OVERVIEW

This manual describes how to replace the ±15 Vdc power supply module in the system power supply with a larger capacity ±15 Vdc supply. The upgrade involves the following steps:

• Preparing for the Upgrade on page 6
• Removing the Power Supply on page 7
The power supply module, in the UNITY INOVA acquisition console power supply, provides the ±15 V to the digital and analog card cages. The original power supply module was running at its maximum capacity. The addition of the 5-MHz Wideline ADC board, which requires an additional 400 mA, put the supply over the limit.

All systems that have received the 5-MHz Wideline ADC board, must be upgraded with the new, larger capacity, power supply module. Job Order # 94900-309 was created to charge time and material for the incorporation of this retrofit program.

The new power supply module and associated hardware are part of the wideline solids power supply retrofit kit (01-904629-00). Refer to Table 1 for a list of the kit contents.

<table>
<thead>
<tr>
<th>Table 1. Wideline Solids Power Supply Retrofit Kit, 01-904629-00</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Item</strong></td>
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<tr>
<td>---------------------------------</td>
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<tr>
<td>INOVA Power Supply Retrofit Instructions</td>
</tr>
<tr>
<td>Power Supply, ±15 V, 1.5 A</td>
</tr>
<tr>
<td>Plate, Power Supply Retrofit</td>
</tr>
<tr>
<td>Z Bracket, AC Line Filter</td>
</tr>
<tr>
<td>Standoff, Male/Female, 8-32 X 5/8-inch (SS)</td>
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<tr>
<td>Standoff, Female/Female, 8-32 X 5/8-inch (SS)</td>
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<tr>
<td>Screw, Flathead, 8-32 X 5/16-inch</td>
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<tr>
<td>Nut, kep, #6</td>
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<tr>
<td>Nut, Kep, #8</td>
</tr>
<tr>
<td>Cable Tie, 3-5/8-inch Long</td>
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<tr>
<td>Cable Tie, 6-3/4-inch Long</td>
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<tr>
<td>Clamp, Cable Tie, Large</td>
</tr>
<tr>
<td>Fuse, MOL 0.5 A, Slo-Blo</td>
</tr>
<tr>
<td>Wire, Uninsulated Copper, 18 AWG</td>
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</table>

**Tool List**

The following is a list of tools required for the upgrade. If the appropriate ratchet drive is not available, purchase one using the Job Order number mentioned in the introduction.

- Phillips #2 (long shaft)
- 6-inch extension
- 3/8-inch socket
- 11/32-inch socket
• 5/16-inch socket (best if sockets have thin walls)
• Needle-nose Pliers
• Standard pliers
• Tie wraps (included)
• Soldering Iron
• Solder
• Wire cutter
• Wire stripper

Shut Down and Disconnect Console Power

**CAUTION:** Shut down the system according to the following procedure. Failure to shut down the system properly can corrupt system files.

1. Stop any experiments in process.
2. Open a Shelltool window and enter `su acqproc` to stop the acquisition process.
3. There is no need to exit VNMR or shut down the Sun computer.

**WARNING:** Dangerous high voltages exist inside the equipment that can kill or injure. Make sure the power is off and the power cord is disconnected before working inside the cabinet. Only qualified maintenance personnel shall remove equipment covers or make internal adjustments.

4. On the front of the NMR acquisition console system power supply, turn off the ac power to the analog, digital and shim power supplies.
5. Turn off the main power circuit breaker, located on the rear of the system power supply.
6. Remove the main ac power cable.

Removing the Power Supply

This section describes how to remove the power supply. Be sure to keep track of removed parts, preferably placing items in labeled bags.

1. Remove the front door of the console by lifting it off the hinges.
2. Remove the Phillips-head screws that attach the power supply to the console.
   • The front of the supply is secured with two adapter brackets that are attached to the supply with four 10-32 screws.
   • The back of the supply is attached with four cabinet screws.
3. On the front of the console directly above the power supply, remove either the blank panel or the screws holding the module above the power supply.
4. Remove the console side panel.
   To avoid losing the side panel screw, screw it into the side panel nut.
5. From the rear of the console, reach in and detach the two ac power cords that plug into the outlets on the side of the power supply, inside the console.

6. Position the dc power supply harness on the top of the power supply. This will help prevent damage to the harness when the power supply is pulled out of the console.

7. If possible, arrange a platform at the back of the console to support the power supply to facilitate removing and installing the supply in the console.

**WARNING:** The power supply is very heavy and lifting it could cause injury. Find someone to assist you before pulling the power supply out of the console. Make sure you have enough room to pull the supply out and work on the supply after it is out.

8. Slowly pull the power supply out the rear of the console. Place the power supply on the platform or on the floor. Make sure the power supply harness is not snagging on anything.

If a module is installed directly above the power supply, the module will have to be pulled out on its slide. However do not pull the module out until you need to access the power supply and its cables, inside the console.

