

AD-8000 Power Supply Unit

After over 6 years of servicing the AD-8000, the Apogee Service Department has acquired significant insight into troubleshooting the AD-8000 Power Supply Unit. In order to expedite repairs in the field, we offer the following guidelines, including schematics and board layout documents.

Circuit Board Revision

All AD-8000s must be equipped with a revision **E4** PSU; the revision label may be found at the location indicated below. Revision E PSUs and above should be updated to rev. E4 as described further in this document. Revision D PSUs and lower must be replaced.



AD-8000 Fuse Ratings

In 2001 the fuse ratings for the AD-8000 were raised to the following values:

Units set to 100,120,140 VAC use 2 amp Slo-Blo fuses
Units set to 200,220,240 VAC use 1 amp Slo-Blo fuses

TechNote #21 was sent to all distributors concerning this change. If fuses are blowing intermittently, installing the correct fuse value most likely will resolve the problem.

Heat Sink Fan

Switching off the fan is strongly discouraged, and should only be done when the AD-8000 is free-standing outside a rack. The location of the fan switch is indicated in the photo above.

Testing : AD-8000 Burn-In Test

In order to verify the reliability of the AD-8000, we recommend the following burn-in (soak) test; burn-in tests conducted when the unit is not fully loaded cannot be considered reliable.

- 1) Install AMBus cards in all 4 AMBus slots.
- 2) Install an 8-channel DAC card (or DAC8 “dummy” load) in the DAC slot. The DAC “dummy” load card is available from the Apogee Service Department.
- 3) Input a 0dBFS 1kHz signal via the AES chassis mount input, set the AD-8000 **Clock Source** to “AES”, set **Source** to “AES”, and engage “DIG IN” on all channels. Ensure that the OVER indicators are “ON” and that all LEDs of the bargraphs are illuminated.

Testing : Shock Test

To verify the mechanical solidity of the PSU, perform the following test:

- 1) Place the AD-8000 on a rubber protective surface, raise the front of the unit about an inch, and let it drop. It is left to the discretion of the technician as to what constitutes a reasonable shock test which suitably tests the PSU but avoids further damage to the unit. If intermittent power-down is observed, see the Troubleshooting section below.

Troubleshooting : General

It is assumed that basic linear power supply troubleshooting techniques are understood by the technician; thus, only those issues specific to the AD-8000 PSU are presented here.

- 1) Of course, all troubleshooting should begin with a careful inspection of the board.
- 2) All regulators are enabled by the +6 regulator (U3); thus, if the +6 circuitry fails, all power rails will be down.
- 3) In our experience, the regulators fail rather infrequently; if a regulator appears to pass a DC voltage without regulating it, carefully inspect the passive components around it.
- 4) If the +5 digital board voltage is lower than 5.0 volts DC when under load, see the **Updating to E4** section below.

Troubleshooting : Intermittent Power-down

By far, the most common symptom observed with the AD-8000 PSU is intermittent power-down of the unit. Below are several of the issues observed by Apogee Service which may cause this symptom.

- 1) If the AD-8000 exhibits intermittent shut-down *only* when locked to an external clock source, the digital board clock circuitry needs to be modified as explained in TechNote #24.
- 2) If intermittent power-down is observed during the Shock Test, manipulate the two molex connectors which provide input to, and output from, the AC transformer. Apogee Service has encountered the case where female receptacles in the molex connectors have been dilated beyond their normal diameter, thereby rendering the connection to the male pins unreliable. Closing the diameter of the female receptacles with needle nose pliers usually resolves this issue.
- 3) Verify that all power regulators, diodes and diode bridges are securely fastened to the black heat sink; verify that the back of all devices are flat against the heat sink. If contact between the device and the heat sink is not complete, the device may overheat and cause internal protection circuitry to shut it down.
- 4) Finally, intermittent power-down symptoms may be caused by a broken surface mount capacitor or resistor. Only a careful examination of all components under a magnifying device will reveal such broken components. Also, re-flowing of solder points may reveal a broken component.

