

User's Guide

Vanguard Multiport™ Serial Controller 12000CPR

Asynchronous Communications for
CompactPCI®-equipped Sun™ SPARC™ and x86 Sys-
tems running Solaris™

Copyright © 2001, Aurora Technologies, Inc., a Carlo Gavazzi Group company.
All Rights Reserved.

Printed in the United States of America

This publication is protected by Federal Copyright Law, with all rights reserved. No part of this publication may be copied, photocopied, reproduced, stored in a retrieval system, translated, transmitted, or transcribed in any form or by any means manual, electric, electronic, electromagnetic, mechanical, optical, or otherwise, in whole or in part without prior written consent from Aurora Technologies, Inc.

Limitation of Liability

Aurora Technologies, Inc. makes NO WARRANTY, EXPRESSED or IMPLIED, with respect to this manual, and any related items, its quality, performance, merchantability, or fitness for any particular use. It is solely the purchaser's responsibility to determine its suitability for any particular use.

Information contained in this document is subject to change without notice.

Trademark Credits

Aurora Technologies, the Aurora logotype, Apollo Multiport, Nova Multiport, Aries Multiport, Control-Tower, Explorer Multiport, LANMultiServer, Saturn Multiport, SBox, Vanguard Multiport, WANMulti-Server, XP7 Expansion Tower and XP-7R Rack-Mounted Expansion Unit are trademarks of Aurora Technologies, Inc., a Carlo Gavazzi Group company.

PICMG and CompactPCI are registered trademarks of the PCI Industrial Computers Manufacturers Group.

SPARC is a registered trademark of SPARC International, Inc. in the United States and other countries.

Sun, Sun Microsystems, Solaris and Java are trademarks or registered trademarks of Sun Microsystems, Inc.

All other registered trademarks and salesmarks are the proprietary property of their respective owners.

Declaration of Conformity
Konformitätserklärung
Déclaration de conformité
Declaración de Confomidad
Verklaring de overeenstemming
Dichiarazione di conformità



We/Wir/Nous/Wij/Noi: Aurora Technologies, Inc.
10 Mupac Drive
Brockton, MA 0230 1USA

declare under our sole responsibility that the products,
erklären, in alleniniger Verantwortung, daß dieses Produkt,
déclarons sous notre seule responsabilité que les produit,
declaramos, bajo nuestra sola responsabilidad, que el producto,
verklaren onder onze verantwoordelijkheid, dat het product,
dichianriamo sotto nostra unica responsabilità, che il prodotto,

Vanguard Multiport™ Serial Controller 12000CPR

to which this declaration relates is in conformity with the following standard(s) or other documents.
auf das sich diese Erklärung bezieht, mit der/den folgenden Norm(en) oder Richtlinie(n) übereinstimmt.
auquel se réfère cette déclaration est conforme à la (aux) norme(s) ou au(x) document(s) normatif(s).
al que se refiere esta declaracion es conforme a la(s) norma(s) u otro(s) documento(s) normativo(s).
waarnaar deze verklaring verwijst, aan de volende norm(en) of richtlijn(en) beantwoordt.
a cui si riferisce questa dichiarazione è conforme all'e seguente/i norma/o documento/i normativo/i.

EN 55022:1998 Class A ITE emissions requirements (EMC)
EN 50082-1:1997 EMC generic immunity standard

Jim Reinhold

Jim Reinhold, President

Warning

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures

FCC Notices

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 A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Contents

PREFACE	<i>About this Book</i>	ix
	Manual Organization	ix
	Who Should Use This Book	x
	Documentation Conventions	x
	Related Manuals	xi
	Getting Help.....	xi
	Registration.....	xi
CHAPTER 1	<i>Introduction</i>	1
	System Requirements	1
	Specification Overview	2
	Installation Overview	2
CHAPTER 2	<i>Hardware Installation</i>	3
	Installation Precautions	3
	Unpacking the Serial Card.....	4
	Other Things You'll Need	5
	Cabling	5
	Tools	6
	Installing and Removing Cards.....	6
	Slot Numbers.....	6
	Moving Cards	7
	Connecting Peripherals to the Vanguard Multiport 12000CPR Serial Controller	7

CHAPTER 3	<i>Software Installation and Configuration</i>	9
	Installing the Device Driver.....	9
	Driver and Release Note Downloads	10
	Asynchronous Device File Names	10
	Setting Up Asynchronous Port Services	12
	Setting Up Printer Services	12
	Setting Up Terminal Services.....	13
	Bypassing the Carrier Detect (CD) Line.....	14
	Bypassing the CD Line from a C program	14
	Setting Up Modem Services	14
	Setting Asynchronous Data Rates	16
CHAPTER 4	<i>Troubleshooting</i>	17
	Installation Problems	17
	Tracing Drivers with xxtrace.....	18
	xxtrace Command Summary	18
	Running xxtrace.....	19
	The mset Utility	21
	mset Command Options Summary	21
	Using mset.....	23
	Setting Higher Asynchronous Data Rates.....	24
	Error Messages	24
	Driver Messages.....	24
	mset Messages.....	26
	Calling for Support.....	26
APPENDIX A	<i>Warranty</i>	27
	Warranty Information	27
	Hardware	27
	Application and Protocol Software.....	28
	Return Policy.....	28
	90 Day Technical Support.....	28
	Software License Agreement	30

Aurora Technologies Software License	30
INDEX	33
PRODUCT INFORMATION WORKSHEET	34

About this Book

The *Vanguard Multiport™ 12000CPR Serial Controller User's Guide* describes how to install and use Aurora Technologies' asynchronous communications controllers for CompactPCI®-equipped SPARC™ and x86 systems running Solaris™ Operating Systems.

