User’s Guide

Black Box Device Servers

Single-Port Device Server
2-Port Device Server
4-Port Device Server

90000617_A1

Contents

About This Guide

Purpose

This user guide provides the following:

- Configuration and administration procedures
- Configuration examples

Audience

This guide is intended for the person responsible for configuring and administering the Black Box Device Server. It assumes that this person has experience configuring network devices and is familiar with networking concepts.

Scope

This guide provides step-by-step instructions for configuring and administering your Device Server's main features. It focuses on performing these tasks through the Web user interface. It does not address how to configure every option, provide complete information on commands, or discuss hardware installation. These topics are covered in other documents in the Device Server library.

Other Documents in the Library

The Device Server library is a collection of documents found on the Software and Documentation CD under Documentation. The following is a description of the documents available on the CD.

Quick Start Guide

The guide that comes in the package with the Device Server covering the first steps necessary to get your device up and running. UNIX mounting instructions can be found on the back of the Quick Start Guide.

Device Server Command Reference

This online manual, available on the Software and Documentation CD, provides complete information on commands.

Online Help for the Web UI (User Interface)*

This context-sensitive online help provides information on configuration fields used with web browser configuration interface.

*This information is part of the user interface and not an actual document on the CD.

Setup Overview

The following is an overview of the process for setting up your Device Server. The rest of this guide provides details on each step of the process.

Step A: Plan

Before beginning setup, consider the following:

- How to assign an IP address to the Device Server's Ethernet interface, which can be accomplished in a number of ways. See "Configuring the IP Address" on page 13.
- The various ways in which your Device Server can be configured. See "About Configuration Methods" on page 9 for more information.

Note: A key consideration is whether to use RealPort. Other considerations include the type of peripheral that will connect to the port and the peripheral's cabling requirements. See "Setting Up RealPort" on page 37.

Step B: Set Up the Hardware

1. If the Device Server supports multiple serial port interfaces (EIA-232, EIA-422/485), set the interface with the dip switches on the device.
2. Connect peripherals to serial ports.
3. Connect the device to the network.
4. Connect the power supply to the Device Server.

Step C: Configure an IP Address

There are a number of ways to configure an IP address. See "Configuring the IP Address" on page 13 for more information.

Step D: Configure Ports

See the following for more information:

- "Setting Up RealPort" on page 37
- "Network Settings" on page 17

Step F: Configure Other Features as Required

See the following for information on setting up other features:

- "PPP Settings" on page 33
- "Configuring Autoconnection" on page 43
- "Configuring IP Routing" on page 47
- "Configuring Security Features" on page 49

Supported Devices

This manual provides information on the following Device Servers:

- Single-Port Device Server
- 2-Port Device Server
- 4-Port Device Server

About Configuration Methods

Use this section to learn about the different configuration methods.

Configure the Device Server with the Wizard

Simply follow the prompts and choose your configuration with the wizard available on the CD. Choose either a Microsoft Windows or UNIX platform. The wizard will configure your device based on your description of your environment and determine (for you) if you need to install RealPort. This is the recommended and preferred method for configuration.

Configure the Device Server from an Attached Terminal

With this method, you cable a terminal or PC running terminal emulation software to a device server port and then use the command line to enter commands. This method allows you to configure all features. It requires, however, that you and the device server be in the same location. Some users find it advantageous to configure the device server IP address this way and then use one of the other methods for the rest of the configuration.

Configure the Device Server from a Telnet Session

With this method, you Telnet to the device server and use the command line to complete configuration tasks. The only disadvantage to this method is that you have to configure the device server with an IP address before you can Telnet to it.

Configure the Device Server from the Web Interface

The great advantage to this method is ease of use. This method requires that you configure the IP address before you can access the configuration from the web interface, however, some features cannot be configured this way.

Downloading a Configuration File

With this method, you configure a Device Server and then do the following:

1. Download an existing configuration file to a host system.
2. Edit the file with specific configuration using a text editor.

3. Upload the file to the device server.

This an excellent method for maintaining highly similar configuration files for multiple Device Servers. The disadvantage is that the device server requires some configuration steps, such as the IP address, to be completed before it can be used.

Accessing the Configuration from the Web Interface

To access the configuration from the web interface, follow these steps.

This procedure assumes that you have configured the Device Server with an IP address already. See "Configuring the IP Address" on page 13.

1. Access the Device Server from a web browser by specifying the device server's IP address in the URL window.
2. Log on as **`root`**. The default password is **`dbps`**.

Quick Find Feature Support Table

The following table is a quick reference for specific features and where to find the web interface configuration procedures. The User's Guide supports the following products:

- Single-Port Device Server
- 2-Port Device Server
- 4-Port Device Server

Feature	Device Servers Supported	Configuration Overview
RealPort	Device Server Family	Serial Port > Port Profile > RealPort
Modem Emulation	Device Server Family	Serial Port > Port Profile > Modem Emulation
AutoConnection	2-Port Device Server 4-Port Device Server	Serial Port > Port Profile >TCP Sockets
Access Control	2-Port Device Server 4-Port Device Server	User > New User > determine access
DNS	2-Port Device Server 4-Port Device Server	System > System Name
Industrial Automation (IA)	2-Port Device Server 4-Port Device Server	Serial Port > Port Profile >Industrial Automation
Power Over Serial Port	2-Port Device Server 4-Port Device Server	See "Special Features: Power Over the Serial Ports" on page 55
PPP	2-Port Device Server 4-Port Device Server	System > PPP

Feature	Device Servers Supported	Configuration Overview
SSH Version 2	2-Port Device Server 4-Port Device Server	Secruity > Network Security > Custom
TCP Socket Communication	Device Server Family	Serial Port > Port Profile >TCP Sockets
UDP Multicast Communication	Device Server Family	Serial Port > Port Profile >UDP Sockets
Power Management	2-Port Device Server 4-Port Device Server	Serial Port > Port Profile >Power Management

The next step in the device configuration process is to configure an IP address and access the device for more advanced configurations. You must set the initial IP before you can use the web interface. Once the IP is set, the device can be accessed through the web interface and any changes made including changing the IP address.

Options for Configuring the IP Address and Mask

The device server IP address can be configured using the following methods:

- With the Wizard from the Software and Documentation CD. (Insert the Software and Documentation CD and the wizard automatically pops up letting you choose Microsoft Windows platform or UNIX platform. If you have a UNIX system and the wizard does not pop up, see the back of the quick start guide for mounting instructions.)
- From the command line, using the set config command. See the *Device Server Command Reference* for more details including syntax and supported devices.
- By updating the ARP table on a server and then pinging the Device Server (called ARP-Ping, see "Configuring the IP Address Using ARP-Ping" on page 14).
- Using a DHCP server ("Configuring an IP Address using DHCP and RARP" on page 14.)
- Using a RARP server ("Configuring an IP Address using DHCP and RARP" on page 14.)

The IP address and mask can also be changed using the web interface, but not for initial IP address configuration.

Configuring the IP Address with Wizard

Configure the IP Address with the wizard found on the Software and Documentation CD. The wizard is the preferred method for configuring the Device Server and available in both Microsoft Windows platform and UNIX platform. If you have a UNIX platform without auto-mount, use the back of the Quick Start guide for mounting instructions.

1. Insert the CD (the wizard automatically pops up)
2. Select your platform.
3. Follow the wizard by answering the prompts. When the wizard is complete, you will be prompted to run the RealPort software (if your configuration calls for it.) Follow the prompts for complete installation.

Configuring the IP Address Using ARP-Ping

An IP address can be configured by manually updating a server's ARP table and then pinging the Device Server.

Note: The ARP-Ping command assigns the IP address you designate but also assigns default subnet mask and gateway addresses. It is necessary to change the subnet mask and gateway addresses.

Assumptions

This procedure assumes that your Device Server is connected to the Ethernet network

Procedure

1. Record the MAC address of the Device Server. The MAC address is on the label side of the unit.
2. Access a server on the same subnet as the Device Server.
3. Manually update the server's ARP table using the Device Server's MAC address and the IP address you want assigned to the Device Server. The following is an example of how this is done on a Windows NT 4.0 system:

```
arp -s 191.168.2.2 00-00-9d-22-23-60
```

4. Ping the Device Server using the IP address just assigned. The following is an example:

```
ping 191.168.2.2
```

The ping will probably time out before there is a response from the Device Server.

5. Wait 30 seconds and then ping the Device Server again.

   The Device Server replies to the ping, indicating that the IP address has been configured.

Configuring an IP Address using DHCP and RARP

About DHCP and RARP

When the device server boots, it transmits a DHCP request and a RARP request. This continues until an address is assigned.

Procedure

To use RARP or DHCP follow these steps:

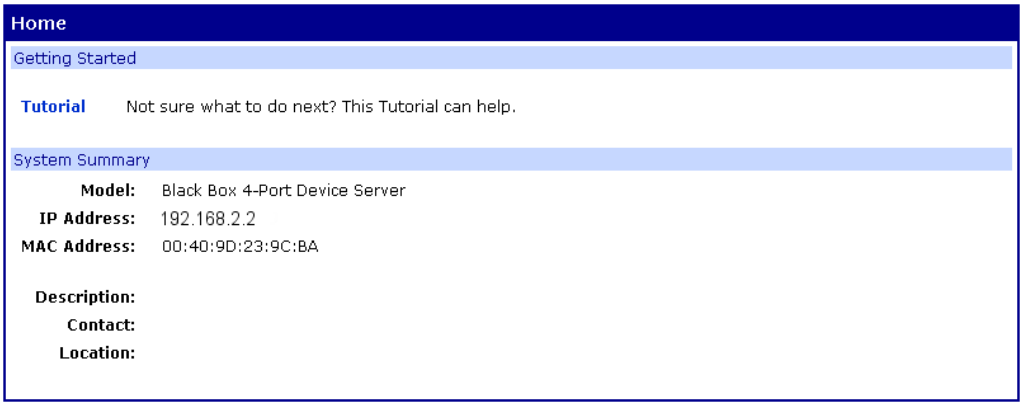
1. Set up an entry for an address on a DHCP or RARP server. If you intend to use RealPort, do the following:
   - Reserve a permanent IP address.
   - Record the IP address. You will need it when you configure the RealPort driver.
2. Power on the device server.

The DHCP or RARP server assigns the device server an IP address.

Accessing the Device Server

1. Enter the IP address in the URL bar of your browser.
2. Enter your login name (**root**) and password (**dbps**).

   Note: The following screen appears allowing you to configure the device for your specific needs. A tutorial is available to guide you in your decisions. The Help button in the upper right corner is also available.

