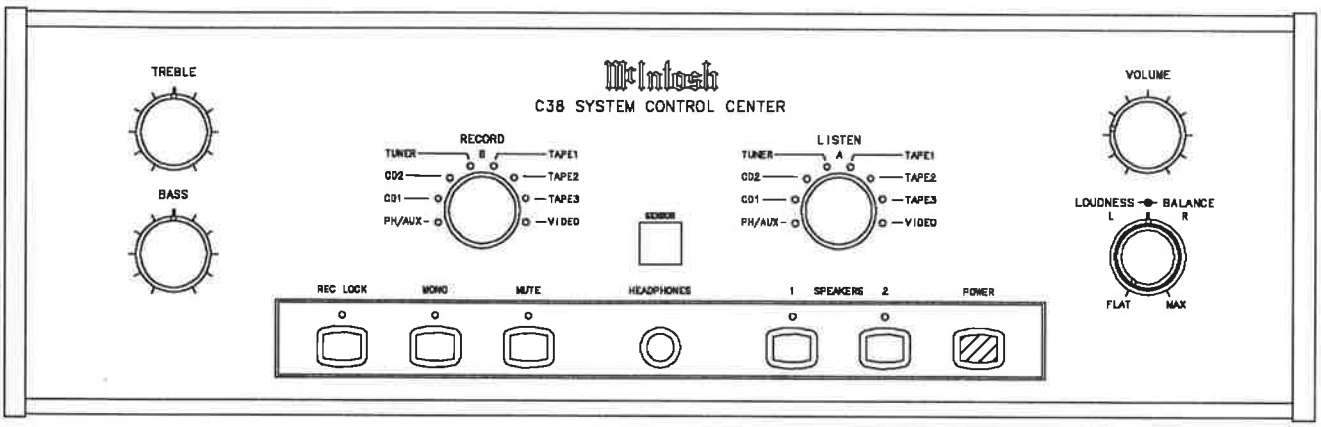
C 38

SYSTEM CONTROL CENTER



CONTENTS

McIntosh® Service Manual

Performance Specifications

FREQUENCY RESPONSE
+0, -0.5dB from 20Hz to 20,000Hz.

RATED OUTPUT
2.5V at MAIN, SWITCHED 1 and 2, BALANCED and Area B Outputs.

OUTPUT IMPEDANCE
600 ohms for MAIN, SWITCHED 1 and 2, BALANCED and Area B Outputs.

MAXIMUM OUTPUT VOLTAGE
8V from 20Hz to 20,000Hz at MAIN, SWITCHED 1 and 2, BALANCED and Area B Output.

TOTAL HARMONIC DISTORTION
0.002% maximum from 20Hz to 20,000Hz at rated output.

SENSITIVITY
Phono: 2.5mV for 2.5V rated output, (0.5mV IHF).
High Level: 250mV for 2.5V rated output, (50mV IHF).

SIGNAL-TO-NOISE RATIO, A-WEIGHTED
Phono: 90dB below 10mV input, (84dB IHF).
High Level: 105dB below rated output, (95dB IHF).

MAXIMUM INPUT SIGNAL
Phono: 90mV.
High Level: 10V.

INPUT IMPEDANCE
Phono: 47K ohms and 65pF capacitance.
High Level: 22K ohms.

VOLTAGE GAIN
Phono to Tape: 40dB.
Phono to Main: 60dB.
High Level to Tape: 0dB.
High Level to Main: 20dB.

TONE CONTROLS
Bass and Treble variable, 12dB boost to 12dB cut.

AC POWER OUTLETS
Total current capacity of all four outlets is 1400 watts.
One Unswitched.
One Switched for Area A power amplifier.
One Switched for Area B power amplifier.
One Switched for accessories.

POWER REQUIREMENTS
120V, 50/60Hz, 25 Watts.

MECHANICAL

SIZE: Front Panel is 17-1/2 inches (44.5cm) wide, by 5-3/8 inches (13.7cm) high.
Depth behind mounting panel, including clearance for connectors: 17 inches (43.2cm).
Knob clearance required in front of Mounting Panel: 1-1/8 inches (2.9cm).

FINISH: Front Panel is glass, with gold/teal nomenclature illumination. The chassis is black.

WEIGHT: 20 pounds (9.1Kg) net; 35 pounds (15.9Kg) in shipping carton.

Rear Panel

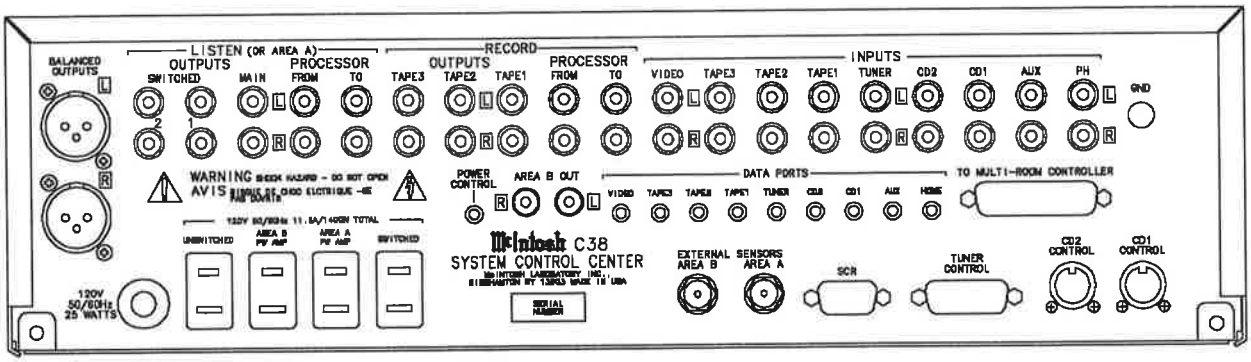


Fig. 1. Rear view

Notes

1. The heavy lines on the schematics denote the primary signal path.

2. Unless otherwise noted, all voltages indicated on the schematics are measured under the following conditions:
   a. AC input at 120 volts, 50/60Hz.
   b. All voltages are ±10% with respect to ground. A high impedance (10 megohm) voltmeter must be used.

3. Unless otherwise specified:
   a. Resistor values are in ohms.
   b. Capacitor values are in microfarads (uF).
   c. Inductor values are in microhenries (uH).

4. The voltages enclosed in a box are signal voltages that are measured with a 2mV, 1kHz signal connected to both channels at the PHONO input jacks.

   Front panel controls are set at:

   BALANCE . . . . . CENTER DETENT
   INPUT SELECTOR(S) . . . . . AUX
   LOUDNESS . . . . . FLAT
   MODE . . . . . STEREO
   POWER . . . . . ON
   TONES . . . . . CENTER DETENT
   VOLUME . . . . . CLOCKWISE

5. On PC Board Drawings, Square Pad Indicates:
   a. Polarized Capacitors - Positive
   b. Diode - Cathode
   c. Others - Pin 1

6. **WARNING:**
   Parts marked with the symbol ⚠ have critical characteristics.
   Use ONLY replacement parts recommended by the manufacturer.

Section Locations

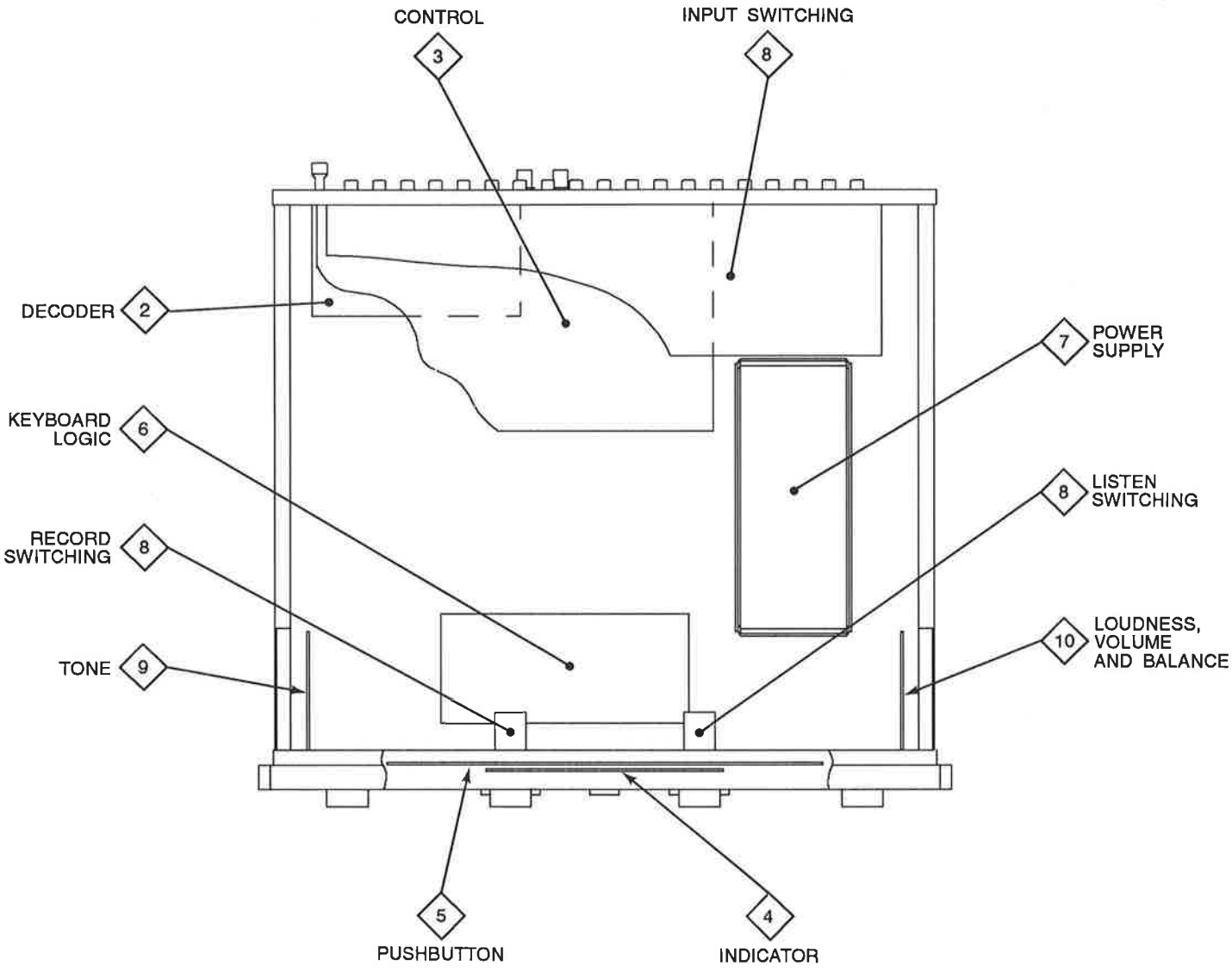
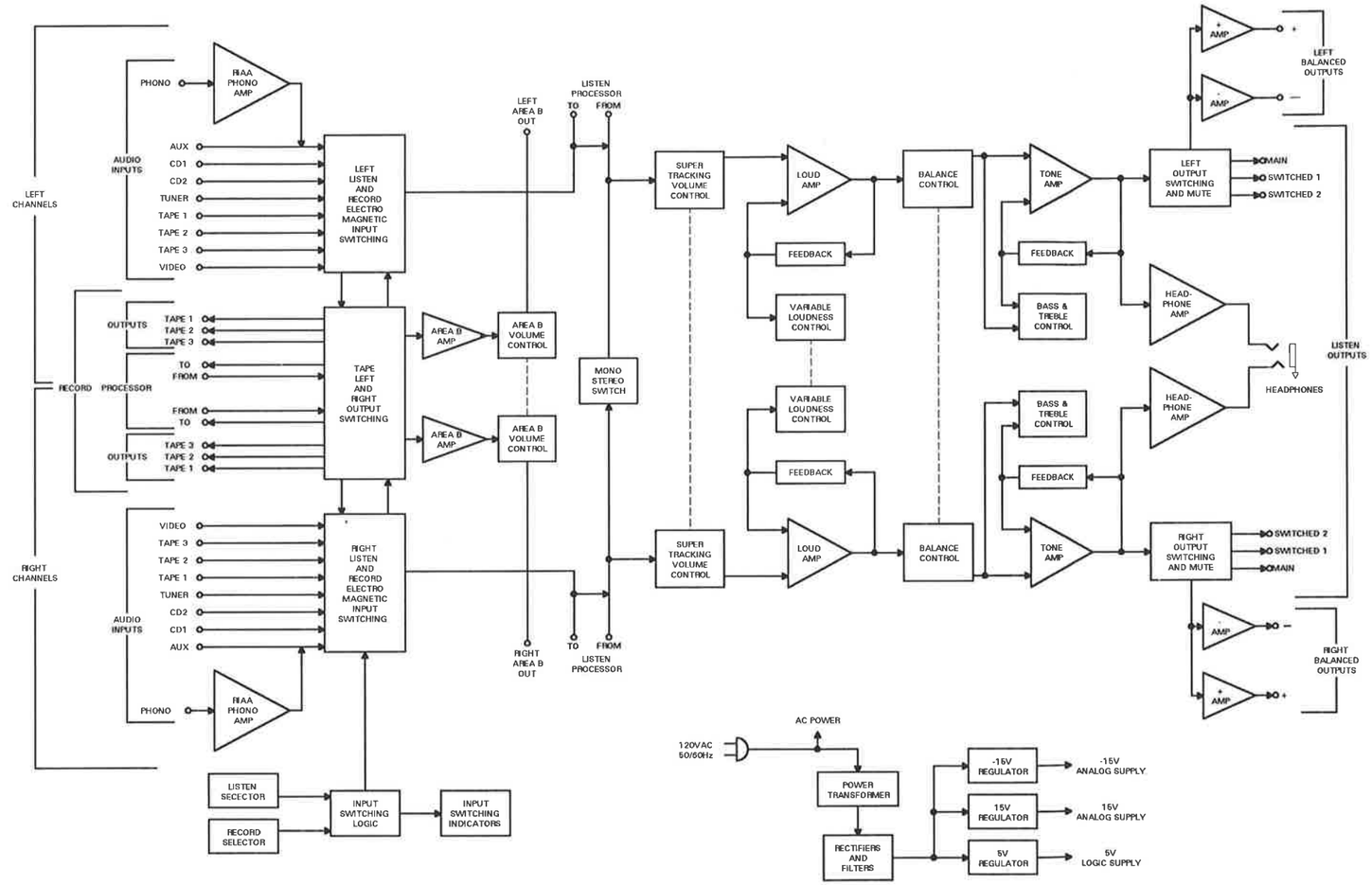


