TIME OF FLIGHT

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INSTRUCTION MANUAL

EGUN Electron Gun
EGUN P.S. PC BOARD REV-2A

WARNING

THIS EQUIPMENT USES VOLTAGES WHICH ARE DANGEROUS TO LIFE. IT SHOULD BE SERVICED ONLY BY QUALIFIED PERSONNEL USING PROPER SAFETY PRECAUTIONS. DISCONNECT ALL CABLES BEFORE REMOVING TOP COVER.

TABLE OF CONTENTS

		PAGE
1.0	SPECIFICATIONS	1
2.0	GENERAL DESCRIPTION	1
3.0	INSTALLATION	1
4.0	DESCRIPTION OF CONTROLS	2
5.0	DESCRIPTION OF REAR PANEL CONNECTIONS	3
6.0	OPERATION	3
7.0	OPERATION PRECAUTIONS	4
8.0	CONTROL UNIT SERVICE PROCEDURES	6
9.0	CONTROL UNIT CIRCUITRY DESCRIPTION	7
10.0	DESCRIPTION AND CALIBRATION OF PC BOARD CONTROLS	11

1.0 SPECIFICATIONS

1.1 MECHANICAL SPECIFICATION

Cabinet size	19.0" W. x 13.5" D. x 3.5" H.
Cabinet weight	9.5 Lbs.

1.2 ELECTRICAL SPECIFICATIONS

Emission	0-1 milliamps
Electron Energy	-40 to -100 volts
Focus	0 to -100 volts
Input Bias Voltage	**3500 volts MAX.**

1.3 SERVICE REQUIREMENTS

Input Power	100/120/220/240 volts 1 PHASE, 50-60 Hz

2.0 GENERAL DESCRIPTION

The EGUN is used to generate and inject ions into the ionization region of the Time of Flight Mass Spectrometer. Electrons are emitted from the Filament into the space between repeller plate and extraction grid while both are at the same potential **(3500V max.)**. The Pulser then dips **(400V max.)** the extraction grid to a lower voltage. This will draw out the resulting ions through the extraction grid and into the acceleration region.

A plug-in Filament Assembly is used to allow quick replacement of the burned out filament as well as those sheet metal parts which are usually dirty.

3.0 INSTALLATION

Plug the Filament Assembly into the flange mounting base with the four pins bottomed in their sockets. **Note:** There is a dimple stamped in the filament feed through header adjacent to the focus pin. There is a matching mark on the mounting plate. These two marks must be aligned in order for the gun to be connected to the proper controls. **Failure to align these marks can result in damage to both EGUN and Controller.**

Insert the EGUN Assembly into the vacuum port without the gasket. It should be noted that the contact strips on the top plates of the Filament Assy. must touch the repeller and extraction plates respectively. This contact pressure should be felt before the flange faces meet. If it is not felt, it may be that the contacts have been depressed and should be lifted until they can be felt to touch when the Gun is inserted.

Temporarily bolt the flanges with two bolts and observe the position and orientation of the slits with respect to the plates. If adjustment is needed, the Filament Assy. can

usually be moved enough while it is still plugged into the mounting base. When you are satisfied with the position of the EGUN, remove it and bolt up the flange using a gasket.

Connections between the EGUN Power Supply and the Electron Gun are as follows. Connect the two SHV connectors on the Power Supply marked "FIL." to the two SHV Connectors on the EGUN marked "FIL". This is the voltage for the filament. Connect the SHV connector on the Power Supply marked "FOCUS" to the SHV connector marked "F" on the EGUN. Connect the SHV connector on the Power Supply marked "COLL." to the SHV connector on the EGUN marked "C". This is the collector for Emission Current. An external power supply is connected to the "BIAS IN" SHV connector which elevates the Electron Gun to the desired potential **(3500 volts DC max)**.

4.0 DESCRIPTION OF CONTROLS

4.1 FOCUS SCREWDRIVER ADJUST

Adjusts the Focus Lens power supply from 0 to -100 volts DC.

4.2 E. ENERGY SCREWDRIVER ADJUST

Adjusts the Electron Energy power supply from -40 to -100 volts DC.

