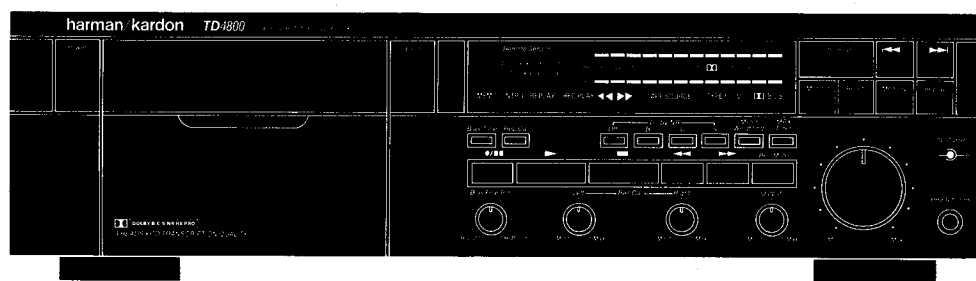


The Harman Kardon Model TD4800

Manual 165A

3 HEADS CD TRANSCRIPTION QUALITY CASSETTE DECK

Technical Manual



The following marks found in the parts list of this manual identify the models as follows.

- UA** : North America area model
- BK** : North America area model Black version
- I** : International model
- IB** : International model Black version

harman/kardon

240 Crossways Park West, Woodbury, N. Y. 11797
1112-3152165A8 P-119012 2000 Printed in Japan

TD4800

SPECIFICATIONS

	Nominal	Limit		Nominal	Limit
Track Configuration	4-track 2 Channel Stereo Cassette Deck		Channel Separation	45dB	≧ 35dB
			Crosstalk	70dB	≧ 60dB
			Record/Playback Distortion (Input 1kHz)		
			LN	0.6%	≧ 1.2%
			CrO ₂	1.3%	≧ 2.0%
			Metal	1.1%	≧ 2.0%
			MPX Filter Attenuation		
			at 15kHz	0.3dB	≧ 1dB
			at 19kHz	35dB	≧ 30dB
			Erase Ratio (Input 80Hz)		
			LN	70dB	≧ 60dB
			Metal	61dB	≧ 56dB
			Input Sensitivity (Input 1kHz) at Line Input	45mV 30(min) ~ 80(max) mV	
			Input Impedance (Input 1kHz) at Line Input	22kΩ 19(min) ~ 30(max) kΩ	
			• DIMENSIONS (W x H x D)	17-3/8" x 5" x 12-5/8" (443 x 126 x 320 mm)	
			• WEIGHT	15.2lbs (6.9kg)	
			• POWER SUPPLY		
			U.S.A. and Canada models	AC120V, 60Hz	
			International model	AC220V/240V, 50/60Hz	
			• POWER CONSUMPTION		
			U.S.A. and Canada models	29W	
			International model	31W	

• MECHANICAL SECTION

Record/Playback Tape Speed		
Drift 4.75cm/sec.	0.2%	≧ 1.0%
Wow and Flutter (WTD)	0.035% (NAB) ≧ 0.07%	
	0.06% (CCIR) ≧ 0.12	
Take Up Torque	50gr.cm	35 ~ 70gr.cm
Back Tension	4gr.cm	2 ~ 6gr.cm
F.FWD Torque	140gr.cm	70 ~ 160gr.cm
REW Torque	140gr.cm	70 ~ 160gr.cm
F.FWD/REW Time (C-60 Tape)	70sec.	≧ 100sec.

• AMPLIFIER SECTION

Bias Frequency	210kHz	± 5kHz
Playback Output (Output VR Max.)	1150mV	± 1.5dB
Signal-to-Noise Ratio at Line Input (Input 1kHz, 100mV)		
IHF-A WTD at Dolby Level (WTD)		
Dolby NR off	LN	51dB
	CrO ₂	54dB
	Metal	54dB
Dolby B/C NR	LN	69dB
	CrO ₂	72dB ≧ 66dB
	Metal	72dB ≧ 66dB
Dolby S NR	LN	72dB
	CrO ₂	75dB ≧ 68dB
	Metal	75dB ≧ 68dB

These specifications are service target specs.
Specifications and components are subject to change without notice.
Overall performance will be maintained or improved.

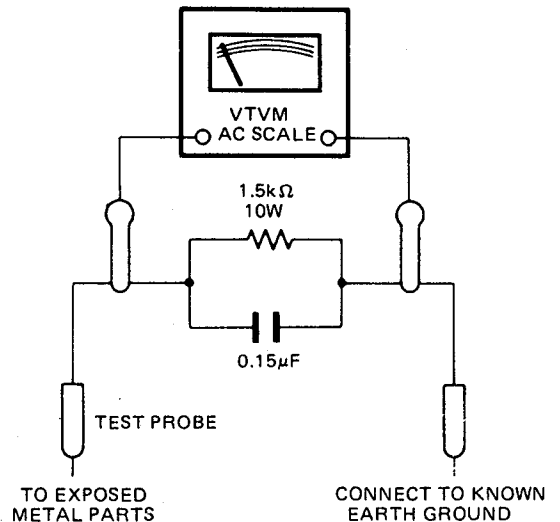
LEAKAGE TEST (FOR SERVICE ENGINEERS IN THE U.S.A.)

Before returning the unit to the user, perform the following safety checks:

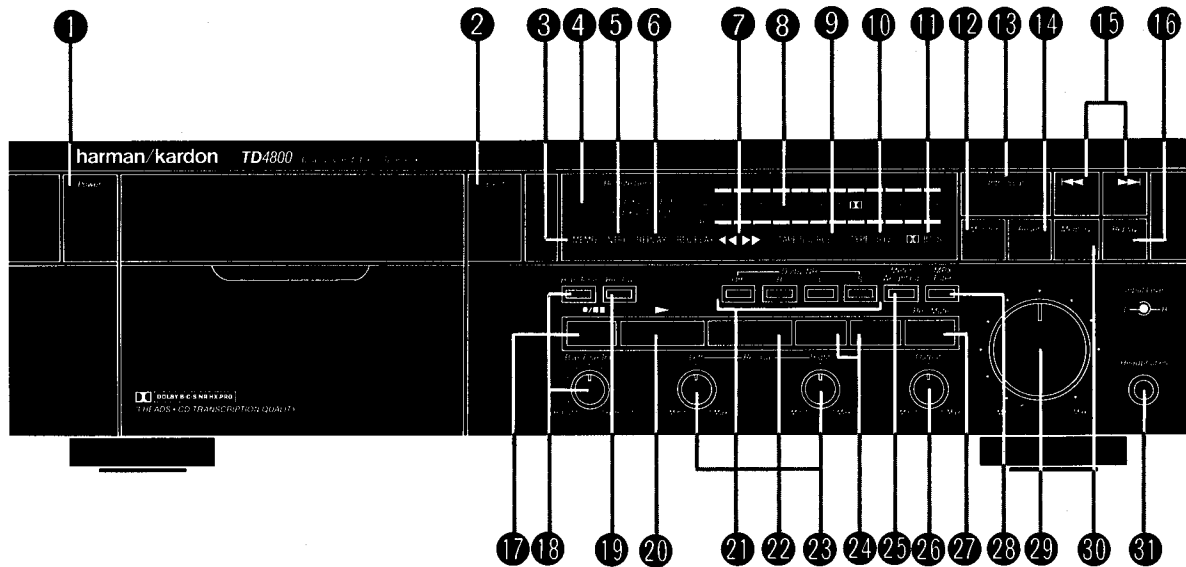
1. Inspect all lead dress to make certain that leads are not pinched or that hardware is not lodged between the chassis and other metal parts in the unit.
2. Replace all protective devices such as nonmetallic control knobs, insulating fishpapers, cabinet backs, or shields, isolation resistor-capacitor networks, mechanical insulators, etc.
3. Be sure that no shock hazard exists; check for leakage current using Simpson Model 229 Leakage Tester, standard equipment item No. 21641, RCA Model WT540A or use alternate method as follows:
Plug the AC line cord directly into a 120-volt AC receptacle (do not use an Isolation Transformer for this test). Using two clip leads, connect a 1500 ohm, 10-watt resistor paralleled by a 0.15µF capacitor, in series with all exposed metal cabinet parts and a known earth ground, such as a water pipe or conduit. Use a VTVM or VOM with 1000 ohms per volt, or higher sensitivity to measure the AC voltage drop across the resistor. (See Diagram.) Move the resistor connection to each exposed metal part having a return path to the chassis (antenna, metal, cabinet, screw heads, knobs and control shafts, escutcheon, etc.) and measure the AC voltage drop across the resistor. (This test should be performed with the power switch in both the On and Off positions.)

A reading of 0.35 volt RMS or more is excessive and indicates a potential shock hazard which must be corrected before returning the unit to the owner.

SIMPSON MODEL 229 ETC. FOR LEAKAGE TEST




CONTROLS AND FUNCTIONS



- 1 POWER SWITCH**
Press to turn unit on/off.
- 2 EJECT**
Press to load/remove tape cassette.
- 3 MEMORY**
Indicates Memory is engaged.
- 4 COUNTER**
Indicates tape position in minutes and seconds.
- 5 INTRO**
Indicates Intro Scan is engaged.
- 6 REPLAY**
Indicates Replay is engaged.
- 7 REC PLAY ◀▶**
Displays operating mode: Record, Play, Rewind or Fast Forward.
- 8 LEVEL**
Shows signal level.
- 9 TAPE SOURCE**
Shows whether deck output is tape playback or source signal.
- 10 TYPE I II IV**
Automatically indicates type of tape in use.
- 11 DOLBY B C S**
Shows if Dolby B, or C or S circuits are on.
- 12 MONITOR**
Press to override Automatic Tape Monitor Switching.
- 13 INTRO SCAN**
Previews each segment on a pre-recorded tape.
- 14 RESET**
Resets Counter to 00:00.
- 15 SKIP REVERSE/SKIP FORWARD**
Locates the start of any desired segment on a pre-recorded tape.
- 16 REPLAY**
Press on: when tape reaches end, deck automatically rewinds to start and begins Play.
- 17 RECORD/PAUSE**
Puts cassette deck in Record ready or pause mode.
- 18 BIAS TONE/BIAS FINE TRIM**
Adjusts bias used when recording.
- 19 REC CAL**
Press and hold when adjusting Rec Cal setting.
- 20 PLAY**
Begins playback or recording.
- 21 DOLBY* NR**
Activates Dolby Noise Reduction circuitry for playing or recording tapes.
- 22 STOP**
Stops tape transport in any mode.
- 23 REC CAL**
Adjust when recording using Dolby Noise Reduction.
- 24 REWIND/FAST FORWARD**
Rapidly rewinds or advances tape.
- 25 METER WEIGHTING**
Allows for easy setting of optimum record levels.
- 26 OUTPUT**
Adjusts output level to headphones and receiver/pre-amp/integrated amplifier.
- 27 RECORD MUTE**
Inserts blank space when recording.
- 28 MPX FILTER**
Press when recording FM stereo broadcasts using Dolby noise reduction.
- 29 INPUT LEVEL**
Adjusts recording level and balance.
- 30 MEMORY**
Press on: when ◀ is pressed, tape rewinds to approximately 00:00 on Counter.
- 31 HEADPHONES**
Insert headphone plug.

* NOTE

Dolby noise reduction and HX Pro headroom extension manufactured under license from Dolby Laboratories Licensing Corporation. HX Pro originated by Bang & Olufsen.

"DOLBY", the double-D symbol  and "HX PRO" are trademarks of Dolby Laboratories Licensing Corporation.

DISASSEMBLY PROCEDURES (REFER TO PAGES 13, 18 AND 19)**[1] CABINET TOP (133) REMOVAL**

Remove 4 screws (A) and 2 screws (B), then remove the Cabinet Top (133).

[2] FRONT PANEL ASSEMBLY (AA) REMOVAL

1. Remove the Cabinet Top (133). (Refer to step 1.)
2. Disconnect connectors (LCN502, LCN503 and LCN505) connected to the Dolby NR (REC) P. C. Board (PCB-5).
3. Remove 6 screws (C) and then remove the Dolby NR (REC) P. C. Board (PCB-5).
4. Disconnect connectors (LCN501, LCN502 and LCN506) connected to the Dolby NR (PLAY) P. C. Board (PCB-6).
5. Remove 4 screws (D) and 2 plastic rivets (E), then remove the Dolby NR (PLAY) P. C. Board (PCB-6) with Metal Fittings (184 and 185) and Shield Plate (186).
6. Disconnect the jumper lead wire from connector (CN803) on the Main P. C. Board (PCB-1).
7. Pull out the Input Level knob and remove the hexagon nut (F).
8. Remove 7 screws (G) and then remove the Front Panel Assembly (AA) with Front P. C. Board (PCB-2).

[3] CASSETTE TAPE RECORDER MECHANISM ASSEMBLY (105) REMOVAL

1. Remove the Front Panel Assembly (AA). (Refer to step 2.)

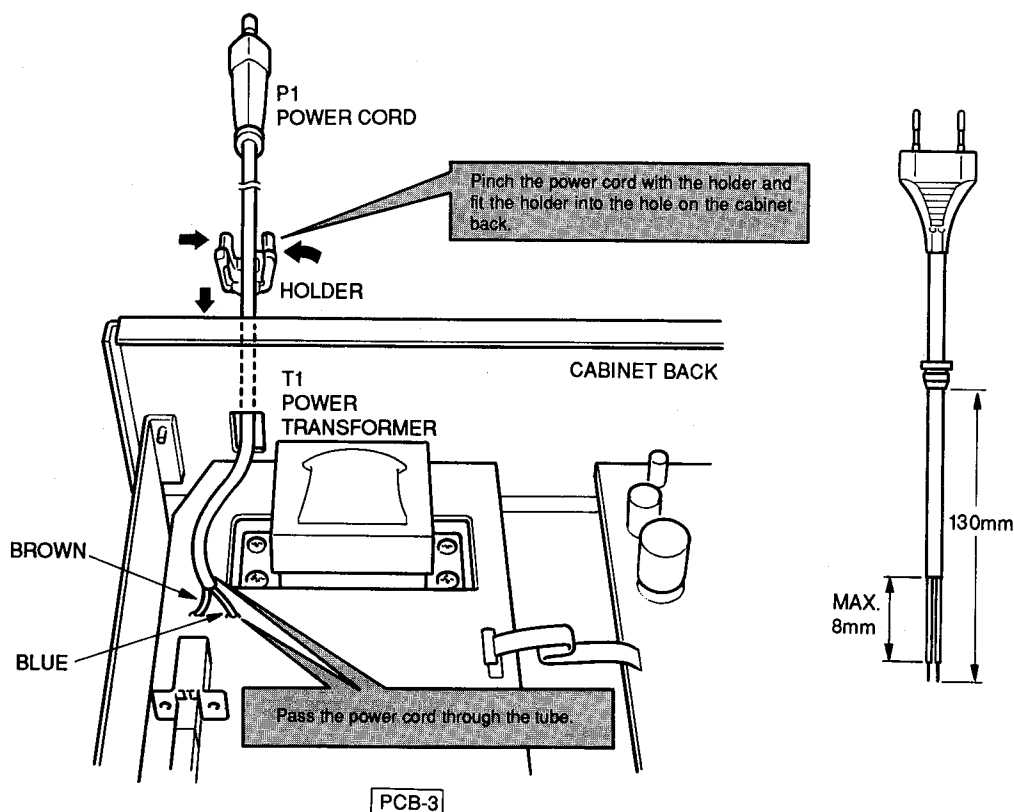
2. Disconnect connector (CN105, CN106, CN301 and CN805) on the Main P. C. Board (PCB-1).
3. Disconnect connector (LCN801 and LCN801) on the P. C. Board of the Cassette Tape Recorder Mechanism Assembly (105).
4. Remove the spring (179) and 2 screws (H), then remove the Cassette Holder (144).
5. Remove the cassette lid open lever (187).
6. Remove 4 screws (I) and then remove the Cassette Tape Recorder Mechanism Assembly (105).

[4] MAIN P. C. BOARD (PCB-1) REMOVAL

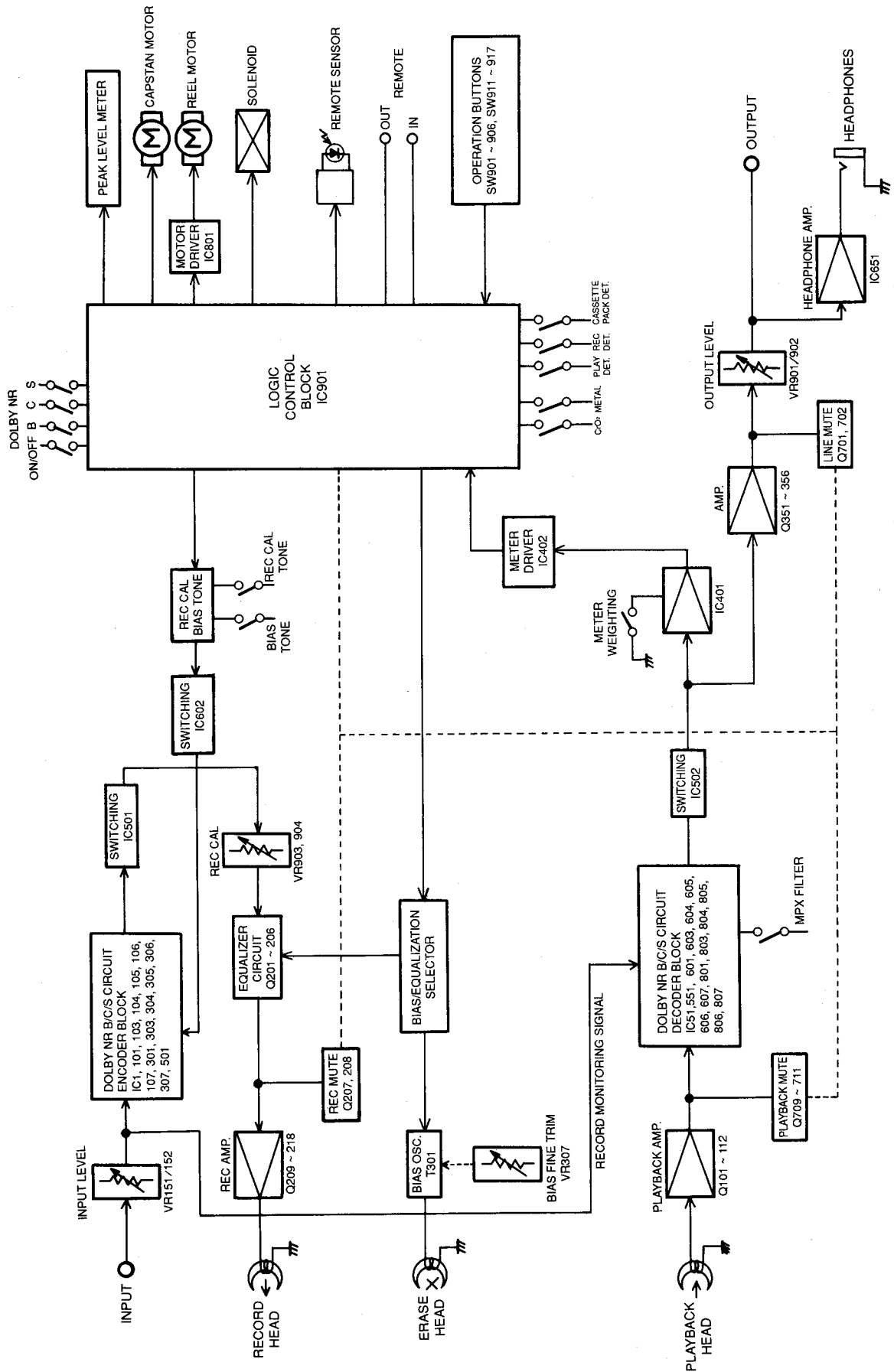
1. Remove the Front Panel Assembly (AA). (Refer to step 2.)
2. Disconnect the connectors and unsolder the lead wires connected to the Main P. C. Board (PCB-1).
3. Remove 6 screws (J) and then remove the Cabinet Back (134).
4. Remove 8 screws (K) and then remove the Main P. C. Board (PCB-1) backward.

POWER CORD REPLACEMENT (FOR SERVICE ENGINEERS OTHER THAN NORTH AMERICA)

In order to prevent fire or shock hazard when replacing the power cord, follow the Procedure below to replace the part with the standard supply parts.



BLOCK DIAGRAM



CIRCUIT DESCRIPTION

PLAYBACK SIGNAL

Signals that are retrieved by the playback head are amplified by playback amplifiers Q101, Q103, Q105, Q107, Q109, and Q111 (L ch) and Q102, Q104, Q106, Q108, Q110, and Q112 (R ch). Then, they are divided into Dolby NR B/C and Dolby NR S types, and sent to the Dolby NR circuit where they are decoded. Signals are sent to the peak level meter circuit via the switching IC502, and their levels are controlled by the output level controller from which they are sent to the output jack. The level controlled signals are simultaneously sent to the headphone amplifier IC651 where they are amplified before being sent to the headphone jack.

RECORD SIGNAL

Signals that reach the input jack are level controlled by the input level controller. Then, they are divided into recording and record monitoring signals and sent to the Dolby NR circuit. After being encoded in the Dolby NR circuit, the recording signals are switched by the switching IC501 and sent to the equalizer circuit via the Rec Cal controller. The record monitoring signals are decoded by the Dolby NR circuit and then processed in the same manner as the playing signals. After the equalizer circuit, the recording signals are amplified by a recording amplifier consisting of Q209, Q211, Q213, Q215, and Q217 (L ch) and Q210, Q212, Q214, Q216, and Q218 (R ch) before being sent to the recording head.

DOLBY NR CIRCUIT

The Dolby NR circuit has two blocks, one for processing the playing signals and another for processing the recording signals. The block for the playing signals also decodes the record monitoring signals.

Playing signals processing block

• Dolby NR B/C type

The playing signals are supplied to pin 29 (L ch) and pin 2 (R ch) of IC551. After decoding, they are sent to pin 25 (L ch) and pin 6 (R ch).

The record monitoring signals are supplied to pin 30 (L ch) and pin 1 (R ch) of the IC551 for decoding.

• Dolby NR S type

The playing signals are supplied to pin 41 of the IC603 (L ch) and IC803 (R ch). They are supplied from pin 37 to pin 2 for low frequency (LF) processing, and sent out from pin 43. At the same time, they are supplied to pin 2 of the IC607 (L ch) and IC807 (R ch) via the IC606 (L ch) and IC806 (R ch) for high frequency (HF) processing. The processed signals are sent out from pin 43 of these ICs. Signals after LF and HF processing are supplied to pin 2 of the IC605 (L ch) and IC805 (R ch) via the IC601 and IC604 (L ch) and IC801 and IC804 (R ch) for low level (LL) processing. The processed signals are sent out from pin 43 to pin 35 of the IC603 (L ch) and IC803 (R ch). Then, they are supplied from pin 34 to pin 39. Finally, they are supplied from pin 37 as playing signals.

Recording signals processing block

• Dolby NR B/C type

The recording signals are supplied to pin 30 (L ch) and pin 1 (R ch) of the IC501 in the Dolby NR circuit. After encoding, they are sent out from pin 18 (L ch) and pin 13 (R ch).

• Dolby NR S type

The recording signals are supplied to pin 40 of the IC103 (L ch) and IC303 (R ch). They are sent out from pin 37 to pin 2 for low frequency (LF) processing. At the same time, they are supplied to

pin 2 of the IC107 (L ch) and IC307 (R ch) via the IC106 (L ch) and IC306 (R ch) for high frequency (HF) processing. After LF and HF processing, the signals are supplied from pin 43 to pin 2 of the IC105 (L ch) and IC305 (R ch) via the IC101 and IC104 (L ch) and IC301 and IC304 (R ch) for low level (LL) processing. Then, they are supplied from pin 43 to pin 35 of the IC103 (L ch) and IC303 (R ch). Finally, they are supplied from pin 34 as recording signals.

MUTING OPERATION

The signal that mutes the sound produced at switching to recording or playback is applied from IC901 of the logic control block.

When the "STOP" button is pressed, the mute signal output from the pin 28 of IC901 turns ON Q701 (L ch.) and Q702 (R ch.) to short-circuit the output signals of the playback amplifiers for muting. For the purpose of preventing generation of noise at power ON/OFF, the mute signal is output from Q51. The muting is done by short circuiting the output signal with Q701 (L ch.) and Q702 (R ch.) turned ON.

LOGIC FOR RECORD MODE

Pressing the "REC" button puts pin 27 of the IC901 in the "high" level. This causes the Q709 and Q711 (L ch) and Q710 and Q712 (R ch) to go on muting signals reaching the Dolby NR circuit. Since the Q219 goes off at the same time, the Q207 (L ch) and Q208 (R ch) are turned off. This cancels muting of the signals going to the recording amplifier so that the recording signals are allowed to reach the recording head.

SWITCHING FROM RECORD MODE TO PLAYBACK MODE IN LOGIC

When the "STOP", "PAUSE" or "PLAY" button is pressed, the pin 26 of IC901 becomes high level. Q219 turns ON and Q207 (L ch.), Q208 (R ch.) turn ON to mute the inputs to the record amplifiers.

DOLBY NR S-TYPE TECHNICAL DESCRIPTION

Circuit Operation

Like all other Dolby noise reduction systems, S-type is complementary, that is, signals are encoded before being recorded, then decoded in a complementary manner during playback. The following discussion will describe the operation of an encoder, but it should be noted that an encoder can be switched to the decode mode in the same manner as an A-type, B-type, C-type, or SR processor.

As with C-type NR, an S-type encoder has two staggered-action compressors, each having a passive main path which is summed with an active side chain, and each of which operates over a different signal level range. The high level stage has three compressors in its sidechain, which are known as the high frequency fixed band (HF/FB), the high frequency sliding band (HF/SB), and the low frequency fixed band (LF/FB). The low level stage has a high frequency fixed band and a high frequency sliding band. Fixed bands are band limited to provide more compression at frequencies below dominant signals above 6 kHz, which gives less signal modulation in the encoder and less overall noise modulation. The fixed and sliding bands operate together in a technique known as action substitution.

The encoder output is filtered and then fed back to the control paths of each compressor to control compressor action using a technique known as modulation control.

Spectral skewing is provided to reduce sensitivity to very low and high frequency signals. The low frequency spectral skewing network is located at the encoder input, while high frequency attenuation is provided by two high frequency spectral skewing circuits which are distributed between the low and high level stages to reduce compression ratios at high frequencies. Two stages of antisaturation provide high frequency attenuation at high levels to reduce tape overload.

An S-type encoder adapts its characteristics to the input signal in such a way as to provide the maximum amount of boost at all times, especially at frequencies which are lower or higher than the dominant signal. The overshoot suppression (O/S) circuits used are also designed to allow maximum boost from the compressor. Thus, the least treatment is given to the signal at all times, resulting in a very stable output with little dynamic action. When the signal is decoded, the maximum amount of noise reduction is obtained in the presence of signals, ensuring low noise modulation and a high degree of tolerance to error in the transmission chain. Up to 24 dB of noise reduction at high frequencies and 10 dB at low frequencies is provided.

High Level Stage

The high level stage is active for signal levels in the range from -25 dB to Dolby level, and provides up to 12 dB of boost at frequencies above 400 Hz and 10 dB of boost at frequencies below 200 Hz.

The LF/LB is basically a passive low pass filter followed by a variable attenuator, with the amount of attenuation increasing with signal level. The HF/FB is similar, although the variable attenuator follows a high pass filter. The HF/SB is a variable frequency high pass filter whose corner frequency rises with increasing signal level or frequency (as in B and C-type processors). The input of the sliding band is connected in such a way as to provide an output which is the sum of the fixed band output and a signal which is the difference of the HF/FB output and the input signal (action substitution).

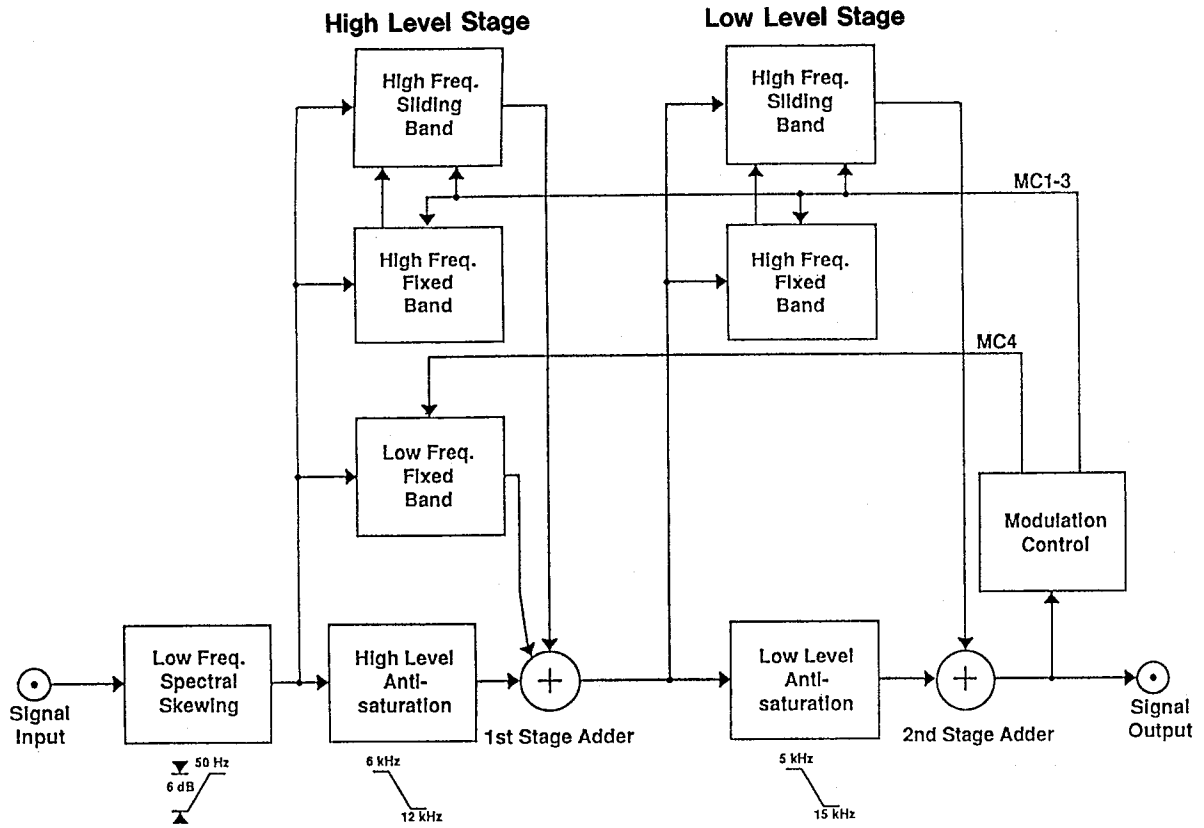
The control signals are derived from the compressor output, which is filtered, and averaged to produce a smooth control signal. An alternate path is provided to quickly charge the control path under high level transient conditions to suppress overshoots. Modulation controls signals are subtracted from the control path to reduce the control signal and the resultant attenuation under conditions where extra attenuation is not necessary. The final signal is then fed to a nonlinear control law stage which provides the required attenuation versus control voltage characteristics.

Low Level Stage

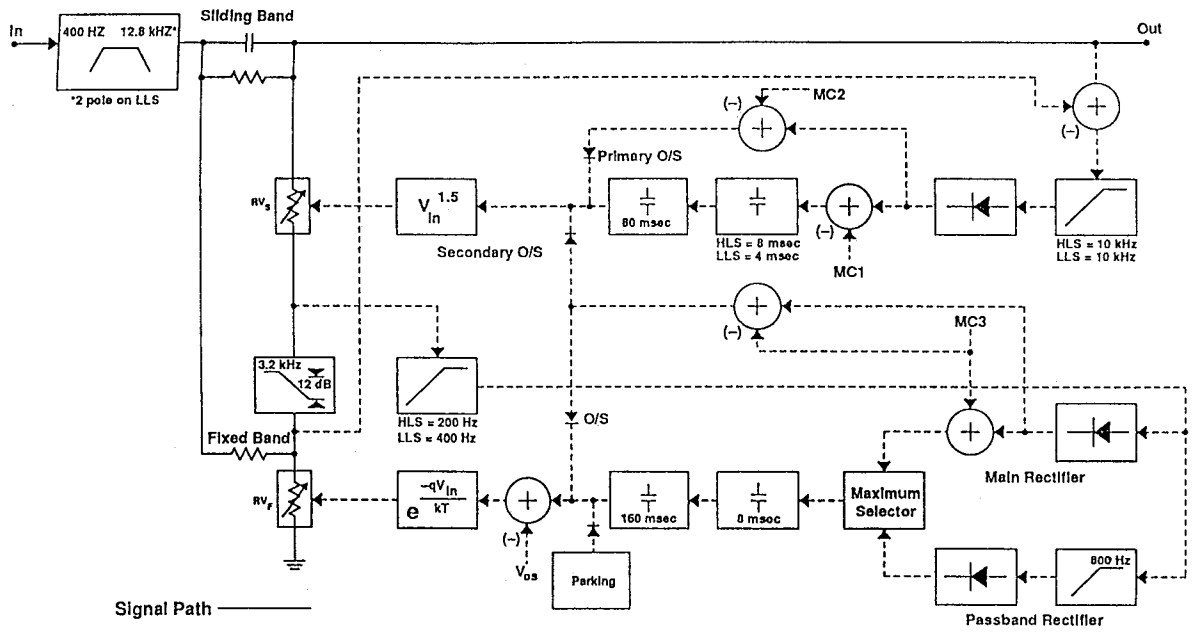
The low level stage is active for signal levels from -50 to -25 dB. No low frequency signal processing is provided, but in all other respects it is quite similar to the high level stage.

Modulation Control

Modulation control is used to prevent unnecessary modulation of the compressors in the presence of high level signals. It is inactive at low levels. The encoder output is fed to the input of the modulation control circuit, where it is split into three frequency bands. The MC1 signal goes through a 3 kHz high pass filter to a full wave rectifier, and is then fed in opposition to the HF/SB control signals. MC2 is created by smoothing the MC1 signal using a 2 msec time constant. This signal is then applied in opposition to the HF/SB overshoot suppression signal. MC3 is low pass filtered at 200 and 400 Hz, full wave rectified, and then fed in opposition to the HF/SB control signals. The LF/FB is controlled by MC4, which first passes through 200 and 400 Hz high pass filters and a full wave rectifier.

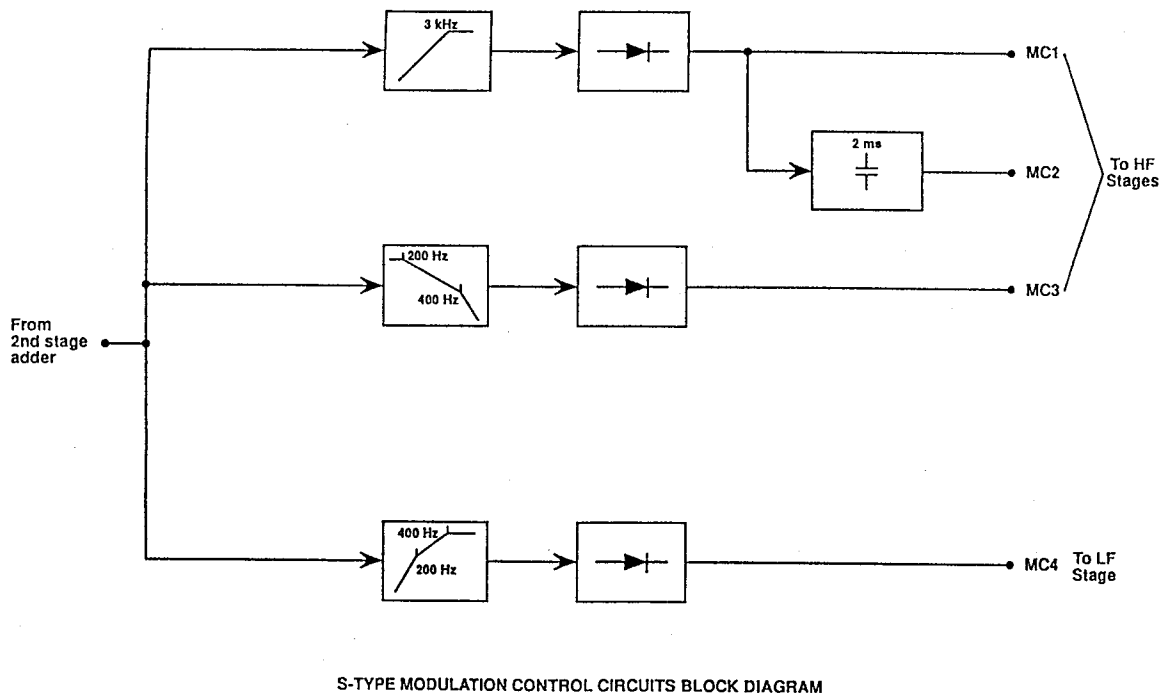
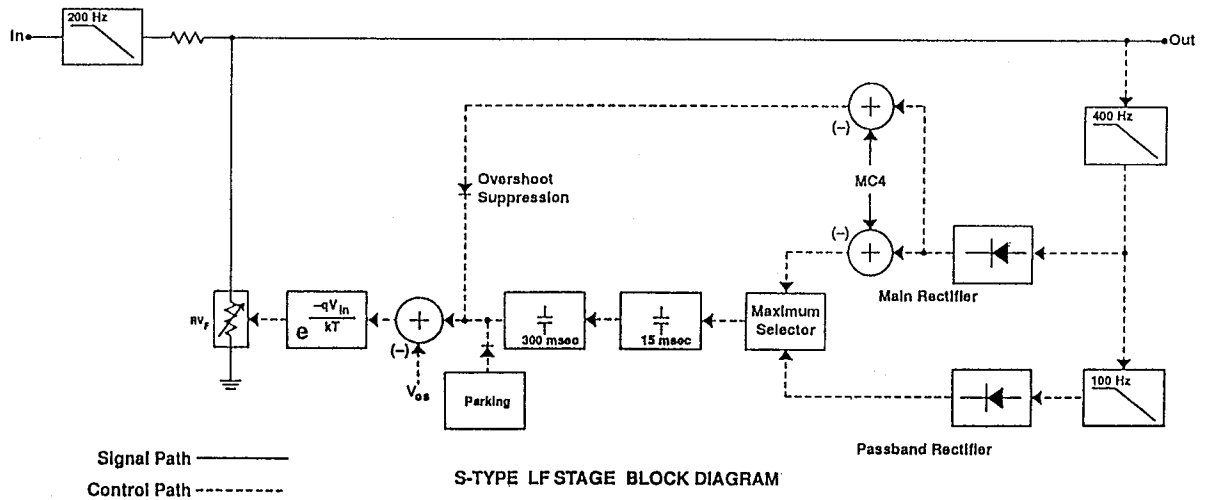


S-TYPE ENCODER BLOCK DIAGRAM

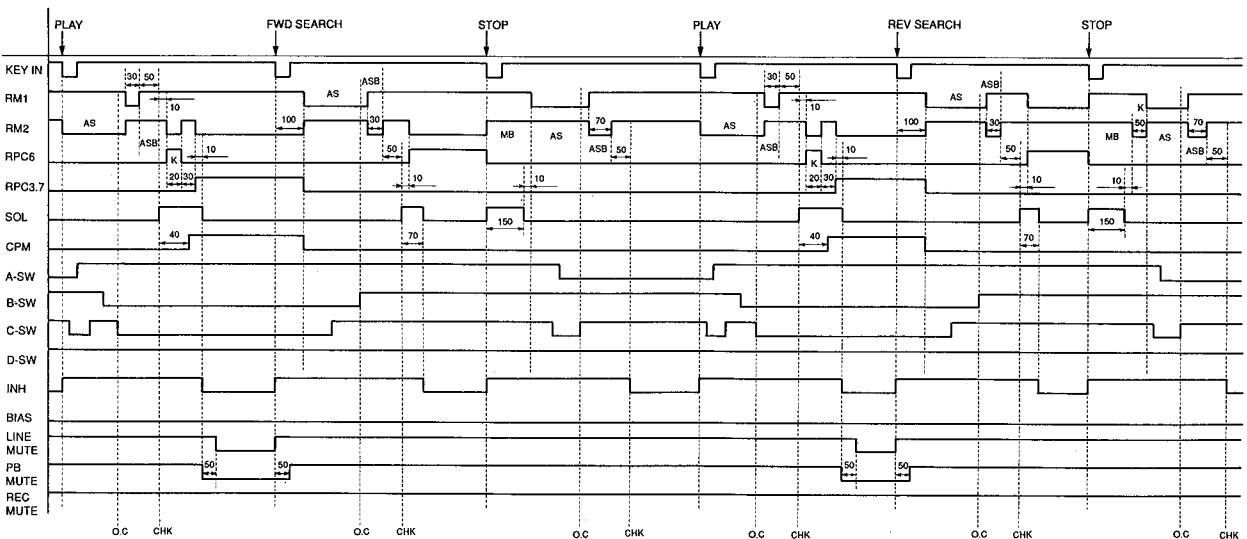
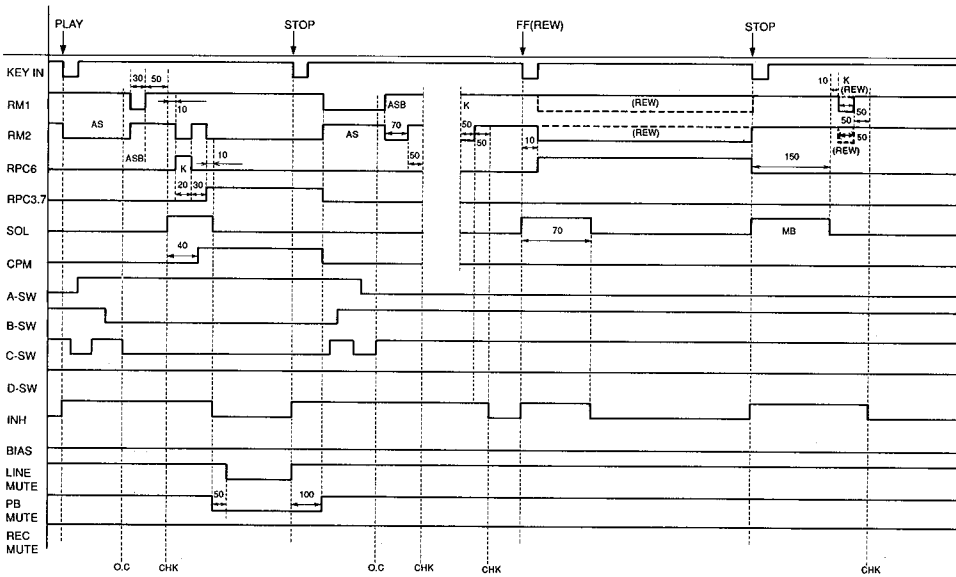
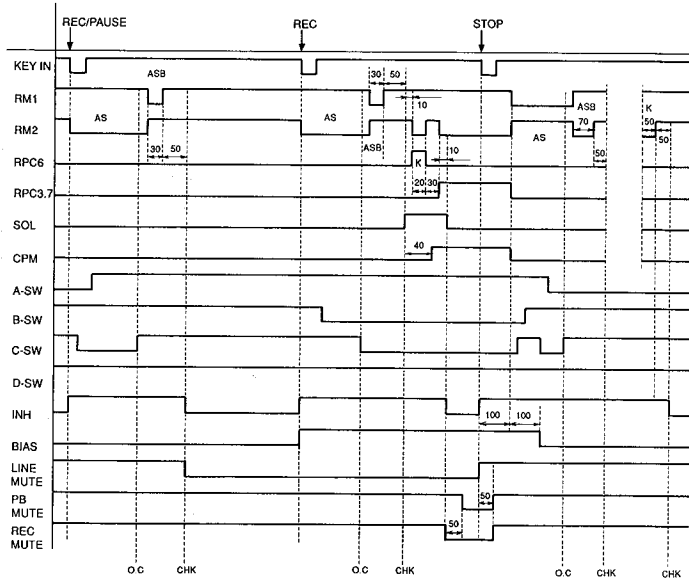


S-TYPE HF STAGE BLOCK DIAGRAM

Signal Path —————
 Control Path - - - - -
 O/S = Overshoot Suppression



TIMING CHART



ALIGNMENT PROCEDURES (REFER TO PAGES 14, 15, 16, 17, 35, 36, 37, 38 AND 39)

■ CASSETTE MECHANISM CONFIRMATION

Make sure to confirm conditions of the cassette mechanism as follows before adjustment.

1. Confirmation of erase prevention function

- The switch should turn ON when a tape with erroneous erase preventive pawl is inserted. (Use a tape which is 0.2mm smaller than the minimum size of 62.9mm or a MAZ-0184-C gauge one.)
- When the switch arm is moved back gradually from the ON position, the switch should turn OFF.

2. Confirmation of cassette pack detection function

- The switch should turn ON when a tape is inserted. (Use a tape whose minimum size is 63.5mm or a MAZ-0184-C gauge one.)
- When the switch arm is moved back gradually from the ON position, the switch should turn OFF.

3. Confirmation of eject function

- The cassette compartment opens smoothly and no abnormal noise should be heard while opening and closing.
- The eject lock arm opens smoothly without contacting the chassis and damper.
- The eject button can not be pressed during playback.

4. Confirmation of playback, fast forward and rewind functions

- The torque used in each of the playback, fast forward and rewind modes should be within specification.
 - Playback 35gr.cm~70gr.cm
 - FastForward 70gr.cm~160gr.cm
 - Rewind 70gr.cm~160gr.cm
- No abnormal noise should be heard during operation in any mode. The solenoid switching sound should not be considered as a noise.

5. Confirmation of positions of record/playback head and erase head

- Head height
 - a) Set the M-300 head gauge.
 - b) Set the unit in the playback mode and place the adjustment chip on the head gauge as shown in the Fig. 1.
 - c) The adjustment chip should not contact the tape guide of both record/playback head and erase head.

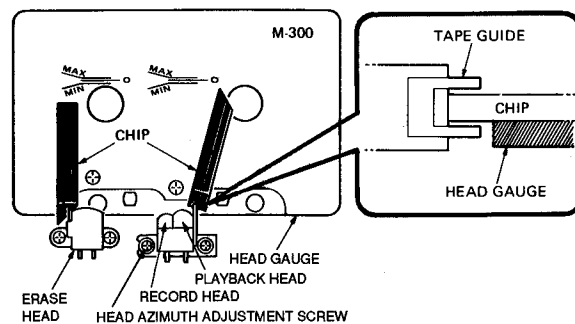


Fig. 1

- Head position
 - a) Set the M-300 head gauge.
 - b) Set the unit in the playback mode and place the adjustment chip on the head gauge as shown in the Fig. 2.
 - c) With both record/playback head and erase head, the adjustment chip should be between MIN and MAX of the M-300 head gauge.

