Software Installation and Configuration Guide

SCO® OpenServer™

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Overview

The Comtrol *RocketPort/RocketModem Software Installation and Configuration Guide* covers the following Comtrol software products:

- RocketPort/RocketModem Windows NT Driver (6540)
- RocketPort/RocketModem Windows 95/98 Driver (6533)
- RocketPort/RocketModem Novell NetWare Driver (6535)
- RocketPort/RocketModem SCO OpenServer Driver (6543)
- RocketModem AT Command Set

Please note that these software drivers support a broad range of Comtrol hardware products, and that both this guide and the driver you install may include features not applicable to your installation.

Each Comtrol adapter, board, or interface comes packaged with a *Hardware Reference Card*, which covers hardware-specific installation instructions and performance characteristics. For more information about your Comtrol product, see the *Hardware Reference Card*.

Operating System Requirements

The drivers discussed in this document work with the following operating systems:

- Microsoft Windows® NT (3.51, 4.0, or higher)

    Note: *NT 4.0 or higher is required to support Multilink PPP. RAS or RRAS is required to support Remote Access Service. Under NT 4.0, Service Pack 3 is required to support RAS.*

- Citrix® WinFrame® (1.7 or later)
- Microsoft Windows® 95 and Windows® 98
- Novell® NetWare® 3.12, 3.2, or 4.1x (with MPR 3.1A or higher and/or NetWare Connect 2.0.30 or higher)
- Novell IntranetWare I (with NIAS and Support Pack v1.0)
- SCO® OpenServer™ (5.0.x)

Technical Support

Comtrol has a staff of support technicians available to help you. U.S. and U.K. telephone support is available during business hours, Monday through Friday (holidays excluded), at the phone number(s) listed on the previous page. Before you call Comtrol technical support, please have the following information available.

Table 1. Support Call Information

Item	Information
Product name	
Country where used	
Serial number*	
Part number**	
I/O address***	
Interrupt (IRQ)***	
Operating system type and release	
OS service pack number	
Driver version number	
Computer make, model, and speed	
Other Comtrol products installed and their I/O addresses, if applicable	
Other serial port adapters installed and respective COM port numbers	

* *Serial numbers can be found on a printed tag on the RocketPort/ RocketModem circuit board.*

** *Part numbers can be found on both the box and on a tag on the circuit board. It is a six-digit number similar to this:* **96850**-**4**.

*** *The I/O address is set in two places: in the DIP switch block on the circuit board, and in the driver software. The IRQ, if used, is set in the driver software only.*

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Software and Document Updates

For information not in this guide, see the README and/or online **Help** files on the installation media.

Comtrol manuals and other documents are available in electronic form on the Comtrol corporate headquarters (U.S.) web site. Driver software updates can be downloaded at no charge from the Comtrol U.S. ftp site. Always check the web and ftp sites to make sure that you have the current driver and documentation.

- Comtrol U.S. web site: **http://www.comtrol.com**
- Comtrol U.S. ftp site: **ftp://ftp.comtrol.com**

The current released version of the software is stored in the **Rocket** directory. If a newer version has reached the beta testing stage, it can be found in the **BETA** directory. Beta software is made available on an **"as-is"** basis and users of beta software assume all risks and liabilities relating thereto.

Note: *Downloadable driver software files are stored in either zipped (*filename.**zip***) or self-extracting zip (*filename.**exe***) format. You must extract the zipped files before installing a downloaded file. For more information, see the appropriate section for your server operating system.*

Table 2. Device Drivers for RocketPort and RocketModem

Operating System (Level)	Part Number	RocketPort ISA	RocketPort PCI	RockePort Plus	RocketPort 485	RocketModem
BSDI (3.0)	†	*	*			
FreeBSD 2.2+	†	*	*			
FreeBSD 3.0	†	*	*			
Linux (V1.2.0 or higher)	††	*	*			
MS-DOS (5.0 and 6.2) Int 14 & FOSSIL	6546	*	*	*	*	*
Novell (3.12 through 4.11)	6535	*	*	*		*
OS/2 (2.X and 3.X) not WARP Connect	6522††	*	*			
QNX 4.X (16- and 32-bit)	6523	*	*			
SCO OpenServer (5.0.X)	6543	*	*		*	*
SCO UNIX/Open Desktop (3.2v4.2 & 3.2v5)	6500	*				
Solaris X86 (2.4, 2.5.1, and 2.6)	6519	*				
SVR3.2 UNIX (3.2v3 and 3.2v4)	6502	*				
SVR4 UNIX (SVR4.2 and UnixWare 1.X)	6503	*				
SVR4 UNIX (UnixWare 2.1.X)	6544	*	*			
Windows 3.1 and WFWG 3.11	6536	*	*			
Windows 95/98	6533	*	*		*	*
Windows NT (3.51 and 4.0) I386	6540	*	*	*	*	*
Windows NT (3.51 and 4.0) DEC ALPHA	6540R	*	*	*	*	*

† See the README the FTP site or use the search engine on the Web site.
†† ftp://tsx-11.mit.edu/pub/linux/packages/comtrol/comtrol-1.12.tar.gz

SCO OpenServer

Overview

Use this section to install and configure the *RocketPort/RocketModem SCO OpenServer Driver*. This driver supports both the RocketPort series of multiport serial boards and the RocketModem series of integrated multimodem boards.

You can install up to four RocketPort/RocketModem boards in one computer, including a combination of RocketPort and RocketModem and ISA- and PCI-bus adapters. This driver supports a maximum of 128 serial I/O ports or modems per computer, and each port can be driven at baud rates up to 230.4K bps, depending on the model of RocketPort or RocketModem installed.

*   All **RocketModem** boards support their own built-in modems exclusively.
*   All **RocketPort** boards support external RS-232 devices at speeds up to 230.4K bps. Selected models also support RS-422 or RS-485.

