

Figure 1. Type 1543 Strobotac.

PURPOSE.

The Type 1543 Strobotac produces a bright flashing light over a wide flash-rate range to stop motion. It is well suited for use in industrial applications as an engineering or maintenance tool, as part of a photography setup, or as an aid in the classroom. Additionally, it is small, light, simple to operate and inexpensive.

DESCRIPTION.

(Figure 1)

The 1543 features simple pushbutton control with a single knob to control the flash rate — no range switching is necessary. An uncalibrated dial indicates the approximate number of flashes per minute. Modes of operation are: normal, line frequency sub-multiple, and external trigger. The light output is electronically compensated for relatively constant subjective brightness (as the flash rate decreases, the light intensity increases).

The instrument is housed in a high impact plastic case that is shaped for comfortable hand-held operation. Alternatively, a threaded hole is provided for mounting on a tripod or a bail-type stand. The stand (supplied) doubles as a carrying handle or a bracket to hang the instrument in a convenient location.

MOUNTING.

A stainless-steel insert, which will accept a standard 1/4-20 tripod thread, is built into the bottom of the case for bail or tripod mounting. To tripod mount the strobotac remove the bail by turning its knob ccw. Screw the threaded end of the tripod pan head into the insert and hand tighten.

Type 1543 Strobotac[®]

(Electronic Stroboscope)

specifications

Flash Rate	180 fpm	3800 fpm
Duration ¹	4 μ s	6 μ s
Watt Seconds	0.6	0.16
Beam Candella ²	30X10 ⁶	4X10 ⁶
Beam Width ³	11°	11°

1. Measured at peak-intensity points. 2. Measured with silicon photodetector 1 meter from lamp. 3. Measured at 1/2 intensity points.

External Trigger: Std. phone jack, operated by contact-closure device.

Sub-Mult Mode: Provides $\pm 0.1\%$ accuracy by synchronizing to submultiples of the line frequency.

Environmental: TEMPERATURE: 0 to 50°C operating, -40 to 75°C storage. Humidity: 95% RH at +40°C.

Power: 105 to 125 V, 50 to 60 Hz, 25 W max.

Mechanical: DIMENSIONS (wxhxd): 4.2X6.19X7.8 in. (107X157X198 mm). WEIGHT: 3.5 lb (1.6 kg) net, 5 lb (2.3 kg) shipping.

Catalog Number	Description
1543-9700	1543 Strobotac
1530-9410	Replacement Strobotron Flash Lamp

CONTROLS, CONNECTOR, AND INDICATOR.

The controls, connector, and indicator are listed and described in Table 1. Refer to the illustration of Figure 2.

PRELIMINARY CHECKS.

With the power connected, depress the ON-OFF and NORMAL buttons. Turn the flash-rate knob through its range — there should be no erratic action of the flash tube.

Set the flash-rate knob to the high end and depress the LINE-FREQ-SUB-MULT button. The instrument is now synchronized with the line at 3600 flashes per min. Slowly turn the dial in a ccw direction. The flash rate will change at 3600/2, the first submultiple of the line frequency. Additional changes in the flash rate will be noticed as the dial is turned toward the low end. These changes correspond to other submultiples of the line frequency. Do not expect the flash rate to change continuously in this mode.

Depress the EXTERNAL TRIGGER button and connect a contact-closure device (such as a switch) isolated from ground to the rear-panel phone jack. The strobe should flash each time the device is activated.

OPERATING PROCEDURE.

To operate the 1543:

- Plug the power cord into a 115-V 50/60 Hz source (standard ac line socket).
- Depress the ON-OFF button to turn the strobe on.
- Depress the switch that corresponds to the desired mode of operation.

NOTE

One of the mode buttons must be depressed before the strobotac will operate.

- Point the strobe light toward the motion to be stopped.
- Except for the EXTERNAL-TRIGGER mode, rotate the flash-rate knob until the visual image of the motion stops. The visual image may be made to move slowly

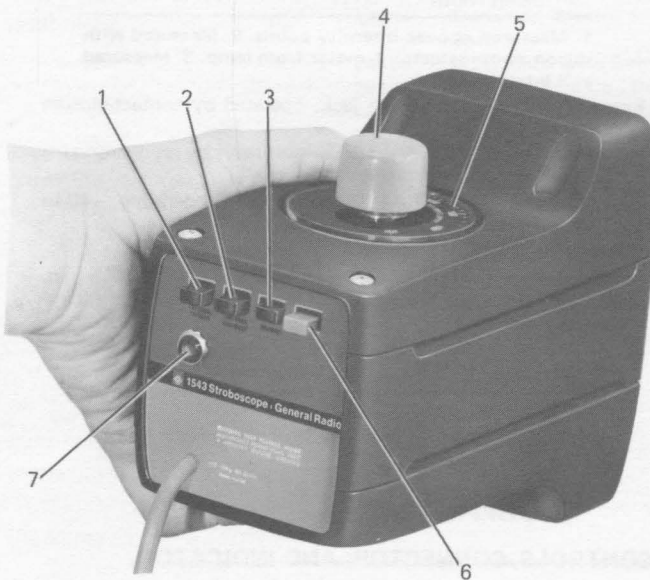


Figure 2. Rear-view showing controls, connector and indicator.

through its cycle by a slight readjustment of the knob setting in either direction. Note: This is a ten-turn control without positive stops.

MODES OF OPERATION.

Normal.

In the NORMAL mode of operation the strobotac will flash at a rate determined by the flash-rate control setting. The number of flashes can be varied between 3 and 63 flashes/sec.

When stopping the motion of an object, it is recommended that the dial be initially set to the high end. Then, slowly reduce the flashing rate until the object motion is stopped.