Manual Organization

The User's Guide is organized as follows:




<i>CHAPTER 1</i> <i>Introduction</i>	Provides a technical overview of the product for SPARC™ and x86 systems.
<i>CHAPTER 2</i> <i>Hardware Installation</i>	Describes unpacking procedures, hardware installation, and connecting peripherals.
CHAPTER 3 Software Installation and Configuration	Describes the board driver installation, administration of ports and asynchronous port names for Solaris.
CHAPTER 4 Troubleshooting	Describes potential installation problems, error messages, and diagnostic tools.
APPENDIX A <i>Warranty</i>	Provides information on Aurora Technologies hardware and software warranties and maintenance.

Who Should Use This Book

This book is a reference manual for anyone who wants to install, configure, and use Vanguard Multiport 12000CPR Serial Controllers in SPARC™ and x86 systems running the Solaris Operating System.

Documentation Conventions

Unless otherwise noted in the text, this document uses the following symbolic conventions:

screen display	Graphic text that appears on menus and dialog boxes appears in sans serif font.
literal input	Bold words or characters in formats and command descriptions represent commands that you must type literally. Literal values are in the bold typewriter font.
<non-literal input>	<Bold, italic, bracketed> words or characters in formats and command descriptions represent values that you must supply. Do not type the brackets.
command	ASCII text that the system displays and pathnames and commands in the text appear in plain typewriter font.
<i>emphasis</i>	<i>Italics</i> are used in the text for emphasis, titles, and variables.
	This symbol marks procedures.
	This symbol marks cautionary notes about possible damage to your equipment or data.
	This symbol indicates the end of a chapter.

Related Manuals

For more information, refer to the following manuals:

- Your SPARC™ and x86 systems Installation Guide
- Your SPARC™ and x86 systems Owner's Guide
- Your Solaris documentation
- Your peripheral device documentation.

Getting Help

If you need to reach us, you can contact us by

- The Web: www.auroratech.com for product literature, phone numbers and address.
- Phone service: 888.290.9660. Mon–Fri, 8:30AM–6:00PM Eastern Time. To expedite service, have your product serial number and your system information available.
- FAX: Attn: Customer Service and Support
- Email: support@auroratech.com

Registration

To receive standard warranty coverage on your Aurora product, including 90 days of free technical support, you must fill out and mail back the Aurora Warranty Registration Card that is located in the back of this manual. Phone support can only be provided after product registration is complete. Extended Hardware and Software Support Agreements can be purchased to provide additional coverage.

Sending in this card also lets us keep you up-to-date on the complete line of Aurora Technologies' products.

If you have any questions or comments on your Aurora Technologies' product, contact our Customer Service and Support Department at support@auroratech.com or your sales representative. □

Congratulations on purchasing your Vanguard Multiport 12000CPR Serial Controller card. Combining on-board RISC processing, dedicated data buffers, and flow control processing, Vanguard Multiport 12000CPR Serial Controllers off-load communications overhead from your host CPU and your network for optimum system performance.

Aurora offers CompactPCI (cPCI) expansion solutions for serial communications using rear I/O transition cards. The rear transition card provides 12 RJ45 ports.

System Requirements

Aurora's Vanguard Multiport 12000CPR Serial Controller cards are designed to work with a wide range of SPARC or x86 systems (and compatibles). As long as your SPARC or x86 system meets the following system requirements, your communications controllers will be compatible.

Workstation:	SPARC or x86 system
Operating System:	Solaris/Solaris x86 (See Driver Release Note for supported releases.)
CPU:	SPARC or x86 system
Bus:	CompactPCI
Memory:	64 MB minimum
Disk Space:	1 MB free in /opt
Media Device:	CD-ROM Drive (optional)

Specification Overview

Table 1 provides a technical specification overview of the Vanguard Multiport 12000CPR Serial Controller family for SPARC or x86 systems.

TABLE 1. *Specifications Overview of Vanguard Multiport 12000CPR Serial Controller.*

	12000CPR
Board Type	CompactPCI 5V signalling
Ports	12
Signal	RS-232
Connector	RJ-45
Speed	50 bps–115.2 kbps
Start/Stop bits	1 or 2
Data bits	5, 6, 7, or 8 bits
Flow Control	Hardware: CTS/RTS, DSR/DTR Software: XON/XOFF
Modem support	RTS, CTS, DSR, CD, DTR

Installation Overview

This section provides an overview of how to install your communications controller and the Aurora asynchronous drivers. Steps 1–5 are required for all boards. □

STEP	Go to
1. Unpack the Aurora card	Chapter 2
2. Install the card in an empty slot	Chapter 2
3. Connect devices to the Aurora ports	Chapter 2
4. Install the device driver	Chapter 3
5. Set up port services for the asynchronous ports	Chapter 3

This chapter describes how to install the serial card and consists of the following:

- *Installation Precautions*
- *Unpacking the Serial Card*
- *Other Things You'll Need*
- *Installing and Removing Cards*
- *Connecting Peripherals to the Vanguard Multiport 12000CPR Serial Controller*

Before beginning the installation, record the following information in the section *Product Information* inside the back cover.

- Vanguard Multiport 12000CPR Serial Controller serial number
- The model number and name of the system in which you have installed our product.
- The version of the operating system that your system is currently running (e.g., Solaris 8)

Then complete and mail the *Product Registration Card/License Application* inside the back cover in order to be eligible for technical support.

Installation Precautions

Taking the precautions described in this section should help you avoid injuring yourself or damaging your equipment.



CAUTION: Electrostatic discharge can damage integrated circuits on your controller cards.

To prevent such damage from occurring, observe the following precautions during board unpacking and installation.

- Wear a grounding strap to ensure that any accumulated electrostatic charge is discharged from your body to the ground.
- Stand on a static-free mat.
- Handle circuit boards and cards only by their non-conducting edges once you have removed them from their protective antistatic bags.
- Install circuit boards and cards as soon as you remove them from their protective anti-static packaging.
- Do not leave boards exposed after you unpack them.
- If you must put a board or card down, place it on anti-static packaging or on a rubber mat.

Unpacking the Serial Card

Remove the card from the packing box. Leave the card in its anti-static bag. Check the shipping carton contents to ensure that you have all of the required parts, as listed in Table 2.

Note: Save the shipping carton and the internal packaging. If you need to ship the product back to your dealer, you must use the original carton and packaging.

