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**SERVICE
MANUAL 5220**

marantz

model 5220

Stereo Cassette Deck

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INTRODUCTION

The service manual was prepared for use by Authorized Warranty Stations and contains service information for the Marantz Model 5220 Stereo Cassette Deck.

Servicing information and voltage data included in this manual are intended for use by the knowledgeable and experienced technician only. All instructions should be read carefully. No attempt should be made to proceed without a good understanding of the operation in the Cassette Deck.

The parts list furnishes information by which replacement parts may be ordered from the Marantz Company. A simple description is included for parts which can be usually obtained through local suppliers.

1. SERVICE NOTE

As can be seen from the circuit diagram, the chassis of Model 5220 consists of following units. Each unit mounted on a printed circuit board is described within the square enclosed by a bold dotted line on the circuit diagram.

1. Pre-Amp. mounted on P.W. Board, P100
2. Power Supply mounted on P.W. Board, P400
3. Lamp mounted on P.W. Board, P650
4. Switch mounted on P.W. Board, P500
5. Terminals mounted on P.W. Board, P700
6. Dolby mounted on P.W. Board, P800
7. Volume mounted on P.W. Board, P600

2. TEST EQUIPMENT REQUIRED FOR SERVICING REPLACEMENT

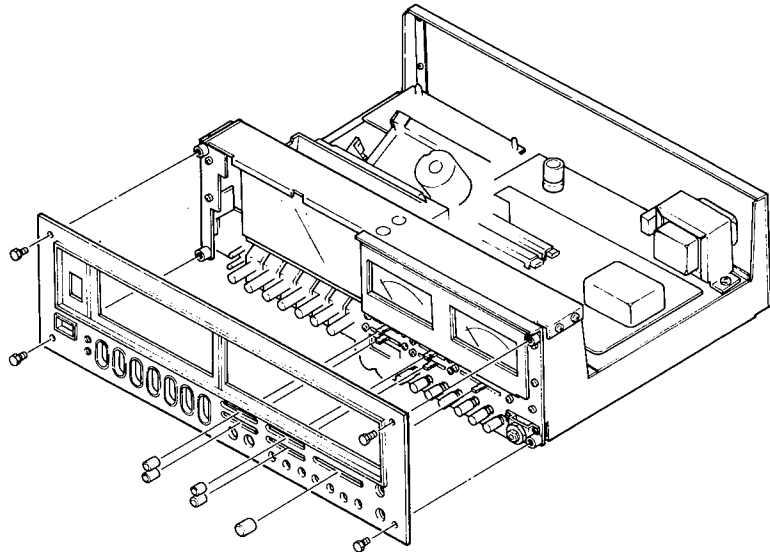
For measuring or checking the Model 5220, the following instruments and materials are necessary.

VTVM		Blank Tapes
Audio Oscillator	(of OSC)	Digital Frequency Counter
Attenuator	(600 Ω)	Distortion Meter
Oscilloscope		Test Tapes
Bandpass Filters	(1kHz, 500Hz)	
Wow and Flutter Meter		
Torque Meter		

3. DISASSEMBLING INSTRUCTIONS FOR MODEL 5220

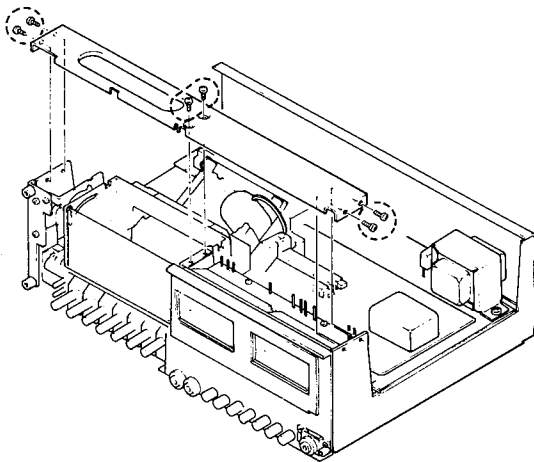
1. Demounting the Front Panel

Remove the five knobs. Unscrew the four hexagon nuts. The front panel, then, will be removed as illustrated in the line drawing below.

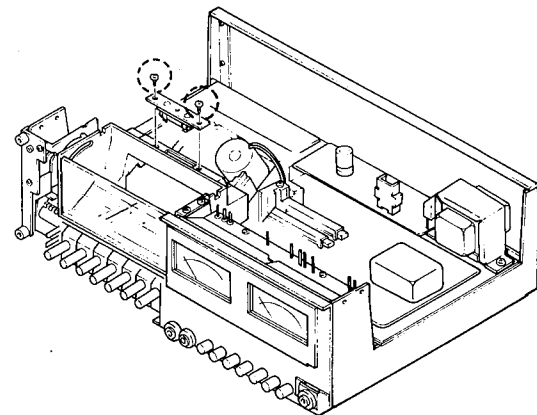


2. Demounting the Cassette Compartment for Repairing Around Head

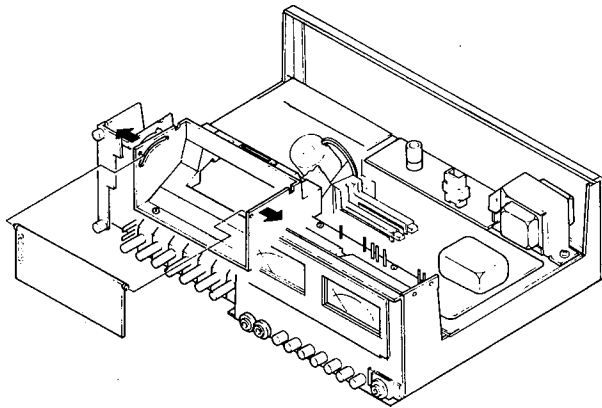
2-1. Unscrew the six screws. Remove the upper supporting plate as illustrated below.



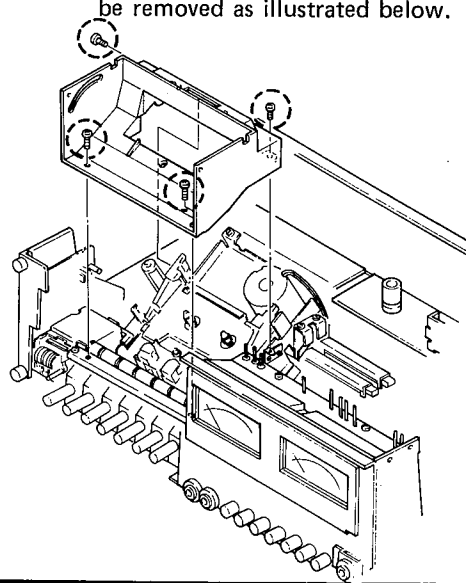
2-2. Remove the lamp holder located on the top of the cassette compartment as illustrated below.



2-3. Press the cassette compartment in the arrow direction by finger as illustrated below. The cassette lid, then, will be removed.

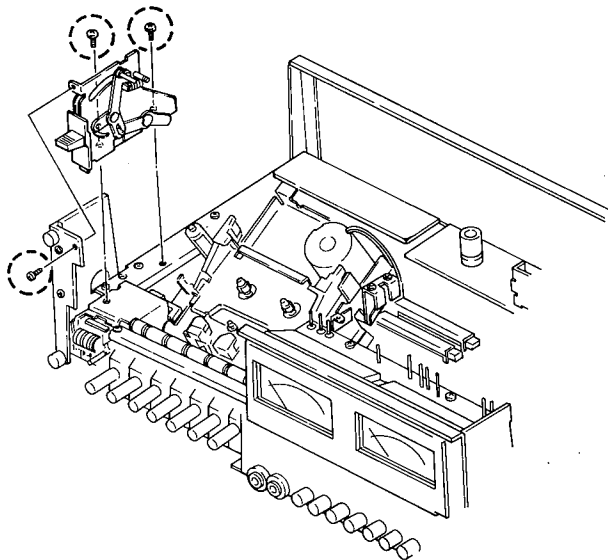


2-4. Unscrew the four screws holding the cassette compartment. The cassette compartment, then, will be removed as illustrated below.

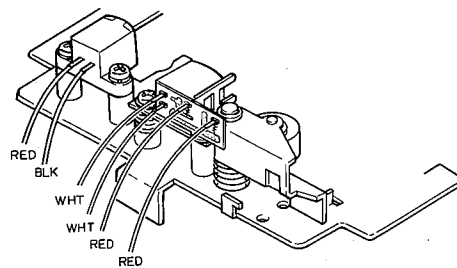


3. Demounting the Tape Mechanism Block

3-1. Unscrew the three screws holding the door open arrangement. The arrangement, then, will be removed as illustrated below.



3-2. Disconnect the head lead wires as illustrated below.



3-3. Unscrew the four screws holding the tape mechanism block.

Unscrew the screw A holding the Muting switch. In turn, turn the recorder body upside down, and disconnect the two connectors located on the bottom of the recorder body (Fig. A).

Unscrew the screws B and C holding the tape mechanism block on the bottom. The block, then, will be removed from the recorder body as illustrated in Fig. B.

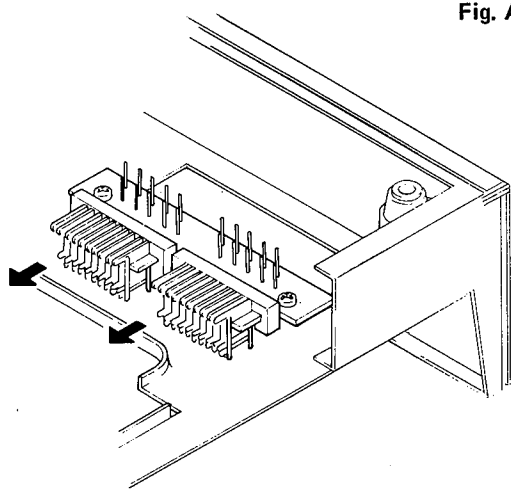


Fig. A

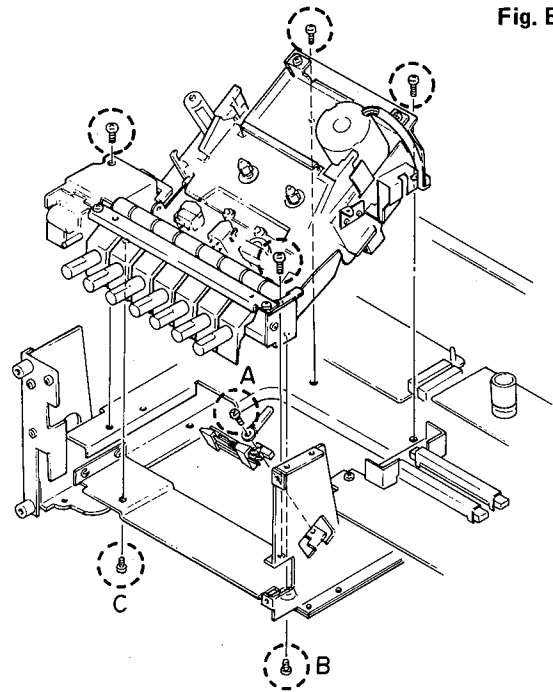
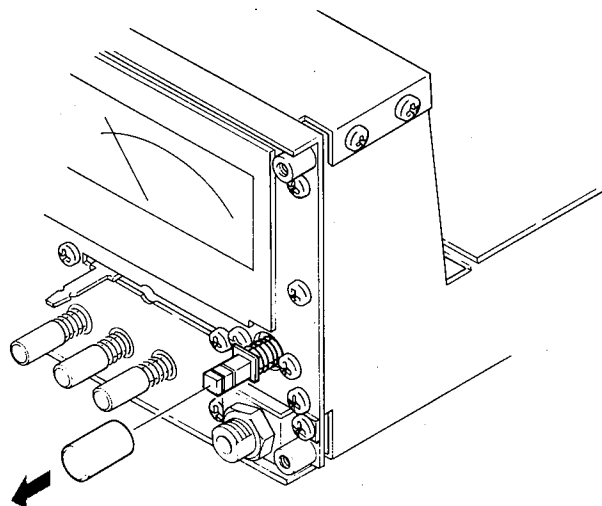


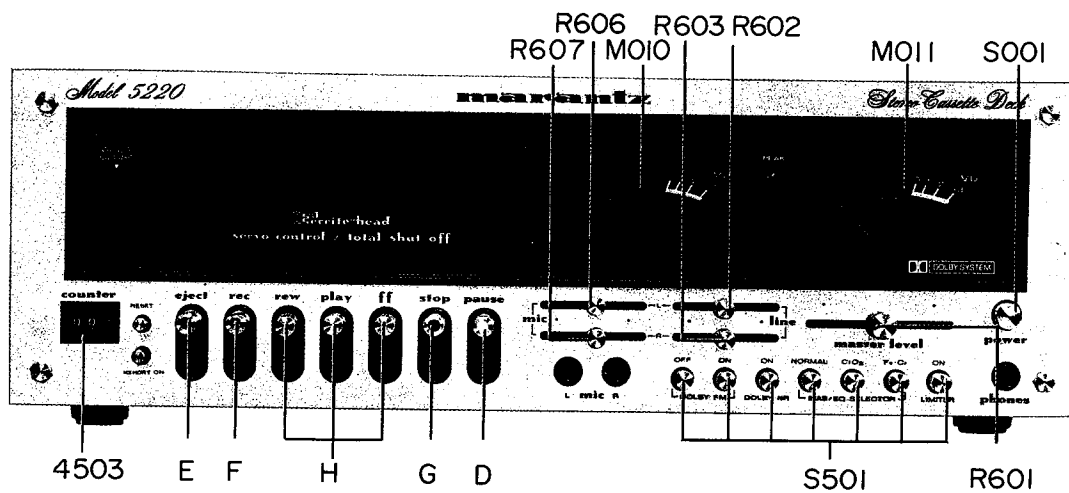
Fig. B

4. Replacing the Push-Switch Knob

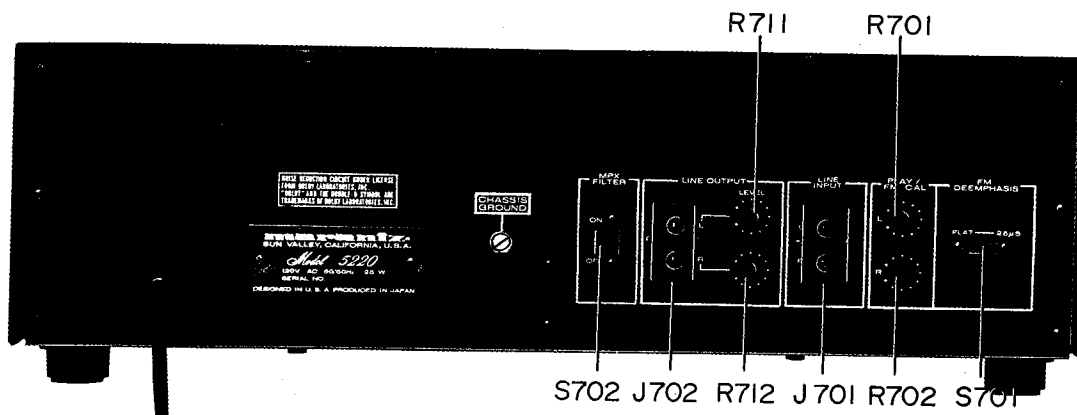
Set the push switch in the "off" state. Forcibly pull the knob in the arrow direction as illustrated below. The knob, then, will be removed.



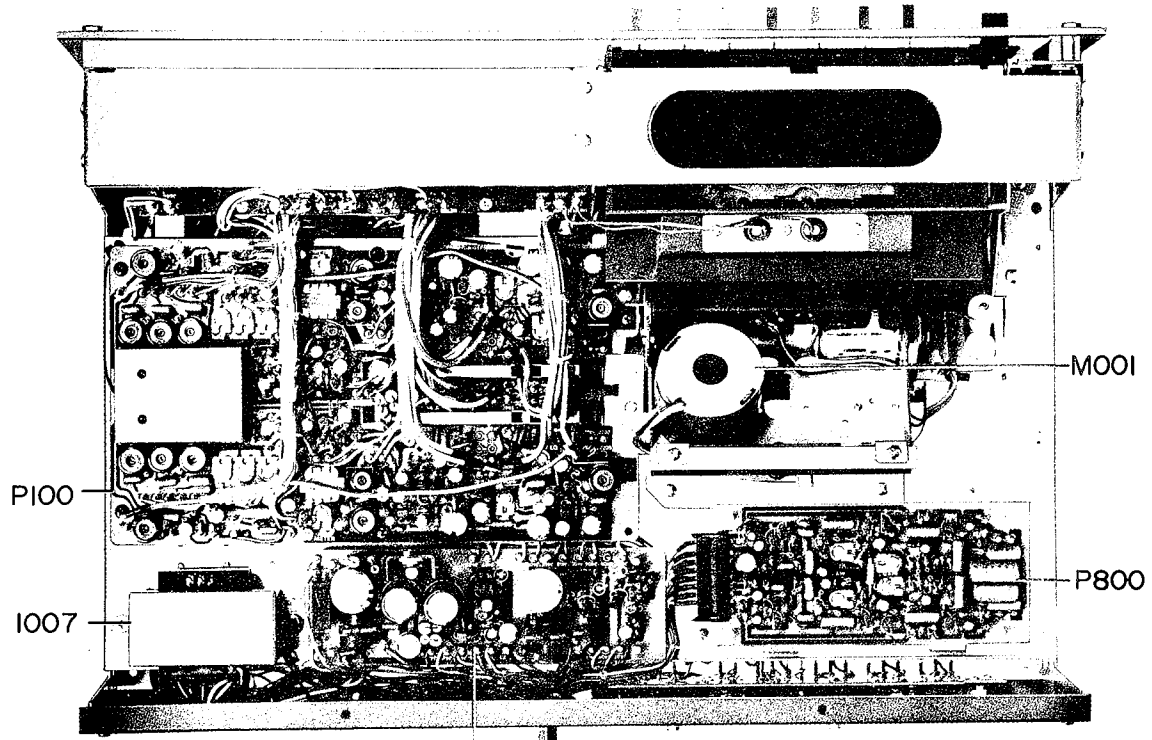
4. MAJOR PARTS LOCATIONS



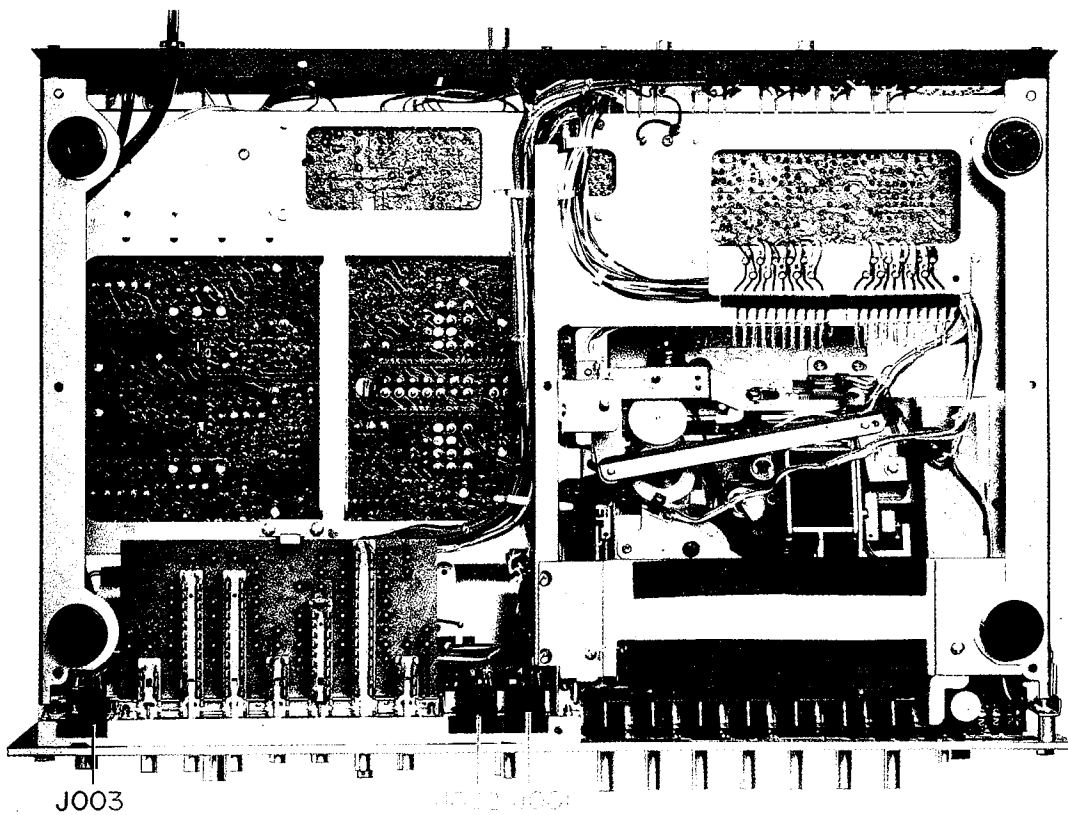
— Front View —



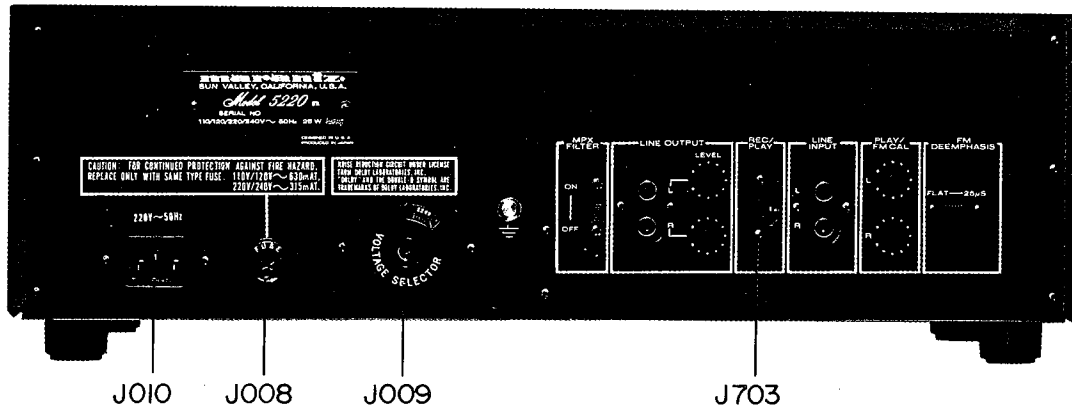
— Rear View —



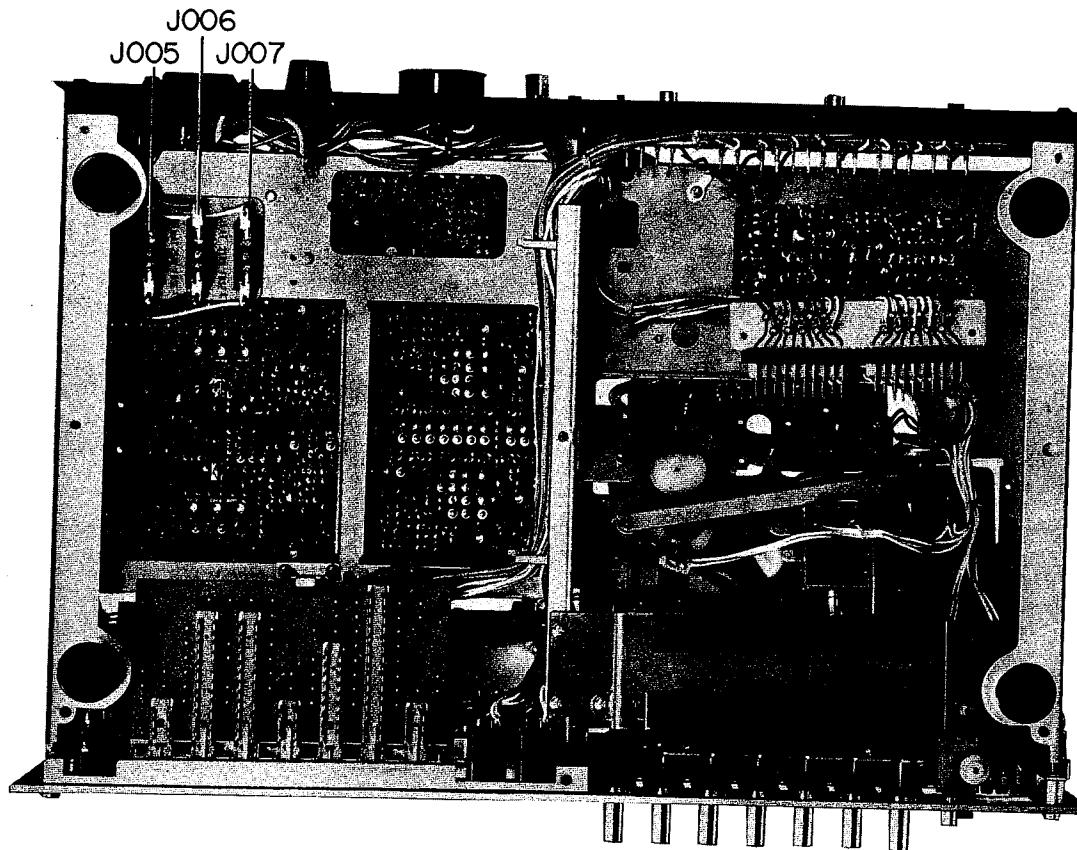
Chassis — Top View —



Chassis — Back View —



— Rear View —
(for Europe)



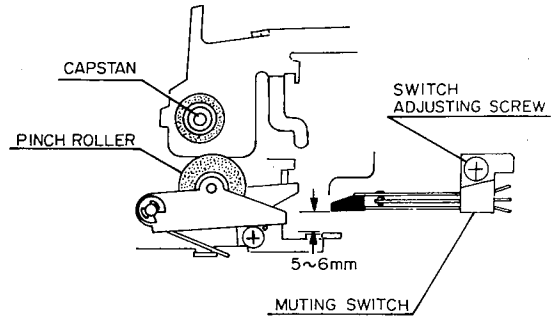
— Back View —
(for Europe)

5. ADJUSTMENT PROCEDURES

5-1. MECHANICAL ADJUSTMENTS

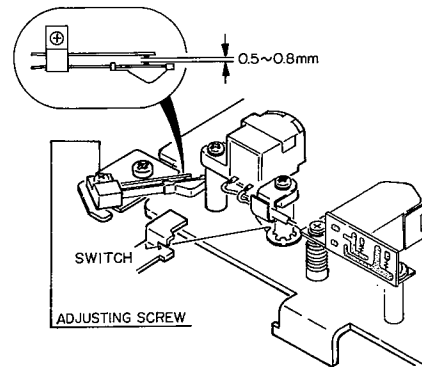
1. **PLAY muting switch**

Position the PLAY muting switch 5 to 6mm away from the switch operating arm so that the PALY muting switch is actuated just before the PLAY pushbutton is depressed to lock.



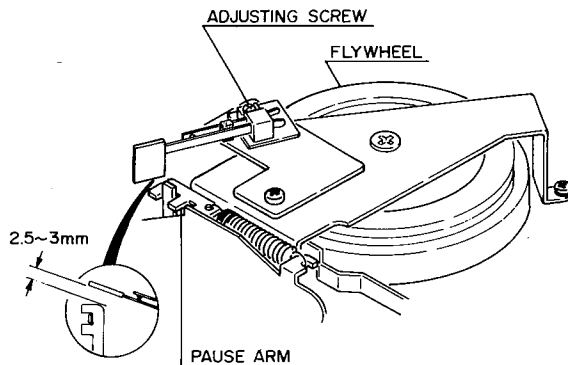
2. **Adjusting the PLAY muting switch**

In the playback mode of operation, position the PLAY muting switch with the adjusting screw until the switch contacts opens 0.5 to 0.8mm as illustrated in the right line drawing.



3. **Adjusting the PAUSE muting switch**

Loose the PAUSE muting switch mounting screw in the "stop" state of the tape deck, and adjust it until the clearance between the mold end tip of the switch contact and the pause arm becomes 0.5 to 1mm as illustrated in Fig. below.

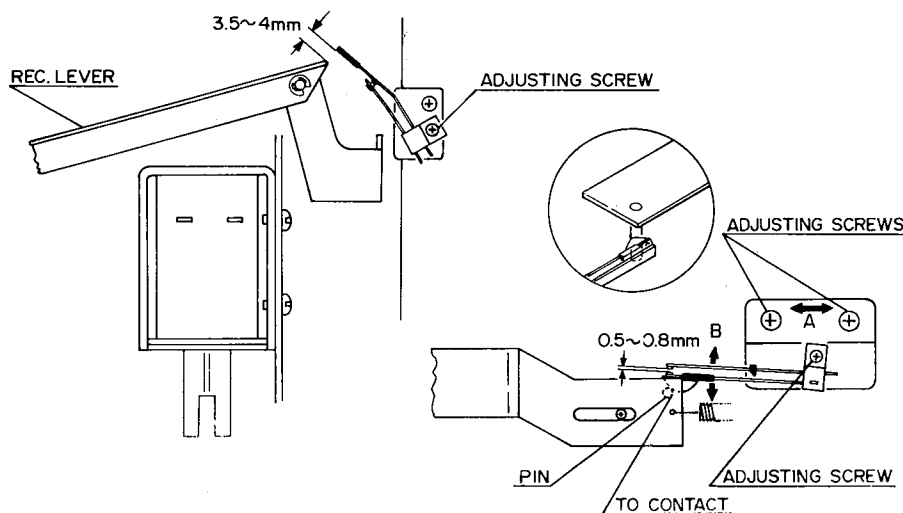


4. Adjusting the RECORD muting switch (A)

In the stop state, position the RECORD muting switch with the adjusting screw until the switch mold tip is separated 3.5 to 4mm away from the record lever as illustrated in the left line drawing.

