

Technical Manual



MAINTENANCE
INSTRUCTIONS FOR

SLAVE STROBONAR MODELS 200/202

Honeywell

PHOTOGRAPHIC PRODUCTS DIVISION
P. O. BOX 1010 • LITTLETON, COLORADO • 80120

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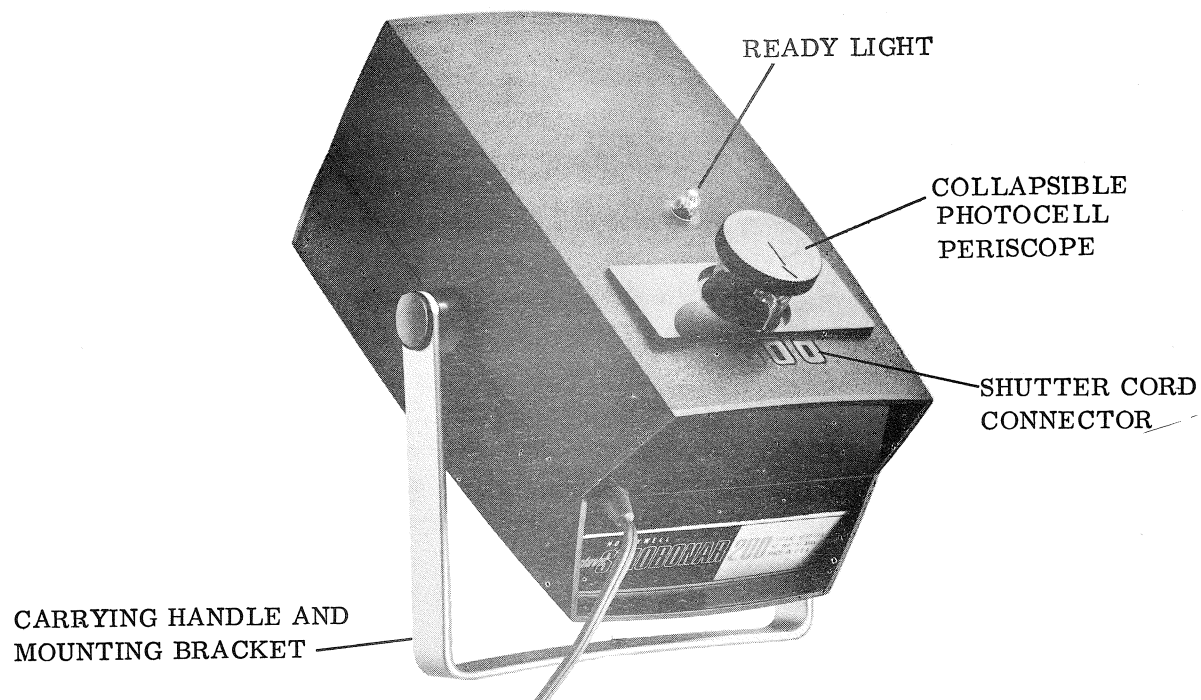


