



Service Manual

Nakamichi CR-7 CR-7A CR-7E

Discrete Head Cassette Deck



CONTENTS

1.	General	2
2.	Test Tapes and Gauges	2
3.	Mechanical Adjustments	2
3. 1.	Record Head and Playback Head Tilt Adjustment	2
3. 2.	Head Base Stroke Check	3
3. 3.	Erase Head Stroke Adjustment and Tape Guide Height Check	3
3. 4.	Erase Head Height and Tilt Adjustment	3
3. 5.	Playback Head Azimuth Center Adjustment	4
3. 6.	Playback Head and Record Head Height Adjustment and Azimuth Alignment	4
3. 7.	Tape Travelling Check	4
3. 8.	Eject Damper Adjustment	4
3. 9.	Reel Motor Speed Adjustment in Play Mode	4
3. 10.	Tape Speed Adjustment	5
3. 11.	Lubrication	5
4.	Parts Location for Electrical Adjustment	6
5.	Electrical Adjustments	7
5. 1.	How to Use Measurement Tools	7
5. 2.	Adjustment Instructions	8
5. 3.	Playback Frequency Response Adjustment	14
6.	Mechanism Ass'y and Parts List	15
6. 1.	Synthesis	15
6. 2.	Chassis Ass'y (A01)	16
6. 3.	Front Escutcheon L Ass'y (B01)	16
6. 4.	Front Escutcheon R Ass'y (B02)	17
6. 5.	Mechanism Ass'y (B03)	18
6. 6.	Rear Panel Ass'y (B04)	19
6. 7.	Front Escutcheon R Sub Ass'y (C01)	19
6. 8.	D.D. Motor Ass'y (D01)	19
7.	Mounting Diagrams and Parts List	20
7. 1.	Power Switch P.C.B. Ass'y	20
7. 2.	Shut-off P.C.B. Ass'y	20
7. 3.	Azimuth Motor P.C.B. Ass'y	20
7. 4.	Timer Switch P.C.B. Ass'y	20
7. 5.	Headphone Jack P.C.B. Ass'y	20
7. 6.	Azimuth Control P.C.B. Ass'y	20
7. 7.	Pin Jack P.C.B. Ass'y	21
7. 8.	Volume P.C.B. Ass'y	21
7. 9.	Receiver P.C.B. Ass'y	21
7. 10.	Remote Control P.C.B. Ass'y	21
7. 11.	Control Switch P.C.B. Ass'y	22
7. 12.	Display P.C.B. Ass'y	23
7. 13.	Dolby NR P.C.B. Ass'y	25
7. 14.	Power Supply P.C.B. Ass'y	27
7. 15.	Main P.C.B. Ass'y	29
7. 16.	Logic P.C.B. Ass'y	34
8.	Schematic Diagrams	35
8. 1.	IC Block Diagrams	35
8. 2.	Schematic Diagrams	37
8.2.1.	Display Section	37
8.2.2.	Amplifier Section	38
8.2.3.	Mechanism Control Section	40
9.	Wiring Diagram	41
10.	Block Diagrams	42
10. 1.	Amplifier Section	42
10. 2.	Mechanism Control Section	43
11.	Timing Chart and Eq. Amp. Frequency Response	44
11. 1.	Eq. Amp. Frequency Response	44
11. 2.	Timing Chart	44
12.	Remote Control Unit RM-7C	45
13.	Specifications	46

1. GENERAL

1.1. Voltage Selector

Voltage selector is installed on the rear panel for Other version of the Nakamichi CR-7. This voltage selector can select either 120 V or 220-240 V at customer's disposal.

1.2. Packing Materials and Owner's Manuals

Part No.	Description	Q'ty
0F03900A	Packing	2
0F03928A	Carton Box CR-7A	1
0F03922A	Carton Box CR-7E	1
0F03926A	Carton Box CR-7D	1
0F03921A	Carton Box CR-7	1
0M03884A	Voltage Label 120V (Canada)	2
0M03457A	Voltage Label 240V (Australia & UK)	2
0D04561B	Owner's Manual CR-7E/CR-5E, CR-7/CR-5 (English/German/French)	1
0D04562B	Owner's Manual CR-7D/CR-5D (Japanese)	1
0D04563C	Owner's Manual CR-7A/CR-5A, CR-7/CR-5 (English)	1
HA04956A	Remote Control Unit RM-7C	1

2. TEST TAPES AND GAUGES

- | | |
|--|---|
| <ul style="list-style-type: none"> (1) 400 Hz Level Tape (DA09005B) (2) 1 kHz Track Alignment Tape (DA09007B) (3) 10 kHz PB Frequency Response Tape (DA09003B) (4) 15 kHz PB Frequency Response Tape (DA09002B) (5) 20 kHz PB Frequency Response Tape (DA09001B) (6) 15 kHz Azimuth Alignment Tape (DA09004B) (7) 3 kHz Speed and Wow/Flutter Tape (DA09006C) (8) Tape Travelling Cassette Tape (DA09071A) (9) Reference EXII Tape (DA09102A) (10) Reference SX Tape (DA09103A) (11) Reference ZX Tape (DA09100A) (12) EH Tilt Check Gauge S (DA09088A) (13) Stroke Check Gauge S (DA09090A) (14) Tape Guide Height Check Gauge S (DA09091A) | <ul style="list-style-type: none"> (15) Tilt Check Gauge (DA09039B) (16) Torque Gauge FWD (DA09082A) (17) Test Unit (DA09101A) |
|--|---|

3. MECHANICAL ADJUSTMENTS

3.1. Record Head and Playback Head Tilt Adjustment

Remove the Cover Plate Ass'y by loosening two screws. Refer to Fig. 3.1.

- (1) Remove the pad lifter from the playback head.
- (2) Load a Tilt Check Gauge in the cassette deck.
- (3) Remove both of the Height Gears (PH and RH).
- (4) Set the cassette deck 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 away from the heads, then return them to their original places to be in contact with the record head and the playback head surfaces after Play mode is securely locked.
- (5) The beacon playback Head "Lower" will light up when the height adjustment screw (PH) is turned counterclockwise but the Playback Head "Upper" when clockwise. Adjust so that both "Upper" and "Lower" will light up even when you move the slide knob away from the head and then return it to the original place.
- (6) The same procedures will apply to the Beacons Record Head "Upper" and "Lower", except for the height adjustment screw (RH).

- (7) Set the cassette deck in Stop mode and fit both of the serrated Height Gears. Then set the cassette deck in Play mode again and insure all of the 4 Beacons are illuminating. If not, (5) and (6) will have to be repeated till satisfactory results are obtained.
- (8) Mount the pad lifter on the playback head.

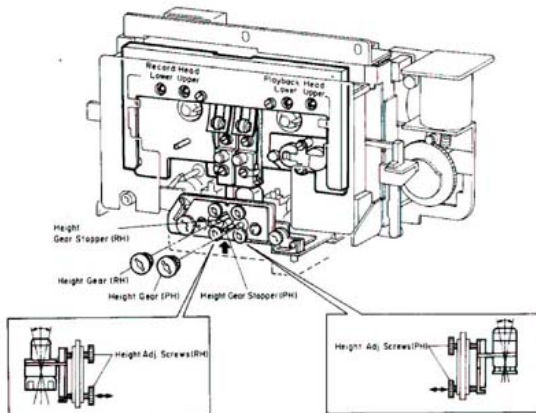


Fig. 3.1

CONTENTS

1. Ge
2. T
3. *

y. Refer to Fig. 3.2.

this adjustment, adjust with a "Tilt" freedom from tilt on the playback

Record Head Indicator and the Playback Head

indicator to the direction of arrow mark "A" with your finger tip and then set the cassette deck in Play mode.

Then slowly release the Indicators and make sure that each of the Indicators is in contact with the record and the playback heads.

- (3) Check to insure whether the line "P" on the Playback Head Indicator meets the central line on the Indicator Plate.
- (4) Check to insure whether the line "P" on the Playback Head Indicator locates between the 2 lines on the Record Head Indicator, thus check can be made on record head stroke.

3.3. Erase Head Stroke Adjustment and Tape Guide Height Check

Remove the Head Mount Base Ass'y and the Cover Plate Ass'y. Refer to Fig. 3.3.

(1) Erase Head Stroke Adjustment

- (a) Load a Tape Guide Height Check Gauge S in the cassette deck.
- (b) Set the cassette deck 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 screw A that assembles the erase head with erase head plate.
- (d) After completion of the adjustment, screw A shall be locked with lock tight paint.

(2) Supply Tape Guide Height Check

- (a) Load a Tape Guide Height Check Gauge S in the cassette deck.
- (b) Set the cassette deck in Play mode.
- (c) Slide the Supply Tape Guide Check Bar down onto the supply tape guide, and check to insure that the Supply Tape Guide Check Bar is accepted by the supply tape guide.

(3) Take-up Tape Guide Height Check

- (a) Load a Tape Guide Height Check Gauge S in the cassette deck.
- (b) Set the cassette deck in Play mode.
- (c) Slide the Take-up Tape Guide Check Bar down onto the take-up tape guide, and check to insure that the Take-up Tape Guide Check Bar is accepted by the take-up tape guide.

3.4. Erase Head Height and Tilt Adjustment

Refer to Fig. 3.4.

- (1) Remove the Cassette Case Ass'y, Head Mount Base Ass'y and Cover Plate Ass'y.
- (2) Load an EH Tilt Check Gauge S in the cassette deck.
- (3) Set the cassette deck in Stop mode.
- (4) Check to insure whether one of the 3 Beacons is illuminating. Look down the mirror and slowly turn the Screw "Height" counterclockwise (or clockwise) so that the line of the erase head (in different color) is located between the two horizontal lines on the mirror and check to insure whether the first Beacon is illuminating.
- (5) Turn the Screw "Tilt" counterclockwise (or clockwise) to light up the second Beacon. Excessive turning will cause the first Beacon to light off.

Adjustment of the Screw "Tilt" will therefore be conducted till both of the first and the second Beacons illuminate.

- (6) Turn Screw "Azimuth" counterclockwise (or clockwise) to light up the third Beacon. Excessive turning will cause either the first or the second Beacon to light off, and therefore adjust Screw "Azimuth" until all of the 3 Beacons illuminate.
- (7) Check to insure whether the horizontal line of the erase head is located between two lines on the mirror. If not, (4) through (6) must 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 dirt, or overflow in the groove of the erase head surface.

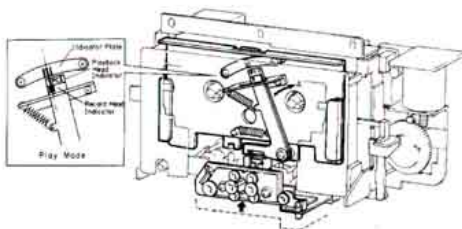


Fig. 3.2

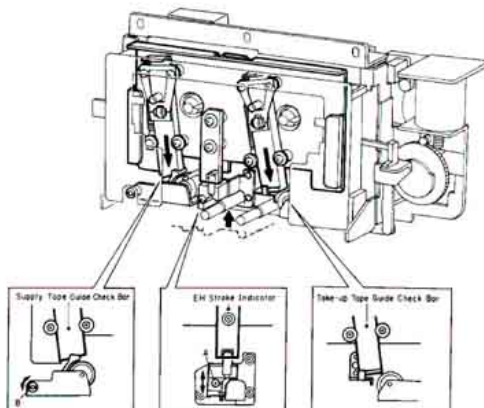


Fig. 3.3

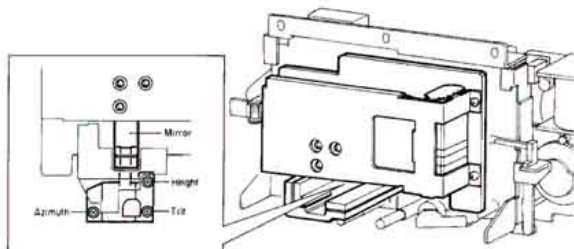


Fig. 3.4

3.5. Playback Head Azimuth Center Adjustment

Note: Refer to item 5.1.2 "Test Unit" for handling the Test Unit.

- (1) Remove the Top Cover by loosening four screws and the Front Panel by loosening six screws.
- (2) Separate the Front Escutcheon R Ass'y from the Front Chassis by loosening four screws and slide it to the right to gain access to the Azimuth Center potentiometer.
- (3) Connect the Test Unit to CN-11 on the Logic P.C.B. Ass'y.
- (4) Turn ON the power and press the TEST button on the Test Unit.
- (5) Press the CENTER button on the Test Unit.
- (6) Adjust the Azimuth Center potentiometer so that the arrow mark on the Azimuth Cam Gear corresponds to the Indicator Plate of the Mechanism Chassis as shown in Fig. 3.5.
- (7) Press the TEST button twice.
- (8) Turn OFF the power, remove the Test Unit from CN-11 and assemble the Front Escutcheon R Ass'y, Front Panel and Top Cover.

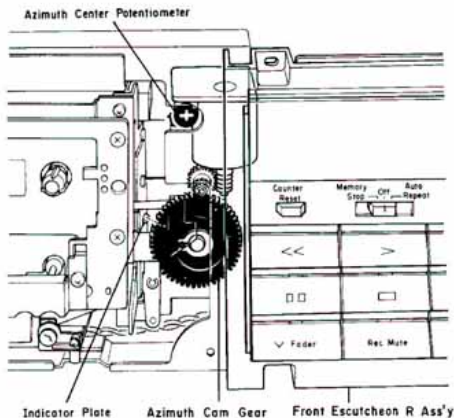


Fig. 3.5

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

Remove the Top Cover by loosening four screws. Refer to Fig. 3.6.

(1) Playback Head Height Adjustment and Azimuth Alignment

Note: Refer to item 5.1.2 "Test Unit" for handling the Test Unit.

- (a) Connect the Test Unit to CN-11 on the Logic P.C.B. Ass'y.
- (b) Press the Monitor button to select the Tape position and connect an AC voltmeter to the Output Jacks.
- (c) Press the TEST button on the Test Unit.
- (d) Press the CENTER button on the Test Unit.
- (e) Load a 1 kHz Track Alignment Tape and play it back.
- (f) Turn the PH Height Gear until the outputs of both channels become minimum.
- (g) Load a 15 kHz Azimuth Tape and play it back.
- (h) Turn the PH Azimuth Alignment Screw until the outputs of both channels become maximum.
- (i) Repeat above steps (e) through (h) one or two times to obtain optimum performance.
- (j) Press the TEST button twice, then remove the Test Unit from CN-11.

(2) Record Head Height Adjustment and Azimuth Alignment

- (a) Connect the Test Unit to CN-11 on the Logic P.C.B. Ass'y.
- (b) Press the TEST button on the Test Unit.
- (c) Press the CENTER button on the Test Unit.
- (d) Press the Monitor button to select the Tape position and set the Eq. to 70 μ s.
- (e) Load a reference ZX tape and connect an AC voltmeter to the Output Jacks.
- (f) Feed in 400 Hz (0 dBV) to the Input Jacks.
- (g) Set the cassette deck in Rec./Play mode and turn the RH Height Gear until the outputs of both channels become maximum.

- (h) Feed in 15 kHz (-20 dBV) to the Input Jacks and turn the RH Azimuth Alignment Screw until the outputs of both channels become maximum.
- (i) Repeat (f) through (h) one or two times to obtain optimum performance.
- (j) Press the TEST button twice, then remove the Test Unit from CN-11.

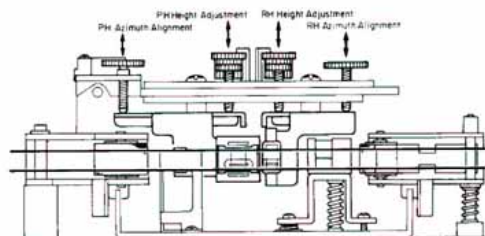


Fig. 3.6

3.7. Tape Travelling Check

Load and play back a Tape Travelling Cassette and check the following:

- (1) Tape is in contact with heads sufficiently.
- (2) Tape waving is small on the heads and pressure rollers.
- (3) Tape is free from waving or slippage from the tape guide.

3.8. Eject Damper Adjustment

Refer to Fig. 3.7. Load a cassette tape and with opening and closing the Cassette Case, adjust the speed of damper action by the Damper Adjustment Screw.

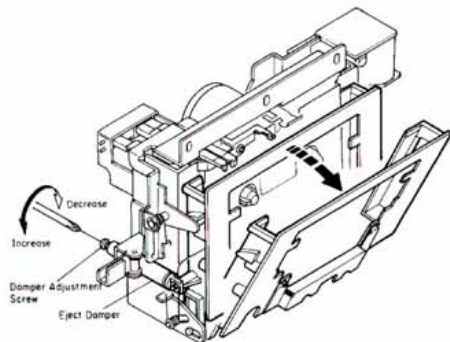


Fig. 3.7

3.9. Reel Motor Speed Adjustment in Play Mode

- (1) In order to warm-up the cassette deck, load a C-60 cassette tape and play it back for more than four minutes.
- (2) Load a Torque Gauge FWD or equivalent and set the cassette deck in Play mode.
- (3) Adjust VR601 on the Logic P.C.B. Ass'y to obtain exactly 50 g-cm on the torque gauge.

3.10. Tape Speed Adjustment

Refer to Fig. 3.8.

- (1) Connect a frequency counter to the Output Jack.
- (2) Load a 3 kHz Speed and Wow/Flutter Tape and play it back.
- (3) Adjust VR101 on the Motor P.C.B. Ass'y to obtain 3,000 Hz ± 15 Hz on the frequency counter.

3.11. Lubrication

The tape transport mechanism is of a lubrication-free type. However, when the following parts are replaced with new ones, apply the specified lubricant.

- (1) Molykote [®] Grease (X5-6020)
Cam Motor Pulley
Thrust portion on the Capstan Shaft
- (2) FLOIL GB-TS-1
Washer between Reel Hub Ass'y and Back Tension Spring
- (3) Diamond Oil (EP56)
Reel Hub Shaft
- (4) Anderol 456
Capstan Shaft

Note: We suggest that you use the above specified lubricant or equivalent type.

The company dealing in the above lubricant is as follows:

- (a) Molykote [®] Grease (X5-6020)
Dowcorming Co., Ltd., 1-15-1 Nishishinbashi, Minato-ku, Tokyo, Japan
- (b) FLOIL GB-TS-1
Kanto Chemicals Co., Ltd., 2-7 Kanda Sakumacho, Chiyoda-ku, Tokyo, Japan
- (c) Diamond Oil (EP-56)
Mitsubishi Oil Co., Ltd., 1-2-4 Toranomon, Minato-ku, Tokyo, Japan
- (d) Anderol 456
Tokyo Kokusai Oil Co., Ltd., 3-3-5 Hatchobori, Chuo-ku, Tokyo, Japan

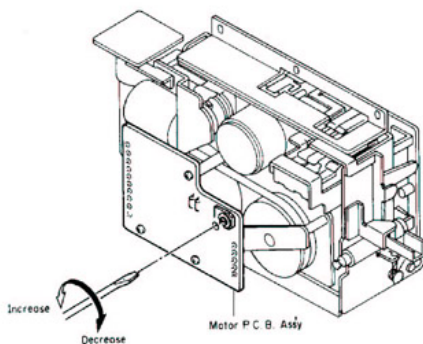


Fig. 3.8

4. PARTS LOCATION FOR ELECTRICAL ADJUSTMENT

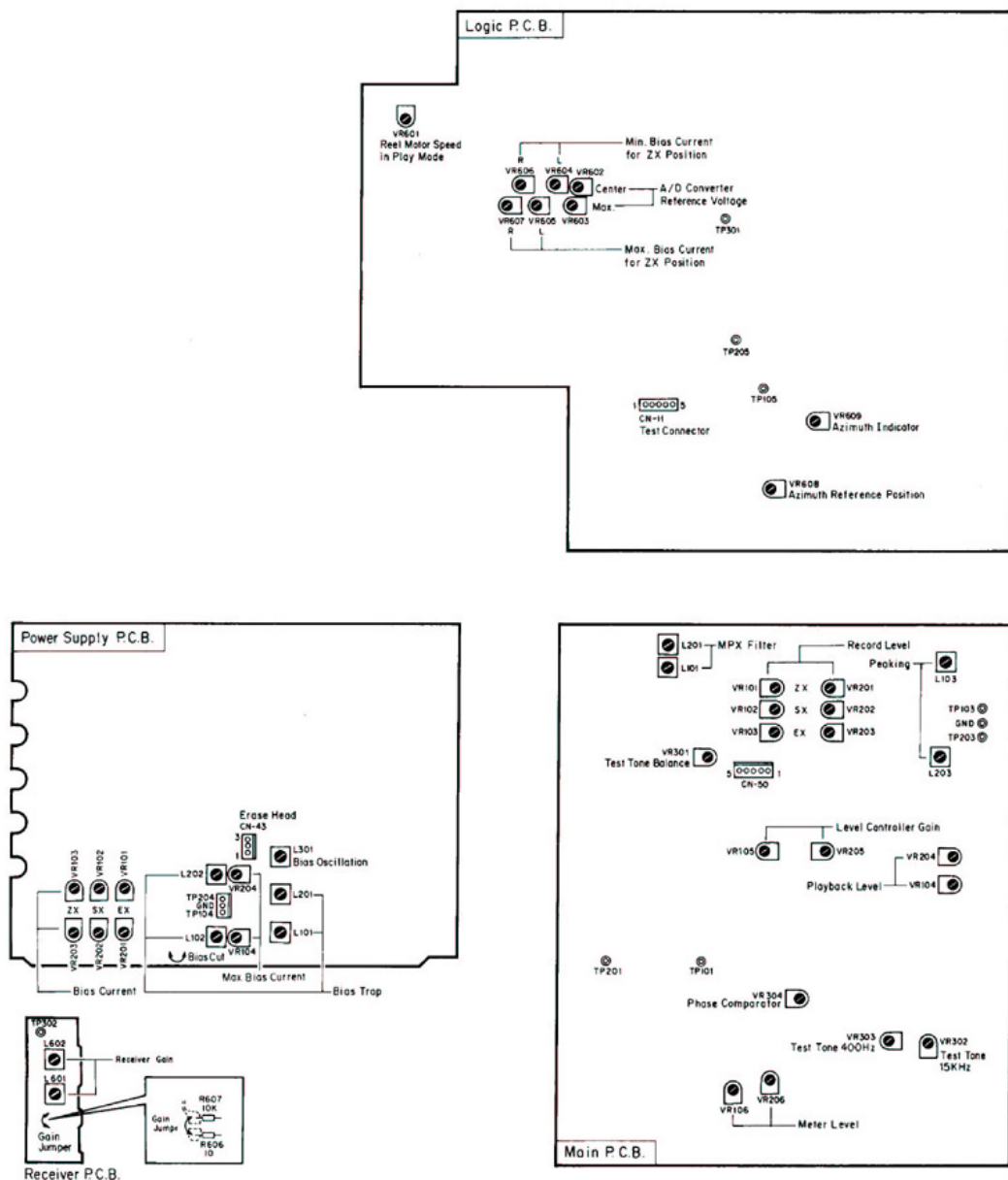


Fig. 4

5. ELECTRICAL ADJUSTMENTS

- Notes:
1. Electrical adjustment should be performed after mechanical adjustment is completed.
 2. Before adjustment, set the Playback Azimuth control on the Front Panel to the mechanical center position.

5.1. How to Use Measurement Tools

5.1.1. Bias Osc. Coil

When performing "Bias Oscillation Frequency and Erase Current Adjustment" in Step 4, connect a 0.1-ohm resistor and a Bias Osc. Coil (0B06646B) with the erase head as shown in Fig. 5.1.

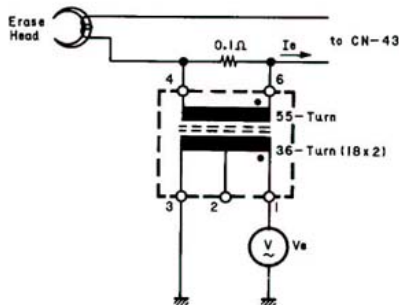


Fig. 5.1

5.1.2. Test Unit

(1) Introduction

The cassette deck incorporates an auto calibration system. When the Auto Calibration button is pressed before recording, optimum record level and bias current for the tape being loaded are calculated by the micro-processors and the level and bias data are stored into the memory.

Since above procedure is performed automatically by the microprocessors, it is necessary to put the circuit to the desired adjustment condition for adjusting the following Steps manually. Test Unit is used for this purpose. Figs. 5.2 and 5.3 show the appearance and the circuit diagram of the Test Unit.

Step	Item
6	Recording Bias Current Adjustment
7	A/D Converter Reference Voltage Adjustment
8	Test Tone Level Adjustment
9	Level Controller Gain Adjustment
10	Playback Head Azimuth Center Adjustment
11	Azimuth Reference Position Adjustment
12	Azimuth Indicator Adjustment
13	Playback Head Track and Azimuth Alignment
14	Playback Level Calibration
15	Playback Frequency Response Adjustment
16	Record Head Height Adjustment and Azimuth Alignment
17	Phase Comparator Adjustment
18	Record Level Calibration

(2) How to Connect the Test Unit

Open the Top Cover and connect the Test Unit to the test connector CN-11 on the Logic P.C.B. Ass'y. Refer to Fig. 4.

(3) How to Use the Test Unit

Operate the Test Unit according to the instruction in item 5.2 "Adjustment Instruction". Following shows a typical operation procedure.

- (a) Press the TEST button.
- (b) Press the MAX, CENTER, MIN, AZ, OSC, or LEVEL button.
- (c) Repeat (a) and (b) as required.
- (d) Press the TEST button twice. The Ready indicator of the Indicator Panel flashes, then stays ON for a moment and finally goes out to notice that the Test mode has been terminated.

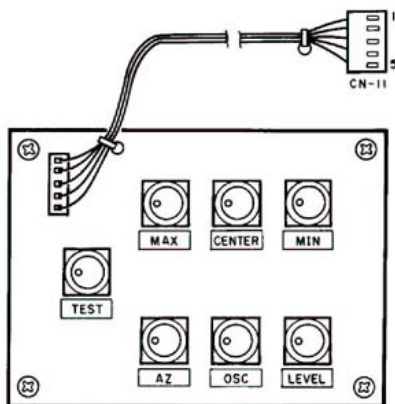


Fig. 5.2 Test Unit

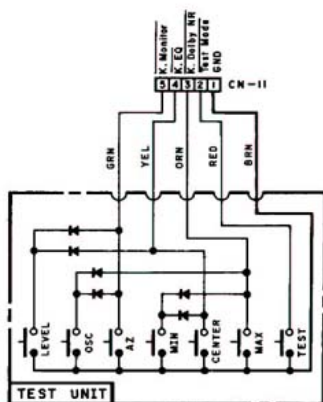


Fig. 5.3 Circuit Diagram of Test Unit

5.2. Adjustment Instructions

STEP	ITEM	SIGNAL SOURCE	OUTPUT CONNECTION	MODE	ADJUSTMENT	REMARKS
1	Tape Speed Adjustment	3 kHz Speed and Wow/Flutter Tape	Frequency Counter to Output Jacks	Play Eq. - 70 μ s	Motor P.C.B. VR101	Adjust VR101 to obtain 3 kHz $\pm$ 15 Hz on the frequency counter.
2	Meter Level Calibration	400 Hz to Input Jacks	AC Voltmeter to TP101, TP201 on Main P.C.B.	Monitor - Source	Main P.C.B. VR106 VR206	1. Adjust the Input Level controls to obtain 350 mV -0.6 dB on the AC voltmeter. 2. Adjust VR106 (VR206) so that the 0 dB segment of the level meter begins to light up.
3	MPX Filter Adjustment	19 kHz to Input Jacks	AC Voltmeter to Output Jacks	Monitor - Source MPX - ON	Main P.C.B. L101 L201	1. Set the Output Level control to max. 2. Feed in 19 kHz (0 dBV) to the Input Jacks. 3. Adjust L101 (L201) to obtain minimum reading on the AC voltmeter. (The minimum reading will be less than -30 dBV.)
4	Bias Oscillation Frequency and Erase Current Adjustment		Frequency Counter to TP103 on Main P.C.B. and AC Voltmeter to Bias Osc. Coil (See Fig. 5.1.)	Rec./Pause Tape - SX	Power Supply P.C.B. L301 R302 R303	1. Connect a 0.1-ohm resistor and a Bias Osc. coil (0B06646B) to the Erase Head and an AC voltmeter to the 36-turn winding of the Bias Osc. coil as shown in Fig. 5.1. 2. Adjust L301 to obtain 105 kHz on the frequency counter. 3. Check the erase current by the AC voltmeter. Erase current will be within the range of 310 mA to 400 mA (20.3 mV to 26.2 mV on the AC voltmeter). (Typically approx. 350 mA or 23 mV on the AC voltmeter.) If erase current is not sufficient, increase it by shorting either R302 or R303. Erase current is given in the following formula. $I_e = \frac{V_e \times 55(\text{turns})}{36(\text{turns}) \times 0.1}$ 4. After completion of the erase current adjustment, re-check the bias oscillation frequency. 5. Remove the Bias Osc. Coil and the 0.1-ohm resistor.
5	Bias Trap Adjustment		AC Voltmeter to TP103, TP203 on Main P.C.B. TP104, TP204 on Power Supply P.C.B.	Rec./Pause Tape - ZX	Power Supply P.C.B. L101 L201 L102 L202	1. Connect an AC voltmeter to TP103 (TP203). 2. Adjust L102 (L202) to obtain minimum reading on the AC voltmeter. 3. Connect the AC voltmeter to TP104 (TP204). 4. Adjust L101 (L201) to obtain maximum reading on the AC voltmeter.