The power supply harness is normally long enough to allow the power supply to be moved far enough out of the console to do the rework. If necessary, cut the tie wraps that attach the dc power supply harness to the console chassis. Normally, two self-adhesive tie wrap brackets are present that provide an attachment point for the tie wraps.

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**Preparing the Power Supply**

This section describes how to modify the power supply. Figure 1 shows the location of the components inside the power supply.

1. Remove all of the screws that attach the cover to the power supply.

2. Remove the ac quick-disconnect terminals on PS 202 (see Figure 2)—white/green on terminal 5, white/brown on terminal 1, and the brown jumper between terminals 2 and 3. Save the jumper for use on the replacement supply.

3. Cut off dc power leads close to the terminals on the power supply.

   The plus output wires are white/green and red, the common wires are black, and the minus output wires are green and violet. Make a note of the colors if they do not match the ones in this write up.

4. Remove power supply PS202.

   The power supply is attached to the chassis by a #8 kep nut and two mounting clips, one of which is used by PS 205. The clip, that secured PS 202, is not used.

5. After the power supply has been removed, position the clip that secures PS 205 to the chassis. Using a 11/32-inch socket, with ratchet and extension, tighten the kep nut securing the clip.

6. For better access to the ac line filter and PS 209, dismount the fuse holder assembly from the four long standoffs supporting it.

   - Remove the four screws attaching the fuse bracket to the long standoffs.
   - Move the fuse holder assembly out of the way (see Figure 3).
Figure 1. Power Supply Before Modifications, Open Top View

Figure 2. PS 202 Electrical Connectors
7. Remove the 2 standoffs nearest the ac line filter.
   The standoffs have a hole through them as a mechanism for tightening them to the chassis. Use the hole or common pliers, whichever works best.

8. Remove the +24 V power supply, PS 209.
   - Use the 11/32-inch socket with extension to remove the #8 kep nuts securing PS 209.
   - Disconnect the wires going to the ac input terminals, 1 and 5 of PS 209—two white/brown wires on terminal 1 and a white/black wire on terminal 5. Do not remove any of the PS 209 output wires.

9. Move PS 209 out of the way to make room for installing of the adapter bracket and for repositioning the ac line filter (see Figure 3).

10. Locate the 4 male/female 8-32 X 5/8-inch standoffs (22-407722-00) in the kit.
    Attach them to the studs that held PS 209 to the power supply chassis (see Figure 3).
    Use a 3/8-inch socket to tighten them in place (do not over tighten).

11. Locate the 2 female/female 8-32 X 5/8-inch standoffs (22-431153-00) in the kit.
    Attach them to the studs that held PS 202 to the power supply chassis (see Figure 3).
    Use a 5/16-inch socket to tighten them in place (do not over tighten).

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**Repositioning the AC Line Filter**

This section describes how to reposition the ac line filter inside the power supply.

1. Remove the ac line filter. Use a 5/16-inch socket with extension to remove the two #6 kep nuts holding the filter to the chassis.

2. Install the two Z brackets (01-904637-00, 2 required) onto the line filter. Do not tighten the nuts at this time.

3. Install the line filter, with the Z brackets installed, on the studs that held the ac line filter to the chassis—use two #6 kep nuts from the kit.
   - Position brackets and filter so that the filter is raised and moved toward the cooling fans on the rear of the power supply chassis.
   - Check the wiring to the filter and make sure the wires clear any obstructions and sharp edges.
   - Tighten all four #6 kep nuts.

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**Installing the Adaptor Bracket**

This section describes how to install the adaptor bracket into the power supply.

1. Locate the adaptor bracket in the kit (Plate, Power Supply Retrofit, 01-904636-00).
    A top view of the adaptor place is shown in Figure 4.

2. Locate the two 8/32 X 5/16-inch flat-head screws in the kit.

3. Position the adapter bracket on the studs of the four male/female standoffs with the countersunk holes over the female/female standoffs (see Figure 3).

4. Use the two 8/32 X 5/16-inch flat-head screws to fasten the adapter bracket in place.
Figure 3. Power Supply After Modifications, Open Top View

Figure 4. Adaptor Plate
Reinstalling PS 209

This section describes how to reinstall PS 209 power supply module into the system power supply. Figure 5 shows the new locations of the two supplies.

1. Reinstall the +24 V power supply (PS209).
   PS 209 is rotated counterclockwise 90 degrees (as viewed from side), with the ac terminals located in the cutout of the adapter plate. This rotation makes room for the larger capacity supply that replaces PS 202.

2. Connect the ac input to PS 209 by connecting the spade lug with the two white/brown wires to terminal 1 and the white/black wire to terminal 5.

3. Attach PS 209 to the adapter plate studs and male/female standoffs nearest the ac line filter.
   - Use three or four #8 kep nuts to secure the power supply.
   - Make sure that no ac power leads have fallen off their terminals and no wires are pinched.

Installing the New PS 202

This section describes how to install the new 1.5 Amp 15 V power supply module (PS 202) into the power supply.

