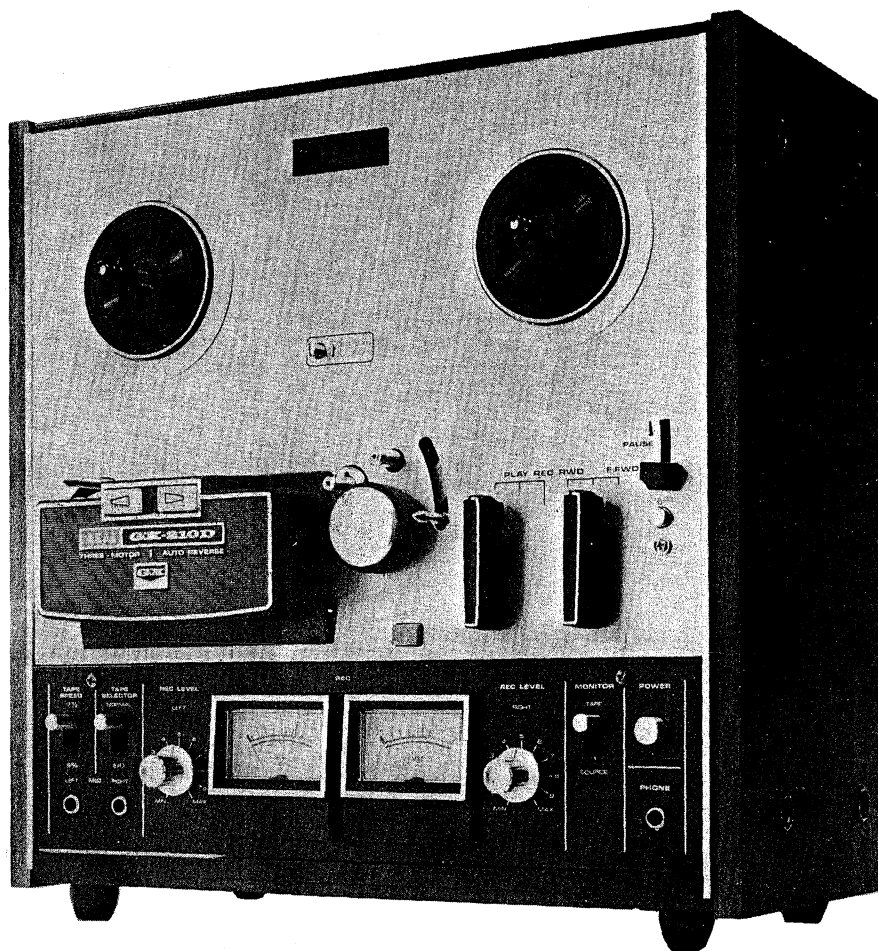


**AKAI**

**GX-210D**

**SERVICE INFORMATION**

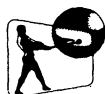




## STEREO TAPE DECK

### MODEL GX-210D

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**RANK RADIO INTERNATIONAL A/S**

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SECTION 1

**SERVICE MANUAL**

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# I. SPECIFICATIONS

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

|                          |                            |   |
|--------------------------|----------------------------|---|
| TRACK SYSTEM             |                            | 4-track 2-channel stereo 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                | 30 to 25,000 Hz $\pm 3$ dB at 7-1/2 ips<br>40 to 20,000 Hz $\pm 3$ dB at 3-3/4 ips  |
|                          | REGULAR TAPE               | 30 to 23,000 Hz $\pm 3$ dB at 7-1/2 ips<br>40 to 18,000 Hz $\pm 3$ dB at 3-3/4 ips  |
| TOTAL DISTORTION FACTOR  |                            | Less than 1.5%<br>*Less than 2% at 1,000 Hz 0 VU recording<br>*Less than 3% at 1,000 Hz 0 VU recording  |
| OUTPUTS                  | LINE OUTPUT                | 1.228V (4 $\pm 1$ dB) at FWD mode, using a 250 Hz 0 VU pre-recorded tape<br>1.228V (4 $\pm 1.5$ dB) at REV mode, using a 250 Hz 0 VU pre-recorded tape  |
|                          | DIN OUTPUT                 | 610 mV (-2 dB), using a 250 Hz 0 VU pre-recorded tape   |
| INPUTS                   | MIC INPUT                  | More than 0.3 mV  |
|                          | LINE INPUT                 | More than 60 mV   |
|                          | DIN INPUT                  | More than 5 mV (Low)<br>More than 60 mV (High)  |
| RECORDING/PLAYBACK LEVEL |                            | 1.228V (4 $\pm 1.5$ dB) at 7-1/2 ips 1,000 Hz 0 VU recording  |
| S/N RATIO                |                            | Better than 50 dB<br>*Better than 50 dB at 7-1/2 ips<br>*Better than 47 dB at 3-3/4 ips   |
| TOTAL S/N RATIO          |                            | Better than 47 dB at 7-1/2 ips  |
| CROSS TALK               |                            | Better than 45 dB<br>*Better than 40 dB at 1,000 Hz, 3 VU recording   |
| ERASE RATIO              |                            | Better than 70 dB   |
| RECORDING BIAS FREQUENCY |                            | 102 kHz $\pm 5\%$   |
| BIAS LEAK                |                            | Less than -30 VU  |
| HIGH FREQUENCY DEVIATION | Between FWD channels       | Within 3 dB   |
|                          | Between REV channels       | Within 4 dB   |
|                          | Between FWD-REV            | Within 3.5 dB   |
| REVERSING TIME           |                            | 2 to 3 seconds  |
| RECORDING CAPACITY       |                            | 45 min. 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              | 2 speed Hysteresis Synchronous Motor<br>Type: HM2-16MC (winterized)<br>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  |
|                          | REEL MOTOR                 | Two 6-pole eddy current outer rotor motor<br>Type: 24XO-MR<br>Revolutions: 930/1,120 r.p.m. at 50/60 Hz   |
| HEADS                    | COMBO RECORDING/ERASE HEAD | Type: RE4-6 GX Head<br>Gap: 3.5 to 5.5 microns (REC)<br>0.2 mm W Gap (Erase)<br>Impedance: 1,400 $\Omega$ $\pm 25\%$ at 100 kHz (REC)<br>130 $\Omega$ $\pm 7\%$ at 100 kHz (Erase)<br>D.C. Resistance: 5.5 $\Omega$ (REC)<br>2.3 $\Omega$ (Erase) |
|                          | PLAYBACK HEAD              | Type: P4-202 GX Head<br>Gap: 1.2 to 2.2 microns<br>Impedance: 1,400 $\Omega$ at 1,000 Hz<br>D.C. Resistance: 268 $\Omega$   |

|                   |   |   |
|-------------------|---|---|
| TRANSISTORS       | 2SC711(D) (E) (F) ... 14<br>2SD360(D) ... 1   | 2SC1312(G) (H) ... 14                       |
| DIODES            | 1N34A ... 4<br>10D05 ... 4<br>10D2 ... 1  | 1S2473VE ... 4<br>10D1 ... 1<br>WG713 ... 1 |
| ZENER DIODES      | WZ240 ... 1   | YZ088 ... 2                                 |
| POWER SUPPLY      | 100 to 240V A.C. 50/60 Hz for Universal and WG models<br>120V A.C. 60 Hz for CSA models<br>220V A.C. 50 Hz for CEE models |   |
| POWER CONSUMPTION | 100W max.   |   |
| DIMENSIONS        | 371(H) x 368(W) x 227(D) mm<br>(14.6" x 14.5" x 8.9")   |   |
| WEIGHT            | 15.4 kg (33.9 lbs.)   |   |

**NOTE:** Specifications subject to change without notice.

## II. MEASURING METHOD

### 1. TAPE SPEED DEVIATION

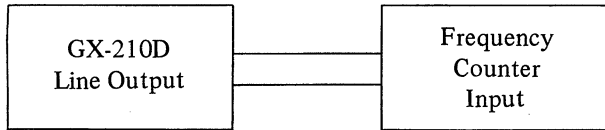


Fig. 1

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

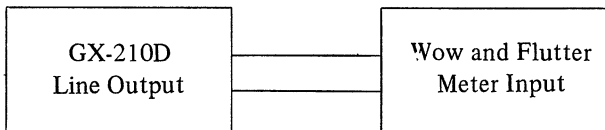


Fig. 2

#### 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

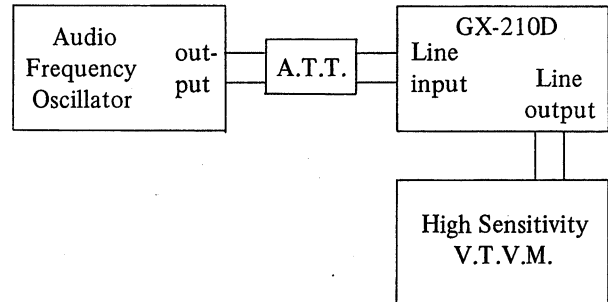


Fig. 3

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

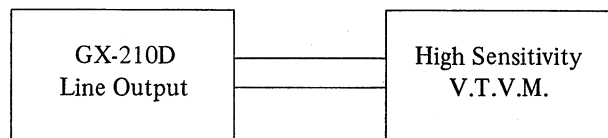


Fig. 4

As shown in Fig. 4, connect a High Sensitivity V.T.V.M. to the Line output. Playback a 250 Hz "0" VU pre-recorded test tape and measure the output. Then remove the tape and measure the noise level under the same condition. Convert each of the measured values into decibels.



## 5. TOTAL HARMONIC DISTORTION FACTOR

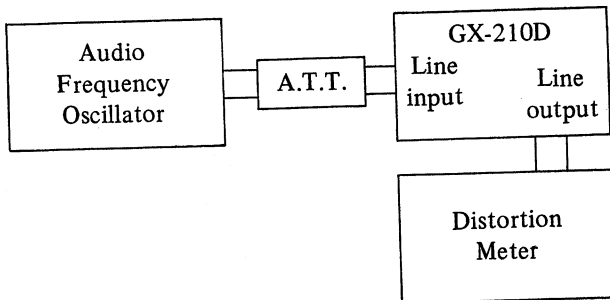


Fig. 5

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)

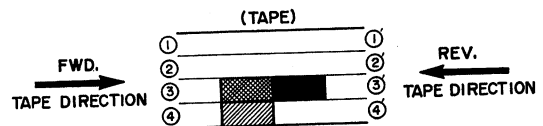


Fig. 6

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

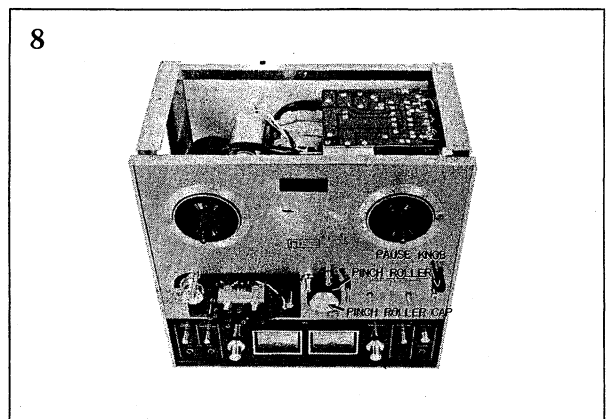
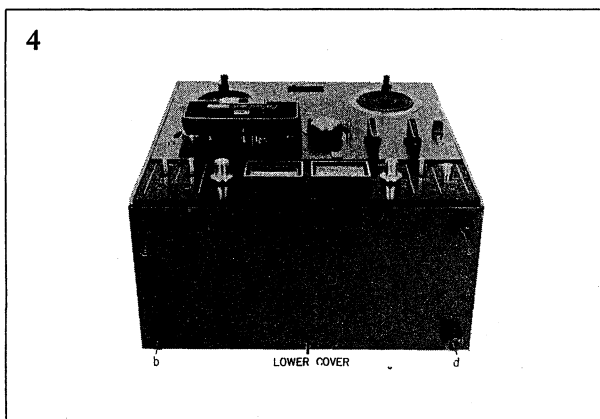
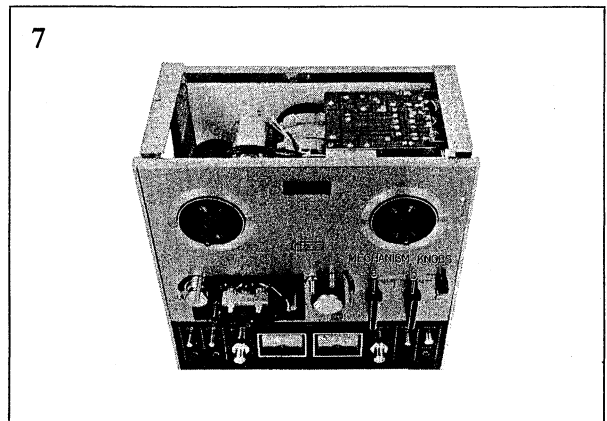
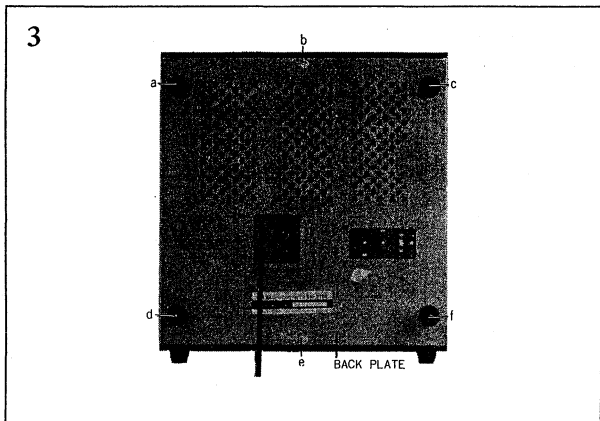
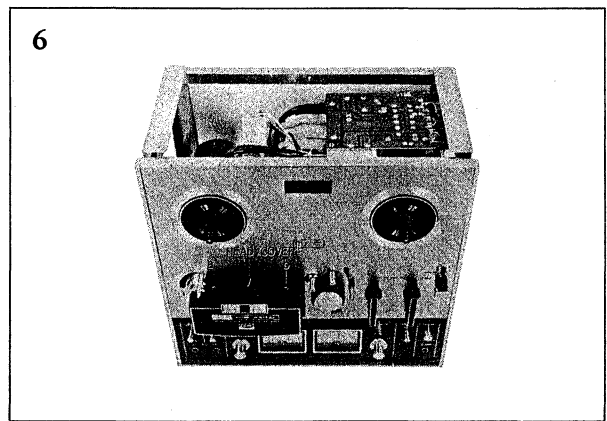
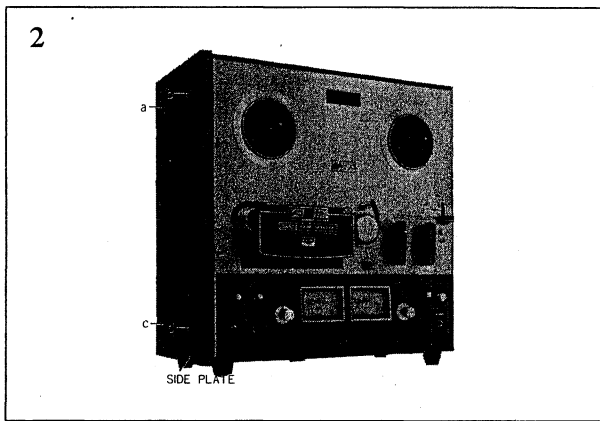
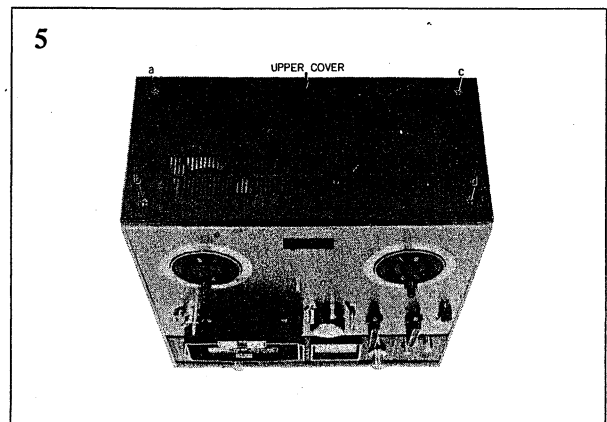
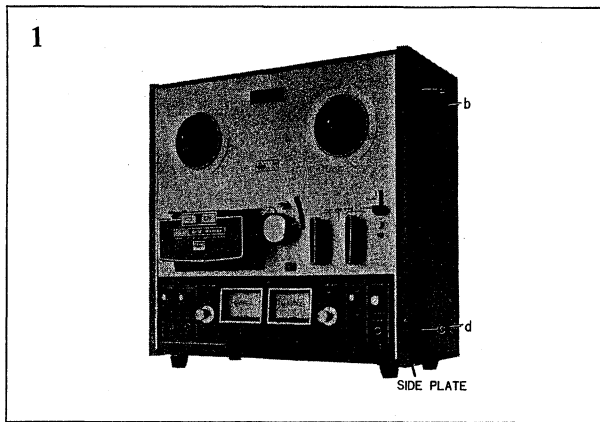
As shown in Fig. 4, connect a High Sensitivity V.T.V.M. to the Line output. Playback a virgin tape and take a V.T.V.M. reading of the output level. Next, record a 1,000 Hz sine wave signal at +3 VU, then playback this recorded signal and take a V.T.V.M. reading of the output level. Next, using this pre-recorded 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:

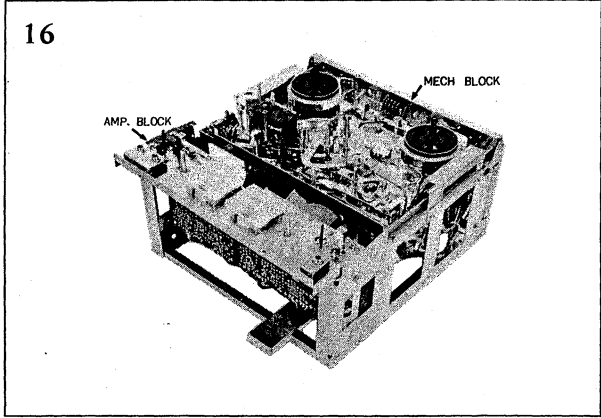
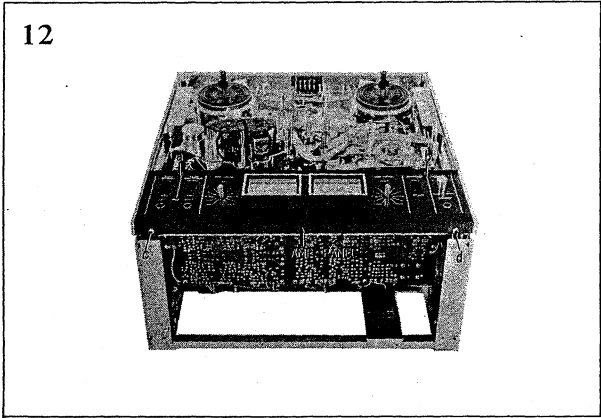
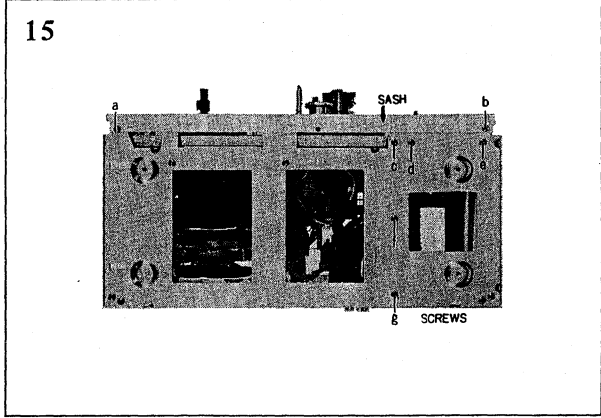
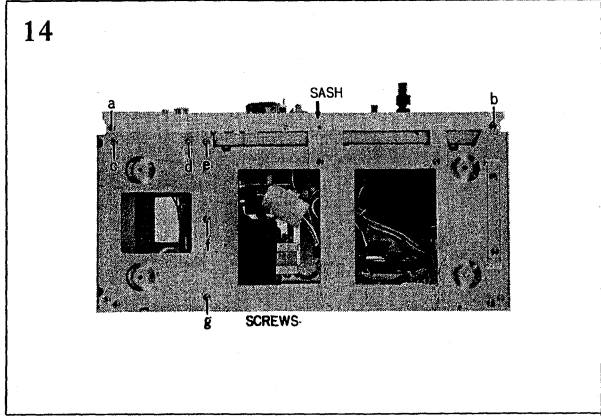
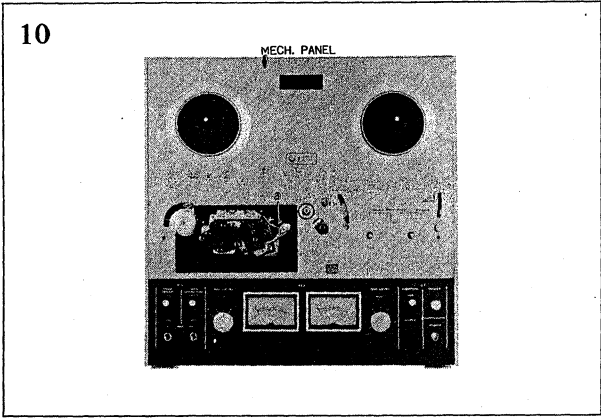
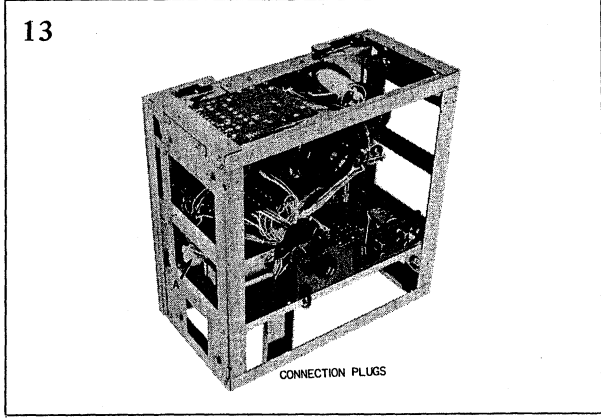
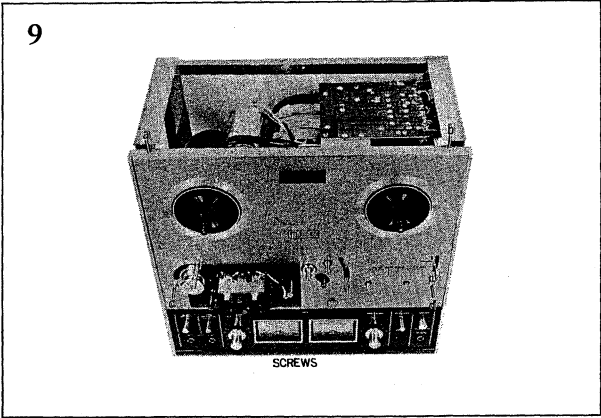
$$E_r = 20 \log \frac{E_0}{E_2 - E_1} \text{ (dB)}$$

