

TECHNICAL MANUAL

PHI MODEL 11-067 SPUTTER ION GUN CONTROL

April 1986

PERKIN-ELMER

Physical Electronics Division
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Eden Prairie, MN 55344



OPERATOR SAFETY SUMMARY

All PHI Systems have been designed to assure operator safety. However, like all other sophisticated instruments, continual operator safety is dependent on the proper use of system components. Such use is described in the manuals supplied with each unit.

LISTED BELOW ARE WARNINGS APPLICABLE TO THIS EQUIPMENT. ALL PERSONNEL INVOLVED IN THE OPERATION AND MAINTENANCE OF THIS EQUIPMENT MUST FULLY UNDERSTAND THE WARNINGS AND THE PROCEDURES BY WHICH THE HAZARD IS TO BE REDUCED OR ELIMINATED.

WARNING

THE PRODUCT(S) COVERED IN THIS MANUAL HAS BEEN DESIGNED TO FUNCTION SAFELY WITH THE REQUIRED DEGREE OF PRECISION WHEN USED IN THE DESCRIBED MANNER.

WE DO NOT RECOMMEND THAT THIS EQUIPMENT BE MODIFIED FOR ANY NON-STANDARD APPLICATION SINCE HAZARDOUS CONDITIONS MAY RESULT. DUE TO THE FACT THAT PHYSICAL ELECTRONICS DIVISION OF PERKIN-ELMER HAS NO CONTROL OVER CUSTOMER MODIFICATIONS TO PHI PRODUCTS SHIPPED, IT DISCLAIMS ANY RESPONSIBILITY FOR ANY MALFUNCTIONS OR ACCIDENTS THAT MAY RESULT!

DANGER ELECTRICAL SHOCK HAZARD

HIGH VOLTAGES ARE PRESENT IN THE SYSTEM WHEN THE SYSTEM POWER INPUT LINES ARE CONNECTED. DISCONNECT INPUT POWER AT THE WALL BEFORE MAKING ANY ADJUSTMENTS. REFER SERVICING TO PERSONNEL WHO HAVE BEEN TRAINED AND HAVE WORKING EXPERIENCE WITH VOLTAGES IN EXCESS OF 50 VOLTS.

ALL ELECTRICAL CABLES ASSOCIATED WITH VARIOUS UNITS INCLUDED IN A SYSTEM ARE WELL SHIELDED. HOWEVER, CARE MUST BE TAKEN NEVER TO COME IN CONTACT WITH ANY ASSOCIATED TERMINALS WHEN THE POWER IS ON. SOME OF THESE LEADS CARRY POTENTIALLY LETHAL HIGH VOLTAGES. OTHER LEADS MAY CARRY SUFFICIENT RF POWER TO INFLECT SEVERE BURNS.

RF INTERFERENCE

THIS EQUIPMENT GENERATES, USES, AND CAN RADIATE RADIO-FREQUENCY ENERGY, AND IF NOT INSTALLED AND USED IN ACCORDANCE WITH THE INSTRUCTION MANUAL, MAY CAUSE INTERFERENCE TO RADIO COMMUNICATIONS. OPERATION OF THIS EQUIPMENT IN A RESIDENTIAL AREA IS LIKELY TO CAUSE INTERFERENCE IN WHICH CASE THE USER AT HIS OWN EXPENSE WILL BE REQUIRED TO TAKE WHATEVER MEASURES MAY BE REQUIRED TO CORRECT THE INTERFERENCE.

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SECTION I

INTRODUCTION

1.0 GENERAL INFORMATION

The PHI Model 11-067 Sputter Ion Gun Control is a multi-output power supply with a two axis deflection system for use with the PHI Model 04-300 Differentially Pumped Ion Gun. The ion gun control is used in the PHI Model 425B MBE system, and is packaged in a standard chassis with a 13.1 centimeter (5.25 inch) front panel, mounted in an electronics rack.

This manual is divided into five sections. Section I contains a brief description of each model of the control. Section II describes, in detail, the proper procedures for installing the control. Operating controls and procedures are discussed in Section III, while Section IV explains how the various components of the control function together as a unit. Calibration and maintenance procedures are covered in Section V.

1.1 GENERAL DESCRIPTION

The ion gun control is comprised of four voltage-regulated power supplies and one current-regulated power supply. Beam and Focus supplies are voltage-regulated. The Beam supply is adjustable between 0 and +5000 volts, and is referenced to ground.

In the PHI Model 11-067 Sputter Ion Gun Control, the Focus supply is slaved to the Beam supply so that the output of the Focus supply is a ratio of the Beam supply, and is adjustable between 70 and 100 percent of the Beam supply. Once the ratio is set to the desired value, the ratio will be maintained throughout the range of the Beam voltage as it is varied. However, the minimum Focus voltage is +100 volts DC.

The two other voltage-regulated supplies are the Grid and Extractor supplies. These are fixed-voltage supplies, and both are referenced to the Beam supply. The current output of the Grid supply represents the "emission current" of the ion gun filament. This current is measured and can be monitored by the front panel meter of the ion gun control.

While both Grid and Extractor supplies have fixed outputs, they do have a limited range of adjustment by means of board-mounted potentiometers.

The Filament current supply is a current-regulated supply which is also referenced to the Beam voltage. Emission current is the result of electron emission from the filament in the ion gun. Since it is important that the emission current remain constant, the measurement of the emission current is used as a feedback signal to the Filament current supply. Filament temperature, and thus the filament current, varies to keep the emission current constant.

The two-axis deflection system provides push-pull triangular output voltage waveforms for both axes. The amplitude is adjustable between 0 and +200 volts AC peak-to-peak maximum with a DC level of 110 volts. A single-turn potentiometer for each axis is used to control the amplitude. These controls are mounted on the front panel.

Installed in the ion gun, a special electrically isolated aperture plate collects a fraction of the electrons which are produced in the ionization region. This current is a function of pressure, and is used as a pressure measurement signal. It is read as a pressure on the panel meter of the control. The meter circuit has a switch to select either emission current or pressure.

The pressure signal is also buffered and made available to control the Balzer's Auto Leak Valve. The connector labeled PRESSURE REFERENCE provides this signal.

Power requirements for the ion gun control are supplied by a power module. It transforms the line voltage down to the required voltage levels, and regulates and filters these voltages. The module has all required heat sinking and overload protection.

1.2 SPECIFICATIONS

Pressure Range:	0-50 mP
Anode Current:	25 μ A = 50 mP
Output Current:	50 mA
Stability:	1% / Hour
Ripple:	0.2 V P-P

SECTION II

INSTALLATION

2.0 GENERAL INFORMATION

-DANGER-
ELECTRICAL SHOCK HAZARD

**HIGH VOLTAGES ARE PRESENT
WHEN THE SYSTEM POWER INPUT
LINES ARE CONNECTED.
DISCONNECT INPUT POWER BEFORE
ADJUSTMENT. REFER SERVICING TO
QUALIFIED PERSONNEL.**

WARNING

INSTALLATION AND TEST
INSTRUCTIONS ARE FOR
USE BY QUALIFIED
PERSONNEL ONLY. TO
AVOID PERSONAL INJURY,
DO NOT PERFORM ANY
INSTALLATION OR
SERVICING UNLESS
QUALIFIED TO DO SO.

2.1 TOOLS REQUIRED

- Phillips screwdriver.

The control is installed by sliding the chassis into the electronics rack, securing it with the four screws provided, and connecting the appropriate cables. The location of the chassis will vary with the system configuration. Refer to the appropriate system manual for the location of the chassis, and specific power and interface cabling connections.

SECTION III OPERATION

3.0 GENERAL INFORMATION

Section 3.1 gives an overview of the operating controls of the PHI Model 11-067 Sputter Ion Gun Control. Refer to the system manual for specific operating procedures.

3.1 PHI MODEL 11-067 ION GUN CONTROL OPERATING CONTROLS

1. **POWER Switch and Indicator.** To apply line power to this unit, the main power switch is moved to the ON position. The indicator lamp above the switch will be illuminated. Refer to Figure 3-1.
2. **BEAM VOLTAGE ON/OFF/REMOTE.** This three-position toggle switch controls the operation of the Beam voltage power supply. In the REMOTE position, the beam voltage is turned ON or OFF by means of TTL level signal which enters the control through the
3. **BEAM VOLTAGE Readout Control.** This five-turn switch controls the amplitude of the Beam voltage power supply whenever the toggle switch is in either the ON or REMOTE positions. The Beam voltage power supply may be adjusted to any value between zero and +5000 volts DC.
4. **FOCUS.** This five-turn digital readout control is used to set the ratio of the beam voltage to that of the focus voltage. This ratio is variable between 70 and 100 percent. Once the ratio is set, the ratio between the two voltages will be maintained while the beam voltage is varied. However, the minimum focus voltage is 100 volts DC.

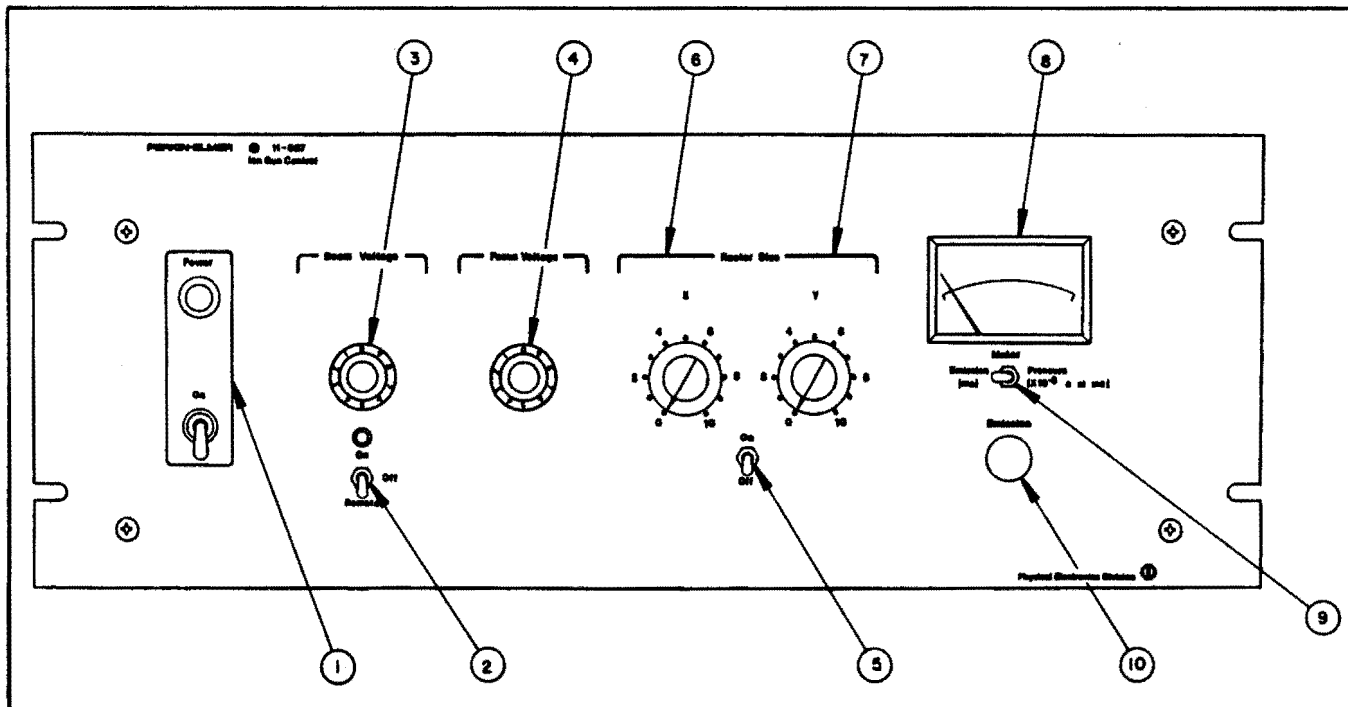


Figure 3-1. PHI Model 11-067 Sputter Ion Gun Control Front Panel

5. RASTER AMPLITUDE ON/OFF. In the ON position, the toggle switch enables the X- and Y- axes raster deflection system. In the OFF position, the deflection system is disabled.
6. RASTER AMPLITUDE X-axis Control. The single-turn control to the left of the toggle switch controls the amplitude of the triangular waveform used in the deflection of the X-axis. This control varies the amplitude between 0 and +200 volts peak-to-peak.
7. RASTER AMPLITUDE Y-axis Control. The single-turn control to the right of the toggle switch controls the deflection of the Y-axis. The control varies the amplitude between 0 and +200 volts peak-to-peak, and is independent of the X-axis.
8. EMISSION CURRENT METER. This meter is used to monitor both the emission current from the filament and the gas pressure in the ionization chamber.
9. EMISSION/PRESSURE. This two-position toggle switch is used to select which parameter is being displayed on the meter; either emission current in milliamperes or pressure in pascals.
10. EMISSION/CURRENT. The five-turn control is used to set the emission current amplitude. After the Beam voltage and Focus voltage controls have been set, the meter selector switch is set to EMISSION, and this control is used to set the desired emission current. The typical operating condition is 20 milliamperes emission current.

SECTION IV

THEORY OF OPERATION

4.0 GENERAL INFORMATION

Access to a block diagram and/or schematics is essential in the understanding of the discussion that follows. Refer to Figure 4-1 for a block diagram of the PHI Model 11-067 Sputter Ion Gun Control.

4.1 BEAM VOLTAGE SUPPLY

Located on the Beam-Focus board, this switching power supply operates at 20 kHz with a fixed pulse width. The output voltage is controlled by a series-pass regulator which varies the transformer supply voltage. The supply is referenced to ground potential, and is controlled by a five-turn potentiometer on the front panel.

4.2 FOCUS VOLTAGE SUPPLY

This supply is virtually identical to the Beam supply. Also located on the Beam-Focus board, the main difference is that the input signal to this supply is obtained both from the Beam supply setting, and from the Focus control setting. This is used to cause the Focus voltage to track the Beam voltage.

4.3 FILAMENT SUPPLY

Located on the Beam Focus board, the Filament supply is a switching power supply operating at 20 kHz. The output current is controlled by varying the switching waveform pulse width. The feedback signal is obtained by measuring the emission current in the Grid supply. The filament emission is thus regulated by holding the filament temperature constant. The circuit contains a power limit control which is used to limit the maximum current

which the supply will deliver. The current limit should be reset if a new filament is installed.

4.4 GRID SUPPLY

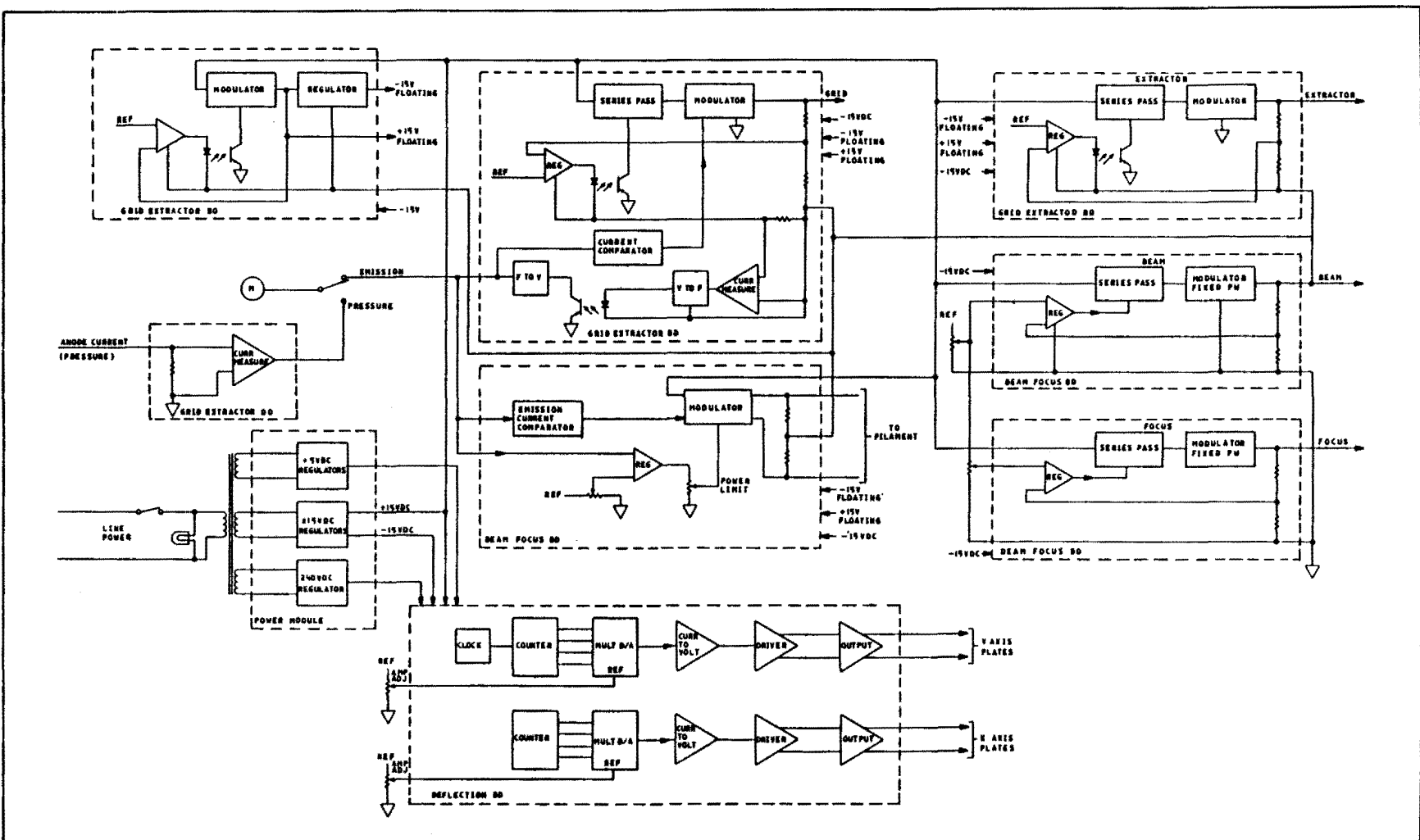
The Grid supply is located on the Grid-Extractor board. This is a switching supply operating at 20 kHz, having a fixed pulse width. Voltage control is obtained by means of a series-pass regulator which controls the supply voltage to the power transformer. This supply is referenced to the Beam voltage. It has an optical coupler in the voltage feedback path which is used to transmit the feedback signal from the Beam voltage level down to the ground reference level.

This supply also contains an accurate output current measurement circuit, which is used to regulate emission. Current is regulated by feeding this signal to the Filament supply to control its output and consequently regulate emission. A voltage-to-frequency (V/f) circuit is used to generate a pulse train whose repetition rate is directly proportional to the amplitude of the current. This pulse train is transmitted through an optical coupler to again change the reference level from Beam voltage to ground. At ground reference, the pulse train is converted back to a DC voltage which is then sent to the front panel meter when the meter selector is in the emission position.

4.5 EXTRACTOR SUPPLY

The Extractor supply is extremely similar to the Grid supply. It is located on the Grid-Extractor board, and in the modulator portion of its circuitry, the Extractor supply is virtually identical to the Grid supply.

Figure 4-1. Block Diagram.



Minor differences exist between the two supplies in the voltage control feedback loop. The major differences in the two supplies is in the current measurement circuit. This circuit incorporates a linear optical isolator circuit used to change reference levels. The circuit will turn the power supply OFF if an overcurrent-draw situation exists. The Extractor supply is referenced to the Beam voltage.

4.6 DEFLECTION

The Deflection board contains the driving circuitry, which is capacitively coupled to the deflection plates used in the PHI Model 04-300 Differentially Pumped Ion Gun. The result is that the drive waveform does not have to swing both positive and negative with respect to ground, and so only a positive High Voltage supply is needed. Triangular waveforms are digitally generated by a clock driving a counter for each axis. The counter counts up to a set value, and then reverses and counts back down to zero. This count is fed to an 8-bit digital-to-analog converter, (D/A) which generates a step-rising and falling current as the counting continues.

The D/A output current is converted to a voltage, and then amplified and further converted to a push-pull pair of triangular waveforms for each axis. Because both axes are generated from the same clock, the axes are locked together and do not generate beat frequencies. The X-axis frequency is 25.641 kHz, and the Y-axis frequency is 19.608 kHz. Amplitude of the output for each axis is independently adjustable by means of a single-turn control located on the front panel.

4.7 15.0 VOLT FLOATING SUPPLY

This is a pulse-width modulated switching supply, located on the Grid-Extractor board, which is operated at 20 kHz. Since this supply is used to power circuits which are referenced to the Beam voltage, it must also float at this voltage. The feedback signal is transmitted through an optical coupler to return it to a ground level reference.

4.8 PRESSURE CIRCUIT

This circuit accurately measures the extracted ion current. Since this current is a function of pressure, this measurement, after switchable scaling, is used to indicate pressure. The circuitry is located on the Grid-Extractor board.

4.9 POWER MODULE

This unit contains the rectifiers, filters, and regulators to supply all ground referenced voltages to the ion gun control. A non-floating 15 volt supply is contained in the module. Also included are all of the necessary current limiting circuits, fuses, and other protection circuits. The power devices are mounted on a heat sink which is cooled by forced air when the module is installed in the chassis.

SECTION V

CALIBRATION AND MAINTENANCE

5.0 GENERAL INFORMATION

The printed circuit boards have been calibrated and checked at the factory, and normally should not need adjustment. However, if a component is replaced, or for some other reason it is decided that calibration is necessary, refer to the following procedures.

The printed circuit board components are identified using a coordinate location code. Letters are assigned from left to right, and numbers from top to bottom beginning in the upper left corner of the board. To locate a component, find the intersection of a letter and a number. For example: R41/H1 is identified as Resistor No. 41 at location H1. Refer to the circuit boards for the location of the components listed.

CAUTION

THE FOLLOWING PRO-
CEDURES ARE FOR
QUALIFIED SERVICE
PERSONNEL ONLY. DO
NOT PERFORM ANY
ADJUSTMENTS UNLESS
QUALIFIED TO DO SO.

5.1 EQUIPMENT REQUIRED

- 5-1/2 digit digital voltmeter (DVM).
- High voltage probe.
- Oscilloscope - HP Model 1740 equivalent.
- Signal generator - Wavetek Model 166 or equivalent.
- Voltage standard - Fluke Model 343A or equivalent.

- Digital voltmeter (DVM) -Data Precision Model 248 or equivalent.
- High Voltage extender board (Part No. 606637).
- (2) Load resistors 4k ohms-20 watts, 750k ohms-1/4 watt, 25 M ohms-2 watts, 15 ohms-50 watts, 150 ohms-3 watts (all resistors 1%).

5.2 INITIAL SETUP

1. Remove all circuit boards from the card cage.
2. Connect the power cord to connector J1, at the rear of the ion gun control.

5.3 POWER SUPPLY CHECKOUT

1. Remove connectors at J5, J9 and J11.
2. Connect a 15 ohm load resistor between J9-5 and J9-3. Connect a 150 ohm load resistor between J9-1 and J9-3.
3. Connect the (+) lead of the DVM to J5-2 and the (-) lead to J5-1 Check for 5.000 volts 150 millivolts DC.
4. Connect an oscilloscope to J5-2 (J5-1 GND.), and check the output ripple. It should not exceed 60 millivolts AC.
5. Connect the (+) lead of the DVM to CR15 cathode, and the (-) lead to CR15 anode. The +15 volt output is adjusted to +15.000 volts 200 millivolts DC by removing the appropriate jumper:

Remove W4 to reduce the voltage by 0.817 volts.