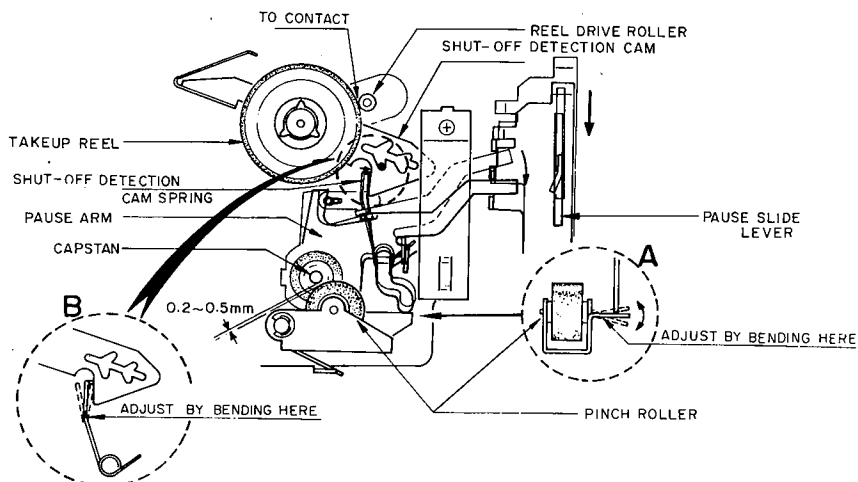
Adjusting the RECORD muting switch (B)

In the recording mode of operation, position the switch assembly in the arrow A and B directions with the adjusting screws until the switch contacts open 0.5 to 0.8mm when the switch mold tip is in contact with the switch operating pin fitted on the record lever, as illustrated in the right line drawing.



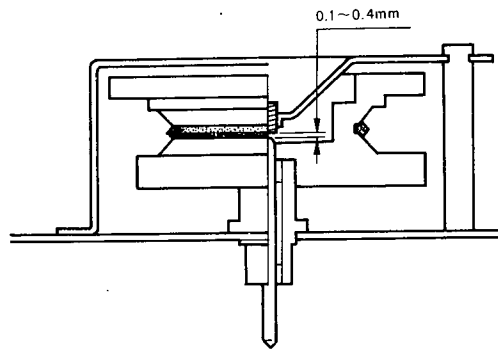
5. PAUSE timing

Depress the PLAY pushbutton down to lock. Adjust the bend angle of the pinch roller arm so that the clearance between the pinch roller and capstan may be 0.2 to 0.5mm at the instant when the takeup reel rotation is stopped by a slow depression of the PAUSE slide lever (See Detail A). In this state, adjust the bend angle of the shut-off detection cam spring so that it may come to push the cam (See Detail B).



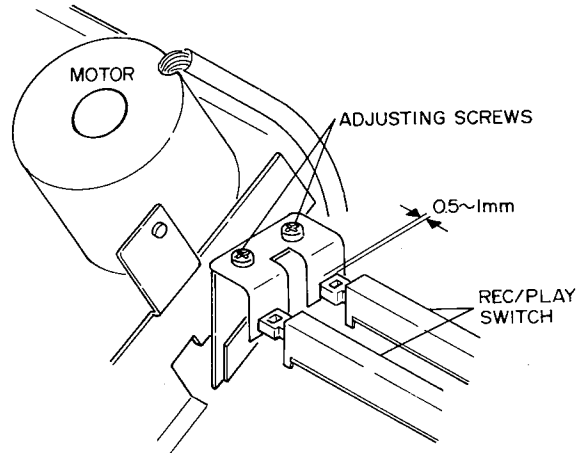
6. Flywheel thrust

Adjust the thrust screw located on the flywheel bracket using a screw-driver until the clearance becomes 0.1 mm to 0.4 mm. After adjustment, paint on the screw to lock.



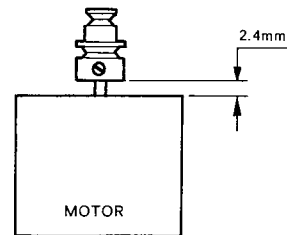
7. Adjusting the RECORD/PLAY switch lever

In the stop state, position the RECORD/PLAY switch lever with the adjusting screws until the lever is separated 0.5 to 1mm away from the RECORD/PLAY switch as illustrated in the right line drawing.



8. Motor-pulley clearance

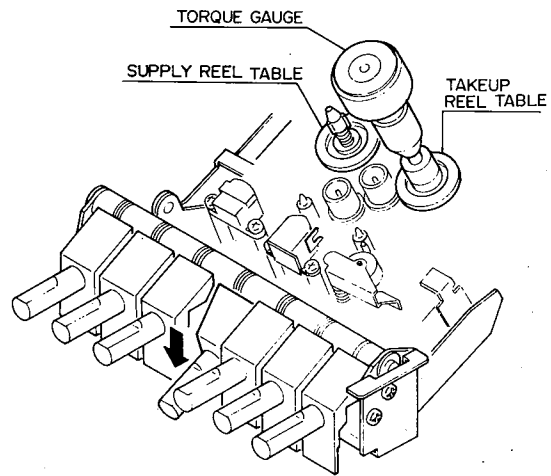
Check to insure that the clearance between the DC motor and pulley is 2.4mm. If not, correct the pulley set position.



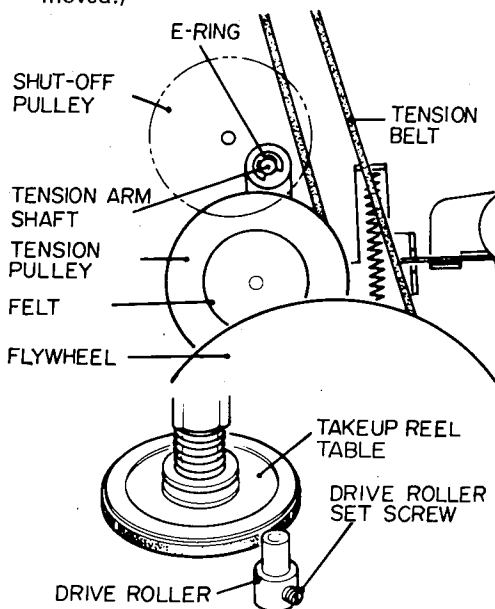
9. Reel table torques

The normal takeup and supply reel table torques are as follows.

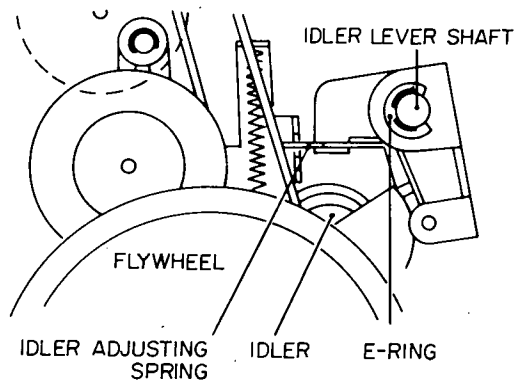
- Takeup reel table: 40 to 70 g.cm
in PLAY mode.
60 to 140 g.cm
in FF mode.
- Supply reel table: 60 to 140 g.cm
in REW mode.



- (1) If the takeup reel table torque in the PLAY state is not correct, first make sure that the drive roller set screw is not loose. If there is oil adhering to the rim of the reel table, wipe it away carefully. If the torque is still incorrect, see whether oil has penetrated on the tension pulley friction belt. This could cause slipping. In such a case, replace the tension arm assembly. To remove it, remove the E-ring on top of the tension arm shaft and lift the assembly upward to demount. (The belt and flywheel must first be removed.)



- (2) If the reel table torque in the FF and REW states is not correct, bend the idler adjusting spring inward so that the idler easily engages with the flywheel, increasing the contact pressure between the flywheel and idler tire. If the torque is still incorrect, replace the idler lever assembly. To remove it, remove the E-ring on the idler lever shaft and lift the assembly upward to demount.



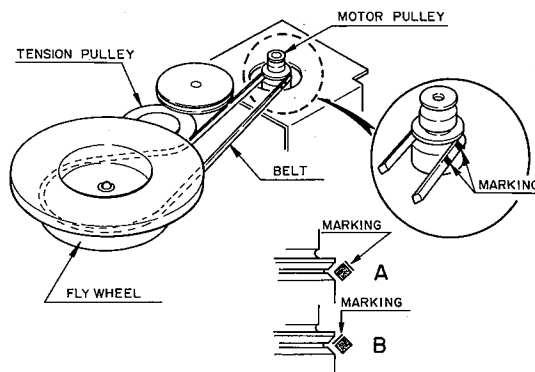
10. Wow and flutter improvement

Make sure that the tension belt is not twist.
Clean the belt with alcohol.

NOTE: As the belt installed on the motor pulley and flywheel largely affects the wow and flutter, its optimum side is selected at the factory for an individual mechanism to face the motor pulley and flywheel to provide minimum wow and flutter. To assure optimum belt arrangement, the belt has markings.

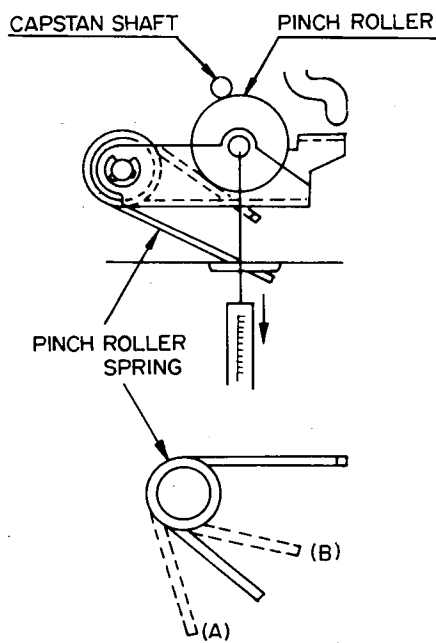
If the belt is removed, make sure to reinstall the new belt so that its marking should face the same direction as the case with the old one. Wrong marking direction might increase the wow and flutter.

If replacing the belt, it should be installed by selecting the direction of either marking A or B in connection with minimum wow and flutter.



11. Pinch roller pressure

Measure the pinch roller pressure using a contact pressure gauge as follows: Pull the pinch roller away from the capstan shaft in the direction of the arrow shown to stop its rotation and return it toward the capstan gradually. Read the gauge just when the pinch roller begins to rotate. The pinch roller pressure has been reset at the factory to 300 to 450g by adjusting the shape of the pinch roller spring. If the gauge read is out of this range, change the shape of the pinch roller spring by pulling it toward (A) when a greater pressure is wanted; or toward (B) when a smaller pressure.



12. Shut-off mechanism

(1) Adjusting the link allowance

Turn and locate the shut-off pulley so that the gear tooth (C) moves the lever to its farthest position as shown in Fig. A. Keeping the link in the direction of the arrow (B), adjust the link allowance along the direction of the arrow (A) to 0.1 to 0.5mm with the adjusting screws.

(2) Adjusting the detect pin position

Turn and locate the shut-off pulley so that the gear tooth (C) is not in contact with the lever as shown in Fig. A. Setting the STOP button to the STOP mode (Fig. B), adjust the detect pin position by changing the shape of member (A) so that the pin is in the slot of the detect cam as shown in Fig. C.

(3) Adjusting the detect cam

In the REW mode, adjust the clearance between the brake plate and detect cam to 1 to 2mm when the pin engages with the cam as shown in Fig. D.

Fig. A

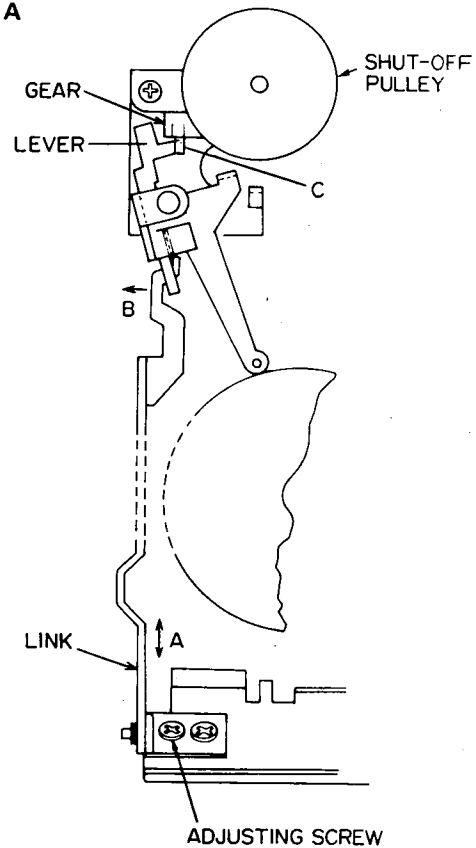


Fig. C

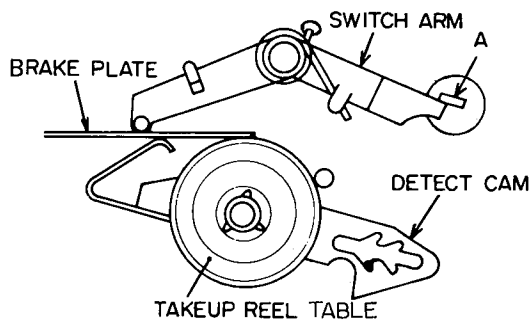


Fig. B

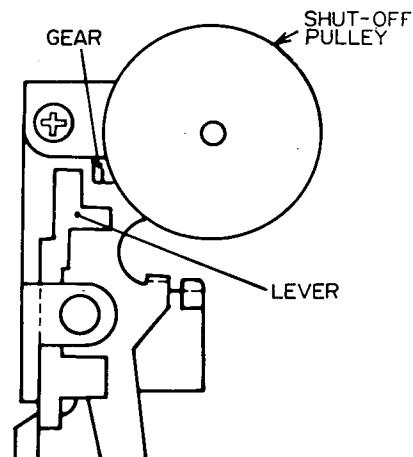
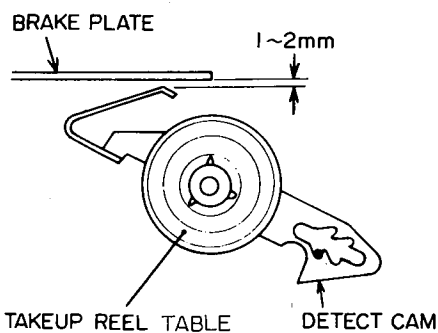


Fig. D



13. Adjusting the Plunger

If the plunger is replaced, proceed for installation and adjustment as follows.

(A) Fully press the STOP button by hand until the button lock cam is moved down to the lowest position (Fig. A).

(B) In turn, push the plunger core to the extreme end by hand (Fig. B).

Assuring the plunger lever is in contact with the inside of the stopper, tighten the plunger with the screws.

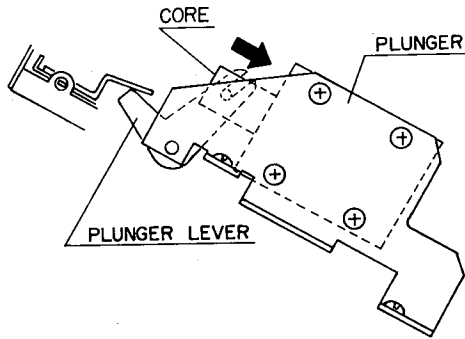


Fig. B

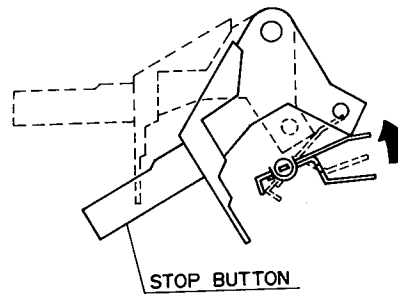


Fig. A

5-2. ELECTRICAL ADJUSTMENTS AND MEASUREMENTS

Precautions Before Adjustment and Measurement

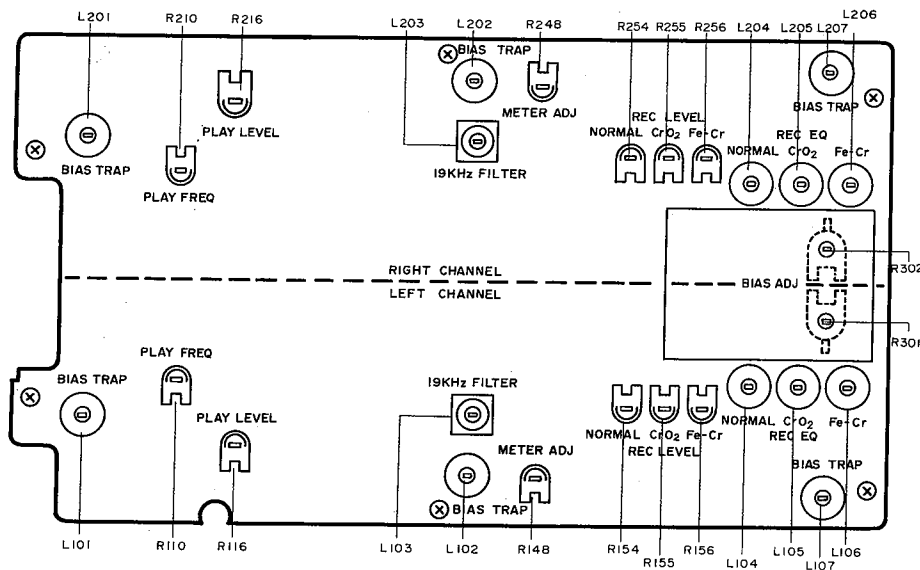
1. Before playing the test tape back, thoroughly demagnetize the heads, capstan and similar metal parts using an eraser as the test tape-recorded tone is easily erased.
2. Do not place the test tape on any measuring instrument.
3. Do not put the test tape near a place where the eraser is used.
4. Method of Demagnetization:—Turn the eraser power switch on at a remote position far away from the heads. Bring the eraser close to the heads, capstan and other parts to be demagnetized, and move it up and down four or five times to demagnetize. Slowly separate the eraser far away from the parts, and turn the power switch off.
5. Do not use any magnetized adjusting tool. When using it, demagnetize it from time to time in the course of each adjustment.
6. Do not turn semi-fixed resistor, capacitor, and inductor adjusting screws more than needed.
7. If measuring the tape speed wow and flutter, operate the tape deck in the normal opera-

ting condition.

8. Do not apply locking bond excessively.

Definitions

1. The "normal playback state" is an operating state of the tape deck which plays back the MTT-150 test tape and is adjusted so as to produce a 580mV output at the MAIN P.W. Board (P100) J141, J241 with the load assuming the measuring instrument input impedance of greater than 100k Ω and with the TAPE selector switch set at the NORMAL position.
2. The "normal recording state" is an operating state of the tape deck which records a 1kHz signal to a specified recording level for which the recording level control is adjusted with the 1kHz signal applied at a specified input level to the MIC input terminal.
In the normal recording state, therefore, this tape deck is set up with the level control to the state that the level meter pointer may deflect to the 100% mark as 0VU with a 1kHz, 1mV input signal applied.



1. Head Azimuth Adjustment

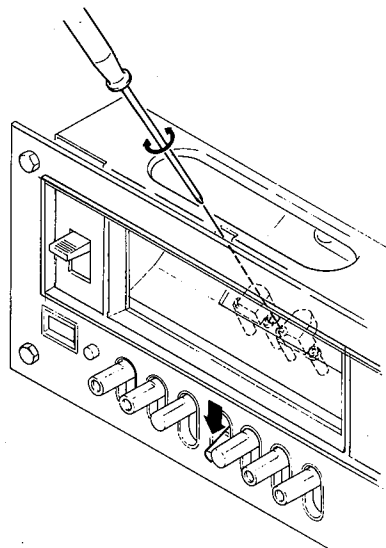
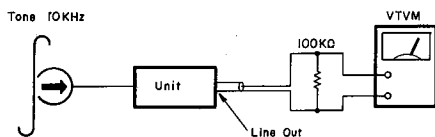
SET UP

1. Power voltage:- 50 or 60Hz a-c voltage rated for the unit to be used in a market country.
2. TAPE selector switch position:- NORMAL.
3. Load:- Measuring instrument input impedance.
4. Output terminal used:- LINE OUT.
5. Test tape used:- MTT-116U (31.5Hz to 14kHz).

PROCEDURES

1. Play the 10kHz portion of the test tape MTT-116U back. Adjust the head azimuth adjusting screw for maximum VTVM read.
2. If the peak output reads of the right and left channels are different, set the screws to obtain the mechanical center between the peaks.
3. After adjustment, lock the screw with bond.

Mode: playback



CAUTION

After adjustment, repeat the playback and stop setting a few times to make certain of no head azimuth deviation.

2. Tape Speed Adjustment

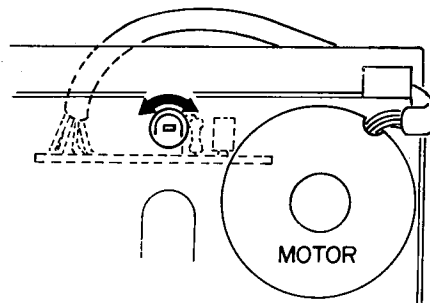
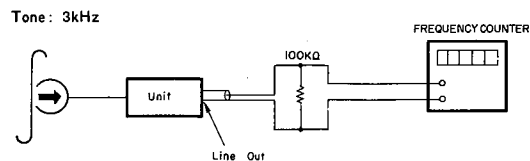
SET UP

1. Power voltage:- 50 or 60Hz a-c voltage rated for the unit to be used in a market country.
2. Output terminal:- LINE OUT.
3. Test tape used:- MTT-111.
4. Unit position:- Horizontal.

PROCEDURES

1. Play the mid portion of the test tape MTT-111 back. Adjust the tape speed adjusting semi-fixed resistor for 2990 to 3010Hz counter indication.

Mode: playback



CAUTIONS

1. For adjustment, the tape deck should be set up in the normal operating condition.
2. Do not adjust the semi-fixed resistor more turns than needed.
3. Do not proceed with adjustment after the tape deck temperature has changed.
4. If a strong shock or similar vibration is applied to the tape deck after adjustment, make certain that the measured tape speed had not changed.
5. If the tape speed deviation occurs, perform the adjustment again.
6. Be careful that the counter may indicate a wrong value because of too low counter input level.
7. Before adjustment, allow for 30 seconds or more after depressing of the PLAY push-button.

3. Playback Equalizer Adjustment

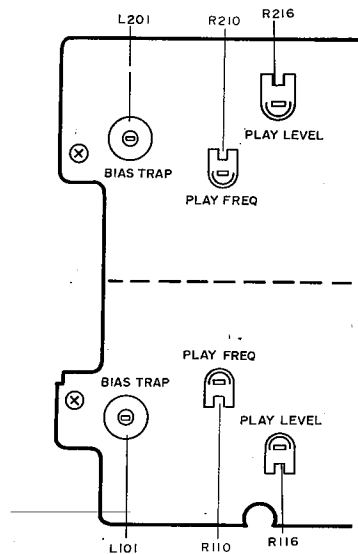
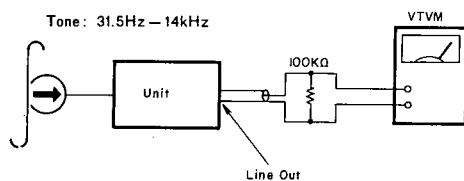
SET UP

1. Power voltage:- 50 or 60Hz a-c voltage rated for the unit to be used in a market country.
2. TAPE selector switch position:- NORMAL.
3. Load:- Measuring instrument input impedance.
4. output terminal:- LINE OUT.
5. Test tape used:- MTT-116U (31.5Hz to 14kHz).

PROCEDURES

1. Play the test tape MTT-116U. Let the 315Hz signal level be reference as 0dB.
2. Adjust R110 and R210 ($3k\Omega$ each) for 10kHz frequency response of 0 to -1dB in reference to the 315Hz signal level (0dB).
3. Proceed both for the right and left channels in the same manner.
4. Note that clockwise turning of R110 and R210 will increase the 10kHz signal output level.

Mode: playback



4. Playback Output Adjustment

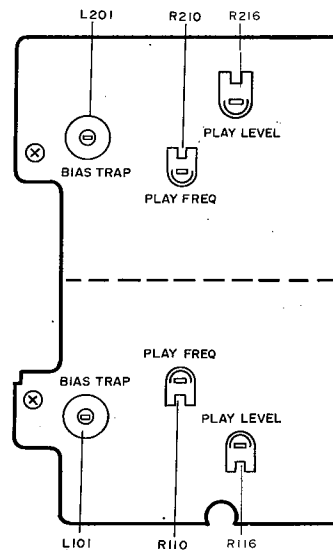
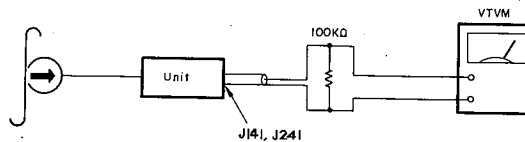
SET UP

1. Power voltage:- 50 or 60 Hz a-c voltage rated for the unit to be used in a market country.
2. TAPE selector switch position:- NORMAL.
3. Load:- Measuring instrument input impedance.
4. Output terminal:- MAIN P.W. Board (P100) J141 and J241.
5. Test tape used:- MTT-150.

PROCEDURES

1. Play the test tape MTT-150 back. Adjust R116 and R216 ($50k\Omega$ each) for 580mV playback output level.
2. Proceed both for the right and left channels in the same manner.

Mode: playback



CAUTION

1. This adjustment should be performed after the one for the playback equalizer. If the playback equalizer is adjusted after the playback output adjustment, the playback output should be readjusted.

5. VU Meter Adjustment

SET UP

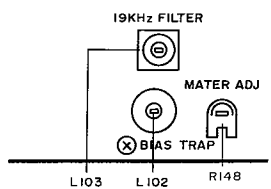
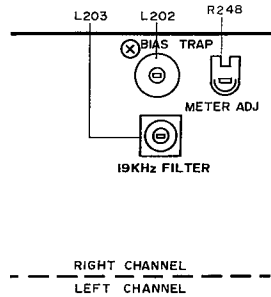
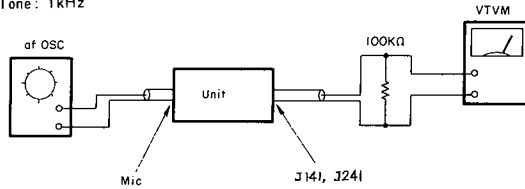
1. Power voltage:- 50 or 60Hz a-c voltage rated for the unit to be used in a market country.
2. FUNCTION selector switch position:- NORMAL.
3. Load:- Measuring instrument input impedance.
4. Output terminal used:- MAIN P.W. Board (P100) J141 and J241.
5. Input terminal:- MIC.

PROCEDURES

1. Connect a 1kHz, -60dBV input signal to the MIC terminal. Set up the tape deck for the recording mode of operation.
2. Adjust the REC control for 580mV output level at the MONI. OUT of the MAIN P.W. Board (P100) J141 and J241.
3. Adjust R148 and R248 (3kΩ each) until the VU meter pointer deflects to the DOLBY mark (DQ) on the VU meter.

Mode: record

Tone: 1kHz



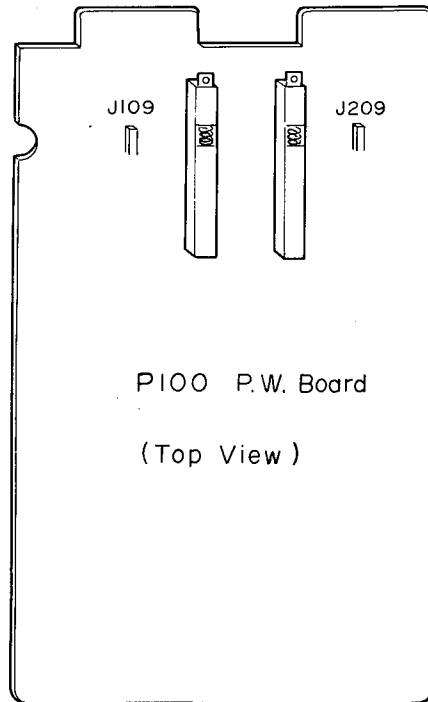
6. Bias Trap Adjustment

SET UP

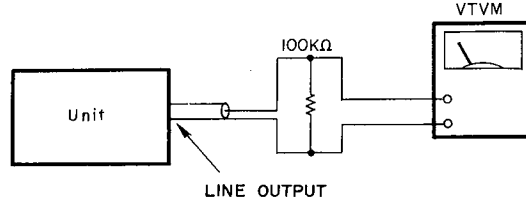
1. Power voltage:- 50 or 60Hz a-c voltage rated for the unit to be used in a market country.
2. Level control position:- Maximum.
3. TAPE selector switch position:- CrO₂.