The dial markings are approximate indications of the flash rate. Following is a procedure that can be used to accurately calibrate the dial and is useful as a lab project for students or for special industrial applications:

- Fasten a disk to the shaft of a synchronous motor (such as the Bodine Electric Co. model no. NSY-12) and make a single mark on the outer surface of the disc.
- Cover the flash-rate dial of the strobotac with masking tape.
- Turn on the strobotac and the synchronous motor.
- Depress the NORMAL mode button and train the strobe light on the outer surface of the rotating disk.
- Turn the flash-rate dial fully cw (highest flash rate).
- Slowly turn the dial ccw until the first double image of the mark on the rotating disk appears. Mark this position on the flash-rate dial as 3600 rpm, using the mark on the instrument case as a reference.
- Continue turning in a ccw direction and mark the dial to correspond with Table 2.

This calibration is temporary, inasmuch as it may change with ambient temperature or line voltage. To recalibrate simply remove the masking tape and repeat the above procedure.

Table 1
CONTROLS, CONNECTOR, AND INDICATOR

Fig. 2 Item	Name	Description	Function
1	EXTERNAL TRIGGER	On-off, pushbutton control	Selects EXTERNAL TRIGGER mode of operation
2	LINE FREQ SUB-MULT	On-off, pushbutton control	Selects LINE FREQ SUB-MULT mode of operation
3	NORMAL	On-off, pushbutton control	Selects NORMAL mode of operation.
4	_____	10-turn potentiometer (without stops)	Varies flash rate between 180 and 3780 flashes/min.
5	_____	Flash-rate dial, marked 500 to 3500	Indicates approximate flash rate per minute
6	ON-OFF	On-off, pushbutton control	Turns instrument on or off
7	_____	Phone jack, mates with 1/4-in., Switchcraft Type 40, two conductor plug or equivalent	Accepts EXTERNAL TRIGGER input (contact closure only)

Table 2
FLASH-RATE DIAL CALIBRATION MARKS

Images	Revolutions Per Minute						
	1800	900	600	450	360	300	200
1	1800	900	600	450	360	300	200
2	3600	1200	720	514	400		
3	2700	1350	1080				
4	2400	1440	1028	800			
5	3000	2250	1500	1280			
6	2160		1543	1350			

Line Frequency Submultiple.

In the LINE-FREQ-SUB-MULT mode the stroboscopes will flash at a rate equal to a submultiple of the line frequency (i.e. 3600, 1800, 1200 . . . 240 fpm with an accuracy equal to that of the 60-Hz line within 0.1%). The strobe automatically switches from one submultiple to another as the flash-rate control is varied over its range – the flash rate does not vary continuously.

This mode of operation can be used to accurately measure the slip speed of motors. For example:

- Mark the end of the shaft of a 1750 rpm induction motor.
- Set the stroboscopes to the first submultiple of the line frequency and direct the strobe light on the shaft.
- Notice that the mark appears to rotate (slip). To determine the slip speed, count the number of revolutions that occur in one minute. To determine the actual speed of the motor subtract the slip speed from 1800 rpm.

The submultiple of the line frequency at which the stroboscopes is flashing can be determined by using a synchronous motor in the above procedure. Set the flash-rate dial to the high end and depress the LINE-FREQ-SUB-MULT button. Point the stroboscopes toward the outer surface of the disk and turn on the motor. Two images of the mark should be seen 180° apart. Rotate the flash-rate knob ccw until a single image appears. This corresponds to the first submultiple of the line frequency (60/2 flashes/min or 1800 rpm). The second submultiple (60/3) will be a double image and each successive image will alternate between a single and double image, down to approximately the 15th submultiple.

External Trigger.

In the EXTERNAL-TRIGGER mode, the stroboscopes will flash at a rate determined by the frequency of the external-trigger device (such as a cam operated micro switch or a camera shutter). Refer to the STROBES FOR PHOTOGRAPHERS para. for an application of this mode.

NOTE

The trigger device must be a contact closure with both sides isolated from ground.

If a contact device connected to the stroboscopes is operated at a frequency higher than 3780 fpm, the strobe

oscillator will automatically divide down to the approximate submultiple. The strobe will flash at a rate equal to that submultiple.

Noise is usually generated by a contact-closure device when the contacts are closed, due to contact bounce. The circuit design is such that noise occurring up to 15 ms after the initial contact closure will be filtered out. Information on how to increase the time constant of this filter can be obtained from our service department by special request.

STROBES FOR PHOTOGRAPHERS.

GR stroboscopes are widely employed in single and multiflash photography. In general the camera used should have a "time" or "bulb" connection (for multiple exposure), an "X" synchronization connection (for single exposure), an adjustable aperture, a cable release, and a tripod mount. Polaroid film is recommended.

Following is a procedure for making a single-flash photograph using the EXTERNAL TRIGGER mode:

- Find the guide number for the film speed used (see Figure 3).
- Measure the lamp-to-subject distance.
- Calculate the aperture setting using the following formula: $f/number = \frac{Guide\ Number}{1 + lamp-to-subject\ distance\ (ft.)}$
- Adjust the camera aperture to the calculated setting.
- Depress the POWER and EXTERNAL TRIGGER buttons of the stroboscopes.
- Connect the EXTERNAL TRIGGER jack on the stroboscopes to the shutter release on the camera. Use an adaptor cable with a standard, two-conductor phone plug on this end and the appropriate connector for the camera end.

The setup is now ready to make a single-exposure photograph.

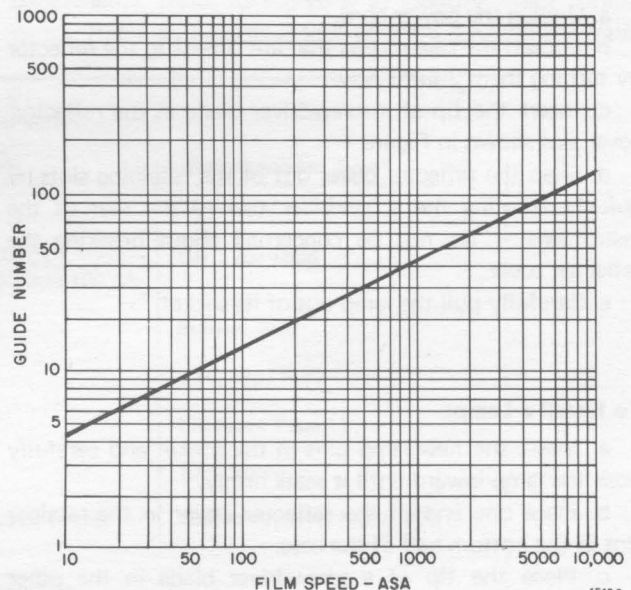


Figure 3. Guide-number chart.

