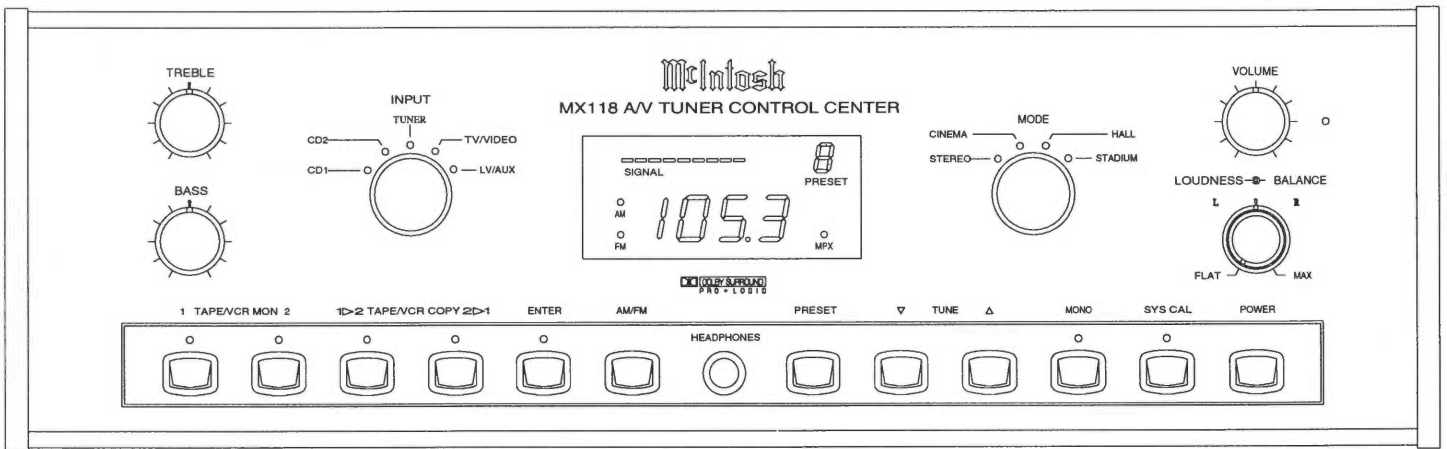


66

MX118 A/V TUNER CONTROL CENTER



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McIntosh

Service Manual

Performance Specifications

(AUDIO)

FREQUENCY RESPONSE
MONO and STEREO MODES
 LEFT, CENTER and RIGHT FRONT channels, +0,
 -0.5dB from 20Hz to 20,000Hz.

HALL MODE
 LEFT, CENTER and RIGHT FRONT channels, +0,
 -0.5dB from 20Hz to 20,000Hz.
 LEFT and RIGHT SURROUND channels, +0,
 -3dB from 50Hz to 7000Hz.

CINEMA (DOLBY PRO-LOGIC) MODE
 LEFT, CENTER and RIGHT FRONT channels, ±0.5dB
 from 30Hz to 16,000Hz.
 LEFT and RIGHT SURROUND channels, ±1dB from
 50Hz to 6300Hz, -3dB at 7000Hz.

ALL MODES
 SUBWOOFER channel low pass, 10Hz to a corner
 frequency of 80Hz with a 24dB per octave rolloff.
 With the rear panel HIGH PASS switch ON, and the
 SUBWOOF Switch ON, the LEFT, CENTER and RIGHT
 FRONT channels include high pass filters with a 12dB
 per octave rolloff and a corner frequency of 80Hz.

RATED OUTPUT
 2.5V at LEFT FRONT, CENTER, RIGHT FRONT, LEFT
 SURROUND, RIGHT SURROUND and SUBWOOFER
 unbalanced.
 2.5V at LEFT and RIGHT FRONT Balanced.

OUTPUT IMPEDANCE
 Less than 200 ohms at all outputs.

MAXIMUM VOLTAGE OUTPUT
 6V RMS at all outputs.

TOTAL HARMONIC DISTORTION
MONO, STEREO and HALL MODES
 LEFT, CENTER and RIGHT FRONT channels, 0.005%
 from 20Hz to 20,000Hz.
 (HALL MODE, only) LEFT and RIGHT SURROUND
 channels, 0.1% from 50Hz to 7000Hz.

CINEMA (DOLBY PRO-LOGIC) MODE
 LEFT, CENTER and RIGHT FRONT channels, 0.05%
 from 80Hz to 16,000Hz.
 LEFT and RIGHT SURROUND channels, 0.1% from
 50Hz to 7000Hz.

SENSITIVITY
 HIGH LEVEL: 400mV for 2.5V output, (80mV IHF).
 DOLBY LEVEL: 200mV input.

SIGNAL TO NOISE RATIO, A-WEIGHTED
MONO, STEREO and HALL MODES
 LEFT, CENTER and RIGHT FRONT channels, HIGH
 LEVEL: 90dB below rated output (85dB IHF)

CINEMA (DOLBY PRO-LOGIC) MODE
 All outputs greater than 70dB below reference level.

MAXIMUM INPUT SIGNAL
 HIGH LEVEL: 5V MONO and STEREO, 2.1V HALL,
 STADIUM and CINEMA (DOLBY PRO-LOGIC).

INPUT IMPEDANCE
 HIGH LEVEL: Greater than 22K ohms.

VOLTAGE GAIN
 HIGH LEVEL to TAPE: 0dB.
 HIGH LEVEL to MAIN: 14dB.

TONE CONTROLS
 BASS and TREBLE variable 12dB boost to 12dB cut.

(FM SECTION)
USEABLE SENSITIVITY
 11.25dB which is 1uV across 75 ohms.

50dB QUIETING SENSITIVITY
 Mono: 15dB which is 1.6uV across 75 ohms.
 Stereo: 37dB which is 20uV across 75 ohms.

SIGNAL TO NOISE RATIO
 Mono: 80dB.
 Stereo: 75dB.

FREQUENCY RESPONSE
 Mono: +0, -1dB, 20Hz to 15,000Hz.
 Stereo: +0, -1dB, 20Hz to 15,000Hz.

HARMONIC DISTORTION
 Mono: 0.08% at 100Hz.
 0.08% at 1000Hz.
 0.12% at 10,000Hz.

Stereo: 0.08% at 100Hz.
 0.08% at 1000Hz.
 0.12% at 10,000Hz.

INTERMODULATION DISTORTION
 Mono: 0.08%
 Stereo: 0.12%

CAPTURE RATIO
 1.5dB.

ALTERNATE CHANNEL SELECTIVITY
 70dB.

SPURIOUS RESPONSE
 100dB.

IMAGE RESPONSE
 80dB.

RF INTERMODULATION
 65dB.

STEREO SEPARATION
 45dB at 100Hz.
 50dB at 1000Hz.
 35dB at 10,000Hz.

Performance Specifications continued...

SCA REJECTION
 65dB.

(AM SECTION)
SENSITIVITY
 20uV External Antenna Input, 50 ohm generator.

SIGNAL TO NOISE
 50dB at 30% modulation.
 60dB at 100% modulation.

HARMONIC DISTORTION
 0.5% maximum at 50% modulation.

FREQUENCY RESPONSE
 50Hz to 6000Hz NRSC.

ADJACENT CHANNEL SELECTIVITY
 45dB minimum IHF.

IMAGE REJECTION
 75dB minimum from 540kHz to 1600kHz.

Notes

- The heavy lines on the schematics denote the primary signal path.
- Unless otherwise noted, all voltages indicated on the schematics are measured under the following conditions:
 - AC input at 120 volts, 50/60Hz.
 - All voltages are ± 10% with respect to ground. A high impedance (10 megohm) voltmeter must be used.
- Unless otherwise specified:
 - Resistor values are in ohms.
 - Capacitor values are in microfarads (uF).
 - Inductor values are in microhenries (uH).
- The voltages enclosed in a box are signal voltages that are measured with a 400mV, 1kHz signal connected to both channels at the AUX/LV input jacks.

Front panel controls are set at:
 BALANCE CENTER DETENT
 TREBLE/BASS CENTER DETENT
 INPUT SELECTOR(S) LV/AUX
 LOUDNESS FLAT
 MODE STEREO
 POWER ON
 VOLUME CLOCKWISE
 MONO OFF

Rear panel controls are set at:
 SYSTEM TRIM CENTER DETENTS
 HIGH PASS FILTERS OFF
 CHANNEL 3
 SYSTEM CALIBRATE MAN
 CENTER SPEAKER LARGE
 CENTER FILL ON
 SUBWOOF ON

IF REJECTION
 68dB minimum.

(AC POWER AND MECHANICAL)
AC POWER OUTLETS
 2 switched for accessories
 1 unswitched

POWER REQUIREMENTS
 120 volts, 50/60Hz, 35 watts.

SIZE
 Front Panel: 17-1/2 inches (44.4cm) Wide, 5-3/8
 inches (13.7cm) High. Depth behind front panel
 including clearance for connectors, 17-1/2 inches
 (44.5cm). Knob clearance required in front of the
 mounting panel is 3/4 inches (1.9cm).

WEIGHT
 22 pounds (10Kg) net, 37 pounds (16.8Kg) in shipping
 carton.

Rear Panel

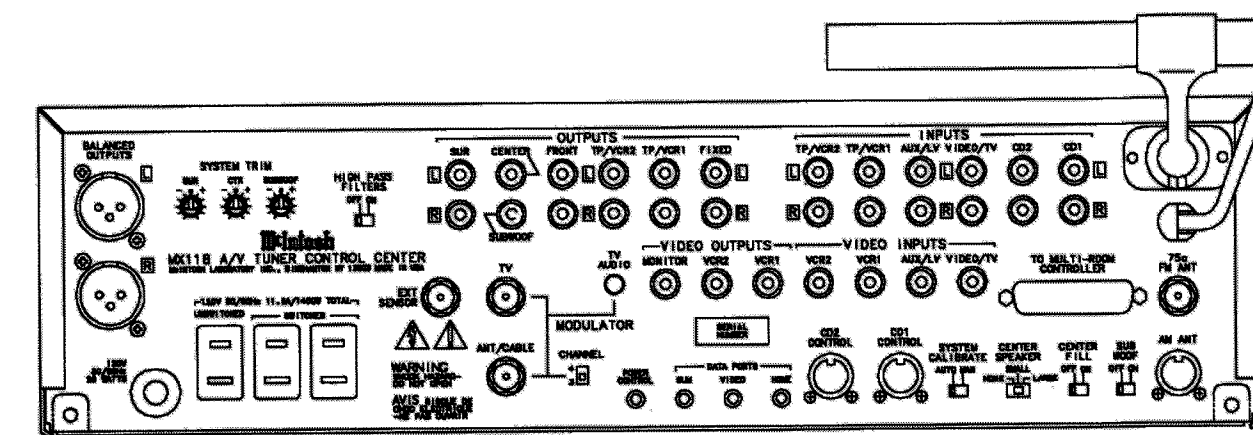


Fig. 1 Rear view

Section Locations

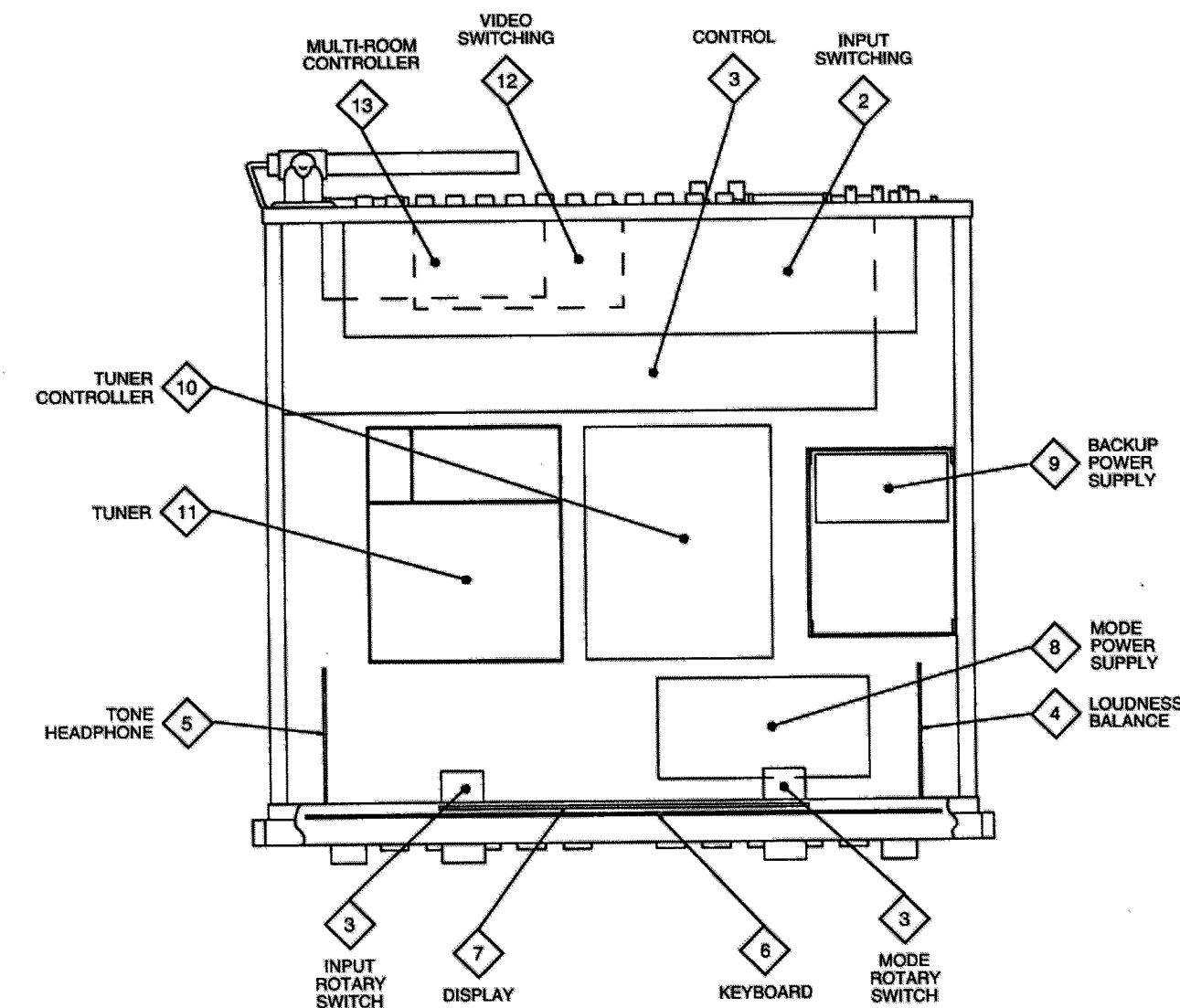
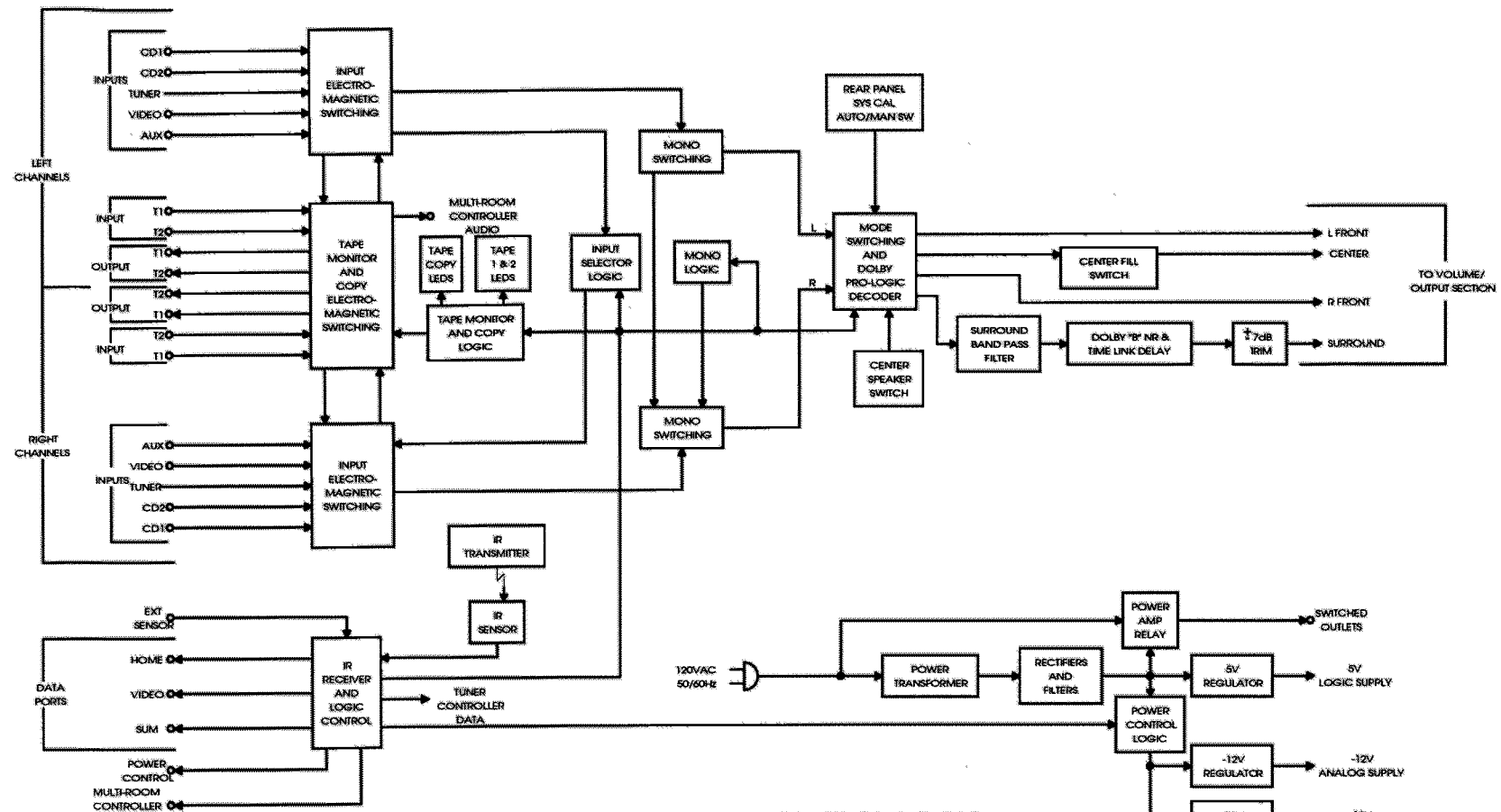