Figure 1-1. Model 200 Slave Strobolar

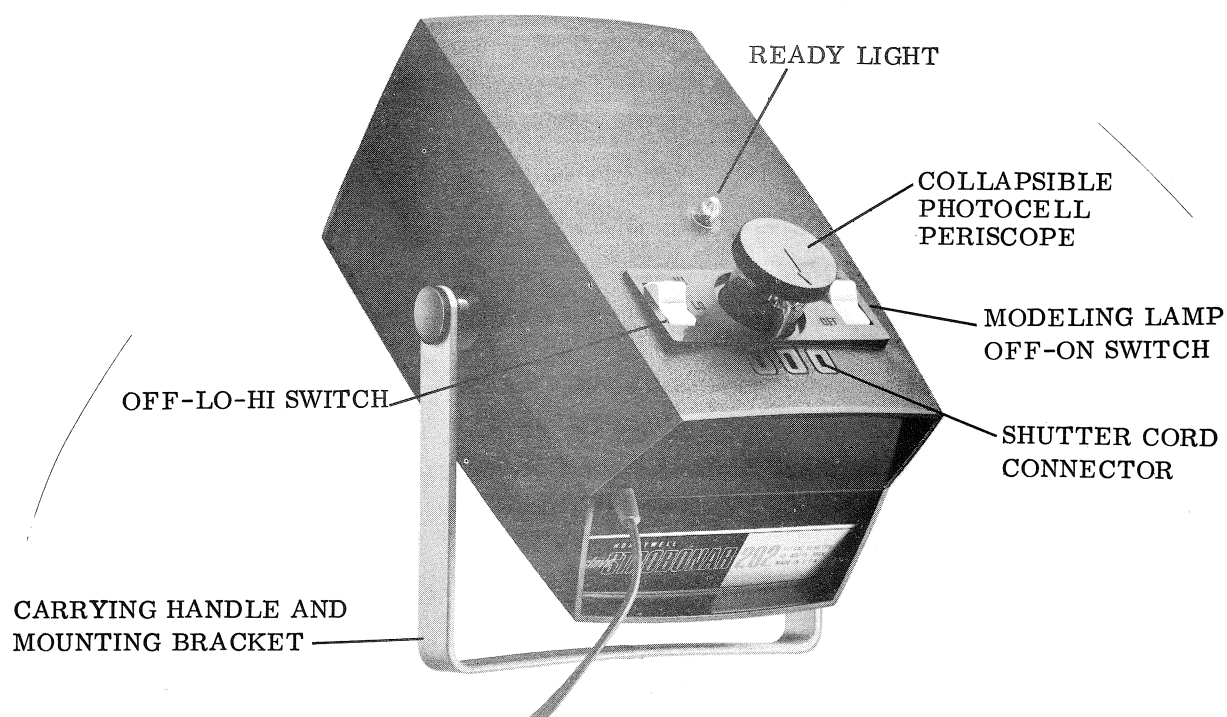


Figure 1-2. Model 202 Slave Strobolar

SECTION 1

INTRODUCTION

1-1. SCOPE OF MANUAL

This manual provides maintenance instructions for the Honeywell Slave Strobos, Models 200 and 202. It includes information on operational checkout, principles of operation, troubleshooting data, problem analysis, disassembly, repair, component replacement, adjustments, recommended equipment, and a parts list.

1-2. UNIT DESCRIPTION (See Figures 1-1 and 1-2.)

The Honeywell Models 200 and 202 Slave Strobos are portable, electronic, photographic flash units, designed for multiple flash. Powered only on ac, they are flashed either by the light from another flash unit or by closing the camera shutter contacts. A blinking neon lamp indicates when a unit is charged to about 3/4 of full energy level and can be flashed. A unit can be set at any angle whether on a table or mounted on a tripod. The modeling lamp uses the same reflector as the flashtube and gives the same light coverage.

In addition to the features common to both models (described above), the Model 202 has two switches and the option of twice the light output of the Model 200. A two position switch turns the modeling lamp on and off, and a three position switch (HI-LO-OFF) turns power on and off and selects high or low light output.

1-3. SPECIFICATIONS

Center Axis Light Output

(Four feet from the reflector
with 330 ± 10 Vdc storage
capacitor voltage)

Model 200 or Model 202 on LO - -
21 to 42 lumen seconds per square
foot (339 to 678 B. C. P. S.).

Model 202 on HI - - 42 to 84 lumen seconds
per square foot (678 to 1354 B. C. P. S.).

Angle of Coverage

(Vertical and horizontal)

Minimum of 50% of center axis light output
at 30° off center axis.

Ready Light

(117 Vac input)

Blinks when the storage capacitor voltage
reaches 265 to 295 Vdc, not later than
eight seconds after the unit flashes.

Modeling Lamp Output

(Center Axis)

Minimum of one to two candles per square
foot four feet from the reflector.

Storage Capacitor

Model 200 - - 700 to 1120 μ f.

Model 202 - - Two capacitors, 700 to 1120 μ f each.

Recycle Time

With 117 \pm 2 Vac input, the interval from the time the unit is flashed until storage capacitor voltage reaches 310 Vdc, is ten seconds maximum.

SECTION 2

PRINCIPLES OF OPERATION

2-1. GENERAL (See Figures 1-1 and 1-2)

Honeywell Slave Strobosars, Models 200 and 202, operate only on ac, 105 to 129 volts, 50 to 60 Hz. They are flashed either by the light from another flash unit, from camera shutter contacts, or manually.

A neon indicator (on top of the unit) lights when the voltage on the storage capacitor reaches about 280 volts, at which time the energy stored in the capacitor is about 3/4 of a full charge, and the unit is ready to flash.

An incandescent modeling lamp, operating on line voltage, shares the reflector with the flashtube and gives the same light coverage as the flashtube.

Stored energy of the Model 200, or the Model 202 on LO, is 40 watt-seconds per flash. Stored energy of the Model 202 on HI is 80 watt-seconds per flash. A switch on the Model 202 turns the modeling lamp on or off, and the HI-LO-OFF switch turns power on or off and selects high or low light output. The Model 200 has no provision for switching the modeling lamp or power.

2-2. CIRCUIT DESCRIPTION

A. POWER (See Figure 5-4)

When line voltage is applied to the input of the unit, C1B charges through CR1 when the polarity of the ac voltage is right. On the other half cycles, C1B, in series with the line voltage, charges C1A to twice line voltage peak, through CR2. C2A (Model 202) also charges to twice line voltage peak through R1. Due to impedance in the circuit, several hundred cycles are required to bring the capacitors to full charge.

B. HIGH AND LOW LIGHT OUTPUT (See Figure 5-4) (Model 202)

With S2 in LO position, C2A charges to the same voltage as C1A, but due to the relatively long time constant of C2A and R1, the voltage across C2A cannot follow the rapid voltage decline that occurs across C1A when the unit flashes. Switch S2, in HI position, shorts R1, putting C1A and C2A in parallel; C1A and C2A then act as one capacitor, doubling the light output when the unit flashes.

Resistor R1 allows C2A to maintain very nearly the same voltage as that across C1A except immediately after flashing the unit on LO. Running C1A and C2A at the same voltage performs two functions:

1. C2A forms when the unit operates on LO.
2. S2 is protected from arcing which occurs if there is a considerable difference between the voltages across C1A and C2A when S2 is switched from LO to HI.

