Technical Manual

MAINTENANCE INSTRUCTIONS FOR

STROBONARS 710 AND 780

Honeywell PHOTOGRAPHIC PRODUCTS DIVISION

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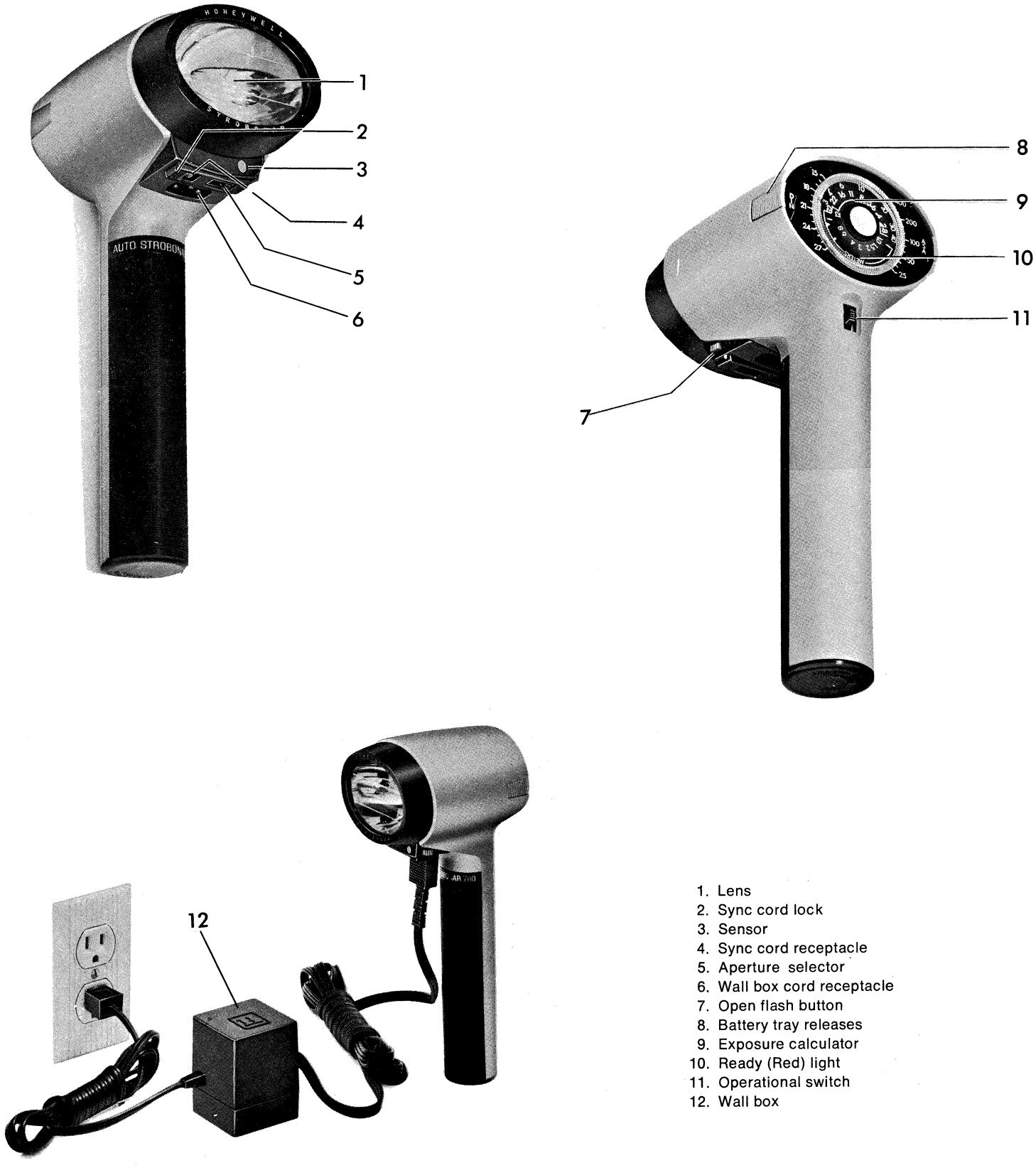
Figure 1-1. Strobonar 710



1. Lens
2. Sync cord lock
3. Sensor
4. Sync cord receptacle
5. Aperture selector
6. Wall box cord receptacle
7. Open flash button
8. Battery tray releases
9. Exposure calculator
10. Ready (Red) light
11. Operational switch
12. Wall box

Figure 1-2. Auto/Strobonar 780

SECTION I

INTRODUCTION

1-1. SCOPE OF MANUAL.

Your service manual provides maintenance instructions for the Honeywell Model 710 and 780 Strobonars and the wall box.

The manual includes information on operational check-out, principles of operation, troubleshooting, disassembly, repair, component replacement and recommended test equipment. A list of replaceable parts, exploded view illustrations, and a schematic diagram are also provided.

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

The Strobonar 710 and 780 are powered by either battery or AC. Battery power is supplied by four "Sub-C" welded nickel cadmium cells located in the replaceable tray at the back of the flash head. AC power is supplied by the wall box which also contains the battery charging circuit.

On the back of the Strobonars are mounted an exposure calculator (9), a ready (red) light (10), and an operational switch (11). The switch is a two-position switch (On/Off) on the Model 710 and a three-position switch (Off/Man/Auto) on the Model 780.

On the front of the units, under the flash head, are located the sync cord receptacle (4) and lock (2) and the wall box cord receptacle (6). The sensor (3) and aperture selector (5), used only on the Model 780, are also located under the flash head.

The aperture selector regulates the light output at two different levels, depending upon the position of the selector (▲ - ♦) by positioning one of the two different aperture sizes in front of the sensor.

The open flash button (7) and tray releases (8) are located on the side of the Strobonars. The open flash button provides a means of open flashing or test flashing the unit.

Connecting the wall box to the Strobonar through the three-prong receptacle (6) under the flash head allows the unit to operate on AC power or charges the batteries depending upon the position of the operational switch (11). The wall box accepts either 105-129 VAC, 50-60 Hz or 208-258 VAC, 50-60 Hz, depending upon the position of the voltage selector switch on the base of the wall box.

CAUTION

You must select the proper input voltage by positioning the switch, located on the bottom of the wall box, to the correct position. Operating the wall box with the voltage selector switch set to the wrong position will damage the wall box.

1-3. SPECIFICATIONS.

NOTE

For those service center utilizing test equipment measuring light output in lux-seconds rather than lumen-seconds, the following conversion equation is provided.

$$\text{Lux-seconds/m}^2 = 10.764 \times \text{lumen-seconds/ft}^2$$

a. Power Source.

Battery ..... Four "Sub-C" size (welded) nickel cadmium rechargeable cells.

AC..... Wall Box.

b. Wall Box Input Voltage.

104-129 VAC, 50-60 Hz, or
208-258 VAC, 50-60 Hz.

c. Wall Box Output Voltage.

2J3, pins A-C ..... 340 ±20 VDC at 0.05 amp.
2J3, pins B-C ..... 14 VAC at 0.3 amp.

d. Battery Charging.

80% of full charge within 3 hours at 117 VAC, 50-60 Hz.

e. Equivalent Battery Source.

5.25 ±0.1 VDC with impedance of 0.25 ohms.

NOTE: A 100 ufd capacitor must be connected across the battery contacts when an equivalent battery source is used.

f. Storage Capacitor Forming.

Form for one hour minimum at maximum anode voltage.

g. Guide Number.

Automatic..... Not applicable.

Manual..... 90 for ASA 25 film.

h. Flash Duration.

Full Power..... Approximately 1/500 second.

Automatic..... Vary between 1/50,000 to about 1/500 second.

i. Automatic Range.

Total range of 3.5 to 23 feet.

▲ ..... 4 to 23 feet.

♦ ..... 3.5 to 17 feet.

j. Recycle Time.

(Using fully charged batteries and formed storage capacitor and measured at 5th flash.)

Battery..... 8 seconds maximum.

AC ..... 12 seconds maximum.

k. Number of Flashes (Battery Operation).

72 minimum before recycle time exceeds 15 seconds.

l. Full Power Output.

160 lumen-seconds per square foot (or 2560 beam-candle-power-seconds) at cutoff when measured 4 feet from the flash head. Measurement must be made with fully charged batteries and a formed storage capacitor. Unit must be flashed for measurement after 30 seconds of power operation.

m. Auto-Quench Light Output (Model 780).

Light output is regulated at two different levels depending upon the position of the aperture selector. Light output is measured at the center of a 5 foot minimum diameter, 18% reflectance, neutral gray target. 30 seconds minimum required between tests.

ASA SETTING	APERTURE SELECTOR SETTING	AUTOMATIC RANGE (feet)	LIGHT OUTPUT (lm-sec/ft^2)
25	▲ f/2.8	4 to 23 ft.	4.5 to 9.0
25	♦ f/4	3.5 to 17 ft.	9.0 to 18

n. Angle of Illumination.

About 60° horizontally and 40° vertically.

o. Color Temperature.

Approximately noon daylight.

p. Shutter Synchronization.

Between the lens shutters ..... x-sync all speeds.

Focal plane shutters..... x-sync - usually 1/60 second.

q. Operational Switch.

Model 710 ..... Two position - On/Off.

Model 780 ..... Three position - Off/Man/Auto.

r. Aperture Selector (Model 780).

Selects two lens settings for each film speed.

Choice of ▲ f/2.8 or ♦ f/4 for ASA 25 film.

s. Open Flash Button.

Push button to open flash or test flash the Strobonar.

t. Physical Size.

4.2" deep x 3.6" wide x 9.3" high.

u. Weight.

25 ounces complete with batteries.

1-4. COMPONENT REFERENCE DESIGNATIONS.

To avoid component reference designator duplication, each unit, such as the Strobonar, wall box, etc., has been assigned a prefix number. A prefix has, therefore, been added to each reference designator as shown below.

UNIT	PREFIX	EXAMPLE
Strobonar Models 710-780	No Prefix	R1
SCR Test Circuit	#1 Prefix	1R1
Wall Box	#2 Prefix	2R1
Resistor R10 Test Circuit	#3 Prefix	3R1
Resistor R2 Test Circuit	#4 Prefix	4R1
Resistor R6 Test Circuit	#5 Prefix	5R1

SECTION 2

PRINCIPLES OF OPERATION

2-1. GENERAL.

The Strobonar Models 710 and 780 provide a source of repeating photoflash light. They are powered by a set of four "Sub-C" cells located in the replaceable battery tray or by AC when connected to the wall box. The wall box also charges the batteries, as well as providing AC operation, depending upon the position of the operational switch.

A two-position operational switch (On/Off) on the 710 or the three-position switch (Off/Man/Auto) on the 780 connects the battery or wall box to the Strobonar circuit. The Off/Man/Auto switch on the Model 780 also selects either the automatic or manual mode of operation.

High voltage dc is stored in the storage capacitor to fire the flashtube. Closing the camera shutter contacts (J2) or the open flash button (S2) triggers a xenon flashtube which converts the stored energy into light. The trigger circuit utilizes an SCR to improve trigger reliability and prevents shutter contact arcing.

The Auto/Strobonar 780 has an automatic circuit to regulate light output. Using a light-activated, silicon-controlled rectifier (LASCR), the automatic circuit detects and integrates (sums) light reflected from the subject. When the reflected light reaches a predetermined level, the flashtube is turned off automatically.

The aperture selector beneath the flash head on the Model 780 selects either of two automatic positions. The selector positions two different size apertures in front of the light sensing window of the LASCR, thereby controlling the amount of light reaching the LASCR during a flash. Each aperture corresponds to an f/stop to be set on the camera for the type of film being used, thus, providing a selection of shooting ranges and depth-of-field control.

2-2. CIRCUIT DESCRIPTION. (See Figures 5-11, 5-12 and 5-13).

2-3. OSCILLATOR CIRCUIT (See Figures 5-12 and 5-13).

The transistor-driven stored energy flyback oscillator converts the low dc voltage from the battery BT1 to high dc voltage which is stored in the high-energy storage capacitor C3. The polarity of the transformer in the oscillator circuit prevents the secondary from conducting when the magnetic field in the primary is building. When the primary is opened (Q1 off), the magnetic field collapses and current flows in the secondary charging the energy storage capacitor C3. The stored energy flyback circuit allows a portion of the magnetic energy to remain in the core of the transformer at the time the succeeding oscillation starts.

The primary current flow circuit consists of BT1, S1A, winding N1 of transformer T1 and transistor Q1. With the operational switch set to On (710) or to Auto or Man (780), Q1 is forward-biased by the base current flowing through N1, R1, R2 and the base-emitter junction of Q1. This is the starting loop causing the oscillator to start running initially.

As the collector of Q1 falls in voltage toward the emitter, current flows through N1, collector to emitter of Q1 and back to the battery. This is the primary current flow circuit. The current flowing in N1 induces a voltage in winding N3. The voltage is positive at pins 2 and 6 of T1 during the primary current flow cycle.

The forward base drive circuit consists of transformer winding N3, R2, Q1 and CR3. As voltage is induced in N3 from N1, current flows through R2, the base-emitter junction of Q1, through CR3 and back to pin 3 of T1. Pin 2 in the primary winding, pin 6 in the base drive winding and pin 1 in the secondary winding are all positive. At this time, current cannot flow in the secondary circuit to charge C3 because CR4 and CR5 are reverse-biased. Consequently, when current is flowing in the primary circuit (N1), no current is flowing in the secondary, except for the tuning network consisting of capacitor C2 and resistor R3. With the base-emitter drive circuit completed through CR3 and as the regenerative feedback of N1 and N3 increases, Q1 saturates.

A shorted or open CR3 will cause the oscillator circuit to be inoperable because of the loss of base drive for transistor Q1.

Assuming there is constant current flowing into the base of Q1, the collector current will increase linearly with time. The collector current, from the time Q1 was turned on, is building flux (or storing energy) in the core of T1. This current (or flux in the core) is becoming increasingly large. For an incremental unit of time, there is an incremental increase in current. This current continues to increase until a point is reached where Q1 base current times the gain of Q1 (βI_b) can no longer supply collector current. At this point, Q1 comes out of saturation because its base drive is insufficient to keep it saturated.

