*GE Medical Systems*

# Technical Publications

## Direction 2407600
**Revision 2**

# Resistive Shim Power Supply Software and Interconnect Installation



**Operating Documentation**

# DAMAGE IN TRANSPORTATION

All packages should be closely examined at time of delivery. If damage is apparent, have notation **"damage in shipment"** written on **all** copies of the freight or express bill **before** delivery is accepted or "signed for" by a General Electric representative or a hospital receiving agent. Whether noted or concealed, damage **MUST** be reported to the carrier **immediately** upon discovery, or in any event, within **14**-days after receipt, and the contents and containers held for inspection by the carrier. A transportation company will not pay a claim for damage if an inspection is not requested within this **14**-day period.

File a report with

- Call 1–800–548–3366 and use option 8.
- Fill out a report on http://3.28.216.127/sctg/InstallFulfill/IFHome.htm
- Contact your local service coordinator for more information on this process.

Rev. 08/15/2003

## Direction 2128126 - Language Policy For Service Documentation, Rev 0

**W A R N I N G**

- **THIS SERVICE MANUAL IS AVAILABLE IN ENGLISH ONLY.**
- **IF A CUSTOMER'S SERVICE PROVIDER REQUIRES A LANGUAGE OTHER THAN ENGLISH, IT IS THE CUSTOMER'S RESPONSIBILITY TO PROVIDE TRANSLATION SERVICES.**
- **DO NOT ATTEMPT TO SERVICE THE EQUIPMENT UNLESS THIS SERVICE MANUAL HAS BEEN CONSULTED AND IS UNDERSTOOD.**
- **FAILURE TO HEED THIS WARNING MAY RESULT IN INJURY TO THE SERVICE PROVIDER, OPERATOR OR PATIENT FROM ELECTRIC SHOCK, MECHANICAL OR OTHER HAZARDS.**

**AVERTISSEMENT**

- **CE MANUEL DE MAINTENANCE N'EST DISPONIBLE QU'EN ANGLAIS.**
- **SI LE TECHNICIEN DU CLIENT A BESOIN DE CE MANUEL DANS UNE AUTRE LANGUE QUE L'ANGLAIS, C'EST AU CLIENT QU'IL INCOMBE DE LE FAIRE TRADUIRE.**
- **NE PAS TENTER D'INTERVENTION SUR LES ÉQUIPEMENTS TANT QUE LE MANUEL SERVICE N'A PAS ÉTÉ CONSULTÉ ET COMPRIS.**
- **LE NON–RESPECT DE CET AVERTISSEMENT PEUT ENTRAÎNER CHEZ LE TECHNICIEN, L'OPÉRATEUR OU LE PATIENT DES BLESSURES DUES À DES DANGERS ÉLECTRIQUES, MÉCANIQUES OU AUTRES.**

**WARNUNG**

- **DIESES KUNDENDIENST-HANDBUCH EXISTIERT NUR IN ENGLISCHER SPRACHE.**
- **FALLS EIN FREMDER KUNDENDIENST EINE ANDERE SPRACHE BENÖTIGT, IST ES AUFGABE DES KUNDEN FÜR EINE ENTSPRECHENDE ÜBERSETZUNG ZU SORGEN.**
- **VERSUCHEN SIE NICHT, DAS GERÄT ZU REPARIEREN, BEVOR DIESES KUNDENDIENST-HANDBUCH NICHT ZU RATE GEZOGEN UND VERSTANDEN WURDE.**
- **WIRD DIESE WARNUNG NICHT BEACHTET, SO KANN ES ZU VERLETZUNGEN DES KUNDENDIENSTTECHNIKERS, DES BEDIENERS ODER DES PATIENTEN DURCH ELEKTRISCHE SCHLÄGE, MECHANISCHE ODER SONSTIGE GEFAHREN KOMMEN.**

**AVISO**

- **ESTE MANUAL DE SERVICIO SÓLO EXISTE EN INGLÉS**
- **SI ALGÚN PROVEEDOR DE SERVICIOS AJENO A GEMS SOLICITA UN IDIOMA QUE NO SEA EL INGLÉS, ES RESPONSABILIDAD DEL CLIENTE OFRECER UN SERVICIO DE TRADUCCIÓN.**
- **NO SE DEBERÁ DAR SERVICIO TÉCNICO AL EQUIPO, SIN HABER CONSULTADO Y COMPRENDIDO ESTE MANUAL DE SERVICIO.**
- **LA NO OBSERVANCIA DEL PRESENTE AVISO PUEDE DAR LUGAR A QUE EL PROVEEDOR DE SERVICIOS, EL OPERADOR O EL PACIENTE SUFRAN LESIONES PROVOCADAS POR CAUSAS ELÉCTRICAS, MECÁNICAS O DE OTRA NATURALEZA.**

## ATENÇAO

- **ESTE MANUAL DE ASSISTÊNCIA TÉCNICA SÓ SE ENCONTRA DISPONÍVEL EM INGLÊS.**
- **SE QUALQUER OUTRO SERVIÇO DE ASSISTÊNCIA TÉCNICA, QUE NÃO A GEMS, SOLICITAR ESTES MANUAIS NOUTRO IDIOMA, É DA RESPONSABILIDADE DO CLIENTE FORNECER OS SERVIÇOS DE TRADUÇÃO.**
- **NÃO TENTE REPARAR O EQUIPAMENTO SEM TER CONSULTADO E COMPREENDIDO ESTE MANUAL DE ASSISTÊNCIA TÉCNICA.**
- **O NÃO CUMPRIMENTO DESTE AVISO PODE POR EM PERIGO A SEGURANÇA DO TÉCNICO, OPERADOR OU PACIENTE DEVIDO A' CHOQUES ELÉTRICOS, MECÂNICOS OU OUTROS.**