C. TRIGGER CIRCUIT (See Figure 5-4)

1. Shutter Operation

As C1A charges, C3 charges to the voltage across R3. When the unit is flashed by the shutter contacts, the contacts short R3, dumping the charge in C3 through T1 primary. The high voltage induced in T1 secondary ionizes the gas in FT1 which discharges C1A (or C1A and C2A) through FT1.

2. Slave Operation

Slave operation also triggers the unit by shorting R3, but uses a different method to accomplish it. Photocell V1 is a photovoltaic cell whose voltage output is a function of the amount of light falling on the cell. At normal ambient light levels the voltage output of V1 is very low, and the necessary shutoff bias is maintained on SCR1 by the voltage divider, R2, R3, L1, and R5. When the master unit flashes, and sufficient light falls on V1, the voltage output of V1 reverses the voltage polarity across L1, making SCR1 gate positive with respect to the cathode, turning on SCR1, and dumping the charge in C3 through T1 primary.

D. MODELING LAMP (See Figure 5-4)

The modeling lamp operates on 117 Vac. For the modeling lamp of a Model 202 to be on, S1 must be in the ON position. A model 200 need only be plugged into the line voltage.

SECTION 3

CHECKOUT AND TROUBLESHOOTING

3-1. TEST EQUIPMENT

Test equipment required for an operational checkout and service of the unit is as follows:

Volt-Ohm Meter	Triplett Model 630-NA or equivalent.
Light Meter	Honeywell TE 611, EGG 580-11, or equivalent.
DC Power Supply	Variable dc voltage to 350 Vdc.

3-2. OPERATIONAL CHECKOUT

WARNING

Use extreme caution in disassembling the unit, as residual voltage on energy storage capacitors presents serious shock hazard. Discharge the storage capacitors through a resistor of at least 100 Ω , 2W.

A. PRELIMINARY

Disassemble the unit (see paragraph 4-2). Before performing any operational checkout tests, form the capacitors, C1A and C2A, for 30 minutes at 300 Vdc. Flashing the unit every two or three minutes accelerates forming.

B. LEAKAGE CHECK

After following the procedure in paragraph 3-2,A, discharge the capacitors, and disconnect them from the rest of the circuit. Check the leakage current of each capacitor as follows:

1. Charge the capacitor to 300 Vdc from a dc power supply with a 1000 ohm, 1% resistor in series.
2. Measure leakage current by reading the voltage across the resistor. Allow at least 10 seconds for the capacitor to charge.
3. If leakage current exceeds .9 ma (.9 volts across 1000 ohms), replace the capacitor.

C. NEON INDICATOR

The neon indicator light should begin to flash when the voltage across C1A reaches 265 to 295 Vdc, not more than ten seconds after the unit flashes, with 117 Vac input.

D. RECYCLE TIME

1. Manual or camera shutter triggering: The unit should flash consistently at 10 second intervals with 117 Vac input.
2. Slave triggering: The unit should flash consistently at 10 second intervals with 117 Vac input.

E. LIGHT OUTPUT

Check light output to specifications (see paragraph 1-3).

3-3. TROUBLESHOOTING

If the unit operates, perform the operation checkout first (paragraph 3-2).

A. TECHNIQUES

1. Look first for obvious things: broken wires, broken or discolored components, or evidence of physical damage. Faults such as arcing and burned-out resistors or transformers can often be detected by sight, smell, or sound. Most will be located by voltage, current, and resistance measurements. Check electrical connections at connectors.
2. Isolate the section of the circuit responsible for the fault. An operational check will demonstrate what the circuit is doing and what it is NOT doing. Observe the actions of switches and indicators to isolate the fault.
3. Having isolated the defective section of the circuit, isolate the component responsible for the malfunction. Consider which components, if faulty, could cause the voltages or currents to be as you find them. Refer to the schematic diagram, Figure 5-4.
4. Use caution against shorting components when making voltage measurements on a circuit board, as short circuits in some areas can damage good components.

B. TROUBLESHOOTING DATA

1. No Flash

- a. Power circuit: Check line voltage, line cord, HI-LO-OFF switch, diodes, and doubler capacitor.
- b. Energy storage capacitor: If C1A (or C2A) is open or defective, causing high leakage current, the unit may not flash. Check for leakage current. There should be a measurable leakage current, but it should not exceed the capacitor specifications (see paragraph 3-2, B).
- c. Triggering: Short J1, and look for a spark.
 - 1) If a spark is produced, probable faults are T1 secondary open or shorted, faulty connection from T1 to FT1, faulty FT1, or defective V1.
 - 2) No spark indicates T1 primary open, R2, L1, or R5 open, R3 or SCR1 shorted, or C3 either open or shorted. C3 normally operates at 150 to 200 Vdc when storage capacitor voltage is at full energy level. Due to meter loading, a voltage reading on C3 may be about 100V.
 - 3) If the unit flashes manually, but not on slave operation, momentarily jumper from gate to anode of SCR1 with a 10K resistor. If the unit does not flash when that is done, SCR1 may be at fault. If the unit flashes, SCR1 is operating, and V1 is the probable fault.

