

# LC53

## “Z METER” CAPACITOR — INDUCTOR ANALYZER

### SCHEMATIC & PARTS LIST



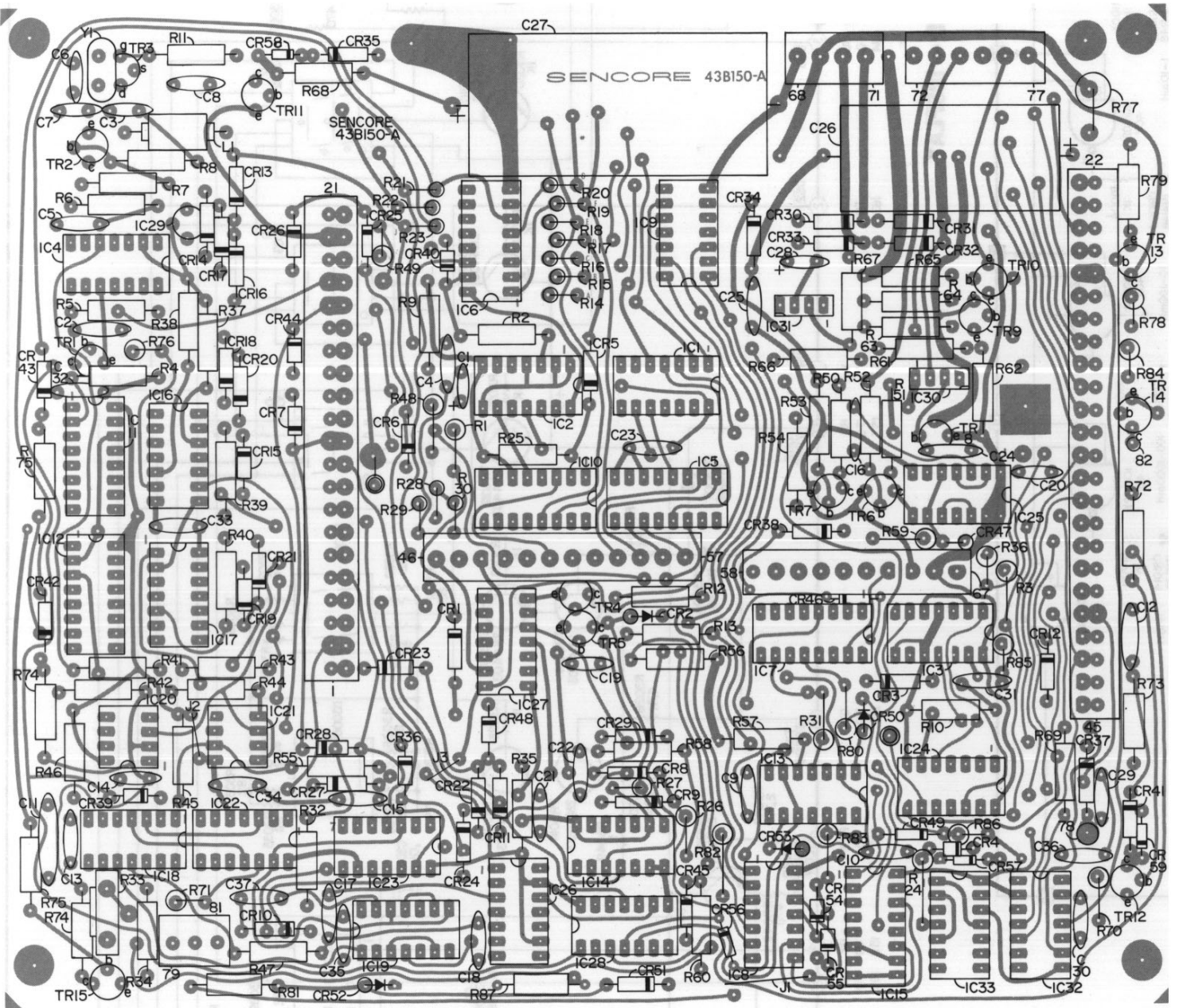
**SENCORE**

*... the electronic instrument "analyzer people"*

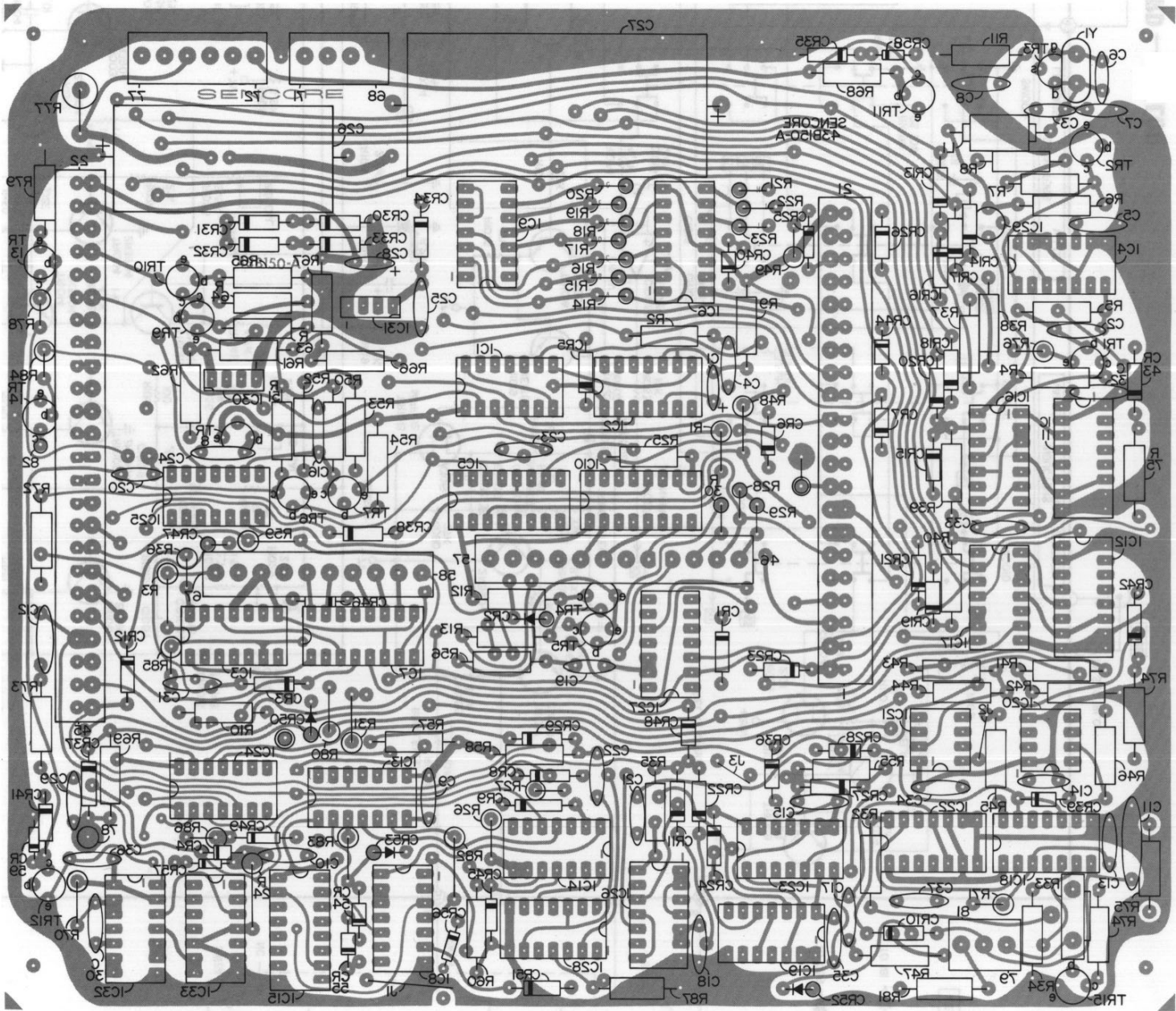
3200 SENCORE DRIVE, SIOUX FALLS, SOUTH DAKOTA 57107 • (605) 339-0100

## SHEET 1

This sheet includes schematics for the Analog and Display Boards. Layouts are found on Sheet 2.