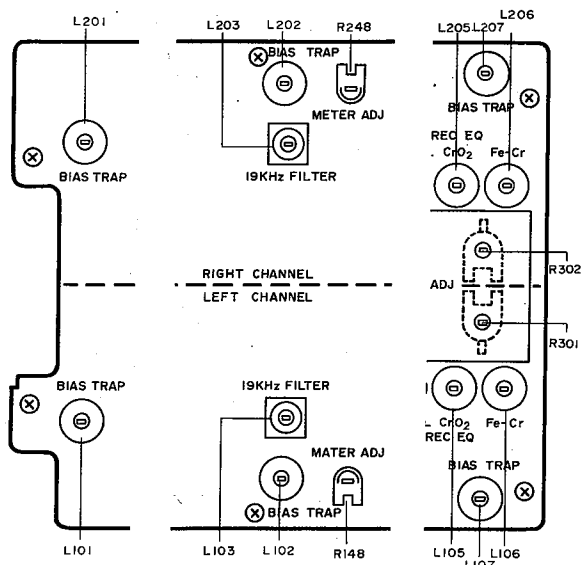
PROCEDURES

1. Set up the tape deck in the recording mode of operation.
2. Connect the VTVM to J109 and J209. Adjust L101 and L201 for minimum VTVM read.
3. In turn, connect the VTVM to R162 and R262. Adjust L107 and L207 for minimum VTVM read.
4. Adjust L102 and L202 for minimum leak bias at the LINE OUTPUT terminal.



Mode: record





CAUTIONS

1. If the leak bias is less than the specified value, the bias trap needs not to be adjusted since the adjusting coil is factory preset.
2. The adjusting rod used should be non-metallic.

7. 19kHz Filter Adjustment

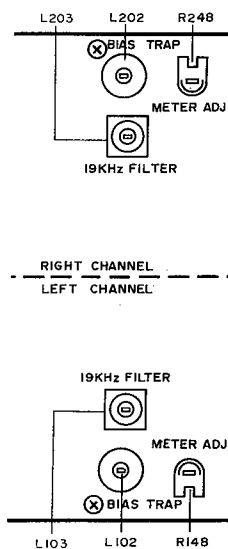
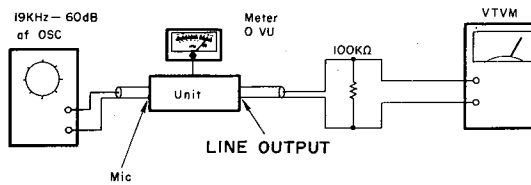
SET UP

1. Power voltage:- 50 or 60Hz a-c voltage rated for the unit to be used in a market country.
2. Input connection:- 19kHz, -60dB signal to MIC terminal.
3. TAPE selector switch:- NORMAL.
4. Output terminal: LINE OUTPUT.
5. Load:- Measuring instrument input impedance.

PROCEDURES

1. Connect the 19kHz, -60dBV input signal to the MIC terminal. Adjust the level control for 0VU.
2. In turn, turn the MPX Filter switch to the ON position. Adjust L103 and L203 for minimum output level at the LINE OUTPUT terminal.
3. Proceed both for the right and left channels in the same manner.

Mode: record



CAUTIONS

1. The 19kHz input signal should be as precise as 19 ± 0.5 kHz.
2. If the filter characteristic is better than 15dB, the adjusting coil needs not to be adjusted since it is factory set.

**8. Recording Bias Current Adjustment
(Temporal)**

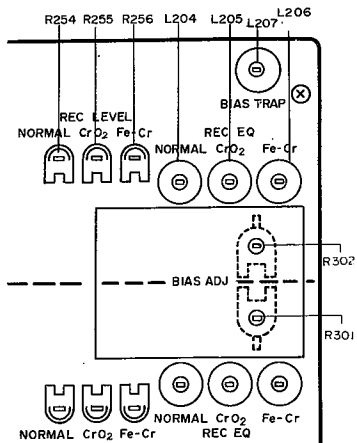
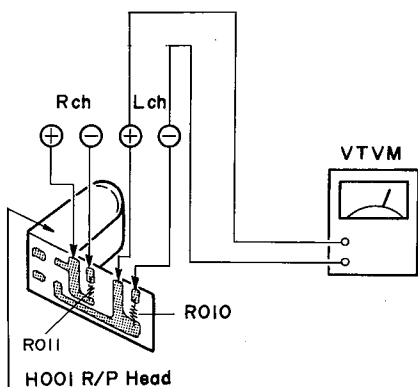
SET UP

1. Power voltage:- 50 or 60Hz a-c voltage rated for the unit to be used in a market country.
2. TAPE selector switch:- NORMAL.

PROCEDURES

1. Set up the tape deck in the recording mode of operation. Connect the VTVM to R010 and R011 (10Ω resistor). Adjust the semi-fixed resistor R301 and R302 for 1.8mV VTVM read.
2. Proceed both for the right and left channels in the same manner.
3. For the tape deck equipped with the TAPE selector switch, make certain that the VTVM reads approximately 2.6mV with it set to the CrO₂ position.
4. When the TAPE selector switch is set at the NORMAL position, the leaf switch interlocked with the automatic tape selector lever, or CrO₂ tape detecting lever, will turn off.

Mode: record



CAUTION

The measured recording bias current may be different from the actual value. If so, fix the VTVM lead wire connected to the 10Ω resistor for minimum VTVM read.

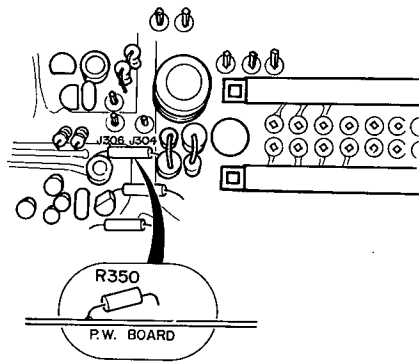
9. Recording Equalizer Adjustment

SET UP

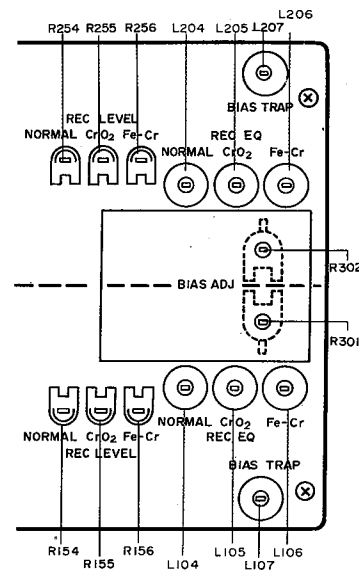
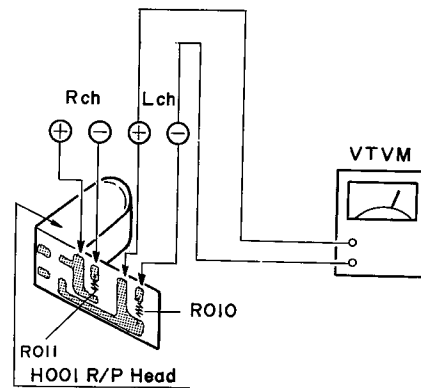
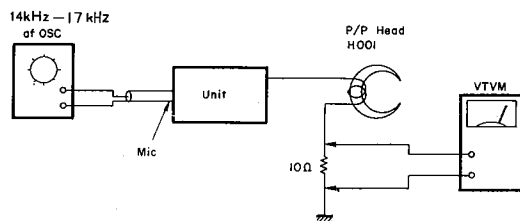
1. Power voltage:- 50 or 60Hz a-c voltage rated for the unit to be used in a market country.
2. Input level:- 20dB lower than -60dB.

PROCEDURES

1. Stop the recording bias current oscillation by disconnecting the bias circuit +B jumper wire (R350).
2. Set up the tape deck to the normal recording state. Reduce the input level by 20dB.
3. Set the TAPE selector switch to the NORMAL position. Set the low-frequency oscillator to 14kHz. Connect the VTVM to R010 and R011 (10Ω resistor). Adjust L104 and L204 for maximum VTVM read.
4. In turn, set the TAPE selector switch to the CrO₂ position. Set the low-frequency oscillator to 16kHz. Connect the VTVM to R010 and R011. Adjust L105 and L205 for maximum VTVM read.
5. Set the TAPE selector switch to the Fe-Cr position. Set the low-frequency oscillator to 17kHz. Connect the VTVM to R010 and R011. Adjust L106 and L206 for maximum VTVM read.
6. Proceed both for the right and left channels in the same manner.
7. After adjustment, release the recording bias current.



Mode: record



CAUTION

The adjusting rod should be non-metallic.

10. Recording Current Adjustment (Temporal)

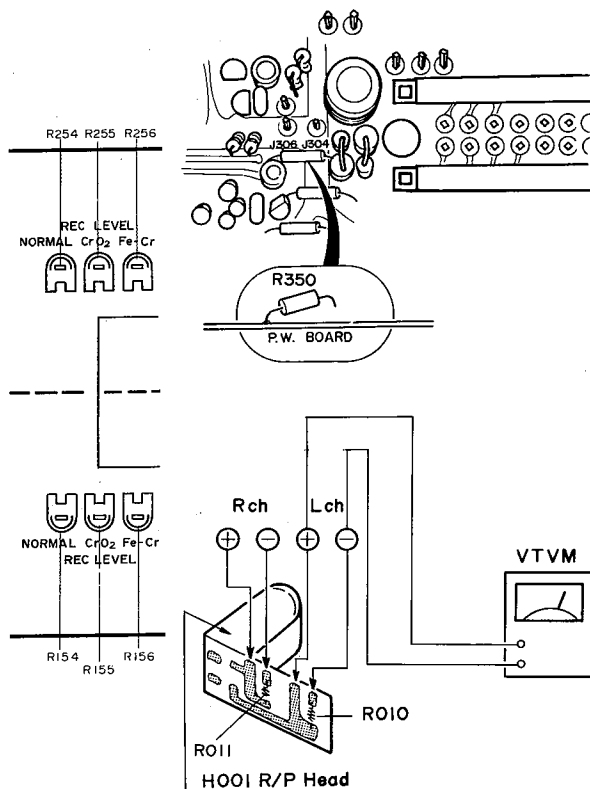
SET UP

1. Power voltage:- 50 or 60Hz a-c voltage rated for the unit to be used in a market country.
2. Input signal:- 1kHz, -60dB signal.
3. TAPE selector switch positions:- NORMAL, CrO₂ and Fe-Cr.
4. Load:- Measuring instrument input impedance.

PROCEDURES

1. Stop the recording bias current oscillation by disconnecting the bias circuit +B jumper wire (R350).
2. Set up the tape deck to the normal recording state. Connect the VTVM to R010 and R011 (10Ω resistor). Adjust the semifixed resistors R154 and R254 (for NORMAL), R155 and R255 (for CrO₂) and R156 and R256 (for Fe-Cr) until the VTVM reads 0.52mV (for NORMAL), 0.90mV (for CrO₂) and 0.65mV (for Fe-Cr), respectively.
3. Proceed both for the right and left channels in the same manner.
4. After adjustment, release the recording bias current.

Mode: record



11. Record-Playback Frequency Response Adjustment

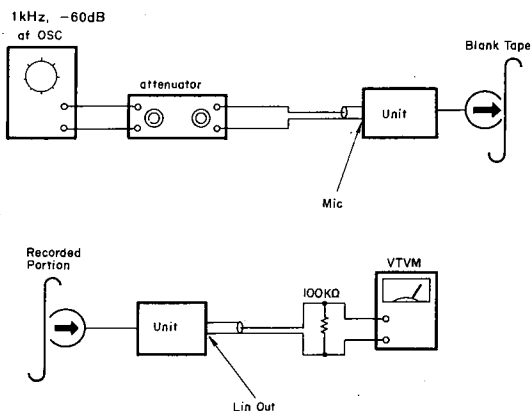
SET UP

1. Power voltage:- 50 or 60Hz a-c voltage rated for the unit to be used in a market country.
2. Input signal:- 1kHz, -60dB with -20dB referenced as 0VU.
3. TAPE selector switch:- Fe-Cr.
4. Output terminal:- LINE OUT.
5. Load:- Measuring instrument input impedance.
6. Test tape used:- SONY Fe-Cr.

PROCEDURES

1. Connect the input signal to the MIC terminal. Set up the tape deck to the normal recording state.
2. In turn, reduce the input level by 20dB with the use of the attenuator. Record the 1 and 14kHz tones.
3. Play the 1kHz, 20dB-down recorded tone back as 0dB. Adjust the recording bias current until the 14kHz response is within ±1.5dB as referenced to the 1kHz, 0dB response.
4. Proceed both for the right and left channels in the same manner.
5. If the recording bias current is reduced in the above adjustment, be sure to measure the distortion.

Mode: record



12. Record-Playback Output Level Adjustment

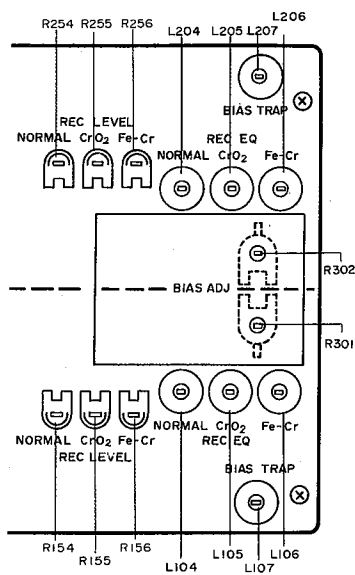
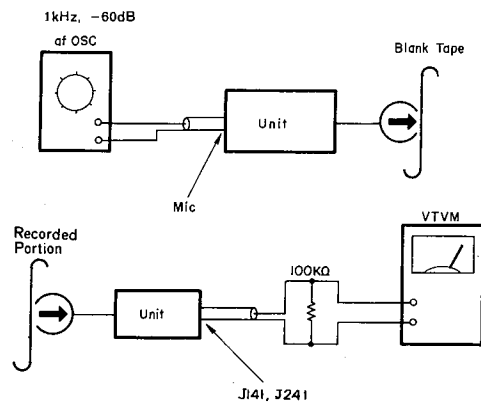
SET UP

1. Power voltage:- 50 or 60Hz a-c voltage rated for the unit to be used in a market country.
2. Input:- 1kHz, -60dB signal.
3. TAPE selector switch position:- NORMAL, CrO₂ and Fe-Cr.
4. Output terminal:- MAIN P.W. Board (P100) J141 and J241.
5. Load:- Measuring instrument input impedance.
6. Test tape used:- TDK DC-60, KRC-60 and SONY Fe-Cr.

PROCEDURES

1. Connect the 1kHz, -60dB input signal to the MIC terminal. Set up the tape deck to the normal recording state.
2. Adjust the REC LEVEL semi-fixed resistor until the recorded signal is reproduced at 460mV \pm 0.5dB.
3. Proceed for the NORMAL, CrO₂ and Fe-Cr positions each in the same manner.
4. The semi-fixed resistors to be adjusted are:
R154 and R254 for the NORMAL position.
R155 and R255 for the CrO₂ position.
R156 and R256 for the Fe-Cr position.

Mode: record



CAUTION

1. If the bias current is changed, be sure to perform the above adjustment.

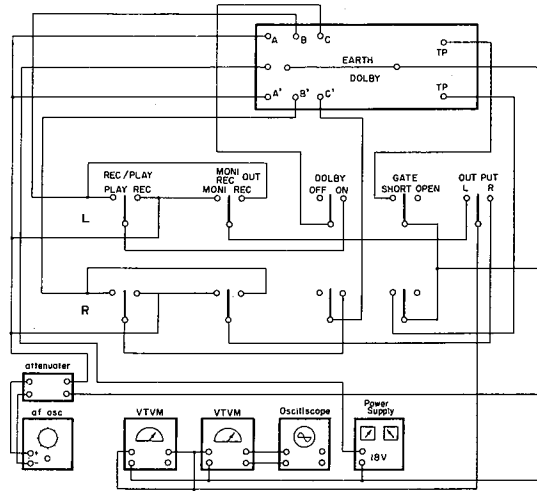
13. Dolby Circuit Adjustment

A) Encoder Circuit

1. Set the selector switch to the ENCODER (recording) position.
2. Adjust the LAW control for maximum positive potential applied to the source of the FET.
3. Turn the NOISE REDUCTION switch to the OFF position. Ground the gate of the FET.
4. Connect and adjust a 5kHz input signal for 17.5mV level at the MON. OUT terminal.
5. Note the output level at the REC. OUT terminal. Let the output level be 0dB as reference level.
6. Turn the NOISE REDUCTION switch to the ON position. Adjust the GAIN control until the output level at the REC. OUT terminal increases by $10 + 0.25\text{dB}$ as compared with the one measured in Step (5) above (0dB).
7. Open the gate of the FET. Adjust the LAW control until the output level at the REC. OUT terminal decreases by $2 + 0.25\text{dB}$ as compared with the 0dB reference level.

B) Decoder Circuit

1. Set the selector switch to the DECODER (playback) position.
2. Turn the NOISE REDUCTION switch to the OFF position. Ground the gate of the FET.
3. Connect and adjust the 5kHz input signal for 4.4mV level at the MON. OUT terminal.
4. Make certain that the output level at the MON. OUT terminal is reduced by $10\text{dB} \pm 0.5\text{dB}$ when the NOISE REDUCTION switch is turned to the ON position.
5. Open the gate of the FET. Make certain that the signal level at the MON. OUT terminal is $17.5\text{mV} \pm 0.5\text{dB}$.
6. If the signal level is out of the above permissible range, repeat the adjustment beginning with the encoder circuit, not from the decoder circuit at all.



14. Tape Speed Measurement

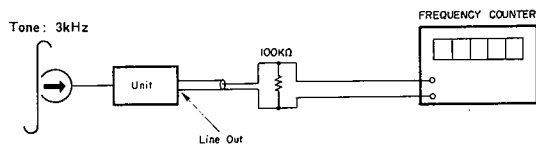
SET UP

1. Power voltage:- 50 or 60Hz a-c voltage rated for the unit to be used in a market country.
2. Output terminal:- LINE OUT.
3. Test tape used:- MTT-111.
4. Set position:- Horizontal

PROCEDURES

1. Play the wound-up end of the test tape MTT-111 back. Read the frequency counter indication.

Mode: playback



STANDARD

Tape speed:- 4.8cm/sec +2, -2%.
Frequency: 2940 to 3060Hz.

CAUTION

The tape deck should be leveled as specified for this measurement.

15. Wow and Flutter Measurement

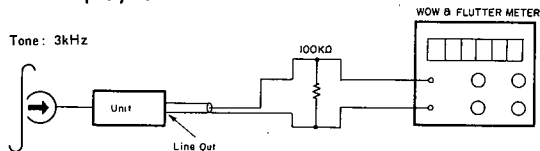
SET UP

1. Power voltage:- 50 or 60Hz a-c voltage rated for the unit to be used in a market country.
2. Output terminal:- LINE OUT.
3. Load:- Measuring instrument input impedance.
4. Test tape used:- MTT-111.
5. Set position:- Horizontal.
6. Wow & flutter meter function switch:- JIS UNWTD.

PROCEDURES

1. Play the test tape MTT-111 back. Read the wow & flutter meter indication.

Mode: playback



STANDARD

Less than NAB 0.15% in Wrms.

CAUTION

The measurement should be performed at the wound-up end of the test tape.

**16. Playback Output Level Measurement
(at LINE OUT)**

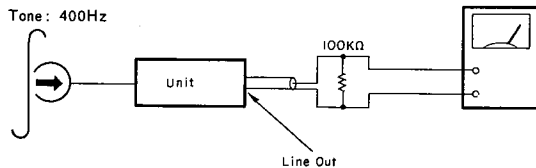
SET UP

1. Power voltage:- 50 or 60Hz a-c voltage rated for the unit to be used in a market country.
2. TAPE selector switch position: **NORMAL**.
3. Load:- Measuring instrument input impedance.
4. Output terminal:- **LINE OUT**.
5. Test tape used:- **MTT-150**.

PROCEDURES

1. Play the test tape back in the normal playback state. Read the VTVM indication.
2. Proceed both for the right and left channels in the same manner.

Mode: playback



STANDARD

Within 900mV \pm 3dB.

17. Playback Signal-to-Noise Ratio Measurement

SET UP

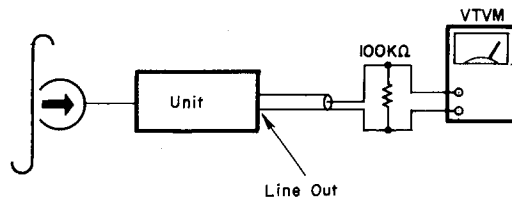
1. Power voltage:- 50 or 60Hz a-c voltage rated for the unit to be used in a market country.
2. Load:- Measuring instrument input impedance.
3. Measuring output terminal:- **LINE OUT**.
4. Test tape used:- **MTT-112 (333Hz tone)**.
5. TAPE selector switch position:- **NORMAL**, **CrO₂** and **Fe-Cr**.

PROCEDURES

1. Load the test tape **MTT-112**. Set up the tape deck to the normal playback state.
2. Read playback output as a 0dB reference. Then playback blank tape and note the output level drop in dB.
3. Proceed both for the right and left channels in the same manner.
4. Repeat the above measurement for each TAPE selector switch position.

Mode: playback

Tone 333Hz



STANDARD

Greater than 45dB.

CAUTIONS

1. Arrange the tape deck power cord for minimum hum component.
2. Effect by induction noises should be minimized for the measurement.
3. When playing the standard reference level tape **MTT-112** back, the VU meter indication is close to +2.5 VU and is used as the reference level for the signal-to-noise ratio measurement.

18. Playback Frequency Response Measurement

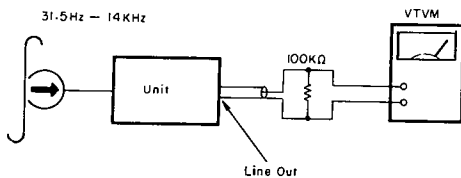
SET UP

1. Power voltage:- 50 or 60Hz a-c voltage rated for the unit to be used in a market country.
2. TAPE selector switch position:- NORMAL and CrO₂ or Fe-Cr.
3. Load:- Measuring instrument input impedance.
4. Measuring output terminal:- LINE OUT.
5. Test tape used:-
MTT-116U (for NORMAL).
MTT-116K (for CrO₂ or Fe-Cr).

PROCEDURES

1. Play the test tape MTT-116U and -116K back. Let the 315Hz output level be 0dB as reference level.
2. Read the 40Hz and 10kHz output level differences from the 315Hz, 0dB reference level.
3. Proceed both for the right and left channels in the same manner.
4. For the above measurement, use the test tape MTT-116U for the NORMAL position and MTT-116K for the CrO₂ or Fe-Cr.

Mode: playback



STANDARD

In reference to the 315Hz, 0dB signal output level,

- +3 to -3dB at 40Hz.
- +3 to -6dB at 10kHz.

CAUTION

Since the test tapes used may involve some head azimuth difference, the head azimuth should be corrected at the highest frequency of each test tape before measurement.

19. Record-Playback Output Level Measurement (at LINE OUT)

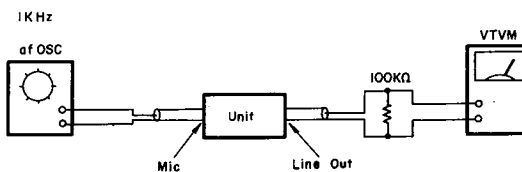
SET UP

1. Power voltage:- 50 or 60Hz a-c voltage rated for the unit to be used in a market country.
2. Input: 1kHz, -60dB signal.
3. Load:- Measuring instrument input impedance.
4. Level control position:- SRL for recording operation.
5. TAPE selector switch position:- NORMAL, CrO₂ and Fe-Cr.
6. Measuring output terminal:- LINE OUT.
7. Cassette tape used:- TDK DC-60, KRC-60 and SONY Fe-Cr.

PROCEDURES

1. Record the 1kHz, -60dB signal in the normal recording state.
2. Play the recorded signal back. Read the VU meter indication.
3. Proceed for the NORMAL, CrO₂ and Fe-Cr positions each in the same manner.
4. Proceed both for the right and left channels in the same manner.

Mode: record



STANDARDS

1. NORMAL position: 730mV ± 3dB.
2. CrO₂ position: 730mV ± 3dB.
- Fe-Cr position: 730mV ± 3dB.

20. Record-Playback, Harmonic Distortion Measurement

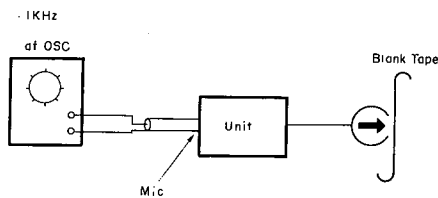
SET UP

1. Power voltage:- 50 or 60Hz a-c voltage rated for the unit to be used in a market country.
2. Input:- 1kHz, -60dB signal.
3. Playback output level:- Same as the recorded signal level.
4. Load:- Measuring instrument input impedance.
5. Measuring output terminal:- LINE OUT.
6. Cassette tape used:- TDK DC-60, KRC-60 and SONY Fe-Cr.

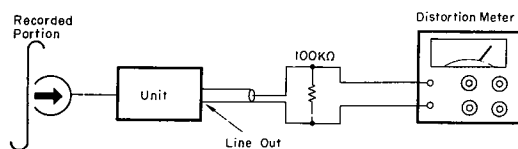
PROCEDURES

1. Record the 1kHz signal in the normal recording state.
2. Play the recorded signal back in the normal playback state. Calibrate the harmonic distortion meter to 100% at the INPUT CONT. Adjust the adjusting knob for minimum meter pointer deflection, and read the harmonic distortion.
3. Proceed both for the right and left channels in the same manner.
4. Proceed for the NORMAL, CrO₂ and Fe-Cr positions each in the same manner.

Mode: record



Mode: playback



STANDARDS

1. Less than 4% for the NORMAL and Fe-Cr positions.
2. Less than 4.5% for the CrO₂ position.

CAUTIONS

1. Be sure to demagnetize the heads as the measured values may deviate from the accurate values.
2. Note that excessive wow and flutter also causes deviation of the measured values.

21. Record-Playback Signal-to-Noise Ratio Measurement

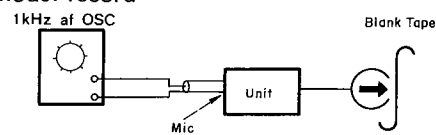
SET UP

1. Power voltage:- 50 or 60Hz a-c voltage rated for the unit to be used in a market country.
2. Input:- 1kHz, -60dB signal.
3. Playback output level:- Same as the recorded signal level.
4. Load:- Measuring instrument input impedance.
5. Measuring output terminal:- LINE OUT.
6. Cassette tape used:- TDK DC-60, KRC-60 and SONY Fe-Cr.

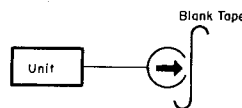
PROCEDURES

1. Record the 1kHz signal in the normal recording state.
2. Disconnect the input signal from the microphone jack. In this state, record no signal.
3. Play the 1kHz signal back in the normal playback state. Let the output level be 0dB as reference level.
4. Read difference between the recorded 0dB reference output and no-signal output levels.
5. Proceed both for the right and left channels in the same manner.
6. Set the DOLBY switch to the ON position, and proceed with similar measurement with the use of the high-pass filter.

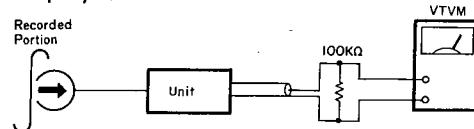
Mode: record



Mode: record



Mode: playback



STANDARDS

1. Greater than 55dB for the ON position of the DOLBY switch.
2. Greater than 45dB for the OFF position of the DOLBY switch.

CAUTION

Arrange the tape deck power cord for minimum hum component.

22. Record-Playback Frequency Response Measurement

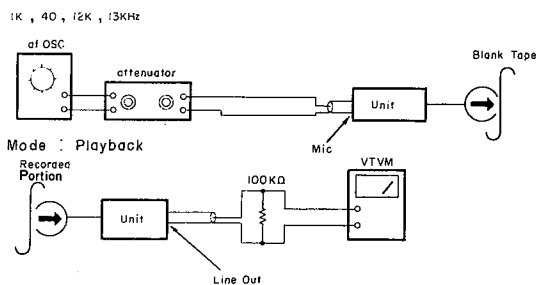
SET UP

1. Power voltage:- 50 or 60Hz a-c voltage rated for the unit to be used in a market country.
2. Input:- 1kHz, -60dB signal with -20dB as OVU.
3. Playback output level:- Same as the recorded signal level.
4. Load:- Measuring instrument input impedance.
5. Measuring output terminal:- LINE OUT.
6. Cassette tape used:- TDK DC-60, KRC-60 and SONY Fe-Cr.

