

# Tru64 UNIX

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## *Configuring a Remote Console Connection*

**April 2000**

This Best Practice describes how to configure a remote modem connection to the console prompt of a system running the Tru64 UNIX (formerly Digital UNIX ) operating system.



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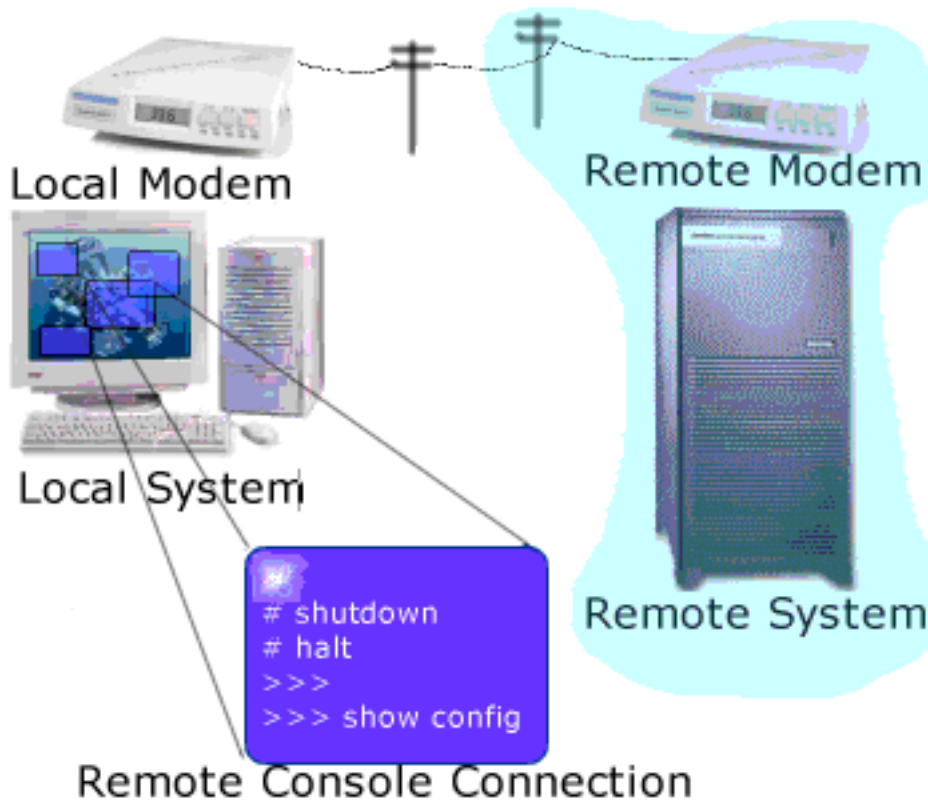
## **Configuring a Remote Console Connection**

Configuring a remote modem connection to the console is a useful feature even if you have a local or wide area network. In this context, the term **remote** means that the system is at another location. It could be physically near to you, or it could be many miles away.

A remote modem connection enables you to dial up a system even if it is at the console prompt, such as after a system crash. On such a connection, you can perform diagnostic operations, fix operating system problems (providing no hardware fix is necessary), and reboot the system to single-user or multi-user mode.

Even if the remote system is not at the console prompt, a remote console connection enables you to log in to multi-user mode and perform administrative tasks should your LAN or WAN network become unavailable. A representation of the configuration is shown in *Figure 1*, which shows an example of a local workstation connecting via an external modem to a modem on a remote server system. The console of the remote server is displayed in a VT terminal window on the local workstation.

### A Typical Remote Console Configuration



Not all Best Practices apply to all configurations, so you must be sure that it is appropriate for your system and circumstances. See *Is This Best Practice Right for You?* for more information.

See the Tru64 UNIX Best Practices Web page for more information about Best Practices documentation.