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

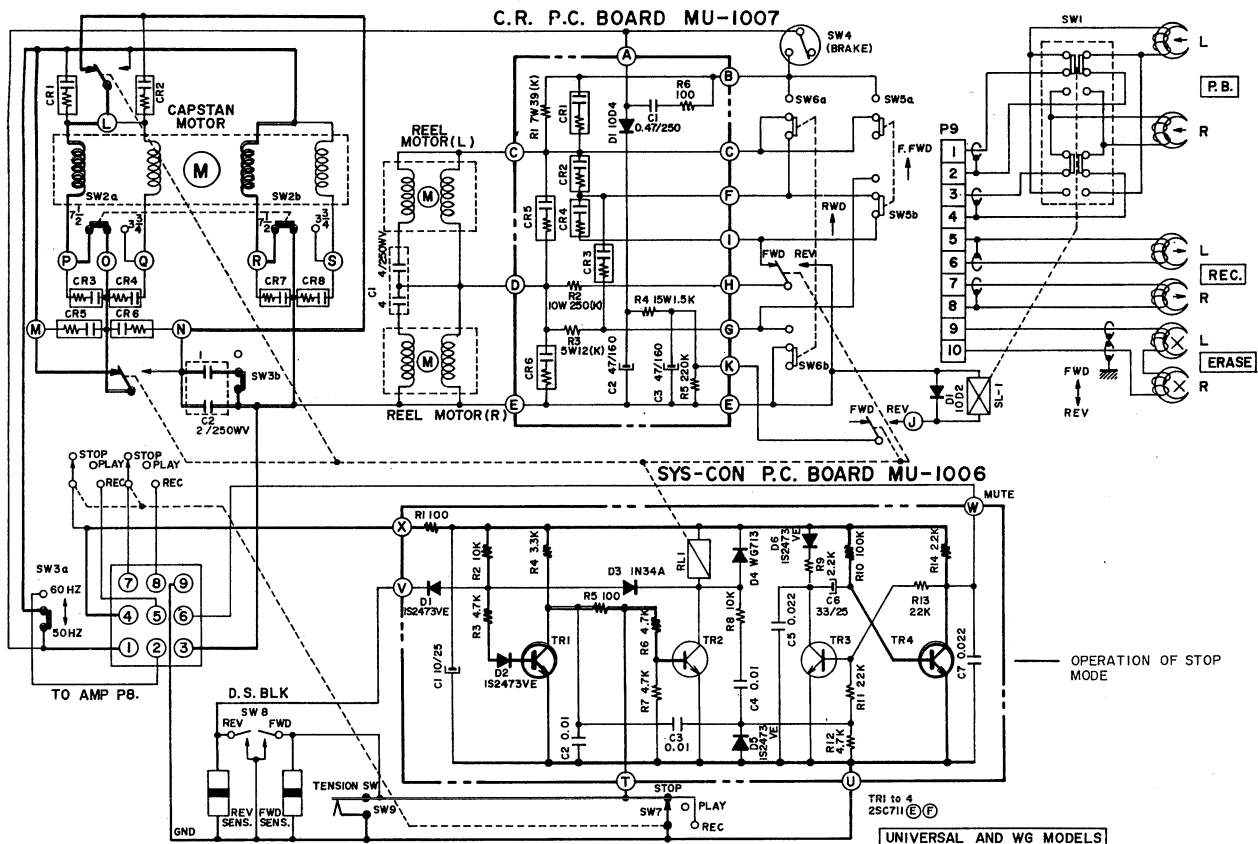
### III. DISMANTLING OF UNIT

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

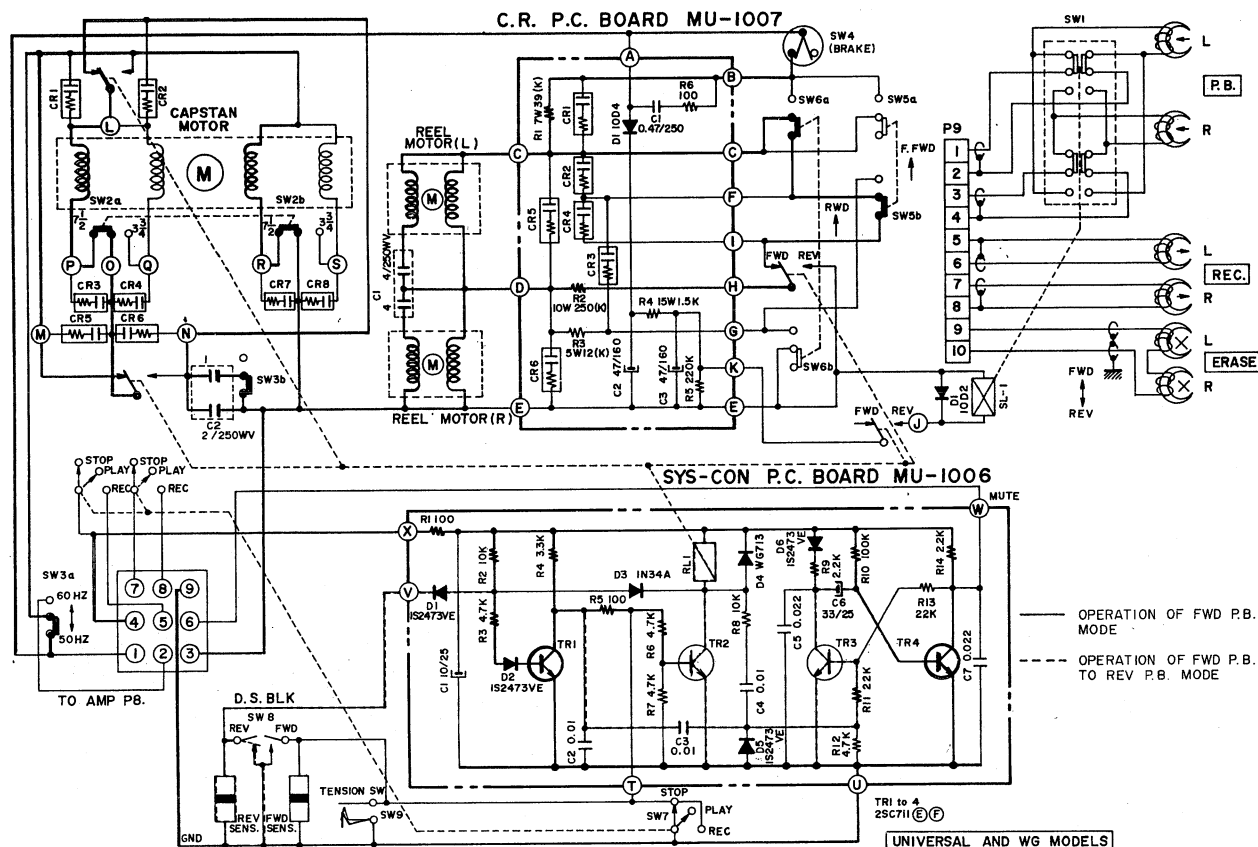




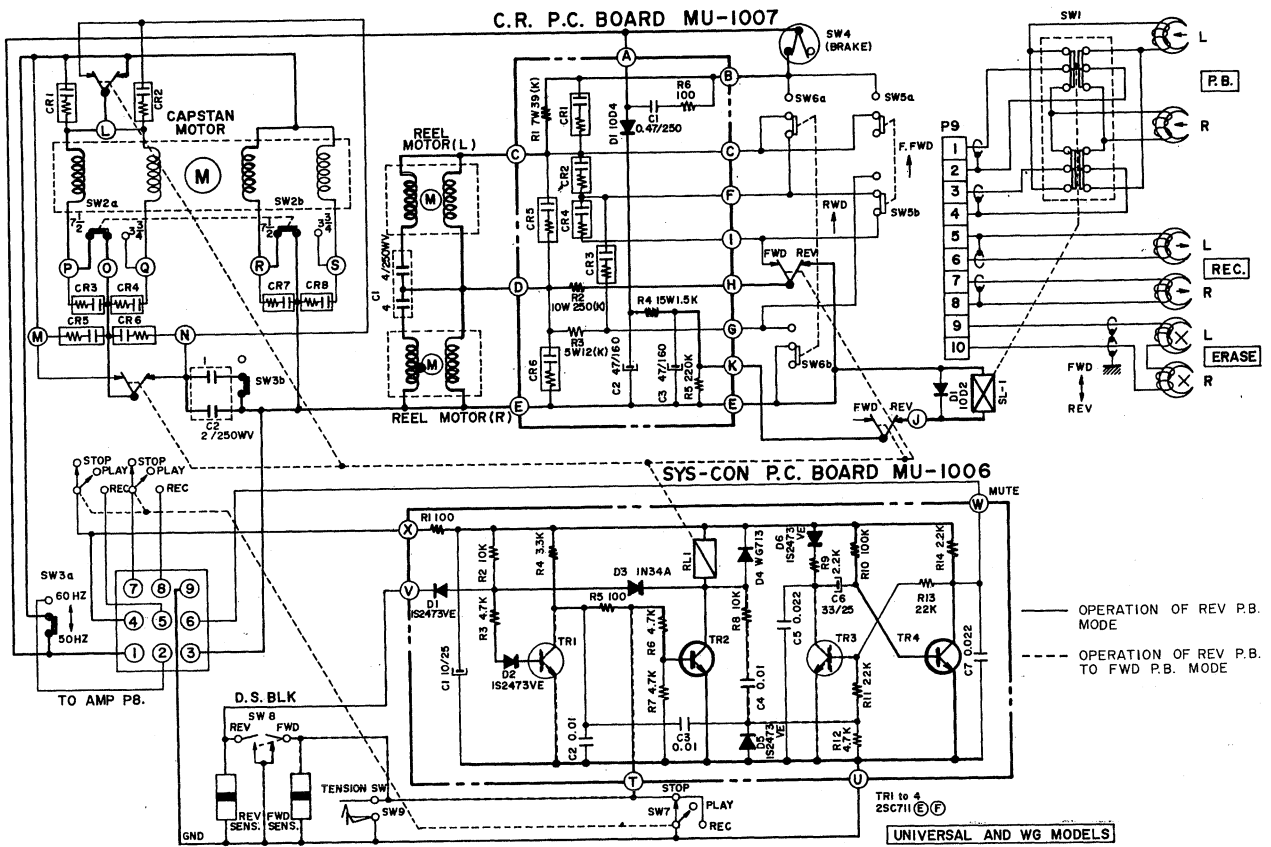
# IV. SYSTEM CONTROL CIRCUIT OPERATION



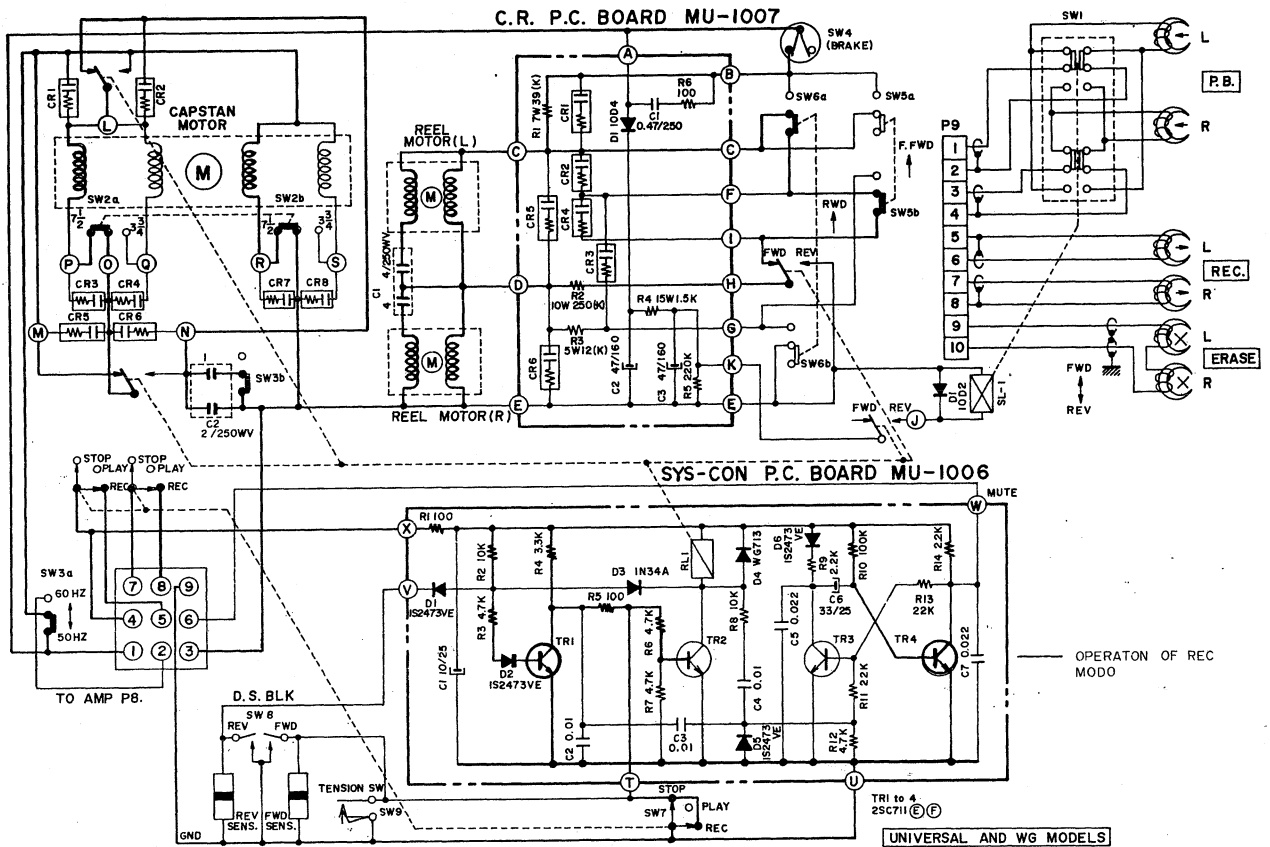
SCHEMATIC 1



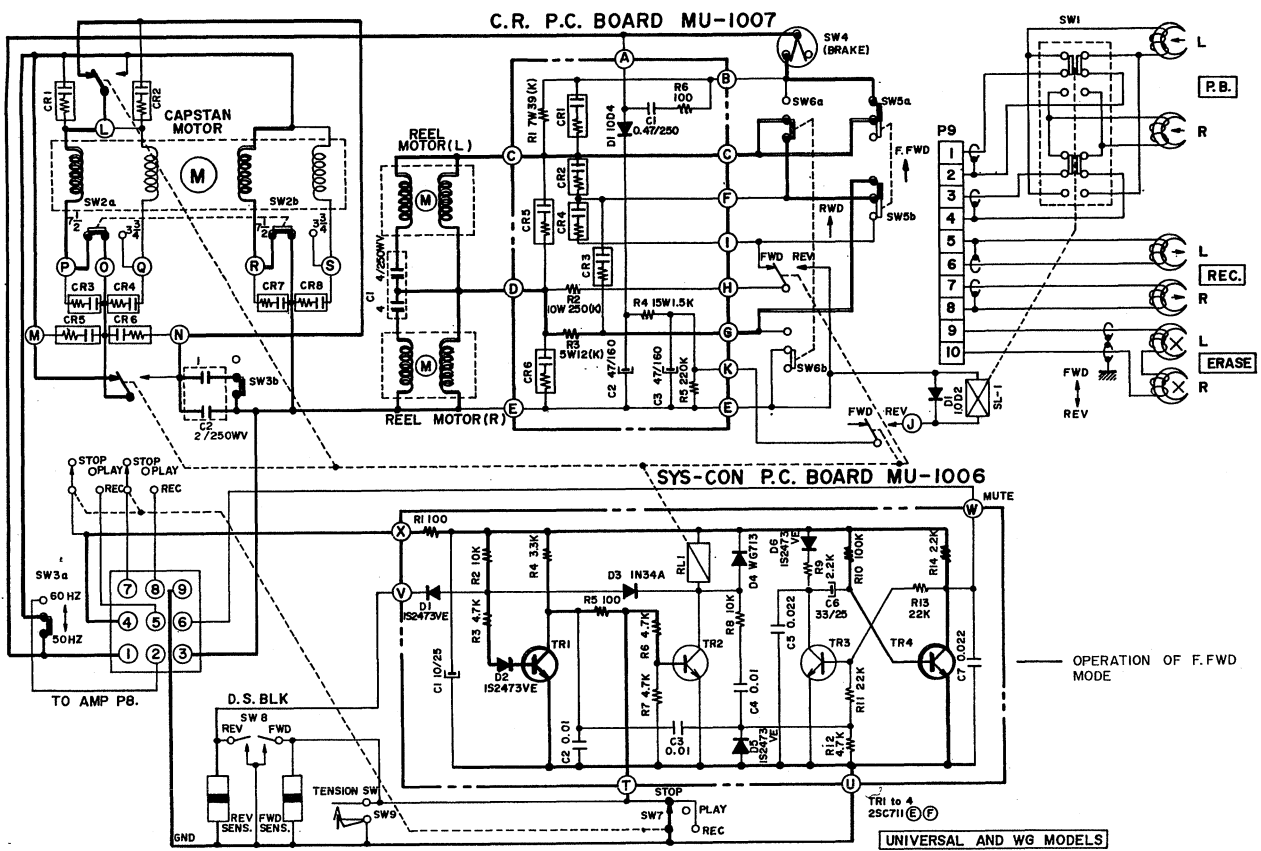
SCHEMATIC 2



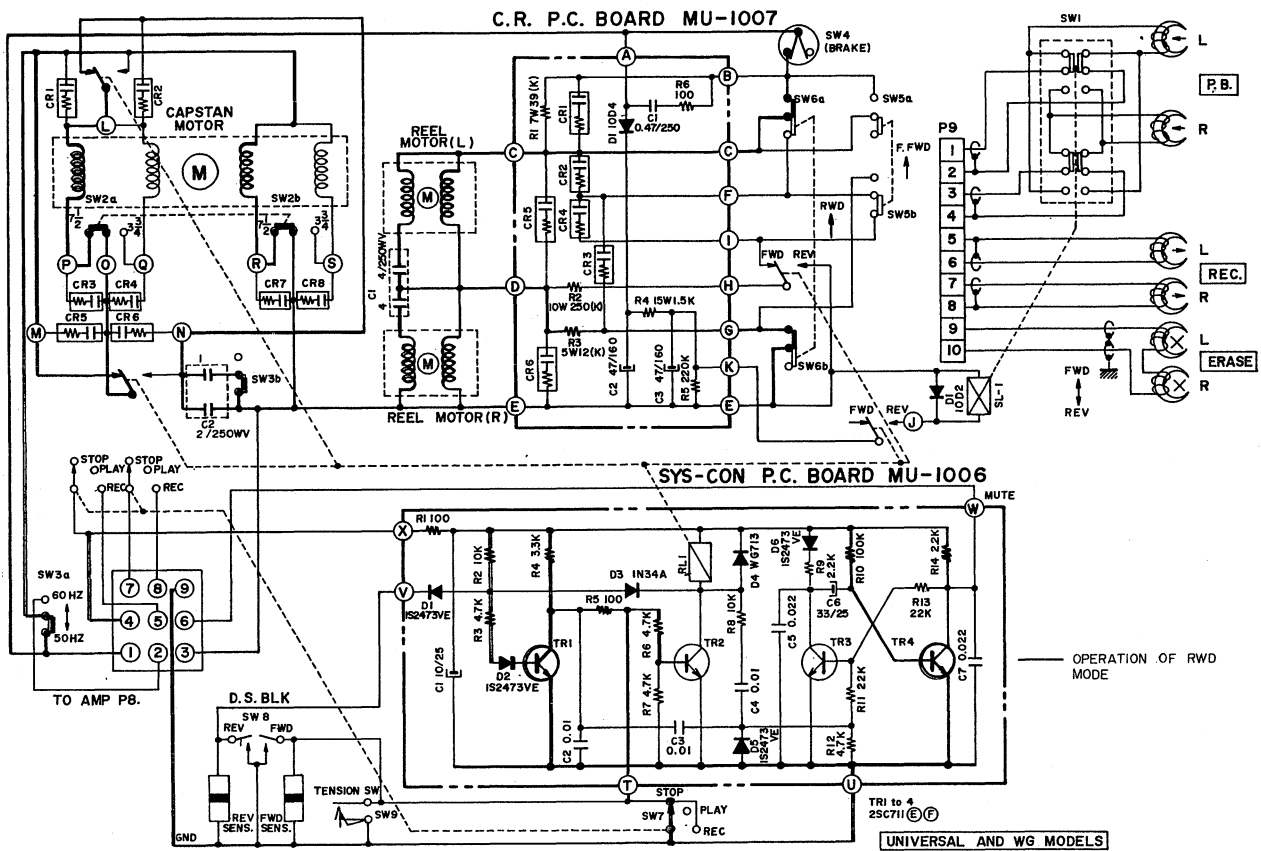
SCHMATIC 3



SCHMATIC 4



SCHMATIC 5



SCHMATIC 6

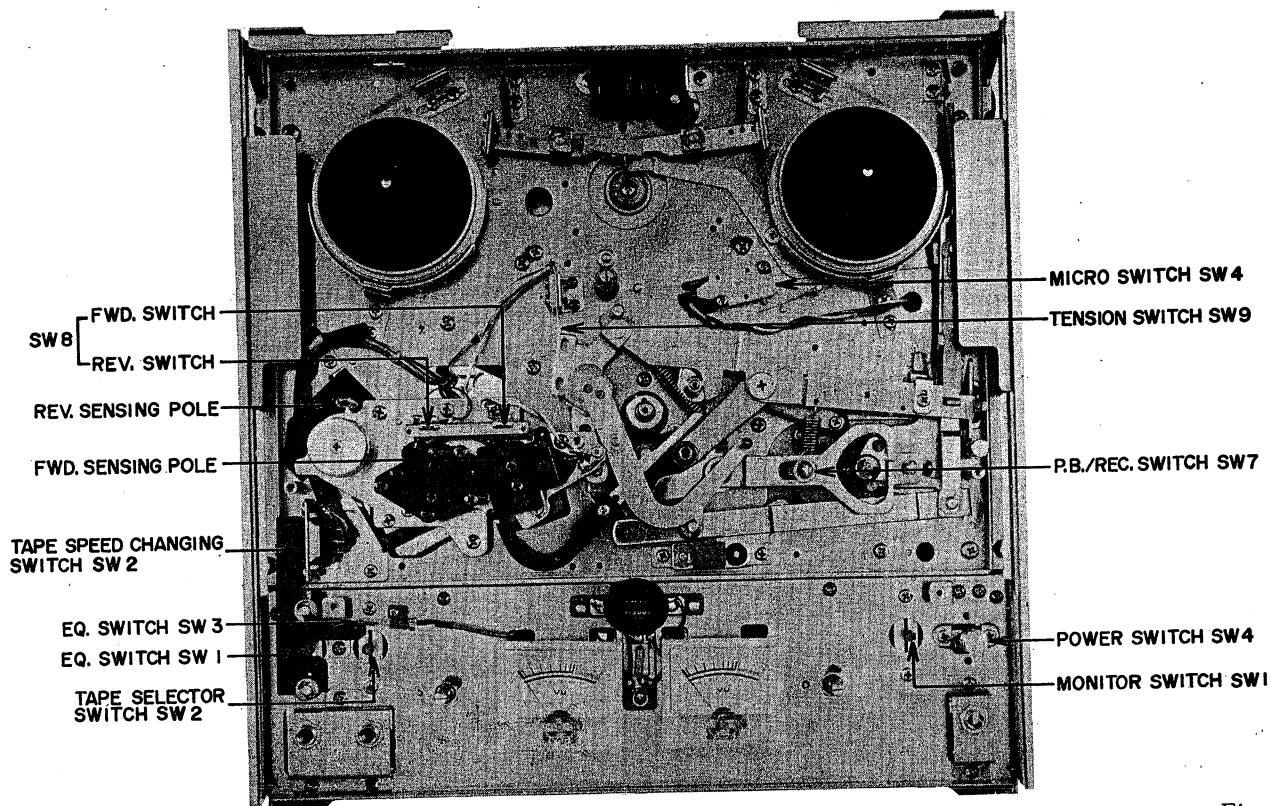


Fig. 7

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

At Stop Mode, the various System Control (hereinafter referred to as SYSCON) 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 (Playback Amp. P.C. Board) connected to the collector of TR4 is turned OFF, the playback Amp. Mute Circuit is also turned OFF. Both the supply and take-up reel motor 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 SYSCON 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 Reverse 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 Diagram-2)

When the P.B./REC Switch is at PLAY position, the various SYSCON 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 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.

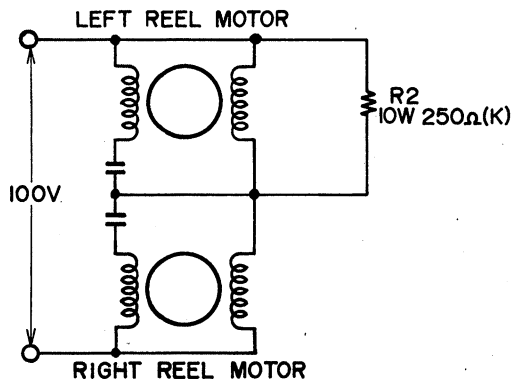


Fig. 8

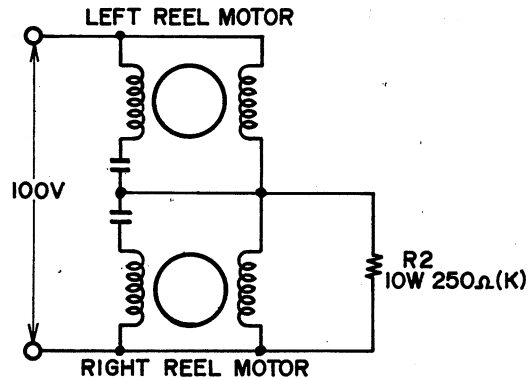


Fig. 9

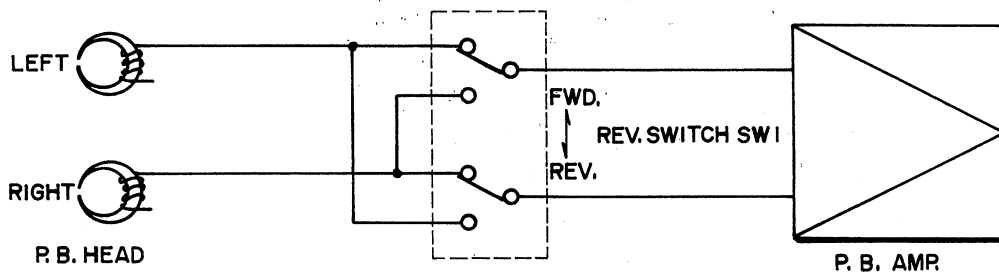


Fig. 10

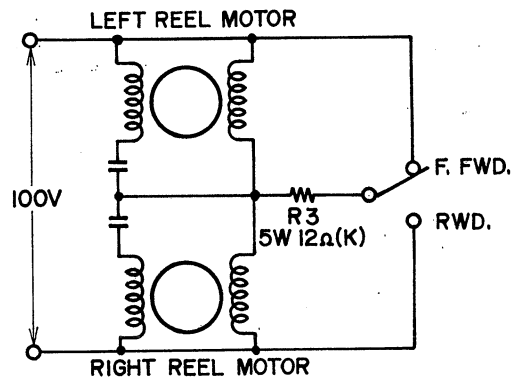


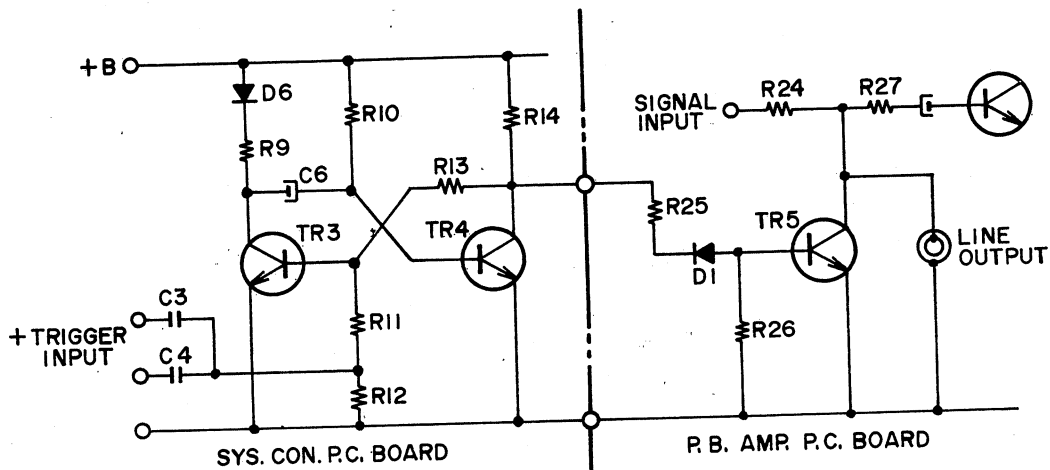
Fig. 11

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

When the sensing tape passes the reverse sensing poles or when the Reverse 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 RL-1 is turned ON. In this TR1 and TR2 circuit, TR1 is maintained at OFF and TR2 at ON by means of Diode D3 (1N34A). (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 the capstan motor revolutions have been stabilized. (Refer to MUTING CIRCUIT OPERATION explanation) Solenoid Plunger SL1 also functions to shift down Reverse Switch SW-1 and the P.B. Head. In other words, P.B. Head left and right channels are reversed by means of SW-1 as shown in Fig. 10.





SCHMATIC 7

#### 4. FROM REVERSE TO FORWARD PLAY-BACK (Refer to Schematic Diagram-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 (1N34A) 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 RL1 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

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

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

In this case, SYSCON 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 Diagrams 2, 3, and 7)

As shown in Schematic Diagram-7, the muting circuit is made up of an electronic switch from transistor TR5 and a one-shot multi-vibrator comprised of TR3 and TR4. When stabilization is attained, TR3 of the one-shot multi-vibrator is turned OFF, and TR4 turned ON. Accordingly, the electrical potential of TR4 collector is lowered, Zener Diode D1 is biased in reverse direction, and TR5 assumes an OFF condition. 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. Thus the base of TR3 is biased (this becomes the trigger signal), the one-shot multi vibrator comprised of TR3 and TR4 is inverted, and after a certain period of time (2 to 3 seconds) again returns to its stabilized condition.

Further, 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 TR5 is turned ON, and the signal is muted (the internal resistance TR5 at lead through time is extremely low).