For more information regarding the specific capabilities of your RocketPort or RocketModem board, see the *Hardware Reference Card* that is packaged with each board.

Note: *While the driver and boards are capable of this performance, older versions of UUCP and CU (prior to 5.0.4c) are limited to a maximum baud rate of 38.4 Kbps.*

This product was developed and tested using SCO OpenServer 5.0.4c.

You must install your RocketPort/RocketModem controller board(s) before installing the device driver software. This section discusses how to install, configure, and test the SCO OpenServer device driver software.

If you need more information about baud rate support, see the manual page for **termio** on your system. If you need to access rates higher than 38.4 Kbps, see the section on *Baud Rate Mapping* on page 18.

For more information about signals, cables, and pinouts, see the *Hardware Reference Card* that came with your board and interface.

Installation Prerequisites

Before you install the SCO OpenServer device driver, you must:

- Obtain the current driver, either on media or from the Comtrol web or ftp site.
- Remove any older RocketPort/RocketModem driver that may be on your system.
- Extract the current driver files and create an installation diskette.

Removing an Existing Driver

If upgrading from an earlier version of the driver, remove the old driver before installing the new one. Follow these steps:

1. Log in as the system administrator (**root**).
2. Invoke the **custom** utility.
3. Select the RocketPort/RocketModem device driver to be removed.
4. Select the **Software** option.
5. Select **Remove Software**.
6. Select **Remove** to confirm your choice.
7. Type **Y** to boot the kernel by default.
8. Type **Y** to rebuild the kernel environment.
9. Press **any key** to return to the *custom* menu.
10. Select **Host** and **Exit** to exit the *custom* utility.
11. If you have other drivers to remove at this time, do so.
12. Reboot the kernel so that your changes take effect.

Installing the New Driver

Use the following instructions to extract and install the RocketPort/RocketModem SCO OpenServer driver.

Extracting the Driver Files

The RocketPort/RocketModem SCO OpenServer driver is distributed as either a UNIX install diskette or as a compressed DOS-format file named **6543.z**. If you have the UNIX version, skip to *Driver Installation* on page 13.

If you have obtained **6543.z**, either by downloading it from the Comtrol ftp site or on DOS-formatted media, follow these steps to extract the file and create a UNIX installation diskette.

1. If needed, copy the file to your UNIX server. For example, if copying from a DOS diskette in your **A:** drive, enter this command:

    doscp a:6543.z

2. Enter this command to rename the file: **mv 6543.z 6543.Z**

3. Enter this command to extract the driver: **uncompress 6543.Z**

4. Enter this command to copy the resulting file to a blank diskette:

    dd if=6543 of=/dev/rfd?135ds18

    Where **?** is **0** if this is the primary or **1** if it is the secondary drive.

Software Installation

If you have changed the hardware configuration, added or removed controller boards, or are upgrading to a new version of the driver, remove the existing RocketPort/RocketModem device driver before proceeding. For more information, see *Removing the Existing Driver*.

To install a new device driver, follow these steps:

1. Boot the system and log in as the system administrator (**root**).

2. Invoke the **custom** utility.

    For more information about the **custom** utility, see the *System Administrator's Guide* or the online manual page for **custom**.

3. Select **Software**.

4. Select **Install New**.

5. Select **From** *scosysv* (where *scosysv* is your system name).

6. Insert the installation diskette in the primary drive. Select the appropriate device (e.g., floppy disk drive 0) and press **Enter**.

7. Select **Install**.

8. Enter the number of ISA RocketPort/RocketModem boards installed in the system.

9. Choose a valid I/O address for each ISA controller board. These must match the I/O addresses set using the DIP switches on the boards during hardware installation. (For more information see the *Hardware Reference Card* that came with your board.)

10. Enter the number of PCI RocketPort/RocketModem boards installed in the system.

11. If you do *not* have any RocketModem boards installed in your system, press **N**.

If you *do* have one or more RocketModem boards installed, press **Y**, then select the code for the country where the modem will be used. Values are:

F	France
G	Germany
I	Italy
S	Sweden
K	United Kingdom
U	USA/North America

12. If you do *not* have a RocketPort 485 board installed in your system, press **N**.

    If you *do* have a RocketPort 485 installed, press **Y**. Each port that can be configured for RS-485 is then displayed; press **Y** if the port is configured for RS-485, or **N** if the port is configured for RS-232.

    Note: *Only the first two ports on a RocketPort 485 can be set up for RS-485. The remaining ports are always RS-232. To determine how the board is configured, see the* RocketPort 485 Hardware Reference Card.

13. Press **Y** to boot this new kernel by default.

14. Press **Y** to rebuild the kernel environment.

15. Press **any key** to continue.

16. Remove the device driver installation diskette.

17. Select **Host** and **Exit** to exit the **custom** utility.

18. Reboot the system so that your driver changes will take effect.

Rebooting the System

If you need to install new hardware, follow these steps:

1. At the root prompt, enter **haltsys** and press **Enter**. A screen displays saying you can safely shut off your system.

2. Turn the system off and install the new hardware.

3. After installing the new hardware, turn the system back on.

If you do *not* need to install new hardware, enter **reboot** at the root prompt and press **Enter**.

Alternately, you can sync, shutdown, and reboot the system by entering this command:

    shutdown -y -g0

Verifying Installation

If the hardware and software installations were successful, the following message displays for each board after you reboot:

% Rocket ###h - ###h- - *YYY* nports=X v*x.xx* <date>

Where *###*h - *###*h is the I/O address of the board, *YYY* indicates ISA or PCI board, *X* is the number of ports on the controller, v*x.xx* is driver revision number, and <date> is the driver release date.

