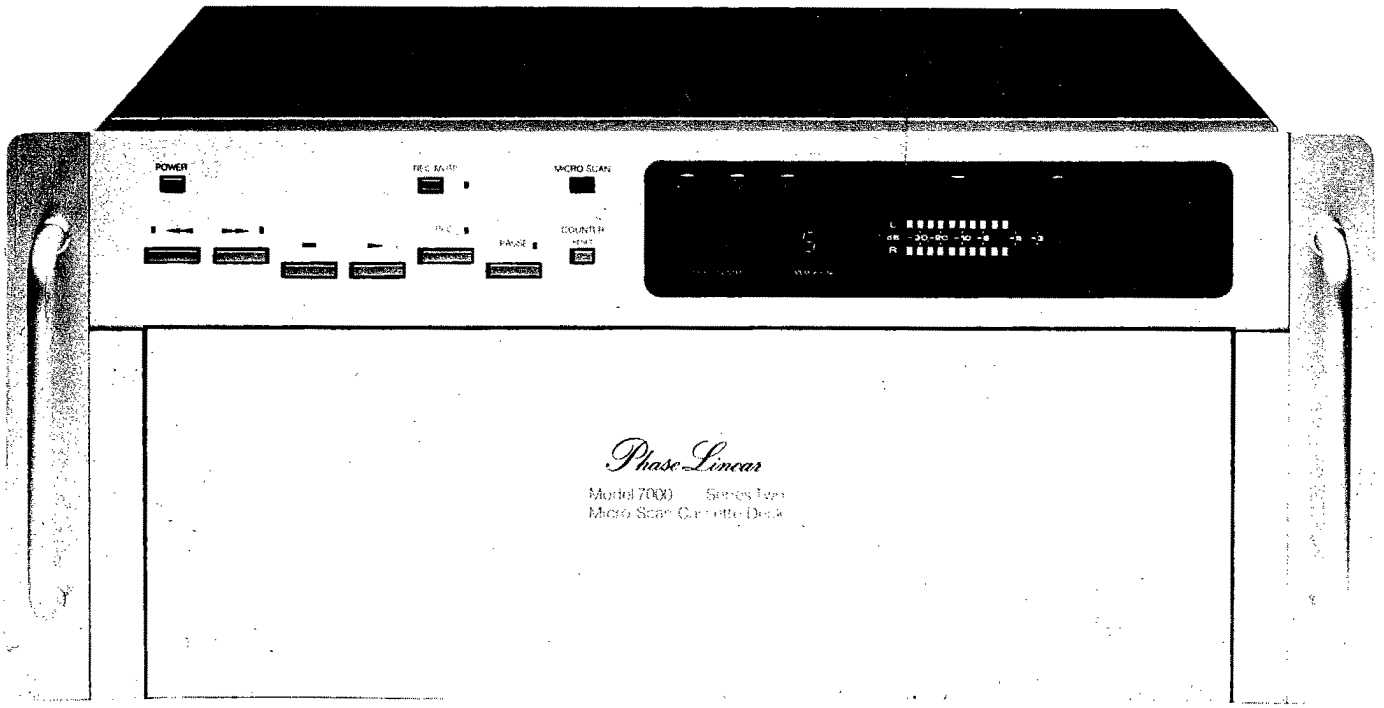
MODEL 7000 SERIES TWO MICROSCAN CASSETTE DECK

Service Manual



Phase Linear®

7000 SERIES TWO

MICRO-SCAN CASSETTE DECK

SERVICE MANUAL

CONTENTS:

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THIS MANUAL IS INTENDED FOR USE ONLY BY QUALIFIED TECHNICAL SERVICE PERSONNEL. HAZARDOUS VOLTAGES MAY BE ENCOUNTERED IN THE TEST AND SERVICING OF THE 7000II. USE EXTREME CAUTION; READ ALL INSTRUCTIONS.

Phase Linear Service Department
20121 48th Ave. West
Lynnwood, WA 98036
Tel. (206)774-8848, 774-3571

1-0. SPECIFICATIONS

SYSTEM:
Compact cassette, 2 channel

MOTORS:
Capstan drive; Quartz PLL DD motor x 1, Reel drive; DC high torque coreless motor x 1

HEADS:
Uni-crystal ferrite record/playback combination type head x 1, Erase head x 1

CONTROL SECTION:
Permits solenoid-driver, "feather touch", direct change and unattended operation with a timer

FAST WINDING TIME:
Approximately 75 seconds (C-60)

WOW AND FLUTTER:
No more than 0.03% (JIS WRMS)

FREQUENCY RESPONSE:
-20dB Recording;
  Standard, LH tape: 20-19kHz (25-16kHz ± 3dB)
  Ferrichrome tape: 20-20kHz (25-18kHz ± 3dB)
  Chromium dioxide tape: 20-20kHz (25-18kHz ± 3dB)
  Metal tape: 20-20kHz (25-19kHz ± 3dB)
0dB Recording;
  Chromium dioxide tape: 20-13kHz
  Metal tape: 20-15kHz
Microscan (-20dB recording);
  Metal tape 35-15kHz ± 1dB

SIGNAL TO NOISE RATIO:
Dolby NR OFF; more than 60dB
Dolby NR ON; more than 70dB (over 5kHz)

HARMONIC DISTORTION:
No more than 1.0% (0dB)

INPUTS:
(Sensitivity/Maximum allowable input/Impedance):
  MIC (L,R); 0.3mV/100mV/10kohms, 6mm diameter jack
  (Reference MIC impedance; 250 ohms to 10kohms)
  LINE x 2; 60mV/15V/100kohms, pin jack

OUTPUTS:
(Reference level/Maximum level/Load impedance);
  LINE x 2; 450mV/640mV/50kohms, pin jack
  HEADPHONES x 1; 63mV/90mV/8 ohms, 6mm diameter jack

SEMICONDUCTORS:
Transistors x 194
Diodes x 124 (Zener; 16, LED; 19)
ICs x 42

MISCELLANEOUS:
Power requirements: 120VAC 50-60Hz
Power consumption: 45 watts
Dimensions: 480(W) x 217(H) x 425(D) mm Max.
18-7/8 x 8-9/16 x 16-3/4 in.
Weight: 18.2kg (40lb 2oz)

NOTE: Specifications and the design subject to possible modification without notice due to improvements.

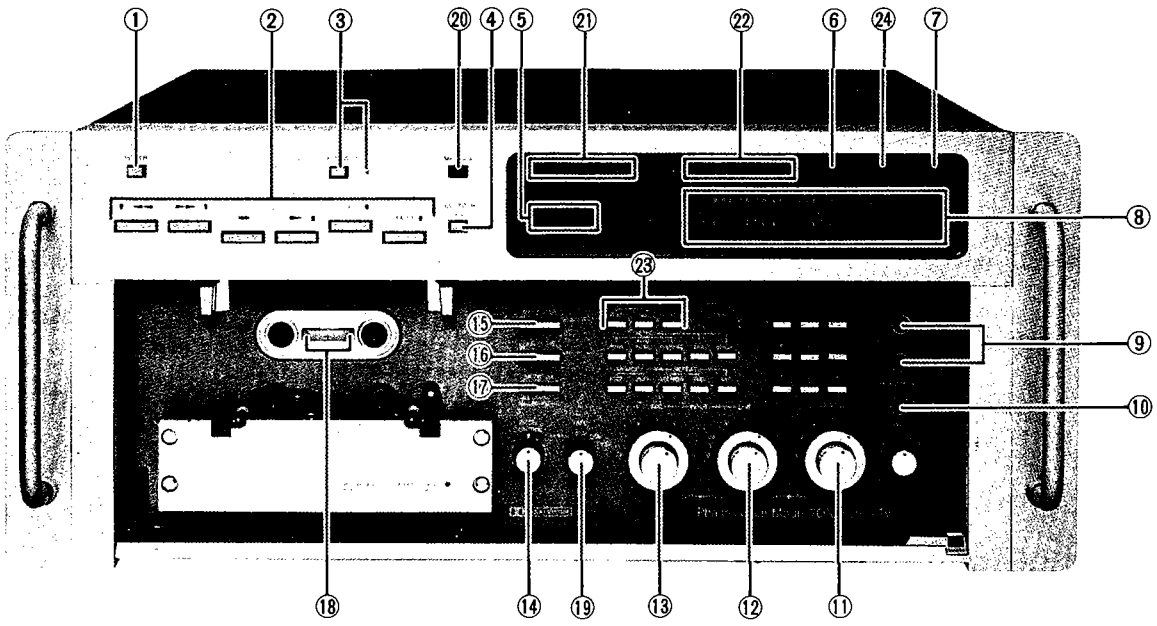
SUBFUNCTIONS:

Microscan system with Memory/ Recall function
Dolby NR system (ON/OFF) with Led indicator lamp
Tape selector with 4 positions (METAL/STD/CrO_2/FeCr)
Memory stop/Memory play
Counter repeat/End repeat
Auto start/Auto stop
Flourescent tube level meter with two color indication (-30 to +8dB), (Peak/ Peak hold/Average selector)
4 digit Fluorescent tape counter
Automatic tape slack canceller
Pitch control ±6% (only in playback mode)
REC muting function with blinking indication
Timer aid unattended recording/wake-up playback device
Bias control knob for manually adjusting the Bias
Batteries indicator
Multiplex filter
Tape monitor (TAPE/SOURCE)
Mixing control used for MIC and LINE imputs
Level meter brightness selector
Cassette compartment illumination (Remaining tape marker)
Output level controls with click-stop for reference playback level

NOTES:

1. Reference Recording Level: Meter 0dB indicating level (160nwb/m magnetic level= Philips cassette reference level
2. Reference Signal: 333Hz
3. Wow & Flutter: 3kHz, with acoustic compensation (weighted) rms value
4. Frequency Response: Measured at -20dB level, DOLBY NR OFF, level deviation is ±6dB without indication
5. Signal to Noise Ratio : Measured at the third harmonic distortion 3% level, weighted
6. Sensitivity: Input level (mV) required for reference recording level with input (REC) controls set to max.
7. Maximum Allowable Input: While decreasing settings of input (REC) level controls and increasing level at input jacks, this is the maximum input level (mV) at the point where recording amplifier output waveform becomes clipped
8. Reference Output Level: Playback output level when meter indicates 0dB
9. Maximum Output Level: Playback output level with respect to reference recording level when output (PLAY) level controls are set to maximum

2-0 FRONT PANEL FACILITIES



1. POWER SWITCH
   The level meter, tape counter and the remaining tape marker will come on when POWER switch is pushed.

2. OPERATING BUTTONS
   (Rewind): Push this button to rewind the tape.
   (Fast Forward): Push this button to advance the tape forward at high speed.
   (Stop): Push this button to stop the tape and to release the operating buttons.
   (Play): Push this button to play a tape and push this button together with the REC button for recording.
   REC: Push this button together with the PLAY button for recording.
   Note: This button will not work when a cassette is not loaded or when the erasure prevention tabs of a cassette have been removed.
   PAUSE: Push this button to stop the tape temporarily during recording or playback. Push it again to allow the tape to continue to travel as before.
   Notes: When any of the operating buttons are pushed, the corresponding indicator (except stop) will come on signifying that the deck is set to that respective mode.
   All the operating buttons are released to stop mode when the Power switch is turned OFF.

3. REC MUTE BUTTON/INDICATOR
   You can create unrecorded sound gaps while you are recording by pushing this button. When this button is pushed, the indicator blinks at intervals of about one second.

4. COUNTER RESET BUTTON
Push this button to reset the tape counter display to 0000.

5. TAPE COUNTER
This indicated the position of the tape run. The counter reverts to 0000 when the power is switched on.

6. DOLBY NR INDICATOR
This lights up when the DOLBY NR switch is pushed.

7. BATTERY INDICATOR
When this indicator lights up with the power switch ON, it means the batteries (Size AA) should be replaced at the earliest opportunity.

8. FLUORESCENT LEVEL METER
This indicates the input level during recording and the output level during playback.

9. MIC JACKS
These are the input jacks for microphone recording.

10. HEADPHONE JACK
This is the output jack for stereo headphones/
Notes: Use low-impedance headphones. If you use a high-impedance model, you will not be able to obtain sufficient volume.
You will damage the microphone if you plug it into the HEAD PHONE jack by mistake.

11. OUTPUT (PLAYBACK LEVEL) CONTROLS
Use these to adjust the output signal level during playback. Turning the controls to the right increases the level. The controls are coupled when turned but it is also possible to adjust the right channel (back) and the left channel (front) independently.
When playing back a reference tape (160nwb/m), a reference playback level (0dB) is obtained with these controls set to the "6" click stop position.

12. LINE RECORDING LEVEL CONTROLS
These adjust the recording input level from the LINE INPUT terminals on the rear panel. The level increases as the controls are turned to the right. The front control is for the left channel and the back control for the right channel.

13. MIC RECORDING LEVEL CONTROLS
Use these controls to adjust the recording level when you are recording with a microphone. Use the front control for the left channel and the back control for the right channel.
Note: For adjustments to the recording level, refer to page 17 of the owners manual "Setting the recording level". These controls can also be used for mixing.

14. PITCH CONTROL KNOB
You can use this knob to make the tape travel ±6% faster or slower than the rated tape speed during playback only. When the knob is set to the center click-stop position, the quartz PLL circuit is activated, the QUARTZ LOCKED indicator comes on, and the tape speed is locked to the 1 7/8" speed.
When the knob is rotated counterclockwise, the speed drops and the musical steps are lowered. Conversely, when it is rotated clockwise, the speed increases and the musical steps are raised. During recording, the quartz lock function is always actuated and so the tape speed does not change.

15. MPX (MULTIPLEX) FILTER SWITCH
Push this switch when recording a FM Stereo broadcast with the Dolby NR system to prevent leakage of the stereo pilot signal contained in the stereo broadcast.
Release to switch to OFF when you are not recording an FM Stereo broadcast with the Dolby NR system.

16. DOLBY NR SWITCH
Push this switch to the ON position when recording a program with the built-in Dolby noise reduction system or when playing back a tape which has been recorded with the Dolby NR system.

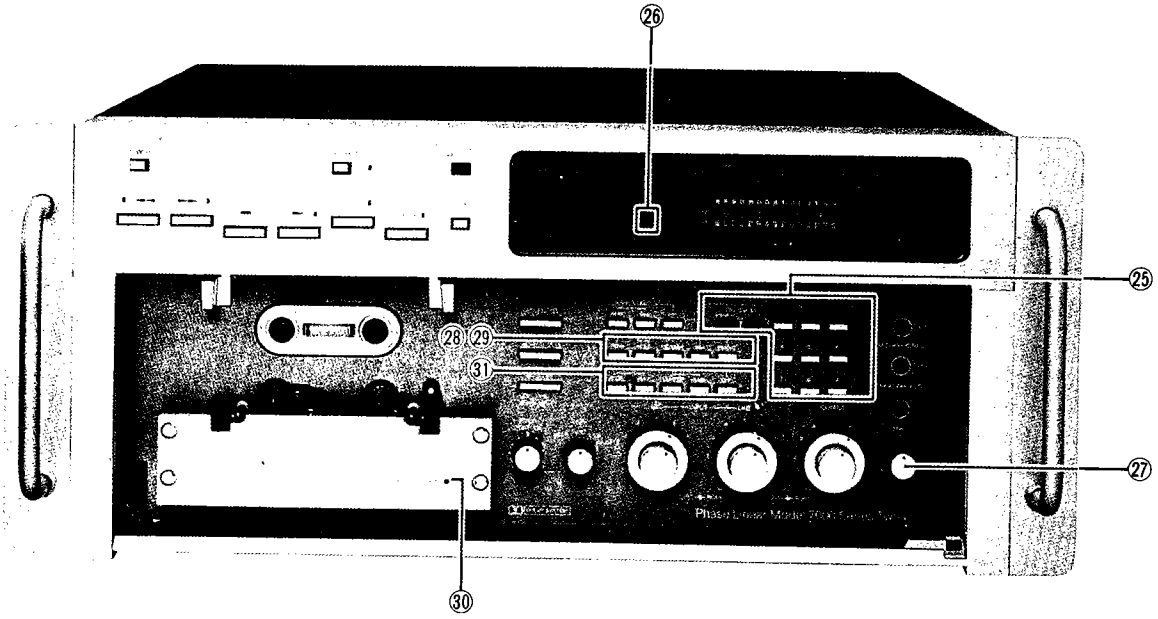
17. MONITOR SWITCH
This switch is used to select the output signal which is made available at the output jacks and headphones. Always make it a rule to push this switch when adjusting the recording level.
For PLAYBACK: Set the switch to the out (TAPE) position. If it is set to the depressed position, you will not be able to hear the playback sound.
For RECORDING: Set the switch to the out (TAPE) position and you will then be able to hear the signals (playback sound) immediately after you have recorded the sound source.
If the switch is set to the in (SOURCE) position, you will be able to hear the signals (recording input) immediately before you record the sound source.

18. REMAINING TAPE MARKER (DISPLAY LENS)
When this marker is visible during recording or playback, it means that there is enough tape on the supply reel for only another two or three minutes.

19. TAPE SELECTOR
This switch is used to select the bias, level and equalization characteristics, along with the u-scan system, during recording and the equalization characteristics during playback in accordance with the type of tape which has been loaded into the deck.

20. MICROSCAN CONTROL BUTTON/LAMP
Depress this button when the tape characteristics are to be adjusted automatically.

21. BIAS/LEVEL/EQ INDICATORS
Each of these indicators light up in accordance with the u-scan adjustment operation. They will also light up when data is recalled from the memory.



22. TAPE INDICATORS (METAL, STD, CrO_2, FeCr)

23. TIMER START SWITCHES
Push these switches when you are playing back or recording a tape with the use of as external timer.

24. MEMORY/REPEAT INDICATOR
This indicator lights up when either the MEMORY switch or the REPEAT switch is pushed to indicate that the corresponding operation is being performed.

25. BIAS/LEVEL/EQ MEMORY NUMBER BUTTONS
Microscan memory: Push this button and then a number button (No. 1-9) when storing tape data from an automatic adjustment operation using the u-scan system.
Microscan recall: Push this button when calling out the adjustment data when calling out the adjustment data which has been stored in the memory.

26. MEMORY NUMBER INDICATOR
When the u-scan adjustment operation is completed and the adjustment data of the tape characteristics are to be stored in the memory, this indicator will show the number as soon as the corresponding memory number button is selected and pushed. In the same way, it indicates when the memory recall operation is performed.

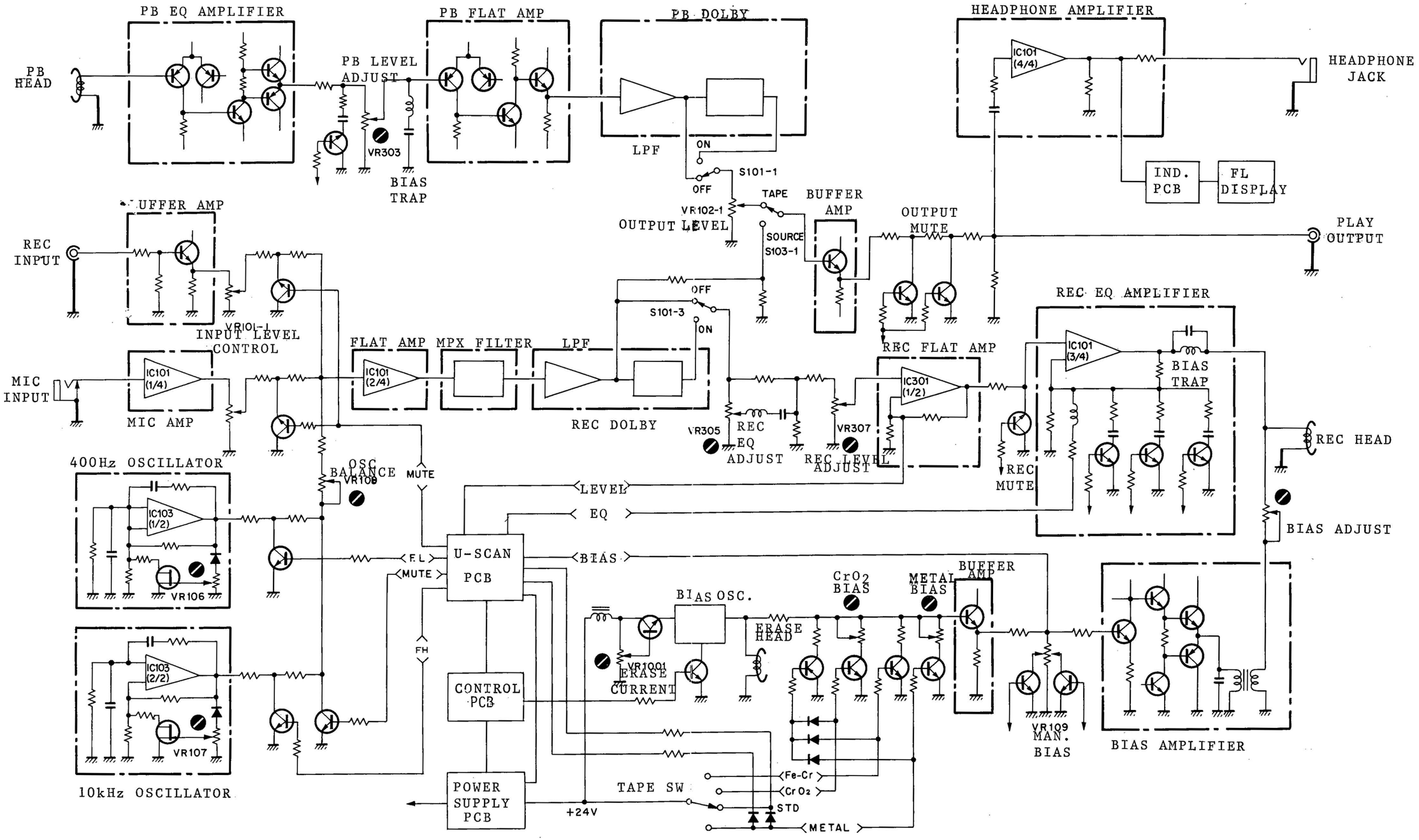
27. BIAS CONTROL
Use this knob to adjust the bias manually without using the u-scan system when obtaining the desired frequency response. A standard bias value is available when the control is set to the center click-stop position.

28. FLUORESCENT LEVEL METER SWITCHES
PEAK: When this switch is pushed, the meter functions as a peak responding meter, and the peak level of the signals is indicated for about 2 seconds.
PEAK HOLD: The meter functions as a peak level meter and the highest level of the signals is indicated when this switch is pushed.
AVERAGE: The meter functions as an average responding level meter when this switch is pushed.

29. LEVEL METER BRIGHTNESS SELECTORS
Use these switches to select the meter brightness.

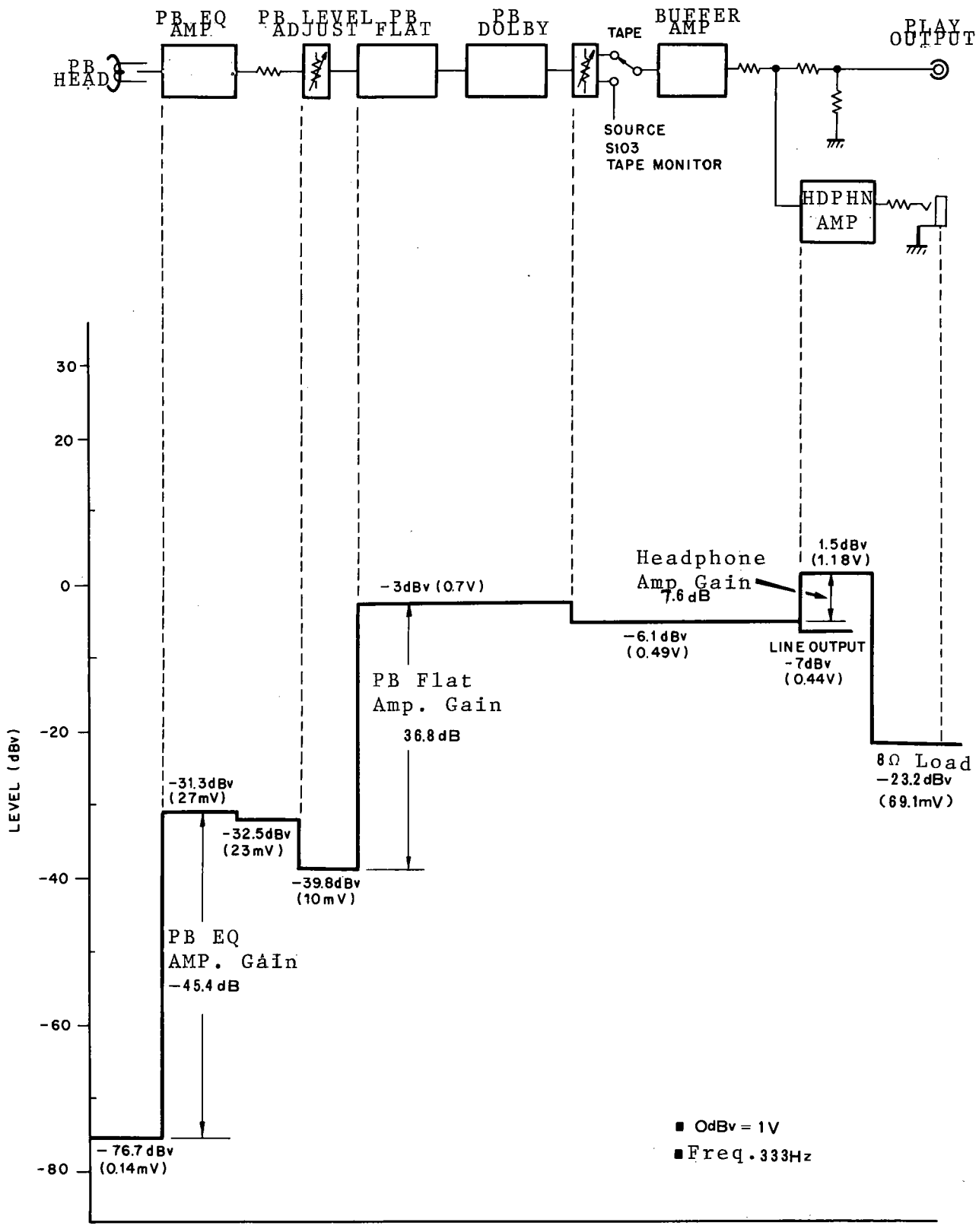
30. QUARTZ LOCKED INDICATOR
When the PITCH CONTROL knob is set to it's center position, the quartz PLL circuit is activated and this indicator comes on. It goes off, however, when the knob is rotated either clockwise or counterclockwise. During a recording, this indicator will remain on even if the PITCH CONTROL knob is rotated. The quartz PLL circuit is always activated in the record mode.

31. MEMORY REPEAT SWITCHES
These switches are used to start playback after the tape has automatically been rewound or just to rewind the tape.

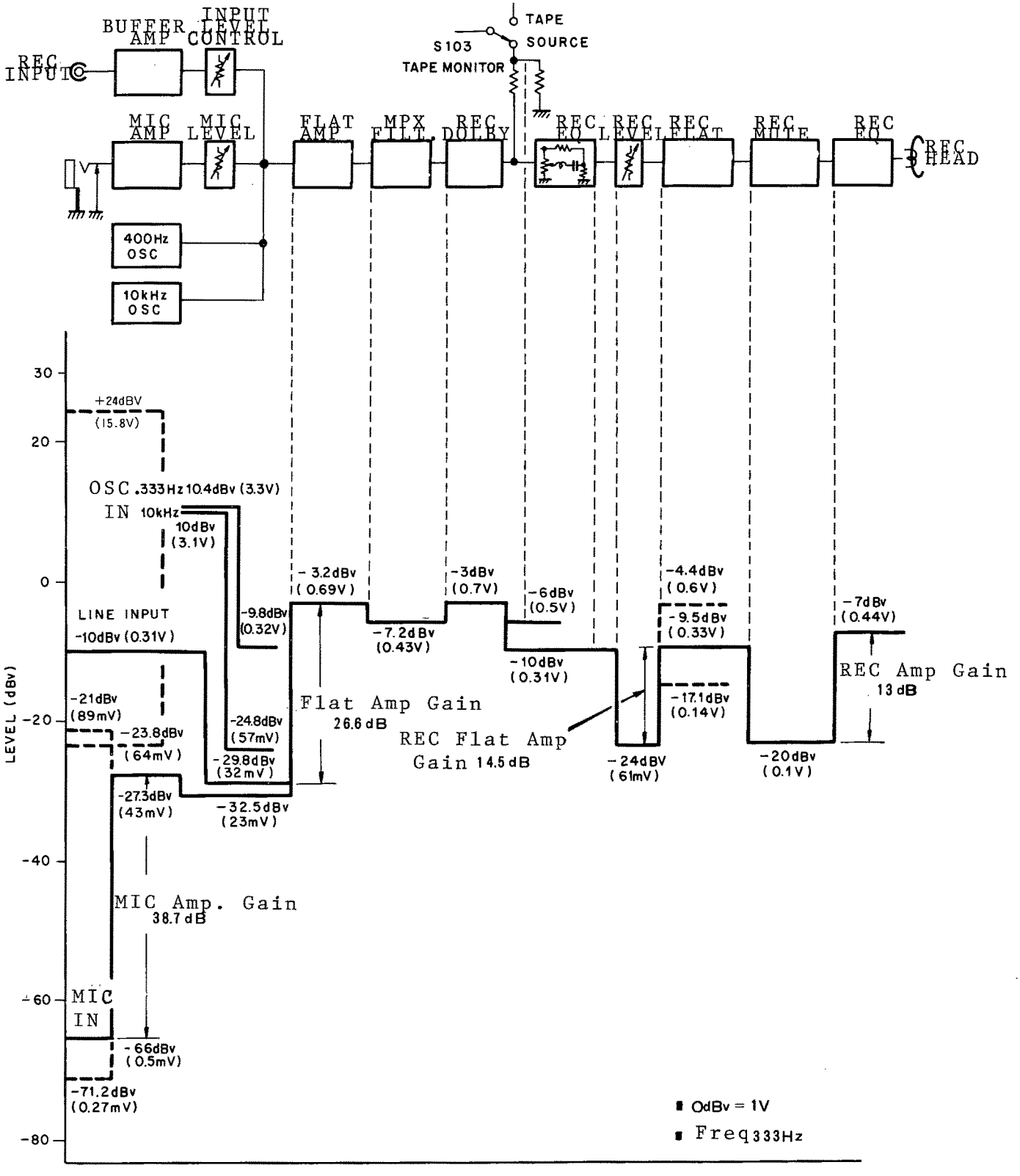

PB EQ AMPLIFIER
PB FLAT AMP
PB DOLBY
HEADPHONE AMPLIFIER
PB HEAD
PB LEVEL ADJUST
VR303
BIAS TRAP
LPF
ON
OFF
S101-1
IC101 (4/4)
HEADPHONE JACK
IND. PCB
FL DISPLAY
TAPE
SOURCE
S103-1
VR102-1
OUTPUT LEVEL
BUFFER AMP
OUTPUT MUTE
PLAY OUTPUT
REC INPUT
VR101-1
INPUT LEVEL CONTROL
OFF
S101-3
ON
REC EQ AMPLIFIER
REC FLAT AMP
IC101 (3/4)
IC301 (1/2)
BIAS TRAP
MIC INPUT
IC101 (1/4)
MIC AMP
FLAT AMP
MPX FILTER
LPF
IC101 (2/4)
REC DOLBY
VR305
REC EQ ADJUST
VR307
REC LEVEL ADJUST
REC MUTE
REC HEAD
BIAS ADJUST
400Hz OSCILLATOR
OSC BALANCE
VR108
MUTE
LEVEL
EQ
BIAS
IC103 (1/2)
VR106
F.L
MUTE
U-SCAN PCB
BIAS OSC.
CrO2 BIAS
METAL BIAS
BUFFER AMP
IC103 (2/2)
VR107
FH
VR1001
ERASE CURRENT
ERASE HEAD
CONTROL PCB
VR109
MAN. BIAS
BIAS AMPLIFIER
10kHz OSCILLATOR
POWER SUPPLY PCB
+24V
TAPE SW
Fe-Cr
CrO2
STD
METAL

4-0. LEVEL DIAGRAMS

4-1.1 Playback Level Diagram



4-1.2 Record Level Diagram



5-0. CIRCUIT DESCRIPTIONS

5-1. TAPE SELECTOR CIRCUIT

5-1.1 Playback Equalizer Switching Circuit

*The playback equalizer is switched by the front panel TAPE switch S104. The RC series circuit (R329 and C319) connected to the playback equalizer output is controlled by the Q311 transistor switch.

1. When S104 is switched to the STD position, no current will be passed to Q311. With this transistor thus switched off, the high region time constant for the equalizer will become 120us (for STD tapes). When S104 is switched to the FeCr position, Q311 is switched on by a current applied to it's base from the u-scan PCB via D303 and R333. And since the R329/C319 series circuit is also included, the high region time constant is switched to 70us (for FeCr tapes). The FeCr indicator LED lamp is lit up by a current via S104-1.

2. When S104 is switched to the CrO_2 and METAL positions, the high region time constant is again switched to 70us, and the corresponding CrO_2 and METAL indicator LED lamps are lit up.

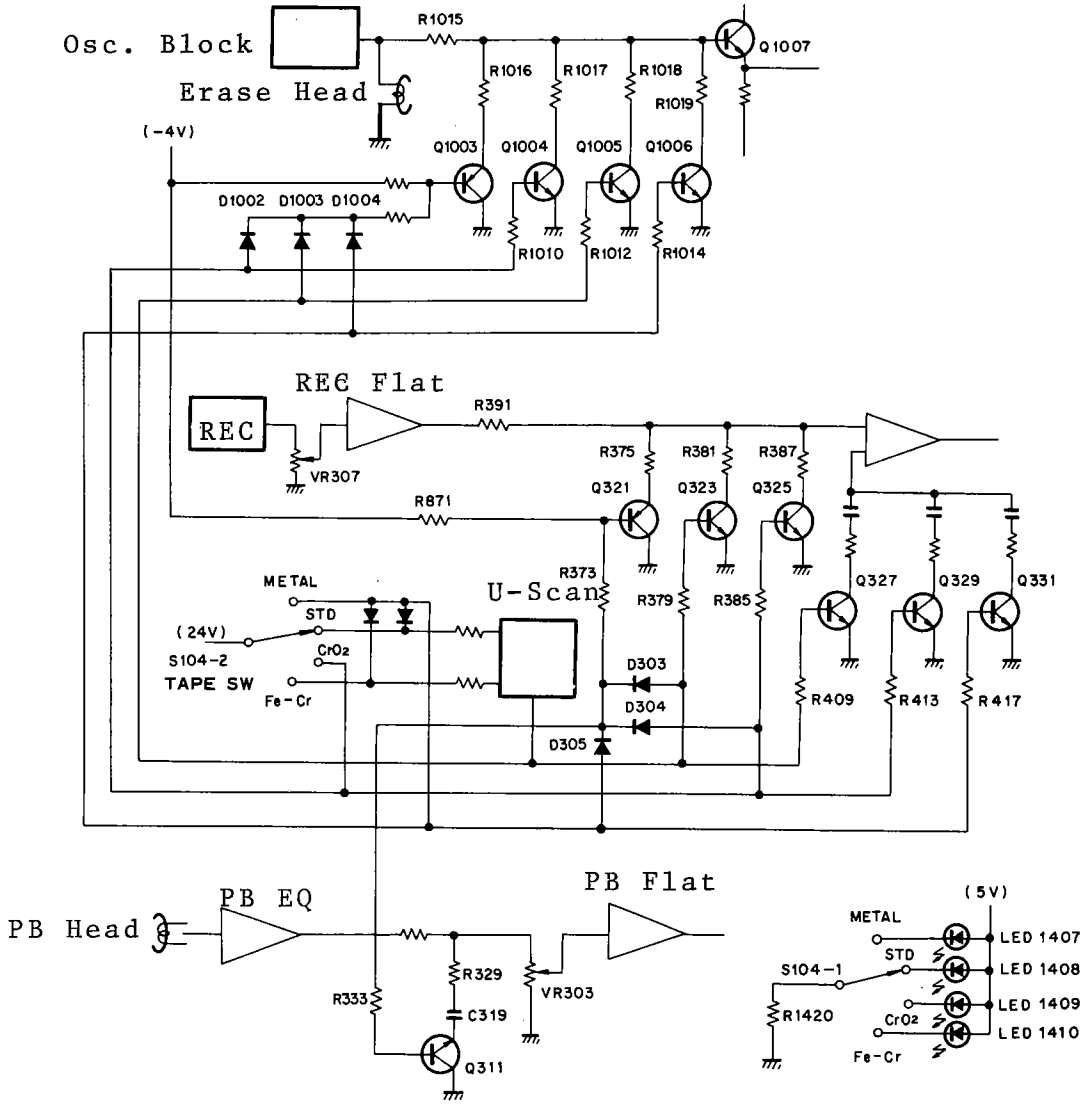


Fig. 5-1 Tape Selector Circuit

* The first paragraph in each section is a general description. The succeeding paragraphs comprise a detailed description.

