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# *Instructions*

**FOR  
EQUIPMENT  
Type**

**X-60 D LAMP  
81003-1  
11-1-79**

**STRONG ELECTRIC**  
87 CITY PARK AVE., TOLEDO, OHIO



## PREFACE

OBSERVE ALL SAFETY PROCEDURES. The xenon bulb operates with a high internal pressure and servicing should be referred to qualified personnel.

THIS IS A REFLECTOR TYPE, direct current projection lamphouse using a xenon bulb as the light source and only xenon bulbs designed for horizontal operation should be used in the X-60 lamphouse.

THE REFLECTOR is an interference coated deep ellipse type, designed to operate in a fixed position at 34 inches from the projection film line.

THE SPECIAL POWER SUPPLY manufactured by Strong Electric, is the only power source that can be used with the X-60 projection lamphouse.

ADJUSTMENT CONTROLS to position the xenon bulb in relation to the reflector are located on the lower right side of the lamphouse. The two rear knobs provide for the horizontal and vertical movement of the bulb and the knob at the front adjusts the focus of the bulb in relation to the reflector.

THE LAMPHOUSE is equipped with an ammeter to indicate the operating current of the lamp and an elapsed time meter to show the number of hours the lamp has operated.

CURRENT CONTROL for the lamphouse is located on the power supply. A tap panel and dial switches are provided for this adjustment. See the power supply manual for adjustment instructions.

THE LAMPHOUSE BLOWER is internally wired and operates on 220 V. A. C. This blower is required to keep the bulb seals at a safe operating temperature.

AIRFLOW SAFETY INTERLOCK SWITCHES are installed at the lamphouse exhaust stack and the bulb seal blower. Inadequate air flow to close either one or both of these switches will interrupt the A. C. control circuit and prevent ignition of the xenon bulb.

SAFETY INTERLOCK SWITCHES are located in the lamphouse at the side door and rear access panel. Both must be secured before the bulb will ignite.

THE LAMP "ON-OFF" rocker type switch, in the "ON" position, energizes the A.C. supply circuit to the running time meter, seal cooling blower, the igniter and completes the circuit for ignition of the xenon bulb.

THE "MODE" rocker type switch provides the means of operating the equipment from a remote "Automatic" system or when placed in the "Man. " position, from the lamphouse.

THE IGNITE PUSH BUTTON SWITCH is provided for ignition of the xenon bulb from the lamphouse, when the "Mode" switch is in the "Man. " position.

IF AT ANY TIME you have a suggestion, or desire aid in securing anticipated results, please feel free to write directly to STRONG ELECTRIC, P.O. Box 1003, 87 City Park Ave., Toledo, Ohio 43697.

## SAFETY PROCEDURES

THE XENON BULB has high internal pressure. Therefore extreme care should be taken when handling the bulb. Refer servicing to qualified service personnel. To minimize any danger, the following rules should be followed.

1. CAUTION: BULB EXPLOSION HAZARD. Relamping to be done only by QUALIFIED SERVICE PERSONNEL with protective clothing and face shield.

2. Turn power off at main line switch before opening the door or rear access panel.

3. The xenon bulb when outside the lamphouse must be encased in its plastic protective cover.

4. The lamphouse must be properly vented to the outside atmosphere. See Exhaust Systems installation in this manual.

5. The bulb shall be inserted into the lamphouse while still encased in its protective cover. The cover should be removed only after all the necessary cable connections have been made and the door is ready to be closed. When removing the bulb from the lamphouse, it should be encased in the cover before the bulb cables are disconnected from the anode feed-through connector and igniter.

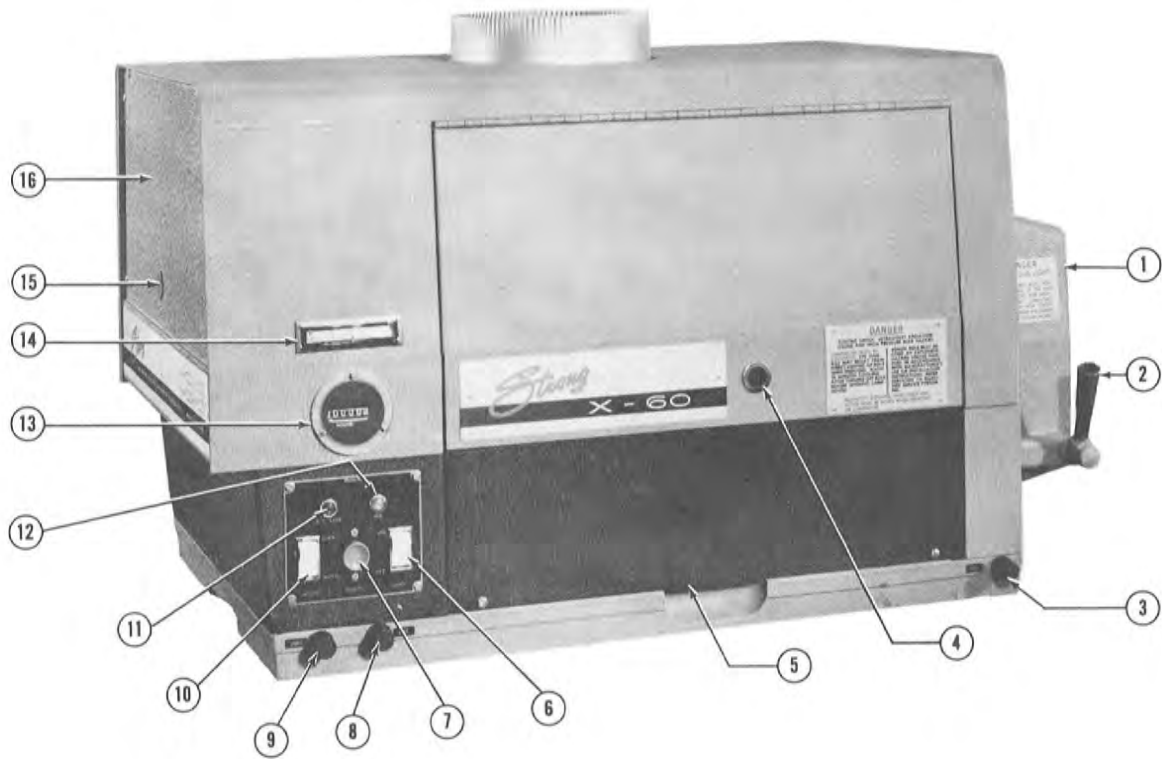
6. Clean the bulb only after it has cooled to room temperature. Never touch the glass envelope of the bulb; fingerprints will burn in and dull the bulb. If fingerprints are made, they should be carefully removed from the bulb with methyl alcohol and cotton.

7. Do not open the lamphouse when the bulb is in operation. Wait at least 20 minutes for the bulb to cool after turning off power.

8. Never look directly at the ignited bulb - TO DO SO MAY CAUSE BLINDNESS.

9. Encase the bulb in its protective cover when cleaning the lamphouse interior.

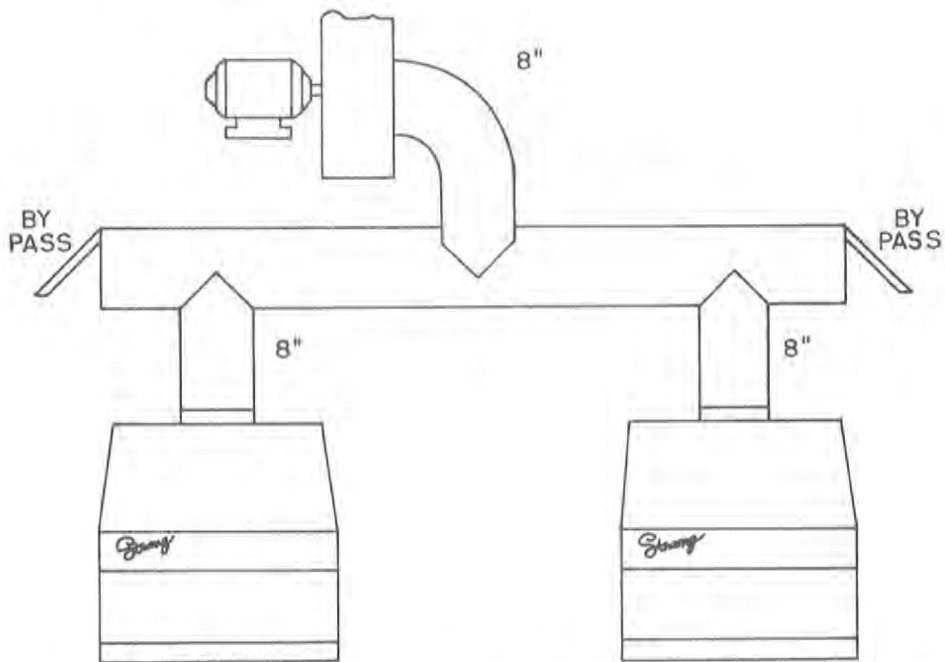
10. Dispose of expended bulbs that are beyond warranty immediately in the following manner. Wrap the bulb with several layers of canvas or heavy cloth, and smash with a hammer, before depositing in a refuse container.



- |                                 |  |
|---------------------------------|--|
| 1. 70mm Lens Accessory          | 10. Auto-Man Mode Switch                       |
| 2. Douser Handle                | 11. AC Power Indicator Lamp                    |
| 3. Focus Control Knob           | 12. Interlock System,<br>Indicator Lamp        |
| 4. Arc Viewing Port             | 13. Elapsed Time Meter                         |
| 5. Side Door                    | 14. Ammeter                                    |
| 6. Lamp "On-Off" (Power) Switch | 15. Plug Button (Emergency<br>Ignition Switch) |
| 7. Ignition Switch              | 16. Rear Access Panel                          |
| 8. Vertical Control Knob        |  |
| 9. Horizontal Control Knob      |  |

## EXHAUST SYSTEM INSTALLATION

THE EXHAUST STACK of this lamphouse is designed to fit an eight inch diameter pipe. This size pipe must be used through the complete exhaust system and installed to eliminate any possibility of down draft or rain dripping on the xenon bulb. (See illustration below.) The exhaust fan must be capable of removing 700 lineal feet of air per minute at each lamp. A minimum of 650 lineal feet is required to operate the lamphouse exhaust air vane switch. Do not install the xenon bulb until the exhaust system has been adjusted.



ONE DRAFT GAUGE is enclosed in an envelope attached to this instruction book. The gauge is designed for 700 lineal feet per minute. Follow the instructions for use printed on the gauge. If your exhaust system holds the draft gauge when the lamphouse door is closed, it is meeting the air flow requirements. Do not attempt to reduce the air flow by restricting the full 8-inch pipe opening either by the use of a damper or smaller pipe.

AN EXHAUST SYSTEM that has proven adequate for 150 ampere carbon arc operation will be suitable for the xenon installation providing it has been thoroughly cleaned and tested with the draft gauge to verify the draft is meeting the requirements.

## WIRING INSTALLATION

REMOVE THE SIX (6) SCREWS securing the Rear Access Panel to permit access to the ground lug and A. C. control terminal block. Spring out the top of the panel and lift up to release the panel from the bottom retaining strip.

ALL WIRES between the lamp and power supply must be shielded by enclosing them in Greenfield or conduit, to prevent electrical interference from feeding into the theatre sound system.

CONNECT THE RECTIFIER to the lamphouse as shown on the installation wiring diagram. The two heavy asbestos leads coming from the rectifier should be connected to the two heavy asbestos leads coming from the lamp. Polarity must be observed. Connect Red to Red and Black to Black.