## AVVERTENZA

- **IL PRESENTE MANUALE DI MANUTENZIONE È DISPONIBILE SOLTANTO IN INGLESE.**
- **SE UN ADDETTO ALLA MANUTENZIONE ESTERNO ALLA GEMS RICHIEDE IL MANUALE IN UNA LINGUA DIVERSA, IL CLIENTE È TENUTO A PROVVEDERE DIRETTAMENTE ALLA TRADUZIONE.**
- **SI PROCEDA ALLA MANUTENZIONE DELL'APPARECCHIATURA SOLO DOPO AVER CONSULTATO IL PRESENTE MANUALE ED AVERNE COMPRESO IL CONTENUTO.**
- **NON TENERE CONTO DELLA PRESENTE AVVERTENZA POTREBBE FAR COMPIERE OPERAZIONI DA CUI DERIVINO LESIONI ALL'ADDETTO ALLA MANUTENZIONE, ALL'UTILIZZATORE ED AL PAZIENTE PER FOLGORAZIONE ELETTRICA, PER URTI MECCANICI OD ALTRI RISCHI.**

## 警告

・このサービスマニュアルは英語版しかありません。

・GEMS以外でサービスを担当される業者が英語以外の言語を要求される場合、翻訳作業はその業者の責任で行うものとさせていただきます。

・このサービスマニュアルを熟読し、理解せずに装置のサービスを行わないでください。

・この警告に従わない場合、サービスを担当される方、操作員あるいは患者さんが、感電や機械的又はその他の危険により負傷する可能性があります。

## 注意:

- 本维修手册仅存有英文本。
- 非 GEMS 公司的维修员要求非英文本的维修手册时，客户需自行负责翻译。
- 未详细阅读和完全了解本手册之前，不得进行维修。
- 忽略本注意事项会对维修员，操作员或病人造成触电，机械伤害或其他伤害。

# LIST OF EFFECTIVE PAGES

| REV | DATE | PRIMARY REASON FOR CHANGE |
|---|---|---|
| 0 | Mar 18, 2004 | Initial version for Software Installation document to be included with FRU's shipping to Signa OpenSpeed LX systems |
| 1 | Dec 8, 2004 | Added Sec 1-3, Shim Power Supply Hardware Connections. Corrected references of 5 channels to 6 channels through out the document. |
| 2 | May 25, 2005 | Added process for using FRU on 9x systems. |

| PAGE | REV | PAGE | REV | PAGE | REV | PAGE | REV |
|---|---|---|---|---|---|---|---|
| Title Page | 1 | Title Page | 2 | | | | |
| Damage in Trans. | - | Damage in Trans. | - | | | | |
| Direction 2128126 | 0* | Direction 2128126 | 0* | | | | |
| 5 to 14 | 1 | 5 to 18 | 2 | | | | |

* This revision/letter corresponds to the indicated document's revision control system.

# TABLE OF CONTENTS

## 1- OVERVIEW

A New 6 Channel Resistive Shim Power Supply (2352972) has been developed by GE and can be used as a FRU replacement for the Shim Power Supply manufactured by Resonance Research Inc. The new power supply is capable of supporting both RS232 and CAN communication links, however the default configuration for the FRU unit is CAN. All Signa Excite Products use the new CAN communication link therefore no other software changes to the system or the shim power supply are required. For the RS232 LX based systems new software is required to be loaded onto the host computer and then downloaded to the shim power supply.

The new 6 channel Shim Power Supply is currently used on the following products:

- Signa 3.0T Excite
- Signa Open*Speed* Excite
- Signa Open*Speed* LX
- Signa 1.5T Excite
- Signa 9x Excite

Signa 3.0T Excite utilizes 5 channels whereas the Signa Open*Speed* systems will only utilize 1 channel (for Z2).

### 1-1 Requirements

One Field Engineer for 0.5 hours

### 1-2 Supplied Parts

- 6 Channel Resistive Shim Power Supply (p/n 2352972)
- HFO2/HFO3 Shim Supply Patch CD Version: Patch 01 (p/n 2391784)
  Signa Open*Speed* LX Systems
- Signa 9X Shim Supply Patch Version (part 5141869).

## 1-3 Shim Power Supply Hardware Connections

Use Table 1-1 to determine the cable connections needed for the product the unit is used on.