1543-3

Following is a procedure for making a multiple-exposure photograph using the LINE-FREQ-SUBMULTIPLE mode:

- a. Perform steps a and b of the single-flash procedure.
- b. Obtain the guide-number multiplier from Figure 4 and multiply it by the guide number.
- c. Calculate the aperture setting (with the formula in the single-flash procedure) using the corrected guide number. Adjust the camera accordingly.
- d. Estimate the strobe flash rate required to give the number of images desired and adjust the strobe accordingly.
- e. Adjust the camera shutter speed so that the shutter will remain open long enough for the desired number of images to be recorded on film.
- f. With the strobe flashing at the desired rate, release the shutter to take the multiflash photo.

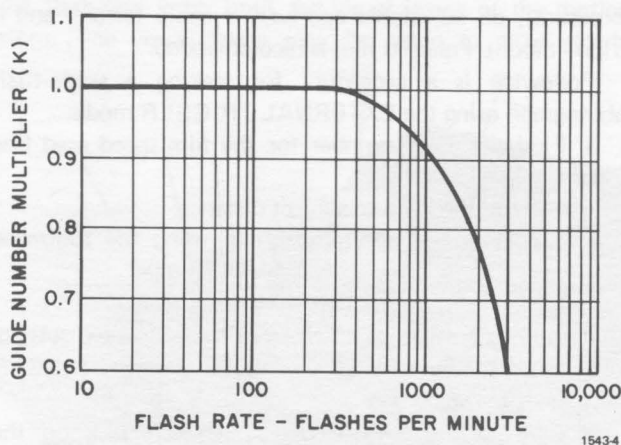


Figure 4. Guide-number correction for repetitive flashing.

LAMP REPLACEMENT.

The following lamp-replacement procedure is recommended:

- a. Unplug the power cord.
- b. Loosen the case screws that are closest to the reflector by turning them 2 turns ccw.
- c. Insert the tip of a screwdriver blade in the reflector-cover slot shown in Figure 1.
- d. Snap the reflector cover out of the retaining slots by quickly rotating the screwdriver toward the rear of the instrument — do not be concerned about breaking the reflector cover.
- e. Carefully pull the lamp out of its socket.

To Install a Lamp:

- a. Insert the new lamp pins in the socket and carefully push the lamp inward until it seats firmly.
- b. Place one end of the reflector cover in the retainer slot in the bottom half of the case.
- c. Place the tip of a screwdriver blade in the other retainer slot.

d. Rotate the screwdriver toward the reflector cover. This action will pry the case outward and simultaneously bend the reflector cover slightly, causing it to pop into place.

e. Check to see that the side panels are properly seated and then tighten the case screws.

f. Age the replacement lamp by operating the instrument for a minimum of one hour.

KNOB AND DIAL REMOVAL.

Use the following procedure to remove the FLASH RATE knob and dial:

a. Turn the knob ccw until the last mark on the low end of the dial aligns with the white mark on the case.

b. 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.

c. 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.

d. Recheck the dial alignment and remove the dial by loosening its setscrew.

KNOB AND DIAL INSTALLATION.

To install a knob and dial assembly:

a. Place the dial on the larger shaft and align the marks mentioned in the removal procedure.

b. Tighten the dial setscrew.

c. Mount the knob bushing on the smaller 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.

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

e. 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.

ETCHED-BOARD MAINTENANCE.

(Figure 5)

WARNING

Potentially lethal voltages inside — this instrument should be serviced by skilled service personnel only.

The following procedure is recommended for opening the case:

- a. Unplug the instrument *at least 3 minutes* before opening the case.
- b. Remove the four case screws from the dial side of the instrument.
- c. Separate the two halves of the case.

At this juncture the instrument comes apart with the power-supply board attached to the lower half and the control board attached to the upper half of the case. The reflector and backplate can be separated from the case by simply pulling them loose. Further disassembly is recommended for trained personnel only. However, once a problem has been isolated to a particular component, the covers will have to be removed to replace the component. Remove the four spacers to remove the lower half of the case; remove the knob and dial assembly to remove the upper half (refer to the KNOB AND DIAL REMOVAL procedure).

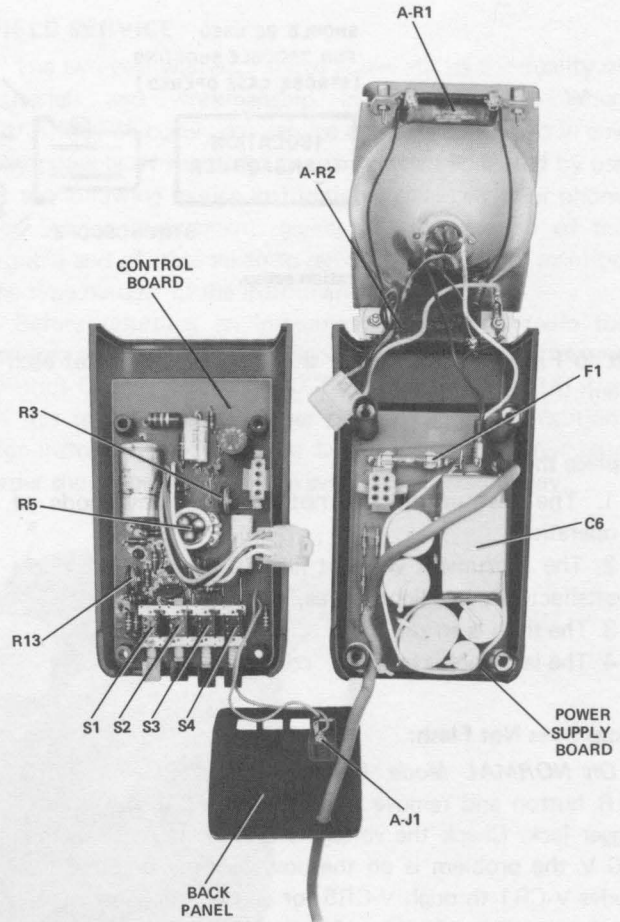


Figure 5. Interior view, showing the component side of the Control Board and the Power Supply Board.