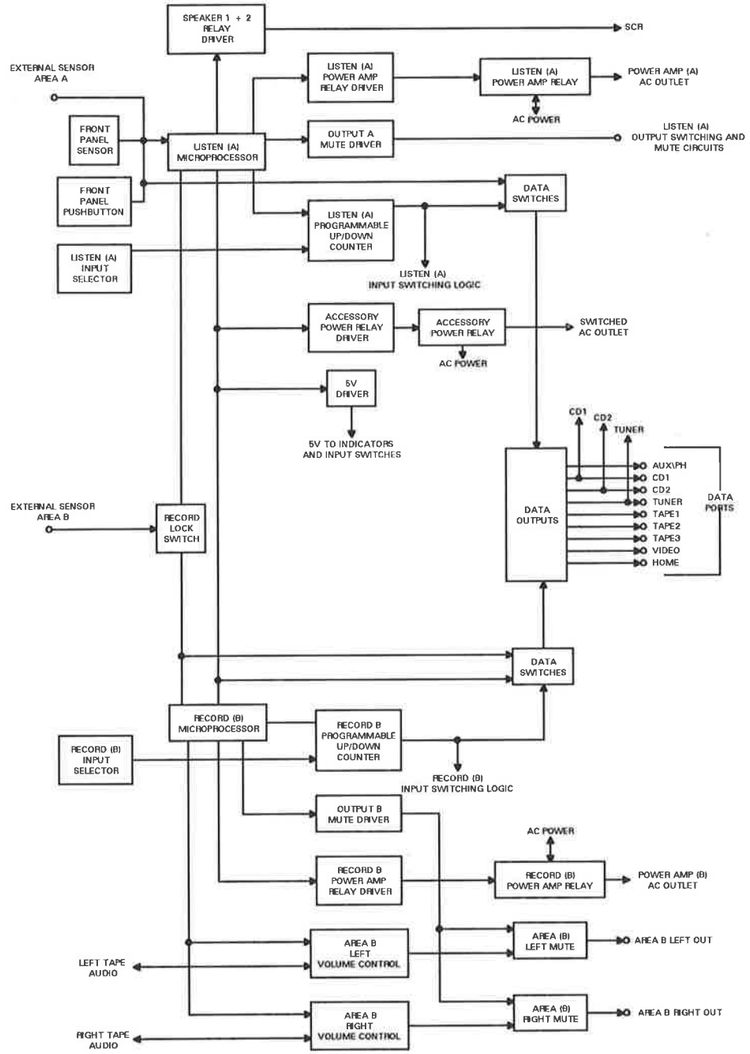
Fig. 2. Top view with cover removed

Block Diagram

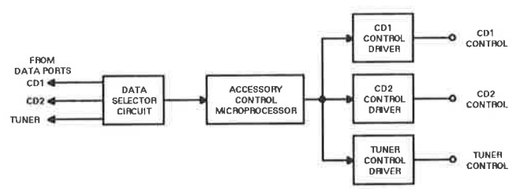
C38 BLOCK DIAGRAM
ANALOG AND POWER SUPPLY



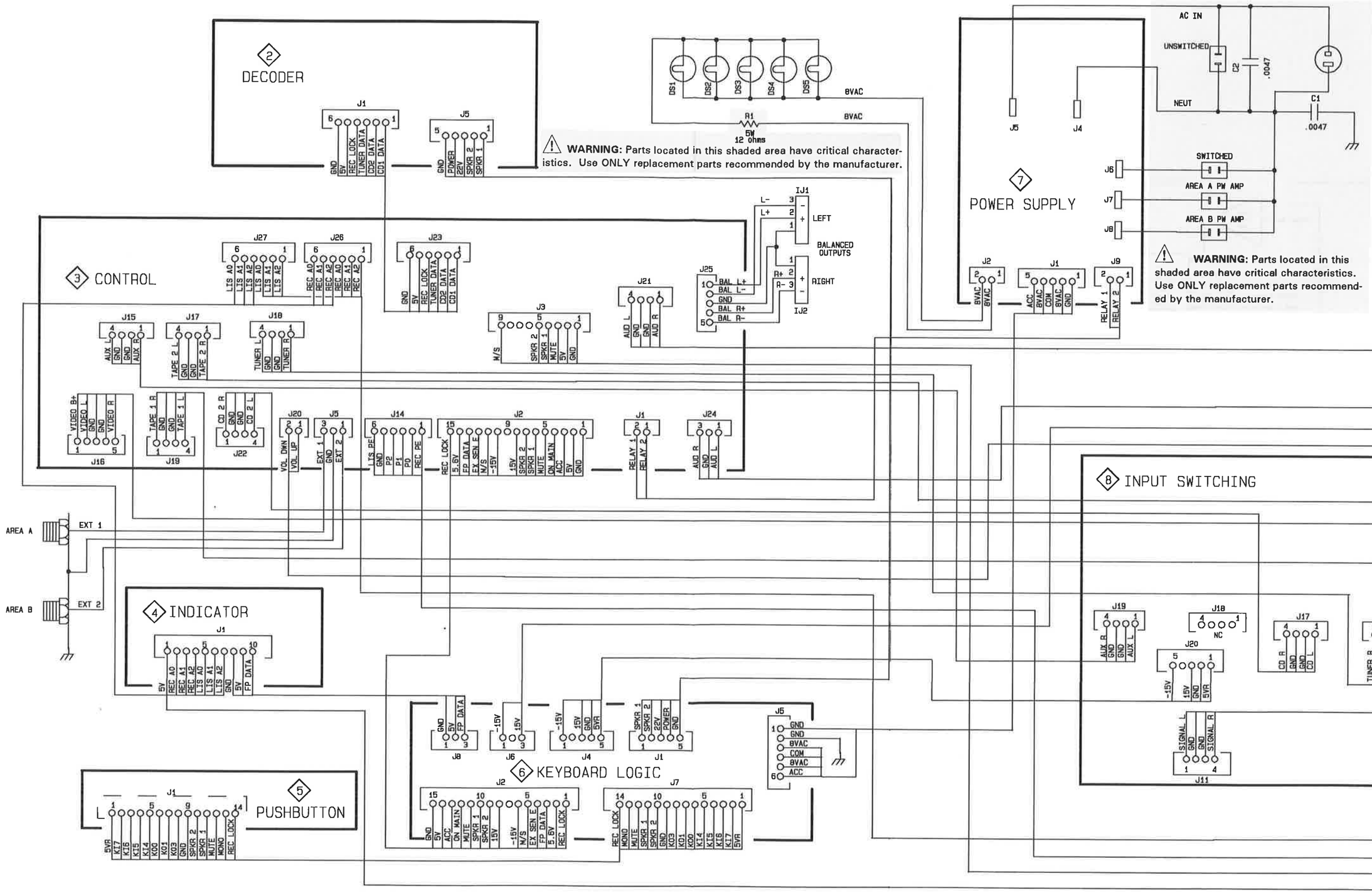
REMOTE CONTROL LOGIC

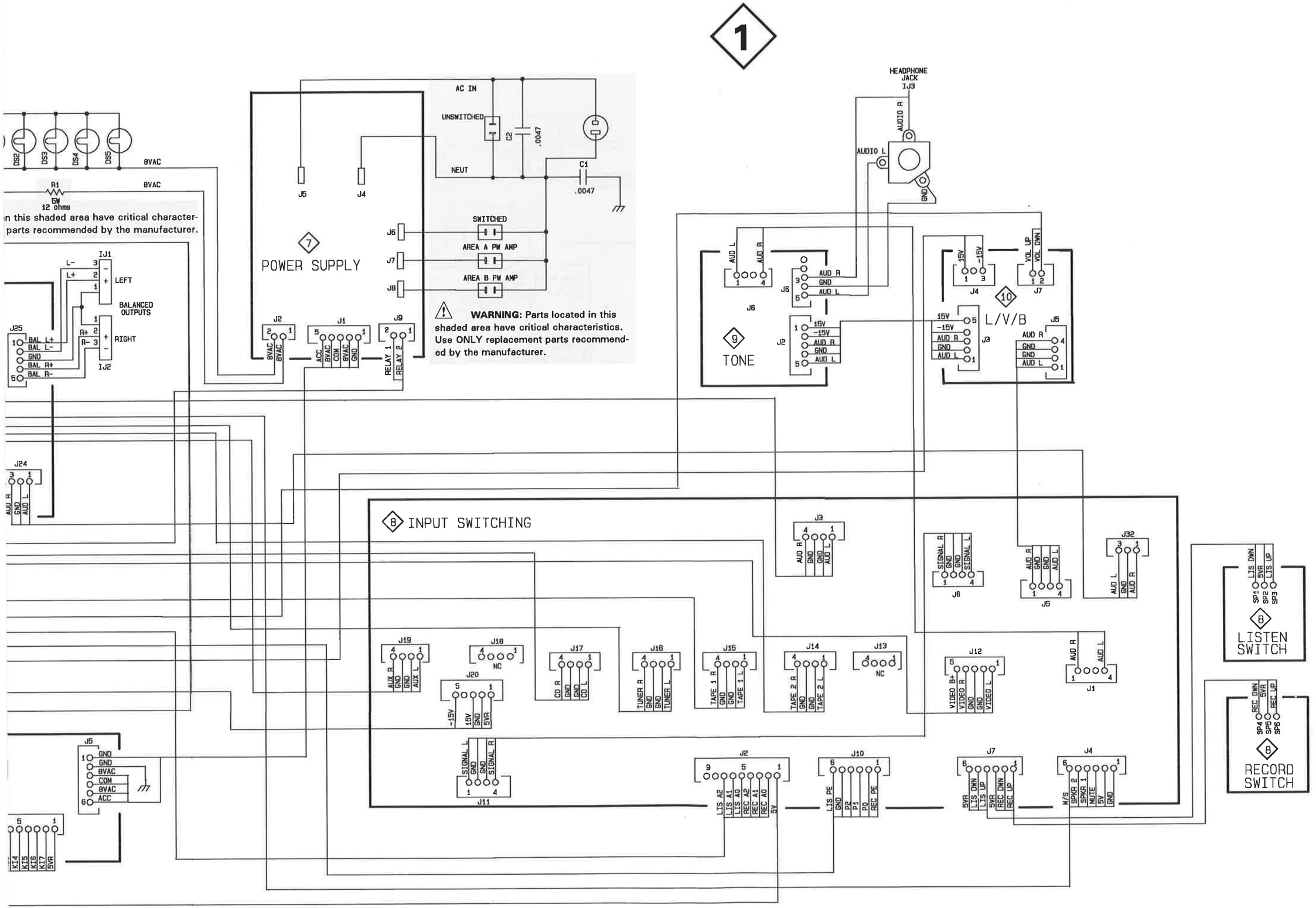


ACCESSORY CONTROL PANEL



1 Interconnection Diagram




1
DS2
DS3
DS4
DS5
8VAC
8VAC
R1
5W
12 ohms
n this shaded area have critical character-
parts recommended by the manufacturer.
IJ1
L-
L+
LEFT
BALANCED
OUTPUTS
RIGHT
IJ2
J25
BAL L+
BAL L-
GND
BAL R+
BAL R-
AC IN
UNSWITCHED
NEUT
C2
.0047
C1
.0047
J5
J4
SWITCHED
J6
AREA A PW AMP
J7
AREA B PW AMP
J8
7
POWER SUPPLY
J2
J1
J9
8VAC
8VAC
ACC
8VAC
COM
8VAC
GND
RELAY 1
RELAY 2
WARNING: Parts located in this shaded area have critical characteristics. Use ONLY replacement parts recommended by the manufacturer.
HEADPHONE JACK IJ3
AUDIO R
AUDIO L
GND
AUD L
AUD R
J6
9
TONE
AUD R
GND
AUD L
15V
-15V
AUD R
GND
AUD L
J2
15V
-15V
VOL UP
VOL DWN
J4
J7
10
L/V/B
J3
J5
GND
GND
AUD L
J24
AUD R
GND
AUD L
8
INPUT SWITCHING
J3
J32
J19
J18
J17
J16
J15
J14
J13
J12
J1
J20
J11
J2
J10
J7
J4
J6
J5
LISTEN SWITCH
RECORD SWITCH
J5
GND
GND
8VAC
COM
8VAC
ACC
K14
K15
K16
K17
5VR