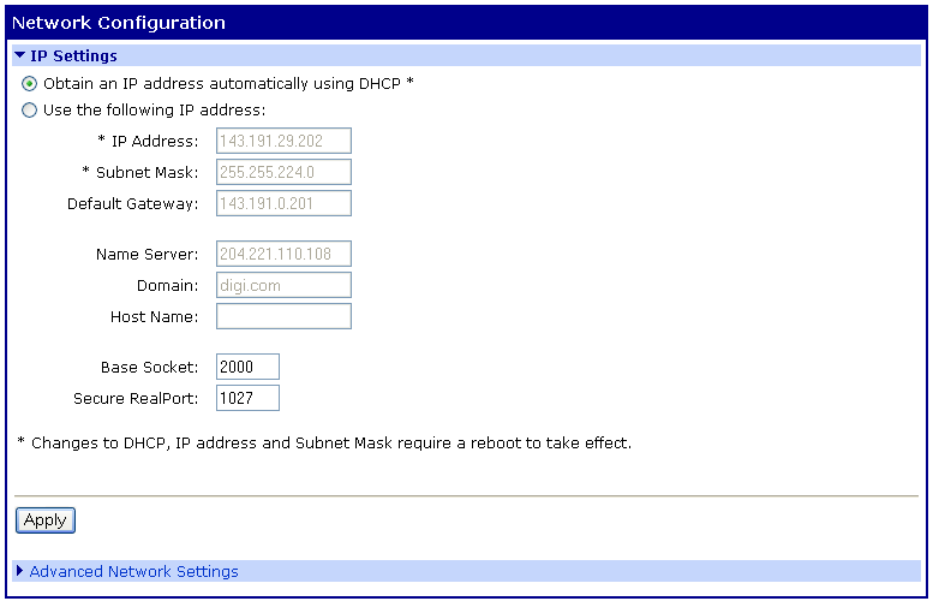


From the web interface, you make any changes you need for your configuration. Remember to click Apply to save your changes and **Reboot** when you are ready for the changes to take effect.

The next step in the device setup process is to configure the network and serial port settings. In order to access the web interface an IP address must be assigned. It is assumed you have logged onto the web interface using the username, **root** and password, **dbps** in order to make any changes or additional configuration assignments. However, it is important to note that if you have used the wizard, your configuration is complete and you do not need additional changes.

Network Settings

1. Click Network to view the IP settings or make any changes to the IP address.



2. Enter the IP address for the DNS server in the Name Server box. The DNS server maps names (example: MyDeviceName.mycompany.com) to IP addresses (example:192.105.1.2).
3. Enter the domain name that this device will live in that is tied to the DNS server address assigned in step 2. This name can be used by other network devices to talk to it, instead of using the its IP address. Get this name from the network administrator, because it must be entered in the DNS server to work properly.
4. Enter a host name for a group of network devices.
5. Enter the Base Socket. The base socket is the network which remote devices need to use to access the device using the named protocols such as, Telnet, TCP, or UDP.

   Note: **Base Socket**
   This determines which network port (socket) on this Device Server or another network device (such as another Device Server or a PC) uses to communicate using certain services. Most applications can leave this value unchanged. To calculate these settings:

Telnet port = Base Socket + Serial Port Number
Raw port = Base Socket + 100 + Serial Port Number

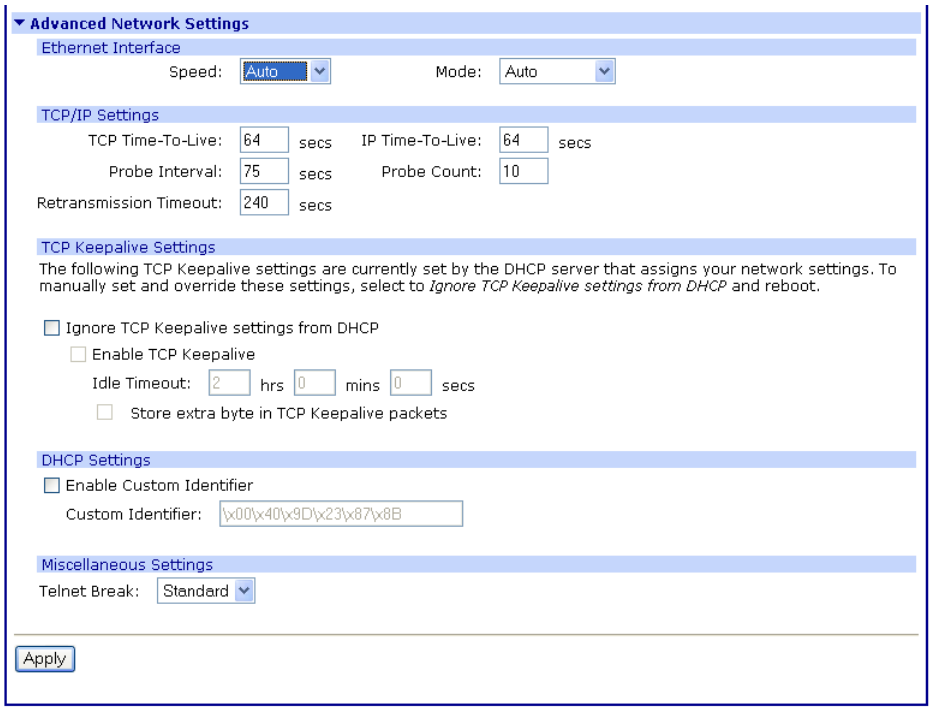
Service	Base Socket	Network Port
telnet	2000	2001
raw (TCP or UDP)	2000	2101

6. Click Apply.
7. Click **Reboot** for changes to take effect.

Advanced Network Settings

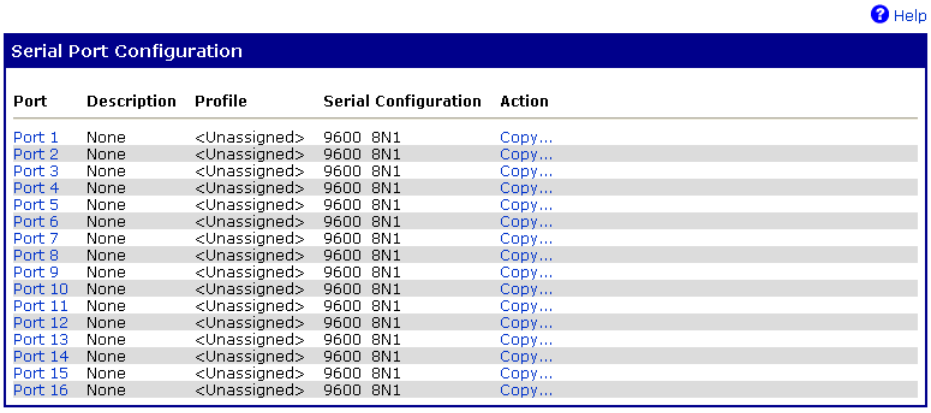
WARNING!!!!! changing the Advanced Network Settings could cause you to 'lose' your device on the Network. If you alter these settings - you may need to reset your device with the reset button and reconfigure your device as if it were new. See "Resetting Configuration to Defaults" on page 62 for instructions.

****The next screen shot is for informational purposes. Black Box recommends that you do NOT alter the Advanced Network Settings. Be advised these settings are correct for most environments.



Configuring the Serial Ports

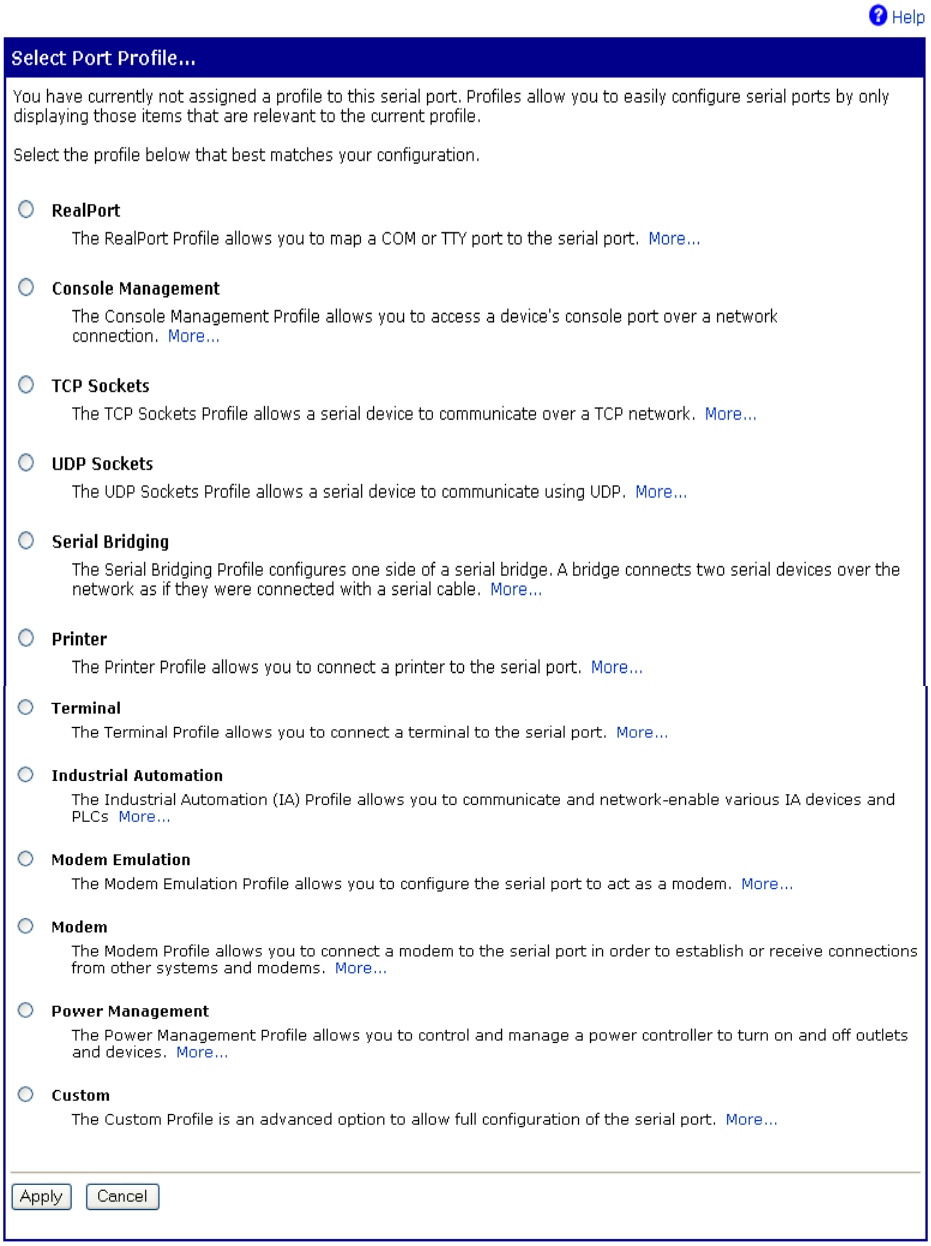
1. Click **Serial Ports** under Configuration.