CLEANING.

CAUTION

Unplug the stroboscope 3 minutes 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.

TROUBLE ANALYSIS

General.

This section is intended to provide a method for isolating a problem to a component or a group of components. Refer to Figure 5 to identify major components. Refer to Figures 8 and 10 for a schematic diagram

**Table 3
TEST EQUIPMENT**

Item	Requirements	Recommended Type*
Oscilloscope	Dc to 450 kHz	Tektronix† 503
Photoelectric Pickoff	Operating rate: 63 pulses/s Requires: 3 to 25 V dc, 0 to 100 μA	GR Type 1536
Battery	9 V	Burgess, 2U6
Isolation Transformer	115 V, 30 W	UTC Type R-72
Phone Jack	2 conductor	Littel-Jax Type 11
Resistor	100 kΩ, ¼ W	10% carbon
Multimeter	Measures resistance and dc voltage	Weston Analyzer Model 980

*or equivalent

†Reg. trademark, Tektronix Inc., Beaverton, Oregon

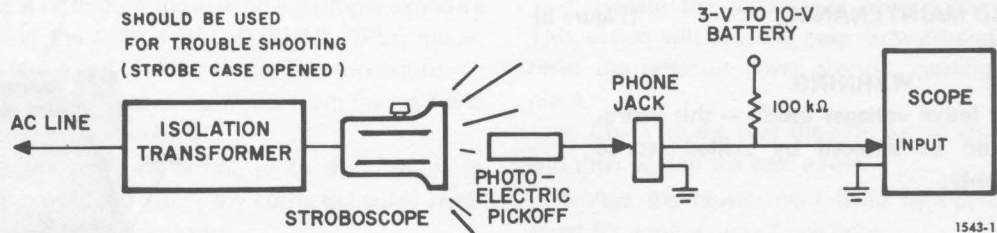


Figure 6. Calibration setup.

and to Figures 9 and 11 for a component layout of each circuit.

Replace the Lamp If:

1. The instrument will not flash on any mode of operation,
2. The instrument will not flash in the dark but works satisfactorily in a lighted area,
3. The flash is erratic,
4. The lamp holds over (i.e., continuous arc).

Lamp Does Not Flash:

On NORMAL Mode, Depress the EXTERNAL TRIGGER button and remove any connections to the external trigger jack. Check the voltage on V-C6. If it is less than 700 V the problem is on the power-supply board. Check diodes V-CR1 through V-CR5 for an open or short circuit. Check capacitor voltages as follows: V-C1 through V-C4 \approx 300 V; V-C5 \approx 150 V. If one capacitor is defective it will change the voltage on all. The defective one will have the lowest voltage.

If the voltage on V-C6 is greater than 700 V, the problem is on the control board. The following procedure is recommended.

- a. Depress the NORMAL button and check the voltage on C-C1 to be approximately 27 V.
- b. If the voltage is low, C-C1 may be defective; if it is missing C-VR1 may be short circuited.
- c. If the voltage in step b is present, check the anode of Q1 for a sawtooth signal of approximately 14 V. Replace Q1 if this signal is missing.
- d. If the signal in step c is present, check the anode of Q3 for a 150 -V sawtooth signal. Replace Q3 if this voltage is low or missing. If the voltage is normal, the problem is in transformer T1.

On EXTERNAL TRIGGER or SUB-MULT. If the instrument does not work in the EXTERNAL TRIGGER or LINE-FREQ-SUB-MULT modes, check operation in the NORMAL mode. If this mode functions correctly, Q2 is probably defective.

On EXTERNAL TRIGGER only. Check to see that the external contact-closure device is isolated from ground. If so, check the internal connections between A-J1 and the control board. The next step should be to check Q2. If this

transistor is not defective, check the wiring to the EXTERNAL-TRIGGER switch.

Instrument Blows Fuses.

- If the stroboscope continuously blows fuses:
- a. Check the fuse value to be 1/2 A.
 - b. Check for defective power supply components.

Calibration Procedure.

NOTE

The instrument should not have to be recalibrated unless it is damaged or a component has been replaced.

The recommended calibration procedure follows:

- a. Make the setup shown in Figure 6 and adjust the oscilloscope controls as follows:

TRIGGER SOURCE	INT
TRIGGER SLOPE	negative
SENSITIVITY	1V/CM
SWEEP TIME/CM	100 ms
- b. Set the flash-rate control to the maximum ccw position (min rpm). An oscilloscope pattern should be observed.
- c. Measure the period between the negative pulses generated by the photoelectric pickoff. It should be approximately 300-360 ms.
- d. Set the flash-rate control to the maximum cw position (max rpm) and again measure the period.
- e. Adjust R3 for 1/21th of the period as measured in step d.
- f. Adjust R13 for a period of 16 ms.

The instrument is now calibrated to flash at rate of 180-3780 fpm.

If you need more information, we have it in abundance: *A Primer of Stroboscopy* — free; a 20-page illustrated introduction to stroboscopy. *Using Stroboscopy* — free; a 16-page reprint with fundamental information on basic and advanced techniques of stroboscopy, especially the photographic aspects. *Strobotactics* — free; an informative periodic publication devoted to the latest techniques and instrumentation in the strobe field. *Handbook of High-Speed*

Photography — \$1.00; a 92-page detailed discussion of strobe photography. The *Handbook of Stroboscopy* — \$2.00; a 117-page comprehensive work on stroboscopy tailored to your needs.