Remove W5 to reduce the voltage by 0.389 volts.

Remove W6 to reduce the voltage by 0.199 volts.

6. Connect an oscilloscope across CR15 (ground to CR15 anode), and check the output ripple. It should not exceed 100 millivolts AC.

7. Connect the (+) lead of the DVM to CR14 anode, and the (-) lead to CR14 cathode. The -15 volt output is adjusted to -15.000 volts 200 millivolts DC by removing the appropriate jumper:

Remove W4 to reduce the voltage by 0.817 volts.

Remove W5 to reduce the voltage by 0.389 volts.

Remove W6 to reduce the voltage by 0.199 volts.

8. Connect an oscilloscope across CR14 (ground to CR14 anode), and check the output ripple. It should not exceed 100 millivolts AC.
9. Connect the (+) lead of the DVM to J11-2 and the (-) lead to J11-1. Adjust R20 for +240 volts 1 volt DC.
10. Connect the oscilloscope to J11 (ground to J11-1), and check the output ripple. It should not exceed 250 millivolts AC.
11. Using a short test lead, short pins J11-1 to J11-2 for 5 seconds. Remove the shorting wire, and check the output with a DVM. The output should be +240 volts.

12. Turn power to the unit OFF, and reconnect J5, J9, and J11.

5.4 INITIAL CHECKOUT OF THE BEAM-FOCUS BOARD

1. Turn the BEAM VOLTAGE and FOCUS VOLTAGE front panel controls to 0 and lock. Turn the beam voltage and raster switches OFF, and turn the X- and Y-axes raster size controls to 0. Turn the EMISSION knob fully counterclockwise.
2. Install the Beam-Focus board into the bottom card slot, J5.
3. Connect a 25 M ohm load resistor between the R146, R147 junction and the CR33 anode, C25 junction on the Beam voltage supply. Connect a 25 M ohm load resistor between the R159, R156 junction and the CR37 anode, C32 junction on the Focus voltage supply.
4. Connect the high voltage probe to the R146, R147 junction on the Beam voltage supply.
5. On the Beam-Focus board, turn potentiometer R47A fully clockwise, and turn power to the unit ON.
6. Connect an oscilloscope to pin 12 of VR3, and adjust R43 for a 20 kHz (50) sec) 100 Hz square wave output. Adjust R128 for 1.0 volts 0.5 volts DC on the output of the Beam voltage supply.
7. Turn the BEAM VOLTAGE switch ON, and turn the BEAM and FOCUS controls to 5. Adjust R41 for 5000 volts 10 volts on the Beam voltage supply output.

8. Turn power to the unit OFF, turn the BEAM VOLTAGE switch OFF, and turn the BEAM and FOCUS controls to 0. Remove the high voltage probe from the Beam voltage supply, and connect it to the R159, R156 junction on the Focus voltage supply.
9. Turn power to the unit ON, and check the focus voltage for 255 volts 10 volts. Turn the BEAM VOLTAGE switch ON, and adjust R137C for 100 volts 1 volt DC on the Focus voltage supply output.
10. Connect the (+) lead of the DVM to the junction of R31, AR2 pin 6 junction, and the (-) lead to CR19A anode. Adjust R27 for 0.000 volts 1 millivolt DC.
11. Turn the BEAM and FOCUS front panel controls to 5, and adjust R75 for 5000 volts 10 volts DC.
12. Turn the Focus front panel control to 0, and adjust R33 for 3500 volts 5 volts DC.
13. Turn power to the unit OFF, turn the BEAM and FOCUS controls to 0 and lock, and turn the BEAM VOLTAGE switch OFF.

5.5 GRID-EXTRACTOR BOARD CHECKOUT AND CALIBRATION

1. Insert the Grid-Extractor board onto the High Voltage extender board, and insert the extender board into the middle card cage slot, J3. Turn power to the unit ON.
2. Connect an oscilloscope to pin 12 of VR4, and adjust R88 for a 20 kHz (50) sec) 100 Hz square wave output.

3. Connect an oscilloscope to pin 12 of VR14, and adjust R64B for a 20 kHz (50) sec) 100 Hz square wave output.

CAUTION

MONITOR THE BEAM VOLTAGE OUTPUT TO ENSURE THAT IT IS 0 VOLTS PRIOR TO MAKING MEASUREMENTS OR ADJUSTMENTS ON FLOATING CIRCUITRY.

4. Connect a DVM across CR40 (ground to CR40 anode), and adjust R133 for +15.000 volts 10 millivolts DC. Connect a DVM across CR38 (ground to CR38 cathode), and adjust R129 for -15.000 volts 10 millivolts DC.
5. Connect the (-) lead of the DVM to C54 cathode and the (+) lead to C54 anode. Adjust the grid voltage, R164, for +200.000 volts 200 millivolts DC.
6. Connect the (-) lead of the DVM to C53 cathode and the (+) lead to C53 anode. Adjust the extractor voltage, R142, for 230.000 volts 200 millivolts DC.
7. Connect the (+) lead of the DVM to the junction of R174 and R176, and the (-) lead to the junction of R182 and C59 anode. Adjust R184 for 0.000 volts 5 millivolts DC.
8. Connect the (+) lead of the DVM to the junction of R152 and R153, and the (-) lead to the junction of R160 and CR47 cathode. Adjust R157 for 0.000 volts 5 millivolts DC.

9. Connect the 4k ohm load resistor from C54 anode to the junction of R162 and R155. Connect an oscilloscope to the junction of R107 and Q28 collector. The oscilloscope ground lead is connected to CR9 cathode. Adjust R169 for a 10 kHz square wave output.
10. Connect the (+) lead of the DVM to pin 61 and the (-) lead to pin 12 on the extender board.
11. Connect the 750k ohm load resistor between CR54 anode and the junction of R162 and R155. Adjust R31 for +2.500 volts 10 millivolts DC on the base of Q6 to ground. This should cause the Beam voltage, Focus voltage, Filament, Grid, Extractor, and Floating 15 volt supplies to shutdown.
12. Turn power to the unit OFF, and remove the 750k ohm and 4k ohm load resistors. Turn power to the unit ON. All power supplies should reset and return to normal operation.
13. Connect the (+) lead of the DVM to pin 84 and the (-) lead to pin 12 on the extender board.
14. Connect the voltage standard across R50 (positive to CR12 cathode), and adjust the standard for 0.103 volts. Switch the front panel meter switch to PRESSURE, and check for full scale deflection. Check pin 84 to ground for 5.000 volts 200 millivolts.
15. Connect an oscilloscope to pin 81, and adjust R113 for a 10 kHz square wave output. Turn power to the unit OFF.

5.6 BEAM-FOCUS BOARD FINAL CHECKOUT

1. Remove the Beam-Focus board from the card cage, install the board on the high voltage extender board, and install the extender board back into the card cage.
2. Turn R57B fully counter-clockwise. Connect the (+) lead of the DVM to the base of Q11. Turn power to the unit ON, and adjust R47A for 4 volts on the base of Q11 to ground.
3. Connect the (+) lead of the DVM to pin 6 of AR1. Connect the (-) lead to the junction of R6 and R7. With the front panel EMISSION control fully counterclockwise, adjust R12 for 0.000 volts 5 millivolts DC.
4. Turn the front panel EMISSION control fully clockwise, place the meter switch at EMISSION, and adjust R16 for a 50 milliamperereading on the front panel meter.
5. Turn power to the unit OFF, remove the extender board from the card cage, and reinstall the Beam-Focus board back into the card cage.

5.7 DEFLECTION BOARD CHECKOUT

1. Remove the Deflection board from the card cage, install the board on the High Voltage extender board, and install the extender board back into the card cage top slot, J1.
2. Turn power to the unit ON.
3. Connect the DVM across TP2 and TP3, and adjust R64 for 0.000 volts 100 millivolts DC.

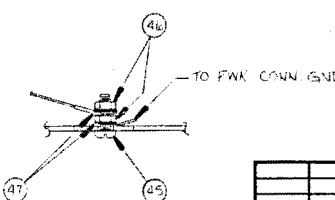
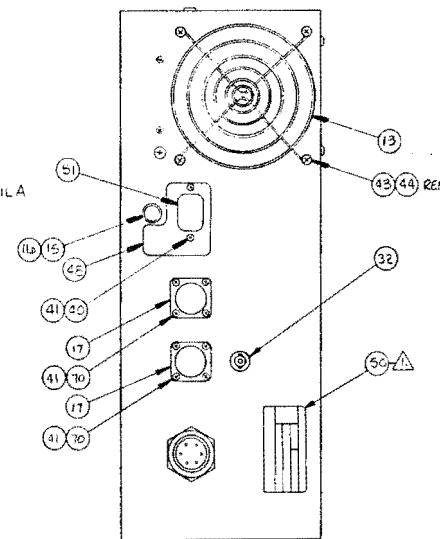
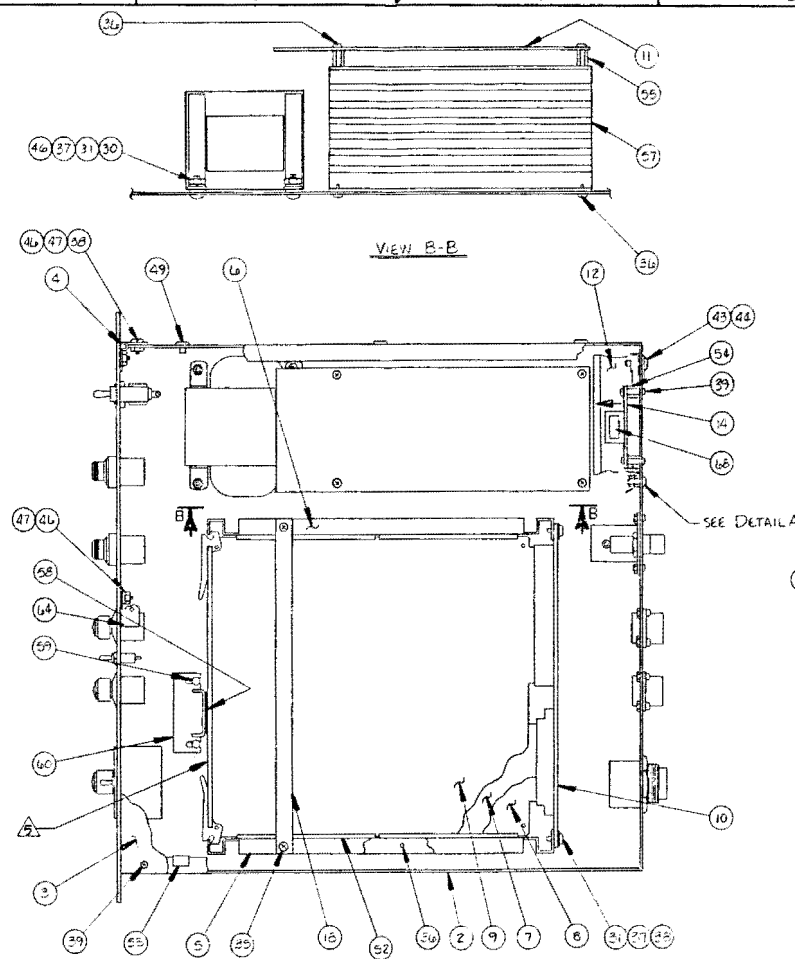
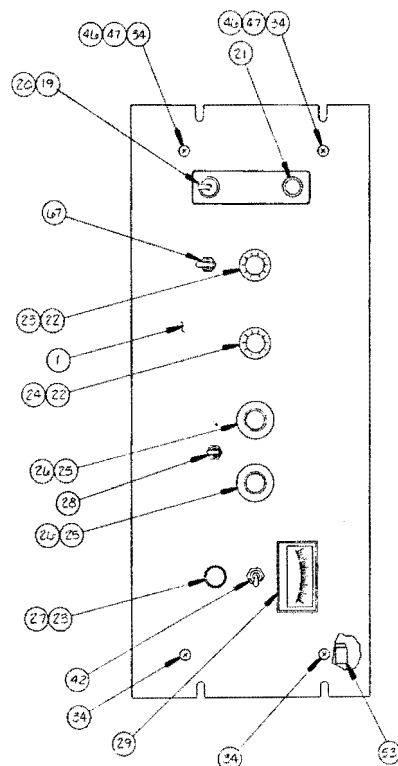
4. Connect the DVM across TP4 and TP5, and adjust R82 for 0.000 volts 100 millivolts DC.
5. Adjust R96 for +110.000 volts 100 millivolts on TP2 and TP3 to ground.
6. Adjust R108 for +110.000 volts 100 millivolts on TP4 and TP5 to ground.
7. Turn the X and Y RASTER controls on the front panel to 10, and turn the RASTER switch ON.
8. Connect the (+) lead of the DVM to pin 81 and the (-) lead to pin 12 on the extender board. Adjust R83 for +10.000 volts 10 millivolts DC.
9. Connect the (+) lead of the DVM to pin 77 and the (-) lead to pin 11-14. Adjust R43 for +10.000 volts 10 millivolts DC.

10. Adjust R114 for a 200 volt peak-to-peak 2 volts, 25.6 kHz (39) sec) triangle waveform on TP2 and TP3 with respect to ground.
11. Adjust R125 for a 200 volt peak-to-peak 2 volts, 19.6 kHz (51) sec) triangle waveform on TP4 and TP5 with respect to ground.

5.8 SYSTEM ADJUSTMENT

1. Turn power to the unit ON. Turn the EMISSION control clockwise until the EMISSION meter indicates 35 milliamperes emission current.
2. R57B is located on the top left side of the Beam-Focus board (bottom card slot). The potentiometer is adjustable from the edge of the board. Adjust R57B for 30 milliamperes emission current.

REVISIONS		DATE	APPROVED
ZONE	REV	DESCRIPTION	
A		RELEASE PER ECO 5085 SUPERSEDES 607446	1-85 BT

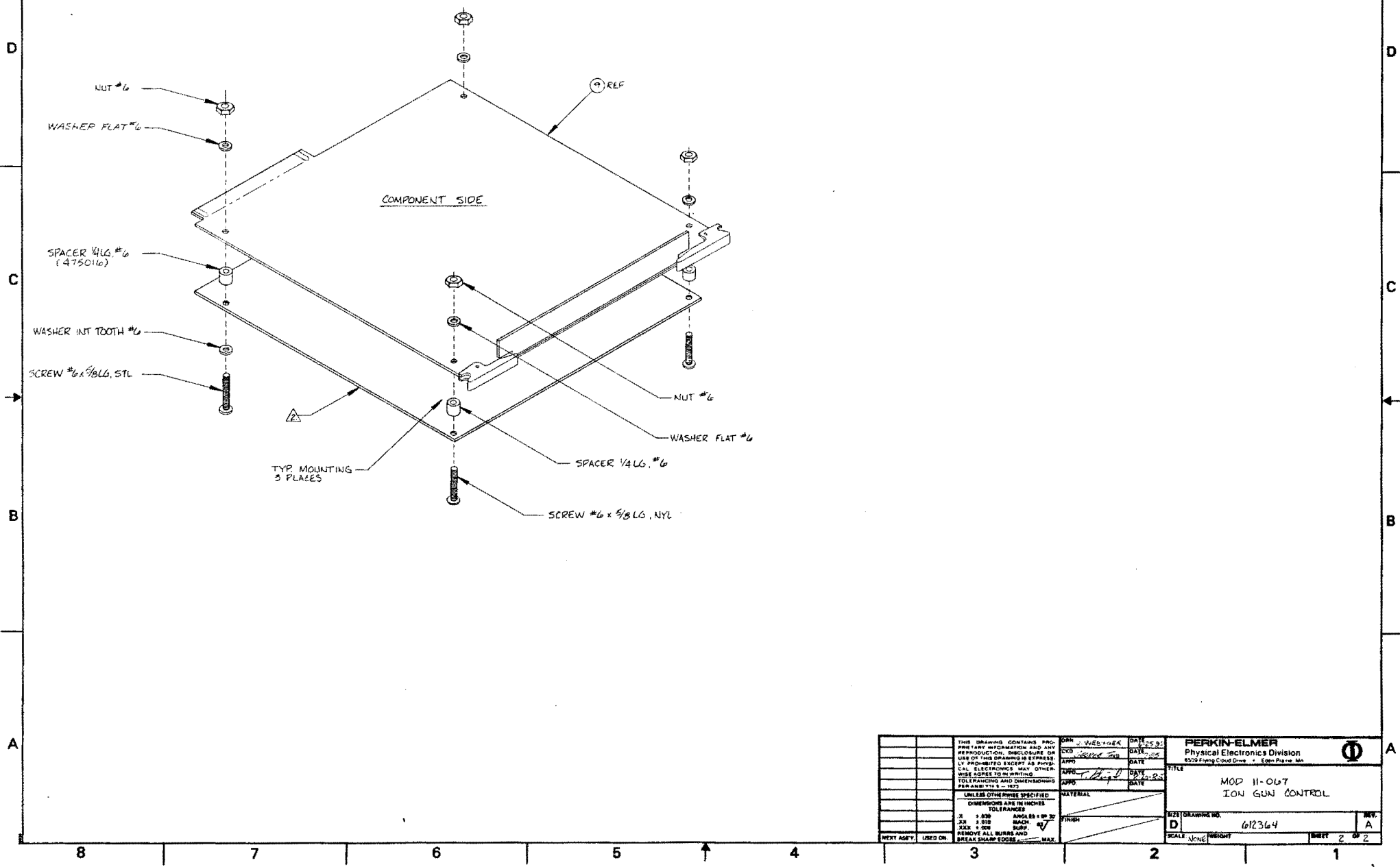


DETAIL A
SCALE: NONE

- NOTE:
1. MARK AFFIXABLE INFORMATION ON I.D. LABEL (ITEM 51) PER ENG SPEC 603322, LOCATE APPROP. AS SHOWN (UNIT I.D. NS AMU).
 2. SHIELD ATTACHED TO BEAM-FOCUS BD ASSY (ITEM 8) MUST BE REMOVED AND MOUNTED ON DEFLECTION BD ASSY (ITEM 9) BEFORE ASSEMBLIES ARE INSTALLED IN UNIT SEE SHEET 2 OF THIS DRAWING FOR SHIELD INSTALLATION.
 3. ITEMS 72 THRU 85 ARE NOT SHOWN ON THIS ASSEMBLY. REFER TO WIRE DATA LIST FOR APPROPRIATE LOCATIONS.
 4. REMOVE BOARD EDGE SHIELDS FROM ITEMS 7 & 9. RE-INSTALL SHIELDS AS FOLLOWS - 610534 (1.1 HIGH) ON BOARD ASSY ITEM 7 & 608122 (1.3 HIGH) ON BOARD ASSY ITEM 9.

THIS DRAWING CONTAINS PROPRIETARY INFORMATION AND ANY REPRODUCTION OR USE OF THIS DRAWING IS EXPRESSLY PROHIBITED EXCEPT AS PHYSICALLY ELECTRONICS MAY OTHERWISE ADVISE TO IN WRITING. TOLERANCING AND DIMENSIONING PER ANSI Y14.5 - 1975.		DATE 2-2-85	
APPROVED	DATE 2-2-85	DATE 2-2-85	
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES		MATERIAL	
X 1.000 ANGLES 1 OR 30		FINISH	
XX 1.000 MACH		TYP	
XXX 1.000 SURF		TYP	
REMOVE ALL BURRS AND BREAK SHARP EDGES		MAN	
NEXT ASSY. USED ON		DATE 2-2-85	
SEE DETACHED P.L.		DATE 2-2-85	
PERKIN-ELMER Physical Electronics Division 6509 Fords Court Drive • Eden Prairie, Mn		DATE 2-2-85	
TITLE MOD 11-067 ION GUN CONTROL		DATE 2-2-85	
SIZE DRAWING NO. 612364		DATE 2-2-85	
SCALE 1/2		WEIGHT	
SHEET 1 OF 2		REV. A	

REVISIONS		DATE	APPROVED
ZONE	REV.		



THIS DRAWING CONTAINS PROPRIETARY INFORMATION AND ANY REPRODUCTION, DISCLOSURE OR USE OF THIS DRAWING IS EXPRESSLY PROHIBITED EXCEPT AS PHYSICAL ELECTRONICS MAY OTHERWISE AGREE TO IN WRITING. TOLERANCING AND DIMENSIONING PER ANSI Y14.5 - 1973		DATE 8-25-80 DATE 8-25-80 DATE 8-25-80 DATE 8-25-80		PERKIN-ELMER Physical Electronics Division 8559 Flying Cloud Drive • Eden Prairie, MN		①	
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES X .030 ANGLES ± .01 XX .015 MAX XXX .005 SURF. REMOVE ALL BURRS AND BREAK SHARP EDGES MAX		DATE 8-25-80 DATE 8-25-80 DATE 8-25-80 DATE 8-25-80		TITLE MOD 11-067 ION GUN CONTROL		SIZE DRAWING NO. D 612364	
NEXT ASSY. USED ON		MATERIAL FINISH		SCALE NONE WEIGHT		SHEET 2 OF 2	

DETACHED PARTS LIST

PERKIN-ELMER 			TITLE: MOD 11-067 ION GUN CONTROL		PART NO. 612364	REV A
Physical Electronics					SHEET 1	OF 4
ITEM NO.	PART NUMBER	QUANTITY PER ASSEMBLY	DESCRIPTION	DOC CODE	REF. DESIGNATIONS / NOTES	
1	605895	1.	FRONT PANEL-ION GUN CONTROL			
2	612365	1.	CHASSIS-ION GUN CONTROL			
3	601350	1.	TOP PANEL-ELECTRON MULT R SPLY			
4	605892	1.	HINGE-STEEL, 1.5 x 5.88			
5	609970	1.	BRACKET-CARD GUIDE MTG, RIGHT			
6	609971	1.	BRACKET-CARD GUIDE MTG, LEFT			
7	612352	1.	PC ASSY-EXTRACTOR & GRID SUPPLY			
8	605959	1.	BOARD ASSY-BEAM & FOCUS SUPPLY			
9	608083	1.	PC ASSY-DEFLECTION			
10	612355	1.	PC ASSY-MOTHER BD, ION GUN CTRL			
11	607277	1.	PC ASSY-POWER SUPPLY			
12	606247	1.	FAN-QUIET, 75CFM, 115V, 4.7 IN. SQ			
13	476142	1.	FINGER GUARD-FAN, 4.12 SQ.			
14	603825	1.	PC BD-TERMINAL SWITCH			
15	171308	1.	FUSEHOLDER-PANEL MTG, 3AG			
16	171306	1.	FUSE-3AG, 3A, 250V, SLO BLO			
17	274028	2.	CONN-CIRC, BOX RCPT, 5S, MS3102A		J2, 3	
18	602527	1.	BRACKET-CARD GUIDE SUPPORT			
19	174005	1.	SW-TGL, DPST, 6 AMP			
20	512118	1.	WASHER-INTL TOOTH, 1/2, SST			
21	477073	1.	LAMP-PILOT, 120V, .3W, AMBER, RND			
22	171186	2.	DIAL-TURN COUNTING IOT W/LOCK			
23	609589	2.	POT-WW, 5K, 1.5W, 5T, BSHG, MT			
24	609588	1.	POT-WW, 1K, 1.5W, 5T, BSHG, MT			
25	171193	2.	KNOB-CONT, .72 DIA, RND			

PREPARED J. WEBINGER	DATE 6-25-85	CHECKED GEORGE TAKO	DATE 7-9-85	APPROVED TJS	DATE 8-20-85	☐ ADD
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DETACHED PARTS LIST