TABLE 2. *Vanguard Multiport 12000CPR Serial Controller Parts List*

Qty	12000CPR
1	Vanguard Multiport 12000CPR Serial Controller
1	Rear I/O Transition card
1	Serial test plug
1	User's Manual with Driver CD-ROM and registration Card
1	Driver Release Note

Other Things You'll Need

To ensure a smooth installation, you should have the proper cabling and tools on hand.

Cabling

The Vanguard Multiport 12000CPR Serial Controller with rear I/O transition card provides RJ45 port connections. Consequently, no break-out or connection box, or octopus cable is needed.

There are a number of cabling approaches you can use to connect devices to the new Aurora ports. Cabling to your peripheral devices is customer specific. Please call Customer Service and Support to assist you in defining your cabling needs.

Figure 1 is provided as an example of one cabling approach. Refer to Figure 1 to assist you in making a RJ-45 to DB-25 null modem connection.

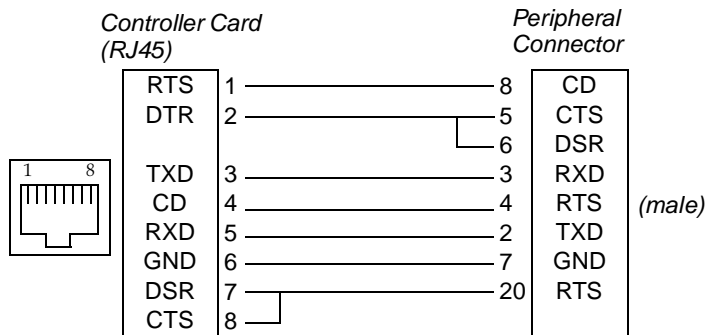


FIGURE 1. Asynchronous RJ45-to-DB25 Null Modem Adapter (Out-of-Band Flow Control).

Tools

You'll need the following tools to install your controller card:

- Any tools listed in your SPARC or x86 system's documentation.
- A small Phillips-head screwdriver to secure mounting screws.

Installing and Removing Cards

Detailed installation and removal procedures for cPCI cards can be found in your SPARC or x86 system's installation or hardware documentation. Be sure to take the installation precautions listed earlier in this chapter and any additional ones that are recommended in the SPARC or x86 system documentation.

✎ To install the Vanguard Multiport 12000CPR Serial Controller Card with Rear I/O Transition Card

1. Shut down and power off the prospective host machine.
2. Open the cabinet and remove the blank filler panel.
3. Install the controller card in a cPCI slot. Make sure the card is secured in the slot with the retainer screws.
4. Install the rear I/O transition card.
5. Close the host cabinet.

Software installation and removal is described in CHAPTER 3, Software Installation and Configuration.

Slot Numbers

Your SPARC or x86 system documentation also explains how the cPCI slots are numbered and any special considerations you should note. When all the serial cards are installed in their

slots, record their slot numbers; you will need to know them when you set up your port services.

Moving Cards

If you move a Vanguard Multiport 12000CPR Serial Controller card from one slot to another on the same system, you must reboot the system using the `-r` switch, then remove the device driver package and reinstall it. Refer to the Driver Release Note for the package removal and installation procedures.

Connecting Peripherals to the Vanguard Multiport 12000CPR Serial Controller

The Vanguard Multiport 12000CPR Serial Controller with the rear I/O transition card installed has 12 built-in RJ45 ports. The RJ45 port jacks are used for connecting the multiport serial card to your peripheral devices.

Note: You must supply cabling that connects your peripheral devices to the cPCI multiport serial controller card.

✍ *To connect a peripheral device to the cPCI controller card*

1. Choose the correct peripheral cable.¹
2. Attach one end of the cable to the peripheral, and the other to one multiport controller RJ45 connectors.
3. Record the slot number of the controller card and the port number of the Aurora port on the *Product Information Worksheet* at the back of this book.

1. This cable is not provided. If you are not sure what cable type to use, call Aurora Technologies Customer Service and Support.

The rear I/O transition connectors are numbered 0–11 to match the device names that will be created when the driver software is installed. Refer to Figure 2 for port number layout. You will need to know which port the peripheral was connected to when you set up port services for it.

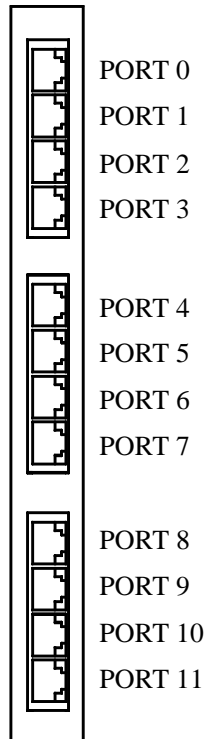


FIGURE 2. 12000CPR Port Assignments



Software Installation and Configuration

The Aurora device driver allows your SPARC or x86 system to communicate with various asynchronous serial devices (such as printers, terminals, or modems) through the Aurora ports.

A CD-ROM containing device driver software and an installation script is shipped with your Vanguard Multiport 12000CPR Serial Controller. The Release Note accompanying the device driver CD-ROM provides detailed driver installation procedures.

This chapter presents the following:

- *Installing the device driver software*
- *Setting up asynchronous port services*

Before performing these installation procedures, you should have installed the cPCI controller card.

Installing the Device Driver

After you have installed your new Aurora hardware, follow the device driver software installation procedures in the Driver Release Note to install the driver.

You only need to install the driver once, even if you are installing more than one Vanguard Multiport 12000CPR Serial Controller card. One device driver can support multiple serial cards.

After you have installed the driver software, proceed with the setup and configuration procedures that follow in this chapter.

Driver and Release Note Downloads

You can download the latest versions of all Aurora drivers and release notes from the Aurora Technologies web site, www.auroratech.com. You will find the appropriate download links under Aurora's *Support* web page. Call Customer Service and Support for further assistance.