TABLE 1-1
**SHIM POWER SUPPLY CABLE CONNECTIONS**

| Shim Power Supply Connector | Function | 3.0T Signa With Excite | 0.7T Signa OpenSpeed With Excite | 0.7T Signa OpenSpeed LX (see Note 1) | Signa LX systems |
|---|---|---|---|---|---|
| J1 – DB9M | Host - RS232 Interface | No connection | No connection | To Sys Cab I/F J32 | Goes to Host, OW1 A16 Port 2 |
| J2 – DB9M | Debug - RS232 Interface | No connection | No connection | No connection | No connection |
| J3 – 37 pin amp circular | HO Shim Output | To RF Access Cab I/F J126 | No connection | No connection | Shim Output |
| J4 – DB9F | Can Com Port - Out | Ro RF Access Cab I/F J119 | To Sys Cab I/F J56 | No connection | No connection |
| J5 – DB9M | Can Com Port - In | From ASC/UPM Slot 18 J3 | From Driver Module J1 | No connection | No connection |
| J6 – DB37F | RTD Interface | No Connection | Not used | No connection | No connection |
| J7 – DB9F | Z2 Shim Output | No Connection | To Sys Cab I/F J59 | To Sys Cab I/F J34 | No connection |
| J8 – DB9M | | No Connection | Not used | No connection | No connection |
| Note 1: The cables coming from the Navigator hardware and Fluke meter are not used. | | | | | |

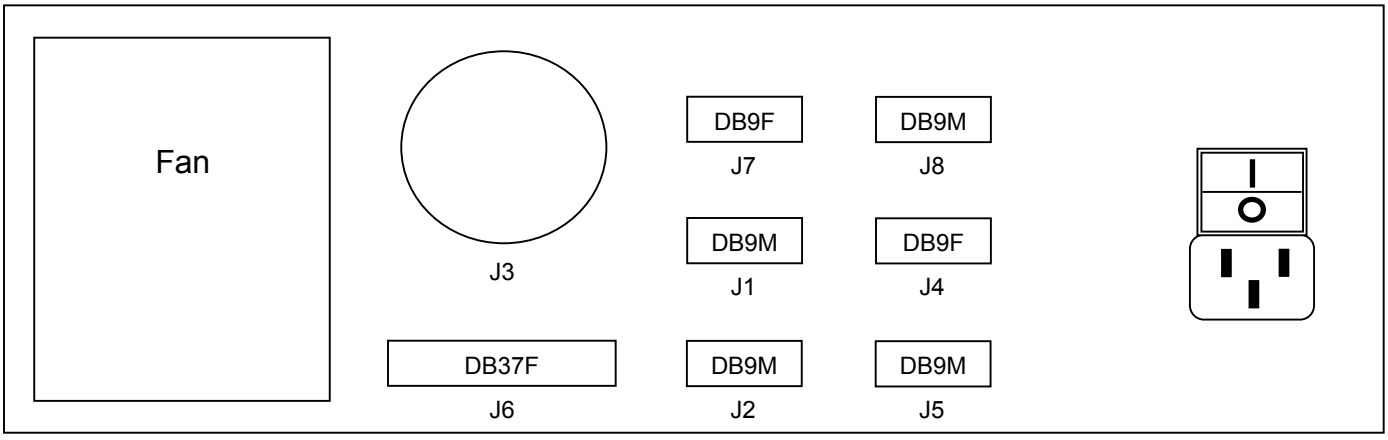
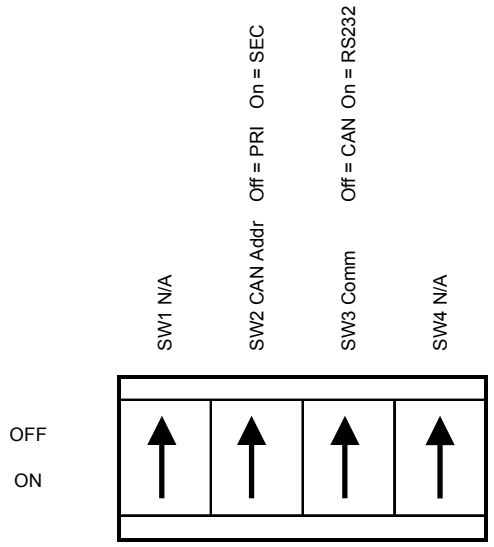



ILLUSTRATION 1-1
**SHIM POWER SUPPLY – REAR PANEL VIEW**

2- DIP SWITch settings

## 2-1 CAN Communications

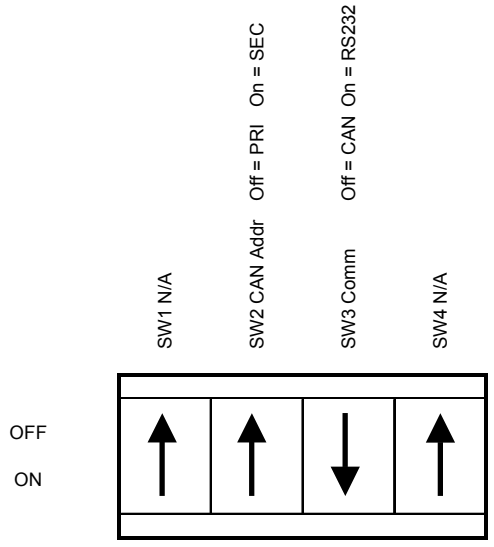
The DIP Switch settings on the front panel of the Shim Power Supply should be set as follows to support CAN Communication, used on Signa Open*Speed* Excite, see Illustration 2-1:




**CAN COMMUNICATION DIP SWITCH SETTINGS**
ILLUSTRATION 2-1

## 2-2 RS232 Communications

The DIP Switch settings on the front panel of the Shim Power Supply should be set as follows to support RS232 Communication, used on Signa Open*Speed* LX and Signa 9.1. See Illustration 2-2:




**RS232 COMMUNICATION DIP SWITCH SETTINGS**
ILLUSTRATION 2-2

## 3- PATCH SOFTWARE FOR HFO SYSTEMS

### 3-1 Verification Of CD Content

If you need to verify the content of the CD-ROM you can view it on your laptop using Windows Explorer. See Illustration 3-1 for content listing.