Interconnection Diagram 1

INTERCONNECTION PARTS LIST

Symbol	*Part*	*Description*
CAPACITORS		
C1,C2	06127600	CD, .0047uF, 400V, UL/CSA
LIGHTING DEVICES		
DS1-DS5	05812000	INC, 14V, 7373

FRONT PANEL and TRIM PARTS LIST

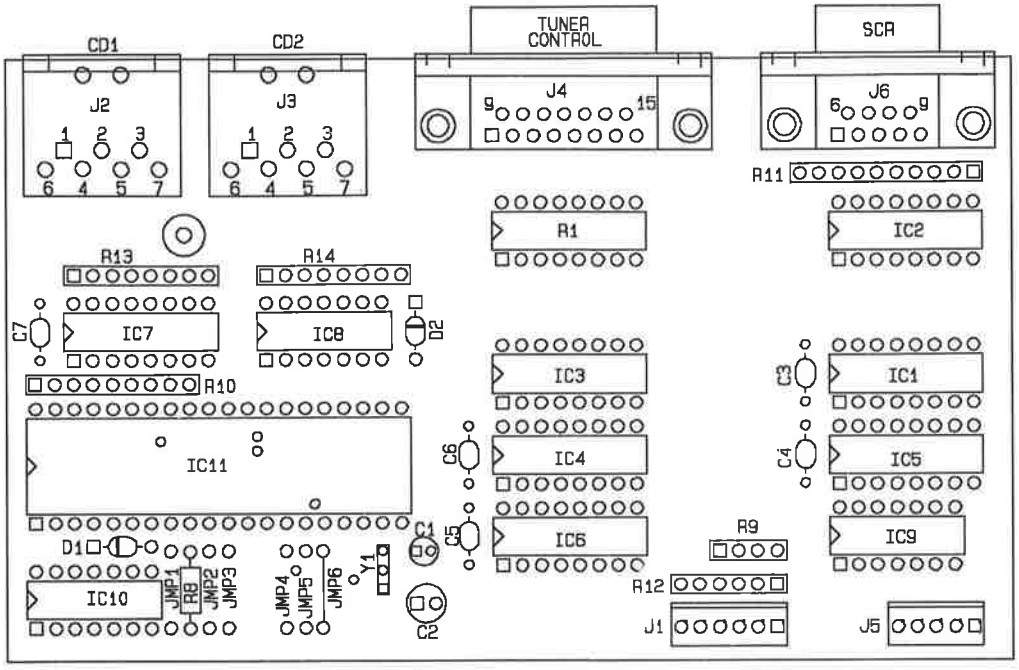
Part	*Description*
01845300	Top Panel Rail
01844600	Bottom Panel Rail
01823200	End Cap
04758700	Front Panel, Complete
09018700	Balance Knob, Rear
09021700	Loudness Knob, Front
09021500	Volume/Treble/Bass Knob
09022500	Record/Listen Knob
10401700	Knob Felt Washer, 3/4" Dia

