



505½ CENTINELA AVE., INGLEWOOD, CALIFORNIA 90302 (213) 674-3021

ES 301S/302S

Operation Manual

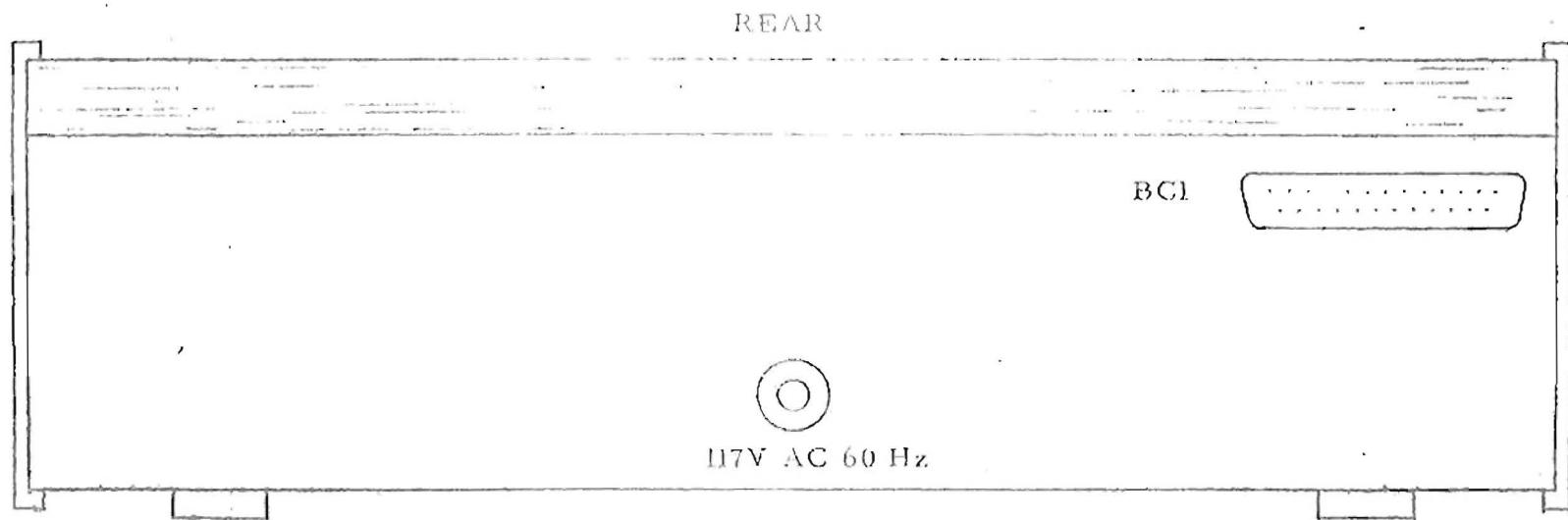
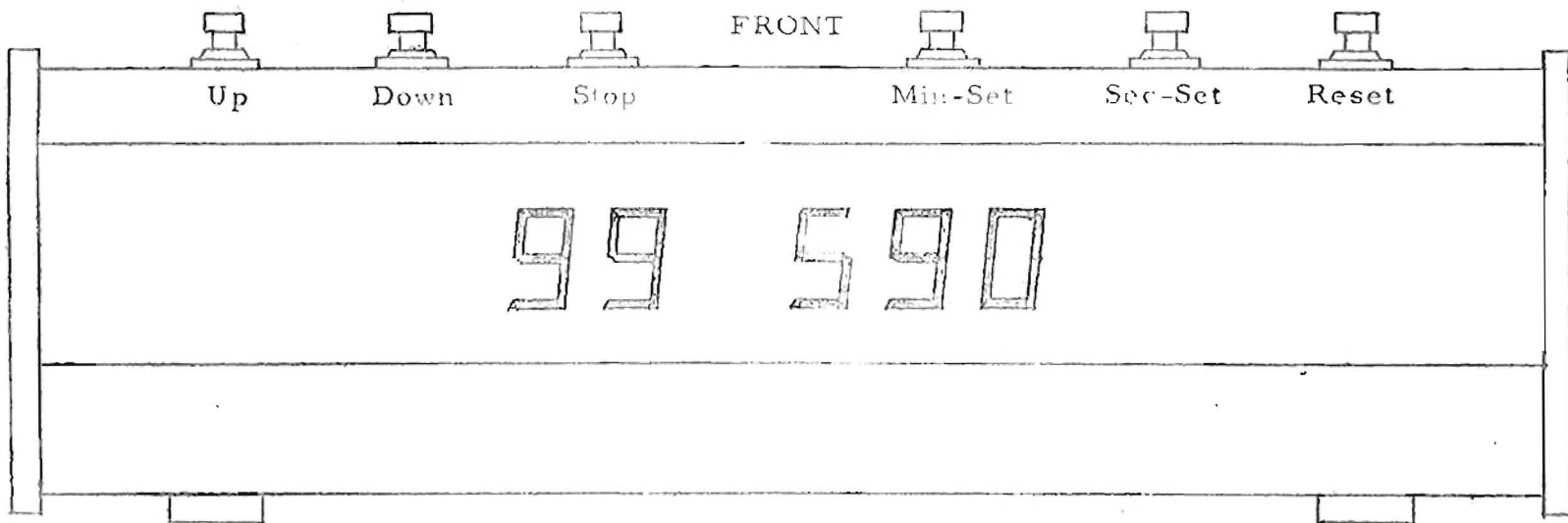
The ES 301S and ES 302S are four digit one hundred minute slaves with gas discharge displays. The units are designed to receive BCD information and display time (minutes and seconds). The BCD information may be derived from any of the following master units which have BCD output: ES 300, ES 301, ES 302, ES 380 or ES 381. No more than two slaves should be connected to a master.

