TECHNICAL MANUAL

OPERATING MANUAL

and

GENERAL SUPPORT MAINTENANCE MANUAL

STROBOSCOPE TS-805A/U

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W A R N I N G

Be careful when working on the 280-volt and 210-volt power supply circuits, or on the 115-volt ac line connections, Serious injury or death may result from contact with these terminals.

DON'T TAKE CHANCES!

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STROBOSCOPE TS-805A/U

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CHAPTER 1 INTRODUCTION

Section I. GENERAL

1–1. Scope

a. This technical manual describes stroboscope TS-805A/U and covers its general support maintenance.

b. Throughout this manual, the word stroboscope or Strobotach® refers to all models of the equipment. Strobotach® and Strobolux® are registered trademarks of General Radio Co.

c. Appendix A contains references.

1–2. Sources.

This manual was compiled from material presented in TM11-6625-396-40, which describes stroboscopes TS-805B/U, TS-805C/U, TS-805D/U and TS-805E/U. The block diagram, the multivibrator and power supply sections of TS-805A/U resemble those of TS-805C/U, while the flasher circuit is similar to that of TS-805D/U. Appropriate corrections have been made to the drawings so that they are applicable to Model TS-805A/U.

Section II. DESCRIPTION AND DATA

1–3. Description

The stroboscope is a portable electronic tachometer which provides rapid and accurate means of directly measuring the speed of rotating or oscillating equipment without mechanical contact with the device being measured. Stroboscope TS-805A/U will directly measure speeds between 60 and 15,000 revolutions per minute (rpm). The instrument, by indirect methods, has the capability of measuring speeds as high as 50,000 rpm.

1–4. Specifications

Table 1-1. Specifications.

Front panel controls	a. Power switching accomplished with function switch.
	b. Six-position function switch designated STROBOTAC-CONTACTOR.
	c. 900 ADJUST and 3600 ADJUST screwdriver controls located at bottom section of panel
Rear panel controls	a. SLOW-DIRECT toggle switch, decreases flashing speed range to one-tenth of value indicated on dial scale.
	b. Receptacle for connection to external contactor or commutator is designated CONTACTOR.
	c. Receptacle for connection to external light source is designated STROBOLUX.
	d. REED on-off switch to turn on vibrating reed for calibration.

Electron tube complement	6X5GT/G, 6N7GT/G , and 631P1 (flash tube)
Color of flash	Red.
Speed range	60 to 15,000 rpm.
Accuracy	Within ±l% at 600 to 14,000 rpm (DIRECT speed range). Within 5% at 60 to 1,440 rpm (SLOW speed range)
Line-voltage input	115 to 120 volts ac, 60 Hz.
Power consumption	35 watts
Height	9 ¾ in.
Depth	6 ½ in.
Width	9 ¼ in.
Weight	8.6 lb.

1–5. Items Comprising an Operable Equipment

Each model of the equipment is composed of only one item and a detachable ac line cord, as listed below. One copy of TM 11-6625-396-12 is packed with each equipment.

The unit is housed in a rugged metal case and is provided with a carrying handle. An illuminated window escutcheon is used to view the indicated speed in rpm. Operating controls are on the front and rear panels. The reed and flasher tube are located within the lens on one side. The unit contains provisions for operation with auxiliary equipment.

Figure 1.1. TS-805A/U Stroboscope.

1–6. Additional Operational Features

Provision is made for the use of accessory items to extend the operational capabilities of the equipment as given below. The accessory items, however, are not available.

a. **Contactor.** A contactor or commutator (coupling device) connected between the CONTACTOR receptacle on Stroboscope TS-805A/U and a rotating element are used to flash the stroboscope in exact synchronization with the rotating element. The front panel CONTACTOR-LOW and CONTACTOR-HIGH switch positions are used only when a contactor is connected to the stroboscope.

b. **External Lamp.** An external light source (self-contained lamp and power supply) may be connected to the STROBOLUX jack on Stroboscope TS-805A/U to provide a greater amount of light at low rotating speeds.

CHAPTER 2 OPERATING INSTRUCTIONS

2-1. General

This section describes the function of each control, indicator, and connector of the stroboscope. Haphazard operation and improper setting of controls can result in poor operation and possible damage to the equipment, Become familiar with the function of each control before operating the equipment.

2-2. Damage From Improper Settings

The flasher tube should not be used continuously at higher speeds (5,000 rpm). The flasher tube life will decrease if the stroboscope is operated unnecessarily at high speeds (STROBOTAC-HIGH switch position).

2-3. Operator's Controls (figs. 2-1 and 2-2).

Table 2-1. Operator's Controls.

Control, indicator, or connector	Function
STROBOTAC - CONTACTOR (6-position rotary switch) (function switch)	Turns equipment power on and off; selects flashing speed range and mode of operation to be used.
	Switch position / **Speed range** OFF — None STROBOTAC-LOW — 60-360 and 600-3,600 rpm STROBOTAC-HIGH — 250-1,440 and 2,500-14,400 rpm LINE — 3,600 rpm CONTACTOR-LOW * — 60-3,600 rpm CONTACTOR-HIGH * — 2,500-14,400 rpm
	* NOTE Refer to paragraph 1-6a for contactor use
HIGH-LOW R.P.M. dial scale (calibrated in two vertical columns)	Allows direct reading of the speed (in rpm) of rotating element under measurement, as follows:
	HIGH scale (left side of drum, farthest from front panel); calibrated from 25 through 145, (Multiply dial setting by factor of 100).**
	LOW scale (right side of drum, closest to front panel): calibrated from 6 through 37. (Multiply dial setting by factor of 100.) **
	** NOTE For accuracy of measurements, use only the 25 through 144 markings on HIGH scale; use only the 6 through 36 markings on LOW scale.
Dial scale control (rotary dial)	Sets the HIGH-LOW R.P.M. dial scale to the required rpm.
900 ADJUST (screwdriver adjustment)	Provides stroboscope adjustment at low speed end of dial.
3600 ADJUST (screwdriver adjustment)	Provides stroboscope adjustment at high speed end of dial.

DIRECT- SLOW
(2-position toggle switch)

Decreases flashing speed range to one-tenth of value indicated on the HIGH LOW R.P.M. dial scale

Switch position	Speed range
DIRECT	600-3,600 and 2,500-14,400 rpm.
SLOW	60-360 and 250-1,440 rpm.

REED
(2-position push-button switch)

Provides images for calibration purposes. Turns reed on and off

CONTACTOR (input connector)

Provides connection for external contactor or commutator.

STROBOLUX (output connector)

Provides connection for external light source

Figure 2-1. TS-805A/U Stroboscope Front Panel Controls.

Figure 2-2. TS-805A/U Stroboscope Rear Panel Controls and Connectors.

2-4. Startup Procedure and Calibration Before Use (figs. 2-1 and 2-2).

To start the equipment, perform ***a*** through ***m*** below.

NOTE
If an abnormal indication is obtained during the starting procedure, refer to paragraphs 4-1 and 4-2 for corrective measures.

a. Connect the power cable to the 115V 60- receptacle at the rear of the stroboscope and then connect the power cable to a power source of 115-120 volts ac, 60 HZ.

b. Set the function switch to STROBOTAC-HIGH. Allow 5 minutes for equipment warm up.

c. Set the REED switch to on.

d. Set the SLOW-DIRECT switch to DIRECT.

e. Set the function switch to STROBOTAC-LOW.

f. Adjust the dial scale control for a reading of 3,600 rpm (LOW SCALE 36 x 100) on the HIGH-LOW R.P.M. dial scale.

g. Adjust the 3600 ADJUST control with a screwdriver until a single stationary reed image is observed.

h. Adjust the dial scale control for a reading of 1,800 rpm (LOW scale 18 x 100) on the HIGH-LOW R.P.M. dial scale.

i. Adjust the 900 ADJUST control until a single stationary reed image is observed.

j. Adjust the dial scale control for a reading of 900 rpm (LOW scale 9 x 100) on the HIGH-LOW R.P.M. dial scale.

k. Slightly readjust the 900 ADJUST control until a stationary reed image is observed.

l. Repeat the procedures given in a through k above until the reed image appears stationary at each HIGH-LOW R.P.M. dial scale position.

m. Set the REED switch to the OFF position.

2-5. Measurement of Unknown Speed (fig. 2-1 and 2-2)

Start the equipment as instructed in paragraph 2-4 and perform the following procedure to measure an unknown speed:

a. Set the function switch to STROBOTAC-HIGH to measure speeds that appear to be above 3,600 rpm, or at STROBOTAC-LOW to measure speeds that appear to be below 3,600 rpm.

b. Direct the stroboscope light at the rotary device.

c. Start at the high end and adjust the dial scale control toward its low end until the rotating element appears stationary.

d. Read the speed of the rotary device from the dial scale.

NOTE

The correct speed of the rotating device is the highest dial scale reading that produces a single stationary image. Where the rotating device is uniform or symmetrical, a single white chalk or crayon mark should be placed on the device to aid in determining when the image is stationary.

2-6. Operating Procedures for Low Speed Measurement (fig. 2-1 and 2-2)

Start the equipment as instructed in paragraph 2-4 and perform the following procedure for measuring speeds in the 60-360 rpm range:

a. Set the function switch to STROBOTAC LOW.

b. Set the SLOW-DIRECT switch to SLOW.

c. Direct the stroboscope light at the rotating device.

d. Start at the high end and adjust the dial scale control down towards its low end until the rotating element appears to be stationary.

e. Divide the HIGH-LOW R.P.M. dial scale reading (LOW scale R.P.M. X 100) by 10 to obtain the correct speed measurement.

2-7. Operating Procedures for High Speed Measurement (fig. 2-1and 2-2)

Start the equipment as instructed in paragraph 2-4 and proceed as follows for measuring speeds above 14,000 rpm:

a. Set the function switch to STROBOTAC HIGH.

b. Direct the stroboscope light at the rotating device.

c. Start at the high end and adjust the dial scale control down towards its low end until the rotating element appears to be stationary.

d. Record the speed from the dial scale and designate it X.

e. Readjust the dial scale control to the next lower dial scale marking that produces a stationary image.

f. Record this lower speed reading from the dial scale and designate it Y.

g. Calculate the speed of the rotating element as follows:

$$RPM = \frac{XY}{X-Y}$$

Where X is the highest dial scale reading (d above) and Y is the next lower dial scale reading (f above).

h. For example, if the highest reading (obtained in d above) was 7,500 rpm and the next lower reading (obtained in f above) was 5,000 rpm, then:

$$Rpm = \frac{7{,}500 \times 5{,}000}{7{,}500 - 5{,}000} = \frac{37{,}500{,}000}{2{,}500} = 15{,}000$$

CAUTION
Do not continuously operate the stroboscope at speeds greater than 5,000 rpm.

2-8. Shutdown Procedure (fig. 2-1and 2-2)

a. To return the stroboscope to a standby position, rotate the HIGH-LOW R.P.M. dial scale to its lowest reading, and set the function switch to STROBOTAC LOW.

b. To turn off the stroboscope, set the function switch to OFF.

CHAPTER 3 FUNCTIONING OF EQUIPMENT

3 - 1 . G e n e r a l

Functional circuit descriptions are provided in this chapter for the TS-805A/U stroboscope.

3-2. Block Diagram Description (fig. 3-1)

The stroboscope is a portable electronic tachometer that provides a rapid and accurate means of directly measuring the speed of rotating or oscillating equipment without mechanical contact with the device being measured. The stroboscope consists of a multivibrator, a control circuit, a flasher, and a power supply circuit. A reed circuit is provided for calibration.

a. **Multivibrator.** The multivibrator produces a square wave output, the frequency of which can be varied over a wide range by the dial scale control and the control circuit. The selected multivibrator output frequency is used to drive the flasher circuit through the control circuit.

b. **Flasher.** The flasher circuit consists of a flasher tube and associated circuit parts. This tube flashes at a rate determined by the multivibrator output frequency with the flashing light directed at the rotating device to be measured. The rotational speed of the device can be determined by operation of the dial scale control to vary the frequency output of the multivibrator, which in turn, varies the flashing rate of the flasher tube. When the flashing rate of the flasher tube is in coincidence with the rotational speed of the device being measured, the device will appear to be stationary; then, by observation of the reading on the calibrated scale associated with the dial scale control, the exact rotational speed of the device can be read directly. If the flashing rate of the flasher tube is so low that it prevents enough light output to occur, an external high-intensity flasher lamp can be connected to the flasher circuit.

c. **Control Circuit.** The control circuit consists of switches S103 and S104 and extends the facilities of the stroboscope. Switches S103 and S104 permit selection of various frequency ranges and also provide the means for disconnection of the multivibrator from the stroboscope circuit so that in external contactor can be used to energize the flasher tube. By use of an external contactor (which is attached to the rotating device), the flashing rate of the flasher tube can be synchronized with that of the rotating device.

d. **Reed Circuit.** The reed circuit permits calibration of the multivibrator frequency by use of the 60-cycle-per-second (Hz) power source frequency as the reference. Such calibration compensates for minor drifts in the multivibrator frequency caused by aging of components or power source voltage variations. The reed circuit consists of a coil-operated reed, The reed is located near the light path of the flasher tube. When the reed coil is energized by turning S102 to the ON position, the reed vibrates. When the flasher tube flashing rate corresponds to the vibrating rate of the reed (or to a multiple or submultiple of it), the reed appears to be stationary. The source voltage frequency is 60 Hz; therefore, the reed vibrates 120 times a second (two alternations for each cycle) or 7,200 times a minute. If the flashing rate of the flasher tube corresponds to the vibrating

rate of the reed (reed appears to be stationary) and the dial scale associated with the dial scale control indicates 7,200 revolutions per minute (rpm), it can be assumed that the stroboscope is properly calibrated. If the dial scale reading is not 7,200 rpm, the stroboscope requires calibration. By use of the multiples or submultiple of the reed vibrating rate, the complete dial scale range can be checked at these various points for accuracy and, in turn, calibrated if necessary.

e. **Power Supply.** The power supply provides the required potentials for operating the stroboscope. Positive potentials of 280 volts and 210 volts are provided for the tube plates and screen; a low magnitude alternating current of 6.3 volts is provided for the tube heaters, 3.6 volts for the reed coil, and a potential of 47 volts ac is provided for synchronizing the multivibrator to the line frequency.