5-1.2 Recording Equalizer Switching Circuit

The recording equalizer switching involves 4 positions: STD FeCr, CrO_2 and METAL. When the front panel TAPE switch S104 is set to the FeCr, CrO_2 and METAL positions, a bias current is applied to the bases of different transistors, thereby switching the frequency response for each type of tape.

1. When S104 is switched to the FeCr position, Q327 is turned on by a bias current applied to it's base from the u-scan PCB via R409, resulting in switching to the frequency response for FeCr tapes. When S104 is switched to the CrO_2 and METAL positions, a similar bias current is applied to the bases of Q329 and Q331 respectively, thereby switching to the corresponding frequency responses for CrO_2 and METAL tapes. The frequency response for STD tapes is obtained when all 3 transistors (Q327, Q329 and Q331) are switched off. The frequency response is extended to about 20kHz in the FeCr, CrO_2 and METAL positions, and to about 18kHz in the STD position.

5-1.3 Recording Bias Switching Circuit

Switching of the recording bias involves dividing the voltage of the bias oscillator output passed via R1015 according to the position selected by the front panel TAPE switch S104.

1. The respective transistors are switched on via Q1003 when S104 is switched to the STD position, Q1004 in the CrO_2 position, Q1005 in the FeCr position, and Q1006 in the METAL position. In this way, the record bias is matched with the peak bias for each type of tape.

5-1.4 Recording Level Switching Circuit

The recording level switching also involves 4 positions: STD, FeCr, CrO_2 and METAL.

1. In the STD position, Q321 is turned on by a base current passed via Q321, R871 to B-. In the FeCr and CrO_2 positions, Q323 and Q325 are turned on by B+ being passed via S104 to the respective transistors. The recording level in the METAL position is set when the STD, FeCr and CrO_2 transistors are all turned off.

5-2. CONTROL CIRCUITS

5-2.1 Playback Mode

When a cassette half is loaded, the cassette half detector switch S1301 is switched to HALF position. In addition to activation of the tape slack elimination circuit (described later) for elimination of any slack in the loaded tape, the Q1101 transistor is turned on by a current passed via R1101, R1102 and S1301 to ground, resulting in power being applied to the DD motor to start the capstan motor turning.

1. When the PLAY switch S1704 is turned on, pin 15 of IC801 is switched to high (H) level, resulting in Q810 being turned on by the current passed via R827, Q810 and R820. Q809 is then turned on by a current passed from Q810 via R822 and Q809 to B- (-2.2V).

2. Next, Q805 is turned on due to the current passed via Q805, R813 and Q809, resulting in the reel motor (RM) starting to turn due to the current passed from Q805 to Q809 via RM. At the same time, Q837 is turned on by a current passed from pin 15 of IC801 to Q837 via R833. And since B+ is passed from the pinch solenoid SL1301 to Q836 and Q837, SL1301 is activated to commence playback.

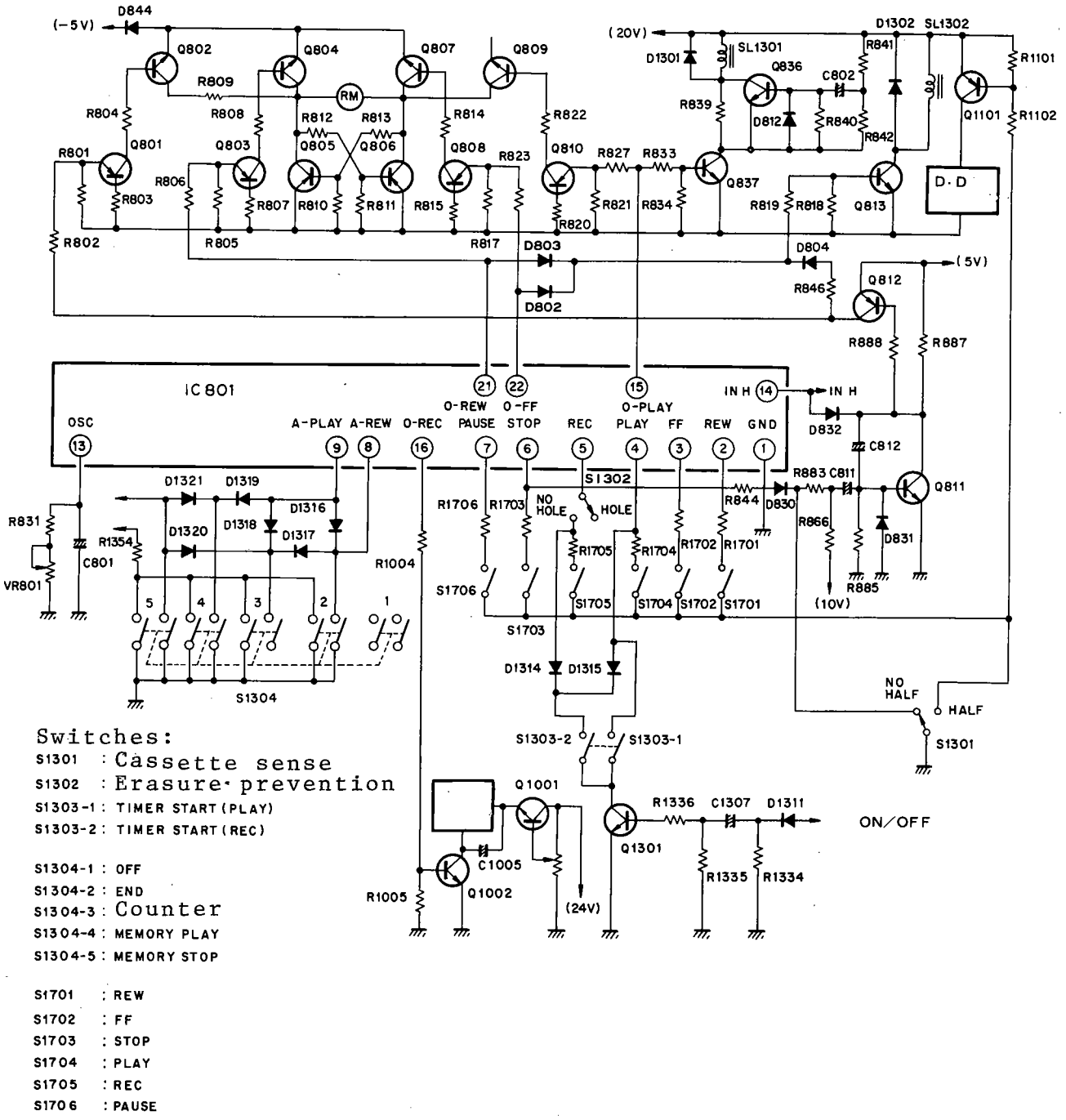


Fig. 5-2 Control Circuit

5-2.2 Record Mode

1. When a cassette half with the erasure prevention tabs intact is loaded, the erasure prevention switch S1302 is switched to the NO HOLE position. Then the PLAY switch S1704 and REC switch S1705 are switched on together. See section 5-2.1 for details on the activation of the pinch solenoid SL1301 and capstan motor.

2. Pin 16 of IC801 is thus switched to H level, resulting in Q1002 being turned on by the R1004/Q1002 current, thereby activating

the bias oscillator circuit to commence recording. If, however, the erasure prevention tab has been snapped off, S1302 will switch to the HOLE position. This means that pin 5 of IC801 will not be switched to low (L) level when the REC switch is pushed, thereby preventing the commencement of recording.

5-2.3 Fast Forward Mode

1. When the FF switch is pushed, pin 22 of IC801 is switched to H level, resulting in Q808 and Q807 being turned on. With Q807 on, B+ is passed from Q805 to Q807 via RM, resulting in the reel motor being started.
2. At the same time, Q813 is turned on by a current passed via D802 and R819, resulting in B+ being passed via the brake solenoid SL1302 to Q813. This SL1302 is thus activated, and the brake released.
3. Rewind operation is basically the same as fast forward, the difference being that the voltage applied to RM is of opposite polarity.

5-2.4 Pause Mode

1. During playback and recording modes, B+ is applied to the pinch solenoid SL1301, the DD motor assembly (capstan motor), the reel motor and the bias oscillator circuit.
2. If the PAUSE switch S1706 is pushed, pin 15 of IC801 is switched to L level, resulting in SL1302 being disengaged and the reel motor stopping, thereby temporarily halting playback or recording.

5-2.5 Timer Start Operation

When the power switch is turned on, IC801 outputs are controlled by switching pin 14 to L level for about 3 seconds to ensure that the power voltage reaches complete stability before being used.

1. When the power switch is turned on with the TIMER START (PLAY) switch S1303-1 switched on, the INH output is switched to L level and the power switch on/off muting output to H level approximately 3 seconds later (this muting time being determined by R1622, C1646, R1624 and R1625).
2. Q1607 and Q1608 are turned on by the output of the IC1602 NAND gate muting circuit, while Q1301 is turned on by a current passed ia D1311, C1307, R1366 and Q1301 (see Fig. 5-2).
3. At the same time that Q1301 is turned on, pin 4 of IC801 is switched to L level, thereby commencing playback.

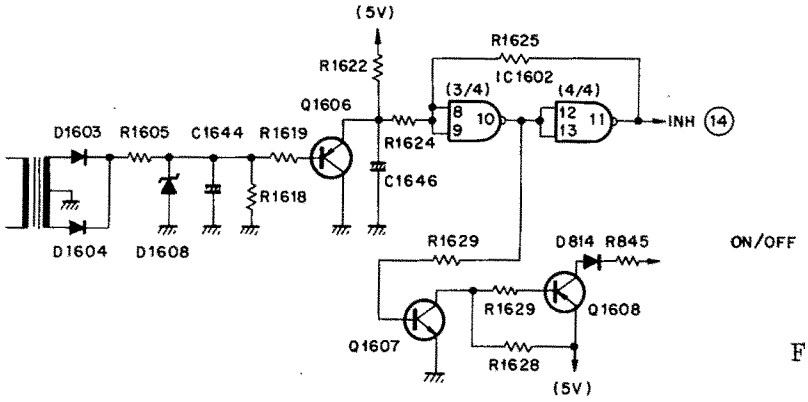


Fig. 5-3 Timer Start Operation

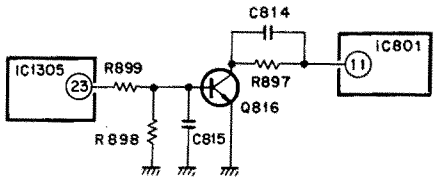


Fig. 5-4 Memory Stop Operation

4. When the power switch is turned on with the TIMER START (REC) switch S1303-2 switched on, an L level is obtained by passing a current via Q1301 from D1314 and D1315, this being the same as pressing the PLAY and REC switches together.

5. Pin 14 of IC801 is again switched to H level about 3 seconds later in the same way as was described above, resulting in commencement of recording.

5-2.6 Memory Stop Operation

When the REW switch S1701 is pushed with the MEMORY STOP switch S1304-5 already on, rewind mode will be stopped when the counter reading reaches 9999.

1. When the tape counter reaches 9999 during rewind with the MEMORY STOP switch S1304-5 on, a pulse signal is generated by IC1305, resulting in a current being applied to the base of Q816 via R899.

2. When Q816 is turned on, pin 11 of IC801 is switched momentarily to L level by the differential pulse signal, resulting in outputs being switched to stop mode by the IC program, and thereby stopping all operations.

5-2.7 Memory Play Operation

When the REW switch S1701 is switched on the MEMORY PLAY switch already on, rewind mode will be switched automatically to playback mode when the tape counter reaches 9999.

1. When the MEMORY PLAY switch S1304-4 is switched on, pin 9 of IC801 is switched to L level via D1319.

2. And if the REW switch S1701 is then switched on, a pulse signal will be generated by IC1305 when the tape counter reaches 9999, resulting in pin 11 of IC801 being switched to L level in the same way as during the memory stop operation.

3. Then according to the IC801 program, switching of pin 11 to L level when pin 9 has already been set to L level results in a temporary switching to stop mode before commencement of playback.

5-2.8 Counter Repeat Operation

When tape transport stops during playback or recording mode with the REPEAT COUNTER switch S1304-3 is switched on, the tape is rewound automatically and switched back to playback (again automatically) when the tape counter reaches 9999.

1. When the REPEAT COUNTER switch S1304-3 is switched on, pins 3 and 9 of IC801 are set to L level via D1318 and D1317 (D1316).

2. If tape transport stops during playback or recording, pin 12 of IC801 is switched momentarily to L level. And according to the IC801 program, tape transport is re-commenced automatically in the rewind mode when pin 12 is switched to L level with pins 8 and 9 already set to L level.

3. When the tape counter reaches 9999, IC1305 generates a pulse signal (in the same way as during the memory play operation), resulting in the start of playback mode (again according to IC801 program).

4. Note that when the end of tape is reached during fast forward mode with the REPEAT COUNTER switch on, the IC801 is programmed not to proceed to counter repeat operation, but to switch to auto stop.

5-2.9 Auto Stop Operation

When the tape stops during playback, recording, fast forward or rewind modes, this tape transport detector circuit is involved in the automatic disengagement of the tape transport mechanism. Tape transport is detected by a photo-interrupter equipped sensing switch coupled to the take-up reel and belt.

1. During tape transport, pulse signals are generated by the photo-interrupter, and are used in repeated on/off switching of IC803 1/4 and 2/4.
2. IC802 incorporates a built-in oscillator specifically for "auto-stop" purposes, the oscillation frequency being determined by C816, and the auto stop timing subsequently determined by this oscillation frequency.
3. To maintain tape transport, an input signal is applied to pin 2 of IC802 via R907. The IC802 output at pin 6 will thus be off (open), and B+ (10V) will be applied across R906 and R905 to keep pin 6 at H level.
4. When tape transport stops, the photo-interrupter pulse signals cease, and so the input signal is no longer applied to pin 2 of IC802. Approximately 3 seconds later, pin 6 of IC802 is switched on (shorted) and thereby switched to L level. Pin 12 of IC801 is then switched to L level via C807 and R867 to put the tape deck into stop mode.
5. During pause mode, however, pin 19 of IC801 is kept at H level, resulting in Q820 being turned on due to a current passed via D815 and R869 to the base of the transistor. Pin 1 of IC802 is thus connected to ground, thereby inhibiting the circuit program oscillation output to prevent the deck from being switched to the stop mode.

5-2.10 Pinch Solenoid Switching Circuit

When the PLAY switched is pushed, a high voltage (about 20V) is applied to the pinch solenoid for about 0.5 seconds to increase the solenoid pulling power. After this initial pulling action, the applied voltage is dropped back to about 12V to reduce the generation of heat in the solenoid coil.

1. When the PLAY switch S1704 is pushed, Q837 is turned on.

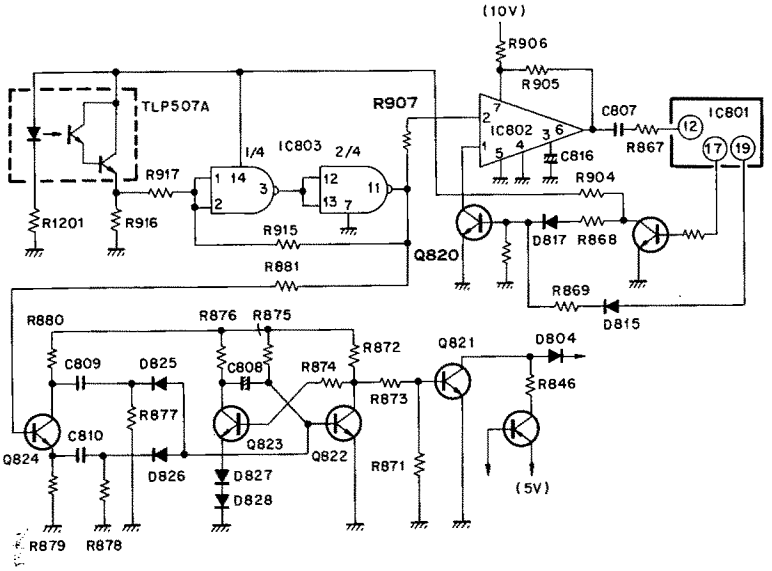


Fig. 5-5 Auto Stop Operation

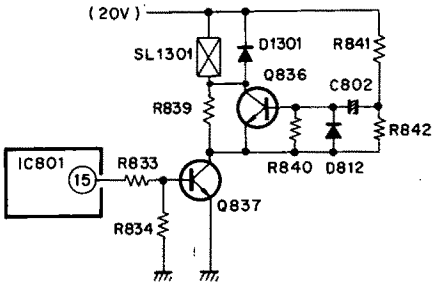


Fig. 5-6 Pinch Solenoid Switching Circuit

2. Q836 is then turned on by the current passed via R841 and C802 to it's base, resulting in a voltage which is practically equal to B+ (20V) being applied to the pinch solenoid SL1301.

3. But once C802 has been charged up (about 0.5 seconds) Q836 is turned off, resulting in the voltage applied to SL1301 (via R839) being dropped to about 12V (which is sufficient to maintain the solenoid in the activated state).

5-2.11 End Repeat Operation

If tape transport stops during playback or recording with the REPEAT END switch on, the tape will be rewound automatically, and switched back to playback (also automatically) after the tape has been completely rewound back to start.

1. When the REPEAT END switch S1304-2 is switched on, pins 8 and 9 of IC801 are set to L level.

2. If the tape stops during playback or recording, pin 12 of IC801 is momentarily switched to L level. And when pin 12 is switched to L level with pins 8 and 9 already set to L level, IC801 has been programmed to re-commence automatically to rewind.

3. Then when pin 12 is switched momentarily to L level again after the tape has been completely rewound to start, playback will commence automatically, again according to IC801 program.

Note, however, that when the tape is fully rewound during normal rewind mode, even when REPEAT END switch is on, IC801 has been programmed not to start repeat end mode, but to switch to auto stop instead.

5-2.12 Tape Slack Elimination Circuit

Since the tape transport mechanism employed in this tape deck is based on the "close loop capstan system", it is necessary to ensure proper tape tension within this loop prior to starting playback and recording. Otherwise, it may not be possible to achieve adequate head-to-tape contact. This slack is removed by reversing the supply reel briefly when the cassette half is first loaded.

1. When a cassette half is loaded with the deck in stop mode, the cassette half detector switch S1301 is switched to the HALF position. Q813 is thus turned on by the current passed via Q812, R846, D804 and R819 to the base of Q813, thereby resulting in B+ (20V) being applied to the brake solenoid SL1302 and Q813 to activate SL1302 (which releases the brake).

2. When Q812 is turned on, Q801 and Q802 are both turned on by the current passed via Q812, R802, Q801, R804, Q801, Q802, D844 and B- (-5V).

3. With Q802 turned on, Q806 is also turned on, resulting in the reel motor being turned in the reverse direction due to the current passed via Q806, RM, R809, Q809, D844, B- (-5V) and B+ (+5V). Any tape slack is thus removed.

4. The motor rotation detector photo-interrupter is driven by the take-up reel via a belt, so as soon as the take-up reel starts to rotate, pulse signals are generated and will stop the rewind mode momentarily.

5. If the take-up reel continues to rotate further after removing the tape slack in rewind mode, sensing pulse signals will be generated and applied to Q824, resulting in a full-wave rectified output (see fig. 5-5)

6. Q823 and Q822 form a mono-stable multivibrator where Q823 is normally off and Q822 on. If the D825/D826 negatively rectified signal is then applied to the base of Q822, the operation of Q823 and Q822 is reversed with Q822 being turned off.

7. Once Q822 is turned off, B+ is applied to Q821 via R837, resulting in Q821 being turned on. Brake solenoid SL1302 is thus activated, thereby stopping the reel motor.

5-3. MUTING CIRCUITS

5-3.1 Muting During FF, REW and Stop Modes

Unwanted noise during FF, REW and stop modes is muted by this circuit.

1. During FF, REW and Stop modes, Q830 is turned on since pin 20 of IC801 is set to H level.

2. As a result of Q830 being turned on, Q829 and Q828 are also turned on, thereby passing a bias current via Q828, D821, MONITOR switch S103-4 (TAPE position), R159 (R161)and Q109 (Q111). Q109 and Q111 are thus turned on to mute LINE OUTPUT. Note that this LINE OUTPUT muting may be cancelled by switching the MONITOR switch S103-4 to the SOURCE position.

5-3.2 Muting When Switching From Stop to Playback or Record

1. As has already been outlined above, Q109, Q111 and Q105 are switched on during stop, thereby muting the LINE OUTPUT and record amplifier.

2. If the PLAY switch S1704 is then switched on, pin 20 of IC801 is switched to L level, resulting in Q830 being turned off, and the charge on C806 being discharged via R843. During the time taken for this capacitor to discharge (about 1 sec.) Q829, Q828, Q109, Q111 and Q105 will remain on, thereby muting unwanted noise generated during the switching action and initial playback. Note that during playback, a bias current is passed via R856 and R857 to Q826, thereby keeping Q826 and Q825 turned on to keep the record amplifier muted.

3. When switching from stop to record, the circuit changes are basically the same as described above in steps 1 and 2, with the exception that pin 16 of IC801 is switched to H level, resulting in Q827 being turned on, and Q826 and Q825 being turned off to release the muting of the record amplifier.

5-3.3 Record Muting (REC MUTE)

When the REC MUTE switch is switched on during recording, the signal is muted to form a section of blank tape.

1. Since Q827 is turned on and Q826 and Q825 turned off during recording, the record amplifier is not muted. But when the REC MUTE switch S1707 is switched on, the bias current passed from B+ to R849, R850 and Q835 is also applied to S1707 via R849, resulting in Q835 being turned off.

2. And once Q835 is turned off, Q834 is turned on, resulting in B+ being supplied to the a-stable multivibrator circuit formed by Q832 and Q833. The REC MUTE indicator LED1706 connected between the Q832 collector and ground is thus turned on and off in about 1 second cycles.

3. With Q834 turned on, Q826 and Q825 are turned on via R855, thereby muting the recording signal.

5-3.4 Muting When the Power Switch is Turned On

1. When the power switch is turned on, C1646 is charged via R1622. And while the input level at pin 10 of IC1602 3/4 remains below the trigger level, this pin is kept at H level, resulting in Q1607 and Q1608 being turned on, and B+ thus being applied via Q1608, D814, R845 and R844 to Q829. The Q829 and Q828 transistors are thus turned on to mute the LINE OUTPUT.

2. Once the IC1602 input level reaches the trigger level the pin 10 level is inverted to L level, resulting in Q1607 and Q1608 being turned off. LINE OUTPUT is thus muted only during the time required for C806 to be discharged.

5-3.5 Muting When the Power Switch is Turned Off

1. When the power switch is turned off, C1644 is discharged rapidly via R1618, resulting in Q1606 being turned on, and C1646 also being discharged rapidly.

2. Since the IC1602 input is switched to L level, pin 10 of IC1602 3/4 will be switched to H level, thereby turning Q829 and Q828 on to mute the LINE OUTPUT (in the same way as described above for muting when the power switch is turned on). The click noise generated when the power switch is turned off and thus muted.

5-3.6 Muting During U-Scan Switching Operations

During automatic u-scan microcomputer operations, oscillator switching, LINE INPUT, LINE OUTPUT and MIC INPUT are all muted.

Oscillator Switching

1. The microcomputer oscillator switching outputs FL and FH are switched to H level during normal status, and to L level during microcomputer operations.

2. During recording bias and level switching operations, FL is switched to L level, and FH to H level, resulting in Q118 being

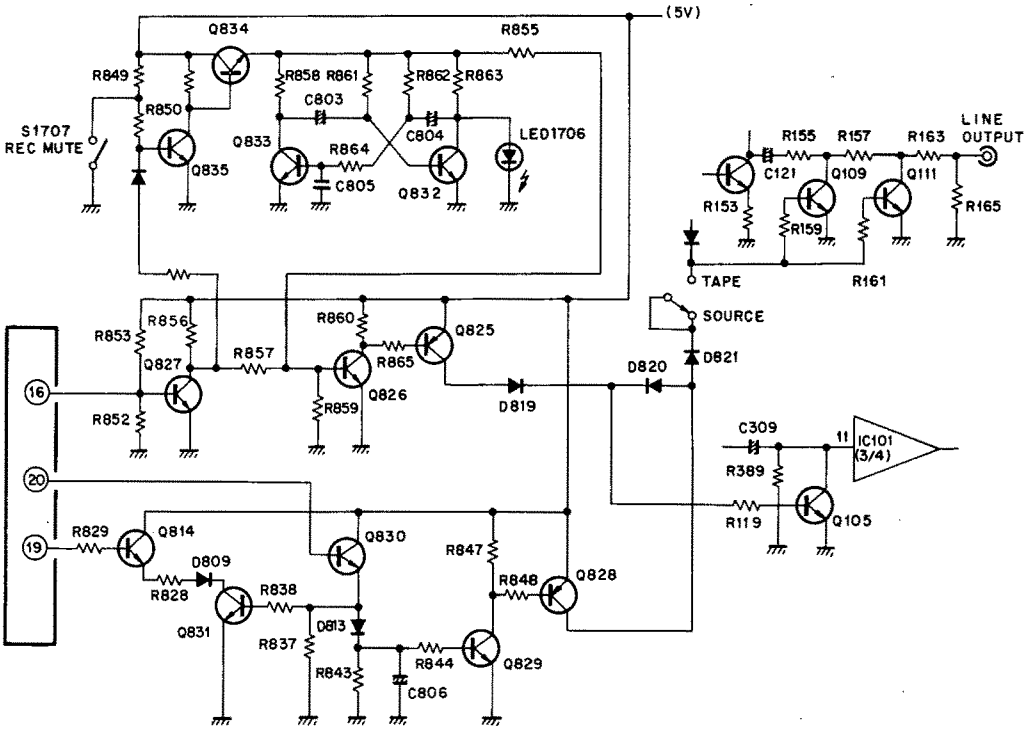


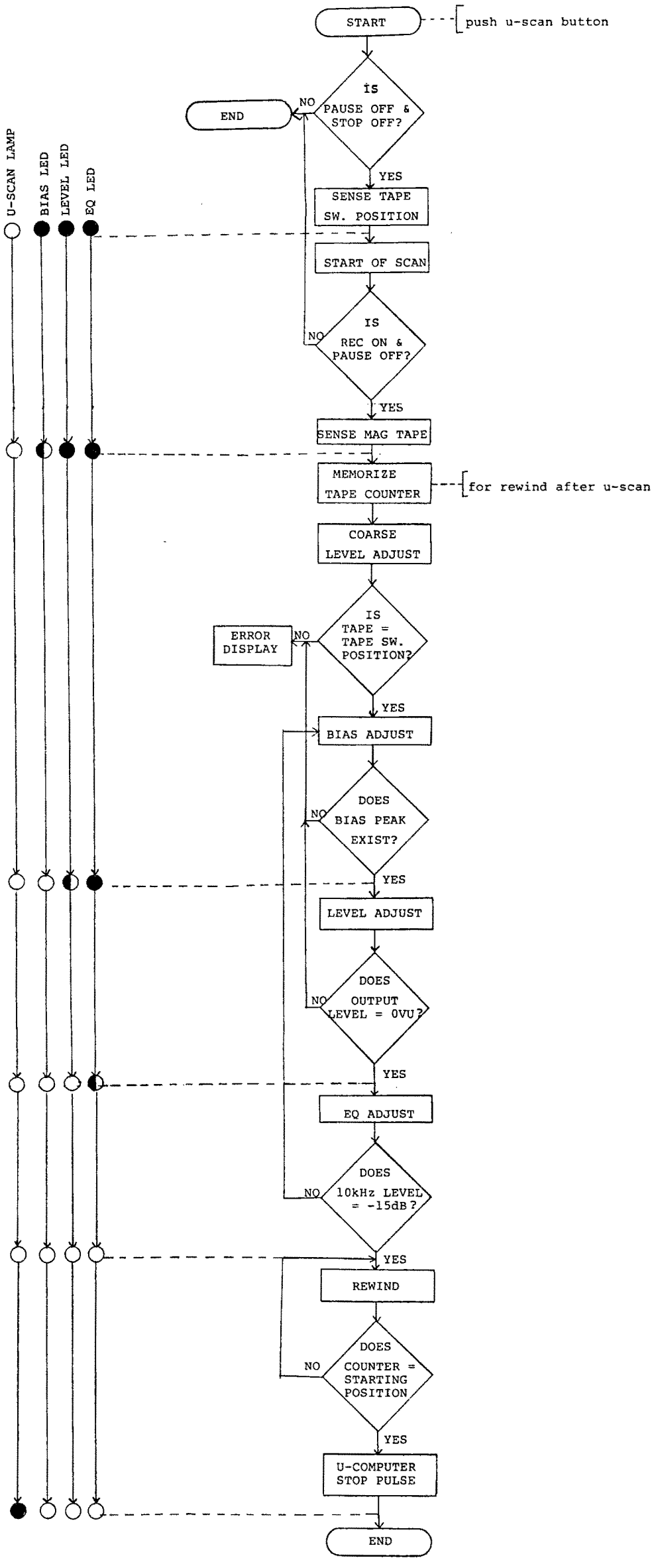
Fig. 5-7 Muting Circuits

5-4. Micro-scan Operation

Micro-scan operation is controlled by IC911(PD4005) of the u-scan PCB. The PD4005 is a true micro-computer system with all ALU, ROM, RAM and I/O necessary for controller applications. The PD4005 contains a 4 bit parallel ALU, 2k x 8 bit ROM for program storage, 96 x 4 bit RAM for data storage, 35 I/O lines, a three level stack, a programable interval timer, interrupt capability and an on-board clock generator. See Fig. 5-10 for a general flowchart of the u-scan program. See Fig. 5-11 through 5-14 for simplified schematics of the decision and adjustment circuitry.

1. The PD4005's output ports have been designed for 6 bit operation yielding 64 discreet steps of adjustment over a 12dB (±6dB) range. Bias adjustment is common to both channels while Level and EQ adjustment is independent for each channel.
2. Bias adjustment is done by sensing a bias peak. If no bias peak is sensed an error display (all three LEDs flashing simultaneously) is indicated. Level adjustment is accomplished by adjusting the record level to obtain a 0VU playback level. EQ adjustment is accomplished by adjusting the 10kHz record level (from the built-in oscillator) such that the playback level is -15dB compared to the 400Hz level used for level adjustment. The decision as to whether each condition has been met is made by IC915-1/4,2/4 and 3/4(comparator circuit). The comparator reference level is generated by IC906(D/A converter) which is controlled by IC911(PD4005). Only the record circuitry is adjusted. The 12dB adjustment range allows the u-scan circuit to accomodate practically all brands and types of tape.
3. After the u-scan program is completed, adjustment data is available for entry into memory. Memory data is written into IC914(uPD5101LC) which is a 256 word x 4 bit static RAM. Bias sweep A/D conversion data is written in addresses 00-7F. Memory key(1-9) data is written in addresses 80-ED.
4. The u-scan circuit is operational during normal(non-micro-scan) use and is normally set to the middle(0dB) of it's adjustment range.

Fig. 5-10 Micro-scan Program General Flowchart



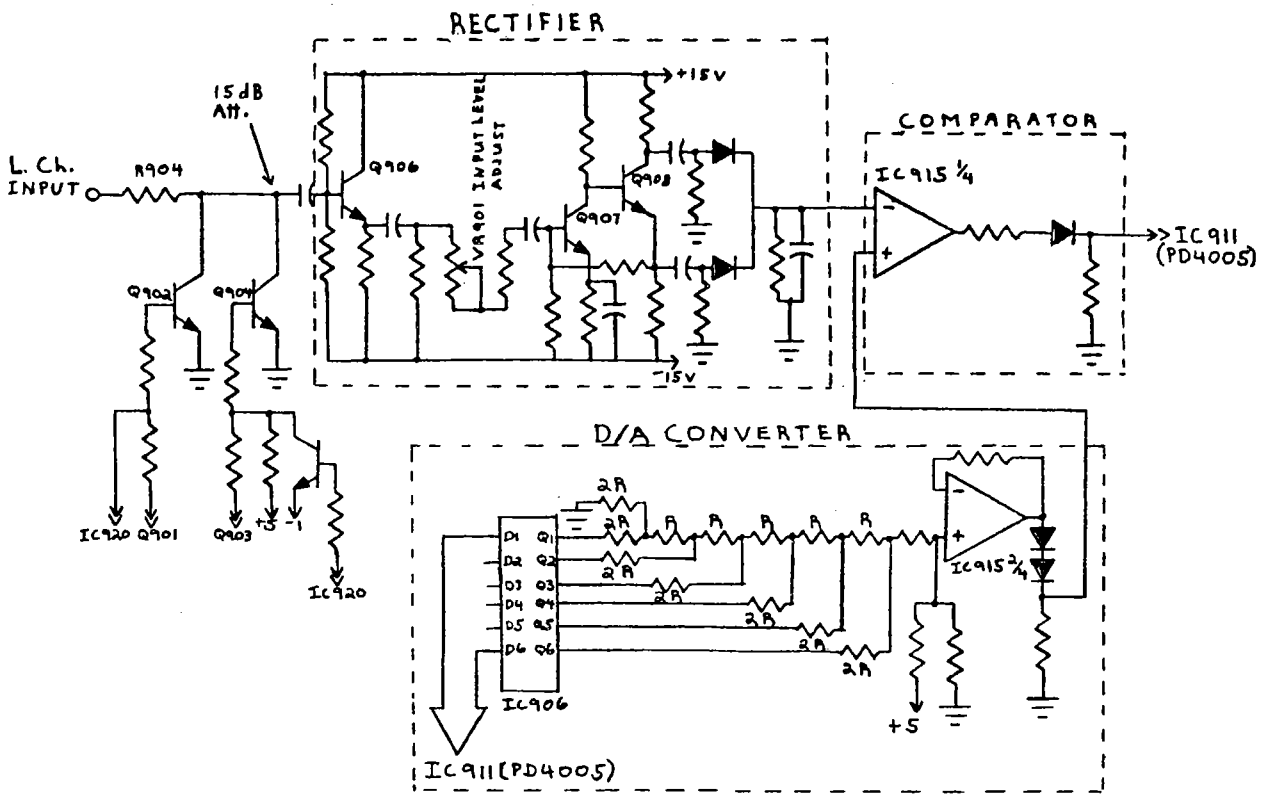


Fig. 5-11 U-Scan A/D Converter

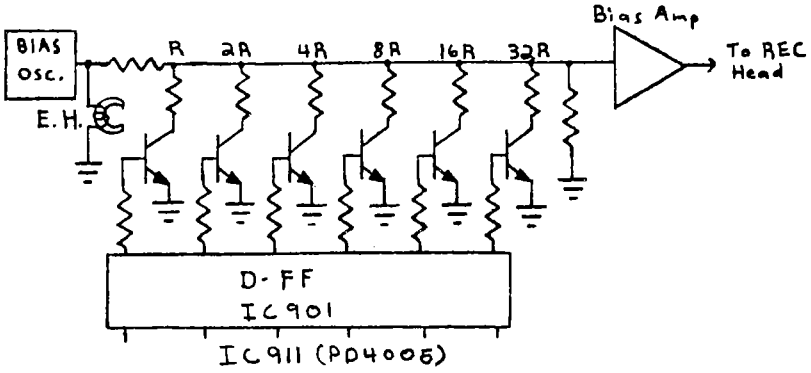


Fig. 5-12 U-Scan Bias Adjust

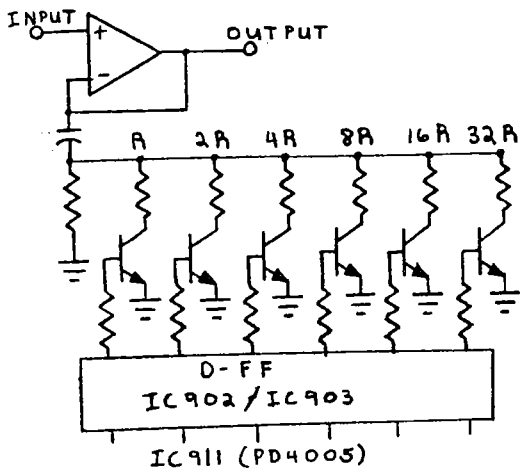


Fig. 5-13 U-Scan Level Adjust

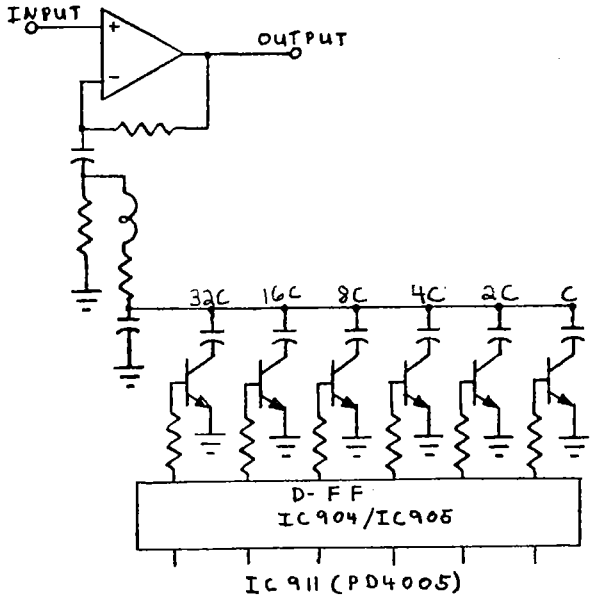


Fig. 5-14 U-Scan EQ Adjust

6-0. DISASSEMBLY

6-1. DISASSEMBLY OF MAJOR PARTS

6-1.1 Top Cover

Remove screws (1) from top cover and handle plate.

