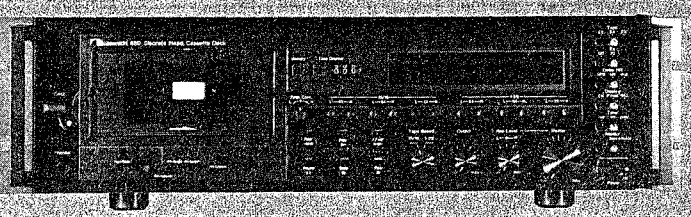
Nakamichi

Service Manual

Nakamichi 680

Discrete Head Cassette Deck



1. GENERAL

1.1. Control Functions

Nakamichi 680 control functions are shown below:

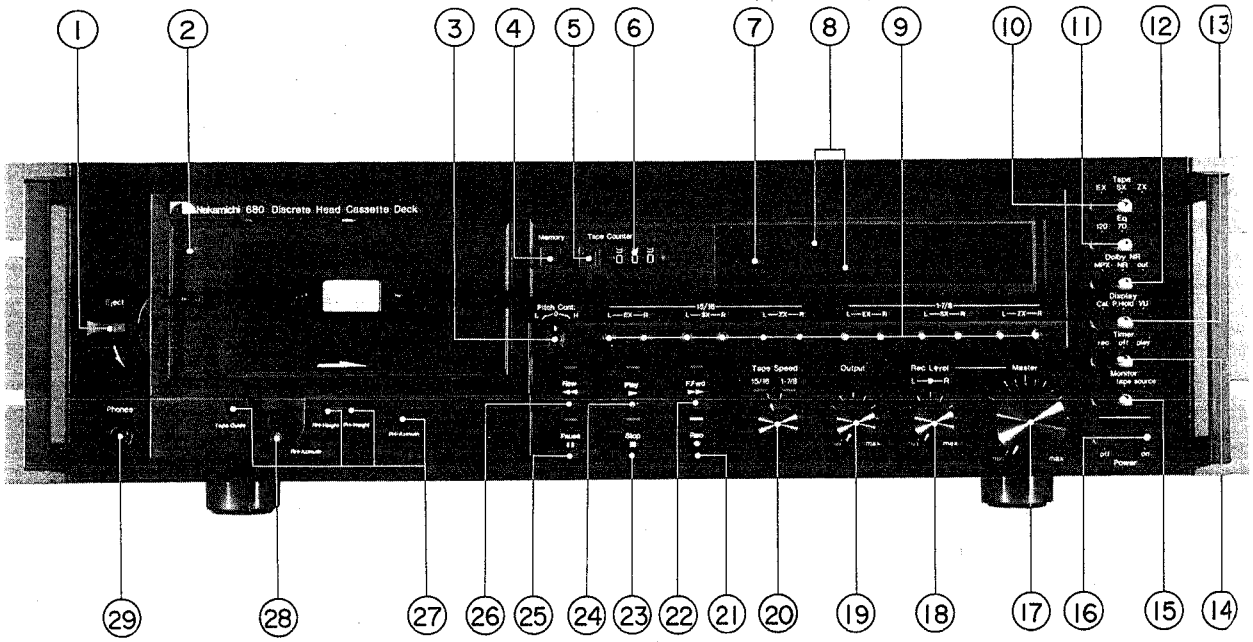


Fig. 1.1 Front View

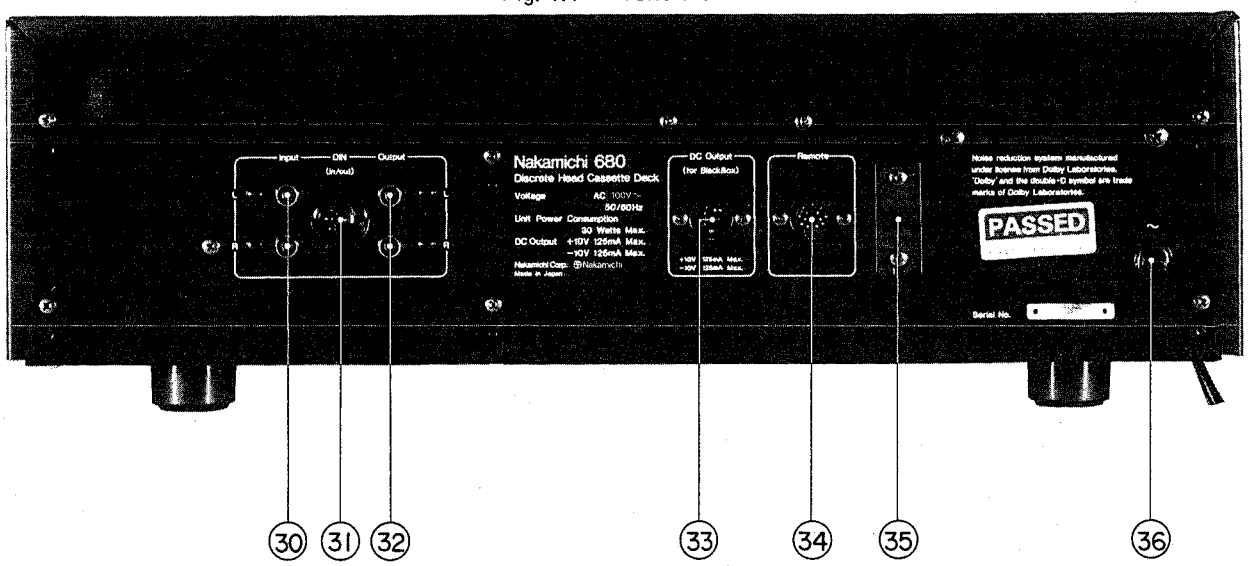


Fig. 1.2 Rear View

1. Eject Lever
2. Cassette Holder (with see-thru cover)
3. Pitch Control
4. Tape Start Memory Switch
5. Counter Reset Button
6. Tape Counter
7. RAMM Display
8. Fluorescent (FL) Level Indicators
9. Record Calibration Controls
10. Tape Switch
11. Eq. Switch
12. Dolby NR/MPX Filter Switch
13. Display Switch
14. Timer Switch
15. Monitor Switch
16. Power Switch
17. Master Input Level Control
18. Input Level Controls
19. Output Level Control
20. Tape Speed Selector
21. Record Button
22. Fast-Forward Button
23. Stop Button
24. Play Button
25. Pause Button
26. Rewind Button
27. Head Height and Azimuth Alignment Screws
28. Record Head Azimuth Alignment Knob
29. Headphone Jack
30. Input Jacks
31. DIN In/Out Connector
32. Output Jacks
33. DC Output Jack
34. Remote Control Socket
35. Voltage Selector
36. Power Cord

1.2. Voltage Selector

Voltage selector is installed on the rear panel for other versions of the Nakamichi 680.
This voltage selector can select either 120 V or 220 – 240 V at customer's disposal.

2. PRINCIPLE OF OPERATION

2.1. Mechanisms

2.1.1. Headblock

Refer to Fig. 2.1.1.
Nakamichi 680 Headblock provides more stabilized tape travel.
Accuracy of tape travel is one of the most essential factors for a device to optimize its performance. Inaccurate tape travel will therefore induce deterioration exemplified by the following:

(a) vibration will be given to tape travel, as a result of which flutter and modulation noise will become increased
(b) insufficient tape-to-head contact will result in level drops
(c) tape skew will become greater and frequency response will become decreased

Needless to say, constant tape travel must consist of smooth drive mechanism, as well as of the fact that tape, heads and tape guide are placed in the most appropriate positions.
N-680 Playback Head and Record Head, they are both made small in size so that the both heads are assembled in a space of the conventional Record/Playback Head.
Erase Head is located at the place where the Record Head is located in the N-700II/1000II.
Both Playback Head and Record Head are assembled on the Head Mount Base. Take-up Tape Guide and Supply Tape Guide are fixed to the Take-up Pressure Roller Arm and Supply Pressure Roller Arm, respectively. Erase Head is placed on the Head Base. All these can be separately adjusted.
Record Head is placed slightly backward, approximately 0.15 mm away from the Playback Head. Record Head is placed approximately 3° inclined leftward. Shape of the Heads and its location have been carefully studied to bring about smoother contact of tape with the Heads. Pad Lifter is affixed to the Playback Head so as not to let Tape Pad touch the Head to give more stabilized tape travel, making it free from the influence of the Tape Pad within the Cassette Tape. Thus the trouble of changes in azimuth can now be avoided at changing of cassette tape, if only the Record Head azimuth is properly adjusted in advance.
The Fig. 2.1.2 shows trackings of each head against a tape of the N-680, wherein the figure shows ideal locations at the time of designing, thus the tracking in actual use will vary more or less, depending upon the tape width, etc.

(1) Adjustment of Tape Guide Height

Tape Guide of the N-680 is assembled into the Take-up and Supply Pressure Roller Assemblies.
With a spring in the stud of Mechanism Chassis Ass'y, Pressure Roller Ass'y is tightly affixed with Tape Guide Adjustment Nut. The Adjustment Nut is placed on a spring through Pressure Roller Arm, and therefore by either tightening or loosening adjustment the height of the Tape Guide will become possible.

(2) Playback Head Height Adjustment and Azimuth Alignment

Azimuth and height of Playback Head can be made independently and adjustment may be done separately without affecting others. In order to adjust the tilt of Playback Head backwards or frontwards, take off the Height Gear Stopper and take out the Height Gear and then turn the two Height Adjustment Screws. After the adjustment is done, place the Height Gear back and fix it with the Height Gear Stopper. After the tilt is adjusted in such a way as above, adjust the height by loosening or tightening the Height Gear. Azimuth alignment is adjusted by loosening or tightening the PH Azimuth Screw. This system has been carefully designed so as to minimize influence each other between azimuth and height adjustment.

(3) Record Head Height Adjustment and Azimuth Alignment

Record Head tilt adjustment can be performed in the same way as for the Playback Head.
Height adjustment can be adjusted while recording 400 Hz test tone by loosening or tightening RH Height Adjustment Screw to obtain the maximum level on the both Level Meters. Azimuth alignment can be adjusted while playing back 15 kHz signal by loosening or tightening RH Azimuth Alignment Screw to obtain the maximum level on the both Level Meters.
This system has also been carefully designed so as to minimize influence each other between azimuth and height adjustment.

(4) Erase Head Height and Tilt Adjustment

Erase Head is affixed onto the Erase Head Plate which is assembled with the Head Base. It is installed with three screws. By turning these screws, its height, tilt of backward or frontward, and tilt of leftward or rightward can be adjusted separately, thus the best location of Erase Head can be obtained.

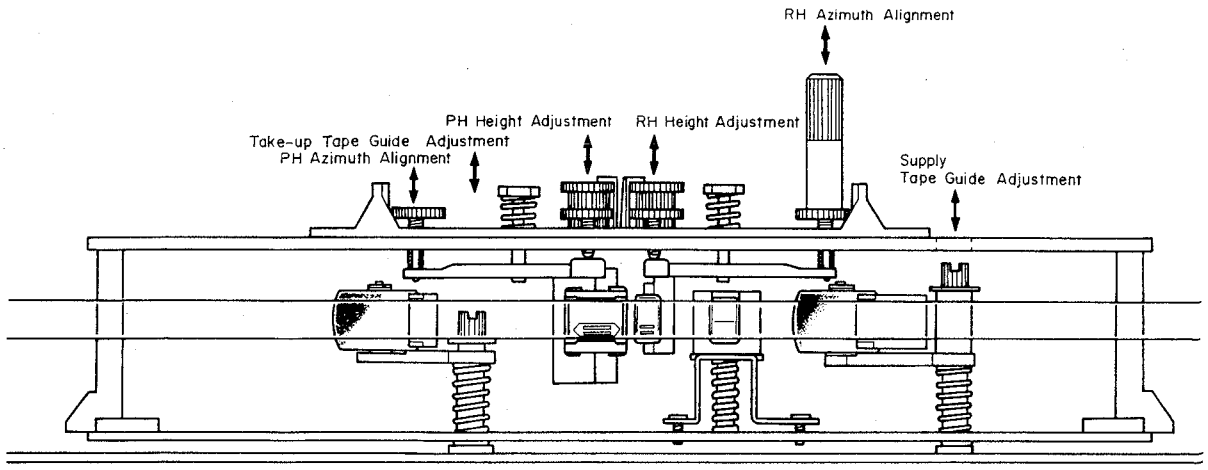


Fig. 2.1.1 Headblock

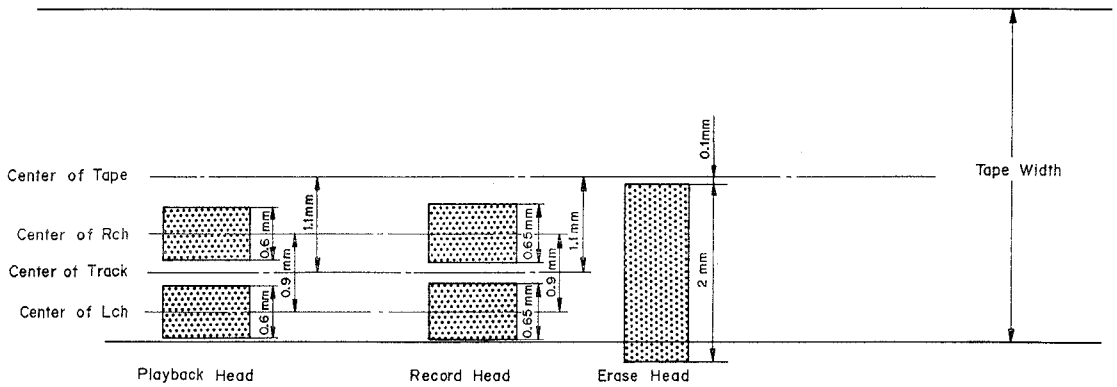


Fig. 2.1.2 Trackings

2.1.2. Erase Head

Fig. 2.1.3 shows the sectional view of Erase Head.

Fig. 2.1.4 shows the characteristics of erasing current and erasure.

It has the same characteristics with the previous type Direct-Flux Erase Head but been purposely developed to minimize the size further.

Conventional Erase Head had its inside core narrower than its outside core, while this Erase Head is equipped with an inside core wider than the outside core. This has resulted more power sufficient enough for erasing even Metal Tape with small power consumption, approx. 0.5 W, though the head width is as small as 3 mm. The smaller the power consumption is, the smaller will be the heat generation, and this is of course another merit.

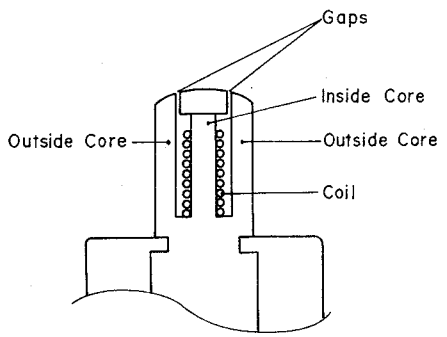


Fig. 2.1.3 Sectional View of Erase Head

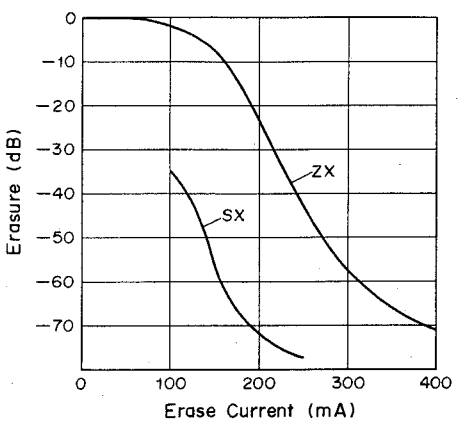


Fig. 2.1.4 Characteristics of Erasing Current and Erasure

2.1.3. Double Capstan Tape Drive

As shown in Fig. 2.1.5, the double capstan system consists of two capstan shafts (a) and (b) connected to the two flywheels which are driven by a capstan belt.

Against these capstans two pressure rollers (a) and (b) are engaged to run the tape with an adequate holdback tension created by the double capstan and pressure rollers.

Since the diameter of capstan shaft (a) is smaller than that of capstan shaft (b), when two flywheels begin to turn as shown in the figure, capstan (a) runs slightly faster than capstan (b), which subsequently generates holdback tension.

As you note, if the diameters of the 2 capstans should be the same, the generation cycles of wow and flutter will become approximately the same, as a result of which defective portion will be doubly superposed and preferable portion vice versa. The N-680 employs 2 capstans, each having different diameter and rotations, thereby avoiding the aforesaid occurrence and stabilizing wow and flutter characteristics.

As the double capstan system always creates a constant and stable holdback tension between the two capstans, the condition of the tape between two capstans will not be affected by any external conditions such as irregular take-up and supply torques, irregular loading of cassette tape, undesirable mechanism vibration and etc., thus assuring the superior wow and flutter characteristics. The double capstan system provides a constant holdback tension on the tape and maintains the stable pressure onto the tape against the heads.

The only critical factor in the double capstan system is to be considered; the two capstans have to be positioned perfectly in parallel and to be precisely vertical against the head base, the pressure rollers have to be evenly pressed against the capstan shafts and the head surface must be positioned perfectly vertical to the tape surface. Otherwise, the running tape might become out of the tape guide resulting in irregular movement.

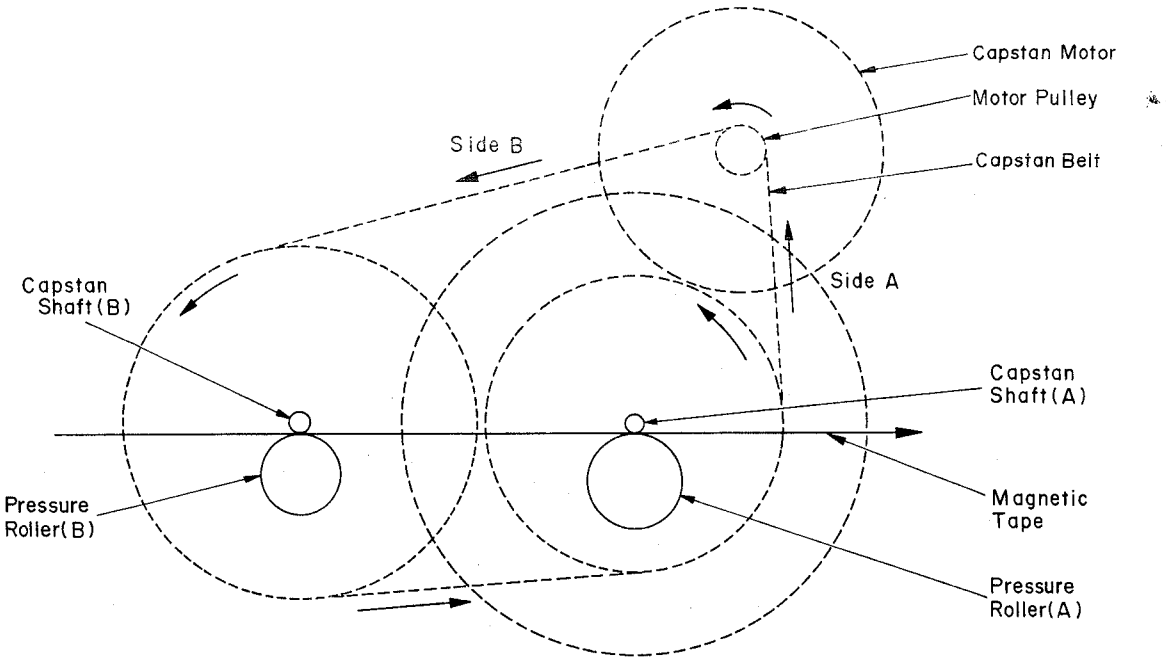


Fig. 2.1.5 Double Capstan Tape Drive

2.1.4. Mechanism Control Cam Operation

Refer to Fig. 2.1.6 Mechanism Cam Control timing chart. Function of N-680 Mechanism is done by Cam Control. Cam is driven by the Control Motor.

The Motor operates so as to result zero in the difference of voltages between each voltage corresponding to mechanism function and each reference voltage which corresponds to each commands of the Control Switch. When the difference comes to zero, then it stops. In this way, each function is kept properly operated. For further details, please see the explanation on Logic Control. Here we explain principle of its mechanical functions.

Cam Control System works as follows: Cam Drive Gear is driven by Control Motor by means of Drive Belt. Cam Drive Gear is related to the cam with which each function may be mechanically set on.

(1) Play Mode

Press the Play Switch to make it Play mode. Then the Cam begins to move from Stop position to Play position and the Play mode will be set.

The Head Base which is linked to the Cam and which is normally pushed against the Stop Position gets released and the Head Base will slowly come out for playing. To explain this function, first the Head Base is latched and the Reel Motor begins to turn. Then the Pressure Roller will be pushed and the Brake will be released. Now the tape begins to run. If you press the Pause Switch at this stage, it comes to Pause mode. Brake operates and the Pressure Roller moves away from the Capstan and the Reel Motor stops.
Play mode may be changed to Stop mode by pressing the Stop Switch, and latch of the Head Base being released.
The Cassette Case cannot be opened because of the latched eject effect unless it is in Stop mode.

(2) Record Mode
By pressing the Record Switch and the Pause or Play Switch, it may be made to Record mode.
The cam action is identical to in (1) Play mode, but the $\overline{\text{Rec.}}$ signal produced in the logic control circuit becomes L, and Record mode is set.

(3) F.F. or Rewind Mode
By pressing F.F. or Rewind Switch, it comes either to F.F. or Rewind mode. The only difference of these two modes is that one is to turn the Reel Motor reverse and the other to transmit the torque against the Reel Hub onto the take-up side or to the supply side. Brake is released at this stage and the Reel Motor begins to turn F.F. or Rewind.

(4) Pause Mode
Press the Pause Switch to make it to Pause mode. In changing it from Stop mode to Pause mode, the Brake is first released, then the Head Base is latched, and again the Brake works.
At this stage, the Reel Motor would not turn with the Pressure Roller being apart from the Capstan, and the tape would remain still.

(5) Cue Mode
Cue mode may be either of Forward Cue or of Reverse Cue mode.
In either case, it could be effected by pressing F.F. Switch or Rewind Switch after the Pause Switch has been pressed. The speed of the tape at this moment will be 1/3 the running speed of normal F.F. or normal Rewind. The tape speed will get slow further down to 1/5 the speed of F.F. or of Rewind if you keep on pressing the F.F. or Rewind Switch. In this case, the Brake is released at first and then the Head Base will get latched at the Cue position and the Reel Motor will start while the Pressure Roller remains apart from the Capstan.

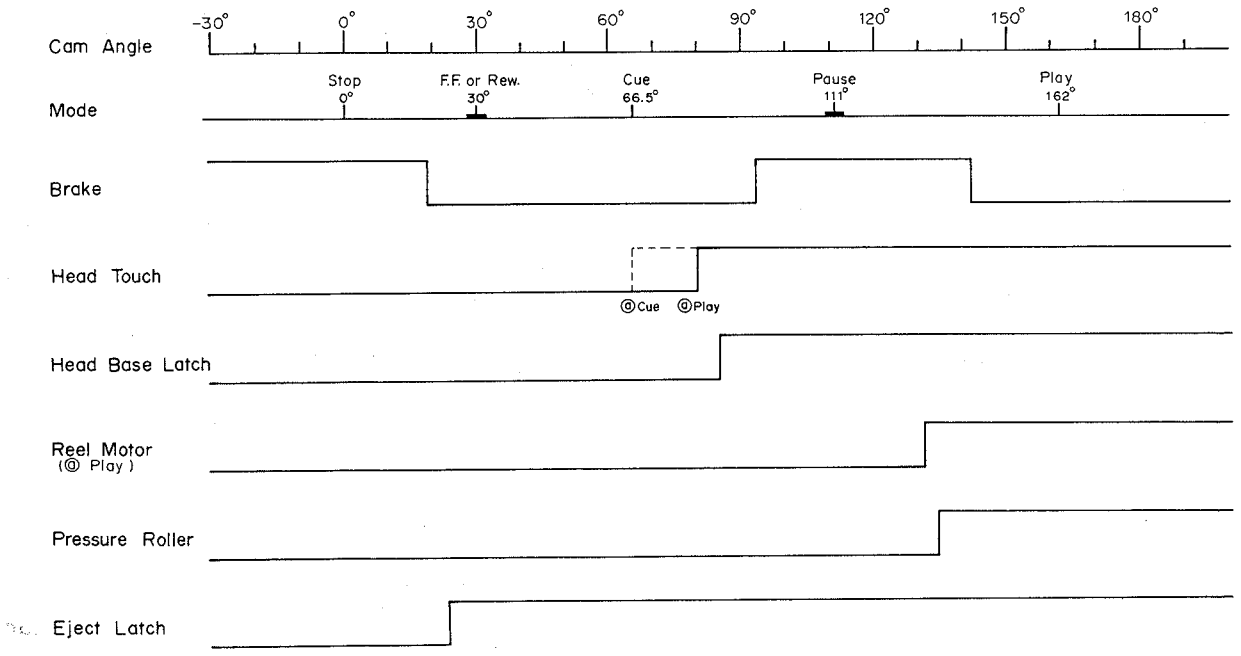


Fig. 2.1.6 Mechanism Control Cam Timing Chart

2.2. Amp. Circuits

2.2.1. Playback Eq. Amp. Circuit

Fig. 2.2.1 shows playback equalizer amp. circuit.

Fig. 2.2.2 shows its system diagram, and Fig. 2.2.3 shows the time constant of equalizer.

Playback Head is connected to the input of this circuit. Amplifier, which is composed of Q101, Q102 and Q103, is an equalizer amplifier and its time constant is shown in Fig. 2.2.3.

R112, L101, C107 and C108/C109 consist of a peaking circuit. C108 is selected at the half-speed, and C109 at the standard tape speed.

Peaking circuit compensates Playback Head gap loss and improve frequency response at high. L101 and C107 compose bias trap circuit and prevent bias leakage from playback eq. amp. circuit. L101 is of variable type and adjustment performed by L101 is mainly for the purpose of reducing bias leakage.

Playback eq. amp. gain adjustment should be performed so as to obtain 100 mV at TP101 (TP201) by adjusting VR101 (VR201) during the course of playing back 400 Hz Level Tape (DA09005A). Eq. Switch (70 μs/120 μs) is connected to playback eq. amp. circuit and the overall time constant of playback eq. amp. circuit will become as follows:

Eq. Switch — 70 μs: 3180 μs (50 Hz) + 70 μs (2274 Hz)

Eq. Switch — 120 μs: 3180 μs (50 Hz) + 120 μs (1326 Hz)

Following table shows tapes used at each Tape Switch combined with Eq. Switch:

Tape SW	Eq. Sw	Tape
ZX	70 μs	Nakamichi ZX
SX	70 μs	Nakamichi SX, TDK SA, Maxell XL-II Scotch Master 70 μs
EX	120 μs	Low-Noise High-Density (including EX, EXII, TDK AD, Maxell XL-I, Scotch Master 120 μs)
	70 μs	Nakamichi EX, EXII

It is specified in IEC Standard that time constant is 120 μs on tapes of ferric oxide, and 70 μs on tapes of CrO2.

However, in the case of Eq. Switch on N-680, when time constant at playback is changed, at the same timt time constant at record must also be changed.

Therefore, even though record and playback is made by the method other than the IEC Standard, no deterioration of frequency response or level difference will occur. (Any other method for instance, record and playback on ferric oxide tape with putting Tape Switch on EX and Eq. Switch on at 70 μs.)

When Nakamichi EX or EXII Tape is used at Tape Switch: EX, and Eq. Switch: 70 μs, S/N ratio will be improved by approximately 4 dB (WTD).

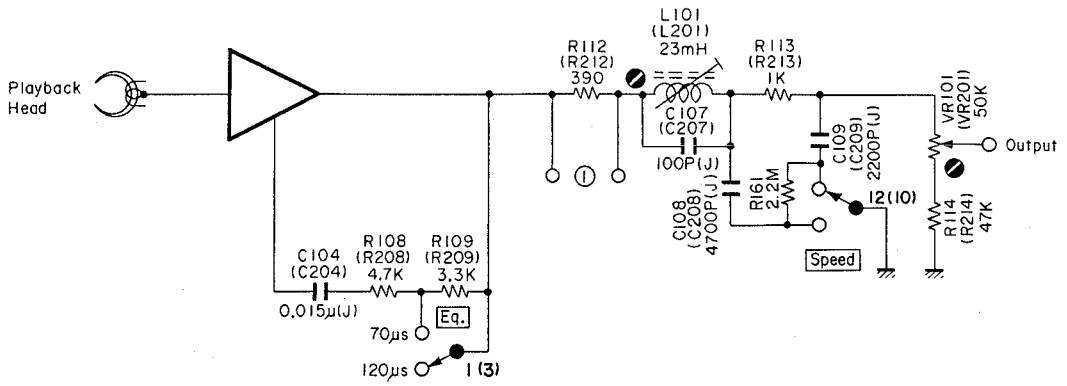


Fig. 2.2.2 System Diagram

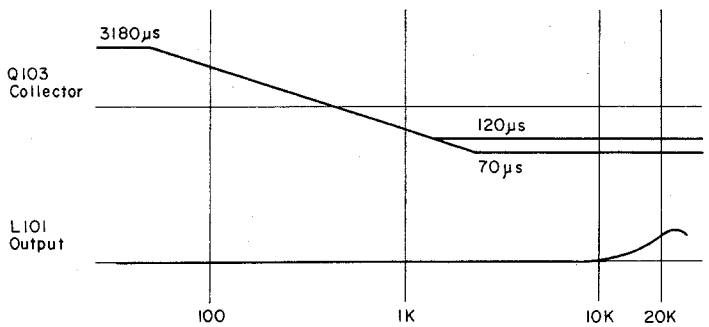


Fig. 2.2.3 Time Constant

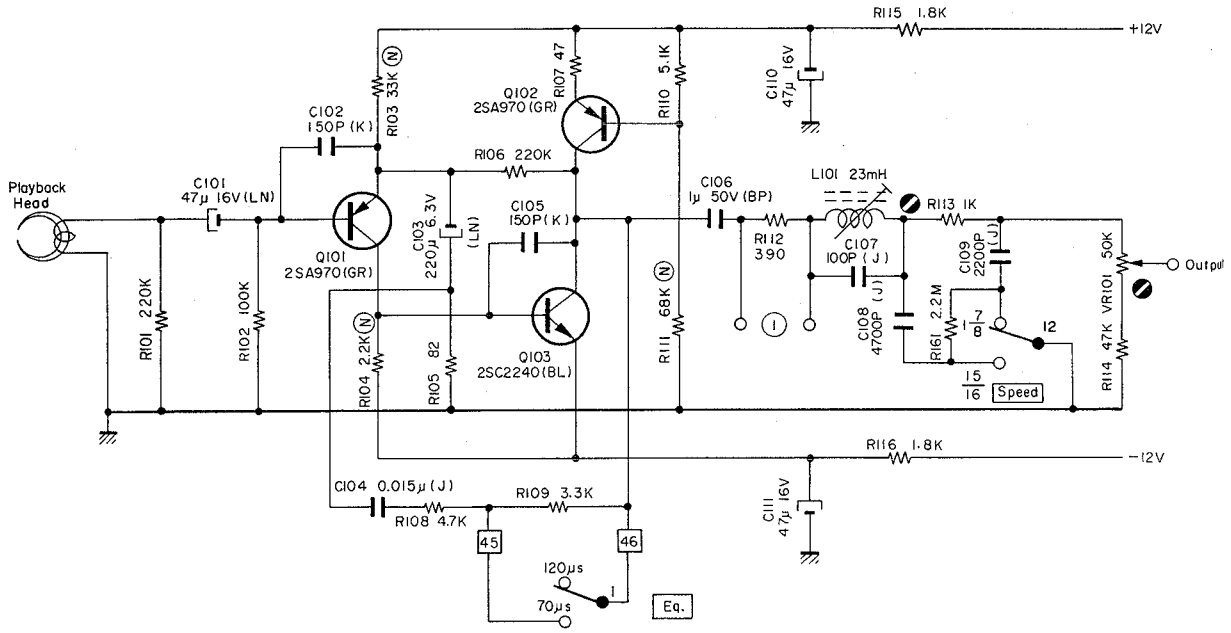


Fig. 2.2.1 Playback Eq. Amp. Circuit

2.2.2. Record Amplifier Circuit

Fig. 2.2.4 shows record amplifier circuit which employs a low noise operational amplifier IC.

This circuit adopted the direct coupling system (the DC amp. output is connected directly with the Record Head). Direct coupling system provides improvements of linearity and phase characteristic at low frequency, less distortion (as a clipping level becomes higher), etc.

Peaking circuit is switched with Tape Speed Selector Switch.

Therefore, at standard speed, peaking circuit is composed of L102, C137, R151, C138 and R153, and L102, C136, R150, C139 and R154 at half tape speed.

This record amp. is muted with Record Signal from Logic P.C.B. Ass'y and also with Mute Signal.

With the exception of record mode, input and output of record amp. are muted simultaneously. When Record Switch is kept further pressed at record mode, Mute Signal is given from Logic P.C.B. Ass'y and the input of record amp. is muted.

This mute operation can be used when making a silent gap on the tape for RAMM operation.

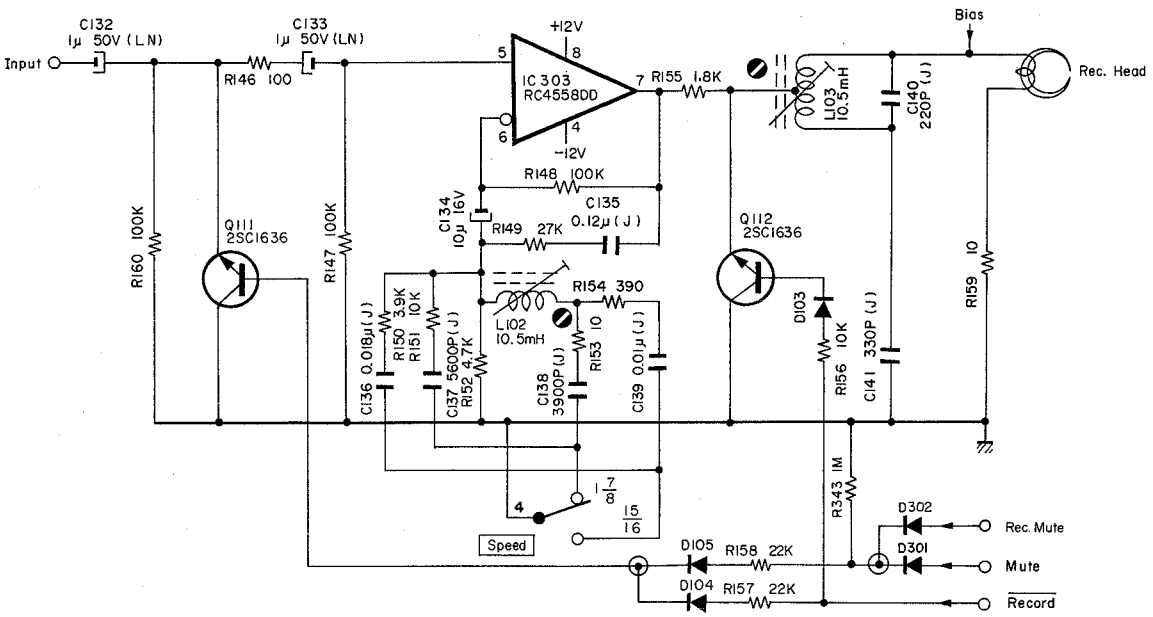


Fig. 2.2.4 Record Amp. Circuit

2.2.3. Bias Oscillation Circuit

Fig. 2.2.5 shows a push-pull oscillator with an oscillation frequency of 105 kHz which is constructed by capacitors C321 and C322, coupling the collectors and bases of two transistors (Q301 and Q302).

This is used to provide recording bias and as an erase signal.

By pressing the Record and Pause, or Record and Play Buttons, $\overline{\text{Rec.}}$ signal conducted from the Logic P.C.B. Ass'y becomes L, and Q303 turns to ON.

Therefore, +12 V is applied to the circuit through Q303, as a result of which oscillation begins.

When the record mode is released, oscillator output is damped by the discharge of C319. This prevents magnetization of the Record Head.

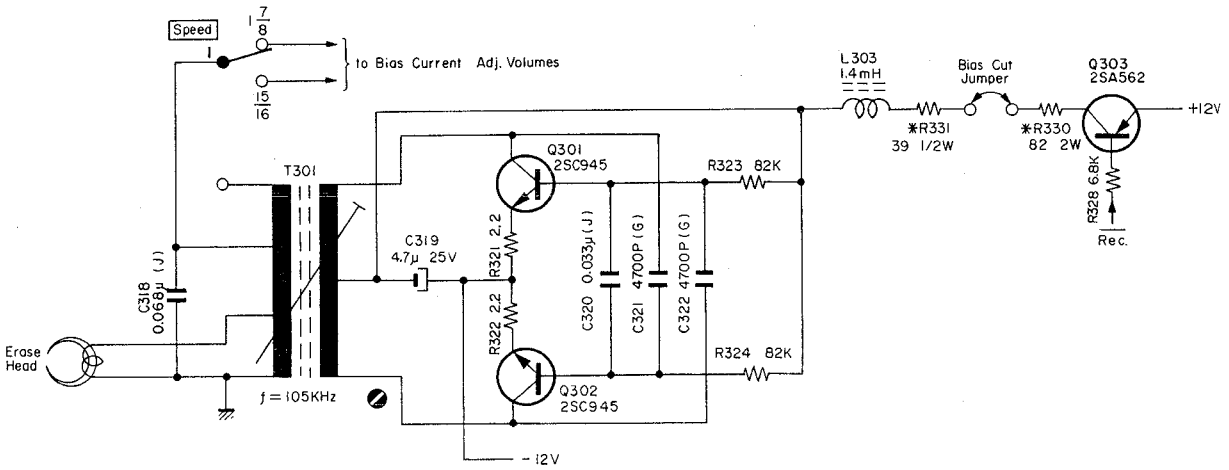


Fig. 2.2.5 Bias Osc. Circuit

CONTENTS

2.3. Mechanism Control Circuits

Refer to Fig. 11.2 block diagram for mechanism control circuit.

2.3.1. Introduction

(1) C-MOS IC

The IC's used in the logic circuit of the N-680 are of the C-MOS (complementary metal oxide semiconductor) type, in which P-channel and N-channel MOS FET's complement each other.

1) Small power consumption

A C-MOS is an inverter, as shown in Fig. 2.3.1-1.

Whether the input of this inverter is at "H" or "L" level, either the P-channel or N-channel MOS FET is OFF, and therefore, current does not pass from VDD to VSS under steady normal state. Consequently, when there is no input, power consumption (VDD x IDD) is nearly zero, except for surface and junction leakage.

When the input signal is switched from "H" to "L", or "L" to "H", however, both P- and N-channel FET's instantly come on, and a current flows either charging or discharging the stray output capacity, so that the power consumption during dynamic operation cannot be said to be zero.

2) A large noise margin

The input-output transmission characteristics of the C-MOS inverter differ from those of bipolar IC's as shown in Fig. 2.3.1-2. The knee characteristic is sharper, the threshold voltage is almost half of VDD, and the output amplitude is nearly equal to VDD - VSS.

Since the noise margin of a digital IC is defined as the difference between the minimum value of output amplitude and the minimum required amplitude of the input signal, it is quite natural that the C-MOS circuit, which produces an output amplitude of nearly VDD - VSS and is operated by a small input signal, should have a large noise margin.

3) High input impedance

A C-MOS IC has a very high input impedance because it is insulated from the substrate by the oxide film of the gate. Although leakage resistance must be considered in an actual C-MOS IC because diodes are usually used in the direction of reverse bias for protecting input circuit, its impedance is several tens of megohms. The advantage of a high input impedance is that the fan-out of the IC is large, which simplifies the interface. Also, a timer circuit for a longer period of time can be produced. This means that the high input impedance enables the input to be connected with a large resistance, but does not mean to use a capacitor of large capacity.

4) Wide operating voltage range

Fig. 2.3.1-3 shows input-output transfer characteristics of C-MOS. The general purpose C-MOS family has a wide operating voltage range extending from 3 to 18 V, which is much wider than that of TTL and DTL (5 ± 0.25 V), and HTL (15 ± 1.5 V). The reason for the C-MOS IC's wide operating voltage range is that the P-MOS and N-MOS are made symmetrical, and if VDD is varied, the threshold voltage for the circuit is always about half of VDD. In a bipolar IC, the threshold voltage is decided by the forward voltage from the base to the emitter of the transistor (VBE), and is little affected by the source voltage. Therefore, if the source voltage exceeds a certain limit, the output voltage and the threshold voltage will not balance, as a result of which operation will become impossible.

With a C-MOS, the threshold voltage varies according to changes in the source voltage, and stable operation throughout a wide range can be expected. As indicated above, the performance of a C-MOS IC as a digital IC is excellent.

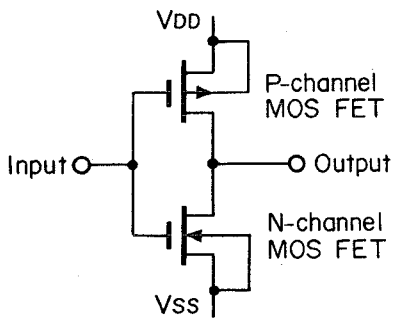


Fig. 2.3.1-1

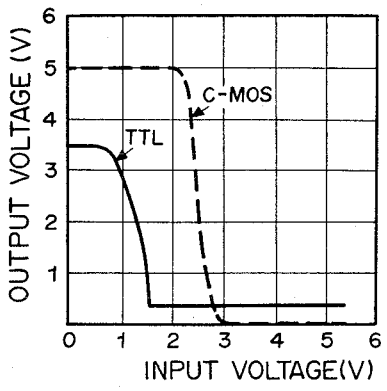


Fig. 2.3.1-2

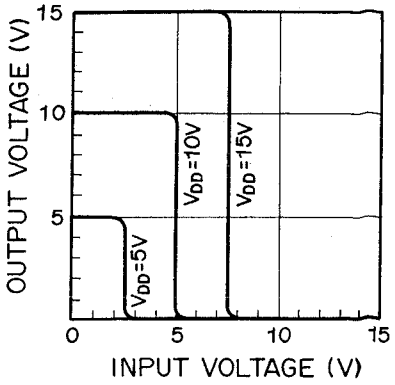
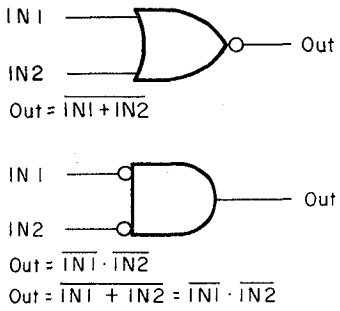


Fig. 2.3.1-3 Input-Output Transfer Characteristics of C-MOS

(2) Logic Symbols

(a) NOR Gate

The output will be H only if inputs IN1 and IN2 are L's, and the output will be L if IN1 is H or IN2 is H.
(H: +12V, L: 0 V)



Truth Table

IN1	IN2	Out
L	L	H
H	L	L
L	H	L
H	H	L

Fig. 2.3.1-4A

The construction of the foregoing 2 Logic Symbols is identical and intended to show the use of either OR or AND.

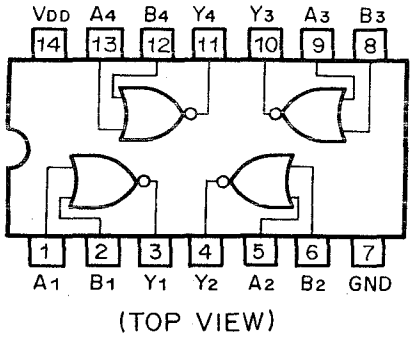


Fig. 2.3.1-4B

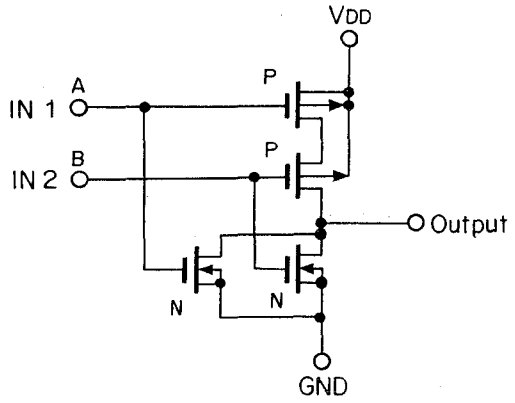
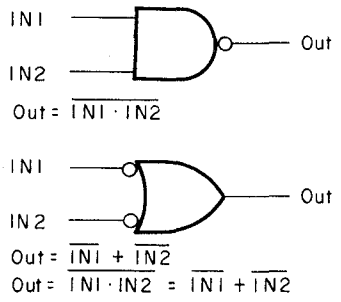


Fig. 2.3.1-4C

(b) NAND Gate

The output will be L only if inputs IN1 and IN2 are H's, and the output will be H if IN1 is L or IN2 is L.



Truth Table

IN1	IN2	Out
L	L	H
H	L	H
L	H	H
H	H	L

Fig. 2.3.1-5A

The construction of the foregoing 2 Logic Symbols is identical and intended to show the use of either AND or OR.

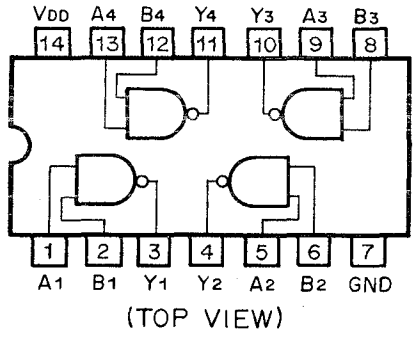


Fig. 2.3.1-5B

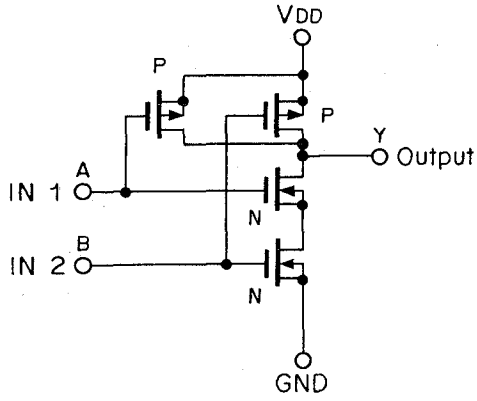
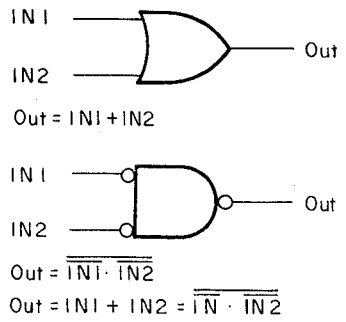


Fig. 2.3.1-5C

(c) OR Gate

The output will be L only if inputs IN1 and IN2 are L's, and the output will be H if IN1 is H or IN2 is H.



Truth Table

IN1	IN2	Out
L	L	L
H	L	H
L	H	H
H	H	H

Fig. 2.3.1-6A

The construction of the foregoing 2 Logic Symbols is identical and intended to show the use of either OR or AND.

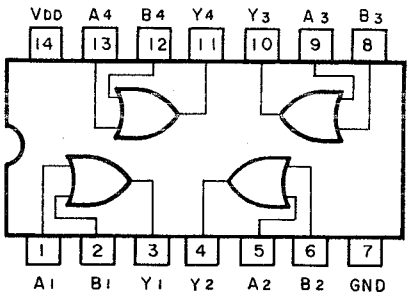


Fig. 2.3.1-6B

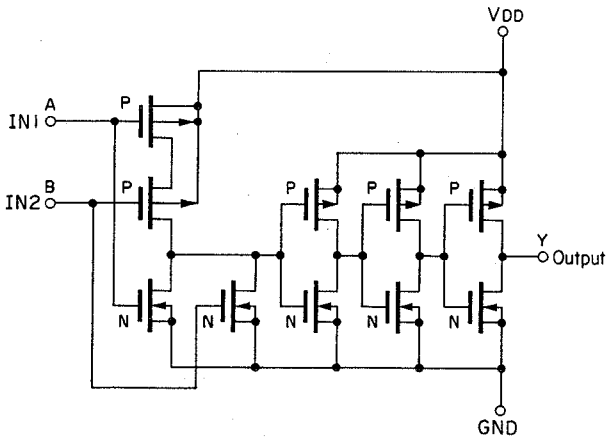
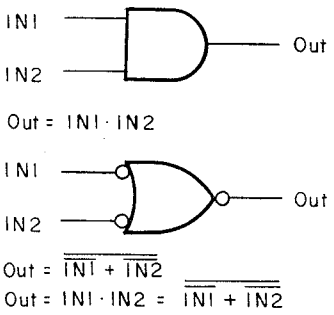


Fig. 2.3.1-6C

(d) AND Gate

The output will be H only if inputs IN1 and IN2 are H's, and the output will be L if IN1 is L or IN2 is L.



Truth Table

IN1	IN2	Out
L	L	L
H	L	L
L	H	L
H	H	H

Fig. 2.3.1-7A

The construction of the foregoing 2 Logic Symbols is identical and intended to show the use of either AND or OR.

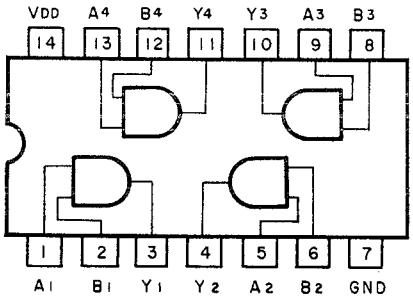


Fig. 2.3.1-7B

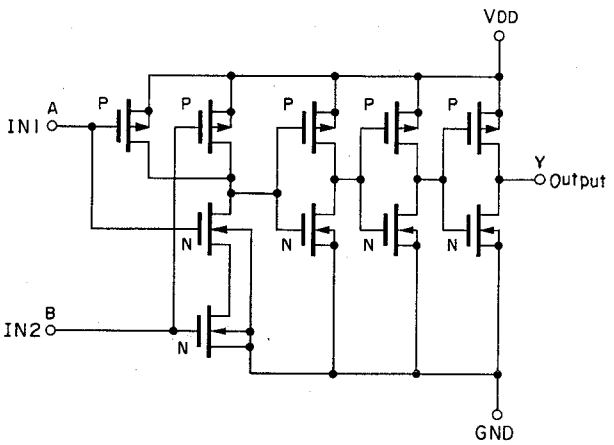


Fig. 2.3.1-7C

(e) Gated Flip-Flop

The two NAND gates can be used to form flip-flop. The inputs operate as follows:

When both S and R are H's, the flip-flop will remain in its present state, i.e., will not change the state.

If however, the R input goes to L, the NAND gate connected to R will have H output regardless of the other feedback input to the NAND gate, and this will force the flip-flop to the L state (provided the S input is kept H).

Similar reasoning shows that making the S input an L will cause the NAND gate at the S input to have an H output, forcing the flip-flop to the H state (again provided the R input is kept H).

If both inputs R and S are made L's, the next state will depend on which input is returned to H first, and if both are returned to H simultaneously, the resulting state of the flip-flop will be indeterminate. As a result, this is a "forbidden" or "restricted" input combination.

In the actual use, the activation speed of the flip-flop is managed to be delayed in order to prevent erroneous movements caused by noise as shown in Fig. 2.3.1-8B.

Truth Table

Set	Reset	Q	$\bar{Q}$	Remarks
L	L	H	H	✳ : Maintains the previous state.
L	H	H	L	
H	L	L	H	
H	H	✳	✳	

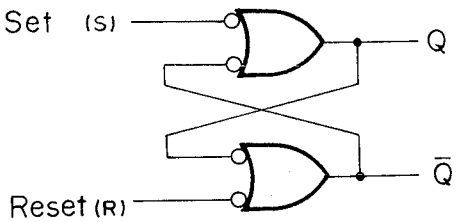


Fig. 2.3.1-8A

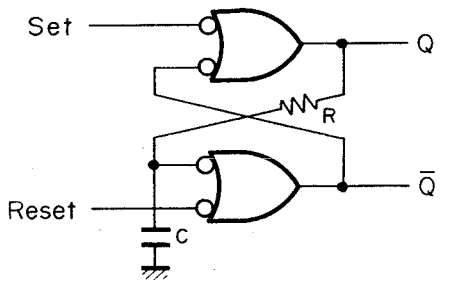


Fig. 2.3.1-8B

(f) D-type Flip-Flop

(D-type positive-edge-triggered flip-flop with preset and clear.)

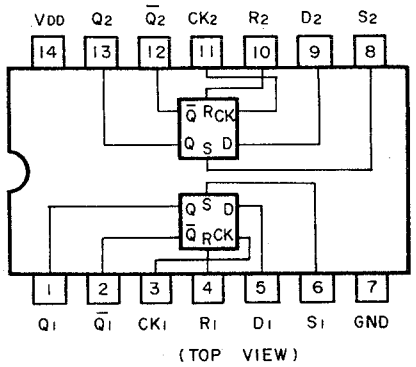
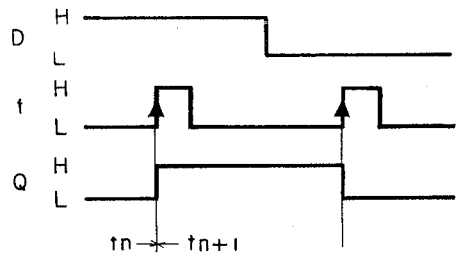


Fig. 2.3.1-9A

Truth Table

Clear (R)	Preset (S)	Qn+1
L	L	Qn
L	H	H
H	L	L
H	H	L

tn		tn+1
D	Qn	Qn+1
L	L	L
L	H	L
H	L	H
H	H	H



tn = Bit time before clock pulse.
tn+1 = Bit time after clock pulse.

Fig. 2.3.1-9B

(g) BCD Up/Down Counter

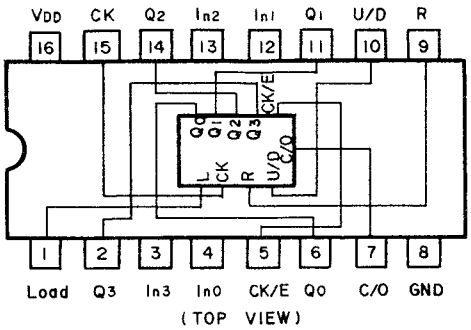


Fig. 2.3.1-10A

Truth Table

CK/E (Carry Input)	U/D (Up/Down)	L (Load)	R (Clear)	Output Q0	Q1	Q2	Q3
x	x	x	H	L	L	L	L
x	x	H	L	Preset			
L	H	L	L	Count Up			
L	L	L	L	Count Down			
H	x	L	L	No Count			

x : Irrelevant

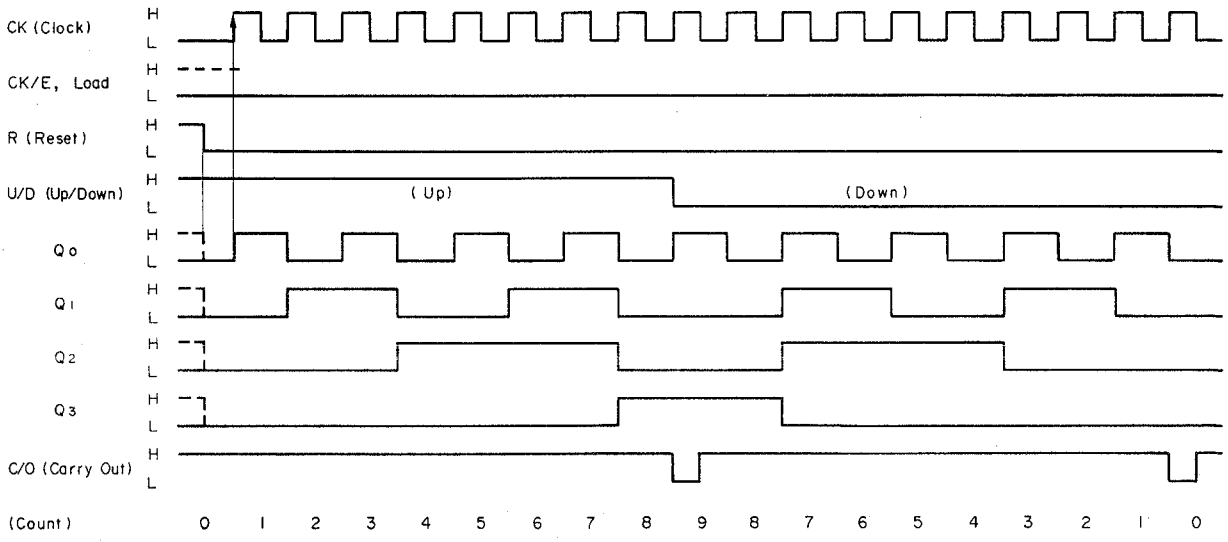


Fig. 2.3.1-10B

(h) BCD to 7-segment decorder

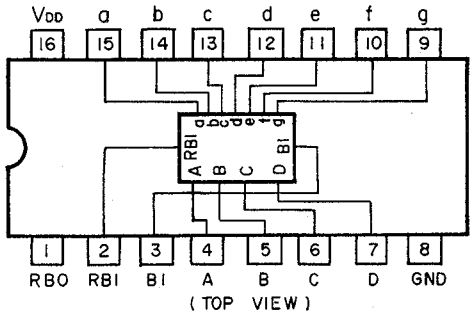
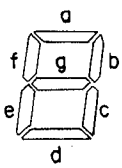


Fig. 2.3.1-11

Truth Table

BI Input : L

Display



	A (2^0)	B (2^1)	C (2^2)	D (2^3)	a	b	c	d	e	f	g
0	L	L	L	L	H	H	H	H	H	H	L
1	H	L	L	L	L	H	H	L	L	L	L
2	L	H	L	L	H	H	L	H	H	L	H
3	H	H	L	L	H	H	H	H	L	L	H
4	L	L	H	L	L	H	H	L	L	H	H
5	H	L	H	L	H	L	H	H	L	H	H
6	L	H	H	L	H	L	H	H	H	H	H
7	H	H	H	L	H	H	H	L	L	H	L
8	L	L	L	H	H	H	H	H	H	H	H
9	H	L	L	H	H	H	H	H	L	H	H
0	L	H	L	H	H	H	H	H	H	H	L
1	H	H	L	H	L	H	H	L	L	L	L
2	L	L	H	H	H	H	L	H	H	L	H
3	H	L	H	H	H	H	H	H	L	L	H
4	L	H	H	H	L	H	H	L	L	H	H
5	H	H	H	H	H	L	H	H	L	H	H

(i) 12-stage Binary Counter

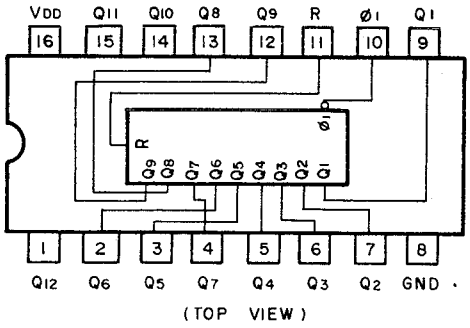


Fig. 2.3.1-12A

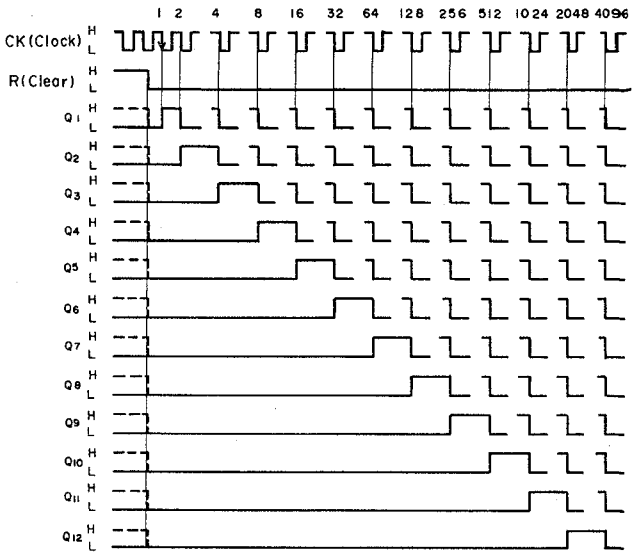


Fig. 2.3.1-12B

(j) Octal Counter

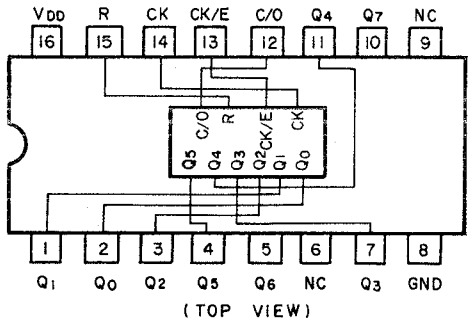


Fig. 2.3.1-13A

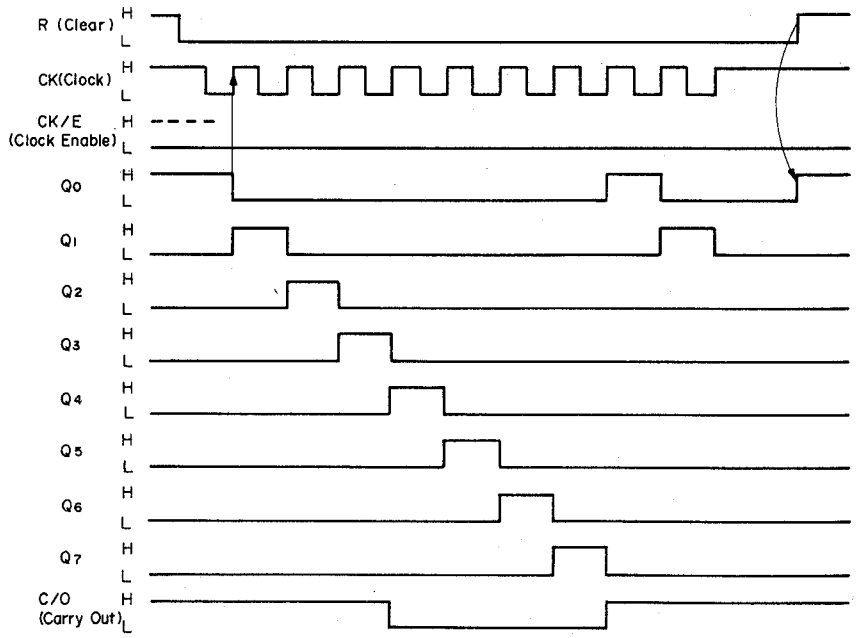


Fig. 2.3.1-13B

2.3.2. Mechanism Control Circuits

Foolproof operation will be done by logic control.
For example, when command the playback mode while fast winding or command fast-forward mode while rewinding, it is guaranteed that no abnormal tape tension or loosening of tape will happen by passing through the stop mode. This is also guaranteed even when the switches are pressed simultaneously.

(1) Logic Signal

How to read signals is referred to the following:
Positive logic is used; the signal H shows the condition that the signal is executing, and in case there is a — on the signal, signal L shows the condition that the signal is executing.

(a) $\overline{\text{Kstop}}$ (Stop Switch output signal)
$\overline{\text{Kstop}}$ becomes L when the Stop Switch is pressed, and $\overline{\text{Kstop}}$ is H while switch is open.
In other words, $\overline{\text{Kstop}}$ = L shows while Stop mode is commanded, and $\overline{\text{Kstop}}$ = H shows stop is not commanded.

(b) $\overline{\text{PLAY}}$ (Play Flip-Flop $\overline{\text{Q}}$ output signal)
$\overline{\text{PLAY}}$ = H: out of Play mode
$\overline{\text{PLAY}}$ = L: in Play mode

(c) PLAY (Play Flip-Flop Q output signal)
PLAY = H: in Play mode
PLAY = L: out of Play mode

(2) Logic Operating Status

Refer to Fig. 2.3.2-1 logic status.
Each stage of logic status under the series control switch operation is shown in the figure.

MODE	STOP	RECORD				PLAY-BACK	FAST WIND		CUE
CONTROL SWITCH	STOP	RECORD	RECORD PAUSE	PLAY	PAUSE	PLAY	FF	REW	PAUSE
IC 402 (5,6 → 4) PLAY	L	L	L	H	L	H	L	L	L
IC 402 (2,1 → 3) $\overline{\text{PLAY}}$	H	H	H	L	H	L	H	H	H
IC 401 (9,8 → 10) REC	L	H	H	H	H	L	L	L	L
IC 401 (12,13 → 11) $\overline{\text{REC}}$	H	H	L	L	L	H	H	H	H
IC 403 (9,8 → 10) PAUSE	L	L	H	L	H	L	L	L	H
IC 403 (12,13 → 11) $\overline{\text{PAUSE}}$	H	H	L	H	L	H	H	H	L
IC 401 (5,6 → 4) FF	L	L	L	L	L	L	H	L	L
IC 401 (2,1 → 3) $\overline{\text{FF}}$	H	H	H	H	H	H	L	H	H
IC 402 (9,8 → 10) REW	L	L	L	L	L	L	L	H	H
IC 402 (12,13 → 11) $\overline{\text{REW}}$	H	H	H	H	H	H	H	L	L
$\overline{\text{REC}}$ (Q417 Collector)	H	H	L	L	L	H	H	H	H
MUTE (Q418 Collector)	H	H	L	L	L	L	H	H	L
$\overline{\text{CUE}}$ (Q415 Collector)	H	H	H	H	H	H	H	H	L

Fig. 2.3.2-1 Logic Status

(3) Conditions of Flip-Flops

(a) FF Flip-Flop

Set = $\overline{Kff}$

Reset = $\overline{Kplay} + \overline{Krew} + \overline{Kstop}$

(b) REW Flip-Flop

Set = $\overline{Krew}$

Reset = $\overline{Kplay} + \overline{Kff} + \overline{Kstop} + \overline{\text{Memory Rewind}}$

($\overline{\text{Memory Rewind}}$ = L: With Memory Switch ON, a differential L pulse is generated when the tape counter reaches "999".)

(c) PLAY Flip-Flop

Set = $\overline{Kplay}$

Reset = $\overline{Kff} + \overline{Krew} + \overline{Kstop} + \overline{PAUSE}$

(d) PAUSE Flip-Flop

Set = $\overline{Kpause}$

Reset = $\overline{Kplay} + \overline{Kstop}$ + (the rising of the FAST signal)

(FAST = FF + REW. When FAST signal becomes H, a differential pulse is generated at the rising of the signal. This pulse conducts Q401 to turn ON, accordingly PAUSE Flip-Flop is reset.)

(e) REC Flip-Flop

Set = $\overline{Krec} \cdot \overline{FAST} \cdot \overline{PAUSE} \cdot \overline{PLAY}$ · Record Protector Switch OFF

= $\overline{Krec} \cdot \overline{FAST}$ · Q402 OFF

(Q402 OFF = $\overline{PAUSE} \cdot \overline{PLAY}$ · Record Protector Switch OFF)

Reset = $\overline{PLAY} \cdot \overline{PAUSE}$ = Q403 ON

(4) Initial Reset and Power Mute

Refer to Fig. 2.3.2-2 circuit diagram and Fig. 2.3.2-3 timing chart.

When the Power Switch is turned ON, the voltage of the power source increases from 0 to +12 V DC. After this voltage is built up, Q428 is turned ON and the mute signal is generated, until C421 is charged through R522, R523, and R521. At the same time, this signal enters the base of Q422 in the automatic shut-off circuit, and turns this transistor ON so that it generates $\overline{Kstop}$ = L pulse.

When the Power Switch is turned OFF, the signal from the secondary winding of the transformer entering Q430 through D438 and D439 soon ceases and Q430 is in the cut-off state. Since the base of Q429 is positively charged, Q429 comes ON, which turns Q428 ON and produces the $\overline{Kstop}$ = L pulse. The $\overline{Kstop}$ = L pulse resets each flip-flop to its initial condition (the stop condition.)

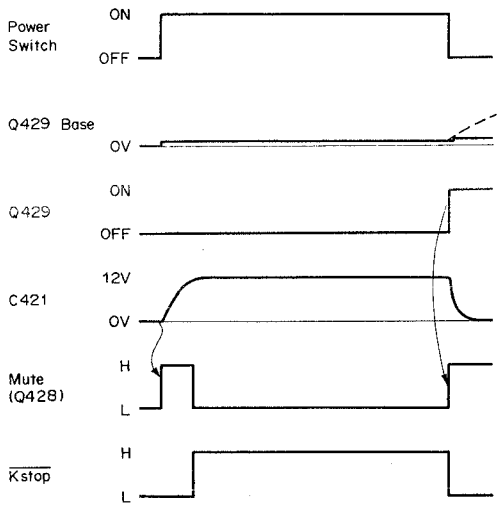


Fig. 2.3.2-3 Timing Chart

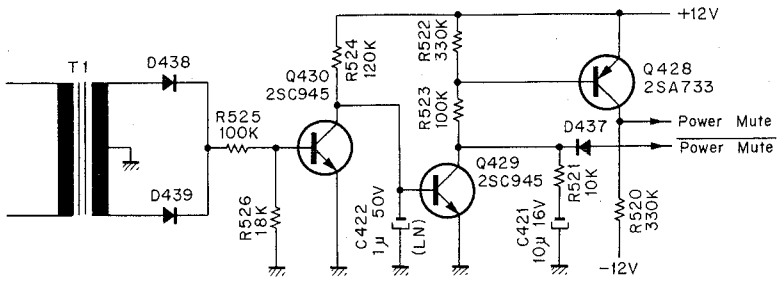


Fig. 2.3.2-2 Initial Reset and Power Mute Circuit

(5) One-shot Pulse-generating Circuit

Refer to Fig. 2.3.2-4 circuit diagram and Fig. 2.3.2-5 timing chart.

The circuit consists of IC403-4,5, and 6, IC403-1,2, and 3, Q404, R432, R433, C410, etc. When the mode is changed as shown below, the circuit generates a one-shot pulse of approximately 400 msec, so that this period passes in the stop mode, and as soon as this is over, a new mode is set:

From FAST (FF or REW) mode to PLAY or PAUSE mode;

From PLAY mode to FAST (FF or REW) mode;

From FF mode to REW mode, or vice versa.

This interval is necessary to avoid an extraneously large tension on the tape, in view of the response of the tape deck mechanism.

(a) From PLAY mode to FF mode

Since the PLAY flip-flop is set during playing, IC403-5 is H and IC403-6 is L, and therefore, IC403-4 is H and C410 is charged to +12 V. Consequently, IC403-3 is L, and the gates connected to IC403-3 are open.

When the FF Switch is pressed the PLAY flip-flop is reset, and at the same time, the FF flip-flop is set. However, the capacitor C404 connected to the play flip-flop retards so that PLAY = L. Therefore, FF = H and PLAY = H for a short period, and a narrow pulse is produced in IC403-4. C410 is discharged by this L pulse, but it is charged again through R432 and R433 when the L pulse is released. IC403-3 is maintained at H for approximately 400 msec, until the voltage of C410 exceeds the threshold of IC403-1 and 2, and the gates connected to IC403-3 are closed to bring about the stop condition.

(b) From FF mode to REW mode

When the REW Switch is pressed, the FF flip-flop is reset, and the REW flip-flop is set. As in case (a), a narrow H pulse is generated in the base of Q404, cutting off Q404, and as a result, C410 is discharged through D425. The subsequent actions are the same as in (a).

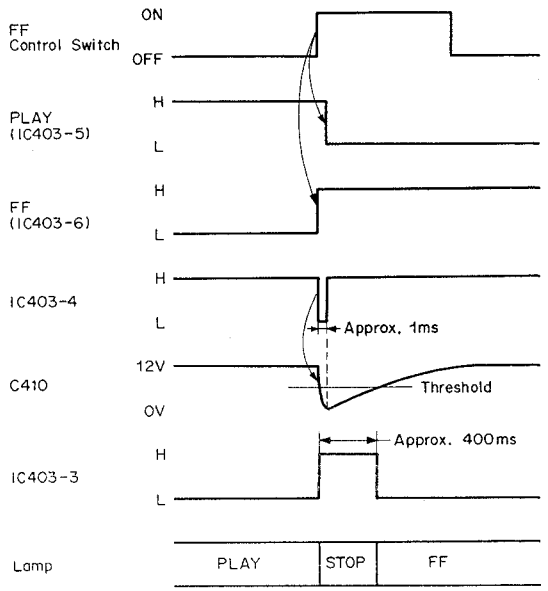


Fig. 2.3.2-5 Timing Chart

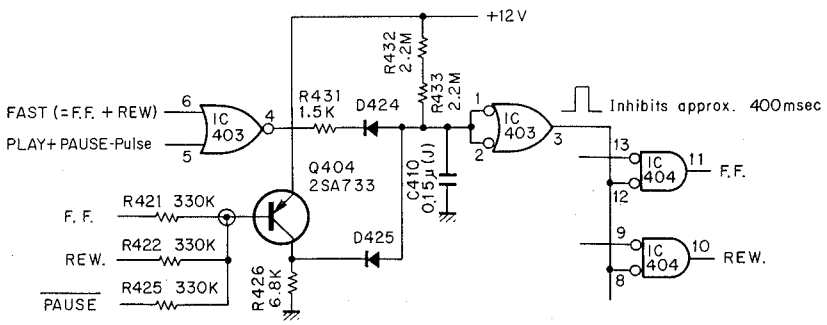


Fig. 2.3.2-4 One-shot Pulse-generating Circuit

(6) Unattended RECORD/PLAY

Refer to Fig. 2.3.2-6 circuit diagram.

Unattended recording or playback can be carried out by the use of the Timer Switch. When the power is connected a differential pulse is supplied to Q447 through C401, and Q447 is turned ON.

Therefore, when the Timer Switch is moved to REC side, D401 and D403 are grounded through Q447, and the RECORD mode is selected. When it is moved to the PLAY side, only D403 is grounded, and the PLAY-BACK mode is selected.

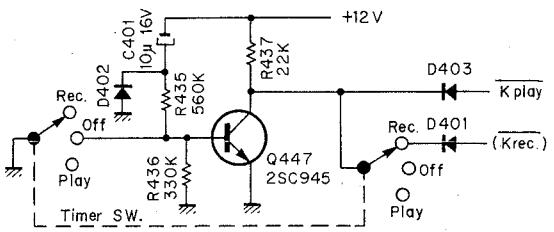


Fig. 2.3.2-6 Unattended Record/Play Circuit

(7) Signals for Amp. Circuit

Refer to Fig. 2.3.2-7 circuit diagram.

(a) $\overline{\text{REC}}$ Signal

This is the signal that controls bias oscillation in the amplifier circuit. In RECORD/PLAY and RECORD/PAUSE modes, $\overline{\text{REC}}$ = L, and bias oscillation is started. Q417 is turned ON when the REC flip-flop is H and Q419 is OFF, i.e., when the cam selects PLAY or PAUSE mode mechanically, and $\overline{\text{REC}}$ = L.

(b) $\overline{\text{CUE}}$ Signal

When the PAUSE Switch is pressed during the FAST (FF or REW) mode, $\overline{\text{CUE}}$ = L, and the output level of the amplifier circuit is attenuated. Q415 is turned ON at FAST/PAUSE, thus $\overline{\text{CUE}}$ = L.

(c) Mute Signal

When Q418 is ON and when the power mute signal is H, MUTE = H and the amplifier circuit is muted.

Q418 ON = Q416 OFF(=$\overline{\text{CUE}}$)·(STOP + PAUSE + Q423 ON(= $\overline{\text{PLAY-Position}}$)) + IC413 -1 = L(i.e., RAMM Operation)

The modes in which the amplifier circuit is not muted are (MUTE=L):

Q418 OFF = $\overline{\text{Q418 ON}}$

= (CUE + $\overline{\text{STOP}}$·$\overline{\text{PAUSE}}$·PLAY-Position)·$\overline{\text{RAMM Operation}}$

i.e., PLAYBACK mode and FAST/PAUSE(i.e., CUE) mode during out of RAMM operation.

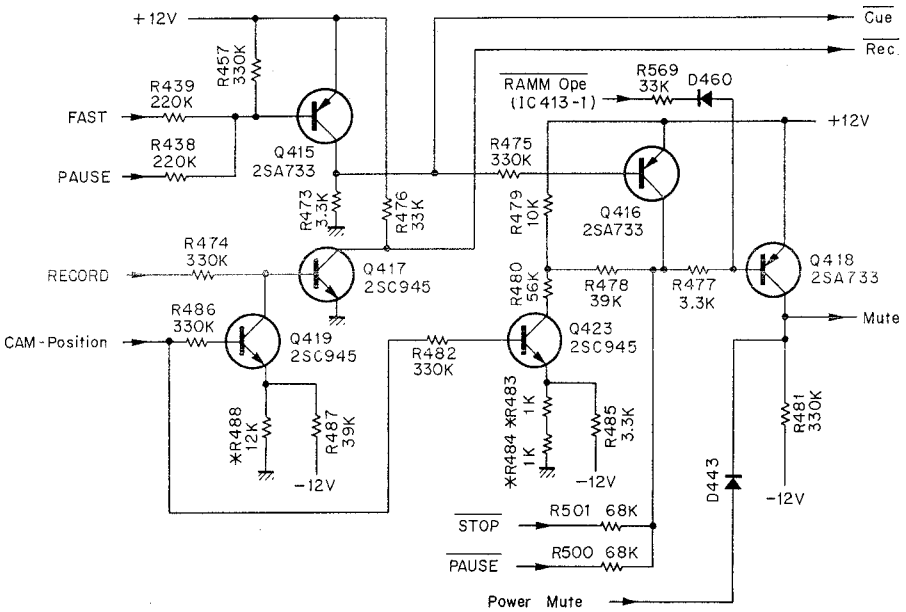


Fig. 2.3.2-7

(8) Shut-off Sensor and Detector

Refer to Fig. 2.3.2-8 circuit diagram and Fig. 2.3.2-9 timing chart.

(a) Shut-off sensor

Light from lamp PL407 is projected through holes in a disc rotating synchronously with the take-up reel, and the intermittent flashes coming through the disc are converted into electrical signals by a phototransistor (Q450). These signals are amplified into square waves by Q449, and transmitted to the shut-off detector in the subsequent stage. When the tape-end comes, the take-up reel and the disc stop rotating, and no pulse is output from the sensor.

(b) Shut-off detector

The shut-off detector, which receives the pulse output from the sensor, produces the shut-off signal (i.e., $\overline{\text{Kstop}}$ = L) having detected a certain period of absence of pulse, and this signal resets each flip-flop in the logic control circuit.

1) Through C414, Q421 is ON and discharges C415 at every H cycle of the sensor output pulse. On the other hand, C415 (1 μF) is charged through R503 (2.2 MΩ) in the PLAY (Playback or Record) mode or the FAST (FF or REW) mode.
2) At the end of the tape, no sensor output is produced and Q421 is not turned ON, resulting in C415 being charged continuously. When the voltage of C415 exceeds the sum of the emitter voltage and the Vbe of Q422, Q422 is turned ON and transmits the shut-off signal ($\overline{\text{Kstop}}$ = L) to the logic control circuit.
3) In the STOP mode, C415 is grounded through D432 and R502, and the shut-off detection function is made inoperative.
4) Q422 is turned ON by the power mute signal generated whenever power is turned ON or OFF, and produces the $\overline{\text{Kstop}}$ = L pulse.

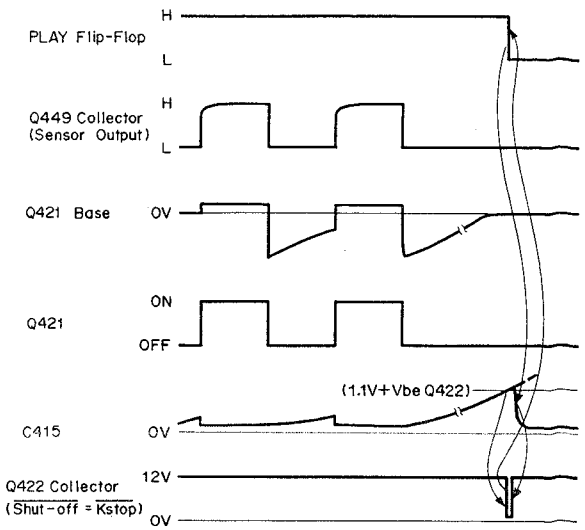


Fig. 2.3.2-9 Timing Chart

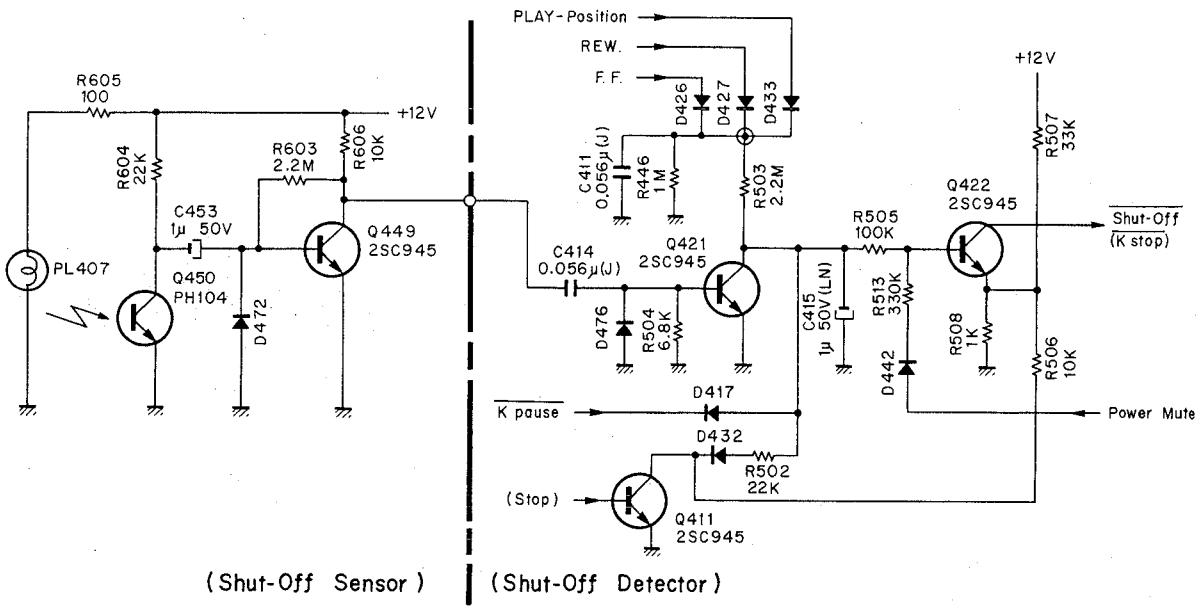


Fig. 2.3.2-8 Shut-OFF Sensor and Detector Circuit

(9) Control Motor Drive Circuit

Refer to Fig. 2.3.2-10 circuit diagram and Fig. 2.3.2-11 timing chart for the series control switch operation.

