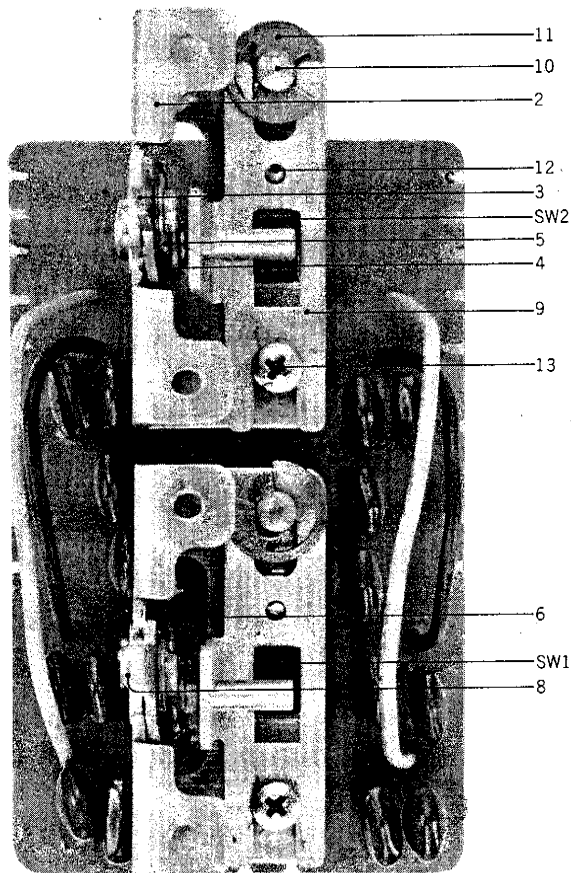
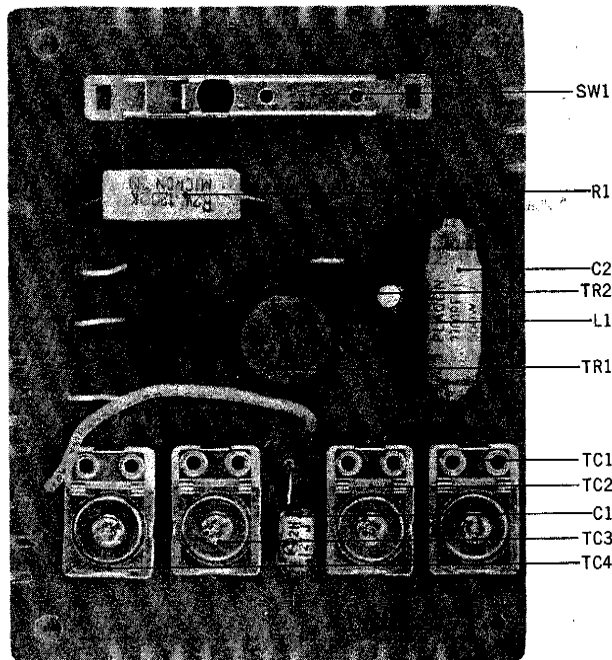


FIG. 12 PHOTO OF OSC. P.C. BOARD  
(MU-5242)



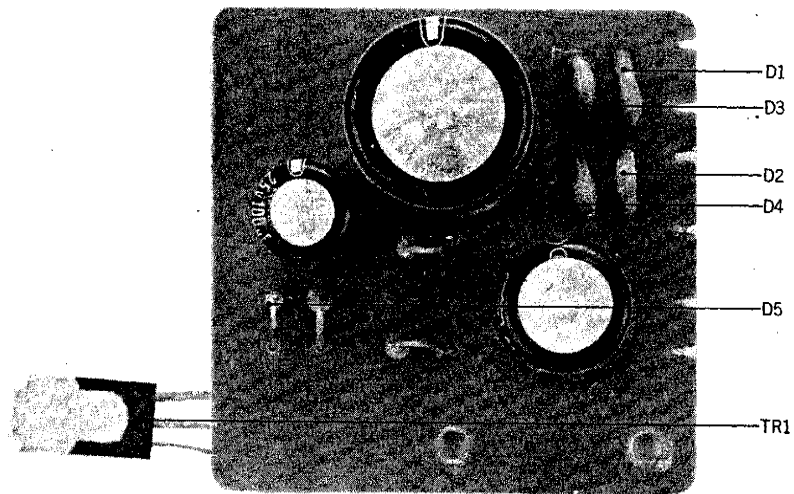
**EQ. P.C. BOARD (MU-5241) BLOCK**

| Symbol No. | Parts No. | Description                       | Q'ty |
|------------|-----------|-----------------------------------|------|
| 11-1x      | BA563613  | Eq. P.C. Board Comp.<br>(MU-5241) | 1    |
| 11-SW1, 2  | ES446117  | Slide SW. SL-282A2                | 2    |
| 11-2       | EZ548357  | Switch Base B                     | 2    |
| 11-3       | ML549630  | Selector Lever B                  | 2    |
| 11-4       | ZW322525  | Washer (PBP)D4.1x7x0.2t           | 2    |
| 11-5       | ZW270101  | 'E' Ring 3M                       | 2    |
| 11-6       | ZG548403  | Operation Spring                  | 2    |
| 11-7x      | ZW270088  | 'E' Ring 1.9M                     | 2    |
| 11-8       | ZS413155  | Screw, binding head 3x6           | 2    |
| 11-9       | EZ548381  | Slider                            | 2    |
| 11-10      | ZW548370  | Slide Pin B                       | 2    |
| 11-11      | ZW290283  | 'U' Ring 2.85M                    | 2    |
| 11-12      | ZS442585  | Screw, binding head 2.6x4         | 2    |
| 11-13      | ZS563444  | Screw, binding head 2.6x8         | 2    |
|            |           | <b>Capacitor, Vertical Type</b>   |      |
| 11-C1to4   | EC392016  | Mylar 0.068μF(J) 50WV             | 4    |
| 11-C5to8   | EC379203  | Mylar 0.039μF(J) 50WV             | 4    |
| 11-C9to12  | EC379168  | Mylar 0.033μF(J) 50WV             | 4    |
| 11-C13to16 | EC329872  | Mylar 0.027μF(J) 50WV             | 4    |