PERKIN-ELMER



Physical Electronics

TITLE:

MOD 11-067
ION GUN CONTROL

PART NO. 612364

REV A

SHEET 2 OF 4

ITEM NO.	PART NUMBER	QUANTITY PER ASSEMBLY	DESCRIPTION	DOC CODE	REF. DESIGNATIONS / NOTES
26	609587	2.	POT-5K, 2W, 1T, LIN BSHG MT		
27	472039	1.	KNOB-END, W/SKT, W/DOT		
28	275220	1.	SW-TOGGLE, SPDT, 6A		
29	278074	1.	METER-PANEL, ANALOG, 0-50 SCALE		
30	542008	4.	SCREW-MACH, PPAN, 8-32 x .500 SST		
31	512008	14.	WASHER-FLAT, #8, SST		
32	174009	1.	CONN.-CHAS. BNC, ISOL, 1 PIN, 48901		J5
33		.			
34	546408	4.	SCREW-FLH, 8-32 x .500 SST, PHH		
35	546304	2.	SCREW-FLH, 6-32 x .250, SST, PHH		
36	541904	14.	SCREW-PNH, 6-32 x .250, SST, PHH		
37	542208	14.	WASHER-LOCK, SPLIT-RING, #8, SST		
38	542006	13.	SCREW-PNH, 8-32 x .375, SST, PHH		
39	541804	13.	SCREW-PNH, 4-40 x .250, SST, PHH		
40	541807	2.	SCREW-PNH, 4-40 x .437, SST, PHH		
41	545304	10.	NUT-NYL INSERT LKNT, 4-40, SST		
42	274001	1.	SW-TGL, DPDT, 5A @ 125 VAC		
43	541910	4.	SCREW-PNH, 6-32 x .625, SST, PHH		
44	606248	4.	MOUNTING CLIP-FAN, FLUSH TYPE		
45	542010	1.	SCREW-PNH, 8-32 x .625, SST, PHH		
46	542108	15.	NUT-HEX, 8-32, SST, SM PATTERN		
47	512108	11.	WASHER-INTL TOOTH, #8, SST		
48	603547	1.	COVER-MARKING		
49	607156	3.	MOUNT-PUSH BUTTON, CA TIE, NYLON		
50	479092	1.	LABEL-UNIT ID, 1.38 x 2.75, POLY		PHI-192

PREPARED

J. WEBINGER

DATE

6-25-85

CHECKED

GEORGE TAKO

DATE

7-9-85

APPROVED

TJS

DATE

8-20-85

☐ ADD

DETACHED PARTS LIST

PERKIN-ELMER


Physical Electronics

TITLE:

 MOD 11-067
ION GUN CONTROL

PART NO. 612364

REV A

SHEET 3 OF 4

ITEM NO.	PART NUMBER	QUANTITY PER ASSEMBLY	DESCRIPTION	DOC CODE	REF DESIGNATIONS / NOTES
51	375039	1.	FLTR-AC, CONN-CHAS, 115/250V, 3A		J1
52	476146	12.	GUIDE-CARD, 4.5, NYLON		
53	479186	2.	CLIP-SPEED U TYPE, GROUNDING		
54	602978	2.	SPACER-HEX THD 4-40 x .437 AL		
55	604535	4.	SPACER-HEX, M/F, 6-32 x .50 LG, BRS		
56		.			
57	609593	1.	ASSY-HEATSINK, ION GUN CONTROL		
58	529600	A/R.	GASKET-STRIP, NEOPREME, .125 THK		
59	603147	2.	SCREW-THUMB, 6-32 x .25, .53 LG, BRS		
60	609581	1.	BRACKET-BOARD RETAINING		
61	612366	1.	WIRE HARN-ION GUN CONTROL		
62		1.	CAL PROCEDURE-ION GUN CONTROL		
63	609967	1.	PRODUCT SPEC-ION GUN CONTROL		
64	601111	2.	BRACKET-CHASSIS SUPPORT		
65	610447	1.	SCHEMATIC-ION GUN CONT., 11-067		
66		.			
67	609651	1.	SW-TGL, SPDT, ON-OFF-ON, 5A/125V		
68	603858	1.	SW-SLIDE, PCB, RTANG, LINE V SEL		
69		.			
70	541806	8.	SCREW-PNH, 4-40 x .375, SST, PHH		
71		.			
72	177271	1.	CONN-PLUG, CRIMP TYPE, 5 SKT		P9
73	177058	2.	CONN-PLUG, CRIMP TYPE, 2 SKT		P1,5
74	607847	2.	CONN-HSG, 2 CKT, AMP #1-480698-1		P7,11
75	506706	1.0"	TUBING-SHRINK, .187 ID, PVC, BLK		

 PREPARED
J. WEBINGER

 DATE
6-25-85

 CHECKED
GEORGE TAKO

 DATE
7-9-85

 APPROVED
TJS

 DATE
8-20-85

☐ ADD

Physical Electronics



TITLE:

MOD 11-067
ION GUN CONTROL

PART NO. 612364

REV A

SHEET 4 OF 4

[illegible]

PREPARED

J. WEBINGER

DATE _____

6-25-85

CHECKED

CREW
GEORGE TAKO

DATE _____

7-9-85

APPROVED

TJS

DATE _____

8-20-85

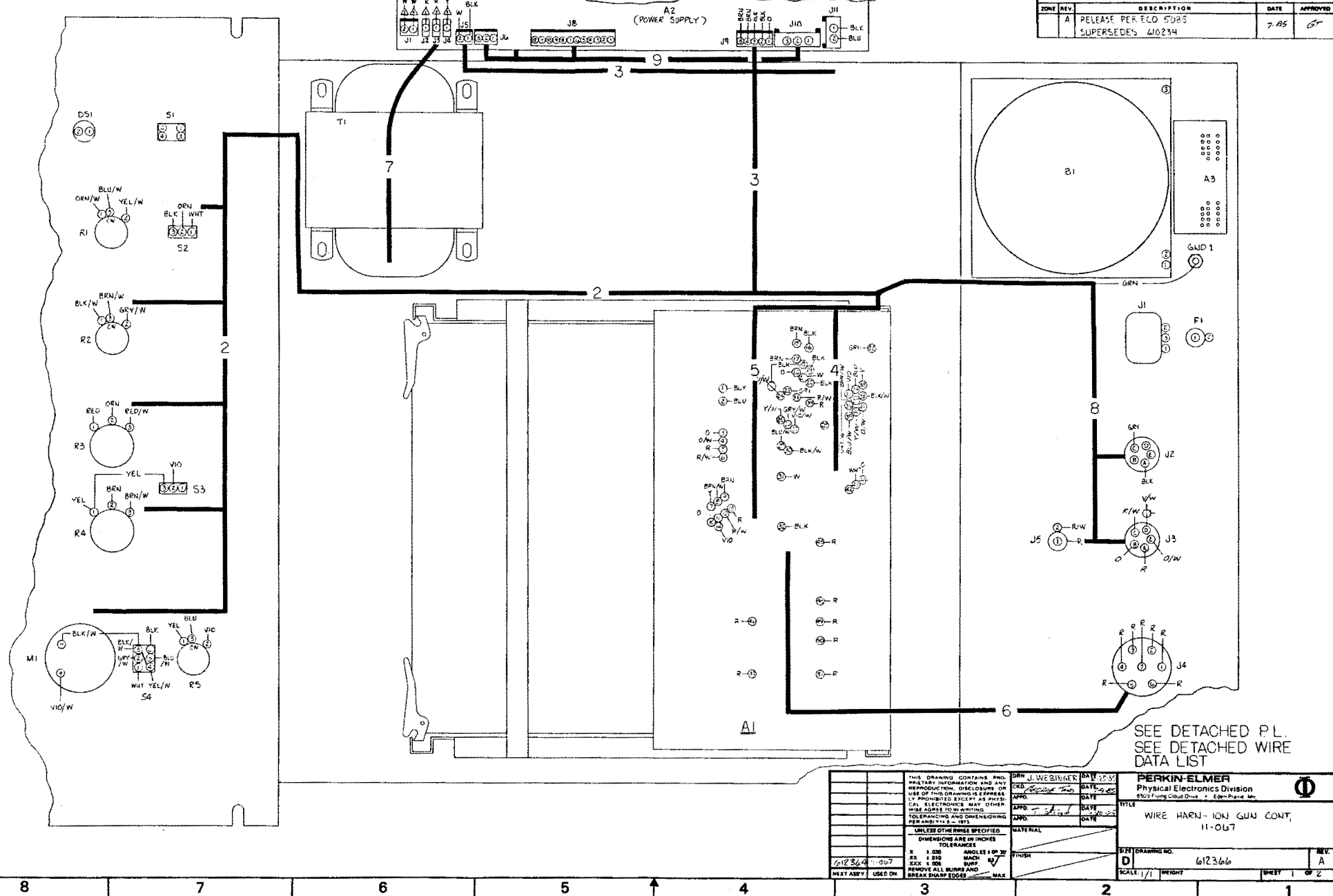


ADD

0085	508703	1.000	IN	180-DHAK, 40/512, 1/2" DIA, 1/2" THK		
0086	612364	1.000	EA	MANUAL, 11-067 ION GUN CONTROL	IN U/NONE	41888

PERKINMER PHYSICAL ELEC. DIV.			TITLE SHEET: 3 1/22/91 MOD 11-067-ION GUN CONTROL			PART NUMBER 612364		ENG. DWG NO/REV IN U/NONE 1H		EFFECTIVITY DATES:	
ITEM	PART NO.	QTY	UM	DESCRIPTION	DRAWING NO.	REFERENCE	FROM	TO			
0087	546506	2.000	EA	WASHER-EXT TOOTH LOCK,#6 SST			50289				
0088	533204	14.000	EA	NUT-KEFS,8-32,HEX,SST			81590				
				** END OF REPORT **							

D
C
B
A

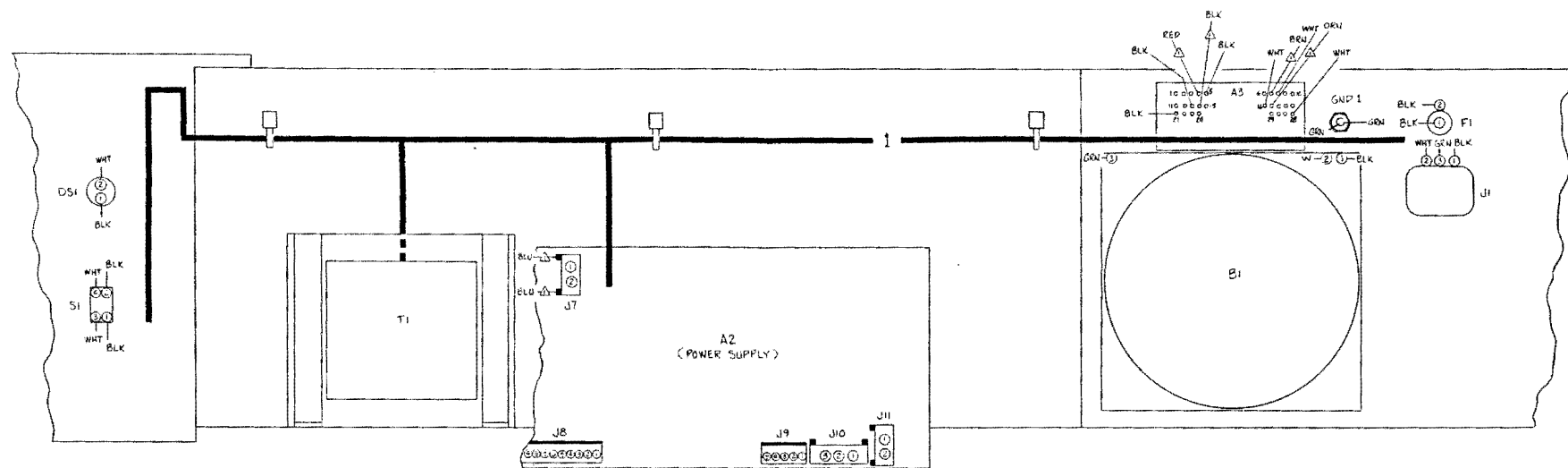


ZONE		REV	DESCRIPTION	DATE	APPROVED
A		1	RELEASE PER EDO 5085 SUPERSEDES 610234	7.85	ST

SEE DETACHED P.L.
SEE DETACHED WIRE
DATA LIST

THIS DRAWING CONTAINS PROPRIETARY INFORMATION AND ANY REPRODUCTION, DISCLOSURE OR USE OF THIS DRAWING IS EXPRESSLY PROHIBITED EXCEPT AS PHYSICAL ELECTRONICS MAY OTHERWISE AGREE TO IN WRITING.		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES	
X 1.000 ANGLES 1/8" MIN		X 1.000 MACH	
XXX 1.000 BUMP		REMOVE ALL BURRS AND BREAK SHARP EDGES	
NEXT ASSY USED ON		DATE	
612346		11-067	
SCALE 1/1		WEIGHT	
SHEET 1 OF 2		REV. A	

PERKIN-ELMER Physical Electronics Division 8500 Flying Cloud Drive • Eden Prairie, Minn.		TITLE WIRE HARN - 10W GUN CONT, 11-067	
DRAWING NO. D 612346		REV. A	



SEE DETACHED P. L.
SEE DETACHED WIRE DATA LIST

THIS DRAWING CONTAINS PROPRIETARY INFORMATION AND ANY REPRODUCTION, IN WHOLE OR IN PART, OF THIS DRAWING IS EXPRESSLY PROHIBITED WITHOUT THE WRITTEN CONSENT OF PERKIN-ELMER CAL. ELECTRONICS MAY OTHER WISE ACQUIRE TO IN VIOLATION OF TOLERANCING AND DIMENSIONING REAS. PAR. 11-1 - 1975		DRN. J. WEBB/166P DATE 11-1-75 APP'D. <i>[Signature]</i> DATE 11-1-75 MATERIAL <i>[Blank]</i>	PERKIN-ELMER Physical Electronics Division 6559 Fungus Grove Drive • Appleton, Wis. 54912	
UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES TOLERANCES			TITLE	
H .100 KK ± .010 BUNCH JXX ± .005 SURF REMOVE ALL MARKS AND REPEAT SHARP EDGES		FINISH <i>[Blank]</i> SCALE 1/1 WEIGHT 612.366 SHEET 2 OF 2	WIRE HARN-100N GUN CONT. 11-067	
MEET ASSY USED ON	MAX MAX			

DETACHED PARTS LIST

PERKIN-ELMER			Physical Electronics		TITLE: WIRE HARN-ION GUN CONT, 11-067		PART NO. 612366 REV A	
					SHEET 1 OF 2			
ITEM NO.	PART NUMBER	QUANTITY PER ASSEMBLY	DESCRIPTION	DOC CODE	REF. DESIGNATIONS / NOTES			
1	506000	75 .	TIE-CABLE, .750 BDL OD, NYL, NAT					
2	602076	7.0'	WIRE-STRD, 20GA, 9KVDC, TFL, RED					
3	502001	11.0'	WIRE-STRD, 18GA, 600V, IPVC, BLK					
4	502002	2.4'	WIRE-STRD, 18GA, 600V, IPVC, BRN					
5		.						
6	502004	1.4'	WIRE-STRD, 18GA, 600V, IPVC, ORN					
7		.						
8	502006	1.4'	WIRE-STRD, 18GA, 600V, IPVC, GRN					
9	502007	1.5'	WIRE-STRD, 18GA, 600V, IPVC, BLU					
10	502010	7.0'	WIRE-STRD, 18GA, 600V, IPVC, WHT					
11	501700	0.3'	WIRE-BARE, SOLID, TND COP 22GA					
12	502201	8.6'	WIRE-STRD, 22GA, 600V, IPVC, BLK					
13	502202	3.0'	WIRE-STRD, 22GA, 600V, IPVC, BRN					
14	502203	5.0'	WIRE-STRD, 22GA, 600V, IPVC, RED					
15	502204	6.3'	WIRE-STRD, 22GA, 600V, IPVC, ORN					
16	502205	6.0'	WIRE-STRD, 22GA, 600V, IPVC, YEL					
17	502207	3.0'	WIRE-STRD, 22GA, 600V, IPVC, BLU					
18	502208	5.0'	WIRE-STRD, 22GA, 600V, IPVC, VIO					
19	502209	1.0'	WIRE-STRD, 22GA, 600V, IPVC, GRY					
20	502210	8.0'	WIRE-STRD, 22GA, 600V, IPVC, WHT					
21	502211	6.3'	WIRE-STRD, 22GA, 600V, IPVC, WHT/BLK					
22	502212	6.0'	WIRE-STRD, 22GA, 600V, IPVC, WHT/BRN					
23	502213	5.3'	WIRE-STRD, 22GA, 600V, IPVC, WHT/R					
24	502214	4.0'	WIRE-STRD, 22GA, 600V, IPVC, WHT/O					
25	502215	6.0'	WIRE-STRD, 22GA, 600V, IPVC, WHT/Y					
PREPARED J. WEBINGER		DATE 6-25-85	CHECKED GEO TAKO	DATE 7-9-85	APPROVED TJS	DATE 8-20-85	☐ ADD	

DETACHED PARTS LIST

[illegible]



DWG

TITLE WIRE HARN-ION GUN CONT, 11-067

DWG
NO.

612366

REV.

E

SHEET

OF 7

PROCEDURE AND COMMON NOTES:

All leads shall be PHI part number 5022XX for Awg 22. PHI part number 5020XX for Awg 18 of color shown unless otherwise specified.

All leads shall be routed into a harness as indicated unless otherwise specified.

All leads shall be terminated per PHI soldering specifications unless otherwise specified.

Designated parts referred to are shown in parts list of main assembly drawing.

Part number refers to part added to lead.

DESIGNATIONS:

- * Part called out on main assembly drawing.

"Sur" (Surface Wiring) Wire run from terminal to terminal in the most convenient manner.

"Dir" (Direct Wiring) Wire run from terminal to terminal with a minimum amount of slack.

"TP" TWISTED PAIR

NOTES:

INACTIVE - FOR SERVICE

USE ONLY - SUPERSEDED

BY PER-ECO

1. Use sleeve (see Part No. 10229) 1/2" long over connection and shrink to secure in place.

2. Crimp terminal to lead per PHI specifications.

3. ATTACH GND LEAD TO FAN USING #8-32 x 1/2" LG SCREW & INTERNAL TOOTH LOCK WASHER CALLED OUT ON MAIN ASSEMBLY DWG.

NOTE: GND REQ'D ONLY WHEN USING METAL BODIED FAN! IF LEAD IS UNUSED, DOUBLE IT BACK & TIE INTO WIRE BUNDLE.

4. TERMINATE SHIELD FLUSH WITH ITS OUTER INSULATION APPROX 1-1/2" FROM END OF CONDUCTOR AND COVER WITH TUBING.

5. TERMINATE SHIELD TO A BK #22 LEAD 3" LONG IN THE INBOARD DIRECTION.

6. MAKE ALL WIRES ATTACHED TO CONNECTOR J4 APPROX. 10 INCHES LONG, THEN FILL REAR CAVITY OF J4 WITH POTTING COMPOUND ITEM 31. WIRES TO BE DRESSED AND TRIMMED TO EXACT LENGTH AT TIME OF TERMINATION DURING FINAL ASSEMBLY.

[illegible]



ITEM NO.	DWG TITLE WIRE HARN-ION GUN CONT, 11-067						DWG NO 612366		REV. E		3 SHEET OF 7		
	WIRE/COMP.			FROM			ROUTE	TO			REMARKS		
	PART NO.	COLOR	AWG	TERM	NOTE	PART NO.		TERM	NOTE	PART NO.			
26	502007	BLU	18	AI-E2			3,2,4	A2, J11-2	2	*L07850			
27	502004	ORN	18	AI-E20			3,2,4	A2, J9-1	2	*177070			
28													
29													
30	502007	BLU	18	AI-E2			3,2,4	A2, J11-2	2	*L07850			
31													
32													
33	502007	BLU	18	AI-E2			3,2,4	A2, J11-2	2	*L07850			
34													
35													
36	502004	ORN	18	AI-E20			3,2,4	A2, J9-1	2	*177070			
37													
38													
39	551303	RED	20	AI-E45			6	J4-7	2	*L02070			
40	↑	↑	↑	AI-E46			6	J4-6	2	↑			
41				AI-E47			6	J4-1	2				
42				AI-E48			6	J4-2	2				
43				AI-E49			6	J4-3	2				
44	↓	↓	↓	AI-E50			6	J4-5	2	↓			
45	551303	RED	20	AI-E51			6	J4-4	2,6	*L02070			
46													
47													
48													
49	502201	BLK	22	DSI-1	2	*L03390	1	A3-E5					
50	502201	BLK	22	AI-E32			5,2	S4-L					



WIRE DATA

[illegible]



PHYSICAL ELECTRONICS INDUSTRIES INC.