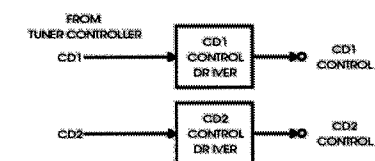
Fig. 2 Top view with cover removed

Block Diagram

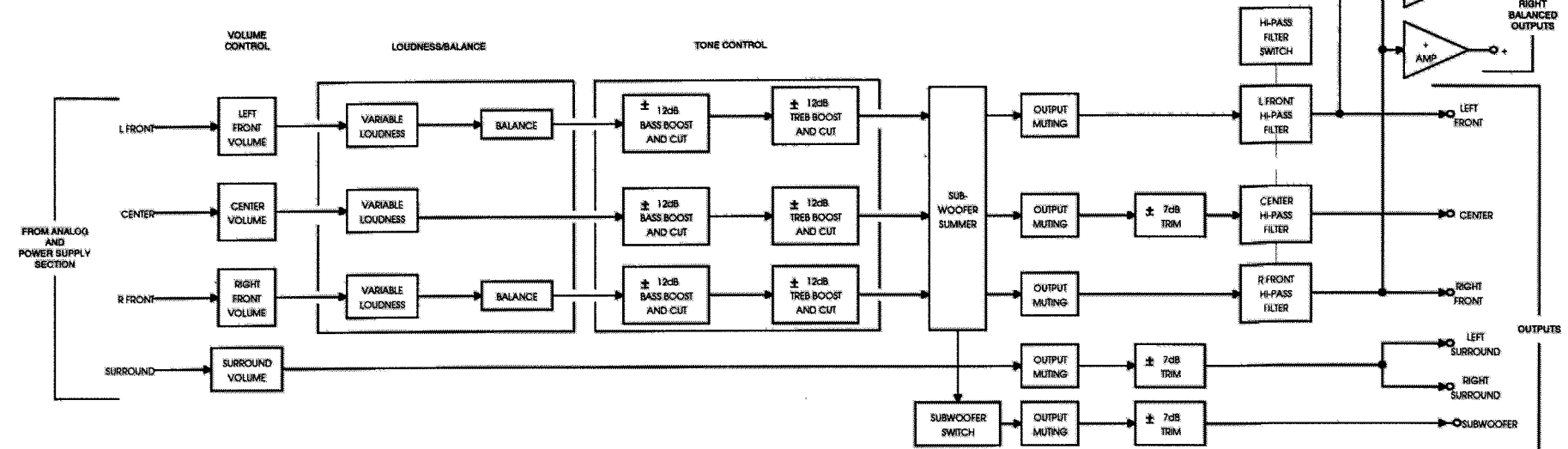
ANALOG AND POWER SUPPLY



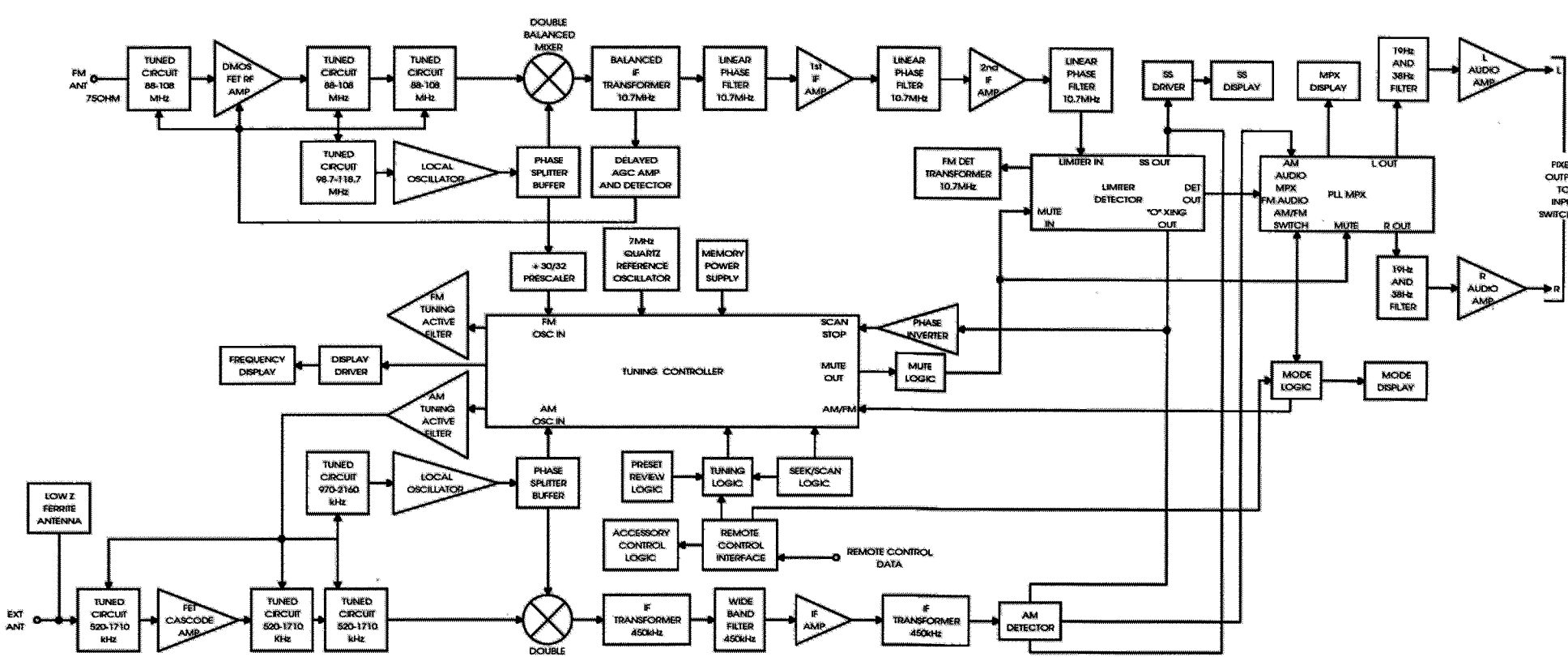
ACCESSORY CONTROL LOGIC



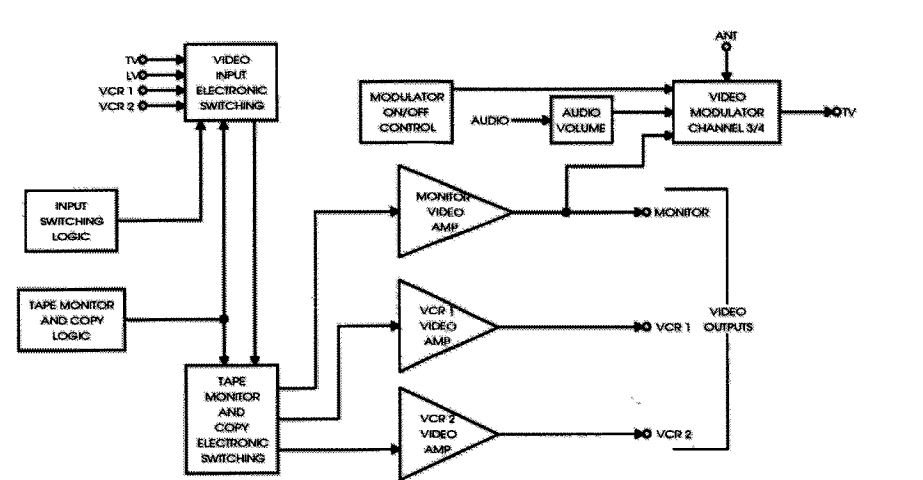
VOLUME/OUTPUT SECTION



TUNER AND TUNER CONTROL



VIDEO SWITCHING



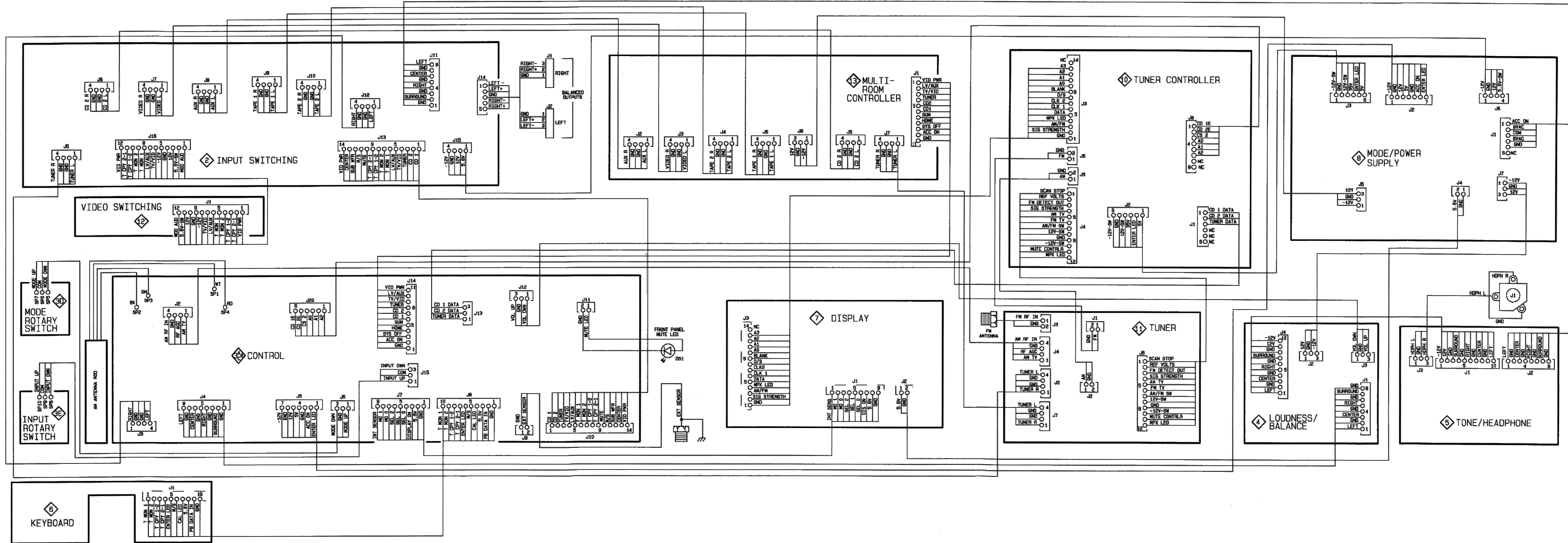
FRONT PANEL and TRIM PARTS LIST

Part	Description
018453	Top Panel Rail
018446	Bottom Panel Rail
018232	End Caps
118-FRNTPANEL	FRONT PANEL Complete
090207	Loudness Knob, Rear
090214	Treble/Bass/Volume Knob
090218	Balance Knob, Front
090225	Input/Mode Knob
104017	Knob Felt Washer, 3/4" Dia.

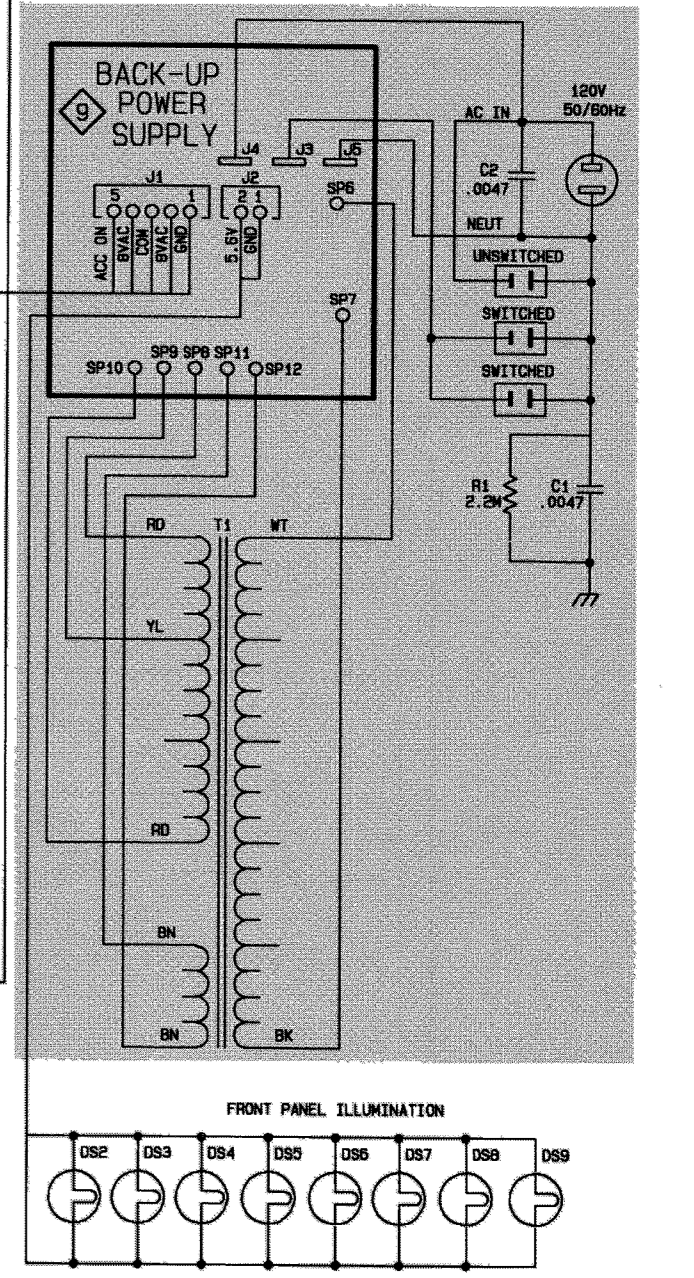
INTERCONNECTION PARTS LIST

Symbol	Part	Description
CAPACITORS		
C1,C2	061276	CD, .0047uF, 400V, UL/CSA
LIGHTING DEVICES		
DS1	070093	LED, Red, HP5085-4658
DS2-DS9	058120	INC, 14V, 7373
ANTENNA		
E1	122271	AM ANTENNA
JACKS		
J1,J2	117437	XLR Connector, Male
TRANSFORMER		
T1	159237	Power

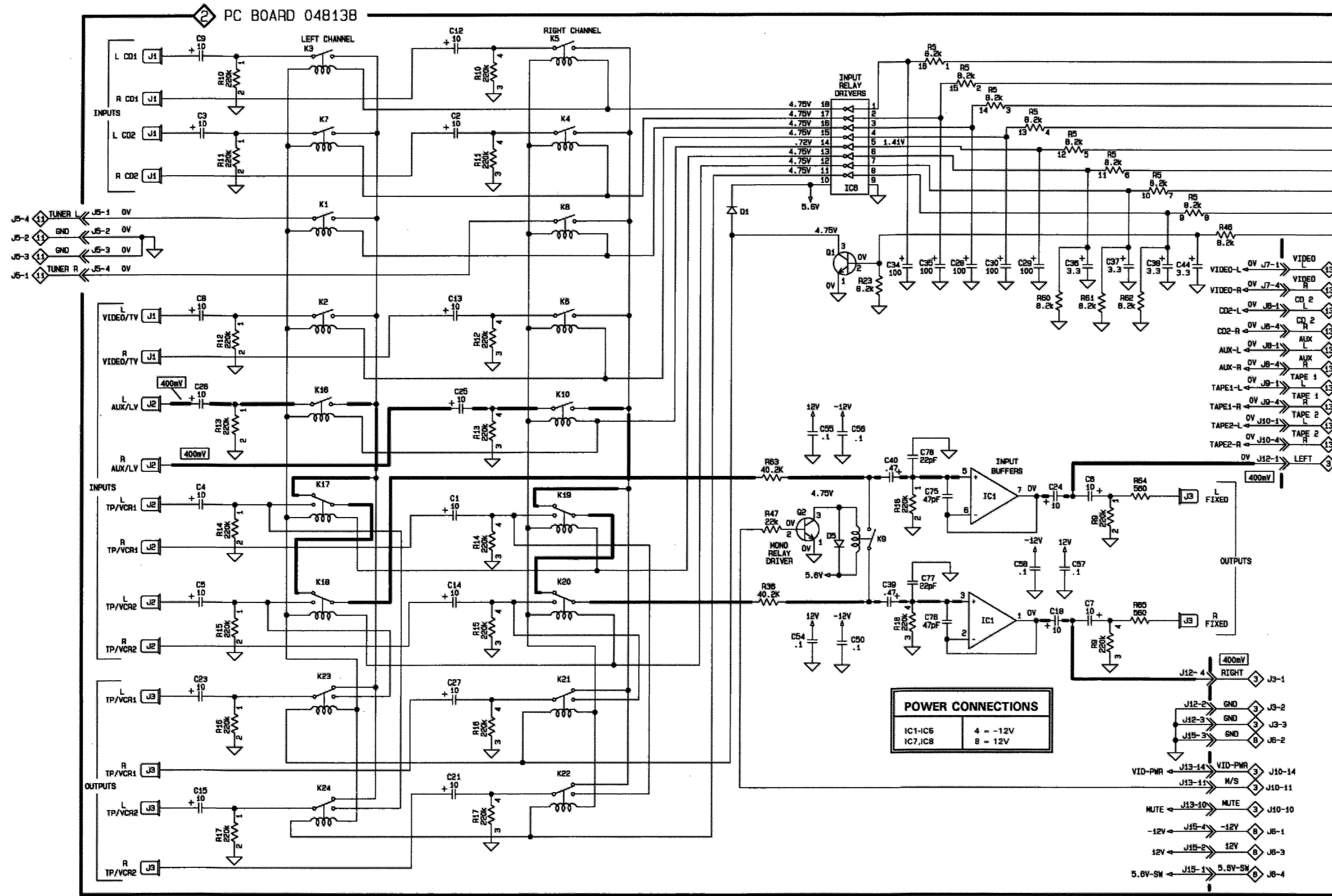
Interconnection Diagram 1



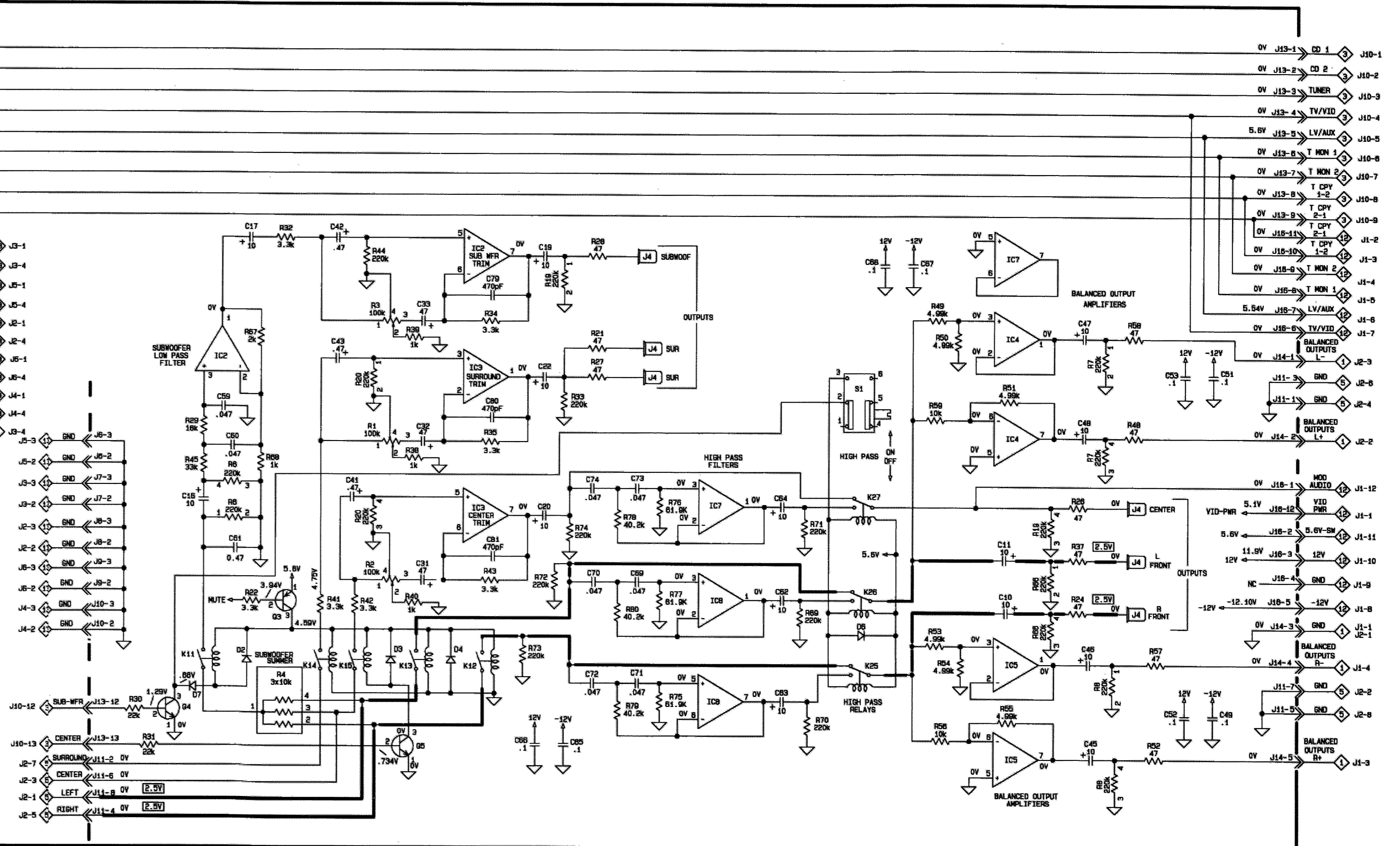
WARNING: Parts located in the below shaded area have critical characteristics. Use ONLY replacement parts recommended by the manufacturer.