**OSC. P.C. BOARD (MU-5242) BLOCK**

| Symbol No.  | Parts No. | Description                            | Q'ty |
|-------------|-----------|--|------|
| 12-1x       | BA563646  | OSC. P.C. Board Comp.<br>(MU-5242)     | 1    |
| 12-TR1, 2   | ET398711  | Transistor 2SC945(Q) (R)               | 2    |
| 12-TC1 to 4 | EC558202  | Trimmer/C. TM-80A                      | 4    |
| 12-L1       | EO383365  | OSC. Coil OT-204                       | 1    |
| 12-SW1      | ES494302  | Slide SW. CL-104B                      | 1    |
|             |           | <b>Capacitor, Vertical Type</b>        |      |
| 12-C1       | EC563422  | Styrol 120PF(J) 500WV(Tub. type)       | 1    |
| 12-C2       | EC435655  | Plastic Film 2700PF(J) 500WV           | 1    |
| 12-C3       | EC450055  | Elect. 1μF 25WV                        | 1    |
| 12-C4, 5    | EC250841  | Mylar 0.01μF(J) 50WV                   | 2    |
|             |           | <b>Resistor, Stopper Type</b>          |      |
| 12-R1       | ER466525  | Cement 2W 120(K)<br>(Metal Oxide type) | 1    |
| 12-R2       | ER212883  | Carbon RD1/4 4.7k(J)                   | 1    |
| 12-R3       | ER304402  | Carbon RD1/4 470(J)                    | 1    |
| 12-R4, 5    | ER315944  | Carbon RD1/4 3.3(J)                    | 2    |

FIG. 13 PHOTO OF POWER SUPPLY P.C. BOARD (MU-5017)



**POWER SUPPLY P.C. BOARD  
(MU-5017) BLOCK**

| Symbol No.                      | Parts No. | Description                                | Q'ty |
|---------------------------------|-----------|--|------|
| 13-1x                           | BA558450  | Power Supply P.C. Board Comp.<br>(MU-5017) | 1    |
| 13-TR1                          | ET495371  | Transistor 2SC1098(L)                      | 1    |
| 13-D1to4                        | ED494583  | Silicon Diode 10D05                        | 2    |
| 13-D5                           | ED511918  | Zener Diode WZ-240                         | 1    |
| 13-2x                           | ZS323728  | Screw, binding head 3x5                    | 1    |
| <b>Capacitor, Vertical Type</b> |           |  |      |
| 13-C1                           | EC557651  | Elect. 470 $\mu$ F 50WV                    | 1    |
| 13-C2                           | EC220151  | Elect. 100 $\mu$ F 25WV                    | 1    |
| 13-C3                           | EC336115  | Elect. 220 $\mu$ F 25WV                    | 1    |
| <b>Resistor, Stopper Type</b>   |           |  |      |
| 13-R1                           | ER306843  | Carbon RD1/4 1.2k(J)                       | 1    |
| 13-R2                           | ER211667  | Carbon RD1/4 100(J)                        | 1    |
| 13-R3                           | ER430018  | Carbon RD1/4 1(J)                          | 1    |