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 a period of two years after original shipment. Any instrument or component that is found within the two-year period not to meet these standards, after examination by our factory, District Office, or authorized repair agency personnel, will be repaired or, at our option, replaced without charge, except for lamps that have given normal service.

FIELD SERVICE.

The two-year warranty stated 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 General Radio for service, please contact our Service Department or nearest District Office, 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.



Figure 7. Mechanical parts — rear view.

MECHANICAL PARTS LIST

Fig Ref	Qty	Description	GR Part No.	Fed Mfg Code	Mfg Part No.
1	1	Connector, telephone jack, A-J1,	4260-1031	82389	N111
2	3	Pushbutton knob, black	0861-5988	71590	J52305
3	1	Pushbutton knob, gray	0861-5987	71590	J52304
4	1	Knob asm., inc. fastener	5220-5401	24655	5220-5402
5	1	Dial asm., FLASHES PER MINUTE (APPROX)	1543-1030	24655	1543-1030
6	1	Top housing	1543-7040	24655	1543-7040
7	2	Side pan	1543-7020	24655	1543-7020
8	1	Bottom housing	1543-2030	24655	1543-2030
9	1	Power cable, 10 ft.	4200-3010	24655	4200-3010
-	1	Stand asm.	1543-9800	24655	1543-9800
-	1	Reflector cover	1543-7000	24655	1543-9800

ELECTRICAL PARTS LIST

1543-4700 CONTROL BOARD C

Ref Des	Description	GR Part No.	Fed Mfg Code	Mfg Part No.	Fed Stock No.
CAPACITORS					
C1	Elect., 80 μ F +150-10%, 200 V	4450-6167	90201	80 μ F +150-10%	
C2	Mylar, 0.39 μ F \pm 10%, 100 V	4860-7979	84411	663UW, .39 μ F \pm 10%	
C3	Tant., 1.0 μ F \pm 10%, 35 V	4450-4301	56289	150D105X9035A2	
C4	Cer., .01 μ F \pm 10%, 100 V	4402-3108	01121	SV5011	
C5	Mylar, 0.2 μ F \pm 10%, 200 V	4860-7948	84411	663UW, .2 μ F \pm 10%	
CONNECTORS					
J1	Mult Jack, 4 Contacts	4230-4154	00779	1-480426-0	
P3	Mult, Plug, 6 Contacts	4220-4155	00779	1-480276-0	
DIODES					
CR1 thru					
CR4	Type 1N4009	6082-1012	07910	1N758A	
CR5	Type 1N3254	6081-1002	07910	1N748A	5960-800-3973
VR1	Type 1N971B	6083-1049	07910	1N971B	
RESISTORS					
R1	Comp., 18 k Ω \pm 5% 2 W	6120-3185	01121	RC426F183J	5905-249-4225
R2	Comp., 3 k Ω \pm 5% 1/2 W	6100-2305	01121	RC20GF302J	5905-279-1751
R3	Pot Comp., P.C., 5 k Ω \pm 30%	6049-0331	71450	X201-2RS	
R4	Comp., 47 k Ω \pm 5% 1/2 W	6100-3475	01121	RC20GF473J	5905-254-9201
R5	Pot Comp Dual Sht P.C., 1.0 M Ω \pm 10%	6045-0440	71450	CFVA-U45	
R7	Comp., 10 k Ω \pm 5% 1/2 W	6100-3105	01121	RC20GF103J	5905-185-8510
R8	Comp., 1 M Ω \pm 5% 1/2 W	6100-5105	01121	RC20GF105J	5905-192-0390
R9	Comp., 4.3 k Ω \pm 5% 1/2 W	6100-2435	01121	RC20GF432J	5905-257-0935
R11	Comp., 51 Ω \pm 5% 1/2 W	6100-0515	01121	RC20GF510J	5905-279-3517
R13	Pot Comp., P.C., 2.5 k Ω \pm 30%	6049-0330	71450	X-201	
R14	Comp., 6.8 k Ω \pm 5% 1/2 W	6100-2685	01121	RC20GF682J	5905-279-3503
R15	Comp., 51 k Ω \pm 5% 1/2 W	6100-3515	01121	RC20GF513J	5905-279-3496
R16 and					
R17	Comp., 330 k Ω \pm 5% 1/2 W	6100-4335	01121	RC20GF334J	5905-279-2519
R18	Comp., 120 k Ω \pm 5% 1/2 W	6100-4125	01121	RC20GF124J	5905-192-3981
R19	Comp., 27 k Ω \pm 10% 1 W	6110-3279	01121	RC20GF279J	
R20	Comp., 10 Ω \pm 5% 1/2 W	6100-0105	01121	RC20GF100J	5905-190-8883
R21	Comp., 100 k Ω \pm 5% 1/2 W	6100-4105	01121	RC20GF104J	5905-195-6761
R22	Comp., 5.6 k Ω \pm 5% 1/2 W	6100-2565	01121	RC20GF562J	5905-195-6453
R23 and					
R24	Comp., 10 Ω \pm 5% 1/2 W	6100-0105	01121	RC20GF100J	5905-190-8883
SWITCHES					
S1 thru					
S4	Pushbutton, Multiple, 4Sec	7880-2020	71590	PB-15	
TRANSFORMERS					
T1	Trigger	1542-0410	24655	1542-0410	
TRANSISTORS					
Q1	Type D13T1	8210-1210	24454	D13T1	
Q2	Type 2N3391A	8210-1092	24454	2N3391A	
Q3	Type RTJ0220	8210-1215	12065	RTJ0220	
Q4	Type 2N3414	8210-1047	24454	2N3414	5961-989-2749