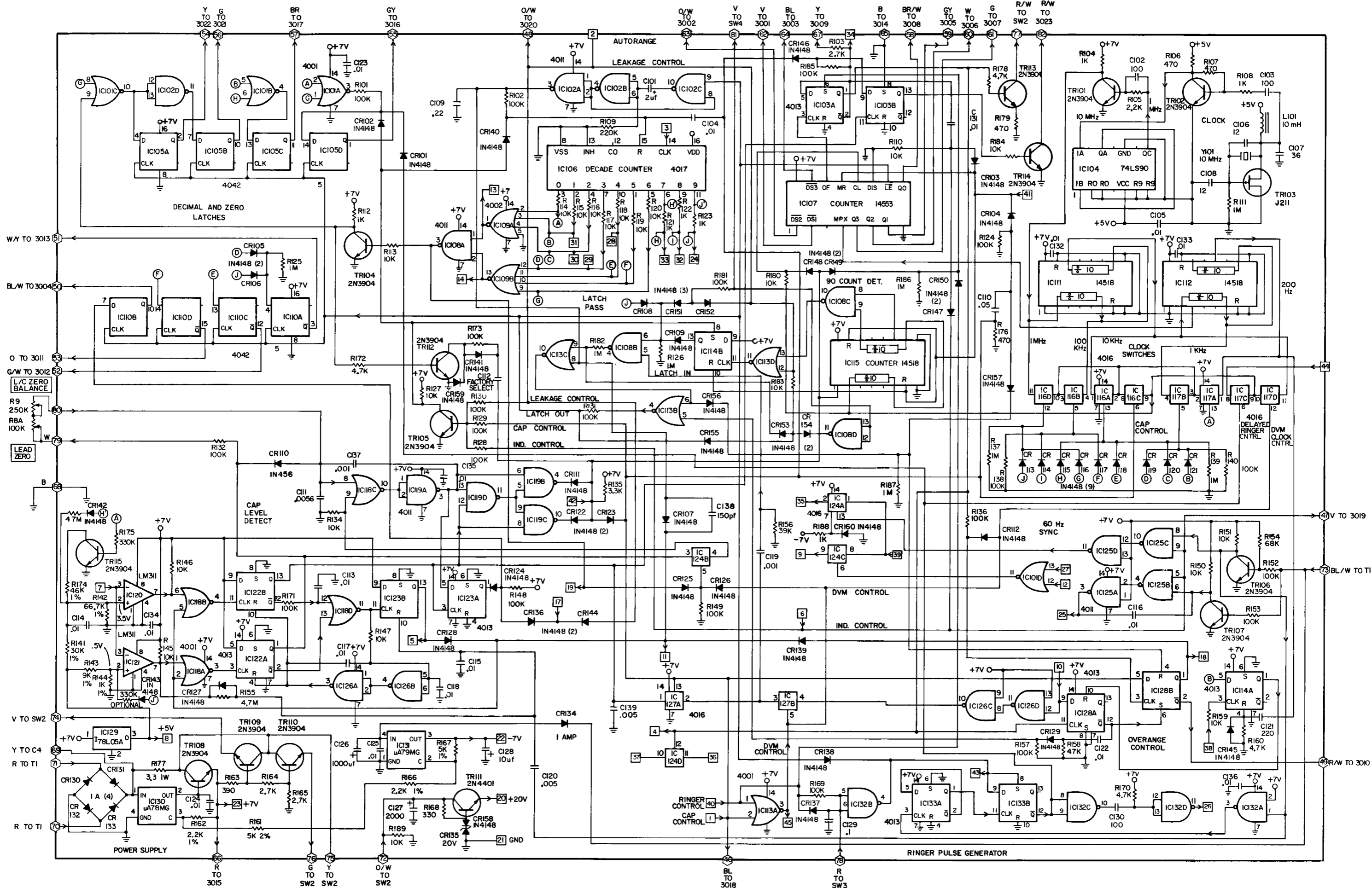


**DIGITAL BOARD (COMPONENT SIDE)**



**DIGITAL BOARD (FOIL SIDE)**

**The schematic for the Digital Board is found on Sheet 2.