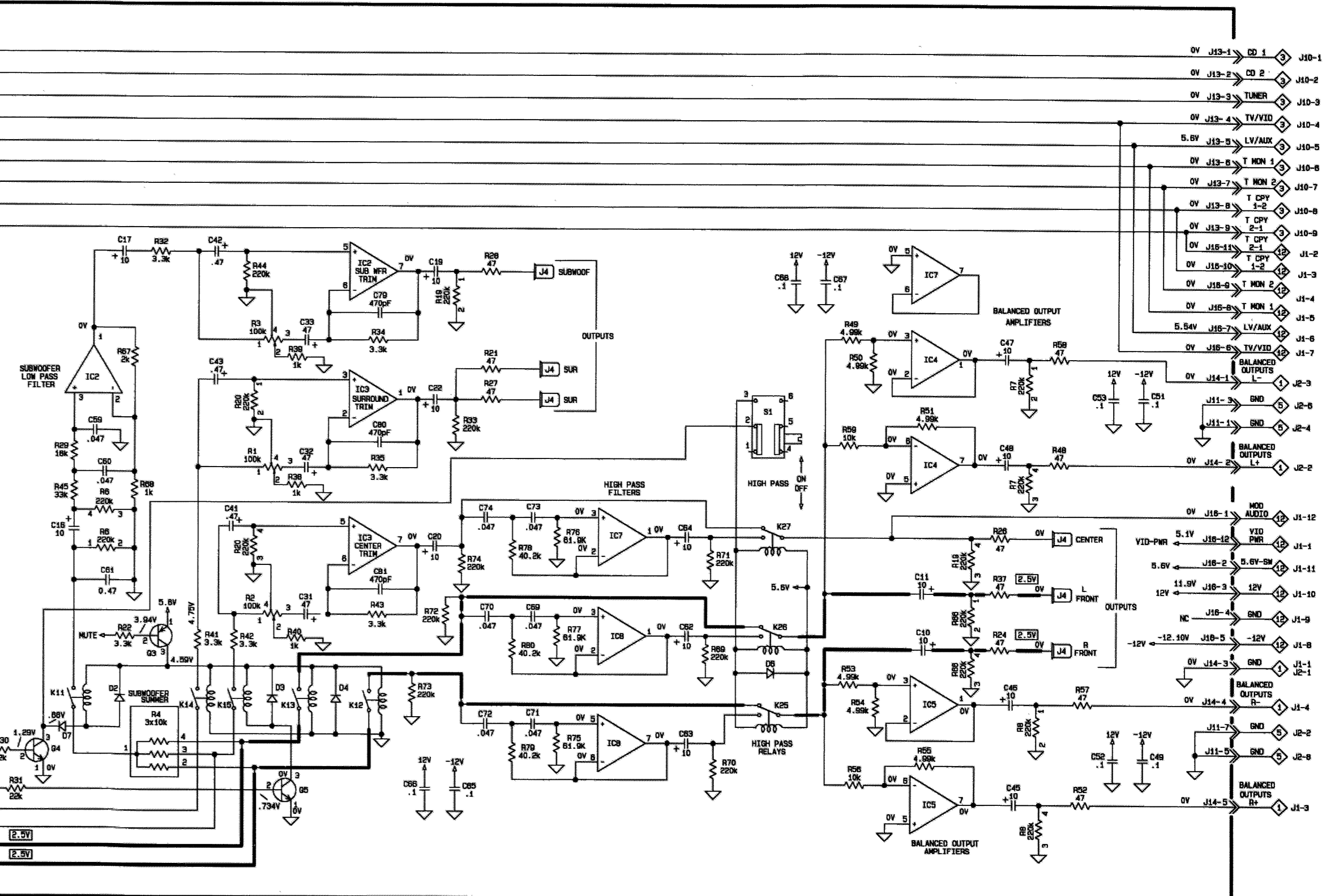
2 Input Switching



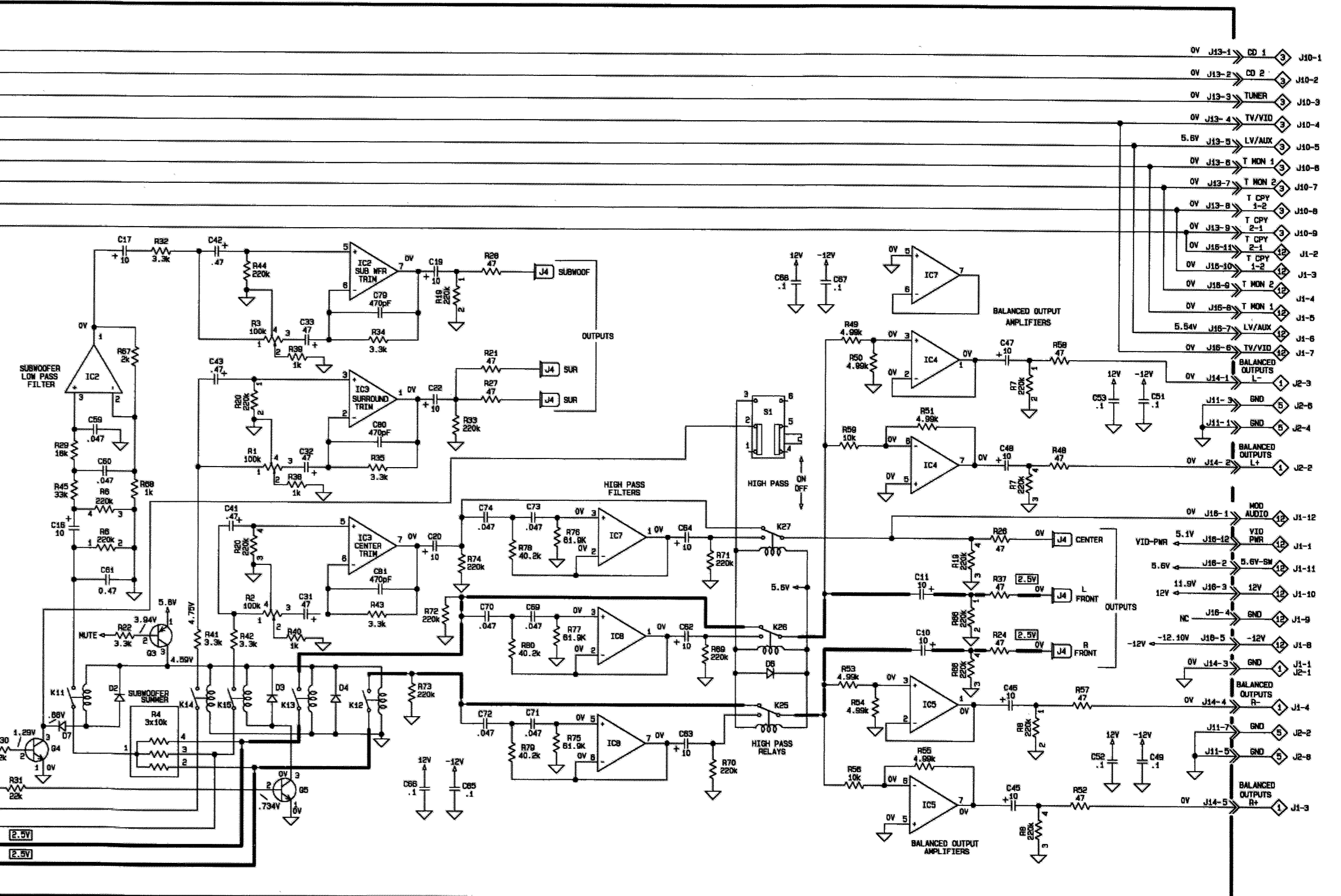
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2

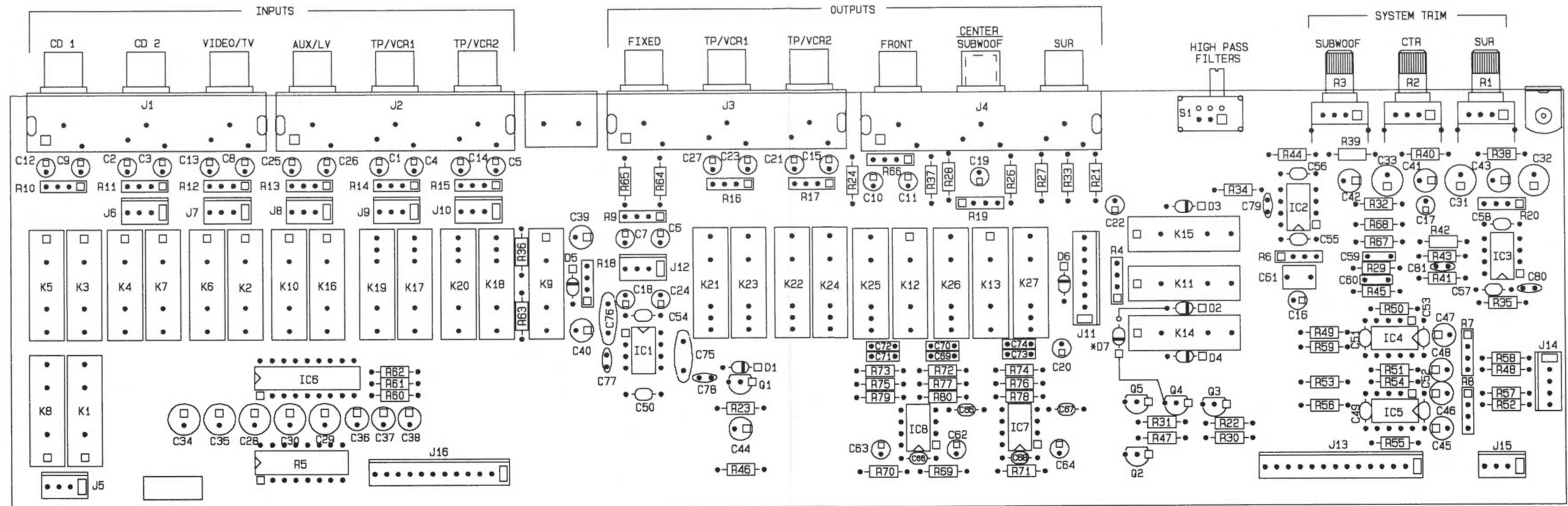


2



Input Switching

2



INPUT SWITCHING PCB 048138

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

INPUT SWITCHING PARTS LIST

Symbol	Part	Description
DIODES		
D1-D7	070047	SIG, 75V, 150mA, 1N4148
INTEGRATED CIRCUITS		
IC1	133094	Dual Operational Amp, NE5532N
IC2	133189	Dual Op-Amp, MC33178P
IC3-IC5	133094	Dual Operational Amp, NE5532N
IC6	133169	Octal Darlington Transistor Array, ULN2801
IC7,IC8	133094	Dual Operational Amp, NE5532N
RELAYS		
K1-K16	087050	SPST, 5VDC, Reed, HE3321A0400
K17-K27	087056	Form, 1C, 5VDC, Reed, HE3321C0500

RESISTORS (POTENTIOMETERS)

R1-R3	134469	POT 100K ohm
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SWITCHES

S1	148059	Slide Switch DPDT
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TRANSISTORS