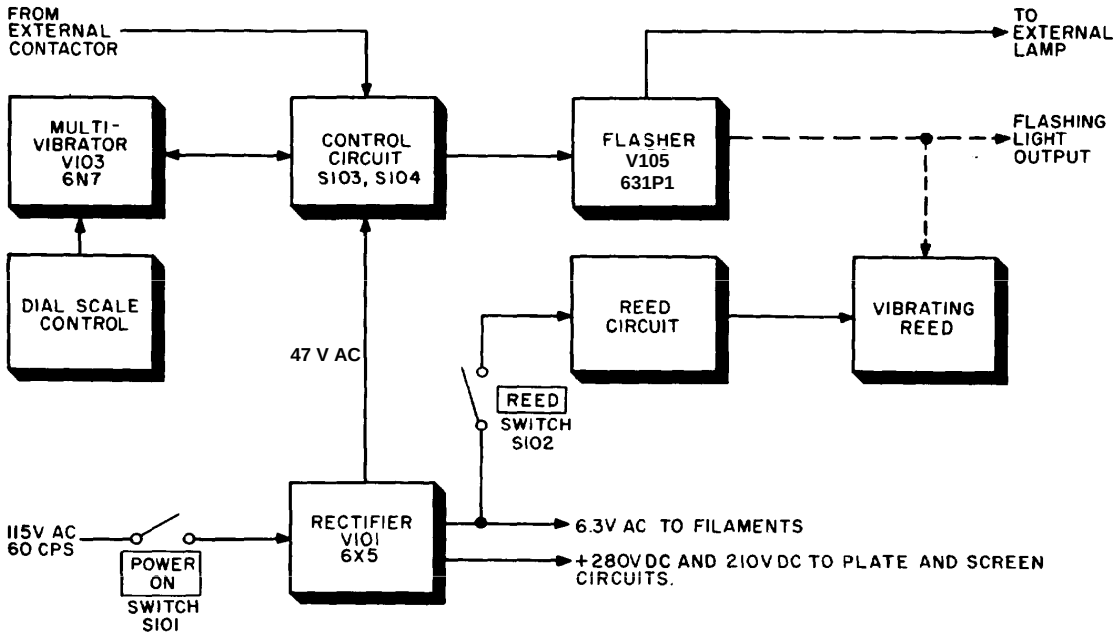

Figure 3-1. TS-805A/U Block Diagram

3-3. Multivibrator Circuit Description (fig. 3-2)

a. The multivibrator circuit, operating in four frequency ranges, provides the required pulses to drive the associated flasher circuit. The frequency at which the multivibrator operates is determined by the dial scale control; the frequency range through which the multivibrator operates is determined by the setting of STROBOTAC-CONTACTOR switch S103. The two frequency ranges provided by the multivibrator circuit are 600 to 3,700 cycles per minute and 2,500 to 14,000 cycles per minute. (The term cycles per minute in this discussion corresponds to rpm; these terms are used interchangeably.) Two additional low-frequency ranges are also provided and are approximately one-tenth of the normal frequency ranges. The additional low-frequency ranges are provided primarily for use when frequency accuracy is not essential.

b. Multivibrator V103 is a symmetrical free-running type, the frequency of which is controlled by the resistive value of dial scale control R108 and plate-to-grid coupling capacitors C107 through C110. When operated, resistor R108 varies the bias applied to

both grids of V103, thus varying the frequency of V103 output in the selected frequency range. Capacitors C107 through C110, as selected by S103, and resistors R115 and R116, as determined by DIRECT-SLOW switch S104, determine the frequency range within which multivibrator V103 oscillates. Assume that S103 is set in the STROBOTAC-LOW position (contact 1 makes with contact 6, sections 1A, 2A, and 1B) and DIRECT-SLOW switch S104 is set in the DIRECT position. When voltage is applied to the multivibrator circuit, current flows in both sections of V103. Since some unbalance exists in the triodes, the multivibrator circuit starts to oscillate.

c. Assume that V103A starts to conduct harder than V103B; the following actions will occur: The increase of current in V103 increases the voltage drop across resistor R112, which sharply lowers the plate-to-ground voltage at V103A. Capacitors C110 and C109 discharge toward the voltage present at the plate of V103A through R111 in series with 3600 ADJUST potentiometer R109, dial scale control R108, and 900 ADJUST potentiometer R113. This discharge current drives the grid of V103B negative and increases the plate-to-ground voltage at V103B. Capacitors C107 and C108 charge to the level of the increased voltage it the plate of V103B. The charging current flows through resistor R110, in series with R109, R108, and R113, to drive the grid of V103A more positive. The positive-going signal at the grid of R103A reinforces the original slight increase in current, which results in high current increase. This process continues until the current in V103B is decreased to zero by a grid voltage far below cut-off. With zero current, the plate voltage of V103B rises to the plate supply voltage and capacitors C107 and C108 quickly change to this value. The plate voltage of V103A remains at a constant low value so that capacitors C109 and continue to discharge through R111, in series with R109, R108, and R113.

d. At this time, no circuit changes occur except for the slow discharge of C109 and C110. When the grid voltage of V103B rises above cutoff, a slight current starts flowing through V103B, ending the period of conduction of V103A. When V103B conducts, the circuit action is similar to that described in c above except that the status of the triode sections is reversed. This regenerative process continues at a rate deter-mined by the resistive value of R108 at the selected frequency (HI-LO RPM dial scale setting), with the appropriate capacitors (C107, C108, C109, and C110) determining the frequency range (HI-LO RPM dial scale range). When R108 is at its minimum resistance position with respect to the supply voltage (3,700 rpm), the bias applied to both grids of V103 will be more positive and cause the multivibrator output frequency to increase accordingly. Conversely, when R108 is at its maximum resistance position with respect to the supply voltage (600 rpm), the grids of V103 are made less positive and the output frequency of V103 is lowered accordingly. The 3600 ADJUST and 900 ADJUST potentiometers permit resistive correction to be made in both legs of the dial scale control for calibration purposes. Essentially, the potentiometers permit trimming the high and low ends of the HI-LO RPM dial scale to assure accuracy within the frequency range selected. When S103 is operated to the STROBOTAC-HIGH position, contact 2 on S103 (sections 2A and 1A) remove capacitors C107 and C109 from the grids of V103A and V103B, respectively. Normally, C107 and C109 are connected in parallel with C108 and C110, respectively. With C107 and C109 removed, the charge and discharge time of the capacitors now in use is decreased, which permits V103 to oscillate at a higher frequency. This

higher frequency corresponds to the high-frequency range of the HI-LO RPM dial scale. The positive-going pulse output of multivibrator V103B, developed across plate load resistor R107, is taken from the plate of V103B and applied through contact 1, 2, or 3 of S103 section 1B to the grid circuit flasher V102.

e. When DIRECT-SLOW switch S104 is operated to the SLOW position, the contacts of S104 open and remove the shorts across resistors R115 and R116. With increased grid resistance in the grid circuits, the discharge time of capacitors C107, C1 C108, C109, and C110 is increased. This increased discharge time causes V103 to oscillate at a frequency approximately one-tenth of the original HI-LO RPM dial scale reading in the selected range. For example, 600 rpm becomes 60 rpm on the LO RPM scale, and 2,700 rpm becomes 270 rpm on the HI RPM scale, and so on.

f. When S103 is operated to the LINE position (contact 3 makes with contact 6, sections 1A, 1B, and 2A), 60 Hz at 47 volts is applied to the grid of V103B through R114 and closed contact 3 of S103, section 1A. With this Hz source applied to the grid of V103B, the multivibrator is synchronized or caused to oscillate at the same rate. The flasher circuit receiving the 60 Hz pulse will have a flashing rate equal to 3,600 flashes per minute (60 cycles a second equals 3,600 cycles (rpm) per minute). This mode of operation is used mainly to observe hunting of certain classes of electrical machinery or to measure speed or slip of small motors operating from the same 60 Hz source.

g. When S103 is operated to CONTACTOR-LOW or CONTACTOR-HIGH position (contact 4 or 5 makes with contact 6, section 1B), plate supply voltage to V103B is removed by the corresponding open contacts of switch S103, section 1B, and, in turn, applied to CONTACTOR jack J1 through closed contact 4 or 5. With the plate supply voltage removed from V103B, the multivibrator stops oscillating. During this mode of operation, the multivibrator has no function and remains inoperative.

h. Resistor R105 and capacitor C103 provide filtering and decoupling of the supply voltage to the multi-vibrator circuit. Resistor R117 provides a negligible amount of self-bias voltage. This bias voltage makes the grid of V103A slightly negative during the contactor mode of operation (at which time, plate voltage is removed from V103B and regeneration stops). In this way, V103A plate current cannot rise to an excessive value.

g. When S101 is placed in the CONTACTOR-LOW or HIGH position (contact 1 makes with contact 5, section 1B, an externally applied signal connected at IN-PUT jack J101 is coupled to V101A through capacitor C101. Operation of V101 as a two-stage amplifier in these two external pulse modes is the same as de-scribed in f. above for LINE mode, except that external pulses instead of the 60 Hz signal drive V101A. The required voltage input from the external source is between 5 and 50 volts peak positive-going pulses. The bias voltage provided by R109, R110, and R111 is grounded by S101 (contact 1 makes with contact 3, section 2B, and contact 1 makes with contact 2, section 2A).

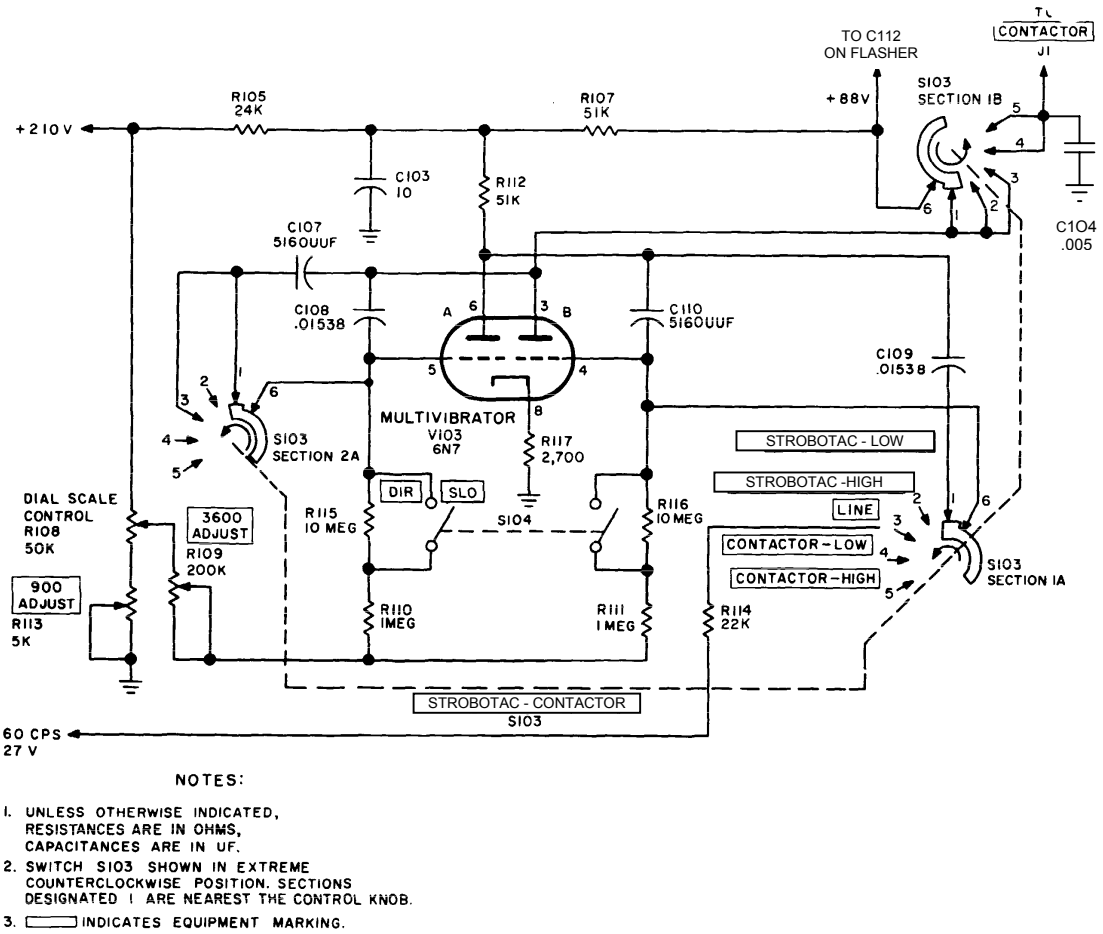

Figure 3-2. TS-805A/U Multivibrator V-103 Schematic Diagram

3-4. TS-805A/U Flasher Circuit Description (figs. 3-2 and 3-3)

a. The flasher circuit provides the high-intensity, short-duration flashes of light required to check the frequency of the rotating or oscillating device under study. The rate at which flasher V105 flashes is determined by the frequency selected and applied to it from multivibrator V103. Facilities are provided for connection of an external contactor to the flasher circuit to control the flashing rate of V105. When the flashing rate of the flasher is low, the intensity of the V105 light output is greatly reduced, which makes it difficult to check the frequency of the rotating or oscillating device. Additional facilities have been provided to enable connection of an external high-intensity flashlamp to the flasher circuit to provide the required high-intensity light required during low-frequency flashing rates.

