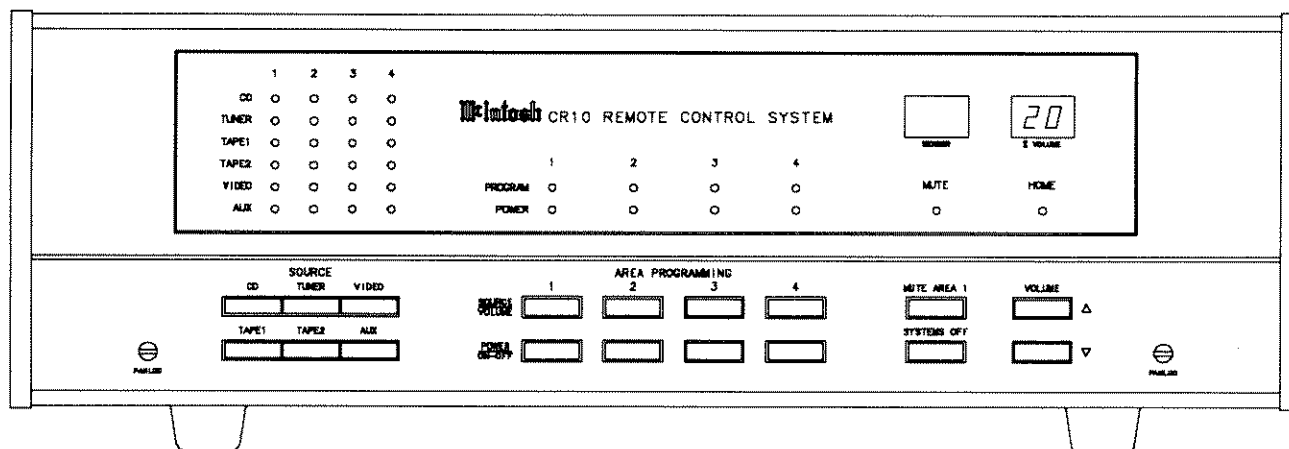


# CR10

## REMOTE CONTROL SYSTEM



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|                                         |       |
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# Performance Specifications

## **FREQUENCY RESPONSE**

+0, -0.5dB from 20Hz to 20,000Hz

## **RATED OUTPUT VOLTAGE**

2.5 volts, (8 volts maximum)

## **SENSITIVITY**

ALL inputs; 0.25 volts for 2.5 volts rated output

## **TOTAL HARMONIC DISTORTION**

0.004% maximum from 20Hz to 20,000Hz at rated output

## **SIGNAL TO NOISE RATIO, A-WEIGHTED**

86dB below rated output.

98dB below rated output, (A-Weighted)

## **MAXIMUM INPUT SIGNAL**

8 volts

## **INPUT IMPEDANCE**

22K ohms

## **MECHANICAL**

### **SIZE**

Front Panel: 17.5 inches (44.5cm) wide by 5-3/8 inches (13.7cm) high. Depth behind the mounting panel including clearance for connectors is 15-1/2 inches (39.4cm). Clearance required in front of the mounting panel is 1 inch (2.54cm).

### **FINISH**

The top section of the front panel is glass with gold/teal nomenclature illumination. The bottom section is anodized black aluminum.

### **WEIGHT**

16.5 pounds (7.5Kg) net, 28.5 pounds (12.9Kg) in shipping carton.

# Mechanical Views

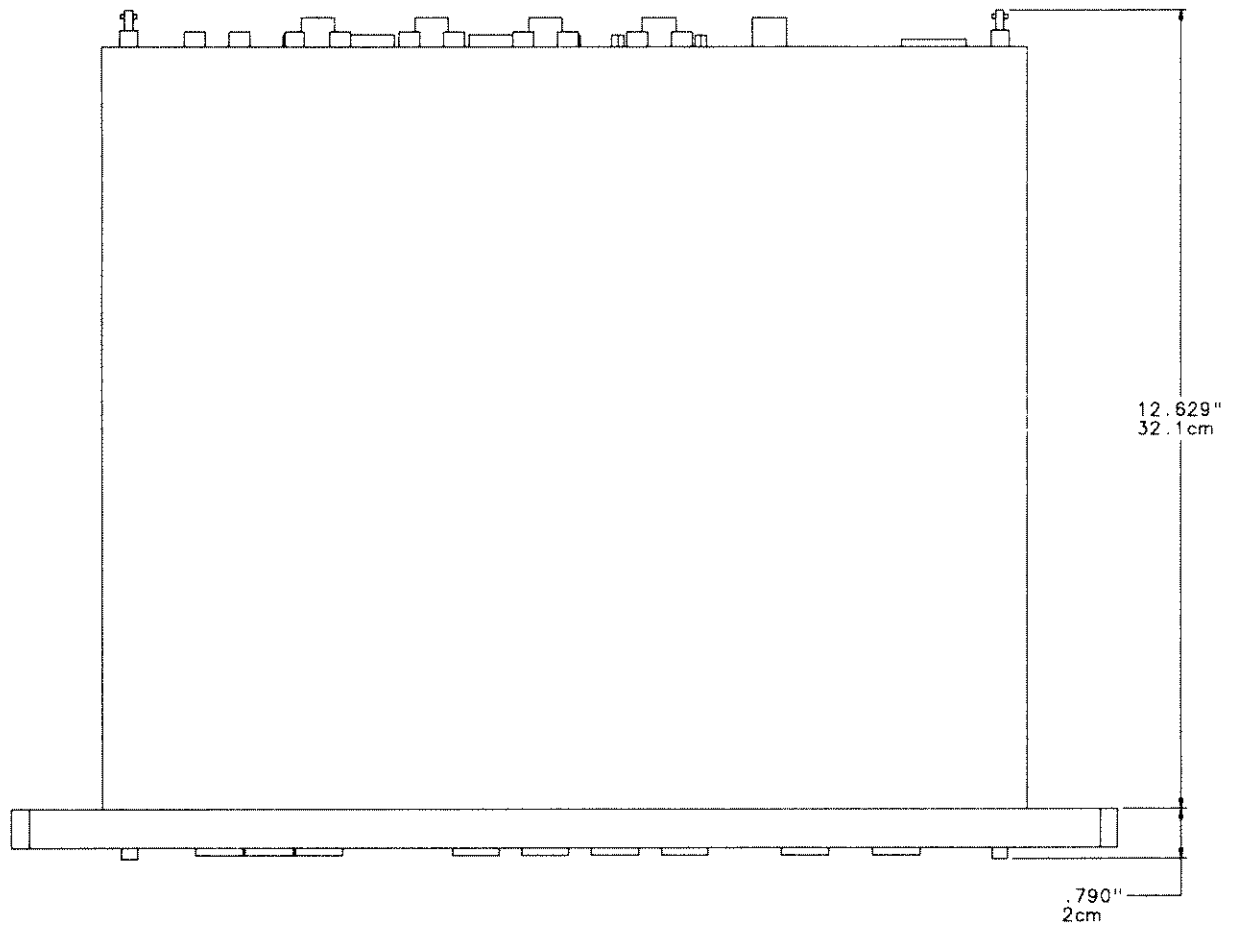


Fig. 1. Top view

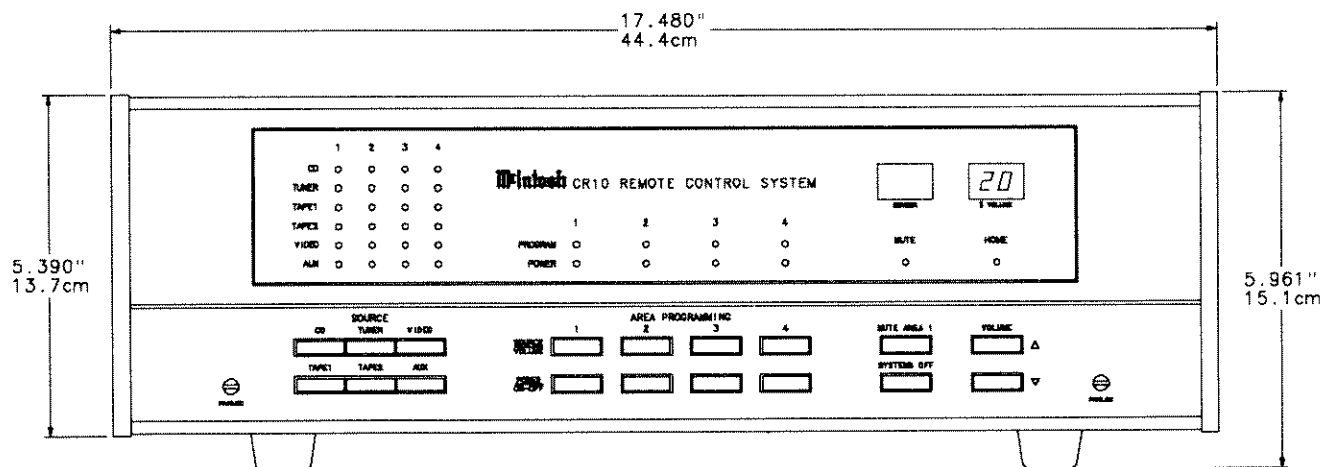


Fig. 2. Front view

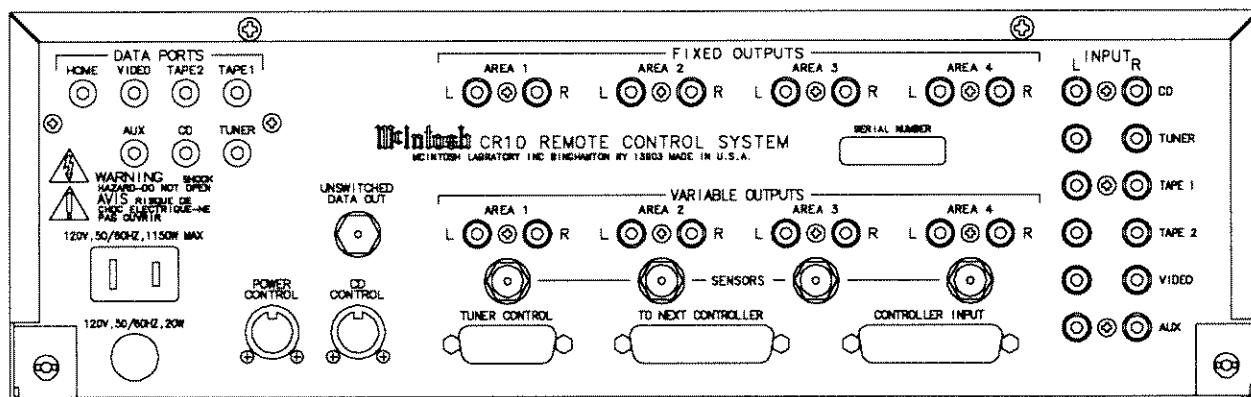


Fig. 3. Rear view

## Notes

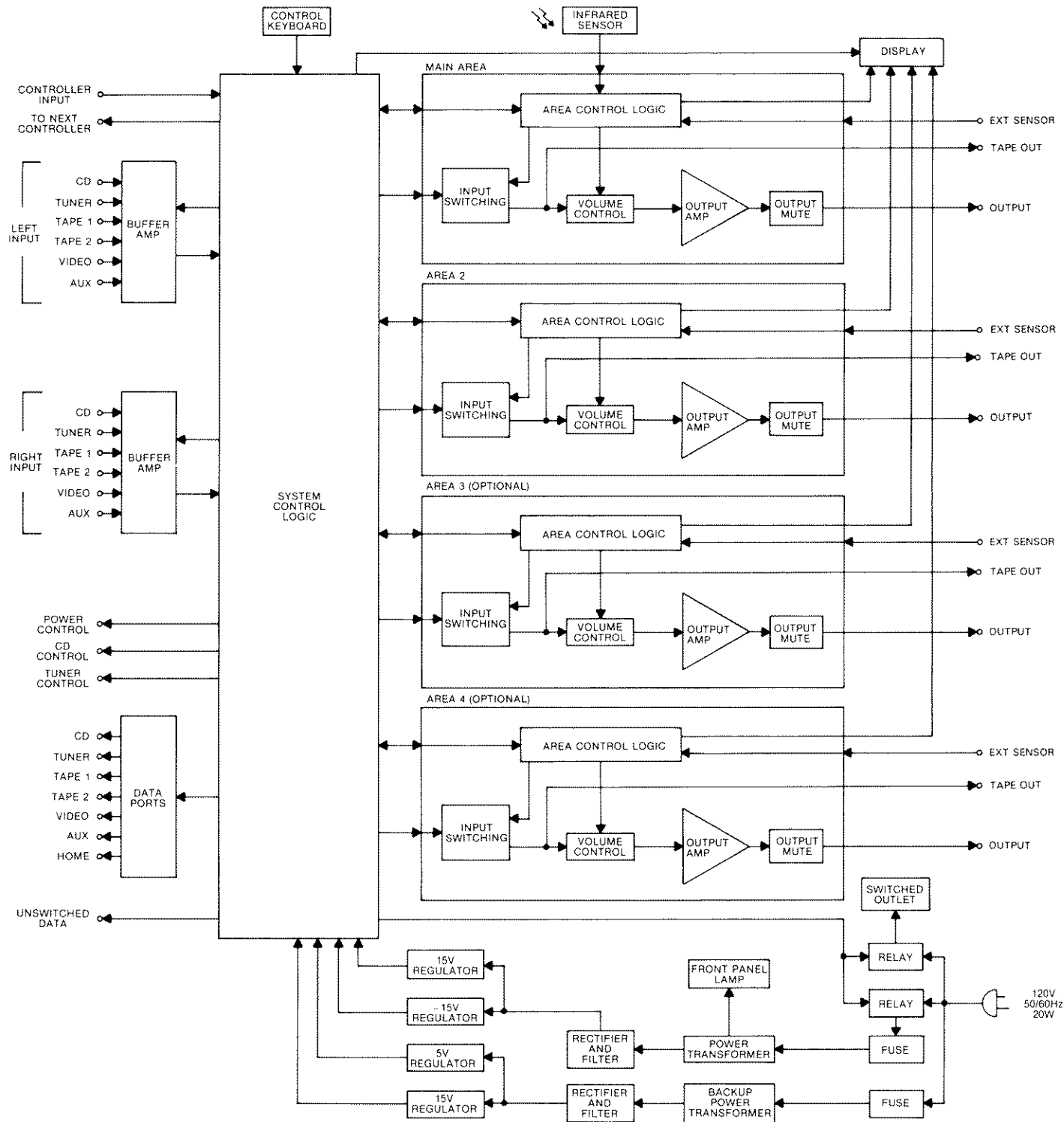
1. Unless otherwise noted, all voltages indicated on the following schematics are measured under the following conditions:
  - a. AC input at 120 volts, 50/60Hz.
  - b. All voltages are  $\pm 10\%$  with respect to ground. A high impedance (10 megohm) voltmeter must be used.
2. Unless otherwise specified:
  - a. Resistor values are in ohms.
  - b. Capacitance values smaller than 1 are microfarads ( $\mu\text{F}$ ) and capacitors values greater than 1 are in picofarads (pF).
  - c. Inductor values are in microhenries ( $\mu\text{H}$ ).

### WARNING:

Parts marked with the symbol  have critical characteristics.

Use ONLY replacement parts recommended by the manufacturer.