4.3 FOCUS/ E. ENERGY METER SWITCH

Determines whether the meter monitors the Focus power supply or the E. Energy power supply.

4.4 10 mA/ 1mA METER SWITCH

Determines whether the EMISSION meter reads 1 milliamp full scale or 10 milliamps full scale.

4.5 EMISSION ADJUST KNOB

Adjusts the Emission Current.

4.6 EMISSION LIMIT SCREWDRIVER ADJUST

Limits the maximum emission current that the EMISSION CURRENT adjust knob can obtain.

5.0 DESCRIPTION OF REAR PANEL CONNECTIONS

5.1 FIL. SHV CONNECTOR

This is the output for one side of the EGUN filament.

5.2 FIL. SHV CONNECTOR

This is the output for the other side of the EGUN filament.

5.3 COLL. SHV CONNECTOR

This is the input from the Electron Collector (first slit) on the EGUN.

5.4 FOCUS SHV CONNECTOR

This is the output for the Focus lens (second slit) on the EGUN.

5.5 BIAS IN SHV CONNECTOR

This is the input for the Bias Power Supply that elevates the EGUN **(3500 volts DC max.)**.

5.6 BIAS OUT SHV CONNECTOR

This is connected to the "BIAS IN" SHV connector internally and is used as an output for anything you may wish to connect to the Bias Power Supply.

6.0 OPERATION

With the EGUN Power Supply and Pulser connected and EGUN pumped to high vacuum, turn on the Power Supply and adjust Electron Energy to 70 volts. Set Focus to 30 volts and Emission to 0.5 mA. Set VA1 and VA2 to the same value. It is preferable to use either power supply (VA1 or VA2) and a SHV "T" thereby assuring that both Bias voltages are the same. This is important since a slight mismatch between these voltages will unbalance the slits and deflect the Electron Beam. If both power supplies are not simultaneously brought up to voltage it may create a mismatch sufficient to cause arcing between the elements of the gun. This is normally 3500 volts for the TOF and 1500 volts for the Angular Reflectron (AREF). Set Pulse Voltage to 200 volts. Initiate operation of the Pulser (see Pulser manual).

Pulser operation with these voltage settings is as follows: The Repeller Plate initially will be at 3500 volts and the Extraction Grid at 3300 volts (3500V-200V). This is the proper condition for extracting Ions from between the plates. At a set time (determined by the TRIGGER DELAY control) after the trigger pulse, the voltage on the plates will equalize at 3500V. They will remain at this voltage for the length of time determined by the PULSE DURATION control. During this time, electrons are injected between the plates and ionization takes place. This duration is usually 3 microseconds or so. After this time, the voltage on the Extraction Grid returns to 3300 volts so that Ions can again be extracted. It will remain at this value until another trigger pulse is given.

Ions of the residual gas can now be observed at the detector. While observing these peaks, their height should be maximized by adjusting Focus voltage and by making

small changes in VA1 and VA2. Intensity of the peaks can be increased by increasing the repetition rate. It should be noted that repetition rate can be adjusted high enough to make delay time and pulse duration attempt to overlap. If this happens the Pulser will lock up and cease to function. Refer to Pulser Manual.

7.0 OPERATION PRECAUTIONS

The EGUN will run trouble free for long periods of time as long as it is in a clean high vacuum and within the specifications listed in section 1.2. When used otherwise, extra care must be taken as outlined below. It should be noted that these are only a few of the most common causes for problems.

7.1 REDUCED ELECTRON ENERGY

If the voltage between the Filament and Collector is reduced below a critical value, the control circuit will overdrive the Filament to achieve the required Emission current. Whenever the Electron Energy is reduced below 40V, Emission must be reduced according to the following table.

E. ENERGY	EMISSION, MAX.
70V	5mA.
40	5
23	2
19	1
14	0.66
10	0.4

Filament current becomes exponential below 10V due to space charging. Operation at this level is not likely due to the low yield of electrons.

