

OPERATING INSTRUCTIONS

TYPE 648-A STROBOLUX®



... SINCE 1915
manufacturers of
electronic apparatus
for science and industry



G E N E R A L R A D I O C O M P A N Y
CAMBRIDGE 39, MASSACHUSETTS, USA

GENERAL RADIO COMPANY

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SPECIFICATIONS

Range:	Single flash - 6000 per minute.
Flash Duration:	Between 15 and 50 μ sec, depending on flashing rate and SPEEDS switch setting. The shorter flash is obtained at the higher speeds.
Peak Light:	1.8 megacandlepower at single flash; 0.2 Mcp at 6000 flashes per minute.
Guide Number:	For single-flash photography, guide number (distance in feet X aperture) is about 20 with a film speed of 100 (ASA).
Power Supply:	105-125 (or 210-250) v, 50-60 cps.
Power Input:	125 watts maximum.
Tubes:	5Z3 rectifier; Type 648-P1 lamp.
Mounting:	Sheet-metal case with black-wrinkle finish. Lamp and its 9-in. reflector are mounted in one side of case, power supply in other. The removable lamp assembly has a 1/4 x 20 tripod thread and connects to power supply through 9-ft cable.
Accessories Required:	A Strobotac [®] is necessary to operate the Strobolux [®] .
Accessories Supplied:	Type CAP-35 7-ft power cord, cable for connection to Strobotac, spare fuses.
Dimensions:	Height 12-3/4 in., width 11-5/8 in., depth 13-3/4 in., over-all.
Weight:	31-3/4 lb.

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Patent Notice: Licensed under designs, patents, and patent applications of Edgerton, Germeshausen and Grier.

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TYPE 648-A STROBOLUX®

Form 522-G
March, 1958

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CAMBRIDGE 39



MASSACHUSETTS

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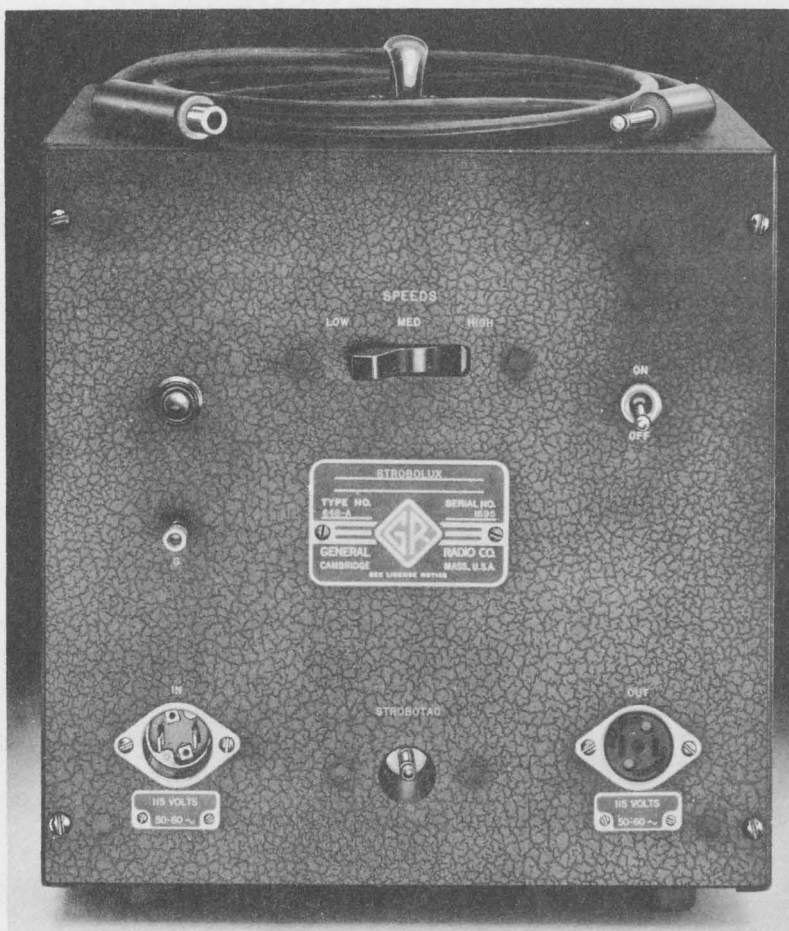


Figure 1. Type 648-A Strobolux®

CONDENSED OPERATING INSTRUCTIONS

- a. Connect Strobotac and Strobolux to power source.
- b. Connect Strobotac to Strobolux by cable provided.
- c. If external contactor or switch is to be used, connect to Strobotac.
- d. Turn both instruments ON.
- e. Set Strobotac control switch as desired.
- f. Adjust Strobolux SPEEDS switch for best illumination.