FIG. 14a PHOTO OF AMPLIFIER ASSEMBLY BLOCK

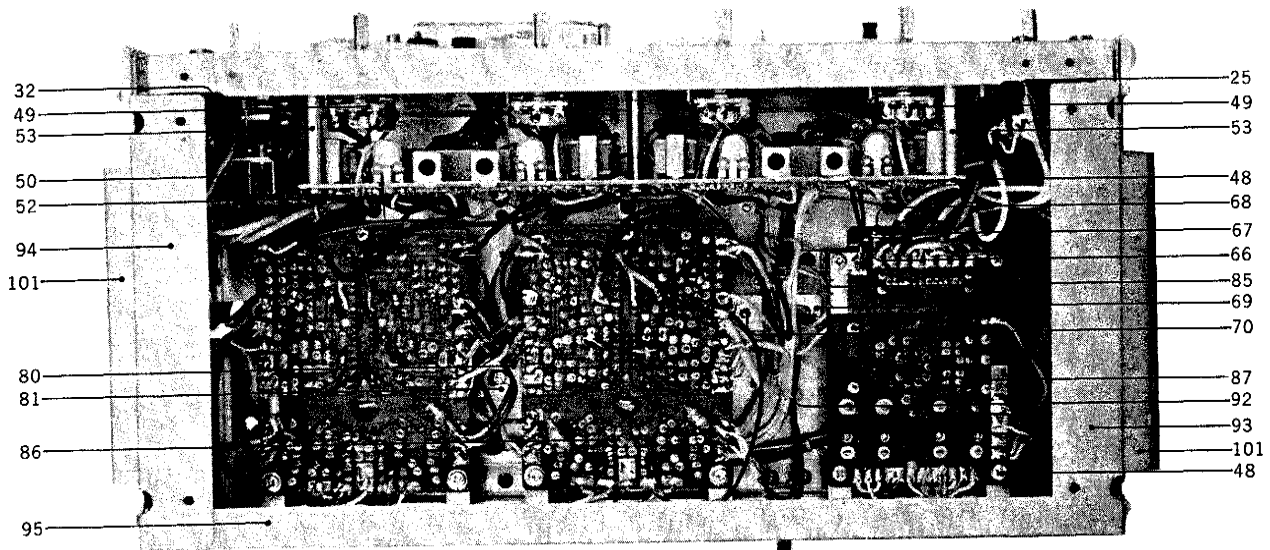
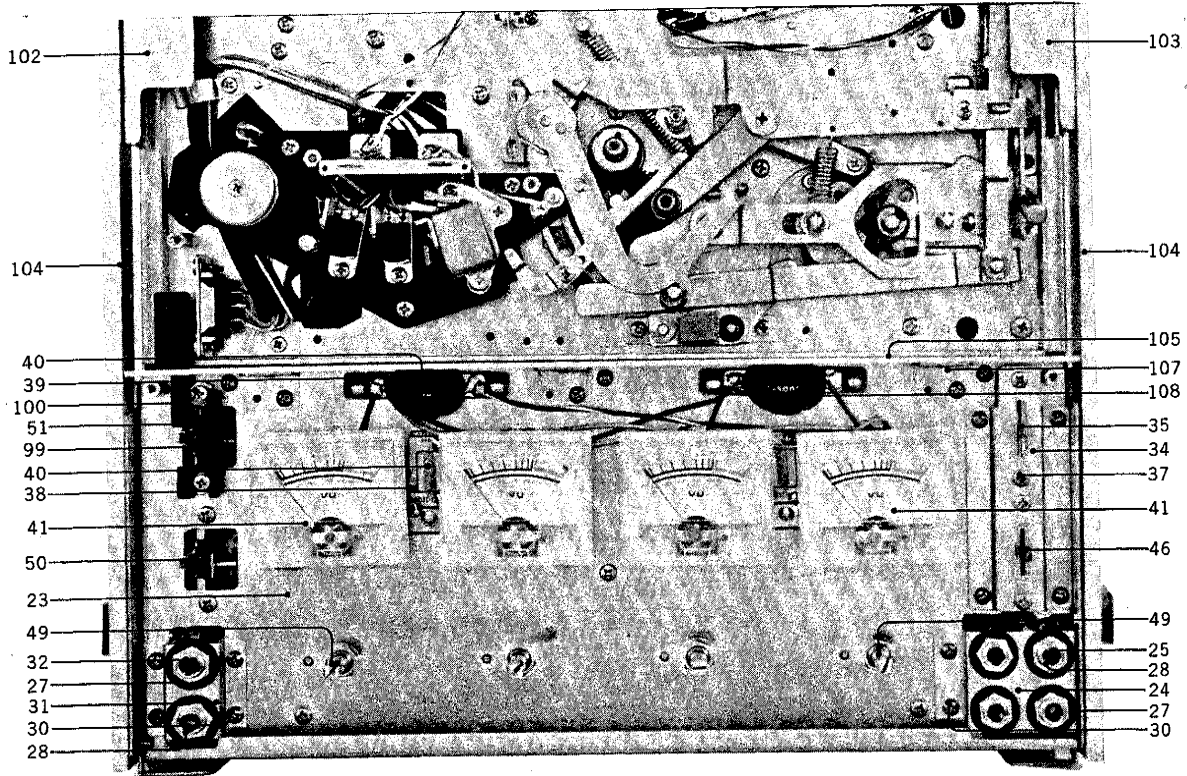
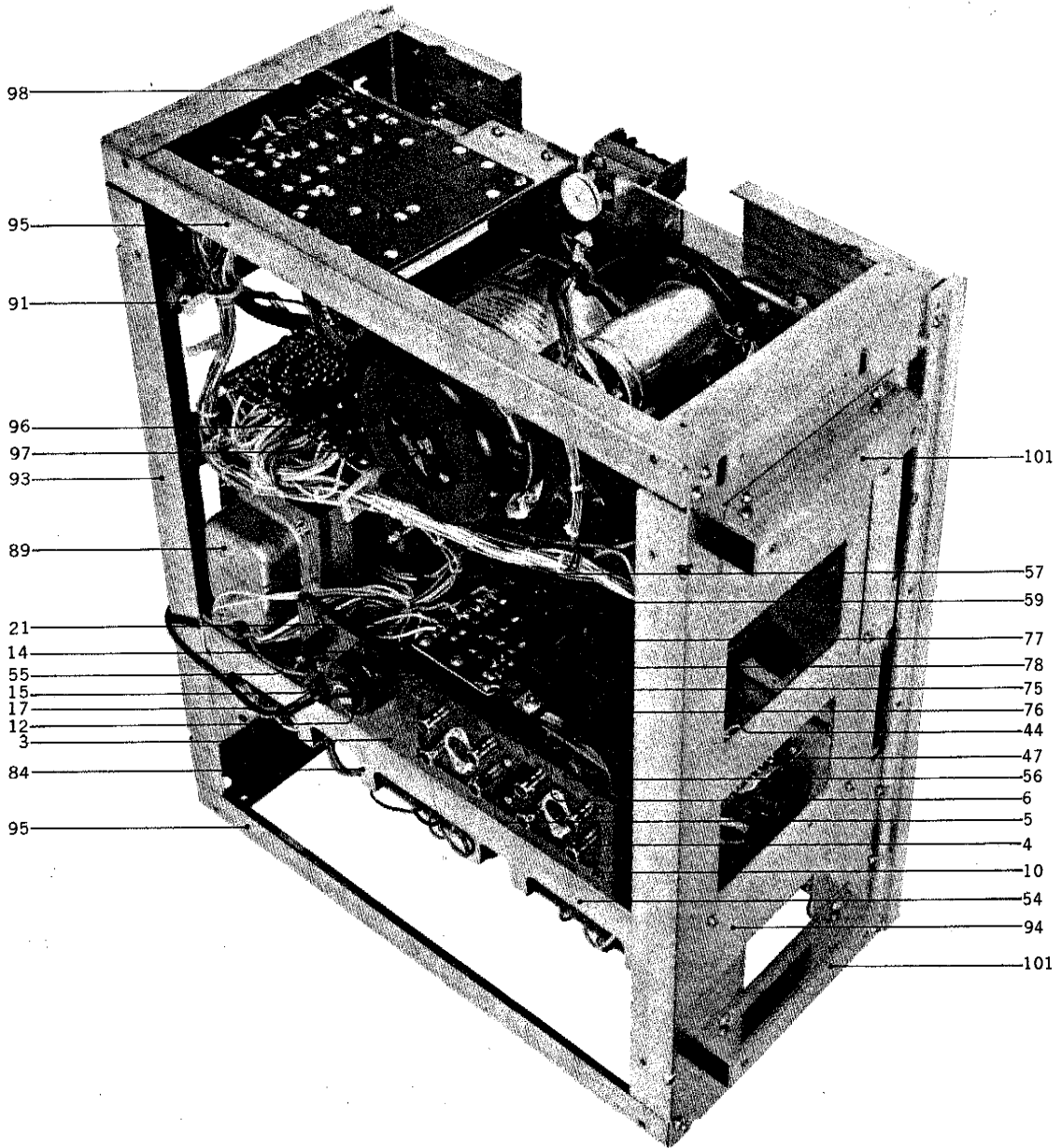