b. Assume that switch S101 is set to STROBOTAC-LOW (contact 1 makes with contact 6 on switch sections 1A and 2A) as shown in figure 3-2. The multivibrator output is applied to the control grid of flasher V105 through coupling capacitor C112, with R130 functioning as the grid impedance resistor. During the pulse cycle when the multivibrator is at a low potential, the grid of V105 is at zero potential with respect to chassis ground; therefore, the gases in V105 cannot ionize and no current flows through flasher lamp V105. During this interval, the voltage at the anode of flasher lamp V105 rises to its

maximum level (the supply voltage) enabling capacitors C113A to C113B to charge to full supply voltage potential. With no auxiliary light connected to AUX LIGHT jack J103, one plate of capacitor C113A is connected to chassis ground. With switch S101 set to STROBOTAC-LOW, one plate of capacitor C113B has a path of continuity to chassis ground, through contacts 6 and 1 of switch section 2A. When the pulse cycle from the multivibrator is positive, the grid of V105 is driven positive. This positive drive fires V105, providing a discharge path for capacitors C113A and C113B. The two capacitors discharge through V105 and produce a flash of high intensity.

c. The current through V105 causes a large voltage drop across anode resistor R121; therefore, the voltage at the anode of V105 drops sharply to a level that causes the gases in V105 to de-ionize. With V105 non-conductive, the anode voltage of flasher lamp V105 rises to the supply level, recharging capacitors C113A and C113B. When the next positive pulse is received at the grid of V105, the flasher lamp fires again, and the cycle repeats,

d. When switch S101 is set to STROBOTAC-HIGH (contact 2 makes with contact 6 on switch sections 1A and 2A) or to CONTACTOR-HIGH (contact 5 makes with contact 6 on switch sections 1A and 2A), C113B is removed from the plate circuit of the flasher lamp. (This action is accomplished by open-circuiting one plate of capacitor C113B through switch section 2A). Therefore, a faster rate of charge and discharge can occur with the remaining capacitor section C113A. This circuit condition is required when the multivibrator output frequency is increased to provide a higher flashing rate for flasher lamp V105.

e. When S101 is set to STROBOTAC-LOW, or to CONTACTOR-LOW, the light intensity of V105 decreases as compared to its intensity in operating over the higher frequency ranges (from approximately 3,600 to 15,000 cycles per minute). In these modes of operation, difficulty may occur in checking the speed of the rotating device under test, because of the lower intensity of the flashing signal. Provision is made for connecting an external high-intensity flashlamp to the stroboscope, yielding the desired flash intensity. Connection of flasher circuit V105 to an external high-intensity flashlamp can be made through STROBOLUX jack J103. The output pulses from V105 are then routed to the external flashlamp through capacitor section C113A and the contacts of STROBOLUX jack J103.

f. An external pulse source, such as a commutator or contactor, may be used with the stroboscope to directly synchronize the flashing rate of V105 with that of the rotating device under measurement. Connection of this external pulse source is made through CONTACTOR receptacle J101. When switch S101 is rotated to CONTACTOR-HIGH (contact 5 makes with contact 6 on switch sections 1A and 2A), or to CONTACTOR-LOW (contact 4 makes with contact 6 on switch sections 1A and 2A), the coupling path from the plate of one-half of multivibrator stage V101B to the grid of the other half (V101A) is broken by switch S101, section 1A; however, a new path of continuity is established through switch section 1A from CONTACTOR receptacle J101, through coupling capacitor C101 to the grid of V101A. In these modes of operation (CONTACTOR-HIGH or LOW), the driving power required to fire V105 is synchronized with the frequency of the coupling device connected to receptacle J101. Resistor R119, shunted

across the terminals of J101, dissipates the energy of transients that maybe generated by the external coupling device.

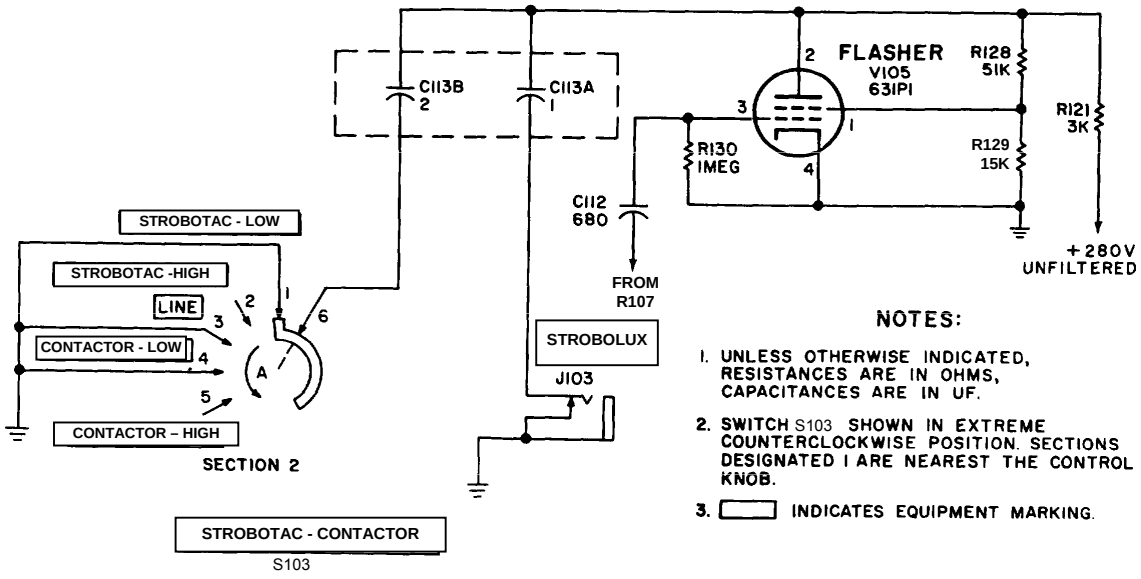

Figure 3-3. TS-805A/U Flasher Circuit, Schematic Diagram.

3-5. TS-805A/U Power Supply Circuit Description (fig. 3-4)

a. The power supply provides the necessary ac and direct current (dc) operating voltages for the stroboscope circuits. The power supply consists of power transformer T101, full-wave rectifier V101, and a resistance-capacitance filter.

b. The power source of 115 volts, 60 Hz, is applied to T101 primary winding terminals 1 and 2 through plug P1, POWER switch S101 and fuses F101 and F102. Switch S101, which is mechanically linked to the STROBOTAC-CONTACTOR switch, S103, controls power to the power supply. Fuses F101 and F102 protect the power supply against overload and consequent damage.

c. Transformer T101 contains three secondary windings. One secondary winding, between terminals 5 and 6, provides a stepped-up ac voltage which is applied to and rectified by V101. The resultant rectified voltage at the cathode of V101 is applied to the flasher circuit. Resistor R101 and capacitors C101 and C102 filter the dc voltage applied to the multivibrator circuit. Forty-seven volts is also provided by this secondary winding at terminal 11 of T101. This ac voltage is applied to the multivibrator circuit only when the 60-Hz . The second secondary winding supplies 6.3 volts ac to the filaments of V101 and V103. The third supplies 3.6 volts ac to the reed coil L1.

3-6. Reed Circuit Description (fig. 3-4)

a. The reed circuit is comprised of reed coil L1, the reed proper, and REED switch S102. The reed circuit permits adjustment of the multivibrator frequency in terms of the 60 cycle source frequency during calibration.

b. The reed is positioned so that the light from flasher V102 strikes the reed surface. When S102 is operated to its on position, 3.6 volts at 60 Hz is applied to the reed coil. The magnetic field setup by the reed coil then causes the reed to vibrate. Since the source frequency is 60 Hz, the reed vibrates 120 times per second, or twice for each cycle of the source frequency. Thus, the reed vibrates 7,200 times a minute. When the dial scale control is rotated to a point on the HI-LO R.P.M. dial scale that causes a flashing rate to occur that corresponds to the vibration rate on the reed, to a multiple of it, or to a submultiple, the reed appears to be stationary. The points on the HI-LO R.P.M. dial scale can then be used to calibrate the multivibrator through the use of the 3600 ADJUST and 900 ADJUST controls. To stop the operation of the reed, S102 is operated to its off position. The contacts of S102 open and the 3.6-volts, 60-Hz source is removed from the reed coil.

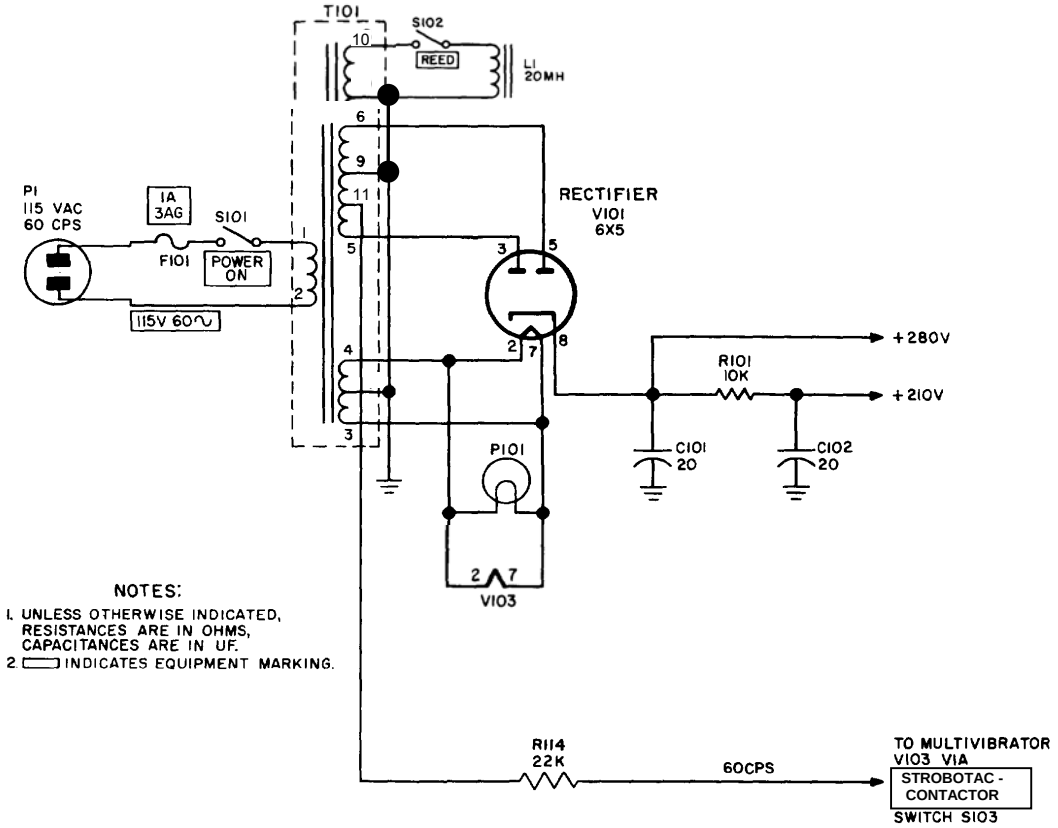

Figure 3-4. TS-805A/U Power Supply and Reed Circuit, Schematic Diagram.

CHAPTER 4 GENERAL SUPPORT MAINTENANCE

Section I. GENERAL

WARNING
When servicing the TS-805A/U be extremely careful of exposed high voltages when working on the 280-volt and 210-volt plate supply circuits, or on the 117-volt ac line circuits.

4-1 . Voltage and resistance measurements

Make all voltage and resistance measurements with Multimeter ME-26/U or other high impedance vacuum tube voltmeter at the points specified in the troubleshooting chart. When required to make additional voltage, resistance, or continuity measurements that are not specified in the chart, consult applicable illustrations to locate desired test points. For designated voltage and resistance measurements on figures 3-1 through 3-7 Voltmeter ME-26/U was used.

4-2. Continuity Test

a. When abnormal symptoms observed during operation indicate possible power supply circuit troubles, check for short circuits and clear the trouble before applying power.

(1) Remove the stroboscope from its case.

(2) Set the STROBOTAC CONTACTOR switch to the STROBOTAC-LOW position.

(3) Check resistance between pin 7 of tube socket XV103 and chassis for approximately 40,000 ohms.

(4) If reading obtained ((3) above) is zero, check for shorted capacitor section C107A.

(5) If reading obtained ((3) above) is low, but not zero, check for shorted capacitor section C107B, C106A, or C106B or for leakage in capacitor section C107A.

(6) If reading obtained ((3) above) is higher than normal, check for open resistor.

4-3. Dc Resistances of Transformers and coils

a. General. The dc resistance data charts (b, c, and d) are provided as an aid to troubleshooting. Observe the following

(1) Before making resistance measurements of the windings, determine that the faulty operation is due to a defective transformer or coil. To do this, follow the troubleshooting procedures (para. 4-7) and make voltage and resistance checks (para. 4-7 d and figs. 4-3 through 4-5).

(2) Due to rather broad winding tolerances during manufacture, resistances may vary from one trans former or coil to another; the chart values are typical average values.

(3) The normal resistance of replacement transformers and coils may differ greatly from the values given in the chart.