# Block Diagram



# Section Locations

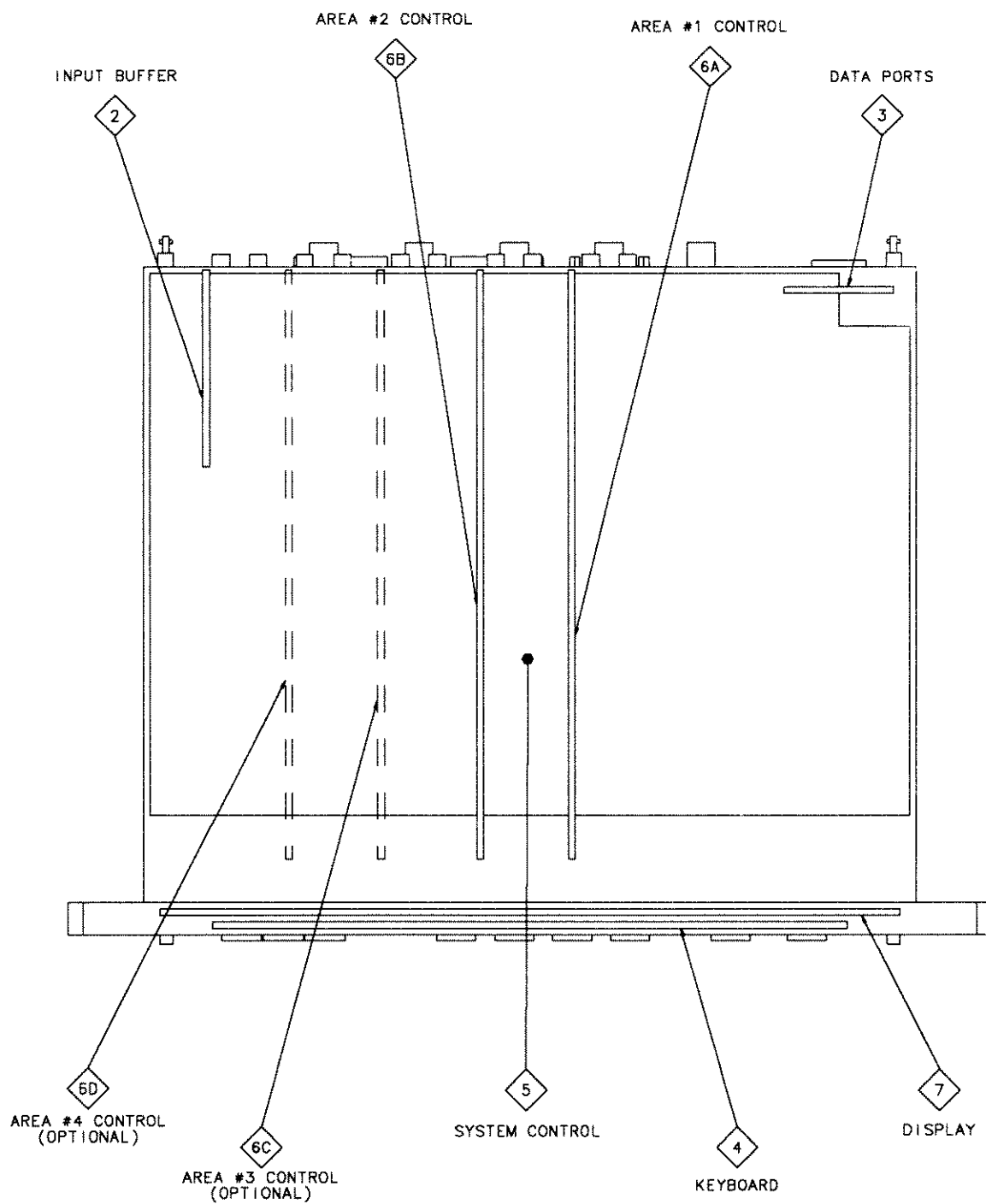


Fig. 4. Top view with cover removed

# Interconnection Diagram

1

## FRONT PANEL AND TRIM PARTS LIST

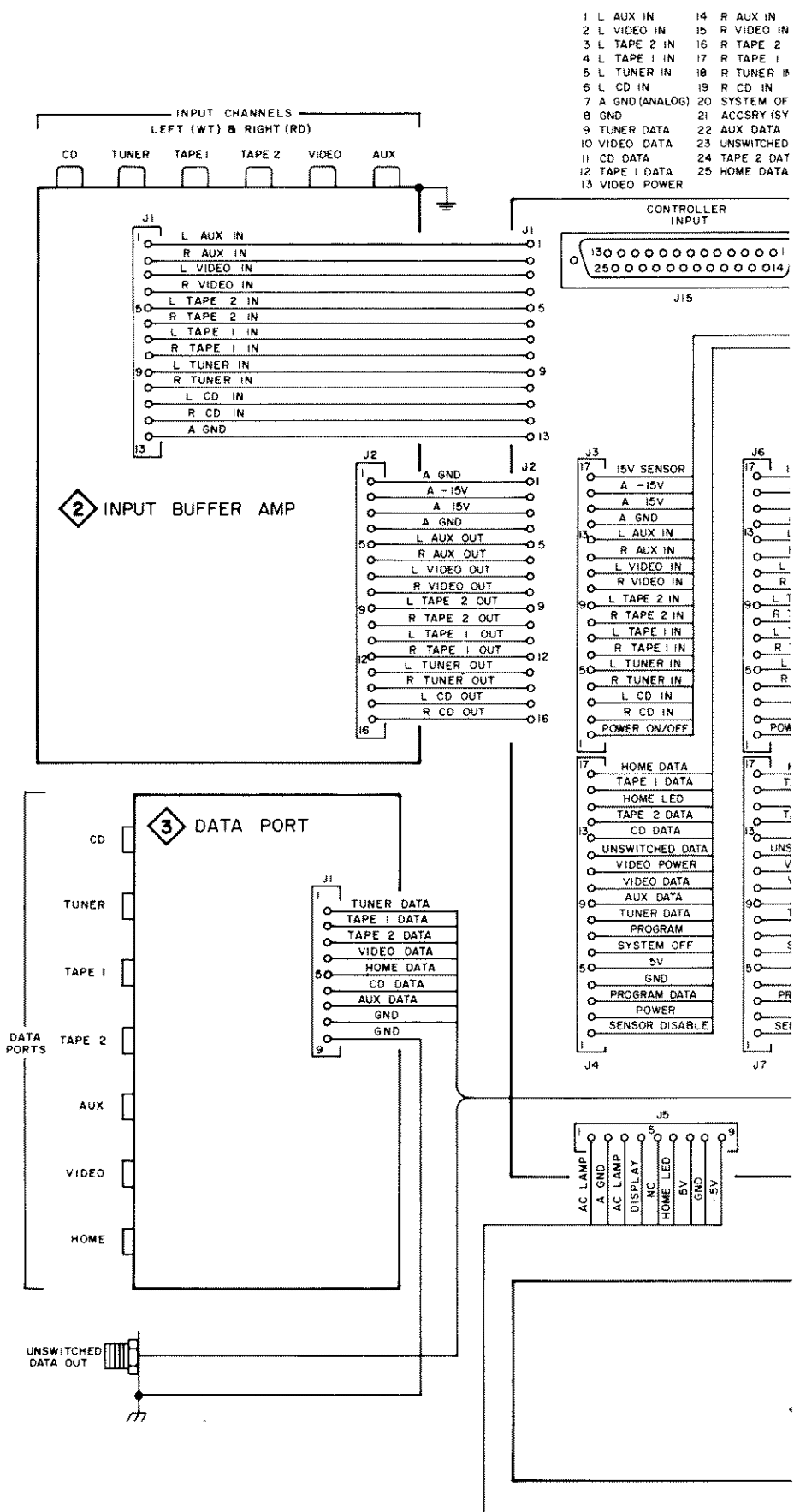
| Part   | Description           |
|--------|-----------------------|
| 017485 | Pushbutton, Red       |
| 017486 | Pushbutton, Black     |
| 018428 | Top Panel Rail        |
| 018394 | Bottom Extrusion      |
| 018232 | End Cap               |
| 047154 | Front Panel, Glass    |
| 047155 | Front Panel, Complete |

## INSTALLATION HARDWARE PARTS LIST

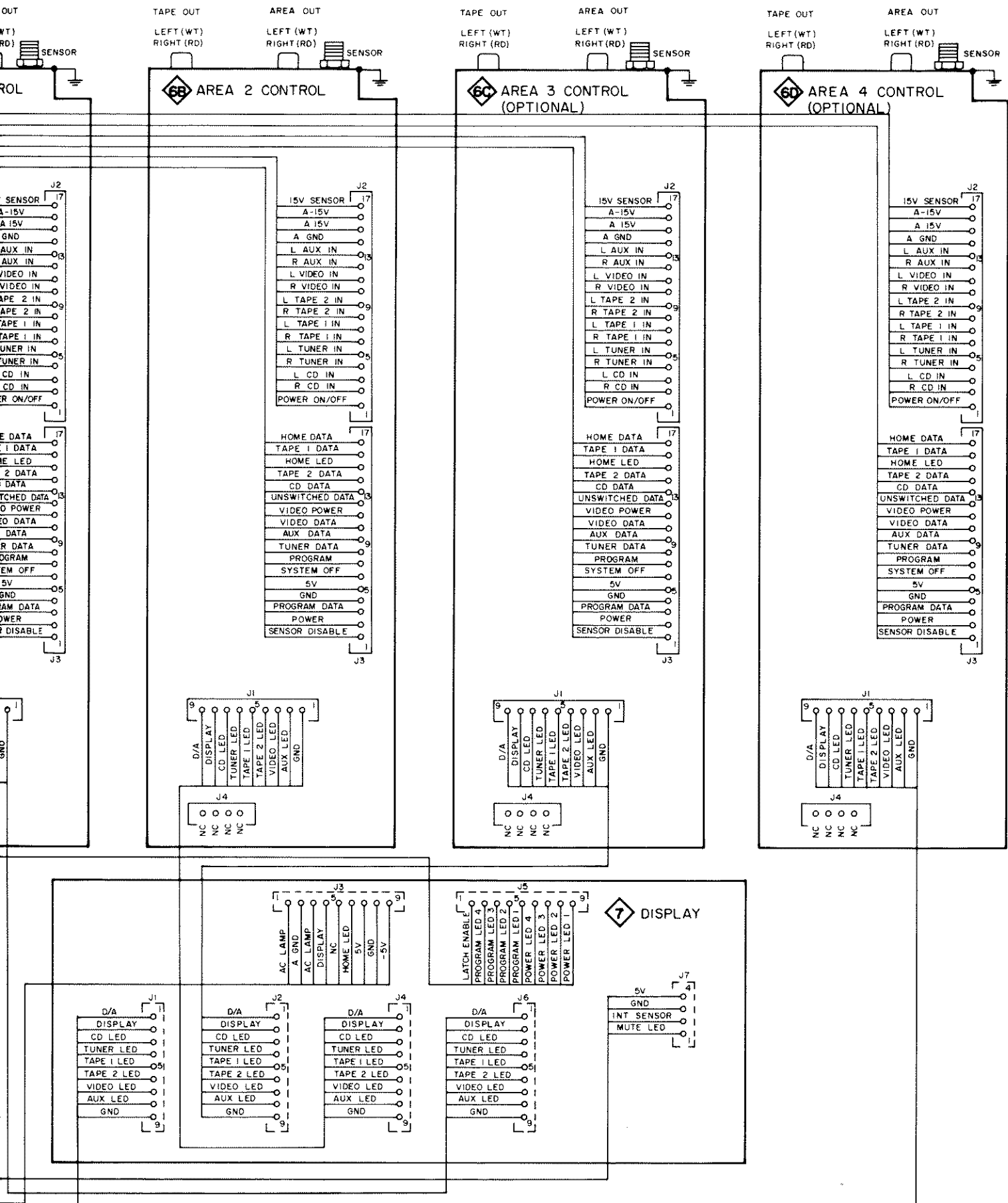
| Part   | Description                    |
|--------|--------------------------------|
| 003508 | Panloc Shelf Bracket, Right    |
| 003509 | Panel Shelf Bracket, Left      |
| 017218 | Plastic Secure W/100159 Screws |
| 039671 | Mounting Template              |
| 043401 | Mounting Strip                 |
| 047153 | Hardware Package               |
| 100159 | Mach Screw, 10-32 x 3/4        |

## INTERCONNECTION PARTS LIST

| Symbol     | Part   | Description               |
|------------|--------|---------------------------|
| CAPACITORS |        |                           |
| C1         | 061276 | CD, .0047uF, 400V, UL/CSA |