PROCEDURES

1. Record the 1kHz signal in the normal recording state. In turn, reduce the input level by 20dB with an attenuator. Then, record the 1kHz, 40Hz, 12kHz, and 13kHz signals.
2. Play the recorded 1kHz signal back in the normal playback state.
3. Let the 1kHz, -20dB-down signal level be 0dB as reference level. Read difference of the 40Hz, 12kHz and 13kHz signal output levels from the 1kHz signal 0dB reference level.
4. Proceed for the NORMAL, CrO₂ and Fe-Cr positions each in the same manner.
5. Proceed both for the right and left channels in the same manner.

Mode: record



STANDARDS

1. NORMAL position:
 - +0dB to -6dB at 40Hz
 - +3dB to -6dB at 12kHz
 - with DOLBY switch at OFF.

2. CrO₂ position:
 - +0dB to -6dB at 40Hz
 - +2dB to -8dB at 13kHz
 - with DOLBY switch at OFF.
3. Fe-Cr position:
 - +3dB to -3dB at 40Hz
 - +3dB to -3dB at 13kHz
 - with DOLBY switch at OFF.
4. NORMAL, CrO₂ and Fe-Cr position:
 - +3dB to -8dB at 40Hz
 - +5dB to -8dB at 10kHz
 - with DOLBY switch at ON.

23. Erasing Effect Measurement

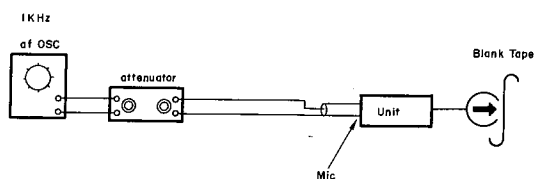
SET UP

1. Power voltage:- 50 or 60Hz a-c voltage rated for the unit to be used in a market country.
2. Input:- 1kHz, -60dB signal with +10dB as OVU.
3. Playback output level:- Same as the recorded signal level.
4. Load:- Measuring instrument input impedance.
5. TAPE selector switch position:- NORMAL, CrO₂ and Fe-Cr.
6. Cassette tape used:- TDK DC-60, KRC-60 and SONY Fe-Cr.
7. Filter used:- 1kHz band-pass filter.

PROCEDURES

1. Record the 1kHz input signal in the normal recording state.
2. In turn, increase the input level by 10dB with the attenuator, and record it.
3. Rewind a half portion of the 10dB-up tape and record in no-signal state, or erase, on the portion with the input signal disconnected from the microphone jack.
4. Play back in the normal playback state the input signal recorded in the normal recording state.
5. In turn, let the 10dB-up recorded signal level be 0dB as reference level. Read difference of the level at the erased portion from the 0dB reference level.

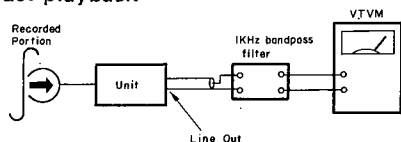
Mode: record



Mode: record



Mode: playback



STANDARD

Greater than 60dB.

24. Leak Bias Measurement

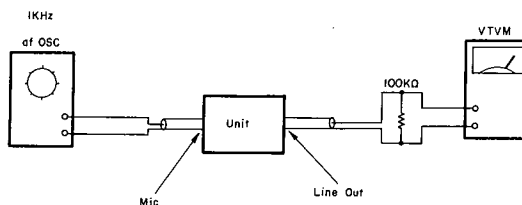
SET UP

1. Power voltage:- 50 or 60Hz a-c voltage rated for the unit to be used in a market country.
2. Input:- 1kHz, -60dB signal.
3. Load:- Measuring instrument input impedance.
4. Level control position:- SRL.
5. TAPE selector switch position:- NORMAL, CrO₂ and Fe-Cr.

PROCEDURES

1. Record the 1kHz input signal in the normal recording state. Let the monitor output level at the LINE OUT terminal be 0dB as reference level. Read difference of the output level having the input signal disconnected from the 0dB reference level.
2. Proceed both for the right and left channels in the same manner.

Mode: record



STANDARD

Lower than -50dB.

25. FM Deemphasis Measurement

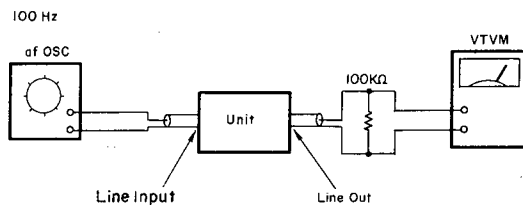
SET UP

1. Power voltage:- 50 or 60Hz a-c voltage rated for the unit to be used in a market country.
2. Input:- 100Hz, -10dB signal.
3. Input terminal:- LINE INPUT
4. Output terminal:- LINE OUT.
5. DOLBY FM switch position: ON
6. DOLBY switch position:- ON.
7. REC/PLAY switch position:- REC.

PROCEDURES

1. Connect the 100Hz, -10dBV input signal to the LINE INPUT terminal. Adjust the FM CAL control for 0VU output level with the DEEMPHASIS switch set at the FLAT position.
2. Let the above output level at the LINE OUT terminal be 0dB as reference level. Set the DEEMPHASIS switch to the 25 μ sec position and read output level differences of 5kHz and 10kHz to 100Hz.
3. Proceed both for the right and left channels in the same manner.

Mode: record



STANDARD

FREQ.	FOR U AND C	FOR N
5kHz	+6 \pm 2dB	+3.5 \pm 2dB
10kHz	+8.5 \pm 2dB	+5 \pm 2dB

NOTE

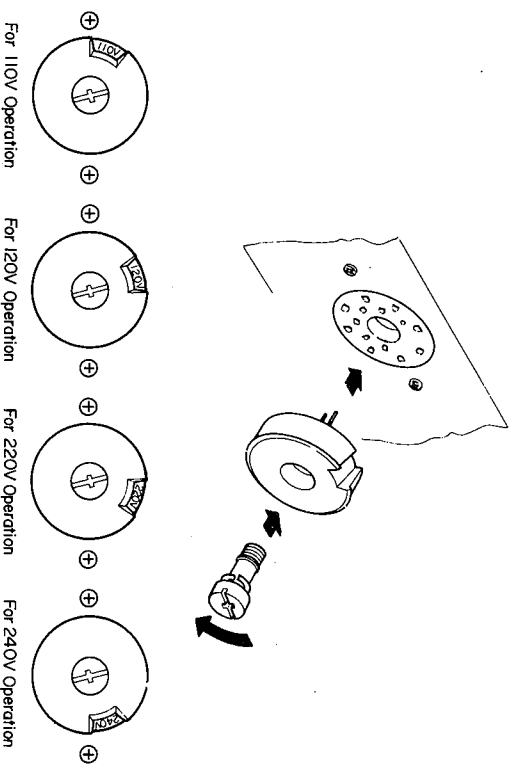
- U: U.S.A.
- C: Canada
- N: Europe

6. VOLTAGE CONVERSION (For European Model Only)

This Model is equipped with a universal power transformer to permit operation at either power source of 110, 120, 220 or 240 V AC, 50/60 Hz.

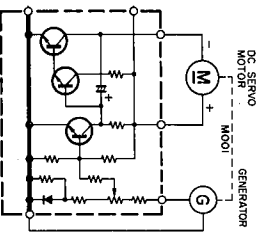
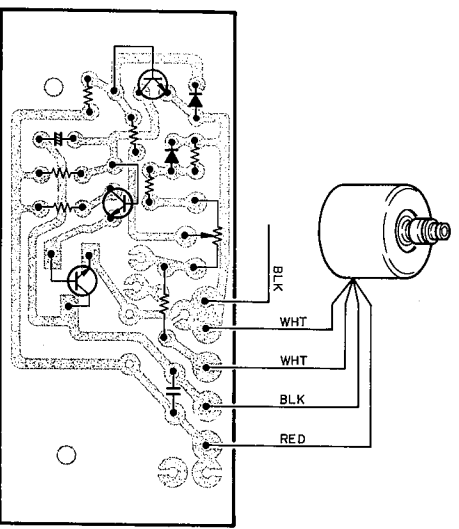
To convert the unit to a different power source voltage, change the plug as illustrated in the drawing below.

CAUTION: DISCONNECT POWER SUPPLY CORD FROM AC OUTLET BEFORE CONVERTING VOLTAGE.



7. MOUNTING SCHEMATIC DIAGRAM AND CAUTION FOR MOTOR

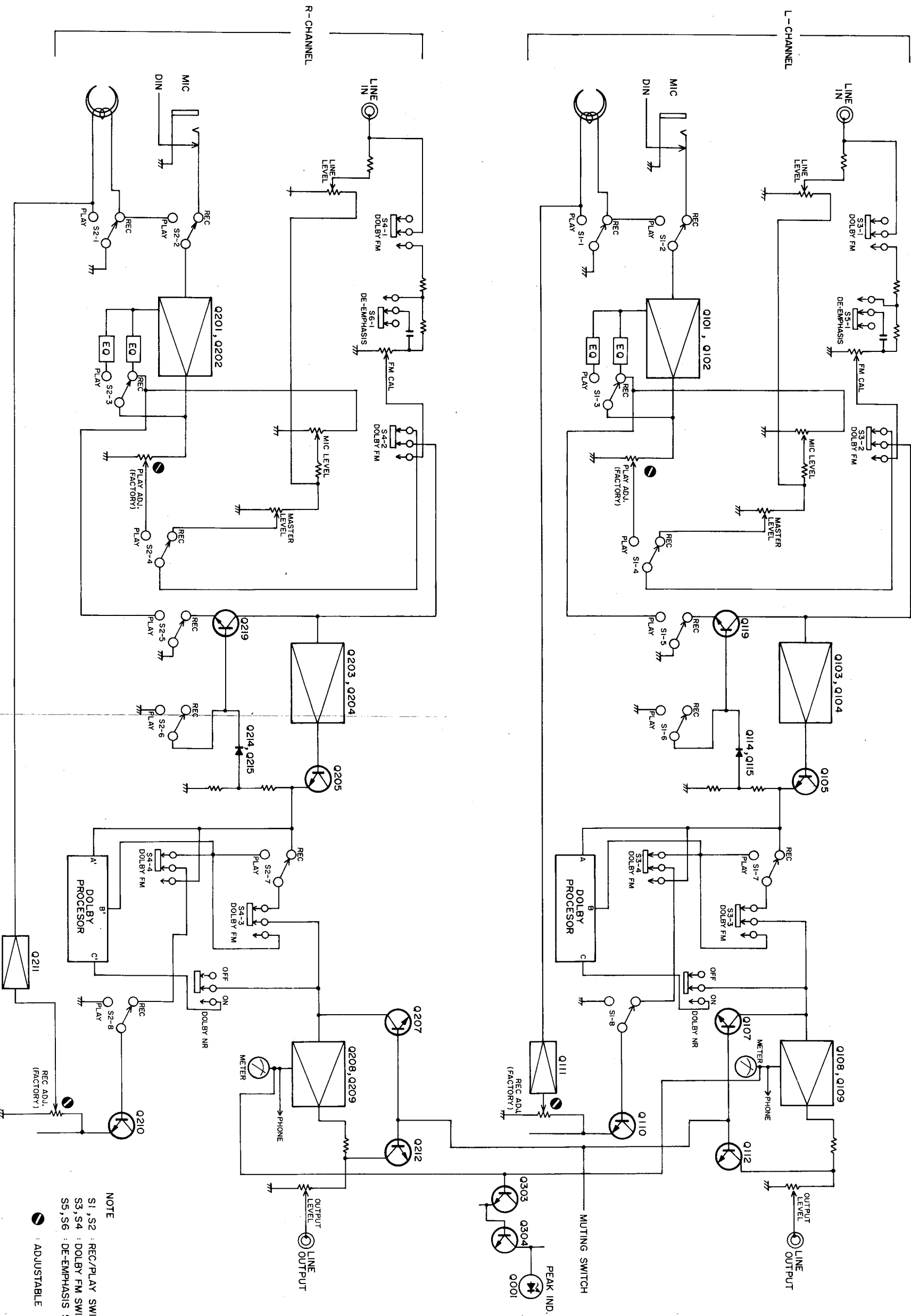
If replacing the motor, be sure to replace the motor together with the motor servo board as they are combined into a single unit as an individual replacement part. Note also that each of the transistors, diode, capacitor and resistors installed on the motor servo board is not available as the individual replacement part.



8. HOW TO USE 5220 DOLBY SYSTEM

Use	Connections	Input	Deck Mode	Level Adj.	5220 Function Switches				Signal State			
					DOLBY NR	DOLBY FM	De-emphasis	Mic/Line In	Input	Rec. Out Rec. Amp	Output	Result
Play back	5220 LINE (Line output) - Amp AUX Tape In	Recorded Tape	Play	Output Level Cont. (Rear)	ON	OFF	-		—	—	—	Good
					OFF	OFF	-		—	—	—	Wrong
Record	Amp Tape Out/ Rec Out - 5220 LINE (Line Input) Microphone - 5220 Mic	LINE MIC	Rec	Record Level Cont. Master Level Cont. (Front)	ON	OFF	-	Both position OK	—	—	—	Wrong
					OFF	OFF	-	Both position OK	—	—	—	Good
DOLBY FM	Tuner - 5220 LINE INPUT & 5220 LINE (Line Output) - Amp. AUX Tape In	LINE	Rec	FM CAL (Rear)	ON	ON	25µ		—	—	—	Wrong
					ON	ON	Flat		—	—	—	Good
Other Tape Recorder play CAL for Decode	Other Tape Recorder Output - 5220 LINE IN-PUT (from Recorder)	LINE	STOP	Play CAL (Rear)	ON	ON			—	—	—	Good
					ON	ON			400Hz DOLBY TONE		—	—

9. BLOCK DIAGRAM

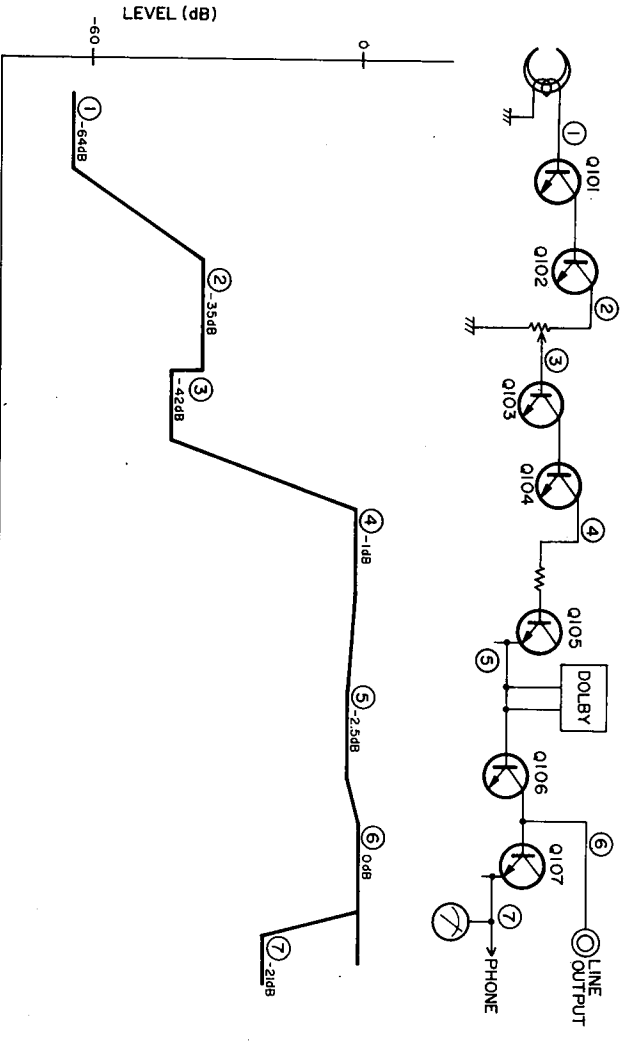


NOTE

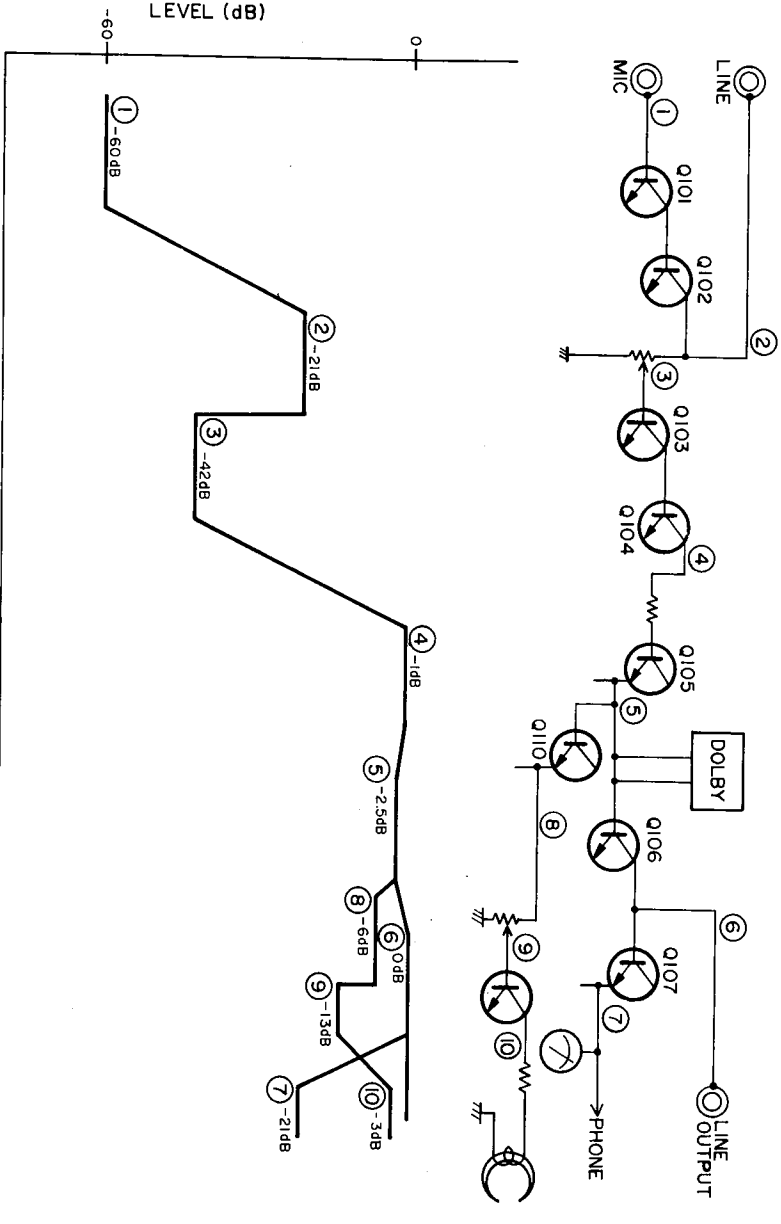
- S1, S2 : REC/PLAY SWITCH (IN REC POSITION)
 - S3, S4 : DOLBY FM SWITCH (IN OFF POSITION)
 - S5, S6 : DE-EMPHASIS SWITCH (IN FLAT POSITION)
- : ADJUSTABLE