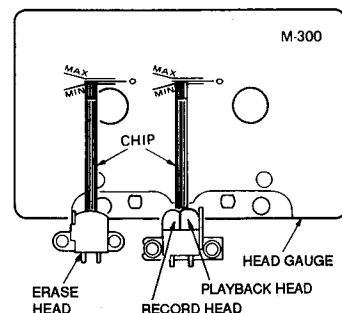


Fig. 2

■ ELECTRICAL ADJUSTMENT AND CONFIRMATION

1. Before adjustment

- Before electrical adjustment, make sure that confirmations of the cassette mechanism are all completed.
- After the power switch is pushed on, wait for 10 minutes before measuring to be sure of the most stable operation.
- Since head magnetization, dust accumulations, etc. are likely to introduce errors in the various characteristics, it is very important that the heads are properly demagnetized and cleaned before commencing any adjustment, particularly frequency response and head azimuth adjustment.

2. Instruments required

- Low frequency oscillator
- AC VTVM or dual channel AC VTVM
- Oscilloscope
- Wow/flutter meter
- Frequency counter
- Distortion meter

3. Test tapes

- Azimuth adjustment MTT-114 or TCC-153
- Tape speed adjustment MTT-111DN or TCC-112
- Playback output level adjustment TCC-130 or MTT-150
- Playback frequency characteristic confirmation TCC-1216 or TCC-162C and TCC-262C
- Music search adjustment SCC-1425
- Reference tapes
 - LN SCC-502
 - CrO₂ SCC-1360
 - METAL SCC-565

Note:
C-90 differs with C-60 in the thickness and bias is of unequal, so adjust with the tape whose bias in of specified value.

4. General conditions (unless otherwise noted)

Controls and Switches	Settings
Dolby NR	Off
Input Level	Maximum
MPX Filter	Off
Bias Fine Trim	Center
Rec Cal	Center
Output Level	Maximum

Azimuth Adjustment

When the maximum level point of R channel does not equal that L channel, connect the oscilloscope as shown in Fig. 3 and proceed with azimuth adjustment so that L and R channels are in phase.

- a) Connect L channel tape out to "X (or V)" and R channel to "Y (or H)". Observe the lissajous waveform.
- b) Set L and R channels to monaural. Adjust vertical and horizontal gain so that the waveform becomes 45 degree.
- c) Adjust azimuth so that the measurement of "a" becomes maximum and the measurement of "b" becomes minimum against the 45 degree line.

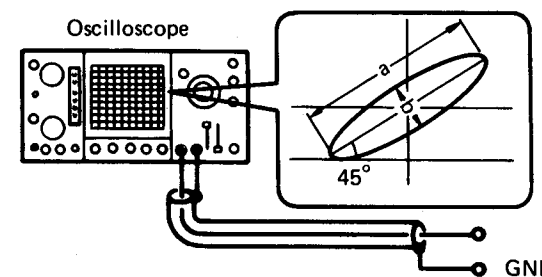
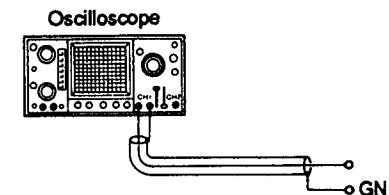


Fig. 3

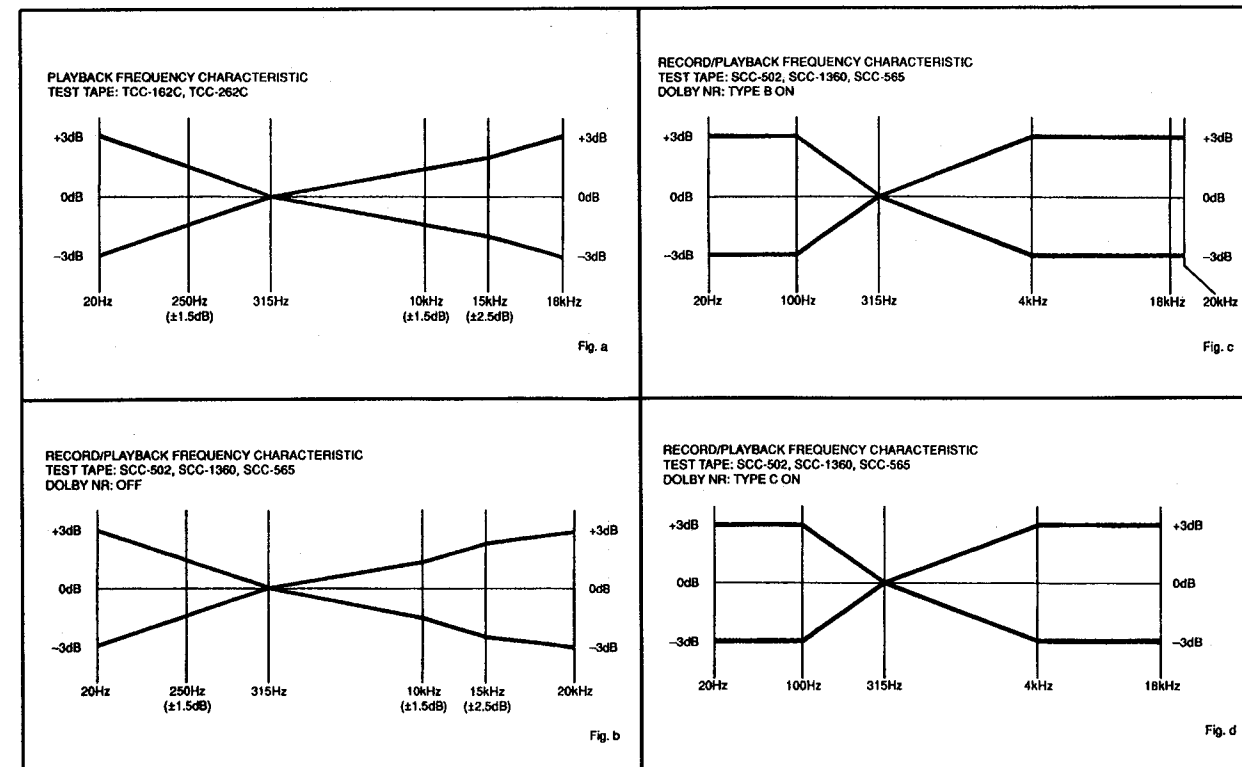
Dolby S Type NR DC Adjustment

- Apply -30dB below 43.5mV signal to INPUT jack with 100mS On and 1S Off continuously.
- Connect the oscilloscope to TP1 and GND. Solder an appropriate resistor (1MΩ ~ 6.6MΩ) between TM17 and TM18, so that the fluctuation of DC level becomes below 3mV.
- Connect the oscilloscope to TP2 and GND. Solder an appropriate resistor between TM5 and TM6 with the same procedure as above.
- Apply -40dB below 43.5mV signal to INPUT jack with 100mS On and 1S Off continuously.
- Connect the oscilloscope to TP3 and GND. Solder an appropriate resistor (1MΩ ~ 6.6MΩ) between TM25 and TM26, so that the fluctuation of DC level becomes below 3mV.
- Connect the oscilloscope to TP4 and GND. Solder an appropriate resistor between TM11 and TM13 with the same procedure as above.



Note:
In case the Dolby NR (REC) P. C. Board can not be adjusted as above, it needs additional resistors between these terminals.

- TM15 and TM17
- TM3 and TM5
- TM24 and TM25
- TM11 and TM12



ALIGNMENT PROCEDURES (REFER TO PAGES 14, 15, 16, 17, 35, 36, 37, 38 AND 39)

■ CASSETTE MECHANISM CONFIRMATION

Make sure to confirm conditions of the cassette mechanism as follows before adjustment.

1. Confirmation of erase prevention function

- The switch should turn ON when a tape with erroneous erase preventive pawl is inserted. (Use a tape which is 0.2mm smaller than the minimum size of 62.9mm or a MAZ-0184-C gauge one.)
- When the switch arm is moved back gradually from the ON position, the switch should turn OFF.

2. Confirmation of cassette pack detection function

- The switch should turn ON when a tape is inserted. (Use a tape whose minimum size is 63.5mm or a MAZ-0184-C gauge one.)
- When the switch arm is moved back gradually from the ON position, the switch should turn OFF.

3. Confirmation of eject function

- The cassette compartment opens smoothly and no abnormal noise should be heard while opening and closing.
- The eject lock arm opens smoothly without contacting the chassis and damper.
- The eject button can not be pressed during playback.

4. Confirmation of playback, fast forward and rewind functions

- The torque used in each of the playback, fast forward and rewind modes should be within specification.
 - Playback 35gr.cm~70gr.cm
 - FastForward 70gr.cm~160gr.cm
 - Rewind 70gr.cm~160gr.cm
- No abnormal noise should be heard during operation in any mode. The solenoid switching sound should not be considered as a noise.

5. Confirmation of positions of record/playback head and erase head

- Head height
 - a) Set the M-300 head gauge.
 - b) Set the unit in the playback mode and place the adjustment chip on the head gauge as shown in the Fig. 1.
 - c) The adjustment chip should not contact the tape guide of both record/playback head and erase head.

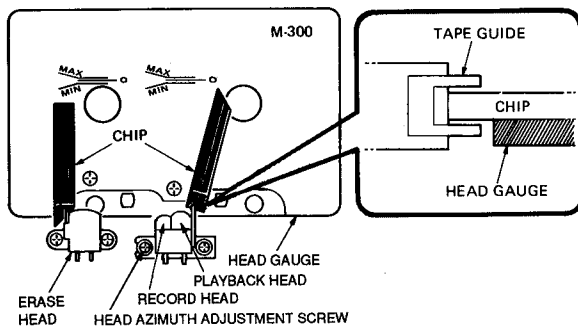


Fig. 1

- Head position
 - a) Set the M-300 head gauge.
 - b) Set the unit in the playback mode and place the adjustment chip on the head gauge as shown in the Fig. 2.
 - c) With both record/playback head and erase head, the adjustment chip should be between MIN and MAX of the M-300 head gauge.

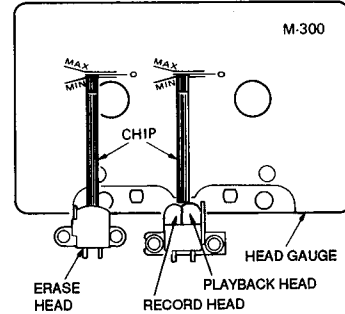


Fig. 2

■ ELECTRICAL ADJUSTMENT AND CONFIRMATION

1. Before adjustment

- Before electrical adjustment, make sure that confirmations of the cassette mechanism are all completed.
- After the power switch is pushed on, wait for 10 minutes before measuring to be sure of the most stable operation.
- Since head magnetization, dust accumulations, etc. are likely to introduce errors in the various characteristics, it is very important that the heads are properly demagnetized and cleaned before commencing any adjustment, particularly frequency response and head azimuth adjustment.

2. Instruments required

- Low frequency oscillator
- AC VTVM or dual channel AC VTVM
- Oscilloscope
- Wow/flutter meter
- Frequency counter
- Distortion meter

3. Test tapes

- Azimuth adjustment MTT-114 or TCC-153
- Tape speed adjustment MTT-111DN or TCC-112
- Playback output level adjustment TCC-130 or MTT-150
- Playback frequency characteristic confirmation TCC-1216 or TCC-162C and TCC-262C
- Music search adjustment SCC-1425
- Reference tapes
 - LN SCC-502
 - CrO₂ SCC-1360
 - METAL SCC-565

Note:

C-90 differs with C-60 in the thickness and bias is of unequal, so adjust with the tape whose bias in of specified value.

4. General conditions (unless otherwise noted)

Controls and Switches	Settings
Dolby NR	Off
Input Level	Maximum
MPX Filter	Off
Bias Fine Trim	Center
Rec Cal	Center
Output Level	Maximum

Azimuth Adjustment

When the maximum level point of R channel does not equal that L channel, connect the oscilloscope as shown in Fig. 3 and proceed with azimuth adjustment so that L and R channels are in phase.

- Connect L channel tape out to "X (or V)" and R channel to "Y (or H)". Observe the lissajous waveform.
- Set L and R channels to monaural. Adjust vertical and horizontal gain so that the waveform becomes 45 degree.
- Adjust azimuth so that the measurement of "a" becomes maximum and the measurement of "b" becomes minimum against the 45 degree line.

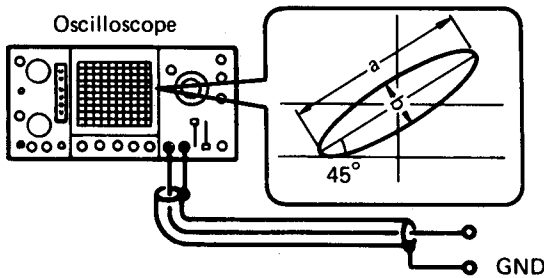
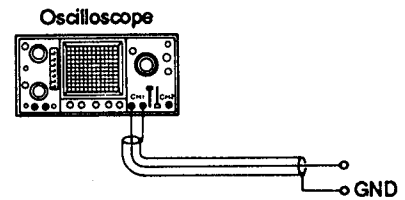


Fig. 3

Dolby S Type NR DC Adjustment

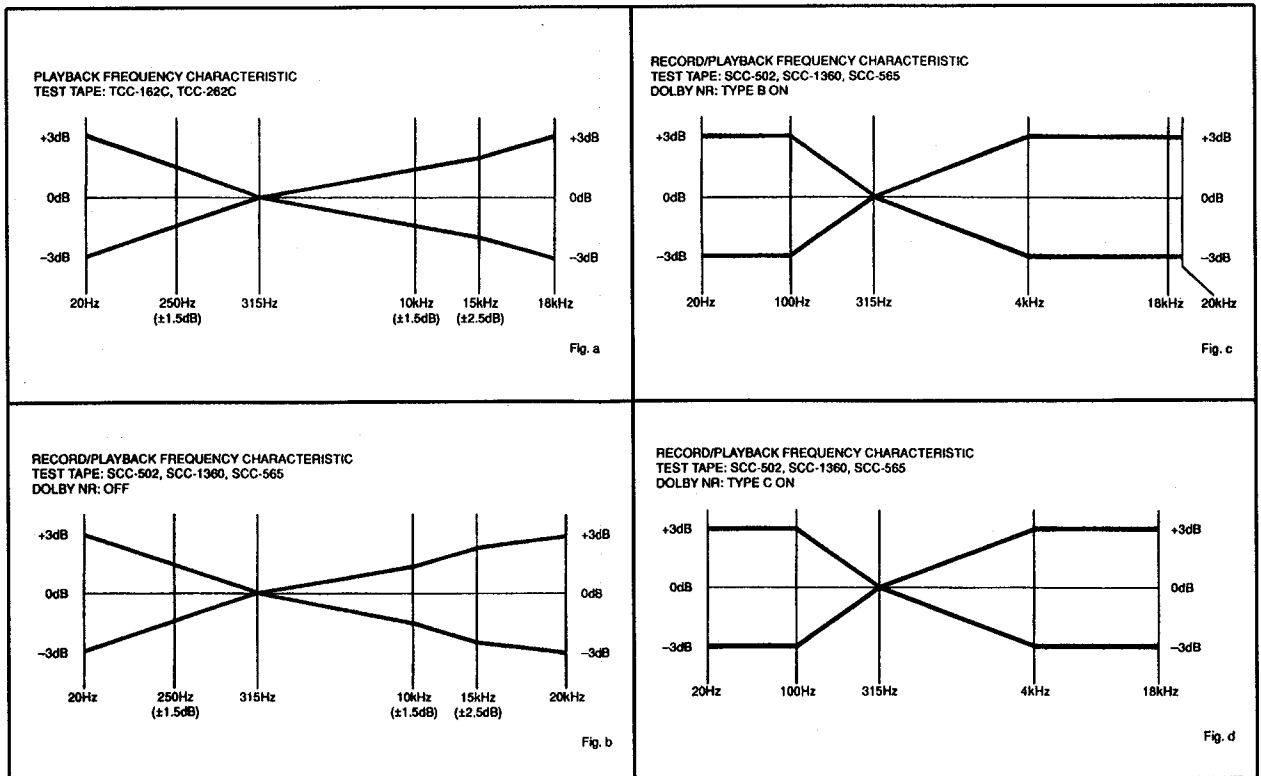
- Apply -30dB below 43.5mV signal to INPUT jack with 100mS On and 1S Off continuously.
- Connect the oscilloscope to TP1 and GND. Solder an appropriate resistor (1MΩ ~ 6.6MΩ) between TM17 and TM18, so that the fluctuation of DC level becomes below 3mV.
- Connect the oscilloscope to TP2 and GND. Solder an appropriate resistor between TM5 and TM6 with the same procedure as above.
- Apply -40dB below 43.5mV signal to INPUT jack with 100mS On and 1S Off continuously.
- Connect the oscilloscope to TP3 and GND. Solder an appropriate resistor (1MΩ ~ 6.6MΩ) between TM25 and TM26, so that the fluctuation of DC level becomes below 3mV.
- Connect the oscilloscope to TP4 and GND. Solder an appropriate resistor between TM11 and TM13 with the same procedure as above.



Note:

In case the Dolby NR (REC) P. C. Board can not be adjusted as above, it needs additional resistors between these terminals.

- TM15 and TM17
- TM3 and TM5
- TM24 and TM25
- TM11 and TM12

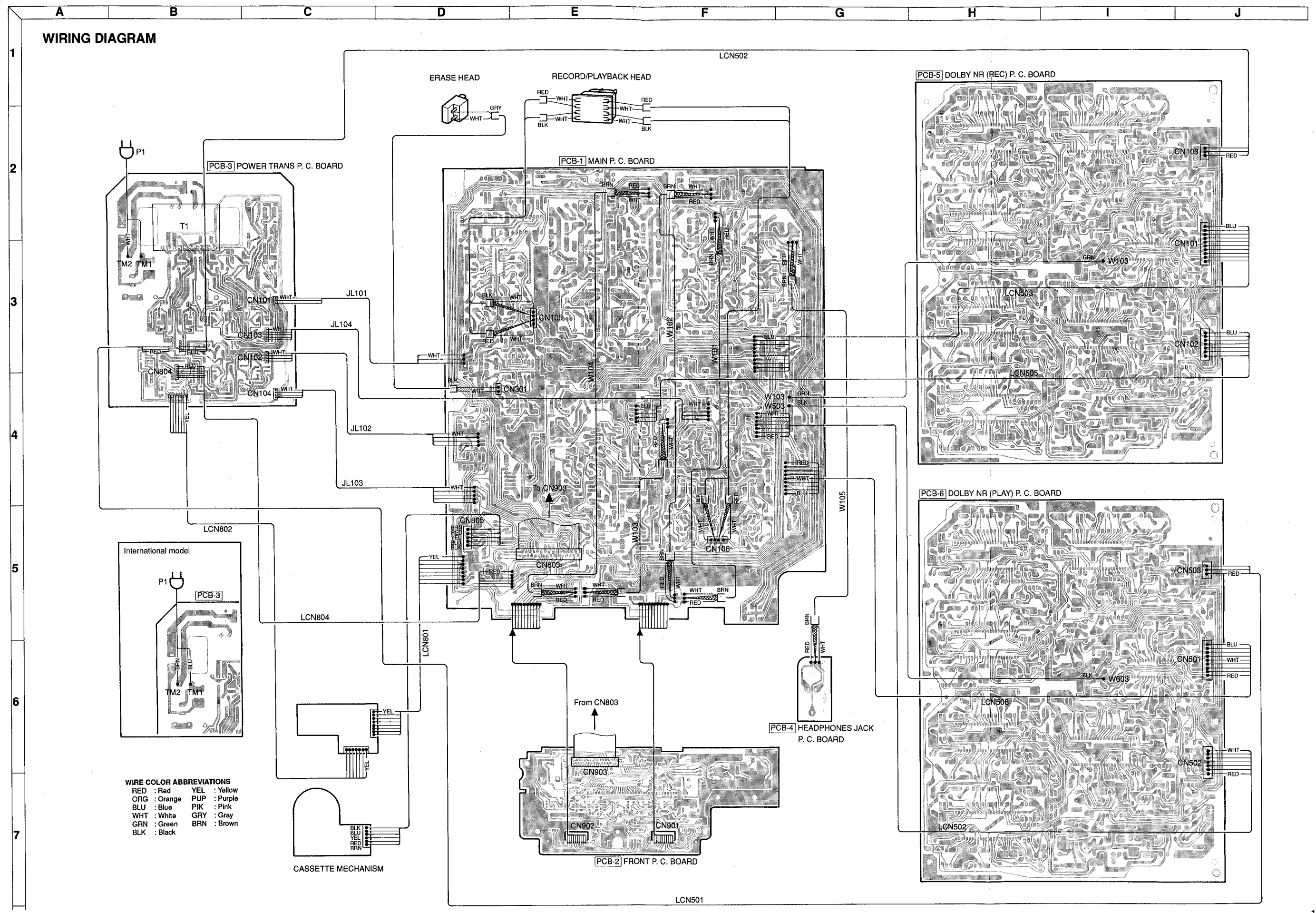


Step	Alignment	Instrument Required	Input Signal	Mode	Test Point	Adjustment	For
1	Azimuth	VTVM Oscilloscope Test tape (MTT-114 or TCC-153)		PB	TP501 (Lch), GND TP502 (Rch), GND or OUTPUT jack	Azimuth screw	Maximum output Refer to "Azimuth Adjustment" on page 11.
2	Tape speed	Frequency counter Test tape (MTT-111DN or TCC-112)		PB	TP501 (Lch), GND TP502 (Rch), GND	VR (built in motor)	3000Hz \pm 10Hz Adjust at the center of test tape.
3	Playback output level	VTVM Test tape (TCC-130 or MTT-150)		PB	TP501 (Lch), GND TP502 (Rch), GND	VR101 (Lch) VR102 (Rch)	388mV Tape selector is LN position.
4	Playback output level	VTVM Test tape (TCC-130 or MTT-150)		PB	TP501 (Lch), GND TP502 (Rch), GND	VR103 (Lch) VR104 (Rch)	388mV This adjustment should be at Dolby S type NR ON position.
5	Playback frequency characteristic confirmation	VTVM Test tape (TCC-1216 or TCC-162C and TCC-262C)		PB	TP501 (Lch), GND TP502 (Rch), GND or OUTPUT jack		So that the frequency response is within the range as shown in Fig. a.
6	Music search	Oscilloscope Test tape (SCC-1425)		Forward Search	TP751, GND	VR751	Perform checkong with Forward Search mode at the front of the test tape. Adjust VR751 so that the DC level becomes $1.6 \pm 0.05V$.
7	Bias frequency confirmation	Frequency counter		REC	TP101 (Lch), GND TP102 (Rch), GND	T301 T302	210kHz \pm 3kHz Tape selector is METAL position.
8	Dolby HX PRO	VTVM		REC	TP101 (Lch), GND TP102 (Rch), GND	L301 L302	Tape selector is METAL position. So that the bias level is maximum.
9	Bias trap	VTVM		REC	TP201 (Lch), GND TP202 (Rch), GND	LC201, LC203 LC202, LC204	Minimum output Tape selector is METAL position. Input Level control is minimum.
10	Bias level (pre-adjustment)	VTVM		REC	TP101 (Lch), GND TP102 (Rch), GND	VR301 VR302	3.3mV Tape selector is METAL position.
						VR305 VR306	1.8mV Tape selector is CrO ₂ position.
						VR303 VR304	1.2mV Tape selector is LN position.
11	Record level (pre-adjustment)	VTVM Blank tapes CrO ₂ SCC-1360 METAL SCC-565 LN SCC-502	Apply 1kHz signal to INPUT jack. Set INPUT LEVEL knob so that TP501 and TP502 to GND voltage is 388mV in REC-PAUSE mode.	REC/PB	TP501 (Lch), GND TP502 (Rch), GND	VR203, VR204 VR301, VR302	388mV Tape selector is METAL position. Adjust VR301 and VR302 so that the distortioon becomes 0.8%~1.2%
						VR303, VR304 (CrO ₂) VR305, VR306 (LN)	388mV Adjust VR303 and VR304 so that the distortion becomes 1.3% (CrO ₂). Adjust VR305 and VR306 so that the distortion becomes 0.7% (LN). This confirmation should be at each tape selector position.
12	Record/playback equalizer frequency characteristic	VTVM Blank tapes CrO ₂ SCC-1360 METAL SCC-565 LN SCC-502	Apply 1kHz signal to INPUT jack. Set INPUT LEVEL knob so that TP501 and TP502 to GND voltage is 25dB below 388mV in REC-PAUSE mode. Then adjust with a 20Hz to 30kHz sweep signal.	REC/PB	OUTPUT jack	VR301, VR302 L201, L202	So that the record/playback frequency response is flat (at least within the range in Fig. b). Tape selector is METAL position.
						VR303, VR304	So that the record/playback frequency response is flat (at least within the range in Fig. b). Tape selector is CrO ₂ position.
						VR305, VR306	So that the record/playback frequency response is flat (at least within the range in Fig. b). Tape selector is LN position.
13	Record level	VTVM Blank tapes CrO ₂ SCC-1360 METAL SCC-565 LN SCC-502	Apply 1kHz signal to INPUT jack. Set INPUT LEVEL knob so that TP501 and TP502 to GND voltage is 388mV in REC-PAUSE mode.	REC/PB	TP501 (Lch), GND TP502 (Rch), GND	VR203 VR204	388mV Perform adjustment using CrO ₂ . Perform checking only for LN and METAL tapes.
14	Record/playback equalizer frequency characteristic confirmation	VTVM Blank tapes CrO ₂ SCC-1360 METAL SCC-565 LN SCC-502	Apply 1kHz signal to INPUT jack. Set INPUT LEVEL knob so that TP501 and TP502 to GND voltage is 25dB below 388mV in REC-PAUSE mode. Then adjust with a 20Hz to 30kHz sweep signal.	REC/PB	OUTPUT jack		Perform checking with Dolby B, C and S NR ON at each tape selector position. Confirm the record/playback frequency characteristic is within ± 3 dB at 20 to 20 kHz.
15	Meter level	VTVM	Apply 1kHz signal to INPUT jack. Set INPUT LEVEL knob so that TP501 and TP502 to GND voltage is 1.5dB below 388mV.	REC-PAUSE	PEAK LEVEL METER	VR401 VR402	Adjust VR401 and VR402 so that the peak level meter reads: -1 dB.
16	MPX filter characteristic confirmation	VTVM	Apply 19kHz, 15kHz and 1kHz signal to INPUT jack. Set INPUT LEVEL knob so that TP501 and TP502 to GND voltage is 388mV.	REC-PAUSE	TP501 (Lch), GND TP502 (Rch), GND or OUTPUT jack		MPX filter is ON position. Confirm the attenuation level at 15kHz and 19kHz within specification.
17	Rec cal tone	VTVM	Apply 1kHz signal to INPUT jack. Set INPUT LEVEL knob so that TP501 and TP502 to GND voltage is 388mV in REC-PAUSE mode.	REC-PAUSE	TP501 TP502	VR602	When press and hold the REC CAL, adjust VR602 so that the output level of TP501 and TP502 is 388mV.
18	Bias tone	VTVM	Apply 400Hz signal to INPUT jack. Set INPUT LEVEL knob so that TP501 to GND voltage is 388mV -20dB in REC-PAUSE mode.	REC-PAUSE	TP501	VR603	When press and hold the BIAS, adjust VR603 so that the output level of TP501 is 90mV.
			Apply 12.5kHz signal to INPUT jack. Set INPUT LEVEL knob so that TP502 to GND voltage is 388mV -20dB in REC-PAUSE mode.		TP502	VR601	When press and hold the BIAS, adjust VR601 so that the output level of TP502 is 90mV.

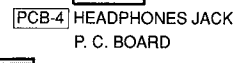
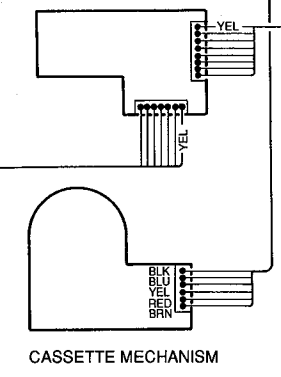
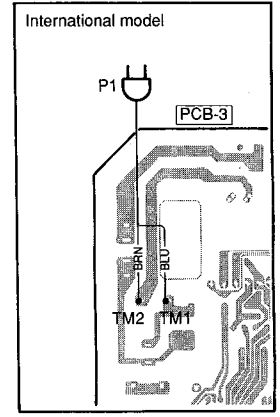
Step	Alignment	Instrument Required	Input Signal	
1	Azimuth	VTVM Oscilloscope Test tape (MTT-114 or TCC-153)		
2	Tape speed	Frequency counter Test tape (MTT-111DN or TCC-112)		
3	Playback output level	VTVM Test tape (TCC-130 or MTT-150)		
4	Playback output level	VTVM Test tape (TCC-130 or MTT-150)		
5	Playback frequency characteristic confirmation	VTVM Test tape (TCC-1216 or TCC-162C and TCC-262C)		
6	Music search	Oscilloscope Test tape (SCC-1425)		
7	Bias frequency confirmation	Frequency counter		
8	Dolby HX PRO	VTVM		
9	Bias trap	VTVM		
10	Bias level (pre-adjustment)	VTVM		
				1
				2
11	Record level (pre-adjustment)	VTVM Blank tapes CrO ₂ SCC-1360 METAL SCC-565 LN SCC-502	Apply 1kHz signal to INPUT jack. Set INPUT LEVEL knob so that TP501 and TP502 to GND voltage is 388mV in REC-PAUSE mode.	
				1
				2
12	Record/playback equalizer frequency characteristic	VTVM Blank tapes CrO ₂ SCC-1360 METAL SCC-565 LN SCC-502	Apply 1kHz signal to INPUT jack. Set INPUT LEVEL knob so that TP501 and TP502 to GND voltage is 25dB below 388mV in REC-PAUSE mode. Then adjust with a 20Hz to 30kHz sweep signal.	
				1
				2
13	Record level	VTVM Blank tapes CrO ₂ SCC-1360 METAL SCC-565 LN SCC-502	Apply 1kHz signal to INPUT jack. Set INPUT LEVEL knob so that TP501 and TP502 to GND voltage is 388mV in REC-PAUSE mode.	
				1
				2
14	Record/playback equalizer frequency characteristic confirmation	VTVM Blank tapes CrO ₂ SCC-1360 METAL SCC-565 LN SCC-502	Apply 1kHz signal to INPUT jack. Set INPUT LEVEL knob so that TP501 and TP502 to GND voltage is 25dB below 388mV in REC-PAUSE mode. Then adjust with a 20Hz to 30kHz sweep signal.	
				1
				2
15	Meter level	VTVM	Apply 1kHz signal to INPUT jack. Set INPUT LEVEL knob so that TP501 and TP502 to GND voltage is 1.5dB below 388mV.	
16	MPX filter characteristic confirmation	VTVM	Apply 19kHz, 15kHz and 1kHz signal to INPUT jack. Set INPUT LEVEL knob so that TP501 and TP502 to GND voltage is 388mV.	
17	Rec cal tone	VTVM	Apply 1kHz signal to INPUT jack. Set INPUT LEVEL knob so that TP501 and TP502 to GND voltage is 388mV in REC-PAUSE mode.	
18	Bias tone	VTVM	Apply 400Hz signal to INPUT jack. Set INPUT LEVEL knob so that TP501 to GND voltage is 388mV -20dB in REC-PAUSE mode.	
			Apply 12.5kHz signal to INPUT jack. Set INPUT LEVEL knob so that TP502 to GND voltage is 388mV -20dB in REC-PAUSE mode.	

	Mode	Test Point	Adjustment	For
	PB	TP501 (Lch), GND TP502 (Rch), GND or OUTPUT jack	Azimuth screw	Maximum output Refer to "Azimuth Adjustment" on page 11.
	PB	TP501 (Lch), GND TP502 (Rch), GND	VR (built in motor)	3000Hz \pm 10Hz Adjust at the center of test tape.
	PB	TP501 (Lch), GND TP502 (Rch), GND	VR101 (Lch) VR102 (Rch)	388mV Tape selector is LN position.
	PB	TP501 (Lch), GND TP502 (Rch), GND	VR103 (Lch) VR104 (Rch)	388mV This adjustment should be at Dolby S type NR ON position.
	PB	TP501 (Lch), GND TP502 (Rch), GND or OUTPUT jack		So that the frequency response is within the range as shown in Fig. a.
	Forward Search	TP751, GND	VR751	Perform checking with Forward Search mode at the front of the test tape. Adjust VR751 so that the DC level becomes $1.6 \pm 0.05V$.
	REC	TP101 (Lch), GND TP102 (Rch), GND	T301 T302	210kHz \pm 3kHz Tape selector is METAL position.
	REC	TP101 (Lch), GND TP102 (Rch), GND	L301 L302	Tape selector is METAL position. So that the bias level is maximum.
	REC	TP201 (Lch), GND TP202 (Rch), GND	LC201, LC203 LC202, LC204	Minimum output Tape selector is METAL position. Input Level control is minimum.
	REC	TP101 (Lch), GND TP102 (Rch), GND	VR301 VR302	3.3mV Tape selector is METAL position.
VR305 VR306			1.8mV Tape selector is CrO ₂ position.	
VR303 VR304			1.2mV Tape selector is LN position.	
so that ode.	REC/PB	TP501 (Lch), GND TP502 (Rch), GND	VR203, VR204 VR301, VR302	388mV Tape selector is METAL position. Adjust VR301 and VR302 so that the distortion becomes 0.8%~1.2%.
			VR303, VR304 (CrO ₂) VR305, VR306 (LN)	388mV Adjust VR303 and VR304 so that the distortion becomes 1.3% (CrO ₂). Adjust VR305 and VR306 so that the distortion becomes 0.7% (LN). This confirmation should be at each tape selector position.
so that n REC-	REC/PB	OUTPUT jack	VR301, VR302 L201, L202	So that the record/playback frequency response is flat (at least within the range in Fig. b). Tape selector is METAL position.
			VR303, VR304	So that the record/playback frequency response is flat (at least within the range in Fig. b). Tape selector is CrO ₂ position.
			VR305, VR306	So that the record/playback frequency response is flat (at least within the range in Fig. b). Tape selector is LN position.
so that ode.	REC/PB	TP501 (Lch), GND TP502 (Rch), GND	VR203 VR204	388mV Perform adjustment using CrO ₂ . Perform checking only for LN and METAL tapes.
so that n REC-	REC/PB	OUTPUT jack		Perform checking with Dolby B, C and S NR ON at each tape selector position. Confirm the record/playback frequency characteristic is within ± 3 dB at 20 to 20 kHz.
so that	REC-PAUSE	PEAK LEVEL METER	VR401 VR402	Adjust VR401 and VR402 so that the peak level meter reads: -1 dB.
LEVEL	REC-PAUSE	TP501 (Lch), GND TP502 (Rch), GND or OUTPUT jack		MPX filter is ON position. Confirm the attenuation level at 15kHz and 19kHz within specification.
so that ode.	REC-PAUSE	TP501 TP502	VR602	When press and hold the REC CAL, adjust VR602 so that the output level of TP501 and TP502 is 388mV.
so that	REC-PAUSE	TP501	VR603	When press and hold the BIAS, adjust VR603 so that the output level of TP501 is 90mV.
so that		TP502	VR601	When press and hold the BIAS, adjust VR601 so that the output level of TP502 is 90mV.

WIRING DIAGRAM



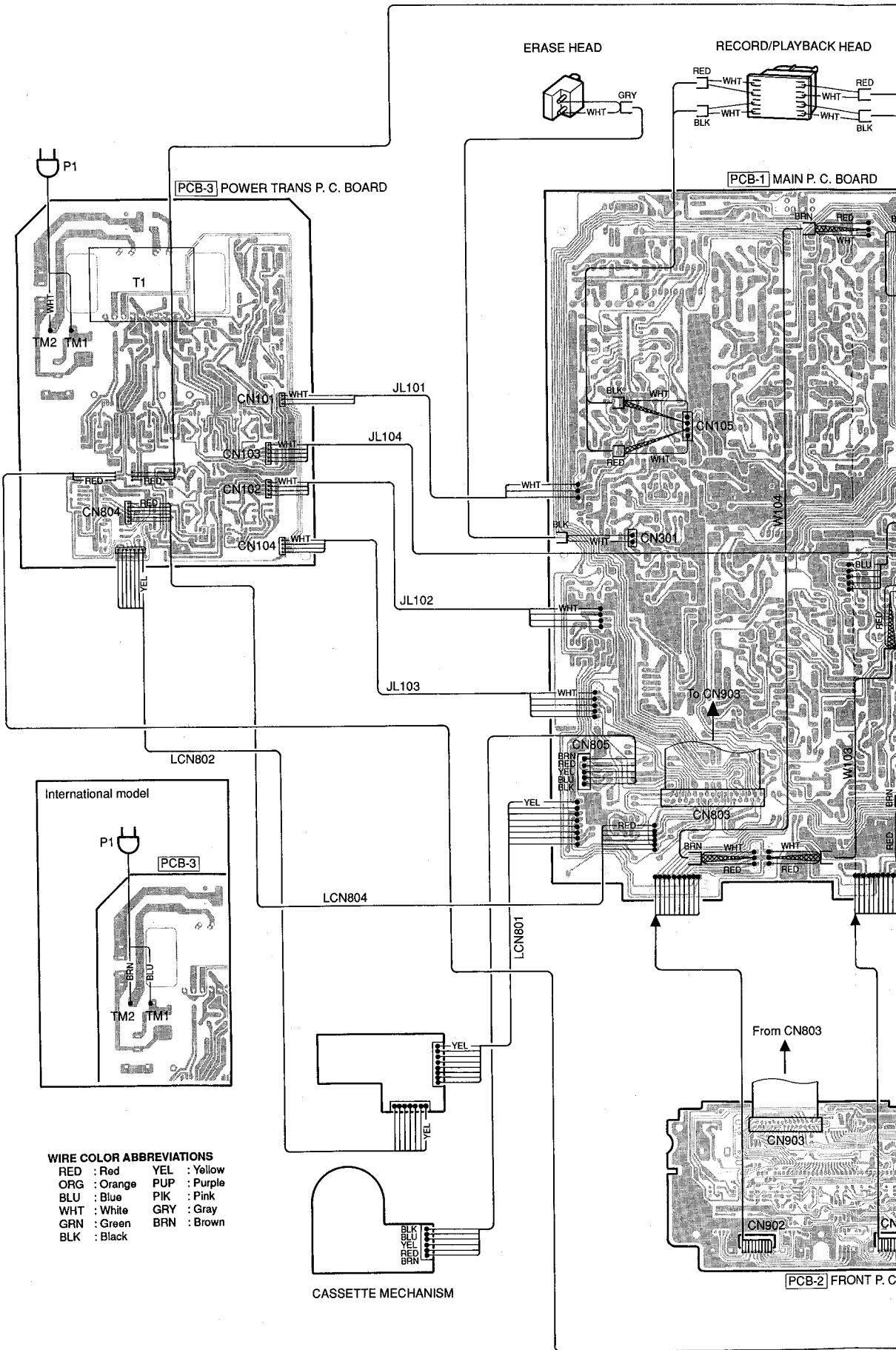
- WIRE COLOR ABBREVIATIONS**
- RED : Red
 - ORG : Orange
 - BLU : Blue
 - WHT : White
 - GRN : Green
 - BLK : Black
 - YEL : Yellow
 - PUP : Purple
 - PIK : Pink
 - GRY : Gray
 - BRN : Brown



WIRING DIAGRAM

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A B C D E



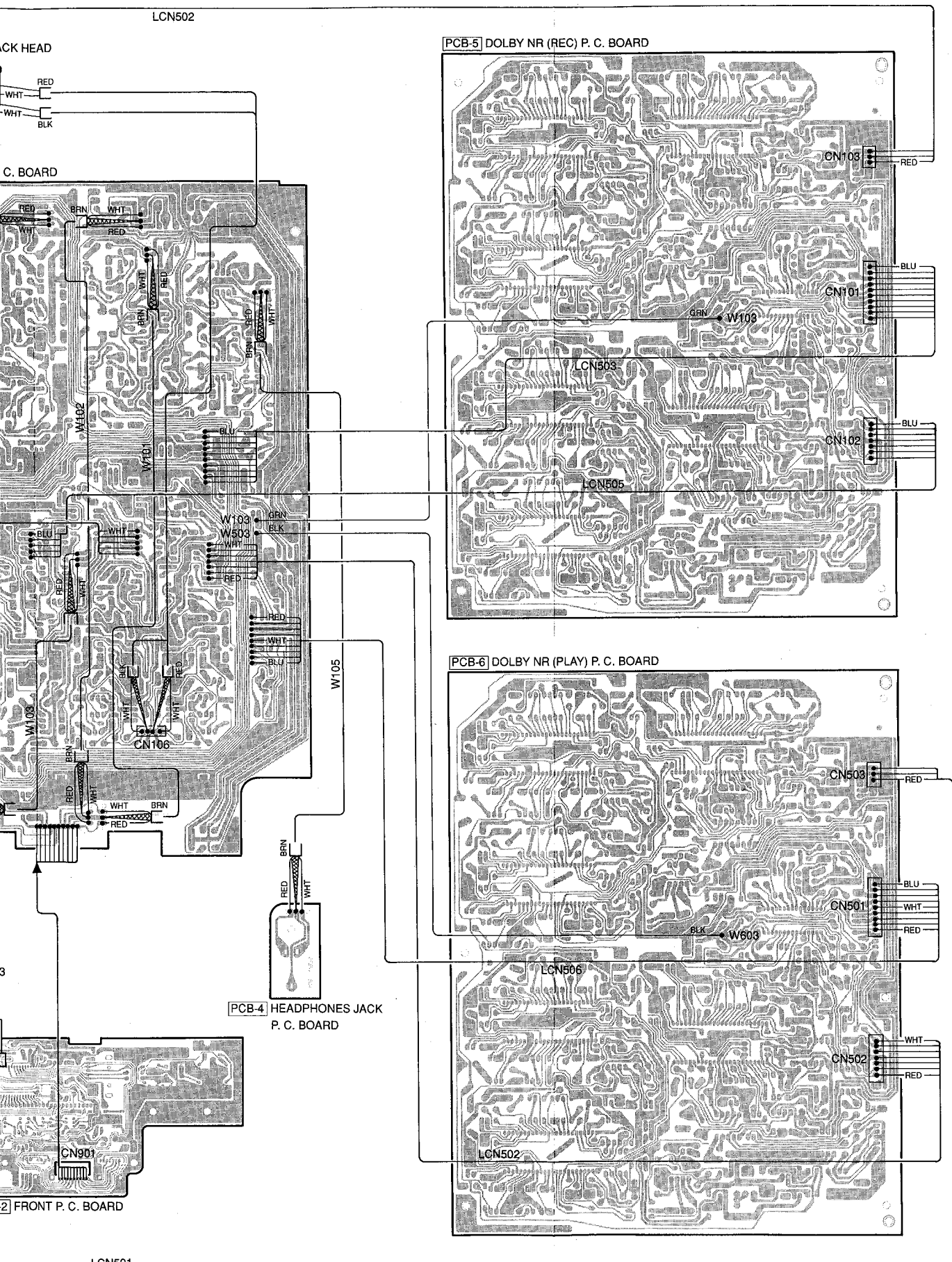
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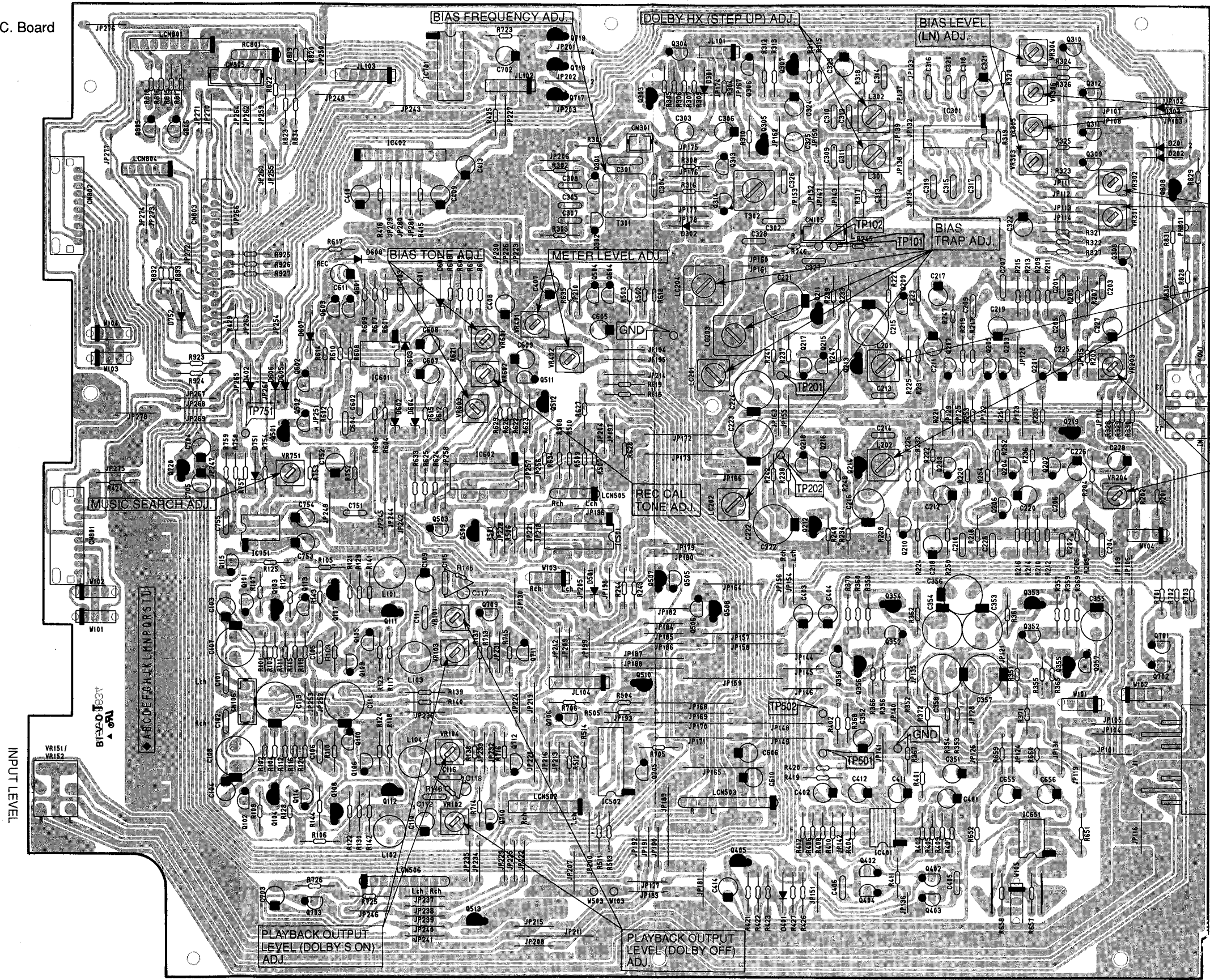
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LCN501

