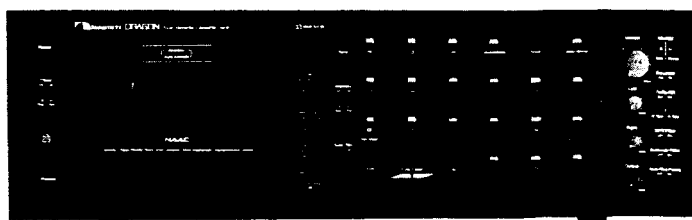




Service Manual

Nakamichi DRAGON

Auto Reverse Cassette Deck



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1. GENERAL

1.1. Voltage Selector

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

1.2. Parts List for Carton and Packing

Part No.	Description	Q'ty
OF03685B	Inner Carton	1
OF03686B	Outer Carton	1
OF03629B	Packing	2

2. MECHANICAL ADJUSTMENTS

2.1. Mechanism Control Cam Adjustment

Before adjustment, remove the Front Panel Ass'y and the Cover Plate.

(1) Offset Adjustment of Control Motor Driver

(a) Refer to Fig. 2.1.

Adjust VR604 and VR603 on the Logic P.C.B. Ass'y to locate approximately at the middle of the variable range. Then turn ON the Power switch.

VR604 (for Cam position stop)
VR603 (for Cam position play)

(b) Press the Stop button to set the cassette deck in Stop mode. Adjust VR604 (for stop) so that the "S" mark on the Cam corresponds to the pointer on the mechanism chassis.

(c) Press the Play button to set the cassette deck in Playback mode. (Cam will rotate, and the position marked with "PY" comes to the pointer.) Adjust VR603 (for play) so that the "PY" mark on the Cam corresponds to the pointer.

(d) Repeat above (b) and (c) 2 - 3 times so that the "S" and "PY" marks on the Cam correspond to the pointer accurately in Stop and Playback modes respectively.

(This adjustment is required because the position adjusted by one volume will be slightly changed when the other volume is adjusted.)

(e) Set the cassette deck in F.F., Pause, or Cue mode by pressing each button. Check to insure that the pointer is in a range of "F", "PS", "CU" mark respectively.

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

(2) Offset Fine Adjustment of Control Motor Driver

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

(a) Observation Point of Reference Voltage

Observe the each voltage at the sliding contact of the Cam Control Volume VR605 (10 kΩ) in Stop, Fast (F.F. or Rew.), Pause and Playback modes.

(b) Reference Voltage

Reference voltage at the sliding contact of VR605 (Cam Control Volume) in each mode is as follows:

Mode	Reference Voltage (Typical Value)
Stop	0 V
Fast (F.F./Rew.)	-2.0 V
Pause	-6.5 V
Play	-9.1 V

2.0 V ± 0.25 V
2.6 V ± 0.4 V

(c) Resistors for Adjustment

Mode	Ref. No.	Typical Value
Fast (F.F./Rew.)	R640	22 kΩ
Pause	R643	76.8 kΩ (F)
Play	R639	10 kΩ

(d) Adjustment Procedures

- Set the cassette deck in Stop mode, then check to insure that the voltage at the sliding contact of VR605 is 0 V (±0.3 V).
- Set the cassette deck in F.F. mode, then adjust the value of

R640 so that the voltage at the sliding contact of VR605 will become lower by 2.0 V (±0.25 V) than in Stop mode.

- Press the Pause button to set the cassette deck in Pause mode. Adjust the value of R643 to obtain -6.5 V (+0.4, -0.15 V) at the sliding contact of VR605.
- Set the cassette deck in Playback mode, then adjust the value of R639 so that the voltage at the sliding contact of VR605 will become lower by 2.6 V (±0.4 V) than in Pause mode.

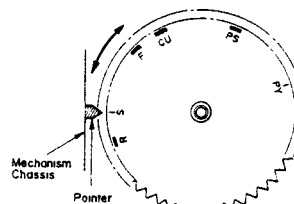


Fig. 2.1

2.2. Reel Motor Speed Adjustment in Play mode

- Connect a DC voltmeter to TP1 and GND on the Logic P.C.B. Ass'y.
- Without loading a cassette tape, set the cassette deck in Play mode.
- Adjust VR601 on the Logic P.C.B. Ass'y to obtain -4 V on the DC voltmeter.

2.3. Record Head and Playback Head Tilt Adjustment

Note: On items 2.3 - 2.9, refer to Fig. 2.2 flow chart. Refer to Figs. 2.3 and 2.4.

- Load a Tilt Check Gauge M-9039 (DA09039A) in the cassette deck.
- Clip the grounding terminal of the Tilt Check Gauge with one end of the cord with clip, and the chassis of the cassette deck with the other end.
- Remove both of the Height Gears.
- 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 to the direction of arrow marks, then return them to the original place to be in contact with record head and playback head surfaces after Play mode is securely locked.
- Check to insure freedom from contact between the Gauge and pad lifter.
- Beacon Playback Head "Lower" will light on when height adjustment screw (P) turned clockwise but Playback Head "Upper" when counterclockwise. Adjust so that both "Upper" and "Lower" will light on even when you move the slide knob to the direction of an arrow mark and then return it to the original place.
- Same procedures will apply to the Beacons Record Head "Upper" and "Lower", except for the height adjustment screw (R).
- Set the cassette deck in Stop mode and fit both of the serrated Height Gears. Then set the cassette deck again in Play mode and insure all of the 4 Beacons are illuminating. If not, (3) through (7) will have to be repeated till satisfactory results are obtained.

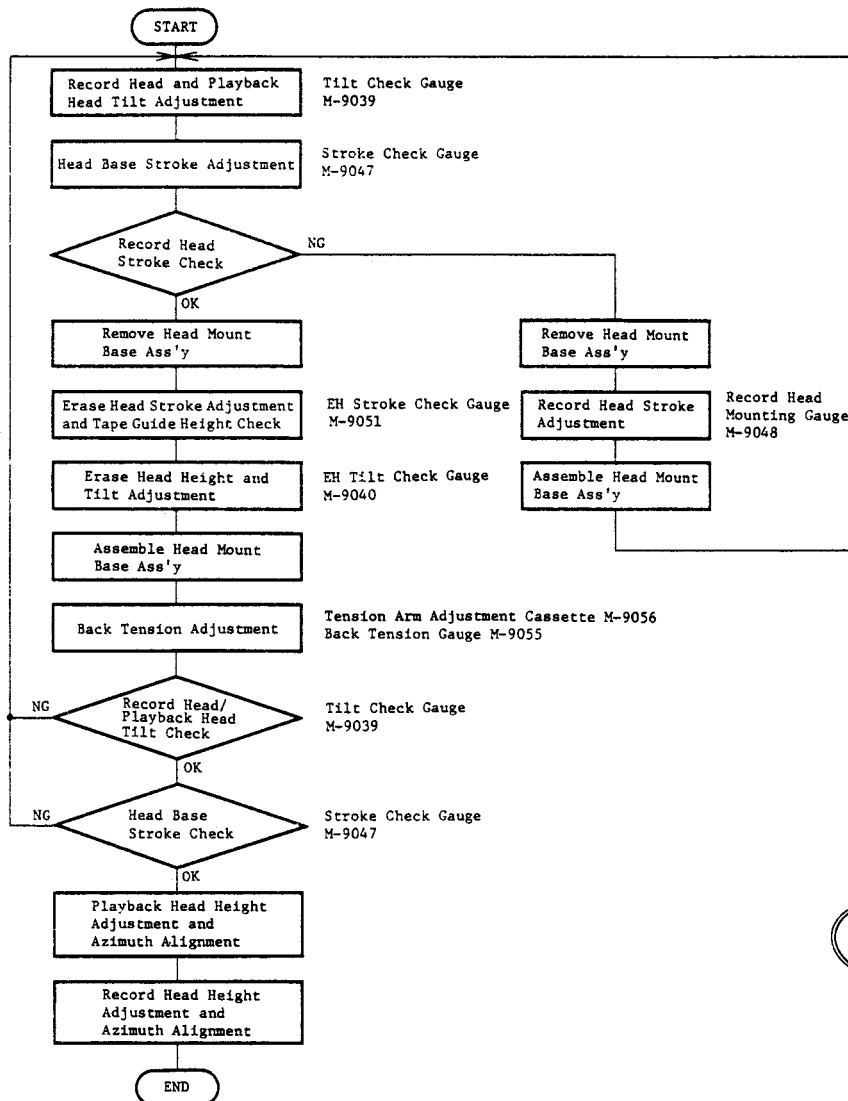


Fig. 2.2

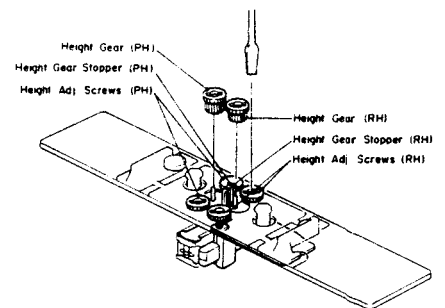


Fig. 2.3

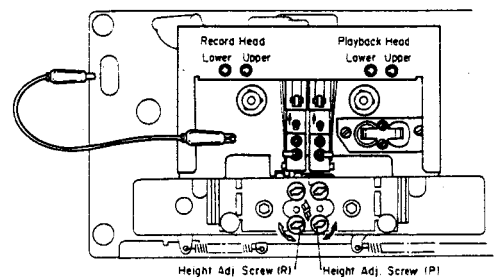


Fig. 2.4

2.4. Head Base Stroke Adjustment

Refer to Fig. 2.5.

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

- (1) Head Base Stroke Adjustment in Play Mode
 - (a) Load a Stroke Check Gauge M-9047 (DA09047B) in the cassette deck.
 - (b) Move Record Head Indicator and 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 insure whether each of the Indicators is in contact with record and playback heads.
 - (c) Check to insure whether the "P" pointer on the Playback Head Indicator locates between the 2 lines on the Indicator Plate.
 - (d) If the playback head stroke is noted to be misaligned, adjustment can be made by moving the stroke adjuster assembled in the head base assembly (either forwardly or backwardly).
 - (e) Check to insure whether the "P" pointer on the Playback Head Indicator locates between the 2 lines on the Record Head Indicator, thus check can be made on record head stroke.

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

(2) Head Base Stroke Adjustment in Cue Mode

- (a) Load a Stroke Check Gauge M-9047 (DA09047B) in the cassette deck.
- (b) Move Record Head Indicator and Playback Head Indicator to the direction of arrow mark "A" with your finger tip and then set the cassette deck in Cue mode. Then slowly release the Indicators and insure whether each of the Indicators is in contact with record and playback heads.
- (c) Check to insure whether the "C" pointer on the Playback Head Indicator locates between the 2 lines on the Indicator Plate.
- (d) If the playback head stroke is noted to be misaligned, adjust VR602 on the Logic P.C.B. Ass'y till satisfactory results are obtained.
- (e) After completion of the Head Base Stroke Adjustment, check to insure accuracy of the Head Base Stroke Adjustment in Play mode. If the above are inaccurate, items (1) and (2) will have to be repeated till satisfactory results are obtained.

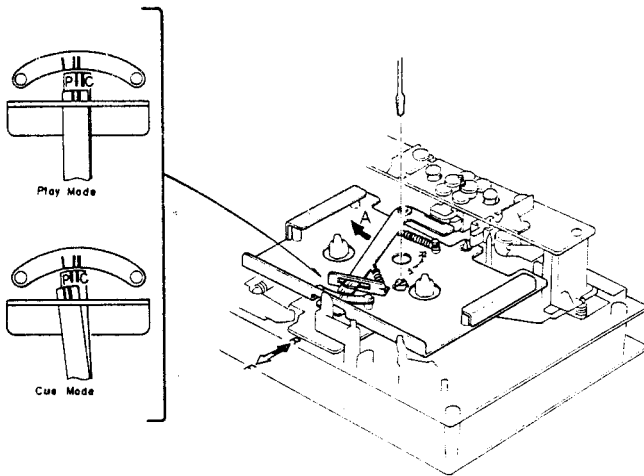


Fig. 2.5

2.5. Erase Head Stroke Adjustment and Tape Guide Height Check
Remove the Head Mount Base Ass'y.
Refer to Figs. 2.6 and 2.7.

- (1) Erase Head Stroke Adjustment
 - (a) Load an EH Stroke Check Gauge M-9051 (DA09051A) 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 2 screws A that assemble erase head and erase head plate.
 - (d) After completion of adjustment, 2 pcs. of screws shall be locked with lock tight paint.
- (2) Supply Tape Guide Height Check
 - (a) Load an EH Stroke Check Gauge M-9051 (DA09051A) in the cassette deck.
 - (b) Set the cassette deck in Play mode.
 - (c) Slide the Supply Tape Guide Check Bar down against 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 an EH Stroke Check Gauge M-9051 (DA09051A) in the cassette deck.
 - (b) Set the cassette deck in Play mode.
 - (c) Slide the Take-up Tape Guide Check Bar down against 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.

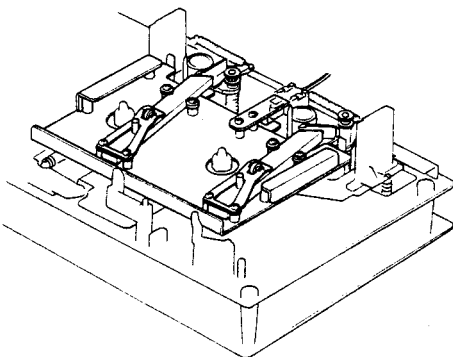


Fig. 2.6

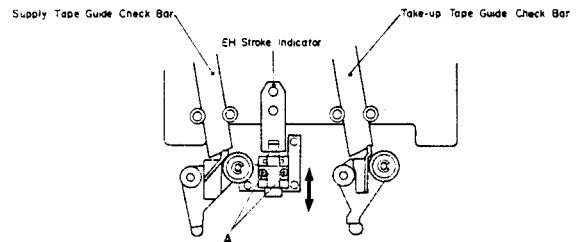


Fig. 2.7

2.6. Erase Head Height and Tilt Adjustment
Refer to Figs. 2.8 and 2.9.

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

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

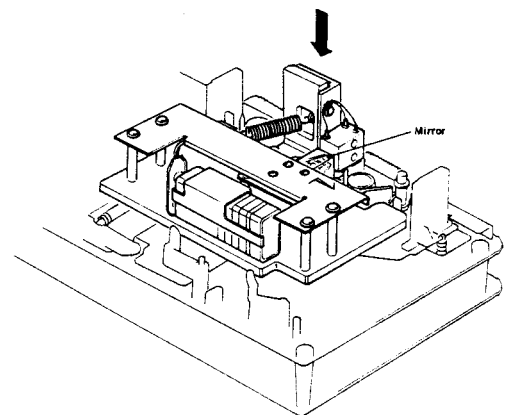


Fig. 2.8

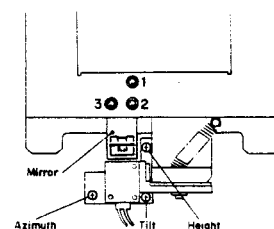


Fig. 2.9

2.7. Back Tension Adjustment

Refer to Figs. 2.10 — 2.13.

- (1) Load a Tension Arm Adjustment Cassette (DA09056A) in the cassette deck referring to Fig. 2.10.
- (2) Set the cassette deck in Play mode.
- (3) Bend the Back Tension Arm with pliers so that the gap between the Cassette Holding Spring assembled on the Head Base Ass'y and the Back Tension Arm becomes 0.5 mm as shown in Fig. 2.11. Do not bend the top of the Back Tension Arm.
- (4) Set the cassette deck in Stop mode, and remove the Tension Arm Adjustment Cassette (DA09056A), then set the cassette deck in Cue mode.

In Cue mode, check to insure that the gap is found between the Supply Reel Hub B Ass'y and the Felt of Back Tension Ass'y as shown in Fig. 2.12.

- (5) Load the Back Tension Gauge (DA09055A) in the cassette deck.
- (6) Set the cassette deck in Play mode and read the torque value of Back Tension Gauge.

If the value is in a range of 6 g-cm to 10 g-cm, adjustment is not necessary. If not, change the installation point of the Back Tension Spring as shown in Fig. 2.13, and obtain the torque of 7 g-cm to 9 g-cm range.

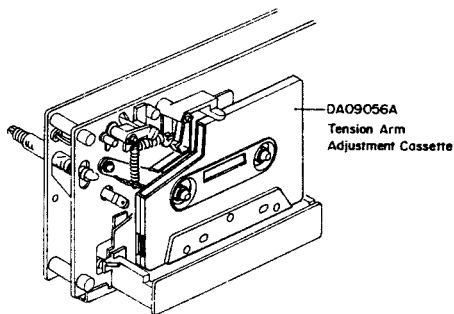


Fig. 2.10

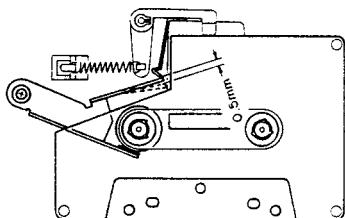


Fig. 2.11

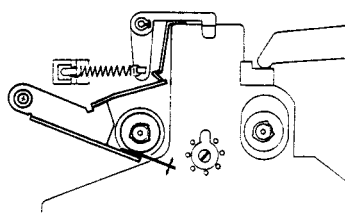


Fig. 2.12

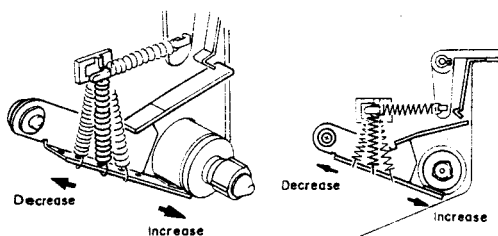


Fig. 2.13

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

Refer to Figs. 2.14 and 2.15. Perform the following adjustments successively.

- (1) Playback Head Height Adjustment
 - (a) Set the Monitor switch to Tape, Tape Selector button to ZX and Eq. switch to 70 μ s.
 - (b) Connect a VTVM to Output Jacks.
 - (c) Load a 1 kHz Track Alignment Tape (DA09007B) and set the cassette deck in Forward-Play mode.
 - (d) Turn the PH Height Gear until the outputs of both channels become minimum on the VTVM.

(2) Azimuth Reference Position Adjustment

- (a) With the Cassette Holder open, press the Forward-Play button. Adjust VR824 on the Auto Azimuth P.C.B. Ass'y so that the Alignment Indicator coincides with the Pointer in the Azimuth Alignment Motor Ass'y. Refer to Fig. 2.15.
- (b) With the Cassette Holder open, press the Reverse-Play button. Adjust VR823 on the Auto Azimuth P.C.B. Ass'y so that the Alignment Indicator coincides with the Pointer in the Azimuth Alignment Motor Ass'y.

(3) Playback Head Azimuth Alignment

- (a) Disconnect the Azimuth Motor by pulling out the connector CN-5 of the Auto Azimuth P.C.B. Ass'y.
- (b) Load a 15 kHz Azimuth Alignment Tape (DA09004B) and set the cassette deck in Forward-Play mode.
- (c) Turn the PH Azimuth Alignment screw until the outputs of both channels become maximum on the VTVM.

(4) Phase Adjustment and Record Head Height Adjustment and Azimuth Alignment

- (a) Connect a DC millivoltmeter to pin 1 of CN-5 on the Auto Azimuth P.C.B. Ass'y (CN-5 is removed).
- (b) Load a 15 kHz Azimuth Alignment Tape (DA09004B) and set the cassette deck in Forward-Play mode. Adjust the VR701 on the Main P.C.B. Ass'y to obtain 0 V on the DC millivoltmeter. (Adjustment should be carried out within approx. 10 seconds.)
- (c) Turn the Azimuth Alignment Tape upside down and set the cassette deck in Reverse-Play mode. Adjust VR702 on the Main P.C.B. Ass'y to obtain 0 V on the DC millivoltmeter within approx. 10 seconds.
- (d) Load a Reference ZX Tape (DA09037B) and set the cassette deck in Rec./Forward-Play mode.
- (e) Press the Level Calibration button to oscillate 400 Hz (0 dB) and turn the RH Height Gear until the outputs of both channels become maximum on the VTVM.
- (f) Press the Bias Calibration button to oscillate 15 kHz (-20 dB) and turn the RH Azimuth Alignment Screw until the outputs of both channels become maximum on the VTVM.
- (g) Feed in 5 kHz (-20 dB) from an external generator. Set the cassette deck in Rec./Forward-Play mode and adjust VR822 on the Auto Azimuth P.C.B. Ass'y to obtain the closest value to 0 V on the DC millivoltmeter at pin 1 of CN-5. (Adjustment should be done within approx. 10 seconds.)
- (h) Mount CN-5 on the original place.
- (i) Load a 15 kHz Azimuth Alignment Tape (DA09004B) and set the cassette deck in Forward-Play mode. Note the Indicator swing from the Pointer. Turn the Azimuth Alignment Tape upside down, set the cassette deck in Reverse-Play mode and note the Indicator swing from the Pointer. (Indicator will move in the opposite direction as above.) Adjust the PH Azimuth Alignment Screw so that the Pointer swings evenly in Forward-Play and Reverse-Play modes.
- (j) Load a 15 kHz Azimuth Alignment Tape (DA09004B) and set the cassette deck in Forward-Play mode. Pull out CN-5 of the Auto Azimuth P.C.B. Ass'y after the Direction Indicator has been finished flashing.
- (k) Press the Bias Calibration button to oscillate 15 kHz (-20 dB) and turn the RH Azimuth Alignment Screw until the outputs of both channels become maximum on the VTVM.
- (l) Mount CN-5 on the original place.

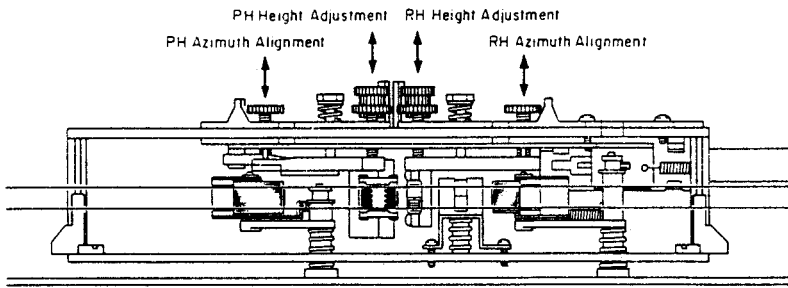


Fig. 2.14

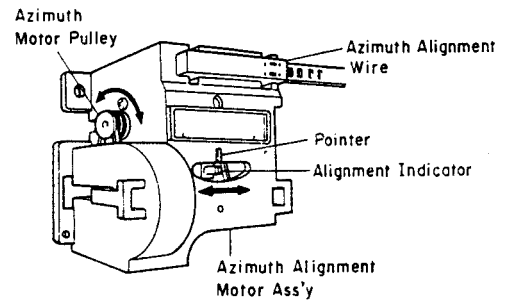


Fig. 2.15

2.9. Record Head Stroke Adjustment

Refer to Figs. 2.16 and 2.17.

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

- (1) Check the accuracy of the record head stroke.
- (2) Remove Head Mount Base Ass'y.
- (3) Remove the record head assembly.
- (4) Adjustment of Record Head Mounting Gauge M-9048 (DA0-9048A)
 - (a) Mount the Block B onto the Mounting Gauge Plate.
 - (b) Loosen the 2 screws fixing the Block A.
 - (c) As shown in Fig. 2.16, hold the Gauges (3.05 mm and 0.1 mm thickness) between the Block A and Block B, and fix the Block A with screws, pushing the Block A to the 2 guide pins.
- (5) Remove the Block B from the Mounting Gauge Plate.
- (6) As shown in Fig. 2.17, mount the R-8L record head assembly onto the Mounting Gauge Plate, then check the location of the R-8L record head surface. (If record head touches the Block C, loosen 2 pcs. of screws that assemble record head and record head plate, then place the R-8L record head assembly onto the Plate.)
- (7) Remove the R-8L record head assembly from the Mounting Gauge Plate.
- (8) Readjustment of Record Head Mounting Gauge M-9048 (DA09048A)
 - (a) Mount the Block B onto the Mounting Gauge Plate.
 - (b) Loosen the 2 screws fixing the Block A.
 - (c) As shown in Fig. 2.16, hold the Gauges (3.05 mm and either one of 0.05, 0.15, 0.2, 0.25, 0.3 or 0.35 mm thickness) between the Block A and Block B, and fix the Block A with screws, pushing the Block A to the 2 guide pins.
- (9) Remove the Block B from the Mounting Gauge Plate.
- (10) Mount the R-8L record head assembly onto the Mounting Gauge Plate.
- (11) As shown in Fig. 2.17, loosen 2 pcs. of screws that assemble record head and record head plate.

As the location of the Block A is secured by the item (8)-(c), push the record head to the directions A and B, then tighten 2 pcs. of screws.
- (12) Check to insure freedom from gap between the Block C and record head surface, then tighten the 2 pcs. of screws on the record head assembly with lock tight paint.
- (13) Remove the R-8L record head assembly from the Mounting Gauge Plate.
- (14) Assemble the record head assembly to the head mount base assembly.
- (15) Assemble the head mount base assembly to the mechanism assembly.
- (16) Check the record head stroke.

If the above are inaccurate, items (1) through (16) will have to be repeated till satisfactory results are obtained.