The control motor is turned by varying amounts, according to which control switch is set. This motor is connected to the mechanism control cam, and the mechanism of the N-680 is set to the mode indicated by this cam.

The motor is driven by the differential amplifier (IC405) and drivers Q424 and Q425. When the motor has stopped, the voltage at the sliding contact of the cam control variable resistor moving synchronously with the motor (control voltage) is balanced with the reference voltage corresponding to each mode, and the input difference of the differential amplifier is zero. When a new mode is demanded, a different reference voltage breaks the balance at the differential amplifier, and the motor operates.

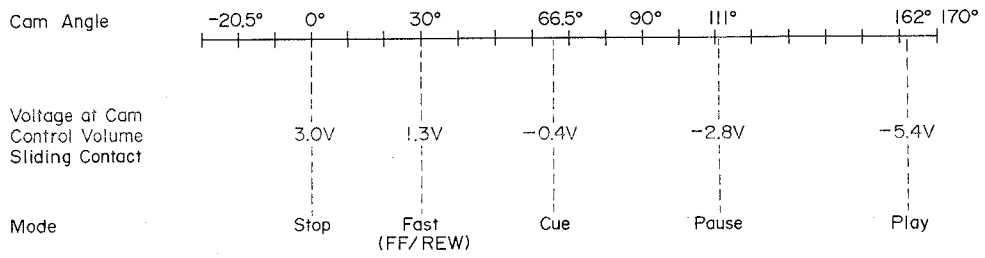
The motor drives the cam control variable resistor and changes the control voltage. When the control voltage is changed and the input difference of the differential amplifier becomes zero, the motor stops.

The following table shows the position of the cam and the voltage at the sliding contact of the cam control variable resistor:

Position on Cam	Voltage at Sliding Contact of Cam Control Volume
Stop	3.0 V
FF/REW	1.3 V
Pause	−2.8 V
Play	−5.4 V
Cue	−0.4 V

State of transistors in each mode:

STOP: Q412, Q413, Q414 OFF
PLAY: Q413 ON
FF/REW: Q412, Q414 ON
PAUSE: Q413 ON
CUE: Q412, Q413, Q414 ON



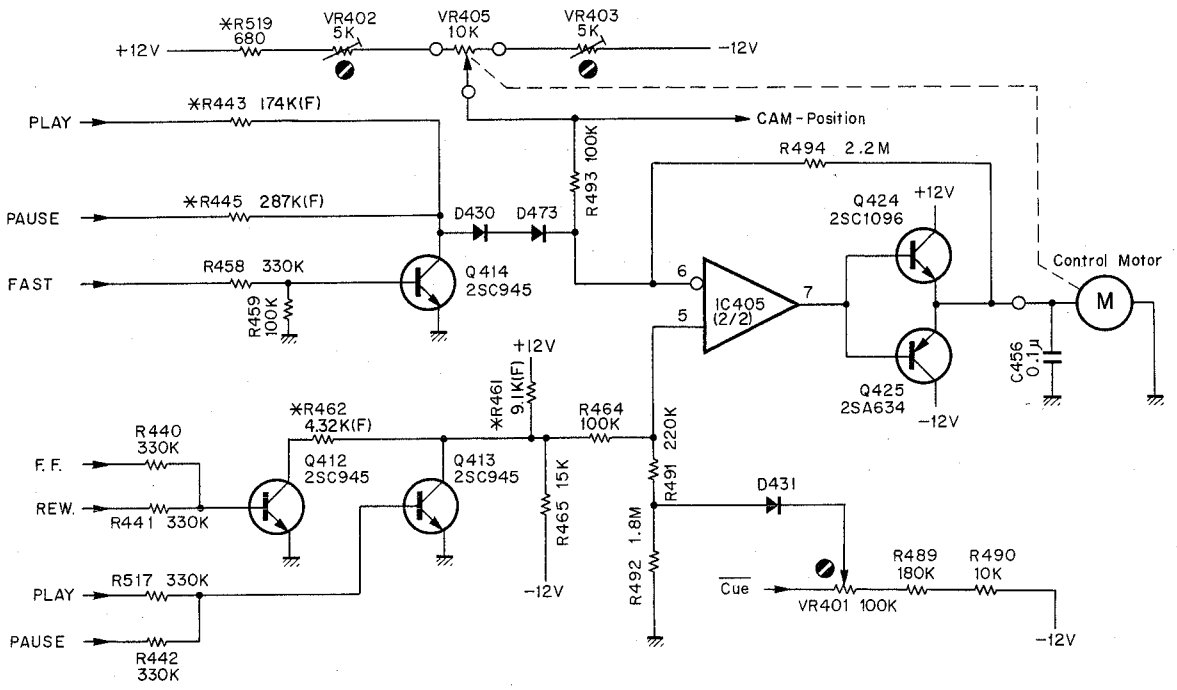


Fig. 2.3.2-10 Control Motor Drive Circuit

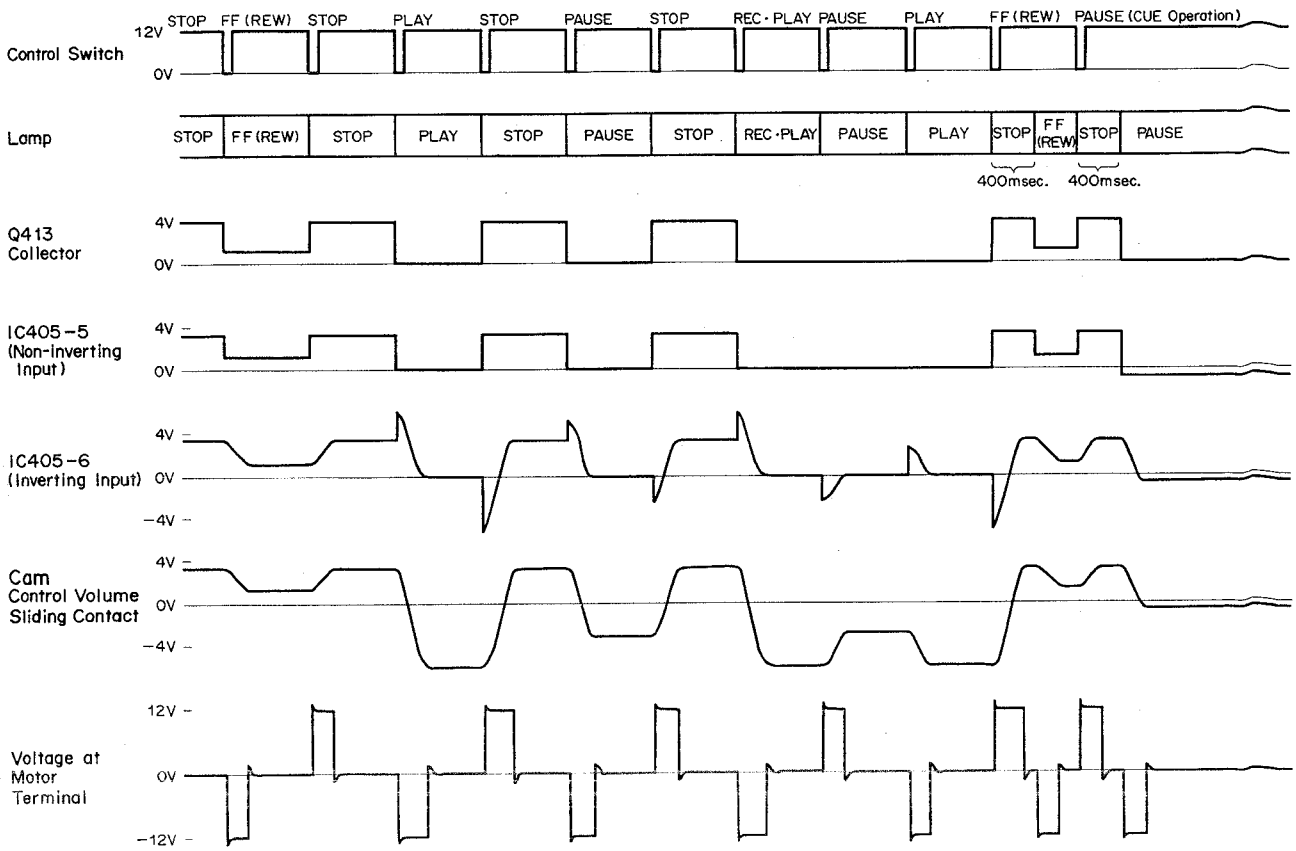


Fig. 2.3.2-11 Timing Chart

(10) Capstan Motor Governor

This is a governor employing a PLL (phase-locked loop) IC, and drives the capstan motor at a constant speed when the Power Switch is turned ON.

Muting function for capstan motor governor:
Refer to Fig. 2.3.2-12 circuit diagram. N-680 has the muting function activated by the power mute generator when the Power Switch is turned ON and OFF.

When the Power Switch is switched ON, D437 is turned ON until the capacitor C421 is charged, and the capstan motor does not rotate. After C421 is charged, D437 is turned OFF and the motor starts rotating. When the Power Switch is switched OFF, Q430 is turned OFF and the capacitor C422 is charged. As a result, Q451 in the capstan motor governor circuit is turned OFF and the capstan motor stops rotating.

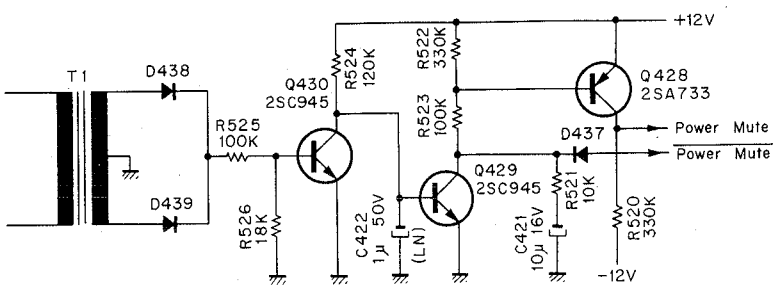


Fig. 2.3.2-12

(11) Reel Motor Governor

Refer to Fig. 2.3.2-13 circuit diagram and Fig. 2.3.2-14 timing chart.

This is a governor controlling the reel motor speed and it consists of a differential amplifier, IC405, and motor drivers, Q426 and Q427, etc. The speed of the motor varies as follows:

(a) PLAY

Q420 is ON and IC405-2 (inverting input) is supplied with a positive voltage, and Q427 is conducted. The motor is kept running at a constant speed by the governor.

(b) FF or REW

A positive voltage is supplied to IC405-2 in the FF mode, when Q427 is saturated, and in the REW mode, to IC405-3 (non-inverting input), when Q426 is saturated. Therefore, the governor function does not operate and the motor turns forward or in reverse, depending on whether is supplied with an approximately -12 V or +12 V voltage.

(c) PAUSE Switch pressed during FF or REW (i.e., CUE)

Q408 is turned ON and the input voltage to IC405 is decreased, and the motor speed is reduced to approx. 1/3 of that for FF or REW. The motor is kept running at a constant speed by the governor.

(d) FF or REW Switch kept further pressed in state (c)

Since R468 is grounded through D407 or D408, the input voltage to IC405 is further decreased, and the motor speed is reduced to approx. 3/5 of that for CUE (approx. 1/5 of that for FF or REW).

The motor is kept running at a constant speed by the governor.

(e) Take-up function at loading

SW409 Eject Switch is closed when eject is made.

When a cassette tape is inserted into the Cassette Case Ass'y and loaded, SW409 will become open. Therefore, plus voltage is applied at No.2 pin of IC405 until C416 (4.7 μF) is charged up through R509 (2.2 MΩ). Accordingly reel motor rotates forwardly and eliminates tape loosening of the cassette tape if any.

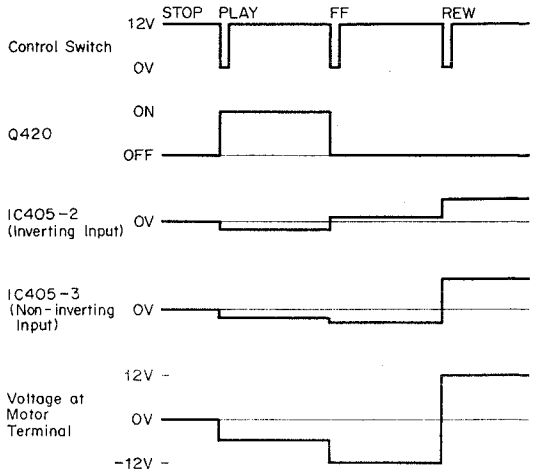


Fig. 2.3.2-14 Timing Chart

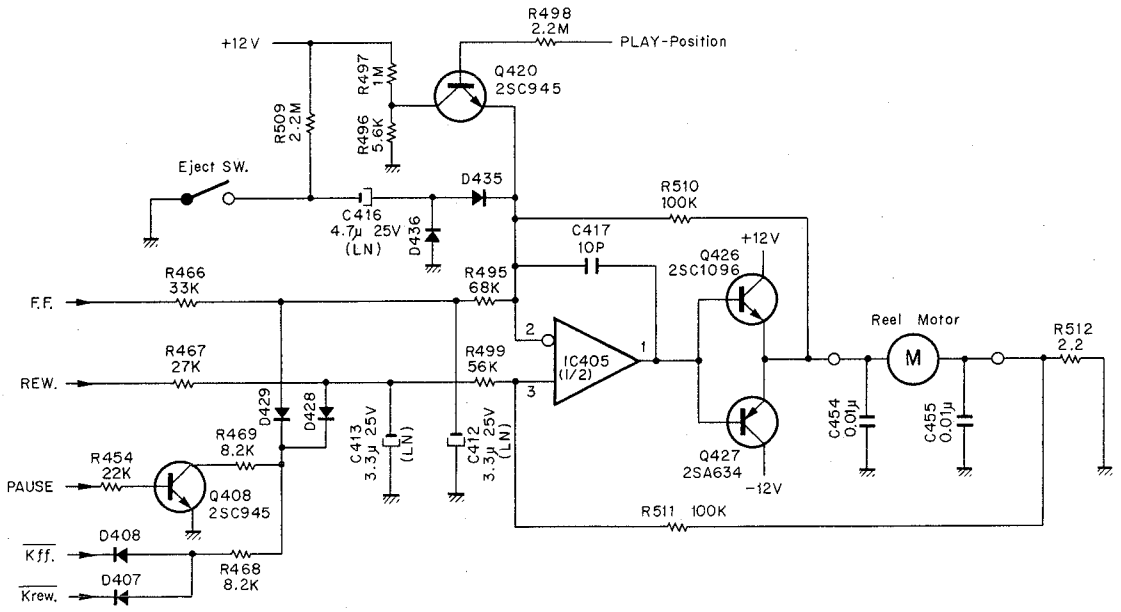


Fig. 2.3.2-13 Reel Motor Drive Circuit

(12) Half-speed Operation

Refer to Figs. 2.3.2-15 and 2.3.2-16. During standard-speed operation (1-7/8 ips), 10 kΩ resistors R340 and R341 are connected between the center tap and the left-hand end of the pitch control variable resistor VR406, and between the center tap and the right-hand end of VR406, respectively, so that VR406 acts as a 10-kΩ variable resistor. During half-speed operation, the two 10-kΩ resistors are cut off, and VR406 works as a 20-kΩ variable resistor.

When half-speed is selected, a +12 V voltage is supplied to IC406-1, 2, 3, turning it ON. Thus, C420 (0.033 μF) is connected between the base and the collector of Q451 of the capstan motor governor, and the response speed of the governor circuit is delayed to prevent rotation speed from fluctuation.

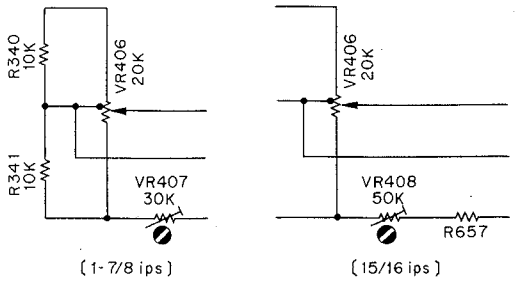


Fig. 2.3.2-15

(13) Pitch Control Circuit

Refer to Fig. 2.3.2-16 circuit diagram. This circuit increases or decreases the speed of revolution of the capstan motor by about ±6% for standard (1-7/8 ips) and half (15/16 ips) speeds (the same function as N-7001I and N-1000II). Since this function is activated only during playback, the $\overline{\text{Rec.}}$ signal is used as a control signal to turn ON and OFF the bilateral switch IC's.

The switches, IC406-6, 8, 9 and IC406-10, 11, 12, constitute an OR circuit. Signals are fed from the sliding contact and the center tap of VR406. The output signal is supplied to the PLL IC in the capstan motor governor circuit, and is added to the output of the governor to vary the output frequency of the VCO for speed control.

During recording, since the $\overline{\text{Rec.}}$ signal is L, both switches IC406-3, 4, 5 and IC406-6, 8, 9 are turned OFF, and IC406-10, 11, 12 is turned ON. Then, a voltage from the center tap of VR406 is fed to the OR circuit output. This voltage is supplied to the capstan motor governor circuit, but since it is constant regardless of the position of the sliding contact of VR406, the pitch control function is therefore neglected.

During playback, since the $\overline{\text{Rec.}}$ signal is H, switches IC406-3, 4, 5 and IC406-6, 8, 9 are turned ON and IC406-10, 11, 12 is turned OFF. Then, the OR circuit outputs the voltage from the sliding contact of VR406. This voltage is supplied to the capstan motor governor circuit, and as a voltage of which value depends on the position of the sliding contact of VR406 is supplied, the pitch control function is activated.

Since VR406 has a click stop at the center, the slide stops there naturally.

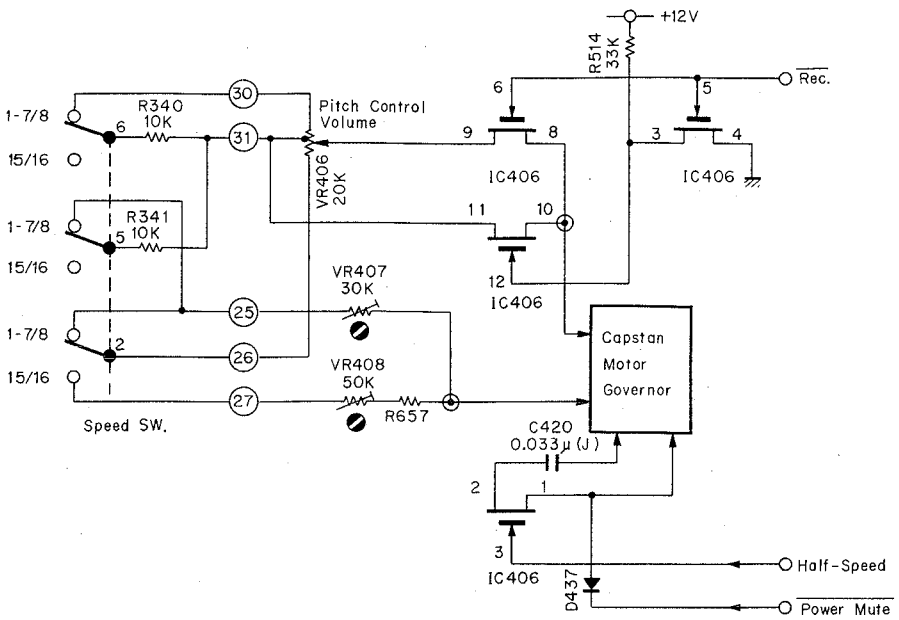


Fig. 2.3.2-16

(14) Azimuth Detector

Refer to Fig. 2.3.2-17 circuit diagram. When the Display Switch is turned to the CAL position, and a test tone of 400 Hz is recorded and played back, azimuth detector detects an azimuth deviation between L and R channels. The peak levels of the L and R channels are indicated on the FL level indicators. An extra-bright vertical line, called the azimuth cursor, is also illuminated on the FL level indicators, superimposed on the above peak level indications. When the Record Head Azimuth Alignment Knob is turned so that the cursor comes to the right ends of the peak level indications of the L and R channels, the azimuth deviation disappears and the optimum characteristics can be obtained.

The 400 Hz L-ch and R-ch signals when played back are amplified by the output amplifier in the PB Dolby NR IC and input to the azimuth detector. The L-ch and R-ch signals are fed to IC416(1/2) and IC416(2/2), respectively, amplified, and form a rectangular wave switching between source voltages.

When the L-ch is at the H level, the signal passes through R600 and D469, and C452 (1.5 μF) is charged; but when the R-ch is H, Q448 is turned ON, and C452 discharges through R601 (100 kΩ).

When there is no azimuth deviation between the channels, the H cycles of IC416-7(2/2) and IC416-1(1/2) coincide, and C452 is not charged because the collector of Q448 is grounded. As a result, no positive voltage (azimuth signal) is produced at C452. If azimuth deviation occurs, there is a period when the level at the collector of Q448 is H, and this H pulse charges C452. Consequently, the voltage at C452 becomes positive, and the positive azimuth signal is transmitted to the Switch P.C.B. in the following step. This circuit works only in the play mode. When not in this mode, the collector of Q448 is grounded through D467 and the azimuth signal changes to the L level. VR404 and VR405 are the volumes for record head azimuth phase adjustment. VR404 will be adjusted at standard tape speed. At this time, VR405 is simply connected in parallel with VR404 as Q451 is turned OFF.

VR405 will be adjusted at half tape speed. In this case, Q451 is turned ON, as a result, adjustment of VR405 becomes effective.

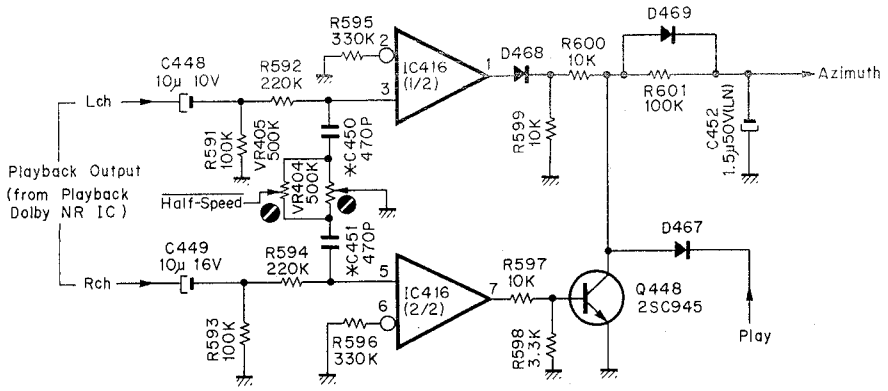


Fig. 2.3.2-17 Azimuth Detecting Circuit

2.3.3. RAMM (Random Access Music Memory) Control

Refer to Fig. 2.3.3 block diagram.

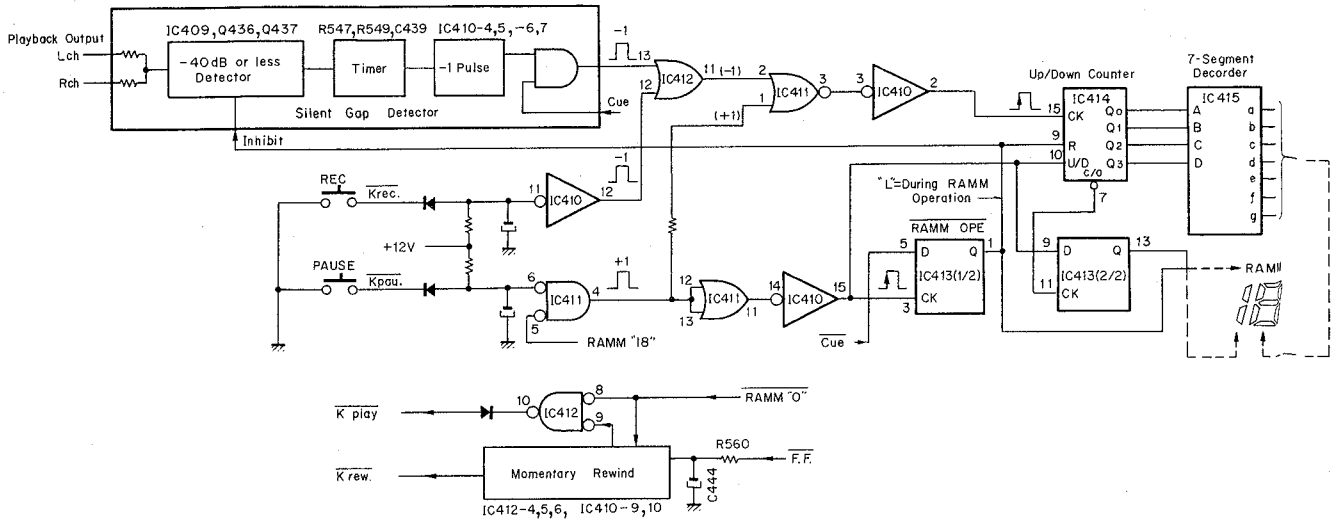


Fig. 2.3.3

(1) Outline

When the cue mode (FF/REW and Pause) is set, and the Pause Button is then depressed once, the letters "RAMM" appear on the FL level indicator to show that the unit is in the RAMM operation mode. At the same time, the number 1 is also displayed.

This number is increased by 1 each time the Pause Button is depressed, up to a count of 18. On the other hand, it is decreased by 1 each time the Record Button is depressed. This function is used when it is desired to change the RAMM number, which shows how many audibly recorded sections are to be skipped. Each time one is skipped, the RAMM number decreases by 1; and when it becomes 0, the cue mode is automatically cancelled, the unit returns to the play mode via the stop mode and the desired section is played.

At this time, the RAMM operation is cancelled and the letters "RAMM" and the number disappear.

The RAMM operation control circuit mainly consists of the following parts:

(a) $\overline{\text{RAMM Ope}}$ flip-flop (IC413(1/2): Dual D-type positive-edge-triggered flip-flop with preset and clear)

This flip-flop indicates RAMM operation.

The Q output is at the L level during RAMM operation, otherwise at the H level.

(b) BCD Up/Down counter (IC414)

During RAMM operation, this IC counts up or down when a +1 or -1 pulse, respectively, is input. This is for the units digits of RAMM, from 0 to 9. When the 10th +1 pulse is input, this counter returns to 0, but C/O (carry output) is output. By this C/O signal, the flip-flop IC413(2/2) outputs the H level to make the tens digit 1.

(c) BCD to 7-segment decoder (IC415)

The BCD (binary-coded decimal) output of IC414 is decoded by this IC, and is indicated on the FL level indicators as 0 –9 of the units digit of the RAMM number. As to the tens digit, only 1 is indicated by the output of IC413(2/2).

(d) Silent gap detection circuit

This circuit consists of IC409(1/2), (2/2), IC410-6, 7, -4, 5, IC411-8, 9, 10, Q436, Q437, and the peripheral circuits. When a pre-recorded tape is played back, and there is a section with no signal (below -40 dB) for about 3 seconds at the standard or half speed, this circuit produces a -1 pulse indicating a gap between audibly recorded sections of the tape.

(2) Counting Up

When the Power Switch is ON, and H pulse through C446 is fed to pin 6, the S (preset) terminal, of the $\overline{\text{RAMM Ope}}$ flip-flop IC413(1/2), the Q terminal of the flip-flop is at the H level, and the RAMM operation mode is reset initially.

In the cue mode, pin 5, the D terminal, of IC413(1/2) is at the L level. In this state, when the Pause Button is depressed and then released, the $\overline{\text{Kpau}}$ = L pulse is produced and passes through IC411-4, 5, 6, IC411-11, 12, 13 and IC410-14, 15, and an H pulse (+1 pulse) is input to pin 3, the CK (clock) terminal, of the $\overline{\text{RAMM Ope}}$ flip-flop.

Due to the rising edge of this H pulse (i.e., at the moment the Pause Button is depressed), $\overline{\text{RAMM Ope}}$ flip-flop is reset, Q output of the flip-flop changes from H to L, and the RAMM operation mode is activated. IC411-5 becomes

H when the RAMM number is 18, and at this time the $\overline{\text{Kpau}}$ = L signal (IC411-6) is inhibited and the +1 pulse is no longer produced.
When Q output of IC413(1/2) is L, that at pin 9, the R (reset) terminal, of the Up/Down counter (IC414) becomes L and reset is cancelled, thus making the counter effective.
When the Pause Button is depressed and the +1 pulse is H, pin 10, the U/D (up/down) terminal of IC414, is at the H level and the Up mode is activated. At the same time, a +1 pulse passes through IC411-1, 2, 3 and IC410-2, 3 and is input to pin 15, the CK (clock) terminal, of IC414. Since the Up mode is selected, the Up/Down counter counts +1 due to the rising edge of this clock pulse (+1 pulse).
Each time the Pause Button is depressed, the Up/Down counter adds +1 similarly. When 10 clock pulses are input, the counter returns to 0, but the carry signal is output from pin 7, the C/O (carry output) terminal, and the flip-flop, IC413(2/2), is set. The BCD outputs of IC414 (2^0, 2^1, 2^2 and 2^3 from Q_0, Q_1, Q_2 and Q_3 terminals, respectively) are input to the 7-segment decoder, IC415, by which the units digits 0 – 9 are indicated. The tens digit, 1, is indicated by the output of flip-flop IC413(2/2).

(3) Counting Down

(a) Counting Down by Use of the Record Button

During the RAMM operation (i.e., when the unit is in the cue mode, the Q output of IC413(1/2) is at the L level, and the letters "RAMM" are indicated), the depression of the Record Button produces a -1 pulse, and the RAMM number is decreased by 1. When the Record Button is depressed and then released, a $\overline{\text{Krec.}}$ = L pulse (-1 pulse) is produced, and this pulse passes through IC410-11, 12, IC412-11, 12, 13, IC411-1, 2, 3 and IC410-2, 3 and H pulse is input at pin 15, the CK (clock) terminal, of the Up/Down counter. Since pin 10, the U/D (up/down) terminal, is maintained at the L level, counter is decreased at the rising edge of this clock pulse, as a result, the RAMM number is decreased by 1.

(b) Counting Down Through the Detection of a Silent Gap Between Audibly Recorded Sections of Tape

During RAMM operation, when a no-signal condition (less than about -40 dB) from a pre-recorded tape continues in both L- and R-channel outputs (output signals from the output amplifiers of PB Dolby NR ICs) for more than about 3 seconds at the standard or half tape speed (i.e., when a gap between audible sections is detected), a -1 pulse is produced and the RAMM number is decreased by 1.
The signals of the L and R channels when a pre-recorded tape is played back are OR-operated by R532 and R534, and input to IC409(1/2) and then to IC409(2/2). IC409 (1/2) is an amplifier with AGC, and IC409(1/2) and IC409 (2/2) consist of a high pass filter circuit.
These two amplifiers detect the silent gaps between audibly recorded sections and prevent misoperation due to rumble.
Pin 3 of IC409(1/2) is connected to Q436, and when RAMM is not in operation, i.e., when the Q terminal of the $\overline{\text{RAMM Ope}}$ flip-flop is at the H level, Q436 is turned ON and the detection function is inhibited. D445, connected to pin 1 of IC409(1/2), and C434 and Q436 constitute the AGC (automatic gain control) circuit, and when there is an input signal, it always transmits a constant output to the following step.
An input signal causes a positive voltage to be output from IC409(2/2), and Q437 is turned ON; whereas, when there is no input signal (level lower than -40 dB), Q437 is turned OFF.
When Q437 is OFF, C439 (0.15 μF) starts charging. At half tape speed, C439 is charged through resistors R547 (2.2 MΩ) and R549 (2.2 MΩ) connected in parallel, but at standard tape speed, it is charged through only R547 (2.2 MΩ). When the charged voltage of C439 exceeds the threshold voltage (about 12 V/2 = 6 V) of the inverter IC410-6, 7 — in about 75 ms at half tape speed, and in about 150 ms at the standard tape speed —, IC410-6, 7 inverts the state from H to L.
IC410-6, 7, IC410-4, 5, IC411-8, 9, 10 and the peripheral circuit form a circuit that produces a -1 pulse when a gap between recorded sections is detected. The -1 pulse is produced in a different way during the forward cue mode from that during the reverse cue mode: during the forward cue mode, when the beginning of a recorded section is sensed after a gap is detected, the RAMM number is decreased by 1; during the reverse cue mode, it is decreased by 1 when the gap itself is detected.

1) A -1 pulse during the forward cue mode

A -1 pulse produced at the moment the beginning of a recorded section is sensed after a section of silence is detected. When a section of silence is detected, pins 6 and 4 of IC410 are at L and H levels, respectively, and L and H levels are applied to capacitors C440 and C441, respectively.
But no -1 pulse is produced at this time. When the beginning of the next recording is detected, i.e., when the state of IC410-6 changes from L to H, and that of IC410-4 from H to L, D447 is grounded due to the forward cue mode and $\overline{\text{FF}}$ = L, the capacitor C440 starts charging through R550 (330 kΩ) from 0 V towards +12 V. On the other hand, C441 starts discharging from about 3 V (330 kΩ/(1 MΩ + 330 kΩ) x 12 V $\simeq$ 3 V) towards 0 V. Consequently, a period when both IC411-9 and IC411-8 are at the L level is produced, and a -1 H pulse is output at IC411-10. (D449 connected to IC411-9 is kept to be OFF since $\overline{\text{Cue}}$ = L.)

2) A -1 pulse during the reverse cue mode

A -1 pulse is produced at the moment a gap between recorded areas is detected. Before this, IC410-6 = H and IC410-4 = L, and capacitors C440 and C441, are kept at H and L voltages, respectively. When the gap is detected, IC410-6 = L and IC410-4 = H. Since $\overline{REW}$ = L and D448 is grounded during the reverse cue mode, the capacitor C441 is charged from 0 V towards +12 V, whereas C440 is discharged from about 3 V towards 0 V. Consequently, a period ensures when both IC411-9 and IC411-8 are at the L level, and a -1 H pulse is output at IC411-10.
(D449 connected to IC411-9 is kept to be OFF since $\overline{Cue}$ = L.)
The -1 H pulse from IC411-10 is input at pin 13 of the OR gate, IC412. At pin 12 of the OR gate, the -1 H pulse due to the depression of the Record Button mentioned in (a) is input.
Therefore, the RAMM number is decreased by 1 in the same manner as in (a). (The -1 pulse produced while the Pause, FF or REW Button is depressed is inhibited because D450 is ON.)

(c) End of RAMM Operation

When the RAMM number reaches zero, the cue mode is cancelled, and the system returns to the playback mode automatically via the stop mode. This is achieved by the IC412-8, 9, 10 gate.
When the following conditions are satisfied at IC412-8 and -9, IC412-8 and -9 become L, as a result IC412-10 becomes L and $\overline{Kplay}$ = L pulse is produced, thus the system returns to the play mode after passing momentarily through the stop mode, in the same way as when the Play Button is depressed.

Conditions:
1) At IC412-8:
RAMM number is 0 (i.e., when D461 through D465, connected to the Up/Down counter outputs and IC413-13 (2/2), are OFF) and $\overline{RAMM\ Ope}$ flip-flop Q = L, (i.e., IC412-8 is kept at the L level via R571).

2) At IC412-9:
FF, REW and Pause Buttons are not depressed and $\overline{Kff}$, $\overline{Krew}$ and $\overline{Kpau}$ = H (as a result IC410-9 = H and IC410-10 (i.e., IC412-9) = L).

Since the -1 pulse is output when the beginning of a recorded area is detected during the forward cue mode (as described above) the tape must be rewound a little automatically when this -1 pulse is output and the RAMM operation ended. During the forward cue mode, FF = L, and therefore an L voltage is input via R560 and C444 to IC412-5. Consequently, when the RAMM operation ends and IC412-6 = L, then IC412-4 = L, $\overline{Krew}$ = L, and the tape is rewound. IC412-9 is kept at the H voltage via D456 and IC410-9, 10 because $\overline{Krew}$ = L, the play mode is inhibited. When rewinding starts, the fast-forward mode is released, $\overline{FF}$ is changed to H, and the capacitor C444 (1 μF) connected to IC412-5 is charged to +12 V via R560 (220 kΩ). When the voltage of C444 exceeds the threshold voltage of IC412-5, then, IC412-4 = H, $\overline{Krew}$ = H, and rewind is cancelled. In this case IC412-9 returns to L, therefore, $\overline{Kplay}$ = L, and the rewind mode changes to the play mode. (Even if a -1 pulse is output from the silent gap detector after the RAMM number becomes 0, the -1 pulse is inhibited by D475, so that the RAMM number is not increased.)

2.3.4. FL Level Indicator Control

(1) FL Level Indicator Indication System

The FL level indicator consists of a number of segments. These are arranged horizontally for both L and R channels as shown in Fig. 2.3.4-11, and light up to indicate the levels. The FL level indicator has two methods of indication: one on the main display, where levels are represented by the varying lengths of continuous horizontal bars of light; and the other with the cursor, a vertical line of light (1 segment wide) to the right (high-level side) of the main display bars. Indications when the Display Switch is in the positions of "P. Hold (Peak Hold)", "VU" and "CAL" are as follows:

(a) "P. Hold" Position

Refer to Fig. 2.3.4-1 circuit diagram.

The main display works as a peak-level meter. The cursor holds the latest peak level indicated by the main display. If there is no signal of higher level than the peak level, the cursor decays slowly to the left of the scale in a decay time about 20 times that of the main display.

(b) "VU" Position

Refer to Fig. 2.3.4-2 circuit diagram.

The main display works as a VU meter. The cursor indicates the peak value (i.e., the leading edge of the main display at the "P. Hold" position.)

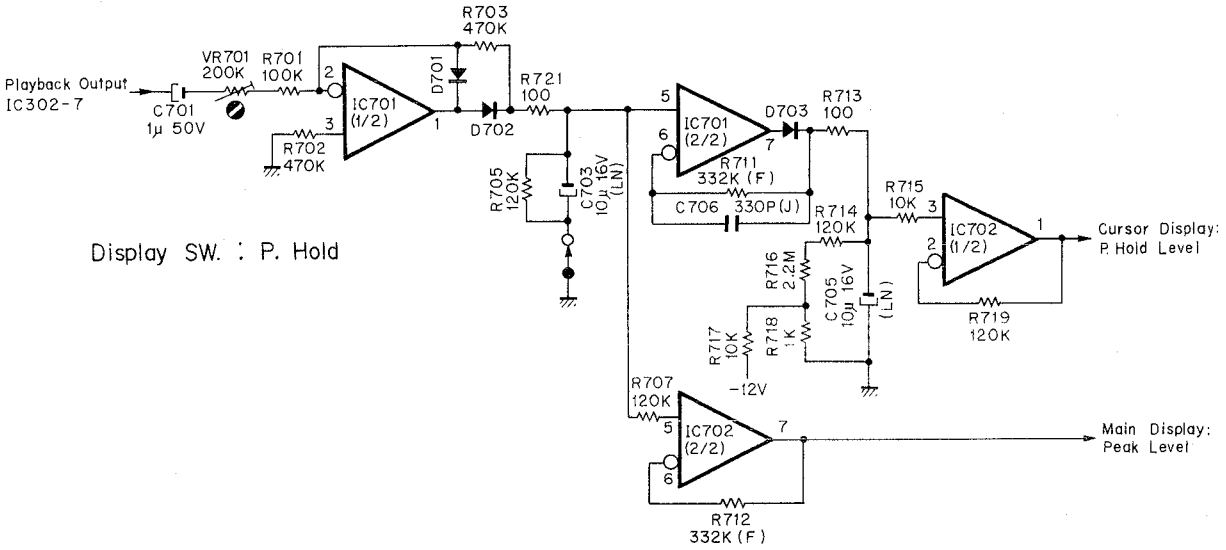


Fig. 2.3.4-1 "P. Hold"

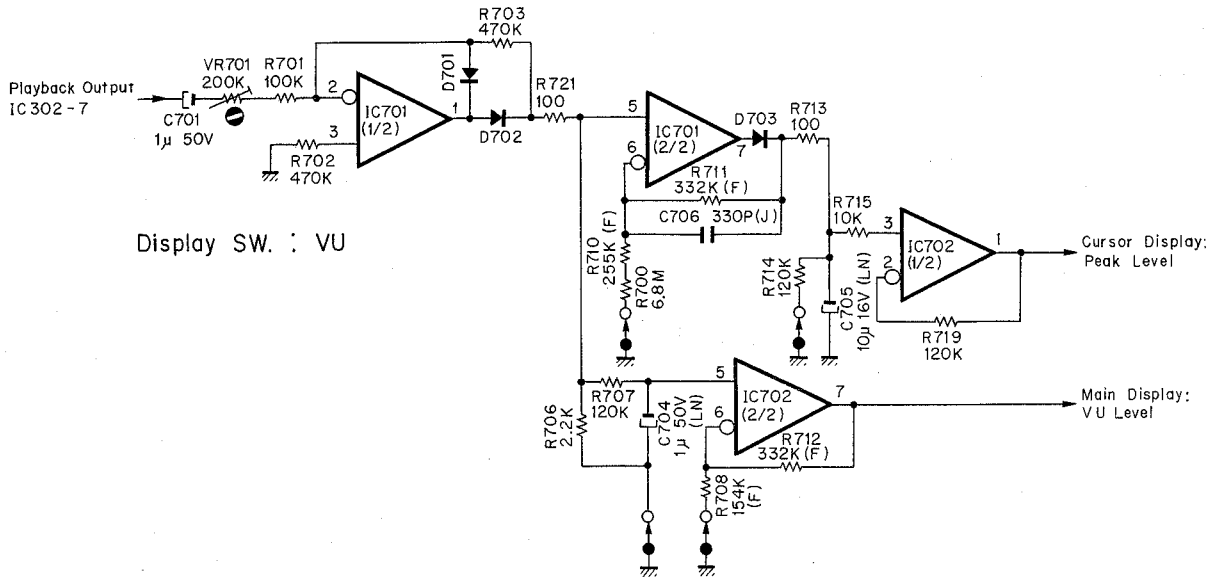


Fig. 2.3.4-2 "VU"

(c) "CAL" Position

Refer to Fig. 2.3.4-3 circuit diagram.

The built-in 400 Hz test tone is activated, and the scale is enlarged for calibration. When the Monitor Switch is at the "Source" position, the bar indicates 0 dB. In the case of azimuth alignment, when the Monitor Switch is turned to the "Tape" position and the Record and Play Buttons are depressed at the same time, the main displays of the 400 Hz test tone and extra-bright lines superimposed on the main displays can be seen on both L and R channel FL level indicators. These extra-bright lines are called azimuth cursors. If there is azimuth deviation between L and R channels, the azimuth cursors come to around the middle of the main display. When the Azimuth Alignment Knob is turned to minimize azimuth deviation, the azimuth cursors come to the right-hand end of the main displays.

The azimuth signal is output from the Logic P.C.B., is fed to the Switch P.C.B. and is input to Q701 (Q801). If there is azimuth deviation between L and R channels, the azimuth signal becomes a positive voltage and Q701 is turned ON. When Q701 is ON, the IC702-3 voltage is divided by R720 (10 kΩ) via Q701, and drops to about a half the peak value of the main displays. Therefore, the IC702-1 voltage, or the cursor voltage, is also approximately halved. When azimuth deviation is removed, Q701 is turned OFF and the peak value of the main displays appears on IC702-1 as it is.

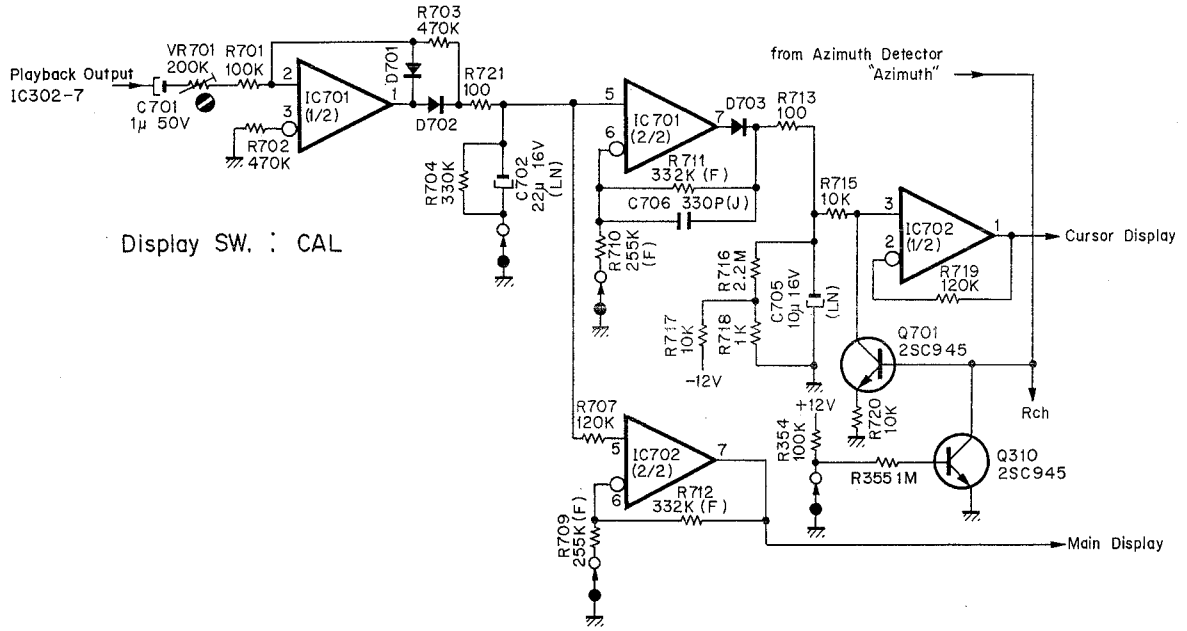


Fig. 2.3.4-3 "CAL"

(2) FL Level Indicator Control Circuit

(a) Outline

Indication is controlled by the time-sharing system and the FL level indicator uses a dynamic control system employing a matrix. Therefore, the use of a number of similar circuits can be avoided, and the common circuits and the control circuits are simplified, although they have a number of functions.

1) Time sharing of indication mode

As mentioned in (1) "FL Level Indicator Indication System", since two kinds of indications, the main displays and the cursors, are displayed on the FL level indicators, a 20-millisecond cycle is divided into 4 equal 5-millisecond stages, in each of which the indication corresponding to the mode is made, as follows:

Display / Position	Cursor	Main	Cursor	Main
P. Hold	P. Hold	Peak	P. Hold	Peak
VU	Peak	VU	Peak	VU
	R Channel		L Channel	
	5msec	5msec	5msec	5msec
	1cycle 20msec			

The actual indication time lasts for about 0.5 ms, starting 3.75 ms after the beginning of each 5 ms stage, until a reset pulse is input.

2) Dynamic control of FL level indicator

Refer to Fig. 2.3.4-4 basic circuit diagram. IC909 and IC910 are octal counters which are incremented each time a clock pulse is input. A reset pulse is initially input, setting Q_0 of IC909 and Q_0 of IC910 to the H level (Q_1 – Q_7 of both = L). When a clock pulse is input, Q_1 of IC909 is made H (Q_0, Q_2 – Q_7 = L) at the rising edge of clock pulse. After that, each time a clock pulse is input, Q_2, Q_3, - - - Q_7 are made H in order. (Only one of the 8 outputs at a time is made H.) When the 8th clock pulse is input, Q_0 of IC909 returns to H, and the CO (carry output) terminal (i.e., the clock terminal of IC910) changes its L state to H, changing Q_1 of IC910 to the H level (Q_0, Q_2 – Q_7 = L). As Fig. 2.3.4-4 shows, the outputs of IC909 are connected to the anodes of the FL level indicator and those of IC910 to the grids. In the initial state (IC909 Q_0 = H, IC910 Q_0 = H), the leftmost segment of the 6G grid is lit. When a clock pulse is input, this segment is turned OFF and the segments to the right light up in order.

When the 8th clock pulse is input, Q_0 of IC909 and Q_1 of IC910 are made H, and the leftmost segment of the 5G grid lights and, in the same manner, the segments to the right are lit in order, corresponding to the input signal level to be indicated.

Each stage of the indication process is completed in 5 ms; and the frequency of the clock pulse to the octal counter, IC909, is 12.8 kHz (78.125 μs). The operation described above is for the main display, or continuous-level indication. The same procedure applies to cursor (single vertical line) indication, except that: the contents of the octal counter are displayed only when clock pulse input to IC909 is completed and the process is completed; and nothing is displayed while the counter is in operation. At this time, since the counter stores the maximum value, the peak of the level (1 segment) is displayed. The mechanism of clock control by the octal counter, IC909, is as follows: Because the indication proceeds according to the number of clock pulses, the number of pulses corresponding to the input signal level to be displayed must be produced. The clock controller consists of a function generator (IC904(1/2), IC904(2/2), Q901-903 and the peripheral circuit) and a comparator, IC908(2/2), for comparing the input level through the Switch P.C.B. amplifier with the output level of the function generator.

The function generator initiates operation every 5 ms, its output falling gradually from 10 V to the ground level. When its output level is lower than the input level, the output level of the comparator, IC908(2/2), becomes H, and a 12.8 kHz signal is input at the clock terminal of the octal counter, IC909. The function generator completes the generation of function signal in 3.75 ms, and the output level returns to 10 V. Then, the output level of the comparator, IC908(2/2), becomes L, and no clock pulse is input to IC909. Thus, the comparator is at the H level for a longer or shorter period, depending upon the level of the input, and the octal counter is incremented, and in this way indication according to the input level is made.

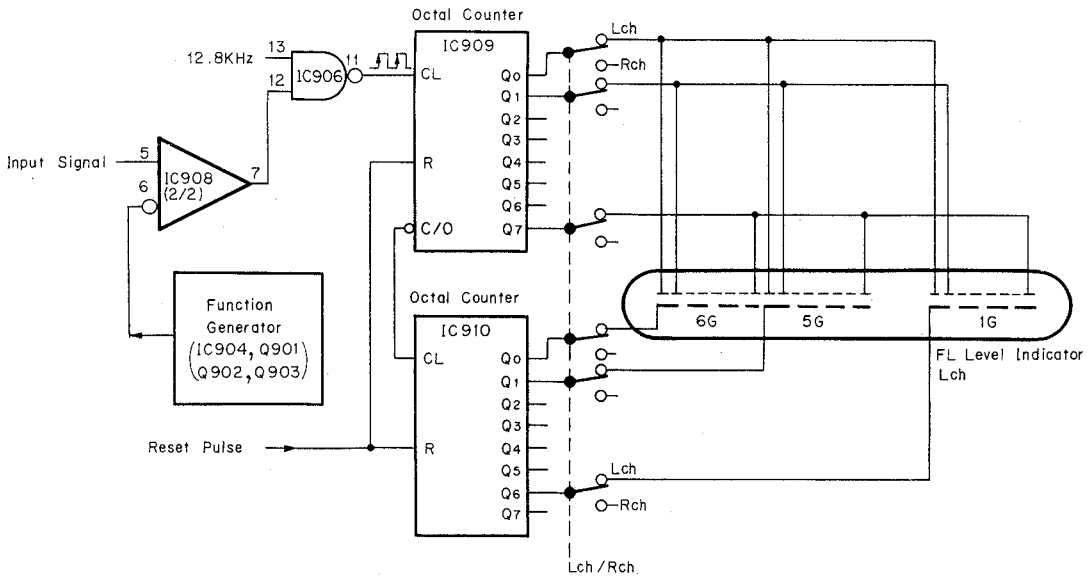


Fig. 2.3.4-4 Basic Circuit

(b) Clock Oscillator and Frequency Divider

IC908(1/2) and its peripheral circuit form a 25.6 kHz rectangular-wave oscillator. This 25.6 kHz clock pulse is input to IC907 (12-stage binary counter) and the input is divided into nine parts whose frequencies are $1/2^n$ of the original. Thus IC907 produces 12.8, 6.4, 3.2, 1.6 kHz, and 800, 400, 200, 100 and 50 Hz frequencies, and these are combined to produce various timings for indication control. As Fig. 2.3.4-5 shows, IC906-3 outputs the function generation control pulses, and during the 3.75 ms H period, the function generator operates. The reset pulse given to IC909-15 and IC910-15 resets the contents of the octal counters (IC909 and IC910) for display.

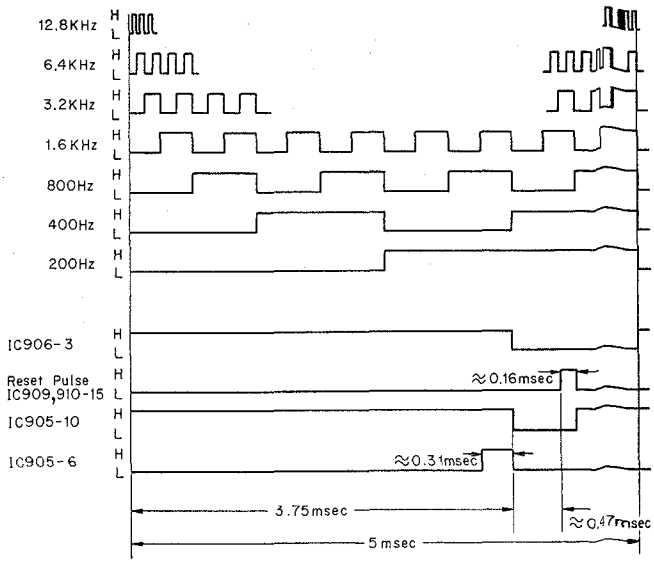


Fig. 2.3.4-5 Clock Timing Chart

(c) Input Signal Time-sharing Circuit

Refer to Fig. 2.3.4-6 circuit diagram and Fig. 2.3.4-7 timing chart.

A 20 ms cycle is divided into four 5 ms stages by the 100 Hz and 50 Hz output pulses of IC907, and the 4 kinds of signals from the Switch P.C.B. are fetched by the time-sharing system.

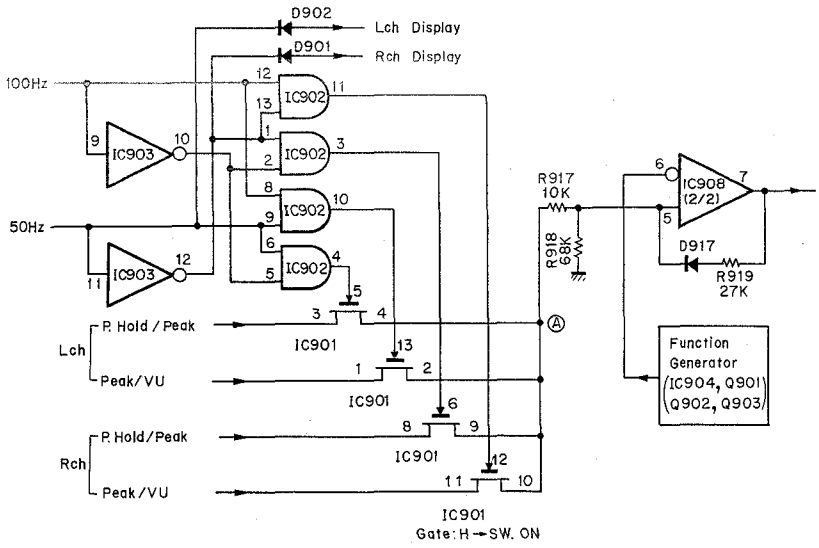


Fig. 2.3.4-6 Input Signal Time-sharing Circuit

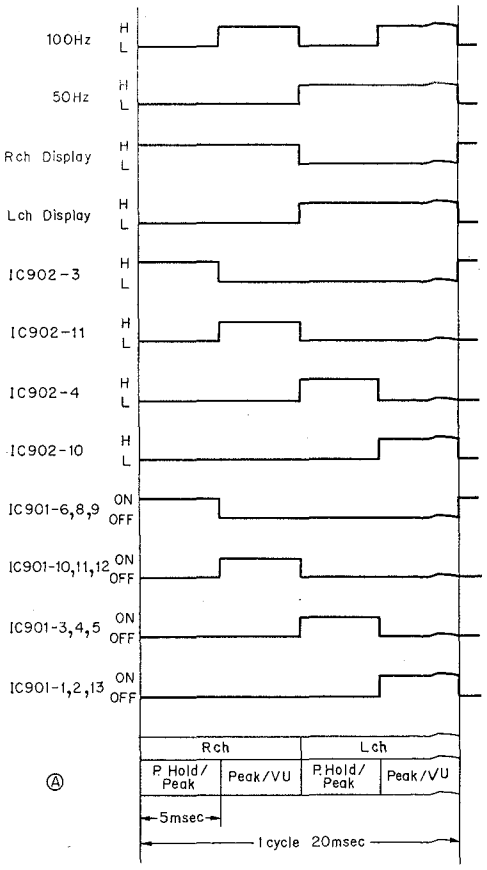


Fig. 2.3.4-7 Timing Chart

(d) Function Generator

Refer to Fig. 2.3.4-8 circuit diagram and Fig. 2.3.4-9 timing chart.

Functions are generated when IC906-3 is at the H level. When IC906-3 is at the L level, Q902 is ON, and the capacitor C901 is not charged because it is short-circuited by Q902. When IC906-3 is at the H level, Q902 is OFF and C901 (4700 pF) is charged from 10 V toward 0 V through R910 (64.9 kΩ) and R909 (150 kΩ). Since these compose an RC integration circuit, the voltage of C901 (the voltage of IC904-3(1/2)) is of an exponential waveform.

IC904(1/2) constitutes a voltage follower, and outputs a similar waveform, current-amplified. On the other hand, if IC904(2/2), which senses the output voltage of IC904 (1/2), finds this lower than the reference voltage, V_S, of IC904-5(2/2) (0.67 V), then IC904-7(2/2) becomes H and turns Q901 ON. Therefore, R909 is grounded through Q901, and this time, C901 is charged through only R910 (64.9 kΩ) at a faster time constant than before. This reference voltage, V_S, corresponds to -20 dB of the input signal level, and since the scale of the FL level indicators below -20 dB is compressed, the exponential waveform is changed. The output of the function generator (V_F) is compared by the comparator, IC908(2/2), with the input signal level (V_X) to be displayed, and when V_F becomes lower than V_X, the output from the comparator becomes H for the period T_X. During this period, the conditions of the NAND gate, IC906-11, 12, 13, are satisfied, and a 12.8 kHz clock pulse is input to the clock terminal of the display octal counter, IC909. Therefore, during the T_X period, i.e., the period corresponding to the input signal level to be displayed, the clock pulse is input and the octal counter is incremented.

Although the scale below -20 dB is compressed, when the input signal level is -20 dB, V_F equals V_S, the output level of the comparator is H, and the clock pulse is input to the octal counter. Thus, by clock pulses produced during the T_S period, indication moves from the left to the position indicating -20 dB on the FL level indicator.

Function generation during CAL mode:

When the Display Switch is in the CAL position, the whole scale is enlarged and the accuracy of the scale is increased. (The normal scale range, -40 dB to +10 dB, is reduced to become -5 dB to +3 dB.) At the same time, the function generation is also altered so that it is represented by the dotted line (V_F') in Fig. 2.3.4-9.

$\overline{CAL}$ being = L, Q903 is ON, and C902 is connected in parallel with C901 via Q903, as a result the time constant of the RC integration circuit is increased.

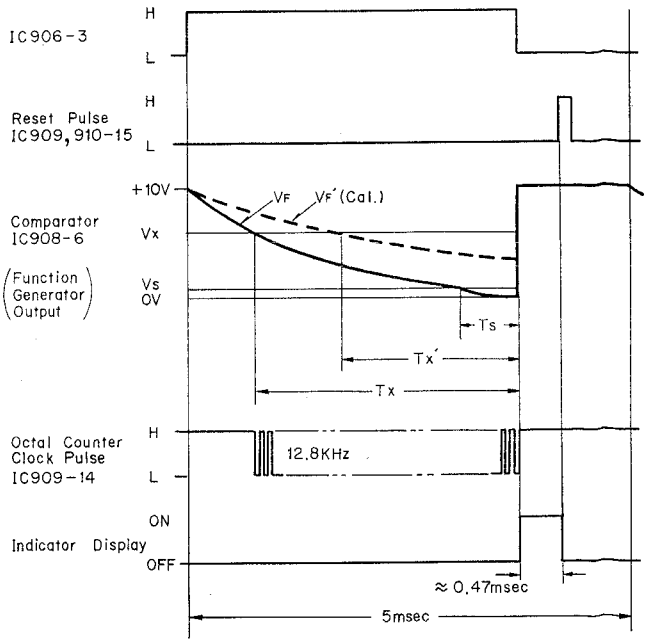


Fig. 2.3.4-9 Timing Chart

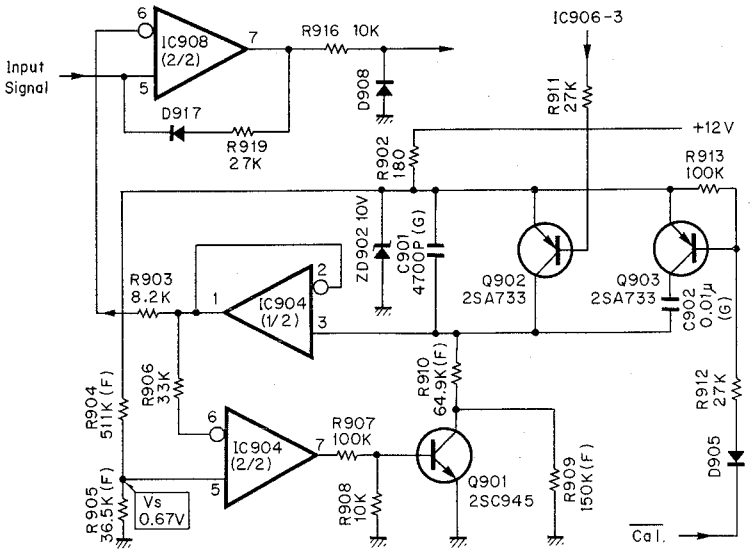


Fig. 2.3.4-8 Function Generator Circuit

(e) Indication Switch-over

As mentioned before, a cycle of indication is divided into the following four stages.

R-ch ... Cursor: "P. Hold", Main display: "Peak"
R-ch ... Cursor: "Peak", Main display: "VU"
L-ch ... Cursor: "P. Hold", Main display: "Peak"
L-ch ... Cursor: "Peak", Main display: "VU"

In order to display these, R and L channel indications must be switched over. Further, main display (continuous indication) and cursor indication (single segment) must also be switched over.

1) R-ch/L-ch switch-over

A 50 Hz signal from Q9 of IC907 is used in R-ch/L-ch switch-over. During the H period of the 50 Hz signal, D902 is open and an anode voltage is applied to the L-ch segment specified by the octal counter, IC909, and the segment is allowed to be lit. During the L period of the 50 Hz signal, D902 is ON, the lighting of the L-ch segment is inhibited. In this period, D901 connected to pin 12 of the inverter, IC903, is open, and an anode voltage is applied to the R-ch segment specified by the octal counter, IC909, and the R-ch segment is allowed to be lit. The anodes of D902 and D901 are connected via D906 and D907, respectively, to IC906-10, and when IC906-10 = L, no anode voltage is applied to the FL level indicators and no lighting up occurs. While IC906-10 = H, that is, while a grid voltage is being applied, an anode voltage is also applied to the FL level indicators so that the segment is lit.

2) Main display/Cursor display switch-over

An anode voltage and a grid voltage are necessary in order for a segment to be lit. The grid voltage is controlled as follows:

a) Main display

The peak level indication in the P. Hold mode and the VU level indication in the VU mode are made continuously from the left. These indications are made during the H level of the 100 Hz signal from Q8 of IC907. When the output of the comparator, IC908(2/2), is H (or when clock pulses are input to the octal counter, IC909), the condition of the NAND gate, IC906-4, 5, 6 are satisfied, making IC906-4 = L, and IC906-10 = H. (Since IC905-10 is maintained at the L level for 0.625 ms after the comparator output is changed to L, IC906-10 is also maintained at the H level during this period (see Fig. 2.3.4-5).) When IC906-10 = H, Q904 is ON, and a grid voltage is input to one of 6 grids specified by the octal counter, IC910, to allow the segment to be lit. That is, the segment can be lit for about 0.47 ms after IC906-10 becomes H, which occurs 3.75 ms after the beginning of a 5-ms step, until the octal counters, IC909 and IC910, are reset by a reset pulse.

b) Cursor display

The peak value is displayed by a single segment during the VU mode, and is held during the P. Hold mode. These indications are made during the L period of the 100 Hz signal from Q8 of IC907. During this period, since IC906-5 = L, IC906-4 becomes H regardless of the state of the comparator, IC908(2/2), and no grid voltage is applied even the comparator output is H. However, for 0.625 ms after the comparator output becomes L, when IC905-10 = L, IC906-10 becomes H, turning Q904 ON, and a voltage is applied to one of six grids specified by octal counter, IC910, and only the one segment selected is lit. The period the segment is lit is the same as that of the main display. When the mute signal is H, H signals are input to pins 8 and 9 of IC906, IC906-10 becomes L, and Q904 is turned OFF. Consequently, no grid voltage is applied and the segment is turned OFF.

(3) FL Level Indicator and Peripheral Circuits

Refer to Fig. 2.3.4-10 basic circuit diagram. The filament voltage is supplied from the secondary winding of the power transformer, which is center-tapped at a voltage of about -33 V via a zener diode, ZD402 (5 V). The filament voltage is applied continuously to the filament. When a grid voltage and an anode voltage are applied, the segment to which the anode voltage is applied is lit. Octal counter IC909 controls the anode voltage and octal counter IC910 controls the grid voltage. Both voltages are applied as pulses. During the main display, since both Q_0 of IC909 and IC910 are at the H level in the initial state, Q751 and Q909 are ON, the former applying the anode voltage at the left-hand end of 6G, and the latter applying a grid voltage to 6G, so that the leftmost segment is lit. When the octal counter is incremented, Q_1 of IC909 and Q_0 of IC910 = H, so that Q753 and Q909 are turned ON, and the next segment is lit. After the rightmost segment (8th segment) of 6G is lit, Q_0 of IC909 and Q_1 of IC910 become H next, turning Q751 and Q910 ON, thus lighting the leftmost segment of 5G. The other segments are lit in order in a similar fashion.

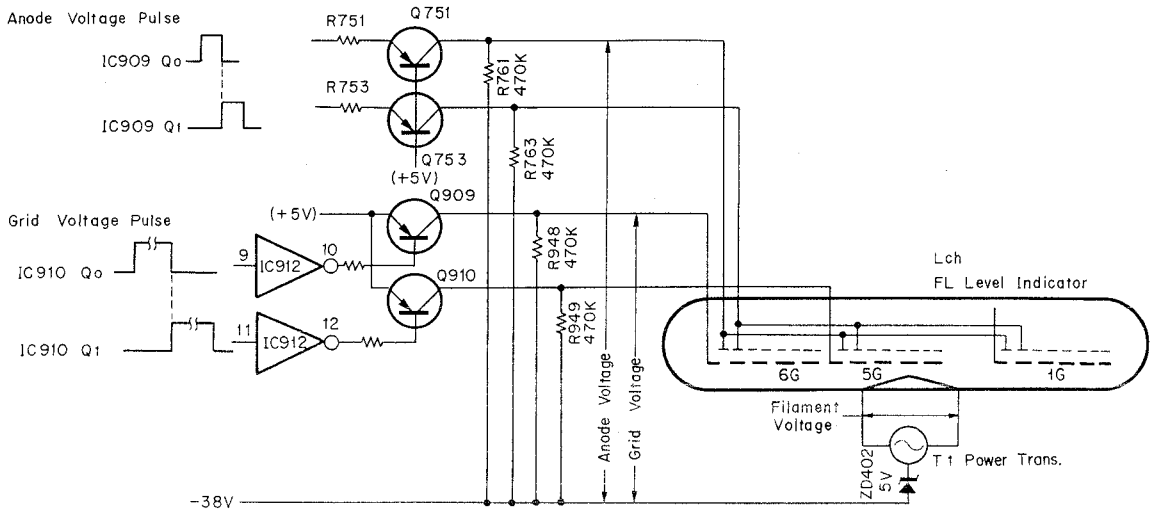


Fig. 2.3.4-10 Basic Circuit

The peripheral circuits of the FL level indicator are a little more complex than the basic circuit because these are designed to suit the FL level indicator itself. Indications other than those already described are as follows:

(a) Lighting of the Characters, L, dB, R, 0, and One Segment at the Leftmost End of L and R Channels

When IC905-6, on the Indicator P.C.B. C, is L, for 312 μs, Q907 is turned ON, an anode voltage is applied, and these characters and the segments are lit.

(b) Lighting of the Numbers, -40, 30, 20, 10, 5 and +10

When IC905-6 is L for 312 μs, Q906 is turned ON through IC903-4, 5, and an anode voltage is applied.

(c) Lighting of the Numbers, 5, 3, and 1

The scale is expanded during the CAL mode. D914 is ON when $\overline{CAL}$ = L, and Q906 cannot be turned ON, and therefore indications of -40, 30, 20, 10, 5 and +10 are extinguished. On the other hand, since IC903-15 = H, Q905 is turned ON through IC903-4, 5 for 312 μs when IC905-6 is L, and an anode voltage is applied, so that the figures 5, 3 and 1 are lit.

(d) RAMM Indication

When the Q output of IC413(1/2), $\overline{\text{RAMM Ope}}$ flip-flop, of the Logic P.C.B. is L (i.e., during the RAMM operation), Q438 is turned ON and an anode voltage is applied.

(e) RAMM Number

Units digit: The numbers 0 - 9 are indicated by drivers (Q439 - Q445) according to the output of IC415 (7-segment decoder).

Tens digit: When IC413(2/2) Q = H, Q446 is turned ON and the numeral 1 is indicated.

(f) FL level Indicator Connecting Diagram

Refer to Fig. 2.3.4-11 connecting diagram and the table of terminal number and pole connected.

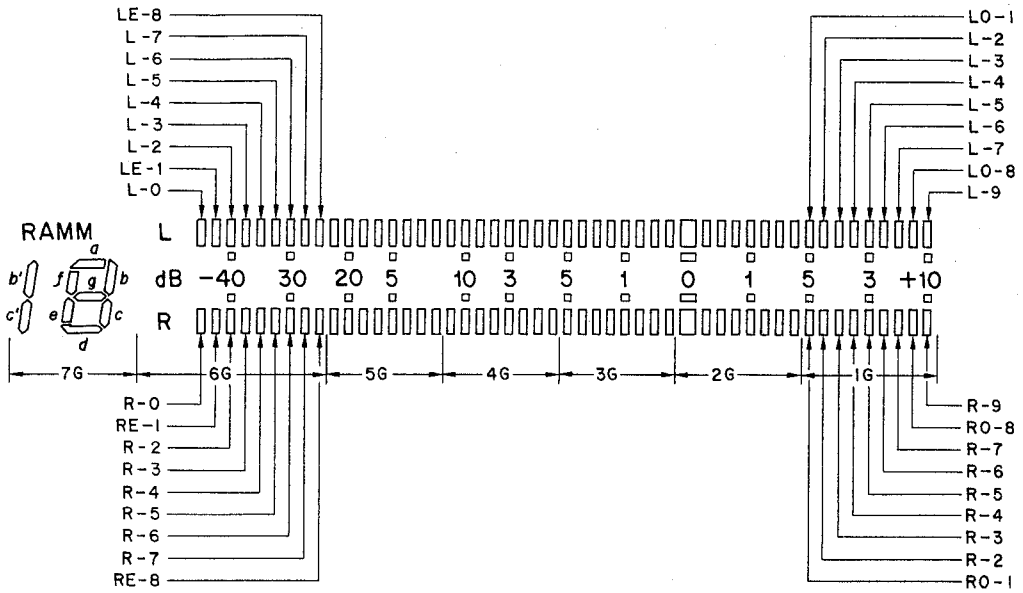


Fig. 2.3.4-11 FL Level Indicator Connecting Diagram

Terminal No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Pole Connected	F	P (RO-1)	P (RE-1 / R-9)	7G	P (R-2)	P (R-3)	P (R-4)	P (RAMM)	7G	6G	P (b', c')	P(g)	P(f)	P(e)	P(d)	P(c)	6G
Terminal No.	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
Pole Connected	5G	P(b)	P(a)	P(X)	5G	P(Y)	4G	P (LO-1)	P (LE-1 / L-9)	P (L-2)	4G	3G	P (L-3)	P (L-4)	P (L-5)	3G	2G
Terminal No.	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49		
Pole Connected	P (L-6)	P (L-7)	P (LO-8)	P (LE-8)	2G	1G	P(Z)	P (R-5)	P (R-6)	P (R-7)	1G	P (RO-8)	P (RE-8)	NC	F		

Notes:

1. P(LO-1) connects in parallel L-1 segments of L-ch odd-number grids (1G, 3G and 5G)
2. P(LE-1) connects in parallel L-1 segments of L-ch even-number grids (2G, 4G and 6G).
3. P(RO-1) connects in parallel R-1 segments of R-ch odd-number grids (1G, 3G and 5G).
4. P(RE-1) connects in parallel R-1 segments of R-ch even-number grids (2G, 4G and 6G).
5. P(LO-8) connects in parallel L-8 segments of L-ch odd-number grids (1G, 3G and 5G).
6. P(LE-8) connects in parallel L-8 segments of L-ch even-number grids (2G, 4G and 6G).
7. P(RO-8) connects in parallel R-8 segments of R-ch odd-number grids (1G, 3G and 5G).
8. P(RE-8) connects in parallel R-8 segments of R-ch even-number grids (2G, 4G and 6G).
9. P(L-2) to P(L-7) connect, in parallel, segments L-2 to L-7 of each L-ch grid.
10. P(R-2) to P(R-7) connect, in parallel, segments R-2 to R-7 of each R-ch grid.
11. P(X) is for L, dB, R, 0, L-0 and R-0.
12. P(Y) is for –40, 30, 20, 10, 5 (3G and 1G) and +10.
13. P(Z) is for 5(5G), 3(4G and 1G) and 1(3G and 2G).
14. Each pair of dots (0.6 x 0.7) above and below the numbers is connected to the number between them.
15. There is no lead at N.P.

3. REMOVAL PROCEDURES

3.1. Side Panel Ass'y
Refer to Fig. 3.1.
Remove F01 and F02, then disassemble F03 (Side Panel Ass'y).

3.2. Top Cover Ass'y
Refer to Fig. 3.1.
(1) Remove Side Panel Ass'y referring to item 3.1.
(2) Remove F04 and F05, then disassemble F06 (Top Cover Ass'y).

3.3. Bottom Cover Ass'y
Refer to Fig. 3.1.
Remove F07, then disassemble F08 (Bottom Cover Ass'y).

3.4. Cassette Case Cover Ass'y
Refer to Fig. 3.1.
Turn fully counterclockwise two screws which are mounted on the Cassette Case Cover, then disassemble F09 (Cassette Case Cover Ass'y).

3.5. Front Panel Ass'y
Refer to Fig. 3.2.
(1) Refer to Fig. 3.1. Remove Top Cover Ass'y and Bottom Cover Ass'y referring to items 3.2 and 3.3.
(2) Pull out F01 (Volume Knob A), F02 (Volume Knob L), F03 (Volume Knob R), F04 (Volume Knob B) and F05 (Pitch Control Knob).
(3) Remove F06, then disassemble F07 (Front Panel Ass'y including 2 connectors).

3.6. Headphone Jack Ass'y
Refer to Fig. 3.2.
(1) Remove Front Panel Ass'y referring to item 3.5.
(2) Remove F08, then disassemble F09 (Headphone Jack Ass'y).

3.7. Mechanism Ass'y
Refer to Fig. 3.2.
(1) Remove Front Panel Ass'y referring to item 3.5.
(2) Remove F10, then disassemble F11 (Mechanism Ass'y including 6 connectors).

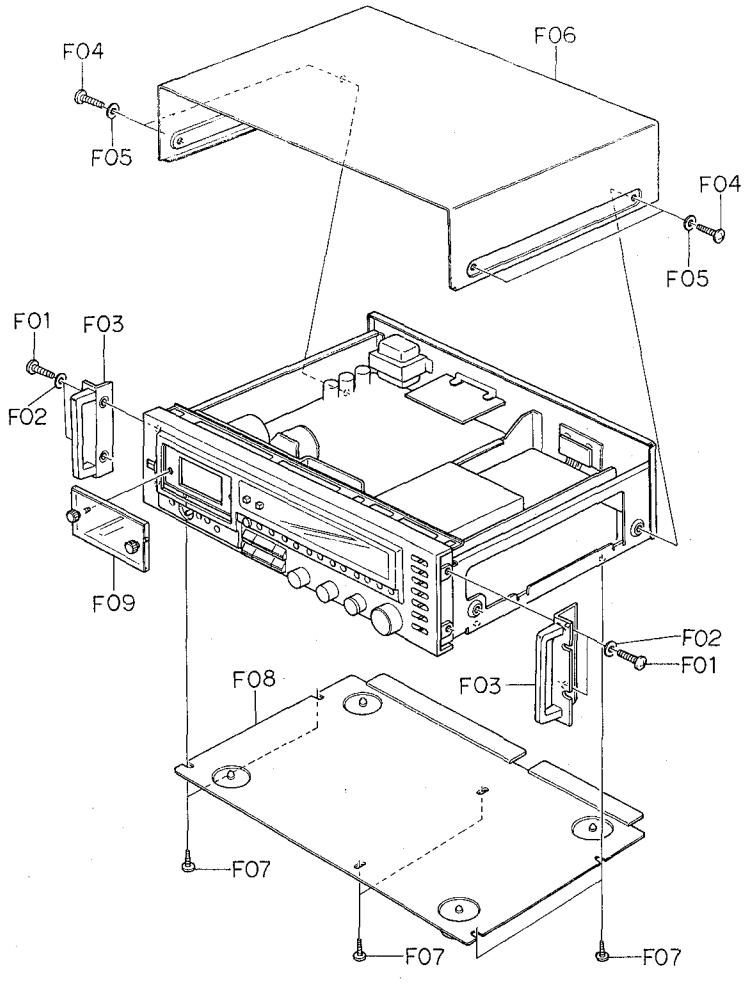


Fig. 3.1

3.8. FL Indicator Ass'y

Refer to Fig. 3.3.

(1) Refer to Fig. 3.2. Remove Front Panel Ass'y referring to item 3.5.
(2) Remove F01, then disassemble F02 (FL Indicator Ass'y including 3 connectors).

3.9. Logic P.C.B. Ass'y

Refer to Fig. 3.3.

(1) Refer to Fig. 3.2. Remove Front Panel Ass'y referring to item 3.5.
(2) Remove 7 connectors and the wires connected by wrapping from F04 (Logic P.C.B. Ass'y).
(3) Remove F03, then disassemble F04 (Logic P.C.B. Ass'y).

3.10. Switch P.C.B. Ass'y

Refer to Fig. 3.3.

(1) Refer to Fig. 3.2. Remove Front Panel Ass'y referring to item 3.5.
(2) Pull out F05 (Function Switch Knob Ass'y).
(3) Remove the Flat Cables, connector and wires connected by wrapping from F08 (Switch P.C.B. Ass'y).
(4) Remove F06 and F07, then disassemble F08 (Switch P.C.B. Ass'y).

3.11. Main P.C.B. Ass'y

Refer to Fig. 3.3.

(1) Remove FL Indicator Ass'y and Switch P.C.B. Ass'y referring to items 3.8 and 3.10.
(2) Remove the Flat Cables, 3 connectors and wires connected by wrapping from F10 (Main P.C.B. Ass'y).
(3) Remove F09, then disassemble F10 (Main P.C.B. Ass'y).

3.12. Volume P.C.B. Ass'y

Refer to Fig. 3.3.

(1) Remove FL Indicator Ass'y referring to item 3.8.
(2) Remove F11 and the Flat Cable from F12 (Volume P.C.B. Ass'y), then disassemble F12 (Volume P.C.B. Ass'y).

3.13. Record Cal. P.C.B. A Ass'y, Record Cal. P.C.B. B Ass'y and Lamp P.C.B. A Ass'y

Refer to Fig. 3.3.

(1) Refer to Fig. 3.2. Remove Front Panel Ass'y referring to item 3.5.
(2) Remove F13, then disassemble F14 (Calibration Case Ass'y).
(3) Remove F15, then disassemble F16 (Record Cal. P.C.B. A Ass'y),
(4) Remove F17, then disassemble F18 (Record Cal. P.C.B. B Ass'y).
(5) Remove F19, then disassemble F20 (Lamp P.C.B. A Ass'y).

3.14. Power Switch

Refer to Fig. 3.3.

(1) Refer to Fig. 3.2. Remove Front Panel Ass'y referring to item 3.5.
(2) Remove F21, then disassemble F22 (Power Switch Knob).
(3) Remove F23, then disassemble F24 (Power Switch Holder Ass'y).
(4) Remove F25, then disassemble F26 (Power Switch).

3.15. Lamp P.C.B. B Ass'y and Lamp P.C.B. C Ass'y

Refer to Fig. 3.3.

(1) Refer to Fig. 3.2. Remove Front Panel Ass'y referring to item 3.5.
(2) Remove F27, then disassemble F28 (Insulator) and F29 (Lamp P.C.B. B Ass'y).
(3) Remove F30 (Lamp P.C.B. C Ass'y) by releasing the self-interlocking pin of the Reflector.