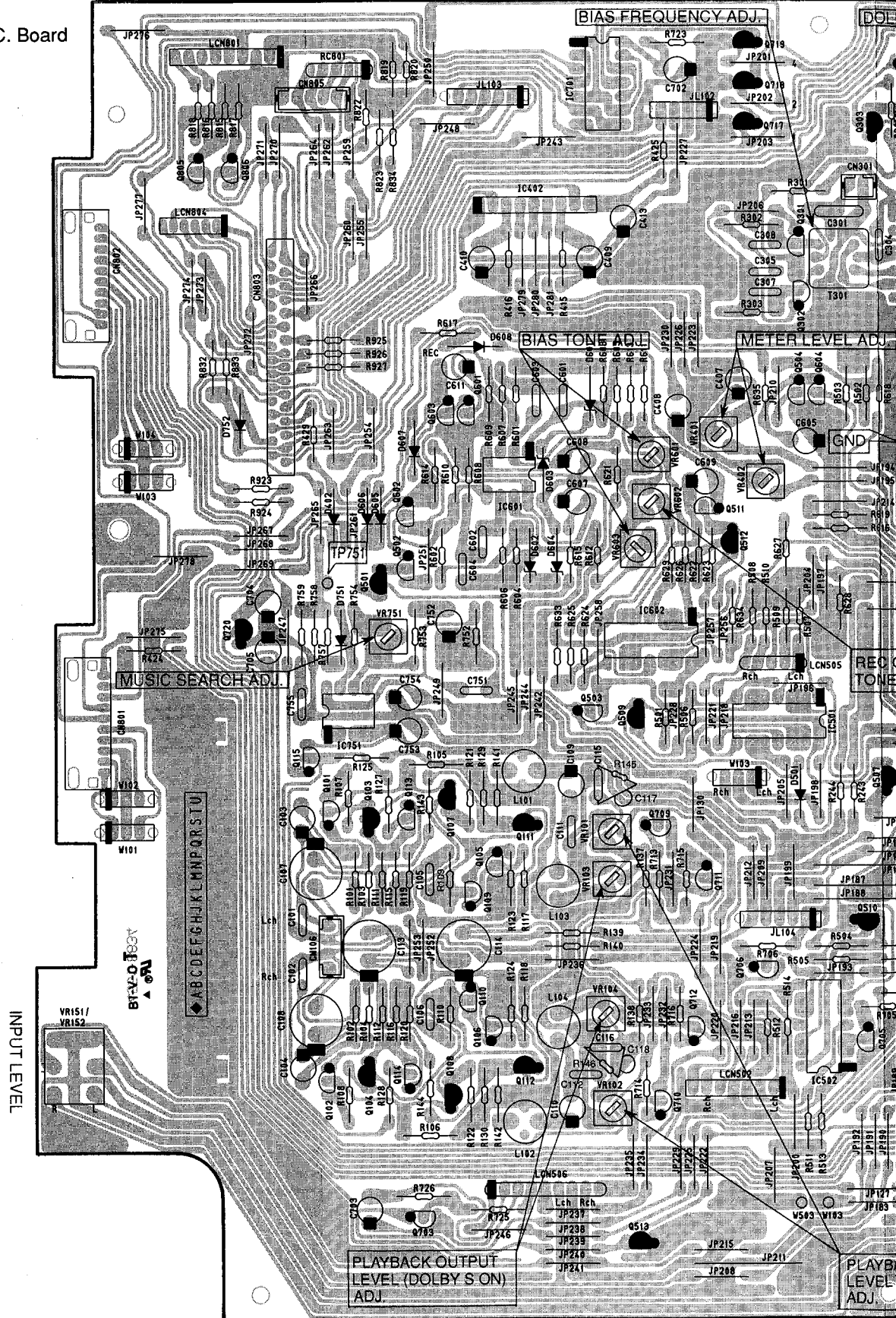
P. C. BOARDS (1)

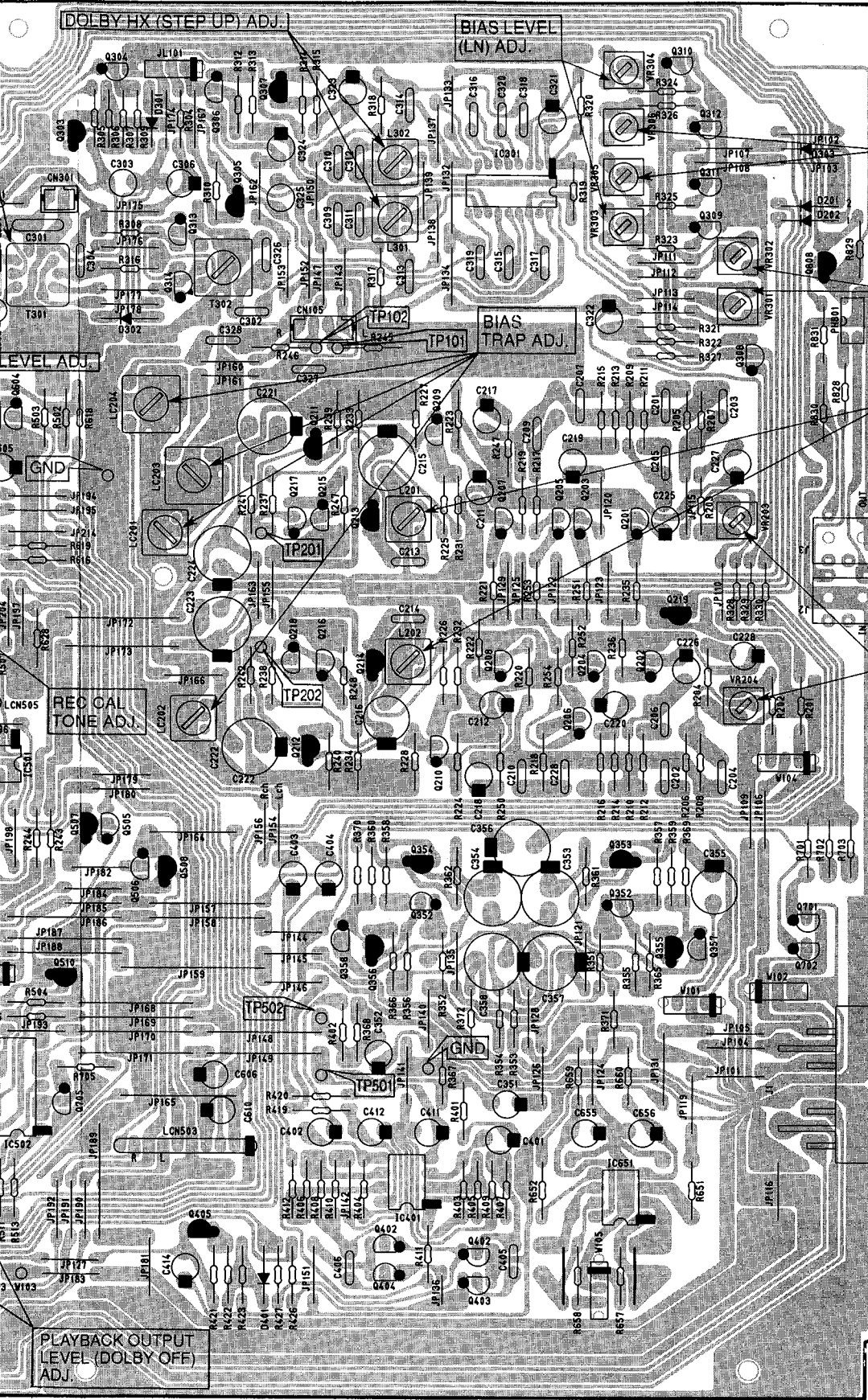
PCB-1 Main P. C. Board



P. C. BOARDS (1)

PCB-1 Main P. C. Board





BIAS LEVEL
(CrO₂) ADJ.

BIAS LEVEL
(METAL) ADJ.

RECORD/PLAYBACK
EQUALIZER FREQUENCY
CHARACTERISTIC ADJ.

RECORD
LEVEL ADJ.

REC CAL
TONE ADJ.

LEVEL ADJ.

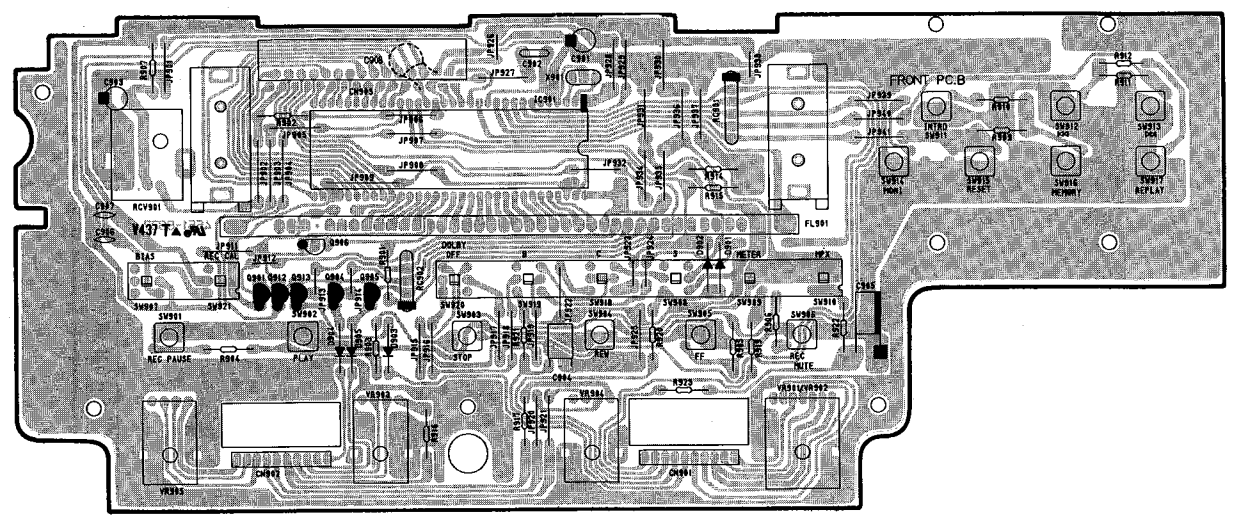
GND

BIAS TRAP ADJ.

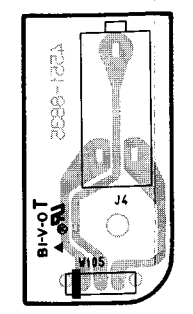
PLAYBACK OUTPUT
LEVEL (DOLBY OFF)
ADJ.

P. C. BOARDS (2)

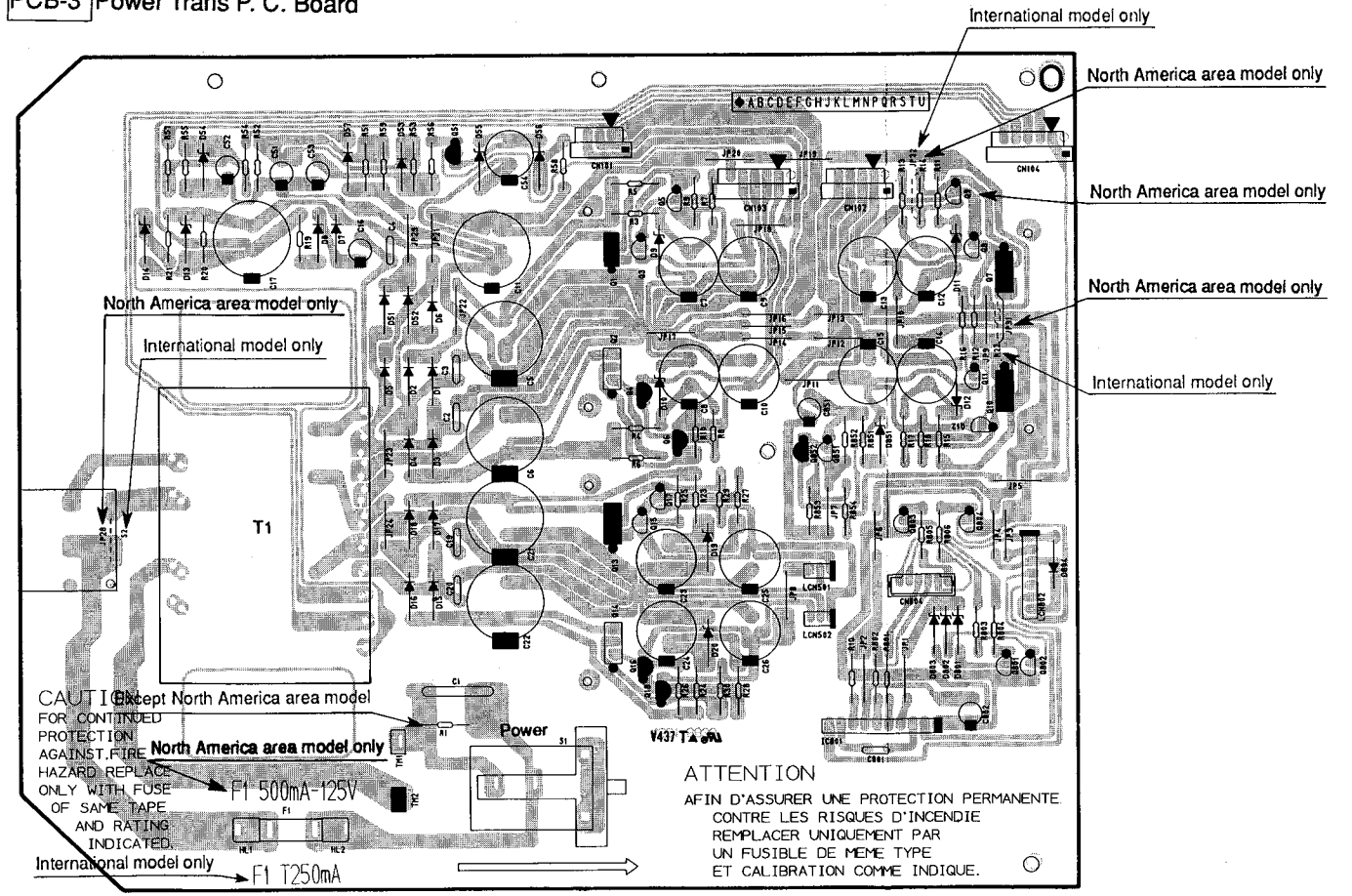
PCB-2 Front P. C. Board



PCB-4 Headphones Jack P. C. Board

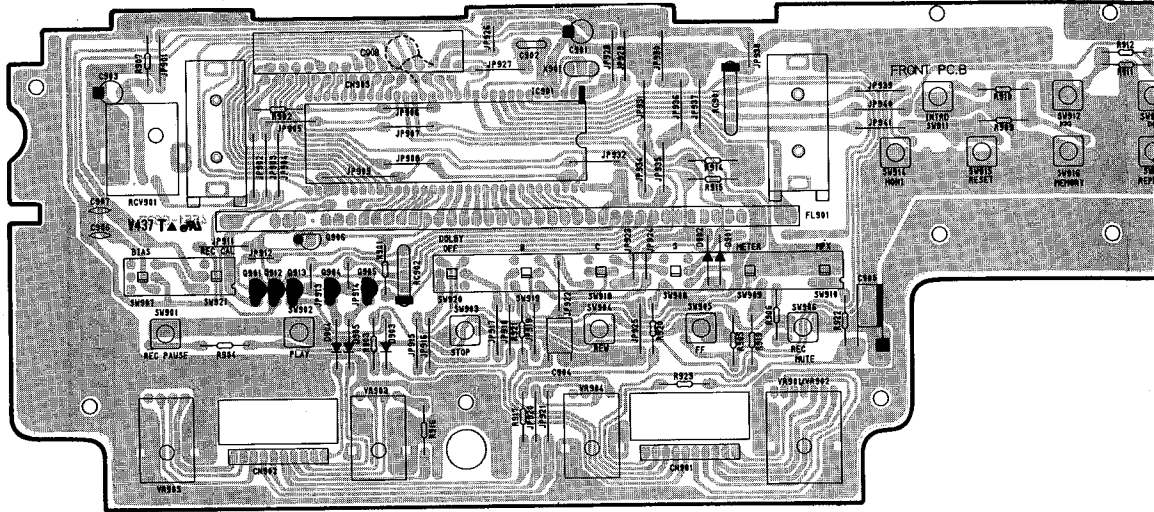


PCB-3 Power Trans P. C. Board

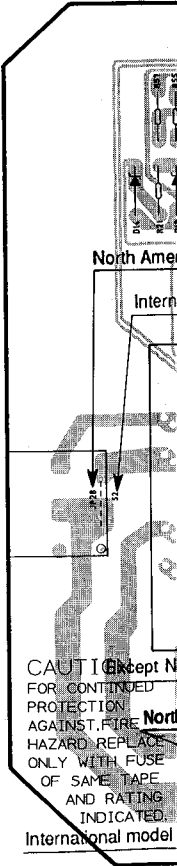


P. C. BOARDS (2)

PCB-2 Front P. C. Board



PCB-3 Power Tr



CAUTION: Except for North American model, for continued protection against fire hazard, replace only with fuse of same type and rating indicated. International model.

F

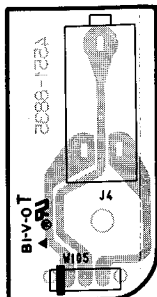
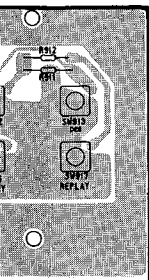
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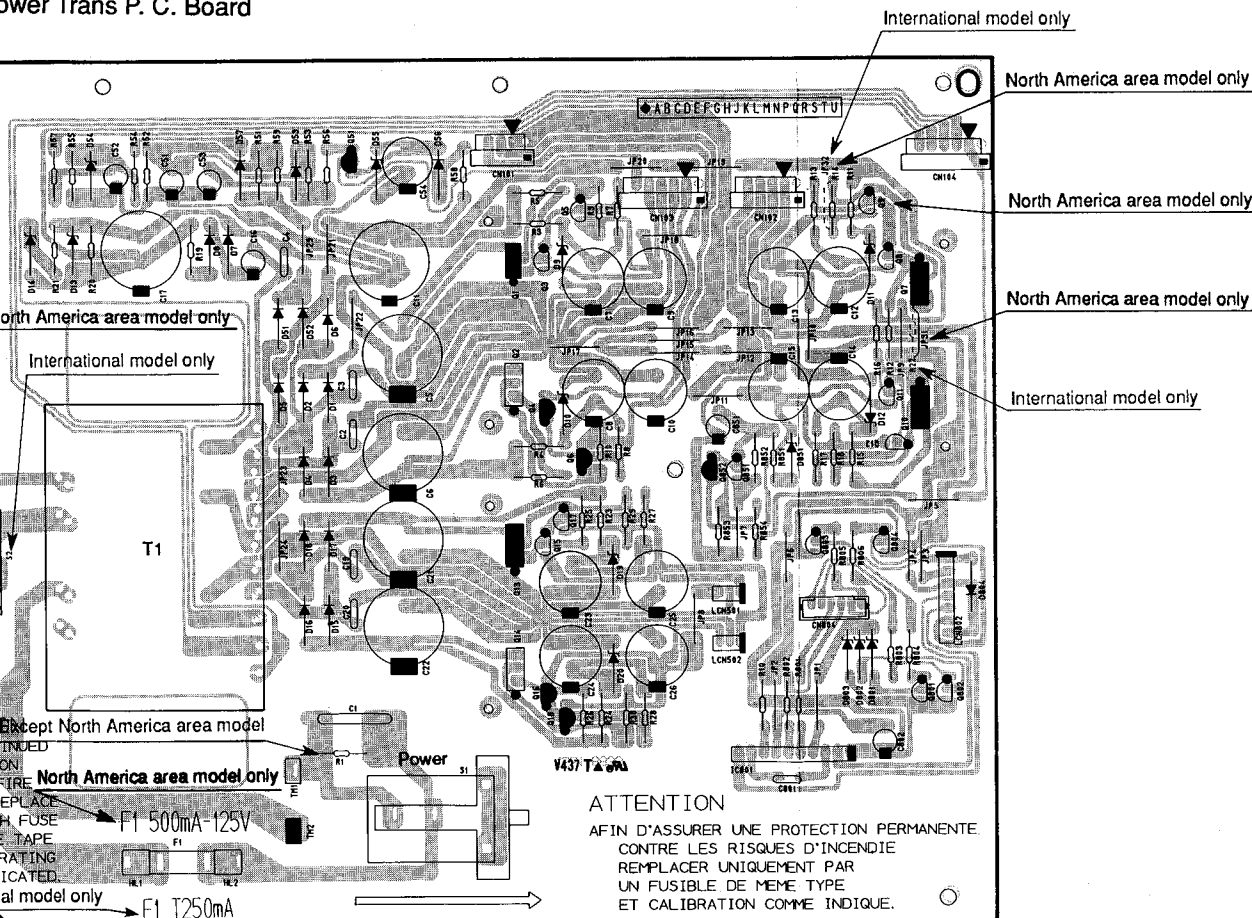
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PCB-4 Headphones Jack P. C. Board



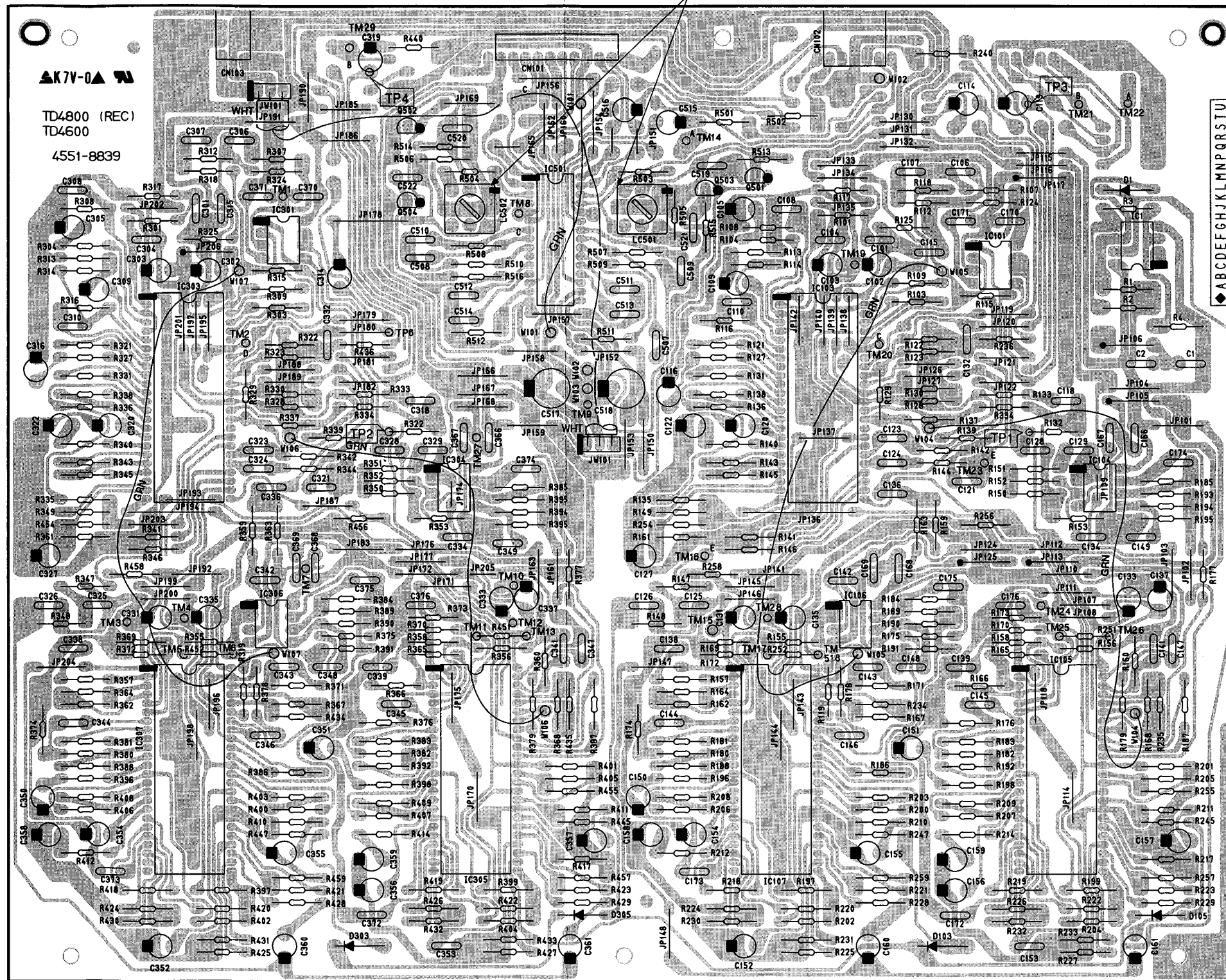
Power Trans P. C. Board



P. C. BOARDS (3)

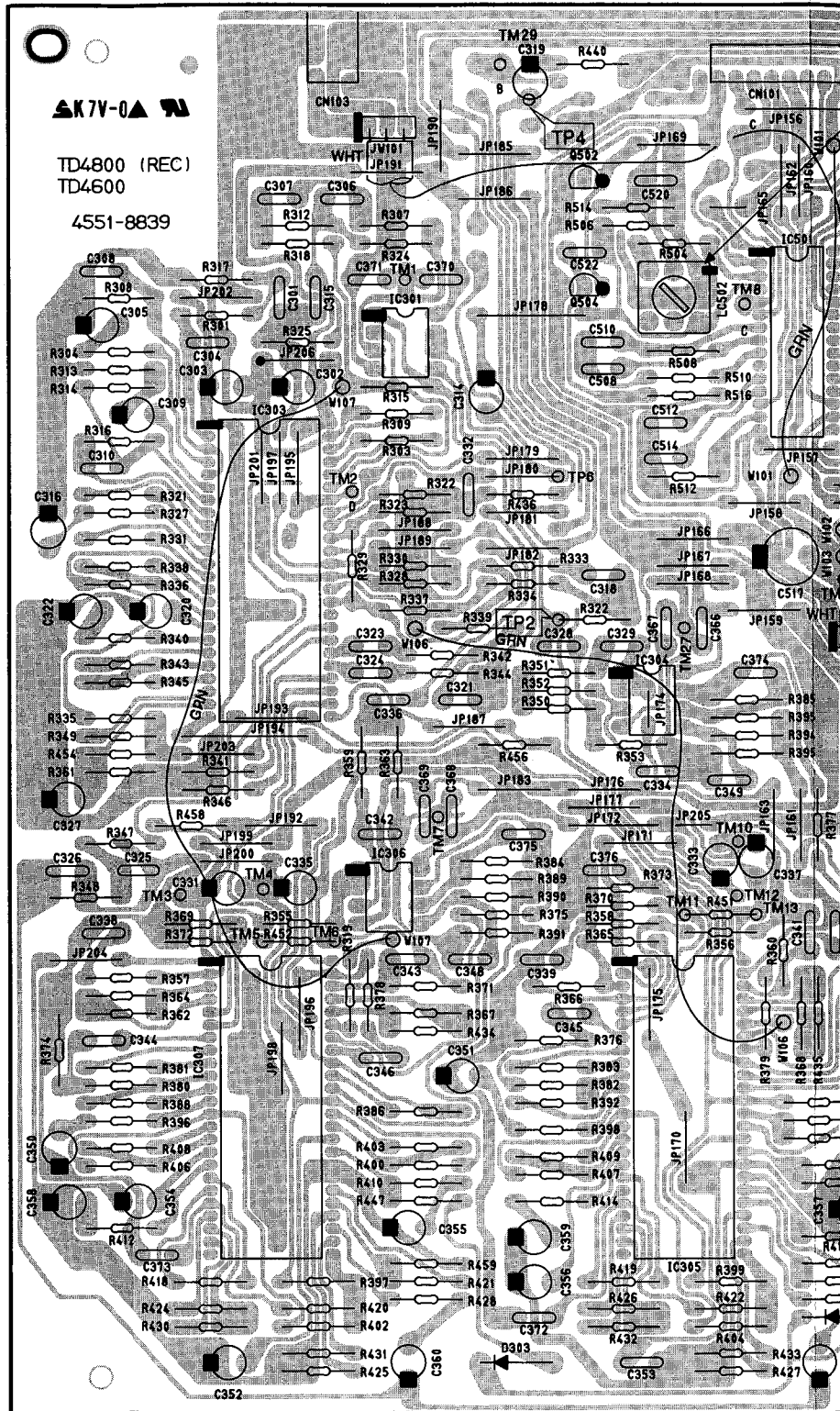
PCB-5 Dolby NR (Rec) P. C. Board

MPX FILTER CHARACTERISTIC ADJ.

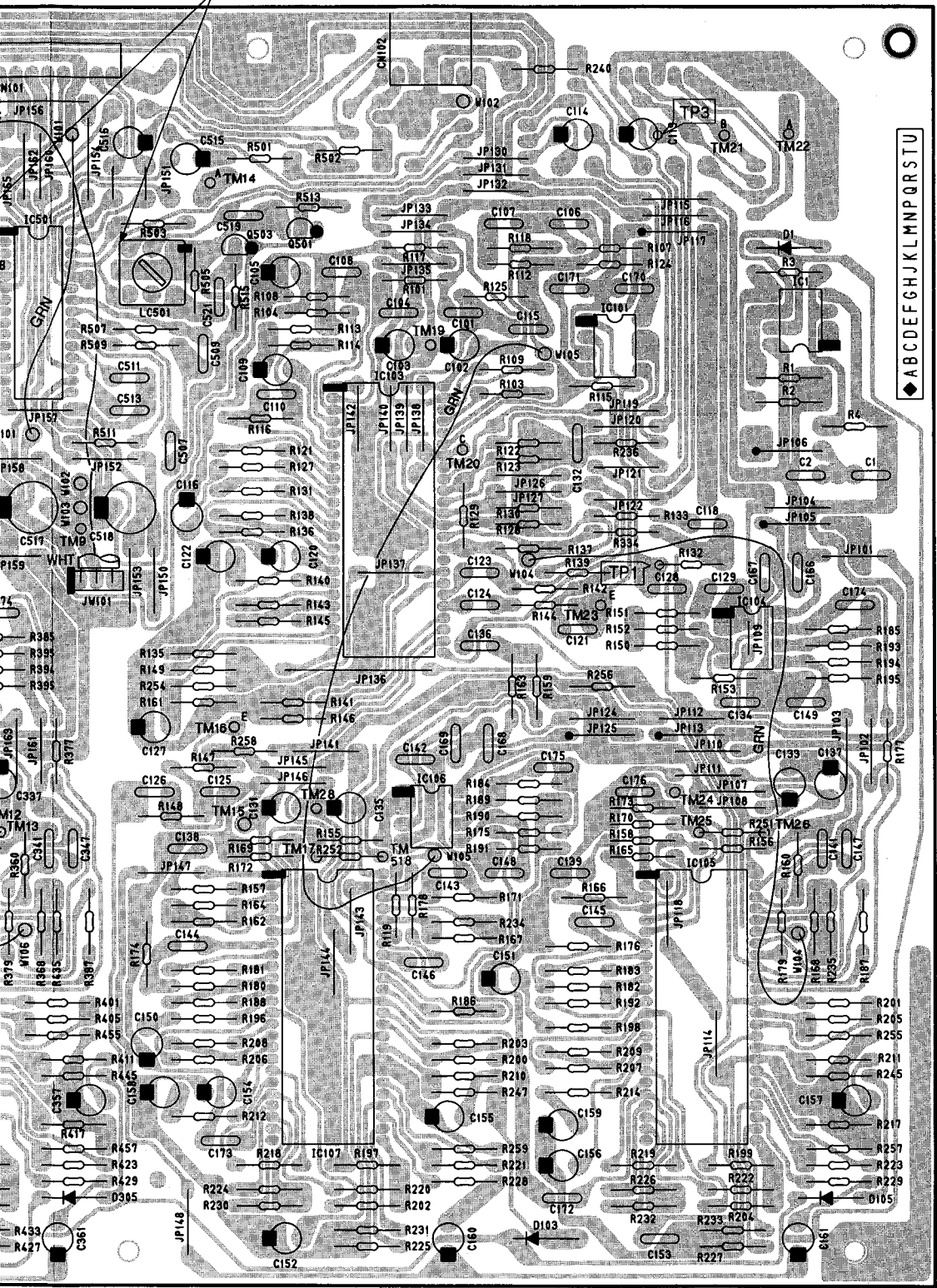


P. C. BOARDS (3)

PCB-5 Dolby NR (Rec) P. C. Board



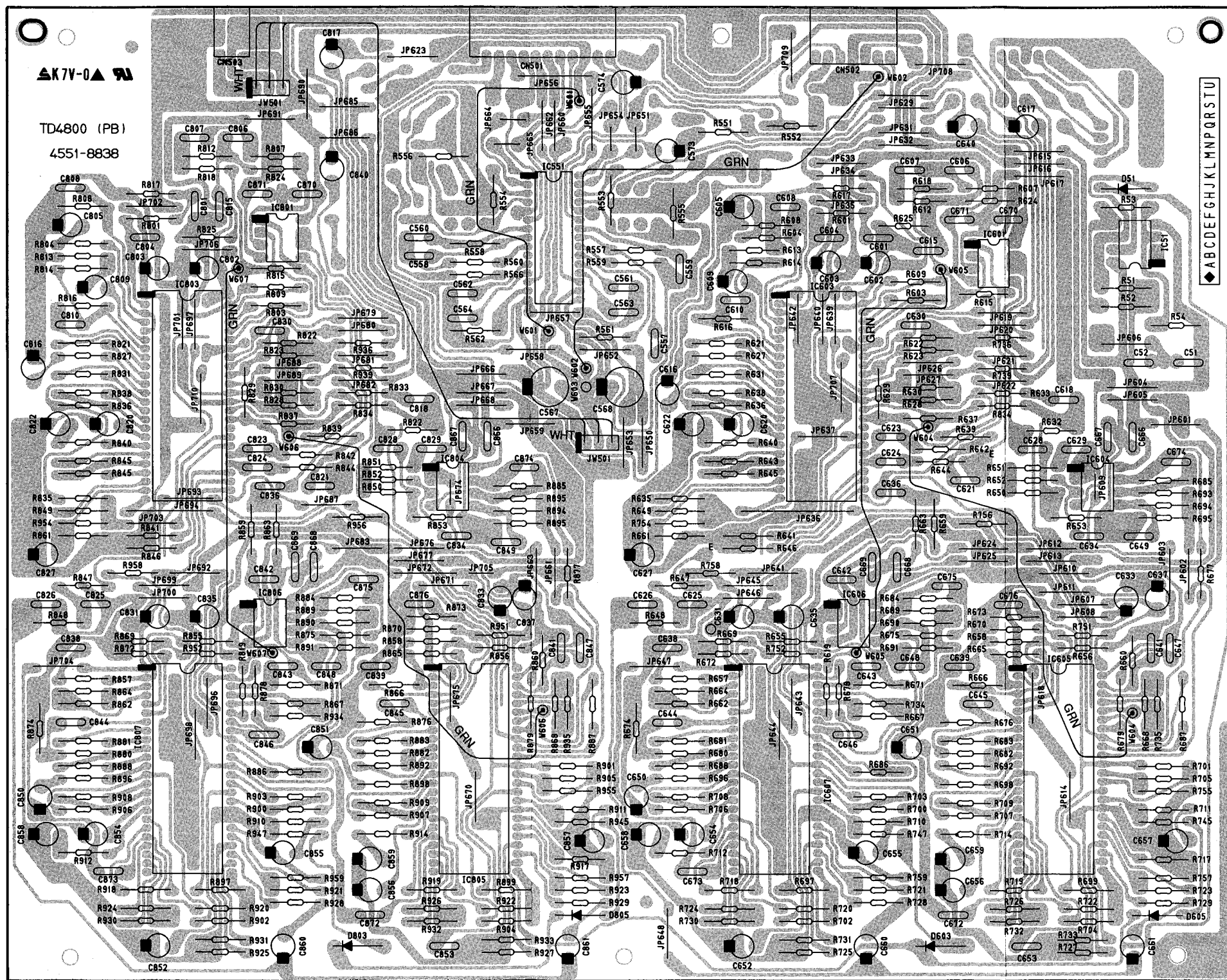
MPX FILTER
CHARACTERISTIC ADJ.



◆ ABCDEFGHJKL MNPQRSTU

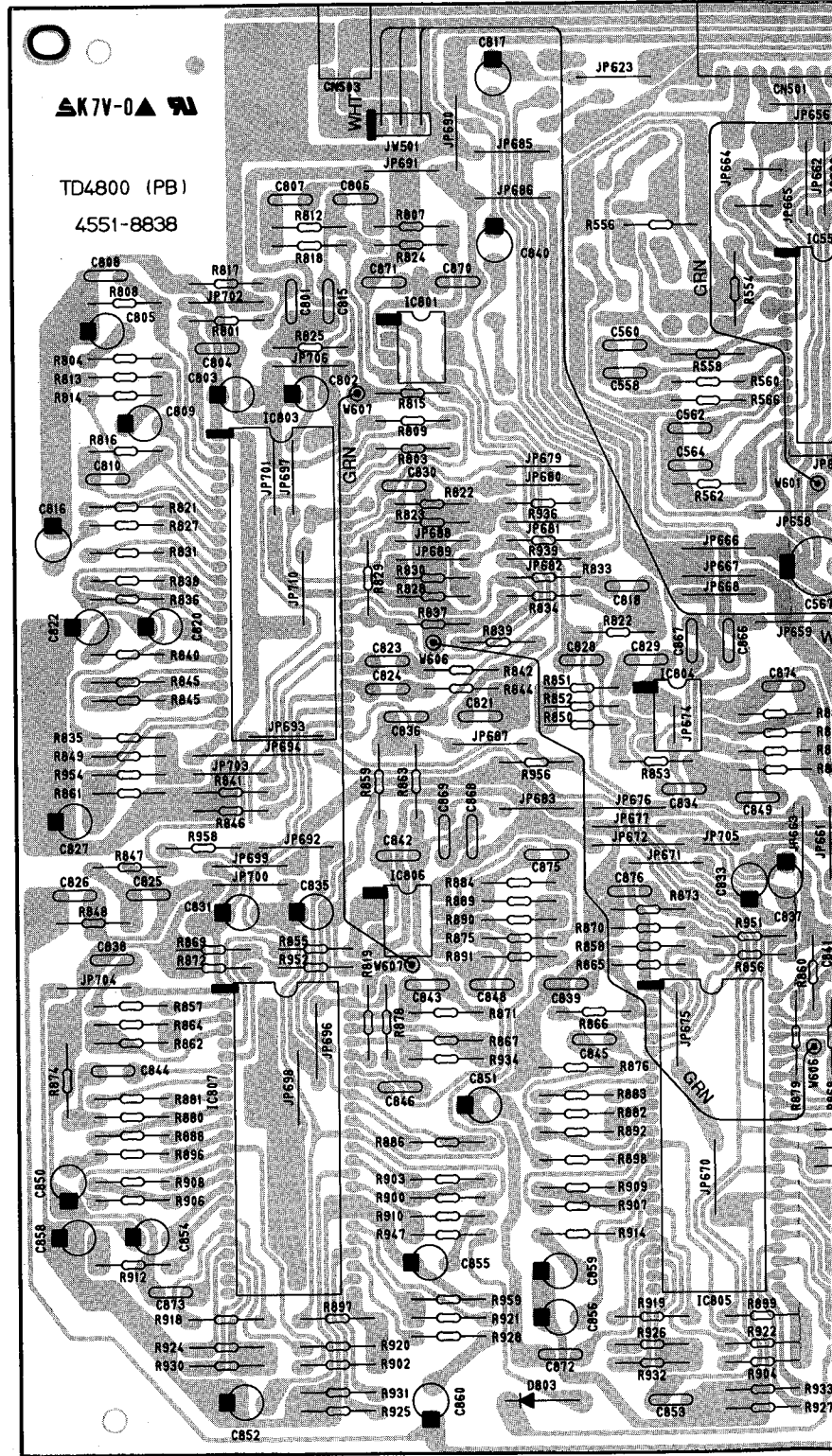
P. C. BOARDS (4)

PCB-6 Dolby NR (Play) P. C. Board



P. C. BOARDS (4)

PCB-6 Dolby NR (Play) P. C. Board



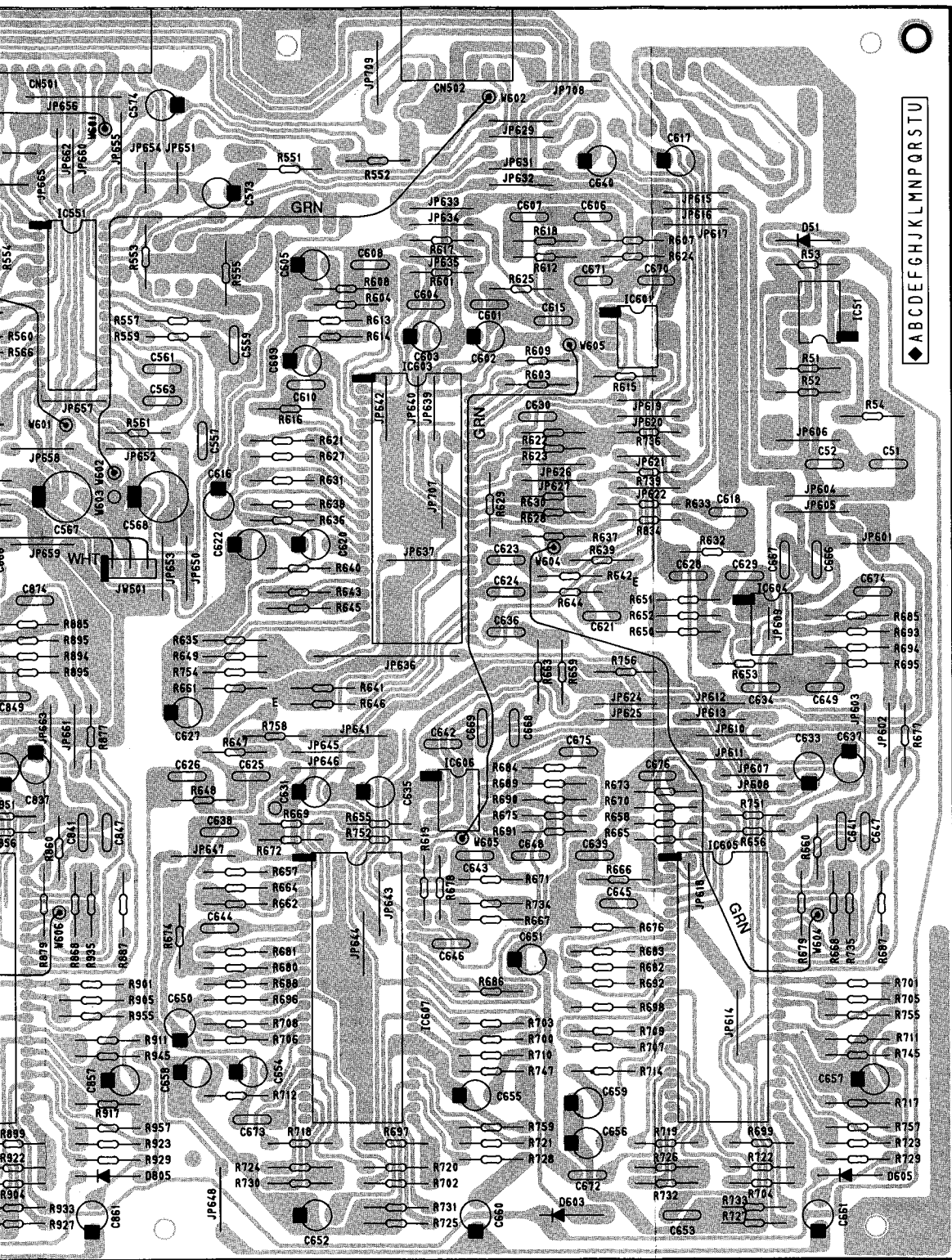
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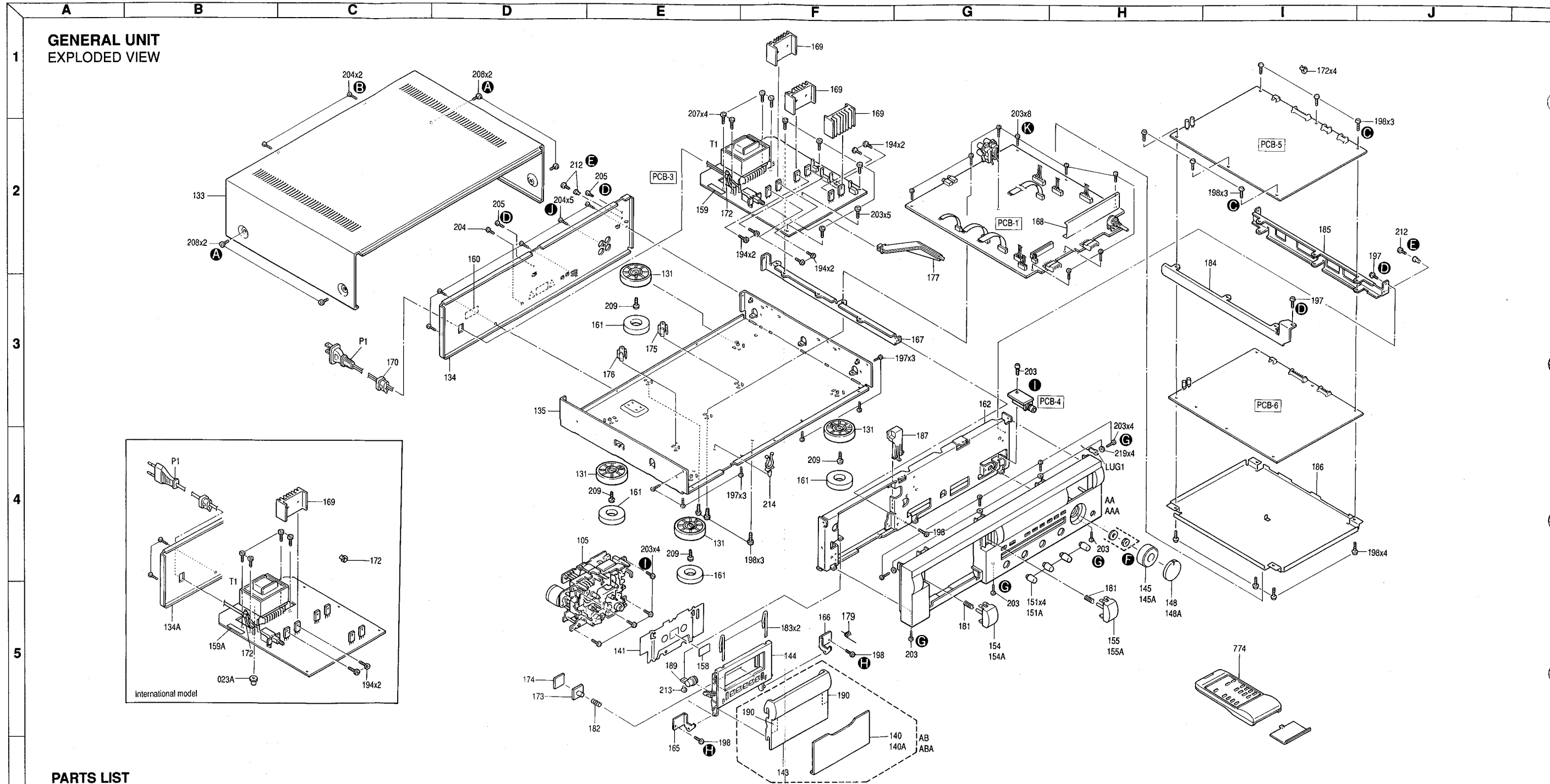
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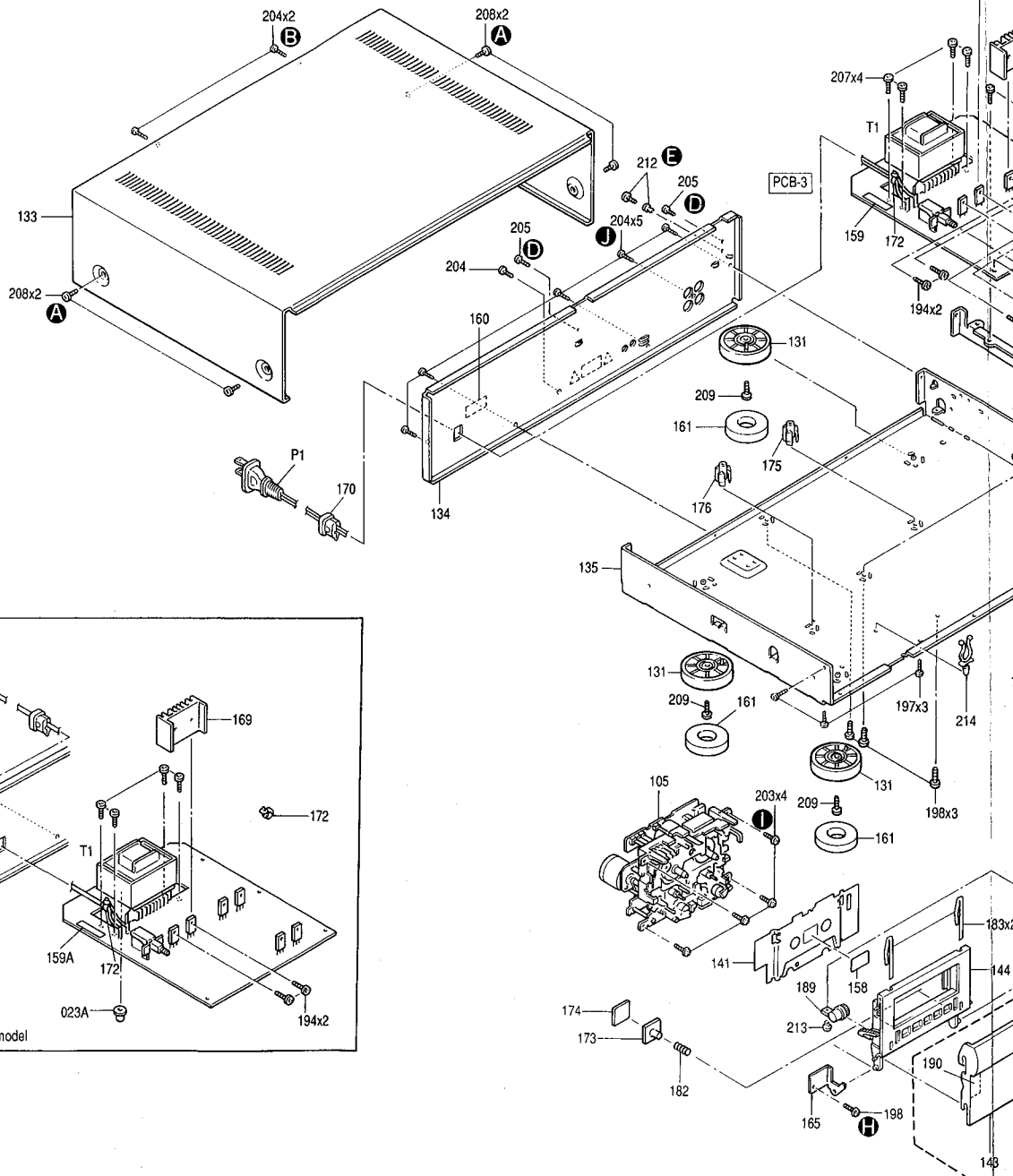