Q1 starts to turn off. The collector voltage starts to rise and the voltage across N1 starts to decrease. The induced voltage across N3 decreases. The collector voltage falls toward the battery minus causing the voltages across the windings to switch making pins 7, 3 and 4 more positive.

As the voltages on the windings switch, the magnetic field collapses and current flows out of the secondary winding N2. With diodes CR4 and CR5 forward-biased, current flows from pin 4 in the secondary winding to charge the energy storage capacitor C3. The voltage appearing on C3 is the same value appearing across N2 for any oscillator cycle. Since the storage capacitor is charged by the secondary when the magnetic field is collapsing, the current flowing from pin 4 of winding N2 is linearly decreasing.

During the period of time the magnetic field is collapsing and the storage capacitor is being charged, the stored energy flyback circuit is operating. The flyback circuit consists of winding N3, C1, CR2 and R2. Current flows from pin 3 of N3, through C1, CR2 (anode to cathode), R2 and to pin 6 of N3. The voltage across N3 is a constant voltage. Capacitor C1 is charged through R2. The charging time constant of C1-R2 determines the flyback time constant. R2 is a selected resistor to provide peak collector current for transistor Q1. Refer to paragraph 3-14 for selection of resistor R2.

CR2 anode is positive by .7 volt with respect to the cathode. This same voltage is impressed across the emitter-base of Q1 with the emitter being more positive than the base. Q1 is therefore reverse-biased and held off.

When C1 is charged to the same voltage across N3, current flow ceases in the flyback circuit. Since there is no longer a voltage drop across CR2, the base of Q1 starts rising from -.7 volts due to the current flowing through R1 and R2 from pin 7 of N1. Transistor Q1 turns on and the drive cycle is again initiated.

The flyback cycle is accomplished before the magnetic field in the transformer has completely collapsed. Therefore, Q1 is turned on and the drive cycle is initiated before the magnetic flux in the core reaches zero and the stored energy totally expended.

The oscillator circuit is turned off when the storage capacitor reaches its rated value by turning transistor Q2 on. When Q2 is on and its collector voltage is low, base voltage cannot be generated on Q1. If the base of Q1 is not positive by .7 volts, the oscillator cannot operate.

Q2 is turned on by sensing the voltage across C3 by the divider network R4 and R6. The charging voltage across C3 must be a minimum of 200 volts before the divider network (R4-R6) senses a voltage since CR16 subtracts 200 volts from the anode voltage. The cutoff neon VR2 ignites when the voltage at the junction of R4-R6 reaches 150 volts.

The point VR2 turns on is determined by the values of R4 and R6. R6 is a selected resistor that insures VR2 turns on at the proper anode voltage (350 volts). Refer to paragraph 3-15 for selection of resistor R6.

With VR2 on, current flows to the base of Q3 and resistor R24. R24 insures there is current flow in VR2 before the base of Q3 rises. The Darlington transistor Q3 multiplies the small current flowing in VR2 (approximately 40 ua) to provide sufficient base current to turn Q2 on. Q2 collector current is provided by battery positive through S1A and R25.

Summarily, Q2 is on when VR2 is on; whenever Q2 is on, Q1 is off. Therefore, when VR2 is on, Q1 is off and the oscillator circuit is off.

Diode CR1 protects Q1 during the reverse recovery time of CR4 and CR5. A shorted or open CR1 will cause Q1 to fail. Always check CR1 if Q1 is found to be defective.

Diodes CR4 and CR5 are high-speed, 200 nano-second reverse-recovery diodes. A defective diode(s) CR4 and/or CR5 will cause Q1 and/or CR1 to fail. Two diodes (CR4 and CR5) are required to meet the extremely fast rise and fall times of the oscillator because of the use of the silicon transistor in the oscillator circuit. Very rapid voltage changes are produced on N3 as Q1 is turned on and off.

The neon ready light VR1 circuit consists of diodes CR16, resistors R10 and R14 and the neon VR1. A portion of the voltage across the energy storage capacitor C3 is impressed across the neon ready light. Resistors R14 and R10 act as a voltage divider to establish the firing voltage of VR1. Diode CR16 subtracts 200 volts from the anode voltage.

The value of resistor R10 is selected to insure that VR1 ignites with 300 ±5 VDC applied across the neon ready light circuit. Refer to paragraph 3-16 to determine the value of R10. The selection and replacement of R10 is required only when it is necessary to replace diode CR16 or the neon VR1.

2-4. WALL BOX.

The wall box serves as an AC power supply and battery charger. The unit operates on either 105-129 VAC, 50-60 Hz or 208-258 VAC, 50-60 Hz. The voltage selector switch on the bottom of the wall box must be properly positioned depending upon the available voltage. Refer to paragraph 1-2. A regulated 340 volts is supplied to the Strobonar for AC operation and 14 VAC is supplied to charge the batteries. Connection to the Strobonar is made through the three wire cord to the plug-in receptacle located beneath the flash head on the Strobonar.

2-5. AC OPERATION.

With the wall box connected to the Strobonar and the operational switch set to On (710) or to either Auto or Manual on the 780, a regulated 340 volts is supplied to the Strobonar for AC operation.

Transformer 2T1 is wound so the source impedance is the same with the voltage selector switch 2S1 in either the 105-129 VAC, or 208-258 VAC position. The transformer steps up the line voltage so that the voltage between pins A and C of 2J3 is 340 VDC with 105-129 VAC between pins 7 and 6 or with 208-258 VAC between pins 7 and 5. The secondary winding N3 provides high voltage to the bridge circuit for full wave operation and to the regulator circuit to supply regulated anode voltage to the storage capacitor C3.

When pin 3 of transformer 2T1 is positive (+) with respect to pin 1, current flows through diode 2CR2, the regulator circuit, battery switch S1, isolation diodes CR22 and CR5, storage capacitor C3 and diode 2CR4 to pin 1 of 2T1. This current charges the storage capacitor toward anode voltage.

On the next half cycle of AC input, pin 1 of 2T1 is positive (+) with respect to pin 3. Current now flows through diode 2CR1, the regulator circuit, S1, CR22, CR5, C3 and 2CR3 to pin 3 of 2T1. The storage capacitor C3 is charged on both half cycles of AC. Although only one cycle of AC operation has been explained, it takes several cycles for C3 to charge to anode voltage.

The regulator circuit consists of 2SCR1, 2R1, 2CR5, 2CR6, 2C1 and 2R2. The gate of 2SCR1 is clamped to 340 volts (anode voltage) with respect to pin C of 2J3 by the voltage drop across 2CR5 and 2CR6. The current through 2R1 and the gate of 2SCR1 gates 2SCR1 on when the voltage on the cathode of 2SCR1 is less than the gate voltage.

As the storage capacitor C3 approaches full charge (regulated anode voltage of 340 volts), the voltage on the cathode of 2SCR1 is at a higher potential than the voltage at the gate of 2SCR1. The gate of 2SCR1 is back-biased, preventing 2SCR1 from gating on.

Capacitor 2C1 and resistor 2R2 reduce noise across the gate-cathode of 2SCR1.

When capacitor C3 is charged to anode voltage, a portion of the voltage across C3 is impressed across the neon ready light VR1, VR1 lights and the Strobonar is ready to flash.

Diodes CR22 and CR5 isolate the power input prongs of the wall box cord receptacle P3 on the bottom of the flash head to prevent the possibility of electrical shock. One diode is all that is electrically necessary to isolate the input but two diodes are required to obtain U.L. approval.

2-6. BATTERY CHARGING.

With the wall box connected to the Strobonar and the operational switch set to Off, 14 VAC is supplied to the Strobonar to charge the batteries.

Transformer 2T1 is wound so the source impedance is the same with the voltage selector switch 2S1 in either the 105-129 VAC or 208-258 VAC position. The transformer steps down the AC line voltage so that the voltage between pins B and C of 2J3 is 14 VAC with 105-129 VAC between pins 7 and 6 or with 208-258 VAC between pins 7 and 5. The secondary winding N4 provides the low dc voltage to charge the batteries.

Half-wave rectifier CR14 and limiting resistor R27 comprise the charging circuit for the four nickel-cadmium cells of BT1. The circuit supplies a constant charging current of 0.3 ampere to BT1. It takes approximately 5 hours to fully charge the batteries.

When pin 4 of 2T1 is positive, current flows through 2J3-P3, pin B, R27, CR14 and BT1 to charge the batteries. On the half-cycle when pin 4 is negative, CR14 is back-biased and no current flows.

Storage capacitor C3 is automatically formed by the charging circuit when the batteries are being charged. The capacitor is formed through 2J3-P3, pin A, diodes CR22 and CR5, storage capacitor C3 and back to 2J3-P3, pin C.

2-7. TRIGGER CIRCUIT (See Figures 5-12 and 5-13).

The trigger circuit provides a high voltage pulse to the exterior of the flashtube. This pulse ionizes the xenon gas in the tube, initiating a discharge path through the tube for the energy stored in capacitor C3. The trigger circuit includes an SCR for improved trigger reliability and to prevent arcing on the shutter contacts.

The flashtube trigger coil T2 ignites the flashtube by impressing a few thousand volts to the exterior of the flashtube. As the storage capacitor C3 charges, R9 and R21 act as a voltage divider to produce about 200 volts at the anode of SCR2. The trigger capacitor C6 charges through R9, T2 and R23 to the anode voltage of SCR2. Capacitor C15 charges through R9, R29 and R23 to about 200 volts.

When the open flash button S2 or the camera shutter contact J2 closes, C15 discharges through R23, triggering SCR2 gate. The cathode of SCR2 will go negative with respect to the gate as a result of C15 discharging. This provides the discharge path for the trigger capacitor C6. Capacitor C6 discharges through SCR2 and the primary of T2 producing the high voltage pulse that fires flashtube FT1. Capacitor C7 is a noise filter and resistor R8 across the primary of T2 in the Model 780 reduces flyback ringing.

2-8. AUTOMATIC CIRCUIT - MODEL 780 (See Figure 5-13).

The automatic circuit regulates light output over a range of 3.5 to 23 feet depending upon which automatic position is selected. Using an LASCR, the circuit detects and integrates (sums) light reflected from the subject. When the integrated light reaches a predetermined level, a xenon-filled quench tube (FT2), connected directly across the energy storage capacitor C3 is triggered. During ionization of both tubes, FT2 is of much lower impedance (1/10 or less) than FT1, thus shorting FT1 and quenching the light source.

When storage capacitor C3 is charged, base current flows in Q5, turning on Q5. Ambient light or flash from another source cannot affect the quench circuit as long as Q5 is on.

When FT1 flashes, the voltage across C3 drops. When the voltage across C3 drops below the voltage across C20, Q5 base-emitter voltage reverses and cuts off Q5. With Q5 off, the reflected light from FT1 falls on LASCR1 and is converted into current in the gate of LASCR1. This current flows through C22 and R37 and produces a rising voltage which is proportional to the sum of the reflected light falling on LASCR1.

The voltage across C22, R37, and C24 determines the gate to cathode voltage of LASCR1. When the voltage across C22 and R37 reaches a level above the voltage on C24 (established by the setting of R40) which is coincident with the gate to cathode cut-on voltage of LASCR1, LASCR1 turns on. This discharges C13 (originally charged through R38, T3 and C24) through LASCR1 and T3 primary, providing the high-voltage trigger pulse for FT2. Quench tube FT2 then flashes and turns off FT1 by completing the discharge of C3.

Diode CR19 protects Q5 by clamping its base-emitter junction at about .6 volt negative as the voltage across C3 falls during a flash. Filter capacitor C21 prevents erratic quench operation. For consistent quenching, zener diode CR21 clamps the voltage at the positive end of R40 at 7.5 volts. Capacitor C24 maintains voltage on the LASCR cathode when FT1 flashes. Capacitor C23 suppresses AC noise.

SECTION 3

CHECKOUT AND TROUBLESHOOTING

3-1. GENERAL.

When you are checking out or adjusting the Strobonar, you should insure that all electrical connections are good; the storage capacitor has been formed; and the batteries are fully charged.

If you find it necessary to replace any components in the automatic (quench) circuit (Model 780), it will be necessary to recalibrate that particular circuit.

WARNING

When you are repairing the unit, discharge the storage capacitor through a 100 ohm, 2 watt resistor to insure that the unit is safe to work on.

3-2. OPERATIONAL CHECKOUT.

3-3. TEST EQUIPMENT.

You will find the following test equipment is required for operational check of the Strobonar.

Volt-Ohm Meter - Triplett Model 630-NA or equivalent.

DC Power Supply - Variable dc voltage to 380 volts, Honeywell Model 230 Power Panel or equivalent.

Quench Tester - Honeywell Model CE319 or equivalent.

or

Pulse Photometer - Honeywell Model CE237 and incident light sensor, Model CE238 or equivalent.

and

18% reflectance, neutral gray card, 5 foot minimum diameter.

3-4. STORAGE CAPACITOR C3 FORMING.

Before performing any operational checkout, you should form the storage capacitor C3 for at least one hour at anode voltage. Flash the unit a few times to accelerate forming.

3-5. STORAGE CAPACITOR C3 LEAKAGE CHECK.

Form the storage capacitor before checking the capacitor for leakage. Disconnect one end of capacitor C3 from the circuit. Using a dc power supply, form the capacitor for one hour at 360 volts with a 1K ohm, 1% resistor in series with the capacitor. With 360 volts across C3, connect a voltmeter in parallel with the 1K ohm resistor. Measure the leakage current of C3 by reading the voltage across the 1K ohm resistor. If you find the leakage current exceeds 1 ma (1 volt across the 1K ohm resistor), replace C3.