Table 4-1 Transformer and Coil dc Resistances

Transformer or coil	Terminals	Ohms
T101	1 to 2 (120 V AC primary)	12
	9 (ground) to 3 (filament)	0.1
	9 (ground) to 4 (filament)	0.1
	3 to 4 (6.3 V AC)	0.2
	9 (ground) to 5 (260 V AC, B+)	207
	9 (ground) to 6 (260V AC, B+)	220
	5 to 6 (520 V AC B+)	428
	9 (ground) to 10 (3.6 V AC, Reed)	99
	9 (ground) to 11 (47 V AC)	22
L101	Red to white	0.4

NOTES:

1. STROBOTAC-CONTACTOR SWITCH IN OFF POSITION.
2. REED SWITCH IN OFF POSITION.
3. ALL TUBES REMOVED FROM THEIR SOCKETS.

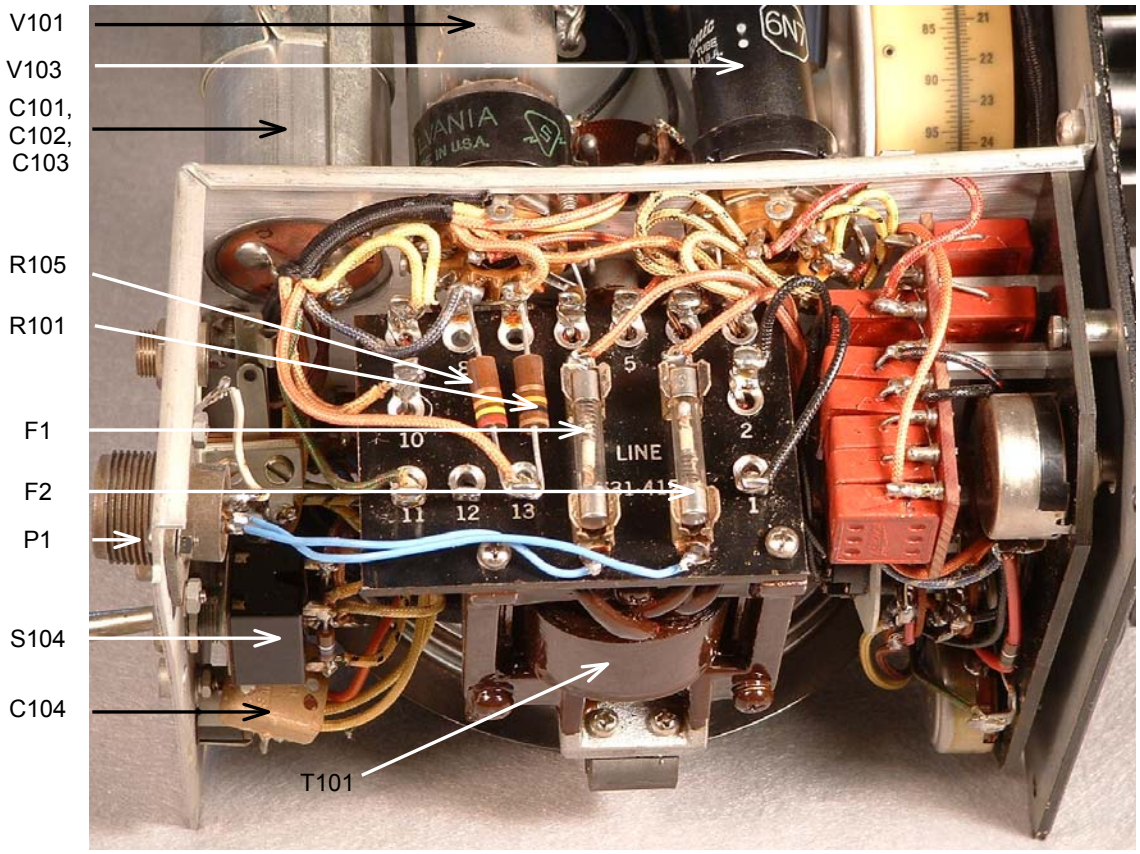

Figure 4-1 TS-805A/U Left Side Showing Power Supply Terminal Board.

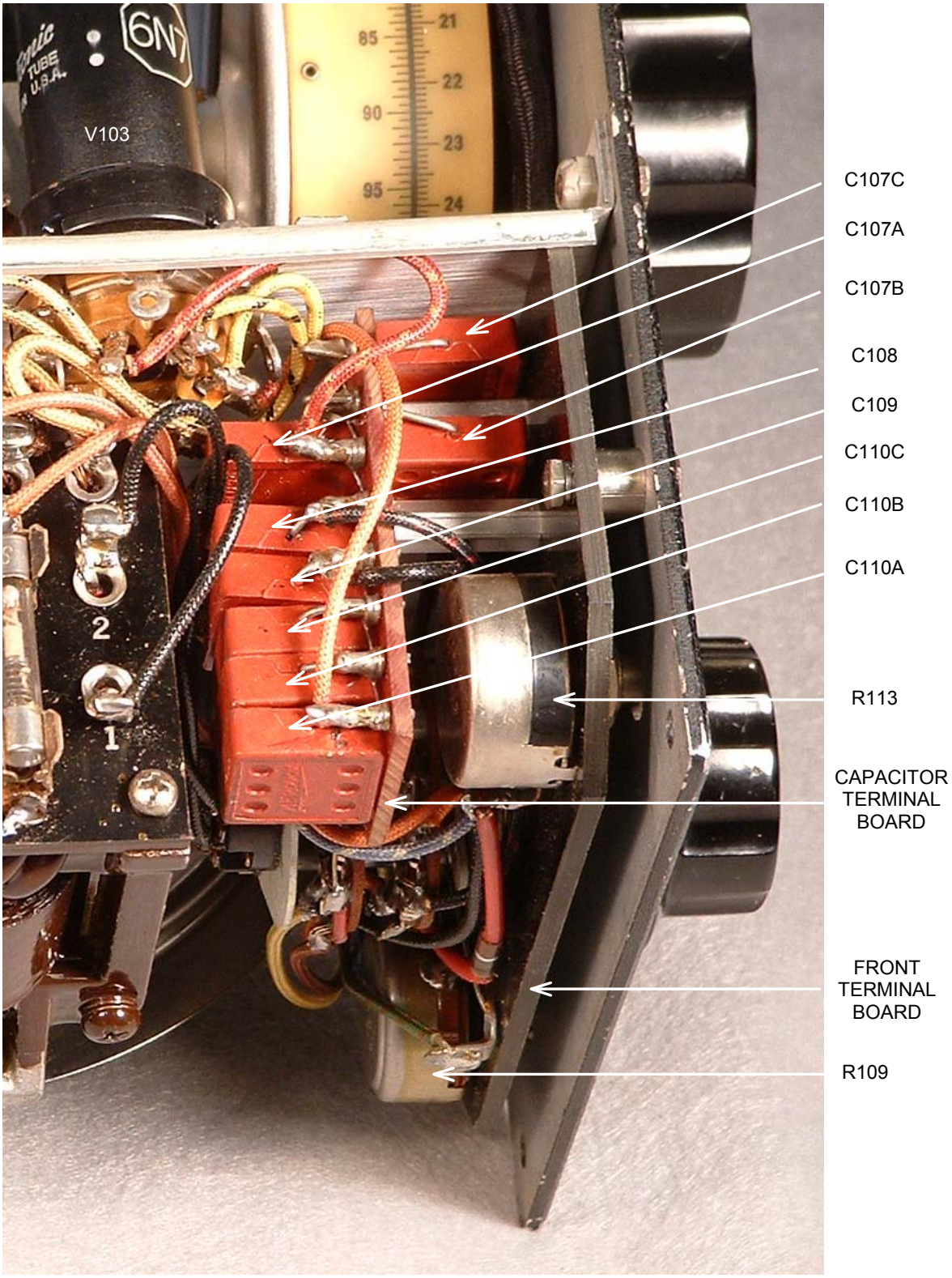

Figure 4-2 TS-805A/U Left Side Showing Front Terminal Board and Capacitor Terminal Board.

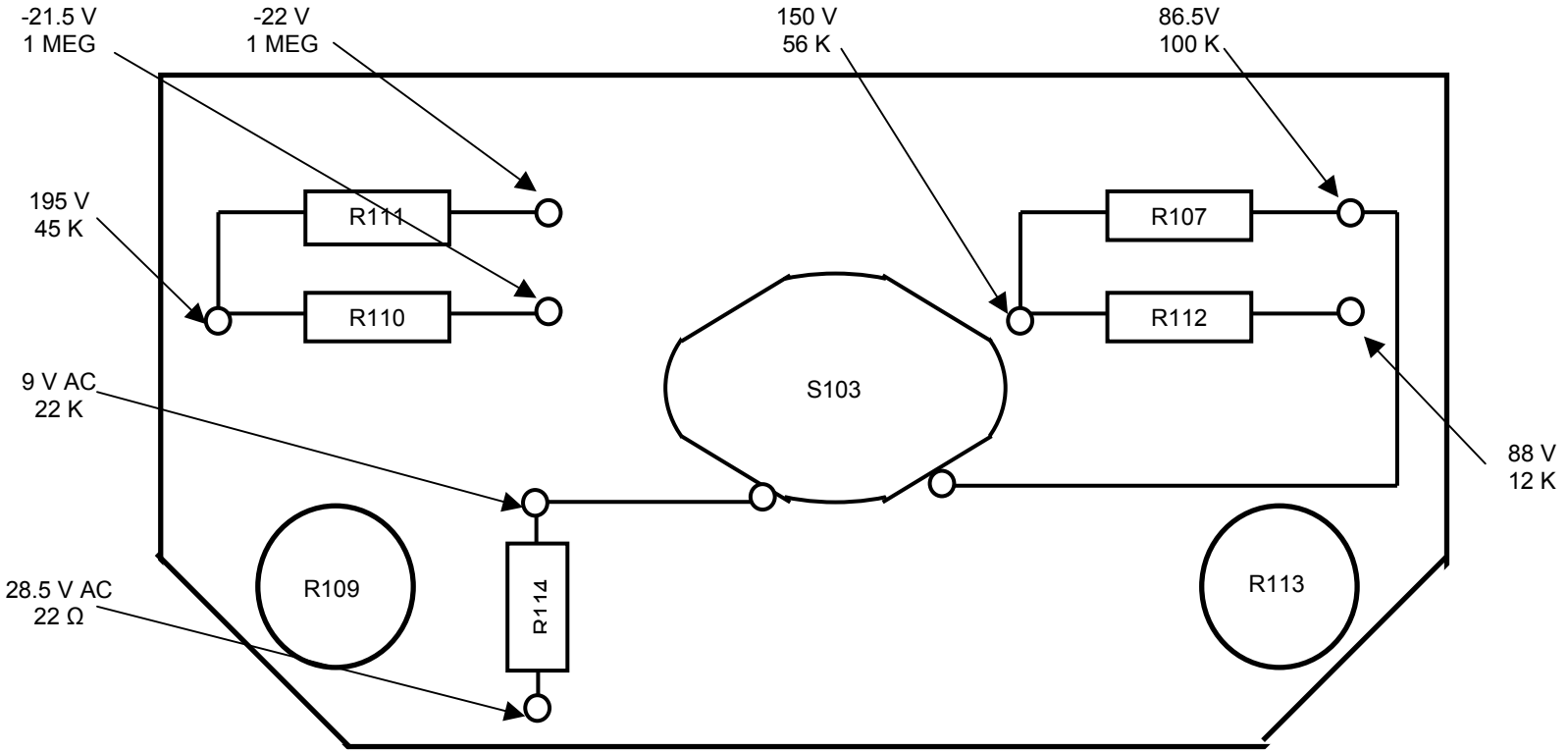

Figure 4-3. TS-805A/U Front Terminal Board Voltage and Resistance Diagram.

NOTES:

1. LINE VOLTAGE AT 115 V, 60 HZ.
2. ALL VOLTAGE READINGS TO CHASSIS GROUND UNLESS OTHERWISE NOTED.
3. STROBOTAC – CONTACTOR SWITCH IN STROBOTAC LOW POSITION.
4. DIAL SCALE CONTROL IN FULLY CW POSITION.
5. ALL VOLTAGES MEASURED WITH ME-26/U MULTIMETER.

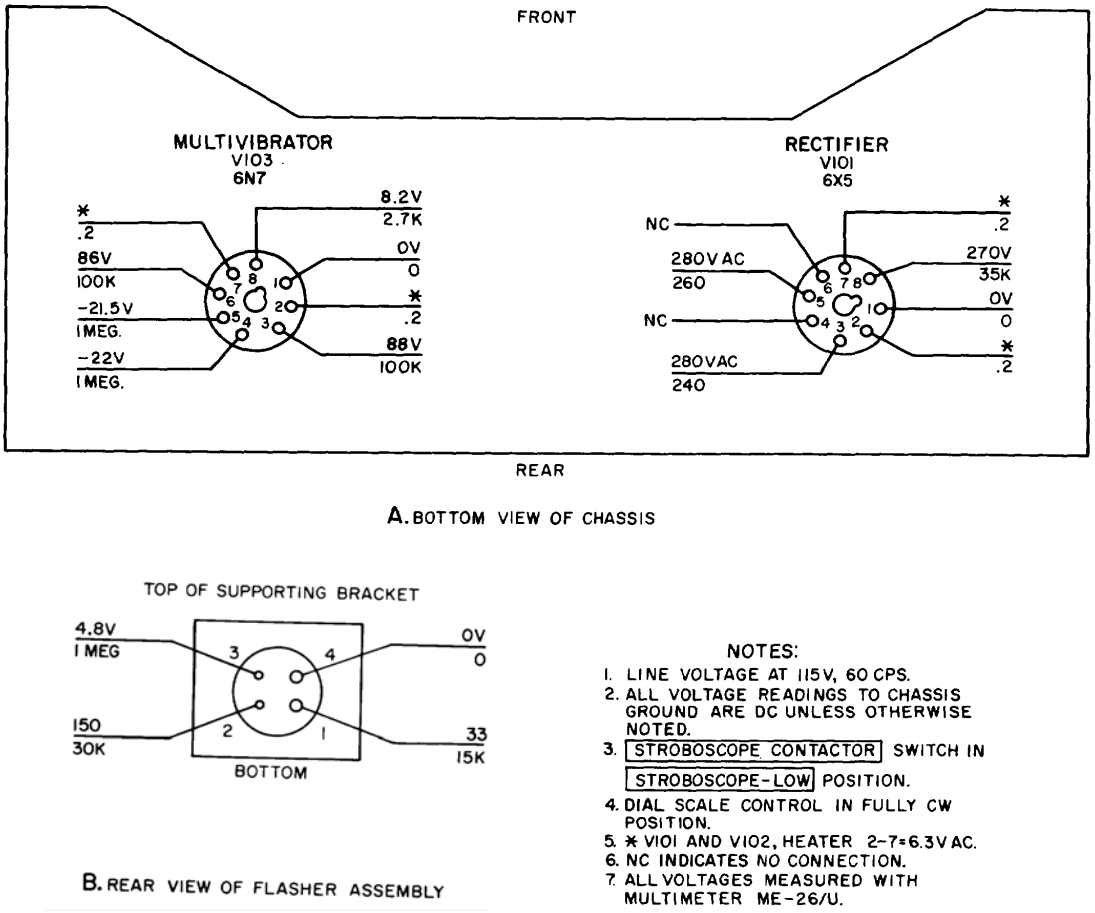

Figure 4-4. TS-805A/U Tube Socket Voltage and Resistance Diagram.