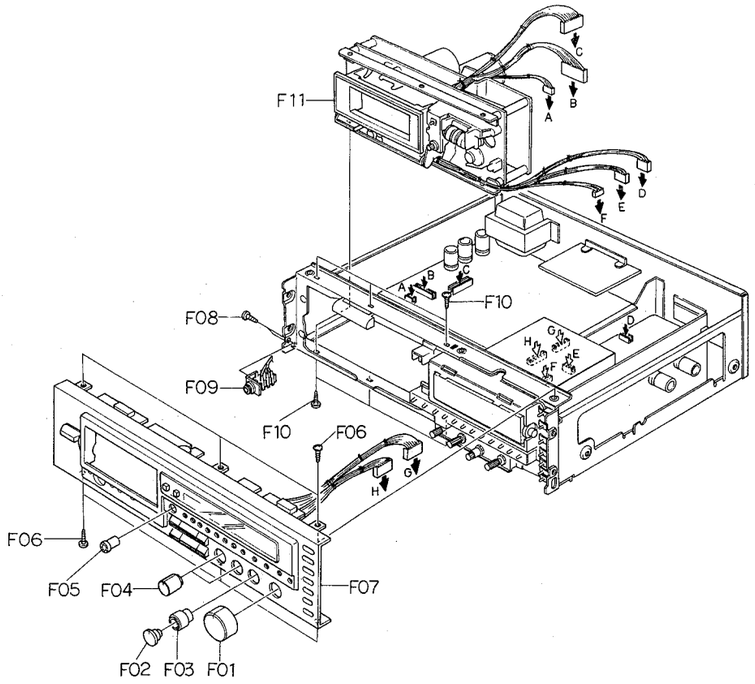


Fig. 3.2

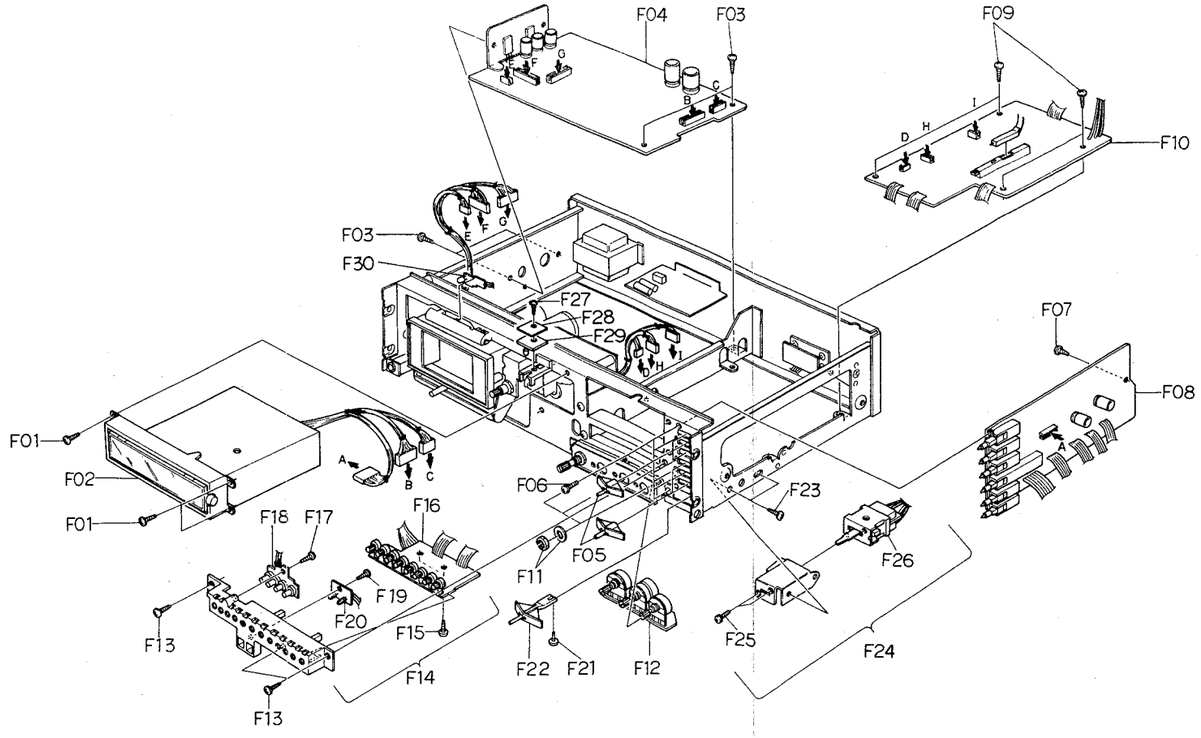


Fig. 3.3

3.16. Control Switch P.C.B. Ass'y

Refer to Fig. 3.4.

(1) Refer to Fig. 3.2. Remove Front Panel Ass'y referring to item 3.5.
(2) Remove F01, F02, F03 and F04, then disassemble F05 (Control Button Ass'y).
(3) Remove F06, then disassemble F07 (Control Switch P.C.B. Ass'y).

3.17. Indicator P.C.B. Ass'y

Refer to Fig. 3.5.

(1) Refer to Fig. 3.3. Remove FL Indicator Ass'y referring to item 3.8.
(2) Remove F01, then disassemble F02 (Shield Cover).
(3) Remove F03 (Indicator P.C.B. C Ass'y) by releasing the self-interlocking pin of the P.C.B. supporters.
(4) Remove F04, then disassemble F05 (Indicator P.C.B. B Ass'y).
(5) Remove F06 and F07, then disassemble F08 (FL Indicator Holder L), F09 (FL Indicator Holder R) and F10 (Indicator P.C.B. A Ass'y).

3.18. Rear Panel Ass'y

Refer to Figs. 3.6.1 and 3.6.2.

(1) Refer to Fig. 3.1. Remove Top Cover Ass'y and Bottom Cover Ass'y referring to items 3.2 and 3.3.
(2) Remove F01 and F02, then disassemble F03 (Rear Panel Ass'y).

3.19. Power Transformer and Fuse P.C.B. Ass'y

Refer to Figs. 3.6.1 and 3.6.2.

(1) Refer to Fig. 3.1. Remove Top Cover Ass'y and Bottom Cover Ass'y referring to items 3.2 and 3.3.
(2) Remove F04 and F05, then disassemble F06 (Power Transformer).
(3) Remove F08 and F09, then disassemble F10 (Fuse P.C.B. Ass'y).

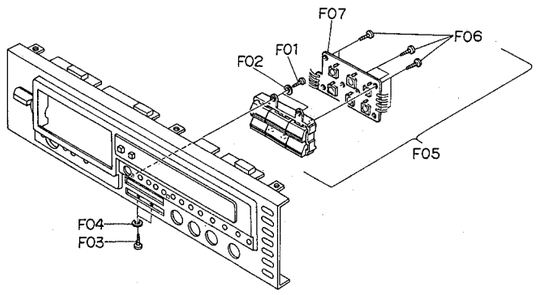


Fig. 3.4

3.20. Cassette Case Ass'y and Cover Plate Ass'y

Refer to Fig. 3.7.

(1) Refer to Fig. 3.2. Remove Mechanism Ass'y referring to item 3.7.
(2) Remove F01 and F02, then disassemble F03 (Cassette Case Holder L Ass'y) by releasing the self-interlocking pin of the Damper Lock Arm and F04 (Cassette Case Ass'y).
(3) Remove F04, then disassemble F05 (Cover Plate Ass'y).

3.21. Tape Counter Ass'y, Memory Switch and Pitch Control Volume

Refer to Fig. 3.7.

(1) Refer to Fig. 3.2. Remove Mechanism Ass'y referring to item 3.7.
(2) Remove F07, then disassemble F08 (Tape Counter Ass'y).
(3) Remove F09, then disassemble F10 (Pitch Control Holder Ass'y).
(4) Remove F11, then disassemble F12 (Memory Switch).
(5) Remove F13, then disassemble F14 (Pitch Control Volume).

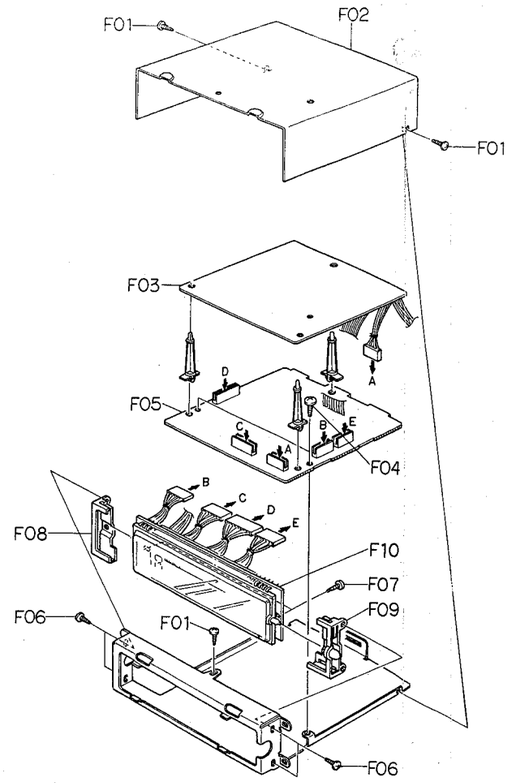


Fig. 3.5

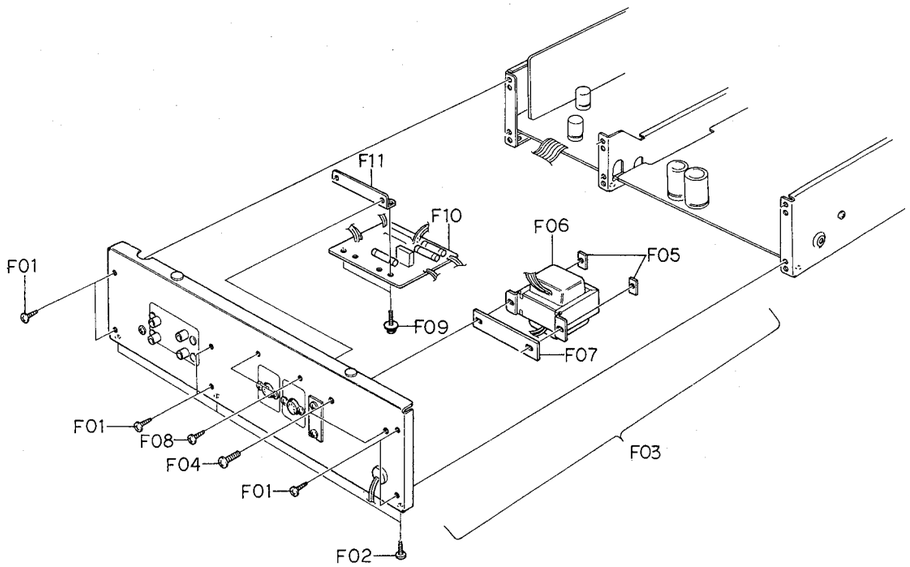


Fig. 3.6.1 Serial No.: A11204051 –

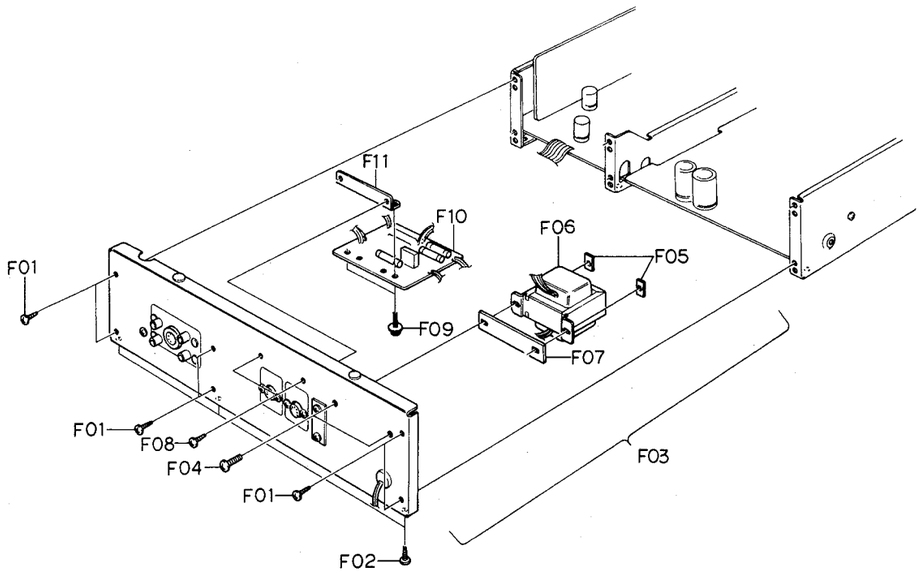


Fig. 3.6.2 Serial Nos.: A11201001 – A11204050

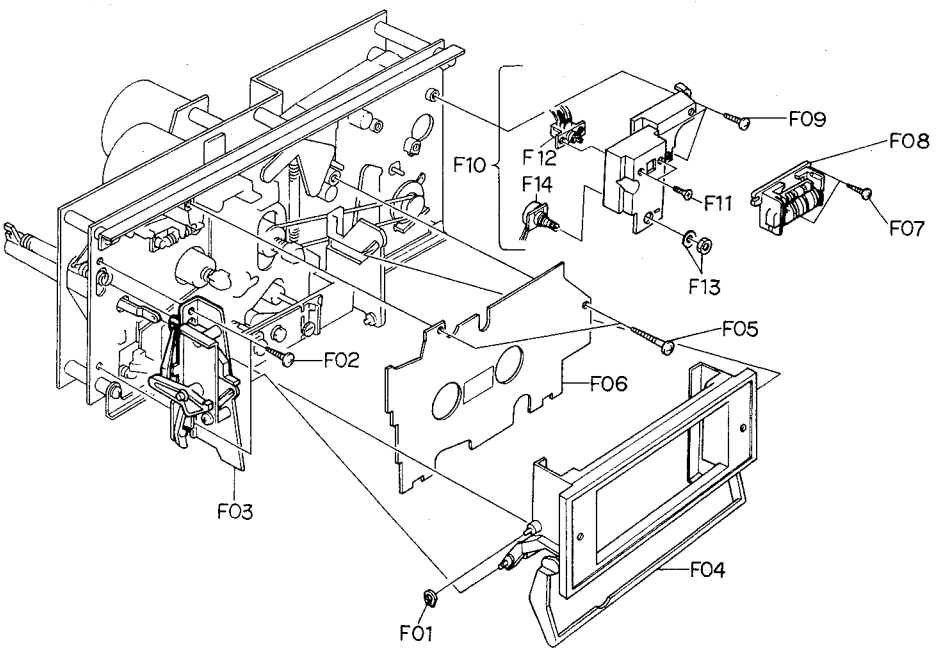


Fig. 3.7

3.22. Capstan Motor Ass'y and Flywheel Ass'y

Refer to Fig. 3.8.

(1) Refer to Fig. 3.2. Remove Mechanism Ass'y referring to item 3.7.
(2) Remove F01 and F02, then disassemble F03 (Flywheel Holder Ass'y) and F08 (Capstan Belt).
(3) Remove F04, then disassemble F05 (Capstan Motor Ass'y).
(4) Remove F06, then disassemble F07 (Speed Cal. P.C.B. Ass'y).
(5) Remove F09 (Supply Flywheel Ass'y), then disassemble F10 (Take-up Flywheel Ass'y).
(6) After removing both Flywheel Assemblies, disassemble F11 (Thrust Washer 3 mm), F12 (Thrust Washer 2.6 mm), F13 (Flange Thrust Cap) and F14 (Thrust Spring).

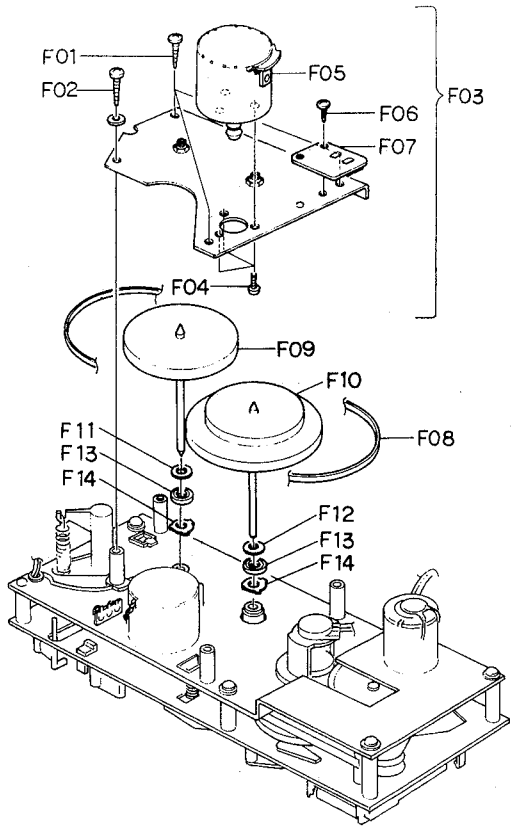


Fig. 3.8

3.23. Sub Mechanism Chassis Ass'y

Refer to Fig. 3.9.

(1) Remove Flywheel Holder Ass'y referring to item 3.22.
(2) Remove F01 and F02, then disassemble F03 (Sub Mechanism Chassis Ass'y).

3.24. Control Motor Ass'y and Reel Motor Ass'y

Refer to Fig. 3.9.

(1) Remove Sub Mechanism Chassis Ass'y referring to item 3.23.
(2) Remove F04, then disassemble F05 (Control Motor Ass'y).
(3) Remove F06, then disassemble F07 (Reel Motor Ass'y).

3.25. Cam Control Volume

Refer to Fig. 3.9.

(1) Remove Sub Mechanism Ass'y referring to item 3.23.
(2) Remove F08, then disassemble F09 (Volume Coupler).
(3) Remove F10, then disassemble F11 (Cam Control Volume).

3.26. Reel Hub Ass'y and Idler Ass'y

Refer to Fig. 3.9.

(1) Remove Sub Mechanism Chassis Ass'y referring to item 3.23.
(2) Remove F12 (Reel Hub Head), then disassemble F13 (Reel Hub B Ass'y), F14 (Reel Hub Supply Ass'y), F15 (Reel Hub Take-up Ass'y), F16 (Back Tension Ass'y) and F17 (Back Tension Spring).
(3) Remove F18, then disassemble F19 (Idler Ass'y).

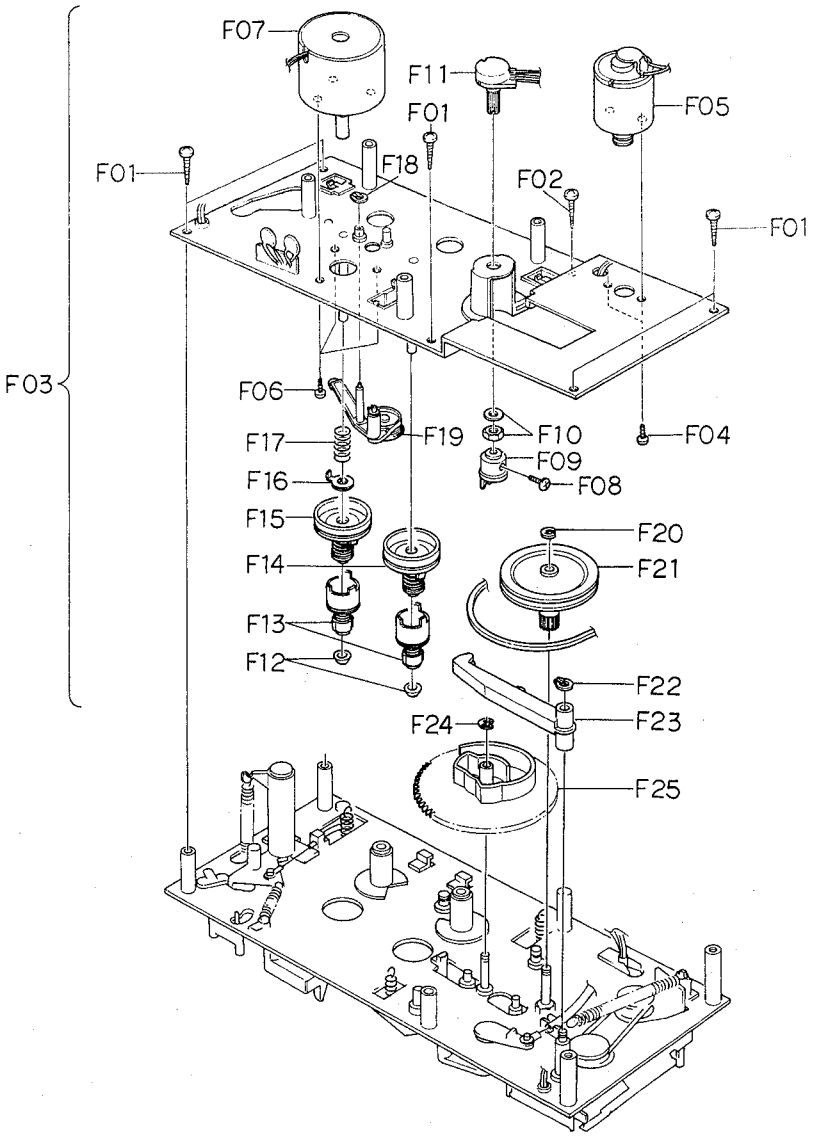


Fig. 3.9

3.27. Cam Drive Gear and Control Cam

Refer to Fig. 3.9.

(1) Remove Sub Mechanism Chassis Ass'y referring to item 3.23.
(2) Remove F20, then disassemble F21 (Cam Drive Gear).
(3) Remove F22, then disassemble F23 (Counter-Load Arm Ass'y).
(4) Remove F24, then disassemble F25 (Control Cam).

3.28. Head Mount Base Ass'y

Refer to Fig. 3.10.

(1) Refer to Fig. 3.7. Remove Cassette Case Ass'y referring to item 3.20.
(2) Remove F01, then disassemble F02 (Head Mount Base Ass'y).

3.29 Pressure Roller Ass'y and Erase Head

Refer to Fig. 3.10.

(1) Remove Head Mount Base Ass'y referring to item 3.28.
(2) Remove F03, then disassemble F04 (Supply Pressure Roller Ass'y).
(3) Remove F05, then disassemble F06 (Erase Head).
(4) Remove F07, then disassemble F08 (Take-up Pressure Roller Ass'y).

3.30. Playback Head Ass'y and Record Head Ass'y

Refer to Fig. 3.10.

(1) Remove Head Mount Base Ass'y referring to item 3.28.
(2) Turn F09 by 90° by pushing it, then disassemble F10 (Playback Head Ass'y).
(3) Turn F10 by 90° by pushing it, then disassemble F12 (Record Head Ass'y).

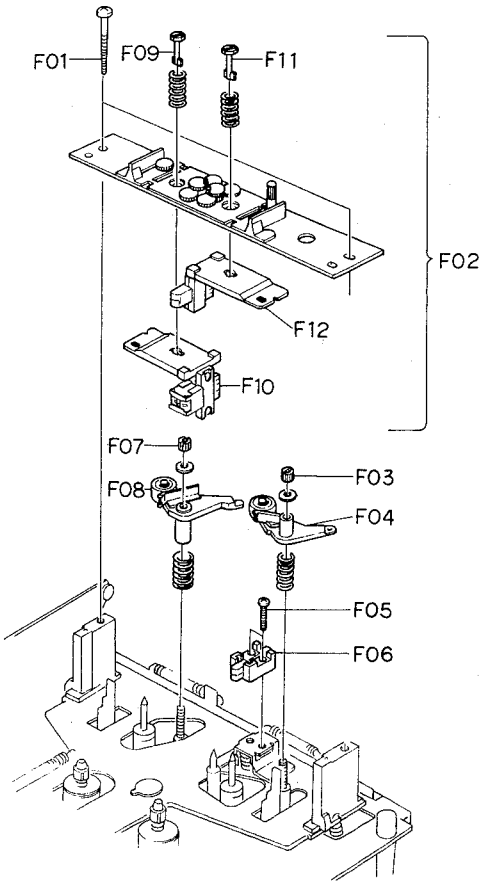


Fig. 3.10

4. MEASUREMENT INSTRUMENTS

(1) Audio Generator (20 Hz – 200 kHz)
(2) AC Millivolt Meter (with dB measures)
(3) Oscilloscope (DC – 5 MHz)
(4) Distortion Meter
(5) Speed & Wow/Flutter Meter
(6) Frequency Counter (DC – 1 MHz)
(7) Ohm Meter
(8) DC Volt Meter
(9) AC Volt Meter
(10) Torque Gauge (DA09013A)
(11) 15 kHz Azimuth Tape (DA09004A)
(12) 3 kHz Speed & Wow/Flutter Tape (DA09006A)
(13) 1 kHz Track Alignment Tape (DA09007A)
(14) 400 Hz Level Tape (DA09005A)
(15) 20 kHz PB Frequency Response Tape (DA09001A)
(16) 15 kHz PB Frequency Response Tape (DA09002A)
(17) 10 kHz PB Frequency Response Tape (DA09003A)
(18) Reference EXII Tape (DA09021A)
(19) Reference SX Tape (DA09025A)
(20) Reference ZX Tape (DA09037A)
(21) Tilt Check Gauge M-9039 (DA09039A)
(22) EH Tilt Check Gauge M-9040 (DA09040A)
(23) EH Stroke Check Gauge M-9042 (DA09042A)
(24) EH Stroke Check Gauge M-9051 (DA09051A)
(25) Stroke Check Gauge M-9047 (DA09047A)
(26) Record Head Mounting Gauge M-9048 (DA09048A)
(27) Audio Analyzer T-100
(including Distortion, Wow/Flutter, Speed, Oscillator and dB meter)

Notes: 1. (10) – (27) are the products of Nakamichi Corporation.
2. EH Stroke Check Gauge M-9042 (DA09042A) should be used for the Models serial Nos. from A11201001 to A11205380, and EH Stroke Check Gauge M-9051 (DA09051A) is for the Models serial No. A11205381 and greater.

5. MECHANICAL ADJUSTMENTS

5.1. Mechanism Control Cam Adjustment

Before adjustment, disassemble the Front Panel Ass'y, then remove the Cover Plate referring to items 3.4 and 3.21.

(1) Offset Adjustment of Control Motor Driver

(a) Refer to Figs. 5.1 and 5.2.
Adjust VR402 and VR403 on the Logic P.C.B. to locate approximately at the middle of the variable range. Then turn ON the Power Switch.
VR402 (for Cam position stop)
VR403 (for Cam position play)

(b) Press the Stop Switch to set the N-680 in stop mode. Adjust VR402 (for stop) so that the "S" mark on the Cam corresponds to the pointer on the mechanism chassis.

(c) Press the Play Switch to set the N-680 in playback mode.
(Cam will rotate, and the position marked with "PY" comes to the pointer.) Adjust VR403 (for play) so that the "PY" mark on the Cam corresponds to the pointer.

(d) Repeat above (b) and (c) 2 – 3 times so that the "S" and "PY" marks on the Cam correspond to the pointer accurately in stop and playback modes respectively.
(This adjustment is required because the position adjusted by one volume will be slightly changed when the other volume is adjusted.)

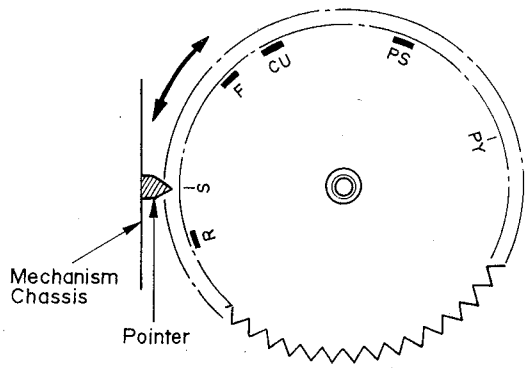


Fig. 5.1

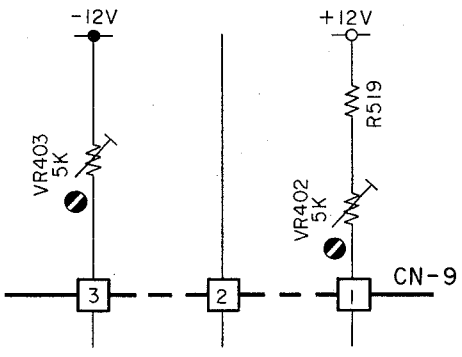


Fig. 5.2

(e) Set the N-680 in FF, pause, or cue mode by pressing each switch (press FF and Pause Switches to set the N-680 in cue mode) and check to insure that the pointer is in a range of "F", "PS", or "CU" mark respectively.

(f) If out of the range, precise adjustment for each position according to "(2) Offset Fine Adjustment of Control Motor Driver" will be required.

(2) Offset Fine Adjustment of Control Motor Driver

Adjust only if a satisfactory result is not obtained in "(1) Offset Adjustment of Control Motor Driver". This adjustment is made by changing the value of the fixed resistors on the Logic P.C.B.

Note: The value of voltage is typical value.

(a) Observation Point of Reference Voltage

Observe the each voltage at the sliding contact of the Cam Control Volume VR405 (10 kΩ) in stop, fast (FF or REW), pause, record and playback mode.

(b) Reference Voltage

Reference voltage at the sliding contact of VR405 (Cam Control Volume) in each mode is as follows:

Mode	Reference Voltage (Typical Value)	
Stop	3.0 V	1.7 V ±0.25 V
Fast (FF/REW)	1.3 V	
Pause	-2.8 V	2.6 V ±0.4 V
Play	-5.4 V	

(c) Resistors for Adjustment

Mode	Ref. No.	Typical Value
Stop	R461	9.1 kΩ (F)
Fast (FF/REW)	R463	4.32 kΩ (F)
Pause	R445	287 kΩ (F)
Play	R444	174 kΩ (F)

(d) Adjustment Procedures

1) Press the Stop Switch to set the N-680 in stop mode. Adjust the value of R461 to obtain 3.0 V (±0.6 V) at the sliding contact of VR405.
Note: When R461 is adjusted, the reference voltage in fast (FF or REW) mode is changed. Therefore, re-check of the reference voltage in fast (FF or REW) mode is required. If the reference voltage is out of the range, re-adjustment of R463 according to next step (2) is necessary.

2) Set the N-680 in FF mode, then adjust the value of R463 so that the voltage of VR405 will become lower by 1.7 V (±0.25 V) than in stop mode.

3) Press the Pause Switch to set the N-680 in pause mode.

Adjust the value of R445 to obtain −2.8 V (+0.4, -0.15 V) at the sliding contact of VR405.

4) Set the N-680 in playback mode, then adjust the value of R444 so that the voltage of VR405 will become lower by 2.6 V (±0.4 V) than in pause mode.

(3) Cam Timing Adjustment

(a) Remove the wires from the Control Motor Terminals to set the motor open.

(b) Without loading a cassette tape and with pressing the Record Protecting Switch with your finger tip, press the Record and Play Switches to set the N-680 in record mode.

(c) Turn the Cam and bring the "PY" mark toward the pointer by hand. Reel Motor will rotate before the "PY" mark reaches the pointer. Adjust the value of R483 and R484 so that the voltage at sliding contact of VR405 becomes -3.6 V (±0.3 V) when Reel Motor starts rotation.

(d) Observe the mute signal at the Q418 collector. Turn the Cam referring to above step (c) and check to insure that the voltage at the sliding contact of VR405 is -3.8 V (±0.3 V) when mute is released (mute signal changes from H to L).
(This voltage is determined by the adjustment of R483 and R484 in above step (c).)

(e) Observe the $\overline{\text{Rec.}}$ signal at the Q417 collector. Turn the Cam referring to above step (c) and adjust the value of R488 to obtain -2.1 V (±0.4 V) at the sliding contact of VR405 when $\overline{\text{Rec.}}$ signal changes from H to L (bias oscillation will begin).

(f) Upon completion of above adjustment, re-connect wires to the motor terminals.

5.2. Tape Speed Adjustment

(1) Standard Speed (1-7/8 ips)

(a) Remove the Top Cover.

(b) Connect a Frequency Counter to Output Jack.

(c) Load a 3 kHz Speed Wow/Flutter Tape (DA09006A) and play it back.

(d) Referring to Fig. 5.3, adjust the Tape Speed Adjustment Volume VR407 on the Speed Cal. P.C.B. to obtain 3,000 Hz on the Frequency Counter.

(2) Half-Speed (15/16 ips)

(a) Remove the Top Cover.

(b) Connect a Frequency Counter to Output Jack.

(c) Load a 3 kHz Speed Wow/Flutter Tape (DA09006A) and play it back.

(d) Referring to Fig. 5.3, adjust the Tape Speed Adjustment Volume VR408 on the Speed Cal. P.C.B. to obtain 1,500 Hz on the Frequency Counter.

CCW: Motor drives slowly.

CW: Motor drives fast.

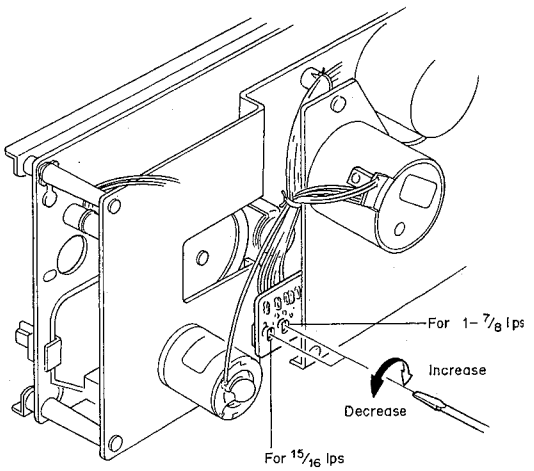


Fig. 5.3

5.3. Record Head and Playback Head Tilt Adjustment

Note: On items 5.3 — 5.8, please refer to Fig. 5.4 flow chart.

Refer to Figs 5.5 and 5.6.

(1) Load a Tilt Check Gauge M-9039 (DA09039A) in the N-680.

(2) Clip the grounding terminal of the Tilt Check Gauge with one end of the cord with clip, and the other end to the chassis of the N-680.

(3) Remove both of the Height Gears.

(4) Set the N-680 in play mode. Check to insure whether the Beacons Playback Head "Upper" or "Lower" and Record Head "Upper" or "Lower" are illuminating. In order not to give damages onto the head surfaces, push both of slide knobs of the Gauge to the direction of arrow marks, then return it to the original place to be in contact with record head and playback head surfaces after play mode is securely locked.

(5) Check to insure freedom from contact between the Gauge and pad lifter.

(6) Beacon Playback Head "Lower" will light on when height adjustment screw (P) turned clockwise but Playback Head "Upper" when counterclockwise. Adjust so that both "Upper" and "Lower" will light on even when you move the slide knob to the direction of an arrow mark and then return it to the original place.

(7) Same procedures will apply to the Beacons Record Head "Upper" and "Lower", except for the height adjustment screw (R).

(8) Set the N-680 in stop mode and fit both of the serrated height gears. Then set the N-680 again in play mode and insure all of the 4 Beacons are illuminating. If not, (3) through (7) will have to be repeated till satisfactory results are obtained.

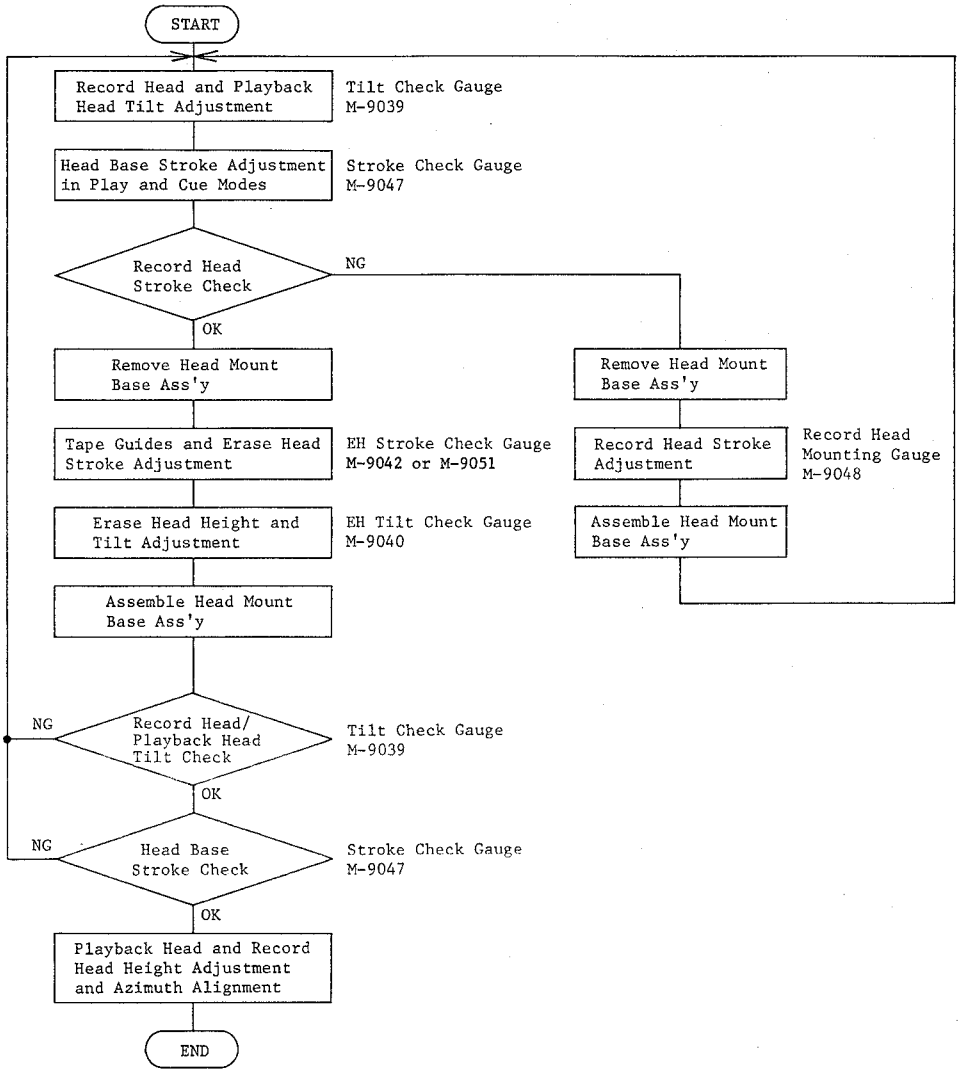


Fig. 5.4 Adjustment Flow Chart

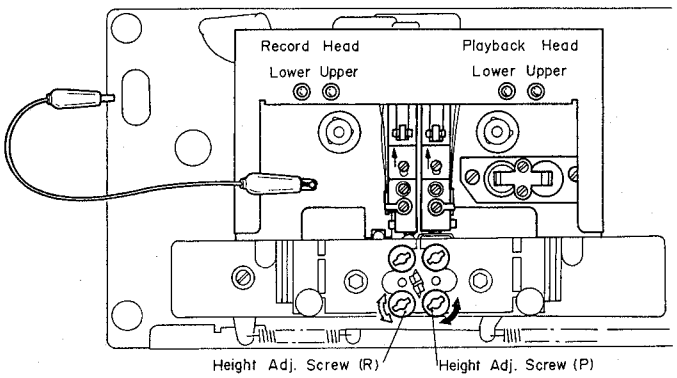


Fig. 5.5

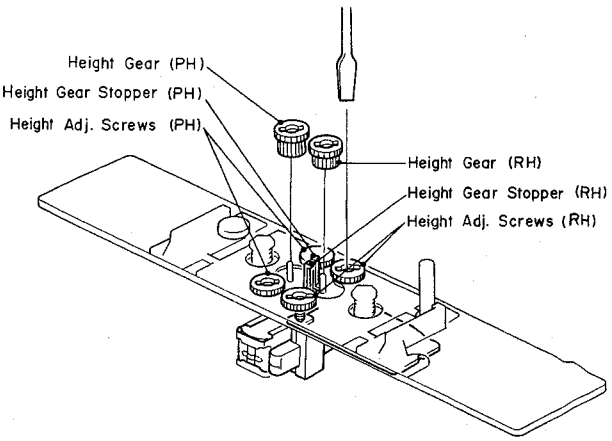


Fig. 5.6

5.4. Head Base Stroke Adjustment in Play and Cue Modes

Note: Before you conduct this adjustment, adjust with a "Tilt Check Gauge" to insure freedom from tilt on the playback head and record head.

(1) Head Base Stroke Adjustment in Play Mode

Refer to Fig. 5.7.

(a) Load a Stroke Check Gauge M-9047 (DA09047A) in the N-680.

(b) Move Record Head Indicator and Playback Head Indicator to the direction of arrow mark "A" with your finger tip and then set the N-680 in play mode.
Then slowly release the Indicators and insure whether each of the Indicators is in contact with record and playback heads.

(c) Check to insure whether the "P" pointer on the Playback Head Indicator locates between the 2 lines on the Indicator Plate.

(d) If the playback head stroke is noted to be misaligned, adjustment can be made by moving the stroke adjuter assembled in the head base assembly (either forwardly or backwardly).

(e) Check to insure whether the "P" pointer on the Playback Head Indicator locates between the 2 lines on the Record Head Indicator, thus check can be made on record head stroke.

(f) If the record head stroke is noted to be misaligned, adjustment can be made with a Record Head Mounting Gauge M-9048 (DA09048A).

(2) Head Base Stroke Adjustment in Cue Mode

Refer to Fig. 5.8.

(a) Load a Stroke Check Gauge M-9047 (DA09047A) in the N-680.

(b) Move Record Head Indicator and Playback Head Indicator to the direction of arrow mark "A" with your finger tip and then set the N-680 in cue mode (F.F. and Pause).
Then slowly release the Indicators and insure whether each of the Indicators is in contact with record and playback heads.

(c) Check to insure whether the "C" pointer on the Playback Head Indicator locates between the 2 lines on the Indicator Plate.

(d) If the playback head stroke is noted to be misaligned, adjust VR401 on the Logic P.C.B. Ass'y till satisfactory results are obtained.

(e) After completion of the Head Base Stroke Adjustment, check to insure accuracy of the Head Base Stroke Adjustment in play mode.
If the above are inaccurate, items (1) and (2) will have to be repeated till satisfactory results are obtained.

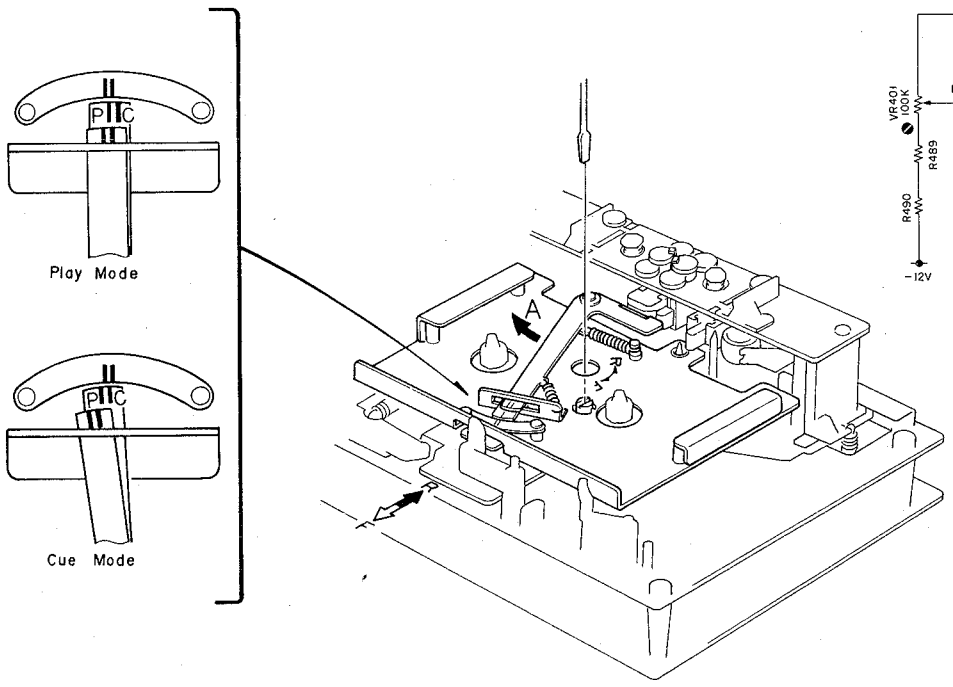


Fig. 5.7

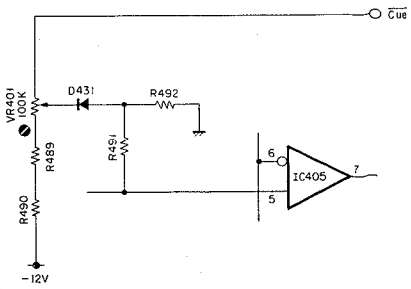


Fig. 5.8

5.5. Tape Guides Adjustment and Erase Head Stroke Adjustment

Remove Head Mount Base Ass'y referring to item 3.28. Refer to Figs. 5.9 and 5.10.

(1) Supply Tape Guide Height Adjustment

(a) Load an EH Stroke Check Gauge M-9042/M-9051 in the N-680.
(b) Set the N-680 in play mode.
(c) Slide the Supply Tape Guide Check Bar down against the supply tape guide, thus check can be made on supply tape guide height.
(d) If the supply tape guide is misaligned, the Supply Tape Guide Check Bar will not come into the supply tape guide. If such is noted, turn to adjust the height adjustment nut A till the Supply Tape Guide Check Bar is accepted by the supply tape guide.
(e) If the above are insured, set the N-680 in pause mode, then in play mode to see whether adjustments are appropriately made. If not, (b) through (e) will have to be repeated till satisfactory results are obtained.

(2) Take-up Tape Guide Height Adjustment

(a) Load an EH Stroke Check Gauge M-9042/M-9051 in the N-680.
(b) Set the N-680 in play mode.
(c) Slide the Take-up Tape Guide Check Bar down against the take-up tape guide, thus check can be made on take-up tape guide height.
(d) If the take-up tape guide is misaligned, the Take-up Tape Guide Check Bar will not come into the take-up tape guide. If such is noted, turn to adjust the height adjustment nut B till the Take-up Tape Guide Check Bar is accepted by the take-up tape guide.
(e) If the above are insured, set the N-680 in pause mode, then in play mode to see whether adjustments are appropriately made. If not, (b) through (e) will have to be repeated till satisfactory results are obtained.

(3) Erase Head Stroke Adjustment

(a) Load an EH Stroke Check Gauge M-9042/M-9051 in the N-680.
(b) Set the N-680 in play mode, thus check can be made on erase head stroke through the EH Stroke Indicator.
(c) Check to insure whether the erase head surface is aligned with red line on the EH Stroke Indicator. If not, adjust the erase head stroke by loosening 2 screws that assembled erase head and erase head plate.
(d) After completion of adjustment, 2 pcs. of screws shall be locked with lock tight paint.

Note:
EH Stroke Check Gauge M-9042 (DA09042A) should be used for the Models serial Nos. from A11201001 to A11205380, and EH Stroke Check Gauge M-9051 (DA-09051A) is for the Models serial No. A11205381 and greater.

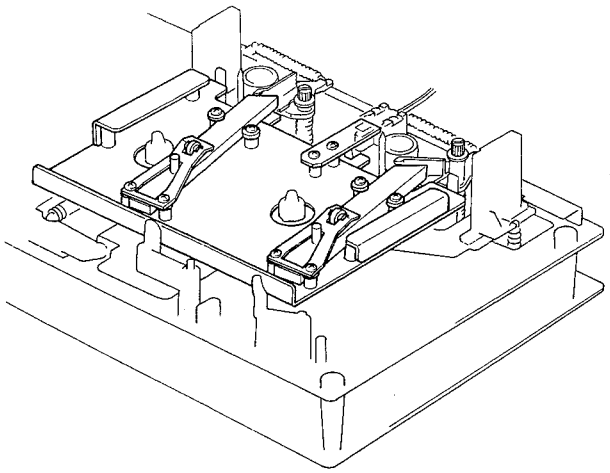


Fig. 5.9

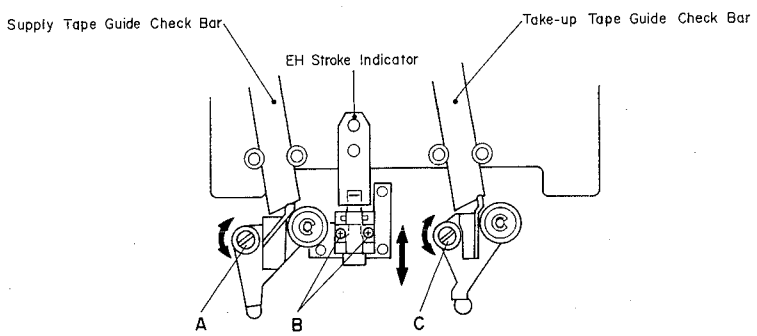


Fig. 5.10

5.6. Erase Head Height and Tilt Adjustment

Refer to Figs. 5.11 and 5.12.

(1) Remove Head Mount Base Ass'y referring to item 3.28.
(2) Load an EH Tilt Check Gauge M-9040 (DA09040A) in the N-680.
(3) Set the N-680 in stop mode.
(4) Check to insure whether one of the 3 Beacons is illuminating. Look down the mirror as shown by an arrow mark and slowly turn the Screw "Height" counterclockwise (or clockwise) so that the two horizontal lines of the mirror will become superposed on the line (in different color) of the erase head, and check to insure whether Beacon "1" is illuminating.
(5) Turn Screw "Tilt" counterclockwise (or clockwise) to light on Beacon "2". Excessive turning will cause the Beacon "1" to light off. Adjustments of Screw "Tilt" will therefore be conducted till both of the Beacons "1" and "2" illuminate.
(6) Turn Screw "Azimuth" counterclockwise (or clockwise) to light on Beacon "3". Excessive turning will cause either Beacon "1" or "2" to light off, and therefore adjust with Screw "Azimuth" until all of the 3 Beacons, "1", "2" and "3" illuminate.
(7) Check to insure whether the horizontal line on the mirror corresponds to that on the erase head. If not, (4) through (7) will have to be repeated till satisfactory results are obtained.
(8) After completion of adjustment, 3 pcs. of screws shall be locked with lock tight paint.

Note: Before use of this gauge, check to insure freedom from dust or dirts, or overflow in the groove of the erase head surface.

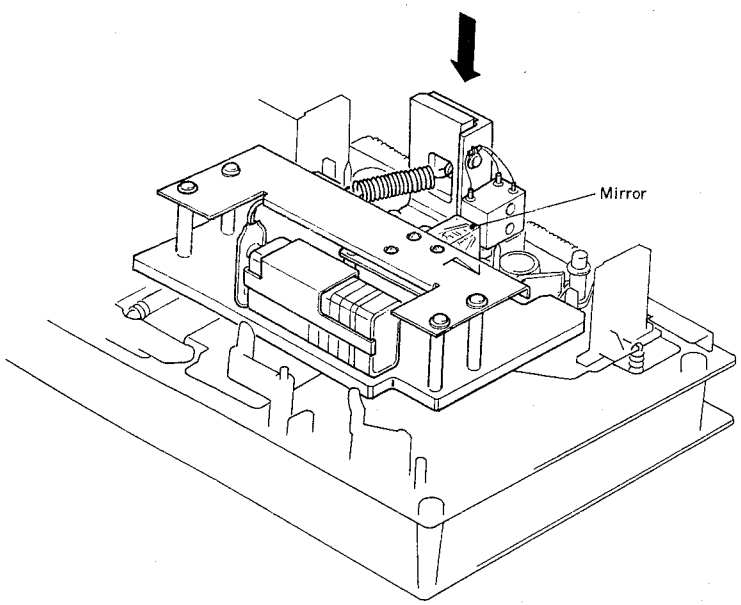


Fig. 5.11

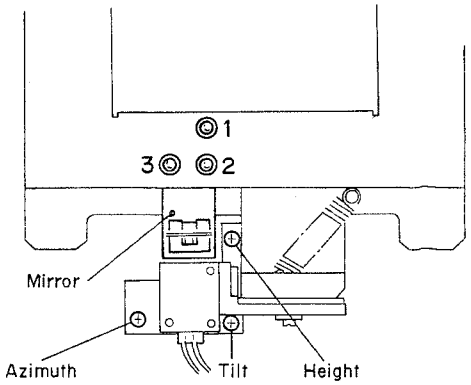


Fig. 5.12

5.7. Playback Head and Record Head Height Adjustment and Azimuth Alignment

Refer to Fig. 5.13.

(1) Playback Head Height Adjustment and Azimuth Alighment

(a) Place the Monitor Switch in the Tape position, then connect a VTVM to the Output Jacks.
(b) Load a 1 kHz Track Alignment Tape (DA09007A), then set the N-680 in play mode.
(c) Turn the PH Height Gear until the output of both channels becomes minimum.
(d) Load a 15 kHz Azimuth Tape (DA09004A), then set the N-680 in play mode.
(e) Turn the PH Azimuth Alignment Screw until the output of both channels becomes maximum.
(f) Repeat (b) through (e) for 1 – 2 times.

(2) Record Head Height Adjustment and Azimuth Alignment

(a) Place the Monitor Switch in the Tape position, then connect a VTVM to the Output Jacks.
(b) Load a Reference SX Tape (DA09025A). Set the Eq. and Tape Switches of the N-680 to 70 μs and SX positions, then set the N-680 in record and play mode.
(c) Set the Display Switch of the N-680 to Cal., then turn the RH Height Gear until the output of both channels becomes maximum.
(d) Feed in 15 kHz (-20 dB) and set the N-680 in record and play mode, then turn the RH Azimuth Alignment Screw until the output of both channels becomes maximum.
(e) Repeat (c) and (d) for 1 – 2 times.
(f) After completion of both adjustment and alignment, record the 400 Hz tone to the same portion of both A and B sides of the tape.
(g) Immerse the recorded tape in a magnetized developing solution. In turn, check to insure that the recording head tracks across the center are separated with a distance of 0.55 to 0.75 mm (typically 0.65 mm) as illustrated in Fig. 5.14.

Note: Liquid for tape magnetized development solution
"MAGNA-SEE, SOUND CRAFT a product of CBS RECORDS a division of Columbia Broadcasting System, Inc., Danbury, Conn. 06810 U.S.A., or equivalent".
After development, clean the tape otherwise pressure rollers and heads will become dirty.

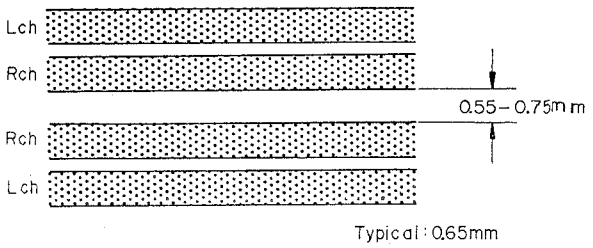


Fig. 5.14

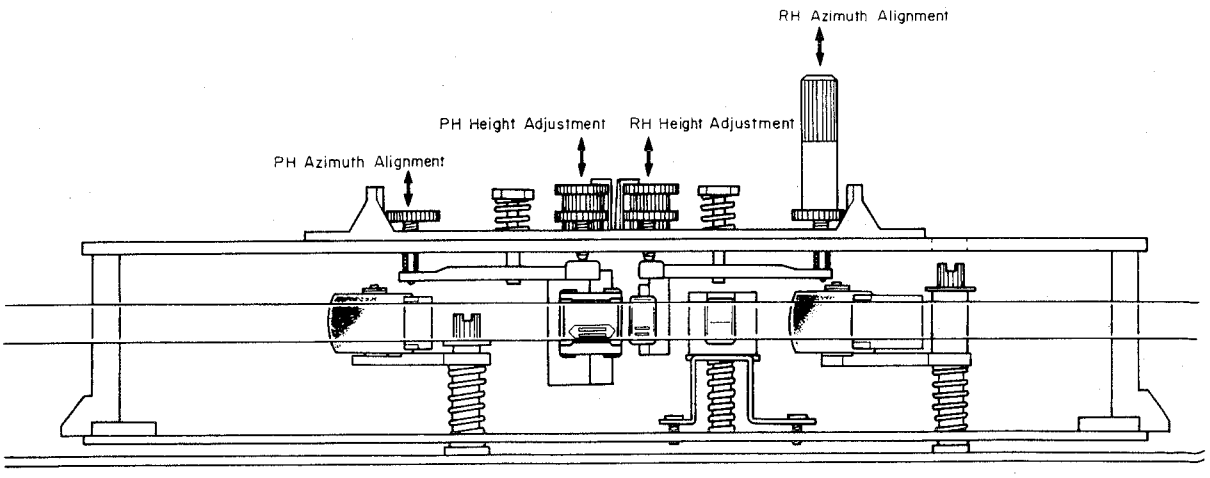


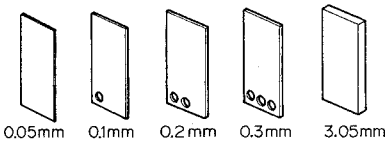
Fig. 5.13

5.8. Record Head Stroke Adjustment

Refer to Figs. 5.15 and 5.16.

Note: This adjustment will be required only to insure freedom from misalignment of the record head stroke in the record head stroke check mode.

(1) Check the accuracy of the record head stroke.
(2) Remove Head Mount Base Ass'y referring to item 3.28.
(3) Remove the record head assembly.
(4) Adjustment of Record Head Mounting Gauge M-9048 (DA09048A)
  (a) Mount the Block B onto the Mounting Gauge Plate.
  (b) Loosen the 2 screws fixing the Block A.
  (c) As shown in the Fig. 5.15, hold the Gauges (3.05 mm and 0.1 mm thickness) between the Block A and Block B, fix the Block A with screws, pushing the Block A to the 2 guide pins.
(5) Remove the Block B from the Mounting Gauge Plate.
(6) As shown in the Fig. 5.16, mount the R-54 record head assembly onto the Mounting Gauge Plate, then check the location of the R-54 record head surface. (If record head contacts to the Block C, loosen 2 pcs. of screws that assembled record head and R-54 record head assembly, then place the R-54 record head assembly onto the Plate.)
(7) Remove the R-54 record head assembly from the Mounting Gauge Plate.
(8) Readjustment of Record Head Mounting Gauge M-9048 (DA09048A)
  (a) Mount the Block B onto the Mounting Gauge Plate.
  (b) Loosen the 2 screws fixing the Block A.
  (c) As shown in the Fig. 5.15, hold the Gauges (3.05 mm and either one of 0.05, 0.15, 0.2, 0.25, 0.3 or 0.35 mm thickness) between the Block A and Block B, fix the Block A with screw, pushing the Block A to the 2 guide pins.
(9) Remove the Block B from the Mounting Gauge Plate.
(10) Mount the R-54 record head assembly onto the Mounting Gauge Plate.
(11) As shown in the Fig. 5.16, loosen the R-54 record head with 2 pcs. of screws onto the record head plate. As the location of the Block A is secured by the item (8) - (c), push the record head to the directions A and B, then tighten 2 pcs. of screws.
(12) Check to insure freedom from gap between the Block C and record head surface, then tight the 2 pcs. of screws on the record head plate with lock tight paint.
(13) Assemble the record head assembly to the head mount base assembly.
(14) Assemble the head mount base assembly to the mechanism assembly.
(15) Check the record head stroke.
If the above are inaccurate, items (1) through (15) will have to be repeated till satisfactory results are obtained.



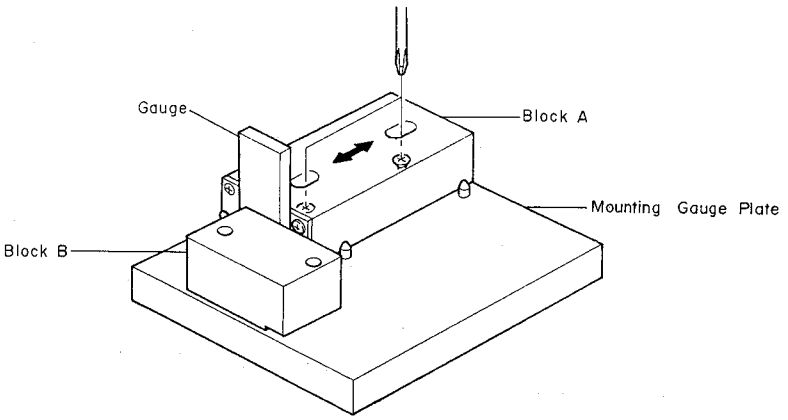


Fig. 5.15

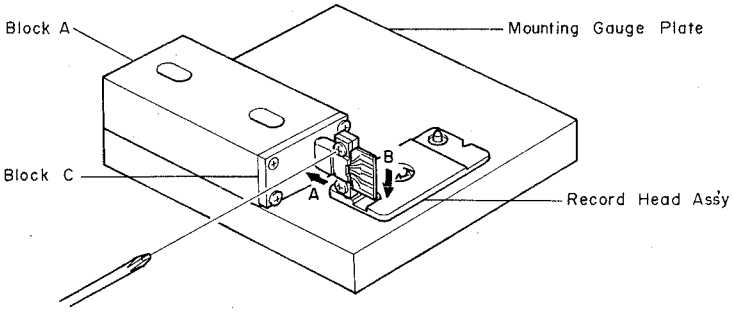


Fig. 5.16

5.9. Tape Travelling Adjustment

The adjustment shall be made with a modified version of the current type EXII C-90 as shown in Fig. 5.17 (error will be made if a current type Tape Travelling Cassette (DA09011A) should be used for this purpose).

While modifying an EXII C-90, the tape guides in the cassette housing shall be kept protected to avoid tilt. Check shall be made in the following procedures:

(1) An EXII C-90 Tape thus modified shall be loaded onto the N-680.
(2) Release the back-tension (rotate the Supply Reel and feed out some length of tape) and set the N-680 in play mode.
(3) In this juncture, check to insure whether the tape is free from waving or slippage from the tape guide.
(4) When the modified EXII C-90 is played back, check to insure whether the tape is freedom from waving from head surface or at pressure rollers.
(5) If either of waving or slippage from the tape guide should be noted, adjustments of "5.3. Record Head and Playback Head Tilt Adjustment", "5.4. Head Base Stroke Adjustment", "5.5. Tape Guides Adjustment and Erase Head Stroke Adjustment", "5.6. Erase Head Height and Tilt Adjustment", "5.7. Playback Head and Record Head Height Adjustment and Azimuth Alignment", "5.8. Record Head Stroke Adjustment", etc. will be required.

As a case may be, the said waving or slippage may have been caused from defective supply Pressure Roller Ass'y or Take-up Pressure Roller Ass'y without parallel contact with capstans. If such are noted, the Pressure Roller Assemblies will have to be replaced.

Further, excessively weak take-up torque or strong take-up torque may cause defective tape travelling.

The N-680 is intended to be an adjustment-free Model, however if the similar matters as above should be noted, please replace the Reel Hub Ass'y to obtain appropriate take-up torque.

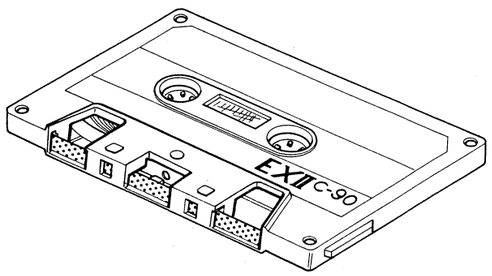


Fig. 5.17

5.10. Flywheel Holder Adjustment

(1) Refer to Fig. 5.18.
Tighten the Thrust Screws until the gap between the Flywheel Assemblies and Thrust Screws becomes minimized when both of the Capstan Shafts are moved backwardly and forwardly (the Thrust Springs between the Capstan Flanges and Flywheel Thrust Caps are in a flat state).
Excessive tightening of the Thrust Screws however will give damages on the Flywheel Assemblies, to which careful attention is invited.
(2) Return the Thrust Screws by 1/2 turn.
(3) Fixing the Thrust Screw with a screwdriver, lock the Lock Nut.
(4) Apply a quantity of lock tight paint to the Thrust Screws.

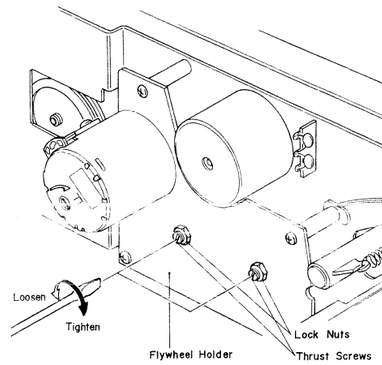


Fig. 5.18.

5.11. Lubrication

N-680 is a lubrication-free cassette deck except when parts are replaced. Apply the following lubricant for each replaced part:

(1) LAUNA #100
Capstan Shaft
Pressure Roller Shaft
Thrust Cap
(2) FLOIL GB-TS-1
Reel Hub Shaft
Thrust portion on the Capstan Shaft
FLOIL GB-TS-1, made by Kanto Chemicals Co., Ltd., in Japan.
We suggest you use the above or equivalent type. If unavailable please contact Kanto Chemicals Co., Ltd., 2-7 Kanda Suda-cho Chiyoda-ku, Tokyo 101 Japan.
(3) Silicon Oil #3000CST
Air Damper Piston
Note: Excessive lubrication may cause defective damper action as the 0.2ϕ hole at the end of the cylinder may be filled with oil.

6. ELECTRICAL ADJUSTMENTS AND MEASUREMENTS

6.1. Current Type (Serial No.: A11202474 –)

6.1.1. Parts Location for Electrical Adjustment

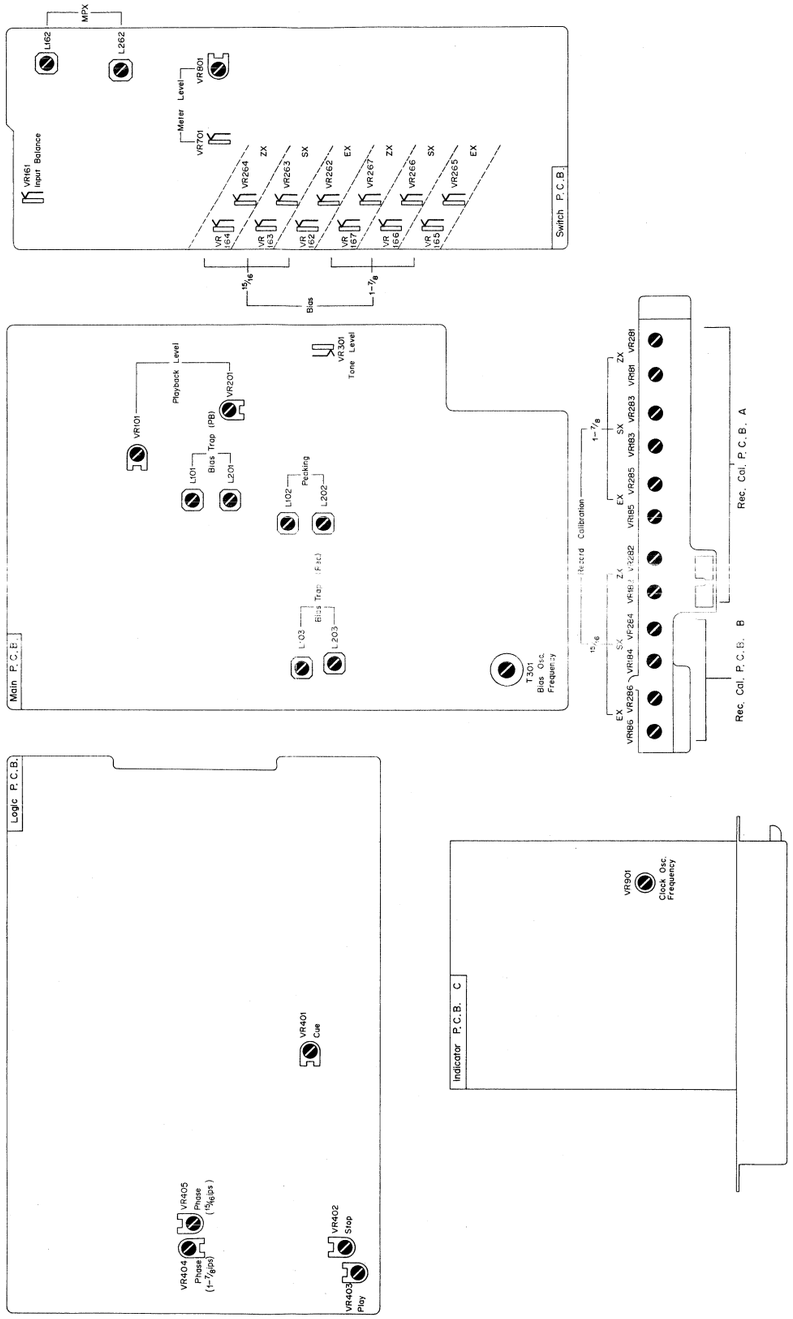


Fig. 6.1.1-A Serial No.: A11202661 –

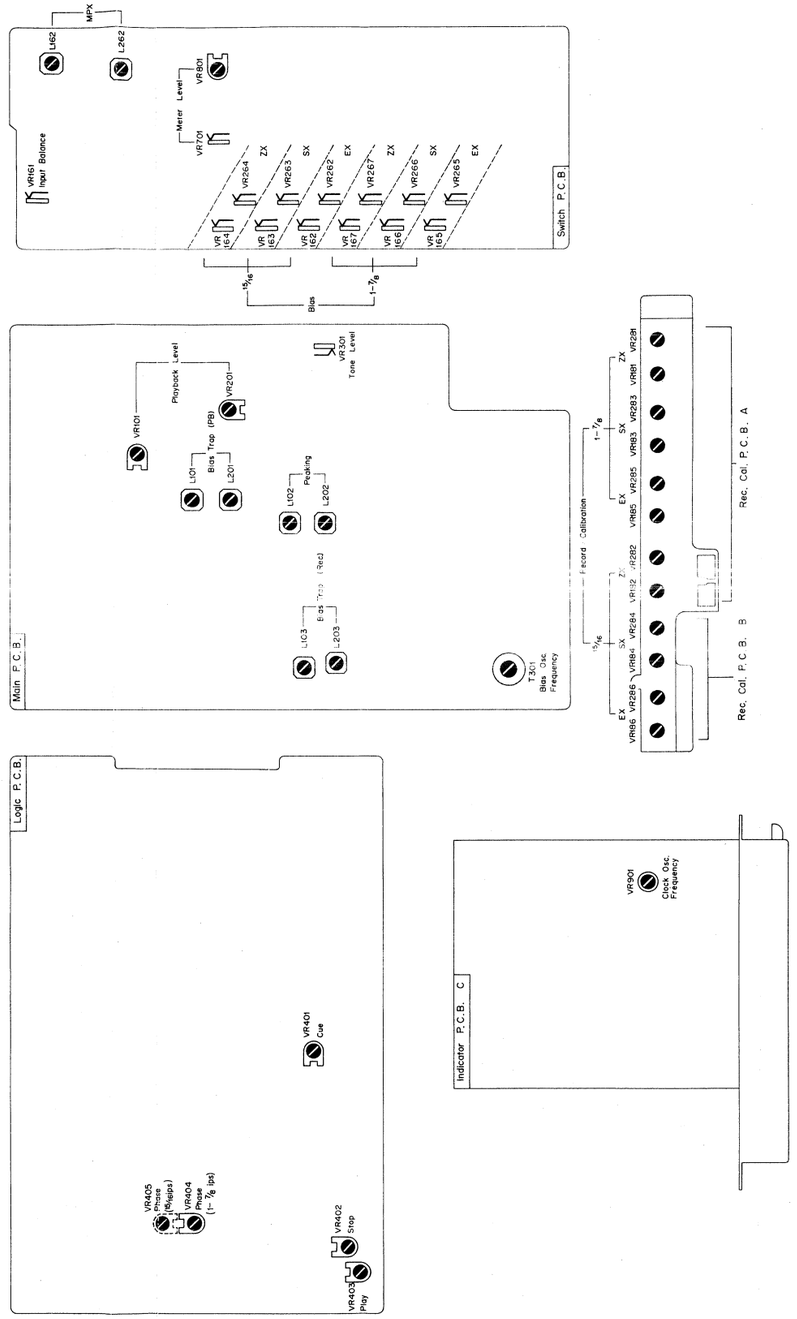


Fig. 6.1.1-B Serial Nos.: A11202474 – A11202660

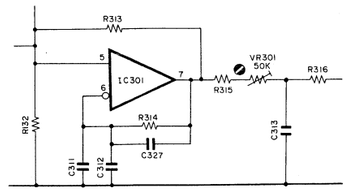


Fig. 6.1.2 2. Tone Calibration

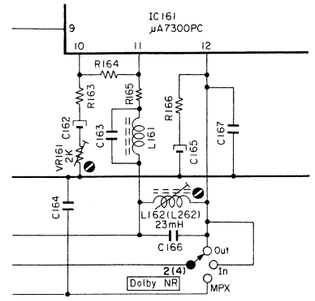


Fig. 6.1.3 2. Tone Calibration
4. MPX Filter

Fig. 6.1.4 3. FL Indicator Level and Dynamic Range

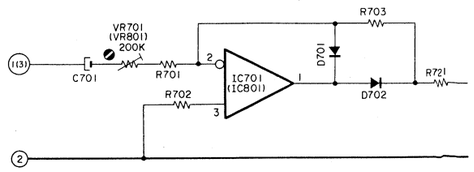


Fig. 6.1.5 3. FL Indicator Level and Dynamic Range

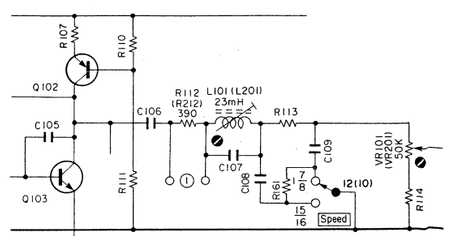


Fig. 6.1.6 7. Playback Level
8. Playback Frequency Response (1-7/8 ips)

6.1.2. Electrical Adjustments and Measurements

(1) Adjustment and Measurement Instructions Note: Electrical Adjustment should be performed after mechanical adjustment is completed.

STEP	ITEM	SIGNAL SOURCE	OUTPUT CONNECTION	MODE	ADJUSTMENT	REMARKS
1	Tape Speed	3 kHz Speed and Wow/Flutter Tape (DA09006A)	Frequency Counter to OUTPUT Jacks	Playback	Speed Cal. P.C.B. VR407 VR408	1. Standard Speed (1-7/8 ips): Adjust VR407 to obtain 3 kHz ± 0.5%. 2. Half-Speed (15/16 ips): Adjust VR408 to obtain 1.5 kHz ± 0.5%.
2	Tone Calibration	Test Tone 400 Hz	VTVM to TP101, TP201 on the Main P.C.B.	Monitor SW – Source Display SW – CAL	Main P.C.B. VR301 Switch P.C.B. VR161	1. Set the Display Switch to CAL. Turn output level control fully clockwise (maximum position). 2. Adjust VR301 to obtain 100 mV ± 0.2 dB on the VTVM at TP201 (output will be 1 V (0 dB)). 3. Adjust VR161 to obtain the same level as Right channel on the VTVM at TP101.
3	FL Indicator Level and Dynamic Range	400 Hz (0 dB/–20 dB) to INPUT Jacks	Frequency Counter to IC907-10 pin on the Indicator P.C.B. C and VTVM to TP101, TP201 on the Main P.C.B.	Monitor SW – Source Display SW – VU or P. Hold	Indicator P.C.B. C VR901 Switch P.C.B. VR701, VR801	1. Remove the Display Ass'y from the Front Chassis, then disassemble the Display Ass'y itself. 2. Adjust VR901 to obtain 25.6 kHz clock oscillation frequency on the Frequency Counter. 3. Assemble the Display Ass'y, then install it to the Front Chassis. 4. Adjust the input level control to obtain 100 mV at TP101 (TP201) on the VTVM. 5. Adjust VR701 (VR801) so that the FL level indicator displays 0 dB. 6. Decrease input signals by 20 dB to obtain 10 mV at TP101 (TP201) on the VTVM, then adjust VR901 so that the FL level indicator displays –20 dB. 7. Repeat steps 4 through 6 till satisfactory results are obtained.
4	MPX Filter	19 kHz ± 100 Hz to INPUT Jacks	VTVM to OUTPUT Jacks	Monitor SW – Source Display SW – VU or P. Hold Dolby NR SW – OUT/MPX	Switch P.C.B. L162, L262	1. Turn output level control fully clockwise (maximum position). 2. Adjust input level control to obtain 1 V on the VTVM. 3. Set the Dolby NR Switch to MPX position, then adjust L162 (L262) to obtain minimum reading on the VTVM (minimum reading will be less than –30 dB).
5	Playback Head Track Alignment	1 kHz Track Alignment Tape (DA09007A)	VTVM to OUTPUT Jacks	Playback Monitor SW – Tape Display SW – VU or P. Hold Eq. SW – 70 μs Dolby NR SW – OUT Tape Speed SW – 1-7/8 ips	Playback Head Height Adj. Screw	Adjust the Playback Head Height Adj. Screw to obtain minimum reading of both L and R channels on the VTVM. See "Playback Head Height Adjustment and Azimuth Alignment" in item 5.7.
6	Playback Head Azimuth Alignment	15 kHz Azimuth Tape (DA09004A)	VTVM to OUTPUT Jacks	Playback Monitor SW – Tape Display SW – VU or P. Hold Eq. SW – 70 μs Dolby NR SW – OUT Tape Speed SW – 1-7/8 ips	Playback Head Azimuth Alignment Screw	Adjust the Playback Head Azimuth Alignment Screw to obtain maximum reading of both L and R channels on the VTVM. See "Playback Head Height Adjustment and Azimuth Alignment" in item 5.7. Note: Repeat steps 5 and 6 one or two times to obtain optimum performance.
7	Playback level	400 Hz Level Tape (DA09005A)	VTVM to TP101, TP201 on the Main P.C.B.	Same as above	Main P.C.B. VR101, VR201	Adjust VR101 (VR201) to obtain 100 mV on the VTVM or 0 dB on the FL level indicators.
8	Playback Frequency Response Adjustment at Standard Speed (1-7/8 ips)	400 Hz Level Tape (DA09005A) 10 kHz PB Frequency Response Tape (DA09003A) 15 kHz PB Frequency Response Tape (DA09002A) 20 kHz PB Frequency Response Tape (DA09001A)	VTVM to OUTPUT Jacks	Playback Monitor SW – Tape Display SW – VU or P. Hold Eq. SW – 70 μs Dolby NR SW – OUT Tape Speed SW – 1-7/8 ips	Main P.C.B. R112, R212	1. Load the 400 Hz level tape and play it back. Adjust the output level control to a certain level (example 0 dB). 2. Load the 10 kHz, 15 kHz and 20 kHz PB frequency response tapes and adjust the playback head azimuth to give maximum levels on the VTVM with each tape. Short R112 (R212) to obtain the following levels against 400 Hz level tape. Refer to Fig. 6.1.6. 10 kHz: –20 dB –1 dB to +2 dB 15 kHz: –20 dB –1 dB to +3 dB 20 kHz: –20 dB –1 dB to +4 dB 3. Conduct step 6 "Playback Head Azimuth Alignment". 4. If above is not sufficient, refer to "Playback Frequency Response Adjustment" in item 6.1.2-(2).

STEP	ITEM	SIGNAL SOURCE	OUTPUT CONNECTION	MODE	ADJUSTMENT	REMARKS
9	Playback Frequency Response Check at Half-Speed (15/16 ips)	400 Hz Level Tape (DA09005A) 10 kHz PB Frequency Response Tape (DA09003A) 15 kHz PB Frequency Response Tape (DA09002A) 20 kHz PB Frequency Response Tape (DA09001A)	VTVM to OUTPUT Jacks	Playback Monitor SW — Tape Display SW — VU or P. Hold Eq. SW — 120 μs Dolby NR SW — OUT Tape Speed SW — 15/16 ips		1. Load the 400 Hz level tape and play it back. Adjust the output level control to a certain level (example 0 dB). 2. Load the 10 kHz, 15 kHz and 20 kHz PB frequency response tapes and adjust the playback head azimuth to give maximum levels on the VTVM with each tape. Check to insure the following levels against 400 Hz level tape. Output frequency will become half as shown in ( ) as the tape speed is half. 10 kHz: (5 kHz) −22 dB −3 dB to 0 dB 15 kHz: (7.5 kHz) −22 dB −3 dB to +1 dB 20 kHz: (10 kHz) −22 dB −3 dB to +2 dB 3. Conduct step 6 "Playback Head Azimuth Alignment".
10	Bias Oscillation Frequency and Erase Current	Connect an additional 0.1 Ω resistor in series to the Erase Head	VTVM and Frequency Counter across the additional 0.1 Ω resistor	Record, Pause Monitor SW — Source Tape SW — ZX Eq. SW — 70 μs Dolby NR SW — OUT	Main P.C.B. T301 R331, R330	1. Adjust T301 to obtain 105 kHz on the frequency counter. 2. Check the erase current by the VTVM. Erase current will be in a range of 310 mA to 400 mA (typically approx. 350 mA). If erase current is not sufficient, increase it by shorting R331 or R330. 3. After completion of the erase current adjustment, re-check the bias oscillation frequency.
11	Record Amplifier Equalizer	23 kHz (−20 dB) to INPUT Jacks	VTVM to CN2-1, CN2-3 on the Main P.C.B.	Record, Pause Monitor SW — Source Display SW — VU or P. Hold Tape SW — ZX Eq. SW — 70 μs Dolby NR SW — OUT Tape Speed SW — 1-7/8 ips	Main P.C.B. L102, L202	1. Remove the bias-cut-jumper from the dip side of the Main P.C.B. 2. Adjust L102 (L202) to obtain peak reading at 23 kHz on the VTVM. 3. Re-solder the bias-cut-jumper.
12	Bias Trap (Record Amp.)	Remove Input Signals	Same as above	Same as above	Main P.C.B. L103, L203	Adjust L103 (L203) to obtain maximum reading on the VTVM.
13	Bias Trap (Playback Amp.)	Remove Input Signals	VTVM to OUTPUT Jacks	Same as above	Main P.C.B. L101, L201	Adjust L101 (L201) to obtain minimum reading on the VTVM.