7.2 CONTAMINATION

Most problems with the EGUN are due to contamination. The most troublesome contaminant can be easily avoided. This is Silicon pump fluid. Do not use Silicon pump fluid in instrument applications, especially where Microchannel Plates are used. Polyphenol Ether such as SANTOVAC V is known to be satisfactory. For very large pumps the cost may be prohibitive. In this case there is an alternate fluid obtainable from VARIAN ASSOC. which may be acceptable. We do not yet have reports from users which are conclusive as to its performance.

Other common contaminants are recondensed hydrocarbons due to fingerprints, etc. and other substances which are introduced as samples for analysis.

7.2.1 SYMPTOMS

Non conducting substances can condense onto electrode surfaces and form a dielectric coating which will surface charge and cause a distortion in the local field. Evidence of

this is usually time dependent. Elements which have been tweaked for sensitivity must be readjusted. This is most noticeable after turn-on.

Conducting substances can coat insulators and create leakage paths between elements. This will cause various circuit elements to "talk to each other" and erratic emission readings. Sensitivity can build up, then drop due to breakdown between elements.

7.2.2 REMEDY

Ceramic parts can be cleaned by air abrasive cleaning followed by acid etching. After the parts are clean, they may be fired in air.

Metal parts can be scrubbed with fine abrasive, then solvent and acid cleaned. This can be followed by electro-polishing to a bright finish.

Grids can only be cleaned by washing in solvents and etchants, however this is seldom successful. It is usually better to replace them.

The Filament Assembly can be detached and replaced easily and with minimal expense. Experience has shown that guns used in a reasonable environment do not need cleaning beyond replacement of the Filament Assembly.

7.3 OPERATING ENVIRONMENT

Time between cleaning and filament replacement depends directly upon pressure and filament current. Pressures below 10^{-5} Torr and an Emission Current of 1mA or less are advised.

When used in conjunction with a pulse nozzle or other source of a pressure burst, the elements of the EGUN can experience arc down due to a local pressure transient. This can be very hard to detect since it is synchronized with other events in the experiment. It is helpful to remember that Total Pressure Gages only tell you the average pressure. Local pressure can be momentarily much higher. If there is a possibility of this, it can be tested by changing the carrier gas to one which is more stable (less easily ionized) and taking note of any difference.

Many fail to note that cold traps must be valved off from the experiment before they are allowed to warm up. A clean experiment at the end of a working day can be a contaminated experiment the following day due to recondensation from the cold trap.

8.0 CONTROL UNIT SERVICE PROCEDURES

8.1 SAFETY PRECAUTIONS

WARNING: Before removing the top cover or disconnecting any of the rear panel connections turn off the "POWER" and disconnect the power supply from its power source. Also turn off any power supply connected to the "BIAS IN" connector and disconnect all of the cables from the rear panel. Even though the power is disconnected the "BIAS IN" voltage will elevate over half of the circuitry on the PC Board which can result in a dangerous electrical shock.

8.2 TROUBLE SHOOTING

The majority of the problems with the EGUN Power Supply are caused by arcing due to a high pressure burst near the EGUN probe. If the EGUN Power Supply periodically has problems, pressure or voltage parameters may have to be changed.

8.2.1 Substitution Testing

All integrated circuits in this equipment are mounted in sockets and can easily be changed. Do not reverse position of IC's or they will be destroyed. IC's have a notch on the end near Pin No. 1 and/or a dot over Pin 1. The IC sockets have a notch on the one end to show the position of Pin 1.

8.2.2 NO POWER OR METER LAMPS

Check power source and 1 amp slow blow fuse on rear panel.

8.2.3 NO ELECTRON ENERGY

Turn off the EGUN Power Supply. Turn off the external "BIAS IN" power supply. Disconnect the "BIAS IN" connector on the rear panel. Disconnect the "FOCUS", "COLL.", and the two "FIL" connectors on the rear panel. Connect a SHV shorting plug to the "BIAS IN" connector. Connect a volt meter from the + terminal of C30 ("BIAS IN") to the can of Q9. Turn on the EGUN Power Supply and check Electron Energy. If the volt meter indicates Electron Energy is working but the front panel meter isn't reading right then check A7 for proper operation. If the volt meter indicates Electron Energy is working and the front panel meter is also working the problem is in the EGUN probe or a "FIL." cable is shorted. If Electron Energy is not working the problem is more than likely that Q9 (2N5416) and/or Q8 (2N3439) is bad. **If either Q9 or Q8 are found to be bad, both should be replaced as a set.**