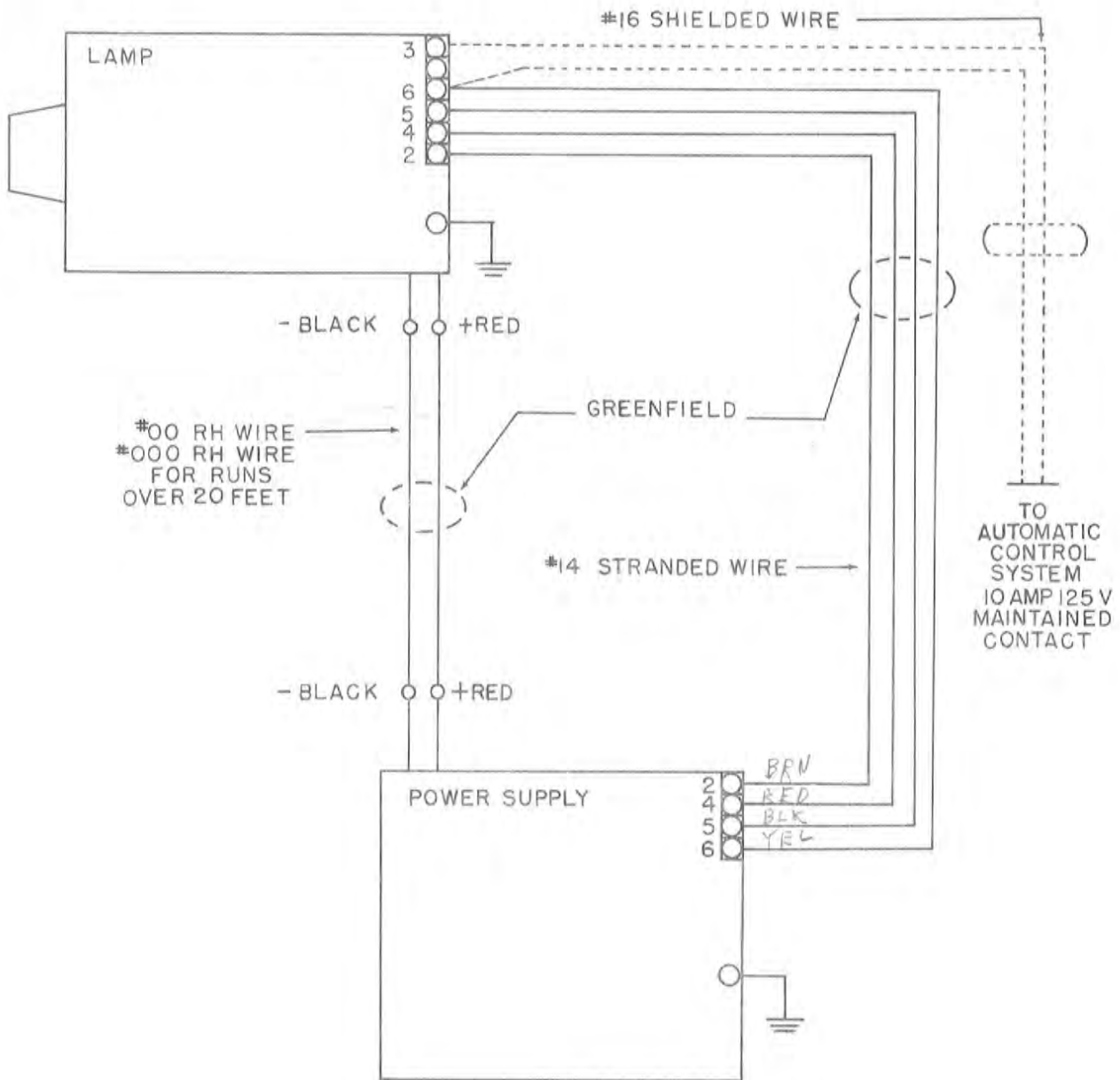
FEED FOUR #14 AWG WIRES for the A. C. control circuit and one #8 AWG ground wire (not supplied by manufacturer) through the small right angle connector on the side of the lamp. Connect the #14 AWG wires from the terminal block in the lamphouse to the corresponding terminals in the rectifier.

DUE TO HIGH VOLTAGES impressed during the ignition cycle, the xenon lamphouse must be grounded. A ground terminal, is provided inside the lamphouse just to the left of the terminal block. Connect the #8 AWG wire from this terminal to a suitable ground.

REPLACE THE REAR ACCESS PANEL.



# INSTALLATION DIAGRAM



## LAMPHOUSE ALIGNMENT

ONE ALIGNING KIT consisting of an aligning cord, aperture plate, dummy lens and weight is supplied with each pair of xenon lamps to provide an accurate and reliable method of optical alignment of the lamphouse to the projector mechanism. Good screen results can only be obtained by the careful use of the aligning kit.

PLACE THE LAMPHOUSE on the projector table and open the side door.

WHEN USED for 70mm projection, the lens adapter kit should be installed on the lamp before aligning the lamphouse with the projector. Do not insert the lens until the following aligning procedure has been completed.

POSITION THE LAMPHOUSE on the table so the center of the reflector will be as near 34 inches from the projector film line as the projector design will permit.

IN PREPARATION for optical alignment, bolt the lamphouse temporarily to the projector with the 5/16-18 cap screws (in small cloth bag) shipped with the lamp.

REMOVE the 1/4-20 screw in the douser and pass the cord through the small hole in the rear access panel of the lamphouse located at the approximate center of the nameplate in the black band along the bottom of the plate.

OPEN THE FIRE SHUTTER and fasten it so it cannot fall shut. This can be done with a rubber band or paper clip. Turn the projector mechanism by hand to clear the shutter blades.

CLOSE THE DOUSER and pass the cord through the hole in the center of the douser and into the projector mechanism.

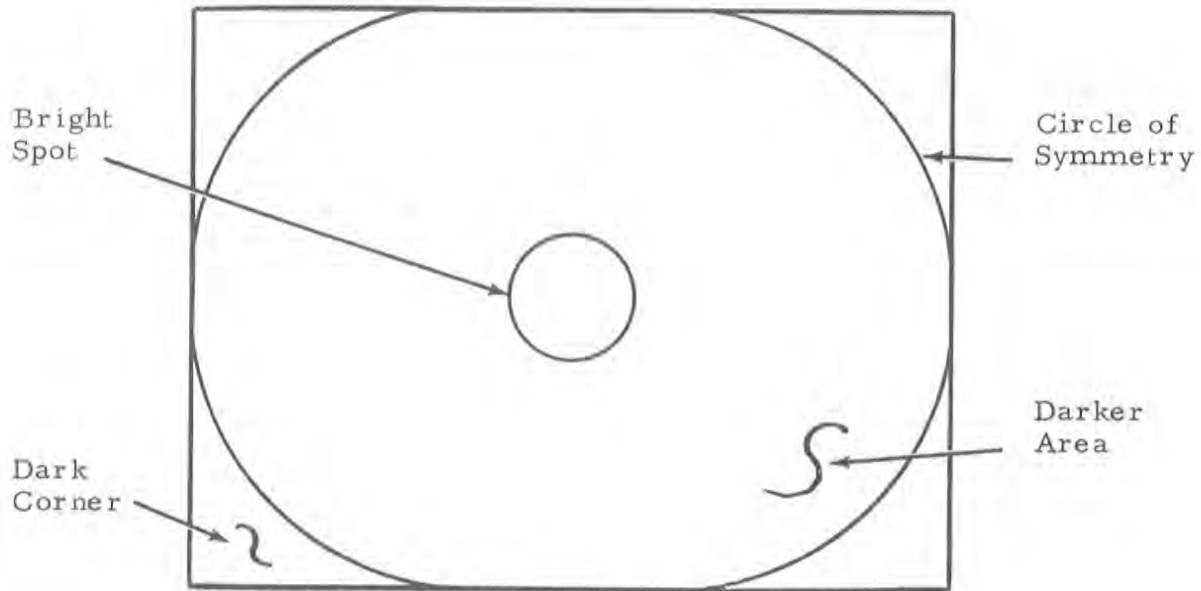
REMOVE THE PROJECTION LENS and pull the cord through the opening. Pass the cord through the dummy lens and tie the cord to the weight. Position the test aperture in the projector. The test aperture is held in place by closing the projector film gate.

MOST PROJECTOR BASES have adjustable lamphouse tables so the lamp can be brought into optical alignment with the projector mechanism. If the lamphouse table is not adjustable, use shims or washers at the front, rear or at both ends of the lamphouse to obtain optical alignment with the projector lens system.

ALIGN THE LAMPHOUSE in relation to the projector so the cord passes through the center of the hole in the test aperture and douser.

REMOVE THE CORD, and associated fixtures and replace the 1/4-20 screw in the douser. Turn the focus control knob to move the bulb pedestal to its extreme forward position to prevent the bulb safety shield from contacting the reflector.

INSTALL THE XENON BULB according to the instructions presented under "Xenon Bulb Installation" in this instruction manual. Observing all safety procedures, remove the protective plastic cover from the bulb. Adjust the focus control knob to move the focus adjustment shaft to the approximate center of its travel.



CLOSE the side door and secure the door in the closed position to engage the door interlock switch.

TURN ON THE PROJECTOR and ignite the bulb as described under "OPERATION" in this manual. Adjust the lamp focus control until a bright spot appears on the screen. The bright spot at this point does not need to be in the center of the screen but it must be relatively symmetrical. If it is not symmetrical adjust the horizontal and vertical adjustment controls. It is very important that a symmetrical bright spot is projected to the screen.

IF THE BRIGHT SPOT does not appear in the center of the screen move the projection table to center the spot. Once the spot is centered on the screen then the circle of symmetry should also be centered on the screen.

CAUTION; DO NOT LEAVE BRIGHT SPOT ON TOO LONG AS THE HEAT GENERATED BY THE XENON BULB COULD CRACK THE PROJECTION LENS.

THE LAMPHOUSE can now be firmly located and the focus adjusting knob adjusted until the proper light distribution is obtained on the screen.

INSERT THE BEAM EXPANDER LENS for 70mm operation. A slight change of the focus adjustment may be required when changing from 35mm to 70mm operation. Do not leave the Beam Expander Lens in position when projecting 35mm film.

XENON BULB INSTALLATION  
OSRAM 4000 WATT(135A.)  
Strong #81339

CAUTION: OBSERVE ALL SAFETY PRECAUTIONS WHEN WORKING WITH THE XENON BULB. Be sure the bulb is in its plastic case before handling. Wear clean cotton gloves when handling the bulb to prevent marking the bulb with fingerprints.

REMOVE THE HINGE PIN taped to the bulb support casting in the front of the lamphouse.

BENCH ASSEMBLE the adapter parts and bulb as outlined below.

- (a) Place the flanged teflon bearing on the anode (pos.) stud with the flat side of the bearing against the bulb.
- (b) Place the bulb adapter casting over the flange on the teflon bearing.
- (c) Slip the flat teflon washer over the stud on the bulb, up against the adapter casting.
- (d) Install the collar and secure to the bulb stem with the set screw.
- (e) Slip the piece of silastic rubber tubing over the anode (Pos.) lead.

SLIP THE CATHODE LEAD and adapter assembly over the cathode (negative) stem of the bulb. At this time tighten the set screw just enough to hold the lead assembly to the bulb. Assemble so both the anode and cathode leads come off the same side of the bulb. Position the bulb adapter casting so that when the bulb is placed in the lamphouse, both leads extend towards the side door of the lamphouse.