# V. MECHANISM ADJUSTMENTS

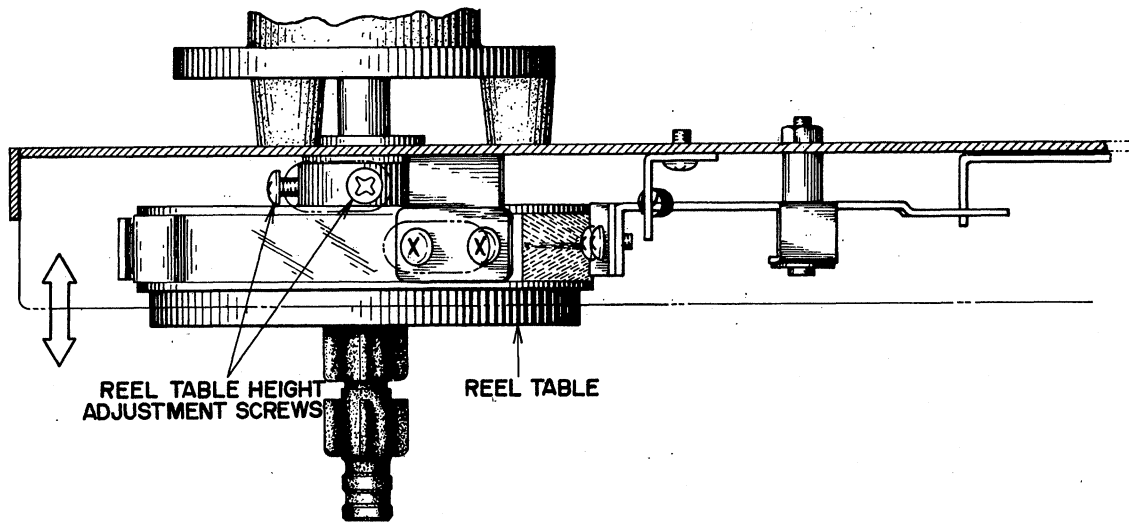


Fig. 12

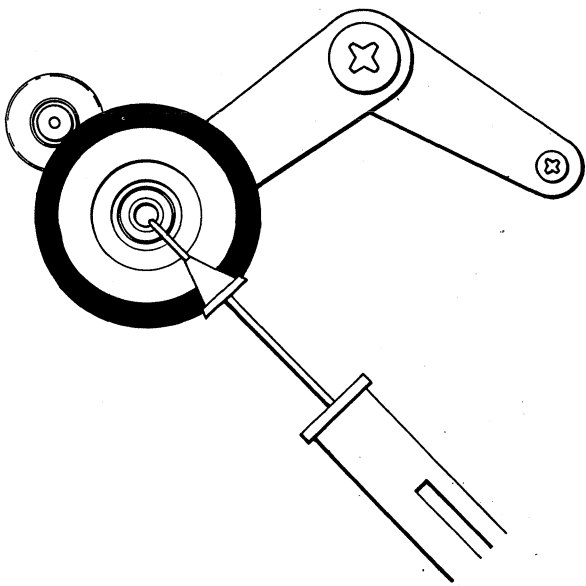


Fig. 13

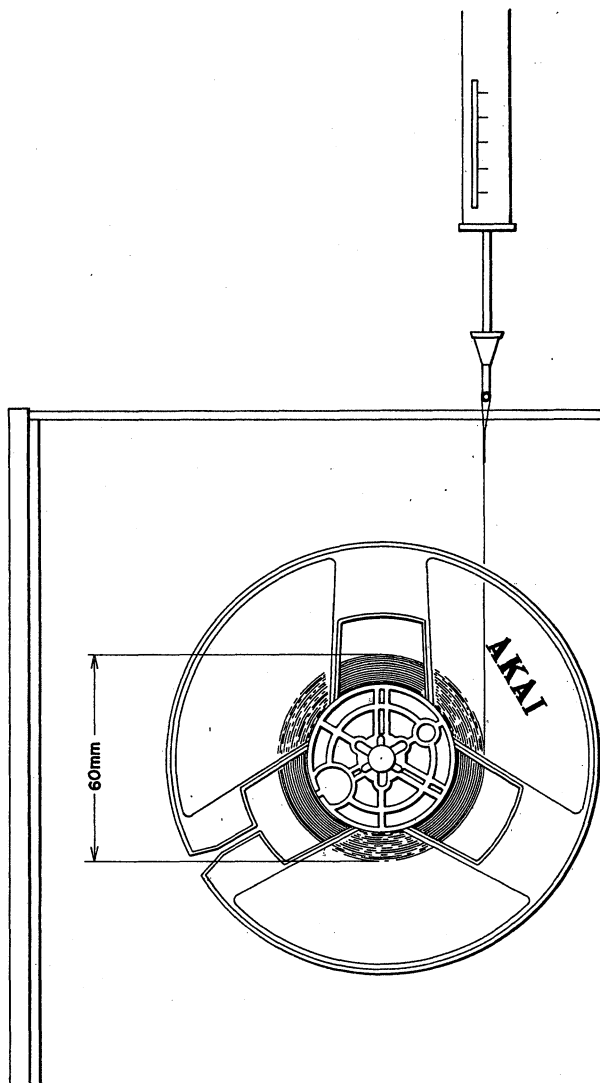


Fig. 14

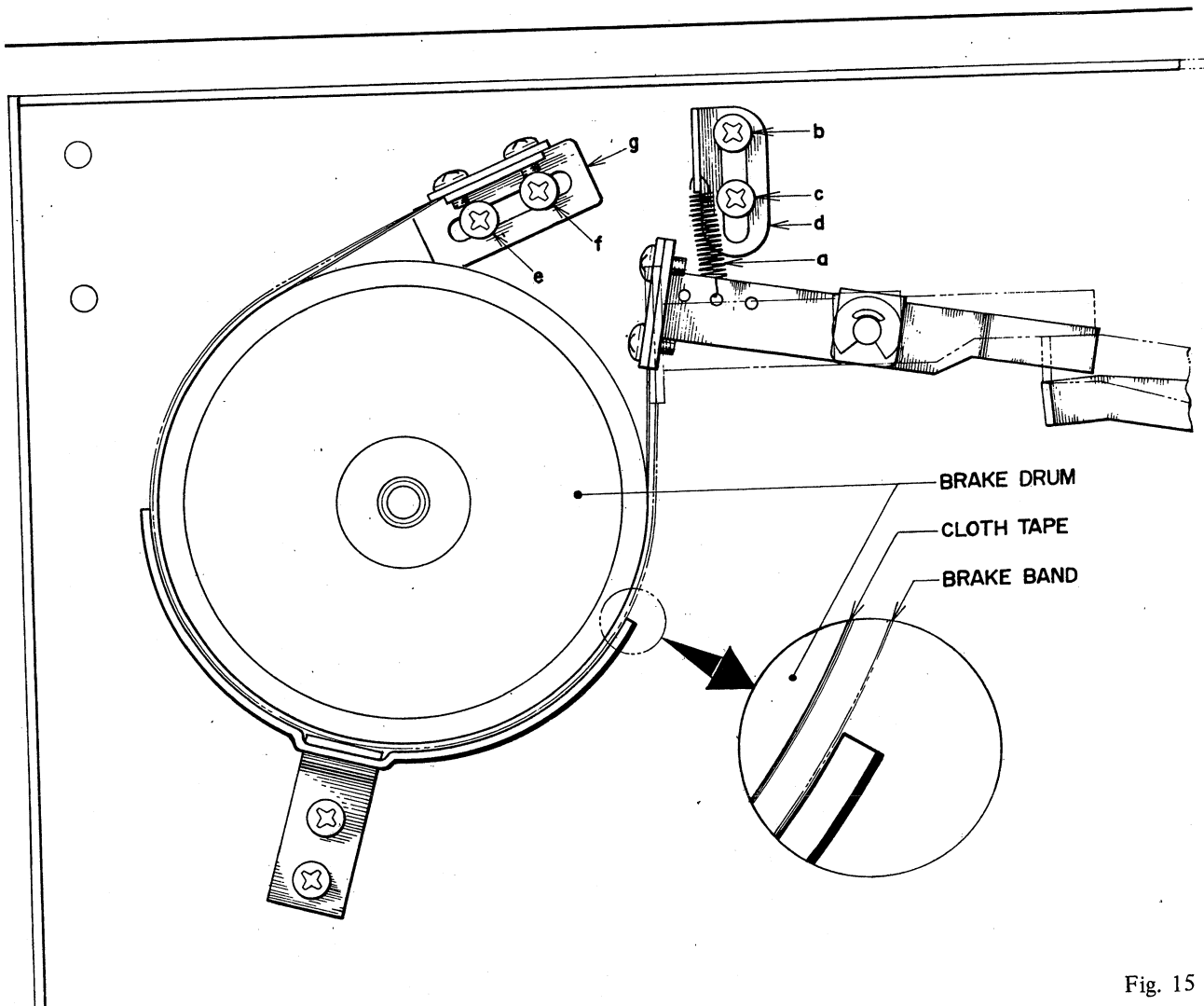


Fig. 15

### 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)

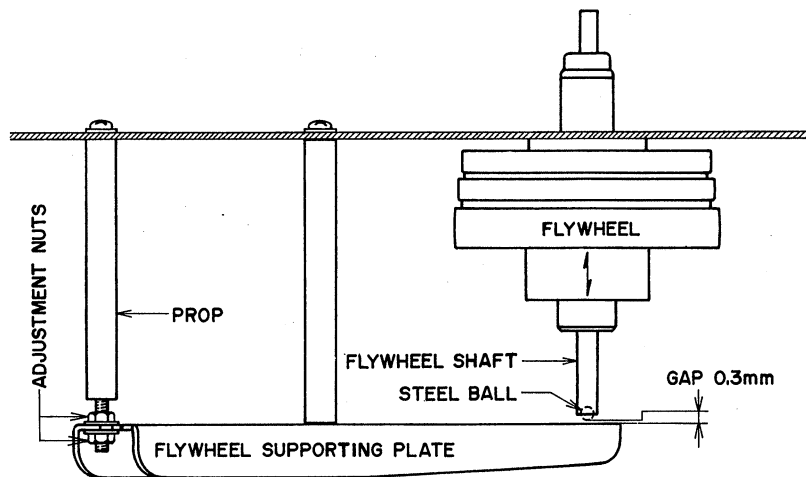


Fig. 16

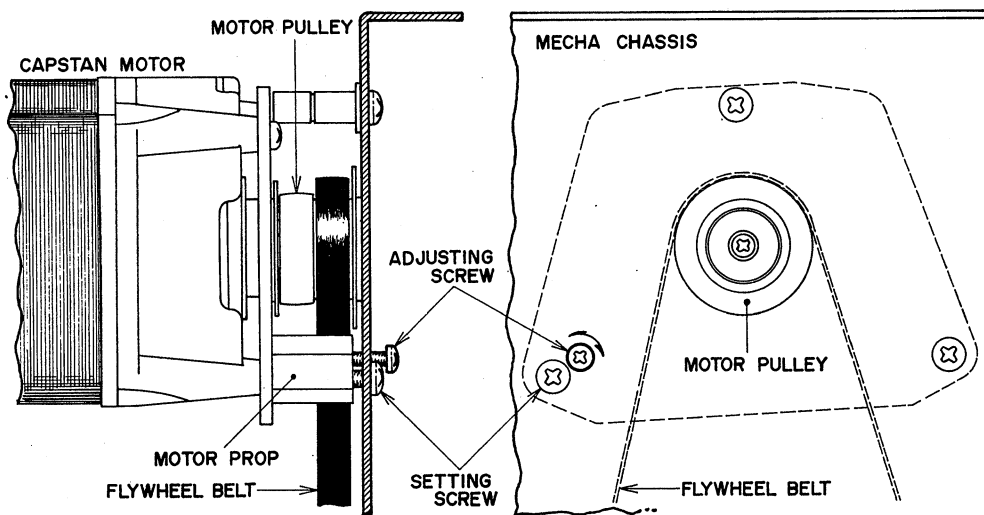


Fig. 17

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

| Mode \ Reel Motor | 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

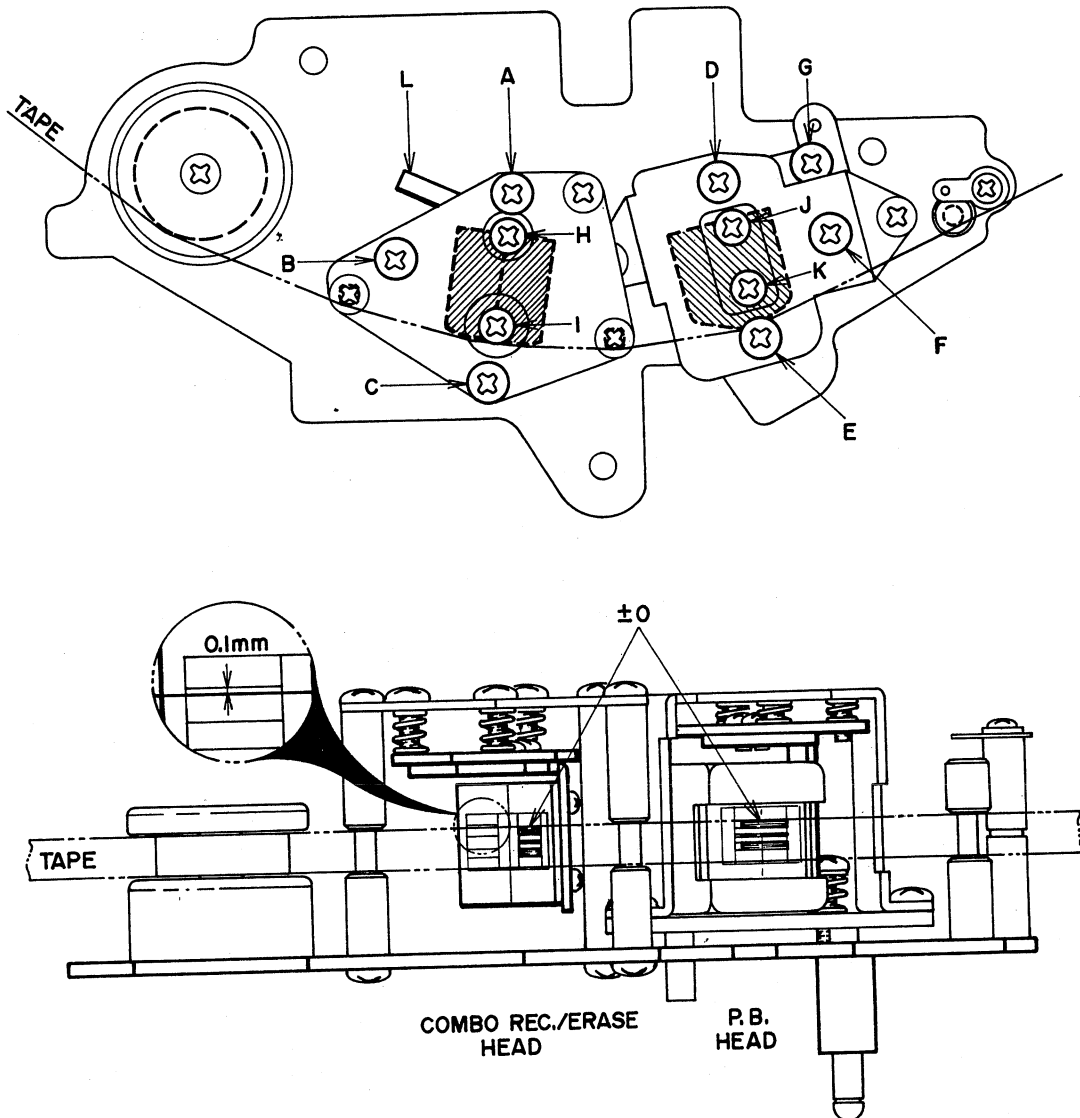


Fig. 18

### 1. HEAD HEIGHT ADJUSTMENT

#### 1) COMBO Head

At Playback mode adjust COMBO head height by turning screws (A) (B) and (C) shown in Fig. 18 to left and right until the upper edge of the tape is the same height as the upper edge of the left channel recording head core.

#### 2) Playback Head

- a) At Forward Playback mode, adjust playback head height by turning screws (D) (E) and (F) shown in Fig. 18 to left and right until the upper edge of the tape is the same height as the upper edge of the left channel playback head core.
- b) At Reverse Playback mode, adjust playback head height by turning screw (G) shown in Fig. 18 to left and right until the lower edge of the tape is the same height as the lower edge of the right channel playback head core.

### 2. HEAD AZIMUTH ALIGNMENT ADJUSTMENT

#### 1) Playback Head

- a) Connect a high sensitivity V.T.V.M. to the line output terminals.
- b) Set the Tape Speed Switch to 7-1/2 ips. (19 cm/sec.), and set the Monitor Switch to TAPE position.
- c) Playback an 8,000 Hz 3-3/4 ips. recorded Ampex Alignment test tape.
- d) At Forward Playback mode, turn Azimuth Alignment Screw (F) shown in Fig. 18 to obtain maximum line output level on both channels.
- e) After the adjustment in Item d) above has been completed, loosen screws (J) and (K) shown in Fig. 18 and move the head gap side of the playback head to left and right. When tension is applied to the supply reel side and

---

the line output level of both channels do not fluctuate, (maximum allowable fluctuation within  $+0.5/-0$  dB) fix screws (J) and (K) to maintain this condition.

- f) At reverse playback mode, make the same adjustment as outlined above until the line output level of both channels do not fluctuate.

## 2) COMBO Head

- a) Connect an audio frequency oscillator to the line input terminals, and connect a high sensitivity V.T.V.M. to the line output terminals and load a blank tape.
- b) Set the Tape Speed Switch to 7-1/2 ips. (19 cm/sec.) and set the monitor switch to TAPE position.
- c) Record a 16,000 Hz audio frequency at  $-10$  dB recording level.
- d) At recording mode, turn Azimuth Alignment Adjustment Screw (B) shown in Fig. 18 to left and right until the line output level of both channels is maximum and does not fluctuate.
- e) After completing adjustment in Item d) above, adjust gap side of recording head by moving installation angle (L) shown in Fig. 18 to left and right until the line output level of both channels do not fluctuate (maximum allowable fluctuation within  $+0.5/-0$  dB) when tension is applied to the supply reel side.

- 3. To obtain best results, repeat adjustments outlined in paragraphs 1 and 2 above 2 or 3 times. New blank tape should be used when making these adjustments.

## VII. AMPLIFIER ADJUSTMENTS

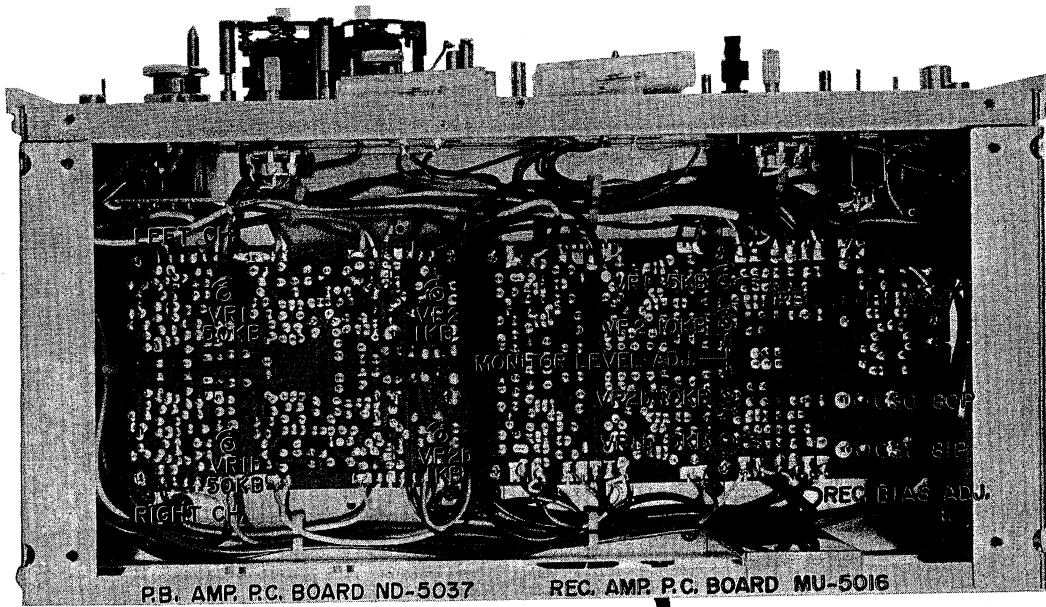


Fig. 19

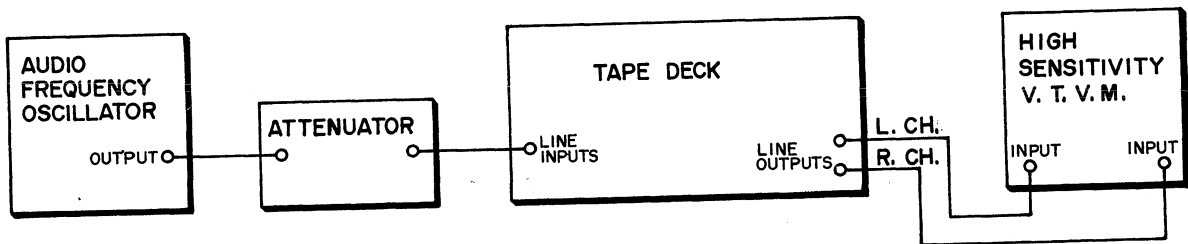


Fig. 20

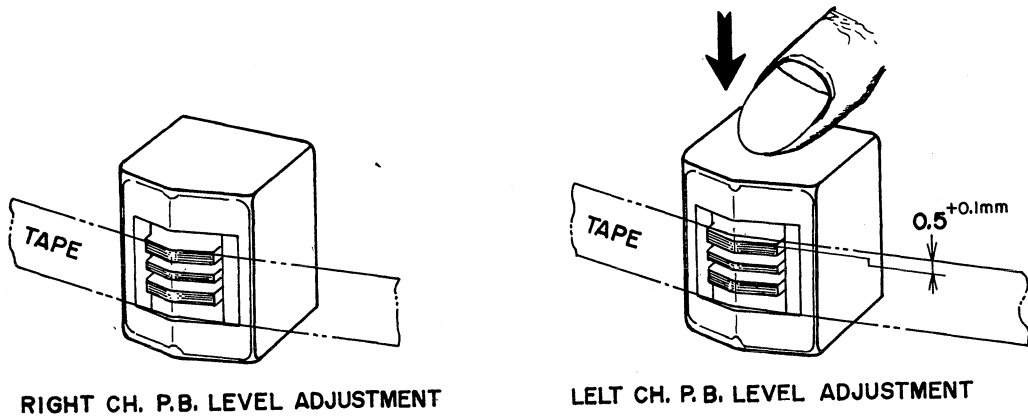


Fig. 21

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

### 1. PLAYBACK LEVEL ADJUSTMENTS

- 1) Set Tape Speed Selector to 7-1/2 ips.
- 2) Set Monitor Switch to TAPE position.
- 3) Playback a 250 Hz recorded test tape at 7-1/2 ips.
- 4) Adjust Playback Amp. P.C. Board semi-fixed resistors VR1 50 kB (left ch.), and VR1b 50 kB (right ch.) shown in Fig. 19 to obtain a high sensitivity V.T.V.M. indication of 4 dB (1.228V) line output level on both channels.
- 5) When making the left channel line output level adjustment, press playback head slightly downward with one finger and regulate to 4 dB.

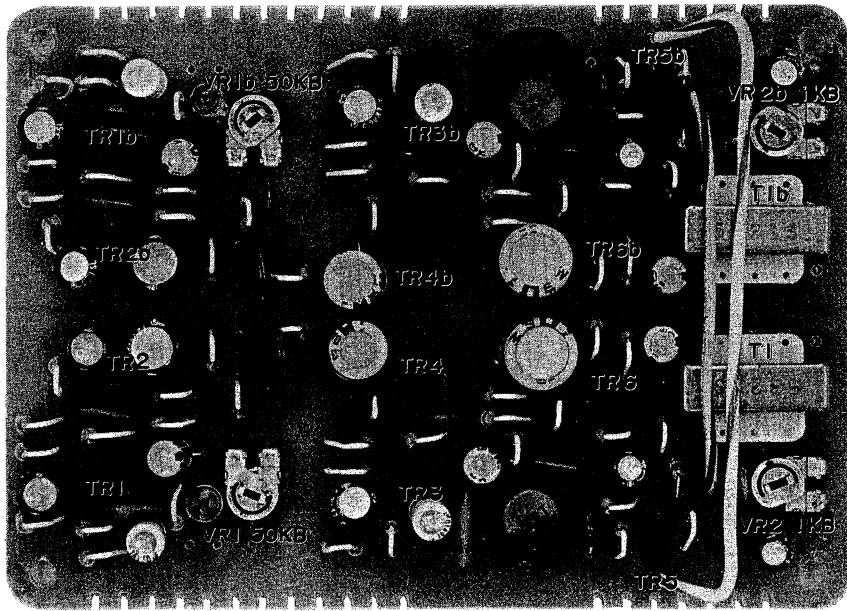


Fig. 22 PLAYBACK AMP. P.C. BOARD ND-5037

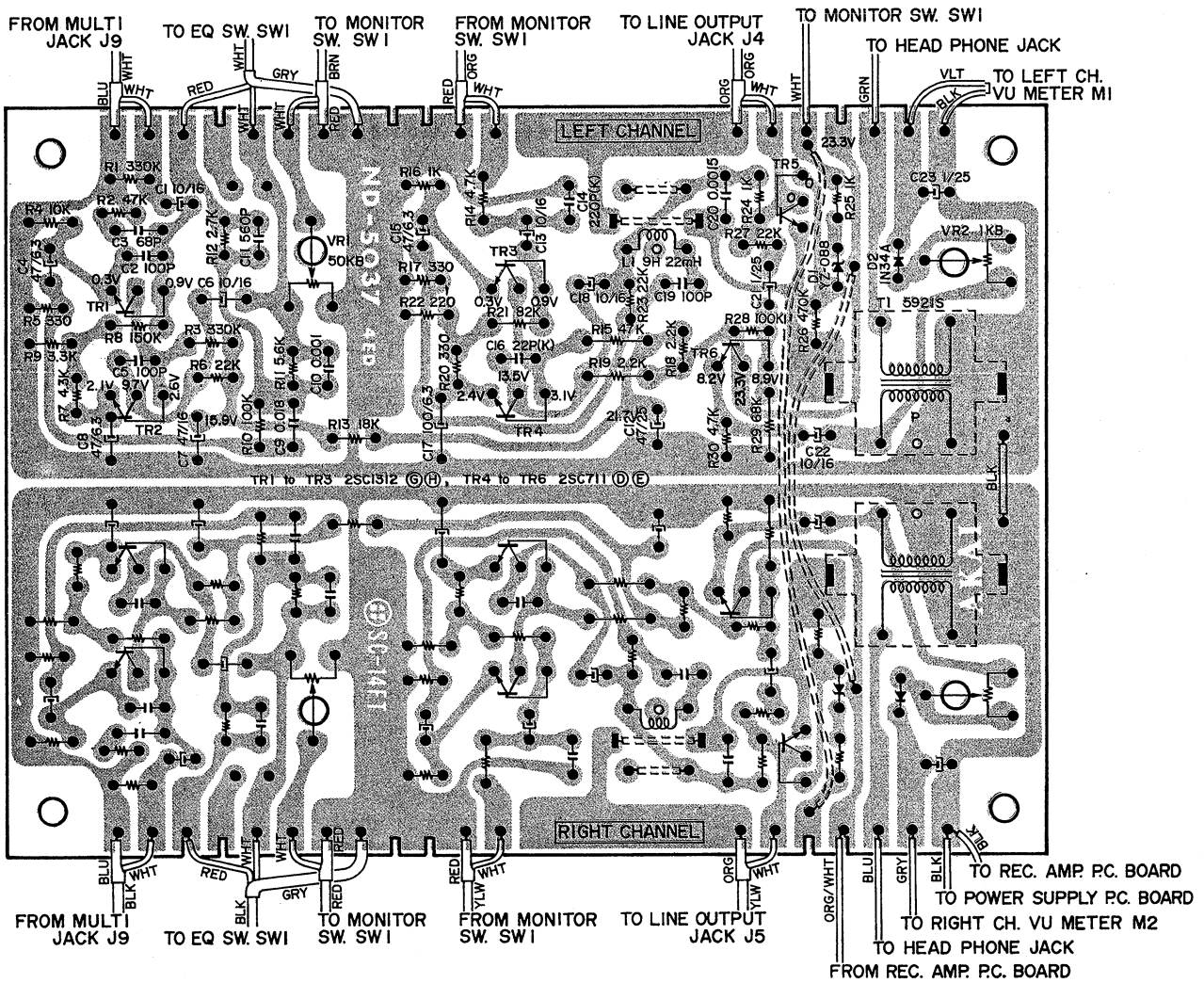


Fig. 23 PLAYBACK AMP. P.C. BOARD ND-5037 (Reverse Side)



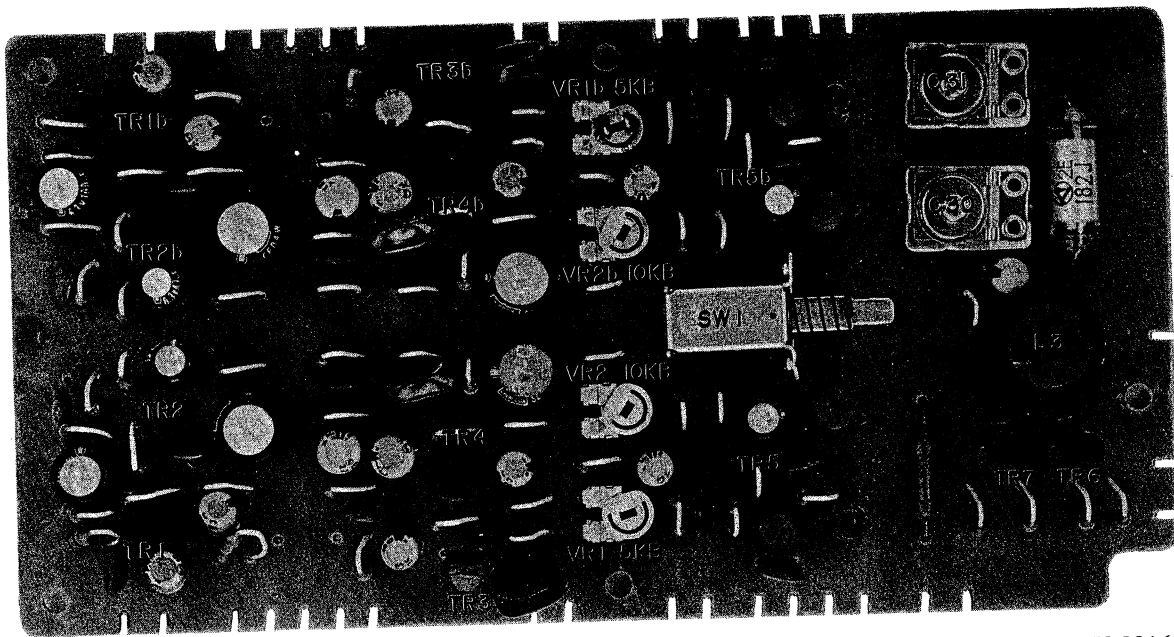


Fig. 24 RECORDING AMP. P.C. BOARD MU-5016

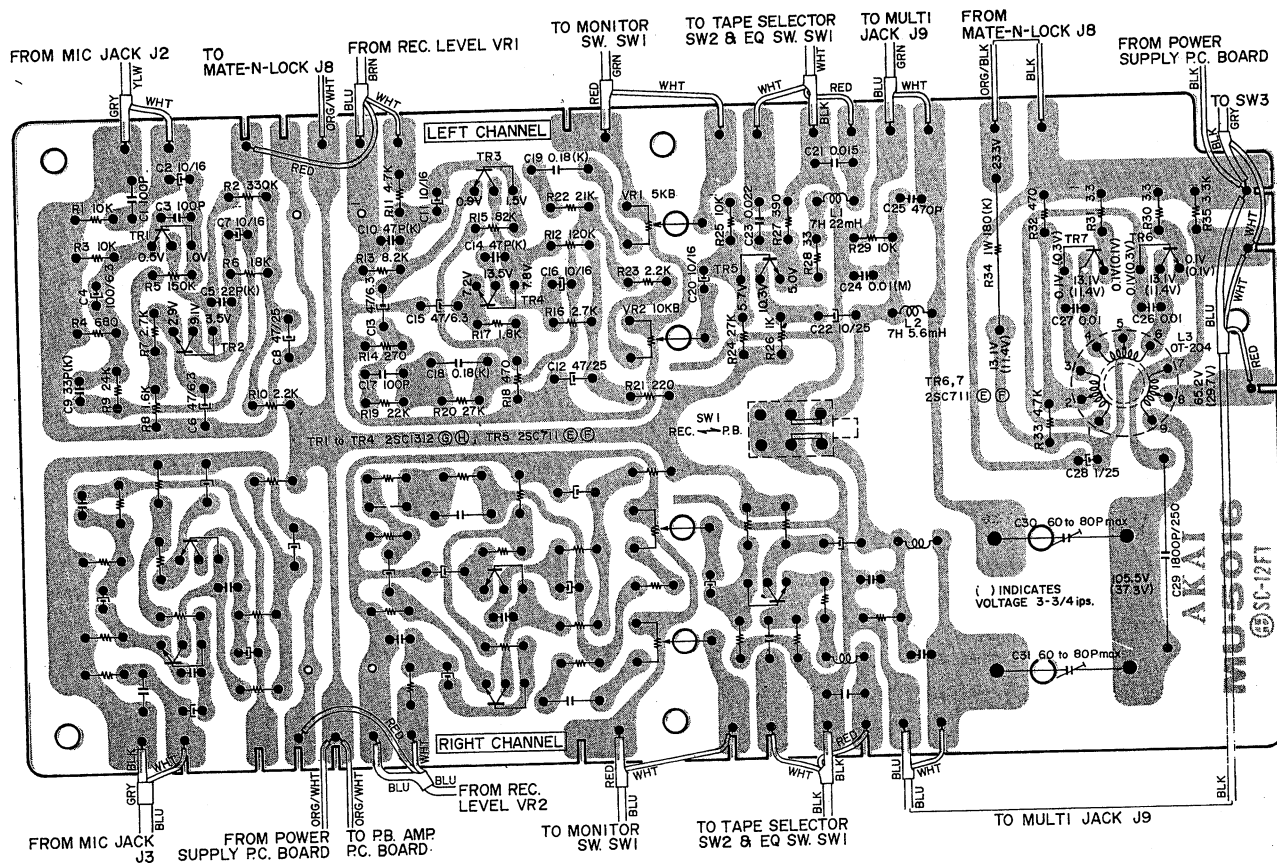


Fig. 25 RECORDING AMP. P.C. BOARD MU-5016 (Reverse Side)

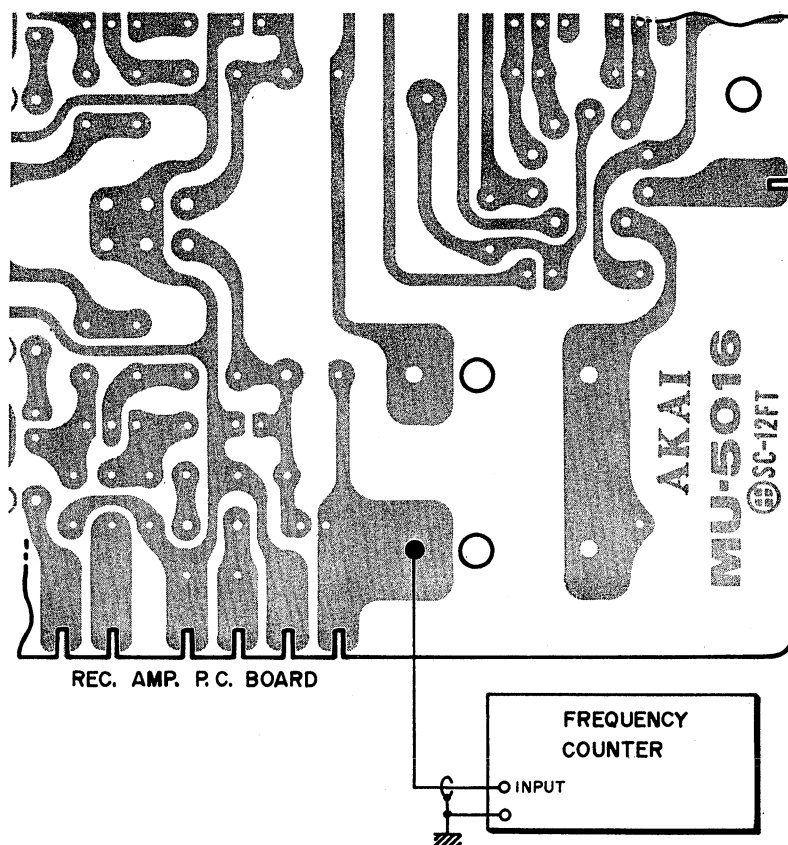


Fig. 26

## 2. VU METER SENSITIVITY ADJUSTMENT

After playback level adjustments has been completed, with the playback level of both channels at 4 dB, adjust P.B. Amp. P.C. Board semi-fixed resistors VR2 1 k $\Omega$  (left ch.) and VR2b 1 k $\Omega$  (right ch.) shown in Fig. 19 to obtain a left/right VU meter indication of 0 VU.