**



**SCHEMATIC  
REFERENCE**

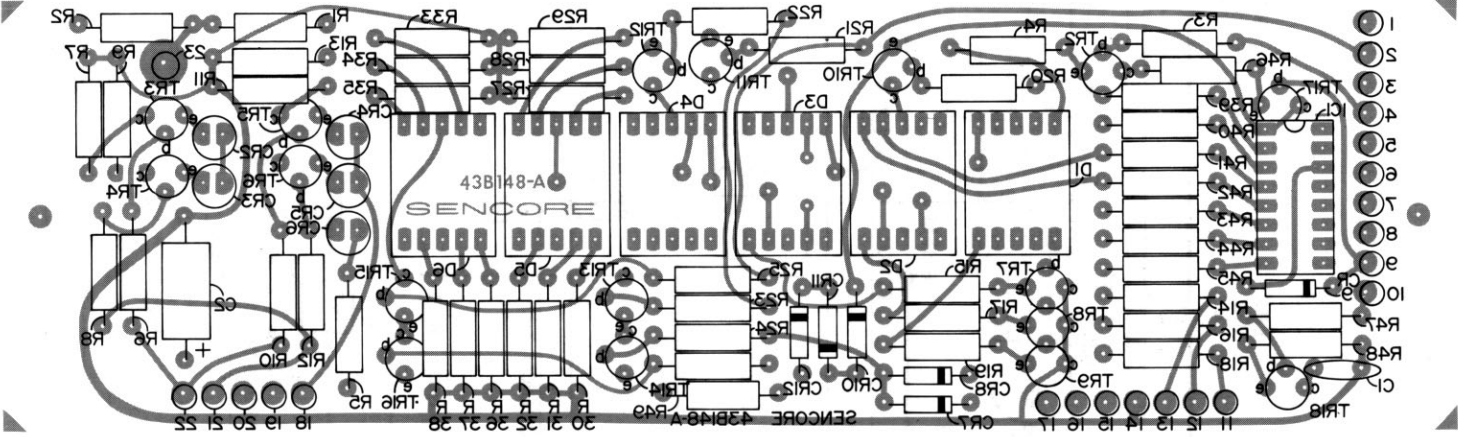
**PART NO.**

**DESCRIPTION**

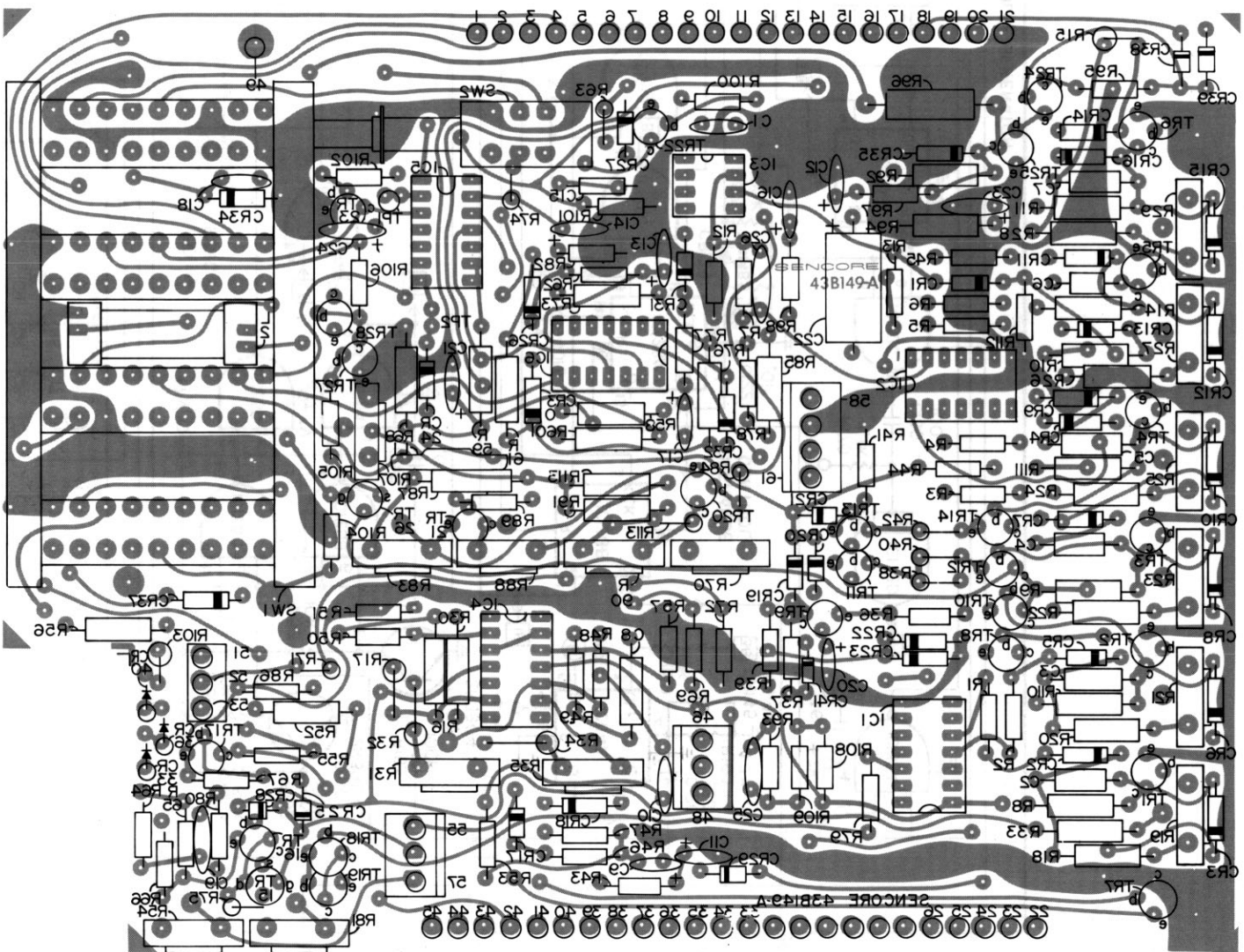
DIGITAL P.C. BOARD (100 Board)