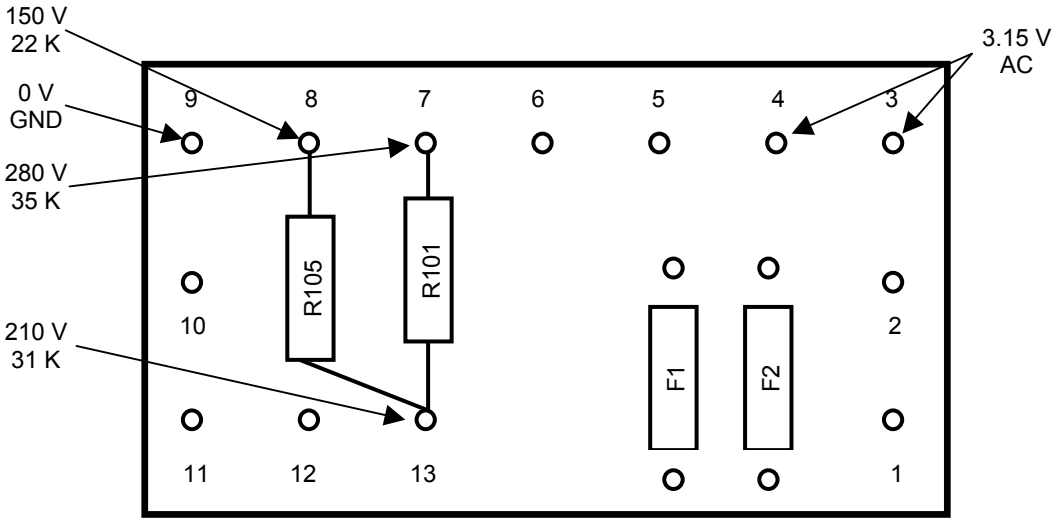

Figure 4-5. TS-805A/U Transformer Terminal Board Voltage and Resistance Diagram.

4-4. Bench Testing

CAUTION
If operational symptoms are not known, or if they indicate the possibility of short circuits within the stroboscope, perform the continuity tests described in paragraph 4-2 before applying power to the equipment.

Remove stroboscope from its case and using multimeter perform resistance measurements. Connect stroboscope to 115-volt, 60 Hz source and measure voltage. Refer to figures 4-3, 4-4, and 4-5.

Section II. TOOLS AND EQUIPMENT

Table 4-2. General Support Tools and Test Equipment

Nomenclature	National Stock No
Counter, Electronic, Digital Readout AN/ USM-207A	6625-00-044-3228
Multimeter AN/USM-223	6625-00-999-7465
Multimeter ME-26D/U	6625-00-913-9781
Tachometer. Electronic TS-806/U	6625-0(-551-0710
Test Set, Electron Tube TV-2/U	6625-00-669-0263
Test Set, Electron Tube TV-7D/U	6625-00-820-0064

4-5. Test Equipment

Tools and test equipment prescribed for use by general support maintenance personnel for the stroboscope are listed in table 4-2.

4-6. Special Tools and Equipment

No special tools and equipment are required.

Section III. TROUBLESHOOTING

4-7. Troubleshooting Procedures

a. **General.** The first step in servicing a defective stroboscope is to sectionalize the fault. Sectionalization means tracing the fault to a major circuit responsible for the abnormal operation. The second step is to localize the fault, Localization means tracing the fault to a defective part responsible for the abnormal condition. Some faults, such as burned-out resistors, and arcing and shorted transformers, can often be located by sight, smell, and hearing. The majority of faults, however, must be localized by checking voltages and resistances.

b. **Sectionalization.** The stroboscope consists of three circuits: the multivibrator circuit, the flasher circuit, and the power supply. The first step in tracing trouble is to locate the circuit or circuits at fault as follows:

(1) Visual inspection. Visual inspection will help to locate faults without the testing or measuring of circuits. All visual signs should be observed and an attempt made to sectionalize the fault to a particular part. For example, the fuse should be checked and re-placed if blown. If the replacement fuse also blows, a short exists somewhere in the stroboscope. Visually check for cracked resistors, frayed or burned insulation, and possible broken or loose connections.

(2) Operational test. Operational tests frequently indicate the general location of trouble. Operate the stroboscope in accordance with Chapter 2 and TM 11-6625-396-12 to try to determine the exact nature of the fault.

c. **Localization.** The tests listed below will aid in isolating the trouble, First, localize the trouble to a single stage or circuit, and then isolate the trouble within that circuit by voltage, resistance, and continuity measurements.

(1) Voltage and resistance measurements. Make voltage and resistance measurements in this equipment only as specified. Use voltage and resistance diagrams (fig. 4-3, 4-4, and 4-5) to find normal readings and compare them with readings taken.

(2) Troubleshooting chart. The trouble symptoms listed in the chart (para. d below) will aid in localizing trouble to a component part.

(3) Intermittent troubles. In all these tests, the possibility of intermittent troubles should not be over-looked. If present, this type of trouble may often be made to appear by tapping or jarring the equipment. Check all the wiring and connections,

d. **Troubleshooting Chart.**

Table 4-3 Troubleshooting Chart.

Item No.	Symptom	Probable cause	Corrective measure
1	Dial lamp and flasher inoperative when STROBOTAC CONTACTOR switch is rotated clockwise from OFF.	a. No ac power applied to T102 b. Open fuse F101. c. T102 defective. d. S101 defective.	a. Check power cord. b. Replace fuse (1 amp, 250 volt, type 3AG). If replaced fuse blows, check power supply circuits for shorts (para. 3-3). c. Check dc resistance of T102 (para. 3-4 b). Replace defective T102. d. Replace S101,

Table 4-3 Troubleshooting Chart.			
Item No.	**Symptom**	**Probable cause**	**Corrective measure**
2	Dial lamp lights, but flasher is inoperative.	a. Faulty rectifier, multivibrator or flasher circuit, b. Switch S101 defective c. T102 defective.	a. Check tubes V103, V101, and V104 and voltages and resistances at tube sockets (fig. 3-1) and resistor boards (fig. 3-2 and 3-3). Replace defective component. b. Replace S101 (para. 3-21). c. Check dc resistance of T102 (para. 3-4b). Replace defective T102.
3	Dial lamp and flasher do not go off when STROBOTAC CONTACTOR switch is set of OFF.	Switch S101 defective	Replace S101 (para. 3-21).
4	Flasher glows on high scale, but flashes correctly on low scale.	Capacitor section C106A or C106B defective,	Replace C106,
5	Flasher flashes erratically on high end of high scale.	Capacitors C103, C104 or C109 defective.	Replace C103, C104, or C109.
6	Flashing rate erratic,	Capacitor section C107A or C107B defective	Replace C107.
7	Rotating device does not appear to stop when HIGH LOW R. P. M. dial scale is within ±1% of known speed.	Multivibrator not properly calibrated,	Recalibrate multivibrator
8	Reed does not vibrate,	a. Switch S103 defective. b. Coil L102 defective.	a. Replace S103. b. Check dc resistance of coil L102 (para. 3-4 b). Replace defective L102.
9	Reed does not stop when calibrating flasher with LOW ADJUST control.	a. Dial scale control R110 or dial-scale drum slips from planetary drive assembly. b. LOW ADJUST potentiometer R111 defective. c. Multivibrator V101	a. Tighten setscrews on drum (para3-18). b. Replace R111 (para. 3-23) c. Check V101 voltages and resistances at tube socket (fig. 3- 1). Replace defective component.

Table 4-3 Troubleshooting Chart.			
Item No.	**Symptom**	**Probable cause**	**Corrective measure**
10	Reed does not stop when calibrating flasher with HIGH ADJUST control	a. drum slips from planetary drive assembly. b. HIGH ADJUST potentiometer R109, dial-scale control R110, or LOW ADJUST potentiometer R111 defective. c. Switch S103 defective.	a. Tighten setscrews on drum (para3-18). b. Replace R109, R110, or R111 as required (para. 3-18 or 3-23). c. Replace S103.
11	When REED switch is set to its off position (down) reed does not stop vibrating.	a. Open resistor R110. b. Setscrews in collar of planetary drive assembly loose.	a. Replace R110 (para. 3-18). b. Tighten setscrews (para. 3-18).
12	Flasher flashes at same rate regardless of dial setting.		
13	Auxiliary flasher inoperative when plugged into STROBOLUX receptacle J103.	Capacitor section C106A or STROBOLUX receptacle J103 defective.	Replace defective component.
14	Coupling device (such as a commutation) input at CONTACTOR receptacle J101 does not operate flasher.	Switch S101, resistor R119, or receptacle J101 defective.	Replace defective component.
15	Dial-scale drum does not rotate properly when dial-scale control is rotated.	Setscrews fastening dial-scale drum to planetary drive assembly loose.	Tighten setscrews fastening dial-scale drum to planetary drive assembly (para. 3- 8).
16	Dial-scale drum appears to bind	Insufficient clearance between dial-scale and wires connected to dial-scale control R110.	Reposition wires.

4-8. General Support Maintenance Techniques

The general support maintenance consists of repair by removal and replacement of assemblies and parts of the stroboscope. Follow the procedures in paragraphs 4-10 through 4-16 to remove and replace assemblies. Observe the following precautions:

a. Before an assembly or part is removed, note the position of the leads. Tag each lead before removing.

b. Be careful not to damage other leads or parts by pushing or pulling them out of the way.

c. Before unsoldering, make sure that the soldering iron tip is clean and tinned. When removing wiring, do not keep the soldering iron on the solder joint too long because excessive heat may damage surrounding parts attached to the same joint. When the part is removed, clean the terminals before soldering a new part to the terminals.

d. When replacing a wire, use approximately the same length as the original. The wire should also be dressed against the chassis or between connection points as was the original.

4-9. Tube Testing

When trouble occurs, a tube can be at fault, If tube failure is suspected, remove and check the tube.

CAUTION
Do not rock or try to rotate a tube when removing it from a socket, pull it straight out. Rocking or attempting to rotate a tube can damage the tube socket and tube pins and result in complete failure or intermittent operation of the tube.

a. **Access to Tubes.**

(1) Remove the four front-panel retaining screws (fig. 3-8 or 3-9).

(2) Remove the chassis retaining screw (fig. 3-10 or 3-11).

(3) Remove the chassis from the case.

Section IV. SPECIFIC PROCEDURES

4-10. Replacement of Flasher Tube

a. **Removal.**

(1) Remove the four front-panel retaining screws (fig. 4-6).

(2) Remove the chassis retaining screw (fig. 4-7).

(3) Remove the chassis from the case.

CAUTION
Do not try to rotate the flasher tube when removing it from the socket; use a side-to-side motion and pull it out, Attempting to rotate the flasher tube can damage the tube socket and tube pins and result in complete failure or intermittent operation of the tube. Separate the plastic tube base from the socket by prying gently with a small screwdriver.

(4) Remove the flasher tube (V105) from its socket (fig. 4-9).

b. **Replacement.**

(1) Replace the flasher tube.

(2) Place the chassis into the case and secure it with the four front-panel retaining screws and the chassis retaining screw.

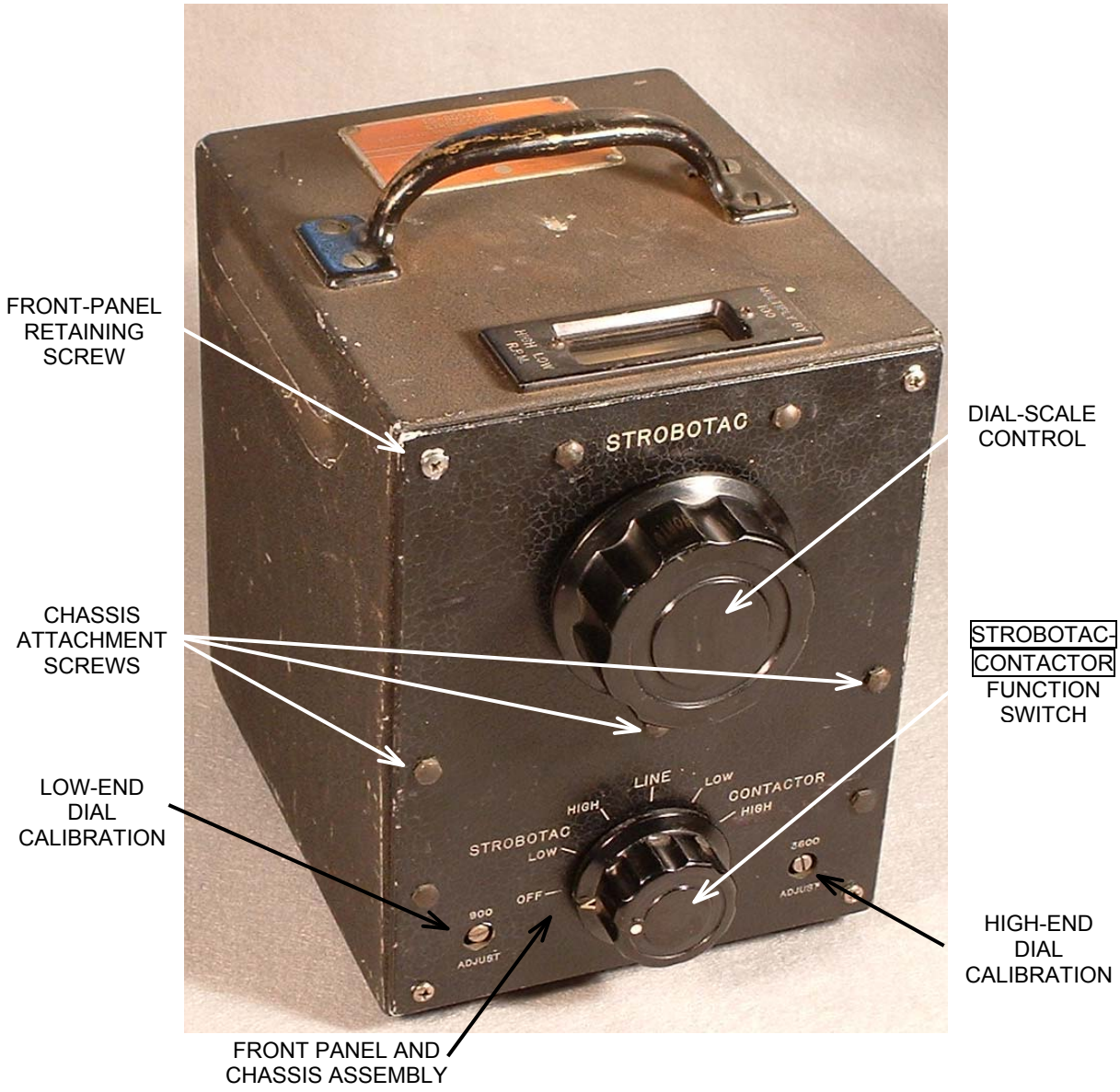

Figure 4-6. TS-805A/U Stroboscope Front View.