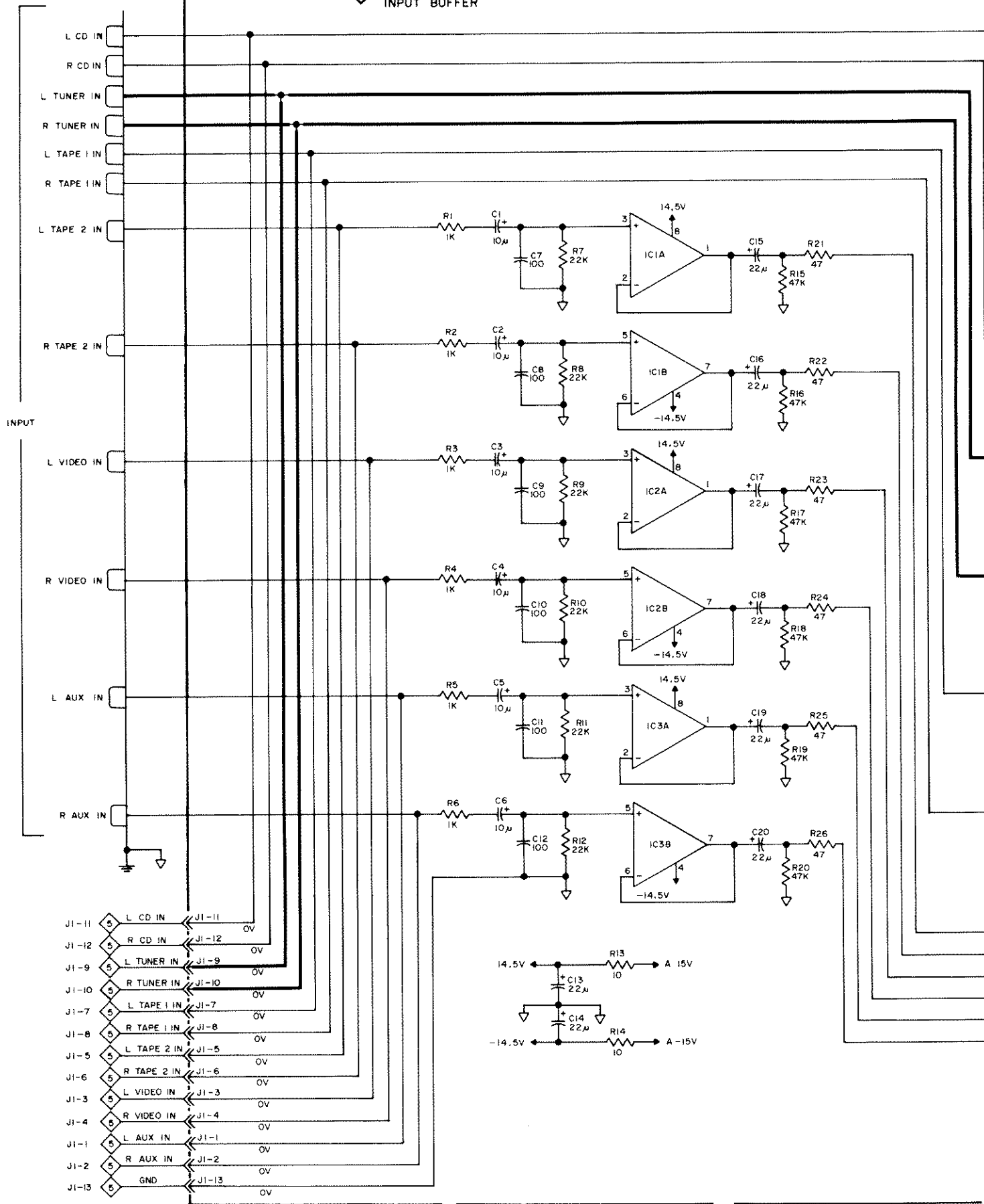


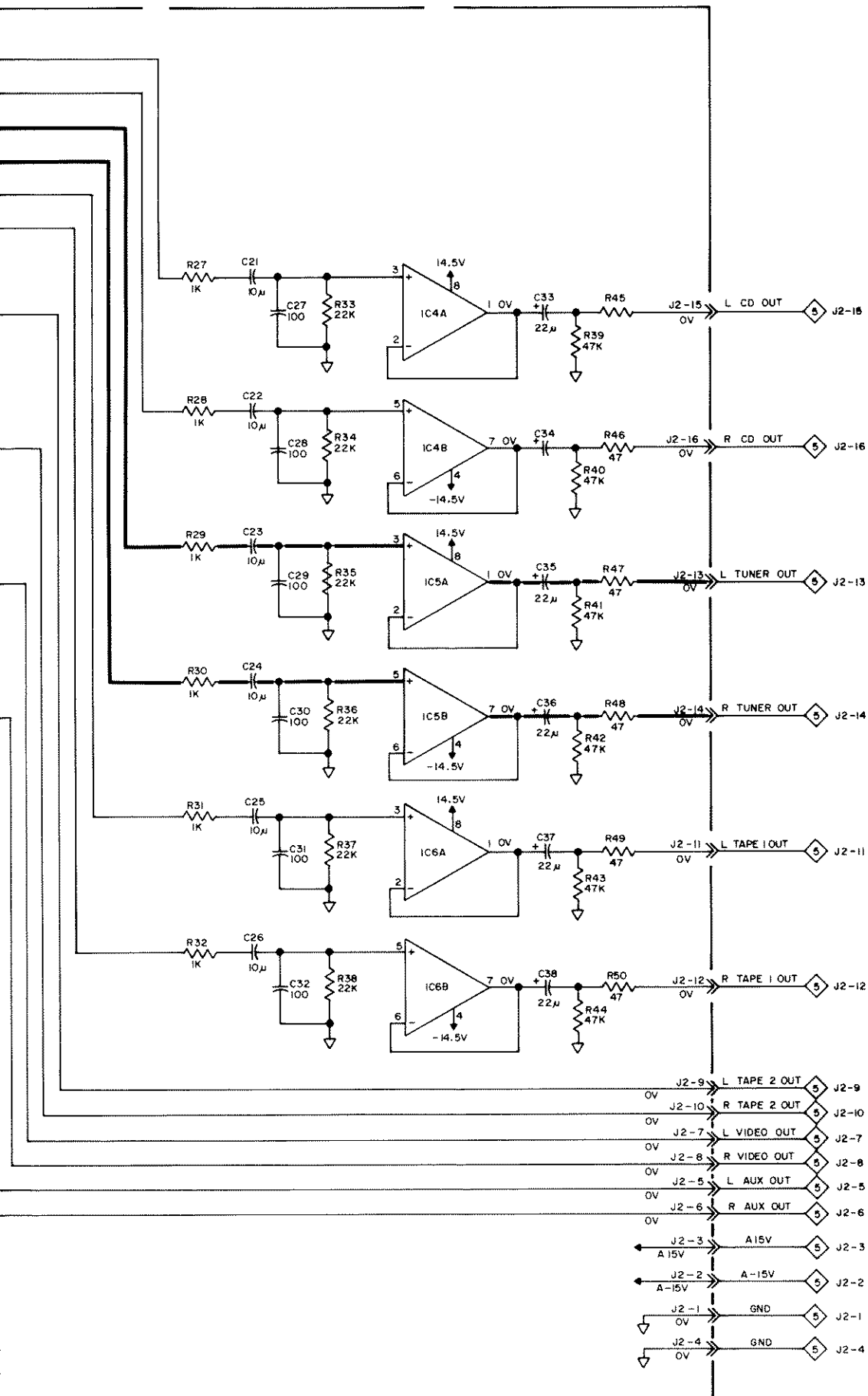


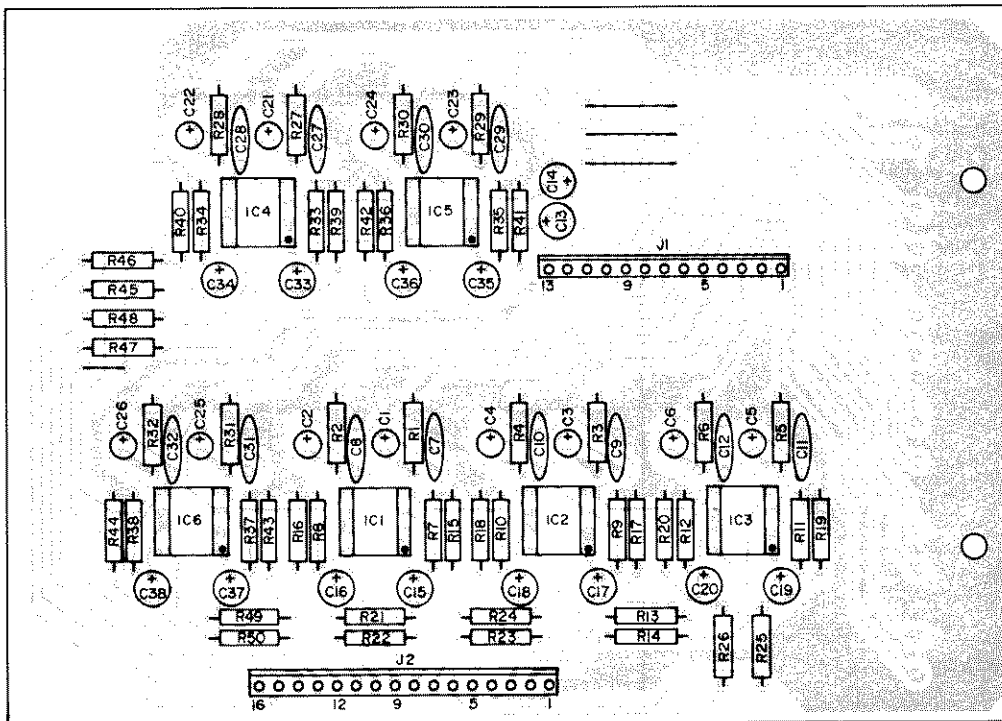
# 2

## Input Buffer

PC BOARD 047296  
INPUT BUFFER







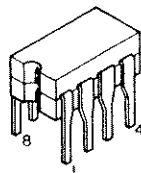
INPUT BUFFER PCB 047296

# INPUT BUFFER PARTS LIST

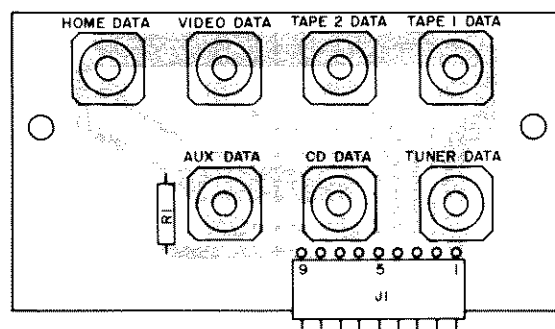
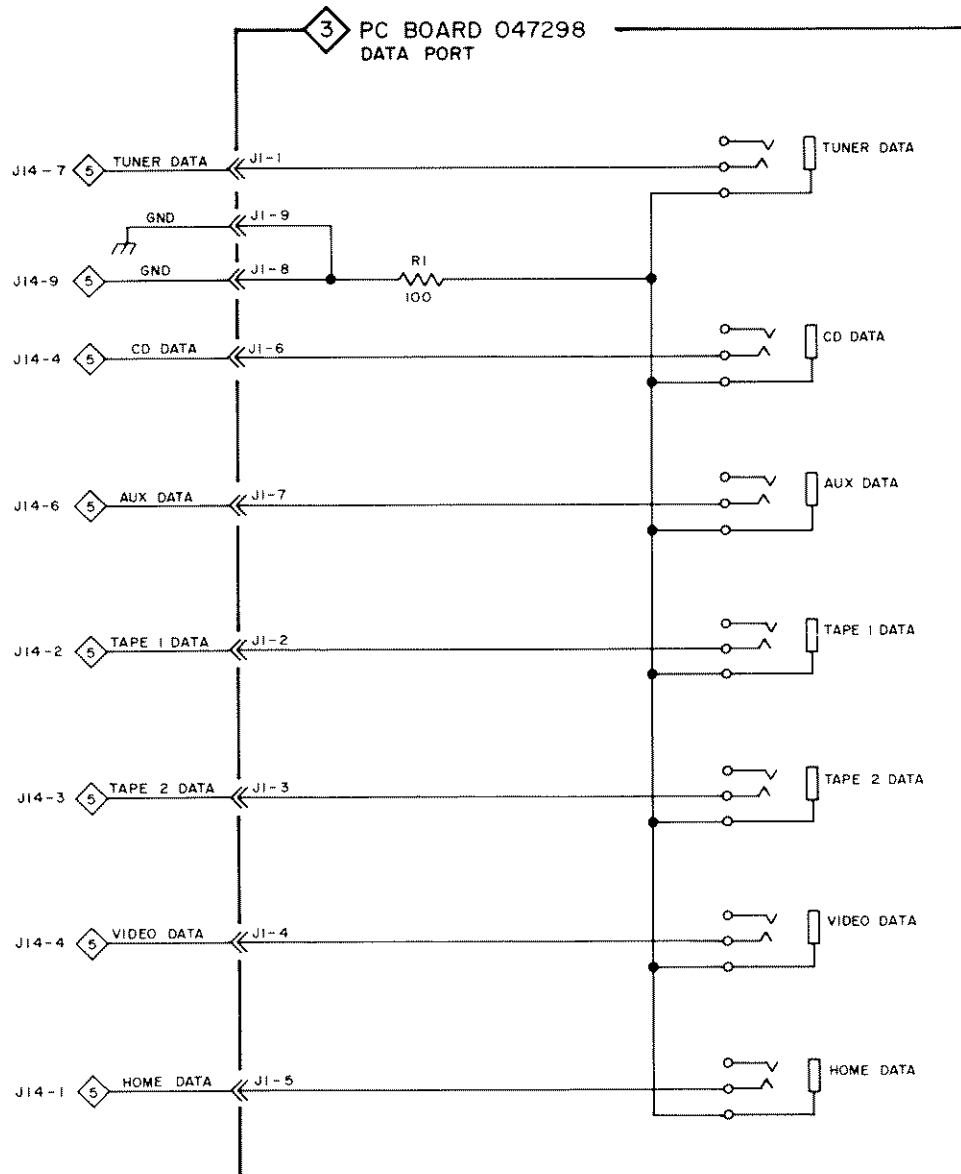
| Symbol | Part | Description |
|--------|------|-------------|
|--------|------|-------------|

## INTEGRATED CIRCUITS

|         |        |                                   |
|---------|--------|-----------------------------------|
| IC1-IC6 | 133189 | Dual Operational Amp,<br>MC33178P |
|---------|--------|-----------------------------------|



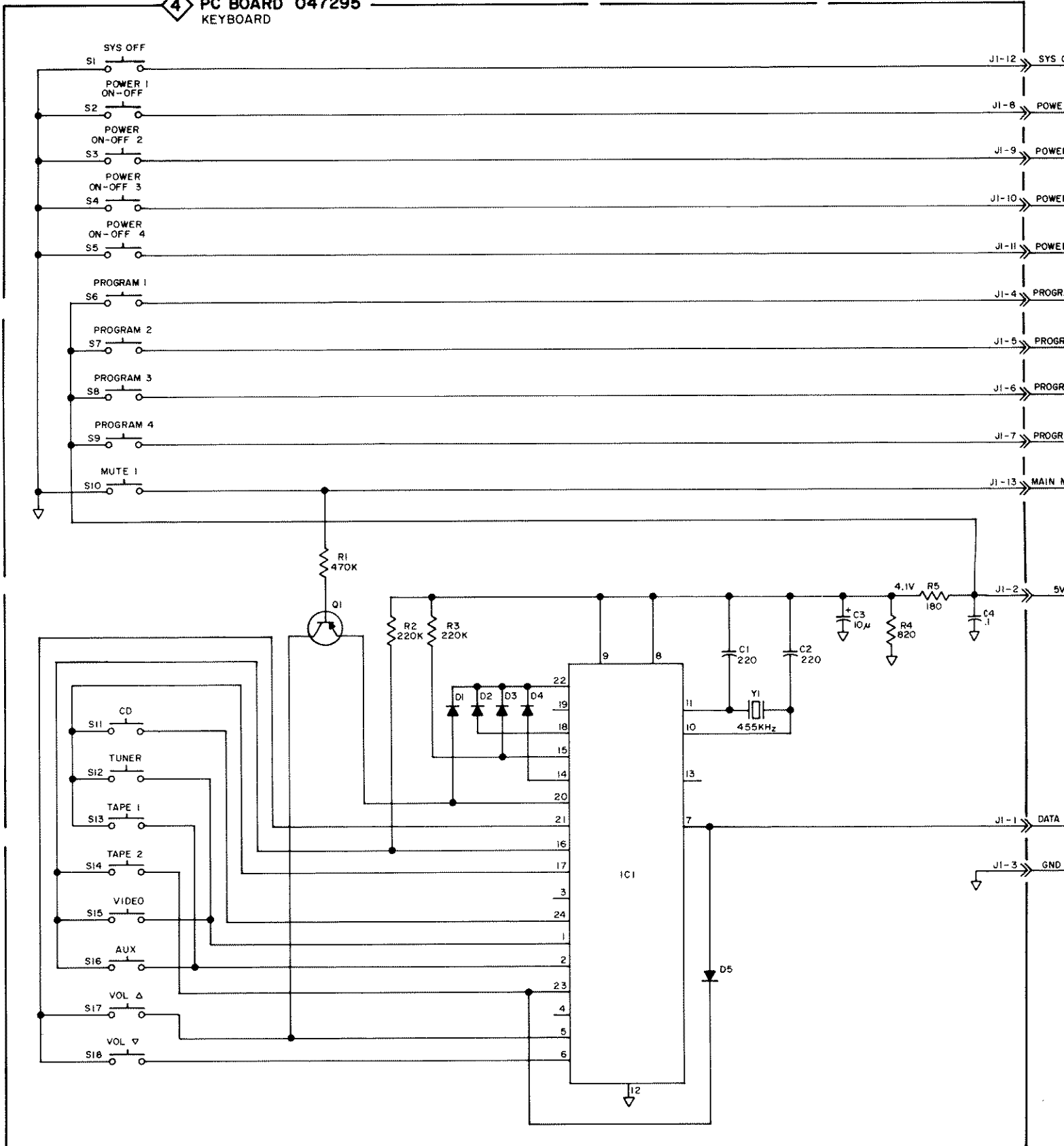
IC1-IC6

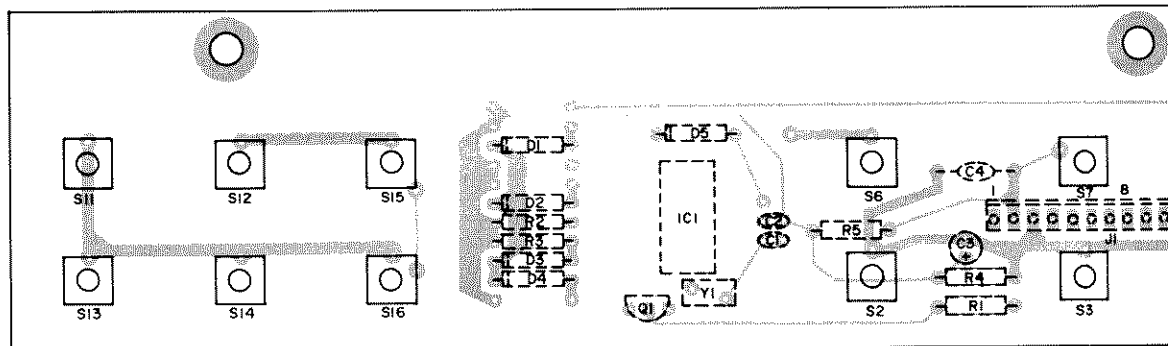
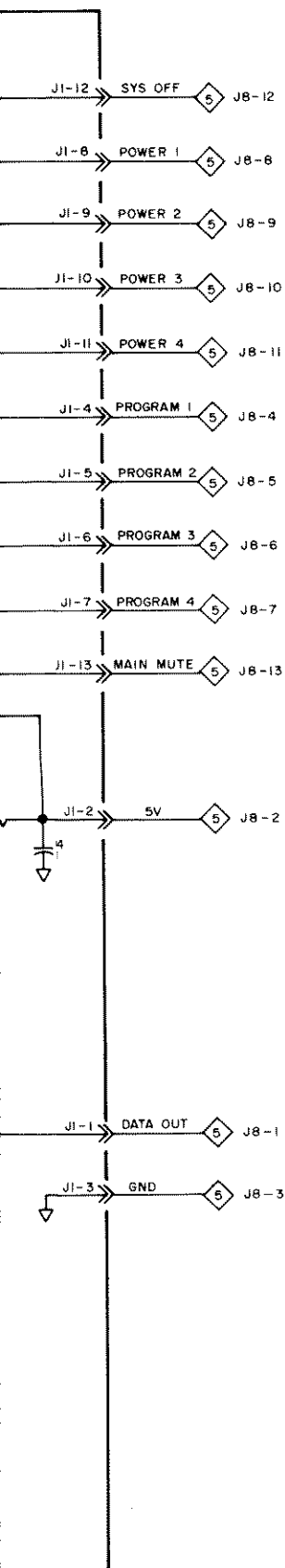


**DATA PORT PCB 047298**

# Keyboard 4

4 PC BOARD 047295  
KEYBOARD

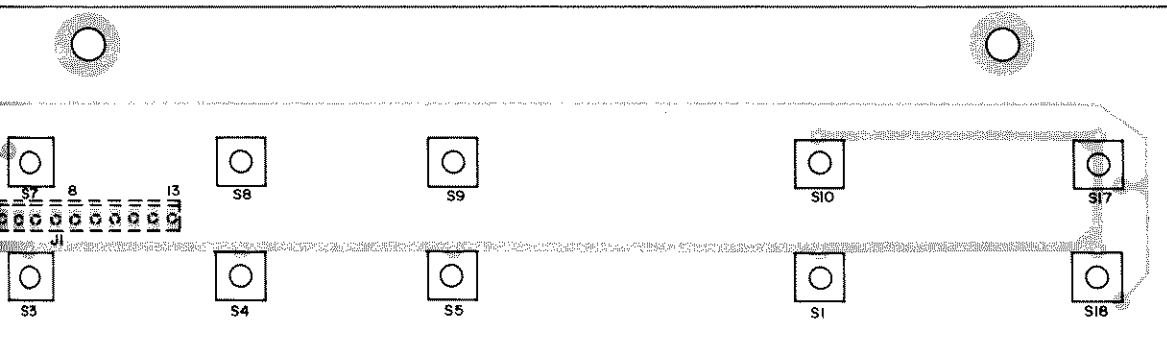




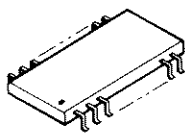
KEYBOARD PCB C

# KEYBOARD PARTS LIST

| Symbol                     | Part   | Description                        |
|----------------------------|--------|------------------------------------|
| <b>DIODES</b>              |        |                                    |
| D1-D5                      | 070047 | SIG, 75V, 150mA, 1N4148            |
| <b>INTEGRATED CIRCUITS</b> |        |                                    |
| IC1                        | 133188 | Transmitter, uPD61226-001          |
| <b>TRANSISTORS</b>         |        |                                    |
| Q1                         | 132224 | PNP, MPS4126                       |
| <b>MISC</b>                |        |                                    |
| Y1                         | 180031 | Ceramic Resonator, 455kHz,<br>± 5% |