TYPE 648-A STROBOLUX®

Section 1

INTRODUCTION

1.1 PURPOSE. The Type 648-A Strobolux® (Figure 1), an accessory to the Type 631 Strobotac®, provides, over an area of several feet, a light flash 100 times brighter than that obtained from the Strobotac.

1.2 DESCRIPTION. The Strobolux consists of a control panel, power supply, and lamp, all mounted in a metal carrying case. The lamp can be used either mounted in the carrying case or at the end of an extension cord. The flashing rate is controlled by the Strobotac, and all control possible with the Strobotac is also possible with the Strobolux. The upper flashing limit of the Strobolux is about 6000 flashes per minute. The cable provided carries the tripping circuit from Strobotac to Strobolux.

Section 2

OPERATING PROCEDURE

2.1 CONNECTIONS. Connect a power source to the IN connector. Power input requirements are as marked on the plate below the connector. Connect the Strobotac to the STROBOTAC jack with the cable provided. The OUT connector can be used for the Strobotac power supply cable or for a contactor, if desired.

2.2 LAMP HOUSING. The lamp can be used in or out of the carrying case. To remove the lamp housing, loosen the two clamp screws on the lamp panel and slide the clamps outward, releasing the rim. The lamp may then be removed, being connected to the power supply by a 10-foot flexible cable. If the cable kinks, unplug it from the lamp, straighten it, and reconnect it to the lamp. To replace the lamp housing, unplug the cable and wind it around the pins. Then plug the cable into the lamp again. Fasten the housing firmly to the panel by means of the clamps.

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Legs are provided on the lamp housing, as well as a socket with a 1/4 x 20 screw thread for use with a tripod such as the Type 759-P11 Tripod.

2.3 CONTROL.

a. To energize the Strobolux, place the ON-OFF toggle switch in the ON position.

b. For single flash or speeds up to about 10 rpm, place the SPEEDS switch at LOW. For speeds from 10 to 2500 rpm, place the switch at MED; and for speeds from 2500 rpm to the Strobolux maximum of 6000 rpm, use the HIGH position. These speeds are approximate and not critical; if the light seems brighter at a certain setting, use this position. If, after long, continuous use, flashing is not uniform, move the SPEEDS switch to a higher speed position or operate at a lower flashing rate. Just as with any lamp, tube life is increased if long periods of operation at maximum intensity are avoided.

c. The flashing rate is determined by the Strobotac control setting. Either the Type 631-B (lower limit 600 rpm) or 631-BL (lower limit 60 rpm) can be used.

d. For speed measurements or stroboscopic work, use the STROBOTAC LOW or HIGH position as required, remembering that the upper limit of the Strobolux is 6000 rpm. The LINE position gives a flashing rate synchronous with line frequency.

e. For control by contactor or oscillator, plug the controlling device into the CONTACTOR jack on the Strobotac, and select CONTACTOR HIGH or LOW as required. The Strobolux will follow the contactor rate. The Type 1535 Contactor is recommended where a contactor is needed.

f. For single flash, plug the controlling switch or other device into the Strobotac CONTACTOR jack, and set the Strobolux SPEEDS switch to LOW.