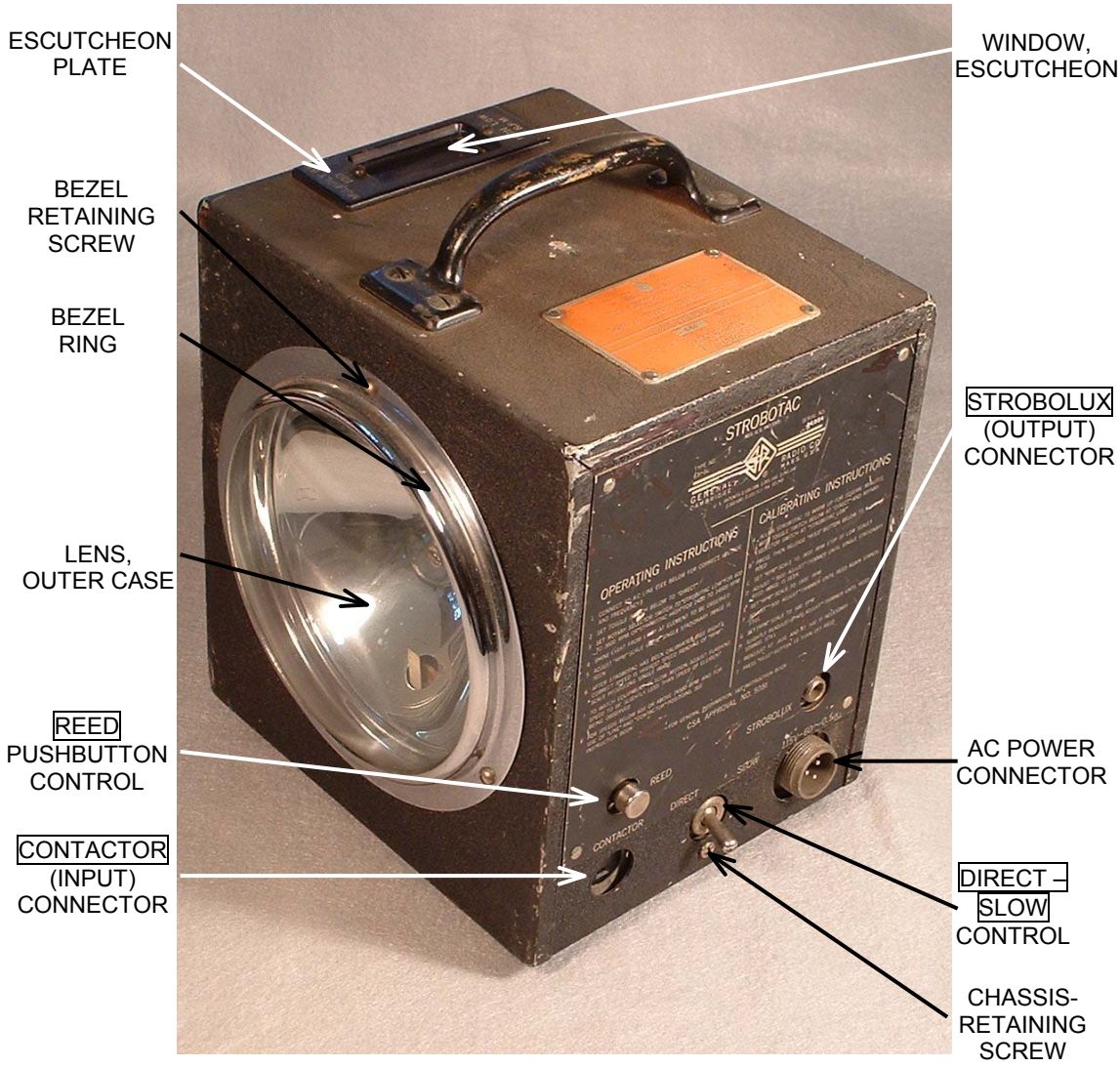

Figure 4-7. TS-805A/U Stroboscope Rear View.

4-11. Dial Lamp Replacement (fig. 4-6 and 4-13)

a. **Removal.**

(1) Remove the four front-panel retaining screws (fig. 4-6).

(2) Remove the chassis retaining screw (fig. 4-7). Remove the chassis from the case.

(3) Set the HIGH-LOW R.P.M. dial scale to “95” on the HIGH (inner) scale (fig. 4-8) so that the dial lamp and lamp holder are centered on the dial lamp access slot.

(4) Rotate the dial-scale control (fig. 4-6) fully counterclockwise.

(5) Slide the lamp holder and lamp straight back toward the rear of the chassis. There should be enough clearance to remove the lamp holder and the

lamp without the need to remove the dial scale. If not, follow the procedures in steps *6, 7* and *8* below.

(6) Rotate the dial scale knob fully counterclockwise (to the minimum dial reading).

(7) Loosen the setscrew in the collar of the dial scale (fig. 4-11).

(8) Remove the HIGH-LOW R. P. M. dial scale.

(9) Remove the defective dial lamp by turning it counterclockwise in its lamp holder.

b. **Replacement.**

(1) Insert the new dial lamp, one known to be in satisfactory operating condition, into the lamp holder. Turn the dial lamp clockwise, to make secure electrical contact with the lamp holder terminals.

(2) Slide both the lamp holder and lamp forward toward the panel so that the clip at the base of the lamp holder engages the tang on the left side of the dial bezel assembly. Perform steps *3, 4* and *7* below only if it was necessary to remove to remove the dial scale.

(3) Replace the dial scale on the shaft and align it so that the hairline of the bezel assembly (fig. 4-8) is just below the number "6" on the LOW (outer) scale with the dial scale (fig. 4-8) turned fully counterclockwise.

(4) Tighten the setscrew in the collar of the dial scale (fig. 4-11).

(5) Before placing the chassis into the case, turn the dial scale control clockwise while checking that the dial scale does not scrape against the new dial lamp or the wires connected to dial-scale control R110 (fig. 4-8 and 4-10).

(6) Place the chassis into the new case and secure it with the four front-panel retaining screws and the chassis retaining screw.

(7) Check the dial calibration and adjust the 900 ADJUST and 3600 ADJUST controls if necessary (Para. 2-4).

4-12. Reflector Assembly Replacement (fig. 4-9)

a. **Removal.**

(1) Remove the flasher tube (para. 4-10a).

(2) Remove the two reflector assembly retaining screws (fig. 4-9).

(3) Remove the reflector assembly; be careful to clear the reed.

b. **Replacement.**

(1) Carefully place the reflector assembly on the chassis so that the reed is cleared, and secure the reflector assembly with the two retaining screws.

(2) Replace the flasher tube (para. 4-10b).

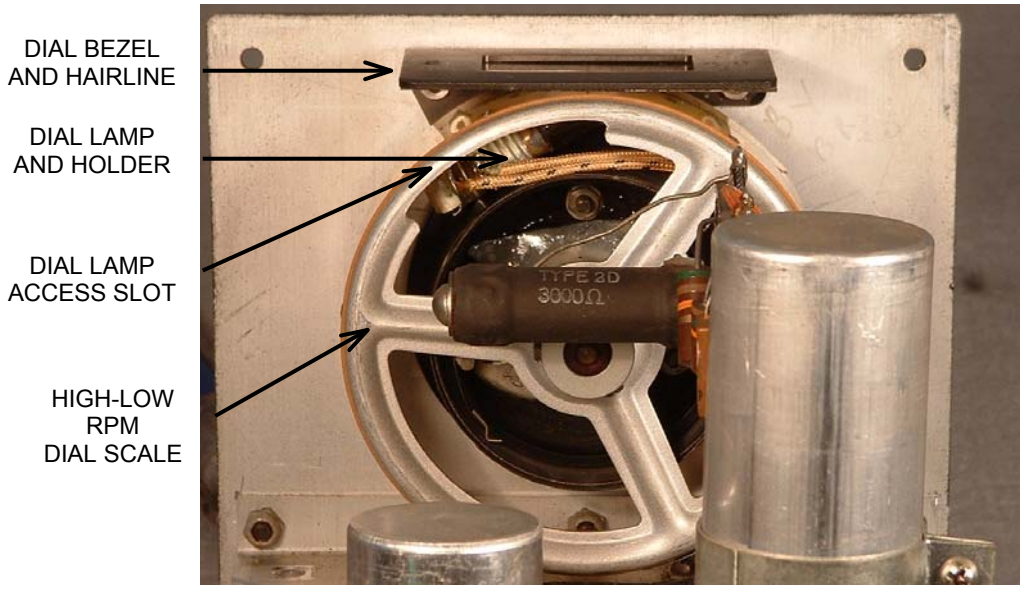

Figure 4-8. Dial Lamp Replacement

4-13. Reed Assembly Replacement (fig. 4-11 and 4-12).

a. **Removal.**

(1) Remove the flasher tube (para. 4-10a).

(2) Tag and disconnect the reed assembly coil wires (fig. 4-11 and 4-12).

(3) Remove two screws attaching the reed assembly to the frame of the power transformer and remove the reed assembly.

NOTE
Do not remove the two screws that clamp the vibrating reed to the reed assembly frame.

b. **Replacement.**

(1) Secure the reed assembly to the bottom of the chassis with the two retaining screws. Make sure the reed is properly inserted into the opening in the reflector assembly

(2) Connect the coil wires of the reed assembly to the appropriate terminals (fig. 3-4).

(3) Replace the flasher tube (para. 4-10 b).

4-14. Dial-Scale Control Assembly Replacement (fig. 4-9, 4-11 and 4-13).

a. **Removal.**

(1) Remove the dial lamp (para. 4-11a).

(2) Tag and disconnect three wires from dial-scale control R108 (fig. 4-9).

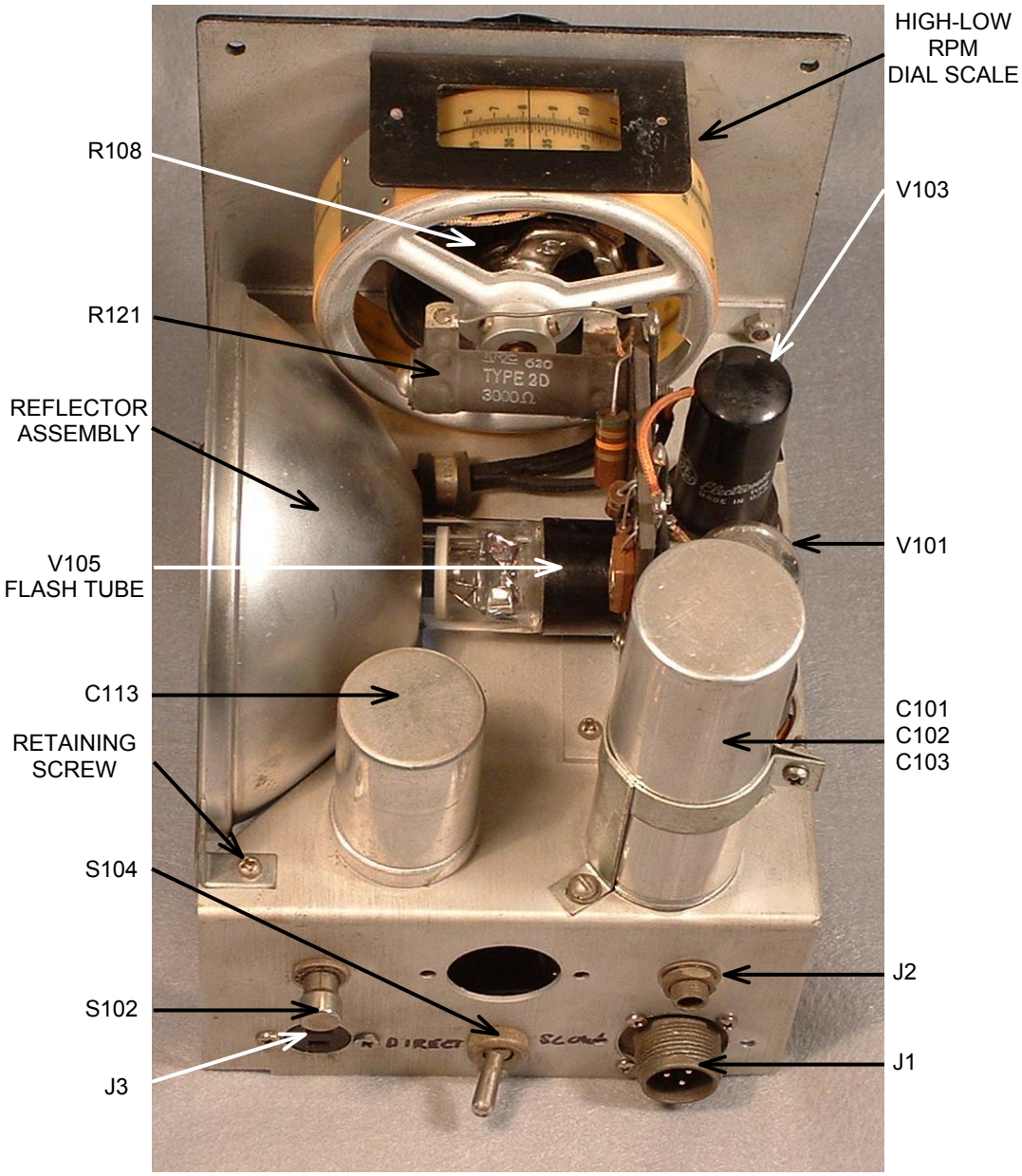

Figure 4-9. TS-805C/U Stroboscope Top View.