PARTS LIST

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description	Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
AA	A442-TD4800A	FRONT PANEL ASS'Y UA I	145A	1630-04401	ROTARY KNOB IB BK	203	2347-R0130082	SCREW,BND T+	203	2347-R0130082	SCREW,BND T+
AAA	A442-TD4800B	FRONT PANEL ASS'Y IB BK	148	1630-04502	ROTARY KNOB UA I	204	2347-R0130084	SCREW,BND T+	204	2347-R0130084	SCREW,BND T+
AB	A532-TD4800A	CASSETTE LID ASS'Y UA I	148A	1630-04501	ROTARY KNOB IB BK	207	2347-R0140062	SCREW,BND T+	207	2347-R0140062	SCREW,BND T+
ABA	A532-TD4800B	CASSETTE LID ASS'Y IB BK	151	1632-20402	ROTARY KNOB UA I	208	2347-R0140064	SCREW,BND T+	208	2347-R0140064	SCREW,BND T+
021A	1756-06303	LABEL IB I	151A	1632-20401	ROTARY KNOB IB BK	209	2347-R0140082	SCREW,BND T+	209	2347-R0140082	SCREW,BND T+
022A	1756-03108	LABEL IB I	154	1662-58403	PUSH BUTTON UA I	212	2459-3003511	RIVET,PLSTC	212	2459-3003511	RIVET,PLSTC
105	3112-16001	REC BLOCK	154A	1662-58401	PUSH BUTTON IB BK	213	2459-3005511	RIVET,PLSTC	213	2459-3005511	RIVET,PLSTC
131	1319-02301	LEG	155	1662-58404	PUSH BUTTON UA I	214	2240-7049	HOLDER	214	2240-7049	HOLDER
133	1414-15902	CABINET	155A	1662-58402	PUSH BUTTON IB BK	219	2411-30Z1	WASHER,PLAIN	219	2411-30Z1	WASHER,PLAIN
134	1424-31604	CABI BACK UA BK	158	1741-01601	ORNAMENT	774	6142-02703	REMOTE CONTROL	774	6142-02703	REMOTE CONTROL
134A	1424-31608	CABI BACK IB I	160	1756-CSA	LABEL UA BK	LUG1	4211-5005	LUG TERMINAL	LUG1	4211-5005	LUG TERMINAL
135	1424-31702	CABI BACK	162	2211-7311	CHASSIS	Δ P1	4161-71151	CORD W/PLUG UA BK	Δ P1	4161-71151	CORD W/PLUG UA BK
140	1512-06808	PLATE UA I	165	2219-8296	METAL FITTG	Δ P1	4161-7256	CORD W/PLUG IB BK	Δ P1	4161-7256	CORD W/PLUG IB BK
140A	1512-06804	PLATE IB BK	166	2219-8297	METAL FITTG						
141	1514-23301	PLATE	167	2219-8293	METAL FITTG						
143	1532-19501	WINDOW	168	2216-7191	SHIELD PLATE						
144	1612-07401	CASS LID	169	2222-7281	HEAT SINK						
145	1630-04402	ROTARY KNOB UA I	170	2240-364	HOLDER						
						172	2240-R0101	HOLDER			
						173	2240-7371	HOLDER			
						174	2114-87143	BUSHING			
						175	2360-7022	BOSS,SPE			
						176	2360-7063	BOSS,SPE			
						177	2601-7192	SHAFT			
						179	2651-047	SPRING			
						180	2651-11212	SPRING			
						181	2651-2101732	SPRING			
						182	2651-2101735	SPRING			
						183	2652-105	LEAF SPRING			
						184	2219-8294	METAL FITTG			
						185	2219-8295	METAL FITTG			
						186	2216-7190	SHIELD PLATE			
						187	2672-7045	LEVER			
						189	2692-016	DAMPER			
						190	2111-11401	FELT			
						194	2327-R0130082	SCREW,BND T+			
						197	2347-R0130062	SCREW,BND T+			

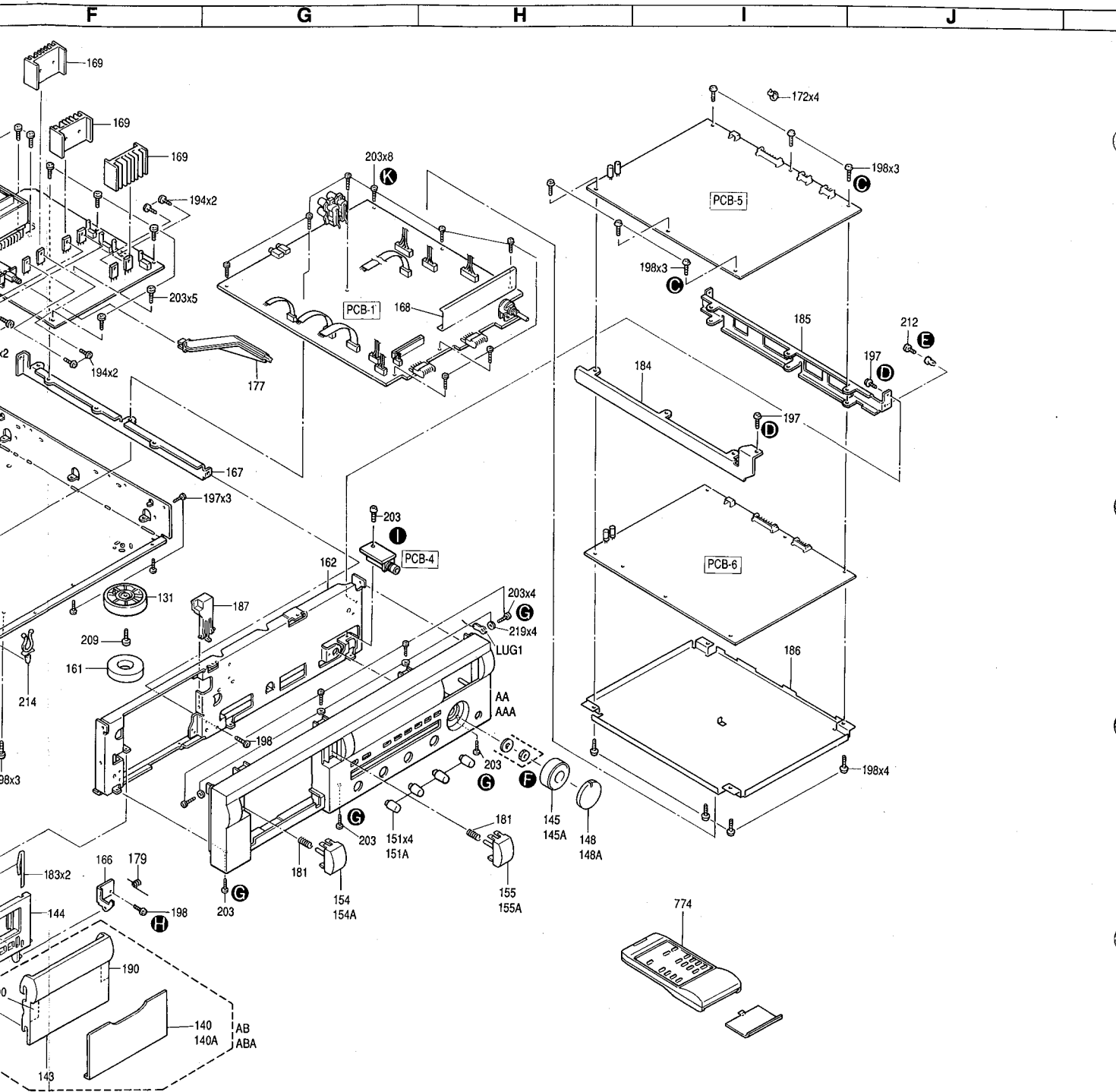
NOTE
 SAFETY RELATED COMPONENT. USE ONLY EXACT REPLACEMENT PART AS SPECIFIED.

**GENERAL UNIT
EXPLODED VIEW**



PARTS LIST

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
AA	A442-TD4800A	FRONT PANEL ASS'Y (UA) (I)	145A	1630-04401	ROTARY KNOB (IB) (SK)
AAA	A442-TD4800B	FRONT PANEL ASS'Y (IB) (SK)	148	1630-04502	ROTARY KNOB (UA) (I)
AB	A532-TD4800A	CASSETTE LID ASS'Y (UA) (I)	148A	1630-04501	ROTARY KNOB (IB) (SK)
ABA	A532-TD4800B	CASSETTE LID ASS'Y (IB) (SK)	151	1632-20402	ROTARY KNOB (UA) (I)
021A	1756-06303	LABEL (IB) (I)	151A	1632-20401	ROTARY KNOB (IB) (SK)
022A	1756-03108	LABEL (IB) (I)	154	1662-58403	PUSH BUTTON (UA) (I)
105	3112-16001	REC BLOCK	154A	1662-58401	PUSH BUTTON (IB) (SK)
131	1319-02301	LEG	155	1662-58404	PUSH BUTTON (UA) (I)
133	1414-15902	CABINET	155A	1662-58402	PUSH BUTTON (IB) (SK)
134	1424-31604	CABI BACK (UA) (SK)	158	1741-01601	ORNAMENT
134A	1424-31608	CABI BACK (IB) (I)	160	1756-CSA	LABEL (UA) (SK)
135	1424-31702	CABI BACK	162	2211-7311	CHASSIS
140	1512-06808	PLATE (UA) (I)	165	2219-8296	METAL FITTG
140A	1512-06804	PLATE (IB) (SK)	166	2219-8297	METAL FITTG
141	1514-23301	PLATE	167	2219-8293	METAL FITTG
143	1532-19501	WINDOW	168	2216-7191	SHIELD PLATE
144	1612-07401	CASS LID	169	2222-7281	HEAT SINK
145	1630-04402	ROTARY KNOB (UA) (I)	170	2240-364	HOLDER

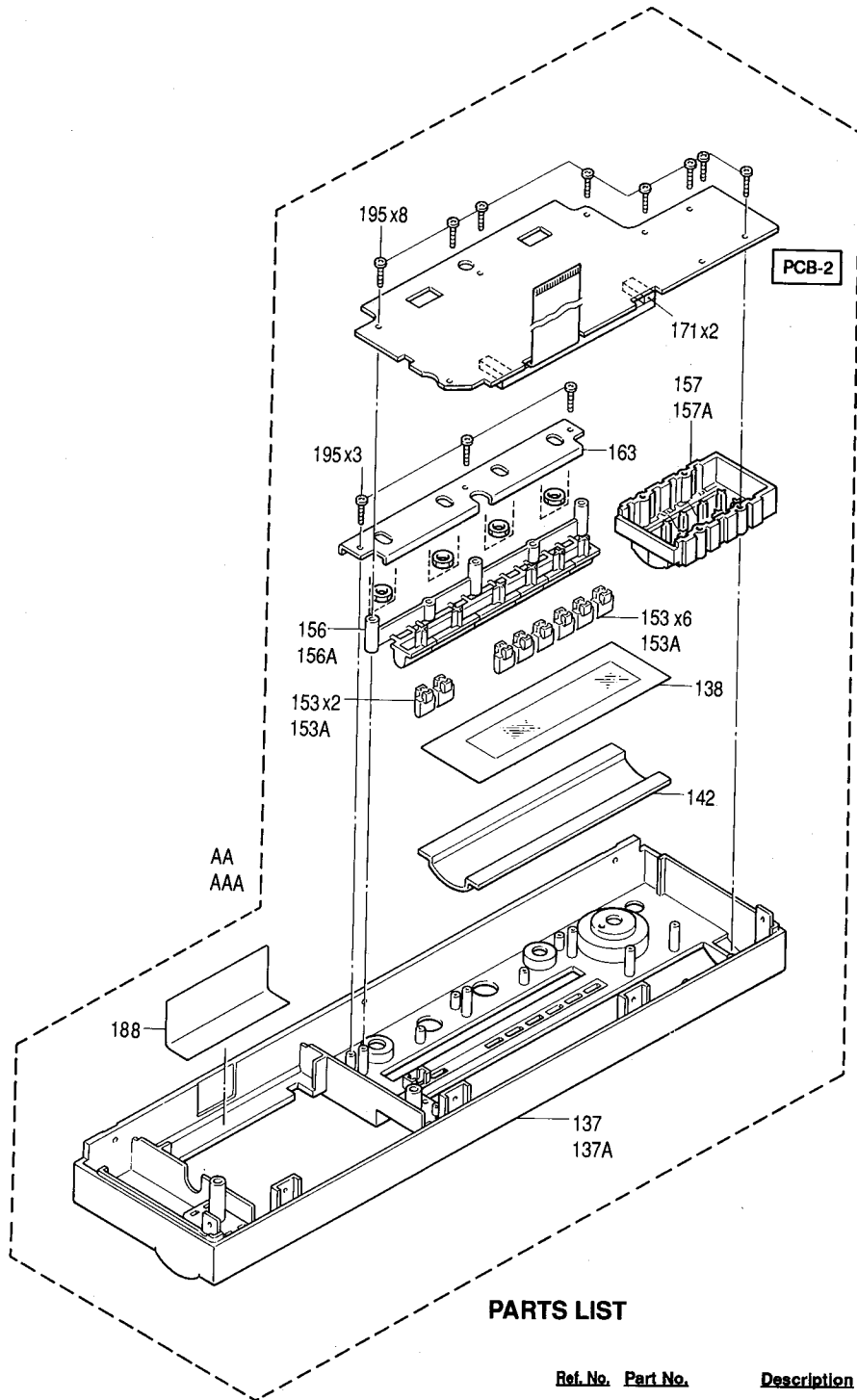


Ref. No.	Part No.	Description
172	2240-R0101	HOLDER
173	2240-7371	HOLDER
174	2114-87143	BUSHING
175	2360-7022	BOSS,SPE
176	2360-7063	BOSS,SPE
177	2601-7192	SHAFT
179	2651-047	SPRING
180	2651-11212	SPRING
181	2651-2101732	SPRING
182	2651-2101735	SPRING
183	2652-105	LEAF SPRING
184	2219-8294	METAL FITTG
185	2219-8295	METAL FITTG
186	2216-7190	SHIELD PLATE
187	2672-7045	LEVER
189	2692-016	DAMPER
190	2111-11401	FELT
194	2327-R0130082	SCREW,BND T+
197	2347-R0130062	SCREW,BND T+

Ref. No.	Part No.	Description
203	2347-R0130082	SCREW,BND T+
204	2347-R0130084	SCREW,BND T+
207	2347-R0140062	SCREW,BND T+
208	2347-R0140064	SCREW,BND T+
209	2347-R0140082	SCREW,BND T+
212	2459-3003511	RIVET,PLSTC
213	2459-3005511	RIVET,PLSTC
214	2240-7049	HOLDER
219	2411-30Z1	WASHER,PLAIN
774	6142-02703	REMOTE CONTROL
LUG1	4211-5005	LUG TERMINAL
Δ P1	4161-71151	CORD W/PLUG UA SK
Δ P1	4161-7256	CORD W/PLUG IB L

NOTE
 SAFETY RELATED COMPONENT. USE ONLY EXACT REPLACEMENT PART AS SPECIFIED.

**FRONT PANEL
EXPLODED VIEW**



PARTS LIST

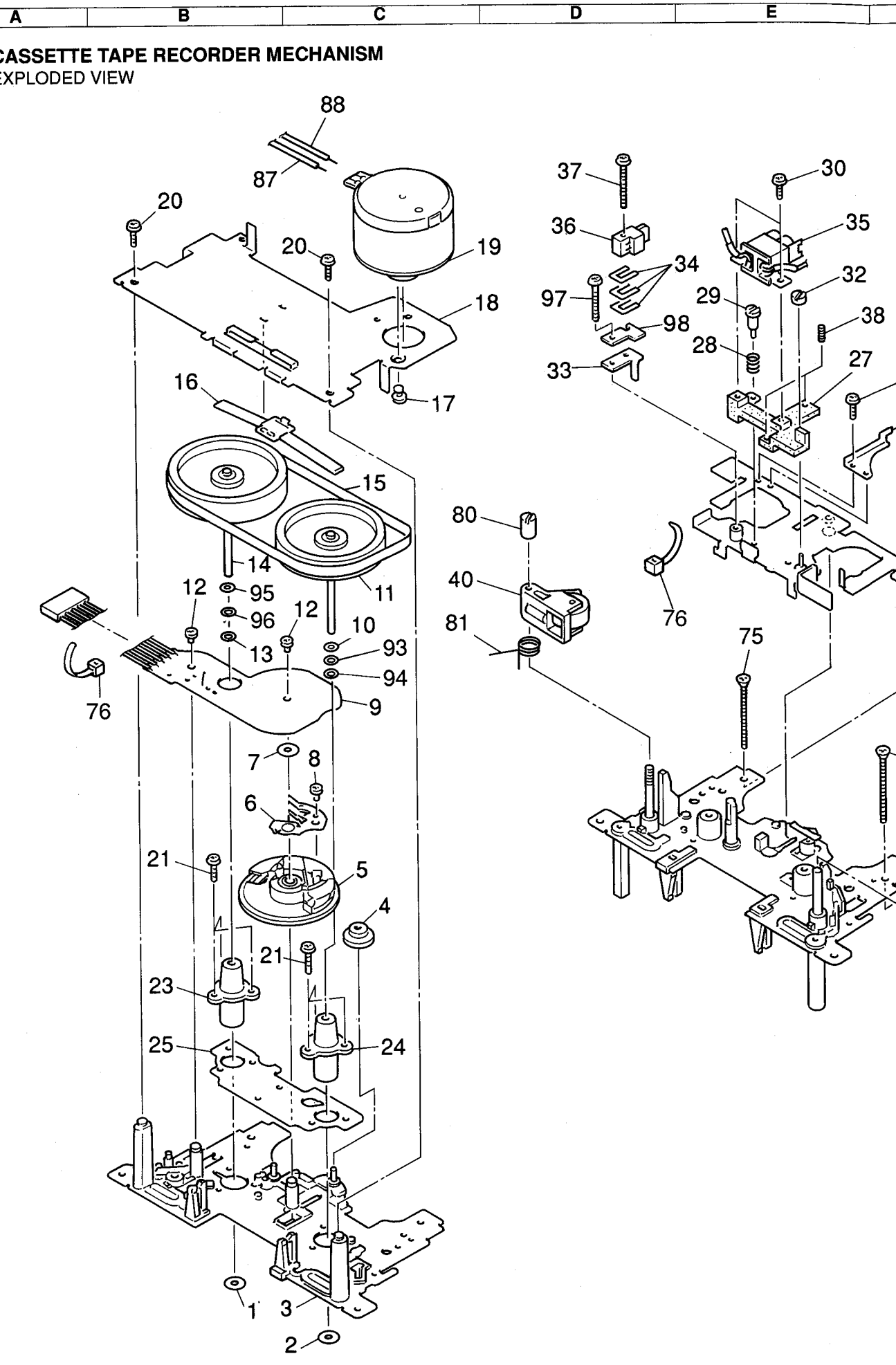
Ref. No.	Part No.	Description
AA	A442-TD4800A	FRONT PANEL ASS'Y UA I
AAA	A442-TD4800B	FRONT PANEL ASS'Y IB BK
137	1442-24410	PANEL UA I
137A	1442-24404	PANEL IB BK
138	1511-19807	PLATE
142	1532-17505	WINDOW
153	1662-52303	PUSH BUTTON UA I
153A	1662-52301	PUSH BUTTON IB BK
156	1662-58502	PUSH BUTTON UA I
156A	1662-58501	PUSH BUTTON IB BK
157	1662-61002	PUSH BUTTON UA I
157A	1662-61001	PUSH BUTTON IB BK
163	2219-8284	METAL FITTG
171	2240-7370	HOLDER
188	2216-7195	SHIELD PLATE
195	2347-R0126082	SCREW,BND T+ (2.6 x 8 mm)

CASSETTE TAPE RECORDER MECHANISM

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>	<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
1	SEE10230-01	WASHER ($\phi 2.5 \times \phi 7 \times 10.8$)	68	SGE24008-01	COIL SPRING
2	KGE103473-A	WASHER ($\phi 2.2 \times \phi 7 \times 10.8$)	69	KGD104046-B	CASSETTE HOLD PLATE
3	SGD01001-32	MECHA CHASSIS	70	KGE104147-A	PHOTO REFLECTOR
4	KGE103928-A	ASSIST GEAR	71	KGE103267-A	SPINDLE
5	KGD104231-A	CAM	72	KGE104053-A	LEVER (RIGHT)
6	KGE104233-A	ROTARY	73	SGD20001-01	EJECT LEVER (RIGHT)
7	KGE104234-A	WASHER ($\phi 3 \times \phi 8 \times 10.5$)	75	SEE30514-03	SCREW (M2.6 x 30)
8	SEE30522-01	SCREW (M2 x 3)	76	SGE33008-01	BAND
9	SGE0800122	CONTROL P. C. BOARD (w/CONNECTOR)	77	SEE27179-54	CONNECTOR WITH LEAD WIRE
10	SGE36008-02	WASHER ($\phi 2.2 \times \phi 7 \times 10.2$)	78	SEE27179-81	CONNECTOR WITH LEAD WIRE
11	SGD32005-03	FLYWHEEL	79	SEE27179-82	CONNECTOR WITH LEAD WIRE
12	KGE103483-A	SCREW (M2 x 3)	80	KGE103738-B	P/R ARM ADJUST SCREW
13	SEE10228-38	WASHER ($\phi 2.6 \times \phi 7 \times 10.13$)	81	SGE24018-01	S PINCH ROLLER SPRING
14	SGD32004-01	FLYWHEEL	82	SEE30525-13	SCREW (M2 x 2.5)
15	SGE18003-01	BELT	83	SGE19006-01	STOPPER
16	KGE103929-C	FLYWHEEL SPINDLE CATCHER	84	SEE5523-07	CONNECTOR
17	14536	SCREW (M2.6 x 3)	85	SEE5523-08	CONNECTOR
18	KGD103953-B	MOTOR BASE	86	KGE104145-A	LEAD WIRE
19	SGE05004-22	CAPSTAN MOTOR	87	SGE64005-06	LEAD WIRE
20	SEE30544-03	SCREW (M2.6 x 8)	88	SGE64004-02	LEAD WIRE
21	SEE30578-07	SCREW (2 x 8)	89	KGE015113-B	PULLEY
23	SGE09008-01	CAPSTAN STAND	90	SGE18006-02	BELT
24	SGE09008-02	CAPSTAN STAND	91	SEE10228-18	WASHER
25	SGE19007-01	PLATE	92	SEE30544-03	SCREW (M2.6 x 8)
27	SGD11001-02	HEAD BLOCK	93	SGE36007-02	WASHER ($\phi 2.3 \times \phi 4.7 \times 10.2$)
28	SIE24029-02	COIL SPRING	94	SEE10228-39	WASHER ($\phi 2.3 \times \phi 7 \times 10.13$)
29	SIE22059-01	SPINDLE	95	SGE36008-03	WASHER ($\phi 2.5 \times \phi 6 \times 10.2$)
30	SEE30578-07	SCREW (2 x 4)	96	SGE36007-01	WASHER ($\phi 2.6 \times \phi 4.7 \times 10.2$)
31	SGE02004-51	HEAD BASE	97	SEE30545-02	SCREW (M2 x 5)
32	SIE23008-01	ADJUST NUT	98	SGE19019-01	ERASE HEAD BASE
33	KGE103206A	ERASE HEAD BASE			
34	SIE34011-01~03	SPACER			
35	SGE65009-01	REC/PB HEAD			
36	HJWB3701A	ERASE HEAD			
37	KGE103216A	SCREW (M2 x 10)			
38	SEE30539-03	SCREW (M2 x 4)			
39	SGE33005-01	WASHER			
40	SGE03003-01	S PINCH ARM ASS'Y			
43	SGE03001-03	PINCH ARM ASS'Y			
46	KGD104113-A	P. C. BOARD			
47	SEE50212-32	RESISTOR (2.2k)			
48	KGE104135-A	GND WIRE			
49	KGE104136-A	LEAD WIRE			
50	KGD103952-A	LEAF SWITCH			
51	SGE05001-03	REEL MOTOR			
52	KGE103931-B	AIDLER GEAR			
53	KGD103948-A	ASSIST LEVER A			
54	SGE24022-02	COIL SPRING			
55	SGE09004-01	BRAKE PULLEY T			
56	KGE103982-A	COIL SPRING			
57	SEE10228-20	WASHER ($\phi 2.6 \times \phi 5.5 \times 10.13$)			
58	SGE09003-01	BRAKE PULLEY S			
59	KGD103949-B	ASSIST LEVER B			
60	KGC103950-C	SUB CHASSIS			
61	SGE05002-01	SOLENOID			
62	KGE103960-A	PLUNGER			
63	SGE24020-01	CASSETTE HOLD SPRING			
64	SEE30622-01	SCREW (M2.6 x 1.6)			
65	KGE103983-A	COIL SPRING			
66	SGE04001-03	REEL (w/REFLECTION PLATE)			

CASSETTE TAPE RECORDER MECHANISM
EXPLODED VIEW

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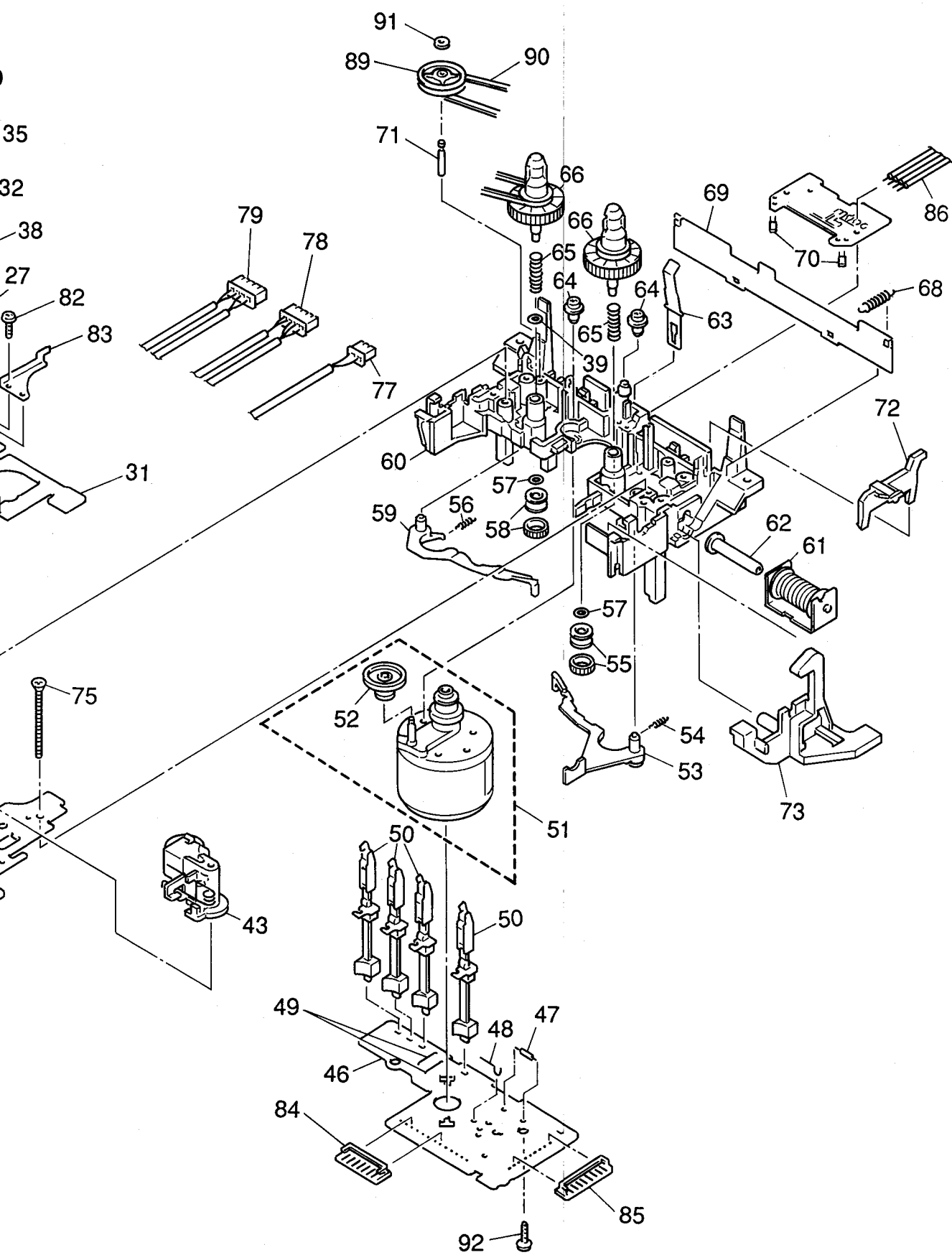
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ELECTRICAL PARTS LIST



Ser. No.	Ref. No.	Part No.	Description	Ser. No.	Ref. No.	Part No.	Description	Ser. No.	Ref. No.	Part No.	Description	Ser. No.	Ref. No.	Part No.	Description
PCB-1 MAIN P. C. BOARD															
CAPACITORS															
427	C101	5353-470534	CAP,MCA 47P	712	C403	5345-475F041	CAP,MINI ELE 4.7μ/50V	501	R212	5135-392522	RES,CBN 1/2P 3.9K	922	R366	5135-101522	RES,CBN 1/2P 100
427	C102	5353-470534	CAP,MCA 47P	712	C404	5345-475F041	CAP,MINI ELE 4.7μ/50V	502	R213	5135-104522	RES,CBN 1/2P 100K	925	R367	5135-104522	RES,CBN 1/2P 100K
415	C103	5345-226C0951	CAP,MINI ELE 22μ/16V	716	C405	5359-S010J222	CAP,PPP 2200P	502	R214	5135-104522	RES,CBN 1/2P 100K	925	R368	5135-104522	RES,CBN 1/2P 100K
415	C104	5345-226C0951	CAP,MINI ELE 22μ/16V	716	C406	5359-S010J222	CAP,PPP 2200P	503	R215	5135-183522	RES,CBN 1/2P 18K	926	R369	5135-331522	RES,CBN 1/2P 330
423	C105	5359-8225851	CAP,PPP 8200P	712	C407	5345-475F041	CAP,MINI ELE 4.7μ/50V	503	R216	5135-183522	RES,CBN 1/2P 18K	926	R370	5135-331522	RES,CBN 1/2P 330
423	C106	5359-8225851	CAP,PPP 8200P	712	C408	5345-475F041	CAP,MINI ELE 4.7μ/50V	504	R217	5135-471522	RES,CBN 1/2P 470	927	R371	5135-220522	RES,CBN 1/2P 22
416	C107	5345-337A0952	CAP,MINI ELE 330μ/6.3V	712	C409	5345-475F041	CAP,MINI ELE 4.7μ/50V	504	R218	5135-471522	RES,CBN 1/2P 470	927	R372	5135-220522	RES,CBN 1/2P 22
416	C108	5345-337A0952	CAP,MINI ELE 330μ/6.3V	712	C410	5345-475F041	CAP,MINI ELE 4.7μ/50V	505	R219	5135-222522	RES,CBN 1/2P 2.2K	719	R401	5135-472522	RES,CBN 1/2P 4.7K
415	C109	5345-226C0951	CAP,MINI ELE 22μ/16V	715	C411	5345-226F041	CAP,MINI ELE 22μ/50V	505	R220	5135-222522	RES,CBN 1/2P 2.2K	719	R402	5135-472522	RES,CBN 1/2P 4.7K
415	C110	5345-226C0951	CAP,MINI ELE 22μ/16V	715	C412	5345-226F041	CAP,MINI ELE 22μ/50V	506	R221	5135-103522	RES,CBN 1/2P 10K	720	R403	5135-104522	RES,CBN 1/2P 100K
424	C111	5359-2225851	CAP,PPP 2200P	713	C413	5345-476D041	CAP,MINI ELE 47μ/25V	506	R222	5135-103522	RES,CBN 1/2P 10K	720	R404	5135-104522	RES,CBN 1/2P 100K
424	C112	5359-2225851	CAP,PPP 2200P	714	C414	5345-105F041	CAP,MINI ELE 1μ/50V	507	R223	5135-104522	RES,CBN 1/2P 100K	720	R405	5135-104522	RES,CBN 1/2P 100K
420	C113	5345-477C041	CAP,MINI ELE 470μ/16V	952	C601	5354-393J1HM	CAP,MYL .039μ	507	R224	5135-104522	RES,CBN 1/2P 100K	720	R406	5135-104522	RES,CBN 1/2P 100K
420	C114	5345-477C041	CAP,MINI ELE 470μ/16V	953	C602	5359-S010J122	CAP,PPP 1200P	508	R225	5135-121522	RES,CBN 1/2P 120	723	R407	5135-222522	RES,CBN 1/2P 2.2K
425	C115	5359-1025851	CAP,PPP 1000P	952	C603	5354-393J1HM	CAP,MYL .039μ	508	R226	5135-121522	RES,CBN 1/2P 120	723	R408	5135-222522	RES,CBN 1/2P 2.2K
425	C116	5359-1025851	CAP,PPP 1000P	953	C604	5359-S010J122	CAP,PPP 1200P	510	R227	5135-122522	RES,CBN 1/2P 1.2K	724	R409	5135-303522	RES,CBN 1/2P 30K
485	C201	5359-S010J332	CAP,PPP 3300P	957	C605	5345-475F041	CAP,MINI ELE 4.7μ/50V	510	R228	5135-122522	RES,CBN 1/2P 1.2K	724	R410	5135-303522	RES,CBN 1/2P 30K
485	C202	5359-S010J332	CAP,PPP 3300P	956	C606	5345-476D041	CAP,MINI ELE 47μ/25V	511	R229	5135-221522	RES,CBN 1/2P 220	725	R411	5135-102522	RES,CBN 1/2P 1K
484	C203	5359-S010J821	CAP,PPP 820P	956	C607	5345-476D041	CAP,MINI ELE 47μ/25V	511	R230	5135-221522	RES,CBN 1/2P 220	725	R412	5135-102522	RES,CBN 1/2P 1K
484	C204	5359-S010J821	CAP,PPP 820P	956	C608	5345-476D041	CAP,MINI ELE 47μ/25V	509	R231	5135-122522	RES,CBN 1/2P 1.2K	726	R415	5135-334522	RES,CBN 1/2P 330K
486	C205	5359-S010J183	CAP,PPP .018μ	955	C609	5345-106F041	CAP,MINI ELE 10μ/50V	509	R232	5135-122522	RES,CBN 1/2P 1.2K	726	R416	5135-334522	RES,CBN 1/2P 330K
486	C206	5359-S010J183	CAP,PPP .018μ	956	C610	5345-476D041	CAP,MINI ELE 47μ/25V	514	R233	5135-473522	RES,CBN 1/2P 47K	727	R419	5135-331522	RES,CBN 1/2P 330
487	C207	5359-S010J222	CAP,PPP 2200P	954	C611	5345-336D041	CAP,MINI ELE 33μ/25V	514	R234	5135-473522	RES,CBN 1/2P 47K	727	R420	5135-331522	RES,CBN 1/2P 330
487	C208	5359-S010J222	CAP,PPP 2200P	935	C653	5353-220534	CAP,MCA 22P	512	R237	5135-104522	RES,CBN 1/2P 100K	723	R421	5135-222522	RES,CBN 1/2P 2.2K
488	C209	5359-S010J152	CAP,PPP 1500P	935	C654	5353-220534	CAP,MCA 22P	512	R238	5135-104522	RES,CBN 1/2P 100K	721	R422	5135-103522	RES,CBN 1/2P 10K
488	C210	5359-S010J152	CAP,PPP 1500P	934	C655	5345-476D041	CAP,MINI ELE 47μ/25V	515	R239	5135-680522	RES,CBN 1/2P 68	721	R423	5135-103522	RES,CBN 1/2P 10K
476	C211	5345-105F0951	CAP,MINI ELE 1μ/50V	934	C656	5345-476D041	CAP,MINI ELE 47μ/25V	515	R240	5135-680522	RES,CBN 1/2P 68	728	R424	5135-472522	RES,CBN 1/2P 4.7K
476	C212	5345-105F0951	CAP,MINI ELE 1μ/50V	683	C702	5345-106F041	CAP,MINI ELE 10μ/50V	516	R241	5135-331522	RES,CBN 1/2P 330	729	R425	5135-100522	RES,CBN 1/2P 10
491	C213	5359-S010J153	CAP,PPP .015μ	892	C703	5345-107C041	CAP,MINI ELE 100μ/16V	516	R242	5135-331522	RES,CBN 1/2P 330	721	R426	5135-103522	RES,CBN 1/2P 10K
491	C214	5359-S010J153	CAP,PPP .015μ	675	C704	5345-107C041	CAP,MINI ELE 100μ/16V	513	R243	5135-220522	RES,CBN 1/2P 22	721	R427	5135-103522	RES,CBN 1/2P 10K
477	C215	5345-107B0951	CAP,MINI ELE 100μ/10V	683	C705	5345-106F041	CAP,MINI ELE 10μ/50V	513	R244	5135-220522	RES,CBN 1/2P 22	725	R429	5135-102522	RES,CBN 1/2P 1K
477	C216	5345-107B0951	CAP,MINI ELE 100μ/10V	893	C751	5354-473J1HM	CAP,MYL .047μ	518	R245	5135-1R0522	RES,CBN 1/2P 1	647	R501	5135-473522	RES,CBN 1/2P 47K
475	C217	5345-684F0951	CAP,MINI ELE .68μ/50V	891	C752	5345-476D041	CAP,MINI ELE 47μ/25V	518	R246	5135-1R0522	RES,CBN 1/2P 1	650	R502	5135-102522	RES,CBN 1/2P 1K
475	C218	5345-684F0951	CAP,MINI ELE .68μ/50V	891	C754	5345-476D041	CAP,MINI ELE 47μ/25V	517	R247	5135-680522	RES,CBN 1/2P 68	648	R503	5135-103522	RES,CBN 1/2P 10K
478	C219	5345-224F0951	CAP,MINI ELE .22μ/50V	891	C755	5345-476D041	CAP,MINI ELE 47μ/25V	517	R248	5135-680522	RES,CBN 1/2P 68	647	R504	5135-473522	RES,CBN 1/2P 47K
478	C220	5345-224F0951	CAP,MINI ELE .22μ/50V	894	C755	5359-S010J822	CAP,PPP 8200P	519	R249	5135-472522	RES,CBN 1/2P 4.7K	647	R505	5135-473522	RES,CBN 1/2P 47K
480	C221	5345-227B0952	CAP,MINI ELE 220μ/10V	434	R101	5135-470522	RES,CBN 1/2P 47	519	R250	5135-472522	RES,CBN 1/2P 4.7K	647	R506	5135-473522	RES,CBN 1/2P 47K
480	C222	5345-227B0952	CAP,MINI ELE 220μ/10V	434	R102	5135-470522	RES,CBN 1/2P 47	506	R251	5135-103522	RES,CBN 1/2P 10K	649	R507	5135-104522	RES,CBN 1/2P 100K
481	C223	5345-227C041	CAP,MINI ELE 220μ/16V	435	R103	5135-473522	RES,CBN 1/2P 47K	506	R252	5135-103522	RES,CBN 1/2P 10K	649	R508	5135-104522	RES,CBN 1/2P 100K
481	C224	5345-227C041	CAP,MINI ELE 220μ/16V	435	R104	5135-473522	RES,CBN 1/2P 47K	506	R253	5135-103522	RES,CBN 1/2P 10K	649	R509	5135-104522	RES,CBN 1/2P 100K
479	C225	5345-474F0951	CAP,MINI ELE .47μ/50V	436	R105	5135-272522	RES,CBN 1/2P 2.7K	506	R254	5135-103522	RES,CBN 1/2P 10K	649	R510	5135-104522	RES,CBN 1/2P 100K
479	C226	5345-474F0951	CAP,MINI ELE .47μ/50V	436	R106	5135-272522	RES,CBN 1/2P 2.7K	560	R301	5135-330522	RES,CBN 1/2P 33	649	R511	5135-104522	RES,CBN 1/2P 100K
482	C227	5345-335F0951	CAP,MINI ELE 3.3μ/50V	437	R107	5135-470522	RES,CBN 1/2P 47	562	R302	5135-104522	RES,CBN 1/2P 100K	649	R512	5135-104522	RES,CBN 1/2P 100K
482	C228	5345-335F0951	CAP,MINI ELE 3.3μ/50V	437	R108	5135-470522	RES,CBN 1/2P 47	562	R303	5135-104522	RES,CBN 1/2P 100K	649	R513	5135-104522	RES,CBN 1/2P 100K
547	C301	5354-S060K103	CAP,MYL .01μ	437	R109	5135-470522	RES,CBN 1/2P 47	538	R304	5135-100522	RES,CBN 1/2P 10	649	R514	5135-104522	RES,CBN 1/2P 100K
556	C302	5361-220523	CAP,CER 22P	438	R109	5135-394522	RES,CBN 1/2P 390K	538	R305	5135-100522	RES,CBN 1/2P 10	958	R601	5135-333522	RES,CBN 1/2P 33K
542	C303	5342-106D041	CAP,ELE BP 10μ/25V	438	R110	5135-394522	RES,CBN 1/2P 390K	563	R306	5135-103522	RES,CBN 1/2P 10K	958	R602	5135-333522	RES,CBN 1/2P 33K
550	C304	5359-S010J332	CAP,PPP 3300P	438	R111	5135-151522	RES,CBN 1/2P 150	563	R307	5135-103522	RES,CBN 1/2P 10K	959	R603	5135-472522	RES,CBN 1/2P 4.7K
551	C305	5359-S010J153	CAP,PPP .015μ	439	R112	5135-151522	RES,CBN 1/2P 150	561	R308	5135-220522	RES,CBN 1/2P 22	959	R604	5135-472522	RES,CBN 1/2P 4.7K
543	C306	5345-106F041	CAP,MINI ELE 10μ/50V	442	R115	5135-153522	RES,CBN 1/2P 15K	564	R309	5135-103522	RES,CBN 1/2P 10K	960	R605	5135-104522	RES,CBN 1/2P 100K
552	C307	5359-S010J222	CAP,PPP 2200P	442	R116	5135-153522	RES,CBN 1/2P 15K	565	R310	5135-473522	RES,CBN 1/2P 47K	960	R606	5135-104522	RES,CBN 1/2P 100K
552	C308	5359-S010J222	CAP,PPP 2200P	443	R117	5135-473522	RES,CBN 1/2P 47K	539	R311	5135-220522	RES,CBN 1/2P 22	961	R607	5135-102522	RES,CBN 1/2P 1K
557	C309	5361-1010423	CAP,CER 100P	443	R118	5135-473522	RES,CBN 1/2P 47K	566	R312	5135-472522	RES,CBN 1/2P 4.7K	961	R608	5135-102522	RES,CBN 1/2P 1K
557	C310	5361-1010423	CAP,CER 100P	443	R118	5135-473522	RES,CBN 1/2P 47K	567	R313	5135-822522	RES,CBN 1/2P 8.2K	962	R609	5135-122522	RES,CBN 1/2P 1.2K
557	C311	5361-1010423	CAP,CER 100P	444	R119	5135-203522	RES,CBN 1/2P 20K	566	R314	5135-472522	RES,CBN 1/2P 4.7K	962	R610		