WIRE DATA

ITEM NO.	DWG TITLE WIRE HARN-ION GUN CONT, 11-067						DWG NO 612366	REV. E	SHEET 5 OF 7		
	WIRE/COMP.			FROM			ROUTE	TO			REMARKS
	PART NO.	COLOR	AWG	TERM	NOTE	PART NO.		TERM	NOTE	PART NO.	
76	502209	GRY	22	AI-E23			5,8	J2-C			
77											
78											
79	502210	WHT	22	DSI-2	2	* L03390	1	A3-E16			
80	502210	WHT	22	AI-E31			5,2	S4-1			
81	502210	WHT	22	AI-E43			4,2	S2-1			
82											
83											
84											
85	502211	BLK/W	22	AI-E30			5,2	S4-3			
86	502211	BLK/W	22	AI-E38			4,2	R2-1			
87	502211	BLK/W	22	S4-3			SUR	M1 "—"	2	* 500610	
88											
89											
90	502212	BRN/W	22	AI-E8			5,2	R4-3			
91	502212	BRN/W	22	AI-E37			4,2	R2-3			
92											
93											
94	502213	RED/W	22	AI-E12			5,2	R3-3			
95	502213	RED/W	22	AI-E53			4,8	J5-2			
96											
97	502214	ORN/W	22	AI-E41			4,2	R1-1			
98											
99	502616	GRN/W	24	AI-E24	6	* 500800	5,8	J3-D	5	* 500703	
100			SHLD	AI-E18							

[illegible]



ITEM NO.	DWG TITLE WIRE HARJ- ION GUN CONT , 11-067						DWG NO 612366		REV. E		SHEET 7 OF 7		
	WIRE/COMP.			FROM			ROUTE	TO			REMARKS		
	PART NO.	COLOR	AWG	TERM	NOTE	PART NO.		TERM	NOTE	PART NO.			
126	502203	RED	22	A1-E5	TP		5,8	J3-A					
127	502213	RED/W	22	A1-E6			5,8	J3-C					
128													
129													
130													
131													
132	*606888	BLK	PGT				1	A3-E14					
133	▲	BRN	▲				1	A3-E7					
134		RED					1	A3-E4					
135		ORN					1	A3-E17					
136													
137		BLU					1	A2,P7-1	2	*607850			
138		BLU					1	A2,P7-2	2	*607850			
139		RED					7	A2,P2	2	*603609			
140		YEL					7	A2,P4	2	*603609			
141		RED					7	A2,P3	2	*603609			
142	▼	WHT	▼				7	A2,P1-1	2	*177070			
143	*606888	WHT	PGT				7	A2,P1-2	2	*177070			
144													
145													
146													
147													
148	*609593	—	PGT	P6			9	A2-J6					
149	*609593	—	PGT	P8			9	A2-J8					
150	*609593	—	PGT	P10			9	A2-J10					

THIS DRAWING CONTAINS PROPRIETARY INFORMATION AND ANY REPRODUCTION, DISCLOSURE OR USE OF THIS DRAWING IS EXPRESSLY PROHIBITED. ACCEPTANCE OF THIS DRAWING BY PHYSICAL ELECTRONICS INDUSTRIES INC. MAY BE TAKEN AS AGREE TO BE BOUND TO THE FRANCHISING AND DIMENSIONING POLICIES OF PEI.		DRW. <u>WV-018</u>	DATE <u>12-24-83</u>	 PHYSICAL ELECTRONICS INDUSTRIES INC. 8500 FLYING CLOUD DRIVE - IDEM PHAIRE, MINN. 55433
		DATE <u>12-24-83</u>		
		DATE <u>12-24-83</u>		
		DATE <u>12-24-83</u>		
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES		MATERIAL	TITLE	
X 1.000 ANGLES 1 OF 30			P.C.B. ASSEMBLY - BEAM & FOCUS	
X 1.010			SUPPLY	
X 1.005				
X 1.005				
REMOVE ALL BURRS AND SPRUE AND CHAMFER TOES				
NEXT ASSY - SHRN 000				
66-0027 77-667				
SIZE DRAWING NO.				REV.
D			U05959	H
SCALE		ONE	TWO	THREE
			SHEET	OF

DETACHED PARTS LIST

PERKIN-ELMER


Physical Electronics

TITLE: PC ASSY - BEAM & FOCUS SUPPLY

PART NO. L005959

REV: H

SHEET 1 OF 1

ITEM NO.	PART NUMBER	QUANTITY PER ASSEMBLY	DESCRIPTION	DOC CODE	REF. DESIGNATIONS / NOTES
1	L005958	1	PC BD-BEAM & FOCUS SUPPLY		
2	177228	5	IC-OP AMP, JFET, INPUT, LF356N		AR2-L
3	171414	1	IC-OP AMP, LM741CN		ARI
4	L001802	3	IC-V RGLTR, 5V, 1W, PW MOD, 3524N		VR1-3
5	L006760	2	IC-V RGLTR, ADJ, 37V, 1.5A, LM317K		VR4, 5
6	L002876	1	IC-ANALOG SWITCHES, LF13333N		UI
7		.			
8	279224	1	RES - 2.7K OHM, .25W, 5% RC07		R139
9	271040	3	RES - 33K OHM, 1W, 5% RC32		R147, 158, 159
10	279209	1	RES - 220 OHM, .25W, 5%, RC07		R7
11	478028	18	RES - 10K OHM, .25W, 5%, RC07		R6, 18, 20, 55, 61, 62, 91-94, 108, 111, 112, 114, 115, 119, 122, 140
		.			
12	279219	1	RES - 1.2 K OHM, .25W, 5%, RC07		R3
13	279226	1	RES - 3.3 K OHM, .25W, 5%, RC07		R117
14	279221	5	RES - 1.8 K OHM, .25W, 5%, RC07		R11, 21, 53, 65, 66
15	279242	3	RES - 33K OHM, .25W, 5%, RC07		R26, 51, 70
16	L006657	2	RES - 11K OHM, .25W, 5%, RC07		R59, 60
17	279252	2	RES - 100K OHM, .25W, 5%, RC07		R39, 44
18	279253	5	RES - 120K OHM, .25W, 5%, RC07		R25, 49, 63, 64, 69
19	279231	1	RES - 6.2K OHM, .25W, 5%, RC07		R113
20	279223	4	RES - 2.2K OHM, .25W, 5%, RC07		R28, 57A, 76, 116
21	279095	5	RES - F80 OHM, .25W, 5%, RC07		R31A, 41A, 71, 72, 125A
22	279210	4	RES - 270 OHM, .25W, 5%, RC07		R87, 90, 103, 106
23	371086	4	RES - 1.8K OHM, .5W, 5%, RC20		R86, 89, 102, 105

 PREPARED
M. Morris

 DATE
5-4-83

CHECKED

DATE

 APPROVED
T.H.

DATE

9-8-83

☐ ADD

DETACHED PARTS LIST

PERKIN-ELMER

Physical Electronics



TITLE: PC ASSY-BEAM & FOCUS SUPPLY

PART NO. 605959

REV H

SHEET 2 OF 7

ITEM NO.	PART NUMBER	QUANTITY PER ASSEMBLY	DESCRIPTION	DOC CODE	REF. DESIGNATIONS / NOTES
24	171017	2.	RES - 3.9K OHM, .5W, 5%, RC20		R130,135
25	279272	1.	RES - 1M OHM, .25W, 5%, RC07		R15
26	279232	5.	RES - 6.8K OHM, .25W, 5%, RC07		R2,4,22,56,120
27	602044	2.	RES - 2.4K OHM, .25W, 5%, RC07		R8,9
28	606656	2.	RES - 240 OHM, .25W, 5%, RC07		R131,136
29	279237	1.	RES - 18K OHM, .25W, 5%, RC07		R5
30	279250	1.	RES - 82K OHM, .25W, 5%, RC07		R1
31	279269	1.	RES - 680K OHM, .25W, 5%, RC07		R109
32	279284	3.	RES - 10M OHM, .25W, 5%, RC07		R110,56A,120A
33	171005	2.	RES - 51 OHM, .5W, 5%, RC20		R138,144
34	378050	4.	RES - 8.2K OHM, .25W, 5%, RC07		R23,24,67,68
35	279234	1.	RES - 9.1K OHM, .25W, 5%, RC07		R121
36	478029	1.	RES - 27K OHM, .25W, 5%, RC07		R118
37	279239	1.	RES - 22K OHM, .25W, 5%, RC07		R54
38		.			
39	279215	1.	RES - 680 OHM, .25W, 5%, RC07		R52
40	279096	1.	RES - 390 OHM, .25W, 5%, RC07		R19
41		.			
42	273005	4.	RES - 47K OHM, .5W, 5%, RC20		R151,152,156,157
43		.			
44	606660	4.	RES - 160 OHM, 2W, 5% RC42		R40,48,88,104
45	601951	2.	RES - 150 OHM, 2W, 5% RC42		R59A,125
46	606659	2.	RES - 130 OHM, 2W, 5% RC42		R58,124
47	606658	1.	RES - 120 OHM, 1W, 5% RC32		R143
48	272067	2.	RES - 100 OHM, 1W, 5% RC32		R141,142

PREPARED

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DATE

9-8-83

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DETACHED PARTS LIST

PERKIN-ELMER


Physical Electronics

TITLE: PC ASSY-BEAM & FOCUS SUPPLY

PART NO. 605959

REV H

SHEET 3 OF 7

ITEM NO.	PART NUMBER	QUANTITY PER ASSEMBLY	DESCRIPTION	DOC CODE	REF. DESIGNATIONS / NOTES
49	604965	2.	RES - 1.82K OHM, .12W, 1%, RN55D		R17,32
50	603133	2.	RES - 2K OHM, .12W, 1%, RN55D		R14,46
51	604347	3.	RES - 49.9K OHM, .12W, 1%, RN55D		R84,127,133
52	606652	4.	RES - 57.6K OHM, .12W, 1%, RN55D		R80,83,97,100
53	606649	4.	RES - 6.19K OHM, .12W, 1%, RN55D		R79,82,96,99
54	606650	4.	RES - 6.65K OHM, .12W, 1%, RN55D		R78,81,95,98
55		.			
56	606804	2.	RES - 41.2K OHM, .12W, 1%, RN55D		R34,45
57	603137	2.	RES - 4.99K OHM, .12W, 1%, RN55D		R29,77
58	606647	1.	RES - 249 OHM, .12W, 1%, RN55D		R37
59	603768	1.	RES - 9.09K OHM, .12W, 1%, RN55D		R74
60	606648	1.	RES - 3.09K OHM, .12W, 1%, RN55D		R47
61	603594	1.	RES - 9.53K OHM, .12W, 1%, RN55D		R35
62	606651	1.	RES - 40.2K OHM, .12W, 1%, RN55D		R36
63	603140	6.	RES - 10K OHM, .12W, 1%, RN55D		R30,31,38,42,85,126
64	603134	1.	RES - 3.01K OHM, .12W, 1%, RN55D		R13
65	606684	4.	RES - 100M OHM, 1.5W, 1%, 10KV		R145,146,153,154
66	606653	1.	RES - 1.15K OHM, .25W, 1%, RN60D		R10
67	606683	2.	RES - 0.12 OHM, 2W, 1%, LVR-2		R132,137
68	606682	1.	RES - 0.03 OHM, 2W, 1%, LVR-2		R57
69	609147	1.	RES - 866 OHM, .12W, 1%, RN55D		R57C
70	279228	1.	RES - 4.7K OHM, .25W, 5%, RC07		R125B
71	609149	1.	RES - 1.87K OHM, .12W, 1%, RN55D		R50
72	279266	2.	RES - 470K OHM, .25W, 5%, RC07		R101,129
73		.			

 PREPARED
M. MORRIS

 DATE
5-4-83

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DATE

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TJ

 DATE
9-8-83

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DETACHED PARTS LIST

PERKIN-ELMER 
Physical Electronics

TITLE: PC ASSY-BEAM & FOCUS SUPPLY

PART NO. L605959 REV H
SHEET 4 OF 7

ITEM NO.	PART NUMBER	QUANTITY PER ASSEMBLY	DESCRIPTION	DOC CODE	REF DESIGNATIONS / NOTES
74	610203	1.	RES - 1.5M OHM, .12W, 1%, RN55D		137B
75	610202	1.	RES - 560 OHM, .1W, 5%, RC32		137A
76	603696	1.	RES - 2.37K OHM, .12W, 1%, RN55D		R107
77	606807	2.	RES - 200K OHM, .12W, 1%, RN55D		R150, 155
78		.			
79		.			
80		.			
81	471031	1.	POT - 2K, .25W, 20 TURNS, TRIM, S/A		R57B
82	273030	1.	POT - 2M, .25W, 20 TURNS, TRIM, T/A		R137C
83	472033	1.	POT - 1K, .25W, 20 TURNS, TRIM T/A		R43
84	471030	3.	POT - 2K, .5W, 20 TURNS, TRIM T/A		R16, 33, 75
85	472042	1.	POT - 5K, .25W, 20 TURNS, TRIM T/A		R41
86	373057	2.	POT - 10K, .5W, 20T-TRMR - T/A		R12, 47A
87	472041	3.	POT - 25K, .25W, 20 TURNS, TRIM T/A		R27, 73, 128
88		.			
89	603954	1.	DIODE - ZENER 3.3V, 5%, .4W IN746A		CR25A
90	273017	1.	DIODE - ZENER, 6.2V, 100MW, IN823A		CR3
91	279184	8.	DIODE - RECT, 5KV, .040A LM50		CR33-40
92	606685	6.	DIODE - HV SW, 200V, .15A IN3070		CR17-21, 25
93	606686	4.	DIODE - FAST RCVY, 100V, 1A IN4934		CR22, 23, 28, 29
94	471007	12.	DIODE - SIG, 175V, 100MA, IN459A		CR2, 4-9, 10-14
95	606687	2.	DIODE - FAST RCVY, 100V, 5A MR821		CR31, 32
96	606772	3.	DIODE - ZENER, 4.7V, 5%, .4W IN750A		CR6A, 6D, 26A
97	609144	1.	DIODE - ZENER, IN752A		CR1
98		.			

PREPARED
M. Morris

DATE
5-4-83

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DATE

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DATE
9-8-83

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DETACHED PARTS LIST

PERKIN-ELMER 
Physical Electronics

TITLE: PC ASSY-BEAM & FOCUS SUPPLY

PART NO. 605959 REV H
SHEET 5 OF 7

ITEM NO.	PART NUMBER	QUANTITY PER ASSEMBLY	DESCRIPTION	DOC CODE	REF DESIGNATIONS / NOTES
99	476179	11 .	TRANSZORB-15V, 60A MPTE-15		CR6B, 6C, 10A, 15, 16, 19A, 21A, 24, 26, 27, 30
100	472043	3 .	CAP-1UF, 50V, CER, RDL		C13A, 23, 31
101	606832	1 .	CAP-2.2UF, 50V, ML CER, RDL		C18A
102	606698	1 .	CAP-5.6UF, 25V, TANT, DP RDL		C9
103	278002	18 .	CAP-.01UF, 50V ML CER, RDL		CF'S, C9A
104	606700	1 .	CAP-3100UF, 15V, ELCTLT, TUB		C20
105	171455	1 .	CAP-.005UF, 100V, CER-DISC		C13
106	606701	1 .	CAP-4700UF, 35V, CER-DISC		C12
107	606695	3 .	CAP-.33UF, 50V, ML CER RDL		C1, 14, 17
108	171472	6 .	CAP-500 PFD, 6KV, CER-DISC		C21, 22, 24, 29, 30, 33
109	177032	1 .	CAP-100UF, 20VDC, TANT, TUB		C11A
110	606697	8 .	CAP-220 PF, 3KVDC, CER DISC		C25-28, 32, 34-36
111	177254	2 .	CAP-220PF, 5%, 50V, MICA		C7, 11
112	477027	5 .	CAP-12UF, 25VDC, TANTALUM, ELCTLT		C4-6, 16, 19
113	171468	1 .	CAP-100PF, 1KV, CER-DISC		C3
114	606696	2 .	CAP-18 PF, 1KVDC, CER DISC		C2, 8
115		.			
116	606699	1 .	CAP-680UF, 25V, ELCTLT, AXL		C10
117	373037	1 .	CAP-.01UF, 100V, FILM		C1A
118	601279	2 .	CAP-10UF, 25VDC, TANT, RDL		C15, 18
119		.			
120	606688	2 .	XSTR-NPN, PWR, 120V, 140W, 2N6354		Q36, 37
121	478126	23 .	XSTR-NPN, 40V, 310MW 2N3904		Q1, 2, 4-8, 10-13, 14A, 16-19, 22, 23, 26, 27, 33-35

PREPARED
M. Morris

DATE
5-4-83

CHECKED

DATE

APPROVED

T.H.

DATE

9-8-83

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DETACHED PARTS LIST

PERKIN-ELMER

Physical Electronics



TITLE:

PC ASSY-BEAM & FOCUS SUPPLY

PART NO. 605959

REV

H

SHEET 6 OF 7

ITEM NO.	PART NUMBER	QUANTITY PER ASSEMBLY	DESCRIPTION	DOC CODE	REF. DESIGNATIONS / NOTES
122	179313	5.	XSTR-PNP, 40V, 350MW 2N3906		Q3, 9, 30-32
123	279187	4.	XSTR-NPN, 80V, 6W, 2N5337		Q40, 41, 44, 45
124	603960	12.	XSTR-NPN, 40V, .52 2N2219A		Q14, 15, 20, 21, 24, 25, 28, 29, 38, 39, 42, 43
125		.			
126	609145	1.	XSTR NTWK- CA3118		QNI
127	528500	16.	INSULATOR-MTG PAD, TO-5, NYLON		XQ14, 15, 20, 21, 24, 25, 28, 29, 38-45
128		.			
129	606858	2.	TRANSFORMER-POWER INVERTER		T1, 2
130	606851	1.	TRANSFORMER-POWER INVERTER		T3
131		.			
132		.			
133	606758	1.	CHOKE-PWR LINE, OPEN, 220 UH, 2.8A		L3
134	606756	1.	CHOKE-PWR LINE, OPEN, 39 UH, 4A		L1
135	606757	1.	CHOKE-PWR LINE, OPEN, 120 UH, 2A		L2
136		.			
137	606761	2.	RELAY-12VDC, SPDT, 5A, PCB MTG		K1, 2
138		.			
139	272049	6.	SOCKET-IC, 8 PIN, DIP, L PROFILE		XARI-L
140	378029	4.	SOCKET-IC, 16 PIN, DIP		XVR1-3, XU1
141		.			
142	601268	4.	HEAT SINK-TO-3, BLK ANDZ, 6013B		XVR4, 5, XQ36, 37
143	602823	2.	EJECTOR-PCB, 2 IN LG, .062, PLSTC		
144	613074	1.	SHIELD-HV BOARD EDGE, BEAM & FOCUS		
145	541806	2.	SCREW-PNH, 4-40x.375, SST, PHH		

PREPARED
M. MORRISDATE
5-4-83

CHECKED

DATE

APPROVED
T.H.

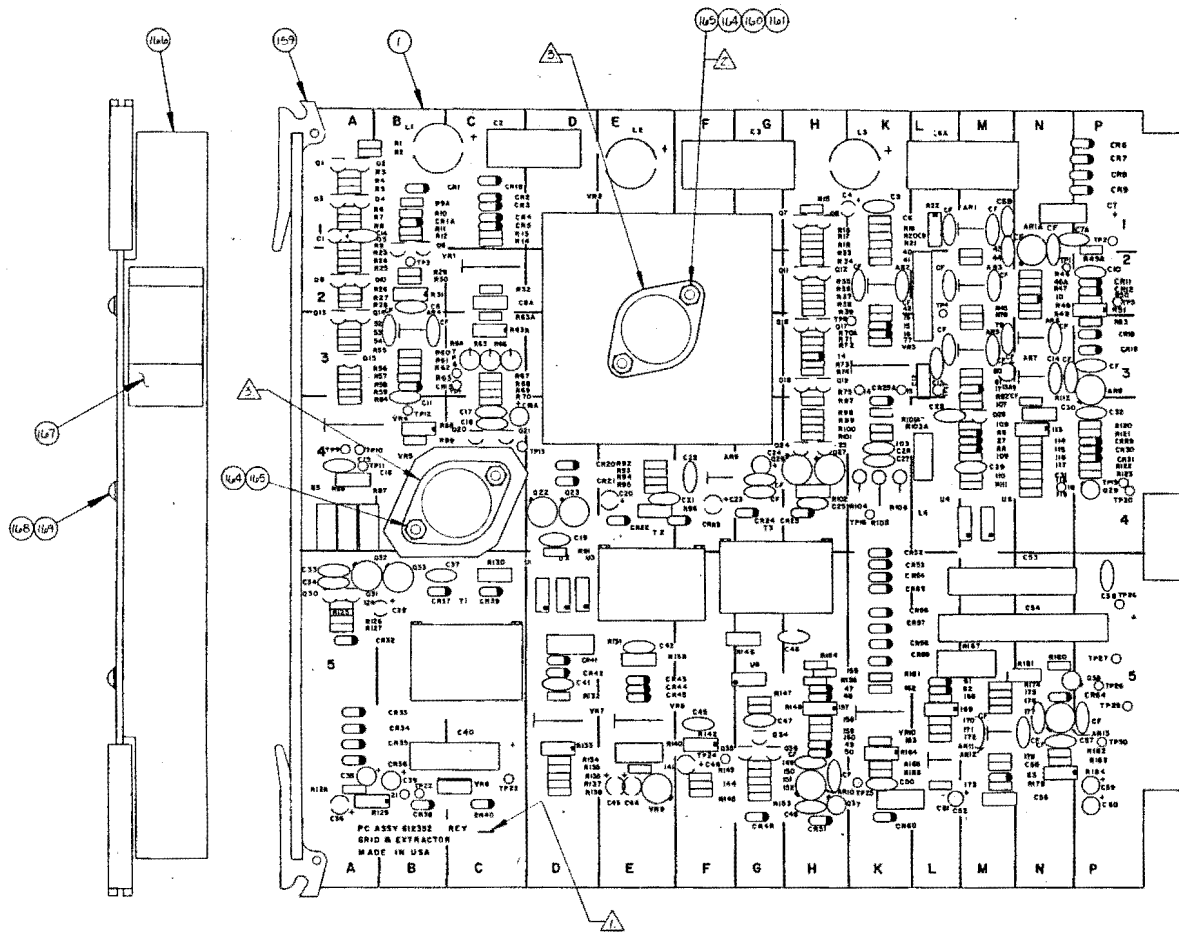
DATE

9-8-83

☐ ADD

☐ **ADD**

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED
A	1	RELEASE PER ECO 5085 SUPERSEDES 605589	7-85	BT
B	2	SEE ECO 5333	10-8-85	BT



NOTES:

- △ MARK REVISION LEVEL OF THIS DRAWING IN SPACE PROVIDED.
- △ INSTALL FLAT WASHER, ITEM 161, BETWEEN HEATSINK, ITEM 100, AND PC BOARD.
- △ APPLY HEAT SINK COMPOUND, TYP 2 PLACES.

SEE DETACHED PARTS LIST

THIS DRAWING CONTAINS PROPRIETARY INFORMATION AND ANY REPRODUCTION, DISCLOSURE OR USE OF THIS DRAWING IS EXPRESSLY PROHIBITED EXCEPT AS PHYSICALLY AGREED TO IN WRITING.		DATE: 6-25-85	
UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES TOLERANCES:		DRAWN: J. WEINGER	
X .100 ANGLES 1 OF 30		DATE: 6-25-85	
XX .010 BACH		DATE: 6-25-85	
XXX .005 SURF		DATE: 6-25-85	
NEXT ASSY USED ON: MAX		DATE: 6-25-85	
BREAK SHARP EDGES		DATE: 6-25-85	
MATERIAL:		DATE: 6-25-85	
FINISH:		DATE: 6-25-85	
DATE: 6-25-85		DATE: 6-25-85	
SCALE: 1/8" = 1"		SCALE: 1/8" = 1"	
SHEET 1 OF 1		SHEET 1 OF 1	

PHYSICAL ELECTRONICS INDUSTRIES INC.
8201 FLYING CLOUD DRIVE - EDES PRAIRIE, ILL. 60124

TITLE: P.C.B. ASSEMBLY-EXTRACTOR & GRID SUPPLY

DATE: 6-25-85
SCALE: 1/8" = 1"
SHEET 1 OF 1

DETACHED PARTS LIST

PERKIN-ELMER 
Physical Electronics

TITLE: PC ASSY-EXTRACTOR #
GRID SUPPLY

PART NO. 612352 REV 8

SHEET 1 OF 8

ITEM NO.	PART NUMBER	QUANTITY PER ASSEMBLY	DESCRIPTION	DOC CODE	REF. DESIGNATIONS / NOTES
1	612351	1.	PC BD-EXTRACTOR # GRID SUPPLY		
2	601802	3.	IC-V RGLTR, 5V, 1W, PW MOD, 3524N		VR1,3,4
3	171414	4.	IC-OP AMP LM741CN		AR1,5,6,12
4	177392	3.	IC-V TO FREQ CONVERTER, XR-4151		AR2,7,11
5	171415	3.	IC-V RGLTR, +/-40V, 1W, LM723CN		VR7,8,10
6	472045	4.	IC-OP AMP LM208H		AR8,10,13,14
7	177228	3.	IC-OP AMP, JFET, INPUT, LF356N		AR3,4,9
8	606826	1.	IC-V RGLTR, ADJ, 37V, .5A, LM337H		VR9
9	606760	2.	IC-V RGLTR, ADJ, 37V, 1.5A, LM317K		VR2,5
10	603903	1.	IC-V RGLTR, NEG, ADJ 1-37V, LM337T		VR6
11		.			
12		.			
13	606825	6.	OPT CPLR / ISOLATOR, 10KV, OPI 110		UI-6
14		.			
15		.			
16	601419	2.	XSTR-FET, N-CHAN 2N4093		Q29,37
17	279187	6.	XSTR-NPN, 80V, 6W 2N5337		Q22,23,26,27,32,33
18	478126	22.	XSTR-NPN, 40V, 310MW 2N3904		Q3,5-10,13-16,18-21,24,25,28,30,31,35,36
		.			
19	179313	7.	XSTR-PNP, 40V, 350MW 2N3906		Q1,2,4,11,12,17,34
20	606827	1.	XSTR-JFET, P CHAN 2N5115		Q38
21		.			
22		.			
23		.			

