# *SunSwift™ SBus Adapter Installation and User's Guide*

The Network Is the Computer™

**Sun Microsystems Computer Company**
2550 Garcia Avenue
Mountain View, CA 94043 USA
415 960-1300 fax 415 969-9131

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# *Contents*

# *Preface*

This manual describes how to install and use your SBus card.

The procedures in this manual assume that you are a system or network administrator experienced in installing similar hardware and that you are familiar with Solaris administration.

## *UNIX Commands*

This document may not include specific software commands or procedures. Instead, it may name software tasks and refer you to operating system documentation or the handbook that was shipped with your new hardware.

The type of information that you might need to use references for includes:

- Shutting down the system
- Booting the system
- Configuring devices
- Other basic software procedures

See one or more of the following:

- *Solaris 2.x Handbook for SMCC Peripherals* contains Solaris™ 2.x software commands.
- On-line AnswerBook™ for the complete set of documentation supporting the Solaris 2.x software environment.
- Other software documentation that you received with your system.

## *Typographic Conventions*

The following table describes the typographic changes used in this book.

| Typeface or Symbol | Meaning | Example |
|---|---|---|
| `AaBbCc123` | The names of commands, files, and directories; on-screen computer output | Edit your `.login` file.<br>Use `ls -a` to list all files.<br>`machine_name% You have mail.` |
| **`AaBbCc123`** | What you type, contrasted with on-screen computer output | `machine_name% su`<br>`Password:` |
| *AaBbCc123* | Command-line placeholder: replace with a real name or value | To delete a file, type `rm` *filename*. |
| *AaBbCc123* | Book titles, new words or terms, or words to be emphasized | Read Chapter 6 in the *User's Guide*.<br>These are called *class* options.<br>You *must* be root to do this. |

## *Shell Prompts*

The following table shows the default system prompt and superuser prompt for the C shell, Bourne shell, and Korn shell.

| Shell | Prompt |
|---|---|
| C shell | `machine_name%` |
| C shell superuser | `machine_name#` |
| Bourne shell and Korn shell | `$` |
| Bourne shell and Korn shell superuser | `#` |

## *Related Documents*

The following documents contain topics that relate to the information in the *SunSwift SBus Adapter Installation and User's Guide*.

| Title | Part Number |
|---|---|
| Your system installation or service manual | |
| *Solaris 2.5 Handbook for SMCC Peripherals* | 802-3725 |
| *SMCC Open Issues Supplement Solaris 2.5* | 802-3708 |
| *Solaris 2.5 on Sun Hardware AnswerBook* | |
| *SunVTS 1.0 User's Guide* | 801-7271 |
| *Platform Notes: The hme Fast Ethernet Device Driver* | 802-3970 |

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## *FCC Class B Notice—United States*

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and

2. This device must accept any interference received, including interference that may cause undesired operation.

Note - This equipment has been tested and found to comply with the limits for a Class B digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed an used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into a power outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio / television technician for help.

### *Shielded Cables*

Connections between the workstation and peripherals must be made using shielded cables in order to maintain compliance with FCC radio frequency emission limits.

### *Modifications*

Modifications to this device, not approved by Sun Microsystems, Inc. may void the authority granted to the end user by the FCC to operate the equipment.

## *DOC Class B Notice—Canada*

This digital apparatus does not exceed Class B limits for radio noise emission for a digital apparatus as set out in the Radio Interference Regulations of the Canadian Department of Communications.

## *Avis Concernant les Systèmes Appartenant à la Classe B du DOC—Canada*

Le présent appareil numérique n´émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe B prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

