

6.4 POWER SUPPLY DRIVER BOARDS

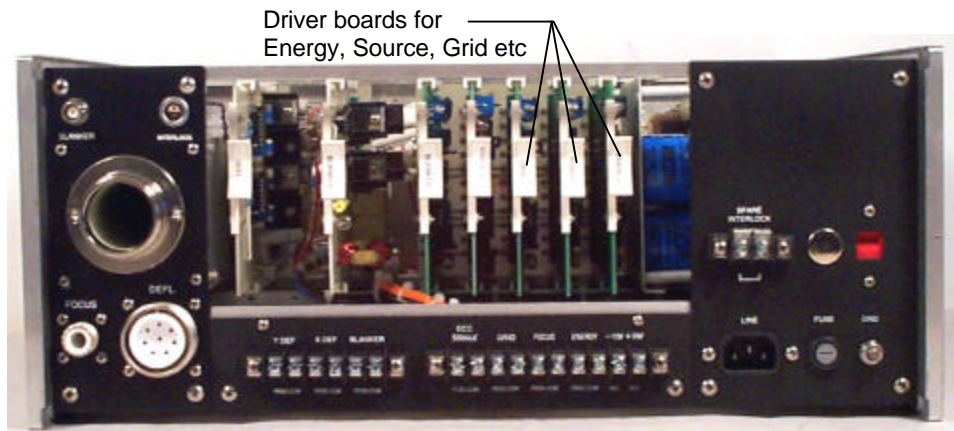


Fig. 6.4-1 A typical Power Supply with rear access panel removed, showing sine wave driver boards in slots

The Power Supply employs a modular design for ease of operation and repair. The main Power Supply unit includes a number of separate sine-wave driver boards, depending on the particular gun. The driver board is a sine-wave oscillator and is common to all of the control supplies such as Energy, Source, Grid, etc. Each individual power supply has a corresponding sine-wave driver board that provides transformer drive and remote metering signals. In some power supply systems, instead of individual boards, there is one auxiliary board that drives a transformer that provides power for all floating supplies, except Source. The driver boards are accessible by removing the rear center access panel of the Power Supply (or the entire back panel in some cases) and can be **temporarily** interchanged for quick troubleshooting. Refer to the troubleshooting instructions below.

Each board is factory-adjusted for a dedicated slot position, using feedback jumper positioning and trim potentiometer adjustments. The feedback jumpers on each board plug into two of the three sockets. The position of the feedback jumper determines whether a power supply is floating or grounded: vertical (perpendicular to the fuse) for floating supplies, and horizontal (parallel with the fuse) for grounded supplies. Some grounded supply boards, such as Deflection, do not include a jumper. For normal operation of the gun-control supplies, the feedback jumper should not be removed or its position changed.

Additionally, the trim potentiometers on each board (current limit, frequency adjustment, voltage adjustment, meter adjustment, etc.) should not be changed, as their values are adjusted at the factory. Refer to the Sine Wave Driver Board Drawing (000S930) in the Drawings Section for the location of each.

The boards are labeled on their tabs and are positioned in the same order as the labels on the panel for the remote terminals (with the exception that there is no corresponding board for the +10 V and -10 V terminals, or in some guns for Low Energy and Low Focus terminals).

Tables giving the board pin-outs and wire color codes are at the end of this section. Power Supply schematics are included in the Drawings Section.



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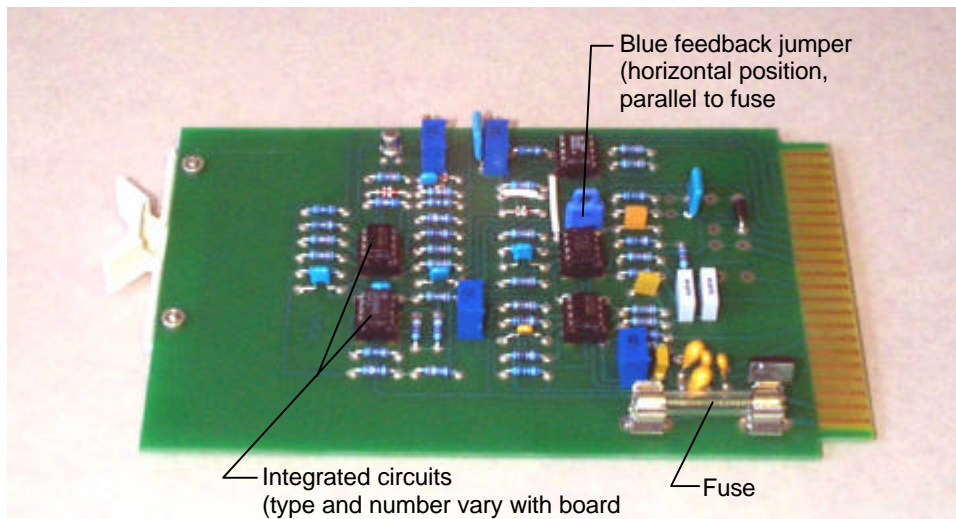