Asynchronous Device File Names

Each serial port connected to terminals, modems, etc., need to be identified by one or more device files, depending on the intended use of the port. Device file naming conventions vary, depending on the device's use.

The format for device file names is defined as:

`term/11`

└─┬─┘ *Indicates the port number being accessed on the card. The number increments sequentially from the first port on the first card through the rest of the ports on the rest of the cards installed in the system.*

└─┬─┘ *Indicates device type, for example:*

*term for dial in modems
cua for dial out modems*

The install script automatically creates Solaris device files for each new port on the Vanguard Multiport 12000CPR Serial Controller serial card. Table 3 shows the device files created on a system with two 12000CPR cards with rear I/O transition cards. Assume both cards occupy the first available two slots. On that system, the terminal device for the port labelled 3 on card #2 would be accessed by the `term/15` device file.

TABLE 3. Device Names for two Vanguard Multiport 12000CPR Serial cards with Rear I/O

Port Label	Async Modem (Dial-in Modem)	Async Modem (Dial-out Modem)
<i>Vanguard Multiport 12000CPR card 1 with rear I/O</i>		
0	/dev/term/0	/dev/cua/0
1	/dev/term/1	/dev/cua/1
2	/dev/term/2	/dev/cua/2
3	/dev/term/3	/dev/cua/3
4	/dev/term/4	/dev/cua/4
5	/dev/term/5	/dev/cua/5
6	/dev/term/6	/dev/cua/6
7	/dev/term/7	/dev/cua/7
8	/dev/term/8	/dev/cua/8
9	/dev/term/9	/dev/cua/9
10	/dev/term/10	/dev/cua/10
11	/dev/term/11	/dev/cua/11
<i>Vanguard Multiport 12000CPR card 2 with rear I/O</i>		
0	/dev/term/12	/dev/cua/12
1	/dev/term/13	/dev/cua/13
2	/dev/term/14	/dev/cua/14
3	/dev/term/15	/dev/cua/15
4	/dev/term/16	/dev/cua/16
5	/dev/term/17	/dev/cua/17
6	/dev/term/18	/dev/cua/18
7	/dev/term/19	/dev/cua/19
8	/dev/term/20	/dev/cua/20
9	/dev/term/21	/dev/cua/21
10	/dev/term/22	/dev/cua/22
11	/dev/term/23	/dev/cua/23

Setting Up Asynchronous Port Services

Once your peripherals are connected and the Aurora software packages are installed, the next step is to set up the appropriate port services for each peripheral.

Solaris has a number of tools available for administering port services. You should familiarize yourself with the man pages on `sacadm`, `pmadm`, `ttyadm`, and `lpadmin` before attempting to connect peripherals to the communications controller ports.

There is also a window-based administration tool, `Admintool`, that can simplify many tasks. However, in some cases it may not provide sufficient control over communications parameters to allow you to optimize the performance of your peripheral. For example, if you decide to use `Admintool:Printers` to set up printer services, you will find that you can't vary the baud rate.

In this section, we do not describe the use of `Admintool`; we simply provide setup examples using the command line. If you want more information, refer to your Solaris documentation.

Setting Up Printer Services

Setting up printer service in Solaris requires the `lpadmin`, `accept`, and `enable` commands. The following example sets up a printer named `testlp` on port 0 running at 38,400 baud.

```
system% lpadmin -p testlp -v /dev/term/0 -T \
hplaserjet -D "testlabel" -o nobanner -o \
"stty='38400 cs8 -parenb -cstopb -crtcts ixon \
tabs'"
system% accept testlp
system% enable testlp
```

For More Information. Refer to your printer manual for details on how to set its transmission characteristics (baud rate, bits/char, parity) and flow control (software/hardware).

Refer to your Solaris documentation for more information on setting up printer services.

Setting Up Terminal Services

Setting up terminal service in Solaris requires the `sacadm` and the `pmadm` commands. The following example sets up a typical terminal.

✍ *To set up services for a typical terminal*

1. Create a new port monitor using `ttyaur0` as the PMTAG name:

```
system% sacadm -a -p ttyaur0 -t ttymon -c \  
/usr/lib/saf/ttymon -v 1
```

We recommend a unique PMTAG name for each Aurora board. This makes administration easier.

If you get the message `ttyaur0` already exists, it simply means that someone has already created `ttyaur0`.

2. Check the status of the port monitor:

```
system% pmadm -l
```

3. Remove the existing service (`ttymon0`) from the port to be administered (in this case port 0):

```
system% pmadm -r -p ttymon0 -s 0
```

4. Start a port monitor service for a specific port (in this case, a Wyse 50 terminal running at 38.4 Kbps):

```
system% pmadm -a -p ttyaur0 -s 0 -i root -fu -v 1 \  
-m ``ttyadm -d /dev/term/0 -l 38400 \  
-s /usr/bin/login -m ldterm -T wyse50 -S y``
```

5. Repeat steps 2–4 to set up other terminal ports.

For More Information. Refer to your terminal manual for details on how to set its transmission characteristics (baud rate, bits/char, parity) and flow control (software/hardware).

Refer to your Solaris documentation for more information on setting up terminal services.

Bypassing the Carrier Detect (CD) Line

If you are using 3-wire cabling (or for some other reason the CD line will not be pulled high), you must bypass the CD line for terminal and printer ports. This is done by instructing the driver to assume the CD line is high regardless of its actual state.

The easiest way to do this is using Admintool. Browse the serial ports, select the appropriate port, and edit the port service by checking off the Software Carrier option on the Admintool:Modify Serial Port dialog box (click on Detail: More to display this option).

Alternatively, you can make the driver assume the CD line is high by typing

```
system% /opt/AURAsio16/ttysoftcar -y <device>
```

To restore the CD line to its normal, driven state, type

```
system% /opt/AURAsio16/ttysoftcar -n <device>
```

You can query the state of the software carrier by typing

```
system% /opt/AURAsio16/ttysoftcar <device>
```

Bypassing the CD Line from a C program

If you need to bypass the CD line from a C program, open the port using the `O_NDELAY` flag, and issue the following `ioctl` call:

```
int val=1;
ioctl(fd, TIOCSSOFTCAR, &val);
```

Note: Do not use bypass the CD line on serial ports connected to modems.