RD PCB 047295



IC1



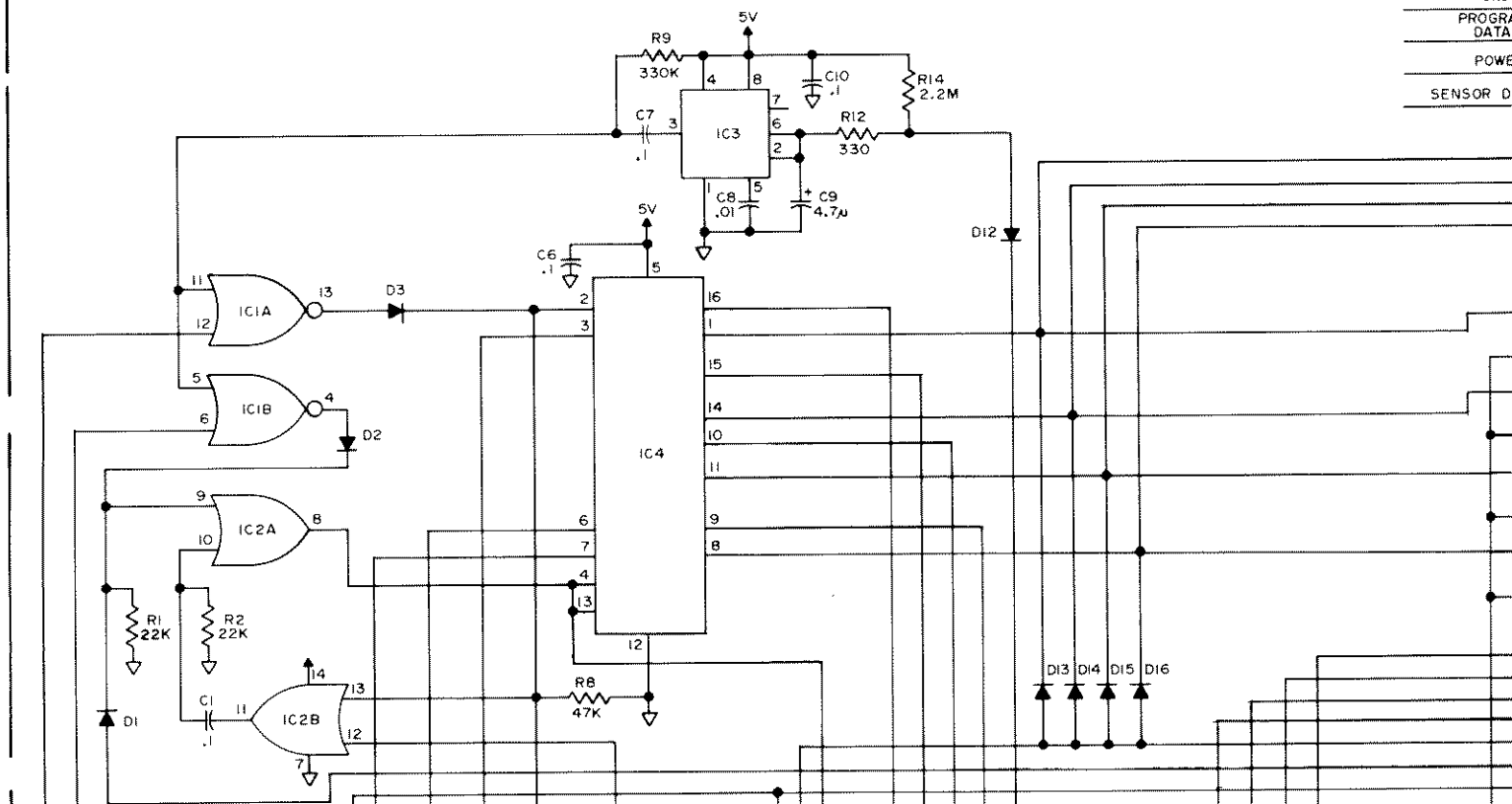
Q1

# 5 System Control

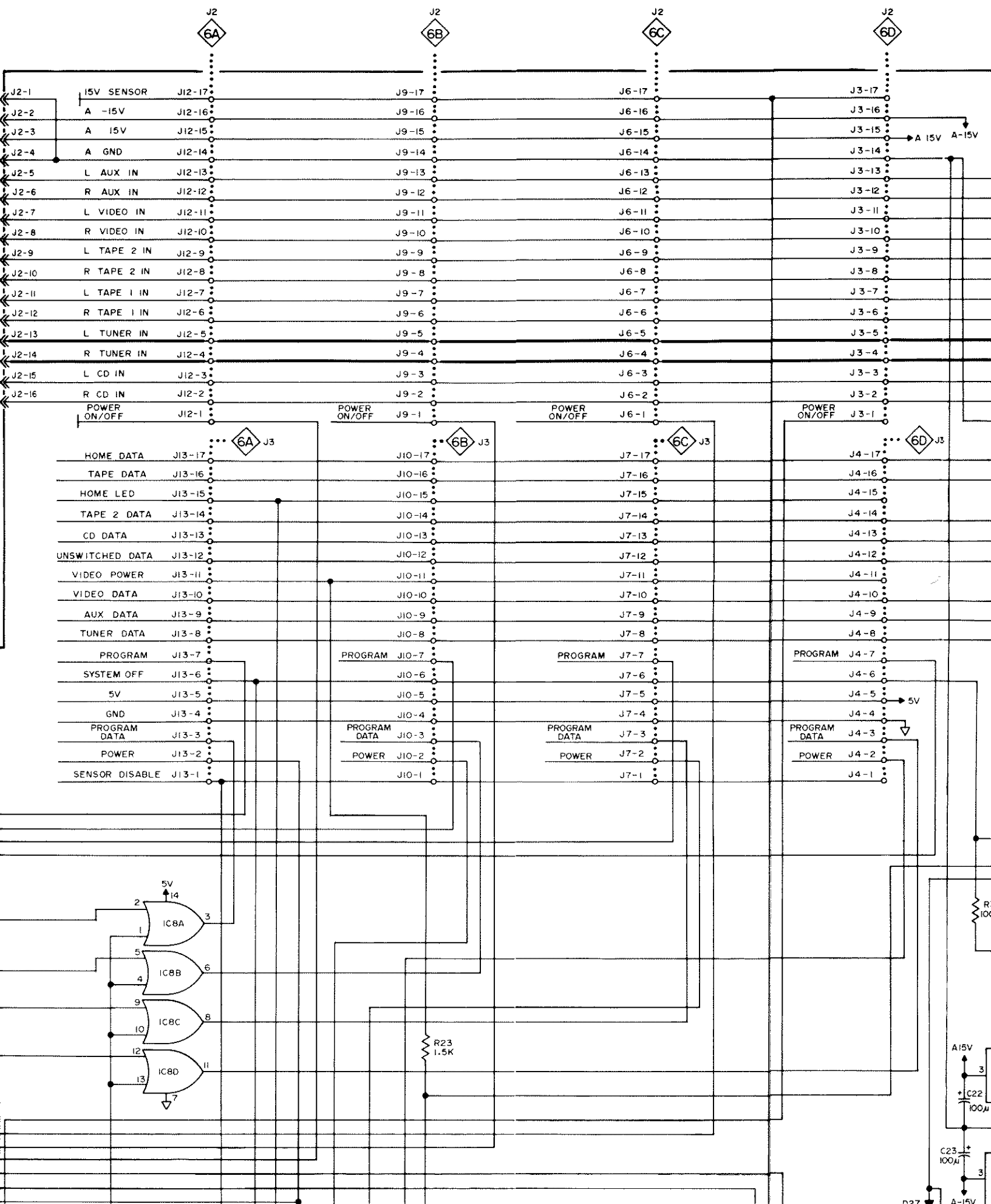
|       |   |              |       |              |
|-------|---|--------------|-------|--------------|
| J2-1  | 2 | A GND        | J2-1  | 15V SENS     |
| J2-2  | 2 | A -15V       | J2-2  | A -15V       |
| J2-3  | 2 | A 15V        | J2-3  | A 15V        |
| J2-4  | 2 | A GND        | J2-4  | A GND        |
| J2-5  | 2 | L AUX OUT    | J2-5  | L AUX I      |
| J2-6  | 2 | R AUX OUT    | J2-6  | R AUX I      |
| J2-7  | 2 | L VIDEO OUT  | J2-7  | L VIDEO      |
| J2-8  | 2 | R VIDEO OUT  | J2-8  | R VIDEO      |
| J2-9  | 2 | L TAPE 2 OUT | J2-9  | L TAPE       |
| J2-10 | 2 | R TAPE 2 OUT | J2-10 | R TAPE       |
| J2-11 | 2 | L TAPE 1 OUT | J2-11 | L TAPE       |
| J2-12 | 2 | R TAPE 1 OUT | J2-12 | R TAPE       |
| J2-13 | 2 | L TUNER OUT  | J2-13 | L TUNER      |
| J2-14 | 2 | R TUNER OUT  | J2-14 | R TUNER      |
| J2-15 | 2 | L CD OUT     | J2-15 | L CD IN      |
| J2-16 | 2 | R CD OUT     | J2-16 | R CD IN      |
|       |   |              |       | POWER ON/OFF |

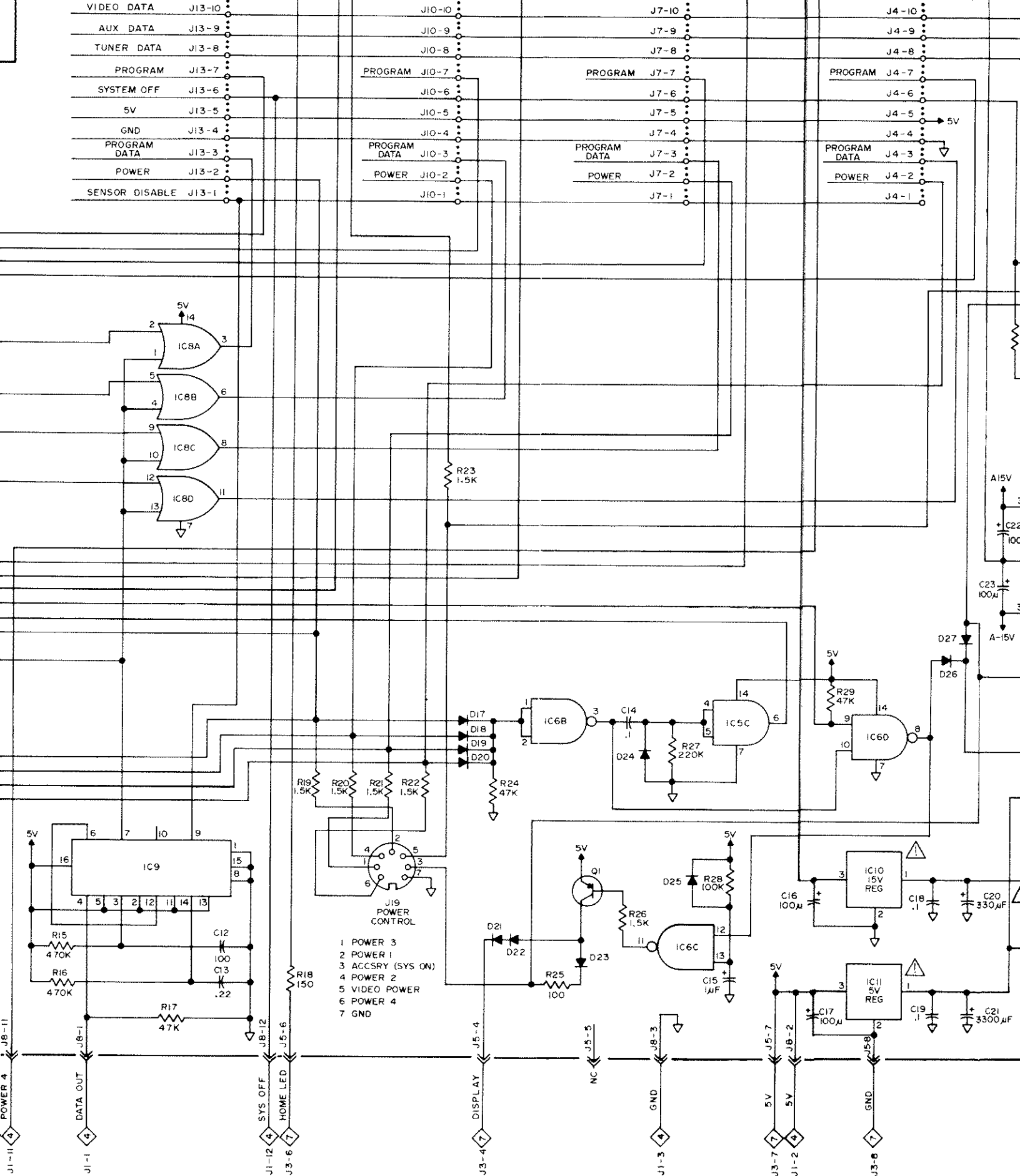
HOME DA  
TAPE D  
HOME LE  
TAPE 2  
CD DATA  
UNSWITCHED  
VIDEO POW  
VIDEO DAT  
AUX DA  
TUNER D  
PROG  
SYSTEM  
5V  
GND  
PROGRA  
DATA  
POWE  
SENSOR D