STEP	ITEM	SIGNAL SOURCE	OUTPUT CONNECTION	MODE	ADJUST-MENT	REMARKS
6	Recording Bias Current Adjustment		AC Voltmeter to TP104, TP204 on Power Supply P.C.B.	Rec./Pause Tape - ZX/SX/EX	Power Supply P.C.B. EX: VR101 VR201 SX: VR102 VR202 ZX: VR103 VR203 Max: VR104 VR204 Logic P.C.B. ZX min: VR604 VR606 ZX max: VR605 VR607	1. Load a reference ZX tape and set the cassette deck in Rec./Pause mode. 2. Set the Tape selector to the ZX position. 3. Connect an AC voltmeter to TP104 (TP204). 4. Turn VR103 (VR203) fully clockwise. 5. Connect the Test Unit to CN-11 on the Logic P.C.B. Ass'y. 6. Press the TEST button on the Test Unit. 7. Press the MAX button on the Test Unit. 8. Adjust VR104 (VR204) to obtain 80 mV on the AC voltmeter. (The maximum bias current is set to 8 mA.) 9. Return VR103 (VR203) to its mechanical center position. 10. Adjust VR605 (VR607) to obtain 70 mV on the AC voltmeter. (The maximum bias current for the ZX position is set to 7 mA.) 11. Press the TEST button. 12. Press the MIN button on the Test Unit. 13. Adjust VR604 (VR606) to obtain 25 mV on the AC voltmeter. (The minimum bias current for the ZX position is set to 2.5 mA.) 14. Repeat above 6 through 13 one or two times. 15. Press the TEST button. 16. Press the CENTER button. 17. Change the cassette tape to a reference SX tape and set the Tape selector to the SX position. 18. Adjust VR102 (VR202) to obtain 20 mV on the AC voltmeter. (The middle value of bias current for the SX position is set to 2 mA.) 19. Change the cassette tape to a reference EXII tape and set the Tape selector to the EX position. 20. Adjust VR101 (VR201) to obtain 13 mV on the AC voltmeter. (The middle value of bias current for the EX position is set to 1.3 mA.) 21. Press the TEST button twice, then remove the Test Unit from CN-11.
7	A/D Converter Reference Voltage Adjustment		DC Voltmeter to TP301 on Logic P.C.B.	Rec./Pause	Logic P.C.B. VR602 VR603	1. Connect the Test Unit to CN-11 on the Logic P.C.B. Ass'y. 2. Press the TEST button on the Test Unit. 3. Press the MAX button on the Test Unit. 4. Adjust VR603 to obtain 2.00 V on the DC voltmeter. 5. Press the TEST button. 6. Press the CENTER button on the Test Unit. 7. Adjust VR602 to obtain 1.00 V on the DC voltmeter. 8. Repeat above 2 through 7 one or two times. 9. Press the TEST button twice, then remove the Test Unit from CN-11.

STEP	ITEM	SIGNAL SOURCE	OUTPUT CONNECTION	MODE	ADJUSTMENT	REMARKS
8	Test Tone Level Adjustment		DC Voltmeter to TP105, TP205 on Logic P.C.B.	Rec./Pause Monitor - Source	Main P.C.B. Bal: VR301 15 kHz: VR302 400 Hz: VR303	1. Connect a DC voltmeter to TP105. 2. Connect the Test Unit to CN-11 on the Logic P.C.B. Ass'y. 3. Press the TEST button on the Test Unit. 4. Press the OSC button on the Test Unit. 5. Press the Auto Calibration button of the cassette deck. The Level indicator will light up. 6. Adjust VR303 to obtain 1.00 V on the DC voltmeter. 7. Press the Auto Calibration button again. The Bias indicator will light up. 8. Adjust VR302 to obtain 0.93-0.94 V on the DC voltmeter. 9. Repeat above 4 through 8 one or two times. 10. Remove the DC voltmeter from TP105 and connect it to TP205. 11. Press the Auto Calibration button. The Level indicator will light up. 12. Adjust VR301 to obtain 1.00 V on the DC voltmeter. 13. Press the TEST button twice, then remove the Test Unit from CN-11.
9	Level Controller Gain Adjustment	400 Hz (0 dBV) to Input Jacks	AC Voltmeter to CN50-2, CN50-4, CN50-1, and CN50-5 on Main P.C.B.	Rec./Pause Monitor - Source	Main P.C.B. VR105 VR205	1. Connect an AC voltmeter between pin 4 (pin 5) and Ground. 2. Feed in 400 Hz (0 dBV) to the Input Jacks. 3. Connect the Test Unit to CN-11 on the Logic P.C.B. Ass'y. 4. Set the Monitor selector to the Source position. 5. Press the TEST button on the Test Unit. 6. Press the CENTER button on the Test Unit. 7. Note the reading at pin 4 (pin 5) on the AC voltmeter. 8. Connect the AC voltmeter to pin 2 (pin 1), then adjust VR105 (VR205) to obtain the same level at pin 4 (pin 5) on the AC voltmeter. 9. Press the TEST button twice, then remove the Test Unit from CN-11.
10	Playback Head Azimuth Center Adjustment			Stop	Azimuth Motor P.C.B. Azimuth Center Potentiometer	Refer to item 3.5. 1. Connect the Test Unit to CN-11 on the Logic P.C.B. Ass'y. 2. Press the TEST button on the Test Unit. 3. Press the CENTER button on the Test Unit. 4. Adjust the potentiometer so that the arrow mark of the Cam corresponds to the Indicator Plate of the Mechanism Chassis as shown in Fig. 3.5.

STEP	ITEM	SIGNAL SOURCE	OUTPUT CONNECTION	MODE	ADJUSTMENT	REMARKS
11	Azimuth Reference Position Adjustment			Play	Logic P.C.B. VR608	1. Connect the Test Unit to CN-11 on the Logic P.C.B. Ass'y. 2. Turn the Playback Azimuth control to its mechanical center position. 3. Press the TEST button on the Test Unit. 4. Press the AZ button on the Test Unit. 5. Adjust VR608 so that the Ready indicator lights up. 6. Press the TEST button twice, then remove the Test Unit from CN-11.
12	Azimuth Indicator Adjustment			Play	Logic P.C.B. VR609	1. Connect the Test Unit to CN-11 on the Logic P.C.B. Ass'y. 2. Press the TEST button on the Test Unit. 3. Press the CENTER button on the Test Unit. 4. Adjust VR609 so that the indicator segments of upper row indicate the Azimuth Center Position indicator as shown below: 5. Press the TEST button. 6. Press the MAX button on the Test Unit. 7. Check whether all indicator segments of upper row light up. If not, repeat above 2 through 7. 8. Press the TEST button twice, then remove the Test Unit.
13	Playback Head Track and Azimuth Alignment	1 kHz Track Alignment Tape and 15 kHz Azimuth Tape	AC Voltmeter to Output Jacks	Play Monitor - Tape Eq. - 70 μ s	PH Height Gear and Playback Head Azimuth Alignment Screw	1. Connect the Test Unit to CN-11 on the Logic P.C.B. Ass'y. 2. Press the TEST button on the Test Unit. 3. Press the CENTER button on the Test Unit. 4. Set the Output control to max. 5. Load a 1 kHz Track Alignment Tape and play it back. 6. Adjust the PH Height Gear to obtain minimum readings for both channels on the AC voltmeter. 7. Load a 15 kHz Azimuth Tape and play it back. 8. Adjust the Playback Head Azimuth Alignment Screw to obtain maximum readings for both channels on the AC voltmeter. 9. Repeat above 4 through 8 once or twice. 10. Press the TEST button twice, then remove the Test Unit from CN-11.

STEP	ITEM	SIGNAL SOURCE	OUTPUT CONNECTION	MODE	ADJUSTMENT	REMARKS
14	Playback Level Calibration	400 Hz Level Tape	AC Voltmeter to TP101, TP201 on Main P.C.B.	Play Monitor - Tape Eq. - 70 μ s	Main P.C.B. VR104 VR204	1. Connect the Test Unit to CN-11 on the Logic P.C.B. Ass'y. 2. Press the TEST button on the Test Unit. 3. Press the CENTER button on the Test Unit. 4. Load a 400 Hz level tape and play it back. 5. Adjust VR104 (VR204) to obtain 350 mV on the AC voltmeter. 6. Press the TEST button twice, then remove the Test Unit from CN-11.
15	Playback Frequency Response Adjustment	400 Hz Level Tape 10 kHz PB Frequency Response Tape 15 kHz PB Frequency Response Tape 20 kHz PB Frequency Response Tape	AC Voltmeter to Output Jacks	Same as above	Main P.C.B. R143 R243 R144 R244	1. Connect the Test Unit to CN-11 on the Logic P.C.B. Ass'y. 2. Press the TEST button on the Test Unit. 3. Press the CENTER button on the Test Unit. 4. Load a 400 Hz level tape and play it back. Adjust the Output Level control to obtain 0 dBV (1 V) on the AC voltmeter. 5. Load 10 kHz, 15 kHz and 20 kHz PB frequency response tapes and play them back in order. Align the playback head azimuth to obtain maximum levels on the AC voltmeter with each tape and note their levels. 6. Check whether the maximum levels are within the ranges given below. If not, short R143 (R243) or R144 (R244). 10 kHz: -20 dBV -2 to + 2 dB 15 kHz: -20 dBV -2 to + 3 dB 20 kHz: -20 dBV -2 to + 4 dB Refer to "Playback Frequency Response Adjustment" in item 5.3. 7. Conduct Step 13 "Playback Head Track and Azimuth Alignment". 8. Press the TEST button twice, then remove the Test Unit from CN-11.
16	Record Head Height Adjustment and Azimuth Alignment	400 Hz (0 dBV) and 15 kHz (-20 dBV) to Input Jacks	AC Voltmeter to Output Jacks	Rec./Play Monitor - Tape - ZX Eq. - 70 μ s	RH Height Gear and Record Head Azimuth Alignment Screw	1. Connect the Test Unit to CN-11 on the Logic P.C.B. Ass'y. 2. Press the TEST button on the Test Unit. 3. Press the CENTER button on the Test Unit. 4. Load a reference ZX tape and set the cassette deck in Rec./Play mode. 5. Feed in 400 Hz (0 dBV) to the Input Jacks. 6. Adjust the RH Height Gear to obtain maximum readings for both channels on the AC voltmeter. 7. Feed in 15 kHz (-20 dBV) to the Input Jacks. 8. Adjust the Record Head Azimuth Alignment Screw to obtain maximum readings for both channels on the AC voltmeter. 9. Repeat above 5 through 8 one or two times. 10. Press the TEST button twice, then remove the Test Unit from CN-11.

STEP	ITEM	SIGNAL SOURCE	OUTPUT CONNECTION	MODE	ADJUSTMENT	REMARKS
17	Phase Comparator Adjustment	400 Hz (0 dBV) to Input Jacks		Rec./Play Tape - ZX Monitor - Tape	Main P.C.B. VR304	1. Connect the Test Unit to CN-11 on the Logic P.C.B. Ass'y. 2. Press the TEST button on the Test Unit. 3. Press the CENTER button on the Test Unit. 4. Feed in 400 Hz (0 dBV) to the Input Jacks. 5. Load a reference ZX tape and set the cassette deck in Rec./Play mode. 6. Adjust VR304 so that the Azimuth indicator lights up. 7. Press the TEST button twice, then remove the Test Unit from CN-11.
18	Record Level Calibration	400 Hz (0 dBV) to Input Jacks	AC Voltmeter to Output Jacks	Rec./Play Monitor - Source /Tape Tape - ZX/SX/EX Eq. - 70 μ s (ZX/SX) 120 μ s (EX)	Main P.C.B. ZX: VR101 VR201 SX: VR102 VR202 EX: VR103 VR203	1. Connect the Test Unit to CN-11 on the Logic P.C.B. Ass'y. 2. Set the Tape selector to the ZX position and the Monitor selector to the Source position. 3. Feed in 400 Hz to the Input Jacks and adjust the Input Level controls to obtain 0 dBV (1 V) on the AC voltmeter. Set the Monitor selector to the Tape position. 4. Press the TEST button on the Test Unit. 5. Press the LEVEL button on the Test Unit. 6. Load a reference ZX tape and set the cassette deck in Rec./Play mode. 7. Press the Auto Calibration button. 8. After auto calibration is completed and the Ready indicator lights up, adjust VR101 (VR201) to obtain 0 dBV (1 V) on the AC voltmeter. 9. Change the cassette tape to a reference SX tape and set the Tape selector to the SX position. 10. Set the cassette deck in Rec./Play mode and press the Auto Calibration button. 11. After completion of auto calibration, adjust VR102 (VR202) to obtain 0 dBV (1 V) on the AC voltmeter. 12. Change the cassette tape to a reference EX tape and set the Tape selector to the EX position. 13. Set the cassette deck in Rec./Play mode and press the Auto Calibration button. 14. After completion of auto calibration, adjust VR103 (VR203) to obtain 0 dBV (1 V) on the AC voltmeter. 15. Press the TEST button twice, then remove the Test Unit from CN-11.

STEP	ITEM	SIGNAL SOURCE	OUTPUT CONNECTION	MODE	ADJUSTMENT	REMARKS
19	Record Amplifier Equalizer Adjustment	23 kHz (-20 dBV) to Input Jacks	AC Voltmeter to TP103, TP203 on Main P.C.B.	Rec./Pause Eq. - 70 μ s	Main P.C.B. L103 L203	1. Remove the bias-cut jumper from the dip side of the Power Supply P.C.B. Ass'y. 2. Adjust L103 (L203) to obtain peak reading on the AC voltmeter. 3. Re-solder the bias-cut jumper.
20	Remote Control Receiver Gain Adjustment		Oscilloscope to TP302 on Receiver P.C.B.		Receiver P.C.B. L601 L602	1. Remove the gain jumper from the dip side of the Receiver P.C.B. Ass'y. 2. While pressing the Play button of the Remote Control Unit, adjust L601 and L602 to obtain maximum amplitude on the Oscilloscope as shown below. 3. Resolder the gain jumper.



5.3. Playback Frequency Response Adjustment

Figs. 5.4 and 5.5 show the playback amp. circuit for adjustment and the playback equalization curve.

This adjustment will be required if playback level is not sufficient during playing back a 20 kHz PB frequency response tape.

The peaking portion of the equalization curve compensates the gap loss of the playback head. Peaking level can be varied by the shortcircuit of either R143 (R243) or R144 (R244) on the Main P.C.B. Ass'y.

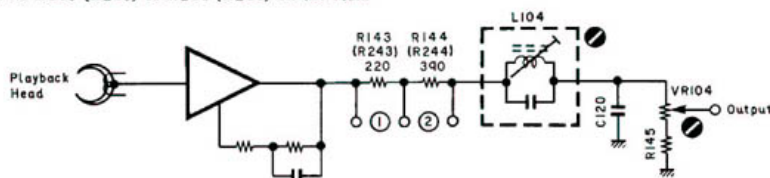


Fig. 5.4 Playback Amp.

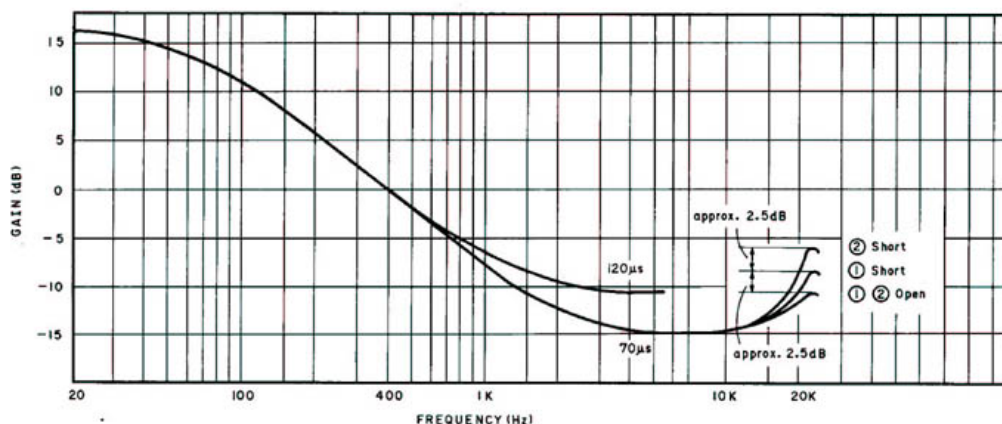


Fig. 5.5 Playback Eq. Curve

6. MECHANISM ASS'Y AND PARTS LIST

6.1. Synthesis

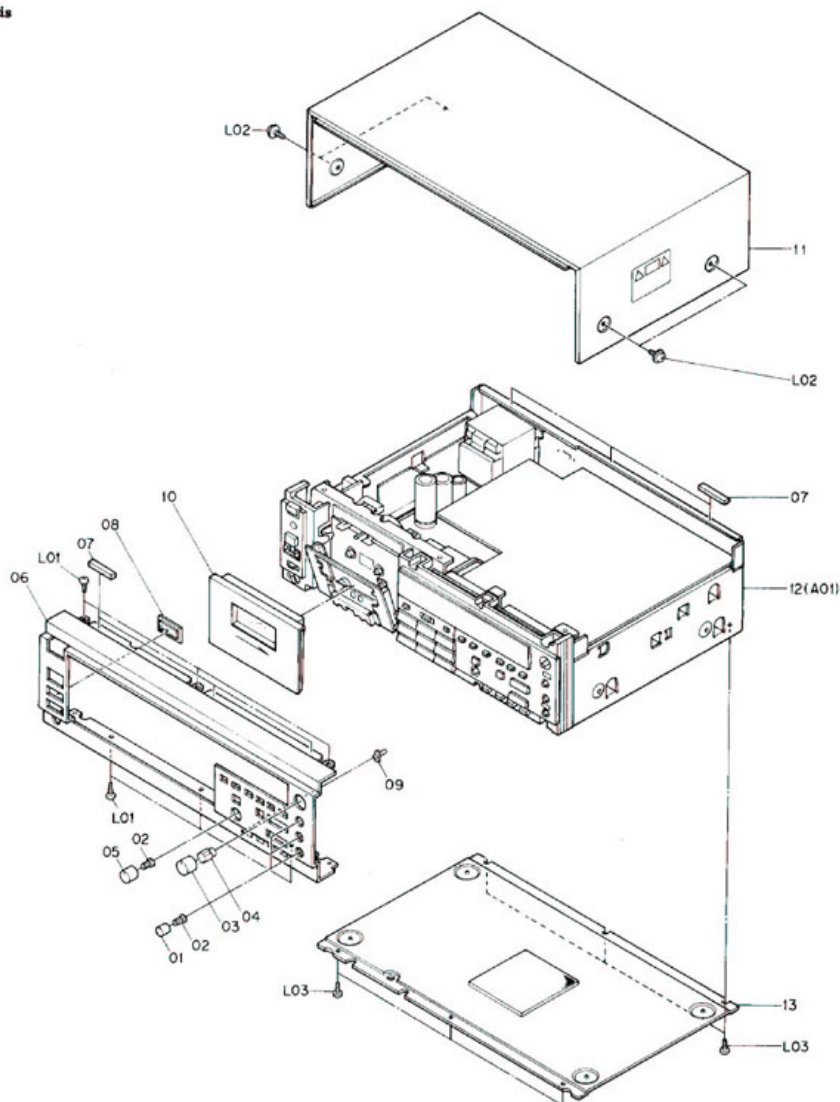


Fig. 6.1

Schematic Ref. No.	Part No.	Description	Q'ty	Schematic Ref. No.	Part No.	Description	Q'ty
		Synthesis					
01	0H04342A	Volume Knob (S)	3		(0H04837B)	Top Cover	(1)
02	0H03737A	Volume Knob Base (S)	4		(0M04377B)	Caution Label	(1)
03	0H04716A	Volume Knob (L)	1	12	(0J04753A)	Vibration Isolating Rubber	(1)
04	0H03739A	Volume Knob Base	1	13	JA04197A	Chassis Ass'y	1
05	0H04343A	Volume Knob (M)	1			Bottom Cover Ass'y (consisting of the followings)	1
06	0H04781A	Front Panel CR-7	1			Bottom Cover	(1)
	0H04797A	Front Panel CR-7A	1		(0J03564A)	Leg T-H	(4)
	0H04782A	Front Panel CR-7E	1		(0J04833A)	Vibration Isolating Rubber B	(1)
	0H04792A	Front Panel CR-70	1		(0M04377B)	Caution Label	(1)
07	0J04550A	Top Cover Cushion A	6		(0E00865A)	BT3x10 @ Binding	(4)
08	0H04777B	Remote Control Sensor Lens	1	—	(0J05158A)	Top Cover Cushion B	2
09	0H04767B	Lens	1	L01	0E00921A	BT3x8 @ Binding	6
10	HA04953A	Cassette Case Cover Ass'y	1	L02	0E03032A	BT4x8 @ Pan Washer-faced (Black Chromate)	4
11	HA05003A	Top Cover Ass'y (consisting of the followings)	1	L03	0E00868A	BT3x8 @ Binding	6

6.2. Chassis Ass'y (A01)

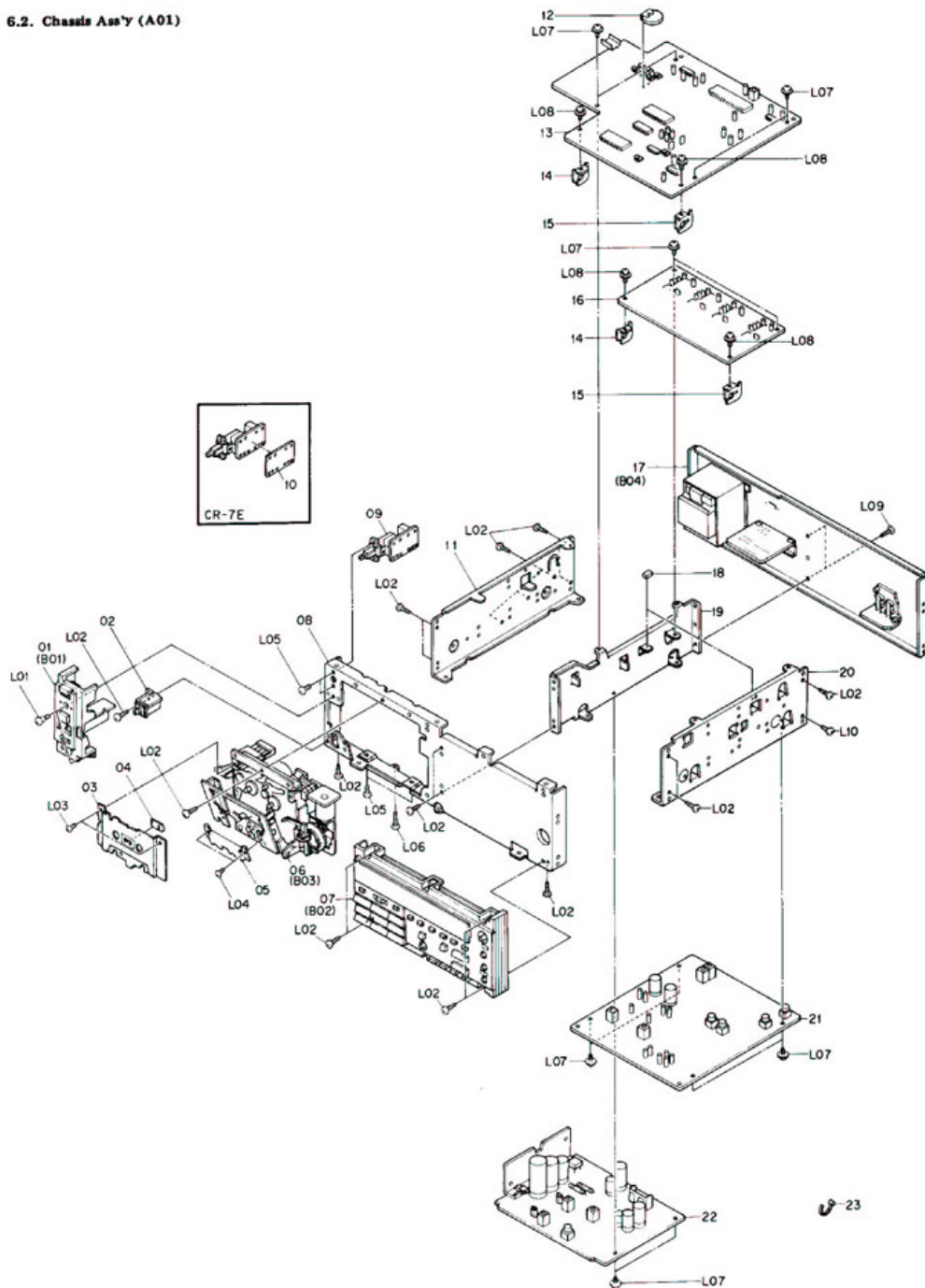


Fig. 6.2

6.3. From

A0	Scherer Ref.
0	0
0	0
0	0
0	0
0	0
0	0
1	1
1	1
1	1
1	1
1	1
1	1
1	1
1	1
2	2
2	2
L _a	-
L _b	L _c
L _c	L _d
L _d	L _e
L _e	L _f
L _f	L _g
L _g	L _h
L _h	L _i

6.3. Front Escutcheon L Ass'y (B01)

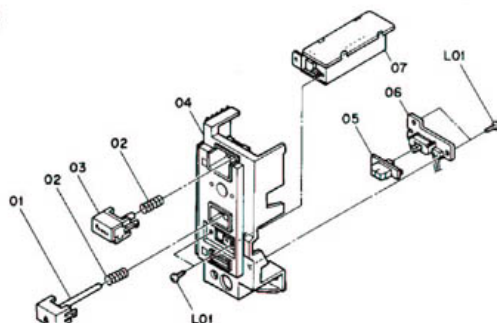


Fig. 6.3

Schematic Ref. No.	Part No.	Description	Qty	Schematic Ref. No.	Part No.	Description	Qty
A01	—	Chassis Ass'y	1	B01	HA04952A	Front Escutcheon L Ass'y Serial No.: A13001001 -	1
01	HA04952A	Front Escutcheon L Ass'y	1	01	HA04909C	Eject Button Ass'y	1
02	BA05918A	Headphone Jack P.C.B. Ass'y	1	02	OJ05084A	Eject Spring	2
03	OH04726B	Cover Plate	1	03	HA04908A	Power Switch Button	1
04	OH04722C	Lens	1	04	OH04740B	Front Escutcheon L	1
05	OH04415B	Head Mounting Cover	1	05	OH04745A	Slide Switch Knob	1
06	CA08761A	Mechanism Ass'y	1	06	BA05917A	Timer Switch P.C.B. Ass'y	1
07	HA04951A	Front Escutcheon R Ass'y	1	07	BA05916A	Receiver P.C.B. Ass'y	1
08	OJ05072B	Front Chassis	1	L01	OE00859A	BT2.6x6 @ Binding	4
09	BA05929A	Power Switch P.C.B. Ass'y CR-7 (Canada) & CR-7A	1				
	BA06072A	Power Switch P.C.B. Ass'y CR-7 (Australia & Others) & CR-7E (UK)	1				
	BA05930A	Power Switch P.C.B. Ass'y CR-7E (Europe)	1				
	BA05928A	Power Switch P.C.B. Ass'y CR-70	1				
10	OJ05107C	Insulator (CR-7E)	1				
11	OJ05073A	Side Chassis L	1				
12	OB90141A	Lithium Battery CR2032-FT	1				
13	BA05914A	Logic P.C.B. Ass'y	1				
14	OJ05080A	P.C.B. Holder L	2				
15	OJ05081A	P.C.B. Holder R	2				
16	BA05931A	Dolby NR P.C.B. Ass'y	1				
17	HA04974A	Rear Panel Ass'y CR-7 (Canada)	1				
	HA04947A	Rear Panel Ass'y CR-7 (Australia)	1				
	HA04946A	Rear Panel Ass'y CR-7 (Others)	1				
	HA04944A	Rear Panel Ass'y CR-7A	1				
	HA04943A	Rear Panel Ass'y CR-7E (UK)	1				
	HA04948A	Rear Panel Ass'y CR-7E (Europe)	1				
	HA04945A	Rear Panel Ass'y CR-70	1				
18	OJ05115A	P.C.B. Cushion	2				
19	OJ05075B	Center Chassis	1				
20	OJ05074A	Side Chassis R	1				
21	BA05932A	Main P.C.B. Ass'y	1				
22	BA05922A	Power Supply P.C.B. Ass'y CR-7 (Canada & Others) & CR-7A	1				
	BA05923A	Power Supply P.C.B. Ass'y CR-7 (Australia) & CR-7E	1				
	BA05921A	Power Supply P.C.B. Ass'y CR-70	1				
23	OB08515A	Insu-Lock	19				
—	OJ05144A	Motor Cushion A	1				
—	OJ05145A	Motor Cushion B	1				
L01	OE03135B	M3x8 @ Binding	2				
L02	OE00868A	BT3x8 @ Binding	20				
L03	OE00939A	BT2.6x4 @ Pan (Black Chromate)	2				
L04	OE03202A	M2.6x3 @ Binding (Black Chromate)	2				
L05	OE00896A	M3x6 @ Binding	4				
L06	OE00865A	BT3x10 @ Binding	1				
L07	OE03157A	BT3x8 @ Binding Washer-faced	12				
L08	OE00606A	M3x6 @ Pan (3A)	4				
L09	OE00921A	BT3x8 @ Binding (Black Chromate)	2				
L10	OE00857A	BT3x6 @ Binding	1				
—	OE00037A	Earth Lug B-5	1				

6.4. Side Mold R Assy (B02)

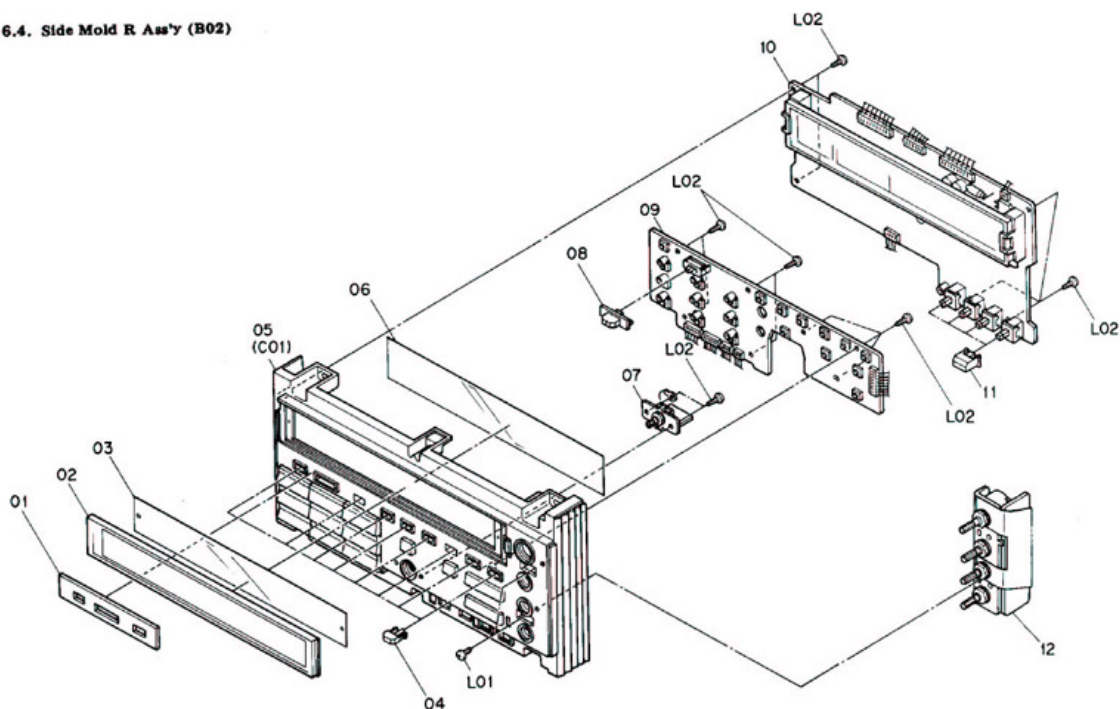


Fig. 6.4

Schematic Ref. No.	Part No.	Description	Qty
B02	HA04951A	Front Escutcheon R Assy Serial No.: A13001001 -	1
01	OH04778A	Front Plate	1
02	OH04711C	Display Lens	1
03	OJ05066B	Display Filter B	1
04	OH04736A	Push Button (S)	8
05	HA04957A	Front Escutcheon R Sub Assy	1
06	OJ05065A	Display Filter A	1
07	BA05920A	Azimuth Control P.C.B. Ass'y	1
08	OH04745A	Slide Switch Knob Ass'y	1
09	BA05926A	Control Switch P.C.B. Ass'y	1
10	BA05925A	Display P.C.B. Ass'y	1
11	OH04738A	Push Switch Button (L)	4
12	BA05919A	Volume P.C.B. Ass'y	1
L01	OE00896A	M3x6 @ Binding	2
L02	OE00857A	BT3x6 @ Binding	14



