♦ PRECISION INSTRUMENTS FOR TEST AND MEASUREMENT ♦

1542-9701
Electronic Stroboscope
User and Service Manual

IET LABS, INC.
formerly manufacturer by
GenRad

534 Main Street, Westbury, NY 11590 www.ietlabs.com
TEL: (516) 334-5959 • (800) 899-8438 • FAX: (516) 334-5988

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- Combinations of functions, special ranges, ratings, or accuracies.
- Replacement for discontinued models from other manufacturers.
- Calibration and repair services - NIST traceable.
- Compliant with ISO 9001, ISO 17025, ANSI Z540-1-1994, and MIL-STD-45662A.

Capabilities

- **R**: 20 μΩ-1 TΩ
- **C**: <1 pF - 1 F
- **L**: 100 μH-100 H

- Accuracy to 1 ppm
- Resolution to 0.1 ppm
- Voltage to 20 kV
- Power to over 1000 W
- Programmable IEEE-488 or BCD

The World Standard in Metrology Since 1915
Now continuing the GenRad tradition

Featuring instruments formerly manufactured by GenRad/General Radio/QuadTech

WARRANTY

We warrant that this product is free from defects in material and workmanship and, when properly used, will perform in accordance with applicable IET specifications. If within one year after original shipment, it is found not to meet this standard, it will be repaired or, at the option of IET, replaced at no charge when returned to IET. Changes in this product not approved by IET or application of voltages or currents greater than those allowed by the specifications shall void this warranty. IET shall not be liable for any indirect, special, or consequential damages, even if notice has been given to the possibility of such damages.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTIBILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.

WARNING

OBSERVE ALL SAFETY RULES
WHEN WORKING WITH HIGH VOLTAGES OR LINE VOLTAGES.

Dangerous voltages may be present inside this instrument. Do not open the case
Refer servicing to qulified personnel

HIGH VOLTAGES MAY BE PRESENT AT THE TERMINALS OF THIS INSTRUMENT

WHENEVER HAZARDOUS VOLTAGES (> 45 V) ARE USED, TAKE ALL MEASURES TO AVOID ACCIDENTAL CONTACT WITH ANY LIVE COMPONENTS.

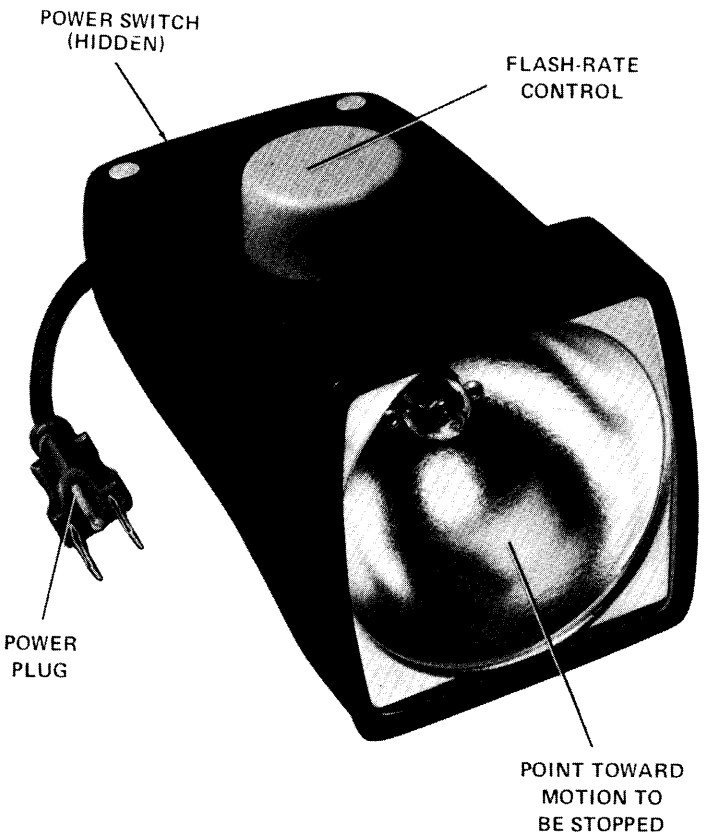
USE MAXIMUM INSULATION AND MINIMIZE THE USE OF BARE CONDUCTORS WHEN USING THIS INSTRUMENT.