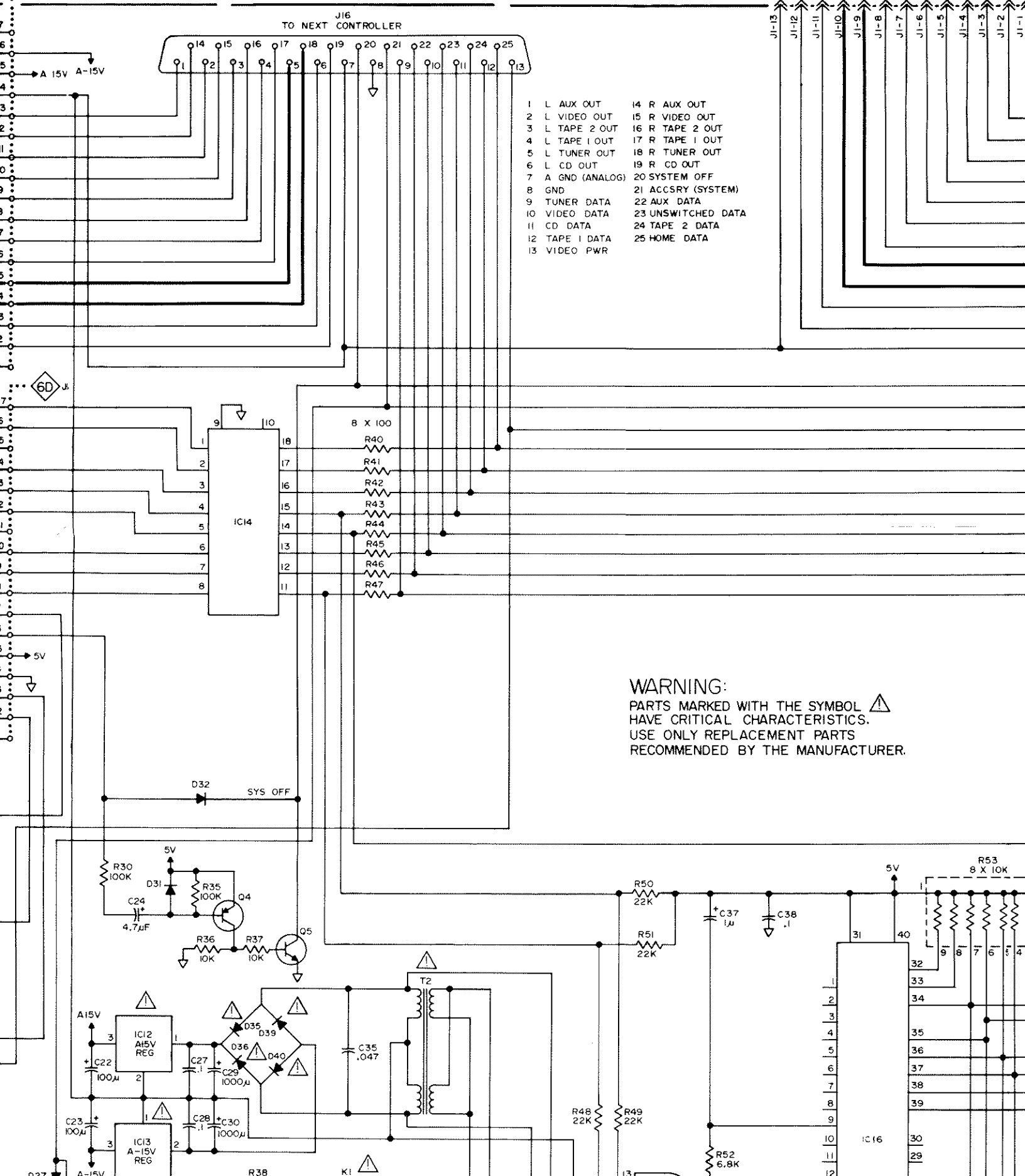
5 PC BOARD 047292  
SYSTEM CONTROL









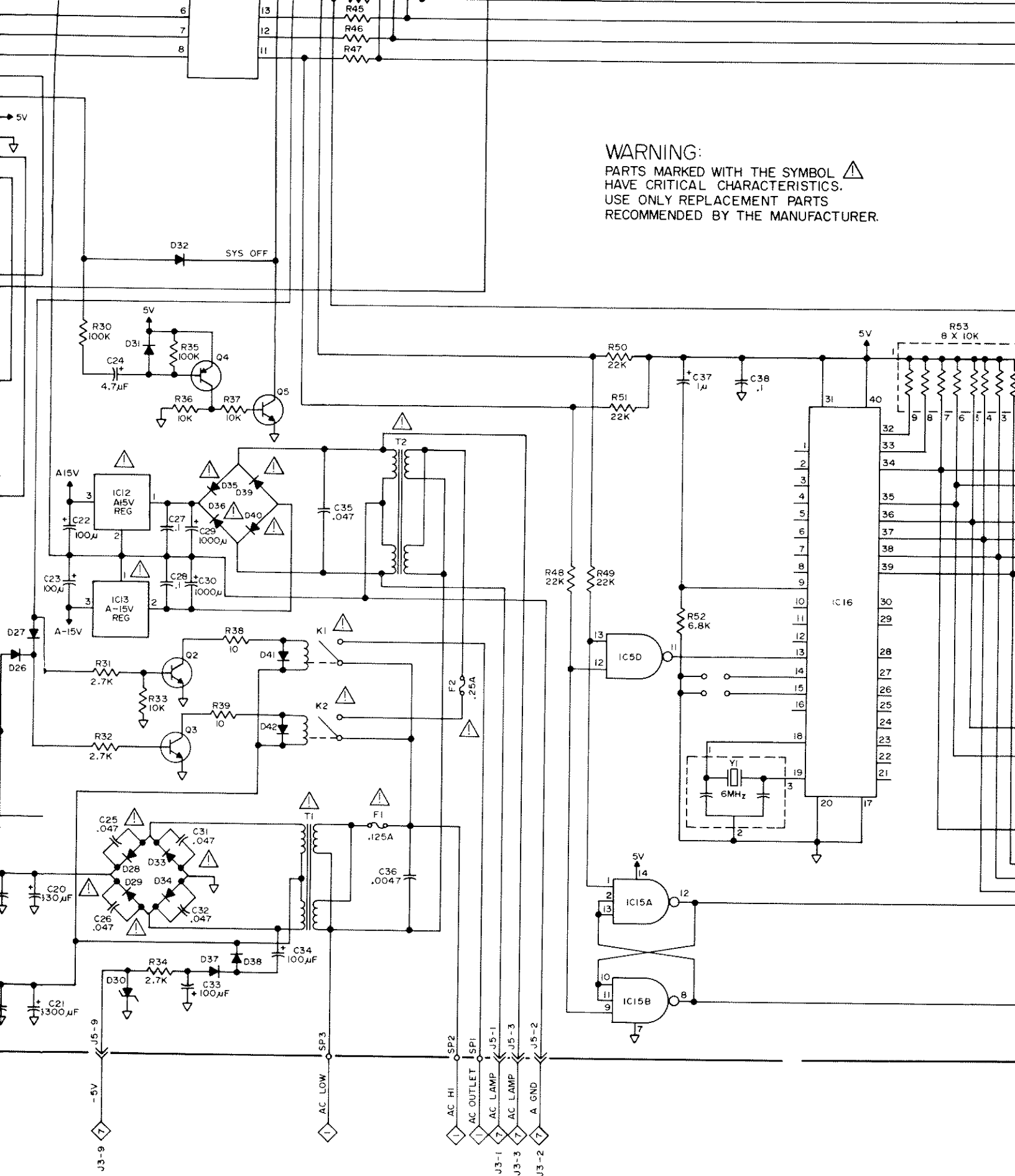
J2  
60J16  
TO NEXT CONTROLLER

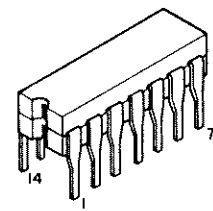
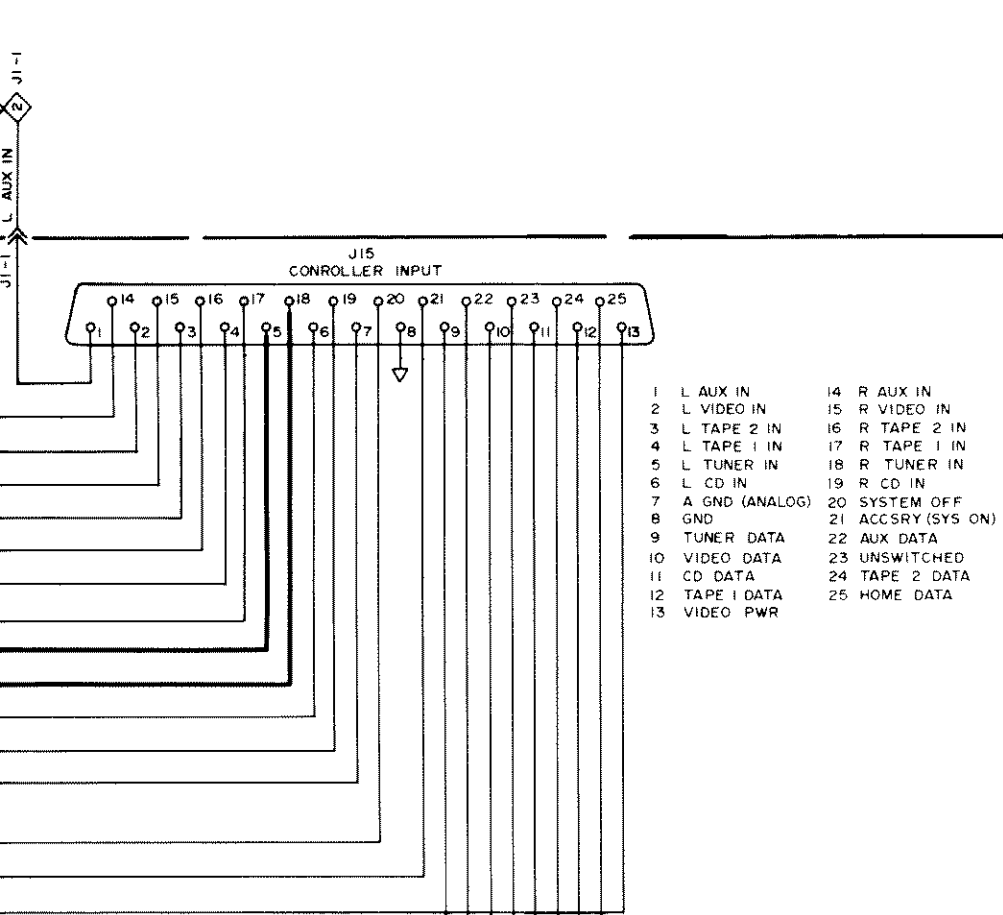
- |                  |                    |
|------------------|--------------------|
| 1 L AUX OUT      | 14 R AUX OUT       |
| 2 L VIDEO OUT    | 15 R VIDEO OUT     |
| 3 L TAPE 2 OUT   | 16 R TAPE 2 OUT    |
| 4 L TAPE 1 OUT   | 17 R TAPE 1 OUT    |
| 5 L TUNER OUT    | 18 R TUNER OUT     |
| 6 L CD OUT       | 19 R CD OUT        |
| 7 A GND (ANALOG) | 20 SYSTEM OFF      |
| 8 GND            | 21 ACCSRY (SYSTEM) |
| 9 TUNER DATA     | 22 AUX DATA        |
| 10 VIDEO DATA    | 23 UNSWITCHED DATA |
| 11 CD DATA       | 24 TAPE 2 DATA     |
| 12 TAPE 1 DATA   | 25 HOME DATA       |
| 13 VIDEO PWR     |                    |

WARNING:  
PARTS MARKED WITH THE SYMBOL Δ  
HAVE CRITICAL CHARACTERISTICS.  
USE ONLY REPLACEMENT PARTS  
RECOMMENDED BY THE MANUFACTURER.

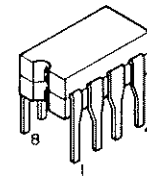
# WARNING:

PARTS MARKED WITH THE SYMBOL  HAVE CRITICAL CHARACTERISTICS. USE ONLY REPLACEMENT PARTS RECOMMENDED BY THE MANUFACTURER.

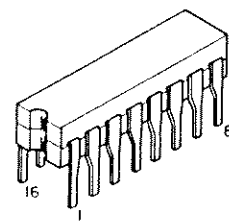




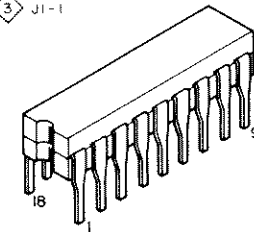
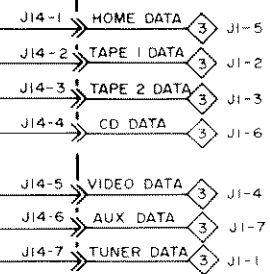
IC1, IC2, IC5,  
IC6 & IC15



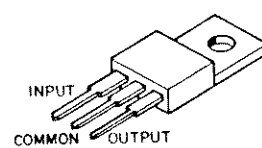
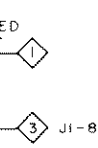
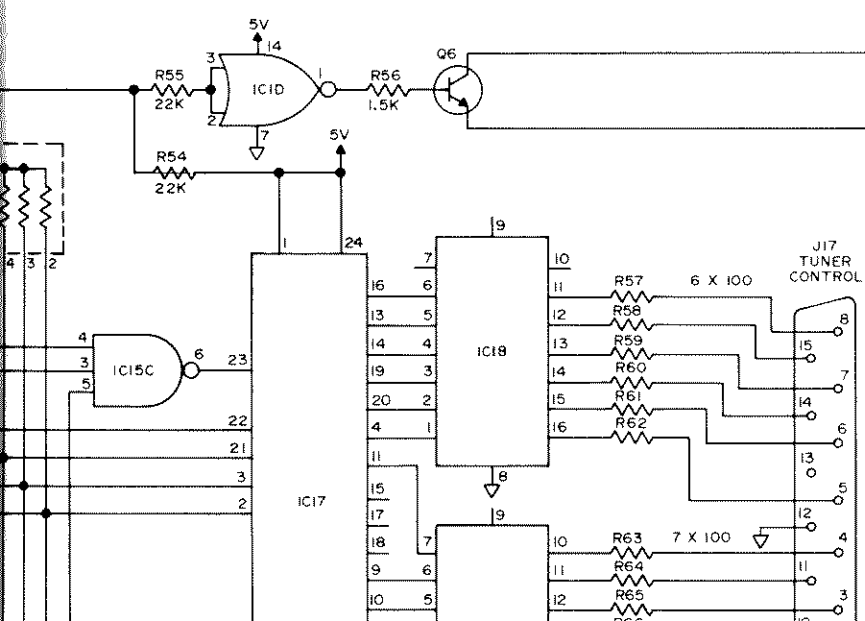
IC3



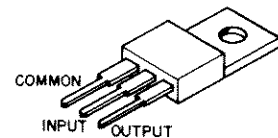
IC4, IC8, IC9,  
IC18 & IC19



IC7, IC14, IC20



IC10, IC11, IC12



IC10, IC11, IC12



## SYSTEM CONTROL PARTS LIST

| Symbol        | Part   | Description                |
|---------------|--------|----------------------------|
| <b>DIODES</b> |        |                            |
| D1-D20        | 070047 | SIG, 75V, 150mA, 1N4148    |
| D21,D22       | 070131 | RECT, 400V, 1A, 1N4004     |
| D23           | 070132 | ZN, 5V, 5% 500mW, 1N5231B  |
| D24-D27       | 070047 | SIG, 75V, 150mA, 1N4148    |
| D28,D29       | 070131 | RECT, 400V, 1A, 1N4004     |
| D30           | 070132 | ZN, 5V, 5%, 500mW, 1N5231B |
| D31,D32       | 070047 | SIG, 75V, 150mA, 1N4148    |
| D33-D36       | 070131 | RECT, 400V, 1A, 1N4004     |
| D37,D38       | 070098 | SIG, 175V, 500mW, FDH400   |
| D39,D40       | 070131 | RECT, 400V, 1A, 1N4004     |

|              |        |                       |
|--------------|--------|-----------------------|
| <b>FUSES</b> |        |                       |
| F1           | 089044 | Fuse, SB, .125A, 250V |
| F2           | 089048 | Fuse, SB, .25A, 250V  |

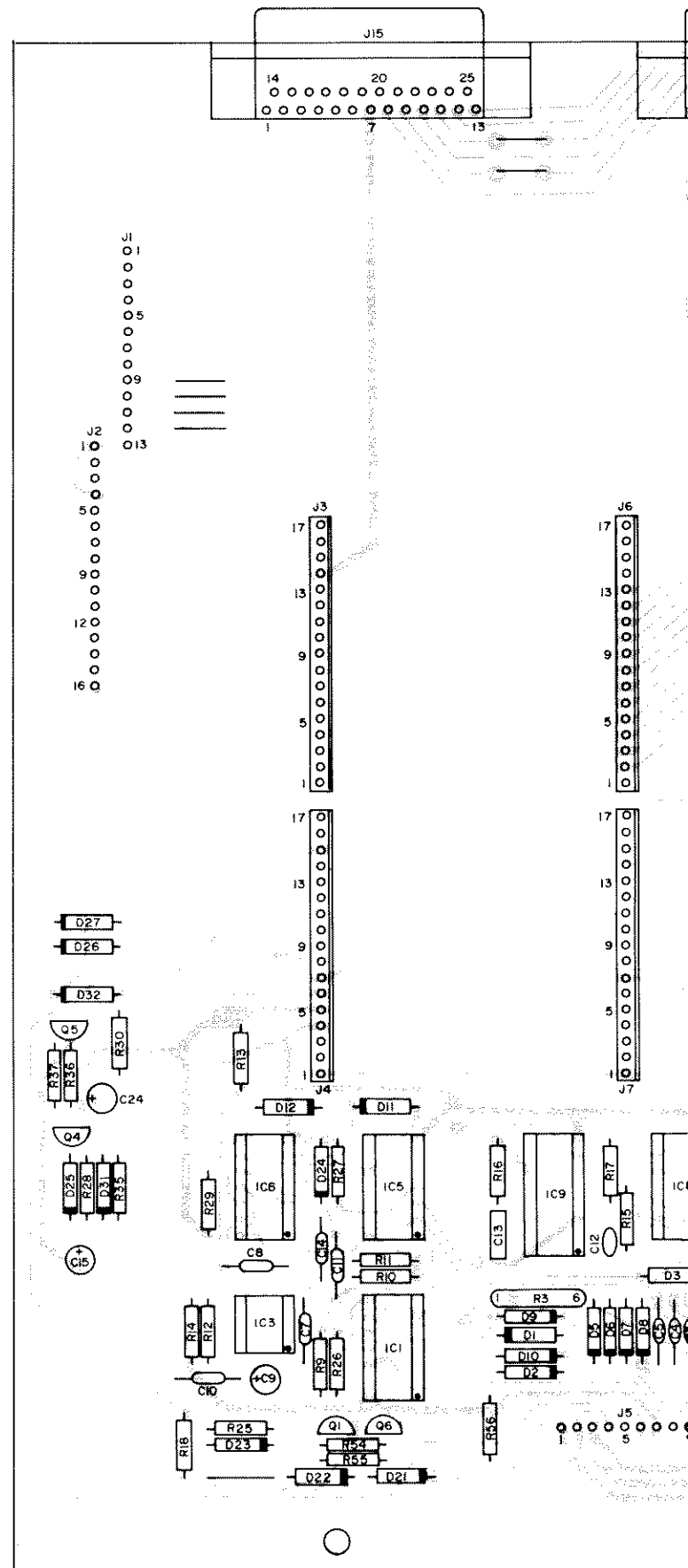
|               |        |                          |
|---------------|--------|--------------------------|
| <b>RELAYS</b> |        |                          |
| K1,K2         | 087054 | SPST, 12VDC, JT1AE-DC12V |