12

Schematic Ref. No.	Part No.	Description	Qty	Schematic Ref. No.	Part No.	Description	Qty
B03	CA08761A	Mechanism Ass'y Serial No.: A13001001 -	1	85	OC81392A	Mechanism Holder	1
01	OC81322A	Eject Lever Holder	1	86	OC81390A	Azimuth Arm	1
02	OC81321A	Eject Lever B	1	87	OC81395B	Azimuth Idler Gear	1
03	OC81323A	Eject Lever B Spring	1	88	OC81394A	Azimuth Chassis	1
04	OC80020A	Eject Lever A Spring	1	89	OC81397A	Azimuth Cam Gear	1
05	OC81465A	Eject Lever A	1	90	OC81401A	Thrust Spring C	1
06	CA80006A	Pneumatic Damper Ass'y	1	91	OC81398A	Limit Switch	2
07	OC80019A	Eject Spring	1	92	OB07240A	Volume 10K (B)	1
08	OC80018B	Cassette Case Holder L	1	93	CA80361A	Azimuth Motor P.C.B. Ass'y	1
09	OC80617A	Back Tension Arm Spring	1	94	OC81396A	Azimuth Motor	1
10	OC80618A	Back Tension Arm Collar	1	95	OC81400A	SP-H Connector	1
11	OC80619A	Back Tension Arm	1	96	OC80037A	Innu-Lock	3
12	OC80620A	Back Tension Pulley	1	97	OC81317A	7P-H Connector	1
13	OC80621A	Back Tension Belt	1	L01	OE03229A	FT2.5x6 @ Pan	18
14	OC80013A	Lock Lever Spring	1	L02	OE00181A	E-Ring 3mm	4
15	OC80014A	Lock Lever Collar	1	L03	OE03235A	Washer 2x5x0.25 (Plastics)	1
16	OC80015A	Lock Lever	1	L04	OE03052A	CS Stopper Ring 2.4mm	2
17	OC81421A	Height Adjustment Nut	1	L05	OE03236A	M2x5 @ Pan (2A)	4
18	CA80366A	Supply Pressure Roller Ass'y	1	L06	OE03043A	FT2.5x10 @ Pan	2
19	CA81420A	Supply Pressure Roller Spring	1	L07	OE03225A	Washer 1.8x3.8x0.5	1
20	OC81422A	Supply Pressure Roller Thrust Spring	1	L08	OE03226A	Washer 2.1x4.5x0.1	3
21	CA80201A	Take-up Reel Hub Ass'y	2	L09	OE00222A	E-Ring 2mm	2
22	OC80612A	Spring Holder	2	L10	OE03049A	Washer 1.8x3.2x0.5	2
23	OC80614A	Supply Reel Hub Spring	1	L11	OE00976A	M2x5 @ Binding	5
24	CA80200A	Cassette Case Ass'y	1	L12	OE00025A	Washer 2mm (Spring)	2
25	OC80762A	Head Height Adjustment Gear	2	L13	OE00117A	Washer 2x4.3x0.4	5
26	OC80761A	Head Height Adjustment Screw	4	L14	OE03018A	M2x5 @ Pan	6
27	OC80763A	Azimuth Alignment Screw	1	L15	OE00042A	E-Ring 1.5mm	1
28	OC81389A	Head Mount Plate	1	L16	OC08774A	Plate Washer L	1
29	CA80659B	R-3L Record Head Ass'y	1	L17	OC08773A	Plate Washer R	1
30	OC80776A	Head Plate Spring (L)	1	L18	OE03228A	FT3x4 @ Pan	1
31	OC81376A	4P-H Connector R	1	L19	OE03232A	M1.7x7 @ Pan	1
32	OC81326A	Lamp Holder	1	L20	OE03222A	Washer 1.8x3.8x0.3	1
33	OC81327A	Lamp	1	L21	OE03234A	M2x3 @ Pan	2
34	OC81402A	Rubber Cap	1	L22	OE03035A	M2x3.2 @ Truss	3
35	OC80003A	Head Base Hold Plate	1	L23	OE03227A	Washer 2.7x5x0.5	2
36	OC80004A	Steel Ball 3mm	1	L24	OE03231A	M2x30 @ Pan	2
37	GA02201A	E-4F Erase Head	1	L25	OE00698A	E-Ring 2.5mm	1
38	OC81387A	3P-H Connector E	1	L26	OE03041A	FT2.5x4 @ Pan	5
39	OC80768A	E.H. Hold Plate	1	L27	OE03233A	Washer 2.6x8x1	1
40	OC80889A	E.H. Hold Plate Tapering Spring	2	L28	OE03230A	ST2.6x12 @ Pan	1
41	OC80886A	E.H. Hold Plate Spring	1	L29	OE03245A	Washer 1.3x3.3x0.3 (Plastics)	1
42	OC80007A	Steel Ball 2mm	3	L30	OE03237A	Nut Hex. M2.6	1
43	OC80826D	Azimuth Alignment Screw	1	L31	OE03045A	M2.6x3 @ Binding	2
44	OC81391A	Azimuth Alignment Screw Stopper	1	L32	OE00694A	Nut Hex. M2	1
45	OC81393A	Azimuth Alignment Plate	1	L33	OE00691A	M2x3 @ Pan	5
46	CA08755A	P2H-3L Playback Head Ass'y	1	L34	OE03044A	FT2.5x20 @ Pan	1
47	OC80775A	Head Plate Spring R	1	L35	OC81404A	Washer 2.9x7.5x0.5	2
48	OC81375A	4P-H Connector F	1	L36	OE03062A	Washer 2.6mm (Plastics)	1
49	OC08771A	Tape Guide Plate	1	L37	OE00993A	Stopper Ring 6mm	1
50	CA80365A	Head Base Ass'y	1	L38	-	Nut	(1)
51	OC80613A	Take-up Reel Hub Spring	1	L39	-	Washer	(1)
52	CA80368A	Take-up Pressure Roller Ass'y	1	L40	OC81403A	M1.7x5 @ Pan	2
53	OC81423A	Take-up Pressure Roller Spring	1				
54	OC80610A	Cassette Case Spring	1				
55	OC81424A	Switch Hold Plate	1				
56	OC80623A	Switch Plate	1				
57	OC80626A	Leaf Switch	3				
58	OC81315A	Switch Collar C	2				
59	OC81320A	Metal Sensor Lever Spring	1				
60	OC81319A	Metal Sensor Lever	1				
61	OC80017B	Record Protector Lever	2				
62	CA80367A	Mechanism Chassis	1				
63	OC80022B	Cassette Hold Spring	1				
64	OC81325A	Mechanism Holder B	1				
65	CA80360A	Shut-off P.C.B. Ass'y	1				
66	CA80204A	Brake Ass'y	1				
67	OC80628A	Brake Spring B	1				
68	OC80630A	Brake Arm Collar	1				
69	OC80629A	Brake Arm	1				
70	OC80030A	Reel Motor Holder	1				
71	OC80635B	Idler Pulley	1				
72	CA80205A	Reel Motor Ass'y	1				
73	CA80364A	D.D. Motor Ass'y	1				
74	OC81388A	10P-H Connector	1				
75	OC81417A	Cam Gear B	1				
76	OC81418A	Control Motor Holder	1				
77	OC80027A	Mode Switch	1				
78	OC81416A	Thrust Spring B	1				
79	OC81419A	Joint Angle	1				
80	OC81415A	Thrust Bushing	1				
81	CA80007A	Control Motor Ass'y	1				
82	OC80010D	Cassette Case Holder R	1				
83	OC80012A	Eject Sensor	1				
84	OC81399A	Joint Arm	1				

6.5. Mechanism Ass'y (B03)

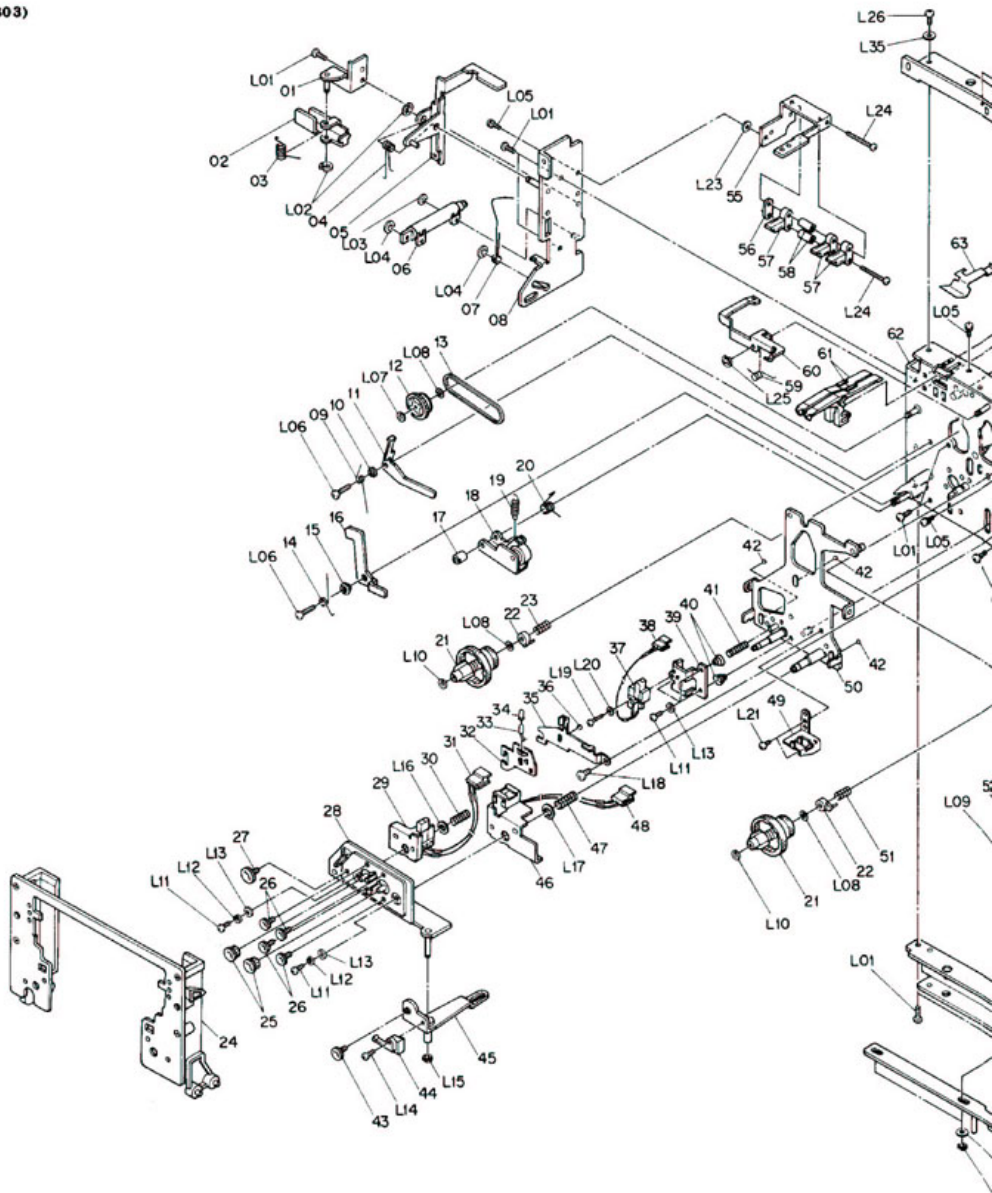


Fig. 6.5

6.6. Rear Panel Ass'y (B04)

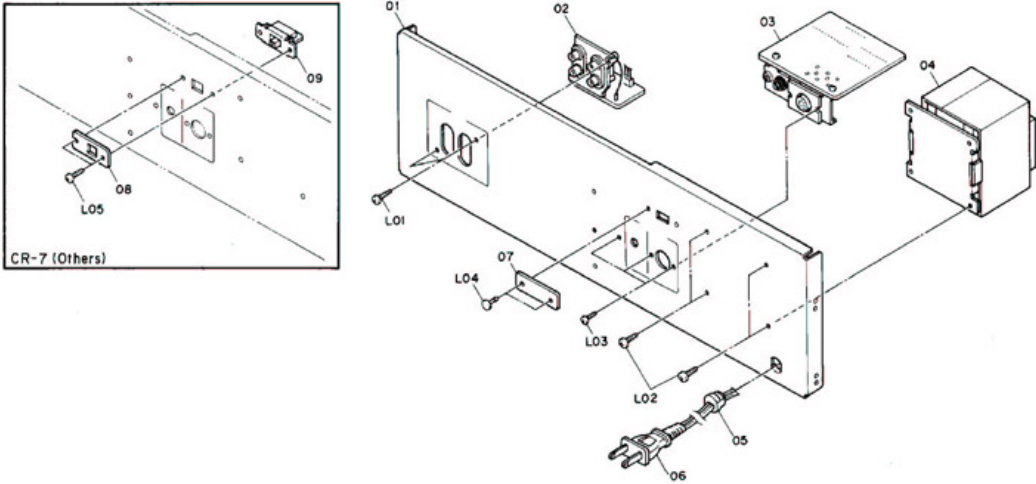


Fig. 6.6

6.7. Front Escutcheon R Sub Ass'y (C01)

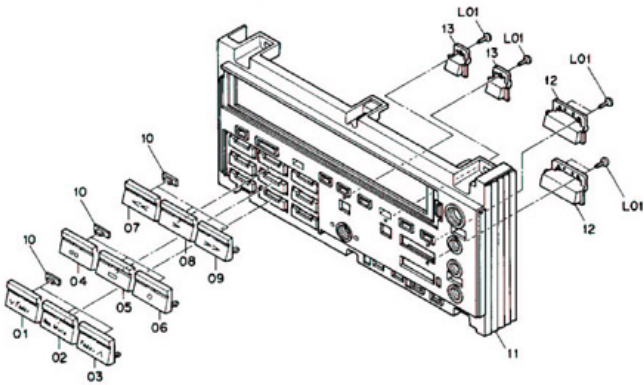


Fig. 6.7

6.8. D.D. Motor Ass'y (D01)

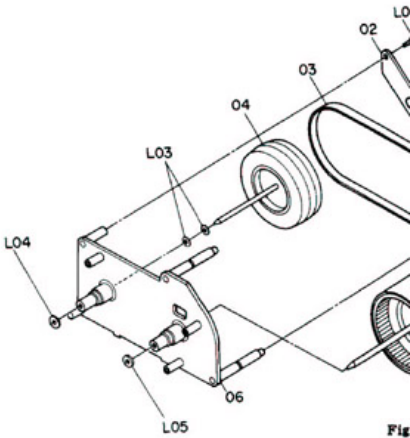


Fig. 6.8

7. MOUNTING DIAGRAMS AND PARTS LIST

Notes: 1. Mounting diagram shows a dip side view of the printed circuit board.

2. Diode is 1SS53, 1S1555, or 1SS176 unless otherwise specified.

3. Following transistors are interchangeable with each other.

a. 2SA733, 2SA608SP, 2SA1048, 2SA1175

b. 2SC945, 2SC536SP, 2SC2458, 2SC2785

4. Abbreviation for part name:

TR — Transistor, SiD — Silicon Diode, GD — Germanium Diode, ZD — Zener Diode

RK — Carbon Resistor, RM — Metal Film Resistor, RF — Fail Safe Type Resistor, RW — Wire Wound Resistor

CE — Electrolytic Capacitor, CM — Mylar Capacitor, CC — Ceramic Capacitor, CP — PP Capacitor,

CT — Tantalum Capacitor, CF — Film Capacitor, C — Mica Capacitor

7.1. Power Switch P.C.B. Ass'y

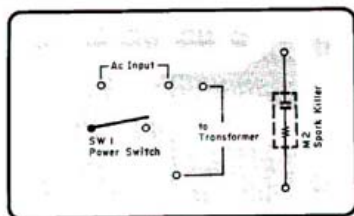


Fig. 7.1

7.2. Shut-off P.C.B. Ass'y

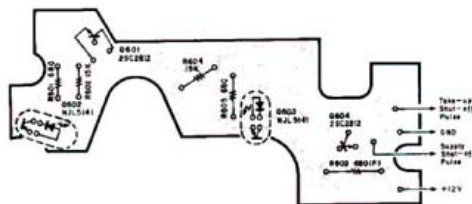


Fig. 7.2

7.3. Azimuth Motor P.C.B. Ass'y
Mounting diagram is omitted.

7.4. Timer Switch P.C.B. Ass'y

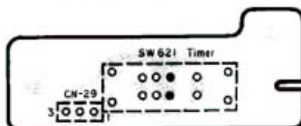


Fig. 7.3

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

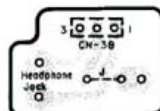


Fig. 7.4

7.6. Azimuth Control P.C.B. Ass'y

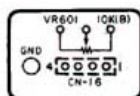


Fig. 7.5

Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description
	BA05929A	Power Switch P.C.B. Ass'y CR-7 (Canada) & CR-7A		CA80360A	Shut-off P.C.B. Ass'y		BA05918A	Headphone Jack P.C.B. Ass'y
	BA06072A	Power Switch P.C.B. Ass'y CR-7 (Australia & Others) & CR-7E (UK)		OC80047A	Shut-off P.C.B. Ass'y		OB60287A	Headphone Jack P.C.B.
	BA05930A	Power Switch P.C.B. Ass'y CR-7E (Europe)		OB06388A	Photoreflexor		OB82585A	3P-H Connector
	BA05928A	Power Switch P.C.B. Ass'y CR-70		OB06389A	NJL5141		OB81478A	Headphone Jack (1)
	OB60295A	Power Switch P.C.B.		OB09840A	RK 680 Leadless		OJ05077A	Headphone Holder (1)
SW1	OB70002A	Power Switch		OB09841A	RK 15K Leadless		OJ05092A	Snap Plate (1)
M2	OB08342A	Spark Killer CR-7 (Canada) & CR-7A		OB22651A	RM 680 1/4W F			
	OB08955A	Spark Killer CR-7 (Australia & Others) & CR-7E (UK)		CA80361A	Azimuth Motor P.C.B. Ass'y		BA05920A	Azimuth Control P.C.B. Ass'y
	OB08445A	Spark Killer CR-7E (Europe)		OC81383A	Azimuth Motor P.C.B.		OB60289A	Azimuth Control P.C.B.
	OB08363A	Spark Killer CR-70		OB06109A	SiD GP08B		OB30052A	Volume 10K (B)
	OB90069A	Spark Killer Cover CR-7E (Europe)		OB32047A	Semi VR 2.2K (B)		OB82565A	4P-H Connector
	OE00752A	Eyelet 2x3 (2)		OB09292A	CC 0.1μ 50V Z		OJ05069A	Bias Plate (1)
				BA05917A	Timer Switch P.C.B. Ass'y		BA05950A	Earth Lug Ass'y (1)
				OB60286A	Timer Switch P.C.B.			
				OB07437A	Slide Switch 2-3			
				OB82578A	3P-H Connector			

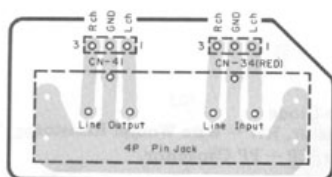


Fig. 7.6

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

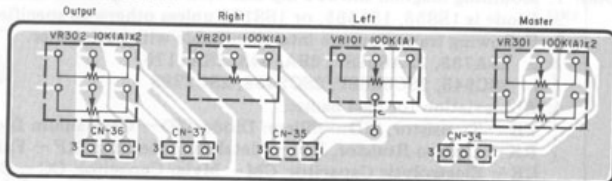


Fig. 7.7

7.9. Receiver P.C.B. Ass'y

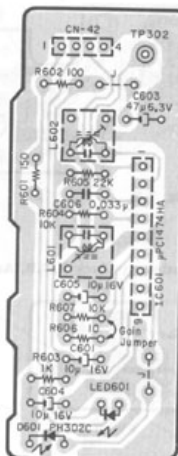


Fig. 7.8

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

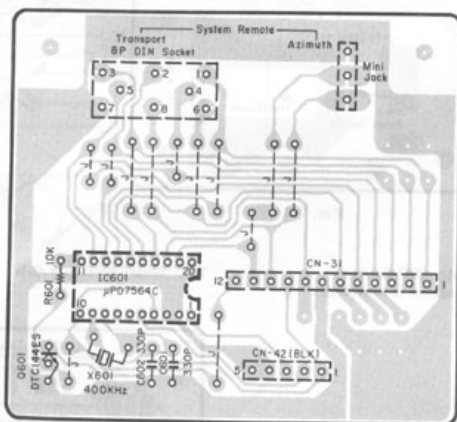


Fig. 7.9

Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description
CN34 CN41	BA05927A	Pin Jack P.C.B. Ass'y	IC601 D601 LED601	BA05916A	Receiver P.C.B. Ass'y	IC601 Q601 X601 R601 C601,602 CN31 CN42	BA05915A	Remote Control P.C.B. Ass'y
	OB60294A OB81229A OB82587A OB81477A BA06082A	Pin Jack P.C.B. 3P-T Post (Red) 3P-H Connector 4P Pin Jack (1) Earth Lug Ass'y (1)		OB60285B OB11192A OB12352A OB12353A	Receiver P.C.B. IC μ PC1474HA PIN Diode PH302C LED (Green) SLB-26MG-N		OB60284B	Remote Control P.C.B. IC μ PD7564C TR DTC144ES Crystal 400kHz RK 10K 1/6W J CC 330P 50V K 12P-H Connector 5P-S Post (Black) 8P DIN Socket (1) Mini Stereo Jack (1) DIN Bracket (1) BT3x8 @ Binding (2)
VR101,201 VR301 VR302 CN34 CN35 CN36 CN37	BA05919A	Volume P.C.B. Ass'y	L601,602 R601 R602 R603 R604,607 R605 R606 C601,604 605 C603 C606 CN42	OB51220A OB09657A OB09653A OB09677A OB09701A OB09709A OB09629A OB40009A	L-C Block RK 150 1/6W J RK 100 1/6W J RK 1K 1/6W J RK 10K 1/6W J RK 22K 1/6W J RK 10 1/6W J CE 10 μ 16V			
	OB60288B OB30050A OB30049A OB30051A OB82581A OB82582A OB82583A OB82584A OJ05068A OJ05113A	Volume P.C.B. Volume 100K (A) Volume 100K (A)x2 Volume 10K (A)x2 3P-H Connector 3P-H Connector 3P-H Connector 2P-3PH Connector Volume Holder (1) Shield Plate (1)		OB40004A OB05583A OB82588A OB81085A OJ05110A	CE 47 μ 6.3V CM 0.033 μ 50V J 4P-5P Connector Wire Mate 2P (1) Shield Case (1)			

	BA05926A	Control Switch F.C.B. Ass'y
	OB60293A	Control Switch P.C.B.
D601.602 603.604 605	OB06398A	SID 1SS176
LED601 602,603 604,605	OB12274A	LED (Green) SLR-34MG3
LED606 607,608 609	OB12275A	LED (Red) SLR-34VR3
R601	OB09677A	RK 1K 1/6W J
R602	OB01856A	RK 8.2K 1/4W J
R603	OB01857A	RK 1K 1/4W J
SW601-621	OB70062A	Tact Switch
SW622	OB07437A	Slide Switch 2-3
CN9	OB82560A	7P-H Connector
CN12	OB82562A	6P-H Connector
CN13	OB82563A	4P-H Connector
CN25	OB82574A	4P-H Connector
CN28	OB82577A	8P-H Connector
CN30	OB82579A	3P-H Connector
	OB05087A	LPH Holder (9)

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

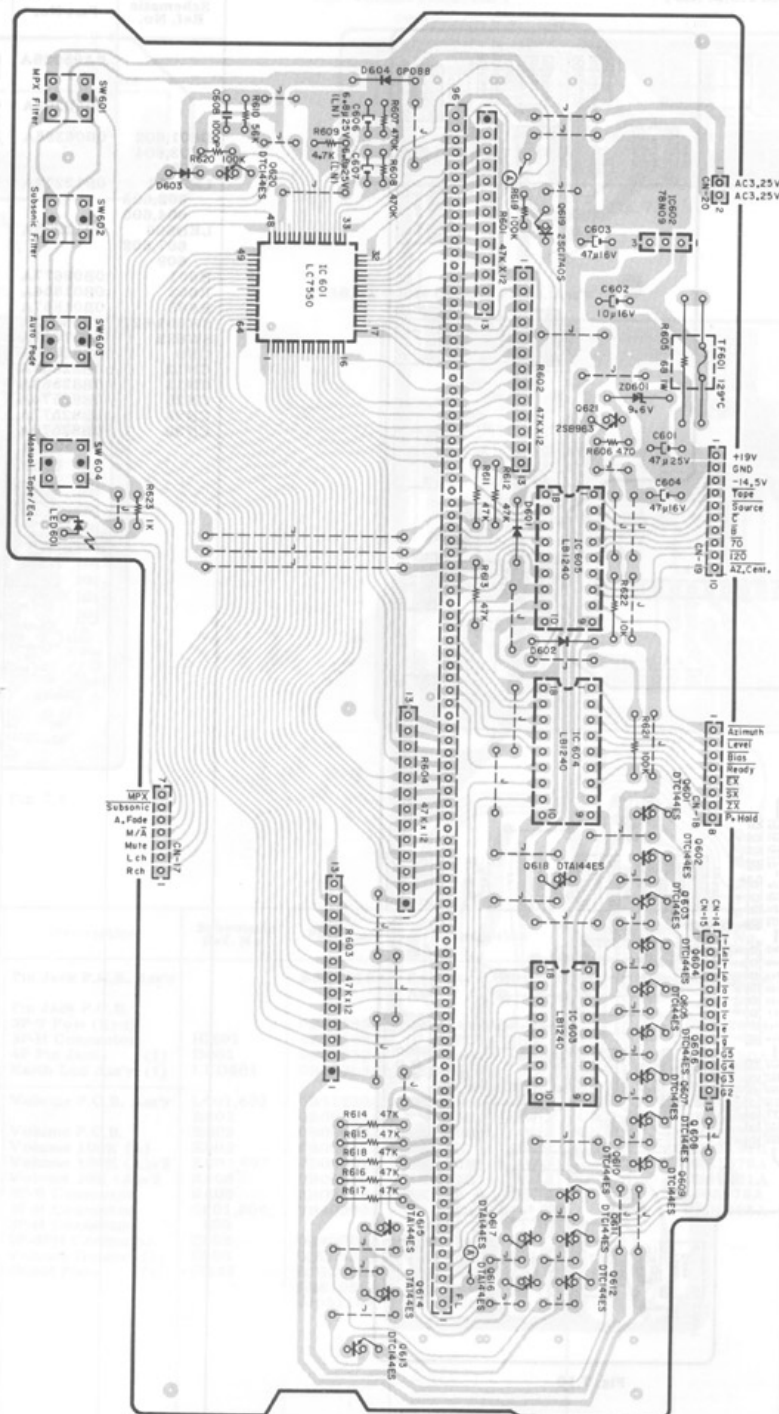


Fig. 7.11

Schematic Ref. No.	Part No.	Description
	BA05925A	Display F.C.B. Ass'y
IC601	OB60291A	Display F.C.B.
IC602	OB11194A	IC LC7550
IC603,604	OB11195A	IC L78N09
605	OB11193A	IC LB1240
Q601-613	OB10062A	TR DTC144ES
620		(14)
Q614,615	OB10053A	TR DTA144ES
616,617		
618		
Q619	OB10030A	TR 2SC1740S
		(Q.R.S.E)
Q621	OB10144A	TR 2SB963 (L,K)
ZD601	OB12272A	ZD 9.5V
		MTZ10B T-77
D601,602	OB06181A	SID 1SS53
D603	OB06398A	SID 1SS176
D604	OB06109A	SID GP08B
LED601	OB12354A	LED (Red)
		SLR-34VR5
R601,602	OB21013A	R-Network 47Kx12
603,604		
R605	OB24021A	RF 68 1W J
R606	OB09669A	RK 470 1/6W J
R607,608	OB09741A	RK 470K 1/6W J
R609	OB09693A	RK 4.7K 1/6W J
R610	OB09719A	RK 56K 1/6W J
R611-618	OB05641A	RK 47K 1/4W J
		(8)
R619,620	OB09725A	RK 100K 1/6W J
R621	OB01889A	RK 100K 1/4W J
R622	OB01888A	RK 10K 1/4W J
R623	OB09677A	RK 1K 1/6W J
C601	OB40036A	CE 47μ 25V
C602	OB40009A	CE 10μ 16V
C603,604	OB40012A	CE 47μ 16V
C606,607	OB09219A	CE 6.8μ 25V (LN)
C608	OB05550A	CM 1000P 50V J
SW601,602	OB70014A	Push Switch
603,604		
TF601	OB08715A	Thermal Fuse 129°C
CN14/15	OB82564A	13P-H Connector
CN17	OB82566A	7P-H Connector
CN18	OB82567A	8P-H Connector
CN19	OB82568A	10P-H Connector
CN20	OB82569A	2P-H Connector
	OB90169A	FL Indicator (1)
	OJ05067A	LED Holder (1)
	OJ05071C	Display Holder (2)
	OB05339B	3P Flat Cable (1)
	OE00857A	BT3x6 @ Binding (2)