PREPARED
J. WERINGER

DATE
6-25-85

CHECKED
G. TAKO

DATE
7-8-85

APPROVED
TJS

DATE
8-20-85

☐ ADD

DETACHED PARTS LIST

PERKIN-ELMER Physical Electronics			TITLE: PC ASSY- EXTRACTOR # GRID SUPPLY		PART NO. 612352	REV B
			SHEET 2 OF 8			
ITEM NO.	PART NUMBER	QUANTITY PER ASSEMBLY	DESCRIPTION	DOC CODE	REF. DESIGNATIONS / NOTES	
24	471007	19.	DIODE - SIG, 175V, 100MA IN459A		CR1A, 2-5, 13-16, 31, 41-45, 51, 61, 62, 64	
25	603955	13.	DIODE - H SP SW, 75V, .25W, IN914		CR11, 12, 17, 26-30, 47-50, 63	
26	606686	6.	DIODE - FAST RCY, 100V, 1A IN4934		CR22-25, 37, 39	
27	606822	4.	DIODE - FAST RCY, 400V, 1A MR814		CR52-55	
28	606823	4.	DIODE - FAST RCY, 100V, 3A MR851		CR33-36	
29	606824	4.	DIODE - FAST RCY, 400V, 3A MR854		CR56-59	
30	606772	1.	DIODE - ZENER, 4.7V, 5%, .4W IN750A		CR1B	
31	478012	1.	DIODE - ZENER, 11V, 400MW, IN962B		CR10	
32	476179	15.	TRANSORB-15V, 60A MPTE15		CR1, 6-9, 18-21, 25A, 32, 38, 40, 46, 60	
33	603133	2.	RES - 2K OHM, .12W, 1%, RN55D		R63A, 89	
34	609152	1.	RES - 4.12K OHM, .12W, 1%, RN55D	11	R50	
35	606801	1.	RES - 17.4K OHM, .12W, 1%, RN55D		R143	
36	603132	2.	RES - 1K OHM, .12W, 1%, RN55D		R48, 49	
37	603140	10.	RES - 10K OHM, .12W, 1%, RN55D		R21, 40, 41, 43, 44, 46, 102A, 122, 153, 176	
38	603770	1.	RES - 11.5K OHM, .12W, 1%, RN55D		R45	
39	606096	2.	RES - 7.15K OHM, .12W, 1%, RN55D		R137, 166	
40	603944	4.	RES - 3.92K OHM, .12W, 1%, RN55D		R134, 136, 163, 165	
41	602948	3.	RES - 205 OHM, .12W, 1%, RN55D		R83, 160, 182	
42	603137	4.	RES - 4.99K OHM, .12W, 1%, RN55D		R42, 47, 60, 94	
43	605428	2.	RES - 392K OHM, .12W, 1%, RN55D		R154, 161	

PREPARED J. WEBINGER	DATE 6-25-85	CHECKED G. TAVO	DATE 7-8-85	APPROVED TJS	DATE 8-20-85	☐ ADD
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DETACHED PARTS LIST

PERKIN-ELMER			TITLE: PC ASSY- EXTRACTOR & GRID SUPPLY		PART NO 612352	REV B
Physical Electronics					SHEET 3 OF 8	
ITEM NO.	PART NUMBER	QUANTITY PER ASSEMBLY	DESCRIPTION	DOC CODE	REF. DESIGNATIONS / NOTES	
44	602947	1.	RES- 121 OHM , .12W , 1% , RN55D		R144	
45	603131	3.	RES- 100 OHM , .12W , 1% , RN55D		R121, 158, 180	
46	606652	1.	RES- 57.6K OHM , .12W , 1% , RN55D		R20	
47	603598	2.	RES- 100K OHM , .12W , 1% , RN55D		R80, 81	
48	603586	1.	RES- 499 OHM , .12W , 1% , RN55D		R155	
49	606805	1.	RES- 54.9K OHM , .12W , 1% , RN55D		R78	
50	606797	1.	RES- 732 OHM , .12W , 1% , RN55D		R145	
51	606804	2.	RES- 41.2K OHM , .12W , 1% , RN55D		R14, 103	
52	610236	1.	RES- 20.5K OHM , .12W , 1% , RN55D		R156	
53	606800	1.	RES- 12.1K OHM , .12W , 1% , RN55D		R170	
54	606806	3.	RES- 60.4K OHM , .12W , 1% , RN55D		R112, 175, 177	
55	606807	3.	RES- 200K OHM , .12W , 1% , RN55D		R120, 159, 183	
56	603768	1.	RES- 9.09K OHM , .12W , 1% , RN55D		R19	
57	606803	1.	RES- 26.1K OHM , .12W , 1% , RN55D		R114	
58	606171	1.	RES- 22.6K OHM , .12W , 1% , RN55D		R132	
59	603595	2.	RES- 15K OHM , .12W , 1% , RN55D		R61, 150	
60	606808	1.	RES- 2 OHM , .75W , 1% , RS-1/2		R162	
61	478029	3.	RES- 27K OHM , .25W , 5% , RC07		R1, 18, 173	
62	279211	3.	RES- 330 OHM , .25W , 5% , RC07		R56, 91, 111	
63	279096	1.	RES- 390 OHM , .25W , 5% , RC07		R58	
64	279226	9.	RES- 3.3K OHM , .25W , 5% , RC07		R6, 35, 69, 70, 98, 99, 125, 127, 147	
65	279206	1.	RES- 120 OHM , .25W , 5% , RC07		R128	
66	279197	1.	RES- 22 OHM , .25W , 5% , RC07		R138	
67	279230	1.	RES- 5.6K OHM , .25W , 5% , RC07		R115	

PREPARED J. WEBINGER	DATE 6-25-85	CHECKED H. TAKU	DATE 7-8-85	APPROVED T. K.	DATE 8-20-85	☐ ADD
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DETACHED PARTS LIST

PERKIN-ELMER 
Physical Electronics

TITLE: PC ASSY - EXTRACTOR #
GRID SUPPLY

PART NO. 612352

REV **B**

SHEET 4 OF 8

ITEM NO.	PART NUMBER	QUANTITY PER ASSEMBLY	DESCRIPTION	DOC CODE	REF. DESIGNATIONS / NOTES
68	279252	2.	RES-100 K OHM, .25W, 5%, RC07		R32,77
69	279242	3.	RES-33K OHM, .25W, 5%, RC07		R12,28,74
70	378050	4.	RES-8.2K OHM, .25W, 5%, RC07		R10,29,73,75
71	279231	2.	RES-6.2K OHM, .25W, 5%, RC07		R16,24
72	279229	2.	RES-5.1K OHM, .25W, 5%, RC07		R118,172
73	279218	1.	RES-910 OHM, .25W, 5%, RC07		R82
74	478028	18.	RES-10K OHM, .25W, 5%, RC07		R2,3,4,9,13,17,26,27,33, 34,39,57,59,70A,72,119,149, 171
75	606810	6.	RES-91 OHM, .25W, 5%, RC07		R67,68,100,101,124,126
76	279219	2.	RES-1.2K OHM, .25W, 5%, RC07		R52,107
77	279223	4.	RES-2.2K OHM, .25W, 5%, RC07		R7,30,36,110
78	279246	2.	RES-56K OHM, .25W, 5%, RC07		R117,178
79	279255	1.	RES-150K OHM, .25W, 5%, RC07		R109
80	279194	2.	RES-12 OHM, .25W, 5%, RC07		R41,168
81	279253	2.	RES-120K OHM, .25W, 5%, RC07		R11,97
82	279205	2.	RES-100 OHM, .25W, 5%, RC07		R79,179
83	606656	2.	RES-240 OHM, .25W, 5%, RC07		R63,92
84	279284	5.	RES-10M OHM, .25W, 5%, RC07		R8,15,123,152,174
85	279269	2.	RES-680K OHM, .25W, 5%, RC07		R5,37
86	603766	1.	RES-16K OHM, .25W, 5%, RC07		R53
87	279215	1.	RES-680 OHM, .25W, 5%, RC07		R76
88	279232	1.	RES-6.8K OHM, .25W, 5%, RC07		R55
89	279239	3.	RES-22K OHM, .25W, 5%, RC07		R23,71,108
90	279244	2.	RES-47K OHM, .25W, 5%, RC07		R135,148

PREPARED
J. WEBINGER

DATE
6-25-85

CHECKED

G. TAYLOR 7-8-85

DATE

APPROVED

TJS

DATE

8-20-85

☐ ADD

DETACHED PARTS LIST

PERKIN-ELMER 
 Physical Electronics

 TITLE: PC ASSY - EXTRACTOR &
 GRID SUPPLY

PART NO. 612352

REV B

SHEET 5 OF 8

ITEM NO.	PART NUMBER	QUANTITY PER ASSEMBLY	DESCRIPTION	DOC CODE	REF. DESIGNATIONS / NOTES
91	279221	4.	RES- 1.8 K OHM, .25W, 5%, RC07		R25,38,62,93
92	171025	2.	RES- 39 K OHM, .5W, 5%, RC20		R139,146
93	171006	1.	RES- 100 OHM, .5W, 5%, RC20		R130
94	171010	1.	RES- 1K OHM, .5W, 5%, RC20		R181
95	606812	6.	RES- 360 OHM, 1W, 5%, RC32		R64,66,85,86,104,106
96	606811	1.	RES- 330 OHM, 1W, 5%, RC32		R131
97	606813	2.	RES- 180 OHM, 2W, 5%, RC42		R140,147
98	171097	2.	RES- .1 OHM, 3W, 3%, RW79		R65,87
99	606809	1.	RES- .05 OHM, 2W, 1%, LVR-2		R105
100	279236	1.	RES- 15K OHM, .25W, 5%, RC07		R95
101	602147	1.	RES- 3.6K OHM, .25W, 5%, RC07		R84
102	177253	2.	RES- 1K OHM, .25W, 5%, RC07		R54,151
103	279220	1.	RES- 1.5K OHM, .25W, 5%, RC07		R116
104	279095	2.	RES- 180 OHM, .25W, 5%, RC07		R9A,101A
105	472042	3.	POT- 5K, .25W, 20 TURNS, TRIM, T/A		R22,113,149
106	471109	1.	POT- 500 OHM, .5W, T/A		R142
107	472040	3.	POT- 50K, .25W, 20 TURNS, TRIM, T/A		R51,157,184
108	471030	3.	POT- 2K, .5W, 20 TURNS, TRIM T/A		R129,133,164
109	472033	2.	POT- 1K, .25W, 20 TURNS, TRIM T/A		R638,88
110	177401	1.	POT- 200K, .25W, 20 TURNS, TRIM T/A		R31
111	171005	2.	RES- 51 OHM .5W, 5%, RC20		R96,102
112	606759	1.	CHOKE - PWR LINE, OPEN, 330UH, 1.3A		L1
113	606757	2.	CHOKE - PWR LINE, OPEN, 120UH, 2A		L2,3
114	612422	1.	RES- 1.13K OHM, .12W, 1% RN55D		R49A
115	612423	1.	RES- 1.05K OHM, .12W, 1% RN55D		R46A

 PREPARED
 J. WEBINGER

 DATE
 6-25-85

CHECKED

A. TAKO

DATE

7-8-85

APPROVED

TJS

DATE

8-20-85

☐ ADD

DETACHED PARTS LIST

PERKIN-ELMER



Physical Electronics

TITLE: PC ASSY-EXTRACTION +
GRID SUPPLY

PART NO. 612352

REV

B

SHEET 6 OF 8

ITEM NO.	PART NUMBER	QUANTITY PER ASSEMBLY	DESCRIPTION	DOC CODE	REF. DESIGNATIONS / NOTES
116	472043	1 .	CAP- 1UF , 50V , ML CER , RDL		C13
117	602139	1 .	CAP- .47UF, 25VDC, CER DISC		C41
118	278002	33 .	CAP- .01UF, 50V, ML CER , RDL		CF'S, C5, 8, 14, 15, 19, 29, 1A, 37, 50
119	174092	3 .	CAP- .01UF, 200V, FILM TUBE		C8A, 12, 16
120	602140	3 .	CAP- .001UF, 25VDC, PS, TUBE		C6, 31, 55
121	171468	4 .	CAP- 100 PF, 1KV , CER-DISC		C32, 57, 68, 7A
122	174085	1 .	CAP- 5 PF, 1KV , CER DISC		C28
123	177032	1 .	CAP- 100UF, 20VDC, TANT, TUBE		C7
124	177035	1 .	CAP- .1MF, 50VDC, FILM		C51
125	371015	1 .	CAP- .001MF, 1KV , CER		C49
126	374049	2 ..	CAP- 2 PF, 500V , MICA		C11, 22
127	603951	6 .	CAP- 1UF , 35V, DP TANT, RDL		C18A, 24, 36, 43, 46, 52
128	477157	1 .	CAP- .1UFD, 50V , CER		C10
129	609186	1 .	CAP- .47 MF, 50V, FILM		C9
130	171455	2 .	CAP- .005MF, 100V, CER DISC		C21, 25
131	477027	9 .	CAP- 12MF, 25VDC, TANTALUM, ELCTLT		C13A, 20, 23, 35, 38, 39, 44, 59, 60
132	273025	1 .	CAP- .1UF , 500V, ML CER, RDL		C58
133	479209	1 .	CAP- 1UF , 400VDC, POLYEST		C53
134	606831	2 .	CAP- 300 PF, 1KV , CER DISC		C42, 48
135	606833	2 .	CAP- .0039UF, 33V, PS FILM, TUB		C30, 56
136	606698	2 .	CAP- 5.6UF, 25V, TANT, DP RDL		C1, 4
137	606832	1 .	CAP- 2.2UF, 50V, ML CER, RDL		C45
138	606829	1 .	CAP- 300UF, 25V, ELCTLT, TUB		C40
139	606830	1 .	CAP- 950 UF, 25V, ELCTLT, TUB		C2

PREPARED
J. WEBINGERDATE
6-25-85

CHECKED

G. TANO

DATE

7-8-85

APPROVED

TJS

DATE

8-7-85

☐ ADD

DETACHED PARTS LIST

PERKIN-ELMER			TITLE: PC ASSY- EXTRACTION & GRID SUPPLY		PART NO. 612352	REV B
Physical Electronics					SHEET 7 OF 8	
ITEM NO.	PART NUMBER	QUANTITY PER ASSEMBLY	DESCRIPTION	DOC CODE	REF. DESIGNATIONS / NOTES	
140	606773	2.	CAP- 1800 UF, 25V, ELCTLT, TUB		C3, 6A	
141	606828	1.	CAP- 12 UF, 350V, ELCTLT, TUB		C54	
142	278140	4.	CAP- .02UF, 100VDC, CER DISC		C17, 18, 26, 27	
143	275028	2.	CAP- .0015MF, 1KV, CER DISC		C33, 34	
144	602136	1.	CAP- .22UF, 50V, ML CER RDL		C47	
145	478128	1.	IDCTR- MOLDED, 3.3 MH, AS, LEAD		L4	
146		.				
147	606853	2.	TRANSFORMER - POWER INVERTER		T2, 3	
148	606844	1.	TRANSFORMER - POWER INVERTER		T1	
149		.				
150	606834	1.	HEAT SINK- TO 3, BLK ANDZ, 6033B-34		XVR2	
151	601268	1.	HEAT SINK- TO-3, BLK ANDZ, 6013B		XVR5	
152		.				
153	272049	10.	SOCKET- IC, 8 PIN, DIP, L PROFILE		XAR1-7, 9, 11, 12	
		.				
154	179192	4.	SOCKET- IC, TO-5, 8 PIN, SD- 5178		XAR 8, 10, 13, 1A	
155	378028	3.	SOCKET- IC, 14 PIN, DIP		XVR 7, 8, 10	
156	378029	3.	SOCKET- IC, 16 PIN, DIP		XVR1, 3, 4	
157		.				
158	528500	7.	INSULATOR-MTG PAD, TO-5, NYLON		XQ22, 23, 26, 27, 32, 33 XVR9	
159	602823	2.	EJECTOR - PCB, 2 IN LG, .062 PLSTC			
160	541906	2.	SCREW- PNH, 6-32 X .375, SST, PHH			
161	512006	2.	WASHER- FLAT #6, SST			
162		.				
163		.				
PREPARED J. WEBINGER		DATE 6-25-85	CHECKED G. TAKO	DATE 7-8-85	APPROVED TJS	DATE 8-20-85
						☐ ADD

Φ

TITLE: PC ASSY- EXTRACTION #
GRID SUPPLY

REV B.

SHEET 1 OF 1

PREPARED
J. WEBINGER

DATE
6-25-85

CHECKED *A. TAKO*

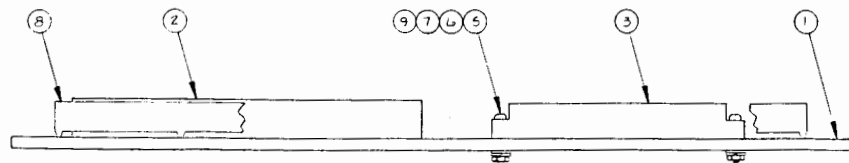
DATE
7-8-85

APPROVED *TJS*

DATE
8-70-85

☐ ADD

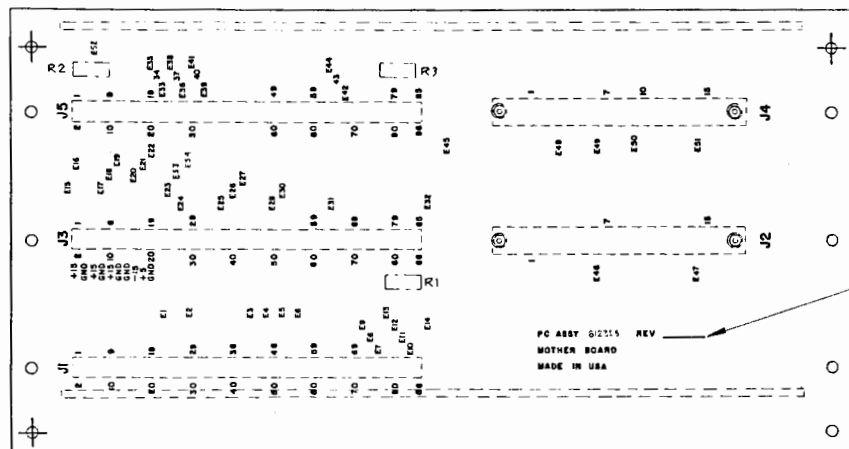
ZONE	REV	DESCRIPTION	DATE	APPROVED
A		RELEASE PER ECD 5095 SUPERSEDES 609936	7.85	GT
B		SEE ECD 5325	J2 10-2-85	GT



NOTES:

△ MARK REVISION LEVEL OF THIS DRAWING
IN SPACE PROVIDED.

2. REMOVE CONTACTS INDICATED FROM THE
FOLLOWING CONNECTORS BEFORE INSTALLING
J2 — 2 THRU 4 & 8 THRU 14
J4 — 2, 3, 5, 6, 8, 9, 11 THRU 14



SEE DETACHED PARTS LIST

THIS DRAWING CONTAINS PROPRIETARY INFORMATION AND ANY REPRODUCTION, DISCLOSURE OR USE OF THIS DRAWING IS EXPRESSLY PROHIBITED EXCEPT AS PHYSICAL ELECTRONICS INDUSTRIES, INC. MAY OTHERWISE AGREE TO IN WRITING FOR REPAIR AND DISCONTINUING FOR AUGUST 1, 1983.		DRN 612355	DATE 10-2-85	PHYSICAL ELECTRONICS INDUSTRIES, INC. 6009 FLYING CLOUD DRIVE - Eagan, MINN. 55121
CKD 612355	DATE 10-2-85	APPRO 612355	DATE 10-2-85	TITLE P.C.B. ASSEMBLY - MOTHER, ION GUN CONTROL
UNLESS OTHERWISE SPECIFIED		MATERIAL		
DIMENSIONS ARE IN INCHES		FINISH		
TOLERANCES		SCALE 1"=1.0"		
X .020 ANGLES 10°/30°		SHEET 1 OF 1		
XX .010 MACH .01		REV B		
XXX .005 SURF		DATE 10-2-85		
REMOVE ALL BURRS AND BREAK SHARP EDGES		MAX		
NEXT ASSY USED ON		DATE 10-2-85		

8

7

6

5

4

3

2

1

DETACHED PARTS LIST

Physical Electronics



TITLE: P.C. BD ASSY-MOTHER,
ION GUN CONTROL

REV : B

SHEET 1 OF 1

[illegible]

DATE
6-25-85

CHECKED *GEORGE TAKO* DATE *7-8-85*

APPROVED *TJS*

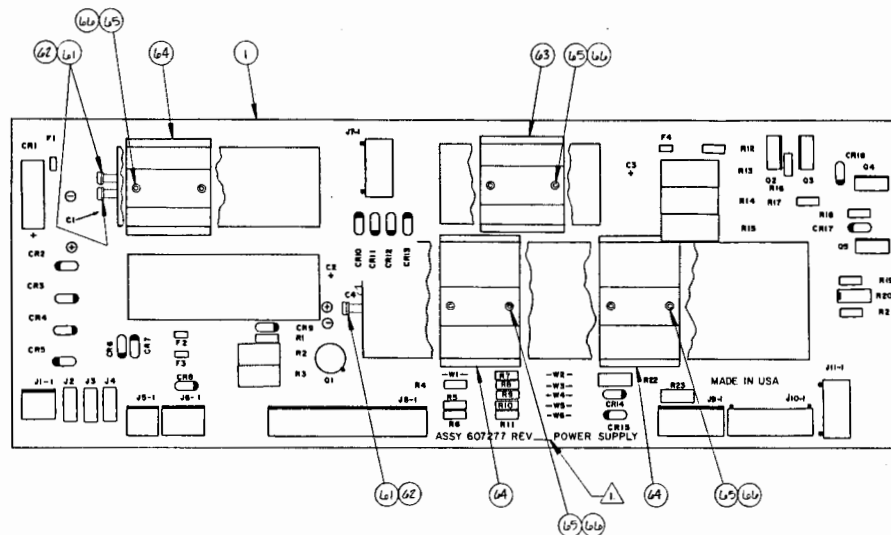
DATE
8-70-85

ADD

ZONE	REV	DESCRIPTION	DATE	APPROVED
A		RELEASE FOR PRODUCTION	1-17-84	GT
B		SEE ECD 9715	DDJ	2-10-84
C		HDN CHG	8-15-85	GT

NOTES:

▲ MARK REVISION LEVEL OF THIS DRAWING
IN SPACE PROVIDED.