Updating to Revision E4

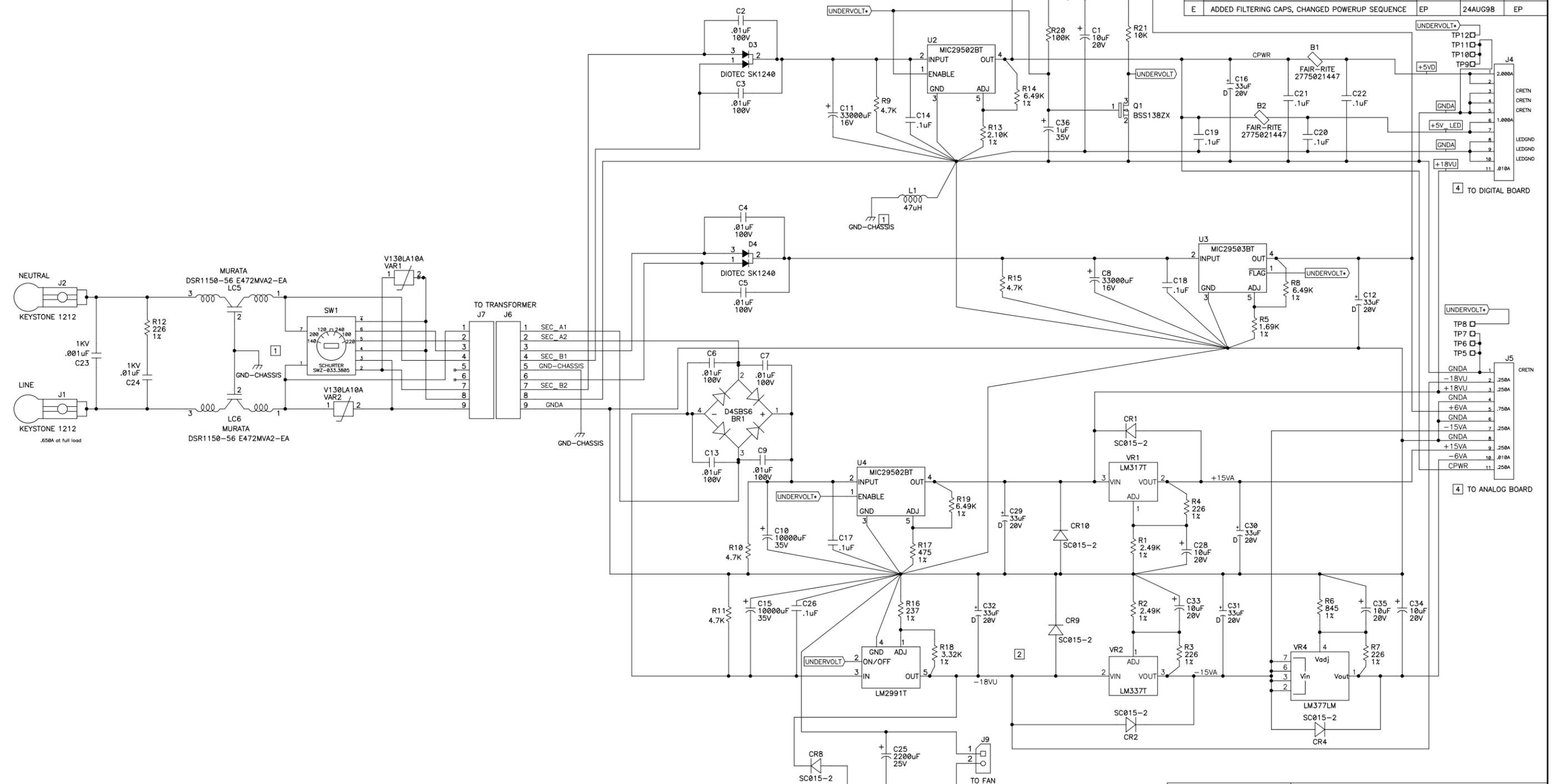
All AD-8000 PSUs should be updated to revision E4; this may be accomplished by performing the following modifications. See the schematic and board layout diagrams at the end of this document to locate the components to be changed.

- 1) Change R14 to 6.81kOhms 1/4watt 1% resistor
- 2) Change R8 to 6.04kOhms 1/4watt 1% resistor
- 3) Change R6 to 768 Ohms 1/4watt 1% resistor