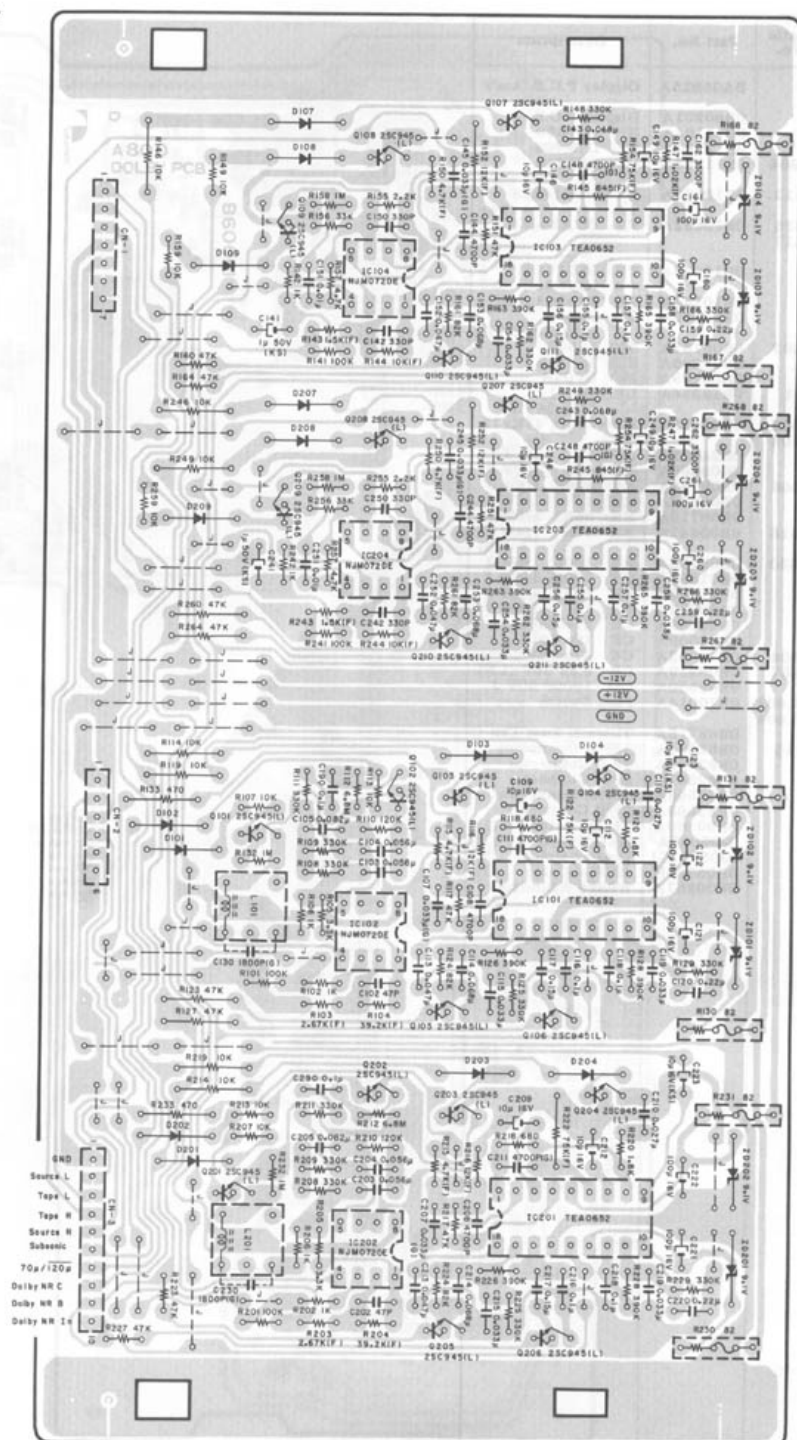


Fig. 7.12

Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description
	BA05931A	Dolby NR P.C.B. Ass'y	R147,247	OB22230A	RM 1.02K 1/6W F
	— Encoder —		R148,162	OB09737A	RK 330K 1/6W J
IC101,201	OB11205A	IC TEA0652	166,248		
IC102,202	OB11005A	IC NJM072DE	262,266	OB09701A	RK 10K 1/6W J
Q101-106	OB01872A	TR 2SC945L (P,Q)	R149,159		
201-206		(12)	259	OB22305A	RM 4.7K 1/6W F
ZD101,102	OB06232A	ZD 9.1V RD9.1EB2	R150,250	OB09717A	RK 47K 1/6W J
201,202			R151,160		
D101-104	OB06181A	SID 1SS53 (8)	164,251	OB09796A	RM 12K 1/4W F
201-204			R152,252	OB22443A	RM 75K 1/6W F
L101,201	OB51225A	L-C Block 36mH	R154,254	OB09685A	RK 2.2K 1/6W J
R101,201	OB09725A	RK 100K 1/6W J	R155,255	OB09713A	RK 33K 1/6W J
R102,106	OB09677A	RK 1K 1/6W J	R156,256	OB09693A	RK 4.7K 1/6W J
202,206			R157,257	OB09749A	RK 1M 1/6W J
R103,203	OB22275A	RM 2.67K 1/6W F	R158,258	OB09723A	RK 82K 1/6W J
R104,204	OB22410A	RM 39.2K 1/6W F	R161,261	OB09739A	RK 390K 1/6W J
R105,205	OB09689A	RK 3.3K 1/6W J	R163,165		
R107,113	OB09701A	RK 10K 1/6W J	263,265	OB24024A	R-Fuse 82
207,213			R167,168	OB05641A	RK 47K 1/4W J
R108,109	OB09737A	RK 330K 1/6W J	267,268	OB09814A	CE 1u 50V (KS)
111,125			R260,264	OB09322A	CP 330P 100V J
129,208			C141,241		
209,211			C142,150	OB09866A	CF 0.068u 50V J
225,229			242,250		
R110,210	OB09727A	RK 120K 1/6W J	C143,153		
R112,212	OB09347A	RM 6.8M 1/4W J	243,253	OB05652A	CM 4700P 50V J
R114,119	OB01888A	RK 10K 1/4W J	C144,244	OB09240A	CP 0.033u 100V G
214,219			C145,245	OB01412A	CE 10u 16V
R115,215	OB22305A	RM 4.7K 1/6W F	C146,149		
R116,216	OB22351A	RM 12K 1/6W F	246,249	OB09191A	CP 4700P 100V G
R117,217	OB09717A	RK 47K 1/6W J	C148,248	OB05681A	CM 0.01u 50V J
223,227			C151,251	OB09864A	CF 0.047u 50V J
R118,218	OB09673A	RK 680 1/6W J	C152,252	OB09862A	CF 0.033u 50V J
R120,220	OB09683A	RK 1.8K 1/6W J	C154,158		
R122,222	OB09562A	RM 75K 1/4W F	254,258	OB09868A	CF 0.1u 50V J
R123,127	OB05641A	RK 47K 1/4W J	C155,157		
R124,224	OB09723A	RK 82K 1/6W J	255,257	OB09870A	CF 0.15u 50V J
R126,128	OB09739A	RK 390K 1/6W J	C156,256	OB09872A	CF 0.22u 50V J
226,228			C159,259	OB01400A	CE 100u 16V
R130,131	OB24024A	R-Fuse 82	C160,161		
230,231			260,261	OB01914A	CM 3300P 50V J
R132,232	OB09749A	RK 1M 1/6W J	C162,262		
R133,233	OB05576A	RK 470 1/4W J		— Miscellaneous —	
C101,201	OB09814A	CE 1u 50V (KS)	CN1	OB60061D	Dolby NR P.C.B.
C102,202	OB09242A	C 47P 50V J	CN2	OB82506A	7P-H Connector
C103,104	OB09865A	CF 0.056u 50V J	CN3	OB82507A	6P-H Connector
203,204				OB82508A	10P-H Connector
C105,205	OB09867A	CF 0.082u 50V J			
C107,207	OB09240A	CP 0.033u 100V G			
C108,208	OB05652A	CM 4700P 50V J			
C109,112	OB01412A	CE 10u 16V			
209,212					
C110,210	OB09045A	CM 0.027u 50V J			
C111,211	OB09191A	CP 4700P 100V G			
C113,213	OB09864A	CF 0.047u 50V J			
C114,214	OB09866A	CF 0.068u 50V J			
C115,119	OB09862A	CF 0.033u 50V J			
215,219					
C116,118	OB09868A	CF 0.1u 50V J			
190,216					
218,290					
C117,217	OB09870A	CF 0.15u 50V J			
C120,220	OB09872A	CF 0.22u 50V J			
C121,122	OB01400A	CE 100u 16V			
221,222					
C123,223	OB09816A	CE 10u 16V (KS)			
C130,230	OB09409A	CP 1800P 100V G			
	— Decoder —				
IC103,203	OB11205A	IC TEA0652			
IC104,204	OB11005A	IC NJM072DE			
Q107-111	OB01872A	TR 2SC945L (P,Q)			
207-211		(10)			
ZD103,104	OB06232A	ZD 9.1V RD9.1EB2			
203,204					
D107-109	OB06181A	SID 1SS53 (6)			
207-209					
R141,241	OB09725A	RK 100K 1/6W J			
R142,242	OB09677A	RK 1K 1/6W J			
R143,243	OB22247A	RM 1.5K 1/6W F			
R144,244	OB09929A	RM 10K 1/6W F			
R145,245	OB22549A	RM 845 1/4W F			
R146,246	OB01888A	RK 10K 1/4W J			
249					

7.14. Power Supply P.C.B. Assy

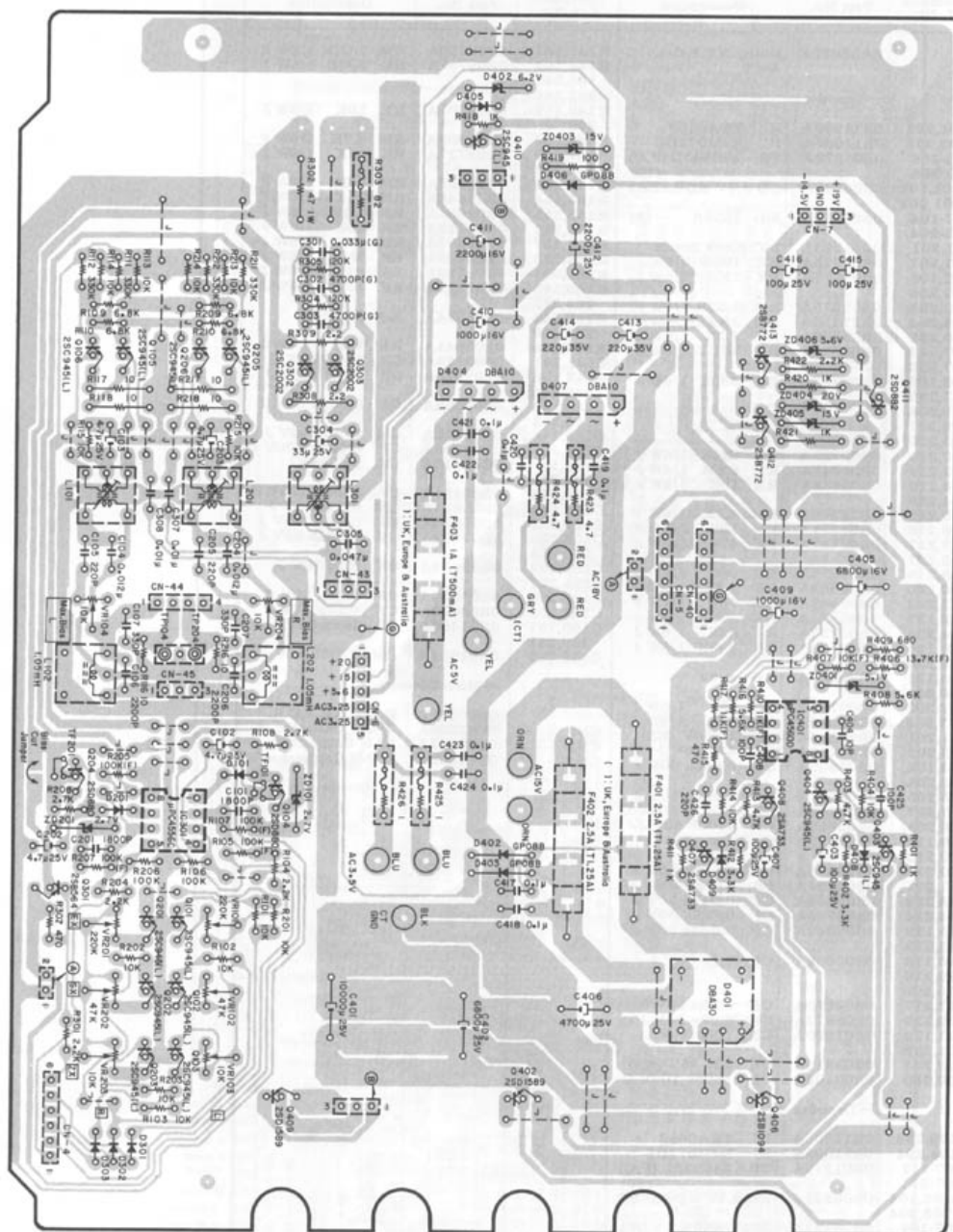


Fig. 7.13

Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description
	BA05922A	Power Supply P.C.B. Assy CR-7 (Canada & Others) & CR-7A	C104,204 C105,205 426	OB09794A OB41394A	CP 0.012μ 100V J CP 220P 50V J
IC301 IC401 Q101,102 103,105 106,201 202,203 205,206 403,404 410	OB60290A OB06216A OB06217A OB01872A	Power Supply P.C.B. IC μPC4556C IC μPC4560D TR 2SC945L (P,Q)	C106,206 C107,207 C301 C302,303 C304 C305 C307,308 C401 C402 C403,407 415,416	OB09834A OB09322A OB09240A OB09191A OB09251A OB09248A OB05681A OB40365A OB40364A OB01272A	CP 2200P 100V J CP 330P 100V J CP 0.033μ 100V G CP 4700P 100V G CE 33μ 25V CP 0.047μ 100V J CM 0.01μ 50V J CE 10000μ 25V CE 6800μ 25V CE 100μ 25V
Q104,204 Q301 Q302,303 Q402,409 Q406 Q407,408 Q411 Q412,413 ZD101,201 ZD401	OB06255A OB06069A OB06322A OB10107A OB10106A OB06013A OB06316A OB06303A OB12103A OB12147A	TR 2SD880 (Y) TR 2SB564 (L,M) TR 2SC2002 (K,L) TR 2SD1585 (L,K) TR 2SB1094 (L,K) TR 2SA733 (P,Q) TR 2SD882 (P,Q) TR 2SB772 (P,Q) ZD 2.7V RD2.7EB2 ZD 5.1V	C404 C405 C406 C408,425 C409,410 C411 C412 C413,414 C417-424	OB41628A OB40362A OB40197A OB41386A OB40360A OB40361A OB40363A OB05831A OB09292A	C 10P 100V J CE 6800μ 16V CE 4700μ 25V CP 100P 50V J CE 1000μ 16V CE 2200μ 16V CE 2200μ 25V CE 220μ 35V CC 0.1μ 50V Z (8)
ZD402	OB12153A	RD5.1JS-T1B2 ZD 6.2V	TF101,201 F401,402 F403	OB08715A OB08962A OB08374A	Thermal Fuse 129°C Fuse 2.5A Fuse 1A
ZD403,405 ZD404 ZD406	OB12321A OB12330A OB12150A	ZD 15V MTZ15C ZD 20V MTZ20C ZD 5.6V	CN4,5,40 CN4 CN5 CN6 CN6 CN7 CN40 CN43 CN44	OB81013A OB82556A OB82557A OB81012A OB82558A OB82559A OB82586B OB81488A OB81476A OB81227A	Dip Mate 6P 6P-H Connector 6P-H Connector Dip Mate 5P 5P-H Connector 3P-H Connector 6P-H Connector 3P-T Post 4P-T Post (Blue) 3P-T Post (White)
D101,201 301,302 303,405 408,409	OB06398A	SID 1SS176		OB82589A OB81010A OB81002A OB82120B OB82590A OB90005A	(1) 3P-H Connector (1) Dip Mate 3P (3) Dip Mate 2P (2) 3P Ribbon Cable (1) 2P Ribbon Cable (1) Insu-Lock 204mm
D401 D402,403 406 D404,407 L101,201 L102,202 L301	OB06283A OB06109A OB06282A OB06646B OB06705A OB51221B	Diode Bridge DBA30 SID GP08B Diode Bridge DBA10 Bias Osc. Coil Trap Coil 1.05mH Erase Osc. Coil	TP104/204	OE00507A OJ04485A OJ05079A OE00607A	Nut Hex. M3 (2) Heat Sink B (1) Heat Sink (1) M3x8 @Pan (3A)
VR101,201 VR102,202 VR103,104 203,204 R101,102 103,113 114,115 201,202 203,213 214,215 404,414 R104,204 301,422 R105,107 205,207 R106,206 R108,208 R109,110 209,210 R111,112 211,212 R116,216 R117,118 217,218 R302 R303 R304,305 R307,415 R308,309 R401,411 418,420 421 R402,412 R403,413 R406 R407 R408,416 R409 R410,417 R419 R423,424 R425,426 C101,201 C102,103 202,203	OB32066A OB32064A OB32061A OB09701A OB09685A OB09927A OB09725A OB09687A OB09697A OB09737A OB09629A OB05936A OB24016A OB24024A OB09727A OB09669A OB09212A OB09677A OB09689A OB09693A OB22357A OB09929A OB09695A OB09673A OB22347A OB09215A OB24087A OB24023A OB01913A OB01402A	Semi VR 220K Semi VR 47K Semi VR 10K RK 10K 1/6W J RK 2.2K 1/6W J RM 100K 1/6W F RK 100K 1/6W J RK 2.7K 1/6W J RK 6.8K 1/6W J RK 330K 1/6W J RK 10 1/6W J RK 10 1/4W J RF 47 1W J R-Fuse 82 1/2W J RK 120K 1/6W J RK 470 1/6W J RF 2.2 1/4W J RK 1K 1/6W J RK 3.3K 1/6W J RK 4.7K 1/6W J RM 13.7K 1/6W F RM 10K 1/6W F RK 5.6K 1/6W J RK 680 1/6W J RM 11K 1/6W F RF 100 1/4W J R-Fuse 4.7 1/4W J R-Fuse 1 1/4W CM 1800P 50V J CE 4.7μ 25V	F401,402 F403	OB02240A OB08457A OB08349B OM04096C OM04755A OB08961A OB08686A	(1) (2) (1) (1) (2) (5) Fuse T1.25A 250V Fuse T500mA 250V Fuse Clip (6) Fuse Label T500mA (1) Fuse Label T1.25Ax2 (1) Power Supply P.C.B. Assy CR-7 (Australia) & CR-7E Contents is the same as BA05922A except for the following parts: Fuse T1.25A 250V Fuse T500mA 250V Fuse Clip (6) Fuse Label T500mA (1) Fuse Label T1.25Ax2 (1) Power Supply P.C.B. Assy CR-70 Contents is the same as BA05922A except for the following parts: Fuse 2.5A Fuse 1A

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

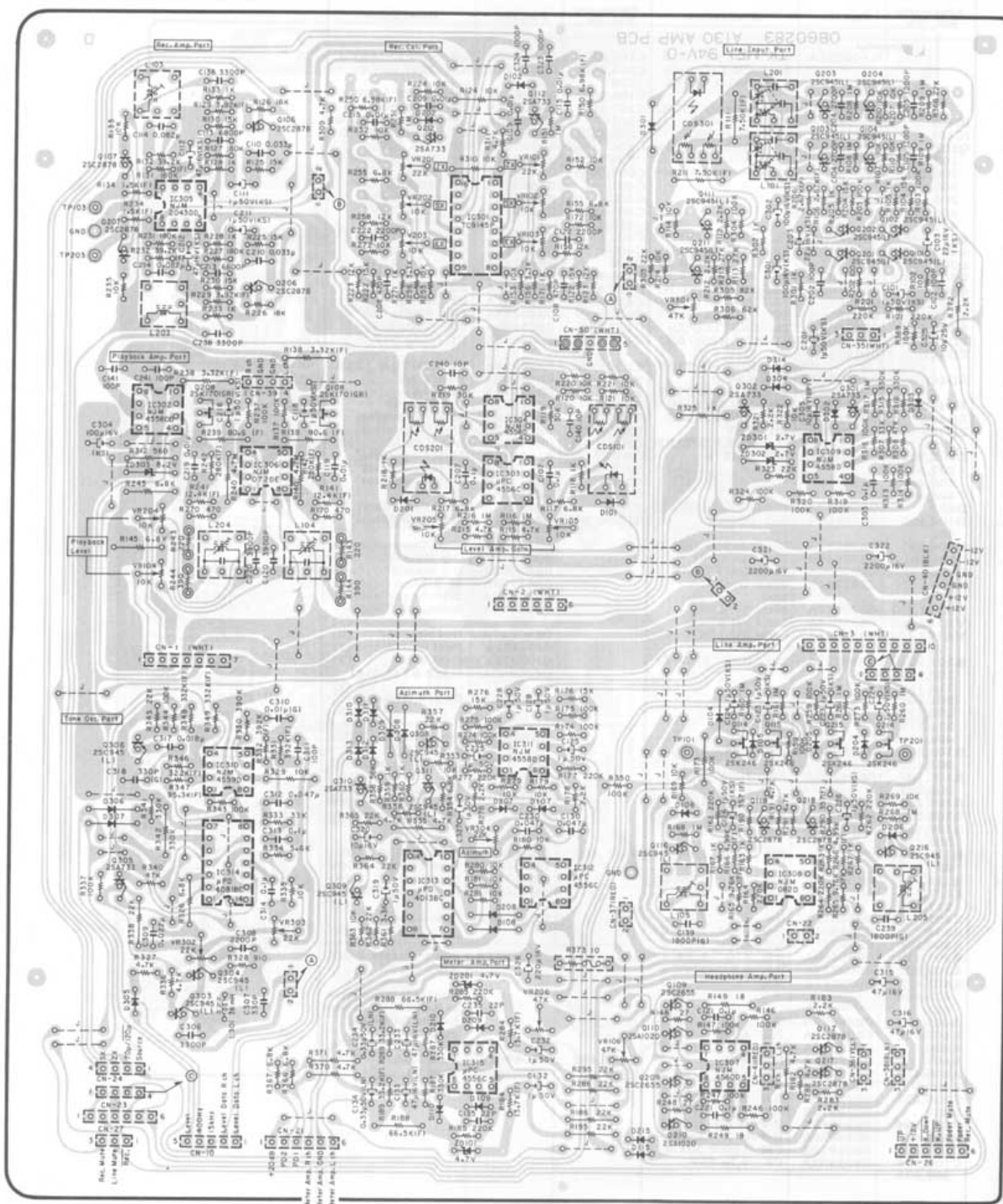


Fig. 7.14

Description	Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description
CF 0.1μ 50V J	Q101,102	OB01872A	TR 2SC945L (P,Q)	C308	OB01802A	CM 2200P 50V J
CF 470P 100V J	103,104			C309	OB05582A	CM 0.022μ 50V J
CM 0.01μ 50V J	111,201			C310	OB09312A	CF 0.01μ 100V G
	202,203			C311	OB09302A	C 100P 100V J
CM 2200P 50V J	204,211			C312	OB09864A	CF 0.047μ 50V J
C 10P 50V J	Q301,302	OB06013A	TR 2SA733 (P,Q)	C313,314	OB09868A	CF 0.1μ 50V J
CM 1000P 50V J	ZD301,302	OB12103A	ZD 2.7V RD2.7E2	C317	OB41289A	CF 0.018μ 50V J
5P-T Post (White)	D301	OB06181A	SID 1SS53	C318	OB09325A	CP 330P 100V G
	D302,303	OB06398A	SID 1SS176			
	304,314					
	L101,201	OB06690A	L-C Block (Blue)			
IC μPC4556C	Cds301	OB06325B	Photoconductor	IC311	OB06124B	IC NJM4558D
ZD 4.7V			MCD7214F	IC312	OB06216A	IC μPC4556C
MT24.7B T-77	VR301	OB32064A	Semi VR 47K	IC313	OB06358A	IC μPD4013BC
SID 1SS176	R101,201	OB09733A	RK 220K 1/6W J	Q308,309	OB01872A	TR 2SC945L (P,Q)
	R102,202	OB09653A	RK 100 1/6W J	311		
	R103,203	OB09725A	RK 100K 1/6W J	Q310	OB06013A	TR 2SA733 (P,Q)
Semi VR 47K	304,313			D107,207	OB06398A	SID 1SS176
RM 13.7K 1/6W F	314,316			310,311		
RK 220K 1/6W J	319,320			312,313		
RK 22K 1/4W J	324,369			D108,208	OB06181A	SID 1SS53
	R104,204	OB09705A	RK 15K 1/6W J	308,309		
RK 330K 1/6W J	R105,205	OB09677A	RK 1K 1/6W J	VR304	OB32062A	Semi VR 22K
RM 66.5K 1/4W F	301,302			R174,175	OB09725A	RK 100K 1/6W J
RM 33.2K 1/6W F	R106,206			274,275		
R-Fuse 10 1/4W J	R107,110	OB09701A	RM 2.67K 1/6W F	R176,276	OB09705A	RK 15K 1/6W J
CE 1μ 50V	114,207		RK 10K 1/6W J	R177,277	OB09733A	RK 220K 1/6W J
CE 47μ 16V (LN)	210,214			R178,278	OB09685A	RK 2.2K 1/6W J
CE 0.33μ 50V (LN)	322			R179,180	OB09701A	RK 10K 1/6W J
CC 22P 50V K	R108,109	OB09749A	RK 1M 1/6W J	181,279		
CC 220μ 16V	208,209			280,281		
	317			353,363		
Amp. —	R111,211	OB22669A	RM 7.5K 1/4W F	R354,366	OB09697A	RK 6.8K 1/6W J
IC NJM4560D	R112,212	OB09685A	RK 2.2K 1/6W J	367		
TR 2SC2655 (Y)	321			R355,370	OB01846A	RK 4.7K 1/4W J
TR 2SA1020 (O,Y)	R113,213	OB09711A	RK 27K 1/6W J	371		
TR 2SC2878	R303,323	OB09709A	RK 22K 1/6W J	R356	OB09693A	RK 4.7K 1/6W J
RK 100K 1/6W J	368			R357,362	OB09709A	RK 22K 1/6W J
	R305	OB09723A	RK 82K 1/6W J	364,365		
RK 27 1/6W J	R306	OB09720A	RK 62K 1/6W J	R358	OB09719A	RK 56K 1/6W J
RF 18 1/2W J	R307	OB09713A	RK 33K 1/6W J	R359,360	OB09677A	RK 1K 1/6W J
RK 4.7K 1/4W J	R308	OB09717A	RK 47K 1/6W J	R361	OB09689A	RK 3.3K 1/6W J
RK 2.2K 1/6W J	R315,318	OB09737A	RK 330K 1/6W J	C125,128	OB01405A	CE 1μ 50V
RK 4.7K 1/6W J	R325	OB01857A	RK 1K 1/4W J	225,228		
CF 0.1μ 50V J	R372	OB05622A	RK 2.2K 1/4W J	319,327		
CE 47μ 16V	C101,201	OB09814A	CE 1μ 50V (KS)	C130,230	OB09864A	CF 0.047μ 50V J
3P-T Post (Yellow)	C102,202	OB09814A	CP 100P 50V J	C320	OB01412A	CE 10μ 16V
3P-T Post (Black)	C103,203	OB09932A	CE 22μ 16V (KS)			
3P-T Post (Red)	C104,204	OB09818A	CM 2700P 50V J			
	C105,205	OB05687A	CM 1200P 50V J			
	C301,302	OB40377A	CE 100μ 16V (KS)			
	C303	OB09868A	CF 0.1μ 50V J	C321,322	OB60283D	Main P.C.B.
	C305	OB09163A	CE 10μ 16V (BP)	CN1	OB40361A	CE 2200μ 16V
	C325	OB01674A	CE 10μ 25V	CN2	OB81243A	7P-T Post (White)
	CN35	OB81227A	3P-T Post (White)	CN3	OB81239A	6P-T Post (White)
				CN10	OB81255A	10P-T Post (White)
				CN21	OB82561A	5P-H Connector
				CN22	OB82570A	6P-H Connector
				CN23	OB82571A	3P-2PH Connector
				CN24	OB82572A	6P-H Connector
				CN26	OB82573A	4P-H Connector
				CN27	OB82575A	6P-H Connector
				CN40	OB82576A	3P-H Connector
					OB81240A	6P-T Post (Black)
					OB81002A	Dip Mate 2P (4)
					OB81011A	Dip Mate 4P (2)
					OB82595A	Ribbon Cable 2P(1)
					OB82596A	Ribbon Cable 4P(1)

Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description
	BA05932A	Main P.C.B. Ass'y	C107,207	OB09868A	CF 0.1μ 50V J	Q101,102	OB01872A	TR 2SC945L (P,Q)
	— PB Eq. Amp. —		C108,208	OB09270A	CP 470P 100V J	103,104		
			C109,115	OB05681A	CM 0.01μ 50V J	111,201		
			209,215			202,203		
IC302	OB06146A	IC NJM4558DD	C122,222	OB01802A	CM 2200P 50V J	204,211		
IC306	OB11005A	IC NJM072DE	C140,240	OB41621A	C 10P 50V J	Q301,302	OB06013A	TR 2SA733 (P,Q)
Q108,208	OB06376A	FET 2SK170 (GR)	C323,324	OB05550A	CM 1000P 50V J	ZD301,302	OB12103A	ZD 2.7V RD2.7EB2
L104,204	OB06717A	Trap Unit	CN50	OB81235A	5P-T Post (White)	D301	OB06181A	SID 1SS53
ZD303	OB06418A	ZD 8.2V RD8.2JB2				D302,303	OB06398A	SID 1SS176
VR104,204	OB32061A	Semi VR 10K		— Meter Amp. —		304,314		
R137,237	OB09725A	RK 100K 1/6W J	IC315	OB06216A	IC μPC4556C	L101,201	OB06690A	L-C Block (Blue)
R138,238	OB09829A	RM 3.32K 1/4W F	ZD101,201	OB12271A	ZD 4.7V	Cds301	OB06325B	Photocoupler
R139,239	OB09891A	RM 80.5 1/4W F						
R140,240	OB22548A	RM 4.7M 1/4W J				VR301	OB32064A	Semi VR 47K
R141,241	OB22353A	RM 12.4K 1/6W F	D109,110	OB06398A	SID 1SS176	R101,201	OB09733A	RK 220K 1/6W J
R142,242	OB22506A	RM 280K 1/6W F	115,209			R102,202	OB09653A	RK 100 1/6W J
R143,243	OB09661A	RK 220 1/6W J	210,215			R103,203	OB09725A	RK 100K 1/6W J
R144,244	OB09667A	RK 390 1/6W J	VR106,206	OB32064A	Semi VR 47K	304,313		
R145,245	OB09697A	RK 6.8K 1/6W J	R184,284	OB22357A	RM 13.7K 1/6W F	314,316		
R170,270	OB09699A	RK 470 1/6W J	R185,285	OB09733A	RK 220K 1/6W J	319,320		
R312	OB05575A	RK 560 1/4W J	R186,195	OB05615A	RK 22K 1/4W J	324,369		
C118,218	OB09814A	CE 1μ 50V (KS)	288,295			R104,204	OB09705A	RK 15K 1/6W J
C119,219	OB09591A	CP 0.01μ 100V J	R187,287	OB09737A	RK 330K 1/6W J	R105,205	OB09677A	RK 1K 1/6W J
C120,220	OB01804A	CM 3900P 50V J	R188,288	OB09510A	RM 66.5K 1/4W F	301,302		
C141,241	OB41386A	CP 100P 50V J	R189,289	OB22401A	RM 33.2K 1/6W F	R106,206	OB22275A	RM 2.67K 1/6W F
C304	OB40377A	CE 100μ 16V (KS)	R373	OB24088A	R-Fuse 10 1/4W J	R107,110	OB09701A	RK 10K 1/6W J
CN39	OB02242A	4P-T Post	C132,232	OB01405A	CE 1μ 50V	114,207		
	— Rec. Eq. Amp. —		C133,233	OB09218A	CE 47μ 16V (LN)	210,214		
			C134,234	OB09327A	CE 0.33μ 50V (LN)	322	OB09749A	RK 1M 1/6W J
			C135,235	OB09279A	CC 22P 50V K	R108,109		
			C326	OB40079A	CE 220μ 16V	208,209		
IC305	OB06387A	IC NJM2043DD		— Headphone Amp. —		317		
Q106,107	OB06299A	TR 2SC2878	IC307	OB06217A	IC NJM4560D	R111,211	OB22669A	RM 7.5K 1/4W F
206,207			Q109,209	OB06429A	TR 2SC265 (Y)	R112,212	OB09685A	RK 2.2K 1/6W J
L103,203	OB51226A	L-C Block 10.5mH	Q110,210	OB10015A	TR 2SA1020 (O,Y)	R113,213	OB09711A	RK 27K 1/6W J
R125,130	OB09705A	RK 15K 1/6W J	Q117,217	OB06299A	TR 2SC2878	R303,323	OB09709A	RK 22K 1/6W J
225,230			R146,147	OB09725A	RK 100K 1/6W J	368		
R126,226	OB09707A	RK 18K 1/6W J	246,247			R305	OB09723A	RK 82K 1/6W J
R127,131	OB09731A	RK 180K 1/6W J	R148,248	OB09639A	RK 27 1/6W J	R306	OB09720A	RK 62K 1/6W J
227,231			R149,249	OB09536A	RF 18 1/2W J	R307	OB09713A	RK 33K 1/6W J
R128,133	OB09677A	RK 1K 1/6W J	R182	OB01846A	RK 4.7K 1/4W J	R308	OB09717A	RK 47K 1/6W J
228,233			R183,283	OB09685A	RK 2.2K 1/6W J	R315,318	OB09737A	RK 330K 1/6W J
R129,229	OB22296A	RM 3.92K 1/6W F	R282	OB09693A	RK 4.7K 1/6W J	R325	OB01857A	RK 1K 1/4W J
R132,232	OB22410A	RM 39.2K 1/6W F	C121,221	OB09868A	CF 0.1μ 50V J	R372	OB05622A	RK 2.2K 1/4W J
R134,234	OB22247A	RM 1.5K 1/6W F	C315,316	OB01403A	CE 47μ 16V	C101,201	OB09814A	CE 1μ 50V (KS)
R135,235	OB09701A	RK 10K 1/6W J	CN36	OB81230A	3P-T Post (Yellow)	C102,202	OB41386A	CP 100P 50V J
C110,210	OB05583A	CM 0.033μ 50V J	CN38	OB81228A	3P-T Post (Black)	C103,203	OB09932A	CE 22μ 16V (KS)
C111,211	OB09814A	CE 1μ 50V (KS)	CN41	OB81229A	3P-T Post (Red)	C104,204	OB09189A	CM 2700P 50V J
C112,212	OB40154A	CE 47μ 16V (KS)		— Line Amp. —		C105,205	OB05687A	CM 1200P 50V J
C113,213	OB05530A	CM 6800P 50V J				C301,302	OB40377A	CE 100μ 16V (KS)
C114,214	OB05685A	CM 0.082μ 50V J				C303	OB09868A	CF 0.1μ 50V J
C138,238	OB41237A	CP 3300P 100V J				C305	OB09163A	CE 10μ 16V (BP)
	— Rec. Cal. —		IC308	OB06443A	IC NJM082D	C325	OB01674A	CE 10μ 25V
IC301	OB11027A	IC TC9145P	Q114,115	OB10022A	FET 2SK246	CN35	OB81227A	3P-T Post (White)
IC303	OB06216A	IC μPC4556C	214,215				— Tone Osc. —	
IC304	OB06124B	IC NJM4558D	Q116,216			IC310	OB06127A	IC NJM4559D
Q112,212	OB06013A	TR 2SA733 (P,Q)	Q118,218	OB01872A	TR 2SC945L (P,Q)	IC314	OB06219A	IC μPD4081BC
Cds101,201	OB10135A	Photocoupler	D104	OB06299A	TR 2SC2878	Q303,304	OB01872A	TR 2SC945L (P,Q)
			D105,106	OB06181A	SID 1SS53	306		
D101,102	OB06398A	SID 1SS176	204,205	OB06398A	SID 1SS176	Q305	OB06013A	TR 2SA733 (P,Q)
201,202			L105,205	OB51225A	L-C Block 36mH	D305	OB06398A	SID 1SS176
VR101,201	OB32062A	Semi VR 22K	R159,259	OB09725A	RK 100K 1/6W J	D306,307	OB06181A	SID 1SS53
VR102,103	OB32061A	Semi VR 10K	273,300			L301	OB03919C	Inductor 36mH
105,202			R160,161	OB09749A	RK 1M 1/6W J	VR302,303	OB32062A	Semi VR 22K
203,205			168,260			R326	OB01682A	RK 6.8K 1/4W J
R115,215	OB09693A	RK 4.7K 1/6W J	261,268			R327,336	OB09693A	RK 4.7K 1/6W J
309,311			R162,164	OB09733A	RK 220K 1/6W J	R328	OB09676A	RK 910 1/6W J
R116,161	OB09749A	RK 1M 1/6W J	262,264			R329	OB01888A	RK 10K 1/4W J
216,261			R163,167	OB09677A	RK 1K 1/6W J	R330	OB09739A	RK 390K 1/6W J
R117,155	OB09697A	RK 6.8K 1/6W J	263,267			R331,332	OB22524A	RM 392K 1/6W F
217,255			R165,265	OB22342A	RM 9.76K 1/6W F	R333	OB09713A	RK 33K 1/6W J
R118,171	OB09677A	RK 1K 1/6W J	R166,266	OB22308A	RM 4.99K 1/6W F	R334	OB09701A	RK 5.6K 1/6W J
218,271			R169,269	OB09701A	RK 10K 1/6W J	R335	OB09701A	RK 10K 1/6W J
R119,219	OB09712A	RK 30K 1/6W J	R173	OB01889A	RK 100K 1/4W J	R337,343	OB09725A	RK 100K 1/6W J
R120,121	OB09701A	RK 10K 1/6W J	R190,290	OB22176A	RM 357 1/6W F	344		
152,153			R191,291	OB09693A	RK 4.7K 1/6W J	R338	OB05615A	RK 22K 1/4W J
221,224			C123,124	OB09814A	CE 1μ 50V (KS)	R340	OB09717A	RK 47K 1/6W J
252,253			126,223			R341	OB09737A	RK 330K 1/6W J
272			224,226			R342	OB05627A	RK 330K 1/4W J
R122,222	OB09705A	RK 15K 1/6W J	C139,239	OB09409A	CP 1800P 100V G	R345	OB09709A	RK 22K 1/6W J
R123,158	OB09703A	RK 12K 1/6W J	CN37	OB81225A	2P-T Post (Red)	R346,348	OB22515A	RM 332K 1/6W F
223,258				— Line Input —		349		
R124,310	OB01888A	RK 10K 1/4W J	IC309	OB06124B	IC NJM4558D	R347	OB05987A	RM 95.3K 1/6W F
R150,250	OB22326A	RM 6.98K 1/6W F				C306	OB01914A	CM 3300P 50V J
R156,256	OB09689A	RK 3.3K 1/6W J				C307	OB09322A	CP 330P 100V J

Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description	Schematic Ref. No.
IC601	BA05914A	Logic P.C.B. Ass'y	665,667			R675,676	OB09741A	RK 470K 1/6W J	
IC602,603	OB60296C	Logic P.C.B.	678,679			704,705			
IC604,605	OB11020A	IC	681,682			706,707			
IC606	OB06214A	IC	684,686			708,709			
	OB06178A	IC	697,711			794,809			
	OB11189A	IC	765,770			R686,688	OB09671A	RK 560 1/6W J	
		IC	771,772			729,787			
		IC	774,776			799			
		IC	780,784			R690,777	OB09705A	RK 15K 1/6W J	
		IC	788,790			R691,694	OB09697A	RK 6.8K 1/6W J	
		IC	801,803			746,767			
		IC	815,817			R693			
		IC	818,819			R710	OB09689A	RK 3.3K 1/6W J	
		IC	827,831			R716	OB09721A	RK 68K 1/6W J	
		IC	841			R720	OB21014A	R-Network 47Kx4	
		IC	R603,606	OB09737A	RK 330K 1/6W J	R723,724	OB09217A	RF 5.6 1/4W J	
		TR	616,617			742,743	OB09669A	RK 470 1/6W J	
		(Q,R,S,E)	628,629			749			
			702			R725	OB05836A	RK 2.7 1/4W J	
			R607,613	OB09693A	RK 4.7K 1/6W J	R726	OB06706A	RW 3.5	
			626,627			R730	OB09663A	RK 270 1/6W J	
			670,673			R732,750	OB09711A	RK 27K 1/6W J	
			674,698			R733	OB09699A	RK 8.2K 1/6W J	
			699,715	OB09719A	RK 56K 1/6W J	R737	OB09715A	RK 39K 1/6W J	
			R608,782			R739	OB09831A	RF 22 1W J	
			786			R747	OB24023A	R-Fuse 1 1/4W	
			R609,712	OB09713A	RK 33K 1/6W J	R768,837	OB09685A	RK 2.2K 1/6W J	
			713,736			R778	OB09722A	RK 75K 1/6W J	
			R610,611	OB09701A	RK 10K 1/6W J	R789,802	OB22531A	RM 453K 1/6W F	
			619,637			R791,804	OB22457A	RM 100K 1/6W F	
			651,653			R797,810	OB09703A	RK 12K 1/6W J	
			661,685			836			
			689,695			R812	OB22073A	RM 43.2 1/6W F	
			700,763			R813	OB22139A	RM 169 1/6W F	
			773,775			R814	OB22229A	RM 1K 1/6W F	
			779,781			R820	OB22220A	RM 825 1/6W F	
			783,785			R821,836	OB22361A	RM 15K 1/6W F	
			792,793			838			
			798,805			R822	OB22469A	RM 130K 1/6W F	
			806,811			R824	OB22366A	RM 16.5K 1/6W F	
			816,823			R832	OB05671A	RK 2.2M 1/4W J	
			825,826			R844	OB09653A	RK 100 1/6W J	
			828,833			C601,602	OB09222A	CE 0.47μ 50V (LN)	
			834,839			631,632			
			R612,649	OB09717A	RK 47K 1/6W J	C603,609	OB09223A	CE 1μ 50V (LN)	
			652,660			C604,605	OB09332A	CE 2.2μ 50V (LN)	
			663,683			617			
			714,734			C606,607	OB09286A	CC 470P 50V K	
			751,752			608			
			753,754			C610	OB09148A	CE 10μ 25V (LN)	
			755,759			C611,650	OB01403A	CE 47μ 16V	
			760,761			651			
			762,764			C612,618	OB09868A	CF 0.1μ 50V J	
			829			623,628			
			R614,615	OB09677A	RK 1K 1/6W J	634,636			
			722,728			639			
			741,745			C613	OB05583A	CM 0.033μ 50V J	
			795,808			C614,621	OB05582A	CM 0.022μ 50V J	
			840			622			
			R618,624	OB09749A	RK 1M 1/6W J	C619,620	OB05557A	CM 0.015μ 50V J	
			631,632			C625,626	OB01527A	CE 22μ 25V	
			633,703			C627	OB01674A	CE 10μ 25V	
			769,830			C629,630	OB09285A	CC 330P 50V K	
			R620,621	OB05641A	RK 47K 1/4W J	C633,648	OB05681A	CM 0.01μ 50V J	
			622,721			C635	OB40079A	CE 220μ 16V	
			727,740			C637,638	OB09279A	CC 22P 50V K	
			744,756			C640,641	OB09905A	CC 120P 50V K	
			757,758			C642,645	OB05796A	CM 0.047μ 50V J	
			R634	OB09735A	RK 270K 1/6W J	C643,644	OB09144A	CE 0.22μ 50V (LN)	
			R635,650	OB09733A	RK 220K 1/6W J	646,647			
			655,669			C649	OB01405A	CE 1μ 50V	
			672			C652,653	OB09292A	CC 0.1μ 50V Z	
			R638,639	OB09667A	RK 390 1/6W J	CN4,26	OB81241A	6P-T Post (Red)	
			692			CN5,23	OB81239A	6P-T Post (White)	
			R640,641	OB09661A	RK 220 1/6W J	CN6	OB81235A	5P-T Post (White)	
			642,643			CN7	OB81227A	3P-T Post (White)	
			644			CN8	OB02243A	5P-T Post	
			R645	OB09665A	RK 330 1/6W J	CN9	OB81245A	7P-T Post (Red)	
			R646,731	OB09695A	RK 5.6K 1/6W J	CN10	OB81237A	5P-T Post (Red)	
			R647,738	OB09707A	RK 18K 1/6W J	CN11	OB81236A	5P-T Post (Black)	
			842			CN12	OB81240A	6P-T Post (Black)	
			R654,664	OB09709A	RK 22K 1/6W J	CN13	OB81232A	4P-T Post (Black)	
			677,680			CN14,24	OB81231A	4P-T Post (White)	
			687			CN15	OB81251A	9P-T Post (White)	
			R666,843	OB09691A	RK 3.9K 1/6W J	CN16	OB81234A	4P-T Post (Yellow)	
			R668,671	OB09727A	RK 120K 1/6W J	CN17	OB81243A	7P-T Post (White)	
			701,735			CN18	OB81247A	8P-T Post (White)	
						CN19	OB81255A	10P-T Post (White)	

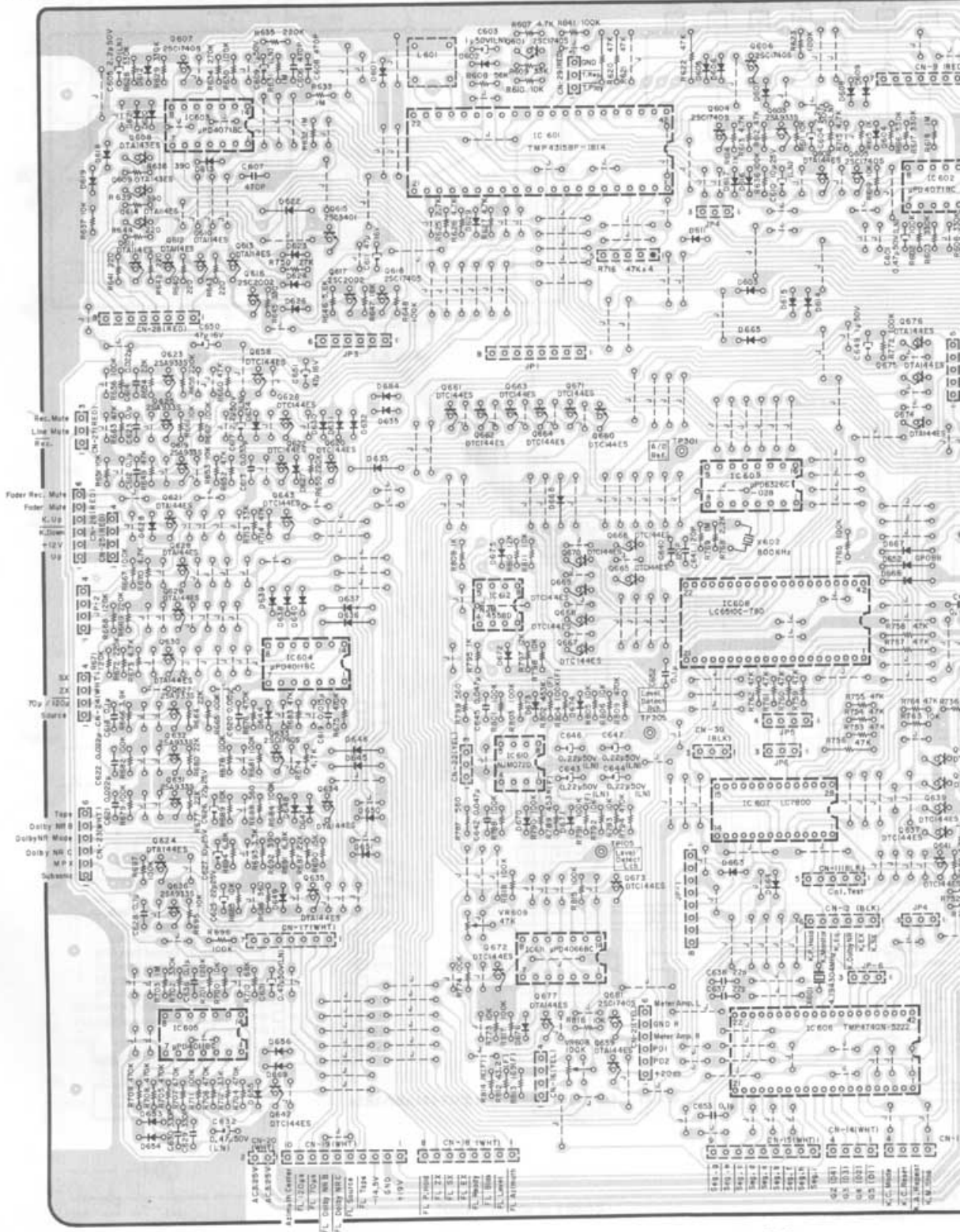


Fig. 7.15

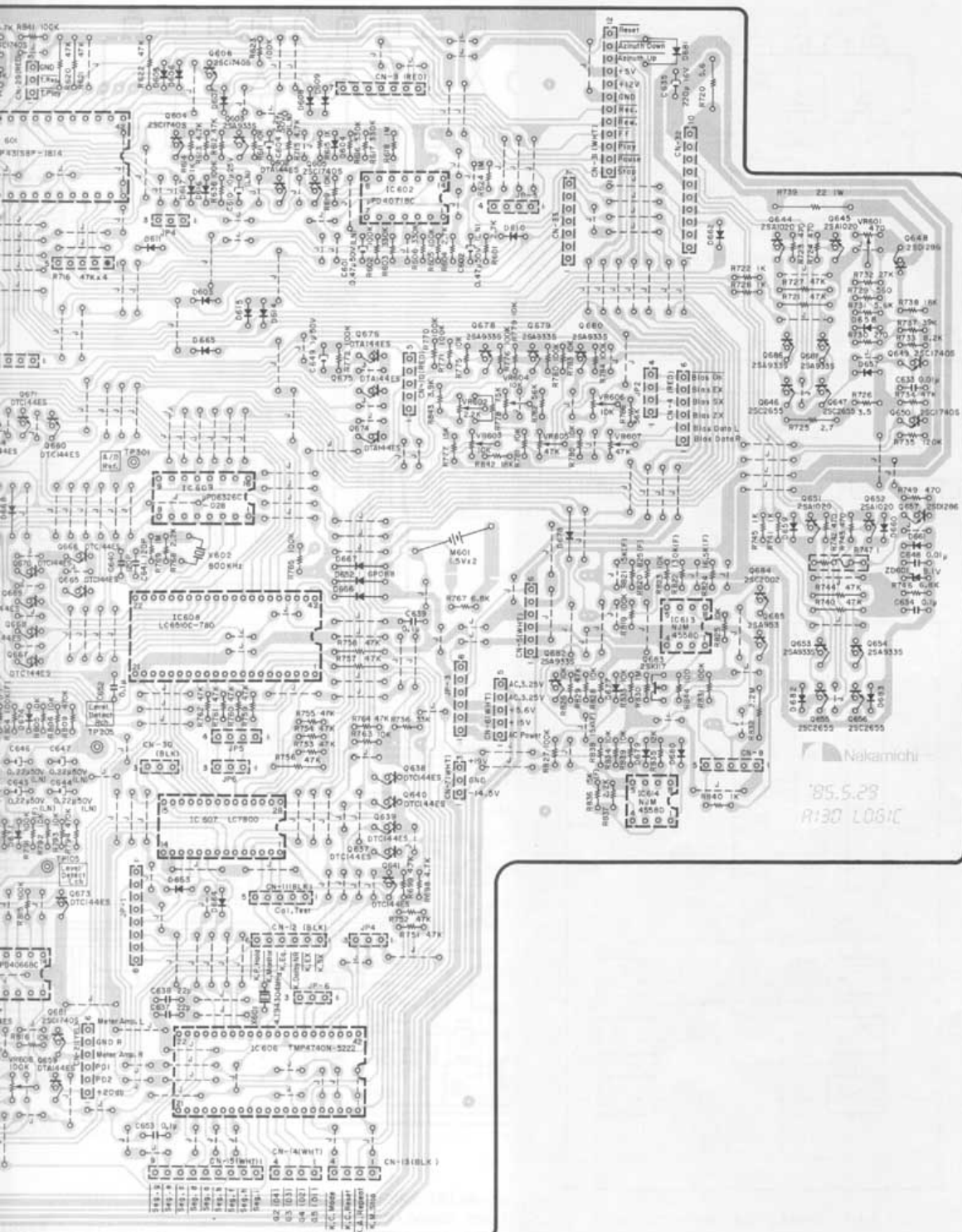


Fig. 7.15

8. SCHEMATIC DIAGRAMS

8.1. IC Block Diagrams

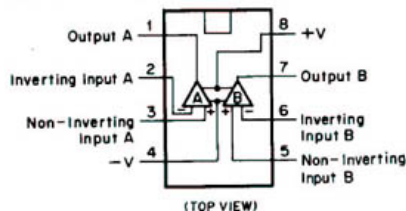


Fig. 8.1.1 Operational Amp. IC 4558D, 4558DD, 4559D, 4556C, 4560D, 2043DD, 072, 072DE, 082D

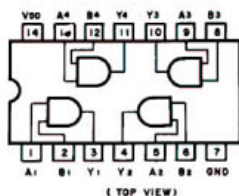


Fig. 8.1.2 AND Gate C-MOS IC μPD4081BC

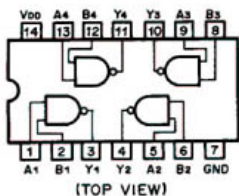


Fig. 8.1.3 NAND Gate C-MOS IC μPD4011BC

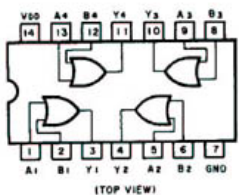


Fig. 8.1.4 OR Gate C-MOS IC μPD4071BC

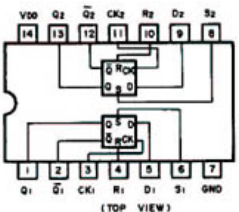


Fig. 8.1.5 D-Type Flip-Flop C-MOS IC μPD4013BC

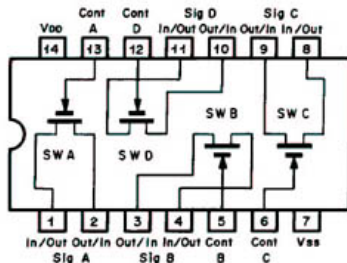


Fig. 8.1.6 Bilateral Switch C-MOS IC μPD4066BC

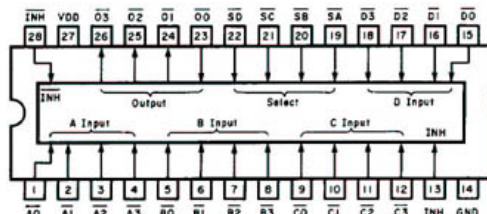


Fig. 8.1.7 Input Port Expander LC7800

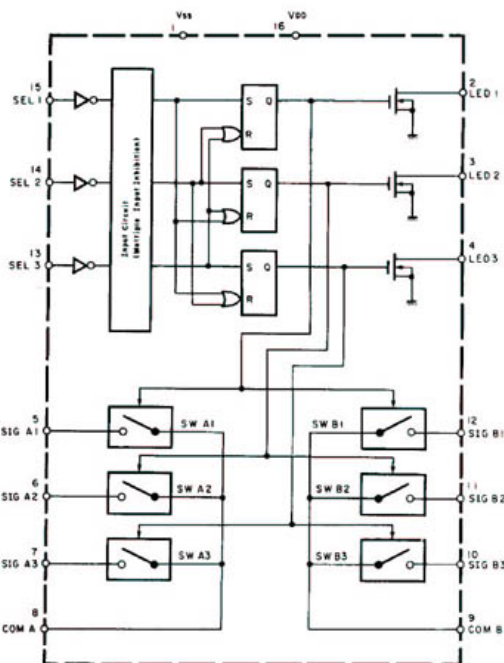


Fig. 8.1.8 Analog Switch Selector TC9145P

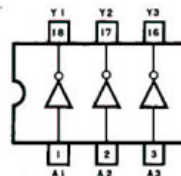
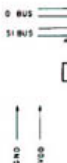


Fig. 8.1.9 F



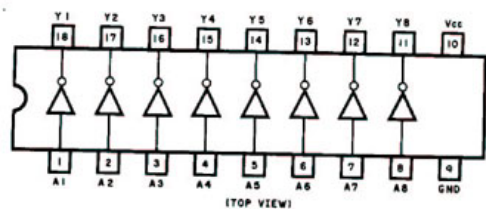


Fig. 8.1.9 FL Display Tube Driver LB1240

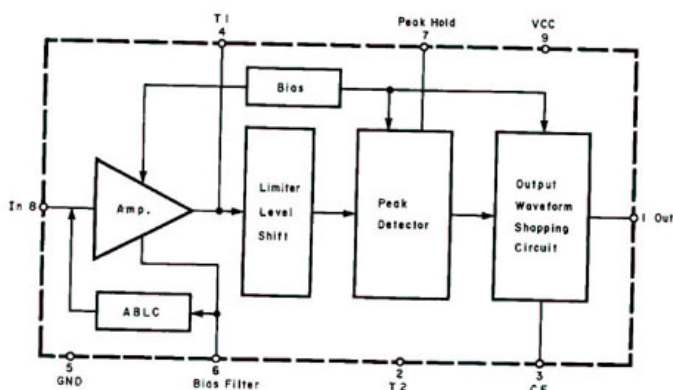


Fig. 8.1.10 Pre-amp. IC μPC1474HA

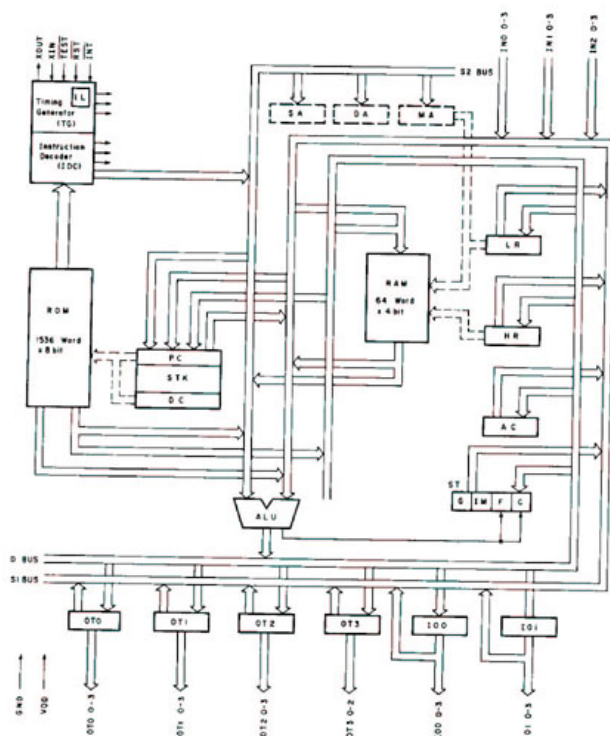
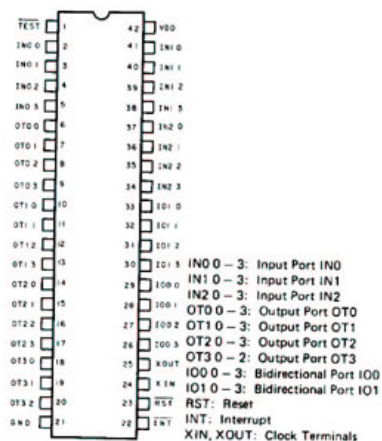