PLACE THE XENON BULB AND ADAPTERS in the lamphouse (with plastic shell over the bulb) with the cathode (negative) end in the "V" of the insulated support block behind the reflector frame. Position the anode (positive) end of the bulb adapter over the front support casting and insert and tighten the hinge pin through the hole marked for 4 KW operation. It is necessary to use the correct hole to provide the amount of movement required to properly focus the bulb in relation to the reflector. The bulb must float and pivot on the support to allow for movement by the vertical and horizontal adjustment controls. Both leads from the bulb should extend towards the side door of the lamphouse.

CONNECT THE ANODE (positive) lead from the bulb, to the feed-through connector located on the base casting. Remove one nut, lockwasher and flat washer. Place the positive terminal against the nut remaining on the connector and replace the flat washer, lockwasher and nut in that order. Tighten securely to prevent the connection from overheating. Lay the lead so it does not shadow the reflected light any more than absolutely necessary.

REMOVE THE HEX HEAD BOLT, lockwasher and flat washer from the negative terminal of the igniter, located directly behind the reflector frame. Run the cathode lead from the bulb, out toward the side door and form the lead to curve up to the negative terminal on the igniter. Try to position the lead so that it does not touch any structural part of the lamphouse. Replace the flat washer, lockwasher and hex head bolt, in that order, on the negative terminal and tighten securely. Tighten the set screw holding the negative lead and adapter to the stem of the bulb.

IF THE BULB MANUFACTURER recommends that the bulb be rotated after (500) hours of operation, loosen the set screw in the cathode (negative) adapter and remove the anode (positive) connection at the feed-through connector at the front of the lamphouse. Rotate the bulb 180°, form the anode lead to the feed-through connector and tighten securely. Then form the cathode lead and tighten the set screw in the adapter. It should not be necessary to loosen or remove the cathode connection at the igniter.

DO NOT EXCEED the bulb manufacturer's recommended initial starting current or maximum current for aged bulbs. The recommended initial current is 80-85% of the maximum rated current.

A XENON BULB can be focused to a small hot spot at the aperture or projection lens and if this is done the film may be damaged or the projection lens broken. The projector must be running whenever the bulb is ignited and the douser is open. Adjust the focus of the bulb in relation to the reflector to obtain a flat field, with the corners of the screen evenly lighted. It is possible to obtain nearly 100% coverage. Check the film for damage or high temperature and if running hot, reduce the current at the bulb or adjust the focus for a flatter field.

WHEN A NEW BULB is installed it is necessary to reduce the current by resetting the transformer/rectifier coarse tap leads to tap "A" and the dial switches to position #1. (All three switches must be on the same number.) This is necessary because each bulb operates at a slightly different voltage due to manufacturing tolerances. The current can now be adjusted to operate within the specified range.

RETURN BULBS on which a warranty claim is being made in original shipping carton with protective plastic cover over bulb. Include the following information: number of hours bulb was used, amperage bulb was burned, date bulb was installed, date bulb was removed and reason for removing.



## BULB INSTALLATION PROCEDURES

### OSRAM 3000 WATT (100A.)

Strong #81344

Follow the same assembly and installation procedures as outlined for the Osram 4000 Watt, except as follows:

1. Cut the anode (positive) lead on the bulb so it extends 4" from the bulb stem.
  2. Attach the wire connector to the 4" lead from the bulb.
  3. Insert the rubber covered anode extension into the cable connector (step 2) and tighten securely both set screws in the connector.
  4. Make the lamphouse connections the same as specified for the 4000 Watt.
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### HANOVIA 4000 WATT (150A.)

Follow the same assembly and installation procedures as specified for the Osram 4000 watt bulb.

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### DUROTEST 150 AMPERE

Strong #81918

This bulb does not require any adapters or lead extensions to permit mounting and use in this lamphouse. The following changes do have to be made in the lamphouse.

1. Due to the larger diameter of the cathode (neg.) end of the Durotest bulb, it is necessary to remove the insulated guide block #81135 and the metal spacer #81336 from the cathode support casting.
  2. The metal spacer is NOT required for the Durotest bulb. Fasten the insulated guide block back on the cathode support casting. This will lower the cathode end of the bulb to the optical centerline of the reflector.
  3. Remove the small sheet metal air deflector #81351 from the anode air duct at the front of the lamphouse. It cannot be used with this bulb.
  4. Attach the bulb to the anode support casting with the #81129 hinge pin and secure the leads from the bulb to the igniter and feed-through connector as instructed for the Osram 4 KW bulb. Make certain all electrical connections are tight.
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HANOVIA 3000 WATT (100A.)  
STRONG #81390

FOLLOW the same bench assembly procedure as specified for the Osram 4000W. bulb. Some parts are different for the Hanovia bulb, therefore use the parts specified on drawing #81883 for the Hanovia 3000 watt bulb. Note particularly the smaller center hole diameter in the retaining collar.

DUE TO THE LEADS coming off opposite sides of the Hanovia bulb, installation in the lamphouse will be different from that of Osram.

INSTALL THE HANOVIA BULB in the lamphouse with the positive lead extending to the right hand side of the lamphouse, to the feed-through connector located on the right front of the lamphouse base casting.

THE NEGATIVE LEAD will then extend off the bulb to the left-hand side of the lamphouse. Form the lead up over the top of the bulb stem to the negative post of the igniter.



## AUTOMATIC SYSTEMS

### INSTALLATION:

To install the lamp in an automatic system follow the same instructions presented for manual type operation. Two 16 AWG wires (not supplied by manufacturer) must be installed to permit operation by the automatic system (See installation diagram). The wires must be shielded to prevent interference from feeding into the theatre sound system.

### OPERATION:

The operation of the lamp in an automatic system is the same as outlined in the manual with the exception that the "Auto-Man." switch, must be placed in the "Auto." position. When the lamp "ON-OFF" switch is turned on the lamp will be ready to operate from the remote station. The bulb seal cooling blower will operate until the main A. C. line switch or the lamp "ON-OFF" switch is placed in the "OFF" position.

Attach the automation ignition cue or tab on the film far enough in advance of the projection cue, to permit a few ignition pulses. The ignition pulse is timed at approximately one second on and two to three seconds off. This pulse is controlled by the timer circuit in the igniter.

### TROUBLE CHART:

To trouble shoot the lamp when installed in an automated system, place the "Auto-Man." switch in the "Man." position. The lamp will then operate in the normal mode as described under "Trouble Chart".

To restore the lamp to a remote operation, place the "Auto-Man." switch in the "Auto" position.

## OPERATION

REMOVE THE PROTECTIVE PLASTIC COVER from the xenon bulb. Do not ignite the lamp with the cover on the bulb. Secure the side door of the lamphouse, to actuate the door interlock switch.

THE PROJECTION BOOTH exhaust system must be operating to close the lamphouse exhaust air flow interlock switch.

CLOSE THE LAMPHOUSE DOUSER and place the Auto-Man. switch in the "Man. " position.

TURN ON MAIN LINE SWITCH to energize the power supply, the red indicator on the lamphouse will glow.

PLACE LAMP ON-OFF SWITCH in the "ON" position. The cooling blower for the bulb seal will run and close the air vane interlock switch. The amber indicator lamp will glow, indicating all interlock switches are closed.

IGNITE THE LAMP by pressing the ignite button and hold until the bulb ignites. The recommended initial current range is 80-85% of the maximum current stated by the manufacturer. The lamp current should never exceed the maximum rating of the xenon bulb.

OPEN THE DOUSER with the projector running and adjust the horizontal and vertical control knobs to center the light on the screen. Insert the beam expander lens only for 70mm operation. Adjust the focus control knob to obtain the desired light distribution for 35 or 70mm. When the desired light distribution has been achieved the control knobs may be removed and kept in a safe place to prevent the possibility of anyone accidentally changing the adjustments.

WAIT A FEW MINUTES until the current or arc stabilizes, then adjust the power supply, (see power supply manual), to obtain the desired current as indicated on the lamp ammeter.

TO MAINTAIN SCREEN LIGHT BALANCE it may be necessary to operate one lamp at a little higher current than the other. Due to manufacturing tolerances and to normal aging, increase the current of the lamp giving low light output, or adjust the current of both lamps.

TO EXTINGUISH THE ARC, push the lamp power switch to the "OFF" position.

## ARC STABILIZING MAGNET ADJUSTMENT

THE ARC STABILIZING MAGNET is located on the lamphouse base casting in front of the reflector frame.

THIS MAGNET is preset at the factory and should not require adjustment.

IF IT SHOULD BECOME NECESSARY to adjust the magnet, the following procedure must be followed. Observe all safety procedures when working inside the lamp.

THE NORMAL ARC, when viewed thru the arc viewing port, will appear as in Figure A. When this condition exists, the magnet is set properly.

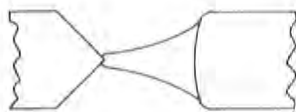


FIGURE A

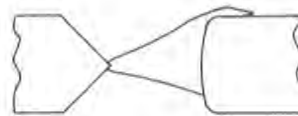


FIGURE B

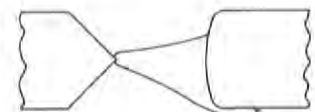


FIGURE C

FIGURE B shows the position of the arc when the magnet is too low. To correct this condition the magnet must be raised (moved toward the bulb). To do this, loosen one of the 2 screws in the slot, about 3 turns. Loosen the other screw in the slot, just enough so that the magnet assembly can be moved upward about 1/8 inch. After adjusting the magnet, tighten both screws. Repeat this step until the arc looks like Fig. A.

FIGURE C shows the position of the arc when the magnet is too high. To correct this condition the magnet must be lowered. To do this loosen the magnet as described in above paragraph and lower magnet 1/8 inch. After adjusting the magnet, tighten both screws. Repeat this step until the arc looks like Fig. A.

THE MAGNET must always be installed with the longest portion of the magnet facing the bulb, and with the South (S) Pole pointing to the side door.

IN NEW EQUIPMENT the magnet normally is in the center of the adjustment range. Changes in magnet position must only be made when the arc is burning improperly as shown in Figure B and C.

WHEN A NEW MAGNET is installed it should be set in the center of the adjustment range and then adjusted if necessary to obtain results shown in Figure A.

## MAINTENANCE

THE XENON LAMP requires very little maintenance to keep it in good working order.

THE REFLECTOR should be cleaned with a clean soft dry cotton cloth every two weeks. Care should be taken when handling the reflector so as not to fingermark the coated surface.

IF THE REFLECTOR is removed for cleaning or for any other purpose, check to see that the bulb is adjusted for maximum light output after replacing the reflector.