8.2.4 NO FOCUS VOLTAGE

Turn off the EGUN Power Supply. Turn off the external "BIAS IN" power supply. Disconnect the "BIAS IN" connector on the rear panel. Disconnect the "FOCUS", "COLL.", and the two "FIL" connectors on the rear panel. Connect a SHV shorting plug to the "BIAS IN" connector. Connect a volt meter from the + terminal of C30 ("BIAS IN") to the can of Q7. Turn on the EGUN Power Supply and check Focus. If the volt meter indicates Focus is working but the front panel meter isn't reading right then check A8 for proper operation. If the volt meter indicates Focus is working and the front panel meter is also working the problem is in the EGUN probe or the "FOCUS" cable is shorted. If Focus is not working the problem is more than likely that Q7 (2N5416) and/or Q6 (2N3439) is bad. **If either Q7 or Q6 are found to be bad, both should be replaced as a set.**

8.2.5 NO EMISSION CURRENT

First verify the Electron Energy is correct. If there is no Electron Energy refer to section 8.2.3. Turn off the external "BIAS IN" power supply. Disconnect the "BIAS IN" connector on the rear panel. Disconnect the "FOCUS", "COLL.", and the two "FIL" connectors on the rear panel. Remove the Top Cover and replace F1 on the PC Board if it is bad. Check the EGUN probe for filament continuity with an Ohm meter. If the above is ok then the EGUN power supply will have to be reconnected to the EGUN probe and tested while operating. Connect a SHV shorting connector to the "BIAS IN" connector. Reconnect the "FOCUS", "COLL.", and the two "FIL" cables between the power supply and the probe. Section 9.2.5 can then be followed with a volt meter to locate the problem. If the emission regulator circuit is not working the problem is more than likely that A4 (LM741C) is bad.

An RCA 811-A vacuum tube can be connected to the EGUN Power Supply to simulate operation with the EGUN probe. Connect the two "FIL." connectors to the filament of the RCA 811-A. Connect the "COLL." connector to the grid of the RCA 811-A. This can be done when extensive trouble shooting is required and connection to the EGUN probe is not convenient.

9.0 CONTROL UNIT CIRCUITRY DESCRIPTION

9.1 CONTROL UNIT

The control unit contains two sets of +/- 15 volt power supplies, two negative 100 volt power supplies, an emission current regulation circuit, and a filament drive circuit. There are several special grounding points that are very carefully marked on the EGUN schematic and an understanding of their purpose is needed before the following circuit descriptions will make any sense.

9.2 CIRCUIT DESCRIPTION

See Control Unit Schematic, Drawing No. D0903

9.2.1 POWER SUPPLY

Line power (100/120/220/240 volts, 50 or 60 Hz) is brought in through a fuse, line switch, interlock switch, and a voltage selector switch to the main power transformer T301.

The "POWER" indicator light and the meter lights are powered from one of the 120 volt primaries of T301.

T301 has four secondary windings that connect to the PC Board. Three of those windings have an isolation voltage of 8,000 volts from the primary windings and the 31.6 volt secondary winding.

There are two different +/- 15 volt power supplies. The 31 volt 8KV isolated center tapped winding is full wave rectified and supplies +20 volts to C16 and -20 volts to C17. The +20 volts on C16 supplies voltage regulator Q4 for the floating +15 volt power supply. The output voltage of regulator Q4 is set by resistors R19 and R20. The -20 volts on C17 supplies voltage regulator Q5 for the floating -15 volt power supply. The output voltage of regulator Q5 is set by resistors R24 and R25.

The 31.6 volt center tapped winding is full wave rectified and supplies +20 volts to C56 and -20 volts to C55. The +20 volts on C56 supplies voltage regulator Q11 for the +15 volt power supply. The output voltage of regulator Q11 is set by resistors R44 and R45. The -20 volts on C55 supplies voltage regulator Q10 for the -15 volt power supply. The output voltage of regulator Q10 is set by resistors R42 and R43.