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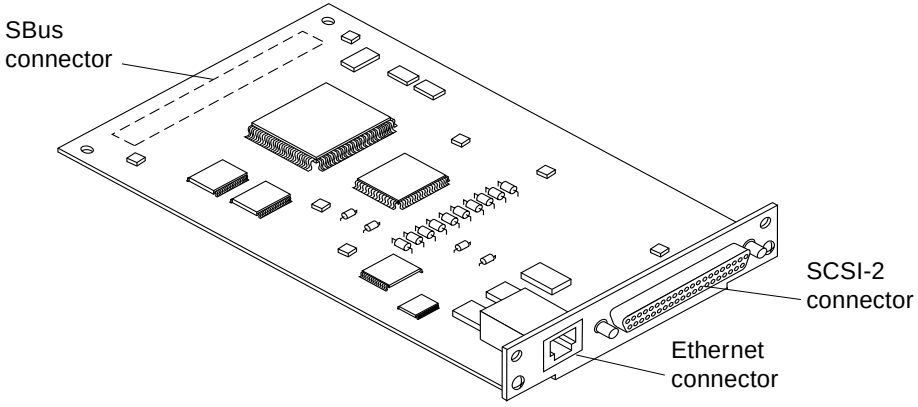
取扱説明書に従って正しい取り扱いをして下さい。

# *Preparing for Installation* 1

The SunSwift™ SBus Adapter offers fast Ethernet and FastWide SCSI-2 capabilities on the same SBus card.




This SBus card offers the following features:

- Switchable 10BASE-T/100BASE-TX Ethernet. Automatically sets 10/100 Mbps speed. Conforms to IEEE 802.3u Ethernet standard.
- 20 Mbytes/s, 16-bit, single-ended SCSI-2 controller. Conforms to ANSI X3T9.2 SCSI-2 standard.
- SBus interface to host system. Complies with IEEE 1496 SBus specification.

## 1.1 Requirements for Using the SBus Adapter

Before installing the adapter, make sure your system meets the following hardware and software requirements:

| | |
|---|---|
| Systems | Sun™ Ultra™ 140, Sun Ultra Creator 170E, SPARCstation™ 4, SPARCstation 5, SPARCstation 10 models, SPARCstation 20 models, SPARCserver™ 600MP series, SPARCserver 1000 or SPARCcenter™ 2000 |
| Firmware | OpenBoot™ PROM Version 2.9 or greater |
| Operating System | Solaris™ 2.5 environment |
| Peripherals | Only Sun SCSI-2 devices |
| SCSI Cables | Only standard, Sun-supported cabling to ensure reliable SCSI interface connections |
| Part Numbers | 530-2115-02 (1.2 m 50-pin to 68-pin cable)<br>530-1884-03 (0.8 m 68-pin to 68-pin cable)<br>530-2228-01 (2 m 50-pin to 68-pin cable)<br>530-1885-03 (2 m 68-pin to 68-pin cable) |

### *SCSI Cabling*

You can daisy chain up to 15 devices on the SunSwift SBus Adapter as follows:

| | |
|---|---|
| Wide-to-wide devices | Use a 68-pin to 68-pin cable.<br>Always put wide SCSI devices closest to the host system. |
| Wide-to-narrow devices | Use a 68-pin to 50-pin cable.<br>You can include only one wide-to-narrow cable along a chain of peripherals.<br>Always put the narrow SCSI devices at the end of the chain. |

The SCSI bus must be terminated at the end of the chain.

**Note –** If you use the SunSwift SBus Adapter for SCSI purposes only, you *must* change the device name from `SUNW,hme` to `SUNW,hme_idle` to avoid a "`Link Down – cable problem?`" message. Refer to *SMCC Open Issues Supplement Solaris 2.5* for more detailed information.

*Ethernet Cabling*

An additional Ethernet cable is required if you want to use your system's existing Ethernet interface *and* the SunSwift SBus Adapter Ethernet interface.

*Disabling Your Current Ethernet Device*

If you remove your system's existing Ethernet cable (either from its on-board Ethernet device or from an existing Ethernet card) and insert it into the SunSwift SBus Adapter Ethernet connection, you must disable your current card's Ethernet device. For example, if your current Ethernet device is called `le0`, you would remove its IP address and host name from the `/etc/hosts` file and remove the `/etc/hostname.le0` file itself.

## 1.2 If Solaris 2.5 is Not Installed on Your System

1. **Install the SunSwift SBus Adapter as described in Chapter 2 first.**
2. **Install the Solaris 2.5 software environment after the adapter installation, as described in Section 2.4, "Installing the Solaris 2.5 Software."**

## 1.3 If Solaris 2.5 is Installed on Your System

If the Solaris 2.5 software is already installed on your system, you must perform the following installation tasks before installing the SunSwift SBus Adapter.