2. Click the port number that you want to configure.
3. Click Change Profile and select a profile based on the device you have connected to your port.

   Note: If this is the first profile assigned or if the unit has been restored to factory defaults, the interface will take you directly to the port profile page. The following section shows the settings available for each profile.

Note: The ‘More’ link will describe the profiles with additional information.



Note: Profiles are available based on the features supported by your device. Naturally, if you do not have a device capable of a specific profile such as Power Management or Wireless, you will not see that particular profile. Check the "Quick Find Feature Support Table" on page 10 to verify if your device supports a particular feature.

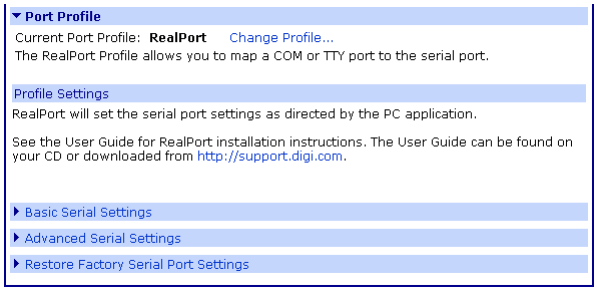
4. Click Apply to save the profile. The interface will determine any additional settings and A port port options page will come up and ask for additional parameters if needed. See "Port Profiles" on page 21 or click Help for additional information.
5. Enter the appropriate parameters and click Apply.
6. Click **Reboot** for changes to take effect.

Port Profiles

Each port profile determines the settings needed. The following screenshots of each profile show the port settings. For a complete description of each profile click the Help button.

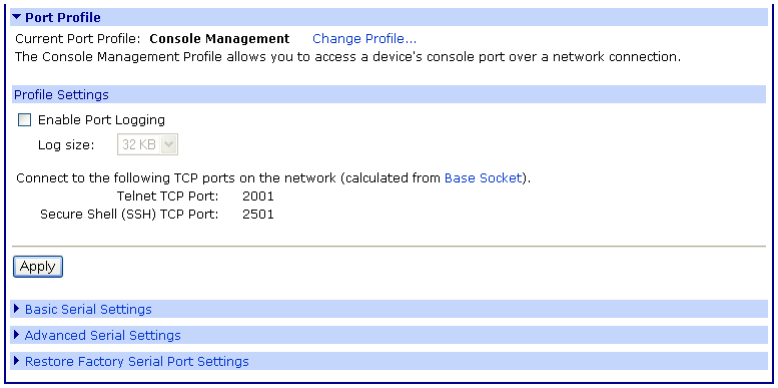
RealPort

Installed on a network-based PC, RealPort emulates a serial port. That is, the application “thinks” it is working with a real serial port, such as COM1. When the application sends data to this serial port, RealPort ships the data across the network to the Device Server which in turn routes it to the serial device. This is also referred to as COM Port Redirection. The network is transparent to both the application and the device.



Console Management

Access a device's console port over a network connection. Most network devices such as routers, switches, and servers offer serial port(s) for management. Instead of connecting a terminal to the console port, cable the console port to the serial port of your Device Server. Then using Telnet features, network administrators can access these consoled serial ports from the LAN by addressing the appropriate TCP port.

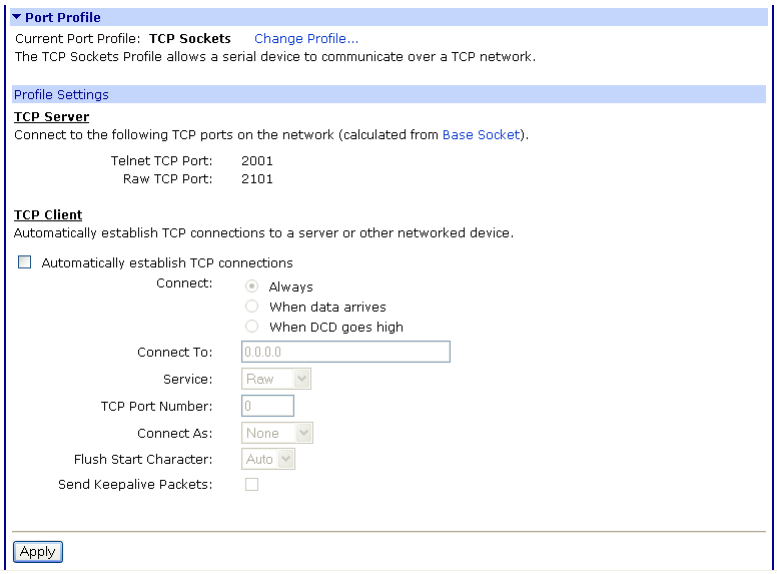


TCP Sockets

The Device Servers support TCP socket communication. TCP socket communication enables serial devices to communicate with each other over an Ethernet network as though they were connected by a serial cable.

Configuring TCP socket communications involves configuring the Device Server for the following types of connections:

- Inbound connections, that is, connections that are initiated by the device on the other side of the network.
- Outbound connection, that is, connections that are initiated by the device connected to the serial port.



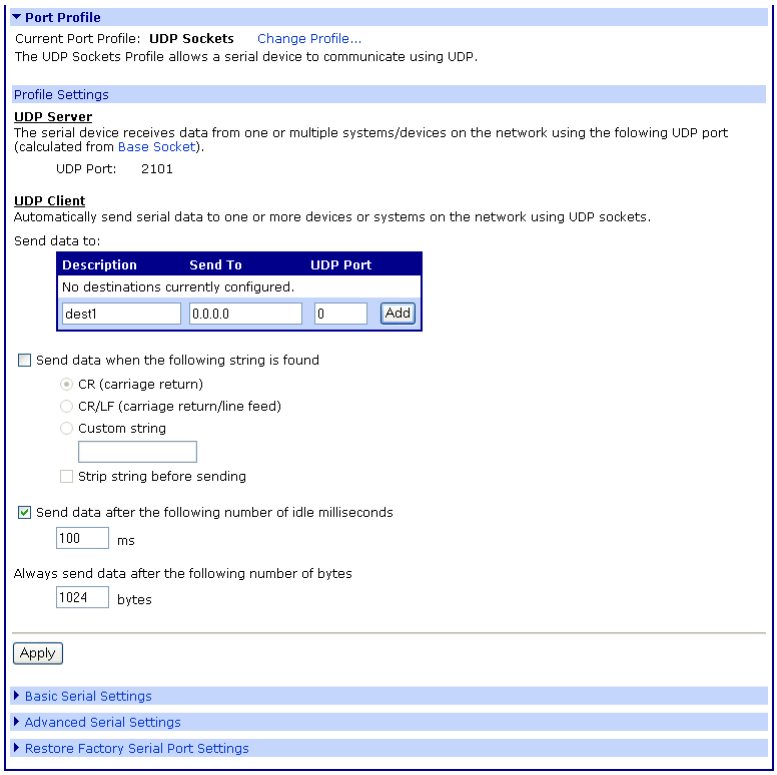
Note: TCP Sockets profile is also the profile to use for Autoconnection. See "About Autoconnection" on page 35 for more information.

UDP Sockets

The Device Servers are capable of UDP multicast. UDP multicast is used to send serial data over an Ethernet cable to one or many hosts at the same time. UDP does not need a protocol because it sends data without any form of acknowledgment of error or error correction. Up to 64 devices can receive a UDP multicast at one time. Both the transmitting and receiving devices must be configured properly for UDP multicast to work.

Configuring UDP multicast communications involves configuring the Device Server for the following types of connections:

- Inbound connections, that is, connections that are initiated by the device on the other side of the network.
- Outbound connections, that is, connections that are initiated by the device connected to the serial port.

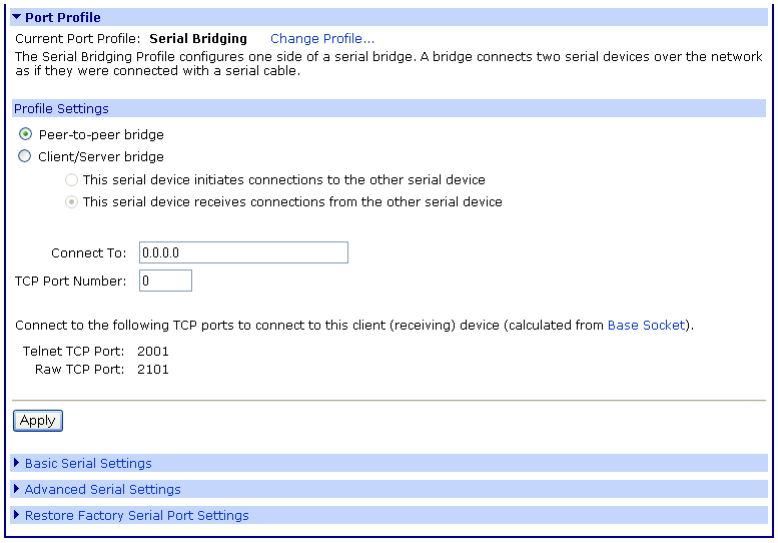


Note: The serial parameters for two connecting devices must match meaning if one device is set for 9600 bps, the other device must be set for the same rate.

Serial Bridging

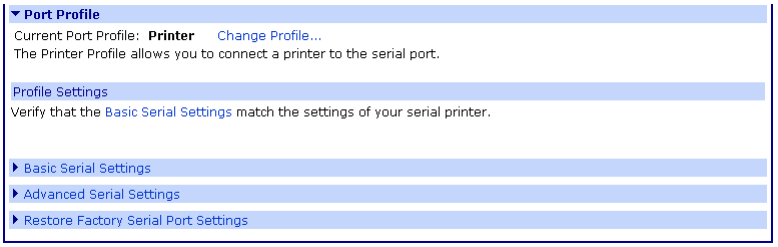
The Device Servers support serial bridging (sometimes referred to as ‘tunneling’). A serial bridge is a network connection between two serial devices, each of which uses a device server. The serial devices “think” they are communicating with each other across a serial cable using serial communication techniques. There is no need to reconfigure the server or the serial device. Neither is aware of the intervening network.