6-1.2 Front Panel

Remove screws (2) from side plates.
Remove Level Control knobs (A&B).
Remove screws (3) and foam tape from front panel assembly.
Disconnect quartz lock LED wires (red&white) from pitch control PCB.

6-1.3 Bottom Chassis

Remove screws (4,5,7&8) from sides and rear of chassis
Remove screws (6) from bottom plate.

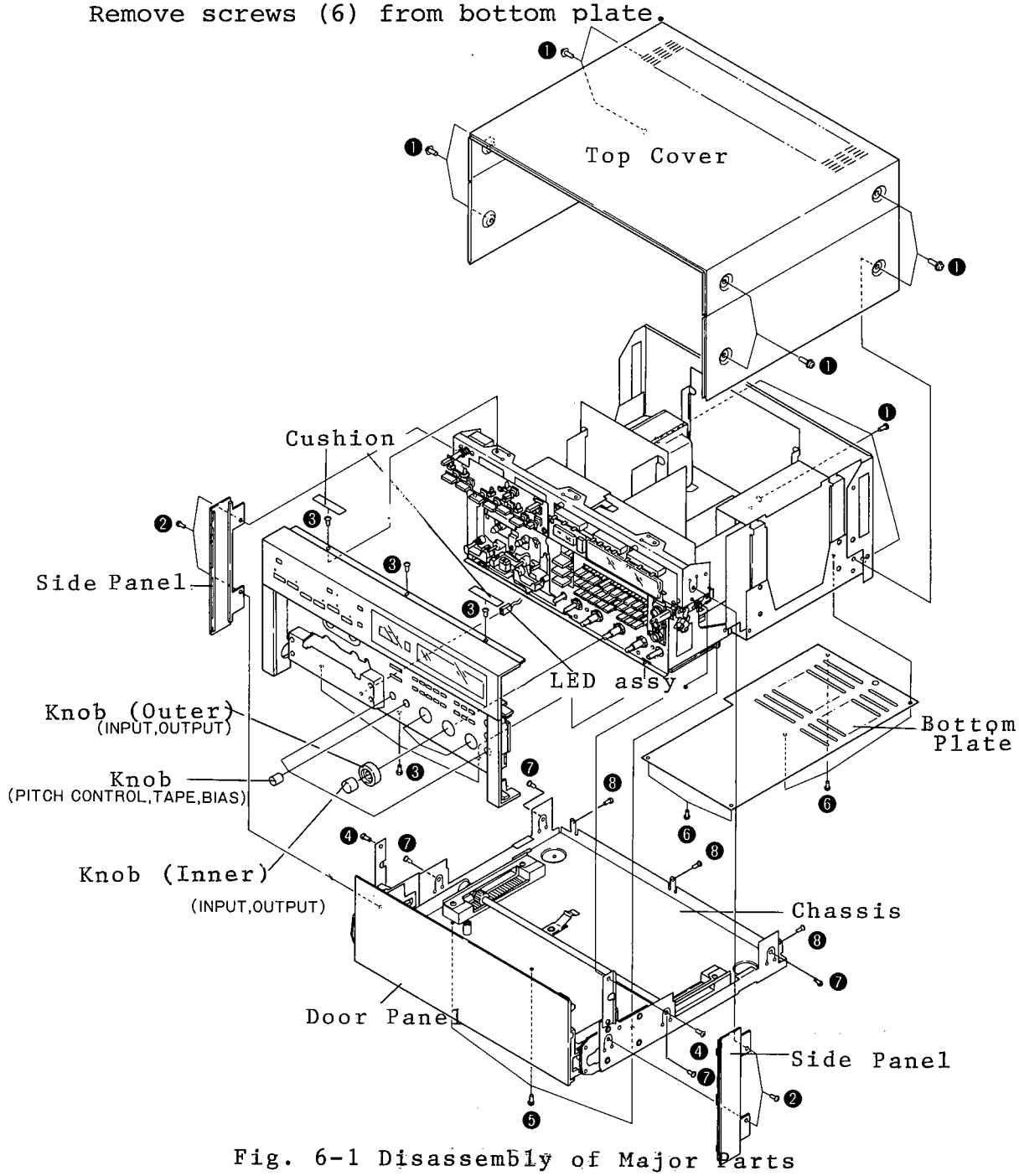


Fig. 6-1 Disassembly of Major Parts

6-2. DISASSEMBLY OF INDICATOR ASSEMBLY

6-2.1 Indicator A assembly
Remove screws (1) from indicator A PCB.

6-2.2 Headphone and MIC jacks
Remove screws (2) from headphone and MIC jack assembly.

6-2.3 3 Station switch assembly
Remove screws (3) from 3 station switch assembly.

6-2.4 Indicator amp. assembly
Remove screws (4) from indicator amp. assembly

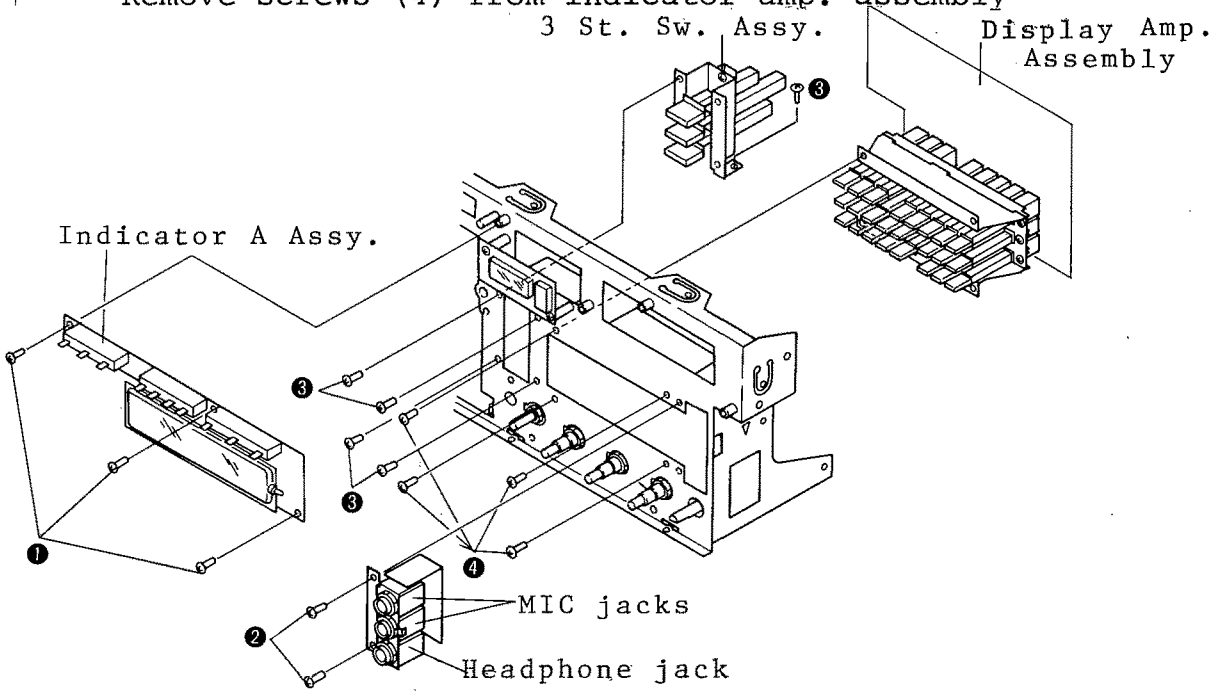
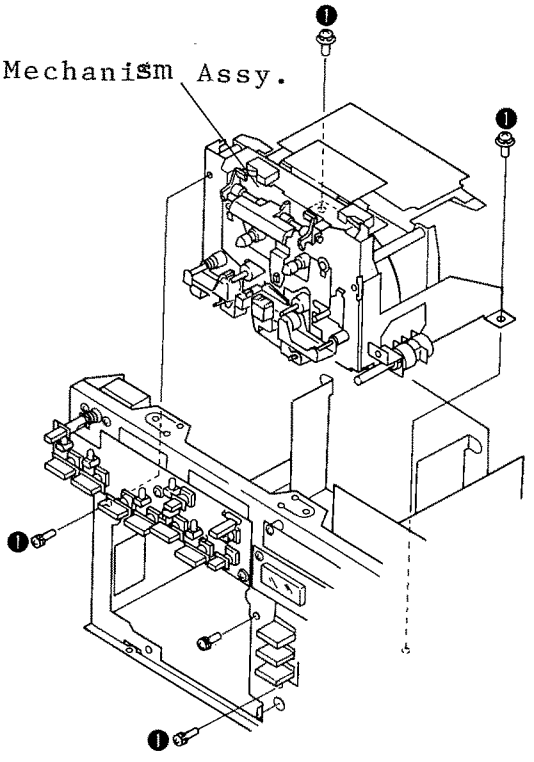


Fig. 6-2 Disassembly of Indicator Assy.



6-3. TRANSPORT MECHANISM ASSY.

6-3.1 Mechanism assembly
Remove screws (1) from front and bottom of chassis.

Fig. 6-3 Disassembly of Transport Mechanism assembly

7-0. PARTS LOCATION

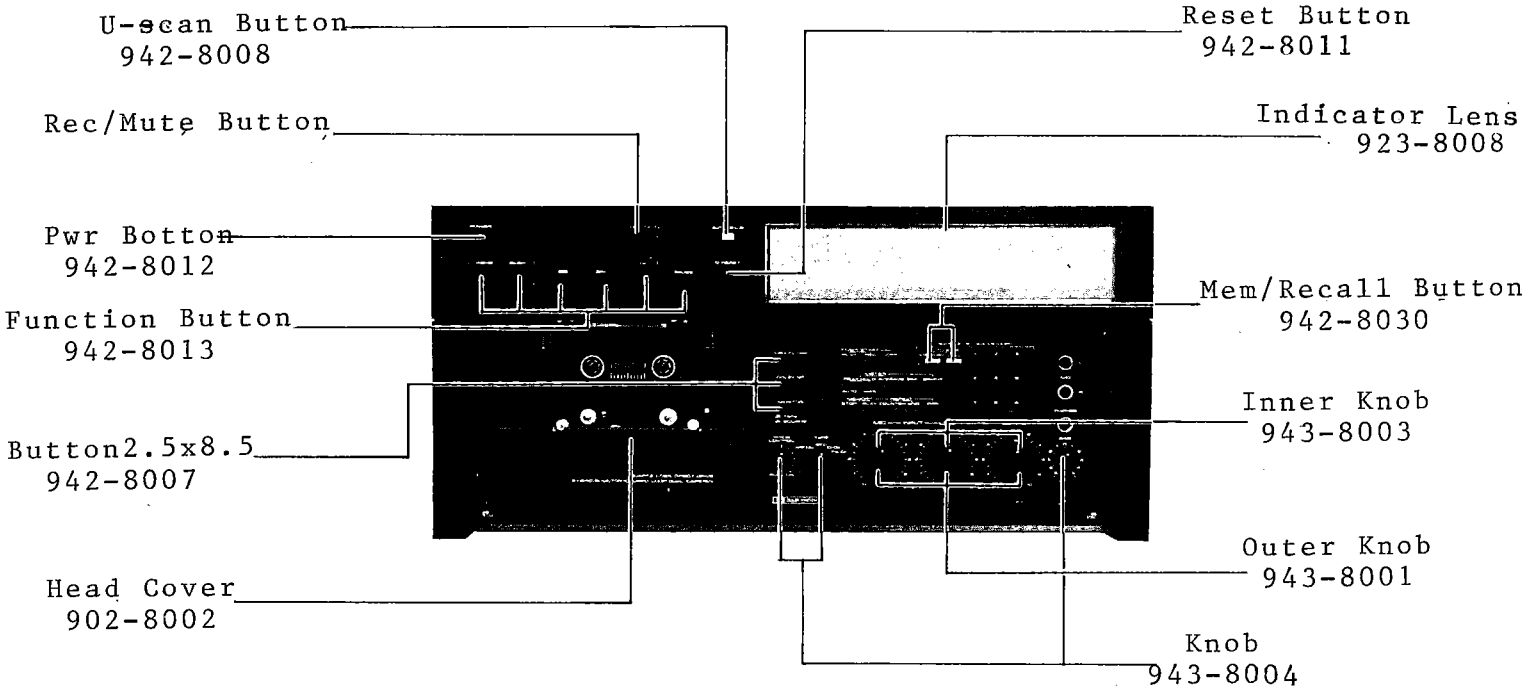


Fig. 7-1 Front View

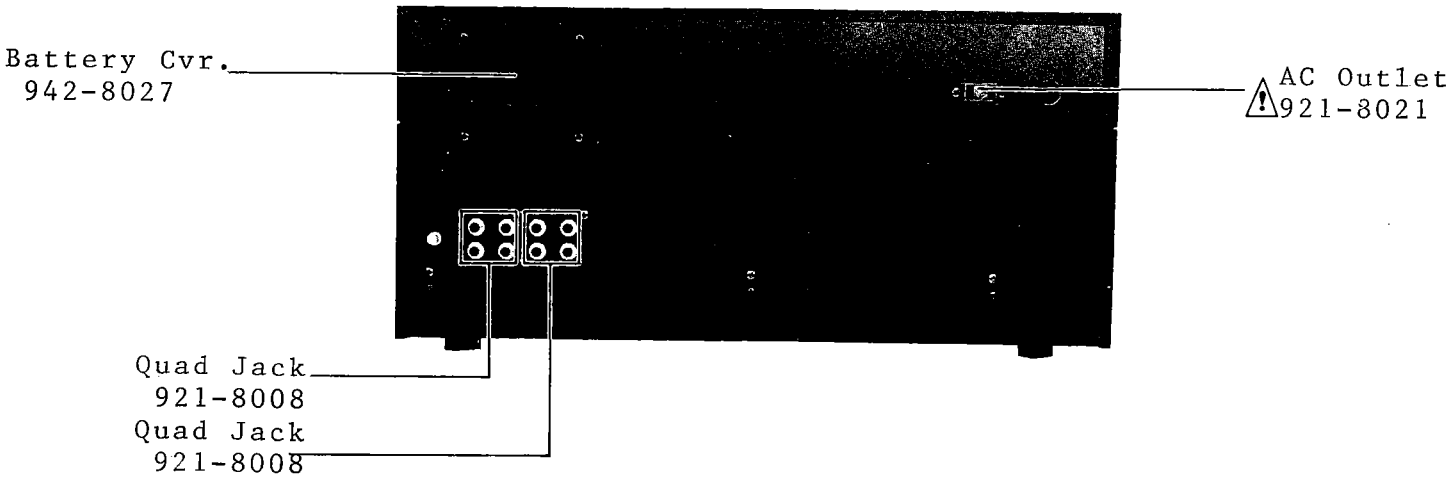


Fig. 7-2 Rear View

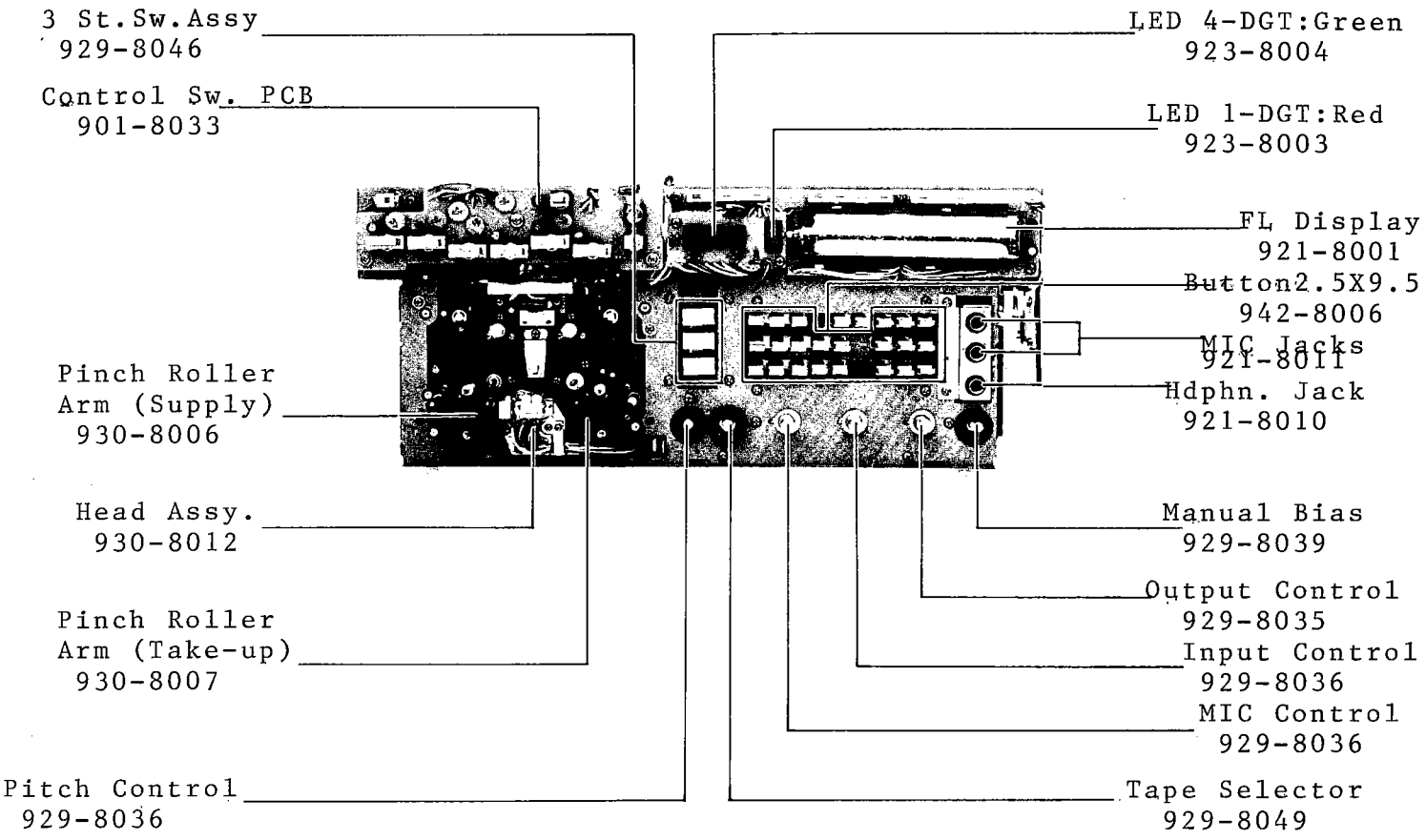


Fig. 7-3 Front View w/o Front Panel

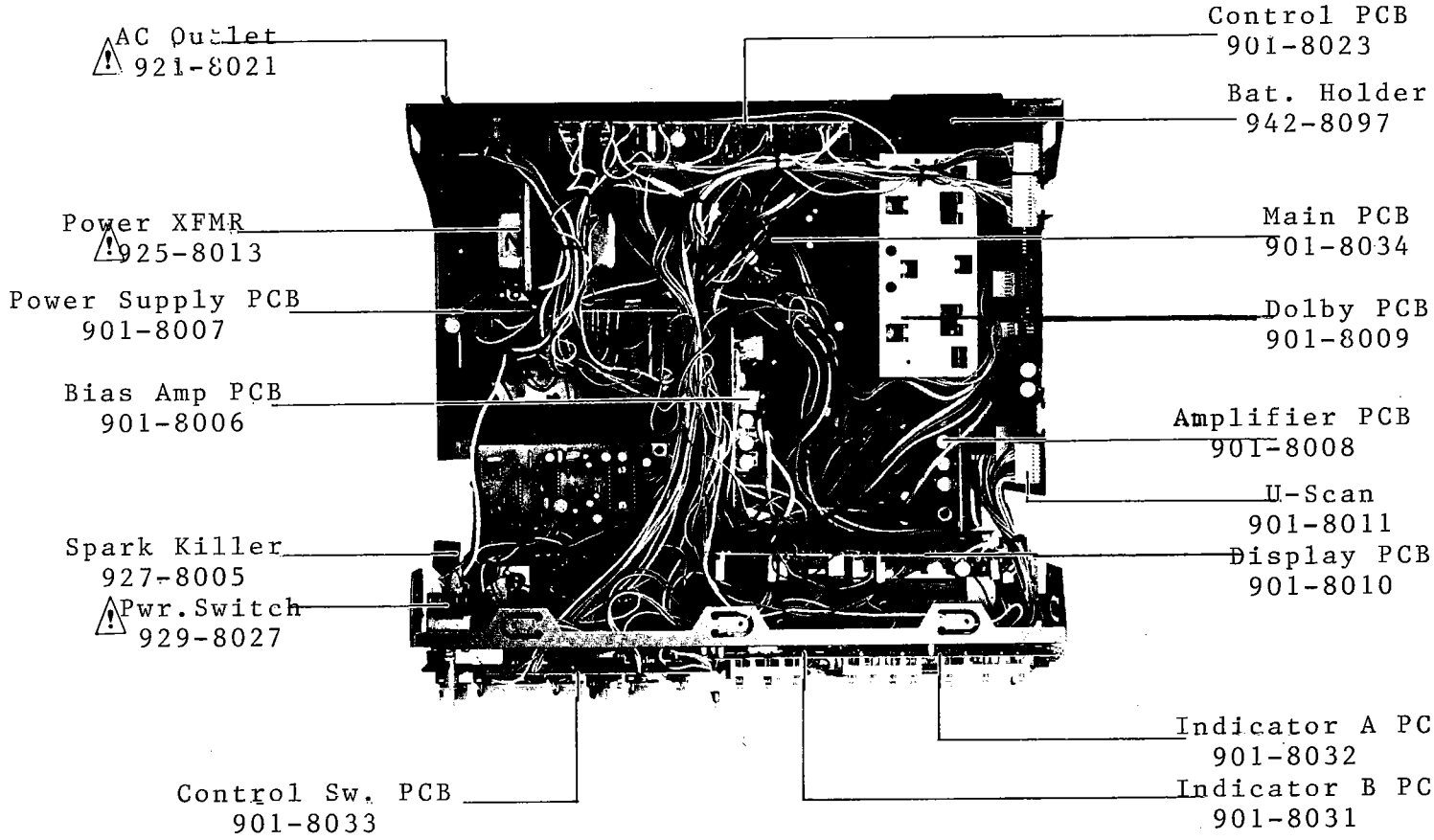


Fig. 7-4 Top View

8-0. ADJUSTMENTS

Contents:

Required Test Equipment:
- Dual trace scope
- AC mv meter (x2)
- Audio signal generator
- Precision attenuator
- Frequency counter
- DVM
- Wow/Flutter analyzer

Required Test Tapes:
- STD-301A: Tape speed/Wow&Flutter
- STD-303 : Playback level/0dB
- STD-331A: PB System, general use
- STD-341A: PB System, adjustment
- STD-601 : STD blank test tape
- STD-603 : CrO_2 blank test tape
- STD-701B: METAL blank test tape
- Sony Duad: FeCr C-60 blank tape

Proceed as follows before beginning adjustment of the electrical system. Adjustments will apply to both left and right channels unless otherwise indicated.

1. Confirm that the mechanical section has been properly adjusted.
2. When making measurements, make the level 0dB=1Volt, and connect a 50k (47k-52k) dummy load resistor to the PLAY outputs.
3. All adjustments should be performed with the designated test tapes. Although pre-recorded test tapes are prepared with side A and side B, always use side A. Note: Reference frequency is 333Hz. Reference recording level is 160nwb/m (Philips cassette reference level).

4. Make sure heads are cleaned, and demagnetized.
5. Always perform adjustments in the following sequence. IF this sequence is not followed, complete adjustment will be impossible and the deck will not display it's full performance (and will not micro-scan properly).

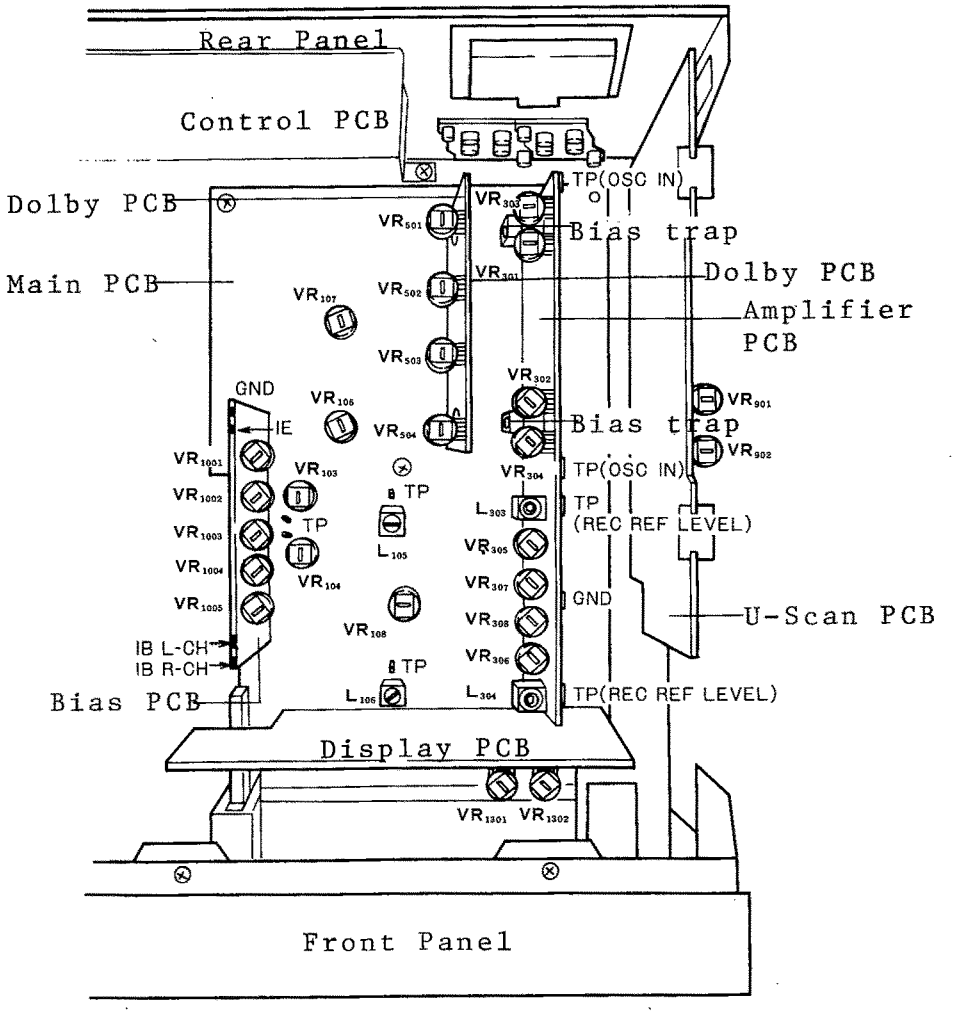


Fig. 8-1 Adjustment Positions

Amplifier PCB

VR301, VR302: Playback EQ
VR303, VR304: Playback Level
VR305, VR306: Record EQ
VR307, VR308: Record Level

Dolby PCB

VR501, VR502: Playback Dolby
VR503, VR504: Record Dolby

Bias PCB

VR1001: Erase Current
VR1002: CrO_2 Bias
VR1003: METAL Bias
VR1004, VR1004: Record Bias

Main PCB

VR103, VR104: Output Level
VR106: 400Hz Oscillator
VR107: 10kHz Oscillator
VR108: Oscillator Balance

8-1.0 Mechanical Adjustments

8-1.1 Pinch Roller Pressure Adjustment

1. Press the tape sensor switch and the PLAY switch simultaneously.
2. Gently press the tension gauge (500g full scale) against the pinch roller arm.
3. Check that the amount of pressure required to push the pinch rollers away from the capstans lies in the 250-310g range on the take-up side, and in the 130-170g range on the supply side. If the pressure readings do not lie within these ranges, re-adjust by moving spring to the suitable position.
4. If the above adjustment procedure fails to satisfy the above stated conditions, the pinch roller pressure spring will have to be replaced.

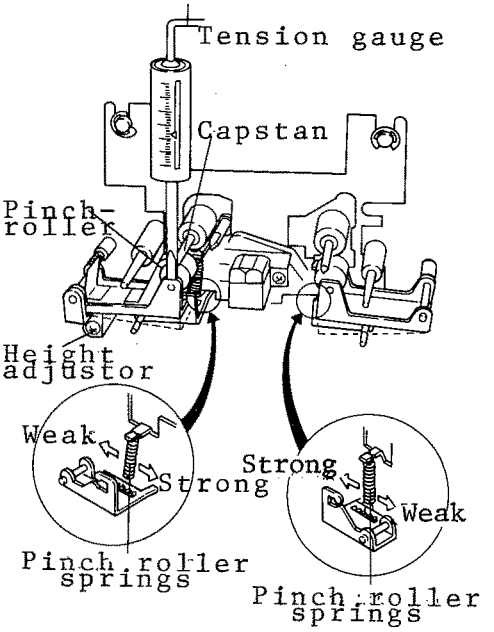


Fig. 8-1. Pinch roller pressure adj.

8-1.2 Tape Guide Adjustment

1. The tape should be free of curling at the head guide, and any other transport abnormality in the PLAY mode. If curling does occur at the head guide, load a mirror cassette into the transport and adjust the height of the tape guide by rotating the height adjuster screw. Maximum curling at the tape guide is .4mm.

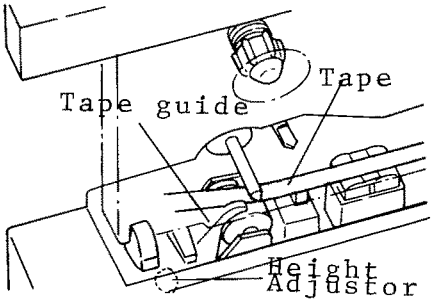


Fig. 8-2 Tape guide adj.

8-1.3 Capstan Motor Lock Range Adjustment

1. Press the tape sensor switch and the PLAY switch simultaneously. Set the pitch control knob to it's center click position.
2. Connect the TP2 and TP3 terminals of the D.D. motor control assembly to each input of the dual trace scope.
3. Adjust the VR2 (white) of the D.D. motor control assembly so that it resemble diagram 8-3.

8-1.4 Reel Motor Applied Voltage Adjustment

1. Connect a DVM to TP3 of the power supply PCB.
2. Insert a tape and press the PLAY switch.
3. Adjust VR601 of the power supply PCB for -2.1VDC ± 0.1 V. Turning the pot CCW increases the voltage. If a cassette torque meter is available, verify a torque reading of 30-55 g-cm.

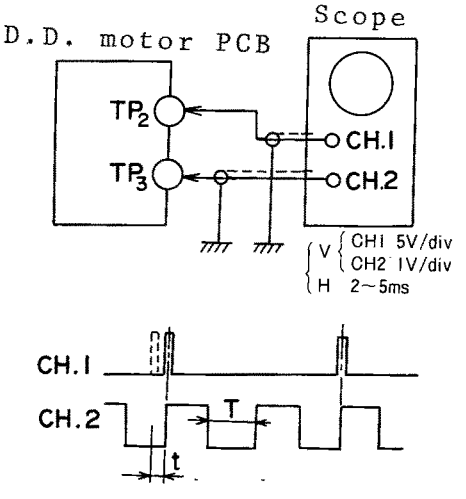


Fig. 8-3 Capstan motor lock range adj.

8-1.5 Pitch Control, Center Click Position Speed Adjustment

1. Connect the frequency counter to the TP1 terminal of the D.D. motor control PCB.
2. Insert a tape and press the PLAY switch.
3. Set the pitch control to the center click position (Quartz Lock on) and measure the frequency. Then short terminals 3 and 5 of the pitch control PCB (Quartz Lock off).
4. Adjust VR1 (Blue) of the D.D. motor control PCB so that the difference between tape speed with Quartz Lock off is no more than $\pm$6Hz difference from the Quartz Lock on tape speed.

8-2.0 Dolby System Adjustment
8-2.1 Playback Dolby Adjustment

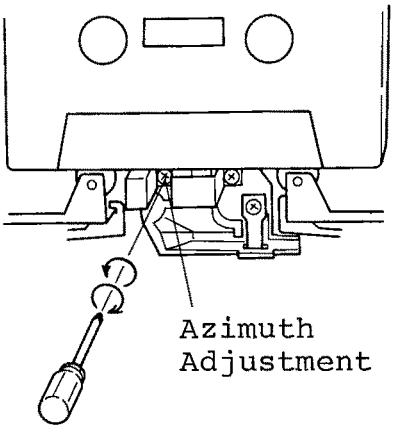
1. Connect the AC mv meter to TP terminals 58 (L.Ch.) and 60 (R.Ch.) of the Main (mother) PCB.
2. Set the Dolby switch to the OFF position, and turn VR303 and VR304 to the minimum (CCW) position.
3. Apply a 1kHz signal to the TP terminals (OSC IN) of the amplifier PCB. Adjust the input level to obtain -.2dBv (977mv).
4. Then reduce the input level 34dB with the precision attenuator.
5. Set the Dolby switch to the ON position and adjust VR501 (L.Ch.) and VR502 (R.Ch.) to obtain -40.2dBv (9.8mv).
6. Return attenuator to the 0dB position.

8-2.2 Record Dolby Adjustment

1. Connect the AC mv meter to the REC REF LEVEL TP terminals of the amplifier PCB. Switch Monitor to SOURCE.
2. Apply the 1kHz, -10dBv (316mv) signal to the main INPUT terminals.
3. Set the Dolby switch to the OFF position, and adjust the INPUT level control to obtain -.7dBv (922mv).
4. Then reduce the input level 40dB to -50dBv with the attenuator.
5. Set the Dolby switch to the ON position and adjust VR503 and VR504 to obtain -34.7dBv (18.4mv)
6. Return attenuator to the 0dB position.

8-3.0 Playback System Adjustment
8-3.1 Head Azimuth Adjustment

1. Connect the AC mv meters to the main outputs.
2. Set the Tape switch to the STD position. Turn the OUTPUT level control to the maximum position and turn VR303 and VR304 fully CW.
3. Play back the 10kHz, -20dB porition of test tape STD-341A. Turn the azimuth adjustment screw to obtain maximum output from both ch's.
4. Re-apply screw lock after adjusting.



8-3.2 Playback EQ Adjustment

1. Connect the AC mv meters to the output PLAY terminals.
2. Set the Tape switch to the STD position and Turn VR301 and VR302 to the center position. Then turn VR303 and VR304 fully CW.

3. Play back the 333Hz, -20dB portion of test tape STD341A and adjust the OUTPUT level controls to obtain -20dBv (.1v).
4. Then play back the 10kHz, -20dB portion of the same test tape. Adjust VR301 and VR302 to obtain a +1.5dB difference from the 333Hz portion.
5. Next, play back the 14kHz, -20dB portion of the same test tape. The difference from the 333Hz portion should be within the +.5-2.5dB range. Note: If not within the proper range then adjust the 10kHz level again and adjust the head azimuth again.
6. Finally, set the Tape switch to the METAL, CrO_2, or FeCr position and verify that the frequency response based on 333Hz is within -4.3dB $\pm$1dB at 10kHz.

8-3.3 Playback Level Adjustment

Note: Be sure to perform this adjustment in order to establish the Playback Dolby level and the u-scan micro-computer level.