Decoder 2

2 PC BOARD 047591

POWER CONNECTIONS	
IC7	16 = 5V 8 = gnd
IC8,IC9,IC10	14 = 5V 7 = gnd

2 Decoder

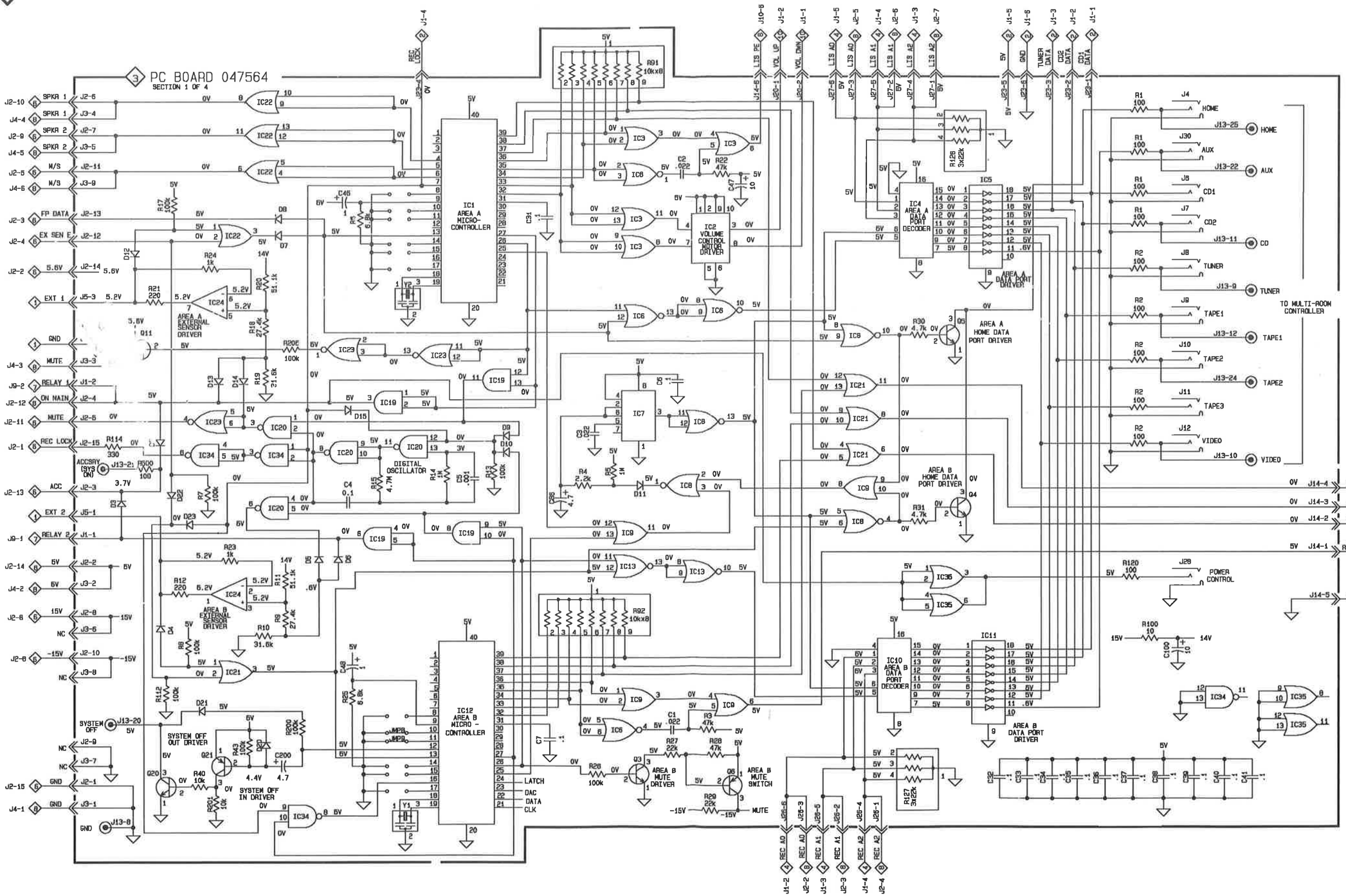


DECODER PCB 047591

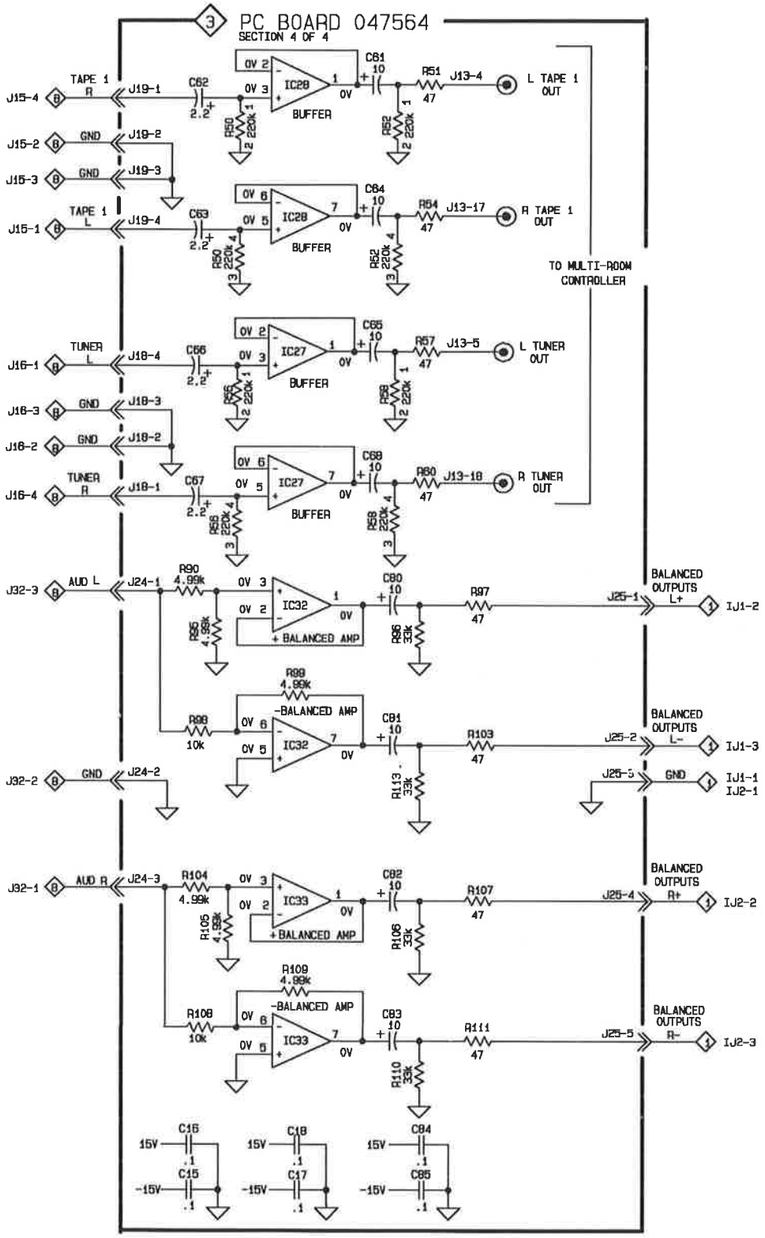
DECODER PARTS LIST

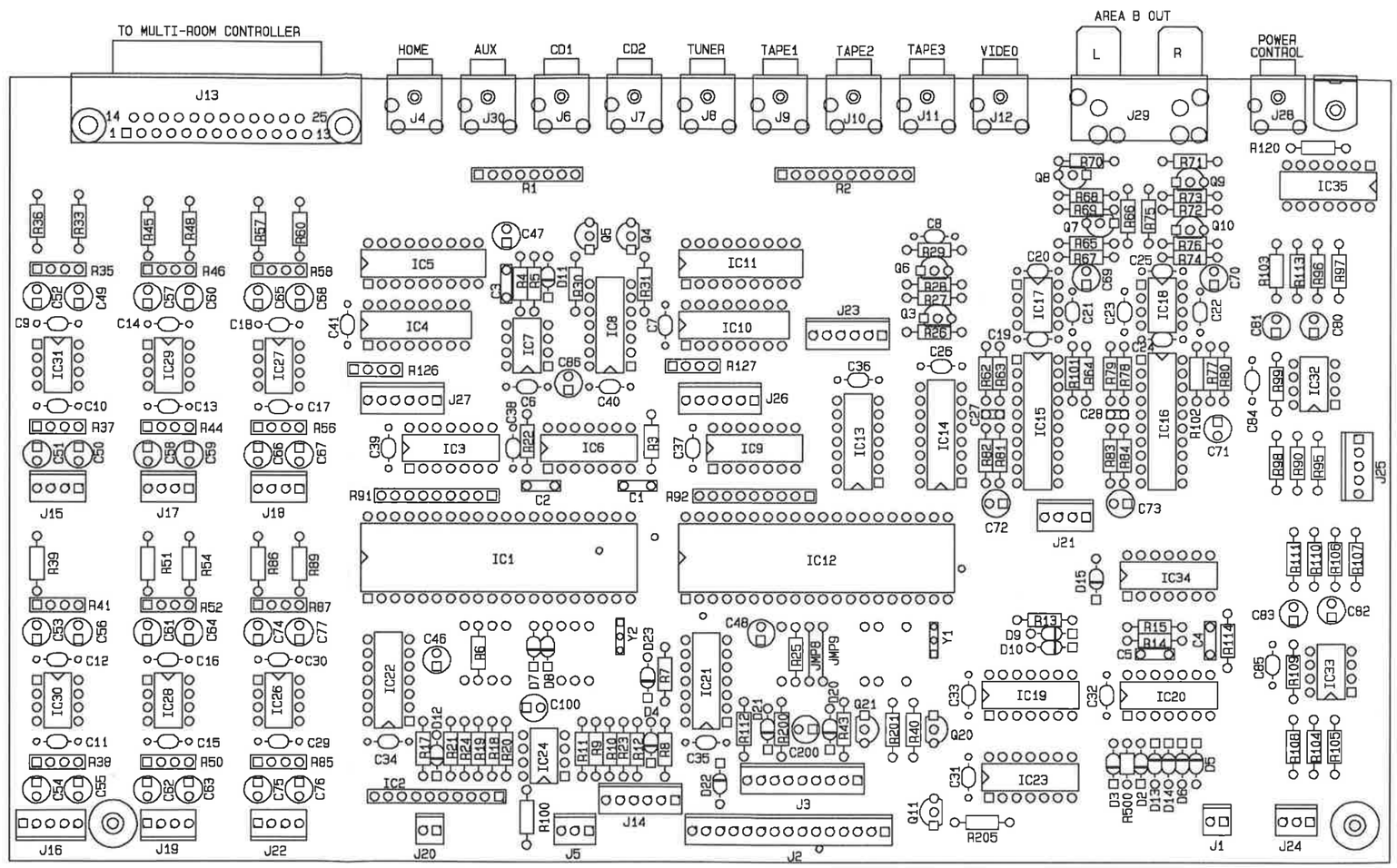
Symbol	*Part*	*Description*
CRYSTALS		
Y1	18003900	Ceramic Resonator, 6MHz
INTEGRATED CIRCUITS		
IC1,IC4-IC6	13317000	CMOS, 1 of 8 Decoder/Latch, MC74HC237N
IC2,IC3	13318100	7-Line Driver, MC1413P
IC7	13313000	CMOS, Quad NAND R/S Latch, MC14044B
IC8	13316800	CMOS, Quad 2-Input AND Gate, MC74HC08AN
IC9	13316700	CMOS, Quad 2-Input OR Gate, MC74HC32AN
IC10	13316100	CMOS, Quad 2-Input NAND Gate, 74HC00N
IC11	13317700	Microcontroller, SC80C51BCCN40
RESISTORS		
R1	14427500	Resistor Network, 22K ohm x 3
R10	14425300	Resistor Network, 10K ohm x 8
R11	14426000	Resistor Network, 100 ohm x 5

3 Control


PC BOARD 047564
SECTION 1 OF 4
IC1 AREA A MICRO-CONTROLLER
IC2 VOLUME CONTROL MOTOR DRIVER
IC4 AREA A DATA PORT DECODER
IC5 AREA A DATA PORT DRIVER
IC10 AREA B DATA PORT DECODER
IC11 AREA B DATA PORT DRIVER
IC12 AREA B MICRO - CONTROLLER
AREA A EXTERNAL SENSOR DRIVER
AREA B EXTERNAL SENSOR DRIVER
AREA A HOME DATA PORT DRIVER
AREA B HOME DATA PORT DRIVER
AREA A MUTE DRIVER
AREA B MUTE DRIVER
AREA B MUTE SWITCH
SYSTEM OFF OUT DRIVER
SYSTEM OFF IN DRIVER
DIGITAL OSCILLATOR
TO MULTI-ROOM CONTROLLER
SPKR 1
SPKR 2
W/S
FP DATA
EX SEN E
5.6V
EXT 1
GND
MUTE
RELAY 1
ON MAIN
MUTE
REC LOCK
ACCSRY (SW3 ON)
ACC
EXT 2
RELAY 2
SYSTEM OFF
HOME
AUX
CD1
CD2
TUNER
TAPE1
TAPE2
TAPE3
VIDEO
POWER CONTROL
LATCH
DAC
DATA
CLK
MUTE
REC PE
VOL UP
VOL DWN
TUNER DATA
CD2 DATA
CD1 DATA
P2
P1
P0

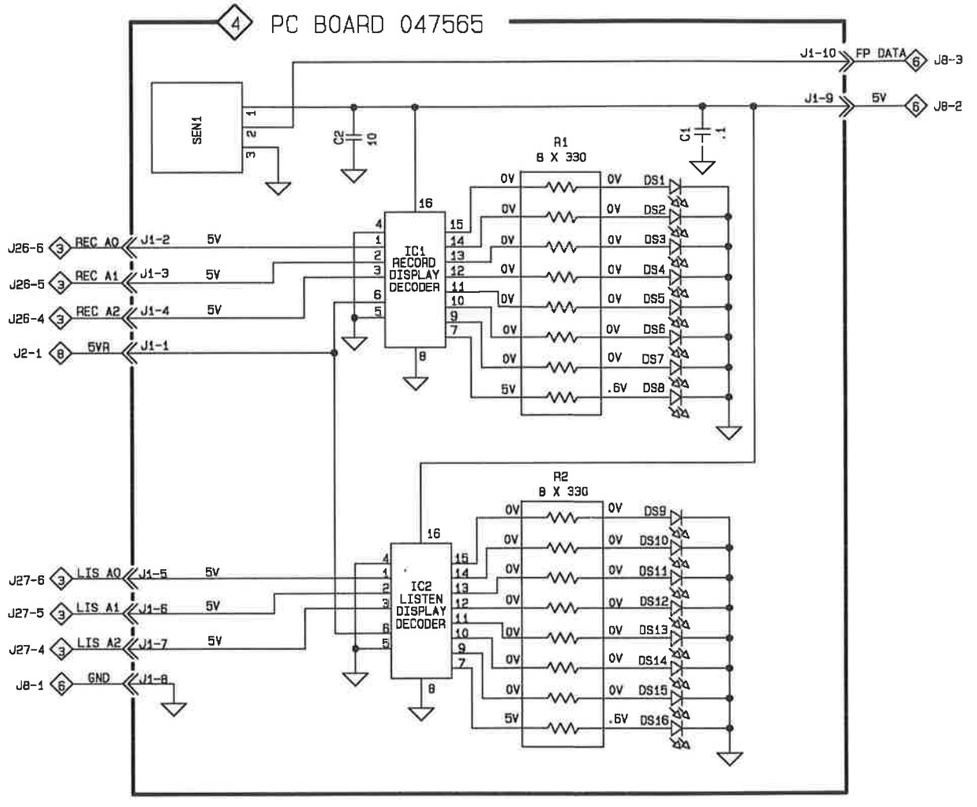
Control 3



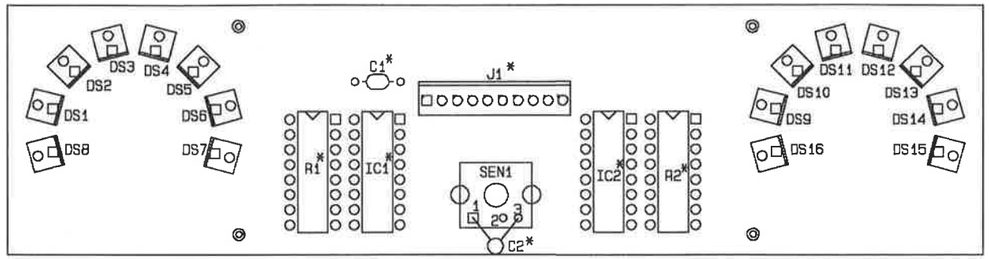


CONTROL PCB 047564

4 Indicator



ASTERISKED (*) COMPONENTS
LOCATED ON THE REVERSE OR
BACKSIDE OF THE BOARD

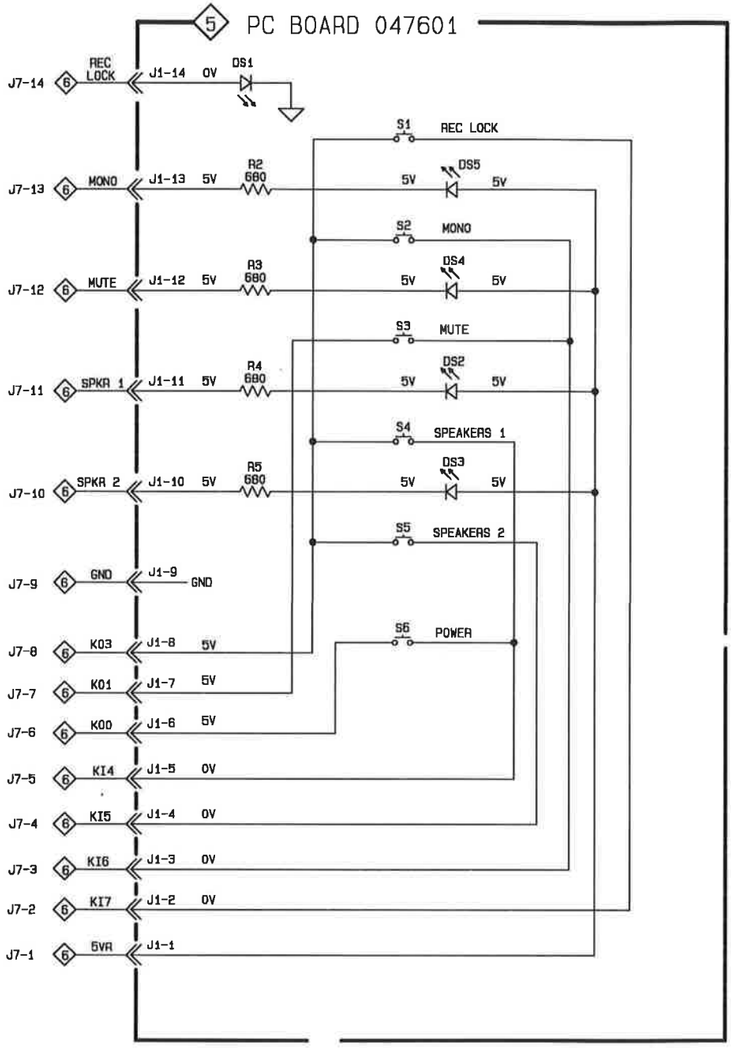


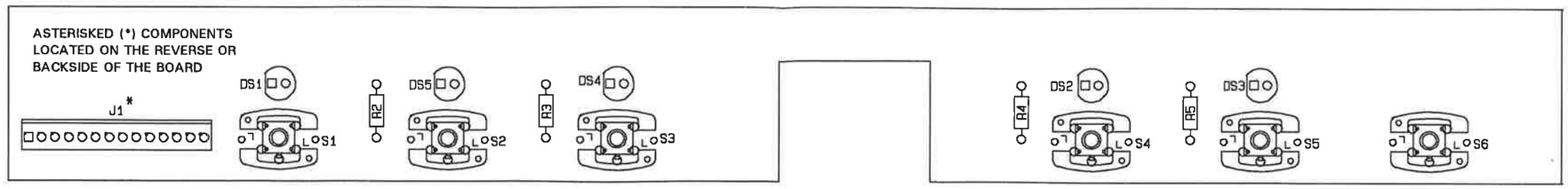
INDICATOR PCB 047565

INDICATOR PARTS LIST

Symbol	*Part*	*Description*
INTEGRATED CIRCUITS		
IC1,IC2	13317000	CMOS, 1-of-8 Decoder/Latch, MC74HC237N
LIGHTING DEVICES		
DS1-DS16	05810900	LED, Red, SBR5551SQR
RESISTORS		
R1,R2	14426300	Resistor Network, 330 ohm x 8
SENSORS		
SEN1	12102200	Sensor, IR