### Is This Best Practice Right for You?

Not all Best Practices apply to all configurations, so you must be sure that it is appropriate for your system and circumstances. To use this Best Practice, you must meet the requirements described in the following table:

Requirement	Description
Operating System	Tru64 UNIX Version 4.0B and later.
System Configuration	The remote system must support use of a modem as a console device. Consult the owner's manual for this information.
Security	A remote console connection cannot be validated for authenticity. You may want to configure a console password to prevent unauthorized access to the system console prompt.
Impact on Availability	None, providing you configure this facility when the remote system is set up initially. You can also perform it during scheduled operating system updates. Therefore, it will not impact availability, but should enable you to greatly reduce potential system downtime in the event of a system crash.
User Prerequisites	You must be an experienced operator (power user) with root login privilege or DOP privileges that enable you to access the required system files.

If you do not meet the previous requirements, see *Alternative Practices* for information.

## Before You Begin

Before you apply this Best Practice, you must understand some background information and may need to perform preliminary tasks as follows:

### *Hardware Prerequisites*

This section describes the required state of the local and remote hardware.

### *Data Required to Complete the Procedure*

This section identifies information that you need to gather before you begin.

### *Commands Used in this Procedure*

This section describes the commands that you will use.

Checklists are provided in the following sections.

## Hardware Prerequisites

Hardware	Prerequisite
Modems	<p>You require two systems with modems as shown in <i>Figure 1</i>. Throughout this procedure, you are required to carry out some operations on the <b>local</b> system and modem and some on the <b>remote</b> system and modem. This procedure does not describe the installation of the modem hardware. Follow the installation instructions in the modem manufacturer's documentation. Some information on verifying the remote modem installation is provided here. Additional information is provided in <code>modem(7)</code>. The local system can be any terminal or a PC with a modem connection that is already configured.</p> <p>Compaq recommends that the modem on the remote system be of a type that allows you remote access to the modem configuration. This feature enables you to change the remote modem settings (such as the baud rate) from your local system.</p>
Modem Commands	<p>This procedure assumes the use of the AT modem command language, where modem configuration commands have a syntax similar to the following examples:</p> <pre># ate0 (echo off) # atq1 (quiet mode)</pre> <p>If your modem has a different command syntax, you may need to identify the equivalent commands in your modem owner's manual.</p>
Telephone Connection	<p>Identify the telephone number of the remote modem and familiarize yourself with the dial-out commands and procedures for your local terminal (or PC terminal emulator).</p>
Console Commands	<p>You should be familiar with the console commands that are valid at the console prompt (<code>&gt;&gt;&gt;</code>) of the remote system. These commands are sometimes known as the SRM (system reference manual) console commands and are part of the firmware that provides basic system access when the operating system is not booted.</p>
Your Physical Location	<p>To perform the configuration, you (or another administrator) must be at the remote system site to enter the console commands and to verify the configuration.</p>

## Data Required to Complete the Procedure

Data Item	Description and Source
Baud Rate	<p>The maximum baud rates supported by the hardware. This is usually determined by the modem, but the system or telecommunications equipment itself may have a hardware limitation on the baud rate. Do not automatically choose the highest rate offered by the modem but verify the rate supported by the other hardware. The limiting factor is generally determined by the remote console firmware.</p>

Data Item	Description and Source
Parity Setting	<p>This procedure specifies that parity (<b>pa</b>) must be set to eight bits and no parity (<b>pa=none</b>).</p> <p>This value is required by the console firmware. A value of <b>pa=none</b> will work for most modems, but consult your modem owner's manual to be certain.</p>
Connection Identifier	<p>Your chosen name(s) for the connection. The name should be easy to identify such as a combination of the remote system name and the connection speed, such as: <b>wilbur38400</b>. You can create many connection names for the same remote system, each using different line speeds and characteristics. Each connection name must be unique.</p>
Flow Control Setting (rarely needed)	<p>This data is usually not required, but may be needed for troubleshooting. Tru64 UNIX supports both hardware and software flow control. If the system supports hardware flow control, you will set up the modem and the serial line to use hardware flow control.</p> <p>If hardware flow control is not supported, you must use software flow control. The critical requirement here is that the remote operating system, the modem, and the remote console firmware settings must all be either hardware <b>or</b> software.</p>
Terminal Emulation	<p>The type of terminal emulation that you want to use. For example, if you are using a terminal emulation windowing utility on a PC that emulates a terminal type VT420, you would use that as the terminal emulation.</p>