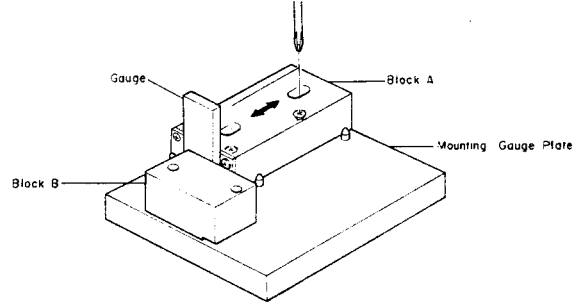
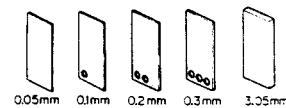


Fig. 2.16

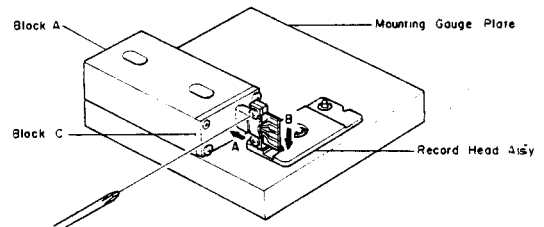


Fig. 2.17

2.10. Tape Travelling Adjustment

The adjustment shall be made with a modified version of the current type EXII C-90 as shown in Fig. 2.18 (error will be made if a current type Tape Travelling Cassette (DA09011A) should be used for this purpose).

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

Check shall be made in the following procedures.

- (1) An EXII C-90 tape thus modified shall be loaded onto the cassette deck.
- (2) Release the back-tension (rotate the Supply Reel and feed out some length of tape) and set the cassette deck in Play mode.
- (3) In this juncture, check to insure whether the tape is free from waving or slippage from the tape guide.
- (4) When the modified EXII C-90 is played back, check to insure whether the tape is freedom from waving from head surface or at pressure rollers.
- (5) If either of waving or slippage from the tape guide should be noted, adjustments of items 2.3 to 2.9, etc. will be required.

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

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

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

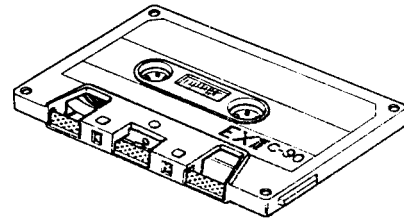


Fig. 2.18

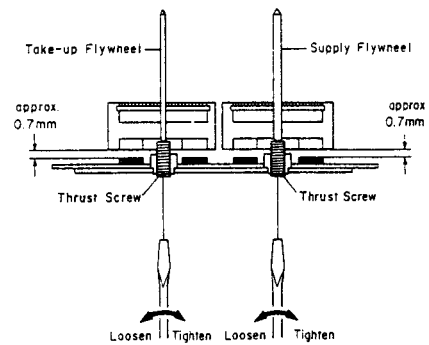


Fig. 2.19

2.11. Flywheel Ass'y Height Adjustment

Refer to Fig. 2.19.

- (1) Adjust both Thrust Screws so that the gaps between the Motor Coil Assemblies and the Flywheel Assemblies become approx. 0.7 mm.
- (2) Connect a synchroscope to CN501-1 (take-up side) and CN502-1 (supply side) on the Motor Control P.C.B. Ass'y. Set the synchroscope to AC input.
- (3) Check to insure that the peak-to-peak levels of both waveforms are greater than 20 mV.
- (4) Apply a quantity of lock tight paint to the Thrust Screws.

Note: Mount washers on the Flywheel Ass'y as follows if Flywheel Ass'y is replaced.

- (a) Turn the Thrust Screw so that the gap between the Motor Coil Ass'y and the Flywheel Ass'y becomes approx. 1 mm.
- (b) From the front side of the cassette deck, first insert a Washer 3.1 mm FT into the capstan shaft of supply side (Washer 2.6 mm FT for take-up side), then insert a Washer 3 mm (Washer 2.5 mm) into the shaft and press it until the Washer 3.1 mm FT (Washer 2.6 mm FT) contacts with the flange sufficiently. Refer to Fig. 5.5.
- (c) Perform the "Flywheel Ass'y Height Adjustment" in item 2.11.

2.12. Lubrication

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

- (1) LAUNA #100
Capstan Shaft
Pressure Roller Shaft
Thrust Cap
- (2) FLOIL GB-TS-1
Reel Hub Shaft
Thrust portion on the Capstan Shaft
FLOIL GB-TS-1, made by Kanto Chemicals Co., Ltd. in Japan.
We suggest that you use the above or equivalent type. If unavailable please contact Kanto Chemicals Co., Ltd., 2-7 Kanda Suda-cho Chiyoda-ku, Tokyo 101 Japan.
- (3) Silicon Oil #3000 CST
Air Damper Piston

Note: Excessive lubrication may cause defective damper action as the 0.2 ϕ hole at the end of the cylinder may be filled with oil.

4. ELECTRICAL ADJUSTMENTS AND MEASUREMENTS

Note: Electrical adjustment should be performed after mechanical adjustment is completed.

4.1. Adjustment and Measurement Instructions

STEP	ITEM	SIGNAL SOURCE	OUTPUT CONNECTION	MODE	ADJUSTMENT	REMARKS
1	Tone Level Calibration	Tone 400 Hz and 15 kHz	VTVM to TP101, TP201 on Main P.C.B. and Output Jacks	Tone — 400 Hz/15 kHz Monitor SW — Source	Auto Azimuth P.C.B. VR721 (400 Hz) VR722 (15 kHz) Main P.C.B. VR301 (400 Hz Balance)	<ol style="list-style-type: none"> 1. Press the Level Calibration button to oscillate 400 Hz. 2. Adjust VR721 to obtain 350 mV on the VTVM at TP101 (L ch). 3. Adjust VR301 to obtain the same level as L ch at TP201. 4. Measure the reading on the VTVM at the Output Jacks. 5. Press the Bias Calibration button to oscillate 15 kHz. 6. Adjust VR722 to obtain 20 dB lower level than in 4 on the VTVM at the Output Jacks. 7. Press the Calibration Reset button to stop the tone oscillation.
2	Meter Level Calibration	400 Hz to Input Jacks and Tone 400 Hz and 15 kHz	VTVM to TP101, TP201 on Main P.C.B.	Tone — OFF/400 Hz/15 kHz Monitor SW — Source	Auto Azimuth P.C.B. VR701, VR801 VR702, VR802 VR703, VR803 VR721 (400 Hz) VR722 (15 kHz)	<ol style="list-style-type: none"> 1. Feed in 400 Hz, then adjust the Input level controls to obtain 350 mV -0.9 dB on the VTVM. 2. Adjust VR701 (VR801) so that the 0 dB segment of the level meter starts illuminating. 3. Press the Level Calibration button to oscillate 400 Hz, then adjust VR721 to obtain 350 mV -0.25 dB on the VTVM. 4. Adjust VR702 (VR802) so that the 0 dB segment of the level meter starts illuminating. 5. Press the Bias Calibration button to oscillate 15 kHz, then adjust VR722 to obtain 35 mV -0.25 dB on the VTVM. 6. Adjust VR703 (VR803) so that the 0 dB segment of the level meter starts illuminating. 7. Press the Calibration Reset button. 8. Re-adjust the tone level according to step 1 "Tone Level Calibration".
3	MPX Filter Adjustment	19 kHz ± 100 Hz to Input Jacks	VTVM to Output Jacks	Monitor SW — Source Dolby NR SW — OFF MPX SW — ON	Main P.C.B. L102, L202	<ol style="list-style-type: none"> 1. Turn the Output level control fully clockwise (maximum position). 2. Adjust the Input Level controls to obtain 1 V on the VTVM. 3. Set the MPX Filter switch to ON, then adjust L102 (L202) to obtain the minimum reading on the VTVM (the minimum reading will be less than -30 dB).
4	Playback Head and Record Head Height Adjustment and Azimuth Alignment	1 kHz Track Alignment Tape (DA09007B) 15 kHz Azimuth Tape (DA09004B) 5 kHz (-20 dB) to Input Jacks Tone 15 kHz	VTVM to Output Jacks and DC Millivoltmeter to pin 1 of CN-5 on Auto Azimuth P.C.B.	Playback (Fwd./Rev.) Record, Playback (Fwd.) Monitor SW — Tape Tape SW — ZX Eq. SW — 70μ s Dolby NR SW — OFF MPX SW — OFF	PH Height Gear PH Azimuth Alignment Screw RH Height Gear RH Azimuth Alignment Screw Auto Azimuth P.C.B. (Fwd. Azimuth Ref.) VR824 (Rev. Azimuth Ref.) VR823 (5 kHz Phase) VR822 Main P.C.B. (15 kHz Fwd. Phase) VR701 (15 kHz Rev. Phase) VR702	<p>Perform the following adjustments successively.</p> <ol style="list-style-type: none"> 1. Playback Head Height Adjustment <ol style="list-style-type: none"> a. Load a 1 kHz track alignment tape (DA09007B) and forward-play it back. b. Adjust the PH Height Gear to obtain minimum readings of both channels on the VTVM. 2. Azimuth Reference Position Adjustment <ol style="list-style-type: none"> a. With the Cassette Holder open, press the Forward-Play button. Adjust VR824 on the Auto Azimuth P.C.B. Ass'y so that the Alignment Indicator coincides with the Pointer in the Azimuth Alignment Motor Ass'y. Refer to Fig. 2.15. b. With the Cassette Holder open, press the Reverse-Play button. Adjust VR823 on the Auto Azimuth P.C.B. Ass'y so that the Alignment Indicator coincides with the Pointer in the Azimuth Alignment Motor Ass'y. 3. Playback Head Azimuth Alignment <ol style="list-style-type: none"> a. Disconnect the Azimuth Motor by pulling out the connector CN-5 of the Auto Azimuth P.C.B. Ass'y. b. Load a 15 kHz azimuth tape (DA09004B) and forward-play it back. c. Adjust the PH Azimuth Alignment Screw to obtain maximum readings of both channels on the VTVM. 4. Phase Adjustment and Record Head Height Adjustment and Azimuth Alignment: <ol style="list-style-type: none"> a. Disconnect CN-5 of the Auto Azimuth P.C.B. Ass'y. b. Load a 15 kHz azimuth tape (DA09004B) and forward-play it back. Adjust VR701 on the Main P.C.B. Ass'y to obtain 0 V on the DC millivoltmeter. (Adjustment should be carried out within approx. 10 seconds.) <p>(to be continued)</p>

STEP	ITEM	SIGNAL SOURCE	OUTPUT CONNECTION	MODE	ADJUSTMENT	REMARKS
4 (continued)						<ul style="list-style-type: none"> c. Turn the azimuth tape upside down and reverse-play it back. Adjust VR702 on the Main P.C.B. Ass'y to obtain 0 V on the DC millivoltmeter within approx. 10 seconds. d. Load a reference ZX tape (DA09037B) and record/forward-play it back. e. Press the Level Calibration button to oscillate 400 Hz (0 dB) and adjust the RH Height Gear to obtain maximum readings of both channels on the VTVM. f. Press the Bias Calibration button to oscillate 15 kHz (-20 dB) and adjust the RH Azimuth Alignment Screw to obtain maximum readings of both channels on the VTVM. g. Feed in 5 kHz (-20 dB) from an external generator and record/forward-play it back. Adjust VR822 on the Auto Azimuth P.C.B. Ass'y to obtain the closest value to 0 V on the DC millivoltmeter. (Adjustment should be done within approx. 10 seconds.) h. Mount CN-5 on the original place. i. Load a 15 kHz azimuth tape (DA09004B) and forward-play it back. Note the Indicator swing from the Pointer. Turn the azimuth tape upside down, reverse-play it back and note the Indicator swing from the Pointer. (Indicator will move in the opposite direction as above.) Adjust the PH Azimuth Alignment Screw so that the Pointer swings evenly in Forward-Play and Reverse-Play modes. j. Load a 15 kHz azimuth tape (DA09004B) and forward-play it back. Pull out CN-5 of the Auto Azimuth P.C.B. Ass'y after the Direction Indicator has been finished flashing. k. Press the Bias Calibration button to oscillate 15 kHz (-20 dB) and adjust the RH Azimuth Alignment Screw to obtain maximum readings of both channels on the VTVM. l. Mount CN-5 on the original place.
5	Playback Level Calibration	400 Hz Level Tape (DA09005B)	VTVM to TP101, TP201 on Main P.C.B.	Playback (Fwd./Rev.) Monitor SW - Tape Eq. SW - 70 μ s Dolby NR SW - OFF MPX SW - OFF	Main P.C.B. VR501, VR601 (Fwd.) VR502, VR602 (Rev.)	<ol style="list-style-type: none"> 1. Load a 400 Hz level tape and forward-play it back. 2. Adjust VR501 (VR601) to obtain 350 mV on the VTVM. 3. Turn the tape upside down and reverse-play it back. 4. Adjust VR502 (VR602) to obtain 350 mV on the VTVM.
6	Playback Frequency Response Adjustment	400 Hz Level Tape (DA09005B) 10 kHz PB Frequency Response Tape (DA09003B) 15 kHz PB Frequency Response Tape (DA09002B) 20 kHz PB Frequency Response Tape (DA09001B)	VTVM to Output Jacks	Playback (Fwd./Rev.) Monitor SW - Tape Tape SW - SX Eq. SW - 70 μ s Dolby NR SW - OFF MPX SW - OFF	Main P.C.B. (Fwd.) R507, R607 R508, R608 (Rev.) R517, R617 R518, R618	<ol style="list-style-type: none"> 1. Load a 400 Hz level tape and forward-play it back. Adjust the Output level control to a certain level (0 dB for example). 2. Load 10 kHz, 15 kHz and 20 kHz PB frequency response tapes and forward-play them back. Short R507 (R607) or R508 (R608) to obtain the following levels against the level for the 400 Hz level tape. 10 kHz: -20 dB -1 dB to +2 dB 15 kHz: -20 dB -1 dB to +3 dB 20 kHz: -20 dB -1 dB to +4 dB 3. Turn the tape upside down and reverse-play them back. Short R517 (R617) or R518 (R618) to obtain the levels which suffice the range specified in above 2. 4. Refer to the "Playback Frequency Response Adjustment" in item 4.2 for the detailed description.
7	Bias Oscillation Frequency and Erase Current Adjustment		VTVM across the additional 0.1 Ω resistor and Frequency Counter to CN1-1 on Main P.C.B.	Record, Pause Monitor SW - Source Tape SW - ZX Eq. SW - 70 μ s Dolby NR SW - OFF MPX SW - OFF	Main P.C.B. T301 R313, R314	<ol style="list-style-type: none"> 1. Connect an additional 0.1 Ω resistor in series to the Erase Head, then connect a VTVM across it. 2. Adjust T301 to obtain 105 kHz on the frequency counter. 3. Check the erase current by the VTVM. Erase current will be in a range of 310 mA to 400 mA (typically approx. 350 mA). If erase current is not sufficient increase it by shorting R313 or R314. 4. After completion of the erase current adjustment, re-check the bias oscillation frequency. 5. Remove the additional 0.1 Ω resistor.

STEP	ITEM	SIGNAL SOURCE	OUTPUT CONNECTION	MODE	ADJUSTMENT	REMARKS
8	Record Amplifier Equalizer Adjustment	23 kHz (-20 dB) to Input Jacks	VTVM to TP102, TP202 on Main P.C.B.	Record, Pause Monitor SW - Source Tape SW - ZX Eq. SW - 70 μ s Dolby NR SW - OFF MPX SW - OFF	Main P.C.B. L503, L603	1. Remove the bias-cut jumper from the dip side of the Main P.C.B. Ass'y. 2. Adjust L503 (L603) to obtain approx. +16 dB at 23 kHz on the VTVM. 3. Re-solder the bias-cut jumper.
9	Bias Trap Adjustment (Record Amp.)	Remove input signals	VTVM to TP103, TP203 on Main P.C.B.	Same as above	Main P.C.B. L504, L604	Adjust L504 (L604) to obtain minimum reading on the VTVM.
10	Bias Trap Adjustment (Playback Amp.)	Remove input signals	VTVM to IC502-3, IC602-3 (Fwd. Playback Amp.), IC502-1, IC602-1 (Rev. Playback Amp.) and AM39 (Sub Playback Amp.)	Same as above	Main P.C.B. L501, L502 L601, L602 L701	1. Adjust L501 (L601) to obtain minimum reading on the VTVM at IC502-3 (IC602-3). 2. Adjust L502 (L602) to obtain minimum reading on the VTVM at IC502-1 (IC602-1). 3. Adjust L701 to obtain minimum reading on the VTVM at terminal AM39.
11	Record Level Calibration and Recording Bias Current Adjustment	Tone 400 Hz and 15 kHz and 10 kHz/20 kHz (-20 dB) to Input Jacks	VTVM and Distortion Meter to Output Jacks	Record, Playback (Fwd.) Tone - 400 Hz/15 kHz Monitor SW - Tape Tape SW - ZX/SX EX Eq. SW - 70 μ s (ZX/SX) 120 μ s (EX) Dolby NR SW - C-Type/B-Type/OFF MPX SW - OFF	Control P.C.B. (Level) ZX: VR101, VR201 SX: VR102, VR202 EX: VR103, VR203 (Bias) ZX: VR106, VR206 SX: VR105, VR205 EX: VR104, VR204	Adjustment should be made in the order of ZX, SX and EX. 1. Set the Dolby NR switch to C-Type. 2. Load a reference ZX tape (DA09037B), reference SX tape (DA09025B) and reference EXII tape (DA09066B). 3. Adjust the Sensitivity controls VR101 (VR201) for ZX, VR102 (VR202) for SX and VR103 (VR203) for EXII to maximum position. 4. Adjust the Bias controls VR106 (VR206) for ZX, VR105 (VR205) for SX and VR104 (VR204) for EXII to maximum position. 5. Press the Record and Fwd. Play buttons, then press the Level Calibration button to oscillate 400 Hz. 6. Adjust the Sensitivity controls VR101 (VR201), VR102 (VR202) and VR103 (VR203) to obtain 0 dB on the level meters. 7. Press the Bias Calibration button to oscillate 15 kHz. 8. Adjust the Bias controls VR106 (VR206), VR105 (VR205) and VR104 (VR204) to obtain 0 dB on the level meters. 9. Repeat 5 to 8 as above two or three times to obtain optimum performance. 10. Set the Dolby NR switch to B-Type/OFF. 11. Feed in 10 kHz (-20 dB) and 20 kHz (-20 dB), then record and forward-play them back. Check to insure that the levels are within -20 dB \pm 2 dB against the levels in Dolby NR C-Type. 12. Check to insure whether the total harmonic distortion is less than 0.8% for ZX tape and 1.0% for SX and EXII tapes.
12	Overall Frequency Response Adjustment	400 Hz (0 dB) and 20 Hz to 20 kHz (-20 dB) to Input Jacks	VTVM to Output Jacks	Record, Playback (Fwd.) Monitor SW - Source/ Tape Tape SW - ZX/SX/EX Eq. SW - 70 μ s (ZX/SX) 120 μ s (EX) Dolby NR SW - OFF MPX SW - OFF	Main P.C.B. L503, L603	1. Set the Monitor switch to Source. 2. Feed in 400 Hz (0 dB) and adjust the input level controls to obtain 0 dB on the level meters. 3. Switch the Generator output level to -20 dB. 4. Set the Monitor switch to Tape, then record and forward-play it back. 5. Feed in 20 Hz to 20 kHz (-20 dB) and check to insure whether the output levels are within -20 dB \pm 3 dB. 6. If above is not sufficient, adjust L503 (L603) to obtain approx. -20 dB on the VTVM at 20 kHz. 7. Conduct step 11 "Record Level Calibration and Recording Bias Current Adjustment". 8. If above is not sufficient further, precise re-adjustment of step 6 "Playback Frequency Response", replacement of Playback Head or Record Head, check on item 2.10 "Tape Travelling Adjustment" or frequency response adjustment according to item 4.2 will be required.
13	Crosstalk Measurement	1 kHz to Input Jacks	1 kHz Band Pass Filter and VTVM to Output Jacks	Record and Playback (Fwd.) Monitor SW - Tape Tape SW - ZX Eq. SW - 70 μ s Dolby NR SW - OFF		1. Erase a reference ZX tape with a bulk eraser. 2. Load the reference tape and adjust the input level controls to obtain 0 dB on the level meters. 3. Record input signals on the tape with pressing the Record and Fwd. Play buttons. 4. Press the Stop button, then reverse-play it back with pressing Rev. Play button. 5. Measure the difference between 3 and 4. (to be continued)

STEP	ITEM	SIGNAL SOURCE	OUTPUT CONNECTION	MODE	ADJUSTMENT	REMARKS
13 (continued)						6. Record input signals on the tape but not on the portion used as above. 7. Turn the tape the other way round and forward-play it back. 8. Measure the output level difference between 6 and 7.
14	Channel Separation Measurement	1 kHz to Input Jacks	1 kHz Band Pass Filter and VTVM to Output Jacks	Record and Playback (Fwd.) Monitor SW - Tape Tape SW - ZX Eq. SW - 70 μ s Dolby NR SW - OFF		1. Erase a reference ZX tape with a bulk eraser. 2. Load the reference tape and adjust the L ch (R ch) Input level control to obtain 0 dB on the level meter. Close the R ch (L ch) Input level control. 3. Record and forward-play the input signals and measure the R ch (L ch) level on the VTVM. 4. Turn the tape the other way round and reverse-play it back. 5. Measure the R ch (L ch) level on the VTVM.
15	Signal to Noise Ratio Measurement	400 Hz to Input Jacks	VTVM and Distortion Meter to Output Jacks	Record and Playback (Fwd.) Monitor SW - Tape Tape SW - ZX Eq. SW - 70 μ s Dolby NR SW - B-Type/C-Type		1. Feed in 400 Hz and record and forward-play it back. 2. Adjust the Input level controls to obtain a 3% total harmonic distortion in Playback mode. 3. Close the Input level controls, then record again. After reword, forward-play back and check the output level difference between 3 and 4. Note: The filter of IHF-A curve shall be used in the measurements.
16	Total Harmonic Distortion Measurement	400 Hz to Input Jacks	Distortion Meter to Output Jacks	Record and Playback (Fwd.) Monitor SW - Tape Tape SW - ZX/SX/EX Eq. SW - 70 μ s (ZX/SX) 120 μ s (EX) Dolby NR SW - OFF		1. Adjust the Input level controls to obtain 0 dB on the level meters. 2. Record and forward-play it back. 3. Read the distortion meter and check to insure that the distortion is less than 0.8% for ZX tape and 1.0% for SX and EXII tapes.
17	Wow/Flutter & Speed Measurement	3 kHz Speed and Wow/Flutter Tape (DA09006C)	Wow/Flutter Meter to Output Jacks	Playback Monitor SW - Tape Eq. SW - 70 μ s		Forward-play back and read the wow/flutter meter.

4.2. Frequency Response Adjustment

(1) Playback Frequency Response Adjustment

Refer to Figs. 4.2.1 and 4.2.2.

Peaking adjustment will be required if playback level is not sufficient when 20 kHz PB frequency response tape is played back as referred to step 6 in 4.1 "Adjustment and Measurement Instructions".

The adjustment will compensate the gap loss of the playback head.

Peaking level is varied by the short circuit of the following resistors in the playback amp. circuit of the Main P.C.B. Ass'y.

Forward Playback Amp.:

R507, R607 (220 ohms) or R508, R608 (470 ohms)

Reverse Playback Amp.:

R517, R617 (220 ohms) or R518, R618 (470 ohms)

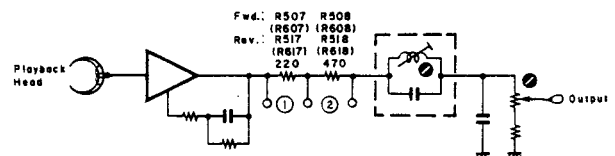


Fig. 4.2.1

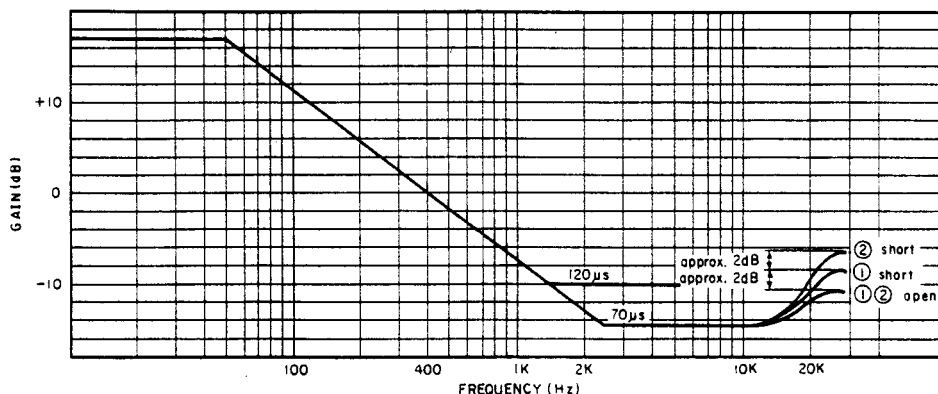


Fig. 4.2.2

(2) Record Current Frequency Response Adjustment

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

Normally however peaking frequency is pre-adjusted to approx. 23 kHz in Record mode. Refer to Fig. 4.2.3.