<u>Ser. No.</u>	<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>	<u>Ser. No.</u>	<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
501	R212	5135-392522	RES,CBN 1/2P 3.9K	922	R366	5135-101522	RES,CBN 1/2P 100
502	R213	5135-104522	RES,CBN 1/2P 100K	925	R367	5135-104522	RES,CBN 1/2P 100K
502	R214	5135-104522	RES,CBN 1/2P 100K	925	R368	5135-104522	RES,CBN 1/2P 100K
503	R215	5135-183522	RES,CBN 1/2P 18K	926	R369	5135-331522	RES,CBN 1/2P 330
503	R216	5135-183522	RES,CBN 1/2P 18K	926	R370	5135-331522	RES,CBN 1/2P 330
504	R217	5135-471522	RES,CBN 1/2P 470	927	R371	5135-220522	RES,CBN 1/2P 22
504	R218	5135-471522	RES,CBN 1/2P 470	927	R372	5135-220522	RES,CBN 1/2P 22
505	R219	5135-222522	RES,CBN 1/2P 2.2K	719	R401	5135-472522	RES,CBN 1/2P 4.7K
505	R220	5135-222522	RES,CBN 1/2P 2.2K	719	R402	5135-472522	RES,CBN 1/2P 4.7K
506	R221	5135-103522	RES,CBN 1/2P 10K	720	R403	5135-104522	RES,CBN 1/2P 100K
506	R222	5135-103522	RES,CBN 1/2P 10K	720	R404	5135-104522	RES,CBN 1/2P 100K
507	R223	5135-104522	RES,CBN 1/2P 100K	720	R405	5135-104522	RES,CBN 1/2P 100K
507	R224	5135-104522	RES,CBN 1/2P 100K	720	R406	5135-104522	RES,CBN 1/2P 100K
508	R225	5135-121522	RES,CBN 1/2P 120	723	R407	5135-222522	RES,CBN 1/2P 2.2K
508	R226	5135-121522	RES,CBN 1/2P 120	723	R408	5135-222522	RES,CBN 1/2P 2.2K
510	R227	5135-122522	RES,CBN 1/2P 1.2K	724	R409	5135-303522	RES,CBN 1/2P 30K
510	R228	5135-122522	RES,CBN 1/2P 1.2K	724	R410	5135-303522	RES,CBN 1/2P 30K
511	R229	5135-221522	RES,CBN 1/2P 220	725	R411	5135-102522	RES,CBN 1/2P 1K
511	R230	5135-221522	RES,CBN 1/2P 220	725	R412	5135-102522	RES,CBN 1/2P 1K
509	R231	5135-122522	RES,CBN 1/2P 1.2K	726	R415	5135-334522	RES,CBN 1/2P 330K
509	R232	5135-122522	RES,CBN 1/2P 1.2K	726	R416	5135-334522	RES,CBN 1/2P 330K
514	R233	5135-473522	RES,CBN 1/2P 47K	727	R419	5135-331522	RES,CBN 1/2P 330
514	R234	5135-473522	RES,CBN 1/2P 47K	727	R420	5135-331522	RES,CBN 1/2P 330
512	R237	5135-104522	RES,CBN 1/2P 100K	723	R421	5135-222522	RES,CBN 1/2P 2.2K
512	R238	5135-104522	RES,CBN 1/2P 100K	721	R422	5135-103522	RES,CBN 1/2P 10K
515	R239	5135-680522	RES,CBN 1/2P 68	721	R423	5135-103522	RES,CBN 1/2P 10K
515	R240	5135-680522	RES,CBN 1/2P 68	728	R424	5135-472522	RES,CBN 1/2P 4.7K
516	R241	5135-331522	RES,CBN 1/2P 330	729	R425	5135-100522	RES,CBN 1/2P 10
516	R242	5135-331522	RES,CBN 1/2P 330	721	R426	5135-103522	RES,CBN 1/2P 10K
513	R243	5135-220522	RES,CBN 1/2P 22	721	R427	5135-103522	RES,CBN 1/2P 10K
513	R244	5135-220522	RES,CBN 1/2P 22	725	R429	5135-102522	RES,CBN 1/2P 1K
518	R245	5135-1R0522	RES,CBN 1/2P 1	647	R501	5135-473522	RES,CBN 1/2P 47K
518	R246	5135-1R0522	RES,CBN 1/2P 1	650	R502	5135-102522	RES,CBN 1/2P 1K
517	R247	5135-680522	RES,CBN 1/2P 68	648	R503	5135-103522	RES,CBN 1/2P 10K
517	R248	5135-680522	RES,CBN 1/2P 68	647	R504	5135-473522	RES,CBN 1/2P 47K
519	R249	5135-472522	RES,CBN 1/2P 4.7K	647	R505	5135-473522	RES,CBN 1/2P 47K
519	R250	5135-472522	RES,CBN 1/2P 4.7K	647	R506	5135-473522	RES,CBN 1/2P 47K
506	R251	5135-103522	RES,CBN 1/2P 10K	649	R507	5135-104522	RES,CBN 1/2P 100K
506	R252	5135-103522	RES,CBN 1/2P 10K	649	R508	5135-104522	RES,CBN 1/2P 100K
506	R253	5135-103522	RES,CBN 1/2P 10K	649	R509	5135-104522	RES,CBN 1/2P 100K
506	R254	5135-103522	RES,CBN 1/2P 10K	649	R510	5135-104522	RES,CBN 1/2P 100K
560	R301	5135-330522	RES,CBN 1/2P 33	649	R511	5135-104522	RES,CBN 1/2P 100K
562	R302	5135-104522	RES,CBN 1/2P 100K	649	R512	5135-104522	RES,CBN 1/2P 100K
562	R303	5135-104522	RES,CBN 1/2P 100K	649	R513	5135-104522	RES,CBN 1/2P 100K
538	R304	5135-100522	RES,CBN 1/2P 10	649	R514	5135-104522	RES,CBN 1/2P 100K
538	R305	5135-100522	RES,CBN 1/2P 10	958	R601	5135-393522	RES,CBN 1/2P 39K
563	R306	5135-103522	RES,CBN 1/2P 10K	958	R602	5135-393522	RES,CBN 1/2P 39K
563	R307	5135-103522	RES,CBN 1/2P 10K	959	R603	5135-472522	RES,CBN 1/2P 4.7K
561	R308	5135-220522	RES,CBN 1/2P 22	959	R604	5135-472522	RES,CBN 1/2P 4.7K
564	R309	5135-103522	RES,CBN 1/2P 10K	960	R605	5135-104522	RES,CBN 1/2P 100K
565	R310	5135-473522	RES,CBN 1/2P 47K	960	R606	5135-104522	RES,CBN 1/2P 100K
539	R311	5135-220522	RES,CBN 1/2P 22	961	R607	5135-102522	RES,CBN 1/2P 1K
566	R312	5135-472522	RES,CBN 1/2P 4.7K	961	R608	5135-102522	RES,CBN 1/2P 1K
567	R313	5135-822522	RES,CBN 1/2P 8.2K	962	R609	5135-122522	RES,CBN 1/2P 1.2K
566	R314	5135-472522	RES,CBN 1/2P 4.7K	962	R610	5135-122522	RES,CBN 1/2P 1.2K
567	R315	5135-822522	RES,CBN 1/2P 8.2K	960	R611	5135-104522	RES,CBN 1/2P 100K
573	R316	5135-564522	RES,CBN 1/2P 560K	960	R612	5135-104522	RES,CBN 1/2P 100K
568	R317	5135-154522	RES,CBN 1/2P 150K	960	R613	5135-104522	RES,CBN 1/2P 100K
568	R318	5135-154522	RES,CBN 1/2P 150K	965	R614	5135-103522	RES,CBN 1/2P 10K
571	R319	5135-333522	RES,CBN 1/2P 33K	966	R615	5135-220522	RES,CBN 1/2P 22
571	R320	5135-333522	RES,CBN 1/2P 33K	968	R616	5135-272522	RES,CBN 1/2P 2.7K
572	R321	5135-102522	RES,CBN 1/2P 1K	959	R617	5135-472522	RES,CBN 1/2P 4.7K
572	R322	5135-102522	RES,CBN 1/2P 1K	959	R618	5135-472522	RES,CBN 1/2P 4.7K
575	R323	5135-471522	RES,CBN 1/2P 470	959	R619	5135-472522	RES,CBN 1/2P 4.7K
575	R324	5135-471522	RES,CBN 1/2P 470	966	R621	5135-220522	RES,CBN 1/2P 22
572	R325	5135-102522	RES,CBN 1/2P 1K	967	R622	5135-473522	RES,CBN 1/2P 47K
572	R326	5135-102522	RES,CBN 1/2P 1K	967	R623	5135-473522	RES,CBN 1/2P 47K
572	R327	5135-102522	RES,CBN 1/2P 1K	963	R624	5135-153522	RES,CBN 1/2P 15K
575	R328	5135-471522	RES,CBN 1/2P 470	964	R625	5135-683522	RES,CBN 1/2P 68K
575	R329	5135-471522	RES,CBN 1/2P 470	964	R626	5135-683522	RES,CBN 1/2P 68K
576	R330	5135-822522	RES,CBN 1/2P 8.2K	959	R627	5135-472522	RES,CBN 1/2P 4.7K
569	R331	5135-100522	RES,CBN 1/2P 10	959	R628	5135-472522	RES,CBN 1/2P 4.7K
569	R332	5135-100522	RES,CBN 1/2P 10	963	R629	5135-153522	RES,CBN 1/2P 15K
919	R351	5135-102522	RES,CBN 1/2P 1K	959	R633	5135-472522	RES,CBN 1/2P 4.7K
919	R352	5135-102522	RES,CBN 1/2P 1K	959	R634	5135-472522	RES,CBN 1/2P 4.7K
920	R353	5135-473522	RES,CBN 1/2P 47K	969	R635	5135-223522	RES,CBN 1/2P 22K
920	R354	5135-473522	RES,CBN 1/2P 47K	937	R651	5135-103522	RES,CBN 1/2P 10K
921	R355	5135-182522	RES,CBN 1/2P 1.8K	937	R652	5135-103522	RES,CBN 1/2P 10K
921	R356	5135-182522	RES,CBN 1/2P 1.8K	938	R653	5135-333522	RES,CBN 1/2P 33K
922	R357	5135-101522	RES,CBN 1/2P 100	938	R654	5135-333522	RES,CBN 1/2P 33K
922	R358	5135-101522	RES,CBN 1/2P 100	939	R655	5135-153522	RES,CBN 1/2P 15K
923	R359	5135-622522	RES,CBN 1/2P 6.2K	939	R656	5135-153522	RES,CBN 1/2P 15K
923	R360	5135-622522	RES,CBN 1/2P 6.2K	940	R657	5135-101522	RES,CBN 1/2P 100
924	R361	5135-272522	RES,CBN 1/2P 2.7K	940	R658	5135-101522	RES,CBN 1/2P 100
924	R362	5135-272522	RES,CBN 1/2P 2.7K	936	R659	5135-100522	RES,CBN 1/2P 10
922	R365	5135-101522	RES,CBN 1/2P 100	936	R660	5135-100522	RES,CBN 1/2P 10

Ser. No.	Ref. No.	Part No.	Description
409	L104	5995-S200J273	COIL W/CORE
469	L201	5932-70223	COIL CASE,7
469	L202	5932-70223	COIL CASE,7
532	L301	5932-11402	COIL CASE,7
532	L302	5932-11402	COIL CASE,7
533	T301	5923-10501	OSC COIL,10
534	T302	5923-10401	OSC COIL,10
CONTROLS			
411	VR101	5101-20301934	RES,SEMI FIX 20K
411	VR102	5101-20301934	RES,SEMI FIX 20K
411	VR103	5101-20301934	RES,SEMI FIX 20K
411	VR104	5101-20301934	RES,SEMI FIX 20K
738	VR151/	5113-S1101503	RES,V CBN 16 50K
	VR152		
473	VR203	5101-20201934	RES,SEMI FIX 2K
473	VR204	5101-20201934	RES,SEMI FIX 2K
535	VR301	5101-20301934	RES,SEMI FIX 20K
535	VR302	5101-20301934	RES,SEMI FIX 20K
536	VR303	5101-20201934	RES,SEMI FIX 2K
536	VR304	5101-20201934	RES,SEMI FIX 2K
537	VR305	5101-50201934	RES,SEMI FIX 5K
537	VR306	5101-50201934	RES,SEMI FIX 5K
709	VR401	5101-20301934	RES,SEMI FIX 20K
709	VR402	5101-20301934	RES,SEMI FIX 20K
949	VR601	5101-50301934	RES,SEMI FIX 50K
949	VR602	5101-50301934	RES,SEMI FIX 50K
949	VR603	5101-50301934	RES,SEMI FIX 50K
885	VR751	5101-10401934	RES,SEMI FIX 100K
MISCELLANEOUS			
782	Δ J1	4484-46	PIN JACK,4P
808	CN105	4443-03201004	CONNECTOR
808	CN106	4443-03201004	CONNECTOR
809	CN301	4443-03201002	CONNECTOR
814	CN801	4443-00501010	CONNECTOR
814	CN802	4443-00501010	CONNECTOR
812	CN803	4443-05501032	CONNECTOR
800	CN805	4443-03201005	CONNECTOR
792	JL101	4242-R0503800	JUMPER LEAD
793	JL102	4242-R0504800	JUMPER LEAD
794	JL103	4242-R0505800	JUMPER LEAD
795	JL104	4242-R0505251	JUMPER LEAD
471	LC201	5214-13804	LC COMPOSITE
471	LC202	5214-13804	LC COMPOSITE
470	LC203	5214-13805	LC COMPOSITE
470	LC204	5214-13805	LC COMPOSITE
857	PH801	5624-ON3161	PHOTO COUPLR
868	RC801	5212-S0304473	R COMPOSITE
776	TP101	4214-132	TERMINAL
776	TP102	4214-132	TERMINAL
776	TP103	4214-132	TERMINAL
776	TP201	4214-132	TERMINAL
776	TP202	4214-132	TERMINAL
776	TP501	4214-132	TERMINAL
776	TP502	4214-132	TERMINAL
776	TP503	4214-132	TERMINAL
817	LCN502	4163-01319007	CONNECTOR W/W
818	LCN503	4163-01327010	CONNECTOR W/W
816	LCN505	4163-01326005	CONNECTOR W/W
819	LCN506	4163-01320009	CONNECTOR W/W
797	LCN801	4163-01324008	CONNECTOR W/W
820	LCN804	4163-S0206241	CONNECTOR W/W

PCB-2 FRONT P. C. BOARD

Ser. No.	Ref. No.	Part No.	Description
CAPACITORS			
833	C901	5345-106D041	CAP,MINI ELE 10μ/25V
834	C902	5359-S010J103	CAP,PPP .01μ
832	C903	5345-476D041	CAP,MINI ELE 47μ/25V
831	C904	5342-106C041	CAP,ELE BP 10μ/16V
835	C905	5345-106F041	CAP,MINI ELE 10μ/50V
830	C906	5359-S010J102	CAP,PPP 1000P
830	C907	5359-S010J102	CAP,PPP 1000P
843	C908	5359-S010J103	CAP,PPP .01μ
RESISTORS			
841	R901	5135-104522	RES,CBN 1/2P 100K
837	R902	5135-102522	RES,CBN 1/2P 1K
838	R903	5135-183522	RES,CBN 1/2P 18K
839	R904	5135-273522	RES,CBN 1/2P 27K
838	R905	5135-183522	RES,CBN 1/2P 18K
839	R906	5135-273522	RES,CBN 1/2P 27K
842	R907	5135-101522	RES,CBN 1/2P 100

Ser. No.	Ref. No.	Part No.	Description
838	R909	5135-183522	RES,CBN 1/2P 18K
839	R910	5135-273522	RES,CBN 1/2P 27K
838	R911	5135-183522	RES,CBN 1/2P 18K
839	R912	5135-273522	RES,CBN 1/2P 27K
836	R914	5135-473522	RES,CBN 1/2P 47K
836	R915	5135-473522	RES,CBN 1/2P 47K
749	R916	5135-822522	RES,CBN 1/2P 8.2K
749	R917	5135-822522	RES,CBN 1/2P 8.2K
837	R919	5135-102522	RES,CBN 1/2P 1K
837	R920	5135-102522	RES,CBN 1/2P 1K
837	R921	5135-102522	RES,CBN 1/2P 1K
837	R922	5135-102522	RES,CBN 1/2P 1K
837	R923	5135-102522	RES,CBN 1/2P 1K
INTEGRATED CIRCUITS			
821	IC901	5654-MN18787K	IC,DIGITAL
TRANSISTORS			
823	Q901	5611-UN4114	XISTOR,PNP R
823	Q902	5611-UN4114	XISTOR,PNP R
823	Q903	5611-UN4114	XISTOR,PNP R
823	Q904	5611-UN4114	XISTOR,PNP R
823	Q905	5611-UN4114	XISTOR,PNP R
824	Q906	5613-2320(F)	XISTOR,NPN R
DIODES			
829	D901	5631-1S2473	DIODE,DET
829	D902	5631-1S2473	DIODE,DET
829	D903	5631-1S2473	DIODE,DET
829	D904	5631-1S2473	DIODE,DET
829	D905	5631-1S2473	DIODE,DET
829	D906	5631-1S2473	DIODE,DET
CONTROLS			
742	VR901/	5109-S0305502	RES,V CBN 5K
	VR902		
746	VR903	5109-S0402502	RES,V CBN 5K
746	VR904	5109-S0402502	RES,V CBN 5K
746	VR905	5109-S0402502	RES,V CBN 5K
MISCELLANEOUS			
827	X901	5693-FC4004A4	OSC,CER
813	CN901	4443-00401010	CONNECTOR
813	CN902	4443-00401010	CONNECTOR
810	CN903	4443-05401032	CONNECTOR
758	FL801	5722-050	TUBE DISPLAY
825	RC901	6143-00802	RECEIV BLOCK
845	RC908	5212-S0305273	R COMPOSITE
846	RC913	5212-S0304104	R COMPOSITE
735	SW901	4437-00604	SWITCH,PU-TC
735	SW902	4437-00604	SWITCH,PU-TC
735	SW903	4437-00604	SWITCH,PU-TC
735	SW904	4437-00604	SWITCH,PU-TC
735	SW905	4437-00604	SWITCH,PU-TC
735	SW906	4437-00604	SWITCH,PU-TC
733	SW907	4431-S0114204	SWITCH,PUSH
734	SW908	4431-S0113612	SWITCH,PUSH
734	SW909	4431-S0113612	SWITCH,PUSH
734	SW910	4431-S0113612	SWITCH,PUSH
735	SW911	4437-00604	SWITCH,PU-TC
735	SW912	4437-00604	SWITCH,PU-TC
735	SW913	4437-00604	SWITCH,PU-TC
735	SW914	4437-00604	SWITCH,PU-TC
735	SW915	4437-00604	SWITCH,PU-TC
735	SW916	4437-00604	SWITCH,PU-TC
735	SW917	4437-00604	SWITCH,PU-TC
734	SW918	4431-S0113612	SWITCH,PUSH
734	SW919	4431-S0113612	SWITCH,PUSH
734	SW920	4431-S0113612	SWITCH,PUSH
733	SW921	4431-S0114204	SWITCH,PUSH
785		4211-5005	LUG
PCB-3 POWER TRANS P. C. BOARD			
CAPACITORS			
615	C1	5352-S010M103	CAP,MTL .01μ 
615A	C1	5352-1030961	CAP,MTL .01μ 
616	C2	5352-S060K104	CAP,MTL .1μ
616	C3	5352-S060K104	CAP,MTL .1μ
616	C4	5352-S060K104	CAP,MTL .1μ
603	C5	5345-228D041	CAP,MINI ELE 2200μ/25V
603	C6	5345-228D041	CAP,MINI ELE 2200μ/25V
604	C7	5345-227C041	CAP,MINI ELE 220μ/16V
604	C8	5345-227C041	CAP,MINI ELE 220μ/16V

Ser. No.	Ref. No.	Part No.	Description	Ser. No.	Ref. No.	Part No.	Description
605	C9	5345-108C041	CAP,MINI ELE 1000μ/16V	586	Q5	5613-2320(F)	XISTOR,NPN R
605	C10	5345-108C041	CAP,MINI ELE 1000μ/16V	585	Q6	5611-999(F)	XISTOR,PNP R
607	C11	5341-109D0958	CAP,ELE 10000μ	581	Q7	5612-941(P)	XISTOR,PNP A
604	C12	5345-227C041	CAP,MINI ELE 220μ/16V	586	Q8	5613-2320(F)	XISTOR,NPN R
605	C13	5345-108C041	CAP,MINI ELE 1000μ/16V	586	Q9	5613-2320(F)	XISTOR,NPN R
604	C14	5345-227C041	CAP,MINI ELE 220μ/16V	581	Q10	5612-941(P)	XISTOR,PNP A
610	C15	5345-108B041	CAP,MINI ELE 1000μ/10V	586	Q11	5613-2320(F)	XISTOR,NPN R
606	C16	5345-226F041	CAP,MINI ELE 22μ/50V	586	Q12	5613-2320(F)	XISTOR,NPN R
609	C17	5345-477E041	CAP,MINI ELE 470μ/35V	581	Q13	5612-941(P)	XISTOR,PNP A
616	C19	5352-S060K104	CAP,MTL .1μ	582	Q14	5614-1266(P)	XISTOR,NPN A
616	C20	5352-S060K104	CAP,MTL .1μ	586	Q15	5613-2320(F)	XISTOR,NPN R
602	C21	5345-228C041	CAP,MINI ELE 2200μ/16V	585	Q16	5611-999(F)	XISTOR,PNP R
602	C22	5345-228C041	CAP,MINI ELE 2200μ/16V	586	Q17	5613-2320(F)	XISTOR,NPN R
604	C23	5345-227C041	CAP,MINI ELE 220μ/16V	585	Q18	5611-999(F)	XISTOR,PNP R
604	C24	5345-227C041	CAP,MINI ELE 220μ/16V	678	Q51	5611-999(F)	XISTOR,PNP R
608	C25	5345-108B041	CAP,MINI ELE 1000μ/10V	854	Q801	5613-2320(F)	XISTOR,NPN R
608	C26	5345-108B041	CAP,MINI ELE 1000μ/10V	854	Q802	5613-2320(F)	XISTOR,NPN R
684	C51	5345-226F041	CAP,MINI ELE 22μ/50V	855	Q803	5613-2925(T)	XISTOR,NPN R
685	C52	5345-106F041	CAP,MINI ELE 10μ/50V	855	Q804	5613-2925(T)	XISTOR,NPN R
684	C53	5345-226F041	CAP,MINI ELE 22μ/50V	854	Q851	5613-2320(F)	XISTOR,NPN R
686	C54	5345-107F041	CAP,MINI ELE 100μ/50V	856	Q852	5611-UN4114	XISTOR,PNP R
866	C801	5359-S010J103	CAP,PPP .01μ				
865	C802	5345-476D041	CAP,MINI ELE 47μ/25V				
864	C851	5345-107B041	CAP,MINI ELE 100μ/10V				
RESISTORS				DIODES			
042A	R1	5135-335522	RES,CBN 1/2P 3.3M (I) (IB)	589	D1	5632-S5566B	DIODE,RECT
619	R3	5135-152522	RES,CBN 1/2P 1.5K	589	D2	5632-S5566B	DIODE,RECT
619	R4	5135-152522	RES,CBN 1/2P 1.5K	589	D3	5632-S5566B	DIODE,RECT
620	R5	5135-471522	RES,CBN 1/2P 470	589	D4	5632-S5566B	DIODE,RECT
620	R6	5135-471522	RES,CBN 1/2P 470	589	D5	5632-S5566B	DIODE,RECT
621	R7	5135-101522	RES,CBN 1/2P 100	589	D6	5632-S5566B	DIODE,RECT
621	R8	5135-101522	RES,CBN 1/2P 100	589	D7	5632-S5566B	DIODE,RECT
622	R9	5135-2R7522	RES,CBN 1/2P 2.7	589	D8	5632-S5566B	DIODE,RECT
622	R10	5135-2R7522	RES,CBN 1/2P 2.7	590	D9	5635-HZ12B2L	DIODE,ZENER
619	R11	5135-152522	RES,CBN 1/2P 1.5K	590	D10	5635-HZ12B2L	DIODE,ZENER
620	R12	5135-471522	RES,CBN 1/2P 470	591	D11	5635-HZ12B2L	DIODE,ZENER
621	R13	5135-101522	RES,CBN 1/2P 100	592	D12	5635-HZ6B2L	DIODE,ZENER
623	R14	5135-0R5522	RES,CBN 1/2P .5 (UA) (EK)	593	D13	5635-HZ18-2L	DIODE,ZENER
619	R15	5135-152522	RES,CBN 1/2P 1.5K	594	D14	5635-RD5R1EB3	DIODE,ZENER
620	R16	5135-471522	RES,CBN 1/2P 470	588	D15	5632-S5566B	DIODE,RECT
627	R17	5135-101522	RES,CBN 1/2P 100 (UA) (EK)	588	D16	5632-S5566B	DIODE,RECT
627A	R17	5102-1014715	RES,FUSE 100 (I) (IB)	588	D17	5632-S5566B	DIODE,RECT
624	R18	5135-6R8522	RES,CBN 1/2P 6.8	588	D18	5632-S5566B	DIODE,RECT
626	R19	5135-221522	RES,CBN 1/2P 220	595	D19	5635-HZ6C1L	DIODE,ZENER
625	R20	5135-223522	RES,CBN 1/2P 22K	595	D20	5635-HZ6C1L	DIODE,ZENER
625	R21	5135-223522	RES,CBN 1/2P 22K	670	D51	5632-S5566B	DIODE,RECT
043A	R22	5102-1R05116	RES,FUSE 1 (I) (IB)	670	D52	5632-S5566B	DIODE,RECT
619	R23	5135-152522	RES,CBN 1/2P 1.5K	680	D53	5631-1S2473	DIODE,DET
619	R24	5135-152522	RES,CBN 1/2P 1.5K	682	D54	5635-RD5R1EB2	DIODE,ZENER
620	R25	5135-471522	RES,CBN 1/2P 470	681	D55	5635-RD11EB2	DIODE,ZENER
620	R26	5135-471522	RES,CBN 1/2P 470	670	D56	5632-S5566B	DIODE,RECT
621	R27	5135-101522	RES,CBN 1/2P 100	670	D57	5632-S5566B	DIODE,RECT
621	R28	5135-101522	RES,CBN 1/2P 100	859	D801	5635-RD5R1EB1	DIODE,ZENER
636	R29	5135-2R2522	RES,CBN 1/2P 2.2	858	D802	5635-RD8R2EB3	DIODE,ZENER
636	R30	5135-2R2522	RES,CBN 1/2P 2.2	861	D803	5635-HZ7B2L	DIODE,ZENER
699	R51	5135-331522	RES,CBN 1/2P 330	862	D804	5632-S5566B	DIODE,RECT
697	R52	5135-562522	RES,CBN 1/2P 5.6K	860	D851	5635-HZ3B2	DIODE,ZENER
696	R53	5135-154522	RES,CBN 1/2P 150K				
700	R54	5135-102522	RES,CBN 1/2P 1K	755	Δ F1	5732-801031	FUSE (UA) (EK)
700	R55	5135-102522	RES,CBN 1/2P 1K	755A	Δ F1	5732-161030	FUSE (I) (IB)
695	R56	5135-104522	RES,CBN 1/2P 100K	731	Δ S1	4433-00202	SWITCH,PU-PW
688	R57	5135-103522	RES,CBN 1/2P 10K	601	Δ T1	5584-S8301	XFORMER,POWER (UA) (EK)
698	R58	5135-182522	RES,CBN 1/2P 1.8K	601A	Δ T1	5584-S8302	XFORMER,POWER (I) (IB)
699	R59	5135-331522	RES,CBN 1/2P 330	805	CN101	4443-030185	CONNECTOR
875	R801	5135-102522	RES,CBN 1/2P 1K	806	CN102	4443-040185	CONNECTOR
875	R802	5135-102522	RES,CBN 1/2P 1K	807	CN103	4443-050185	CONNECTOR
872	R803	5135-103522	RES,CBN 1/2P 10K	807	CN104	4443-050185	CONNECTOR
872	R804	5135-103522	RES,CBN 1/2P 10K	811	CN804	4443-0601140	CONNECTOR
875	R805	5135-102522	RES,CBN 1/2P 1K	041A	Δ S2	4411-1047111	SWITCH,ROTRY (I) (IB)
875	R806	5135-102522	RES,CBN 1/2P 1K	777	TM1	4214-122	TERMINAL
871	Δ R810	5102-1005116	RES,FUSE 10	777	TM2	4214-122	TERMINAL
880	R828	5135-331522	RES,CBN 1/2P 330	815	LCN501	4163-S0203501	CONNECTOR W/W
877	R851	5135-102522	RES,CBN 1/2P 1K	815	LCN504	4163-S0203501	CONNECTOR W/W
878	R852	5135-471522	RES,CBN 1/2P 470	798	LCN802	4163-01325007	CONNECTOR W/W
879	R853	5135-103522	RES,CBN 1/2P 10K	753	Δ	4472-04501	HOLDER,FUSE
877	R854	5135-102522	RES,CBN 1/2P 1K				
INTEGRATED CIRCUITS				MISCELLANEOUS			
851	IC801	5653-BA6229	IC,LINEAR	751	J4	4451-51501	JACK,1P
TRANSISTORS				MISCELLANEOUS			
581	Q1	5612-941(P)	XISTOR,PNP A				
582	Q2	5614-1266(P)	XISTOR,NPN A				
586	Q3	5613-2320(F)	XISTOR,NPN R				
585	Q4	5611-999(F)	XISTOR,PNP R				

PCB-4 HEADPHONES JACK P. C. BOARD

751 J4 4451-51501 JACK,1P

Ser. No. Ref. No. Part No. Description

CHASSIS MISCELLANEOUS

MISCELLANEOUS

781	J2	4451-00184	JACK,1P
781	J3	4451-00184	JACK,1P
761	Δ P1	4161-71151	CORD W/PLUG (UA) (EK)
761A	Δ P1	4161-7256	CORD W/PLUG (I) (IB)
762		4161-71184	CORD W/PLUG
773		4191-0355	BATTERY, DRY
774		6142-02703	CONT BLOCK
791		4242-S0232131	JUMPER LEAD

PACKAGE

021A	1756-06303	LABEL (I) (IB)
022B	1756-03108	LABEL (I) (IB)
106	1111-J30335	OWNER GUIDE (UA) (EK)
106A	1111-J30336	OWNER GUIDE (I) (IB)
107	1113-717004	OWNER CARD (UA) (EK)
111	1119-047	ATTACH SHEET, WARRANTY (UA) (EK)
112	1119-0137	ATTACH SHEET, SERVICE AGENCIES (UA) (EK)
113	1119-01201	ATTACH SHEET, SAFETY (UA) (EK)
115	1221-28010	CARTON BOX (UA) (I)
115A	1221-28004	CARTON BOX (IB) (EK)
116	1222-7362	CUSHION
117	1222-7365	CUSHION
119	1223-R0220055	SOFT SHEET
120	1223-00403012	SOFT SHEET
123	1241-R0160600	POLYETHY BAG
124	1241-R0123350	POLYETHY BAG

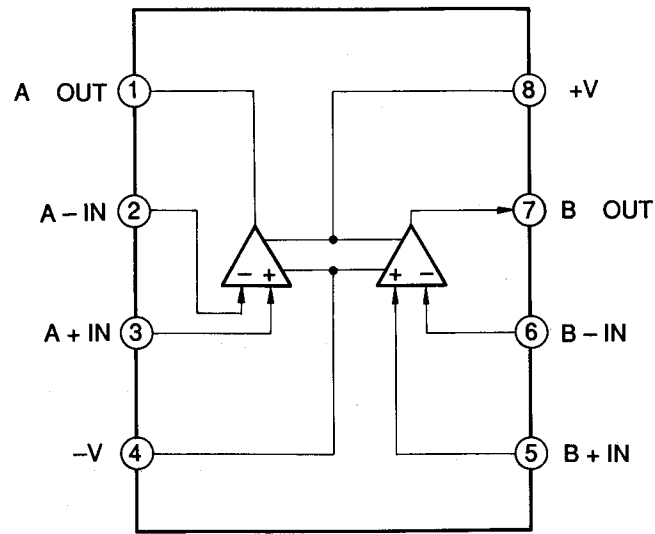
NOTE



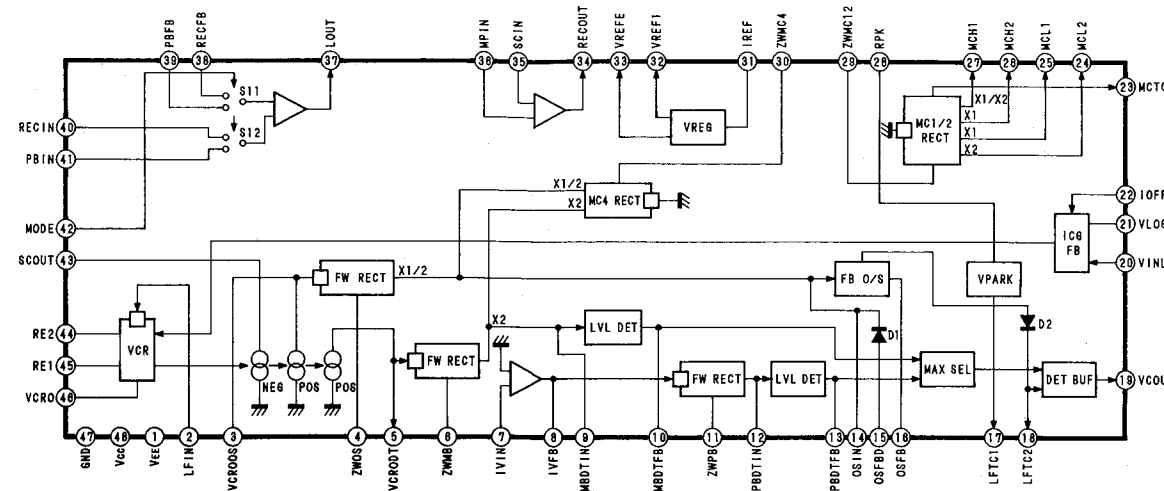
SAFETY RELATED COMPONENT. USE ONLY EXACT REPLACEMENT PART AS SPECIFIED.

IC BLOCK DIAGRAM

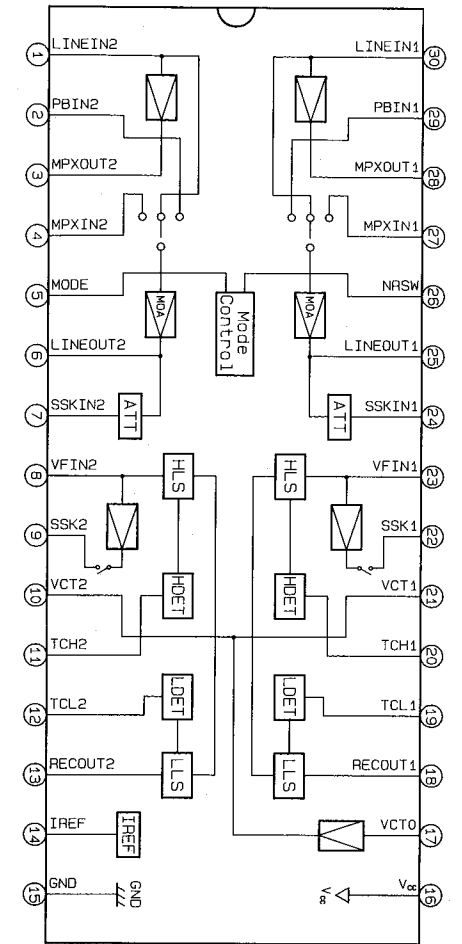
IC 1, 401, 601, 751: NJM4558D
OP-Amp.



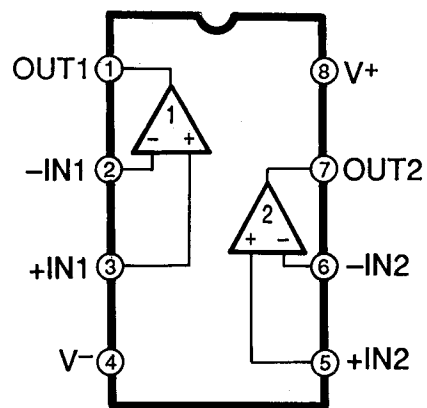
IC 103, 303, 603, 803: CXA1416
Dolby S-Type NR



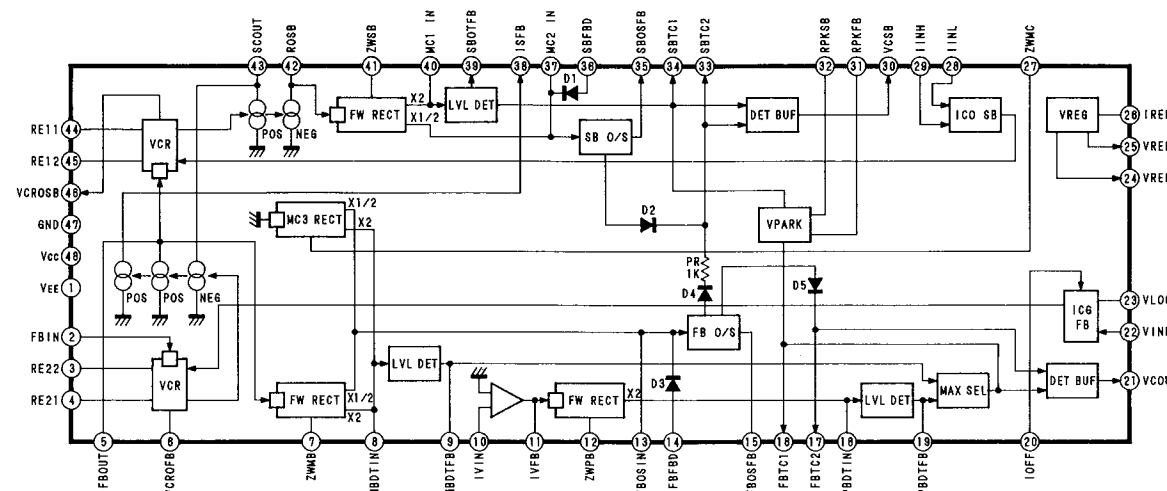
IC 501, 551: CXA1332S
Dolby B/C NR



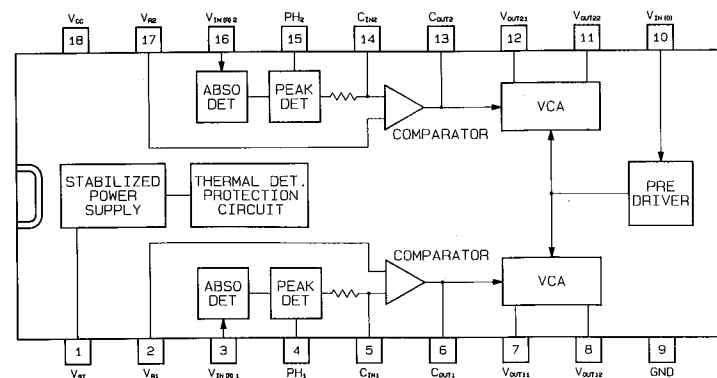
IC 51, 101, 104, 106,
301, 304, 306, 601,
604, 606, 651, 801,
804, 806: NJM4565D
OP-Amp.



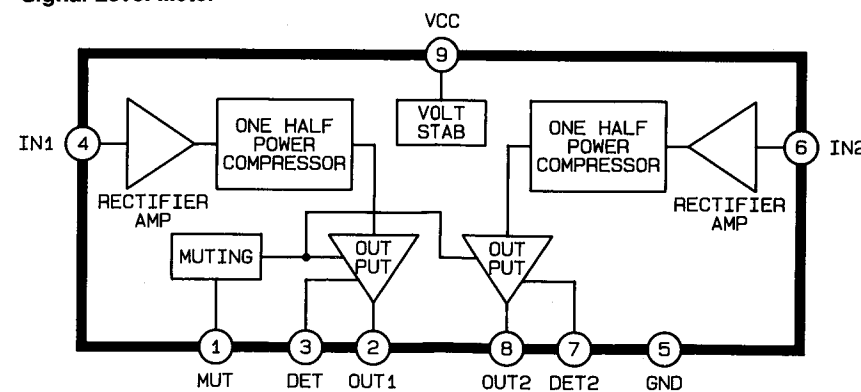
IC 105, 107, 305, 307,
605, 607, 805, 807: CXA1415
Dolby S-Type NR



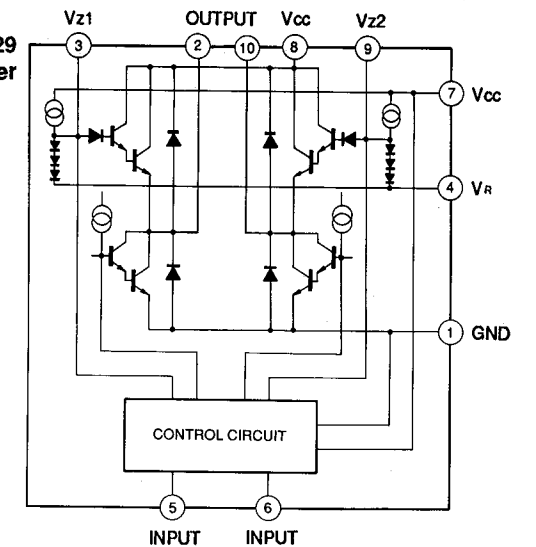
IC 301: μPC1297CA
Dolby HX-Pro



IC 402: BA6138
Signal Level Meter

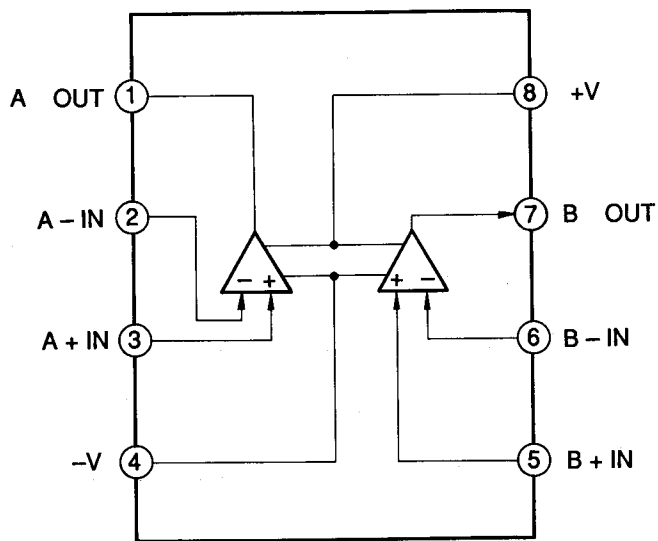


IC 801: BA6229
Motor Driver

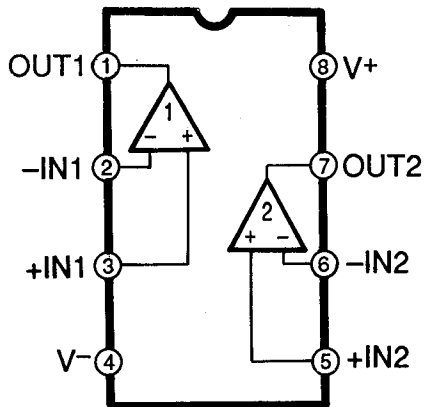


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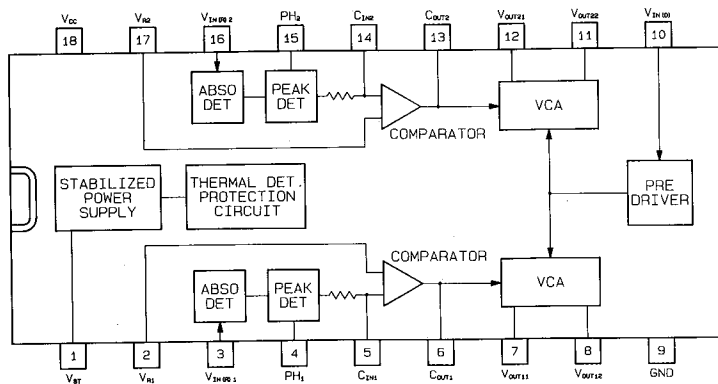
IC 1, 401, 601, 751: NJM4558D
OP-Amp.



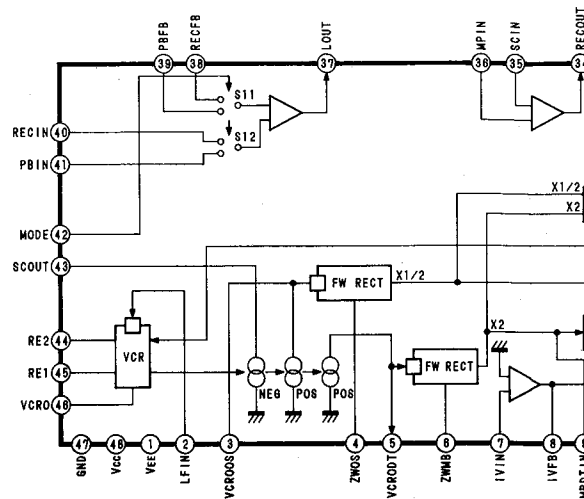
IC 51, 101, 104, 106, 301, 304, 306, 601, 604, 606, 651, 801, 804, 806: NJM4565D
OP-Amp.