This profile configures each side of the bridge separately. Repeat the configuration for the second Device Server using the web interface. Enter the IP address in the URL bar of your browser and follow the same procedure of the bridge specifying the IP address of the first Device Server.



Printer

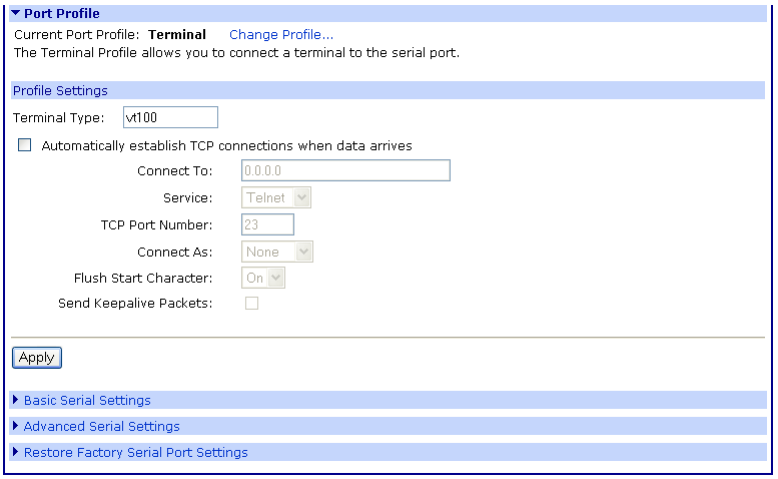
This profile allows you to connect a printer to a serial port. Use this profile if you intend to print using the lpd protocol on your UNIX system.



Note: Refer to your UNIX User Guide for tips on configuring the print spooler on your UNIX system.

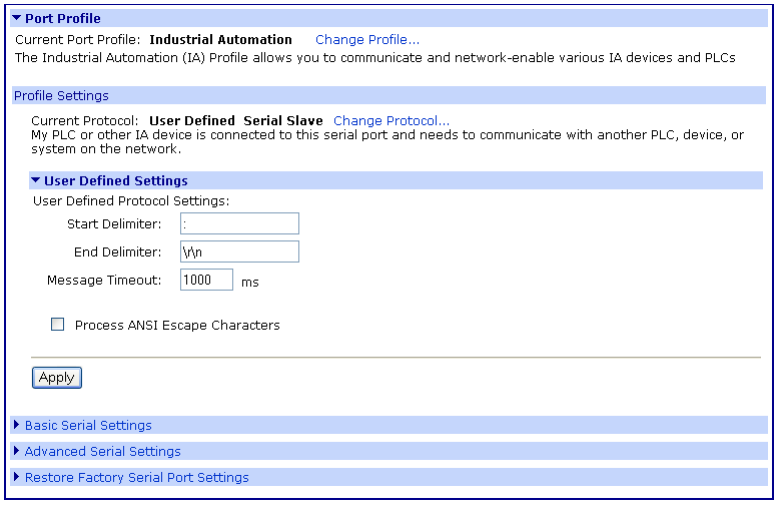
Terminal

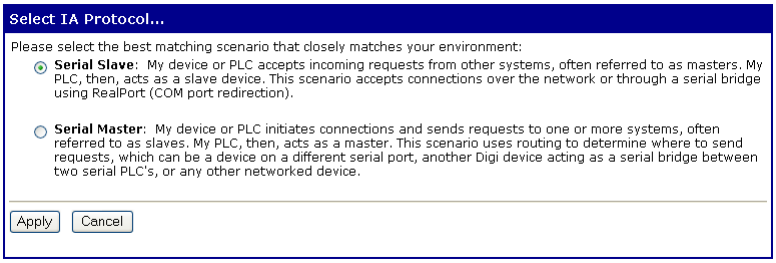
This profile allows you to connect a terminal to the serial port. Also allows you to automatically establish TCP connections, enabling the connection to a system or a device on the network when data arrives.



Industrial Automation

The Industrial Automation (IA) Profile allows you to connect IA devices and PLCs (programmable logic controller) to the serial port in order to network-enable the devices. Use this profile if you need to communicate over the network with an IA device or PLC that only uses serial protocols. This profile may also be used to add routing capabilities to IA devices or PLCs that act as serial masters and send packets to various systems or devices on the network. Industrial Automation enhances the IA device or PLC connected to the serial port. Use the Help button for more assistance configuring this profile.





Configuring Industrial Automation with Modbus

1. Click Serial Port > Change profile and select Industrial Automation.
2. Click Apply.
3. Under Profile settings, click change protocol
    1. (Master or Slave).
4. Select the serial protocol that your device expects to communicate on.

    Note: 2-Port and 4-Port Device Servers - Modbus RTU and Modbus ASCII for all other devices the only option is User defined.The User Defined IA serial protocol is useful for devices or PLC's that do not use any of the predefined protocols and have a protocol that conforms to the following criteria: All message packets are bounded by fixed header and trailer strings Every protocol request is followed by a single response.

5. Use the Help button for additonal information.
6. click Apply.

Note: Configure the serial port for the serial communication parameters (baud rate, data bits, parity and stop bits) required by the connected IA device. If you configure the port for a slave, you do not have to configure a network-based master. Communication with the master just works. (If the master is connected to a serial port, it must be configured, however.) If you configure a port for a master and the slaves are located on the network, TCP sockets, UDP sockets, and Modbus/TCP are all supported. Use the protocol required by the master.

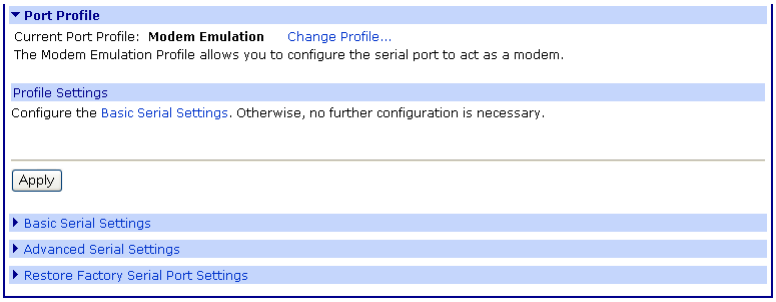
Modem Profiles

There are 2 types of modem profiles:

- Modem Emulation
  Modem Emulation allows the Device Server to function as a modem. A short description follow the modem profiles listed below. For more specific information about Modem Emulation see "Special Features: Modem Emulation" on page 39, including AT commands specific to this function.
- Modem
  The Modem profile configures the Device Server for attaching a modem to a serial port. For more specific information about the modem profile use the Help button in the upper right corner on the profile page of the web interface.

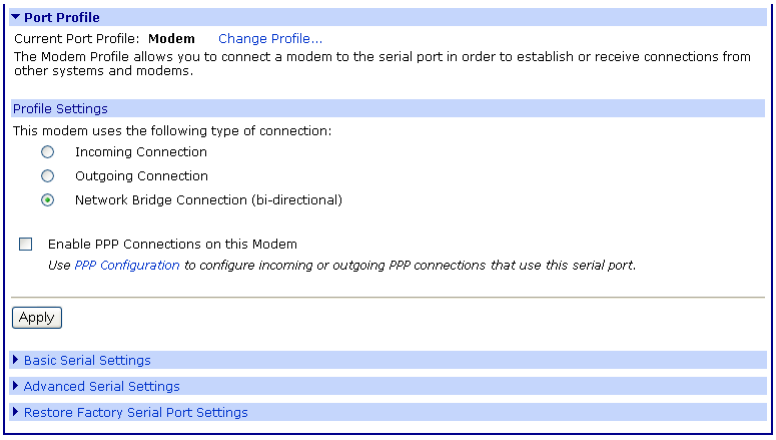
Modem Emulation

Modem Emulation allows you to configure the serial port to **act** as a modem. The Device Server **emulates** modem responses to a serial device and seamlessly sends and receives data over an Ethernet network instead of a PSTN (Public Switched Telephone Network). The advantage for a user is the ability to retain legacy software applications without modification and use a less expensive Ethernet network in place of public telephone lines.



Modem

Modem allows you to **attach** modem devices to the serial port in order to **establish or receive** connections from other systems and modems.



Note: Select Enable PPP Connections on this Modem and click the PPP Configuration link to set up incoming, outgoing or advanced PPP settings if the attached modem uses PPP connections. See "System Configuration" on page 32 for more information about PPP settings.

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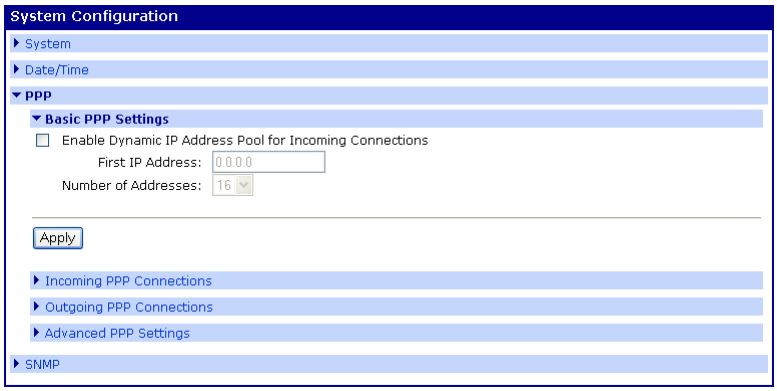
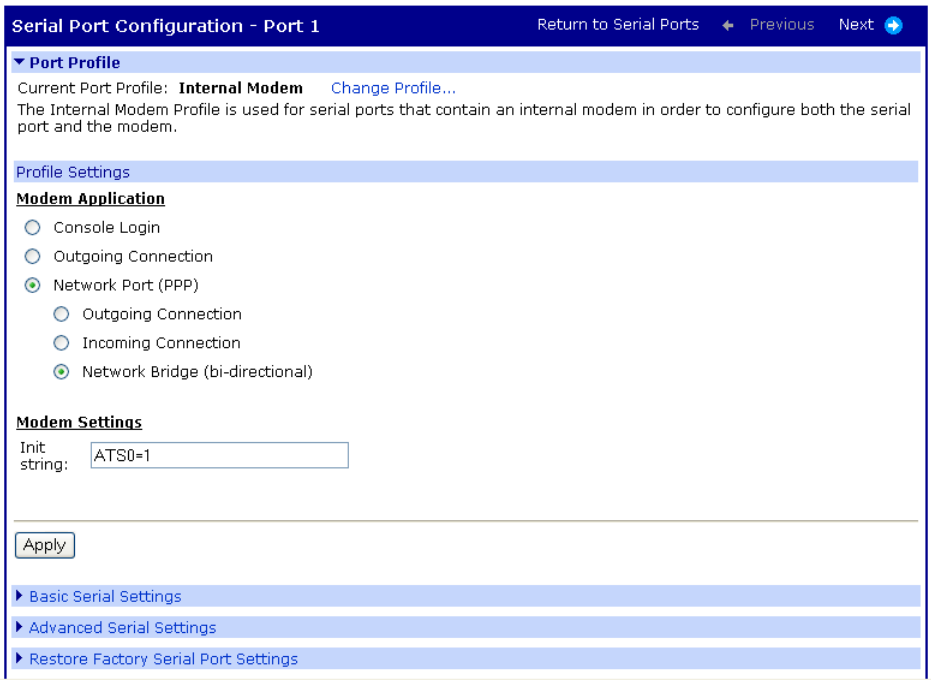