Q1,Q2	132223	NPN, MPS4124
Q3	132224	PNP, MPS4126
Q4	132090	NPN, DAR, MPSA25
Q5	132223	NPN, MPS4124

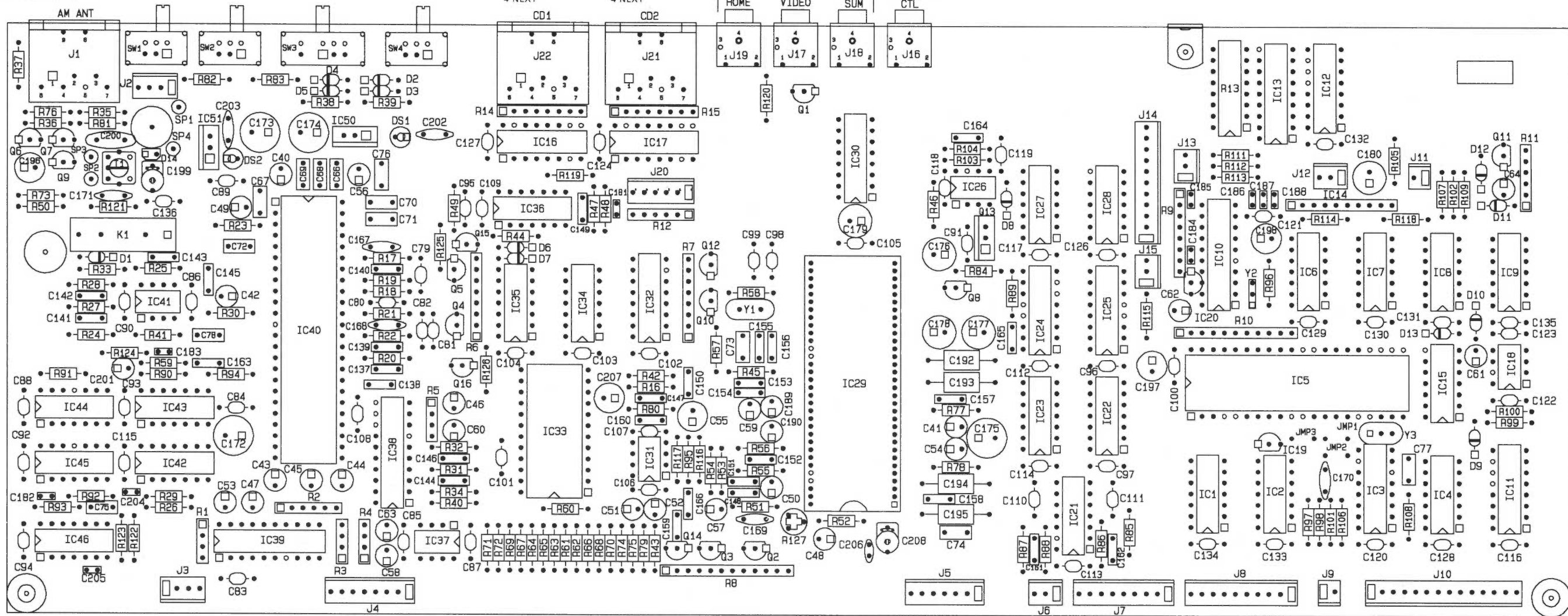
3A Control

J1
1 AM TV 5 NC
2 RF IN 6 SW SENSE
3 RF AGC 7 GND
4 EXT WIRE

J22
1 BACK 5 NC
2 STOP 6 GND
3 PLAY 7 GND
4 NEXT

J21
1 BACK 5 NC
2 STOP 6 GND
3 PLAY 7 GND
4 NEXT

DATA PORTS
HOME VIDEO SUM PWR CTL
J19 J17 J18 J16

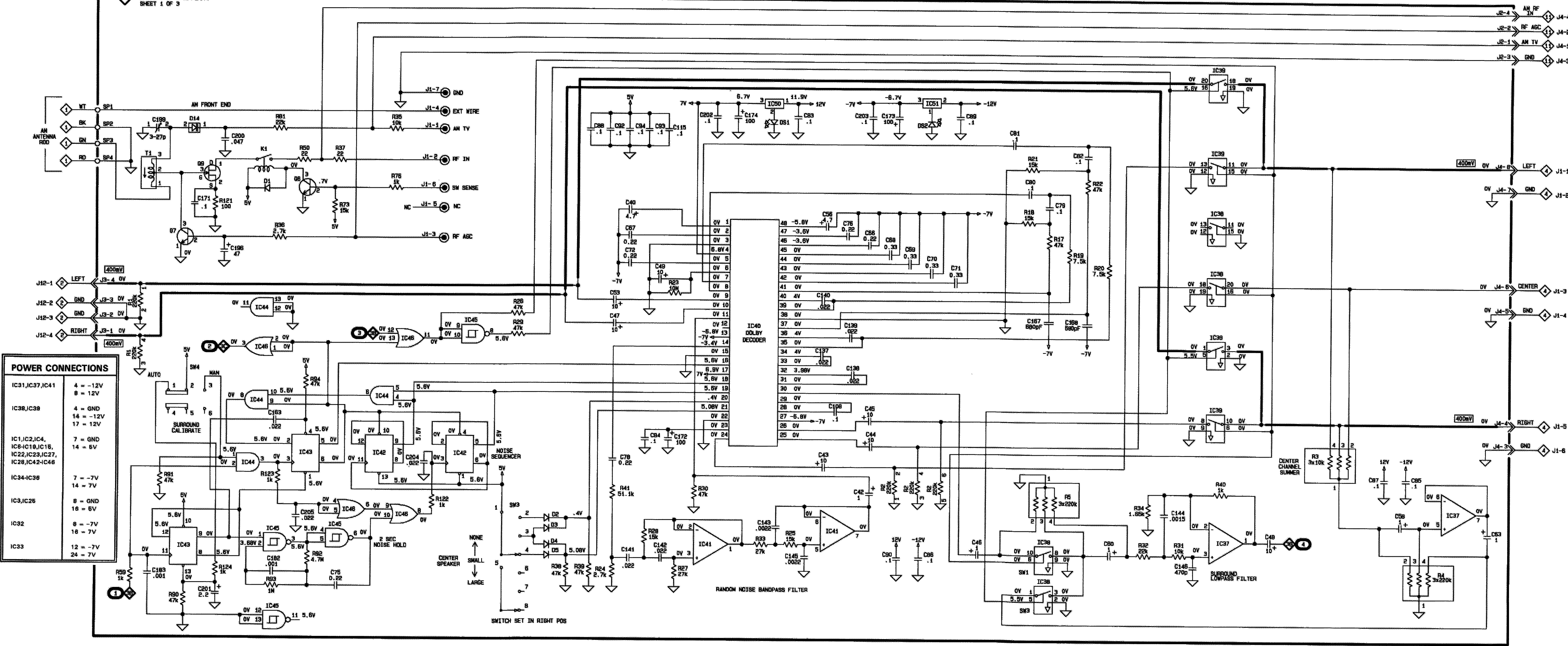


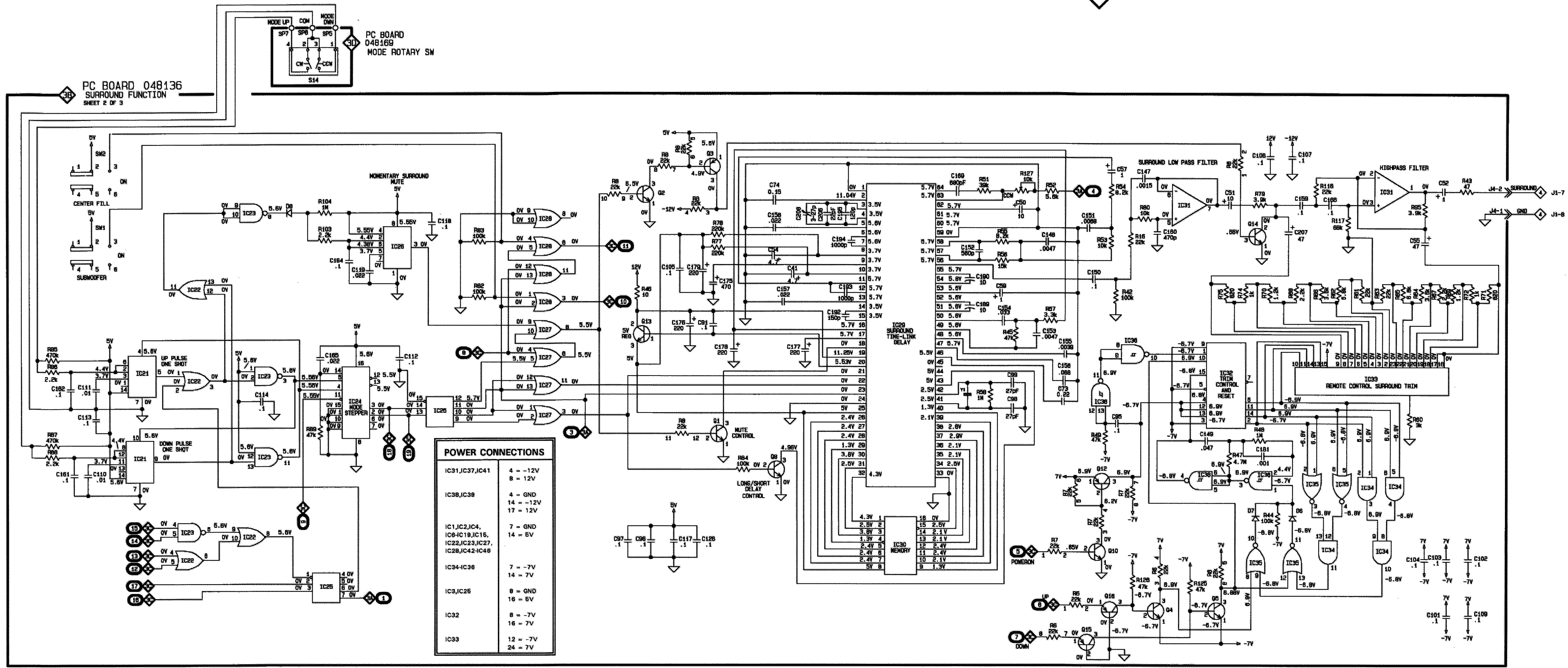
CONTROL PARTS LIST

CONTROL PCB 048136

Symbol	Part	Description	Part	Description	Part	Description	Part	Description
CAPACITORS								
C199,C208	060029	Trimmer, 3-27pF	IC11,IC12	133170	3 to 8 Line Decoder, Latch, 74HC327N	IC33	133205	CMOS, 16 Channel Multiplexer, MC14067
CRYSTALS								
Y1	180040	Crystal, 8MHz	IC13	133180	8 Line Driver Array, LB1720	IC34	133076	CMOS, Quad 2-Input AND Gate, MC14081B
Y2	180038	Ceramic Resonator, 4MHz ±0.5%	IC14	133191	DC Motor Driver, LB1642B	IC35	133064	CMOS, Quad 2-Input NOR Gate, MC14001B
Y3	180039	Ceramic Resonator, 6MHz	IC15	133167	Quad 2-Input OR Gate, MC74HC32AN	IC36	133207	CMOS, Quad NAND Schmitt, MC14093B
DIODES								
D1-D13	070047	SIG, 75V, 150mA, 1N4148	IC16,IC17	133170	3 to 8 Line Decoder, Latch, 74HC237N	IC37	133189	Dual Op-Amp, MC33178P
D14	070125	VAC, AM, SVC333	IC18	133141	Timer, NE555N	IC38,IC39	133209	Quad Audio Switch, SSM2404
INTEGRATED CIRCUITS								
IC1	133167	Quad 2-Input OR Gate, MC74HC32AN	IC19	133241	Microprocessor Reset Positive, PST573E	IC40	133202	Dolby PRO-LOGIC Decoder,SSM-2125
IC2	133161	CMOS, Quad 2-Input NAND Gate, 74HC00N	IC20	133240	Microprocessor Reset Negative, PST572E	IC41	133189	Dual Op-Amp, MC33178P
IC3	133182	Dual Precision Monostable Multivibrator, MC74HC4538AN	IC21	133116	CMOS, Dual Timer, NE556N	IC42,IC43	133190	CMOS, Dual D Flip-Flop, 74HC74N
IC4	133176	CMOS, Quad 2-Input NOR Gate, MC74HC02AN	IC22	133167	Quad 2-Input OR Gate, MC74HC32AN	IC44	133175	CMOS, Quad 2-Input AND Gate, MC74HC08AN
IC5	133177	Custom 80C51 Microcontroller, 80C51	IC23	133161	CMOS, Quad 2-Input NAND Gate, 74HC00N	IC45	133192	CMOS, Quad 2-Input Schmitt-Trigger NAND Gate, MC74HC132
IC6	133175	CMOS, Quad 2-Input AND Gate, MC74HC08AN	IC24	133171	CMOS, Presettable Binary UP/DOWN Counter, 74HC193N	IC46	133167	Quad 2-Input OR Gate, MC74HC32AN
IC7	133161	CMOS, Quad 2-Input NAND Gate, 74HC00N	IC25	133248	Timer, NE555N	IC50	133108	+5V Regulator MC7805CT
IC8,IC9	133175	CMOS, Quad 2-Input AND Gate, MC74HC08AN	IC26	133141	Quad 2-Input OR Gate, MC74HC32AN	IC51	133253	-5V Regulator, MC79M05CT...MO
IC10	133213	Microcontroller, MC68HC705J2P	IC27,IC28	133167	Timer, NE555N			
			IC29	133203	Dolby PRO-LOGIC Delay, LV1000N			
			IC30	133208	DRAM 256K Memory, MCM62 56BP10			
			IC31	133189	Dual Op-Amp, MC33178P			
			IC32	133206	CMOS, UP/DWN Binary Counter, MC14516B			
LIGHTING DEVICES								
DS1,DS2	058078	LED, Red, SLP144B						
RELAYS								
K1	087050	SPST, 5VDC, Reed, HE3321A0400						
RESISTORS								
R127	134414	POT, 10k ohm						
TRANSISTORS								
Q1,Q2	132223	NPN, MPS4124						
Q3	132224	PNP, MPS4126						
Q4-Q8	132223	NPN, MPS4124						
Q9	132178	N, JFET, Selected J-310						
Q10	132223	NPN, MPS4124						
Q11,Q12	132224	NPN, MPS4126						
Q15,Q16	132224	NPN, MPS4126						
SWITCHES								
S1,S2	148059	Slide Switch DPDT						
S3	148060	Slide Switch DP3T						
S4	148059	Slide Switch DPDT						

PC BOARD 048136
DOLBY FUNCTION
SHEET 1 OF 3





POWER CONNECTIONS

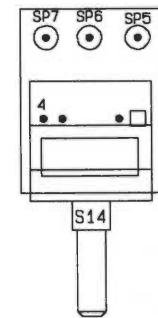
IC31,IC37,IC41	4 = -12V
	8 = 12V
IC38,IC38	4 = GND
	14 = -12V
	17 = 12V
IC1,IC2,IC4,	7 = GND
IC6-IC19,IC16,	14 = 5V
IC22,IC23,IC27,	
IC28,IC42-IC48	
IC34-IC36	7 = -7V
	14 = 7V
IC3,IC25	8 = GND
	16 = 5V
IC32	8 = -7V
	16 = 7V
IC33	12 = -7V
	24 = 7V

Control 3B

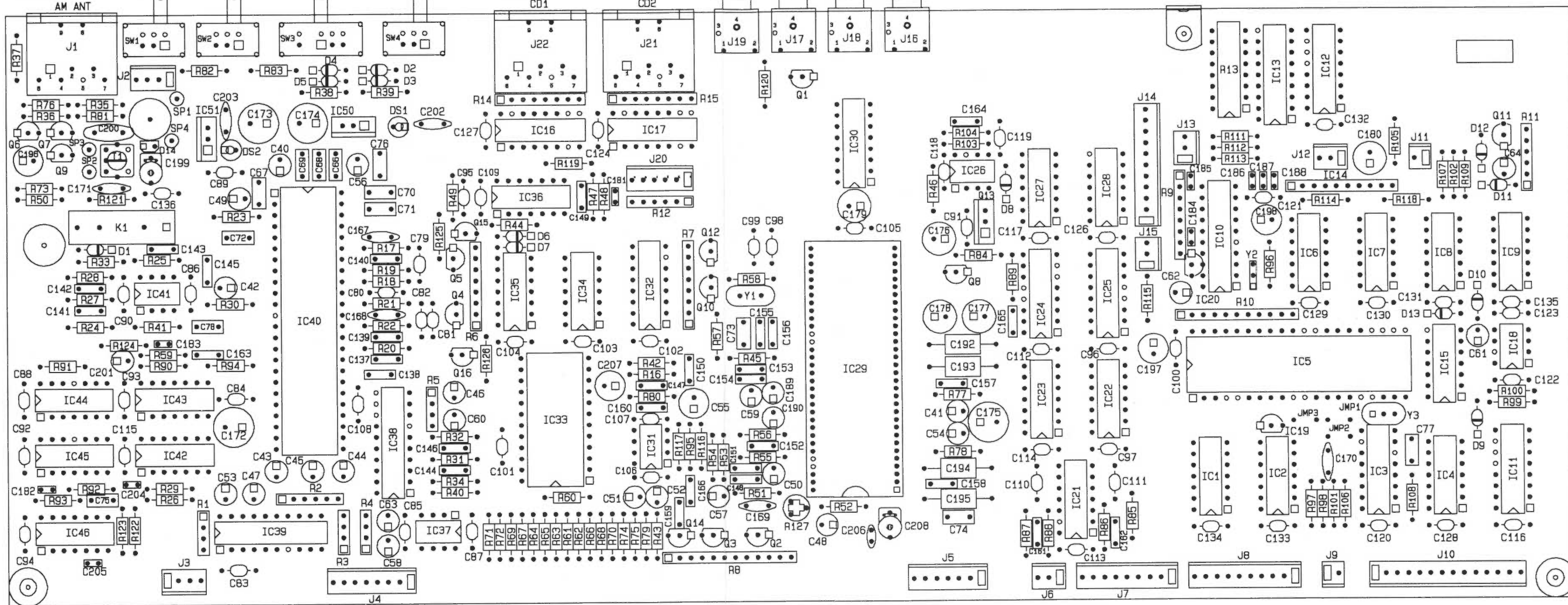
J1
1 AM TV 5 NC
2 RF IN 6 SW SENSE
3 RF AGC 7 GND
4 EXT WIRE

J22 J21
1 BACK 5 NC 1 BACK 5 NC
2 STOP 6 GND 2 STOP 6 GND
3 PLAY 7 GND 3 PLAY 7 GND
4 NEXT 4 NEXT

DATA PORTS
HOME VIDEO SUM PWR CTL
J19 J17 J18 J16



MODE
ROTARY SWITCH
PCB 048169



CONTROL PARTS LIST

Symbol	Part	Description
CAPACITORS		
C199, C208	060029	Trimmer, 3-27pF
CRYSTALS		
Y1	180040	Crystal, 8MHz
Y2	180038	Ceramic Resonator, 4MHz ±0.5%
Y3	180039	Ceramic Resonator, 6MHz
DIODES		
D1-D13	070047	SIG, 75V, 150mA, 1N4148
D14	070125	VAC, AM, SVC333
INTEGRATED CIRCUITS		
IC1	133167	Quad 2-Input OR Gate, MC74HC32AN
IC2	133161	CMOS, Quad 2-Input NAND Gate, 74HC00N
IC3	133182	Dual Precision Monostable Multivibrator, MC74HC4538AN
IC4	133176	CMOS, Quad 2-Input NOR Gate, MC74HC02AN
IC5	133177	Custom 80C51 Microcontroller, 80C51
IC6	133175	CMOS, Quad 2-Input AND Gate, MC74HC08AN
IC7	133161	CMOS, Quad 2-Input NAND Gate, 74HC00N
IC8, IC9	133175	CMOS, Quad 2-Input AND Gate, MC74HC08AN
IC10	133213	Microcontroller, MC68HC705J2P
IC11, IC12	133170	3 to 8 Line Decoder, Latch, 74HC327N
IC13	133180	8 Line Driver Array, LB1720
IC14	133191	DC Motor Driver, LB1642B
IC15	133167	Quad 2-Input OR Gate, MC74HC32AN
IC16, IC17	133170	3 to 8 Line Decoder, Latch, 74HC237N
IC18	133141	Timer, NE555N
IC19	133241	Microprocessor Reset Positive, PST573E
IC20	133240	Microprocessor Reset Negative, PST572E
IC21	133116	CMOS, Dual Timer, NE556N
IC22	133167	Quad 2-Input OR Gate, MC74HC32AN
IC23	133161	CMOS, Quad 2-Input NAND Gate, 74HC00N
IC24	133171	CMOS, Presetable Binary UP/DOWN Counter, 74HC193N
IC25	133248	Timer, NE555N
IC26	133141	Quad 2-Input OR Gate, MC74HC32AN
IC27, IC28	133167	CMOS, Quad 2-Input AND Gate, MC74HC08AN
IC29	133203	Dolby PRO-LOGIC Delay, LV1000N
IC30	133208	DRAM 256K Memory, MCM62 56BP10
IC31	133189	Dual Op-Amp, MC33178P
IC32	133206	CMOS, UP/DWN Binary Counter, MC14516B
IC33	133205	CMOS, 16 Channel Multiplexer, MC14067
IC34	133076	CMOS, Quad 2-Input AND Gate, MC14081B
IC35	133064	CMOS, Quad 2-Input NOR Gate, MC14001B
IC36	133207	CMOS, Quad NAND Schmitt, MC14093B
IC37	133189	Dual Op-Amp, MC33178P
IC38, IC39	133209	Quad Audio Switch, SSM2404
IC40	133202	Dolby PRO-LOGIC Decoder, SSM-2125
IC41	133189	Dual Op-Amp, MC33178P
IC42, IC43	133190	CMOS, Dual D Flip-Flop, 74HC74N
IC44	133175	CMOS, Quad 2-Input AND Gate, MC74HC08AN
IC45	133192	CMOS, Quad 2-Input Schmitt-Trigger NAND Gate, MC74HC132
IC46	133167	Quad 2-Input OR Gate, MC74HC32AN
IC50	133108	+5V Regulator, MC7805CT
IC51	133253	-5V Regulator, MC79M05CT...MO
LIGHTING DEVICES		
DS1, DS2	058078	LED, Red, SLP144B
RELAYS		
K1	087050	SPST, 5VDC, Reed, HE3321A0400
RESISTORS		
R127	134414	POT, 10k ohm
TRANSISTORS		
Q1, Q2	132223	NPN, MPS4124
Q3	132224	PNP, MPS4126
Q4-Q8	132223	NPN, MPS4124
Q9	132178	N, JFET, Selected J-310
Q10	132223	NPN, MPS4124
Q11, Q12	132224	NPN, MPS4126
Q15, Q16	132224	NPN, MPS4126
SWITCHES		
S1, S2	148059	Slide Switch DPDT
S3	148060	Slide Switch DP3T
S4	148059	Slide Switch DPDT

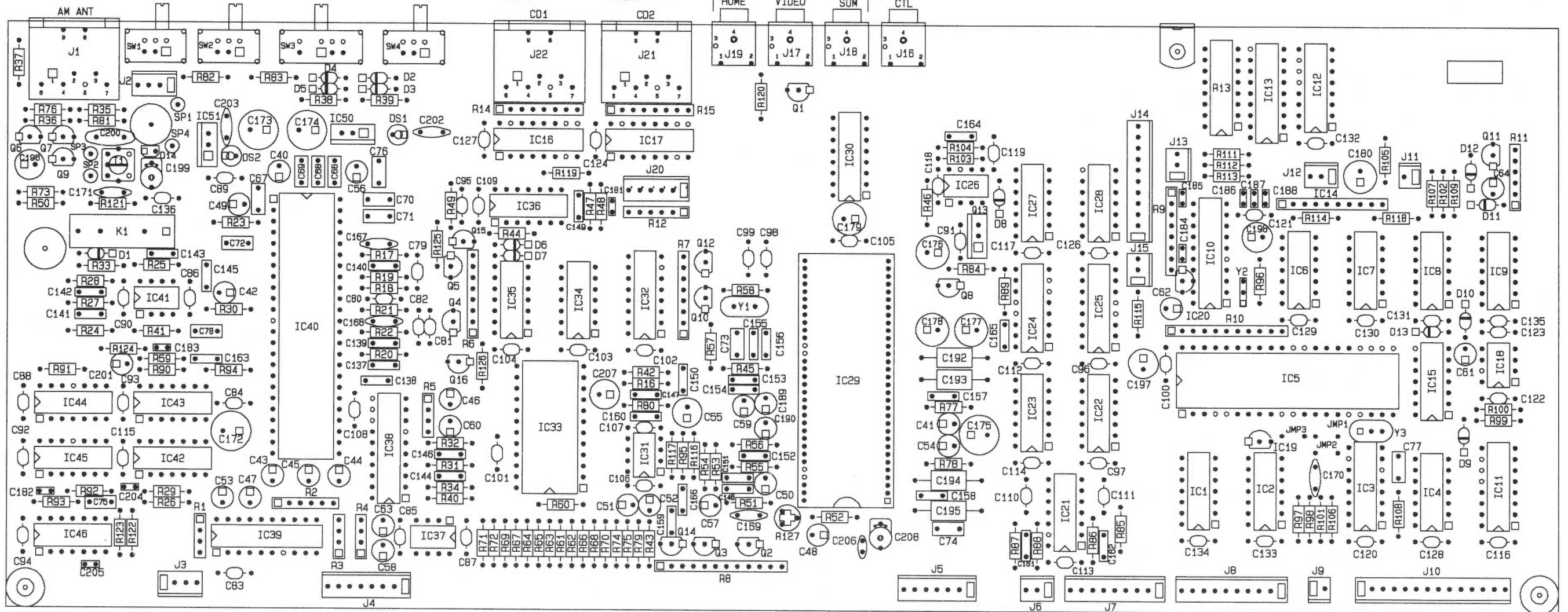
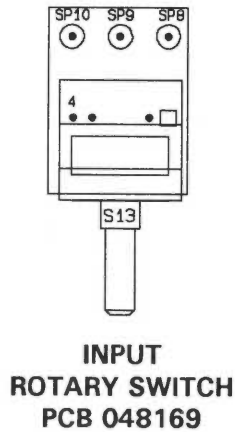
CONTROL PCB 048136

3C Control

- J1
 1 AM TV 6 NC
 2 RF IN 6 SW SENSE
 3 RF AGC 7 GND
 4 EXT WIRE

- J22
 1 BACK 6 NC
 2 STOP 6 GND
 3 PLAY 7 GND
 4 NEXT
- J21
 1 BACK 6 NC
 2 STOP 6 GND
 3 PLAY 7 GND
 4 NEXT

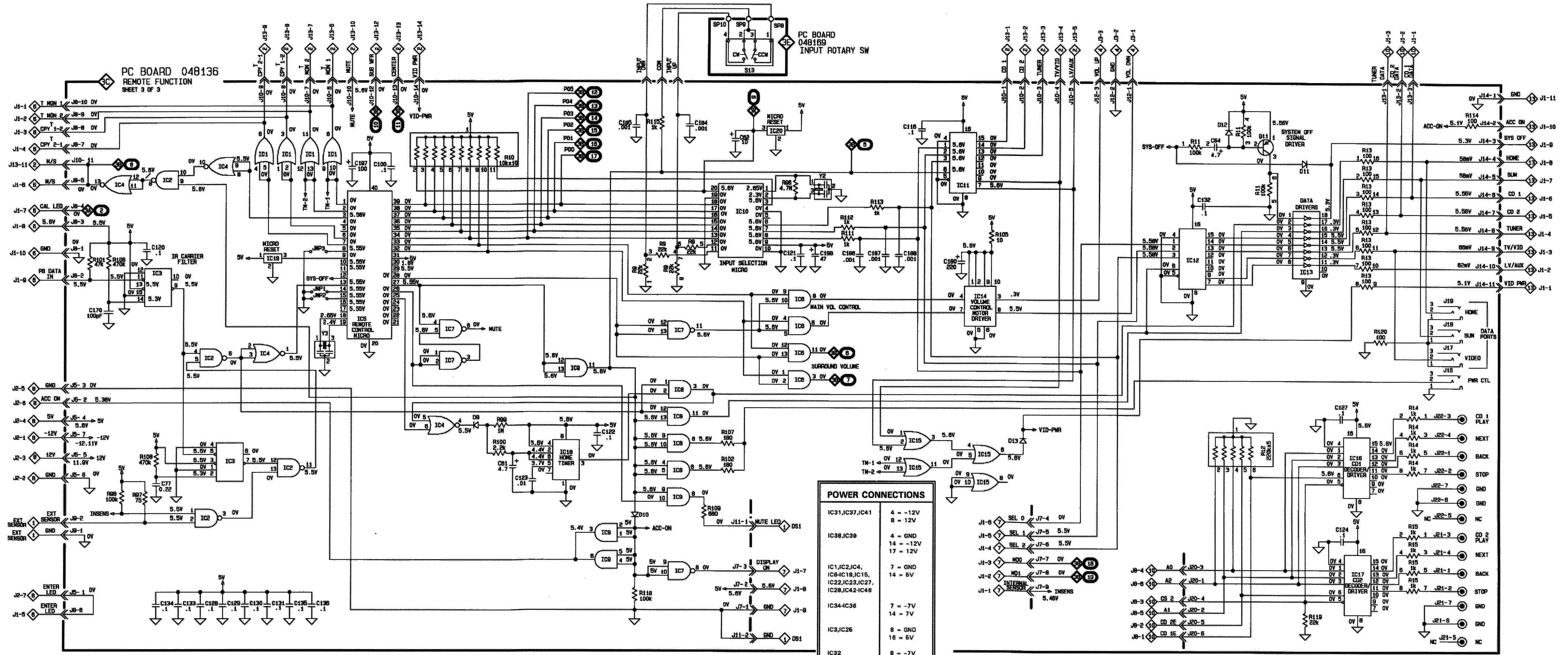
- DATA PORTS
 HOME VIDEO SUM PWR CTL
 J19 J17 J18 J16