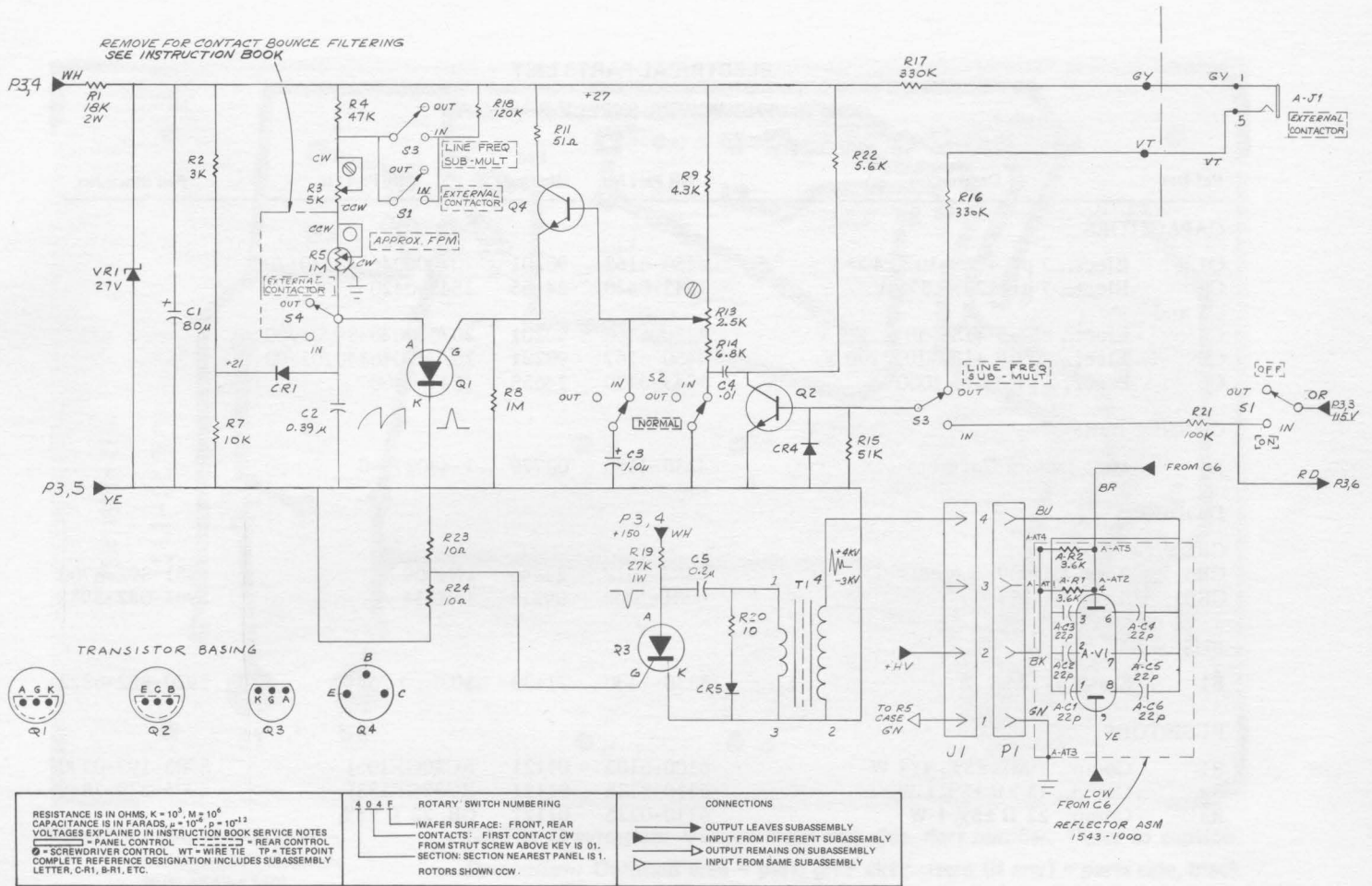


Figure 8. Control Circuit — schematic diagram.