Setting Up Modem Services

Setting up modem service in Solaris requires the `sacadm` and the `pmadm` commands. The following example sets up a typical bidirectional modem.

/// **To set up services for a typical bidirectional modem**

1. Create a new port monitor using ttyaur0 as the PMTAG name:

```
system% sacadm -a -p ttyaur0 -t ttymon -c \  
/usr/lib/saf/ttymon -v 1
```

We recommend a unique PMTAG name for each Aurora board. This makes administration easier.

If you get a the message ttyaur0 already exists, it simply means that someone has already created ttyaur0.

2. Check the status of the port monitor:

```
system% pmadm -l
```

3. Remove the existing service (ttymon0) from the port to be administered (in this case port 0):

```
system% pmadm -r -p ttymon0 -s 0
```

4. Start a port monitor service for a specific port (in this case, a bidirectional modem running at 38.4 Kbps):

```
system% pmadm -a -p ttyaur0 -s 0 -i root -fu -v 1 \  
-m "`ttyadm -b -d /dev/term/0 -l 38400 \  
-s /usr/bin/login -m ldterm -s y`"
```

5. Now, add the modem to the /etc/uucp/Devices file using the following format:

```
ACU cua/0 - 38400 <type>
```

where <type> is either a built-in function (801, Sytek, TCP, Unetserver, DK) or one whose name appears in the /etc/uucp/Dialers file (hayes, tbfast, etc.).

6. Repeat steps 2–5 for other modem ports.

For More Information. Refer to your modem manual for details on how to set its transmission characteristics (baud rate, bits/char., parity) and flow control (software/hardware).

Refer to Sun Microsystems™'s *Adding and Maintaining Peripherals* manual for more information about using the Serial Port Manager and setting up modem services.

Setting Asynchronous Data Rates

Aurora recommends that you use the Sun™ Admintool or Solaris `stty` command to set baud rates for asynchronous ports. See the Admintool documentation or the Solaris `stty(1)` man page for information on how to do this. □

This chapter describes problems you could possibly experience with your Vanguard Multiport 12000CPR Serial Controller and the actions you should take to diagnose and solve the problem. Topics covered in this chapter include:

- *Installation Problems*
- *Tracing Drivers with *xxtrace**
- *The *mset* Utility*
- *Calling for Support*

Installation Problems

If you experience problems immediately after the installation of your SPARC or x86 system Series Communications Controller, check the following list of potential problems.

- Is the device cable the correct type? If it is a null-modem cable is it the right kind of null-modem cable?
The vast majority of problems are due to incorrect cable selection.
- Are any connections to other boards loose?
- Is the controller card properly seated in the system?
- Is the power cord loose in the wall socket or at the connection to the system unit?
- Are the external equipment connections made properly?
- Is the equipment powered on?
- If you're experiencing interference, are you using properly shielded cables? For optimal performance use twisted pair shielded cables.

Make sure that the cabling is not running near a power source; if it is, try moving the cabling to a new location.

- Is the cable length correct?

The RS-232 cable specification is 75 feet at 9.6 Kbps. However, this is a nominal length defined by the standard, and it is possible to use longer cables up to 30 meters, with low-capacitance cables, or with slow data rates and a proper error correction mechanism.

If the problem remains after these checks, remove

- the Aurora device driver software (see “Remove Existing Aurora Drivers” in the Driver Release Notes).
- the cPCI controller card (see your SPARC or x86 system hardware documentation for instructions).

Then test your system to determine whether it operates correctly. If it does, the problem may be with the Vanguard Multiport 12000CPR Serial Controller card. If it does not, the problem is most likely with the system.

Tracing Drivers with `xxtrace`

If you are having problems with your Aurora product, a service representative may ask you to take a trace of your problem to help troubleshoot it. This section describes how to get a driver trace using `xxtrace`, the driver tracing utility.

`xxtrace` Command Summary

Table 4 contains a summary of the `xxtrace` commands.

TABLE 4. *xxtrace* Command Summary

xxtrace Command	Description
<code>ld</code>	Loads the board driver (async)
<code>ul</code>	Unloads the board driver (async)

TABLE 4. *xxtrace* Command Summary

xxtrace Command	Description
xa	Enables tracing on all ports
xb n:p	Enables tracing on a specific board/port
xc	Clears the trace buffer and restarts tracing, keeping the same ports and events active
xp	Dumps the contents of the trace buffer out of memory and prints it to stdout
xr	Clears the trace buffer and shuts off tracing
xs	Shows the port(s) and events being traced

Running *xxtrace*

✍ *To run xxtrace*

1. Log in as root

Note: You must be logged in as root in a `cs` environment to run this test.

2. Change to the appropriate directory:

```
system# cd /opt/AURAsio16
```

3. Enter the following:

```
system# source sourceme
```

4. Enable tracing by entering one of the following:

To enable tracing on *all* ports, type

```
system# xa
```

To enable tracing on a *specific* port, type

```
system# xb n:p
```

where *n* is the board number in the system starting with 0, and *p* is the port number, starting with 0.

For example, `xb 2:7` turns on tracing for the *eighth* port on the *third* Aurora card in the system. Note that this command uses hexadecimal notation. Therefore, `xb 0:f` turns on tracing for the *sixteenth* port on the *first* Aurora card.

5. To show that tracing is turned on, type:

```
system# xs
```

The system displays a list of all the trace points.

6. Reproduce the situation that was occurring when you encountered the problem.
7. *As soon as* the failure condition occurs (to avoid overwriting any buffers), dump the contents of the trace buffer out of memory and print it by typing:

```
system# xp
```

This command prints data to standard output. You can redirect the contents to a file, using this format:

```
system# xp > /tmp/<filename>
```

where **<filename>** is the name of the redirected output file in the `/tmp` directory.