**SIGNA OPENSPEED CD-ROM CONTENT LISTING**
ILLUSTRATION 3-1

### 3-2 Software Installation Onto Host for HFO LX based system.

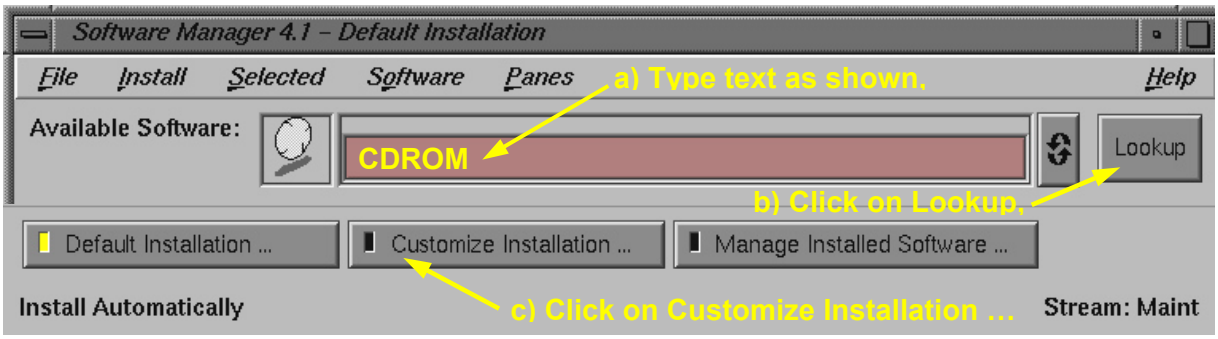
This section describes how to load and initialize the software onto the host computer. **Important! Do Not attempt to load this software onto a Signa Open*Speed* Excite or Signa 1.5T 9X System.**

**Note:** The host software must be at either version HFO2.29F_M4 or HFO3.29I_M4 in order to load this software. Verify the host software revision by typing getver <enter>.within a c-shell window.

At the Operator Workspace perform the following:

1. Insert the CD-ROM, part number **2391784** into the CD drive located in the tower to the right of the Host PC.
2. Select the Tools icon to switch to the Service Desktop Manager, if not already shown.
3. Open a “C Shell” window session and login as root.
   {sdc@host name} [1] **su root <enter>**
   Password: **operator <enter>**
4. Start up the Software Manager Tool by typing the following:
   {sdc@host name} [1] **swmgr <enter>**

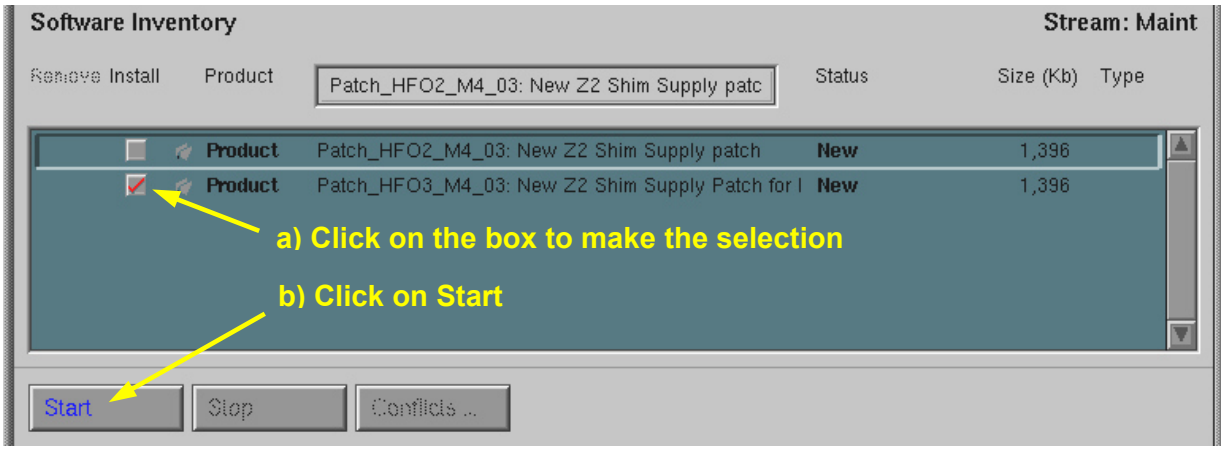
5. Perform the steps shown in Illustration 3-2.