(a) For ZX Tape

- 1) Feed in 400 Hz (0 dB), then record and play it back. Adjust bias current by VR106 (VR206) on the Control P.C.B. Ass'y to obtain 0.8% distortion.
- 2) Feed in 10 kHz and 400 Hz (-20 dB), then record and play them back.
Check the difference of the levels between 10 kHz and 400 Hz, and mount an additional capacitor in parallel with C126 (C226) on the Main P.C.B. Ass'y from the dip side of the printed circuit board depending upon the difference of the levels against 400 Hz. Refer to Fig. 4.2.4.

Level Difference	Addition	Total
0 dB	0	820 pF
-1 dB	220 pF	1040 pF

- 3) Feed in 22 kHz (-20 dB), then record and play it back. Adjust record peaking coil L503 (L603) on the Main P.C.B. Ass'y to obtain flat overall frequency response.

(b) For SX Tape

- 1) Feed in 15 kHz and 400 Hz (-20 dB), then record and play them back.
Adjust bias current by VR105 (VR205) on the Control P.C.B. Ass'y to obtain flat overall frequency response.
- 2) Feed in 20 kHz and 400 Hz (-20 dB), then record and play them back.
And check to insure that the overall frequency response is flat.

(c) For EXII Tape

- 1) Feed in 15 kHz and 400 Hz (-20 dB), then record and play them back.
Adjust bias current by VR104 (VR204) on the Control P.C.B. Ass'y to obtain flat overall frequency response.
- 2) Feed in 20 kHz and 400 Hz (-20 dB), then record and play them back.
And check to insure that the overall frequency response is flat.

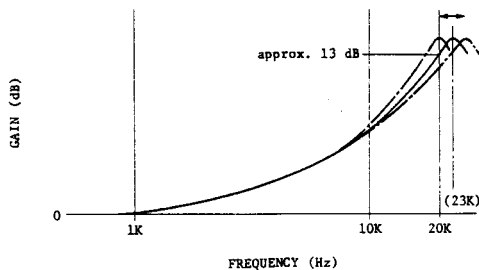


Fig. 4.2.3

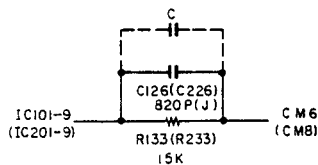


Fig. 4.2.4

4.3. Dolby NR Circuit Check

Dolby NR circuit incorporates Dolby NR ICs which have no adjustment point.

Perform the following checks and make sure that the IC operates accurately, i.e., accuracy of frequency response through IC.

4.3.1. Dolby NR B-Type Circuit Check

(1) Playback Dolby NR Circuit

Signal Source: 1.4 kHz to negative side of C131 (C231) on Main P.C.B.
Output Connection: VTVM to TP101 (TP201) on Main P.C.B.
Mode: Stop
Monitor SW — Tape
Dolby NR SW — B-Type/OFF

- (a) Connect a VTVM to TP101 (TP201) on the Main P.C.B. Ass'y.
- (b) Set the Dolby NR switch to B-Type.
Feed in 1.4 kHz and adjust the generator output control to obtain 35 mV on the VTVM.
- (c) Set the Dolby NR switch to OFF.
Check to insure that the reading is +3.2 dB ±1.5 dB on the VTVM.

(2) Record Dolby NR Circuit

Signal Source: 1.4 kHz to Input Jacks
Output Connection: VTVM to TP101 (TP201) and CM6 (CM8) on Main P.C.B.
Mode: Stop
Monitor SW — Source
Dolby NR SW — B-Type/OFF

- (a) Connect a VTVM to TP101 (TP201) on the Main P.C.B. Ass'y.
- (b) Feed in 1.4 kHz and adjust the Input Level controls to obtain 35 mV/11.1 mV on the VTVM.
- (c) Remove the VTVM from TP101 (TP201) and reconnect it to CM6 (CM8) on the Main P.C.B. Ass'y.
- (d) Check to insure that the reading at CM6 (CM8) corresponds to the following with Dolby NR switch OFF and B-Type.

Input Level at TP101, TP201	Level at CM6, CM8	
	Dolby NR OFF	Dolby NR B-Type
35 mV	0 dB	+3.2 dB ±1.5 dB
11.1 mV	0 dB	+8.2 dB ±1.5 dB

4.3.2. Dolby NR C-Type Circuit Check

(1) Playback Dolby NR Circuit

Signal Source: 1.4 kHz to negative side of C131 (C231) on Main P.C.B.
Output Connection: VTVM to TP101 (TP201) on Main P.C.B.
Mode: Stop
Monitor SW — Tape
Dolby NR SW — C-Type/OFF

- (a) Connect a VTVM to TP101 (TP201) on the Main P.C.B. Ass'y.
- (b) Set the Dolby NR switch to C-Type.
Feed in 1.4 kHz and adjust the generator output control to obtain 35 mV on the VTVM.
- (c) Set the Dolby NR switch to OFF.
Check to insure that the reading is +6.5 dB ±1.5 dB on the VTVM.

(2) Record Dolby NR Circuit

Signal Source: 1.4 kHz to Input Jacks
Output Connection: VTVM to TP101 (TP201) and CM6 (CM8) on Main P.C.B.
Mode: Stop
Monitor SW — Source
Dolby NR SW — C-Type/OFF

- (a) Connect a VTVM to TP101 (TP201) on the Main P.C.B. Ass'y.
- (b) Feed in 1.4 kHz and adjust the Input Level controls to obtain 35 mV/11.1 mV on the VTVM.
- (c) Remove the VTVM from TP101 (TP201) and reconnect it to CM6 (CM8) on the Main P.C.B. Ass'y.
- (d) Check to insure that the reading at CM6 (CM8) corresponds to the following with Dolby NR switch OFF and C-Type.

Input Level at TP101, TP201	Level at CM6, CM8	
	Dolby NR OFF	Dolby NR C-Type
35 mV	0 dB	+6.5 dB ±1.5 dB
11.1 mV	0 dB	+11.4 dB ±1.5 dB

5. MECHANISM ASS'Y AND PARTS LIST

5.1. Synthesis

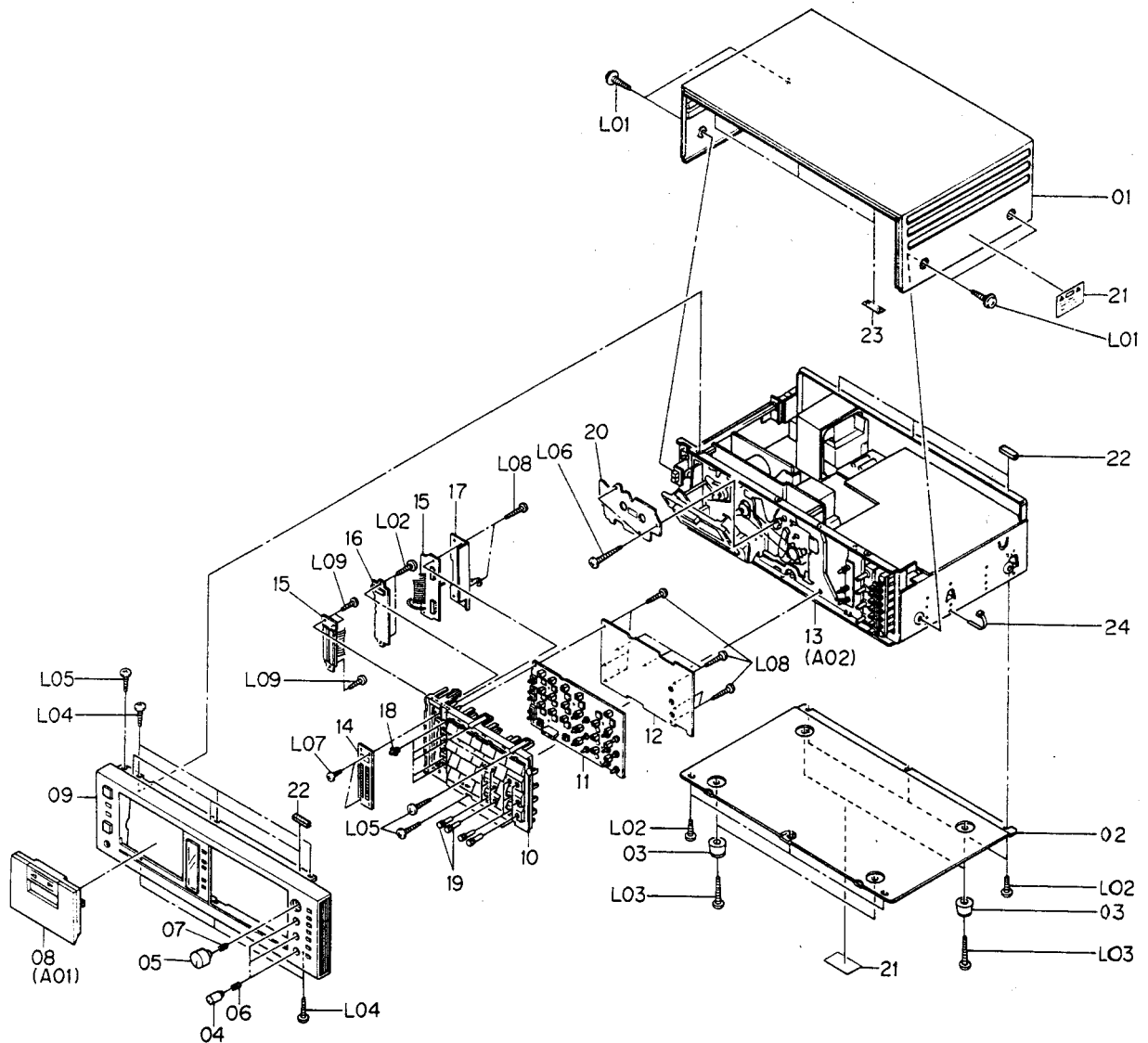


Fig. 5.1

Schematic Ref. No.	Part No.	Description	Q'ty	Schematic Ref. No.	Part No.	Description	Q'ty
	HA04393A	Synthesis (Japan)	1	14	0H04198A	Meter Cover	1
	HA04392A	Synthesis (U.S.A. & Canada)	1	15	BA04893A	Indicator P.C.B. Ass'y	1
	HA04396A	Synthesis (220V Class 2)	1	16	BA04894A	Counter P.C.B. Ass'y	1
	HA04391A	Synthesis (UK)	1	17	0J04698B	Shield Plate	1
	HA04395A	Synthesis (Australia)	1	18	0H04180A	Function Button	5
	HA04394A	Synthesis (Others) Serial No.: A80101001 -	1	19	0H04204A	Calibration Volume Knob	12
				20	HA04422A	Cover Plate	1
01	0H04010A	Top Cover	1	21	0M04377A	Caution Label (U.S.A. & Canada)	2
02	0J04652A	Bottom Cover	1	22	0J04550A	Top Cover Cushion	6
03	0J03564A	Leg T-H	4	23	0J04080A	Top Cover Himelon	3
04	0H04203A	Volume Knob	3	24	0B08515A	Insu-Lock	1
05	0H04202A	Master Volume Knob	1	L01	0E03032A	BT 4x8 @ Pan (Washer Faced)	4
06	0H03737A	Volume Knob Base	3	L02	0E00857A	BT 3x6 @ Binding	8
07	0H03739A	Master Volume Knob Base	1	L03	0E00865A	BT 3x10 @ Binding	4
08	HA04401A	Cassette Lid Ass'y	1	L04	0E00921A	BT 3x8 @ Binding (Black Chromate)	6
09	HA04398A	Front Panel Ass'y	1	L05	0E00868A	BT 3x8 @ Binding	3
10	HA04399A	Front Panel Escutcheon Ass'y	1	L06	0E00950A	BT 3x14 @ Pan (Black Chromate)	2
11	BA04892A	Control P.C.B. Ass'y	1	L07	0E00869A	BT 2.6x4 @ Binding	2
12	0J04707A	Insulator	1	L08	0E00954A	BT 2.6x8 @ Binding	10
13	JA03971A	Chassis Ass'y (Japan)	1	L09	0E00859A	BT 2.6x6 @ Binding	3
	JA03970A	Chassis Ass'y (U.S.A. & Canada)	1				
	JA03974A	Chassis Ass'y (220V Class 2)	1				
	JA03969A	Chassis Ass'y (UK)	1				
	JA03973A	Chassis Ass'y (Australia)	1				
	JA03972A	Chassis Ass'y (Others)	1				

5.2. Cassette Lid Ass'y (A01)

5.3. Chassis Ass'y (A02)

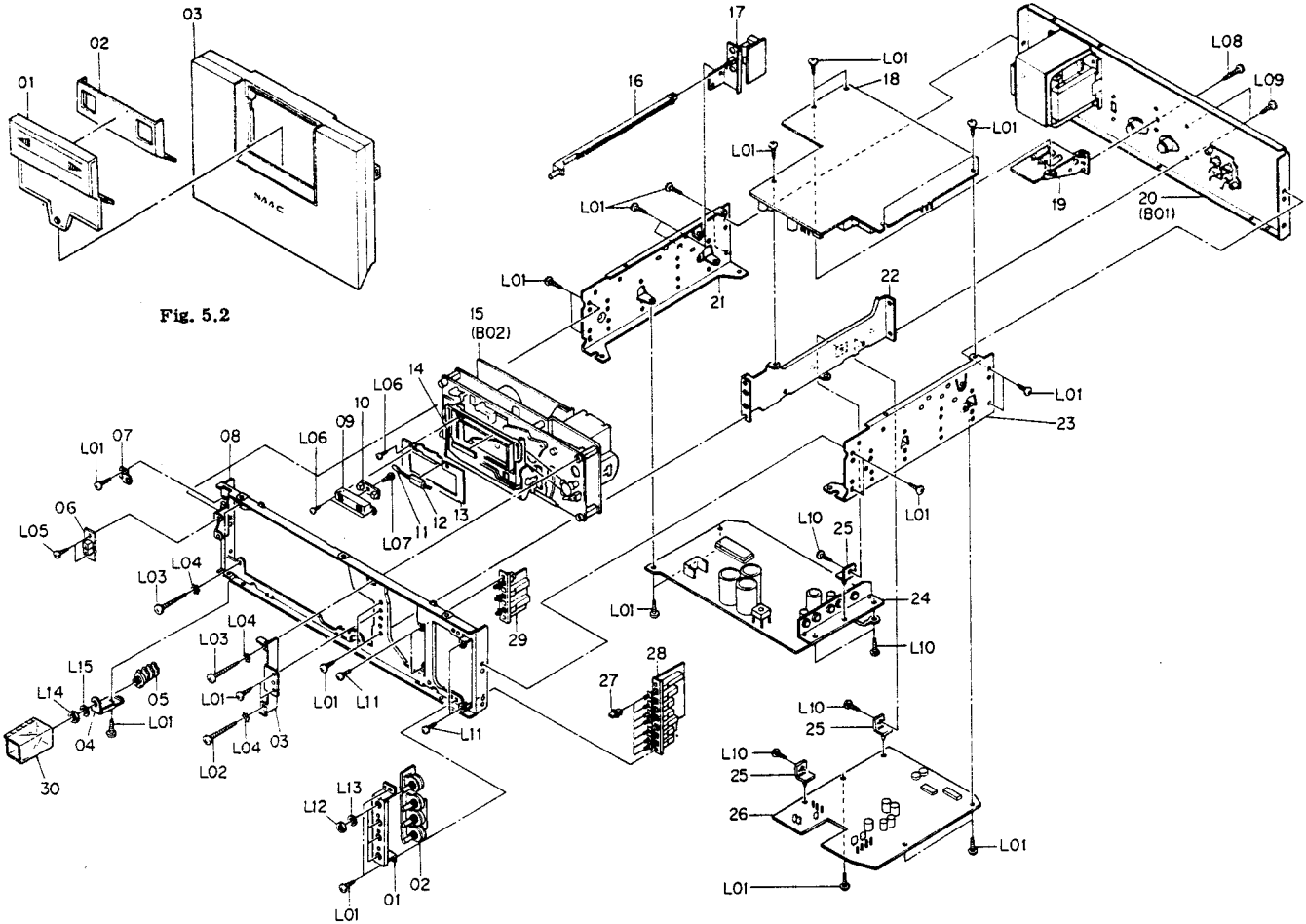


Fig. 5.2

Fig. 5.3

Schematic Ref. No.	Part No.	Description	Q'ty	Schematic Ref. No.	Part No.	Description	Q'ty
A01	HA04401A	Cassette Lid Ass'y Serial No.: A80101001 -	1	18	BA04870A	Main P.C.B. Ass'y	1
01	OH04189A	Lid Cover	1	19	BA04899A	Fuse P.C.B. Ass'y (U.S.A., Canada & Others)	1
02	OH04187A	Indicator Reflector	1		BA04900A	Fuse P.C.B. Ass'y (UK, 220V Class 2 & Australia)	1
03	HA04414A	Cassette Lid Sub Ass'y	1	20	BA04898A	Fuse P.C.B. Ass'y (Japan)	1
A02	JA03969A	Chassis Ass'y (UK)	1		HA04403A	Rear Panel Ass'y (UK)	1
	JA03970A	Chassis Ass'y (U.S.A. & Canada)	1		HA04408A	Rear Panel Ass'y (U.S.A. & Canada)	1
	JA03971A	Chassis Ass'y (Japan)	1		HA04404A	Rear Panel Ass'y (Japan)	1
	JA03972A	Chassis Ass'y (Others)	1		HA04405A	Rear Panel Ass'y (Others)	1
	JA03973A	Chassis Ass'y (Australia)	1		HA04406A	Rear Panel Ass'y (Australia)	1
	JA03974A	Chassis Ass'y (220V Class 2) Serial No.: A80101001 -	1		HA04407A	Rear Panel Ass'y (220V Class 2)	1
01	QJ04643A	Volume Holder	1	21	0J04650A	Side Chassis L	1
02	BA04890A	Volume P.C.B. Ass'y	1	22	0J04649A	Center Chassis	1
03	QJ04135A	Mechanism Bracket	1	23	0J04651A	Side Chassis R	1
04	QJ04644A	Headphone Jack Holder	1	24	BA04886A	Logic P.C.B. Ass'y	1
05	OB08511A	Headphone Jack	1	25	OB08771A	Hinge	1
06	BA04897A	Timer Switch P.C.B. Ass'y	1	26	BA04879A	Auto Azimuth P.C.B. Ass'y	1
07	QJ04645A	Power Switch Bar Holder	1	27	OH04179A	Function Button A	7
08	QJ04648A	Front Chassis	1	28	BA04889A	Switch P.C.B. Ass'y	1
09	OH04186A	Indicator Cover	1	29	BA04891A	Tape Select P.C.B. Ass'y	1
10	BA04896A	Direction P.C.B. Ass'y	1	30	QJ04516A	Headphone Jack Cover	1
11	OB02228B	Lamp 14V 50mA	1	L01	0E00857A	BT 3x6 @ Binding (Chromate)	31
12	QJ04506C	Lamp Holder	1	L02	0E00924A	BT 4x16 @ Binding (Chromate)	1
13	QJ04637A	Cassette Case Plate	1	L03	0E00944A	BT 4x15 @ Binding (Black Chromate)	3
14	BA04896A	Connector P.C.B. Ass'y	1	L04	0E00078A	Washer 4mm Toothed Lock	4
15	CA08445A	Mechanism Ass'y	1	L05	0E03022A	BT 2x4 @ Binding (Black Chromate)	2
16	QJ04604B	Power Switch Bar	1	L06	0E00869A	BT 2x4 @ Binding (Chromate)	1
17	BA04947A	Power Switch P.C.B. Ass'y (U.S.A. & Canada)	1	L07	0E00873A	BT 2.6x5 @ Binding (Chromate)	1
	BA04948A	Power Switch P.C.B. Ass'y (UK, 220V Class 2, Australia & Others)	1	L08	0E00921A	BT 3x8 @ Binding (Black Chromate)	1
	BA04946A	Power Switch P.C.B. Ass'y (Japan)	1	L09	0E00860A	BT 3x6 @ Binding (Black Chromate)	2
				L10	0E00612A	M3x6 @ Pan	3

5.4. Rear Panel Ass'y (B01)

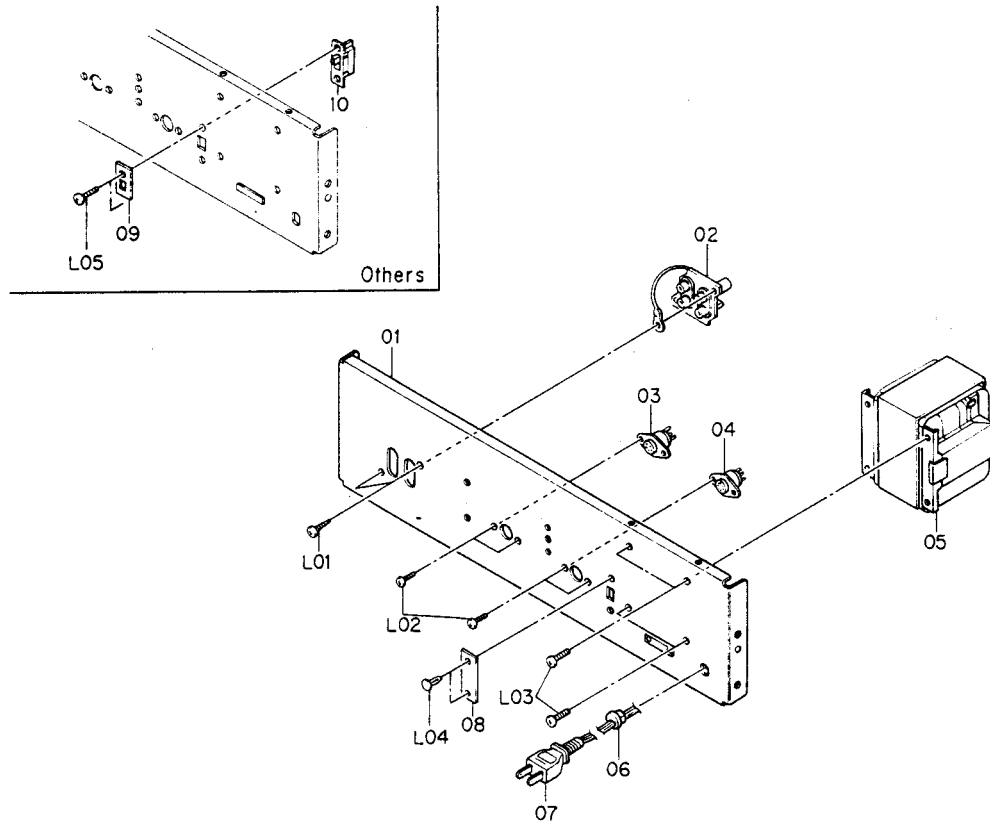


Fig. 5.4

Schematic Ref. No.	Part No.	Description	Qty	Schematic Ref. No.	Part No.	Description	Qty
B01	HA04408A	Rear Panel Ass'y (U.S.A. & Canada)	1	L03	0E00953A	M4x10 ⊕ Binding (Black Chromate)	4
	HA04404A	Rear Panel Ass'y (Japan)	1	L04	0B08583A	Plastic Rivet (U.S.A., Canada, Japan, 220V Class 2, UK & Australia)	2
	HA04405A	Rear Panel Ass'y (Others)	1	L05	0E00594A	M3x8 ⊕ Binding (Bronze) (Others)	2
	HA04403A	Rear Panel Ass'y (UK)	1				
	HA04407A	Rear Panel Ass'y (220V Class 2)	1				
	HA04406A	Rear Panel Ass'y (Australia)	1				
	Serial No.: A80101001 -						
01	0H04205A	Rear Panel	1				
02	BA04945A	Pin Jack P.C.B. Ass'y	1				
03	BA04944A	4P DIN Socket Ass'y	1				
04	BA04949A	8P DIN Socket Ass'y	1				
05	0B06639B	Power Transformer (U.S.A. & Canada)	1				
	0B06640B	Power Transformer (Japan)	1				
	0B06637B	Power Transformer (Others)	1				
	0B06638B	Power Transformer (UK, Australia & 220V Class 2)	1				
06	0B08037U	Cord Bushing C (U.S.A., Canada, Japan, 220V Class 2, Australia & Others)	1				
	0B08351A	Cord Bushing 4K-4 (UK)	1				
07	0B08533A	Power Cord (U.S.A. & Canada)	1				
	0B08219B	Power Cord (Japan)	1				
	0B08348A	Power Cord (UK)	1				
	0B08093U	Power Cord (220V Class 2)	1				
	0B05241A	Power Cord (Australia)	1				
08	0J04601B	Switch Cover (U.S.A., Canada, Japan, 220V Class 2, UK & Australia)	1				
09	0M03946A	Voltage Selector Lock Plate C (Others)	1				
10	0B07092U	Voltage Selector (Others)	1				
L01	0E00921A	BT 3x8 ⊕ Binding (Black Chromate)	2				
L02	0E00714A	M2.6x6 ⊕ Binding (Bronze)	4				