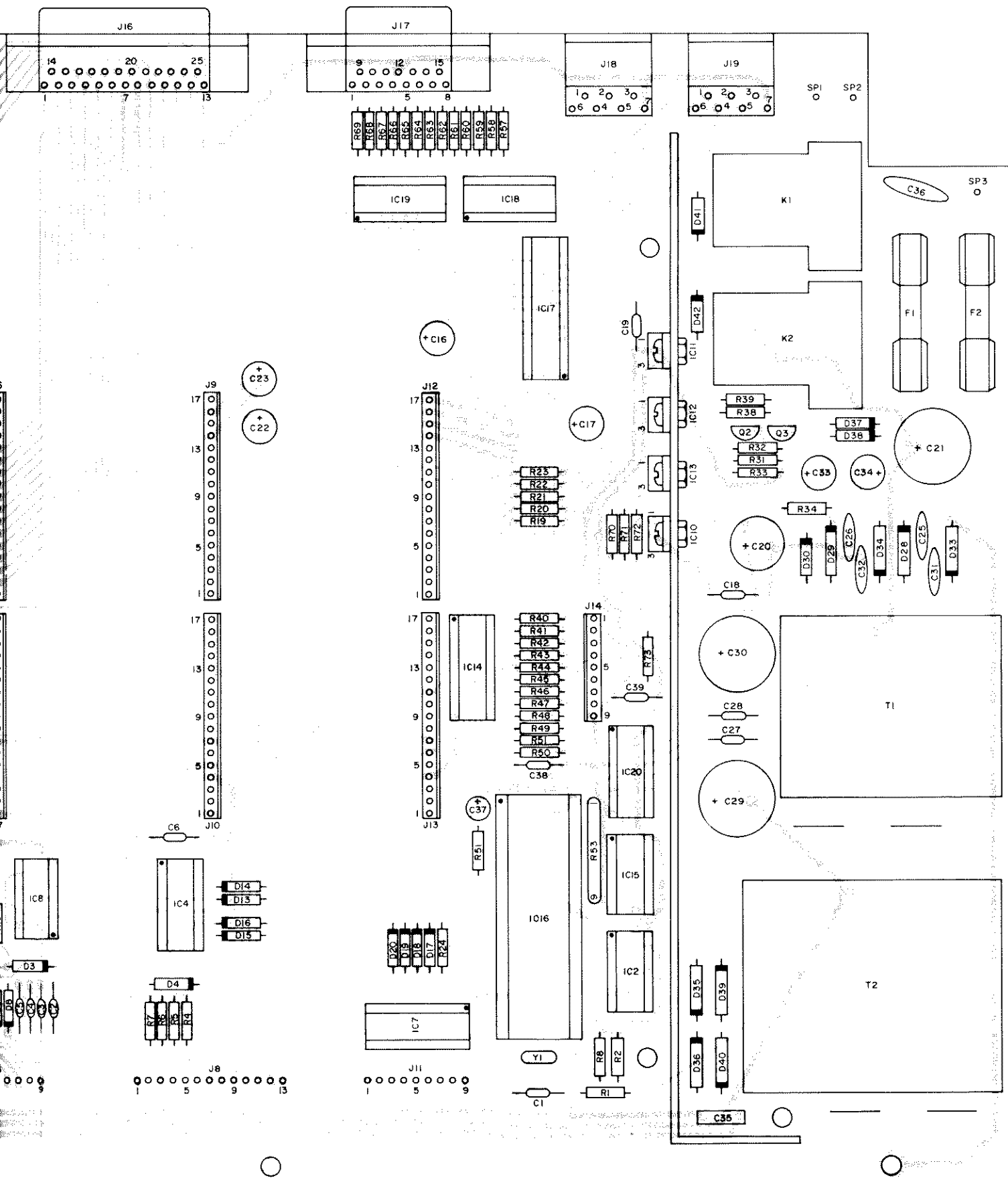
|                            |        |                                                  |
|----------------------------|--------|--------------------------------------------------|
| <b>INTEGRATED CIRCUITS</b> |        |                                                  |
| IC1                        | 133176 | CMOS, Quad 2-input NOR Gate MC74HC02AN           |
| IC2                        | 133167 | CMOS, Quad 2-input OR Gate MC74HC32AN            |
| IC3                        | 133141 | TIMER, NE555N                                    |
| IC4                        | 133183 | CMOS, Dual 2-Bit Latch, MC74HC75N                |
| IC5                        | 133175 | CMOS, Quad 2-input AND Gate, MC74HC08AN          |
| IC6                        | 133161 | CMOS, Quad, 2-input NAND Gate, 74HC00N           |
| IC7                        | 133180 | 8 LINE DRIVER, LB1720                            |
| IC8                        | 133183 | CMOS, Dual 2-Bit Latch, MC74HC75N                |
| IC9                        | 133182 | CMOS, Dual Monostable Multivibrator, MC74HC4538N |
| IC10                       | 133086 | + 15V Regulator, MC7815CT                        |
| IC11                       |        |                                                  |
| IC12                       | 133086 | + 15V Regulator, MC7815CT                        |
| IC13                       | 133087 | -15V Regulator, MC7915CT                         |
| IC14                       | 133180 | 8 LINE DRIVER, LB1720                            |
| IC15                       | 133179 | CMOS, Triple 3-input NAND Gate, MC74HC10N        |
| IC16                       | 133177 | Microcontroller, SC80C51BCCN40                   |
| IC17                       | 133184 | CMOS, 1 of 16 Decoder/Latch MC74HC4514N          |
| IC18,IC19                  | 133181 | 7 LINE DRIVER, MC1413P                           |
| IC20                       | 133170 | CMOS, 1 of 8 Decoder/Latch, MC74HC237N           |

|                    |        |              |
|--------------------|--------|--------------|
| <b>TRANSISTORS</b> |        |              |
| Q1                 | 132224 | PNP, MPS4126 |
| Q2,Q3              | 132223 | NPN, MPS4124 |
| Q4                 | 132224 | NPN, MPS4126 |
| Q5,Q6              | 132223 | NPN, MPS4124 |

|                     |        |                    |
|---------------------|--------|--------------------|
| <b>TRANSFORMERS</b> |        |                    |
| T1                  | 159221 | POWER TRANSFORMERS |
| T2                  | 159220 | POWER TRANSFORMERS |

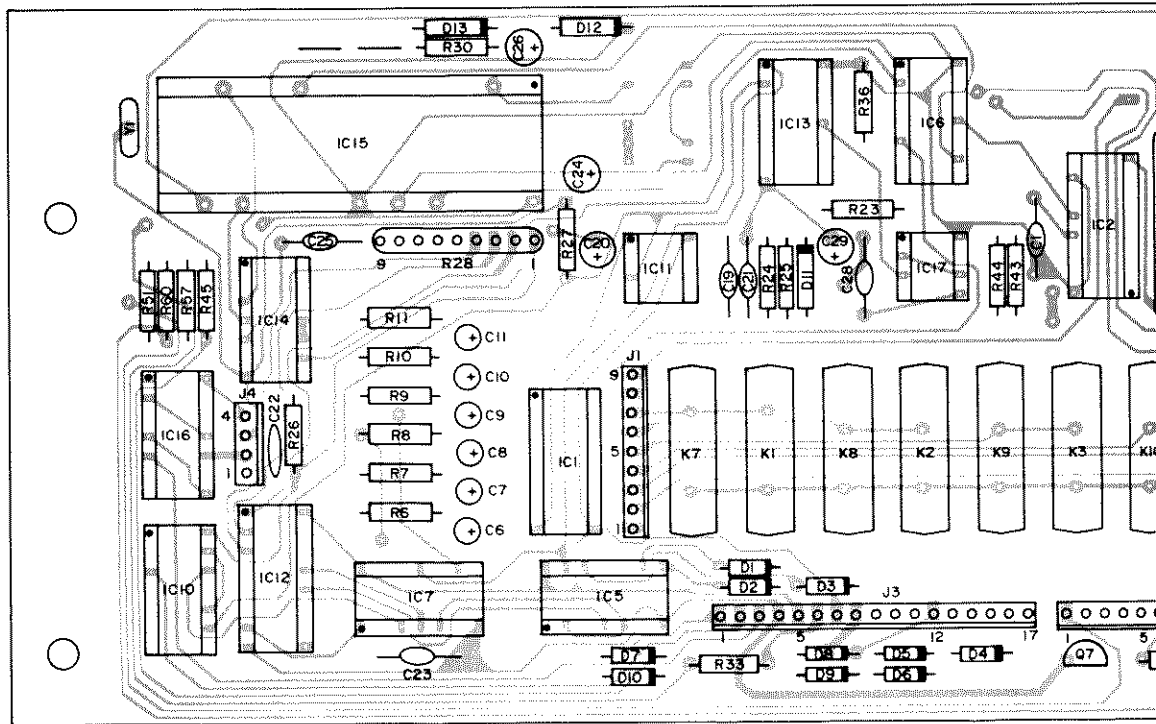
|             |        |                         |
|-------------|--------|-------------------------|
| <b>MISC</b> |        |                         |
| Y1          | 180039 | Ceramic Resonator, 6MHz |





# 6

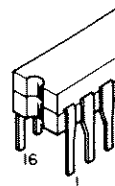
## Area Control



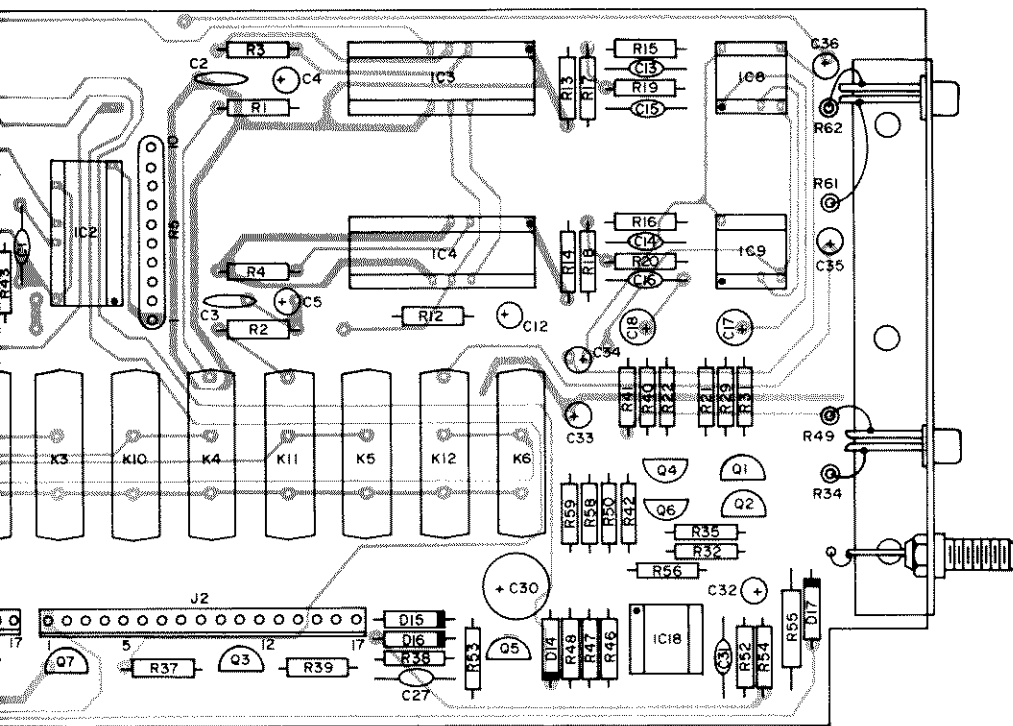
AREA CONTROL PCB 04

### AREA CONTROL PARTS LIST

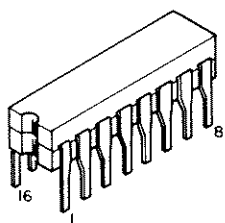
| Symbol                     | Part   | Description                              |
|----------------------------|--------|------------------------------------------|
| <b>DIODES</b>              |        |                                          |
| D1-D17                     | 070074 | SIG, 75V 10mA, 1N4148                    |
| <b>INTEGRATED CIRCUITS</b> |        |                                          |
| IC1                        | 133181 | 7 LINE DRIVER, MC1413P                   |
| IC2                        | 133186 | CMOS, 8-Bit Shift Register, MC74HC595AN  |
| IC3,IC4                    | 133187 | Attenuator, MP7529BJN                    |
| IC5                        | 133185 | CMOS, Triple 3-input AND Gate, MC74HC11N |
| IC6                        | 133193 | CMOS, Hex Inverter, MC74HC04AN           |
| IC7                        | 133185 | CMOS, Triple 3-input AND Gate, MC74HC11N |
| IC8,IC9                    | 133094 | Dual OP-Amp, NE5532N                     |
| IC10                       | 133175 | CMOS, Quad 2-input AND Gate, MC74HC08AN  |
| IC11                       | 133141 | TIMER, NE555N                            |
| IC12                       | 133170 | CMOS, 1 of 8 Decoder/Latch, MC74HC237N   |
| IC13                       | 133176 | CMOS, Quad 2-input NOR Gate, MC74HC02AN  |
| IC14                       | 133167 | CMOS, Quad 2-input OR Gate, MC74HC32AN   |
| IC15                       | 133177 | Microcontroller, SC80C51BCCN40           |
| IC16                       | 133161 | CMOS, Quad 2-input NAND Gate, 74HC00N    |
| IC17                       | 133141 | TIMER, NE555N                            |
| IC18                       | 133066 | OP Amp, NE5534N                          |
| <b>TRANSISTORS</b>         |        |                                          |
| Q1,Q2                      | 132257 | NPN, 2SC3792                             |
| Q3                         | 132223 | NPN, MPS4124                             |
| Q4                         | 132257 | NPN, 2SC2792                             |
| Q5                         | 132172 | PNP, MPSA55                              |
| Q6                         | 132257 | NPN, 2SC3792                             |
| Q7                         | 132223 | NPN, MPS4124                             |
| <b>MISC</b>                |        |                                          |
| Y1                         | 180039 | Ceramic Resonator, 6MHz                  |