IC1, 13	69G7-B	IC, 4001 Quad 2 in NOR
IC2, 8, 19, 25, 26, 32	69G3-B	IC, 4011 Quad 2 in NAND
IC3, 14, 22, 23, 28, 33	69G8-B	IC, 4013 Dual D F.F.
IC4	69G42	IC, 74LS90 Decade Counter
IC5, 10	69G57-B	IC, 4042 Quad D Latch
IC6	69G45-B	IC, 4017 Decade Counter
IC7	69G23	IC, 14553 Three Decade
IC9	69G56-B	IC, 4002 Dual 4 in NOR
IC11, 12, 15	69G36	IC, 14518 2 Decade
IC16, 17, 27	69G11-B	IC, 4016 Quad Switch
IC18	69G7-A	IC, 4001 Quad 2 in NOR AE
IC19	69G3-A	IC, 4011 Quad 2 in NAND AE
IC20, 21	69G58	IC, LM311 Comparator
IC24	69G11-A	IC, 4016 Quad Switch AE
IC29	69G29	IC, LM78L05A 5V Reg.
IC30	69G73	IC, uA78 MGU1-C Positive V. Reg.
IC31	69G74	IC, uA79 MGU1-C Negative V. Reg.
TR1, 2, 4-7, 9, 10, 12, 13-15	19A33-1	Transistor, 2N3904 NPN
TR3	19A50	Transistor, J211 N Channel FET
TR8	19A29-1	Transistor, MJE180, NPN
TR11	19A44	Transistor, 2N4401 NPN
CR1-9, 11-29, 36-60	50C5-2	Diode, 1N4148
CR10	50C5-4 SEL 1 or 3	Diode, 1N456
CR30-34	16S10	Diode, 1A
CR35	50C4-8	Diode, 1N4747A 20V 5% Zener
R35	15C7-13	Control, 100K, Vert PC Mount Pot.
R41	14C29-3004A	Resistor, 30K ½W 1% 100 ppm/°C
R42	14C29-6674A	Resistor, 66.7K ½W 1% 100 ppm/°C
R43	14C29-9003A	Resistor, 9K ½W 1% 100/°C
R44	14C29-1003A	Resistor, 1K ½W 1% 100 ppm/°C
R61, 67	14C30-5003	Resistor, 5K ½W 2%
R62, 66	14C29-2203A	Resistor, 2.2K ½W 1% 100 ppm/°C
R74	14C29-5004A	Resistor, 50K ½W 1% 100/°C
C1	24G384	Capacitor, 2.2 uF Lytic
C2,3	24G70	Capacitor, 100 pF Disc
C4, 5, 13-18, 22-25, 31-36	24G207	Capacitor, .01 uF Disc
C6, 8	24G324	Capacitor, 12 pF, Disc NPO
C7	24G317	Capacitor, 36 pF Disc NPO
C9	24G168	Capacitor, .22 uF Mylar
C10	24G59	Capacitor, .05 uF Disc
C11	24G319	Capacitor, .0056 uF Mylar 20%
C12	24G23	Capacitor, .02 uF Disc.
C19	24G17	Capacitor, .001 uF Disc.
C20, 39	24G125	Capacitor, .005 uF, Disc
C21	24G25	Capacitor, 220 pF Disc
C26	24G272	Capacitor, 1000 uF Lytic
C27	24G307	Capacitor, 2000 uF Lytic
C28	24G382	Capacitor, 10 uF Lytic
C29	24G216	Capacitor, .1 uF Mylar 10%
C30	24G190	Capacitor, 180 pF Disc
C37	24G188	Capacitor, .001 uF Poly 5%
C38	24G208	Capacitor, 150 pF Disc
L1	46G9	Coil, 10 mH
Y1	47A20	Crystal, 10 MHz