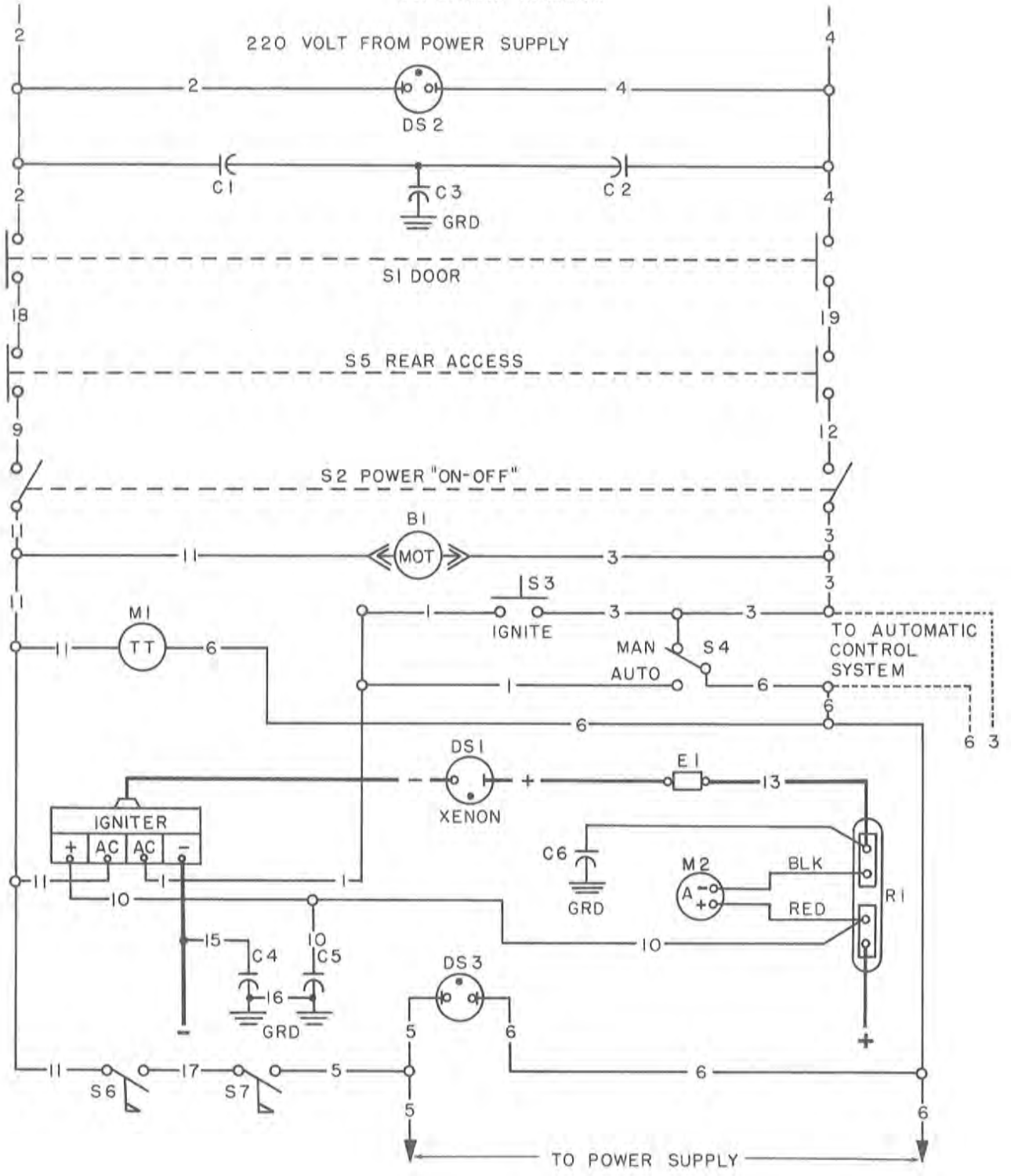
CHECK ALL ELECTRICAL CONNECTIONS periodically for tightness. Particularly the D. C. connections on the shunt inside the rear access panel and the bulb connections at the igniter, and at the positive feed-through connector.

OCCASIONALLY THE BULB should be checked for presence of foreign material on the envelope. Any dirt or other foreign material should be removed promptly. CAUTION: Observe all safety procedures when working around the bulb.

THE INSIDE OF THE LAMPHOUSE and the fan blades should be cleaned periodically, depending on the dust conditions at each installation. Make sure the blower inlet screen on the front of the lamphouse is clean and free of any obstruction.

BUG SCREENS in the rear access panel just below the nameplate and inside the lamphouse, must be kept clean at all times to permit a free air flow to cool the back of the lamphouse and rear surface of the reflector.

SCHMATIC DIAGRAM



PARTS LIST  
SCHEMATIC DIAGRAM

<u>Reference Designation</u>	<u>Part No.</u>	<u>Description</u>
-	81857	Igniter (50/60 Hz)
B1	81272	Blower Fan (bulb seal) 50/60 Hz
-	88253	Lead Cord & Plug for B1 (81272)
C1 & C2	76132	Capacitor .005 MFD/600 V. DC (R. F. Suppression)
C3	76133	Capacitor .01 MFD/400 V. DC (R. F. Suppression)
C4 & C5	76323	Capacitor 8 MFD/150 V. AC (DC By-Pass)
C6	81921	Capacitor .01 MFD/500 or 1000 V. DC
DS1	81339	Xenon Bulb (Osram 4000 W.)
-	81391	Xenon Bulb (Hanovia 4200W.)
-	81390	Xenon Bulb (Hanovia 3000W.)
-	81344	Xenon Bulb (Osram 3000W.)
DS2	81278-1	Indicator Lamp (Red)
DS3	81278-2	Indicator Lamp (Amber)
E1	81920	Feed-Thru Insulator and Lead #13
M1	81289	Elapsed Time Meter 230V. AC, 60 Hz
-	81374	Elapsed Time Meter 230V. AC, 50 Hz
M2	81280	Ammeter D. C.
R1	81247	Shunt
S1	80168	Switch, Interlock, Side Door
S2	81275	Switch, Power (On-Off)
S3	81277	Switch, Ignite
S4	81276	Switch, "Man-Auto"
S5	80168	Switch, Interlock; Rear Access Cover
S6	75187	Switch, Air Flow (Bulb Seal)
S7	75187	Switch, Air Flow (Exhaust)

NOTE

Order Strong Electric Kit #81883 for 3000 watt and Kit #81888 for 4000 Watt operation. Xenon bulbs are not part of the kit. If ordered from Strong Electric specify make and part number of bulb.

## PRINCIPLE OF IGNITER OPERATION

THE IGNITER is energized through the stepdown transformer T101 when the lamphouse power switch S2 is in the "On" position and the ignite switch S3 is pressed for bulb ignition.

CAUTION: Do not use the emergency ignition switch S102 in the igniter, until it is determined that polarity is correct. Use of the S102 switch defeats the purpose of the CR201 polarity sensing diode on the P. C. board and if polarity is not correct, will destroy the xenon bulb.\*

THE IGNITER supplies a high RF voltage pulse to the bulb together with the high D. C. "No Load" voltage from the power supply, to ignite the xenon bulb. After the arc is sustained, the A. C. circuit in the igniter is interrupted by the opening of K201 relay contacts on the signal of the timer circuit on the printed circuit board. The D. C. output of the power supply is automatically lowered to the power level required to maintain the arc. The D. C. power to the bulb is dependent upon the bulb characteristics and setting of the line taps and dial switches in the power supply.

D. C. VOLTAGE is applied to the printed circuit board from the power supply, energizing the 12 volt D. C. coil and closing the contacts of K201 relay, completing the A. C. circuit through the igniter to the T102 high voltage (10 KV.) transformer. High voltage boost capacitor C107 is charged to a voltage sufficient to cause breakdown across the E101 spark gap. Approximately 35 K. V. is supplied to the bulb for ignition.

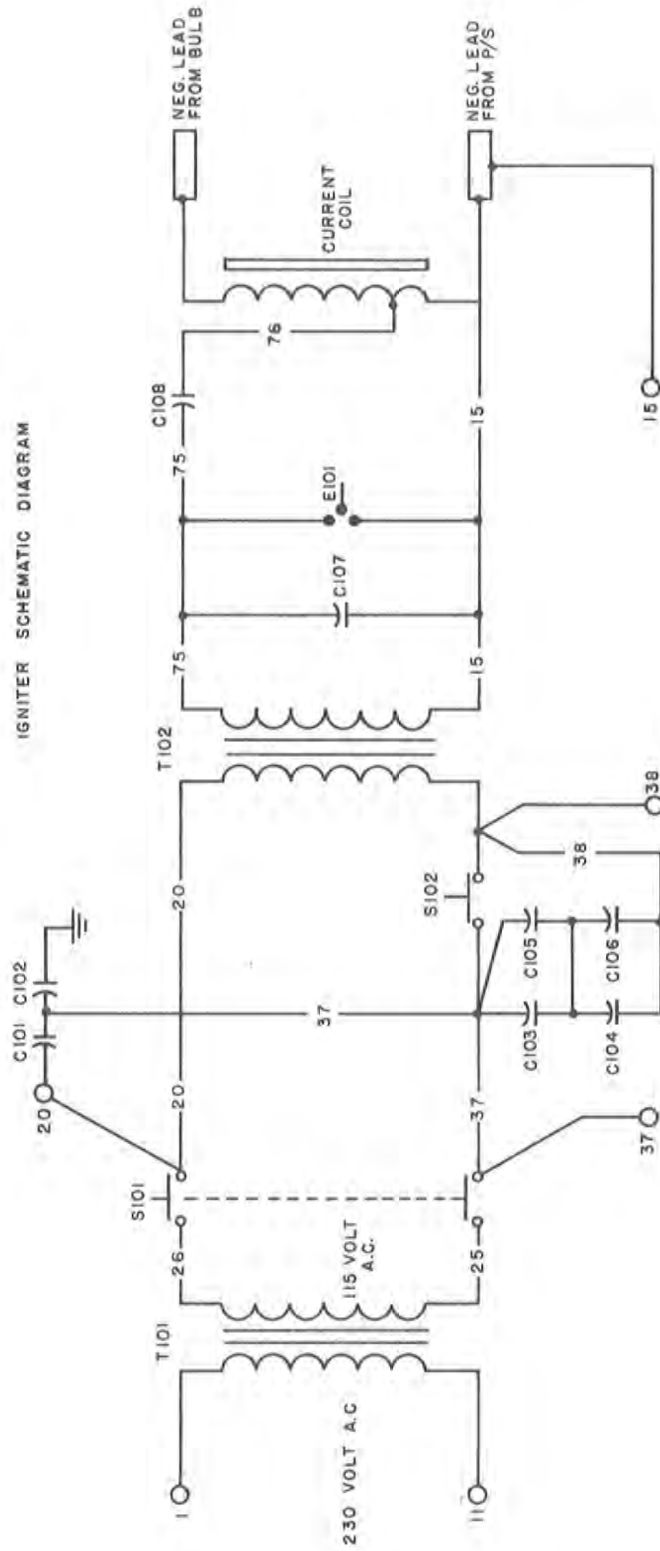
S101 is the igniter cover interlock switch and S102 is the emergency ignition switch which is a bypass for the K101 relay contacts on the circuit board. Components C101, 102, 103, 104, 105 and C106 function as RF bypass capacitors in the igniter. The C108 capacitor serves as a coupling capacitor to the current coil.

THE P. C. BOARD operates on D. C. voltage from the power supply. Capacitor C201 across the positive #10 and negative #15 is an RF suppression capacitor. Resistor R201, zener diodes VR201 and VR202 drop the D. C. voltage to 12 volts for the K201 relay coil. CR201 is the polarity sensing diode. C204 is a polarized capacitor used for arc suppression at the K201 relay coil. CR202 functions as a transient protection diode.

THE FOLLOWING are parts of the timing circuit on the circuit board. Timer chip U201, resistors R202, R203 and the C203 polarized capacitor. The C203 capacitor functions as the timing control and CR203 serves as the "On" time control diode. C202 is the control voltage isolation capacitor.