FIG. 14b PHOTO OF AMPLIFIER ASSEMBLY BLOCK



**AMPLIFIER ASSEMBLY BLOCK**

| Ref. No. | Parts No.               | Description                  | Schematic No. | Q'ty | Ref. No. | Parts No. | Description                      | Schematic No. | Q'ty |
|----------|-------------------------|------------------------------|---------------|------|----------|-----------|----------------------------------|---------------|------|
|          | <b>JACK PLATE BLOCK</b> |                              |               |      |          | 14-12     | EJ233370 Socket (Volt. Selector) |               |      |
| 14-1x    | BZ563624                | Jack Plate Block Comp.       | MU-2          | 1    |          |           | S-18010                          | 40-2-3        | 1    |
| 14-2x    | BZ563635                | Jack Plate Block Comp.       |               |      | 14-13x   | EF558066  | Fuse 2A 125V                     | 39-1-47       | 1    |
|          |                         | (3 core)                     | MU-2          | 1    | 14-14    | ZS372025  | ISO Screw, truss head 3x6        |               | 2    |
| 14-3     | EZ548741                | Jack Plate Bracket           | MU-5231       | 1    | 14-15    | EZ382263  | Strain Relief SR-4K-4            | 2-7-12        | 1    |
| 14-4     | EJ563433                | Jack Plate MU-2 (w/jack)     | 31-5-86       | 1    | 14-16x   | EZ246936  | Strain Relief SR-6W-1            |               |      |
| 14-5     | ES446973                | Slide SW. SL-242B4D          | 25-3-51       | 1    |          |           | (WG, 3 core)                     | 2-7-8         | 1    |
| 14-6     | EA549270                | Jack P.C. Board              | MU-5237       | 1    | 14-17    | EW540112  | AC Cord (CUL) 2.5M               | 26-3-19       | 1    |
| 14-7x    | ER589375                | Carbon/R. RD1/4 680k(J)      |               |      | 14-18x   | EW315448  | Australia Cord (3 core)          | 26-3-11       | 1    |
|          |                         | (Insu. type)                 | 35-9-10       | 4    | 14-19x   | EW524845  | AC Cord (J) 2.5M                 | 26-3-31       | 1    |
| 14-8x    | ER558573                | Carbon/R. RD1/4 27k(J)       |               |      | 14-20x   | ZW273778  | Earth Lug M3                     |               | 1    |
|          |                         | (Insu. type)                 | 35-9-10       | 4    | 14-21    | BA558450  | Power Supply P.C. Board          |               |      |
| 14-9x    | ER368133                | Carbon/R. RD1/4 22k(J)       |               |      |          |           | Comp. (MU-5017)                  |               | 1    |
|          |                         | (Insu. type)                 | 35-9-10       | 8    | 14-22x   | ZS447772  | Tapping Screw #2 3x6(BR).        |               | 2    |
| 14-10    | ZS201183                | Screw, truss head 3x8(black) |               | 4    |          |           |                                  |               |      |
| 14-11x   | ZW273756                | Nut M3                       |               | 4    |          |           |                                  |               |      |

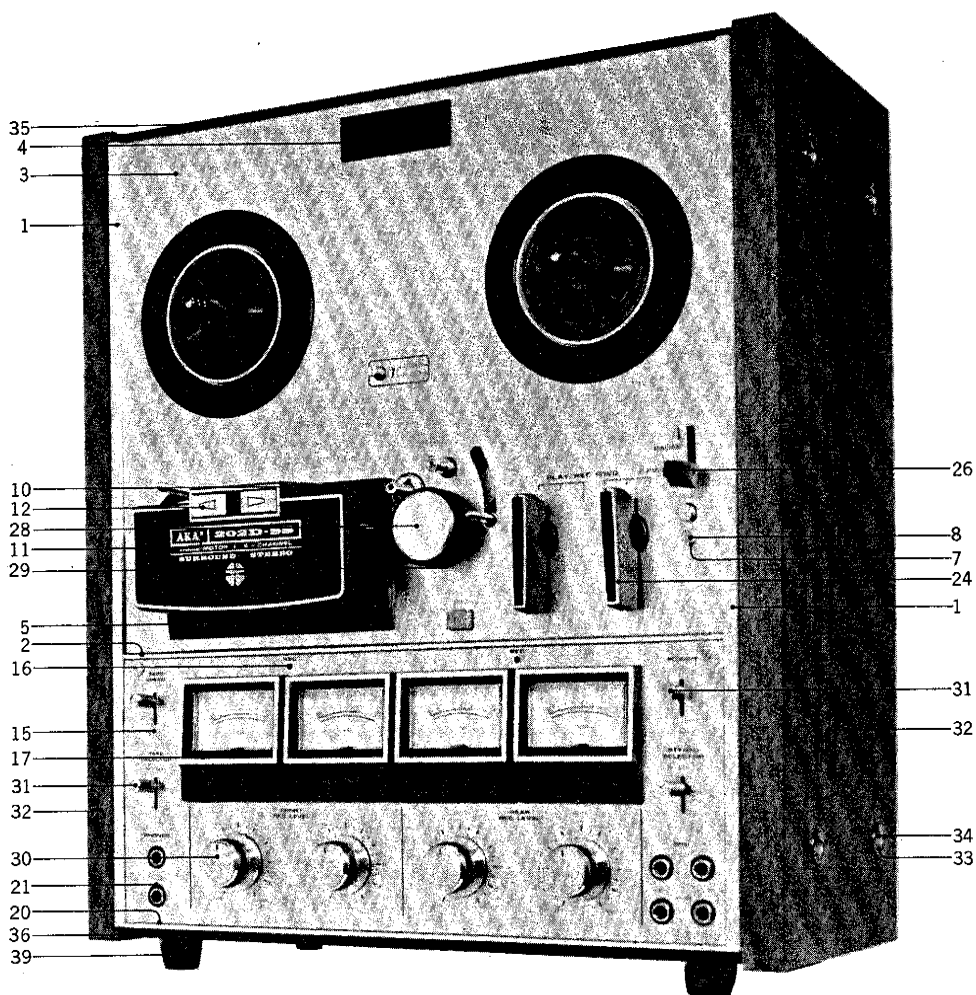
When ordering parts, please describe Parts Number, Serial Number, and Model Number in detail.