(3) Loosen two setscrews (15, fig. 4-13) in collar of rear section of dial-scale control R108 (14).

(4) Remove screw (12), then remove rear section of dial-scale control R108.

(5) Remove insulator (13) from rear section of dial-scale control R108.

(6) Loosen the setscrew on the dial-scale control knob (fig. 4-6), then remove the knob.

(7) Remove three hexagon nuts (17, fig. 4-13) and three lockwashers (18).

(8) Remove flat washer (19) and three sleeve spacers (20).

(9) Remove dial drive assembly (21) and two sleeve spacers (22).

(10) Remove three screws (25) to separate the front section of dial-scale control R108 from front panel.

NOTE
If new dial drive assembly (21) is not fitted with a bushing (16), remove the bushing from the old dial drive assembly and install it on the new dial drive assembly,

b. **Replacement.**

(1) Attach front section of dial-scale control R108 to front panel with three screws (25, fig. 4-13).

(2) Install two sleeve spacers (22) and dial drive assembly (21).

(3) Install three sleeve spacers (20) and flat washers (19).

(4) Install three lockwashers (18) and three hexagon nuts (17).

(5) Install dial-scale control knob (fig. 4-6) and tighten its setscrew.

(6) If the front section of dial-scale control R108 (14, fig. 4-13) is not fitted with an insulator (13), install the insulator removed from the old control (para. 4-14 a (5)).

(7) Install the rear section of dial-scale control R108, orienting it so that the insulator (13) is aligned with the threaded hole in flat washer (19).

(8) Install screw (12).

(9) Tighten setscrews (15) in collar of rear section of dial-scale control R108.

(10) Connect three wires to terminals of dial-scale control R108. Dress the wires against the front panel and the body of R108 so that they will not interfere with rotation of dial-scale (9) after it is installed.

(11) Replace dial lamp (para. 4-11 b).

4-15. Switch S103 Replacement

a. **Removal.**

(1) Loosen the setscrew on the STROBOTAC-CONTACTOR switch knob.

(2) Remove the knob from the switch shaft.

(3) Remove the four front-panel retaining screws (fig. 4-6) and the chassis retaining screw (fig. 4-7) at the lower rear of the case. Remove the chassis from the case.

(4) Remove the three chassis retaining screws (fig. 4-6) and separate the panel and the front terminal board from the chassis.

(5) Place the panel on the bench with the front terminal board facing up.

(6) Remove the two terminal board retaining nuts that secure the front terminal board to the two studs that project from the rear of the panel (fig. 4-12). Note the position of the two spacers and the lock washers. There should be enough slack in the wiring harness to allow separation of the panel and the front terminal board.

(7) Remove the hexagon nut and washer from the switch shaft at the front of the terminal board.

(8) Tag and remove all wires connected to STROBOTAC CONTACTOR switch.

(9) Slide switch out from the rear of the front terminal board.

B. **Replacement.**

(1) Insert the shaft of the replacement switch through the hole in the front terminal board.

(2) Reconnect all wires to the switch terminals.

(3) Secure the shaft of S103 to the front terminal board with the hexagon nut and the washer provided with the switch.

(4) Replace a metal spacer on each of the studs. Re-attach the front terminal board to the back of the panel. Tighten the retaining nuts.

(5) Slide the knob on the switch shaft and tighten the setscrew.

(6) Re-attach the chassis to the front panel with the three chassis retaining screws.

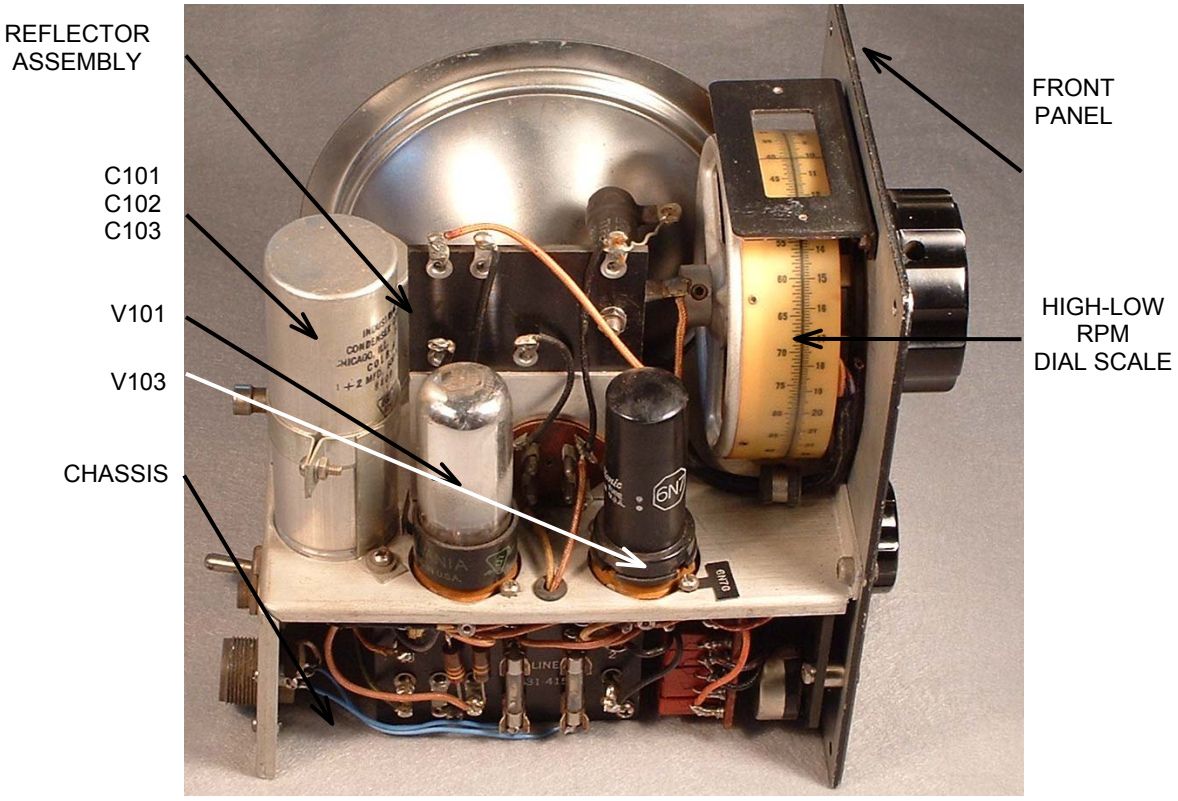

Figure 4-10. TS-805A/U Stroboscope Left Side View.

(6) Place the chassis into the case and secure it with the four front-panel retaining screws and the chassis retaining screw.

4-16. Replacement of Adjustment Controls R109 and R113.

The procedures for replacement of 3600 ADJUST (R109) and 900 ADJUST (R113) controls are identical, Each control is mounted on the front terminal board (fig. 4-2) at the rear of the front panel.

a. **Removal.**

(1) Tag and disconnect the wires soldered to the lugs on the defective control.

(2) Remove the hexagon nut which secures the shaft to the front of the front. panel.

(3) Remove the defective control from the rear of the front terminal board.

b. **Replacement.**

(1) Insert the shaft of the replacement control through the hole in the front terminal board.

(2) Secure the control to the front panel with the hexagon nut provided with the control.

(3) Reconnect all wires to the control terminals.

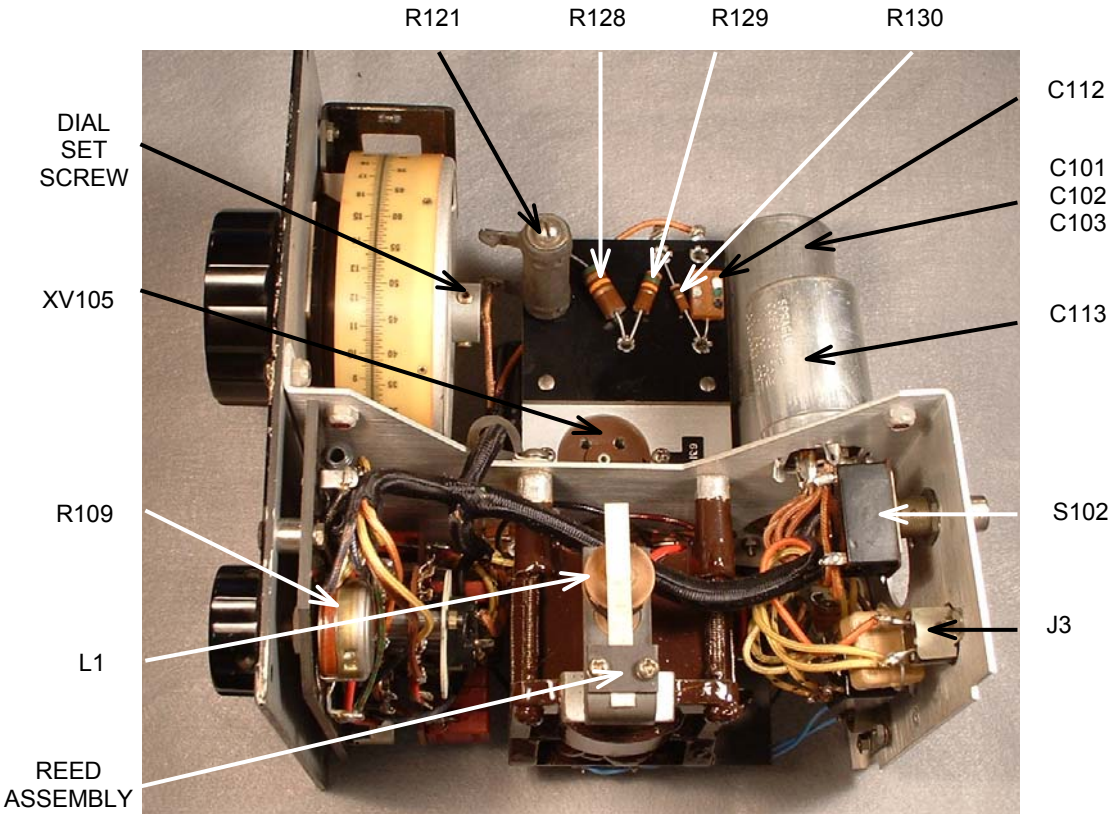

Figure 4-11. TS-805A/U Stroboscope Right Side View.

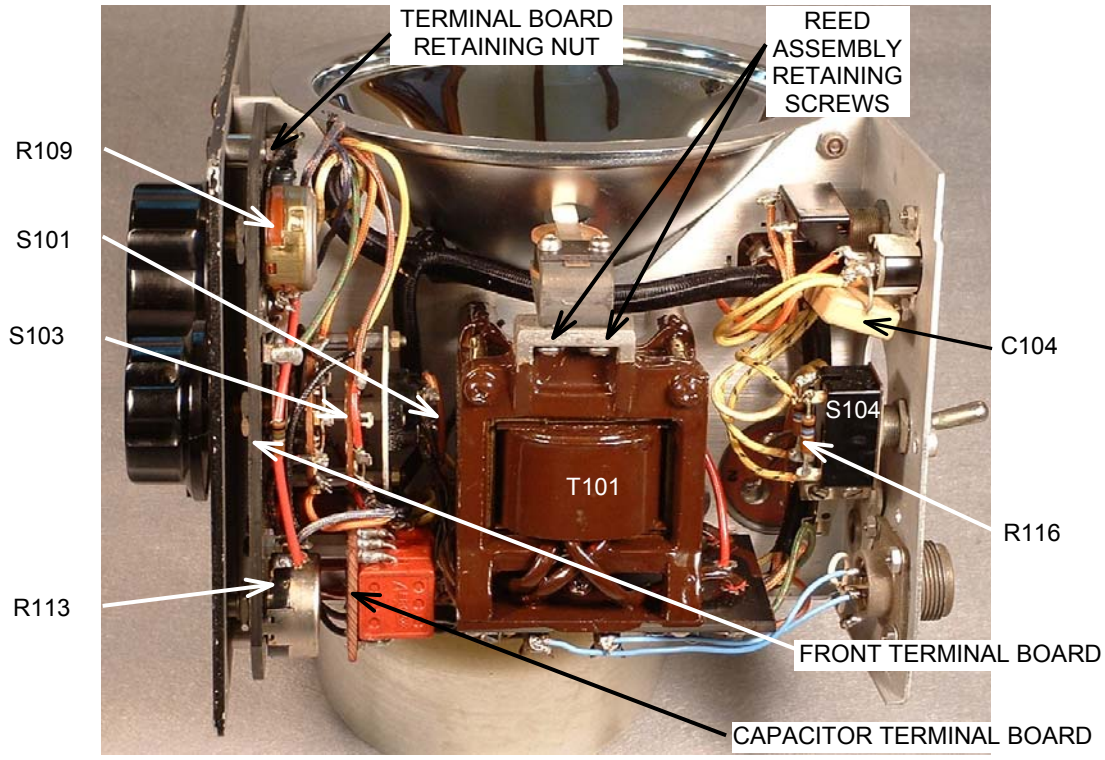

Figure 4-12. TS-805A/U Stroboscope Bottom View.