2. Low Light Output

Be sure the storage capacitor has been formed for at least 30 minutes. Look for the following faults:

- a. Defective storage capacitor.
- b. Low voltage on storage capacitor.
- c. Flash tube turning black.
- d. Flash tube or reflector dislocated.
- e. Dirty reflector or lens.

If a Model 202 suffers from low light output on HI only, the HI-LO-OFF switch, S2, and C2A are suspect.

3. Slow Recycle

- a. Check line voltage; low line voltage can cause slow recycle.
- b. Check storage capacitor leakage (see paragraph 3-2, B).

SECTION 4

MAINTENANCE

4-1. TOOLS AND TEST EQUIPMENT

Maintenance of the Models 200 and 202 Strobunar flash units requires no special tools. Ordinary screwdrivers, diagonal cutters, long nose pliers, a soldering iron, and other common hand tools are adequate to perform all repair and replacement procedures. A volt-ohm meter such as the Triplet Model 630-NA and a variable dc power supply suffice to perform adjustments described in this section.

4-2. DISASSEMBLY

WARNING

Use extreme caution in disassembling the unit, as residual voltage on energy storage capacitors presents serious shock hazard. Discharge the storage capacitors through a resistor of at least 100 Ω , 2W.

Disassembly, to the extent necessary for operational checkout and troubleshooting, is done by the following steps; reassemble the unit by reversing these steps.

- A. Remove the lens and modeling lamp.
- B. Spread the handle, and remove it.
- C. Separate the top and bottom halves of the case; be careful not to put undue strain on wiring.
- D. To remove the circuit card, turn each speed nut until one side of the nut meets the flat side of the plastic mounting post. Remove the nuts and circuit card (see Figure 5-2).

4-3. CLEANING

A. MECHANICAL AND ELECTRICAL COMPONENTS

Wipe the large surfaces with a clean, dry, lint-free cloth. Use low pressure compressed air to blow dust from hard-to-reach areas. When using compressed air, always direct the first blast of air at the floor to remove moisture from the air line.

B. REFLECTOR AND LENS

Immerse the reflector or lens in warm, soapy water, and clean it gently with cotton or a soft cloth. Rinse with clean water, and wipe dry with a soft, dry, lint-free cloth.

4-4. ELECTRICAL COMPONENT REPLACEMENT

When removing or replacing electrical components, observe the following precautions:

- A. When applying heat, use a heat sink to avoid component and circuit board damage by heat conduction of component leads.
- B. Apply heat sparingly to the component lead to be removed, and lift the lead clear of the junction.
- C. Use heat sinks, and apply heat sparingly when installing new components.
- D. Make component placement and lead dressing of new components the same as for the original.

4-5. ELECTRICAL ADJUSTMENT (NEON INDICATOR)

Connect a dc power supply across C1A with a 1000 ohm resistor in series. Adjust R6 until the neon indicator comes on when the voltage across C1A reaches 275 ± 10 volts. Adjust near the low end of the range, as neon aging causes an upward shift in the neon ionization voltage.

4-6. SEMI-CONDUCTOR CHECKS

An ohmmeter will detect catastrophic defects in the SCR, a diode, or the photo cell. First determine polarity of the ohmmeter with a voltmeter or diode. In each pair of resistance readings the high resistance reading should be at least 10 times the low resistance reading. Use the same ohmmeter range for both readings in each pair.

A. SCR TEST

- 1. Gate to cathode, positive lead to gate - - low resistance.
Gate to cathode, positive lead to cathode - - high resistance.
- 2. Anode to cathode, positive lead to anode with gate shorted to cathode -
- high resistance.
Anode to cathode, positive lead to cathode with gate shorted to
cathode - - high resistance.

B. DIODE TEST

Resistance across a good diode with the positive lead to the anode is low. Resistance with the positive lead to the cathode is high.

C. PHOTO CELL TEST

Connect a voltmeter across the photo cell. Hold a 100W lamp about a foot from the photo cell with the black side of the cell facing the lamp. The voltmeter should read at least .25V.

SECTION 5

PARTS LIST AND DIAGRAMS

5-1. GENERAL

This section lists all replaceable parts. It contains assembly and schematic diagrams. The following explains the column heads used in the parts list.

A. INDEX REFERENCE

This column lists the number of each part as shown in the diagrams.

B. SCHEMATIC REFERENCE

This column lists the schematic reference designator of electrical parts.

C. HONEYWELL PART NUMBER

This column lists the number by which an item may be ordered from Honeywell-Photographic Products Division, Denver, Colorado.

D. DESCRIPTION

This column lists the part name and specifications required for identification.

E. QUANTITY PER UNIT

This column lists the total quantity of each item used in the unit or assembly.

5-2. ORDERING INFORMATION

When ordering spare or replacement parts, always specify the unit model number, serial number, item description, and Honeywell part number as they appear in the parts list.