- If you are using the SunSwift SBus Adapter as your *only* Ethernet interface, perform the tasks in section 1.3.1.
- If you are using the SunSwift SBus Adapter *and* another Ethernet interface, perform the tasks in section 1.3.2.

### 1.3.1 *Using the SunSwift SBus Adapter as Your* Only *Ethernet Interface*

You will be installing software from the Solaris 2.5 CD-ROM. Make sure the Solaris 2.5 CD-ROM is properly placed in the CD-ROM drive before performing the following tasks.

1. **As superuser, add the `SUNWhmd` and `SUNWhmdu` packages to your system:**

```
# pkgadd -a none -d /cdrom/solaris_2_5_sparc/s0/Solaris_2.5 SUNWhmd SUNWhmdu
```

2. **For both packages, answer `/` to the following question:**

```
Enter path to package directory [?,q]
```

   You will receive a message stating the process was successful.

3. **Assign an IP address and host name for the SunSwift SBus Adapter Ethernet channel.**
   For example, `123.456.78.90` (IP address); `zardoz` (host name).

4. **Edit the `/etc/hosts` file and remove your existing Ethernet interface's IP address and host name.**

5. **Add an entry to the `/etc/hosts` file containing the new IP address and host name for the selected `hme` channel.**
   This is the IP address and host name that you assigned in step 3.

6. **Remove your existing Ethernet interface's `/etc/hostname.xx`*<num>* file from your system.**

7. **Create a `/etc/hostname.hme`*<num>* file for the Ethernet channel you are planning to use for the SunSwift SBus Adapter.**
   - `hostname` is literal. Type **`hostname`**.
   - ***num*** is the instance number of the SBus card installation. Use `0` for the first SunSwift SBus Adapter installation, `1` for the second instance, and so on.

8. **In this file, add a line containing *just* the host name that you assigned for the SunSwift SBus Adapter. For example, if your host name is `zardoz`, enter just this word.**

9. **Power off your system, using standard shutdown procedures described in** *Solaris 2.5 Handbook for SMCC Peripherals***.**

10. **Install the SunSwift SBus Adapter as described in Chapter 2.**

### *1.3.2 Using the SunSwift SBus Adapter* and *Existing Ethernet Interface*

You will be installing software from the Solaris 2.5 CD-ROM. Make sure the Solaris 2.5 CD-ROM is properly placed in the CD-ROM drive before performing the following tasks.

If you want to use the SunSwift SBus Adapter Ethernet interface *and* your existing Ethernet interface, you must perform the following tasks before installing the SunSwift SBus Adapter.

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**Note –** Make sure you have an Ethernet cable for each Ethernet interface.

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1. **As superuser, add the `SUNWhmd` and `SUNWhmdu` packages to your system:**

```
# pkgadd -a none -d /cdrom/solaris_2_5_sparc/s0/Solaris_2.5 SUNWhmd SUNWhmdu
```

2. **For both packages, answer `/` to the following question:**

```
Enter path to package directory [?,q]
```

   You will receive a message stating the process was successful.

3. **Assign an IP address and host name for the SunSwift SBus Adapter Ethernet channel.**
   For example, `123.456.78.90` (IP address); `zardoz` (host name).

4. **Edit the `/etc/hosts` file and add an entry containing the new IP address and host name for the selected `hme` channel.**
   This is the IP address and host name that you assigned in step 3.

5. **Create a `/etc/hostname.hme`*<num>* file for the Ethernet channel you are planning to use for the SunSwift SBus Adapter.**
   - `hostname` is literal. Type **`hostname`**.
   - ***num*** is the instance number of the SBus card installation. Use `0` for the first SunSwift SBus Adapter installation, `1` for the second instance, and so on.
6. **In this file, add a line containing *just* the host name that you assigned for the SunSwift SBus Adapter. For example, if your host name is `zardoz`, enter just this word.**
7. **Power off your system, using standard shutdown procedures described in *Solaris 2.5 Handbook for SMCC Peripherals*.**
8. **Install the SunSwift SBus Adapter as described in Chapter 2.**

# Installing the Adapter 2

This chapter tells you how to install the adapter in your system, verify that the adapter is correctly installed, and boot your system.