Note: *The driver sees all RocketModem ISA boards as 8-port boards.*

If the installation was not successful, the following message displays:

% Rocket xxxh - xxxh- - board *X* NOT FOUND v*x.xx*

Where *X* is the adapter number (1-4) that was expected to be in the system but could not be detected by the driver, and v*x.xx* is the driver revision number.

The **nports** statement may also display the wrong number of ports.

For help resolving installation problems, see the *Troubleshooting* on page 32.

Configuring Ports

The RocketPort/RocketModem SCO OpenServer device driver provides three device types:

* ***Non-modem (Direct) Control***

    Enabling direct device names allows communications without the carrier detect signal being present. It also allows for 3-wire connections with non-modem serial devices, using the TxD (transmit data), RxD (receive data), and SG (signal ground).

* ***Modem Control***

    The modem device names require modem control to function properly. Specifically, the carrier detect signal must be present before the serial port becomes active.

* ***Transparent Print***

    This is an output-only device that allows you to access the auxiliary port on a terminal.

Regardless of the number of ports physically present, the driver creates 32 devices in the **/dev** directory for each board installed. (This is to allow for the maximum number of ports possible.) Device names are assigned as shown in Table 3 on page 16.

Table 3. Device Names

	Ports	Non-modem Control	Modem Control	Transparent Print
Board 1	0 - 7	ttyr0a - ttyr0h	ttyr0A - ttyr0H	tpr0a - tpr0h
	8 - 15	ttyr1a - ttyr1h	ttyr1A - ttyr1H	tpr1a - tpr1h
	16 - 23	ttyr2a - ttyr2h	ttyr2A - ttyr2H	tpr2a - tpr2h
	24 - 31	ttyr3a - ttyr3h	ttyr3A - ttyr3H	tpr3a - tpr3h
Board 2	32 - 39	ttyr4a - ttyr4h	ttyr4A - ttyr4H	tpr4a - tpr4h
	40 - 47	ttyr5a - ttyr5h	ttyr5A - ttyr5H	tpr5a - tpr5h
	48 - 55	ttyr6a - ttyr6h	ttyr6A - ttyr6H	tpr6a - tpr6h
	56 - 63	ttyr7a - ttyr7h	ttyr7A - ttyr7H	tpr7a - tpr7h
Board 3	64 - 71	ttyr8a - ttyr8h	ttyr8A - ttyr8H	tpr8a - tpr8h
	72 - 79	ttyr9a - ttyr9h	ttyr9A - ttyr9H	tpr9a - tpr9h
	80 - 87	ttyraa - ttyrah	ttyraA - ttyraH	tpraa - tprah
	88 - 95	ttyrba - ttyrbh	ttyrbA - ttyrbH	tprba - tprbh
Board 4	96 - 103	ttyrca - ttyrch	ttyrcA - ttyrcH	tprca - tprch
	104 - 111	ttyrda - ttyrdh	ttyrdA - ttyrdH	tprda - tprdh
	112 - 119	ttyrea - ttyreh	ttyreA - ttyreH	tprea - tpreh
	120 - 127	ttyrfa - ttyrfh	ttyrfA - ttyrfH	tprfa - tprfh

Note: *With ISA-bus RocketPort boards, the board numbering sequence is determined by board I/O addresses. With PCI-bus RocketPort boards, the numbering sequence is determined by the PCI slot number. When mixing ISA- and PCI-bus RocketPorts, the ISA boards always come before the PCI boards. For example, if you have one ISA and one PCI RocketPort, the ISA board will always be Board 1 and the PCI board will always be Board 2.*

For more information on ISA board I/O addressing, see your Hardware Reference Card.

Note: *While the driver supports these device types, your hardware may not. For example, the RocketModem does not support Transparent Print.*

Enabling Ports

To enable a port, enter this command:

enable *portname*

Where *portname* is the device name as shown in the *Device Names* table. For example, to enable Board 1, Port 0 for direct communications, enter:

enable ttyr0a

For more information, see the online manual page for *enable*.

Disabling Ports

To disable a port, enter this command:

disable *portname*

Where *portname* is the device name as shown in the *Device Names* table. For example, to disable Board 1, Port 0, enter:

disable ttyr0a

For more information, see the online manual page for *disable*.

Viewing Settings

To view the current tty settings for a port, enter this command:

stty -a < /dev/*portname*

For more information see the *Troubleshooting* beginning on page 32.

Hardware Flow Control

To enable hardware flow control for a port that has already been enabled, cd to the **/comtrol/rckt** directory and enter this command:

rtscts -y /dev/*portname*

To disable hardware flow control, enter this command:

rtscts -n /dev/*portname*

Baud Rate Mapping

Older versions of UUCP and CU do not support baud rates above
38.4K bps. (This was corrected in 5.0.4c.) Therefore, to take full
advantage of the RocketPort or RocketModem board's potential speed
with either older or current versions, use one of the following methods
to remap baud rates:

- **_setbaud_**

    This program enables you to remap baud rates for one or more
    ports, for the current session only.

- **_baud.init_**

    This command enables you to remap the baud rates automatically
    each time the system is rebooted.

Setbaud

Follow these steps to temporarily remap baud rates:

1. Disable the ports for which you want to remap baud rates.

2. Enter this command:

    /comtrol/rckt/setbaud -h /dev/_portname_

    The rates are remapped as shown in the following table:

    ### Table 4. Baud Rate Mapping

System Rate	_Setbaud_ Rate
50	57600
75	76800
110	115200
134	230400

3. Repeat Step 2 for each port for which you are remapping rates.

4. Use the normal tty administrative procedure to set the port to the
    system rate. The _setbaud_ rate will be used instead.

To map a port to a rate not in the _setbaud_ table, enter this command:

/comtrol/rckt/setbaud -x /dev/_portname oldrate newrate_

Where _oldrate_ is the system rate and _newrate_ is the desired new rate.