Pushbutton 5



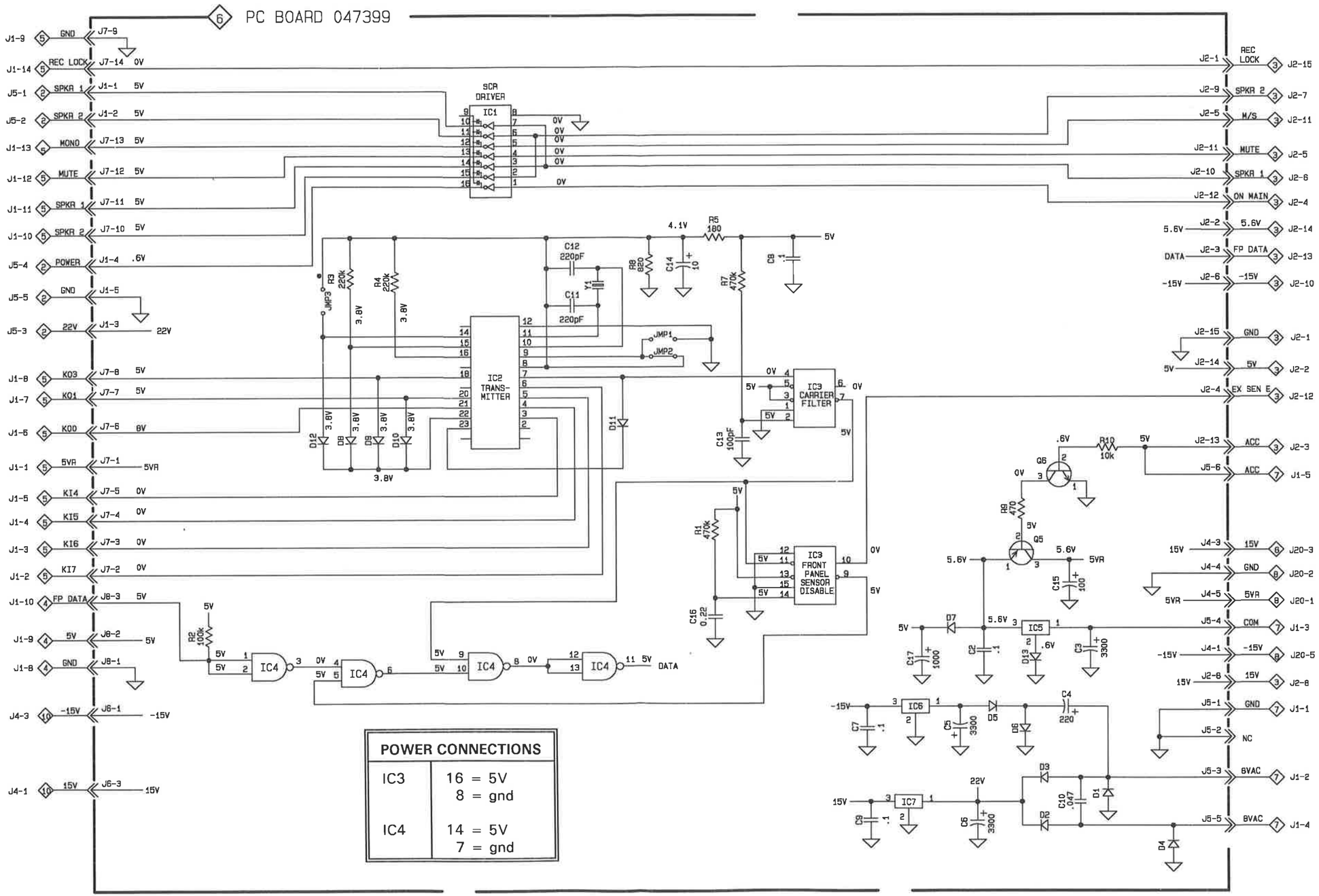


PUSHBUTTON PCB 047601

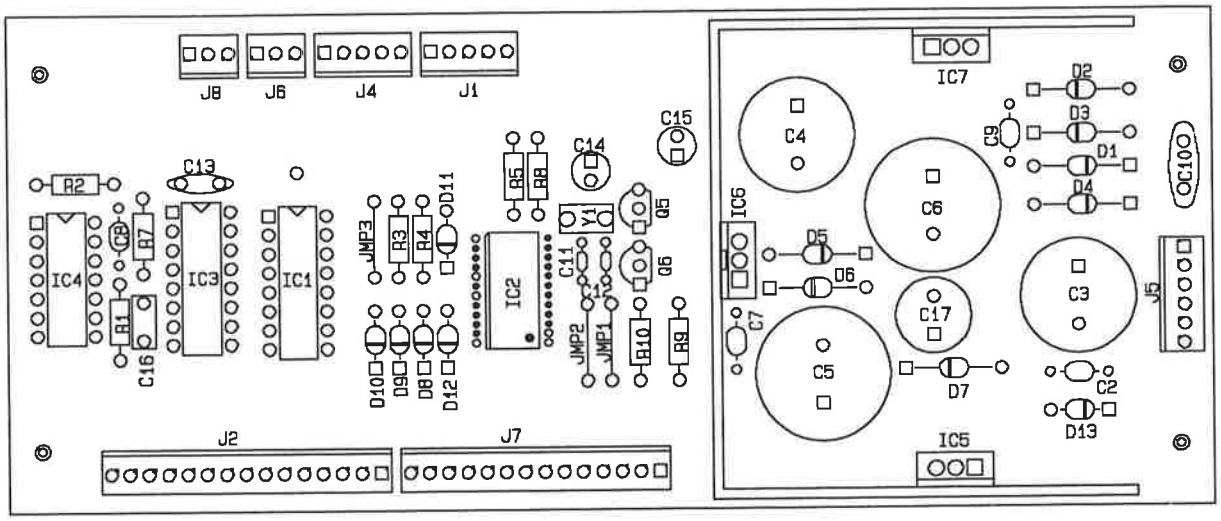
PUSHBUTTON PARTS LIST

Symbol	*Part*	*Description*
LIGHTING DEVICES		
DS1-DS5	07009300	LED, Red, HP5082-4658
SWITCHES		
S1-S6	15005800	Tact Switch

6 Keyboard Logic



POWER CONNECTIONS	
IC3	16 = 5V 8 = gnd
IC4	14 = 5V 7 = gnd

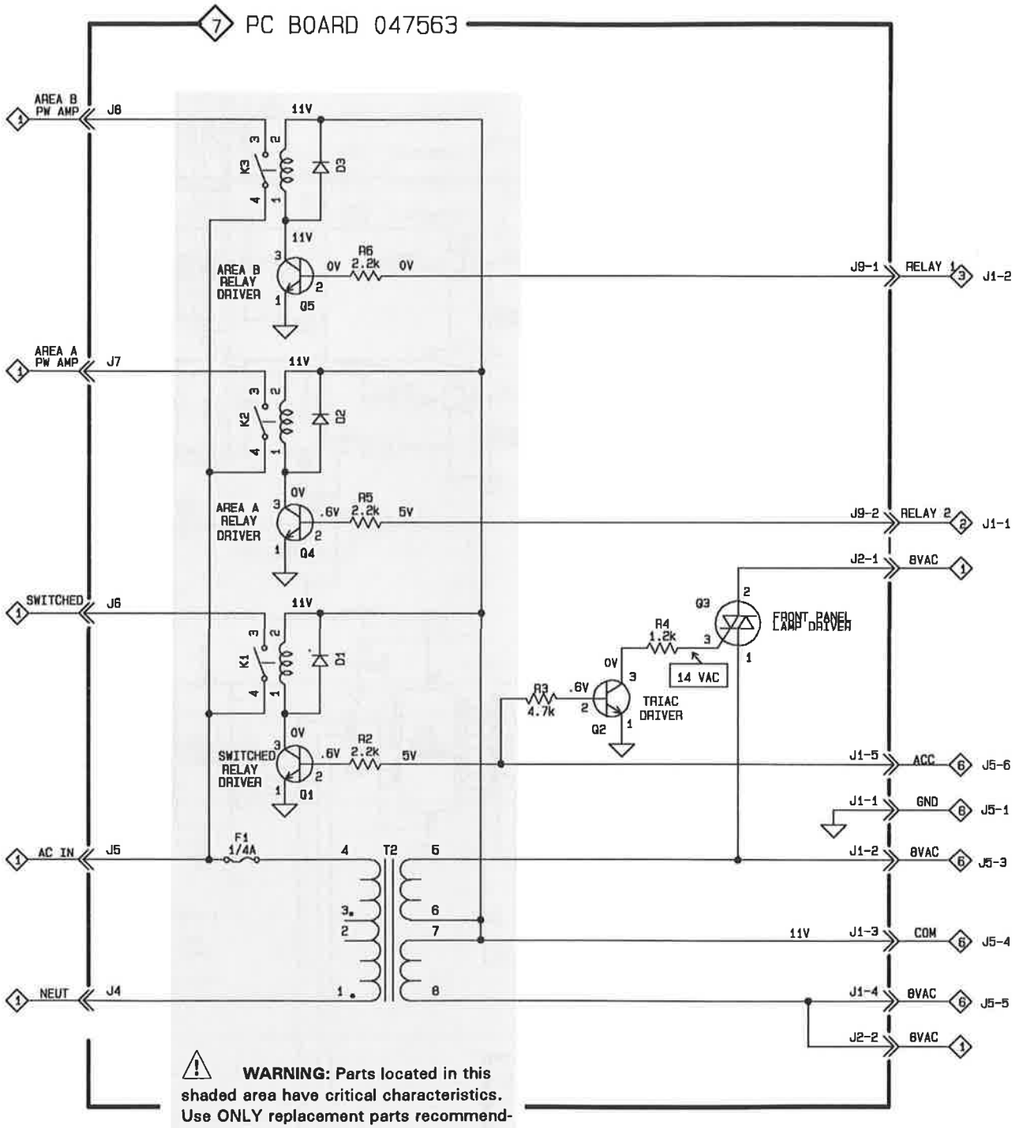


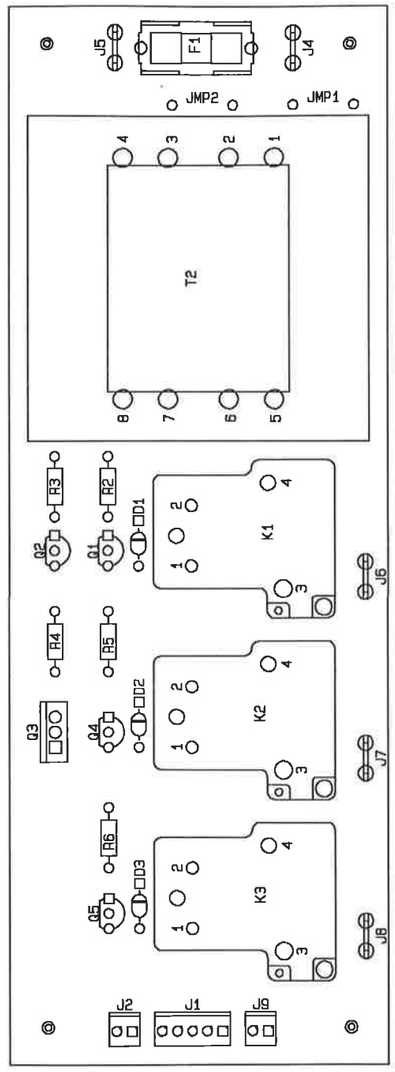
KEYBOARD LOGIC PCB 047399

KEYBOARD LOGIC PARTS LIST

Symbol	*Part*	*Description*
CRYSTALS		
Y1	18003300	Ceramic Resonator, 455kHz, ±3%
INTEGRATED CIRCUITS		
IC1	13318100	7-Line Driver, MC1413P
IC2	13318800	Transmitter, NPD61226-001
IC3	13318200	CMOS, Dual Monostable Multivibrator, MC74HC4538N
IC4	13316100	CMOS, Quad 2-Input NAND Gate, 74HC00N
IC5	13310800	+5V Regulator, MC7805CT
IC6	13315300	-15V Regulator, MC79M15CT
IC7	13315400	+15V Regulator, MC78M15CT
TRANSISTORS		
Q5	13222400	PNP, MPS4126
Q6	13222300	NPN, MPS4124