| Ref. No.                   | Parts No. | Description                                | Schematic No. | Q'ty | Ref. No. | Parts No. | Description                              | Schematic No. | Q'ty |
|----------------------------|-----------|--|---------------|------|----------|-----------|--|---------------|------|
| <b>AMP. ASSEMBLY BLOCK</b> |           |  |               |      | 14-87    | BA563646  | OSC. P.C. Board Comp.<br>(MU-5242)       |               | 1    |
| 14-23                      | EZ548908  | Amp. Plate, w/stand                        | MU-5201       | 1    | 14-88x   | UM388348  | Power Supply Trans. Shield<br>Plate, CSA | CS-5016       | 1    |
| 14-24                      | EZ548313  | Jack Base A                                | MU-5203       | 1    | 14-89    | BT563411  | Power Trans. MUT-4                       | 38-4-263      | 1    |
| 14-25                      | EJ448075  | Mic. Jack 2PMJ1                            | 31-2-23       | 4    | 14-90x   | ZS462925  | Tapping Screw #2 4x8(BR)                 |               | 4    |
| 14-26x                     | EZ225180  | Nylon Collar, Jack                         | LD-520        | 4    | 14-91    | EJ514607  | Wire Clip 220-JD485210-01<br>(Nylon)     | 2-7-18        | 2    |
| 14-27                      | ZW260368  | Washer (Fiber)D9.2x18x0.5t                 |               | 6    | 14-92    | EJ510333  | Wire Clip 220-JD481610-0104<br>(Nylon)   | 2-7-17        | 4    |
| 14-28                      | ZW554624  | Nut, E Jack                                | 7-1-56        | 6    | 14-93    | EZ548965  | Side Chassis R, w/angle                  | MU-5232       | 1    |
| 14-29x                     | ER315213  | Carbon/R. RD1/4 8.2k(J)<br>(Insu. type)    | 35-9-5        | 4    | 14-94    | EZ548976  | Side Chassis L, w/angle                  | MU-5232       | 1    |
| 14-30                      | ZS447772  | Tapping Screw #2 3x6(BR)                   |               | 52   | 14-95    | EZ548763  | Reinforcement Angle                      | MU-5234       | 2    |
| 14-31                      | EZ548324  | Jack Base B                                | MU-5204       | 1    | 14-96    | SZ529108  | Main Motor Fan                           | ND-7010       | 1    |
| 14-32                      | EJ447603  | Mic. Jack 3PMJ1                            | 31-2-24       | 2    | 14-97    | ZW270134  | 'E' Ring 5M                              | 6-1-9         | 1    |
| 14-33x                     | ZW272722  | Toothed Lock Washer M9<br>D9.3x13x0.5t     |               | 2    | 14-98    | SZ544476  | P.C. Board Holder D                      | MU-6016       | 1    |
| 14-34                      | EZ548302  | SW. Base                                   | MU-5202       | 1    | 14-99    | SZ548594  | Coupling Plate                           | MU-6201       | 1    |
| 14-35                      | ES436983  | Lever SW. SDD2LCPO<br>(LPS60112CPOO)       | 25-4-9        | 1    | 14-100   | ZS425981  | Screw, binding head 3x3                  |               | 2    |
| 14-36x                     | ER450797  | Spark Quencher U/L<br>0.033μ+120Ω 400WV    | 41-1-34       | 1    | 14-101   | SZ548605  | Side Plate Support                       | MU-6202       | 4    |
| 14-37                      | ZS379405  | ISO Screw, binding head 3x6                |               | 4    | 14-102   | SZ544465  | Reinforcement Plate L                    | MU-6015       | 1    |
| 14-38                      | EA476256  | Lamp P.C. Board                            | MR-5004       | 2    | 14-103   | SZ544691  | Reinforcement Plate R                    | MU-6015       | 1    |
| 14-39                      | EA449414  | Lamp P.C. Board                            | BS-5005       | 2    | 14-104   | SE548921  | Sash                                     | MU-6205       | 2    |
| 14-40                      | EL295312  | Lamp (No. 2) 8V 0.2A                       | 28-2-8        | 4    | 14-105   | SE548774  | Sash B                                   | MU-6204       | 1    |
| 14-41                      | EM558180  | VU Meter KL-243S-5                         | 46-1-74       | 4    | 14-106x  | ZS200384  | Screw, countersunk head 3x6              |               | 3    |
| 14-42x                     | EZ449471  | VU Mat                                     | BS-5010       | 4    | 14-107   | SZ548616  | Sash Bracket                             | MU-6203       | 3    |
| 14-43x                     | EJ293073  | Mate-N-Lock Plug Housing<br>12P 1-480275-0 | 52-1-1        | 1    | 14-108   | UM494267  | Lamp Cover                               | CG-2206       | 2    |
| 14-44                      | EJ430378  | Multi-jack 14P 3252-014-001                | 31-4-14       | 1    |          |           |  |               |      |
| 14-45x                     | EJ373634  | Socket Contact 61115-1                     | 52-1-1        | 12   |          |           |  |               |      |
| 14-46                      | ES443013  | Lever SW. SQ11 12-4-2<br>Black(M)          | 25-12-3       | 1    |          |           |  |               |      |
| 14-47                      | EZ548414  | Jack Metal Parts                           | MU-5215       | 1    |          |           |  |               |      |
| 14-48                      | ZS413155  | Screw, binding head 3x6                    |               | 25   |          |           |  |               |      |
| 14-49                      | EV476223  | Volume V24N 50 kA                          | 36-2-26       | 4    |          |           |  |               |      |
| 14-50                      | BA563613  | EQ. P.C. Board Comp.<br>(MU-5241)          |               | 1    |          |           |  |               |      |
| 14-51                      | MH548335  | Slide Prop                                 | MU-5206       | 2    |          |           |  |               |      |
| 14-52                      | BA563602  | P.B. Amp. P.C. Board Comp.<br>(MU-5239)    |               | 1    |          |           |  |               |      |
| 14-53                      | EZ548583  | P.C. Board Stand C                         | MU-5236       | 3    |          |           |  |               |      |
| 14-54                      | EZ548910  | Amp. Chassis                               | MU-5214       | 1    |          |           |  |               |      |
| 14-55                      | EZ548572  | Amp. Chassis Reinforcement<br>Plate        | MU-5235       | 1    |          |           |  |               |      |
| 14-56                      | ES563387  | Leaf SW. BSW-1A                            | 25-10-19      | 1    |          |           |  |               |      |
| 14-57                      | EP563398  | Plunger Solenoid 0730THTI-3                | 44-1-64       | 1    |          |           |  |               |      |
| 14-58x                     | ED224548  | Silicon Diode 10D2                         | 45-2-14       | 1    |          |           |  |               |      |
| 14-59                      | EZ548504  | Plunger Base                               | MU-5224       | 1    |          |           |  |               |      |
| 14-60x                     | ZS442585  | Screw, binding head 2.6x4                  |               | 2    |          |           |  |               |      |
| 14-61x                     | EZ548515  | Pull Plate                                 | MU-5225       | 1    |          |           |  |               |      |
| 14-62x                     | ZW548548  | Pin  | MU-5228       | 1    |          |           |  |               |      |
| 14-63x                     | ZW357164  | 'E' Ring 2.3M                              | 6-1-9         | 1    |          |           |  |               |      |
| 14-64x                     | UM494414  | Joint Pin                                  | CG-1206       | 1    |          |           |  |               |      |
| 14-65x                     | ZW270088  | 'E' Ring 1.9M                              | 6-1-9         | 3    |          |           |  |               |      |
| 14-66                      | EZ548550  | Lever Mt. Plate                            | MU-5229       | 1    |          |           |  |               |      |
| 14-67                      | ML548526  | Lever, w/plate                             | MU-5226       | 1    |          |           |  |               |      |
| 14-68                      | EZ548561  | Lever Shaft                                | MU-5230       | 1    |          |           |  |               |      |
| 14-69                      | ML548458  | R Lever                                    | MU-5219       | 1    |          |           |  |               |      |
| 14-70                      | MH314280  | Rec. Lever Pin                             | MR-528        | 1    |          |           |  |               |      |
| 14-71x                     | ZW273892  | Toothed Lock Washer M4                     |               | 1    |          |           |  |               |      |
| 14-72x                     | ZW416698  | Nut M4                                     |               | 1    |          |           |  |               |      |
| 14-73x                     | ZS314717  | Graduated Screw, MR                        | MR-254        | 2    |          |           |  |               |      |
| 14-74x                     | ZW273756  | Nut M3                                     |               | 6    |          |           |  |               |      |
| 14-75                      | ML548436  | Rec. Lever                                 | MU-5217       | 1    |          |           |  |               |      |
| 14-76                      | ZS207314  | Amp. Lever Set Screw                       | 3A-737        | 2    |          |           |  |               |      |
| 14-77                      | ZG548447  | Rec. Spring                                | MU-5218       | 1    |          |           |  |               |      |
| 14-78                      | ZG431291  | Slide Spring                               | ED-B108       | 1    |          |           |  |               |      |
| 14-79x                     | ZW273778  | Earth Lug M3                               |               | 1    |          |           |  |               |      |
| 14-80                      | ML548460  | R Lever A, w/pin                           | MU-5220       | 1    |          |           |  |               |      |
| 14-81                      | ML548482  | R Lever B                                  | MU-5222       | 1    |          |           |  |               |      |
| 14-82x                     | ZW290283  | 'U' Ring 2.85M                             | 6-1-1         | 2    |          |           |  |               |      |
| 14-83x                     | MH548493  | R Prop                                     | MU-5223       | 2    |          |           |  |               |      |
| 14-84                      | EZ548730  | P.C. Board Stand A                         | MU-5205       | 1    |          |           |  |               |      |
| 14-85                      | EZ548425  | P.C. Board Stand B                         | MU-5216       | 4    |          |           |  |               |      |
| 14-86                      | BA563591  | Rec. Amp. P.C. Board Comp.<br>(MU-5238)    |               | 2    |          |           |  |               |      |