5.5. Mechanism Ass'y (B02)

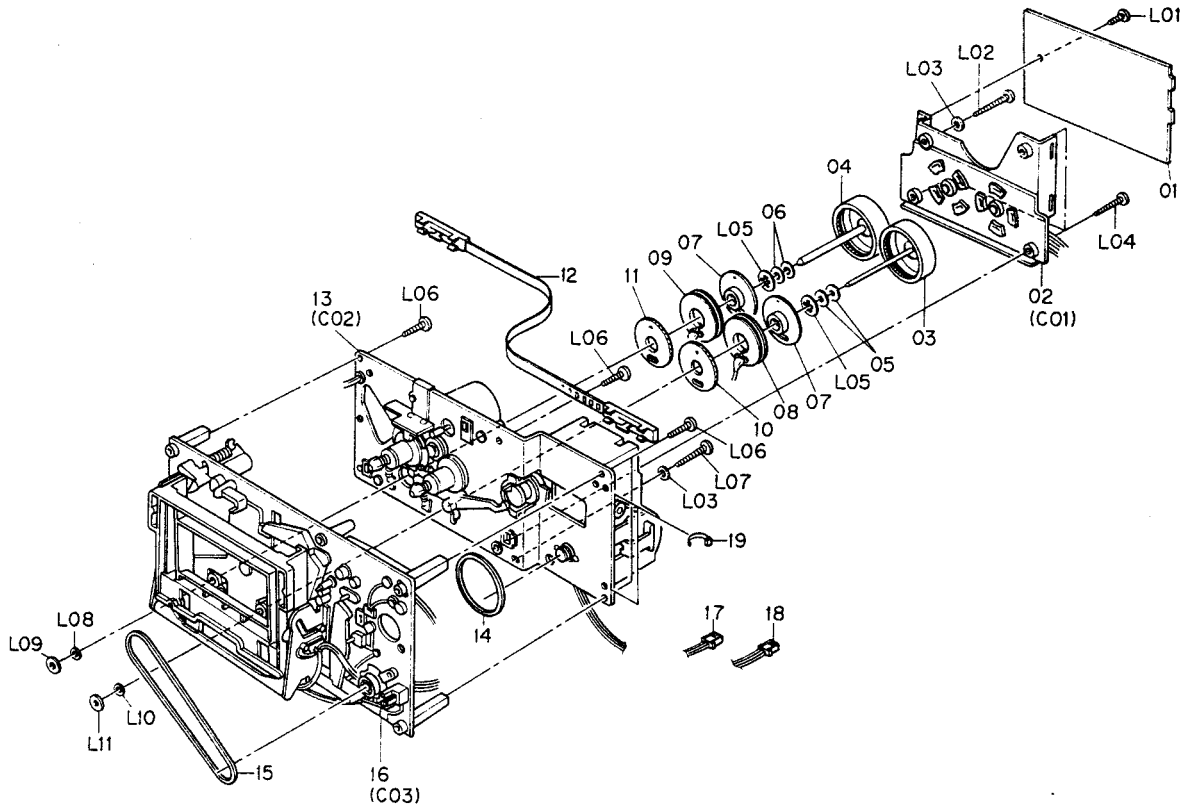


Fig. 5.5

5.6. Flywheel Holder Ass'y (C01)

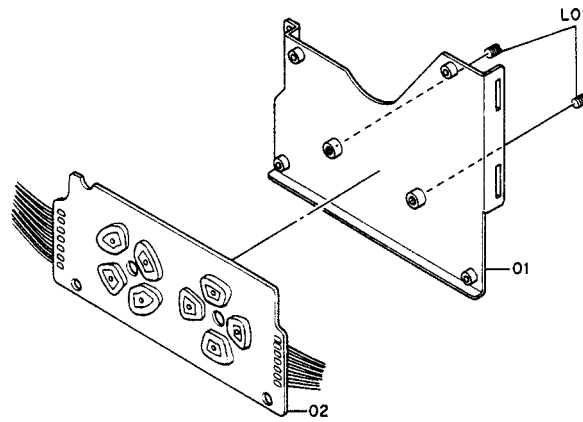


Fig. 5.6

5.7. Sub Mechanism Chassis Ass'y (C02)

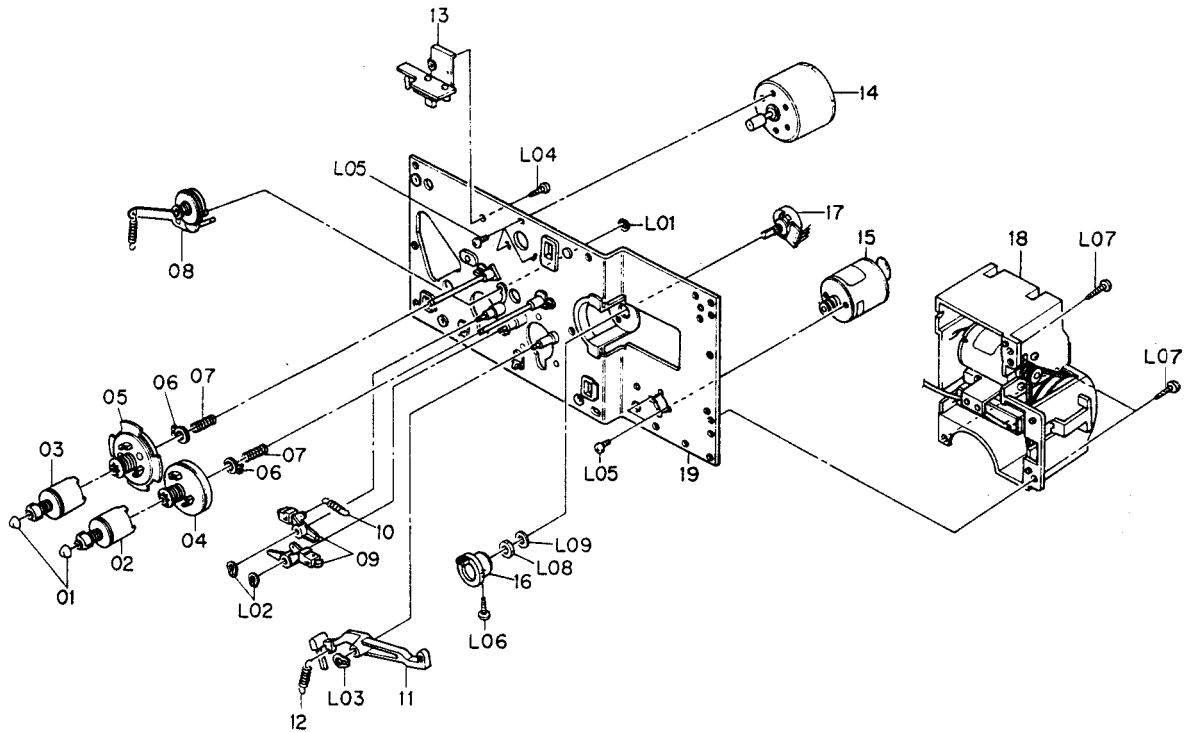


Fig. 5.7

Schematic Ref. No.	Part No.	Description	Qty	Schematic Ref. No.	Part No.	Description	Qty
B02	CA08445A	Mechanism Ass'y Serial No.: A80101001 -	1	C02	CA08444A	Sub Mechanism Chassis Ass'y Serial No.: A80101001 -	1
01	BA04941A	Motor Control P.C.B. Ass'y	1	01	OC08039B	Reel Hub Head	2
02	CA08422A	Flywheel Holder Ass'y	1	02	CA08038B	Reel Hub B Pulley Ass'y	1
03	CA08433A	Take-up Flywheel Sub Ass'y	1	03	CA08397A	Reel Hub S Pulley Ass'y	1
04	CA08434A	Supply Flywheel Sub Ass'y	1	04	CA08037A	Reel Hub Take-up Ass'y	1
05	OC08020B	Thrust Washer 2.6mm	2	05	CA08452A	Reel Hub Supply Ass'y	1
06	OC08021B	Thrust Washer 3.1mm	2	06	CA08039A	Back Tension Ass'y	2
07	OC08333A	Sensor Plate	2	07	OC08269A	Back Tension Spring C	2
08	CA08391A	Sensor Coil Take-up Sub Ass'y	1	08	CA08193A	Idler Ass'y	1
09	CA08454A	Sensor Coil Supply Sub Ass'y	1	09	CA08042A	Brake Ass'y	2
10	CA08483A	Sensor Gear Take-up Ass'y	1	10	OC08129B	Brake Arm Spring	1
11	CA08485A	Sensor Gear Supply Ass'y	1	11	OC08030C	Brake Drive Arm	1
12	OC08237A	Azimuth Wire	1	12	OC08128A	Brake Drive Arm Spring	1
13	CA08444A	Sub Mechanism Chassis Ass'y	1	13	BA04943A	Counter Pulse Generator P.C.B. Ass'y	1
14	OC08099B	Cam Motor Belt	1	14	CA08242A	Reel Motor Ass'y	1
15	OC08098B	Counter Belt B	1	15	CA08034A	Control Motor Ass'y	1
16	CA08443A	Main Mechanism Chassis Ass'y	1	16	OC08053B	Volume Coupler	1
17	OB02333B	3P-H Connector (Blue with Shield)	1	17	OB07240A	Volume Control 10K (B)	1
18	OB08672A	3P-H Connector	1	18	CA08453A	Playback Head Azimuth Alignment Motor Ass'y	1
19	OB08515A	Insu-Lock	1	19	CA08194A	Sub Chassis Ass'y B	1
L01	OE00857A	BT 3x6 @ Pan	1	L01	OE00698A	E-Ring 2.5mm	1
L02	OE00834A	BT 3x30 @ Pan	1	L02	OE00837A	Stopper Ring 3mm	2
L03	OE00178A	Washer 3.3x8x0.5	2	L03	OE00838A	Stopper Ring 4mm	1
L04	OE00833A	BT 3x20 @ Pan	3	L04	OE00859A	BT 2.6x6 @ Binding	1
L05	OE03023A	Stopper Ring 8mm	2	L05	OE00226A	M2.6x4 @ Pan	5
L06	OE00883A	BT 3x18 @ Pan	5	L06	OE00792A	BT2.6x6 @ Pan	1
L07	OE00835A	BT 3x25 @ Pan	1	L07	OE00846A	BT 3x8 @ Pan	3
L08	OC08347A	Washer 3.1mm FT	1	L08	-	Volume Nut	(1)
L09	OC08345A	Capstan Washer 3mm	1	L09	-	Volume Washer	(1)
L10	OC08348A	Washer 2.6mm FT	1				
L11	OC08346A	Capstan Washer 2.5mm	1				
C01	CA08422A	Flywheel Holder Ass'y Serial No.: A80101001 -	1				
01	CA08382B	Flywheel Holder Sub Ass'y	1				
02	BA04942A	Motor P.C.B. Ass'y	1				
L01	OC08068C	Thrust Screw	2				

5.8. Main Mechanism Chassis Ass'y (C03)

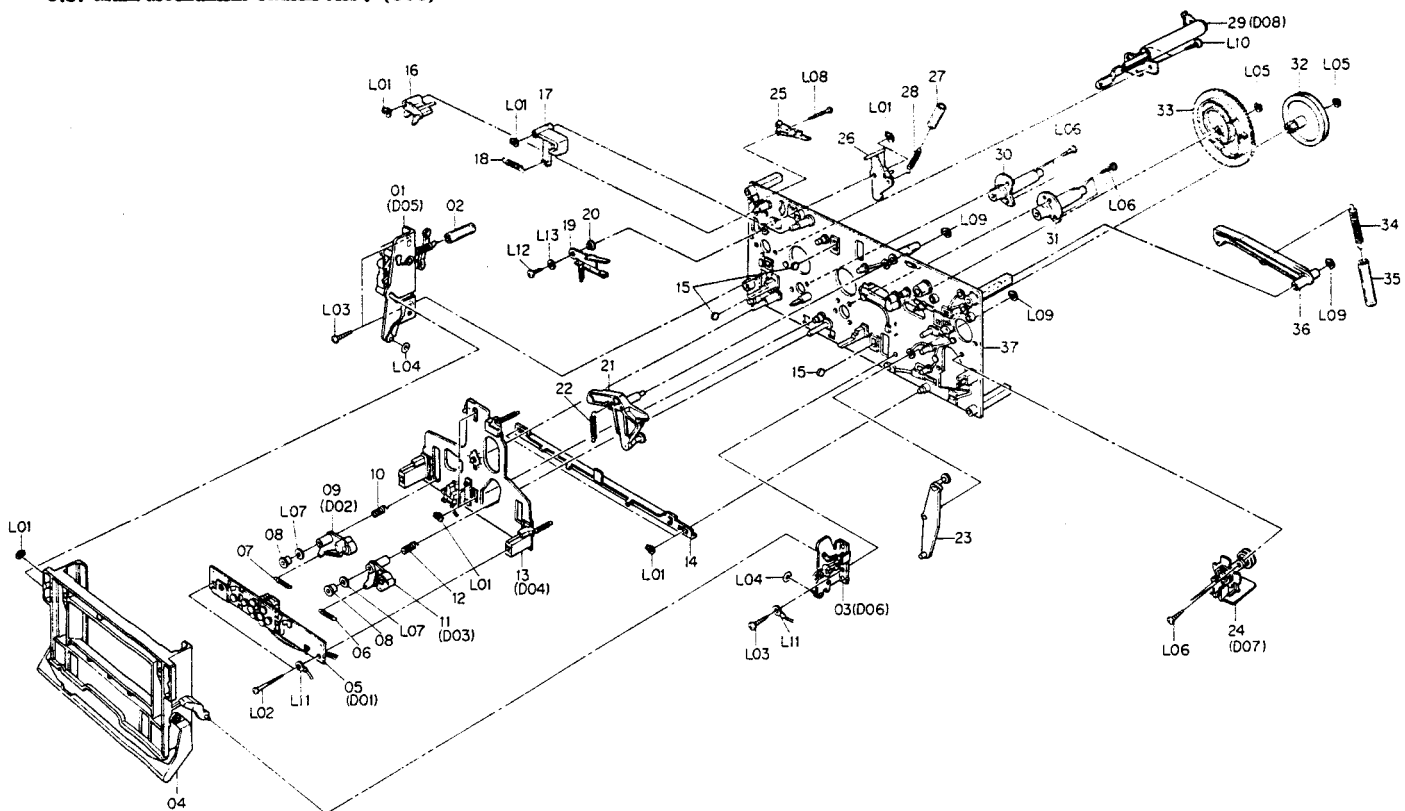


Fig. 5.8

Schematic Ref. No.	Part No.	Description	Q'ty	Schematic Ref. No.	Part No.	Description	Q'ty
C03	CA08443A	Main Mechanism Chassis Ass'y Serial No.: A80101001 -	1	36	CA08028A	Counter-Load Arm	1
				37	CA08347A	Main Chassis Ass'y	1
01	CA08350A	Cassette Case Holder L Ass'y	1	L01	0E00837A	Stopper Ring 3mm	9
02	OC08152A	Lid Arm Spring Tube	1	L02	0E00834A	BT 3x30 @ Pan	2
03	CA08455A	Cassette Case Holder R Ass'y	1	L03	0E00831A	BT 3x10 @ Pan	3
04	CA08451A	Cassette Case Ass'y	1	L04	0E00254A	Washer 3.1mm	2
05	CA08438A	Head Mount Base Ass'y	1	L05	0E00222A	E-Ring 2mm	2
06	OC08250A	Take-up Roller Arm Spring	1	L06	0E00876A	BT 2.6x8 @ Pan	8
07	OC08121A	Supply Roller Arm Spring	1	L07	0E00178A	Washer 3mm	2
08	OC08313A	Pressure Roller Arm Bushing	2	L08	0E00879A	BT 2x15 @ Pan	1
09	CA08437A	Supply Pressure Roller Arm Ass'y	1	L09	0E00838A	Stopper Ring 4mm	3
10	OC08122C	Supply Pressure Roller Thrust Spring	1	L10	0E00846A	BT 3x8 @ Pan	3
11	CA08436A	Take-up Pressure Roller Arm Ass'y	1	L11	0E00895A	Earth Lug 3mm	2
12	OC08183B	Take-up Pressure Roller Thrust Spring	1	L12	0E00859A	BT 2.6x6 @ Binding	1
13	CA08339A	Head Base Ass'y	1	L13	OC08255A	Washer 2.6mm	1
14	OC08368A	Pressure Roller Drive Bar D	1				
15	OC08086B	Head Base Roller	3				
16	OC08050B	Record Sensor Arm	1				
17	OC08051E	Cassette Hold Arm	1				
18	OC08120A	Cassette Hold Arm Spring	1				
19	OC08371A	Back Tension Arm Ass'y	1				
20	OC08254A	Back Tension Arm Collar	1				
21	OC08027A	Head Base Drive Arm Ass'y	1				
22	OC08143C	Head Base Drive Arm Spring	1				
23	CA08026A	Pressure Roller Drive Arm Ass'y	1				
24	CA08441A	Auto Shut-off Ass'y	1				
25	OC08119A	Record Protector	1				
26	OC08194C	Damper Lock Arm	1				
27	OC08153A	Damper Lock Arm Spring Tube	1				
28	OC08116A	Record Arm Spring	1				
29	CA08030A	Pneumatic Damper Ass'y	1				
30	CA08404B	Supply DD Flange Ass'y	1				
31	CA08457A	Take-up DD Flange Ass'y	1				
32	CA08186A	Cam Drive Gear	1				
33	OC08029H	Control Cam	1				
34	OC08117A	Counter-Load Arm Spring	1				
35	OC08152A	Counter-Load Arm Spring Tube	1				

5.9. Head Mount Base Ass'y (D01)

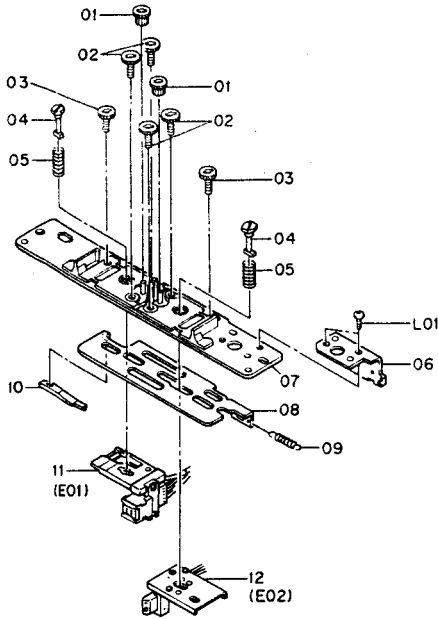


Fig. 5.9

5.10. Supply Pressure Roller Ass'y (D02)

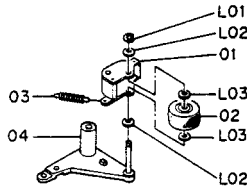


Fig. 5.10

5.11. Take-up Pressure Roller Ass'y (D03)

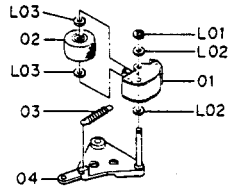


Fig. 5.11

5.12. Head Base Ass'y (D04)

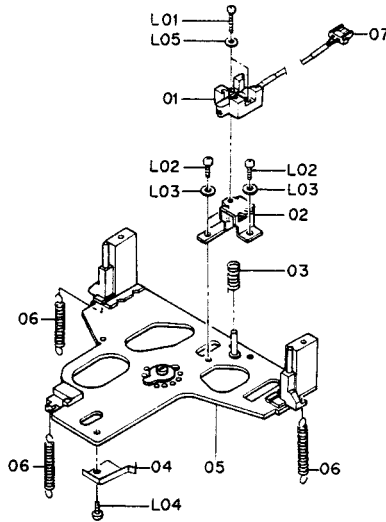


Fig. 5.12

5.13. Cassette Case Holder L Ass'y (D05)

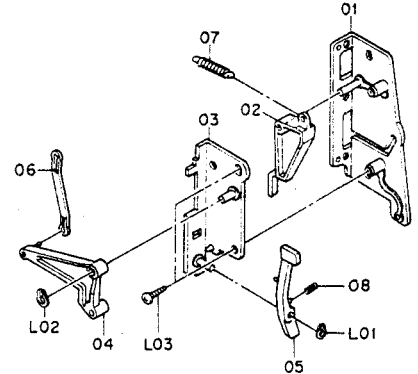


Fig. 5.13

Schematic Ref. No.	Part No.	Description	Q'ty	Schematic Ref. No.	Part No.	Description	Q'ty
D01	CA08438A	Head Mount Base Ass'y Serial No.: A80101001 -	1	L01	0E00042A	E-Ring 1.5mm	1
				L02	0C08024A	Washer 2mm 0.25T	2
				L03	0C08365A	Washer 2mm 0.13T	2
01	0C08028C	Head Height Adjustment Screw	2	D04	CA08339A	Head Base Ass'y Serial No.: A80101001 -	1
02	0C08027F	Head Height Adjustment Gear	4	01	GA02103A	EOK Erase Head	1
03	0C08026D	Azimuth Alignment Screw	2	02	0C08158D	Erase Head Hold Plate	1
04	0C08161B	Spring Stopper	2	03	0C08166A	Erase Head Hold Plate Spring	1
05	0C08187B	Head Plate Spring	2	04	0C08174D	Cassette Hold Spring	1
06	0C08315A	Azimuth Alignment Wire Hold Plate	1	05	CA08003R	Head Base Ass'y	1
07	CA08083D	Head Mount Base Sub Ass'y	1	06	0C08175A	Head Base L Spring	3
08	0C08352A	AP Drive Plate	1	07	0B08944A	2P-H Connector	1
09	0C08362A	TG Spring	1	L01	0E00951A	M1.7x7 @ Pan (Black Chromate)	2
10	0C08351A	PH Azimuth Plate	1	L02	0E00909A	M2x6 @ Pan	3
11	CA08439A	PA-1L Playback Head Ass'y	1	L03	0E00117A	Washer 2mm	3
12	CA08440A	R-8L Record Head Ass'y	1	L04	0E00853A	BT 2x3 @ Pan	1
L01	0E00917A	BT 2.6x5 @ Pan	2	L05	0E00952A	Washer 1.7mm	2
D02	CA08437A	Supply Pressure Roller Arm Ass'y Serial No.: A80101001 -	1	D05	CA08350A	Cassette Case Holder L Ass'y Serial No.: A80101001 -	1
01	CA08403A	Supply Tape Guide	1	01	CA08326B	Cassette Case Holder L Sub Ass'y	1
02	0C08357A	Pressure Roller	1	02	0C08073C	Lid Arm A	1
03	0C08495A	Supply Guide Spring	1	03	0C08306A	Eject Arm Holder	1
04	CA08401A	Supply Roller Arm Ass'y	1	04	0C08307A	Eject Arm A	1
L01	0E00042A	E-Ring 1.5mm	1	05	0C08197C	Eject Arm B	1
L02	0C08024A	Washer 2mm 0.25T	2	06	0C08199B	Eject Arm Joint	1
L03	0C08365A	Washer 2mm 0.13T	2	07	0C08114A	Lid Arm Spring	1
D03	CA08436A	Take-up Pressure Roller Arm Ass'y Serial No.: A80101001 -	1	08	0C08211C	Eject Arm Spring	1
01	CA08402A	Take-up Tape Guide	1	L01	0E00837A	Stopper Ring 3mm	1
02	0C08357A	Pressure Roller	1	L02	0E00838A	Stopper Ring 4mm	1
03	0C08362A	Take-up Guide Spring	1	L03	0E00865A	BT 3x10 @ Binding	2
04	CA08400A	Take-up Roller Arm Sub Ass'y	1				

5.14. Cassette Case Holder R Ass'y (D06)

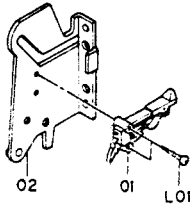


Fig. 5.14

5.15. Auto Shut-off Ass'y (D07)

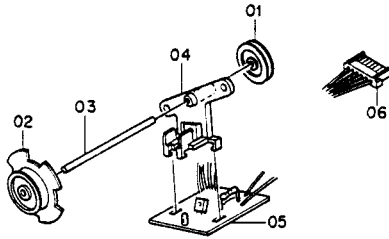


Fig. 5.15

5.16. Pneumatic Damper Ass'y (D08)

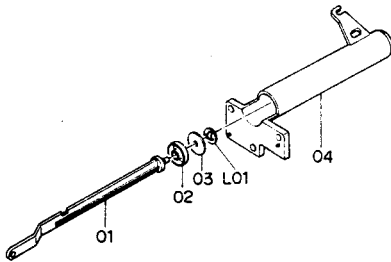


Fig. 5.16

5.17. PA-1L Playback Head Ass'y (E01)

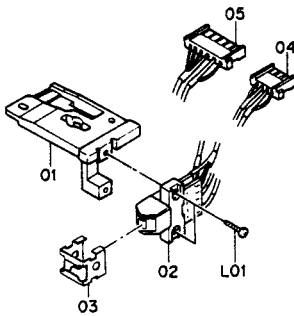


Fig. 5.17

5.18. R-8L Record Head Ass'y (E02)

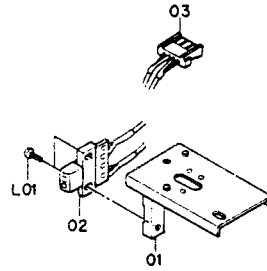


Fig. 5.18

Schematic Ref. No.	Part No.	Description	Q'ty
D06	CA08455A	Cassette Case Holder R Ass'y Serial No.: A80101001 -	1
01	0C08133A	Eject Sensor	1
02	CA08427A	Cassette Case Holder R Sub Ass'y	1
L01	0E00840A	BT 2x8 @ Pan	1
D07	CA08441A	Auto Shut-off Ass'y Serial No.: A80101001 -	1
01	0C08047A	Shut-off Pulley A	1
02	0C08309B	Shut-off Pulley B	1
03	0C08088B	Shut-off Pulley Shaft	1
04	0C08207B	Shut-off Pulley Holder	1
05	BA04852A	Shut-off P.C.B. Ass'y	1
06	0B02339B	6P-H Connector	1
D08	CA08030A	Pneumatic Damper Ass'y Serial No.: A80101001 -	1
01	0C08058C	Damper Piston	1
02	0C08102C	Damper Ring	1
03	0C08010C	Damper Plate	1
04	0C08059D	Sylinder	1
L01	0E00874A	Stopper Ring CS 2mm	1
E01	CA08439A	PA-1L Playback Head Ass'y Serial No.: A80101001 -	1
01	0C08350B	Playback Head Plate	1
02	GA02162A	PA-1L Playback Head	1
03	0C08349C	Tape Protector	1
04	0B02341B	4P-H Connector	1
05	0B02342B	6P-H Connector	1
L01	0E00886A	M1.7x6.5 @ Pan	1
E02	CA08440A	R-8L Record Head Ass'y Serial No.: A80101001 -	1
01	CA08308A	Record Head	1
02	GA01050A	R-8L Record Head	1
03	0B02340B	4P-H Connector	1
L01	0E00887A	M1.7x4 @ Pan	2