SEE DETACHED PARTS LIST

THIS DRAWING CONTAINS PROPRIETARY INFORMATION AND ANY REPRODUCTION OR DISCLOSURE OF THIS DRAWING IS EXPRESSLY PROHIBITED EXCEPT AS PHYSICAL ELECTRONICS INDUSTRIES, INC. MAY OTHERWISE AGREE TO IN WRITING. TOL. FRACTIONING AND DIMENSIONING PER ANSI Y14.5 - 1974.		DRN: M. W. R. S. DATE: 1-17-84	PHYSICAL ELECTRONICS INDUSTRIES, INC. 6308 FLYING CLOUD DRIVE - EDEN PRAIRIE, MINN. 55343
UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES. TOLERANCES:		CND: M. W. R. S. DATE: 1-17-84 APPD: M. W. R. S. DATE: 1-17-84 APPD: M. W. R. S. DATE: 1-17-84	
X ± .020 XX ± .010 XXX ± .005 SURF. REMOVE ALL BURRS AND BREAK SHARP EDGES.		MATERIAL: FINISH:	
NEXT ASSY: USED ON:		SIZE (DRAWING NO.): SCALE: 1/16" = 1" WEIGHT: 1 SHEET 1 OF 1	

DETACHED PARTS LIST

PERKIN-ELMER



Physical Electronics

TITLE:

BOARD ASSY-POWER SUPPLY

PART NO. L607277

REV C

SHEET 1 OF 3

ITEM NO.	PART NUMBER	QUANTITY PER ASSEMBLY	DESCRIPTION	DOC CODE	REF. DESIGNATIONS / NOTES
1	L607276	1	PC BOARD - POWER SUPPLY		
2	173007	4	DIODE - RECT, 1000V, 1A, IN4007		CR10-13
3	175065	4	DIODE - RECT, 100V, 6AMP, MR751		CR2-5
4	373105	1	DIODE - RECT, 100V, 4A, MDA970-A2		CR1
5	171423	1	DIODE - RECT, 400V, 1A, IN4004		CR7
6	471007	2	DIODE - SIG, 175V, 100MA, IN459A		CR9, 17
7	L606771	1	DIODE - RECT, 50V, 3A, IN4719		CR8
8	L610240	1	DIODE - ZENER, 30V, .250W IN4120		CR16
9		.			
10		.			
11	L602916	1	XSTR - PNP, 40V, 0.6W, 2N2905		Q1
12	279186	1	XSTR - NPN, 400V, 40W, TIP50		Q2
13	174082	1	XSTR - PNP, PWR, 300V, 1W, MPSU60		Q4
14	174081	2	XSTR - NPN, 300V, 1W MPSU10		Q3, 5
15		.			
16		.			
17	476179	2	TRANSORB - 15V, 60A, MPTE15		CR14, 15
18	476180	1	TRANSORB - 5V, 160A, MPTE-5		CR6
19		.			
20		.			
21	278012	1	CAP - 60UF, 500VDC, ELCTLT		C3
22	L608197	1	CAP - 7500UF, 20VDC, AL ELCTLT		C1
23	L606774	1	CAP - 13000UF, 40V, AL ELCTLT		C4
24	279189	1	CAP - 3000UF, 35VDC, ELCTLT		C2
25		.			

PREPARED
M. MORRISDATE
12-15-83

CHECKED

Jn. Roeben

DATE
1-84

APPROVED

Jn. Roeben

DATE
1-17-84☐ ADD

DETACHED PARTS LIST

PERKIN-ELMER			TITLE: BOARD ASSY- POWER SUPPLY		PART NO. 607277 REV <u>A</u>	
Physical Electronics					SHEET <u>2</u> OF <u>3</u>	

ITEM NO.	PART NUMBER	QUANTITY PER ASSEMBLY	DESCRIPTION	DOC CODE	REF. DESIGNATIONS / NOTES
26		.			
27	371012	1 .	RES - 1.5 M OHM , .25W , 1% , RN60D		R19
28	610238	1 .	RES - 205K OHM , .25W , 1% , RN60D		R21
29	279253	1 .	RES - 120K OHM , .25W , 5% , RC07		R12
30	279227	2 .	RES - 3.9K OHM , .25W , 5% , RC07		R4,9
31	378050	2 .	RES - 8.2K OHM , .25W , 5% , RC07		R7,10
32	603766	2 .	RES - 16K OHM , .25W , 5% , RC07		R8,11
33	478028	1 .	RES - 10K OHM , .25W , 5% , RC07		R16
34	279223	1 .	RES - 2.2K OHM , .25W , 5% , RC07		R17
35	603611	1 .	RES - 51 OHM , .25W , 5% , RC07		R1
36	610239	2 .	RES - 200K OHM , 2W , 5% , RC42		R13,14
37	172017	1 .	RES - 10 OHM , 1W , 5% , RC32		R15
38	611230	1 .	RES - 11 OHM , .12W , 1% , RN55D		R18
39	606768	2 .	RES - 2.55K OHM , .12W , 1% , RN55D		R5,6
40	606770	1 .	RES - .25 OHM , 2.5W , 3% , CW-2C		R2
41	606769	1 .	RES - .5 OHM , 2.5W , 3% , CW-2C		R3
42	378079	6 .	RES - ZEROHM , MOLDED JUMPER WIRE		W1-6
43	273008	2 .	RES - 2.7K OHM , .5W , 5% , RC20		R22,23
44		.			
45		.			
46	472040	1 .	POT - 50K OHM , .5W , 20T , CERM , T/A		R20
47		.			
48	177048	2 .	CONN - WFR , STR , 2 PIN , 09-65-1021		J1,5
49	377095	1 .	CONN - PCB MTG , 3 PIN , STR , LOCKING		J6
50	177281	1 .	CONN - WAFER , PCB MTG , 5 PIN		J9

PREPARED M. MORRIS	DATE 12-15-83	CHECKED Ch. Roebler	DATE 1-84	APPROVED Ch. Roebler	DATE 1-17-84	☐ ADD
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DETACHED PARTS LIST

PERKIN-ELMER

Physical Electronics



TITLE:

BOARD ASSY- POWER SUPPLY

PART NO. 607277

REV 2

SHEET 3 OF 3

[illegible]

PREPARED
M. Morris

DATE
12-15-83

CHECKED *M. Roeben*

DATE
1-84

APPROVED
R. M. Roeder

DATE
1-17-84

☐ ADD

DETACHED PARTS LIST

PERKIN-ELMER

Physical Electronics



TITLE:

BOARD ASSY-DEFLECTION

 PART NO. 608083

 REV E

 SHEET 1 OF 5

ITEM NO.	PART NUMBER	QUANTITY PER ASSEMBLY	DESCRIPTION	DOC CODE	REF. DESIGNATIONS / NOTES
1	608082	1.	PC BOARD- DEFLECTION		
2	372072	2.	IC-TTL, QUAD 2 INPUT NAND, 7400		U1,7
3	476173	2.	IC-TTL, DUAL, 4 INP, NAND, DM7420N		U9,10
4	476177	1.	IC-TTL, QUAD, 2I IND, AND, DM7408N		U8
5	372073	2.	IC-TTL, HEX INVERTER, 7404		U13,14
6	605684	2.	IC-TTL, DUAL JK FF, 74LS109A		U5,12
7	608593	2.	IC-TTL, 4 BIT BINARY CTR, 74LS191		U11,15
8	608561	2.	IC-TTL, 4 BIT BIN CNTR 74LS161A		U2,3
9	608562	2.	IC-6 BIT D/A CONV, MC1406L		U4,6
10		.			
11	173006	2.	IC-OP AMP, 8 PIN DIP, LM308N		AR5,6
12		.			
13	177228	4.	IC-OP AMP, JFET, INPUT LF356		AR1-4
14		.			
15	605835	2.	CAP- 47UF, 20VDC, TANT TUB		C1,5
16	278002	46.	CAP-.01UF, 50V ML CER, RDL		CF'S, C2,3,4,16,18,20, 22,28,30,31,33,41
		.			
		.			
17	601279	8.	CAP- 10 UF, 25VDC, TANT, RDL		C6,12,23,24,26,27,38,39
18	273025	5.	CAP-.1UF, 500V, ML CER, RDL		C7-11
19		.			
20		.			
21		.			
22	177406	2.	CAP- 270 PF, 50VDC, DIPPED, MICA		C34,35
23	603951	2.	CAP- 1UF, 35V IDP TANT, RDL		C36,40

 PREPARED
M. MORRIS

 DATE
2-3-83

CHECKED

M. Roelen

DATE

5-24-83

APPROVED

18

DATE

7-8-83

☐ ADD

DETACHED PARTS LIST

PERKIN-ELMER 
Physical Electronics

TITLE: BOARD ASSY- DEFLECTION

PART NO. 608083 REV E
SHEET 2 OF 5

ITEM NO.	PART NUMBER	QUANTITY PER ASSEMBLY	DESCRIPTION	DOC CODE	REF. DESIGNATIONS / NOTES
24	602139	2.	CAP-.47UF, 50V, ML, CER DISC		C29, 32
25		.			
26	171468	2.	CAP-100PF, 1KV, CER-DISC		C37, 42
27	608198	4.	CAP-.047UF, 500V, ML CER, RDL		C15, 17, 19, 21
28	273021	1.	CAP-330PF, 1KV, CER		C13
29		.			
30		.			
31		.			
32	476179	2.	TRANSORB-15V, 60A MPTE15		CRI, 2
33	476180	1.	TRANSORB-5V, 160A MPTE-5		CR3
34		.			
35		.			
36	608556	2.	DIODE-ZENER, 5.1V, 5%, .4W, IN751A		CR22, 25
37	273017	2.	DIODE-ZENER, 6.2V, 100MW, IN823A		CR12, 13
38	608557	8.	DIODE-ZENER, 6.2V, 5%, .4W IN821		CR4-7, 20, 21, 23, 24
		.			
39	171425	2.	DIODE-ZENER, 6.2V, 1W, IN4735		CR16, 18
40	471007	8.	DIODE-SIG, 175V, 100MA IN459A		CR8-11, 14, 15, 17, 19
41		.			
42	608558	8.	XSTR-NPN, PWR, 350V, 3W, 2N6559		Q1-4, 9-12
		.			
43	603960	8.	XSTR-NPN, 40V, .5W 2N2219A		Q14, 15, 17, 18, 20, 21, 23, 24
		.			
44	179313	4.	XSTR-PNP, 40V, 350MW 2N3906		Q13, 16, 19, 22
45	174082	4.	XSTR-PNP, PWR, 300V, 1W, MPSU60		Q5-8

PREPARED
M. MORRIS

DATE
2-3-83

CHECKED
M. Roeder

DATE
5-24-83

APPROVED
T. 60.

DATE
9-8-83

☐ ADD

DETACHED PARTS LIST

PERKIN-ELMER			TITLE: BOARD ASSY - DEFLECTION		PART NO. 608083	REV E
Physical Electronics					SHEET 3	OF 5

ITEM NO.	PART NUMBER	QUANTITY PER ASSEMBLY	DESCRIPTION	DOC CODE	REF. DESIGNATIONS / NOTES
46		.			
47	608559	2.	XSTR ARRAY- 5NPN XSTR, CA3183AE		QNI, 2
48		.			
49		.			
50	472033	2.	POT- 1K OHM, .25W, 20T, TRIM, T/A		R114, 125
51	471109	4.	POT- 500 OHM, .50W, 20T, TRIM, T/A		R43, 83, 96, 108
52	472042	2.	POT- 5K, .25W, 20TURNS, TRIM, T/A		RL4, 82
53	478028	4.	RES- 10K OHM, .25W, 5%, RC07		R33-36
54	279215	2.	RES- 680 OHM, .25W, 5%, RC07		R45, 46
55	279228	5.	RES- 4.7K OHM, .25W, 5%, RC07		R86, 91, 110, 121, 123
56	279209	1.	RES- 220 OHM, .25W, 5%, RC07		R79
57	279218	4.	RES- 910 OHM, .25W, 5%, RC07		R84, 85, 116, 117
58	608573	2.	RES- 825 OHM, 1W, 1%, RN75D		R105, 111
59	608999	2.	RES- 510 OHM, 1W, 5%, RC32		R112, 118
60	279207	4.	RES- 150 OHM, .25W, 5%, RC07		R37-40
61	608574	4.	RES- 178K OHM, 1W, 1%, RN75D		R4, 10, 16, 22
62	608572	4.	RES- 1.62K OHM, .5W, 1%, RN65D		R5, 11, 17, 23
63	371114	4.	RES- 121K OHM, .5W, 1%, RN65D		R44, 51, 60, 70
64	272010	10.	RES- 100 OHM, .25W, 1%, RN60D		R3, 9, 15, 21, 25, 27, 29, 31, 90, 101
65	371107	4.	RES- 49.9K OHM, .25W, 1%, RN60D		R122, 124, 127, 128
66	472028	6.	RES- 4.99K OHM, .25W, 1%, RN60D		RL1, 63, 75, 81, 113, 120
67	473047	2.	RES- 3.92K OHM, .25W, 1%, RN60D		R115, 126
68	608644	4.	RES- 75 OHM, .5W, 5%, RC20		R47, 52, 66, 71
69	173020	2.	RES- 1.24K OHM, .25W, 1%, RN60D		RL5, 109
70	473046	2.	RES- 953 OHM, .25W, 1%, RN60D		R41, 42

PREPARED M. MORRIS	DATE 2-3-83	CHECKED M. Roeder	DATE 5-24-83	APPROVED T.H.	DATE 9-8-83	☐ ADD
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DETACHED PARTS LIST

PERKIN-ELMER 
Physical Electronics

TITLE:

BOARD ASSY - DEFLECTION

PART NO. 608083

REV B

SHEET 4 OF 5

ITEM NO.	PART NUMBER	QUANTITY PER ASSEMBLY	DESCRIPTION	DOC CODE	REF. DESIGNATIONS / NOTES
71	471101	4.	RES - 1.5 K OHM, .25W, 1%, RN60D		R56, 57, 76, 77
72	608571	2.	RES - 280K OHM, .25W, 1%, RN60D		R62, 80
73	601515	4.	RES - 3.83K OHM, .25W, 1%, RN60D		R2, 8, 14, 20
74	275014	4.	RES - 806 OHM, .25W, 1%, RN60D		R1, 7, 13, 19
75	608567	4.	RES - 158 OHM, .25W, 1%, RN60D		R6, 12, 18, 24
76	271043	4.	RES - 1.21K OHM, .25W, 1%, RN60D		R88, 93, 99, 103
77	602831	4.	RES - 7.15K OHM, .25W, 1%, RN60D		R49, 53, 68, 72
78	171007	4.	RES - 220 OHM, .5W, 5%, RC20		R50, 54, 69, 73
79	603131	4.	RES - 100 OHM, .12W, 1%, RN55D		R55, 58, 74, 78
80	275121	4.	RES - 453 OHM, .25W, 1%, RN60D		R87, 92, 98, 102
81	472015	2.	RES - 20K OHM, .25W, 1%, RN60D		R48, 67
82	608570	4.	RES - 4.64K OHM, .25W, 1%, RN60D		R89, 94, 100, 104
83	279095	4.	RES - 180 OHM, .25W, 5%, RC07		R26, 28, 30, 32
84	602830	4.	RES - 243 OHM, .25W, 1%, RN60D		R59, 95, 106, 107
85	609000	2.	RES - 261 OHM, .25W, 1%, RN60D		R97, 119
86	608202	2.	FUSE - PICO, .250A, 125V, N BLO, RDL		F1, 2
87		.			
88	176046	19.	TERM - TURRET, 062 MTG DIA, SIL PL		TP1-19
89		.			
90	608564	1.	CRYSTAL - 10 MHZ VF1000		Y1
91		.			
92	609146	16.	LAMP - NEON, , NE-1H		L1-16
93		.			
94	608566	4.	HEAT SINK - TO 127 UP-TO127-CB		XQ9-12

PREPARED
M. MORRIS

DATE
2-3-83

CHECKED
M. Roeder

DATE
5-24-83

APPROVED
T. H.

DATE
9-8-83

☐ ADD

DETACHED PARTS LIST

PERKIN-ELMER


Physical Electronics

TITLE:

BOARD ASSY-DEFLECTION

 PART NO. L08083

 REV E

 SHEET 5 OF 5

ITEM NO.	PART NUMBER	QUANTITY PER ASSEMBLY	DESCRIPTION	DOC CODE	REF. DESIGNATIONS / NOTES
95	278073	4 .	HEAT SINK - TO-127, LATO127B3CB		XQ1-4
96	275034	4 .	HEAT SINK - TO-126, PAI-1CB		XQ5-8
97		.			
98		.			
99	272049	6 .	SOCKET-IC, 8 PIN, DIP, L PROFILE		XAR1-6
100	378028	9 .	SOCKET-IC, 14 PIN, DIP		XU1,4,6-10,13,14
101	378029	8 .	SOCKET-IC, 16 PIN, DIP		XU2,3,5,11,12,15,XQNI,2
102	606102	4 .	SOCKET-.020/.030 PIN, PS-301-14		XFI,2
103		.			
104	602823	2 .	EJECTOR-PCB, 2 IN LG, .062, PLSTC		
105	610534	1 .	SHIELD-HV, BOARD EDGE, 1.1 HIGH		
106	608212	1 .	LABEL-HIGH VOLTAGE WARNING		
107	512004	36 .	WASHER-FLAT, #4, .250 OD, SST		
108	542204	20 .	WASHER-LOCK, SPLIT-RING, #4, SST		
109	542104	20 .	NUT-HEX, SM PATTERN, 4-40, SST		
110	603482	8 .	SPCR-.25 OD, .115 ID, .125 LG, AL		
111	541806	15 .	SCREW-PNH, 4-40x.375, SST, PHH		
112	541808	8 .	SCREW-PNH, 4-40x.500, SST, PHH		
113	512104	3 .	WASHER-INTL TOOTH, #4, SST		
114	528500	8 .	INSULATOR-MTG PAD, TO-5, NYLON		Q14,15,17,18,20,21,23,24
		.			
		.			
		.			
		.			
		.			
		.			

 PREPARED
M. Morris

 DATE
5-9-83

 CHECKED
H. Roebur

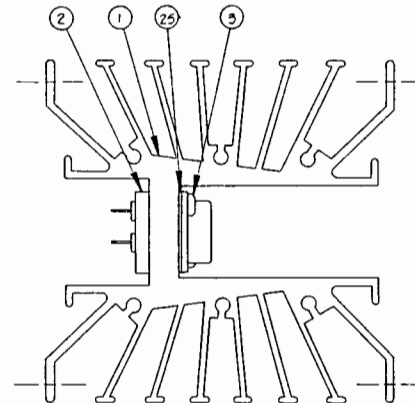
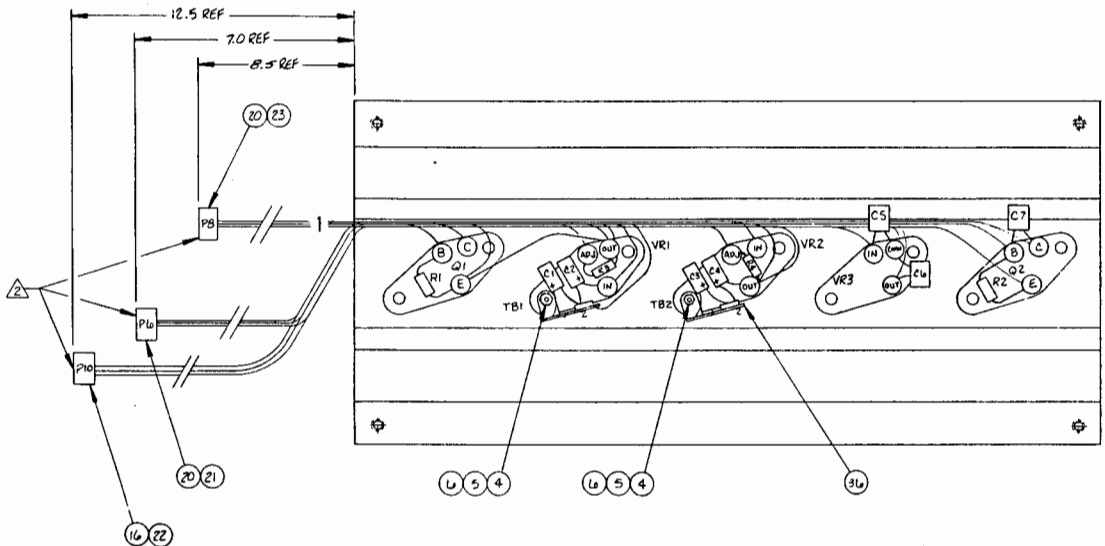
 DATE
5-24-83

 APPROVED
T.H.

 DATE
9-8-83

☐ ADD

REV		REVISIONS		DATE		APPROVED	
ZONE	REV	DESCRIPTION		DATE		APPROVED	
A		RELEASE FOR PRODUCTION		1-17-84		BT	
B		SEE ECO 9715		DOS			
C		HDW CHG		KWA		7-12-85	
D		SEE ECO 5812		RVS		4-15-86	



- NOTES:
1. IDENTIFY ASSY BY MEANS OF A TAG LABEL OR SIMILAR METHOD WITH PART NO. AND APPLICABLE REV. LEVEL.
 2. MARK CONNECTORS WITH INFORMATION INDICATED USING BLACK CHARACTERS .12 ± .03 HIGH. LOCATE APPROX. AS SHOWN.
 3. APPLY HEAT SINK COMPOUND TO Q1,2, AND VR1-3.

SEE DETACHED WIRE DATA LIST
SEE DETACHED P.L.

THIS DRAWING CONTAINS PROPRIETARY INFORMATION AND ANY REPRODUCTION, DISCLOSURE OR USE OF THIS DRAWING IS EXPRESSLY PROHIBITED EXCEPT AS PHYSICAL ELECTRONICS MAY OTHERWISE AGREE TO IN WRITING. TOLERANCES AND DIMENSIONS ARE UNLESS OTHERWISE SPECIFIED.		DRN M. Moore's CRD: <i>[Signature]</i> APPD: <i>[Signature]</i> DATE: 11-06-77 USED ON:		DATE: 11-06-82 DATE: 11-06-82 DATE: 11-06-82 DATE: 11-06-82		PERKIN-ELMER Physical Electronics Division 6509 Flying Cloud Drive • Eden Prairie, MN		TITLE ASSY - HEATSINK, ION GUN CONTROL		REV. C	
DIMENSIONS ARE IN INCHES TOLERANCES X .000 XX .010 XXX .005 SURF. REMOVE ALL BURRS AND BREAK SHARP EDGES. MAX.		FINISH MAX.		SCALE: 1:1 WEIGHT		SHEET 1 OF 1		DRAWING NO. LCO-001		REV. C	

DETACHED PARTS LIST

PERKIN-ELMER 
Physical Electronics

TITLE: ASSY- HEATSINK,
ION GUN CONTROL

PART NO. 609593 REV D

SHEET 1 OF 2

ITEM NO.	PART NUMBER	QUANTITY PER ASSEMBLY	DESCRIPTION	DOC CODE	REF. DESIGNATIONS / NOTES
1	605890	1	HEAT SINK - POWER SUPPLY		
2	609571	5	SOCKET - XSTR, TO 3, 8113PF603		
3	541910	8	SCREW - PNH, 6-32 x .625, SST, PHH		
4	541912	2	SCREW - PNH, 6-32 x .750, SST, PHH		
5	512106	2	WASHER - INT TOOTH, #6, SST		
6	542106	2	NUT - HEX, 6-32, SST, SM PATTERN		
7					
8	275002	1	XSTR - NPN, PWR, 750V, 75W, MJ12002		Q2
9	476162	1	IC - RGLTR, 5V/1.5A, LAS1505		VR3
10	171437	1	XSTR - NPN, PWR, 60V, 115V 2N3055		Q1
11	609570	1	IC - V RGLTR, ADJ, NEG 37V LM337K		VR2
12	602821	1	IC - V RGLTR, ADJ, 35V, 3A, LM350K		VR1
13	173027	1	RES - 75 OHM, .25W, 1%, RNL60D		R1
14	177253	1	RES - 1K OHM, .25W, 5%, RC07		R2
15	603936	2	RES - 243 OHM, .25W 1%, RN55D		R3,4
16	607850	3	TERM - CONN SKT, 20-14WR, 350550-1		
17	273025	1	CAP - .1 MF, 500V, ML CER, RDL		C7
18	477157	2	CAP - .1 UF, 50V, ML CER RDL		C5,6
19	603951	4	CAP - 1UF, 35V, DP TANT, RDL		C1-4
20	177070	15	TERM - CRP CONN CONT, 08-50-0106		
21	377096	1	CONN - HSG, 3 POSN, W/LKG RAMP		PI6
22	607848	1	CONN - HSG, 3 CKT, AMP #1-480700-0		PI0
23	610208	1	CONN - PLUG, CRIMP TYPE, 12 SKT		P8
24					
25	175010	5	INSUL - MICA, TO-3 CASE, 6285		

PREPARED
M. MORRIS

DATE
8-31-83

CHECKED

GEORGE TAKO

DATE

12-85

APPROVED

DR. Roebur

DATE

1-17-84

☐ ADD

☐ ADD



PHYSICAL ELECTRONICS INDUSTRIES INC.