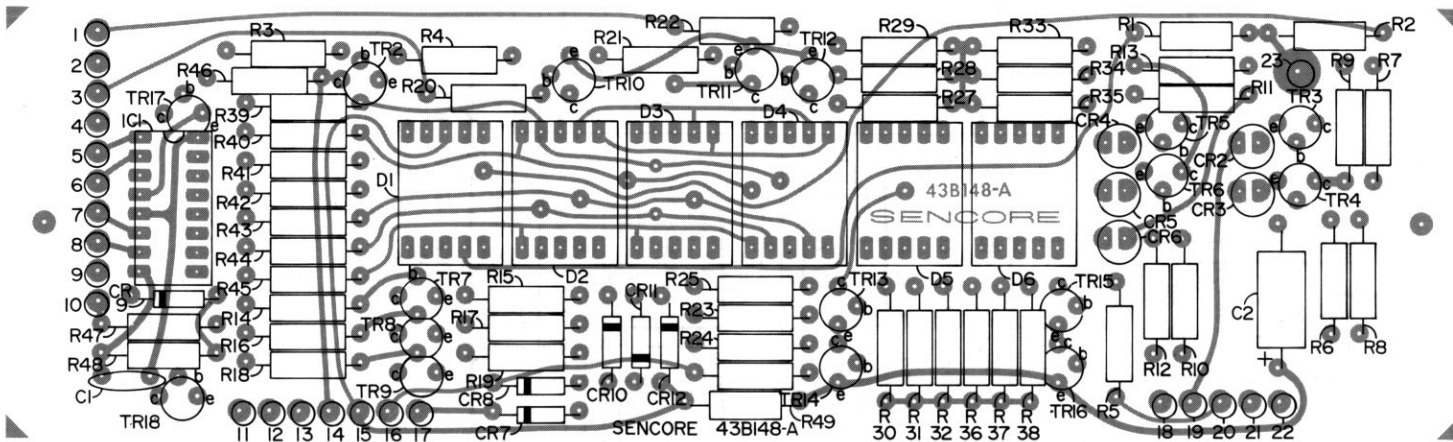


**DISPLAY BOARD (FOIL SIDE)**

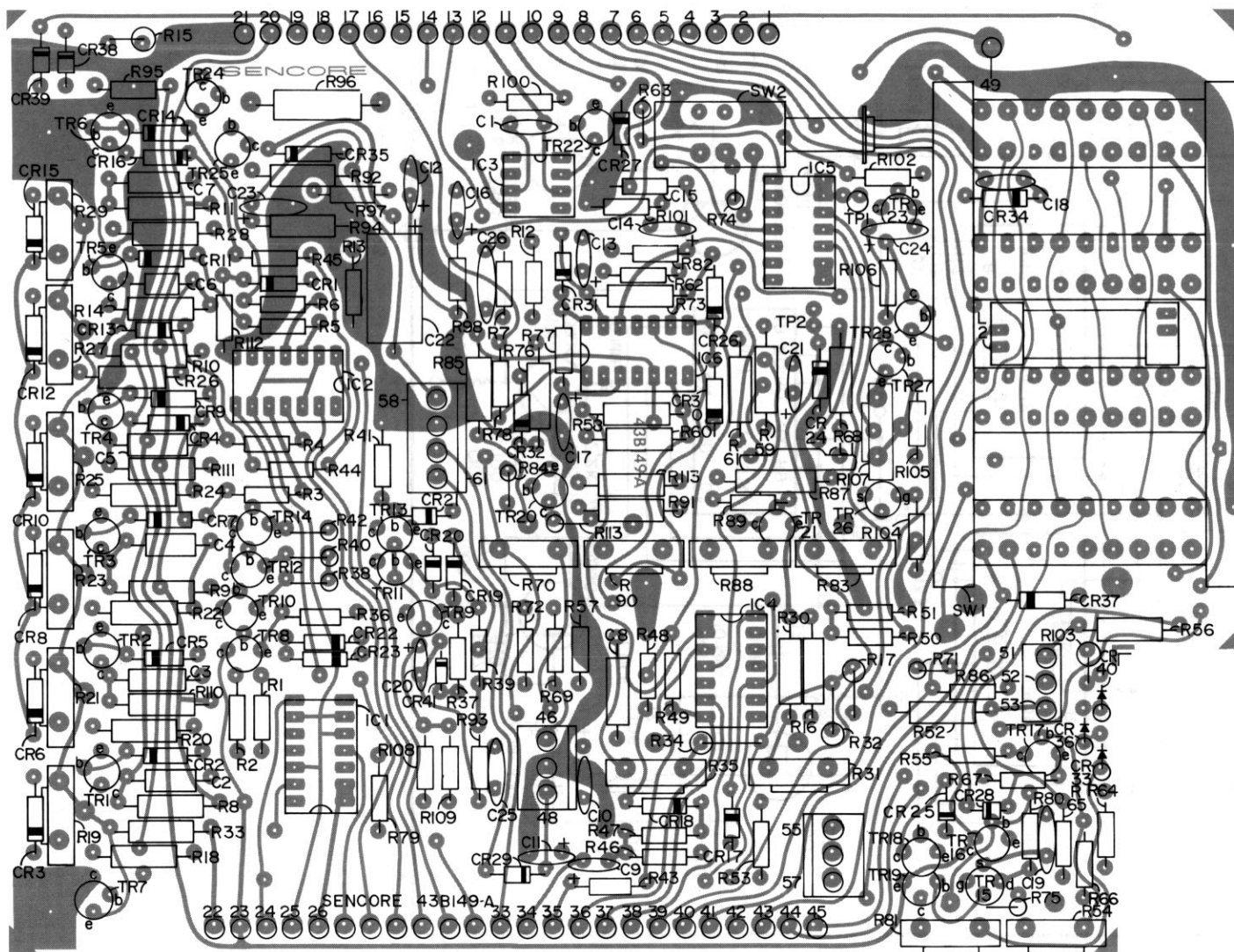


**ANALOG BOARD (FOIL SIDE)**

The schematic for the Analog Board is found on Sheet 1.