- 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, RC — Cement 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

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

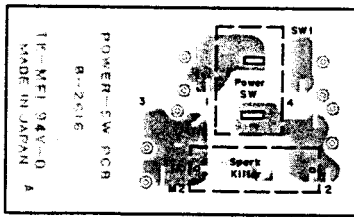


Fig. 6.1

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

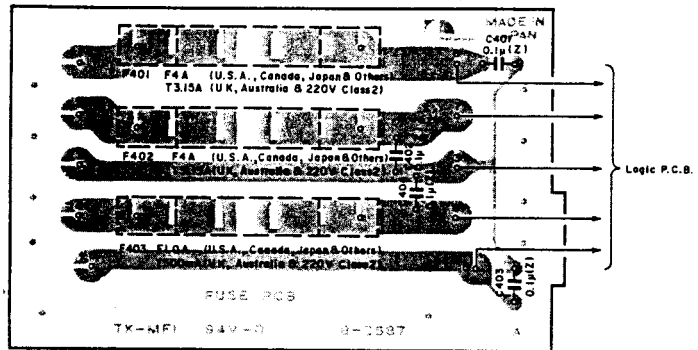


Fig. 6.2

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

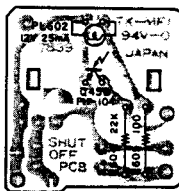


Fig. 6.3

6.4. Counter Pulse Generator P.C.B. Ass'y

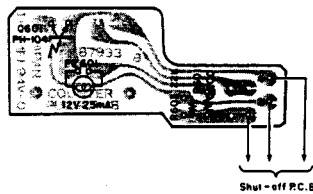


Fig. 6.4

Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description
	BA04947A	Power Switch P.C.B. Ass'y (U.S.A. & Canada)		BA04899A	Fuse P.C.B. Ass'y (U.S.A., Canada & Others)		OM04432A	Fuse Label 4A 125V x 2 (U.S.A., Canada & Others) (1)
	BA04946A	Power Switch P.C.B. Ass'y (Japan)		BA04898A	Fuse P.C.B. Ass'y (Japan)		OM04441A	Fuse Label 4A 250V x 2 (Japan) (1)
	BA04948A	Power Switch P.C.B. Ass'y (UK, Australia, 220V Class 2 & Others)		BA04900A	Fuse P.C.B. Ass'y (UK, Australia & 220V Class 2)		OM03936B	Fuse Label T3.15A 250V (UK, Australia & 220V Class 2) (1)
SW1	OB02616A	Power Switch P.C.B.	C401,402	OB02587A	Fuse P.C.B.		OB08349A	Fuse Clip (UK, Australia & 220V Class 2) (6)
	OB07407A	Power Switch (U.S.A. & Canada)	403,404	OBT9292A	CC 0.1μ 50V Z			
SW1	OB07406A	Power Switch (Japan)	F401,402	OB90002A	Fuse F4A 125V (U.S.A., Canada & Others)		BA04852A	Shut-off P.C.B. Ass'y
SW1	OB07408A	Power Switch (UK, Australia, 220V Class 2 & Others)	F401,402	OB90001A	Fuse F4A 250V (Japan)		OB07839B	Shut-off P.C.B.
M2	OB08342A	Spark Killer (U.S.A. & Canada)	F401,402	OB08281A	Fuse T3.15A 250V (UK, Australia & 220V Class 2)	Q450 R604 R605 PL602	OB06228A	Photo TR PE104
M2	OB08363A	Spark Killer (Japan)	F403	OB08374A	Fuse F1A 250V (U.S.A., Canada & Others)		OB05615A	RK 22K 1/4W J
M2	OB08955A	Spark Killer (UK, Australia, 220V Class 2 & Others)	F403	OB08686A	Fuse F1A 250V (Japan)		OB09215A	RF 100 1/4W J
	OE00622A	M3x5 @Pan (2A) (2)	F403	OB08457A	Fuse T500mA 250V (UK, Australia & 220V Class 2)		OB08552A	Lamp 12V 25mA
	OE00752A	Eyelet 2x3 (2)		OM04190A	Fuse Label 1A 250V (U.S.A., Canada & Japan) (1)	Q601 R601 R603 PL601	BA04943A	Counter Pulse Generator P.C.B. Ass'y
	OJ04646A	Power Switch Holder (1)		OM04096C	Fuse Label T500mA (UK, Australia & 220V Class 2) (1)		OB07933B	Counter Pulse Generator P.C.B.
							OB06228A	Photo TR PE104
							OB09215A	RF 100 1/4W J
							OB05661A	RK 22K 1/4W J
							OB08552A	Lamp 12V 25mA
							OC08281B	P.C.B. Holder (1)
							OE00792A	BT 2.6x6 @Pan (Chromate) (2)

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

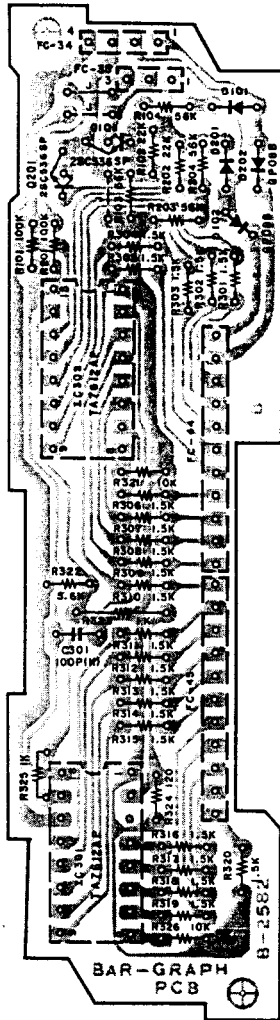


Fig. 6.10

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

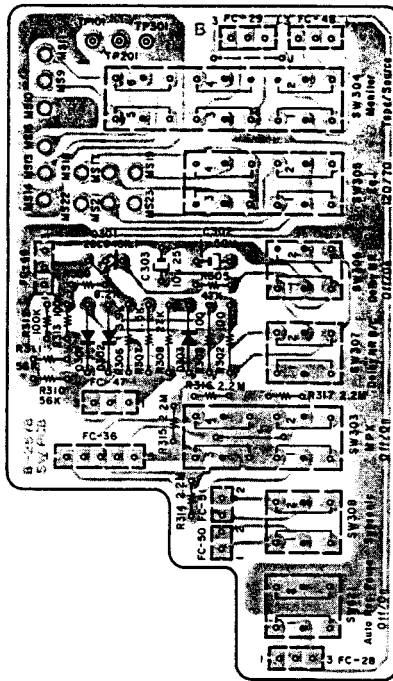


Fig. 6.11

Schematic Ref. No.	Part No.	Description
	BA04889A	Switch P.C.B. Ass'y
	OB02578B	Switch P.C.B.
Q301	OBT1872A	TR 2SC945L (P,Q)
D301,302	OBT6181A	SID 1SS53
303		
R302,303	OBT9653A	RK 100 1/6W J
R305	OBT9717A	RK 47K 1/6W J
R306	OBT5675A	RK 3.9K 1/4W J
R307	OBT5505A	RK 1.5K 1/4W J
R308	OBT5743A	RK 27K 1/4W J
R309	OBT9699A	RK 8.2K 1/6W J
R310,311	OBT9719A	RK 56K 1/6W J
R312,313	OBT9725A	RK 100K 1/6W J
R314,315	OBT5671A	RK 2.2M 1/4W J
316,317		
C302	OBT1405A	CE 1μ 50V
C303	OBT1674A	CE 10μ 25V
FC28	OB82035A	3P Flat Cable
FC29	OB82034A	3P Flat Cable
FC36	OB82036A	5P Flat Cable
FC50	OB05331B	2P Flat Cable
FC51	OB82001B	2P Flat Cable
	OB07460A	Push Switch (1)
	OM04240A	Label CN-28 (1)
	OM04438A	Label CN-29 (1)
	OM04440A	Label CN-36 (1)

Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description
	BA04892A	Control P.C.B. Ass'y		BA04941A	Motor Control P.C.B. Ass'y	C508,521	OBT9222A	CE 0.47μ 50V (LN)
Q601,605	OB02581B	Control P.C.B.				C509,522	OBT9290A	CC 0.01μ 50V Z
Q602,603	OBT6013A	TR 2SA733 (P,Q)		OB02588B	Motor Control P.C.B.	C510,523	OBT9844A	CF 1000P 50V J
604	OBT1872A	TR 2SC945L (P,Q)	IC501			533,541		
D601,602	OBT6181A	SiD 1SS53	IC502,504	OB06423A	IC TC40H002P	C511,524	OBT9286A	CC 470P 50V K
604			IC503,505	OB06223A	IC μPD4040BC	C512,525	OBT9848A	CF 0.022μ 50V J
D603,605	OBT6398A	SiD 1SS176	IC506,507	OB06424A	IC TC40H020P	C514,527	OBT5914A	CM 0.15μ 50V J
606,607			514,517	OB06144A	IC μPD4066BC	C515,528	OBT9288A	CC 1000P 50V K
608,609			518			534,542		
610			IC508,512	OB06297A	IC TC5081P	C529,530	OBT1403A	CE 47μ 16V
LED301	OB06445A	LED ORN TLO-123 (15)	IC509	OB06270A	IC TC4069UBP	531,532		
302,607			IC510,511	OB06124B	IC RC4558D	537,538		
609-620			513,515			539,540		
LED601	OB06446A	LED GRN TLPG-163	516			545,546		
602,603			Q501,504	OBT6013A	TR 2SA733 (P,Q)	547	OBT1402A	CE 4.7μ 25V
604,605			505,508			C535,536		
606,608	OB07404A	Semi-fixed VR 10K	509,511			543,544	OBT5885A	CE 100μ 10V
VR101,102			515	OBT1872A	TR 2SC945L (P,Q)	C548	OB02280A	2P-T Post
106,201			Q502,503			CN501	OB08645A	9P-T Post
202,206	OB07277A	Semi-fixed VR 22K	506,507			CN502	OB08724A	5P-T Post
VR103,105			510,512			CN503,504	OE00507A	Nut Hex. M3 (8)
203,205			514,516			CN505	OE00521A	(Chromate) M3x8 @Fan (8)
VR104,204	OB07260A	Semi-fixed VR 50K	527,528	OBT6299A	TR 2SC2878		OJ04485A	Heat Sink B (4)
R103,105	OBT9693A	RK 4.7K 1/6W J	Q513,517	OB06316A	TR 2SD882 (P,Q)			
107,203			Q518,520					
205,207			522,524	OB06303A	TR 2SB772 (P,Q)			
R104,112	OBT9699A	RK 8.2K 1/6W J	Q519,521					
204,212			523,525	OB06066A	TR 2SD471 (L,M)			
R106,206	OBT9695A	RK 5.6K 1/6W J	Q526	OBT6426A	ZD 8.6V XZ086			
R108,109	OBT9701A	RK 10K 1/6W J	ZD501	OBT6398A	SiD 1SS176			
208,209			D501-520	OB02324A	Xtal 3.088MHz			
R110,210	OBT1679A	RK 100 1/4W J	X501	OB09060A	Semi-fixed VR 100K			
R111,211	OBT9697A	RK 6.8K 1/6W J	VR501,502	OBT9749A	RK 1M 1/6W J			
R115,215	OBT9685A	RK 2.2K 1/6W J	R501,529					
R601,602	OBT5575A	RK 560 1/4W J	552,555	OBT9725A	RK 100K 1/6W J			
603,605			R502,503					
608,610			507,508					
612,613			539,562					
617			568,569					
R604	OBT5578A	RK 180 1/4W J	571,578					
R606,607	OBT5743A	RK 27K 1/4W J	579,581					
611			R504,505	OBT9685A	RK 2.2K 1/6W J			
R609	OBT1857A	RK 1K 1/4W J	506,509					
R614	OBT9709A	RK 22K 1/6W J	536,559	OBT9707A	RK 18K 1/6W J			
R615	OBT9711A	RK 27K 1/6W J	R510,512					
R616	OBT9713A	RK 33K 1/6W J	514,516					
C103,203	OBT9852A	CF 4700P 50V J	524,547					
C104,204	OBT9854A	CF 6800P 50V J	586					
C601	OBT1862A	CE 22μ 16V	R511,513	OBT9713A	RK 33K 1/6W J			
SW301,302	OB07396A	Double Action Switch	515,517					
			531,554	OBT9733A	RK 220K 1/6W J			
SW601-612	OB07459A	Switch	R518,541	OBT9701A	RK 10K 1/6W J			
SW613,614	OB07462A	Push Switch	R519,522					
616,617			527,528					
SW615	OB07463A	Push Switch	537,538					
FC14,15	OB05361B	4P Flat Cable	545,550					
FC16	OB05371B	5P Flat Cable	551,560					
FC17	OB05372B	10P Flat Cable	561	OBT9747A	RK 820K 1/6W J			
FC18	OB82038A	10P Flat Cable	R520	OBT9721A	RK 68K 1/6W J			
FC19	OB05360B	4P Flat Cable	R521,544	OBT9677A	RK 1K 1/6W J			
FC20	OB05370B	5P Flat Cable	570,580					
FC21	OB05346B	3P Flat Cable	R523,546					
FC38	OB05354B	4P Flat Cable	564,565					
FC39,40	OB05365B	5P Flat Cable	566,567					
FC41,42	OB05368B	5P Flat Cable	574,575					
	OE00857A	BT 3x6 @ Binding (Chromate) (1)	576,577					
			R525,548	OBT9671A	RK 560 1/6W J			
	OJ04653A	Lens House (20)	R526,549	OBT9717A	RK 47K 1/6W J			
	OJ04654A	Fader House (1)	R530,532	OBT9709A	RK 22K 1/6W J			
	OM04231A	Label CN-14 (1)	534,553					
	OM04222A	Label CN-15 (1)	555,557					
	OM04223A	Label CN-16 (1)	R533,542	OBT9719A	RK 56K 1/6W J			
	OM04224A	Label CN-17 (1)	543,556					
	OM04330A	Label CN-18 (1)	R535,558	OBT9665A	RK 330 1/6W J			
	OM04225A	Label CN-19 (1)	R540,563	OBT9743A	RK 560K 1/6W J			
	OM04226A	Label CN-20 (1)	R572,573	OB09049A	RF 22 1/4W J			
	OM04232A	Label CN-21 (1)	582,583					
			R584	OBT9673A	RK 680 1/6W J			
			C501	OBT9279A	CC 22P 50V K			
			C502	OBT9277A	CC 10P 50V J			
			C503	OBT1392A	CE 470μ 16V			
			C504,517	OBT9372A	CE 2.2μ 50V			
			C505,518	OBT9292A	CC 0.1μ 50V Z			
			549,550					
			551					
			C506,513	OBT5583A	CM 0.033μ 50V J			
			519,526					