CONTROL PARTS LIST

Symbol	Part	Description
CAPACITORS		
C199,C208	060029	Trimmer, 3-27pF
CRYSTALS		
Y1	180040	Crystal, 8MHz
Y2	180038	Ceramic Resonator, 4MHz ±0.5%
Y3	180039	Ceramic Resonator, 6MHz
DIODES		
D1-D13	070047	SIG, 75V, 150mA, 1N4148
D14	070125	VAC, AM, SVC333
INTEGRATED CIRCUITS		
IC1	133167	Quad 2-Input OR Gate, MC74HC32AN
IC2	133161	CMOS, Quad 2-Input NAND Gate, 74HC00N
IC3	133182	Dual Precision Monostable Multivibrator, MC74HC4538AN
IC4	133176	CMOS, Quad 2-Input NOR Gate, MC74HC02AN
IC5	133177	Custom 80C51 Microcontroller, 80C51
IC6	133175	CMOS, Quad 2-Input AND Gate, MC74HC08AN
IC7	133161	CMOS, Quad 2-Input NAND Gate, 74HC00N
IC8,IC9	133175	CMOS, Quad 2-Input AND Gate, MC74HC08AN
IC10	133213	Microcontroller, MC68HC705J2P
IC11,IC12	133170	3 to 8 Line Decoder, Latch, 74HC327N
IC13	133180	8 Line Driver Array, LB1720
IC14	133191	DC Motor Driver, LB1642B
IC15	133167	Quad 2-Input OR Gate, MC74HC32AN
IC16,IC17	133170	3 to 8 Line Decoder, Latch, 74HC237N
IC18	133141	Timer, NE555N
IC19	133241	Microprocessor Reset Positive, PST573E
IC20	133240	Microprocessor Reset Negative, PST572E
IC21	133116	CMOS, Dual Timer, NE556N
IC22	133167	Quad 2-Input OR Gate, MC74HC32AN
IC23	133161	CMOS, Quad 2-Input NAND Gate, 74HC00N
IC24	133171	CMOS, Presetable Binary UP/DOWN Counter, 74HC193N
IC25	133248	Timer, NE555N
IC26	133141	Quad 2-Input OR Gate, MC74HC32AN
IC27,IC28	133167	Dolby PRO-LOGIC Delay, LV1000N
IC29	133203	DRAM 256K Memory, MCM62 56BP10
IC30	133208	Dual Op-Amp, MC33178P
IC31	133189	CMOS, UP/DWN Binary Counter, MC14516B
IC32	133206	CMOS, 16 Channel Multiplexer, MC14067
IC33	133205	CMOS, Quad 2-Input AND Gate, MC14081B
IC34	133076	CMOS, Quad 2-Input NOR Gate, MC14001B
IC35	133064	CMOS, Quad NAND Schmitt, MC14093B
IC36	133207	Dual Op-Amp, MC33178P
IC37	133189	Quad Audio Switch, SSM2404
IC38,IC39	133209	Dolby PRO-LOGIC Decoder, SSM-2125
IC40	133202	Dual Op-Amp, MC33178P
IC41	133189	CMOS, Dual D Flip-Flop, 74HC74N
IC42,IC43	133190	CMOS, Quad 2-Input AND Gate, MC74HC08AN
IC44	133175	CMOS, Quad 2-Input NAND Gate, MC74HC08AN
IC45	133192	CMOS, Quad 2-Input Schmitt-Trigger NAND Gate, MC74HC132
IC46	133167	Quad 2-Input OR Gate, MC74HC32AN
IC50	133108	+5V Regulator MC7805CT
IC51	133253	-5V Regulator, MC79M05CT...MO
LIGHTING DEVICES		
DS1,DS2	058078	LED, Red, SLP144B
RELAYS		
K1	087050	SPST, 5VDC, Reed, HE3321A0400
RESISTORS		
R127	134414	POT, 10k ohm
TRANSISTORS		
Q1,Q2	132223	NPN, MPS4124
Q3	132224	PNP, MPS4126
Q4-Q8	132223	NPN, MPS4124
Q9	132178	N, JFET, Selected J-310
Q10	132223	NPN, MPS4124
Q11,Q12	132224	NPN, MPS4126
Q15,Q16	132224	NPN, MPS4126
SWITCHES		
S1,S2	148059	Slide Switch DPDT
S3	148060	Slide Switch DP3T
S4	148059	Slide Switch DPDT

Control 3C



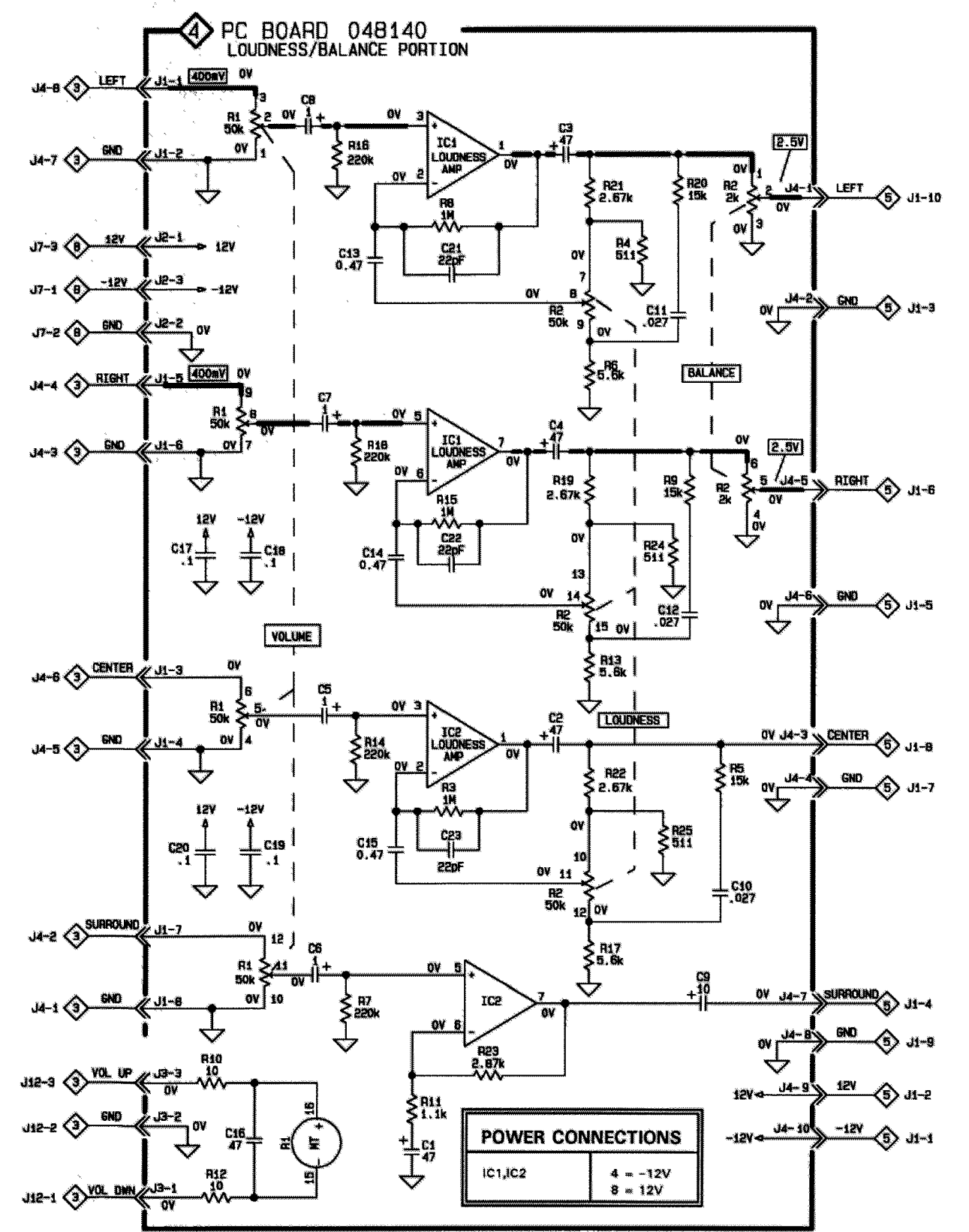
PC BOARD 048136
REMOTE FUNCTION
SHEET 3 OF 3

PC BOARD
048169
INPUT ROTARY SW

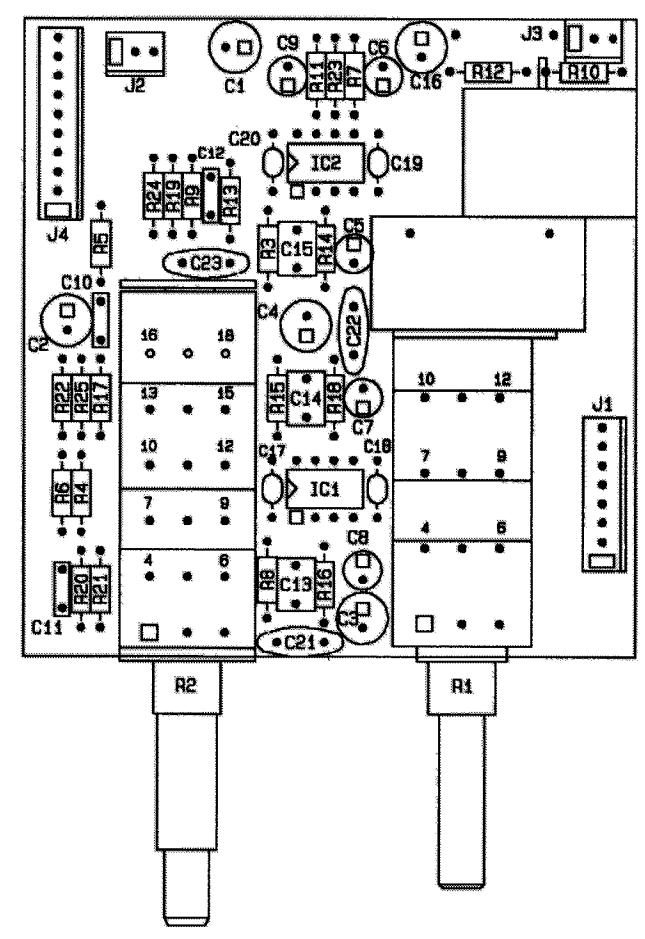
POWER CONNECTIONS

IC31, IC37, IC41	4 - -12V 8 - 12V
IC38, IC39	4 - GND 14 - -12V 17 - 12V
IC1, IC2, IC4, IC8-IC19, IC15, IC22, IC23, IC27, IC28, IC42-IC48	7 - GND 14 - 6V
IC34-IC36	7 - -7V 14 - 7V
IC3, IC26	8 - GND 16 - 6V
IC32	8 - -7V 16 - 7V
IC33	12 - -7V 24 - 7V

4 Loudness/Balance



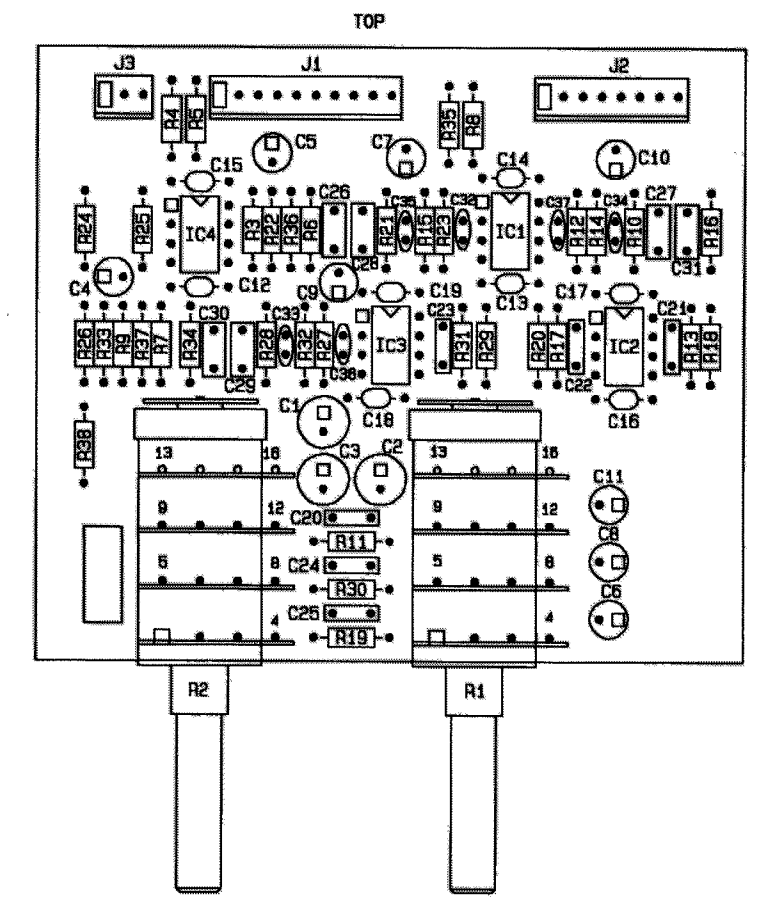
5 Tone/Headphone



LOUDNESS/BALANCE PORTION OF PCB 048140

LOUDNESS/BALANCE PARTS LIST

Symbol	Part	Description
INTEGRATED CIRCUITS		
IC1,IC2	133094	Dual Operational Amp, NE5532N
RESISTORS (POTENTIOMETERS)		
R1	134466	POT 50K ohm, Motor Driven Volume Control
R2	134467	POT 2K ohm Balance POT 50K ohm Loudness

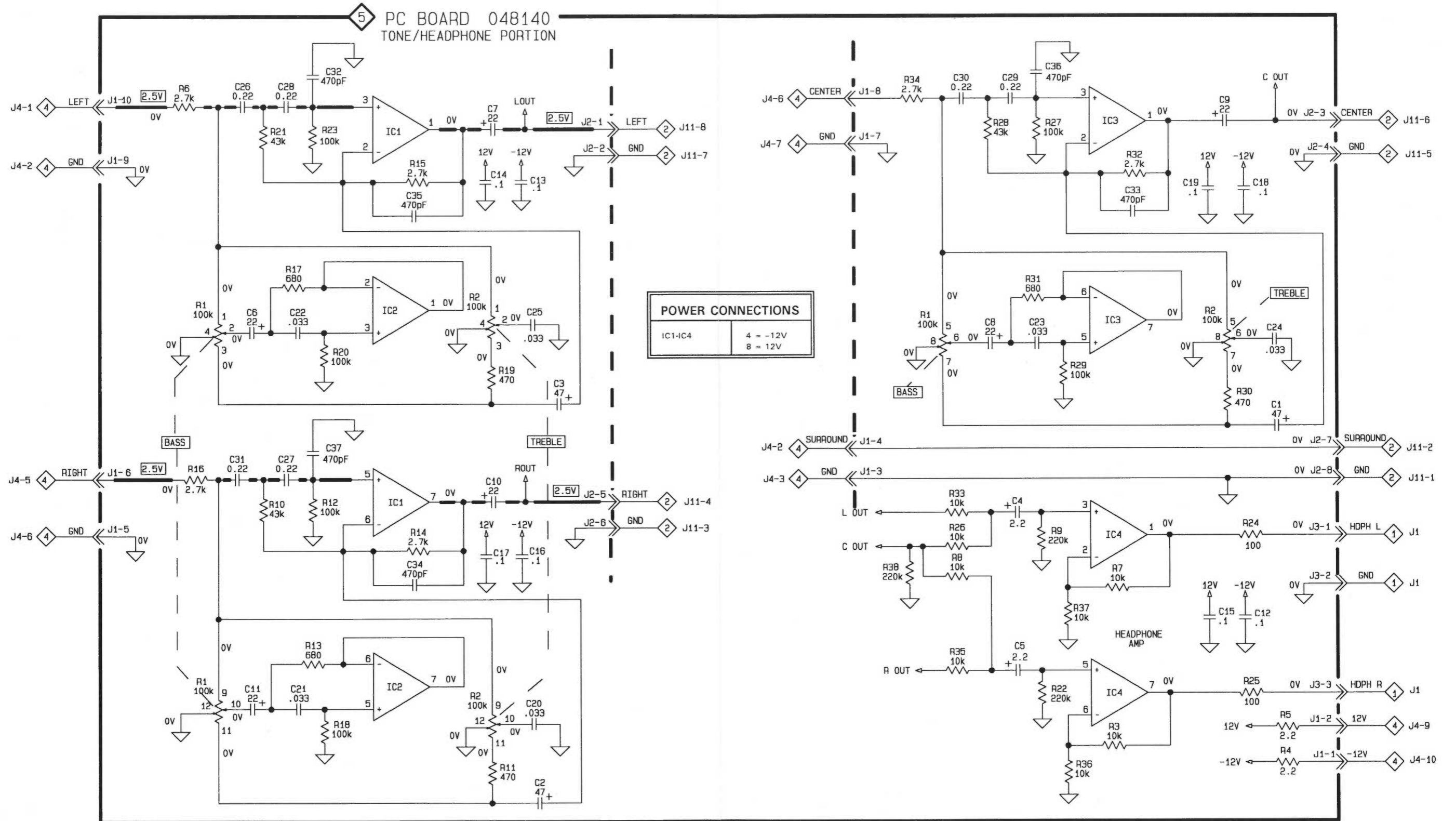


TONE/HEADPHONE PORTION PCB 048140

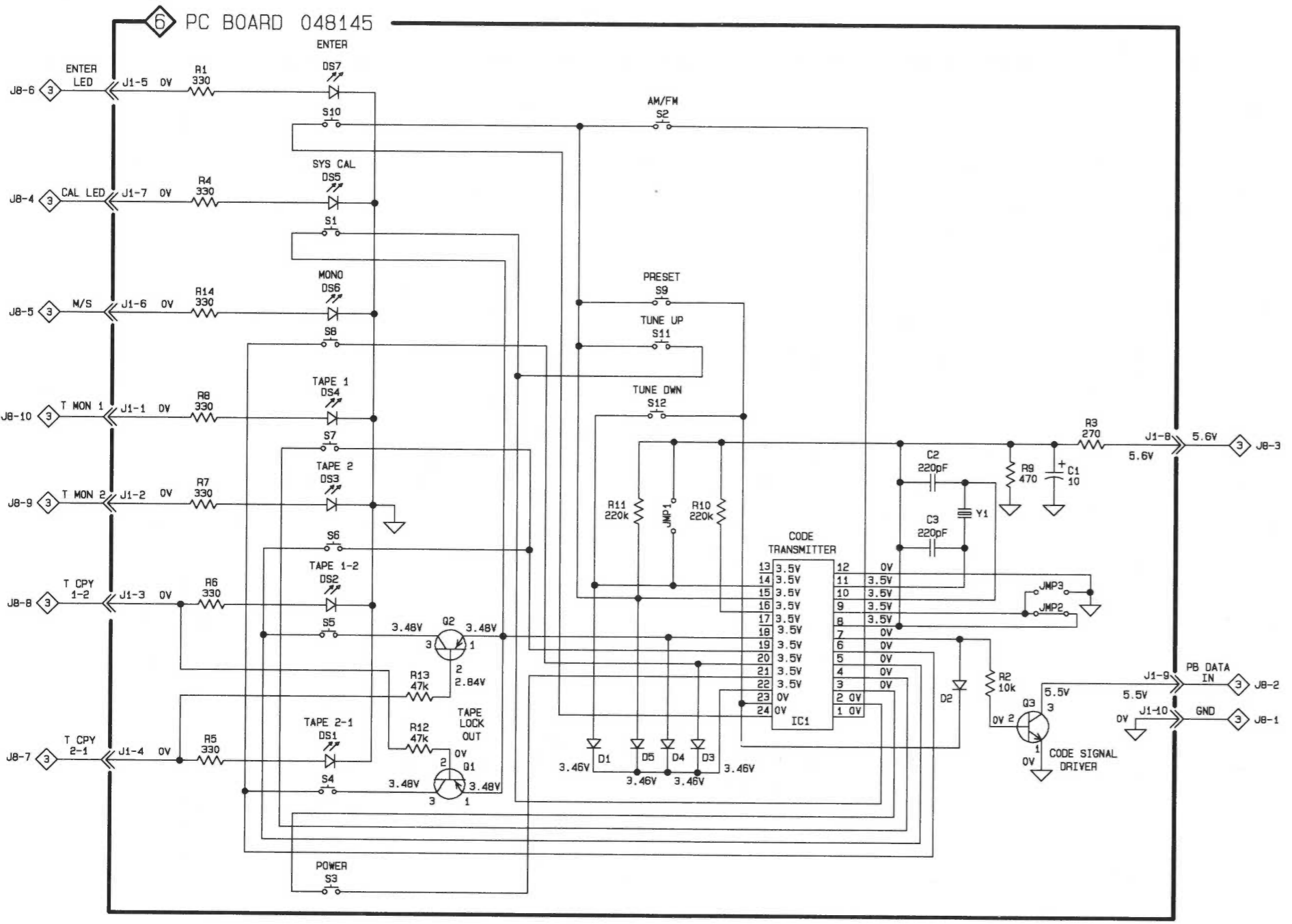
TONE/HEADPHONE PARTS LIST

Symbol	Part	Description
INTEGRATED CIRCUITS		
IC1	133094	Dual Operational Amp, NE5532N
IC2	133189	Dual Op-Amp, MC33178P
IC3	133094	Dual Operational Amp, NE5532N
IC4	133189	Dual Op-Amp, MC33178P
RESISTORS (POTENTIOMETERS)		
R1,R2	134468	POT 100K ohm
SWITCHES		
S13,S14	146231	Input Selector Switch