To reset a port to standard system rates, enter this command:

/comtrol/rckt/setbaud -n /dev/_portname_

Baud.init

Follow these steps to permanently remap baud rates:

1. Edit the **/comtrol/rckt/baud.cfg** file to list the ports for which you are remapping baud rates. To use the remapped rates listed in the *setbaud* table, simply list the devices names. For example:

    /dev/ttyr0a

    /dev/ttyr0A

    /dev/ttyr0b

    /dev/ttyr0B

    To create a custom mapping scheme, enter the device name, the old rate, and the new rate the old rate is mapped to. For example:

    /dev/ttyr0a 9600   230400

    /dev/ttyr0A 9600   230400

    /dev/ttyr0b 9600   230400

    /dev/ttyr0B 9600   230400

2. Reboot the system, or execute **/comtrol/rckt/baud.init** for immediate change. The rates will be remapped according to the contents of the **/comtrol/rckt/baud.cfg** file each time the system is rebooted.

3. Use the normal **tty** administrative procedure to set the port to the system rate. The remapped rate is used instead.

Terminal Sessions in SCO OpenServer

The following discussions provide step-by-step examples of how to enable login services, log in, and test direct connections under SCO OpenServer. Copy and adapt these procedures as needed.

Enabling Login Services

This example enables Port ttyr0a for direct connection at 38,400 baud.

1. Connect a null modem cable from RocketPort Board 1, Port 0, to the modem port of a dumb terminal.

2. Set the terminal modem port baud rate to 38400. If needed, reinitialize the terminal so that it is using the new settings.

3. Edit the following line in the **/etc/inittab** file:

    r0a:2:off:/etc/getty ttyr0a o

    Note: *The* o *matches the* o *entry in the /etc/gettydefs file for 38,400 baud. For more information see the gettydefs and inittab online manual pages.*

4. Enter this command to enable the port:

   enable ttyr0a

   The system should respond with:

   /etc/inittab updated

   /etc/conf/init.d/rckt updated

5. From the terminal, enter your login name and password. If you cannot log in, check the baud rate setting on the terminal and verify that it matches the baud rate setting on the server port.

   To see the current settings for the port, enter this command on the system console:

   stty -a < /dev/ttyr0a

6. From the terminal, move around the system and open files to verify that everything is working correctly. Access the **custom** utility to verify that the system is interpreting ASCII control sequences correctly.

7. When you are finished, type **exit** and log out.

RS-485 Configuration

If you have installed a RocketPort that supports RS-485 and have configured one or more ports for RS-485 operation (see the *Hardware Reference Card*), there are two ways to configure RS-485 service.

- *rs485*

   This program enables you to remap a port to enable or disable RS-485, for the current session only.

- *rs485.init*

   This enables you to remap a port to enable or disable RS-485 automatically each time the system is rebooted.

RS485

Follow these steps to temporarily enable or disable RS-485:

1. Disable the port you want to work with.

2. To enable RS-485 on a port, enter this command:

   /comtrol/rckt/rs485 -y /dev/<*portname*>

   To disable RS-485 on a port, enter this command:

   /comtrol/rckt/rs485 -n /dev/<*portname*>

3. Repeat these steps for each port you want to enable or disable.

   Note: Do not enable RS-485 for a port configured for RS-232.

RS485.init

Follow these steps to permanently enable or disable RS-485:

1. Edit the **/comtrol/rckt/rs485.cfg** file to add or delete the ports you are remapping. To enable a port, add it to the list. To disable a port, remove it from rs485.cfg or comment it out. For example:

   /dev/ttyr0a

   /dev/ttyr0b

   indicates that port 0 and port 1 on Board 1 are enabled for RS-485.

   #/dev/ttyr0a

   #/dev/ttyr0b

   indicates that port 0 and port 1 on Board 1 are *disabled* for RS-485. (The # indicates a commented-out line.)

2. Reboot the system, or execute **/comtrol/rckt/rs485.init** for immediate change. The ports are remapped according to the contents of the **/comtrol/rckt/rs485.cfg** file each time the system is rebooted.

Configuring Modems

The following procedure describes how to set up a RocketModem for dial-in and dial-out operations. If you are using another brand of modem attached to a RocketPort serial port, copy and adapt this procedure as needed (substituting the setup strings for your modem), or use the vendor-provided files for your third-party modem. Setup strings can generally be found in the modem owner's manual.

1. Verify that UUCP is installed. Your system should contain the **/usr/lib/uucp** and **/usr/lib/uucp/default** directories. If necessary, use the **custom** utility to install UUCP.

2. Verify that the serial port you plan to use is recognized by the system, either by checking **/usr/adm/messages** for log entries from previous sessions or by using the **hwconfig** utility.

3. If using an external modem with a RocketPort, connect the modem to the serial port, then connect the modem to the phone line.

    If using a RocketModem, connect the modem to the phone line.

4. Disable both the modem and non-modem devices. For example, to disable Board 1, Port 0, enter these commands:

    disable ttyr0A

    disable ttyr0a

5. Check the **/usr/lib/uucp/Devices** file for the following entries, and add them if they are not present:

    ACU ttyr0A - 38400 /usr/lib/uucp/dialRCKT

    Direct ttyr0a - 38400 direct

    There should be two entries for each serial port being used for a modem. The ACU (Automatic Calling Unit) entry is used when you start a call, and the Direct entry is used to connect directly with the modem and issue AT commands manually.