Use extreme caution when working with bare conductors or bus bars.

WHEN WORKING WITH HIGH VOLTAGES, POST WARNING SIGNS AND KEEP UNREQUIRED PERSONNEL SAFELY AWAY.

CAUTION

DO NOT APPLY ANY VOLTAGES OR CURRENTS TO THE TERMINALS OF THIS INSTRUMENT IN EXCESS OF THE MAXIMUM LIMITS INDICATED ON THE FRONT PANEL OR THE OPERATING GUIDE LABEL.



GenRad

Type 1542-B STROBOTAC® Electronic Stroboscope

specifications

Flash Rate: ≈ 180 to 3800 flashes per minute (3 to 63 flashes per second), continuously adjustable by uncalibrated 5-turn control.

Flash Duration: ≈ 3 μs at 63 fps, ≈ 2 μs at 3 fps.

Beam Angle: ≈ 10° at half-intensity points.

Power: 105 to 125 V, 50 to 60 Hz, 10 W.

Mechanical: ***Dimensions*** (wXhXd): 4.2X2.16X7.52 in. (107X55X191 mm). ***Weight:*** 1.8 lb (0.8 kg) net, 2 lb (0.9 kg) shipping.

Catalog Number	Description
1542-9701	**1542-B Strobotac® Electronic Stroboscope**
1530-9410	**Replacement Strobotron Flash Lamp**
1542-9600	**Arm to position light conveniently in permanent or semi-permanent installations**

PURPOSE.

The Type 1542-B Strobotac® electronic stroboscope produces a bright flashing light over a wide flash-rate to stop motion. It is well suited for use in industrial applications as an engineering or maintenance tool, and as an aid in the classroom. Additionally, it is small, light, simple to operate and inexpensive.

DESCRIPTION.

The 1542-B is housed in a tough plastic case that is shaped for comfortable hand-held operation. Alternatively, a threaded hole is provided for tripod mounting. The unit is equipped with two controls: a flash-rate knob for continuous control of flash rate (without range changing), and an ON-OFF pushbutton power switch. The light output is electronically compensated for relatively constant subjective brightness (as the flash rate decreases, the light intensity increases).

TRIPOD MOUNTING.

A stainless-steel insert, which will accept a standard ¼-20 tripod thread, is built into the bottom of the case. To tripod mount the 1542-B screw the threaded end of the tripod pan head into the insert and hand tighten.

OPERATING PROCEDURE.

To operate the 1542-B:

a. Plug the power cord into a 115-V 50/60 Hz source (standard ac line socket).

b. Depress the ON-OFF switch to turn the strobe on.

c. Point the strobe light toward the motion to be stopped.

d. Rotate the flash-rate knob until the visual image of the motion stops. The visual image may be made to move slowly through its cycle by a slight readjustment of the knob setting in either direction. Note: This is a five-turn control without positive stops.

WARRANTY.

We warrant that each new instrument manufactured and sold by us is free from defects in material and workmanship and that, properly used, it will perform in full accordance with applicable specifications for the period specified on