## 3. HIGH RANGE FREQUENCY DEVIATION CHECK

### 1) Between Channels

When an 8,000 Hz 3-3/4 ips. Ampex Alignment Test Tape is played back at 7-1/2 ips, check to confirm that the difference in high range output between left and right channel is within 3 dB at FWD mode and within 4 dB at REV mode.

### 2) Between FWD and REV Playback

When an 8,000 Hz 3-3/4 ips. Ampex Alignment Test Tape is played back at 7-1/2 ips, check to confirm that the difference in high range output between FWD and REV playback is within 3.5 dB.

3) If in Items 3-1) and 3-2) above, the difference is not within specifications, repeat Head Azimuth Alignment adjustment.

## 4. RECORDING LEVEL ADJUSTMENT

- 1) Set Tape Speed Selector to 7-1/2 ips.
- 2) Set Monitor Switch to TAPE position.
- 3) Set Left and Right ch. recording level to maximum (turn fully clockwise) and load a blank tape.
- 4) Set tape deck to recording mode and supply a 1,000 Hz, -70 dB (0.25 mV) sine wave signal to the Mic Inputs from the audio frequency oscillator.
- 5) Adjust Recording Amp. P.C. Board semi-fixed resistors VR2 10 k $\Omega$  (left ch.) and VR2b 10 k $\Omega$  (right ch.) shown in Fig. 19 to obtain a high sensitivity V.T.V.M. indication of 4 dB (1.228V) line output level on both channels.
- 6) Set Monitor Switch to SOURCE position.
- 7) Adjust Recording Amp. P.C. Board semi-fixed resistors VR1 5 k $\Omega$  (left ch.) and VR1b 5 k $\Omega$  (right ch.) shown in Fig. 19 to obtain a high sensitivity V.T.V.M. indication of 4 dB (1.228V) line output level on both channels.

NOTE: In Item 4) above if sine wave is supplied to Line Input, set audio frequency oscillator output to -24.5 dB (46 mV).

---

## 5. FREQUENCY RESPONSE ADJUSTMENT

- 1) Set Tape Speed Selector to 7-1/2 ips.
- 2) Set Monitor Switch to TAPE position.
- 3) Set Left and Right ch. recording level to maximum (turn fully clockwise) and load a blank tape.
- 4) Set tape deck to recording mode and supply a 2,000 Hz sine wave signal to the Mic or Line Inputs. Adjust attenuator to obtain a high sensitivity V.T.V.M. indication of -16 dB (120 mV) line output level.
- 5) Switch the oscillation frequency of the audio frequency oscillator from the condition described in Item 5-4) above to 20,000 Hz.
- 6) Adjust Recording Amp. P.C. Board Trimmer Condenser C30 80p max (left ch.) and C31 80p max (right ch.) shown in Fig. 19 until the same high sensitivity V.T.V.M. indication level is obtained on both the left and right channel at the two frequencies described in Items 5-4) and 5-5) above.

## 6. RECORDING BIAS FREQUENCY MEASURING METHOD

As shown in Fig. 26, connect a Frequency Counter to the output side of the trimmer condenser. Set tape deck to recording mode, and take a frequency counter reading. Specifications are 102 kHz $\pm$ 5%.

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

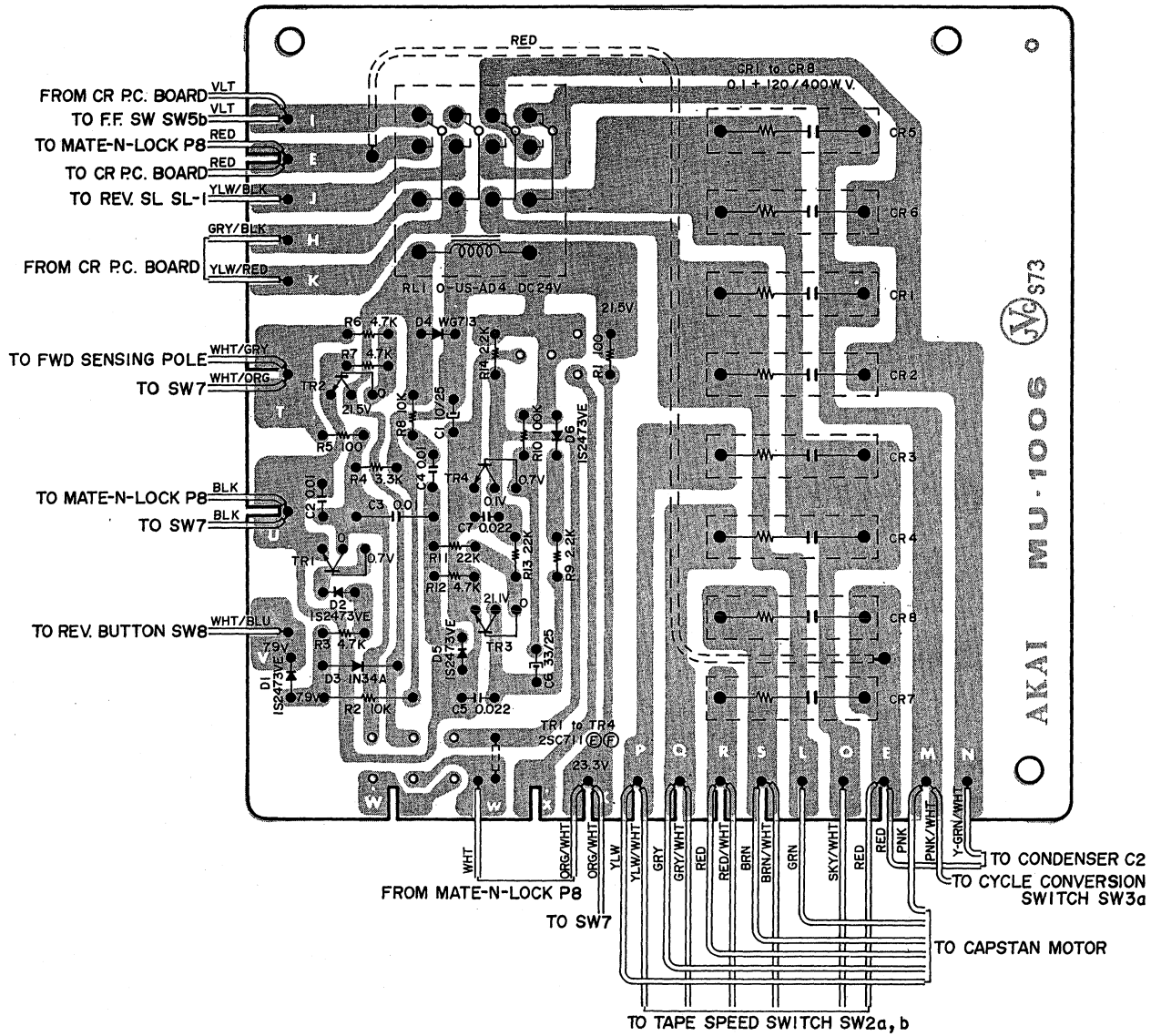
D.C. Resistance shown in chart are average values.

| 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  |
| HEAD REVERSE SOLENOID        | RGA-10143          | 630Ω   |
| REVERSE RELAY                | MY4-0-US-AD4 DC24V | 650Ω   |
| HEADPHONE OUTPUT TRANSFORMER | 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                                     |
| COMBO HEAD                   | RE4-6              | 5.5Ω (REC)<br>2.3Ω (ERASE)   |
| PLAYBACK HEAD                | P4-202             | 268Ω   |

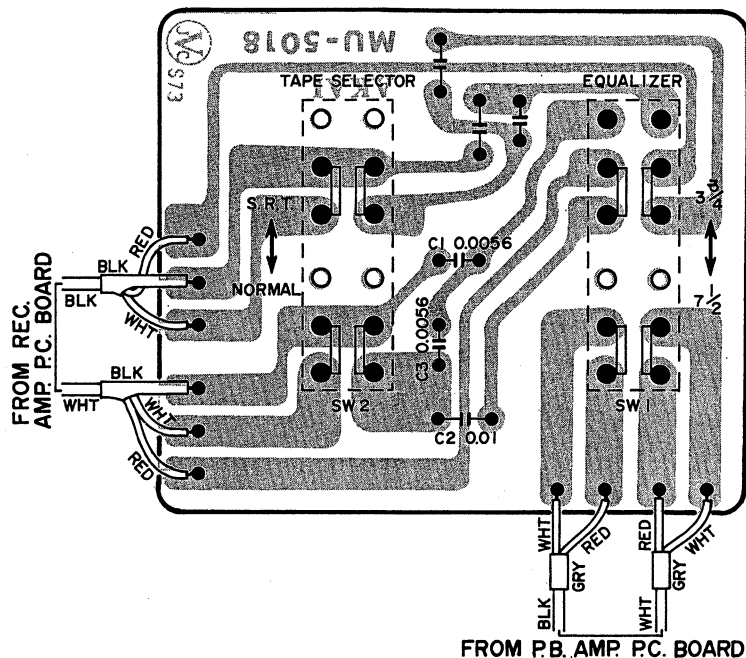
Chart 2

# IX. COMPOSITE VIEWS OF COMPONENTS

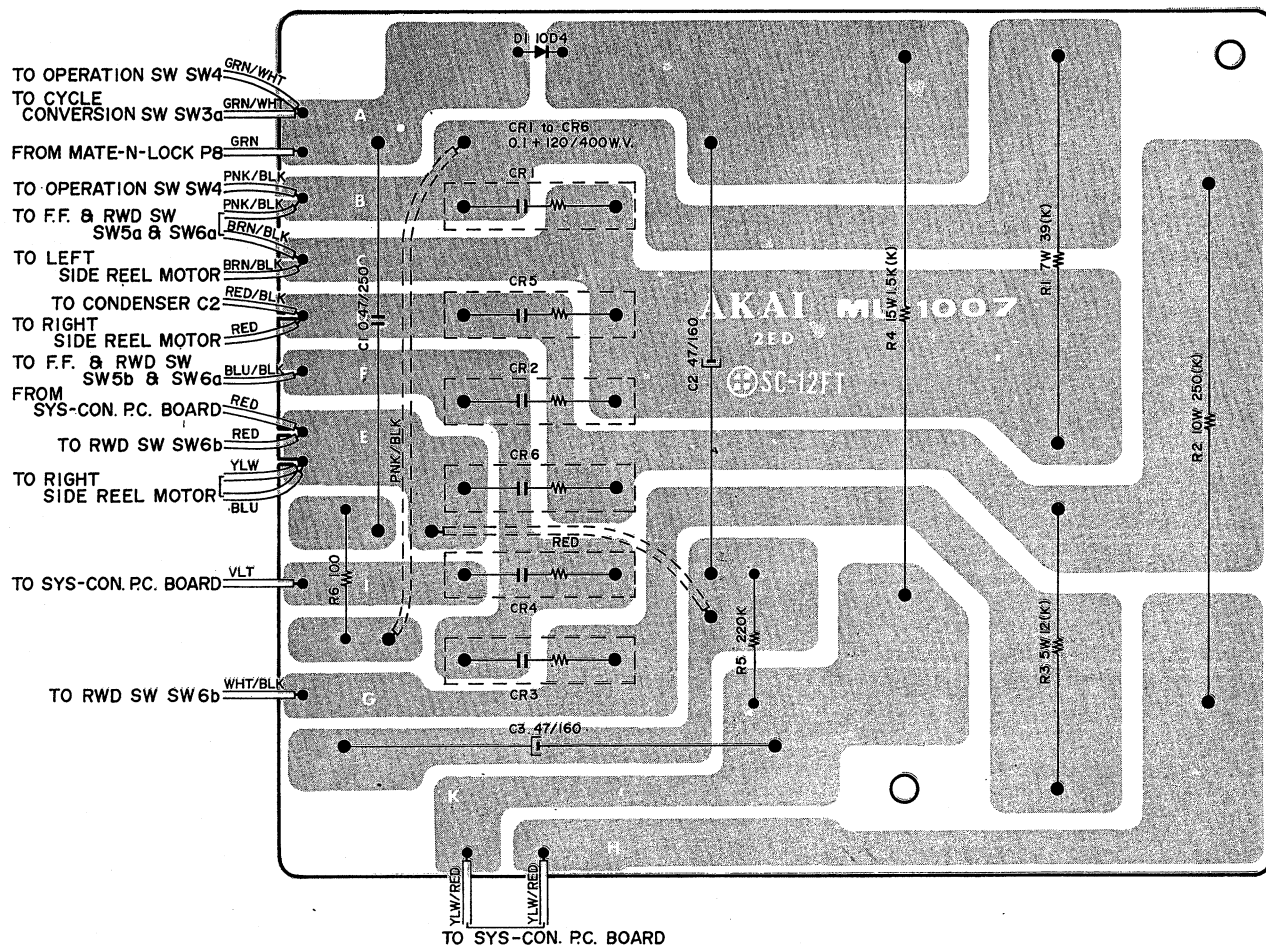
## 1. SYSTEM CONTROL P.C. BOARD MU-1005



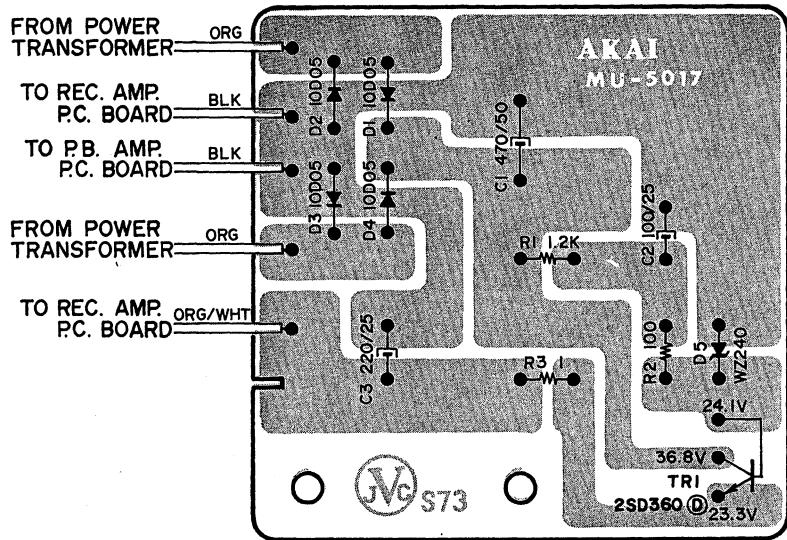
2. EQ. P.C. BOARD MU-5018



3. CR. P.C. BOARD MU-1007



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







SECTION 2

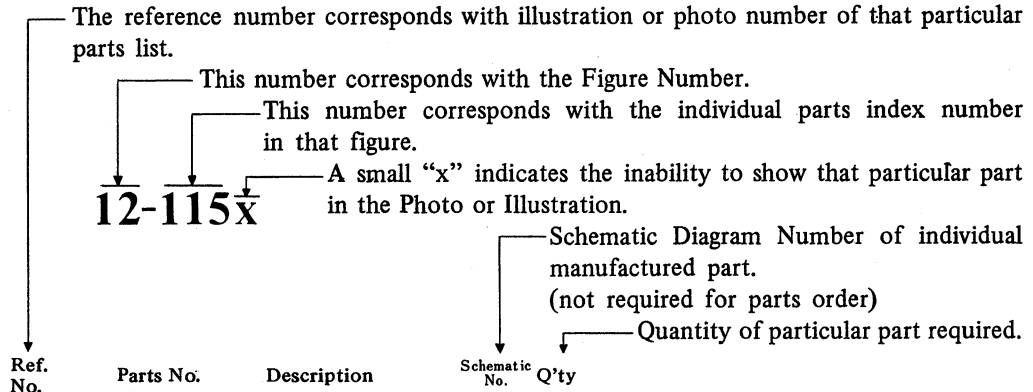
**PARTS LIST**

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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



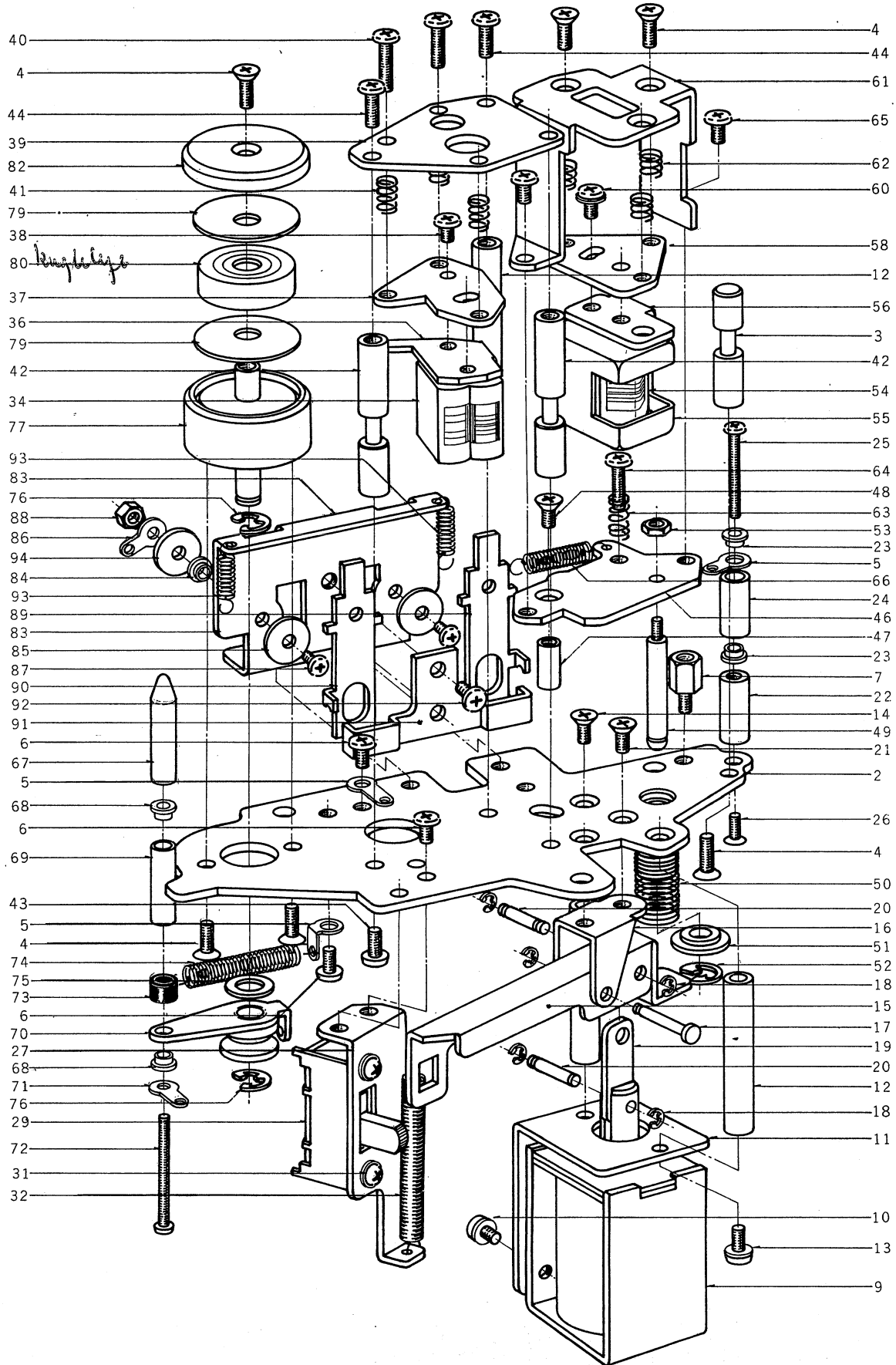
| Ref. No.                  | Parts No. | Description                | Schematic No. | Q'ty |
|---------------------------|-----------|----------------------------|---------------|------|
| <b>FLYWHEEL BLOCK #13</b> |           |                            |               |      |
| 12-115x                   | 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: center;">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: center;">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 MU GX HEAD BLOCK