Power Supply 7





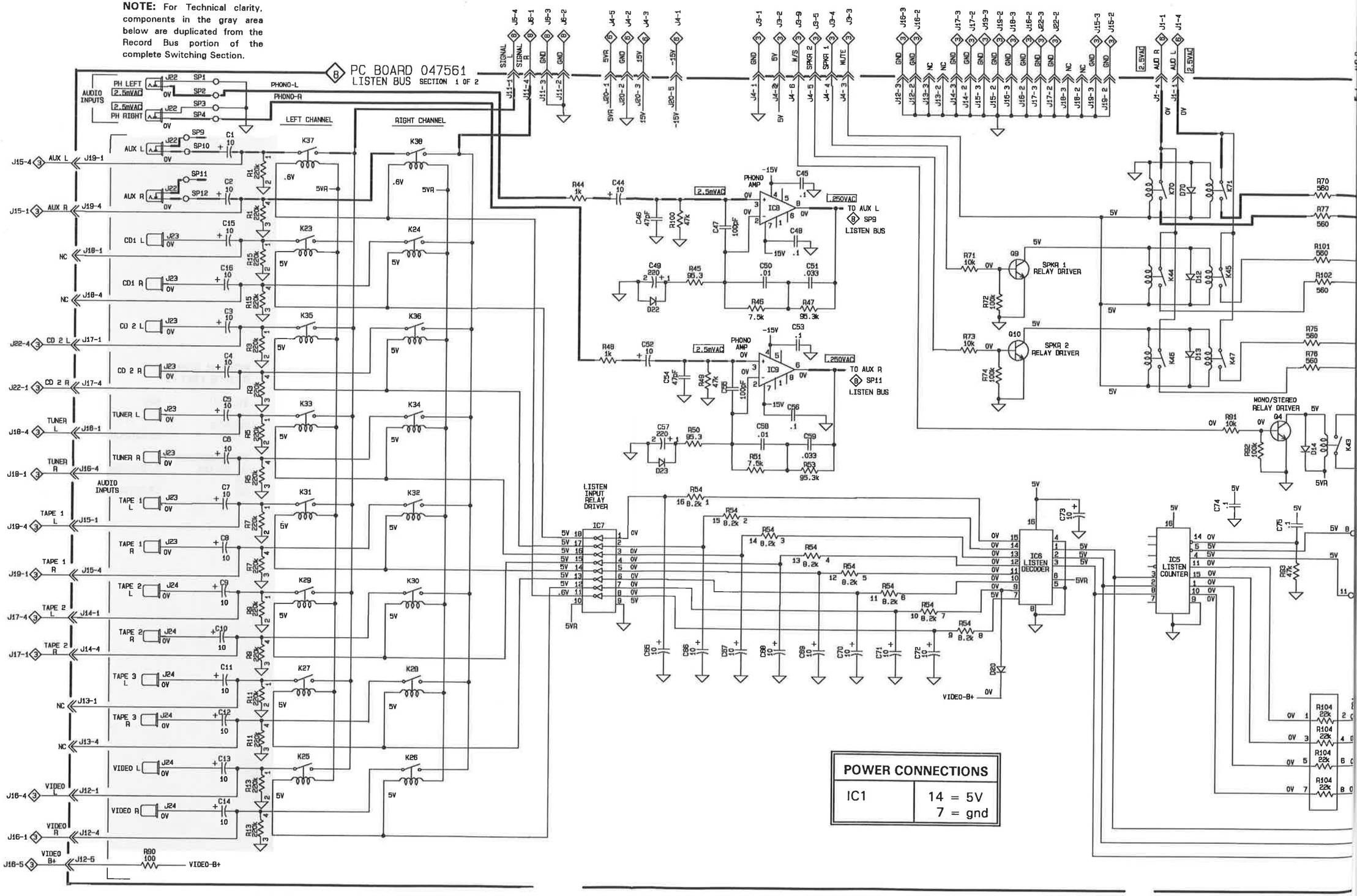
POWER SUPPLY PCB 047563

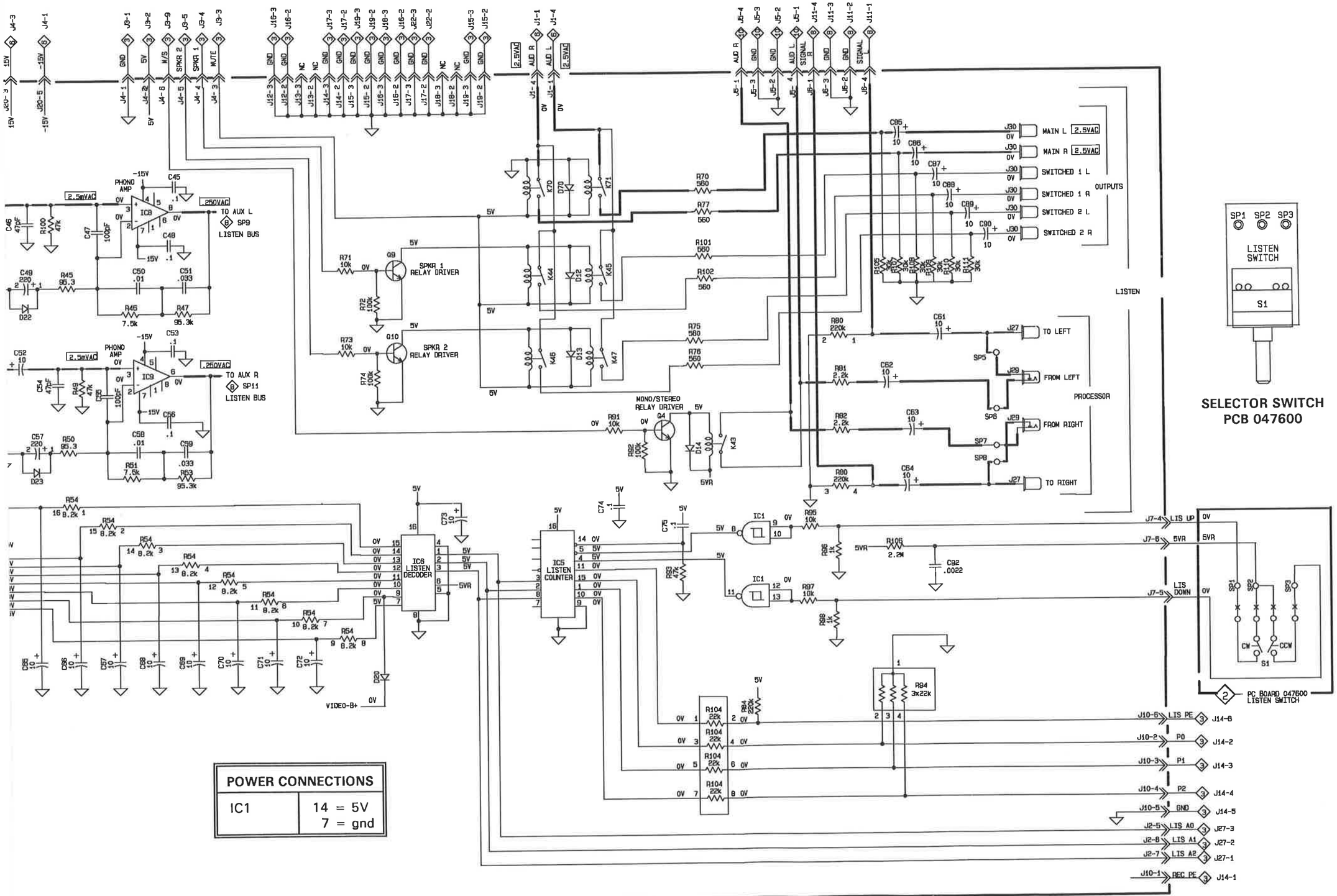
POWER SUPPLY PARTS LIST

Symbol	*Part*	*Description*
RELAYS		
K1-K3	08705400	SPST, 12VDC, JT1AE
TRANSISTORS		
Q1,Q2,Q4, Q5	13217100	NPN, MPSA05
Q3	13101800	Triac, 2N6070A

8 Input Switching

NOTE: For Technical clarity, components in the gray area below are duplicated from the Record Bus portion of the complete Switching Section.

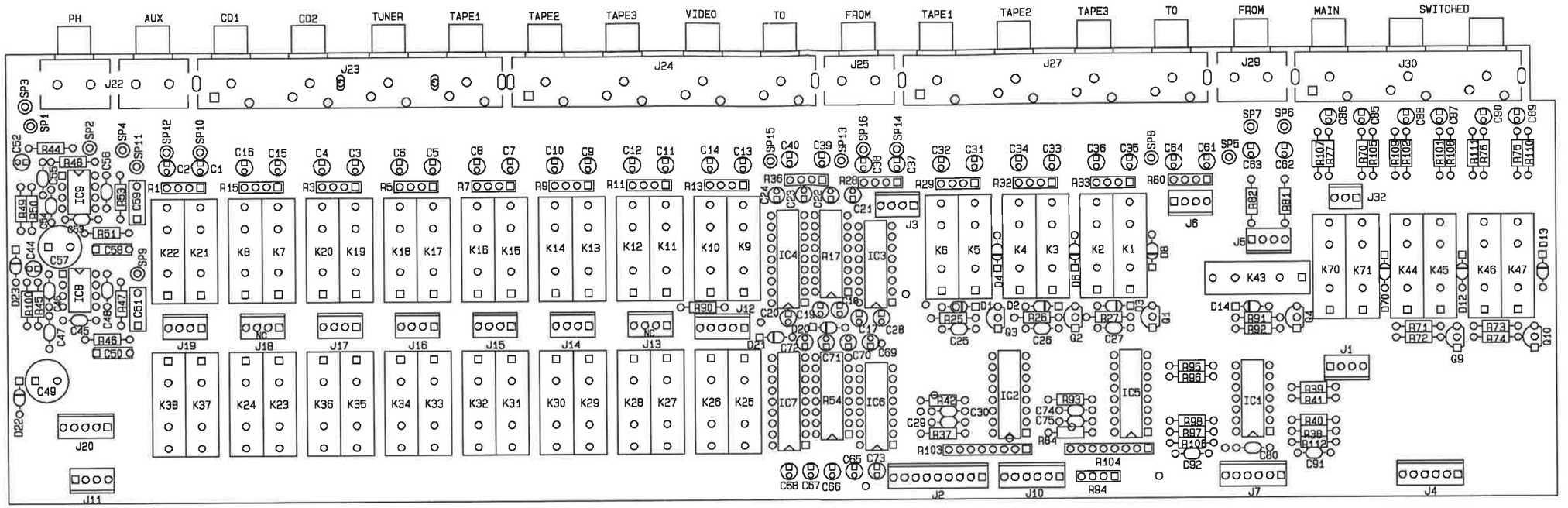




POWER CONNECTIONS	
IC1	14 = 5V 7 = gnd

SELECTOR SWITCH PCB 047600

Input Switching 8

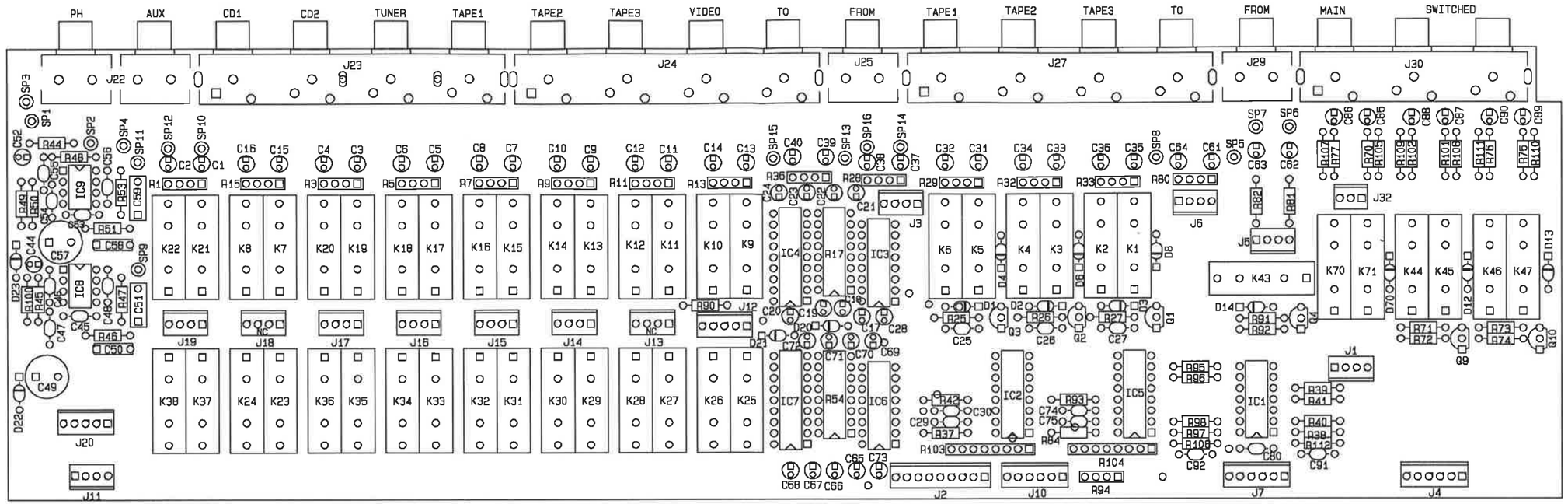


INPUT SWITCHING PCB 047561

INPUT SWITCHING PARTS LIST

Symbol	*Part*	*Description*
INTEGRATED CIRCUITS		
IC1	13319200	Quad, 2-Input Schmitt Trigg., MC74HC132AN
IC2,IC5	13317100	CMOS, Presetable Binary UP/DOWN Counter, 74HC193N
IC3,IC6	13317000	CMOS, 1-of-8 Decoder/Latch, MC74HC237N
IC4,IC7	13316900	Octal Darlington Transistor Array, ULN2801
IC8,IC9	13306700	Operational Amp, Low Noise, NE5534AN
RELAYS		
K1-K38, K43-K47, K70,K71	08705000	SPST, 5VDC, Reed, HE3321A0400
TRANSISTORS		
Q1-Q3	13218200	PNP, DAR, MPSA64
Q4,Q9,Q10	13222300	NPN, MPS4124