2.4 PHOTOGRAPHY. Single- or multiple-flash photography of rapidly moving objects is possible with the Strobolux used as a light source. The very short (0.00005-second) flash makes it possible to arrest extremely rapid motion. The many variables entering into this type of photography make it difficult to give definite instructions for procedure, but a few general rules can be outlined here.

a. The object to be photographed should be prepared to obtain a high degree of light reflection. This reflection should be diffused and avoid as much as possible any specular reflection or highlights. A flat white paint will often achieve this effect on machine parts.

b. Use rapid lenses (f4.5 or faster) and fast emulsions.

c. Place the light as near as possible to the object to be photographed.

d. The flash is triggered by a switch or other device plugged into the Strobotac CONTACTOR jack. Timing is best determined by experiment, and a few trial shots will be of more help than pages of instructions.

e. The triggering mechanism must usually be devised to fit the particular circumstances. For single-flash shots, a mechanical contact activated by the occurrence to be photographed is usually satisfactory. A photocell relay combination can also be used. For multiple photographs on a single plate, a system giving a sequence of contacts must be used. The Strobotac flashing apparatus is quite satisfactory.

Section 3

SERVICE AND MAINTENANCE

3.1 GENERAL. This service information, together with that given in preceding sections, should enable the user to locate and correct ordinary difficulties resulting from normal use. Major service problems should be referred to our Service Department, which will cooperate as much as possible by furnishing information as well as by supplying any replacement parts needed. When notifying our Service Department of any difficulties in operation or service, specify the serial and type numbers of the instrument. Also report the trouble encountered and steps taken to eliminate the trouble.

Before returning an instrument or part for repair, please write to our Service Department, requesting a Returned Material Tag, which includes shipping instructions. Use of this tag will insure proper handling and identification. A purchase order covering repair of material returned should also be forwarded to avoid unnecessary delay.

3.2 REPLACEMENT OF PARTS.

3.2.1 LAMP REPLACEMENT. To replace the Strobolux lamp, remove the three screws and nuts around the edge of the lens. Unscrew the lamp and replace with a General Radio Type 648-P1 Lamp. Place the helical spring in the middle of the new lamp.

3.2.2 FUSE REPLACEMENT. To replace fuses, remove the four screws that attach the chassis to the case. Fuses are above the ON- OFF switch, behind the panel. Replacement fuses are slow-blow-type, 1.6-amp for 115-volt operation, 0.8-amp for 230-volt operation.

3.3 TROUBLE-SHOOTING DATA.

<u>Trouble</u>	<u>Remedy</u>
Strobolux inoperative; pilot lamp out	1. Check fuses. 2. Check power cord and input receptacle.

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Trouble-Shooting Data, continued.

<u>Trouble</u>	<u>Remedy</u>
Fuses blow	<ol style="list-style-type: none">1. Check transformer resistances (paragraph 3.4.2)2. Check 5Z3 tube.3. Check for shorted capacitor by referring to resistance tests, paragraph 3.4.2.
Flash lamp flickers	<ol style="list-style-type: none">1. Check SPEEDS switch setting.2. Check operation of Strobotac or external tripping device. Strobotac should operate normally when connected to Strobolux STROBOTAC jack with Strobolux turned off. Check connecting cable and STROBOTAC jack. Refer to Strobotac Operating Instructions.3. Try moving the tripping electrode (the spring wound around the helical section of the lamp) nearer the base of the tube.4. Check that lamp leads are not touching each other or the reflector. Check that insulators are not broken or cracked.5. If flickering occurs at speeds over 5000 rpm and the flicker cannot be corrected by step 3, replace lamp. Erratic flashing will sometimes correct itself after the lamp cools off, but this cure is only temporary.
Strobolux fails to flash	<ol style="list-style-type: none">1. Refer to step 2 above.2. Refer to resistance checks, paragraph 3.4.2.3. Check that flash lamp is secure in socket.4. The Strobolux will not flash alone, but must be used with a Strobotac.

3.4 VOLTAGE AND RESISTANCE MEASUREMENTS.

3.4.1 GENERAL. Resistance measurements, given in paragraph 3.4.2, are recommended over voltage measurements in trouble-shooting. In measuring voltages or resistances, make sure that the Strobolux power cord is connected and the multipoint plug is disconnected from the lamp housing. All readings are subject to 10-percent variation. Any good ohmmeter can be used for resistance measurements, while voltages should be measured with a 20,000-ohm/volt d-c, 1000-ohm/volt a-c voltmeter.

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3.4.2 RESISTANCES.