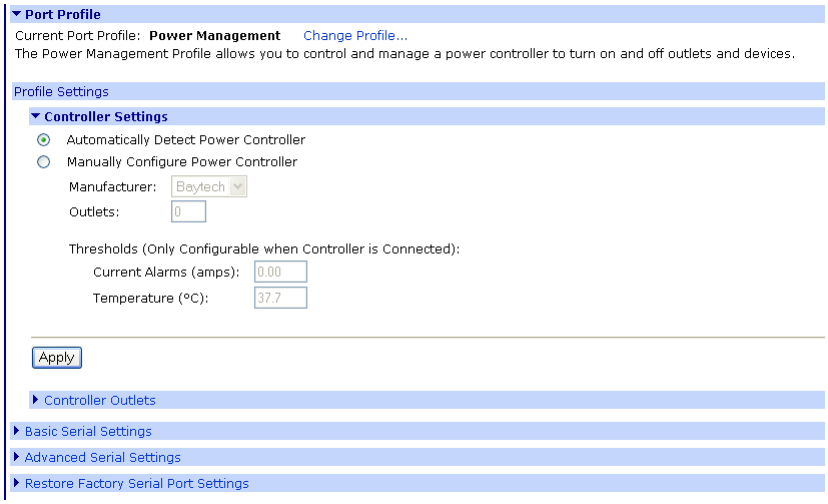
Internal Modem

Used for the serial ports that contains the embedded modem. This profile allows you to configure the modem port. This profile configures the internal modem for PPP connections.

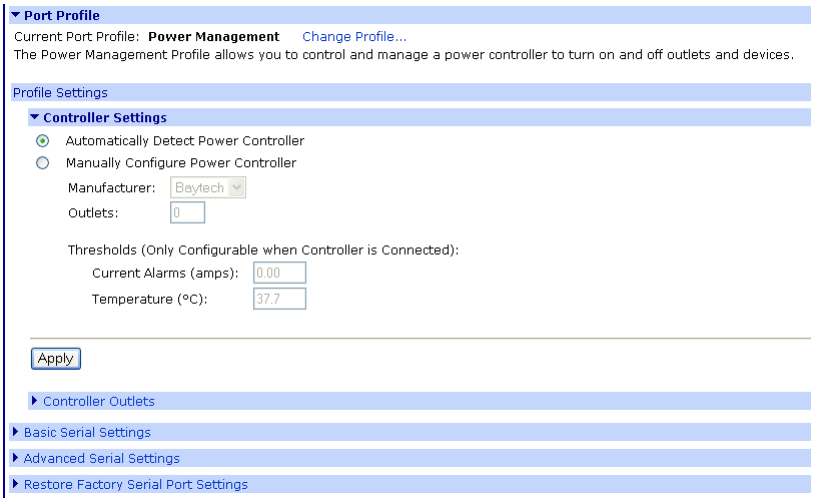


Power Management

The Power Management feature allows you to connect the serial port to a power controller. The Device Server will monitor the power controller to provide the status and control of power outlets. This feature is used most commonly in a console management application, where the console port of a server is connected to one serial port of the Device Server for remote access, and the AC power plug of the server is connected to a power controller for AC power control.

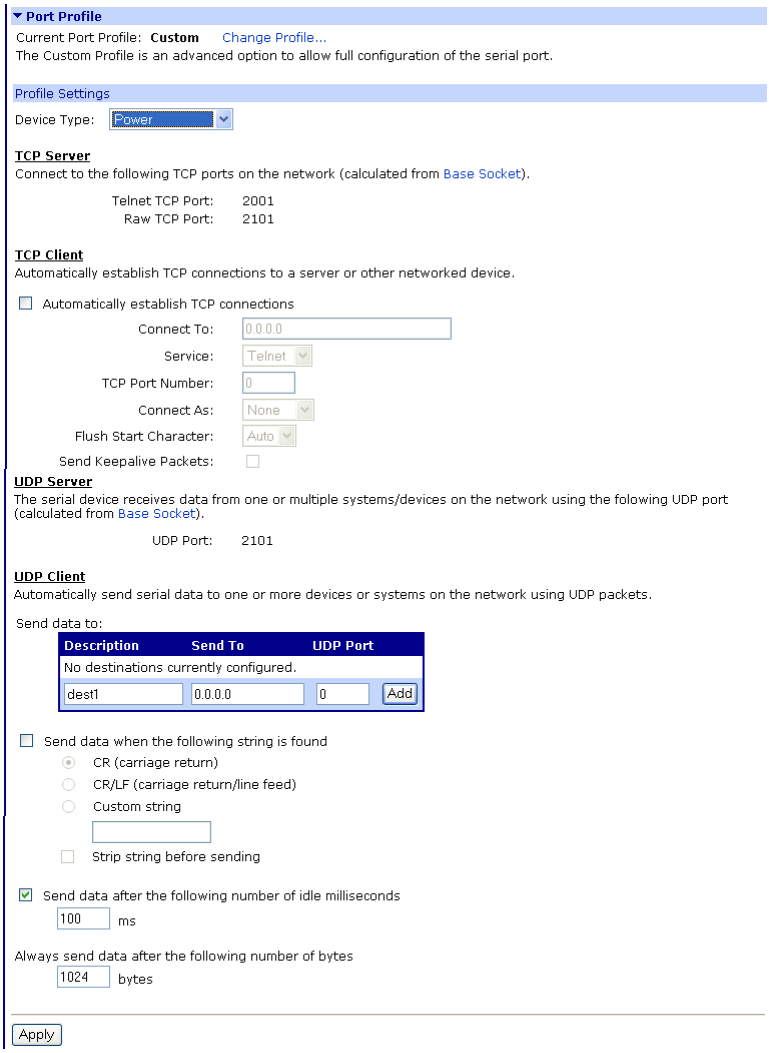


Note: Power controller settings can be automatically detected or configured manually.



Custom

This profile allows you to see all settings and set them accordingly. Use this profile only if your application does not fit into any of the predefined port profiles.



User Configuration

Although it is not required, the device server is often configured to accommodate the requirements of particular users. Typical configurable user attributes include:

- Whether the user is required to supply a password.
- Autoconnection attributes, such as the system to which the user should be automatically connected at login.
- The interface the device presents the user, such as a menu or command line.
- Whether the user has access to outbound ports.

Users select a user profile that most closely describes the user's environment. Profiles include:

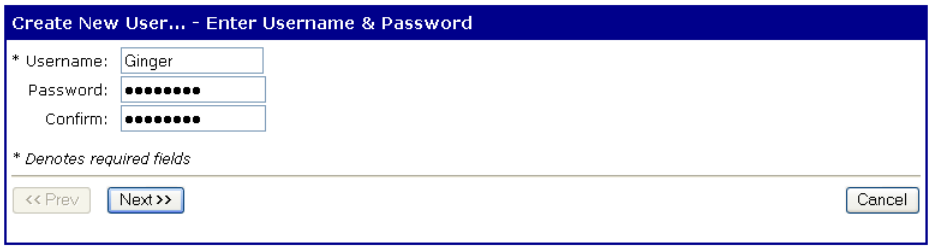
- Console Management - expected to connect to and manage serial devices that have a console port. Users can connect directly, use a custom menu interface, or reverse telnet or SSH into a serial port.
- Terminal/Terminal Emulation -using a terminal or terminal emulation program to connect to the serial port and needs to automatically connect to a device available on the network.
- Custom - using a terminal or terminal emulation program to connect to the serial port and needs to automatically connect to a device available on the network.

Note: For information on configuring PPP users, see "PPP Settings" on page 33.

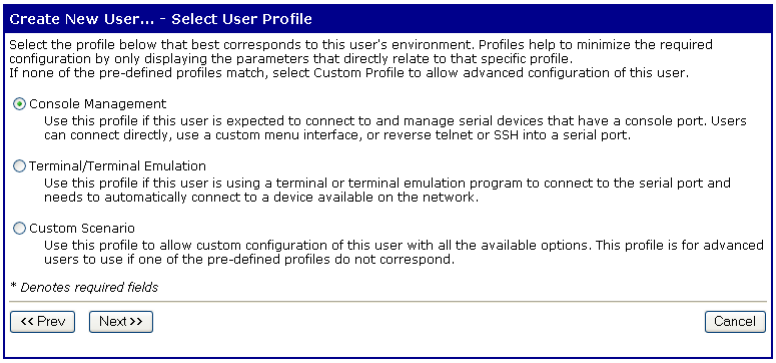
Common User Features

Feature	Description
autoconnect	Automatically connects the user to the host specified on the autohost field using the service (TCP port) defined on the autoport or autoservice fields. Autoconnection can also be implemented by port instead of by user.
Default access type	Defines the type of access the user is restricted to. Menu, command line, autoconnect, and outgoing and netservice are the types.
Menu access	Defines the menu that is to be presented to a user with menu access.
Port access	Defines the number of outbound ports a user connected over the LAN can access at one time. This feature is not configurable from the web interface.
PPP	Defines PPP-related parameters for the user.
Routing updates	Defines whether RIP routing updates are forwarded over the link to this user.