Tone/Headphone 5



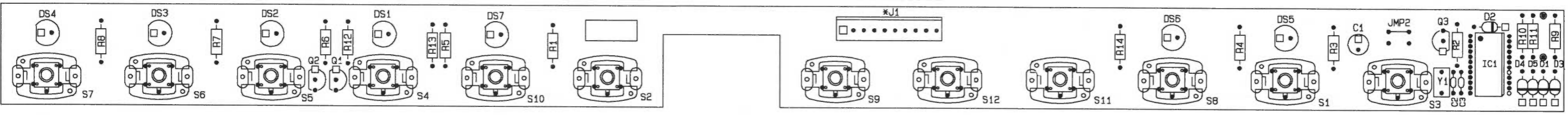
6 Keyboard



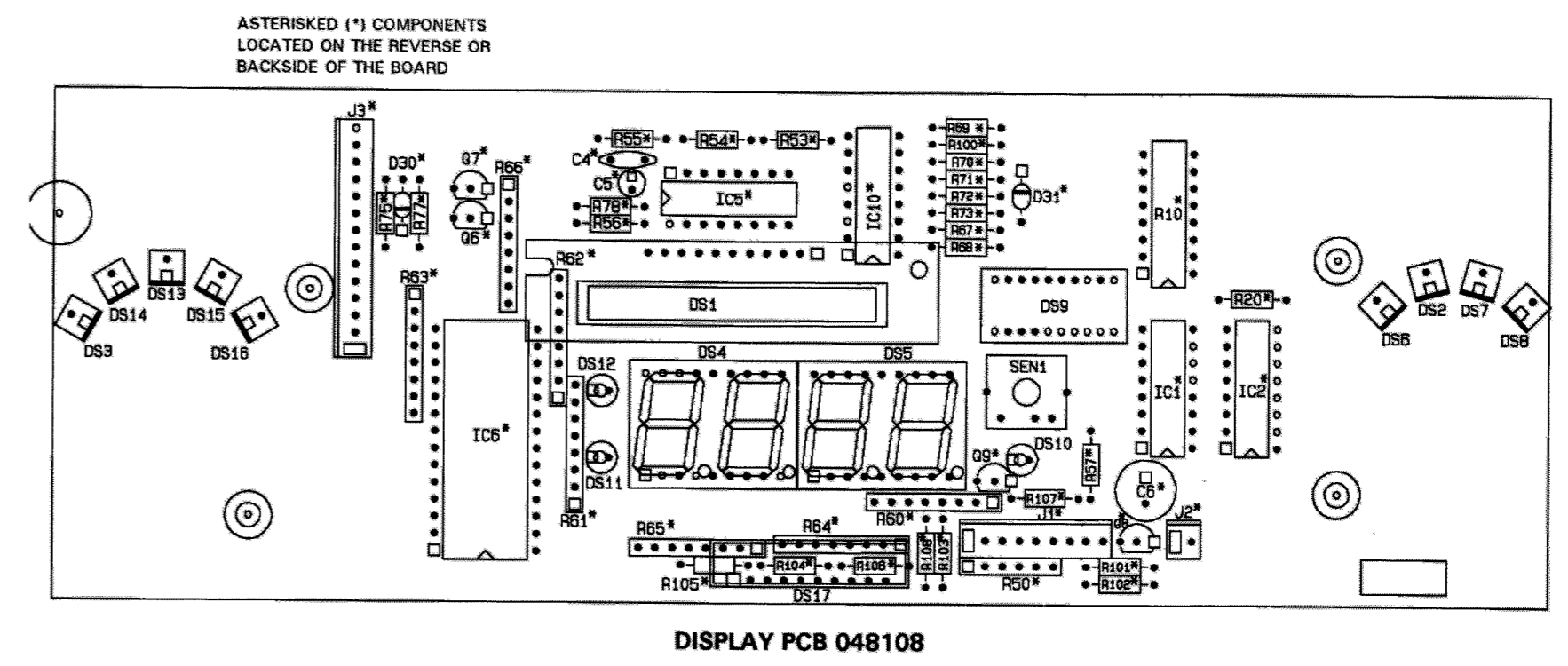
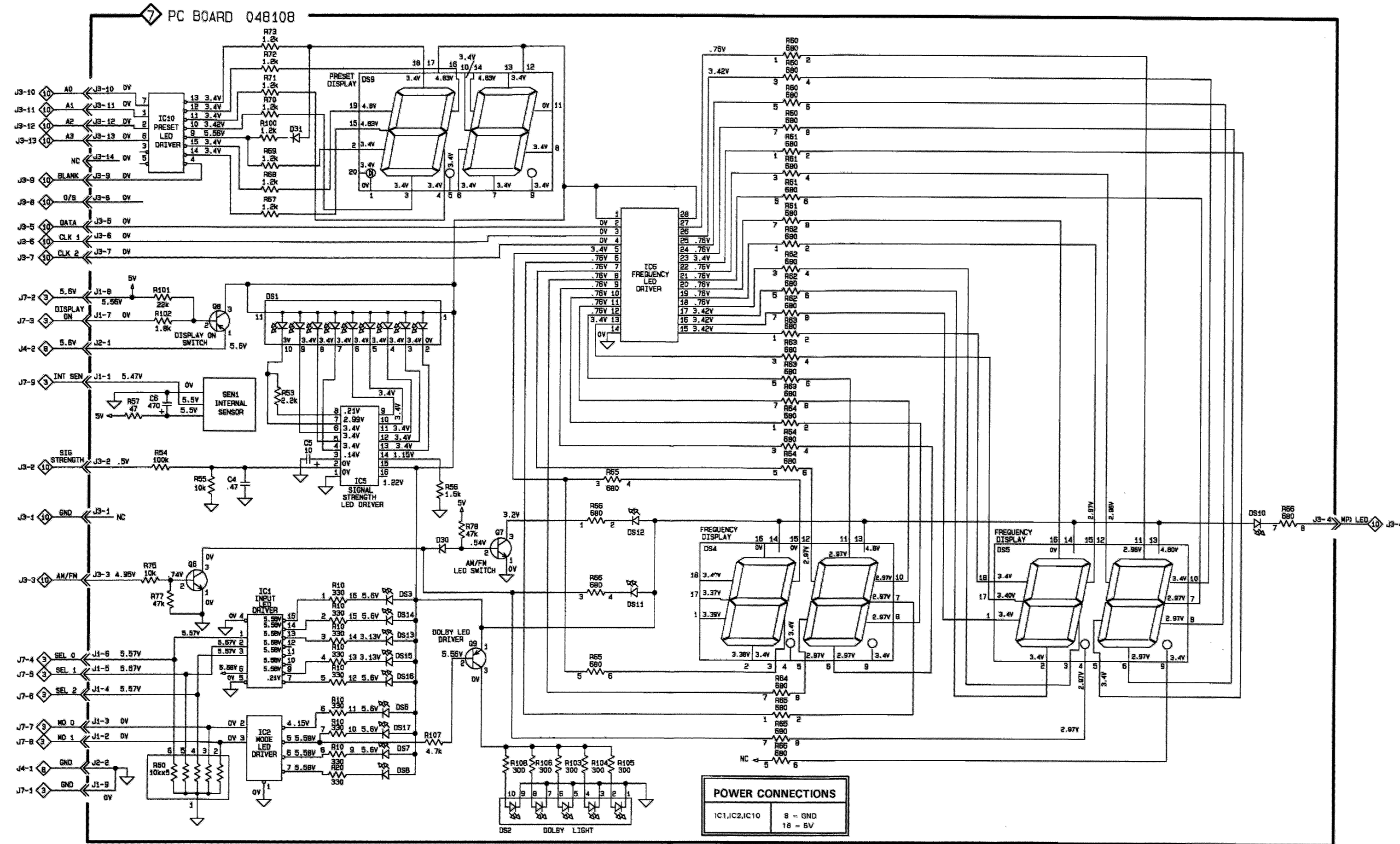
KEYBOARD PARTS LIST

Symbol	Part	Description
CRYSTAL		
Y1	180033	Ceramic Resonator, 455kHz, ±3%
DIODES		
D1-D5	070047	SIG, 75V, 150mA, 1N4148
INTEGRATED CIRCUITS		
IC1	133188	Transmitter, UPD6122G-001
LIGHTING DEVICES		
DS1-DS7	070093	LED, Red, HP5085-4658
SWITCHES		
S1-S12	150058	Tact Switch, Momentary
TRANSISTORS		
Q1, Q2	132224	PNP, MPS4126
Q3	132223	NPN, MPS4124

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



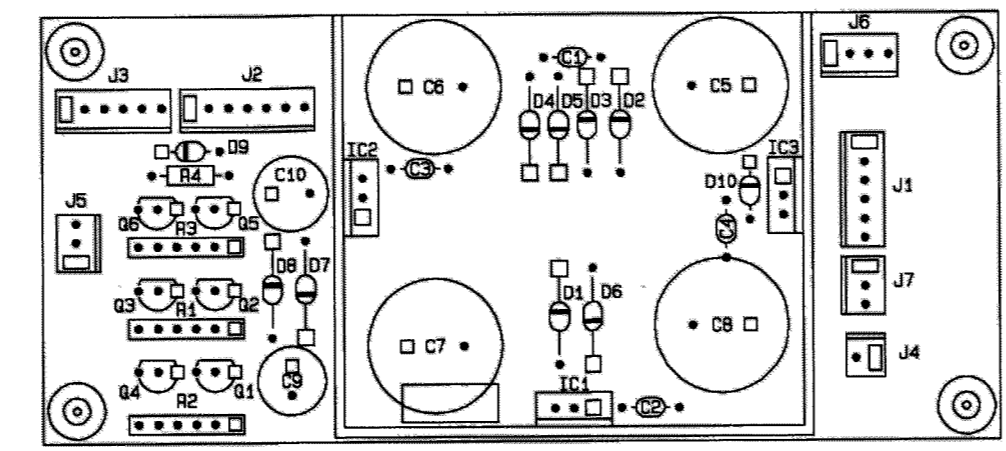
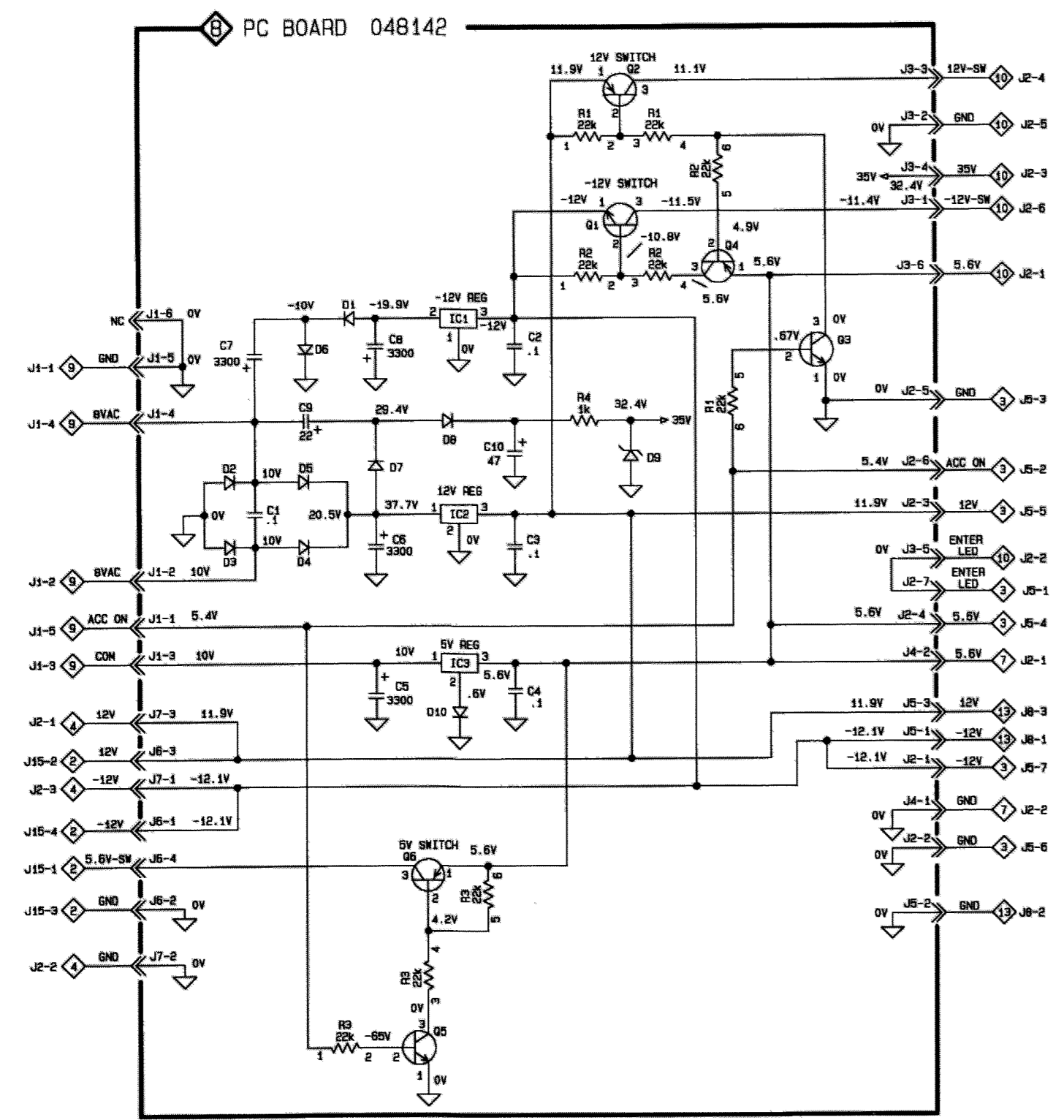
KEYBOARD PCB 048145



DISPLAY PARTS LIST

Symbol	Part	Description
DIODES		
D30, D31	070047	SIG, 75V, 150mA, 1N4148
INTEGRATED CIRCUITS		
IC1	133221	CMOS, 1 of 8 Decoder/Demultiplexer, MC74HC137N
IC2	133252	Decoder/Demultiplexer, LB1411
IC5	133118	Level Display Driver, LB1411
IC6	133162	Display Driver, TD6301AP
IC8	133090	TTL, 7-Segment Decoder/Latch/Driver, 74LS47
IC9	133090	TTL, 7-Segment Decoder/Latch/Driver, 74LS47
IC10	133090	TTL, 7-Segment Decoder/Latch/Driver, 74LS47
LIGHTING DEVICES		
DS1	058107	LED, 9-Segment Column Display
DS2, DS3	058109	LED, Red, SBR551SQ
DS4, DS5	058131	LED, 7-Segment/2-Digit Display, LS1263
DS6-DS8	058109	LED, Red, SBR551SQ
DS9	058129	LED, 2-Digit Display, Red
DS10-DS12	058078	LED, Red, SLP144B
DS13-DS16	058109	LED, Red, SBR551SQ
DS17	058127	LED, Array, Rect, Yellow
SENSORS		
SEN1	121022	Sensor, IR
TRANSISTORS		
Q5, Q7	132223	NPN, MPS4124
Q8, Q9	132224	PNP, MPS4126

8 Mode/Power Supply



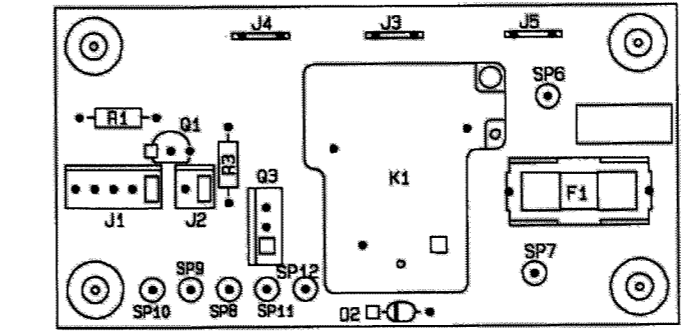
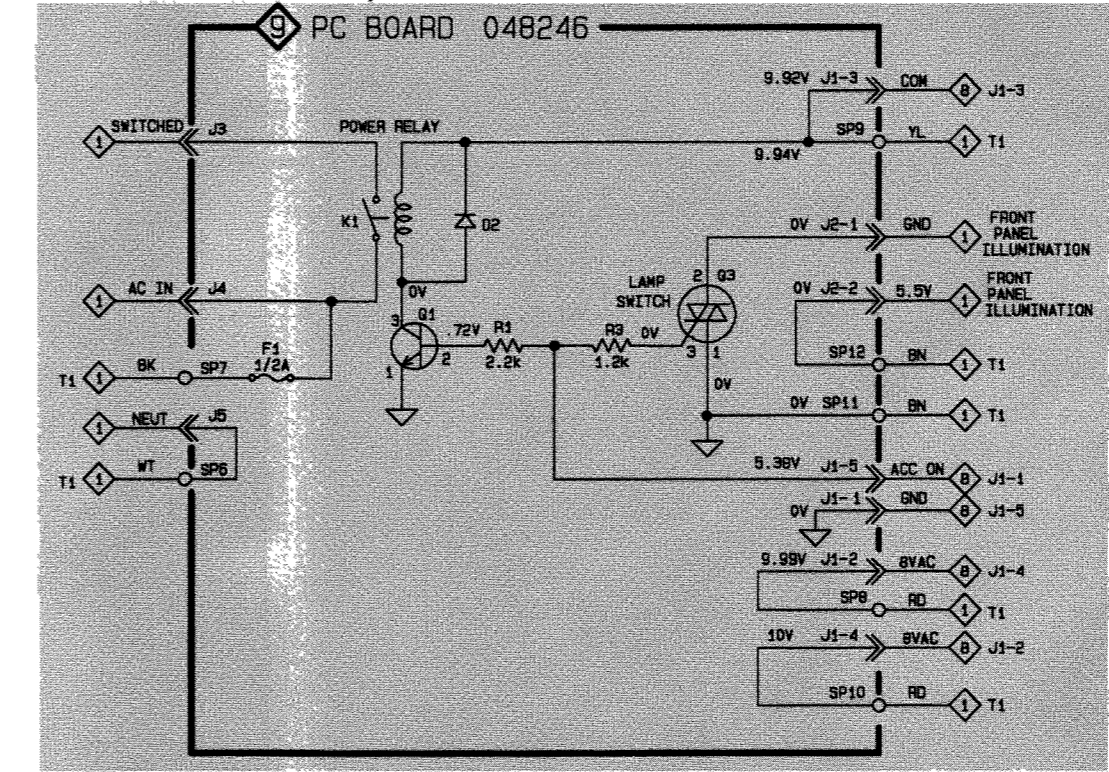
MODE/POWER SUPPLY PCB 048142

MODE/POWER SUPPLY PARTS LIST

Symbol	Part	Description
D1-D8	070131	RECT, 400V, 1A, 1N4004
D9	070121	ZN, 33V, 5%, 500mW, 1N5257B
D10	070047	SIG, 75V, 150mA, 1N4148
INTEGRATED CIRCUITS		
IC1	133138	-12V Regulator, MC7912CT
IC2	133119	12V Regulator, MC7812CT
IC3	133108	+5V Regulator, MC7805CT
TRANSISTORS		
Q1	132090	NPN, DAR, MPSA25
Q2	132182	PNP, DAR, MPSA64
Q3	132233	NPN, MPS4124
Q4	132224	PNP, MPS4126
Q5	132223	NPN, MPS4124
Q6	132182	PNP, DAR, MPSA64

9 Back-up Power Supply

WARNING: Parts located in the below shaded area have critical characteristics. Use ONLY replacement parts recommended by the manufacturer.