1. Connect the AC mv meters to TP terminals 58 and 60 of the main PCB.
2. Play back the 333Hz, 0dB portion of test tape STD-341A and adjust VR303 (L.Ch.) and VR304 (R.Ch.) to obtain +.8dBv (1.1v).
3. With the Output level control in the detent position (be sure the dots line up) connect the AC mv meters to the Output terminals and adjust VR103 (L.Ch.) and VR104 (R.Ch.) to obtain -3dBv (700mv).

8-3.4 FL Display 0dB Adjustment

1. Apply a 333Hz, -10dBv (316mv) to the main Input terminals, set The Dolby switch to the ON position and set the Monitor switch to the SOURCE position.
2. Connect the AC mv meter to the REC REF LEVEL TP terminals of the amplifier PCB. Adjust the Input volume such that the AC mv meters read -3.7dBv (653mv).
3. Adjust VR1301 (LCh.) and VR1302 (R.Ch.) of the Display PCB such that the FL display reads 0dB. After turning VR1301 and VR1302 in the CCW direction, rotate them until the 0dB segment lights up.
4. Verify that the FL display reads as follows when the input signal of item 1 is changed.

INPUT SIGNAL	FL DISPLAY READING
333Hz, -5dB (560mv)	+5 $\pm$ 2dB
333Hz, -20dB (100mv)	-10 $\pm$ 2dB

5. Return Dolby switch to OFF and Monitor switch to TAPE.

8-3.5 Erase Current Adjustment

Note: In order to reduce the bias drift, leave the deck on for 10-20 minutes in the RECORD mode before performing any adjustments (the PAUSE switch may also be pushed).

Connect the AC mv meter between TP terminals GND and Ie of the Bias PCB and remove and input signal. The tape switch can be in any position.

2. With the unit in the RECORD mode, adjust VR1001 such that the AC mv meter reads 150mv. Any filters in the mv meter must be off.

8-3.6 Bias Trap Adjustment

1. Set the Monitor switch to the TAPE position and the Output level controls to the maximum (CW) position.
2. Set the Tape switch to the CrO_2 position and load test tape STD-603 into the deck. Record with the Input level controls fully CCW and play it back again.
3. Connect the AC mv meters and oscilloscope to the Output (PLAY) terminals.
4. Adjust the bias trap coil in the Amplifier PCB to reduce the waveform to minimum amplitude. Note: The bias trap coils can be accessed through two holes in the left side of the Amplifier/ Dolby shield.
5. Next, connect the AC mv meters to the TP terminals located next to coils L105 and L106 and adjust each coil to reduce the waveform **to minimum amplitude.**

8-4.0 Record System Adjustment
8-4.1 Record EQ Adjustment

Note: Be sure to perform this adjustment because it establishes the u-scan u-computer (standard status of the equalizer) setting. If the adjustment is not performed, the range covered by the equalizer will be off center and it will not be possible to accommodate certain types of tape during u-scan operation.

1. Remove the TP terminal No.10 (yellow wire) of the Control PCB.
2. Set Monitor switch to SOURCE and connect the AC mv meters to the Amplifer PCB terminals TP7 and TP9. Apply a 333Hz signal to the Input terminals and adjust the Input level such that the mv meters read -20dBv (.1v).
3. Switch the input frequency between 333Hz and 15kHz. Adjust VR305 and VR306 such that the mv meters read the same (.1v).
4. Connect the AC mv meters to the REC REF LEVEL TP terminals of the Amplifier PCB. Adjust input level (333Hz) such that the mv meter reads -3.7dBv (653mv).
5. Set the Tape switch to STD and connect the mv meters to TP terminals Ib (L.Ch.) and Ib (R.Ch.) of the Bias amplifier PCB.
6. Insert test tape STD-601 and record a 333Hz signal. Adjust VR307 (L.Ch.) and VR308 (R.Ch.) of the Amplifier PCB such that the mv meters reads 1.02mv.
7. Set the input frequency to 15kHz and the precision attenuator to 11dB. Adjust L303 (L.Ch.) and L304 (R.Ch.) of the peaking coil such that the mv meter reads 1.02mv.
8. In the same manner as item 7, verify that the standard (Table 1) is entered when the input frequency and tape switch are changed.

TAPE SW	100Hz	2kHz	4kHz	6.3kHz	10kHz	12kHz	15kHz
STD	.2±.5	.3±.5	1.1±.5	2.5±.5	5.7±.5	7.6±1	11±1
FeCr	-.3±.5	4.5±.5	6.4±.5	8.1±.5	11±.5	12.6±1	15±1
CrO_2	.1±.5	2.1±.5	3.5±.5	5±.5	7.9±.5	9.7±1	12.5±1
METAL	.1±.5	2.8±.5	4.7±.5	6.1±.5	8.6±.5	10.2±1	12.6±1

9. Re-connect the yellow wire to TP 10 of the Control PCB and return the precision attenuator to 0dB.

8-4.2 Record Bias Adjustment

1. Connect the AC mv meter to the main Output terminals.
2. Set the front panel bias control to the center click position and the Monitor switch to the SOURCE position.
3. Apply a 333Hz, -10dBv (316mv) signal to the main Input terminals and set the Input level control such that the mv meter reads -7dBv (446mv).
4. Next, set the Tape switch to the STD position. Record and play back (Monitor) the 333Hz signal on the STD-601 test tape.
5. Set the Monitor switch to the Tape position. After turning VR1004(L.Ch.) and VR1005(R.Ch.) full CCW turn them CW until the output level has peaked. Then turn them CCW until the output has dropped by .1dB. Since VR1004 and VR1005 affect each other it will be necessary to adjust each several times.

8-4.3 Record Level Adjustment

1. Connect the AC mv meters to the REC REF LEVEL TP terminals of the Amplifier PCB.
2. Set the Tape switch to the STD position, the Dolby switch OFF, and the Monitor switch should be in the SOURCE position.
3. Apply a 333Hz, -10dBv (316mv) signal to the INPUT terminals and adjust the INPUT level controls to obtain -3.7dBv (653mv).
4. Then set the Dolby switch ON and record the 333Hz -10dBv signal on the STD-601 test tape. The Monitor switch should be in the TAPE position.
5. Connect the AC mv meters to TP terminals 58 and 60 of the Main PCB and adjust VR307 and VR308 to obtain -3.2dBv (690mv).

8-4.4 Record Frequency Response Adjustment

1. Connect the AC mv meters to the main Output terminals.
2. Set the Tape switch to the STD position and the Dolby switch OFF. Apply a 333Hz, -30dB (31.6mv) signal to the Input terminals.
3. Set the Monitor switch to the SOURCE position and adjust the input level such that the mv meter reads -27dBv (44.6mv).
4. Next, set the Monitor switch to the TAPE position and record a 333 Hz, -30dBv (31.6mv) signal on a STD-601 test tape. Output level controls should be in the center click position.
5. Record and play back (Monitor) a 10kHz, -30dBv (31.6mv) signal on the same tape. Adjust VR1004 and VR1005 such that the output is +.5dB compared to the output of item 4 (333Hz). Perform sequential recording and playback again and verify that the playback output difference is 0dB (TAPE position). If the difference is not 0dB, adjust the simultaneous recording and playback (Monitoring) output in the +.5dB (+1, -.5dB) range so that the sequential recording and playback difference becomes 0dB.
6. Next, record and play back sequentially 333Hz and 15kHz, -30dBv (31.6mv) signal and adjust VR305 and VR306 so that the output difference becomes 0dB (+.5,-1dB). Because the 10kHz level changes slightly when VR305 and VR306 are adjusted, re-adjust item 5.

Note: If the frequency characteristics go outside the specified values as a result of the above adjustments, perform section 8-3.1 (PB EQ) adjustments again. Also, as the recording level may change slightly, re-confirm the items in section 8-4.3 (REC Level).

7. Next, set the Tape switch to CrO_2 and record and play back (Monitor) 333Hz -30dBv (31.6mv) and 10kHz, -30dBv on a STD-603 test tape. Adjust VR1002 such that the playback output difference becomes 0dB.
8. Set the Tape switch to METAL and record and play back (Monitor) a 333Hz and 10kHz, -30dBv signal on the STD-701B test tape. Adjust VR1003 such that the playback output difference becomes 0dB. The VR should be in about the mechanical center.
9. Set the Tape switch to FeCr and record and play back a 333Hz -30dBv (31.6mv) and 10kHz -30dBv signal on a Sony Duad C-60 tape. Verify that the playback output difference is 0dB $\pm$2dB.
10. Turn the Dolby switch to the ON position and switch the Tape switch to METAL, STD, CrO_2 and FeCr. Record and play back each of the tapes and verify that the measurements are within the specifications. Return the Dolby switch to the OFF position.

8-4.5 Built In Oscillator Adjustment

Note: Be sure to perform this adjustment because it is the standard for EQ adjustment during u-scan operation (recording freq. response characteristics).

1. Connect the AC mv meters to the Amplifier PCB REC REF LEVEL TP terminals.
2. Connect the TEST OSC terminal (FL) of the u-scan PCB to GND with a short clip.
3. Adjust VR106 such that the 400Hz level indicated by the mv meter becomes -3.7dBv (653mv). If the level in each channel is different then adjust VR108 (OSC. Balance) such that the level in each channel becomes the same.
4. Next, connect the u-scan PCB TEST OSC terminal (FH) to GND with a short clip after removing the short clip used in item 2.
5. Adjust VR107 such that the 10kHz level indicated by the mv meter becomes -18.7dBv (116mv). After adjusting, verify that the mv meter reads the same for both channels. Remove short clip.

8-4.6 U-scan Input Level Adjustment

Note: Be sure to perform this adjustment because it sets the standard recording level during automatic (u-scan) operation.

1. Set the Tape switch to the STD position and connect the AC mv meters to the Main PCB TP terminals 58 and 60.
2. Connect the u-scan assembly TEST OSC terminal (FL) to GND with a short clip.
3. Switch the Dolby ON and record a 333Hz, -10dBv (316mv) on a STD-601 test tape. Verify that the mv meter reading is -3.2dBv (690mv). If the reading is different, perform section 8-3.2 (PB level) and 8-4.3 (REC level) again.
4. Connect the oscilloscope to the u-scan assembly COMP OUT terminal. Adjust VR901 and VR902 to the point where the comparator switches from ON to OFF to ON (0v to 5v to 0v). This sets the comparator to the middle of it's "window".

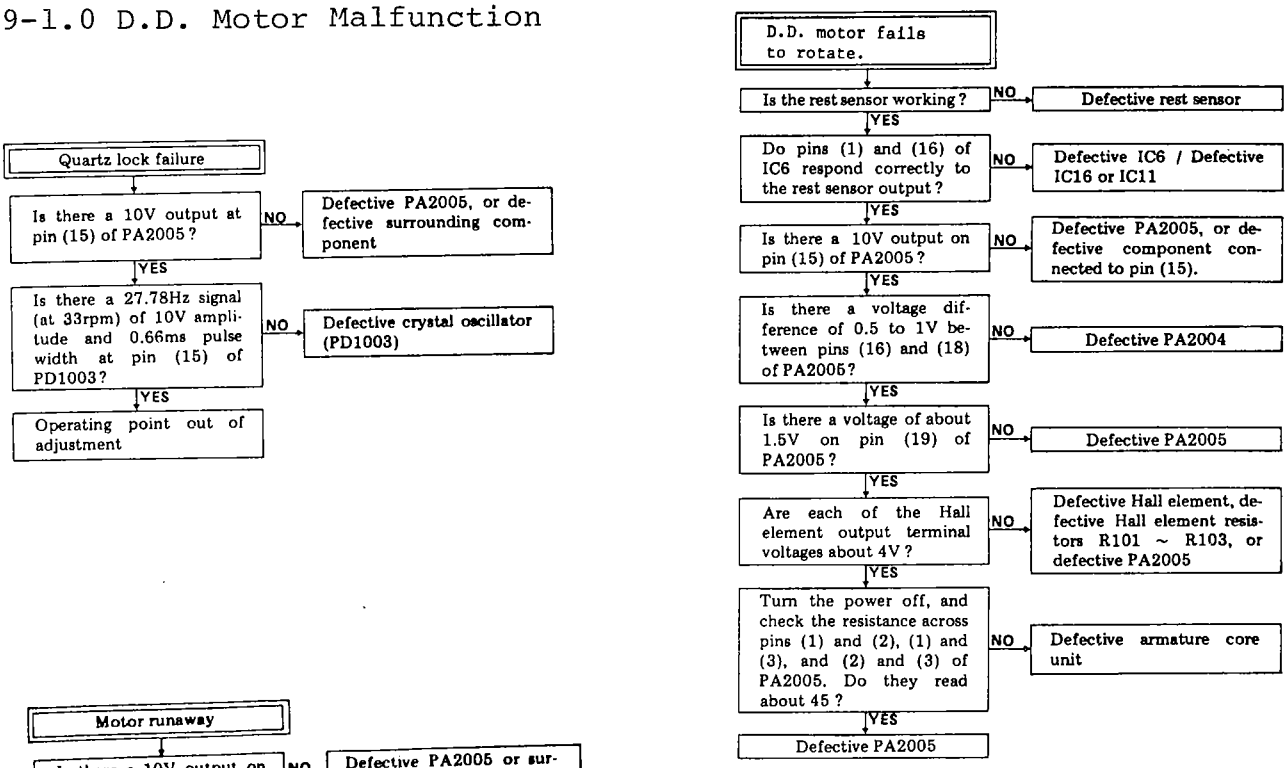
8-5.0 Control System Timing Adjustment
8-5.1 Control IC Clock Adjustment

Note: This controls the timing of the function control IC and is not part of the normal adjustment proceedure. It should be checked if Control IC801 or C801 has been replaced.

1. Connect the oscilloscope to the TP terminal directly above terminal 24 of the Control PCB.
2. Adjust VR801 for a time period of 90-100ms(10-11Hz). Verify head shift timing of .36-.45 seconds.

9-0. TROUBLESHOOTING GUIDE

9-1.0 D.D. Motor Malfunction



9-2.0 Micro-Scan Malfunction

9-2.1 Error display during u-scan operation (Bias, Level and EQ LEDs flashing simultaneously).

a. Be sure the tape selector switch is in the correct position for the type of tape being used.
b. Advance tape to another position (in case of tape drop-outs) and try u-scan again.
c. Check for intermittent PCB connectors. Repair as needed.
d. Adjust u-scan input level (VR902, VR902) per section 8-4.6 (U-scan input level adjustment) and try u-scan again.
e. Perform complete alignment of playback and record circuitry per section 8 (Adjustments).

NOTE: The u-scan circuit depends on correct alignment of both record and playback electronics for proper u-scan operation. If record and playback circuitry is out of adjustment or improperly adjusted the tape will NOT be optimized even if no error display is indicated. And, since each adjustment is dependent on the other adjustments it is recommended that a complete alignment be performed rather than making only one adjustment to correct a u-scan malfunction.

f. Check for proper power supply voltages at connector 7 of the u-scan PCB:

Pin 1:	4.43VDC	5:	Ground
2:	4 volt reset pulse	6:	-15VDC
3:	-5 VDC	7:	+15VDC
4:	+5VDC		

g. Replace u-scan PCB and adjust u-scan input level per section 8-4.6.

9-2.2 Memory Malfunction (will not recall properly)

a. Check for intermittent PCB connectors. Repair as needed.
b. Check/replace memory adress latch ICs (IC912, IC913) and RAM IC (IC914).
c. Check for proper power supply voltages at connector 7 (see section 9-2.1-f).
d. Replace u-scan PCB and adjust u-scan input level per section 8-4.6.

9-2.3 Display Malfunction (Bias, Level, EQ, Memory # LEDs)

a. Check for intermittent PCB connectors. Repair as needed.
b. Check/replace memory drive ICs (IC908-IC910) and LED drive transistors (Q943-Q952).
c. Check for proper power supply voltages at connector 7 (see section 9-2.1-f).
d. Replace u-scan PCB and adjust u-scan input level per section 8-4.6.

10-0 EXPLODED VIEWS

Contents:

NOTE: *Parts without part numbers CANNOT be supplied.
*The ⚠ mark found on some components indicates that the part is a safety critical component. When replacing those parts, be sure to use parts of identical designation.

Key No.	Part No.	Description
1	942-8051	Side Panel
2	941-8030	Cushion
3	943-8004	Knob
4	943-8003	Knob: Inner
5	943-8001	Knob: Outer
6		Bridge
7	901-8007	PCB: Power Supply
8		Heat Sink
⚠ 9	925-8013	Power XFMR
10		PCB: Control
11		Bracket
12		Bracket
13		Holder
14		Chassis
15		
16		Door Guide (L)
17		Stand off
18		Door Guide (R)
19		Bottom Plate
20		Screw M4x8Ni
21	941-8015	Top Cover
⚠ 22	921-8013	Line Cord
⚠ 23	921-8021	AC Outlet
24	921-8022	Strain Relief
25		Rear Panel
26		Battery Case
27	942-8027	Battery Cover
28	921-8008	Jack: Quad
29	901-8011	PCB: U-Scan
30		Bracket
31		Spacer
32		UL Cord Clamper
33		PCB Holder/Shield
34	901-8006	PCB: Bias Amp
35	901-8009	PCB: Dolby
36	901-8008	PCB: Amplifier
37		PCB: Main
38	929-8049	Switch: Rotary

Key No.	Part No.	Description
39	929-8036	Pot: Dual-5k (MIC)
40	929-8036	Pot: Dual-5k (INPUT)
41	929-8035	Pot: Dual-20k(OUTPUT)
42	929-8039	Pot: 5k (BIAS)
43		Holder
44		Connector: 8p
45		Connector
46		Connector: 6p
47		Connector: 5p
48		Screw: 3x6
49		Spring
50		
51		Screw
52		Transport Mech. Assy.

Hardware:

Description	Part No.
BM3x6	922-8091
RT3x6	922-8092
PSA3x6	922-8093
PSB4x8	922-8043
CM3x14	922-8094
PM3x14	922-8042
RT3x4	922-8045
PSA3x8	922-8095
PSB4x6	922-8043
BM3x12	922-8096
RT3x8	922-8097
BM4x8Ni	922-8098

Fig. 10-1 EXTERNAL

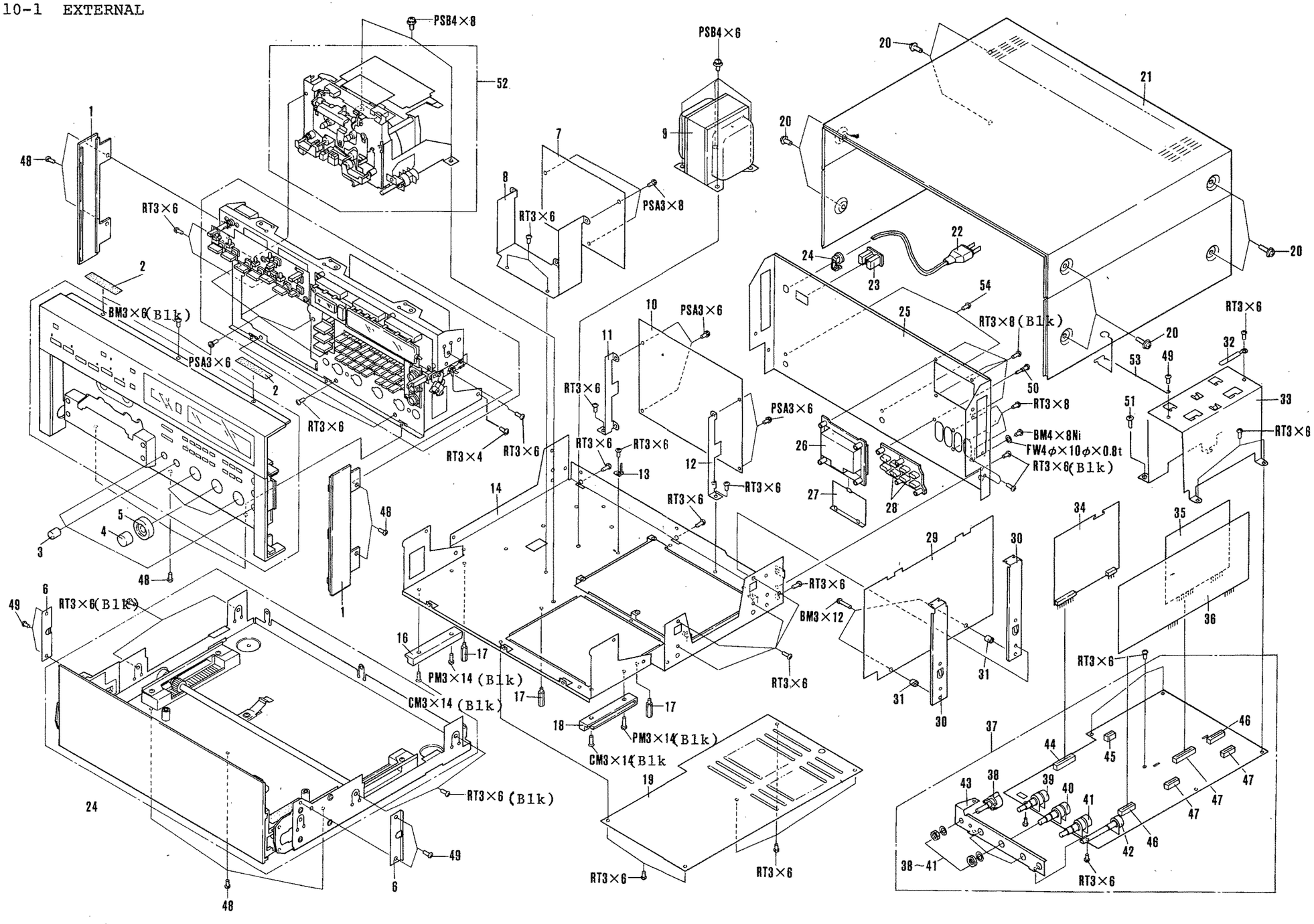
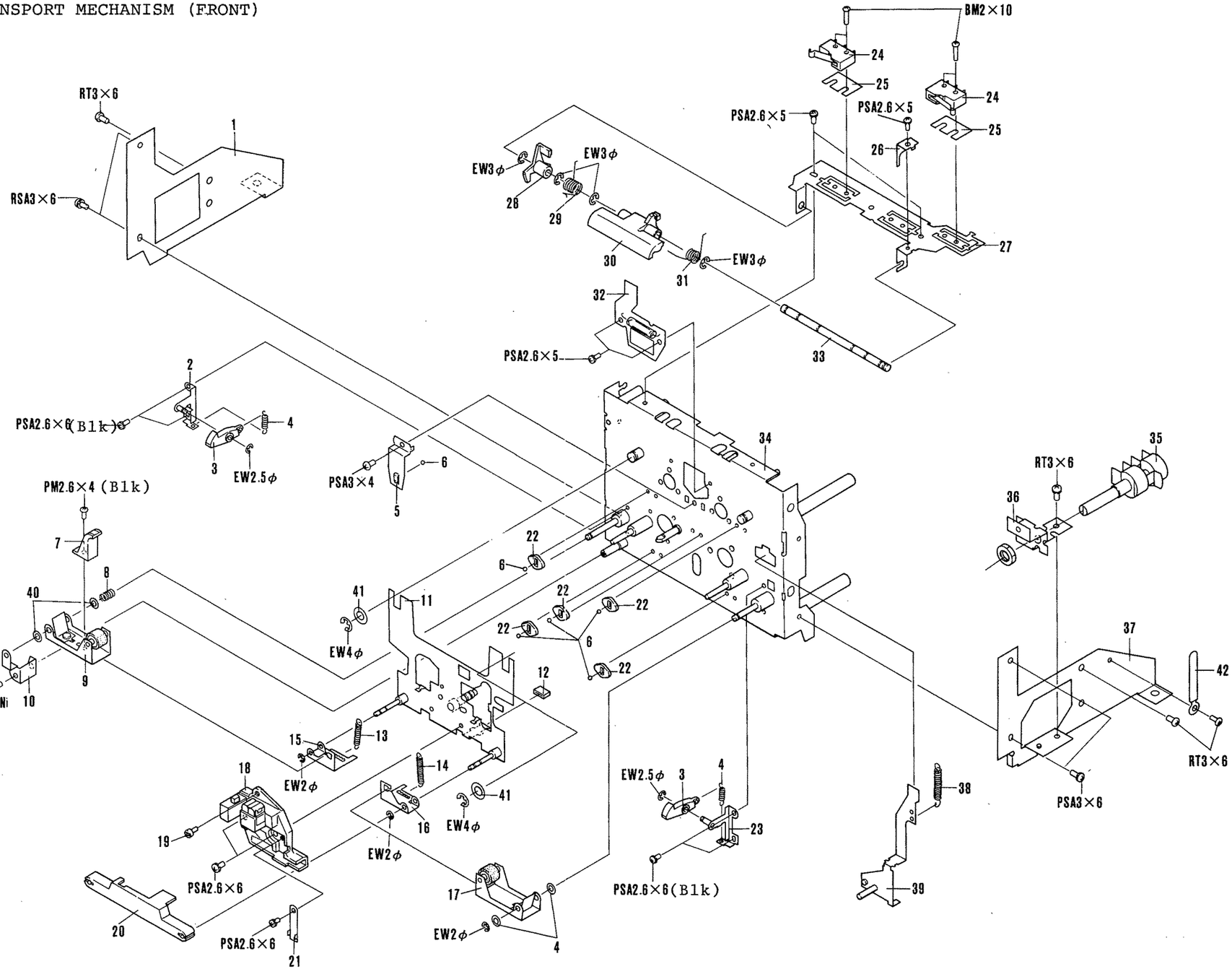


Fig. 10-2 TRANSPORT MECHANISM (FRONT)



10-2 Transport Mechanism Assembly (Front)

Key No.	Part No.	Description	Hardware: Description	Part No.
1		Holder		
2		Bracket assy.(L)		
3	942-8004	Arm: Retainer	RT3x6	922-8092
4	921-8037	Arm spring (B)	RSA3x6	922-8099
5	941-8007	Head base holder	PSA2.6x6	922-8061
6	921-8012	Steel ball	PM2.6x4	922-8100
7	942-8015	Tape guide	BM2.6x12Ni	922-8044
8	921-8045	Spring	EW2.5ø	922-8052
9	930-8006	Pinch roller arm(S)	PSA3x4	922-8101
10	941-8006	Tape guide adjustor	EW2ø	922-8050
11		Head base assy.	EW4ø	922-8051
12	921-8006	Rubber stopper	PSA2.6x5	922-8017
13	921-8029	Pinch spring (Sup.)	EW3ø	922-8049
14	921-8034	Pinch spring (T-up)	BM2x10	922-8102
15		Pressure arm (B)	PSA3x6	922-8093
16		Pressure arm (A)		
17	930-8007	Pinch roller arm(T)		
18	930-8012	Sub-head base assy		
19		Screw		
20	942-8092	Head wire cover		
21		Cord clamper		
22		Ball guide		
23		Bracket assy.(R)		
24	929-8010	Micro-switch		
25	941-8004	Switch spacer		
26	941-8005	Detector lever plate		
27		Switch bracket		
28	942-8095	Detector lever		
29	921-8035	Detector lever spring		
30	942-8048	Cassette retainer		
31	921-8026	Cassette retainer spring		
32	930-8031	Lamp assy.		
33		Detector lever shaft		
34		Chassis assy.		
35	929-8036	Dual pot with switch		
36		Holder		
37		Holder (R)		
38	921-8043	Detector arm spring		
39		Detector arm assy.		
40		Poly. washer 3øx6øx.25t		
41		Nylon washer 5øx10øx.3t		
42		UL cord clamper		

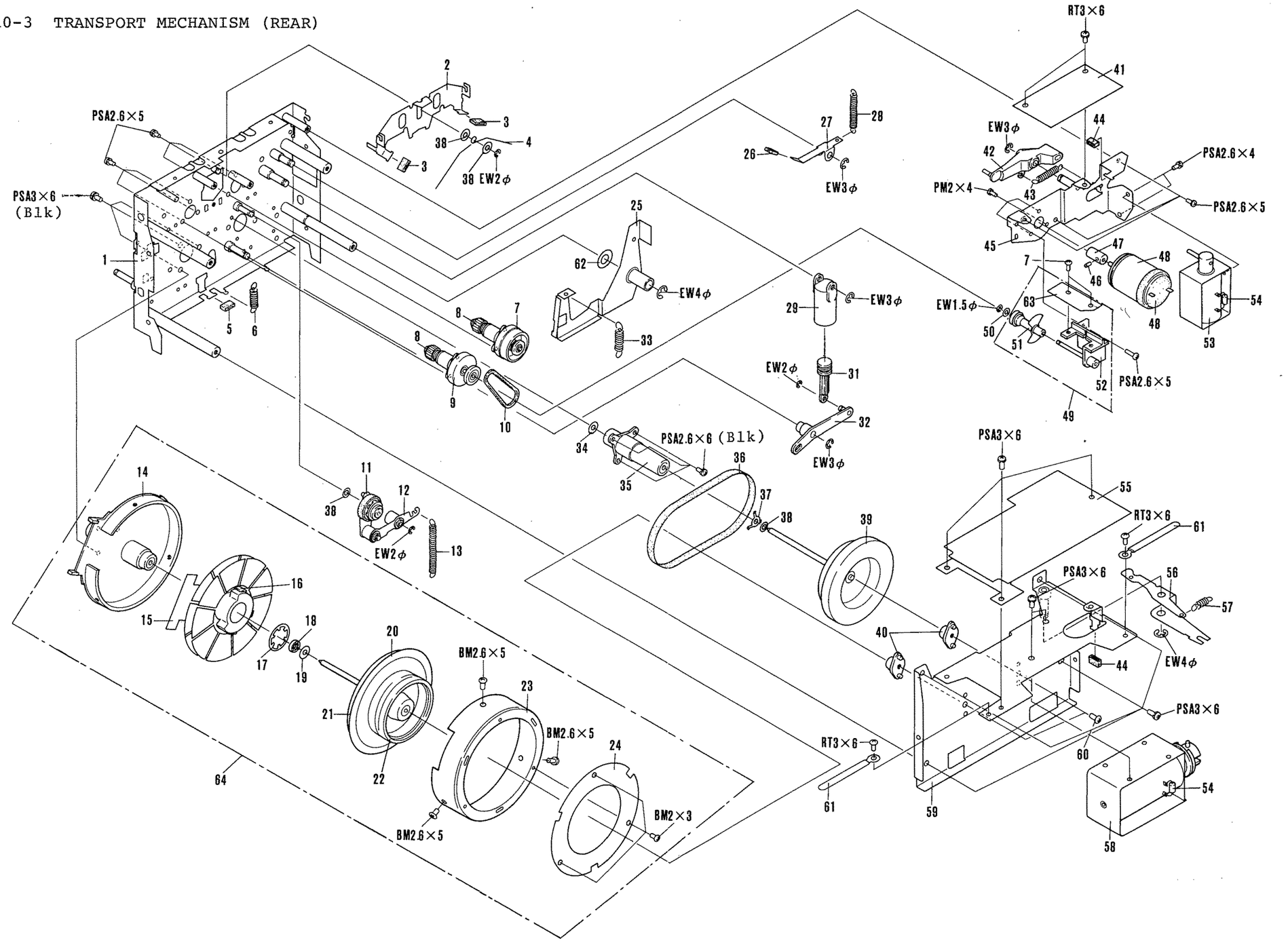
10-3 Transport Mechanism Assembly (Rear)

Key No.	Part No.	Description
1		Chassis assy.
2		Brake plate
3	921-8072	Brake shoe
4	921-8048	Pressure spring
5	921-8006	Rubber stopper
6	921-8048	Head base spring
7	930-8013	Supply reel assy.
8		Supply reel cap
9	930-8011	Take-up reel assy.
10	942-8084	Sensing belt
11	930-8009	Lever full assy.
12		Idler arm assy.
13	921-8042	Idler arm spring
14		
15		
16		
17		CS type stopper 12ø
18		Bearing
19		Washer
20		Pulley assy.
21		Magnet
22		Sub-magnet
23		Housing
24		
25		Head base arm assy.
26	921-8007	Back tension rubber
27	942-8098	Back tension lever
28	921-8044	Back tension spring
29	930-8010	Damping cylinder
30	922-8103	O ring
31	942-8005	Damper piston
32		Arm assy.
33	921-8041	Head base spring
34	921-8003	Oil stop washer
35	930-8054	Capstan holder
36	942-8085	Capstan belt
37	921-8028	Spring
38		Poly. washer3øx6øx.25t
39	930-8015	Capstan flywheel
40	942-8018	Thrust holder
41		Pitch control PCB
42		Brake release lever
43		Return spring
44	921-8006	Rubber stopper
45		Motor bracket assy.
46		Screw M2x2.5
47	942-8099	Reel motor pulley
48	929-8019	Reel motor (RM)
49		Sensing assy.
50		Nylon washer2øx5øx.13t
51	930-8055	Counter pulley assy.
52	930-8008	Counter bracket assy.
53	929-8013	Pinch solenoid
54	929-8018	Diode
55	901-8023	D.D. control PCB
56		Solenoid lever
57	921-8032	Solenoid lever spring
58	929-8014	Brake solenoid
59		Chassis assy.
60		TP screw M3x8
61		UL cord clamper
62		Nylon washer
63		Sensing board
64	929-8066	D.D.capstan motor

Hardware:

Description	Part No.
PSA3x6	922-8093
PSA2.6x5	922-8017
BM2.6x5	922-8104
EW2ø	922-8050
EW4ø	922-8051
EW3ø	922-8049
PSA2.6x6	922-8061
RT3x6	922-8092
EW1.5ø	922-8053
BM2x3	922-8105
PM2x4	922-8106
PSA2.6x4	922-8107

Fig. 10-3 TRANSPORT MECHANISM (REAR)



10-4 Front Panel

Key No.	Part No.	Description
1	941-8015	Top cover
2	942-8088	Switch guide
3	923-8005	Counter lens
4	923-8006	FL meter lens
5	923-8007	Indicator panel
6	923-8008	Indicator lens
7	923-8009	LED lens
8	942-8033	Reel escutcheon
9	942-8050	Remaining tape lens
10	942-8019	Switch guide
11	942-8009	Guide (L)
12	942-8023	Side panel (L)
13	942-8025	Sub panel (L)
14	942-8010	Guide (R)
15	902-8001	Sub-front panel
16	942-8052	Head housing
17	902-8002	Head assy. cover
18	926-8010	Quartz lock LED
19		Connector socket assy.
20	942-8024	Side panel (R)
21	942-8026	Sub-panel (R)
22		TP screw 3x6
23	941-8020	Cushion
24	922-8013	Head cover screw
25		TP screw 3x8
26		TP screw 3x6
27	930-8016	Front panel assy.
28	930-8014	Display lens assy.