Specifications

Mechanical: Etched Aluminum Case - 2 1/2" High x 8" Wide x 5 5/8" Deep

Electrical: Input Voltage - 117V AC 50/60 Hz

Power Requirement - 6W Max



Connector BC1 Pin Designations

Pin	Function		Pin	Function	
1	A3	Seconds Inputs	13	A7	10's of Minutes Inputs
2	B3		14	B7	
3	C3		15	C7	
4	D3		16	D7	
5	A4	10's of Seconds Inputs	17	A2	10th of Seconds Inputs
6	B4		18	B2	
7	C4		19	C2	
8	Not used		20	D2	
9	A6	Minutes Inputs	21	Not used	
10	B6		22	Not used	
11	C6		23	Not used	
12	D6		24	Ground	
			25	Not used	

301/302 Slave Parts List
(970 Board)

Qty	Designation	Description	P/N
4	Z3, Z4, Z6, Z7	IC	DM8880
2	D1, D2	Diode	1N4003
1	R9	Resistor	150 Ohm 1/2W - 10%
4	R13, R14, R16, R17	Resistor	2.7K Ohm 1/4W - 10%
4	R3, R4, R6, R7	Resistor	10K Ohm 1/4W - 10%
1	R10	Resistor	240K Ohm 1/4W - 10%
2	C1, C2	Capacitor	20 uf min 100V min
1	3, 4	Display	SP 352
1	6, 7	Display	SP 352

{Power Supply Board}

1		Capacitor	4700 uf min 6V min
3		Diode	1N4001
2		6.3V @ .6a Transformer	6465 or Equiv.

For Tenths of Seconds

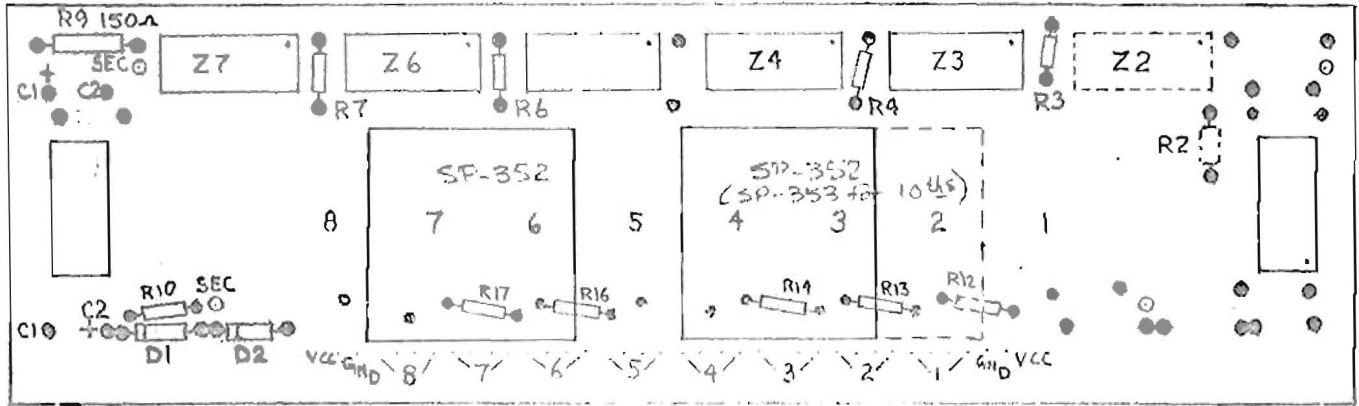
1	Z2	IC	DM8880
1	R12	Resistor	2.7K Ohm 1/4W - 10%
1	R2	Resistor	10K Ohm 1/4W - 10%
1	2, 3, 4 (Replaces 3, 4)	Display	SP 353

Other Components

1		Display Board	ES 970
1		Line Cord	2 Wire 7'
2		Wire Caps	71B
1		Case and Hardware	10002
1		Male BCD Connector	17-20250
1	BC1	Female BCD Connector	17-10250
1		BCD Cable Clamp	17-312-01

ES-970

for ES-3015 or ES-3025



R1-R8 ARE 10KΩ.