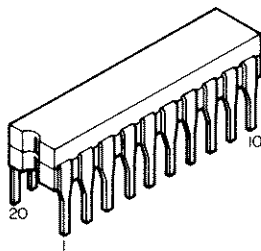
IC1 & IC2



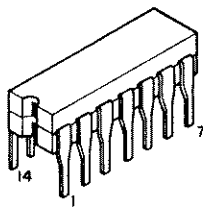
OL PCB 047294



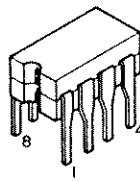
IC1 & IC2



IC3 & IC4



IC5-IC7, IC10,  
IC13, IC14 & IC16



IC8, IC9, IC11,  
IC17 & IC18



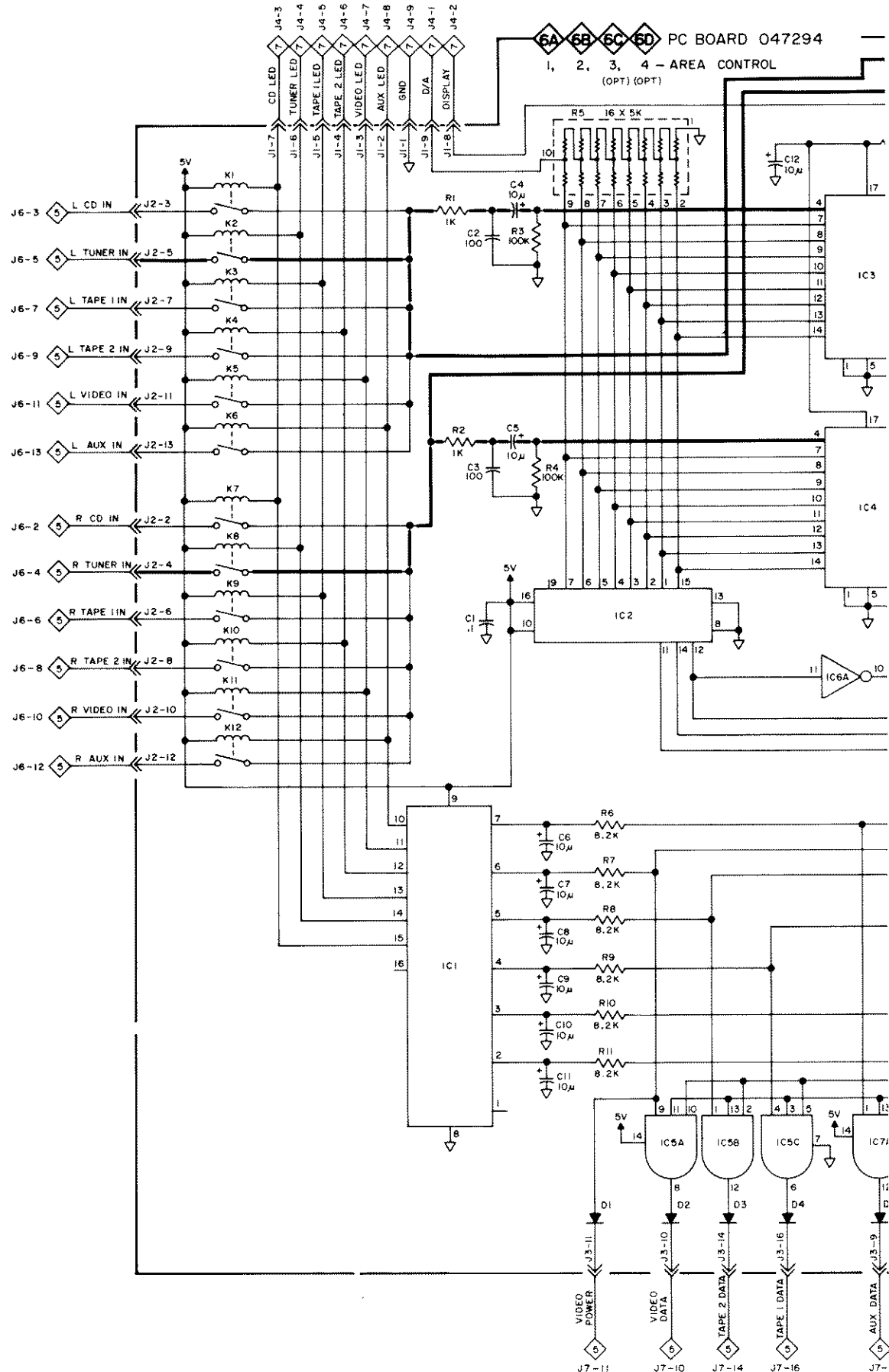
Q1, Q2, Q4 &  
Q6

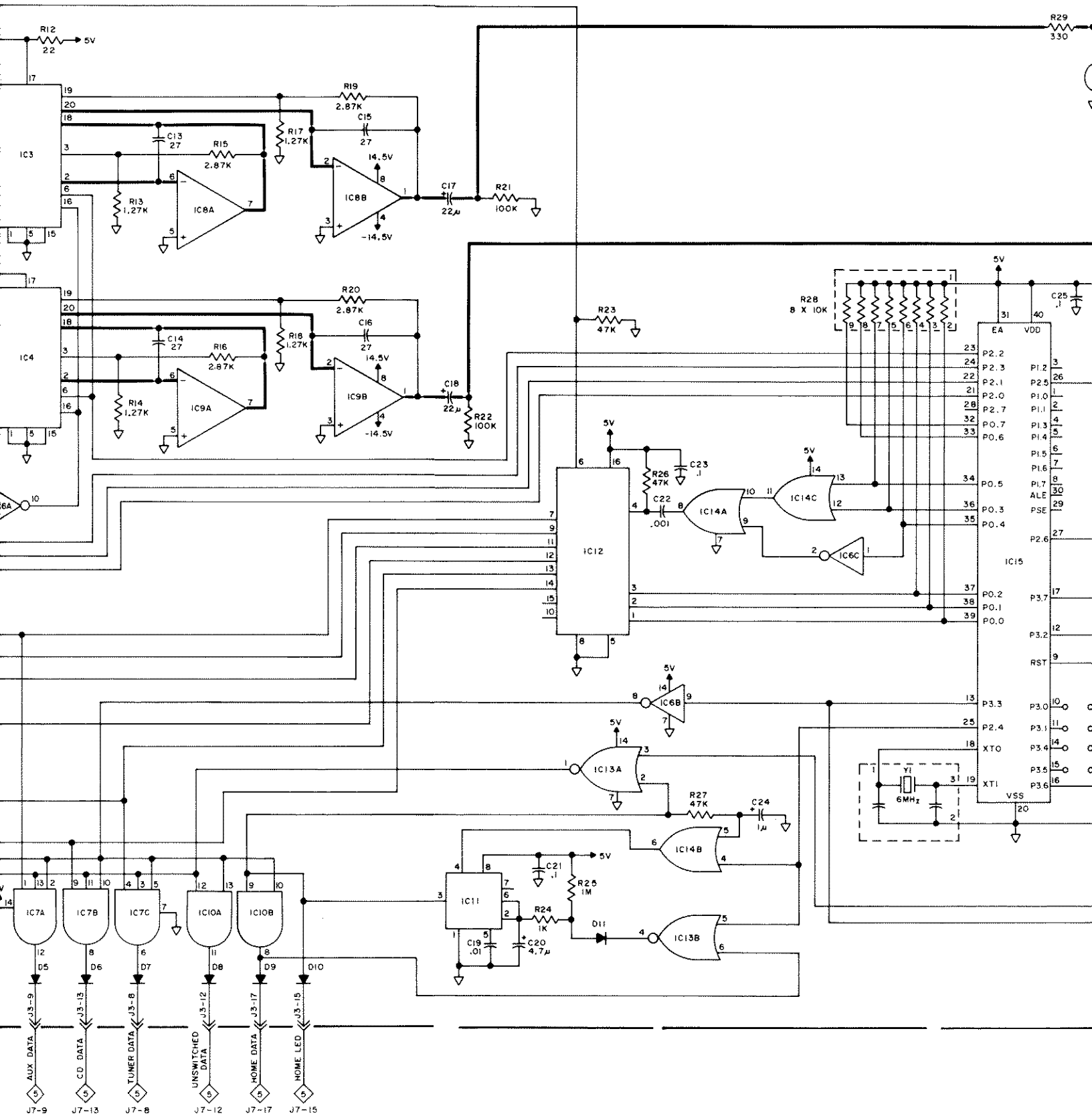


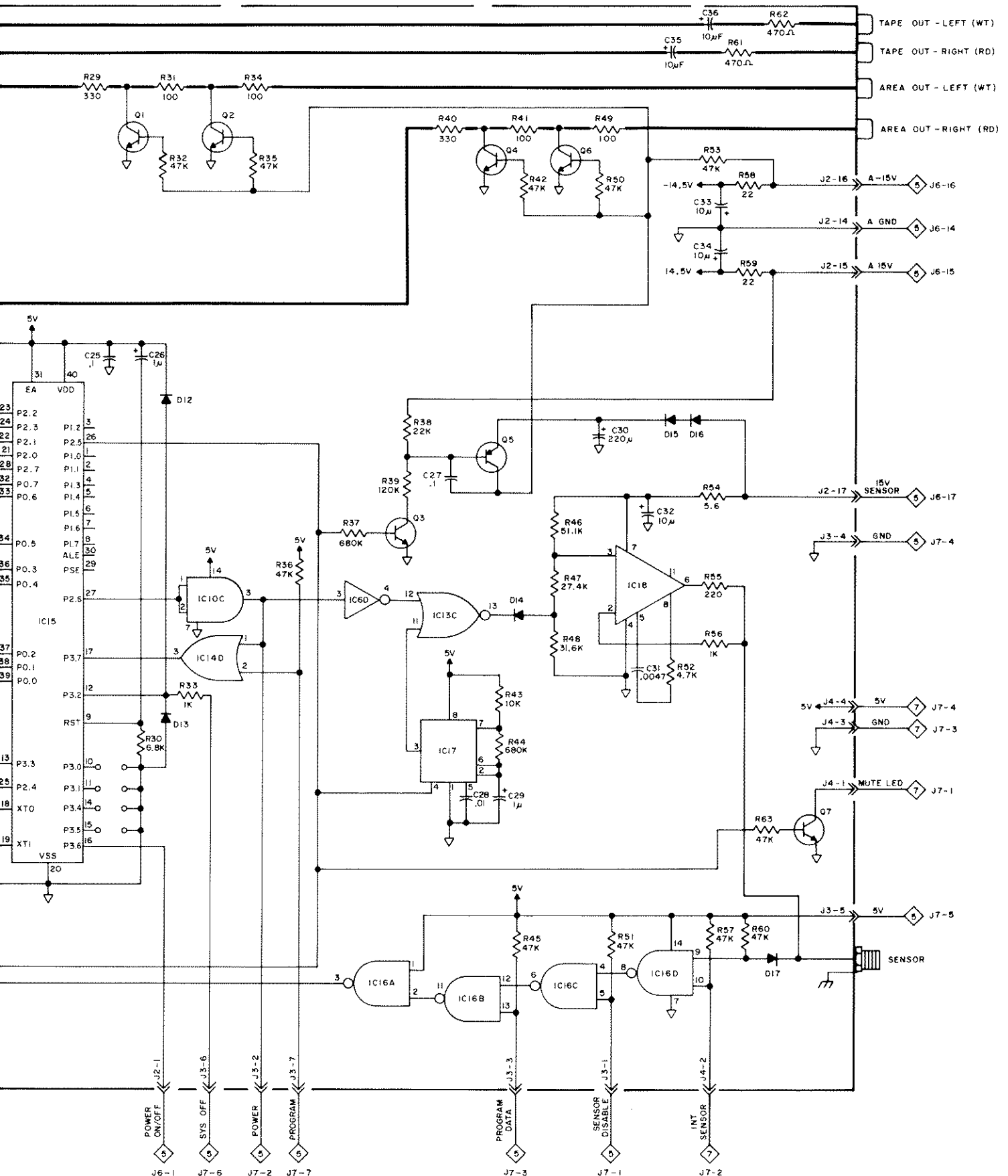
Q3, Q5 & Q7

# Area Control

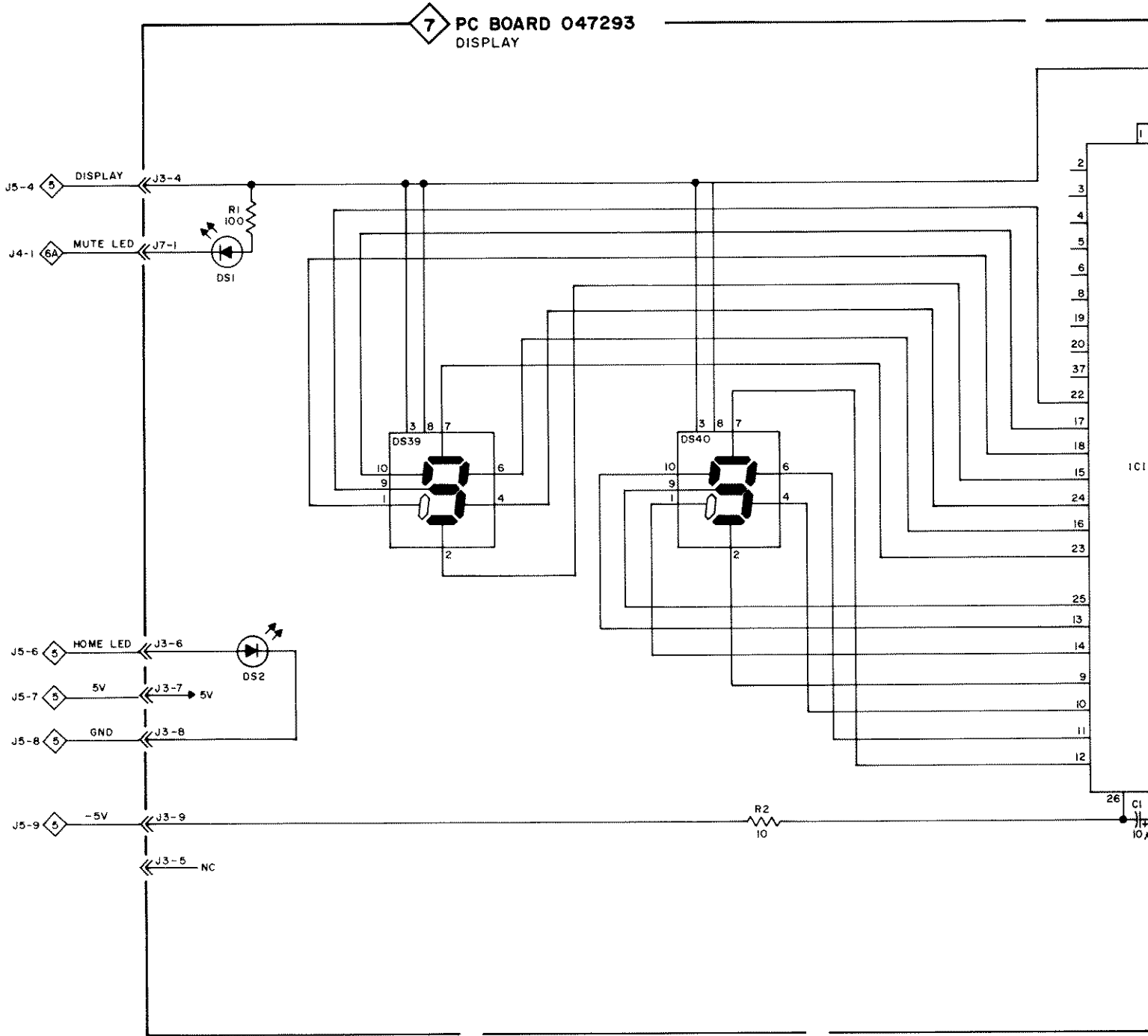
6

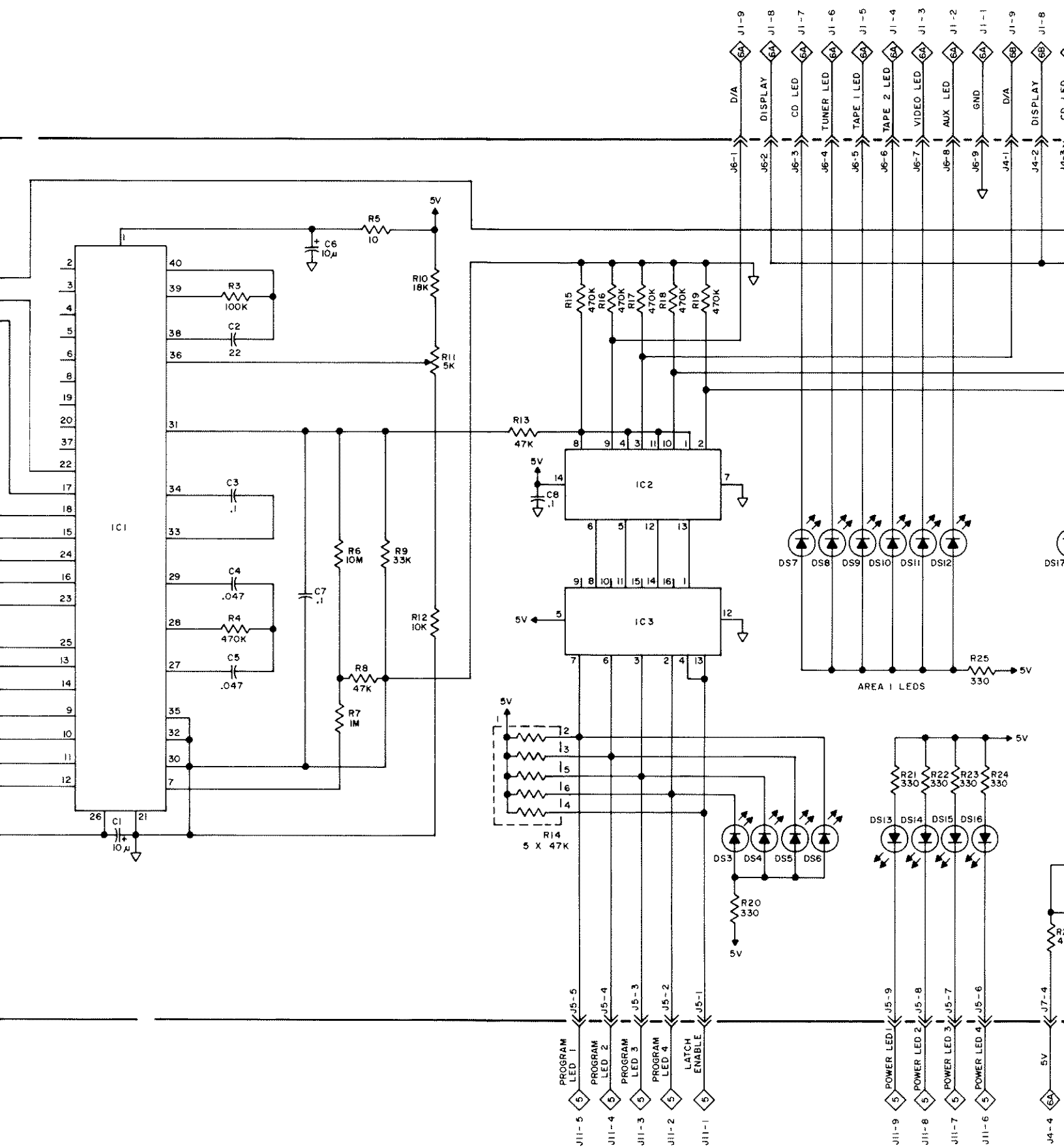


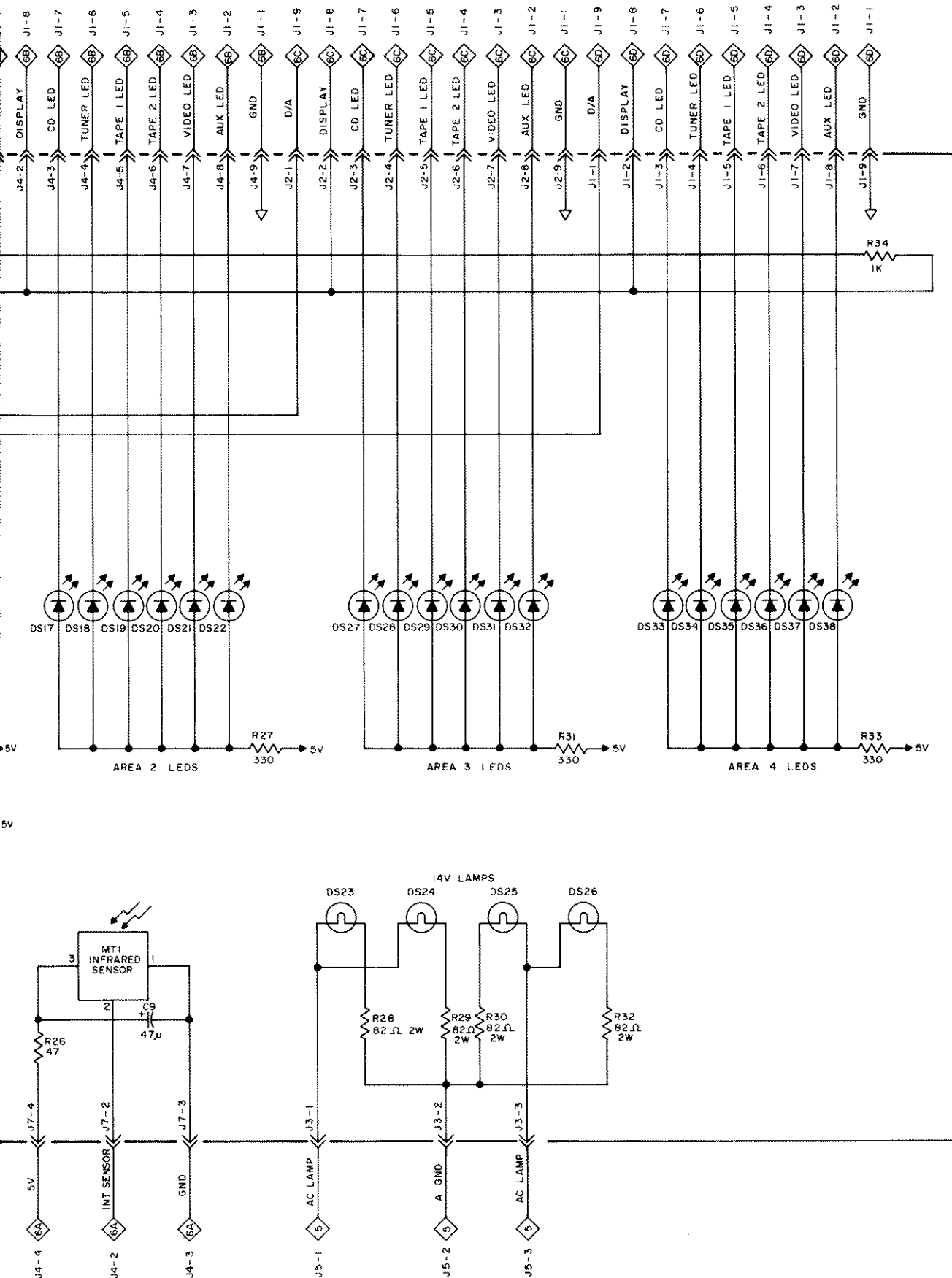


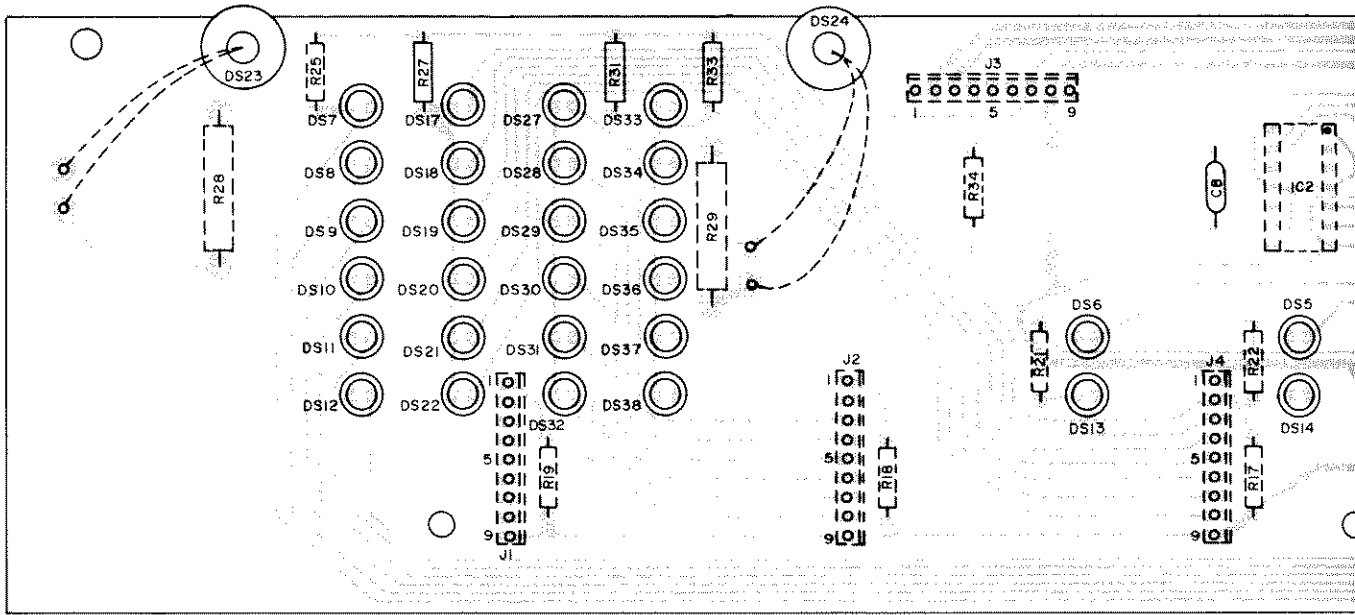


# 7 Display









DISPLAY P

## DISPLAY PARTS LIST

| Symbol | Part | Description |
|--------|------|-------------|
|--------|------|-------------|

### INTEGRATED CIRCUITS

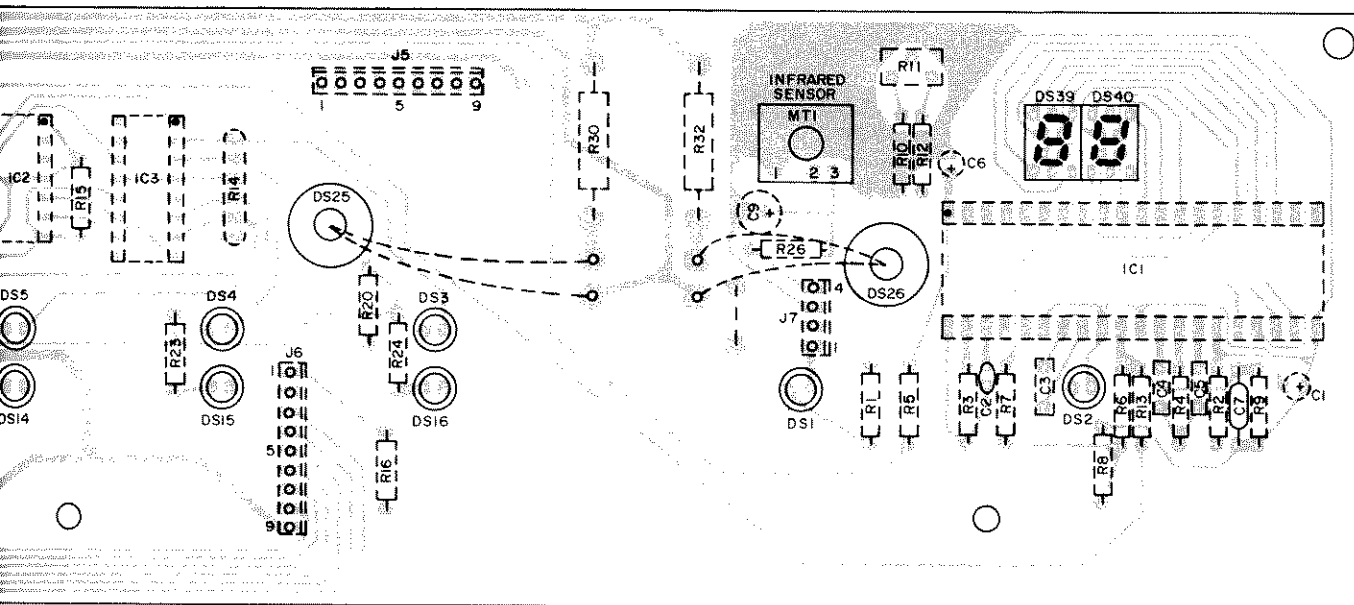
|     |        |                                       |
|-----|--------|---------------------------------------|
| IC1 | 133152 | 3.5 Digit A/D Converter<br>TSC7107CPL |
| IC2 | 133117 | CMOS, Quad Analog Switch,<br>MC14066B |
| IC3 | 133183 | CMOS, Dual 2-Bit Latch,<br>MC74HC75N  |

### LIGHTING DEVICES

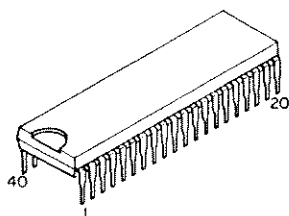
|            |        |                            |
|------------|--------|----------------------------|
| DS1-DS22   | 070093 | LED, RED                   |
| DS23-DS26  | 058042 | INC, 14V, .08A, Blue Leads |
| DS27-DS38  | 070093 | LED, RED                   |
| DS39, DS40 | 058093 | LED, 7-Segment Display     |

### SENSORS

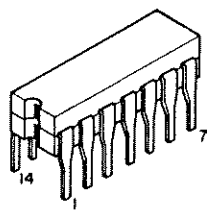
|     |        |            |
|-----|--------|------------|
| MT1 | 121022 | SENSOR, IR |
|-----|--------|------------|



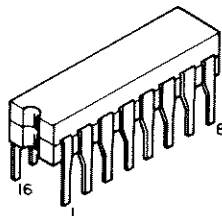
LAY PCB 047293



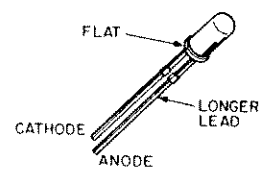
IC1



IC2



IC3