Hardware:

Description	Part No.
EW4ø x10ø x.8t	922-8108
RT3x10	922-8040
RT3x6	922-8092

10-5 Door Mechanism

Key No.	Part No.	Description
1	921-8025	Click spring
2		Click plate assy.
3		Hinge holder assy.
4	942-8028	Hinge guide (L)
5	942-8022	Hinge cap (L)
6		Joint assy.(L)
7	921-8047	Door spring
8	941-8016	Door felt
9	942-8021	Panel hinge (L)
10	943-8005	Cap shaft
11		Main rack
12		Joint rubber
13		Stay
14		Shaft assy.
15		Rack plate
16	902-8003	Door panel
17	942-8003	Panel lock bracket
18	941-8021	Cushion
19	922-8014	Screw
20	943-8005	Cap shaft
21	942-8020	Panel hinge (R)
22		Joint assy. (R)
23	942-8016	Hinge cap (R)
24	942-8029	Hinge guide (R)
25		Hinge holder
26		Door click spring
27		Cushion
28		Bridge
29		Chassis assy.
30	941-8016	Door felt
31	930-8056	Foot assy.
32		Door stopper
33		TP screw 3x6
34		CS type stopper

Hardware:	Description
EW2ø	922-8050
EW5ø	922-8109
BM3x6	922-8091
CM3x12	922-8110
PSA3x6	922-8093
BT3x6	922-8111
PM4x12	922-8112

Fig. 10-4 FRONT PANEL

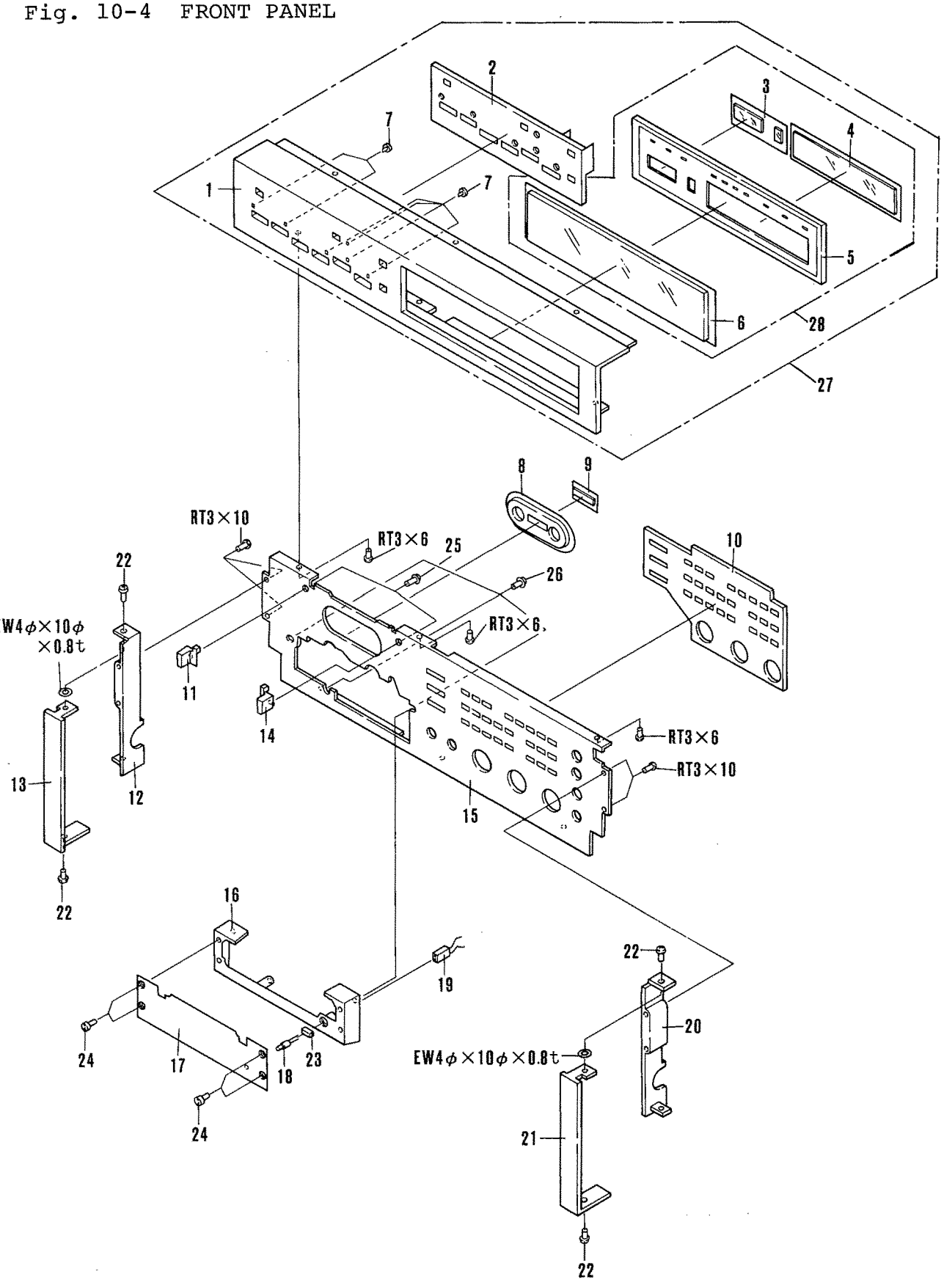


Fig. 10-5 DOOR MECHANISM

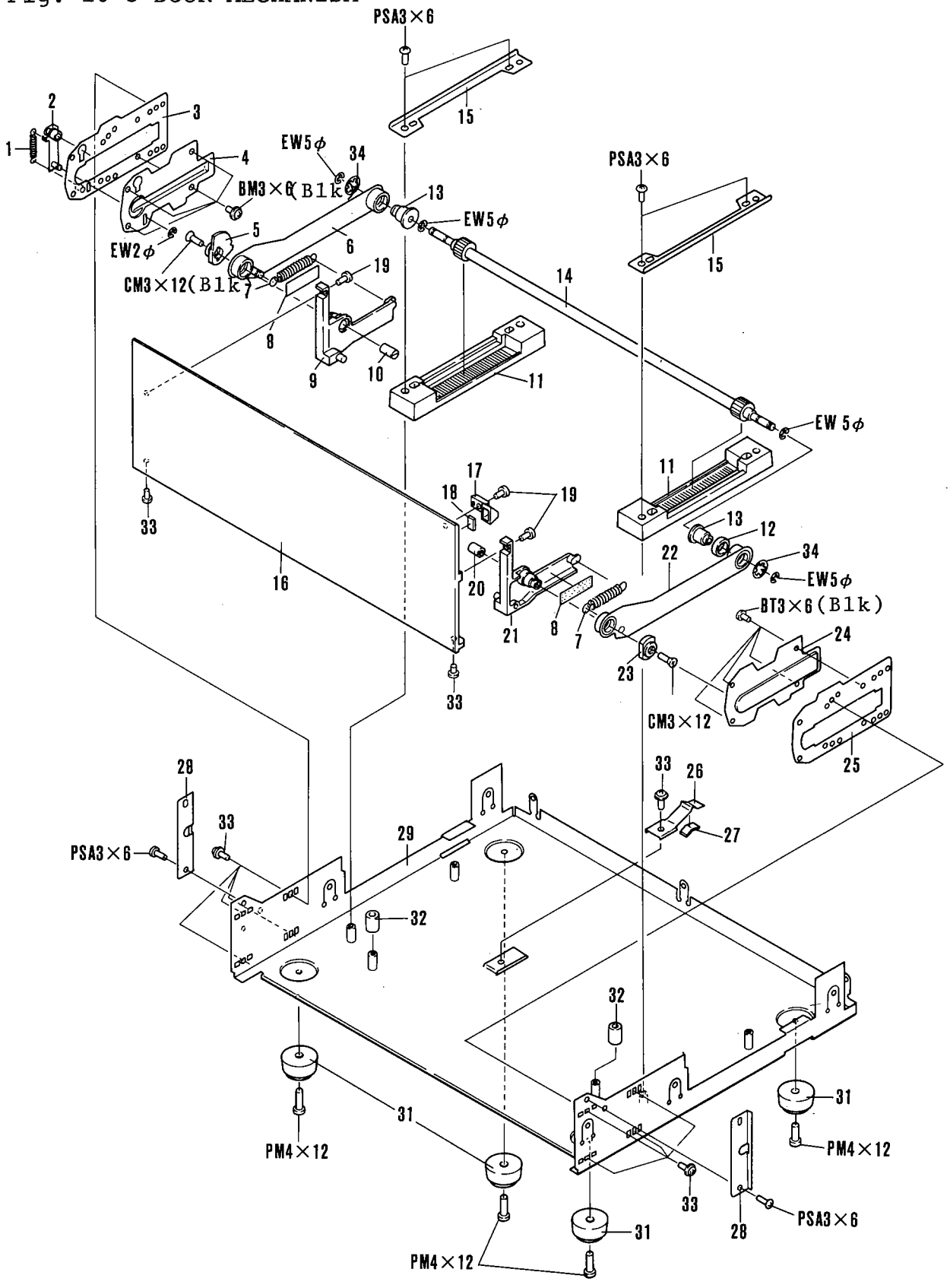
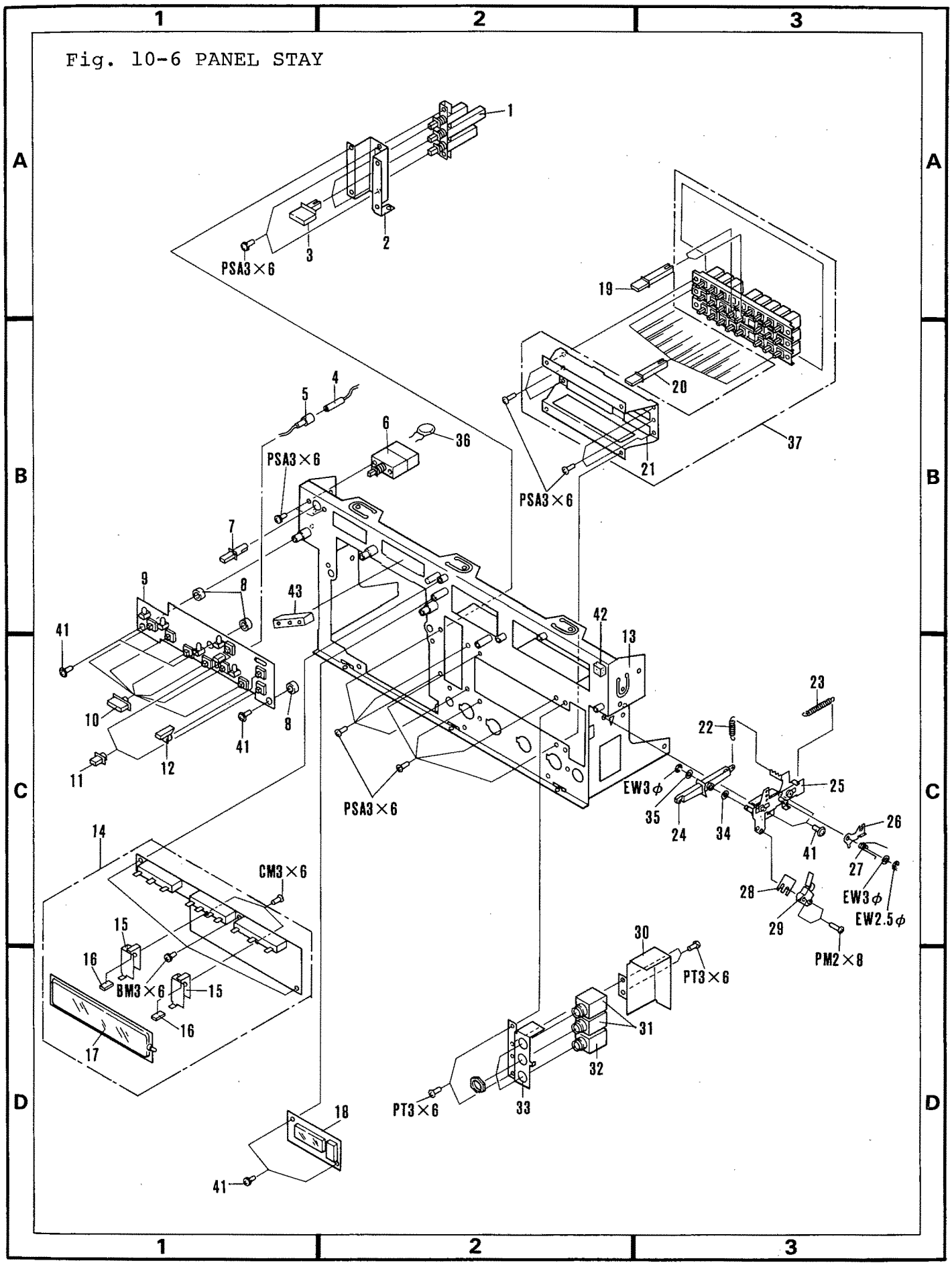


Fig. 10-6 PANEL STAY



10-6 PANEL STAY

Key No.	Part No.	Description
1	929-8046	3-St. switch assy.
2		Switch holder B
3	942-8007	Button(MON, MPX, DOLBY)
4		Male connector
5		Female connector
⚠ 6	929-8027	Power switch
7	942-8012	Power button
8	941-8030	Cushion
9		
10	942-8013	Function button A
11	942-8011	Function button B
12	942-8008	U-scan button
13		Panel stay assy.
14		Indicator A assy.
15		Holder
16	941-8017	Cushion
17	923-8001	FL display
18		Indicator B assy.
19	942-8030	Red button
20	942-8006	Button
21		Switch holder A
22	921-8038	Arm spring
23	921-8039	Slide plate spring
24	942-8032	Panel lock arm
25		Holder full assy.
26	941-8010	Ratchet plate
27	921-8033	Ratchet spring
28	941-8031	Insulator
29	929-8020	Lever switch
30		Shield plate
31	921-8011	MIC jack
32	921-8010	HDPHN jack
33		Jack holder
34		Nylon washer 3ø
35		Nylon washer 4ø
36	927-8005	Spark killer
37		Display assy.
38		
39		
40		
41		TP3x6

Hardware:

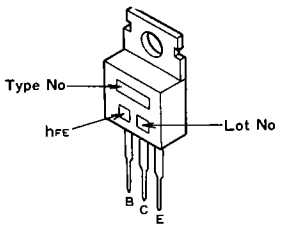
Description	Part No.
PSA3x6	922-8093
BM3x6	922-8091
CM3x6	922-8113
PT3x6	922-8114
PM2x8	922-8115
EW2.5ø	922-8052
EW3	922-8049

11-0. SCHEMATIC DIAGRAMS

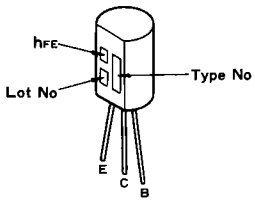
Contents:

11-1. Transistor and IC Pin Configurations

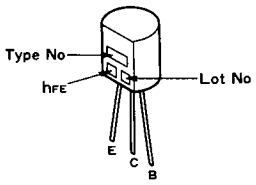
2SA490
2SA816
2SC1626
2SD234
2SD837



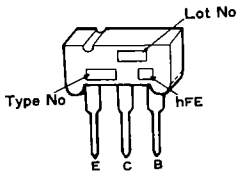
2SA684NC
2SC1384



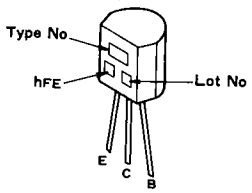
2SA825
2SC1740



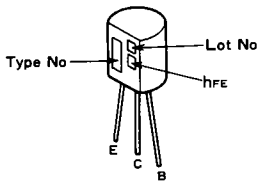
2SA881
2SB643



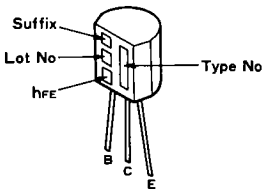
2SA934
2SC2060



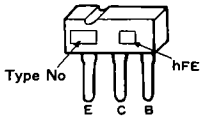
2SA970
2SA1015
2SC1815
2SC2240



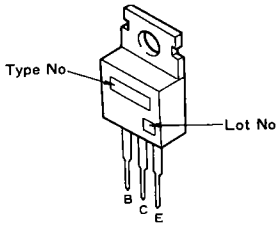
2SA999L
2SC2320L



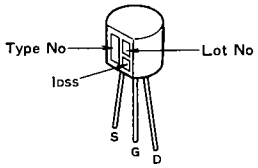
2SC2021
2SD636



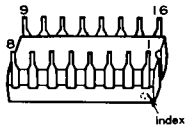
2SD686



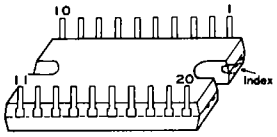
2SK30ADB



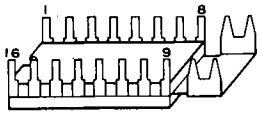
PA2004
PA4005
PD1003
TC4017BP
μPD4028C
μPD4042C
μPD4050C



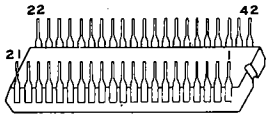
PA2005



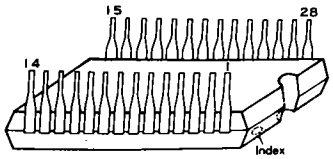
PA4001



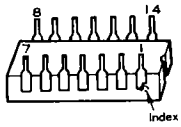
PD4005



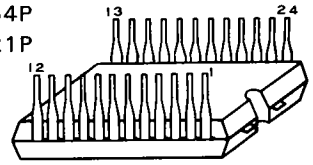
PD4007



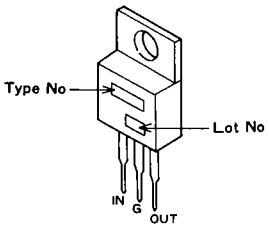
μPC324C
μPD4011C
μPD4069C
μPD4081C



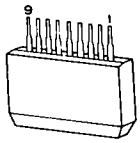
TC5054P
TC9121P



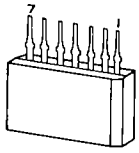
μPC14305H



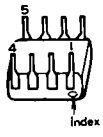
TA7318P



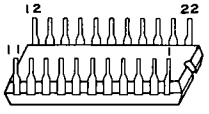
AN6249



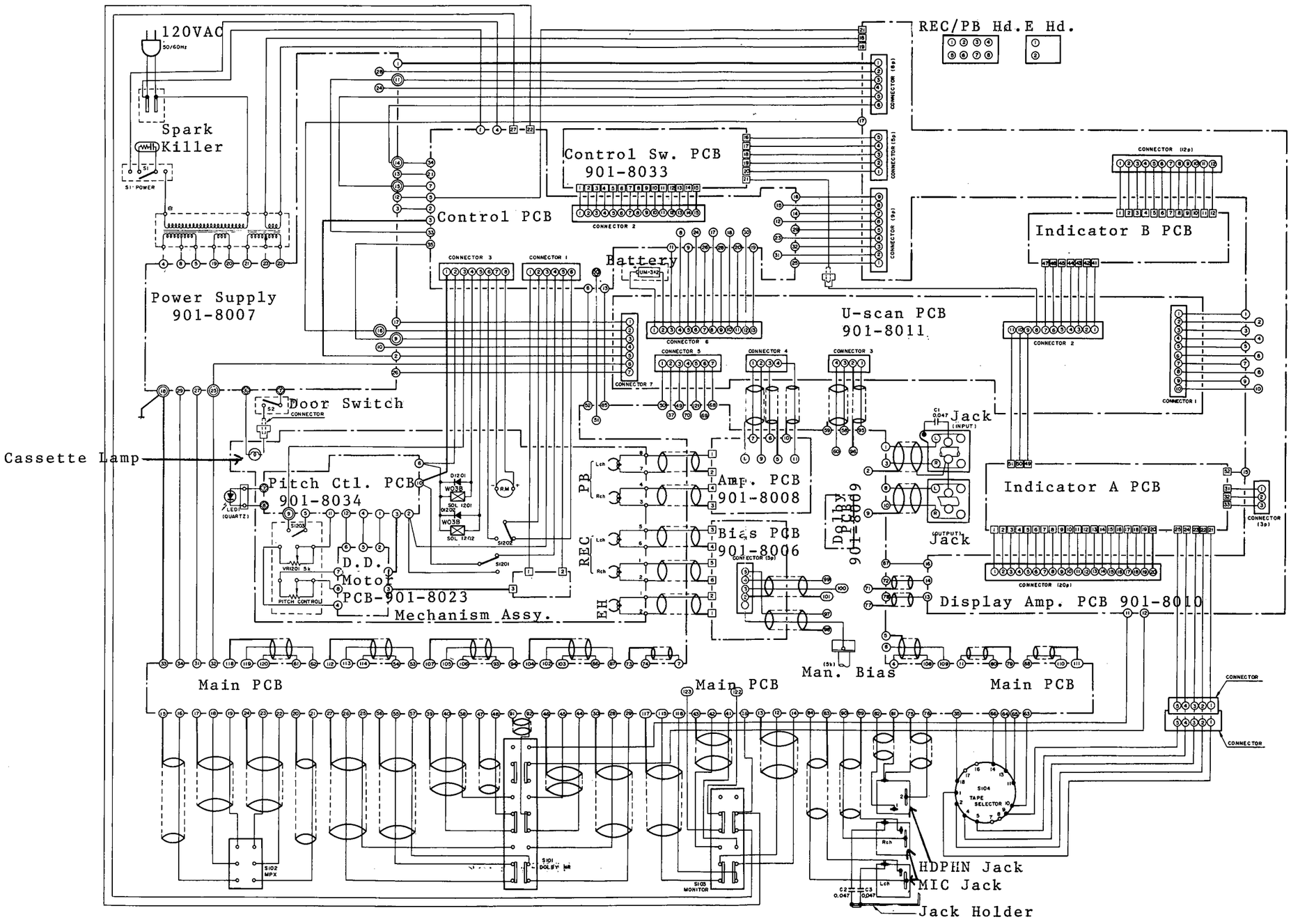
μPC4558C
μPC4741C



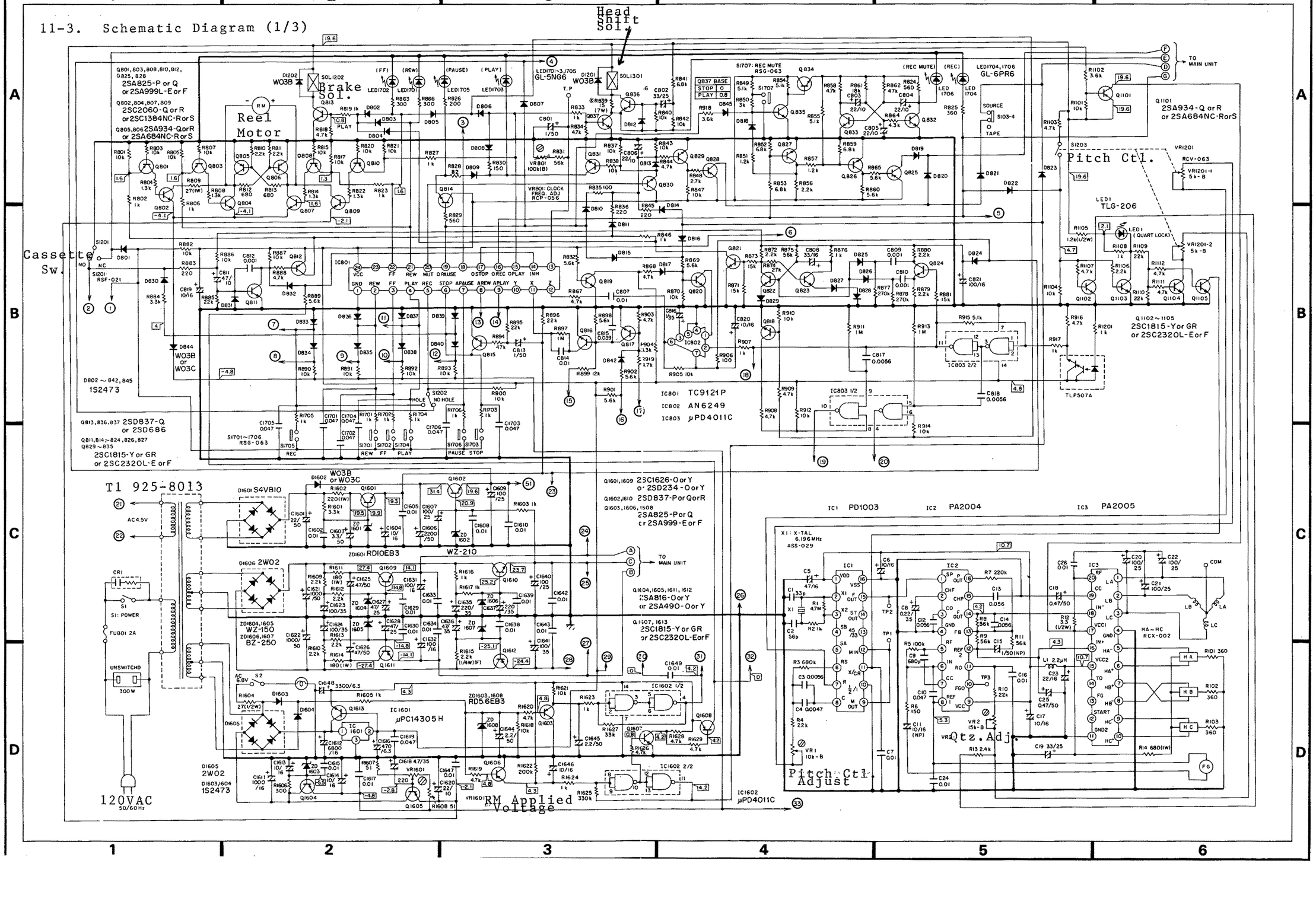
μPD5101LC



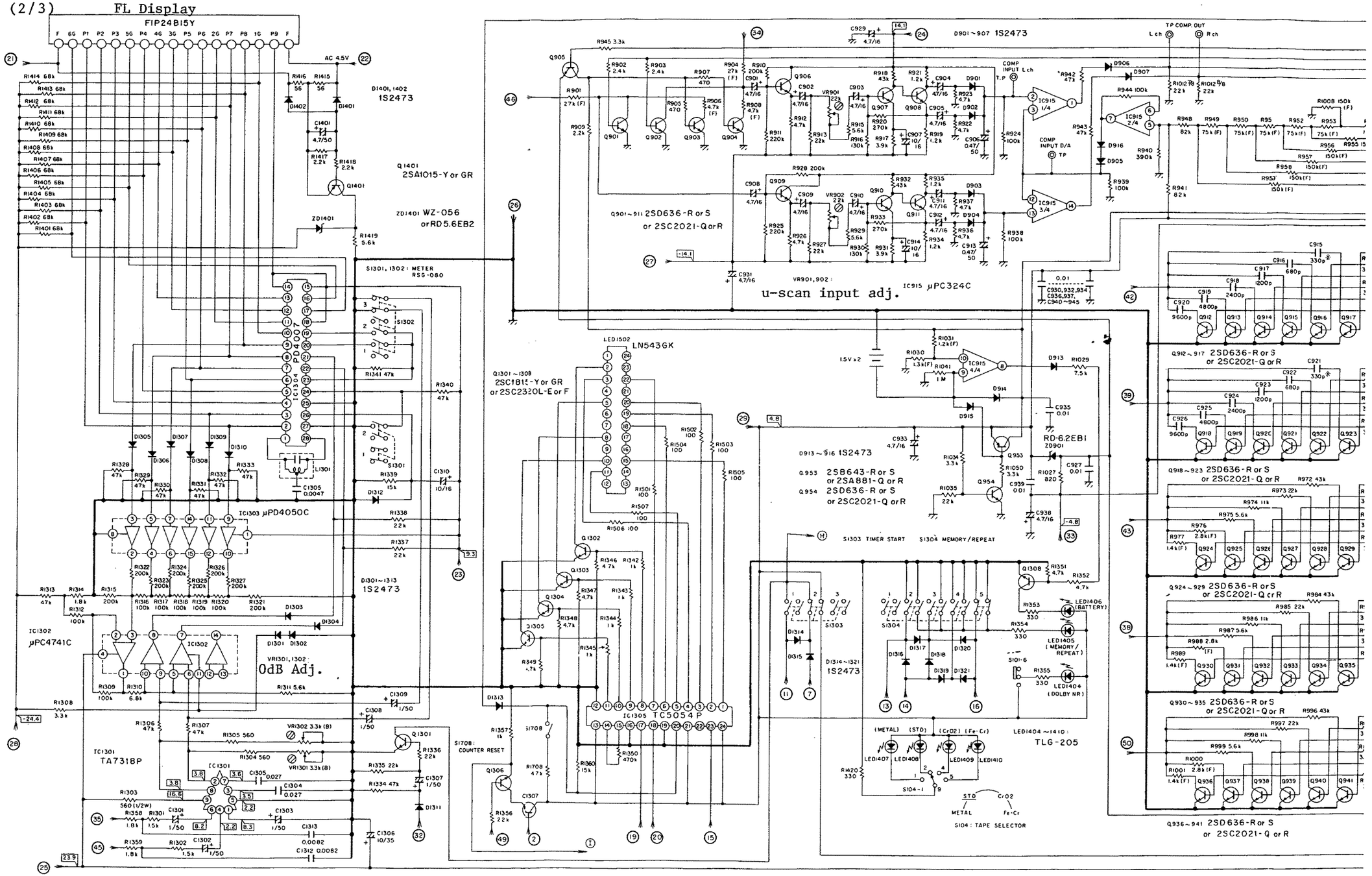
11-2. Interconnect Schematic

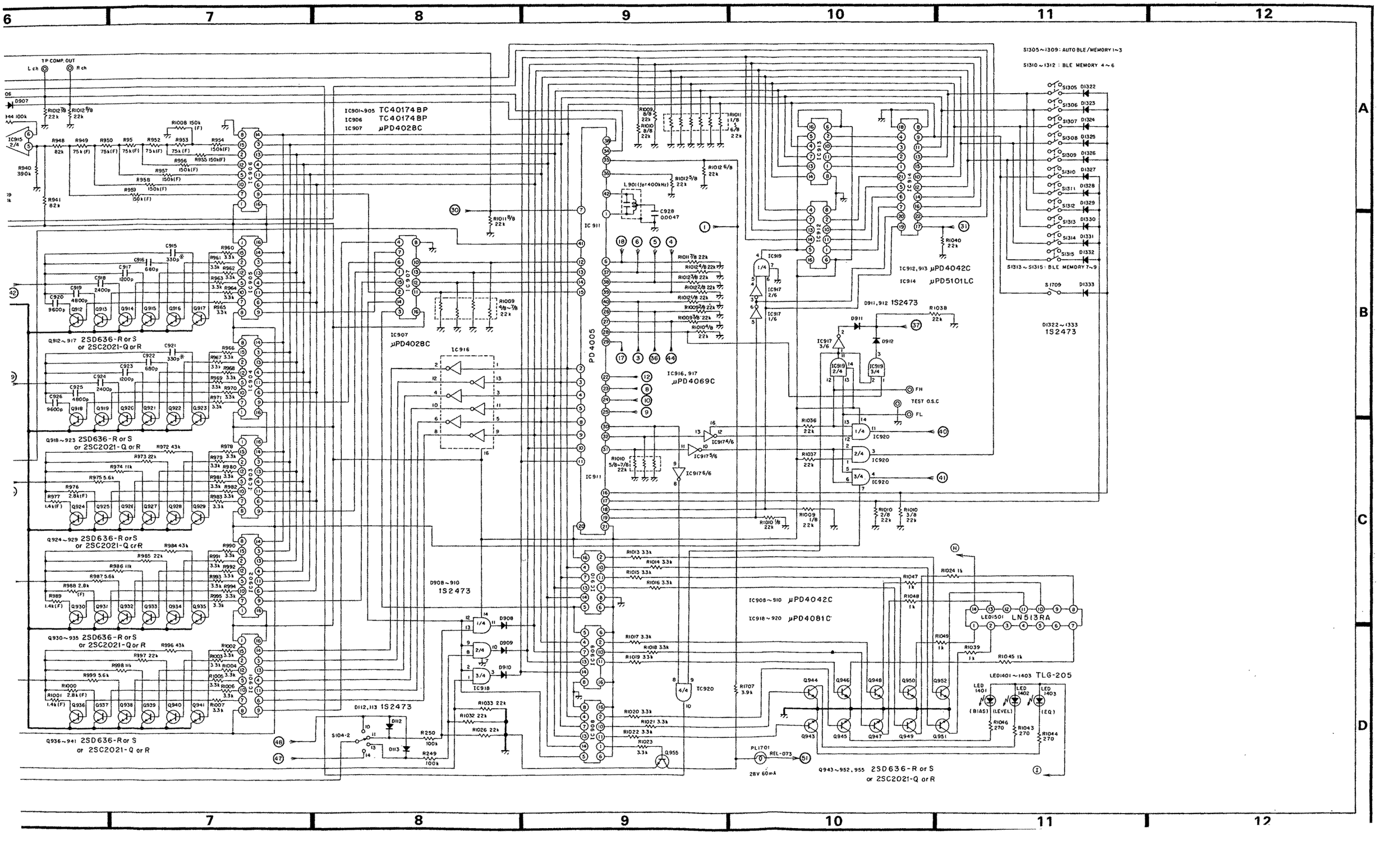


11-3. Schematic Diagram (1/3)

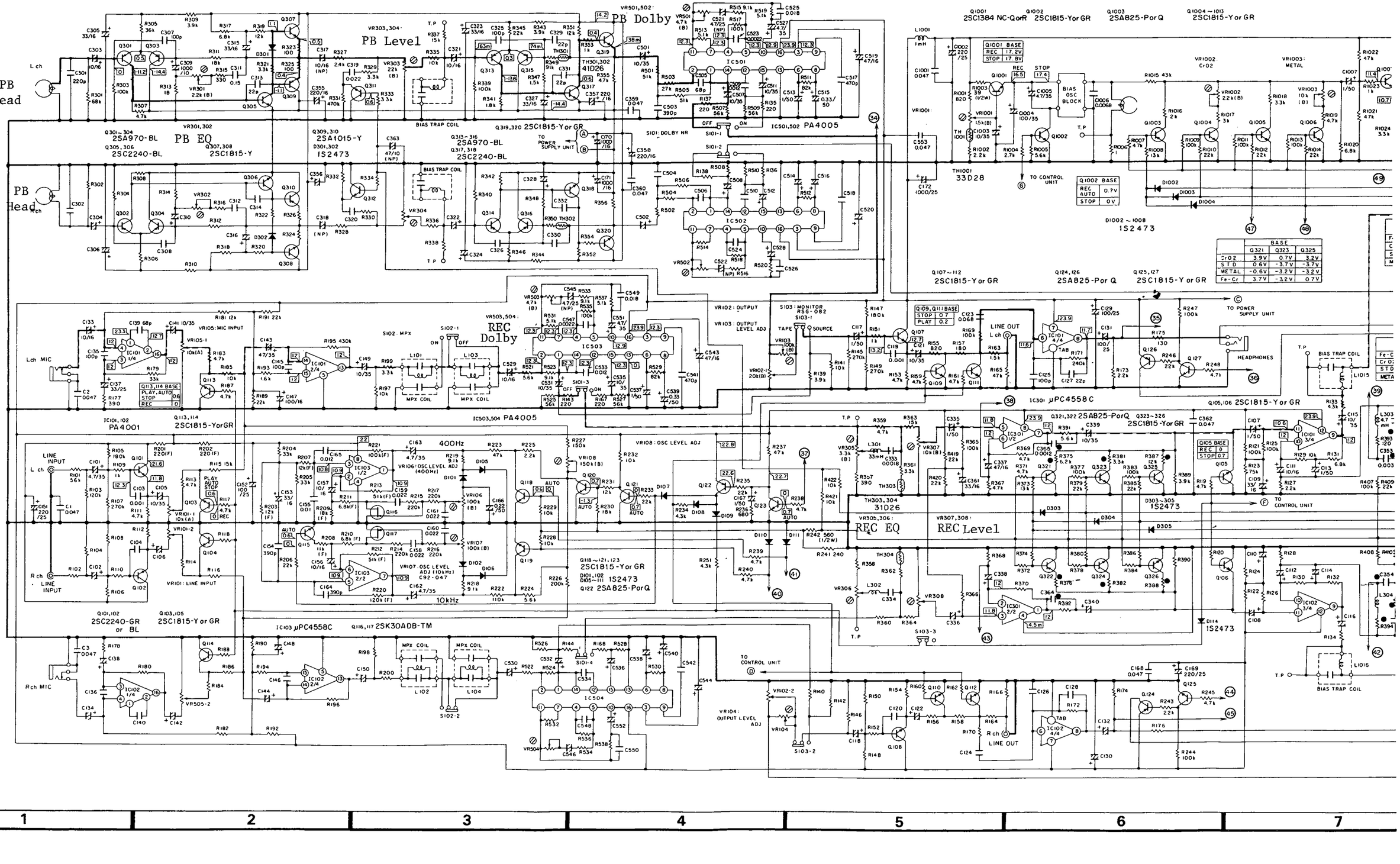


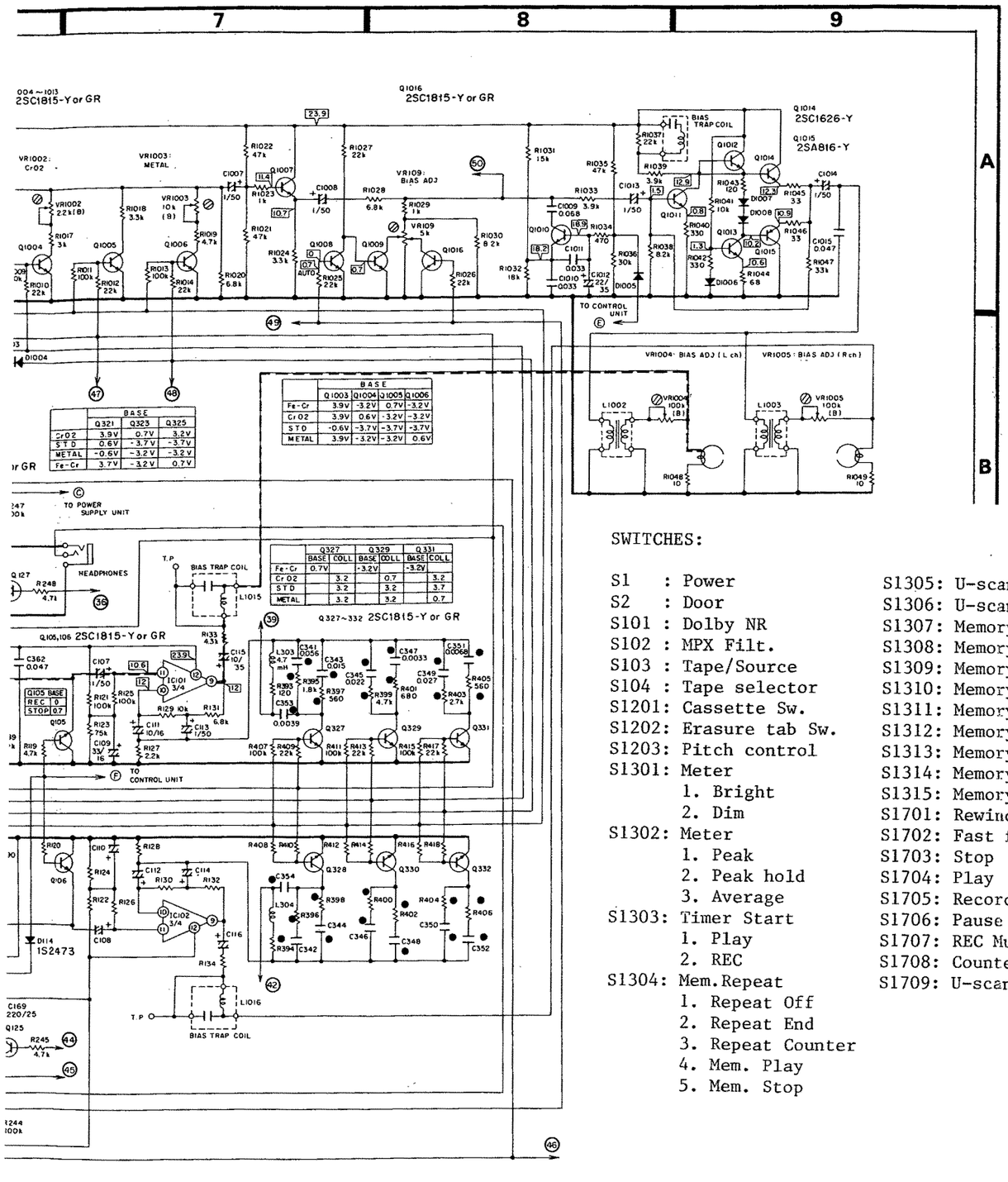
11-4. Schematic (2/3) FL Display




IC901~905 TC40174BP
IC906 TC40174BP
IC907 μPD4028C
IC908~910 μPD4042C
IC918~920 μPD4081C
IC912,913 μPD4042C
IC914 μPD5101LC
IC916,917 μPD4069C
PD4005
Q912~917 2SD636-R or S or 2SC2021-Q or R
Q918~923 2SD636-R or S or 2SC2021-Q or R
Q924~929 2SD636-R or S or 2SC2021-Q or R
Q930~935 2SD636-R or S or 2SC2021-Q or R
Q936~941 2SD636-R or S or 2SC2021-Q or R
Q943~952, 955 2SD636-R or S or 2SC2021-Q or R
D908~910 1S2473
D911, 912 1S2473
D112, 113 1S2473
D1322~1333 1S2473
S1305~1309: AUTO BLE/MEMORY 1~3
S1310~1312 : BLE MEMORY 4~6
S1313~S1315: BLE MEMORY 7~9
LED1401~1403 TLG-205
LED1501 LN513RA
L901 (for 400kHz)
TP COMP. OUT
L ch
R ch
TEST O.S.C
FH
FL
28V 60mA