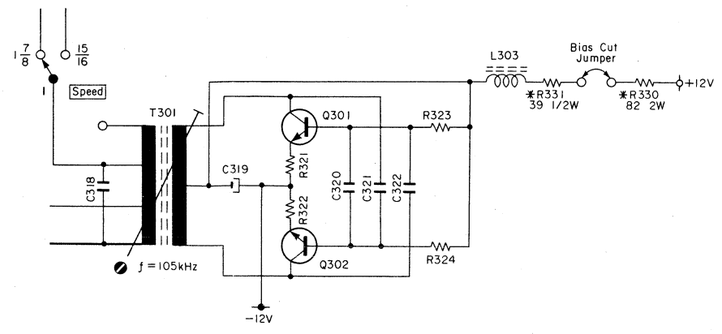


Fig. 6.1.7
10. Bias Oscillation Frequency and Erase Current

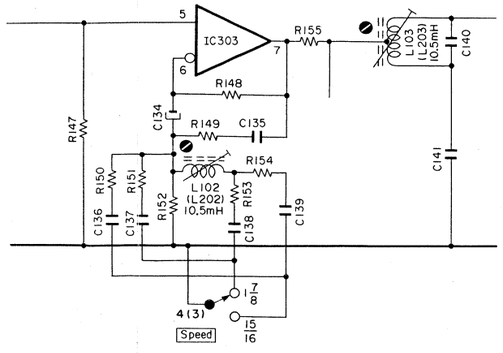


Fig. 6.1.8
11. Record Amp. Equalizer
12. Bias Trap (Record Amp.)

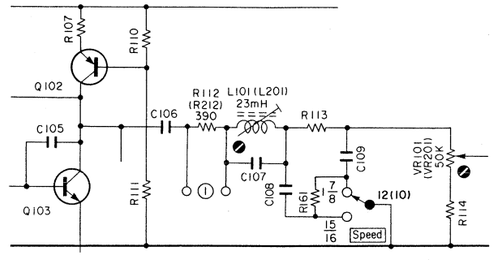


Fig. 6.1.9
13. Bias Trap (Playback Amp.)

STEP	ITEM	SIGNAL SOURCE	OUTPUT CONNECTION	MODE	ADJUSTMENT	REMARKS
14	Record Head Height Adjustment	Test Tone 400 Hz	VTVM to OUTPUT Jacks	Record, Playback Monitor SW – Tape Display SW – CAL Tape SW – SX Eq. SW – 70 μs Dolby NR SW – OUT Tape Speed SW – 1-7/8 ips	Record Head Height Adj. Screw	Adjust the Record Head Height Adj. Screw to obtain maximum reading of L and R channels on the VTVM. See "Record Head Height Adjustment and Azimuth Alignment" in item 5.7.
15	Record Head Azimuth Alignment	15 kHz (–20 dB) to INPUT Jacks	VTVM to OUTPUT Jacks	Record, Playback Monitor SW – Tape Display SW – VU or P. Hold Tape SW – SX Eq. SW – 70 μs Dolby NR SW – OUT Tape Speed SW – 1-7/8 ips	Record Head Azimuth Alignment Knob	Adjust the Record Head Azimuth Alignment Knob to obtain maximum reading of L and R channels on the VTVM. See "Record Head Height Adjustment and Azimuth Alignment" in item 5.7.
16	Record Head Azimuth Phase Adjustment	Test Tone 400 Hz and 15 kHz (–20 dB) to INPUT Jacks	VTVM to OUTPUT Jacks	Record, Playback Monitor SW – Tape Display SW – CAL/VU or P. Hold Tape SW – ZX Eq. SW – 70 μs Dolby NR SW – OUT Tape Speed SW – 1-7/8 ips / 15/16 ips	Standard Speed (1-7/8 ips): Rec. Cal. P.C.B. (Level) VR181, VR281 Switch P.C.B. (Bias) VR167, VR267 Logic P.C.B. VR404 Half-Speed (15/16 ips): Rec. Cal. P.C.B. (Level) VR182, VR282 Switch P.C.B. (Bias) VR164, VR264 Logic P.C.B. VR405	1. Step 15 "Record Head Azimuth Alignment" should be completely performed. 2. Perform the following adjustment procedures first at standard tape speed, then at half tape speed. a. Set VR405 to the center position. b. Set the Tape Speed Selector to 1-7/8 / 15/16. c. Set the Display Switch to CAL. d. Record signals on the reference ZX tape (DA09037A), then play it back. e. Adjust Record Cal. VR181(VR281)/VR182(VR282) to the center position. f. Adjust Bias VR167(VR267)/VR164(VR264) to obtain maximum reading on the VTVM. g. Set the Display Switch to VU or P. Hold, then feed in 15 kHz (–20 dB). h. Record signals on the reference ZX tape (DA09037A), then play it back. i. Adjust Record Head Azimuth Alignment Knob to obtain maximum reading on the VTVM, while adjust Bias VR167(VR267)/VR164(VR264) to obtain –20 dB ±0 dB on the VTVM. j. Set the Display Switch to CAL. k. Adjust VR404/VR405 so that the azimuth cursors are coincident with the rightmost edges of the main displays on the FL level indicators.

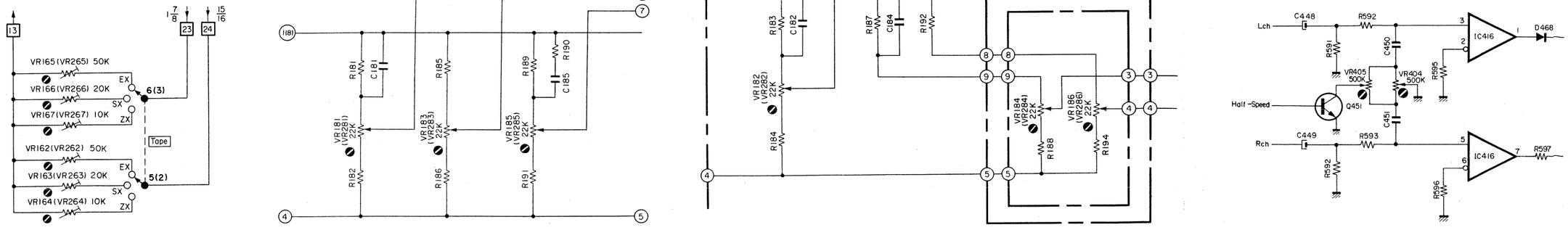


Fig. 6.1.10
16. Record Head Azimuth Phase

STEP	ITEM	SIGNAL SOURCE	OUTPUT CONNECTION	MODE	ADJUSTMENT	REMARKS
17	Record Level Calibration and Recording Bias Current Adjustment	Test Tone 400 Hz or 400 Hz, 12.5 kHz and 15 kHz (−20 dB) to INPUT Jacks	VTVM and Distortion Meter to OUTPUT Jacks	Standard Speed (1-7/8 ips): Record, Playback Monitor SW — Tape Display SW — CAL/VU or P. Hold Tape SW — ZX/SX/EX Eq. SW — 70 μs (ZX/SX) 120 μs (EX) Dolby NR SW — OUT Tape Speed SW — 1-7/8 ips Half-Speed (15/16 ips): Record, Playback Monitor SW — Tape Display SW — CAL/VU or P. Hold Tape SW — ZX/SX/EX Eq. SW — 120 μs Dolby NR SW — OUT Tape Speed SW — 15/16 ips	Standard Speed (1-7/8 ips): Switch P.C.B. (Bias) ZX: VR167, VR267 SX: VR166, VR266 EX: VR165, VR265 Rec. Cal. P.C.B. (Level) ZX: VR181, VR281 SX: VR183, VR283 EX: VR185, VR285 Half-Speed (15/16 ips): Switch P.C.B. (Bias) ZX: VR164, VR264 SX: VR163, VR263 EX: VR162, VR262 Rec. Cal. P.C.B. (Level) ZX: VR182, VR282 SX: VR184, VR284 EX: VR186, VR286	To minimize the influence of interference between each VR, adjustment should be made in the order of ZX, SX and EX. In each tape position, adjust first the following steps at tape speed 1-7/8 ips, then perform at tape speed 15/16 ips. After that re-check the performance at tape speeds 1-7/8 ips and 15/16 ips. If satisfactory results are not obtained, re-adjustment at tape speed 1-7/8 ips and 15/16 ips will be required. After completion of adjustment for each tape, re-check the performance. 1. Set the Tape Speed Switch to 1-7/8 / 15/16 ips. 2. Set the Display Switch to CAL. 3. Record signals on the reference ZX tape (DA09037A), SX tape (DA09025A), or EXII tape (DA09021A), then play it back. 4. Adjust Record Cal. VR181(VR281)/VR182(VR282) (for ZX), VR183(VR283)/VR184(VR284) (for SX), or VR185 (VR285)/VR186(VR286) (for EXII) to the center position. 5. Adjust Bias VR167(VR267)/VR164(VR264) (for ZX), VR166(VR266)/VR163(VR263) (for SX), or VR165 (VR265)/VR162(VR262) for (EXII) to obtain maximum reading on the VTVM. 6. Set the Display Switch to VU or P. Hold, then feed in 15 kHz (−20 dB) (for ZX), or 12.5 kHz (−20 dB) (for SX and EXII). 7. Adjust finely VR167(VR267)/VR164(VR264) (for ZX), VR166(VR266)/VR163(VR263) (for SX), or VR165 (VR265)/VR162(VR262) (for EXII) to obtain the same reading as source monitor level on the VTVM. 8. Set the Display Switch to CAL. 9. Adjust Record Cal. VR181(VR281)/VR182(VR282) (for ZX), VR183(VR283)/VR184(VR284) (for SX), or VR185 (VR285)/VR186(VR286) (for EXII) to obtain 0 dB on the FL level indicators. 10. Repeat 6 through 9 as above two or three times to obtain optimum performance. 11. Check whether the total harmonic distortion (T.H.D.) is less than 0.8%/1.5% (for ZX), or 1.0%/2.0% (for SX and EXII). Note: Typical bias current ZX: approx. 3.4 mA SX: approx. 1.5 mA EXII: approx. 0.9 mA

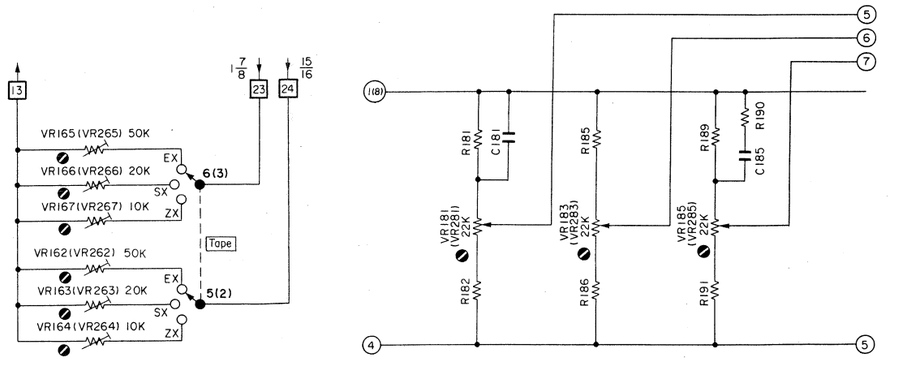


Fig. 6.1.11 17. Record Level and Recording Bias Current

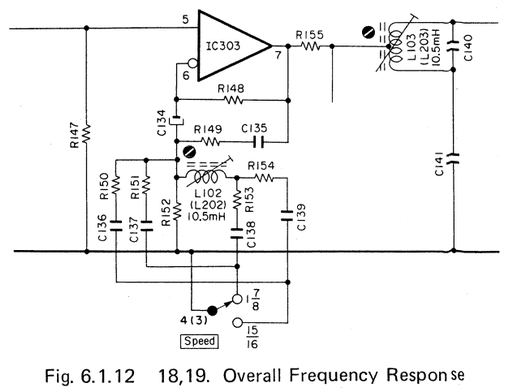


Fig. 6.1.12 18,19. Overall Frequency Response

6.2.2. Electrical Adjustments and Measurements

(1) Adjustment and Measurement Instructions Note: Electrical adjustment should be performed after mechanical adjustment is completed.

STEP	ITEM	SIGNAL SOURCE	OUTPUT CONNECTION	MODE	ADJUSTMENT	REMARKS
1	Tape Speed	3 kHz Speed and Wow/Flutter Tape (DA09006A)	Frequency Counter to OUTPUT Jacks	Playback	Speed Cal. P.C.B. VR407 VR408	1. Standard Speed (1-7/8 ips): Adjust VR407 to obtain 3 kHz ± 0.5%. 2. Half-Speed (15/16 ips): Adjust VR408 to obtain 1.5 kHz ± 0.5%.
2	Tone Calibration	Test Tone 400 Hz	VTVM to TP101, TP201 on the Main P.C.B.	Monitor SW – Source Display SW – CAL	Main P.C.B. VR301 Switch P.C.B. VR161	1. Set the Display Switch to CAL. Turn output level control fully clockwise (maximum position). 2. Adjust VR301 to obtain 100 mV ± 0.2 dB on the VTVM at TP201 (output will be 1 V (0 dB)). 3. Adjust VR161 to obtain the same level as Right channel on the VTVM at TP101.
3	FL Indicator Level and Dynamic Range	400 Hz (0 dB/–20 dB) to INPUT Jacks	Frequency Counter to IC907-10 pin on the Indicator P.C.B. C and VTVM to TP101, TP201 on the Main P.C.B.	Monitor SW – Source Display SW – VU or P. Hold	Indicator P.C.B. C VR901 Switch P.C.B. VR701, VR801	1. Remove the Display Ass'y from the Front Chassis, then disassemble the Display Ass'y itself. 2. Adjust VR901 to obtain 25.6 kHz clock oscillation frequency on the Frequency Counter. 3. Assemble the Display Ass'y, then install it to the Front Chassis. 4. Adjust the input level control to obtain 100 mV at TP101 (TP201) on the VTVM. 5. Adjust VR701 (VR801) so that the FL level indicator displays 0 dB. 6. Decrease input signals by 20 dB to obtain 10 mV at TP101 (TP201) on the VTVM, then adjust VR901 so that the FL level indicator displays –20 dB. 7. Repeat steps 4 through 6 till satisfactory results are obtained.
4	MPX Filter	19 kHz ± 100 Hz to INPUT Jacks	VTVM to OUTPUT Jacks	Monitor SW – Source Display SW – VU or P. Hold Dolby NR SW – OUT/MPX	Switch P.C.B. L162, L262	1. Turn output level control fully clockwise (maximum position). 2. Adjust input level control to obtain 1 V on the VTVM. 3. Set the Dolby NR Switch to MPX position, then adjust L162 (L262) to obtain minimum reading on the VTVM (minimum reading will be less than –30 dB).
5	Playback Head Track Alignment	1 kHz Track Alignment Tape (DA09007A)	VTVM to OUTPUT Jacks	Playback Monitor SW – Tape Display SW – VU or P. Hold Eq. SW – 70 μs Dolby NR SW – OUT Tape Speed SW – 1-7/8 ips	Playback Head Height Adj. Screw	Adjust the Playback Head Height Adj. Screw to obtain minimum reading of both L and R channels on the VTVM. See "Playback Head Height Adjustment and Azimuth Alignment" in item 5.7.
6	Playback Head Azimuth Alignment	15 kHz Azimuth Tape (DA09004A)	VTVM to OUTPUT Jacks	Playback Monitor SW – Tape Display SW – VU or P. Hold Eq. SW – 70 μs Dolby NR SW – OUT Tape Speed SW – 1-7/8 ips	Playback Head Azimuth Alignment Screw	Adjust the Playback Head Azimuth Alignment Screw to obtain maximum reading of both L and R channel on the VTVM. See "Playback Head Height Adjustment and Azimuth Alignment" in item 5.7. Note: Repeat steps 5 and 6 one or two times to obtain optimum performance.
7	Playback level	400 Hz Level Tape (DA09005A)	VTVM to TP101, TP201 on the Main P.C.B.	Same as above	Main P.C.B. VR101, VR201	Adjust VR101 (VR201) to obtain 100 mV on the VTVM or 0 dB on the FL level indicators.
8	Playback Frequency Response Adjustment at Standard Speed (1-7/8 ips)	400 Hz Level Tape (DA09005A) 10 kHz PB Frequency Response Tape (DA09003A) 15 kHz PB Frequency Response Tape (DA09002A) 20 kHz PB Frequency Response Tape (DA09001A)	VTVM to OUTPUT Jacks	Playback Monitor SW – Tape Display SW – VU or P. Hold Eq. SW – 70 μs Dolby NR SW – OUT Tape Speed SW – 1-7/8 ips	Main P.C.B. R112, R212	1. Load the 400 Hz level tape and play it back. Adjust the output level control to a certain level (example 0 dB). 2. Load the 10 kHz, 15 kHz and 20 kHz PB frequency response tapes and adjust the playback head azimuth to give maximum levels on the VTVM with each tape. Short R112 (R212) to obtain the following levels against 400 Hz level tape. Refer to Fig. 6.2.6. 10 kHz: –20 dB –1 dB to +2 dB 15 kHz: –20 dB –1 dB to +3 dB 20 kHz: –20 dB –1 dB to +4 dB 3. Conduct step 6 "Playback Head Azimuth Alignment". 4. If above is not sufficient, refer to "Playback Frequency Response Adjustment" in item 6.2.2-(2).

STEP	ITEM	SIGNAL SOURCE	OUTPUT CONNECTION	MODE	ADJUSTMENT	REMARKS
9	Playback Frequency Response Check at Half-Speed (15/16 ips)	400 Hz Level Tape (DA09005A) 10 kHz PB Frequency Response Tape (DA09003A) 15 kHz PB Frequency Response Tape (DA09002A) 20 kHz PB Frequency Response Tape (DA09001A)	VTVM to OUTPUT Jacks	Playback Monitor SW – Tape Display SW – VU or P. Hold Eq. SW – 120 μs Dolby NR SW – OUT Tape Speed SW – 15/16 ips		1. Load the 400 Hz level tape and play it back. Adjust the output level control to a certain level (example 0 dB). 2. Load the 10 kHz, 15 kHz and 20 kHz PB frequency response tapes and adjust the playback head azimuth to give maximum levels on the VTVM with each tape. Check to insure the following levels against 400 Hz level tape. Output frequency will become half as shown in ( ) as the tape speed is half. 10 kHz: (5 kHz) –22 dB –3 dB to 0 dB 15 kHz: (7.5 kHz) –22 dB –3 dB to +1 dB 20 kHz: (10 kHz) –22 dB –3 dB to +2 dB 3. Conduct step 6 "Playback Head Azimuth Alignment".
10	Bias Oscillation Frequency and Erase Current	Connect an additional 0.1 Ω resistor in series to the Erase Head	VTVM and Frequency Counter across the additional 0.1 Ω resistor	Record, Pause Monitor SW – Source Tape SW – ZX Eq. SW – 70 μs Dolby NR SW – OUT	Main P.C.B. T301 R331, R330	1. Adjust T301 to obtain 105 kHz on the frequency counter. 2. Check the erase current by the VTVM. Erase current will be in a range of 310 mA to 400 mA (typically approx. 350 mA). If erase current is not sufficient, increase it by shorting R331 or R330. 3. After completion of the erase current adjustment, re-check the bias oscillation frequency.
11	Record Amplifier Equalizer	23 kHz (–20 dB) to INPUT Jacks	VTVM to CN2-1, CN2-3 on the Main P.C.B.	Record, Pause Monitor SW – Source Display SW – VU or P. Hold Tape SW – ZX Eq. SW – 70 μs Dolby NR SW – OUT Tape Speed SW – 1-7/8 ips	Main P.C.B. L102, L202	1. Remove the bias-cut-jumper from the dip side of the Main P.C.B. 2. Adjust L102 (L202) to obtain peak reading at 23 kHz on the VTVM. 3. Re-solder the bias-cut-jumper.
12	Bias Trap (Record Amp.)	Remove Input Signals	Same as above	Same as above	Main P.C.B. L103, L203	Adjust L103 (L203) to obtain maximum reading on the VTVM.
13	Bias Trap (Playback Amp.)	Remove Input Signals	VTVM to OUTPUT Jacks	Same as above	Main P.C.B. L101, L201	Adjust L101 (L201) to obtain minimum reading on the VTVM.

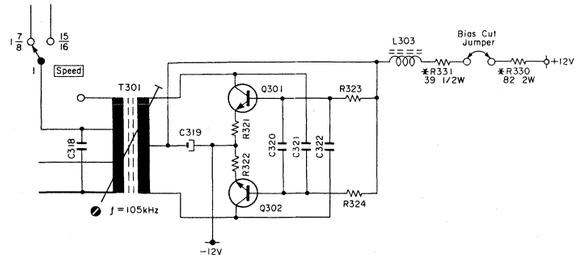


Fig. 6.2.7 10. Bias Oscillation Frequency and Erase Current

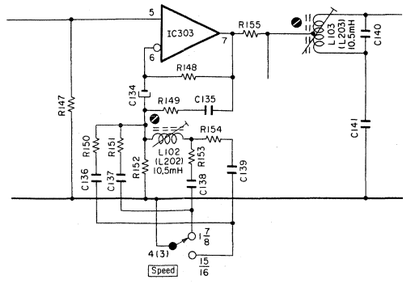


Fig. 6.2.8 11. Record Amp. Equalizer
12. Bias Trap (Record Amp.)

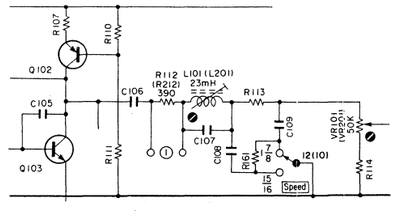


Fig. 6.2.9 13. Bias Trap (Playback Amp.)

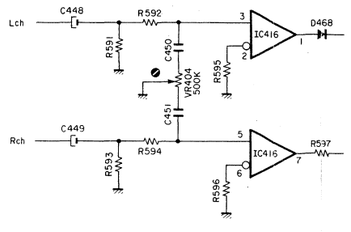
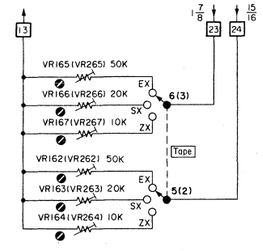


Fig. 6.2.10 16. Record Head Azimuth Phase



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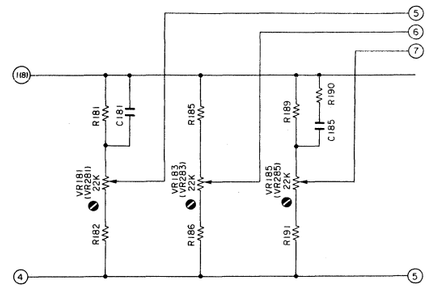

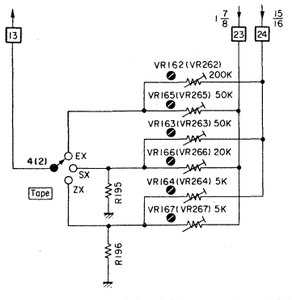

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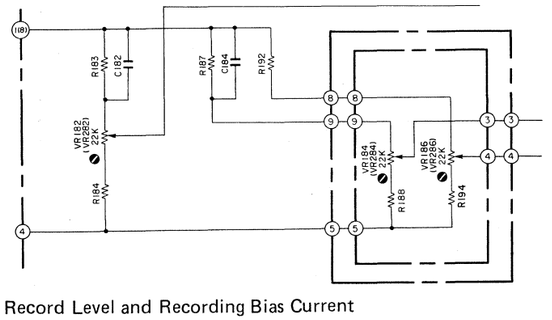


Fig. 6.2.11 17. Record Level and Recording Bias Current

STEP	ITEM	SIGNAL SOURCE	OUTPUT CONNECTION	MODE	ADJUSTMENT	REMARKS
14	Record Head Height Adjustment	Test Tone 400 Hz	VTVM to OUTPUT Jacks	Record, Playback Monitor SW – Tape Display SW – CAL Tape SW – SX Eq. SW – 70 μs Dolby NR SW – OUT Tape Speed SW – 1-7/8 ips	Record Head Height Adj. Screw	Adjust the Record Head Height Adj. Screw to obtain maximum reading of L and R channels on the VTVM. See "Record Head Height Adjustment and Azimuth Alignment" in item 5.7.
15	Record Head Azimuth Alignment	15 kHz (–20 dB) to INPUT Jacks	Same as above	Record, Playback Monitor SW – Tape Display SW – VU or P. Hold Tape SW – SX Eq. SW – 70 μs Dolby NR SW – OUT Tape Speed SW – 1-7/8 ips	Record Head Azimuth Alignment Knob	Adjust the Record Head Azimuth Alignment Knob to obtain maximum reading of L and R channels on the VTVM. See "Record Head Height Adjustment and Azimuth Alignment" in item 5.7.
16	Record Head Azimuth Phase Adjustment	Test Tone 400 Hz		Record, Playback Monitor SW – Tape Display SW – CAL Tape SW – SX Eq. SW – 70 μs Dolby NR SW – OUT Tape Speed SW – 1-7/8 ips	Logic P.C.B. VR404	1. Step 15 "Record Head Azimuth Alignment" should be performed completely. 2. Azimuth cursors (extra-bright lines) are displayed together with the continuous horizontal bars. Azimuth cursors indicate the difference of phases between L and R channels. Adjust VR404 so that the azimuth cursors of both channels indicate maximum value.
17	Record Level Calibration and Recording Bias Current Adjustment	Test Tone 400 Hz or 400 Hz, 12.5 kHz and 15 kHz (–20 dB) to INPUT Jacks	VTVM and Distortion Meter to OUTPUT Jacks	Standard Speed (1-7/8 ips): Record, Playback Monitor SW – Tape Display SW – CAL/VU or P. Hold Tape SW – ZX/SX/EX Eq. SW – 70 μs (ZX/SX) 120 μs (EX) Dolby NR SW – OUT Tape Speed SW – 1-7/8 ips Half-Speed (15/16 ips): Record, Playback Monitor SW – Tape Display SW – CAL/VU or P. Hold Tape SW – ZX/SX/EX Eq. SW – 120 μs Dolby NR SW – OUT Tape Speed SW – 15/16 ips	Standard Speed (1-7/8 ips): Switch P.C.B. (Bias) ZX: VR167, VR267 SX: VR166, VR266 EX: VR165, VR265 Rec. Cal. P.C.B. (Level) ZX: VR181, VR281 SX: VR183, VR283 EX: VR185, VR285 Half-Speed (15/16 ips): Switch P.C.B. (Bias) ZX: VR164, VR264 SX: VR163, VR263 EX: VR162, VR262 Rec. Cal. P.C.B. (Level) ZX: VR182, VR282 SX: VR184, VR284 EX: VR186, VR286	To minimize the influence of interference between each VR, adjustment should be made in the order of ZX, SX and EX. In each tape position, adjust first the following steps at tape speed 1-7/8 ips, then perform at tape speed 15/16 ips. After that re-check the performance at tape speeds 1-7/8 ips and 15/16 ips. If satisfactory results are not obtained, re-adjustment at tape speed 1-7/8 ips and 15/16 ips will be required. After completion of adjustment for each tape, re-check the performance. 1. Set the Tape Speed Switch to 1-7/8 / 15/16 ips. 2. Set the Display Switch to CAL. 3. Record signals on the reference ZX tape (DA09037A), SX tape (DA09025A), or EXII tape (DA09021A), then play it back. 4. Adjust Record Cal. VR181(VR281)/VR182(VR282) (for ZX), VR183(VR283)/VR184(VR284) (for SX), or VR185 (VR285)/VR186(VR286) (for EXII) to the center position. 5. Adjust Bias VR167(VR267)/VR164(VR264) (for ZX), VR166(VR266)/VR163(VR263) (for SX), or VR165 (VR265)/VR162(VR262) for (EXII) to obtain maximum reading on the VTVM. 6. Set the Display Switch to VU or P. Hold, then feed in 15 kHz (–20 dB) (for ZX), or 12.5 kHz (–20 dB) (for SX and EXII). 7. Adjust finely VR167(VR267)/VR164(VR264) (for ZX), VR166(VR266)/VR163(VR263) (for SX), or VR165 (VR265)/VR162(VR262) (for EXII) to obtain the same reading as source monitor level on the VTVM. 8. Set the Display Switch to CAL. 9. Adjust Record Cal. VR181(VR281)/VR182(VR282) (for ZX), VR183(VR283)/VR184(VR284) (for SX), or VR185 (VR285)/VR186(VR286) (for EXII) to obtain 0 dB on the FL level indicators. 10. Repeat 6 through 9 as above two or three times to obtain optimum performance. 11. Check whether the total harmonic distortion (T.H.D.) is less than 0.8%/1.5% (for ZX), or 1.0%/2.0% (for SX and EXII). Note: Typical bias current ZX: approx. 3.4 mA SX: approx. 1.5 mA EXII: approx. 0.9 mA

STEP	ITEM	SIGNAL SOURCE	OUTPUT CONNECTION	MODE	ADJUSTMENT	REMARKS
18	Overall Frequency Response at Tape Speed 1-7/8 ips	400 Hz (0 dB) and 20 Hz to 22 kHz (–20 dB) to INPUT Jacks	VTVM and Distortion Meter to OUTPUT Jacks	Record, Playback Monitor SW – Source/Tape Display SW – VU or P. Hold Tape SW – EX/SX/ZX Eq. SW – 120 μs (EX) 70 μs (SX/ZX) Dolby NR SW – OUT Tape Speed SW – 1-7/8 ips	Main P.C.B. L102, L202	1. Set the Monitor Switch to Source. 2. Feed in 400 Hz (0 dB) and adjust input level controls to obtain 0 dB on the FL level indicators. 3. Switch the Generator output level to –20 dB. 4. Set the Monitor Switch to Tape, then record and play it back. 5. Feed in 20 Hz to 22 kHz (–20 dB), and check to insure if the output levels are within –20 dB ± 3 dB. 6. If above is not sufficient, adjust L102 (L202) to obtain approx. –20 dB on the VTVM. 7. Conduct step 17 "Record Level Calibration and Recording Bias Current Adjustment". 8. If above is not sufficient, precise re-adjustment of step 8 "Playback Frequency Response", replacement of Playback Head or Record Head, or check on item 5.9 "Tape Travelling Adjustment" will be required.
19	Overall Frequency Response at Tape Speed 15/16 ips	400 Hz (0 dB) and 20 Hz to 15 kHz (–20 dB) to INPUT Jacks	Same as above	Record, Playback Monitor SW – Source/Tape Display SW – VU or P. Hold Tape SW – EX/SX/ZX Eq. SW – 120 μs (EX) 70 μs (SX/ZX) Dolby NR SW – OUT Tape Speed SW – 15/16 ips	Main P.C.B. L102, L202	1. Set the Monitor Switch to Source. 2. Feed in 400 Hz (0 dB) and adjust input level controls to obtain 0 dB on the FL level indicators. 3. Switch the Generator output level to –20 dB. 4. Set the Monitor Switch to Tape, then record and play it back. 5. Feed in 20 Hz to 15 kHz (–20 dB), and check to insure if the output levels are within –20 dB ± 3 dB. 6. If above is not sufficient, adjust L102 (L202) to obtain approx. –20 dB on the VTVM. 7. Conduct step 17 "Record Level Calibration and Recording Bias Current Adjustment". 8. If above is not sufficient, precise re-adjustment of step 8 "Playback Frequency Response", replacement of Playback Head or Record Head, or check on item 5.9 "Tape Travelling Adjustment" will be required.
20	Crosstalk	1 kHz to INPUT Jacks	1 kHz Band Pass Filter, VTVM to OUTPUT Jacks	Record and Playback Monitor SW – Tape Display SW – VU or P. Hold Tape SW – ZX Eq. SW – 70 μs Dolby NR SW – OUT Tape Speed SW – 1-7/8 ips		1. Erase the tape with bulk eraser. 2. Adjust input level controls to obtain 0 dB on the FL level indicators, and record the signals on the reference tape. 3. Turn the cassette tape the other way round and play it back. 4. Measure the difference between 2 and 3.
21	Channel Separation	1 kHz to INPUT Jacks	Same as above	Same as above		1. Erase the tape with bulk eraser. 2. Adjust Lch (Rch) input level control to obtain 0 dB on the FL level indicators, and close Rch (Lch) input level control. 3. Record and play it back, then measure the Rch (Lch) level.
22	Erasure	1 kHz to INPUT Jacks	1 kHz Band Pass Filter, VTVM to OUTPUT Jacks	Same as above		1. Erase the tape with bulk eraser. 2. Adjust input level controls to obtain 0 dB on the FL level indicators, and record the signals on the reference tape. 3. Rewind the tape then close input level controls. 4. Record and play it back, then measure the difference between 2 and 3.
23	Signal to Noise Ratio	400 Hz to INPUT Jacks	VTVM and Distortion Meter to OUTPUT Jacks	Record and Playback Monitor SW – Tape Display SW – VU or P. Hold Tape SW – ZX Eq. SW – 70 μs Dolby NR SW – MPX		1. Feed in 400 Hz and record, and play it back. 2. Adjust the input level controls to obtain 3% total harmonic distortion in playback mode. 3. Close the input level controls then record. 4. After rewound, play back and check the output level difference between 2 and 3. Note: The filter of IHF-A curve shall be used in the measurements.

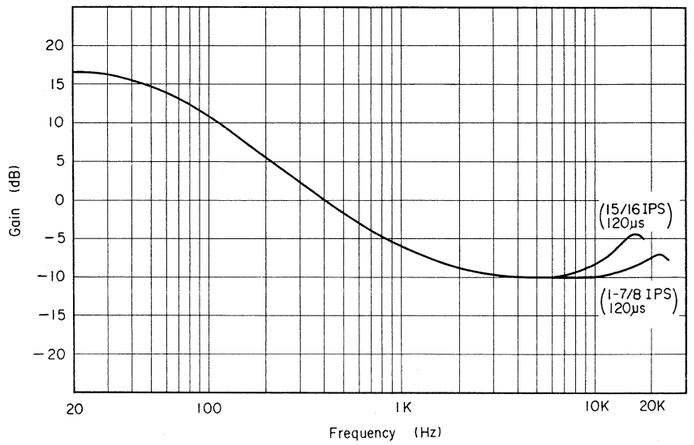


Fig. 6.1.15 Typical Playback Equalization Curve (1-7/8 / 15/16 ips)

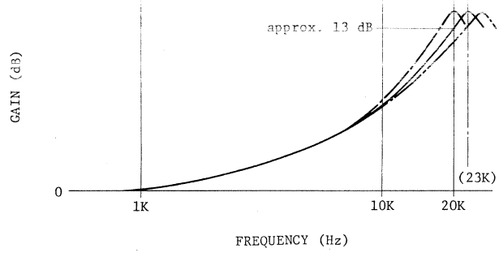


Fig. 6.1.16 Record Peaking Curve (1-7/8 ips)

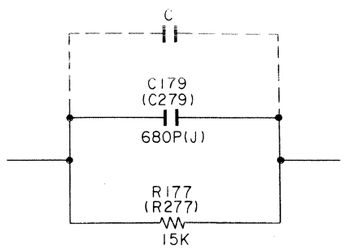


Fig. 6.1.17

(b) Record Current Frequency Response Adjustment at Standard Speed (1-7/8 ips)

Record Eq. peaking is adjusted for compensating the overall frequency response when playback frequency response adjustment is completed.

Normally, however, peaking frequency is pre-adjusted to approx. 23 kHz in record mode. See Fig. 6.1.16.

1) For ZX Tape

a) Feed in 400 Hz (0 dB), then record and play it back. Adjust bias current by VR167 (VR267) on the Switch P.C.B. to obtain a 0.8 % distortion.

b) Feed in 10 kHz and 400 Hz (-20 dB) then record and play it back.
Check the difference of the levels between 10 kHz and 400 Hz, and mount an additional capacitor in parallel with the C179 (C279) on the Switch P.C.B. from the dip side of the printed circuit board depending upon the difference of the levels against 400 Hz.
See Fig. 6.1.17.

	Add	Total
0 dB	0	680 pF
-1 dB	330 pF	1010 pF
-2 dB	680 pF	1360 pF

c) Feed in 22 kHz (-20 dB) then record and play it back.
Adjust record peaking coil L102 (L202) to obtain flat overall frequency response.

2) For SX Tape

a) Feed in 15 kHz and 400 Hz (-20 dB), then record and play it back.
Adjust bias current by VR166 (VR266) on the Switch P.C.B. to obtain flat overall frequency response.

b) Feed in 22 kHz and 400 Hz (-20 dB), then record and play it back.
And check to insure that the overall frequency response is flat.

3) For EX Tape

a) Feed in 15 kHz and 400 Hz (-20 dB), then record and play it back.
Adjust bias current by VR165 (VR265) on the Switch P.C.B. to obtain flat overall frequency response.

b) Feed in 22 kHz and 400 Hz (-20 dB), then record and play it back.
And check to insure that the overall frequency response is flat.

(3) Dolby NR Circuit Check

Dolby NR circuit incorporates a Dolby B-Type NR IC (μA7300PC) which has no adjustment point.
Perform the following checks and make sure that the IC operates accurately i.e. frequency response through IC is accurate.

(a) Playback Dolby NR Circuit (IC101, IC201)

Signal Source: 5 kHz to No. 9 pins of IC101 and IC201.
Output Connection: VTVM to the test points TP101 and TP201 on the Main P.C.B.
Mode: Stop
Monitor SW — Tape
Dolby NR SW — OUT/IN

1) Connect a VTVM to TP101 (TP201) on the Main P.C.B.
Feed in 5 kHz to No. 9 pin of IC101 (IC201) and adjust the generator output control so that VTVM may read 7.6 mV at each Test Point.
2) Set the Dolby NR Switch to IN. Check to insure that the level at TP101 (TP201) is 3 mV ± 1.5 dB.

(b) Record Dolby NR Circuit (IC161, IC261)

Signal Source: 5 kHz to INPUT Jacks
Output Connection: VTVM to the output side of C178 (C278) on the Switch P.C.B.
Mode: Stop
Monitor SW — Source

1) Connect a VTVM to TP101 (TP201) on the Main P.C.B.
Feed in 5 kHz and adjust the input level so that the VTVM may read 100 mV (0 dB) at each Test Point. (Pointer on the meter will indicate 0 dB.)
2) Remove the VTVM from TP101 (TP201) and reconnect it to the output side of C178 (C278). Check to insure that the VTVM indicates approx. 560 mV.
3) Decrease the input level (0 dB) by 20 dB or 30 dB. Check to insure that the level at output side of C178 (C278) corresponds to the following with Dolby NR Switch IN and OUT.

Input Level	Capacitor Output Level		
(f=5 kHz)	Dolby NR OUT	Dolby NR IN	Difference between IN and OUT
−20 dB	−20 dB	−16.8 dB ± 1.5 dB	3.2 dB ± 1.5 dB
−30 dB	−30 dB	−21.8 dB ± 1.5 dB	8.2 dB ± 1.5 dB

6.2. Previous Type (Serial Nos.: A11201001–A11202473)

6.2.1. Parts Location for Electrical Adjustment

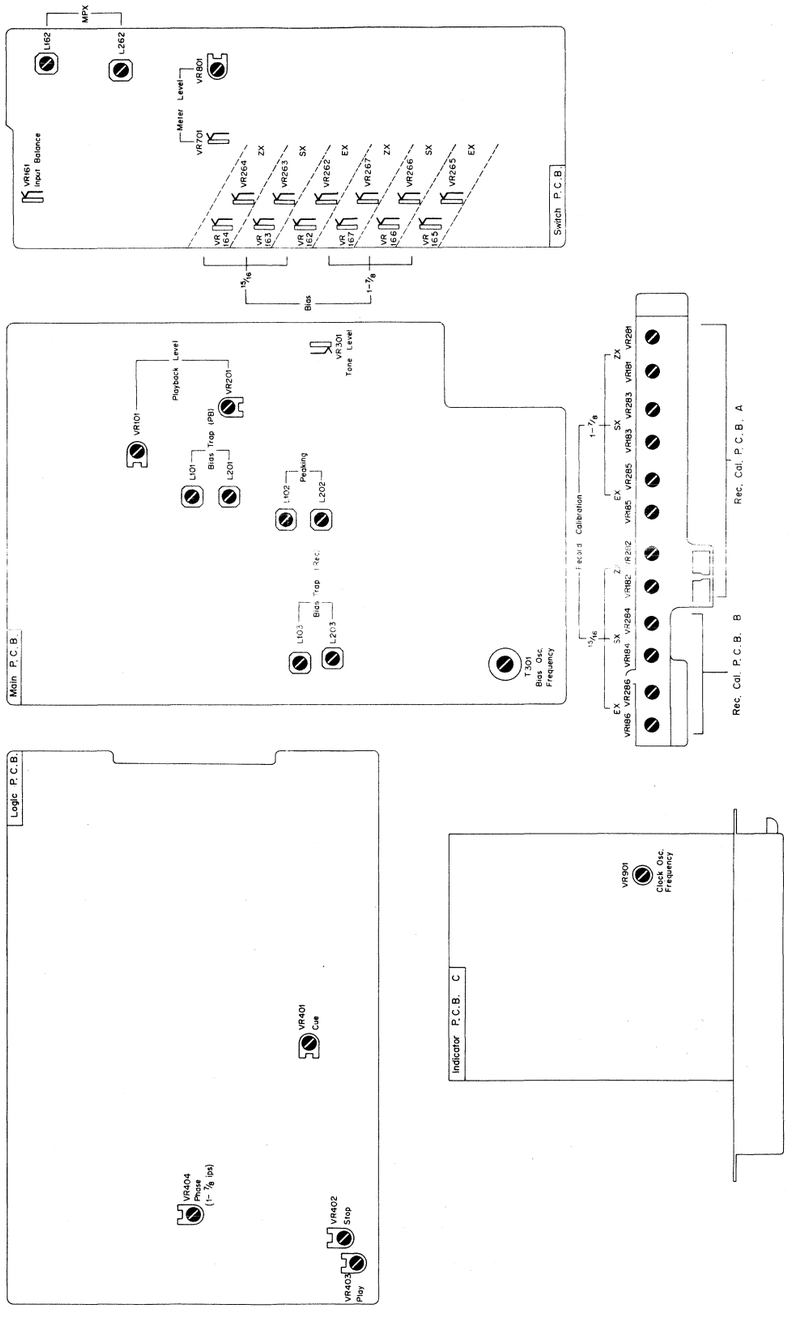


Fig. 6.2.1-A Serial Nos.: A11202011 – A11202473

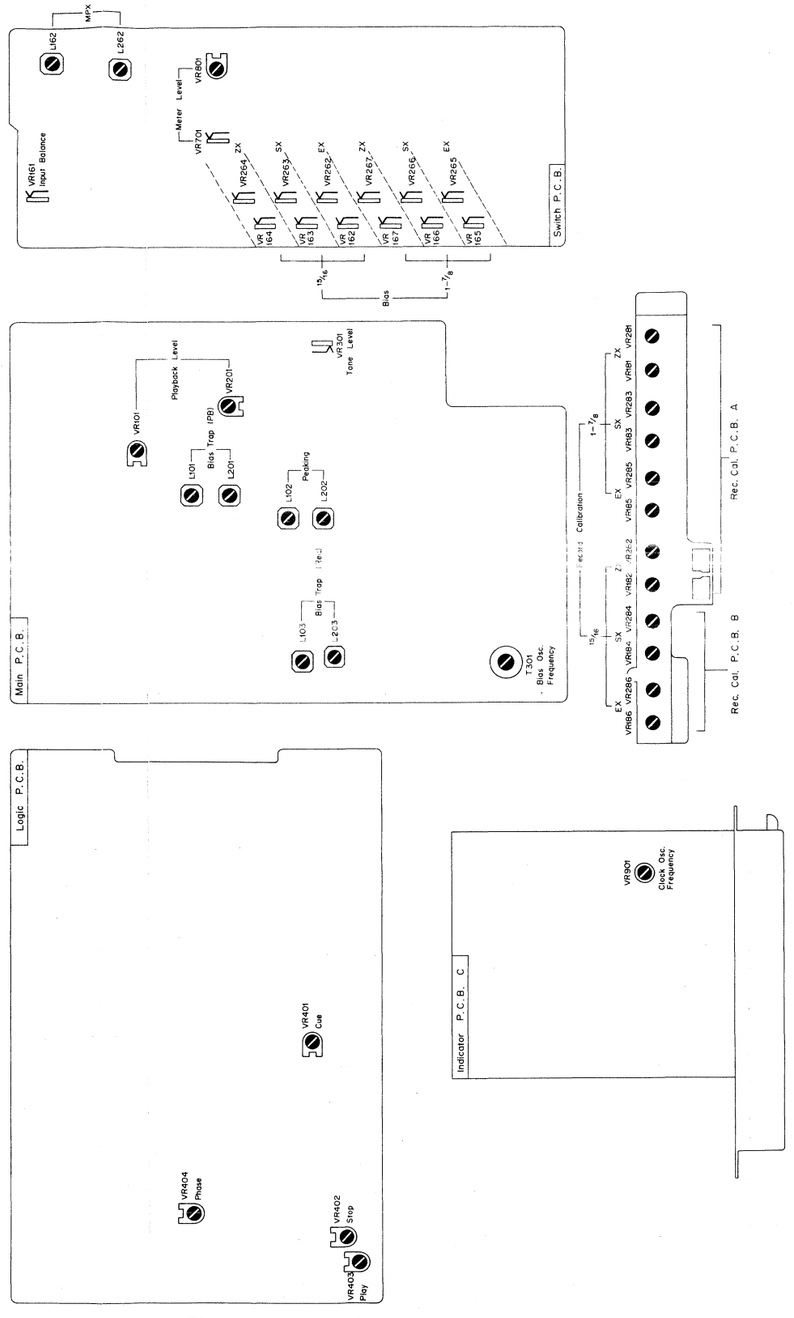


Fig. 6.2.1-B Serial Nos.: A11201001 – A11202010

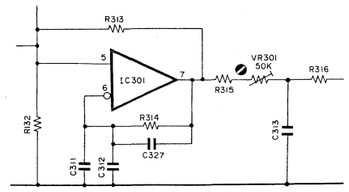


Fig. 6.2.2 2. Tone Calibration

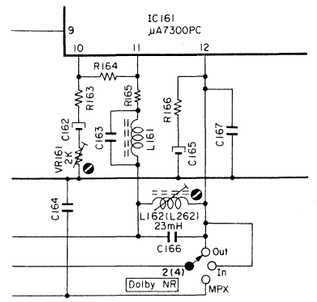


Fig. 6.2.3 2. Tone Calibration
4. MPX Filter

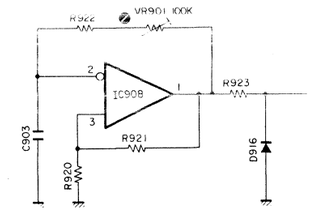


Fig. 6.2.4 3. FL Indicator Level and Dynamic Range

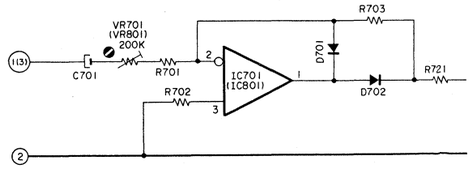


Fig. 6.2.5 3. FL Indicator Level and Dynamic Range

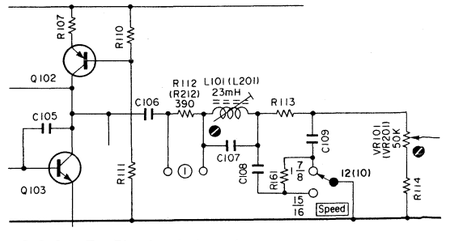


Fig. 6.2.6 7. Playback Level
8. Playback Frequency Response (1-7/8 ips)

STEP	ITEM	SIGNAL SOURCE	OUTPUT CONNECTION	MODE	ADJUSTMENT	REMARKS
18	Overall Frequency Response at Tape Speed 1-7/8 ips	400 Hz (0 dB) and 20 Hz to 22 kHz (–20 dB) to INPUT Jacks	VTVM and Distortion Meter to OUTPUT Jacks	Record, Playback Monitor SW – Source/Tape Display SW – VU or P. Hold Tape SW – EX/SX/ZX Eq. SW – 120 μs (EX) 70 μs (SX/ZX) Dolby NR SW – OUT Tape Speed SW – 1-7/8 ips	Main P.C.B. L102, L202	1. Set the Monitor Switch to Source. 2. Feed in 400 Hz (0 dB) and adjust input level controls to obtain 0 dB on the FL level indicators. 3. Switch the Generator output level to –20 dB. 4. Set the Monitor Switch to Tape, then record and play it back. 5. Feed in 20 Hz to 22 kHz (–20 dB), and check to insure if the output levels are within –20 dB ± 3 dB. 6. If above is not sufficient, adjust L102 (L202) to obtain approx. –20 dB on the VTVM. 7. Conduct step 17 "Record Level Calibration and Recording Bias Current Adjustment". 8. If above is not sufficient, precise re-adjustment of step 8 "Playback Frequency Response", replacement of Playback Head or Record Head, or check on item 5.9 "Tape Travelling Adjustment" will be required.
19	Overall Frequency Response at Tape Speed 15/16 ips	400 Hz (0 dB) and 20 Hz to 15 kHz (–20 dB) to INPUT Jacks	Same as above	Record, Playback Monitor SW – Source/Tape Display SW – VU or P. Hold Tape SW – EX/SX/ZX Eq. SW – 120 μs (EX) 70 μs (SX/ZX) Dolby NR SW – OUT Tape Speed SW – 15/16 ips	Main P.C.B. L102, L202	1. Set the Monitor Switch to Source. 2. Feed in 400 Hz (0 dB) and adjust input level controls to obtain 0 dB on the FL level indicators. 3. Switch the Generator output level to –20 dB. 4. Set the Monitor Switch to Tape, then record and play it back. 5. Feed in 20 Hz to 15 kHz (–20 dB), and check to insure if the output levels are within –20 dB + 3 dB. 6. If above is not sufficient, adjust L102 (L202) to obtain approx. –20 dB on the VTVM. 7. Conduct step 17 "Record Level Calibration and Recording Bias Current Adjustment". 8. If above is not sufficient, precise re-adjustment of step 8 "Playback Frequency Response", replacement of Playback Head or Record Head, or check on item 5.9 "Tape Travelling Adjustment" will be required.
20	Crosstalk	1 kHz to INPUT Jacks	1 kHz Band Pass Filter, VTVM to OUTPUT Jacks	Record and Playback Monitor SW – Tape Display SW – VU or P. Hold Tape SW – ZX Eq. SW – 70 μs Dolby NR SW – OUT Tape Speed SW – 1-7/8 ips		1. Erase the tape with bulk eraser. 2. Adjust input level controls to obtain 0 dB on the FL level indicators, and record the signals on the reference tape. 3. Turn the cassette tape the other way round and play it back. 4. Measure the difference between 2 and 3.
21	Channel Separation	1 kHz to INPUT Jacks	Same as above	Same as above		1. Erase the tape with bulk eraser. 2. Adjust Lch (Rch) input level control to obtain 0 dB on the FL level indicators, and close Rch (Lch) input level control. 3. Record and play it back, then measure the Rch (Lch) level.
22	Erasure	1 kHz to INPUT Jacks	1 kHz Band Pass Filter, VTVM to OUTPUT Jacks	Same as above		1. Erase the tape with bulk eraser. 2. Adjust input level controls to obtain 0 dB on the FL level indicators, and record the signals on the reference tape. 3. Rewind the tape then close input level controls. 4. Record and play it back, then measure the difference between 2 and 3.
23	Signal to Noise Ratio	400 Hz to INPUT Jacks	VTVM and Distortion Meter to OUTPUT Jacks	Record and Playback Monitor SW – Tape Display SW – VU or P. Hold Tape SW – ZX Eq. SW – 70 μs Dolby NR SW – MPX		1. Feed in 400 Hz and record, and play it back. 2. Adjust the input level controls to obtain 3% total harmonic distortion in playback mode. 3. Close the input level controls then record. 4. After rewound, play back and check the output level difference between 2 and 3. Note: The filter of IHF-A curve shall be used in the measurements.

STEP	ITEM	SIGNAL SOURCE	OUTPUT CONNECTION	MODE	ADJUSTMENT	REMARKS
24	Total Harmonic Distortion	400 Hz to INPUT Jacks	Distortion Meter to OUTPUT Jacks	Record and Playback Monitor SW — Tape Display SW — VU or P. Hold Tape SW — EX/SX/ZX Eq. SW — 120 μs (EX) 70 μs (SX/ZX) Dolby NR SW — OUT Tape Speed SW — 1-7/8 ips 15/16 ips		Tape Speed 1-7/8 ips: 1. Adjust input level controls to obtain 0 dB on the FL level indicators. 2. Record and play it back. 3. Read the distortion meter and check to insure that the distortion is less than 0.8% for ZX tape and 1.0% for SX and EXII tapes. Tape Speed 15/16 ips: 1. Adjust input level controls to obtain 0 dB on the FL level indicators. 2. Record and play it back. 3. Read the distortion meter and check to insure that the distortion is less than 1.5% for ZX tape and 2.0% for SX and EXII tapes.
25	Wow/Flutter	3 kHz Speed and Wow/Flutter Tape (DA09006A)	Wow/Flutter Meter to OUTPUT Jacks	Playback Monitor SW — Tape Display SW — VU or P. Hold Eq. SW — 70 μs Tape Speed SW — 1-7/8 ips		Playback and read the wow/flutter meter.

(2) Frequency Response Adjustment at Standard Speed (1-7/8 ips)

(a) Playback Frequency Response Adjustment at Standard Speed (1-7/8 ips)

Fig. 6.1.13 shows the playback equalization curve for the N-680, and Fig. 6.1.14 is the playback amp. circuit.

Typical playback equalization curves at standard and half speeds are shown in Fig. 6.1.15.

1) Level Adjustment (for middle frequency response)

This adjustment will be required when playback level is not sufficient at 10 kHz PB Frequency Response Tape (refer to step 8 in "(1) Adjustment and Measurement Instructions.").

Playback equalization level can be varied by the modification of R108 (R208) and R109 (R209).

Following are the details for level modification:

Approx. +1 dB	R109 (R209):3.0K
	R108 (R208):4.3K
0 dB	R109 (R209):3.3K
	R108 (R208):4.7K
Approx. -1 dB	R109 (R209):3.6K
	R108 (R208):5.1K

2) Peaking Adjustment (for high frequency response)

This adjustment will be required when playback level is not sufficient at 20 kHz PB Frequency Response Tape (refer to step 8 in "(1) Adjustment and Measurement Instructions").

Peaking portion compensates the gap loss of the playback head.

Peaking level is varied by the short circuit of R112 (R212) as illustrated in the figure.

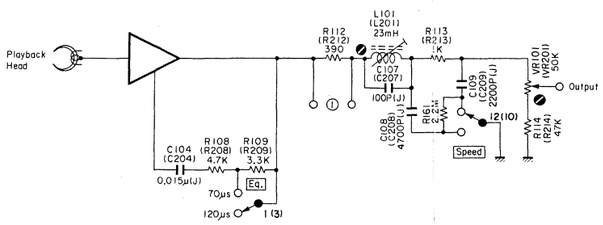


Fig. 6.1.14 Playback Amp.

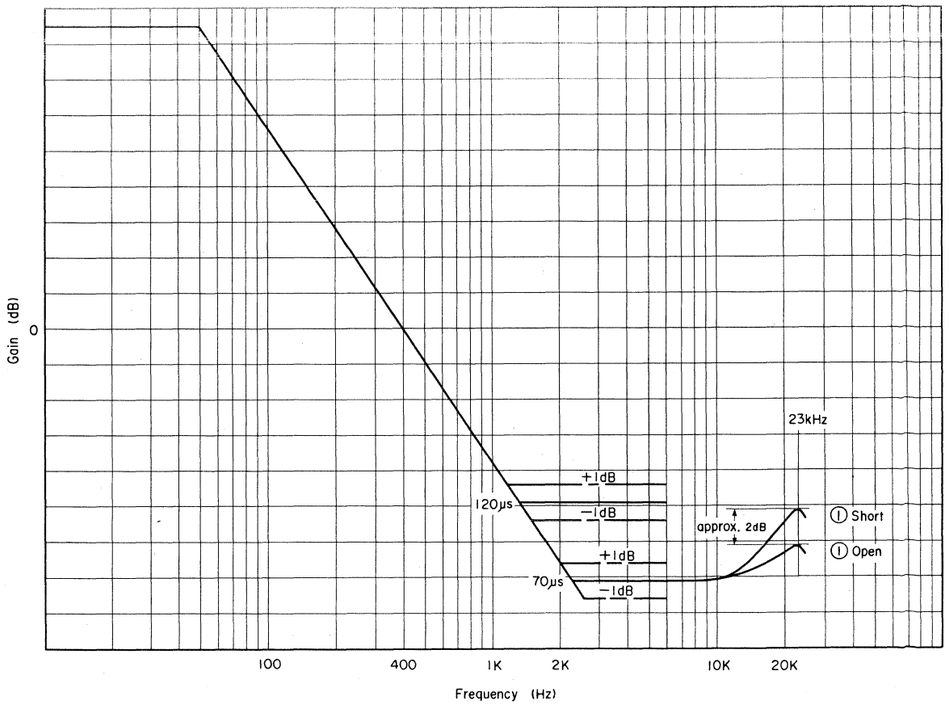


Fig. 6.1.13 Playback Equalization Curve (1-7/8 ips)

STEP	ITEM	SIGNAL SOURCE	OUTPUT CONNECTION	MODE	ADJUSTMENT	REMARKS
24	Total Harmonic Distortion	400 Hz to INPUT Jacks	Distortion Meter to OUTPUT Jacks	Record and Playback Monitor SW – Tape Display SW – VU or P. Hold Tape SW – EX/SX/ZX Eq. SW – 120 μs (EX) 70 μs (SX/ZX) Dolby NR SW – OUT Tape Speed SW – 1-7/8 ips 15/16 ips		Tape Speed 1-7/8 ips: 1. Adjust input level controls to obtain 0 dB on the FL level indicators. 2. Record and play it back. 3. Read the distortion meter and check to insure that the distortion is less than 0.8% for ZX tape and 1.0% for SX and EXII tapes. Tape Speed 15/16 ips: 1. Adjust input level controls to obtain 0 dB on the FL level indicators. 2. Record and play it back. 3. Read the distortion meter and check to insure that the distortion is less than 1.5% for ZX tape and 2.0% for SX and EXII tapes.
25	Wow/Flutter	3 kHz Speed and Wow/Flutter Tape (DA09006A)	Wow/Flutter Meter to OUTPUT Jacks	Playback Monitor SW – Tape Display SW – VU or P. Hold Eq. SW – 70 μs Tape Speed SW – 1-7/8 ips		Playback and read the wow/flutter meter.

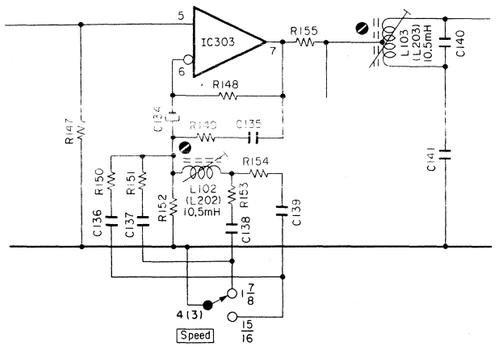


Fig. 6.2.12 18,19. Overall Frequency Response

(2) Frequency Response Adjustment

Same as the current type, please refer to item 6.1.2-(2) on page 61.

(3) Dolby NR Circuit Check

Same as the current type, please refer to item 6.1.2-(3) on page 62.

7. MOUNTING DIAGRAMS AND PARTS LIST

Note: Mounting diagram shows a dip side view of the printed circuit board.

7.1. Main P.C.B. Ass'y

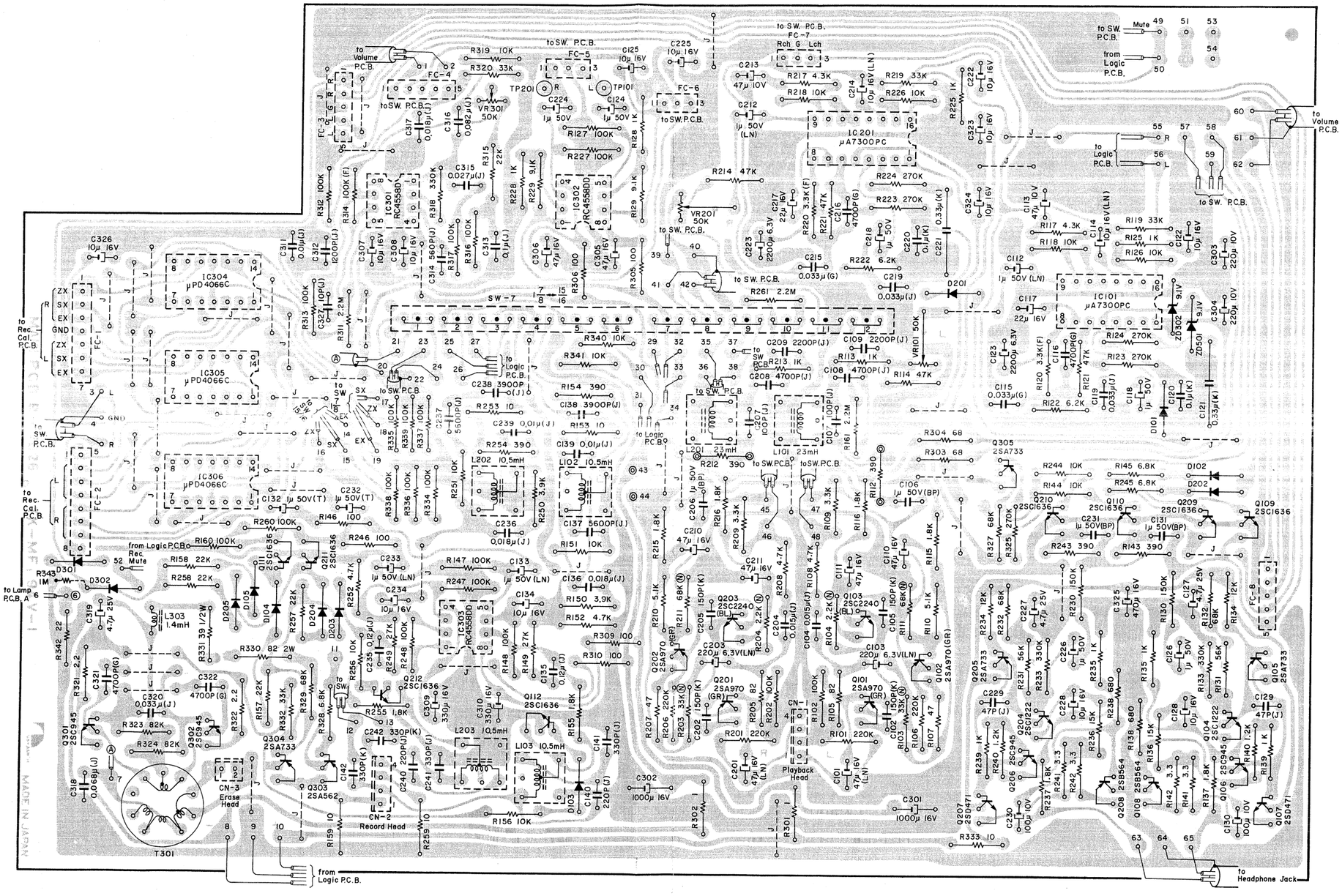


Fig. 7.1.1 Serial No.: A11204051 –

Note: Diode is 1SS53 unless otherwise specified.

Schematic Ref. No.	Part No.	Description
	BA04058C	**Main P.C.B. Ass'y** Serial No.: A11204051 –
		– PB Eq. Amp. –
Q101, 102 201, 202	0B06180A	Transistor 2SA970 (GR)
Q103, 203	0B06142A	Transistor 2SC2240 (BL)
L101, 201	0B03563A	19K Coil 23mH
VR101, 201	0B07228A	Semi-fixed Volume 50K
R101, 106 201, 206	0B05625A	Carbon Resistor 220K ERD-25T J
R102, 202	0B01889A	Carbon Resistor 100K ERD-25T J
R103, 203	0B09310A	Carbon Resistor (Noiseless) 33K ERD-25TS J
R104, 204	0B09309A	Carbon Resistor (Noiseless) 2.2K ERD-25TS J
R105, 205	0B05631A	Carbon Resistor 82 ERD-25T J
R107, 207	0B01706A	Carbon Resistor 47 ERD-25T J
R108, 208	0B01846A	Carbon Resistor 4.7K ERD-25T J
R109, 209	0B01681A	Carbon Resistor 3.3K ERD-25T J
R110, 210	0B09314A	Carbon Resistor 5.1K ERD-25T J
R111, 211	0B09311A	Carbon Resistor (Noiseless) 68K ERD-25TS J
R112, 212	0B05691A	Carbon Resistor 390 ERD-25T J
R113, 213	0B01857A	Carbon Resistor 1K ERD-25T J
R114, 214	0B05641A	Carbon Resistor 47K ERD-25T J
R115, 116 215, 216	0B05614A	Carbon Resistor 1.8K ERD-25T J
R161, 261	0B05671A	Carbon Resistor 2.2M ERD-25T J
C101, 201	0B09218A	Electrolytic Capacitor 47μ 16V (LN)
C102, 105 202, 205	0B09281A	Ceramic Capacitor 150P 50V K
C103, 203	0B09151A	Electrolytic Capacitor 220μ 6.3V (LN)
C104, 204	0B05557A	Mylar Capacitor 0.015μ 50V J
C106, 206	0B09187A	Electrolytic Capacitor 1μ 50V (BP)
C107, 207	0B09302A	Mica Capacitor 100P 50V J
C108, 208	0B05652A	Mylar Capacitor 4700P 50V J
C109, 209	0B01802A	Mylar Capacitor 2200P 50V J
C110, 111 210, 211	0B01403A	Electrolytic Capacitor 47μ 16V
		– PB Dolby NR –
IC101, 201	0B06200A	IC μA7300PC
ZD301, 302	0B06232A	Zener Diode 9.1V
D101, 201	0B06181A	Silicon Diode 1SS53
R117, 217	0B09307A	Carbon Resistor 4.3K ERD-25T J
R118, 126 218, 226	0B01888A	Carbon Resistor 10K ERD-25T J
R119, 219	0B05509A	Carbon Resistor 33K ERD-25T J
R120, 220	0B09317A	Metal Film Resistor 3.3K SN14K2E F
R121, 221	0B05641A	Carbon Resistor 47K ERD-25T J
R122, 222	0B09271A	Carbon Resistor 6.2K ERD-25T J
R123, 124 223, 224	0B05620A	Carbon Resistor 270K ERD-25T J
R125, 225	0B01857A	Carbon Resistor 1K ERD-25T J
R303, 304	0B09306A	Fail Safe Type Resistor 68 RDF-25S J
C112, 212	0B09223A	Electrolytic Capacitor 1μ 50V (LN)
C113, 213	0B01836A	Electrolytic Capacitor 47μ 10V
C114, 214	0B09148A	Electrolytic Capacitor 10μ 16V (LN)
C115, 215	0B09240A	PP Capacitor 0.033μ 100V G
C116, 216	0B09191A	PP Capacitor 4700P 100V G
C117, 217	0B01862A	Electrolytic Capacitor 22μ 16V
C118, 218	0B01405A	Electrolytic Capacitor 1μ 50V
C119, 219	0B05583A	Mylar Capacitor 0.033μ 50V J
C120, 220	0B01603A	Mylar Capacitor 0.1μ 50V K
C121, 221	0B01602A	Mylar Capacitor 0.33μ 50V K
C122, 222 323, 324	0B01412A	Electrolytic Capacitor 10μ 16V
C123, 223	0B09257A	Electrolytic Capacitor 2200μ 6.3V
C303, 304	0B05899A	Electrolytic Capacitor 220μ 10V
	0B06201A	IC Socket 16P (2 pcs.)
		– Rec. Amp. –
IC303	0B06146A	IC RC4558DD
Q111, 112 211, 212	0B06070A	Transistor 2SC1636
Q304	0B06013A	Transistor 2SA733
D103, 104 105, 203 204, 205	0B06181A	Silicon Diode 1SS53
L102, 103 202, 203	0B00068A	Trap Coil 10.5mH
R146, 246	0B01679A	Carbon Resistor 100 ERD-25T J
R147, 148 160, 247 248, 260	0B01889A	Carbon Resistor 100K ERD-25T J
R149, 249	0B05743A	Carbon Resistor 27K ERD-25T J
R150, 250	0B05675A	Carbon Resistor 3.9K ERD-25T J
R151, 156 251, 256	0B01888A	Carbon Resistor 10K ERD-25T J
R152, 252	0B01846A	Carbon Resistor 4.7K ERD-25T J
R153, 253	0B05936A	Carbon Resistor 10 ERD-25T J
R154, 254	0B05691A	Carbon Resistor 390 ERD-25T J
R155, 255	0B05614A	Carbon Resistor 1.8K ERD-25T J
R157, 158 257, 258	0B05615A	Carbon Resistor 22K ERD-25T J
R309, 310	0B09215A	Fail Safe Type Resistor 100 RDF-25S J
R329	0B05692A	Carbon Resistor 68K ERD-25T J
R332	0B05509A	Carbon Resistor 33K ERD-25T J
C132, 232	0B05638A	Tantalum Capacitor 1μ 35V
C133, 233	0B09223A	Electrolytic Capacitor 1μ 50V (LN)
C134, 234	0B01412A	Electrolytic Capacitor 10μ 16V
C135, 235	0B05909A	Mylar Capacitor 0.12μ 50V J
C136, 236	0B05832A	Mylar Capacitor 0.018μ 50V J
C137, 237	0B05659A	Mylar Capacitor 5600P 50V J
C138, 238	0B01804A	Mylar Capacitor 3900P 50V J
C139, 239	0B05681A	Mylar Capacitor 0.01μ 50V J
C140, 240	0B09247A	Mica Capacitor 220P 50V J
C141, 241	0B09322A	PP Capacitor 330P 100V J
C309, 310	0B01502A	Electrolytic Capacitor 330μ 16V
		– Line Amp. –
IC302	0B06146A	IC RC4558DD
Q109, 110 209, 210	0B06070A	Transistor 2SC1636
Q305	0B06013A	Transistor 2SA733
D102, 202	0B06181A	Silicon Diode 1SS53
R127, 227	0B01889A	Carbon Resistor 100K ERD-25T J
R128, 228	0B01857A	Carbon Resistor 1K ERD-25T J
R129, 229	0B05694A	Carbon Resistor 9.1K ERD-25T J
R143, 243	0B05691A	Carbon Resistor 390 ERD-25T J
R144, 244	0B01888A	Carbon Resistor 10K ERD-25T J
R145, 245	0B01682A	Carbon Resistor 6.8K ERD-25T J
R301, 302	0B09214A	Fail Safe Type Resistor 1 RDF-25S J
R305, 306	0B09215A	Fail Safe Type Resistor 100 RDF-25S J
R325	0B05620A	Carbon Resistor 270K ERD-25T J
R327	0B05692A	Carbon Resistor 68K ERD-25T J
C124, 224	0B01405A	Electrolytic Capacitor 1μ 50V
C125, 225	0B01412A	Electrolytic Capacitor 10μ 16V
C131, 231	0B09187A	Electrolytic Capacitor 1μ 50V (BP)
C301, 302	0B01397A	Electrolytic Capacitor 1000μ 16V
C305, 306	0B01403A	Electrolytic Capacitor 47μ 16V
		– Headphone Amp. –
Q104, 204	0B06062A	Transistor 2SC1222
Q105, 205	0B06013A	Transistor 2SA733
Q106, 206	0B01872A	Transistor 2SC945 (L)
Q107, 207	0B06066A	Transistor 2SD471
Q108, 208	0B06069A	Transistor 2SB564
R130, 230	0B05626A	Carbon Resistor 150K ERD-25T J
R131, 231	0B05508A	Carbon Resistor 56K ERD-25T J
R132, 232	0B05692A	Carbon Resistor 68K ERD-25T J
R133, 233	0B05627A	Carbon Resistor 330K ERD-25T J
R134, 234	0B09263A	Carbon Resistor 12K ERD-25T J
R135, 139 235, 239	0B01857A	Carbon Resistor 1K ERD-25T J
R136, 236	0B01683A	Carbon Resistor 15K ERD-25T J
R137, 237	0B05614A	Carbon Resistor 1.8K ERD-25T J
R138, 238	0B05794A	Carbon Resistor 680 ERD-25T J
R140, 240	0B05623A	Carbon Resistor 1.2K ERD-25T J
R141, 142 241, 242	0B09304A	Carbon Resistor 3.3 ERD-25T J
R333	0B09216A	Fail Safe Type Resistor 10 RDF-25S J
C126, 226	0B01405A	Electrolytic Capacitor 1μ 50V
C127, 227	0B01389A	Electrolytic Capacitor 4.7μ 25V
C128, 228	0B01412A	Electrolytic Capacitor 10μ 16V
C129, 229	0B09280A	Ceramic Capacitor 47P 50V J
C130, 230	0B05885A	Electrolytic Capacitor 100μ 10V
C325	0B01392A	Electrolytic Capacitor 470μ 16V
		– Bias Osc. –
Q301, 302	0B01872A	Transistor 2SC945 (L)
Q303	0B01426A	Transistor 2SA562
T301	0B06613A	Osc. Coil
L303	0B03861B	Inductor 1.4mH
R159, 259	0B05936A	Carbon Resistor 10 ERD-25T J
R321, 322	0B09212A	Fail Safe Type Resistor 2.2 RDF-25S J
R323, 324	0B05668A	Carbon Resistor 82K ERD-25T J
R328	0B01682A	Carbon Resistor 6.8K ERD-25T J
R330	0B09295A	Fail Safe Type Resistor 82 RDF-2B J
R331	0B09296A	Fail Safe Type Resistor 39 RDF-1/2S J
C142, 242	0B09285A	Ceramic Capacitor 330P 50V K
C318	0B09254A	PP Capacitor 0.068μ 100V J
C319	0B01402A	Electrolytic Capacitor 4.7μ 25V
C320	0B05583A	Mylar Capacitor 0.033μ 50V J
C321, 322	0B09191A	PP Capacitor 4700P 100V G
		– Tone Osc. –
IC301	0B06124B	IC RC4558D
VR301	0B07058A	Semi-fixed Volume 50K
R311	0B05671A	Carbon Resistor 2.2M ERD-25T J
R312, 313 316, 317	0B01889A	Carbon Resistor 100K ERD-25T J
R314	0B09305A	Metal Film Resistor 100K SN14K2E F
R315	0B05615A	Carbon Resistor 22K ERD-25T J
R318	0B05627A	Carbon Resistor 330K ERD-25T J
R319	0B01888A	Carbon Resistor 10K ERD-25T J
R320	0B05509A	Carbon Resistor 33K ERD-25T J
C307, 308	0B01412A	Electrolytic Capacitor 10μ 16V
C311	0B05681A	Mylar Capacitor 0.01μ 50V J
C312	0B05687A	Mylar Capacitor 1200P 50V J
C313	0B01780A	Mylar Capacitor 0.1μ 50V J
C314	0B09323A	PP Capacitor 560P 100V J
C315	0B09045A	Mylar Capacitor 0.027μ 50V J
C316	0B05685A	Mylar Capacitor 0.082μ 50V J
C317	0B05832A	Mylar Capacitor 0.018μ 50V J
C327	0B09277A	Ceramic Capacitor 10P 50V J
		– Miscellaneous –
	0B07826D	Main P.C.B.
IC304, 305 306	0B06144A	IC μPD4066C
D301, 302	0B06181A	Silicon Diode 1SS53
R334, 335 336, 337 338, 339	0B01889A	Carbon Resistor 100K ERD-25T J
R340, 341	0B01888A	Carbon Resistor 10K ERD-25T J
R342	0B09049A	Fail Safe Type Resistor 22 RDF-25S J
R343	0B05776A	Carbon Resistor 1M ERD-25T J
C326	0B01412A	Electrolytic Capacitor 10μ 16V
SW7	0B07278A	Slide Switch
CN1, 2	0B08654A	4P-T Post
CN3	0B08656A	2P-T Post

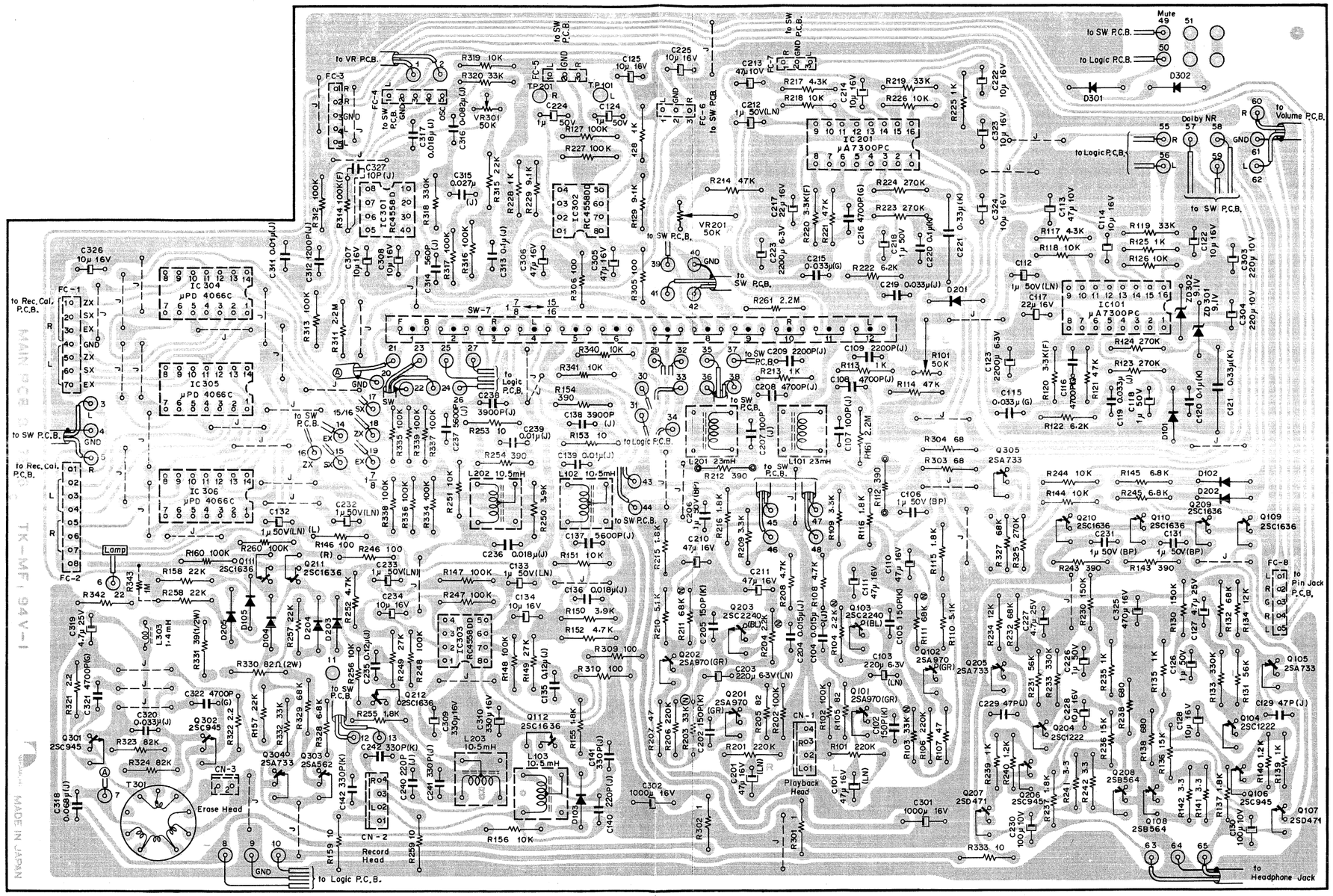


Fig. 7.1.2 Serial Nos.: A11202661 – A11204050

Note: Diode is 1SS53 unless otherwise specified.