8. Find out how many lines the trace output is by doing a `wc -l` on the file.
9. If the output is not very long, FAX it to us. Otherwise, tar it to a diskette or CD and send it to Customer Service and Support. Also you may compress, uuencode, and e-mail it to `support@auroratech.com`.

To clear the trace buffer only and restart tracing, keeping the same port(s) and events active, enter

```
system# xc
```

✎ To make the system operational again

1. Clear the trace buffer and shut off tracing:

```
system# xr
```

2. Reboot the system:

```
system# reboot
```

The mset Utility

The `mset` utility can be used to check the error statistics for the asynchronous lines in use. You can run `mset` when you are receiving data corruption errors on incoming data, such as

- Receiver Overruns: This occurs when the chip's FIFO is full, more data has arrived, and the system could not respond to the interrupt fast enough.
- Frame Errors: The data received was missing a stop bit.
- Parity Errors: The parity check was wrong.
- Dropped Characters: The OS did not have enough memory to handle the incoming data.

mset Command Options Summary

The command format for `mset` is

```
mset <device_name> <option>
```

where

<device_name> is the device name.

<option> is one of the command options listed in Table 5.

TABLE 5. *mset Options*

mset Option	Description
-< <i>baud_rate</i> > - <i>baud</i> < <i>baud_rate</i> >	Replaces the standard 38.4 kbps data rate setting (B38400) with the specified data rate. < <i>baud_rate</i> > is any whole integer from 38400 to 115200. Any time the port service is set to B38400 (38.4 kbps), the port actually operates at the specified data rate. This option should be used only with Customer Service authorization.
- <i>icto</i>	Sets the time, in milliseconds, that the device driver will wait for incoming data before pushing it upstream. If this time is not set, the device driver will wait until the incoming data fills the driver buffers before pushing the data upstream. See <i>-stdicto</i> .
- <i>show</i>	Reports the current settings for the specified port.
- <i>stats</i>	Reports error statistics for the specified asynchronous port.
- <i>statsr</i>	Reports the same information as <i>-stats</i> but also resets each statistics field to zero.
- <i>statschk</i>	Reports a list of all board/port numbers that have detected receiver overruns, frame errors, parity errors, or dropped characters. You must enter a device name with this option: any device name will work.
- <i>statsreset</i>	Resets all errors and statistics for all ports. You must enter a device name with this option: any device name will work.
- <i>std</i>	Resets the data rate to the original value of 38.4 kbps.
- <i>stdicto</i>	Resets the time delay set with <i>-icto</i> to none. In other words, incoming data will be pushed upstream only when the driver buffers get full.
- <i>stdstop</i>	Resets the stop bit setting.
- <i>stop1_5</i>	Sets the stop bit setting to 1.5 (Solaris only).
- <i>timeout</i>	Sets the time that the driver will wait during a close before forcing the close to complete if the close is waiting on transmit data. The default time is 15 seconds.

Using mset

✍ To run mset

1. Log on as root
2. Change to the appropriate directory:

```
system# cd /opt/AURAsio16
```

3. Type the following:

```
system# mset <device_name> -statschk
```

This prints a list of board/port numbers that have detected receiver overruns, frame errors, parity errors, or dropped characters. The output looks similar to this:

```
Errors detected on:  
board 1,          port : 3, 4  
board 2,          port : 2
```

This indicates that the port labeled “3” and the port labeled “4” of the first board has detected errors and the port labeled “2” on the second board has detected errors.

4. To report the error statistics for the specified asynchronous port, enter:

```
system# mset <device_name> -stats
```

This example shows 5 characters received with parity errors. It also shows that the port received 3021 characters and transmitted 21 characters.

```
/dev/cua/0 statistics:  
receiver overruns:          0  
receiver frame errors:      0  
receiver parity errors:     5  
receiver chars dropped:     0  
  
received chars:             3021  
transmitted chars:          21
```

5. To reset all errors and statistics for all ports, enter:

```
system# mset <device_name> -statsreset
```

Note: To report error statistics and reset all errors and statistics for a single port, you could have entered the following in Step 3:

```
system# mset <device_name> -statsr
```

Setting Higher Asynchronous Data Rates

The multiport serial controller software allows you to set higher asynchronous data rates using either the Solaris admin-tool or calls from an application program. You can set data rates up to 115.2 Kbps.

Error Messages

This section lists all error messages associated with the Aurora driver and the various utilities.

Driver Messages

```
board n exceeds maxboards (n)
```

The driver has detected that there are more boards in the system than the driver is able to handle. These extra boards will be ignored.

```
csattach bdn: board reset failed!
```

The board reset for board *n* failed during driver load. This typically indicates a hardware failure and the board should be replaced.

```
csattach bdn: chipn reset failed!
```

The CD2400 chip reset for board *n* failed during driver load. This typically indicates a hardware failure and the board should be replaced.

```
csattach bdn: chipn unknown revision!
```

The CL-CD1865 chip indicates an unknown version. This typically indicates a hardware failure and the board should be replaced.

Error Messages

`csattach bdn: intr attribute not found!`

The driver cannot find the `intr` attribute in the OPEN-BOOT Prom. This typically indicates a hardware failure and the board should be replaced.

`PANIC! cssetdtrts: drv_getparm LBOLT failure!`

This is an extremely rare fatal error, of unknown origin. If this error occurs, your system has gotten into a non-viable state. Reboot it as soon as possible.

`PANIC! csattach: can't create control port device`

(Solaris only) The driver was not able to create the special device file for the `/dev/sioctrl` control device. This is probably due to system resource starvation. If the `sioctrl` device is not created you cannot configure synchronous devices. There is probably something else wrong with the system that should be corrected.

`***ERROR*** line n: unit=n`

The CD2400 chip was programmed to perform an operation and it timed out before completing the operation. This typically means that the chip has gotten into a confused state. Rebooting the system can reset the chip back into operation. If this message continues without the chip working again, then this might mean a chip hardware failure and the board should be replaced.