11-5. Schematic (3/3) PLAY signal path ——— REC signal path - - - -





	BASE		
	Q321	Q323	Q325
Cr02	3.9V	0.7V	3.2V
STD	0.6V	-3.7V	-3.7V
METAL	-0.6V	-3.2V	-3.2V
Fe-Cr	3.7V	-3.2V	0.7V

	BASE			
	Q1003	Q1004	Q1005	Q1006
Fe-Cr	3.9V	-3.2V	0.7V	-3.2V
Cr02	3.9V	0.6V	-3.2V	-3.2V
STD	-0.6V	-3.7V	-3.7V	-3.7V
METAL	3.9V	-3.2V	-3.2V	0.6V

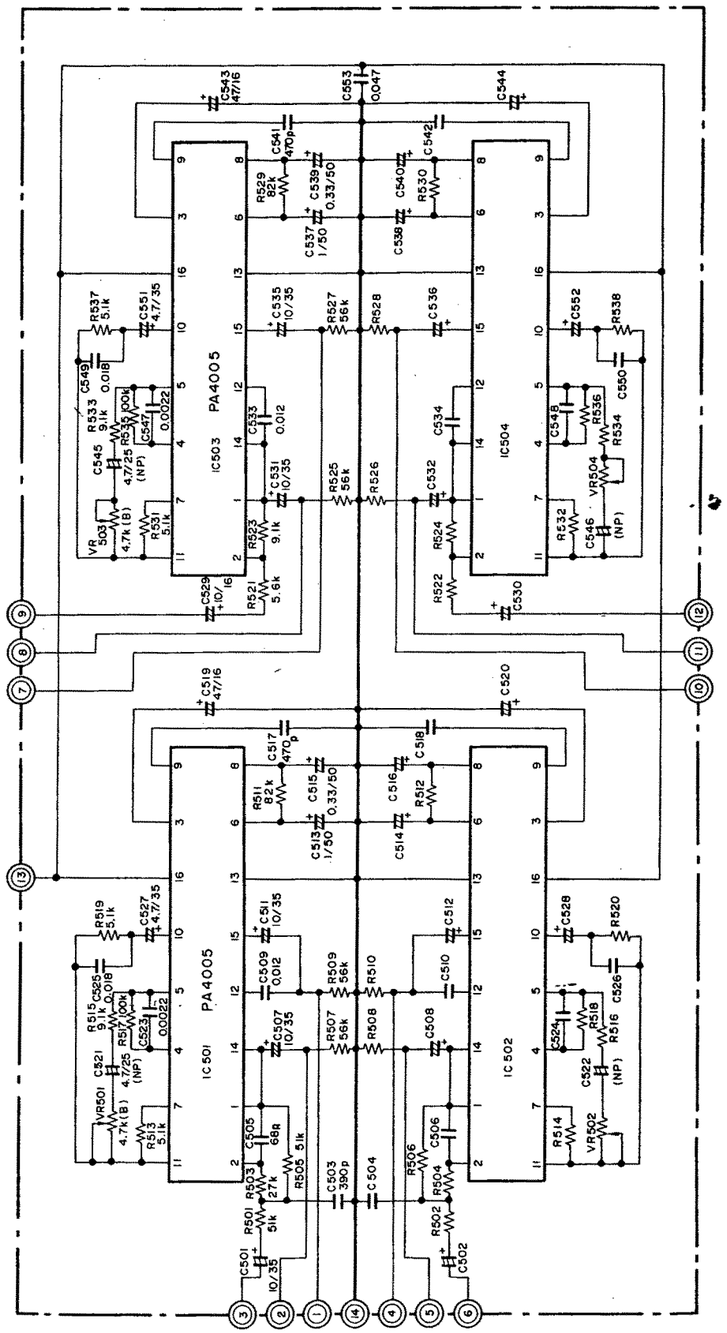
	Q327		Q329		Q331	
	BASE	COLL	BASE	COLL	BASE	COLL
Fe-Cr	0.7V		-3.2V		-3.2V	
Cr02		3.2		0.7		3.2
STD		3.2		3.2		3.7
METAL		3.2		3.2		0.7

SWITCHES:

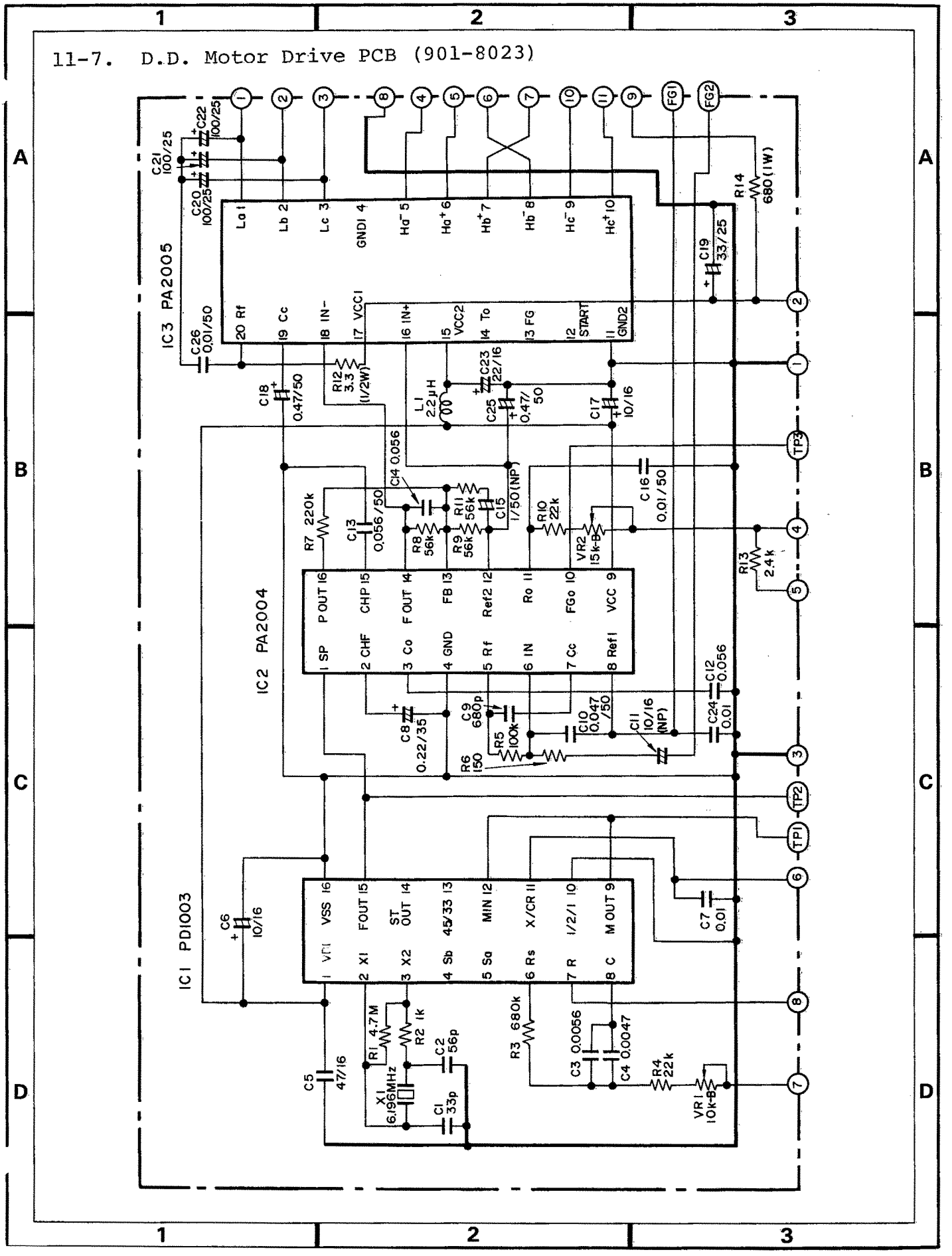
S1 : Power
S2 : Door
S101 : Dolby NR
S102 : MPX Filt.
S103 : Tape/Source
S104 : Tape selector
S1201: Cassette Sw.
S1202: Erasure tab Sw.
S1203: Pitch control
S1301: Meter
1. Bright
2. Dim
S1302: Meter
1. Peak
2. Peak hold
3. Average
S1303: Timer Start
1. Play
2. REC
S1304: Mem.Repeat
1. Repeat Off
2. Repeat End
3. Repeat Counter
4. Mem. Play
5. Mem. Stop

S1305: U-scan memory
S1306: U-scan recall
S1307: Memory 1
S1308: Memory 2
S1309: Memory 3
S1310: Memory 4
S1311: Memory 5
S1312: Memory 6
S1313: Memory 7
S1314: Memory 8
S1315: Memory 9
S1701: Rewind
S1702: Fast forward
S1703: Stop
S1704: Play
S1705: Record
S1706: Pause
S1707: REC Mute
S1708: Counter reset
S1709: U-scan

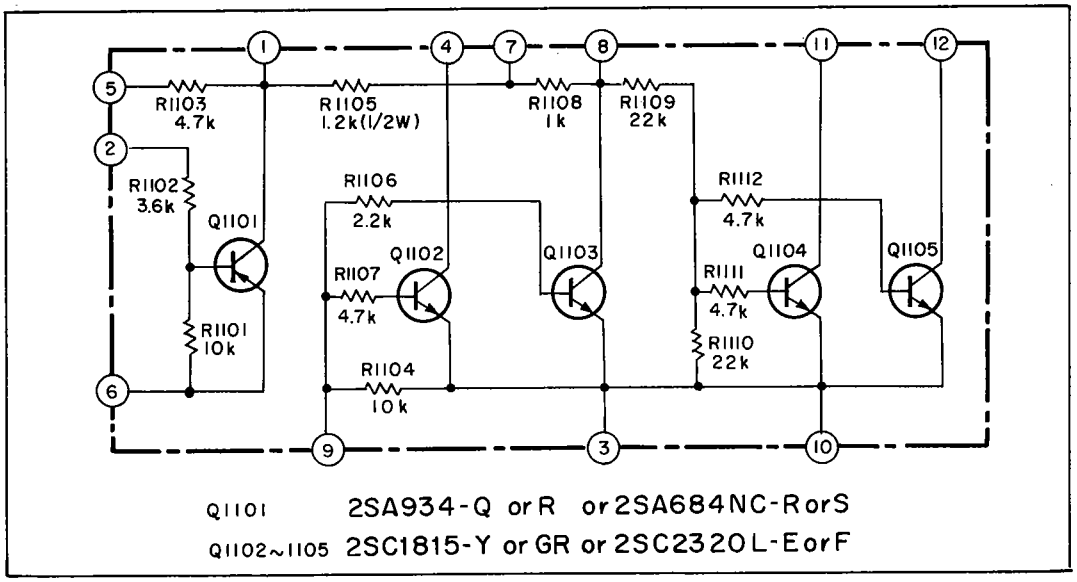
11-6. Dolby PCB (901-8009)



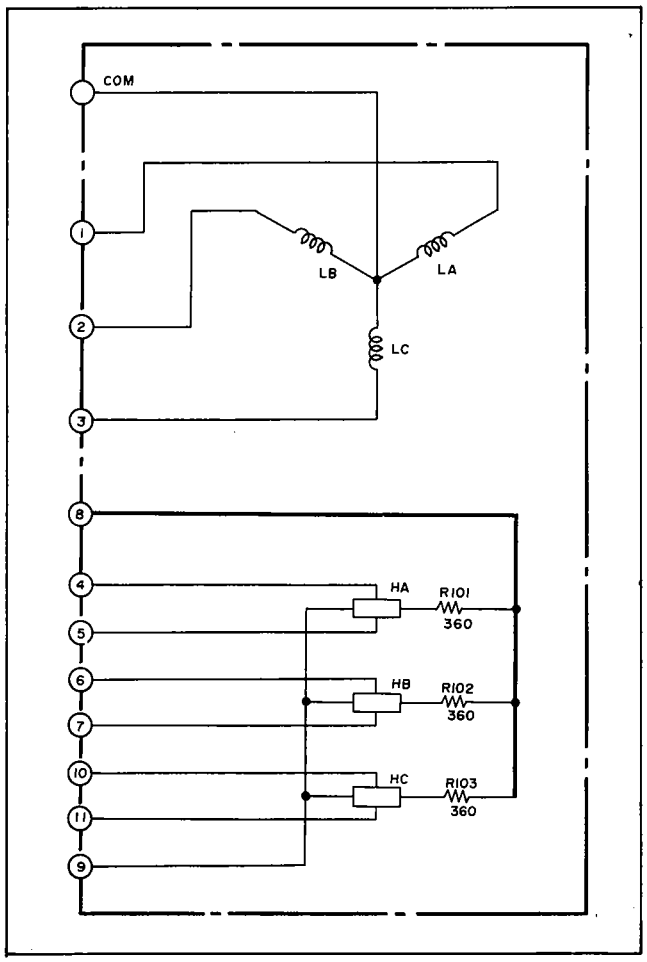
11-7. D.D. Motor Drive PCB (901-8023)



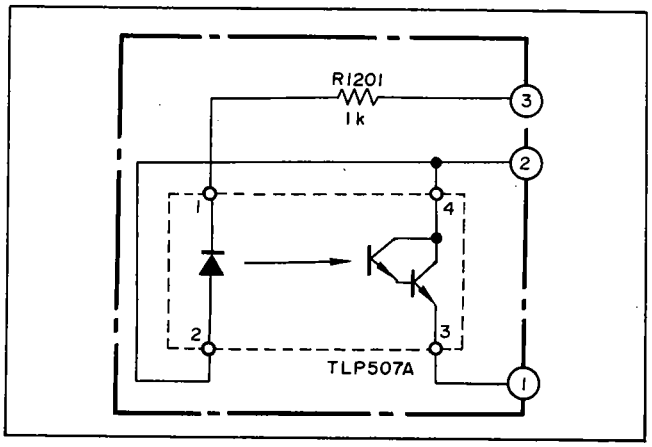
11-8. Pitch Control PCB



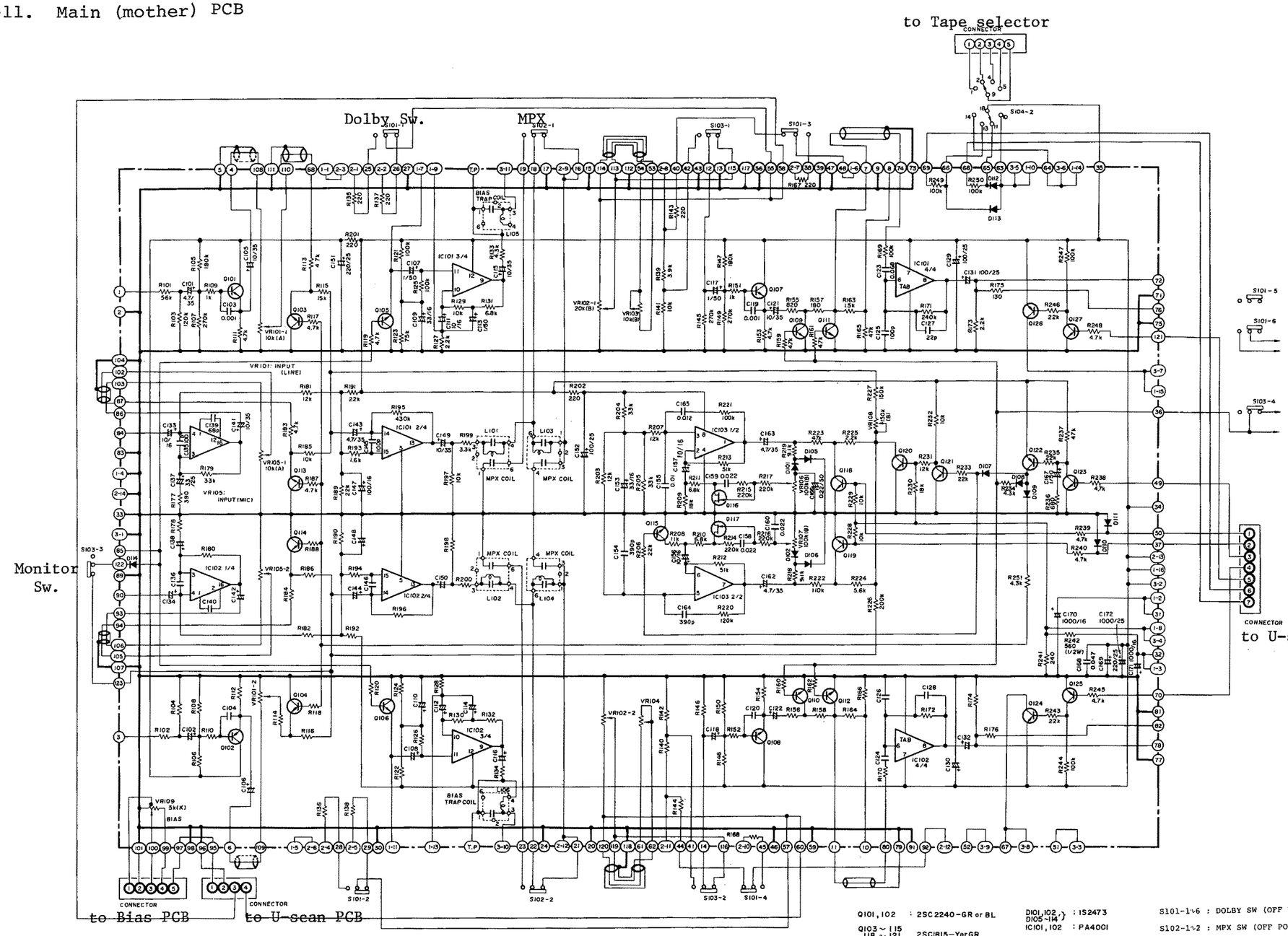
11-9. Position Sensing PCB (for D.D. motor)



11-10. Sensing PCB (for tape counter)



11-11. Main (mother) PCB



Q101,102 : 2SC2240-GR or BL

Q103 ~ 115, 118 ~ 121, 123,125,127 : 2SC1815-YorGR

Q116,117 : 2SK30ADB-TM

Q122,124,126 : 2SA825-PorQ

D101,102,D105~114 : 1S2473

IC101,102 : PA4001

IC103 : μPC4558C

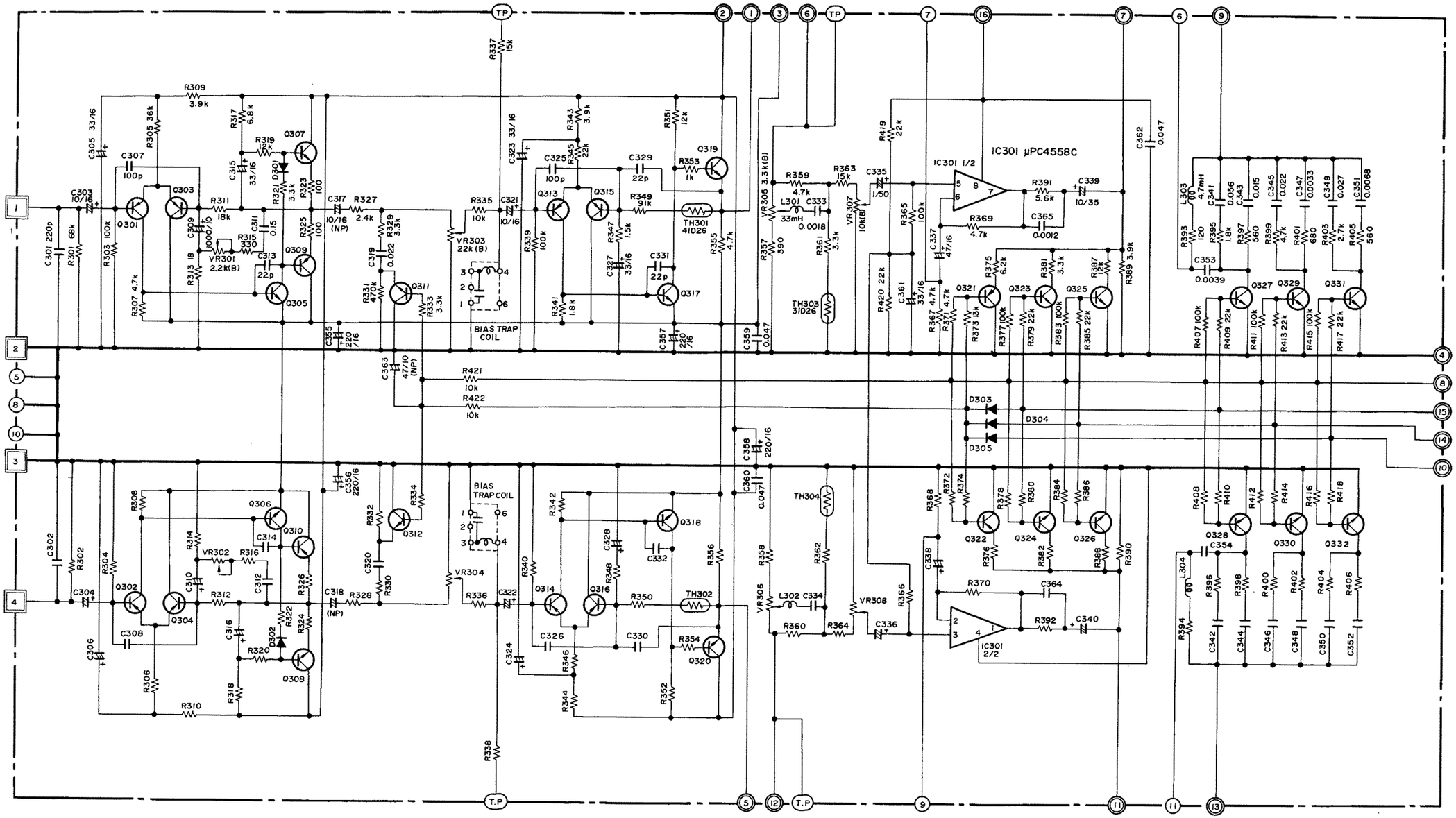
S101-1~6 : DOLBY SW (OFF POSI.)

S102-1~2 : MPX SW (OFF POSI.)

S103-1~4 : MONITE SW (TAPE POSI.)

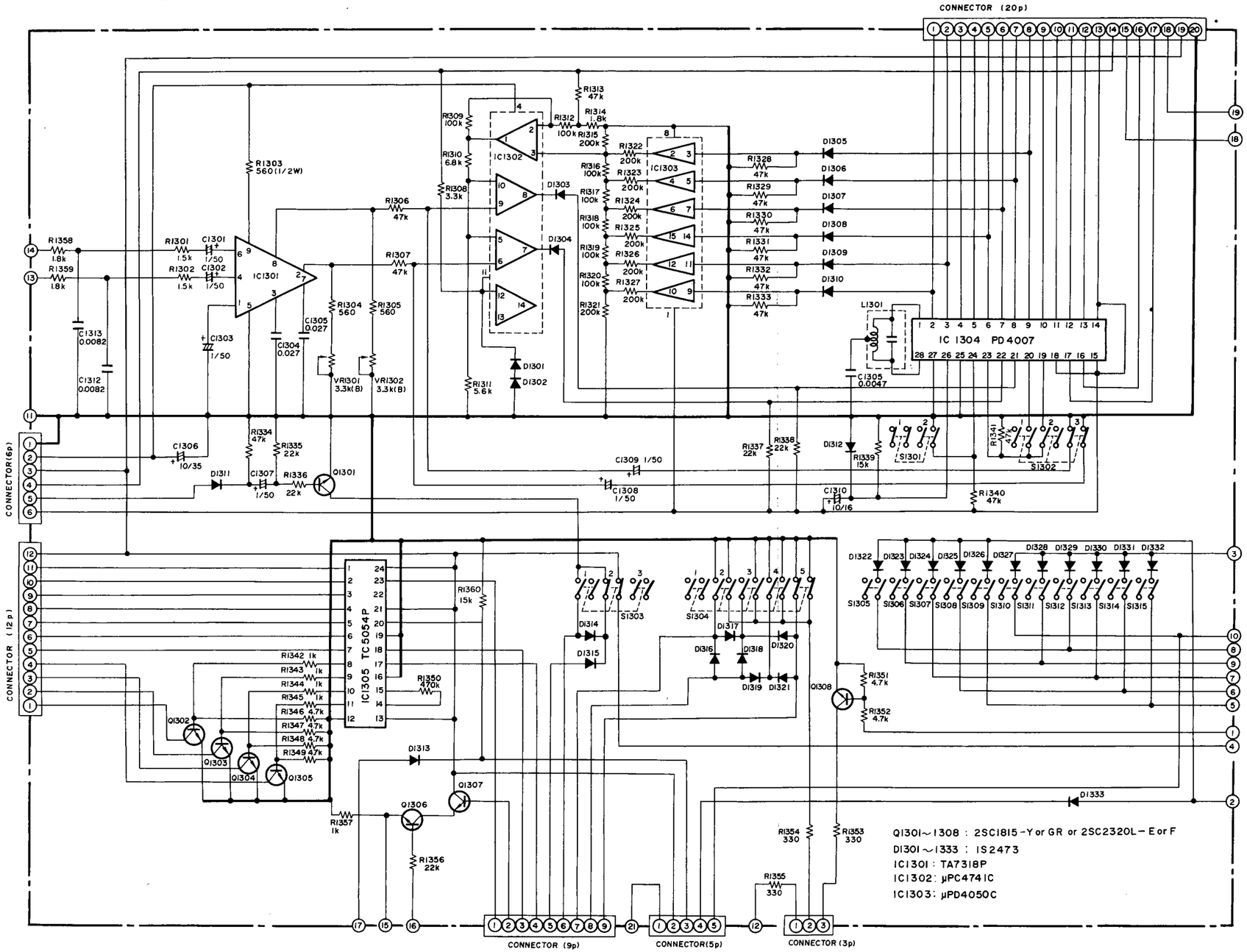
S104-1~2 : EQ SW (STD POSI.)

11-12. Amplifier PCB (901-8008)



Q301~304, 313 316	: 2SA970-BL	Q319,320	: 2SC1815-Y or GR
Q305,306,317,318	: 2SC2240-BL	Q311,312, 323~332	: 2SC1815-Y or GR
Q309,310	: 2SA1015-Y	Q321,322	: 2SA825-P or Q
Q307,308	: 2SC1815-Y		

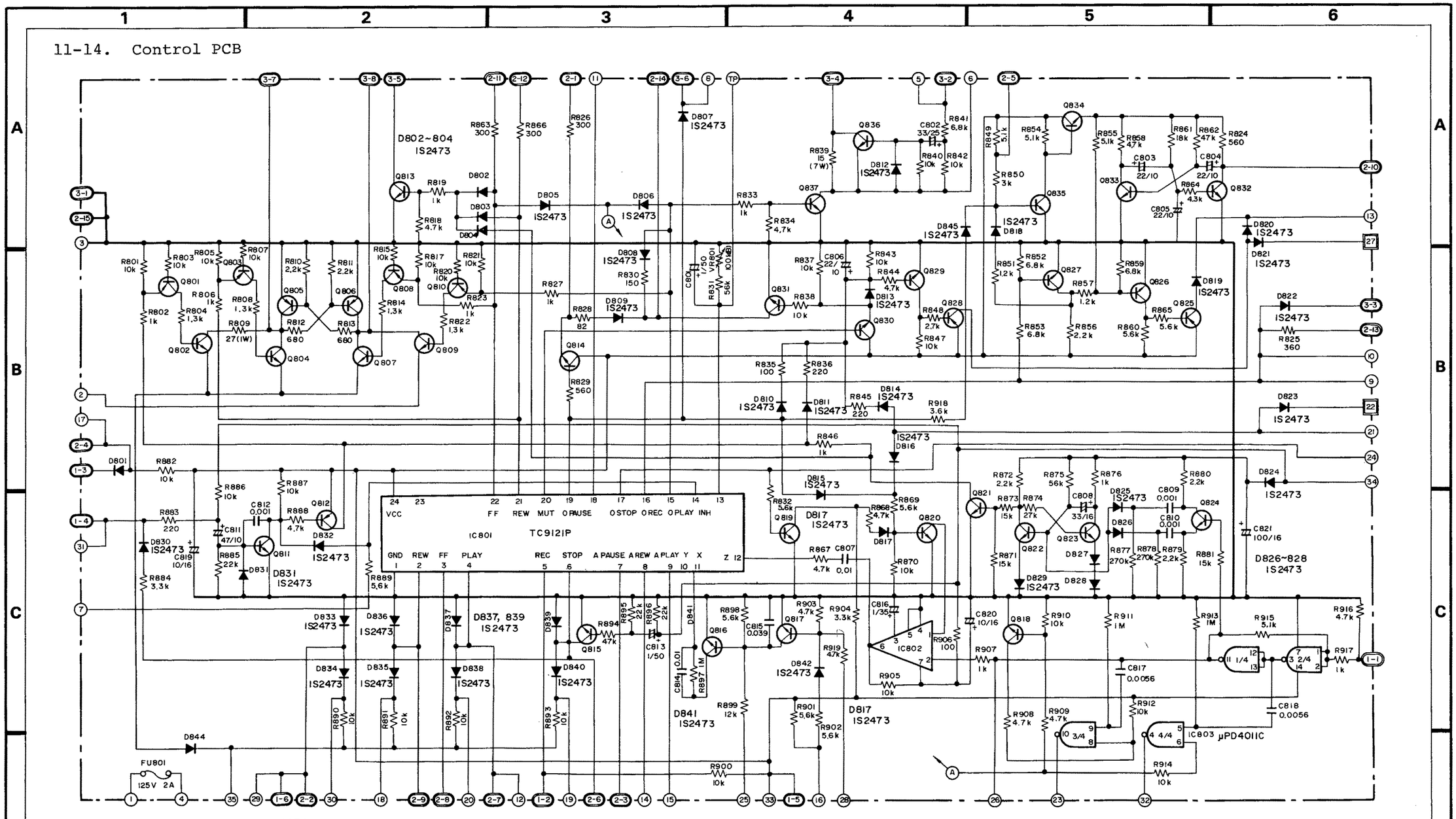
11-13. Display Amp PCB (901-8010)



S1301	1 METER BRIGHT	(ON)
	2 METER DIM.	(OFF)
S1302	1 METER PEAK HOLD AUTO	(OFF)
	2 METER PEAK HOLD MAN.	(OFF)
	3 METER AVERAGE	(ON)
S1303	1 TIMER START-PLAY	(OFF)
	2 TIMER START-REC.	(ON)
	3 OFF	(OFF)
S1304	1 OFF	(OFF)
	2 END-REPEAT	(OFF)
	3 COUNTER-REPEAT	(OFF)
	4 MEMORY-PLAY	(OFF)
	5 MEMORY-STOP	(ON)
S1305	AUTO B.L.E. MEMORY	(OFF)
S1306	AUTO B.L.E. CALL	(OFF)
S1307	B.L.E. MEMORY 1	(OFF)
S1308	B.L.E. MEMORY 2	(OFF)
S1309	B.L.E. MEMORY 3	(OFF)
S1310	B.L.E. MEMORY 4	(OFF)
S1311	B.L.E. MEMORY 5	(OFF)
S1312	B.L.E. MEMORY 6	(OFF)
S1313	B.L.E. MEMORY 7	(OFF)
S1314	B.L.E. MEMORY 8	(OFF)
S1315	B.L.E. MEMORY 9	(OFF)