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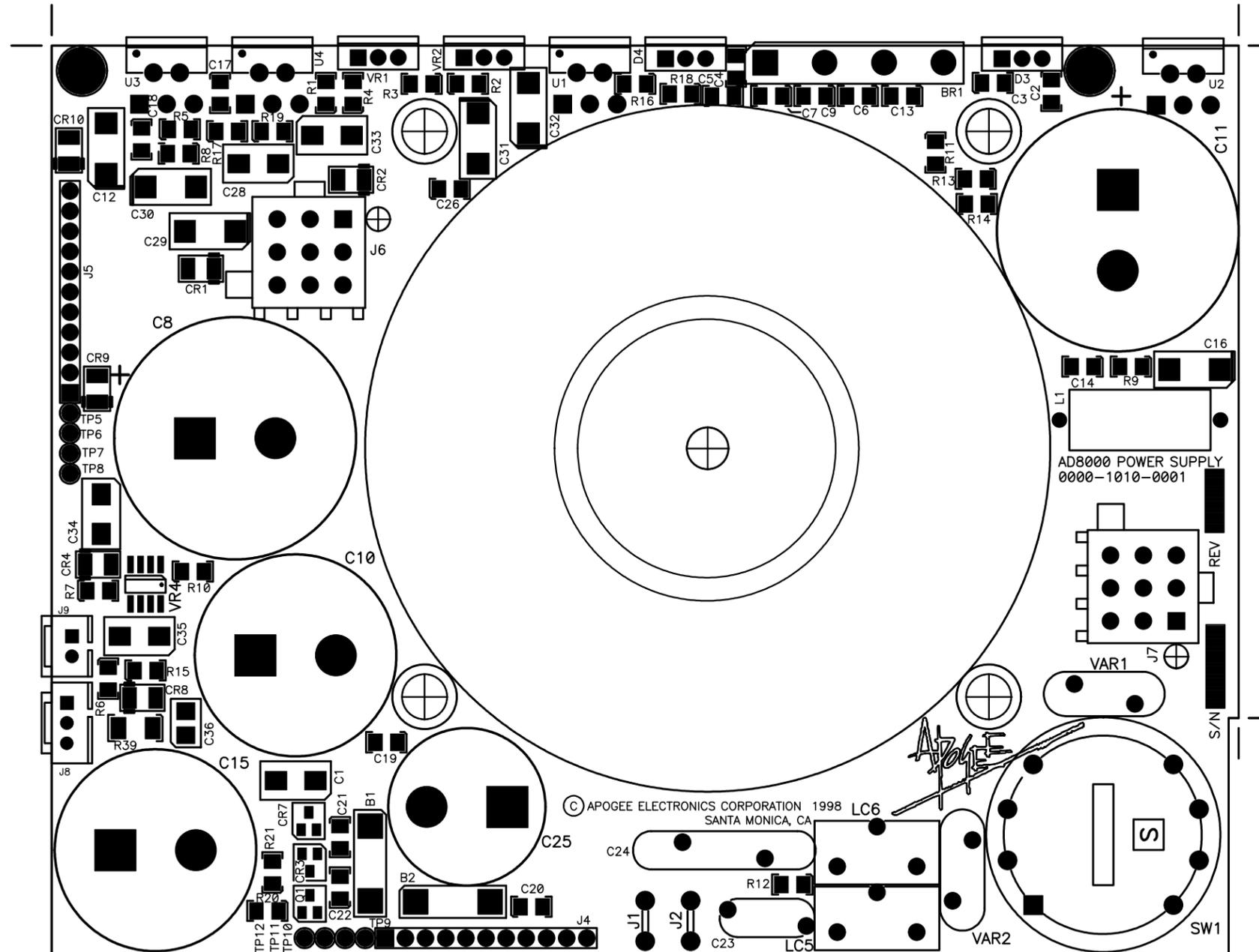
| REVISIONS | | | | |
|-----------|--|--------|----------|----------|
| REV | DESCRIPTION | DRAWN | DATE | APPROVED |
| A | PRODUCTION RELEASE | D. LEE | 3-26-97 | B.E. |
| B | REVISED W/O ECN | D. LEE | 6-24-97 | D.B. |
| C | REVISED PER ECN 059 | | 9/19/97 | |
| C1 | REVISED PER ECN 068 | EP | 11-03-97 | EP |
| D | REDESIGNED FOR EFFICIENCY | EP | 02-16-98 | EP |
| E | ADDED FILTERING CAPS, CHANGED POWERUP SEQUENCE | EP | 24AUG98 | EP |



- 4 ALIGN CONNECTOR WITH RESPECTIVE BOARD.
- 3 CIRCUIT REQUIRES HEAT SINK TO OPERATE.
- 2 TI ONLY, NO SUBS.
- 1 VIA HOLE IN UPPER LEFT CORNER.

NOTES:

| | | | |
|--------------|---------|--|-----------------|
| CONTRACT NO. | | APOGEE ELECTRONICS CORP | |
| APPROVALS | DATE | SCHEMATIC DIAGRAM-- | |
| Ed Pendyk | 3-11-98 | AD-8000 POWER SUPPLY BOARD | |
| CHECKED | | SIZE | FSCM NO. |
| APPROVED | | D | 0000-1010-0003 |
| | | DWG. NO. | REV |
| | | | E |
| SCALE | NONE | P-CAD GENERATED DWG DO NOT MANUALLY ALTER | SHEET 1 OF 1 |



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 SANTA MONICA, CA

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|--|--|--------------|
| APOGEE ELECTRONICS CORPORATION 3145 DONALD DOUGLAS LOOP SOUTH SANTA MONICA, CA 90405 | | |
| TITLE: AD8000 POWER SUPPLY | ARTWORK NO: 0000-1010-0000 REV E | |
| LAYER: SOLDERMASK TOP | Ad8kPS_E.pcb | SHEET 6 OF 8 |