8 Input Switching



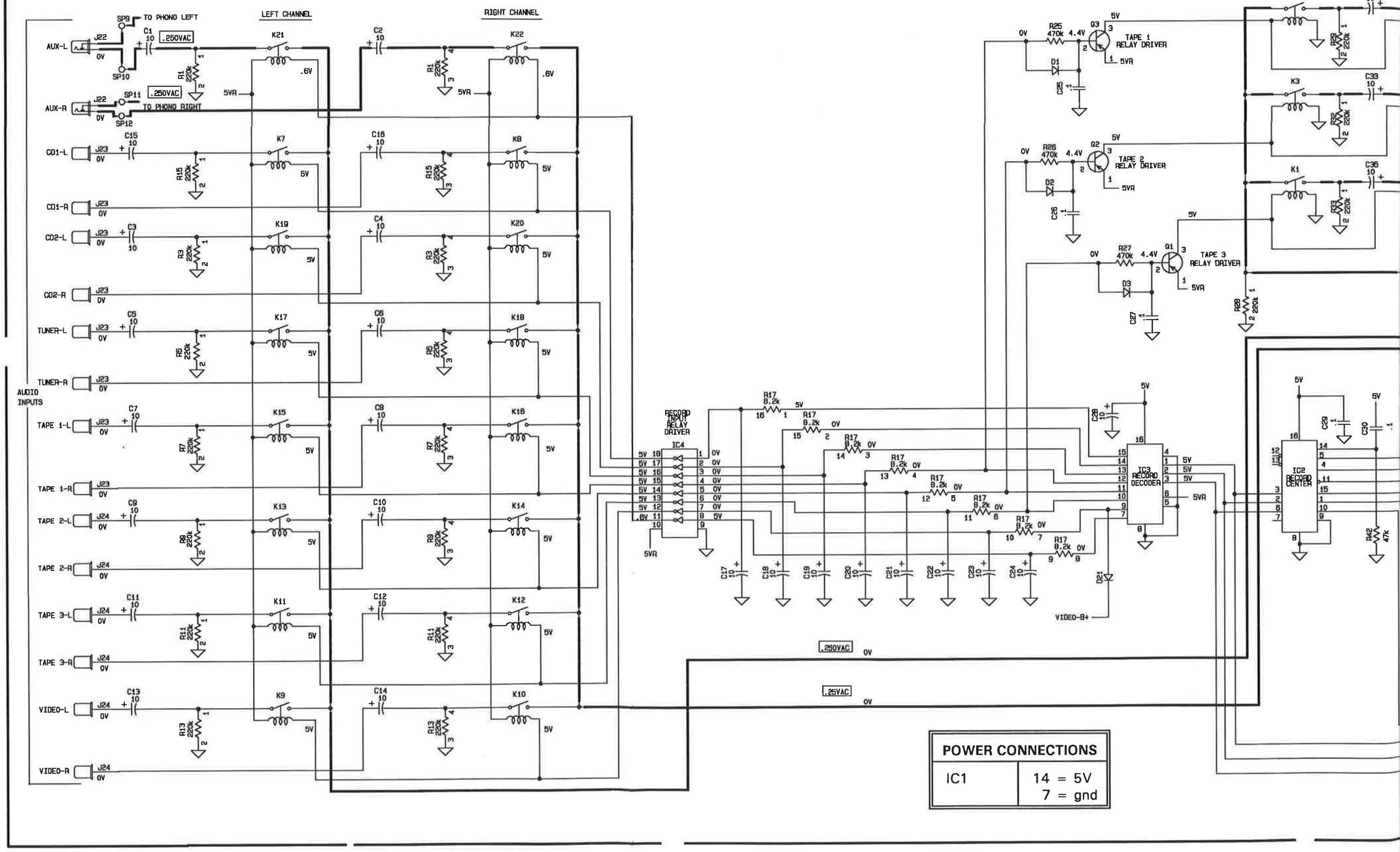
INPUT SWITCHING PCB 047561

INPUT SWITCHING PARTS LIST

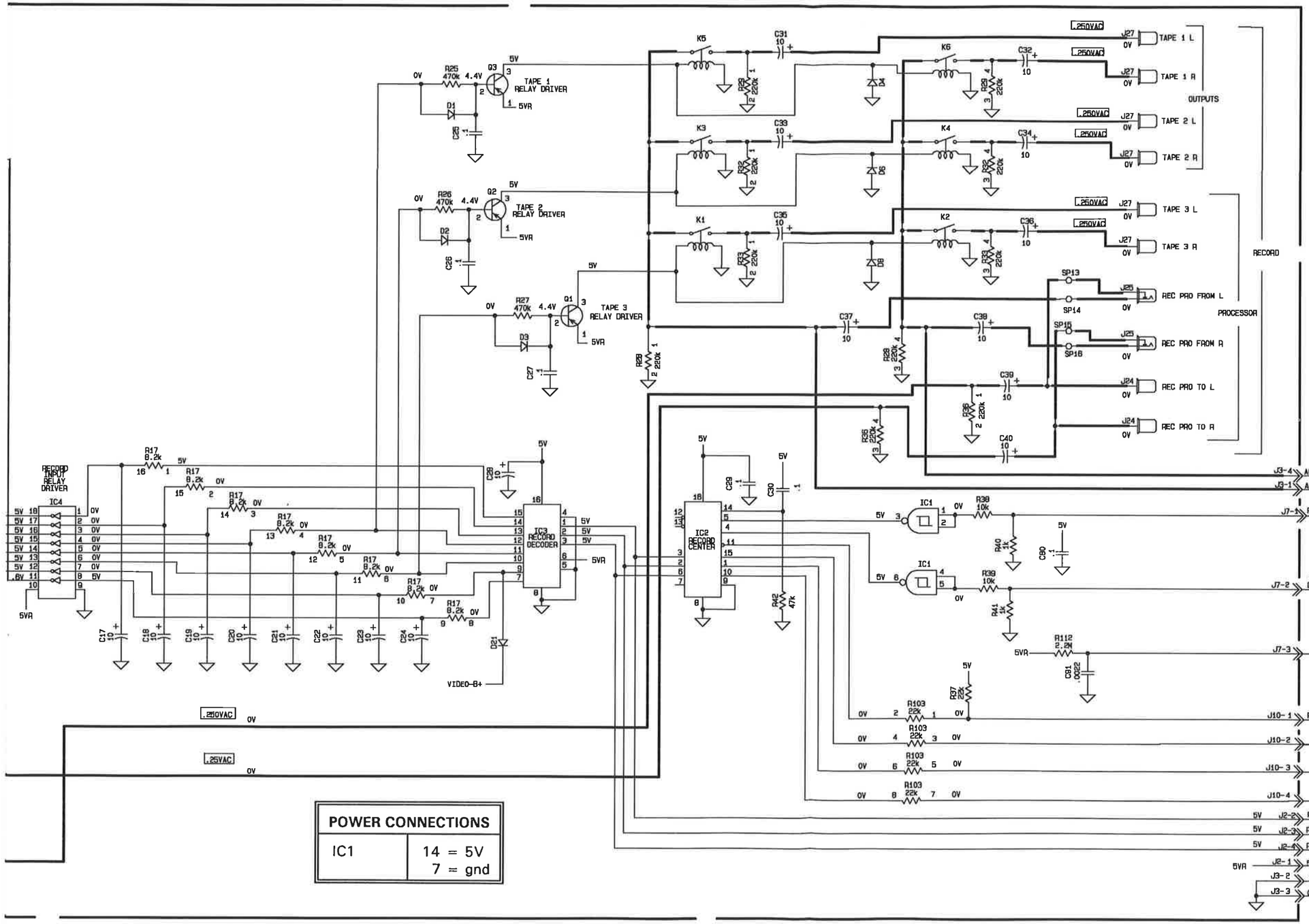
Symbol	*Part*	*Description*
INTEGRATED CIRCUITS		
IC1	13319200	Quad, 2-Input Schmitt Trigg., MC74HC132AN
IC2,IC5	13317100	CMOS, Presetable Binary UP/DOWN Counter, 74HC193N
IC3,IC6	13317000	CMOS, 1-of-8 Decoder/Latch, MC74HC237N
IC4,IC7	13316900	Octal Darlington Transistor Array, ULN2801
IC8,IC9	13306700	Operational Amp, Low Noise, NE5534AN
RELAYS		
K1-K38, K43-K47, K70,K71	08705000	SPST, 5VDC, Reed, HE3321A0400
TRANSISTORS		
Q1-Q3	13218200	PNP, DAR, MPSA64
Q4,Q9,Q10	13222300	NPN, MPS4124