## 2.1 Performing the Installation

**Note –** Refer to your system installation or service manual (and the SCSI device installation manual, as necessary) for detailed instructions for the following tasks.

1. **Power off your system, using the standard shutdown procedures described in** *Solaris 2.5 Handbook for SMCC Peripherals***.**
2. **If you are replacing an SBus card with the SunSwift SBus Adapter, remove the old card now.**
3. **Install the SunSwift SBus Adapter in the selected SBus slot.**
4. **Attach the SCSI cable to the 68-pin SCSI connector on the adapter and to the SCSI device, if necessary.**
5. **Connect the Ethernet cable to the SunSwift SBus Adapter RJ-45 connector and to the hub.**
   Connect the *new* Ethernet cable if you are using two Ethernet interfaces.

## 2.2 Verifying the Installation

Refer to the *Solaris 2.5 Handbook for SMCC Peripherals* manual or your Solaris documentation for detailed instructions for the following tasks.

1. **Power on the system, and when the banner appears, press the Stop-A keys to interrupt the boot process and get to the `ok` prompt.**

2. **Use the `show-devs` command to list the devices in the system.**
   You should see two lines (similar to the example below) in the display, specific to the SunSwift SBus Adapter:

```
ok show-devs
...
/iommu@f,e0000000/sbus@f,e0001000/SUNW,fas@0,8800000
/iommu@f,e0000000/sbus@f,e0001000/SUNW,hme@0,8c00000
...
```

- `fas@0` identifies the adapter's SCSI-2 device.
- `hme@0` identifies the adapter's Ethernet device.

---

**Note –** In the above example, the number `0` following `fas@` and `hme@` corresponds to the instance number of the SunSwift SBus Adapter installation. The numbers *you* see when listing the system devices may be different.

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If you do not see these devices listed, check that the adapter is properly seated and reinstall the adapter, if necessary.

## 2.3 Booting the System

Refer to the *Solaris 2.5 Handbook for SMCC Peripherals* manual for detailed instructions for the following tasks.

- To boot the system from the default boot device, use the `boot -r` command.
- To use the SunSwift SBus Adapter Ethernet interface as the boot device, specify the OpenBoot™ device name with the boot command, for example:

```
ok boot -r /iommu@f,e0000000/sbus@f,e0001000/SUNW,hme@0,8c00000
```

**Note –** A "`SUNW,hme0: Link Down - cable problem?`" message means that the Ethernet cable is disconnected either at the RJ-45 connector or at the hub.

## 2.4 Installing the Solaris 2.5 Software

You will be installing software from the Solaris 2.5 CD-ROM. Make sure the Solaris 2.5 CD-ROM is properly placed in the CD-ROM drive before performing the following tasks.

♦ **Install the Solaris 2.5 software.**
Installing the software will automatically add the `SUNWhmd` and `SUNWhmdu` packages.

The installation process will also create the necessary `/etc/hostname.hme`<*num*> file and the `hme` channel entries in the `/etc/hosts` file, *only if you select* `hme`<*num*> *as the primary interface when prompted during the installation*.

If you are going to use more than one Ethernet interface, you must manually re-enter your existing Ethernet interface's device name in the `/etc/hosts` file and create its `hostname.xx`<*num*> file. Perform the following tasks after installing the Solaris 2.5 software.

1. **As superuser, edit the `/etc/hosts` file and add an entry for the existing Ethernet device, for example, `le0`.**

2. **Create a `/etc/hostname.xx`<*num*> file for the Ethernet channel you are planning to use for the existing Ethernet device.**
   - `hostname` is literal. Type **`hostname`**.
   - ***num*** is the instance number of the SBus card installation. Use `0` for the first SBus card installation, `1` for the second instance, and so on.

3. **In this file, add a line containing *just* the host name for the existing Ethernet interface. For example, if your host name is `zardoz`, enter just this word.**

## 2.5 Post-Installation Procedures (Optional)

Perform the following tasks to verify and customize the performance of the SunSwift SBus Adapter.

### 2.5.1 Watching Network Activity

Make sure that you are connected to an active network.