`drvconfig: System call 'modctl_modconfig' failed: No such device or address`
`Warning: Driver (cseight) configuration failed. System could not install driver.`
`pkgadd:Error:postinstall script did not complete...`

If you see this error during `pkgadd` please make sure that the system was booted with the `-r` option after installing the board. Also check the board seating in the Sbus slot and the condition of the connector pins. Try another Sbus slot if everything else checks out.

mset Messages

cannot open device

The device specified in the message line cannot be opened by `mset`. This could be due to permissions on the device, or the driver is not loaded, or that device actually doesn't even exist. This could also mean that the device name is not specified properly.

Calling for Support

If you need to call Aurora Technologies' technical support for help, make sure that you have completed the following checklist:

1. Serial Number: _____
(found in the back of this manual, on the board, and on the shipping container)
2. SPARC or x86 system model number: _____
3. Solaris version: _____
4. List all peripherals connected to the controller card.
5. Vanguard Multiport 12000CPR Serial Controller software driver version: _____
(The version number is printed on the driver software media and is displayed when installation is completed.)
6. List the cable pinout description.
7. Verify the type of cables used. (modem, null-modem, etc.)

Telephone support is available Monday through Friday, 8:30AM to 6:00PM Eastern Time.

Warranty

Warranty Information

Hardware

All Aurora Technologies, Inc. hardware products are warranted against defects for two years from the date of delivery. Buyer agrees that if this product proves defective, Aurora Technologies, Inc. is obligated only to repair, replace or refund the purchase of this product at Aurora Technologies, Inc.'s discretion. The warranty is void if the product has been subjected to alteration, neglect, misuse or abuse; if any repairs have been attempted by anyone other than Aurora Technologies, Inc.; or if failure is caused by accident, acts of God, or other causes beyond the control of Aurora Technologies, Inc.

Aurora Technologies, Inc. reserves the right to make changes or improvements in any product without incurring any obligation to similarly alter products previously purchased. In no event shall Aurora technologies, Inc. be liable for any direct, indirect, incidental or consequential damages arising out of or in connection with the performance or use of the product or information provided. Aurora Technologies, Inc.'s liability shall in no event exceed the purchase price of the product purchased hereunder.

The foregoing limitation of liability shall be equally applicable to any service provided by Aurora Technologies, Inc.

Application and Protocol Software

Limited Software Warranty. Aurora Technologies, Inc. does not warrant that the functions contained in its Software products will meet your requirements or that the operation of the Software will be uninterrupted or error free. However, Aurora warrants the physical media on which the Software is furnished will be free from defects in materials and workmanship under normal use for a period of ninety (90) days from the date of shipment.

Except as provided above, the software and its written materials are provided “As-Is,” without warranty of any kind, either expressed or implied, including but not limited to the implied warranties of merchantability and fitness for a particular purpose. The entire risk as to the quality and performance of the software is with the licensee. Should the software prove to be defective, licensee assumes the entire cost of necessary servicing, repair, or correction.

Return Policy

Products returned for repair must be accompanied by a Return Material Authorization (RMA) number, obtained from Aurora Technologies, Inc. prior to return. Freight on all returned items must be prepaid by the customer, and the customer is responsible for any loss or damage caused by common carrier in transit. Items will be returned to Aurora Technologies, Inc. via a Customs cleared carrier (for example, Federal Express, UPS, DHL), unless prior arrangements are made by the customer for an alternative shipping method. Each product that is returned for repair must include a failure report and must have the RMA number clearly marked on the outside packaging.

Return Address: Attn.: RMA Department
 Aurora Technologies, Inc.
 646 Summer Street
 Brockton, MA 02302
 USA

90 Day Technical Support

Products must be registered with Aurora Technologies, Inc.’s Customer Service and Support (CSS) organization to receive the 90 Day Technical Support. You must fill out and mail or FAX the warranty card that is included with the product before receiving technical assistance.

What you get during the 90 Day Technical Support

90 Day Technical Support is provided by e-mail, FAX, or by telephone. Customers calling in for technical support on current Aurora technologies, Inc. products will receive a response within four (4) business hours. Customer's e-mails or faxed requests will receive a response within twenty-four (24) business hours.

The Technical Support hours in Massachusetts are

8:30 a.m. - 6:00 p.m. Eastern Time,
Monday through Friday, excluding holidays.

Services provided under the 90 Day Technical Support Plan are:

- Help on installation and configuration
- Help diagnosing problems with Aurora hardware and standard released Aurora device drivers.
- Help navigating and locating existing Aurora documentation
- Acceptance of bug reports and providing status updates on any applicable bug fixes.

Policies and pricing are subject to change without notice.

For extended support, please refer to the Aurora Technologies, Inc. web site at www.auroratech.com or call your Sales representative for details. □

Software License Agreement

THIS LEGAL DOCUMENT IS AN AGREEMENT BETWEEN YOU, THE END USER OR "LICENSEE", AND AURORA TECHNOLOGIES, INC. ("AURORA" OR "LICENSOR"). BY OPENING THIS DISTRIBUTION MEDIA PACKAGE, YOU ARE AGREEING TO BECOME BOUND BY THE TERMS OF THIS AGREEMENT, WHICH INCLUDES THE SOFTWARE LICENSE AND SOFTWARE WARRANTIES (COLLECTIVELY THE "AGREEMENT").

THIS AGREEMENT CONSTITUTES THE COMPLETE AGREEMENT BETWEEN YOU, THE LICENSEE AND AURORA. IF YOU DO NOT AGREE TO THE TERMS OF THIS AGREEMENT, DO NOT OPEN THE DISTRIBUTION MEDIA PACKAGE. PROMPTLY RETURN THE UNOPENED PACKAGE, HARDWARE (IF ANY) AND THE OTHER ITEMS, INCLUDING WRITTEN MATERIALS, BINDERS AND OTHER CONTAINERS, THAT ARE PART OF THIS PRODUCT TO THE PLACE OF PURCHASE.