Schematic Ref. No.	Part No.	Description
	BA04058B	**Main P.C.B. Ass'y**
		Serial Nos.: A11202661 – A11204050
	– PB Eq. Amp. –	
Q101, 102	0B06180A	Transistor 2SA970 (GR)
201, 202		
Q103, 203	0B06142A	Transistor 2SC2240 (BL)
L101, 201	0B03563A	19K Coil 23mH
VR101, 201	0B07228A	Semi-fixed Volume 50K
R101, 106	0B05625A	Carbon Resistor 220K ERD-25T J
201, 206		
R102, 202	0B01889A	Carbon Resistor 100K ERD-25T J
R103, 203	0B09310A	Carbon Resistor 33K ERD-25TS J (Noiseless)
R104, 204	0B09309A	Carbon Resistor 2.2K ERD-25TS J (Noiseless)
R105, 205	0B05631A	Carbon Resistor 82 ERD-25T J
R107, 207	0B01706A	Carbon Resistor 47 ERD-25T J
R108, 208	0B01846A	Carbon Resistor 4.7K ERD-25T J
R109, 209	0B01681A	Carbon Resistor 3.3K ERD-25T J
R110, 210	0B09314A	Carbon Resistor 5.1K ERD-25T J
R111, 211	0B09311A	Carbon Resistor 68K ERD-25TS J (Noiseless)
R112, 212	0B05691A	Carbon Resistor 390 ERD-25T J
R113, 213	0B01857A	Carbon Resistor 1K ERD-25T J
R114, 214	0B05641A	Carbon Resistor 47K ERD-25T J
R115, 116	0B05614A	Carbon Resistor 1.8K ERD-25T J
215, 216		
R161, 261	0B05671A	Carbon Resistor 2.2M ERD-25T J
C101, 201	0B09218A	Electrolytic Capacitor 47μ 16V (LN)
C102, 105	0B09281A	Ceramic Capacitor 150P 50V K
202, 205		
C103, 203	0B09151A	Electrolytic Capacitor 220μ 6.3V (LN)
C104, 204	0B05557A	Mylar Capacitor 0.015μ 50V J
C106, 206	0B09187A	Electrolytic Capacitor 1μ 50V (BP)
C107, 207	0B09302A	Mica Capacitor 100P 50V J
C108, 208	0B05652A	Mylar Capacitor 4700P 50V J
C109, 209	0B01802A	Mylar Capacitor 2200P 50V J
C110, 111	0B01403A	Electrolytic Capacitor 47μ 16V
210, 211		
	– PB Dolby NR –	
IC101, 201	0B06200A	IC μA7300PC
ZD301, 302	0B06232A	Zener Diode 9.1V
D101, 201	0B06181A	Silicon Diode 1SS53
R117, 217	0B09307A	Carbon Resistor 4.3K ERD-25T J
R118, 126	0B01888A	Carbon Resistor 10K ERD-25T J
218, 226		
R119, 219	0B05509A	Carbon Resistor 33K ERD-25T J
R120, 220	0B09317A	Metal Film Resistor 3.3K SN14K2E F
R121, 221	0B05641A	Carbon Resistor 47K ERD-25T J
R122, 222	0B09271A	Carbon Resistor 6.2K ERD-25T J
R123, 124	0B05620A	Carbon Resistor 270K ERD-25T J
223, 224		
R125, 225	0B01857A	Carbon Resistor 1K ERD-25T J
R303, 304	0B09306A	Fail Safe Type Resistor 68 RDF-25S J
C112, 212	0B09223A	Electrolytic Capacitor 1μ 50V (LN)
C113, 213	0B01836A	Electrolytic Capacitor 47μ 10V
C114, 214	0B09148A	Electrolytic Capacitor 10μ 16V (LN)
C115, 215	0B09240A	PP Capacitor 0.033μ 100V G
C116, 216	0B09191A	PP Capacitor 4700P 100V G
C117, 217	0B01862A	Electrolytic Capacitor 22μ 16V
C118, 218	0B01405A	Electrolytic Capacitor 1μ 50V
C119, 219	0B05583A	Mylar Capacitor 0.033μ 50V J
C120, 220	0B01603A	Mylar Capacitor 0.1μ 50V K
C121, 221	0B01602A	Mylar Capacitor 0.33μ 50V K
C122, 222	0B01412A	Electrolytic Capacitor 10μ 16V
323, 324		
C123, 223	0B09257A	Electrolytic Capacitor 2200μ 6.3V
C303, 304	0B05899A	Electrolytic Capacitor 220μ 10V
	0B06201A	IC Socket 16P (2 pcs.)
	– Rec. Amp. –	
IC303	0B06146A	IC RC4558DD
Q111, 112	0B06070A	Transistor 2SC1636
211, 212		
Q304	0B06013A	Transistor 2SA733
D103, 104	0B06181A	Silicon Diode 1SS53
105, 203		
204, 205		
L102, 103	0B00068A	Trap Coil 10.5mH
202, 203		
R146, 246	0B01679A	Carbon Resistor 100 ERD-25T J
R147, 148	0B01889A	Carbon Resistor 100K ERD-25T J
160, 247		
248, 260		
R149, 249	0B05743A	Carbon Resistor 27K ERD-25T J
R150, 250	0B05675A	Carbon Resistor 3.9K ERD-25T J
R151, 156	0B01888A	Carbon Resistor 10K ERD-25T J
251, 256		
R152, 252	0B01846A	Carbon Resistor 4.7K ERD-25T J
R153, 253	0B05936A	Carbon Resistor 10 ERD-25T J
R154, 254	0B05691A	Carbon Resistor 390 ERD-25T J
R155, 255	0B05614A	Carbon Resistor 1.8K ERD-25T J
R157, 158	0B05615A	Carbon Resistor 22K ERD-25T J
257, 258		
R309, 310	0B09215A	Fail Safe Type Resistor 100 RDF-25S J
R329	0B05692A	Carbon Resistor 68K ERD-25T J
R332	0B05509A	Carbon Resistor 33K ERD-25T J
C132, 232	0B05638A	Tantalum Capacitor 1μ 35V
C133, 233	0B09223A	Electrolytic Capacitor 1μ 50V (LN)
C134, 234	0B01412A	Electrolytic Capacitor 10μ 16V
C135, 235	0B05909A	Mylar Capacitor 0.12μ 50V J
C136, 236	0B05832A	Mylar Capacitor 0.018μ 50V J
C137, 237	0B05659A	Mylar Capacitor 5600P 50V J
C138, 238	0B01804A	Mylar Capacitor 3900P 50V J
C139, 239	0B05681A	Mylar Capacitor 0.01μ 50V J
C140, 240	0B09247A	Mica Capacitor 220P 50V J
C141, 241	0B09322A	PP Capacitor 330P 100V J
C309, 310	0B01502A	Electrolytic Capacitor 330μ 16V
	– Line Amp. –	
IC302	0B06146A	IC RC4558DD
Q109, 110	0B06070A	Transistor 2SC1636
209, 210		
Q305	0B06013A	Transistor 2SA733
D102, 202	0B06181A	Silicon Diode 1SS53
R127, 227	0B01889A	Carbon Resistor 100K ERD-25T J
R128, 228	0B01857A	Carbon Resistor 1K ERD-25T J
R129, 229	0B05694A	Carbon Resistor 9.1K ERD-25T J
R143, 243	0B05691A	Carbon Resistor 390 ERD-25T J
R144, 244	0B01888A	Carbon Resistor 10K ERD-25T J
R145, 245	0B01682A	Carbon Resistor 6.8K ERD-25T J
R301, 302	0B09214A	Fail Safe Type Resistor 1 RDF-25S J
R305, 306	0B09215A	Fail Safe Type Resistor 100 RDF-25S J
R325	0B05620A	Carbon Resistor 270K ERD-25T J
R327	0B05692A	Carbon Resistor 68K ERD-25T J
C124, 224	0B01405A	Electrolytic Capacitor 1μ 50V
C125, 225	0B01412A	Electrolytic Capacitor 10μ 16V
C131, 231	0B09187A	Electrolytic Capacitor 1μ 50V (BP)
C301, 302	0B01397A	Electrolytic Capacitor 1000μ 16V
C305, 306	0B01403A	Electrolytic Capacitor 47μ 16V
	– Headphone Amp. –	
Q104, 204	0B06062A	Transistor 2SC1222
Q105, 205	0B06013A	Transistor 2SA733
Q106, 206	0B01872A	Transistor 2SC945 (L)
Q107, 207	0B06066A	Transistor 2SD471
Q108, 208	0B06069A	Transistor 2SB564
R130, 230	0B05626A	Carbon Resistor 150K ERD-25T J
R131, 231	0B05508A	Carbon Resistor 56K ERD-25T J
R132, 232	0B05692A	Carbon Resistor 68K ERD-25T J
R133, 233	0B05627A	Carbon Resistor 330K ERD-25T J
R134, 234	0B09263A	Carbon Resistor 12K ERD-25T J
R135, 139	0B01857A	Carbon Resistor 1K ERD-25T J
235, 239		
R136, 236	0B01683A	Carbon Resistor 15K ERD-25T J
R137, 237	0B05614A	Carbon Resistor 1.8K ERD-25T J
R138, 238	0B05794A	Carbon Resistor 680 ERD-25T J
R140, 240	0B05623A	Carbon Resistor 1.2K ERD-25T J
R141, 142	0B09304A	Carbon Resistor 3.3 ERD-25T J
241, 242		
R333	0B09216A	Fail Safe Type Resistor 10 RDF-25S J
C126, 226	0B01405A	Electrolytic Capacitor 1μ 50V
C127, 227	0B01389A	Electrolytic Capacitor 4.7μ 25V
C128, 228	0B01412A	Electrolytic Capacitor 10μ 16V
C129, 229	0B09280A	Ceramic Capacitor 47P 50V J
C130, 230	0B05885A	Electrolytic Capacitor 100μ 10V
C325	0B01392A	Electrolytic Capacitor 470μ 16V
	– Bias Osc. –	
Q301, 302	0B01872A	Transistor 2SC945 (L)
Q303	0B01426A	Transistor 2SA562
T301	0B06613A	Osc. Coil
L303	0B03861B	Inductor 1.4mH
R159, 259	0B05936A	Carbon Resistor 10 ERD-25T J
R321, 322	0B09212A	Fail Safe Type Resistor 2.2 RDF-25S J
R323, 324	0B05668A	Carbon Resistor 82K ERD-25T J
R328	0B01682A	Carbon Resistor 6.8K ERD-25T J
R330	0B09295A	Fail Safe Type Resistor 82 RDF-2B J
R331	0B09296A	Fail Safe Type Resistor 39 RDF-1/2S J
C142, 242	0B09285A	Ceramic Capacitor 330P 50V K
C318	0B09254A	PP Capacitor 0.068μ 100V J
C319	0B01402A	Electrolytic Capacitor 4.7μ 25V
C320	0B05583A	Mylar Capacitor 0.033μ 50V J
C321, 322	0B09191A	PP Capacitor 4700P 100V G
	– Tone Osc. –	
IC301	0B06124B	IC RC4558D
VR301	0B07058A	Semi-fixed Volume 50K
R311	0B05671A	Carbon Resistor 2.2M ERD-25T J
R312, 313	0B01889A	Carbon Resistor 100K ERD-25T J
316, 317		
R314	0B09305A	Metal Film Resistor 100K SN14K2E F
R315	0B05615A	Carbon Resistor 22K ERD-25T J
R318	0B05627A	Carbon Resistor 330K ERD-25T J
R319	0B01888A	Carbon Resistor 10K ERD-25T J
R320	0B05509A	Carbon Resistor 33K ERD-25T J
C307, 308	0B01412A	Electrolytic Capacitor 10μ 16V
C311	0B05681A	Mylar Capacitor 0.01μ 50V J
C312	0B05687A	Mylar Capacitor 1200P 50V J
C313	0B01780A	Mylar Capacitor 0.1μ 50V J
C314	0B09323A	PP Capacitor 560P 100V J
C315	0B09045A	Mylar Capacitor 0.027μ 50V J
C316	0B05685A	Mylar Capacitor 0.082μ 50V J
C317	0B05832A	Mylar Capacitor 0.018μ 50V J
C327	0B09277A	Ceramic Capacitor 10P 50V J
	– Miscellaneous –	
	0B07826C	Main P.C.B.
IC304, 305	0B06144A	IC μPD4066C
306		
D301, 302	0B06181A	Silicon Diode 1SS53
R334, 335	0B01889A	Carbon Resistor 100K ERD-25T J
336, 337		
338, 339		
R340, 341	0B01888A	Carbon Resistor 10K ERD-25T J
R342	0B09049A	Fail Safe Type Resistor 22 RDF-25S J
R343	0B05776A	Carbon Resistor 1M ERD-25T J
C326	0B01412A	Electrolytic Capacitor 10μ 16V
SW7	0B07278A	Slide Switch
CN1, 2	0B08654A	4P-T Post
CN3	0B08656A	2P-T Post

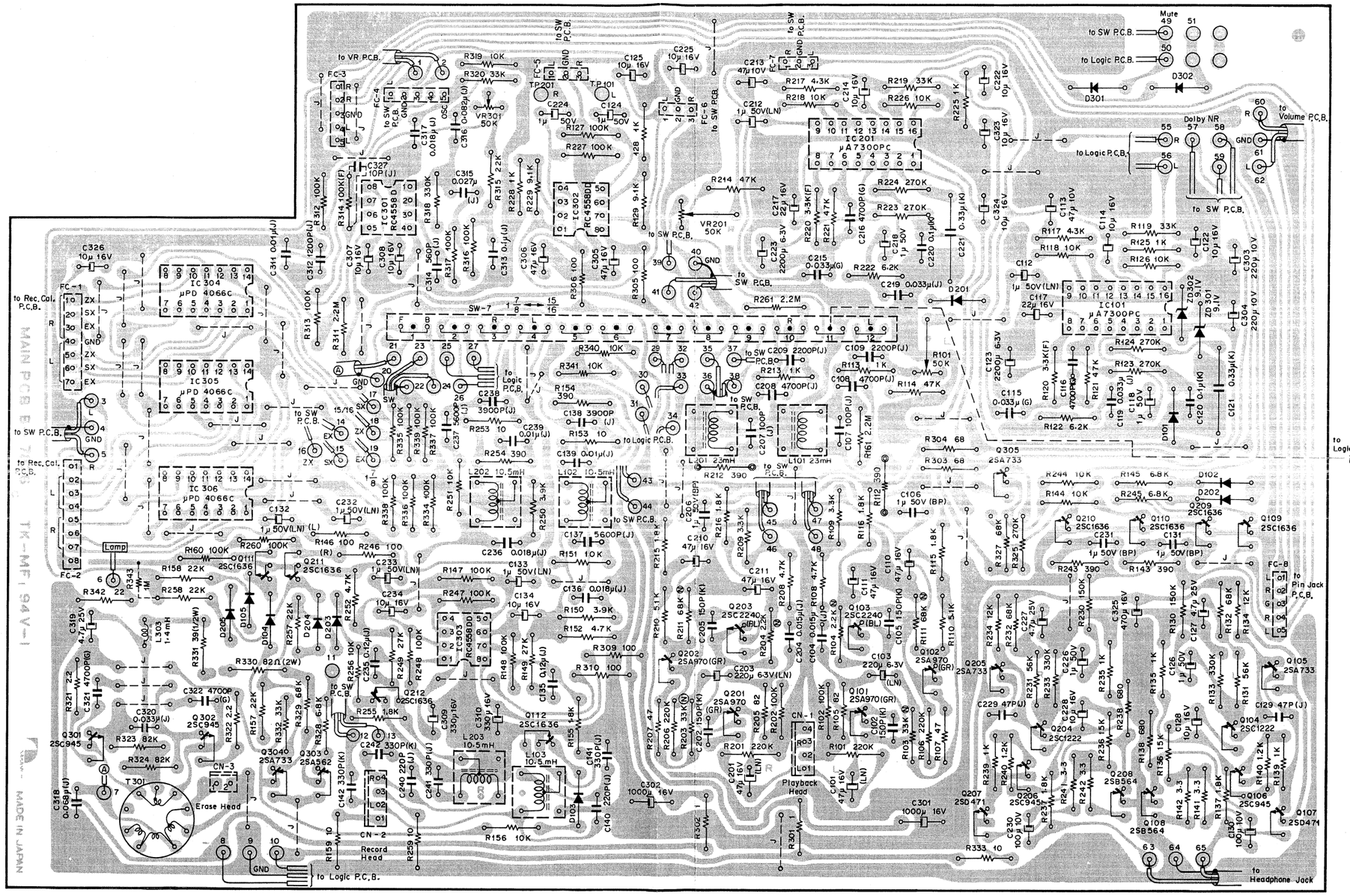


Fig. 7.1.3 Serial Nos.: A11202474 – A11202660

Note: Diode is 1SS53 unless otherwise specified.

Schematic Ref. No.	Part No.	Description
	BA04224A	**Main P.C.B. Ass'y**
		Serial Nos.: A11202474 – A11202660
		– PB Eq. Amp. –
Q101, 102	0B06180A	Transistor 2SA970 (GR)
201, 202		
Q103, 203	0B06142A	Transistor 2SC2240 (BL)
L101, 201	0B03563A	19K Coil 23mH
VR101, 201	0B07228A	Semi-fixed Volume 50K
R101, 106	0B05625A	Carbon Resistor 220K ERD-25T J
201, 206		
R102, 202	0B01889A	Carbon Resistor 100K ERD-25T J
R103, 203	0B09310A	Carbon Resistor 33K ERD-25TS J (Noiseless)
R104, 204	0B09309A	Carbon Resistor 2.2K ERD-25TS J (Noiseless)
R105, 205	0B05631A	Carbon Resistor 82 ERD-25T J
R107, 207	0B01706A	Carbon Resistor 47 ERD-25T J
R108, 208	0B01846A	Carbon Resistor 4.7K ERD-25T J
R109, 209	0B01681A	Carbon Resistor 3.3K ERD-25T J
R110, 210	0B09314A	Carbon Resistor 5.1K ERD-25T J
R111, 211	0B09311A	Carbon Resistor 68K ERD-25TS J (Noiseless)
R112, 212	0B05691A	Carbon Resistor 390 ERD-25T J
R113, 213	0B01857A	Carbon Resistor 1K ERD-25T J
R114, 214	0B05641A	Carbon Resistor 47K ERD-25T J
R115, 116	0B05614A	Carbon Resistor 1.8K ERD-25T J
215, 216		
R161, 261	0B05671A	Carbon Resistor 2.2M ERD-25T J
C101, 201	0B09218A	Electrolytic Capacitor 47μ 16V (LN)
C102, 105	0B09281A	Ceramic Capacitor 150P 50V K
202, 205		
C103, 203	0B09151A	Electrolytic Capacitor 220μ 6.3V (LN)
C104, 204	0B05557A	Mylar Capacitor 0.015μ 50V J
C106, 206	0B09187A	Electrolytic Capacitor 1μ 50V (BP)
C107, 207	0B09302A	Mica Capacitor 100P 50V J
C108, 208	0B05652A	Mylar Capacitor 4700P 50V J
C109, 209	0B01802A	Mylar Capacitor 2200P 50V J
C110, 111	0B01403A	Electrolytic Capacitor 47μ 16V
210, 211		
		– PB Dolby NR –
IC101, 201	0B06200A	IC μA7300PC
ZD301, 302	0B06232A	Zener Diode 9.1V
D101, 201	0B06181A	Silicon Diode 1SS53
R117, 217	0B09307A	Carbon Resistor 4.3K ERD-25T J
R118, 126	0B01888A	Carbon Resistor 10K ERD-25T J
218, 226		
R119, 219	0B05509A	Carbon Resistor 33K ERD-25T J
R120, 220	0B09317A	Metal Film Resistor 3.3K SN14K2E F
R121, 221	0B05641A	Carbon Resistor 47K ERD-25T J
R122, 222	0B09271A	Carbon Resistor 6.2K ERD-25T J
R123, 124	0B05620A	Carbon Resistor 270K ERD-25T J
223, 224		
R125, 225	0B01857A	Carbon Resistor 1K ERD-25T J
R303, 304	0B09306A	Fail Safe Type Resistor 68 RDF-25S J
C112, 212	0B09223A	Electrolytic Capacitor 1μ 50V (LN)
C113, 213	0B01836A	Electrolytic Capacitor 47μ 10V
C114, 122	0B01412A	Electrolytic Capacitor 10μ 16V
214, 222		
323, 324		

Schematic Ref. No.	Part No.	Description
C115, 215	0B09240A	PP Capacitor 0.033μ 100V G
C116, 216	0B09191A	PP Capacitor 4700P 100V G
C117, 217	0B01862A	Electrolytic Capacitor 22μ 16V
C118, 218	0B01405A	Electrolytic Capacitor 1μ 50V
C119, 219	0B05583A	Mylar Capacitor 0.033μ 50V J
C120, 220	0B01603A	Mylar Capacitor 0.1μ 50V K
C121, 221	0B01602A	Mylar Capacitor 0.33μ 50V K
C123, 223	0B09257A	Electrolytic Capacitor 2200μ 6.3V
C303, 304	0B05899A	Electrolytic Capacitor 220μ 10V
	0B06201A	IC Socket 16P (2 pcs.)
		– Rec. Amp. –
IC303	0B06146A	IC RC4558DD
Q111, 112	0B06070A	Transistor 2SC1636
211, 212		
Q304	0B06013A	Transistor 2SA733
D103, 104	0B06181A	Silicon Diode 1SS53
105, 203		
204, 205		
L102, 103	0B00068A	Trap Coil 10.5mH
202, 203		
R146, 246	0B01679A	Carbon Resistor 100 ERD-25T J
R147, 148	0B01889A	Carbon Resistor 100K ERD-25T J
160, 247		
248, 260		
R149, 249	0B05743A	Carbon Resistor 27K ERD-25T J
R150, 250	0B05675A	Carbon Resistor 3.9K ERD-25T J
R151, 156	0B01888A	Carbon Resistor 10K ERD-25T J
251, 256		
R152, 252	0B01846A	Carbon Resistor 4.7K ERD-25T J
R153, 253	0B05936A	Carbon Resistor 10 ERD-25T J
R154, 254	0B05691A	Carbon Resistor 390 ERD-25T J
R155, 255	0B05614A	Carbon Resistor 1.8K ERD-25T J
R157, 158	0B05615A	Carbon Resistor 22K ERD-25T J
257, 258		
R309, 310	0B09215A	Fail Safe Type Resistor 100 RDF-25S J
R329	0B05692A	Carbon Resistor 68K ERD-25T J
R332	0B05509A	Carbon Resistor 33K ERD-25T J
C132, 133	0B09223A	Electrolytic Capacitor 1μ 50V (LN)
232, 233		
C134, 234	0B01412A	Electrolytic Capacitor 10μ 16V
C135, 235	0B05909A	Mylar Capacitor 0.12μ 50V J
C136, 236	0B05832A	Mylar Capacitor 0.018μ 50V J
C137, 237	0B05659A	Mylar Capacitor 5600P 50V J
C138, 238	0B01804A	Mylar Capacitor 3900P 50V J
C139, 239	0B05681A	Mylar Capacitor 0.01μ 50V J
C140, 240	0B09247A	Mica Capacitor 220P 50V J
C141, 241	0B09322A	PP Capacitor 330P 100V J
C309, 310	0B01502A	Electrolytic Capacitor 330μ 16V
		– Line Amp. –
IC302	0B06146A	IC RC4558DD
Q109, 110	0B06070A	Transistor 2SC1636
209, 210		
Q305	0B06013A	Transistor 2SA733
D102, 202	0B06181A	Silicon Diode 1SS53
R127, 227	0B01889A	Carbon Resistor 100K ERD-25T J
R128, 228	0B01857A	Carbon Resistor 1K ERD-25T J
R129, 229	0B05694A	Carbon Resistor 9.1K ERD-25T J
R143, 243	0B05691A	Carbon Resistor 390 ERD-25T J
R144, 244	0B01888A	Carbon Resistor 10K ERD-25T J

Schematic Ref. No.	Part No.	Description
R145, 245	0B01682A	Carbon Resistor 6.8K ERD-25T J
R301, 302	0B09214A	Fail Safe Type Resistor 1 RDF-25S J
R305, 306	0B09215A	Fail Safe Type Resistor 100 RDF-25S J
R325	0B05620A	Carbon Resistor 270K ERD-25T J
R327	0B05692A	Carbon Resistor 68K ERD-25T J
C124, 224	0B01405A	Electrolytic Capacitor 1μ 50V
C125, 225	0B01412A	Electrolytic Capacitor 10μ 16V
C131, 231	0B09187A	Electrolytic Capacitor 1μ 50V (BP)
C301, 302	0B01397A	Electrolytic Capacitor 1000μ 16V
C305, 306	0B01403A	Electrolytic Capacitor 47μ 16V
		– Headphone Amp. –
Q104, 204	0B06062A	Transistor 2SC1222
Q105, 205	0B06013A	Transistor 2SA733
Q106, 206	0B01872A	Transistor 2SC945 (L)
Q107, 207	0B06066A	Transistor 2SD471
Q108, 208	0B06069A	Transistor 2SB564
R130, 230	0B05626A	Carbon Resistor 150K ERD-25T J
R131, 231	0B05508A	Carbon Resistor 56K ERD-25T J
R132, 232	0B05692A	Carbon Resistor 68K ERD-25T J
R133, 233	0B05627A	Carbon Resistor 330K ERD-25T J
R134, 234	0B09263A	Carbon Resistor 12K ERD-25T J
R135, 139	0B01857A	Carbon Resistor 1K ERD-25T J
235, 239		
R136, 236	0B01683A	Carbon Resistor 15K ERD-25T J
R137, 237	0B05614A	Carbon Resistor 1.8K ERD-25T J
R138, 238	0B05794A	Carbon Resistor 680 ERD-25T J
R140, 240	0B05623A	Carbon Resistor 1.2K ERD-25T J
R141, 142	0B09304A	Carbon Resistor 3.3 ERD-25T J
241, 242		
R333	0B09216A	Fail Safe Type Resistor 10 RDF-25S J
C126, 226	0B01405A	Electrolytic Capacitor 1μ 50V
C127, 227	0B01389A	Electrolytic Capacitor 4.7μ 25V
C128, 228	0B01412A	Electrolytic Capacitor 10μ 16V
C129, 229	0B09280A	Ceramic Capacitor 47P 50V J
C130, 230	0B05885A	Electrolytic Capacitor 100μ 10V
C325	0B01392A	Electrolytic Capacitor 470μ 16V
		– Bias Osc. –
Q301, 302	0B01872A	Transistor 2SC945 (L)
Q303	0B01426A	Transistor 2SA562
T301	0B06613A	Osc. Coil
L303	0B03861B	Inductor 1.4mH
R159, 259	0B05936A	Carbon Resistor 10 ERD-25T J
R321, 322	0B09212A	Fail Safe Type Resistor 2.2 RDF-25S J
R323, 324	0B05668A	Carbon Resistor 82K ERD-25T J
R328	0B01682A	Carbon Resistor 6.8K ERD-25T J
R330	0B09295A	Fail Safe Type Resistor 82 RDF-2B J
R331	0B09296A	Fail Safe Type Resistor 39 RDF-1/2S J
C142, 242	0B09285A	Ceramic Capacitor 330P 50V K
C318	0B09254A	PP Capacitor 0.068μ 100V J
C319	0B01402A	Electrolytic Capacitor 4.7μ 25V
C320	0B05583A	Mylar Capacitor 0.033μ 50V J
C321, 322	0B09191A	PP Capacitor 4700P 100V G
		– Tone Osc. –
IC301	0B06124B	IC RC4558D
VR301	0B07058A	Semi-fixed Volume 50K
R311	0B05671A	Carbon Resistor 2.2M ERD-25T J

Schematic Ref. No.	Part No.	Description
R312, 313	0B01889A	Carbon Resistor 100K ERD-25T J
316, 317		
R314	0B09305A	Metal Film Resistor 100K SN14K2E F
R315	0B05615A	Carbon Resistor 22K ERD-25T J
R318	0B05627A	Carbon Resistor 330K ERD-25T J
R319	0B01888A	Carbon Resistor 10K ERD-25T J
R320	0B05509A	Carbon Resistor 33K ERD-25T J
C307, 308	0B01412A	Electrolytic Capacitor 10μ 16V
C311	0B05681A	Mylar Capacitor 0.01μ 50V J
C312	0B05687A	Mylar Capacitor 1200P 50V J
C313	0B01780A	Mylar Capacitor 0.1μ 50V J
C314	0B09323A	PP Capacitor 560P 100V J
C315	0B09045A	Mylar Capacitor 0.027μ 50V J
C316	0B05685A	Mylar Capacitor 0.082μ 50V J
C317	0B05832A	Mylar Capacitor 0.018μ 50V J
C327	0B09277A	Ceramic Capacitor 10P 50V J
		– Miscellaneous –
	0B07826C	Main P.C.B.
IC304, 305	0B06144A	IC μPD4066C
306		
D301, 302	0B06181A	Silicon Diode 1SS53
R334, 335	0B01889A	Carbon Resistor 100K ERD-25T J
336, 337		
338, 339		
R340, 341	0B01888A	Carbon Resistor 10K ERD-25T J
R342	0B09049A	Fail Safe Type Resistor 22 RDF-25S J
R343	0B05776A	Carbon Resistor 1M ERD-25T J
C326	0B01412A	Electrolytic Capacitor 10μ 16V
SW7	0B07278A	Slide Switch
CN1, 2	0B08654A	4P-T Post
CN3	0B08656A	2P-T Post

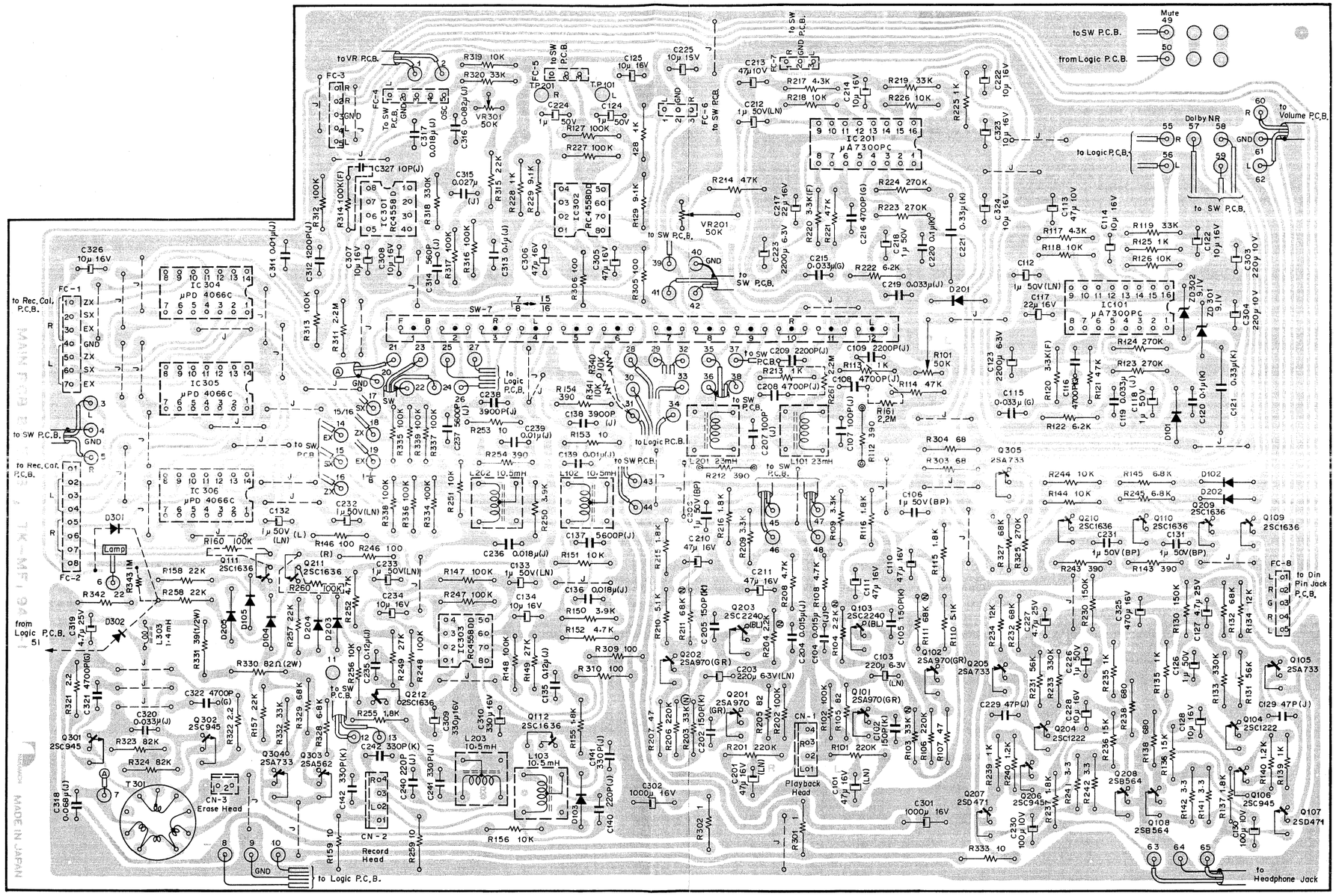


Fig. 7.1.4 Serial Nos.: A11201001 — A11202473

Note: Diode is 1SS53 unless otherwise specified.

Schematic Ref. No.	Part No.	Description
	BA04058A	**Main P.C.B. Ass'y** Serial Nos.: A11201001 – A11202473
	– PB Eq. Amp. –	
Q101, 102 201, 202	0B06180A	Transistor 2SA970 (GR)
Q103, 203	0B06142A	Transistor 2SC2240 (BL)
L101, 201	0B03563A	19K Coil 23mH
VR101, 201	0B07228A	Semi-fixed Volume 50K
R101, 106 201, 206	0B05625A	Carbon Resistor 220K ERD-25T J
R102, 202	0B01889A	Carbon Resistor 100K ERD-25T J
R103, 203	0B09310A	Carbon Resistor 33K ERD-25TS J (Noiseless)
R104, 204	0B09309A	Carbon Resistor 2.2K ERD-25TS J (Noiseless)
R105, 205	0B05631A	Carbon Resistor 82 ERD-25T J
R107, 207	0B01706A	Carbon Resistor 47 ERD-25T J
R108, 208	0B01846A	Carbon Resistor 4.7K ERD-25T J
R109, 209	0B01681A	Carbon Resistor 3.3K ERD-25T J
R110, 210	0B09314A	Carbon Resistor 5.1K ERD-25T J
R111, 211	0B09311A	Carbon Resistor 68K ERD-25TS J (Noiseless)
R112, 212	0B05691A	Carbon Resistor 390 ERD-25T J
R113, 213	0B01857A	Carbon Resistor 1K ERD-25T J
R114, 214	0B05641A	Carbon Resistor 47K ERD-25T J
R115, 116 215, 216	0B05614A	Carbon Resistor 1.8K ERD-25T J
R161, 261	0B05671A	Carbon Resistor 2.2M ERD-25T J
C101, 201	0B09218A	Electrolytic Capacitor 47μ 16V (LN)
C102, 105 202, 205	0B09281A	Ceramic Capacitor 150P 50V K
C103, 203	0B09151A	Electrolytic Capacitor 220μ 6.3V (LN)
C104, 204	0B05557A	Mylar Capacitor 0.015μ 50V J
C106, 206	0B09187A	Electrolytic Capacitor 1μ 50V (BP)
C107, 207	0B09302A	Mica Capacitor 100P 50V J
C108, 208	0B05652A	Mylar Capacitor 4700P 50V J
C109, 209	0B01802A	Mylar Capacitor 2200P 50V J
C110, 111 210, 211	0B01403A	Electrolytic Capacitor 47μ 16V
	– PB Dolby NR –	
IC101, 201	0B06200A	IC μA7300PC
ZD301, 302	0B06232A	Zener Diode 9.1V
D101, 201	0B06181A	Silicon Diode 1SS53
R117, 217	0B09307A	Carbon Resistor 4.3K ERD-25T J
R118, 126 218, 226	0B01888A	Carbon Resistor 10K ERD-25T J
R119, 219	0B05509A	Carbon Resistor 33K ERD-25T J
R120, 220	0B09317A	Metal Film Resistor 3.3K SN14K2E F
R121, 221	0B05641A	Carbon Resistor 47K ERD-25T J
R122, 222	0B09271A	Carbon Resistor 6.2K ERD-25T J
R123, 124 223, 224	0B05620A	Carbon Resistor 270K ERD-25T J
R125, 225	0B01857A	Carbon Resistor 1K ERD-25T J
R303, 304	0B09306A	Fail Safe Type Resistor 68 RDF-25S J
C112, 212	0B09223A	Electrolytic Capacitor 1μ 50V (LN)
C113, 213	0B01836A	Electrolytic Capacitor 47μ 10V
C114, 122 214, 222 323, 324	0B01412A	Electrolytic Capacitor 10μ 16V
C115, 215	0B09240A	PP Capacitor 0.033μ 100V G
C116, 216	0B09191A	PP Capacitor 4700P 100V G
C117, 217	0B01862A	Electrolytic Capacitor 22μ 16V
C118, 218	0B01405A	Electrolytic Capacitor 1μ 50V
C119, 219	0B05583A	Mylar Capacitor 0.033μ 50V J
C120, 220	0B01603A	Mylar Capacitor 0.1μ 50V K
C121, 221	0B01602A	Mylar Capacitor 0.33μ 50V K
C123, 223	0B09257A	Electrolytic Capacitor 2200μ 6.3V
C303, 304	0B05899A	Electrolytic Capacitor 220μ 10V
	0B06201A	IC Socket 16P (2 pcs.)
	– Rec. Amp. –	
IC303	0B06146A	IC RC4558DD
Q111, 112 211, 212	0B06070A	Transistor 2SC1636
Q304	0B06013A	Transistor 2SA733
D103, 104 105, 203 204, 205	0B06181A	Silicon Diode 1SS53
L102, 103 202, 203	0B00068A	Trap Coil 10.5mH
R146, 246	0B01679A	Carbon Resistor 100 ERD-25T J
R147, 148 160, 247 248, 260	0B01889A	Carbon Resistor 100K ERD-25T J
R149, 249	0B05743A	Carbon Resistor 27K ERD-25T J
R150, 250	0B05675A	Carbon Resistor 3.9K ERD-25T J
R151, 156 251, 256	0B01888A	Carbon Resistor 10K ERD-25T J
R152, 252	0B01846A	Carbon Resistor 4.7K ERD-25T J
R153, 253	0B05936A	Carbon Resistor 10 ERD-25T J
R154, 254	0B05691A	Carbon Resistor 390 ERD-25T J
R155, 255	0B05614A	Carbon Resistor 1.8K ERD-25T J
R157, 158 257, 258	0B05615A	Carbon Resistor 22K ERD-25T J
R309, 310	0B09215A	Fail Safe Type Resistor 100 RDF-25S J
R329	0B05692A	Carbon Resistor 68K ERD-25T J
R332	0B05509A	Carbon Resistor 33K ERD-25T J
C132, 133 232, 233	0B09223A	Electrolytic Capacitor 1μ 50V (LN)
C134, 234	0B01412A	Electrolytic Capacitor 10μ 16V
C135, 235	0B05909A	Mylar Capacitor 0.12μ 50V J
C136, 236	0B05832A	Mylar Capacitor 0.018μ 50V J
C137, 237	0B05659A	Mylar Capacitor 5600P 50V J
C138, 238	0B01804A	Mylar Capacitor 3900P 50V J
C139, 239	0B05681A	Mylar Capacitor 0.01μ 50V J
C140, 240	0B09247A	Mica Capacitor 220P 50V J
C141, 241	0B09322A	PP Capacitor 330P 100V J
C309, 310	0B01502A	Electrolytic Capacitor 330μ 16V
	– Line Amp. –	
IC302	0B06146A	IC RC4558DD
Q109, 110 209, 210	0B06070A	Transistor 2SC1636
Q305	0B06013A	Transistor 2SA733
D102, 202	0B06181A	Silicon Diode 1SS53
R127, 227	0B01889A	Carbon Resistor 100K ERD-25T J
R128, 228	0B01857A	Carbon Resistor 1K ERD-25T J
R129, 229	0B05694A	Carbon Resistor 9.1K ERD-25T J
R143, 243	0B05691A	Carbon Resistor 390 ERD-25T J
R144, 244	0B01888A	Carbon Resistor 10K ERD-25T J
R145, 245	0B01682A	Carbon Resistor 6.8K ERD-25T J
R301, 302	0B09214A	Fail Safe Type Resistor 1 RDF-25S J
R305, 306	0B09215A	Fail Safe Type Resistor 100 RDF-25S J
R325	0B05620A	Carbon Resistor 270K ERD-25T J
R327	0B05692A	Carbon Resistor 68K ERD-25T J
C124, 224	0B01405A	Electrolytic Capacitor 1μ 50V
C125, 225	0B01412A	Electrolytic Capacitor 10μ 16V
C131, 231	0B09187A	Electrolytic Capacitor 1μ 50V (BP)
C301, 302	0B01397A	Electrolytic Capacitor 1000μ 16V
C305, 306	0B01403A	Electrolytic Capacitor 47μ 16V
	– Headphone Amp. –	
Q104, 204	0B06062A	Transistor 2SC1222
Q105, 205	0B06013A	Transistor 2SA733
Q106, 206	0B01872A	Transistor 2SC945 (L)
Q107, 207	0B06066A	Transistor 2SD471
Q108, 208	0B06069A	Transistor 2SB564
R130, 230	0B05626A	Carbon Resistor 150K ERD-25T J
R131, 231	0B05508A	Carbon Resistor 56K ERD-25T J
R132, 232	0B05692A	Carbon Resistor 68K ERD-25T J
R133, 233	0B05627A	Carbon Resistor 330K ERD-25T J
R134, 234	0B09263A	Carbon Resistor 12K ERD-25T J
R135, 139 235, 239	0B01857A	Carbon Resistor 1K ERD-25T J
R136, 236	0B01683A	Carbon Resistor 15K ERD-25T J
R137, 237	0B05614A	Carbon Resistor 1.8K ERD-25T J
R138, 238	0B05794A	Carbon Resistor 680 ERD-25T J
R140, 240	0B05623A	Carbon Resistor 1.2K ERD-25T J
R141, 142 241, 242	0B09304A	Carbon Resistor 3.3 ERD-25T J
R333	0B09216A	Fail Safe Type Resistor 10 RDF-25S J
C126, 226	0B01405A	Electrolytic Capacitor 1μ 50V
C127, 227	0B01389A	Electrolytic Capacitor 4.7μ 25V
C128, 228	0B01412A	Electrolytic Capacitor 10μ 16V
C129, 229	0B09280A	Ceramic Capacitor 47P 50V J
C130, 230	0B05885A	Electrolytic Capacitor 100μ 10V
C325	0B01392A	Electrolytic Capacitor 470μ 16V
	– Bias Osc. –	
Q301, 302	0B01872A	Transistor 2SC945 (L)
Q303	0B01426A	Transistor 2SA562
T301	0B06613A	Osc. Coil
L303	0B03861B	Inductor 1.4mH
R159, 259	0B05936A	Carbon Resistor 10 ERD-25T J
R321, 322	0B09212A	Fail Safe Type Resistor 2.2 RDF-25S J
R323, 324	0B05668A	Carbon Resistor 82K ERD-25T J
R328	0B01682A	Carbon Resistor 6.8K ERD-25T J
R330	0B09295A	Fail Safe Type Resistor 82 RDF-2B J
R331	0B09296A	Fail Safe Type Resistor 39 RDF-1/2S J
C142, 242	0B09285A	Ceramic Capacitor 330P 50V K
C318	0B09254A	PP Capacitor 0.068μ 100V J
C319	0B01402A	Electrolytic Capacitor 4.7μ 25V
C320	0B05583A	Mylar Capacitor 0.033μ 50V J
C321, 322	0B09191A	PP Capacitor 4700P 100V G
	– Tone Osc. –	
IC301	0B06124B	IC RC4558D
VR301	0B07058A	Semi-fixed Volume 50K
R311	0B05671A	Carbon Resistor 2.2M ERD-25T J
R312, 313 316, 317	0B01889A	Carbon Resistor 100K ERD-25T J
R314	0B09305A	Metal Film Resistor 100K SN14K2E F
R315	0B05615A	Carbon Resistor 22K ERD-25T J
R318	0B05627A	Carbon Resistor 330K ERD-25T J
R319	0B01888A	Carbon Resistor 10K ERD-25T J
R320	0B05509A	Carbon Resistor 33K ERD-25T J
C307, 308	0B01412A	Electrolytic Capacitor 10μ 16V
C311	0B05681A	Mylar Capacitor 0.01μ 50V J
C312	0B05687A	Mylar Capacitor 1200P 50V J
C313	0B01780A	Mylar Capacitor 0.1μ 50V J
C314	0B09323A	PP Capacitor 560P 100V J
C315	0B09045A	Mylar Capacitor 0.027μ 50V J
C316	0B05685A	Mylar Capacitor 0.082μ 50V J
C317	0B05832A	Mylar Capacitor 0.018μ 50V J
C327	0B09277A	Ceramic Capacitor 10P 50V J
	– Miscellaneous –	
	0B07826A	Main P.C.B.
IC304, 305 306	0B06144A	IC μPD4066C
D301, 302	0B06181A	Silicon Diode 1SS53
R334, 335 336, 337 338, 339	0B01889A	Carbon Resistor 100K ERD-25T J
R340, 341	0B01888A	Carbon Resistor 10K ERD-25T J
R342	0B09049A	Fail Safe Type Resistor 22 RDF-25S J
R343	0B05776A	Carbon Resistor 1M ERD-25T J
C326	0B01412A	Electrolytic Capacitor 10μ 16V
SW7	0B07278A	Slide Switch
CN1, 2	0B08654A	4P-T Post
CN3	0B08656A	2P-T Post

7.2. Switch P.C.B. Ass'y

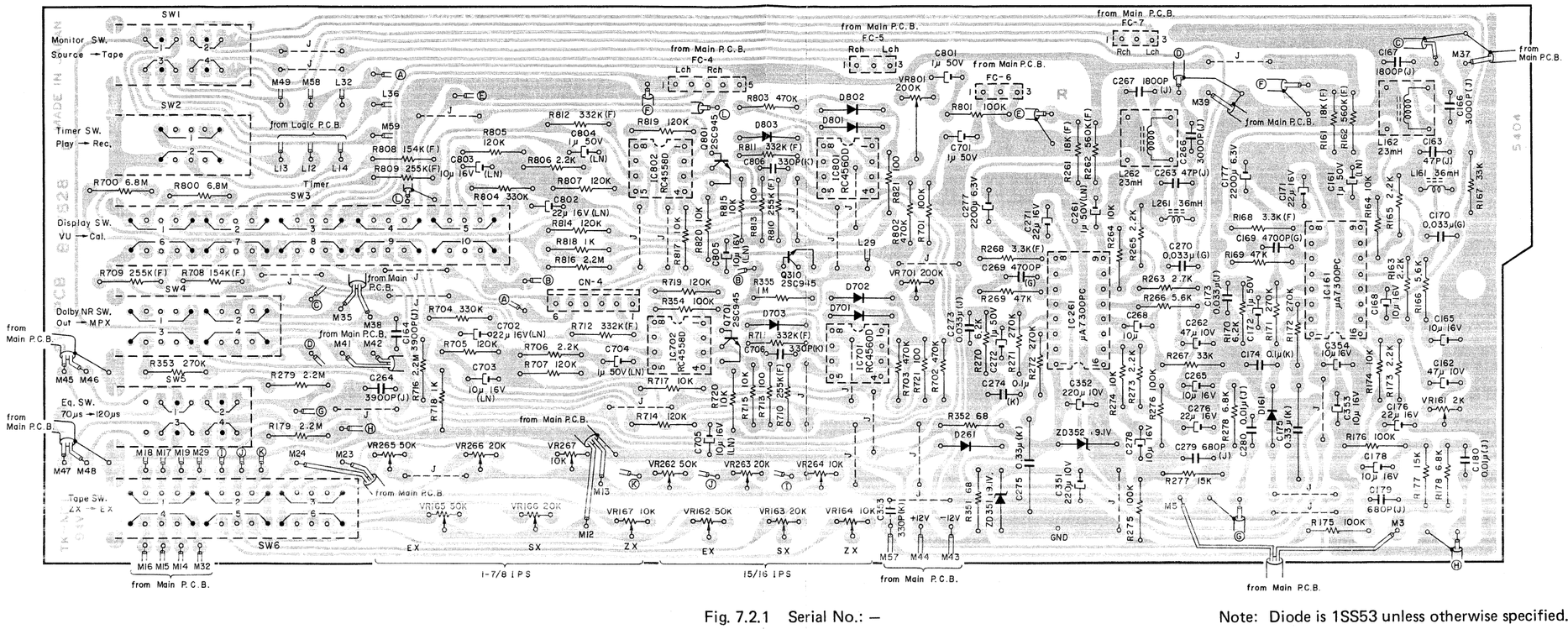


Fig. 7.2.1 Serial No.: –

Note: Diode is 1SS53 unless otherwise specified.

Schematic Ref. No.	Part No.	Description			Schematic Ref. No.	Part No.	Description		
	BA04059B	**Switch P.C.B. Ass'y** Serial No.: —			R163, 165 173, 265 273	0B05622A	Carbon Resistor	2.2K	ERD-25T J
	— Detector —				R164, 174 264, 274	0B01888A	Carbon Resistor	10K	ERD-25T J
IC701, 801	0B06217A	IC	RC4560D		R166, 266	0B01887A	Carbon Resistor	5.6K	ERD-25T J
IC702, 802	0B06124B	IC	RD4558D		R167, 267	0B05509A	Carbon Resistor	33K	ERD-25T J
Q310, 701 801	0B06100A	Transistor	2SC945		R168, 268	0B09317A	Metal Film Resistor	3.3K	SN14K2E F
					R169, 269	0B05641A	Carbon Resistor	47K	ERD-25T J
D701, 702 703, 801 802, 803	0B06181A	Silicon Diode	1SS53		R170, 270	0B09271A	Carbon Resistor	6.2K	ERD-25T J
					R171, 172 271, 272	0B05620A	Carbon Resistor	270K	ERD-25T J
VR701	0B07161A	Semi-fixed Volume	200K		353				
VR801	0B07154A	Semi-fixed Volume	200K		R175, 176 275, 276	0B01889A	Carbon Resistor	100K	ERD-25T J
R354, 701 801	0B01889A	Carbon Resistor	100K	ERD-25T J	R177, 277	0B01683A	Carbon Resistor	15K	ERD-25T J
R355	0B05776A	Carbon Resistor	1M	ERD-25T J	R178, 278	0B01682A	Carbon Resistor	6.8K	ERD-25T J
R700, 800	0B09347A	Carbon Resistor	6.8M	ERD-25T J	R179, 279	0B05671A	Carbon Resistor	2.2M	ERD-25T J
R702, 703 802, 803	0B01684A	Carbon Resistor	470K	ERD-25T J	R263	0B05629A	Carbon Resistor	2.7K	ERD-25T J
					R351, 352	0B09306A	Fail Safe Type Resistor	68	RDF-25S J
R704, 804	0B05627A	Carbon Resistor	330K	ERD-25T J	C161, 261	0B09223A	Electrolytic Capacitor	1μ	50V (LN)
R705, 707 714, 719 805, 807 814, 819	0B05621A	Carbon Resistor	120K	ERD-25T J	C162, 262	0B01836A	Electrolytic Capacitor	47μ	10V
					C163, 263	0B09242A	Mica Capacitor	47P	50V J
					C164, 264	0B01804A	Mylar Capacitor	3900P	50V J
					C165, 178 265, 278	0B01412A	Electrolytic Capacitor	10μ	16V
R706, 806	0B05622A	Carbon Resistor	2.2K	ERD-25T J	353, 354				
R708, 808	0B09348A	Metal Film Resistor	154K	SN14K2E F	C166, 266	0B09262A	PP Capacitor	3000P	100V J
R709, 710 809, 810	0B09316A	Metal Film Resistor	255K	SN14K2E F	C167, 267	0B01913A	Mylar Capacitor	1800P	50V J
R711, 712 811, 812	0B09315A	Metal Film Resistor	332K	SN14K2E F	C168, 268	0B09148A	Electrolytic Capacitor	10μ	16V (LN)
					C169, 269	0B09191A	PP Capacitor	4700P	100V G
R713, 721 813, 821	0B01679A	Carbon Resistor	100	ERD-25T J	C170, 270	0B09240A	PP Capacitor	0.033μ	100V G
					C171, 176 271, 276	0B01862A	Electrolytic Capacitor	22μ	16V
R715, 717 720, 815 817, 820	0B01888A	Carbon Resistor	10K	ERD-25T J	C172, 272	0B01405A	Electrolytic Capacitor	1μ	50V
					C173, 273	0B05583A	Mylar Capacitor	0.033μ	50V J
R716, 816	0B05671A	Carbon Resistor	2.2M	ERD-25T J	C174, 274	0B01603A	Mylar Capacitor	0.1μ	50V K
R718, 818	0B01857A	Carbon Resistor	1K	ERD-25T J	C175, 275	0B01602A	Mylar Capacitor	0.33μ	50V K
C701, 801	0B01405A	Electrolytic Capacitor	1μ	50V	C177, 277	0B09257A	Electrolytic Capacitor	2200μ	6.3V
C702, 802	0B09137A	Electrolytic Capacitor	22μ	16V (LN)	C179, 279	0B09235A	PP Capacitor	680P	100V J
C703, 705 803, 805	0B09148A	Electrolytic Capacitor	10μ	16V (LN)	C180, 280	0B05681A	Mylar Capacitor	0.01μ	50V J
					C351, 352	0B05899A	Electrolytic Capacitor	220μ	10V
C704, 804	0B09223A	Electrolytic Capacitor	1μ	50V (LN)	C353	0B09285A	Ceramic Capacitor	330P	50V K
C706, 806	0B09285A	Ceramic Capacitor	330P	50V K	SW1	0B07286A	Lever Switch	4-2 O	
CN4	0B08642A	6P-T Post			SW2	0B07284A	Lever Switch	2-3 S	
	— Rec. Dolby NR —				SW3	0B07288A	Lever Switch	10-3 S	
					SW4	0B07287A	Lever Switch	4-3 S	
					SW5	0B07285A	Lever Switch	4-2 S	
IC161, 261	0B06200A	IC	μA7300PC		SW6	0B07304A	Lever Switch	6-3 S	
ZD351, 352	0B06232A	Zener Diode	9.1V		FC4	0B05238A	5P Flat Cable	50mm	
D161, 261	0B06181A	Silicon Diode	1SS53		FC5, 6, 7	0B05240A	3P Flat Cable	50mm	
L161, 261	0B03919B	Inductor	36mH						
L162, 262	0B03563A	19K Coil	23mH			**— Miscellaneous —**			
VR161	0B09062A	Semi-fixed Volume	2K						
VR162, 165 262, 265	0B07058A	Semi-fixed Volume	50K			0B07828D	Switch P.C.B.		
VR163, 166 263, 266	0B07215A	Semi-fixed Volume	20K						
VR164, 167 264, 267	0B07162A	Semi-fixed Volume	10K						
R161, 261	0B09205A	Metal Film Resistor	18K	SN14K2E F					
R162, 262	0B09318A	Metal Film Resistor	560K	SN14K2E F					

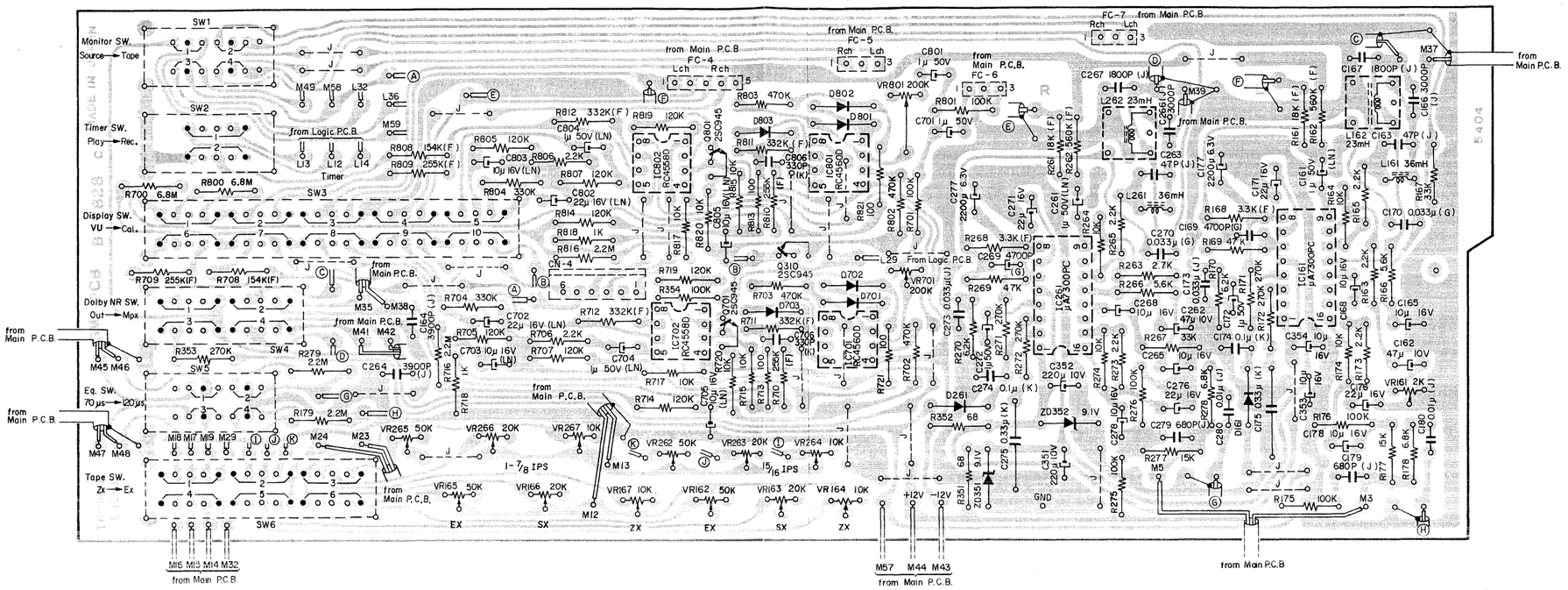


Fig. 7.2.2 Serial No.: A11202011 —

Note: Diode is 1SS53 unless otherwise specified.

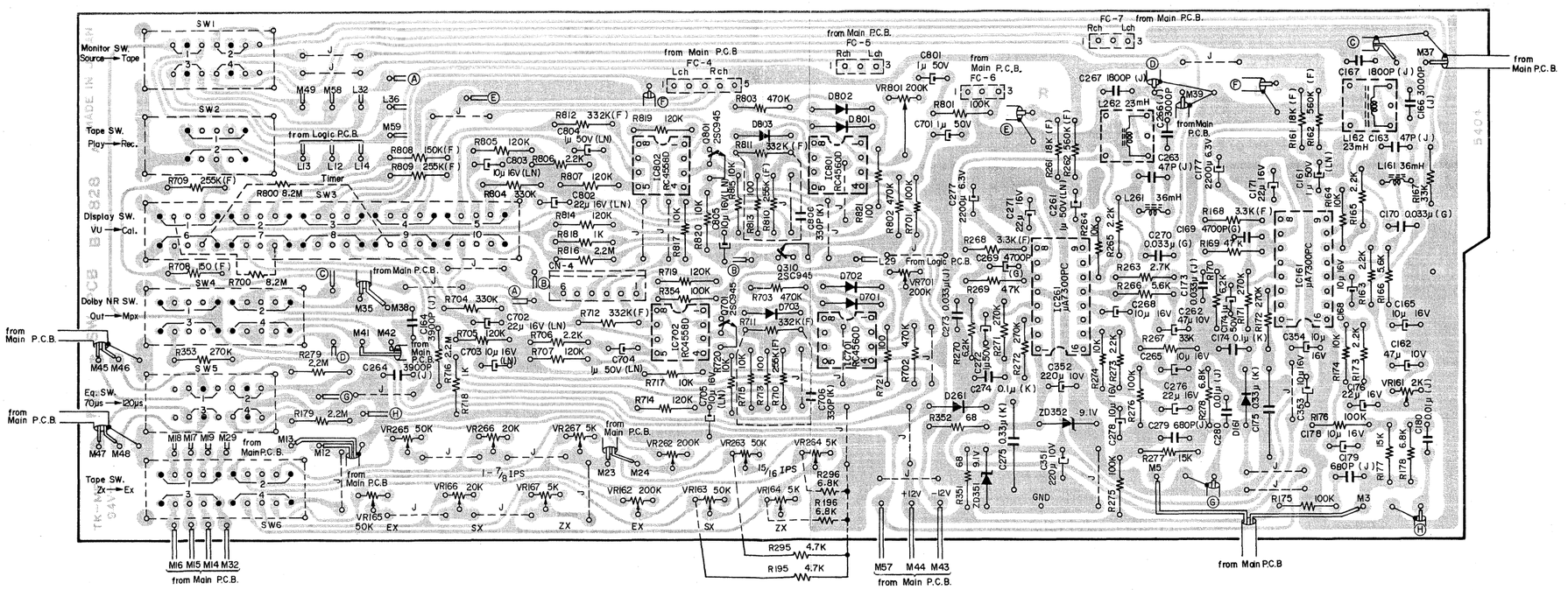


Fig. 7.2.3 Serial Nos.: A11201001 — A11202010

Note: Diode is 1SS53 unless otherwise specified.

Schematic Ref. No.	Part No.	Description
	BA04059B	**Switch P.C.B. Ass'y** Serial No.: A11202011 –
	– Detector –	
IC701, 801	0B06217A	IC RC4560D
IC702, 802	0B06124B	IC RD4558D
Q310, 701 801	0B06100A	Transistor 2SC945
D701, 702 703, 801 802, 803	0B06181A	Silicon Diode 1SS53
VR701	0B07161A	Semi-fixed Volume 200K
VR801	0B07154A	Semi-fixed Volume 200K
R354, 701 801	0B01889A	Carbon Resistor 100K ERD-25T J
R700, 800	0B09347A	Carbon Resistor 6.8M ERD-25T J
R702, 703 802, 803	0B01684A	Carbon Resistor 470K ERD-25T J
R704, 804	0B05627A	Carbon Resistor 330K ERD-25T J
R705, 707 714, 719 805, 807 814, 819	0B05621A	Carbon Resistor 120K ERD-25T J
R706, 806	0B05622A	Carbon Resistor 2.2K ERD-25T J
R708, 808	0B09348A	Metal Film Resistor 154K SN14K2E F
R709, 710 809, 810	0B09316A	Metal Film Resistor 255K SN14K2E F
R711, 712 811, 812	0B09315A	Metal Film Resistor 332K SN14K2E F
R713, 721 813, 821	0B01679A	Carbon Resistor 100 ERD-25T J
R715, 717 720, 815 817, 820	0B01888A	Carbon Resistor 10K ERD-25T J
R716, 816	0B05671A	Carbon Resistor 2.2M ERD-25T J
R718, 818	0B01857A	Carbon Resistor 1K ERD-25T J
C701, 801	0B01405A	Electrolytic Capacitor 1μ 50V
C702, 802	0B09137A	Electrolytic Capacitor 22μ 16V (LN)
C703, 705 803, 805	0B09148A	Electrolytic Capacitor 10μ 16V (LN)
C704, 804	0B09223A	Electrolytic Capacitor 1μ 50V (LN)
C706, 806	0B09285A	Ceramic Capacitor 330P 50V K
CN4	0B08642A	6P-T Post
	– Rec. Dolby NR –	
IC161, 261	0B06200A	IC μA7300PC
ZD351, 352	0B06232A	Zener Diode 9.1V
D161, 261	0B06181A	Silicon Diode 1SS53
L161, 261	0B03919B	Inductor 36mH
L162, 262	0B03563A	19K Coil 23mH
VR161	0B09062A	Semi-fixed Volume 2K
VR162, 165 262, 265	0B07058A	Semi-fixed Volume 50K
VR163, 166 263, 266	0B07215A	Semi-fixed Volume 20K
VR164, 167 264, 267	0B07162A	Semi-fixed Volume 10K
R161, 261	0B09205A	Metal Film Resistor 18K SN14K2E F
R162, 262	0B09318A	Metal Film Resistor 560K SN14K2E F
R163, 165 173, 265 273	0B05622A	Carbon Resistor 2.2K ERD-25T J
R164, 174 264, 274	0B01888A	Carbon Resistor 10K ERD-25T J
R166, 266	0B01887A	Carbon Resistor 5.6K ERD-25T J
R167, 267	0B05509A	Carbon Resistor 33K ERD-25T J
R168, 268	0B09317A	Metal Film Resistor 3.3K SN14K2E F
R169, 269	0B05641A	Carbon Resistor 47K ERD-25T J
R170, 270	0B09271A	Carbon Resistor 6.2K ERD-25T J
R171, 172 271, 272 353	0B05620A	Carbon Resistor 270K ERD-25T J
R175, 176 275, 276	0B01889A	Carbon Resistor 100K ERD-25T J
R177, 277	0B01683A	Carbon Resistor 15K ERD-25T J
R178, 278	0B01682A	Carbon Resistor 6.8K ERD-25T J
R179, 279	0B05671A	Carbon Resistor 2.2M ERD-25T J
R263	0B05629A	Carbon Resistor 2.7K ERD-25T J
R351, 352	0B09306A	Fail Safe Type Resistor 68 RDF-25S J
C161, 261	0B09223A	Electrolytic Capacitor 1μ 50V (LN)
C162, 262	0B01836A	Electrolytic Capacitor 47μ 10V
C163, 263	0B09242A	Mica Capacitor 47P 50V J
C164, 264	0B01804A	Mylar Capacitor 3900P 50V J
C165, 178 265, 278 353, 354	0B01412A	Electrolytic Capacitor 10μ 16V
C166, 266	0B09262A	PP Capacitor 3000P 100V J
C167, 267	0B01913A	Mylar Capacitor 1800P 50V J
C168, 268	0B09148A	Electrolytic Capacitor 10μ 16V (LN)
C169, 269	0B09191A	PP Capacitor 4700P 100V G
C170, 270	0B09240A	PP Capacitor 0.033μ 100V G
C171, 176 271, 276	0B01862A	Electrolytic Capacitor 22μ 16V
C172, 272	0B01405A	Electrolytic Capacitor 1μ 50V
C173, 273	0B05583A	Mylar Capacitor 0.033μ 50V J
C174, 274	0B01603A	Mylar Capacitor 0.1μ 50V K
C175, 275	0B01602A	Mylar Capacitor 0.33μ 50V K
C177, 277	0B09257A	Electrolytic Capacitor 2200μ 6.3V
C179, 279	0B09235A	PP Capacitor 680P 100V J
C180, 280	0B05681A	Mylar Capacitor 0.01μ 50V J
C351, 352	0B05899A	Electrolytic Capacitor 220μ 10V
SW1	0B07286A	Lever Switch 4-2 O
SW2	0B07284A	Lever Switch 2-3 S
SW3	0B07288A	Lever Switch 10-3 S
SW4	0B07287A	Lever Switch 4-3 S
SW5	0B07285A	Lever Switch 4-2 S
SW6	0B07304A	Lever Switch 6-3 S
FC4	0B05238A	5P Flat Cable 50mm
FC5, 6, 7	0B05240A	3P Flat Cable 50mm
	– Miscellaneous –	
	0B07828C	Switch P.C.B.

Schematic Ref. No.	Part No.	Description
	BA04059B	**Switch P.C.B. Ass'y** Serial Nos.: A11201001 – A11202010
	– Detector –	
IC701, 801	0B06217A	IC RC4560D
IC702, 802	0B06124B	IC RD4558D
Q310, 701 801	0B06100A	Transistor 2SC945
D701, 702 703, 801 802, 803	0B06181A	Silicon Diode 1SS53
VR701	0B07161A	Semi-fixed Volume 200K
VR801	0B07154A	Semi-fixed Volume 200K
R354, 701 801	0B01889A	Carbon Resistor 100K ERD-25T J
R700, 800	0B05927A	Carbon Resistor 8.2M ERO-50CD J
R702, 703 802, 803	0B01684A	Carbon Resistor 470K ERD-25T J
R704, 804	0B05627A	Carbon Resistor 330K ERD-25T J
R705, 707 714, 719 805, 807 814, 819	0B05621A	Carbon Reisstor 120K ERD-25T J
R706, 806	0B05622A	Carbon Resistor 2.2K ERD-25T J
R708, 808	0B09300A	Metal Film Resistor 150K SN14K2E F
R709, 710 809, 810	0B09316A	Metal Film Resistor 255K SN14K2E F
R711, 712 811, 812	0B09315A	Metal Film Resistor 332K SN14K2E F
R713, 721 813, 821	0B01679A	Carbon Resistor 100 ERD-25T J
R715, 717 720, 815 817, 820	0B01888A	Carbon Resistor 10K ERD-25T J
R716, 816	0B05671A	Carbon Resistor 2.2M ERD-25T J
R718, 818	0B01857A	Carbon Resistor 1K ERD-25T J
C701, 801	0B01405A	Electrolytic Capacitor 1μ 50V
C702, 802	0B09137A	Electrolytic Capacitor 22μ 16V (LN)
C703, 705 803, 805	0B09148A	Electrolytic Capacitor 10μ 16V (LN)
C704, 804	0B09223A	Electrolytic Capacitor 1μ 50V (LN)
C706, 806	0B09285A	Ceramic Capacitor 330P 50V K
CN4	0B08642A	6P-T Post
	– Rec. Dolby NR –	
IC161, 261	0B06200A	IC μA7300PC
ZD351, 352	0B06232A	Zener Diode 9.1V
D161, 261	0B06181A	Silicon Diode 1SS53
L161, 261	0B03919B	Inductor 36mH
L162, 262	0B03563A	19K Coil 23mH
VR161	0B09062A	Semi-fixed Volume 2K
VR162, 262	0B07161A	Semi-fixed Volume 200K
VR163, 165 263, 265	0B07058A	Semi-fixed Volume 50K
VR164, 167 264, 267	0B09059A	Semi-fixed Volume 5K
VR166, 266	0B07215A	Semi-fixed Volume 20K
R161, 261	0B09205A	Metal Film Resistor 18K SN14K2E F
R162, 262	0B09318A	Metal Film Resistor 560K SN14K2E F
R163, 165 173, 265 273	0B05622A	Carbon Resistor 2.2K ERD-25T J
R164, 174 264, 274	0B01888A	Carbon Resistor 10K ERD-25T J
R166, 266	0B01887A	Carbon Resistor 5.6K ERD-25T J
R167, 267	0B05509A	Carbon Resistor 33K ERD-25T J
R168, 268	0B09317A	Metal Film Resistor 3.3K SN14K2E F
R169, 269	0B05641A	Carbon Resistor 47K ERD-25T J
R170, 270	0B09271A	Carbon Resistor 6.2K ERD-25T J
R171, 172 271, 272 353	0B05620A	Carbon Resistor 270K ERD-25 T J
R175, 176 275, 276	0B01889A	Carbon Resistor 100K ERD-25T J
R177, 277	0B01683A	Carbon Resistor 15K ERD-25T J
R178, 196 278, 296	0B01682A	Carbon Resistor 6.8K ERD-25T J
R179, 279	0B05671A	Carbon Resistor 2.2M ERD-25T J
R195, 295	0B01846A	Carbon Resistor 4.7K ERD-25T J
R263	0B05629A	Carbon Resistor 2.7K ERD-25T J
R351, 352	0B09306A	Fail Safe Type Resistor 68 RDF-25S J
C161, 261	0B09223A	Electrolytic Capacitor 1μ 50V (LN)
C162, 262	0B01836A	Electrolytic Capacitor 47μ 10V
C163, 263	0B09242A	Mica Capacitor 47P 50V J
C164, 264	0B01804A	Mylar Capacitor 3900P 50V J
C165, 168 178, 265 268, 278 353, 354	0B01412A	Electrolytic Capacitor 10μ 16V
C166, 266	0B09262A	PP Capacitor 3000P 100V J
C167, 267	0B01913A	Mylar Capacitor 1800P 50V J
C169, 269	0B09191A	PP Capacitor 4700P 100V G
C170, 270	0B09240A	PP Capacitor 0.033μ 100V G
C171, 176 271, 276	0B01862A	Electrolytic Capacitor 22μ 16V
C172, 272	0B01405A	Electrolytic Capacitor 1μ 50V
C173, 273	0B05583A	Mylar Capacitor 0.033μ 50V J
C174, 274	0B01603A	Mylar Capacitor 0.1μ 50V K
C175, 275	0B01602A	Mylar Capacitor 0.33μ 50V K
C177, 277	0B09257A	Electrolytic Capacitor 2200μ 6.3V
C179, 279	0B09235A	PP Capacitor 680P 100V J
C180, 280	0B05681A	Mylar Capacitor 0.01μ 50V J
C351, 352	0B05899A	Electrolytic Capacitor 220μ 10V
SW1	0B07286A	Lever Switch 4-S O
SW2	0B07284A	Lever Switch 2-3 S
SW3	0B07288A	Lever Switch 10-3 S
SW5	0B07287A	Lever Switch 4-3 S
SW5	0B07285A	Lever Switch 4-2 S
SW6	0B07304A	Lever Switch 6-3 S
FC4	0B05238A	5P Flat Cable 50mm
FC5, 6, 7	0B05240A	3P Flat Cable 50mm
	– Miscellaneous –	
	0B07828A	Switch P.C.B.

7.3. Logic P.C.B. Ass'y

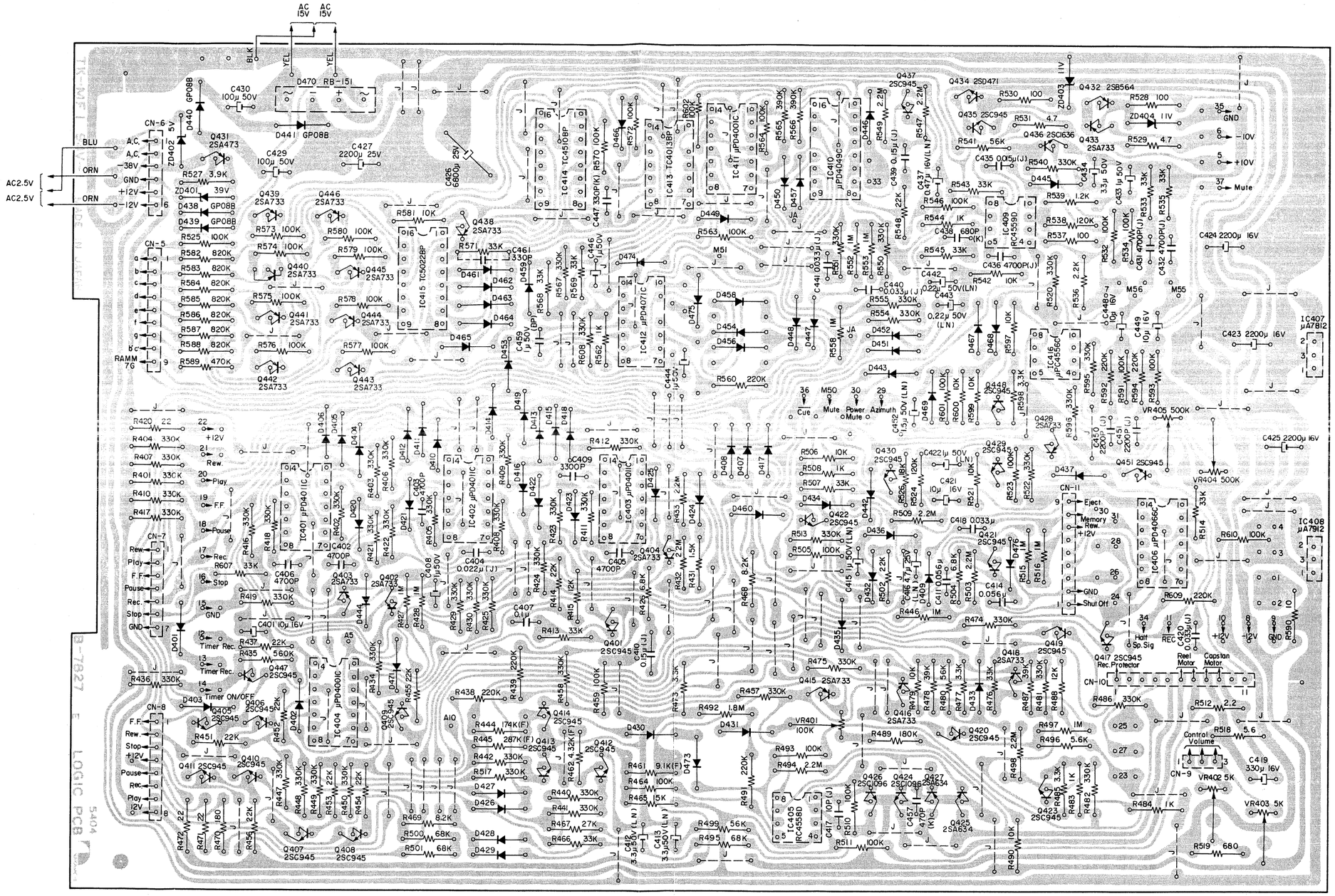


Fig. 7.3.1 Serial No.: A11202661 –

Note: Diode is 1SS53 unless otherwise specified.

Schematic Ref. No.	Part No.	Description
	BA04060C	**Logic P.C.B. Ass'y**
		Serial No.: A11202661 –
	– Logic –	
IC401, 402	0B06178A	IC μPD4011C
403		
IC404	0B06143A	IC μPD4001C
IC405	0B06124B	IC μPD4558D
IC406	0B06144A	IC μPD4066C
IC407	0B06192A	Regulator +12V μA7812
IC408	0B06193A	Regulator -12V μA7912
Q401, 405	0B06100A	Transistor 2SC945
406, 407		
408, 409		
410, 411		
412, 413		
414, 417		
419, 420		
421, 422		
423, 429		
430, 435		
447		
Q402, 403	0B06013A	Transistor 2SA733
404, 415		
416, 418		
428, 433		
Q424, 426	0B06020A	Transistor 2SC1096
Q425, 427	0B06012A	Transistor 2SA634
Q432	0B06069A	Transistor 2SB564
Q434	0B06066A	Transistor 2SD471
ZD403, 404	0B06231A	Zener Diode 11V
D401-437	0B06181A	Silicon Diode 1SS53 (43 pcs.)
442-444		
471, 473		
476		
D438, 439	0B06109A	Silicon Diode GP08B
D470	0B06183A	Diode Bridge RB151
VR401	0B03832A	Semi-fixed Volume 100K
VR402, 403	0B03831A	Semi-fixed Volume 5K
R401, 402	0B05627A	Carbon Resistor 330K ERD-25T J
403, 404		
405, 406		
407, 408		
409, 410		
411, 412		
416, 417		
418, 419		
421, 422		
423, 424		
425, 429		
430, 434		
436, 440		
441, 442		
447, 448		
449, 450		
457, 458		
474, 475		
481, 482		
486, 513		
517, 520		
522		

Schematic Ref. No.	Part No.	Description
R413, 466	0B05509A	Carbon Resistor 33K ERD-25T J
476, 507		
514, 607		
R414, 437	0B05615A	Carbon Resistor 22K ERD-25T J
451-456		(9 pcs.)
502		
R415, 488	0B09263A	Carbon Resistor 12K ERD-25T J
R420, 471	0B09049A	Fail Safe Type Resistor
		22 ERD-14F J
472		
R426, 504	0B01682A	Carbon Resistor 6.8K ERD-25T J
R427, 428	0B05776A	Carbon Resistor 1M ERD-25T J
446, 497		
515, 516		
R431	0B05698A	Carbon Resistor 1.5K ERD-25T J
R432, 433	0B05671A	Carbon Resistor 2.2M ERD-25T J
494, 498		
503, 509		
R435	0B05784A	Carbon Resistor 560K ERD-25T J
R438, 439	0B05625A	Carbon Resistor 220K ERD-25T J
491		
R444	0B09367A	Metal Film Resistor
		174K SN14K2E F
R445	0B09366A	Metal Film Resistor 287K SN14K2E F
R459, 464	0B01889A	Carbon Resistor 100K ERD-25T J
493, 505		
510, 511		
523, 525		
R461	0B09328A	Metal Film Resistor 9.1K SN14K2E F
R463	0B09365A	Metal Film Resistor 4.32K SN14K2E F
R465	0B09340A	Metal Film Resistor 15K SN14K2E F
R467	0B05743A	Carbon Resistor 27K ERD-25T J
R468, 469	0B01856A	Carbon Resistor 8.2K ERD-25T J
R470	0B05578A	Carbon Resistor 180 ERD-25T J
R473, 477	0B01681A	Carbon Resistor 3.3K ERD-25T J
485		
R478, 487	0B01854A	Carbon Resistor 39K ERD-25T J
R479, 490	0B01888A	Carbon Resistor 10K ERD-25T J
506, 521		
R480, 499	0B05508A	Carbon Resistor 56K ERD-25T J
R483, 484	0B01857A	Carbon Resistor 1K ERD-25T J
508		
R489	0B05640A	Carbon Resistor 180K ERD-25T J
R492	0B05680A	Carbon Resistor 1.8M ERD-25T J
R495, 500	0B05692A	Carbon Resistor 68K ERD-25T J
501		
R496	0B01887A	Carbon Resistor 5.6K ERD-25T J
R512	0B09212A	Fail Safe Type Resistor
		2.2 RDF-25S J
R518	0B09217A	Fail Safe Type Resistor
		5.6 RDF-25S J
R519	0B05794A	Carbon Resistor 680 ERD-25T J
R524	0B05621A	Carbon Resistor 120K ERD-25T J
R526	0B05560A	Carbon Resistor 18K ERD-25T J
R528, 530	0B09215A	Fail Safe Type Resistor
		100 RDF-25S J
R529, 531	0B09321A	Fail Safe Type Resistor
		4.7 RDF-25S J
R590	0B09216A	Fail Safe Type Resistor
		10 RDF-25S J
C401, 421	0B01412A	Electrolytic Capacitor
		10μ 16V
C402, 403	0B05556A	Mylar Capacitor 4700P 50V
405, 406		

Schematic Ref. No.	Part No.	Description
C404	0B05582A	Mylar Capacitor 0.022μ 50V J
C407	0B00093A	Mylar Capacitor 0.1μ 50V
C408	0B01405A	Electrolytic Capacitor 1μ 50V
C409	0B09166A	Mylar Capacitor 3300P 50V
C410	0B00610A	Mylar Capacitor 0.15μ 50V
C411, 414	0B01676A	Mylar Capacitor 0.056μ 50V
C412, 413	0B09324A	Electrolytic Capacitor 3.3μ 16V (LN)
C415, 422	0B09223A	Electrolytic Capacitor 1μ 16V (LN)
C416	0B09173A	Electrolytic Capacitor 4.7μ 16V (LN)
C417	0B09277A	Ceramic Capacitor 10P 50V J
C418, 420	0B05513A	Mylar Capacitor 0.033μ 50V
C419	0B01502A	Electrolytic Capacitor 330μ 16V
C423, 424	0B01406A	Electrolytic Capacitor 2200μ 16V
425		
C426	0B09374A	Electrolytic Capacitor 6800μ 25V
C427	0B05654A	Electrolytic Capacitor 2200μ 25V
C457	0B09286A	Ceramic Capacitor 470P 50V K
CN5, 11	0B08645A	9P-T Post
CN6	0B08642A	6P-T Post
CN7	0B08643A	7P-T Post
CN8	0B08644A	8P-T Post
CN9	0B08653A	3P-T Post
CN10	0B08655A	11P-T Post
	-- RAMM –	
IC409	0B06127A	IC RC4559D
IC410	0B06215A	IC TC4049BP
IC411	0B06143A	IC μPD4001C
IC412	0B06214A	IC TC4071BP
IC413	0B06213A	IC TC4013BP
IC414	0B06212A	IC TC4510BP
IC415	0B06211A	IC TC5022BP
Q431	0B06060A	Transistor 2SA473
Q436	0B06070A	Transistor 2SC1636
Q437	0B06100A	Transistor 2SC945
Q438-446	0B06013A	Transistor 2SA733 (9 pcs.)
ZD401	0B06235A	Zener Diode 39V
ZD402	0B06230A	Zener Diode 5V
D440, 441	0B06109A	Silicon Diode GP08B
D445-454	0B06181A	Silicon Diode 1SS53 (24 pcs.)
456-467		
474, 475		
R527	0B05675A	Carbon Resistor 3.9K ERD-25T J
R532, 534	0B01889A	Carbon Resistor 100K ERD-25T J
546, 563		(16 pcs.)
465, 570		
572-580		
602		
R533, 535	0B05509A	Carbon Resistor 33K ERD-25T J
543, 545		
568, 569		
571		
R536	0B05622A	Carbon Resistor 2.2K ERD-25T J
R537	0B01679A	Carbon Resistor 100 ERD-25T J
R538	0B05621A	Carbon Resistor 120K ERD-25T J
R539	0B05623A	Carbon Resistor 1.2K ERD-25T J
R540, 550	0B05627A	Carbon Resistor 330K ERD-25T J
551, 554		
555, 567		
608		
R541	0B05508A	Carbon Resistor 56K ERD-25T J
R542, 581	0B01888A	Carbon Resistor 10K ERD-25T J

Schematic Ref. No.	Part No.	Description
R544, 562	0B01857A	Carbon Resistor 1K ERD-25T J
R547, 549	0B05671A	Carbon Resistor 2.2M ERD-25T J
R548	0B05615A	Carbon Resistor 22K ERD-25T J
R552, 553	0B05776A	Carbon Resistor 1M ERD-25T J
558		
R560	0B05625A	Carbon Resistor 220K ERD-25T J
R565, 566	0B05676A	Carbon Resistor 390K ERD-25T J
R582-588	0B09320A	Carbon Resistor 820K ERD-25T J (7 pcs.)
R589	0B01684A	Carbon Resistor 470K ERD-25T J
C429, 430	0B09313A	Electrolytic Capacitor 100μ 50V
C431, 432	0B05652A	Mylar Capacitor 4700P 50V J
436		
C434, 444	0B01405A	Electrolytic Capacitor 1μ 50V
446		
C434	0B01863A	Electrolytic Capacitor 3.3μ 50V
C435	0B05557A	Mylar Capacitor 0.015μ 50V J
C437	0B09222A	Electrolytic Capacitor 0.47μ 16V (LN)
C438	0B09287A	Ceramic Capacitor 680P 50V K
C439	0B00610A	Mylar Capacitor 0.15μ 50V J
C440, 441	0B05583A	Mylar Capacitor 0.033μ 50V J
C442, 443	0B09220A	Electrolytic Capacitor 0.22μ 16V (LN)
C447	0B09285A	Ceramic Capacitor 330P 50V K
C459	0B09187A	Electrolytic Capacitor 1μ 50V (BP)
C461	0B01180A	Ceramic Capacitor 330P 100V
	– Azimuth Detector –	
IC416	0B06216A	IC μPC4556C
Q448, 451	0B06100A	Transistor 2SC945
D468, 469	0B06181A	Silicon Diode 1SS53
VR404, 405	0B09107A	Semi-fixed Volume 500K
R591, 593	0B01889A	Carbon Resistor 100K ERD-25T J
601		
R592, 594	0B05625A	Carbon Resistor 220K ERD-25T J
609		
R595, 596	0B05627A	Carbon Resistor 330K ERD-25T J
610		
R597, 599	0B01888A	Carbon Resistor 10K ERD-25T J
600		
R598	0B01681A	Carbon Resistor 3.3K ERD-25T J
C448, 449	0B01412A	Electrolytic Capacitor 10μ 16V
C450, 451	0B01802A	Mylar Capacitor 2200P 50V J
C452	0B09221A	Electrolytic Capacitor 1.5μ 50V (LN)
	– Miscellaneous –	
	0B07827E	Logic P.C.B.
	0J04030B	Heat Sink (1 pce.)
	0E00860A	BT Screw M3x6 Philips Binding Head (2 pcs.)
	0E00896A	Screw M3x6 Philips Binding Head (Black Chromate) (2 pcs.)
	0E00507A	Nut Hex. M3 (2 pcs.)