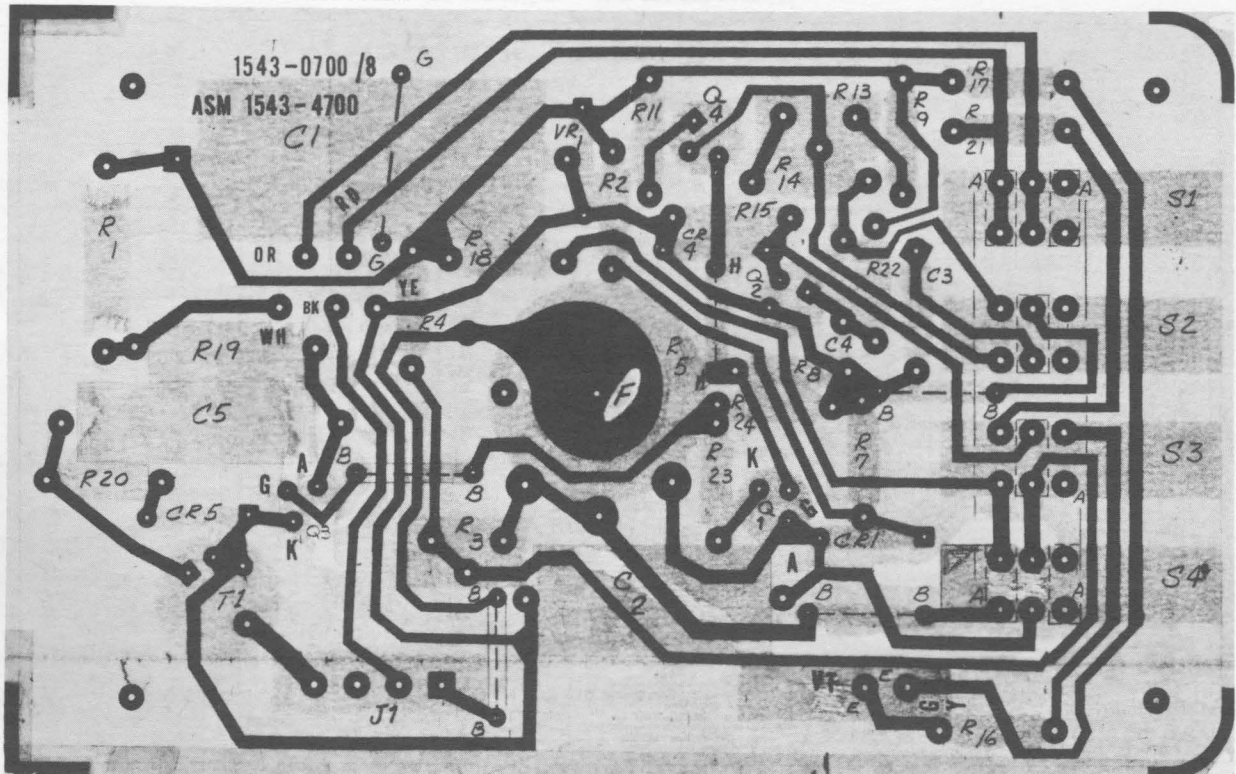


Figure 9. Control circuit — etched circuit diagram.
 (P/N 1543-4700)

NOTE: Orientation: Viewed from foil side. Part number: Refer to caption.
 Symbolism: Outlined area = part; gray ckt pattern (if any) = parts side, black = other side. Pins: Square pad in ckt pattern = collector, I-C pin 1, cathode (of diode), or + end (of capacitor).

ELECTRICAL PARTS LIST

1543-4710 POWER SUPPLY BOARD V

Ref Des	Description	GR Part No.	Fed Mfg Code	Mfg Part No.	Fed Stock No.
CAPACITORS					
C1	Elect., 7 μ F +150-10%, 400 V	4450-6162	90201	20/0000463441/01/00	
C2	Elect., 7 μ F \pm 20% .375 V	1543-0420	24655	1543-0420	
C3 and					
C4	Elect., 35 μ F +150-10% .375 V	4450-6166	90201	20/000046339/01/00	
C5	Elect., 80 μ F +150-10% 200 V	4450-6167	90201	20/000046340/01/00	
C6	Paper, 2 μ F \pm 10% 1000 V	1543-0400	24655	1543-0400	
CONNECTORS					
J3	Mult Jack, 6 Contacts	4230-4155	00779	1-480273-0	
DIODES					
CR1 thru					
CR4	Type 1N4009	6082-1012	24446	1N4009	5961-892-8700
CR5	Type 1N3254	6081-1002	09213	1N3254	5961-082-3988
FUSES					
F1	Slo-Blo, 1A	5330-1400	71400	MDL, 1 Amp	5920-852-6322
RESISTORS					
R1	Comp., 1 M Ω \pm 5%, 1/2 W	6100-5105	01121	RC20GF105J	5905-192-0390
R2	Comp., 13 k Ω \pm 5% 1 W	6110-3135	01121	RC32GF133J	5905-279-2549
R3	Comp., 22 Ω \pm 5% 1 W	6110-0225	01121	GB, 22 Ω \pm 5%	

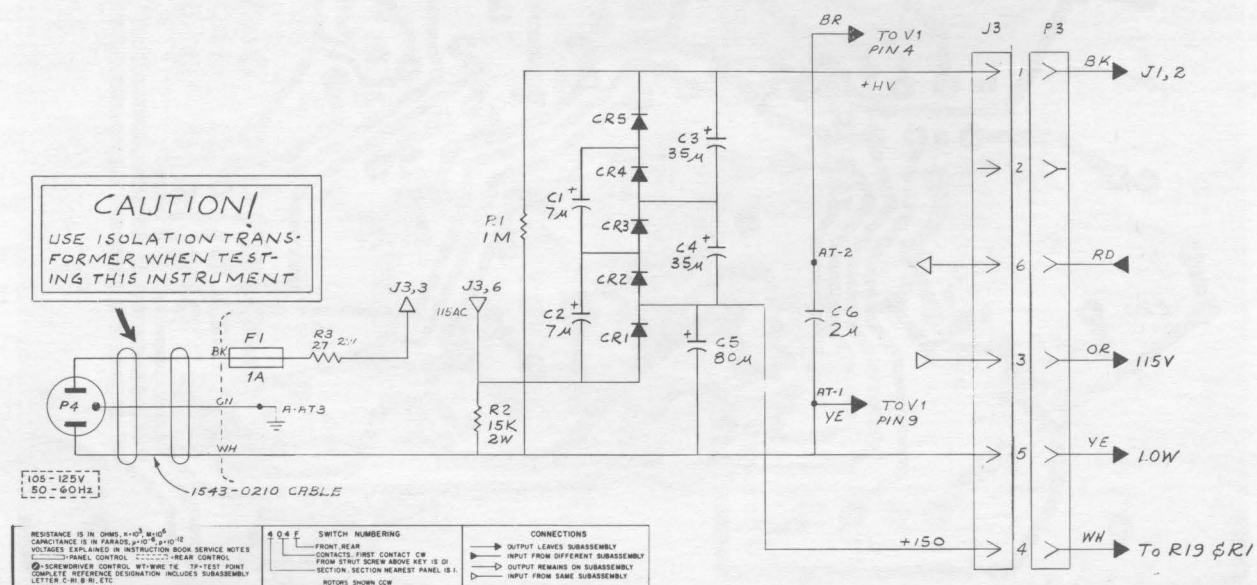


Figure 10. Power supply circuit – schematic diagram.