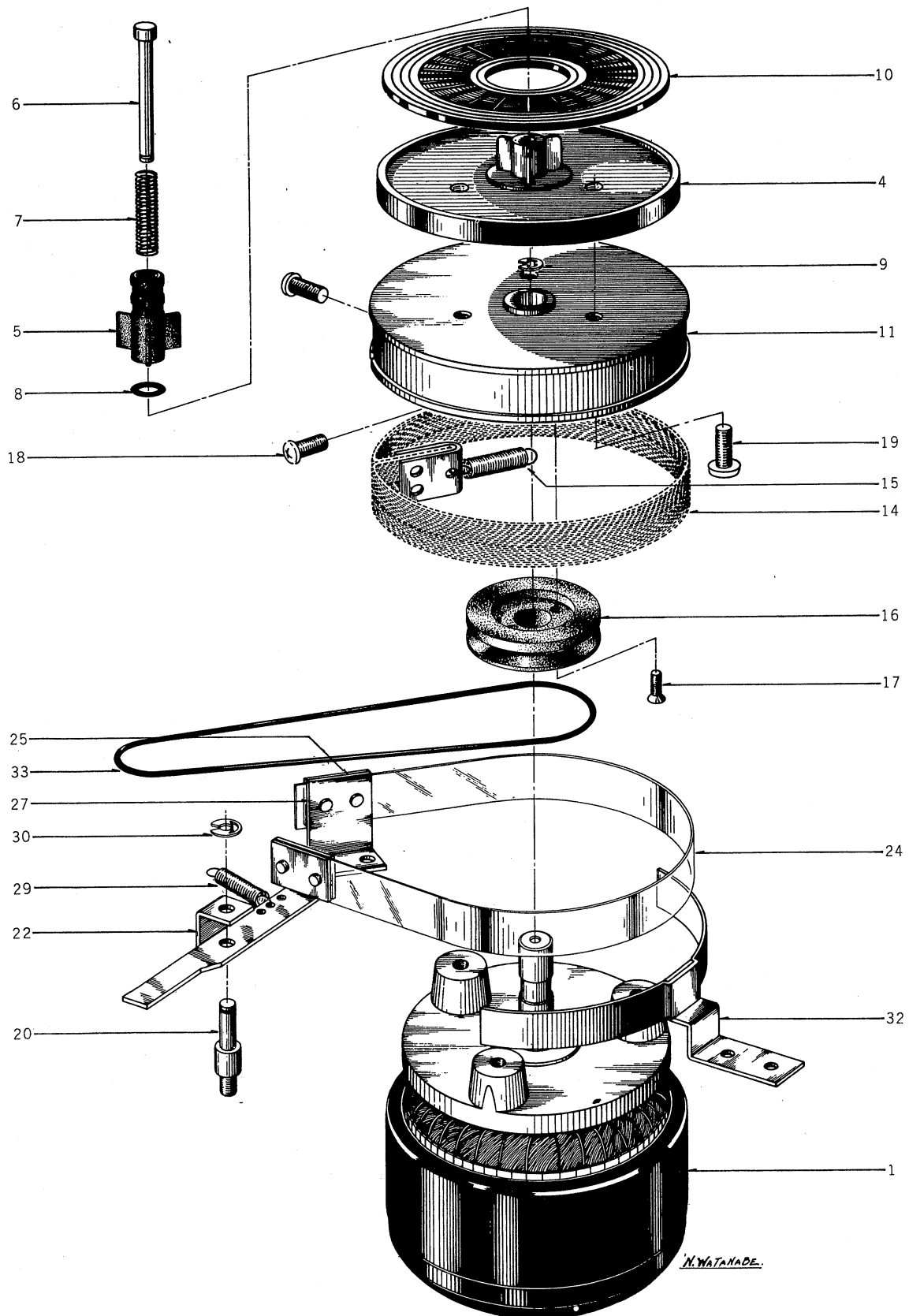


## MU GX HEAD BLOCK

| Ref. No. | Parts No. | Description                              | Schematic No. | Q'ty | Ref. No.                    | Parts No. | Description                   | Schematic No. | Q'ty |
|----------|-----------|--|---------------|------|-----------------------------|-----------|-------------------------------|---------------|------|
| 1-1x     | BH558358  | MU GX Head Block Comp.                   | MU            | 1    | 1-72                        | ZS554962  | Screw, pan head 2.3x25        |               | 1    |
| 1-2      | HZ544498  | Head Base, w/metal                       | MU-0001       | 1    | 1-73                        | HZ467010  | Cushion Rubber, MC            | MC-0004       | 1    |
| 1-3      | HZ317597  | Tape Guide A, MR                         | MR-4          | 1    | 1-74                        | ZG317114  | Tension Lever Spring          | MR-39         | 1    |
| 1-4      | ZS414033  | Screw, countersunk head 3x8              |               | 7    | 1-75                        | ZW259885  | Washer (PBP)D5.1x10.3x0.1t    |               | 1    |
| 1-5      | ZW273778  | Earth Lug M3                             |               | 4    | 1-76                        | ZW270123  | 'E' Ring 4M                   | 6-1-9         | 2    |
| 1-6      | ZS323728  | Screw, binding head 3x5                  |               | 5    | 1-77                        | HZ547751  | Tape Guide A, w/shaft         | MU-0015       | 1    |
| 1-7      | HZ541170  | Panel Support                            | MC-0209       | 1    | 1-78x                       | MS318093  | Guide Roller Shaft            | MR-30         | 1    |
| 1-8x     | ED224548  | Silicon Diode 10D2                       | 45-2-14       | 1    | 1-79                        | ZW231805  | Tape Guide Washer (large)     | 3A-356        | 2    |
| 1-9      | EP558123  | Plunger Solenoid                         |               |      | 1-80                        | MV248117  | Bearing 635AHZZMC1ERB32       |               | 1    |
|          |           | SDC-840FHT1                              | 44-1-59       | 1    | 1-81x                       | ZW326463  | Washer (PBP)D5.1x10.3x0.2t    |               | 1    |
| 1-10     | ZS555737  | ISO Screw, binding head 3x6,<br>w/washer |               | 2    | 1-82                        | HZ317092  | Tape Guide Table B            | MR-32         | 1    |
| 1-11     | HZ544252  | Solenoid Mt. Plate                       | MU-0008       | 1    | <b>MECH. ASSEMBLY BLOCK</b> |           |                               |               |      |
| 1-12     | MH544195  | Head Base Prop                           | MU-0002       | 3    | 1-83                        | ML544285  | D.S Table                     | MU-0011       | 1    |
| 1-13     | ZS413728  | Screw, binding head 3x6,<br>w/washer     |               | 2    | 1-84                        | MZ316822  | Insulator Collar B            | MR-225        | 2    |
| 1-14     | ZS200384  | Screw, countersunk head 3x6              |               | 2    | 1-85                        | HZ542092  | Insulator Washer              | MC-0213       | 2    |
| 1-15     | HL544241  | Solenoid Lever                           | MU-0007       | 1    | 1-86                        | ZW316800  | Earth Lug M2.6                |               | 2    |
| 1-16     | HZ317687  | Lever Support                            | MR-15         | 1    | 1-87                        | ZS464692  | Screw, binding head 2.3x6     |               | 2    |
| 1-17     | MH257477  | Connecting Pin                           | RD-211        | 1    | 1-88                        | ZW273688  | Nut M2.3                      |               | 2    |
| 1-18     | ZW270088  | 'E' Ring 1.9M                            | 6-1-9         | 5    | 1-89                        | HL541168  | D.S Lever A                   | MC-0208       | 1    |
| 1-19     | HZ544263  | Pull Plate                               | MU-0009       | 1    | 1-90                        | HL542687  | D.S Lever B                   | MC-0208       | 1    |
| 1-20     | HZ544274  | Solenoid Pin                             | MU-0010       | 2    | 1-91                        | HL541157  | D.S Lever Support             | MC-0207       | 1    |
| 1-21     | ZS559056  | Screw, countersunk head 3x6              |               | 2    | 1-92                        | ZS417137  | Screw, binding head 3x4       |               | 2    |
| 1-22     | HZ455962  | Sensing Collar B                         | MC-1019       | 1    | 1-93                        | ZG317777  | Pull Spring                   | MR-47         | 2    |
| 1-23     | HZ317632  | Insulator Collar A                       | MR-36         | 2    | 1-94                        | ZW563218  | Washer (Bake)D3.2x10x1t       |               | 2    |
| 1-24     | HZ455973  | Sensing Collar A                         | MC-1018       | 1    | 1-95x                       | ZS558101  | Screw, pan head 3x6, w/washer |               | 2    |
| 1-25     | ZS554916  | Screw, binding head 2.3x20               |               | 1    |                             |           |                               |               |      |
| 1-26     | ZS558134  | Screw, countersunk head 2.3x5            |               | 1    |                             |           |                               |               |      |
| 1-27     | HZ317733  | Slide SW. Base                           | MR-18         | 1    |                             |           |                               |               |      |
| 1-28x    | EA382713  | Head Connector P.C. Board                | RD-A8         | 1    |                             |           |                               |               |      |
| 1-29     | ES317744  | Slide SW. SL-242B4V                      | 25-3-28       | 1    |                             |           |                               |               |      |
| 1-30x    | ZW317801  | Toothed Lock Washer M2.6                 |               | 2    |                             |           |                               |               |      |
| 1-31     | ZS372183  | Screw, round head 2.6x5                  |               | 2    |                             |           |                               |               |      |
| 1-32     | ZG317766  | Plunger Lever Spring                     | MR-19         | 1    |                             |           |                               |               |      |
| 1-33x    | HZ583176  | RE4-6 Terminal Plate                     | TW-0035       | 1    |                             |           |                               |               |      |
| 1-34     | HR556582  | REC./ERASE HEAD RE4-6                    |               | 1    |                             |           |                               |               |      |
| 1-35x    | ZS461395  | Screw, round head 2x3                    |               | 2    |                             |           |                               |               |      |
| 1-36     | HZ544230  | Head Mt. Angle                           | MU-0006       | 1    |                             |           |                               |               |      |
| 1-37     | HZ544228  | Head Angle Base                          | MU-0005       | 1    |                             |           |                               |               |      |
| 1-38     | ZS417137  | Screw, binding head 3x4                  |               | 2    |                             |           |                               |               |      |
| 1-39     | HZ544217  | Head Mt. Plate                           | MU-0004       | 1    |                             |           |                               |               |      |
| 1-40     | ZS413785  | Screw, binding head 3x12                 |               | 3    |                             |           |                               |               |      |
| 1-41     | ZG540584  | Angle Adjust Spring G                    | TW-0025       | 3    |                             |           |                               |               |      |
| 1-42     | HZ544206  | Tape Guide                               | MU-0003       | 2    |                             |           |                               |               |      |
| 1-43     | ZS413741  | Screw, binding head 3x8                  |               | 3    |                             |           |                               |               |      |
| 1-44     | ZS396044  | Screw, binding head 3x8                  |               | 3    |                             |           |                               |               |      |
| 1-45x    | ZW430863  | Washer (SPC)D3.3x6x0.5t                  |               | 2    |                             |           |                               |               |      |
| 1-46     | HZ531551  | Base Plate B                             | MR-10         | 1    |                             |           |                               |               |      |
| 1-47     | HZ298012  | 4-TR Hold-down Base Guide                | 3A-69         | 1    |                             |           |                               |               |      |
| 1-48     | ZS554938  | Screw, countersunk head 2.3x6            |               | 1    |                             |           |                               |               |      |
| 1-49     | HZ541135  | PH Shaft                                 | MC-0205       | 1    |                             |           |                               |               |      |
| 1-50     | ZG317902  | PH Spring                                | MR-13         | 1    |                             |           |                               |               |      |
| 1-51     | ZW317913  | Spring Holder                            | MR-12         | 1    |                             |           |                               |               |      |
| 1-52     | ZW290283  | 'U' Ring 2.85M                           | 6-1-1         | 1    |                             |           |                               |               |      |
| 1-53     | ZW554940  | Nut M3                                   |               | 1    |                             |           |                               |               |      |
| 1-54     | HP536501  | P.B. HEAD P4-202                         |               | 1    |                             |           |                               |               |      |
| 1-55     | HZ411017  | Head Shield Case                         | LF-0005       | 1    |                             |           |                               |               |      |
| 1-56     | HZ541124  | Head Mt. Angle                           | MC-0204       | 1    |                             |           |                               |               |      |
| 1-57x    | ZS460440  | Screw, pan head 2x4                      |               | 2    |                             |           |                               |               |      |
| 1-58     | HZ541113  | Angle Base                               | MC-0203       | 1    |                             |           |                               |               |      |
| 1-59x    | EA463206  | Terminal P.C. Board A                    | RD-A36        | 2    |                             |           |                               |               |      |
| 1-60     | ZS558257  | Screw, binding head 3x5,<br>w/washer     |               | 2    |                             |           |                               |               |      |
| 1-61     | HZ541102  | Base Angle                               | MC-0203       | 1    |                             |           |                               |               |      |
| 1-62     | ZG317968  | Angle Spring                             | MR-14         | 3    |                             |           |                               |               |      |
| 1-63     | ZG466312  | Angle Adjust Spring E                    | BS-0018       | 1    |                             |           |                               |               |      |
| 1-64     | ZS425114  | Screw, round head 3x10                   |               | 1    |                             |           |                               |               |      |
| 1-65     | ZS384131  | Screw, round head 3x5                    |               | 2    |                             |           |                               |               |      |
| 1-66     | ZG317777  | Pull Spring                              | MR-47         | 1    |                             |           |                               |               |      |
| 1-67     | HZ541181  | Sensing Post B                           | MC-0210       | 1    |                             |           |                               |               |      |
| 1-68     | HZ317632  | Insulator Collar A                       | MR-36         | 2    |                             |           |                               |               |      |
| 1-69     | HZ318047  | Sensing Collar A                         | MR-35         | 1    |                             |           |                               |               |      |
| 1-70     | HZ318036  | Tension Arm, w/pulley                    | MR-37         | 1    |                             |           |                               |               |      |
| 1-71     | ZW316800  | Earth Lug M2.6                           |               | 1    |                             |           |                               |               |      |

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

FIG. 2 ILLUSTRATION OF REEL MOTOR & REEL TABLE BLOCK



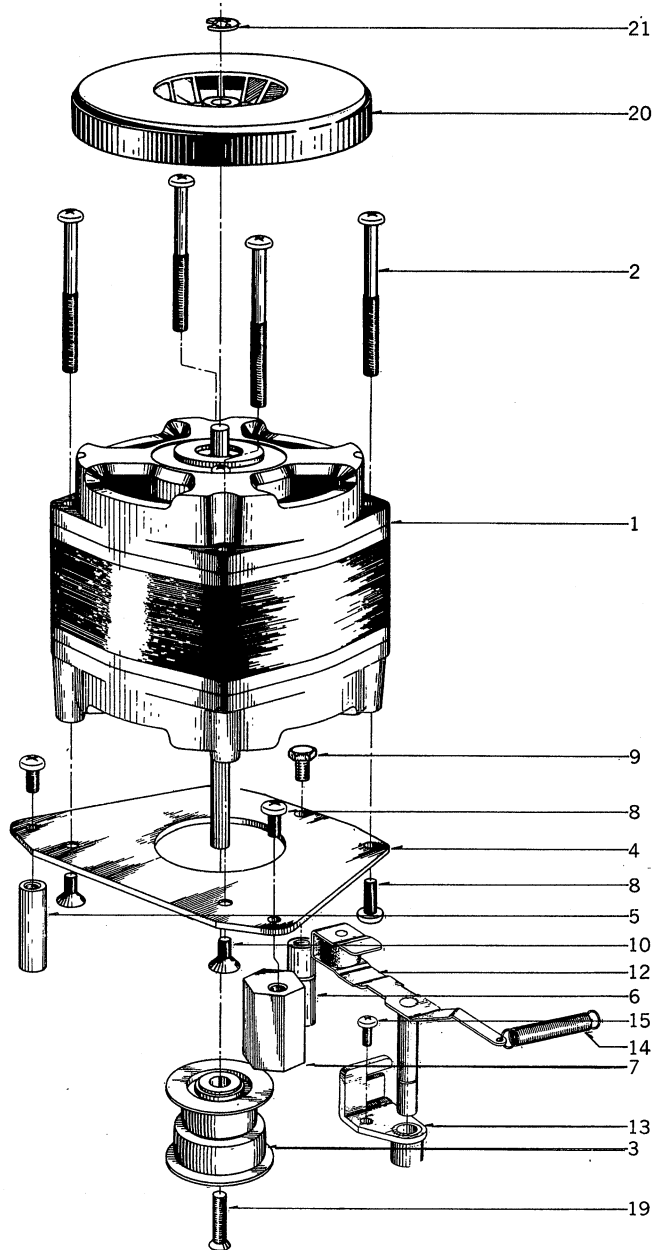
## REEL MOTOR & REEL TABLE BLOCK

| Ref. No. | Parts No. | Description               | Schematic No. | Q'ty |
|----------|-----------|---------------------------|---------------|------|
| 2-1      | BM314741  | Reel Motor Block (24XO-2) |               |      |
|          |           | Comp. MR, KD, MS, MC      |               | 1    |
| 2-2x     | BR317395  | Supply Reel Table Block   |               |      |
|          |           | Comp. MU, MC, MR          |               | 1    |
| 2-3x     | BR317384  | Take-up Reel Table Block  |               |      |
|          |           | Comp. MU, MR              |               | 1    |
| 2-4      | MT317441  | Reel Table, MR            | MR-215        | 2    |
| 2-5      | MT255420  | Reel Retainer             | 3R-102        | 2    |
| 2-6      | MS342000  | Reel Shaft                | 3R-108        | 2    |
| 2-7      | ZG255633  | Reel Spring               | 3R-109        | 2    |
| 2-8      | MT297663  | 3R 'O' Ring 2.9x1.65M     | 3R-139        | 2    |
| 2-9      | ZW270088  | 'E' Ring 1.9M             | 6-1-9         | 2    |
| 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              |               | 2    |
| 2-14     | MT436860  | Brake Cloth Comp.         | MR-269        | 2    |
| 2-15     | ZG317496  | Felt Tension Spring       | MR-260        | 2    |
| 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      |               | 4    |
| 2-19     | ZS413785  | Screw, binding head 3x12  |               | 6    |

### 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  | MB230286 | Timer Belt D74x1.4 (Counter) | 3A-120  | 1 |

FIG. 3 ILLUSTRATION OF MAIN MOTOR BLOCK



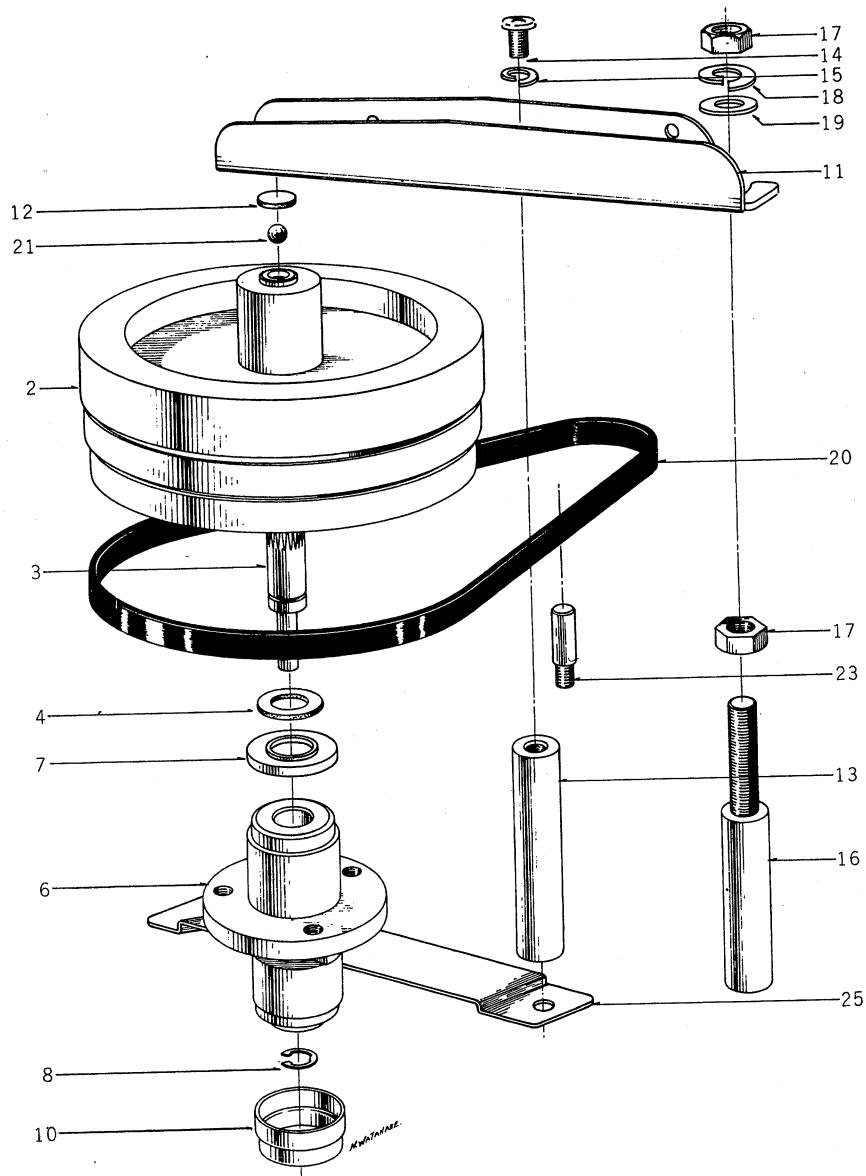
**MAIN MOTOR BLOCK**

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

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



**FIG. 4 ILLUSTRATION OF FLYWHEEL BLOCK**

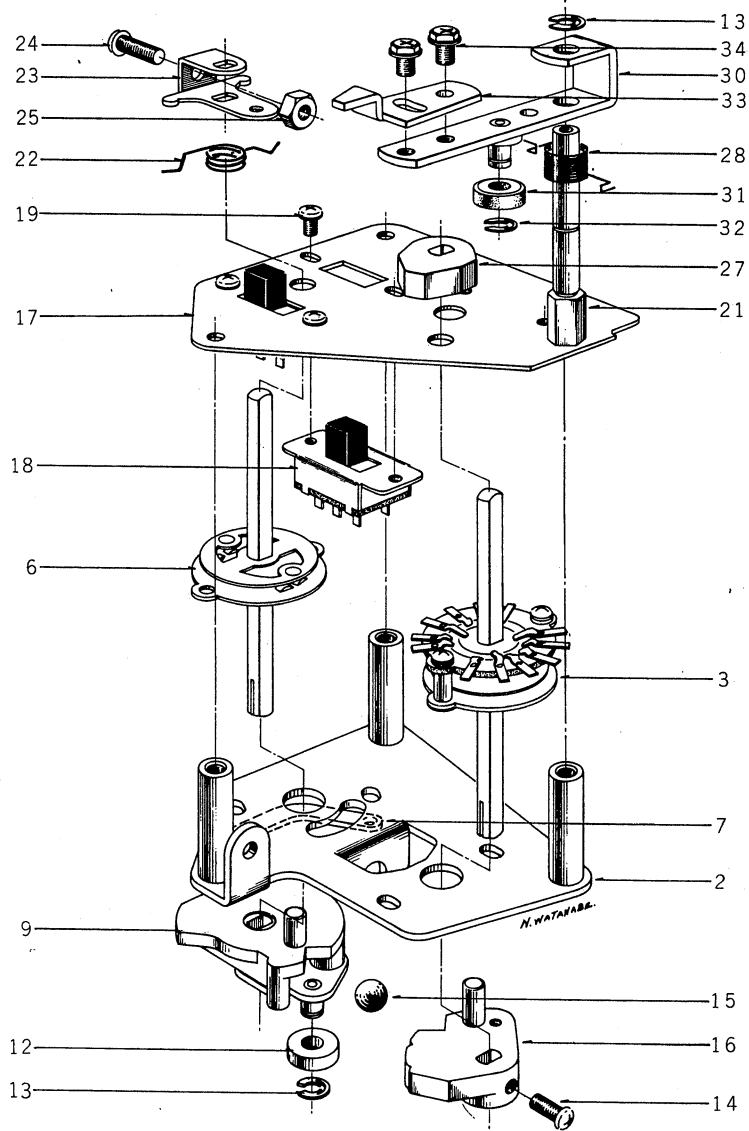


**FLYWHEEL BLOCK**

| Ref. No.                    | Parts No. | Description                            | Schematic No. | Q'ty | Ref. No. | Parts No. | Description                    | Schematic No. | Q'ty |
|-----------------------------|-----------|--|---------------|------|----------|-----------|--------------------------------|---------------|------|
| 4-1x                        | BF476550  | Flywheel Block Comp.                   | MR-2,MS-2,3   | 1    | 4-13     | MH273036  | Flywheel Prop A, M-9           | M9-310        | 1    |
| 4-2                         | MI296245  | Flywheel 24                            | MH-202        | 1    | 4-14     | ZS413201  | Screw, pan head 4x8            |               | 1    |
| 4-3                         | MS476572  | Main Shaft, D6                         | MR-2005       | 1    | 4-15     | ZW273914  | Spring Washer M4               |               | 3    |
| 4-4                         | ZW447208  | Flywheel Thrust B                      |               |      | 4-16     | MH273047  | Flywheel Prop B, M-9           | M9-311        | 1    |
|                             |           | D7.9x13x0.5t                           | 101025        | 1    | 4-17     | ZW413280  | Inch Nut 1/4" mountain 20      |               | 2    |
| 4-5x                        | ZS373577  | Set Screw, hexagon socket<br>5x6(flat) |               | 2    | 4-18     | ZW393232  | Spring Washer 1/4"             |               | 1    |
| 4-6                         | MZ296256  | Main Case A 24, w/metal                | MH-206        | 1    | 4-19     | ZW413998  | Washer (SUP)D6.8x12.7x1t       |               | 1    |
| 4-7                         | MZ446635  | Thrust Cap, Main Metal B2              | LF-2006       | 1    | 4-20     | MB541012  | Drive Belt (Flat) D116.9x1.6x7 | MC-1209       | 1    |
| 4-8                         | MH244710  | Flywheel Fixing Pin                    | 900-250       | 1    | 4-21     | MV269965  | Steel Ball D4                  |               | 1    |
| 4-9x                        | MZ244113  | Felt D12.5x16x2t                       |               | 1    | 4-22x    | ZS424056  | Screw, pan head 4x10           |               | 2    |
| 4-10                        | MZ253113  | Main Metal Cap B                       | MH-208        | 1    | 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    |
| <b>MECH. ASSEMBLY BLOCK</b> |           |  |               |      |          |           |                                |               |      |
| 4-11                        | MZ314897  | Flywheel Support Plate, MR             | MR-121        | 1    |          |           |                                |               |      |
| 4-12                        | ZW392681  | Washer (Nylon)D8x1t<br>(without hole)  |               | 1    |          |           |                                |               |      |

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

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> |           |                                   |               |      | 5-20x                     | ZS559045  | Screw, binding head 4x8, w/washer |               | 2    |
| 5-1x                | BS558336  | Switch Block Comp.                | MU            | 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 head 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, w/washer |               | 2    | 5-28                      | ZG227564  | Spring H                          | 900-120       | 1    |
| 5-9                 | MZ316956  | Cam A-3, w/plate                  | 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.          | 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 D12                    | 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    | 5-35x                     | MZ256814  | Rewind Shaft Spacer               | M9-124        | 2    |
| 5-17                | MZ544364  | Control Chassis                   | MU-2001       | 1    |                           |           |                                   |               |      |
| 5-18                | ES479485  | Slide SW. S-1                     | 25-3-66       | 2    |                           |           |                                   |               |      |
| 5-19                | ZS371856  | ISO Screw, binding head 3x5       |               | 4    |                           |           |                                   |               |      |

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

FIG. 6 (A) ILLUSTRATION OF MECHANISM ASSEMBLY BLOCK

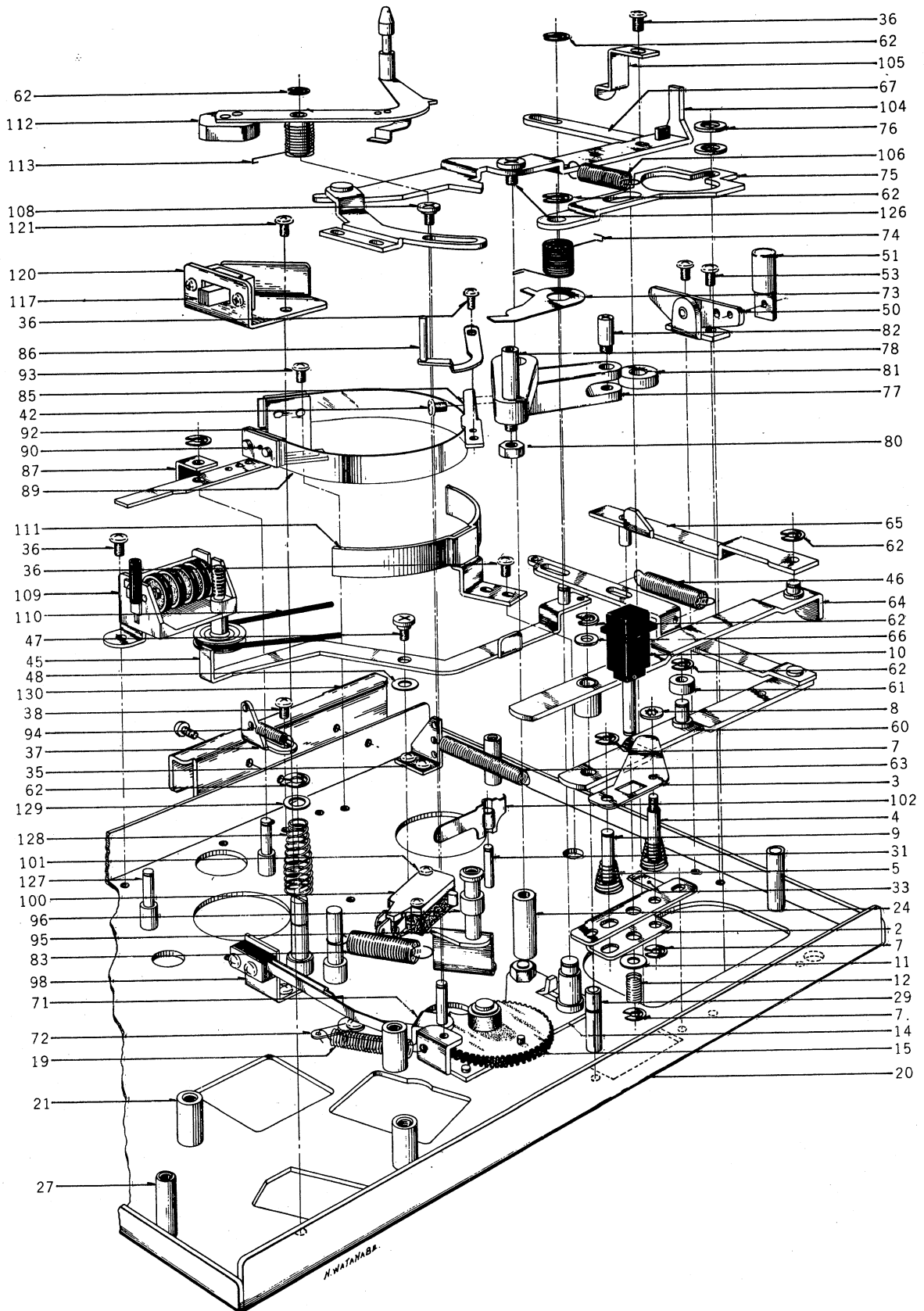
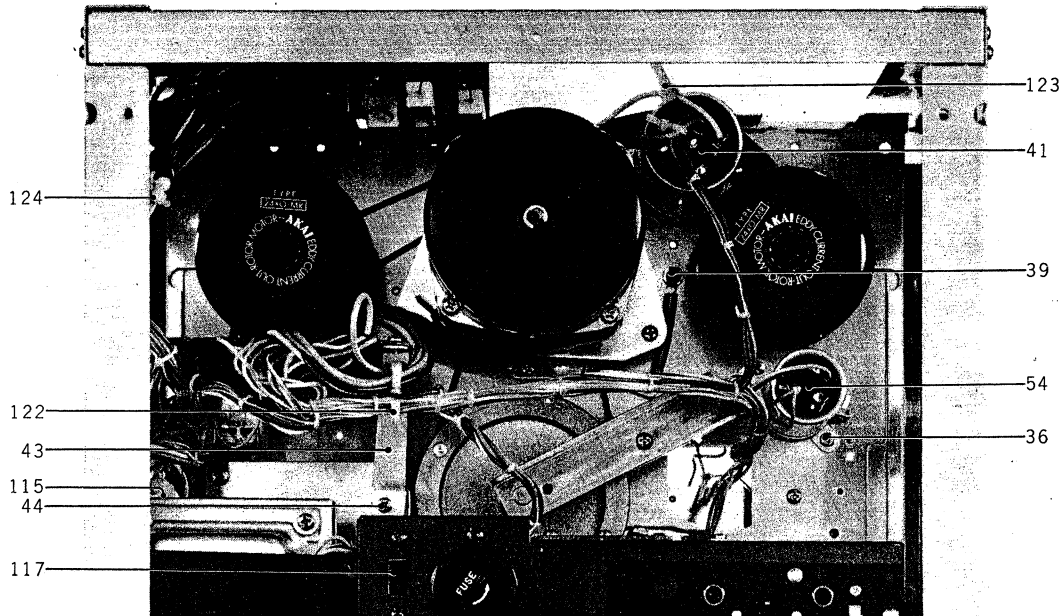