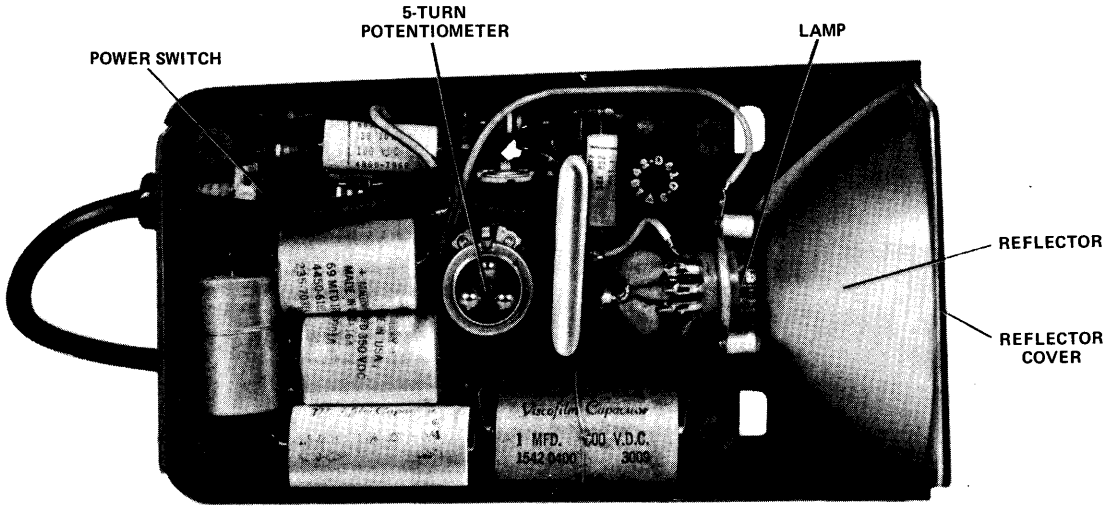


Figure 1. Interior View.

page 6. Any instrument or component that is found within the period not to meet these standards, after examination by our factory, Regional Center, or authorized repair agency personnel, will be repaired or, at our option, replaced.

FIELD SERVICE.

The warranty cited above attests the quality of materials and workmanship in our products. When difficulties do occur, our service engineers will assist in any way possible. If the difficulty cannot be eliminated by use of the following service instructions, please write or phone our Service Department, giving full information of the trouble and of steps taken to remedy it. Be sure to mention the type number of the instrument.

Before returning an instrument to GenRad for service, please contact our Service Department or nearest Regional Center, requesting a "Returned Material" tag. Use of this tag will ensure proper handling and identification. For instruments not covered by the warranty, a purchase order should be forwarded to avoid unnecessary delay.

MAINTENANCE.

Figure 1 identifies the major components of the 1542-B with their corresponding locations. A schematic diagram (Figure 3) and a parts list are also included as part of these instructions. However, untrained personnel should not attempt any repairs other than those presented in paragraphs that follow.

WARNING

Potentially lethal voltages are exposed in a 1542-B operated with its cover removed.

LAMP REPLACEMENT.

To remove the lamp:

a. Unplug the instrument ***at least 3 minutes*** before opening the case.

b. Position the instrument with the FLASH RATE CONTROL down — remove the four Phillips-head screws from the case.

c. Lift off the upper half of the case.

WARNING

Short circuit the brown and yellow wires on the lamp socket for 15 seconds, to avoid the possible danger of a shock due to energy stored in capacitors. (Use a screwdriver with an insulated handle.)

d. Remove the plastic reflector cover.

e. Carefully unplug the lamp from the socket.

Lamp Installation.

To install the lamp:

a. Properly align the lamp pins with the lamp socket.

b. Push the lamp in until it seats, being careful not to bend the pins.

ETCHED-BOARD MAINTENANCE.

a. Perform steps a through d of the lamp-removal procedure.

WARNING

Potentially lethal voltages are exposed in a 1542-B operated with its covers removed.

b. Remove the flash-rate knob (refer to the knob removal procedure).

c. Remove the potentiometer mounting nut with a 3/8 in. wrench.

d. Remove the etched-circuit board, reflector, and back plate from the top half of the case.

e. Remove the old component(s) and solder the new one in place.

f. Remount the etched-circuit board, reflector, and back plate in the top half of the case. (Check to see that the backplate and reflector are inserted in the slots provided in the case before tightening the mounting nut.)

g. Place potentiometer mounting nut on the potentiometer shaft and tighten the nut.

h. Replace the knob (refer to the knob installation procedure).

i. Reverse steps d through a of the lamp-removal procedure.

KNOB REMOVAL.

Use the following procedure to remove the FLASH RATE knob:

a. Grasp the knob firmly with the fingers close to the case and pull the knob straight away from the case — don't attempt to pry it off.

b. Remove the knob bushing by loosening the bushing setscrew with a 3/32-in. Allen wrench.

NOTE

To separate the bushing from the knob, if they should remain combined when the knob is removed, drive a machine tap a turn or two into the bushing to provide sufficient grip for easy separation.

KNOB INSTALLATION.

To install a knob assembly on the FLASH RATE control shaft:

a. Mount the knob bushing on the shaft, keeping the end of the shaft flush with the outer surface of the bushing; tighten the setscrew.