9.2.2 PC BOARD

The circuitry on the PC Board is divided into two halves. The circuitry on the half of the PC Board closest to the Front Panel is referenced to ground (chassis). The circuitry on the half of the PC Board closest to the Rear Panel is referenced to the "BIAS IN" potential.

9.2.3 ELECTRON ENERGY POWER SUPPLY

The Electron Energy power supply is adjustable from -40 volts to -100 volts and has an internal current limit circuit. This power supply elevates the filament drive circuit and gives the electrons enough energy to be emitted from the filament to the Collector and beyond.

NOTE: The Electron Energy power supply regulation circuitry built around amplifier A6 uses voltages that are referenced to the "BIAS IN" voltage. The front panel controls and metering circuit are referenced to ground (chassis).

The Zener regulator made by R57 and CR15 supplies 5.1 volts to the top of the front panel "E. ENERGY" control R104. The bottom of the "E. ENERGY" control R104 connects to the "MIN. E. ENERGY" pot R59 that is located on the PC Board. The "MIN. E. ENERGY" pot R59 is adjusted such that the Electron Energy can not be adjusted below 40 volts. The voltage from the "E. ENERGY" control goes through the buffer amplifier A14-4 to the isolation amplifier A12. The isolation amplifier outputs a voltage equal to the input voltage that is referenced to the "BIAS IN" voltage. The output of the isolation amplifier A12 drives the Electron Energy regulation amplifier A6. As the voltage to the regulation amplifier is increased, A6 starts to shut down Q9 which increases the Electron Energy output voltage. Feedback resistors R36 and R37 create a voltage divider such that when the Electron Energy output is 100 volts the voltage on A6 pin 3 will be 4.75 volts.

A current limit circuit is created by Q8, R28, R29 and CR10. As the current draw on the Electron Energy power supply is increased the voltage drop across R29 is also increased. As the voltage across R29 approaches 9.3 volts Q8 will start to shut down which will start to reduce the Electron Energy output voltage. The varistor VR3 is used to protect the Electron Energy power supply from any high voltage arcing.

The voltage divider R2 and R1 drives the isolation amplifier A7. The isolation amplifier outputs a voltage equal to the input voltage that is referenced to ground (chassis). The output of the isolation amplifier A7 drives the "E. ENERGY/FOCUS" meter M102 through the buffer amplifier A13-2. The "E. ENERGY ADJ." pot R46 calibrates the "E. ENERGY/FOCUS" meter when the "E. ENERGY" scale is selected.

9.2.4 FILAMENT DRIVE CIRCUIT

NOTE: The filament drive circuit floats on both the Electron Energy power supply and the filament current sense resistors R3 and R4. All voltage measurements are relative to the negative terminal of C1.

C1 is charged to 10 volts by CR1 and CR2. This voltage goes through F1 to the filament drive transistors Q201 and Q202 that are mounted on the heat sinks located on the rear panel. Equalizing resistors R201 and R202 are also located on the rear panel heat sinks. R201 and R202 are used to compensate for any differences between Q201 and Q202 and equalize the load between them.

C2 is charged to 9 volts through CR5. CR5 isolates C2 from the large amount of ripple on C1. The 9 volts on C2 is used to power the quad amplifier A2 which is used to limit the filament current. Filament current is converted to voltage by the parallel resistors R3 and R4. For every amp of filament current .05 volts is developed across R3 and R4. This voltage is amplified by a factor of 20 by the amplifier A2-1. Amplifier A2-4 compares the output of A2-1 with the voltage from the "FIL I LIMIT" pot R8. When the filament current is greater than it should be, amplifier A2-4 turns on Q1 which turns down the filament drive transistors Q201 and Q202 until the filament current is below the limit set by the "FIL I LIMIT" pot. The "FIL I LIMIT" pot is factory set for a maximum filament current of 3.5 amps.

9.2.5 EMISSION REGULATOR CIRCUIT

The Emission Current regulator circuit is designed to regulate the current of electrons which are emitted from the filament and collected at the Collector lens.