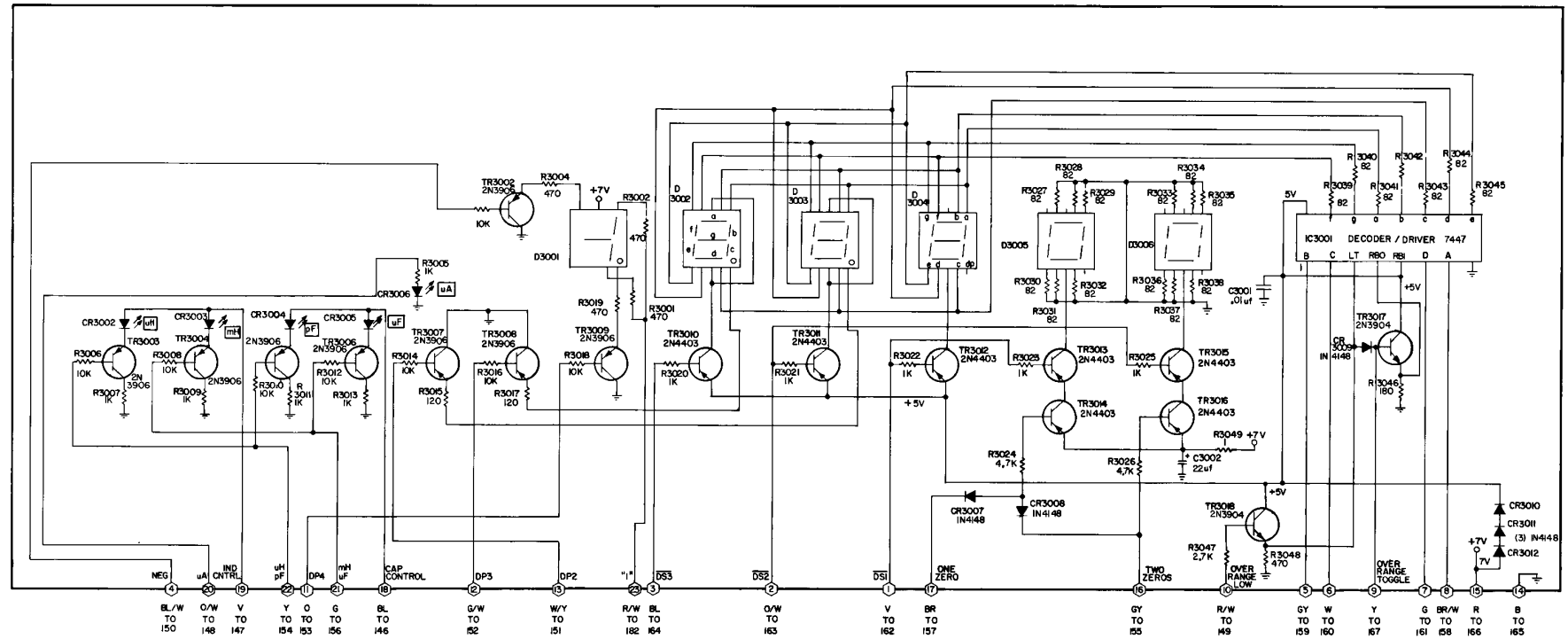
**DISPLAY BOARD (COMPONENT SIDE)**



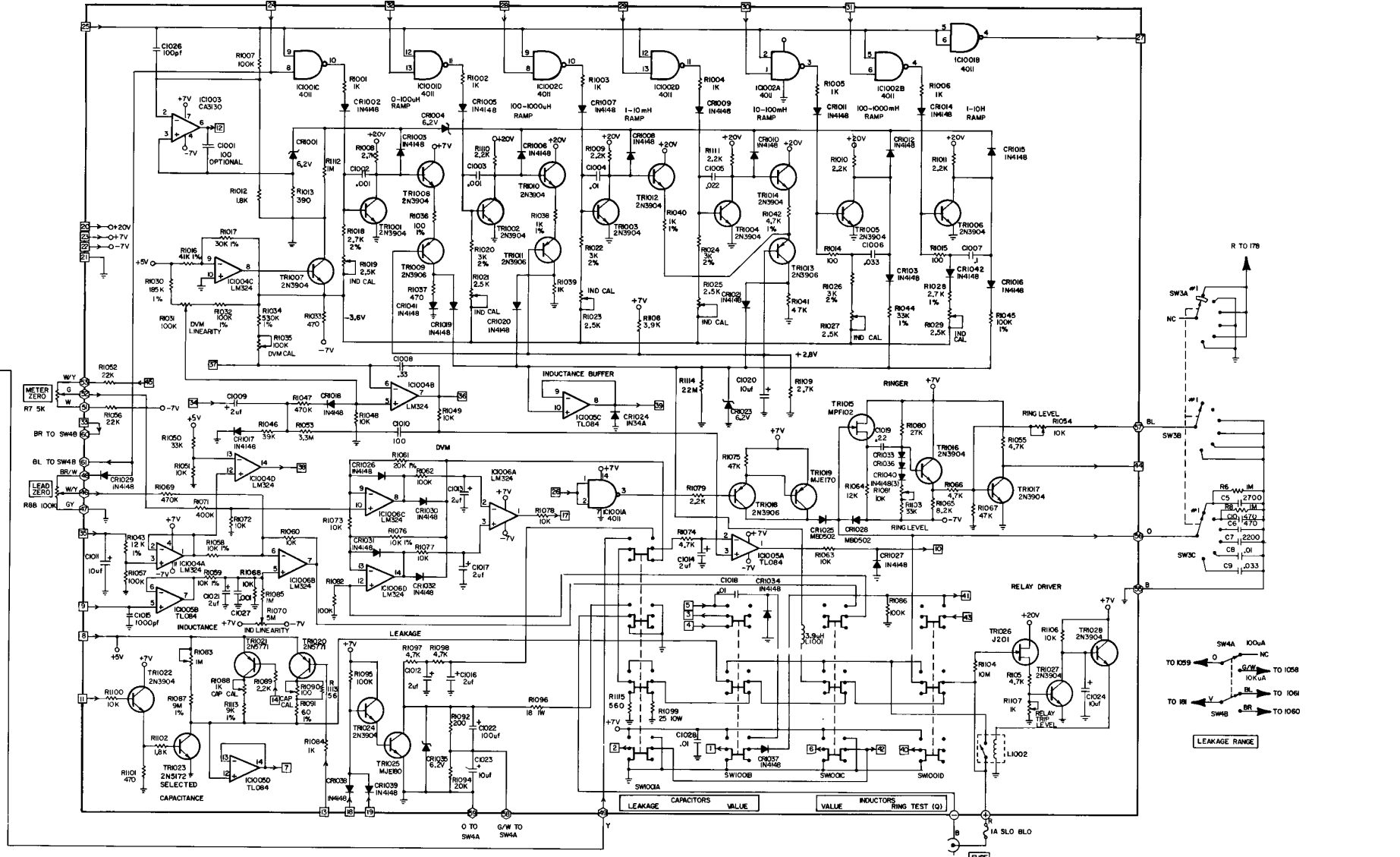
**ANALOG BOARD (COMPONENT SIDE)**

**NOTES:**

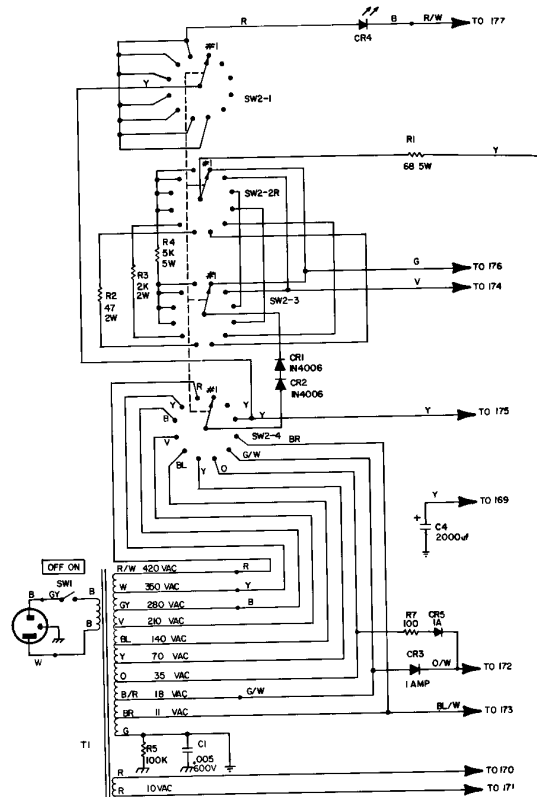
- All resistances in Ohms.
- All capacitances greater than one are pF, less than one are uF, unless otherwise indicated.
- Board interconnection notes:
  - All connections shown in a square  $\square$  are board-to-board direct connections. Connection numbers on both boards are the same. Example:  $\square$  on analog board connects to  $\square$  on digital board.
  - All connections shown in a hex  $\hexagon$  are through cable connectors. The first digit of the "To" note indicates which board the opposite end of the cable is connected. The last part of the "To" note indicates the connector number on that board. The color of the connecting wire is also indicated. Example: "O/W TO 3020" indicates the orange/white wire connects to point 20 on the 3000 board.
  - All connections shown in a circle  $\circ$  are on the same board. No connector is used.
- All controls, jacks, and displays on the exterior of the unit are shown in a box  $\square$ .
- All voltages shown are taken with all buttons in the "out" position. They are taken with a 15 Megohm meter connected to circuit ground.



**3000 BOARD - DISPLAY**



**1000 BOARD - ANALOG**





**SCHEMATIC  
REFERENCE**

**PART NO.**

**DESCRIPTION**

ANALOG P.C. BOARD (1000 Board)