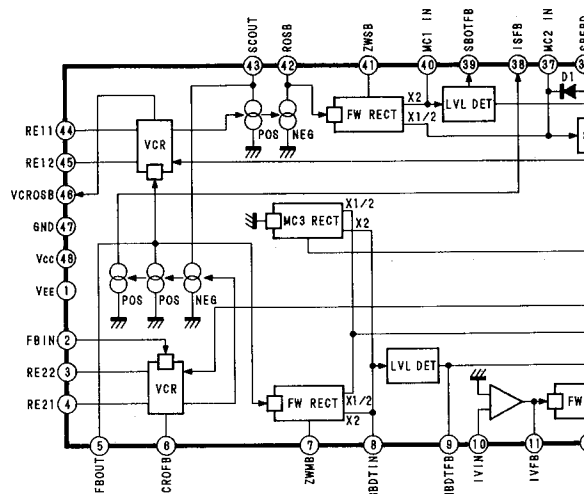
IC 301: μPC1297CA
Dolby HX-Pro



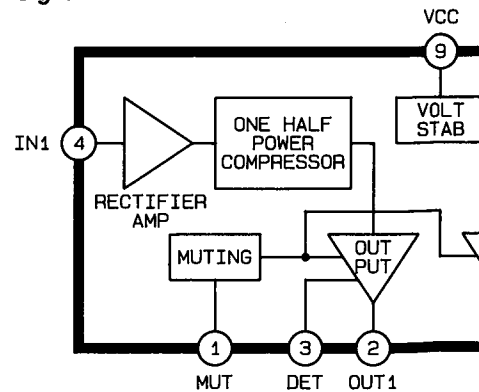
IC 103, 303, 603, 803: CXA1416
Dolby S-Type NR



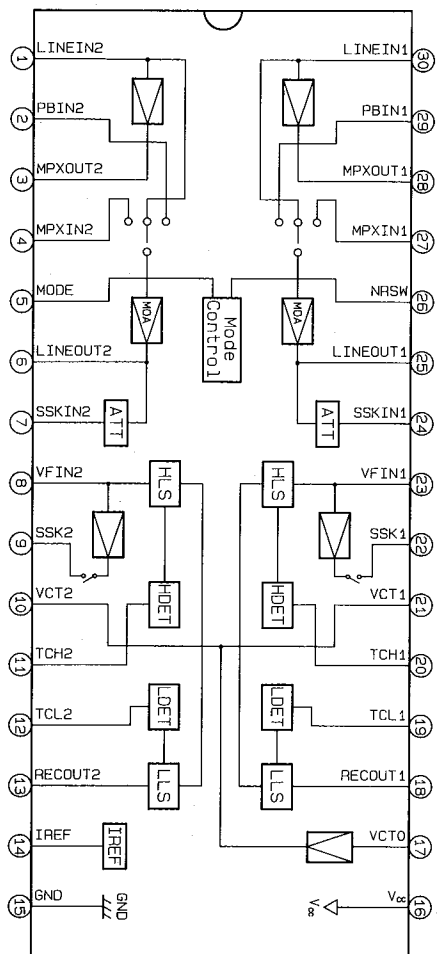
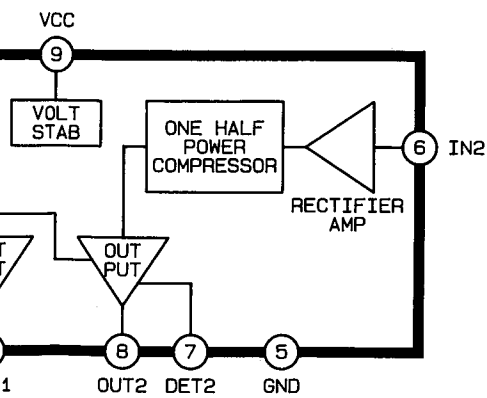
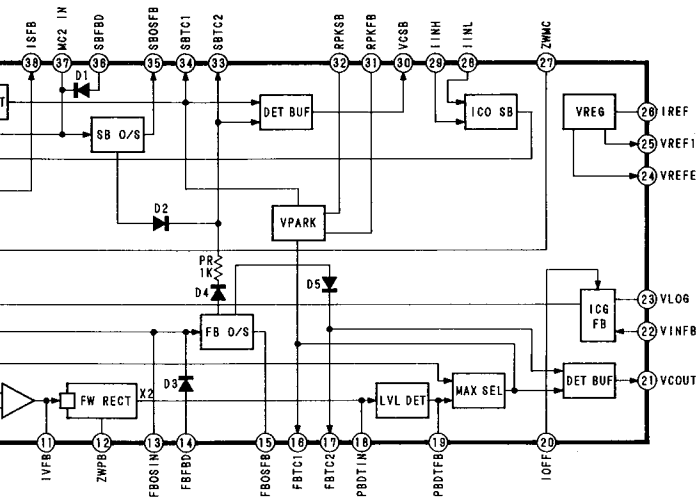
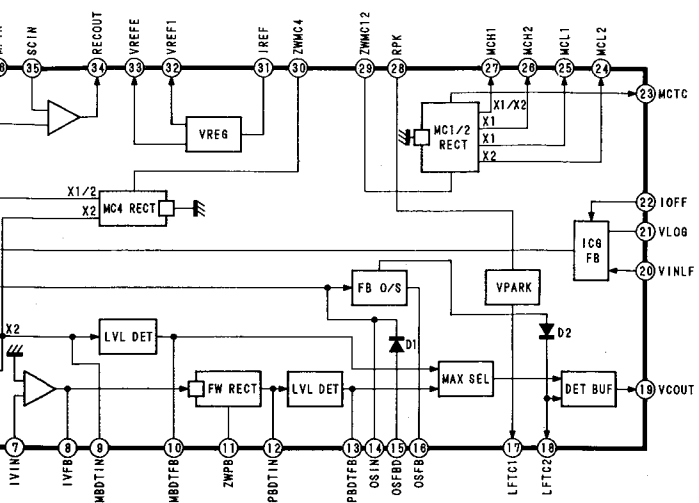
IC 105, 107, 305, 307, 605, 607, 805, 807: CXA1415
Dolby S-Type NR



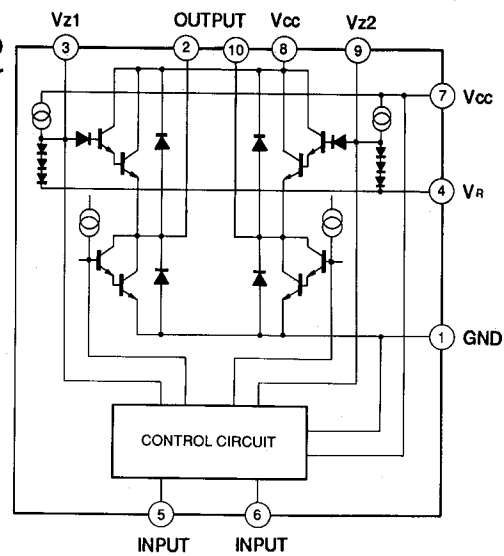
IC 402: BA6138
Signal Level Meter



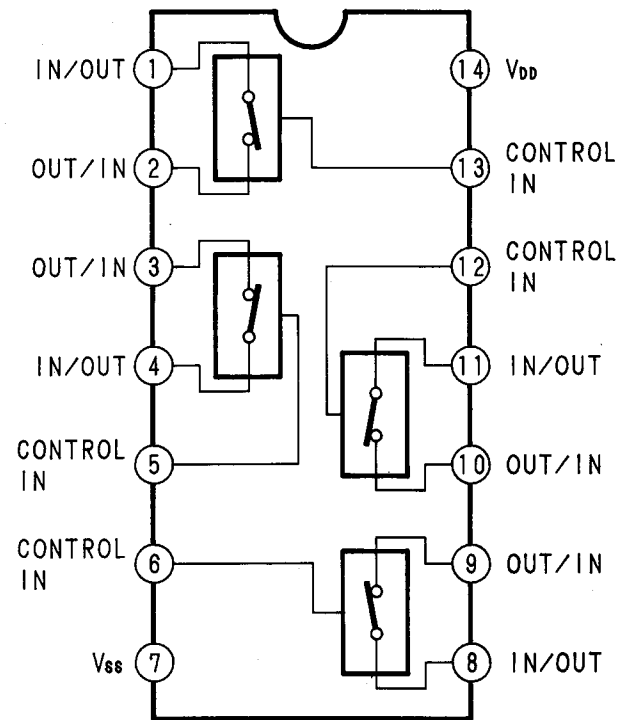
IC 501, 551: CXA1332S
Dolby B/C NR



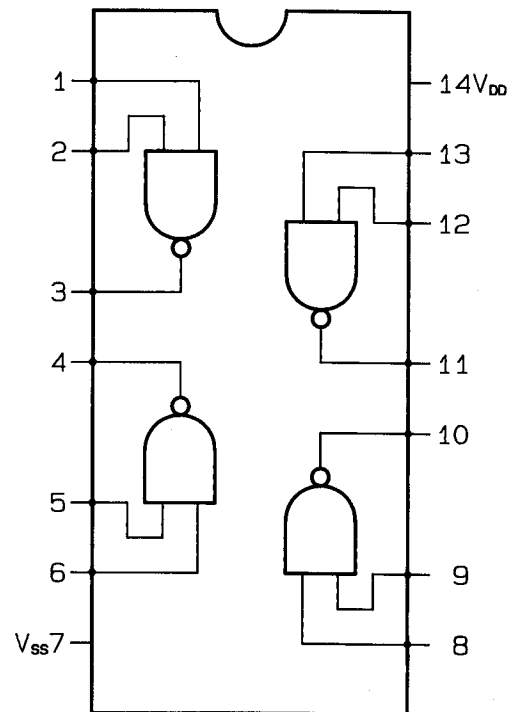
IC 801: BA6229
Motor Driver



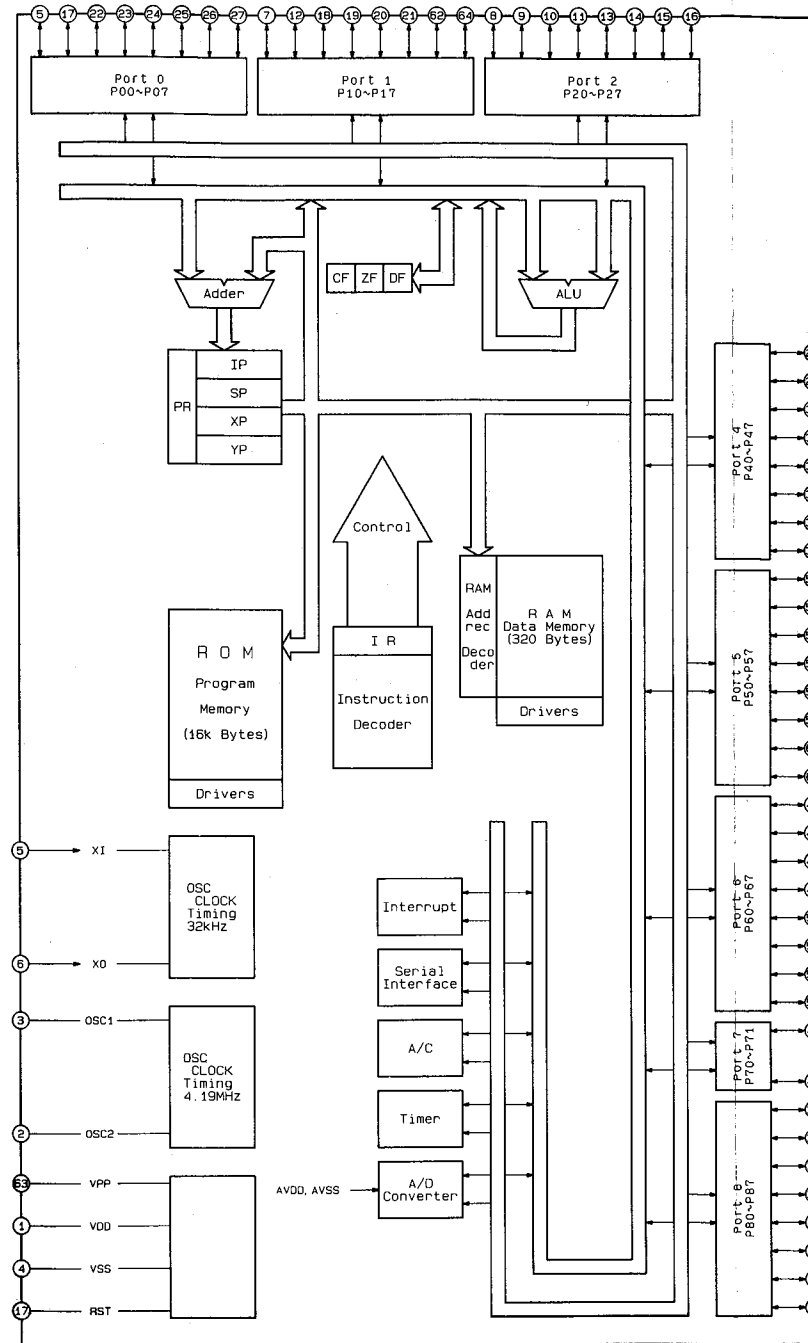
IC 501, 502, 602: TC4066BP
Bilateral Switch



IC 701: TC4011BP
2-inch NAND Gate



IC 901: MN18787K
Logic Controller

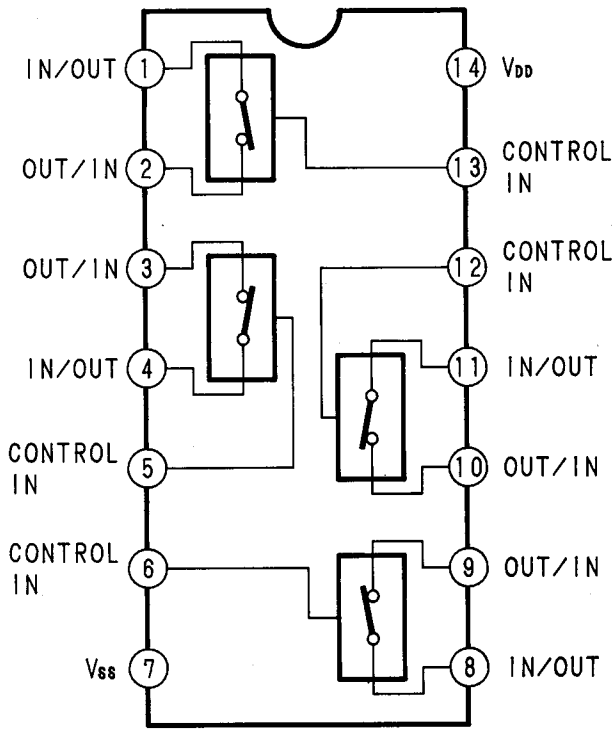


TERMINAL FUNCTIONS

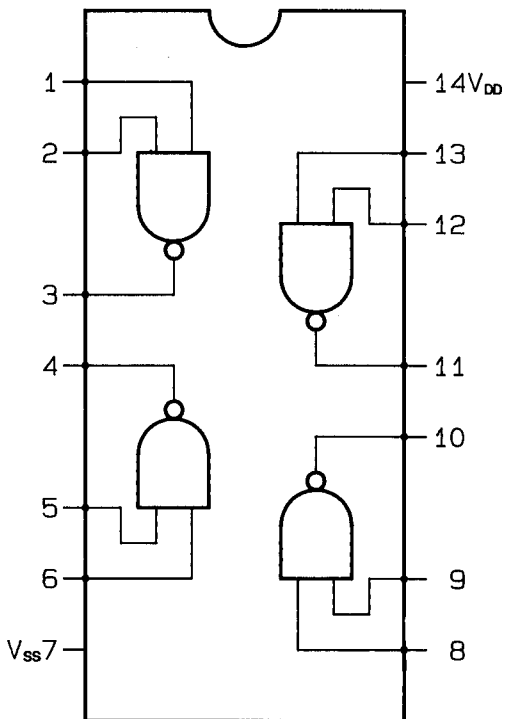
Pin No.	Port name	Function name	I/O	Outline of functions
5	P06	XI	I	Initial setting switch. High level=ON
6	XO	XO	O	
7	P17	AVdd	I	D/A converter standard voltage(DC 5V).
8	P27	AD7	I	Key input terminal.
9	P26	AD6	I	Key input terminal.
10	P25	AD5	I	Key input terminal.
11	P24	AD4	I	Key input terminal.
12	P16	AVss		GND terminal.
13	P23	AD3	I	Key input terminal.
14	P22	AD2	I	A/D input port for LEVEL METER indication.
15	P21	AD1	I	A/D input port for LEVEL METER indication.
16	P20	AD0	I	A/D input port for music search.
17	P07	RST	I	Reset input.
18	1RQ1	R-SI	I	Remote control input.
19	1RQφ	VOLT DN	I	Power on/off detection terminal. Low level=OFF
20	P13	DOLBY-B	I	Input port to switch DOLBY display.
21	P12	DOLBY-C	I	Input port to switch DOLBY display.
22	P05	IND.CONT	O	High level on stand-by or display off and after power off.
23	P04	MONITOR	O	High level on MONITOR mode. Low level on SOURCE mode.
24	P03	REC	O	REC/PLAY switching terminal. High level on REC.
25	P02	BIAS	O	BIAS control terminal. High level=BIAS ON
26	P01	REC MUTE	O	Recording amp. muting terminal. High level=MUTING ON
27	P00	PB MUTE	O	Playback amp. muting terminal. High level=MUTING ON
28	P47	LINE MUTE	O	Line muting terminal. High level=MUTING ON
29	P46	RM1	O	Reel motor control. High level=active
30	P45	RM2	O	Reel motor control. High level=active
31	P44	RPC	O	Reel motor power control. High level=power down
32	P43	CPM	O	Capstan motor control.

NOTE: Low level=0V
High level=5.1V

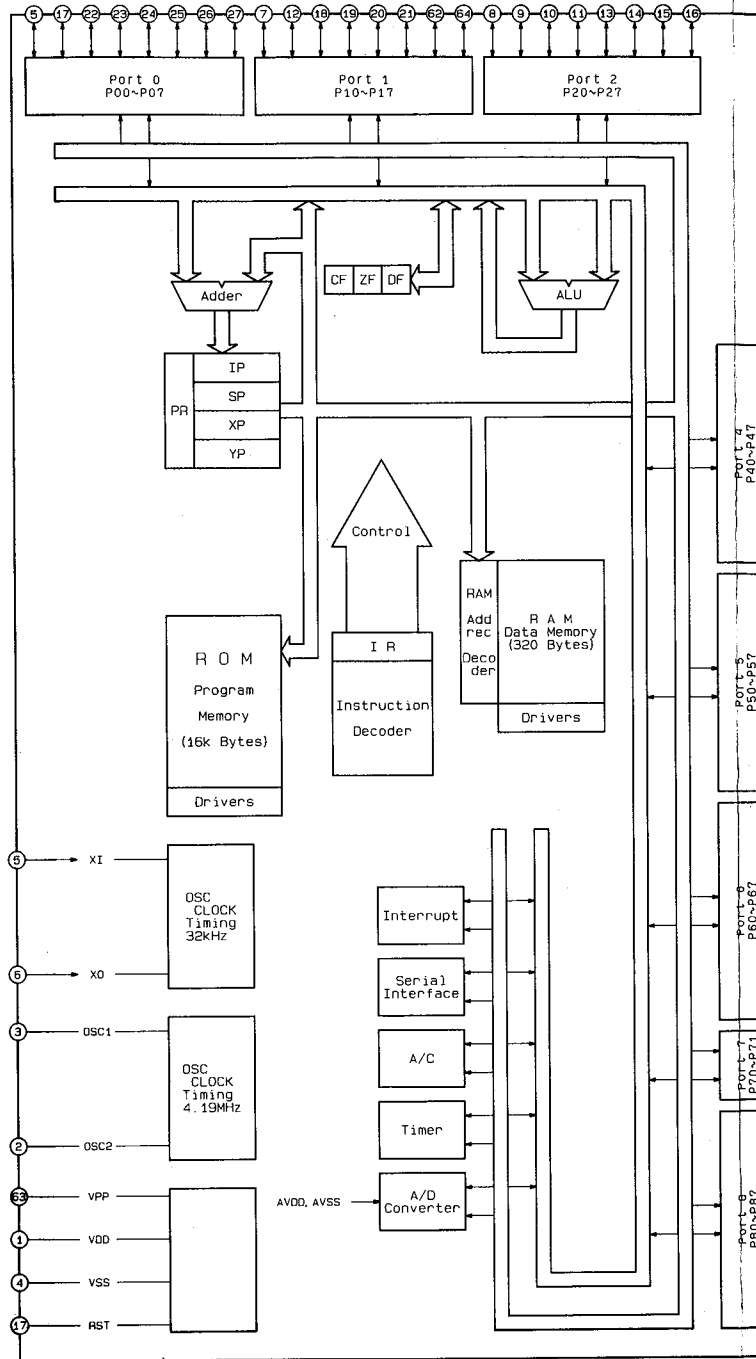
IC 501, 502, 602: TC4066BP
Bilateral Switch



IC 701: TC4011BP
2-inch NAND Gate



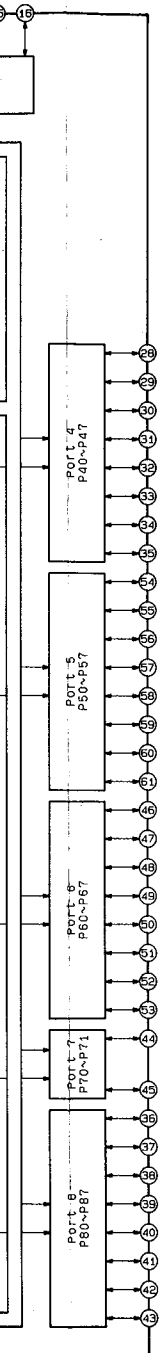
IC 901: MN18787K
Logic Controller



TERMINAL FUNCTIONS

Pin No.	Port name	Function name	I/O	Outline of functions
5	P06	XI	I	Initial setting switch. High level=ON
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11	P24	AD4	I	Key input terminal.
12	P16	AVss		GND terminal.
13	P23	AD3	I	Key input terminal.
14	P22	AD2	I	A/D input port for LEVEL METER indication.
15	P21	AD1	I	A/D input port for LEVEL METER indication.
16	P20	AD0	I	A/D input port for music search.
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25	P02	BIAS	O	BIAS control terminal. High level=BIAS ON
26	P01	REC MUTE	O	Recording amp. muting terminal. High level=MUTING ON
27	P00	PB MUTE	O	Playback amp. muting terminal. High level=MUTING ON
28	P47	LINE MUTE	O	Line muting terminal. High level=MUTING ON
29	P46	RM1	O	Reel motor control. High level=active
30	P45	RM2	O	Reel motor control. High level=active
31	P44	RPC	O	Reel motor power control. High level=power down
32	P43	CPM	O	Capstan motor control.

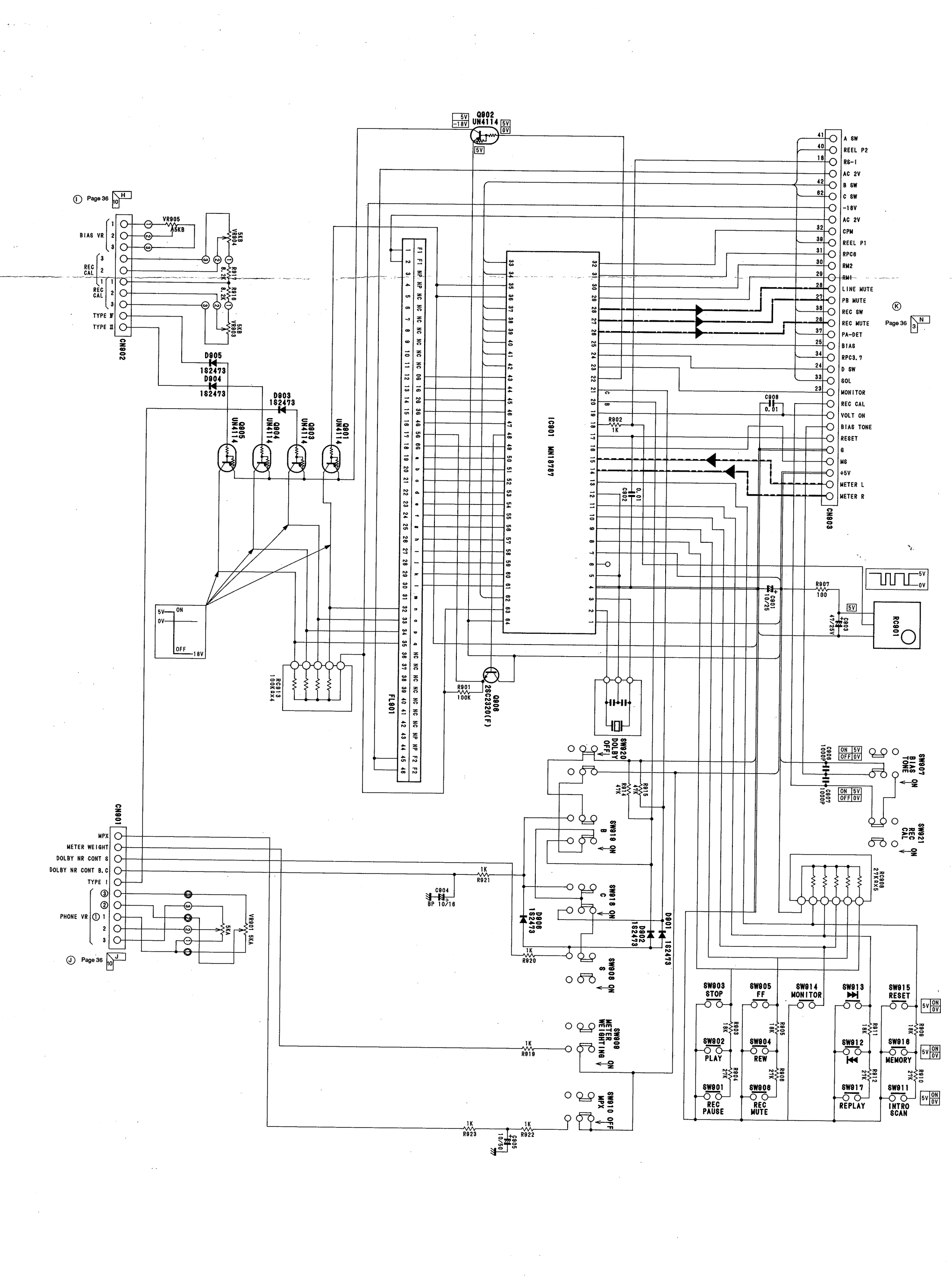
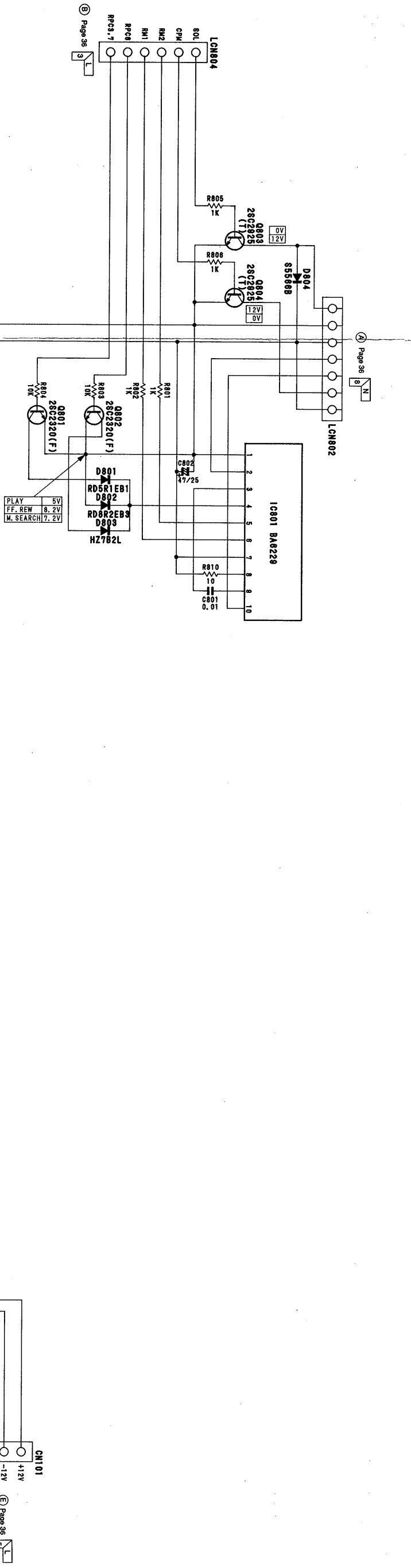
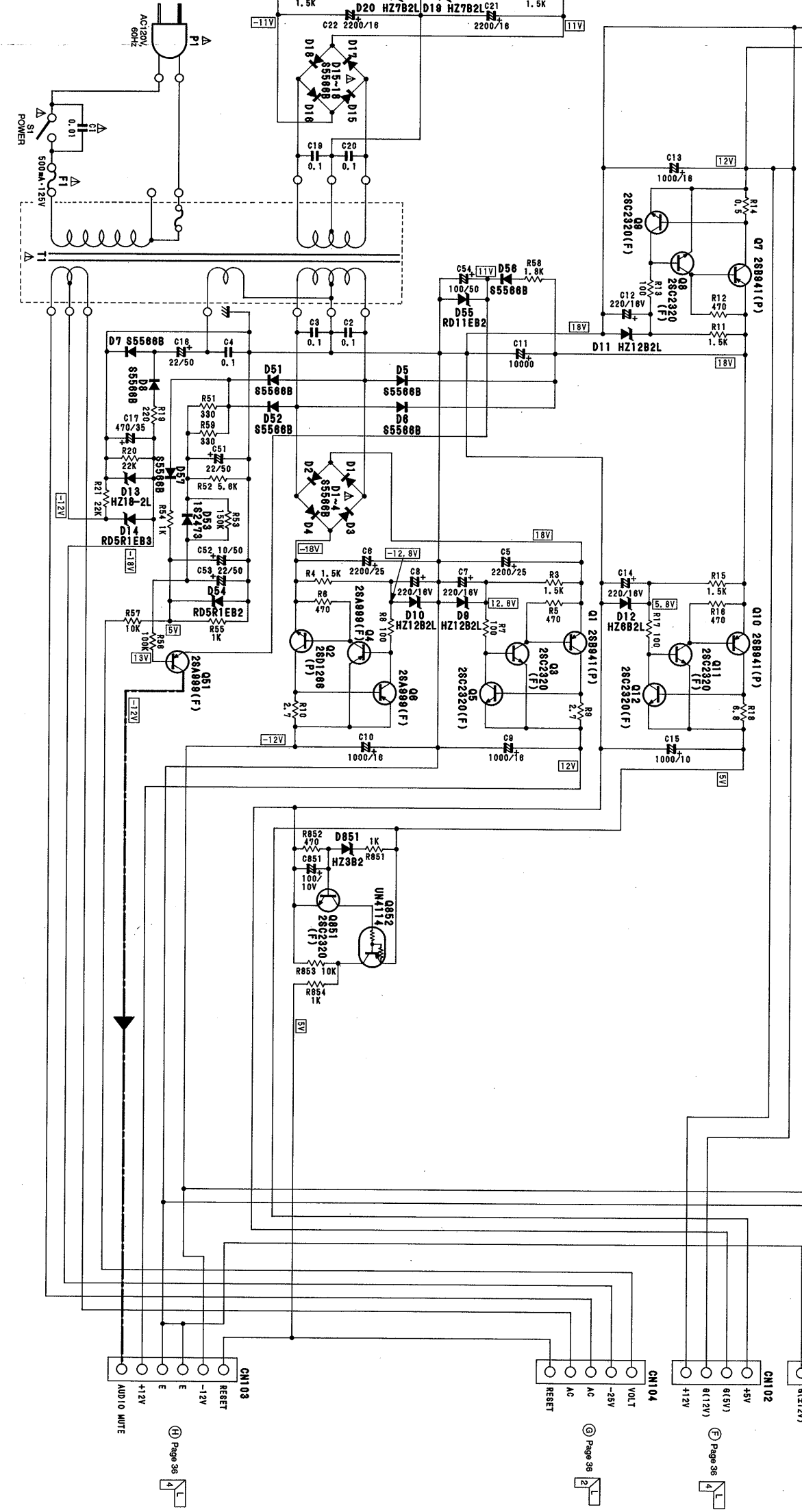
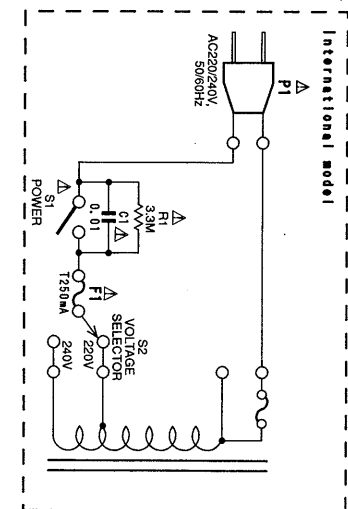
NOTE: Low level=0V
High level=5.1V



SCHEMATIC DIAGRAM (1)

PCB-3 POWER TRANS P. C. BOARD

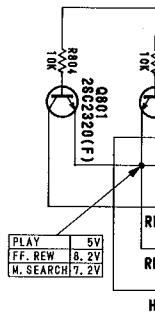
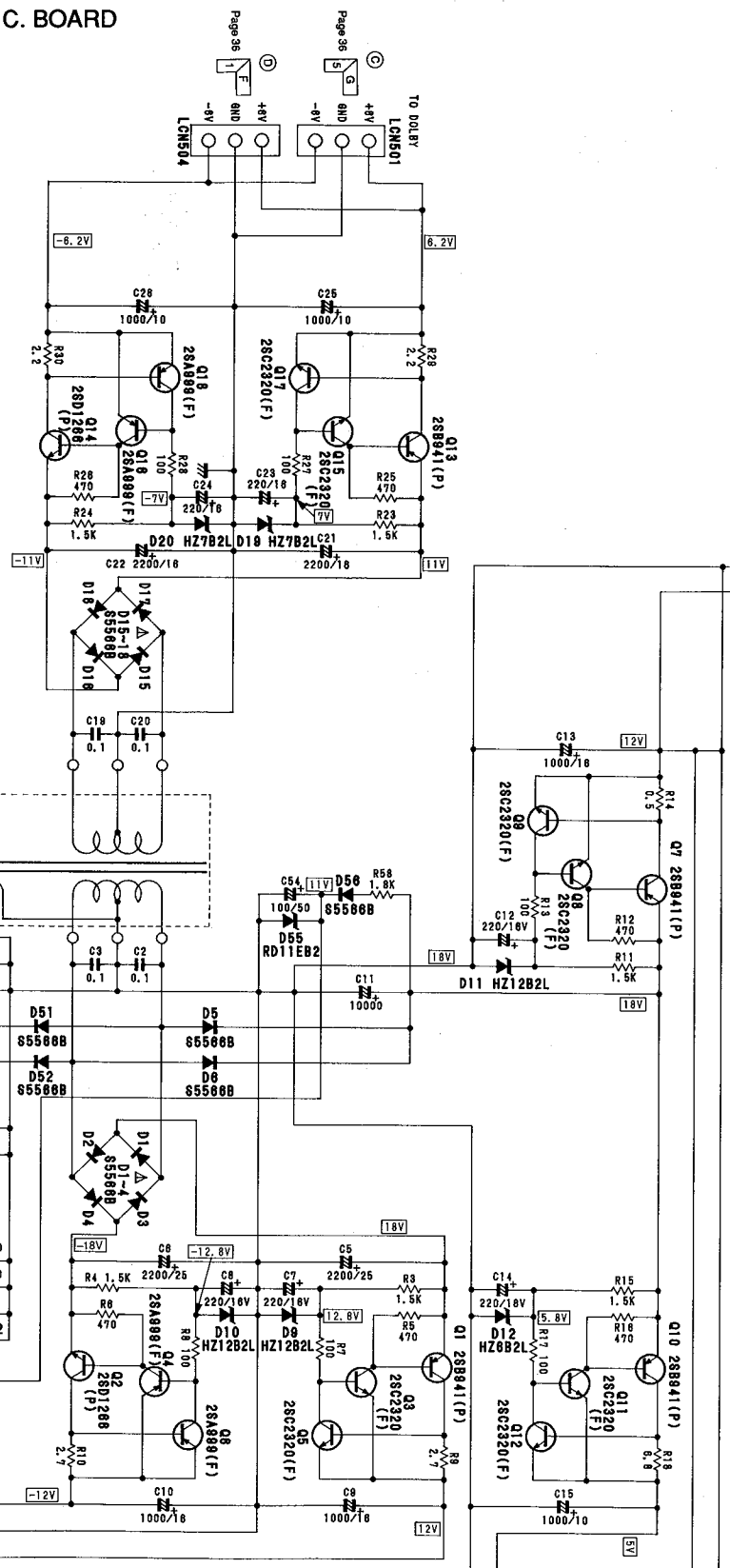
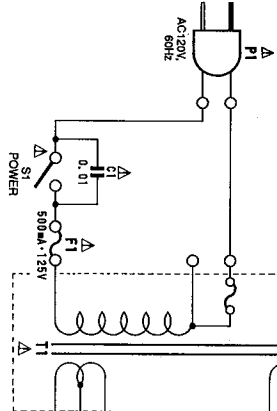
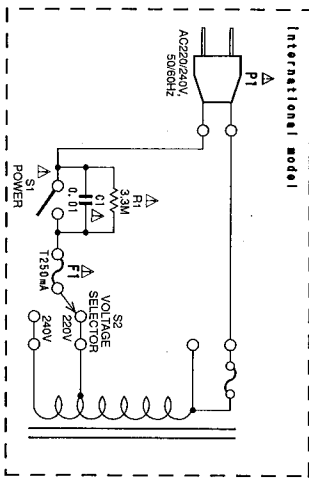
PCB-2 FRONT P. C. BOARD



1
2
3
4
5
6
7
8
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10

SCHEMATIC DIAGRAM (1)