NOTE

If the end of the shaft protrudes through the bushing, the knob cannot seat properly.

b. Place the knob on the bushing with the retention spring opposite the setscrew.

c. Push the knob in until it bottoms and pull it slightly to check that the retention spring is seated in the groove in the bushing.

NOTE

If the retention spring in the knob is loose, reinstall it in the interior notch with the small slit in the inner diameter of the wall.

CLEANING.

CAUTION

Unplug the 1542-B before cleaning.

Do not use an organic solvent. Use a damp NOT WET cloth or sponge with a mild soap or detergent solution to clean the case, reflector, and reflector cover.

Flexible extension arm P/N 1542-9600 for fixed mounting of strobe. Pan-head screw attaches arm to bottom of strobe. Arm reach is 45-in.

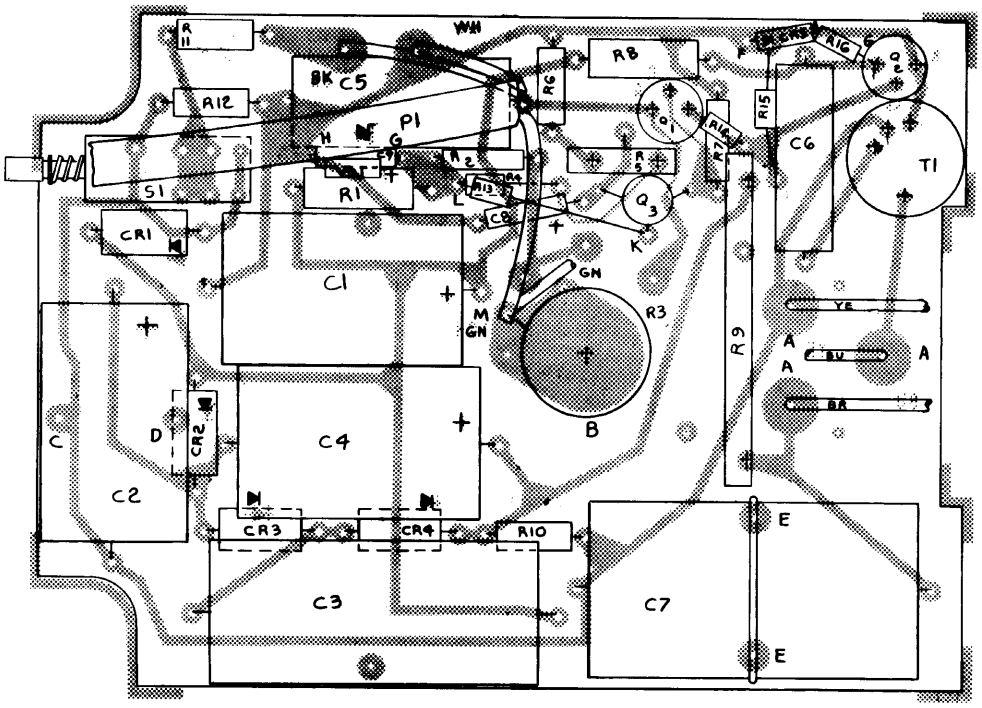
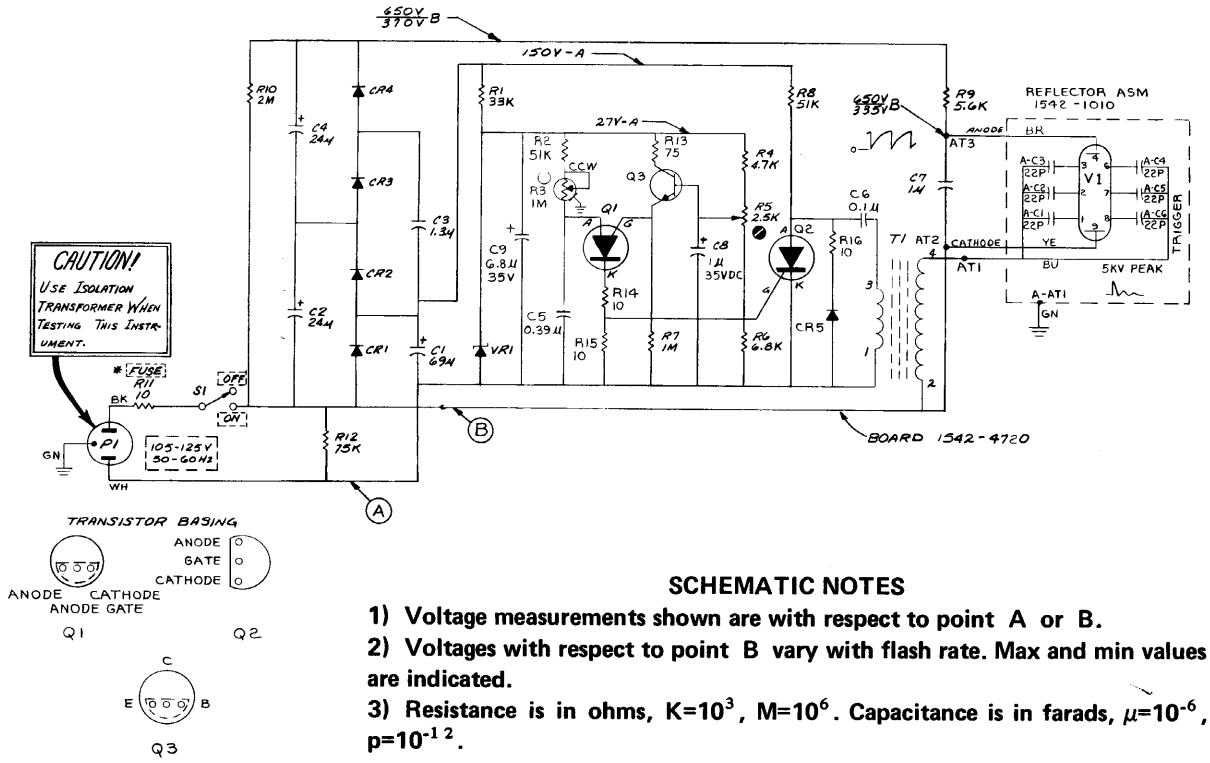