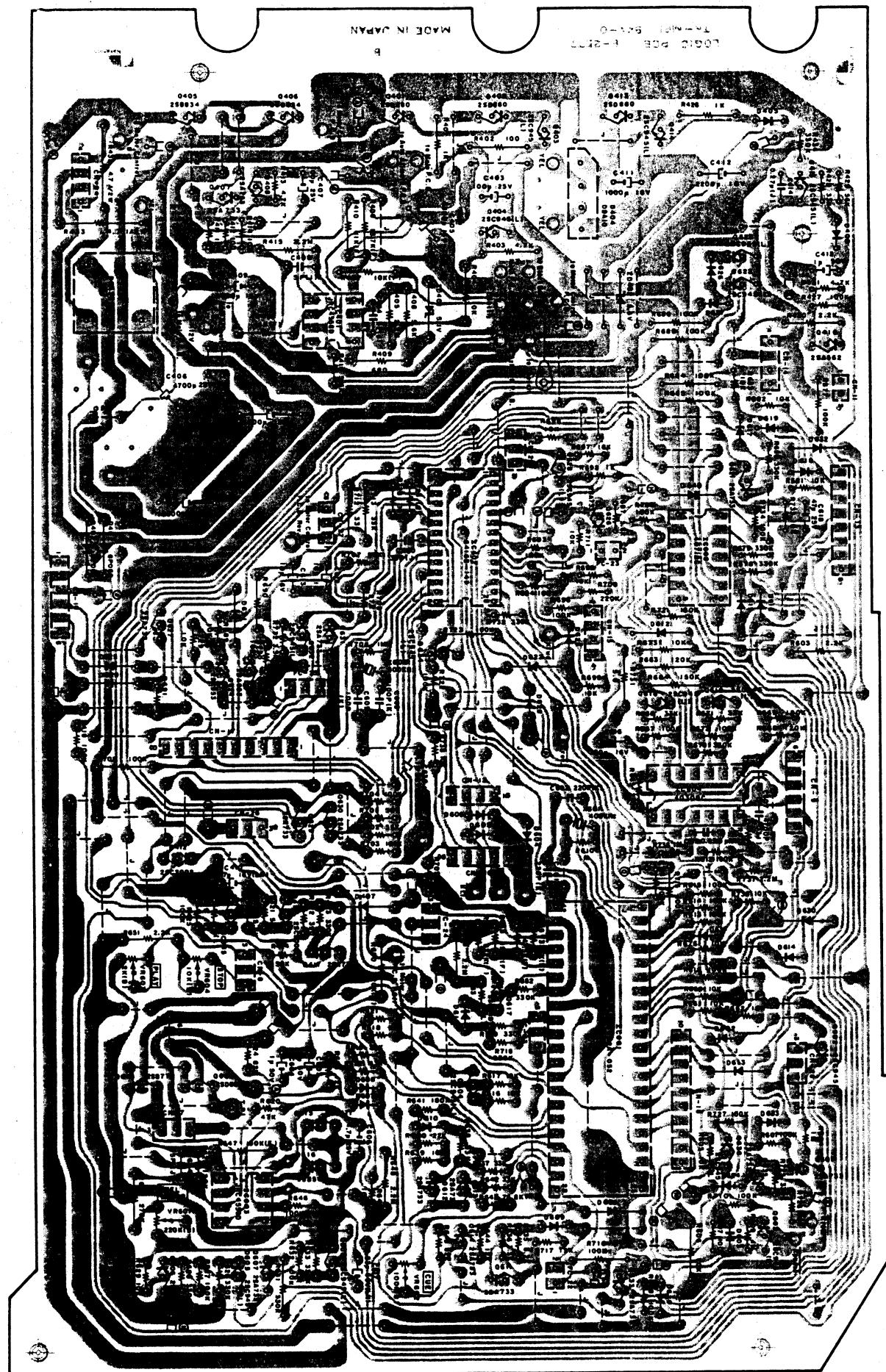


Fig. 6.14.1 Serial No.: A80102201 -

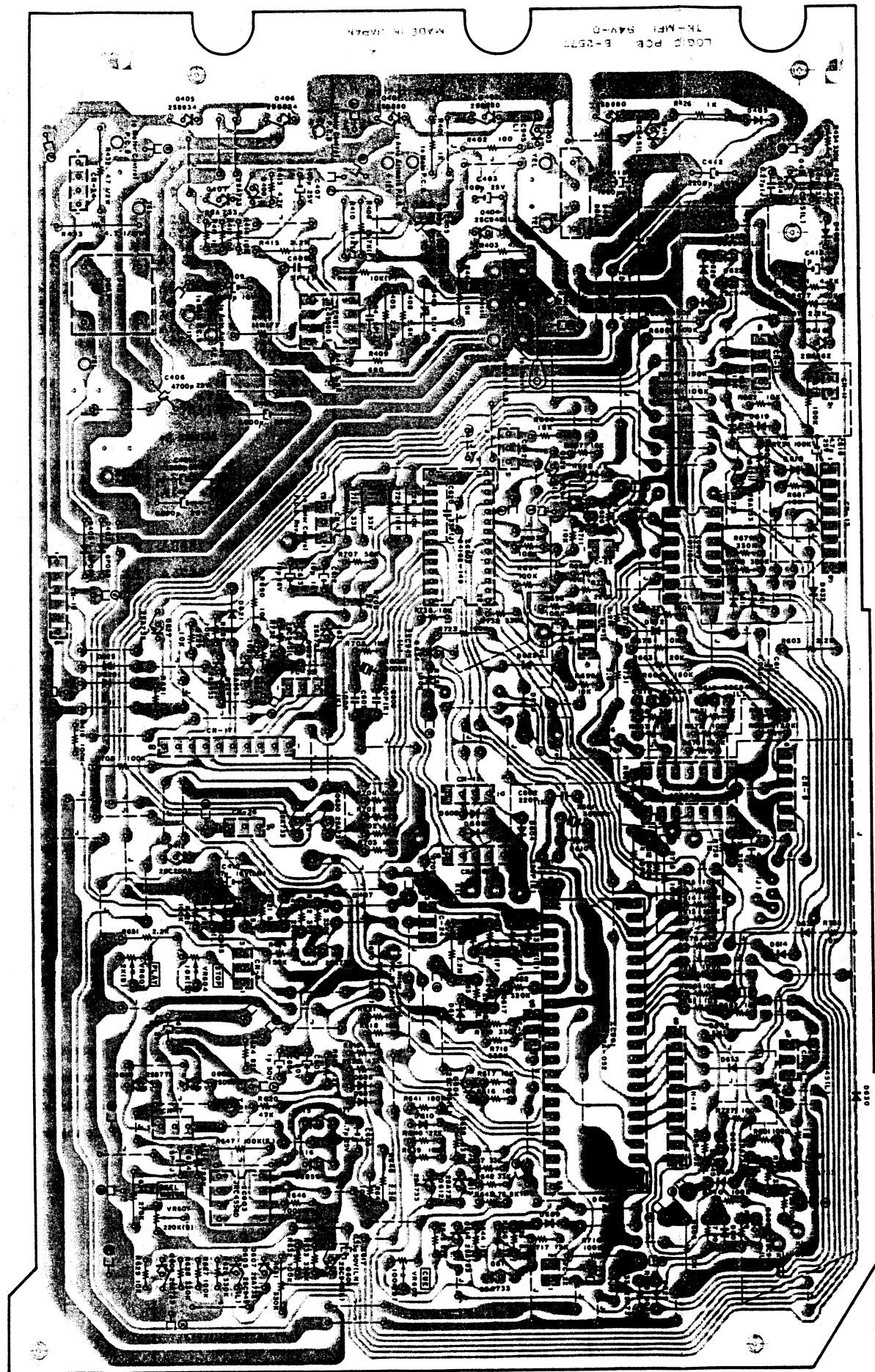


Fig. 6.14.2 Serial Nos.: A80101001 - A80102200

6.15. Auto Azimuth P.C.B. Ass'y

Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description
	BA04879A	Auto Azimuth P.C.B. Ass'y	D821-827	OBT6398A	SID 1SS176 (21)	R805,807		
	- Tone Osc. -		832-835			903,904		
IC721	OB06127A	IC RC4559D	840			905		
IC722	OB06219A	IC μ PD4081BC	842-846			R706,806	OBT5615A	RK 22K 1/4W J
Q721	OBT1872A	TR 2SC945L (P,Q)	848,849			901	OBT1857A	RK 1K 1/4W J
D721,722	OBT6181A	SID 1SS53	850,851			R708,711	OBT1682A	RK 6.8K 1/4W J
L721	OB03919B	Inductor 36mH	D841	OB06181A	SID 1SS53	808,811	OBT5625A	RK 220K 1/4W F
VR721	OB07269A	Semi-fixed VR 50K	VR822	OB07269A	Semi-fixed VR 50K	R709,809	OBT9432A	RM 8.25K 1/4W F
VR722	OB07270A	Semi-fixed VR 20K	VR823,824	OB07256A	Semi-fixed VR 10K	R710,810	OBT5627A	RK 330K 1/4W J
R721,722	OBT9315A	RM 332K 1/4W F	R821	OB22512Y	RM 316K 1/4W F	R712,812		
723			R822,830	OB22265Y	RM 2.2K 1/4W F	R713,714		
R724	OBT9583A	RM 97.6K 1/4W F	R823,831	OB22457Y	RM 100K 1/4W F	813,814		
R725,726	OBT1889A	RK 100K 1/4W J	R824,832	OB22256Y	RM 1.8K 1/4W F	R715,815	OBT9510A	RM 66.5K 1/4W F
732			R825,828	OBT9701A	RK 10K 1/6W J	R716,816	OBT9305A	RM 100K 1/4W F
R727	OBT5615A	RK 22K 1/4W J	833,836			R718,818	OBT5577A	RK 330 1/4W J
R728	OBT5627A	RK 330K 1/4W J	847,848			R902	OBT9709A	RK 22K 1/6W J
R729,730	OBT5508A	RK 56K 1/4W J	R829	OB22507Y	RM 287K 1/4W F	C701,703	OBT1405A	CE 1 μ 50V
731			R838,839	OBT9725A	RK 100K 1/6W J	704,801		
R733	OBT9527A	RK 130K 1/4W J	843,844			803,804		
R734	OBT5676A	RK 390K 1/4W J	862,863			C702,802		
R735	OBT1682A	RK 6.8K 1/4W J	871,872			C705,805		
R736	OBT5622A	RK 2.2K 1/4W J	877,881			C901		
C721,722	OBT1400A	CE 100 μ 16V	882,883					
C723	OBT9836A	CP 360P 100V J	884,898					
C724	OBT9538A	CP 0.018 μ 100V G	899,920					
C725	OBT9861A	CF 0.027 μ 50V J	922,928					
C726	OBT9865A	CF 0.056 μ 50V J	930,931					
C727	OB09302A	C 100P 100V J	R840,842	OBT9749A	RK 1M 1/6W J			
C728	OBT9868A	CF 0.1 μ 50V J	854,856					
C729	OBT9860A	CF 0.022 μ 50V J	894,921					
C730	OBT9848A	CF 2200P 50V J	924,925					
C731	OBT9322A	CP 330P 100V J	R841	OBT9707A	RK 18K 1/6W J			
	- Fader -		R845,846	OBT9733A	RK 220K 1/6W J			
IC741	OB06216A	IC μ PC4556C	849,852					
Q741,744	OB06013A	TR 2SA733 (P,Q)	890,928					
Q742,743	OBT1872A	TR 2SC945L (P,Q)	R850,855					
746			R853	OBT9677A	RK 1K 1/6W J			
ZD741	OBT6290A	ZD 5.6V RD5.6EB2	R869	OBT9681A	RK 1.5K 1/6W J			
D741,742	OBT6181A	SID 1SS53	R873	OBT9687A	RK 2.7K 1/6W J			
743,744			R874	OBT9697A	RK 6.8K 1/6W J			
R741,743	OBT5676A	RK 390K 1/4W J	R875,929	OBT1889A	RK 100K 1/4W J			
746			R876,878	OBT9709A	RK 22K 1/6W J			
R742,744	OBT5640A	RK 180K 1/4W J	R879	OBT5627A	RK 330K 1/4W J			
R745,763	OBT5692A	RK 68K 1/4W J	R880	OBT5671A	RK 2.2M 1/4W J			
R747	OBT5641A	RK 47K 1/4W J	R891	OBT9653A	RK 100 1/6W J			
R748,751	OBT1888A	RK 10K 1/4W J	R892,923	OBT9671A	RK 560 1/6W J			
754,765			927	OBT9743A	RK 560K 1/6W J			
R749,750	OBT5668A	RK 82K 1/4W J	R926	OBT9719A	RK 56K 1/6W J			
R752	OBT1889A	RK 100K 1/4W J	R932	OB01857A	RK 1K 1/4W J			
R753	OBT5621A	RK 120K 1/4W J	R935	OB01857A	RK 15K 1/6W J			
R755	OBT5743A	RK 27K 1/4W J	R936	OB01857A	RK 2.2K 1/6W J			
R756,764	OBT5622A	RK 2.2K 1/4W J	C821,826	OB09302A	C 100P 100V J			
767			C823,828	OBT9489A	CP 5600P 100V G			
R757	OBT1857A	RK 1K 1/4W J	C824,829	OBT9868A	CF 0.1 μ 50V J			
R758	OBT5691A	RK 390 1/4W J	C831,856	OBT9370A	CC 33P 50V J			
R759	OBT5576A	RK 470 1/4W J	C832	OBT9849A	CF 2700P 50V J			
R760,766	OBT1887A	RK 5.6K 1/4W J	C833,834	OBT9223A	CE 1 μ 50V (LN)			
R761	OBT1681A	RK 3.3K 1/4W J	C835,858	OBT9332A	CE 2.2 μ 50V (LN)			
R762	OBT5627A	RK 330K 1/4W J	C841,842	OBT9148A	CE 10 μ 25V (LN)			
C741	OBT1674A	CE 10 μ 25V	C845	OBT9848A	CF 2200P 50V J			
C742	OBT9844A	CF 1000P 50V J	C846	OBT9147A	CE 3.3 μ 50V (LN)			
C743	OBT1409A	CE 47 μ 25V	C853	OBT9163A	CE 10 μ 16V (BP)			
C744	OBT9852A	CF 4700P 50V J	C854,855	OBT9137A	CE 22 μ 25V (LN)			
	- Azimuth -		C857	OBT9288A	CC 1000P 50V K			
IC821	OB06443A	IC NJM082D	C859,860	OBT9490A	CP 0.015 μ 100V G			
IC822	OB06387A	IC NJM2043DD	CN5	OB08656A	2P-T Post			
IC823	OB06216A	IC μ PC4556C	CN6	OB08653A	3P-T Post			
IC824	OB06178A	IC μ PD4011BC						
IC825	OB06358A	IC μ PD4013BC	IC701,801	OB06144A	IC μ PD4066BC	CN19,33		
IC826	OB06144A	IC μ PD4066BC	IC901	OB06216A	IC μ PC4556C	CN20		
IC827	OB06124B	IC RC4558D	Q701,801	OBT1872A	TR 2SC945L (P,Q)	CN22,23		
Q821,822	OBT6013A	TR 2SA733 (P,Q)	901			30,31		
825,831			ZD701,801	OBT6058A	ZD 5.1V YZ051	CN24,25		
Q823,824	OBT1872A	TR 2SC945L (P,Q)	D701,702	OBT6181A	SID 1SS53	32,35		
828,829			703,801					
830,843			802,803					
Q832	OB06066A	TR 2SD471 (L,M)	901					
Q833	OB06069A	TR 2SB564 (L,M)	D902	OBT6398A	SID 1SS176			
Q840	OBT6299A	TR 2SC2878	VR701,703	OB07256A	Semi-fixed VR 10K			
ZD821	OBT6230A	ZD 5.1V RD5.1EB2	801,803					
ZD822	OBT6353A	ZD 6.2V RD6.2EB2	VR702,802					
			R701,801					
			R702,703					
			704,705					
			707,802					
			803,804					

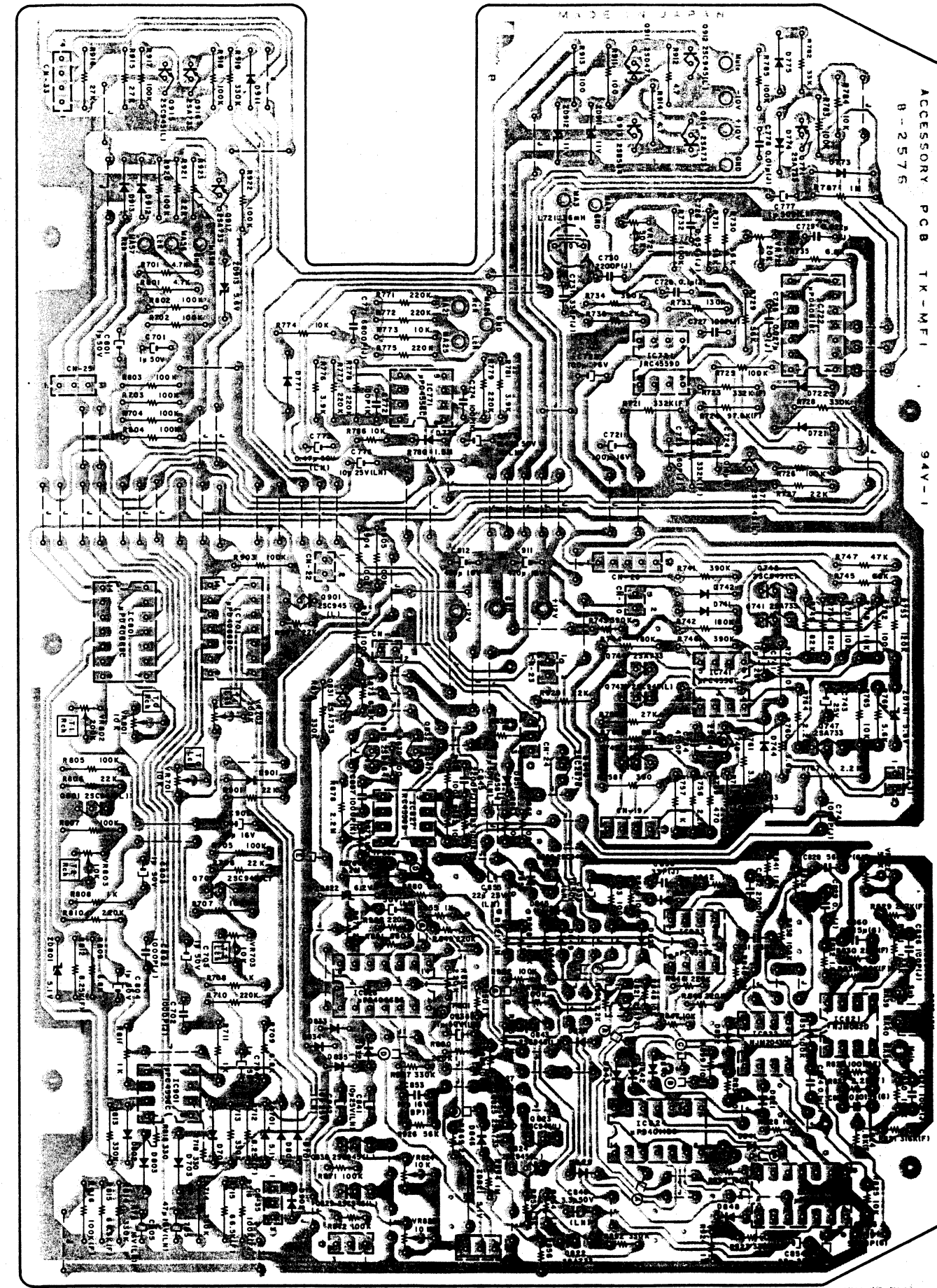


Fig. 6.15.1 Serial No.: A80102201 -

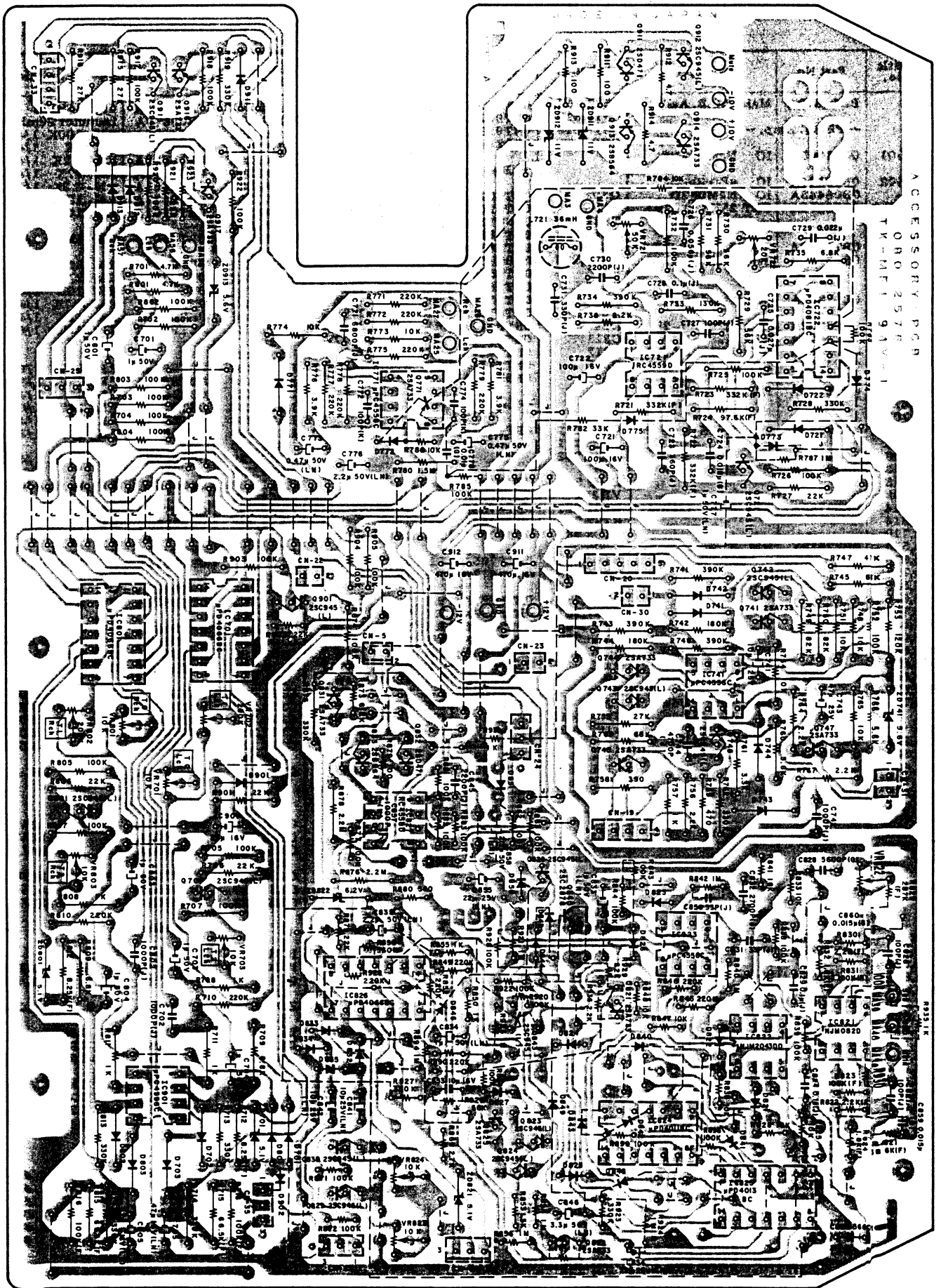


Fig. 6.15.2 Serial Nos.: A80101001 - A80102200

Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description						
	BA04870A	Main P.C.B. Ass'y	C517,617 C518,618 C519,619 CN2	OBT9410A OBT9322A OBT9286A OB02281A	CP 220P 100V G CP 330P 100V J CC 470P 50V K 4P-T Post	D102,202 L101,201 R101,201 R102,202 R103,203 R104,204 R106,206 R107,207 R108,120 R109,110 R111,211 R112,212 R114,214 R115,215 R116,216 R117,125 R118,218 R119,219 R121,221 R123,223 R124,224 R126,130 R127,129 R131,132 R133,233 R134,234 R135,235 R136,236 C101,115 C102,203 C103,203 C104,105 C106,206 C108,208 C109,209 C110,114 C111,211 C112,212 C116,216 C117,217 C118,122 C118,222 C119,121 C120,220 C123,223 C124,125 C126,226 C127,227 C128,228	OBT6398A OB06676A OBT1889A OBT1857A OBT5622A OBT5743A OBT1681A OBT9677A OBT9701A OBT9502A OBT9197A OBT9766A OBT1888A OB22305Y OB22351Y OBT9717A OBT9673A OBT9683A OB22443Y OBT9737A OBT5668A OBT5627A OBT5676A OB09162A OBT9705A OB22326Y OB22545A OBT9735A OBT9814A OBT9409A OBT9857A OBT9863A OBT9240A OBT9852A OBT1412A OBT9861A OBT9191A OBT9864A OBT9866A OBT9862A OBT9868A OBT9870A OBT9872A OBT5885A OBT9783A OBT9856A OB09302A	SiD 1SS176 Inductor 36mH G RK 100K 1/4W J RK 1K 1/4W J RK 2.2K 1/4W J RK 27K 1/4W J RK 3.3K 1/4W J RK 1K 1/6W J RK 10K 1/6W J RM 1M 1/4W F RM 820K 1/4W F RM 2.2M 1/4W F RK 10K 1/4W J RM 4.7K 1/4W F RM 12K 1/4W F RK 47K 1/6W J RK 680 1/6W J RK 1.8K 1/6W J RM 75K 1/4W F RK 330K 1/6W J RK 82K 1/4W J RK 330K 1/4W J RK 390K 1/4W J RF 82 1/4W J RK 15K 1/6W J RM 6.98K 1/4W F RM 10M 1/4W F RK 270K 1/6W J CE 1μ 50V (LN) CP 1800P 100V G CF 0.012μ 50V J CF 0.039μ 50V J CP 0.03μ 100V G CF 4700P 50V J CE 10μ 16V CF 0.027μ 50V J CP 4700P 100V G CF 0.047μ 50V J CF 0.068μ 50V J CF 0.033μ 50V J CF 0.1μ 50V J CF 0.15μ 50V J CF 0.22μ 50V J CE 100μ 10V CP 820P 100V J CF 0.01μ 50V J C 100P 50V J						
	- PB Eq. Amp. -													
IC301,501 601 IC502,602 IC701 Q501,502 601,602 701,702 ZD301 L501,502 601,602 701 VR501,502 601,602 VR701,702 R306 R307 R308 R341,342 R501,511 601,611 701,707 R502,512 602,612 702,708 R503,513 603,613 703,709 R504,514 604,614 704,710 R505,515 605,615 705,711 R506,516 606,616 706,712 R507,517 607,617 R508,518 608,618 R509,519 609,619 R715,716 C304 C305 C325,326 C501,504 601,604 701,703 C502,505 602,605 702,704 C503,506 603,606 705 CN3 CN4	OB11005A OB06144A OB06443A OB06376A OBT6418A OB06717A OB07256A OB32002A OBT5622A OBT9701A OBT1857A OBT9737A OBT9725A OB22296Y OB22104Y OB09785A OB22512Y OB22353Y OBT9661A OBT9669A OBT1682A OBT9653A OBT1412A OBT1400A OBT9291A OBT9933A OBT9312A OBT9851A OBL8654A OBL8642A	IC NJM072DE IC μPD4066BC IC NJM082D FET 2SK170 (GR) ZD 8.2V RD8.2JB2 Trap Unit Semi-fixed VR 10K Semi-fixed VR 2K RK 2.2K 1/4W J RK 10K 1/6W J RK 1K 1/4W J RK 330K 1/6W J RK 100K 1/6W J RM 3.92K 1/4W F RM 80.6 1/4W F RK 4.7M 1/4W J RM 316K 1/4W F RM 12.4K 1/4W F RK 220 1/6W J RK 470 1/6W J RK 6.8K 1/4W J RK 100 1/6W J CE 10μ 16V CE 100μ 16V CC 0.022μ 50V Z CE 2.2μ 50V (LN) CP 0.01μ 100V G CF 3900P 50V J 4P-T Post 6P-T Post	Q302 Q303 T301 R311 R312 R313,314 R315 R316 R317 R318 R343 C311 C312 C321 CN1 Q121,122 123,221 222,223 301 L102,202 VR301 R181,281 R182,282 R183,283 303 R184,284 R185,285 301,302 R186,286 R187,287 R188,288 R189,289 R190,290 R191 R291 R304 R305 C161,261 C162,262 C163,263 C164,264 C165,265 C166,266 C167,267 C301,302 C303 C320 Cds301	OB0613A OBT6202A OB06718A OBT1888A OBT5692A OB09936A OBT5575A OBT1681A OBT5560A OBT9701A OBT9661A OBT9405A OBT1400A OBT9844A OB08656A OBT1872A OB06690A OB07257A OBT9733A OBT9653A OBT9725A OBT9705A OBT9677A OBT9687A OBT9698A OBT5622A OBT9701A OBT5743A OBT5692A OBT5621A OBT9709A OBT9697A OBT9814A OB09247A OBT9932A OBT9849A OBT9845A OBT9288A OBT9270A OBT1400A OBT9850A OBT9290A OB06325B	TR 2SA733 (P,Q) TR 2SA562TM (Y) Bias Osc. Unit RK 10K 1/4W J RK 68K 1/4W J RF 10 1/2W J RK 560 1/4W J RK 3.3K 1/4W J RK 18K 1/4W J RK 10K 1/6W J RK 220 1/6W J CP 0.022μ 100V J CE 100μ 16V CF 1000P 50V J 2P-T Post TR 2SC945L (P,Q) L-C Block Semi-fixed VR 100K RK 220K 1/6W J RK 100 1/6W J RK 100K 1/6W J RK 15K 1/6W J RK 1K 1/6W J RK 2.7K 1/6W J RK 7.5K 1/6W J RK 2.2K 1/4W J RK 10K 1/6W J RK 27K 1/4W J RK 68K 1/4W J RK 120K 1/4W J RK 22K 1/6W J RK 6.8K 1/6W J CE 1μ 50V (LN) C 220P 50V J CE 22μ 16V (LN) CF 2700P 50V J CF 1200P 50V J CC 1000P 50V K CP 470P 100V J CE 100μ 16V CF 3300P 50V J CC 0.01μ 50V Z Photocoupler MCD7214F									
	- Rec. Eq. Amp. -													
IC302 Q503,504 603,604 L503,603 L504,604 R521,529 621,629 R522,622 R523,526 623,626 R524,624 R527,627 R528,628 R530,630 R531,631 R532,632 R533,633 R534,634 C327,328 C511,611 C512,520 612,620 C513,613 C514,614 C515,615 C516,616	OB06387A OBT6299A OB00068A OB06705A OBT9705A OBT5560A OBT9731A OBT9653A OB22410Y OBT2296Y OBT9749A OBT9673A OB2247Y OBT1888A OBT5936A OBT9749A OBT1405A OBT9862A OBT9814A OBT9815A OBT9867A OBT9854A OBT9850A	IC NJM2043DD TR 2SC2878 Trap Coil 10.5mH Trap Coil 1.05mH RK 15K 1/6W J RK 18K 1/4W J RK 180K 1/6W J RK 100 1/6W J RM 39.2K 1/4W F RM 3.92K 1/4W F RK 680 1/6W J RM 1.5K 1/4W F RK 10K 1/4W J RK 1M 1/4W J RK 1M 1/4W J CE 1μ 50V CF 0.033μ 50V J CE 1μ 50V (LN) CE 47μ 6.3V (LN) CF 0.082μ 50V J CF 6800P 50V J CF 3300P 50V J	IC303 Q505,605 D121,221 L504,604 R541,543 641,643 R542,546 642,646 R544,644 R545,645 R547,647 R548,648 C521,621 C522,622 C523,623 IC101,201 IC102,202 Q101,102 103,104 105,201 202,203 204,205 ZD101,102 201,202 D101,103 201,203	OB11004A OBT1872A OBT6398A OB06676A OBT5625A OBT1857A OBT9535A OBT9900A OBT9701A OBT9749A OBT9814A OBT9815A OBT9847A OB06382A OB06457A OBT1872A OB06382A OB06457A OBT1872A OBT6232A OBT6181A	IC NJM2041DD TR 2SC945L (P,Q) SiD 1SS176 Inductor 36mH G RK 220K 1/4W J RK 1K 1/4W J RM 9.76K 1/4W F RM 4.99K 1/4W F RK 10K 1/6W J RK 1M 1/6W J CE 1μ 50V (LN) CE 47μ 6.3V (LN) CF 1800P 50V J IC NE652 IC NJM072DD TR 2SC945L (P,Q) ZD 9.1V RD9.1EB2 SiD 1SS53	IC103,203 IC104,204 Q111-114 211-214 ZD106,107 206,207 D111,211 D112,212 R141,144 241,244 R142,242 R143,243 R145,245 R146,246 R147,247 R148,248 R149,249 R150,250 R151,251 R152,161 165,252 261,265 R153,253	OB06382A OB06457A OBT1872A OBT6232A OBT6181A OBT6398A OBT1889A OBT1857A OBT9588A OBT5615A OB22221Y OBT1888A OB22305Y OBT9796A OBT9717A OB22230Y OBT5627A OBT22443Y	IC NE562 IC NJM072DD TR 2SC945L (P,Q) ZD 9.1V RD9.1EB2 SiD 1SS53 SiD 1SS53 SiD 1SS176 RK 100K 1/4W J RK 1K 1/4W J RK 2.4K 1/4W J RK 22K 1/4W J RM 845 1/4W F RK 10K 1/4W J RM 4.7K 1/4W F RM 12K 1/4W F RK 47K 1/6W J RM 1.02K 1/4W F RK 330K 1/4W J RM 75K 1/4W F						