Transformer

Terminals	Ohms
1-4	3.3 (115-v line)
	13.2 (230-v line)
5-7	0 (NOTE A)
5-gnd	0
6-gnd	0
8-9	200
9-10	200

Multipoint Socket at End of Cable

Terminals	Ohms
15-16	1.0 M (NOTE B)
16-gnd	0
13-gnd	0
15-transformer term. 8	3200

Multipoint Plug on Lamp Housing

Terminals	Ohms
13-helical spring	2180
13-14	0.35

NOTES:

A- Without tube and pilot light.

B- Start with SPEEDS at HIGH and wait for meter to stop drifting. Switch to MED and LOW successively and check for above readings after capacitors have charged and meter settles. A sudden jump in the meter when SPEEDS position is changed shows that capacitors are not open-circuit. For a further check, reverse ohmmeter leads to duplicate results.

3.4.3 VOLTAGES.

WARNING Be careful; high voltage is present.

Transformer

Terminals	Volts ac
1-4	117 (or 234)
5-7	5.5
8-10	1200

Rectifier Output (Multipoint Socket)

Terminals	Volts dc
15-16	800

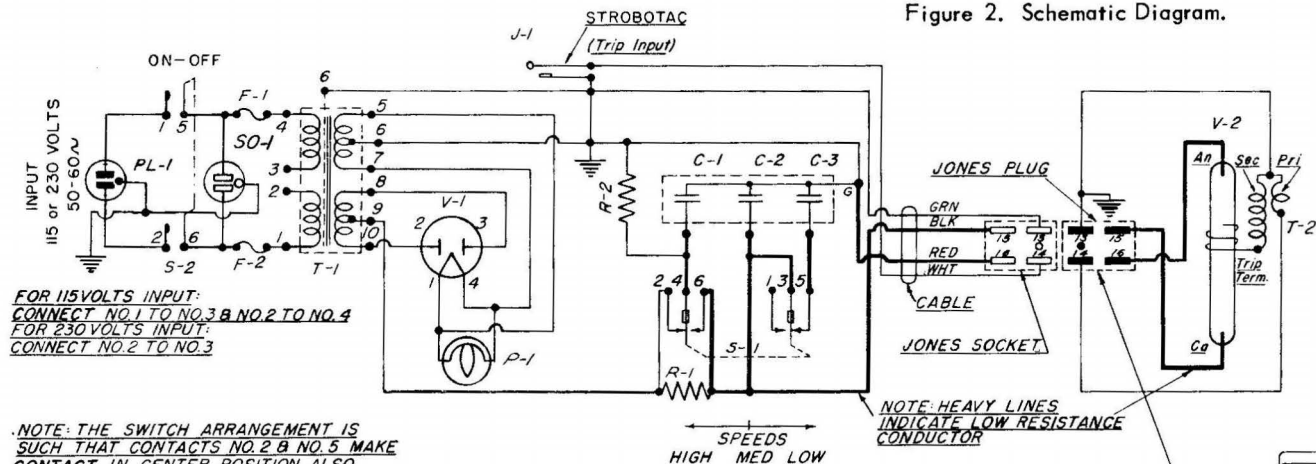


Figure 2. Schematic Diagram.

REF DES	DESCRIPTION	GR No.	REF DES	DESCRIPTION	GR No.
C1	CAPACITOR, 10 μ f \pm 10%	COLB-5	R1	RESISTOR, 3 k \pm 10% (2 in parallel, 60 w each)	REPO-1069
C2	CAPACITOR, 2 μ f \pm 10%		R2	RESISTOR, 1 M \pm 10%, 2 w	REC-41BF
C3	CAPACITOR, 2 μ f \pm 10%				
F1	FUSE, Slo-Blo 3AG, 1.6 a (115 v) or 0.8 a (230 v)	FUF-1	S1	SWITCH, dpdt	648-304
F2	FUSE, Slo-Blo 3AG, 1.6 a (115 v) or 0.8 a (230 v)	FUF-1	S2	SWITCH, dpst	SWT-1279
P1	PILOT LAMP, Mazda Type 44, 6.3 v	2LAP-939	T1	TRANSFORMER, Power	365-411
			T2	TRIP COIL	648-301-3
			V1	TUBE, RCA Type 5Z3	
			V2	STROBOLUX LAMP	648-P1