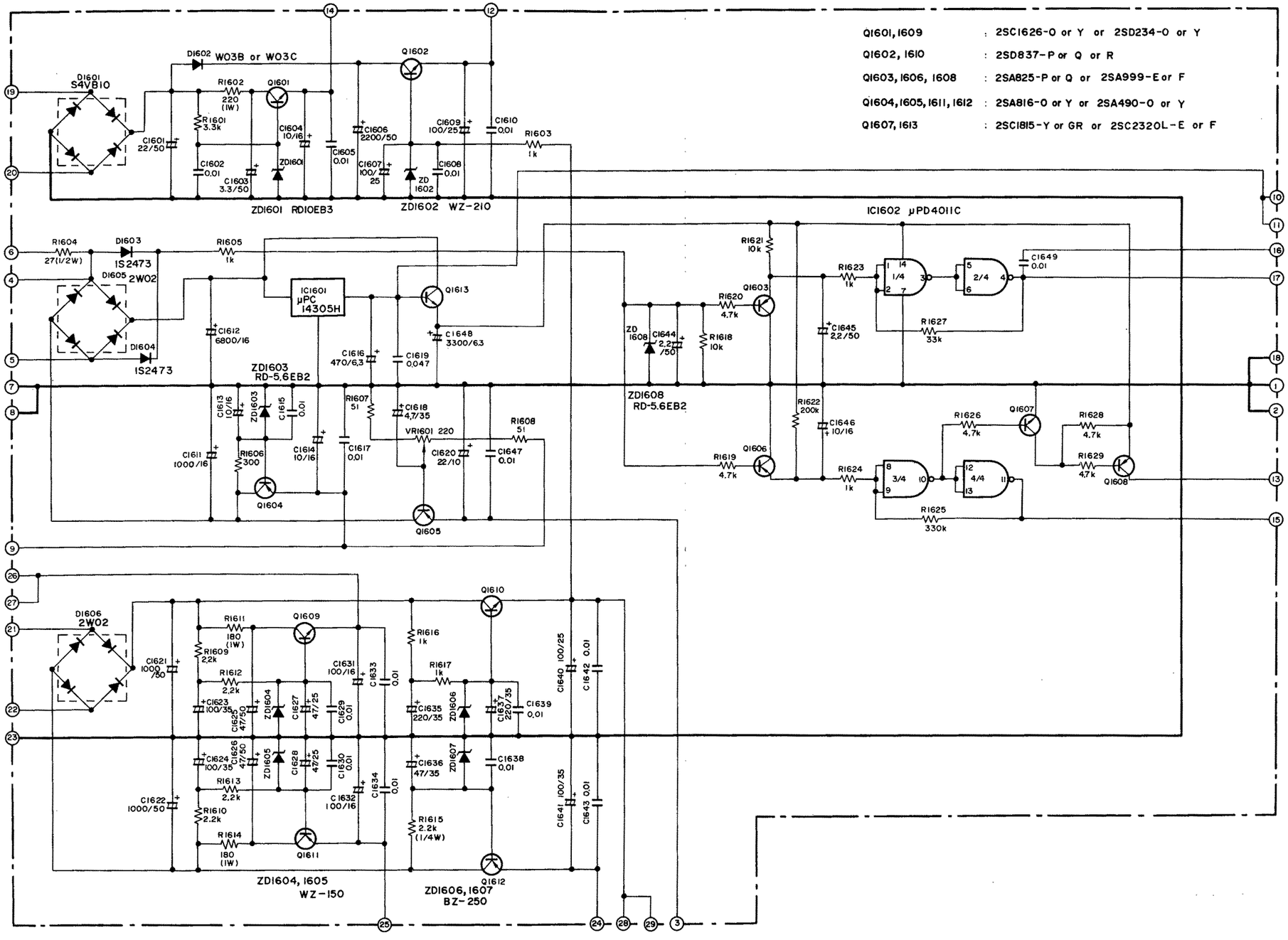
Q1301~1308 : 2SC1815-Y or GR or 2SC2320L-E or F
D1301~1333 : 1S2473
IC1301 : TA7318P
IC1302: μPC4741C
IC1303: μPD4050C

11-14. Control PCB

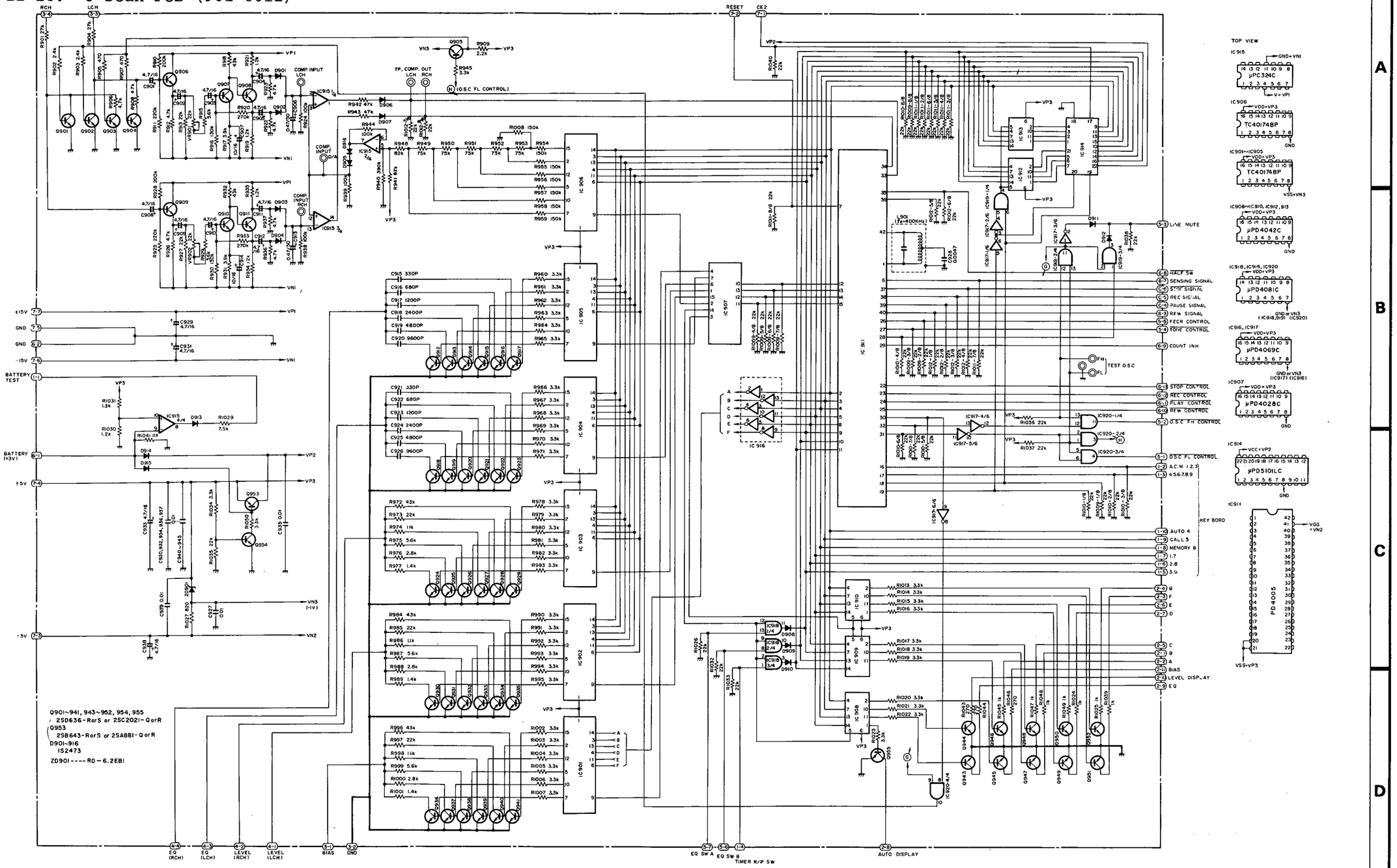


D801, 844	W03B or W03C
Q801, 803, 808, 810, 812, 825, 828	:2SA825-P or Q or 2SA999L-E or F
Q802, 804, 807, 809	:2SC2060-Q or R or 2SC1384NC-Q or R
Q805, 806	:2SA934-Q or R or 2SA684NC-R or S
Q813, 836, 837	:2SD837-Q or 2SD686
Q811, 814~824 826, 827, 829~835,	:2SC1815-Y or GR or 2SC2320L-E or F

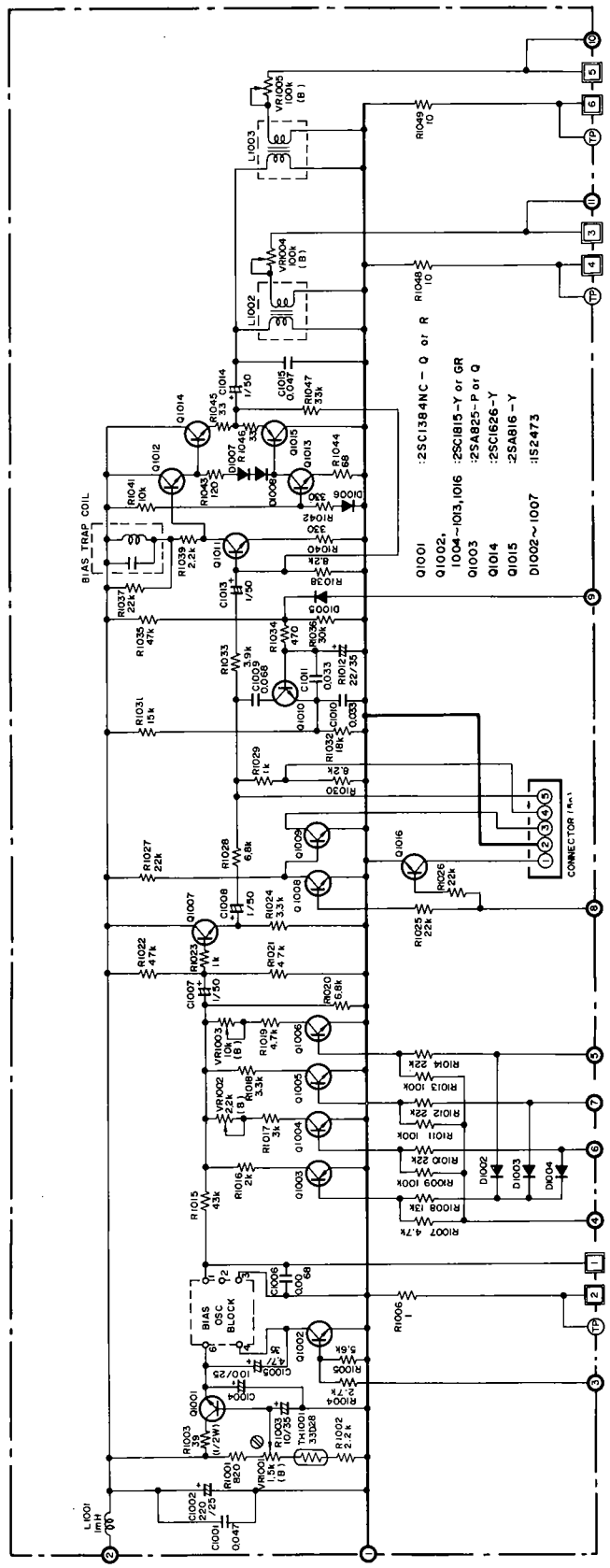
11-15. Power Supply PCB (901-8007)



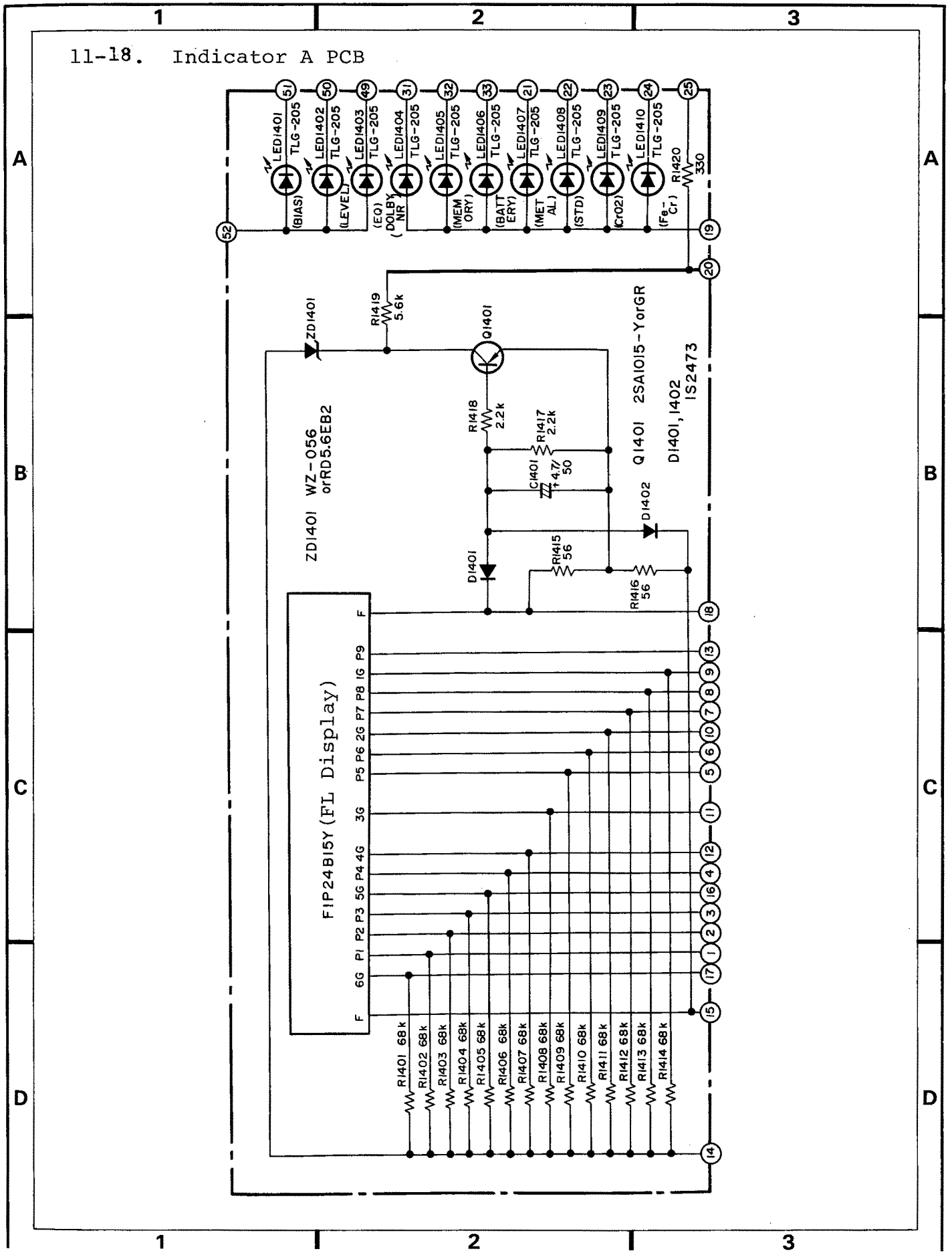
11-16. U-Scan PCB (901-8011)



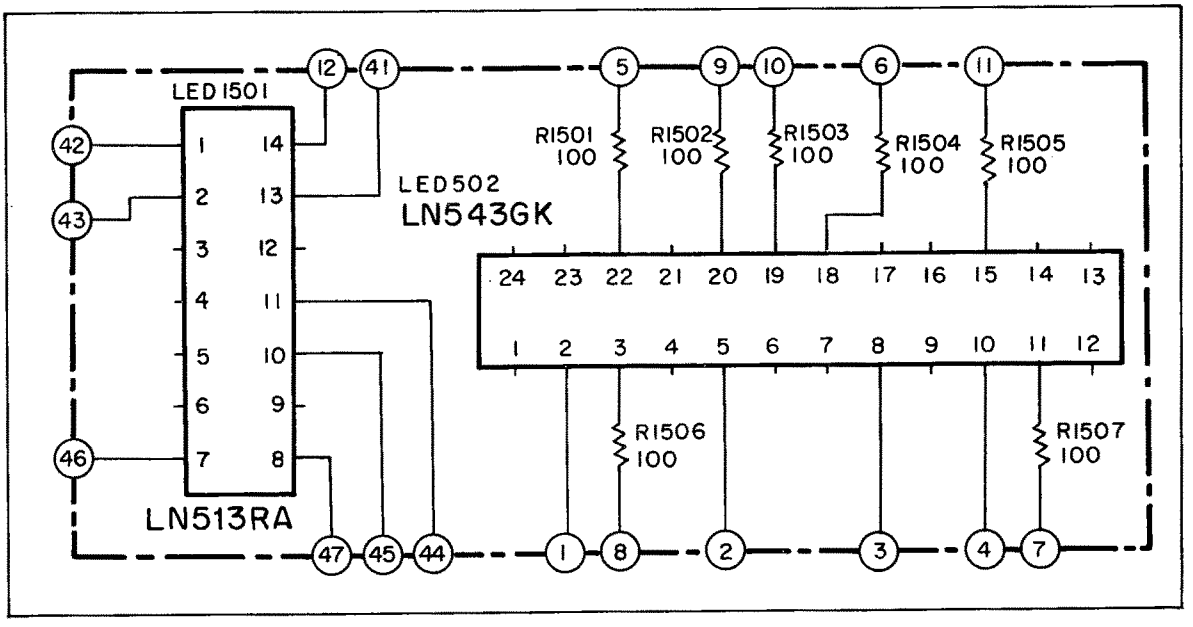
11-17. Bias Amp PCB (901-8006)



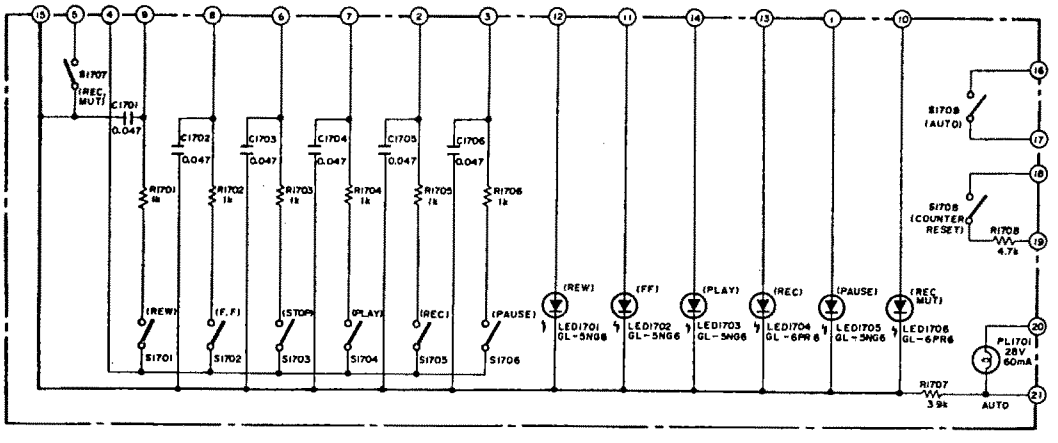
11-18. Indicator A PCB



11-19. Indicator B PCB



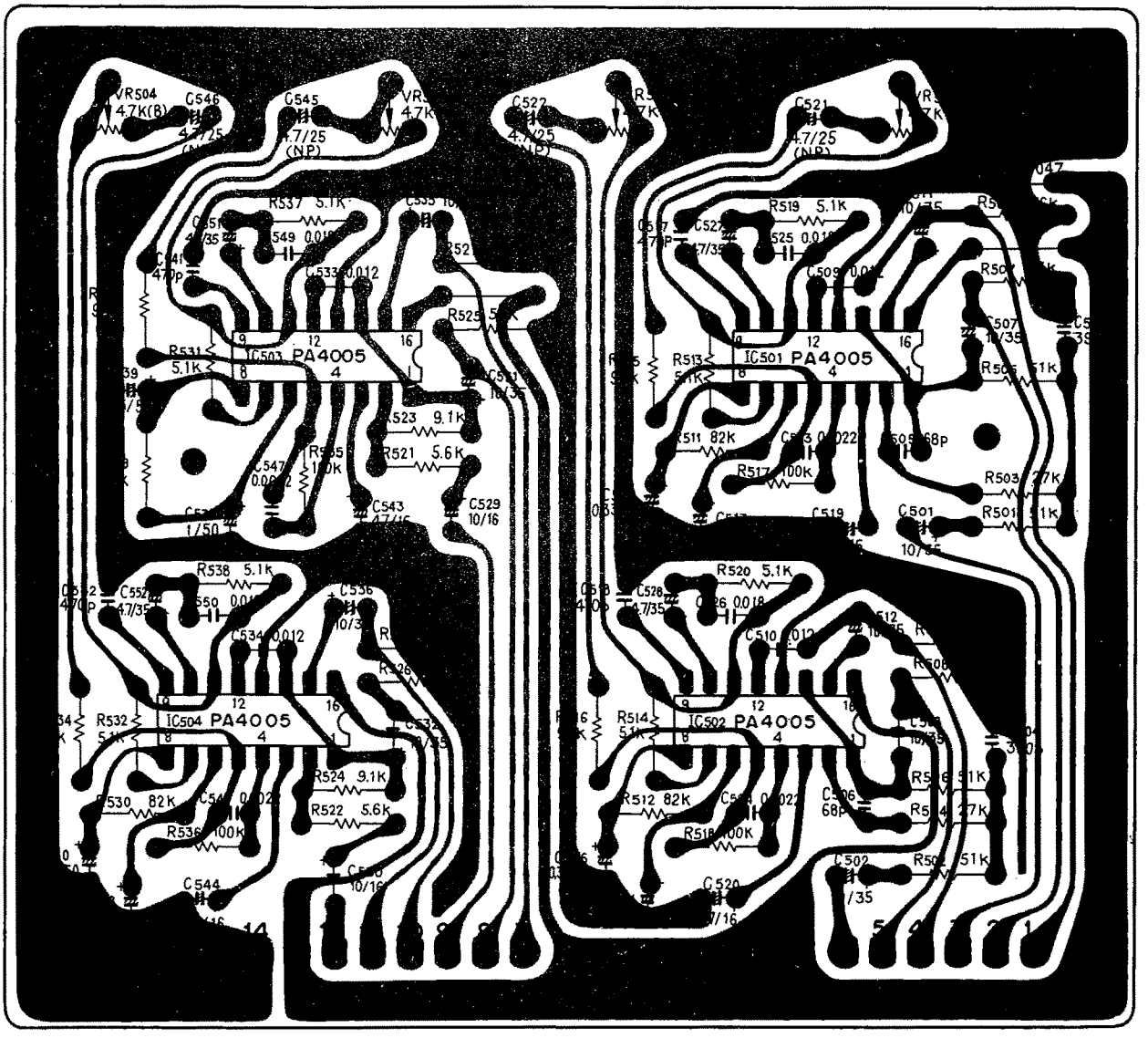
11-20. Control Switch PCB



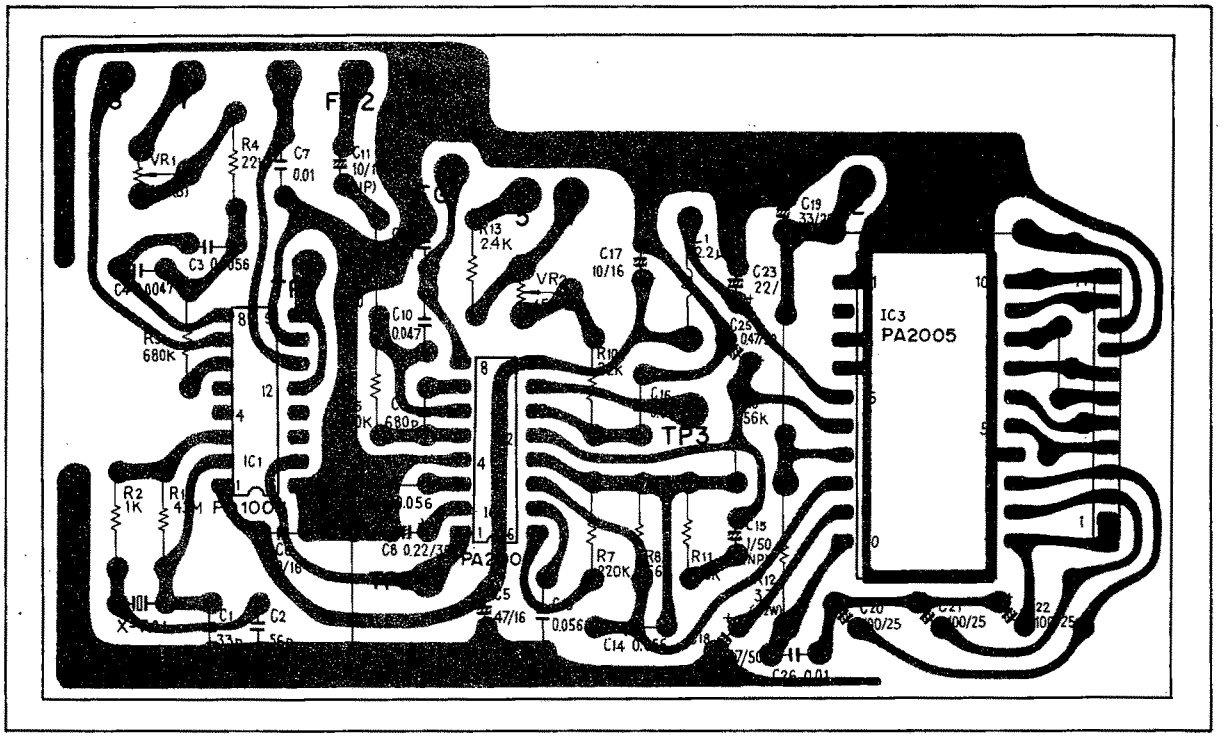
12-0. FOIL PATTERNS AND ASSEMBLY DIAGRAMS

Contents:

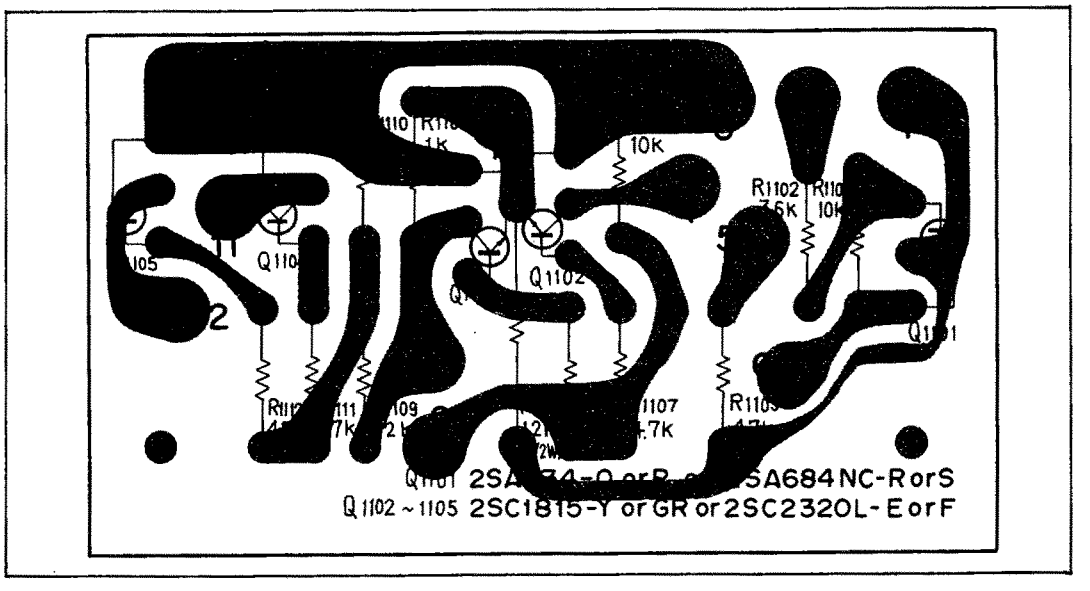
12-1. Dolby PCB (901-8009)



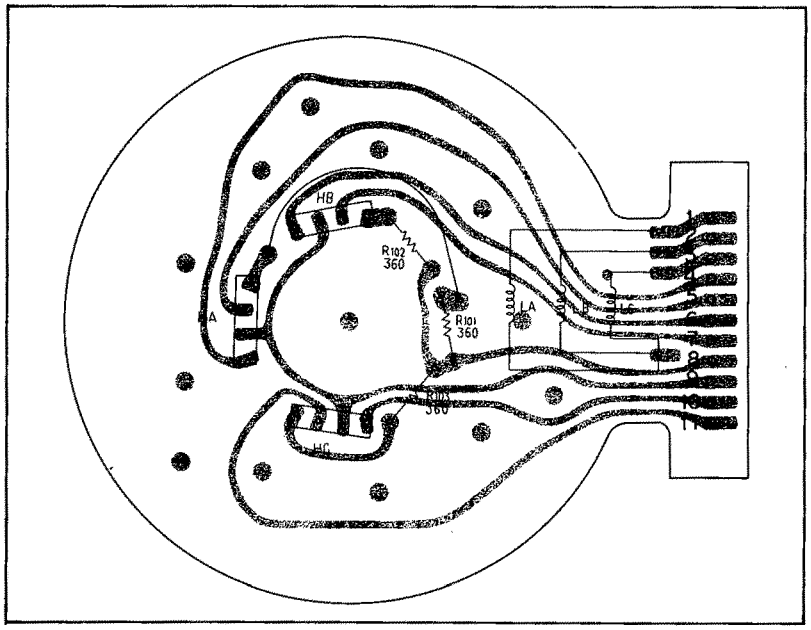
12-2. D.D. Motor Drive PCB (901-8023)



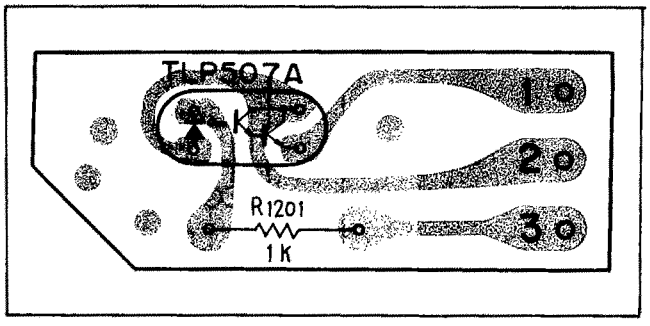
12-3. Pitch Control PCB



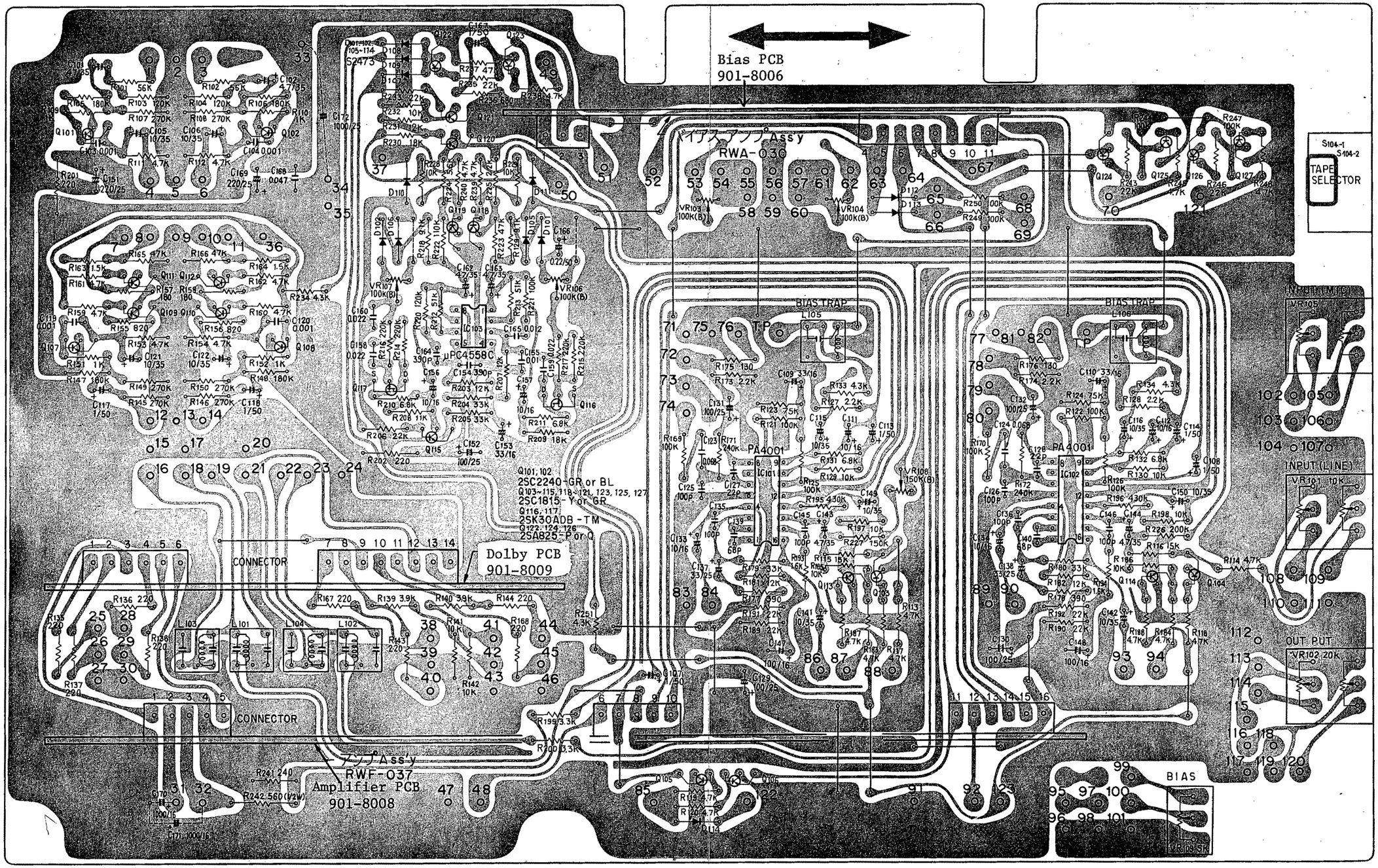
12-4. Position Sensing PCB (for D.D. motor)



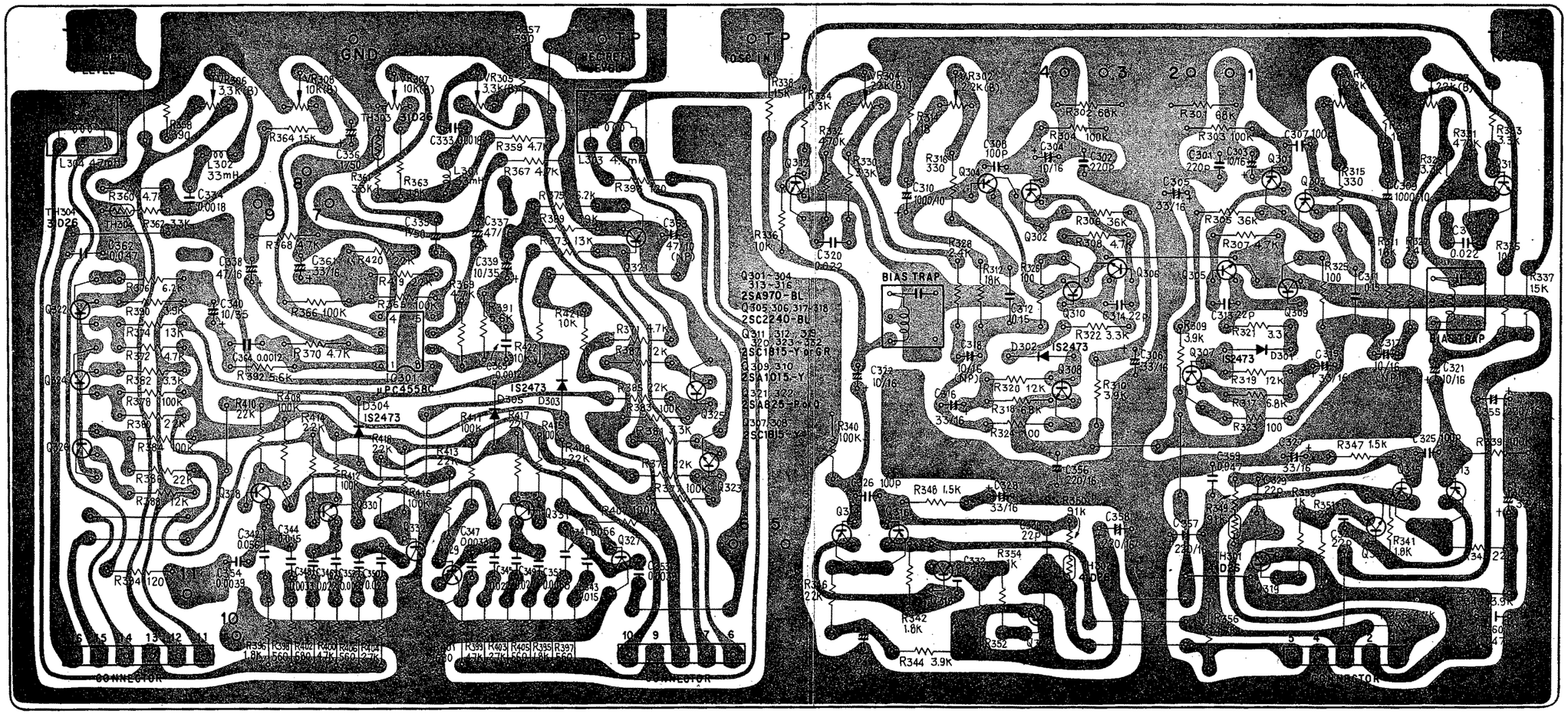
12-5. Sensing PCB (for tape counter)