Schematic Ref. No.	Part No.	Description
R155,255	OBT9685A	RK 2.2K 1/6W J
R156,256	OBT9713A	RK 33K 1/6W J
R157,257	OBT9693A	RK 4.7K 1/6W J
R158,258	OBT9701A	RK 10K 1/6W J
R159,163	OBT5641A	RK 47K 1/4W J
259,263		
R160,260	OBT5668A	RK 82K 1/4W J
R162,164	OBT5676A	RK 390K 1/4W J
262,264		
R166,167	OB09162A	RF 82 1/4W J
266,267		
R168,268	OBT9749A	RK 1M 1/6W J
C131,231	OBT9933A	CE 2.2μ 50V (LN)
C133,233	OBT9852A	CF 4700P 50V J
C134,234	OBT9240A	CP 0.033μ 100V G
C135,140	OBT1412A	CE 10μ 16V
235,240		
329		
C136,144	OBT9866A	CF 0.068μ 50V J
236,244		
C137,237	OBT9814A	CE 1μ 50V (LN)
C139,239	OB09191A	CP 4700P 100V G
C141,241	OBT9286A	CC 470P 50V K
C142,242	OBT9856A	CF 0.01μ 50V J
C143,243	OBT9864A	CF 0.047μ 50V J
C145,149	OBT9862A	CF 0.033μ 50V J
245,249		
C146,148	OBT9868A	CF 0.1μ 50V J
246,248		
C147,247	OBT9870A	CF 0.15μ 50V J
C150,250	OBT9872A	CF 0.22μ 50V J
C151,152	OBT5885A	CE 100μ 10V
251,252		
C153,253	OB09302A	C 100P 50V J
C154,254	OBT9262A	CP 3000P 100V J
C310	OBT1405A	CE 1μ 50V
— Logic Interface —		
Q304,307	OBT1872A	TR 2SC945L (P,Q)
308		
Q305,306	OBT6013A	TR 2SA733 (P,Q)
D301,302	OBT6181A	SID 1SS53
304,305		
313,314		
D303,311	OBT6398A	SID 1SS176
312		
R318,320	OBT1889A	RK 100K 1/4W J
322,326		
R319	OBT5509A	RK 33K 1/4W J
R321,331	OBT5641A	RK 47K 1/4W J
332		
R323	OBT1888A	RK 10K 1/4W J
R324	OBT5743A	RK 27K 1/4W J
R325	OBT1857A	RK 1K 1/4W J
R327	OBT9717A	RK 47K 1/6W J
R328	OBT5575A	RK 560 1/4W J
R333,334	OBT9749A	RK 1M 1/6W J
C313,314	OB01406A	CE 2200μ 16V
C322,323	OBT9292A	CC 0.1μ 50V Z
324		
— Headphone Amp. —		
IC304	OB06217A	IC NJM4560D
Q506,606	OB06066A	TR 2SD471 (L,M)
Q507,607	OB06069A	TR 2SB564 (L,M)
R551,651	OBT9653A	RK 100 1/6W J
R552,553	OBT1889A	RK 100K 1/4W J
652,653		
R554,654	OBT9645A	RK 47 1/6W J
R555,655	OB09331A	RF 8.2 1/4W J
C531,631	OBT9277A	CC 10P 50V J
C315,316	OBT1405A	CE 1μ 50V
— Miscellaneous —		
CN21,37	OB02575B	Main P.C.B.
CN36	OB02348A	3P-JP Connector
FC21	OB02350A	5P-JP Connector
FC30	OB05343B	3P Flat Cable
FC31	OB05334B	2P Flat Cable
FC32,47	OB82032A	2P Flat Cable
FC33	OB05342B	3P Flat Cable
FC37	OB05356B	4P Flat Cable
FC46	OB05341B	3P Flat Cable
FC48	OB05344B	3P Flat Cable
FC49	OB05347B	3P Flat Cable
	OB05335B	2P Flat Cable
	OB08515A	Insu-Lock (5)

Schematic Ref. No.	Part No.	Description
	OB08676B	Heat Sink A304 (1)
	OM04238A	Label CN-26 (1)
	OM04239A	Label CN-27 (1)
	OM04439A	Label CN-30 (1)
	OM04247A	Label CN-31 (1)
	OM04248A	Label CN-32 (1)
	OM04249A	Label CN-33 (1)
	OE00612A	M3x6 @ Pan (2A)
	OE00857A	BT 3x6 @ Binding (Chromate) (2)
	OJ03834C	Fuse P.C.B. Holder (1)

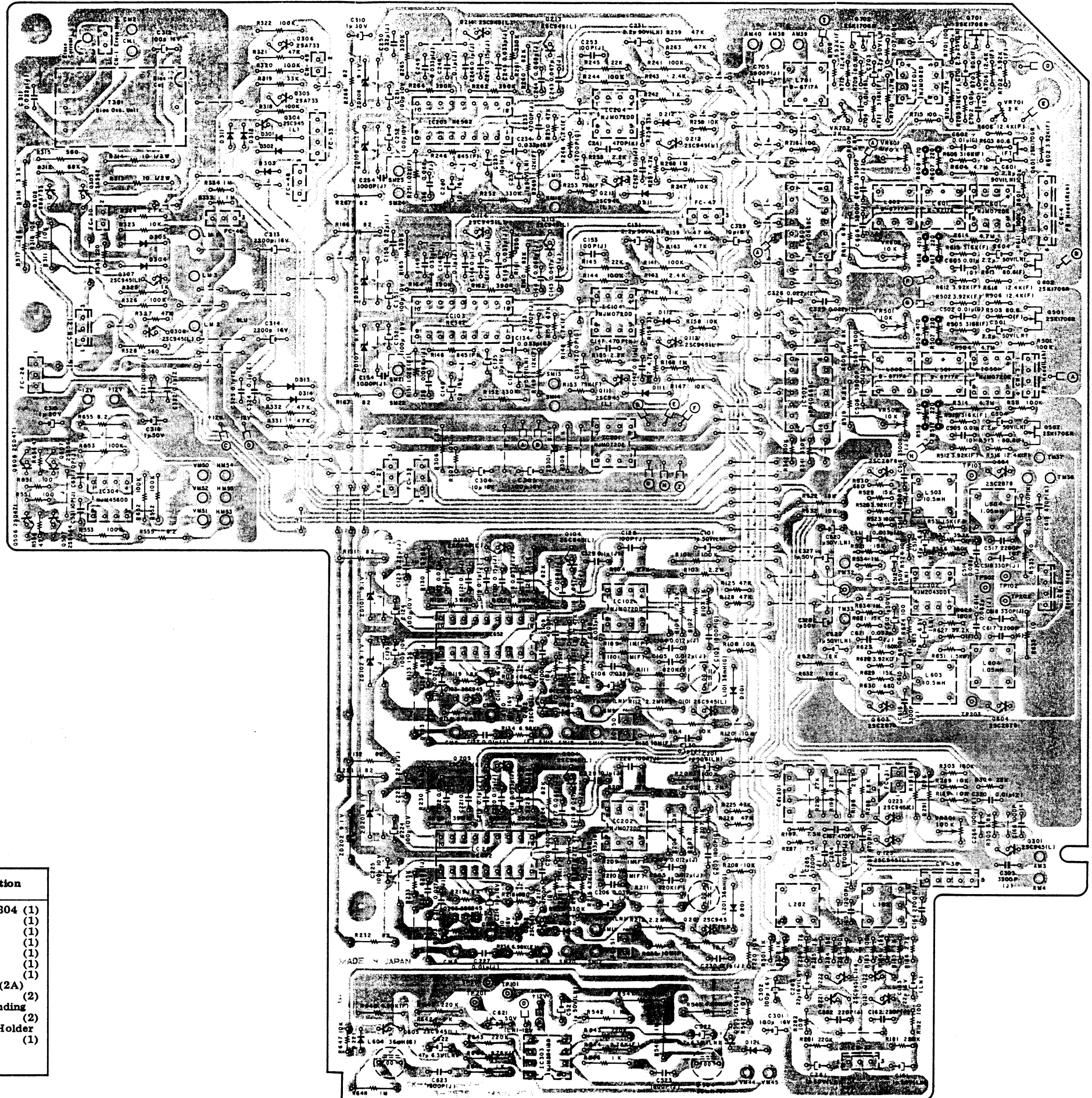


Fig. 6.16.1 Serial No.: A80102201 -

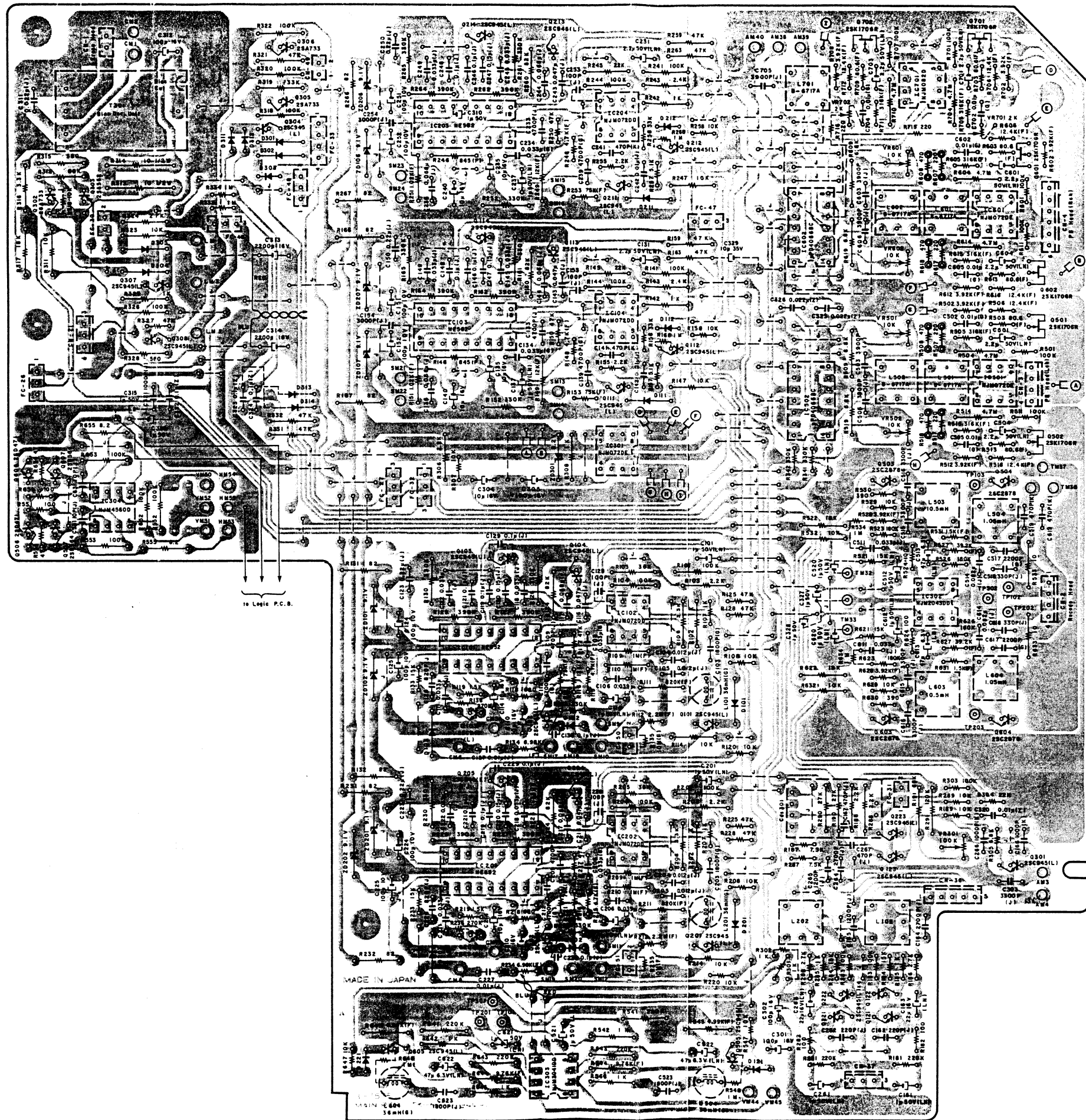


Fig. 6.16.2 Serial Nos: A80101001 - A80102200

7. SCHEMATIC DIAGRAMS

7.1. Attention to Servicemen

(1) **Parts Replacement**
 Following parts shall be replaced with the specified ones.
 Refer to the parts list.

- (a) **Power Supply Circuit**
 Power Cord
 Power Transformer: T1
- (b) **Power Switch P.C.B. Ass'y**
 Power Switch: SW1
 Spark Killer: M2
- (c) **Fuse P.C.B. Ass'y**
 Fuses: F01, 02, 03
- (d) **Logic P.C.B. Ass'y**
 Power Transistors: Q401, 402, 405, 406, 410, 412, 413,
 416, 609, 610, 615, 616
 Diode Bridges: D401, 404
 Fail Safe Type Resistors: R432, 433, 731
- (e) **Main P.C.B. Ass'y**
 Power Transistors: Q303, 506, 606
 Fail Safe Type Resistors: R131, 132, 166, 167, 231, 232,
 266, 267, 313, 314, 555, 655
- (f) **Auto Azimuth P.C.B. Ass'y**
 Power Transistors: Q832, 833, 911, 913
 Fail Safe Type Resistors: R911, 912, 913, 914
- (g) **Motor Control P.C.B. Ass'y**
 Power Transistors: Q518, 519, 520, 521, 522, 523, 524,
 525, 526
 Fail Safe Type Resistors: R572, 573, 582, 583
- (h) **Shut-off P.C.B. Ass'y**
 Fail Safe Type Resistor: R605
 Lamp: PL602
- (i) **Counter Pulse Generator P.C.B. Ass'y**
 Fail Safe Type Resistor: R601
 Lamp: PL601

(2) Insulation Check

Before returning the repaired Nakamichi DRAGON to a customer,
 check to insure that the exposed parts are accurately insulated
 from the AC line by measuring the leakage current or the insula-
 tion resistance between them.

7.2. IC Block Diagrams

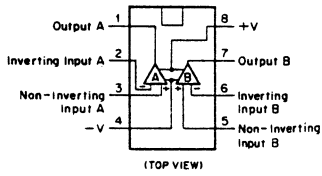


Fig. 7.2.1 Operational Amp IC 4558D, 4559D, 4560D, 4556C, 2041DD, 2043DD, 082D, 072D

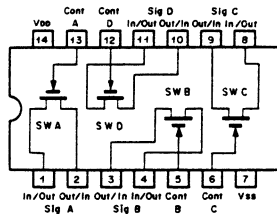


Fig. 7.2.2 Bilateral Switch C-MOS IC μ PD4066BC

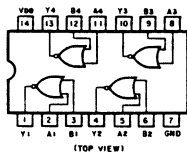


Fig. 7.2.3 NOR Gate C²-MOS IC TC40H002P

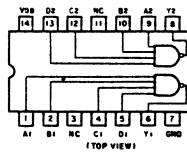


Fig. 7.2.4 NAND Gate C²-MOS IC TC40H020P

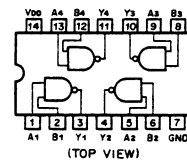


Fig. 7.2.5 NAND Gate C-MOS IC μ PD4011BC

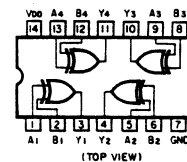


Fig. 7.2.6 Exclusive OR Gate C-MOD IC μ PD4030BC

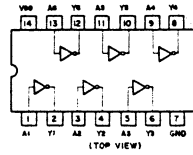


Fig. 7.2.7 Inverter C-MOS IC TC4069UBP

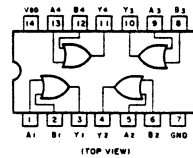


Fig. 7.2.8 OR Gate C-MOS IC μ PD4071BC

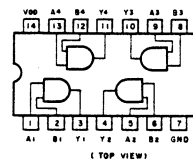


Fig. 7.2.9 AND Gate C-MOS IC μ PD4081BC

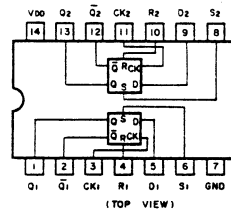


Fig. 7.2.10 D-Type Flip-Flop C-MOS IC μ PD4013BC

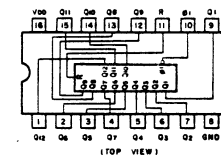


Fig. 7.2.11 Decoder C-MOS IC μ PD4040BC

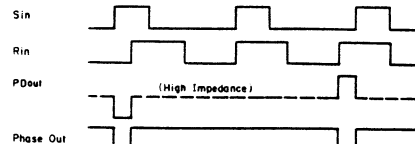
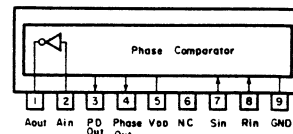


Fig. 7.2.12 Phase Comparator TC5081P

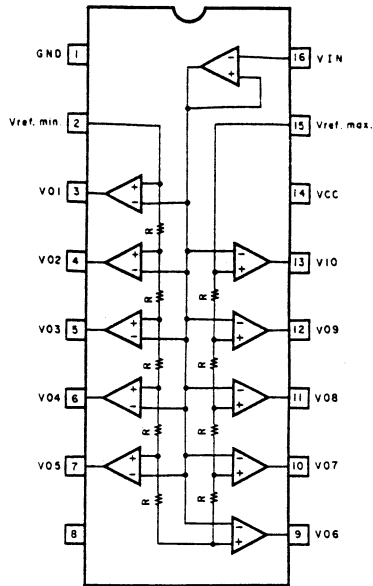


Fig. 7.2.13 Level Meter Driver TA7612AP

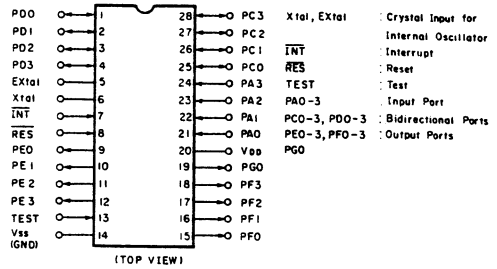
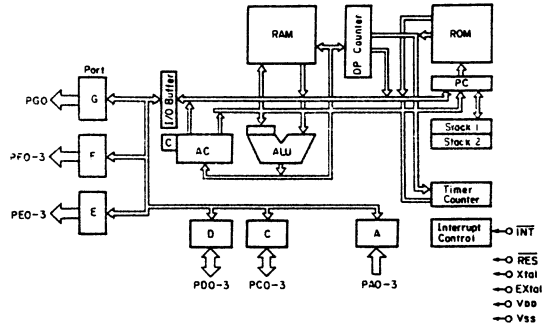


Fig. 7.2.15 4-Bit Micro-processor LM6416E

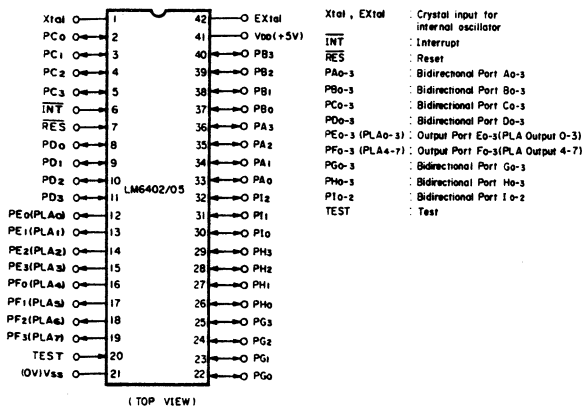
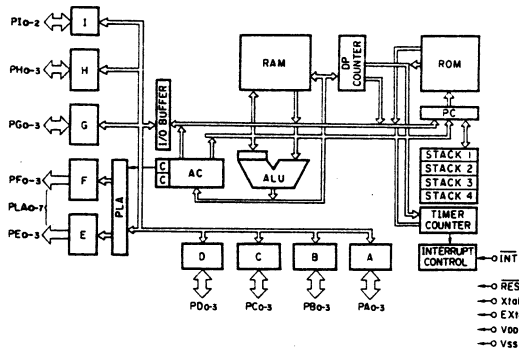
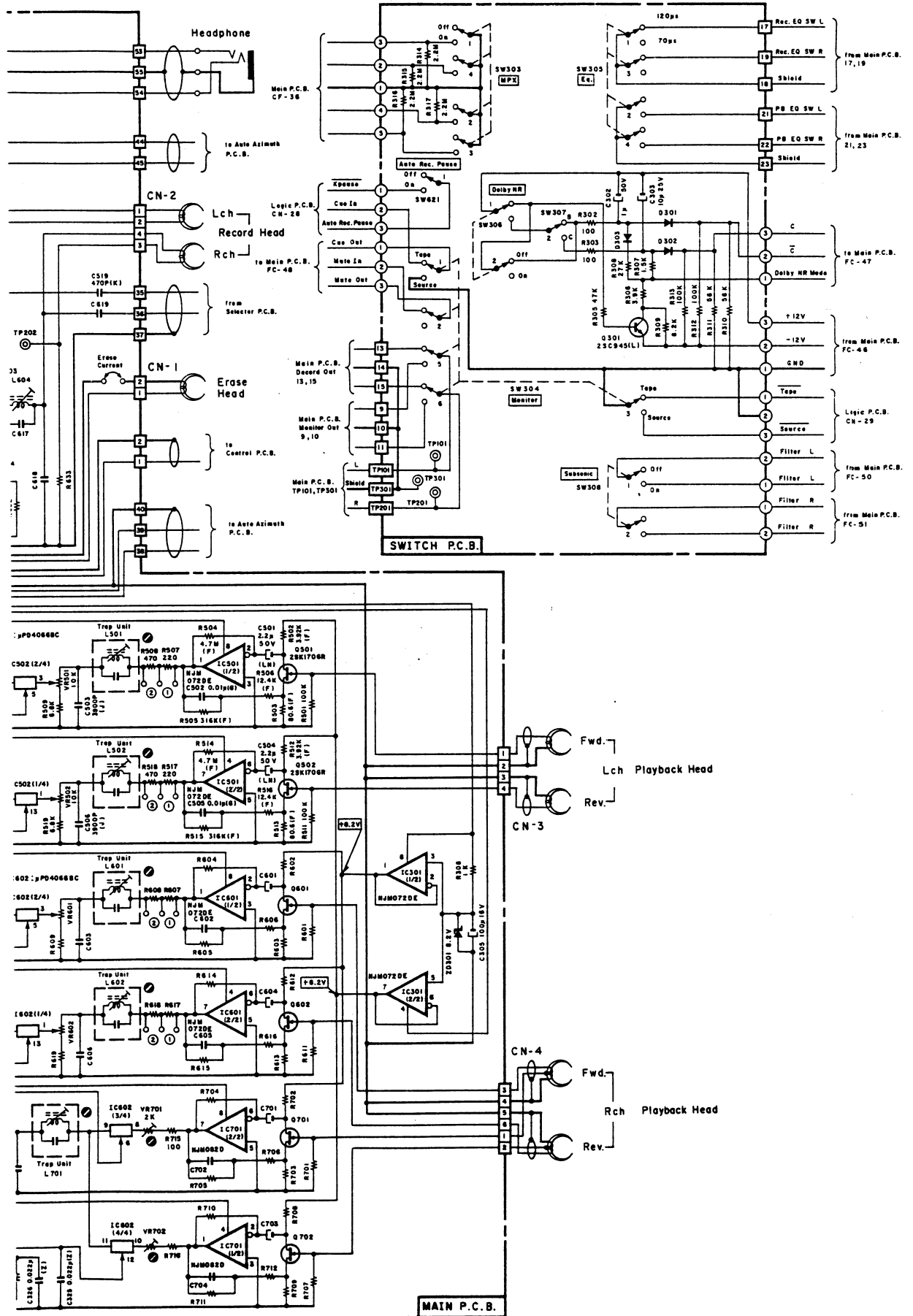


Fig. 7.2.14 4-Bit Micro-processor LM6402A

- Notes: 1. Diode is 1SS53, 1S1555, or 1SS176 unless otherwise specified.
 2. Resistor and capacitor marked with * show typical value.

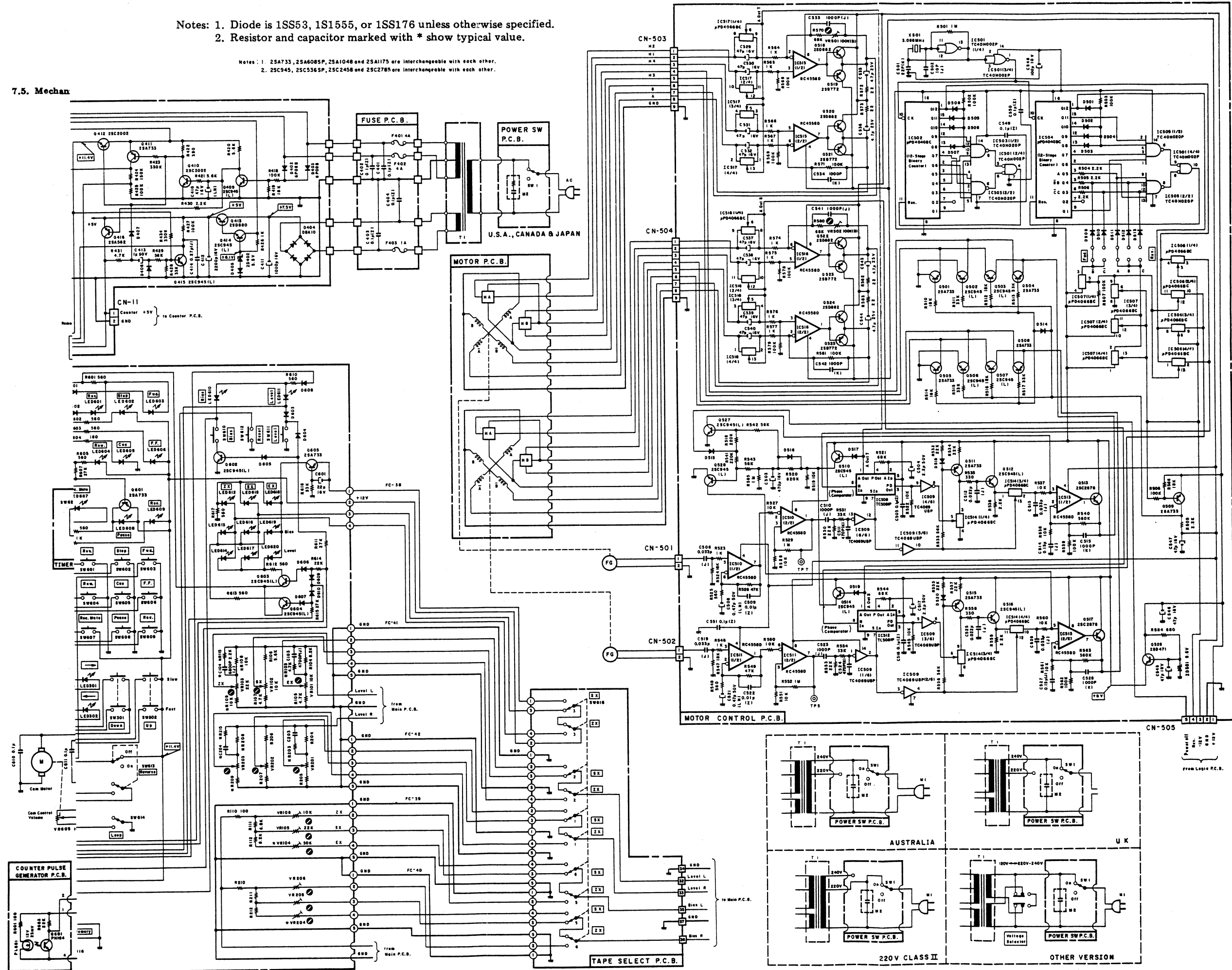
Notes: 1. 2SA733, 2S A6085P, 2SA1048 and 2SA1175 are interchangeable with each other.
 2. 2SC945, 2SC3365P, 2SC2458 and 2SC2785 are interchangeable with each other.