PARTS LIST

REF.		HONEYWELL PART NO.	DESCRIPTION	QTY/UNIT	
INDEX	SCHEM.			200	202
1	C1A, C2A C1B, C2B (C2B not used)	73000435-001	Final Unit Assembly		1
		73000435-002	Final Unit Assembly	1	
		73000433-001	Upper Case Assembly (See Figure 5-2)		1
1		73000433-002	Upper Case Assembly	1	
2		73000431-001	Capacitor Bracket	1	1
3		73000527-424	Screw, 8-15, 1 1/2" lg	2	2
4		16305646-001	Capacitor, 700 uf	1	2
4			Capacitor (doubler), 8 uf in same can with 700 uf capacitor		
5			Foam Pad	2	2
6		73000471-001	Nameplate		1
6		73000470-001	Nameplate	1	
7		73000111-001	Lower Case	1	1
8		16305625-002	Lamp Socket	1	1
9		73000434-001	Handle Assembly	1	1
10		16306056-001	Flashtube Clip	1	1
11		16306028-001	Reflector	1	1
12	FT1	16903384-001	Flashtube	1	1
13	DS1	16305391-001	Lamp, Modeling	1	1
14		16305642-001	Lens	1	1
15		16110350-001	Rivet	1	1

C2B (Model 202 only) is normally not used, but could replace C1B if C1B is defective.

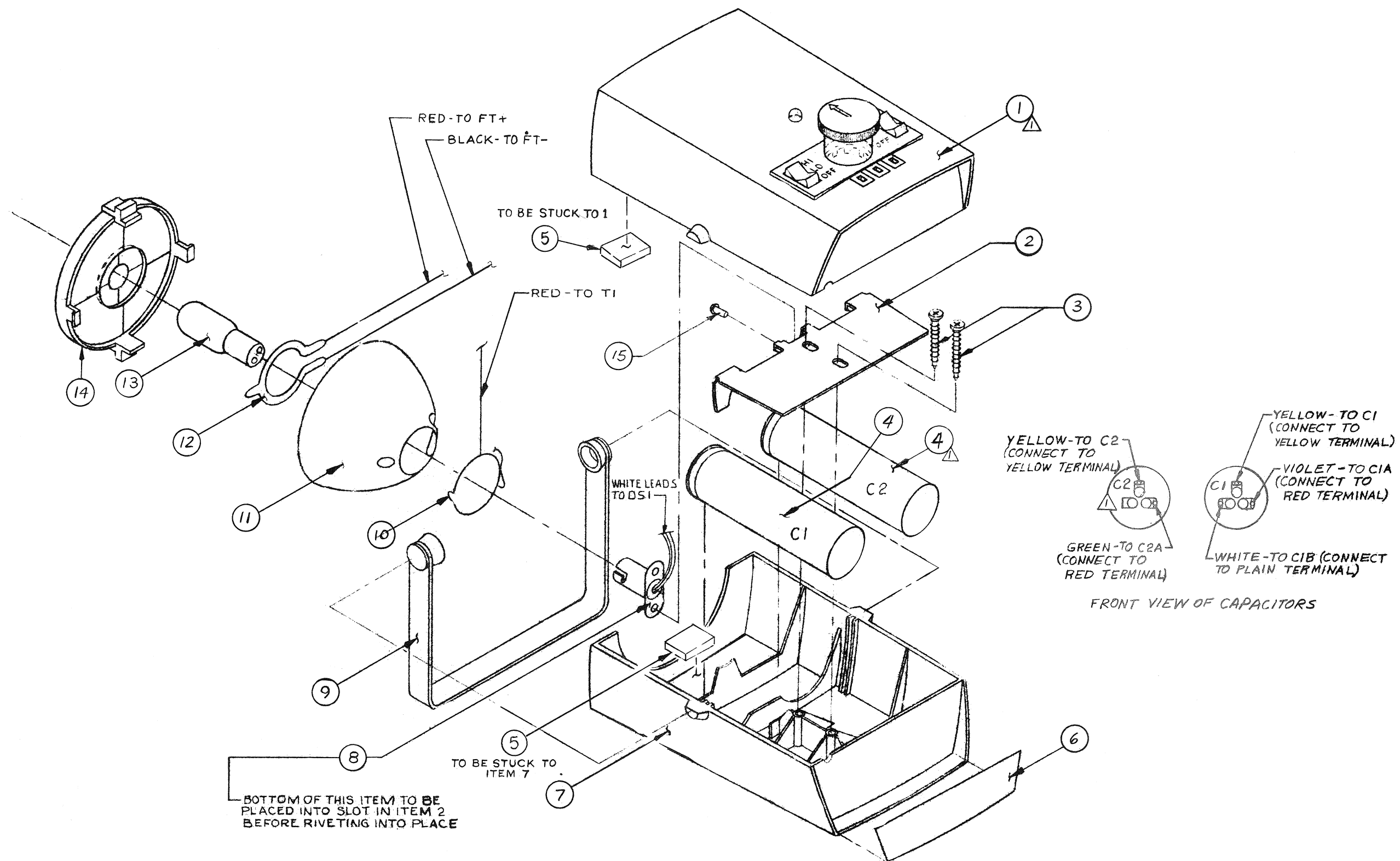


Figure 5-1. Slave Strobosonar, Exploded View

PARTS LIST

REF.		HONEYWELL PART NO.	DESCRIPTION	QTY/UNIT	
INDEX	SCHEM.			200	202
1		73000433-001	Upper Case Assembly		1
		73000433-002	Upper Case Assembly	1	
		73000432-001	Circuit Board Assembly (See Figure 5-3)		1
1		73000432-002	Circuit Board Assembly	1	
2		73000016-001	Periscope	1	1
3		16766859-001	Shutter Contacts	3	3
4		73000105-001	Cap, Periscope	1	1
5		73000347-001	Neon Assembly	1	1
6		73000101-001	Upper Case		1
6		73000101-002	Upper Case	1	
7		16112800-001	Speed Nut	4	4