**SOFTWARE MANAGER**
ILLUSTRATION 3-2

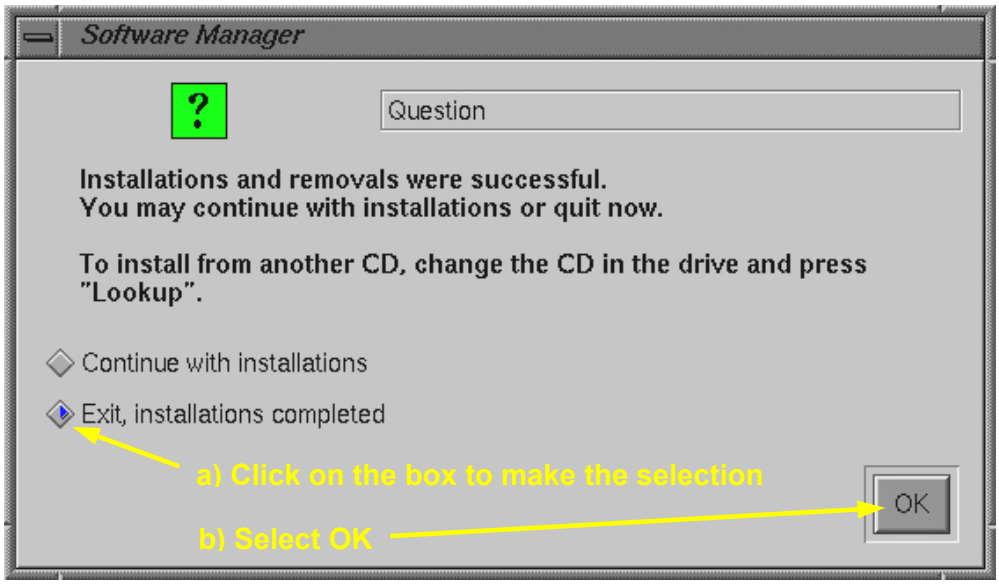
6. Start the appropriate software patch version, either HFO2_M4_03 or HFO3_M3_03. See Illustration 3-3.

   **Note:** The example shows making a selection for an HFO3 system.



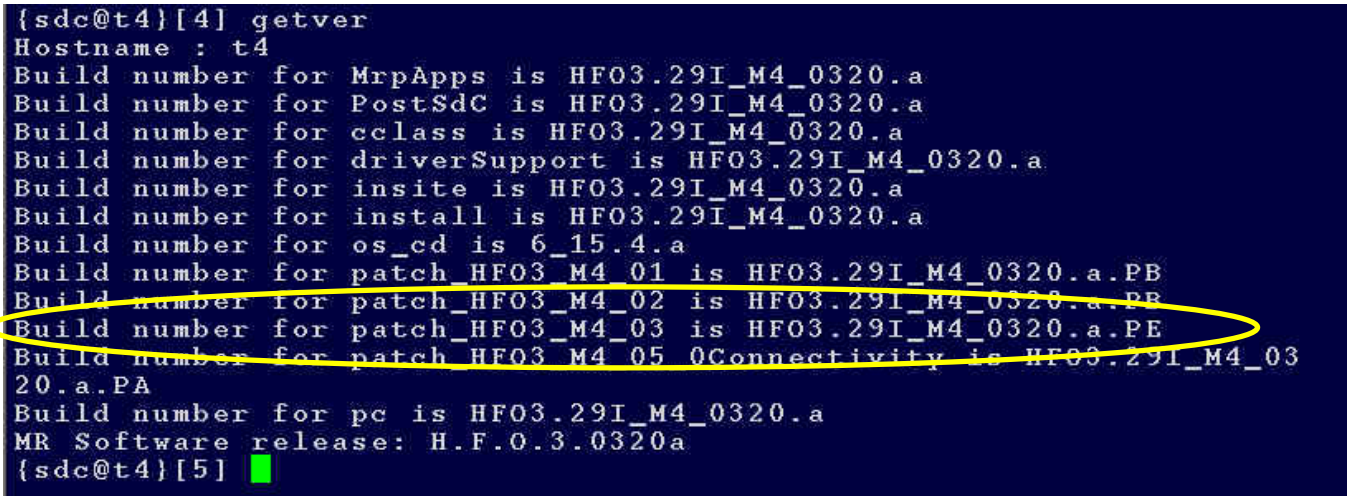

**SOFTWARE INVENTORY**
ILLUSTRATION 3-3

7. Perform steps as shown in Illustration 3-4.




**INSTALLATION COMPLETE**
ILLUSTRATION 3-4

8. Verify the patch copied properly onto the host by typing the following in the c shell:
{sdc@host name} [5] **getver <enter>**



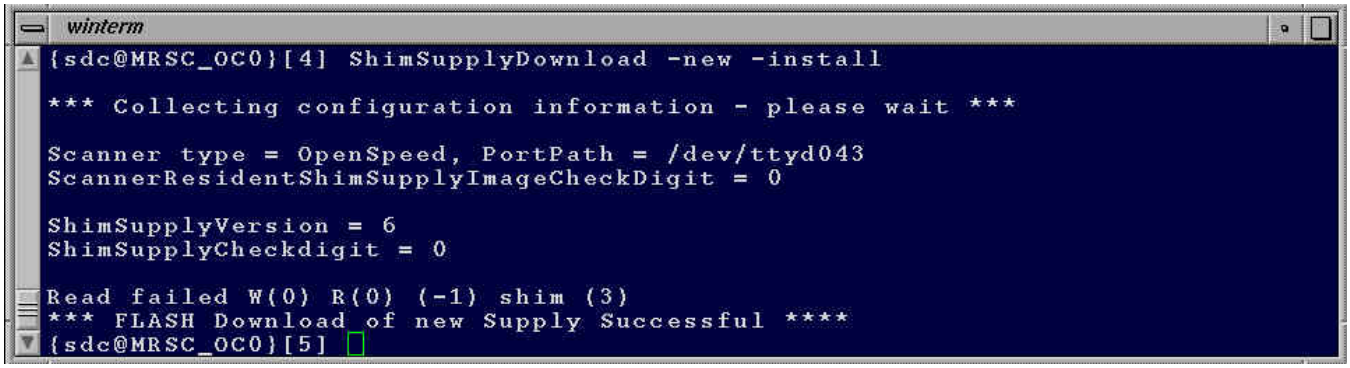

**SOFTWARE PATCH VERIFICATION**
ILLUSTRATION 3-5

### 3-3 Software Installation Onto Shim Power Supply

The actual installation of the software onto the shim power supply by the system will take 3 to 4 minutes, so be patient.