10. LEVEL DIAGRAMS

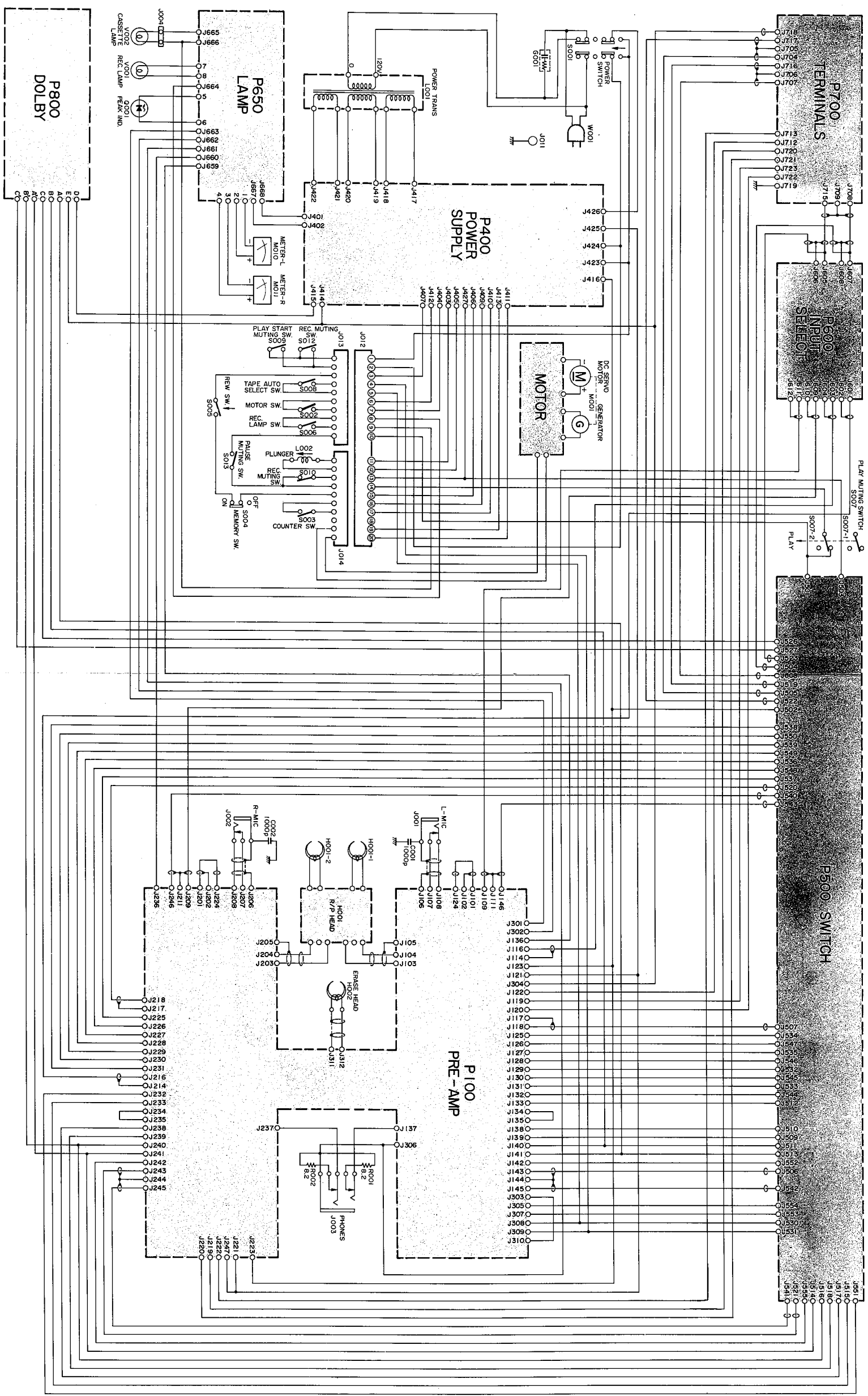
PLAYBACK

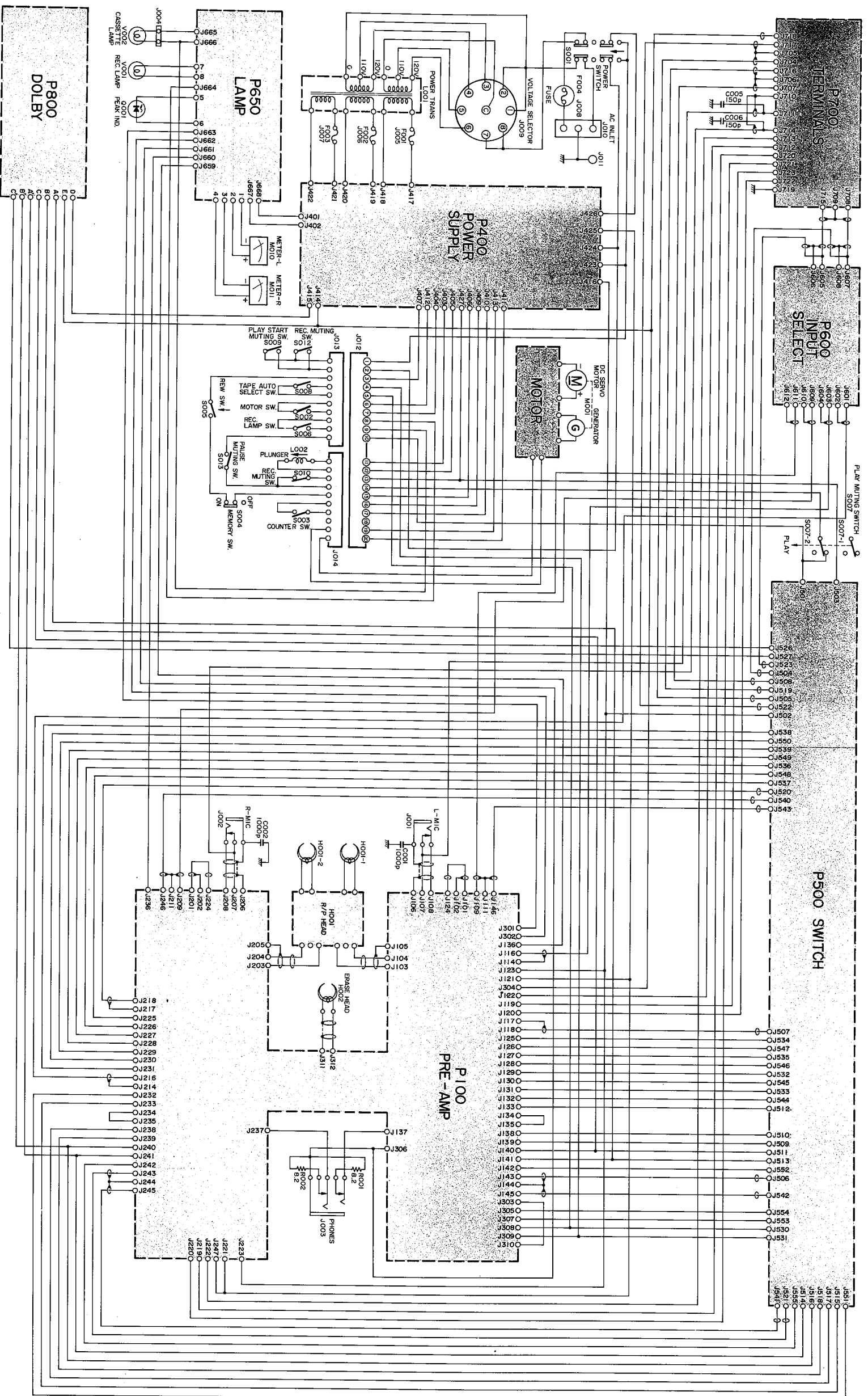


RECORD

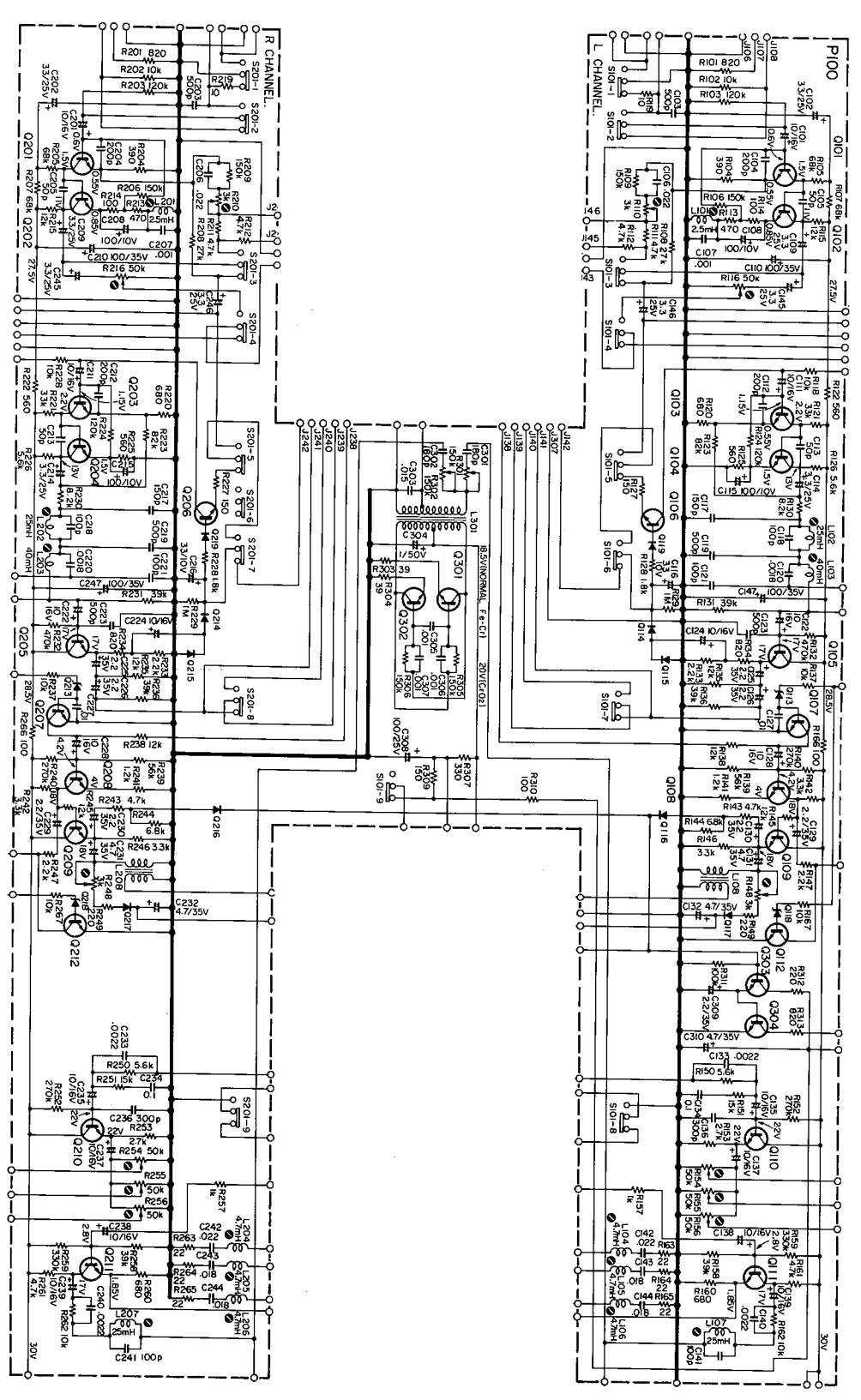


11. INTERCONNECTION DIAGRAMS (A) for U.S.A. and Canada

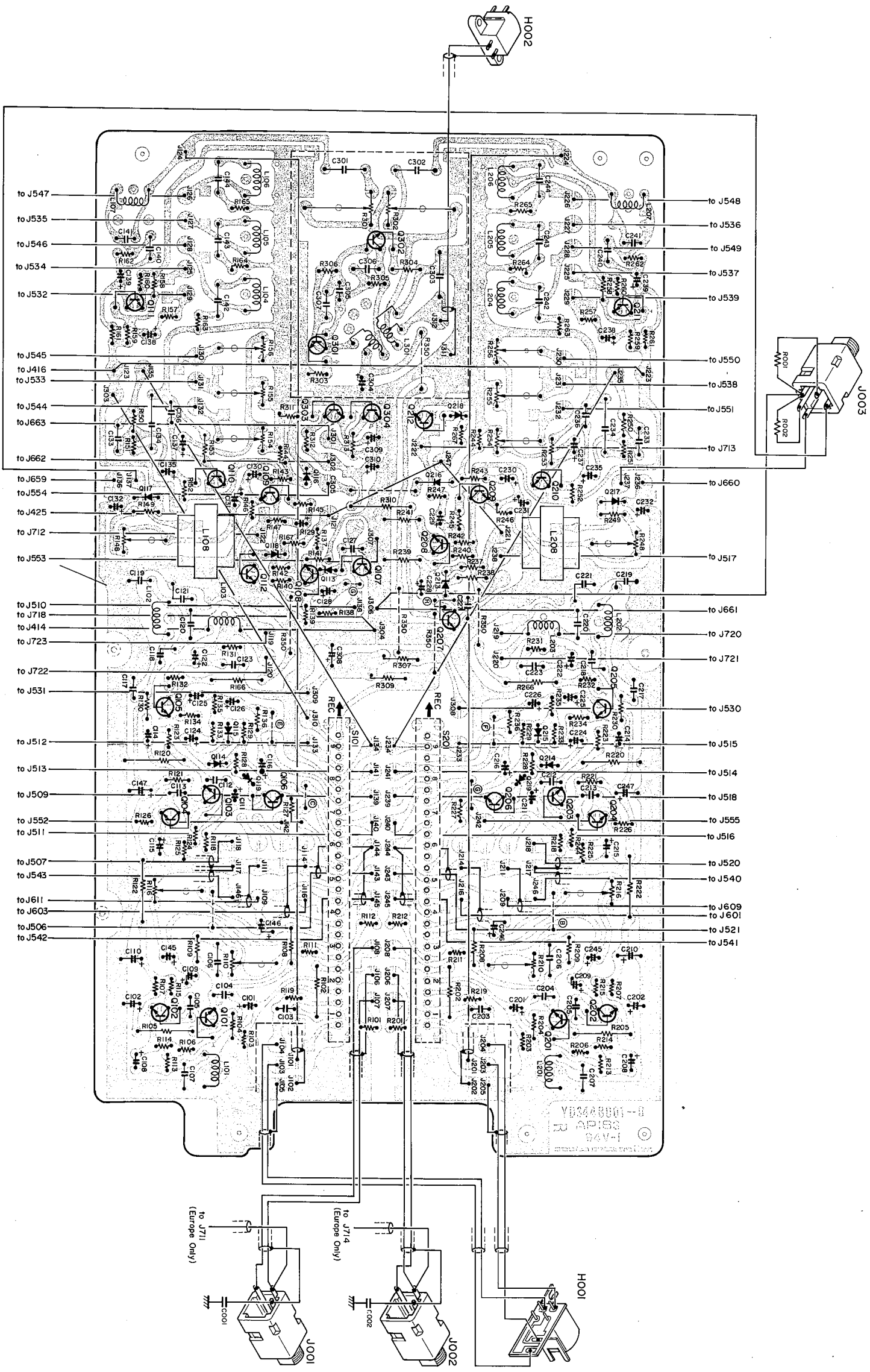




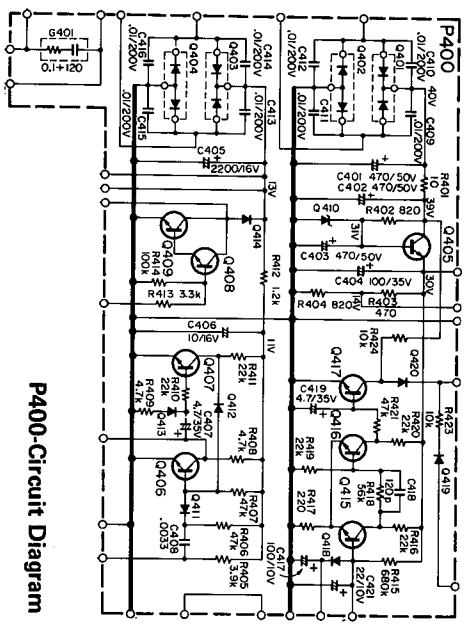
12. MOUNTING/SCHEMATIC DIAGRAMS



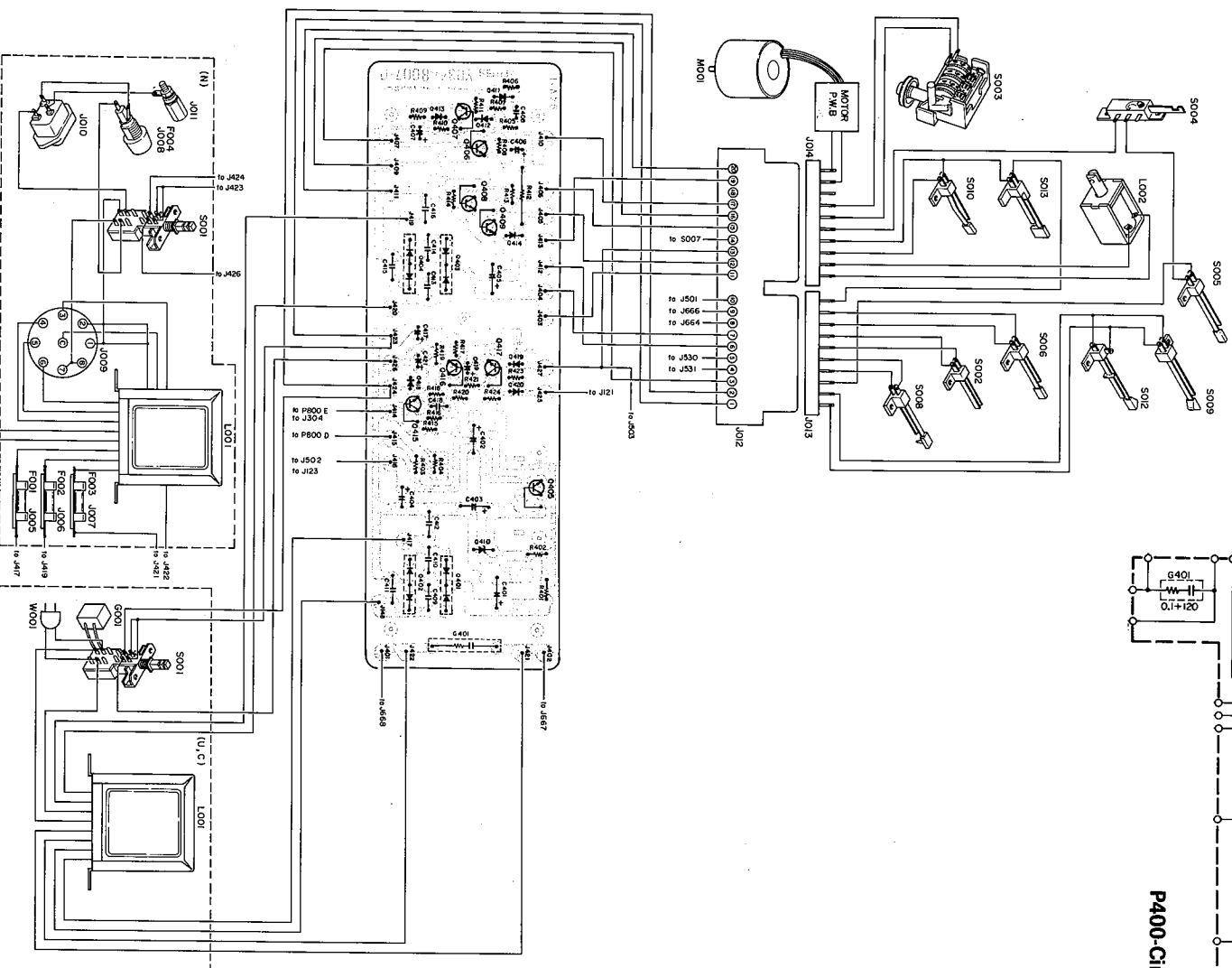
P100-Circuit Diagram



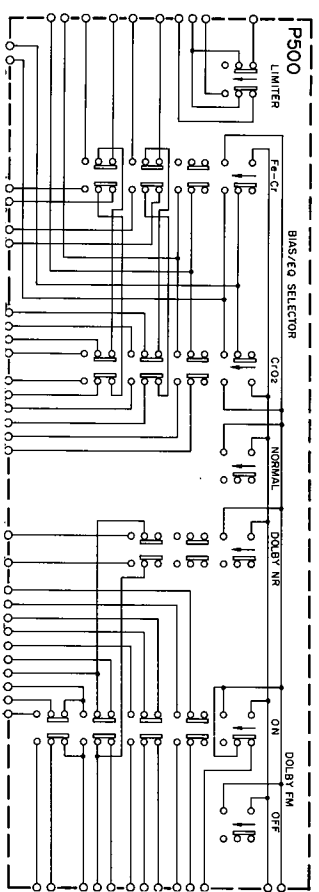
Pre-Amp. Assembly P100 Component Locations



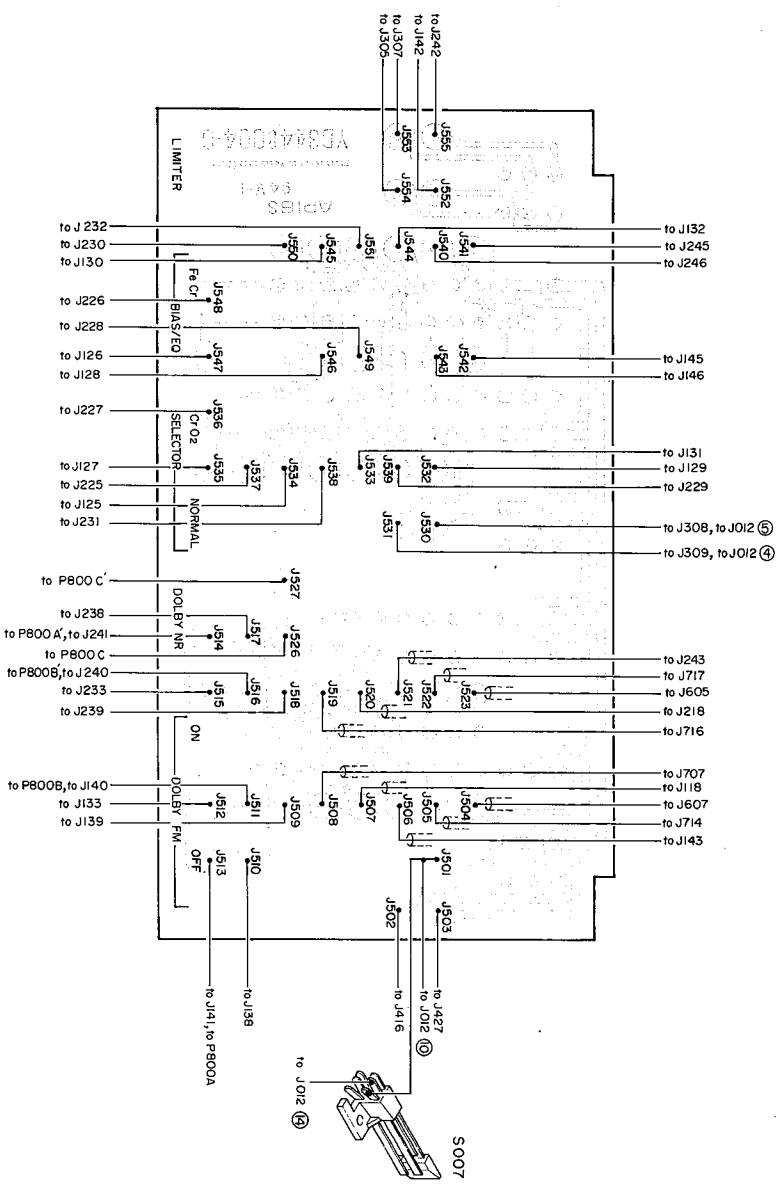
P400-Circuit Diagram



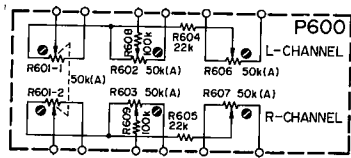
Power Supply Assembly P400 Component Locations



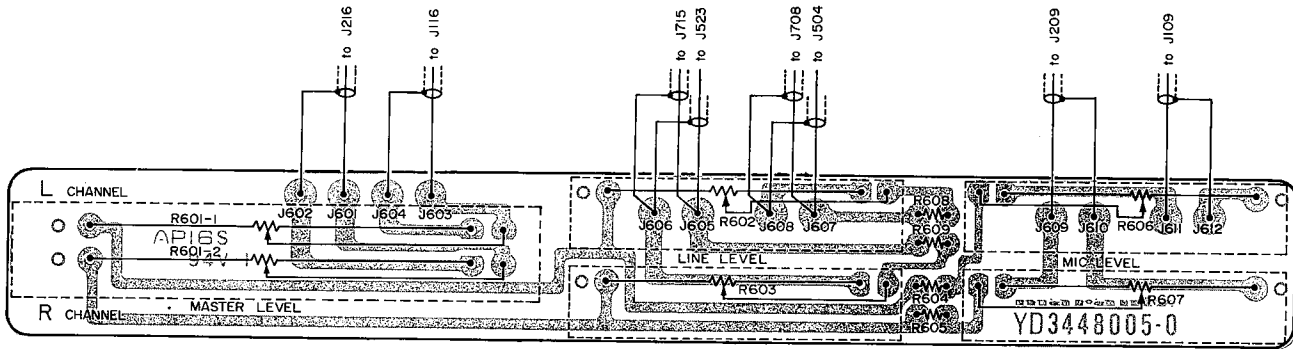
P500-Circuit Diagram



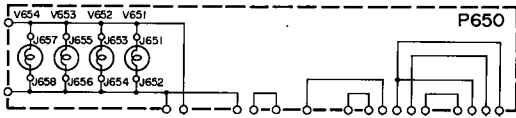
Switch Assembly P500 Component Locations



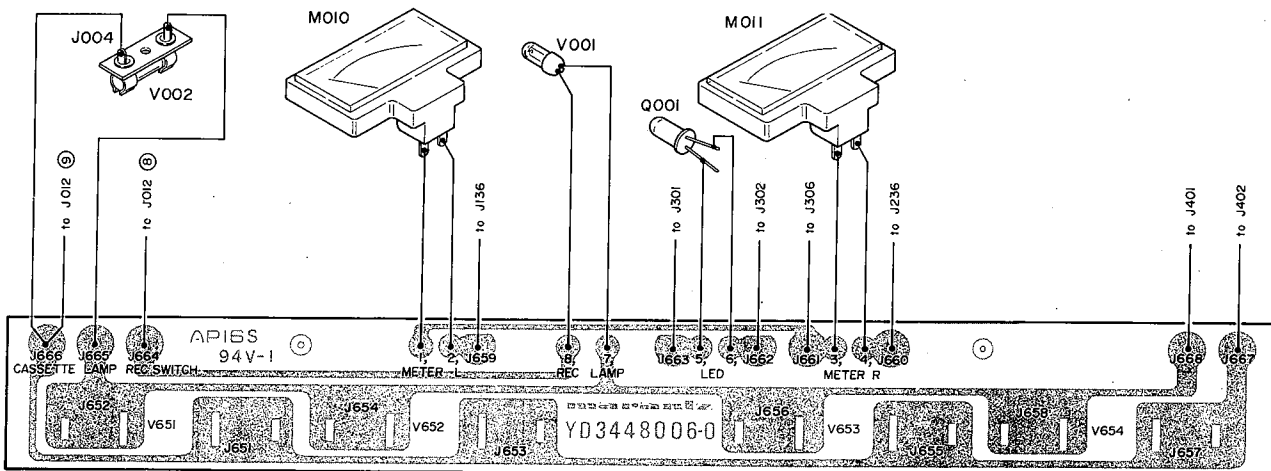
P600-Circuit Diagram



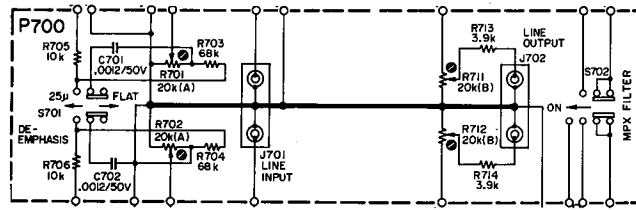
Volume Assembly P600 Component Locations



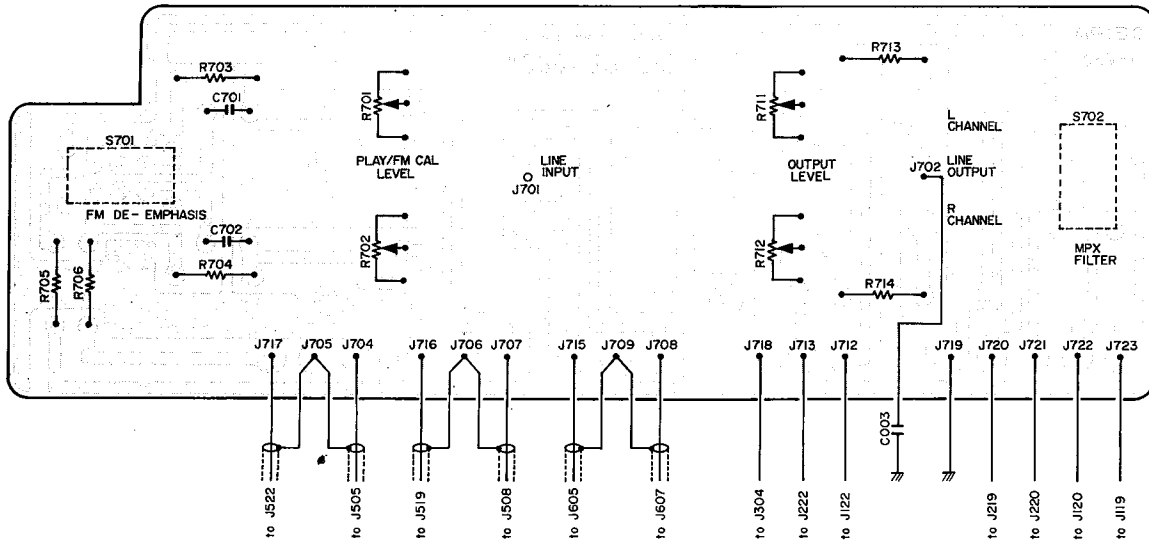
P650-Circuit Diagram



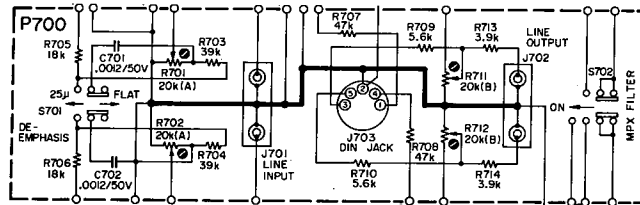
Lamp Assembly P650 Component Locations



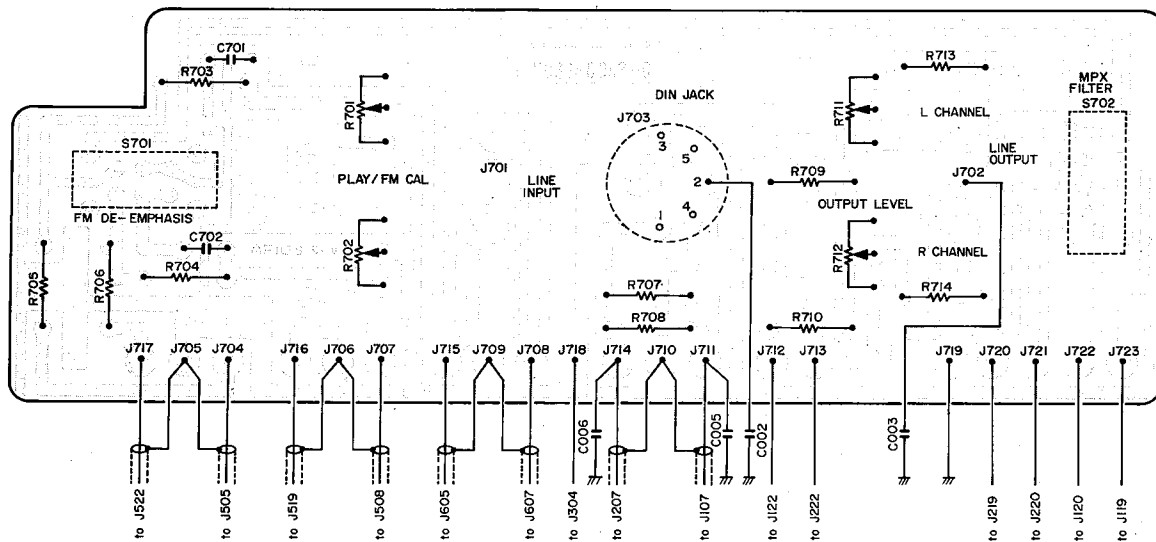
P700-Circuit Diagram



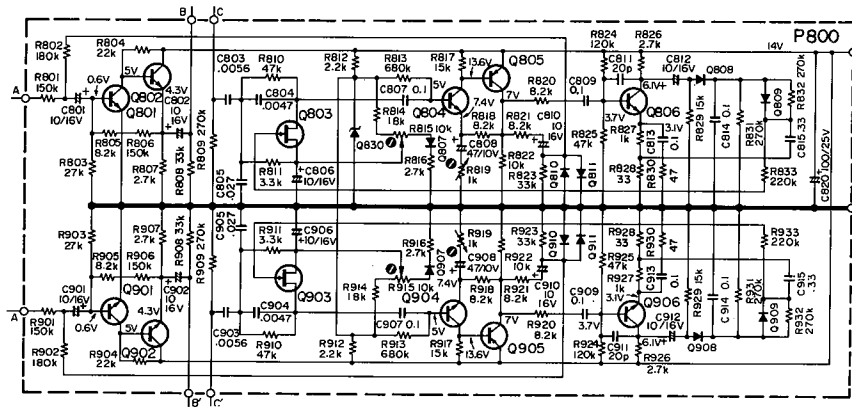
Terminals Assembly P700 Component Locations



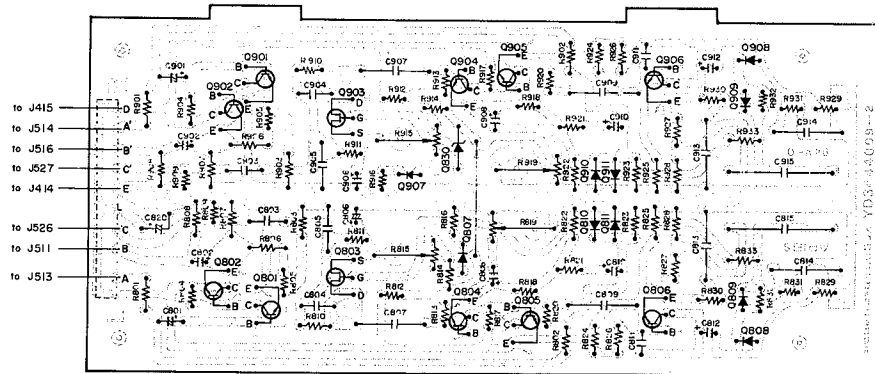
P700-Circuit Diagram (For European Model)



Terminals Assembly P700 Component Locations (For European Model)