FIG. 6 (B) PHOTO OF MECHANISM ASSEMBLY BLOCK



**MECHANISM ASSEMBLY BLOCK**

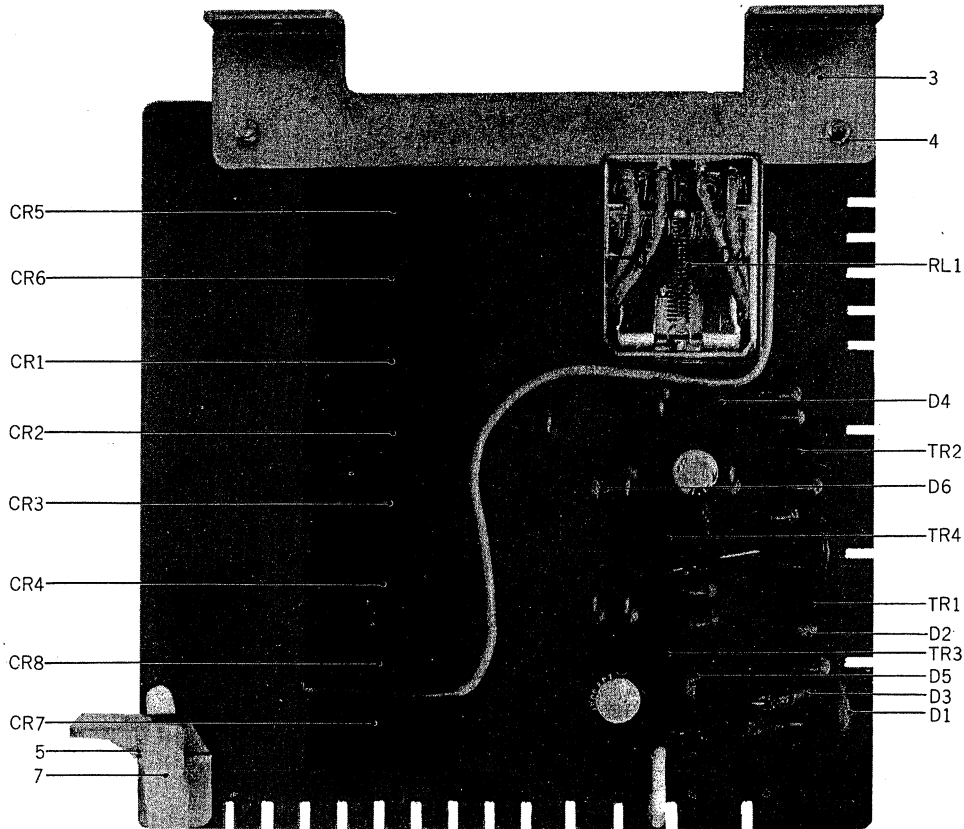
| Ref. No.                    | Parts No. | Description                   | Schematic No. | Q'ty | Ref. No. | Parts No. | Description                                 | Schematic No. | Q'ty |
|-----------------------------|-----------|-------------------------------|---------------|------|----------|-----------|---|---------------|------|
| <b>REC. BUTTON BLOCK</b>    |           |                               |               |      |          |           |   |               |      |
| 6-1x                        | BZ558347  | REC. Button Block Comp.       | MU-1,2        | 1    | 6-35     | MZ227340  | Spring Rack B                               | 900-172       | 1    |
| 6-2                         | MZ316708  | Stopper Table                 | MR-219        | 1    | 6-36     | ZS323728  | Screw, binding head 3x5                     |               | 20   |
| 6-3                         | MZ316710  | Cam Stopper                   | MR-220        | 1    | 6-37     | MZ314605  | Spring Rack, MR                             | MR-104        | 2    |
| 6-4                         | MS316721  | Stopper Shaft                 | MR-221        | 1    | 6-38     | ZS425981  | Screw, binding head 3x3                     |               | 4    |
| 6-5                         | ZG316732  | Cone Spring                   | MR-244        | 2    | 6-39     | ZS413212  | Screw, binding head 3x5,<br>w/lug           |               | 1    |
| 6-6x                        | ZW322525  | Washer (PBP)D4.1x7x0.2t       |               | 1    | 6-40x    | MZ452496  | Cycle Angle (CEE, CSA)                      | LS-1007       | 1    |
| 6-7                         | ZW290283  | 'U' Ring 2.85M                | 6-1-1         | 4    | 6-41     | EC520626  | MP/C. (3+1) $\mu$ Fx2 250WVAC<br>(Lug type) | 24-9-74       | 1    |
| 6-8                         | ZW432944  | Push Nut 3x10x0.3t            |               | 1    | 6-42     | ZS413223  | Screw, binding head 3x5,<br>w/washer        |               | 4    |
| 6-9                         | MS316776  | Stopper Shaft B               | MR-259        | 1    | 6-43     | MZ544331  | P.C. Board Holder B                         | MU-1004       | 1    |
| 6-10                        | SK543857  | REC. Button B                 | MR-222        | 1    | 6-44     | ZS413155  | Screw, binding head 3x6                     |               | 2    |
| 6-11                        | ZW419646  | Washer (SPC)D4.5x9.8x0.5t     |               | 1    | 6-45     | ML314684  | Brake Lever C, w/pin                        | MR-227        | 1    |
| 6-12                        | ZG316765  | REC. Button Spring            | MR-252        | 1    | 6-46     | ZG314706  | Spring IB                                   | MR-115        | 1    |
| <b>ECCENTRIC GEAR BLOCK</b> |           |                               |               |      |          |           |   |               |      |
| 6-13x                       | BZ248027  | Eccentric Gear Block Comp.    | MU,MC,MS      | 1    | 6-47     | ZS314717  | Graduated Screw, MR                         | MR-254        | 1    |
| 6-14                        | MZ248016  | Eccentric Gear Table, w/shaft | 4TR-243       | 1    | 6-48     | ZW432347  | Washer (Luminar)<br>D6.2x13x0.125t          |               | 1    |
| 6-15                        | MZ248005  | Eccentric Gear                | 4TR-245       | 1    | 6-49x    | ZW273756  | Nut M3                                      |               | 1    |
| 6-16x                       | ZW861344  | Washer (PBP)D6.1x10x0.4t      |               | 1    | 6-50     | ML226258  | Start Lever A, w/lever B-2                  | 4TR-122       | 1    |
| 6-17x                       | ZW260144  | Washer (Nylon)D6.1x10x0.3t    |               | 1    | 6-51     | SB425777  | Start Button D                              | MS-1002       | 1    |
| 6-18x                       | ZW290283  | 'U' Ring 2.85M                | 6-1-1         | 1    | 6-52x    | ZW314728  | Cotter Pin 1.6x8                            |               | 1    |
| 6-19                        | ZG437253  | Eccentric Gear Return Spring  | MS-2022       | 1    | 6-53     | ZS425788  | Screw, round head 3x4                       |               | 2    |
| <b>MECH. ASSEMBLY BLOCK</b> |           |                               |               |      |          |           |   |               |      |
| 6-20                        | MZ317340  | MR Mech. Frame, w/pin         | MR-101        | 1    | 6-54     | EC442056  | MP/C. 2+1 $\mu$ F 250WVAC<br>(Lug type)     | 24-9-61       | 1    |
| 6-21                        | MH247533  | Head Prop E                   | 100012        | 3    | 6-55x    | EC536938  | MP/C. 2 $\mu$ F 250WVAC<br>(Lug type) (CSA) | 24-9-78       | 1    |
| 6-22x                       | ZS413201  | Screw, pan head 4x8           |               | 2    | 6-56x    | ZW330412  | Adjust Washer (U)<br>D4x13x0.13t            |               | 1    |
| 6-23x                       | ZS414044  | Screw, countersunk head 4x8   |               | 1    | 6-57x    | ZW330423  | Adjust Washer (U)<br>D4x13x0.25t            |               | 1    |
| 6-24                        | MS317362  | Pinch Roller Arm Shaft        | MR-125        | 1    | 6-58x    | ZW330434  | Adjust Washer (U)<br>D4x13x0.5t             |               | 1    |
| 6-25x                       | ZW274026  | Spring Washer M5              |               | 1    | 6-59x    | ZW330445  | Adjust Washer (U)<br>D4x13x0.8t             |               | 1    |
| 6-26x                       | ZW413278  | Nut M5                        |               | 1    | 6-60     | ML314763  | Lever B, MR (w/lever D)                     | MR-122        | 1    |
| 6-27                        | MH273295  | Mech. Panel Prop, M-9         | M9-302        | 2    | 6-61     | MR314785  | Cam Roller D9                               | MR-237        | 1    |
| 6-28x                       | ZS421806  | Screw, pan head 3x8           |               | 2    | 6-62     | ZW290283  | 'U' Ring 2.85M                              | 6-1-1         | 5    |
| 6-29                        | MS260515  | A Lever Shaft                 | 900-126       | 1    | 6-63     | ZG314818  | D Lever Spring                              | MR-114        | 1    |
| 6-30x                       | ZW413267  | Flange Nut M4                 |               | 1    | 6-64     | ML334506  | Lever A, MR (w/metal)                       | MR-126        | 1    |
| 6-31                        | MS250536  | Micro Lever Shaft             | 3A-239        | 1    | 6-65     | ML314842  | C Lever, MR (w/pin)                         | MR-108        | 1    |
| 6-32x                       | ZW273688  | Nut M2.3                      |               | 1    |          |           |   |               |      |
| 6-33                        | MZ217697  | Pause Lever Stopper Plate     | M9-113        | 1    |          |           |   |               |      |
| 6-34x                       | MZ256814  | Rewind Shaft Spacer           | M9-124        | 2    |          |           |   |               |      |

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

| Ref. No. | Parts No. | Description                 | Schematic No. | Q'ty |
|----------|-----------|-----------------------------|---------------|------|
| 6-66     | ZW419826  | Washer (Fiber)D6.2x10x1t    |               | 2    |
| 6-67     | ML314864  | IB Lever                    | MR-111        | 1    |
| 6-68x    | ZW259705  | Washer (BSP)D4.1x13x1t      |               | 1    |
| 6-69x    | ZS207314  | Amp. Lever Set Screw        | 3A-737        | 1    |
| 6-70x    | ZW259885  | Washer (PBP)D5.1x10.3x0.1t  |               | 1    |
| 6-71     | MZ549426  | AS Lever Prop Table B,      |               |      |
|          |           | w/prop                      | MC-1214       | 1    |
| 6-72     | ZS202116  | Screw, binding head 3x5,    |               |      |
|          |           | w/lug                       |               | 1    |
| 6-73     | MZ218125  | Gear Stopper                | 4TR-120       | 1    |
| 6-74     | ZG226697  | Stopper Spring              | 4TR-121       | 1    |
| 6-75     | ML228868  | Auto. Mech. Control Lever   | 4TR-125       | 1    |
| 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     | ML544353  | Shifter Lever, w/pin        | MU-1008       | 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        | 1    |
| 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   |               |      |
|          |           | 4x6(cup)                    |               | 1    |
| 6-98     | ES546794  | Tension SW. Comp.           | MU-1012       | 1    |
| 6-99x    | 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    | MZ316451  | Pause Stopper, M-7          | MH-126        | 1    |
| 6-106    | ZG301061  | Pause Spring 990A           | 4TR-128       | 1    |
| 6-107x   | ZW260010  | Washer (PBP)D6.1x10x0.1t    |               | 1    |
| 6-108    | ZS207314  | Amp. Lever Set Screw        | 3A-737        | 1    |
| 6-109    | MC316473  | Counter MP-491-17           |               |      |
|          |           | (MD-481-17)                 | 9-1-8         | 1    |
| 6-110    | MB230286  | Timer Belt D74x1.4(Counter) | 3A-120        | 1    |
| 6-111    | MZ317406  | Brake Band Guide, w/base    | MR-120        | 2    |
| 6-112    | BL316484  | AS Lever Comp.              | MR,MS,MC      | 1    |
| 6-113    | ZG260706  | AS Lever Spring             | 4TR-118       | 1    |
| 6-114x   | MP271170  | Pinch Roller, LC D=38       | LC-321        | 1    |
| 6-115    | EJ450573  | Mate-N-Lock Cap Housing     |               |      |
|          |           | 9P 1-480277-0               | 52-1-7        | 1    |
| 6-116x   | EJ373623  | Pin Contact 61116-1         | 52-1-1        | 9    |
| 6-117    | ES375478  | Slide SW. ESD-279DU(black)  | 25-3-23       | 2    |
| 6-118x   | ES479485  | Slide SW. S-1 (EC, CSA)     | 25-3-66       | 1    |
| 6-119x   | ZS444273  | ISO Screw, binding head 3x4 |               | 4    |
| 6-120    | ML544307  | SW. Retaining Plate S       | MU-1001       | 1    |
| 6-121    | ZS413728  | Screw, binding head 3x6,    |               |      |
|          |           | w/washer                    |               | 1    |
| 6-122    | EJ510333  | Wire Clip 220-JD481610-     |               |      |
|          |           | 0104(Nylon)                 | 2-7-17        | 1    |
| 6-123    | EJ205975  | Cramp Terminal 1-SD         | 32-1-7        | 7    |
| 6-124    | EJ553948  | Wire Bundle Holder B        | 2-35-3        | 2    |
| 6-125x   | MZ219576  | Cord Retainer D             | M9-123        | 1    |
| 6-126    | ZS217877  | Pause Lever Set Screw       | 900-136       | 1    |
| 6-127    | MH317373  | Brake Lever Prop            | MR-102        | 2    |
| 6-128    | ZG217394  | Belt Change Spring B        | MH-125        | 1    |
| 6-129    | ZW260054  | Washer (SUP)D6.1x10x0.25t   |               | 1    |
| 6-130    | SZ547648  | Panel Supporting Plate      | MU-6027       | 2    |
| 6-131x   | ZS339502  | Tapping Screw #2 3x5(round) |               | 4    |

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

FIG. 7 PHOTO OF SYS. CON. P.C. BOARD (MU-1006)

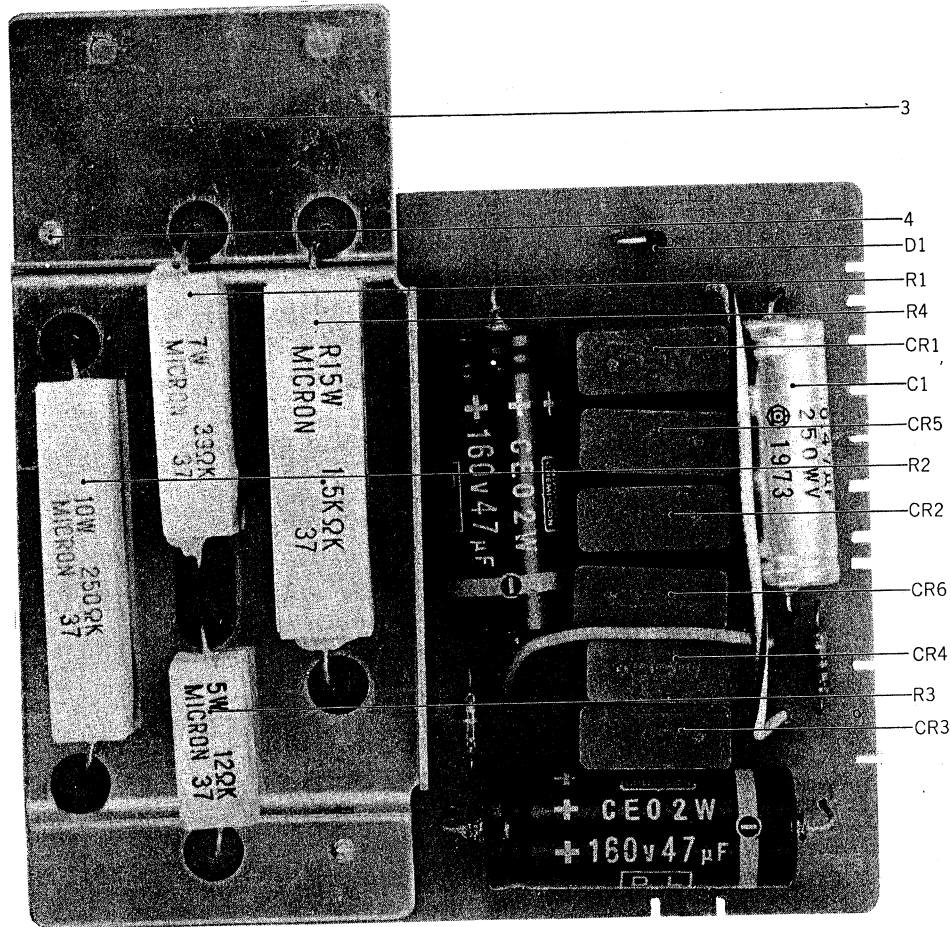


**SYS. CON. P.C. BOARD (MU-1006) BLOCK**

| Symbol No. | Parts No. | Description   | Q'ty | Symbol No.                    | Parts No. | Description                  | Q'ty |
|------------|-----------|---|------|-------------------------------|-----------|------------------------------|------|
| 7-1x       | BA558371  | Sys. Con. P.C. Board Comp.<br>(MU-1006)             | 1    | <b>Resistor, Stopper Type</b> |           |                              |      |
| 7-2x       | BA570058  | Sys. Con. P.C. Board Comp.<br>(MU-1006) (CSA)       | 1    | 7-R1                          | ER211667  | Carbon RD1/4 100(J)          | 1    |
| 7-TR1 to 4 | ET398711  | Transistor 2SC945(Q) (R)                            | 4    | 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-R5                          | ER564772  | Fuse FRN1/4 100k 200MA (CSA) | 1    |
| 7-RL1      | EP344136  | Relay MY4-0-US-AD4 24V                              | 1    | 7-R6, 7                       | ER212883  | Carbon RD1/4 4.7k(J)         | 2    |
| 7-CR1 to 8 | ER450786  | Spark Quencher U/L 0.1 $\mu$ +120 $\Omega$<br>400WV | 8    | 7-R8                          | ER336442  | Carbon RD1/4 10k(J)          | 1    |
| 7-3        | EZ544320  | P.C. Board Holder A                                 | 1    | 7-R9                          | ER357456  | Carbon RD1/4 2.2k(J)         | 1    |
| 7-4        | ZS447772  | Tapping Screw #2 3x6(BR)                            | 2    | 7-R10                         | ER211757  | Carbon RD1/4 100k(J)         | 1    |
| 7-5        | MZ544331  | P.C. Board Holder B                                 | 1    | 7-R11                         | ER212264  | Carbon RD1/4 22k(J)          | 1    |
| 7-6x       | ZS413155  | Screw, binding head 3x6                             | 2    | 7-R12                         | ER212883  | Carbon RD1/4 4.7k(J)         | 1    |
| 7-7        | EJ510333  | Wire Clip 220-JD481610-0104<br>(Nylon)              | 1    | 7-R13                         | ER212264  | Carbon RD1/4 22k(J)          | 1    |
|            |           | <b>Capacitor, Vertical Type</b>                     |      | 7-R14                         | ER357456  | Carbon RD1/4 2.2k(J)         | 1    |
| 7-C1       | EC220994  | Elect. 10 $\mu$ F 25WV                              | 1    |                               |           |                              |      |
| 7-C2       | EC383501  | Mylar 0.001 $\mu$ F(M) 50WV                         | 1    |                               |           |                              |      |
| 7-C3, 4    | EC250918  | Mylar 0.01 $\mu$ F(M) 50WV                          | 2    |                               |           |                              |      |
| 7-C5       | EC391498  | Mylar 0.022 $\mu$ F(M) 50WV                         | 1    |                               |           |                              |      |
| 7-C6       | EC220612  | Elect. 33 $\mu$ F 25WV                              | 1    |                               |           |                              |      |
| 7-C7       | EC391498  | Mylar 0.022 $\mu$ F(M) 50WV                         | 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)

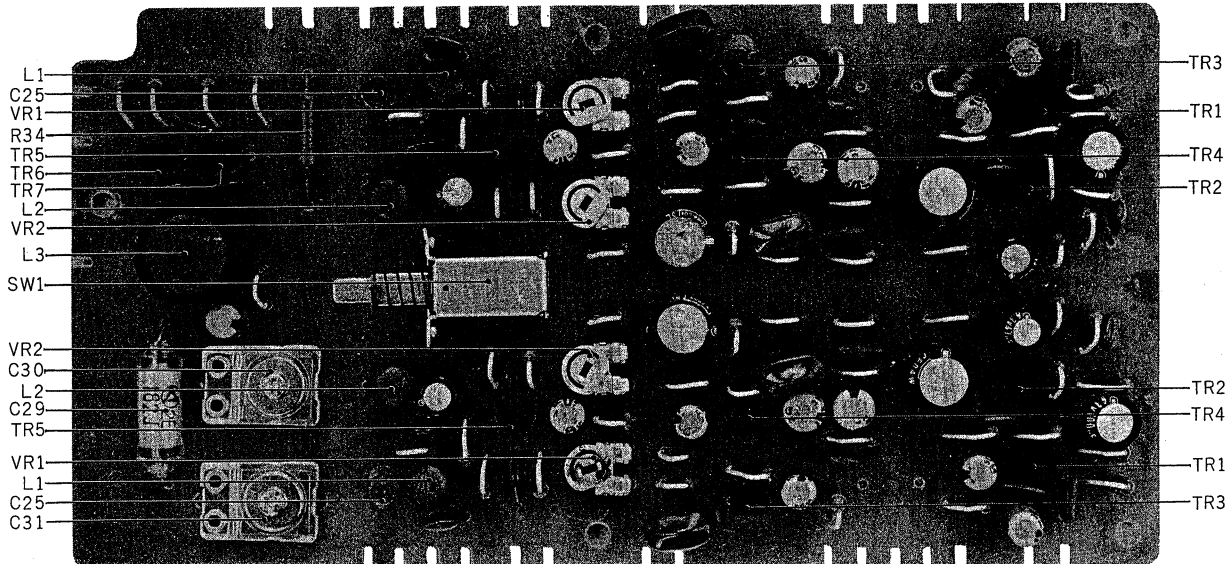


CR P.C. BOARD (MU-1007) BLOCK

| Symbol No.                       | Parts No. | Description                                 | Q'ty |
|----------------------------------|-----------|---|------|
| 8-1x                             | BA558360  | CR P.C. Board Comp. (MU-1007)               | 1    |
| 8-2x                             | BA574806  | CR P.C. Board Comp. (MU-1007)<br>(CSA, EC)  | 1    |
| 8-D1                             | ED224550  | Silicon Diode 10D4                          | 1    |
| 8-CR1 to 6                       | ER450786  | Spark Quencher U/L 0.1μ+120Ω<br>400WV       | 6    |
| 8-CR7                            | ER570532  | Spark Quencher 0.5μ+120Ω<br>400WV (CSA, EC) | 1    |
| 8-3                              | MZ544342  | P.C. Board Holder C                         | 1    |
| 8-4                              | 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 39Ω(K)                            | 1    |
| 8-R2                             | ER554861  | Cement 10W 250Ω(K)                          | 1    |
| 8-R3                             | ER554905  | Cement 5W 12Ω(K)                            | 1    |
| 8-R4                             | ER558461  | Cement 15W 1.5k(K) (Metal Ox.<br>Film type) | 1    |
| 8-R5                             | ER365016  | Carbon RD1/4 220k(J)<br>(Insu. type)        | 1    |
| 8-R6                             | ER324808  | Carbon RD1/4 100(J)(Insu. type)             | 1    |

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

FIG. 9 PHOTO OF REC. AMP. P.C. BOARD (MU-5016)



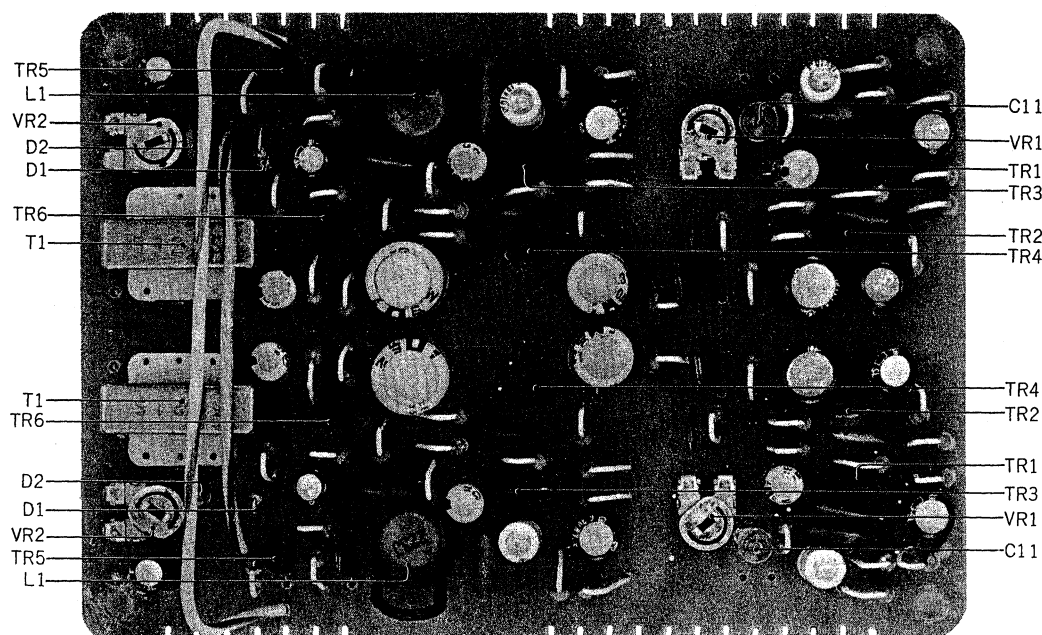
REC. AMP. P.C. BOARD (MU-5016) BLOCK

| Symbol No.                      | Parts No. | Description                             | Q'ty | Symbol No.                    | Parts No. | Description                | Q'ty |
|---------------------------------|-----------|---|------|-------------------------------|-----------|----------------------------|------|
| 9-1x                            | BA558404  | Rec. Amp. P.C. Board Comp.<br>(MU-5016) | 1    | <b>Resistor, Stopper Type</b> |           |                            |      |
| 9-TR1,2,3,4                     | ET517263  | Transistor 2SC1312(G) (H)               | 8    | 9-R1                          | ER336442  | Carbon RD1/4 10k(J)        | 2    |
| 9-TR5,6,7                       | ET368021  | Transistor 2SC458(B) (C)                | 4    | 9-R2                          | ER362485  | Carbon RD1/4 330k(J)       | 2    |
| 9-SW1                           | ES558191  | Slide SW. SPJ-10109                     | 1    | 9-R3                          | ER336442  | Carbon RD1/4 10k(J)        | 2    |
| 9-VR1                           | EV464207  | Semi-fixed/Vol. V8K4-1 5 kB             | 2    | 9-R4                          | ER213300  | Carbon RD1/4 680(J)        | 2    |
| 9-VR2                           | EV520806  | Semi-fixed/Vol. V8K4-1 10 kB            | 2    | 9-R5                          | ER357570  | Carbon RD1/4 150k(J)       | 2    |
| 9-L1                            | EO458932  | Ferri Inductor FL7H 2.2MH(J)            | 2    | 9-R6                          | ER346994  | Carbon RD1/4 18k(J)        | 2    |
| 9-L2                            | EO321254  | Ferri Inductor FL7H 5.6MH(J)            | 2    | 9-R7                          | ER343078  | Carbon RD1/4 2.7k(J)       | 2    |
| 9-L3                            | EO383365  | OSC. Coil 0T-204                        | 1    | 9-R8                          | ER343135  | Carbon RD1/4 1.6k(J)       | 2    |
| <b>Capacitor, Vertical Type</b> |           |   |      | 9-R9                          | ER407316  | Carbon RD1/4 24k(J)        | 2    |
| 9-C1                            | EC290520  | VFM 100PF(J) 50WV                       | 2    | 9-R10                         | ER357456  | Carbon RD1/4 2.2k(J)       | 2    |
| 9-C2                            | EC320051  | Elect. 10µF 16WV                        | 2    | 9-R11                         | ER212883  | Carbon RD1/4 4.7k(J)       | 2    |
| 9-C3                            | EC290520  | VFM 100PF(J) 50WV                       | 2    | 9-R12                         | ER450011  | Carbon RD1/4 120k(J)       | 2    |
| 9-C4                            | EC220364  | Elect. 100µF 6.3WV                      | 2    | 9-R13                         | ER349942  | Carbon RD1/4 8.2k(J)       | 2    |
| 9-C5                            | EC456322  | VFM 22PF(K) 50WV                        | 2    | 9-R14                         | ER347038  | Carbon RD1/4 270(J)        | 2    |
| 9-C6                            | EC329771  | Elect. 47µF 6.3WV                       | 2    | 9-R15                         | ER357491  | Carbon RD1/4 82k(J)        | 2    |
| 9-C7                            | EC320051  | Elect. 10µF 16WV                        | 2    | 9-R16                         | ER343078  | Carbon RD1/4 2.7k(J)       | 2    |
| 9-C8                            | EC220678  | Elect. 47µF 25WV                        | 2    | 9-R17                         | ER362441  | Carbon RD1/4 1.8k(J)       | 2    |
| 9-C9                            | EC394918  | VFM 33PF(K) 50WV                        | 2    | 9-R18                         | ER304402  | Carbon RD1/4 470(J)        | 2    |
| 9-C10                           | EC487394  | VFM 47PF(K) 50WV                        | 2    | 9-R19                         | ER212264  | Carbon RD1/4 22k(J)        | 2    |
| 9-C11                           | EC320051  | Elect. 10µF 16WV                        | 2    | 9-R20                         | ER342933  | Carbon RD1/4 27k(J)        | 2    |
| 9-C12                           | EC220678  | Elect. 47µF 25WV                        | 2    | 9-R21                         | ER357412  | Carbon RD1/4 220(J)        | 2    |
| 9-C13                           | EC329771  | Elect. 47µF 6.3WV                       | 2    | 9-R22                         | ER342933  | Carbon RD1/4 27k(J)        | 2    |
| 9-C14                           | EC487394  | VFM 47PF(K) 50WV                        | 2    | 9-R23                         | ER357456  | Carbon RD1/4 2.2k(J)       | 2    |
| 9-C15                           | EC329771  | Elect. 47µF 6.3WV                       | 2    | 9-R24                         | ER342933  | Carbon RD1/4 27k(J)        | 2    |
| 9-C16                           | EC320051  | Elect. 10µF 16WV                        | 2    | 9-R25                         | ER336442  | Carbon RD1/4 10k(J)        | 2    |
| 9-C17                           | EC290520  | VFM 100PF(J) 50WV                       | 2    | 9-R26                         | ER211465  | Carbon RD1/4 1k(J)         | 2    |
| 9-C18, 19                       | EC333562  | Mylar 0.18µF(K) 50WV                    | 2    | 9-R27                         | ER349784  | Carbon RD1/4 390(J)        | 2    |
| 9-C20                           | EC320051  | Elect. 10µF 16WV                        | 2    | 9-R28                         | ER380913  | Carbon RD1/4 33(J)         | 2    |
| 9-C21                           | EC250975  | Mylar 0.015µF(J) 50WV                   | 2    | 9-R29                         | ER336442  | Carbon RD1/4 10k(J)        | 2    |
| 9-C22                           | EC220994  | Elect. 10µF 25WV                        | 2    | 9-R30, 31                     | ER315944  | Carbon RD1/4 3.3(J)        | 2    |
| 9-C23                           | EC368335  | Mylar 0.022µF(J) 50WV                   | 2    | 9-R32                         | ER304402  | Carbon RD1/4 470(J)        | 1    |
| 9-C24                           | EC250918  | Mylar 0.01µF(M) 50WV                    | 2    | 9-R33                         | ER212883  | Carbon RD1/4 4.7k(J)       | 1    |
| 9-C25                           | EC405898  | Styrol 470PF(J) 50WV                    | 2    | 9-R34                         | ER511288  | Metal Oxide Film 1W 180(K) | 1    |
| 9-C26, 27                       | EC250841  | Mylar 0.01µF(J) 50WV                    | 2    | 9-R35                         | ER212477  | Carbon RD1/4 3.3k(J)       | 1    |
| 9-C28                           | EC450055  | Elect. 1µF 25WV                         | 1    |                               |           |                            |      |
| 9-C29                           | EC558235  | Styrol 1800PF(J) 250WV                  | 1    |                               |           |                            |      |
|                                 |           | (Tub. type)                             | 1    |                               |           |                            |      |
| 9-C30, 31                       | EC558202  | Trimmer TM-80A                          | 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 (ND-5037)