Fig. 8.1.11 4-Bit Micro-processor TMP4315BP-1814



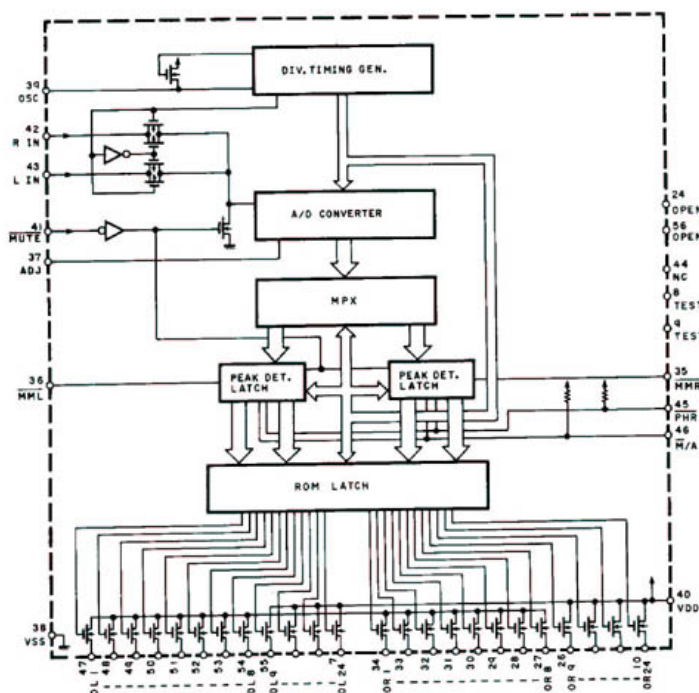


Fig. 8.1.12 Level Meter Controller LC7550

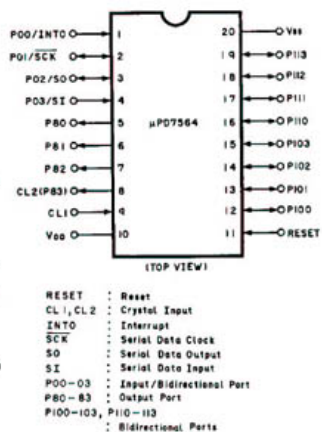
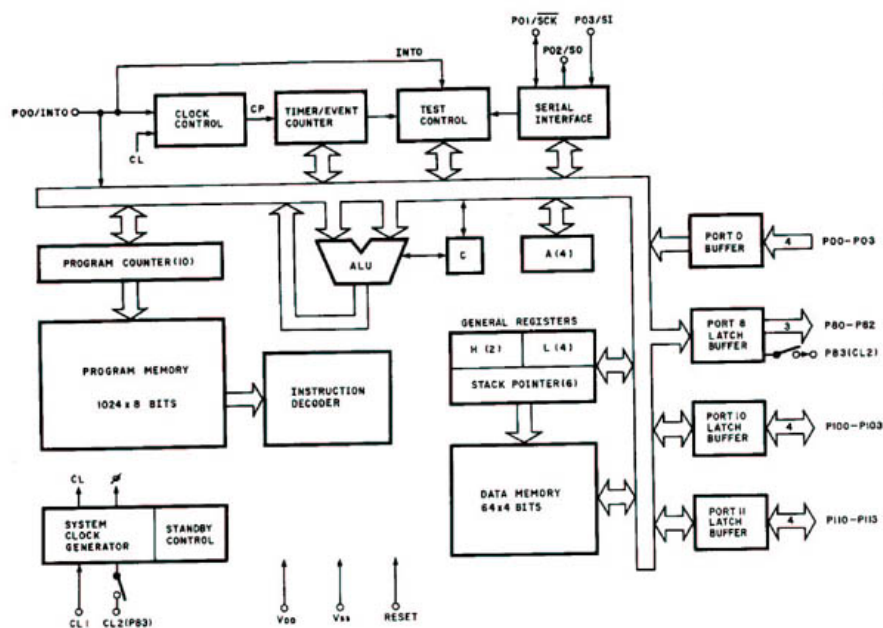
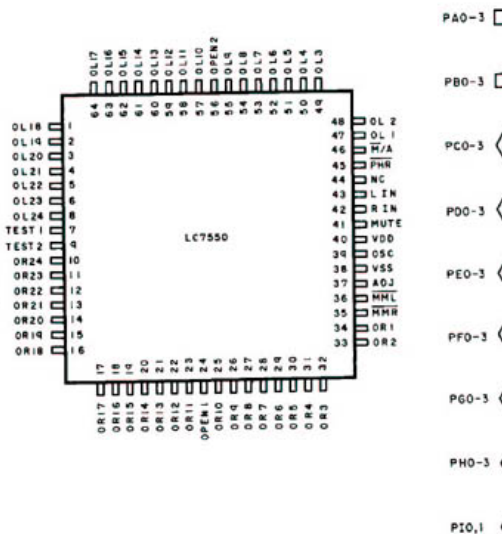
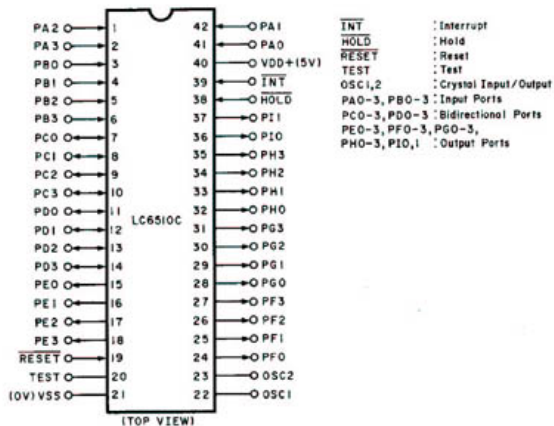


Fig. 8.1.13 4-Bit Micro-processor μPD7564C



The block diagram illustrates the internal architecture of the 8086 microprocessor. Key components include the ROM (4096x8), DATA TABLE, PC (Program Counter), IR (Instruction Register), DECODER, HR (High Register), LR (Low Register), RAA (Register Address Arithmetic), AY (Address Latch Enable), AX (Accumulator), TC (Transfer Flag), ALU (Arithmetic Logic Unit), AC (Address Counter), CF (Carry Flag), FD (Flag Register), SYS CONTROL, CG (Control Group), and TG (Timing Group).

External signals and pins are shown on the left and bottom. The left side includes HOLD, RESET, TEST, XIN, and XOUT. The bottom side shows pins R40 through R92, VDD, and VSS. The right side shows control signals K0-K3, P0-P3, and status signals HOLD, RESET, TEST, XIN, XOUT, K00-K03, P10-P13, P20-P23, and R80-R92.

Pin Connections (Bottom View):

Pin	Signal	Pin	Signal
R40	1	42	VDD
R41	2	41	R92 (SCK)
R42	3	40	R91 (SO)
R43	4	39	R90 (SI)
R50	5	38	R83 (TI)
R51	6	37	R82 (INT1)
R52	7	36	R81 (T2)
R53	8	35	R80 (INT2)
R60	9	34	HOLD
R61	10	33	RESET
R62	11	32	XOUT
R63	12	31	XIN
R70	13	30	TEST
R71	14	29	K03
R72	15	28	K02
R73	16	27	K01
P10	17	26	K00
P11	18	25	P23
P12	19	24	P22
P13	20	23	P21
VDD	21	22	P20

Control Signals and Status:

- HOLD**: High-level active signal.
- RESET**: Active-low reset signal.
- TEST**: Active-low test signal.
- XIN, XOUT**: Input and output signals.
- K00-K03**: Address bus signals.
- P10-P13**: Data bus signals.
- P20-P23**: Data bus signals.
- R80-R92**: Address bus signals.

Fig. 8.1.15 4-Bit Micro-processor TMP474

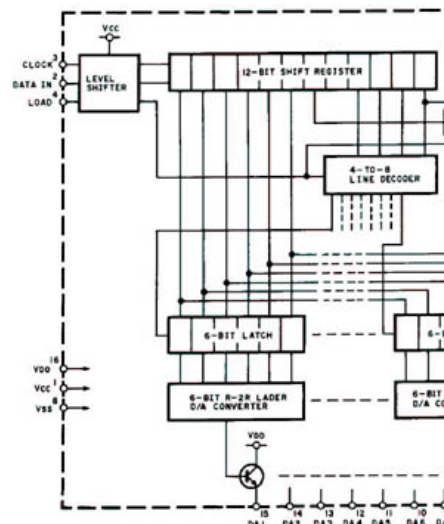
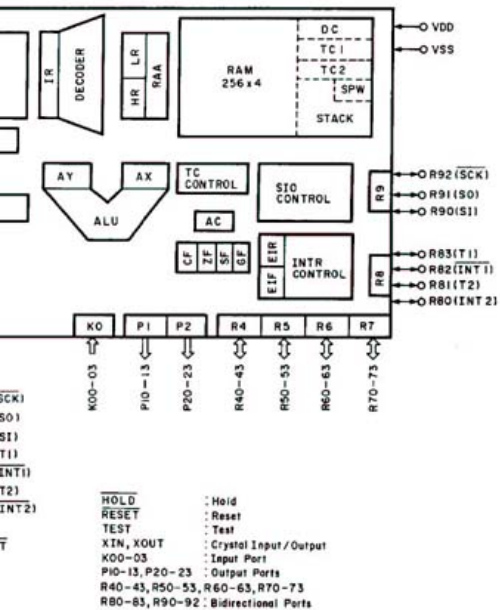
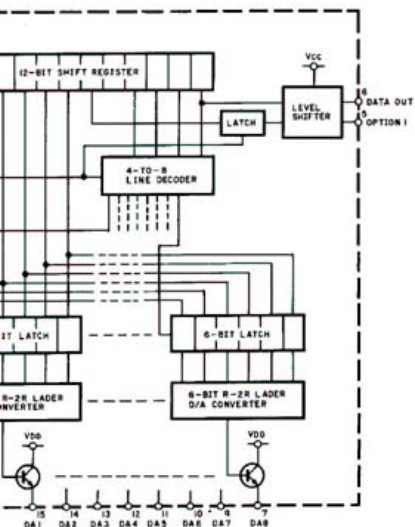


Fig. 8.1.16 μ PD6326C-028



4-Bit Micro-processor TMP4740N-5222



8.1.16 μ PD6326C-028

8.2. Schematic Diagrams

8.2.1. Display Section

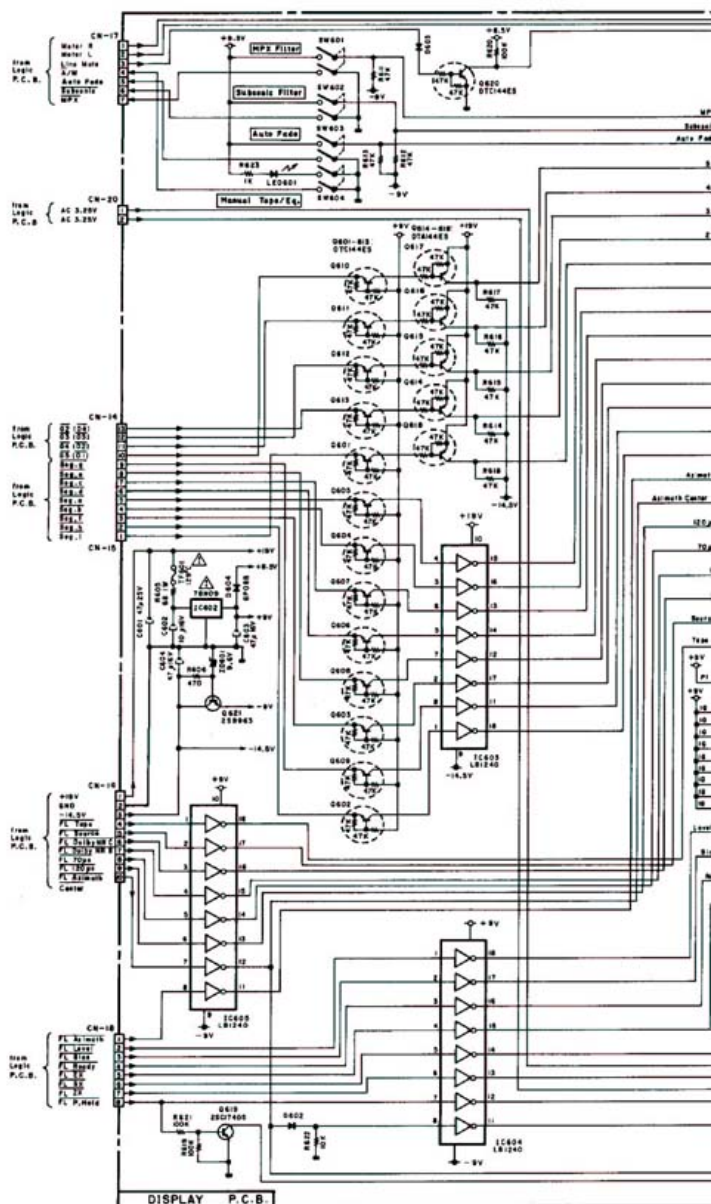


Fig. 8.2.1

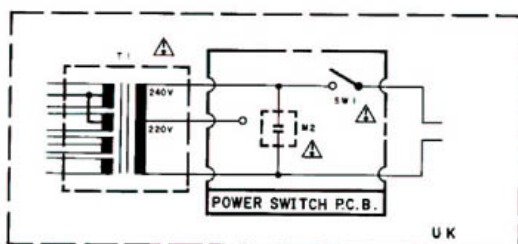
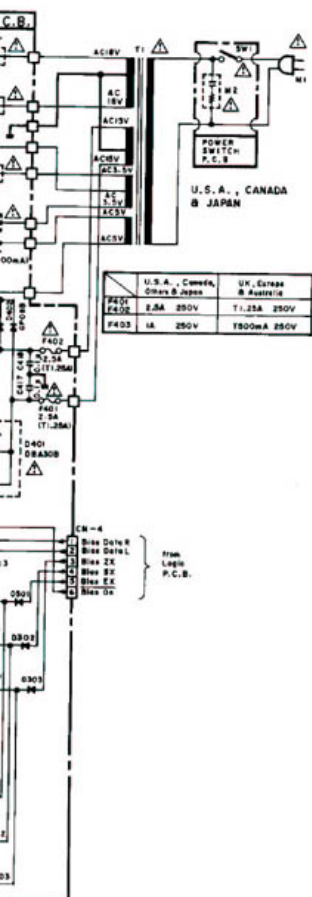
Note: Diode is 1SS53, 1S1555, or 1SS176 unless otherwise specified.

8.2.1. Display Section

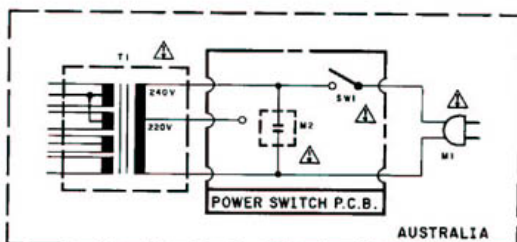


Fig. 8.2.1

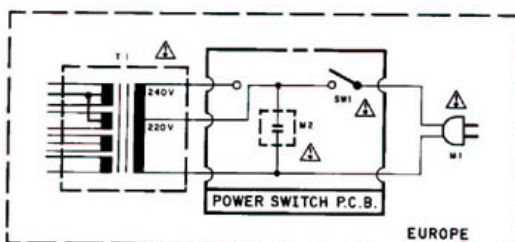
Note: Diode is 1SS53, 1S1555, or 1SS176 unless otherwise specified.



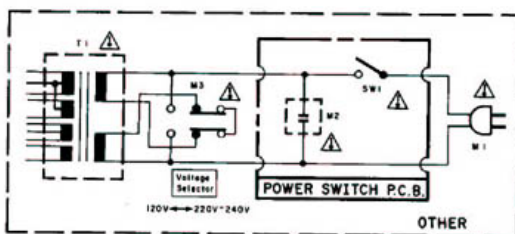
UK



AUSTRALIA



EUROPE



OTHER

WARNING:

Parts marked with the symbol  have critical characteristics.

Use **ONLY** replacement parts recommended by the manufacturer.

It is recommended that the unit be operated from a suitable DC supply or batteries during initial check-out procedures.

CAUTION:

Before returning the unit to the customer, make sure you make either (1) a leakage current check or (2) a line to chassis resistance check. If the leakage current exceeds 0.5 milliamp, or if the resistance from chassis to either side of the power cord is less than 240 k ohms, the unit is defective.

WARNING — DO NOT return the unit to the customer until the problem is located and corrected.

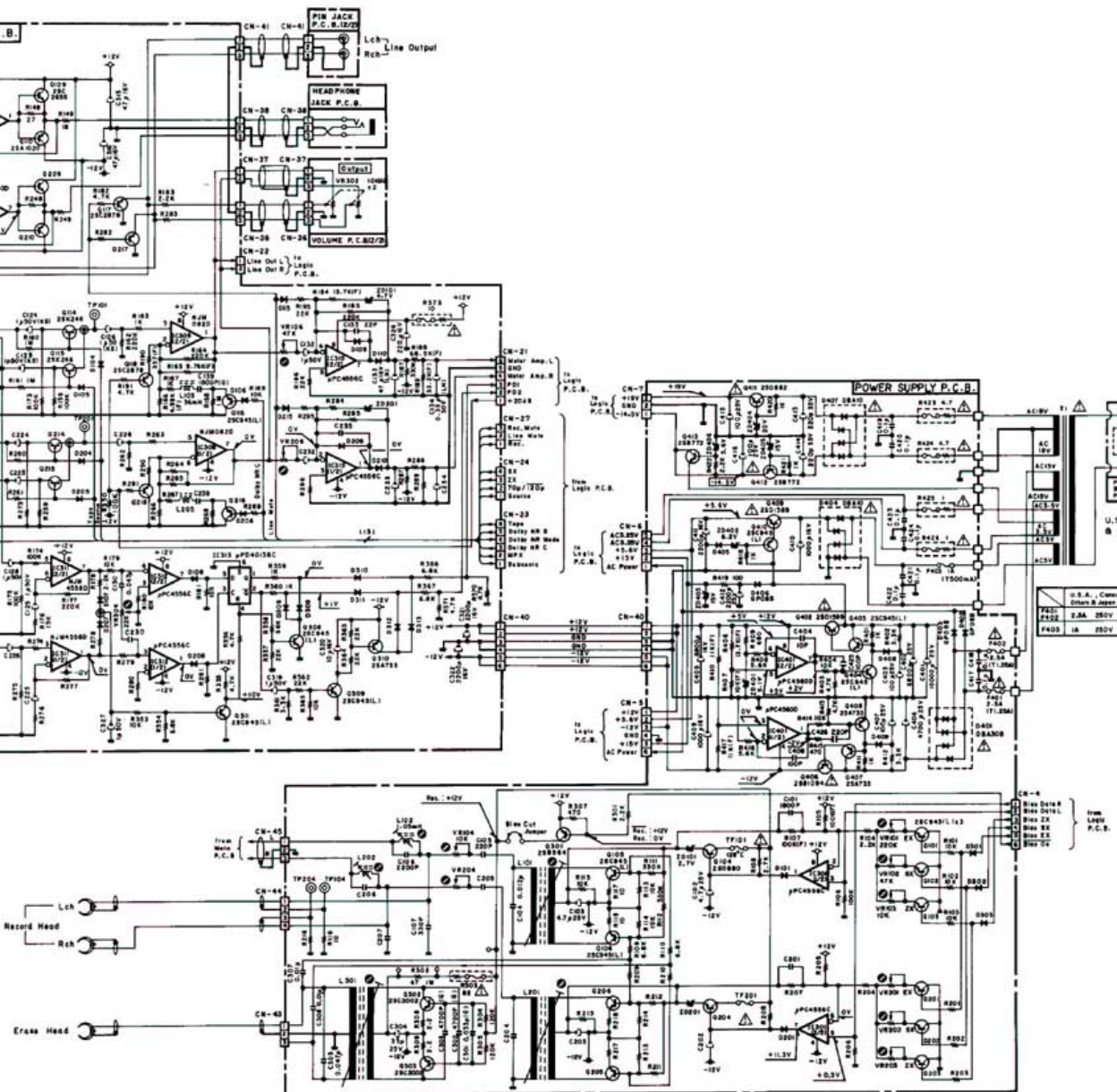
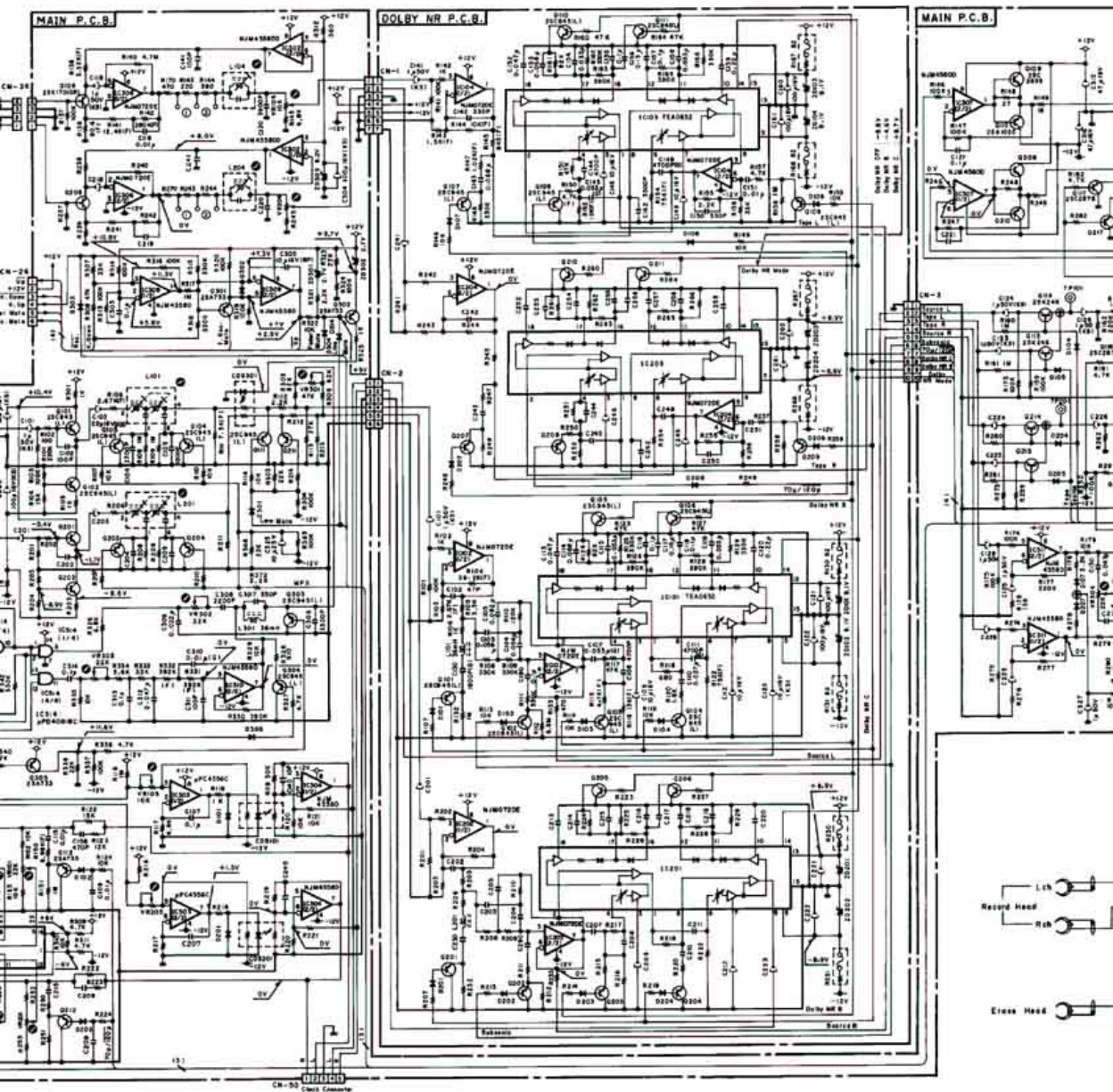


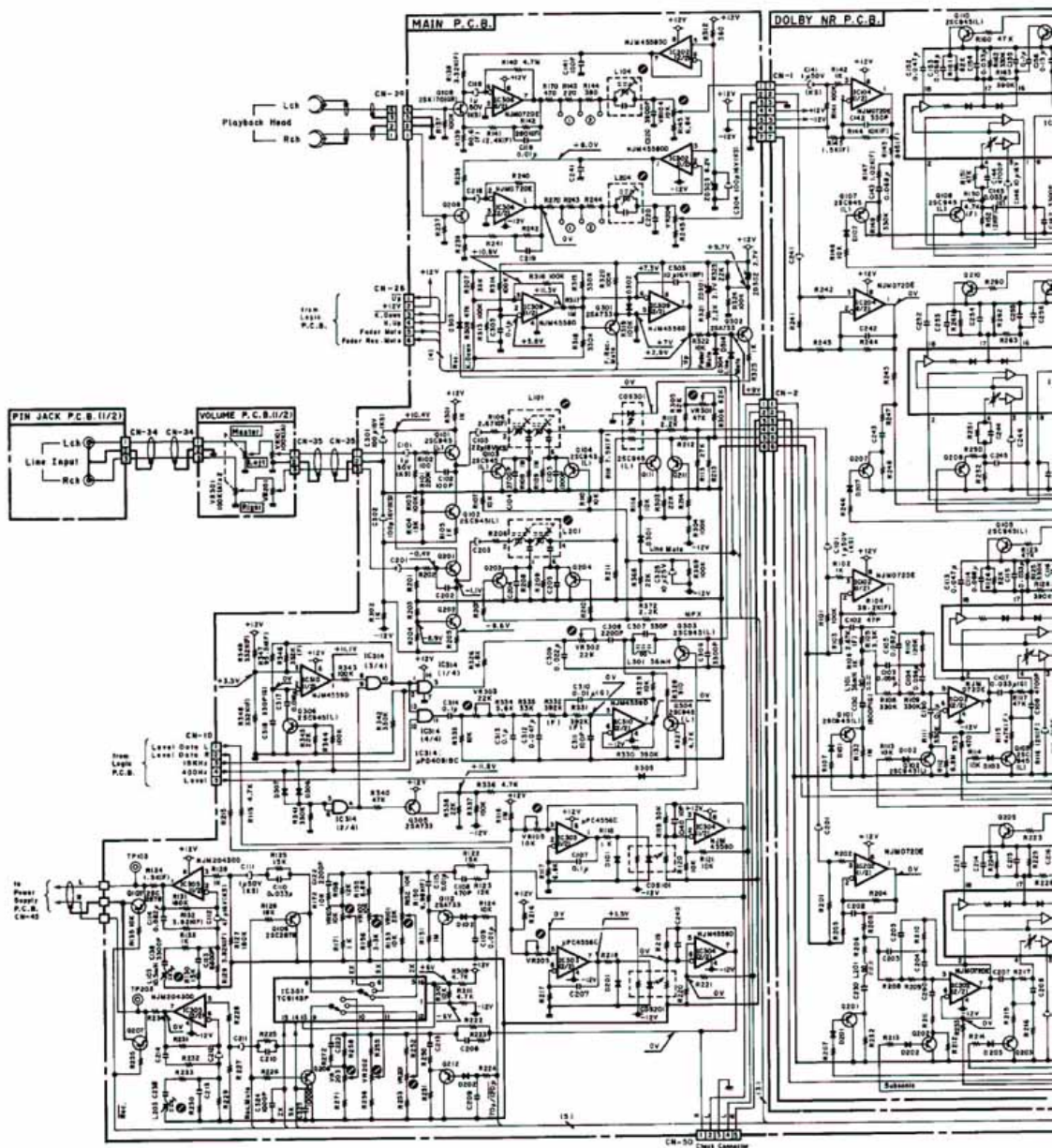
Fig. 8.2.2



6 unless otherwise specified.
 2SA1175 are interchangeable with each other.
 2SC2785 are interchangeable with each other.

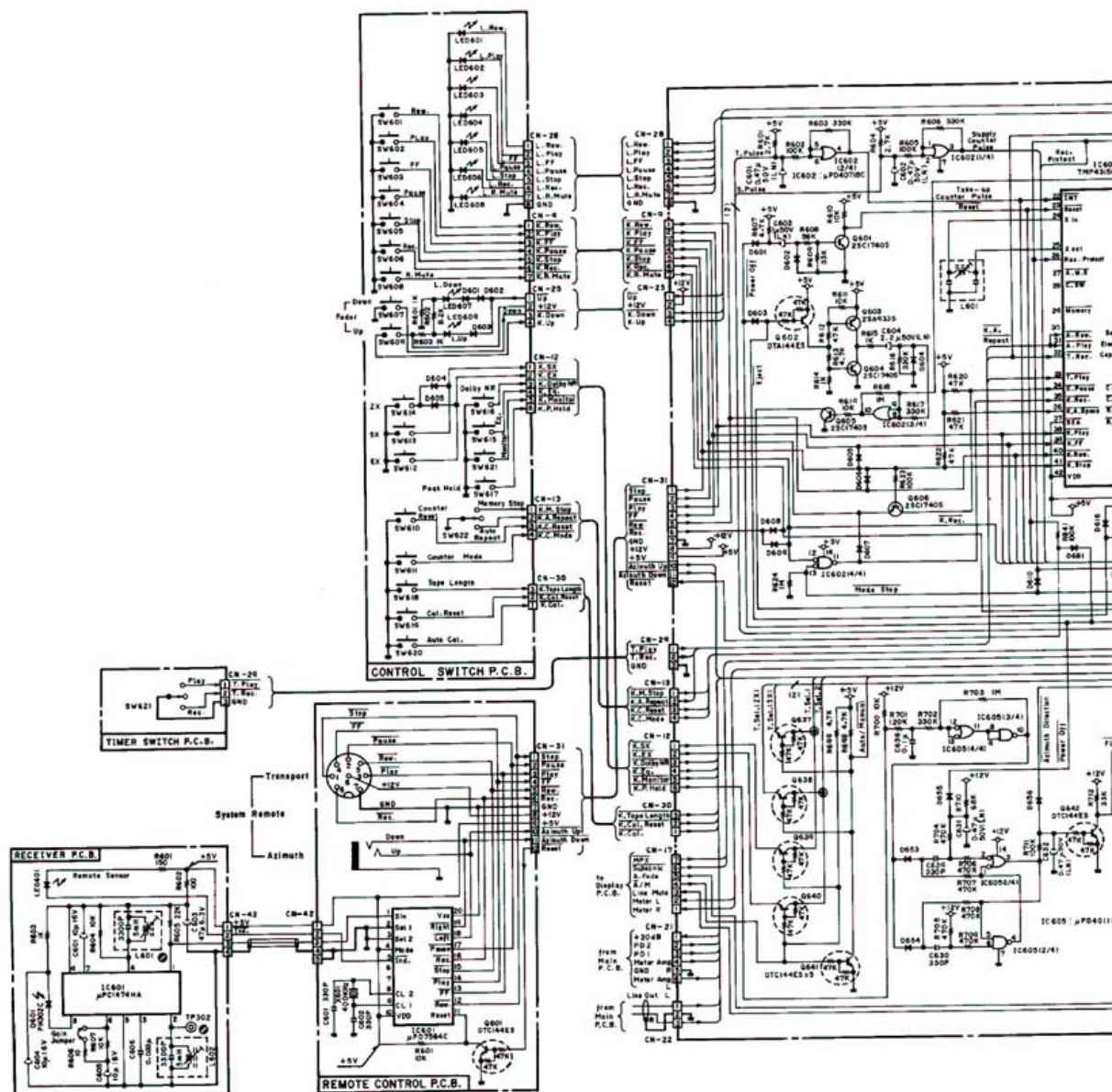
Fig. 8.2.2

8.2.2. Amplifier Section



- Notes:
1. Diode is 1SS53, 1S1555, or 1SS176 unless otherwise specified.
 2. 2SA733, 2SA608SP, 2SA1048 and 2SA1175 are interchangeable with each other.
 3. 2SC945, 2SC536SP, 2SC2458 and 2SC2785 are interchangeable with each other.