Fig. 6.4-2 A typical sine-wave driver board with the feedback jumper in the grounded position (an Energy board)

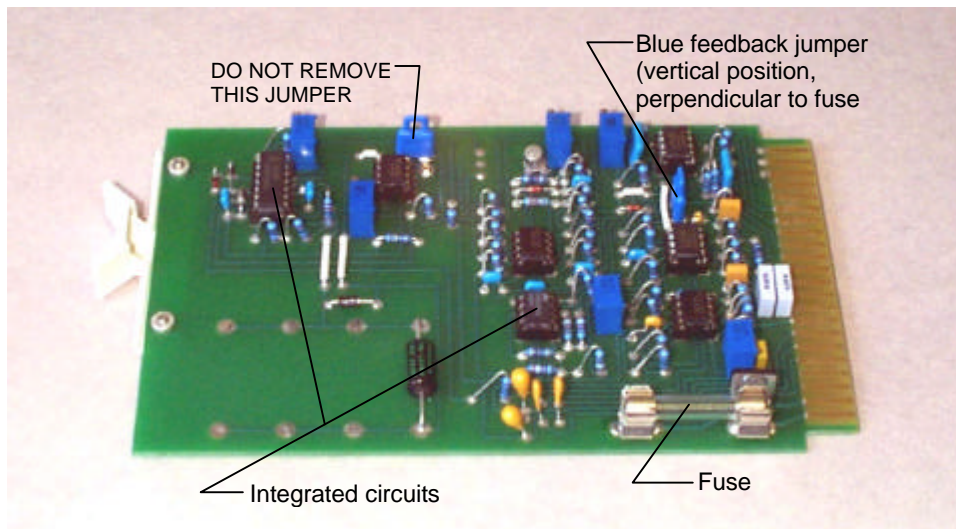
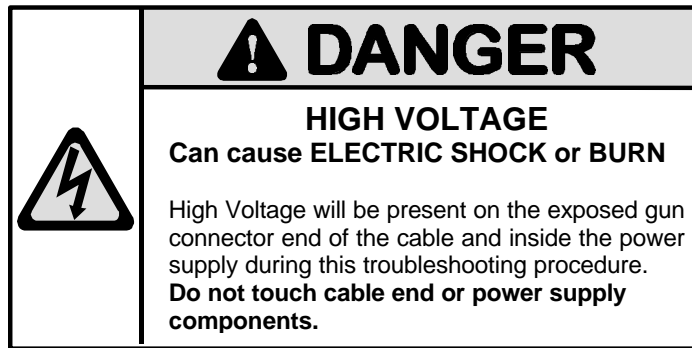


Fig. 6.4-3 A typical sine wave driver board with the feedback jumper in the floating position (a Source/ECC board)

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6.4.1 DRIVER BOARD TROUBLESHOOTING



If a modular power supply, such as Energy, Source, Grid etc., becomes inoperative, perform the following steps.

WARNING: Proper electrical safety precautions must be observed during troubleshooting operations.

1. Secure (turn off) operation of the Electron or Ion Gun according to Section 4.2. Disconnect **ALL** of the cables from the gun. The other ends of the cables must remain connected to the Power Supply.
2. Remove the rear center access panel from the Power Supply (see Fig. 6.4.1).
3. To find out if a driver board is at fault:
 - a. Remove the suspected driver board.
 - b. Check the fuse (Figs. 6.4.2 and 6.4.3).
 - c. If the fuse is blown:
 - d. Replace the fuse (usually 1 amp, sometimes ½ amp, see fuse).
 - e. Reinstall the driver board in its slot in the card cage.
 - f. Energize the power supply and check operation of the supply.
4. If the fault still exists:
 - a. Remove the suspected driver board.
 - b. Note the position of the blue-colored feedback jumper (see Figs. 6.4.2, 6.4.3 and Table 6.4.1).
 - i. The blue feedback jumper must be oriented correctly according to the feedback requirements of the slot that the board is being tested in.
5. To replace the suspected driver board with one from another slot:
 - a. Ensure that the feedback jumper is in the proper location (the same as the suspected board).
 - b. Insert the replacement board in the slot.
 - c. Energize the power supply and check operation of the driver board.
 - d. If, after switching the driver boards, the circuitry operates, it can be concluded that the original board malfunctioned.
 - e. **NOTE: Each driver board is calibrated for a specific slot. Therefore, the output will differ if boards are interchanged.**
6. Once a driver board has been determined to be faulty:
 - a. Reinspect the fuse. Replace the fuse if necessary.
 - b. Replace the integrated circuit chips. Any one of these could have been damaged by a transient. (Standard -- two MC1458, one CA3028AS, and either two TL082, or one TL082 and one AD706. ECC board -- addition one LM324 and one TL431., see Drawings 000S930 and 000S971)
 - c. Replace the board, and check operation of the power supply.
7. Return all boards to their original locations, with their jumpers in the original positions (Table 6.4.1). Replace the rear access panel.

If these steps do not repair the Power Supply, call Kimball Physics Engineering at (603) 878-1616.

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