WIRE DATA

DWG TITLE ASSY-HEATSINK, ION GUN CONTROL	DWG NO. 609593	REV. 5	SHEET 1 OF 3
---	-------------------	--------	-----------------

Procedure and Common Notes -

All leads shall be terminated per PHI soldering specifications unless otherwise specified.

Part Number refers to part added to lead.

Designation -

'SUR' - (Surface Wiring) Wire run from terminal to terminal in the most convenient manner.

PGT - Lead furnished with part.

Notes -

1. Cover leads with Teflon Tubing.
2. Observe polarity of capacitor during installation.
3. Crimp terminal to lead per PHI specification.

G INACTIVE - FOR SERVICE
USE ONLY - SUPERSEDED
BY NONE PER ECO 10229

ITEM NO.	DWG TITLE ASSY-HEATSINK, ION GUN CONTROL						DWG NO 609593	REV. 6	SHEET 2 OF 3		
	WIRE/COMP.			FROM			ROUTE	TO			REMARKS
	PART NO.	COLOR	AWG	TERM	NOTE	PART NO.		TERM	NOTE	PART NO.	
1	173027	—	PGT	Q1-B			SUR	Q1-E			R1
2											
3											
4	603951	—	PGT	TB1-1	2		SUR	TB1-2			C1
5	603951	—	PGT	TB1-2	2		SUR	VR1-IN			C2
6	603951	—	PGT	TB2-1	2		SUR	TB2-2			C3
7	603951	—	PGT	TB2-2	2		SUR	VR2-OUT			C4
8											
9											
10	477157	—	PGT	VR3-IN			SUR	VR3-COMM			C5
11	477157	—	PGT	VR3-OUT			SUR	VR3-COMM			C6
12											
13											
14	177253	—	PGT	Q2-B			SUR	Q2-E			R2
15											
16	471105	—	PGT	Q2-B			SUR	Q2-C			C7
17											
18											
19	603936	—	PGT	VR1-ADJ			SUR	VR1-OUT			R3
20	603936	—	PGT	VR2-ADJ			SUR	VR2-OUT			R4
21											
22											
23											
24	502005	YEL	18	Q2-E			/	PIO-1	3	607850	
25	502002	BRN	18	Q2-B			/	PIO-2	3	607850	



ITEM NO.	DWG TITLE ASSY- HEAT SINK , ION GUN CONTROL						DWG NO 609593		REV. G		SHEET 3 OF 3		
	WIRE/COMP.			FROM			ROUTE	TO			REMARKS		
	PART NO.	COLOR	AWG	TERM	NOTE	PART NO.		TERM	NOTE	PART NO.			
26	502003	RED	18	Q2-C			/	P10-3	3	607850			
27													
28													
29													
30													
31	502008	VIO	18	VR3-IN			/	P6-1	3	177070			
32	502009	GRY	18	VR3-OUT			/	P6-2	3	177070			
33	502001	BLK	18	VR3-COMM			/	P6-3	3	177070			
34													
35	502005	YEL	18	VR2-OUT			1	P8-3	3	177070			
36	502005	YEL	18	VR2-OUT			1	P8-1	3	177070			
37	502002	BRN	18	VR2-ADJ			1	P8-4	3	177070			
38	502003	RED	18	VR1-ADJ			1	P8-5	3	177070			
39	502004	ORN	18	VR1-OUT			1	P8-6	3	177070			
40	502204	ORN	22	VR1-OUT			1	P8-2	3	177070			
41	502001	BLK	18	TBI-2			1	P8-8	3	177070			
42	502007	BLU	18	Q1-B			1	P8-9	3	177070			
43	502008	VIO	18	Q1-C			1	P8-10	3	177070			
44	502009	GRY	18	VR1-IN			1	P8-11	3	177070			
45	502010	WHT	18	VR2-IN			1	P8-12	3	177070			
46	502004	ORN	18	Q1-E			1	P8-7	3	177070			
47													
48	502005	YEL	18	TBI-2			SUR	TB2-2					
49													
50	502004	ORN	18	Q1-E			SUR	VR1-OUT					

PERKIN-ELMER
/SICAL ELEC. DIV.

TITLE SHEET: 1 5/05/87
KIT-CABLE, 11-067, COMP, LABELED

DETACHED PARTS LIST ENG. DRAWING NO
615425

24 B

EM PART NO.	QTY	UM DESCRIPTION	DRAWING NO.	REFERENCE	FROM	TO
01 610300	1.000	EA CA ASSY 5MSM-5MSF DEFL 25.0FT				
02 609963	1.000	EA CA ASSY 7MSM-6MSF, HV, 25.0 FT				
03 611280	1.000	EA CA ASSY 5MSM-M4F 11067REM 8 FT				
04 375038	1.000	EA CORD-POWER IEC 7.5FT				
05 539900	8.000	EA TIE-CABLE MARKER, 4.00LG, NYL, BK				

** END OF REPORT **



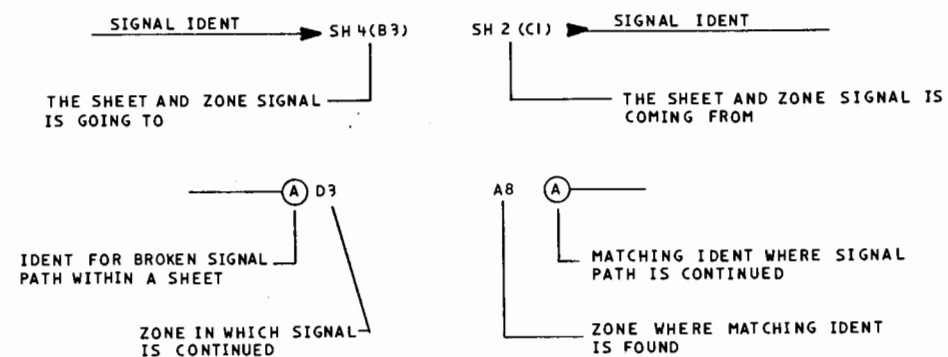
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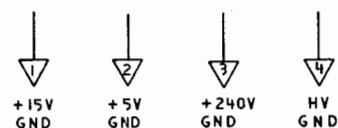
1. UNLESS OTHERWISE SPECIFIED; RESISTANCE VALUES ARE IN OHMS AND CAPACITANCE VALUES ARE IN MICROFARADS.

2. THE COVER SHEET WILL ALWAYS CARRY THE LATEST REVISION LEVEL. ALL REMAINING SHEETS WILL CHANGE REVISION ONLY WHEN APPLICABLE. THE REVISION STATUS LOG REFLECTS THE CURRENT LEVEL OF ALL SHEETS.

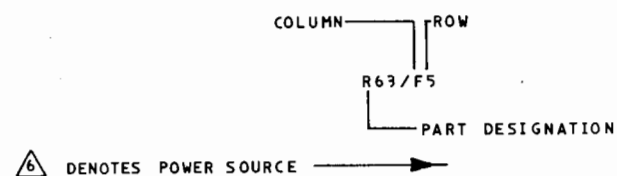
3. INTERCONNECTIONS ARE CODED BY SHEET AND ZONE NUMBER AS FOLLOWS:



4. COMMON CONNECTION CIRCUIT RETURN SYMBOL IDENTIFICATIONS:



5. COMPONENTS ARE LOCATED USING A SYSTEM OF ROWS & COLUMNS. A TYPICAL REFERENCE DESIGNATION SHOULD BE INTERPRETED AS FOLLOWS:



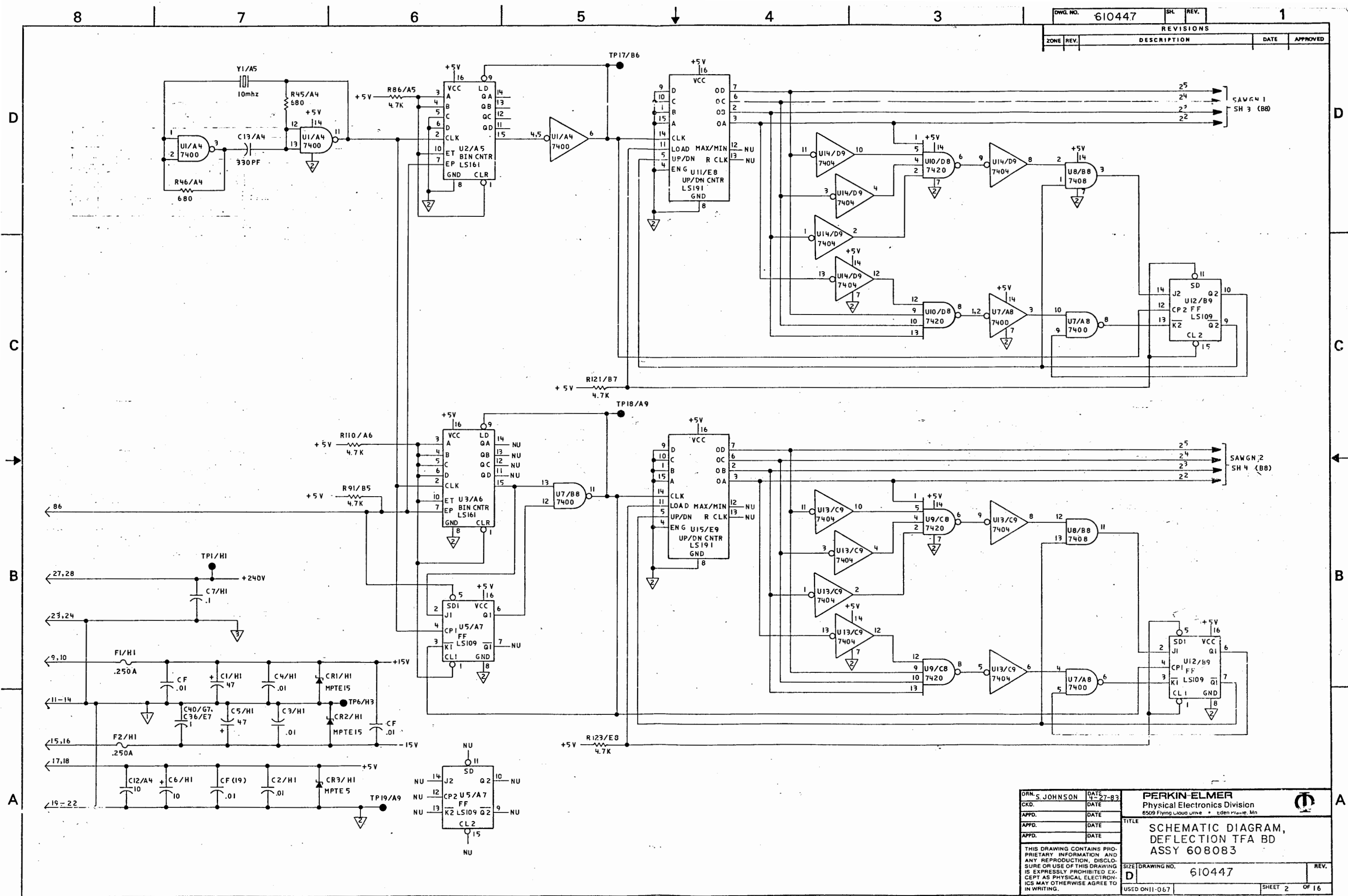
REVISION STATUS LOG

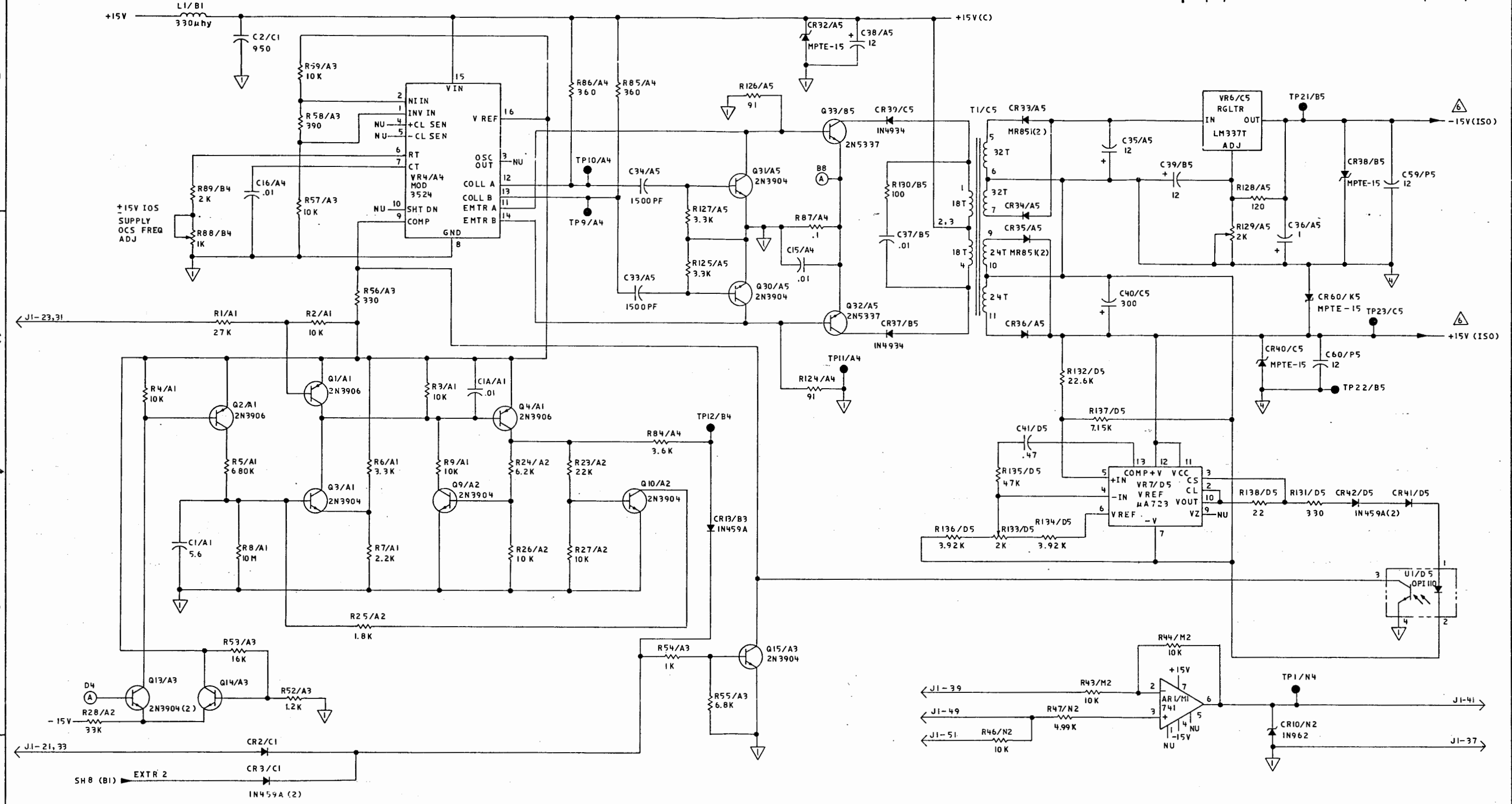
SHEET NUMBERS																
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
A																
B					B											
C														C		
D						D	D		D	D	D	D		D		
E					E	E	E	E					E		E	

ZONE	REV.	DESCRIPTION	DATE	APPROVED
A		RELEASE FOR PRODUCTION	7-84	GT
B		SEE ECO 4415	5-25-84	GT
C		SEE ECO 4492	7-30-84	GT
D		SEE ECO 4718	6-26-85	GT
E		SEE ECO 5085	18-1-85	GT

BOARD DESIGNATION				REFERENCE DESIGNATION	
CODE	TITLE	ASSY NO	SHEET NO	HIGHEST	NOT USED
	DEFLECTION TFA BOARD	608023	2-4		
	GRID AND EXTRACTOR SUPPLY BD	612352	5-9		
	BEAM AND FOCUS SUPPLY BOARD	605959	10-12		
A2	POWER SUPPLY BOARD	607277	13		
A1	MOTHER BOARD	612355	14		
	HEAT SINK ASSY	609593	15		
	UNIT SCHEMATIC		16		
A3	TERMINAL SWITCH	603825	16		

DRN. S. JOHNSON	DATE 2-22-84	PERKIN-ELMER Physical Electronics Division 5509 Flying Cloud Drive • Eden Prairie, Mn	TITLE SCHEMATIC DIAGRAM, DIFF ION GUN CONTROL
CKD. M. Rahn	DATE 2-23-84		
APPD. M. Rahn	DATE 2-23-84		
APPD.	DATE		
APPD.	DATE		
THIS DRAWING CONTAINS PROPRIETARY INFORMATION AND ANY REPRODUCTION, DISCLOSURE OR USE OF THIS DRAWING IS EXPRESSLY PROHIBITED EXCEPT AS PHYSICAL ELECTRONICS MAY OTHERWISE AGREE TO IN WRITING.		SIZE: DRAWING NO. D 610447	REV. E
USED ON 11-067		SHEET 1 OF 16	





8

7

6

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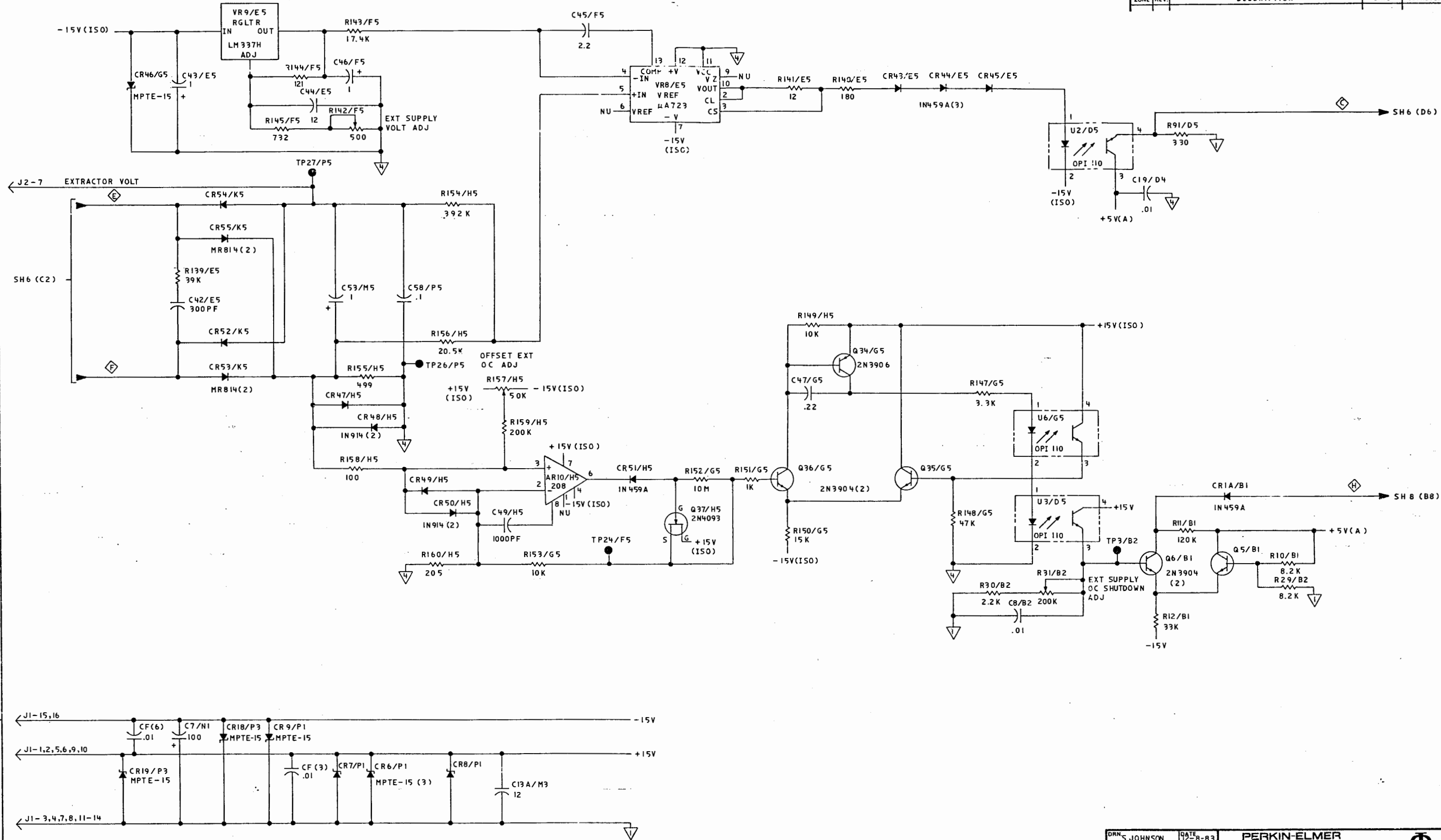
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DWG. NO. 610447

REV. E

REVISIONS

ZONE REV. DESCRIPTION DATE APPROVED



DRN. S. JOHNSON DATE 12-8-83
CKD. DATE
APPD. DATE
APPD. DATE
APPD. DATE

THIS DRAWING CONTAINS PROPRIETARY INFORMATION AND ANY REPRODUCTION, DISCLOSURE OR USE OF THIS DRAWING IS EXPRESSLY PROHIBITED EXCEPT AS PHYSICAL ELECTRONICS MAY OTHERWISE AGREE TO IN WRITING.