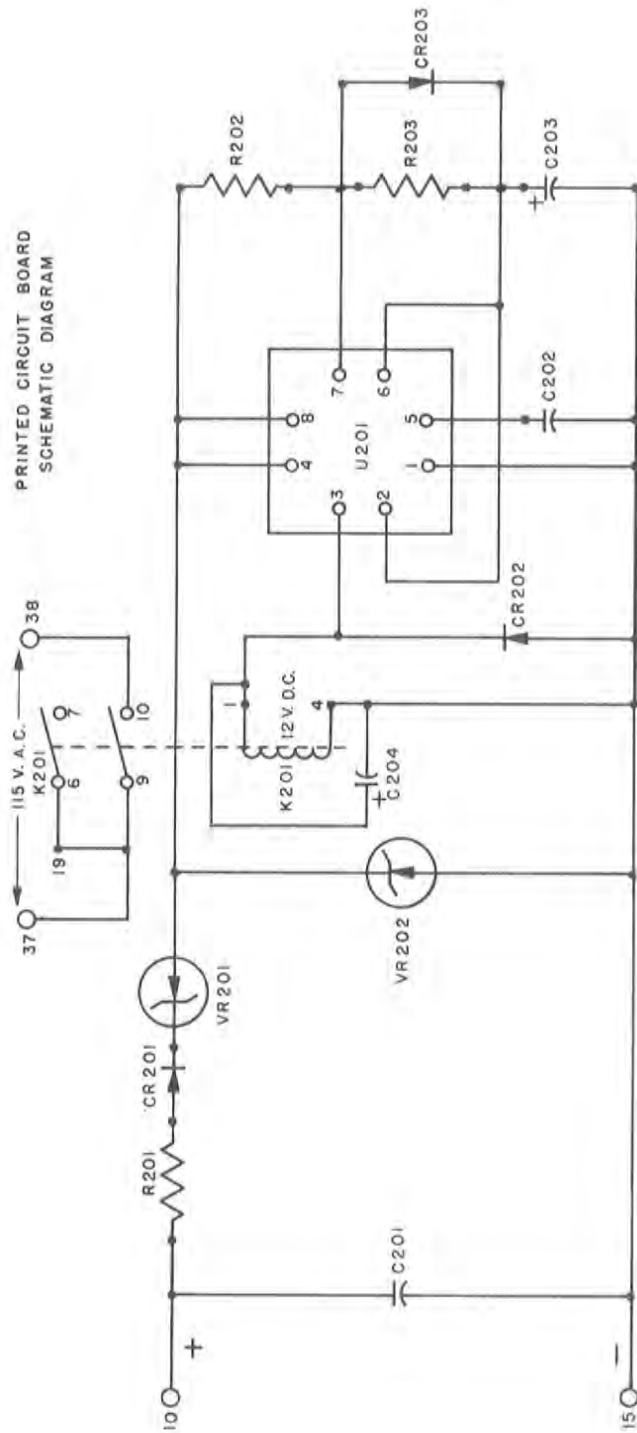
IGNITER SCHEMATIC DIAGRAM



Ref. Desig.	Part No.	Description
C101	81858	Capacitor Assy., .05 uF, 600V, D. C.
C102	81858	Capacitor Assy., .05 uF, 600V, D. C.
C103	81853	Capacitor Assy., .05 uF, 1200V, D. C.
C104	81853	Capacitor Assy., .05 uF, 1200V, D. C.
C105	81853	Capacitor Assy., .05 uF, 1200V, D. C.
C106	81853	Capacitor Assy., .05 uF, 1200V, D. C.
C107	39110	Capacitor, 2400 pF, 20KV, D. C.
T101	81860	Transformer, Stepdown
T102	39997	Transformer, High Voltage
S101	80168	Switch, Cover Interlock
S102	80168	Switch, Emergency Ignition
-	39998	Current Coil (see Fig. 4 Item 1)
C108	39110	Capacitor, 2400 pF, 20KV, D. C.
E101	-	Spark Gap (see Fig. 4)



PRINTED CIRCUIT BOARD  
SCHEMATIC DIAGRAM



Ref. Desig.	Part No.	Description	Ref. Desig.	Part No.	Description
-	81861	Circuit Board Assy.	-	39160	Socket, Relay
-	39145	Printed Circuit Board	-	39161	Hold-down Spring, Relay
C201	88263	Capacitor, .05 uf, 600 WVDC	R201	39157	Resistor, 1000 Ohm, 12 W.
C202	79127	Capacitor, .01 uf, 600 WVDC	R202	39158	Resistor, 100K Ohm, 1/2 W.
C203	39156	Capacitor, 15 uf, 30 or 35 WVDC	R203	39159	Resistor, 200K Ohm, 1/2 W.
C204	88249	Capacitor, 0.1 uf, 600 WVDC	U201	72185	I. C. Timer MC1455P1, Motorola
CR201	85112	Diode, 2.5A., 1000 PRV.	39164	39164	Socket, 8 Pin I. C. Timer
CR202	85112	Diode, 2.5A., 1000 PRV.	VR201	39167	Zener Diode, IN5369A 51V.
CR203	85112	Diode, 2.5A., 1000 PRV.	VR202	39162	Zener Diode, IN4742 12V.
K201	39154	Relay, P&B, R10-E1-W2S800			

## TROUBLE CHART

### NORMAL OPERATION:

The projection booth exhaust system must be operating to close the air vane interlock switch in the lamphouse exhaust stack.

When the switch in the main A.C. line to the power supply is placed in the "ON" position, the "RED" indicator light on the lamphouse will glow and signify that the 220 V. A. C. control circuit to the lamphouse is energized.

The side door interlock switch and the rear access panel interlock switch must be closed to complete the circuit to the lamphouse "ON-OFF" switch.

Place the lamphouse "Mode" switch in the "Man." position. When the lamp "ON-OFF" switch is turned "ON", the running time meter will indicate elapsed time and the bulb seal cooling blower will operate closing its air vane interlock switch. The Amber indicating lamp will glow and show that all the lamphouse safety interlock switches are closed and the A. C. control circuit through the lamphouse is energized.

The line contactor in the power supply will close and the rectifier cooling fan (if so equipped) will run. There will be a faint clicking sound coming from the back of the lamphouse. This is the igniter control relay clicking as its contacts open and close. This clicking will continue at 2-3 second intervals, as long as the power switch is on and the bulb not ignited.

The ignite button is then pushed in and held in this position until the bulb lights. The relay will stop clicking as soon as the bulb lights. There will be a distinct buzzing sound, at the moment the bulb ignites. This is caused by the spark gap in the igniter, and the high voltage arcing in the bulb.

### IGNITER NORMAL OPERATION:

When the "ON-OFF" switch on the lamp is turned on, the power supply is energized supplying a high D. C. voltage to the igniter. This voltage will range from 100 to 120 V. DC, no load, depending on the setting of the power supply. This voltage is necessary to ignite the xenon bulb.

The igniter has a polarity sensing device that determines polarity is correct before energizing the voltage level sensor and timer circuit.

This voltage is then applied to a timer circuit in the igniter, which actuates a relay to turn the R. F. pulse section of the igniter on and off. This timed circuit is on 1 second, off 2-3 seconds. The relay contacts are connected in series with the lamp ignite button so that, although there is sufficient D. C. voltage, the R. F. pulse circuit cannot be energized until the lamphouse ignite button is actuated.

When the bulb ignites, the D. C. voltage drops to normal bulb operating voltage. The voltage sensor in the igniter stops operation of the timer circuit and RF pulsing circuit, even though the ignite button may be held.

The igniter is equipped with a normally open push button switch to by-pass the timer circuit (Emergency Ignition Switch) if a fault is found to be in the timer circuit and should only be used for emergency operation until repairs can be made or a replacement igniter is available. This switch is located on the igniter behind the plug button on the rear access panel of the lamphouse. When this switch and the lamp ignite switch are simultaneously pressed, the xenon bulb should immediately ignite. DO NOT HOLD for more than one second before releasing both switches.

The step-down transformer mounted on the igniter support plate, reduces the lamphouse 220 V. AC control circuit to 115 V. AC for the igniter operation.

## TROUBLE SHOOTING

BEFORE PROCEEDING with the following trouble shooting procedures, observe the following visual indications of trouble. Place the Auto-Man switch in the "MAN" position.

- (1) Red indicator light NOT "ON"
  - (a) Main A. C. line switch not "ON".
  - (b) Main A. C. line fuses open.
  - (c) Circuit breakers in power supply open.
  
- (2) Amber indicator light NOT "ON"
  - (a) Booth exhaust system not operating or lamphouse exhaust air vane switch not closed.
  - (b) Mode switch not in "MAN" position.
  - (c) Lamphouse ON-OFF switch not "ON".
  - (d) Rear access panel interlock switch not closed.
  - (e) Side door interlock switch not actuated.
  - (f) Bulb seal blower not operating or blower air vane switch not closed.

**CAUTION:** The lamphouse control circuit operates on 220V. A. C. and a shock hazard exists when voltage readings are being taken inside the lamphouse. Many A. C. voltage readings can be made at the terminal block located behind the rear access panel.

<u>TROUBLE</u>	<u>PROBABLE CAUSE</u>	<u>TEST</u>	<u>REMEDY</u>
Bulb fails to ignite (Red neon light not on, )	AC power not on to lamphouse		See power supply manual.
Bulb fails to ignite. (Amber neon light not on, )	Door interlock switch not actuated.	Check for open lamphouse door.	Shut & secure door. Tighten actuator knob.
	Faulty door interlock switch.	Check for voltage between Wire #18 & #19.	If voltage is not measured, check loose wiring or replace interlock switch.

<u>TROUBLE</u>	<u>PROBABLE CAUSE</u>	<u>TEST</u>	<u>REMEDY</u>
Cont'd.	Exhaust air vane in lamp not actuated (pulled-up).	Visually check exhaust air vane switch S-7 to see if it is actuated.	Turn on main exhaust blower. Increase air velocity if necessary. (See Exhaust Systems Installation in this manual.)
	Faulty bulb seal blower.	With lamp power on check for bulb seal blower operation.	Check for loose or faulty wiring to bulb seal blower motor. If none, replace blower motor.
	Defective or inoperative switch S-6 (bulb seal) or switch S-7 (exhaust).	Check voltage between terminals 6-17.	If voltage is NOT indicated, S-6 (seal) faulty or inoperative. If voltage IS indicated then S-7 (exhaust) faulty or inoperative.
	Faulty "On-Off" switch (lamp).	Check voltage between wire #11 & 3.	Check for loose wiring. Replace switch if voltage is not measured.
	Rear access panel interlock switch not closed.	Secure rear panel.	Adjust switch if not closing.
	Faulty rear panel switch.	Check voltage between wires 9 and 12 at switch.	If voltage is not indicated, replace switch.

<u>TROUBLE</u>	<u>PROBABLE CAUSE</u>	<u>TEST</u>	<u>REMEDY</u>
Bulb fails to ignite (amber and red neon lights on),	Wrong DC polarity to lamp.	Check polarity.	Connect properly.
	Faulty bulb.	Visually check for cracked anode or cathode.	Replace.
CAUTION: CHECK POLARITY before proceeding with following test,			
	Defective relay or timer circuit on igniter P. C. board.	Remove plug button from back of lamp. Press by-pass switch on igniter simultaneously with ignite button.	If bulb ignites, turn off all power to lamp. Remove access cover. Replace relay or igniter P. C. board.
	Low voltage.	Defeat rear access interlock switch and measure DC voltage at terminals 10 and 15 on capacitor C4, C5 inside rear access panel with on-off switch on lamp turned "On". Should measure minimum 90 volts.	If voltage is less than 90 volts, check power supply (See power supply manual.)
	Faulty remote-contact.	With power "Off" place in Auto-position, close remote control contact and check continuity between 3 & 6.	If continuity is not read, repair/replace contact.
	Power supply.	See power supply manual.	
	Defective igniter.		Replace.

<u>TROUBLE</u>	<u>PROBABLE CAUSE</u>	<u>TEST</u>	<u>REMEDY</u>
Buzzing in theatre sound system only at time of ignition for 1 second.	Defective capacitors C4 & C5)	Check capacitors with capacitor tester if available.	Replace defective capacitors(See C4 & C5 on schematic diagram. )
Popping in theatre sound system when bulb is ignited.	Defective capacitor on R. F. suppression assy.	Remove and check capacitors with capacitor tester if available.	Replace R. F. suppression assy. or faulty capacitors.
"Man-Auto" switch in "Auto" position but operating in "Man" mode.	Faulty "Auto-Man" switch.	With power off, measure continuity between wires #3 & #6 with switch in "Man" position and 1&6 in auto. position.	If zero resistance not read, replace "Auto-Man"switch.
High voltage arc seen in ammeter during ignition.	Defective capacitor (C6)		Replace defective capacitor (C6).
Reduced light.	Bulb aging.		Increase current (see Operation section of power supply manual).
Excessive light flicker.	Faulty bulb	Visual inspect for cracked anode or cathode.	Replace.
	Power supply.		See power supply manual.