PCB-3 POWER TRANS P. C. BOARD



1
2
3
4
5
6
7

PLAY	5V
FF. REW	8.2V
M. SEARCH	7.2V

J

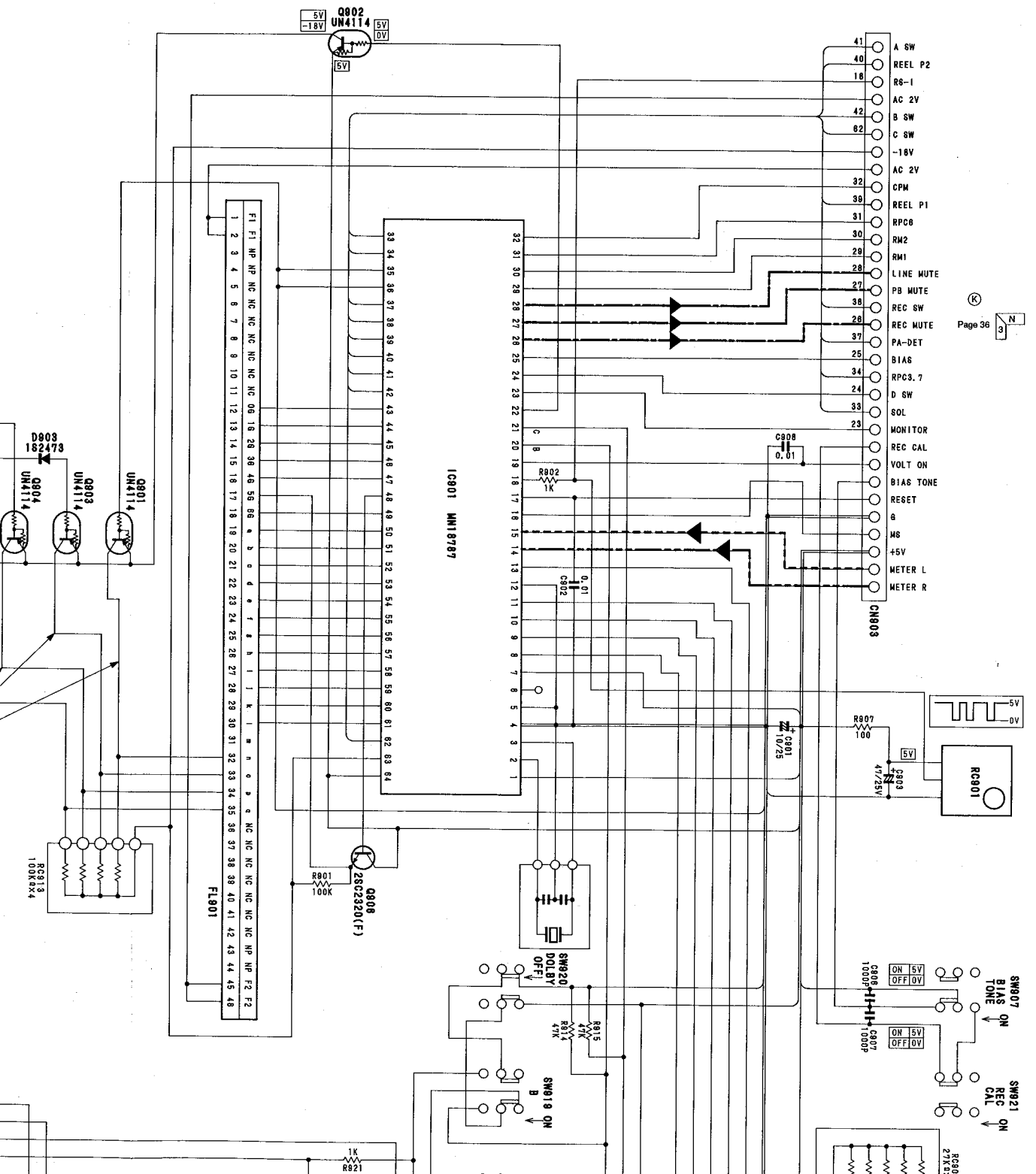
K

L

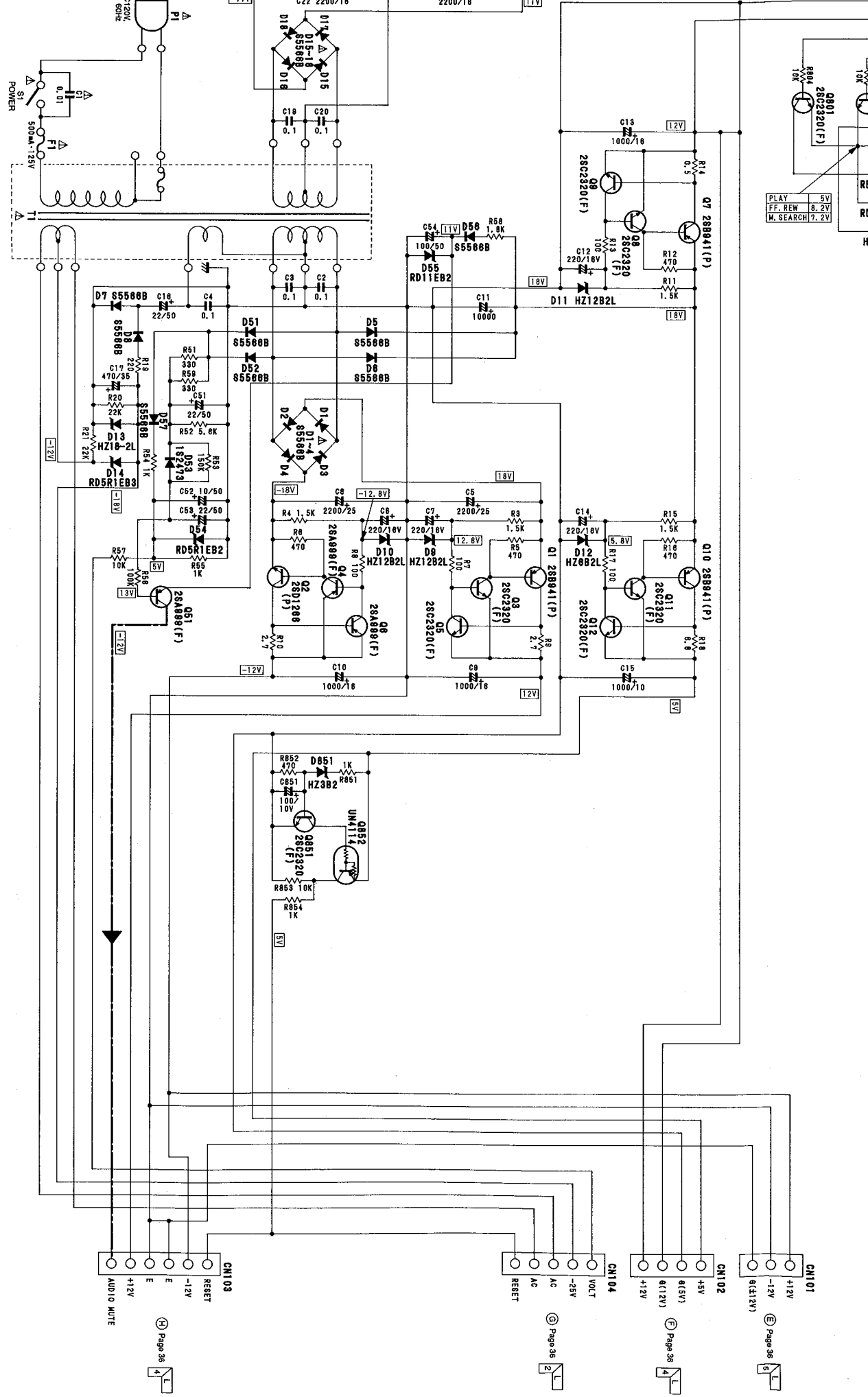
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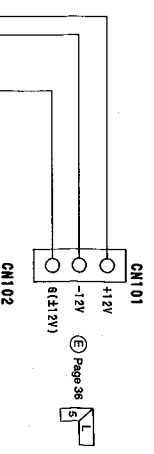
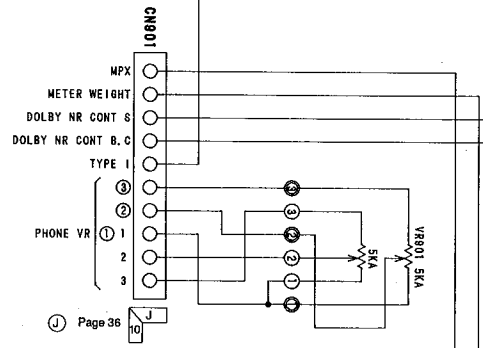
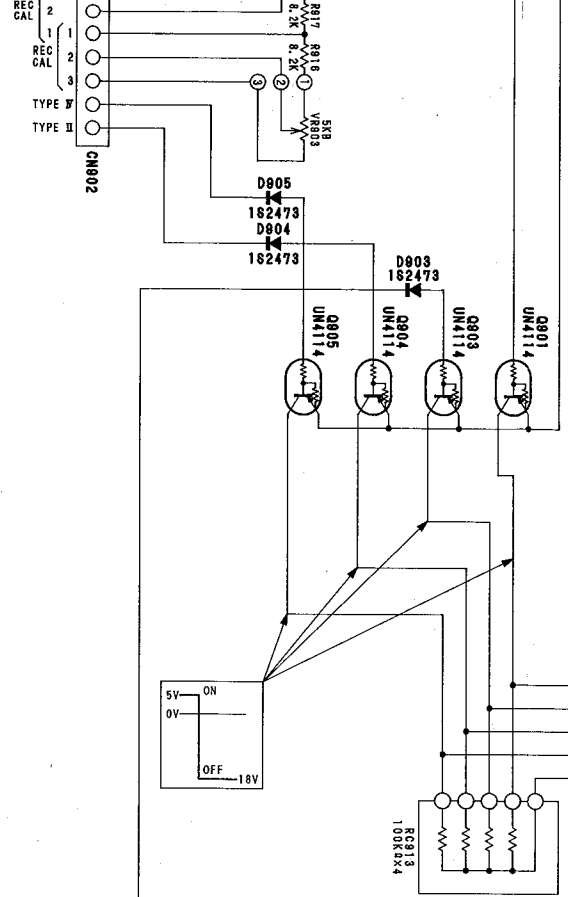
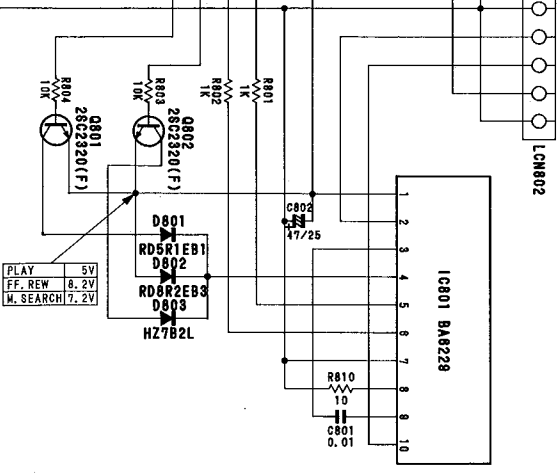
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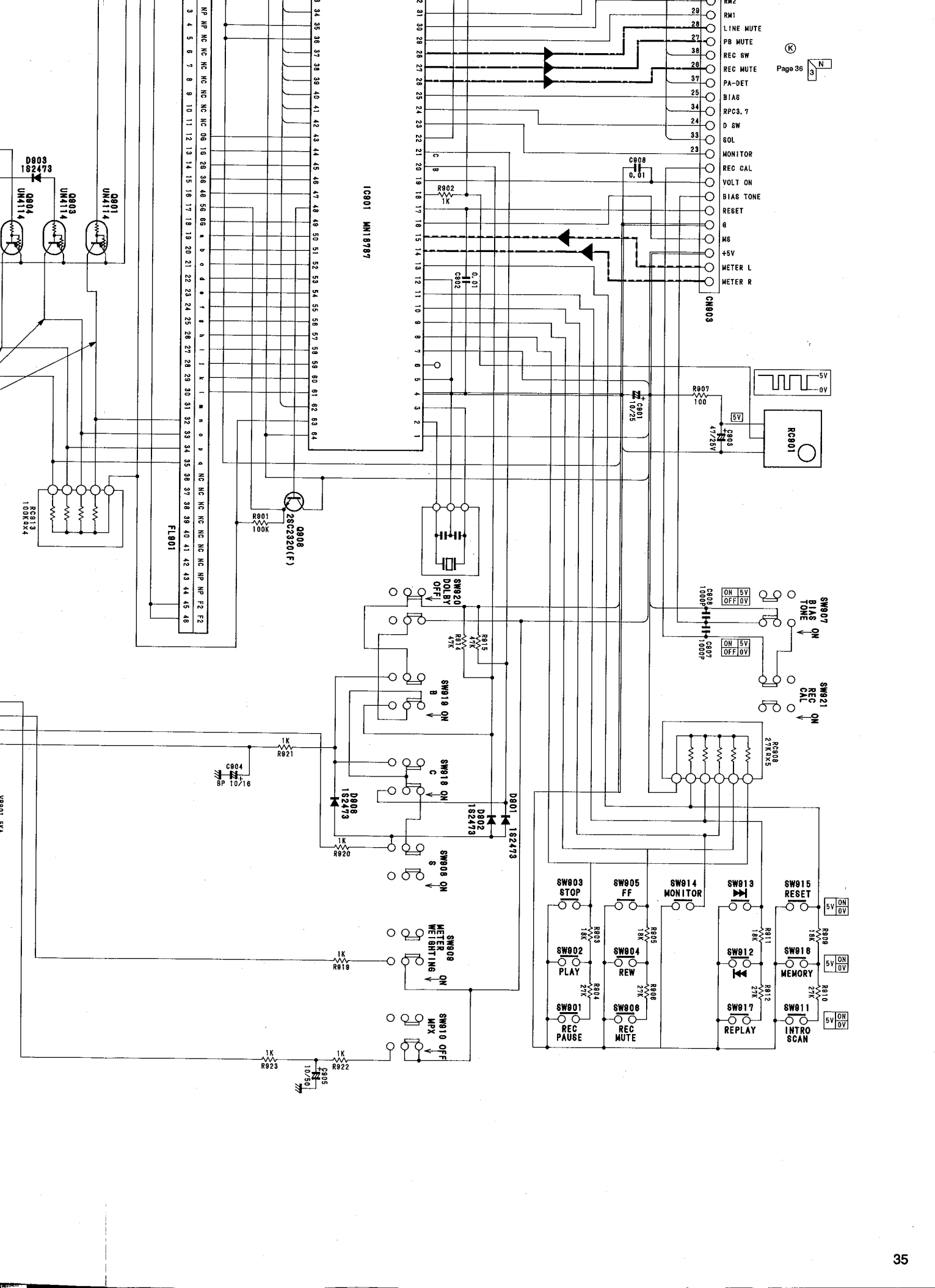
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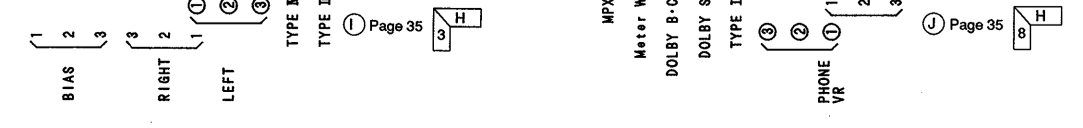
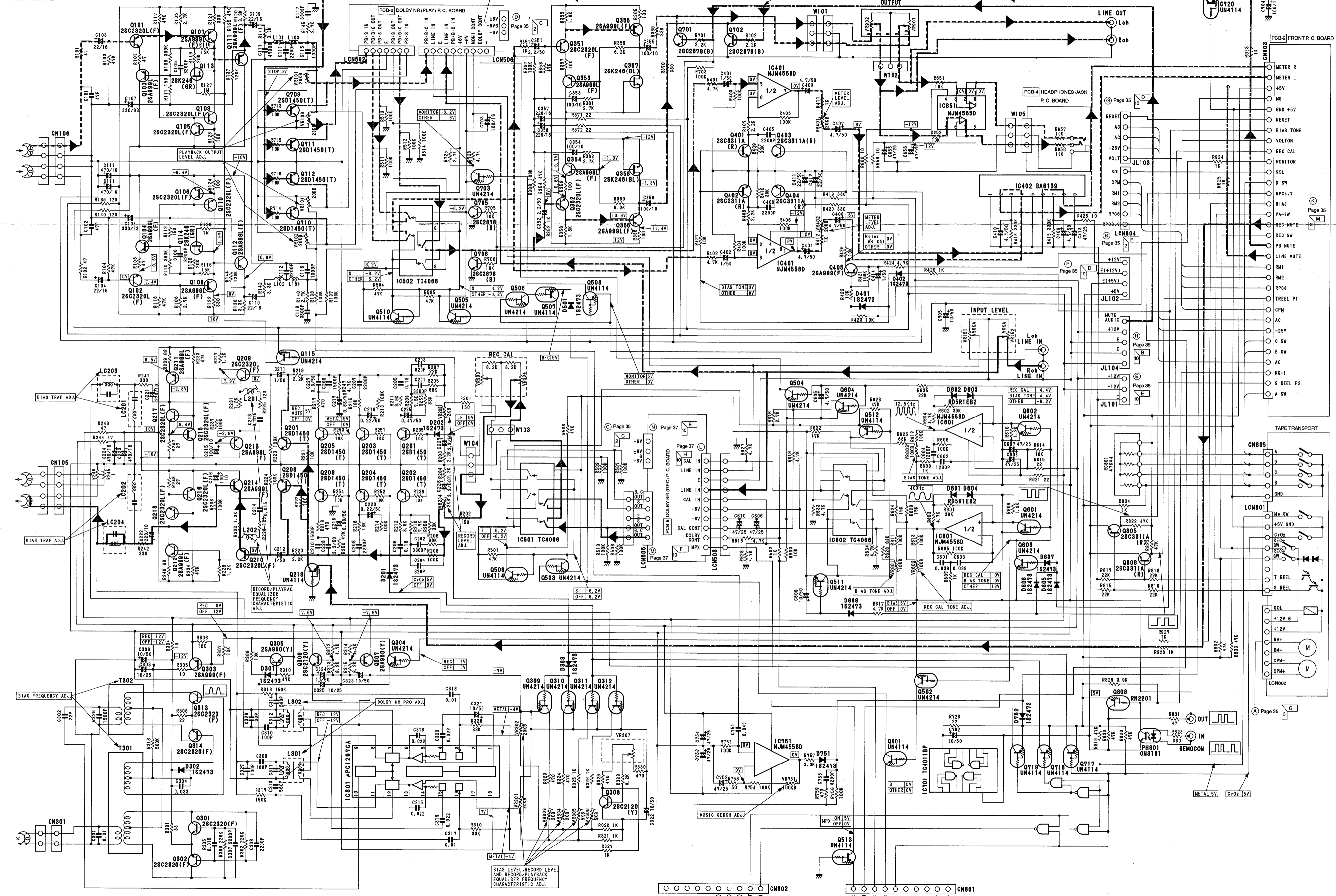
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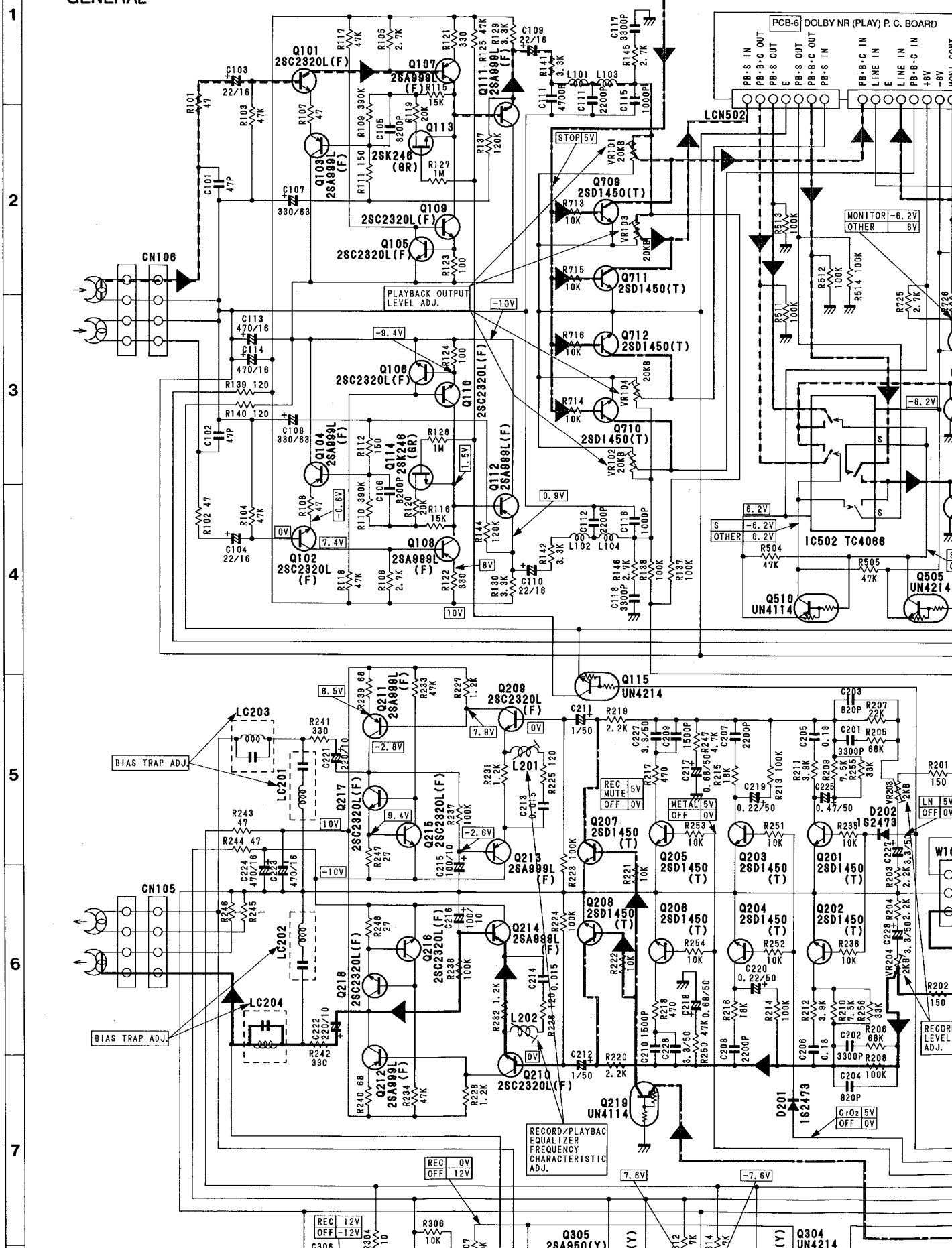


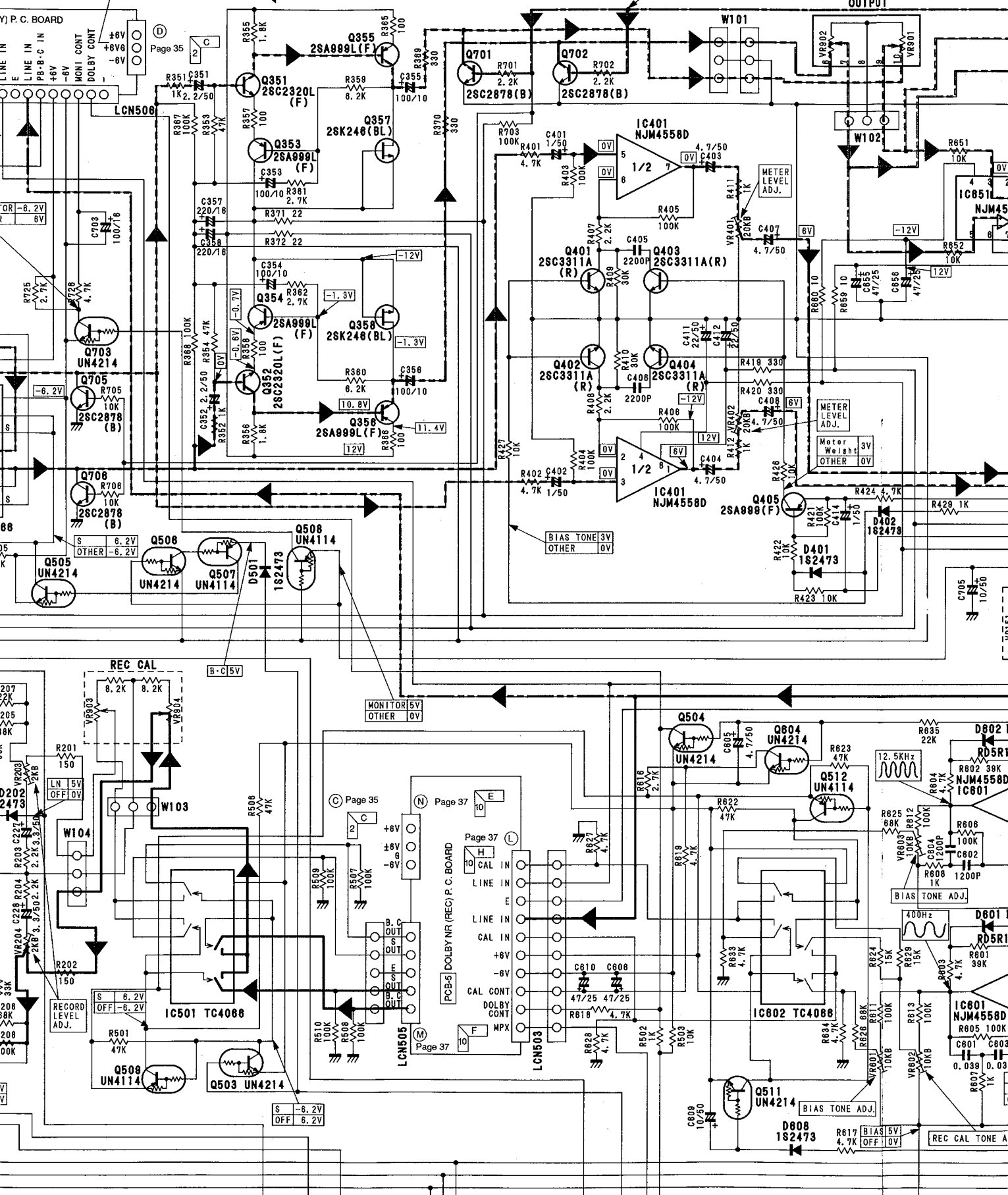
SCHEMATIC DIAGRAM (2)
GENERAL

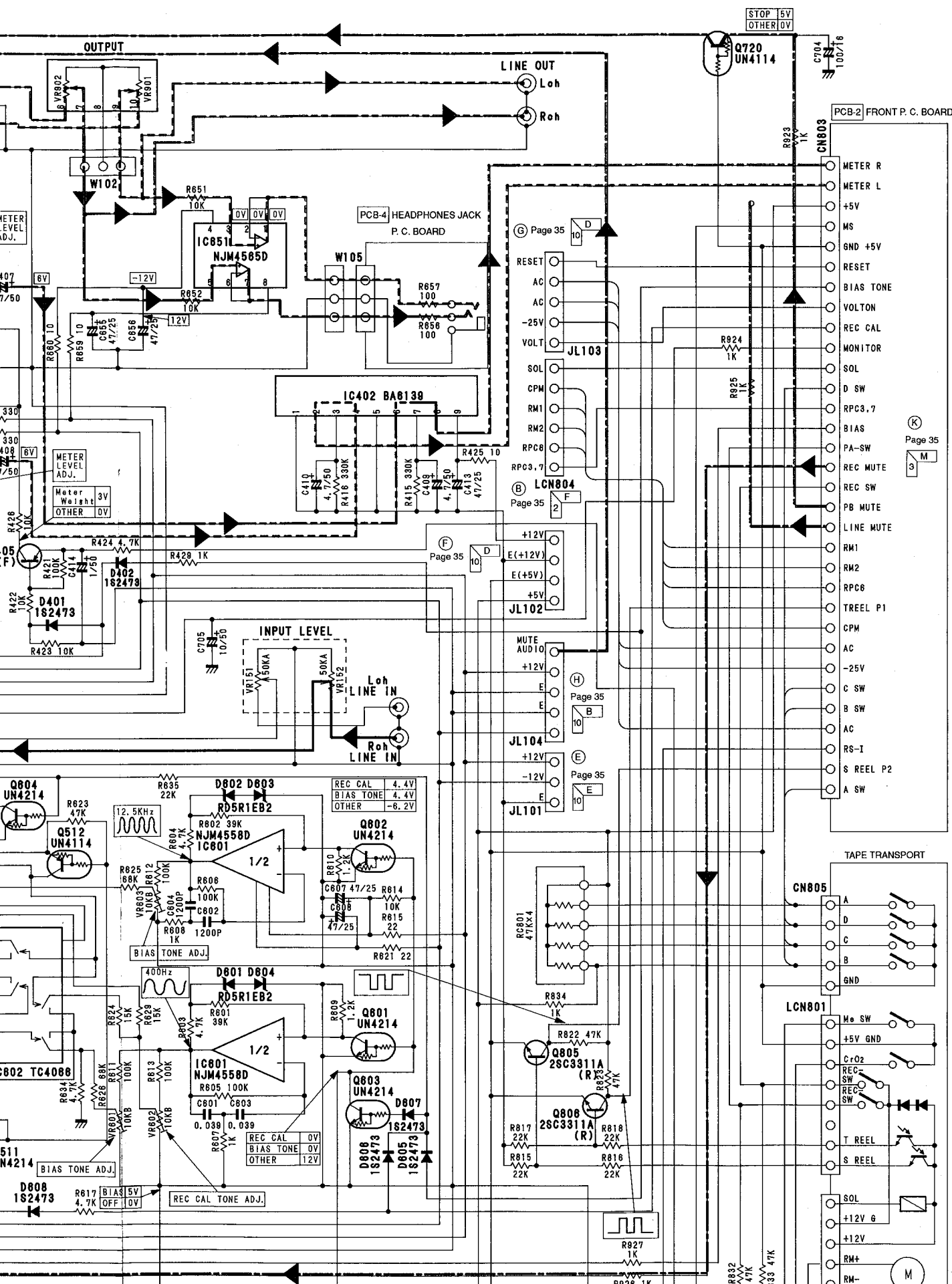


SCHEMATIC DIAGRAM (2)

GENERAL







STOP 5V
OTHER 0V

OUTPUT

LINE OUT
Loh
Roh

PCB-2 FRONT P. C. BOARD

PCB-4 HEADPHONES JACK
P. C. BOARD

METER LEVEL ADJ.

METER LEVEL ADJ.

Meter Weight 3V
OTHER 0V

INPUT LEVEL
Loh
LINE IN
Roh
LINE IN

REC CAL 4.4V
BIAS TONE 4.4V
OTHER -6.2V

REC CAL 0V
BIAS TONE 0V
OTHER 12V

REC CAL TONE ADJ.

BIAS TONE ADJ.

BIAS TONE ADJ.

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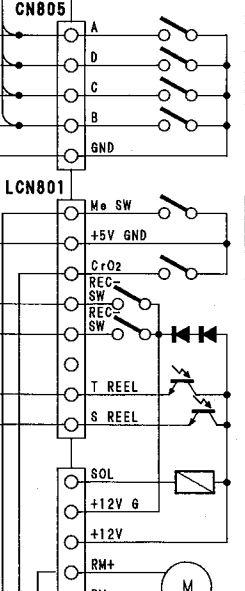
Page 35

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- METER R
- METER L
- +5V
- MS
- GND +5V
- RESET
- BIAS TONE
- VOLTON
- REC CAL
- MONITOR
- SOL
- D SW
- RPC3,7
- BIAS
- PA-SW
- REC MUTE
- REC SW
- PB MUTE
- LINE MUTE
- RM1
- RM2
- RPC6
- TREEL P1
- CPM
- AC
- 25V
- C SW
- B SW
- AC
- RS-I
- S REEL P2
- A SW

TAPE TRANSPORT



C704 100/16

R923 1K

CN803

R924 1K

R925 1K

JL103

R926 1K

JL102

JL104

JL101

CN805

LCN801

R822 47K

Q805 2SC3311A (R)

Q806 2SC3311A (R)

R817 22K

R818 22K

R815 22K

R816 22K

R827 1K

R832 47K

R833 47K

Q720 UN4114

R923 1K

CN803

R924 1K

R925 1K

JL103

R926 1K

JL102

JL104

JL101

CN805

LCN801

R822 47K

Q805 2SC3311A (R)

Q806 2SC3311A (R)

R817 22K

R818 22K

R815 22K

R816 22K

R827 1K

R832 47K

R833 47K

R834 1K

4

5

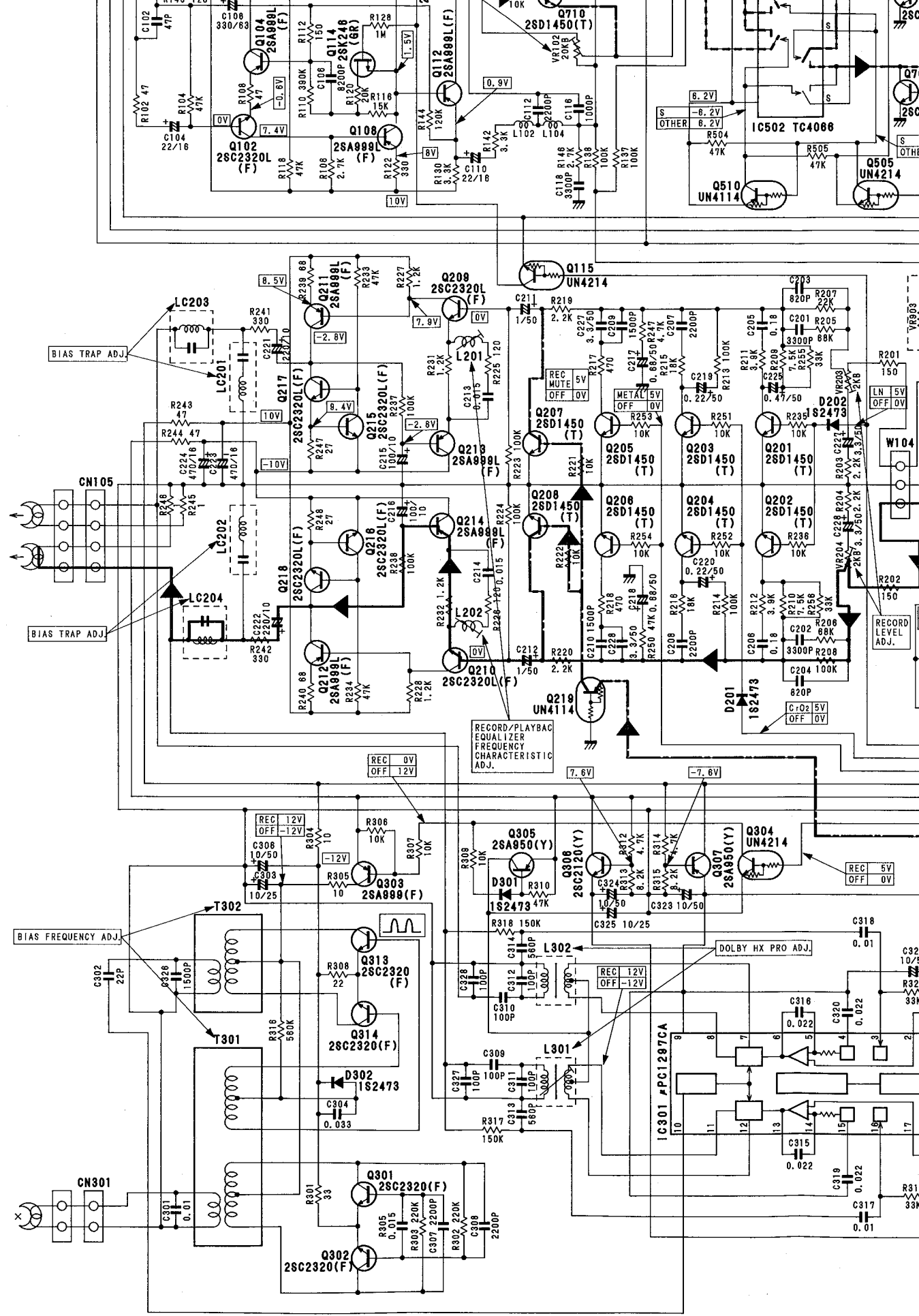
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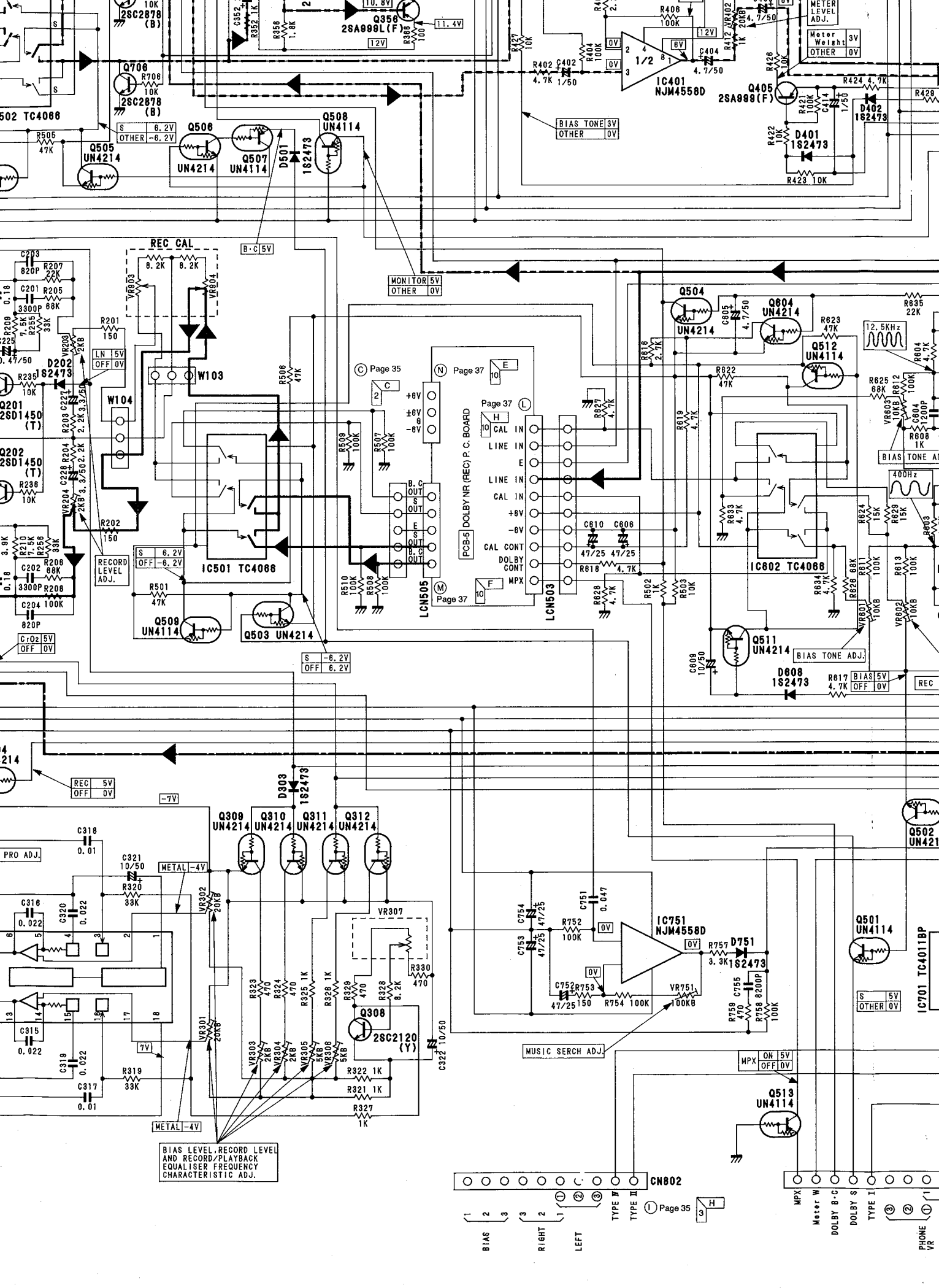
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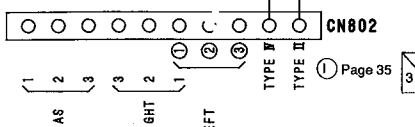




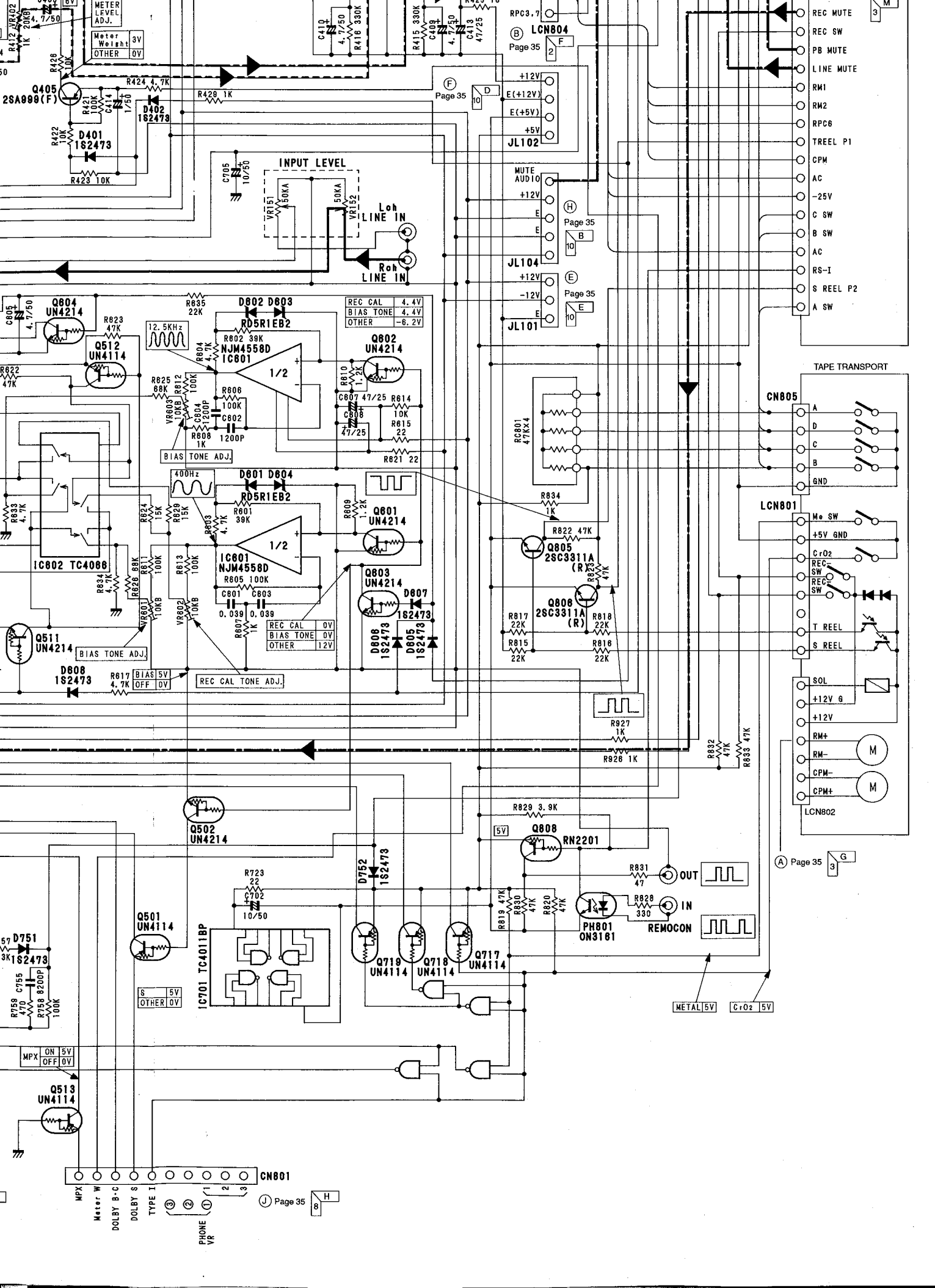
BIAS LEVEL, RECORD LEVEL AND RECORD/PLAYBACK EQUALIZER FREQUENCY CHARACTERISTIC ADJ.

MUSIC SEARCH ADJ.

BIAS TONE ADJ.



PHONE VR



RPC3.7
LCN804
 Page 35

Page 35

+12V
 E(+12V)
 E(+5V)
 +5V
JL102

MUTE
 AUD10
 +12V
 E
 Page 35
JL104

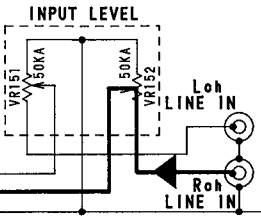
+12V
 E
 Page 35
JL101

- REC SW
- PB MUTE
- LINE MUTE
- RM1
- RM2
- RPC6
- TREEL P1
- CPM
- AC
- 25V
- C SW
- B SW
- AC
- RS-I
- S REEL P2
- A SW

TAPE TRANSPORT

- CN805**
- A
- D
- C
- B
- GND
- LCN801**
- Me SW
- +5V GND
- Cr02
- REC SW
- REC SW
- T REEL
- S REEL
- SOL
- +12V G
- +12V
- RM+
- RM-
- CPM-
- CPM+
- LCN802**

Page 35



REC CAL 4.4V
 BIAS TONE 4.4V
 OTHER -6.2V

REC CAL 0V
 BIAS TONE 0V
 OTHER 12V

S 5V
 OTHER 0V

METAL 5V
 Cr02 5V

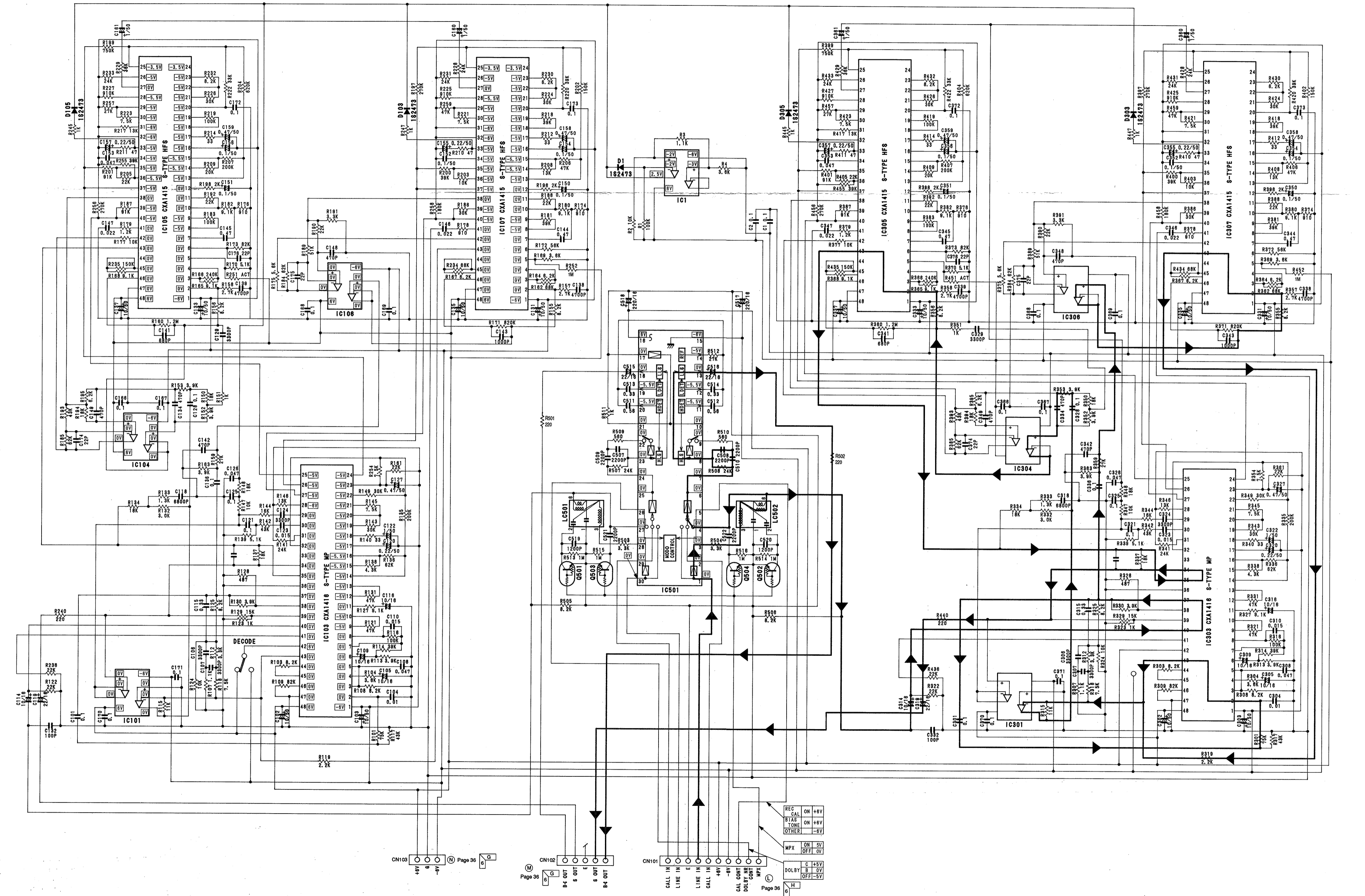
Page 35

CN801

- MPX
- Meter W
- DOLBY B-C
- DOLBY S
- TYPE I
- 1
- 2
- 3
- PHONE VR

SCHMATIC DIAGRAM (3)

[PCB-5] DOLBY NR (REC) P. C. BOARD



Page 36
 48V
 6V
 -6V
 G

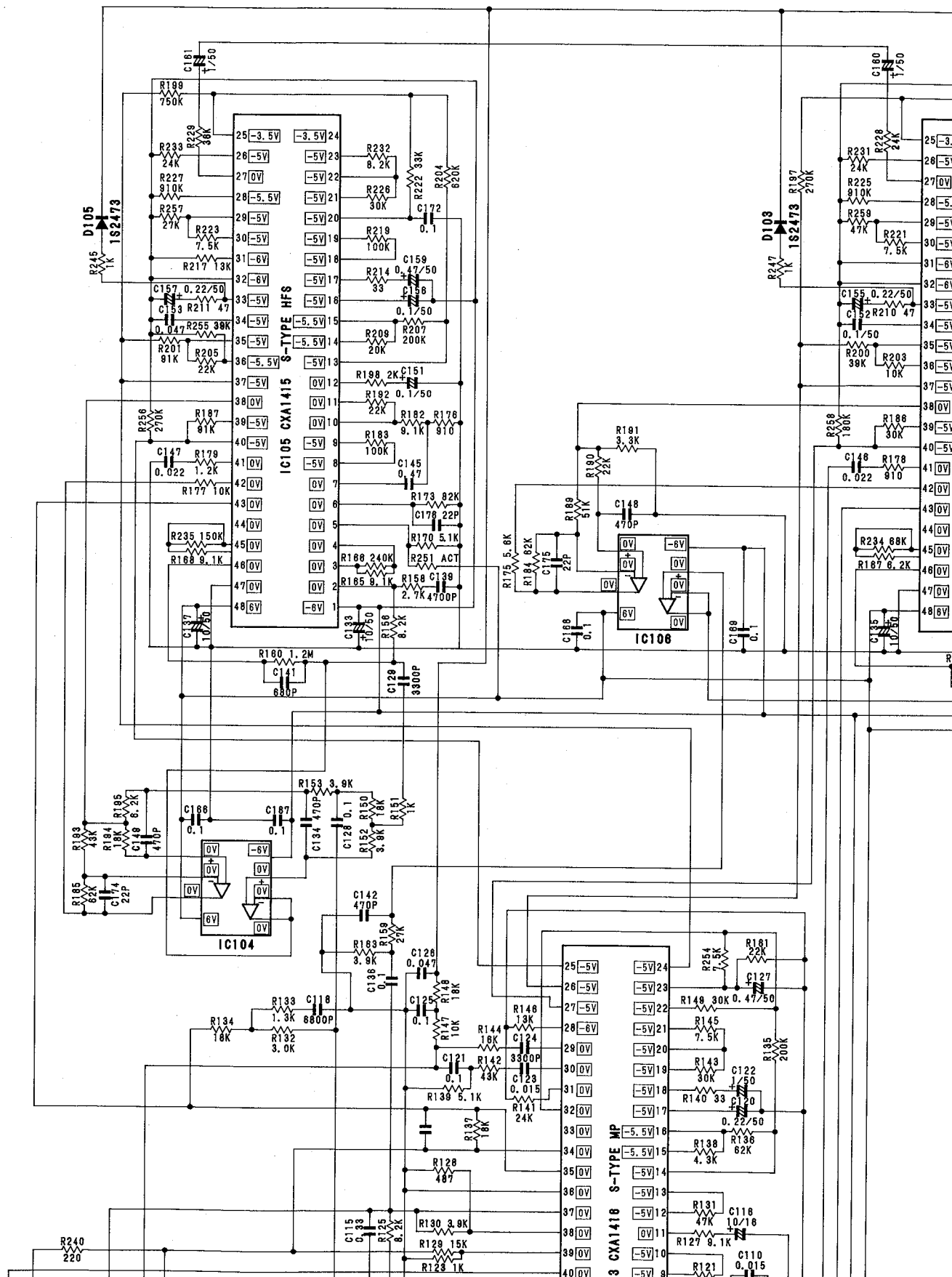
Page 36
 84 OUT
 6V
 -6V
 G

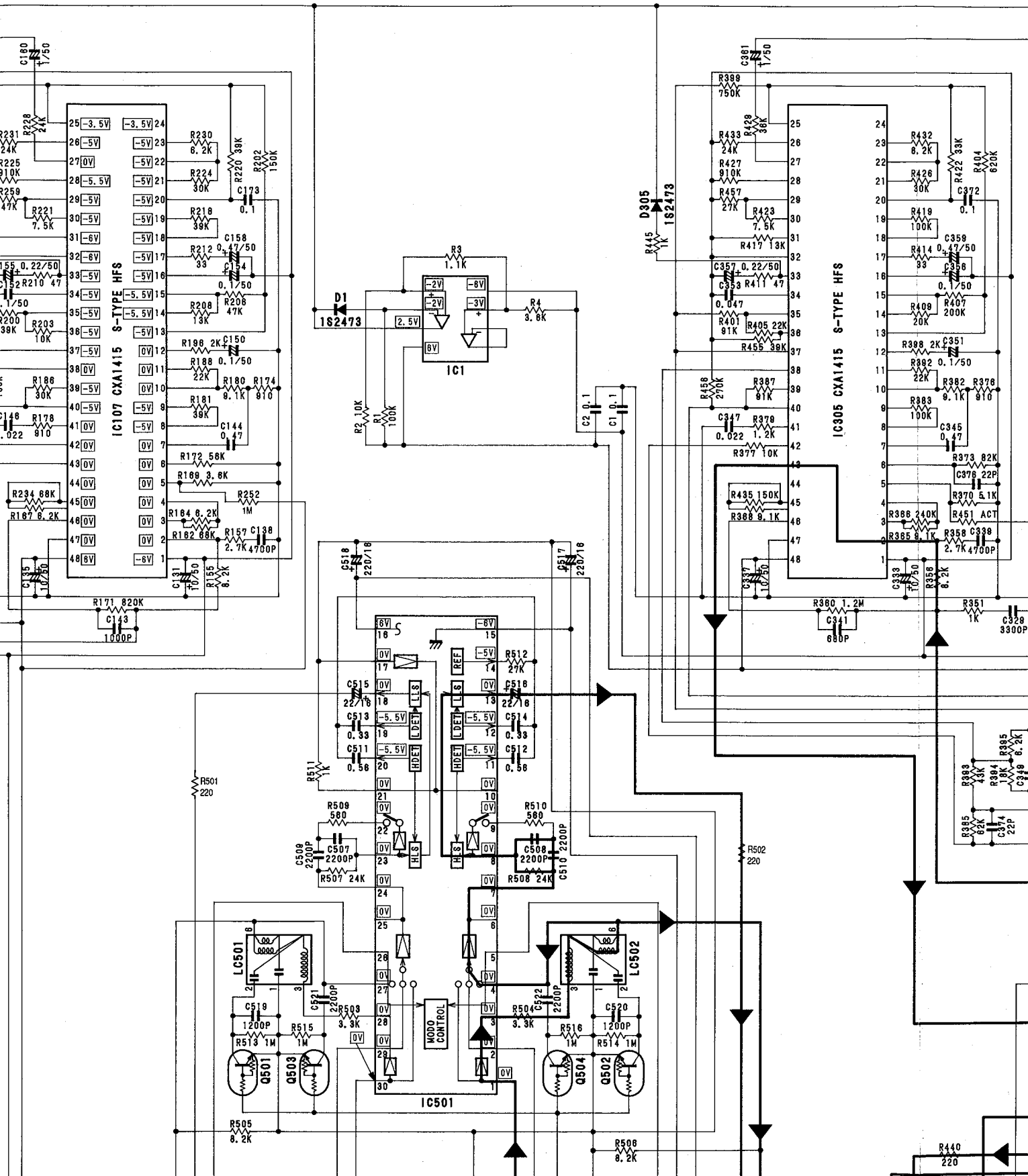
Page 36
 CALL IN
 LINE IN
 E
 LINE IN
 CALL IN
 48V
 -6V
 CAL CONT
 DOLBY NR
 CONT
 MPX
 G