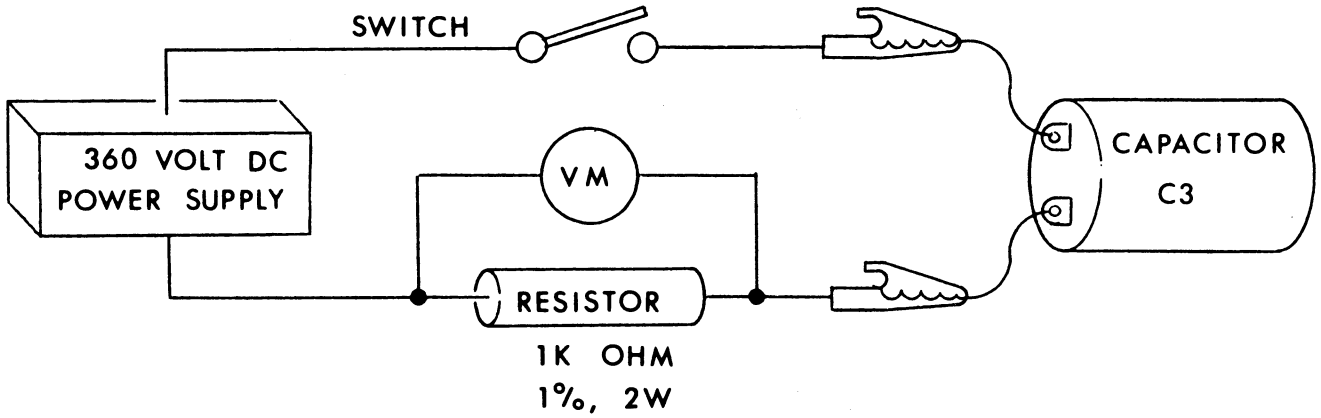


Figure 3-1. Storage Capacitor Leakage Test.

3-6. RECYCLE TIME.

3-7. BATTERY OPERATION.

With the batteries fully charged, the unit should recycle to the neon indicator within 8 seconds after flashing.

3-8. AC OPERATION.

With the wall box connected, the unit should recycle within 12 seconds at nominal line voltage.

3-9. BATTERY CHARGING.

The batteries should be charged to 80% of full charge capacity at 3 hours at nominal line voltage. When fully charged (3600 amp-seconds), the batteries will produce a minimum of 72 flashes before recycle time to neon exceeds 15 seconds. Flash rate to be one flash every 30 seconds.

3-10. FULL POWER LIGHT OUTPUT CHECK.

Check that the full power center light output is a minimum of 160 lumen-seconds per square foot (or 2560 beam-candle-power-seconds) at cutoff when measured at four feet from the diffusing lens of the light meter.

3-11. AUTO QUENCH LIGHT OUTPUT CHECK (MODEL 780).

When you are measuring the auto quench light output, an 18% reflectance neutral gray target at least five feet in diameter should be used. The amount of light output is regulated at two different levels, depending upon the position of the aperture selector.

With the selector knob set to ▲ and the unit positioned 4 to 23 feet from the target, the light output should be 4.5 to 9 lumen-seconds per square foot.

With the selector knob set to ♦ and the unit positioned 3.5 to 17 feet from the target, the light output should be 9 to 18 lumen-seconds per square foot.

3-12. AUTO QUENCH LIGHT OUTPUT ADJUSTMENT (Model 780).

If you find the light output readings in paragraph 3-11 to be out of specification, you can adjust the light output. Remove the battery tray as described in paragraph 4-4,a to gain access to the variable resistor R40 on the circuit board. Adjust the resistor until the proper readings are obtained. Rotate R40 clockwise to decrease quench light output; counterclockwise to increase quench light output.

3-13. ANODE VOLTAGE CHECK (See Figures 1-1 and 1-2)

Insure the storage capacitor C3 is formed before checking the anode voltage. Remove the battery tray as shown in Figure 5-1, page 5-3. Connect an equivalent battery source (5.25 ±0.1 VDC with an impedance of 0.25 ohms) to the three prong receptacle (6) under the flash head on the Strobonar.

Set the operation switch (11) to ON (710) or to Auto or Man (780). Connect the plus (+) and minus (-) terminal probes on the voltmeter as shown in Figure 5-2 on page 5-3. Wait until the neon ready light (10) lights and then flash the unit several times while observing the reading on the meter.

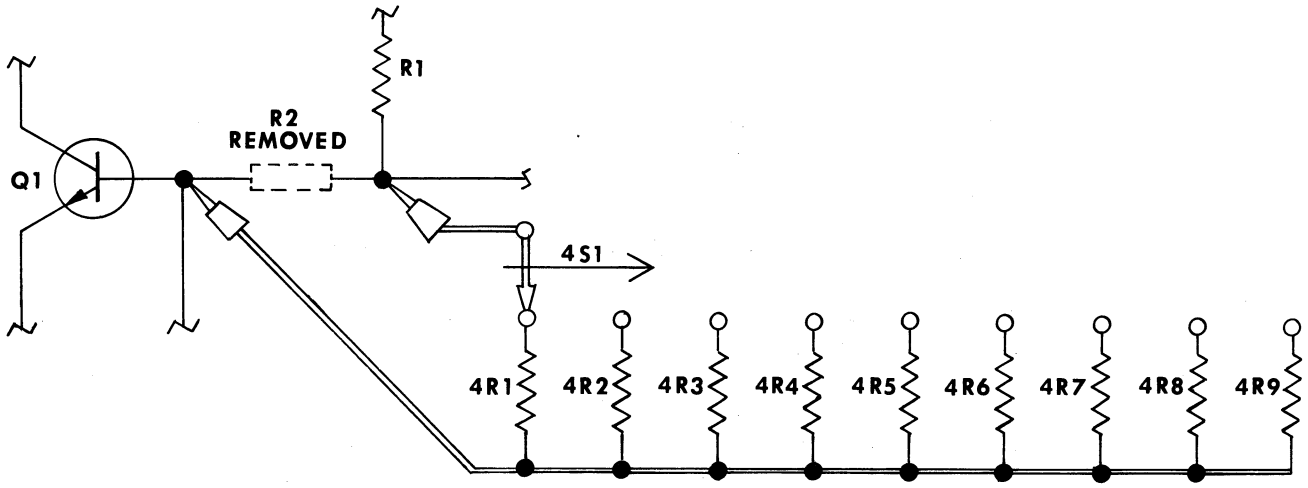
NOTE

It may be necessary to remove the solder resist from the clad on the circuit board when measuring the anode voltage. The resist has a varnish appearance and protects the clad. Be careful not to damage the clad when removing the coating.

3-14. RESISTOR R2 SELECTION.

Resistor R2 requires selection and replacement if it fails or if the peak collector current of Q1 requires correction. Remove resistor R2 from the circuit and connect the Resistor Selector Circuit as shown in Figure 3-2. Select the highest value resistor, 4R1, and advance through the test resistors until the peak collector current of Q1 is achieved. Be sure you start with the highest resistor value first.

If you have not built the Resistor Selector Circuit, simply replace R2 with the resistor values listed in Figure 3-2, starting with the highest values first.



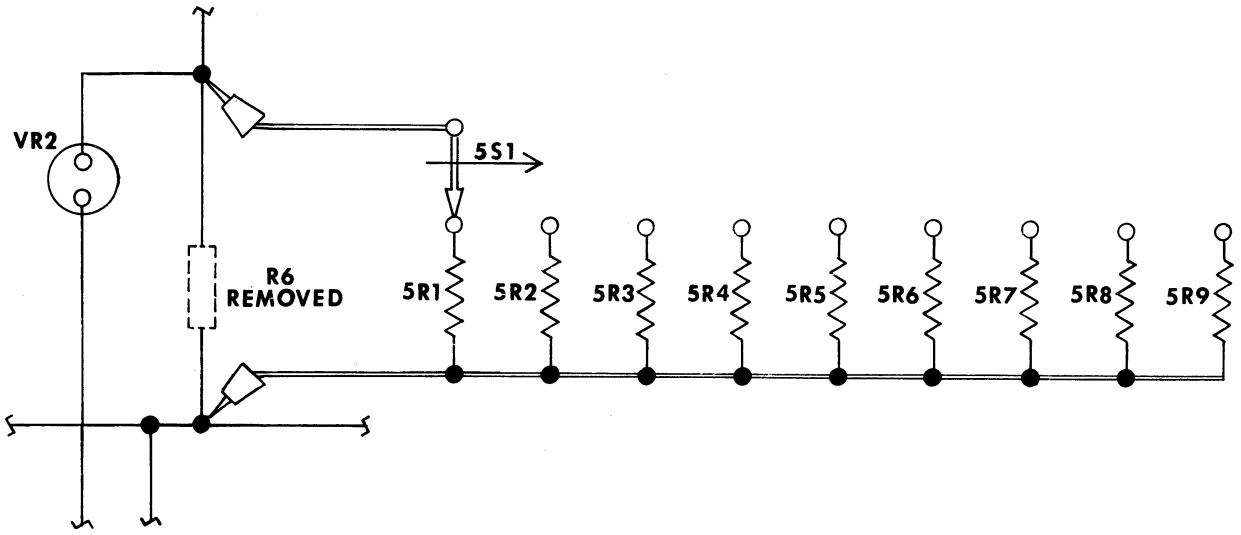
Resistor	Value (1W, 5%)	Part No.
4R1	56 Ohms	H73004070-533
4R2	47 "	-531
4R3	39 "	-529
4R4	33 "	-527
4R5	27 "	-525
4R6	22 "	-523
4R7	18 "	-521
4R8	15 "	-519
4R9	12 "	-517

Figure 3-2. Resistor R2 Selector Circuit.

3-15. RESISTOR R6 SELECTION.

Resistor R6 requires selection and replacement if it fails or if the cutoff neon VR2 must be replaced. Apply 150 VDC at the junction of R4 and R6. With R6 removed, connect the Resistor Selector Circuit as shown in Figure 3-3. Select the lowest value resitor, 5R1, and advance through the test resistors until VR2 lights. Be sure you start with the lowest resistor value first.

If you have not built the Resistor Selector Circuit, simply replace R6 with the resistor values listed in Figure 3-3, starting with the lowest values first.



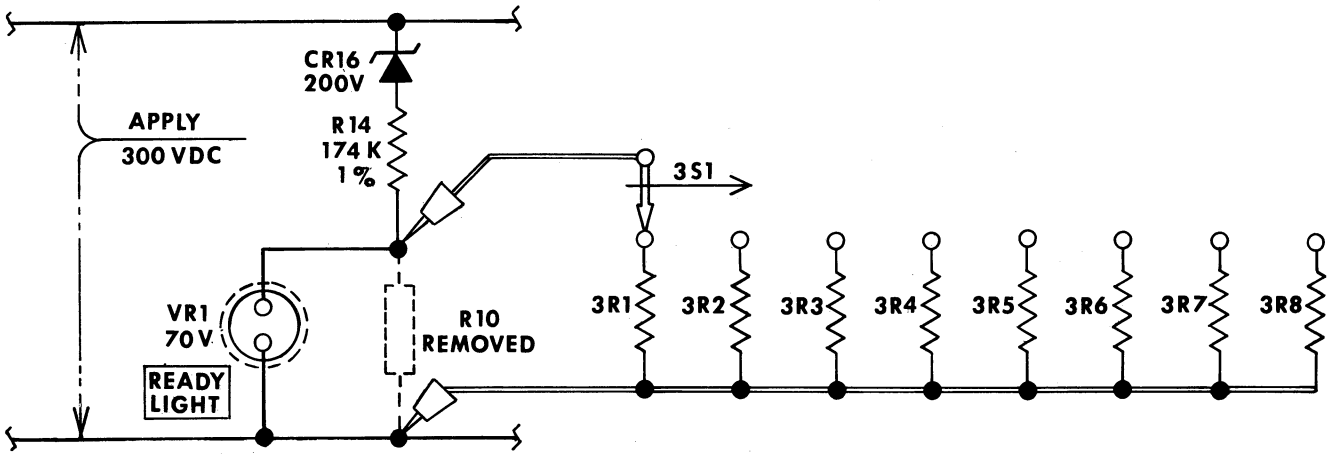
Resistor	Value (¼W, 1%)	Part No.
5R1	82.5 K	H73003356-489
5R2	90.9 K	-493
5R3	102.0 K	-502
5R4	115.0 K	-507
5R5	130.0 K	-512
5R6	143.0 K	-516
5R7	169.0 K	-523
5R8	191.0 K	-528
5R9	221.0 K	-534

Figure 3-3. Resistor R6 Selector Circuit.

3-16. RESISTOR R10 SELECTION.

Resistor R10 requires selection and replacement only if CR16 is defective and must be replaced or if the neon VR1 itself must be replaced. Apply 300 ±5 VDC across the ready light circuit CR16, R14, VR1 and R10. With R10 removed, connect the Resistor Selector Circuit as shown in Figure 3-4. Select the lowest value resistor, 3R1, and advance through the test resistors until VR1 lights. Be sure you start with the lowest resistor value first.

If you have not built the Resistor Selector Circuit, simply replace R10 with the resistor values listed in Figure 3-4, starting with the lowest values first.



Resistor	Value (¼W, 5%)	Part No.
3R1	220 K	H16759940-305
3R2	240 K	-306
3R3	300 K	-308
3R4	390 K	-311
3R5	510 K	-314
3R6	620 K	-316
3R7	750 K	-318
3R8	910 K	-320

Figure 3-4. Resistor R10 Selector Circuit.

3-17. TROUBLESHOOTING.

For assistance in troubleshooting the Strobonar and wall box, you should refer to the circuit description in Section 2, the troubleshooting data charts in Section 3-27 and to the schematic diagrams in Section 5.

3-18. TECHNIQUES.

Before starting a detailed checkout of the circuit, you should first look 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 faults can be located by voltage, current and resistance measurements. Check electrical connections at connectors.

Isolate the section of the circuit responsible for the fault. You will find that an operational check will demonstrate what the circuit is doing or what it is NOT doing. Observe the actions of switches and indicators to isolate the fault.

After you have 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 located in Section 5.

3-19. COMPONENT CHECKS.

No attempt is made in the troubleshooting data to describe how to test or check a particular part. The method of checking and testing is left up to you. However, we would like to remind you of the following points:

a. Turn off power and discharge C3 before making resistance measurements.

b. Set ohmmeter to the lowest range when checking continuity.

c. Set ohmmeter to the highest range when checking high resistance.

d. Capacitors which are shorted can be found by resistance measurements.

e. Check the large electrolytic capacitor (C3) for leakage current. Refer to paragraph 3-5.

f. A capacitor which is suspected of being open can be checked by substituting a good capacitor and seeing if this makes the unit operational.