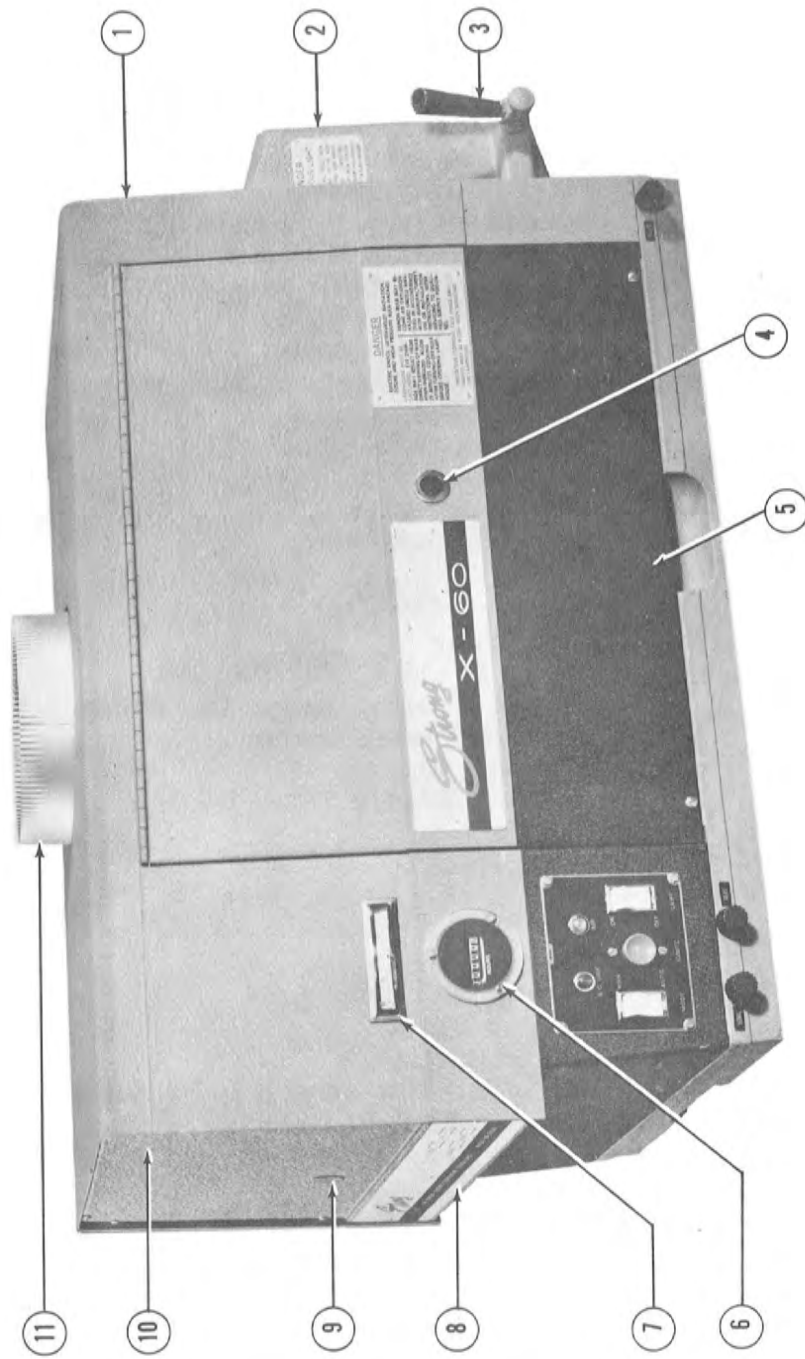


FIGURE I



FIGURE 1

<u>Item</u>	<u>Part No.</u>	<u>Description</u>
1	81881	Housing, Lamphouse
-	685	Screw 1/4-20 x 3/8" Hex Hd.
-	881	L'Washer 1/4" Split Ring
-	852A	Washer 1/4" Flat
-	81913	Screen Assy. , Blower
-	178	Screw #6-32 x 3/16 Fil. Hd.
-	884	L'Washer #6 Split Ring
2	81849	Beam Expander Kit (70mm)
-	81848	Lens & Holder Assy.
-	23110	Lens (curved side to light source)
-	81851	Lens Holder Ring
-	178	Screw #6-32 x 3/16" Fil. Hd.
-	1550	L'Washer #6 Split Ring
-	1553	Washer #6 Flat
-	81847	Lens Holder Frame
-	705	Screw, 1/4-20 x 1-1/8" Hex Hd.
-	863	Washer 1/4" Flat
-	39959	Nose Cone
-	1412	Screw #6-32 x 1/8" Pan Hd.
3	81992	Douser and Housing Assy. (As shown - See Item 3 below for later design.)
-	81147A	Housing, Douser
-	1566	Screw #10-24 x 5/16" Bd. Hd.
-	51509	Handle
-	64540	Stud, Handle
-	808	Nut, 5/16-18 Half, Hex.
-	90266	Hub
-	81149	Cross Shaft
-	81187	Spring, Torsion
-	81148	Douser Plate
-	90134	Shoulder Screw
-	721	Set Screw #10-24 x 3/16" Allen Hd.
-	81234	Bumper Pad, Douser
3	81992	Douser and Housing Assy.
-	81147A	Housing, Douser
-	1566	Screw #10-24 x 5/16" Bd. Hd.
-	81433	Handle and Cross Shaft
-	45150A	Plastic Cap, Handle
-	81187	Spring, Torsion
-	81148	Douser Plate
-	81432	Shoulder Screw #10-24 x 3/4" Allen Hd.
-	721	Set Screw #10-24 x 3/16" Allen Hd. , Cup Pt.
-	81234	Bumper Pad, Douser

<u>Item</u>	<u>Part No.</u>	<u>Description</u>
4	48930	Frame and Glass (Arc Viewing)
5	81886	Side Door
-	315	Screw #10-24 x 7/16 Rd. Hd.
6	81289	Elapsed Time Meter (60 Hz)(M1)
-	81374	Elapsed Time Meter (50 Hz)
-	1515	Screw #4-40 x 1/4" Rd. Hd.
7	81280	Ammeter (M2)
8	81855	Access Panel
-	1304	Screw #8-32 x 5/16 Pan Hd.
9	57275	Plug Button
10	80168	Switch, Panel Interlock S5 (inside panel)
-	1741	L'Washer 7/16" Int. Shakeproof
11	81966	Exhaust Stack & Baffle Assy.
-	1355	Screw, #8-32 x 5/16" Pan Hd.
-	891A	L'Washer #8 Int. Shakeproof
-	75187	Switch, Exhaust Air Flow (S7)
-	81914	Air Vane Assy.
-	81304	Switch Cover
-	1618	Screw #6 x 1/4" Bd. Hd.
-	48316	Snap Bushing .437 I. D.

#### Name Plates & Labels

65353	Danger High Voltage
81100	Name & Data Plate
81104	Focus Label
81105	Vertical Label
81106	Horizontal Label
81282	Danger Plate (side door)
81357	Danger Plate (nose casting)
81422	Name Plate (X-60D)