Z1-Z8 ARE DM8880A.

C1 & C2 ARE 20μF 100V AND ARE MOUNTED ON REAR OF BOARD.

DISPLAYS 1-8 ARE SP-352 OR SP-353.

D1 & D2 ARE 1N4003.

R11-R18 ARE 2.7KΩ.

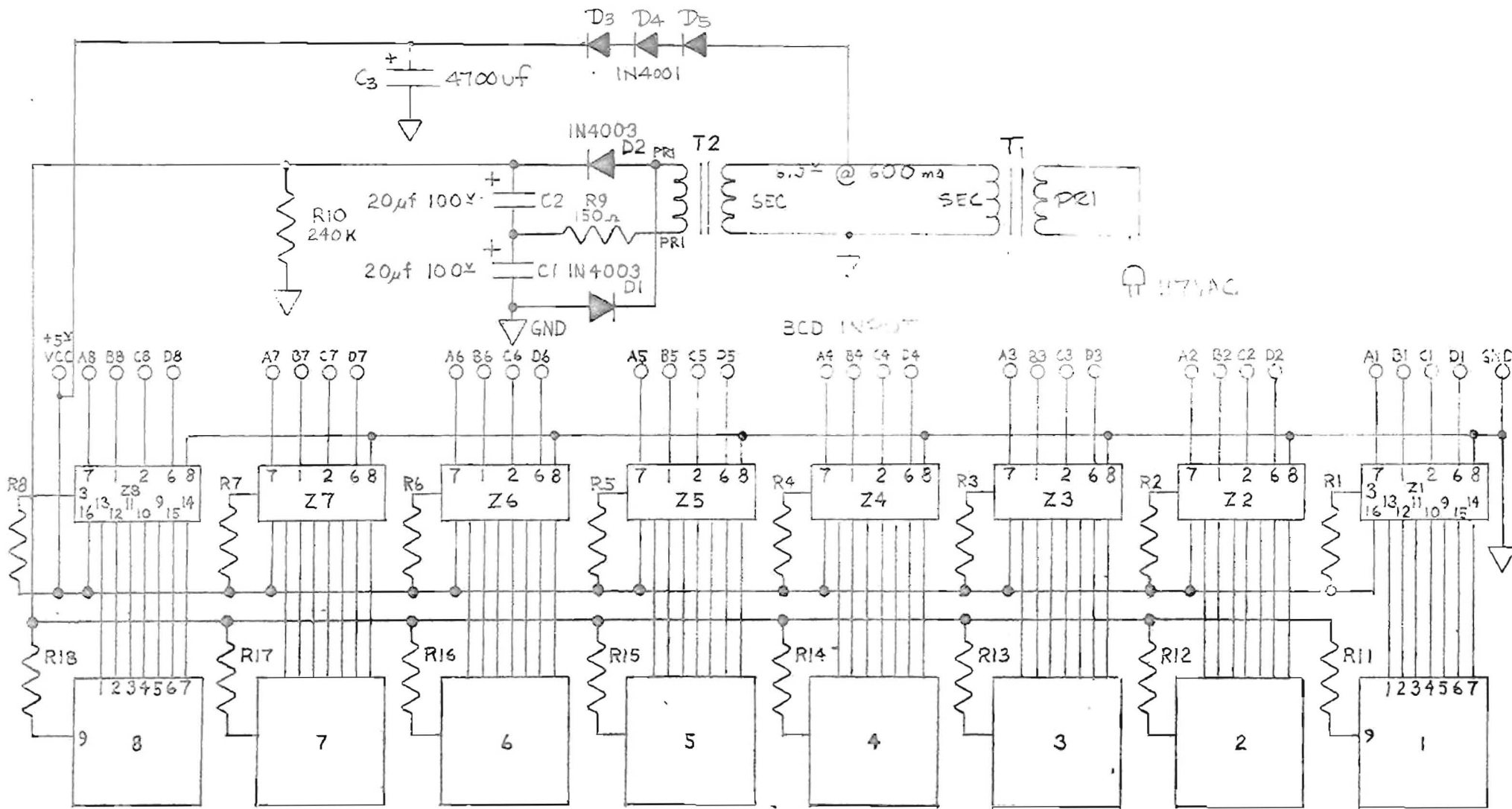
R10 IS 240KΩ.

ES-970 for ES-3015 or ES-3025

The following components are not used

Z₁, Z₅, Z₈, R₁, R₅, Z₃, R₁₁, R₁₅, R₁₉

Z₂, R₂, E₁₂ are used for 10ths of seconds only



R₁₁ - R₁₈ ARE 2.7K_Ω.

R₁ - R₈ ARE 10K_Ω.

Z₁ - Z₈ ARE DM8880A.

DISPLAYS 1 - 8 ARE SP-352 OR SP-353.