IC1, 2	69G3	IC, 4011 Quad 2 in NAND
IC3	69G21	IC, CA3130 Op Amp
IC4, 6	69G13	IC, LM324 Quad Op Amp
IC5	69G46	IC, TL084 Bi FET Quad Op Amp
TR1-8, 10, 12, 14, 16, 17, 22, 24, 27, 28	19A33-1	Transistor, 2N3904 NPN
TR9, 11, 13, 18	19A34-1	Transistor, 2N3906 PNP
TR15	19A19	Transistor, MPF102 N Channel FET
TR19	19A30-1	Transistor, MJE 170 PNP
TR20, 21	19A45	Transistor, 2N5771 PNP
TR23	19A4-1SEL1	Transistor, 2N5172 NPN Graded for low leakage
TR25	19A29-1	Transistor, MJE 180 NPN
TR26	19A36	Transistor, J201 N Channel FET
CR1, 4	50C12-1	Diode, 6.2V Zener, Temp. Comp.
CR2, 3, 5-21, 26, 27, 29-34, 36-42	50C5-2	Diode, 1N4148
CR23, 35	50C4-6	Diode, 6.2V, Zener
CR24	50C3-1	Diode, 1N34A
CR25, 28	50G14	Diode, MBD 502 Hot Carrier
R16	14C29-4104A	Resistor, 41K, 1/2W, 1%, 100 ppm/°C
R17	14C29-3004A	Resistor, 30K, 1/2W, 1%, 100 ppm/°C
R18, 28	14C30-2703A	Resistor, 2.7K, 1/2W, 2%, 100 ppm/°C
R19, 21, 23, 25, 27, 29	15C7-31	Control, 2.5K, Vert PC Mount Pot
R20, 22, 24, 26	14C30-3003A	Resistor, 3K, 1/2W, 2%, 100 ppm/°C
R30	14C29-1855A	Resistor, 185K, 1/2W, 1%, 100 ppm/°C
R30	14C29-1855A	Resistor, 185K, 1/2W, 1%, 100 ppm/°C
R31, 35	15C7-13	Control, 100K, Vert PC Mount Pot
R32, 45	14C29-1005A	Resistor, 100K, 1/2W, 1%, 100 ppm/°C
R36	14C29-1002A	Resistor, 100 Ohm, 1/2W, 1%, 100 ppm/°C
R38, 40	14C29-1003A	Resistor, 1K, 1/2W, 1%, 100 ppm/°C
R42	14C29-4703A	Resistor, 4.7K, 1/2W, 1%, 100 ppm/°C
R44	14C29-3304A	Resistor, 33K, 1/2W, 1%, 100 ppm/°C
R54, 81	15C7-2	Control, 10K, Vert PC Mount Pot
R58-60, 68, 73, 76	14C29-1004A	Resistor, 10K, 1/2W, 1%, 100 ppm/°C
R61, 94	14C29-2004A	Resistor, 20K, 1/2W, 1%, 100 ppm/°C
R70	15C7-7	Control, 5M, Vert PC Mount Pot
R83	15C7-26	Control, 1M, Vert PC Mount Pot
R87	14C32-9006A	Resistor, 9M, 1W 1%
R88, 107	15C7-17	Control, 1K, Vert PC Mount Pot
R90	15C7-9	Control, 100 Ohm, Vert PC Mount Pot.
R91	14C29-6001A	Resistor, 60 Ohm, 1/2W, 1%, 100 ppm/°C
R92	14C29-2002A	Resistor, 200 Ohm, 1/2W, 1%, 100 ppm/°C
R99	14A52-14	Resistor, 50 Ohm, 10W
R113	14C29-9003A	Resistor, 9K, 1/2W, 1%, 100 ppm/°C
C1, 10	24G70	Capacitor, 100 pF disc NPO
C2,3	24G188	Capacitor, .001 uF Poly 5%
C4	24G346	Capacitor, .01 uF Mylar 10%
C5	24G195	Capacitor, .022uF Mylar
C6	24G338	Capacitor, .033 uF Mylar
C7	24G216	Capacitor, .1 uF Mylar
C8	24G374	Capacitor, .33 uF Film 10%
C9, 12-14, 16, 17, 21	24G384	Capacitor, 2 uF Lytic
C11, 20, 23, 24	24G382	Capacitor, 10 uF
C15	24G286	Capacitor, .001 uF 200V 20% Mylar
C18, 28	24G207	Capacitor, .01 uF Disc
C19	24G168	Capacitor, .22 uF Mylar
C22	24G118	Capacitor, 100 uF Lytic
C26	24G82	Capacitor, 100 pF Disc
C27	24G17	Capacitor, .001 uF Disc
SW1	25A273-C	Switch, 4 Module, 6 Pole, P.B.
SW2	25A225-A	Switch, 1 Section, 2 Pole, P.B.
L1	46G76	Coil, 3.9 uH
L2	41G7	Reed Relay

## SHEET 2

This sheet includes schematic for the Digital Board. Layouts are found on Sheet 1.

**SCHEMATIC  
REFERENCE**

**PART NO.**

**DESCRIPTION**

**DISPLAY P.C. BOARD (3000 Board)**

SCHEMATIC REFERENCE	PART NO.	DESCRIPTION
IC1	69G35	IC, BCD - 7 Seg. Decoder/Driver 7447
TR2-9	19A34-1	Transistor, 2N3906, PNP
TR17, 18	19A33-1	Transistor, 2N3904 NPN
TR10-16	19A40	Transistor, 2N4403 PNP
CR2-6	20G14	LED Indicator
CR7-9	50C5-2	Diode, 1N4148
CR10-12	16S10	Diode, 1 Amp
C1	24G207	Capacitor, .01 Disc
C2	24G121	Capacitor, 20 uF 15V Lytic
D1-6	23G63	7 Segment Display T1L321

**CHASSIS MOUNTED PARTS**

SCHEMATIC REFERENCE	PART NO.	DESCRIPTION
CR1, 2	16S5-SEL1	Diode, 1A, 800V PIV
CR3, 5	16S10	Diode, 1A
CR4	20G14	LED Indicator
R1	14B49-30	Resistor, 68 Ohms, 5W
R3	14B49-31	Resistor, 2K, 5W
R4	14B49-22	Resistor, 5K, 5W
R7	15C3-15	Control, 5K, Tab Mtg, Pot
R8	15B21-D	Control, 100K, Dual Pot, Lead Zero
R9	15C3-4	Control, 250K, Tab Mtg, Zero Balance, Pot
C1	24G9	Capacitor, .005 uF Disc
C4	24G240	Capacitor, 2000 uF 25V Lytic
C5	24G341	Capacitor, 2700 pF, Poly, 5%
C6, 10	24G279	Capacitor, 470 pF, Poly, 5%
C7	24G345	Capacitor, .0022 uF, Poly, 10%
C8	24G403	Capacitor, .01 uF, Poly, 10%, 400V
C9	24G404	Capacitor, .033 uF, Poly, 10%, 200V
SW1	25G294	Switch, Rocker, 1PIT, Off, On
SW2	25A275-C	Switch, Leakage
SW3	25A274	Switch, Ringing
SW4	25G245	Switch, Rocker, 2P2T, Leakage Range
T1	28K76-D	Power Transformer
	110K431	Case, Riveted Ass'y.
	110C433-D	VAC Formed Case Back Riveted Ass'y
	21A37	Knob Rotary
	21A58	Push Button
	21K80	Knob, Zero Adjust
	39G143	Test Lead Ass'y
	39G144	Test Lead Adapter
	22B70	Handle, Molded
	39G154	Button Hold Accessory
	63K25-B	Filter, Red Display
	8C239	Bezel, Molded

Components not listed are standard replacement parts and may be purchased locally. When ordering parts, please specify instrument model number, schematic reference, part number, and description. Please include remittance (check or money order) with your order, otherwise invoice will be shipped C.O.D. Minimum billing is \$5.00