6. To examine the /dev directory and ensure that these devices are owned by uucp, enter this command:

    ls -l /dev/ttyr0[a,A]

    The system should respond with a file listing like this:

    crw-r--r--   1   uucp uucp 21,128   Aug 17 17:42   ttyr0A

    crw-r--r--   1   uucp uucp 21,000   Aug 17 17:43   ttyr0a

7. If these devices are *not* owned by uucp, use the **chown** command to change the device owner and group names. For example:

   > **chown uucp:uucp /dev/ttyr0A**

   > **chown uucp:uucp /dev/ttyr0a**

8. Enter this command to connect to the non-modem control port:

   > **cu -s 38400 -l /dev/*portname***

   The system should respond:

   > **connected**

9. Type in **atz** and press **Enter**. The modem should respond:

   > **OK**

10. After verifying that the modem is responding, close the connection by entering ~./

11. If desired, perform these steps to test dialing:

    a. Connect to the non-modem control port. (See Step 8, above.)

    b. Type in **atdt***phonenumber*, where *phonenumber* is the number you want to dial.

    c. When you press **Enter**, the system should connect to the telco, get a dial tone, dial the number, and connect to the host system (if any) on the receiving end. At each stage of the process, appropriate success or failure messages should be displayed.

    d. When you are done, enter **~./** to close the connection.

12. Verify that **/etc/inittab** is set up correctly. The entry for ttyr0A should look similar to the following line:

    > **r0A:23:off:/etc/getty -t60 ttyr0A o**

    If you need to use a different baud rate, check the /etc/gettydefs file for the necessary entries. In this example, the letter **o** corresponds to 38400 baud.

13. Enter this command to enable the port for incoming calls:

    > **enable ttyr0A**

14. To test dial-in, dial into this modem from another modem.

Using Dialers

For dialing, both CU and UUCP use a dialer defined by an entry in
/usr/lib/uucp/Devices. The dialer can be:

- an entry in the **/usr/lib/uucp/Dialers** file

- a symbolic link to **atdialer**, together with a suitable configuration
  file in /usr/lib/uucp/default

- a standalone program such as **/usr/lib/uucp/dialRCKT**

Comtrol provides the necessary dialer files for each of these types of
dialers to support the RocketModem. These files are included with SCO
OpenServer driver v2.02 and above. For more information, see your
SCO manual or manpages for atdialer(C), dialers(F), Devices(F), and
make.dialer(C).

RocketModem: Dialer file entries

During installation of the driver, the following **RcktModem** entries are
added to the /usr/lib/uucp/Dialers file.

> **RcktModem =,-, "" AT&F&S1s0=1\r\c OK\r AT*NC##Z\r\c OK\r
> ATDT\T\r\c Speed**

> **&RcktModem =,-, "" +++\dATQ0H OK\r AT*NC##Z\r\c OK\r
> ATE0&D2 OK\r ATS0=1Q1\r**

Where ## is the code number for the country where the modem will be
used. Values are:

Table 5. RocketModem Country Codes

Code	Country
05	France
06	Germany
08	Italy
14	Sweden
16	United Kingdom
22	USA/North America

To use the RcktModem dialer file entry, change the fifth field of the
/usr/lib/uucp/Devices file to read:

> **ACU ttyr0A - 38400 RcktModem**

RocketModem: atDialer program

During installation, the following files are installed to use with the atdialer program supplied by SCO.

> **cp /comtrol/rckt/dialer/Comtrol_RocketModem /usr/lib/uucp/default/ Comtrol_RocketModem**

A symbolic link named Comtrol_RocketModem is added to /usr/lib/ uucp/atdialer:

> **ln -s /usr/lib/uucp/atdialer /usr/lib/uucp/Comtrol_RocketModem**

To use the Comtrol_RocketModem atDialer program, change the fifth field of the /usr/lib/uucp/Devices file to read:

> **ACU ttyr0A - 38400 Comtrol_RocketModem**

RocketModem: dialRCKT

The dialRCKT files are copied in during driver installation. To set up dialRCKT to support RocketModem, follow these steps:

1. Copy the dialRCKT.c file to /usr/lib/uucp:

> **cp /comtrol/rckt/dialer/dialRCKT.c /usr/lib/uucp/dialRCKT.c**

2. Copy the dialRCKT.<CTRY> file to /usr/lib/uucp:

> **cp /comtrol/rckt/dialer/dialRCKT.*<CTRY>* /usr/lib/uucp/dialRCKT**

where *<CTRY>* is the code for the country where this modem will be used. Values are:

Table 6. dialRCKT Country Codes

Code	Country
FRA	France
GER	Germany
ITA	Italy
SWE	Sweden
UKM	United Kingdom
USA	USA/North America

3. Copy the dialRCKT.txt file to /usr/lib/uucp/default:

cp /comtrol/rckt/dialer/dialRCKT.txt /usr/lib/uucp/default/dialRCKT

4. Edit the /usr/lib/uucp/makefile.

   a. Find the line that reads:

   EXES=dialHA96V dialMUL dialTBIT atdialer

Change it to read:

EXES=dialHA96V dialMUL dialTBIT atdialer dialRCKT

b. Find the line that reads:

CFLAGS = -O -DHDUU -DAUTOCONNECT

Change it to read:

CFLAGS = -O -DHDUU -DAUTOCONNECT -DROW -D<*CTRY*>

Where <*CTRY*> is the name of the country where this modem will be used.

Values are:

Table 7. makefile Country Codes

Code	Country
FRANCE	France
GERMANY	Germany
ITALY	Italy
SWEDEN	Sweden
UNITEDKINGDOM	United Kingdom
UNITEDSTATES	USA/North America

5. To use the dialRCKT dialer, edit the /usr/lib/uucp/Devices file so that the fifth field now reads:

ACU ttyr0A - 38400 /usr/lib/uucp/dialRCKT

Configuring Printers

The following files are used to administer printers connected directly to serial ports under SCO OpenServer:

Table 8. Printer Administration Files

File	Function
/etc/default/lpd	file for the default printer
/usr/spool/lp	printer and scheduler info directory
/usr/spool/lpmodel	directory for interface models
/usr/spool/lp/interface	directory for use by spooler
/usr/spool/lp/log	completed print request log file

Printer Administration Commands

These commands are used frequently when working with printers. See the online manual pages for more information.