1. Click **Users** > **New User**
2. Enter the Username, password, and password confirmation and click Next.



3. Select the profile that fits the user's environment/needs and click Next.



4. Select the Ports to manage or the Autoconnect function if needed and click Next.
5. Review settings and click Finish.

   Note: The Advanced tab under User allows you to set Escape characters for Connect, Telnet, Rlogin, and Kill as well as an SSH Public Key.

6. Click Apply to save the settings.
7. Click **Reboot** for changes to take effect.

   Note: User attributes can be changed after the user is set up. Click User > the User's name. From here you can change the password, the access method, the menu, or verify the user's properties.

User Access Method

1. Set up the user as described in the previous procedure.
2. Click **Users** > the user name to assign access and select the access method or methods.
3. Select the ports for the user and click Apply.

   Note: From this screen, you may also change or update the users password. However, if the Admin password is lost, the only recovery is factory default reset. See "Resetting Configuration to Defaults" on page 62.

Security Configuration

Security settings allow the administrator to set passwords and security levels. Some services, such as Telnet and Rlogin, can be disabled for inbound users. This means that the users cannot access the Device Server using those services. This feature allows you to turn off individual services or to specify a security level, which means that all services not included in that level are turned off. The following services can be turned off.

- SSH

- Reverse SSH
- HTTPS
- HTTP
- SNMP
- RealPort
- Secure RealPort
- Secure Sockets
- Telnet
- Remote Login (RLogin)
- Remote Shell (RSH)
- Reverse TCP
- Reverse Telnet
- Line Printer Daemon (LPD)

Procedure

1. Click **Security** > and enter a new password for the root administrator.
2. Enter the confirmation password and click Apply.
3. Click **Network Security** and select the security level appropriate to your environment and click Apply.

   Note: Secure Access Levels -
   Secure: SSH is the only service available to inbound users.
   High: SSH, HTTP, SNMP, and RealPort services are available to inbound users.
   Normal: all services are available.
   Custom, which means you can select services to turn off.
   The default service level is Normal.

4. Click **Reboot** for changes to take effect.

System Configuration

System settings allow you to tune the performance optimizing throughput or latency, the date and time, PPP connections, SNMP traps, and Baud rates for MEI.

1. Click **System** and enter the System Description (network name assigned to the Device Server), Contact (SNMP contact person -often the network administrator), Location (text description of the physical location of the Device Server), and Optimization (bandwidth used on the network) and click Apply

   Note: Latency - Allows fast access to time-sensitive devices. Requires more network bandwidth.
   Throughput - Allows better network performance at higher throughput.

2. Click **Date/Time**

   Note: If you do not have Date/Time available, Click **Reboot**

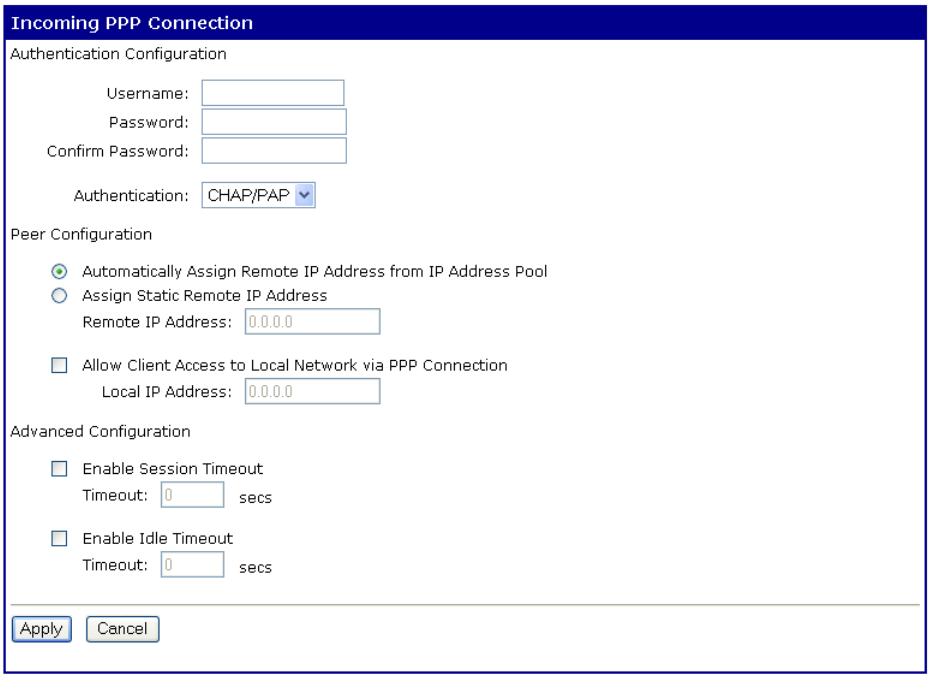
3. Enter the date and time information and click Apply.

4. Click **Reboot** for changes to take effect.

PPP Settings

Under System Configuration, users can set the PPP (Point-to-Point Protocol) options to enable or disable the dynamic IP address pool. The dynamic IP address pool is a set of reserved IP addresses unique to the network that are assigned to the incoming connections. Users set the first IP address to use and the number of sequential addresses (plus one) to be reserved for assignment.

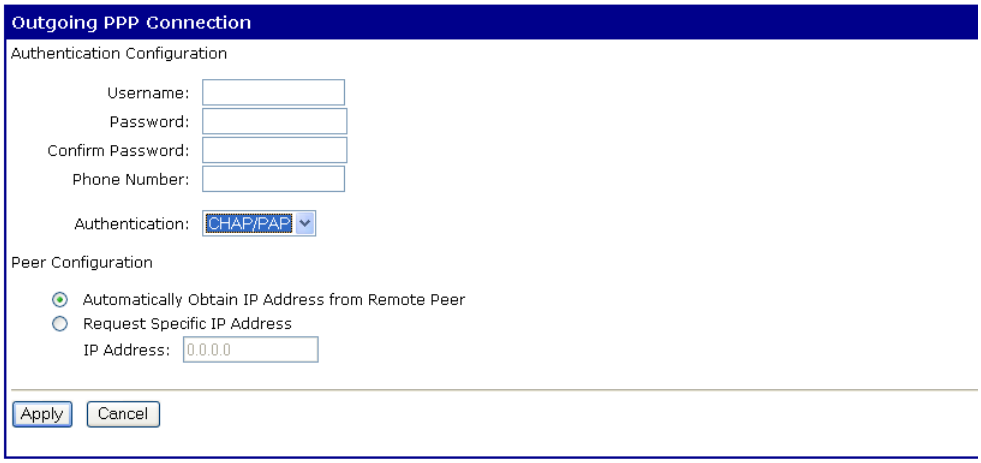
1. Click **PPP**.
2. If you are using PPP select Enable Dynamic IP Address Pool for Incoming Connections.
3. Enter the first reserved IP address of the incoming connections and the number of addresses to use and click Apply.
4. Click **Incoming Connections** > New Connection



5. Enter the appropriate parameters and click Apply.
6. Click **Reboot** for changes to take effect.

For outgoing connections, CHAP or PAP authentication, or password configuration, use the following procedure.

1. Click **Outgoing Connections**



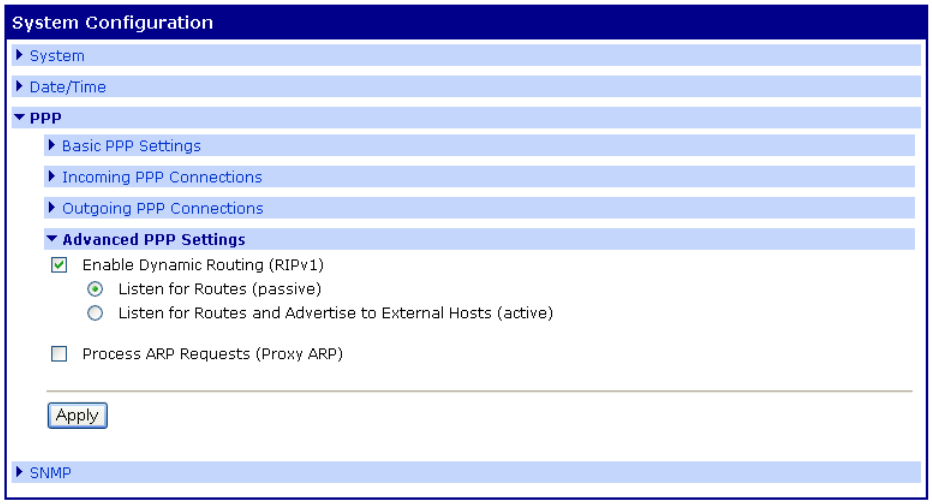
Note: CHAP authentication can be used to restrict PPP user access to outbound ports.

2. Enter the appropriate parameters and click Apply.
3. Click **Reboot** for changes to take effect.

For dynamic routing or proxy ARP settings follow the procedure for Advanced PPP settings.

4. Click **Advanced PPP** settings.

Note: Use the Help button for more information about configuring Advanced PPP settings.

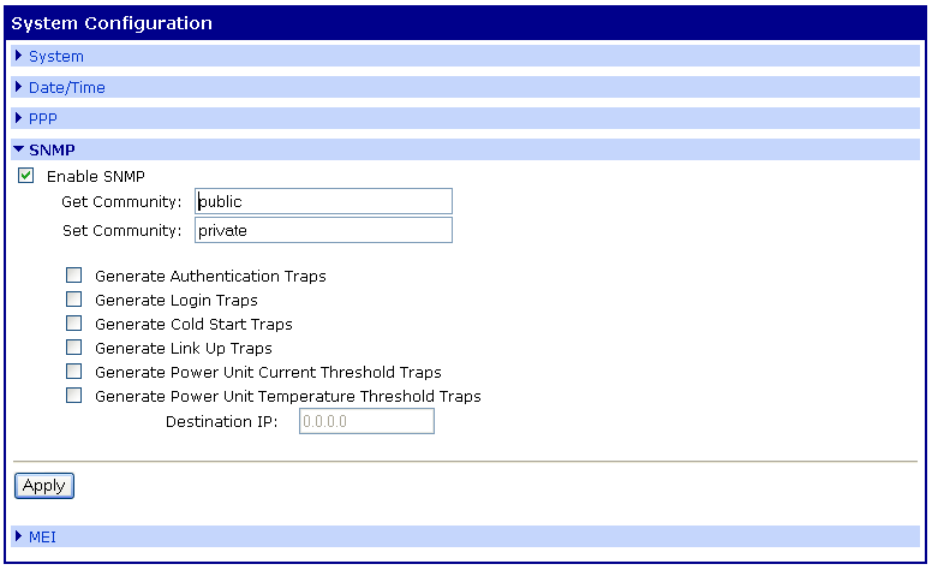


5. Select Enable Dynamic Routing (RIPv1)
6. Select the passive or active route setting.
7. Select the Process ARP requests if appropriate.
8. Click Apply.
9. Click **Reboot** for changes to take effect.