3-20. PRECAUTIONS.

Follow the listed precautions when you are troubleshooting the Strobonar.

a. Use extreme caution to avoid shorting components when making voltage measurements on the circuit board.

3-21. SCR TEST CIRCUIT (SEE FIGURE 3-5).

To check out the SCR, remove it from the circuit and either substitute a good SCR or set up the test circuit as shown in Figure 3-5. Select the proper meter (1M1 or 1M2) by determining the range of the SCR to be tested. Position switch 1S3 to select the proper meter.

Insert the suspected SCR in the test circuit, close switch 1S2 and adjust potentiometer 1R3 for 0 current on the meter. With switch 1S2 closed, hold switch 1S1 closed and adjust potentiometer 1R3 until the meter reverses and moves in a negative direction. The readings on the SCR's should be as follows:

SCR2 -- 200 ua maximum
2SCR1 -- 20 ua maximum

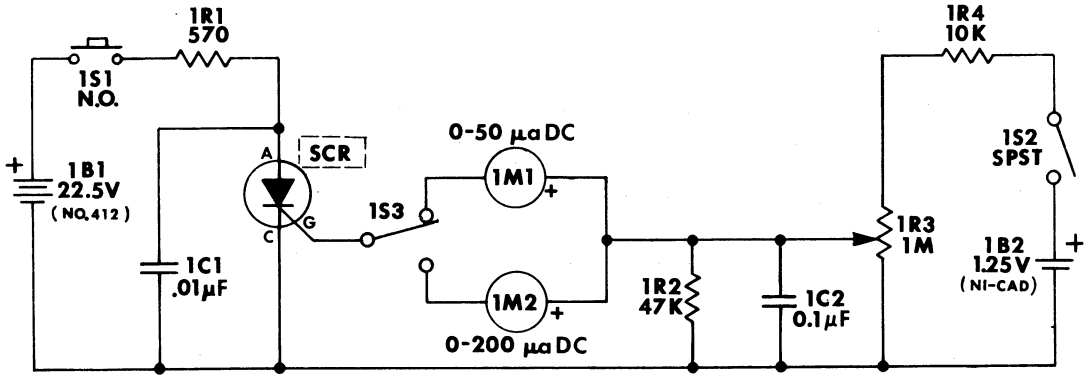


Figure 3-5. SCR Test Circuit.

3-22. SEMICONDUCTOR CHECK.

An ohmmeter will detect catastrophic defects in the transistors or diodes. First determine the 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.

3-23. PNP TRANSISTOR.

a. Base to emitter, positive lead to base - high resistance. Base to emitter, positive lead to emitter - low resistance.

b. Base to collector, positive lead to base - high resistance. Base to collector, positive lead to collector - low resistance.

3-24. NPN TRANSISTOR.

a. Base to emitter, positive lead to base - low resistance. Base to emitter, positive lead to emitter - high resistance.

b. Base to collector, positive lead to base - low resistance. Base to collector, positive lead to collector - high resistance.

3-25. DIODE.

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

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

3-26. LASCR.

a. Gate to cathode, positive lead to gate - low resistance. Gate to cathode, positive lead to cathode - high resistance.

b. Anode to cathode, positive lead to anode with gate shorted to cathode and the component shielded from light - high resistance.

c. Anode to cathode, positive lead to cathode with gate shorted to cathode and the component shielded from light - high resistance.

3-27. TROUBLESHOOTING DATA.

TROUBLE: No AC Operation.		
ACTION	INDICATION	REMARKS
a. Substitute wall box for one known to be operating properly.	AC operation	Go to step b.
	No AC operation	Go to step d.
b. Check diodes CR5 and CR22 for open.	Good	Go to step c.
	Bad	Replace CR5/CR22.
c. Check C3.	Good	Check all connections.
	Bad	Replace C3.
d. Check 2T1 for 300-365 VRMS between pins 1 and 3.	Good	Go to step e.
	Bad	Replace 2T1.
e. Check diodes 2CR1, 2CR2, 2CR3 or 2CR4.	Good	Go to step f.
	Bad	Replace defective component.
f. Check 2SCR1.	Good	Go to step g.
	Bad	Replace 2SCR1.
g. Check 2R1.	Good	Check 2CR5 and/or 2CR6.
	Bad	Replace 2R1.

TROUBLE: No Flash - Trigger Circuit Not Functioning.		
ACTION	INDICATION	REMARKS
a. Check C6 for open or short.	Good	Go to step b.
	Bad	Replace C6.
b. Check for R9, R21 and/or R23 open.	Good	Go to step c.
	Bad	Replace defective component.
c. Check for T2 primary or secondary open or shorted.	Good	Go to step d.
	Bad	Replace T2.
d. Check R8 for short (Model 780 only).	Good	Go to step e.
	Bad	Replace R8.
e. Short SCR2 anode to cathode.	FT1 flashes	Go to step f.
	No flash	Go to step g.
f. Check SCR2.	Good	Go to step g.
	Bad	Replace SCR2.
g. Check FT1 for open circuit or cracked envelope.	Good	Check all connections to FT1.
	Bad	Replace FT1.

TROUBLE: Low Anode Voltage.		
ACTION	INDICATION	REMARKS
a. Check for discharged battery.	Good	Go to step b.
	Bad	Charge or replace battery.
b. Check wall box circuit if operating on AC.	Good	Go to step c.
	Bad	Repair defect.
c. Check storage capacitor leakage (See para. 3-5).	Good	Check all associated components.
	Bad	Replace storage capacitor C3.

TROUBLE: Ready Light Malfunction.		
ACTION	INDICATION	REMARKS
a. Check C3 for low anode voltage (less than 310 VDC).	Good	Go to step b.
	Bad	Replace C3.
b. Check R14 and/or R10.	Good	Go to step c.
	Bad	Replace defective component.
c. Check diode CR16.	Good	Go to step d.
	Bad	Replace CR16. (Refer to para. 3-16.)
d. Check connections and wiring to VR1.	Good	Check VR1.
	Bad	Repair connection and/or wiring.

TROUBLE: Low Light Level - Manual Operation.		
ACTION	INDICATION	REMARKS
a. Measure anode voltage across C3 after 30 seconds.	340 VDC or less.	Go to Low Anode Voltage troubleshooting chart.
	340-360 VDC	Go to step b.
b. Check FT1 polarity.	Good	Go to step c.
	Bad	Reverse polarity of FT1 (See para. 4-7).
c. Check for discolored or misaligned flash-tube or reflector.	Good	Check for discolored or reflector or lens (See para. 4-14).
	Bad	Replace or align flash-tube (See para. 4-7).

TROUBLE: Low Light Level - Premature of Full Quench.		
ACTION	INDICATION	REMARKS
a. Check for R35, R36, R37, C22 and/or Q5 open.	Good	Go to step b.
	Bad	Replace defective component.
b. Check for C24, CR19 and/or CR21 shorted.	Good	Go to step c.
	Bad	Replace defective component.
c. Check for R40 out of adjustment. (See para. 3-12.)	Good	Check all associated components.
	Bad	Adjust R40.

TROUBLE: Inconsistent Light Level - Erratic Quench.		
ACTION	INDICATION	REMARKS
a. Check C21 and/or C24 for open.	Good	Go to step b.
	Bad	Replace defective component.
b. Check CR21.	Good	Check all associated components.
	Bad	Replace CR21.

TROUBLE: High Light Level - Late or No Quench.		
ACTION	INDICATION	REMARKS
a. Check for C20, R35, R36 and/or CR19 open.	Good	Go to step b.
	Bad	Replace defective component.
b. Check for C21, C22 and/or R37 shorted.	Good	Go to step c.
	Bad	Replace defective component.
c. Check for Q5 or LASCR1 open or shorted.	Good	Go to step d.
	Bad	Replace defective component.
d. Check C13 for open or short.	Good	Go to step e.
	Bad	Replace C13.
e. Check T3.	Good	Go to step f.
	Bad	Replace T3.
f. Check for R40 out of adjustment. (See para. 3-12.)	Good	Go to step g.
	Bad	Adjust R40.
g. Check FT2	Good	Go to step h.
	Bad	Replace FT2.
h. Check quench tube FT2 insulation for punctures (Shorting out trigger pulse).	Good	Check all associated components.
	Bad	Repair insulation.

SECTION 4

MAINTENANCE

4-1. GENERAL.

This section contains procedures for disassembly, cleaning, electrical component removal and reassembly of the Strobonar Models 710 and 780.

You should disassemble the units to the extent necessary for operational checkout, troubleshooting and repair. Reassembly is the reverse of disassembly. Special reassembly instructions are included where required.

4-2. TOOLS.

It is not necessary for you to have special tools or fixtures to perform maintenance on the Strobonars or to replace any parts or components. Ordinary screwdrivers, diagonal cutters, long nose pliers, a soldering iron and other common hand tools are adequate to perform all repair and replacement procedures.

4-3. DISASSEMBLY.

4-4. STROBONAR MODELS 710 AND 780.

Disassembly of the Strobonars, to the extent necessary for operational checkout and troubleshooting, is described for you in the following procedure.

WARNING

Before you start disassembling the Strobonar, press the open flash button several times to insure the storage capacitor C3 is discharged as much as possible at this time. The capacitor presents a serious shock hazard if charged. When the Strobonar is disassembled to the point where you have access to the capacitor, it should be discharged through a 100 ohm, 2W resistor to insure the unit is safe to work on. Be sure you handle the unit with extreme caution until you are SURE the capacitor is discharged.

a. Squeeze the two battery tray release buttons (1, Figure 5-1) and withdraw the battery tray.

b. Remove the two screws (2, Figure 5-1) that hold the chassis assembly to the housing, and pull the chassis assembly out of the front of the housing.

c. To remove the nose ring assembly from the chassis assembly, remove the three screws (3, Figure 5-1) that hold the nose ring assembly to the chassis. Separate the nose ring from the chassis.

d. Continue disassembly as required. See Figures 5-3, 5-4 and 5-5.

4-5. REFLECTOR AND FLASHTUBE.

4-6. REFLECTOR ASSEMBLY.

To remove the reflector and flashtube assembly, disassemble the Strobonar as described in paragraph 4-4. Handle the flashtube and reflector assembly gently to avoid damaging the electrode seals at the ends of the flashtube.

Model 780: Since the nickel ribbon leads from the quench tube are welded to the electrodes on the main flashtube FT1, it is impractical to replace the quench tube or the flashtube as separate items. Therefore, it is recommended that the flashtube and quench tube be replaced as a complete assembly, namely the Optics Assembly as illustrated in Figure 5-5.

It is important that when you remove the red and black leads to the storage capacitor from the main flashtube electrodes and also the red lead to transformer T2 on the main circuit board, you should NOT cut the leads, but should unsolder them from the flashtube. Impedance between the flashtube and quench tube and the storage capacitor must be 75×10^{-3} ohms total. Wire length and size from the flashtube to the storage capacitor and the nickel ribbon from the flashtube to the quench tube are critical for quench reliability and light linearity in the automatic mode.

Model 710: The flashtube can be replaced in the Model 710 as a separate item. Be sure you unsolder the leads from the storage capacitor to the flashtube rather than cutting them. Observe the following instructions when replacing the flashtube.

4-7. FLASHTUBE REPLACEMENT (Model 710).

4-8. POSITIONING.

Flashtube removal and replacement should be accomplished with extreme caution to avoid cracking the seals around the metal electrodes. The points where the electrodes enter the glass envelope are the most sensitive areas of the flashtube. Bending or cutting the electrodes will cause excessive strain between the glass and the electrodes. The flashtube should be mounted in the reflector with the leads exerting minimum pressure on the flashtube.

The reflector and flashtube assembly should be handled gently and properly positioned in the Strobonar. Any contact with other components should be avoided to prevent damaging or shorting the metal electrodes.

4-9. POLARITY (See Figure 4-1).

The polarity of the flashtube must be checked when replacing the tube. The positive high voltage lead must be connected to the anode. The cathode, identified by the large diameter electrode inside of the envelope, must be connected to the negative lead. The trigger band is located at the cathode end of the tube.

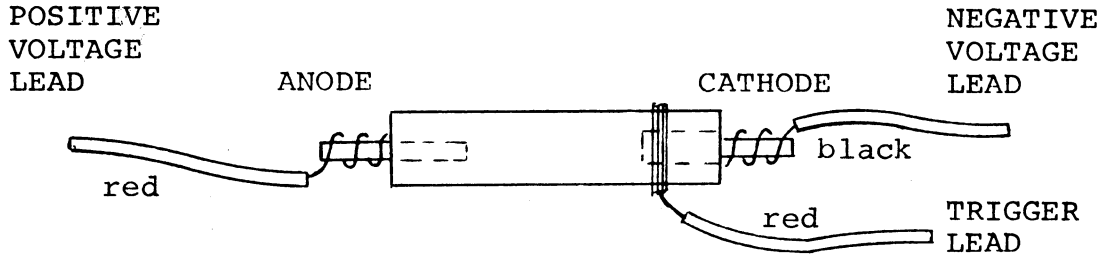


Figure 4-1. Flashtube Polarity.

CAUTION

Reversing the polarity of the flashtube may result in a failure of flash or may produce low light output. Continued use will permanently damage the flashtube.

4-10. SOLDERING.

Soldering the high voltage leads on the flashtube may be done with any high quality Sn 63 solder with a resin core flux. Caution should be taken to avoid exerting any pressure on the metal electrode leads when soldering.

4-11. REASSEMBLY.

You should reassemble the unit by reversing the disassembly procedures and by following the precautions and assembly procedures listed.

a. Check to make sure you have replaced all the insulators on the circuit board.

b. Check that you have properly positioned the reflector and flashtube assembly to avoid damaging the flashtube.

c. Check that the operational switch and open flash button operate properly.

d. Insure that all leads are properly dressed and are not shorted to other leads or components.

4-12. CLEANING.

4-13. 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.

4-14. REFLECTOR AND LENS.

To remove the reflector or lens to clean, you will have to disassemble the Strobonar as described in paragraph 4-4.

To clean the reflector, use low pressure compressed air to blow the dust from the reflector. It is important that you do not touch the inside of the reflector, especially around the flashtube. The reflector is subject to burn spots if it is touched.