## Commands Used in this Procedure

You may need to refer to the following reference pages:

- The `ports(7)` reference page describes the physical communication ports on the rear of a system box, and their logical representation in the operating system (`ttyNN`).
- The `remote(4)` reference page describes the database file in which remote systems are defined.
- The `stty(1)` and `getty(8)` reference pages describe terminal characteristics such as communication speed (baud).
- The `sysconfigdb(8)` reference page describes how you set attributes in the system configuration file, specifically a modem timer attribute.
- The `tip(1)` reference page describes one method of opening a connection to the remote section.

## Applying the Best Practice

Before you configure a remote modem connection, be sure to follow the recommendations in *Before You Begin*.

There are four phases in configuring a remote modem connection:

- Configuring the local operating system for dial-out.
- Configuring the remote modem.
- Configuring the remote operating system for console dial-in.
- Configuring the remote console firmware for a console connection.

## Configuring the Local Operating System for Dial-out

Configure the local operating system as follows:

Task	Method
1 Verify the device special file.	<p>Check the contents of the <code>/dev</code> directory to ensure that the device special files exist. If the local system has a graphics terminal, you can use either <code>/dev/tty00</code> or <code>/dev/tty01</code>. If it is a serial console, then you can only use <code>/dev/tty01</code>.</p> <p>If no device special file exists, you cannot proceed and must stop this procedure. Refer to the <i>System Administration</i> guide for your operating system version for information on creating device special files.</p>

Task	Method
<p>2 Create a modem entry in the local <code>/etc/remote</code> file.</p>	<p>Check the contents of the local <code>/etc/remote</code> file to see if there is an existing modem entry. If not, create one similar to the following, using your chosen connection name, telephone number, baud rate, and the console device special file in the following syntax:</p> <pre>connection_name:port_name:<b>pn</b>=telephone_number:\br#baud_rate:<b>pa</b>=none</pre> <p>The bold text is a code that identifies a <i>characteristic</i> of the modem connection. For example, the entry for <b>pn</b> refers to the telephone (phone) number. Parity (<b>pa</b>) must always be set to none. The following line is an example of a typical entry:</p> <pre>wilbur38400:/dev/tty00:<b>pn</b>=9998881234 \br#38400:<b>pa</b>=none</pre> <p>If no <code>/etc/remote</code> file exists, you must create one and then proceed with the next step. You can add other characteristics to the line entry in the <code>/etc/remote</code>, as defined in the <code>remote(4)</code> reference page.</p>
<p>3 Dial-up the remote system.</p>	<p>You can now dial out to the remote system from your local terminal. Initiate a connection using the <code>tip</code> command, as shown in the following example:</p> <pre># tip wilbur38400</pre> <p>This command will return the system prompt of the remote system, providing it is properly configured. If not, configure the modem as described in <i>Configuring the Remote Modem</i></p>

## Configuring the Remote Modem

To configure the remote modem, initiate a connection to the remote modem from the local system using the `tip` command at the appropriate baud rate as follows:

Task	Method
1 Open a connection using the <code>tip</code> command and set the required modem characteristics.	<pre># tip wilbur38400</pre> <p>You enter modem characteristics once and they are stored in the modem's nonvolatile memory until you change them. Use the following commands to configure the remote modem:</p> <pre>at&amp;c1 (Normal carrier detect) at&amp;d2 (Normal data terminal ready) atq1 (Quiet mode) ate0 (Echo off) ats0=3 (Allow three rings before answering) at&amp;w0 (Save these settings) [Ctrl/D] (Exit from the login)</pre>
2 Verify the remote console environment variables and change them if necessary.	<p>Use the <code>shutdown -h</code> command to shut down and halt the system. Determine the current value of the <code>com1_*</code> console environment variables as follows:</p> <pre>&gt;&gt;&gt;show com1_* com1_baud 9600 com1_flow SOFTWARE com1_modem OFF &gt;&gt;&gt;show console console graphics</pre> <p>The preceding entries are the usual system defaults for a system that has a graphics head. Use the <code>set</code> command if you need to change any settings from the default. For example, the <code>console</code> setting must be <code>serial</code> and you should set it last as follows:</p> <pre>&gt;&gt;&gt;set console serial</pre>

## Configuring the Remote Operating System for Console Dial-in

The minimum action to configure the remote operating system for dial in is as follows. If you have problems initiating a connection, refer to *Troubleshooting* for other possible requirements.

Task	Method
1 Modify the modem entry in the remote <code>/etc/inittab</code> file.	<p>Edit the <code>cons:</code> entry of the <code>/etc/inittab</code> file to include details such as the baud rate and terminal type. For example:</p> <pre>modem:23:respawn:usr/sbin/getty: \ /dev/console M38400 vt420</pre>

## Configuring the Remote Console Firmware for a Dial-in Connection

Task	Method
1 Shut down the remote system.	<p>Shut down the remote system using the following command:</p> <pre># shutdown now</pre> <p>Note that as you will normally be configuring the <b>remote</b> system before it is generally available for use, no other users will be logged on and no shutdown warning is needed. However, if you are retroactively configuring a remote console on a system available for general use, you should warn users of the impending shutdown as follows:</p> <pre># shutdown +10 "system going down in 10 minutes for configuration task. Please log off now."</pre>
2 Optionally, set the remote console environment variables.	<p>At the console prompt of the remote system, verify and set the console environment variables if necessary. The values of the <code>com1*</code> variables should propagate from the operating system. If they are incorrect, set them to the appropriate values for your modem. The following example assumes that your modem is connected to the <code>COMM1</code> physical communications port:</p> <pre>&gt;&gt;&gt; set com1_modem ON &gt;&gt;&gt; set com1_flow HARDWARE</pre> <p>The value of <code>com1_flow</code> must be equivalent to the flow control setting in <code>/etc/gettydefs</code> and the flow control setting of the modem.</p>

	Task	Method
3	Try a test connection.	Attempt to connect to the remote console from a local dial-in, using the <code>tip</code> command to obtain the console prompt as follows:  <pre># tip wilbur38400 &gt;&gt;&gt;</pre>
4	Reboot the remote system.	Use the <code>boot</code> command to start up the remote system as follows:  <pre>&gt;&gt;&gt; boot</pre>

## Verifying Success

After you apply this Best Practice, you can verify whether it was successful as follows:

1. Test a shutdown to the remote system.

Shut down the remote system to the console prompt as follows:

```
# stty -hupcl
# shutdown now
<shutdown messages deleted>
>>>
```

You will now be at the remote console prompt, and you can perform any console operations on the remote system.

2. End a remote console session.

End a remote log in session as follows:

```
# Ctrl-D
```

## Using the Remote Console Connection

The following usage notes highlight important aspects of using a remote console connection:

- Use the following command if you want to disable messages posted to the console by the `syslogd` daemon:

```
# /usr/sbin/syslog -s
```

- Use the `stty -hupcl` command before shutting down the remote system. The connection will be dropped if you do not use this command.

## Troubleshooting

Use the following procedure if any of these problems occur:

- You are unable to initiate a connection using the `tip` command.
- You see random characters or nothing is echoed to the terminal window.
- You can connect, but the line is immediately dropped.