1. Shut down the system, reboot the computer, and bring it up as root. This step is important as the Port Manager is disabled allowing the host to communicate with the shim power supply without interruption.
2. Once the reboot is complete type the following into the open winterm window:
   **`cd /usr/g/bin <enter>`**
   **`ShimSupplyDownload -new -install <enter>`**

   See Illustration 3-6 for display results.




**SOFTWARE INSTALLATION RESULTS**
ILLUSTRATION 3-6

3. After the software has successfully downloaded to the Shim Power Supply, reboot the Host computer and login as sdc. Then proceed to Section 5 - Communication Link Functional Check after the system has restarted.

## 4- PATCH LOAD FOR SIGNA LX

This section describes how to load and initialize the software onto the host computer. **Important! Do Not attempt to load this software onto a Signa Excite or HFO System.**

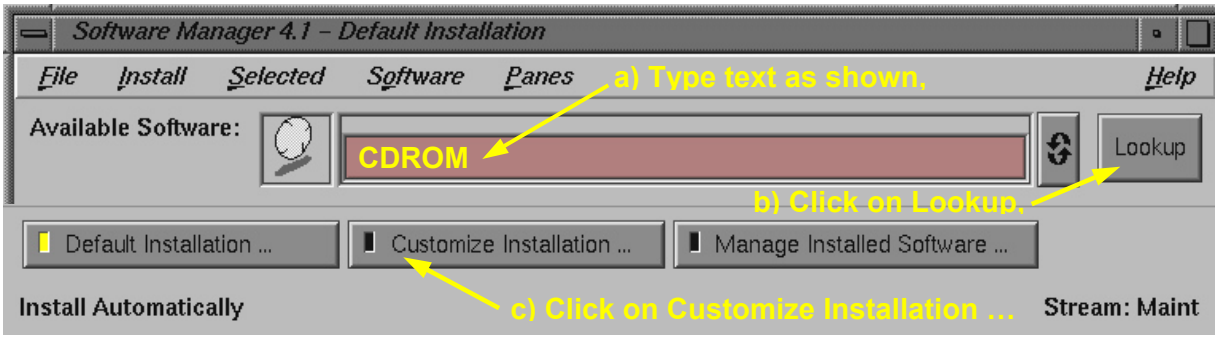
**Note:** The host software must be at either version 91_M4 in order to load this software. Verify the host software revision by typing getver <enter>.within a c-shell window.

At the Operator Workspace perform the following:

1. If applications software is running, restart the computer by “right clicking” on the mouse, and select **Shutdown**. After host shuts down, click on **restart** to continue When system reboots, log in as **root**, password is **operator.**
2. Insert the CD-ROM, part number **5141869** into the CD drive located in the tower to the right of the Host PC.
3. Select the Tools icon to switch to the Service Desktop Manager, if not already shown.
4. Open a “C Shell” window.

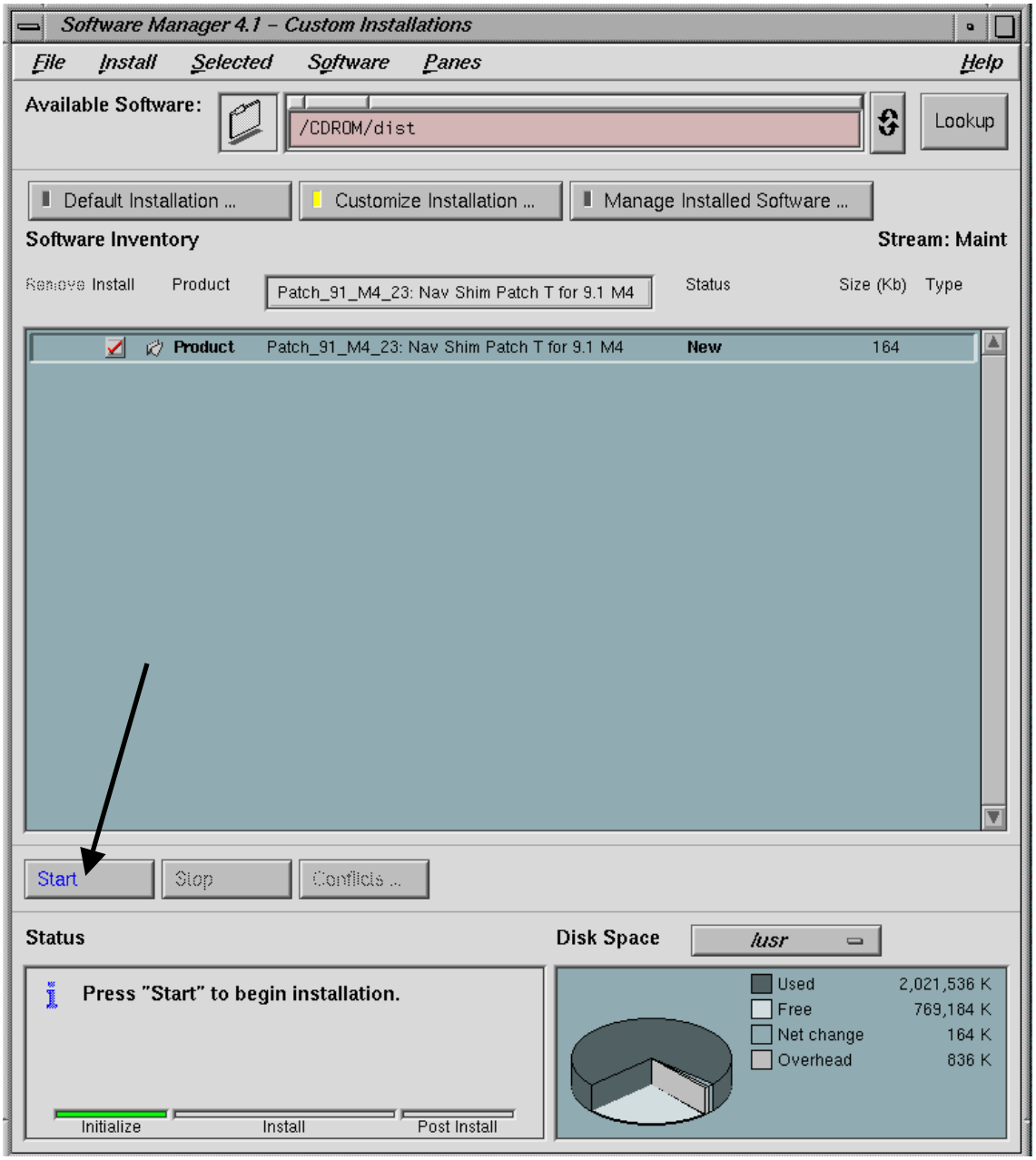
5. Start up the Software Manager Tool by typing the following:
   {sdc@host name} [1] **swmgr <enter>**