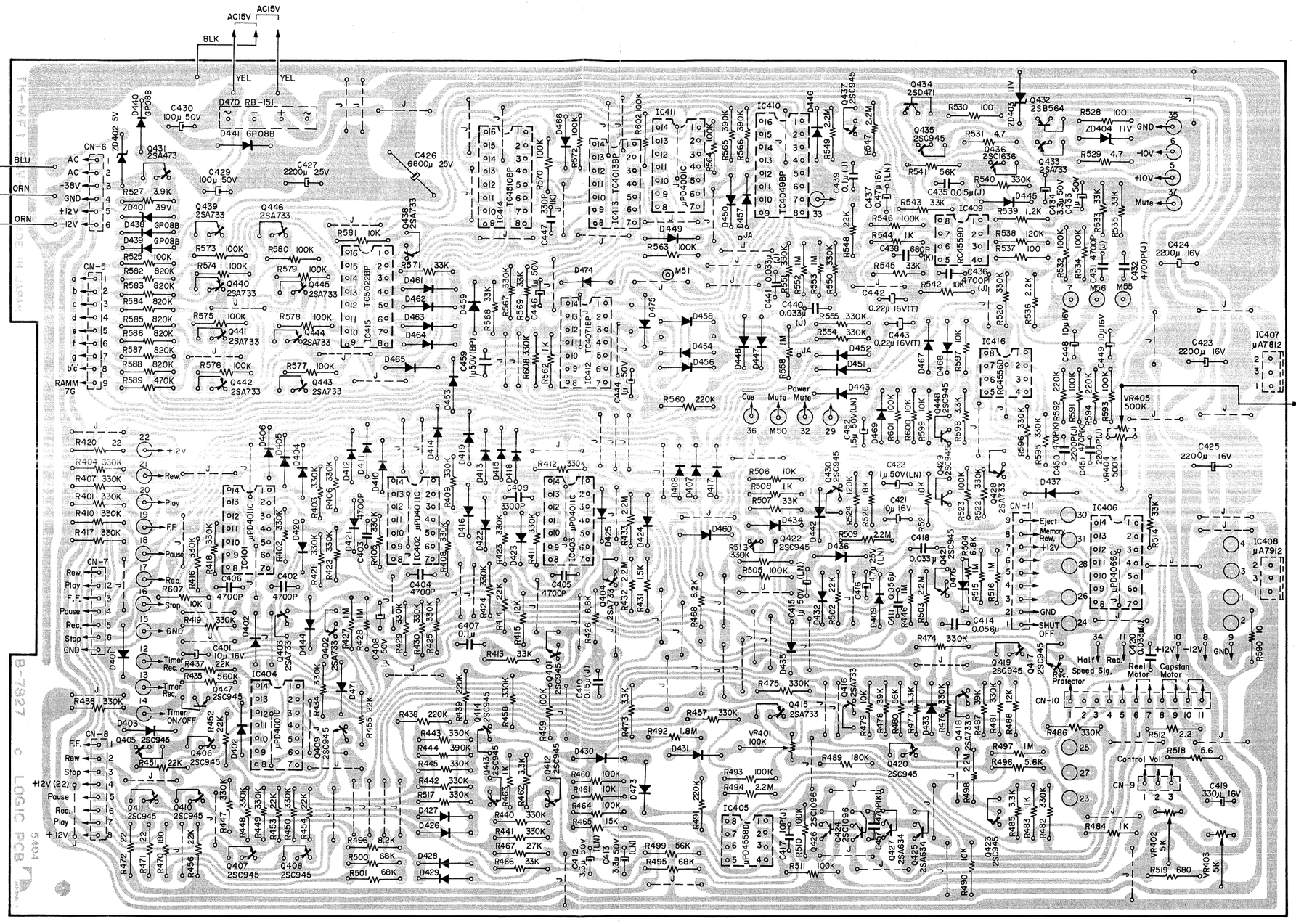


Fig. 7.3.2 Serial Nos.: A11202474 – A11202660

Note: Diode is 1SS53 unless otherwise specified.

Schematic Ref. No.	Part No.	Description
	BA04225A	**Logic P.C.B. Ass'y**
		Serial Nos.: A11202474 – A11202660
	– Logic –	
IC401, 402	0B06178A	IC μPD4011C
403		
IC404	0B06143A	IC μPD4001C
IC405	0B06124B	IC μPD4558D
IC406	0B06144A	IC μPD4066C
IC407	0B06192A	Regulator +12V μA7812
IC408	0B06193A	Regulator –12V μA7912
Q401, 405	0B06100A	Transistor 2SC945
406, 407		
408, 409		
410, 411		
412, 413		
414, 417		
419, 420		
421, 422		
423, 429		
430, 435		
447		
Q402, 403	0B06013A	Transistor 2SA733
404, 415		
416, 418		
428, 433		
Q424, 426	0B06020A	Transistor 2SC1096
Q425, 427	0B06012A	Transistor 2SA634
Q432	0B06069A	Transistor 2SB564
Q434	0B06066A	Transistor 2SD471
ZD403, 404	0B06231A	Zener Diode 11V
D401-437	0B06181A	Silicon Diode 1SS53 (43 pcs.)
442-444		
471, 473		
476		
D438, 439	0B06109A	Silicon Diode GP08B
D470	0B06183A	Diode Bridge RB151
VR401	0B03832A	Semi-fixed Volume 100K
VR402, 403	0B03831A	Semi-fixed Volume 5K
R401, 402	0B05627A	Carbon Resistor 330K ERD-25T J
403, 404		
405, 406		
407, 408		
409, 410		
411, 412		
416, 417		
418, 419		
421, 422		
423, 424		
425, 429		
430, 434		
436, 440		
441, 442		
443, 445		
447, 448		
449, 450		
457, 458		
474, 475		
476, 481		
482, 486		
513, 517		
520, 522		

Schematic Ref. No.	Part No.	Description
R413, 466	0B05509A	Carbon Resistor 33K ERD-25T J
507, 514		
R414, 437	0B05615A	Carbon Resistor 22K ERD-25T J
451-456		(9 pcs.)
502		
R415, 488	0B09263A	Carbon Resistor 12K ERD-25T J
R420, 471	0B09049A	Fail Safe Type Resistor 22 ERD-14F J
472		
R426, 504	0B01682A	Carbon Resistor 6.8K ERD-25T J
R427, 428	0B05776A	Carbon Resistor 1M ERD-25T J
446, 497		
515, 516		
R431	0B05698A	Carbon Resistor 1.5K ERD-25T J
R432, 433	0B05671A	Carbon Resistor 2.2M ERD-25T J
494, 498		
503, 509		
R435	0B05784A	Carbon Resistor 560K ERD-25T J
R438, 439	0B05625A	Carbon Resistor 220K ERD-25T J
491		
R444	0B05676A	Carbon Resistor 390K ERD-25T J
R459, 460	0B01889A	Carbon Resistor 100K ERD-25T J
464, 493		
505, 510		
511, 523		
525		
R465	0B09340A	Metal Film Resistor 15K SN14K2E F
R467	0B05743A	Carbon Resistor 27K ERD-25T J
R468, 469	0B01856A	Carbon Resistor 8.2K ERD-25T J
R470	0B05578A	Carbon Resistor 180 ERD-25T J
R462, 473	0B01681A	Carbon Resistor 3.3K ERD-25T J
477, 485		
R478, 487	0B01854A	Carbon Resistor 39K ERD-25T J
R461, 479	0B01888A	Carbon Resistor 10K ERD-25T J
490, 506		
521, 607		
R480, 499	0B05508A	Carbon Resistor 56K ERD-25T J
R463, 483	0B01857A	Carbon Resistor 1K ERD-25T J
484, 508		
R489	0B05640A	Carbon Resistor 180K ERD-25T J
R492	0B05680A	Carbon Resistor 1.8M ERD-25T J
R495, 500	0B05692A	Carbon Resistor 68K ERD-25T J
501		
R496	0B01887A	Carbon Resistor 5.6K ERD-25T J
R512	0B09212A	Fail Safe Type Resistor 2.2 RDF-25S J
R518	0B09217A	Fail Safe Type Resistor 5.6 RDF-25S J
R519	0B05794A	Carbon Resistor 680 ERD-25T J
R524	0B05621A	Carbon Resistor 120K ERD-25T J
R526	0B05560A	Carbon Resistor 18K ERD-25T J
R528, 530	0B09215A	Fail Safe Type Resistor 100 RDF-25S J
R529, 531	0B09321A	Fail Safe Type Resistor 4.7 RDF-25S J
R590	0B09216A	Fail Safe Type Resistor 10 RDF-25S J
C401, 421	0B01412A	Electrolytic Capacitor 10μ 16V
C402, 403	0B05556A	Mylar Capacitor 4700P 50V
404, 405		
406		
C407	0B00093A	Mylar Capacitor 0.1μ 50V
C408	0B01405A	Electrolytic Capacitor 1μ 50V
C409	0B09166A	Mylar Capacitor 3300P 50V
C410	0B00610A	Mylar Capacitor 0.15μ 50V
C411, 414	0B01676A	Mylar Capacitor 0.056μ 50V
C412, 413	0B09324A	Electrolytic Capacitor 3.3μ 16V (LN)
C415, 422	0B09223A	Electrolytic Capacitor 1μ 16V (LN)
C416	0B09173A	Electrolytic Capacitor 4.7μ 16V (LN)

Schematic Ref. No.	Part No.	Description
C417	0B09277A	Ceramic Capacitor 10P 50V J
C418, 420	0B05513A	Mylar Capacitor 0.033μ 50V
C419	0B01502A	Electrolytic Capacitor 330μ 16V
C423, 424	0B01406A	Electrolytic Capacitor 2200μ 16V
C426	0B09374A	Electrolytic Capacitor 6800μ 25V
C427	0B05654A	Electrolytic Capacitor 2200μ 25V
C457	0B09286A	Ceramic Capacitor 470P 50V K
CN5, 11	0B08645A	9P-T Post
CN6	0B08642A	6P-T Post
CN7	0B08643A	7P-T Post
CN8	0B08644A	8P-T Post
CN9	0B08653A	3P-T Post
CN10	0B08655A	11P-T Post
	– RAMM –	
IC409	0B06127A	IC RC4559D
IC410	0B06215A	IC TC4049BP
IC411	0B06143A	IC μPD4001C
IC412	0B06214A	IC TC4071BP
IC413	0B06213A	IC TC4013BP
IC414	0B06212A	IC TC4510BP
IC415	0B06211A	IC TC5022BP
Q431	0B06060A	Transistor 2SA473
Q436	0B06070A	Transistor 2SC1636
Q437	0B06100A	Transistor 2SC945
Q438-446	0B06013A	Transistor 2SA733 (9 pcs.)
ZD401	0B06235A	Zener Diode 39V
ZD402	0B06230A	Zener Diode 5V
D440, 441	0B06109A	Silicon Diode GP08B
D445-454	0B06181A	Silicon Diode 1SS53 (24 pcs.)
456-467		
474, 475		
R527	0B05675A	Carbon Resistor 3.9K ERD-25T J
R532, 534	0B01889A	Carbon Resistor 100K ERD-25T J
546, 563		(16 pcs.)
564, 570		
572-580		
602		
R533, 535	0B05509A	Carbon Resistor 33K ERD-25T J
543, 545		
568, 569		
571		
R536	0B05622A	Carbon Resistor 2.2K ERD-25T J
R537	0B01679A	Carbon Resistor 100 ERD-25T J
R538	0B05621A	Carbon Resistor 120K ERD-25T J
R539	0B05623A	Carbon Resistor 1.2K ERD-25T J
R540, 550	0B05627A	Carbon Resistor 330K ERD-25T J
551, 554		
555, 567		
608		
R541	0B05508A	Carbon Resistor 56K ERD-25T J
R542, 581	0B01888A	Carbon Resistor 10K ERD-25T J
R544, 562	0B01857A	Carbon Resistor 1K ERD-25T J
R547, 549	0B05671A	Carbon Resistor 2.2M ERD-25T J
R548	0B05615A	Carbon Resistor 22K ERD-25T J
R552, 553	0B05776A	Carbon Resistor 1M ERD-25T J
558		
R560	0B05625A	Carbon Resistor 220K ERD-25T J
R565, 566	0B05676A	Carbon Resistor 390K ERD-25T J
R582-588	0B09320A	Carbon Resistor 820K ERD-25T J
		(7 pcs.)

Schematic Ref. No.	Part No.	Description
R589	0B01684A	Carbon Resistor 470K ERD-25T J
C429, 430	0B09313A	Electrolytic Capacitor 100μ 50V
C431, 432	0B05652A	Mylar Capacitor 4700P 50V J
436		
C433, 444	0B01405A	Electrolytic Capacitor 1μ 50V
446		
C434	0B01863A	Electrolytic Capacitor 3.3μ 50V
C435	0B05557A	Mylar Capacitor 0.015μ 50V J
C437	0B09222A	Electrolytic Capacitor 0.47μ 16V (LN)
C438	0B09287A	Ceramic Capacitor 680P 50V K
C439	0B01780A	Mylar Capacitor 0.1μ 50V J
C440, 441	0B05583A	Mylar Capacitor 0.033μ 50V J
C442, 443	0B05772A	Tantalum Capacitor 0.22μ 16V
C447	0B09285A	Ceramic Capacitor 330P 50V K
C459	0B09187A	Electrolytic Capacitor 1μ 50V (BP)
	– Azimuth Detector –	
IC416	0B06216A	IC μPC4556C
Q448	0B06100A	Transistor 2SC945
D468, 469	0B06181A	Silicon Diode 1SS53
VR404, 405	0B09107A	Semi-fixed Volume 500K
R591, 593	0B01889A	Carbon Resistor 100K ERD-25T J
601		
R592, 594	0B05625A	Carbon Resistor 220K ERD-25T J
R595, 596	0B05627A	Carbon Resistor 330K ERD-25T J
R597, 599	0B01888A	Carbon Resistor 10K ERD-25T J
600		
R598	0B01681A	Carbon Resistor 3.3K ERD-25T J
C448, 449	0B01412A	Electrolytic Capacitor 10μ 16V
C450, 451	0B01802A	Mylar Capacitor 2200P 50V J
C452	0B09221A	Electrolytic Capacitor 1.5μ 50V (LN)
	– Miscellaneous –	
	0B07827C	Logic P.C.B.
	0J04030B	Heat Sink (1 pce.)
	0E00860A	BT Screw M3x6 Philips Binding Head (2 pcs.)
	0E00896A	Screw M3x6 Philips Binding Head (Black Chromate) (2 pcs.)
	0E00507A	Nut Hex. M3 (2 pcs.)

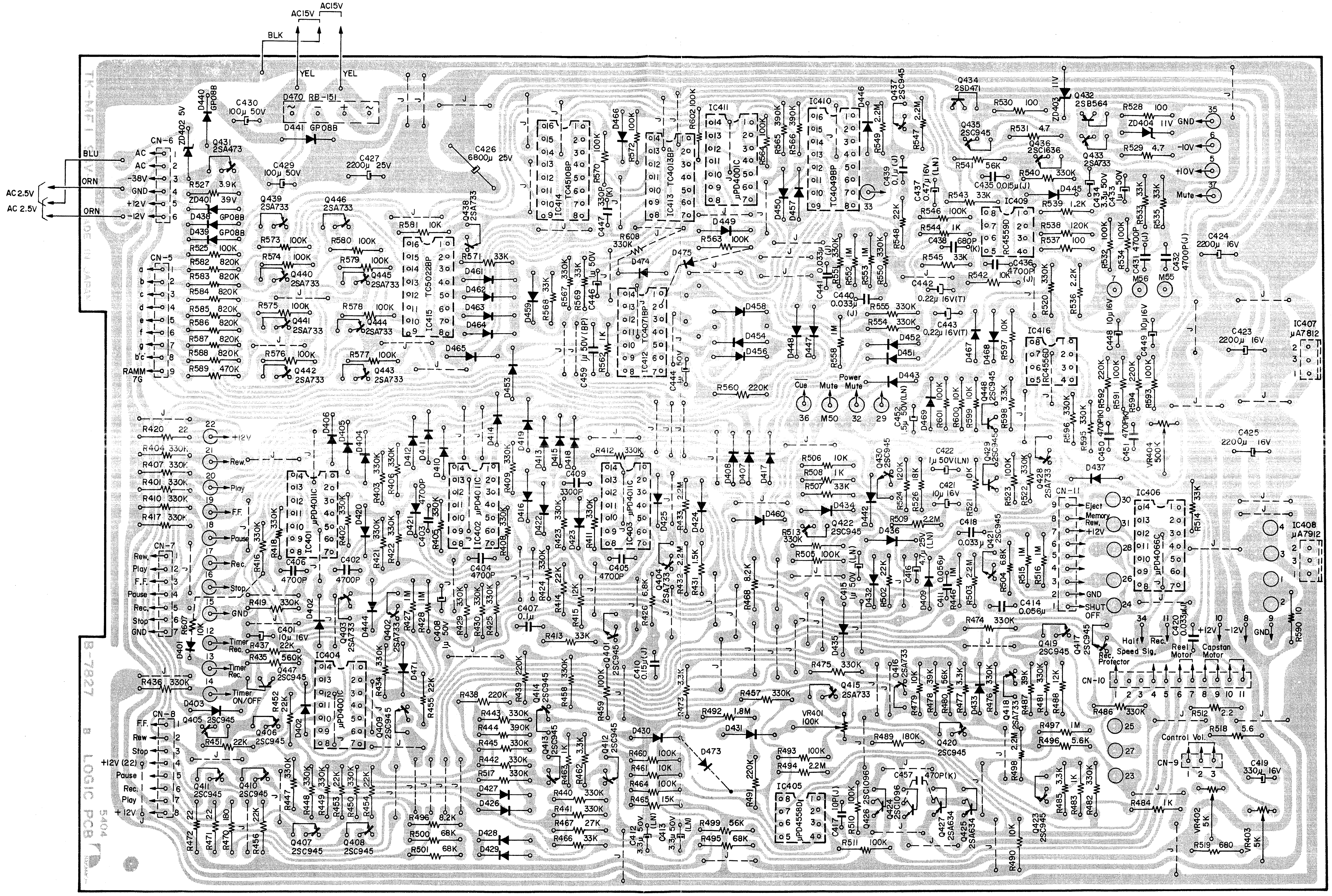


Fig. 7.3.3 Serial Nos.: A11201001 – A11202473

Note: Diode is 1SS53 unless otherwise specified.

Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description
	BA04060A	**Logic P.C.B. Ass'y** Serial Nos.: A11201001 – A11202473	R413, 466 507, 514	0B05509A	Carbon Resistor 33K ERD-25T J	C417 C418, 420	0B09277A 0B05513A	Ceramic Capacitor 10P 50V J Mylar Capacitor 0.033μ 50V	C429, 430 C431, 432	0B09313A 0B05652A	Electrolytic Capacitor 100μ 50V Mylar Capacitor 4700P 50V J
	– Logic –		R414, 437 451-456 502	0B05615A	Carbon Resistor 22K ERD-25T J (9 pcs.)	C419 C423, 424 425	0B01502A 0B01406A	Electrolytic Capacitor 330μ 16V Electrolytic Capacitor 2200μ 16V	436 C433, 444 446	0B01405A	Electrolytic Capacitor 1μ 50V
IC401, 402 403	0B06178A	IC μPD4011C	R415, 488	0B09263A	Carbon Resistor 12K ERD-25T J	C426	0B09374A	Electrolytic Capacitor 6800μ 25V	C434	0B01863A	Electrolytic Capacitor 3.3μ 50V
IC404	0B06143A	IC μPD4001C	R420, 471 472	0B09049A	Fail Safe Type Resistor 22 ERD-14F J	C427 C457	0B05654A 0B09286A	Electrolytic Capacitor 2200μ 25V Ceramic Capacitor 470P 50V K	C435 C437	0B05557A 0B09222A	Mylar Capacitor 0.015μ 50V J Electrolytic Capacitor 0.47μ 16V (LN)
IC405	0B06124B	IC μPD4558D	R426, 504	0B01682A	Carbon Resistor 6.8K ERD-25T J	CN5, 11	0B08645A	9P-T Post	C438	0B09287A	Ceramic Capacitor 680P 50V K
IC406	0B06144A	IC μPD4066C	R427, 428	0B05776A	Carbon Resistor 1M ERD-25T J	CN6	0B08642A	6P-T Post	C439	0B01780A	Mylar Capacitor 0.1μ 50V J
IC407	0B06192A	Regulator +12V μA7812	446, 497			CN7	0B08643A	7P-T Post	C440, 441	0B05583A	Mylar Capacitor 0.033μ 50V J
IC408	0B06193A	Regulator -12V μA7912	515, 516			CN8	0B08644A	8P-T Post	C442, 443	0B05772A	Tantalum Capacitor 0.22μ 16V
Q401, 405 406, 407 408, 409 410, 411 412, 413 414, 417 419, 420 421, 422 423, 429 430, 435 447	0B06100A	Transistor 2SC945	R431 R432, 433 494, 498 503, 509 R435 R438, 439 491 R444 R459, 460 464, 493 505, 510	0B05698A 0B05671A 0B05784A 0B05625A 0B05676A 0B01889A	Carbon Resistor 1.5K ERD-25T J Carbon Resistor 2.2M ERD-25T J Carbon Resistor 560K ERD-25T J Carbon Resistor 220K ERD-25T J Carbon Resistor 390K ERD-25T J Carbon Resistor 100K ERD-25T J	CN9 CN10	0B08653A 0B08655A	3P-T Post 11P-T Post	C447 C459	0B09285A 0B09187A	Ceramic Capacitor 330P 50V K Electrolytic Capacitor 1μ 50V (BP)
Q402, 403 404, 415 416, 418 428, 433	0B06013A	Transistor 2SA733	511, 523 525 R465 R467	0B09340A 0B05743A	Metal Film Resistor 15K SN14K2E F Carbon Resistor 27K ERD-25T J	IC409 IC410 IC411 IC412 IC413 IC414 IC415 Q431 Q436 Q437	0B06127A 0B06215A 0B06143A 0B06214A 0B06213A 0B06212A 0B06211A 0B06060A 0B06070A 0B06100A	**– RAMM –** IC RC4559D IC TC4049BP IC μPD4001C IC TC4071BP IC TC4013BP IC TC4510BP IC TC5022BP Transistor 2SA473 Transistor 2SC1636 Transistor 2SC945	IC416 Q448 D468, 469 VR404 R591, 593 601 R592, 594 R595, 596 R597, 599 600	0B06216A 0B06100A 0B06181A 0B09107A 0B01889A 0B05625A 0B05627A 0B01888A	**– Azimuth Detector –** IC μPC4556C Transistor 2SC945 Silicon Diode 1SS53 Semi-fixed Volume 500K Carbon Resistor 100K ERD-25T J Carbon Resistor 220K ERD-25T J Carbon Resistor 330K ERD-25T J Carbon Resistor 10K ERD-25T J
Q424, 426	0B06020A	Transistor 2SC1096	R468, 469	0B01856A	Carbon Resistor 8.2K ERD-25T J	Q438-446	0B06013A	Transistor 2SA733 (9 pcs.)	R598	0B01681A	Carbon Resistor 3.3K ERD-25T J
Q425, 427	0B06012A	Transistor 2SA634	R470	0B05578A	Carbon Resistor 180 ERD-25T J	ZD401	0B06235A	Zener Diode 39V	C448, 449	0B01412A	Electrolytic Capacitor 10μ 16V
Q432	0B06069A	Transistor 2SB564	R462, 473 477, 485	0B01681A	Carbon Resistor 3.3K ERD-25T J	ZD402	0B06230A	Zener Diode 5V	C450, 451	0B09286A	Ceramic Capacitor 470P 50V K
Q434	0B06066A	Transistor 2SD471	R478, 487	0B01854A	Carbon Resistor 39K ERD-25T J	D440, 441	0B06109A	Silicon Diode GP08B	C452	0B09221A	Electrolytic Capacitor 1.5μ 50V (LN)
ZD403, 404	0B06231A	Zener Diode 11V	R461, 479 490, 506 521, 607	0B01888A	Carbon Resistor 10K ERD-25T J	D445-454 456-467 474, 475	0B06181A	Silicon Diode 1SS53 (24 pcs.)			**– Miscellaneous –**
D401-437 442-444 471, 473	0B06181A	Silicon Diode 1SS53 (42 pcs.)	R480, 499	0B05508A	Carbon Resistor 56K ERD-25T J	R527 R532, 534	0B05675A 0B01889A	Carbon Resistor 3.9K ERD-25T J Carbon Resistor 100K ERD-25T J		0B07827B 0J04030B	Logic P.C.B. Heat Sink (1 pce.)
D438, 439	0B06109A	Silicon Diode GP08B	R463, 483 484, 508	0B01857A	Carbon Resistor 1K ERD-25T J	546, 563 564, 570		(16 pcs.)		0E00860A	BT Screw M3x6 Philips Binding Head (2 pcs.)
D470	0B06183A	Diode Bridge RB151	R489	0B05640A	Carbon Resistor 180K ERD-25T J	572-580				0E00896A	Screw M3x6 Philips Binding Head (Black Chromate) (2 pcs.)
VR401	0B03832A	Semi-fixed Volume 100K	R492	0B05680A	Carbon Resistor 1.8M ERD-25T J	602					
VR402, 403	0B03831A	Semi-fixed Volume 5K	R495, 500 501	0B05692A	Carbon Resistor 68K ERD-25T J	R533, 535 543, 545	0B05509A	Carbon Resistor 33K ERD-25T J		0E00507A	Nut Hex. M3 (2 pcs.)
R401, 402 403, 404 405, 406 407, 408 409, 410 411, 412 416, 417 418, 419 421, 422 423, 424 425, 429 430, 434 436, 440 441, 442 443, 445 447, 448 449, 450 457, 458 474, 475 476, 481 482, 486 513, 517 520, 522	0B05627A	Carbon Resistor 330 K ERD-25T J	R496 R512 R518 R519 R524 R526 R528, 530 R529, 531 R590 C401, 421 C402, 403 404, 405 406 C407 C408 C409 C410 C411, 414 C412, 413 C415, 422 C416	0B01887A 0B09212A 0B09217A 0B05794A 0B05621A 0B05560A 0B09215A 0B09321A 0B09216A 0B01412A 0B05556A 0B00093A 0B01405A 0B09166A 0B00610A 0B01676A 0B09324A 0B09223A 0B09173A	Carbon Resistor 5.6K ERD-25T J Fail Safe Type Resistor 2.2 RDF-25S J Fail Safe Type Resistor 5.6 RDF-25S J Carbon Resistor 680 ERD-25T J Carbon Resistor 120K ERD-25T J Carbon Resistor 18K ERD-25T J Fail Safe Type Resistor 100 RDF-25S J Fail Safe Type Resistor 4.7 RDF-25S J Fail Safe Type Resistor 10 RDF-25S J Electrolytic Capacitor 10μ 16V Mylar Capacitor 4700P 50V Mylar Capacitor 0.1μ 50V Electrolytic Capacitor 1μ 50V Mylar Capacitor 3300P 50V Mylar Capacitor 0.15μ 50V Mylar Capacitor 0.056μ 50V Electrolytic Capacitor 3.3μ 16V (LN) Electrolytic Capacitor 1μ 16V (LN) Electrolytic Capacitor 4.7μ 16V (LN)	571 R536 R537 R538 R539 R540, 550 551, 554 555, 567 608 R541 R542, 581 R544, 562 R547, 549 R548 R552, 553 558 R560 R565, 566 R582-588 R589	0B05622A 0B01679A 0B05621A 0B05623A 0B05627A 0B05508A 0B01888A 0B01857A 0B05671A 0B05615A 0B05776A 0B05625A 0B05676A 0B09320A 0B01684A	Carbon Resistor 2.2K ERD-25T J Carbon Resistor 100 ERD-25T J Carbon Resistor 120K ERD-25T J Carbon Resistor 1.2K ERD-25T J Carbon Resistor 330K ERD-25T J Carbon Resistor 56K ERD-25T J Carbon Resistor 10K ERD-25T J Carbon Resistor 1K ERD-25T J Carbon Resistor 2.2M ERD-25T J Carbon Resistor 22K ERD-25T J Carbon Resistor 1M ERD-25T J Carbon Resistor 220K ERD-25T J Carbon Resistor 390K ERD-25T J Carbon Resistor 820K ERD-25T J Carbon Resistor 470K ERD-25T J			

Schematic Ref. No.	Part No.	Description	
	BA04095A	**Fuse P.C.B. Ass'y (U.S.A. & Canada)**	
	0B07842A	Fuse P.C.B.	
F1, 2, 3	0B08374A	Fuse 1A 250V	
	0B08342A	Spark Killer	(1 pce.)
	0M04075B	Fuse Caution A112	(1 pce.)
	0M04078B	Fuse Label 1A x 2	(1 pce.)
	0M03782A	Fuse Label 1A	(1 pce.)
	0J03834B	Fuse P.C.B. Holder	(1 pce.)
	0E00606A	Screw M3x6 philips Pan Head (3A)	(2 pcs.)
	0E00752A	Eyelet	(6 pcs.)
	BA04096A	**Fuse P.C.B. Ass'y (Japan)**	
	0B07842A	Fuse P.C.B.	
F1, 2, 3	0B08686A	Fuse 1A 250V	
	0B08363A	Spark Killer	(1 pce.)
	0M04078B	Fuse Label 1A x 2	(1 pce.)
	0M03782A	Fuse Label 1A	(1 pce.)
	0J03834B	Fuse P.C.B. Holder	(1 pce.)
	0E00606A	Screw M3 x 6 Philips Pan Head (3A)	(2 pcs.)
	0E00752A	Eyelet	(6 pcs.)
	BA04097A	**Fuse P.C.B. Ass'y (Others)**	
	0B07842A	Fuse P.C.B.	
F1, 2, 3	0B08263A	Fuse 315mA T 250V	
F4, 5	0B08347A	Fuse 1A T 250V	
	0B08349A	Fuse Clip	(10 pcs.)
	0B08240A	Spark Killer	(1 pce.)
	0M04073A	Fuse Label 315mA	(1 pce.)
	0M04131A	Fuse Label 1A x 2	(1 pce.)
	0M04074A	Fuse Label 315mA x 2	(1 pce.)
	0J03834B	Fuse P.C.B. Holder	(1 pce.)
	0E00606A	Screw M3 x 6 Philips Pan Head (3A)	(2 pcs.)
	0E00752A	Eyelet	(6 pcs.)
	BA04098A	**Fuse P.C.B. Ass'y (UK & Australia)**	
	0B07842A	Fuse P.C.B.	
F1	0B08665A	Fuse 160mA T 250V	
F2, 3	0B08263A	Fuse 315mA T 250V	
F4, 5	0B08347A	Fuse 1A T 250V	
	0B08349A	Fuse Clip	(10 pcs.)
	0B08240A	Spark Killer	(1 pce.)
	0M04066A	Fuse Label 160mA	(1 pce.)
	0M04131A	Fuse Label 1A x 2	(1 pce.)
	0M04074A	Fuse Label 315mA x 2	(1 pce.)
	0J03834B	Fuse P.C.B. Holder	(1 pce.)
	0E00606A	Screw M3 x 6 Philips Pan Head (3A)	(2 pcs.)
	0E00752A	Eyelet	(6 pcs.)
	BA04105B	**Fuse P.C.B. Ass'y (220V Class 2)**	
	0B07842A	Fuse P.C.B.	
F1	0B08665A	Fuse 160mA T 250V	
F2, 3	0B08263A	Fuse 315mA T 250V	
F4, 5	0B08347A	Fuse 1A T 250V	
	0B08349A	Fuse Clip	(10 pcs.)
	0B08445A	Spark Killer	(2 pcs.)

7.4. Fuse P.C.B. Ass'y

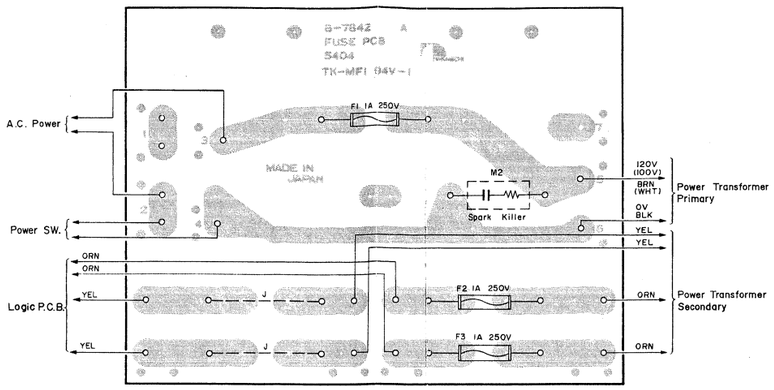


Fig. 7.4.1 U.S.A., Canada & Japan

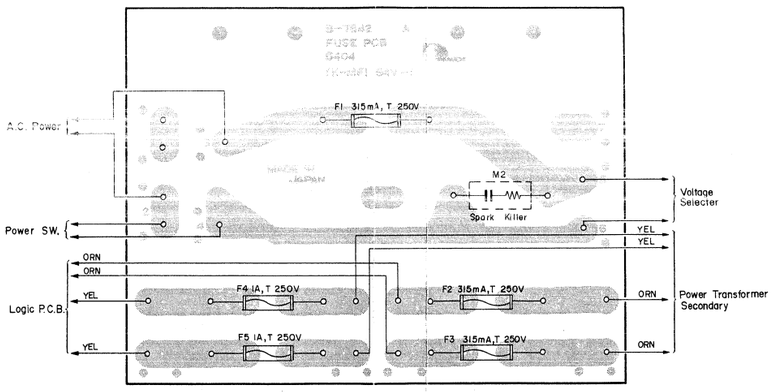


Fig. 7.4.2 Others

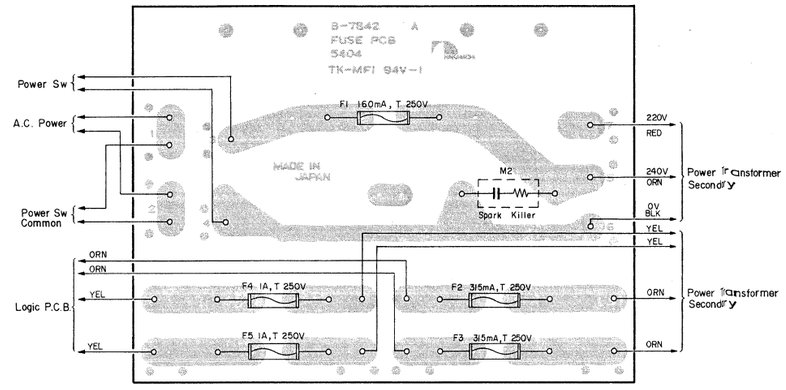


Fig. 7.4.3 UK & Australia

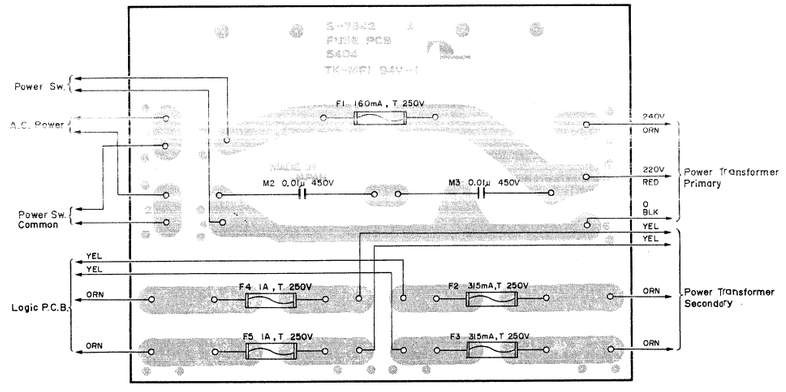


Fig. 7.4.4 220 V Class 2

Schematic Ref. No.	Part No.	Description	
	0M04066A	Fuse Label 160mA	(1 pce.)
	0M04131A	Fuse Label 1A x 2	(1 pce.)
	0M04074A	Fuse Label 315mA x 2	(1 pce.)
	0J03834B	Fuse P.C.B. Holder	(1 pce.)
	0E00606A	Screw M3 x 6 Philips Pan Head (3A)	(2 pcs.)
	0E00752A	Eyelet	(6 pcs.)

7.5. Pin Jack P.C.B. Ass'y

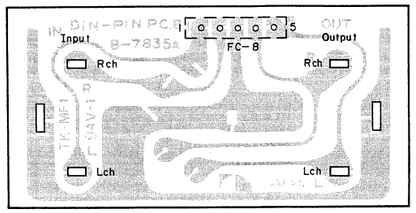


Fig. 7.5.1 Serial No.: A11204051 –

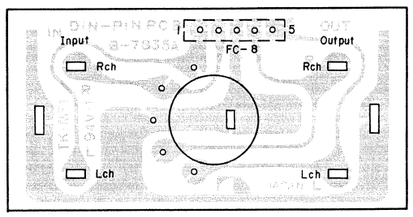


Fig. 7.5.2 Serial Nos.: A11201001 – A11204050

7.6. Record Cal. P.C.B. A Ass'y

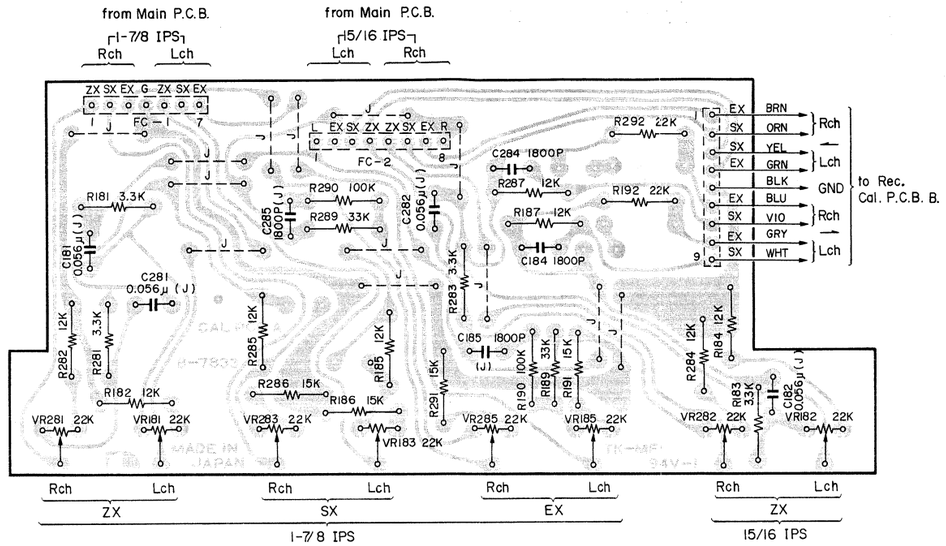


Fig. 7.6

7.7. Record Cal. P.C.B. B Ass'y

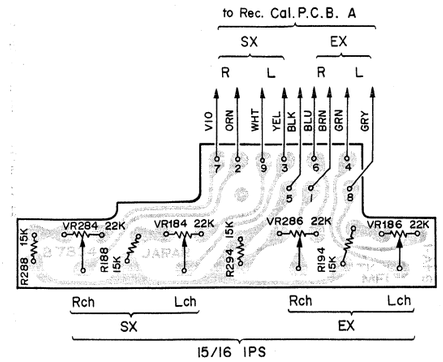


Fig. 7.7

7.8. Volume P.C.B. Ass'y

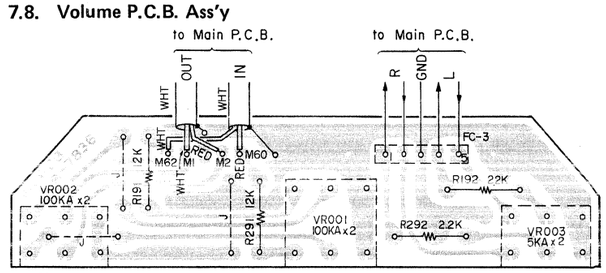


Fig. 7.8

7.9. Auto Shut-off P.C.B. Ass'y

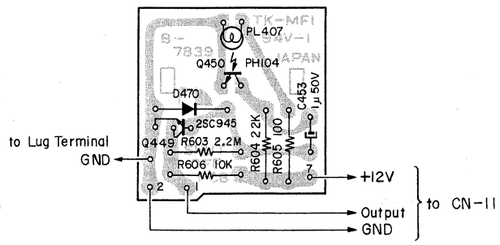


Fig. 7.9

Note: Diode is 1SS53 unless otherwise specified.

Schematic Ref. No.	Part No.	Description
	BA04176A	**Pin Jack P.C.B. Ass'y** Serial No.: A11204051 –
	0B07835A	Pin Jack P.C.B.
FC8	0B05238A	5P Flat Cable 50mm
	0B08709A	Jack Unit (1 pce.)
	0E00037A	Earth Lug B-5 (1 pce.)
	BA04064A	**Pin Jack P.C.B. Ass'y** Serial Nos.: A11201001 – A11204050
	0B07835A	Pin Jack P.C.B.
FC8	0B05238A	5P Flat Cable 50mm
	0B08097A	Jack Unit (1 pce.)
	0E00037A	Earth Lug B-5 (1 pce.)
	BA04067A	**Rec. Cal. P.C.B. A Ass'y**
	0B07833A	Rec. Cal. P.C.B. A
VR181, 182 183, 185 281, 282 283, 285	0B07276A	Semi-fixed Volume 22K
R181, 183 281, 283	0B01681A	Carbon Resistor 3.3K ERD-25T J
R182, 184 185, 187 282, 284 285, 287	0B09263A	Carbon Resistor 12K ERD-25T J
R186, 191 286, 291	0B01683A	Carbon Resistor 15K ERD-25T J
R189, 289	0B05509A	Carbon Resistor 33K ERD-25T J
R190, 290	0B01889A	Carbon Resistor 100K ERD-25T J
R192, 292	0B05615A	Carbon Resistor 22K ERD-25T J
C181, 182 281, 282	0B05813A	Mylar Capacitor 0.056μ 50V J
C184, 185 284, 285	0B01913A	Mylar Capacitor 1800P 50V J
FC1	0B05235A	7P Flat Cable 90mm
FC2	0B05236A	8P Flat Cable 90mm
	BA04068A	**Rec. Cal. P.C.B. B Ass'y**
	0B07834A	Rec. Cal. P.C.B. B
VR184, 186 284, 286	0B07277A	Semi-fixed Volume 22K
R188, 194 288, 294	0B05591A	Carbon Resistor 15K ERD-25V J
	BA04069A	**Volume P.C.B. Ass'y**
	0B07836A	Volume P.C.B.
VR001	0B07231A	Volume 100K (A) x 2
VR002	0B07279A	Volume 100K (A) x 2
VR003	0B07259A	Volume 5K (A) x 2
R191, 291	0B09263A	Carbon Resistor 12K ERD-25T J
R192, 292	0B05622A	Carbon Resistor 2.2K ERD-25T J
FC3	0B05237A	5P Flat Cable 200mm
	BA04070A	**Auto Shut-off P.C.B. Ass'y**
	0B07839A	Auto Shut-off P.C.B.
Q449	0B01872A	Transistor 2SC945 (L)
Q450	0B06228A	Photo Transistor PH104
D472	0B06181A	Silicon Diode 1SS53
R603	0B05671A	Carbon Resistor 2.2M ERD-25T J
R604	0B05615A	Carbon Resistor 22K ERD-25T J
R605	0B09215A	Fail Safe Type Resistor 100 RDF-25S J
R606	0B01888A	Carbon Resistor 10K ERD-25T J
C453	0B01405A	Electrolytic Capacitor 1μ 50V
PL407	0B08552A	Lamp 12V 25mA

7.10. Control Switch P.C.B. Ass'y

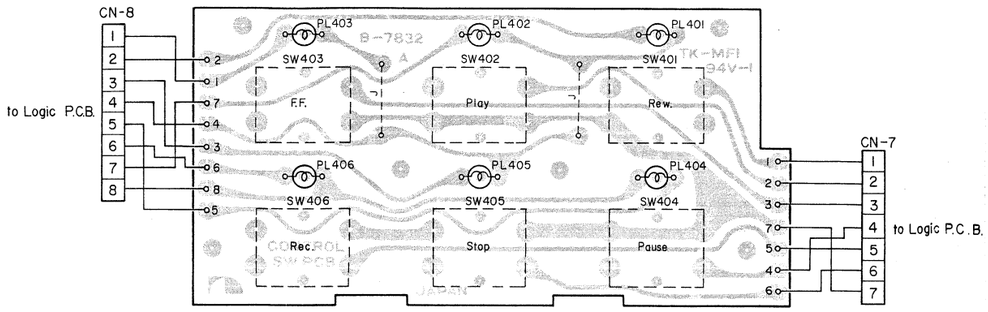


Fig. 7.10

7.11. Lamp P.C.B. A Ass'y

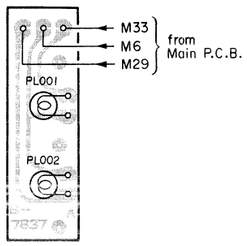


Fig. 7.11.1 Serial No.: A11202011 –

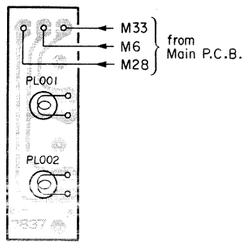


Fig. 7.11.2 Serial Nos.: A11201001 – A11202010

7.12. Lamp P.C.B. B Ass'y

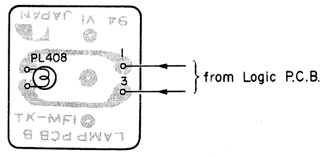


Fig. 7.12

7.13. Lamp P.C.B. C Ass'y

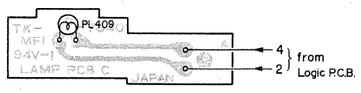


Fig. 7.13

Schematic Ref. No.	Part No.	Description
	BA04071A	**Control Switch P.C.B. Ass'y**
	0B07832A	Control Switch P.C.B.
SW401-406	0B07219A	Semi-Switch
PL401-406	0B08552A	Lamp 12V 25mA
CN7	0B08631B	7P-H Connector A Ass'y
CN8	0B08630B	8P-H Connector A Ass'y
	BA04072A	**Lamp P.C.B. A Ass'y**
	0B07837A	Lamp P.C.B. A
PL001, 002	0B08552A	Lamp 12V 25mA
	BA04062A	**Lamp P.C.B. B Ass'y**
	0B07838A	Lamp P.C.B. B
PL408	0B08586A	Lamp 12V 60mA
	BA04063A	**Lamp P.C.B. C Ass'y**
	0B07840A	Lamp P.C.B. C
PL409	0B08586A	Lamp 12V 60mA

7.14. Indicator P.C.B. A Ass'y

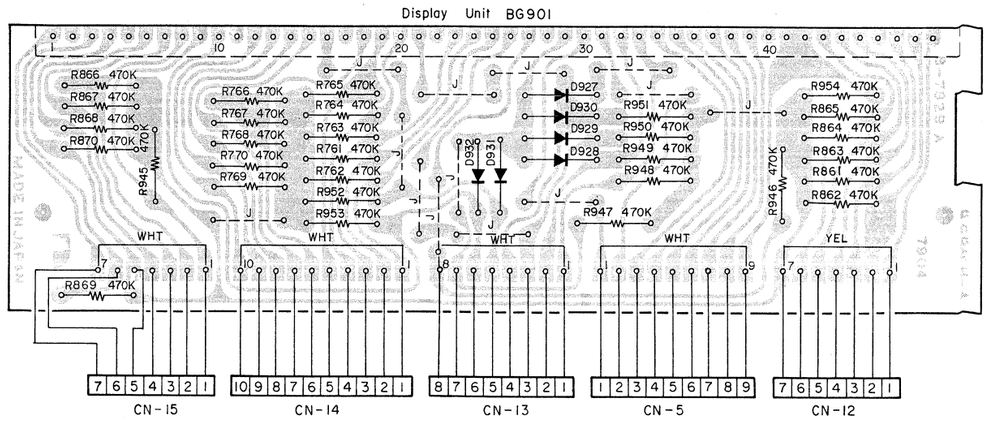


Fig. 7.14 Note: Diode is 1SS53 unless otherwise specified.

7.15. Indicator P.C.B. B Ass'y

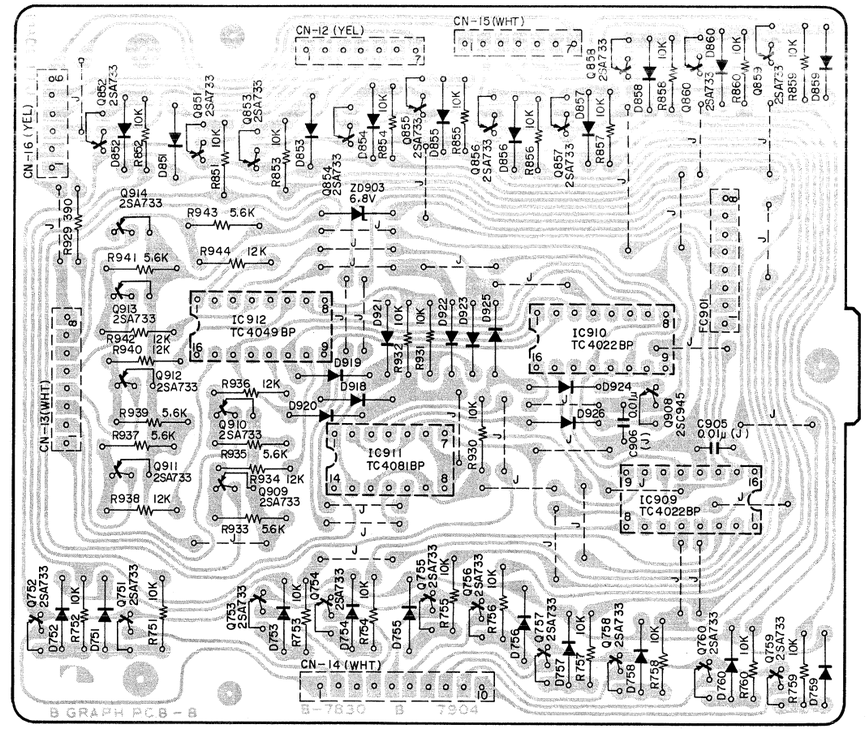


Fig. 7.15 Note: Diode is 1SS53 unless otherwise specified.

Schematic Ref. No.	Part No.	Description		Schematic Ref. No.	Part No.	Description	
	BA04061A	**Indicator P.C.B. A Ass'y**			**BA04066A**	**Indicator P.C.B. C Ass'y**	
	0B07829A	Indicator P.C.B. A			0B07831B	Indicator P.C.B. C	
D927-932	0B06181A	Silicon Diode	1SS53 (6 pcs.)	IC901	0B06144A	IC	μPD4066C
R761-770	0B01684A	Carbon Resistor	470K ERD-25T J (30 pcs.)	IC902	0B06219A	IC	TC4081BP
861-870				IC903	0B06215A	IC	TC4049BP
945-954				IC904	0B06217A	IC	RC4560D
BG901	0B08640A	Display Unit	F1P50A13Y	IC905	0B06224A	IC	TC4023BP
CN5	0B08638A	9P-H Connector Ass'y		IC906	0B06178A	IC	μPD4011C
CN12	0B08636A	7P-H Connector C Ass'y		IC907	0B06223A	IC	TC4040BP
CN13	0B08637A	8P-H Connector B Ass'y		IC908	0B06216A	IC	RC4556C
CN14	0B08639A	10P-H Connector Ass'y		Q901, 904	0B06100A	Transistor	2SC945
CN15	0B08635A	7P-H Connector B Ass'y		Q902, 903 905, 906 907	0B06013A	Transistor	2SA733
	BA04065A	**Indicator P.C.B. B Ass'y**		ZD901	0B06230A	Zener Diode	5V
	0B07830B	Indicator P.C.B. B		ZD902	0B06233A	Zener Diode	10V
IC909, 910	0B06218A	IC	TC4022BP	D901-917	0B06181A	Silicon Diode	1SS53 (17 pcs.)
IC911	0B06219A	IC	TC4081BP	VR901	0B07257A	Semi-fixed Volume	100K
IC912	0B06215A	IC	TC4049BP	R901, 907 913, 914 915	0B01889A	Carbon Resistor	100K ERD-25T J
Q751-760	0B06013A	Transistor	2SA733 (26 pcs.)	R902	0B05578A	Carbon Resistor	180 ERD-25T J
851-860				R903	0B01856A	Carbon Resistor	8.2K ERD-25T J
909-914				R904	0B09299A	Metal Film Resistor	511K SN14K2E F
Q908	0B06100A	Transistor	2SC945	R905	0B09319A	Metal Film Resistor	36.5K SN14K2E F
D751-760	0B06181A	Silicon Diode	1SS53 (29 pcs.)	R906	0B05509A	Carbon Resistor	33K ERD-25T J
851-860				R908, 916 917, 920 921, 922 923, 924	0B01888A	Carbon Resistor	10K ERD-25T J
918-926				R909	0B09300A	Metal Film Resistor	150K SN14K2E F
ZD903	0B06241A	Zener Diode	6.8V	R910	0B09298A	Metal Film Resistor	64.9K SN14K2E F
R751-760	0B01888A	Carbon Resistor	10K ERD-25T J (23 pcs.)	R911, 912 919	0B05743A	Carbon Resistor	27K ERD-25T J
851-860				R918	0B05692A	Carbon Resistor	68K ERD-25T J
930-932				R925	0B01857A	Carbon Resistor	1K ERD-25T J
R929	0B05691A	Carbon Resistor	390 ERD-25T J	R926	0B05698A	Carbon Resistor	1.5K ERD-25T J
R933, 935 937, 939 941, 943	0B01887A	Carbon Resistor	5.6K ERD-25T J	R927	0B01682A	Carbon Resistor	6.8K ERD-25T J
				R928	0B09263A	Carbon Resistor	12K ERD-25T J
R934, 936 938, 940 942, 944	0B09263A	Carbon Resistor	12K ERD-25T J	C901	0B09191A	PP Capacitor	4700P 100V G
C905, 906	0B09290A	Ceramic Capacitor	0.01μ 50V J	C902	0B09312A	PP Capacitor	0.01μ 100V G
CN12, 15	0B08643A	7P-T Post		C903	0B09322A	PP Capacitor	330P 100V G
CN13	0B08644A	8P-T Post		C904	0B09290A	Ceramic Capacitor	0.01μ 50V J
CN14	0B08646A	10P-T Post		CN4	0B08633A	6P-H Connector B Ass'y	
CN16	0B08642A	6P-T Post		CN6	0B08634A	6P-H Connector C Ass'y	
FC901	0B05239A	8P Flat Cable	50mm	CN16	0B08632A	6P-H Connector A Ass'y	

7.16. Indicator P.C.B. C Ass'y

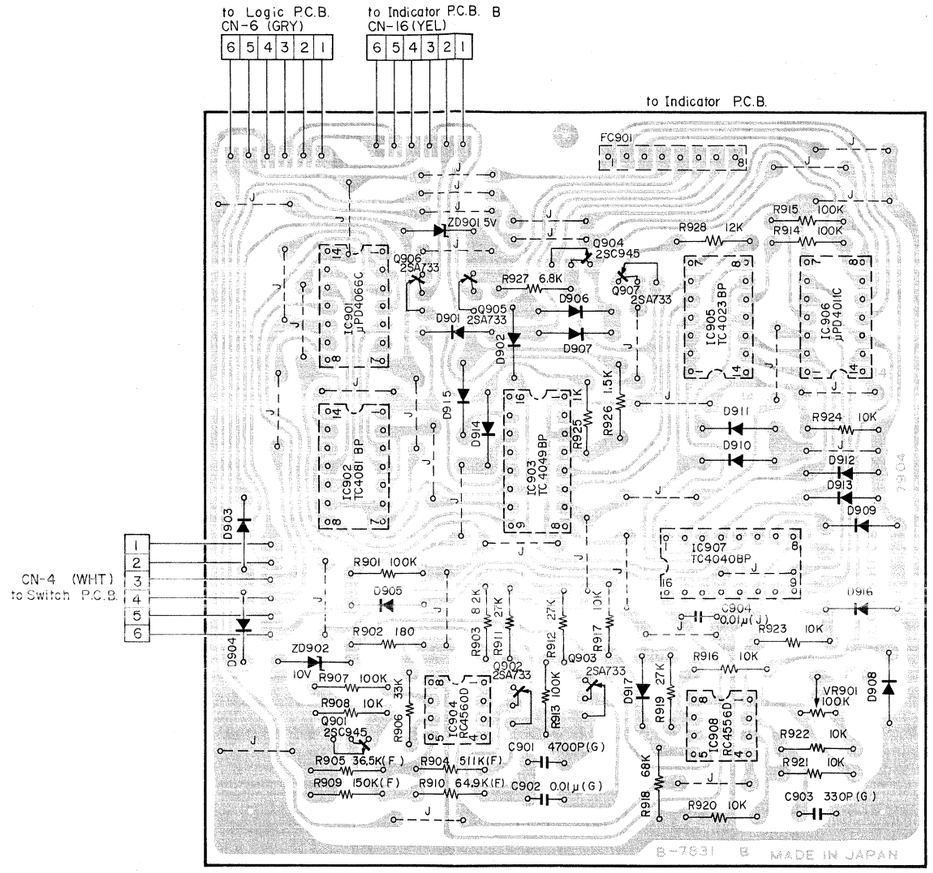


Fig. 7.16 Note: Diode is 1SS53 unless otherwise specified.

8. MECHANISM ASS'Y AND PARTS LIST

8.1. Synthesis

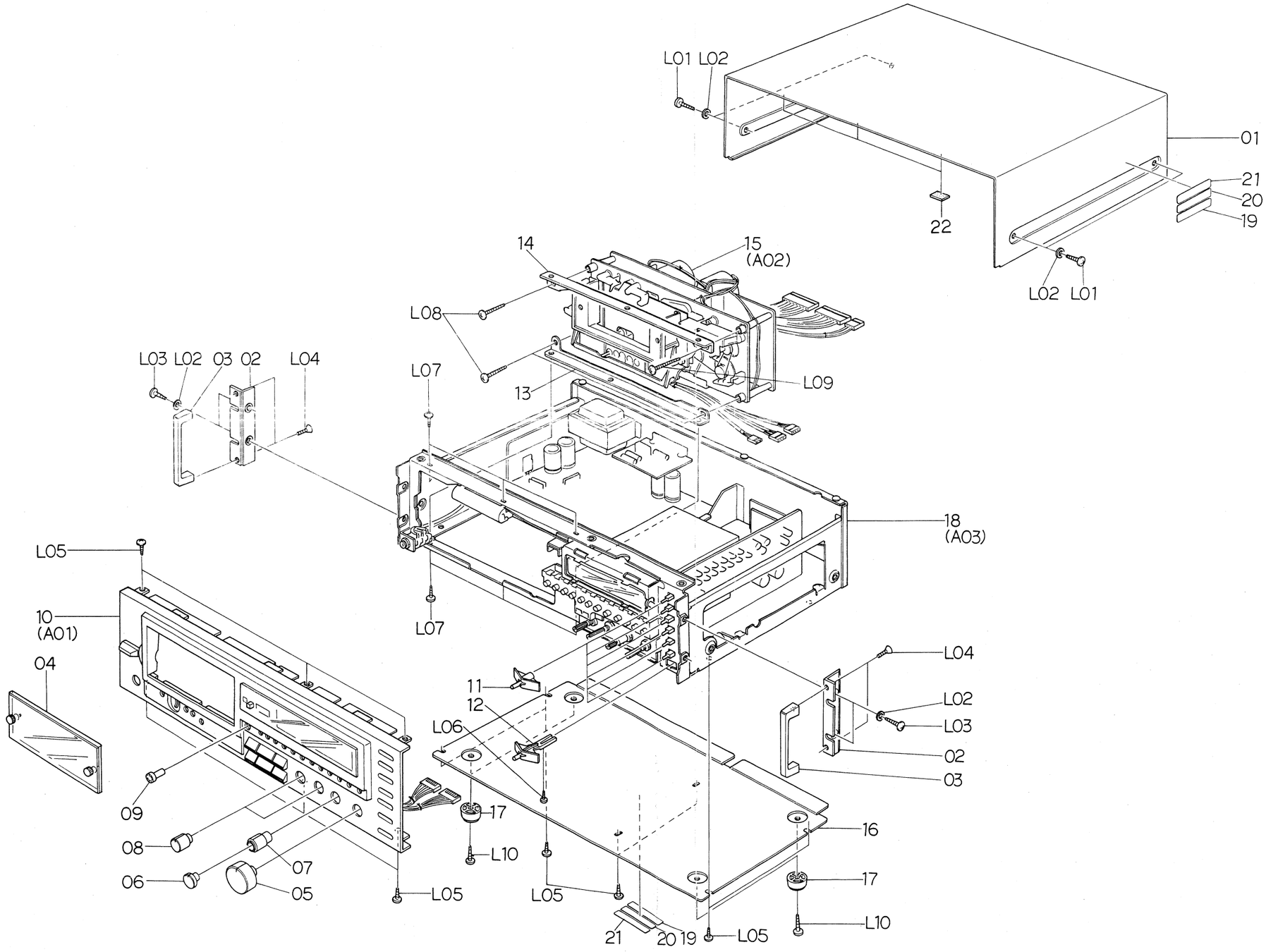


Fig. 8.1

Schematic Ref. No.	Part No.	Description	Q'ty
		Synthesis Serial No.: A11204051 –	
01	0H03723D	Top Cover	1
02	0H03788B	Side Panel B	2
03	0H03763B	Handle B	2
04	HA03882A	Cassette Case Cover Ass'y	1
05	0H03732B	Volume Knob A	1
(05)	0H03733A	Volume Knob Sleeve A	1
06	0H03736B	Volume Knob L	1
(06)	0H03737A	Volume Knob Sleeve L	1
07	0H03734B	Volume Knob R	1
(07)	0H03735A	Volume Knob Sleeve R	1
08	0H03738B	Volume Knob B	2
(08)	0H03739A	Volume Knob Sleeve B	2
09	0H03725A	Pitch Control Knob	1
10	HA03863A	Front Panel Ass'y	1
11	HA03838B	Function Switch Knob Ass'y	6
12	0H03741A	Power Switch Knob	1
13	0J04054B	Mechanism Holder B	1
14	0J04053A	Mechanism Holder A	1
15	CA08092A	Mechanism Ass'y 680	1
16	0H03757A	Bottom Cover	1
17	0J03825A	Leg S	4
18	JA03596D	Chassis Ass'y (U.S.A. & Canada)	1
	JA03597D	Chassis Ass'y (Japan)	1
	JA03603D	Chassis Ass'y (220V Class 2)	1
	JA03601D	Chassis Ass'y (Australia)	1
	JA03599D	Chassis Ass'y (UK)	1
	JA03598D	Chassis Ass'y (Others)	1
19	0M03799A	Caution Label G	2
*20	0M03800A	Caution Label H (U.S.A. & Canada)	2
*21	0M03883A	Lamp Caution Label (U.S.A. & Canada)	2
22	0J04080A	Top Cover Himelon	4
L01	0E00915A	BT Screw M4x8 Philips Binding Head (Black Chromate)	4
L02	0E00736A	Washer 4mm (Black Chromate)	8
L03	0E00907A	ST Screw M4x8 Philips Binding Head (Black Chromate)	4
L04	0E00908A	Screw M4x6 Philips Countersunk	4
L05	0E00857A	BT Screw M3x6 Philips Binding Head	12
L06	0E00814A	ST Screw M2x4 Philips Pan Head	1
L07	0E00920A	Screw M3x6 Philips Polywave	6
L08	0E00867A	BT Screw M4x15 Philips Binding Head	3
L09	0E00878A	BT Screw M4x20 Philips Binding Head	1
L10	0E00852A	BT Screw M4x12 Philips Binding Head	4
		*: Depends on the versions.	

Schematic Ref. No.	Part No.	Description	Q'ty
		Synthesis Serial Nos.: A11202661 – A11204050	
01	0H03723D	Top Cover	1
02	0H03788B	Side Panel B	2
03	0H03763B	Handle B	2
04	HA03882A	Cassette Case Cover Ass'y	1
05	0H03732B	Volume Knob A	1
(05)	0H03733A	Volume Knob Sleeve A	1
06	0H03736B	Volume Knob L	1
(06)	0H03737A	Volume Knob Sleeve L	1
07	0H03734B	Volume Knob R	1
(07)	0H03735A	Volume Knob Sleeve R	1
08	0H03738B	Volume Knob B	2
(08)	0H03739A	Volume Knob Sleeve B	2
09	0H03725A	Pitch Control Knob	1
10	HA03863A	Front Panel Ass'y	1
11	HA03838B	Function Switch Knob Ass'y	6
12	0H03741A	Power Switch Knob	1
13	0J04054B	Mechanism Holder B	1
14	0J04053A	Mechanism Holder A	1
15	CA08092A	Mechanism Ass'y 680	1
16	0H03757A	Bottom Cover	1
17	0J03825A	Leg S	4
18	JA03596C	Chassis Ass'y (U.S.A. & Canada)	1
	JA03597C	Chassis Ass'y (Japan)	1
	JA03603C	Chassis Ass'y (220V Class 2)	1
	JA03601C	Chassis Ass'y (Australia)	1
	JA03599C	Chassis Ass'y (UK)	1
	JA03598C	Chassis Ass'y (Others)	1
19	0M03799A	Caution Label G	2
*20	0M03800A	Caution Label H (U.S.A. & Canada)	2
*21	0M03883A	Lamp Caution Label (U.S.A. & Canada)	2
22	0J04080A	Top Cover Himelon	4
L01	0E00915A	BT Screw M4x8 Philips Binding Head (Black Chromate)	4
L02	0E00736A	Washer 4mm (Black Chromate)	8
L03	0E00907A	ST Screw M4x8 Philips Binding Head (Black Chromate)	4
L04	0E00908A	Screw M4x6 Philips Countersunk	4
L05	0E00857A	BT Screw M3x6 Philips Binding Head	12
L06	0E00814A	ST Screw M2x4 Philips Pan Head	1
L07	0E00920A	Screw M3x6 Philips Polywave	6
L08	0E00867A	BT Screw M4x15 Philips Binding Head	3
L09	0E00878A	BT Screw M4x20 Philips Binding Head	1
L10	0E00852A	BT Screw M4x12 Philips Binding Head	4
		*: Depends on the versions.	

Schematic Ref. No.	Part No.	Description	Q'ty	Schematic Ref. No.	Part No.	Description	Q'ty
		Synthesis Serial Nos.: A11202474 – A11202660				**Synthesis** Serial Nos.: A11201001 – A11202473	
01	0H03723D	Top Cover	1	01	0H03723D	Top Cover	1
02	0H03788B	Side Panel B	2	02	0H03788B	Side Panel B	2
03	0H03763B	Handle B	2	03	0H03763B	Handle B	2
04	HA03882A	Cassette Case Cover Ass'y	1	04	HA03882A	Cassette Case Cover Ass'y	1
05	0H03732B	Volume Knob A	1	05	0H03732B	Volume Knob A	1
(05)	0H03733A	Volume Knob Sleeve A	1	(05)	0H03733A	Volume Knob Sleeve A	1
06	0H03736B	Volume Knob L	1	06	0H03736B	Volume Knob L	1
(06)	0H03737A	Volume Knob Sleeve L	1	(06)	0H03737A	Volume Knob Sleeve L	1
07	0H03734B	Volume Knob R	1	07	0H03734B	Volume Knob R	1
(07)	0H03735A	Volume Knob Sleeve R	1	(07)	0H03735A	Volume Knob Sleeve R	1
08	0H03738B	Volume knob B	2	08	0H03738B	Volume Knob B	2
(08)	0H03739A	Volume Knob Sleeve B	2	(08)	0H03739A	Volume Knob Sleeve B	2
09	0H03725A	Pitch Control Knob	1	09	0H03725A	Pitch Control Knob	1
10	HA03863A	Front Panel Ass'y	1	10	HA03863A	Front Panel Ass'y	1
11	HA03838B	Function Switch Knob Ass'y	6	11	HA03838B	Function Switch Knob Ass'y	6
12	0H03741A	Power Switch Knob	1	12	0H03741A	Power Switch Knob	1
13	0J04054B	Mechanism Holder B	1	13	0J04054B	Mechanism Holder B	1
14	0J04053A	Mechanism Holder A	1	14	0J04053A	Mechanism Holder A	1
15	CA08092A	Mechanism Ass'y 680	1	15	CA08092A	Mechanism Ass'y 680	1
16	0H03757A	Bottom Cover	1	16	0H03757A	Bottom Cover	1
17	0J03825A	Leg S	4	17	0J03825A	Leg S	4
18	JA03596B	Chassis Ass'y (U.S.A. & Canada)	1	18	JA03596A	Chassis Ass'y (U.S.A. & Canada)	1
	JA03597B	Chassis Ass'y (Japan)	1		JA03597A	Chassis Ass'y (Japan)	1
	JA03603B	Chassis Ass'y (220V Class 2)	1		JA03603A	Chassis Ass'y (220V Class 2)	1
	JA03601B	Chassis Ass'y (Australia)	1		JA03601A	Chassis Ass'y (Australia)	1
	JA03599B	Chassis Ass'y (UK)	1		JA03599A	Chassis Ass'y (UK)	1
	JA03598B	Chassis Ass'y (Others)	1		JA03598A	Chassis Ass'y (Others)	1
19	0M03799A	Caution Label G	2	19	0M03799A	Caution Label G	2
*20	0M03800A	Caution Label H (U.S.A. & Canada)	2	*20	0M03800A	Caution Label H (U.S.A. & Canada)	2
*21	0M03883A	Top Cover Himelon (U.S.A. & Canada)	2	*21	0M03883A	Lamp Caution Label (U.S.A. & Canada)	2
22	0J04080A	Top Cover Himelon	4	22	0J04080A	Top Cover Himelon	4
L01	0E00915A	BT Screw M4x8 Philips Binding Head (Black Chromate)	4	L01	0E00915A	BT Screw M4x8 Philips Binding Head (Black Chromate)	4
L02	0E00736A	Washer 4mm (Black Chromate)	8	L02	0E00736A	Washer 4mm (Black Chromate)	8
L03	0E00907A	ST Screw M4x8 Philips Binding Head (Black Chromate)	4	L03	0E00907A	ST Screw M4x8 Philips Binding Head (Black Chromate)	4
L04	0E00908A	Screw M4x6 Philips Countersunk	4	L04	0E00908A	Screw M4x6 Philips Countersunk	4
L05	0E00857A	BT Screw M3x6 Philips Binding Head	12	L05	0E00857A	BT Screw M3x6 Philips Binding Head	12
L06	0E00814A	ST Screw M2x4 Philips Pan Head	1	L06	0E00814A	ST Screw M2x4 Philips Pan Head	1
L07	0E00920A	Screw M3x6 Philips Polywave	6	L07	0E00920A	Screw M3x6 Philips Polywave	6
L08	0E00867A	BT Screw M4x15 Philips Binding Head	3	L08	0E00867A	BT Screw M4x15 Philips Binding Head	3
L09	0E00878A	BT Screw M4x20 Philips Binding Head	1	L09	0E00878A	BT Screw M4x20 Philips Binding Head	1
L10	0E00852A	BT Screw M4x12 Philips Binding Head	4	L10	0E00852A	BT Screw M4x12 Philips Binding Head	4
		*: Depends on the versions.				*: Depends on the versions.	