Table 9. Printer Administration Commands

Command	Description
lp	submit print request
lpr	identical to lp
lpinit	install printer
cancel	cancel print request
lpstat	provide status of printer/pending print jobs
lpsched	start printer scheduler
lpshut	stop printer scheduler
lpadmin	change printer and spooler configuration
enable	enable printer for use
disable	disable printer from accepting print requests

Transparent Print

The *transparent print* feature enables users to attach a printer to the auxiliary port available on most video display terminals. Data can then be directed from the host through the terminal to the printer, without disturbing the normal keyboard entry and display functions. This enables you to attach a terminal and a printer to the same port.

Follow these basic steps to set up transparent print:

1. Attach a printer to the auxiliary port on the terminal.
2. Edit the **/comtrol/rckt/tprint.cfg** file to configure the tprint port.
3. Run **/comtrol/rckt/psetup** to inform the driver of the new configuration.
4. Enable the terminal for logins.
5. Direct output to the tprint port name.

For more information, see the related discussions that follow.

TPRINT.CFG

Each printer device must be described in the **tprint.cfg** file. This description consists of a set of statements describing the terminal and printer used. Each statement consists of a keyword/parameter pair, in the form, *keyword=parameter*.

See your hardware owner's manuals for information regarding the statements required by your printer and operating system.

The tprint.cfg configuration statements consist of up to five lines for each transparent port used:

> **device=**
> **auxon=**
> **auxoff=**
> **printcps=**
> **option=**

For example, the following configuration can be found in the **/comtrol/ rckt/tprint.sample** file:

> **# device tpr0a (attached to device ttyr0a**
> **# terminal: Link Technologies model 220**
> **# printer: Okidata model u92**
> **device=tpr0a**
> > **auxon=(esc [5 i)**
> > **auxoff=(esc [4 i)**
> > **printcps=90**
> > **option=onclr**

The keywords are described further in the following table.

Table 10. TPRINT.CFG Keywords

Keyword	Description
device	This specifies the printer device for a group of statements, and must be the first line in each group of statements describing a device. All statements that follow this statement and come before the next **device** statement (or the end of the file) will apply to the named device. *Example*: **device=tpr0a**
auxon	This specifies the control sequence that must be sent to the terminal to enable transparent printing. This can be a one-to-four character sequence of ASCII characters or mnemonics, or both, in paranthesis. You can enter the characters as: • An actual ASCII character • A backslash and a hexadecimal value, for example, **\28** is the same as (. • A mnemonic character. (See page 30). Characters or mnemonics must be separated by spaces.
auxoff	This is similar to auxon, and specifies the control sequence that must be sent to the terminal to disable transparent printing.
printcps	This specifies (in decimal) the printer speed in characters per second. The driver meters out 80-percent of this for actual use.
option	This specifies any post-processing that is to be performed on data output to the printer. There are three options: • **onclr** outputs a newline character as **nl,cr** (newline, carraige return) • **ocrnl** outputs carriage return as a newline • **none** produces normal output See your printer documentation for more information about post-processing.

Table 11. ASCII Control Code Mnemonics

Mnemonic	ASCII Code	Mnemonic	ASCII Code
ack	06h	etx	03h
bel	07h	ff	0Ch
bs	08h	fs	1Ch
can	18h	gs	1Dh
cr	0Dh	ht	09h
dc1	11h	lf	0Ah
dc2	12h	nak	15h
dc3	13h	nul	00h
dc4	14h	rs	1Eh
dle	10h	si	0Fh
em	19h	so	0Eh
enq	05h	soh	01h
eot	04h	stx	02h
esc	1Bh	sub	1Ah
etb	17h	syn	16h
eot	04h	us	1Fh

PSETUP

After tprint.cfg has been set up, run the **psetup** program to transfer the tprint information to the device driver. The syntax is:

/comtrol/rckt/psetup

This program also includes a test mode. To use it, enter:

/comtrol/rckt/psetup -t

Psetup will verify the statements in tprint.cfg but *not* update the driver. Any errors found are listed by tprint.cfg line number.

Psetup can be run any time after booting, and may be run repeatedly. If transparent print is being used on a regular basis, psetup should be run from the proper **rc** file after the load program.

Testing Transparent Print

The following example uses an IBM InfoWindow II 3153 and an Epson LQ-510 printer. Copy and adapt these procedures as needed.

The terminal is set up as follows:

emulation=wyse60
enhanced mode=on
commmode=full duplex
Host/Printer=EIA/None
EIAbaud=38400
AUXbaud=38400
EIAdata=8/1/N
AUXdata=8/1/N

1. Use a null-modem cable to connect the SES1-EIA port on the terminal to RocketPort Board 1, Port 0 (ttyr0a).

2. Use a serial-to-parallel cable to connect the printer to the SES2-AUX port on the terminal.

3. Verify that the driver has been installed with transparent print feature enabled and a port speed of 38,400.

4. Disable **/dev/ttyr0a**.

5. Edit **/comtrol/rckt/tprint.cfg** and add the following lines:

   device=tpr0a
   auxon=(esc d #)
   auxoff=(dc4)
   printcps=90
   option=onclr

6. Run **/comtrol/rckt/psetup -t**.

   The program should return (**test mode**). If it does not, resolve the error conditions and try again. Repeat until tprint.cfg is error-free.

7. Run **/comtrol/rckt/psetup**.

8. Enable **/dev/ttyr0a**.

9. Enter this command:

   ls> /dev/tpr0a

   This should print a listing of the present working directory on the printer, without printing to the terminal screen.

10. If desired, print man pages, or cat text files to **/dev/tpr0a** to further test the printer.

11. Login on the terminal and cat files to the printer. The terminal should work without stopping while printing is in progress.