8.2.3. Mechanism Control Section



- Notes:
1. Diode is 1S853, 1S1555, or 1S8176 unless otherwise specified.
 2. 2SA733, 2SA608SP, 2SA1048 and 2SA1175 are interchangeable with each other.
 3. 2SC946, 2SC536SP, 2SC2458 and 2SC2785 are interchangeable with each other.

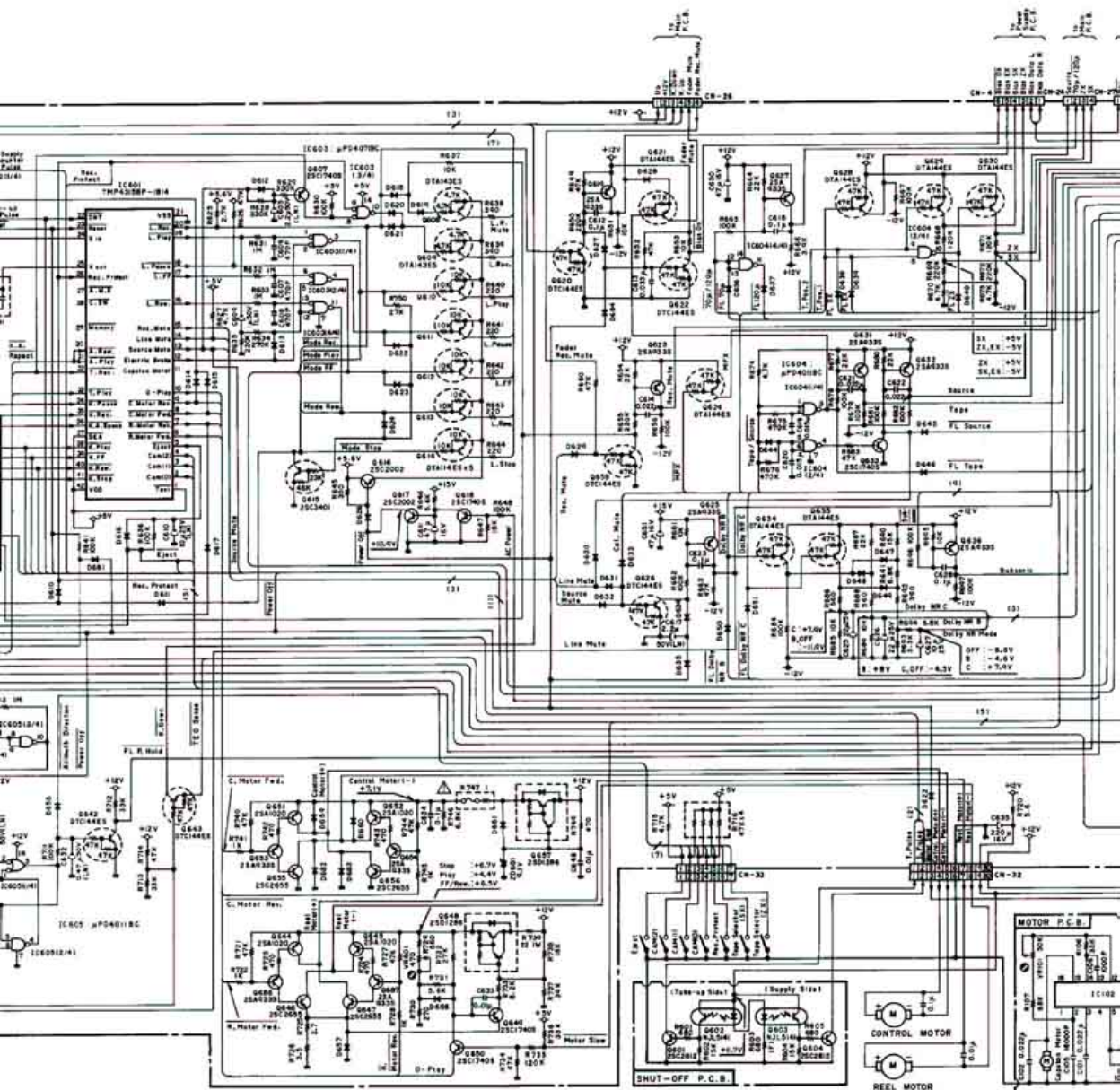
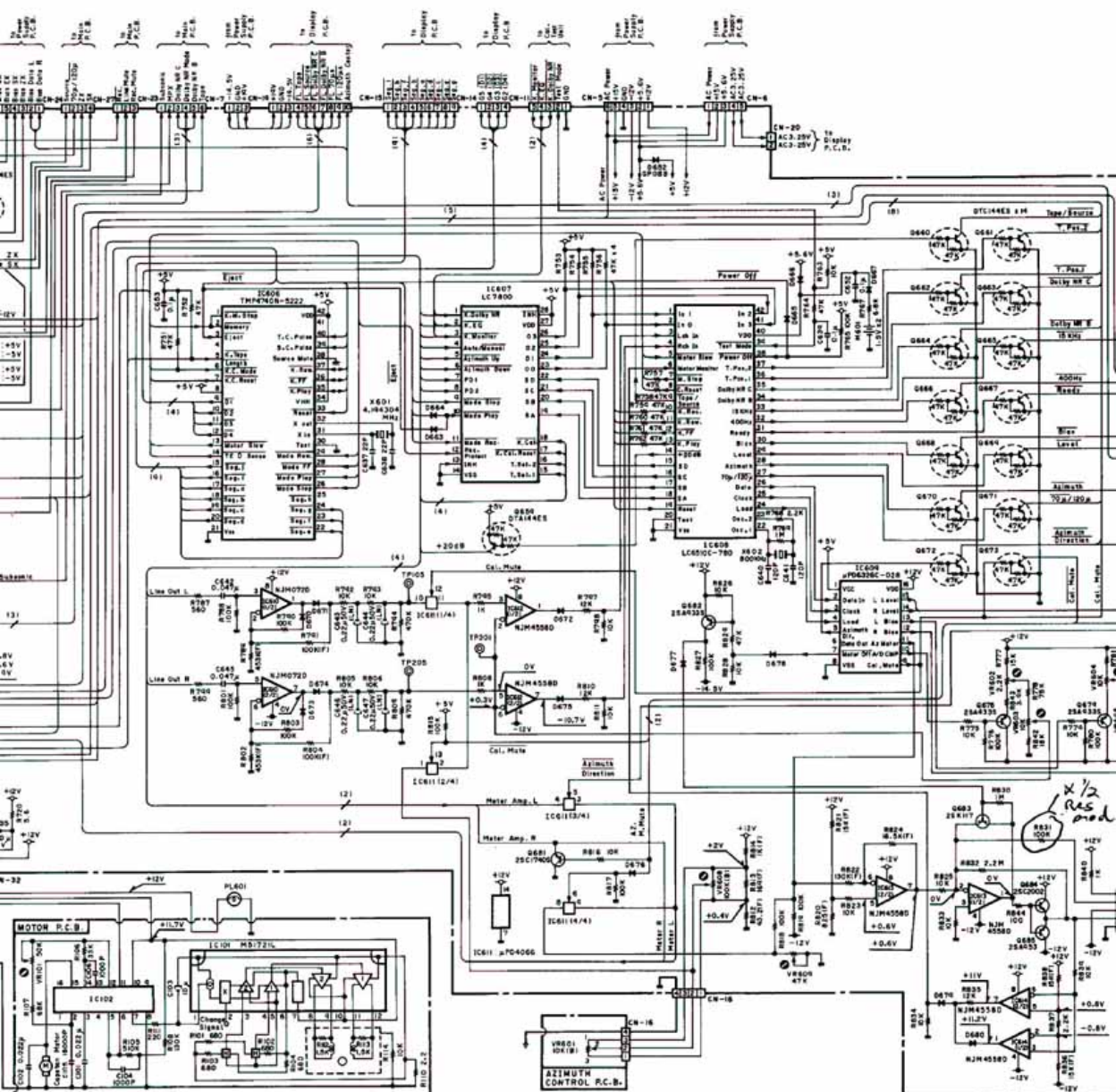
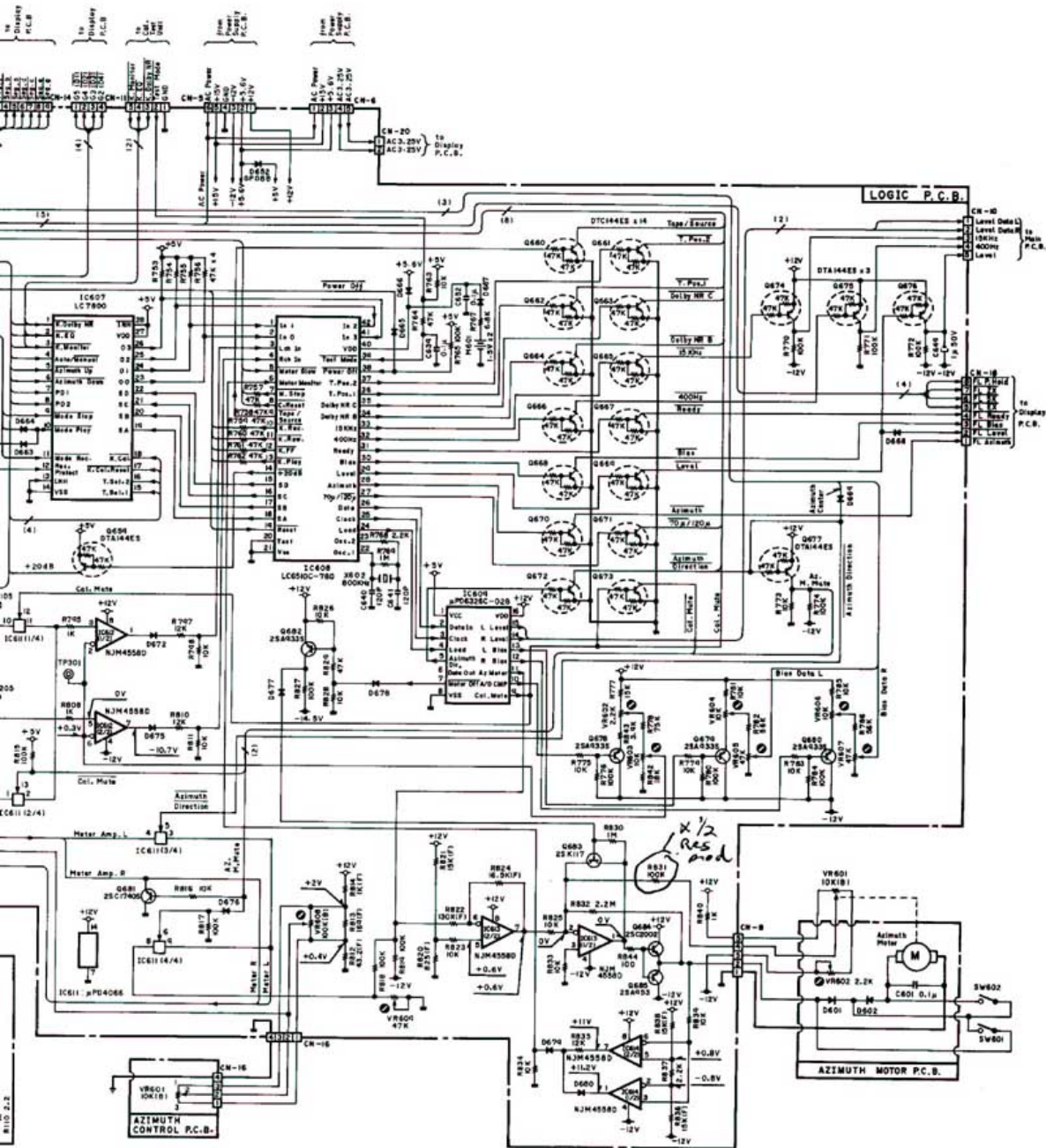
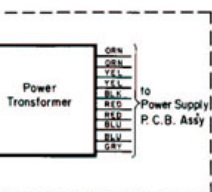
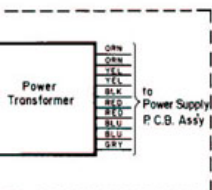
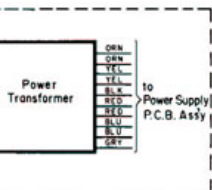
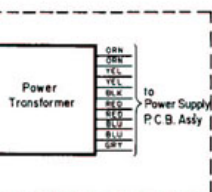


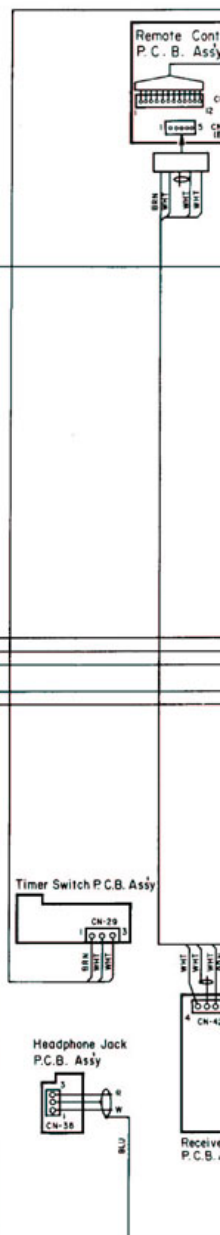
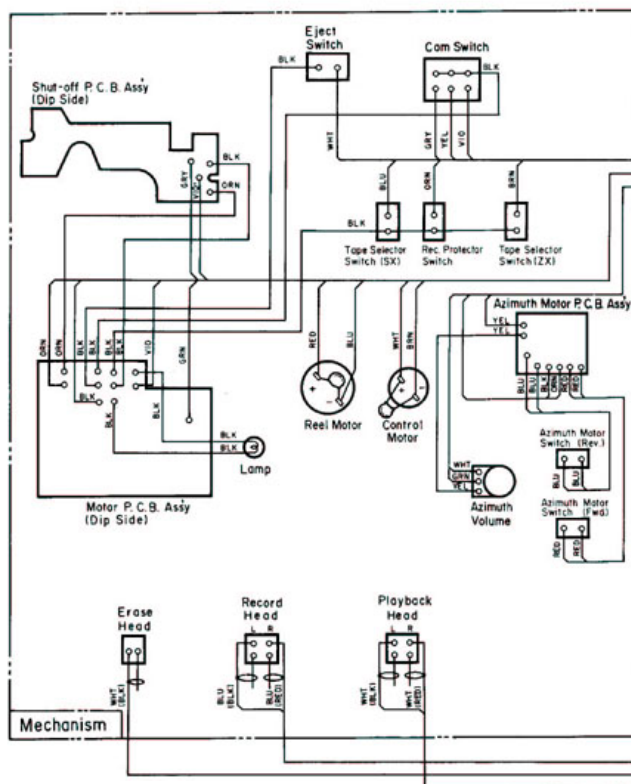
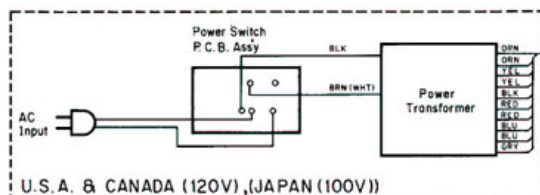
Fig. 8.2.3







Blue
Violet
Gray
White
Black
as illustrated unless otherwise specified.



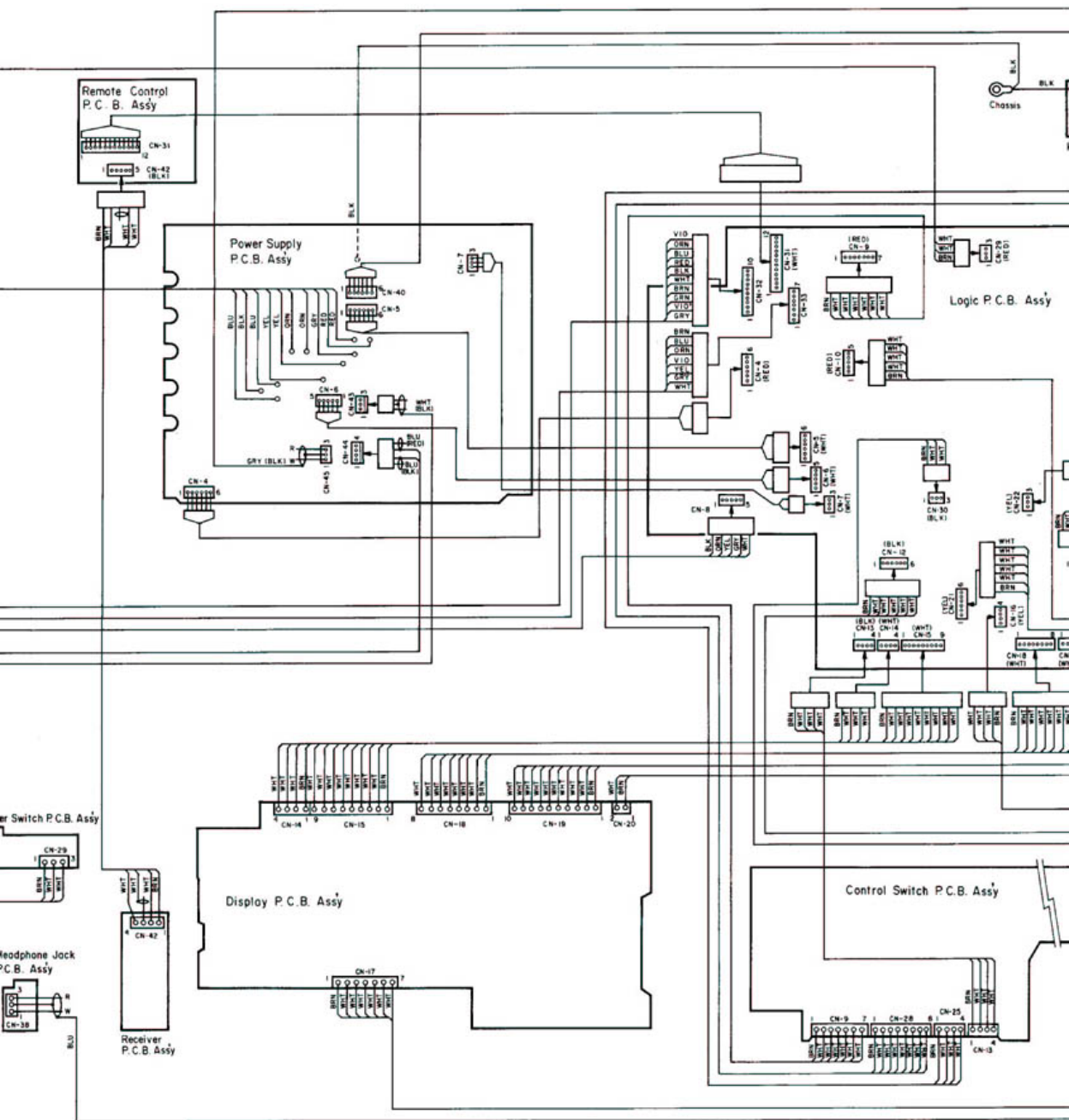
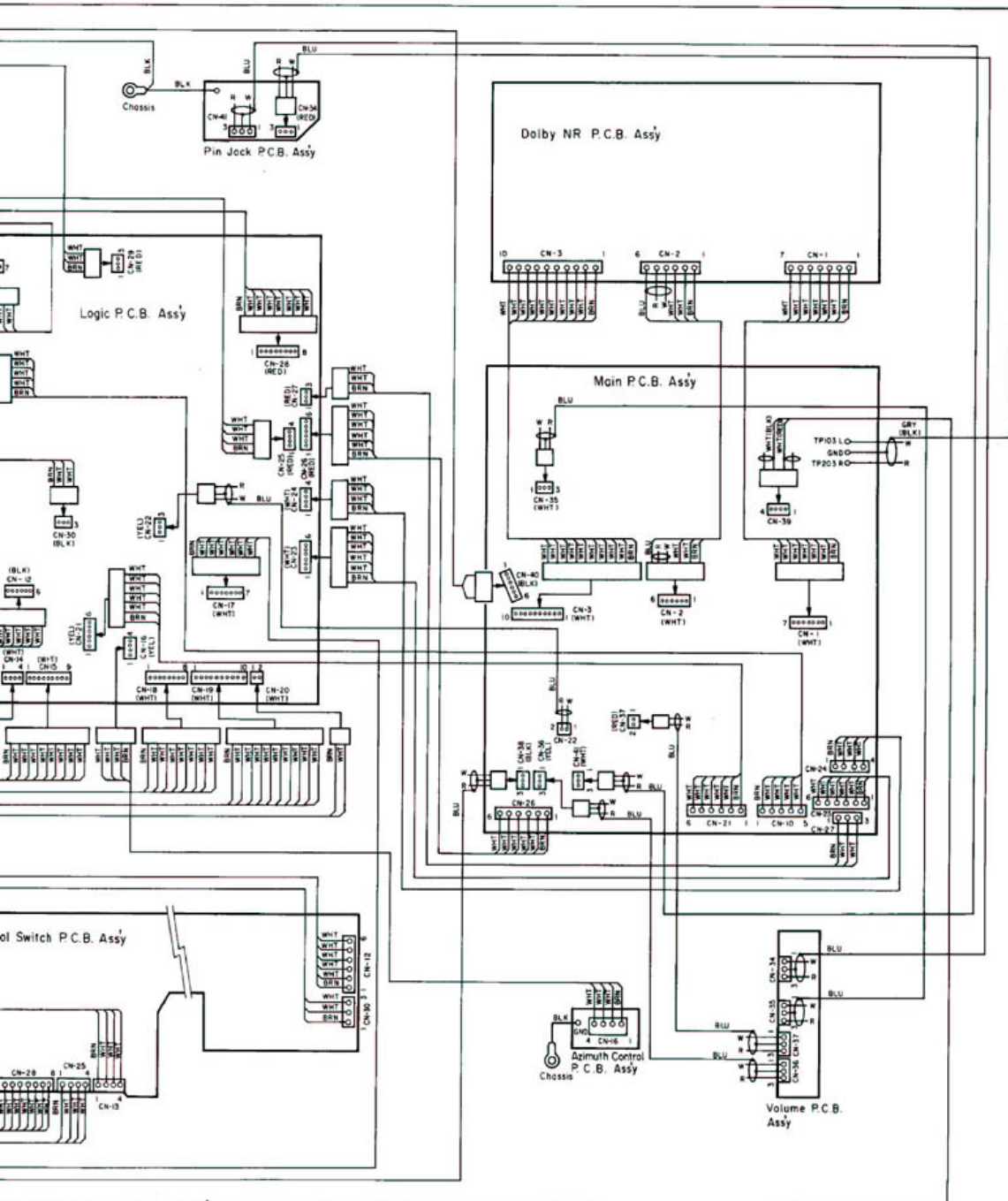


Fig. 9



10. BLOCK DIAGRAMS

10.1. Amplifier Section

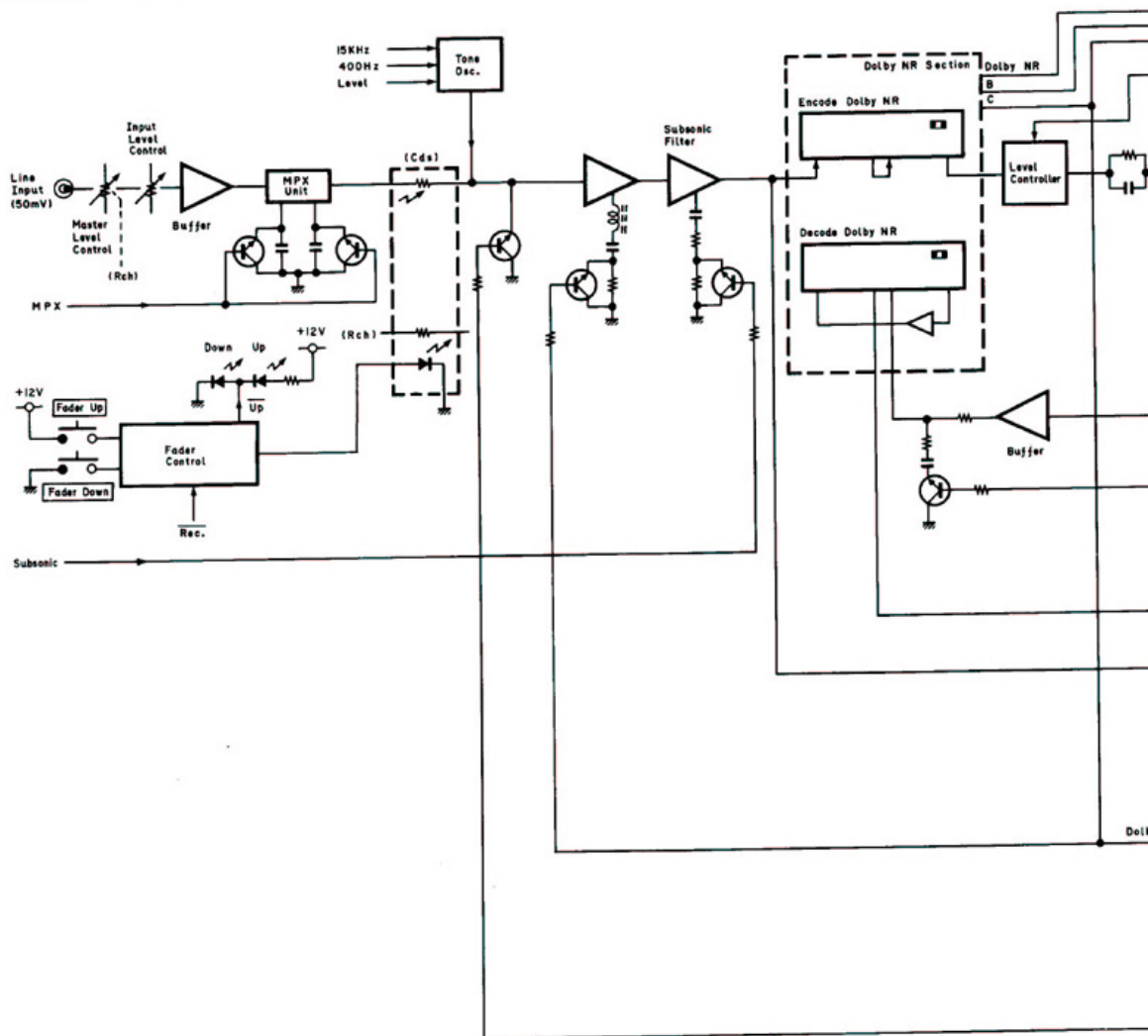
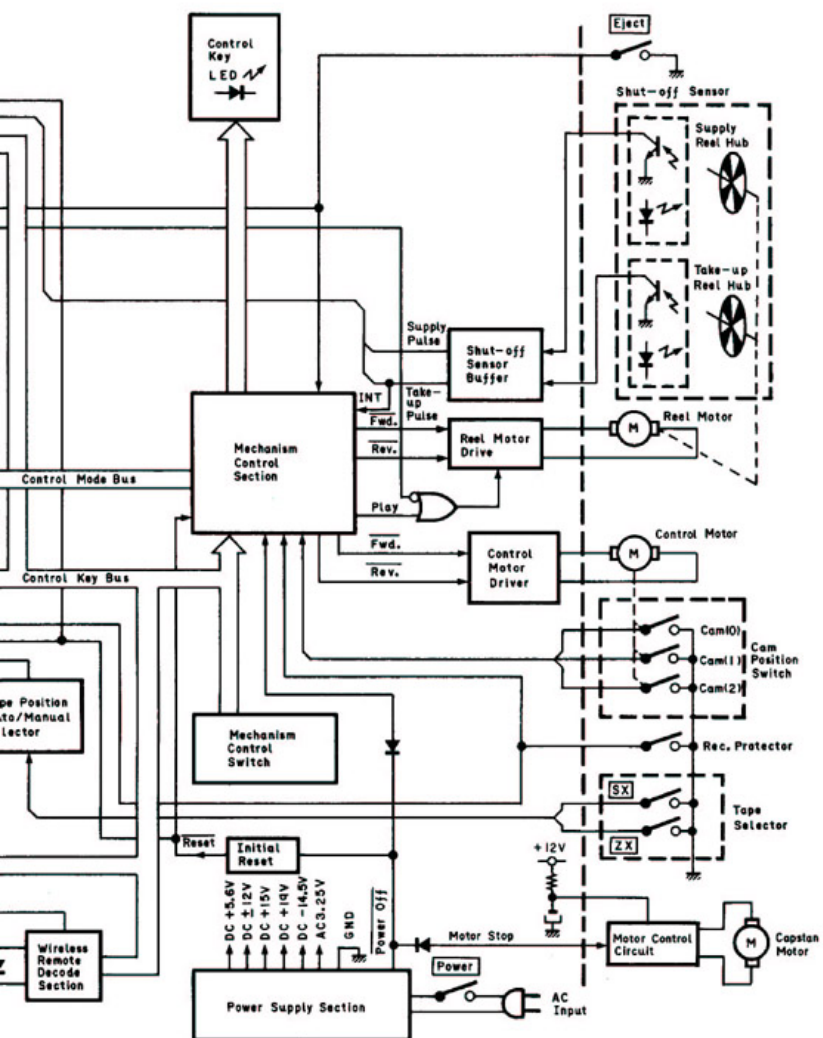