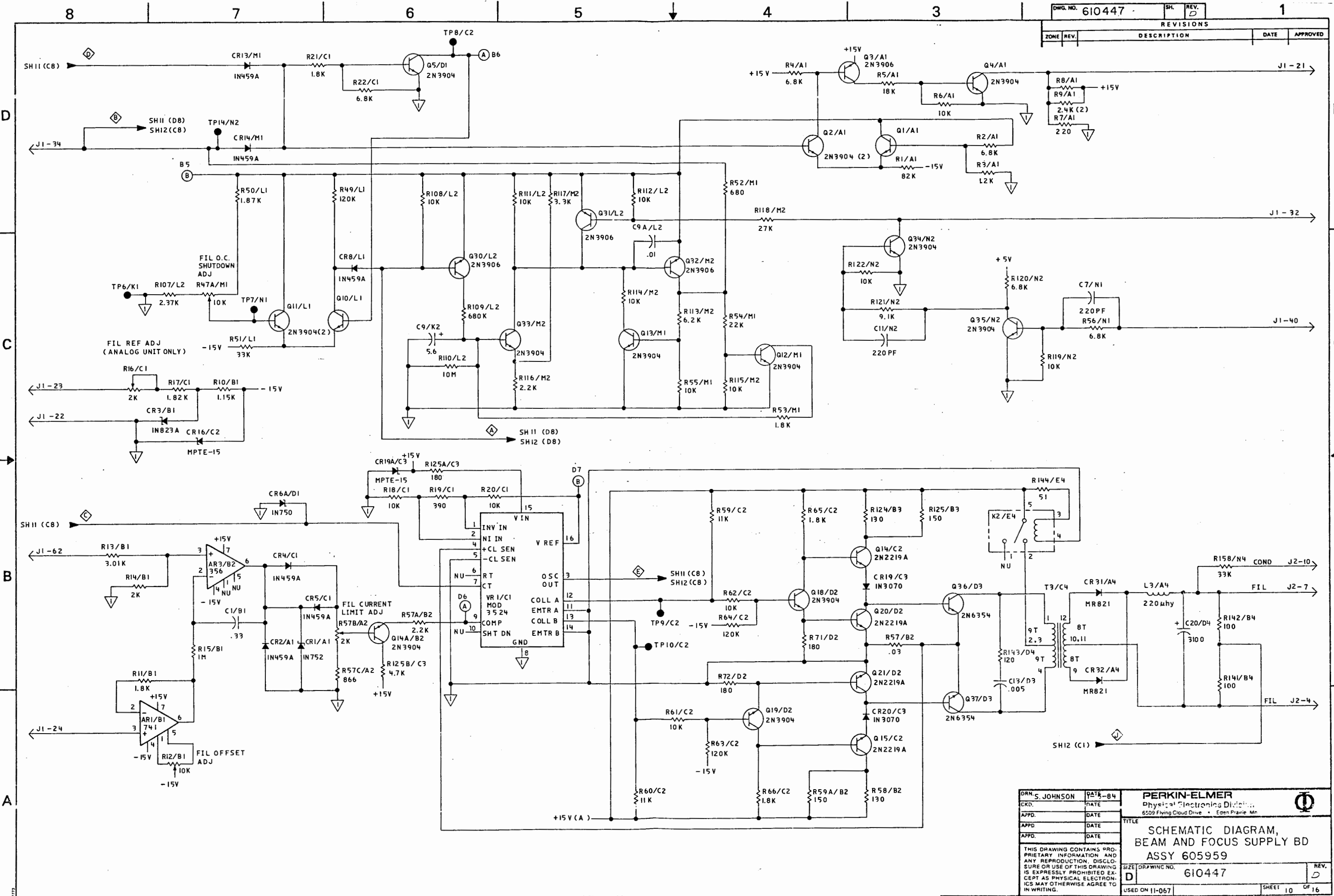
PERKIN-ELMER
Physical Electronics Division
6509 Frying Cloud Drive • Eden Prairie, Mn

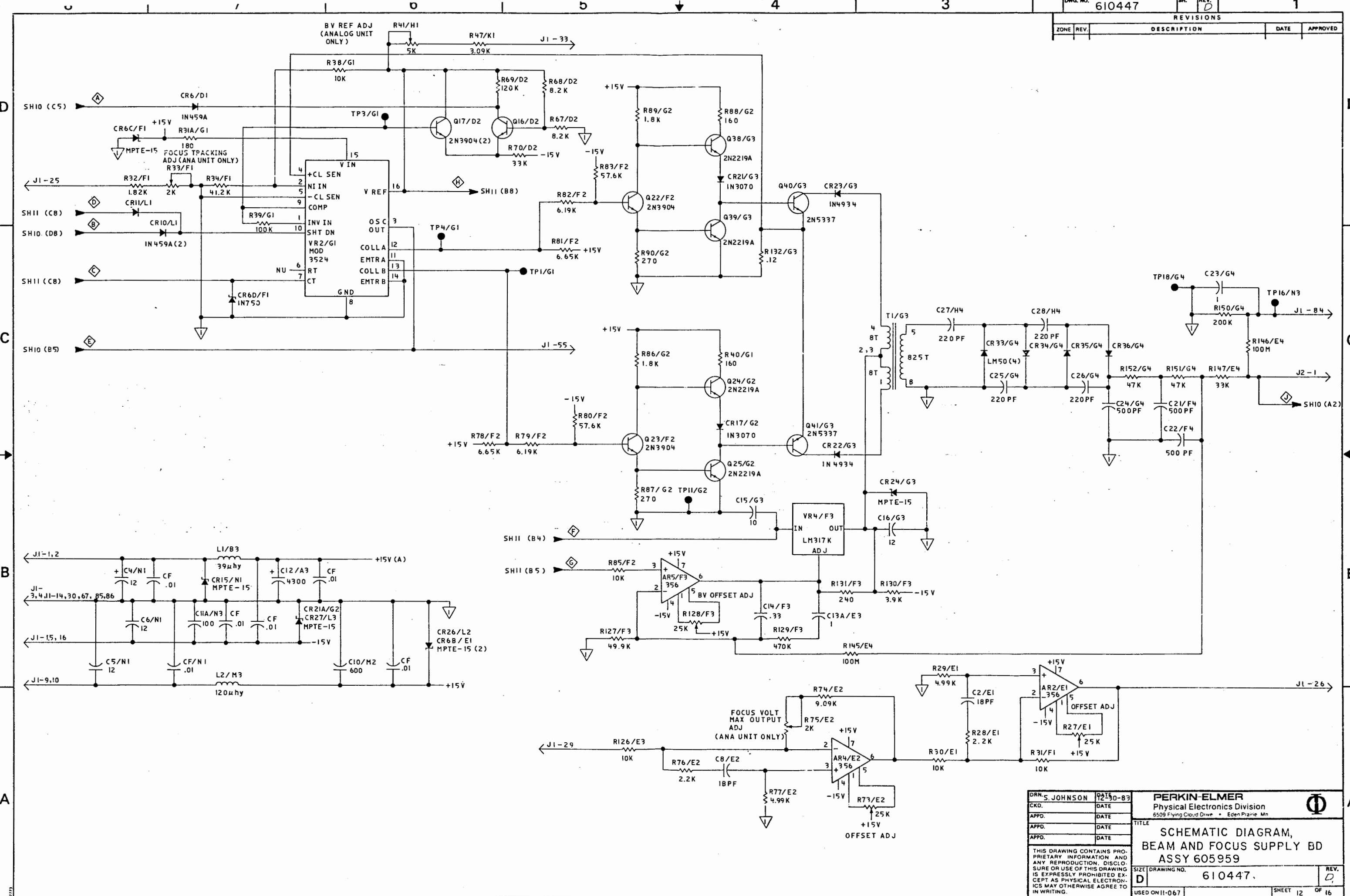
TITLE
SCHEMATIC DIAGRAM,
GRID AND EXTRACTOR SUPPLY
ASSY 612352

SIZE D DRAWING NO. 610447

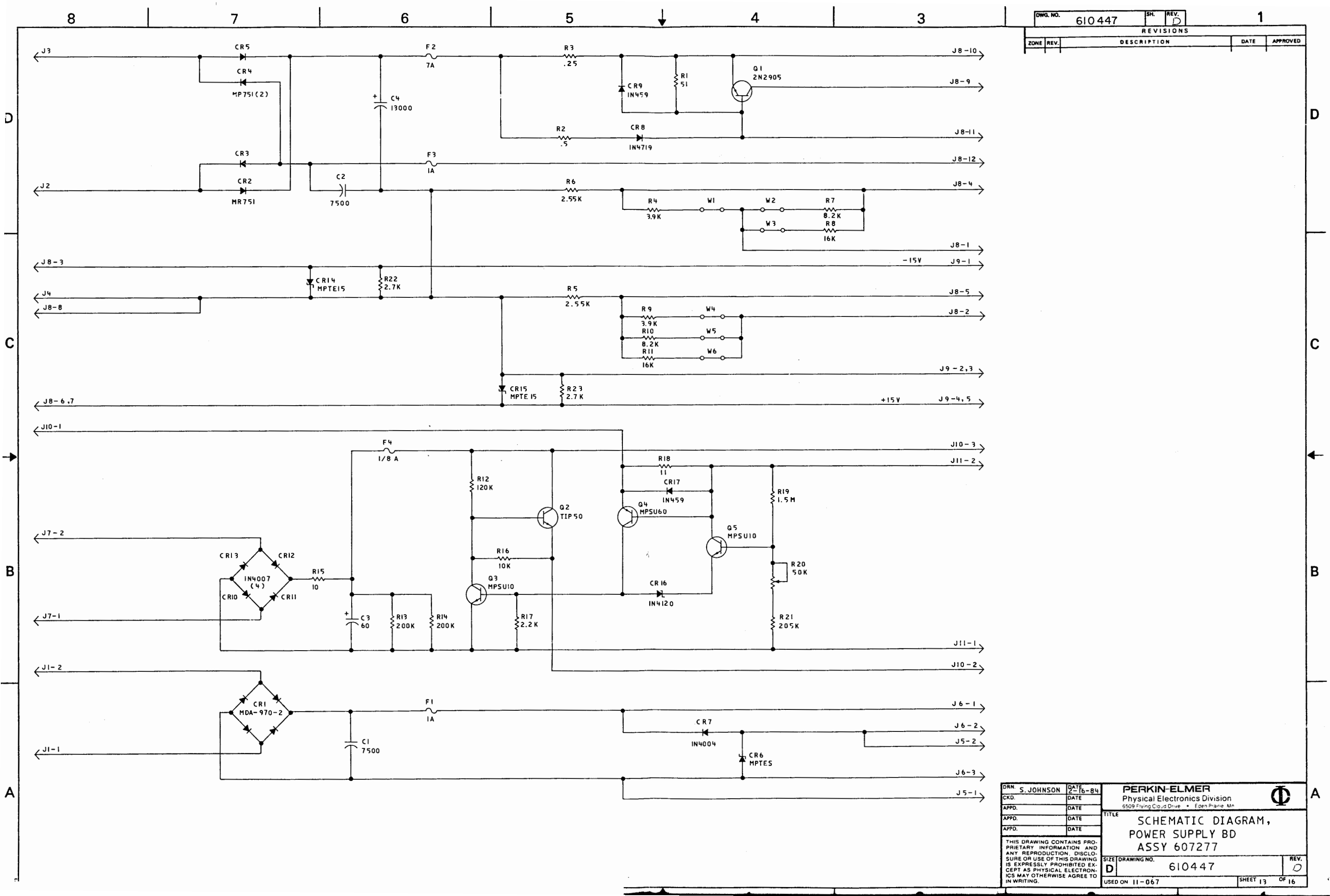
USED ON 11-067

SHEET 7 OF 16

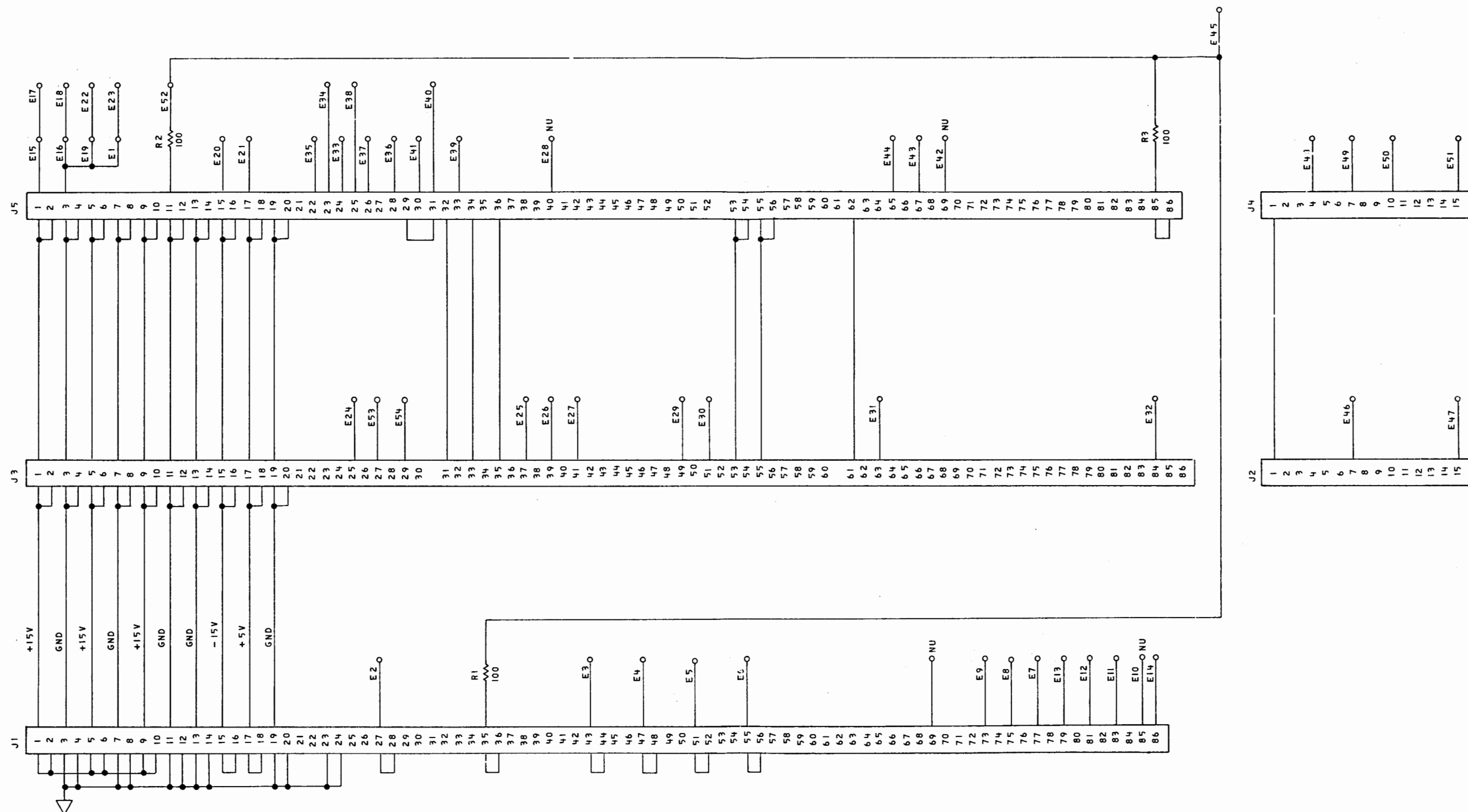




DRN. S. JOHNSON	0215-83	PERKIN-ELMER	
CKD.	DATE	Physical Electronics Division	
APPD.	DATE	6509 Flying Cloud Drive • Eden Prairie, Mn	
APPD.	DATE	TITLE	
APPD.	DATE	SCHEMATIC DIAGRAM,	
APPD.	DATE	BEAM AND FOCUS SUPPLY BD	
APPD.	DATE	ASSY 605959	
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USED ON 11-067		SHEET 12 OF 16	



REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED



8

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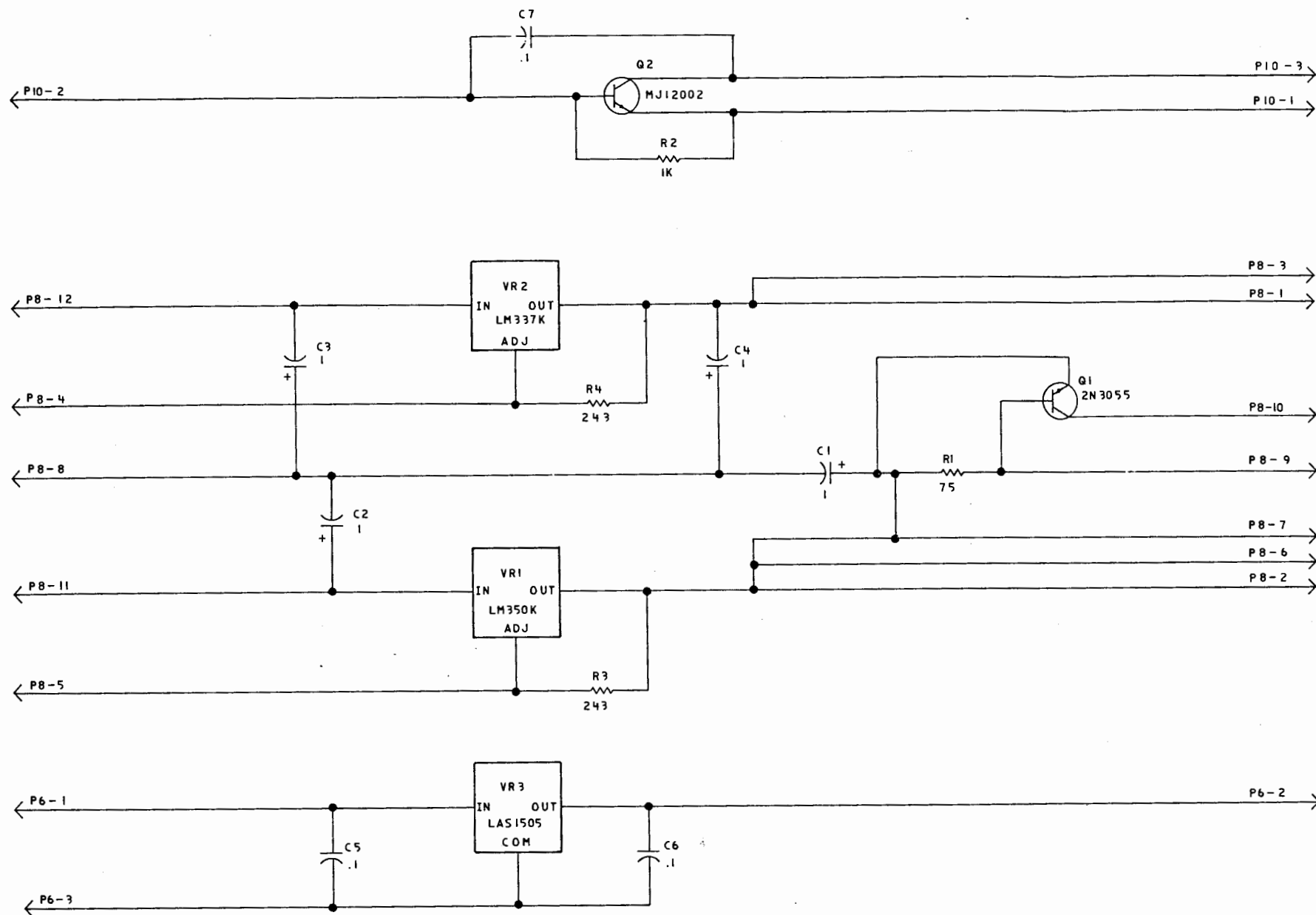
3

DWG. NO. 610447

REV. D

1

ZONE		REV.	DESCRIPTION		DATE	APPROVED

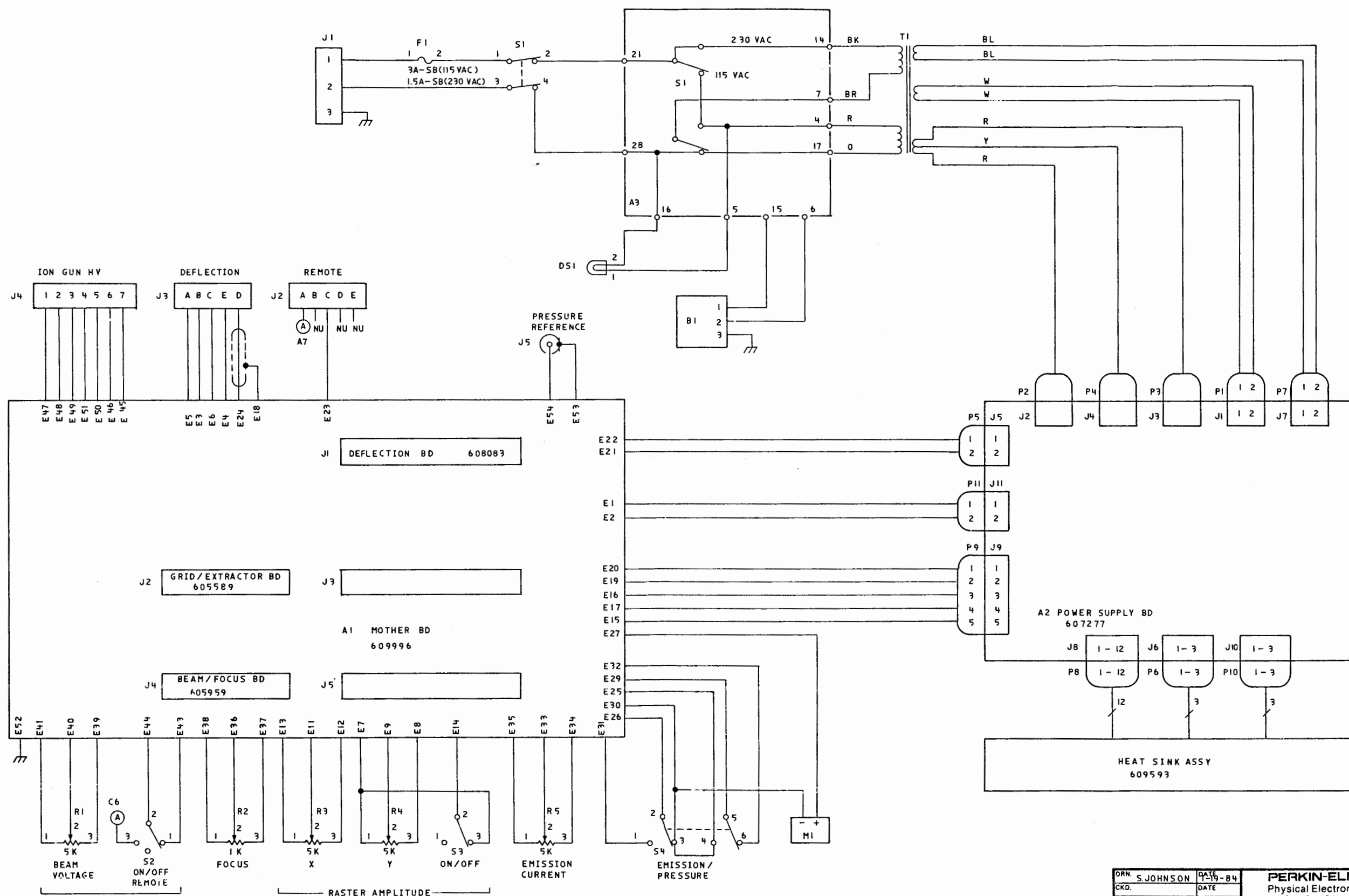


DRN. E. JOHNSON	DATE 8-26-85	PERKIN-ELMER Physical Electronics Division 6509 Flying Cloud Drive • Eden Prairie, Mn		Φ
CKD.	DATE	TITLE SCHEMATIC DIAGRAM, HEAT SINK ASSY 609593		
APPD.	DATE	SIZE D DRAWING NO. 610447		
APPD.	DATE	REV. D		

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REVISIONS			
ZONE	REV.	DESCRIPTION	DATE



DRN. S. JOHNSON	DATE 11-15-84	PERKIN-ELMER Physical Electronics Division 5509 Flying Cloud Drive • Eden Prairie, Mn	Φ
CKD.	DATE		
APPD.	DATE		
APPD.	DATE		
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SIZE D		DRAWING NO. 610447	REV. E
USED ON 11-067		SHEET 16 OF 16	