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

FIG. 15 PHOTO OF FINAL ASSEMBLY BLOCK



**FINAL ASSEMBLY BLOCK**

| Ref. No. | Parts No. | Description                    | Schematic No. | Q'ty | Ref. No. | Parts No. | Description                    | Schematic No. | Q'ty |
|----------|-----------|--------------------------------|---------------|------|----------|-----------|--------------------------------|---------------|------|
| 15-1     | SE548921  | Sash                           | MU-6205       | 2    | 15-25x   | ZS253405  | Mech. Knob Screw               | 7-1-46        | 2    |
| 15-2     | SE548774  | Sash B                         | MU-6204       | 1    | 15-26    | SK314100  | Pause Knob B                   | MR-612        | 1    |
| 15-3     | SP548932  | Mech. Panel A, w/ring          | MU-6206       | 1    | 15-27x   | ZS356804  | Set Screw, hexagon socket      |               |      |
| 15-4     | SE528906  | Counter Escutcheon             | ND-6008       | 1    |          |           | 3x4(cup)                       |               | 1    |
| 15-5     | SC544533  | Head Cover Base                | MU-6003       | 1    | 15-28    | SK425158  | Pinch Roller Cap               | MS-6020       | 1    |
| 15-6x    | ZS413155  | Screw, binding head 3x6        |               | 4    | 15-29    | MP271170  | Pinch Roller, LC D=38          | LC-321        | 1    |
| 15-7     | ZW408418  | Panel Washer                   | KD-6029       | 4    | 15-30    | SK548662  | Volume Knob Comp.              | MU-6219       | 4    |
| 15-8     | ZS563308  | Screw, oval countersunk head   |               | 4    | 15-31    | SK442765  | Lever SW. Knob A-1             | 81-5603       | 4    |
|          |           | 3x6                            |               | 4    | 15-32    | BC548796  | Side Plate                     | MU-6211       | 2    |
| 15-9x    | HZ579126  | Head Shield Plate              | MU-6228       | 1    | 15-33    | ZW548010  | Spot Facing Washer             | MU-6028       | 8    |
| 15-10    | SC544544  | Head Cover                     | MU-6004       | 1    | 15-34    | ZS563321  | Screw, binding head 4x14       |               | 8    |
| 15-11    | SM548673  | Head Cover Name Plate          | MU-6220       | 1    | 15-35    | SP548807  | Upper Plate                    | MU-6212       | 1    |
| 15-12    | SB544454  | Direction Button               | MU-6006       | 2    | 15-36    | SP548818  | Lower Plate                    | MU-6212       | 1    |
| 15-13x   | ZS355511  | Screw, binding head 3x6(black) |               | 2    | 15-37x   | ZW461610  | Decorative Washer 3M           |               | 4    |
| 15-14x   | ZS325495  | Tapping Screw #2 3x6           |               | 5    | 15-38x   | ZS482815  | Screw, oval countersunk head   |               | 4    |
| 15-15    | SP548954  | Amp. Panel                     | MU-6208       | 1    |          |           | 3x8                            |               | 4    |
| 15-16    | SZ457975  | Lamp Lens B (Red)              | 55-5012       | 2    | 15-39    | SA377190  | Rubber Foot, LM                | LM-404        | 8    |
| 15-17    | SE544601  | VU Meter Escutcheon            | MU-6017       | 4    | 15-40x   | ZW419646  | Washer (SPC)D4.5x9.8x0.5t      |               | 8    |
| 15-18x   | SZ548897  | Escutcheon Support             | MU-6221       | 4    | 15-41x   | ZS487776  | Screw, truss head 4x18         |               | 8    |
| 15-19x   | ZS425788  | Screw, round head 3x4          |               | 8    | 15-42x   | SP548820  | Back Plate A                   | MU-6213       | 1    |
| 15-20    | SE548785  | Sash C                         | MU-6210       | 1    | 15-43x   | ZS498273  | Tapping Screw #2 3x8, w/washer |               | 2    |
| 15-21    | ZW526577  | Collar B, Jack                 | MC-5006       | 6    | 15-44x   | EF304626  | Fuse ST-4 1A                   | 39-1-28       | 1    |
| 15-22x   | ZS447772  | Tapping Screw #2 3x6(BR)       |               | 2    | 15-45x   | EF558066  | Fuse 2A 125V                   | 39-1-47       | 1    |
| 15-23x   | ZW432347  | Washer (Luminar)               |               | 2    |          |           |                                |               |      |
|          |           | D6.2x13x0.125t                 |               | 2    |          |           |                                |               |      |
| 15-24    | SK476684  | Mech. Knob                     | LE-6018       | 2    |          |           |                                |               |      |