SNMP

1. Click **System** > **SNMP**

2. Select Enable SNMP.
3. Enter the community (public or private)



4. Select the type or types of traps you wish to enable.
5. Click Apply.

About Autoconnection

The autoconnection feature allows you to configure a user to access the device server and then be automatically connected to a host on the LAN.

You can implement autoconnection in the following ways:

- By port, where all port users are automatically connected to the same host. The device server is completely transparent to them.
- By user, where a user is required to log on and may be required to supply a password. Once the user is authenticated, an automatic connection to a host is made.

Configuring a Port for Autoconnection

1. Select **Serial Ports** under Configuration.
2. Click the TCP Sockets Port Profile.

   Note: TCP Sockets is the Autoconnection profile.

3. Click Apply.
4. Select Automatically establish TCP connections and the appropriate parameters. Use the Help button for addtional information.
5. Click Apply.
6. Click **Reboot** for changes to take effect.

   Note: To return to the main Ports menu, choose Ports from the Menu again.

Configuring a User for Autoconnection

1. Click **Users** from the menu.
2. Choose New User.
3. Enter a username and then click Next**.**
4. Select the “Terminal/Terminal Emulation” user profile and click Next
5. Select Automatically connect to a ...
   Be sure to specify the following:
   - Hostname or IP address that will be the destination
   - Service
   - Destination TCP port number, which determines the type of connection for this user (such as 23 for Telnet)
6. Click Next and Verify the settings.
7. Click Finish to save settings.

The next step in the device setup process is to configure RealPort (if needed.) This section provides a brief introduction to RealPort. If you use the wizard, it will determine (for you) if you need RealPort and a pop-up window with instructions for installing RealPort will appear.

About RealPort

What is RealPort?

RealPort is a feature that allows network-based host systems to use the ports of the Device Server as though they were the host system's own ports, appearing and behaving as local ports to the network-based host.

RealPort Advantages

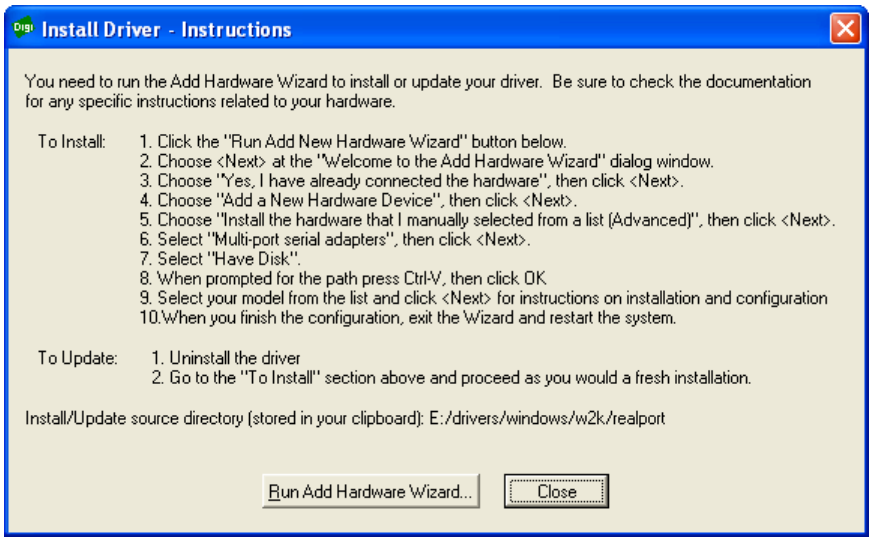
RealPort provides the following advantages:

- It expands the number of ports available to the host system.
- It enables Device Server ports to be treated as if they were directly connected to the host, which means they use all standard operating system interfaces that control baud rate, parity, stop bits, and flow control. The application 'thinks' it is working with a real serial port such as COM1.
- It enables host administrators to do most of the required configuration on the host, the system with which the administrator is most familiar.
- It dramatically reduces host CPU overhead because multiple terminal or printer sessions are multiplexed over the same TCP/IP connection.

Configuring the RealPort Software

You must install and configure RealPort software on each host that will use RealPort ports. See the RealPort documentation for more information.

1. From the CD, click **Software**. (If the wizard pops up, click **cancel**.)



2. From the Control Panel, click Add new hardware and follow the prompts listed above.

Modem Emulation

Modem emulation enables a system administrator to configure a networked Device Server to act as a modem. The Device Server emulates modem responses to a serial device and seamlessly sends and receives data over an Ethernet network instead of a PSTN (Public Switched Telephone Network). The advantage for a user is the ability to retain legacy software applications without modification and use a less expensive Ethernet network in place of public telephone lines.

To use a Device Server for modem emulation, do the following:

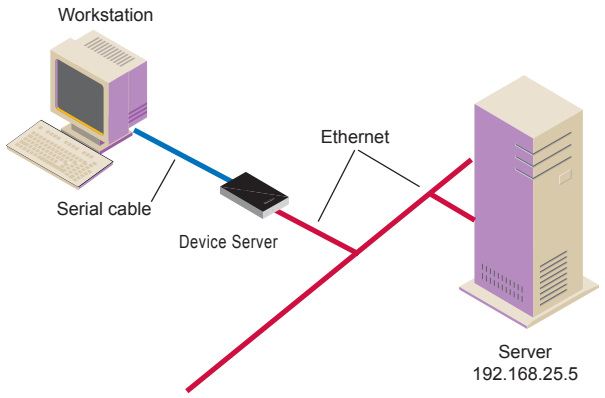
- Use a cable with the correct wiring pinouts (see "Modem Emulation Cable Signals" on page 40)
- Configure the serial ports and device type with the Web Interface serial port profile - Modem Emulation

Note: Before AT commands are accepted, DSR must go high on the Device Server.

Common User Scenarios

The Device Server in modem emulation mode allows for the easy replacement of modems in almost any environment where there is a LAN or WAN.

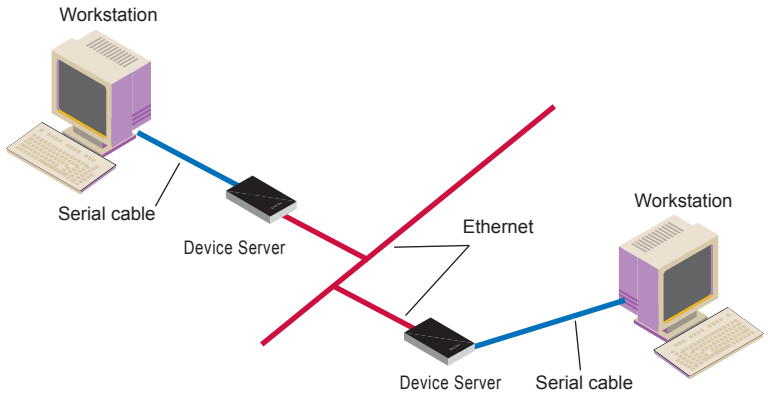
User Scenario - Diagram A



In Diagram A, the Device Server replaces a modem connected to a workstation running an application. The Device Server allows for the use of software applications without modification by responding to all the AT commands configured in the workstation application. The Device Server connects to the IP Address of the server when an `ATDT ipaddress:port` (`ATDT 192.168.25.5:50001`) command is issued. Once the remote device establishes the TCP connection, a CONNECT message is sent to the serial port and only then does the Device Server switch from AT command mode to data mode. Using the modem escape sequence or dropping DTR on either side terminates the connection. A DISCONNECT message will be sent to the

application if the remote side closes the TCP connection.

User Scenario - Diagram B



In Diagram B, two Device Servers will replace modems on both sides of the connection. The initiation of the connection occurs with either of the Device Servers. If both ends are Device Servers, the TCP listening port number is 50001 for port 1. An example of the connection command is `ATDT 192.168.25.30:50001`. Upon establishing a successful TCP connection, a CONNECT message is sent to the serial port and only then does the Device Server switch from AT command mode to data mode. After the CONNECT is received, the transmission of data begins. Using the modem escape sequence or dropping DTR on either side terminates the connection.

Modem Emulation Cable Signals

Use the following signal assignments to make a cable connecting the Device Server to a serial device.

Serial Device		Digi Device
CTS (in)	←	RTS (out)
RTS (out)	→	CTS (in)
DSR (in)	↔	DSR (in)
DTR (out)	↓	
DCD (in)	←	DTR (out)
TX (out)	→	RX (in)
RX (in)	←	TX (out)
GND	—	GND

DSR and DTR on the serial device side are connected to the DSR signal of the Device Server.

Scenarios for Modem Emulation

Outgoing Modem Emulation Connection

Serial device sends ATDx.x.x.x:y command, which triggers the Device Server to establish a telnet connection to destination IP=x.x.x.x, port=y.

Incoming Modem Emulation Connection

A device on the network telnets to port 50001 (50000+1 = 1st serial port). This incoming connection triggers the Device Server to generate a RING on the serial port. The device attached to the serial port will answer the RING and the connection is established.

Modem Emulation Pooling

This is a combination of Incoming Modem Emulation Connection and a hunt group. A device on the network telnets to port 50000. The Device Server checks if a serial port configured for modem emulation is available. If so, it connects to the port, otherwise returns an error.

Modem Emulation Bridge

A combination of Outgoing and Incoming Modem Emulation Connections, in which both serial devices require to talk to a modem. The first serial device telnets to the second device using ATDx.x.x.x:y, the second device gets a RING and accepts the incoming telnet connection.

Originating, Answering, and Disconnecting Calls

In the following table, an application requests a TCP session with the Device Server. The table displays the responses of the Device Server and application as they negotiate a TCP connection.

Application AT Command	Device Server Response	Notes
AT&F	OK.	AT command request to restore defaults to factory settings-Device Server responds OK.
ATDT *ipaddress:TCPport#*	Receives request to start a TCP session. CONNECT 115200.	Request to start TCP session with IP address and TCP port number of the Device Server-which then starts a TCP session
<P>+++<P>	OK	Escape sequence is sent <P> is Pause in seconds with "+++" being the escape sequence in ASCII characters - Device Server switches from AT command to data mode
ATH	NO CARRIER response sent	Disconnect AT command is sent-Device Server responds with NO CARRIER

In the following table, the Device Server receives a request for a connection.