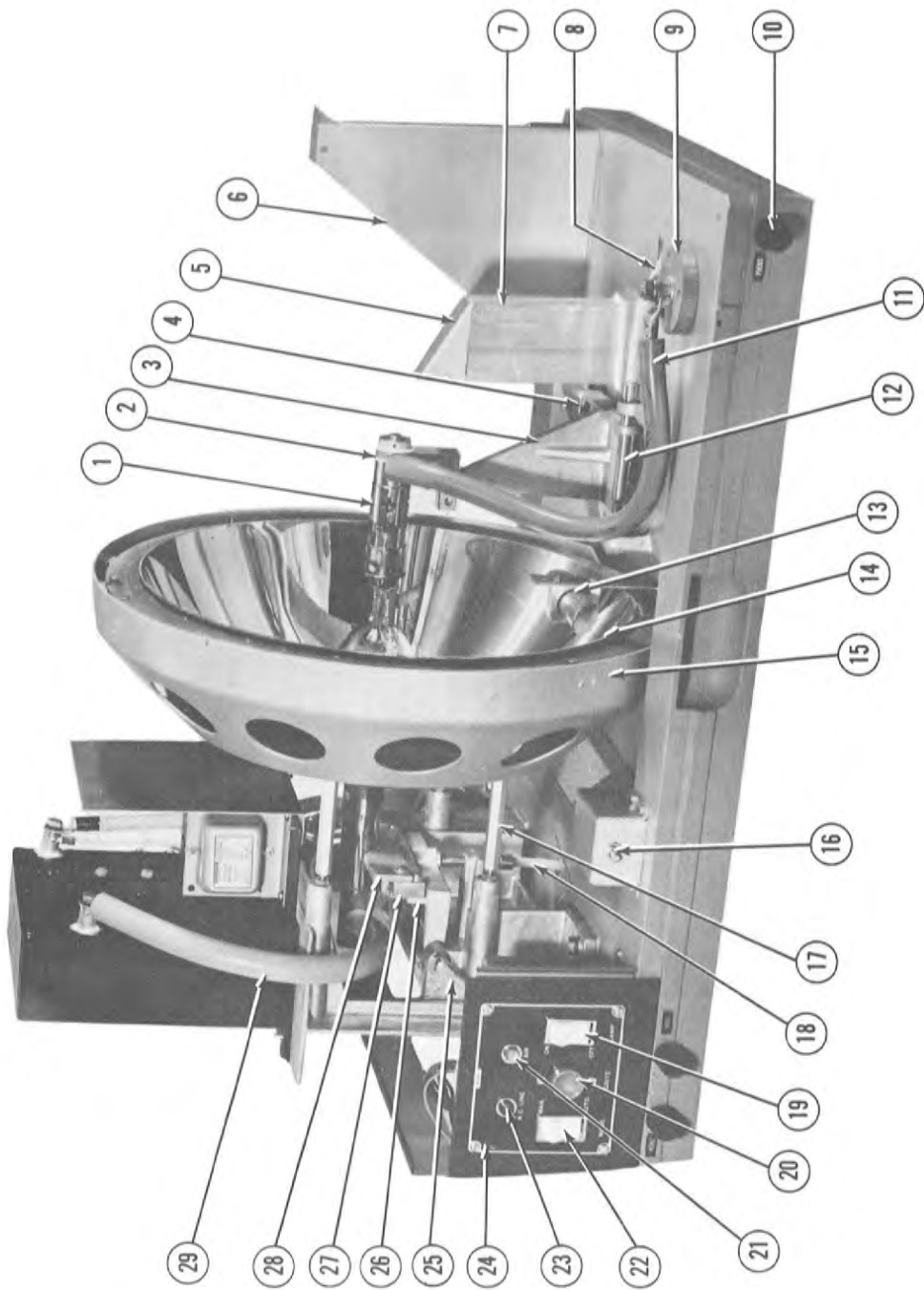


FIGURE 2

FIGURE 2

<u>Item</u>	<u>Part No.</u>	<u>Description</u>
1	81391	Xenon Bulb DS1 (Hanovia 4200W.)
-	81390	Xenon Bulb DS1 (Hanovia 3000W.)
-	81339	Xenon Bulb DS1 (Osram 4000W.)
-	81344	Xenon Bulb DS1 (Osram 3000W.)
2	81338	Adapter, Bulb (all bulbs listed above)
-	81342	Flanged Bushing (for #81391 & 81339)
-	81346	Flanged Bushing (for #81390 & 81344)
-	81343	Washer, Flat (for #81339 & 81391)
-	81347	Washer, Flat (for 81390 & 81344)
-	81341	Collar, Retaining (for #81391 & 81339)
-	81389	Collar, Retaining (for #81390)
-	81345	Collar, Retaining (for #81344)
-	1598	Set Screw #6-32 x 3/16 Hex Allan
3	81122	Support, Bulb
-	81129	Hinge Pin
4	81124	Shaft, Outrider
-	1573	Nut, Jam 1/4-20 Hex
-	881	L'Washer 1/4" Split Ring
5	81351	Air Deflector
6	81933	Blower Housing
-	685	Screw 1/4-20 x 3/8" Hex Hd.
-	881	L'Washer 1/4" Split Ring
-	852-A	Washer 1/4" Flat
7	81140	Air Duct
8	81997	Flexible Shaft
-	46138	Retaining Ring 1/4" "E"
-	714	Set Screw #8-32 x 1/8" Allen Hd., Cup Pt.
-	81941	Cover Plate, Flexible Shaft
9	81920	Feed-Through Connector (See Fig 3 Item 5)
-	81919	Lead Wire & Stud (Pos.)
-	1678	Nut, Half 3/8-16 Hex
-	839	Washer 3/8" Flat
-	878-A	L'Washer 3/8" Split Ring
-	81301	Insulator Body
-	385	Screw #10-24 x 1/2" Fil. Hd.
-	885	L'Washer #10 Int. Shakeproof
-	875	L'Washer 3/16" Split Ring
10	80193	Knob & Set Screw
11	81348	Insulation, Anode Lead
-		(for bulbs #81391, 81390 & 81339)
-	81898	Anode Lead & Insulation (for 81344 only)
-	81350	Anode Insulation (on 81898)
-	81349	Connector, Bulb Anode Lead (for 81344)

<u>Item</u>	<u>Part No.</u>	<u>Description</u>
12	81127	Shaft, Focus
-	76157	Retaining Ring "E" 3/8"
13	M15315	Magnet
-	81137	Retaining Block, Magnet
-	781	Set Screw #8-32 x 1/4" Allen Hd. Cup Pt.
-	1710	Screw #8-32 x 1/4" Hex Hd.
-	81413	Support Bracket, Magnet
-	1304	Screw #8-32 x 5/16" Pan Hd.
-	891-A	L'Washer #8 Int. Shakeproof
14	81871	Reflector Assy.
-	1534	Screw #10-32 x 5/8" Allen Hd.
-	866	Washer #10 Flat
15	81872	Reflector Frame Assy.
16	80168	Switch, Door Interlock (S1)
-	81893	Cover, Door Interlock Switch
-	254	Screw #8-32 x 1/4" Fil. Hd.
-	891-A	L'Washer #8 Int. Shakeproof
-	81372	Grommet
17	81315	Stud, Reflector Frame
-	81318	Shoulder Screw, Hex Hd.
-	1573	Nut 1/4-20 Hex
-	81321	Heat Shield (not shown, hangs on 81315)
18	81997	Flexible Shaft, Vertical Adj.
-	46138	Retaining Ring "E" 1/4"
-	714	Set Screw #8-32 x 1/8" Allen Hd. Cup Pt.
-	81134	Adjustment Shaft Vertical
-	81940	Cover Plate, Flexible Shaft
19	81275	Switch On-Off (Power-S2)
20	81277	Switch, Ignition (S3)
-	1305	Screw #6-32 x 1/4" Pan Hd.
21	81278-2	Indicator Lamp (Amber-DS3)
22	81276	Switch "Auto-Man" (S4)
23	81278-1	Indicator Lamp (Red-DS2)
24	81290	Mounting Plate
-	1305	Screw #6-32 x 1/4" Pan Hd.
-	81922	Switch & Lamp Enclosure (Rear)
-	1305	Screw #6-32 x 1/4" Pan Hd.
25	81998	Flexible Shaft, Horizontal Adj.
-	46138	Retaining Ring "E" 1/4"
-	714	Set Screw #8-32 x 1/8" Allen Hd. Cup Pt.
-	81133	Adjustment Shaft, Horizontal Adj.
-	76157	Retaining Ring "E" 3/8"
-	81940	Cover Plate, Flexible Shaft
26	81987	Support Casting

<u>Item</u>	<u>Part No.</u>	<u>Description</u>
27	81336	Spacer, Guide Block
-	319	Screw #10-24 x 3/4" Rd. Hd.
-	885	L'Washer #10 Int. Shakeproof
28	81135	Guide Block "V"
-	313	Screw #10-24 x 7/16" Rd. Hd.
-	885	L'Washer #10 Int. Shakeproof
29	81901	Cathode Lead & Adapter (for #81391, 81339, 81344)
-	721	Set Screw #10-24 x 3/16" Allen Hd. Cup Pt.
-	81348	Cathode Insulation (all listed bulbs)

Parts Not Identified

81854	Wire Harness Assy.
81943	Bug Screen (behind reflector frame)
81202	Light Shield (under bug screen)
81309	Cover Plate, Base (right side-bottom)
1304	Screw #8-32 x 5/16" Pan Hd.

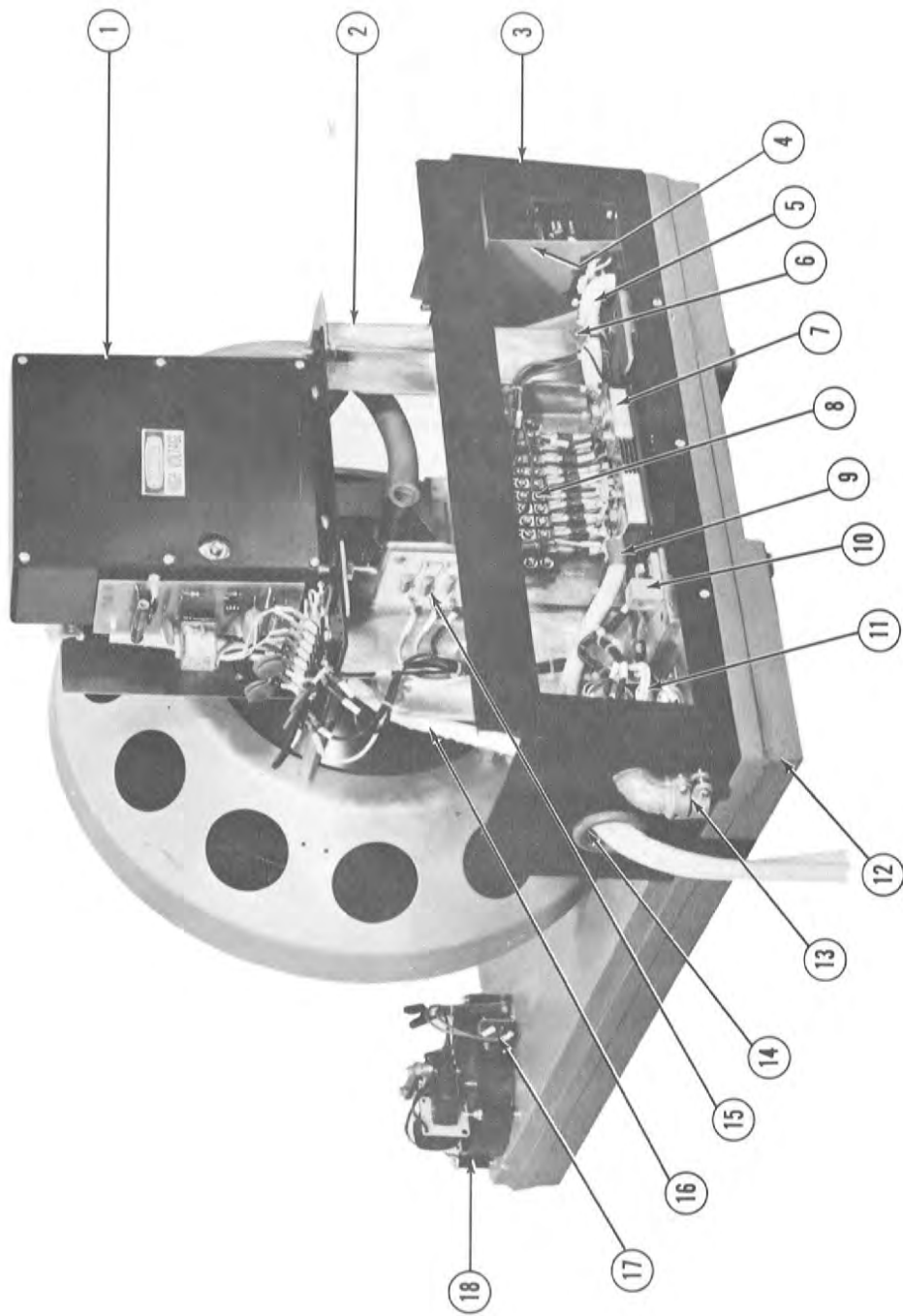


FIGURE 3

FIGURE 3

<u>Item</u>	<u>Part No.</u>	<u>Description</u>
1	81857	Igniter (see Fig 4 & 5)
-	1419	Screw 5/16-18 x 3/4 Hex Hd.
-	877	L'Washer 5/16" Split Ring
2	81123	Pedestal, Reflector & Igniter
-	1419	Screw 5/16-18 x 3/4 Hex Hd.
-	877	L'Washer 5/16" Split Ring
-	1561-1	Dowel Pin 1/8 dia. x 1/2" long
3	81931	Panel Assy. (Welded)
-	236	Screw #8-32 x 5/16" Flat Hd.
4	81922	Cover Assy., Switches
-	1305	Screw #6-32 x 1/4" Pan Hd.
5	81920	Pos. Lead & Insulator (See Fig <u>2</u> Item <u>9</u> )
-	69125	Grommet
6	81921	Capacitor (C-6)
7	81247	Shunt (R-1)
-	385	Screw #10-24 x 1/2" Fil. Hd.
-	875	L'Washer 3/16" Split Ring
8	81307	Terminal Strip (10 terminal)
-	1593	Screw #8-32 x 1/2" Fil. Hd.
-	886-A	L'Washer #8 Int. Shakeproof
9	81976	Pos. D. C. Lead (to power supply)
10	81274	Ground Terminal
-	689	Screw 1/4-20 x 5/8 Hex Hd.
-	876	L'Washer 1/4" Split Ring
-	835	Washer 1/4" Flat
11	76323	Capacitor, DC By-pass (C4 & C5)
-	76208	Strap
-	1304	Screw #8-32 x 5/16" Pan Hd.
-	886-A	L'Washer #8 Int. Shakeproof
12	81928	Base & Duct Plates
13	81142	Angle Connector 1/2"
14	95119	Bushing
-	95120	Locknut
15	76988	R. F. Suppression Assy.
-	1304	Screw #8-32 x 5/16" Pan Hd.
-	830	Washer #8 Flat
-	76132	Capacitor (C1 & C2)
-	76133	Capacitor (C3)
-	81141	Insulator
16	81977	Negative Lead (to power supply)