Troubleshooting

Before you call Comtrol technical support, please check the following:

• Check to make sure all cables are connected properly.

• Check the signals between your peripherals and the RocketPort interface box to verify that they match (if applicable). See the RocketPort Hardware Reference Card for port pinouts.

• If using an ISA-bus RocketPort/RocketModem, check to make sure the DIP switch I/O address settings on the board match the I/O address you used when installing the device driver software.

• Make sure the controller board is seated firmly in the bus slot.

• Make sure the expansion slot screw is in place.

• Reinstall the board and device driver software, selecting a different I/O address range for the controller. For possible I/O address conflicts, see the System I/O Address tables.

If the above steps fail to resolve the problem, follow these steps:

1. Shut down your system.

2. Place the **RocketPort Diagnostics** diskette in your primary drive.

3. Power-up your system, and allow it to boot from the diagnostic diskette.

4. Follow the on-screen instructions to run the diagnostic program.

If this fails to resolve the problem, see the *Introduction* section of this guide for information about contacting Comtrol technical support.

PCI-Bus I/O Conflicts

On occasion, a system will report a PCI-bus board as NOT FOUND due to an I/O conflict during boot-up.

To resolve this problem, follow these steps:

1. Run the diagnostics to determine the I/O address of the PCI board. (This is set automatically by the system.) Note this address.

2. Boot into SCO.

3. Edit the file **/etc/conf/sdevice.d/rckt**. Change the PCI board address shown to the actual address you noted in step 1.

4. Use the **/etc/conf/cf.d/link_unix** command to relink the kernel. Or, using the GUI interface, go to the **System Administration** folder, open the **Hardware Kernel Manager**, and click the **Relink Kernel** button. Select **Y** for the answers to all prompts.

5. Reboot the system.

Modem-Related Error Messages

The following list describes some of the more common error messages seen while performing the exercises in this manual, and their causes. For additional assistance, see the "Troubleshooting Modems" section in the *SCO OpenServer Handbook*.

Message: **Connect failed: SYSTEM NOT IN Systems FILE**
Cause: Missing or incorrect entry in /usr/lib/uucp/Devices.

Message: **Connect failed: NO DEVICES AVAILABLE**
Cause: Missing or incorrect entry in /usr/lib/uucp/Devices.

Message: **Connect failed: CAN'T ACCESS DEVICE**
Cause: Owner or permissions incorrect on /dev/ttyr*XX*

Message: **Connect failed: DEVICE LOCKED**
Cause: There is a lock file on this device.

Message: **cu:dir permission denied**
Cause: You do not have write permission on the /usr/lib/uucp/Devices file.

Solving Modem-related Problems

If you have problems connecting to a modem-equipped port, disconnect the cable to the modem or turn off the modem. Use the **cu** command to test a port with no modem present. After connecting to the port, reconnect or power on the modem and set the modem parameters.

The most useful tool for diagnosing dial-out problems is the **-x9** option to **cu**. Using this option causes cu to display diagnostic output. To do so, follow this syntax:

cu -x9 -l *devicename phonenumber*

Where *devicename* is the port you are trying to use and *phonenumber* is the number you are trying to dial.

If you get a "connected" message when you test the modem with **cu** but no response to an **at** command, follow these steps:

1. Move the modem to a standard serial port and try it there. If it works on a standard port but not on a RocketPort port, the problem lies in the RocketPort board or port configuration.

2. Move the modem back to the RocketPort port.

3. Verify that the modem switch and software settings are correct.

4. Check the modem cable to make sure it is attached at both ends.

5. After issuing the **cu** command, press **Enter** several times and watch the lights on the modem. The receive light should flash. If only the send light flashes, the local echo may be turned off. Use the **ATE1** command to turn on the modem's local echo feature.

6. If no lights flash, the modem cable may be defective. Replace it.

7. Use the **RocketPort Diagnostics** to verify that the port is working.

Using RocketModem Reset (rktmodemreset)

RocketModem Reset enables you to reset individual RocketModems to their default (power-on) states.

Note: *Reset is not implemented on all RocketModems. To determine whether your RocketModem supports reset, see the readme file.*

To reset a RocketModem, follow these steps:

1. Disable the port you want to reset.

2. Enter this command:

    /comtrol/rckt/dialer/rcktmodemreset /dev/<*portname*>

    where <*portname*> is the modem control device name.

3. Repeat this process for each modem you want to reset.

Note: **rcktmodemreset** *checks to ensure that the port you are trying to reset is a RocketModem port. Reset cannot be used to reset non-Comtrol modems or serial ports on non-RocketModem boards.*

Solving Printer-related Problems

To identify and resolve printer-related problems, follow these steps:

1. Verify that the printer is powered up, connected to the correct port, and on-line.

2. Verify that the printer is connected using the correct cable. See the RocketPort *Hardware Reference Card* and your printer manual for connector pinouts and cable specifications.

3. Move the printer to a standard serial port, and try it there. If it works on a standard port but not on a RocketPort, the problem may lie in the RocketPort board or port configuration.

4. Move the printer back to a RocketPort port.

5. Enter this command to send a file directly to the printer port:

   cat /etc/termcap >/dev/ttyr*XX*

   Where *XX* is the port to which the printer is attached.

   a. If you get nothing, check to make sure the device driver is loaded, the port is enabled, and that you are in fact connected to the port you think you're connected to. If all of this is true, connect the printer to the COM1 or COM2 port and repeat this step. If the printer still fails to print, the problem is in the printer. If the printer does print, go back to the beginning of this chapter and test the RocketPort.

   b. If you get a partial file printout or garbled characters, go to the sections on *Flow Control*, beginning below.

   c. If the file is printed correctly, but you are unable to print from an application, check the application setup.

   d. If the file is printed correctly, but you are unable to print through the UNIX spooler, go to the section on *UNIX Spooler Problems*, later in this chapter.