1. Locate the new PS 202 from the kit.
2. Remove the following jumpers, if present, from the transformer of the new PS 202 power supply:
   - Remove the jumper between terminals 1 and 3.
   - Remove the jumper between terminals 2 and 4.
These jumpers are removed for 220 Vac operation.

3. Connect PS 202 for 220 Vac operation by connecting the brown jumper (removed from the smaller PS 202) between terminals 2 and 3 of the transformer (see Figure 5).

4. Connect the white/green wire to terminal 5 of the transformer (see Figure 5).

5. Connect the spade lug, with the two white/brown wires in it, to terminal 1 of the transformer.

6. Install the new 1.5 A, 15 V power supply (PS 202) on the remaining adapter bracket studs and male/female standoffs.
   - Use three #8 kep nuts to secure the power supply.
   - Make sure that none of the ac power leads have fallen off their terminals and none of the other wires in the power supply are pinched.

7. If not already done, use a piece of bus wire to short out the terminals + OUT and +S, –S and –OUT, and the three COMMON posts. Refer to Figure 5.

Make sure the wires are connected as listed below and shown in Figure 5:

<table>
<thead>
<tr>
<th>Pin</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>+ OUT</td>
</tr>
<tr>
<td>2</td>
<td>+ S</td>
</tr>
<tr>
<td>3</td>
<td>Common</td>
</tr>
<tr>
<td>4</td>
<td>Common</td>
</tr>
<tr>
<td>5</td>
<td>–S</td>
</tr>
<tr>
<td>6</td>
<td>- OUT</td>
</tr>
</tbody>
</table>

8. Carefully check all the wiring of the power supply.
   - Check for any loose hardware and faulty wiring.
   - Make sure that no wires were pinched during the upgrade operation.
   - Check for possible damage that could be caused by the wires being run over a sharp edge.

9. If possible, label the power supply module as “PS202”.

10. Reinstall the long standoffs the fuse bracket.

11. Locate the 0.5 A fuse (67-135350-00) in the upgrade kit. Remove the existing fuse in F202 and replace it with the 0.5 A fuse. Use a marker to change the fuse rating on the fuse panel.

12. Position the power supply so that the 220 V cords, from inside the console, can be plugged into the outlets on the side of the power supply.

**WARNING:** Dangerous high voltages exist inside the equipment that can kill or injure. Use caution after the power is turned on and use caution when making adjustments.

13. Connect the primary 220 V power cable to the main power receptacle on the rear of the power supply.

14. With the covers still off, turn on the power to the power supply. Turn on the digital and analog switches on the front of the power supply.

Go to the next section to test and adjust the system.
Adjusting the Power Supply

This section describes how to test and adjust the power supply before it is installed into the console. The power supply was powered up in the previous procedure.

**WARNING:** Dangerous high voltages exist inside the equipment that can kill or injure. Use caution after the power is turned on and use caution when making adjustments.

1. Use the test jacks on the front of the power supply and adjust the plus output voltage of PS 202 to +15.27 ±0.01 V.
   The higher voltage on the +15 V compensates for the line drop between the power supply and the backplanes.
2. Use the test jacks on the front of the power supply and adjust the minus output voltage of PS 202 to −15.00 ±0.01 V.
3. Check all the other voltages in the supply and adjust them as required. Do not make any changes to the +5 V power supply going to the digital card cage.
4. Turn off the power supply and disconnect all the ac power cords going to the supply. Go to the next section to reinstall the power supply.

Reinstalling the Power Supply

This section describes how to reinstall the power supply into the console.

1. Carefully check all the wiring in the power supply.
   - Check for any loose hardware and faulty wiring.
   - Make sure that no wires were pinched during the upgrade operation.
   - Check for possible damage that could be caused by the wires being run over a sharp edge.
2. Use tie wraps from the kit to dress off the wiring inside the power supply.
3. Replace the power supply cover.
4. Insert the power supply in the console. Be careful not to snag the power supply harness while installing the module.
5. Dress off the power supply harness. Use the tie wraps provided in the kit to secure the harness inside the console.
6. Before using the screws to attach the supply to the console, connect the two internal 220V power cords to the ac outlets on the side of the power supply.
7. Attach the power supply to the console using the screws saved earlier.
8. Install all panels and modules removed during the upgrade.
Powering Up the Console

This section describes how to power up the console and finish the upgrade.

1. After the console is put back together, turn on main power circuit breaker and then turn on power to the analog, digital, and shim modules.

2. Restart the acquisition process from a shelltool on the Sun host computer by entering:
   
   su acqproc.

3. Load a known set of good shim values in the VNMR input window by entering:
   
   load='y' su.

4. Take an acquisition to verify system operation and performance.

5. Because the new 15 V supply is used on the observe receiver and ADC, check the system for proper balance between the 0 and 90 degree channels.

   The power supply upgrade is now finished.

Confirming the Retrofit

After the retrofit is finished, inform the Customer Assistance Center that the retrofit is complete.

Provide the following information:

- Customer name
- System frequency
- System serial number

Contact the Customer Assistance Center as follows:

- Phone – 800-356-4437
- e-mail – customersup@varianinc.com