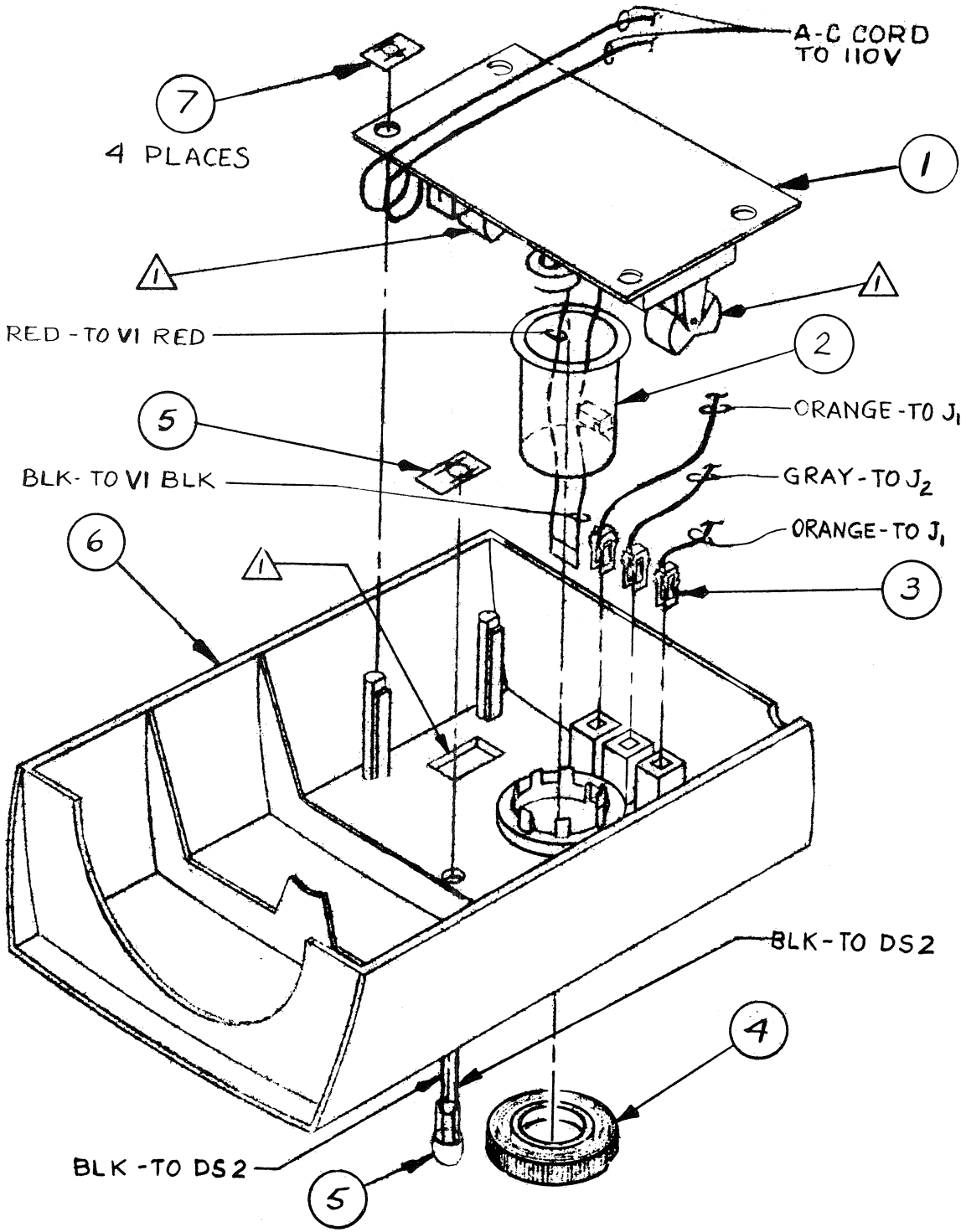
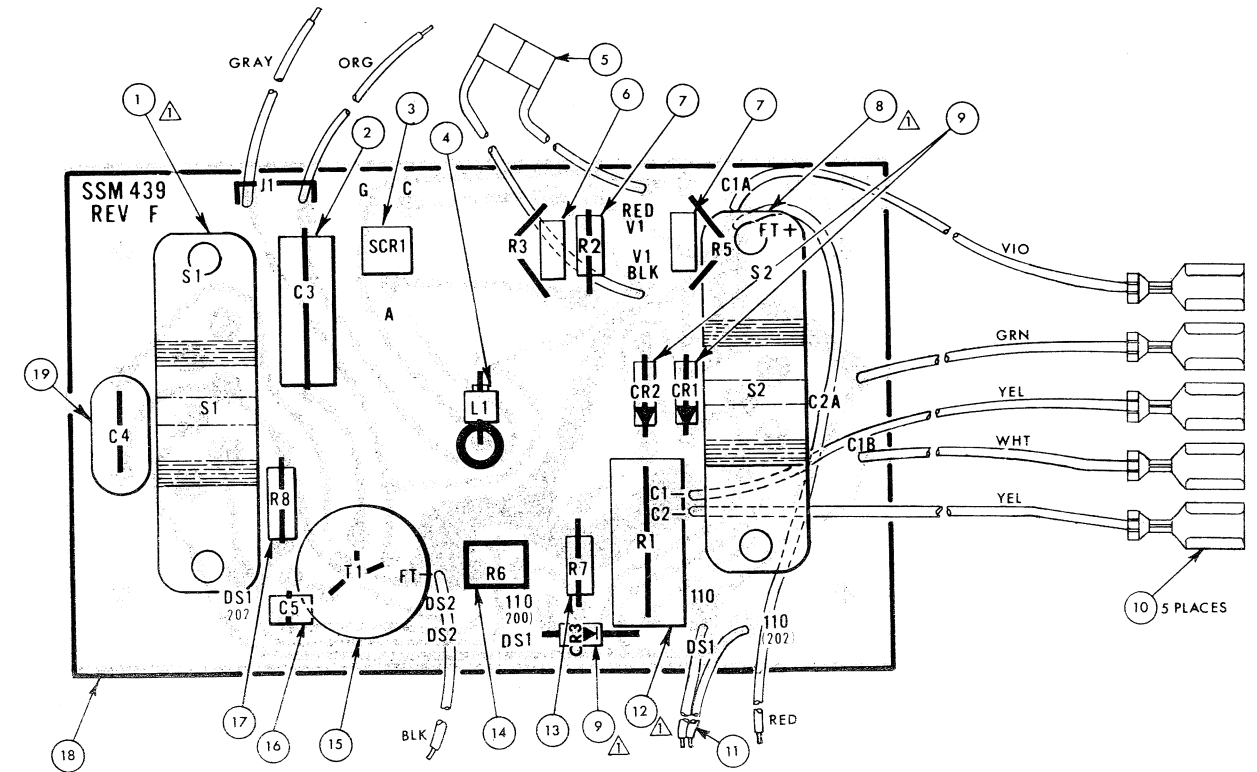