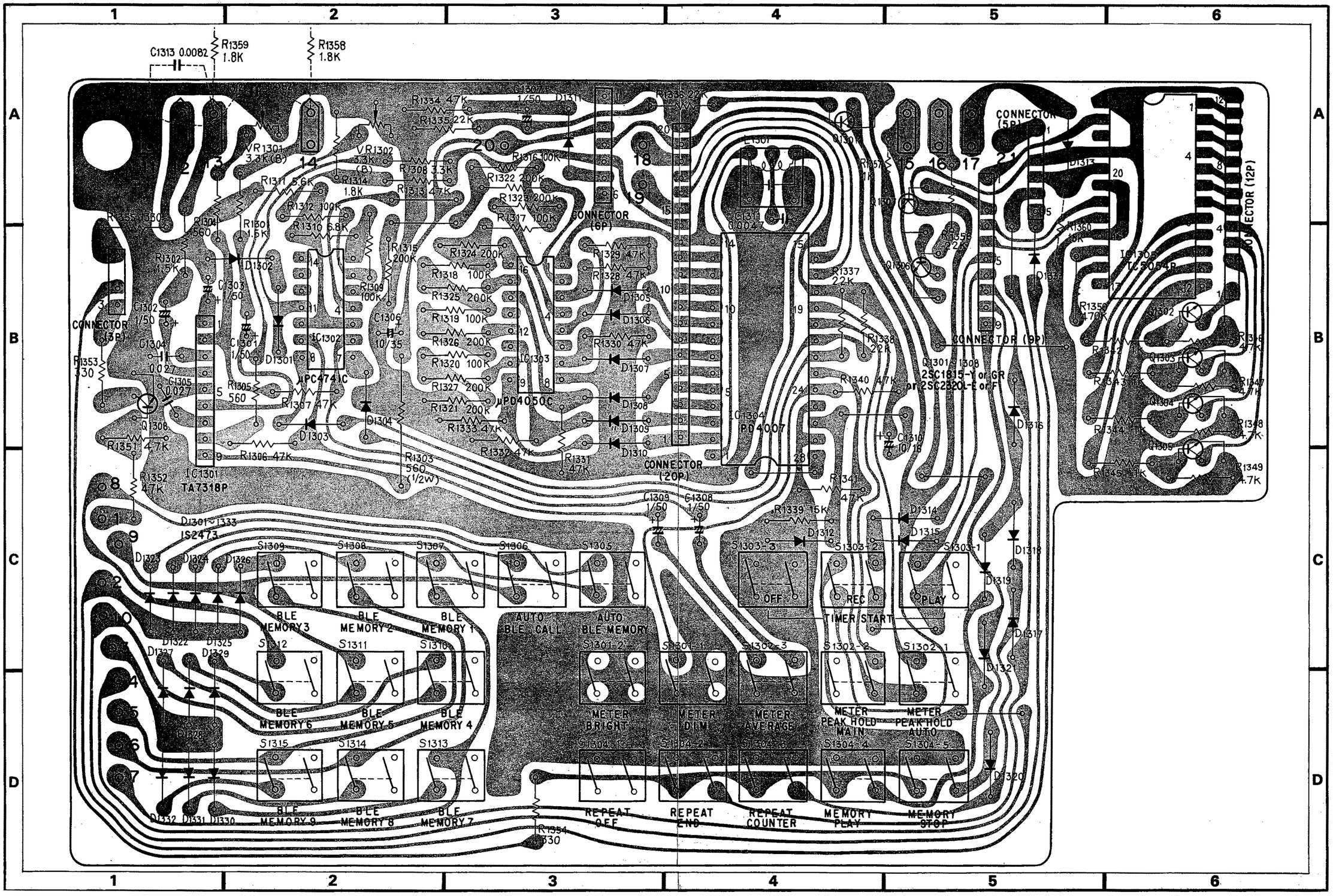
12-6. Main (mother) PCB



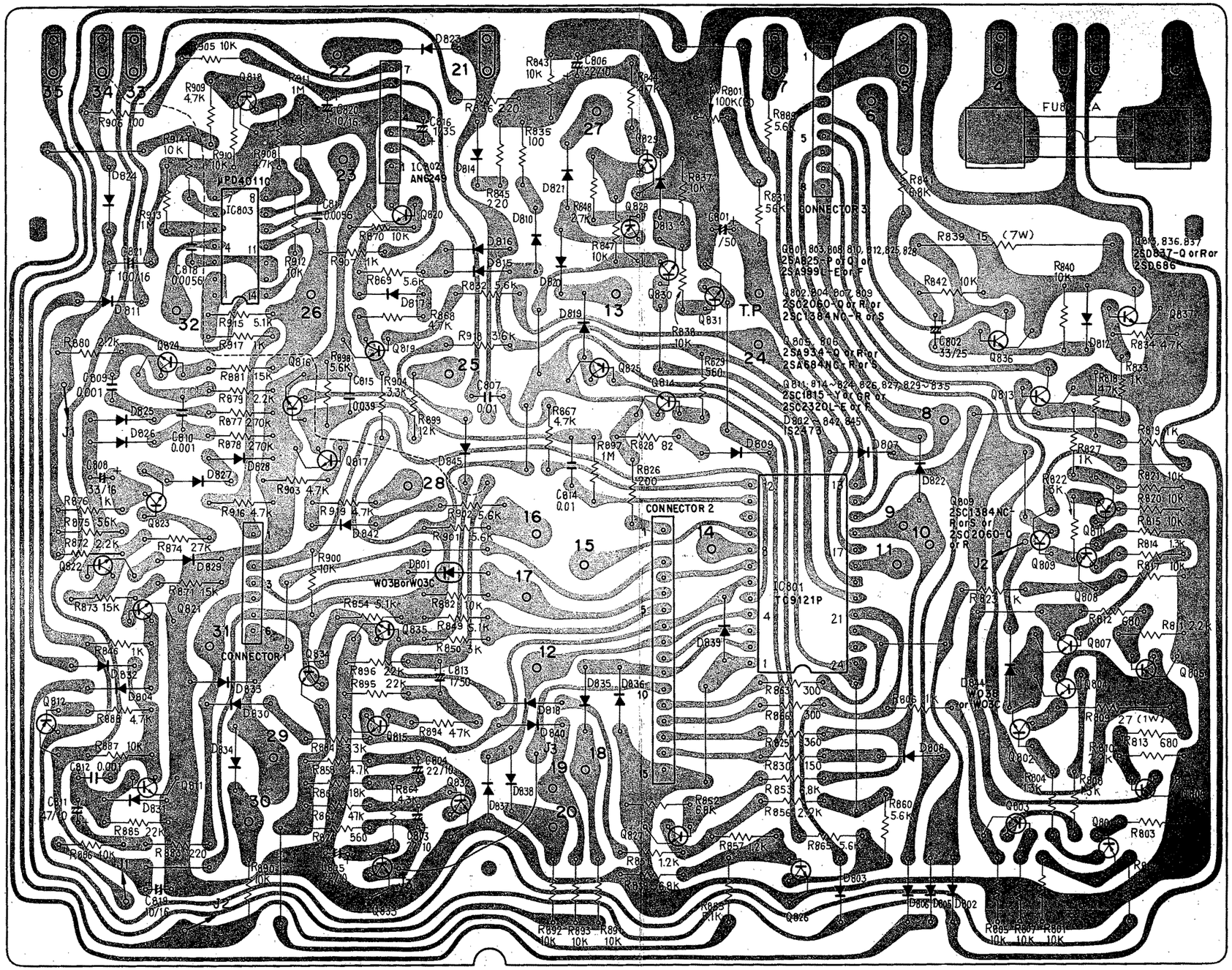
12-7. Amplifier PCB (901-8008)



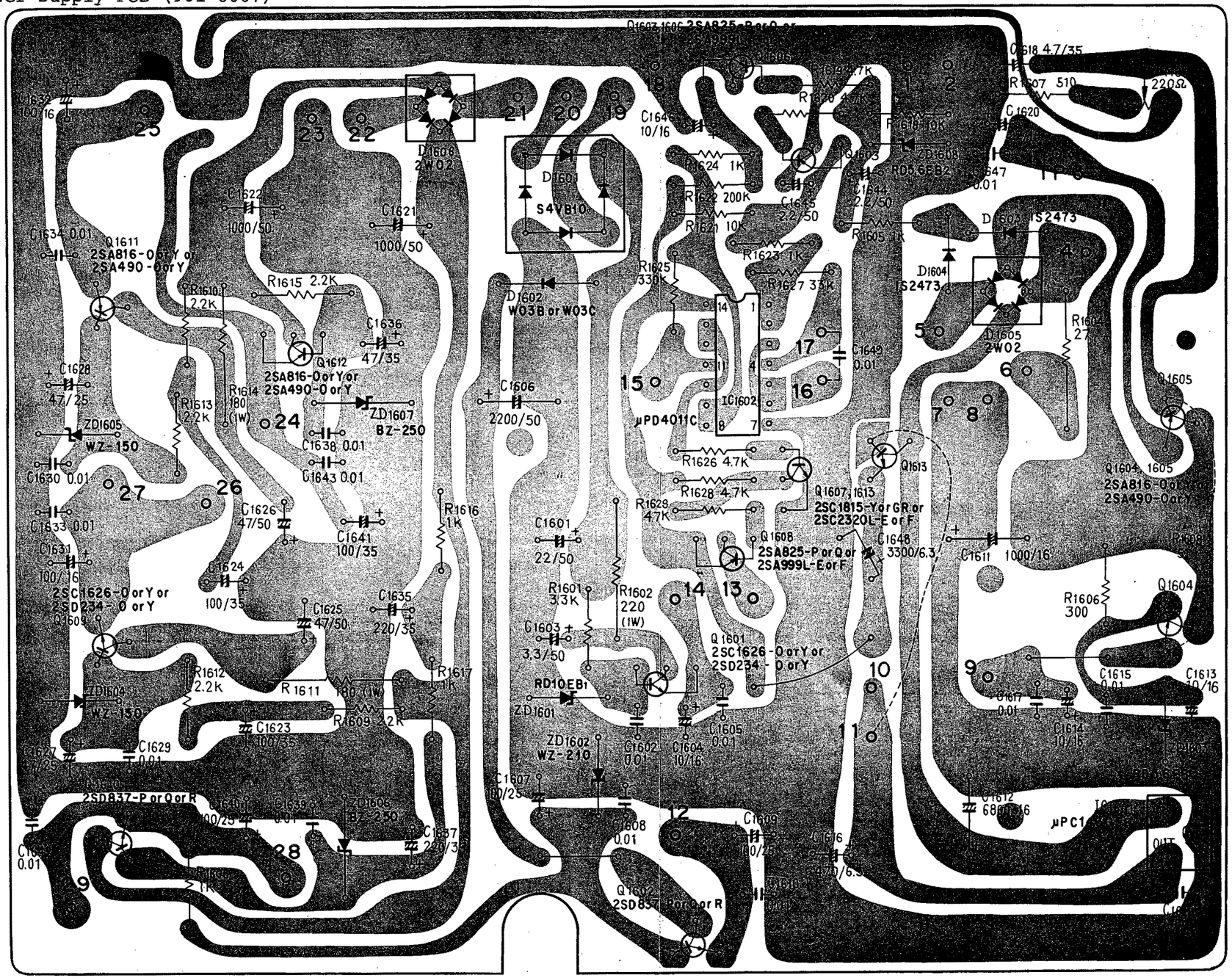
12-8. Display Amp PCB (901-8010)



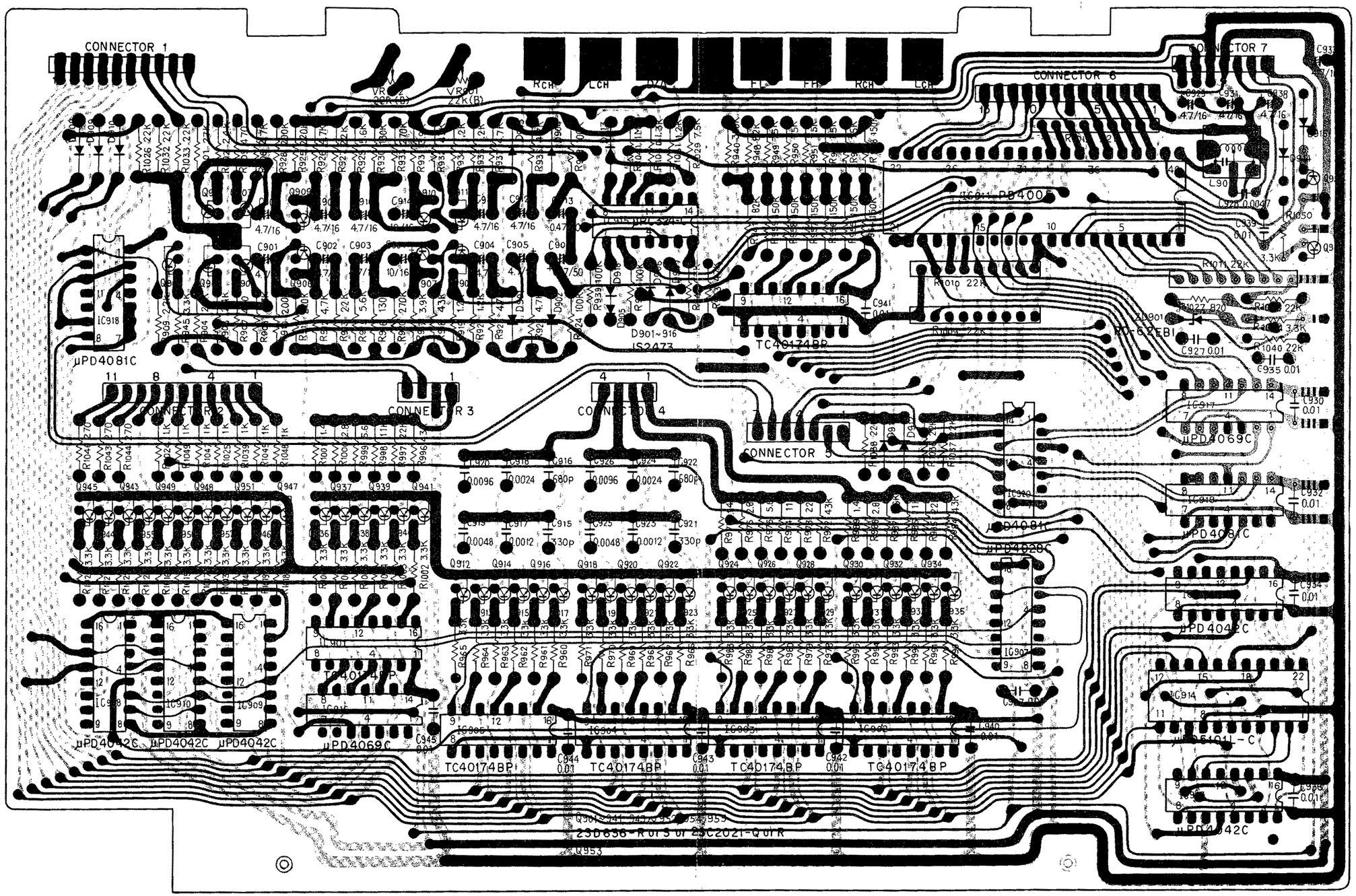
12-9. Control PCB

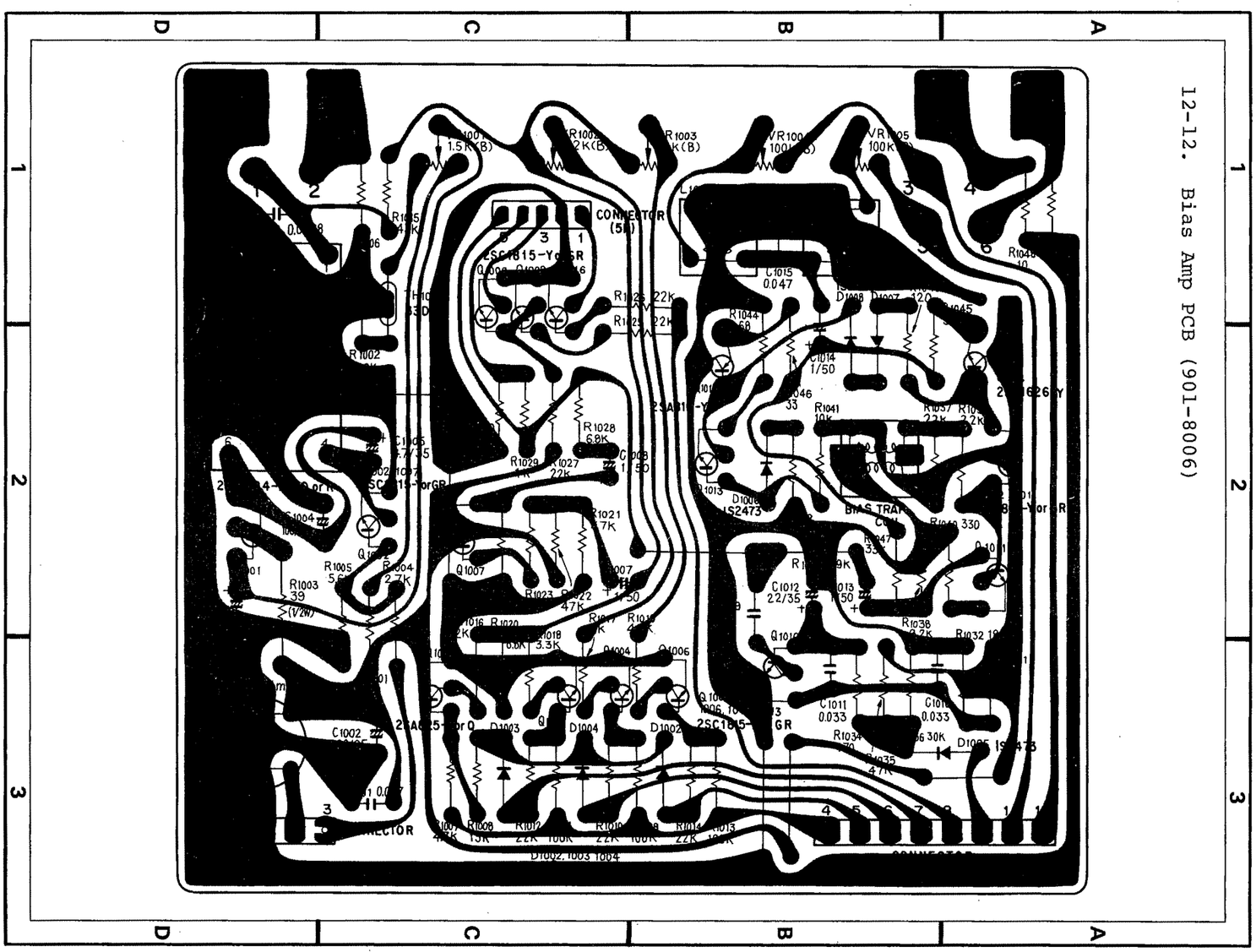


12-10. Power Supply PCB (901-8007)



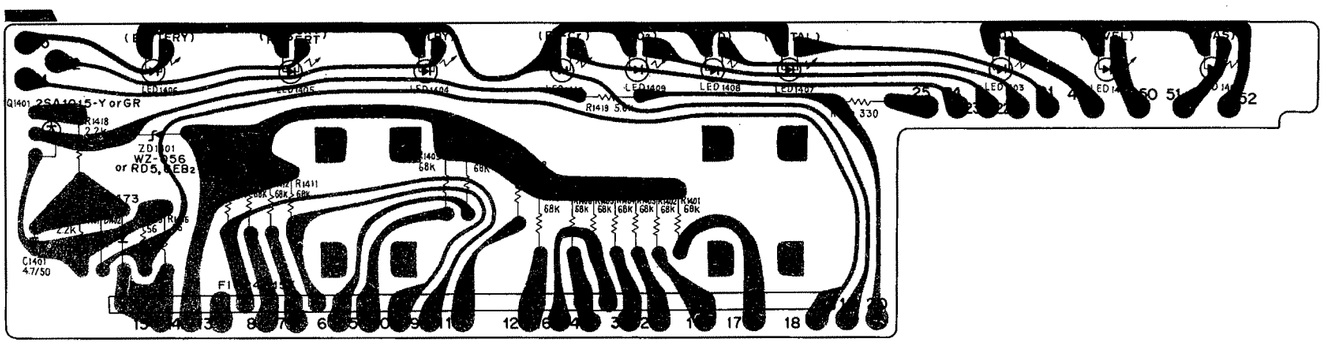
12-11. U-scan PCB (901-8011)



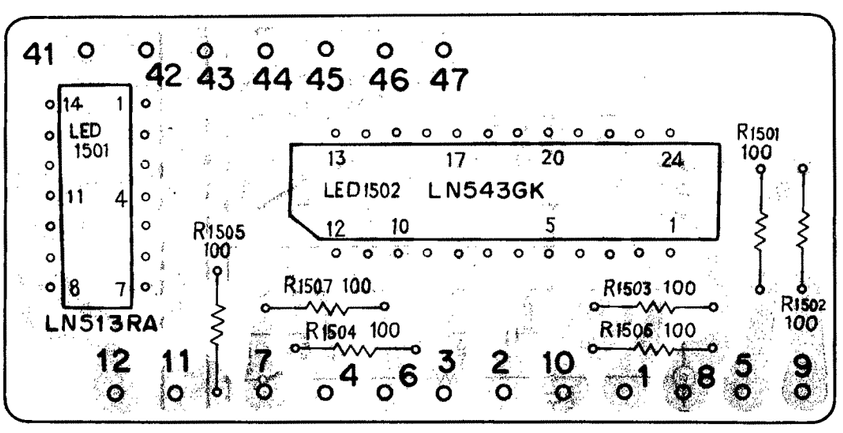


12-12. Bias Amp PCB (901-8006)

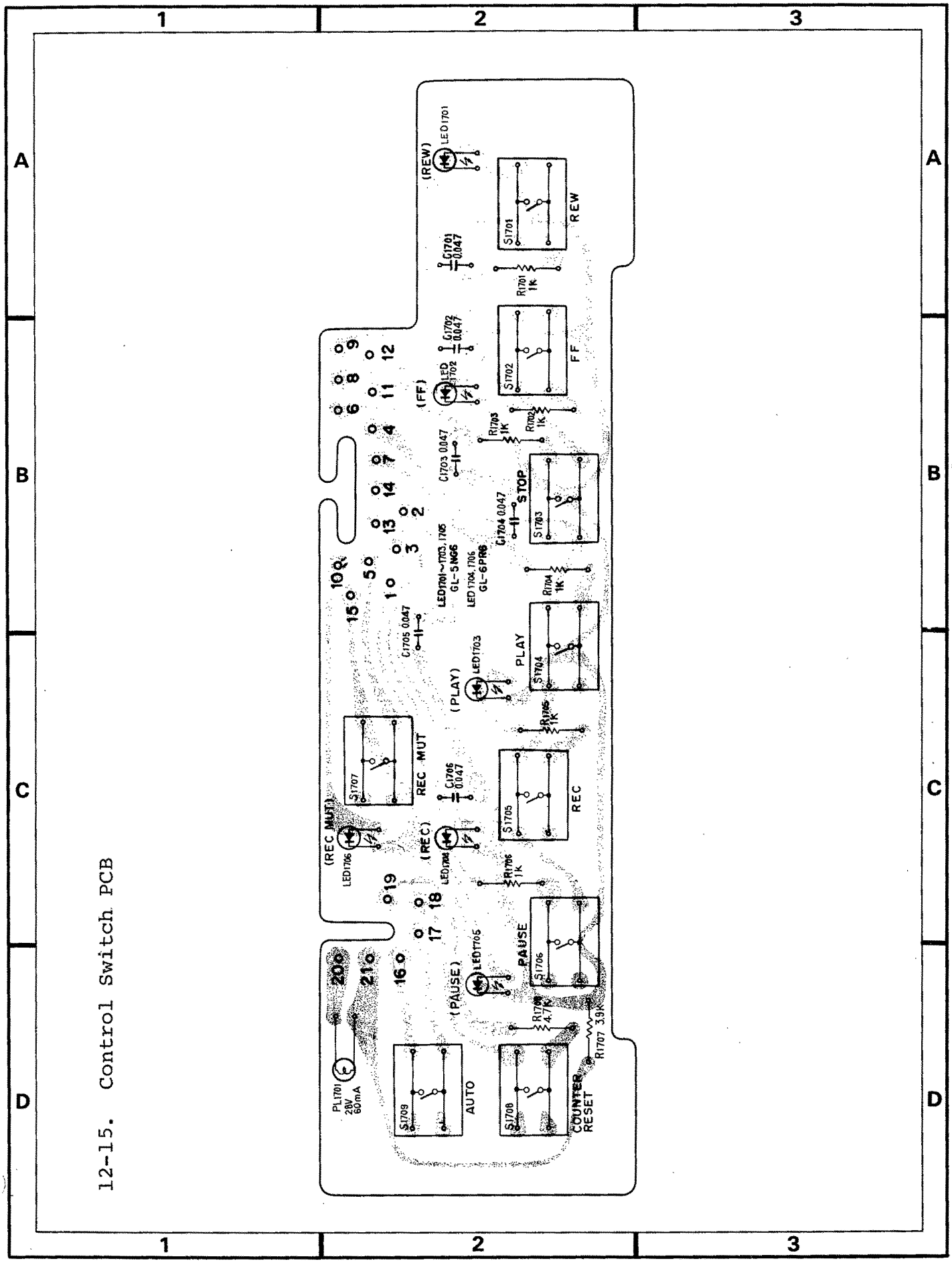
12-13. Indicator A PCB



12-14. Indicator B PCB



12-15. Control Switch PCB



13-0. PARTS LISTS

Contents:

13-0. Parts Lists

NOTE: The ⚠ mark found on some component parts indicates that the part is a safety critical component. When replacing these parts, be sure to use parts of identical description.

NOTE: Parts without part numbers CANNOT be supplied.

13-1. Parts List of Dolby Circuit (901-8009)

Semiconductors:

Part No.	Description	Symbol
926-8055	PA4005	IC501-504

NOTE: The PA4005 is an improved version of the original Dolby "B" which has been authorized by Dolby Labs. These ICs are selected, matched and stamped with the letter A,B,C, or D after the part number and date code. To insure proper tracking of the encode/decode circuits, all four ICs must have the same letter designation. When ordering one of these ICs BE SURE to specify the letter after the date code.

Variable Resistors:

929-8011	4.7k-B	VR501-VR504

13-2. Parts List of D.D. Motor Drive Circuit (901-8023)

Semiconductors:

926-8023	PD1003	IC1
926-8028	PA2004	IC2
926-8031	PA2005	IC3

Variable Resistors:

929-8031	10k-B	VR1
929-8007	15k-B	VR2

Miscellaneous:

926-8104	Crystal	X1
925-8020	Choke	L1

13-3. Parts List of Pitch Control Circuit

Semiconductors:

926-8007	2SA934	Q1101
926-8030	2SC1815Y	Q1102-Q1105

13-4. Parts List of Position Sensing Circuit

Semiconductors:

Part No.	Description	Symbol
926-8014	Hall Element	HA, HB, HC

13-5. Sensing Circuit (for tape counter)

Semiconductors:

926-8021	Photo-coupler TLP507A	

13-6. Parts List of Main (Mother) Circuit Board

Semiconductors:

926-8009	2SC2240-BL	Q101, Q102
926-8012	2SK30ADB-TM	Q116, Q117
926-8011	2SA825	Q122, Q124, Q126
926-8030	2SC1815Y	Q103-Q115, Q118-Q121, Q123, Q125, Q127
926-8056	PA4001	IC101, IC102
926-8115	uPC4558C	IC103
926-8037	1S2473	D101-D114

Variable Resistors:

929-8038	10k-A Dual	VR101, VR105
929-8035	20k-B Dual	VR102
929-8039	5k-K	VR109
929-8008	100k-B	VR103, VR104, VR106, VR107
929-8004	150k-B	VR108

Switches and Coils:

929-8046	3-Sw. Assy.	S101-S103
929-8049	Rotary Sw.	S104
925-8005	Trap Coil	Bias Trap
925-8004	MPX Filter	MPX coil C
925-8008	MPX Filter	MPX coil D

13-7. Parts List of Amplifier Circuit

Semiconductors:

926-8013	2SA970-BL	Q301-Q304, Q313-Q316
926-8022	2SA101S-Y	Q309, Q310
926-8009	2SC2240-BL	Q305, Q306,Q317, Q318
926-8030	2SC1815Y	Q307, Q308, Q311, Q312, Q319, Q320, Q323-Q332
926-8011	2SA825	Q321, Q322
926-8115	uPC4558C	IC301
926-8037	1S2473	D301-D305

Variable Resistors:

Part No.	Description	Symbol
929-8033	2.2k-B	VR301, VR302
929-8026	3.3k-B	VR305, VR306
929-8028	10k-B	VR307, VR308
929-8009	22k-B	VR303, VR304

Coils:

925-8021	Trap Coil	L301, L302
925-8005	Trap Coil	Bias Trap
925-8003	Peaking Coil	L303, L304

13-8. Parts List of Display Amp Circuit

Semiconductors:

926-8030	2SC1815	Q1301, Q1308
926-8090	TA7318P	IC1301
926-8094	uPC4741C	IC1302
926-8092	PD4007	IC1304
926-8061	uPD4050C	IC1303
926-8026	TC5054P	IC1305
926-8037	1S2473	D1301-D1308

Variable Resistors:

929-8026	3.3k-B	VR1301, VR1302

Switches and Coils:

929-8045	Display Sw.	S1301, S1302, S1310-S1312
929-8048	Timer Sw.Assy.	S1303, S1305-S1309
929-8047	Mem/Repeat Sw.	S1304, S1313-S1315
925-8017	Osc. Coil	L1301

13-9. Parts List of Control Circuit

Semiconductors:

926-8039	TC9121P	IC801
926-8062	AN6249	IC802
926-8004	uPD4011C	IC803
926-8030	2SC1815	Q811, Q814-Q824, Q826, Q827, Q829-Q835
926-8112	2SA725P-G	Q801, Q803, Q808, Q810, Q825, Q828
926-8008	2SC2060	Q802, Q804, Q807, Q809
926-8007	2SA934	Q805, Q806
926-8025	2SD837	Q813, Q836, Q837
926-8018	W03B	D801, D844
926-8037	1S2473	D802-D842, D845

Variable Resistors:

929-8034	100k-B	VR801

13-10. Parts List of Power Supply Circuit (9018007)

Semiconductors:

	Part No.	Description	Symbol
⚠	926-8005	2SC1626Y	Q1601, Q1609
⚠	926-8025	2SD837	Q1602, Q1610
⚠	926-8020	2SA816	Q1604, Q1605, Q1611, Q1612
	926-8030	2SC1815	Q1607
	926-8011	2SA825	Q1603, Q1606, Q1608
⚠	926-8081	uPC14305H	IC1601, IC1603
	926-8004	uPD4011C	IC1602
	926-8029	S4VB10	D1601
	926-8018	W03B	D1602
⚠	926-8006	2W02	D1605, D1606
	926-8111	RD10EB3	ZD1601
	926-8096	WZ210	ZD1602
	926-8110	RD5.6EB2	ZD1603, ZD1608
⚠	926-8089	WZ150	ZD1604, ZD1605
	926-8097	BZ250	ZD1606, ZD1607
	926-8037	1S2473	D1603, D1604

Variable Resistors:

929-8029	220ohm-B	VR1601

13-11. Parts List of Micro-Scan Circuit

Semiconductors:

926-8024	2SD636R	Q901-Q941, Q943-Q952, Q954, Q955
926-8016	2SB643	Q953
926-8057	TC4017BP	IC901-IC906
926-8055	PA4005	IC911
926-8087	uPD5101LC	IC914
926-8121	uPD4042C	IC908-IC910, IC912, IC913
926-8027	uPD4028	IC907
926-8058	uPD4069C	IC916, IC917
926-8091	uPD4081C	IC918-IC920
926-8100	uPD324C	IC915
926-8037	1S2473	D901-915
926-8019	RD6.2EB1	ZD901

Variable Resistors and Coils:

929-8009	22k-B	VR901, VR902
925-8017	Osc. Coil	L901

13-12. Parts List of Bias Amp Circuit (901-8006)

Semiconductors:

926-8034	2SC1384	Q1001
926-8030	2SC1815Y	Q1002, Q1004-Q1013, Q1016

13-12. Continued:

Part No.	Description	Symbol
926-8011	2SA825	Q1003
926-8005	2SC1626Y	Q1014
926-8033	2SA816Y	Q1015

Variable Resistors:

929-8051	1.5k-B	VR1001
929-8033	2.2k-B	VR1002
929-8028	10k-B	VR1003
929-8034	100k-B	VR1004, VR1005

Coils:

925-8006	Line Coil	L1001
925-8007	Matching Coil	L1002, L1003
925-8005	Trap Coil	-

Miscellaneous:

901-8005	Osc. Block	-

13-13. Indicator A Circuit

Semiconductors:

926-8022	2SA1015	Q1401
926-8017	TLG205	LED1401-LED1410
926-8037	1S2473	D1401, D1402
926-8110	RD5.6EB2	ZD1401

Miscellaneous:

923-8001	FL Display	FIP24B15Y

13-14. Indicator B Circuit

Indicators:

923-8003	7 Seg. Display	LED1501
923-8004	7 Seg. x 4	LED1502

13-15. Control Switch Circuit

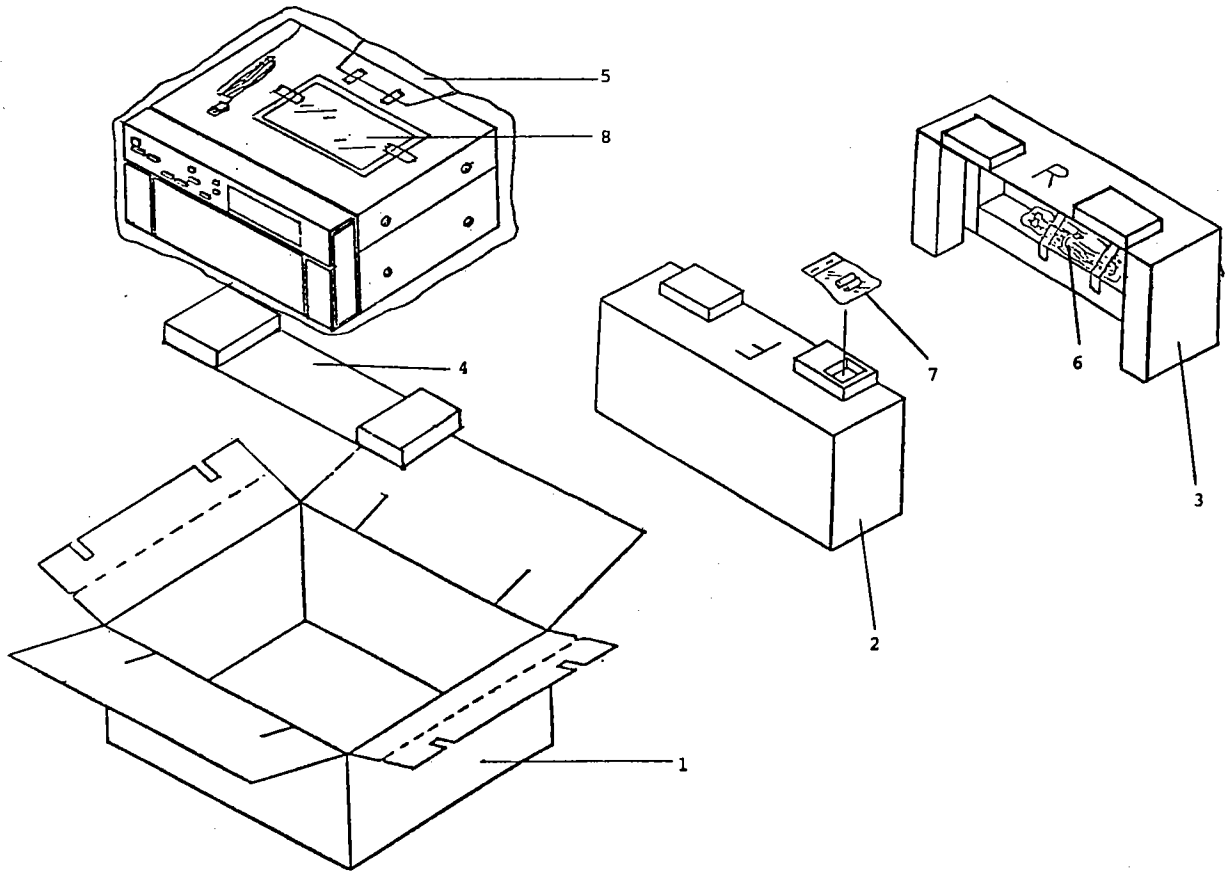
Semiconductors:

926-8032	Green LED	LED1701-LED1703, LED1705
926-8015	Red LED	LED1704, LED1706

Switches:

929-8032	Function Sw.	S1701-S1709

14-0. PACKING



14-1. Parts List of Packing Material

Key No.	Part No.	Description
1.	952-8008	Shipping Box
2.	952-8001	Front Liner
3.	952-8002	Rear Liner
4.	952-8003	Bottom Liner
5.	952-8017	Plastic Cover
6.	921-8053	Patch Cord (2)
7.	930-8053	Head Cleaning Kit
8.		Owner's Manual

NOTE: With the exception of the owner's manual, parts without part numbers CANNOT be supplied.