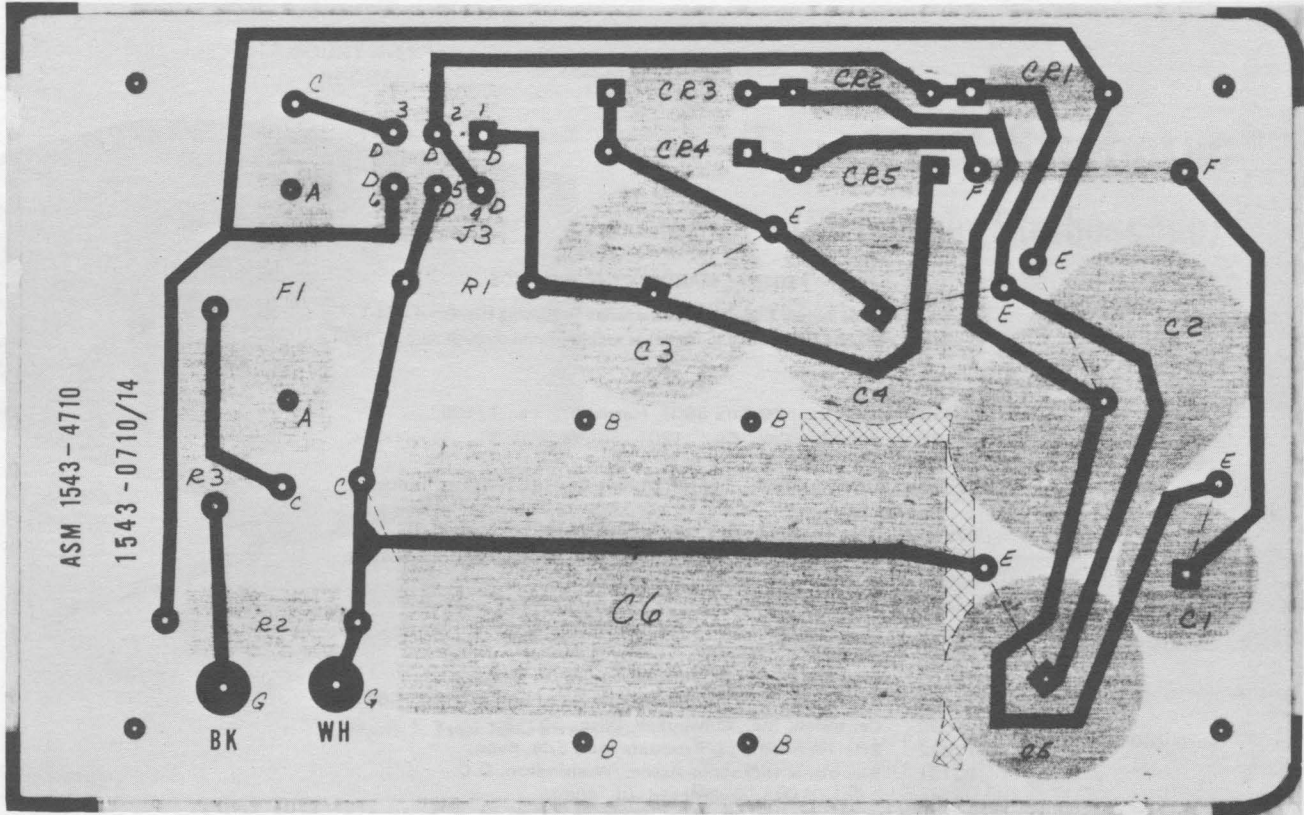


Figure 11. Power supply circuit - etched circuit diagram. (P/N 1543-4710)

NOTE: Orientation: Viewed from foil side. **Part number:** Refer to caption. **Symbolism:** Outlined area = part; gray ckt pattern (if any) = parts side, black = other side. **Pins:** Square pad in ckt pattern = collector, I-C pin 1, cathode (of diode), or + end (of capacitor).

ASSEMBLY PARTS LIST

Ref Des	Description	GR Part No.	Fed Mfg Code	Mfg Part No.	Fed Stock No.
CAPACITORS					
A-C1 thru A-C6	Ceramic, 22 pF ±20% 4000 V	4428-3116	72982	858, 22 pF ±20%	
CONNECTORS					
P1	Mult Plug, 4 Contact	4220-4154	00779	1-480426-0	
A-J1	Jack	4260-1031	82389	N111	
POWER CORDS					
	Cable Power, Bk, 10 ft	4200-3010	24655	4200-3010	
RESISTORS					
A-R1	Pwr, WW, 3.6 kΩ ±5% 40 W	6631-2365	80131	RW21, 3.6 kΩ ±5%	
R2	Pwr, WW, 3.6 kΩ ±5% 40 W	6631-2365	80131	RW21, 3.6 kΩ ±5%	
SOCKETS					
A-SO1	Tube, 9 Contacts	7540-3500	07233	121-11-10-026	
TUBES					
A-V1	Strobotron	1530-9410	24655	1530-4010	

FEDERAL MANUFACTURER'S CODE

From Federal Supply Code for Manufacturers Cataloging Handbooks H4-1
(Name to Code) and H4-2 (Code to Name) as supplemented through August, 1968.

00779 Amp Inc., PO Box 3608, Harrisburg, Pa., 17105
01121 Allen-Bradley Co., 1201 South 2nd St., Milwaukee,
Wisc., 53204
07233 Cinch-Graphik, Div. of United Car Inc., City of Industry,
Calif.
07910 Cont Device Corp., Hawthorne, Calif.
12065 Transition Electronic Corp., 144 Addison St., E. Boston,
Mass.
24454 G.E., Electronics Comp., Syracuse, N.Y.
24655 General Radio Co., Concord, Mass. 01742
56289 Sprague Electric Co., N. Adams, Mass.
71400 Bussman (McGraw Edison), St. Louis, Mo.
71450 CTS Corp., 1142 W. Beardsley Ave., Elkhart, Ind., 46514
71590 Centralab, Inc., Milwaukee, Wisc., 53212
72982 Erie Technological Products Inc., Erie, Penn.
80131 Electronic Industries Assoc., Washington, D.C.
82389 Switchcraft Inc., Chicago, Ill., 60630
84411 TRW Capacitor Div., Ogallala, Nebr.
90201 Mallory Capacitor Co., Indianapolis, Ind.



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