8.2. Front Panel Ass'y (A01)

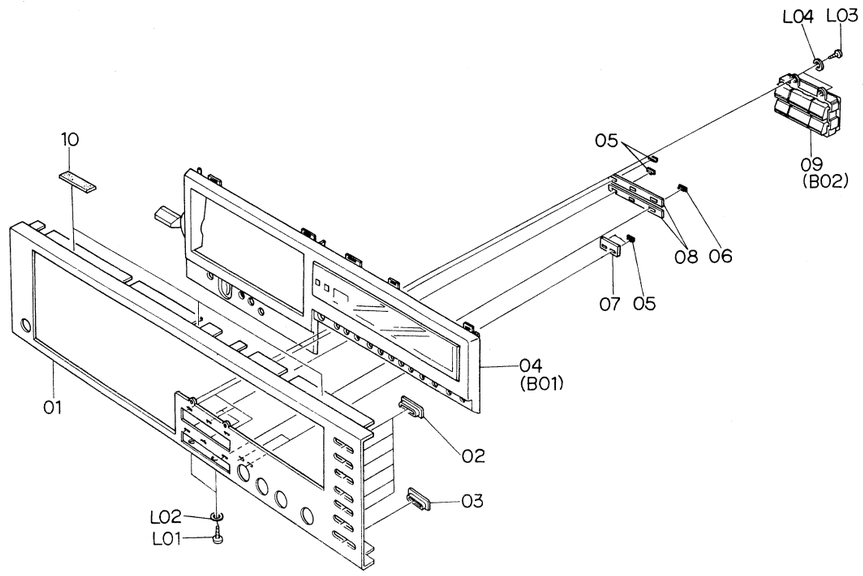


Fig. 8.2

8.3. Mechanism Ass'y (A02)

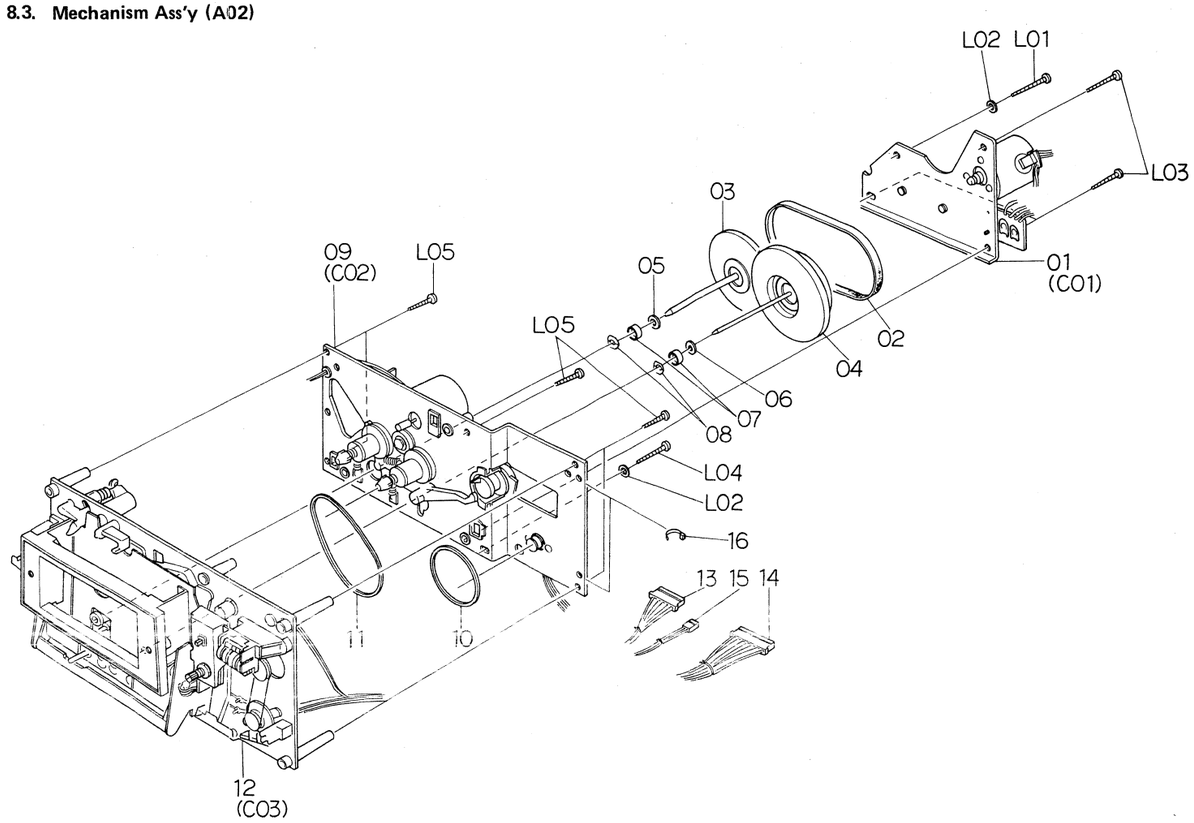


Fig. 8.3

Schematic Ref. No.	Part No.	Description	Q'ty	Schematic Ref. No.	Part No.	Description	Q'ty	Schematic Ref. No.	Part No.	Description	Q'ty	Schematic Ref. No.	Part No.	Description	Q'ty
A01	**HA03863A**	**Front Panel Ass'y** Serial No.: A11205174 –	**1**	**A01**	**HA03863A**	**Front Panel Ass'y** Serial Nos.: A11201001 – A11205173	**1**	**A02**	**CA08092A**	**Mechanism Ass'y 680** Serial No.: A11201001 –	**1**	16	0B08515A	Insh-Lock	15
01	0H03787E	Front Panel	1	01	0H03787E	Front Panel	1	01	CA08093A	Flywheel Holder Ass'y	1	L01	0E00834A	BT Screw M3x30 Philips Pan Head	1
02	0H03746A	Function Switch Escutcheon	6	02	0H03746A	Function Switch Escutcheon	6	02	0C08096C	Capstan Belt	1	L02	0E00178A	Washer 3mm	2
03	0H03747C	Power Switch Escutcheon	1	03	0H03747C	Power Switch Escutcheon	1	03	CA08014A	Supply Flywheel Ass'y	1	L03	0E00833A	BT Screw M3x20 Philips Pan Head	3
04	HA03827B	Front Panel Escutcheon Ass'y	1	04	HA03827A	Front Panel Escutcheon Ass'y	1	04	CA08015A	Take-up Flywheel Ass'y	1	L04	0E00835A	BT Screw M3x25 Philips Pan Head	1
05	0H03744B	Green Lens	7	05	0H03744B	Green Lens	7	05	0C08021B	Thrust Washer 3.1mm	1				
06	0H03745B	Orange Lens	1	06	0H03745B	Orange Lens	1	06	0C08020B	Thrust Washer 2.6mm	1	L05	0E00883A	BT Screw M3x18 Philips Pan Head	5
07	0J04060A	Light Intercepting Seal B	1	07	0J04060A	Light Intercepting Seal B	1	07	0C08069C	Flange Thrust Cap	2				
08	0J04059B	Light Intercepting Seal A	2	08	0J04059B	Light Intercepting Seal A	2	08	0C08022B	Flange Thrust Spring	2				
09	HA03823A	Control Button Ass'y	1	09	HA03823A	Control Button Ass'y	1	09	CA08065A	Sub Mechanism Chassis Ass'y	1				
10	0H03781A	Cushion	3	10	0H03781A	Cushion	3	10	0C08099B	Control Motor Belt	1				
L01	0E00825A	BT Screw M2.6x8 Philips Binding Head	2	L01	0E00825A	BT Screw M2.6x8 Philips Binding Head	2	11	0C08098B	Counter Belt B	1				
								12	CA08097A	Main Mechanism Chassis Ass'y	1				
L02	0E00912A	Washer FT25	2	L02	0E00912A	Washer FT25	2	13	0B08650B	9P-H Connector	1				
L03	0E00794A	BT Screw M2x5 Philips Pan Head	2	L03	0E00794A	BT Screw M2x5 Philips Pan Head	2	14	0B08651D	11P-H Connector	1				
L04	0E00117A	Washer 2mm	2	L04	0E00117A	Washer 2mm	2	15	0B08652C	3P-H Connector	1				

8.4. Chassis Ass'y (A03)

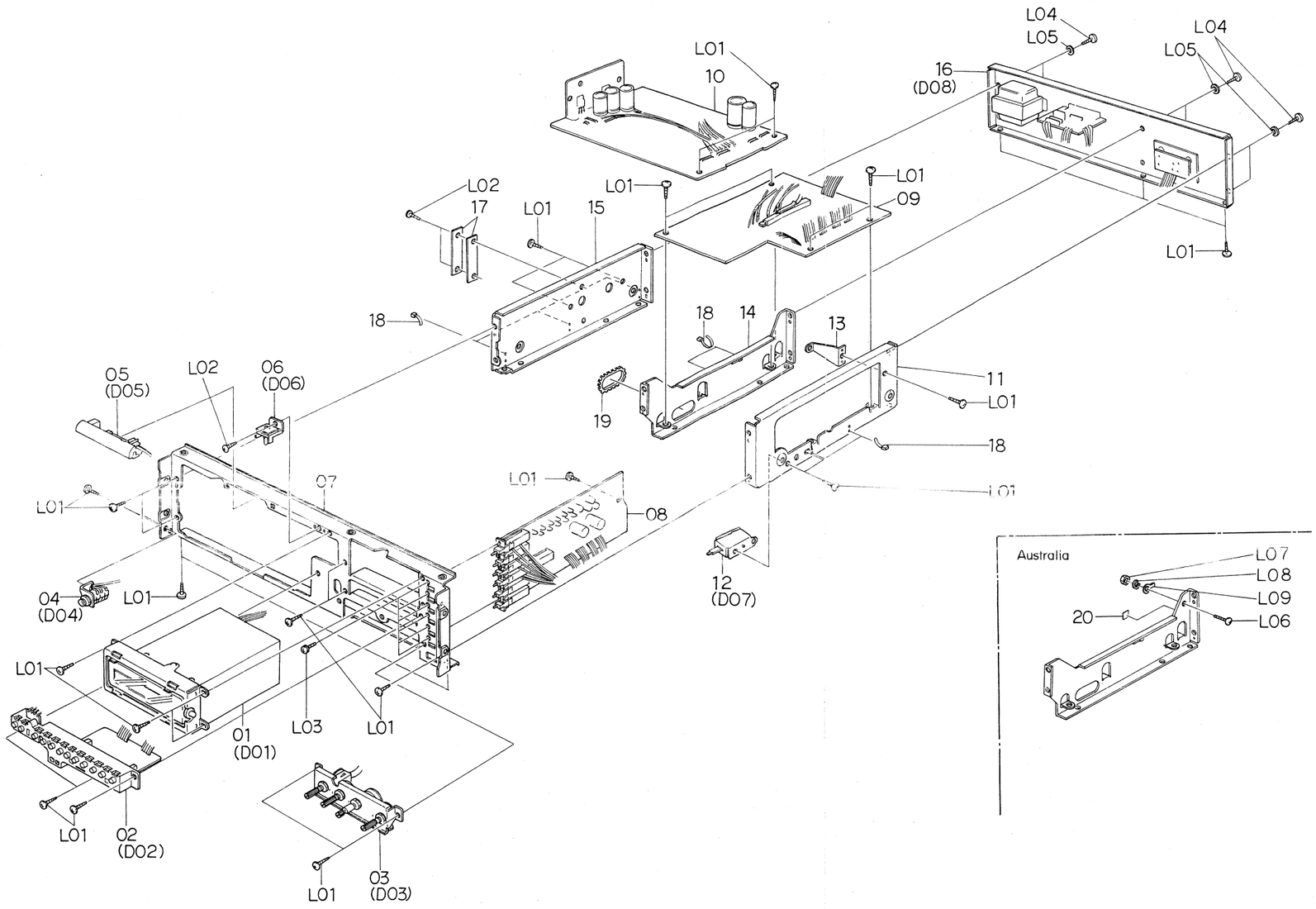


Fig. 8.4

Schematic Ref. No.	Part No.	Description	Q'ty
A03	**JA03596D**	**Chassis Ass'y (U.S.A. & Canada)**	**1**
	JA03597D	**Chassis Ass'y (Japan)**	**1**
	JA03603D	**Chassis Ass'y (220V Class 2)**	**1**
	JA03601D	**Chassis Ass'y (Australia)**	**1**
	JA03599D	**Chassis Ass'y (UK)**	**1**
	JA03598D	**Chassis Ass'y (Others)**	**1**
		Serial No.: A11204051 –	
01	JA03587A	FL Indicator Ass'y	1
02	JA03675A	Calibration Case Ass'y	1
03	JA03589A	Volume Holder Ass'y	1
04	JA03659A	Headphone Jack Ass'y	1
05	JA03600A	Reflector Ass'y	1
06	JA03602A	Counter Lamp Ass'y	1
07	0J04034F	Front Chassis	1
08	BA04059B	Switch P.C.B. Ass'y	1
09	BA04058C	Main P.C.B. Ass'y	1
10	BA04060C	Logic P.C.B. Ass'y	1
11	0J04033C	Side Chassis Right	1
12	JA03592A	Power Switch Holder Ass'y (U.S.A. & Canada)	1
	JA03595A	Power Switch Holder Ass'y (Japan)	1
	JA03594A	Power Switch Holder Ass'y (220V Class 2, UK, Australia & Others)	1
13	0J04055B	Switch P.C.B. Holder	1
14	0J04032C	Center Chassis	1
15	0J04031B	Side Chassis Left	1
16	HA03818B	Rear Panel Ass'y (U.S.A. & Canada)	1
	HA03819B	Rear Panel Ass'y (Japan)	1
	HA03833B	Rear Panel Ass'y (220V Class 2)	1
	HA03834B	Rear Panel Ass'y (Australia)	1
	HA03821B	Rear Panel Ass'y (UK)	1
	HA03820B	Rear Panel Ass'y (Others)	1
17	0J04062B	Insulator	2
18	0B08515A	Insu-Lock	23
19	0J04064A	Free Bushing 85mm	1
*20	0M03700A	Earth Mark Label (Australia)	1
L01	0E00857A	BT Screw M3x6 Philips Binding Head	32
L02	0E00859A	BT Screw M2.6x6 Philips Binding Head	2
L03	0E00622A	Screw M3x5 Philips Pan Head (2A)	6
L04	0E00860A	BT Screw M3x6 Philips Binding Head (Black Chromate)	6
L05	0E00157A	Washer 3mm (Black Plastics)	6
*L06	0E00521A	Screw M3x8 Philips Pan Head	1
*L07	0E00507A	Nut Hex. M3	1
*L08	0E00581A	Washer 3mm (Spring)	1
*L09	0E00037A	Earth Lug B-5	1
		*: Depends on the versions.	

Schematic Ref. No.	Part No.	Description	Q'ty
A03	**JA03596C**	**Chassis Ass'y (U.S.A. & Canada)**	**1**
	JA03597C	**Chassis Ass'y (Japan)**	**1**
	JA03603C	**Chassis Ass'y (220V Class 2)**	**1**
	JA03601C	**Chassis Ass'y (Australia)**	**1**
	JA03599C	**Chassis Ass'y (UK)**	**1**
	JA03598C	**Chassis Ass'y (Others)**	**1**
		Serial Nos.: A11202661 – A11204050	
01	JA03587A	FL Indicator Ass'y	1
02	JA03675A	Calibration Case Ass'y	1
03	JA03589A	Volume Holder Ass'y	1
04	JA03659A	Headphone Jack Ass'y	1
05	JA03600A	Reflector Ass'y	1
06	JA03602A	Counter Lamp Ass'y	1
07	0J04034F	Front Chassis	1
08	BA04059B	Switch P.C.B. Ass'y	1
09	BA04058B	Main P.C.B. Ass'y	1
10	BA04060C	Logic P.C.B. Ass'y	1
11	0J04033C	Side Chassis Right	1
12	JA03592A	Power Switch Holder Ass'y (U.S.A. & Canada)	1
	JA03595A	Power Switch Holder Ass'y (Japan)	1
	JA03594A	Power Switch Holder Ass'y (220V Class 2, UK, Australia & Others)	1
13	0J04055B	Switch P.C.B. Holder	1
14	0J04032C	Center Chassis	1
15	0J04031B	Side Chassis Left	1
16	HA03818A	Rear Panel Ass'y (U.S.A. & Canada)	1
	HA03819A	Rear Panel Ass'y (Japan)	1
	HA03833A	Rear Panel Ass'y (220V Class 2)	1
	HA03834A	Rear Panel Ass'y (Australia)	1
	HA03821A	Rear Panel Ass'y (UK)	1
	HA03820A	Rear Panel Ass'y (Others)	1
17	0J04062B	Insulator	2
18	0B08515A	Insu-Lock	23
19	0J04064A	Free Bushing 85mm	1
*20	0M03700A	Earth Mark Label (Australia)	1
L01	0E00857A	BT Screw M3x6 Philips Binding Head	32
L02	0E00859A	BT Screw M2.6x6 Philips Binding Head	2
L03	0E00622A	Screw M3x5 Philips Pan Head (2A)	6
L04	0E00860A	BT Screw M3x6 Philips Binding Head (Black Chromate)	6
L05	0E00157A	Washer 3mm (Black Plastics)	6
*L06	0E00521A	Screw M3x8 Philips Pan Head	1
*L07	0E00507A	Nut Hex. M3	1
*L08	0E00581A	Washer 3mm (Spring)	1
*L09	0E00037A	Earth Lug B-5	1

*: Depends on the versions.

Schematic Ref. No.	Part No.	Description	Q'ty
A03	**JA03596B**	**Chassis Ass'y (U.S.A. & Canada)**	**1**
	JA03597B	**Chassis Ass'y (Japan)**	**1**
	JA03603B	**Chassis Ass'y (220V Class 2)**	**1**
	JA03601B	**Chassis Ass'y (Australia)**	**1**
	JA03599B	**Chassis Ass'y (UK)**	**1**
	JA03598B	**Chassis Ass'y (Others)**	**1**
		Serial Nos.: A11202474 – A11202660	
01	JA03587A	FL Indicator Ass'y	1
02	JA03675A	Calibration Case Ass'y	1
03	JA03589A	Volume Holder Ass'y	1
04	JA03659A	Headphone Jack Ass'y	1
05	JA03600A	Reflector Ass'y	1
06	JA03602A	Counter Lamp Ass'y	1
07	0J04034F	Front Chassis	1
08	BA04059B	Switch P.C.B. Ass'y	1
09	BA04224A	Main P.C.B. Ass'y	1
10	BA04225A	Logic P.C.B. Ass'y	1
11	0J04033C	Side Chassis Right	1
12	JA03592A	Power Switch Holder Ass'y (U.S.A. & Canada)	1
	JA03595A	Power Switch Holder Ass'y (Japan)	1
	JA03594A	Power Switch Holder Ass'y (220V Class 2, UK, Australia & Others)	1
13	0J04055B	Switch P.C.B. Holder	1
14	0J04032C	Center Chassis	1
15	0J04031B	Side Chassis Left	1
16	HA03818A	Rear Panel Ass'y (U.S.A. & Canada)	1
	HA03819A	Rear Panel Ass'y (Japan)	1
	HA03833A	Rear Panel Ass'y (220V Class 2)	1
	HA03834A	Rear Panel Ass'y (Australia)	1
	HA03821A	Rear Panel Ass'y (UK)	1
	HA03820A	Rear Panel Ass'y (Others)	1
17	0J04062B	Insulator	2
18	0B08515A	Insu-Lock	23
19	0J04064A	Free Bushing 85mm	1
*20	0M03700A	Earth Mark Label (Australia)	1
L01	0E00857A	BT Screw M3x6 Philips Binding Head	32
L02	0E00859A	BT Screw M2.6x6 Philips Binding Head	2
L03	0E00622A	Screw M3x5 Philips Pan Head (2A)	6
L04	0E00860A	BT Screw M3x6 Philips Binding Head (Black Chromate)	6
L05	0E00157A	Washer 3mm (Black Plastics)	6
*L06	0E00521A	Screw M3x8 Philips Pan Head	1
*L07	0E00507A	Nut Hex. M3	1
*L08	0E00581A	Washer 3mm (Spring)	1
*L09	0E00037A	Earth Lug B-5	1

*: Depends on the versions.

Schematic Ref. No.	Part No.	Description	Q'ty
A03	**JA03596A**	**Chassis Ass'y (U.S.A. & Canada)**	**1**
	JA03597A	**Chassis Ass'y (Japan)**	**1**
	JA03603A	**Chassis Ass'y (220V Class 2)**	**1**
	JA03601A	**Chassis Ass'y (Australia)**	**1**
	JA03599A	**Chassis Ass'y (UK)**	**1**
	JA03598A	**Chassis Ass'y (Others)**	**1**
		Serial Nos.: A11202011 – A11202473	
01	JA03587A	FL Indicator Ass'y	1
02	JA03675A	Calibration Case Ass'y	1
03	JA03589A	Volume Holder Ass'y	1
04	JA03659A	Headphone Jack Ass'y	1
05	JA03600A	Reflector Ass'y	1
06	JA03602A	Counter Lamp Ass'y	1
07	0J04034F	Front Chassis	1
08	BA04059B	Switch P.C.B. Ass'y	1
09	BA04058A	Main P.C.B. Ass'y	1
10	BA04060A	Logic P.C.B. Ass'y	1
11	0J04033C	Side Chassis Right	1
12	JA03592A	Power Switch Holder Ass'y (U.S.A. & Canada)	1
	JA03595A	Power Switch Holder Ass'y (Japan)	1
	JA03594A	Power Switch Holder Ass'y (220V Class 2, UK, Australia & Others)	1
13	0J04055B	Switch P.C.B. Holder	1
14	0J04032C	Center Chassis	1
15	0J04031B	Side Chassis Left	1
16	HA03818A	Rear Panel Ass'y (U.S.A. & Canada)	1
	HA03819A	Rear Panel Ass'y (Japan)	1
	HA03833A	Rear Panel Ass'y (220V Class 2)	1
	HA03834A	Rear Panel Ass'y (Australia)	1
	HA03821A	Rear Panel Ass'y (UK)	1
	HA03820A	Rear Panel Ass'y (Others)	1
17	0J04062B	Insulator	2
18	0B08515A	Insu-Lock	23
19	0J04064A	Free Bushing 85mm	1
*20	0M03700A	Earth Mark Label (Australia)	1
L01	0E00857A	BT Screw M3x6 Philips Binding Head	32
L02	0E00859A	BT Screw M2.6x6 Philips Binding Head	2
L03	0E00622A	Screw M3x5 Philips Pan Head (2A)	6
L04	0E00860A	BT Screw M3x6 Philips Binding Head (Black Chromate)	6
L05	0E00157A	Washer 3mm (Black Plastics)	6
*L06	0E00521A	Screw M3x8 Philips Pan Head	1
*L07	0E00507A	Nut Hex. M3	1
*L08	0E00581A	Washer 3mm (Spring)	1
*L09	0E00037A	Earth Lug B-5	1

*: Depends on the versions.

Schematic Ref. No.	Part No.	Description	Q'ty
A03	**JA03596A**	**Chassis Ass'y (U.S.A. & Canada)**	**1**
	JA03597A	**Chassis Ass'y (Japan)**	**1**
	JA03603A	**Chassis Ass'y (220V Class 2)**	**1**
	JA03601A	**Chassis Ass'y (Australia)**	**1**
	JA03599A	**Chassis Ass'y (UK)**	**1**
	JA03598A	**Chassis Ass'y (Others)**	**1**
		Serial Nos.: A11201001 – A11202010	
01	JA03587A	FL Indicator Ass'y	1
02	JA03675A	Calibration Case Ass'y	1
03	JA03589A	Volume Holder Ass'y	1
04	JA03659A	Headphone Jack Ass'y	1
05	JA03600A	Reflector Ass'y	1
06	JA03602A	Counter Lamp Ass'y	1
07	0J04034F	Front Chassis	1
08	BA04059A	Switch P.C.B. Ass'y	1
09	BA04058A	Main P.C.B. Ass'y	1
10	BA04060A	Logic P.C.B. Ass'y	1
11	0J04033C	Side Chassis Right	1
12	JA03592A	Power Switch Holder Ass'y (U.S.A. & Canada)	1
	JA03595A	Power Switch Holder Ass'y (Japan)	1
	JA03594A	Power Switch Holder Ass'y (220V Class 2, UK, Australia & Others)	1
13	0J04055B	Switch P.C.B. Holder	1
14	0J04032C	Center Chassis	1
15	0J04031B	Side Chassis Left	1
16	HA03818A	Rear Panel Ass'y (U.S.A. & Canada)	1
	HA03819A	Rear Panel Ass'y (Japan)	1
	HA03833A	Rear Panel Ass'y (220V Class 2)	1
	HA03834A	Rear Panel Ass'y (Australia)	1
	HA03821A	Rear Panel Ass'y (UK)	1
	HA03820A	Rear Panel Ass'y (Others)	1
17	0J04062B	Insulator	2
18	0B08515A	Insu-Lock	23
19	0J04064A	Free Bushing 85mm	1
*20	0M03700A	Earth Mark Label (Australia)	1
L01	0E00857A	BT Screw M3x6 Philips Binding Head	32
L02	0E00859A	BT Screw M2.6x6 Philips Binding Head	2
L03	0E00622A	Screw M3x5 Philips Pan Head (2A)	6
L04	0E00860A	BT Screw M3x6 Philips Binding Head (Black Chromate)	6
L05	0E00157A	Washer 3mm (Black Plastics)	6
*L06	0E00521A	Screw M3x8 Philips Pan Head	1
*L07	0E00507A	Nut Hex. M3	1
*L08	0E00581A	Washer 3mm	1
*L09	0E00037A	Earth Lug B-5	1

*: Depends on the versions.

8.5. Front Panel Escutcheon Ass'y (B01)

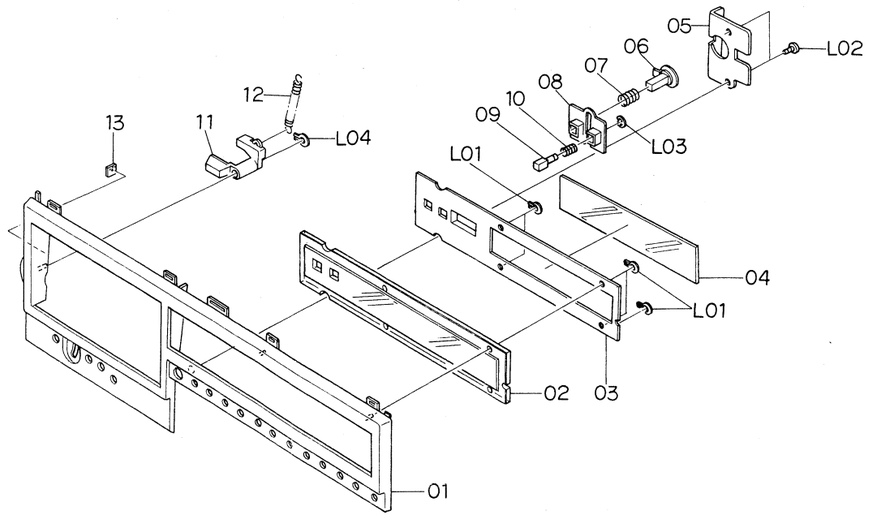


Fig. 8.5

8.6. Control Button Ass'y (B02)

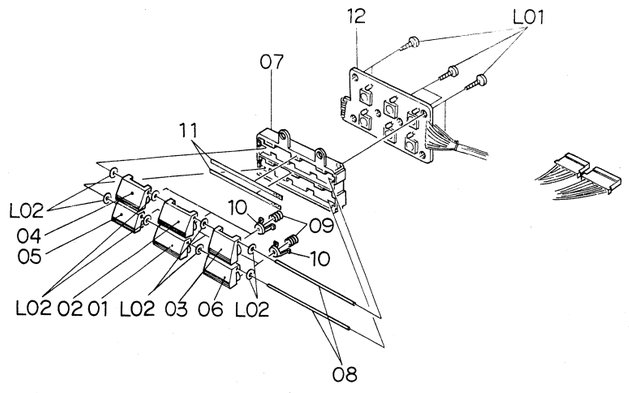


Fig. 8.6

8.7. Flywheel Holder Ass'y (C01)

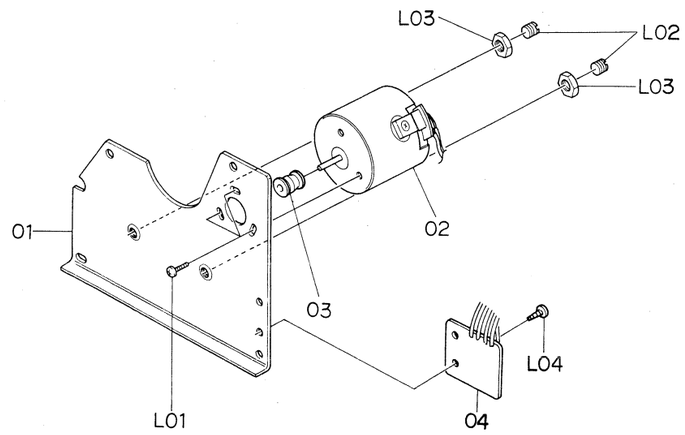


Fig. 8.7

8.8. Sub Mechanism Chassis Ass'y (C02)

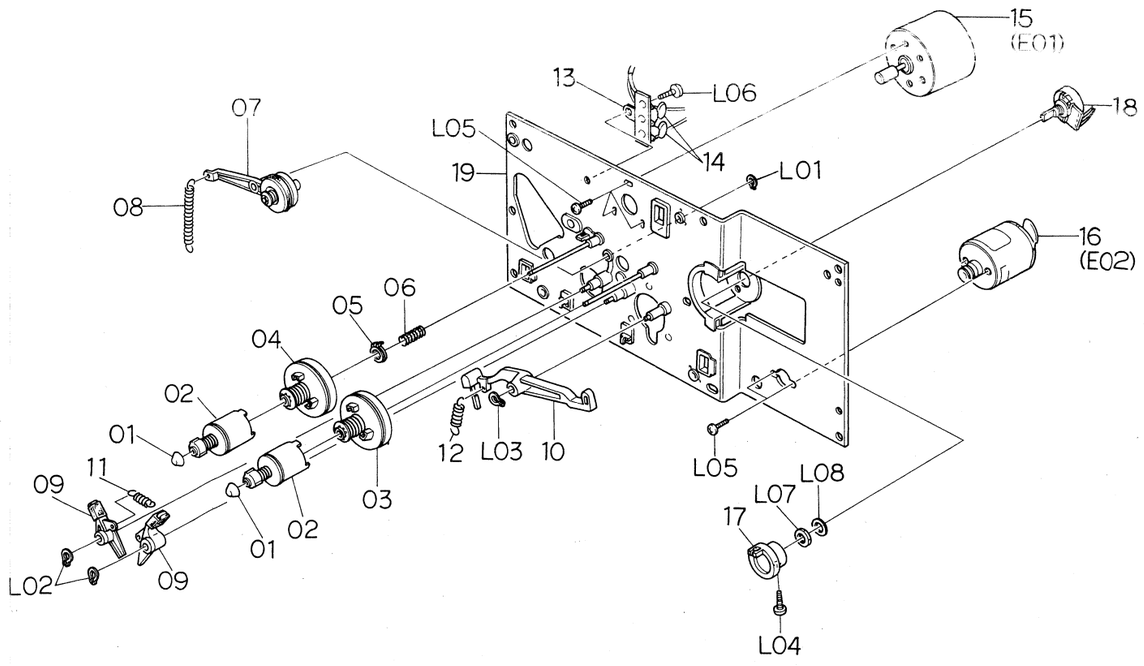


Fig. 8.8

Schematic Ref. No.	Part No.	Description	Q'ty
B01	**HA03827B**	**Front Panel Escutcheon Ass'y** Serial No.: A11205174 –	**1**
01	0H03877A	Front Panel Escutcheon	1
02	0H03722B	Display Glass	1
03	0H03743B	Counter Escutcheon	1
04	0H03748A	FL Indicator Filter	1
05	0J04050A	Counter Escutcheon Holder	1
06	0H03749A	Memory Switch Knob	1
07	0J04043A	Memory Switch Knob Spring	1
08	0H03753C	Counter Reset Knob Holder	1
09	0H03750A	Counter Reset Knob	1
10	0J04042A	Counter Reset Knob Spring	1
11	0H03724F	Eject Lever	1
12	0H03762A	Eject Lever Spring	1
13	0J04057B	Eject Lever Cushion	1
L01	0E00842A	Stopper Ring 2mm	5
L02	0E00854A	BT Screw M2.6x4 Philips Pan Head	2
L03	0E00890A	C-Ring 2mm	1
L04	0E00837A	Stopper Ring 3mm	1
B01	**HA03827A**	**Front Panel Escutcheon Ass'y** Serial Nos.: A11201001 – A11205173	**1**
01	0H03719D	Front Panel Escutcheon	1
02	0H03722B	Display Glass	1
03	0H03743B	Counter Escutcheon	1
04	0H03748A	FL Indicator Filter	1
05	0J04050A	Counter Escutcheon Holder	1
06	0H03749A	Memory Switch Knob	1
07	0J04043A	Memory Switch Knob Spring	1
08	0H03753C	Counter Reset Knob Holder	1
09	0H03750A	Counter Reset Knob	1
10	0J04042A	Counter Reset Knob Spring	1
11	0H03724E	Eject Lever	1
12	0H03762A	Eject Lever Spring	1
13	0J04057A	Eject Lever Cushion	1
L01	0E00842A	Stopper Ring 2mm	5
L02	0E00854A	BT Screw M2.6x4 Philips Pan Head	2
L03	0E00890A	C-Ring 2mm	1
L04	0E00837A	Stopper Ring 3mm	1
B02	**HA03823A**	**Control Button Ass'y** Serial No.: A11201001 –	**1**
01	0H03726B	Control Button Stop	1
02	0H03727B	Control Button Play	1
03	0H03728B	Control Button F.F.	1
04	0H03729B	Control Button Rewind	1
05	0H03730B	Control Button Pause	1
06	0H03731B	Control Button Record	1
07	0J04044C	Control Button Holder	1
08	0J04045B	Control Button Shaft	2
09	0J04046A	Control Button Spring	6
10	0J04052B	Spring Stopper	6
11	0J04099A	Control Button Himelon	2
12	BA04071A	Control Switch P.C.B. Ass'y	1
L01	0E00792A	BT Screw M2.6x6 Philips Pan Head	6
L02	0J04061A	Washer FT20	8

Schematic Ref. No.	Part No.		Q'ty
C01	**CA08093A**	**Flywheel Holder Ass'y** Serial No.: A11201001 –	**1**
01	0C08013I	Flywheel Holder	1
02	0C08213A	Capstan Motor	1
03	0C08228B	Capstan Motor Pulley	1
04	–	Speed Cal. P.C.B. Ass'y (incorporated in the Capstan Motor)	(1)
L01	0E00226A	Screw M2.6x4 Philips Pan Head	3
L02	0C08068C	Lock Nut	2
L03	0C03857A	Thrust Screw	2
L04	0E00862A	BT Screw M3x6 Philips Pan Head	1
C02	**CA08065A**	**Sub Mechanism Chassis Ass'y** Serial No.: A11201001 –	**1**
01	0C08039B	Reel Hub Head	2
02	CA08038B	Reel Hub B Ass'y	2
03	CA08037A	Reel Hub Take-up Ass'y	1
04	CA08064A	Reel Hub Supply Ass'y	1
05	CA08039A	Back Tension Ass'y	1
06	0C08178A	Back Tension Spring	1
07	CA08040A	Idler Ass'y	1
08	0C08127B	Idler Arm Spring	1
09	CA08042A	Brake Arm Ass'y	2
10	0C08030C	Brake Drive Arm	1
11	0C08129A	Brake Arm Spring	1
12	0C08128A	Brake Drive Arm Spring	1
13	0B04042A	Lug Terminal 1L2P	1
14	0B09290A	Ceramic Capacitor 0.01μF 50V	2
15	CA08036B	Reel Motor Ass'y	1
16	CA08034A	Control Motor Ass'y	1
17	0C08053B	Volume Coupler	1
18	0B07240A	Volume Control 10 KΩ (B)	1
19	CA08041A	Sub Chassis Ass'y	1
L01	0E00842A	Stopper Ring 2mm	1
L02	0E00837A	Stopper Ring 3mm	2
L03	0E00838A	Stopper Ring 4mm	1
L04	0E00859A	BT Screw M2.6x6 Philips Binding Head	1
L05	0E00226A	Screw M2.6x4 Philips Pan Head	5
L06	0E00843A	BT Screw M3x5 Philips Pan Head	1
L07	–	Volume Nut	(1)
L08	–	Volume Washer	(1)

Schematic Ref. No.	Part No.	Description	Q'ty	Schematic Ref. No.	Part No.	Description	Q'ty
C03	CA08097B	**Main Mechanism Chassis Ass'y** Serial No.: A11205381 –	1	C03	CA08097B	**Main Mechanism Chassis Ass'y** Serial Nos.: A11201001 – A11205380	1
01	CA08125A	Cassette Case Holder L Ass'y	1	01	CA08125A	Cassette Case Holder L Ass'y	1
02	0C08151A	Lid Arm Spring Tube	1	02	0C08151A	Lid Arm Spring Tube	1
03	CA08022A	Cassette Case Holder R Ass'y	1	03	CA08022A	Cassette Case Holder R Ass'y	1
04	CA08095A	Cassette Case Ass'y	1	04	CA08095A	Cassette Case Ass'y	1
05	0C08019I	Cover Plate	1	05	0C08019I	Cover Plate	1
06	0M03977A	Cassette Viewer Label	1	06	0M03977A	Cassette Viewer Label	1
07	CA08101A	Head Mount Base Ass'y	1	07	CA08101A	Head Mount Base Ass'y	1
08	0C08121A	Supply Pressure Roller Spring	2	08	0C08121A	Supply Pressure Roller Spring	2
09	CA08053B	Supply Pressure Roller Ass'y	1	09	CA08053B	Supply Pressure Roller Ass'y	1
10	0C08122B	Supply Pressure Roller Thrust Spring	1	10	0C08122B	Supply Pressure Roller Thrust Spring	1
11	CA08079B	Take-up Pressure Roller Ass'y	1	11	CA08079A	Take-up Pressure Roller Ass'y	1
12	0C08183B	Take-up Pressure Roller Thrust Spring	1	12	0C08183B	Take-up Pressure Roller Thrust Spring	1
13	CA08104A	Head Base Ass'y D	1	13	CA08104A	Head Base Ass'y D	1
14	0C08182A	Pressure Roller Drive Bar B	1	14	0C08182A	Pressure Roller Drive Bar B	1
15	0C08086B	Head Base Roller	3	15	0C08086B	Head Base Roller	3
16	0C08050B	Record Sensor	1	16	0C08050B	Record Sensor	1
17	0C08051E	Cassette Hold Arm	1	17	0C08051E	Cassette Hold Arm	1
18	0C08120A	Cassette Hold Arm Spring	1	18	0C08120A	Cassette Hold Arm Spring	1
19	CA08027A	Head Base Drive Arm Ass'y	1	19	CA08027A	Head Base Drive Arm Ass'y	1
20	0C08143C	Head Base Drive Arm Spring	1	20	0C08143C	Head Base Drive Arm Spring	1
21	CA08026A	Pressure Roller Drive Arm Ass'y	1	21	CA08026A	Pressure Roller Drive Arm Ass'y	1
22	CA08099A	Auto Shut-off Ass'y	1	22	CA08099A	Auto Shut-off Ass'y	1
23	CA08098A	Counter Ass'y	1	23	CA08098A	Counter Ass'y	1
24	CA08105A	Pitch Control Holder Ass'y	1	24	CA08105A	Pitch Control Holder Ass'y	1
25	0C08224A	Counter Belt	1	25	0C08224A	Counter Belt	1
26	0C08119A	Record Protector	1	26	0C08119A	Record Protector	1
27	0C08194C	Damper Lock Arm	1	27	0C08194C	Damper Lock Arm	1
28	0C08153A	Damper Lock Arm Spring Tube	1	28	0C08153A	Damper Lock Arm Spring Tube	1
29	0C08125A	Damper Lock Arm Spring	1	29	0C08125A	Damper Lock Arm Spring	1
30	CA08030A	Pneumatic Damper Ass'y	1	30	CA08030A	Pneumatic Damper Ass'y	1
31	CA08023A	Supply Capstan Flange Ass'y	1	31	CA08023A	Supply Capstan Flange Ass'y	1
32	CA08024A	Take-up Capstan Flange Ass'y	1	32	CA08024A	Take-up Capstan Flange Ass'y	1
33	0C08186A	Cam Drive Gear	1	33	0C08186A	Cam Drive Gear	1
34	0C08029H	Control Cam	1	34	0C08029H	Control Cam	1
35	0C08152A	Counter-Load Arm Spring	1	35	0C08152A	Counter-Load Arm Spring	1
36	0C08117A	Counter-Load Arm Spring Tube	1	36	0C08117A	Counter-Load Arm Spring Tube	1
37	CA08028A	Counter-Load Arm Ass'y	1	37	CA08028A	Counter-Load Arm Ass'y	1
38	CA08072A	Main Chassis Ass'y	1	38	CA08072A	Main Chassis Ass'y	1
L01	0E00837A	Stopper Ring 3mm	7	L01	0E00837A	Stopper Ring 3mm	7
L02	0E00832A	BT Screw M3x14 Philips Pan Head	2	L02	0E00832A	BT Screw M3x14 Philips Pan Head	2
L03	0E00834A	BT Screw M3x30 Philips Pan Head	2	L03	0E00834A	BT Screw M3x30 Philips Pan Head	2
L04	0E00831A	BT Screw M3x10 Philips Pan Head	3	L04	0E00831A	BT Screw M3x10 Philips Pan Head	3
L05	0E00254A	Washer 3.1mm (Plastics)	2	L05	0E00254A	Washer 3.1mm (Plastics)	2
L06	0E00222A	E-Ring 2mm	2	L06	0E00222A	E-Ring 2mm	2
L07	0E00876A	BT Screw M2.6x8 Philips Pan Head	11	L07	0E00876A	BT Screw M2.6x8 Philips Pan Head	11
L08	0C08060B	Height Adjustment Nut	2	L08	0C08060B	Height Adjustment Nut	2
L09	0E00142A	Washer 2.6mm	2	L09	0E00142A	Washer 2.6mm	2
L10	0E00879A	BT Screw M2x15 Philips Pan Head	1	L10	0E00879A	BT Screw M2x15 Philips Pan Head	1
L11	0E00838A	Stopper Ring 4mm	3	L11	0E00838A	Stopper Ring 4mm	3
L12	0E00846A	BT Screw M3x8 Philips Pan Head	3	L12	0E00846A	BT Screw M3x8 Philips Pan Head	3
L13	0E00865A	BT Screw M3x10 Philips Binding Head	2	L13	0E00865A	BT Screw M3x10 Philips Binding Head	2
L14	0E00895A	Earth Lug 3mm	2	L14	0E00895A	Earth Lug 3mm	2

8.9. Main Mechanism Chassis Ass'y (C03)

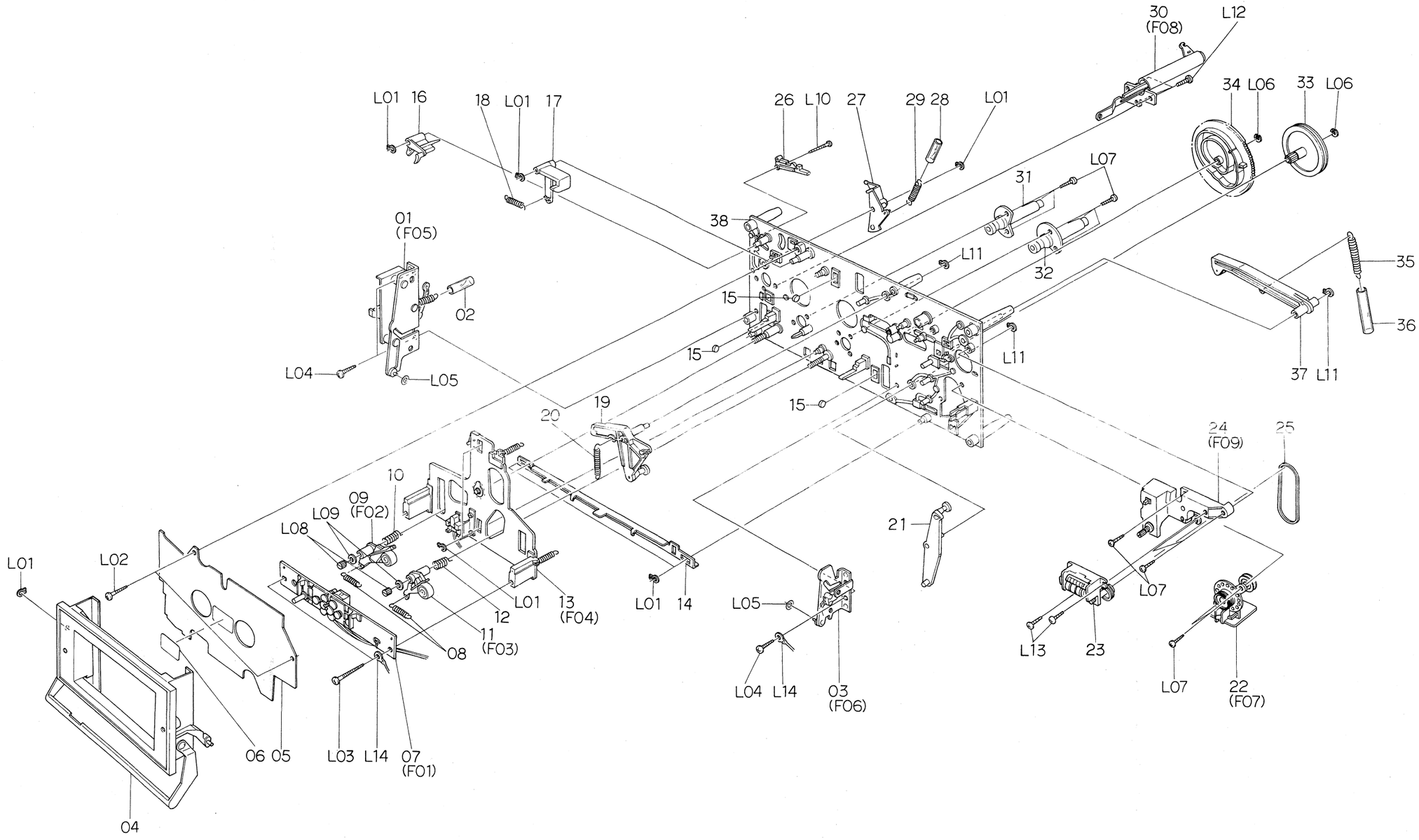


Fig. 8.9

8.10. FL Indicator Ass'y (D01)

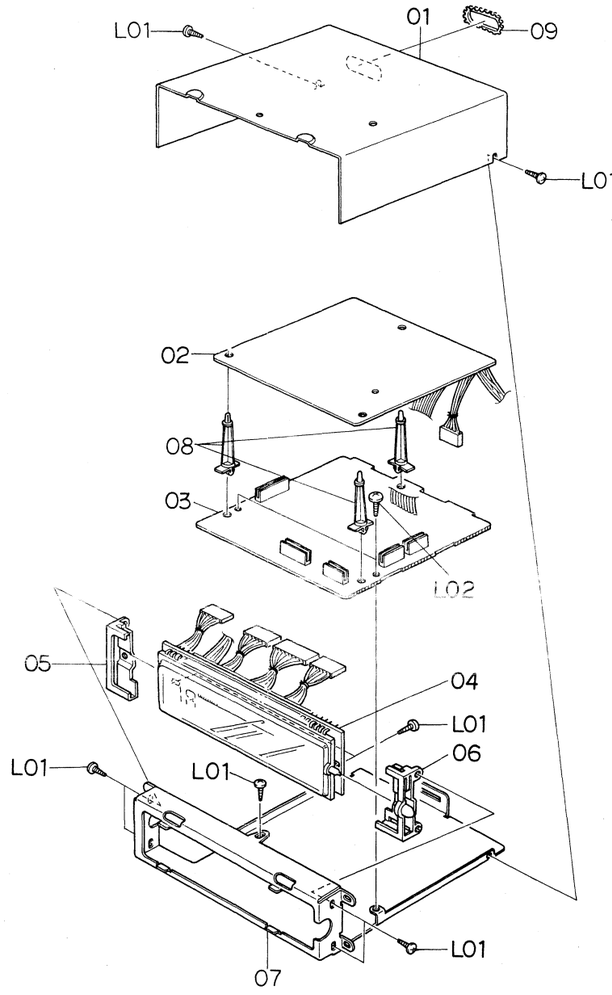


Fig. 8.10

8.11. Calibration Case Ass'y (D02)

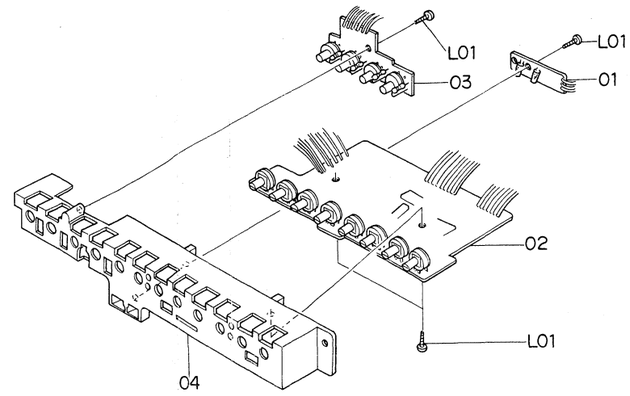


Fig. 8.11

8.12. Volume Holder Ass'y (D03)

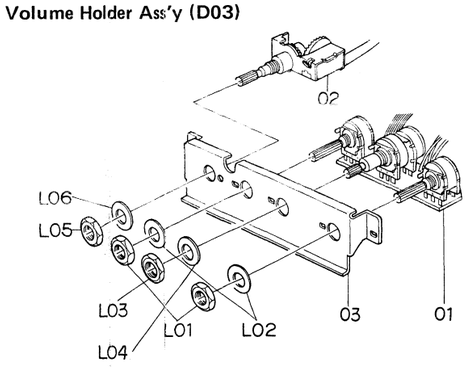


Fig. 8.12

8.13. Headphone Jack Ass'y (D04)

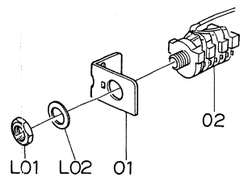


Fig. 8.13

8.14. Reflector Ass'y (D05)

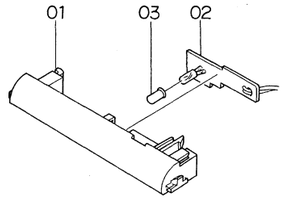


Fig. 8.14

8.15. Counter Lamp Ass'y (D06)

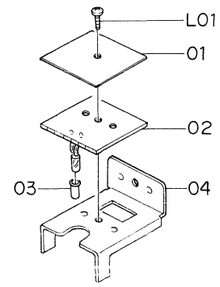


Fig. 8.15

8.16. Power Switch Holder Ass'y (D07)

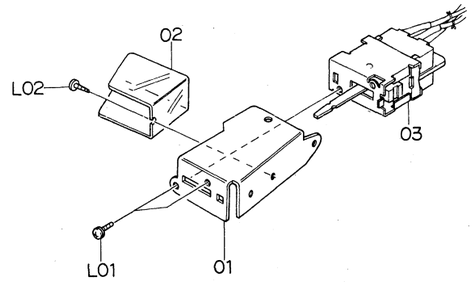


Fig. 8.16

Schematic Ref. No.	Part No.	Description	Q'ty
D01	**JA03587A**	**FL Indicator Ass'y** Serial No.: A11201001 –	**1**
01	0J04037A	Shield Cover	1
02	BA04066A	Indicator P.C.B. C Ass'y	1
03	BA04065A	Indicator P.C.B. B Ass'y	1
04	BA04061A	Indicator P.C.B. A Ass'y	1
05	0J04039A	FL Indicator Holder L	1
06	0J04040A	FL Indicator Holder R	1
07	0J04036A	FL Indicator Hold Plate	1
08	0J04058A	P.C.B. Supporter	3
09	0J04063A	Free Bushing 69mm	1
L01	0E00859A	BT Screw M2.6x6 Philips Binding Head	9
L02	0E00857A	BT Screw M3x6 Philips Binding Head	2
D02	**JA03675A**	**Calibration Case Ass'y** Serial No.: A11201001 –	**1**
01	BA04072A	Lamp P.C.B. A Ass'y	1
02	BA04067A	Record Cal. P.C.B. A Ass'y	1
03	BA04068A	Record Cal. P.C.B. B Ass'y	1
04	0J04108A	Calibration Case	1
L01	0E00792A	BT Screw M2.6x6 Philips Pan Head	4
D03	**JA03589A**	**Volume Holder Ass'y** Serial No.: A11201001 –	**1**
01	BA04069A	Volume P.C.B. Ass'y	1
02	0B07317A	Remote Switch	1
03	0J04028D	Volume Holder	1
L01	–	Volume Nut	(2)
L02	–	Volume Washer	(2)
L03	–	Volume Nut	(1)
L04	–	Volume Washer	(1)
L05	–	Remote Switch Nut	(1)
L06	–	Remote Switch Washer	(1)
D04	**JA03659A**	**Headphone Jack Ass'y** Serial No.: A11201001 –	**1**
01	0J04101A	Headphone Jack Holder	1
02	0B08511A	Headphone Jack	1
L01	–	Headphone Jack Nut	(1)
L02	–	Headphone Jack Washer	(1)
D05	**JA03600A**	**Reflector Ass'y** Serial No.: A11201001 –	**1**
01	0H03754C	Reflector	1
02	BA04063A	Lamp P.C.B. C Ass'y	1
03	0J04107A	Filter Cap	1
D06	**JA03602A**	**Counter Lamp Ass'y** Serial No.: A11201001 –	**1**
01	0J04083A	Insulator	1
02	BA04062A	Lamp P.C.B. B Ass'y	1
03	0J04107A	Filter Cap	1
04	0J04041A	Counter Lamp P.C.B. Holder	1
L01	0E00859A	BT Screw M2.6x6 Philips Binding Head	1

Schematic Ref. No.	Part No.	Description	Q'ty
D07	**JA03592A**	**Power Switch Holder Ass'y (U.S.A. & Canada)**	**1**
	JA03595A	**Power Switch Holder Ass'y (Japan)**	**1**
	JA03594A	**Power Switch Holder Ass'y (220V Class 2, UK, Australia & Others)** Serial No.: A11201001 –	**1**
01	0J04038A	Power Switch Holder	1
02	0J04056A	Power Switch Insulator	1
03	0B07280A	Power Switch (U.S.A. & Canada)	1
	0B07291A	Power Switch (Japan)	1
	0B07292A	Power Switch (220V Class 2, UK, Australia & Others)	1
L01	0E00622A	Screw M3x5 Philips Pan Head (2A)	2
L02	0E00873A	BT Screw M2.6x5 Philips Binding Head	1

Schematic Ref. No.	Part No.	Description	Q'ty
D08	**HA03818B**	**Rear Panel Ass'y (U.S.A. & Canada)**	**1**
	HA03819B	**Rear Panel Ass'y (Japan)**	**1**
	HA03833B	**Rear Panel Ass'y (220V Class 2)**	**1**
	HA03834B	**Rear Panel Ass'y (Australia)**	**1**
	HA03821B	**Rear Panel Ass'y (UK)**	**1**
	HA03820B	**Rear Panel Ass'y (Others)**	**1**
		Serial No.: A11204051 –	
01	0H03831A	Rear Panel	1
02	BA04176A	Pin Jack P.C.B. Ass'y	1
03	0B08355A	4P DIN Socket	
04	0B08584A	8P DIN Socket	
05	BA04095A	Fuse P.C.B. Ass'y (U.S.A. & Canada)	1
	BA04096A	Fuse P.C.B. Ass'y (Japan)	1
	BA04105B	Fuse P.C.B. Ass'y (220V Class 2)	1
	BA04098A	Fuse P.C.B. Ass'y (UK & Australia)	1
	BA04097A	Fuse P.C.B. Ass'y (Others)	1
06	0C01162B	Bolt Receptacle Plate	2
07	0B06618B	Power Transformer (U.S.A. & Canada)	1
	0B06619A	Power Transformer (Japan)	1
	0B06621A	Power Transformer (220V Class 2, UK & Australia)	1
	0B06620A	Power Transformer (Others)	1
08	0J04016A	Transformer Plate	1
09	0B08037U	Cord Bushing C (U.S.A., Canada, Japan, 220V Class 2 & Others)	1
	0B08325A	Cord Bushing E (Australia)	1
	0B08351A	Cord Bushing 4K-4 (UK)	1
10	0B08533A	Power Cord (U.S.A., Canada & Others)	1
	0B08219B	Power Cord (Japan)	1
	0B08093A	Power Cord (220V Class 2)	1
	0B08666A	Power Cord (Australia)	1
	0B08348A	Power Cord (UK)	1
11	0A03154B	Cord Spacer	1
12	0J03663C	Switch Cover (U.S.A., Canada, Japan, 220V Class 2, Australia & UK)	1
	0M03946A	Voltage Selector Lock Plate C (Others)	1
*13	0B07092U	Voltage Selector (Others)	1
14	0J04079A	Cushion B	3
15	0M03458B	Pass Label	1
*16	0M04075A	Fuse Caution Label (U.S.A. & Canada)	1
17	0M03794A	Voltage Label 100V (Japan)	1
	0M03796A	Voltage Label 220V (220V Class 2)	1
	0M03797A	Voltage Label 240V (Australia & UK)	1
	0M03955A	Voltage Label 120V/220–240V (Others)	1
* –	0M03844B	Power Cord Label (UK)	1
–	0F01071A	Free-up Belt	1
–	0M04065A	Serial Number Plate	1
L01	0B08539A	Plastic Rivet	4
L02	0E00594A	Screw M3x8 Philips Binding Head (Bronze)	3
*L03	0E00507A	Nut Hex. M3	3
*L04	0E00581A	Washer 3mm (Spring)	3
L05	0E00714A	Screw M2.6x6 Philips Binding Head (Branze)	4
L06	0E00593A	Screw M3x6 Philips Binding Head (Bronze)	2
L07	0E00756A	Screw M4x8 Philips Binding Head (Bronze)	2
	0J03644A	Chobert Rivet	2
		*: Depends on the versions.	
D08	**HA03818A**	**Rear Panel Ass'y (U.S.A. & Canada)**	**1**
	HA03819A	**Rear Panel Ass'y (Japan)**	**1**
	HA03833A	**Rear Panel Ass'y (220V Class 2)**	**1**
	HA03834A	**Rear Panel Ass'y (Australia)**	**1**
	HA03821A	**Rear Panel Ass'y (UK)**	**1**
	HA03820A	**Rear Panel Ass'y (Others)**	**1**
		Serial Nos.: A11201001 – A11204050	
01	0H03752B	Rear Panel	1
02	BA04064A	Pin Jack P.C.B. Ass'y	1
03	0B08355A	4P DIN Socket	
04	0B08584A	8P DIN Socket	
05	BA04095A	Fuse P.C.B. Ass'y (U.S.A. & Canada)	1
	BA04096A	Fuse P.C.B. Ass'y (Japan)	1
	BA04105B	Fuse P.C.B. Ass'y (220V Class 2)	1
	BA04098A	Fuse P.C.B. Ass'y (UK & Australia)	1
	BA04097A	Fuse P.C.B. Ass'y (Others)	1
06	0C01162B	Bolt Receptacle Plate	2
07	0B06618A	Power Transformer (U.S.A. & Canada)	1
	0B06619A	Power Transformer (Japan)	1
	0B06621A	Power Transformer (220V Class 2, UK & Australia)	1
	0B06620A	Power Transformer (Others)	1
08	0J04016A	Transformer Plate	1
09	0B08037U	Cord Bushing C (U.S.A., Canada, Japan, 220V Class 2 & Others)	1
	0B08325A	Cord Bushing E (Australia)	1
	0B08351A	Cord Bushing 4K-4 (UK)	1
10	0B08533A	Power Cord (U.S.A., Canada & Others)	1
	0B08219B	Power Cord (Japan)	1
	0B08093A	Power Cord (220V Class 2)	1
	0B08666A	Power Cord (Australia)	1
	0B08348A	Power Cord (UK)	1
11	0A03154B	Cord Spacer	1
12	0J03663C	Switch Cover (U.S.A., Canada, Japan, 220V Class 2, Australia & UK)	1
	0M03946A	Voltage Selector Lock Plate C (Others)	1
*13	0B07092U	Voltage Selector (Others)	1
14	0J04079A	Cushion B	3
15	0M03458B	Pass Label	1
*16	0M04075A	Fuse Caution Label (U.S.A. & Canada)	1
17	0M03794A	Voltage Label 100V (Japan)	1
	0M03796A	Voltage Label 220V (220V Class 2)	1

8.17. Rear Panel Ass'y (D08)

Schematic Ref. No.	Part No.	Description	Q'ty
	0M03797A	Voltage Label 240V (Australia & UK)	1
	0M03955A	Voltage Label 120V/220-240V (Others)	1
*–	0M03844B	Power Cord Label (UK)	1
–	0F01071A	Free-up Belt	1
–	0M04065A	Serial Number Plate	1
L01	0B08539A	Plastic Rivet	4
L02	0E00594A	Screw M3x8 Philips Binding Head (Bronze)	3
*L03	0E00507A	Nut Hex. M3	3
*L04	0E00581A	Washer 3mm (Spring)	3
L05	0E00714A	Screw M2.6x6 Philips Binding Head (Bronze)	4
L06	0E00593A	Screw M3x6 Philips Binding Head (Bronze)	2
L07	0E00756A	Screw M4x8 Philips Binding Head (Bronze)	2
	0J03644A	Chobert Rivet	2
		*: Depends on the versions.	

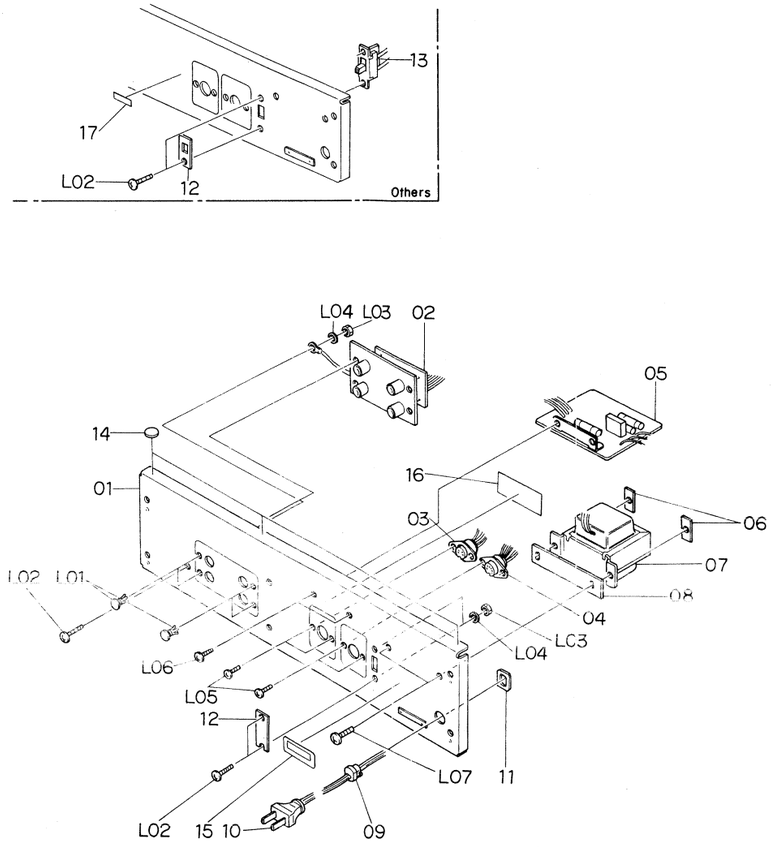


Fig. 8.17.1 Serial No.: A11204051 –

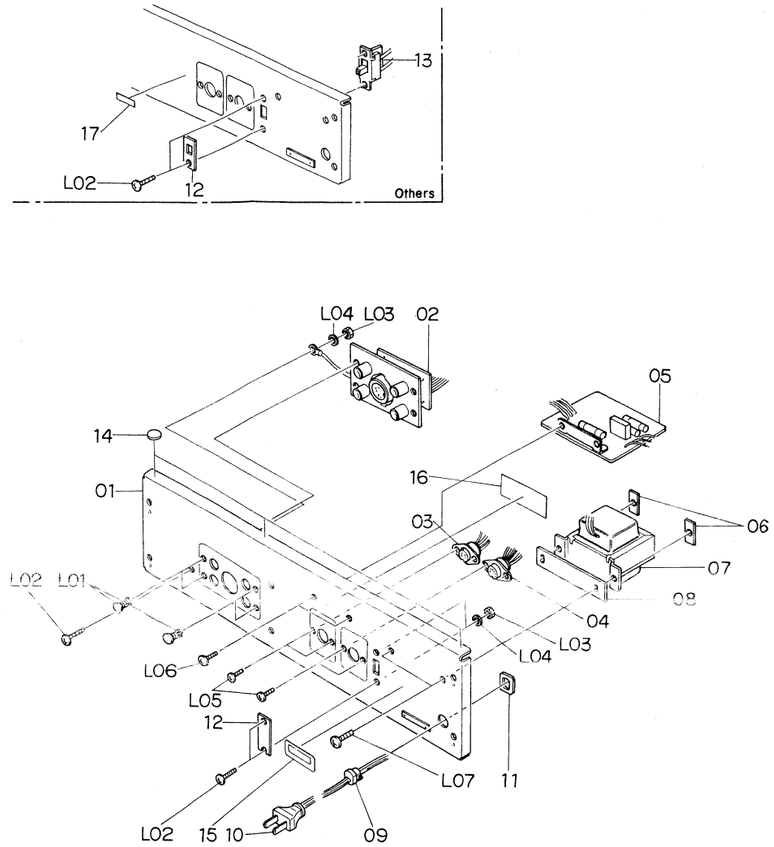


Fig. 8.17.2 Serial Nos.: A11201001 – A11204050

8.18. Reel Motor Ass'y (E01)

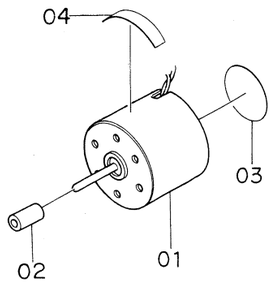


Fig. 8.18

8.19. Control Motor Ass'y (E02)

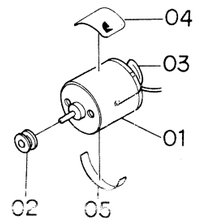


Fig. 8.19

8.20. Head Mount Base Ass'y (F01)

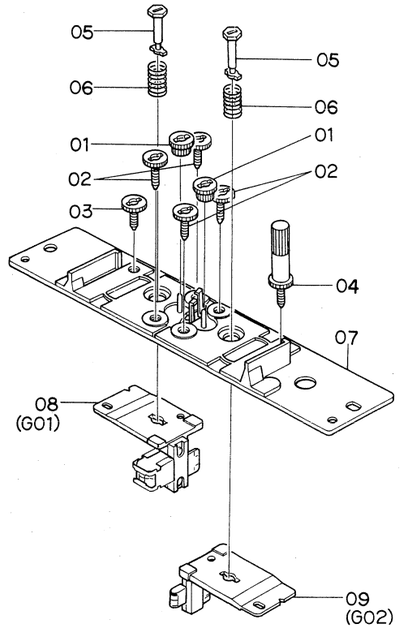


Fig. 8.20

8.21. Supply Pressure Roller Ass'y (F02)

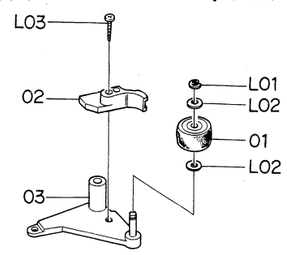


Fig. 8.21

8.22. Take-up Pressure Roller Ass'y (F03)

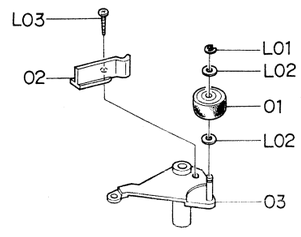


Fig. 8.22

8.23. Head Base Ass'y D (F04)

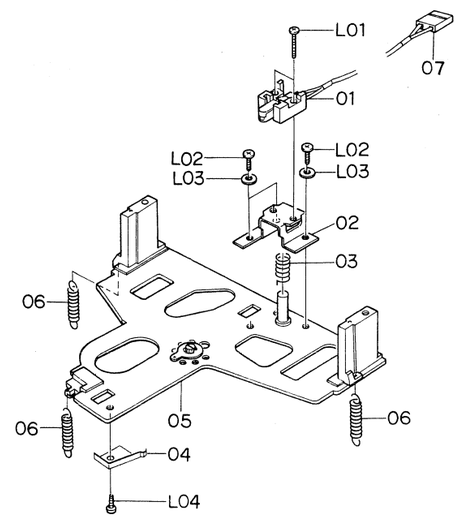


Fig. 8.23

8.24. Cassette Case Holder L Ass'y (F05)

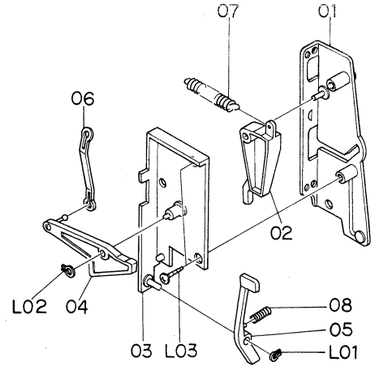


Fig. 8.24

8.25. Cassette Case Holder R Ass'y (F06)

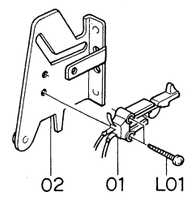


Fig. 8.25

8.26. Auto Shut-off Ass'y (F07)

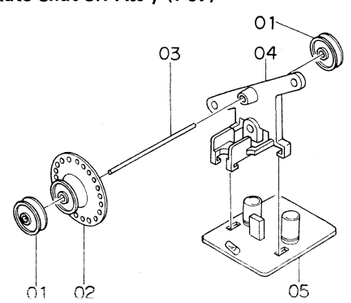


Fig. 8.26

8.27. Pneumatic Damper Ass'y (F08)

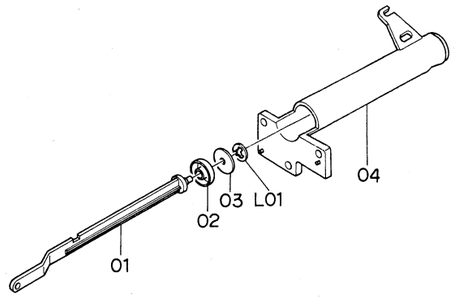


Fig. 8.27

Schematic Ref. No.	Part No.	Description	Q'ty
E01	**CA08036B**	**Reel Motor Ass'y** Serial No.: A11201001 –	**1**
01	0C08138A	Reel Motor	1
02	0C08063F	Reel Motor Pulley	1
03	0M03902A	Motor Label 730	1
04	0M03987A	Motor Seal A	1
E02	**CA08034A**	**Control Motor Ass'y** Serial No.: A11201001 –	**1**
01	0C08137A	Control Motor	1
02	0C08064A	Control Motor Pulley	1
03	0B09292A	Ceramic Capacitor 0.1μF 50V	1
04	0M03985A	Control Motor Label	1
05	0M03988A	Motor Seal B	1
F01	**CA08101A**	**Head Mount Base Ass'y** Serial No.: A11201001 –	**1**
01	0C08028C	Head Height Adjustment Gear	2
02	0C08027E	Head Height Adjustment Screw	4
03	0C08026D	Azimuth Alignment Screw	1
04	0C08209B	RH Azimuth Alignment Knob	1
05	0C08161B	Spring Stopper	2
06	0C08187B	Head Plate Spring	2
07	CA08083C	Head Mount Base Sub Ass'y	1
08	CA08102A	P-8L Playback Head Ass'y	1
09	CA08103A	R-8L Record Head Ass'y	1
F02	**CA08053B**	**Supply Pressure Roller Ass'y** Serial No.: A11201001 –	**1**
01	0C08164F	Pressure Roller	1
02	0C08189B	Supply Tape Guide	1
03	CA08061A	Supply Pressure Roller Arm Ass'y	1
L01	0E00042A	E-Ring 1.5mm	1
L02	0C08024A	Washer 2mm	2
L03	0E00788A	BT Screw M2x8 Philips Pan Head	1
F03	**CA08079B**	**Take-up Pressure Roller Ass'y** Serial No.: A11205381 –	**1**
01	0C08164F	Pressure Roller	1
02	0C08181C	Take-up Tape Guide	1
03	CA08073B	Take-up Pressure Roller Arm Ass'y	1
L01	0E00042A	E-Ring 1.5mm	1
L02	0C08024A	Washer 2mm	2
L03	0E00788A	BT Screw M2x8 Philips Pan Head	1
F03	**CA08079A**	**Take-up Pressure Roller Ass'y** Serial Nos.: A11201001 – A11205380	**1**
01	0C08164F	Pressure Roller	1
02	0C08181B	Take-up Tape Guide	1
03	CA08073B	Take-up Pressure Roller Arm Ass'y	1
L01	0E00042A	E-Ring 1.5mm	1
L02	0C08024A	Washer 2mm	2
L03	0E00788A	BT Screw M2x8 Philips Pan Head	1

Schematic Ref. No.	Part No.	Description	Q'ty
F04	**CA08104A**	**Head Base Ass'y D** Serial No.: A11201001 –	**1**
01	GA02083A	E-8LH Erase Head	1
02	0C08158D	EH Hold Plate	1
03	0C08166A	EH Hold Plate Spring	1
04	0C08174C	Cassette Hold Spring	1
05	CA08003P	Head Base Ass'y	1
06	0C08175A	Head Base L Spring	3
07	0B08649E	2P-H Connector	1
L01	0E00889A	Screw M1.7x8 Philips Pan Head	2
L02	0E00909A	Screw M2x6 Philips Pan Head	3
L03	0E00117A	Washer 2mm	3
L04	0E00853A	BT Screw M2x3 Philips Pan Head	1
F05	**CA08125A**	**Cassette Case Holder L Ass'y** Serial No.: A11201001 –	**1**
01	CA08090F	Cassette Case Holder L Sub Ass'y	1
02	0C08073C	Lid Arm A	1
03	0C08195G	Eject Arm Holder	1
04	0C08196B	Eject Arm A	1
05	0C08197C	Eject Arm B	1
06	0C08199B	Eject Arm Joint	1
07	0C08114A	Lid Arm Spring	1
08	0C08211C	Eject Arm Spring	1
–	0B08151A	Tube	1
L01	0E00837A	Stopper Ring 3mm	1
L02	0E00838A	Stopper Ring 4mm	1
L03	0E00865A	BT Screw M3x10 Philips Binding Head	2
F06	**CA08022A**	**Cassette Case Holder R Ass'y** Serial No.: A11201001 –	**1**
01	0C08133A	Eject Sensor	1
02	CA08044A	Cassette Case Holder R Sub Ass'y	1
L01	0E00840A	BT Screw M2x8 Philips Pan Head	2
F07	**CA08099A**	**Auto Shut-off Ass'y** Serial No.: A11201001 –	**1**
01	0C08047A	Shut-off Pulley A	2
02	0C08206B	Shut-off Pulley B	1
03	0C08210A	Shut-off Pulley Shaft	1
04	0C08207B	Shut-off Pulley Holder	1
05	BA04070A	Shut-off P.C.B. Ass'y	1
F08	**CA08030A**	**Pneumatic Damper Ass'y** Serial No.: A11201001 –	**1**
01	0C08058C	Damper Piston	1
02	0C08102B	Damper Ring	1
03	0C08010C	Damper Plate	1
04	0C08059E	Sylinder	1
L01	0E00874A	Stopper Ring CS 2mm	1

8.28. Pitch Control Holder Ass'y (F09)

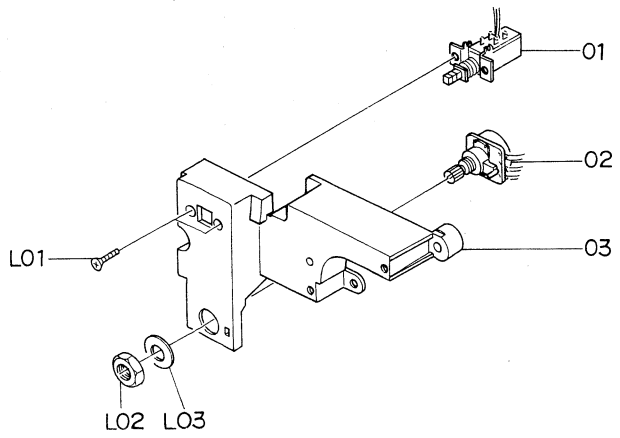


Fig. 8.28

8.29. P-8L Playback Head Ass'y (G01)

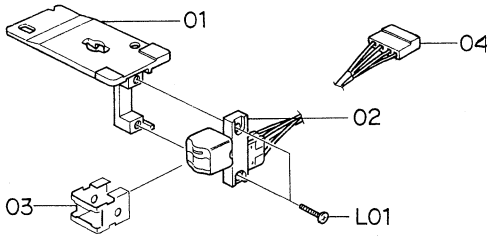


Fig. 8.29

8.30. R-8L Record Head Ass'y (G02)

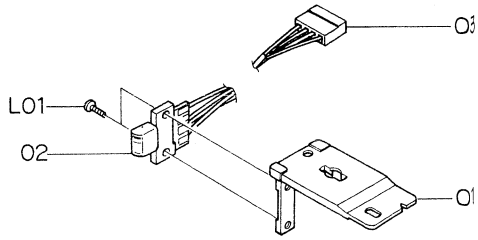


Fig. 8.30

Schematic Ref. No.	Part No.	Description	Q'ty
F09	CA08105A	Pitch Control Holder Ass'y Serial No.: A11201001 –	1
01	0B07283A	Memory Switch	1
02	0B07282A	Volume Control 20 kΩ (B)	1
03	0C08214D	Pitch Control Holder	1
L01	0E00125A	Screw M2x6 Philips Countersunk	2
L02	–	Volume Nut	(1)
L03	–	Volume Washer	(1)
G01	**CA08102A**	**P-8L Playback Head Ass'y** Serial No.: A11201001 –	**1**
01	0C08160F	Head Plate	1
02	GA02085A	P-8LH Playback Head	1
03	0C08169D	Pad Lifter 54	1
04	0B08647D	4P-H Connector	1
L01	0E00886A	Screw M1.7x6.5 Philips Pan Head	2
G02	**CA08103A**	**R-8L Record Head Ass'y** Serial No.: A11201001 –	**1**
01	0C08159G	Head Plate	1
02	GA02084A	R-8LH Record Head	1
03	0B08648D	4P-H Connector	1
L01	0E00887A	Screw M1.7x4 Philips Pan Head	2