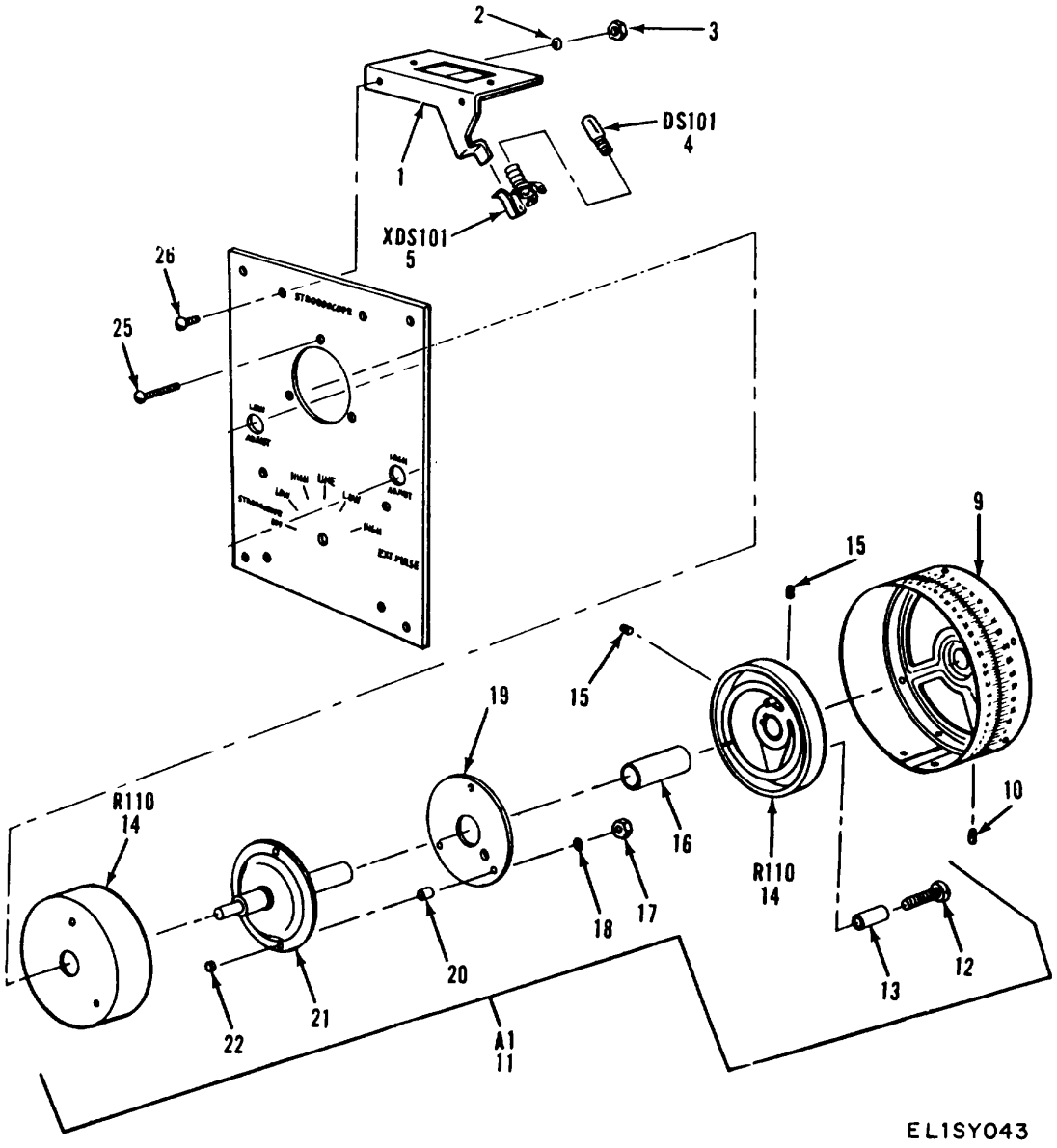

Figure 4-13.. TS-805B/U Dial Scale Control Disassembled.. TS-805A/U is similar.

Section V. GENERAL SUPPORT TESTING PROCEDURES

4-17. General

The following testing procedures have been prepared for use by general support maintenance personnel to determine the acceptability of the repaired equipment. These procedures set forth specific requirements that repaired equipment must meet before it is returned to the using organization. Comply with the instructions preceding each chart before proceeding to the chart. Perform each step in sequence. Do not vary the sequence.

For each step, perform all the actions required in the Test equipment control settings and the equipment under test control settings columns; then perform each specific test procedure and verify it against its performance standard.

4-18. Test Equipment, Tools, and Materials

All test equipment, tools, materials, and other equipment required to perform the testing procedures in this section are listed in the following paragraphs.

a. Test Equipment.

Table 4-4. Test Equipment.

Nomenclature	National Stock No.	Technical Manual
Frequency Meter AN/USM-26*	6625-00-543-1356	TM 11-6625-212-15
Digital Readout Electronic Counter AN/USM-207 (*) may be used. Adapter UG-282/ U P/O Frequency Meter AN/ USM-26 Adapter, Tube Socket (Pomona Electronics Model TVS-9 or equivalent)		

b. **Materials.**

(1) Two lengths of No. 18 copper insulated wire, each 3 feet long.

(2) Four alligator clips.

(3) One 0.1-microfarad (µf), 400-volt capacitor.

4-19. Fabrication of Test Leads

Two test leads are required when performing the frequency test (para. 4-21). The test leads connect a frequency meter to the stroboscope, with a 0.1-micro farad capacitor connected in series with the high side of the meter. Fabricate the leads using the capacitor with two alligator clips as shown in figure 4-13.

4-20. Physical Tests and Inspections

a. **Test Equipment and Materials.**

None.

b. **Test Connections and Conditions.**

(1) No connections are necessary.

(2) Remove the stroboscope chassis from its case.

c. **Procedure.**

Table 4-5. Physical Tests and Inspections

Step No.	Test Equipment control setting	Equipment under test control settings	Test procedure	Performance standard
1	None	Controls may be in any position.	a. Inspect case and chassis for damage, missing parts, and condition of finish and panel lettering. b. Inspect all controls and mechanical assemblies for loose or missing screws, nuts, or washers. c. Inspect all socket, terminal boards, and fuseholders for looseness and damage.	a. No damage or missing parts evident. b. Screws, nuts, and washers will be tight; none missing. c. No loose, damaged, or missing parts.
2	None	Controls may be in any position.	External	Surfaces intended to be painted will not show bare metal. Panel lettering will be legible.
3	None	Controls may be in any position	a. Rotate dial-scale control throughout its limits of travel. b. Operate STROBOTAC-CONTACTOR switch.	a. Control will rotate freely without binding or excessive looseness. b. Switch will operate properly.

NOTE

Touchup painting is recommended in lieu of refinishing whenever practicable. Screwheads and receptacles will not be painted or polished with abrasives.

4-21. TS-805A/U Frequency Test

a. **Test Equipment and Materials.** Frequency Meter AN/USM-26, a tube socket adapter and Adapter UG-282/U (part of Frequency Meter AN/USM-26).

b. **Test Connections and Conditions.** Connect the equipment as shown in figure 4-14.

c. **Procedure.**

Table 4-6. Frequency Test Procedure.

Step No.	Test Equipment control setting	Equipment under test control settings	Test procedure	Performance standard
1	AN/USM-26 Power switch ON; FUNCTION SELECTOR: FREQUENCY; FREQUENCY UNIT: 10 SEC; DISPLAY TIME: Fully counterclockwise.	STROBOTAC CONTACTOR: STROBOTAC-LOW DIRECT-SLOW: DIRECT REED: OFF	Set the HIGH LOW R.P.M. dial scale in succession, to 9, 14.4, 24.0 and 36.0 on the LOW scale.	Readout should be 14.85 to 15.15 cps; 23.76 to 24.24 cps; 39.6 to 40.4 cps; and 59.4 to 60.6 cps; respectively.
2	Same as step 1	STROBOTAC CONTACTOR: STROBOTAC-HIGH DIRECT SLOW: DIRECT REED: OFF	Set the HIGH LOW R.P.M. dial scale in succession to 27, 36, 72, and 144 on the HIGH scale. Read out the frequency on the AN/USM-26.	Readout should be 44.55 to45.45 cps; 59.4 to 60.6 cps; 118.8 to 121.2 cps; and 237.6 to 240.2 cps; respectively.
3	Same as step 1	Same as step 2.	Leave HIGH LOW R.P.M. dial set for 144 on HIGH scale. Read out the frequency on the AN/USM-26 Set the DIRECT SLOW switch to SLOW.	Readout should be approximately 24 cps
4	Same as step 1	STROBOTAC CONTACTOR: STROBOTAC-HIGH DIRECT SLOW: DIRECT REED: ON	Rotate the HIGH LOW R.P.M. dial around 72 on the HIGH scale.	Reed appears to be stationary with the dial set to 72.
5	Power switch: OFF			

TM 11-6625-396-40

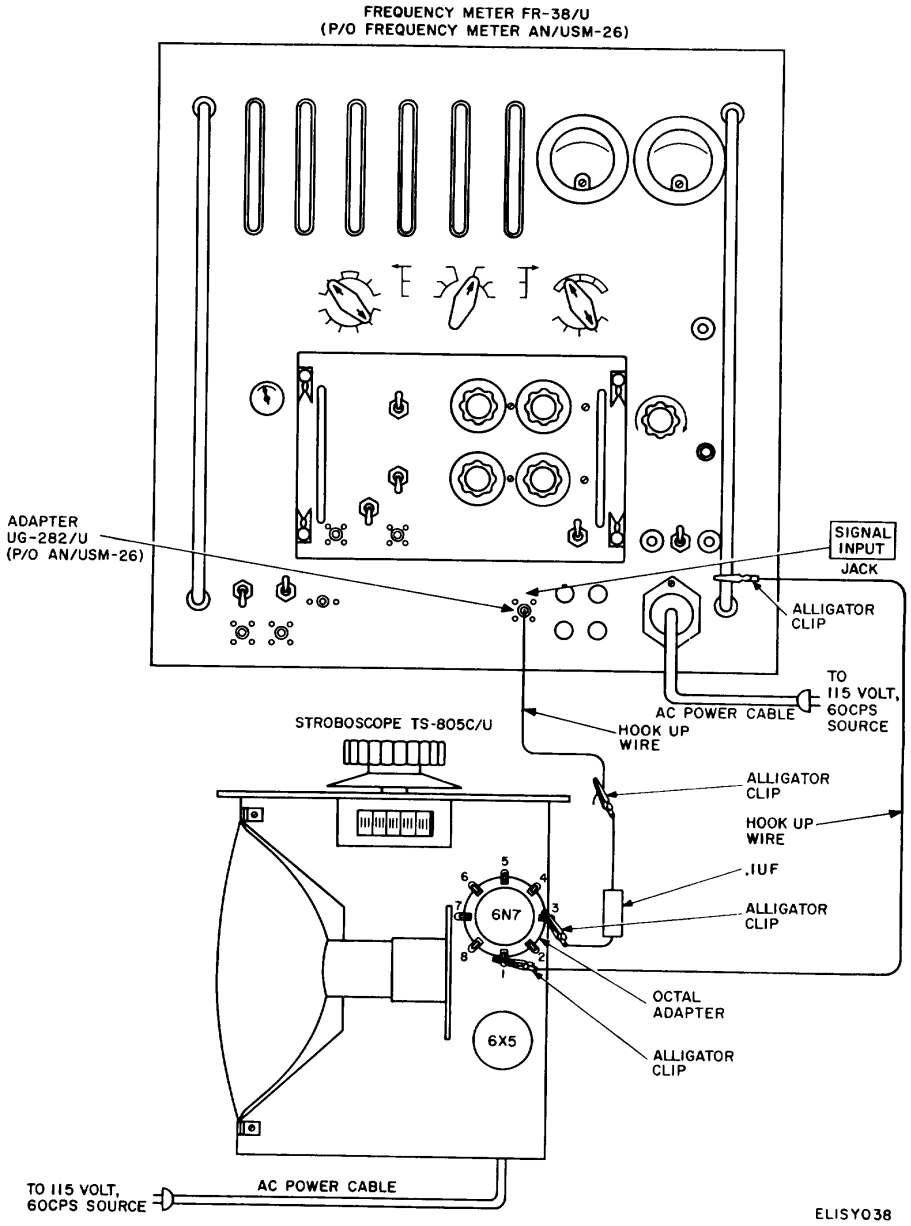

Figure 4-14. TS-805A/U Stroboscope Frequency Test Connection Diagram .

APPENDIX A — REFERENCES

DA Pam 310-1	Consolidated Index of Army Publications and Blank Forms.
DA Pam 738-750	The Army Maintenance Management System (TAMMS).
SB 38-100	Preservation, Packaging, Packing, and Marking Materials, Supplies and Equipment Used by the Army.
TB 43-0118	Field Instructions for Painting and Preserving Electronics Command Equipment Including Camouflage Pattern Painting of Electronic Equipment Shelters.
TB SIG 306	Electronic Tachometer TS-806/U.
TM 11-6625-200-25	Operator's Organizational, DS, GS, and Depot Maintenance Manual: Multimeter ME-26A/U, ME-26B/U, ME-26C/U, and ME-26D/U.
TM 11-6625-274-12	Operator and Organizational Maintenance Manual: Test Sets, Electron Tube TV-7/U, TV-7A/U, TV-7B/U, and TV-7C/U.
TM 11-6625-316-12	Operator and Organizational Maintenance Manual: Test Sets, Electron Tube, TV-2/U, TV-2A/U, TV-2B/U, and TV-2C/U.
TM 11-6625-396-12	Operator and Organizational Maintenance Manual: Stroboscopes TS-805B/U, TS-805C/U, TS-805D/U, and TS-805E/U.
TM 11-6625-700-10	Operator's Manual; Digital Readout, Electronic Counter AN/USM-207.
TM 740-90-1	Administrative Storage Procedures.
TM 750-244-2	Procedures for Destruction of Electronics Materiel to Prevent Enemy Use (Electronics Command).

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