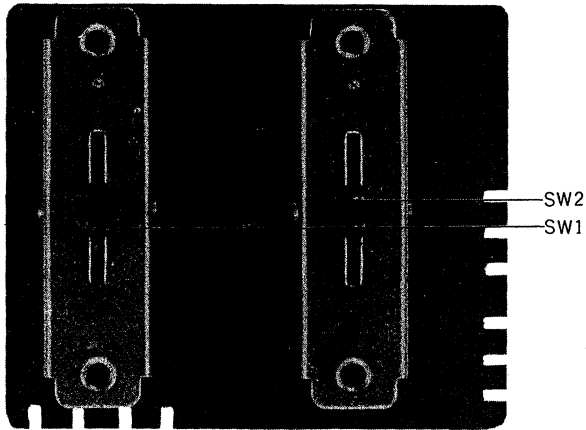


**P.B. AMP. P.C. BOARD (ND-5037) BLOCK**

| Symbol No. | Parts No. | Description                             | Q'ty | Symbol No. | Parts No. | Description                   | Q'ty |
|------------|-----------|---|------|------------|-----------|-------------------------------|------|
| 10-1x      | BA558415  | P.B. Amp. P.C. Board Comp.<br>(ND-5037) | 1    |            |           |                               |      |
|            |           | <b>Capacitor, Vertical Type</b>         |      |            |           | <b>Resistor, Stopper Type</b> |      |
| 10-TR1,2,3 | ET517263  | Transistor 2SC1312(G) (H)               | 6    | 10-R1      | ER362485  | Carbon RD1/4 330k(J)          | 2    |
| 10-TR4,5,6 | ET379462  | Transistor 2SC711(D) (E)                | 6    | 10-R2      | ER346601  | Carbon RD1/4 47k(J)           | 2    |
| 10-D1      | ED520762  | Zener Diode YZ-088A                     | 2    | 10-R3      | ER362485  | Carbon RD1/4 330k(J)          | 2    |
| 10-D2      | ED219464  | Germanium Diode 1N34A                   | 2    | 10-R4      | ER336442  | Carbon RD1/4 10k(J)           | 2    |
| 10-T1      | BT247768  | Headphone Trans. N19-5921S              | 2    | 10-R5      | ER212681  | Carbon RD1/4 330(J)           | 2    |
| 10-L1      | EO244012  | Ferri Inductor FL9H 22MH(J)             | 2    | 10-R6      | ER212264  | Carbon RD1/4 22k(J)           | 2    |
| 10-VR1     | EV464220  | Semi-fixed/Vol. V8K4-1 50 kB            | 2    | 10-R7      | ER212872  | Carbon RD1/4 4.3k(J)          | 2    |
| 10-VR2     | EV478686  | Semi-fixed/Vol. V8K4-1 1 kB             | 2    | 10-R8      | ER357570  | Carbon RD1/4 150k(J)          | 2    |
|            |           |   |      | 10-R9      | ER212477  | Carbon RD1/4 3.3k(J)          | 2    |
|            |           |   |      | 10-R10     | ER211757  | Carbon RD1/4 100k(J)          | 2    |
| 10-C1      | EC320051  | Elect. 10μF 16WV                        | 2    | 10-R11     | ER213030  | Carbon RD1/4 5.6k(J)          | 2    |
| 10-C2      | EC290520  | VFM 100PF(J) 50WV                       | 2    | 10-R12     | ER343078  | Carbon RD1/4 2.7k(J)          | 2    |
| 10-C3      | EC467133  | VFM 68PF(J) 50WV                        | 2    | 10-R13     | ER346994  | Carbon RD1/4 18k(J)           | 2    |
| 10-C4      | EC329771  | Elect. 47μF 6.3WV                       | 2    | 10-R14     | ER212883  | Carbon RD1/4 4.7k(J)          | 2    |
| 10-C5      | EC290520  | VFM 100PF(J) 50WV                       | 2    | 10-R15     | ER346601  | Carbon RD1/4 47k(J)           | 2    |
| 10-C6      | EC320051  | Elect. 10μF 16WV                        | 2    | 10-R16     | ER211465  | Carbon RD1/4 1k(J)            | 2    |
| 10-C7      | EC320040  | Elect. 47μF 16WV                        | 2    | 10-R17     | ER212681  | Carbon RD1/4 330(J)           | 2    |
| 10-C8      | EC329771  | Elect. 47μF 6.3WV                       | 2    | 10-R18, 19 | ER357456  | Carbon RD1/4 2.2k(J)          | 4    |
| 10-C9      | EC389485  | Mylar 0.018μF(J) 50WV                   | 2    | 10-R20     | ER212681  | Carbon RD1/4 330(J)           | 2    |
| 10-C10     | EC350875  | Mylar 0.001μF(J) 50WV                   | 2    | 10-R21     | ER357491  | Carbon RD1/4 82k(J)           | 2    |
| 10-C11     | EC435690  | Styrol 560PF(J) 50WV                    | 2    | 10-R22     | ER357412  | Carbon RD1/4 220(J)           | 2    |
| 10-C12     | EC336126  | Elect. 47μF 25WV                        | 2    | 10-R23     | ER212264  | Carbon RD1/4 22k(J)           | 2    |
| 10-C13     | EC320051  | Elect. 10μF 16WV                        | 2    | 10-R24, 25 | ER211465  | Carbon RD1/4 1k(J)            | 4    |
| 10-C14     | EC290564  | VFM 220PF(K) 50WV                       | 2    | 10-R26     | ER429996  | Carbon RD1/4 470k(J)          | 2    |
| 10-C15     | EC329771  | Elect. 47μF 6.3WV                       | 2    | 10-R27     | ER212264  | Carbon RD1/4 22k(J)           | 2    |
| 10-C16     | EC456322  | VFM 22PF(K) 50WV                        | 2    | 10-R28     | ER211757  | Carbon RD1/4 100k(J)          | 2    |
| 10-C17     | EC336104  | Elect. 100μF 6.3WV                      | 2    | 10-R29     | ER350100  | Carbon RD1/4 68k(J)           | 2    |
| 10-C18     | EC320051  | Elect. 10μF 16WV                        | 2    | 10-R30     | ER212883  | Carbon RD1/4 4.7k(J)          | 2    |
| 10-C19     | EC290520  | VFM 100PF(J) 50WV                       | 2    |            |           |                               |      |
| 10-C20     | EC389474  | Mylar 0.0015μF(J) 50WV                  | 2    |            |           |                               |      |
| 10-C21     | EC450055  | Elect. 1μF 25WV                         | 2    |            |           |                               |      |
| 10-C22     | EC320051  | Elect. 10μF 16WV                        | 2    |            |           |                               |      |
| 10-C23     | EC450055  | Elect. 1μF 25WV                         | 2    |            |           |                               |      |

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

FIG. 11 PHOTO OF EQ. P.C. BOARD (MU-5018)

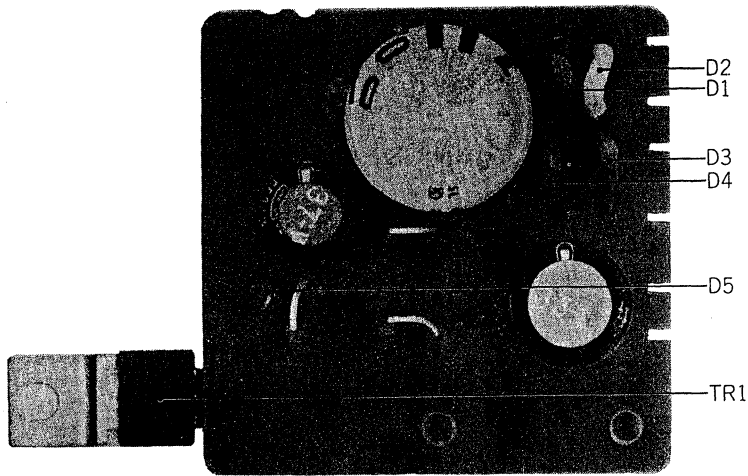


**EQ. P.C. BOARD (MU-5018) BLOCK**

| Symbol No.                      | Parts No. | Description                                | Q'ty |
|---------------------------------|-----------|--|------|
| 11-1x                           | BA558426  | EQ. P.C. Board Comp. (MU-5018)             | 1    |
| 11-SW1, 2                       | ES457514  | Lever SW. SQ11 (PVB) 12-4-2<br>(Black) (M) | 2    |
| <b>Capacitor, Vertical Type</b> |           |  |      |
| 11-C1                           | EC329883  | Mylar 0.0056 $\mu$ F(J) 50WV               | 2    |
| 11-C2                           | EC311793  | Mylar 0.012 $\mu$ F(J) 50WV                | 2    |
| 11-C3                           | EC329883  | Mylar 0.0056 $\mu$ F(J) 50WV               | 2    |

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

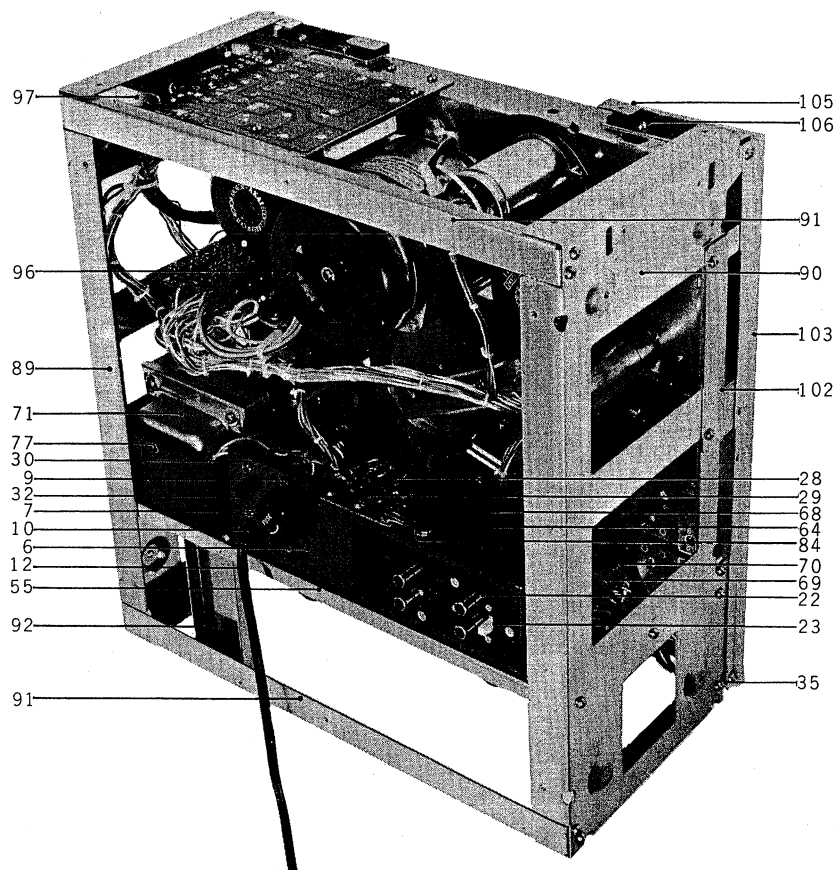
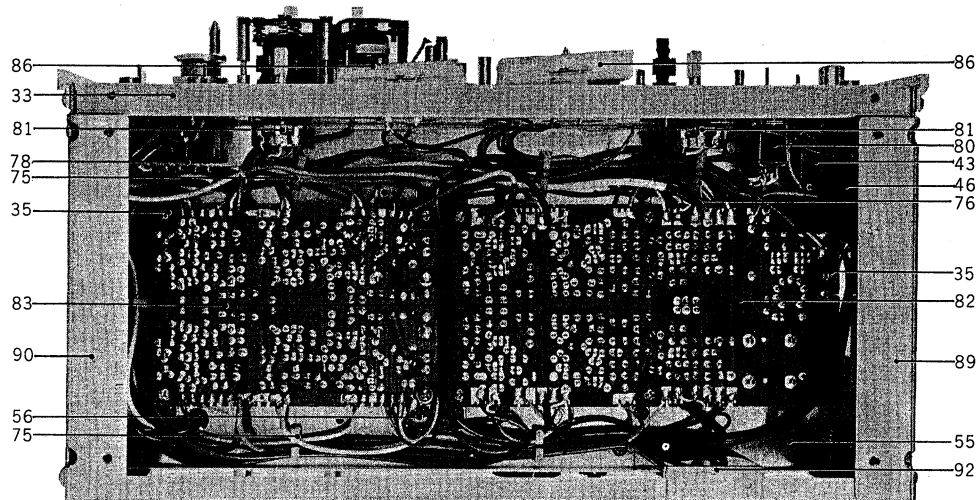
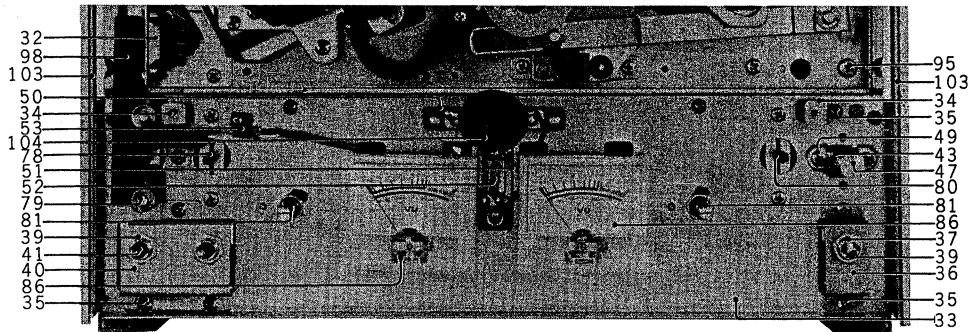
FIG. 12 PHOTO OF POWER SUPPLY P.C. BOARD (MU-5017)



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

| Symbol No.                      | Parts No. | Description                                | Q'ty |
|---------------------------------|-----------|--|------|
| 12-1x                           | BA558450  | Power Supply P.C. Board Comp.<br>(MU-5017) | 1    |
| 12-TR1                          | ET495371  | Transistor 2SC1098(L)                      | 1    |
| 12-D1,2,3,4                     | ED494583  | Silicon Diode 10D05                        | 4    |
| 12-D5                           | ED511918  | Zener Diode WZ-240                         | 1    |
| <b>Capacitor, Vertical Type</b> |           |  |      |
| 12-C1                           | EC557651  | Elect. 470 $\mu$ F 50WV                    | 1    |
| 12-C2                           | EC220151  | Elect. 100 $\mu$ F 25WV                    | 1    |
| 12-C3                           | EC336115  | Elect. 220 $\mu$ F 25WV                    | 1    |
| <b>Resistor, Stopper Type</b>   |           |  |      |
| 12-R1                           | ER306843  | Carbon RD1/4 1.2k(J)                       | 1    |
| 12-R2                           | ER211667  | Carbon RD1/4 100(J)                        | 1    |
| 12-R3                           | ER430018  | Carbon RD1/4 1(J)                          | 1    |

FIG. 13 PHOTO OF AMPLIFIER ASSEMBLY BLOCK

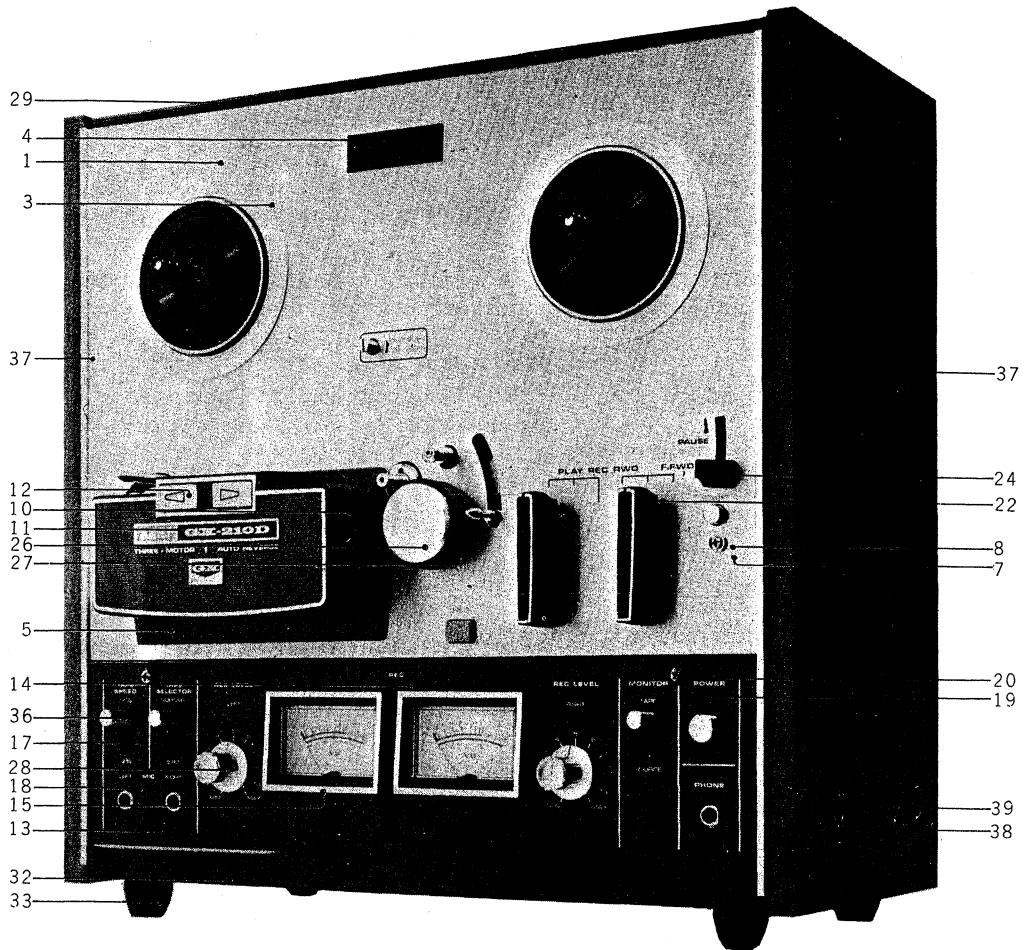


## AMPLIFIER ASSEMBLY BLOCK

| Ref. No.                   | Parts No. | Description                             | Schematic No. | Q'ty | Ref. No. | Parts No. | Description                              | Schematic No. | Q'ty |
|----------------------------|-----------|---|---------------|------|----------|-----------|--|---------------|------|
| <b>JACK PLATE BLOCK</b>    |           |   |               |      |          |           |  |               |      |
| 13-1x                      | BZ558437  | Jack Plate Block Comp.                  | MU            | 1    | 13-54x   | EZ449471  | VU Mat                                   | BS-5010       | 2    |
| 13-2x                      | BZ558448  | Jack Plate Block Comp.                  |               |      | 13-55    | EZ544680  | Amp. Chassis                             | MU-5001       | 1    |
|                            |           | (3 core)                                | MU            | 1    | 13-56    | EZ544375  | P.C. Board Bracket                       | MU-5002       | 9    |
| 13-3x                      | BZ570082  | Jack Plate Block Comp. (EC)             | MU            | 1    | 13-57x   | ML544432  | REC. Lever (Lower)                       | MU-5010       | 1    |
| 13-4x                      | BZ570093  | Jack Plate Block Comp. (CSA)            | MU            | 1    | 13-58x   | MH314280  | REC. Lever Pin                           | MR-528        | 1    |
| 13-5x                      | BZ570330  | Jack Plate Block Comp. (WG)             | MU            | 1    | 13-59x   | ZW273892  | Toothed Lock Washer M4                   |               | 1    |
| 13-6                       | EZ544511  | Jack Plate Bracket                      | MU-5011       | 1    | 13-60x   | ZW416698  | Nut M4                                   |               | 1    |
| 13-7                       | EJ233370  | Socket (Volt. Selector)                 |               |      | 13-61x   | ZS314717  | Graduated Screw, MR                      | MR-254        | 2    |
|                            |           | S-18010                                 | 40-2-3        | 1    | 13-62x   | ZW273802  | Toothed Lock Washer M3                   |               | 3    |
| 13-8x                      | EF558066  | Fuse 2A 125V                            | 39-1-47       | 1    | 13-63x   | ZW273756  | Nut M3                                   |               | 3    |
| 13-9                       | ZS372025  | ISO Screw, truss head 3x6 (black)       |               | 2    | 13-64    | ML314313  | REC. Lever A (Upper)                     | MR-516        | 1    |
| 13-10                      | EZ382263  | Strain Relief SR-4K-4                   | 2-7-12        | 1    | 13-65x   | ZS207314  | Amp. Lever Set Screw                     | 3A-737        | 2    |
| 13-11x                     | EZ246936  | Strain Relief SR-6W-1 (WG, 3 core)      | 2-7-8         | 1    | 13-66x   | ZG314324  | REC. Lever Spring A, MR                  | MR-527        | 1    |
| 13-12                      | EW540112  | AC Cord (CUL) 2.5M                      | 26-3-19       | 1    | 13-67x   | ZW273778  | Earth Lug M3                             | 900-117       | 1    |
| 13-13x                     | EW315448  | Australia Cord (3 core)                 | 26-3-11       | 1    | 13-68    | ZG227441  | Spring C                                 | 31-4-4        | 1    |
| 13-14x                     | EW516600  | Power Supply Cord, CEE VM-0065 (EC)     | 26-3-28       | 1    | 13-69    | EJ292961  | Multi-jack 10P 500-010-005               |               | 1    |
| 13-15x                     | EW486797  | Power Supply Cord, VDE (WG)             | 26-3-26       | 1    | 13-70    | ZW558145  | Tapping Screw #2 2.6x10                  |               | 2    |
| 13-16x                     | EW524845  | AC Cord (J) 2.5M (J)                    | 26-3-31       | 1    | 13-71    | BT558167  | Power Trans. MUT-1                       | 38-4-237      | 1    |
| 13-17x                     | EJ569441  | Fuse Holder D (EC)                      | A0392         | 1    | 13-72x   | BT565931  | Power Trans. MUT-2 (CSA)                 | 38-4-265      | 1    |
| 13-18x                     | EF375660  | Fuse (T type) 1AT (EC)                  |               | 1    | 13-73x   | BT565920  | Power Trans. MUT-3 (EC)                  | 38-4-266      | 1    |
| 13-19x                     | EF375715  | Fuse (T type) 450MAT (EC)               |               | 2    | 13-74x   | ZS468112  | Tapping Screw #2 4x8(truss)              |               | 4    |
| 13-20x                     | EJ569452  | Fuse Terminal Plate GX-210D (CSA)       | A0383         | 1    | 13-75    | EJ514607  | Wire Clip 220-JD485210-01 (Nylon)        | 2-7-18        | 4    |
| 13-21x                     | EF565975  | Fuse 800MA 125V                         | 39-1-44       | 4    | 13-76    | EJ510333  | Wire Clip 220-JD481610-0104 (Nylon)      | 2-7-17        | 2    |
| 13-22                      | EJ547198  | Jack Plate Comp. MU                     | MU-5028       | 1    | 13-77    | EZ461125  | Trans. Shield Plate C                    | MC-5017       | 1    |
| 13-23                      | ES379045  | Slide SW., 6P (small) SJ-0282           | 25-3-36       | 1    | 13-78    | BA558426  | EQ. P.C. Board Comp. (MU-5018)           |               | 1    |
| 13-24x                     | ER443790  | Carbon/R. RD1/4 470k(J) (Insu. type)    | 35-9-5        | 2    | 13-79    | MH544397  | Slide Prop                               | MU-5005       | 2    |
| 13-25x                     | ER345712  | Carbon/R. RD1/4 22k(J) (Insu. type)     | 35-9-5        | 4    | 13-80    | ES443013  | Lever SW. SQ11 12-4-2 (black) (M)        | 25-12-3       | 1    |
| 13-26x                     | ER440921  | Carbon/R. RD1/4 27k(J) (Insu. type)     | 35-9-5        | 2    | 13-81    | EV476223  | Volume V24N 50 kA                        | 36-2-26       | 2    |
| 13-27x                     | EJ255093  | Lug Plate VB1L1                         | 33-4-1        | 1    | 13-82    | BA558404  | REC. Amp. P.C. Board Comp. (MU-5016)     |               | 1    |
| 13-28                      | BA558450  | Power Supply P.C. Board Comp. (MU-5017) |               | 1    | 13-83    | BA558415  | P.B. Amp. P.C. Board Comp. (ND-5037)     | 45-1-122      | 1    |
| 13-29                      | ZS447772  | Tapping Screw #2 3x6(BR)                |               | 2    | 13-84    | ET495371  | Transistor 2SC1098(L)                    |               | 1    |
| 13-30                      | ZS462532  | ISO Screw, truss head 3x4               |               | 2    | 13-85x   | ZS323728  | Screw, binding head 3x5                  | 46-1-74       | 2    |
| 13-31x                     | ZW273778  | Earth Lug M3                            |               | 1    | 13-86    | EM558180  | VU Meter KL-243S-5                       |               | 1    |
|                            |           |   |               |      | 13-87x   | EJ300508  | Mate-N-Lock Plug Housing 9P 1-480274-O   | 52-1-7        | 1    |
| 13-32                      | ES375478  | Slide SW. ESD-279DU(black)              | 25-3-23       | 2    | 13-88x   | EJ373634  | Socket Contact 61115-1                   | 52-1-1        | 9    |
|                            |           |   |               |      | 13-89    | EZ544667  | Side Plate R                             | MU-5013       | 1    |
|                            |           |   |               |      | 13-90    | EZ544678  | Side Plate L                             | MU-5013       | 1    |
|                            |           |   |               |      | 13-91    | EZ544522  | Reinforcement Angle                      | MU-5012       | 2    |
|                            |           |   |               |      | 13-92    | EZ547661  | Amp. Reinforcement Plate                 | MU-5030       | 1    |
|                            |           |   |               |      | 13-93x   | ZW273767  | Earth Lug D3x20L (EC)                    |               | 1    |
|                            |           |   |               |      | 13-94x   | EJ205975  | Cramp Terminal 1-SD (EC, CSA)            | 32-1-7        | 1    |
| <b>AMP. ASSEMBLY BLOCK</b> |           |   |               |      |          |           |  |               |      |
| 13-33                      | EZ544500  | Amp. Plate                              | MU-5003       | 1    | 13-95    | ZS563297  | Screw, binding head 4x8, w/spring washer |               | 4    |
| 13-34                      | EZ544408  | Panel Supporting Plate                  | MU-5006       | 2    | 13-96    | SZ529108  | Main Motor Fan                           | ND-7010       | 1    |
| 13-35                      | ZS447772  | Tapping Screw #2 3x6(BR)                |               | 5    | 13-97    | SZ544476  | P.C. Board Holder D                      | MU-6016       | 1    |
| 13-36                      | EZ544410  | Jack Mt. Plate A                        | MU-5007       | 1    | 13-98    | SZ544386  | Coupling Plate                           | MU-5004       | 1    |
| 13-37                      | EJ447603  | Mic. Jack 3PMJ1                         | 31-2-24       | 1    | 13-99x   | ZW558088  | Washer D5.2x10.3x0.3t                    |               | 2    |
| 13-38x                     | ZW272722  | Toothed Lock Washer M9 D9.3x13x0.5t     |               | 3    | 13-100x  | ZW270101  | 'E' Ring 3M                              | 6-1-9         | 2    |
| 13-39                      | ZW554624  | Nut, E Jack                             | 7-1-56        | 3    | 13-101x  | SZ544465  | Reinforcement Plate L                    | MU-6015       | 1    |
| 13-40                      | EZ544421  | Jack Mt. Plate B                        | MU-5008       | 1    | 13-102   | SZ544691  | Reinforcement Plate R                    | MU-6015       | 1    |
| 13-41                      | EJ391094  | Mic. Jack 2PMJ1P                        | 31-2-27       | 2    | 13-103   | SE544566  | Sash                                     | MU-6011       | 2    |
| 13-42x                     | ER364948  | Carbon/R. RD1/4 3.3k(J) (Insu. type)    | 35-9-5        | 2    | 13-104   | UM494267  | Lamp Cover                               | CG-2206       | 1    |
| 13-43                      | ES246025  | Push SW. SDF1PBP1 (UEH-12BP U/L)        | 25-5-11       | 1    | 13-105   | SZ547648  | Panel Reinforcement Plate                | MU-6027       | 2    |
| 13-44x                     | ES561767  | Push SW. NP-285-2 (EC)                  | 25-5-111      | 1    | 13-106   | ZS339502  | Tapping Screw #2 3x5 (round)             |               | 4    |
| 13-45x                     | ES499972  | Push SW. JS-09 (WG)                     | 25-5-67       | 1    |          |           |  |               |      |
| 13-46                      | ER450797  | Spark Quencher U/L 0.033μ+120Ω 400WV    | 41-1-34       | 1    |          |           |  |               |      |
| 13-47                      | SK487697  | Knob B                                  | CG-2007       | 1    |          |           |  |               |      |
| 13-48x                     | SK569632  | Knob F (EC)                             | CG-2007       | 1    |          |           |  |               |      |
| 13-49                      | ZS379405  | ISO Screw, binding head 3x6             |               | 6    |          |           |  |               |      |
| 13-50                      | EA449414  | Lamp P.C. Board                         | BS-5005       | 1    |          |           |  |               |      |
| 13-51                      | EA476256  | Lamp P.C. Board                         | MR-5004       | 1    |          |           |  |               |      |
| 13-52                      | EL295312  | Lamp (No. 2) 8V 0.2A                    | 28-2-8        | 2    |          |           |  |               |      |
| 13-53                      | ES563242  | Leaf SW. BSW-1E                         | 25-10-18      | 1    |          |           |  |               |      |