REC CAL ON +6V
 BIAS ON +6V
 TONE ON +6V
 OTHER -6V
 MPX ON 5V
 OFF 0V
 DOLBY C +5V
 B 0V
 OFF -5V
 H
 G

SCHEMATIC DIAGRAM (3)

PCB-5 DOLBY NR (REC) P. C. BOARD





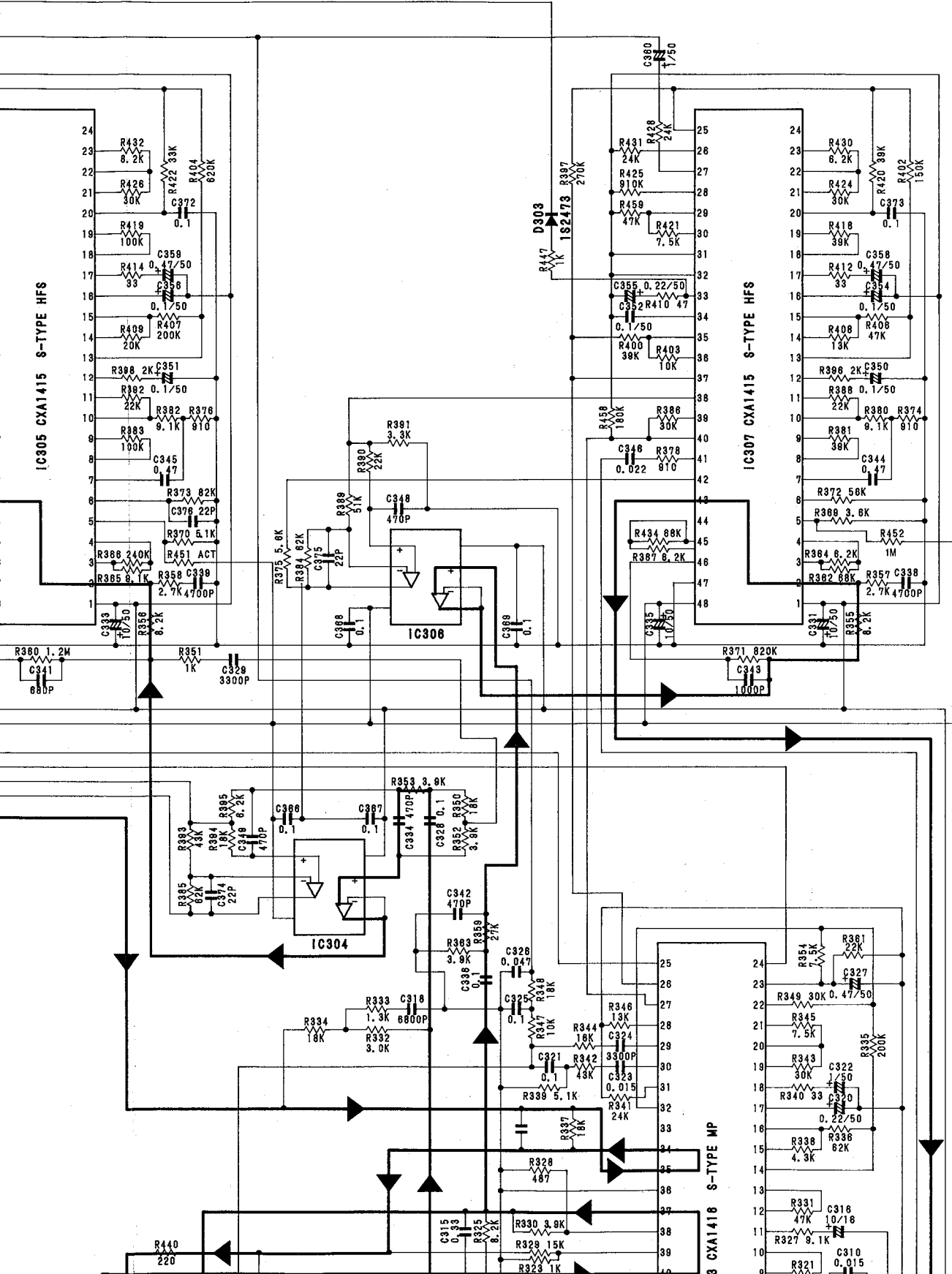
J

K

L

M

N



IC305 CXA1415 S-TYPE HFS

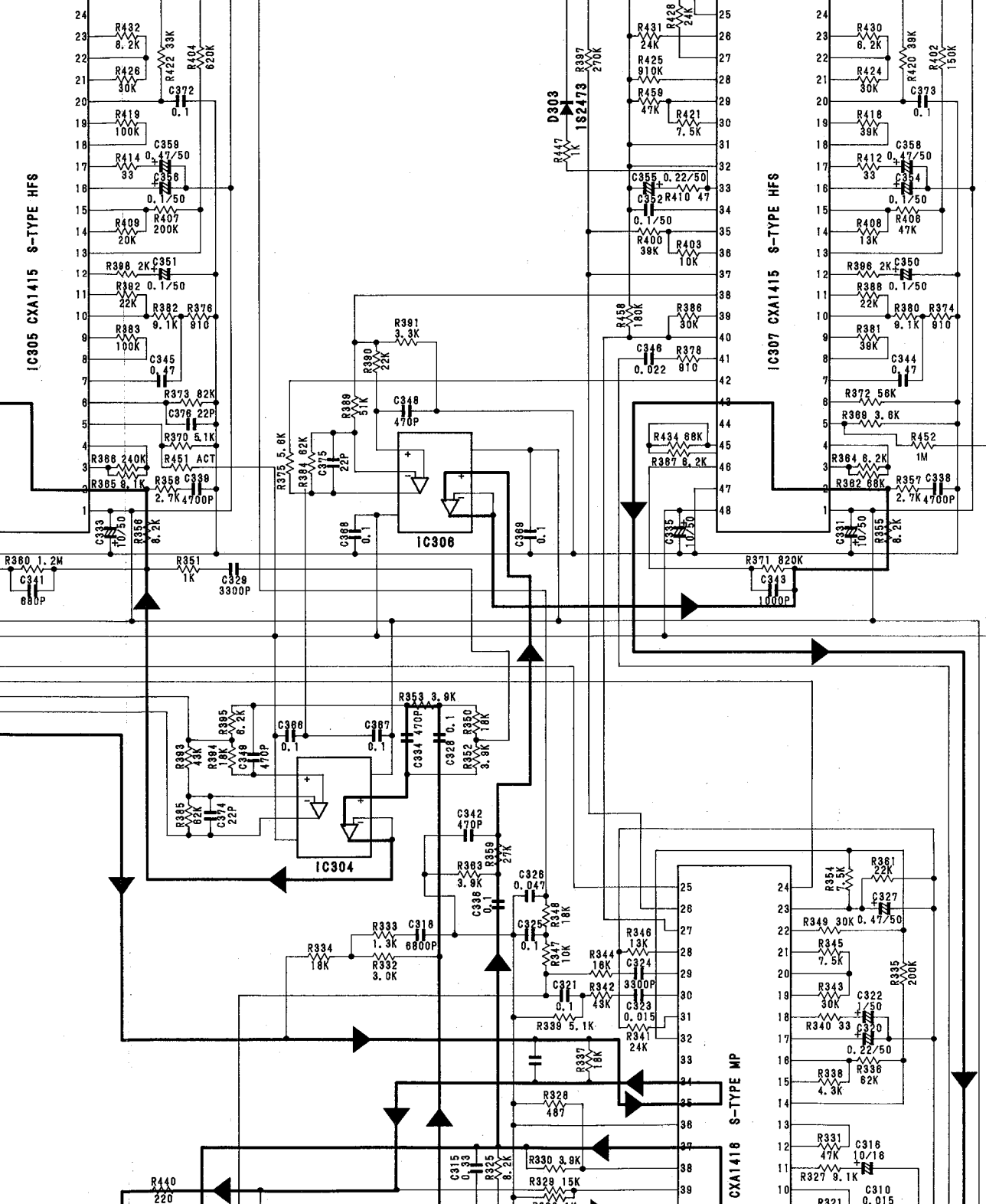
IC307 CXA1415 S-TYPE HFS

IC306

IC304

IC304 CXA1418 S-TYPE MP

D303



4

5

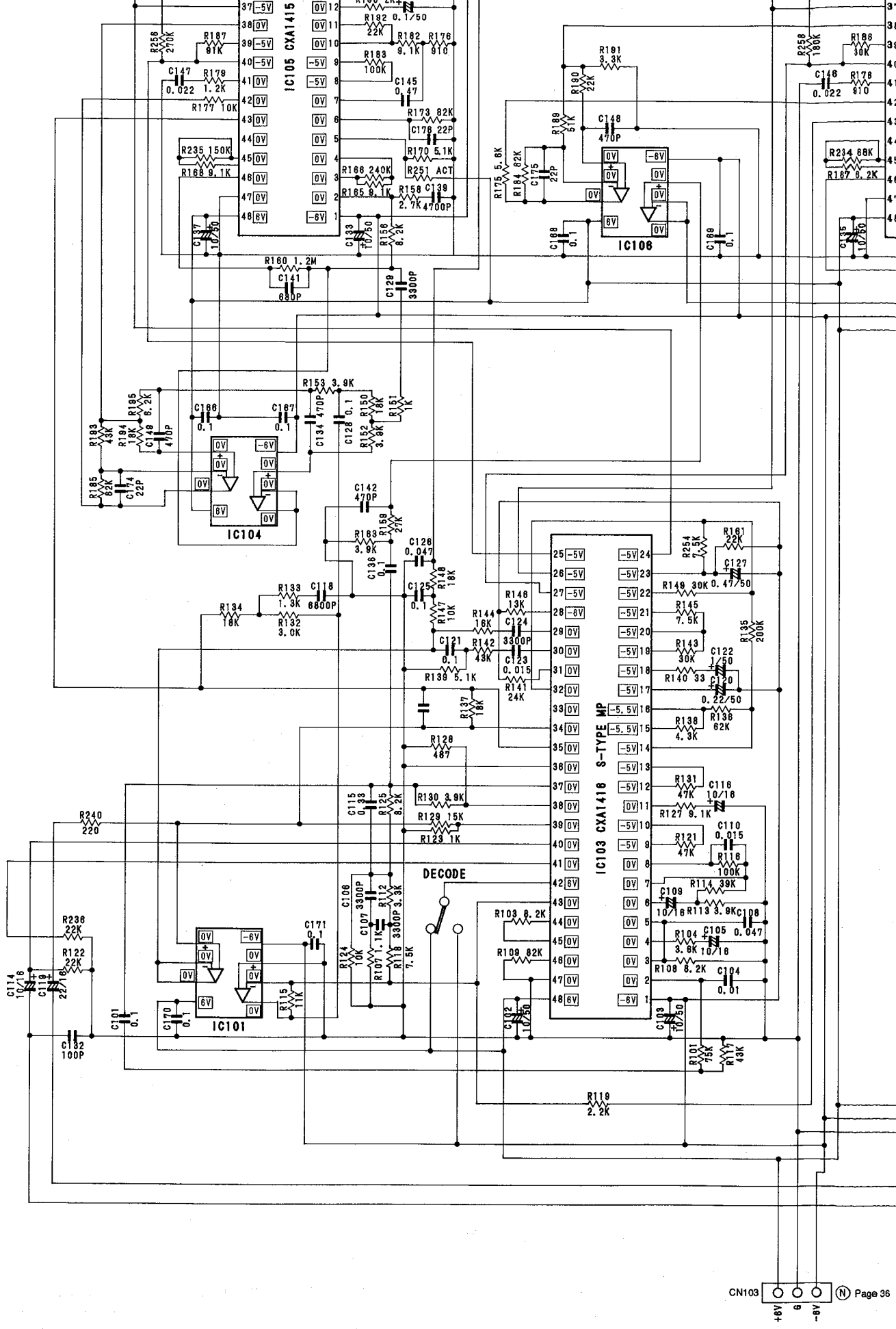
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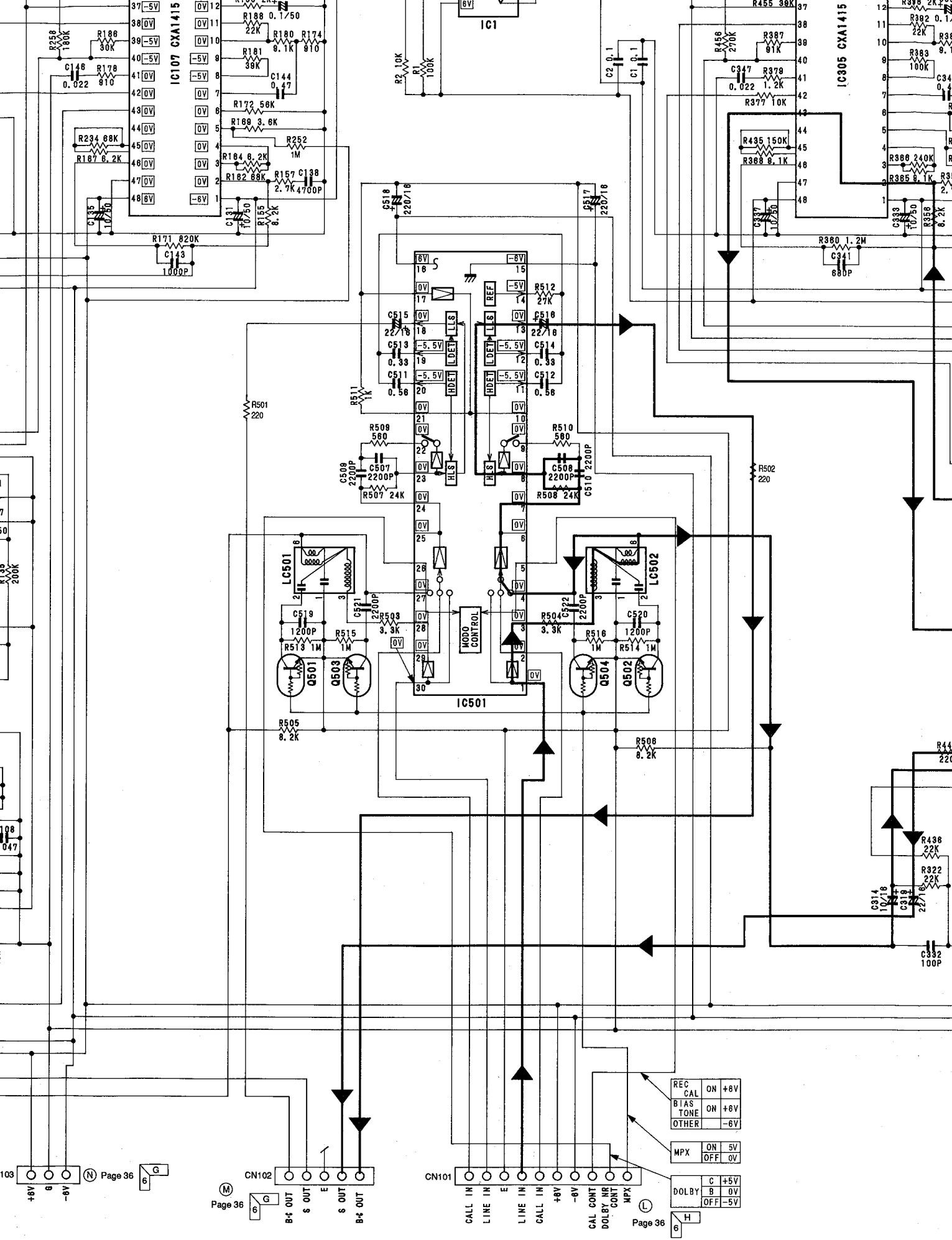
7

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REC	ON	+8V
CAL	ON	+8V
BIAS	ON	+8V
TONE	ON	+8V
OTHER	OFF	-6V

MPX	ON	5V
	OFF	0V

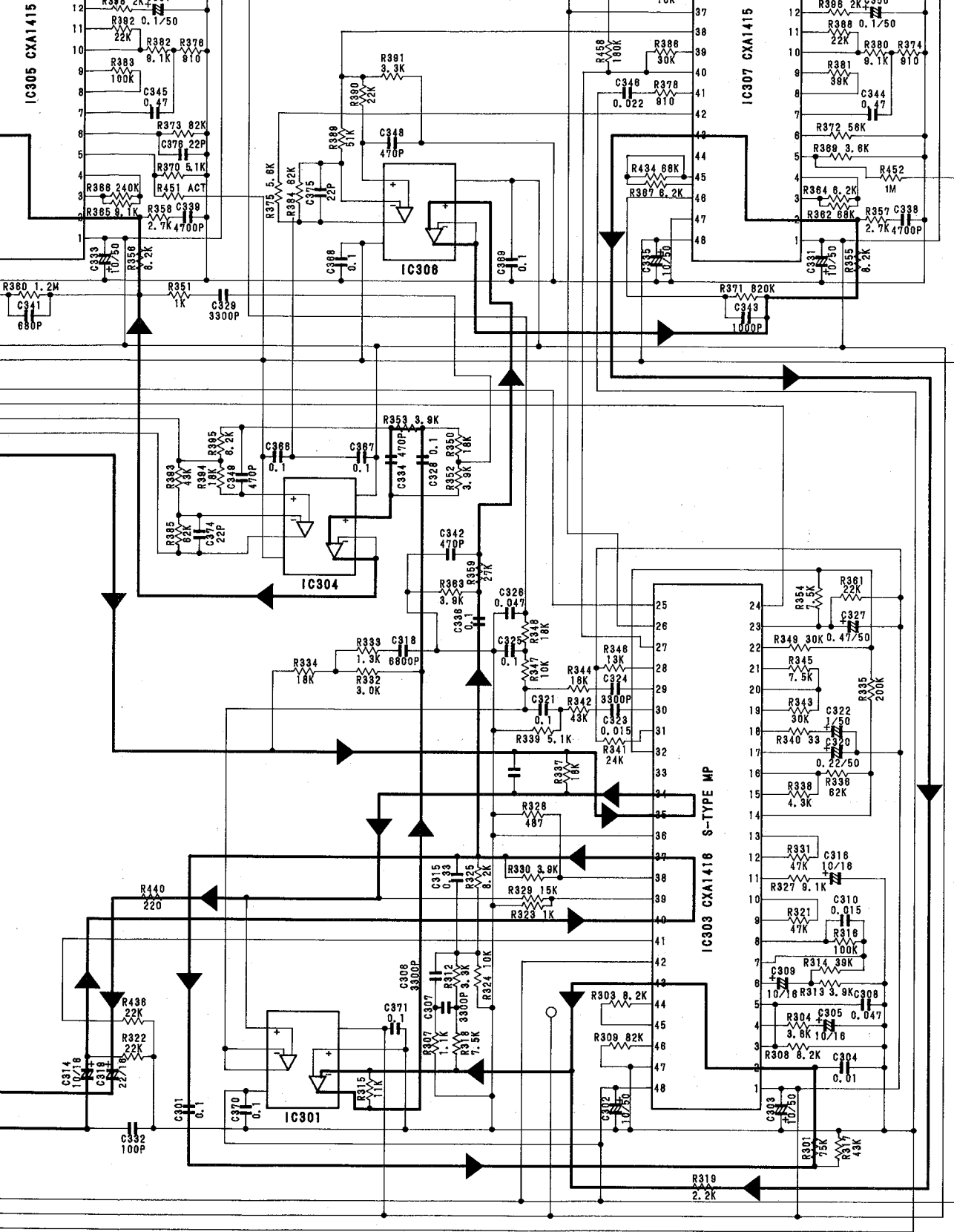
DOLBY	C	+5V
	B	0V
	OFF	-5V

103

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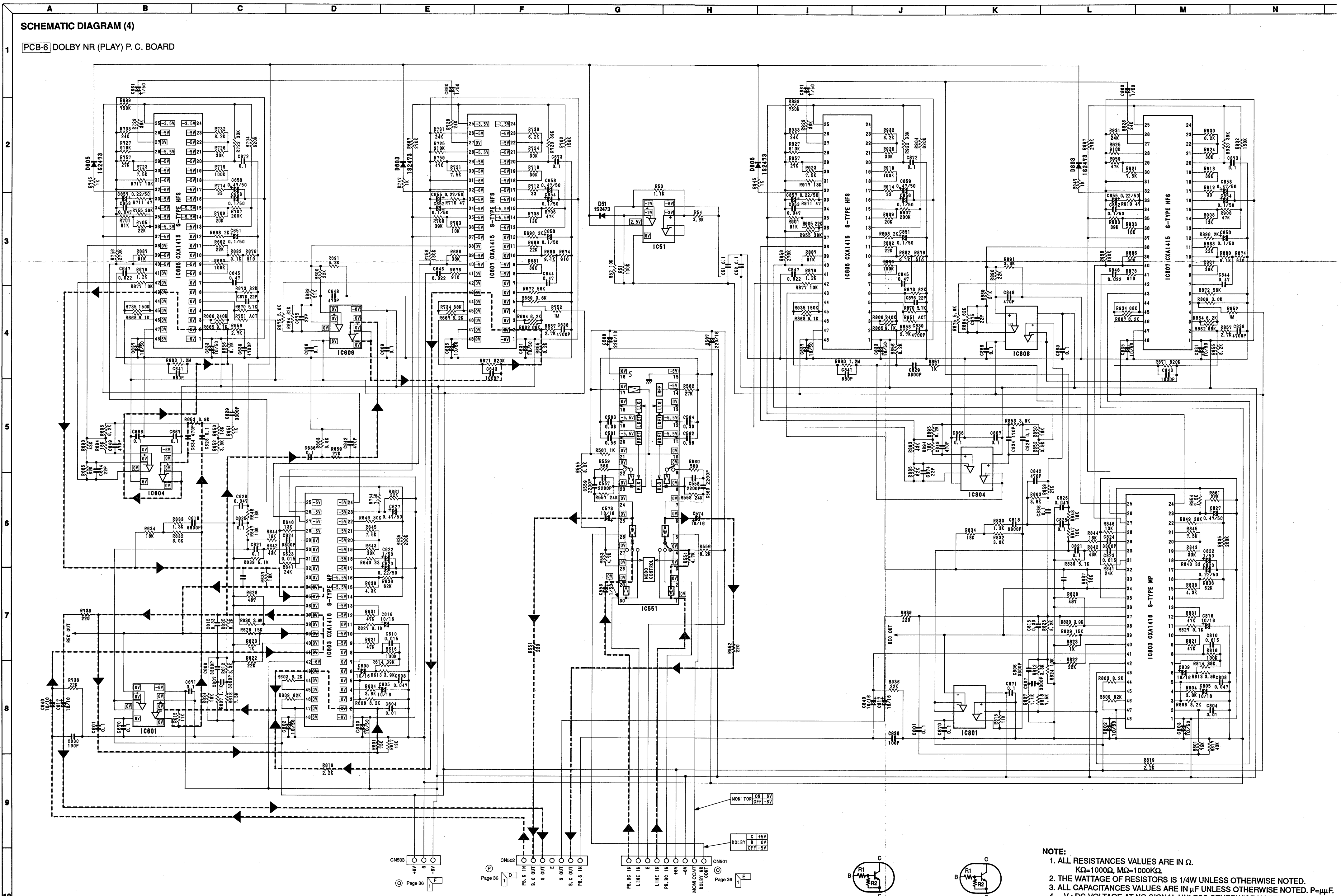
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SCHEMATIC DIAGRAM (4)

PCB-6 DOLBY NR (PLAY) P. C. BOARD



- NOTE:**
1. ALL RESISTANCES VALUES ARE IN Ω .
 $K\Omega=1000\Omega$, $M\Omega=1000K\Omega$.
 2. THE WATTAGE OF RESISTORS IS 1/4W UNLESS OTHERWISE NOTED.
 3. ALL CAPACITANCES VALUES ARE IN μF UNLESS OTHERWISE NOTED. P= $\mu\mu F$.
 4. ...V : DC VOLTAGE AT NO SIGNAL UNLESS OTHERWISE NOTED.
 5. SAFETY REQUIREMENTS COMPONENTS IN ACCORDANCE WITH PRESENT SAFETY REGULATIONS, THESE COMPONENTS MUST ONLY BE REPLACED BY ORIGINAL PARTS.

Type	R1(k Ω)	R2(k Ω)
UN4114	10	47
Type	R1(k Ω)	R2(k Ω)
UN4214	10	47

J

K

L

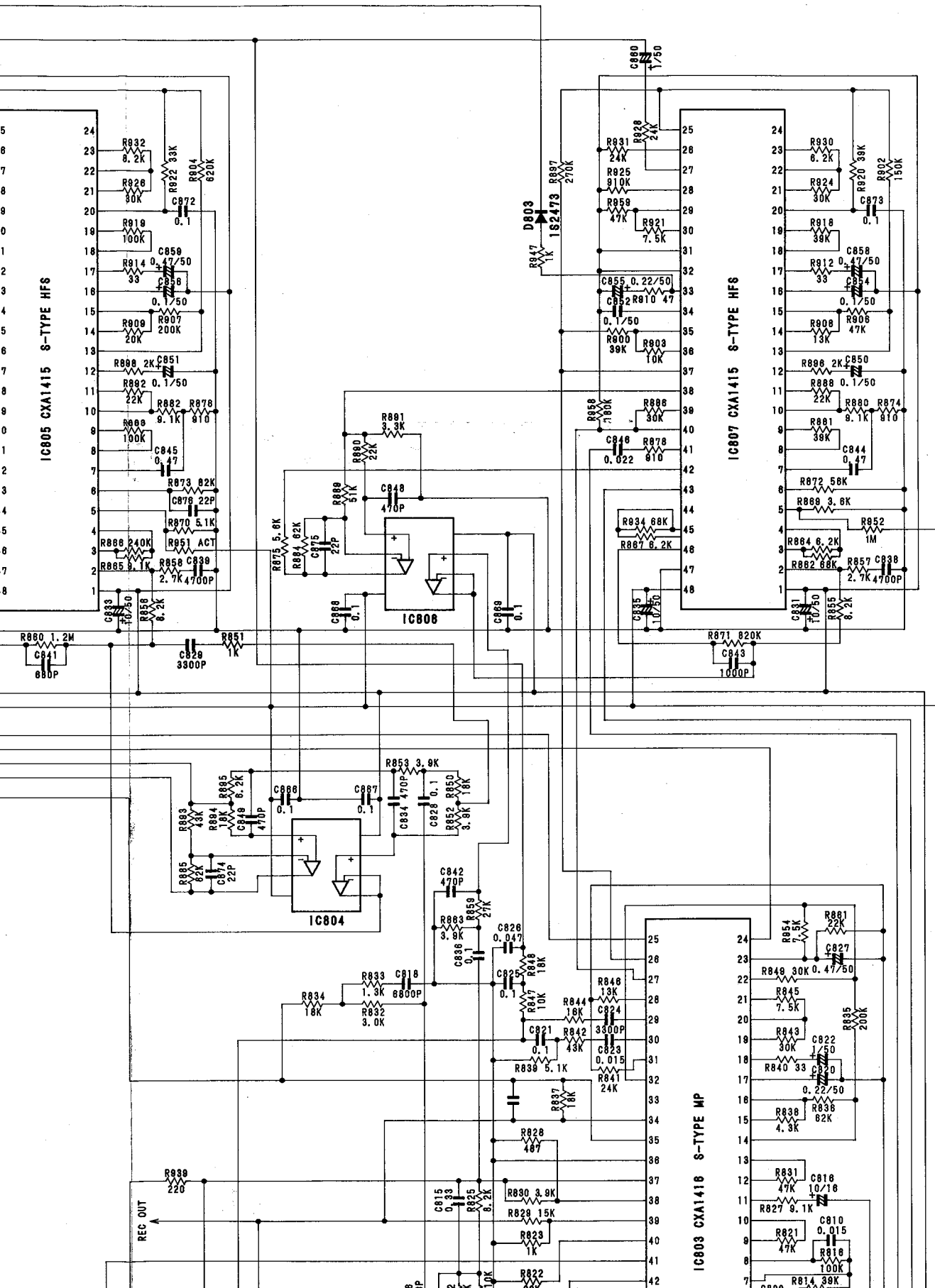
M

N

IC805 CXA1415 S-TYPE HFS

IC807 CXA1415 S-TYPE HFS

IC803 CXA1418 S-TYPE MP



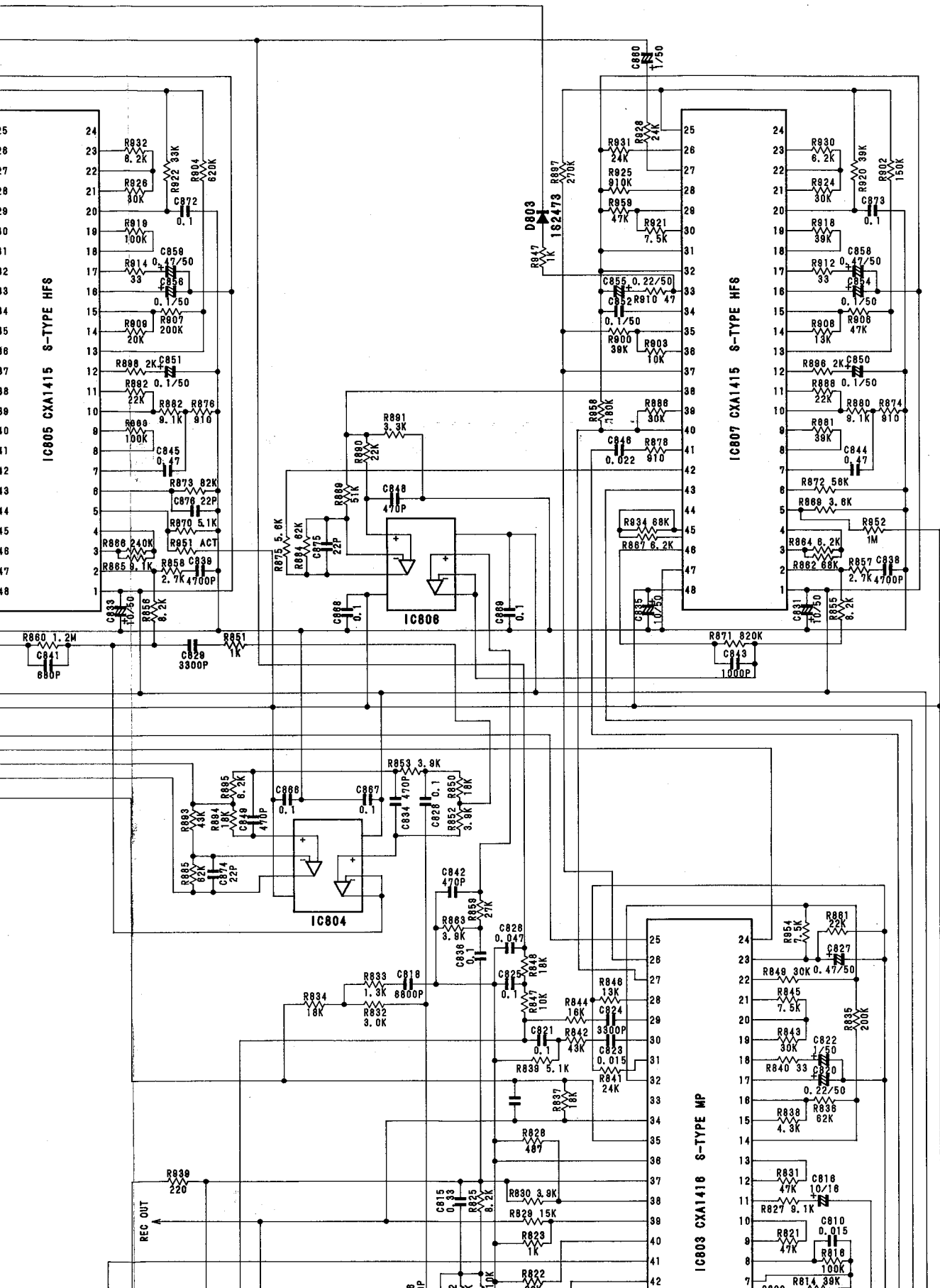
J

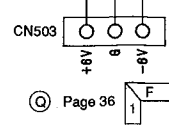
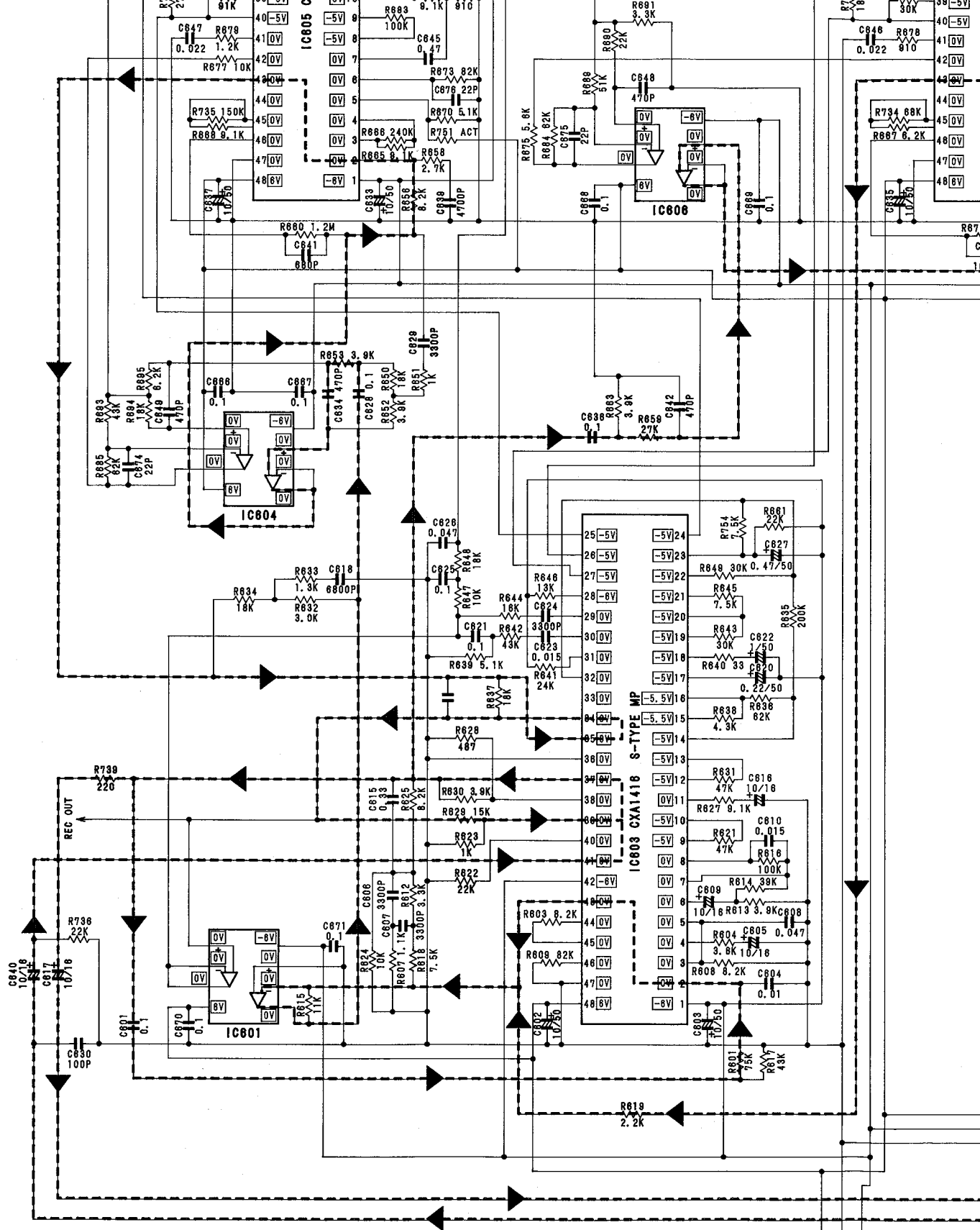
K

L

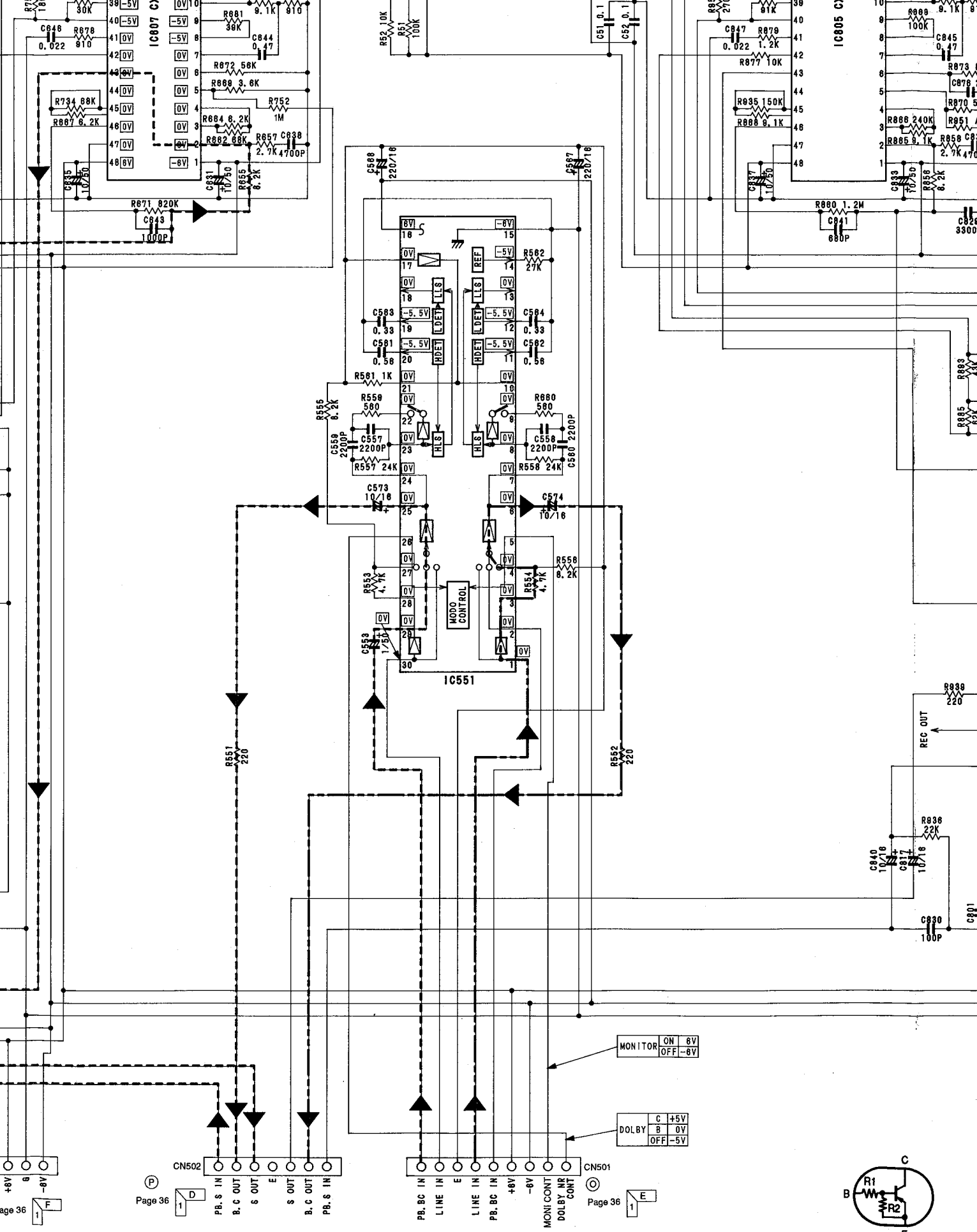
M

N





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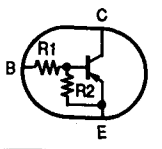


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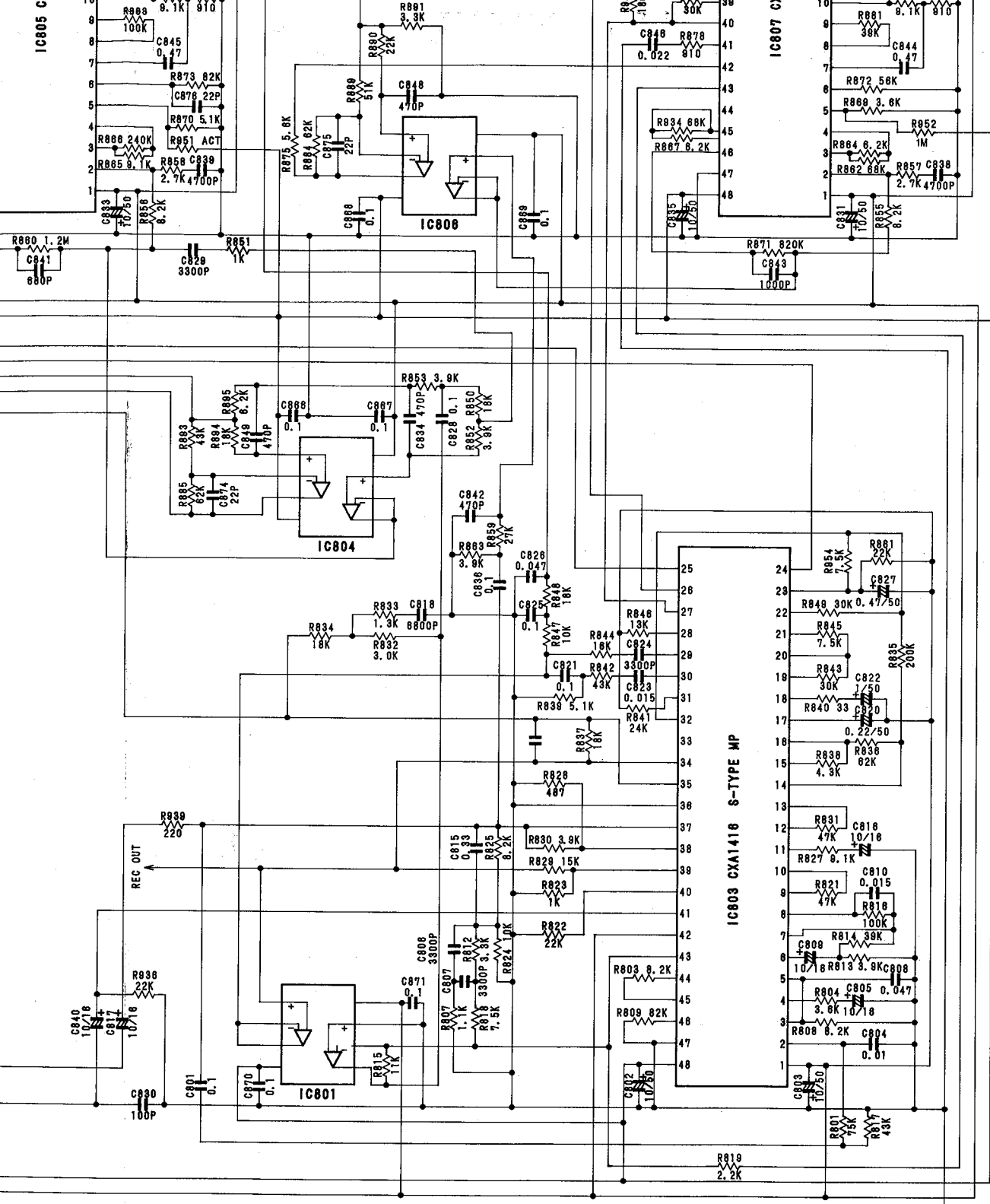
Page 36

MONITOR ON 6V
OFF -6V


DOLBY C +5V
B 0V
OFF -5V

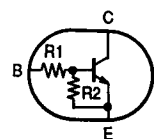
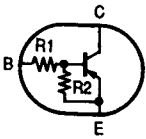


Type	R1(kΩ)	R2(kΩ)
UN4114	10	47



NOTE:

1. ALL RESISTANCES VALUES ARE IN Ω .
 $K\Omega=1000\Omega$, $M\Omega=1000K\Omega$.
2. THE WATTAGE OF RESISTORS IS 1/4W UNLESS OTHERWISE NOTED.
3. ALL CAPACITANCES VALUES ARE IN μF UNLESS OTHERWISE NOTED. $P=\mu\mu F$.
4. ...V : DC VOLTAGE AT NO SIGNAL UNLESS OTHERWISE NOTED.
5.  SAFETY REQUIREMENTS COMPONENTS IN ACCORDANCE WITH PRESENT SAFETY REGULATIONS, THESE COMPONENTS MUST ONLY BE REPLACED BY ORIGINAL PARTS.



Type	R1(k Ω)	R2(k Ω)
UN4114	10	47

Type	R1(k Ω)	R2(k Ω)
UN4214	10	47