4-15. ELECTRICAL COMPONENT REMOVAL.

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

a. When applying heat, you should use a heat sink to avoid damaging the components or circuit board due to heat conduction of the component leads.

b. You should apply heat sparingly to the component lead to be removed and lift the lead clear of the junction.

c. You should insure that component replacement and lead dressing of new components be the same as for the original.

d. If any components are replaced in the automatic (quench) circuit (Model 780), it will be necessary to recalibrate that circuit.

SECTION 5

PARTS LISTS AND DIAGRAMS

5-1. GENERAL.

This section includes a listing of all replaceable parts, exploded views of all assemblies and schematics for the Strobonar Models 710 and 780. The following explains the column headings as used in the parts lists:

INDEX REF - Lists the reference (or callout) number of each part as shown in the illustrations.

SCHEM REF - Lists the schematic reference designator of electrical parts.

HONEYWELL PART NO. - Lists the number by which an item may be ordered.

DESCRIPTION - Lists the part name and specifications required for identification.

QTY/UNIT - Lists the total quantity of each item used in the unit or assembly.

5-2. SCHEMATIC REFERENCE PREFIXES.

Prefix numbers have been added to the schematic reference designators to avoid designator duplication. Each unit has been assigned a prefix number, as shown in the chart.

UNIT	PREFIX	EXAMPLE
Auto/Strobonar 710-780	No Prefix	R1
SCR Test Circuit	#1 Prefix	1R1
Wall Box - Multivoltage	#2 Prefix	2R1
Resistor R10 Test Circuit	#3 Prefix	3R1
Resistor R2 Test Circuit	#4 Prefix	4R1
Resistor R6 Test Circuit	#5 Prefix	5R1

5-3. ORDERING INFORMATION.

When ordering spare or replacement parts, specify the unit model number, item description, Honeywell part number and quantity required.

Order parts from:

Honeywell
Photographic Products Division
P.O. Box 22083
Denver, Colorado 80222

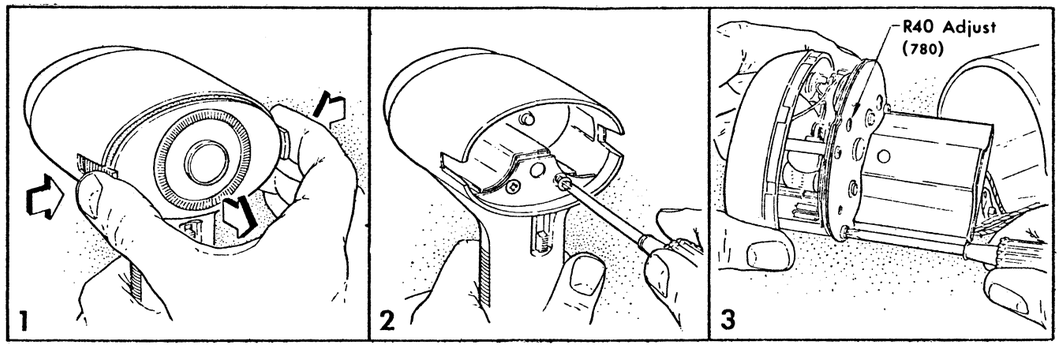


Figure 5-1.
Disassembly Procedure.

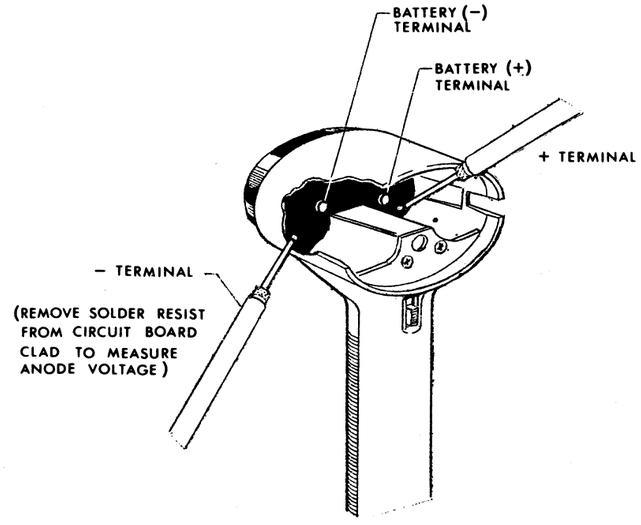


Figure 5-2.
Anode Voltage Check.

REF INDEX	REF SCHEM	HONEYWELL PART NO.	DESCRIPTION	QTY 710	QTY 780
		H73003665 001	Strobonar 710 Assembly	1	
		H73003665 002	Auto/Strobonar 780 Assy		1
1		H73003521 001	Battery and Tray Assy (See Fig. 5-6)	1	1
2		H16761246 023	Screw, Flat Head	2	2
3		H16759761 007	Housing ⚠1	1	
		H16759761 005	Housing ⚠1		1
4		H73003565 001	Guard, Switch		1
5		H73003667 001	Chassis Assembly (See Fig. 5-4)	1	
5		H73003667 002	Chassis Assembly (See Fig. 5-4)		1
6		H73000595 003	Sleeving	2	2
7		H73003511 001	Decal ⚠1	1	
7		H73003511 002	Decal ⚠1		1
8		H73003685 002	Handle Cover ⚠1	1	1
9	C3	H73003518 002	Capacitor ⚠1	1	1
10		H16766627 001	Busing, Handle ⚠1	1	1
11		H73004121 001	Capacitor & Housing Assy	1	
12		H73004121 002	Capacitor & Housing Assy		1

NOTES:

⚠1 Items No. 3, 7, 8, 9 and 10 are preassembled to make up the Capacitor and Housing Assemblies, Items No. 11 and 12 for service.

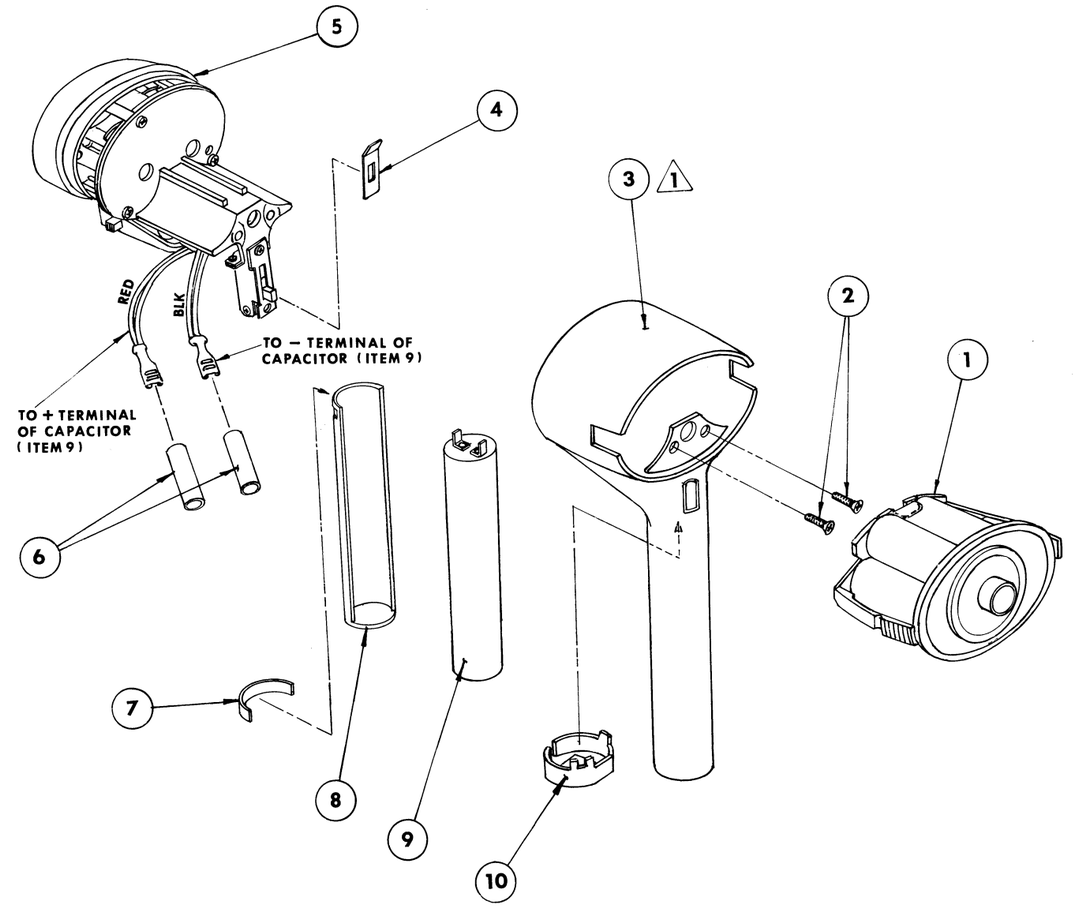
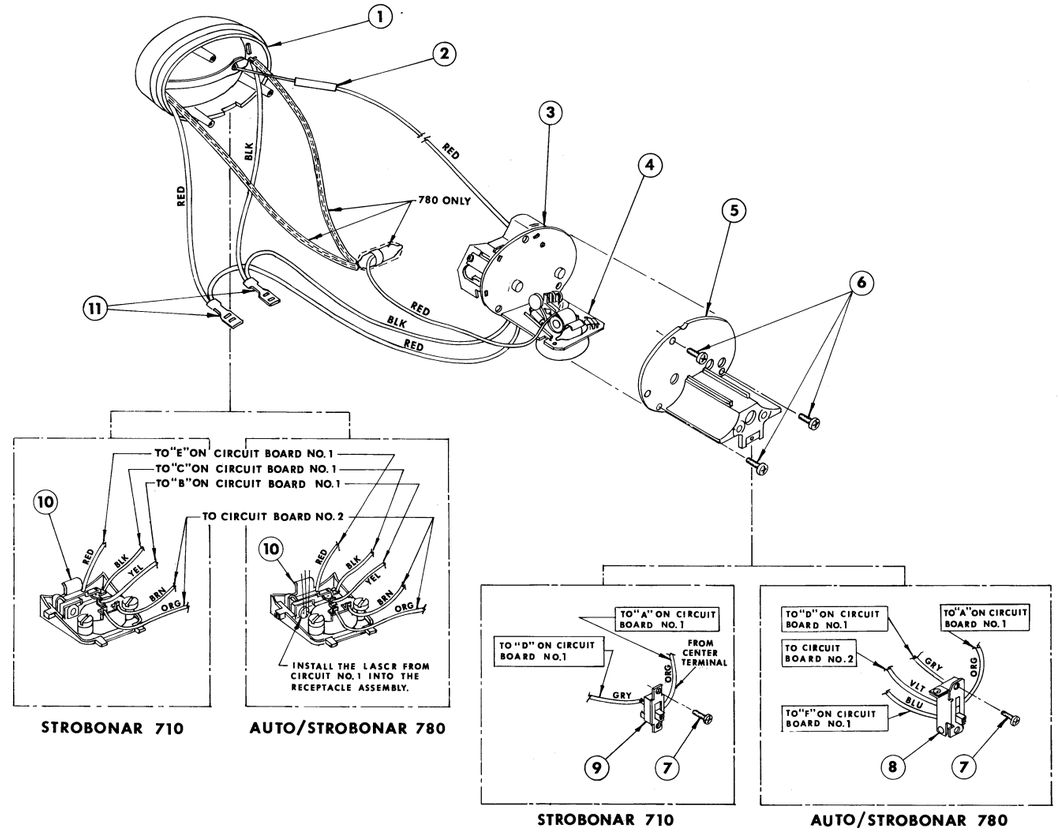


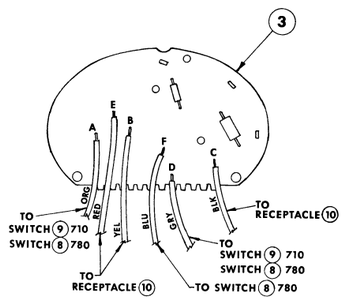
Figure 5-3.
Exploded View -
Strobonar 710
Auto/Strobonar 780

REF INDEX	REF SCHEM	HONEYWELL PART NO.	DESCRIPTION	QTY 710	QTY 780
		H73003667 001	Chassis Assembly	1	
		H73003667 002	Chassis Assembly		1
1		H73003485 001	Optics Assembly (See Fig. 5-5)	1	
1		H73003485 002	Optics Assembly (See Fig. 5-5)		1
2		H16750977 146	Sleeving, ½"	1	1
3		H73003836 003	Circuit Board No. 1 Assy (See Fig. 5-7)	1	
3		H73003836 002	Circuit Board No. 1 Assy (See Fig. 5-7)		1
4		H73003837 003	Circuit Board No. 2 Assy (See Fig. 5-8)	1	
4		H73003837 002	Circuit Board No. 2 Assy (See Fig. 5-8)		1
5		H73003580 001	Chassis	1	1
6		H73000042 026	Screw, Fillister Head	3	3
7		H16765280 201	Screw, Flat Head	1	1
8		H73003510 001	Switch Assy		1
9		H16755813 002	Slide Switch	1	
10		H73003604 003	Receptacle Assy	1	
10		H73003604 001	Receptacle Assy		1
11		H16754482 002	Terminal	2	2

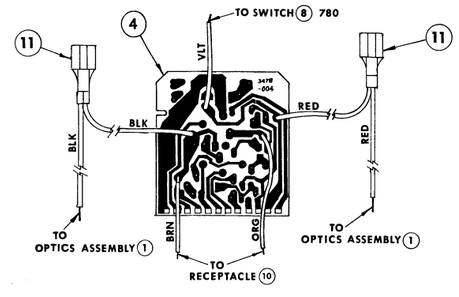


STROBONAR 710 | AUTO/STROBONAR 780

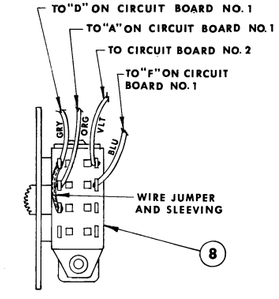
STROBONAR 710 | AUTO/STROBONAR 780



CIRCUIT BOARD NO. 1 WIRING
STROBONARS 710/780



CIRCUIT BOARD NO. 2 WIRING
STROBONARS 710/780
(CLAD SIDE OF CIRCUIT BOARD SHOWN)
(TRANSFORMER NOT SHOWN)