NOTE: The Emission Current regulation circuitry built around A3 and A4 uses voltages that are referenced to the "BIAS IN" voltage. The Front Panel controls and metering circuits are referenced to ground (chassis).

The flow of electrons from the filament to the Collector lens is detected by amplifier A4. This electron flow starts to drive the output of A4 positive which then drives the emitter of Q3 positive. This positive voltage on the emitter of Q3 creates a current through R17. The current from R17 subtracts from the emission current detected at the Collector lens. The amplifier A4 will continue to drive the emitter of Q3 to a greater positive voltage until the current from R17 equals the detected emission current. For 1mA emission current the current through R17 has to be 1mA. Since R17 is a 1K resistor the emitter voltage of Q3 has to be +1 volt. Varistor VR1 protects the input of A4 from a high voltage arc to the Collector lens.

The Zener regulator made by R54 and CR14 supply 9 volts to the padding resistor R55 for the "EMISSION LIMIT" control R56 on the PC Board. The "EMISSION LIMIT" pot on the PC Board limits the range of the front panel "EMISSION" and "LIMIT" controls. The "EMISSION" "LIMIT" pot on the PC Board is factory set for a maximum emission current of 1.5 mA. The "EMISSION LIMIT" pot on the PC Board is variable from 0 to 6 volts which goes through the buffer amplifier A14-2 to drive the front panel "EMISSION" control R101 and the "LIMIT" control R102. The voltage from the front panel "EMISSION" control goes to the isolation amp A10. The isolation amplifier outputs a voltage equal to the input voltage that is referenced to the "BIAS IN" voltage. The output of the isolation amplifier A10 drives the emission regulation amplifier A3 which compares the voltage from the front panel "EMISSION" control to the voltage from the emitter of Q3 (described above). The emission control amplifier A3 senses the need for more or less emission current and changes the filament current accordingly through the isolation transistor A1 which is driven by transistor Q2.

A voltage which is proportional to the emission current (1 volt = 1mA) goes to the input of the isolation amplifier A9. The isolation amplifier outputs a voltage equal to the input voltage that is referenced to ground (chassis). The output of the isolation amplifier A9 drives the "EMISSION" meter M101 through the buffer amplifier A13-3. The "1mA ADJ." pot R51 calibrates the "EMISSION" meter when the 1mA scale is selected. The "10mA ADJ." pot R53 calibrates the "EMISSION" meter when the 10mA scale is selected.

9.2.6 FOCUS LENS POWER SUPPLY

The Focus power supply is adjustable from 0 to -100 volts and has an internal current limit circuit.

NOTE: The Focus power supply regulation circuitry built around amplifier A5 uses voltages that are referenced to the "BIAS IN" voltage. The front panel control and metering circuit are referenced to ground (chassis).

The Zener regulator made by R58 and CR16 supplies 5.1 volts to the front panel "FOCUS" control R103. The voltage from the "FOCUS" control goes through the buffer amplifier A14-3 to the isolation amplifier A11. The isolation amplifier outputs a voltage equal to the input voltage that is referenced to the "BIAS IN" voltage. The output of the isolation amplifier A11 drives the focus regulation amplifier A5. As the voltage to the regulation amplifier is increased Q7 starts to shut down which increases the Focus voltage. Feedback resistors R31 and R32 create a voltage divider such that when the Focus output is 100 volts the voltage on A5 pin 3 will be 4.75 volts.

A current limit circuit is created by Q6, R26, R27 and CR9. As the current draw on the Focus power supply is increased the voltage drop across R27 is also increased. As the voltage across R27 approaches 9.3 volts Q6 will start to shut down which will start to reduce the Focus output voltage. The varistor VR2 is used to protect the Focus power supply from any high voltage arcing.

The voltage divider R30 and R33 drives the isolation amplifier A8. The isolation amplifier outputs a voltage equal to the input voltage that is referenced to the ground

(chassis). The output of the isolation amplifier A8 drives the "E. ENERGY/FOCUS" meter M102 through the buffer amplifier A13-1. The "FOCUS ADJ." pot R48 calibrates the "E. ENERGY/FOCUS" meter when the "FOCUS" scale is selected.