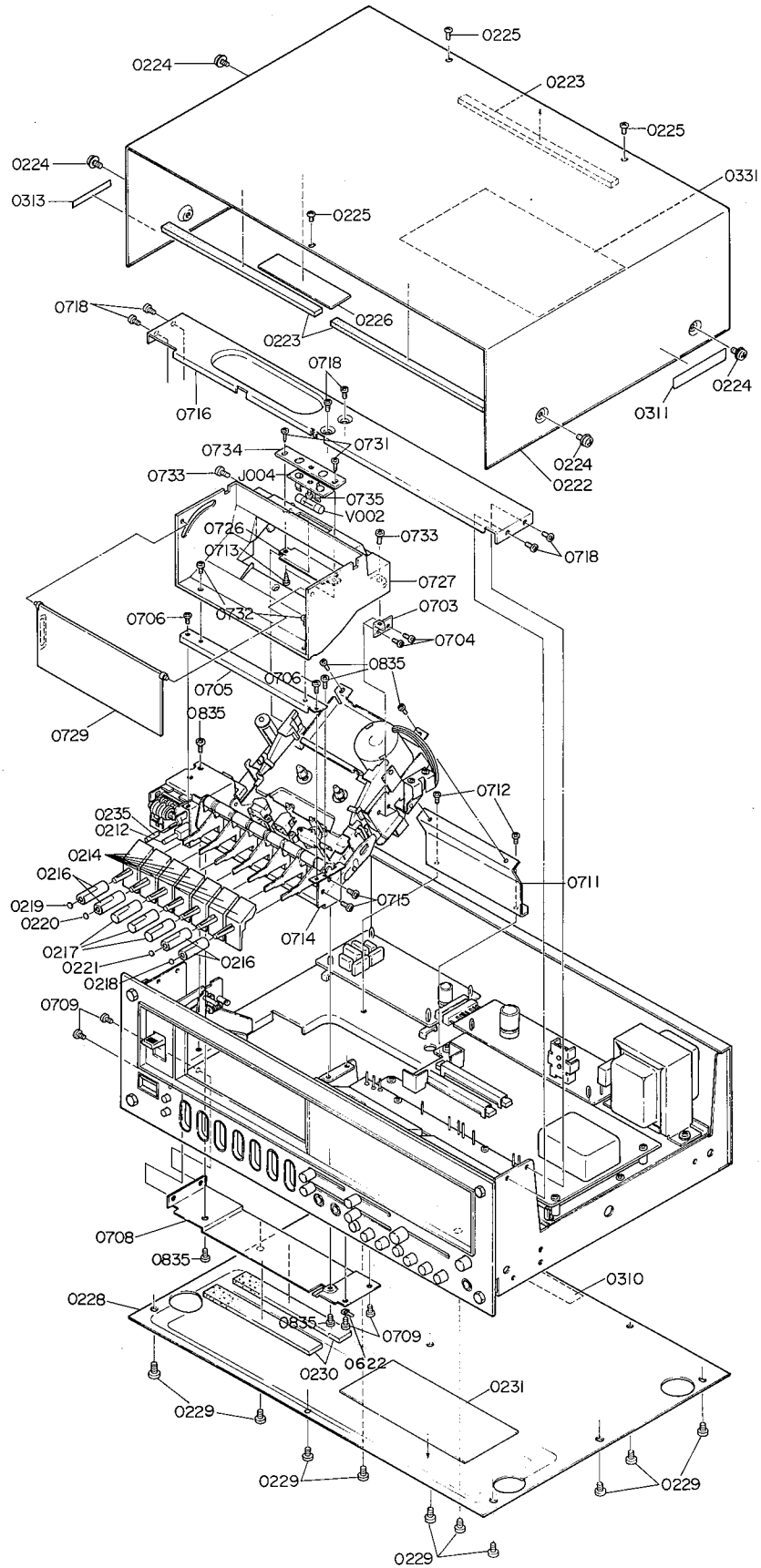
P800-Circuit Diagram



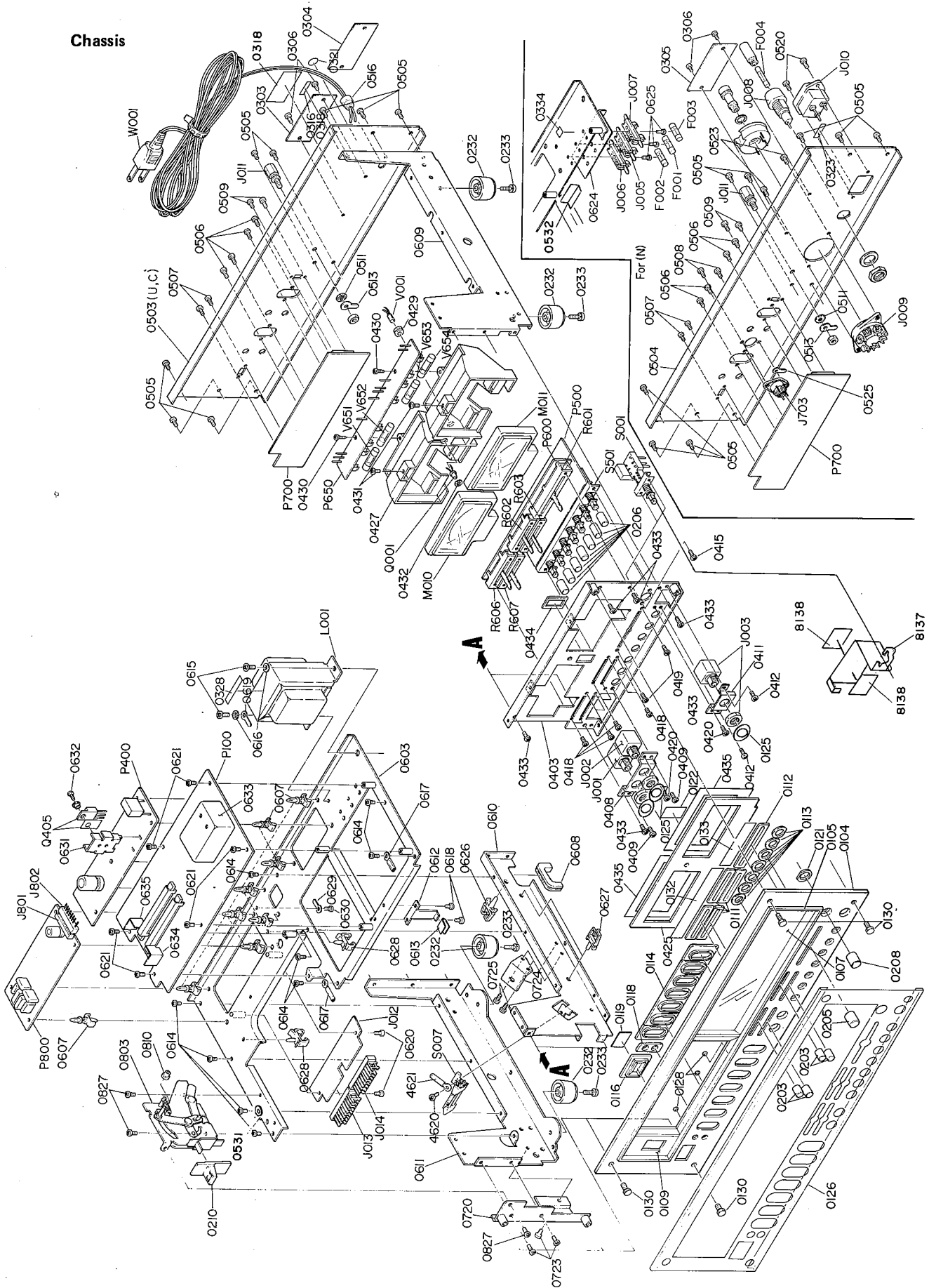
Dolly Assembly P800 Component Locations

13. EXPLODED VIEWS

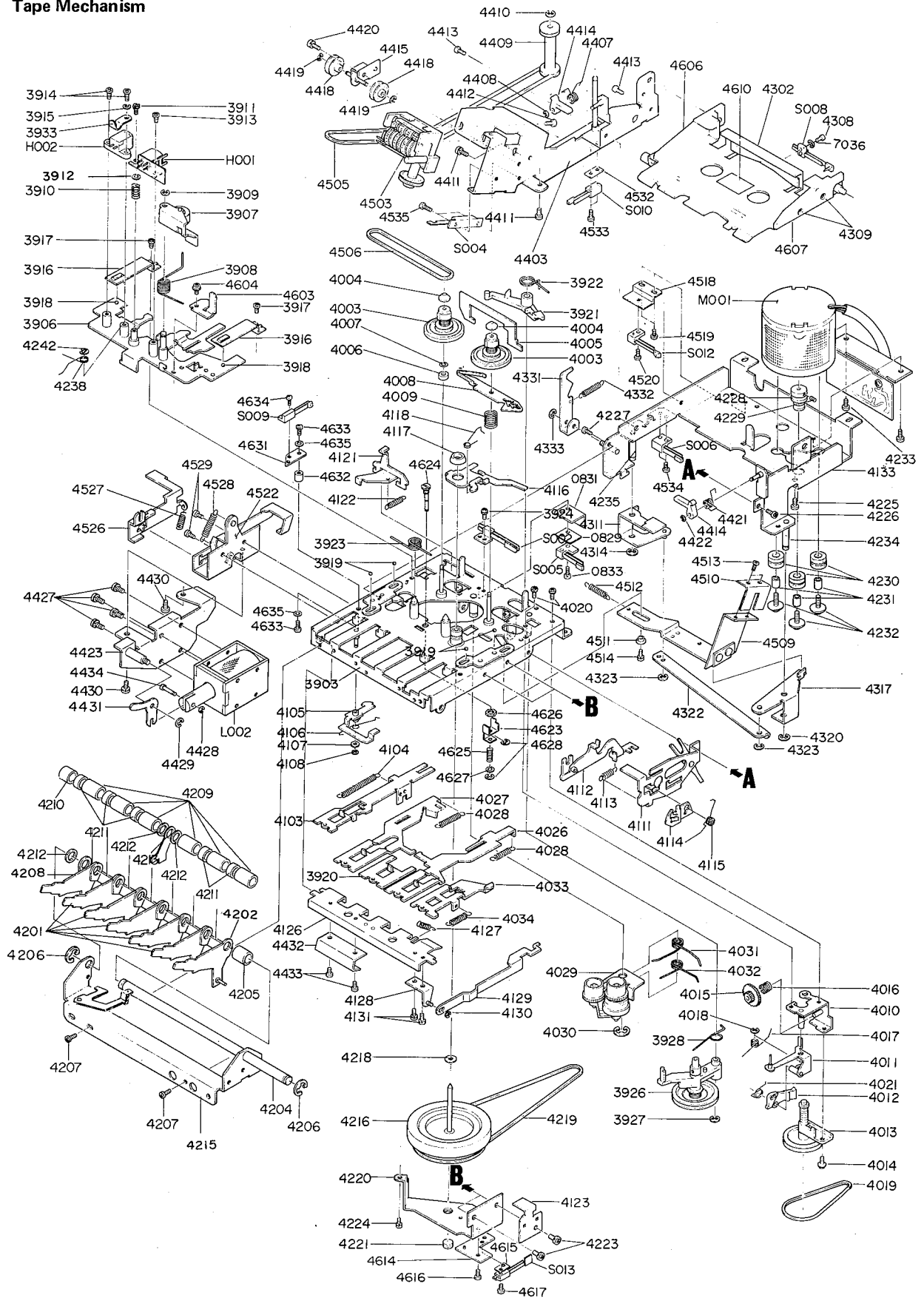
Cabinet



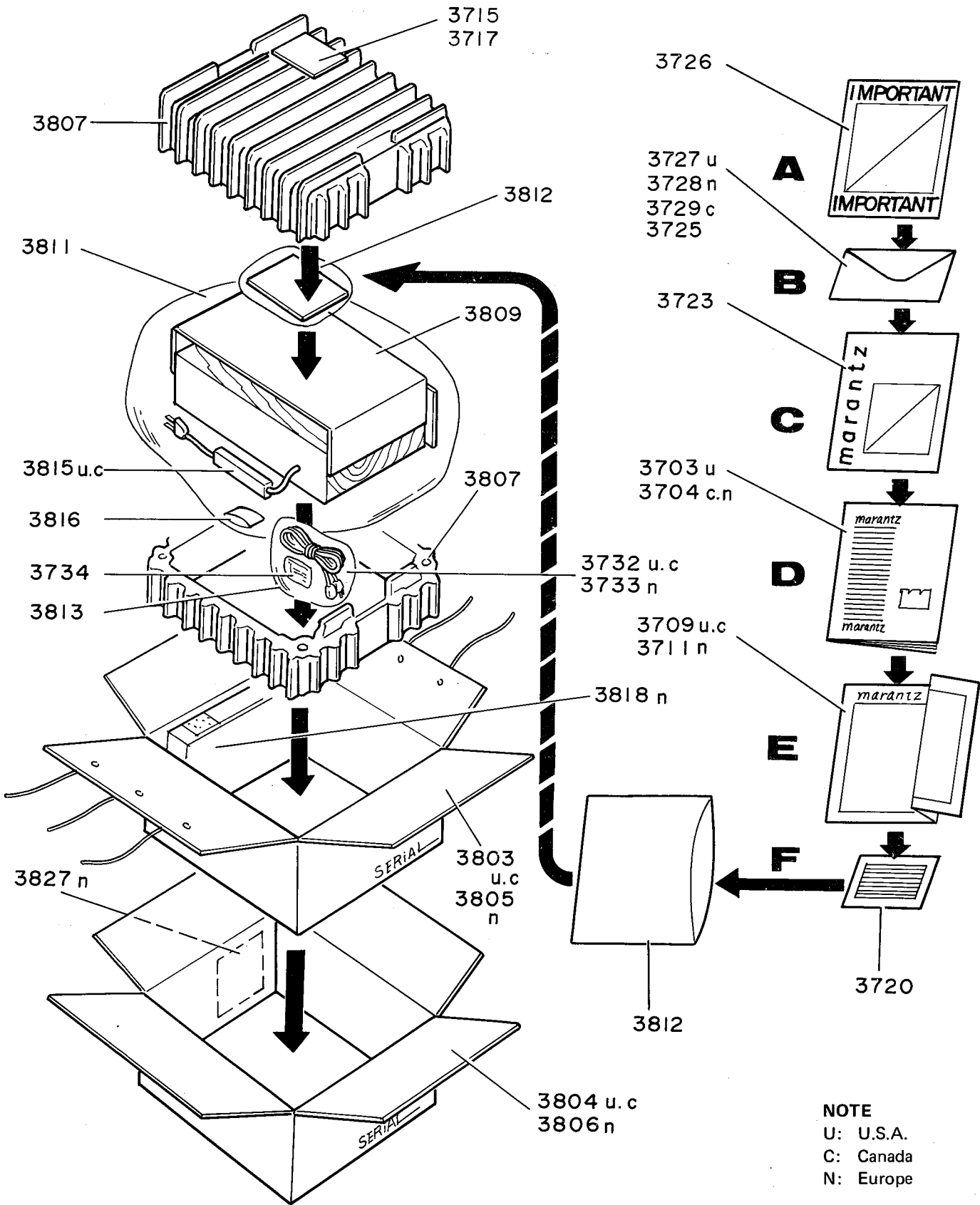
Chassis



Tape Mechanism



14. PACKING



U: U.S.A.
C: Canada
N: Europe

15. PARTS LIST

REF. DESIG.	QTY.			PART NO.	DESCRIPTION
	U	C	N		
A	1	1	1	344806340	Front Panel Assembly
0104	1	1	1	344806301	Escutcheon
0105	1	1	1	344840101	Frame
0107	1	1	1	344815801	Window
0109	1	1	1	344815802	Window
0111	4	4	4	285025901	Bush
0112	1	1	1	285425901	Bush
0113	7	7	7	344825901	Bush
0114	1	1	1	344825902	Bush
0116	1	1	1	344805302	Cover
0118	1	1	1	344825904	Bush
0119	1	1	1	344815803	Window
0121	1	1	1	288625901	Bush
0126	1	1	1	344805301	Cover
0128	3	3	3	186105603	Buffer
0132	4	4	4	344830301	Mask
0133	1	1	1	344830302	Mask
B	1	1	1	344825740	Top Lid Assembly
0222	1	1	1	344825701	Lid
0223	3	3	3	257711807	Spacer
0226	1	1	1	344812002	Insulator
0311	1	1	1	293286101	Label, "Caution"
0313	1	1	1	281886101	Label, Imitation
0331	1	1	1	344886101	Label, "Adjustment Points"
C	1	1	1	344825741	Bottom Lid Assembly
0228	1	1	1	344825702	Lid
0231	1	1	1	344812005	Insulator
0310	1	1	1	257886101	Label, "UL Caution"
D	1	1	1	344827040	Button Assembly, Pause
0214	1	1	1	344827003	Button
0216	1	1	1	344806701	Cap
0218	1	1	1	341110801	Seal
4202	1	1	1	344835422	Lever
E	1	1	1	344827041	Button Assembly, Eject
0212	1	1	1	344827003	Button
0216	1	1	1	344806701	Cap
0219	1	1	1	341110802	Seal
4208	1	1	1	344835420	Lever
F	1	1	1	344827042	Button Assembly, Rec.
0214	1	1	1	344827003	Button
0216	1	1	1	344806701	Cap
0220	1	1	1	341110803	Seal
4201	1	1	1	344835421	Lever
G	1	1	1	344827043	Button Assembly, Stop
0214	1	1	1	344827003	Button
0216	1	1	1	344806701	Cap
0221	1	1	1	341110804	Seal
4201	1	1	1	344835421	Lever
H	1	1	1	344827044	Button Assembly, F.F., PLAY, REW.
0214	3	3	3	344827003	Button
0217	3	3	3	344806702	Cap
4201	3	3	3	344835421	Lever

REF. DESIG.	QTY.			PART NO.	DESCRIPTION
	U	C	N		
0122	1	1	1	344410703	EXTERIORS (1) Cover, Rec. Lamp Tracing
0125	3	3	3	344810701	Sheet, Mic. & Phones
0203	4	4	4	344815401	EXTERIORS (2) Knob, Mic. & Line
0205	1	1	1	285015401	Knob, Master Level
0206	7	7	7	344815402	Knob, Push-Button
0208	1	1	1	344815404	Knob, Power
0210	1	1	1	344827001	Button
0212	1	1	1	344827002	Button, Memory Switch
0224	4	4	4	51480406S	B.H.M. Screw F, B4 x 6
0225	3	3	3	51122605S	T.H.M. Screw, T2.6 x 5
0229	10	10	10	51100406S	B.H.M. Screw, B4 x 6
0230	2	2	2	288611802	Buffer
0232	4	4	4	293205701	Leg
0233	4	4	4	51440410S	L Washer Screw
0235	1	1	1	344806703	Cap, Counter Reset Button
0303	1			344826502	PANEL INDICATORS Name Plate
0304		1		344826503	Name Plate
0305			1	344826504	Name Plate
0306	2	2	2	51100306S	B.H.M. Screw, B3 x 6
0316		1		951091101	Label, LL No.
0317		1		282186102	Label, Fuse Caution
0318	1			951091102	Label, Factory No.
0321	1			951110105	Label, UL
0323			1	288286103	Label, Power Rating
0328	1	1	1	290886101	LABELS INSIDE CABINET Label, Power Transformer
0329		1		951022101	Label, "Caution for Fuse"
0403	1	1	1	344816052	FRONT PANEL ASSOCIATED HARDWARE Bracket K, Front Panel
0408	1	1	1	344816019	Bracket, Mic. Jack
0409	2	2	2	51100306B	B.H.M. Screw, B3 x 6
0411	1	1	1	344816002	Bracket, Phones
0412	2	2	2	51100306B	B.H.M. Screw B3 x 6
0415	2	2	2	51100306B	B.H.M. Screw, B3 x 6
0418	8	8	8	51100205B	B.H.M. Screw, B2 x 5
0419	2	2	2	51100306B	B.H.M. Screw, B3 x 6
0420	2	2	2	51100304B	B.H.M. Screw, B3 x 4
0425	1	1	1	344826501	Indicator, Meter Window
0427	1	1	1	344827401	Reflector
0429	1	1	1	344427106	Holder, Lamp
0430	2	2	2	51400308P	B.H. Tapped Screw, B3 x 8 ST
0431	2	2	2	51100306B	B.H.M. Screw, B3 x 6
0432	1	1	1	344827102	Holder, LED
0433	5	5	5	51100306B	B.H.M. Screw, B3 x 6
0434	1	1	1	344811803	Spacer, Light Cover
0435	2	2	2	344812201	Sticker, Blind
8137	1	1	1	344810904	Shield, Power Switch
8138	2	2	2	344812007	Insulator, Power Switch

U: U.S.A.
C: Canada
N: Europe

REF. DESIG.	QTY.			PART NO.	DESCRIPTION
	U	C	N		
TERMINAL BOARD ASSOCIATED HARDWARE					
0503	1	1		344816003	Bracket, Terminal Board
0504			1	344816004	Bracket, Terminal Board
0505	8	8	8	51100306S	B.H.M. Screw, B3x6
0506	4	4	4	51100306S	B.H.M. Screw, B3x6
0507	2	2	2	51102605S	B.H.M. Screw, B2.6x5
0508			2	51100306S	B.H.M. Screw, B3x6
0509	2	2	2	51102605S	B.H.M. Screw, B2.6x5
0511	1	1	1	54050400R	T.L. Washer OR
0513	1	1	1	62041760W	Lug
0516	1	1		145525903	Bush
0520			2	51100306S	B.H.M. Screw, B3x6
0523			2	51100306S	B.H.M. Screw, B3x6
0525			1	62031340W	Lug
CHASSIS AND ASSOCIATED PARTS					
0603	1	1	1	344810550	Chassis K
0607	11	11	11	291210105	Support, Dolby & Power Supply Circuit Boards
0608	1	1	1	288925901	Bush
0609	1	1	1	344810401	Retainer, Right-Hand
0610	1	1	1	344810402	Retainer, Center
0611	1	1	1	344810403	Retainer, Left-Hand
0612	1	1	1	344816022	Bracket, Switch Circuit Board
0613	1	1	1	288612009	Insulator
0614	9	9	9	51100306B	B. H. M. Screw, B3x6
0615	2	2	2	51100406B	B.H.M. Screw, B4x6
0616	2	2	2	54050400R	T.L. Washer, OR
0617	2	2	2	121000501	Clamper, Erase Head Lead
0618	2	2	2	51100306B	B.H.M. Screw, B3x6
0619	1	1	1	62041760W	Lug
0620	2	2	2	51100306S	B.H.M. Screw, B3x6
0621	6	6	6	51100306S	B.H.M. Screw, B3x6
0622	1	1	1	62030039W	T.L. Lug
0623	1	1	1	51100306B	B.H.M. Screw, B3x6
0624			1	344812004	Insulator
0625			3	51062606B	P.H.M. Screw, P2.6x6
0626	1	1	1	288600505	Clamper, Center
0627	2	2	2	288600502	Clamper, Center
0628	2	2	2	288600505	Clamper, Chassis
0629	1	1	1	62030039W	T.L. Lug
0630	1	1	1	51570306B	P. Tapped Screw, P3x6 ST
0631	1	1	1	344426701	Heat Sink
0632	1	1	1	51100306A	B.H.M. Screw, B3x6
0633	1	1	1	344410909	Shield, OSC
0634	1	1	1	344810902	Shield, Rec. Switch
0635	1	1	1	344810903	Shield, Rec. Switch
TAPE MECHANISM MOUNTING HARDWARE					
0703	1	1	1	344816018	Bracket, Cabinet
0704	2	2	2	51102605B	B.H.M. Screw, B2.6x5
0705	1	1	1	344816008	Bracket, Front
0706	2	2	2	51100306B	B.H.M. Screw, B3x6
0708	1	1	1	344816009	Bracket, Bottom
0709	4	4	4	51100306B	B.H.M. Screw, B3x6
0711	1	1	1	344816010	Bracket, Rear
0712	2	2	2	51100306B	B.H.M. Screw, B3x6
0713	2	2	2	51100306S	B.H.M. Screw, B3x6
0714	1	1	1	344816011	Bracket, Right
0715	2	2	2	51102605B	B.H.M. Screw, B2.6x5

REF. DESIG.	QTY.			PART NO.	DESCRIPTION
	U	C	N		
0716	1	1	1	344810405	Retainer
0718	6	6	6	51100306B	B. H. M. Screw, B3x6
0720	1	1	1	344816051	Bracket K, Front Panel w/Chassis
0723	3	3	3	51100306B	B.H.M. Screw, B3x6
0724	1	1	1	344810407	Retainer
0725	2	2	2	51100305B	B.H.M. Screw, B3x5
0726	1	1	1	344815805	Window, Cassette
0727	1	1	1	344806401	Compartment, Cassette
0729	1	1	1	344825703	Lid, Cassette Compartment
0731	2	2	2	51380308P	P.H. Tapped Screw, P3x8 ST
0732	2	2	2	51040308S	F.H.M. Screw, F3x8
0733	2	2	2	51100306B	B.H.M. Screw, B3x6
0734	1	1	1	344816013	Bracket, Cassette Lamp
0735	1	1	1	51100306B	B.H.M. Screw, B3x6
0803	1	1	1	344816050	Bracket K, Door Arrangement
0806	1	1	1	344835401	Lever
0807	1	1	1	344811201	Shaft
0810	1	1	1	344805505	Collar
0812	1	1	1	344835409	Lever
0813	1	1	1	344811202	Shaft
0816	1	1	1	344835402	Lever
0817	1	1	1	344811202	Shaft
0827	3	3	3	51100306B	B.H.M. Screw, B3x6
0829	1	1	1	344811802	Spacer, Leaf Switch, Rew.
0831	1	1	1	344812001	Insulator
0833	1	1	1	51060208B	P.H.M. Screw, P2x8
0835	6	6	6	51100306B	B.H.M. Screw, B3x6
PRINTED MATTER					
3703	1			344885101	Instructions, Set
3704		1	1	344885131	Instructions, Set
3709	1	1		344885601	Schematic Diagram
3711			1	344885603	Schematic Diagram
3715	1	1		344485103	Instructions, Accessories
3717			1	344485105	Instructions, Accessories
3720	1	1	1	281885104	Instructions, Packing
3723	1			281885402	Guarantee Card
3725	1	1	1	257785401	Guarantee Card, IBM
3726	1	1	1	257785102	Instructions, "Important"
3727	1			257781301	Envelope
3728			1	281881301	Envelope
3729			1	291881301	Envelope
ACCESSORIES					
3732	2	2		ZD0120006	Connection Cord, RCA Type
3733			1	ZD0200007	Connection Cord, DIN Type
3734	1	1	1	288107101	Cleaner
PACKING MATERIALS					
3803	1	1		344880101	Packing Case, Inner
3804	1	1		344880102	Packing Case, Outer
3805			1	344880103	Packing Case, Inner
3806			1	344880104	Packing Case, Outer
3807	2	2	2	344880301	Cushion
3809	1	1	1	291810715	Sheet, Protective
3811	1	1	1	901453835	Polyethylene Bag, Set
3812	1	1	1	901302501	Polyethylene Bag, Printed Matter
3813	1	1	1	901302501	Polyethylene Bag, Accessories
3815	1	1		102980401	Sleeve, Power Cord
3816	2	2	2	273182101	Silicagel
3818			1	344880701	Reinforcing, Power Cord

REF. DESIG.	QTY.			PART NO.	DESCRIPTION
	U	C	N		
3821	4			952281501	Serial No. Card
3822		4		952301512	Serial No. Card
3823			4	952301513	Serial No. Card
3827			1	288286101	Label, Packing Case
TAPE MECHANISM					
3901	1	1	1	344830401	Mechanism Assembly
3903	1	1	1	344810503	Chassis S, Main
3906	1	1	1	344410571	Chassis S, Head
3907	1	1	1	344425550	Pinch Roller K
3908	1	1	1	344411513	Spring
3909	1	1	1	64000200R	R.G. Ring, E Type
3910	1	1	1	344411514	Spring
3911	1	1	1	304825402	Pin
3912	1	1	1	344411807	Spacer
3913	1	1	1	51440206A	P.H. Cam Screw, P2 x 6
3914	2	2	2	51450206A	P. H. Cam Screw, P2 x 6
3915	1	1	1	54010200E	Washer
3916	2	2	2	344411515	Spring
3917	2	2	2	51572505A	P.H. Tapped Screw, P2.5 x 5 ST
3918	2	2	2	61020010T	Ball
3919	4	4	4	61250010T	Ball
3920	1	1	1	344835414	Lever
3921	1	1	1	344435407	Lever
3922	1	1	1	344411518	Spring
3923	1	1	1	344411516	Spring
3924	1	1	1	51100208B	B.H.M. Screw, B2x8
3926	1	1	1	344400250	Arm K
3927	1	1	1	64000200R	R.G. Ring, E. Type
3928	1	1	1	344411519	Spring
3933	1	1	1	116900502	Clamper
4003	2	2	2	344400450	Table K, Reel
4004	2	2	2	344406701	Cap
4005	1	1	1	344426301	Brake
4006	1	1	1	344405502	Collar
4007	1	1	1	59020402G	Polyethylene Washer
4008	1	1	1	344405401	Cam, Auto-Stop Detect
4009	1	1	1	344411521	Spring
4010	1	1	1	344416051	Bracket K, Auto-Stop
4011	1	1	1	344416052	Bracket K, Detect
4012	1	1	1	344435408	Lever
4013	1	1	1	344426250	Pulley K
4014	1	1	1	344411411	Stopper, Screw
4015	1	1	1	344405801	Gear
4016	1	1	1	344411522	Spring
4017	1	1	1	344411523	Spring
4018	1	1	1	64000200R	R.G. Ring, E Type
4019	1	1	1	344426403	Belt, Auto-Stop
4020	2	2	2	51440203A	P. H. Cam Screw, P2 x 3
4021	1	1	1	344411536	Spring, Return
4026	1	1	1	344435409	Lever, F. F.
4027	1	1	1	344435410	Lever, Rew.
4028	2	2	2	344411524	Spring, Return
4029	1	1	1	344400150	Idler K.
4030	1	1	1	64000400R	R. G. Ring, E Type
4031	1	1	1	344411525	Spring
4032	1	1	1	344411526	Spring
4033	1	1	1	344835415	Lever, Stop
4034	1	1	1	344811510	Spring
4103	1	1	1	344835415	Lever, Rec.
4104	1	1	1	344411527	Spring, Return
4105	1	1	1	344835416	Lever, Lock
4106	1	1	1	344811511	Spring, Return

REF. DESIG.	QTY.			PART NO.	DESCRIPTION
	U	C	N		
4107	1	1	1	54022600E	Washer
4108	1	1	1	64001500R	R. G. Ring, E Type
4111	1	1	1	344835450	Lever K, Pause
4112	1	1	1	344835451	Lever K
4113	1	1	1	344811512	Spring, Return
4114	1	1	1	344405402	Cam, Lock
4115	1	1	1	344811513	Spring, Lock
4116	1	1	1	344400206	Arm
4117	1	1	1	344425903	Bush
4118	1	1	1	344411531	Spring, Pause
4121	1	1	1	344435415	Lever, Erase Error Protective
4122	1	1	1	344411533	Spring
4123	1	1	1	344511403	Stopper
4126	1	1	1	344411407	Stopper, Push Button
4127	1	1	1	344411535	Spring, Return
4128	1	1	1	344416054	Bracket K, Link
4129	1	1	1	344435417	Lever
4130	1	1	1	64001500R	R.G. Ring, E Type
4131	2	2	2	51442604A	P. H. Cam Screw, P2.6 x 4
4133	1	1	1	344516050	Bracket K, Motor
4201	1	1	1	344835421	Lever, Push Button (PLAY, F.F. REW. STOP. REC.)
4202	1	1	1	344835422	Lever, Push Button (PAUSE)
4204	1	1	1	344411208	Shaft, Push Button
4205	1	1	1	344805501	Collar
4206	2	2	2	64000500R	R.G. Ring, E Type
4207	2	2	2	51572505A	P.H. Tapped Screw, P2.5x5 ST
4208	1	1	1	344835420	Lever, Push Button (EJECT)
4209	6	6	6	344805502	Collar
4210	1	1	1	344805503	Collar
4211	5	5	5	344805504	Collar
4212	3	3	3	344411804	Spacer
4213	1	1	1	344811402	Stopper
4215	1	1	1	344827170	Holder S
4216	1	1	1	344527350	Fly-wheel K
4218	1	1	1	344511805	Spacer
4219	1	1	1	344526402	Belt, Fly-wheel
4220	1	1	1	344516019	Bracket, Fly-wheel
4221	1	1	1	344411414	Stopper, Screw
4223	2	2	2	51570305A	P.H. Tapped Screw, P3x5 ST
4224	1	1	1	51572505A	P.H. Tapped Screw, P2.5x5 ST
4225	1	1	1	51570305A	P.H. Tapped Screw, P3x5 ST
4226	1	1	1	51572505A	P.H. Tapped Screw, P2.5x5 ST
4227	1	1	1	51572505A	P.H. Tapped Screw, P2.5x5 ST
4228	1	1	1	344426204	Pulley, Motor
4229	1	1	1	51640205A	Set Screw
4230	3	3	3	344425904	Bush
4231	3	3	3	344405501	Collar
4232	3	3	3	344411413	Stopper (Screw)
4233	2	2	2	51570305A	P.H. Tapped Screw, P3x5 ST
4234	1	1	1	344511206	Shaft, Rec. Arm
4235	1	1	1	344511203	Shaft, Rec. Support
4238	1	1	1	344811520	Spring
4242	1	1	1	64000400R	R.G. Ring, E Type
4302	1	1	1	344516350	Tray K, Cassette Receiving
4308	1	1	1	51060204B	P.H.M. Screw, P2x4
4309	4	4	4	51040204S	F.H.M. Screw, F2x4
4311	1	1	1	344800256	Arm K A, Rec.
7036	1	1	1	54040202N	Spring, Washer