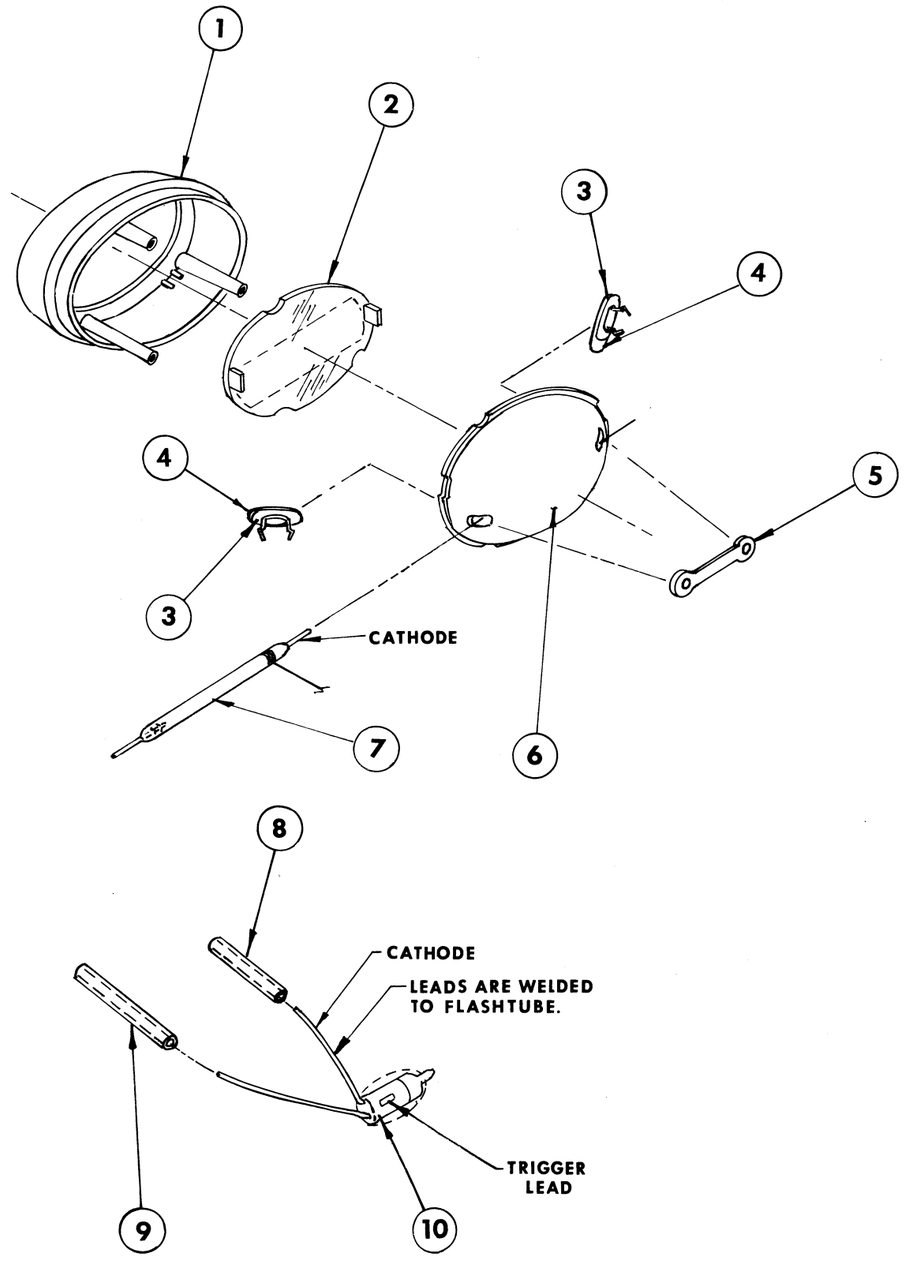
SWITCH WIRING
AUTO/STROBONAR 780

Figure 5-4.
Chassis Assembly -
Strobonar 710
Auto/Strobonar 780

REF INDEX	REF SCHEM	HONEYWELL PART NO.	DESCRIPTION	QTY 710	QTY 780
		H73003485 001	Optics Assembly	1	
		H73003485 002	Optics Assembly		1
1		H16766498 002	Nose Ring	1	1
2		H73003470 001	Lens	1	1
3		H73003472 002	Grommet	2	2
4		H73003979 001	Anti-burn Grommet	2	2
5		H73002457 003	Band	1	1
6		H73003467 002	Reflector	1	1
7	FT1	H73003021 001	Flashtube	1	1
8		H73001214 008	Sleeving		1
9		H73001214 007	Sleeving		1
10	FT2	H73003698 001	Quench Tube Assy		1

NOTES:

1. Model 780: The Optics Assembly is supplied ONLY as a complete assembly for the Model 780 since some components are welded together. Individual parts will not be supplied. Refer to paragraph 4-6.



QUENCH TUBE ASSEMBLY
(USED ON 780 ONLY)

Figure 5-5.
Optics Assembly -
Strobonar 710
Auto/Strobonar 780

REF INDEX	REF SCHEM	HONEYWELL PART NO.	DESCRIPTION	QTY 710	QTY 780
		H73003521 001	Battery and Tray Assy	1	1
1		H73002980 001	Filler	1	1
2		H73003512 001	Battery Assembly	1	1
3		H16750977 159	Sleeving	1	1
4		H16765479 001	Spring Clip	1	1
5		H73003520 001	Tray Assembly	1	1
6		H73000427 005	E-Ring	1	1
7		H16759851 001	Spring	1	1
8		H16766504 003	Tray	1	1
9		H16738656 001	Detent Spring	1	1
10		H73003575 001	Back Plate	1	1
11		H73003568 001	Calculator	1	1
12		H73000003 001	Shaft	1	1
13		H73000008 002	Knob Decal	1	1

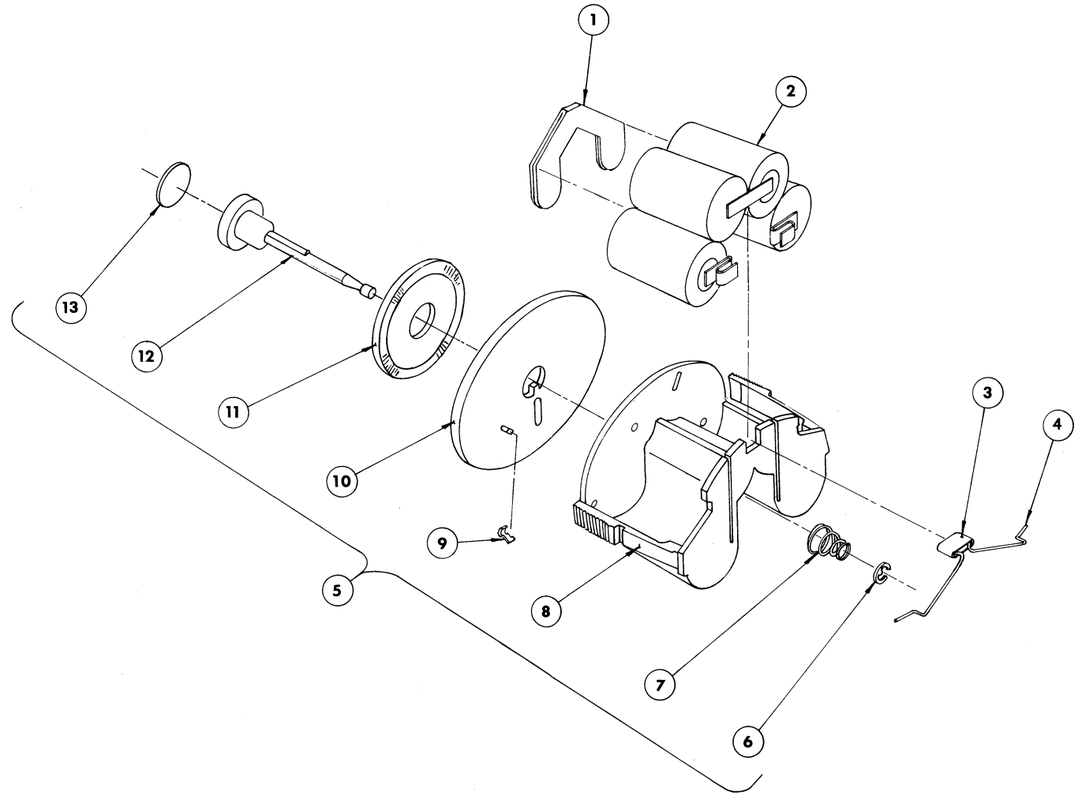


Figure 5-6.
Battery Tray Assembly

REF INDEX	REF SCHEM	HONEYWELL PART NO.	DESCRIPTION	QTY 710	QTY 780
		H73003836 003	Circuit Board No. 1 Assy	1	
		H73003836 002	Circuit Board No. 1 Assy		1
1		H73003477 004	Circuit Board	1	1
2	C15	H73001150 032	Capacitor, .01 uf,500V	1	1
3	R29	H16759940 145	Resistor, 10M, ¼W, 10%	1	1
4	R27	H73000683 228	Resistor, 1.3 ohm,1½W,5%	1	1
5	C24	H73003202 013	Capacitor, 1 uf, 40V		1
6	R40	H16762587 111	Resistor, 220K, Variable		1
7	CR21	H73000204 001	Diode, zener, 7.3V		1
8	R42	H16759940 320	Resistor, 910K, ¼W, 5%		1
9	R6	H73003356 (1)	Resistor (1)	1	1
10	C14	H73002620 013	Capacitor, 820 pf, 1KV	1	1
11	VR2	H73003022 003	Neon	1	1
12	CR14	H73001970 001	Diode, 50V	1	1
13	R24	H16759940 113	Resistor, 470K, ¼W, 10%	1	1
14	Q3	H73001889 001	Transistor, Darlington	1	1
15		H73003540 001	Heat Sink	1	1
16	Q1	H73003317 001 X44H226 6R	Transistor, Power	1	1
17		H16750045 009	Screw, Self-Tap	1	1
18	CR2	H73001970 001	Diode, 50V	1	1
19	R2	H73004070 (2) 6E 6290	Resistor (2)	1	1
20	Q2	H73003382 001	Transistor, Silicon, NPN	1	1
21	CR1	H73003381 001	Diode, zener, 47V	1	1
22	R1	H16759940 049	Resistor, 1K, ¼W, 10%	1	1
23		H73000602 027	Wire, Wht, #22	1	1
24	CR3	H73001970 003	Diode, 200V	1	1
25	C1	H73003664 113	Capacitor, .1 uf, 250V	1	1
26	R25	H16759940 025	Resistor, 100 ohm, ¼W,10%	1	1
27	R38	H16759940 125	Resistor, 1.5M, ¼W, 10%		1
28	LASCR1	(3)	LASCR (3)		1
29		H16750977	Sleeving		A/R
30		H73000602 046	Wire, Wht, #22		1
31	C23	H73001150 015	Capacitor, 100 pf, 500V		1

REF INDEX	REF SCHEM	HONEYWELL PART NO.	DESCRIPTION	QTY 710	QTY 780
32	R37	③	Resistor ③		1
33	C22	③	Capacitor ③		1
34	R23	H16759940 049	Resistor, 1K, ¼W, 10%	1	1
35	CR14	H73001970 001	Diode, 50V	1	1
36	T2	H73000577 005	Transformer, Trigger	1	1
37	CR16	H73003554 261	Diode, zener, 200V	1	1
38	R9	H16759940 332	Resistor, 3M, ¼W, 5%	1	1
39	R8	H16759940 009	Resistor, 22 ohm, ¼W, 10%		1
40		H73000602 042	Wire, Wht, #22	1	1
41	R4	H73003356 512	Resistor, 130K, ¼W, 10%	1	1
42	C6	H73002737 015	Capacitor, .15uf, 250V	1	1
43	R21	H16759940 135	Resistor, 3.9M, ¼W, 10%	1	1
44	C7	H73001150 025	Capacitor, .001 uf, 500V	1	1
45	SCR2	H73002511 013	SCR, 200V	1	1

NOTES:

① Refer to paragraph 3-15, for selection of resistor R6.

② Refer to paragraph 3-14 for selection of resistor R2.

③ The following components make up the Quench Circuit Kit, Honeywell Part No. H73003970-008.

If LASCR1 is:	C21 must be:	C22 must be:	R37 must be:
H73000533 809	H73002426 001 or H73001150 015 100 pf, 50V	H73002426 106 or H73001150 026 1500 pf, 50V	H16759940 009 22 ohm, ¼W, 10% ④
H73000533 813	H73002426 001 or H73001150 015 100 pf, 50V	H73002426 105 or H73001150 029 3300 pf, 50V	H16759940 009 22 ohm, ¼W, 10% ④
H73000533 814	H73002426 001 or H73001150 015 100 pf, 50V	H73002426 108 or H73001150 028 2200 pf, 50V	H16759940 009 22 ohm, ¼W, 10% ④

④ Resistor R37 may be any value from 0 ohms to 22 ohms.