Aurora Technologies Software License

1. GRANT OF LICENSE: In consideration of payment of the License fee, which is part of the price paid for this product, Aurora, as LICENSOR, grants to you, the LICENSEE, a non-exclusive right to use and display this copy of an Aurora Software program, (the "Software") on a single computer at a single location. If the single computer on which you use the Software is a multi-user system, this License covers all users of that system. Aurora reserves all rights not expressly granted to the LICENSEE.

2. DELIVERY, INSTALLATION, ACCEPTANCE AND RISK OF LOSS: Aurora shall deliver the Software to a common carrier, FOB Aurora's Facilities. LICENSEE shall be solely responsible for installation of the Software on the computer. LICENSEE agrees the acceptance shall occur upon delivery of the Licensed Software to a common carrier. LICENSEE assumes all risk of loss or damage upon delivery of the Software by Aurora to LICENSEE or common carrier.

3. PAYMENTS: In consideration of the License and rights in the Software granted by Aurora and in consideration of Aurora's performance of its obligations hereunder, LICENSEE agrees to pay Aurora Technologies, Inc. the License fee according to the terms as invoiced. Failure to remit complete payment according to the specified terms will result in revocation of the License upon thirty (30) days' written notice.

4. OWNERSHIP OF SOFTWARE: As the LICENSEE, you own the magnetic or other physical media on which the Software is originally or subsequently recorded or fixed, but Aurora in no way transfers title or ownership of the Software recorded on the original distribution media and all subsequent copies of the Software, regardless of the form or media in or on which the original and other copies may exist. This License is not a sale of the original Software or any copy.

5. COPY RESTRICTIONS: This Software and the accompanying written materials are copyrighted. Unauthorized copying of this Software, including Software that has been modified, merged or included with other Software, or of the written materials is expressly forbidden. LICENSEE may be held legally responsible for any copyright infringement that is caused or encouraged by LICENSEE's failure to abide by the terms of this License. Subject to these restrictions, and if the Software is not copy protected, LICENSEE may make one (1) copy of the Software solely for backup purposes. LICENSEE must reproduce and include any copyright notice on the backup copy.

6. USE RESTRICTION: LICENSEE may physically transfer the Software from one computer to another provided that the Software is used on only one computer at a time. LICENSEE may not distribute copies of the Software or accompanying written materials to others. LICENSEE may not translate, decompile, disassemble or otherwise reverse engineer, or modify, adapt or create derivative works based on the Software. LICENSEE may not modify, adapt, translate or create derivative works based on the written materials without prior written consent of Aurora.

7. TRANSFER: LICENSEE may sell the License rights in the Software to another party only if that party also agrees to the terms and conditions of this Agreement. In accordance with such sale, the LICENSEE must simultaneously transfer any and all written materials and the backup copy, or destroy the backup copy.

8. TERM AND TERMINATION: The License is effective until terminated. This License will terminate automatically without notice from Aurora if LICENSEE fails to comply with any provision of this License. Upon termination you shall destroy the written materials and all copies of the Software, including modified copies, if any.

9. UPDATE POLICY: Aurora may create, from time to time, updated versions of the Software. At its option, Aurora may make such updates available to the LICENSEE and transferees who have purchased an Extended Support Plan from Aurora.

10. EXPORT RESTRICTIONS: The LICENSEE understands that the United States export control laws may govern the export and re-export of products to be licensed under this Agreement and that individual validated export licenses may be required from the U.S. Department of Commerce prior to the export of products. The LICENSEE agrees to assist the LICENSOR to obtain any required License by supplying appropriate documentation requested by the seller. The LICENSEE agrees to comply with the U.S. Export Administration Regulations in effect from time to time and will not re-export any products without first obtaining approval from the LICENSOR and the U.S. Department of Commerce as required. The re-export of LICENSOR's source code, whether modified or not, is prohibited without prior written approval from the LICENSOR. If the LICENSOR grants the LICENSEE approval to re-export source code, LICENSEE will obtain all required export approvals from the U.S. Department of Commerce prior to sale and shipment. The LICENSEE agrees to indemnify and hold harmless the LICENSOR from all costs and expenses incurred by the LICENSOR as a result of the LICENSEE's breach of this section.

11. RIGHT TO GRANT A LICENSE: Aurora hereby warrants that it has the right to grant a License to use the Software to the LICENSEE and that it has the right and power to enter into this License.

12. LIABILITIES: In no event will Aurora be liable for any lost revenues or profits or other special, indirect or consequential damages, even if Aurora has been advised of the possibility of such damages. Aurora's maximum liability for damage shall be limited to the License fees paid by the LICENSEE under this License for the particular Software which caused the damages.

13. GENERAL: LICENSEE may not sublicense, assign or transfer the License on the Software except as expressly provided in this Agreement. Any attempt otherwise to sublicense, assign or transfer any of the rights, duties or obligations hereunder is void. This Agreement will be governed by the laws of the Commonwealth of Massachusetts in the United States of America. □

Index

A

About this Manual ix–xi
Asynchronous
data rates, setting 16

C

Calling for support 26
Cards, installing 4
Customer Service and
Support
contacting xi, 26

D

Data rates
asynchronous, setting 16
Documentation symbols x
Drivers
tracing 18

E

Error Messages 24–26
ESD precautions 4

G

Getting help xi

I

Installation
overview 2
precautions 3
problems 17
Installing
card 3–8
software 9–16

M

mset 21–26
utility 21

P

Parts list 4
Performance levels 1
Product Information
Worksheet 34

R

Registration xi

S

Serial card, unpacking 4
Setting asynchronous data
rates 16
Software
installing 9–16
license agreement 30–32
warranty 28
Specification overview 2
Support xi
System requirements 1

T

Troubleshooting 17–26

W

Warranty 27–32

X

xxtrace
running 19–21
tracing drivers using 18

Product Information Worksheet

Please record the following information about your Vanguard Multiport 12000CPR Serial Controller and workstation:

Software version number: _____

Workstation
model: _____

Operating System and
version: _____

cPCI card installed in slot
number: _____

hostid of the
system: _____

Devices connected to port numbers:

Port	Peripheral
0	
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	