U: U.S.A.
C: Canada
N: Europe

REF. DESIG.	QTY.			PART NO.	DESCRIPTION
	U	C	N		
4314	1	1	1	64000300R	R.G. Ring, E Type
4317	1	1	1	344800257	Arm K B, Rec.
4320	1	1	1	64000300R	R.G. Ring, E Type
4322	1	1	1	344800203	Arm K C, Rec.
4323	2	2	2	64002500R	R.G. Ring, E Type
4331	1	1	1	344805401	Cam, Cassette Receiving Tray Lock
4332	1	1	1	344511502	Spring
4333	1	1	1	64002500R	R.G. Ring, E Type
4403	1	1	1	344816053	Bracket K, Counter
4407	1	1	1	344511505	Spring, Cassette Retaining
4408	1	1	1	64001500R	R.G. Ring, E Type
4409	1	1	1	344826201	Pulley, Counter
4410	1	1	1	64000200R	R.G. Ring, E Type
4411	2	2	2	51060305B	P.H.M. Screw, P3x5
4412	2	2	2	51060305B	P.H.M. Screw, P3x5
4413	2	2	2	51572505A	P.H. Tapped Screw, P2.5x5 ST
4414	2	2	2	344511402	Stopper
4415	1	1	1	344816055	Bracket K, Intermediate
4418	2	2	2	344426201	Pulley
4419	2	2	2	64001500R	R.G. Ring, E Type
4420	1	1	1	51060305B	P.H.M. Screw, P3x5
4421	1	1	1	344511506	Spring
4422	1	1	1	64001500R	R.G. Ring, E Type
4423	1	1	1	344816054	Bracket K, Plunger
4427	4	4	4	51440306A	P.H.M. Screw, P3x6
4428	1	1	1	64001500R	R.G. Ring, E Type
4429	1	1	1	64000200R	R.G. Ring, E Type
4430	2	2	2	51060305B	P.H.M. Screw, P3x5
4431	1	1	1	344800207	Arm
4432	1	1	1	344811408	Stopper
4433	2	2	2	51572504A	P.H. Tapped Screw, P2.5x4 ST
4434	1	1	1	344411205	Shaft
4503	1	1	1	344805202	Counter, Tape
4505	1	1	1	344826401	Belt A
4506	1	1	1	344826402	Belt B
4509	1	1	1	344835406	Lever, Rec.
4510	1	1	1	344811509	Spring
4511	1	1	1	344805101	Guide
4512	1	1	1	344811504	Spring
4513	2	2	2	51102604B	B.H.M. Screw, B2.6x4
4514	1	1	1	51102605B	B.H.M. Screw, B2.6x5
4518	1	1	1	344816023	Bracket
4519	2	2	2	51570306B	P.H. Tapped Screw, P3x6 ST
4520	1	1	1	51060205B	P.H.M. Screw, P2x5
4522	1	1	1	344835452	Lever K, Cassette Tray-up
4526	1	1	1	344835417	Lever
4527	1	1	1	344811502	Spring
4528	1	1	1	344811503	Spring
4529	2	2	2	51382605C	P.H. Tapped Screw, P2.6x5 ST
4532	1	1	1	344811802	Spacer, Rec. SW
4533	2	2	2	51060206B	P.H.M. Screw, P2x6
4534	1	1	1	51060206B	P.H.M. Screw, P2x6
4535	2	2	2	51100204B	B.H.M. Screw, B2x4
4603	1	1	1	344800205	Arm, Muting SW
4604	1	1	1	51382604C	P.H. Tapped Screw, P2.6x4 ST
4606	1	1	1	344505101	Guide L, Cassette
4607	1	1	1	344505102	Guide R, Cassette
4610	1	1	1	344815804	Window, Cassette Tray
4614	1	1	1	344816024	Bracket, Pause Muting
4615	1	1	1	344412001	Insulator
4616	1	1	1	51382605C	P.H. Tapped Screw, P2.6x5 ST
4617	1	1	1	51060204B	P.H.M. Screw, P2x4

REF. DESIG.	QTY.			PART NO.	DESCRIPTION
	U	C	N		
4620	1	1	1	51100306B	B.H.M. Screw, B3x6
4621	1	1	1	138200503	Clamper, Head Leads
4623	1	1	1	344811409	Stopper, Head Chassis
4624	1	1	1	344811215	Shaft
4625	1	1	1	344811517	Spring
4626	1	1	1	53110403E	Nut
4627	1	1	1	54020300E	Washer
4628	2	2	2	64002500R	R.G. Ring, E Type
4629	2	2	2	121000501	Clamper, Play Start Muting
4630	2	2	2	51062604B	P.H.M. Screw, P2.6x4
4631	1	1	1	344816025	Bracket
4632	1	1	1	344805506	Collar
4633	2	2	2	51060304B	P.H.M. Screw, P3x4
4634	1	1	1	51060204B	P.H.M. Screw, P2x4
4635	2	2	2	54040302B	Spring Washer
PREAMP. CIRCUIT BOARD-P100					
P100	1	1	1	YD3448001	P.W. Board, Preamp. (Print Only)
	1	1	1	ZZ3448001	P.W. Board Assembly
P100-SWITCHES					
S101	1	1	1	SS0902004	Slide, Rec./Play
S201	1	1	1	SS0902004	Slide, Rec./Play
P-100 COILS & TRANSFORMERS					
L101	1	1	1	LC2255001	Choke Coil, 2.5mH
L201	1	1	1	LC2255001	Choke Coil, 2.5mH
L102	1	1	1	LC2256001	Choke Coil, 25mH
L202	1	1	1	LC2256001	Choke Coil, 25mH
L103	1	1	1	LC2406001	Choke Coil, 40mH
L203	1	1	1	LC2406001	Choke Coil, 40mH
L104	1	1	1	LC2475002	Choke Coil, 4.7mH
L204	1	1	1	LC2475002	Choke Coil, 4.7mH
L105	1	1	1	LC2475002	Choke Coil, 4.7mH
L205	1	1	1	LC2475002	Choke Coil, 4.7mH
L106	1	1	1	LC2475002	Choke Coil, 4.7mH
L206	1	1	1	LC2475002	Choke Coil, 4.7mH
L107	1	1	1	LC2256001	Choke Coil, 25mH
L207	1	1	1	LC2256001	Choke Coil, 25mH
L108	1	1	1	TO1190504	Output Transformer
L208	1	1	1	TO1190504	Output Transformer
L301	1	1	1	TC1018007	OSC Transformer
P-100 SEMICONDUCTORS					
Q101	1	1	1	HT313271T	Transistor, 2SC1327(T)
Q201	1	1	1	HT313271T	Transistor, 2SC1327(T)
Q102	1	1	1	HT313271T	Transistor, 2SC1327(T)
Q202	1	1	1	HT313271T	Transistor, 2SC1327(T)
Q103	1	1	1	HT306441A	Transistor, 2SC644(R)
Q203	1	1	1	HT306441A	Transistor, 2SC644(R)
Q104	1	1	1	HT306441A	Transistor, 2SC644(R)
Q204	1	1	1	HT306441A	Transistor, 2SC644(R)
Q105	1	1	1	HT308281C	Transistor, 2SC828(R)
Q205	1	1	1	HT308281C	Transistor, 2SC828(R)
Q106	1	1	1	HT313831X	Transistor, 2SC1383(X)
Q206	1	1	1	HT313831X	Transistor, 2SC1383(X)
Q107	1	1	1	HT308281C	Transistor, 2SC828(R)
Q207	1	1	1	HT308281C	Transistor, 2SC828(R)
Q108	1	1	1	HT308281C	Transistor, 2SC828(R)
Q208	1	1	1	HT308281C	Transistor, 2SC828(R)
Q109	1	1	1	HT308281C	Transistor, 2SC828(R)
Q209	1	1	1	HT308281C	Transistor, 2SC828(R)
Q110	1	1	1	HT308281C	Transistor, 2SC828(R)
Q210	1	1	1	HT308281C	Transistor, 2SC828(R)

U: U.S.A.
C: Canada
N: Europe

REF. DESIG.	QTY.			PART NO.	DESCRIPTION
	U	C	N		
Q111	1	1	1	HT316451B	Transistor, 2SC1645(B)
Q211	1	1	1	HT316451B	Transistor, 2SC1645(B)
Q112	1	1	1	HT308281C	Transistor, 2SC828(R)
Q212	1	1	1	HT308281C	Transistor, 2SC828(R)
Q113	1	1	1	HD3003109	Diode, WZ081
Q213	1	1	1	HD3003109	Diode, WZ081
Q114	1	1	1	HD2001105	Diode, 1S1555
Q214	1	1	1	HD2001105	Diode, 1S1555
Q115	1	1	1	HD1000302	Diode, 20A90
Q215	1	1	1	HD1000302	Diode, 20A90
Q116	1	1	1	HD1000302	Diode, 20A90
Q216	1	1	1	HD1000302	Diode, 20A90
Q117	1	1	1	HD1000302	Diode, 20A90
Q217	1	1	1	HD1000302	Diode, 20A90
Q118	1	1	1	HD3003109	Diode, WZ081
Q218	1	1	1	HD3003109	Diode, WZ081
Q119	1	1	1	HD2001105	Diode, 1S1555
Q219	1	1	1	HD2001105	Diode, 1S1555
Q301	1	1	1	HT308281C	Transistor, 2SC828(R)
Q302	1	1	1	HT308281C	Transistor, 2SC828(R)
Q303	1	1	1	HT308281J	Transistor, 2SC828A(R)
Q304	1	1	1	HT313181R	Transistor, 2SC1318(R)
P100-RESISTORS					
R101	1	1	1	RN0582114	Fixed, 820Ω ±5%, ¼W
R201	1	1	1	RN0582114	Fixed, 820Ω ±5%, ¼W
R102	1	1	1	RN0510314	Fixed, 10KΩ ±5%, ¼W
R202	1	1	1	RN0510314	Fixed, 10KΩ ±5%, ¼W
R103	1	1	1	RN0512414	Fixed, 120KΩ ±5%, ¼W
R203	1	1	1	RN0512414	Fixed, 120KΩ ±5%, ¼W
R104	1	1	1	RT0539114	Fixed, 390Ω ±5%, ¼W
R204	1	1	1	RT0539114	Fixed, 390Ω ±5%, ¼W
R105	1	1	1	RN0568314	Fixed, 68KΩ ±5%, ¼W
R205	1	1	1	RN0568314	Fixed, 68KΩ ±5%, ¼W
R106	1	1	1	RN0515414	Fixed, 150KΩ ±5%, ¼W
R206	1	1	1	RN0515414	Fixed, 150KΩ ±5%, ¼W
R107	1	1	1	RN0568314	Fixed, 68KΩ ±5%, ¼W
R207	1	1	1	RN0568314	Fixed, 68KΩ ±5%, ¼W
R108	1	1	1	RT0527314	Fixed, 27KΩ ±5%, ¼W
R208	1	1	1	RT0527314	Fixed, 27KΩ ±5%, ¼W
R109	1	1	1	RT0515414	Fixed, 150KΩ ±5%, ¼W
R209	1	1	1	RT0515414	Fixed, 150KΩ ±5%, ¼W
R110	1	1	1	RA0302003	Semi-fixed, 3KΩ
R210	1	1	1	RA0302003	Semi-fixed, 3KΩ
R111	1	1	1	RT0547214	Fixed, 4.7KΩ ±5%, ¼W
R211	1	1	1	RT0547214	Fixed, 4.7KΩ ±5%, ¼W
R112	1	1	1	RT0547214	Fixed, 4.7KΩ ±5%, ¼W
R212	1	1	1	RT0547214	Fixed, 4.7KΩ ±5%, ¼W
R113	1	1	1	RT0547114	Fixed, 470Ω ±5%, ¼W
R213	1	1	1	RT0547114	Fixed, 470Ω ±5%, ¼W
R114	1	1	1	RT0510114	Fixed, 100Ω ±5%, ¼W
R214	1	1	1	RT0510114	Fixed, 100Ω ±5%, ¼W
R115	1	1	1	RN0512314	Fixed, 12KΩ ±5%, ¼W
R215	1	1	1	RN0512314	Fixed, 12KΩ ±5%, ¼W
R116	1	1	1	RA0503009	Semi-fixed, 50KΩ
R216	1	1	1	RA0503009	Semi-fixed, 50KΩ
R118	1	1	1	RT0510314	Fixed, 10KΩ ±5%, ¼W
R218	1	1	1	RT0510314	Fixed, 10KΩ ±5%, ¼W
R119	1	1	1	RT0510014	Fixed, 10Ω ±5%, ¼W
R219	1	1	1	RT0510014	Fixed, 10Ω ±5%, ¼W
R120	1	1	1	RT0568114	Fixed, 680Ω ±5%, ¼W
R220	1	1	1	RT0568114	Fixed, 680Ω ±5%, ¼W
R121	1	1	1	RT0533314	Fixed, 33KΩ ±5%, ¼W
R221	1	1	1	RT0533314	Fixed, 33KΩ ±5%, ¼W

REF. DESIG.	QTY.			PART NO.	DESCRIPTION
	U	C	N		
R122	1	1	1	RT0556114	Fixed, 560Ω ±5%, ¼W
R222	1	1	1	RT0556114	Fixed, 560Ω ±5%, ¼W
R123	1	1	1	RT0582314	Fixed, 82KΩ ±5%, ¼W
R223	1	1	1	RT0582314	Fixed, 82KΩ ±5%, ¼W
R124	1	1	1	RT0512414	Fixed, 120KΩ ±5%, ¼W
R224	1	1	1	RT0512414	Fixed, 120KΩ ±5%, ¼W
R125	1	1	1	RT0556114	Fixed, 560Ω ±5%, ¼W
R225	1	1	1	RT0556114	Fixed, 560Ω ±5%, ¼W
R126	1	1	1	RT0556214	Fixed, 5.6KΩ ±5%, ¼W
R226	1	1	1	RT0556214	Fixed, 5.6KΩ ±5%, ¼W
R127	1	1	1	RT0515114	Fixed, 150Ω ±5%, ¼W
R227	1	1	1	RT0515114	Fixed, 150Ω ±5%, ¼W
R128	1	1	1	RT0518214	Fixed, 1.8KΩ ±5%, ¼W
R228	1	1	1	RT0518214	Fixed, 1.8KΩ ±5%, ¼W
R129	1	1	1	RT0510514	Fixed, 1MΩ ±5%, ¼W
R229	1	1	1	RT0510514	Fixed, 1MΩ ±5%, ¼W
R130	1	1	1	RT0582214	Fixed, 8.2KΩ ±5%, ¼W
R230	1	1	1	RT0582214	Fixed, 8.2KΩ ±5%, ¼W
R131	1	1	1	RT0539314	Fixed, 39KΩ ±5%, ¼W
R231	1	1	1	RT0539314	Fixed, 39KΩ ±5%, ¼W
R132	1	1	1	RT0547414	Fixed, 470KΩ ±5%, ¼W
R232	1	1	1	RT0547414	Fixed, 470KΩ ±5%, ¼W
R133	1	1	1	RT0522214	Fixed, 2.2KΩ ±5%, ¼W
R233	1	1	1	RT0522214	Fixed, 2.2KΩ ±5%, ¼W
R134	1	1	1	RT0582114	Fixed, 820Ω ±5%, ¼W
R234	1	1	1	RT0582114	Fixed, 820Ω ±5%, ¼W
R135	1	1	1	RT0512314	Fixed, 12KΩ ±5%, ¼W
R235	1	1	1	RT0512314	Fixed, 12KΩ ±5%, ¼W
R136	1	1	1	RT0539314	Fixed, 39KΩ ±5%, ¼W
R236	1	1	1	RT0539314	Fixed, 39KΩ ±5%, ¼W
R137	1	1	1	RT0510314	Fixed, 10KΩ ±5%, ¼W
R237	1	1	1	RT0510314	Fixed, 10KΩ ±5%, ¼W
R138	1	1	1	RT0512314	Fixed, 12KΩ ±5%, ¼W
R238	1	1	1	RT0512314	Fixed, 12KΩ ±5%, ¼W
R139	1	1	1	RT0556314	Fixed, 56KΩ ±5%, ¼W
R239	1	1	1	RT0556314	Fixed, 56KΩ ±5%, ¼W
R140	1	1	1	RT0527414	Fixed, 270KΩ ±5%, ¼W
R240	1	1	1	RT0527414	Fixed, 270KΩ ±5%, ¼W
R141	1	1	1	RT0512214	Fixed, 1.2KΩ ±5%, ¼W
R241	1	1	1	RT0512214	Fixed, 1.2KΩ ±5%, ¼W
R142	1	1	1	RT0533214	Fixed, 3.3KΩ ±5%, ¼W
R242	1	1	1	RT0533214	Fixed, 3.3KΩ ±5%, ¼W
R143	1	1	1	RT0547214	Fixed, 4.7KΩ ±5%, ¼W
R243	1	1	1	RT0547214	Fixed, 4.7KΩ ±5%, ¼W
R144	1	1	1	RT0568214	Fixed, 6.8KΩ ±5%, ¼W
R244	1	1	1	RT0568214	Fixed, 6.8KΩ ±5%, ¼W
R145	1	1	1	RT0512314	Fixed, 12KΩ ±5%, ¼W
R245	1	1	1	RT0512314	Fixed, 12KΩ ±5%, ¼W
R146	1	1	1	RT0533214	Fixed, 3.3KΩ ±5%, ¼W
R246	1	1	1	RT0533214	Fixed, 3.3KΩ ±5%, ¼W
R147	1	1	1	RT0522214	Fixed, 2.2KΩ ±5%, ¼W
R247	1	1	1	RT0522214	Fixed, 2.2KΩ ±5%, ¼W
R148	1	1	1	RA0302003	Semi-fixed, 3KΩ
R248	1	1	1	RA0302003	Semi-fixed, 3KΩ
R149	1	1	1	RT0522114	Fixed, 220Ω ±5%, ¼W
R249	1	1	1	RT0522114	Fixed, 220Ω ±5%, ¼W
R150	1	1	1	RT0556214	Fixed, 5.6KΩ ±5%, ¼W
R250	1	1	1	RT0556214	Fixed, 5.6KΩ ±5%, ¼W
R151	1	1	1	RT0515314	Fixed, 15KΩ ±5%, ¼W
R251	1	1	1	RT0515314	Fixed, 15KΩ ±5%, ¼W
R152	1	1	1	RT0527414	Fixed, 270KΩ ±5%, ¼W
R252	1	1	1	RT0527414	Fixed, 270KΩ ±5%, ¼W

U: U.S.A.
C: Canada
N: Europe

REF. DESIG.	QTY.			PART NO.	DESCRIPTION
	U	C	N		
R153	1	1	1	RT0527214	Fixed, 2.7K Ω \pm 5%, $\frac{1}{4}$ W
R253	1	1	1	RT0527214	Fixed, 2.7K Ω \pm 5%, $\frac{1}{4}$ W
R154	1	1	1	RA0503009	Semi-fixed, 50K Ω \pm 5%, $\frac{1}{4}$ W
R254	1	1	1	RA0503009	Semi-fixed, 50K Ω \pm 5%, $\frac{1}{4}$ W
R155	1	1	1	RA0503009	Semi-fixed, 50K Ω \pm 5%, $\frac{1}{4}$ W
R255	1	1	1	RA0503009	Semi-fixed, 50K Ω \pm 5%, $\frac{1}{4}$ W
R156	1	1	1	RA0503009	Semi-fixed, 50K Ω \pm 5%, $\frac{1}{4}$ W
R256	1	1	1	RA0503009	Semi-fixed, 50K Ω \pm 5%, $\frac{1}{4}$ W
R157	1	1	1	RT0510214	Fixed, 1K Ω \pm 5%, $\frac{1}{4}$ W
R257	1	1	1	RT0510214	Fixed, 1K Ω \pm 5%, $\frac{1}{4}$ W
R158	1	1	1	RT0539314	Fixed, 39K Ω \pm 5%, $\frac{1}{4}$ W
R258	1	1	1	RT0539314	Fixed, 39K Ω \pm 5%, $\frac{1}{4}$ W
R159	1	1	1	RT0533414	Fixed, 330K Ω \pm 5%, $\frac{1}{4}$ W
R259	1	1	1	RT0533414	Fixed, 330K Ω \pm 5%, $\frac{1}{4}$ W
R160	1	1	1	RT0568114	Fixed, 680 Ω \pm 5%, $\frac{1}{4}$ W
R260	1	1	1	RT0568114	Fixed, 680 Ω \pm 5%, $\frac{1}{4}$ W
R161	1	1	1	RT0547214	Fixed, 4.7K Ω \pm 5%, $\frac{1}{4}$ W
R261	1	1	1	RT0547214	Fixed, 4.7K Ω \pm 5%, $\frac{1}{4}$ W
R162	1	1	1	RT0510314	Fixed, 10K Ω \pm 5%, $\frac{1}{4}$ W
R262	1	1	1	RT0510314	Fixed, 10K Ω \pm 5%, $\frac{1}{4}$ W
R163	1	1	1	RT0522014	Fixed, 22 Ω \pm 5%, $\frac{1}{4}$ W
R263	1	1	1	RT0522014	Fixed, 22 Ω \pm 5%, $\frac{1}{4}$ W
R164	1	1	1	RT0522014	Fixed, 22 Ω \pm 5%, $\frac{1}{4}$ W
R264	1	1	1	RT0522014	Fixed, 22 Ω \pm 5%, $\frac{1}{4}$ W
R165	1	1	1	RT0522014	Fixed, 22 Ω \pm 5%, $\frac{1}{4}$ W
R265	1	1	1	RT0522014	Fixed, 22 Ω \pm 5%, $\frac{1}{4}$ W
R166	1	1	1	RT0510114	Fixed, 100 Ω \pm 5%, $\frac{1}{4}$ W
R266	1	1	1	RT0510114	Fixed, 100 Ω \pm 5%, $\frac{1}{4}$ W
R167	1	1	1	RT0510314	Fixed, 10K Ω \pm 5%, $\frac{1}{4}$ W
R267	1	1	1	RT0510314	Fixed, 10K Ω \pm 5%, $\frac{1}{4}$ W
R301	1	1	1	RA0154002	Semi-fixed, 150K Ω
R302	1	1	1	RA0154002	Semi-fixed, 150K Ω
R303	1	1	1	RT0539014	Fixed, 39 Ω \pm 5%, $\frac{1}{4}$ W
R304	1	1	1	RT0539014	Fixed, 39 Ω \pm 5%, $\frac{1}{4}$ W
R305	1	1	1	RT0515414	Fixed, 150K Ω \pm 5%, $\frac{1}{4}$ W
R306	1	1	1	RT0515414	Fixed, 150K Ω \pm 5%, $\frac{1}{4}$ W
R307	1	1	1	GJ0533102	Fixed, 330 Ω \pm 5%, 2W
R309	1	1	1	GJ0515102	Fixed, 150 Ω \pm 5%, 2W
R310	1	1	1	RT0510101	Fixed, 100 Ω \pm 5%, 1W
R311	1	1	1	RT0510414	Fixed, 100K Ω \pm 5%, $\frac{1}{4}$ W
R312	1	1	1	RT0522114	Fixed, 220 Ω \pm 5%, $\frac{1}{4}$ W
R313	1	1	1	GJ0582101	Fixed, 820 Ω \pm 5%, 1W
R350	6	6	6	RC0000012	Fixed, 0 Ω \pm 0%, $\frac{1}{2}$ W
P100-CAPACITORS					
C101	1	1	1	EE1060162	Electrolytic, 10 μ F, 16V
C201	1	1	1	EE1060162	Electrolytic, 10 μ F, 16V
C102	1	1	1	EA3360259	Electrolytic, 33 μ F, 25V
C202	1	1	1	EA3360259	Electrolytic, 33 μ F, 25V
C103	1	1	1	DF6550101	Film, 500PF
C203	1	1	1	DF6550101	Film, 500PF
C104	1	1	1	DD1620101	Ceramic, 200PF
C204	1	1	1	DD1620101	Ceramic, 200PF
C105	1	1	1	DD1650001	Ceramic, 50PF
C205	1	1	1	DD1650001	Ceramic, 50PF
C106	1	1	1	DF1522305	Film, 0.022 μ F
C206	1	1	1	DF1522305	Film, 0.022 μ F
C107	1	1	1	DF1510205	Film, 0.001 μ F
C207	1	1	1	DF1510205	Film, 0.001 μ F
C108	1	1	1	EA1070109	Electrolytic, 100 μ F, 10V
C208	1	1	1	EA1070109	Electrolytic, 100 μ F, 10V
C109	1	1	1	EE3350251	Electrolytic, 3.3 μ F, 25V
C209	1	1	1	EE3350251	Electrolytic, 3.3 μ F, 25V
C110	1	1	1	EA1070359	Electrolytic, 100 μ F, 35V

REF. DESIG.	QTY.			PART NO.	DESCRIPTION
	U	C	N		
C210	1	1	1	EA1070359	Electrolytic, 100 μ F, 35V
C111	1	1	1	EE1060162	Electrolytic, 10 μ F, 16V
C211	1	1	1	EE1060162	Electrolytic, 10 μ F, 16V
C112	1	1	1	DD1620101	Ceramic, 200PF
C212	1	1	1	DD1620101	Ceramic, 200PF
C113	1	1	1	DD1650001	Ceramic, 50PF
C213	1	1	1	DD1650001	Ceramic, 50PF
C114	1	1	1	EE3350251	Electrolytic, 3.3 μ F, 25V
C214	1	1	1	EE3350251	Electrolytic, 3.3 μ F, 25V
C115	1	1	1	EA1070109	Electrolytic, 100 μ F, 10V
C215	1	1	1	EA1070109	Electrolytic, 100 μ F, 10V
C116	1	1	1	EA3360109	Electrolytic, 33 μ F, 10V
C216	1	1	1	EA3360109	Electrolytic, 33 μ F, 10V
C117	1	1	1	DF6515151	Film, 150PF
C217	1	1	1	DF6515151	Film, 150PF
C118	1	1	1	DF6510101	Film, 100PF
C218	1	1	1	DF6510101	Film, 100PF
C119	1	1	1	DF6550101	Film, 500PF
C219	1	1	1	DF6550101	Film, 500PF
C120	1	1	1	DF1518205	Film, 0.0018 μ F
C220	1	1	1	DF1518205	Film, 0.0018 μ F
C121	1	1	1	DF6610101	Film, 100PF
C221	1	1	1	DF6610101	Film, 100PF
C122	1	1	1	EE1060162	Electrolytic, 10 μ F, 16V
C222	1	1	1	EE1060162	Electrolytic, 10 μ F, 16V
C123	1	1	1	DD1650101	Ceramic, 500PF
C223	1	1	1	DD1650101	Ceramic, 500PF
C124	1	1	1	EA1060169	Electrolytic, 10 μ F, 16V
C224	1	1	1	EA1060169	Electrolytic, 10 μ F, 16V
C125	1	1	1	EE2250351	Electrolytic, 2.2 μ F, 35V
C225	1	1	1	EE2250351	Electrolytic, 2.2 μ F, 35V
C126	1	1	1	EE2250351	Electrolytic, 2.2 μ F, 35V
C226	1	1	1	EE2250351	Electrolytic, 2.2 μ F, 35V
C127	1	1	1	DF1610301	Film, 0.01 μ F
C227	1	1	1	DF1610301	Film, 0.01 μ F
C128	1	1	1	EE1060162	Electrolytic, 10 μ F, 16V
C228	1	1	1	EE1060162	Electrolytic, 10 μ F, 16V
C129	1	1	1	EE2250351	Electrolytic, 2.2 μ F, 35V
C229	1	1	1	EE2250351	Electrolytic, 2.2 μ F, 35V
C130	1	1	1	EE2250351	Electrolytic, 2.2 μ F, 35V
C230	1	1	1	EE2250351	Electrolytic, 2.2 μ F, 35V
C131	1	1	1	EA4750359	Electrolytic, 4.7 μ F, 35V
C231	1	1	1	EA4750359	Electrolytic, 4.7 μ F, 35V
C132	1	1	1	EA4750359	Electrolytic, 4.7 μ F, 35V
C232	1	1	1	EA4750359	Electrolytic, 4.7 μ F, 35V
C133	1	1	1	DF1522205	Film, 0.0022 μ F
C233	1	1	1	DF1522205	Film, 0.0022 μ F
C134	1	1	1	DF1510405	Film, 0.1 μ F
C234	1	1	1	DF1510405	Film, 0.1 μ F
C135	1	1	1	EE1060162	Electrolytic, 10 μ F, 16V
C235	1	1	1	EE1060162	Electrolytic, 10 μ F, 16V
C136	1	1	1	DD1530101	Ceramic, 300PF
C236	1	1	1	DD1530101	Ceramic, 300PF
C137	1	1	1	EE1060162	Electrolytic, 10 μ F, 16V
C237	1	1	1	EE1060162	Electrolytic, 10 μ F, 16V
C138	1	1	1	EE1060162	Electrolytic, 10 μ F, 16V
C238	1	1	1	EE1060162	Electrolytic, 10 μ F, 16V
C139	1	1	1	EE1060162	Electrolytic, 10 μ F, 16V
C239	1	1	1	EE1060162	Electrolytic, 10 μ F, 16V
C140	1	1	1	DF1522205	Film, 0.0022 μ F
C240	1	1	1	DF1522205	Film, 0.0022 μ F
C141	1	1	1	DF6610101	Film, 100PF