Checking Flow Control Configuration

To check flow control setup, enter this command at the system console:

   stty -a </dev/ttyr*XX*

Where *XX* is the port to which the printer is attached.

The system should respond with something like this:

   speed 38400 baud;

   line = 0; intr = DEL; quit = ^\; erase = ^H; kill = ^U;

   eof = ^D; eol = ^@; swtch = ^@

-parenb -parodd cs8 -cstopb hupcl cread -clocal -loblk -ctsflow -rtsflow

-ignbrk brkint ignpar -parmrk -inpck -istrip -inlcr -igncr icrnl -iuclc

-ixon -ixany -ixoff isig icanon -xcase echo -echoe echok -echonl -noflsh

opost -olcuc onlcr -ocrnl -onocr -onlret -ofill -ofdel

cr0 nl0 tab3 bs0 vt0 ff0

Note: *These lines are shown for example only. The parameters for your system will probably be different. A minus sign (-) in front of a parameter indicates that it is* not *configured, while a blank space means that it* is *configured.*

Software (XON/XOFF) Flow Control

Pay particular attention to the minus signs (-) in front of *ixon*, *ixany*, and *ixoff*. A minus sign means that the parameter is turned off, which in turn may mean that flow control is not being handled correctly. To force XON/XOFF flow control, enter these commands:

cat </dev/ttyr*XX* >/dev/null &

stty 38400 ixon -ixany ixoff -rtsflow -ctsflow </dev/ttyr*XX*

Where *XX* is the port to which the printer is attached.

This example assumes the printer is running XON/XOFF handshaking and 38400 baud. The **cat** command opens a background process on the printer port and the **stty** command sets the baud rate and handshaking.

If this resolves the problem, you can make the corrections permanent by adding the **cat** and **stty** commands shown above to the end of the **userdef** file in the **/etc/rc.d/8** directory, then rebooting the system.

Hardware (CTS/RTS) Flow Control

Pay particular attention to the minus signs (-) in front of *ctsflow* and *rtsflow*. A minus sign means that the parameter is turned off, which in turn may mean that flow control is not being handled correctly. To force CTS/RTS flow control, enter these commands:

cat </dev/ttyr*XX* >/dev/null &

stty 38400 -ixon -ixany ixflow ctsflow rtsflow </dev/ttyr*XX*

Where *XX* is the port to which the printer is attached.

This example assumes the printer is running hardware handshaking and 38400 baud. The **cat** command opens a background process on the printer port and the **stty** command sets the baud rate and handshaking.

If this resolves the problem, you can make the corrections permanent by adding the **cat** and **stty** commands shown above to the end of the **userdef** file in the **/etc/rc.d/8** directory, then rebooting the system.

UNIX Spooler Problems

The System V lp spooler has a known problem that causes serial ports with buffers beyond the UNIX internal c-lists to drop characters at the end of print jobs.

When the lp spooler daemon wants to print something, it forks a child process. The child opens the printer port, then forks a process to run the interface shell script. When the shell is finished printing, it exits.

There can still be characters in the output buffer at this point, but because the child still has the printer port open, the shell exits immediately. The child is notified that the shell has exited, it sends a message to the daemon (via the named FIFO) indicating the print job has completed, the child then exits, and the exit code eventually enters the port's close routine.

If there are still characters left to be output to the printer, the process sleeps in the close routine until the characters have gone out the port or until the process gets a signal.

The lp spooler, however, upon receipt of the "print done" message, sends a sigterm signal to the child. If the child is in the close routine waiting for characters, it wakes up, flushes its buffers, and exits. This is how the data is lost.

Possible Solutions

1. Enter **stty -hupcl <&1 ;** in the interface shell script immediately before every possible exit. This prevents the shell from exiting before all the characters have been sent out the serial port.

2. Enter **sleep 30** in the interface shell script immediately before every possible exit. This also prevents the shell from exiting before all the characters have been sent out the serial port.

3. For applications which must access the printer device directly, insert the following command in the **/etc/rc.d/8/userdef** file:

   stty *baud any_flow_control* **; while: ; do sleep 3600; done)<** *portname* **&**

   Where *baud* is the printer baud rate, *any_flow_control* is any flow control parameter such as ixon or ixoff, and *portname* is the serial device name.

   This line can also be issued as a command from the root prompt, but unless **nohup** is used, the process exits and the serial line is reset when root logs out. To ensure that the process is spawned upon going into multi-user mode and continues until the system is shut down or the process is killed manually, place this command in **/etc/rc.d/8/userdef**.

Retaining Non-default Parameters on a Disabled Port

Drivers only retain stty settings for a particular line as long as that line is open. Likewise, when you do an stty on a closed port, the stty settings are not retained. When you apply stty settings to your login tty, the changes are retained because even after stty terminates, the login shell continues to hold the line open.

To make stty settings permanent, enter these commands:

> **(while:; do sleep 3600; done) < /dev/ttyr**_XX_ **&**

> **stty** _desired parameters_ **< /dev/ttyr**_XX_

Where _XX_ is the board/port number, and _desired parameters_ are the desired stty command parameters.

The effect of this is to open, set, and close the port, but because this is nested inside the first open, the parameters will stick. You may place these lines in one of the boot scripts in the **rc.d** directory.

Transparent Print: Known Issues

The **stty** command is not effective for auxiliary devices supported by transparent print.

If the corresponding terminal is very busy, output to the printer may be extremely sluggish or not at all.

Applications that use spreadsheets, menus, windows, and so on send _escape sequences_ to the terminal. Escape sequences cannot be broken up by data going to the printer. Output to the screen is given top priority, and output to the printer is passed through only when nothing is going to the screen, in order to ensure that escape sequences are not broken up.

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