BACKUP POWER SUPPLY PCB 048246

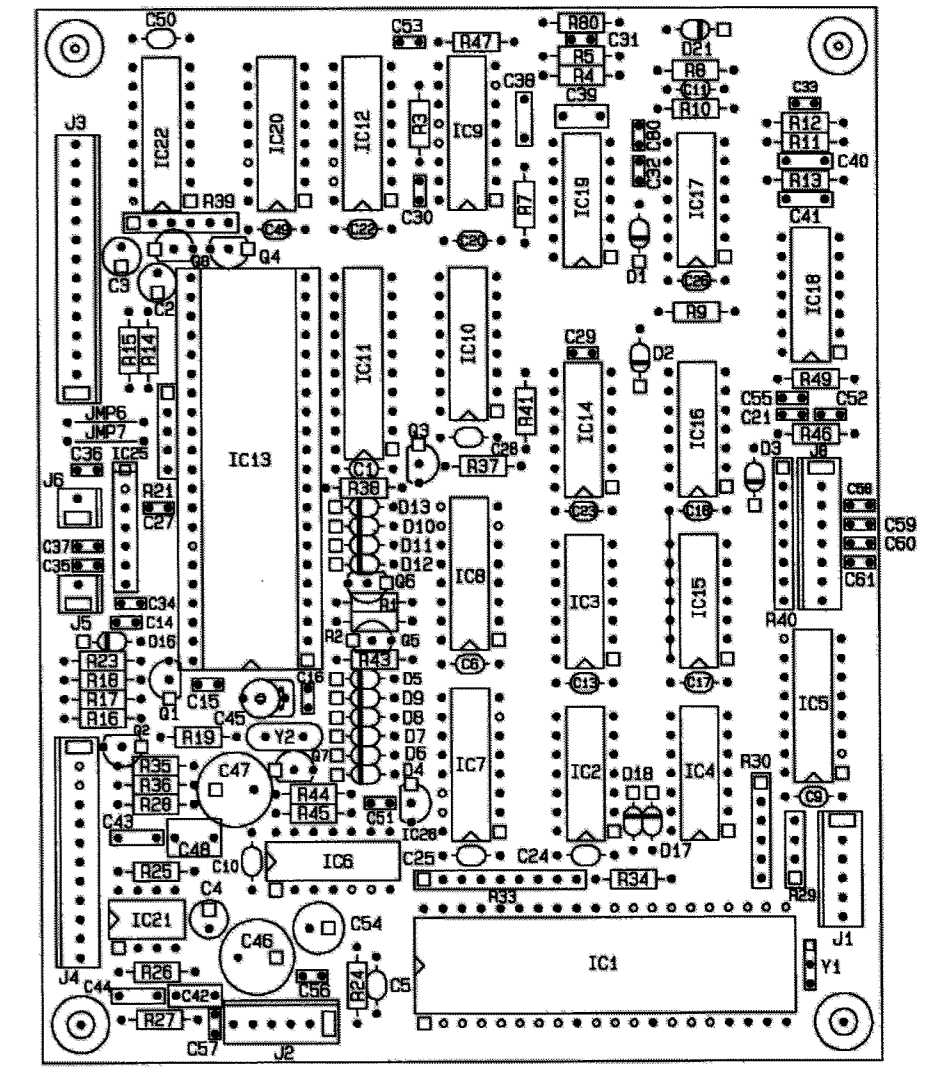
BACKUP POWER SUPPLY PARTS LIST

Symbol	Part	Description
DIODES		
D2	070047	SIG, 75V, 150mA, 1N4148
FUSES		
F1	089053	Fuse, SB, 1/4A, 250V, 2AG
RELAYS		
K1	087054	SPST, 12VDC, JT1AE-DC12V
TRANSISTORS		
Q1	132171	NPN, MPSA05
Q3	131018	Traic, 2N6070A

10 Tuner Controller

TUNER CONTROLLER PARTS LIST

Symbol	Part	Description
CAPACITORS		
C45	060029	Trimmer, 3-27pF
CRYSTAL		
Y1	180039	Ceramic Resonator, 6MHz
Y2	180036	Crystal, 7.2MHz
DIODES		
D1-D13, D16-D18, D21	070047	SIG, 75V, 150mA, 1N4148
INTEGRATED CIRCUITS		
IC1	133177	Custom 80C51 Microcontroller, 80C51
IC2	133161	CMOS, Quad 2-Input NAND Gate, 74HC00N
IC3	133167	CMOS, Quad 2-Input OR Gate, 74HC32AN
IC4	133175	CMOS, Quad 2-Input AND Gate, MC74HC08AN
IC5	133130	CMOS, Quad NAND R/S Latch, MC14044B
IC6	133190	CMOS, Dual D Flip-Flop, 74HC74N
IC7, IC8	133170	3 to 8 Line Decoder, Latch, 74HC237N
IC9	133171	CMOS, Presettable Binary UP/DOWN Counter, 74HC193N
IC10	133170	3 to 8 Line Decoder, Latch, 74HC237N
IC11	133157	Octal Noninverting Driver/Receiver, MC74H16C541
IC12	133234	CMOS, 8-Bit Priority Encoder, MC14532B
IC13	133158	Tuning Controller, TC9147AP
IC14	133161	CMOS, Quad 2-Input NAND Gate, 74HC00N
IC15	133167	CMOS, Quad 2-Input OR gate, MC74HC32AN
IC16	133175	CMOS, Quad 2-Input AND Gate, MC74HC08AN
IC17	133190	CMOS, Dual D Flip-Flop, 74HC74N
IC18, IC19	133192	CMOS, Quad 2-Input Schmitt-Trigger NAND Gate, MC74HC132
IC20	133234	CMOS, 8-bit Priority Encoder, MC14532B
IC21	133028	Dual Hi-speed Operational Amp, MC4558CP1
IC22	133204	CMOS, Quad 2-Input data selector, MC74HC257
IC25	133159	Prescaler, TD6104P
TRANSISTORS		
Q1	132224	PNP, MPS4126
Q2-Q4	132223	NPN, MPS4124
Q5, Q6	132224	PNP, MPS4126
Q7, Q8	132223	NPN, MPS4124
Q9	132241	PNP, 2SA1361

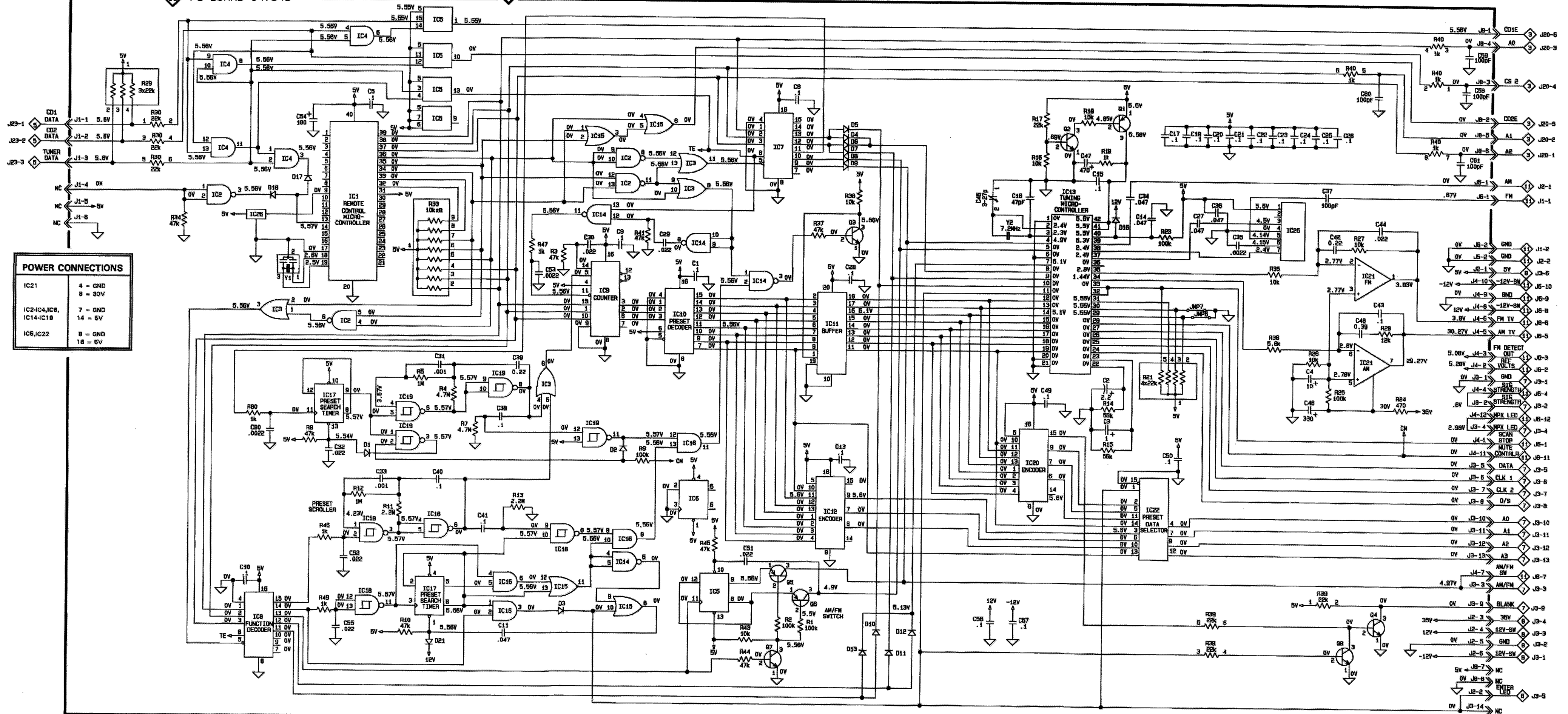


TUNER CONTROLLER PCB 047948

Tuner Controller 10

PC BOARD 047948

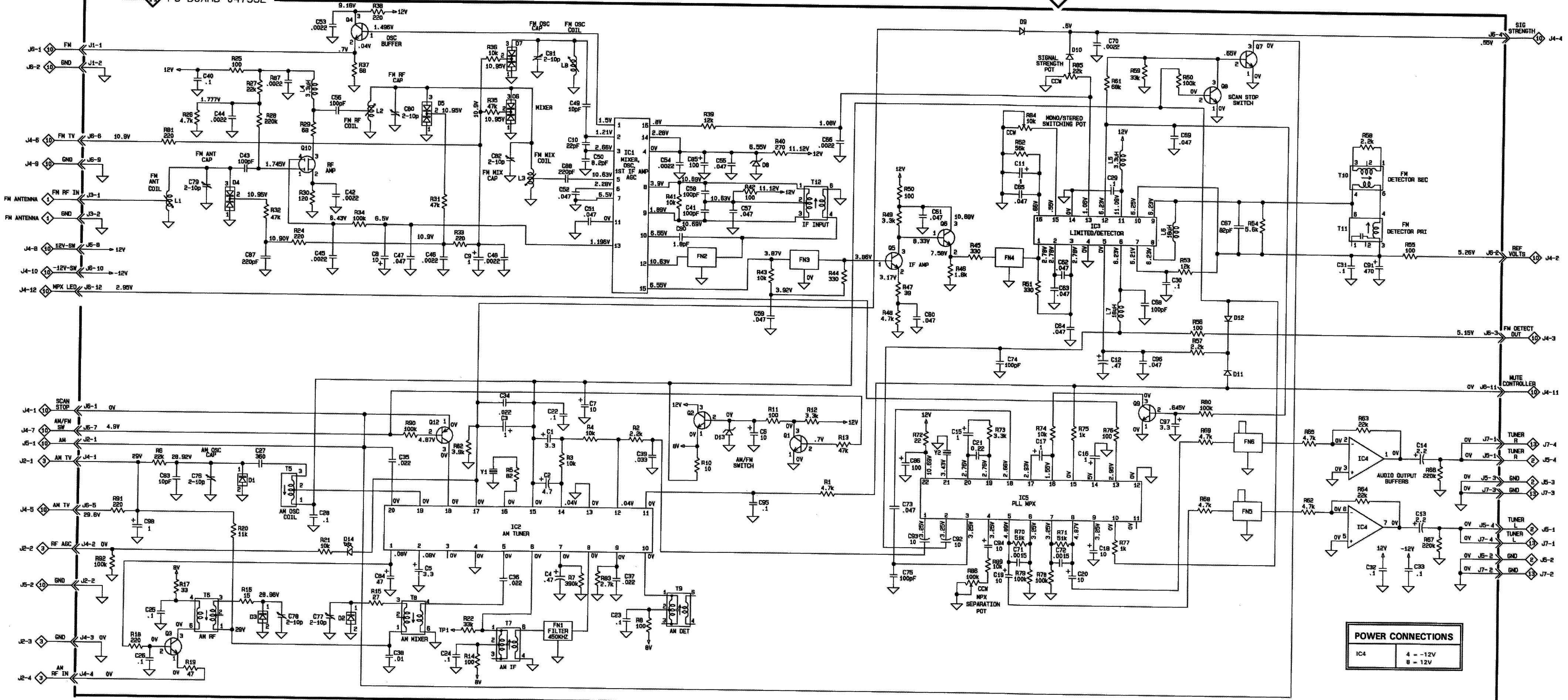
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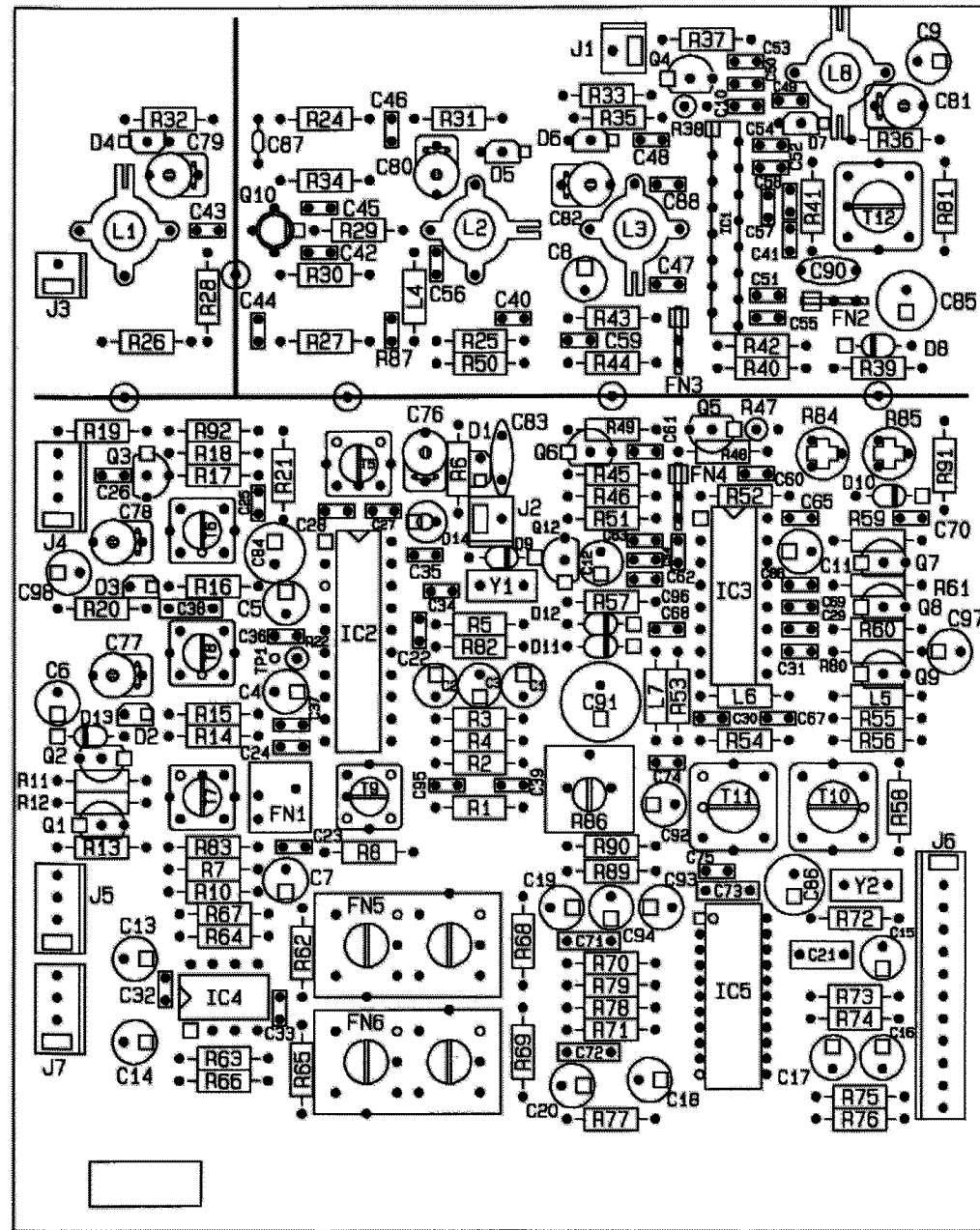
POWER CONNECTIONS

IC21	4 = GND
	8 = 30V
IC2-IC4, IC6,	7 = GND
IC14-IC18	14 = 5V
IC5, IC22	8 = GND
	18 = 5V

PC BOARD 047952



POWER CONNECTIONS	
IC4	4 - -12V
	8 - 12V



TUNER PCB 047952

TUNER PARTS LIST

Symbol	Part	Description
CAPACITORS		
C76-C82	060027	Trimmer, 2-10pF
COILS and INDUCTORS		
L1	122249	Coil, FM
L2	122247	Coil, RF
L3	122250	Coil, Mixer
L4,L5	122229	Choke, 3.3uH, 10%
L6,L7	122224	Choke, 18uH
L8	122248	Coil, OSC
CRYSTALS		
Y1	180046	Ceramic Resonator, 455kHz
Y2	180042	Ceramic Resonator, 457kHz
DIODES		
D1-D3	070125	VAC, AM, SVC333
D4-D7	070122	VAD, Matched, Selected SVC211
D8	070130	ZN, 8.2V, 5%, 500mW, 1N5237B
D9-D12	070047	SIG, 75V, 150mA, 1N4148
D13	070024	ZN, 10V 400mW, 1N758A
FILTERS		
FN1	180037	Filter, CER, 450kHz
FN2-FN4	180030	Filter, CER, 10.7MHz
FN5, FN6	180028	Filter, LC, Low Pass, Multiplex
INTEGRATED CIRCUITS		
IC1	133231	FM Front End, LA1175
IC2	133229	AM Tuner, LA1137N
IC3	133110	FM-IF System, LA1235
IC4	133028	Dual Hi-speed Operational Amp, MC4558CP1
IC5	133230	FM MPX Demodulator, LA3401
LIGHTING DEVICES		
DS14	058078	LED, Red, SLP144B
RESISTORS		
R84	134414	POT, 10k ohm
R85	134406	POT, 22k ohm
TRANSFORMERS		
T5	162115	AM Oscillator
T6	162117	AM-RF (Primary)
T7	162113	AM-IF Matching
T8	162116	AM-RD (Secondary)
T9	162113	AM-IF Matching
T10	162103	FM Discriminator (Secondary)
T11	162102	FM Discriminator (Primary)
T12	162114	FM Mixer
TRANSISTORS		
Q1-Q3	132223	NPN, MPS4124
Q4-Q6	132181	NPN, MPSH10
Q7-Q9	132223	NPN, MPS4124
Q10	132256	DMOS, FET, 2SK114Y
Q12	132224	PNP, MPS4126