Task	Method
1 Verify that your local dial out is correct.	If you do not get a dial tone, repeat the modem hardware installation and initial configuration. Verify that all cables are functional. Follow the modem setup instructions to echo characters to the screen and check the modem settings.
2 Verify and set the remote modem characteristics.	Open a connection using the <code>tip</code> command as follows:  # <code>tip wilbur38400</code>  This command will return the system prompt of the remote system, providing it is properly configured. If not, reconfigure the modem as described in <i>Configuring the Remote Modem</i> .
3 Optionally, configure the remote modem for flow control if required by your hardware.	If necessary, you can also set the flow control of the modem to match the settings in the firmware and operating system using the following AT command sequence:  <code>at&amp;H1</code> <code>at&amp;I0</code>

Task	Method
4 If you set the modem for hardware flow control, set flow control in the operating system.	<p>The flow control must be set to either hardware or software on both sides of the connection. By default, the operating system is configured for software flow control, You can change this setting if any component in the configuration will not support software flow control.</p> <p>For the operating system, the flow control setting is determined in the <code>/etc/gettydefs</code> file. Edit this file and find the entry that corresponds to the baud rate that you are using, such as <code>M38400</code>. In the <code>flags</code> field, set the appropriate flag for flow control by adding the flag <code>CRTSCTS</code> to set RTS/CTS (hardware) flow control. A typical entry is:</p> <pre>M38400# B38400 HUPCL CS8 CRTSCTS # B38400 \ SANE IXANY TAB3 HUPCL #login: #M19200</pre>

Task	Method
5 Verify the console environment variables and change them if necessary.	<p>Use the <code>shutdown -h</code> command to shut down and halt the system. Determine the current value of the <code>com1_*</code> console environment variables as follows:</p> <pre data-bbox="532 758 862 919">&gt;&gt;&gt;show com1* com1_baud 9600 com1_flow SOFTWARE com1_modem OFF &gt;&gt;&gt;show console console graphics</pre> <p>The preceding entries are the usual system defaults for a system that has a graphics head. Use the <code>set</code> command if you need to change any settings from the default. For example, the <code>console</code> setting must be <code>serial</code> and you should set it last as follows:</p> <pre data-bbox="532 1104 889 1157">&gt;&gt;&gt;set com1_flow HARDWARE &gt;&gt;&gt;set console serial</pre>
6 Optionally, set the modem timer value in the <code>/etc/sysconfig</code> file.	<p>If you have timeout or disconnection problems, you may need to set a system attribute matching the DTR interval of your modem. This is the <code>dcd_timer</code> attribute, which by default is set to 2 seconds. Possible values of <code>dcd_timer</code> are 0, 1, and 2. If you specify 0, the system will immediately drop DTR after a disconnect.</p> <p>To modify <code>dcd_timer</code>, add (or change) the following line in the <code>/etc/sysconfigtab</code> file of the <b>remote</b> system. Use the <code>sysconfigdb</code> or the <code>dxkerneltuner</code> interface:</p> <pre data-bbox="532 1556 846 1608">ace:       dcd_timer=N</pre> <p>Where <code>N</code> is in the range 0 to 2, matching the DTR interval in seconds specified for your remote modem. Note that this entry must be added to the <code>/etc/sysconfigtab</code> file so that it persists across reboots, and you should not manually edit the file but use one of the configuration management utilities.</p>

## Alternative Practices

This Best Practice is the recommended method for accessing a remote system when only console access is needed. If your system does not meet the hardware requirements described in *Is This Best Practice Right for You?*, you cannot use this method but must access the system console locally at the console terminal.

Some server systems provide an integrated Remote Management Console (RMC), which is integrated with the system's environmental monitoring features. If the RMC feature exists on your system, use it instead of the procedure described in this Best Practice. Consult the owner's manual for your system for configuration information.

For remote administrative access in single-user and multi-user modes, use the SysMan Menu. Consult the *System Administration* guide for your version of the operating system.

## Comments and Questions

We value your comments and questions on the information in this document. Please mail your comments to us at this address:

[best\\_practices@zk3.dec.com](mailto:best_practices@zk3.dec.com)

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