Fig. 10.1



10.2. Mechanism Control Section

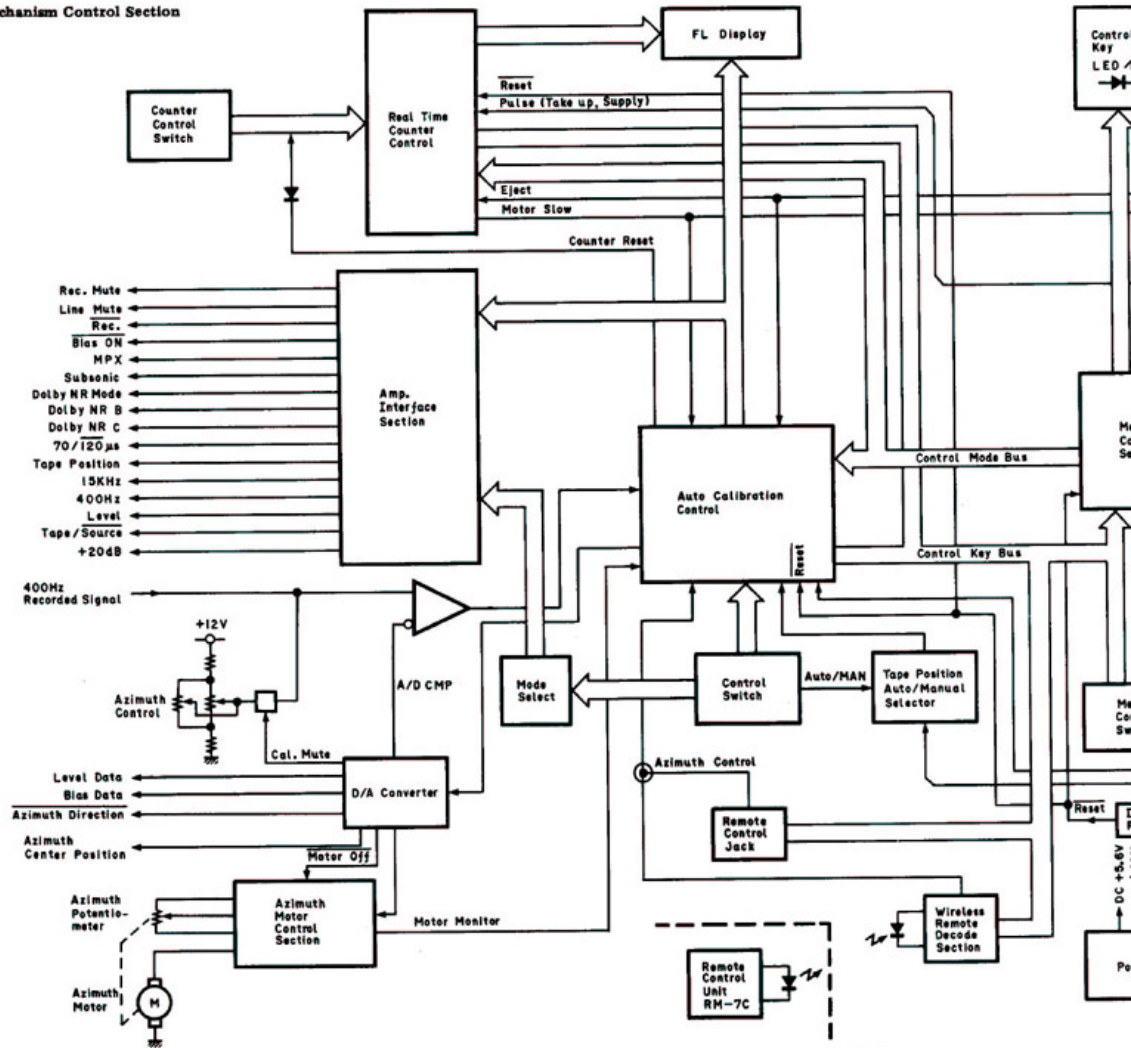


Fig. 10.2

11.2. Timing Chart

(1) Overall Timing Chart

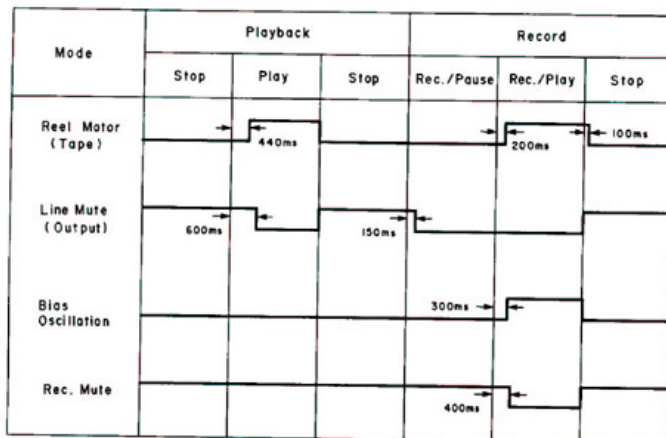


Fig. 11.2.1

(2) Mechanism Control Timing Chart

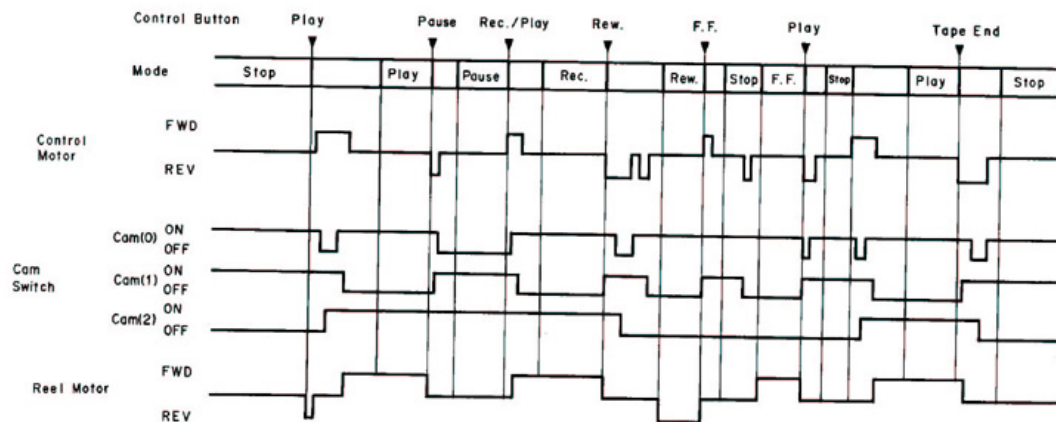


Fig. 11.2.2

11. TIMING CHART AND EQ. AMP. FREQUENCY RESPONSE

11.1. Eq. Amp. Frequency Response

(1) Playback Frequency Response

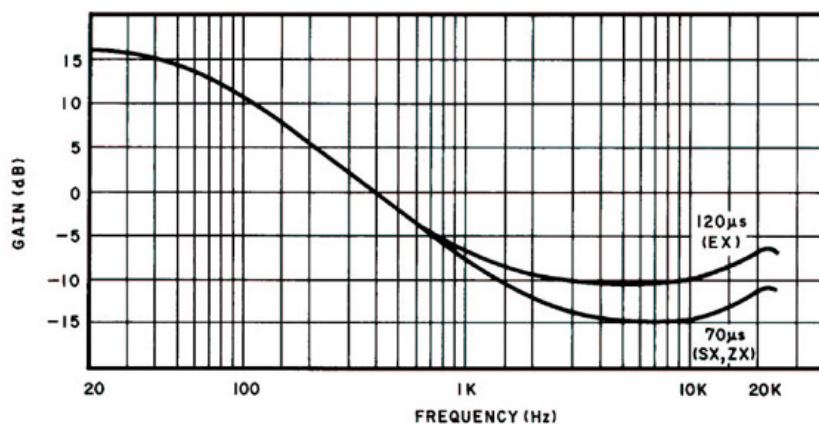


Fig. 11.1.1

(2) Record Current Frequency Response

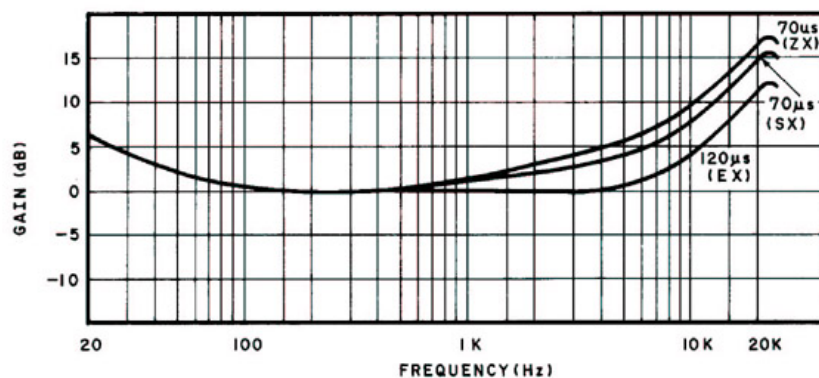


Fig. 11.1.2

12. REMOTE CONTROL UNIT (RM-7C)

12.1. Mechanism Ass'y and Parts List

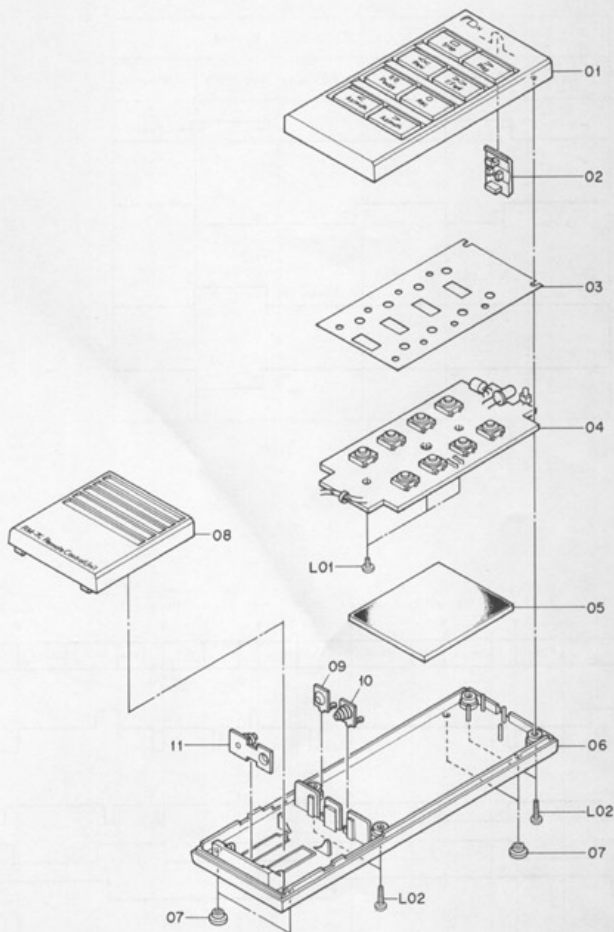
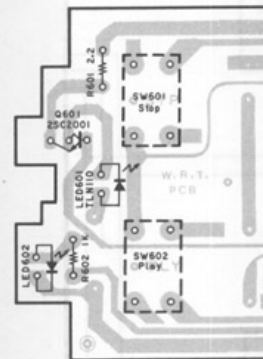


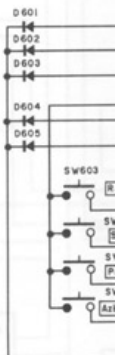
Fig. 12.1

Schematic Ref. No.	Part No.	Description	Qty
	HA04956A	Remote Control Unit (RM-7C) Serial No.: A13001001 -	1
01	OH04785A	Upper Case	1
02	OH04499B	Lens	1
03	OJ05124A	P.C.B. Sheet	1
04	BA05944A	Transmitter P.C.B. Ass'y	1
05	OJ04884A	Rubber	1
06	OH04497C	Bottom Case	1
07	OH03920A	Leg	4
08	OH04786A	Battery Case	1
09	OJ04875A	Terminal Plate A	1
10	OJ04876A	Terminal Plate B	1
11	OJ04877A	Terminal Plate C	1
L01	OE00941A	BT3x5 @ Binding (Black Chromate)	4
L02	OE00948A	BT3x10 @ Binding (Black Chromate)	4

12.2. Mounting Diagram and Part



12.3. Schematic Diagram



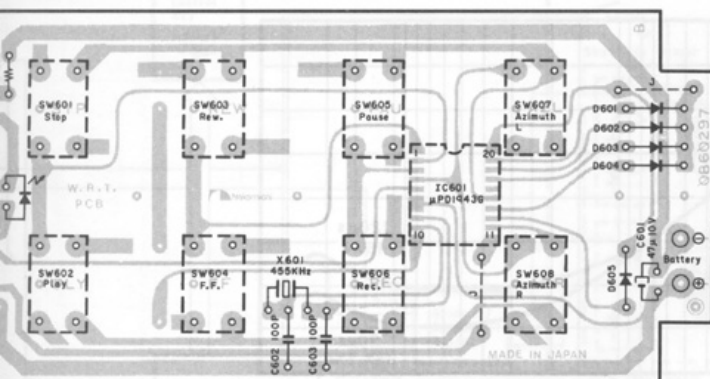


Fig. 12.2

Schematic Ref. No.	Part No.	Description
	BA05944A	Transmitter P.C.B. Ass'y
IC601	OB60297B	Transmitter P.C.B. IC μPD1943G
Q601	OB11065A	TR 2SC2001 (K)
D601,602,603,604,605	OB06181A	SiD 1SS53
LED601	OB12224A	Infrared LED TLN110
LED602	OB12218A	LED TLG226 (Green)
X601	OB92001A	Crystal 455kHz
R601	OB09613A	RK 2.2 1/6W J
R602	OB09677A	RK 1K 1/6W J
C601	OB01836A	CE 47μ 10V
C602,603	OB41079A	CC 100P 50V J
SW601-608	OB70065A	Push Switch (8)
	OB90021A	Band EG-9 (1)

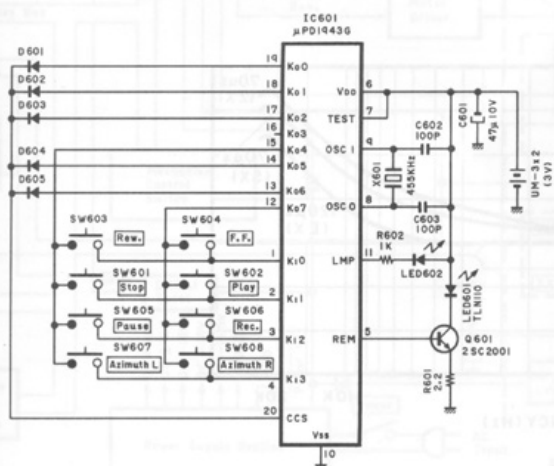


Fig. 12.3

13. SPECIFICATIONS

Main Unit

Track Configuration	4 tracks/2-channel stereo
Heads	3 (erase head x 1, record head x 1, playback head x 1)
Motors	<Tape Transport> FG servo brushless, slotless, coreless DD motor (capstan drive) x 1 DC motor (reel drive) x 1 <Mechanism> DC motor (cam drive) x 1 DC motor (playback head azimuth control) x 1
Power Source	100, 120, 120/220-240, 220 or 240 V AC, 50/60 Hz (According to country of sale)
Power Consumption	55 W max.
Tape Speed	1-7/8 ips. (4.8 cm/sec.) $\pm 0.5\%$
Wow and Flutter	Less than $\pm 0.048\%$ WTD Peak Less than 0.027% WTD RMS
Frequency Response	20 Hz—20,000 Hz ± 2 dB 18 Hz—21,000 Hz ± 3 dB
Signal to Noise Ratio	(recording level -20 dB, ZX, SX, EXII tape) Dolby C-Type NR on <70 μ s, ZX tape> Better than 72 dB (400 Hz, 3% THD, IHF A-WTD RMS) Dolby B-Type NR on <70 μ s, ZX tape> Better than 66 dB (400 Hz, 3% THD, IHF A-WTD RMS)
Total Harmonic Distortion	Less than 0.8% (400 Hz, 0 dB, ZX tape) Less than 1.0% (400 Hz, 0 dB, SX, EXII tape)
Erase	Better than 60 dB (100 Hz, +10 dB)
Separation	Better than 37 dB (1 kHz, 0 dB)
Crosstalk	Better than 60 dB (1 kHz, 0 dB)
Bias Frequency	105 kHz
Input (Line)	50 mV/40 kohms
Output (Line)	1.0 V (400 Hz, 0 dB, output level control at max.) 2.2 kohms
(Headphones)	12 mW into 8 ohms (400 Hz, 0 dB, output level control at max.)
Fast-Wind Time	Approx. 80 seconds (with C-60 cassette)
Dimensions	435 (W) x 135 (H) x 306 (D) mm 17-1/8 (W) x 5-5/16 (H) x 12 (D) inches
Approximate Weight	9.0 kg 19 lbs., 13 oz.

Remote Control Unit RM-7C

System	Infrared pulse system
Power Supply	DC 3 V (1.5 V x 2)
Dimensions	57 (W) x 175 (H) x 19 (D) mm 2-1/4 (W) x 6-7/8 (H) x 3/4 (D) inches
Approximate Weight	140 g 5 oz.

- Specifications and design are subject to change for further improvement without notice.
- Noise Reduction System manufactured under license from Dolby Laboratories Licensing Corporation.
- The word "DOLBY" and the Double-D-Symbol are trademarks of Dolby Laboratories Licensing Corporation.

3.2. Head Base Stroke Check

Remove the Cover Plate Ass'y. Refer to Fig. 3.2.

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) Load a Stroke Check Gauge S in the cassette deck.
- (2) Move the Record Head Indicator and the Playback Head Indicator to the direction of arrow mark "A" with your finger tip and then set the cassette deck in Play mode. Then slowly release the Indicators and make sure that each of the Indicators is in contact with the record and the playback heads.
- (3) Check to insure whether the line "P" on the Playback Head Indicator meets the central line on the Indicator Plate.
- (4) Check to insure whether the line "P" on the Playback Head Indicator locates between the 2 lines on the Record Head Indicator, thus check can be made on record head stroke.

3.3. Erase Head Stroke Adjustment and Tape Guide Height Check

Remove the Head Mount Base Ass'y and the Cover Plate Ass'y. Refer to Fig. 3.3.

(1) Erase Head Stroke Adjustment

- (a) Load a Tape Guide Height Check Gauge S in the cassette deck.
- (b) Set the cassette deck 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 screw A that assembles the erase head with erase head plate.
- (d) After completion of the adjustment, screw A shall be locked with lock tight paint.

(2) Supply Tape Guide Height Check

- (a) Load a Tape Guide Height Check Gauge S in the cassette deck.
- (b) Set the cassette deck in Play mode.
- (c) Slide the Supply Tape Guide Check Bar down onto the supply tape guide, and check to insure that the Supply Tape Guide Check Bar is accepted by the supply tape guide.

(3) Take-up Tape Guide Height Check

- (a) Load a Tape Guide Height Check Gauge S in the cassette deck.
- (b) Set the cassette deck in Play mode.
- (c) Slide the Take-up Tape Guide Check Bar down onto the take-up tape guide, and check to insure that the Take-up Tape Guide Check Bar is accepted by the take-up tape guide.

3.4. Erase Head Height and Tilt Adjustment

Refer to Fig. 3.4.

- (1) Remove the Cassette Case Ass'y, Head Mount Base Ass'y and Cover Plate Ass'y.
- (2) Load an EH Tilt Check Gauge S in the cassette deck.
- (3) Set the cassette deck in Stop mode.
- (4) Check to insure whether one of the 3 Beacons is illuminating. Look down the mirror and slowly turn the Screw "Height" counterclockwise (or clockwise) so that the line of the erase head (in different color) is located between the two horizontal lines on the mirror and check to insure whether the first Beacon is illuminating.
- (5) Turn the Screw "Tilt" counterclockwise (or clockwise) to light up the second Beacon. Excessive turning will cause the first Beacon to light off.

Adjustment of the Screw "Tilt" will therefore be conducted till both of the first and the second Beacons illuminate.

- (6) Turn Screw "Azimuth" counterclockwise (or clockwise) to light up the third Beacon. Excessive turning will cause either the first or the second Beacon to light off, and therefore adjust Screw "Azimuth" until all of the 3 Beacons illuminate.
- (7) Check to insure whether the horizontal line of the erase head is located between two lines on the mirror. If not, (4) through (6) must 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 dirt, or overflow in the groove of the erase head surface.

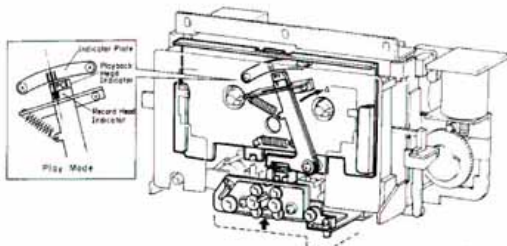


Fig. 3.2

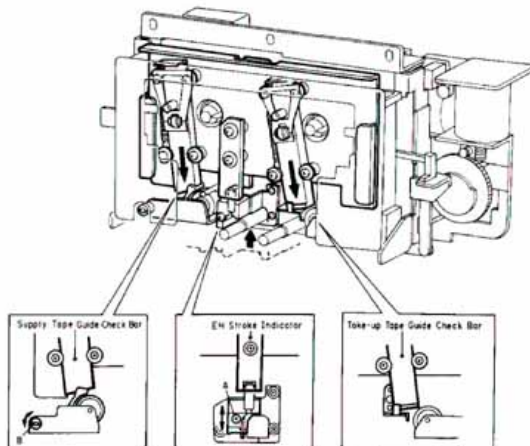


Fig. 3.3

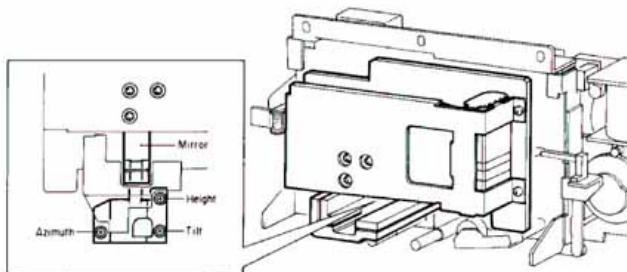


Fig. 3.4

Service Information



Model Nakamichi CR-7/7A/7E/70
Serial No. (Discrete Head Cassette Deck)
from A13008677 -
Subject Modification of Record Eq.
Amp. Circuit

No. OOD-M-0298 (1/3)
Date 22 May 1987

1. General**1.1. Purpose**

The record eq. amp. circuit in the Main P.C.B. Ass'y has been improved because of the following reason.

Nakamichi performs level calibration and bias calibration at 400 Hz and 15 kHz respectively, after determining the record equalizer and the peaking of record current so that flat overall frequency response is obtained on the reference ZX, reference SX and reference EXII tapes complying with the IEC Standard.

Some cassette tapes on the market have frequency response raised in the high-frequency range (above 15 kHz) under the name of improvement. Such tapes account for slightly below 20% of the market, according to our survey. These tapes, although conforming to the IEC Standard, have characteristics far from those of the reference tapes used by Nakamichi. When such a cassette tape is loaded in the CR-7/7A/7E/70 and, after auto calibration, music is recorded with Dolby NR set to C-type, the played back music has the auditory effect of "decreased frequency response in the high frequency range". Actually this decrease in frequency characteristics occurs around the range of 1 kHz to 10 kHz. (Of course the frequency response on the CR-7/7A/7E/70 is within specification).

> (Load of crap)

We have made changes to the record equalizer circuit and record current peaking circuit of the CR-7/7A/7E/70 so that the practical problems will not occur with the cassette tapes featuring raised response in the high-frequency range (above 15 kHz). With these changes, we believe that you will have no more complaints about decreased response at high frequencies.

When a cassette tape with raised response at high frequencies (above 15 kHz) is used, the problem is not severe if the tape requires small bias current, such as Type I. However, when the cassette tape requires large bias current, such as Type II or IV, considerable overbias must be applied to make the 15 kHz response flat. Such overbias would have adverse effects, even on level calibration. The result would be a decrease in 1 kHz - 10 kHz response, particularly noticeable if C-type Dolby NR is selected.

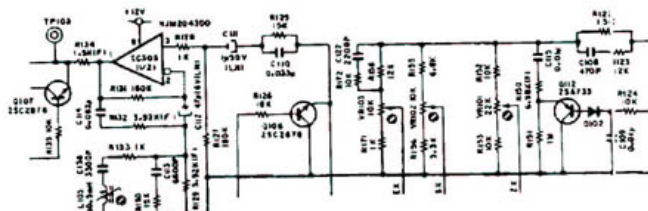
We recommend that you make the circuit changes described only against a complaint voiced from your customers. We do not think it necessary for you to make the circuit changes also for the CR-7/7A/7E/70 units stored in your stock.

Steve
SOS-293-3420

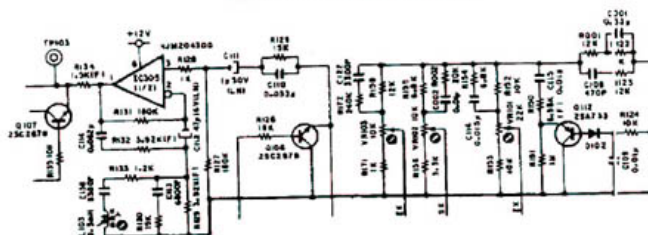
1.2. Modification

The following parts have been modified in the Main P.C.B. Ass'y.
Refer to Fig. 1.

Ref. No.	Current Part No.	New Part No.	Description	Q'ty
	BA05932A	BA05932A	Main P.C.B. Ass'y	1
(Rec. Eq. Amp.)				
R003,200	OB09677A	-	Carbon Resistor 1K 1/6W J	2
R133,233	-	QB09679A	Carbon Resistor 1.2K 1/6W J	2
(Rec. Cal.)				
R001,003	(None)	QB09703A	Carbon Resistor 12K 1/6W J	2
R002,004	(None)	QB09708A	Carbon Resistor 20K 1/6W J	2
R009,009	OB09705A	-	Carbon Resistor 15K 1/6W J	2
R122,222	-	QB09677A	Carbon Resistor 1K 1/6W J	2
R154,254	(None)	QB09697A	Carbon Resistor 6.8K 1/6W J	2
R172,272	OB09701A	-	Carbon Resistor 10K 1/6W J	2
R172,272	-	QB09732A	Carbon Resistor 240K 1/6W J	2
C001,003	(None)	QB41304A	Metalized Mylar Capacitor 0.33 μ 50V J	2
C002,004	(None)	QB05681A	Mylar Capacitor 0.01 μ 50V J	2
C116,216	(None)	QB41096A	Mylar Capacitor 0.015 μ 50V J	2
C122,222	QB01802A	-	Mylar Capacitor 2200P 50V J	2
	-	QB41088A	Mylar Capacitor 3300P 50V J	2



(Before Modification)



(After Modification)

Fig. 1

1.3. Compatibility (of new Main P.C.B. Ass'y with current om.)
Possible.

2. Modification Procedures for Current Models

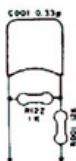
2.1 Parts Required

Ref. No.	Part No.	Description	Qty
R133,233	0B09679A	Carbon Resistor 1.2K 1/6W J	2
R001,003	0B09703A	Carbon Resistor 12K 1/6W J	2
R002,004	0B09708A	Carbon Resistor 20K 1/6W J	2
R122,222	0B09677A	Carbon Resistor 1K 1/6W J	2
R154,254	0B09697A	Carbon Resistor 6.8K 1/6W J	2
R172,272	0B09732A	Carbon Resistor 240K 1/6W J	2
C001,003	0B41304A	Metalized Mylar Capacitor 0.33 μ 50V J	2
C002,004	0B05681A	Mylar Capacitor 0.01 μ 50V J	2
C116,216	0B41096A	Mylar Capacitor 0.015 μ 50V J	2
C122,222	0B41088A	Mylar Capacitor 3300P 50V J	2

2.2. Modification Procedures

Apply the following modifications to the current Main P.C.B. Ass'y.
Refer to Fig. 2.

- (1) Remove R133, 233 (1 K).
- (2) Remove R122, 222 (15 K).
- (3) Remove R172, 272 (10 K).
- (4) Remove C122, 222 (Mylar Capacitor 2200P).
- (5) Mount R133, 233 (1.2 K).
- (6) Mount R172, 272 (240 K).
- (7) Mount C122, 222 (Mylar Capacitor 3300P).
- (8) Connect C001, 003 (Metalized Mylar Capacitor 0.33 μ), R122, 222 (1 K) R001, 003 (12 K) as follows and insert them into the places where R12 and R222 were mounted,



(R122)



(R222)

- (9) Mount R154, 254 (6.8 K).
- (10) Mount C116, 216 (Mylar Capacitor 0.015 μ).
- (11) Mount R002, 004 (20 K).
- (12) Mount C002, 004 (Mylar Capacitor 0.01 μ).
- (13) Perform re-adjustment using new reference tapes.

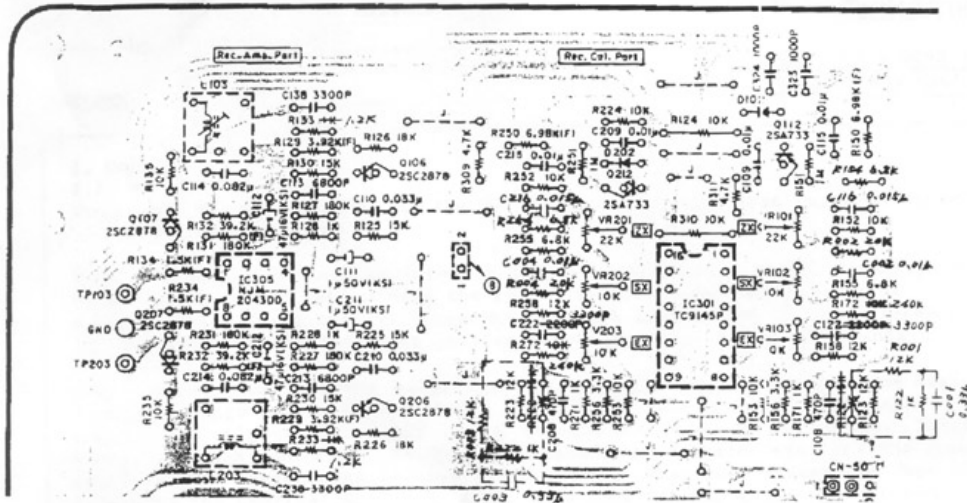


Fig. 2 (Main P.C.B. Ass'y)

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 2. The word "DOLBY" and the Double-D-Symbol are trademarks of Dolby Laboratories Licensing Corporation.