- **You can watch network activity or incoming network packets by typing the following:**

```
ok watch-net-all
/iommu@f,e0000000/sbus@f,e0001000/SUNW,hme@0,8c00000
 hme register test -- succeeded.
 Internal loopback test -- succeeded.
 Transceiver check -- Using Onboard Transceiver, 100 Mbps Link
Down, 10 Mbps Link Up, passed
Using Onboard Transceiver, 100 Mbps Link Down, 10 Mbps Link Up,
Looking for Ethernet packets.
'.' is a good packet. 'X' is a bad packet.
Type any key to stop.
..........
```

**Note –** The network speed is the same as the speed of the hub to which your system is connected. See Section 2.5.3 “Auto-Negotiation” and Section 2.5.4 “Configuring Driver Parameters” for information on speed selection.

### 2.5.2 Running Diagnostics

Refer to the *SunVTS 1.0 User’s Guide* document for diagnostic tests for the SunSwift SBus Adapter.

### 2.5.3 Auto-Negotiation

A key feature of the SunSwift SBus Adapter is auto-negotiation. The *auto-negotiation* protocol, as specified by the 100BASE-TX standard, automatically selects the operation mode (half-duplex or full-duplex) and speed (10 Mbps or 100 Mbps) for the adapter.

The `hme` device driver operates the `SUNW,hme` device by default in half-duplex mode only.

If the SunSwift SBus Adapter is connected to a remote system or interface that is not capable of auto-negotiation, your system automatically selects the speed and half-duplex mode.

If the SunSwift SBus Adapter is connected to a link partner with which the auto-negotiation protocol fails to operate successfully, you can configure the device to not use this protocol and force the driver to set up the link in the mode and speed of your choice.

Refer to the *Platform Notes: The hme Fast Ethernet Device Driver* document (Part No: 802-3970) for more information on the `hme` device driver and auto-negotiation. (This document is also available on the Solaris 2.5 and the Solaris 2.5: 1/96 AnswerBook.)

### 2.5.4 Configuring Driver Parameters

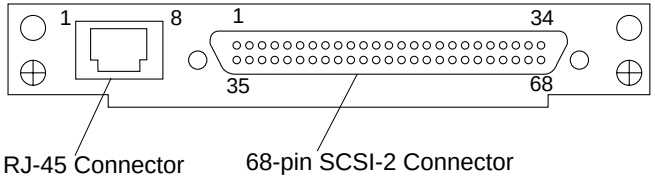
The `hme` device driver, which is loaded from the Solaris 2.5 CD-ROM, controls the `SUNW,hme` Ethernet device. The device driver automatically selects the link speed using the auto-negotiation protocol with the link partner.

You can manually configure the `hme` device driver parameters to customize each `SUNW,hme` device in your system in one of three ways:

- Configure the `hme` driver parameters generally for all devices in the system by entering the parameter variables in the `/etc/system` file.
- Set a parameter on a per-device basis by creating the `hme.conf` file in the `/kernel/drv` directory.
- Use the `ndd` utility to *temporarily* change a parameter. This change is lost when you reboot the system.

# Interface Signals A

## A.1 SunSwift SBus Adapter Connectors




## A.2 RJ-45 Connector Signals

| Pin | Signal |
|---|---|
| 1 | Transmit+ |
| 2 | Transmit- |
| 3 | Receive+ |
| 4 | No Connection |
| 5 | No Connection |
| 6 | Receive- |
| 7 | No Connection |
| 8 | No Connection |