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

FIG. 14 PHOTO OF FINAL ASSEMBLY BLOCK



## FINAL ASSEMBLY BLOCK

| Ref. No. | Parts No. | Description                                | Schematic No. | Q'ty |
|----------|-----------|--|---------------|------|
| 14-1     | SP544645  | Mech. Panel                                | MU-6001       | 1    |
| 14-2x    | SP544656  | Mech. Panel B (EC, CSA)                    | MU-6001       | 1    |
| 14-3     | SZ476076  | Spin Ring                                  | MR-6003       | 2    |
| 14-4     | SE330895  | Counter Escutcheon, MR                     | MR-646        | 1    |
| 14-5     | SC544533  | Head Cover Base                            | MU-6003       | 1    |
| 14-6x    | ZS413155  | Screw, binding head 3x6                    |               | 6    |
| 14-7     | ZW408418  | Panel Washer                               | KD-6029       | 2    |
| 14-8     | ZS411660  | Screw, oval countersunk head<br>3x6        |               | 2    |
| 14-9x    | ZS447772  | Tapping Screw #2 3x6(BR)                   |               | 4    |
| 14-10    | SC544544  | Head Cover                                 | MU-6004       | 1    |
| 14-11    | SM544443  | Head Cover Name Plate                      | MU-6005       | 1    |
| 14-12    | SB544454  | Direction Button                           | MU-6006       | 2    |
| 14-13    | SP544555  | Amp. Panel                                 | MU-6007       | 1    |
| 14-14    | SZ457975  | Lamp Lens B                                | 55-5012       | 1    |
| 14-15    | SE544601  | VU Meter Escutcheon                        | MU-6017       | 2    |
| 14-16x   | ZS425788  | Screw, round head 3x4                      |               | 4    |
| 14-17    | SE544487  | SW. Cover                                  | MU-6018       | 3    |
| 14-18    | ZW526577  | Collar B, Jack                             | MC-5006       | 3    |
| 14-19    | SZ483737  | Panel Washer B (black)                     | KD-6029       | 2    |
| 14-20    | ZS425125  | Screw, oval countersunk head<br>3x6(black) |               | 2    |
| 14-21x   | ZW432347  | Washer (Luminar)<br>D6.2x13x0.125t         |               | 2    |
| 14-22    | SK476684  | Mech. Knob                                 | LE-6018       | 2    |
| 14-23x   | ZS253405  | Mech. Knob Screw                           | 7-1-46        | 2    |
| 14-24    | SK314100  | Pause Knob B                               | MR-612        | 1    |
| 14-25x   | ZS433001  | Set Screw, hexagon socket<br>3x5(cup)      |               | 1    |
| 14-26    | SK425158  | Pinch Roller Cap                           | MS-6020       | 1    |
| 14-27    | MP271170  | Pinch Roller, LC D=38                      | LC-321        | 1    |
| 14-28    | SK476111  | Amp. Knob Comp.                            | MR-6010       | 2    |
| 14-29    | SZ544577  | Upper Plate                                | MU-6012       | 1    |
| 14-30x   | ZW461610  | Decorative Washer For 3M/M                 |               | 4    |
| 14-31x   | ZS482815  | Screw, oval countersunk head<br>3x8        |               | 4    |
| 14-32    | SZ544588  | Lower Plate                                | MU-6012       | 1    |
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| 14-36    | SK544702  | Lever SW. Knob A                           | MU-6019       | 3    |
| 14-37    | BC544590  | Side Plate                                 | MU-6013       | 2    |
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| 14-39    | ZS558090  | Screw, binding head 4x14                   |               | 8    |
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| 14-42x   | SP544623  | Back Plate B (CSA)                         | MU-6009       | 1    |
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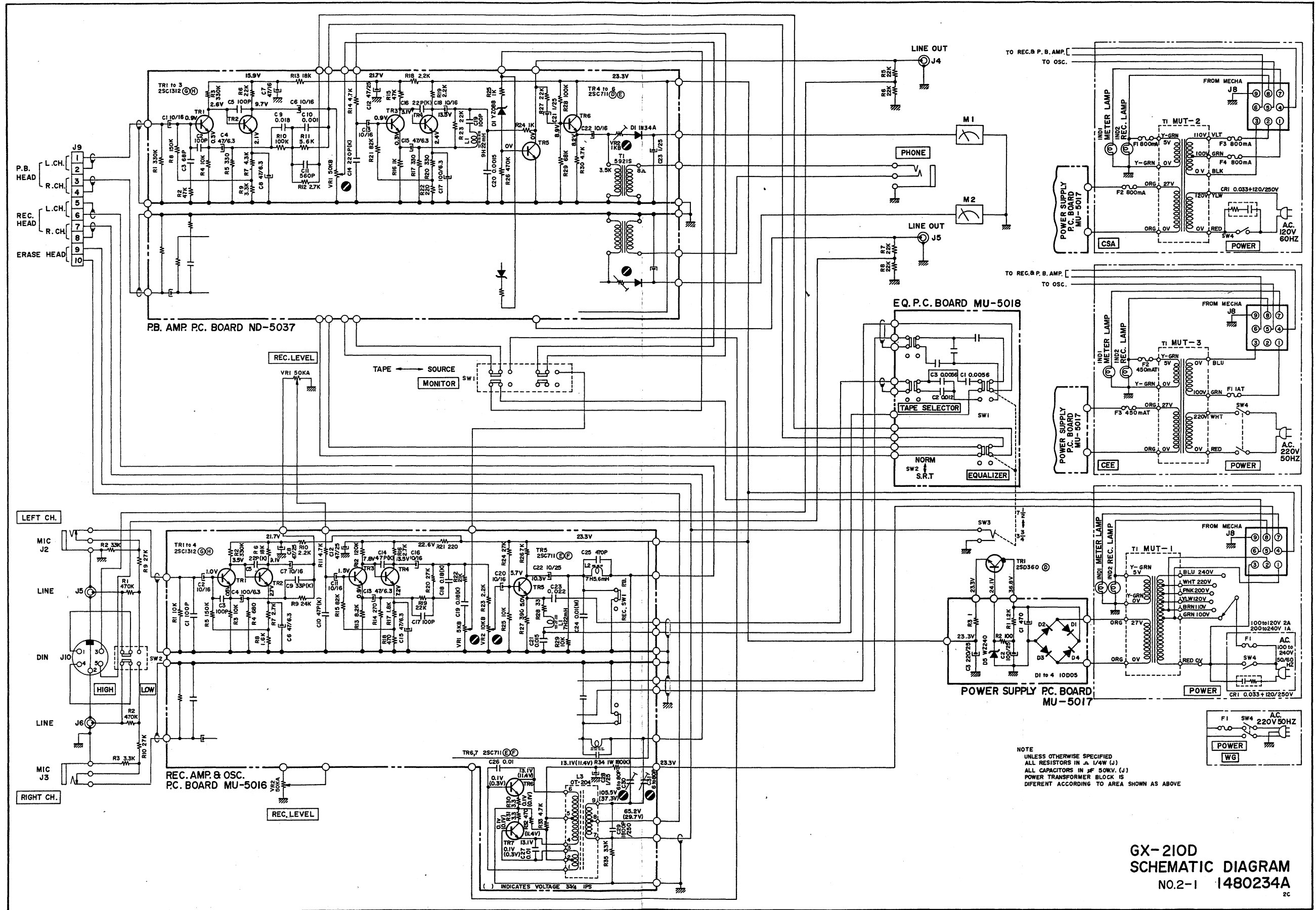
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| MZ316956  | 5-9                   | ZG540584  | 1-41                  | ZS482815  | 14-31x                | ZW416698  | 13-60x                |           |                       |
| MZ317024  | 5-23                  | ZS200384  | 1-14                  | ZS487776  | 14-35x                | ZW419646  | 6-11                  |           |                       |
| MZ317068  | 5-27                  | ZS202116  | 6-72                  | ZS498273  | 14-43x                | ZW419646  | 14-34x                |           |                       |
| MZ317340  | 6-20                  | ZS203016  | 3-19                  | ZS554916  | 1-25                  | ZW419826  | 6-66                  |           |                       |
| MZ317406  | 2-32                  | ZS207314  | 6-69x                 | ZS554938  | 1-48                  | ZW430863  | 1-45x                 |           |                       |
| MZ317406  | 6-111                 | ZS207314  | 6-108                 | ZS554962  | 1-72                  | ZW432347  | 6-48                  |           |                       |
| MZ405483  | 5-16                  | ZS207314  | 13-65x                | ZS555737  | 1-10                  | ZW432347  | 14-21x                |           |                       |
| MZ439525  | 4-25                  | ZS217877  | 6-126                 | ZS558090  | 14-39                 | ZW432944  | 6-8                   |           |                       |
| MZ446635  | 4-7                   | ZS253405  | 14-23x                | ZS558101  | 1-95x                 | ZW447208  | 4-4                   |           |                       |
| MZ452496  | 6-40x                 | ZS272395  | 3-9                   | ZS558134  | 1-26                  | ZW461610  | 14-30x                |           |                       |
| MZ544331  | 6-43                  | ZS314717  | 6-47                  | ZS558257  | 1-60                  | ZW526577  | 14-18                 |           |                       |
| MZ544331  | 7-5                   | ZS314717  | 13-61x                | ZS559045  | 5-20x                 | ZW548010  | 14-38                 |           |                       |
| MZ544342  | 8-3                   | ZS323728  | 1-6                   | ZS559056  | 1-21                  | ZW554624  | 13-39                 |           |                       |
| MZ544364  | 5-17                  | ZS323728  | 2-31x                 | ZS563297  | 13-95                 | ZW554940  | 1-53                  |           |                       |
| MZ549426  | 6-71                  | ZS323728  | 5-26x                 | ZW231805  | 1-79                  | ZW558088  | 13-99x                |           |                       |
| SA377190  | 14-33                 | ZS323728  | 6-36                  | ZW259705  | 6-68x                 | ZW558145  | 13-70                 |           |                       |
| SB425777  | 6-51                  | ZS323728  | 13-85x                | ZW259885  | 1-75                  | ZW563218  | 1-94                  |           |                       |
| SB544454  | 14-12                 | ZS339502  | 6-131x                | ZW259885  | 6-70x                 | ZW861344  | 6-16x                 |           |                       |
| SC544533  | 14-5                  | ZS339502  | 13-106                | ZW259942  | 5-10x                 |           |                       |           |                       |
| SC544544  | 14-10                 | ZS344463  | 6-97x                 | ZW259975  | 6-79x                 |           |                       |           |                       |
| SE330895  | 14-4                  | ZS365973  | 2-17                  | ZW260010  | 6-107x                |           |                       |           |                       |
| SE544487  | 14-17                 | ZS371856  | 5-19                  | ZW260054  | 3-17x                 |           |                       |           |                       |
| SE544566  | 13-103                | ZS372025  | 13-9                  | ZW260054  | 6-129                 |           |                       |           |                       |
| SE544601  | 14-15                 | ZS372183  | 1-31                  | ZW260087  | 6-76                  |           |                       |           |                       |
| SK314100  | 14-24                 | ZS373577  | 4-5x                  | ZW260144  | 6-17x                 |           |                       |           |                       |
| SK425158  | 14-26                 | ZS379405  | 13-49                 | ZW270088  | 1-18                  |           |                       |           |                       |
| SK476111  | 14-28                 | ZS384131  | 1-65                  | ZW270088  | 2-9                   |           |                       |           |                       |
| SK476684  | 14-22                 | ZS396044  | 1-44                  | ZW270088  | 6-103x                |           |                       |           |                       |
| SK487697  | 13-47                 | ZS411660  | 14-8                  | ZW270101  | 13-100x               |           |                       |           |                       |
| SK543857  | 6-10                  | ZS413155  | 6-44                  | ZW270123  | 1-76                  |           |                       |           |                       |
| SK544702  | 14-36                 | ZS413155  | 7-6x                  | ZW270134  | 3-21                  |           |                       |           |                       |
| SK569632  | 13-48x                | ZS413155  | 14-6x                 | ZW272722  | 13-38x                |           |                       |           |                       |
| SM544443  | 14-11                 | ZS413201  | 4-14                  | ZW273688  | 1-88                  |           |                       |           |                       |
| SP544555  | 14-13                 | ZS413201  | 5-14                  | ZW273688  | 6-32x                 |           |                       |           |                       |
| SP544612  | 14-40x                | ZS413201  | 6-22x                 | ZW273756  | 4-27x                 |           |                       |           |                       |
| SP544623  | 14-42x                | ZS413212  | 6-39                  | ZW273756  | 5-5x                  |           |                       |           |                       |
| SP544634  | 14-41x                | ZS413223  | 6-42                  | ZW273756  | 6-49x                 |           |                       |           |                       |
| SP544645  | 14-1                  | ZS413728  | 1-13                  | ZW273756  | 13-63x                |           |                       |           |                       |
| SP544656  | 14-2x                 | ZS413728  | 5-8x                  | ZW273767  | 13-93x                |           |                       |           |                       |
| SZ457975  | 14-14                 | ZS413728  | 6-121                 | ZW273778  | 1-5                   |           |                       |           |                       |
| SZ476076  | 14-3                  | ZS413741  | 1-43                  | ZW273778  | 2-13x                 |           |                       |           |                       |
| SZ483737  | 14-19                 | ZS413785  | 1-40                  | ZW273778  | 13-31x                |           |                       |           |                       |
| SZ529108  | 3-20                  | ZS413785  | 2-19                  | ZW273778  | 13-67x                |           |                       |           |                       |
| SZ529108  | 13-96                 | ZS414033  | 1-4                   | ZW273802  | 5-4x                  |           |                       |           |                       |
| SZ544386  | 13-98                 | ZS414044  | 6-23x                 | ZW273802  | 13-62x                |           |                       |           |                       |
| SZ544465  | 13-101x               | ZS417137  | 1-38                  | ZW273892  | 13-59x                |           |                       |           |                       |
| SZ544476  | 13-97                 | ZS417137  | 1-92                  | ZW273914  | 4-15                  |           |                       |           |                       |
| SZ544577  | 14-29                 | ZS417137  | 2-26x                 | ZW274026  | 6-25x                 |           |                       |           |                       |
| SZ544588  | 14-32                 | ZS417137  | 6-91x                 | ZW290283  | 1-52                  |           |                       |           |                       |

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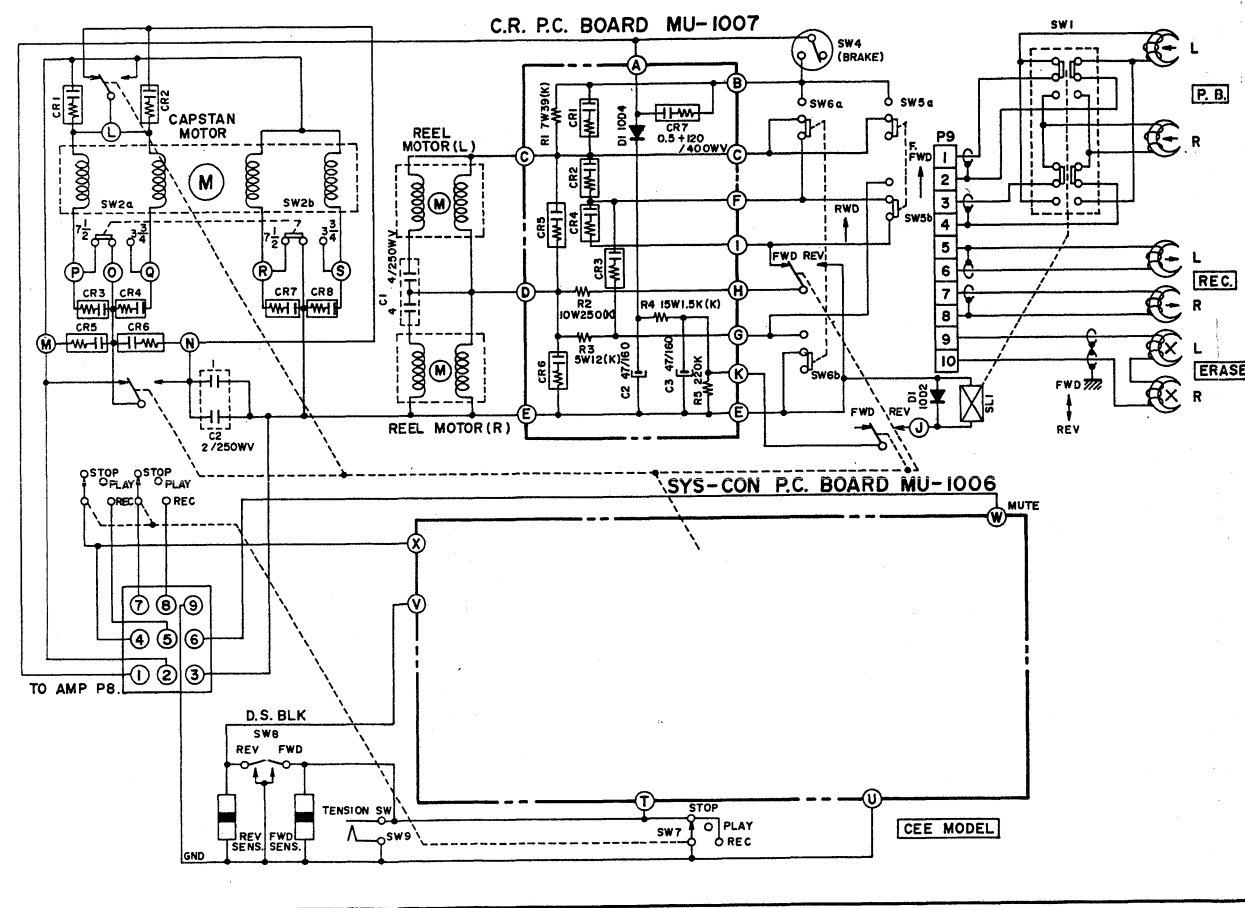
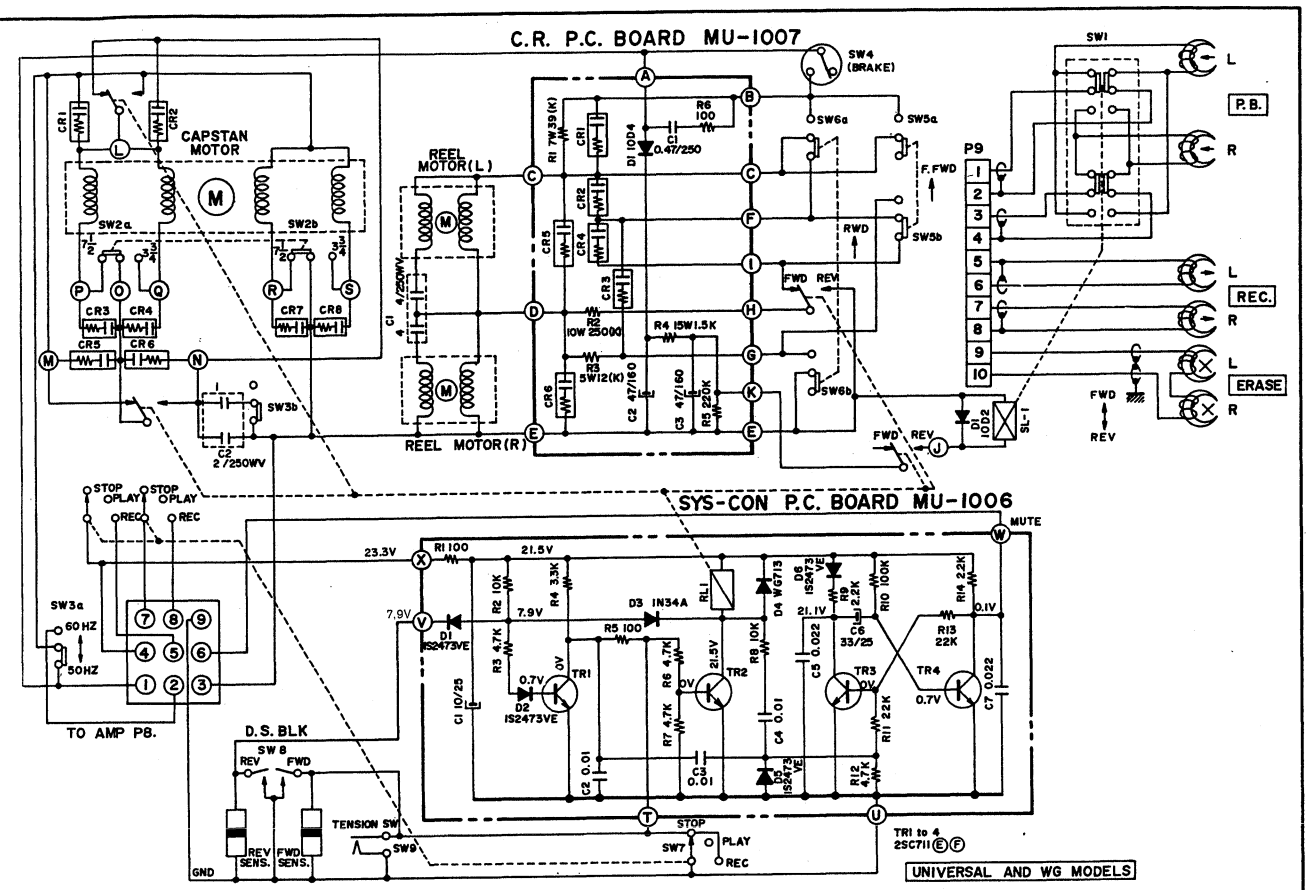
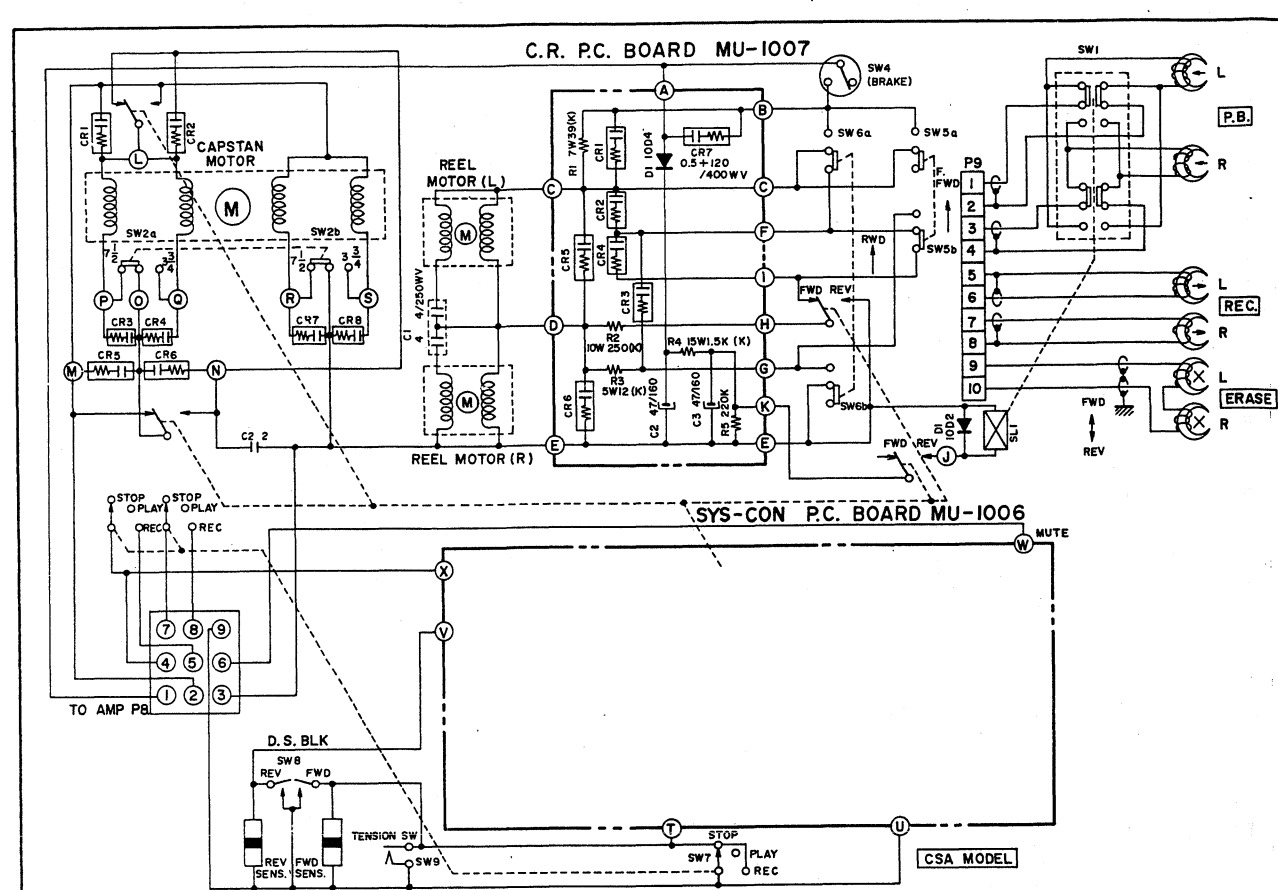
SECTION 3

**SCHEMATIC DIAGRAM**

1. GX-210D SCHEMATIC DIAGRAM



GX-210D  
 SCHEMATIC DIAGRAM  
 NO.2-1 1480234A



NOTE  
 UNLESS OTHERWISE SPECIFIED  
 ALL RESISTORS IN A 1/4W(J)  
 ALL CAPACITORS IN MF 50W.V.(J)  
 ALL SPARK QUENCHERS IN 0.1μ + 120A./400W.V.  
 SPARK QUENCHERS CR1 to CR8 SHOWN IN  
 PARENTHESIS ( ) ARE LOCATED ON  
 SYS-CON P.C. BOARD.  
 MECHANISM BLOCK IS DIFFERENT  
 ACCORDING TO AREA.

GX-210D  
 SCHEMATIC DIAGRAM  
 NO.2-2 1480235A  
 2c