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

# INDEX

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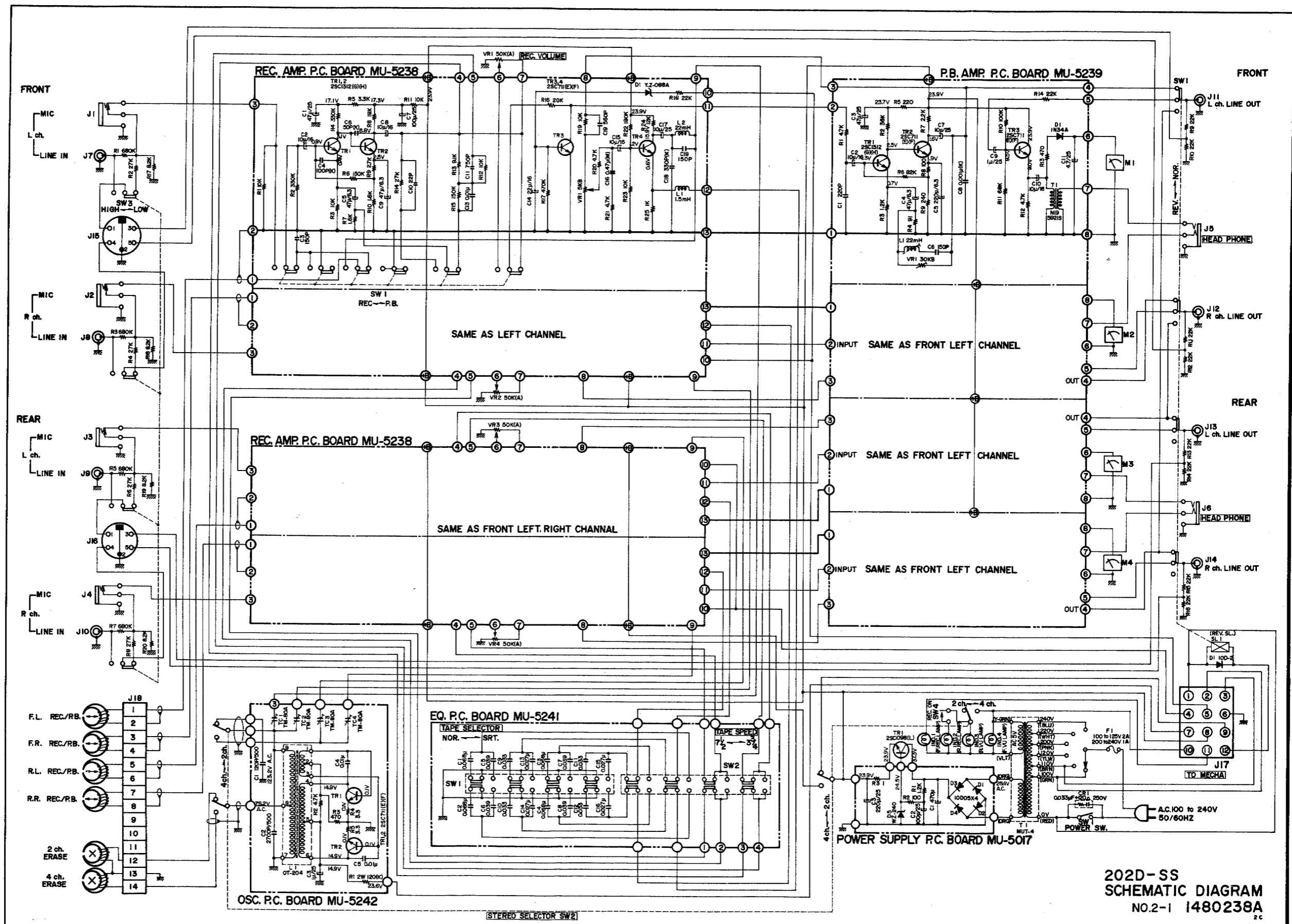
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| ZS201183  | 14-10                 | ZS554962  | 1-34                  | ZW416698  | 6-30x                 |           |                       |           |                       |
| ZS201475  | 1-13                  | ZS558101  | 1-61                  | ZW416698  | 6-80                  |           |                       |           |                       |
| ZS201508  | 1-22                  | ZS558134  | 1-48                  | ZW416698  | 14-72x                |           |                       |           |                       |
| ZS202116  | 6-72                  | ZS559045  | 5-20x                 | ZW419646  | 6-11                  |           |                       |           |                       |
| ZS203016  | 3-19                  | ZS563308  | 15-8                  | ZW419646  | 15-40x                |           |                       |           |                       |
| ZS207314  | 6-69x                 | ZS563321  | 15-34                 | ZW419826  | 6-66                  |           |                       |           |                       |
| ZS207314  | 6-109                 | ZS563332  | 6-111x                | ZW432347  | 6-48x                 |           |                       |           |                       |
| ZS217877  | 6-105                 | ZS563444  | 11-13                 | ZW432347  | 15-23x                |           |                       |           |                       |
| ZS207314  | 14-76                 | ZW231805  | 1-40                  | ZW432944  | 6-8                   |           |                       |           |                       |
| ZS253405  | 15-25x                | ZW259705  | 6-68x                 | ZW447208  | 4-4                   |           |                       |           |                       |
| ZS272395  | 3-9                   | ZW259885  | 6-70x                 | ZW461610  | 15-37x                |           |                       |           |                       |
| ZS314717  | 6-47                  | ZW259942  | 5-10x                 | ZW526577  | 15-21                 |           |                       |           |                       |
| ZS314717  | 14-73x                | ZW259975  | 6-79x                 | ZW548010  | 15-33                 |           |                       |           |                       |
| ZS323728  | 2-31x                 | ZW260010  | 6-108x                | ZW548370  | 11-10                 |           |                       |           |                       |
| ZS323728  | 5-26x                 | ZW260054  | 3-17x                 | ZW548548  | 14-62x                |           |                       |           |                       |
| ZS323728  | 6-37                  | ZW260054  | 6-130                 | ZW554624  | 14-28                 |           |                       |           |                       |