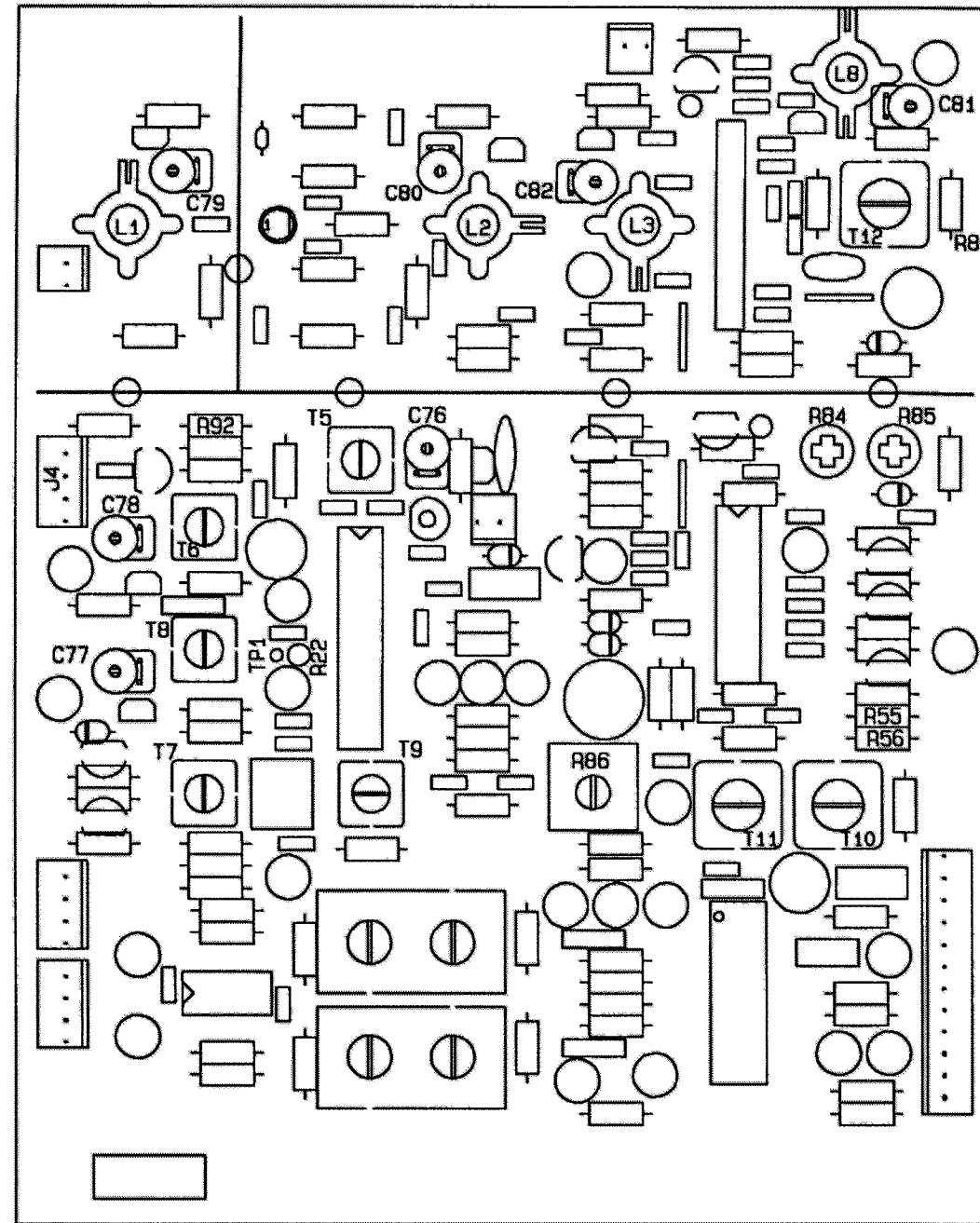


Fig. 3 TUNER PCB 047952 as identifying components referenced in the AM/FM alignment procedure.

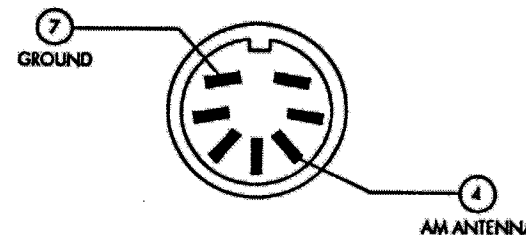


Fig. 4 AM ANTenna Din Jack.

(AM/FM Alignment Procedure)

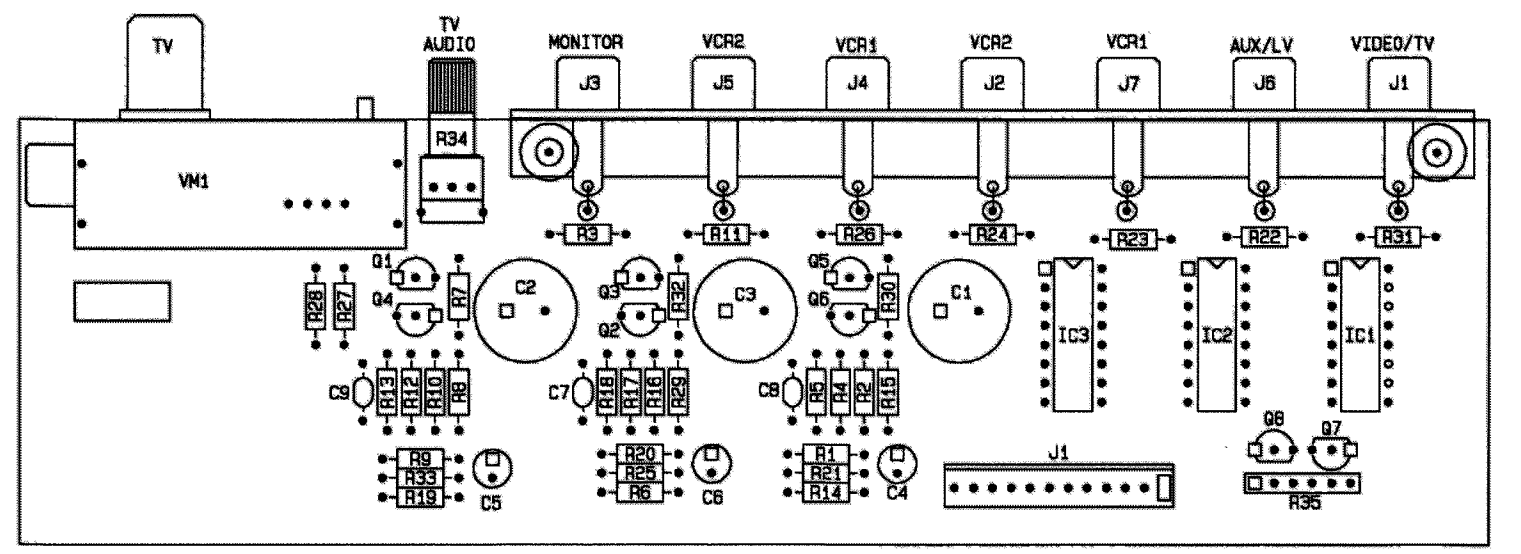
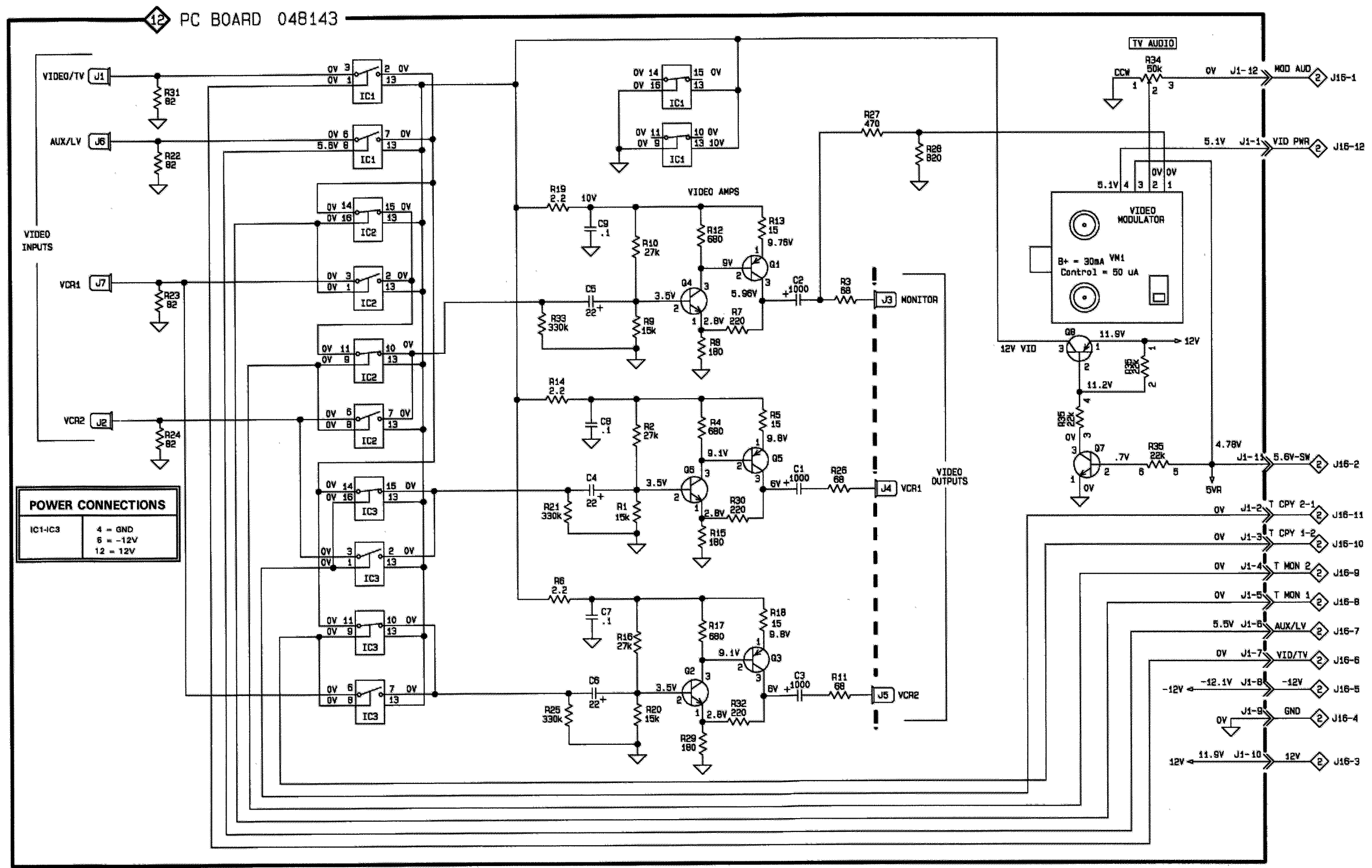
Note: refer to Figure 3 while reading the below procedures.

AM ALIGNMENT PROCEDURE

1. Connect an AM Signal Generator to the IF INJECTION (TP1) at R22. Connect a Distortion Analyzer to the TAPE 1 OUTPUT.
2. Set the generator frequency to $450 \pm 0.5\text{kHz}$ and modulate 30% at 400Hz. Increase the RF Output to 10,000uV and adjust the AM DET Transformer (T9) for maximum audio at the TAPE 1 OUTPUT.
3. Reduce the RF Output to 1000uV or less and adjust the AM IF Transformer (T7) for maximum audio at the TAPE 1 OUTPUT. Disconnect TP1.
4. Tune to bottom of band, and adjust the AM OSC Coil (T5) for 3.0VDC at Connector J4 - 1.
5. Tune to top of band and adjust the AM OSC Trimmer Capacitor (C76) for 28.0VDC at Connector J4 - 1.
6. Repeat steps 4 and 5 as necessary for a Tuning Voltage Range of 3.0 to 28.0VDC.
7. Connect the Generator to an AM TEST LOOP (LEADER LPA-070). Note: The AM GENERATOR can be connected directly to the AM ANTENNA DIN Jack via a 220pF capacitor in series with the Generator. The AM ANTENNA DIN Jack is located on the Rear Panel of the unit. See Figure 4.
8. Tune the Generator and Tuner to 600kHz, then adjust Coils: (T1) - AM ANT; (T6) - AM RF and (8) AM MIXER for best sensitivity. Coil (T1)-AM ANT-is located on the CONTROL PCB/ Section 3.
9. Tune the Generator and Tuner to 1400kHz, then adjust Trimmer Capacitors: (C199) - AM ANT; (C78) - AM RF and (C77) - AM MIXER for best sensitivity. Trimmer Capacitor (C195) - AM ANT - is located on the CONTROL PCB/Section 3.
10. Repeat 8 and 9 until no improvement in sensitivity is noted.
11. Tune Tuner to 90MHz with no RF Input and adjust the FM DETector PRImary (T11) for zero volts between R55 and R56 relative.
12. Tune the Generator to 90MHz and adjust the RF Output to 1000uV and 100% MONO modulation at 1000Hz. Then adjust the FM DETector SEcSecondary (T10) for lowest distortion.
13. Reduce the Generator Output to minimum and detune the Generator so the Receiver picks up only noise, then recheck the voltage between R55 and R56. If it is not $0 \pm 0.2\text{VDC}$, repeat steps 11 and 12. If there is interference from a station on this frequency, tune the Tuner to a nearby frequency free from interference for this measurement.
14. Tune the Generator to 90MHz with a 1000uV output. Then switch the Generator to stereo (left only) and adjust the FM IF Transformer (T12) for the lowest distortion at the Left TAPE 1 OUTPUT.
15. Adjust the SIGNAL STRENGTH Pot (R85) CW to the point where all of the signal strength LEDs are lit.

FM ALIGNMENT PROCEDURE

1. Connect an FM Signal Generator to Antenna Input.
2. Connect Distortion Analyzer to TAPE 1 OUTPUT.
3. Remove Top Cover and AM/FM TUNER Cover. Press Power Button "ON".
4. Put Tuner into FM Mode and tune to 87.5MHz.
5. Adjust FM OSC Coil (L8) for 3.5VDC at R81.
6. Tune to 108.5MHz and adjust FM OSC Trimmer Capacitor (C81) for 24.5VDC at R81.
7. Repeat steps 4, 5 and 6 as necessary for a tuning range of 3.5VDC to 24.5VDC at R81.
8. Tune the Generator and Tuner to 90MHz and adjust Coils: (L3) - FM MIX; (L2) - FM RF and (L1) - FM ANT for best sensitivity.
9. Tune the Generator and Tuner to 104MHz and adjust Trimmer Capacitors: (C82) - FM MIX; (C80) FM RF, and (C79) FM ANT for best sensitivity.
10. Repeat 8 and 9 until no improvement in sensitivity is noted.
11. Tune Tuner to 90MHz with no RF Input and adjust the FM DETector PRImary (T11) for zero volts between R55 and R56 relative.
12. Tune the Generator to 90MHz and adjust the RF Output to 1000uV and 100% MONO modulation at 1000Hz. Then adjust the FM DETector SEcSecondary (T10) for lowest distortion.
13. Reduce the Generator Output to minimum and detune the Generator so the Receiver picks up only noise, then recheck the voltage between R55 and R56. If it is not $0 \pm 0.2\text{VDC}$, repeat steps 11 and 12. If there is interference from a station on this frequency, tune the Tuner to a nearby frequency free from interference for this measurement.
14. Tune the Generator to 90MHz with a 1000uV output. Then switch the Generator to stereo (left only) and adjust the FM IF Transformer (T12) for the lowest distortion at the Left TAPE 1 OUTPUT.
15. Adjust the SIGNAL STRENGTH Pot (R85) CW to the point where all of the signal strength LEDs are lit.
16. Switch the Analyzer to the Right TAPE 1 OUTPUT and adjust the MPX SEPARation Pot (R86) for best separation (minimum output).
17. Switch the Generator to the Right Channel and the Analyzer to the Left Channel. Adjust the MPX SEPARation Pot (R86) and check for best separation (minimum output).
18. Reduce the generator output to 5uV and adjust the STEREO SWITCH Pot (R84) so the MPX light just comes on.



VIDEO SWITCHING PARTS LIST

Symbol	Part	Description
INTEGRATED CIRCUITS		
IC1-IC3	133254	Quad Analog Switch, SW06
TRANSISTORS		
Q1	132224	PNP, MPS4126
Q2	132223	NPN, MPS4124
Q3	132224	NPN, MPS4126
Q4	132223	NPN, MPS4124
Q5	132224	NPN, MPS4126
Q6, Q7	132223	NPN, MPS4124
Q8	132224	NPN, MPS4126

Repacking Instructions

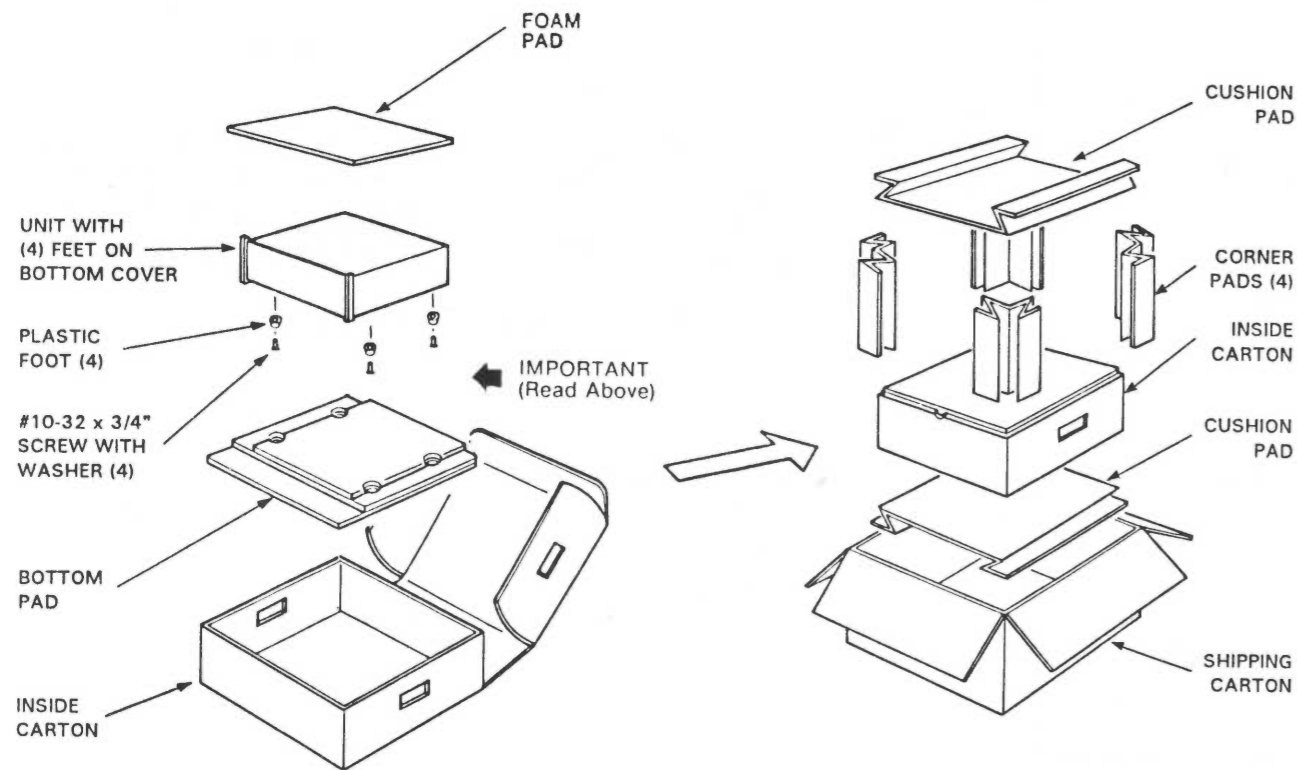
In the event it is necessary to repack the unit for shipment, the unit must be packed exactly as shown below.

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	033333	Corner Pad
1	033590	Inside carton only
1	033602	Foam Pad
1	033851	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.



McIntosh

MX118 A/V TUNER CONTROL CENTER

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