10.0 DESCRIPTION AND CALIBRATION OF PC BOARD CONTROLS

WARNING: Before removing the top cover or disconnecting any of the rear panel connections turn off the "POWER" and disconnect the power supply from its power source. Also turn off any power supply connected to the "BIAS IN" connector and disconnect all of the cables from the rear panel. Even though the power is disconnected the "BIAS IN" voltage will elevate over half of the circuitry on the PC Board which can result in a dangerous electrical shock**.**

Adjustments 10.1 through 10.4 can be done with the cables disconnected from the EGUN probe. A shorting SHV connector should be connected to the "BIAS IN" connector on the rear panel.

10.1 FIL.I LIMIT SCREWDRIVER ADJUST POT

Limits the maximum filament current to the EGUN. Use a high impedance DC Volt Meter with its negative lead connected to the negative lead of C1 and the positive lead to A2 pin 13. The voltage on A2 pin 13 is directly proportional to the maximum filament current (1 volt = 1 amp). This adjustment is factory set for 3.5 amps (3.5 volts on A2 pin 13).

10.2 E. ENERGY ADJ. SCREWDRIVER ADJUST POT

Calibrates the E. ENERGY meter on the front panel. Connect a DC Volt Meter with its negative lead attached to the positive lead of C30 and the positive lead to can of Q9. Adjust the front panel "E. ENERGY" control until the volt meter reads 100 volts. Adjust the "E. ENERGY ADJ." pot until the front panel meter reads 100 volts also.

10.3 MIN E. ENERGY SCREWDRIVER ADJUST POT

Internally limits the minimum Electron Energy that can be adjusted from the front panel. **Before changing this adjustment refer to section 7.1.** Adjust the front panel "E. ENERGY" to its minimum. While monitoring the Electron Energy power supply on the meter adjust the "MIN. E. ENERGY" pot to the desired minimum Electron Energy.

10.4 FOCUS ADJ. SCREWDRIVER ADJUST POT

Calibrates the FOCUS meter on the front panel. Connect a DC Volt Meter with its negative lead attached to the positive lead of C30 and the positive lead to can of Q7. Adjust the front panel "FOCUS" control until the volt meter reads 100 volts. Adjust the

"FOCUS ADJ." pot until the front panel meter reads 100 volts also. The linearity of the meter can be easily checked at this point.

NOTE: Adjustments 10.5 through 10.7 must be done with the cables connected to the EGUN probe. A shorting SHV connector should be connected to the "BIAS IN" connector on the rear panel.

10.5 1 mA ADJ. SCREWDRIVER ADJUST POT

Calibrates the EMISSION meter for 1 milliamp full scale. Use a high impedance DC Volt Meter with its negative lead connected to the positive lead of C30 and the positive lead to A9 pin 2. Switch the "EMISSION" meter switch to "1 mA". Adjust the front panel "EMISSION" control until the volt meter reads 1 volt. Adjust the "1 mA ADJ." pot until the front panel meter reads 1 milliampere.

10.6 10 mA ADJ. SCREWDRIVER ADJUST POT

Calibrates the EMISSION meter for 10 milliamperes full scale.

NOTE: To make this adjustment the front panel Emission "LIMIT" pot and the "MIN E. ENERGY" pot may have to be readjusted to obtain the 5 milliamperes of emission current needed to make this adjustment.