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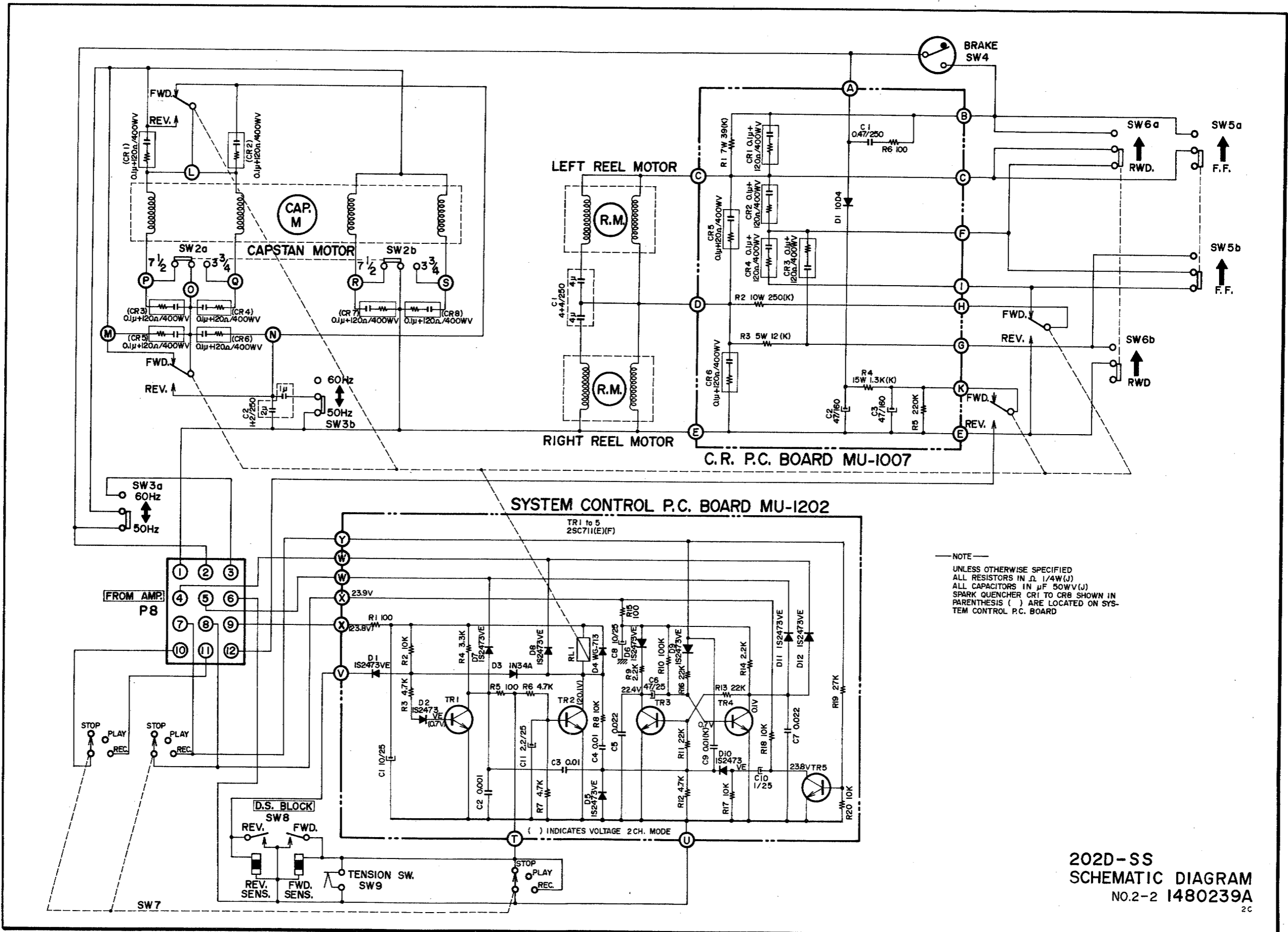
SECTION 3

**SCHEMATIC DIAGRAM**

1. 202D-SS SCHEMATIC DIAGRAM



202D-SS  
SCHEMATIC DIAGRAM  
NO.2-1 1480238A  
2c



202D-SS  
 SCHEMATIC DIAGRAM  
 NO.2-2 1480239A  
 2C