Notes: 1. Diode is 1SS53, 1S1555, or 1SS176 unless otherwise specified.
 2. Resistor and capacitor marked with * show typical value.

Notes: 1. 25A733, 25A6085P, 25A1048 and 25A1175 are interchangeable with each other.
 2. 25C945, 25C5365P, 25C2458 and 25C2785 are interchangeable with each other.

7.5. Mechan



7.5. Mechanism Control Section

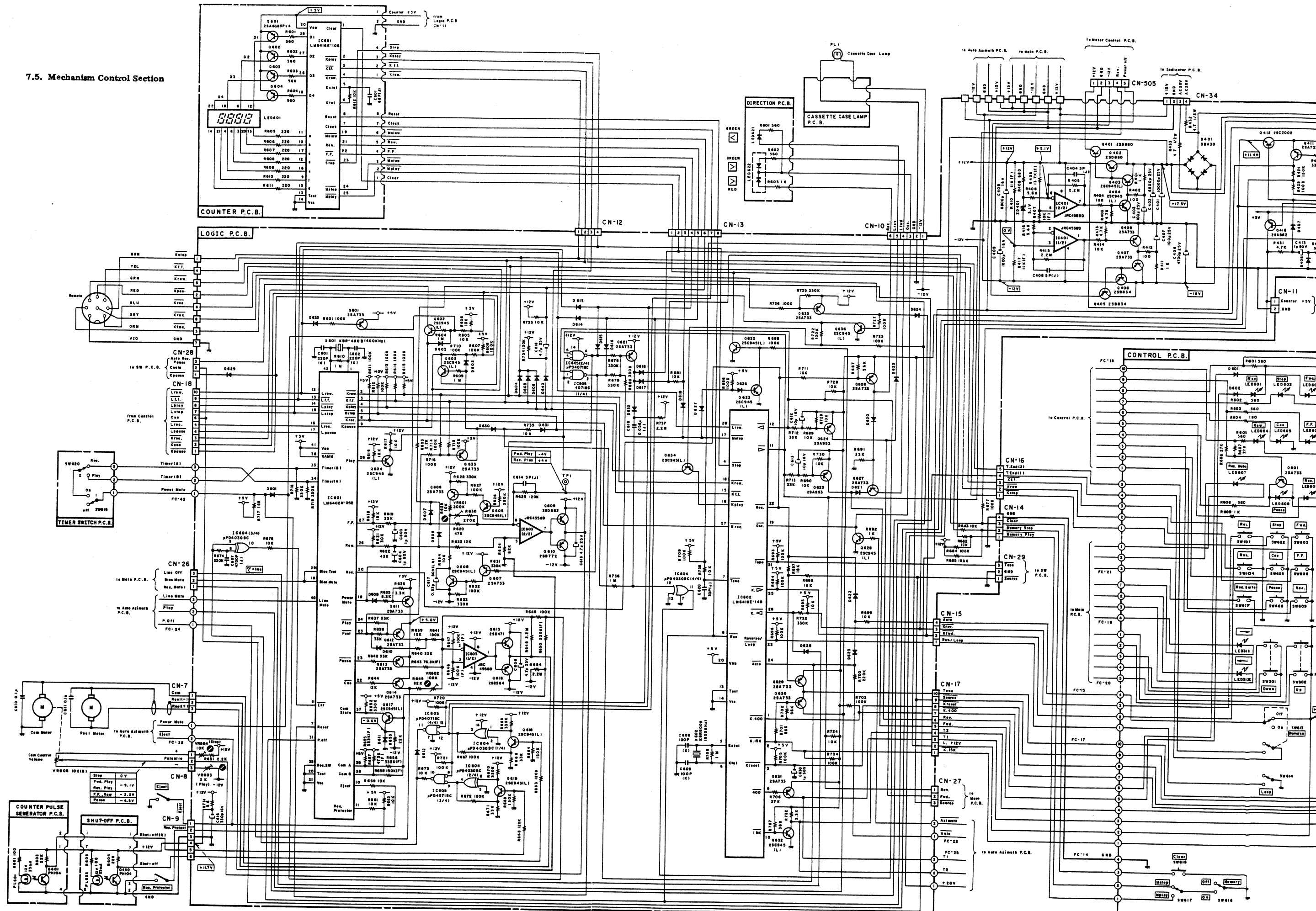
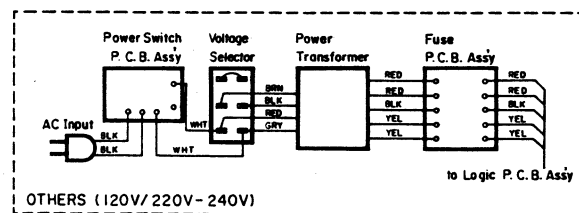
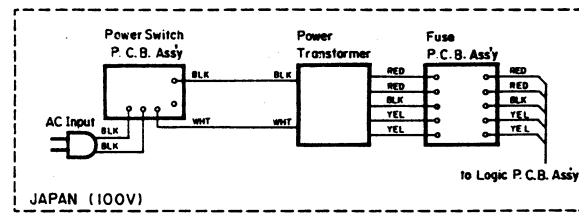
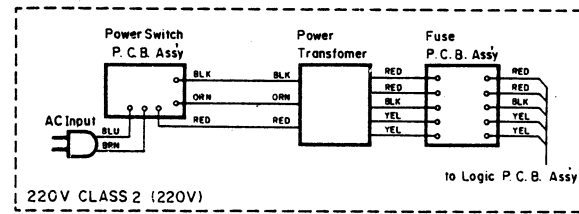
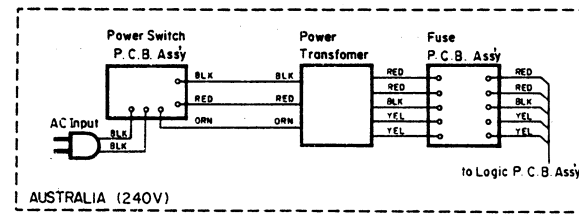
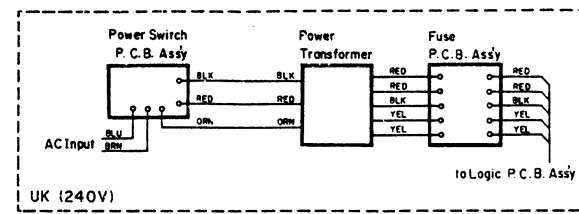


Fig. 7.5

8. WIRING DIAGRAM



Notes: 1. Table of wire colors

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

- 2. Dip side view of the P.C.B. is illustrated.
- 3. Wire tube color is shown in ().

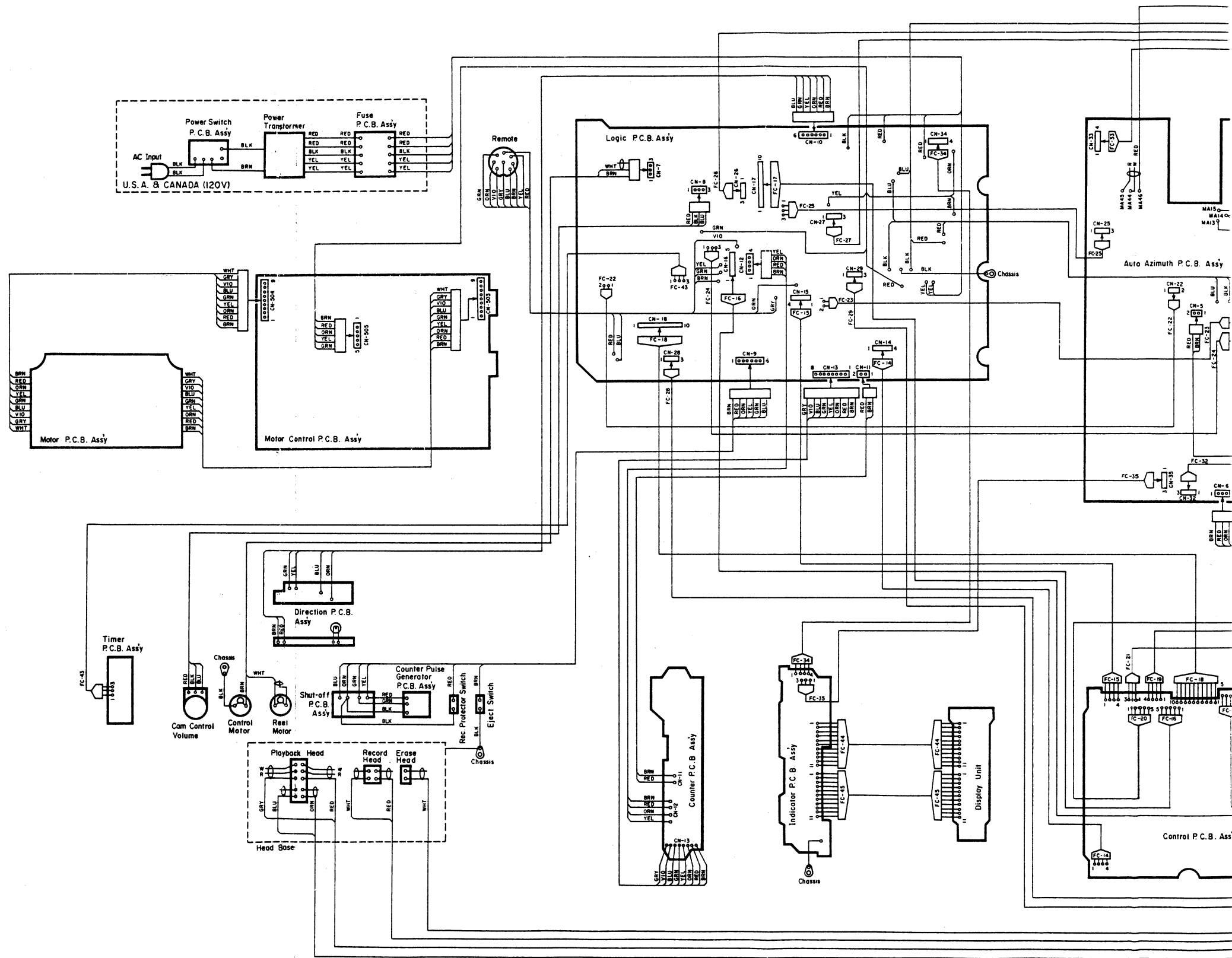
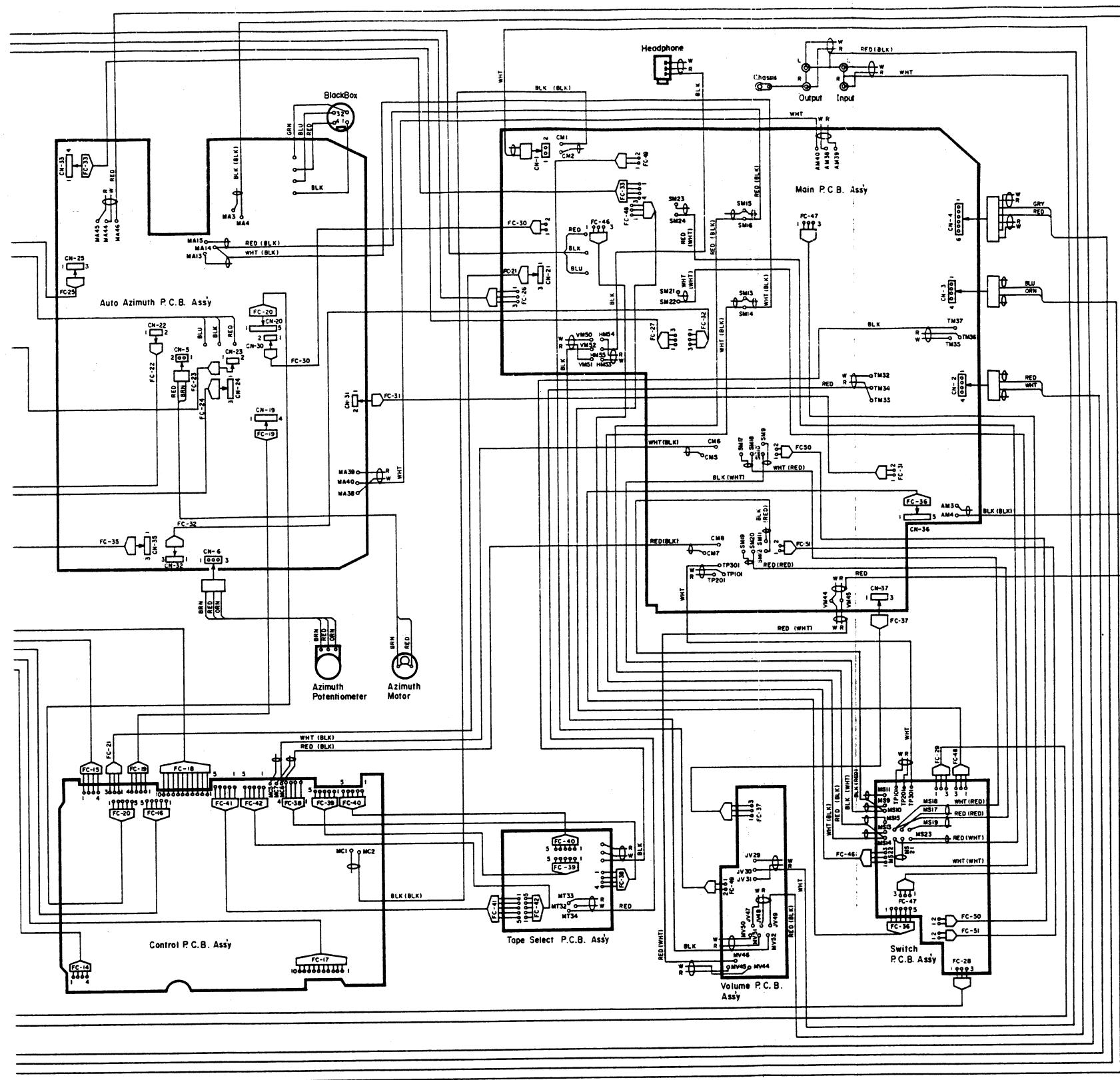


Fig. 8

9. TIMING CHART AND EQ. AMP. FREQUENCY RESPONSE



9.1. Overall Timing Chart

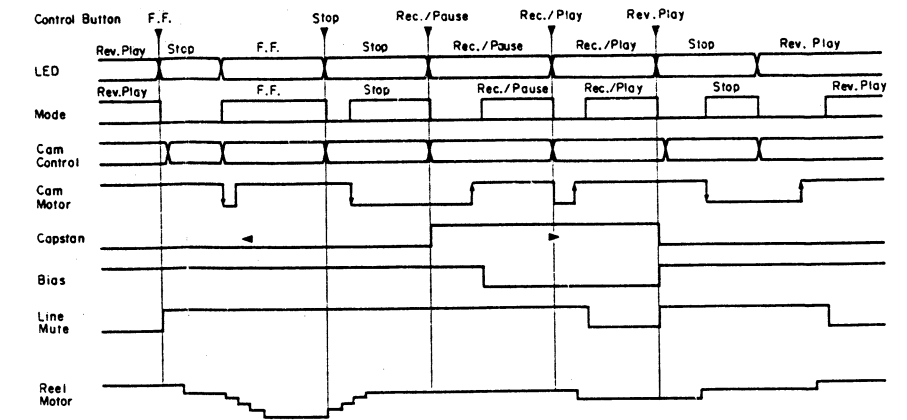


Fig. 9.1

9.2. Eq. Amp. Frequency Response
(1) Playback Frequency Response

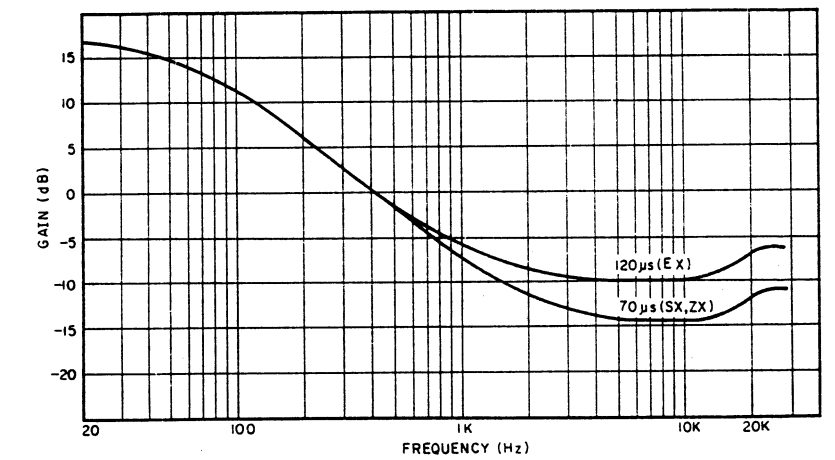


Fig. 9.2.1

(2) Record Current Frequency Response

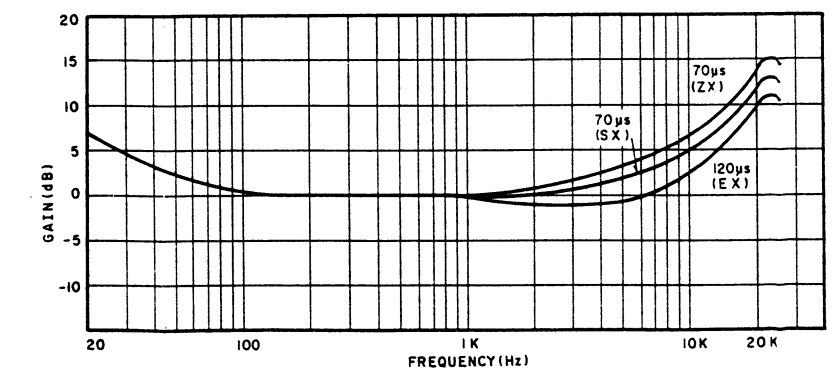


Fig. 9.2.2

10.2. Mechanism Control Section

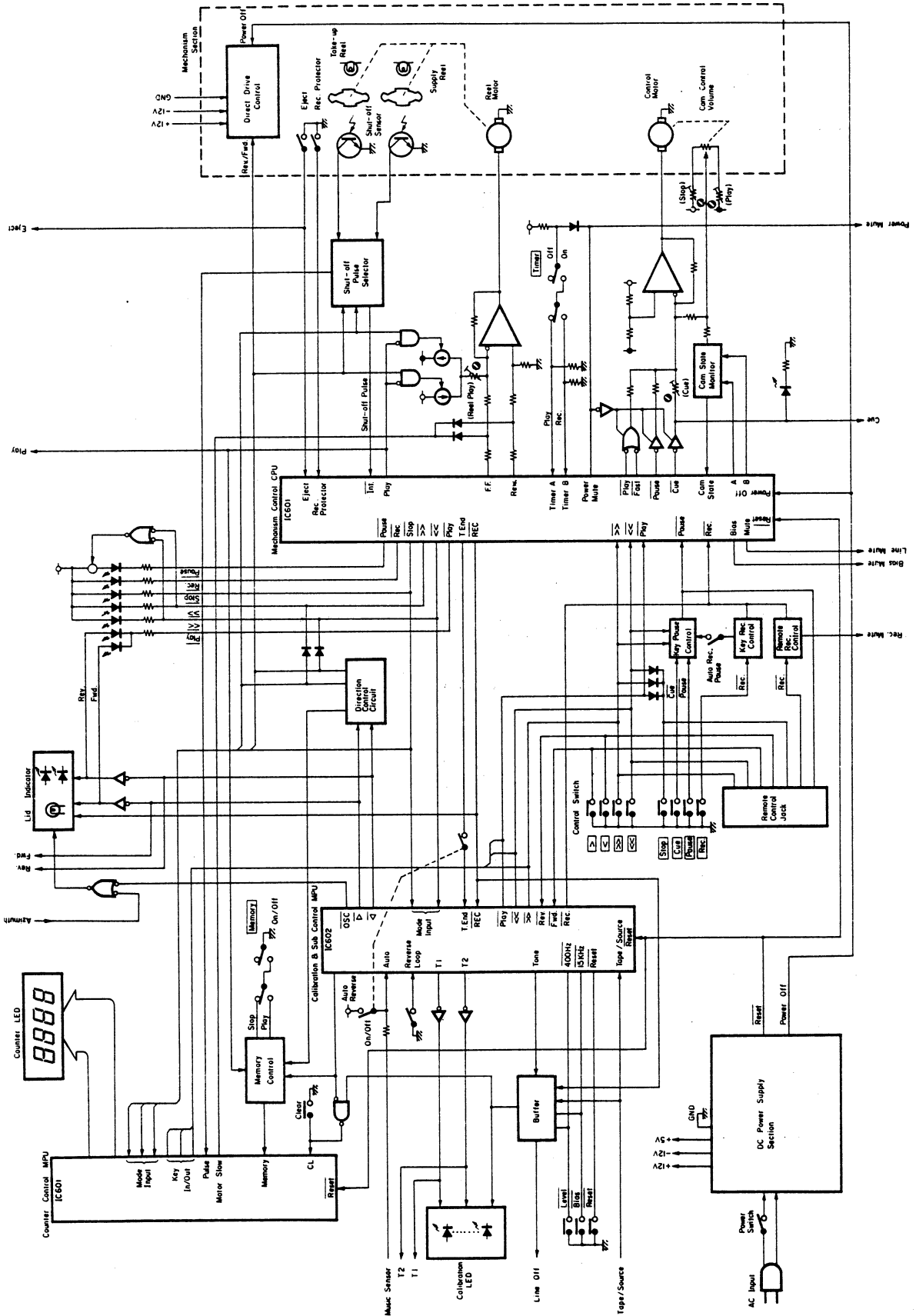


Fig. 10.2

11. SPECIFICATIONS

Track Configuration	4 Tracks/2-Channel Stereo (Playback auto reverse)
Heads	3 (Erase Head x 1, Record Head x 1, 4-Track, 4-Channel Playback Head x 1)
Motors	<ul style="list-style-type: none"> ● TRANSPORT Quartz PLL DC, Brushless, Slotless, Coreless, Super Linear Torque D.D. Motor (Capstan Drive) x 2 DC Motor (Reel Drive x 1) ● AUTO AZIMUTH CORRECTION DC Motor x 1 ● MECHANISM DC Motor x 1
Power Source	100, 120, 120/220-240, 220 or 240 V AC; 50/60 Hz (According to country of sale)
Power Consumption	45 W max.
Tape Speed	1-7/8 ips (4.8 cm/sec.)
Wow and Flutter	Less than 0.019% Wtd rms Less than 0.04% Wtd peak
Frequency Response	20 Hz—22,000 Hz ± 3 dB (recording level -20 dB, ZX Tape) 20 Hz—21,000 Hz ± 3 dB (recording level -20 dB, SX, EXII Tape)
Signal to Noise Ratio	Dolby C-Type NR on $<70 \mu s$, ZX Tape Better than 72 dB (400 Hz, 3% THD, IHF A-Wtd rms) Dolby B-Type NR on $<70 \mu s$, 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% (400 Hz, 0 dB, SX, EXII Tape)
Erasure	Better than 60 dB (100 Hz, 0 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, 50 k ohms
Output (Line)	1 V (400 Hz, 0 dB, Output Level Control at max.) 2.2 k ohms
(Headphones)	45 mV (400 Hz, 0 dB, output level control at max.) 8 ohms
BlackBox Series DC Output	± 10 V, 125 mA max.
Dimensions	450 (W) x 135 (H) x 300 (D) millimeters 17-3/4 (W) x 5-5/16 (H) x 11-13/16 (D) inches
Approximate Weight	9.5 kg 21 lb.

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