U: U.S.A.
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REF. DESIG.	QTY.			PART NO.	DESCRIPTION
	U	C	N		
C241	1	1	1	DF6610101	Film, 100PF
C142	1	1	1	DF1522305	Film, 0.022μF
C242	1	1	1	DF1522305	Film, 0.022μF
C143	1	1	1	DF1518305	Film, 0.018μF
C243	1	1	1	DF1518305	Film, 0.018μF
C144	1	1	1	DF1518305	Film, 0.018μF
C244	1	1	1	DF1518305	Film, 0.018μF
C145	1	1	1	EE3350251	Electrolytic, 3.3μF, 25V
C245	1	1	1	EE3350251	Electrolytic, 3.3μF, 25V
C146	1	1	1	EE3350251	Electrolytic, 3.3μF, 25V
C246	1	1	1	EE3350251	Electrolytic, 3.3μF, 25V
C147	1	1	1	EA1070359	Electrolytic, 100μF, 35V
C247	1	1	1	EA1070359	Electrolytic, 100μF, 35V
C301	1	1	1	DF6618150	Film, 180PF, 125V
C302	1	1	1	DF6618150	Film, 180pF, 125V
C303	1	1	1	DF1515351	Film, 0.015μF, 200WV
C304	1	1	1	EA1050509	Electrolytic, 1μF, 50V
C305	1	1	1	DF1610205	Film, 0.001μF
C306	1	1	1	DF1610251	Film, 0.001μF, 200WV
C307	1	1	1	DF1610251	Film, 0.001μF, 200WV
C308	1	1	1	EA1070259	Electrolytic, 100μF, 25V
C309	1	1	1	EE2250351	Electrolytic, 2.2μF, 35V
C310	1	1	1	EA4750359	Electrolytic, 4.7μF, 35V
P100-MISCELLANEOUS					
P107	2	2	2	344411805	Spacer
P108	4	4	4	293311802	Spacer
J101	98	98	98	YP1000113	Plug
POWER SUPPLY CIRCUIT BOARD-P400					
P400	1	1	1	YD3448007	P.W. Board, Power Supply (Print Only)
	1	1	1	ZZ3448007	P.W. Board Assembly
P400-SEMICONDUCTORS					
Q401	1	1	1	HD2001610	Diode, 10DC1 ⊕
Q402	1	1	1	HD2001710	Diode, 10DC1 ⊕
Q403	1	1	1	HD2001610	Diode, 10DC1 ⊕
Q404	1	1	1	HD2001710	Diode, 10DC1 ⊕
Q405	1	1	1	HT403891A	Transistor, 2SD389 (O)
Q406	1	1	1	HT308281C	Transistor, 2SC828 (R)
Q407	1	1	1	HT308281C	Transistor, 2SC828 (R)
Q408	1	1	1	HT308281C	Transistor, 2SC828 (R)
Q409	1	1	1	HT313831D	Transistor, 2SC1383 (S)
Q410	1	1	1	HD3004609	Diode, BZ-310
Q411	1	1	1	HD1000302	Diode, 20A90
Q412	1	1	1	HD1000302	Diode, 20A90
Q413	1	1	1	HD1000302	Diode, 20A90
Q414	1	1	1	HD2001310	Diode, 10D1
Q415	1	1	1	HT308281J	Transistor, 2SC828A (R)
Q416	1	1	1	HT308281J	Transistor, 2SC828A (R)
Q417	1	1	1	HT308281J	Transistor, 2SC828A (R)
Q418	1	1	1	HD2001105	Diode, 1S1555
Q419	1	1	1	HD2001105	Diode, 1S1555
Q420	1	1	1	HD2001105	Diode, 1S1555
P400-RESISTORS					
R401	1	1	1	GJ0510002	Fixed, 10Ω ±5%, 2W
R402	1	1	1	GJ0582101	Fixed, 820Ω ±5%, 1W
R403	1	1	1	GJ0547102	Fixed, 470Ω ±5%, 2W
R404	1	1	1	GJ0582102	Fixed, 820Ω ±5%, 2W
R405	1	1	1	RT0539214	Fixed, 3.9KΩ ±5%, ¼W
R406	1	1	1	RT0547314	Fixed, 47KΩ ±5%, ¼W
R407	1	1	1	RT0547314	Fixed, 47KΩ ±5%, ¼W
R408	1	1	1	RT0547214	Fixed, 4.7KΩ ±5%, ¼W

REF. DESIG.	QTY.			PART NO.	DESCRIPTION
	U	C	N		
R409	1	1	1	RT0547214	Fixed, 4.7KΩ ±5%, ¼W
R410	1	1	1	RT0522314	Fixed, 22KΩ ±5%, ¼W
R411	1	1	1	RT0522314	Fixed, 22KΩ ±5%, ¼W
R412	1	1	1	RT0512214	Fixed, 1.2KΩ ±5%, ¼W
R413	1	1	1	RT0533214	Fixed, 3.3KΩ ±5%, ¼W
R414	1	1	1	RT0510414	Fixed, 100KΩ ±5%, ¼W
R415	1	1	1	RT0568414	Fixed, 680KΩ ±5%, ¼W
R416	1	1	1	RT0522314	Fixed, 22KΩ ±5%, ¼W
R417	1	1	1	RT0522114	Fixed, 220Ω ±5%, ¼W
R418	1	1	1	RT0556314	Fixed, 56KΩ ±5%, ¼W
R419	1	1	1	RT0522314	Fixed, 22KΩ ±5%, ¼W
R420	1	1	1	RT0522314	Fixed, 22KΩ ±5%, ¼W
R421	1	1	1	RT0547314	Fixed, 47KΩ ±5%, ¼W
R423	1	1	1	RT0510314	Fixed, 10KΩ ±5%, ¼W
R424	1	1	1	RT0522314	Fixed, 22KΩ ±5%, ¼W
P400-CAPACITORS					
C401	1	1	1	EA4770509	Electrolytic, 470μF, 50V
C402	1	1	1	EA4770509	Electrolytic, 470μF, 50V
C403	1	1	1	EA4770509	Electrolytic, 470μF, 50V
C404	1	1	1	EA1070359	Electrolytic, 100μF, 35V
C405	1	1	1	EA2280169	Electrolytic, 2200μF, 16V
C406	1	1	1	EA1060169	Electrolytic, 10μF, 16V
C407	1	1	1	EA4750359	Electrolytic, 4.7μF, 35V
C408	1	1	1	DF1633201	Film, 0.0033μF
C409	1	1	1	DF1610350	Film, 0.01μF, 200V
C410	1	1	1	DF1610350	Film, 0.01μF, 200V
C411	1	1	1	DF1610350	Film, 0.01μF, 200V
C412	1	1	1	DF1610350	Film, 0.01μF, 200V
C413	1	1	1	DF1610350	Film, 0.01μF, 200V
C414	1	1	1	DF1610350	Film, 0.01μF, 200V
C415	1	1	1	DF1610350	Film, 0.01μF, 200V
C416	1	1	1	DF1610350	Film, 0.01μF, 200V
C417	1	1	1	EA1070109	Electrolytic, 100μF, 10V
C418	1	1	1	DD1512101	Ceramic, 120P
C419	1	1	1	EA4750359	Electrolytic, 4.7μF, 35V
C421	1	1	1	EA2260109	Electrolytic, 22μF, 10V
P400-MISCELLANEOUS					
J401	26	26	26	YP1000113	Plug
G401	1	1	1	BF1040003	Printed Comp. 0.1μF + 120Ω
R407	4	4	4	344411805	Spacer
R408	8	8	8	293311802	Spacer
SWITCH CIRCUIT BOARD-P500					
P500	1	1	1	YD3448004	P.W. Board, Switch (Print Only)
	1	1	1	ZZ3448004	P.W. Board Assembly
P500-MISCELLANEOUS					
S501	1	1	1	SP1007001	Push SW, S502~S507, Limiter
J501	51	51	51	YP1000113	Plug
VOLUME CIRCUIT BOARD-P600					
P600	1	1	1	YD3448005	P.W. Board, Volume (Print Only)
	1	1	1	ZZ3448005	P.W. Board Assembly
P600-RESISTORS					
R601	1	1	1	RS0503024	Variable, 50KΩ (A)
R602	1	1	1	RX0503011	Variable, 50KΩ (A)
R603	1	1	1	RX0503011	Variable, 50KΩ (A)
R604	1	1	1	RT0522314	Fixed, 22KΩ ±5%, ¼W
R605	1	1	1	RT0522314	Fixed, 22KΩ ±5%, ¼W
R606	1	1	1	RX0503011	Variable, 50KΩ (A)
R607	1	1	1	RX0503011	Variable, 50KΩ (A)

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REF. DESIG.	QTY.			PART NO.	DESCRIPTION
	U	C	N		
R608	1	1	1	RT0510414	Fixed 100K Ω \pm 5%, $\frac{1}{4}$ W
R609	1	1	1	RT0510414	Fixed, 100K Ω \pm 5%, $\frac{1}{4}$ W
P600-MISCELLANEOUS					
J601	12	12	12	YP1000113	Plug
METER LAMP CIRCUIT BOARD-P650					
P650	1	1	1	YD3448006	P.W. Board, Meter Lamp (Print Only)
	1	1	1	ZZ3448006	P.W. Board Assembly
P650-MISCELLANEOUS					
J651	1	1	1	YJ0800017	Jack
J652	1	1	1	YJ0800017	Jack
J653	1	1	1	YJ0800017	Jack
J654	1	1	1	YJ0800017	Jack
J655	1	1	1	YJ0800017	Jack
J656	1	1	1	YJ0800017	Jack
J657	1	1	1	YJ0800017	Jack
J658	1	1	1	YJ0800017	Jack
J659	10	10	10	YP1000113	Plug
V651	1	1	1	IN1008007	Lamp
V652	1	1	1	IN1008007	Lamp
V653	1	1	1	IN1008007	Lamp
V654	1	1	1	IN1008007	Lamp
TERMINAL CIRCUIT BOARD-P700					
P700	1	1		YD3448002	P.W. Board, Terminal (Print Only)
	1	1		ZZ3448002	P.W. Board Assembly
P700		1		YD3448003	P.W. Board, Terminal (Print Only)
		1		ZZ3448003	P.W. Board Assembly
P700-MISCELLANEOUS					
S701	1	1	1	SS0202042	Slide Switch
J701	1	1	1	YT0202010	Terminal
J702	1	1	1	YT0202010	Terminal
J703		1		YJ1100017	Jack
J704	17	17	20	YP1000113	Plug
P700-RESISTORS					
R701	1	1	1	RK0203036	Variable, 20K Ω (A)
R702	1	1	1	RK0203036	Variable, 20K Ω (A)
R703	1	1	1	RT0568314	Fixed, 68K Ω \pm 5%, $\frac{1}{4}$ W
R704	1	1	1	RT0568314	Fixed, 68K Ω \pm 5%, $\frac{1}{4}$ W
R703		1		RT0539314	Fixed, 39K Ω \pm 5%, $\frac{1}{4}$ W
R704		1		RT0539314	Fixed, 39K Ω \pm 5%, $\frac{1}{4}$ W
R705	1	1	1	RT0510314	Fixed, 10K Ω \pm 5%, $\frac{1}{4}$ W
R706	1	1	1	RT0510314	Fixed, 10K Ω \pm 5%, $\frac{1}{4}$ W
R705		1		RT0518314	Fixed, 18K Ω \pm 5%, $\frac{1}{4}$ W
R706		1		RT0518314	Fixed, 18K Ω \pm 5%, $\frac{1}{4}$ W
R707		1		RT0547314	Fixed, 47K Ω \pm 5%, $\frac{1}{4}$ W
R708		1		RT0547314	Fixed, 47K Ω \pm 5%, $\frac{1}{4}$ W
R709		1		RT0556214	Fixed, 5.6K Ω \pm 5%, $\frac{1}{4}$ W
R710		1		RT0556214	Fixed, 5.6K Ω \pm 5%, $\frac{1}{4}$ W
R711	1	1	1	RK0203032	Variable, 20K Ω (B)
R712	1	1	1	RK0203032	Variable, 20K Ω (B)
R713	1	1	1	RT0539214	Fixed, 3.9K Ω \pm 5%, $\frac{1}{4}$ W
R714	1	1	1	RT0539214	Fixed, 3.9K Ω \pm 5%, $\frac{1}{4}$ W
P700-CAPACITORS & SWITCH					
C701	1	1	1	DF1512205	Film, 0,0012 μ F, 50V
C702	1	1	1	DF1512205	Film, 0,0012 μ F, 50V
S702	1	1	1	SS0202042	Slide SW

REF. DESIG.	QTY.			PART NO.	DESCRIPTION
	U	C	N		
DOLBY CIRCUIT BOARD-P800					
P800	1	1	1	YD3444009	P.W. Board, Dolby (Print Only)
	1	1	1	ZZ3444009	P.W. Board Assembly
P800-SEMICONDUCTORS					
Q801	1	1	1	HT306441B	Transistor, 2SC644 (S)
Q901	1	1	1	HT306441B	Transistor, 2SC644 (S)
Q802	1	1	1	HT306441B	Transistor, 2SC644 (S)
Q902	1	1	1	HT306441B	Transistor, 2SC644 (S)
Q803	1	1	1	HF200301E	Transistor, 2SK30A (D)
Q903	1	1	1	HF200301E	Transistor, 2SK30A (D)
Q804	1	1	1	HT306441B	Transistor, 2SC644 (S)
Q904	1	1	1	HT306441B	Transistor, 2SC644 (S)
Q805	1	1	1	HT107211T	Transistor, 2SA721 (T)
Q905	1	1	1	HT107211T	Transistor, 2SA721 (T)
Q806	1	1	1	HT306441B	Transistor, 2SC644 (S)
Q906	1	1	1	HT306441B	Transistor, 2SC644 (S)
Q807	1	1	1	HD1000302	Diode, 20A90
Q907	1	1	1	HD1000302	Diode, 20A90
Q808	1	1	1	HD1000302	Diode, 20A90
Q908	1	1	1	HD1000302	Diode, 20A90
Q809	1	1	1	HD2001105	Diode, 1S1555
Q909	1	1	1	HD2001105	Diode, 1S1555
Q810	1	1	1	HD2001105	Diode, 1S1555
Q910	1	1	1	HD2001105	Diode, 1S1555
Q811	1	1	1	HD2001105	Diode, 1S1555
Q911	1	1	1	HD2001105	Diode, 1S1555
Q830	1	1	1	HD3003109	Diode, WZ081
P800-RESISTORS					
R801	1	1	1	RT0515414	Fixed, 150K Ω \pm 5%, $\frac{1}{4}$ W
R901	1	1	1	RT0515414	Fixed, 150K Ω \pm 5%, $\frac{1}{4}$ W
R802	1	1	1	RT0518414	Fixed, 180K Ω \pm 5%, $\frac{1}{4}$ W
R902	1	1	1	RT0518414	Fixed, 180K Ω \pm 5%, $\frac{1}{4}$ W
R803	1	1	1	RT0527314	Fixed, 27K Ω \pm 5%, $\frac{1}{4}$ W
R903	1	1	1	RT0527314	Fixed, 27K Ω \pm 5%, $\frac{1}{4}$ W
R804	1	1	1	RT0522314	Fixed, 22K Ω \pm 5%, $\frac{1}{4}$ W
R904	1	1	1	RT0522314	Fixed, 22K Ω \pm 5%, $\frac{1}{4}$ W
R805	1	1	1	RT0582214	Fixed, 8.2K Ω \pm 5%, $\frac{1}{4}$ W
R905	1	1	1	RT0582214	Fixed, 8.2K Ω \pm 5%, $\frac{1}{4}$ W
R806	1	1	1	RT0515414	Fixed, 150K Ω \pm 5%, $\frac{1}{4}$ W
R906	1	1	1	RT0515414	Fixed, 150K Ω \pm 5%, $\frac{1}{4}$ W
R807	1	1	1	RT0527214	Fixed, 2.7K Ω \pm 5%, $\frac{1}{4}$ W
R907	1	1	1	RT0527214	Fixed, 2.7K Ω \pm 5%, $\frac{1}{4}$ W
R808	1	1	1	RT0533314	Fixed, 33K Ω \pm 5%, $\frac{1}{4}$ W
R908	1	1	1	RT0533314	Fixed, 33K Ω \pm 5%, $\frac{1}{4}$ W
R809	1	1	1	RT0527414	Fixed, 270K Ω \pm 5%, $\frac{1}{4}$ W
R909	1	1	1	RT0527414	Fixed, 270K Ω \pm 5%, $\frac{1}{4}$ W
R810	1	1	1	RT0547314	Fixed, 47K Ω \pm 5%, $\frac{1}{4}$ W
R910	1	1	1	RT0547314	Fixed, 47K Ω \pm 5%, $\frac{1}{4}$ W
R811	1	1	1	RT0533214	Fixed, 3.3K Ω \pm 5%, $\frac{1}{4}$ W
R911	1	1	1	RT0533214	Fixed, 3.3K Ω \pm 5%, $\frac{1}{4}$ W
R812	1	1	1	RT0522214	Fixed, 2.2K Ω \pm 5%, $\frac{1}{4}$ W
R912	1	1	1	RT0522214	Fixed, 2.2K Ω \pm 5%, $\frac{1}{4}$ W
R813	1	1	1	RT0568414	Fixed, 680K Ω \pm 5%, $\frac{1}{4}$ W
R913	1	1	1	RT0568414	Fixed, 680K Ω \pm 5%, $\frac{1}{4}$ W
R814	1	1	1	RT0518314	Fixed, 18K Ω \pm 5%, $\frac{1}{4}$ W
R914	1	1	1	RT0518314	Fixed, 18K Ω \pm 5%, $\frac{1}{4}$ W
R815	1	1	1	RA0103014	Semi-fixed, 10K Ω
R915	1	1	1	RA0103014	Semi-fixed, 10K Ω
R816	1	1	1	RT0527214	Fixed, 2.7K Ω \pm 5%, $\frac{1}{4}$ W
R916	1	1	1	RT0527214	Fixed, 2.7K Ω \pm 5%, $\frac{1}{4}$ W
R817	1	1	1	RT0515314	Fixed, 15K Ω \pm 5%, $\frac{1}{4}$ W
R917	1	1	1	RT0515314	Fixed, 15K Ω \pm 5%, $\frac{1}{4}$ W
R818	1	1	1	RT0582214	Fixed, 8.2K Ω \pm 5%, $\frac{1}{4}$ W

U: U.S.A.
C: Canada
N: Europe

REF. DESIG.	QTY.			PARTS NO.	DESCRIPTION
	U	C	N		
R918	1	1	1	RT0582214	Fixed, 8.2KΩ ±5%, ¼W
R819	1	1	1	RA0102011	Semi-fixed, 1KΩ
R919	1	1	1	RA0102011	Semi-fixed, 1KΩ
R820	1	1	1	RT0582214	Fixed, 8.2KΩ ±5%, ¼W
R920	1	1	1	RT0582214	Fixed, 8.2KΩ ±5%, ¼W
R821	1	1	1	RT0582214	Fixed, 8.2KΩ ±5%, ¼W
R921	1	1	1	RT0582214	Fixed, 8.2KΩ ±5%, ¼W
R822	1	1	1	RT0510314	Fixed, 10KΩ ±5%, ¼W
R922	1	1	1	RT0510314	Fixed, 10KΩ ±5%, ¼W
R823	1	1	1	RT0533314	Fixed, 33KΩ ±5%, ¼W
R923	1	1	1	RT0533314	Fixed, 33KΩ ±5%, ¼W
R824	1	1	1	RT0512414	Fixed, 120KΩ ±5%, ¼W
R924	1	1	1	RT0512414	Fixed, 120KΩ ±5%, ¼W
R825	1	1	1	RT0547314	Fixed, 47KΩ ±5%, ¼W
R925	1	1	1	RT0547314	Fixed, 47KΩ ±5%, ¼W
R826	1	1	1	RT0527214	Fixed, 2.7KΩ ±5%, ¼W
R926	1	1	1	RT0527214	Fixed, 2.7KΩ ±5%, ¼W
R827	1	1	1	RT0510214	Fixed, 1KΩ ±5%, ¼W
R927	1	1	1	RT0510214	Fixed, 1KΩ ±5%, ¼W
R828	1	1	1	RT0533014	Fixed, 33Ω ±5%, ¼W
R928	1	1	1	RT0533014	Fixed, 33Ω ±5%, ¼W
R829	1	1	1	RT0515314	Fixed, 15KΩ ±5%, ¼W
R929	1	1	1	RT0515314	Fixed, 15KΩ ±5%, ¼W
R830	1	1	1	RT0547014	Fixed, 47Ω ±5%, ¼W
R930	1	1	1	RT0547014	Fixed, 47Ω ±5%, ¼W
R831	1	1	1	RT0527414	Fixed, 270KΩ ±5%, ¼W
R931	1	1	1	RT0527414	Fixed, 270KΩ ±5%, ¼W
R832	1	1	1	RT0527414	Fixed, 270KΩ ±5%, ¼W
R932	1	1	1	RT0527414	Fixed, 270KΩ ±5%, ¼W
R833	1	1	1	RT0522414	Fixed, 220KΩ ±5%, ¼W
R933	1	1	1	RT0522414	Fixed, 220KΩ ±5%, ¼W
R800	1	1	1	RC0000012	Fixed, 0Ω ±0%, ¼W
P800-CAPACITORS					
C801	1	1	1	EA1060169	Electrolytic, 10μF, 16V
C901	1	1	1	EA1060169	Electrolytic, 10μF, 16V
C802	1	1	1	EA1060169	Electrolytic, 10μF, 16V
C902	1	1	1	EA1060169	Electrolytic, 10μF, 16V
C803	1	1	1	DF1556205	Film, 0.0056μF
C903	1	1	1	DF1556205	Film, 0.0056μF
C804	1	1	1	DF1547205	Film, 0.0047μF
C904	1	1	1	DF1547205	Film, 0.0047μF
C805	1	1	1	DF1527305	Film, 0.027μF
C905	1	1	1	DF1527305	Film, 0.027μF
C806	1	1	1	EA1060169	Electrolytic, 10μF, 16V
C906	1	1	1	EA1060169	Electrolytic, 10μF, 16V
C807	1	1	1	DF1710405	Film, 0.1μF
C907	1	1	1	DF1710405	Film, 0.1μF
C808	1	1	1	EA4760109	Electrolytic, 47μF, 10V
C908	1	1	1	EA4760109	Electrolytic, 47μF, 10V
C809	1	1	1	DF1710405	Film, 0.1μF
C909	1	1	1	DF1710405	Film, 0.1μF
C810	1	1	1	EA1060169	Electrolytic, 10μF, 16V
C910	1	1	1	EA1060169	Electrolytic, 10μF, 16V
C811	1	1	1	DD1520001	Ceramic, 20PF
C911	1	1	1	DD1520001	Ceramic, 20PF
C812	1	1	1	EA1060169	Electrolytic, 10μF, 16V
C912	1	1	1	EA1060169	Electrolytic, 10μF, 16V
C813	1	1	1	DF1710405	Film, 0.1μF
C913	1	1	1	DF1710405	Film, 0.1μF
C814	1	1	1	DF1710405	Film, 0.1μF
C914	1	1	1	DF1710405	Film, 0.1μF
C815	1	1	1	DF1733405	Film, 0.33μF
C915	1	1	1	DF1733405	Film, 0.33μF

REF. DESIG.	QTY.			PART NO.	DESCRIPTION
	U	C	N		
C820	1	1	1	EA1070259	Electrolytic, 100μF, 25V
P800-MISCELLANEOUS					
J801	1	1	1	YP0600027	Plug
J802	1	1	1	YJ0600027	Jack
GENERAL MISCELLANEOUS					
H001	1	1	1	LH4275102	Rec./Play Head
H002	1	1	1	LH3100036	Erase Head
R010	1	1	1	GE0510018	Resistor, 10Ω ± 5%, 1/8 W
R011	1	1	1	GE0510018	Resistor, 10Ω ± 5%, 1/8 W
M001	1	1	1	MM1013001	DC Motor
S001	1	1	1	SP0401015	Push SW, Power
S002	1	1	1	SM0101045	Mini-SW, Motor
S003	1	1	1	SC0101024	Switch, Tape Counter
S004	1	1	1	SP0102002	Push SW, Memory
S005	1	1	1	SM0101043	Mini-SW, Rew.
S006	1	1	1	SM0101043	Mini-SW, Rec.
S007	1	1	1	SM0202007	Mini-SW, Play
S008	1	1	1	SM0101046	Mini-SW, Tape Select
S009	1	1	1	SM0101058	Mini-SW, Muting, Play
S010	1	1	1	SM0101050	Mini-SW, Muting, Rec.
S012	1	1	1	SM0101054	Mini-SW, Muting, Rec.
S013	1	1	1	SM0101057	Mini-SW, Muting, Pause
G001	1	1	1	BF1040004	Printed Comp., 0.1μF +120Ω
L001	1	1	1	TS1601602	Power Transformer.
L001	1	1	1	TS1601702	Power Transformer
W001	1	1	1	YC0240022	Power Cord
J001	1	1	1	YJ0100082	Jack
J002	1	1	1	YJ0100082	Jack
J003	1	1	1	YJ0100081	Jack
J004	1	1	1	YJ0800013	Jack
J005	1	1	1	YJ0800009	Jack
J006	1	1	1	YJ0800009	Jack
J007	1	1	1	YJ0800009	Jack
J008	1	1	1	YJ0800022	Jack
J009	1	1	1	BY0314001	Jack
J010	1	1	1	YP0400056	Jack
J011	1	1	1	YT0101005	Terminal
R001	1	1	1	RT0508214	Resistor, Fixed, 8.2Ω ± 5%, ¼W
R002	1	1	1	RT0508214	Resistor, Fixed, 8.2Ω ± 5%, ¼W
C001	1	1	1	DK1710201	Capacitor, Ceramic, 1000PF
C002	1	1	1	DK1710201	Capacitor, Ceramic, 1000PF
C003	1	1	1	DK1710201	Capacitor, Ceramic, 1000PF
C004	1	1	1	DK1710201	Capacitor, Ceramic, 1000PF
C005	1	1	1	DD1615101	Capacitor, Ceramic, 150PF
C006	1	1	1	DD1615101	Capacitor, Ceramic, 150PF
V001	1	1	1	IN1008030	Lamp
V002	1	1	1	IN1008007	Lamp
J012	1	1	1	BY0320001	Jack
J013	1	1	1	YJ0700014	Jack
J014	1	1	1	YJ0700014	Jack
Q001	1	1	1	HI1000302	Diode, Light-Emitting
F001	1	1	1	FS1010080	Fuse, 1A
F002	1	1	1	FS1010080	Fuse, 1A
F003	1	1	1	FS1031580	Fuse, 3.15A
F004	1	1	1	FS1003180	Fuse, 315mA
L002	1	1	1	ME1053004	Solenoid Coil
M010	1	1	1	IM1108001	Meter, Left
M011	1	1	1	IM1108001	Meter, Right

17 TECHNICAL SPECIFICATIONS

Signal-to-Noise Ratio

DOLBY NR OFF

with Fe-Cr or CrO₂ tape 50 dB
with standard tape 48 dB

DOLBY NR ON improves S/N ratio by 8 dB

Total Harmonic Distortion 3%

Frequency Response

with Fe-Cr tape 35 Hz to 17 kHz

with CrO₂ tape 35 Hz to 15 kHz

with standard tape 45 Hz to 13 kHz

Wow and Flutter 0.08% W.R.M.S.

Input Impedance

Mic 10 k Ω

Line 100 k Ω

Line Output Level 900 mV

Line Output Impedance 6 k Ω

Headphone Output Impedance 8 Ω

GENERAL

Power Requirements 120V AC, 60 Hz. (for U.S.A. and Canada)
..... 110/120/220/240AC, 50 Hz. (for Europe)

Power Consumption 25 W

Dimensions:

Width 17-3/8 inches

Height 5-3/8 inches

Depth 11-1/2 inches

Weight:

Model 5220 Only 20 lbs 10 oz

Packed for Shipment 26 lbs 11 oz



marantz

MARANTZ CO., INC. · P.O. BOX 577 · CHATSWORTH, CALIFORNIA · 91311

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