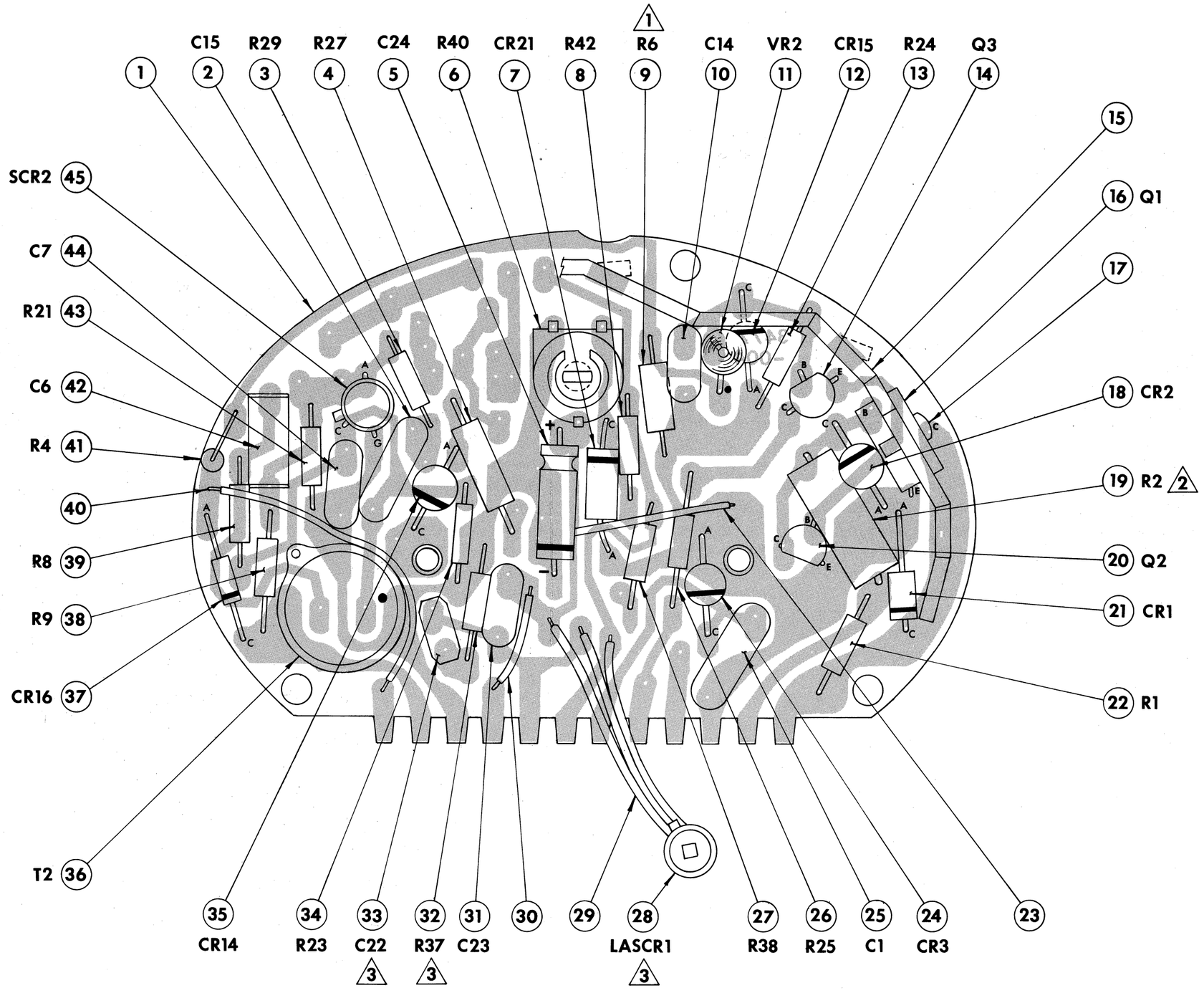


Figure 5-7.
Circuit Board No. 1 Assy

REF INDEX	REF SCHEM	HONEYWELL PART NO.	DESCRIPTION	QTY 710	QTY 780
		H73003837 003	Circuit Board No. 2 Assy	1	
		H73003837 002	Circuit Board No. 2 Assy		1
1		H73003478 004	Circuit Board	1	1
2		H16750977 438	Sleeving	1	1
3	VR1	H73003022 005	Neon	1	1
4		H73000081 001	Neon Retainer	1	1
5	T3	H73002568 004	Transformer		1
6	CR5	H73002061 002	Diode, 600V	1	1
7	CR22	H73001970 007	Diode, 1KV	1	1
8	CR4	H73002061 002	Diode, 600V	1	1
9	R3	H16758183 832	Resistor, 1K, ½W, 10%	1	1
10	C2	H73002620 013	Capacitor, 820 pf, 1KV	1	1
11	CR19	H73001970 001	Diode, 50V		1
12	C13	H73002737 015	Capacitor, .15 uf, 250V		1
13	C21	H73001150 015	Capacitor, 100 pf, 500V		1
14	Q5	H16759913 002	Transistor, silicon		1
15		H73000602 016	Wire, Wht, #22		1
16	C20	H73001150 027	Capacitor, .0022 uf,500V		1
17	R36	H16759940 067	Resistor, 5.6K,¼W, 10%		1
18	R35	H16758183 876	Resistor, 3.9M, ½W,10%		1
19	R14	H73003356 524	Resistor, 174K, ¼W,10%	1	1
20	R10	△1	Resistor △1	1	1
21	T1	H73003366 002	Transformer	1	1

NOTES:

△1 Refer to paragraph 3-16 for selection of resistor R10.

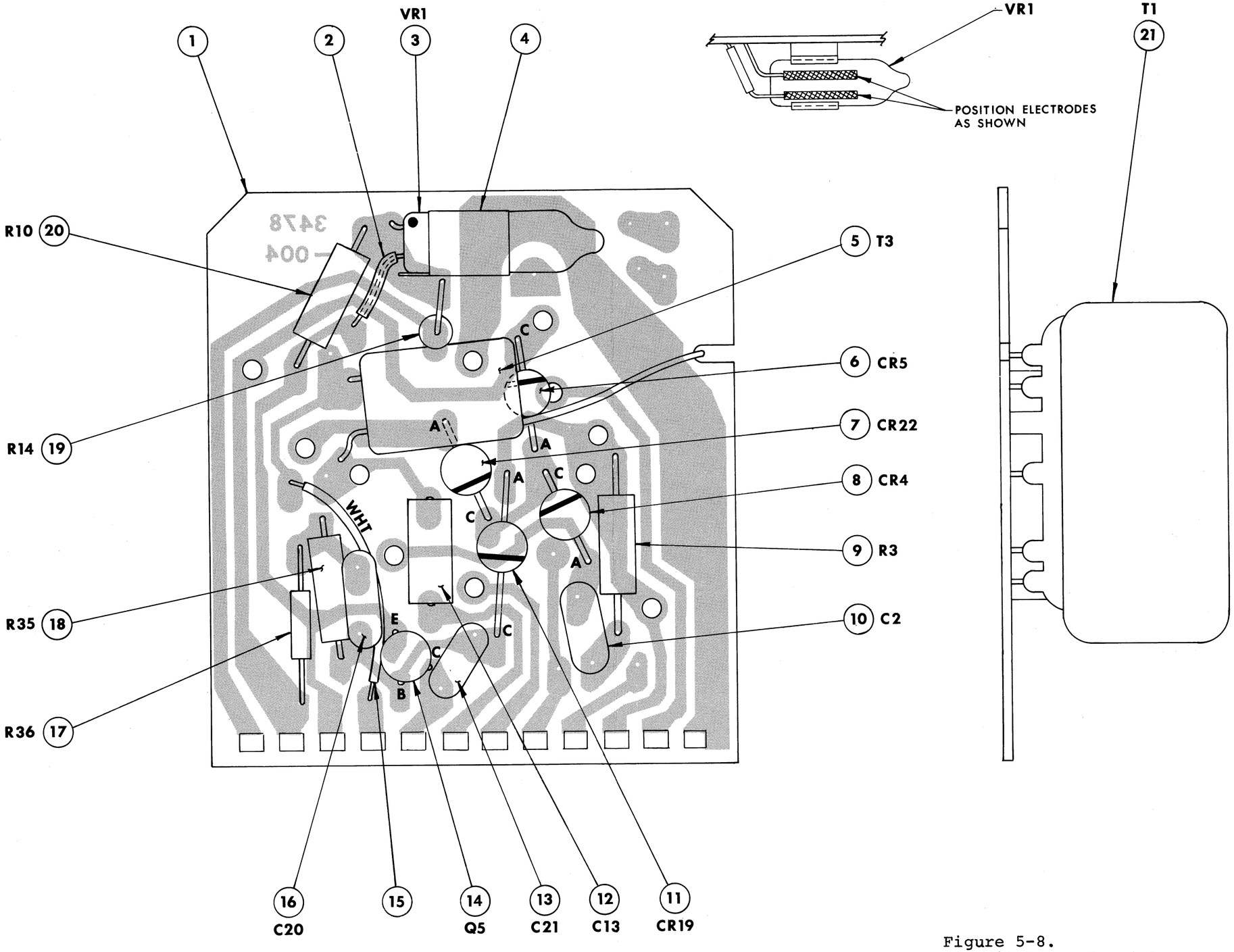
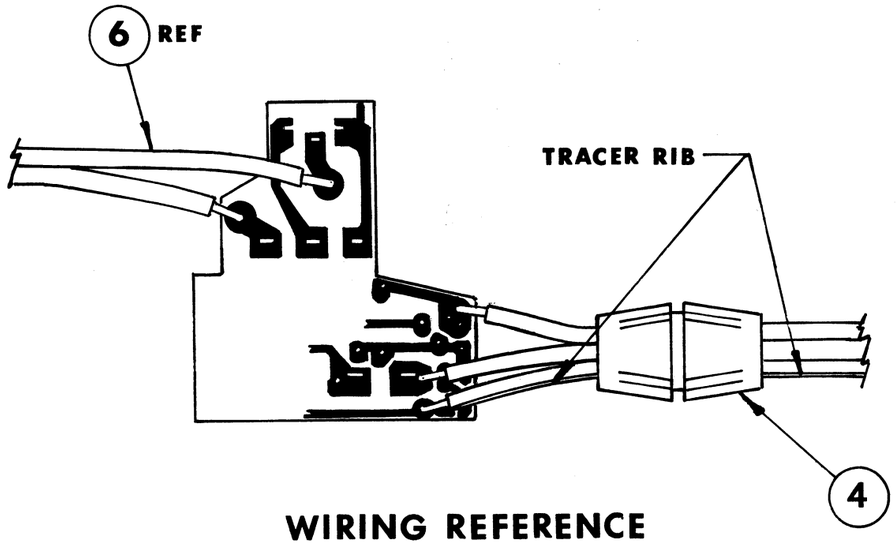


Figure 5-8.
Circuit Board No. 2 Assy

REF INDEX	REF SCHEM	HONEYWELL PART NO.	DESCRIPTION	QTY
		H73003718 001	Wall Box Assembly	1
1		H73003766 002	Decal	1
2		H16756377 023	Screw	2
3		H73002930 001	Base	1
4		H16766484 007	Cable Assembly	1
5		H73003776 001	Circuit Board Assy. (See Fig. 5-10)	1
6		H73001140 002	Power Cord	1
7		H73001173 001	Cover	1



WIRING REFERENCE
(CLAD SIDE SHOWN)

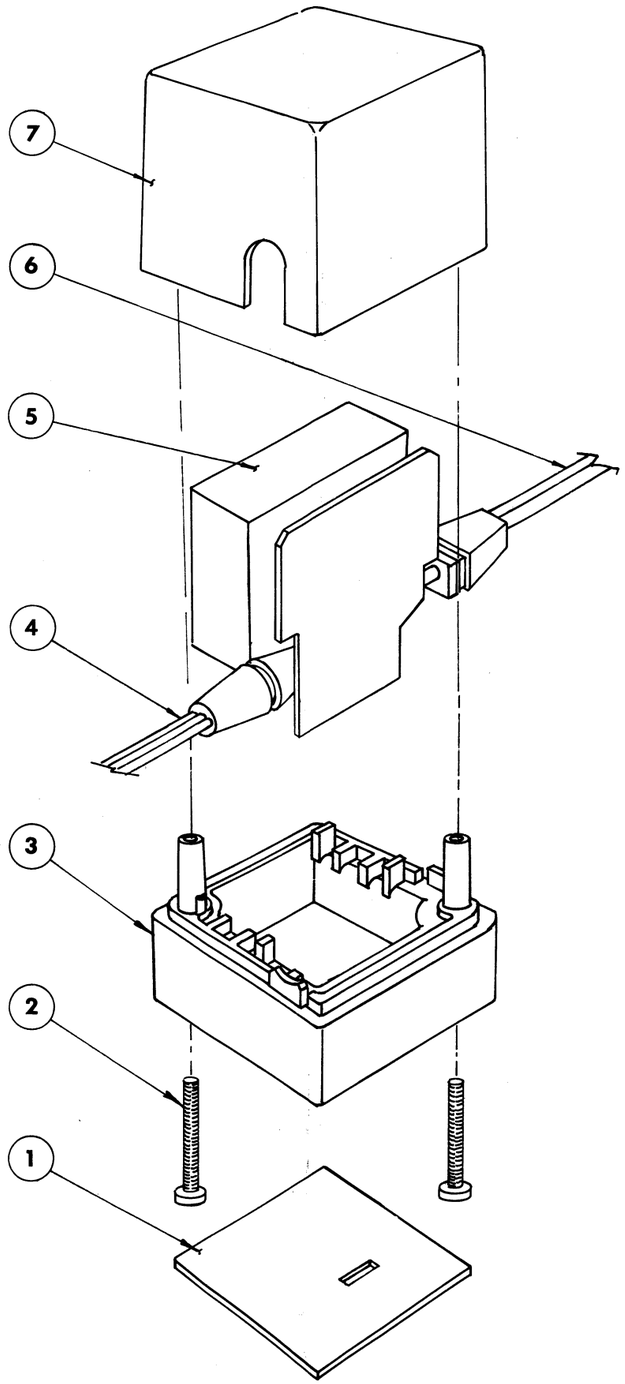


Figure 5-9.
Wall Box Assembly

REF INDEX	REF SCHEM	HONEYWELL PART NO.	DESCRIPTION	QTY
		H73003776 001	Wall Box Circuit Bd. Assy.	1
1		H73003699 001	Circuit Board	1
2	2T1	H73003708 001	Transformer	1
3	2CR4	H73001970 005	Diode, 600V	1
4	2CR1	H73001970 005	Diode, 600V	1
5	2CR3	H73001970 005	Diode, 600V	1
6	2CR2	H73001970 005	Diode, 600V	1
7	2R1	H16759940 313	Resistor, 47M, ¼W, 50%	1
8	2R2	H16759940 328	Resistor, 2M, ¼W, 5%	1
9	2SCR1	H73002511 010	SCR, 200V	1
10	2CR6	H73003531 255	Zener, Diode, 140V	1
11	2CR5	H73003531 261	Zener, Diode, 200V	1
12	2C1	H73002426 001	Capacitor, 1000 pf, 50V	1
13	2S1	H73002937 004	Switch	1
14		H73003139 001	Spacer, Switch	1