6. Perform the steps shown in Illustration 4-2.



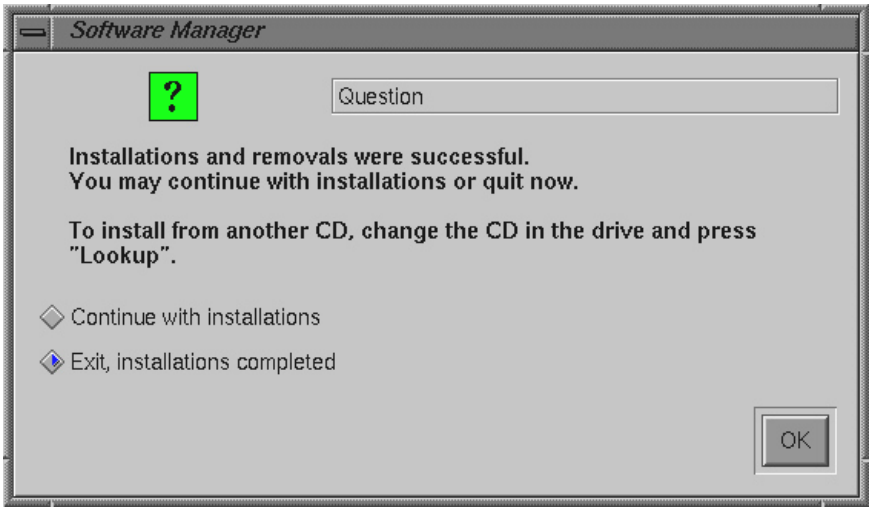

**SOFTWARE MANAGER**
ILLUSTRATION 4-2

7. Start the appropriate software patch version, 91_M4_23: Nav Shim Patch T for 9.1 M4
   See Illustration 4-3.



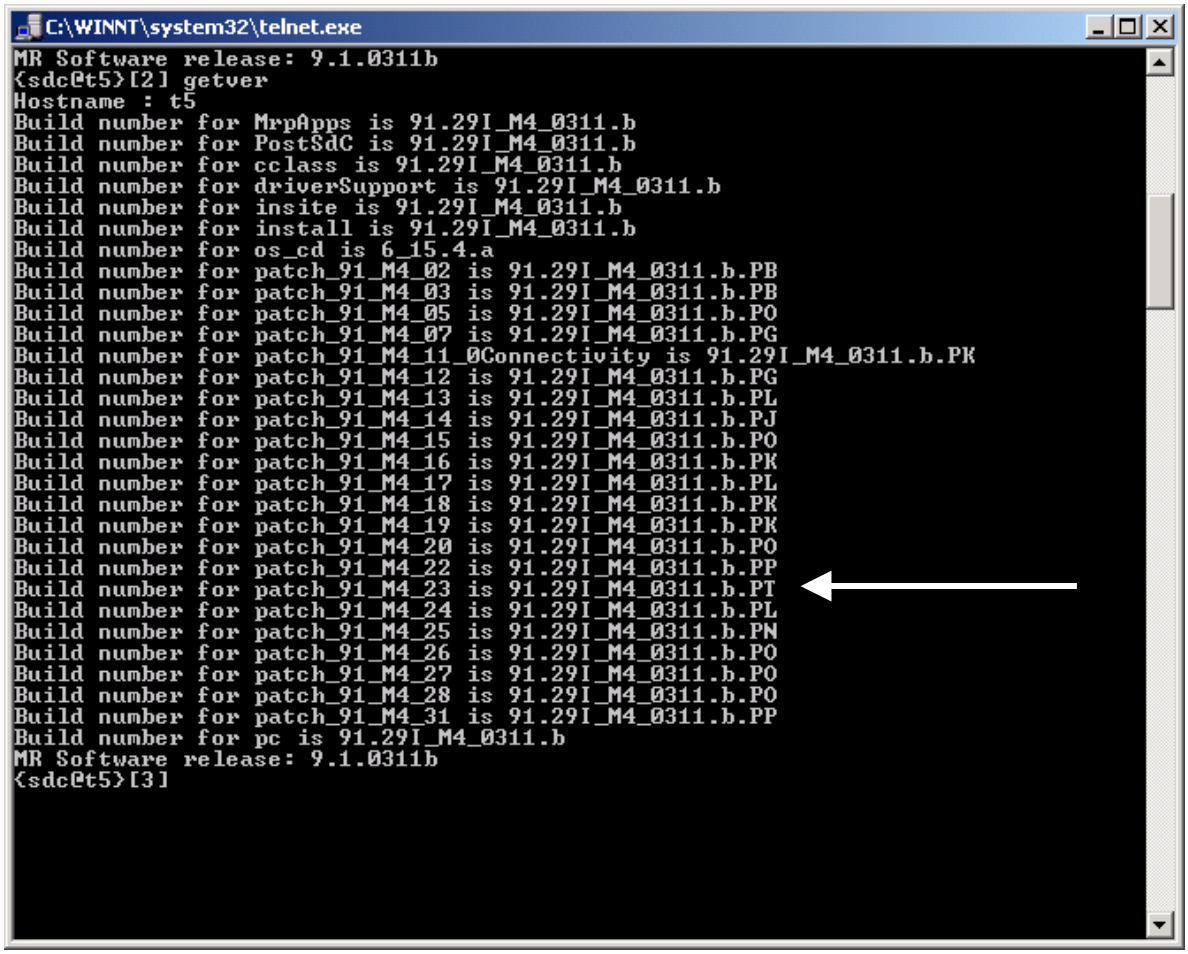

**SOFTWARE MANAGER**
ILLUSTRATION 4-3

8. Press **Start** to load the patch. Eventually the GUI in illustration 4-4 will appear. Select **Exit, installations completed**, then select **OK**.




**SOFTWARE MANAGER**
ILLUSTRATION 4-4

9. To verify successful patch load, log out of root mode by selecting **Desktop**, then **Log out**. Boot to applications using login of **sdc**, password **adw2.0**. After system boots, open Cshell and type **getver**. Verify that patch 23 is present.



## 5- COMMUNICATION LINK FUNCTIONAL CHECK

The following procedure will allow you to perform a functional check on the communication link between the host computer and the shim power supply, and will also check the output of the shim power supply, as there is no visual indication on the unit. This procedure is only valid on LX based systems using the RS232 communication link. All commands are performed from a C Shell at the Operator Workspace.

1. Type the following command in an open C-shell session:

   {sdc@host name} [5] **`readcurrent`** **<enter>**

   Example of response: **"**`The current value for Z2 is 955 ma.`**"**

**Note**

You may get the following response: "No response from SHIM Supply. It may be busy. Try again after 15 sec." This message is posted for the following reasons: 1) The communication port is busy. In this case try the command again. 2) There is a problem with the communication link, or 3) there is a problem with the Shim Power Supply. If after 3 minutes of repeatedly trying to read current and you get the same response then go to Section 5- Troubleshooting.

## 6- TROUBLESHOOTING

1. Make sure the DIP Switch settings on the front panel are correct.