DS1-DS22,  
DS27-DS38



DS39 & DS40

# Repacking Instructions

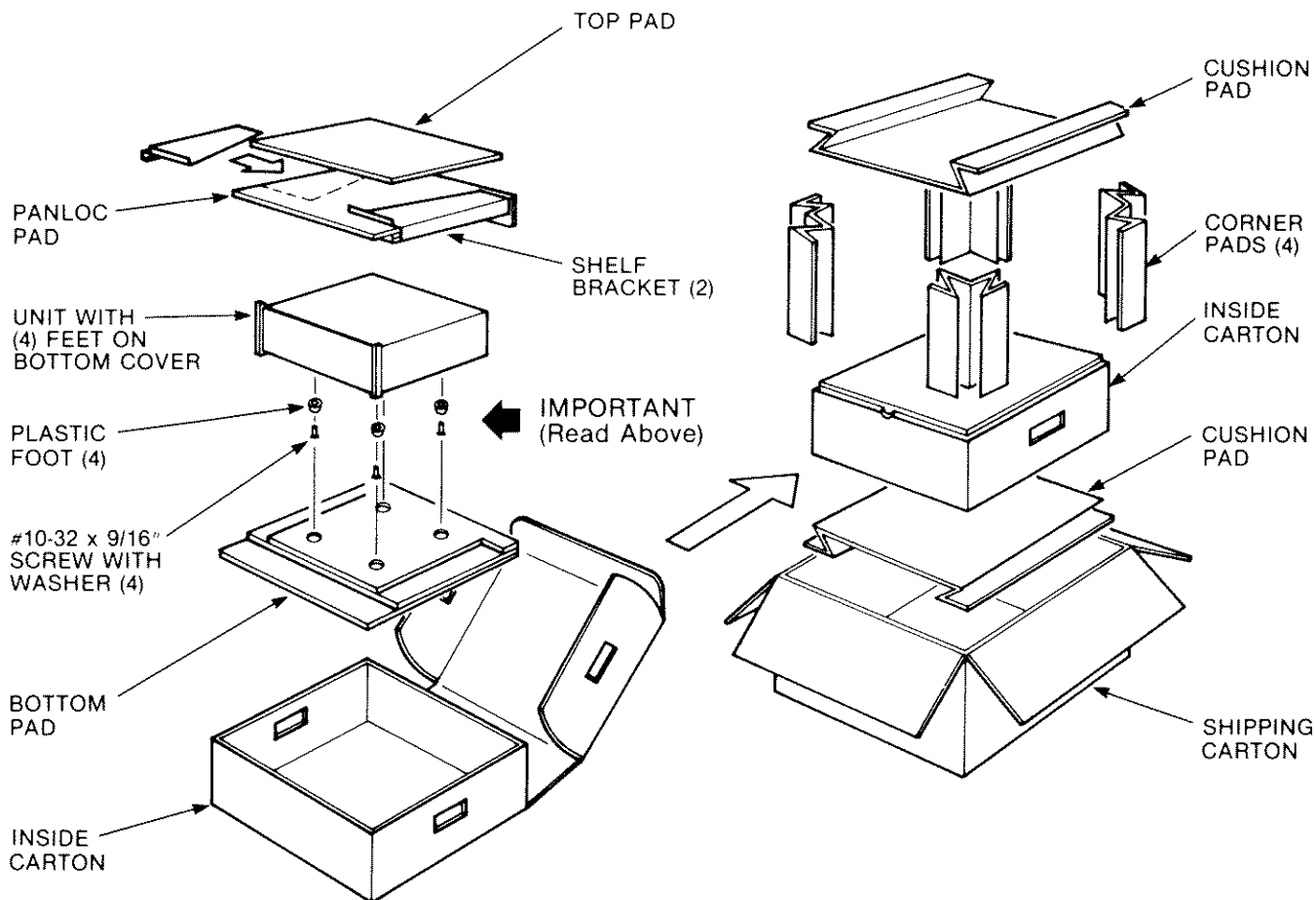
In the event it is necessary to repack the unit for shipment, the unit must be packed exactly as shown below. The shelf brackets do not have to be included in the carton for the unit to be packed properly, but their position in the carton is indicated.

**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   | 033613   | Shipping carton only                               |
| 2   | 033611   | Cushion pad                                        |
| 4   | 033333   | Corner pad                                         |
| 1   | 033608   | Inside carton only                                 |
| 1   | 033610   | Top pad                                            |
| 1   | 033609   | Panloc pad                                         |
| 1   | 033612   | Bottom pad                                         |
| 4   | 017218   | Plastic foot, 1" high held with 100159 screw.      |
| 4   | 100159   | #10-32 x 3/4" Machine screw                        |
| 4   | 104080   | #10 Flat washer                                    |
| 1   | 047438   | Shipping carton complete with all the above parts. |



# McIntosh<sup>®</sup>

## CR10 REMOTE CONTROL SYSTEM

The continuous improvement of its products is the policy of McIntosh Laboratory Incorporated, who reserve the right to improve design without notice. Because of the constant upgrading of McIntosh products' circuitry and components, the Company cannot insure, and does not warrant, the accuracy of the within schematic material, which is intended for information only.

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Part No. 039748

Printed in U.S.A.

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BE012003