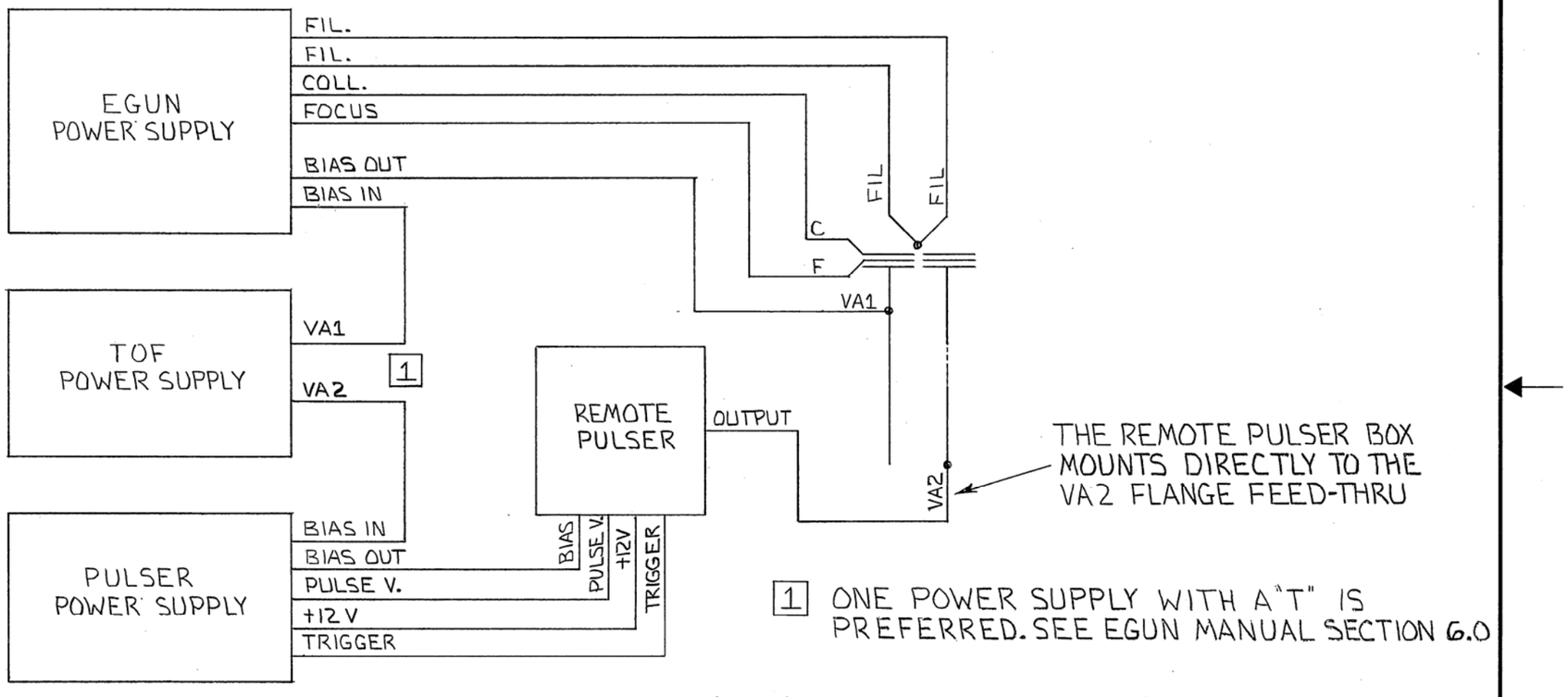
Use a high impedance DC Volt Meter with its negative lead connected to the positive lead of C30 and the positive lead to A9 pin 2. Switch the "EMISSION" meter switch to "10 mA". Adjust the front panel "EMISSION" control until the volt meter reads 5 volts. Adjust the "10 mA ADJ." pot until the front panel meter reads 5 milliamperes.

10.7 EMISSION LIMIT SCREWDRIVER ADJUST POT

Internally limits the maximum Emission that can be adjusted from the front panel. Adjust the front panel "EMISSION" and "LIMIT" controls to their maximum. Adjust the "EMISSION LIMIT" pot on the PC Board until the Emission is the maximum desired value. This adjustment is factory set for 1.5 milliamperes.

DWG. NO.	SH	REV.

REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
1	DRAWN	10-26-88	



QTY REQD	FSCM NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION

PARTS LIST

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS ± DECIMALS .XX ± .XXX ± ANGLES ±

MATERIAL

FINISH

CONTRACT NO.

APPROVALS	DATE
DRAWN	
CHECKED	
ISSUED	

EGUN CABLING

R. M. JORDAN CO.
990 Golden Gate Terrace
GRASS VALLEY, CALIFORNIA 95945
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SIZE	FSCM NO.	DWG. NO.	REV.
B		B0915	1

SCALE

SHEET 1 OF 1

NEXT ASSY	USED ON

APPLICATION

DO NOT SCALE DRAWING