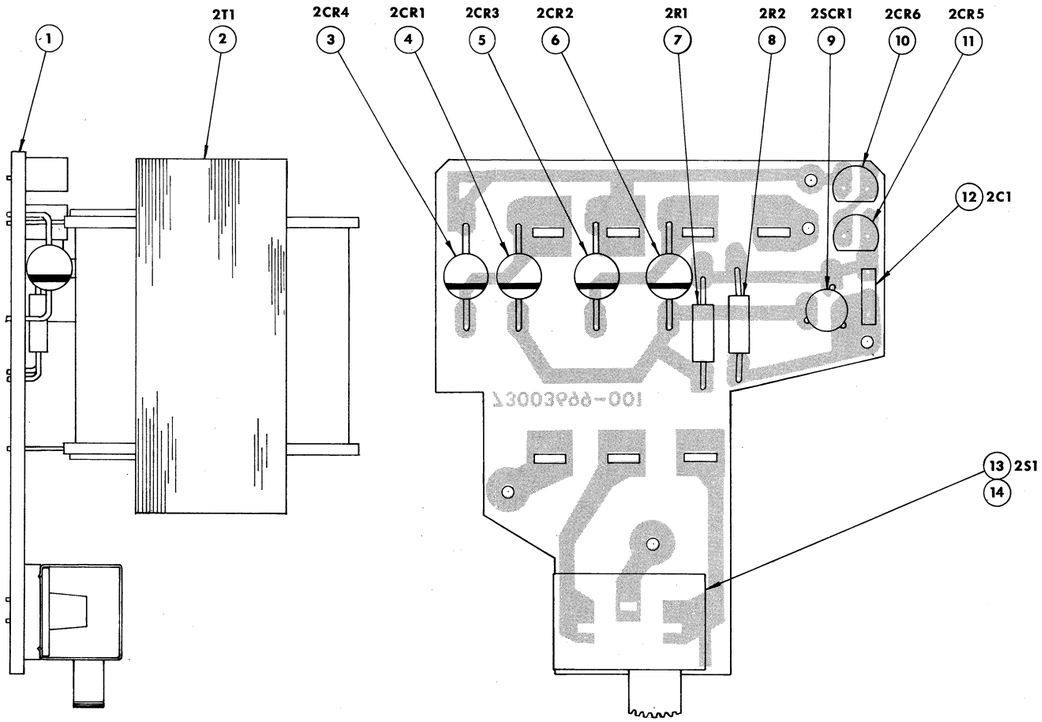


Figure 5-10.
Wall Box Circuit
Board Assembly

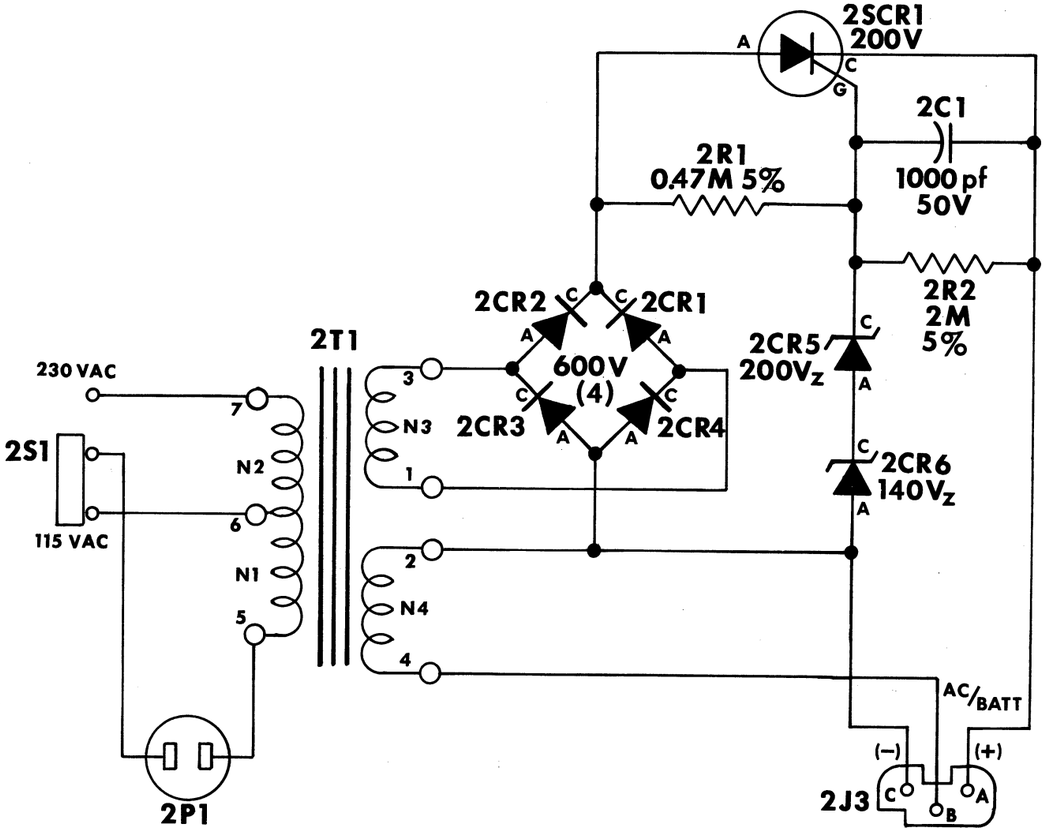


Figure 5-11.
Schematic Diagram
Wall Box

NOTES:

1. Refer to paragraph 3-14 for selection of resistor R2.
2. Refer to paragraph 3-15 for selection of resistor R6.
3. Refer to paragraph 3-16 for selection of resistor R10.
4. Component values depend upon selection of LASCR1. Refer to the parts list on page 5-13 for a listing of these values.
5. All resistance values in ohms, 1/4W, 10%.
6. All capacitance values in microfarads.

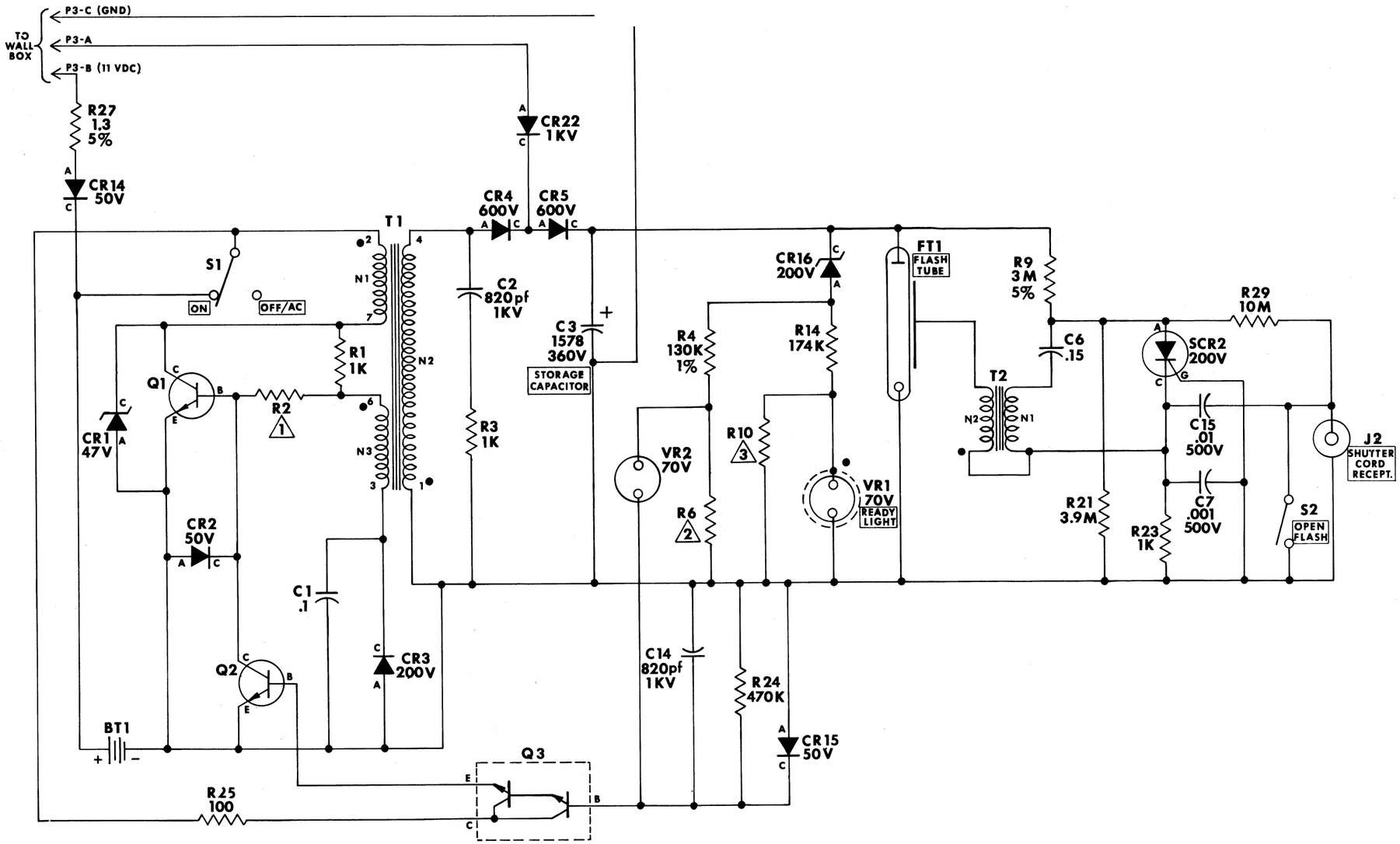


Figure 5-12.
Schematic Diagram -
Strobonar 710

NOTES:

1. Refer to paragraph 3-14 for selection of resistor R2.
2. Refer to paragraph 3-15 for selection of resistor R6.
3. Refer to paragraph 3-16 for selection of resistor R10.
4. Component values depend upon selection of LASCR1. Refer to the parts list on page 5-13 for a listing of these values.
5. All resistance values in ohms, 1/4W, 10%.
6. All capacitance values in microfarads.

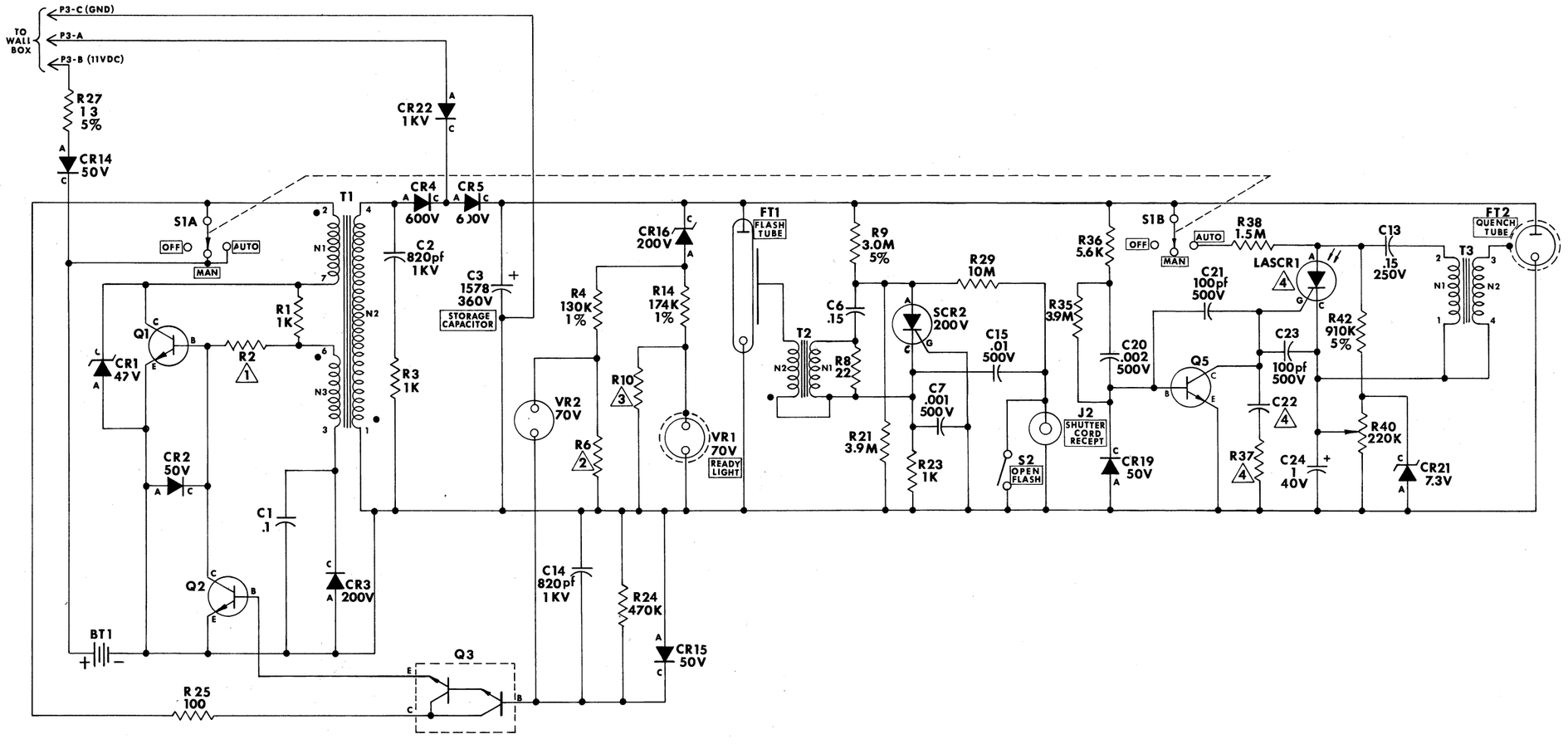


Figure 5-13.
Schematic Diagram -
Auto/Strobonar 780