Input Switching 8

8 PC BOARD 047561
RECORD BUS SECTION 2 OF 2



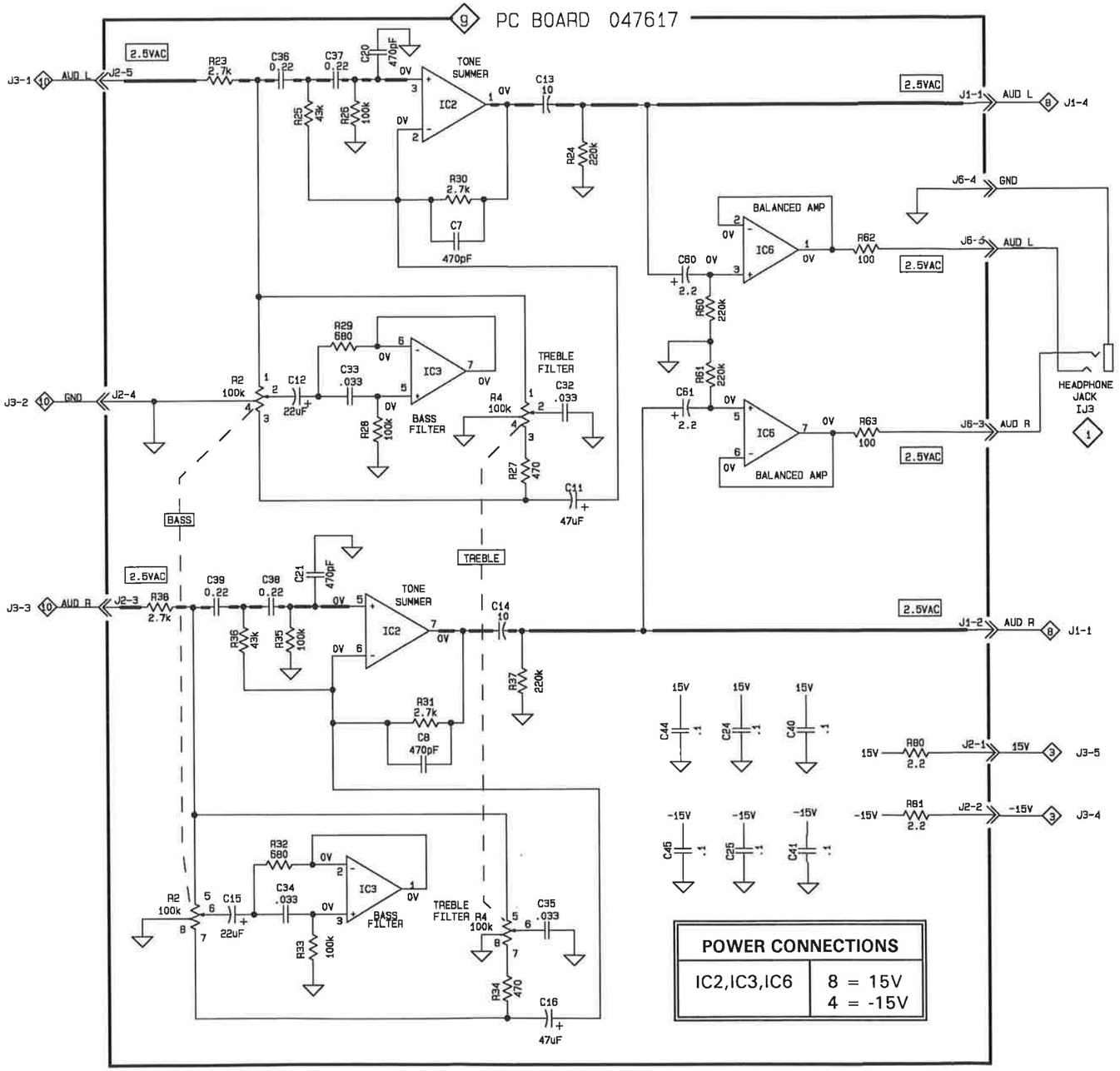
POWER CONNECTIONS	
IC1	14 = 5V 7 = gnd



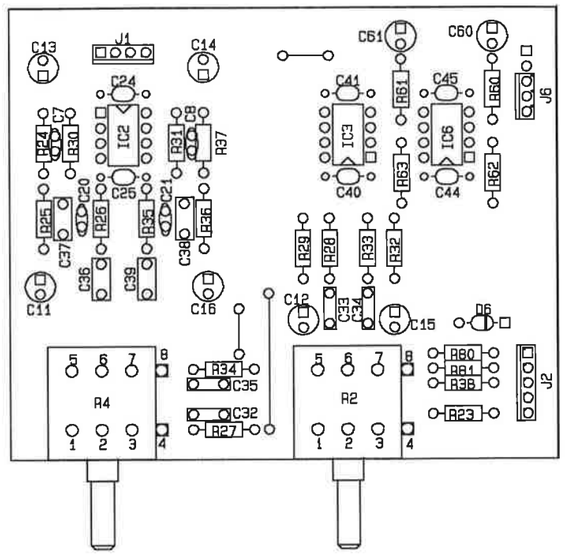
POWER CONNECTIONS	
IC1	14 = 5V 7 = gnd

SELECTOR SWITCH PCB 047600

9 Tone



POWER CONNECTIONS	
IC2,IC3,IC6	8 = 15V 4 = -15V

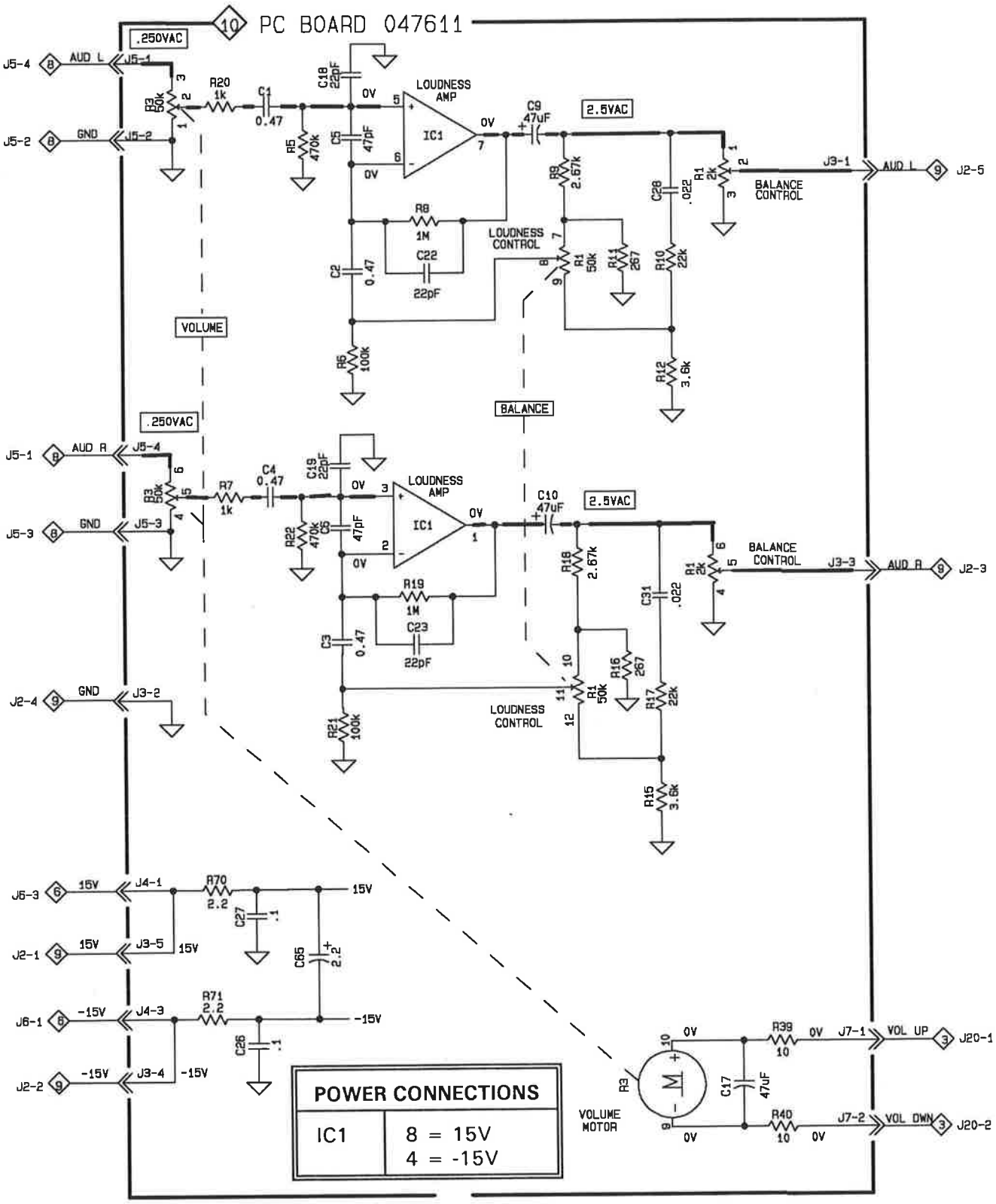


TONE PCB 047617

TONE
PARTS LIST

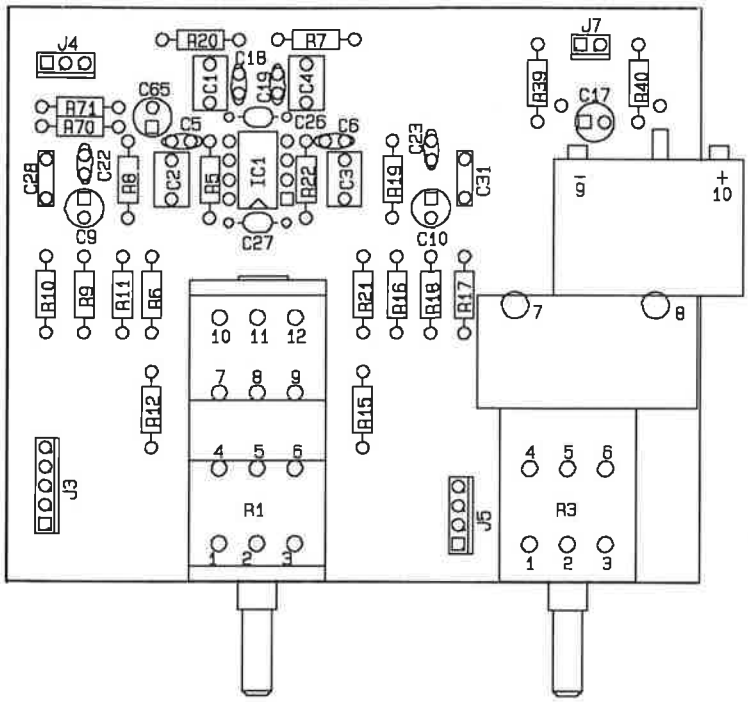
Symbol	*Part*	*Description*
INTEGRATED CIRCUITS		
IC2,IC3,IC6	13318900	Dual Operational Amp, MC33178P
RESISTORS		
R2	13444900	POT, 100K ohm

10 Loudness, Volume and Balance



Loudness, Volume and Balance

10



LOUNDNESS, VOLUME AND BALANCE PCB 047611

LOUDNESS, VOLUME AND BALANCE PARTS LIST

Symbol	*Part*	*Description*
INTEGRATED CIRCUITS		
IC1	13309400	Dual Operational Amp, NE5532N
RESISTORS		
R1	13444800	POT, 50K ohm
R3	13445200	POT, 50K ohm, Motor Driven Volume Control
R4	13444900	POT, 100K ohm

Repacking Instructions

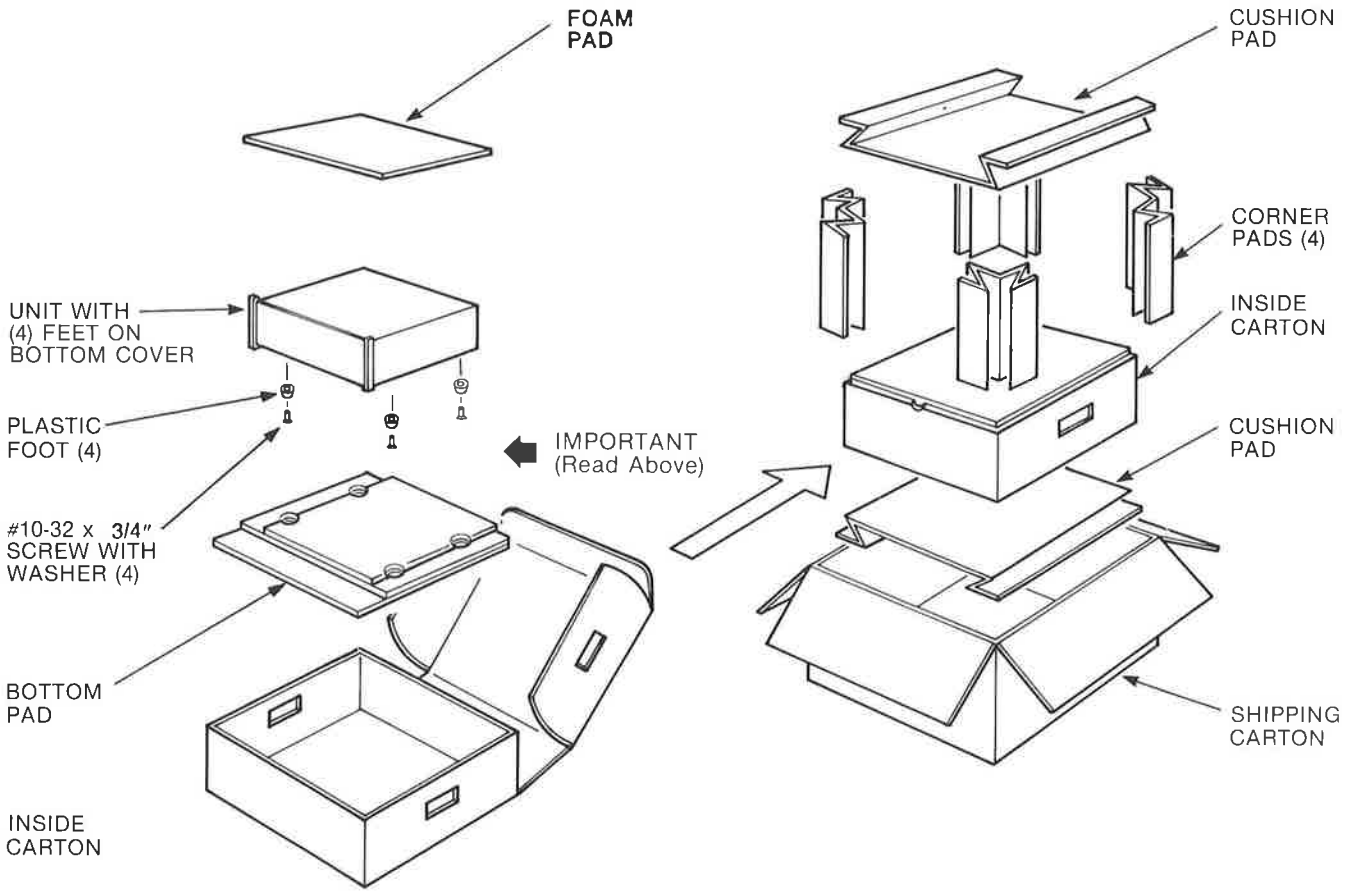
In the event it is necessary to repack the unit for shipment, the unit must be packed exactly as shown below.

IMPORTANT - The four plastic feet must be attached to the bottom of the unit so they will locate in the four holes of the bottom pad. Failure to do this will result in shipping damage.

If a shipping carton or any of the interior parts is needed, please call or write the Customer Service Department of McIntosh Laboratory. Order parts from the accompanying list by part number.

Use the original shipping carton and interior parts only if they are all in good serviceable condition.

Qty	Part No.	Description
1	033593	Shipping carton only
2	033592	Cushion Pad
4	033603	Corner Pad
1	033590	Inside carton only
1	033602	Foam Pad
1	033594	Bottom Pad
4	017218	Plastic foot
4	100159	#10-32 x 3/4 Machine screw
4	104080	#10 Flat washer
1	047436	Shipping carton complete with all the above parts.



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C38 SYSTEM CONTROL CENTER

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