Figure 2. Type 1542-B etched-board assembly.

NOTE: *Orientation:* **Viewed from foil side.** *Part number:* **Refer to caption.** *Symbolism:* **Wavy-line area = part; black ckt pattern (if any) = foil side, gray = other side.**



SCHEMATIC NOTES

1) Voltage measurements shown are with respect to point A or B.

2) Voltages with respect to point B vary with flash rate. Max and min values are indicated.

3) Resistance is in ohms, K=10^3, M=10^6. Capacitance is in farads, μ=10^{-6}, p=10^{-12}.

Figure 3. Schematic diagram of the Type 1542-B Strobotac electronic stroboscope.

ELECTRICAL PARTS LIST

FINAL INSTRUMENT ASM P/N 1542-3010

REFDES		DESCRIPTION	PART NO.	FMC	MFGR PART NUMBER
C	1	CAP CER DISC 22PF 20PCT 4000V	4428-3116	72982	4KV 22PF 20PCT Z5F
C	2	CAP CER DISC 22PF 20PCT 4000V	4428-3116	72982	4KV 22PF 20PCT Z5F
C	3	CAP CER DISC 22PF 20PCT 4000V	4428-3116	72982	4KV 22PF 20PCT Z5F
C	4	CAP CER DISC 22PF 20PCT 4000V	4428-3116	72982	4KV 22PF 20PCT Z5F
C	5	CAP CER DISC 22PF 20PCT 4000V	4428-3116	72982	4KV 22PF 20PCT Z5F
C	6	CAP CER DISC 22PF 20PCT 4000V	4428-3116	72982	4KV 22PF 20PCT Z5F
P	1	CABLE POWER BK 10FT	4200-3010	24655	4200-3010
SO	1	SOCKET, TUBE, 9 CONT.	7540-3500	71785	121-11-10-026
V	1	STROBOTRON TUBE	1530-9410	24655	1530-9410