   Refer to Section 2- DIP SWITCH SETTINGS. If you change the settings be sure to cycle power to the Shim Power Supply to have the settings take effect.
2. Verify the Power Switch on the rear of the unit is in the "1" position.

10. Check the LED status on the front panel. **Note:** The following is valid only after a successful firmware download.
    - Heartbeat: Blinking
    - Comm Err: Off
    - Comm Stat: Blink during CAN comm
    - Power OK: ON
    - Func Err: OFF
    - Out Enable: ON
    - Watchdog: ON
    - Heartbeat: Blinking
    - 5V Stat: ON
11. Make sure the cables are connected properly at J1 and J7 on the rear panel of the power supply.

**Note**

If you still cannot get a response after typing the readcurrent command then there may be a problem with the communication link or the Shim Power Supply. Refer to Table 5-1 for a list of commands that can be useful in troubleshooting.

TABLE 5-1
**IRIX COMMANDS FOR TROUBLESHOOTING**

| **Command** | **Description** | **Comments** |
|---|---|---|
| cu z2supply | Used to establish connection between the host computer and the shim power supply | Connection made via the RS232 port. Once connected press **<enter>** key and the response should show "**.**" |
| gv | Get version | Version should be as follows: `mxserver [6.00] shim [mxa4] path [/vbos/embedded/shim_psupply]` |
| gc z5 | Get DAQ value for shim module channel 5. | This request shows what the DAQ value is that was sent by the system to the shim supply. Therefore the response will be displayed in DAQ units. |
| sc z5 "some value" | Set the DAQ value for shim module channel 5. Channel 5 is used for the HFO Z2 Coil. | The value entered will be in DAQ units. See Note 1 |
| hc | Request actual output current of shim module Channel 5. | Shim module Channel 5 is used to drive the Z2 shim coil on HFO systems. The output current is reported in milli-amps. |
| **Note 1:** Use the following formula to convert from DAQ units to amps<br>DAQ units = amps (approximate new current)<br>32767 4 (max current in amps @ 32767) | | |