9. OVERALL TIMING CHART

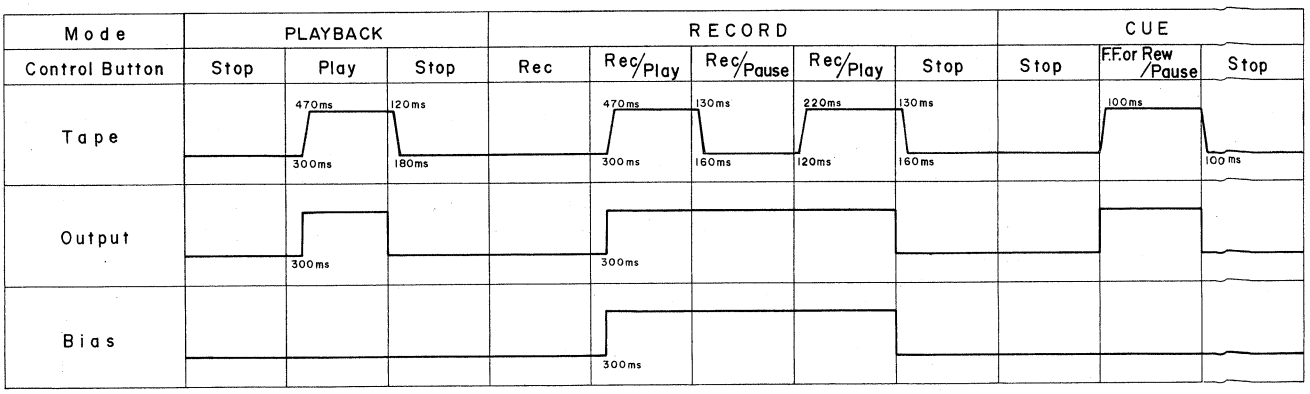


Fig. 9

10. EQ. AMP. FREQUENCY RESPONSE

10.1. Standard Speed (1-7/8 ips)

10.1.1. Playback Frequency Response

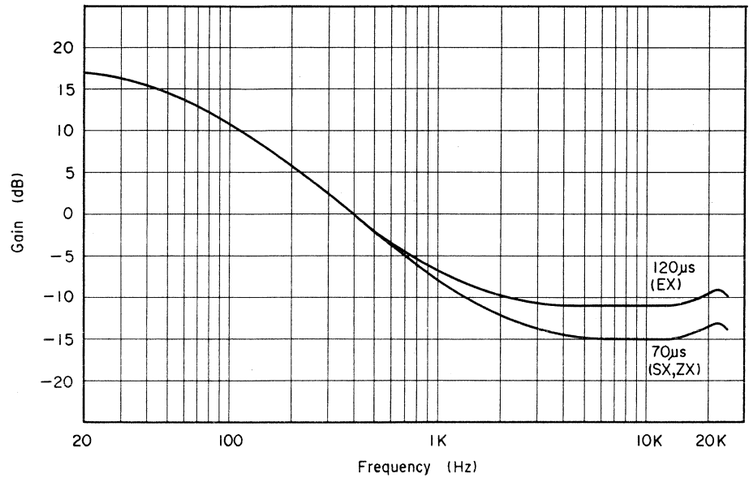


Fig. 10.1.1

10.1.2. Record Current Frequency Response

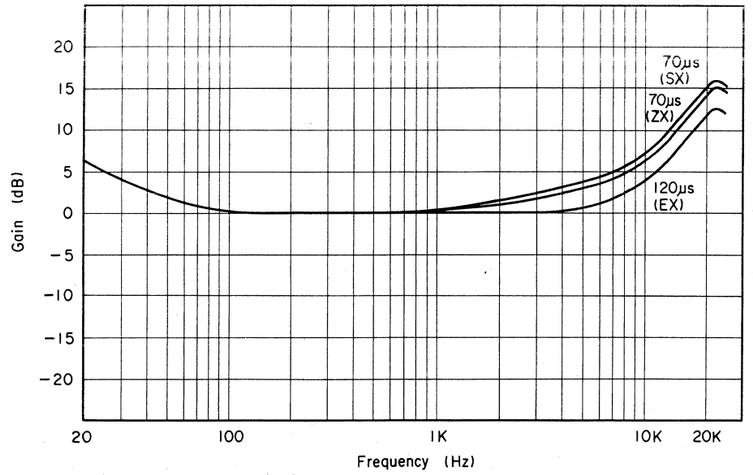


Fig. 10.1.2

10.2. Half-Speed (15/16 ips)

10.2.1. Playback Frequency Response

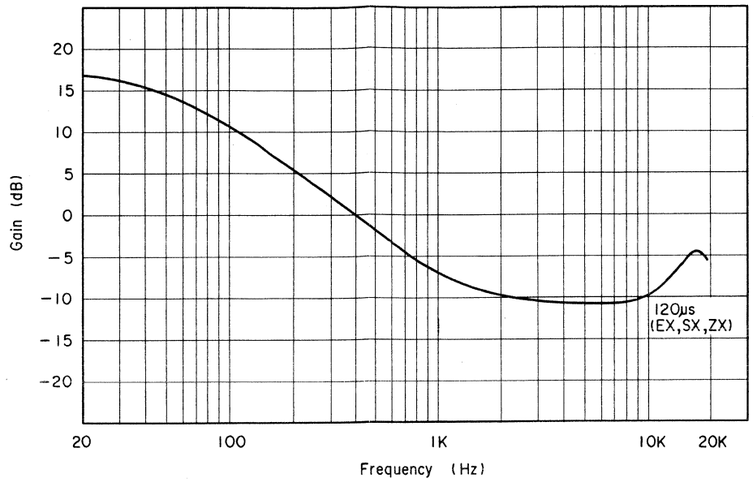


Fig. 10.2.1

10.2.2. Record Current Frequency Response

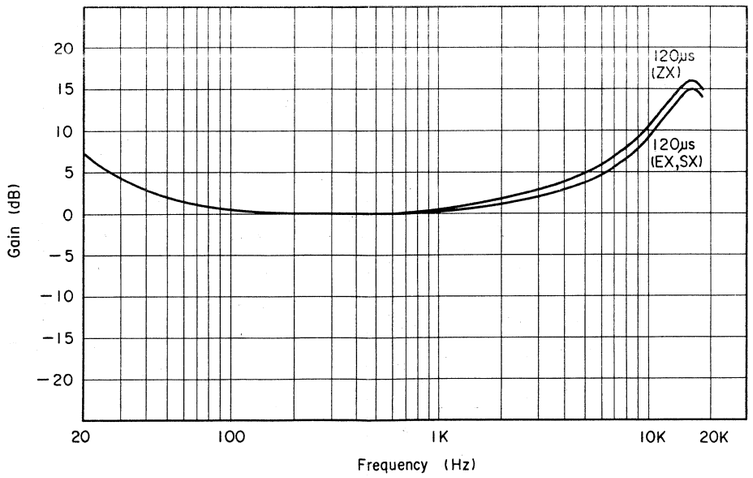


Fig. 10.2.2

11. BLOCK DIAGRAMS

11.1. Amplifier

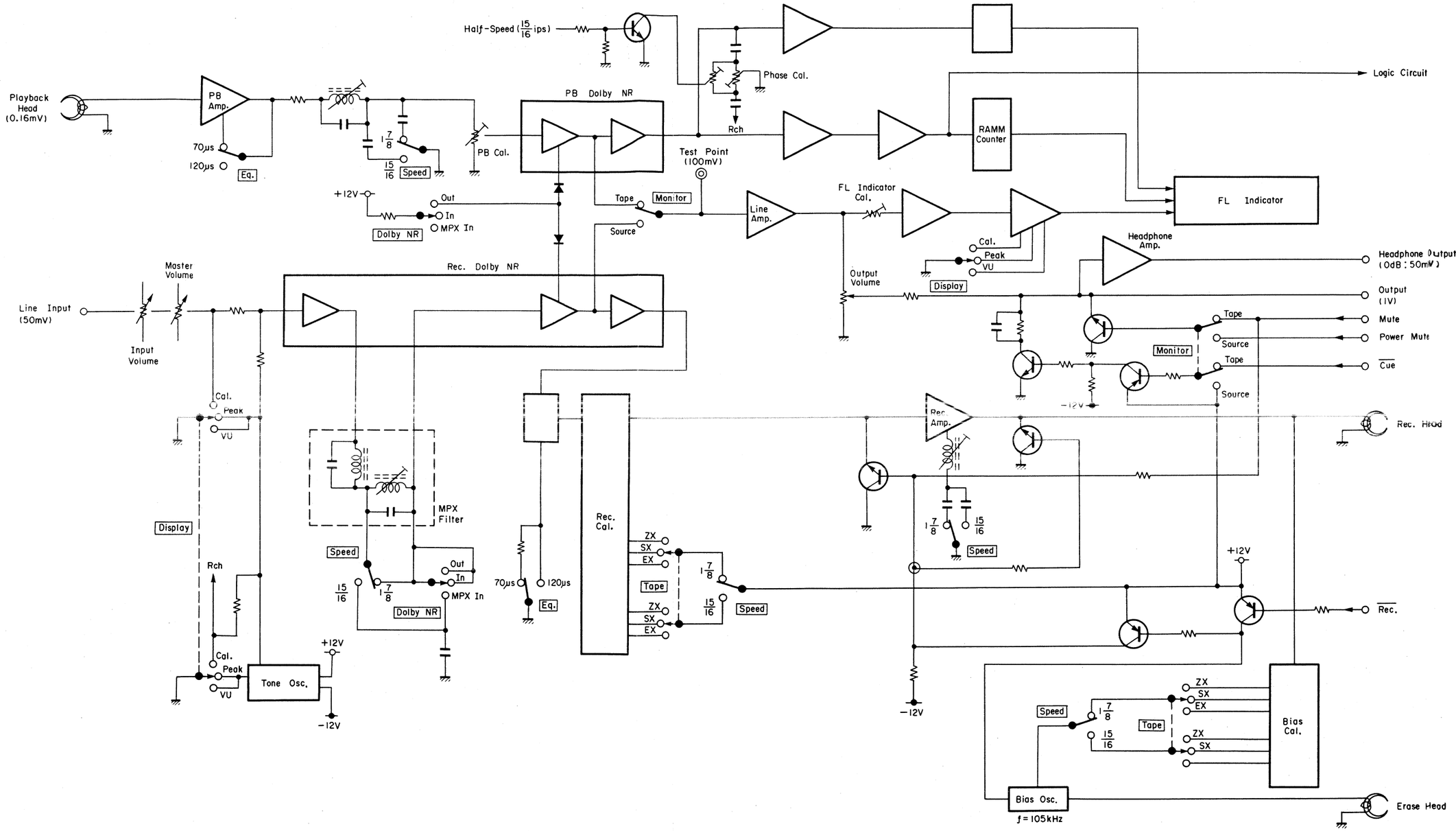


Fig. 11.1.1 Serial No.: A11202661 –

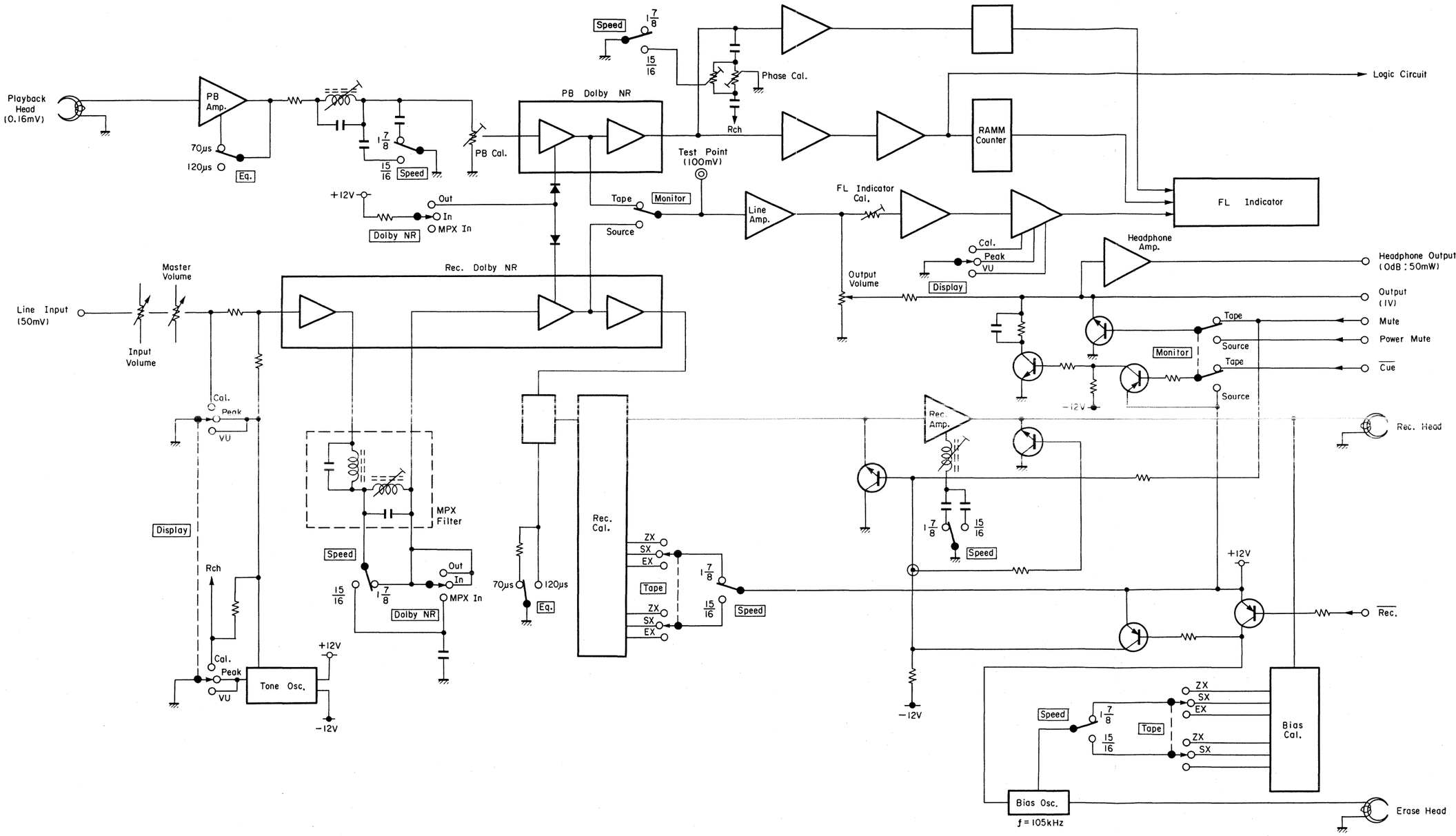


Fig. 11.1.2 Serial Nos.: A11202474 – A11202660

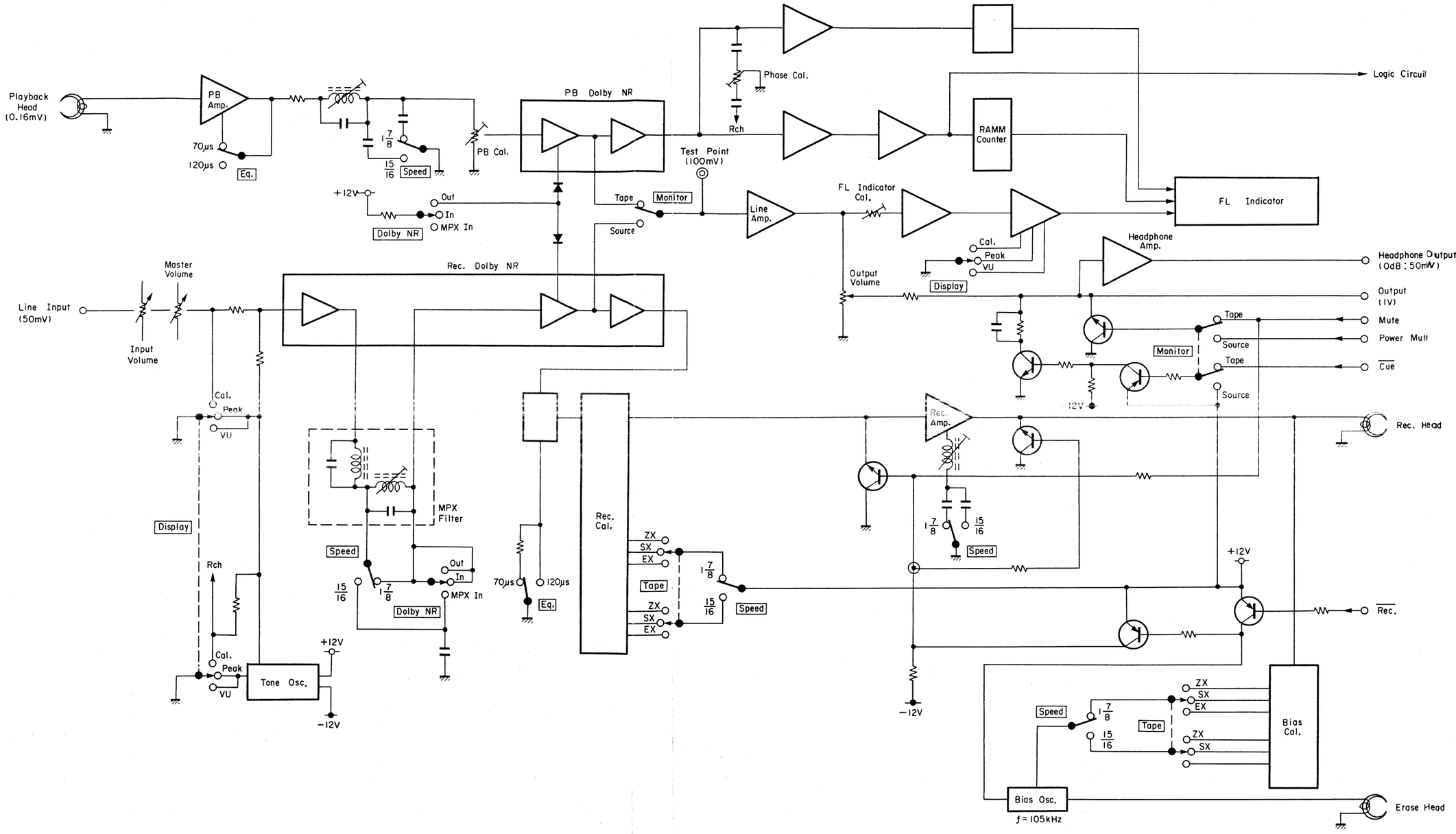


Fig. 11.1.3 Serial Nos.: A11201001 – A11202473

11.2. Mechanism Control

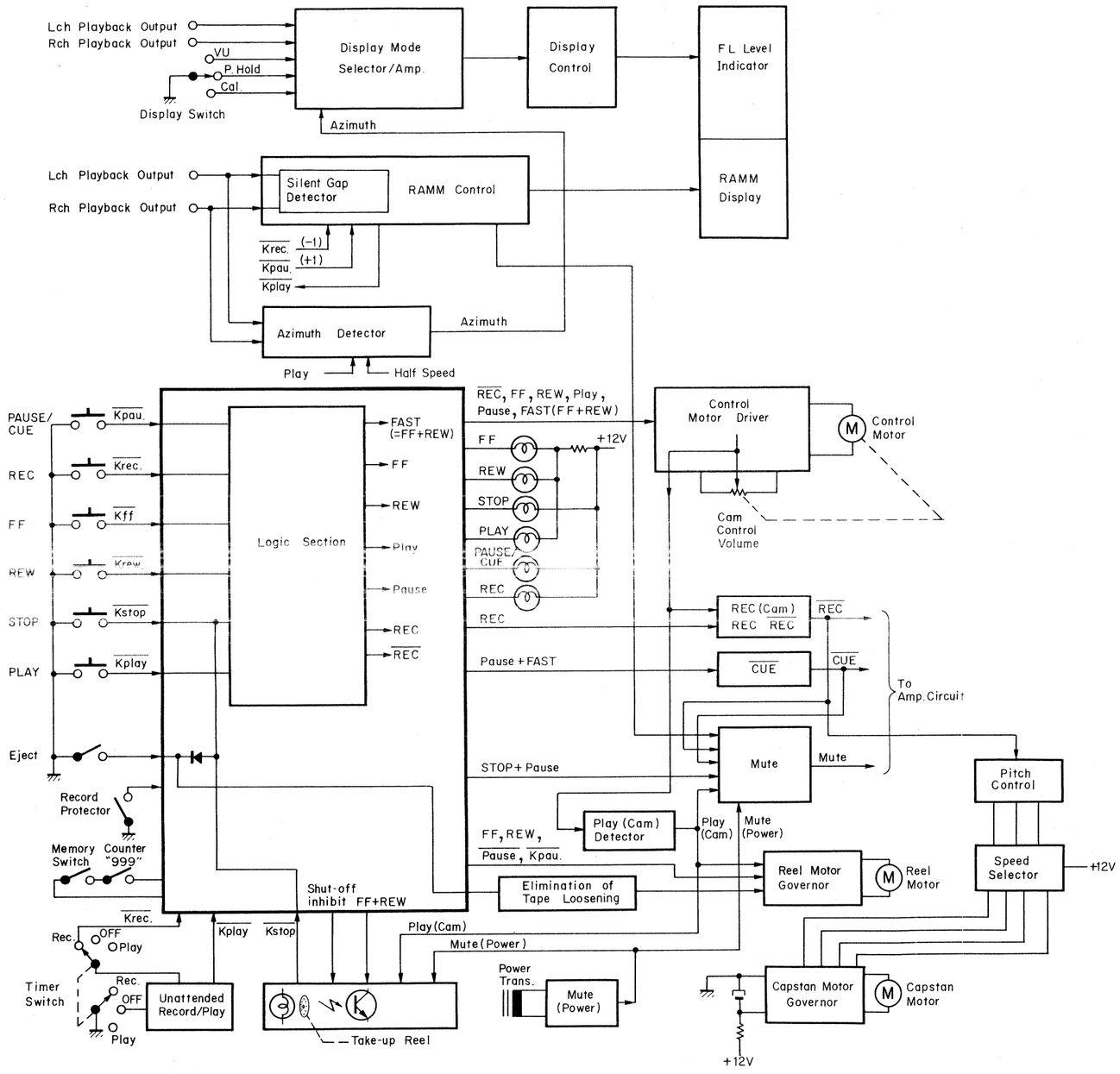


Fig. 11.2.1 Serial No.: A11202474 –

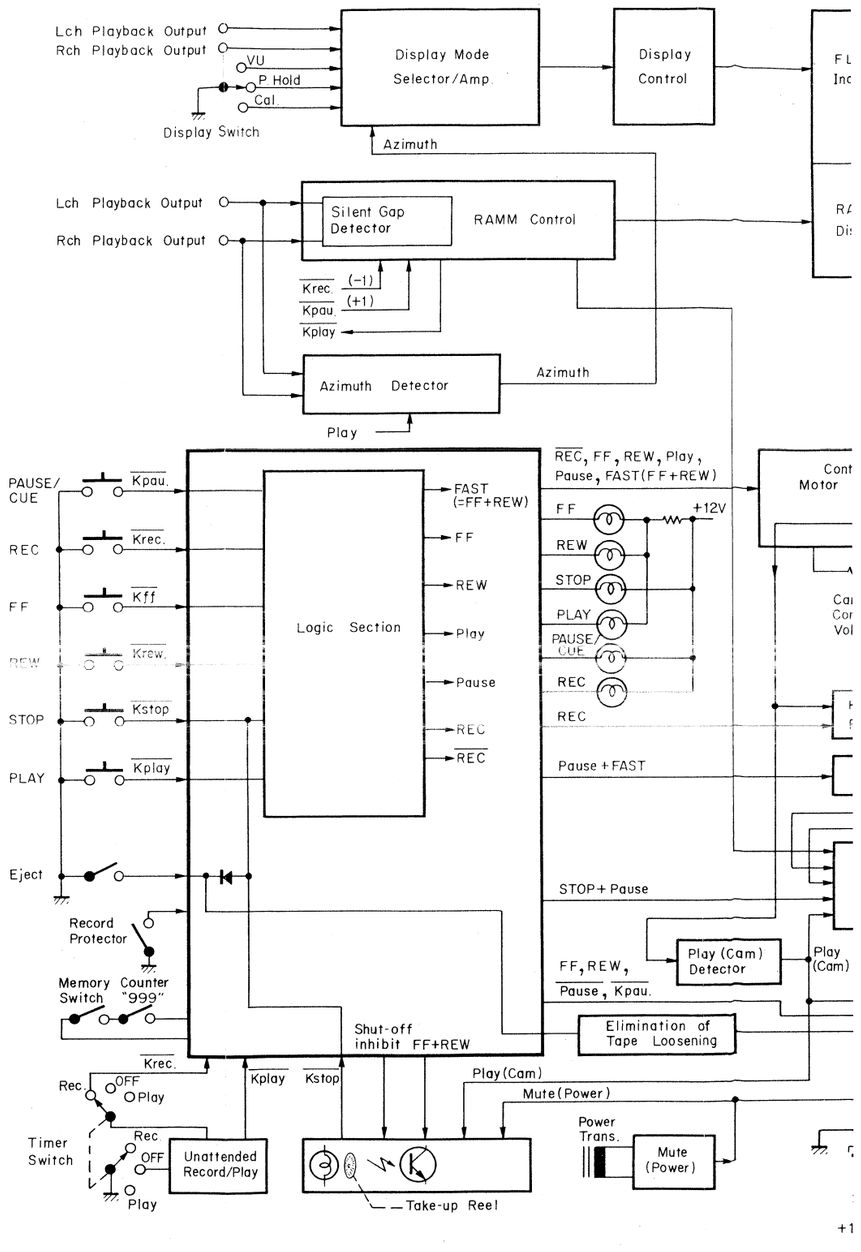
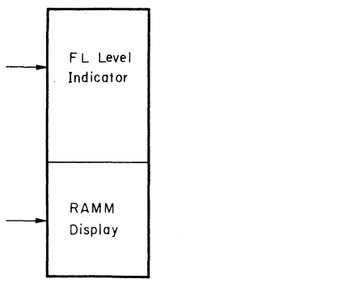
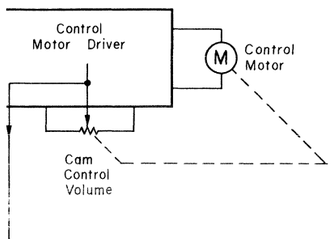


Fig. 11.2.2 Serial Nos.: A11201001 – A112024





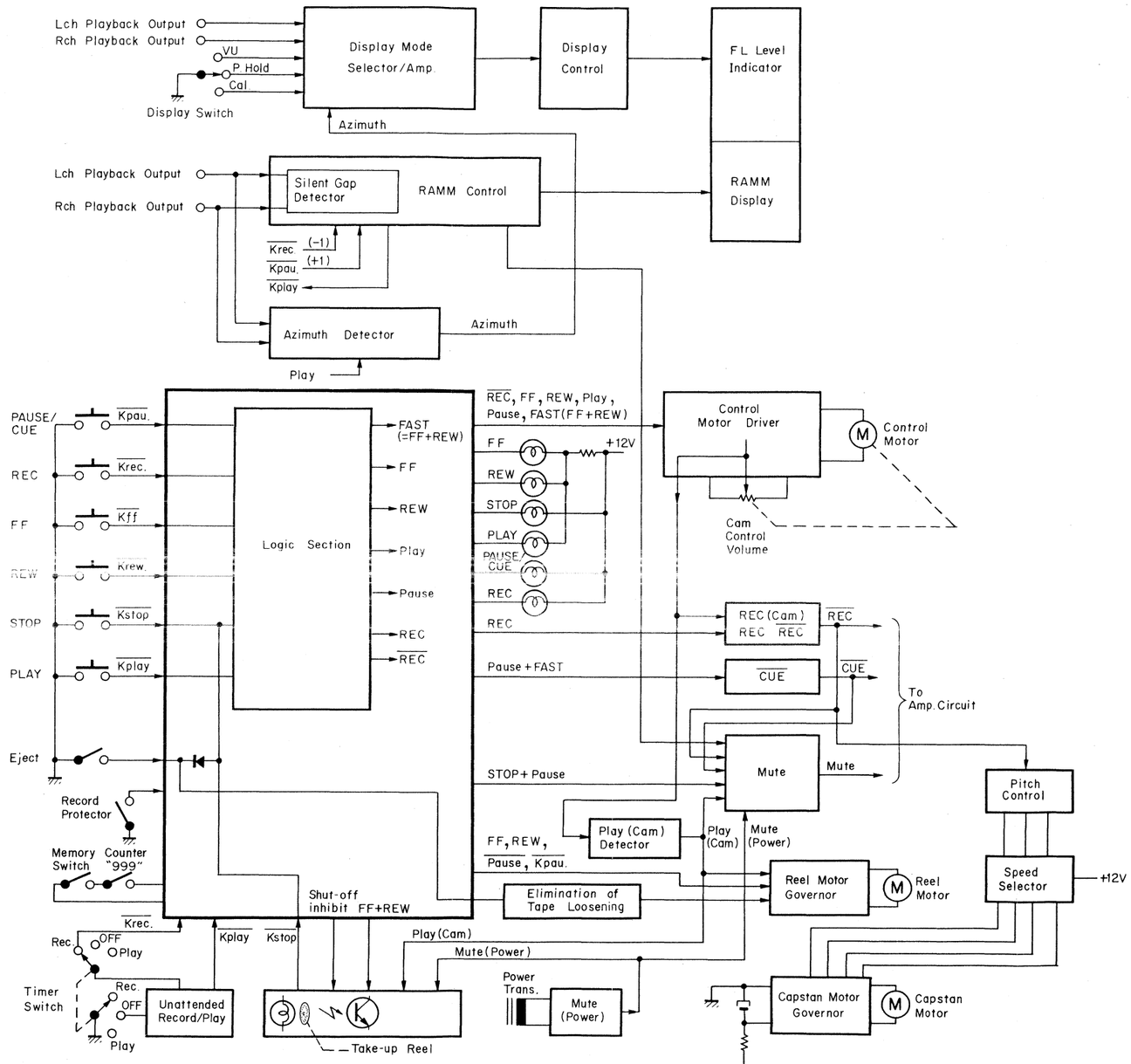


Fig. 11.2.2 Serial Nos.: A11201001 – A11202473

12. WIRING DIAGRAM

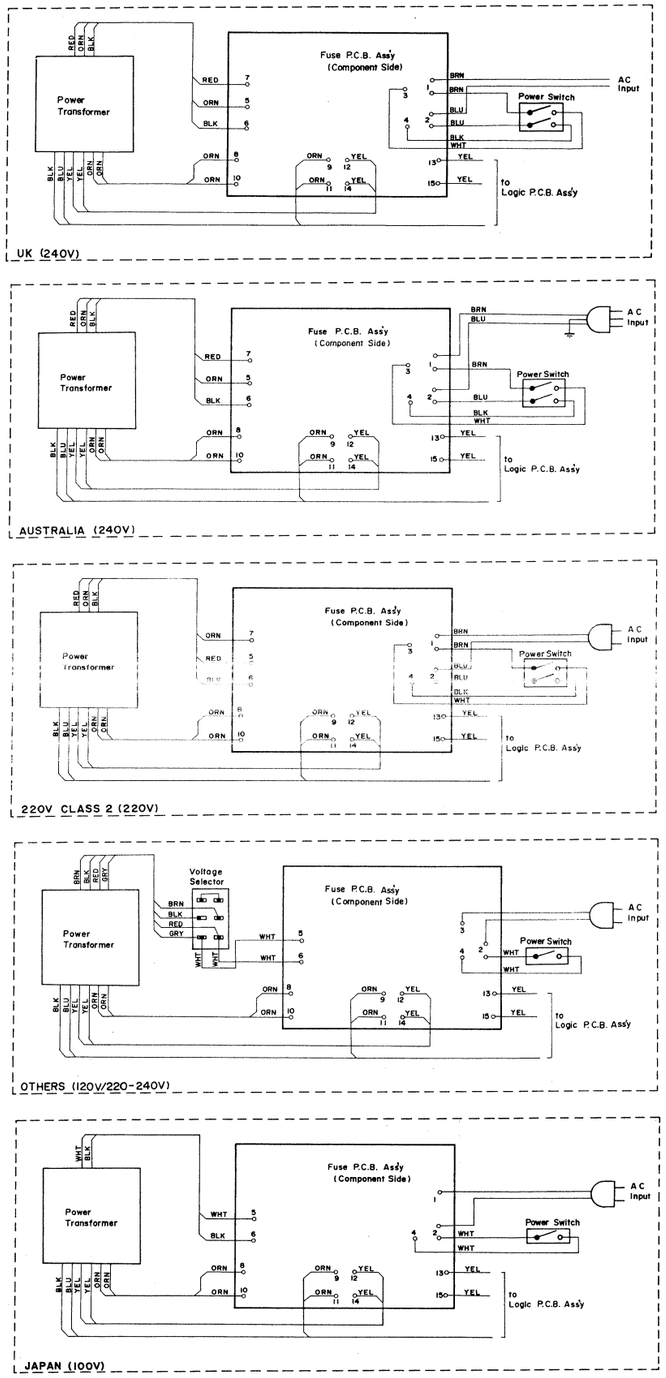


Fig. 12.1

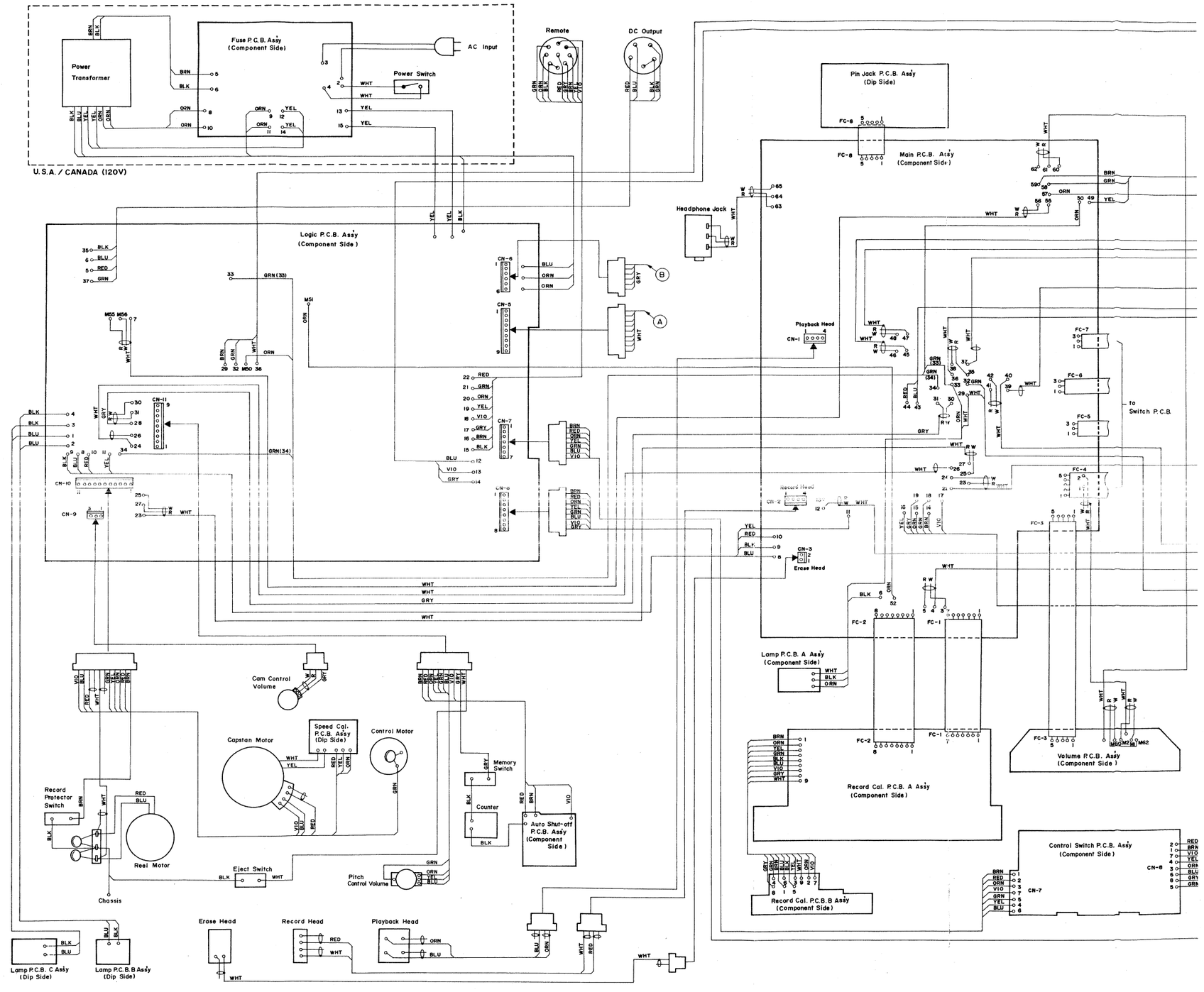


Fig. 12.2 Serial Nos.: A11201001 – A11202473 and A11202661 –

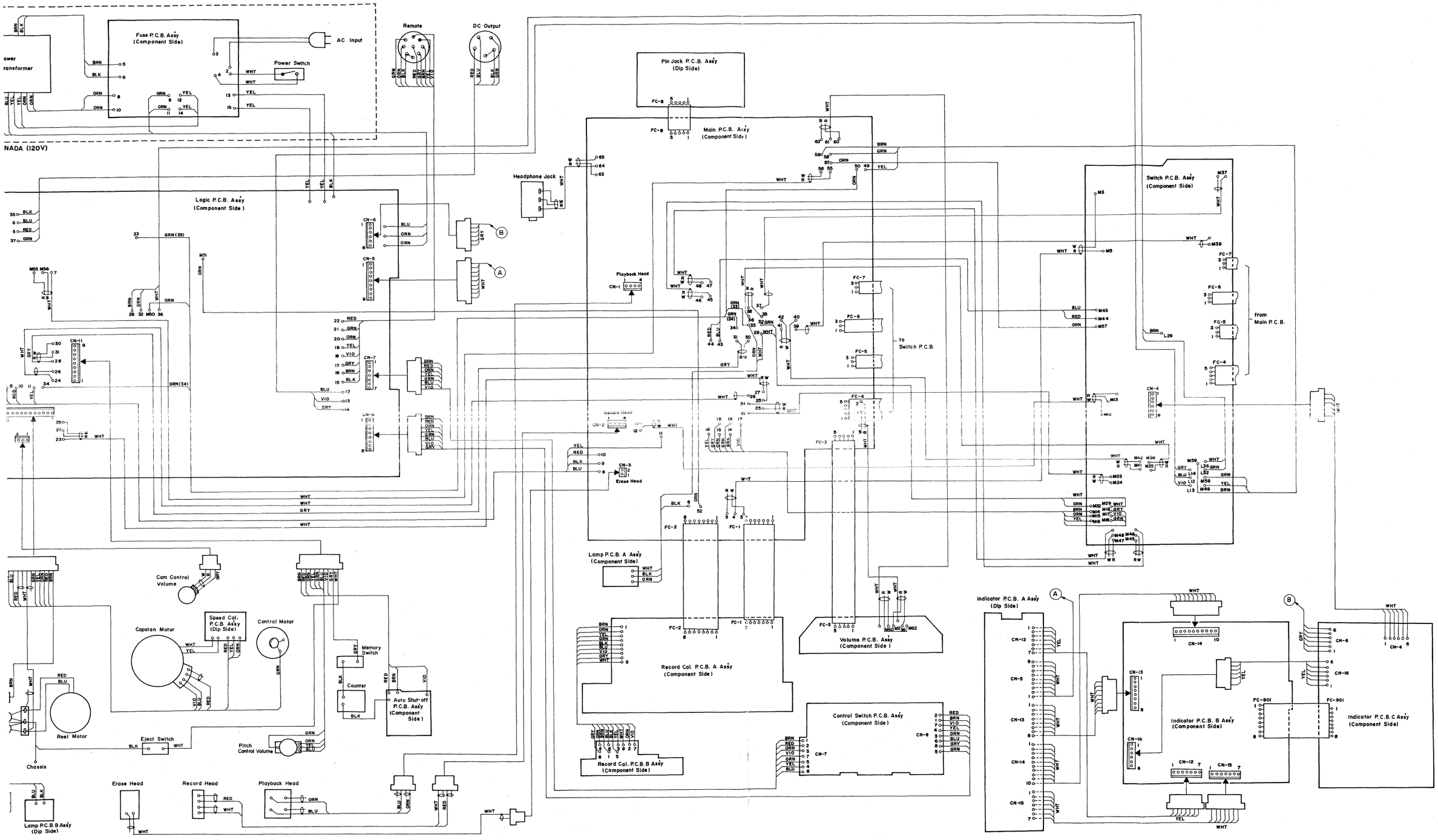
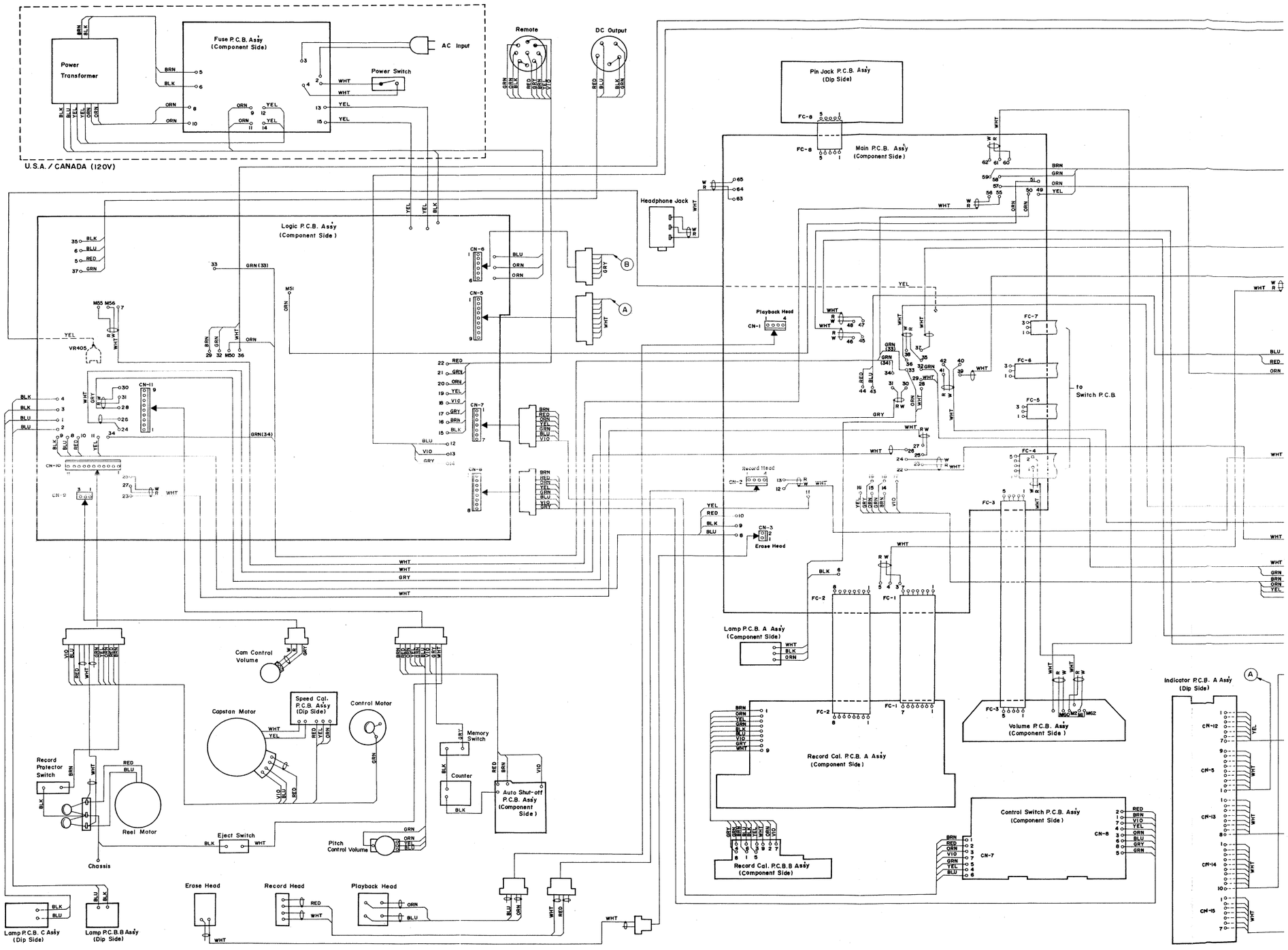


Fig. 12.2 Serial Nos.: A11201001 – A11202473 and A11202661 –



Note: Table of wire colors

BLK—Black	ORN—Orange
BLU—Blue	GRY—Gray
GRN—Green	BRN—Brown
RED—Red	YEL—Yellow
WHT—White	VIO —Violet

Fig. 12.3 Serial Nos.: A11202474 – A11202660

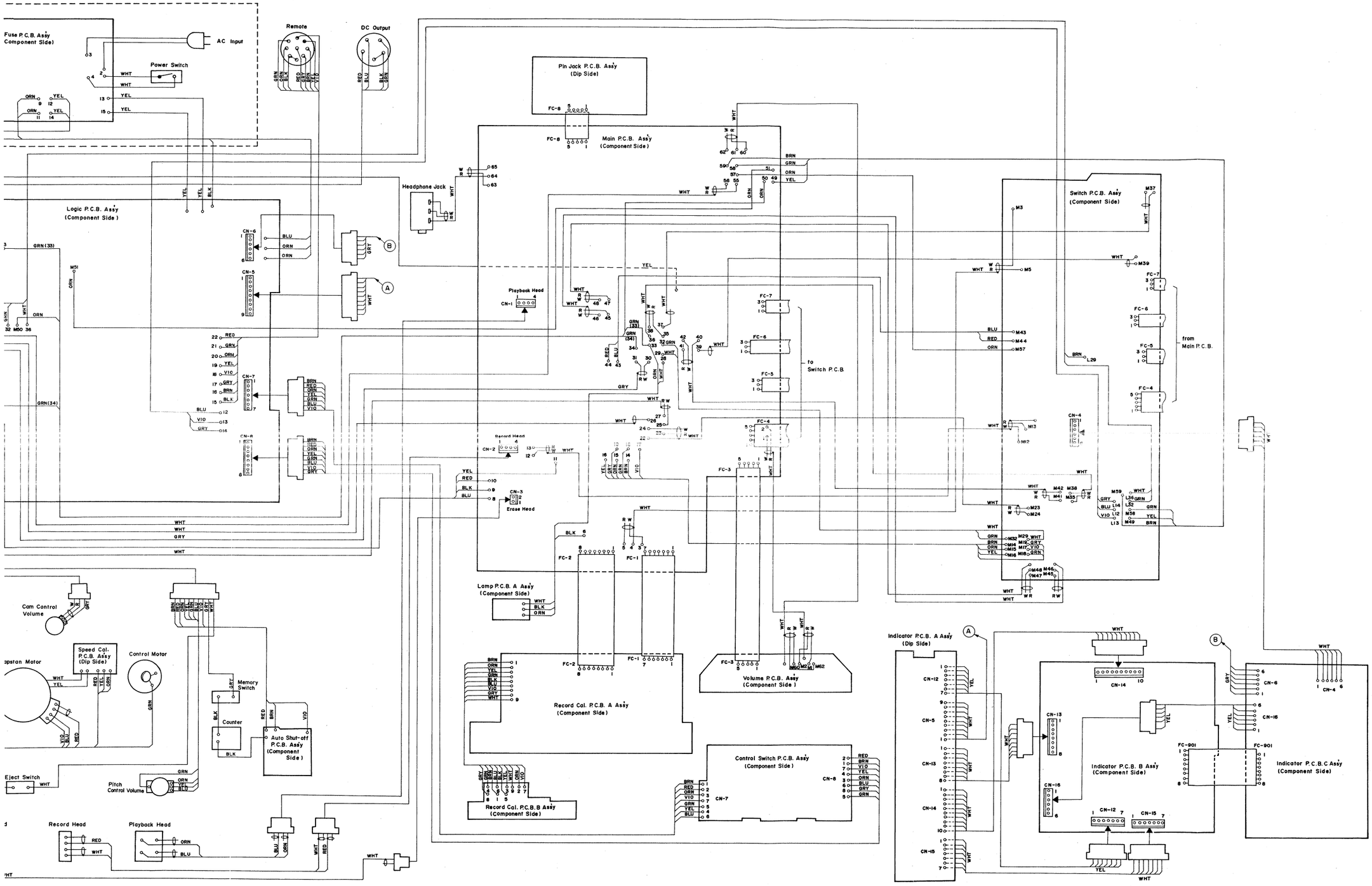


Fig. 12.3 Serial Nos.: A11202474 — A11202660

13. SCHEMATIC DIAGRAMS

13.1. Amplifier

Notes: 1. Diode is 1SS53, 1S953, or 1S1555 unless otherwise specified.
2. Resistor and capacitor marked with * show typical value.
3. DIN Socket of the Pin Jack P.C.B. Ass'y is omitted in the circuit, but it

Switch Chart	
Description	Schematic Reference Number
Monitor	SW001
Timer	SW002
Display	SW003
Dolby NR	SW004
Eq.	SW005
Tape	SW006
Speed	SW007

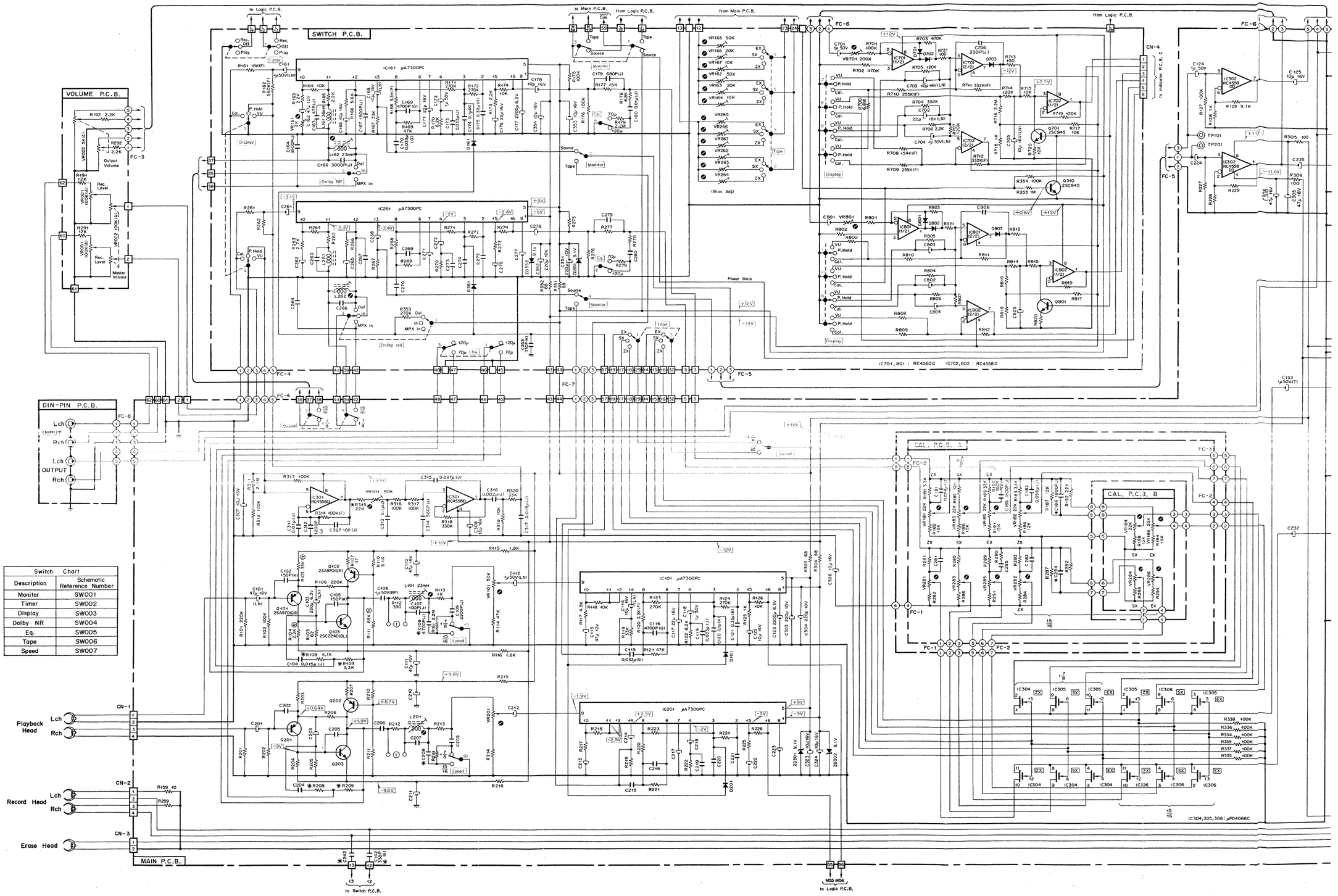


Fig. 13.1.1 Serial No.: A11202661 –

Notes: 1. Diode is 1SS53, 1S953, or 1S1555 unless otherwise specified.
2. Resistor and capacitor marked with * show typical value.
3. DIN Socket of the Pin Jack P.C.B. Ass'y is omitted in the circuit, but it is installed for the Models from serial Nos. A11202661 to A11204050.

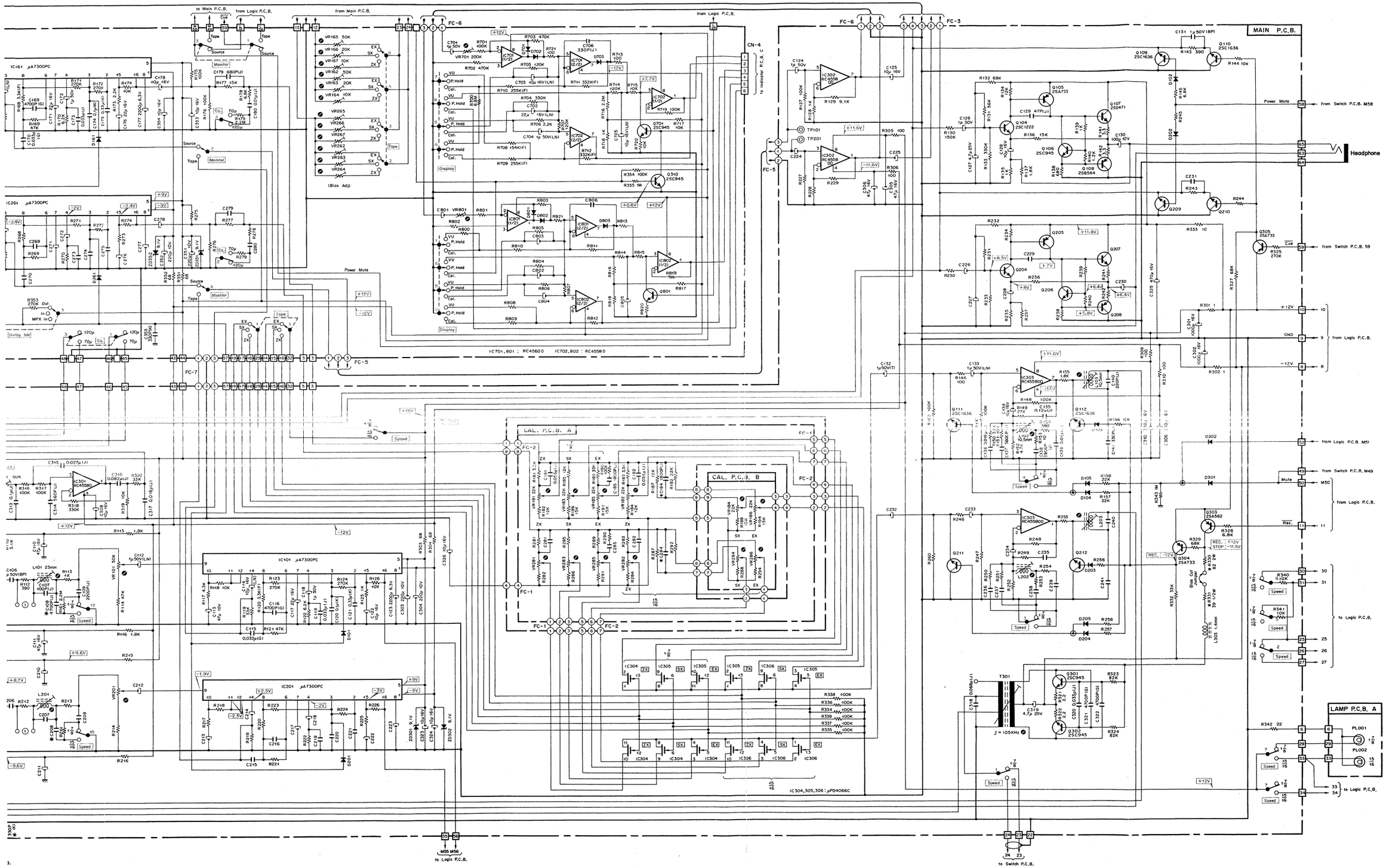


Fig. 13.1.1 Serial No.: A11202661 –

Note : 1. Diode is
2. Resistor

Switch Description	Chart Schematic Reference Number
Monitor	SW001
Timer	SW002
Display	SW003
Dolby NR	SW004
Eq.	SW005
Tape	SW006
Speed	SW007

Fig. 13.1.2 Serial Nos.: A11202474 – A11202660

Notes: 1. Diode is 1SS53, 1S953, or 1S1555 unless otherwise specified.
2. Resistor and capacitor marked with * show typical value.

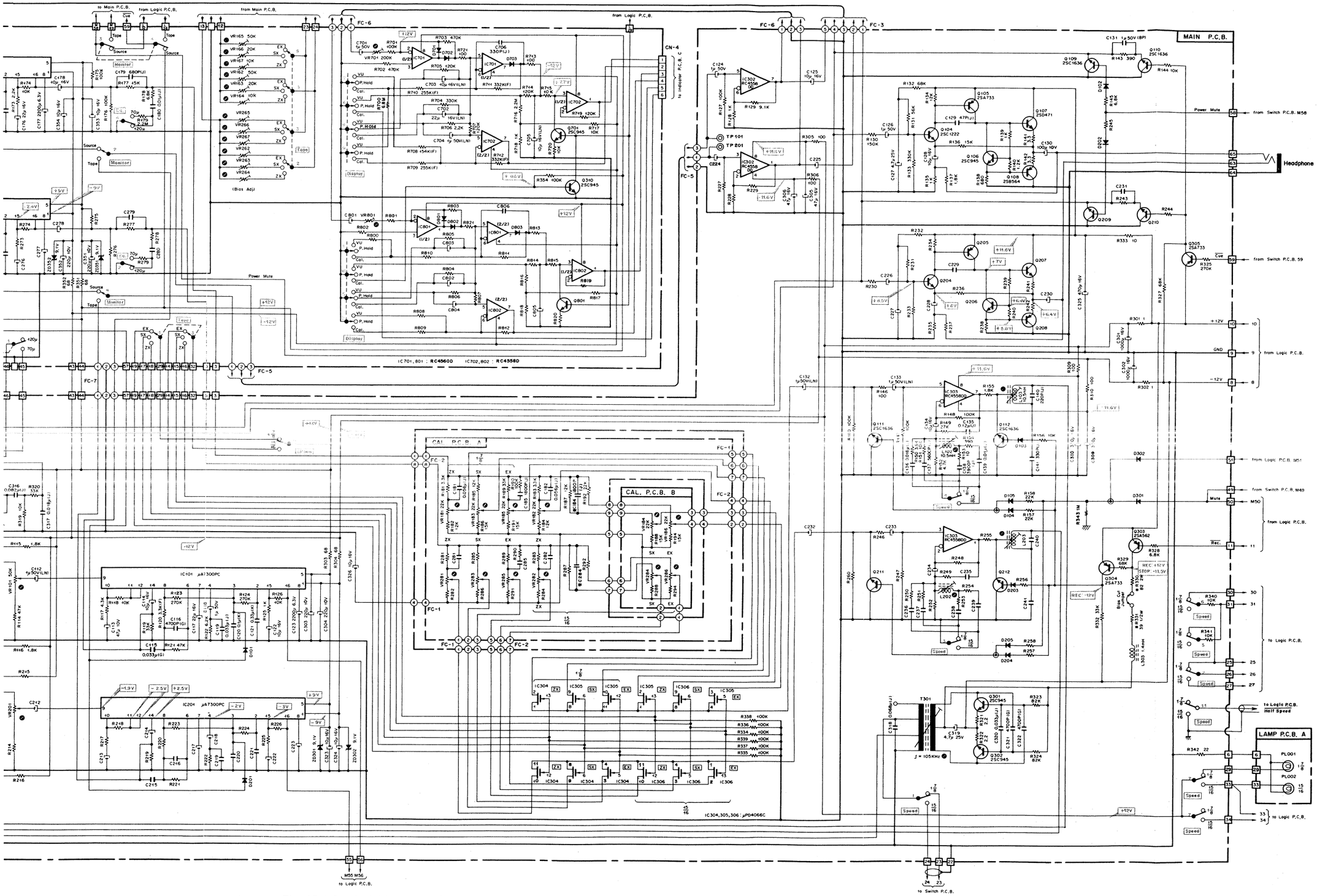


Fig. 13.1.2 Serial Nos.: A11202474 – A11202660

Switch Chart	
Description	Schematic Reference Number
Monitor	SW001
Timer	SW002
Display	SW003
Dolby NR	SW004
Eq.	SW005
Tape	SW006
Speed	SW007

Fig. 13.1.3 Serial Nos.: A11201001 – A11202473

Notes: 1. Diode is 1SS53, 1S953, or 1S1555 unless otherwise specified.
2. Resistor and capacitor marked with * show typical value.

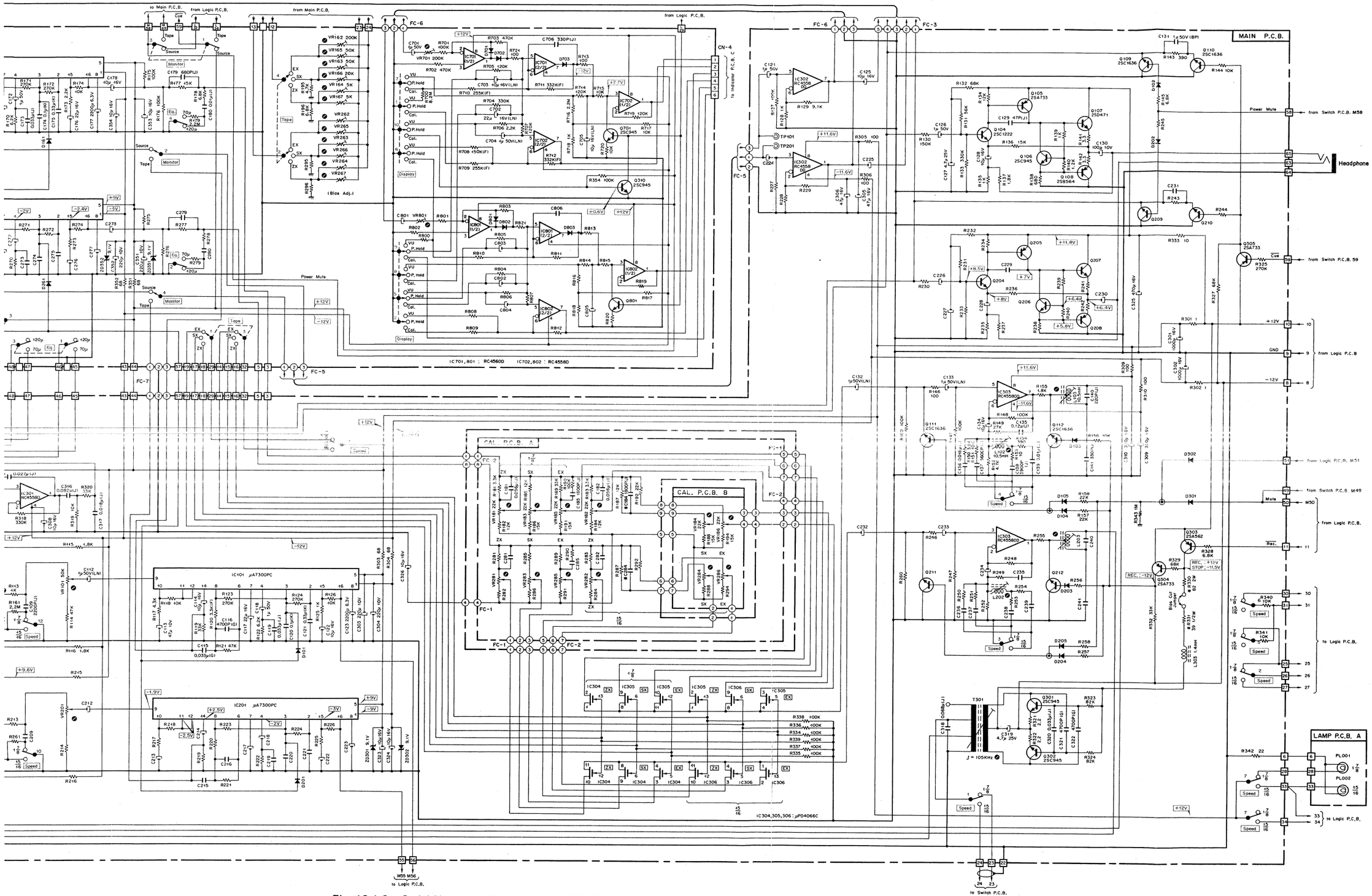
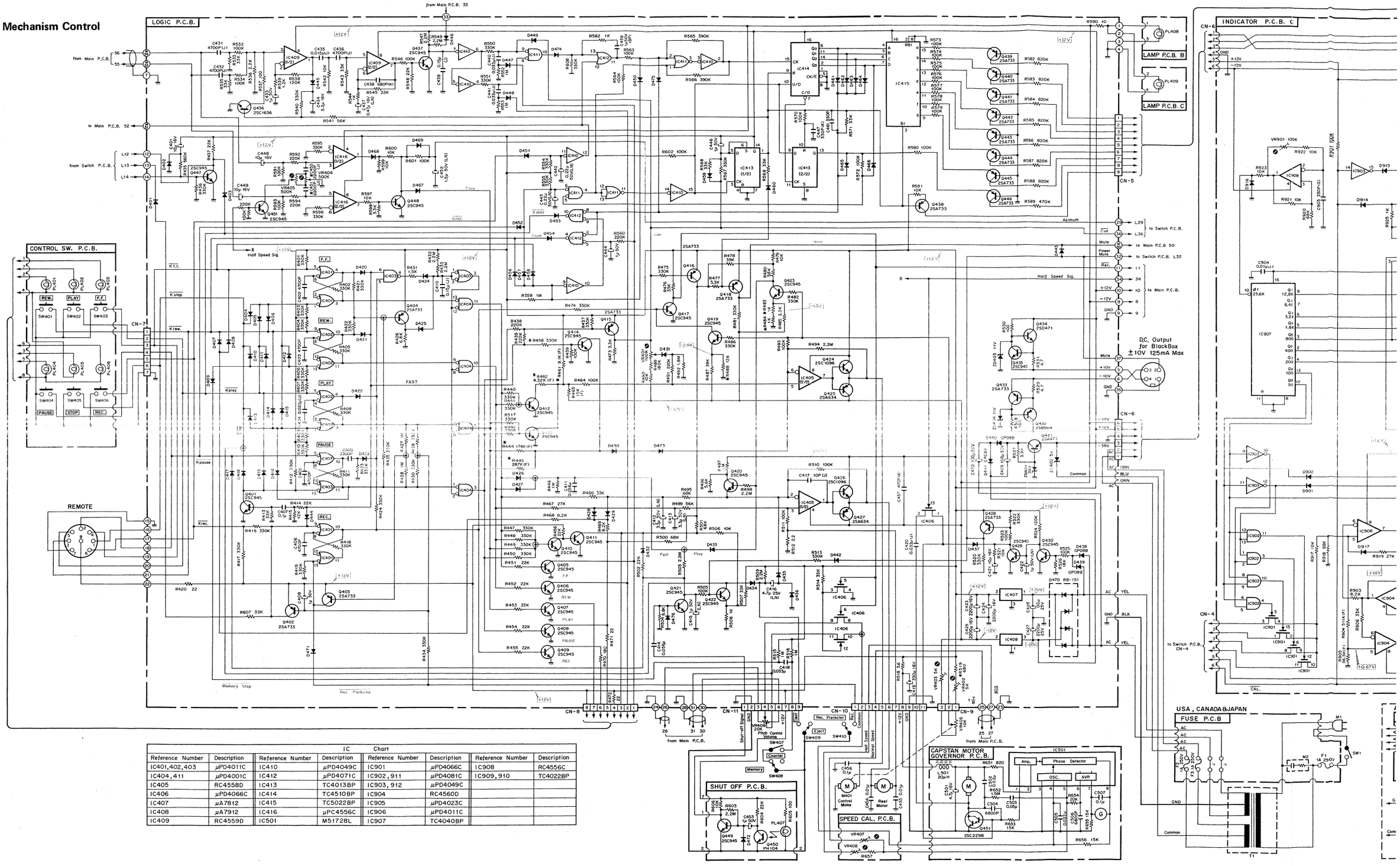


Fig. 13.1.3 Serial Nos.: A11201001 – A11202473

13.2. Mechanism Control



IC Chart							
Reference Number	Description	Reference Number	Description	Reference Number	Description	Reference Number	Description
IC401,402,403	μPD4011C	IC410	μPD4049C	IC901	μPD4066C	IC908	RC4556C
IC404,411	μPD4001C	IC412	μPD4071C	IC902,911	μPD4081C	IC909,910	TC4022BP
IC405	RC4558D	IC413	TC4013BP	IC903,912	μPD4049C		
IC406	μPD4066C	IC414	TC4510BP	IC904	RC4560D		
IC407	μA7812	IC415	TC5022BP	IC905	μPD4023C		
IC408	μA7912	IC416	μPC4556C	IC906	μPD4011C		
IC409	RC4559D	IC501	M51728L	IC907	TC4040BP		

Fig. 13.2.1 Serial No.: A11202661 –

Notes: 1. Diode is 1SS53, 1S953, or 1S1555 unless otherwise specified.
2. Resistor marked with * shows typical value.

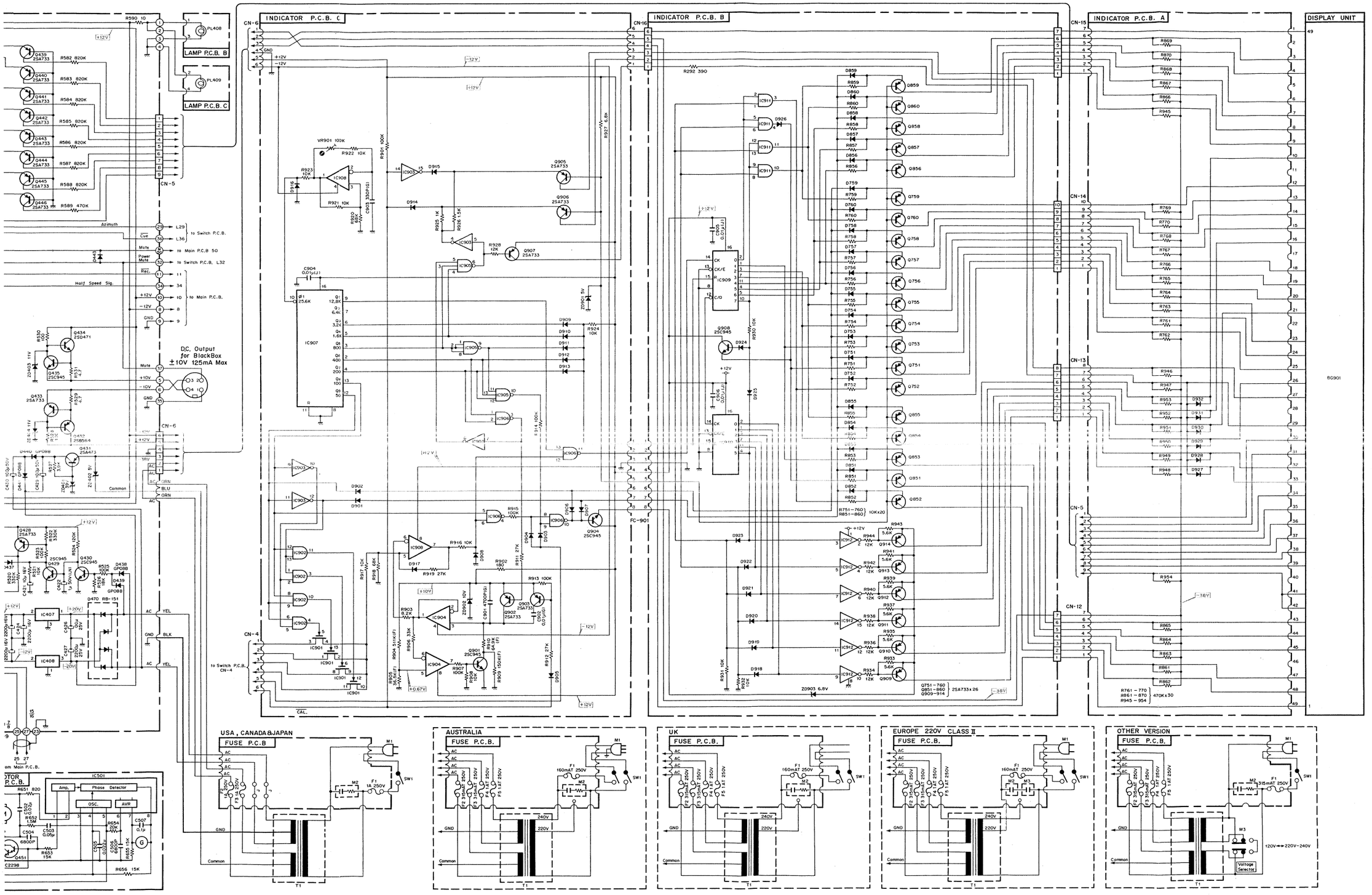
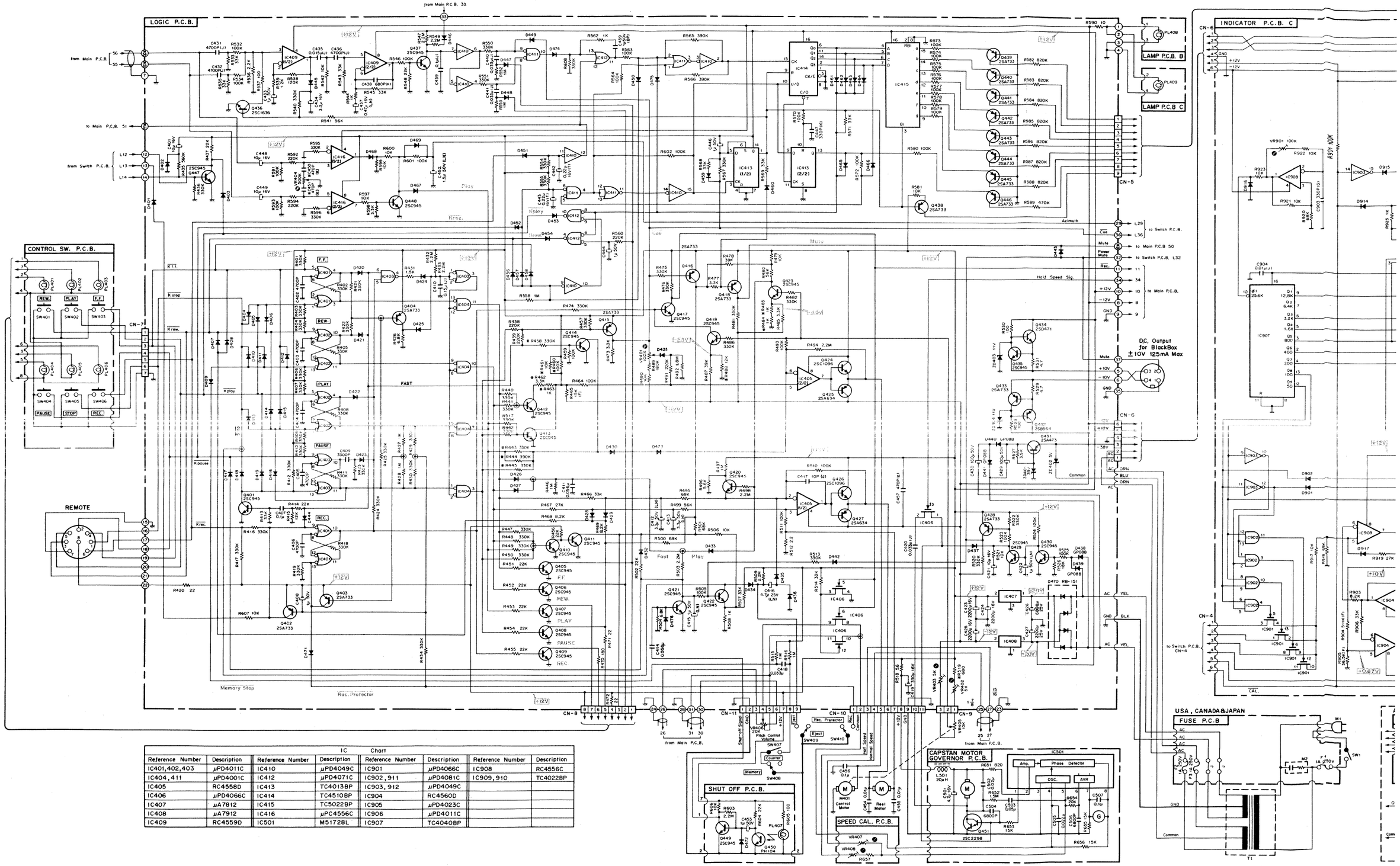


Fig. 13.2.1 Serial No.: A11202661 –



IC Chart

Reference Number	Description	Reference Number	Description	Reference Number	Description	Reference Number	Description
IC401,402,403	μPD4011C	IC410	μPD4049C	IC901	μPD4066C	IC908	RC4556C
IC404, 411	μPD4001C	IC412	μPD4071C	IC902, 911	μPD4081C	IC909, 910	TC4022BP
IC405	RC4558D	IC413	TC4013BP	IC903, 912	μPD4049C		
IC406	μPD4066C	IC414	TC4510BP	IC904	RC4560D		
IC407	μA7812	IC415	TC5022BP	IC905	μPD4023C		
IC408	μA7912	IC416	μPC4556C	IC906	μPD4011C		
IC409	RC4559D	IC501	M51728L	IC907	TC4040BP		

Fig. 13.2.3 Serial Nos.: A11201001 – A11202473

Notes: 1. Diode is 1SS53, 1S953, or 1S1555 unless otherwise specified.
2. Resistor marked with * shows typical value.

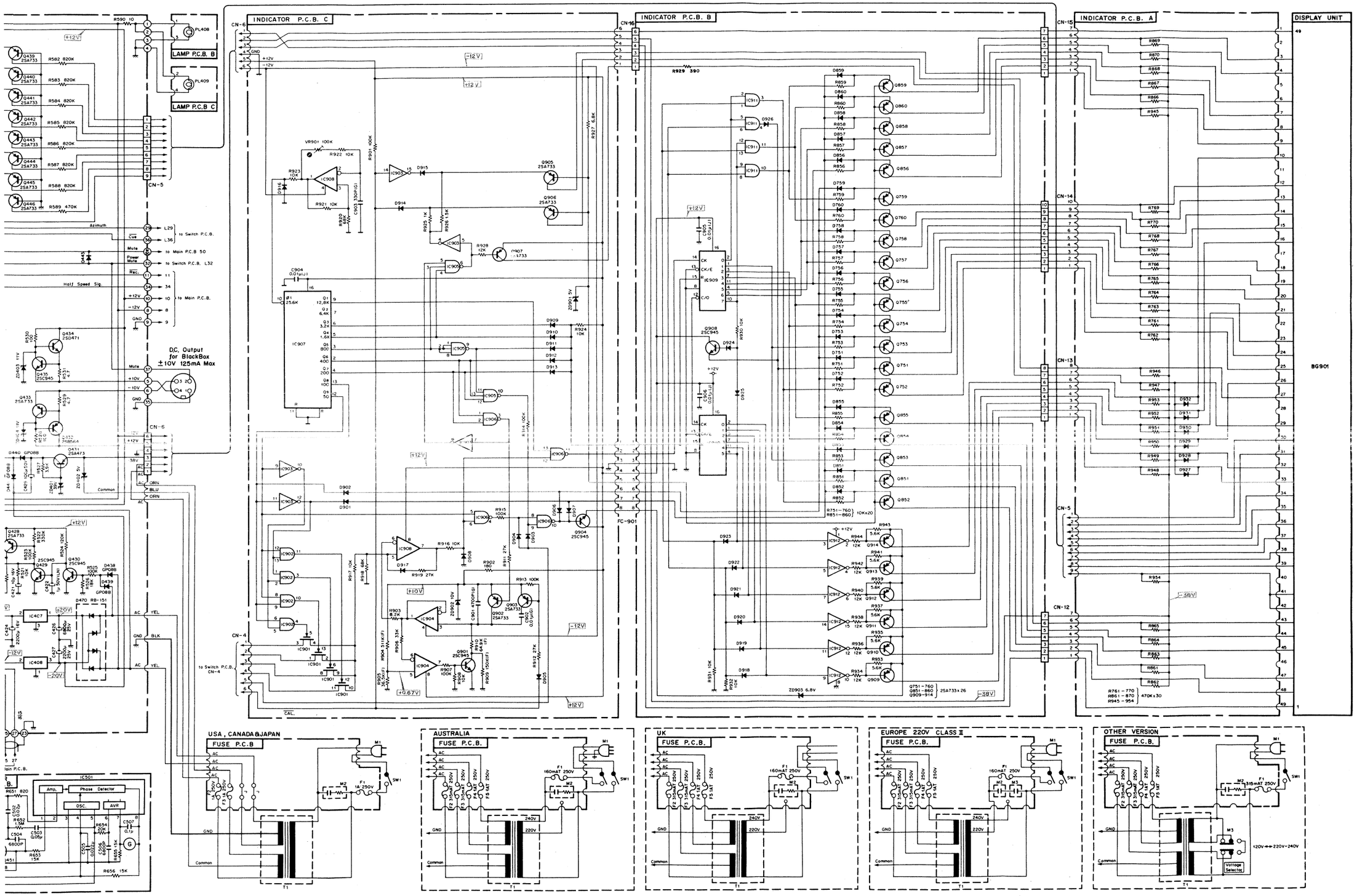


Fig. 13.2.3 Serial Nos.: A11201001 – A11202473

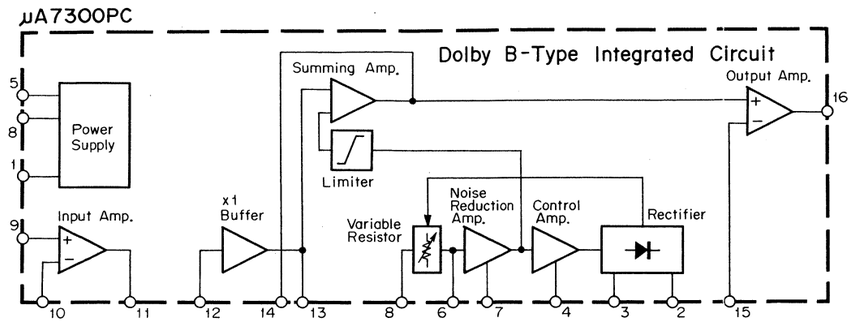


Fig. 13.3 Dolby NR IC μA7300PC

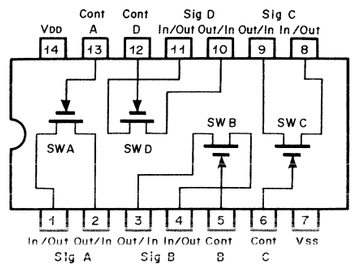


Fig. 13.4 Bilateral Switch C-MOS IC μPD4066C

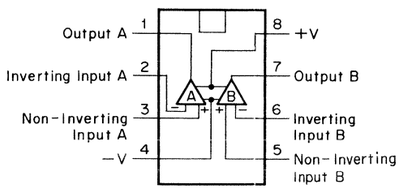


Fig. 13.5 Operational Amp. IC

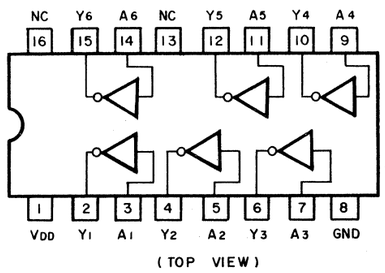


Fig. 13.6 Inverter C-MOS IC μPD4049C

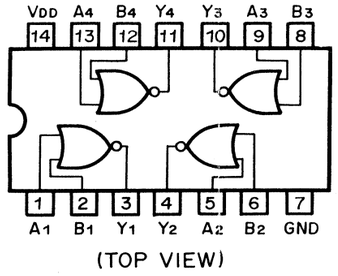


Fig. 13.7 NOR Gate C-MOS IC μPD4001C

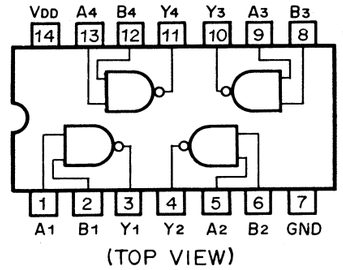


Fig. 13.8 NAND Gate C-MOS IC μPD4011C

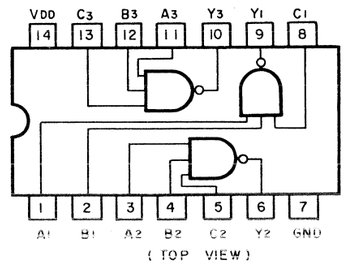


Fig. 13.9 NAND Gate C-MOS IC μPD4023C

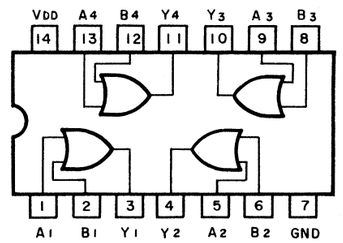


Fig. 13.10 OR Gate C-MOS IC μPD4071C

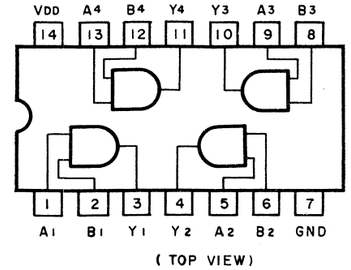


Fig. 13.11 AND Gate C-MOS IC μPD4081C

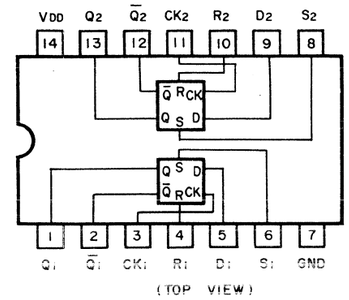


Fig. 13.12 D-Type Flip-Flop C-MOS IC TC4013BP

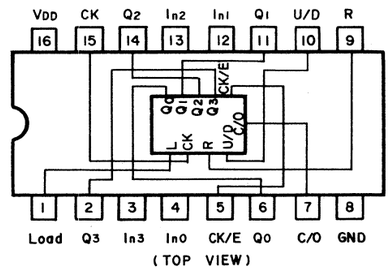


Fig. 13.13 BCD Up/Down Counter C-MOS IC TC4510BP

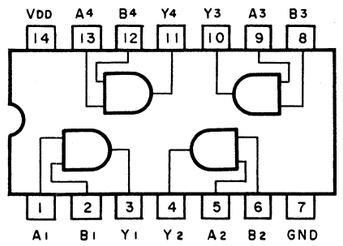


Fig. 13.11 AND Gate C-MOS IC μPD4081C

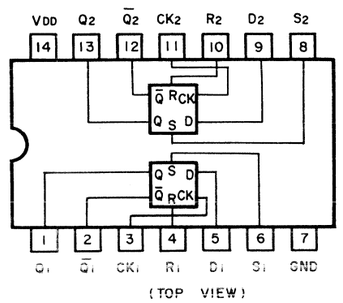


Fig. 13.12 D-Type Flip-Flop C-MOS IC TC4013BP

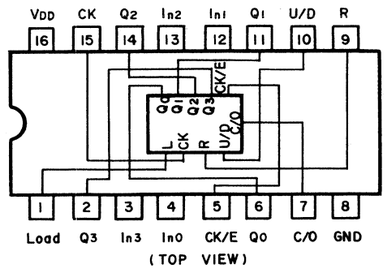


Fig. 13.13 BCD Up/Down Counter C-MOS IC TC4510BP

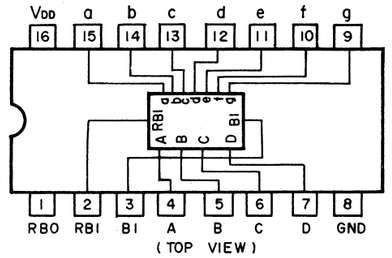


Fig. 13.14 BCD to 7-Segment Decorder/Driver C-MOS IC TC5022BP

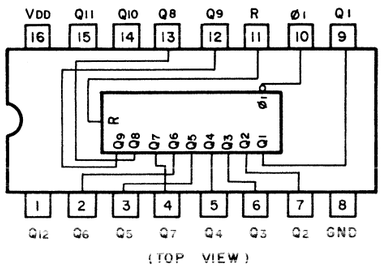


Fig. 13.15 12-Stage Binary Counter C-MOS IC TC4040BP

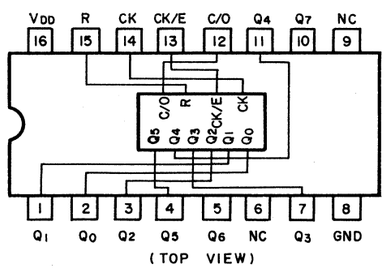


Fig. 13.16 Octal Counter/Driver C-MOS IC TC4022BP

14. SPECIFICATIONS

Standard Speed (1-7/8 ips)

Frequency Response	20-22,000 Hz ± 3 dB (–20 dB rec. level)
Signal-to-Noise Ratio	Better than 66 dB (IHF-A WTD RMS, ref. 400 Hz, 3% THD, w/Dolby NR, ZX tape, 70 μsec EQ)
Total Harmonic Distortion	Less than 0.8% at 400 Hz, 0 dB w/ZX tape Less than 1.0% at 400 Hz, 0 dB w/SX, EXII tapes
Wow-and-Flutter	Less than 0.08% WTD peak, 0.04% WTD RMS
Erasure	Better than 60 dB below saturation level at 1 kHz

Half-Speed (15/16 ips)

Frequency Response	20-15,000 Hz ± 3 dB (–20 dB rec. level, ZX tape)
Signal-to-Noise Ratio	Better than 60 dB (IHF-A WTD RMS, ref. 400 Hz, 3% THD, w/Dolby NR, ZX tape, 120 μsec EQ)
Total Harmonic Distortion	Less than 1.5% at 400 Hz, 0 dB w/ZX tape
Wow-and-Flutter	Less than 0.14% WTD peak, 0.08% WTD RMS
Erasure	Better than 60 dB below saturation level at 1 kHz

General

Separation	Better than 37 dB at 1 kHz, 0 dB
Crosstalk	Better than 60 dB at 1 kHz, 0 dB
Bias Frequency	105 kHz
Input	50 mV, 50 k ohms
Output	1 V (400 Hz, 0 dB, output control at max.) 3.3 k ohms
Headphone Output	45 mW (at 400 Hz, 0 dB, 8 ohms)
DC Output Jack	± 10 V DC, 125 mA max.
Power Source	100, 120, 120/220-240, 220 or 240 V AC; 50/60 Hz (according to country of sale)
Power Consumption	30 W max.
Dimensions	482(W) x 143(H) x 340(D) millimeters 19(W) x 5-5/8(H) x 13-3/8(D) inches
Approximate Weight	9 kg. 19 lb. 13 oz

- Specifications and appearance design are subject to change for further improvement without notice.
- Dolby NR under license from Dolby Laboratories.
- The word "DOLBY" and the Double-D-Symbol are trademarks of Dolby Laboratories.