## A.3 SCSI-2 Connector Signals

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 1 | SCSI_GND | 35 | SCSI_D<12>_ |
| 2 | SCSI_GND | 36 | SCSI_D<13>_ |
| 3 | SCSI_GND | 37 | SCSI_D<14>_ |
| 4 | SCSI_GND | 38 | SCSI_D<15>_ |
| 5 | SCSI_GND | 39 | SCSI_DATA_PARITY1_ |
| 6 | SCSI_GND | 40 | SCSI_D<0>_ |
| 7 | SCSI_GND | 41 | SCSI_D<1>_ |
| 8 | SCSI_GND | 42 | SCSI_D<2>_ |
| 9 | SCSI_GND | 43 | SCSI_D<3>_ |
| 10 | SCSI_GND | 44 | SCSI_D<4>_ |
| 11 | SCSI_GND | 45 | SCSI_D<5>_ |
| 12 | SCSI_GND | 46 | SCSI_D<6>_ |
| 13 | SCSI_GND | 47 | SSCSI_D<7>_ |
| 14 | SCSI_GND | 48 | SCSI_DATA_PARITY0_ |
| 15 | SCSI_GND | 49 | SCSI_GND |
| 16 | SCSI_GND | 50 | SCSI_GND |
| 17 | SCSI_TERMPOWER | 51 | SCSI_TERMPOWER |
| 18 | SCSI_TERMPOWER | 52 | SCSI_TERMPOWER |
| 19 | PULLUP | 53 | PULLUP |
| 20 | SCSI_GND | 54 | SCSI_GND |
| 21 | SCSI_GND | 55 | SCSI_ATN_ |
| 22 | SCSI_GND | 56 | SCSI_GND |
| 23 | SCSI_GND | 57 | SCSI_BSY_ |
| 24 | SCSI_GND | 58 | SCSI_ACK_ |
| 25 | SCSI_GND | 59 | SCSI_RST_ |
| 26 | SCSI_GND | 60 | SCSI_MSG_ |
| 27 | SCSI_GND | 61 | SCSI_SEL_ |
| 28 | SCSI_GND | 62 | SCSI_CD_ |
| 29 | SCSI_GND | 63 | SCSI_REQ_ |
| 30 | SCSI_GND | 64 | SCSI_IO_ |
| 31 | SCSI_GND | 65 | SCSI_D<8>_ |
| 32 | SCSI_GND | 66 | SCSI_D<9>_ |
| 33 | SCSI_GND | 67 | SCSI_D<10>_ |
| 34 | SCSI_GND | 68 | SCSI_D<11>_ |

# Specifications

B

## B.1 Physical Characteristics

| | |
|---|---|
| Length | 5.78 in. (147.70 mm) |
| Width | 3.3 in. (83.82 mm) |
| Weight | 4.0 oz. (113.40 g) |

## B.2 Power Requirements

| | |
|---|---|
| Maximum Power Dissipation | 9.5 Watt |
| Voltage Tolerance | 5V +/- 5% |
| Ripple | Maximum 100 mV |
| Operational Current | 1.9A |

## B.3 Performance Specifications

| | |
|---|---|
| Maximum Ethernet Transfer Rate | 10/100 Mbps |
| Network Interface | 100BASE-TX using Category 5 (data-grade) cable; 10BASE-T using Category 3 (voice-grade) cable or better |
| Ethernet Version | Conforms to IEEE 802.3u |
| SCSI Interface | 20 Mbytes/s, 16-bit single-ended |
| SBus Clock | 16.67 MHz to 25 MHz |
| SBus Burst Sizes | 16/32/64 bytes |
| SBus Modes | Master/Slave, 64-bit support |
| SBus Parity | Yes |
| SBus Version | Conforms to IEEE 1496 |

## Reader Comments

We welcome your comments and suggestions to help improve this manual. Please let us know what you think about the *SunSwift SBus Adapter Installation and User's Guide*, part number *802-4535-10*.

- The procedures were well documented.

| Strongly Agree | Agree | Disagree | Strongly Disagree | Not Applicable |
|---|---|---|---|---|
| ❑ | ❑ | ❑ | ❑ | ❑ |

Comments _____

- The tasks were easy to follow.

| Strongly Agree | Agree | Disagree | Strongly Disagree | Not Applicable |
|---|---|---|---|---|
| ❑ | ❑ | ❑ | ❑ | ❑ |

Comments _____

- The illustrations were clear.

| Strongly Agree | Agree | Disagree | Strongly Disagree | Not Applicable |
|---|---|---|---|---|
| ❑ | ❑ | ❑ | ❑ | ❑ |

Comments _____

- The information was complete and easy to find.

| Strongly Agree | Agree | Disagree | Strongly Disagree | Not Applicable |
|---|---|---|---|---|
| ❑ | ❑ | ❑ | ❑ | ❑ |

Comments _____

- Do you have additional comments about the *SunSwift SBus Adapter Installation and User's Guide*?

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