Figure 5-2. Upper Case Assembly

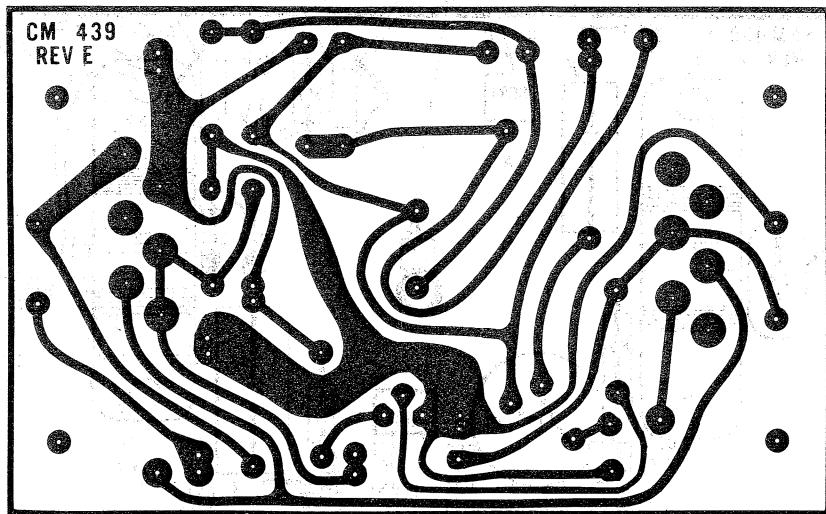
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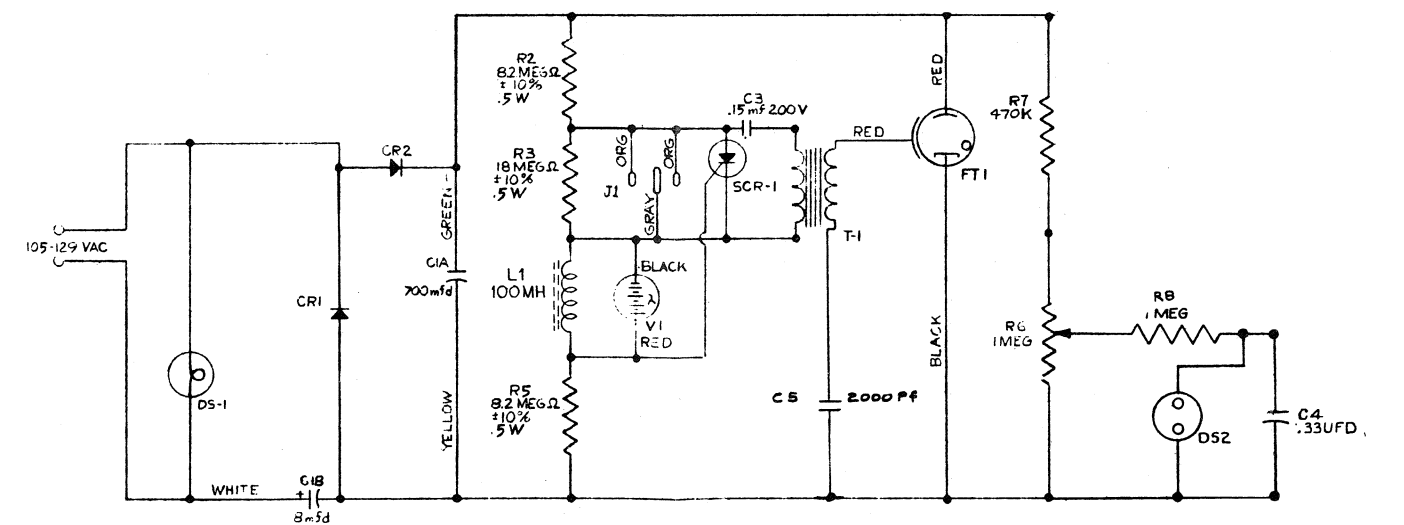
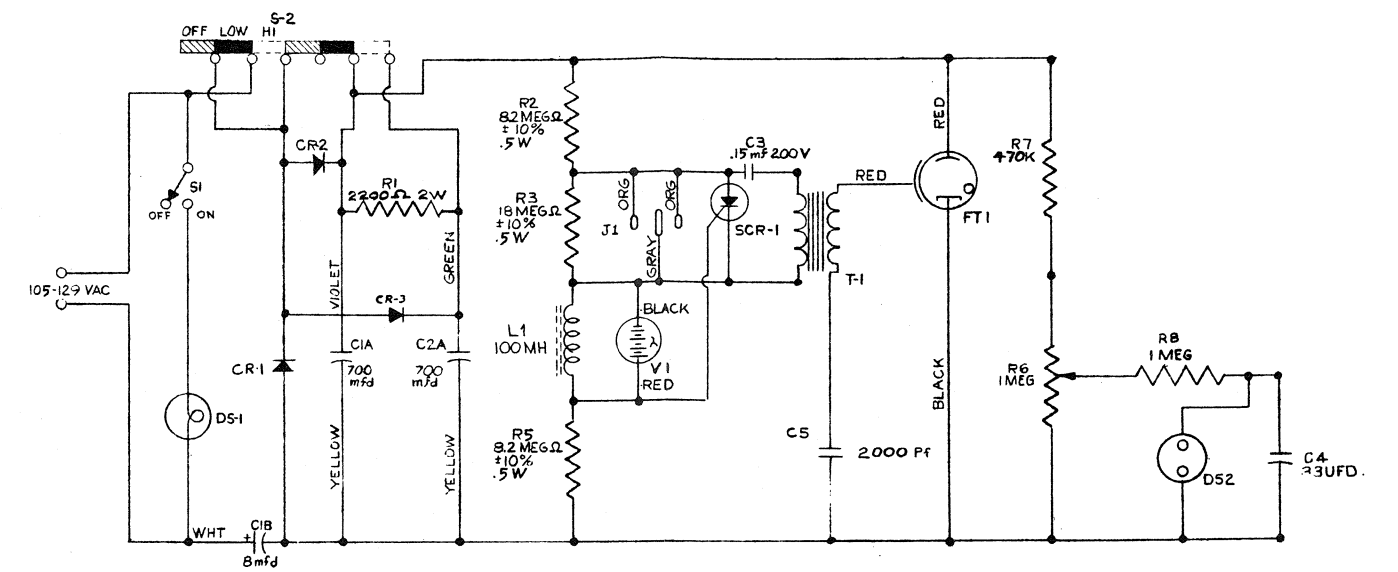
REF.		HONEYWELL PART NO.	DESCRIPTION	QTY /UNIT	
INDEX	SCHEM.			200	202
1	S1	73000432-001	Circuit Board Assembly		1
		73000432-002	Circuit Board Assembly	1	
		73000397-001	Switch, Rocker		1
2	C3	16760006-001	Capacitor, .15 μ f, 200 V	1	1
3	SCR1	16767141-025	SCR	1	1
4	L1	73000824-001	Coil, 100 mh	1	1
5	V1	73000010-001	Photocell	1	1
6	R3	16758183-884	Resistor, 18 M, \pm 10%	1	1
7	R2, R5	16758183-880	Resistor, 8.2 M, \pm 10%	2	2
8	S2	73000396-001	Switch, Rocker		1
9	CR1, CR2, CR3	16756807-002	Diode, 400 PIV	2	3
10		16754482-001	Terminal, Quick Disconnect	3	5
11		16905123-002	AC Line Cord	1	1
12	R1	16750078-536	Resistor, 2200 ohm, 2 W		2
13	R7	16758183-865	Resistor, 470 K, \pm 10%	1	1
14	R6	16762587-013	Resistor, Variable	1	1
15	T1	73000369-001	Trigger Coil	1	1
16	C5	16750036-028	Capacitor, 2000 pf	1	1
17	R8	16758183-869	Resistor, 1 M	1	1
18		73000438-001	Circuit Board	1	1
19	C4	73000513-124	Capacitor, .33 μ f, 100 V	1	1



NOTE: These items are included in the Model 202 only.

Figure 5-3. Circuit Card Assembly





Model 202

Figure 5-4. Schematic Diagrams