<u>Item</u>	<u>Part No.</u>	<u>Description</u>
17	75187	Switch, Blower Interlock (S6)
-	1565	Screw #4-40 x 3/4" Rd. Hd.
-	1343	L'Washer #4 Int. Shakeproof
-	81333	Bracket, Switch
-	1305	Screw #6-32 x 1/4" Pan Hd.
-	81870	Air Vane Assy.
18	81874	Blower (B1) (Zypher type as shown, replace with 81846)
-	192	Screw #6-32 x 2" Fil. Hd.
-	828	Washer #6 Flat
-	45240	Wire Nut
-	81876	Lead, Blower
-	49347	Snap Bushing 7/16" I. D.
-	81383	Wire Shield, Blower Lead (under base Cstg. )
-	1382	Screw #8-32 x 3/16" Pan Hd.
-	891-A	L'Washer #8 Int. Shakeproof
18	81846	Blower (B1) (replacement kit for Zypher Blower)
-	81272	Blower (B1) Rotron
-	88253	Lead, Blower
-	892	Washer #6 Shakeproof <i>5/8"</i>
-	<del>1552</del> <i>1774</i>	Screw #6-32 x <del>3/4"</del> Allen Hd.
-	1756	AllenWrench - for 1552

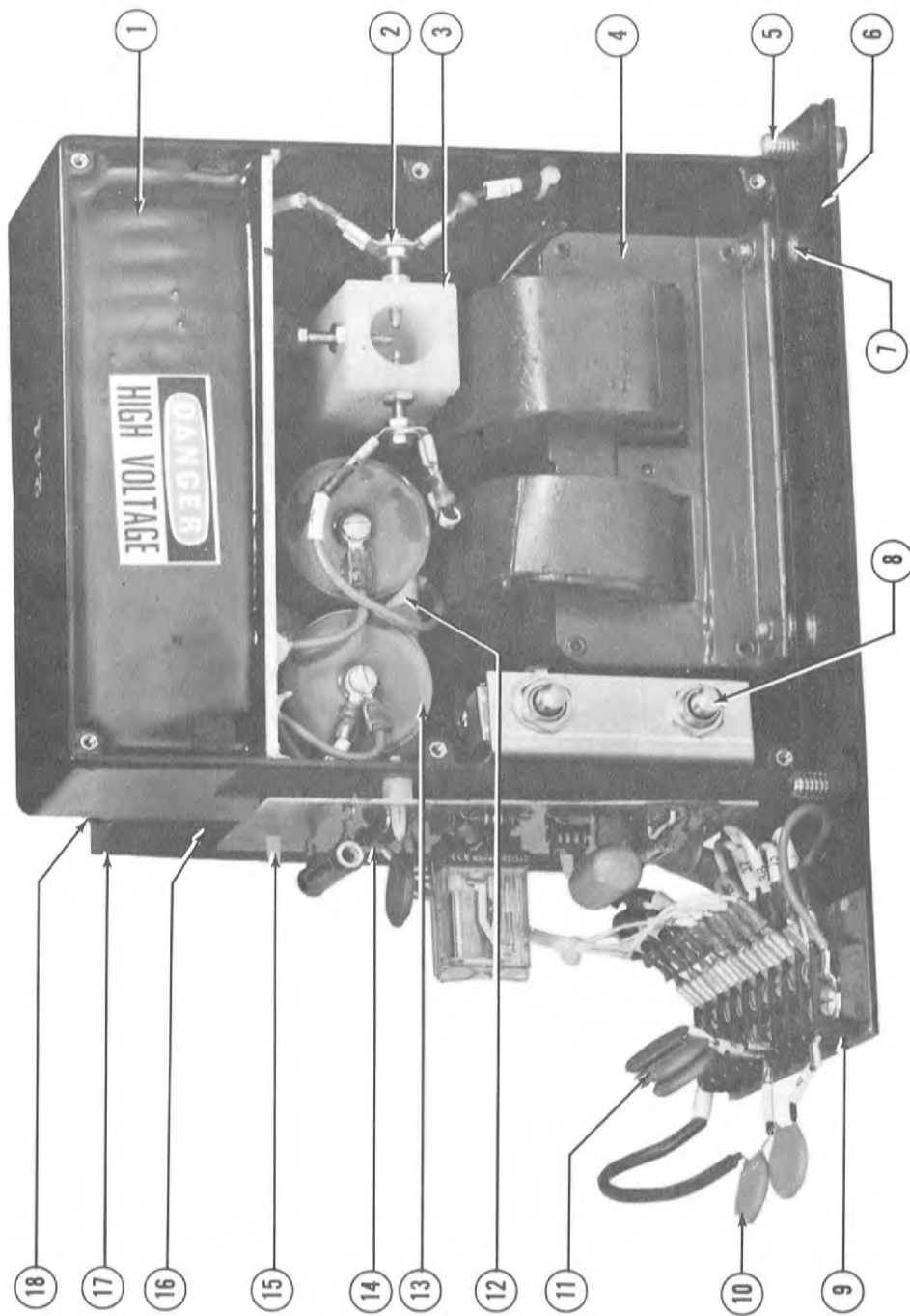


FIGURE 4

FIGURE 4

<u>Item</u>	<u>Part No.</u>	<u>Description</u>
1	39998	Coil & Case Potted Assy.
2	39107	Contact Screws, Tungsten
-	795	Nut #8-32 Hex
-	831	Washer #10 Flat
-	39109	Terminal Tab
3	39106	Spark Gap Body
-	1567	Screw #10-24 x 1/2" Pan Hd.
4	39997	Transformer Assy. (T102)
5	1419	Screw 5/16-18 x 3/4 Hex.Hd.
-	817	Lockwasher, 5/16" Split Ring
6	81863	Base Plate Assy.
7	81417	Spacer
-	691	Screw 1/4-20 x 3/4" Hex Hd.
-	835	Washer 1/4" Flat
8	80168	Switches, Interlock & Emergency Ignition (S101, 102)
-	39113	Bracket, Switches
-	343	Screw #10-32 x 1/4" Flat Hd.
-	49347	Bushing, Wire
9	81415	Terminal Block
-	81416	Insulation & Marker Strip
-	1312	Screw #8-32 x 1/2" Pan Hd.
-	891A	Lockwasher #8 Shakeproof
10	81858	Capacitor Assy. (C101, 102)
11	81853	Capacitor Assy. C103, 104, 105, 106)
12	39112	Bracket, Capacitor
-	39186	Spacer, Bracket
-	1752	Screw 1/4-20 x 1" Hex Hd. Nylon
-	1754	Nut, 1/4-20 Hex. Nylon
-	889	Lockwasher 1/4" Shakeproof
13	39110	Capacitors (C107, 108)
-	254	Screw #8-32 x 1/4" Fil. Hd.
-	891A	Lockwasher #8 Shakeproof
-	1742	Screw #8-32 x 1/4" Pan Hd.
-	891A	Lockwasher #8 Shakeproof
14	81861	Circuit Board Assy. (See Fig. 5)
15	39155	Stand-off, Circuit Board
16	81860	Transformer, Step-down (240V. Pri., 120 Sec.) (T101)
-	464	Screw #10-24 x 1/4" Pan Hd.
-	1344	Lockwasher #10 Shakeproof
17	81418	Heat Shield
-	1744	Screw #10-24 x 1/2" Hex. Soc.Hd.
-	1344	Lockwasher #10 Shakeproof

<u>Item</u>	<u>Part No.</u>	<u>Description</u>
18	1346	D. C. Terminal Screw 5/16-18 x 1/2" Hex Hd.
-	877	Lockwasher 5/16" Split Ring
-	178	Screw #6-32 x 3/16" Fil. Hd.
-	884	Lockwasher #6 Split Ring

Parts Not Listed Above

39101	Cover, Igniter Box
65353	Danger Label

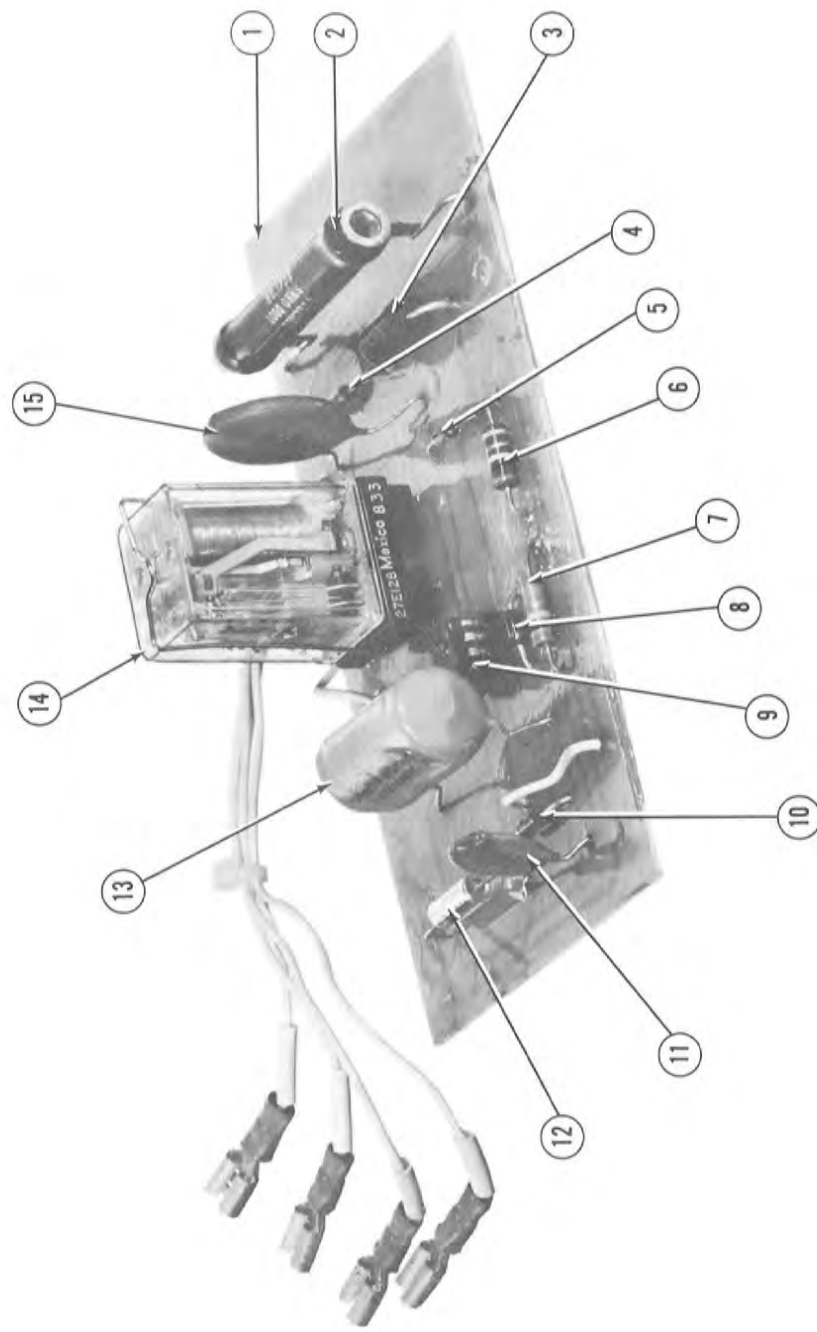


FIGURE 5

FIGURE 5

<u>Item</u>	<u>Part No.</u>	<u>Description</u>
1	39145	Printed Circuit Board
2	39157	Resistor, (R201)
3	39167	Zener Diode (VR201)
4	85112	Diode, 2.5A., (CR201)
5	39162	Zener Diode, (VR202)
6	39158	Resistor, (R202)
7	39159	Resistor, (R203)
8	85112	Diode, (CR202)
9	72185	I. C. Timer, (U201)
-	39164	Socket, 8 Pin
10	85112	Diode, (CR203)
11	79127	Capacitor, (C202)
12	39156	Capacitor, (C203)
13	88249	Capacitor, (C204)
14	39154	Relay (K201)
-	39160	Socket, Relay
-	39161	Hold Down Spring, Relay
15	88263	Capacitor, (C201)