STROBOTAC PC BOARD P/N 1542-4720

REFDES		DESCRIPTION	PART NO.	FMC	MFGR PART NUMBER
C	1	CAP ALUM 69 UF 175V	4450-6165	90201	TCW 69UF
C	2	CAP ALUM 24 UF 350V	4450-6164	90201	TCW 24UF 350V
C	3	CAP MYLAR 1.3UF 10 PCT 300V	4860-8256	75042	GR48 1.3 UF 10PCT
C	4	CAP ALUM 24 UF 350V	4450-6164	90201	TCW 24UF 350V
C	5	CAP MYLAR 0.39UF 10 PCT 100V	4860-7969	56289	410P 0.39 UF 10PCT
C	6	CAP MYLAR .1UF 10 PCT 200V	4860-8253	56289	410P 0.1 UF 10PCT
C	7	CAPACITOR PAPER	1542-0400	24655	1542-0400
C	8	CAP TANT 1.0 UF 20PCT 35V	4450-4300	56289	150D105X0035A2
C	9	CAP TANT 6.8 UF 20PCT 35V	4450-5000	56289	150D685X0035B2
CR	1	RECT 1N4004 400PIV .75A SI A50A	6081-1002	14433	1N4004
CR	2	RECT 1N4004 400PIV .75A SI A50A	6081-1002	14433	1N4004
CR	3	RECT 1N4004 400PIV .75A SI A50A	6081-1002	14433	1N4004
CR	4	RECT 1N4004 400PIV .75A SI A50A	6081-1002	14433	1N4004
CR	5	RECT 1N4004 400PIV .75A SI A50A	6081-1002	14433	1N4004
Q	1	TRANSISTOR 2N6027	8210-1210	03508	2N6027
Q	2	TRANSISTOR RTJ-0220	8210-1215	03877	RTJ-0220
Q	3	TRANSISTOR 2N3414	8210-1290	56289	2N3414
R	1	RES COMP 33 K 5PCT 1W	6110-3335	81349	RCR32G333J
R	2	RES COMP 51 K OHM 5PCT 1/2W	6100-3515	81349	RCR20G513J
R	3	POT COMP 1M OHM 20PCT SPECIAL ST	6045-0410	11236	5VA-045 CCW A TAPER
R	4	RES COMP 4.7 K 5PCT 1/4W	6099-2475	81349	RCR07G472J
R	5	POT CERM TRM 2.5K OHM 30 PCT 1T	6049-0330	71450	X-201 2.5 K
R	6	RES COMP 6.8 K 5PCT 1/2W	6100-2685	81349	RCR20G682J
R	7	RES COMP 1.0 M 5PCT 1/2W	6100-5105	81349	RCR20G105J
R	8	RES COMP 51 K 5PCT 1W	6110-3515	81349	RCR32G513J
R	9	RES PWR 5.6K 10PCT 5W	1542-0420	24655	1542-0420
R	10	RES COMP 2.0 M OHM 5PCT 1/2W	6100-5205	81349	RCR20G205J
R	11	RES COMP 10 OHM 5PCT 1/2W	6100-0105	81349	RCR20G100J
R	12	RES COMP 75 K OHM 5PCT 1/2W	6100-3755	81349	RCR20G753J
R	13	RES COMP 75 OHM 5PCT 1/4W	6099-0755	81349	RCR07G750J
R	14	RES COMP 10 OHM 5PCT 1/4W	6099-0105	81349	RCR07G100J
R	15	RES COMP 10 OHM 5PCT 1/4W	6099-0105	81349	RCR07G100J
R	16	RES COMP 10 OHM 5PCT 1/4W	6099-0105	81349	RCR07G100J
S	1	SWITCH PUSHBUTTON MULTI	7870-1523	24655	7870-1523
T	1	TRIGGER TRANSFORMER	1542-0410	24655	1542-0410
VR	1	ZENER 1N971B 27V 5PCT .4W	6083-1049	14332	N971B

MECHANICAL PARTS LIST

DESCRIPTION	PART NO.	FMC	MFGR PART NUMBER
KNOB ASM. INCLUDES	5520-5520	24655	5520-5520
RETAINER	5220-5401	24655	5220-5401
REFLECTOR	1542-8010	24655	1542-8010
REFLECTOR COVER	1542-7000	24655	1542-7000
CASE, TOP HALF	1542-2020	24655	1542-2020
CASE, BOTTOM HALF	1542-2030	24655	1542-2030

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