AT Command	Device Server Response	Notes
	RING	The Device Server sends a Call Notification
ATA (or ATS0=n)	CONNECT 115200	Manual (ATA) or Auto Answer (ATS0=n) response-the Device Server sends a CONNECT message when the TCP session is started
	NO CARRIER	The Device Server sends a NO CARRIER message when the remote disconnects

Originating Calls

To send data to a Device Server, enter the following information for your application replacing the telephone number with the Device Server's IP address and TCP port number. Enter the following command:

`ATDT ipaddress:tcp_port#`

an example is `ATDT 146.135.13.5:50001`

Answering Calls

The Device Server listens on a pre-defined TCP port to receive data. When the Device Server receives a call notification (RING) through a serial port to begin a TCP connection, it needs to reply with an ATA or a pre-configured Auto-Answer to answer the call.

Note: The TCP ports assigned to the serial ports are as follows:
Serial port 1 listens on TCP port 50001
Serial port 2 listens on TCP port 50002
Serial port 3 listens on TCP port 50003
Serial port 4 listens on TCP port 50004

Disconnecting Calls

The TCP connection disconnects by either dropping the DTR signal on the serial port or sending the escape sequence <P>+++<P> to the Device Server. <P> represents a one second pause.

Disconnecting Calls-Device Server

The Device Server sends a NO CARRIER response to the serial port when the network connection is dropped.

Modem Emulation AT Command Set

AT Command	Function	Result Code
ATA	Answer command: The Device Server will go off hook and answer a TCP connection request.	

<table>
<tr><th>AT
Command</th><th>Function</th><th>Result
Code</th></tr>
<tr><td>ATD<IP>
:
<TCP
PORT></td><td>This command directs the Device Server to go on-line, dial according to the IP address entered as follow 191.1.2.3:12 and attempt to establish a TCP connection. If no dial string is supplied, the Device Server will respond no dial tone.
Note: If the ATD command is issued before the S1 register has cleared, the modem will respond with the NO CARRIER result code.
Dial Modifiers. The valid dial string parameters are described below. Punctuation characters may be used for clarity with parentheses, hyphen, and spaces being ignored.<table>
<tr><td>0-9</td><td>DTMF digits 0 to 9.</td></tr>
<tr><td>.</td><td>Dot notation used for IP addresses.
IP addresses are written as four numbers separated by periods, where the first number is between 1 and 255 and the other three numbers are between 0 and 255. Retype the IP address in the format xxx.xxx.xxx.xxx .</td></tr>
<tr><td>:</td><td>Colon notation used for the TCP port</td></tr>
<tr><td>L</td><td>Re-dial last number: the modem will re-dial the last valid telephone number. The L must be immediately after the D with all the following characters ignored.</td></tr>
<tr><td>P</td><td>This command is accepted, but not acted on.</td></tr>
<tr><td>T</td><td>This command is accepted, but not acted on.</td></tr>
<tr><td>R</td><td>This command is accepted, but not acted on.</td></tr>
<tr><td>S=n</td><td>Dial the number stored in the directory (n=0 to 3). (See &Z.)</td></tr>
<tr><td>,</td><td>Dial pause: the modem will pause for a time specified by S8 before dialing the digits following “,”.</td></tr>
<tr><td>-</td><td>Ignored: may be used to format the dial string.</td></tr>
<tr><td><space></td><td>Ignored: may be used to format the dial string.</td></tr>
<tr><td><I></td><td>Invalid character: will be ignored.</td></tr>
</table></td><td></td></tr>
<tr><td>ATEn</td><td>Command echo. The Device Server enables or disables the echo of characters to the DTE according to the parameter supplied. The parameter value, if valid, is written to S14 bit 1.
E0 : Disables command echo
E1 : Enables command echo</td><td>OK n=0 or 1
ERROR
Otherwise</td></tr>
<tr><td>ATH</td><td>Disconnect (Hang up) command
This command initiates a hang up sequence.
H0 : Disconnect the TCP session if the modem is currently on line.
H1 : If on-hook, the Device Server will go off-hook and enter command mode.</td><td>OK n=0 or 1
ERROR
Otherwise</td></tr>
<tr><td>ATIn</td><td>Identification command
I0 reports product code. Example: Device Server
I1 reports 255
I2 reports “OK”
I3 reports “OK”
I4 reports Device_Server
I5 reports “OK”
I6 reports “OK”
I7 reports “OK”
I8 reports “ERROR”
I9 reports “ERROR”</td><td>OK n=0 or 9
ERROR
Otherwise</td></tr>
</table>

AT Command	Function	Result Code
ATLn	Accepted but ignored.	OK n=0 or 3 ERROR Otherwise
ATMn	Accepted but ignored.	OK n=0 or 3 ERROR Otherwise
ATNn	Accepted but ignored.	OK n=0 or 1 ERROR Otherwise
ATOn	Return to On-Line Data Mode. This command determines how the modem will enter the on-line data mode. If the modem is in the on-line command mode, the modem enters the on-line data mode. If the modem is in the off-line command mode (no connection), ERROR is reported. O0Enters on-line data mode. Handling is determined by the Call Establishment task. Generally, if a connection exists, this command connects the DTE back to the remote modem after an escape (+++). O1Same as above	OKn = 0 or 1 and a connection exists. ERROR Otherwise or if not connected.
ATP	Accepted but ignored.	OK
ATQn	Quiet Results Codes Control command. The command enables or disables the sending of the result codes to the DTE according to the parameter supplied. The parameter value, if valid, is written to S14 bit 2. Q0 Enables result code to the DTE (Default). Q1 Disables result code to the DTE	OK n=0 or 1 ERROR Otherwise
ATSn	Read/Write S- Register. n Establishes S-register n as the last register accessed n=v Sets S-Register n to the value v. n? Reports the value of S-Register n.	
ATT	Accepted but ignored..	OK
ATVn	Result Code Form. This command selects the sending of short-form or long-form codes to the DTE. The parameter, if valid, is written to S14 bit 3. V0 Enables short-form (terse) result codes. Line feed is not issues before a short-form result. V1 Enables long-form (verbose) results codes (Default).	OK n=0 or 1 ERROR Otherwise
ATWn	Accepted but ignored.	OK n=0 to 3 ERROR Otherwise
ATXn	Accepted but ignored.	OK n=0 to 3 ERROR Otherwise
ATYn	Accepted but ignored.	OK n=0 or 1 ERROR Otherwise
ATZn	Accepted but ignored. (Soft Reset and restore Profile).	OK n=0 or 1 ERROR Otherwise

AT Command	Function	Result Code
AT&Cn	DCD Option. The Device Server controls the DCD output in accordance with the parameter supplied. The parameter value, if valid is written to S21 bit 5. &C0 DCD remains ON at all times. &C1 DCD follows the state of the connection	OK n=0 or 1 ERROR Otherwise
AT&Dn	DTR Option. This command interprets the ON to OFF transition of the DTR signal from the DTE in accordance with the parameter supplied. The parameter value, if valid, is written to S21 bits 3 and 4. Also see S25. &D0 -DTR is ignored (assumed ON). Allows operation with DTEs which do not provide DSR. &D1DTR drop is interpreted by the modem as if the asynchronous escape sequence had been entered. The modem returns to asynchronous command state without disconnecting. &D2DTR drop causes the modem to hang up. Auto-answer is inhibited. (Default.) &D3DTR drop causes the modem to perform a soft reset as if the Z command were received. The &Y setting determines which profile is loaded.	OK n=0 to 3 ERROR Otherwise
AT&Fn	Restore Factory Configuration (Profile) The device loads the factory default configuration (profile). The factory defaults are identified for each command and in the S-Register descriptions. A configuration (profile) consists of a subset of S-Registers. &F0Restore factory configuration 0. &F1Restore factory configuration 1.	OK n=0 or 1 ERROR Otherwise
AT&Jn	Accepted but ignored.	OK n=0 or 1 ERROR Otherwise
AT&Gn	Accepted but ignored.	OK n=0 or 1 ERROR Otherwise
AT&Jn	Accepted but ignored.	OK n=0 or 1 ERROR Otherwise
AT&Kn	Flow control. This command defines the DTE/DCE flow control mechanism. The parameter value, if valid, is written to S39 bits 0, 1, and 2. &K0 Disables flow control &K3 Enables RTS/CTS flow control (Default) &K4 Enables XON/XOFF flow control &K5 Enables transparent XON/XOFF flow control &K6 Enables both RTS/CTS and XON/XOFF flow control.	OK n=0,3,4,5,or 6 ERROR Otherwise
AT&Ln	Accepted but ignored.	OK n=0, 1, 2 ERROR Otherwise
AT&Mn	Accepted but ignored.	OK n=0, 1, 2 ERROR Otherwise
AT&Pn	Accepted but ignored.	OK n=0, 1, 2 ERROR Otherwise

AT Command	Function	Result Code
AT&Qn	Accepted but ignored.	OK n=0 to 8 ERROR Otherwise
AT&Rn	RTS/CTS Option This selects how the Device Server controls CTS. CTS is modified if hardware flow control is selected (see &K command). The parameter value, if valid, is written to S21 bit2. &R0CTS reflects the ability of the modem to transmit data. For example, CTS will drop during retrains. In sync mode, CTS tracks the state of RTS; the RTS-to-CTS delay is defined by S26. In async mode, CTS is normally ON and will turn OFF only if required by flow control. &R1CTS forced on (default). In sync mode, CTS is always ON (RTS transitions are ignored). tracks the state of RTS. In async mode, CTS is normally ON and will turn OFF only if required by flow control. &R2CTS follows RTS.	OK n=0 or 1 ERROR Otherwise
AT&Sn	DSR Override This command selects how the modem will control DSR. The parameter value, if valid, is written to S21 bit 6. &S0DSR will remain ON at all times. (Default.) &S1DSR will become active after answer tone has been detected and inactive after the carrier has been lost.	OK n=0 or 1 ERROR Otherwise
AT&Tn	Accepted but ignored.	OK n= 0 ERROR Otherwise
AT&V	Display Current Configuration and Stored Profiles **There is no NVRAM support currently.**	OK
AT&Vn	Accepted but ignored.	OK n=0 to 5 ERROR Otherwise
AT&V6	Display current IP settings of the device	OK
AT&Wn	Accepted but ignored.	OK n=0 or 1 ERROR Otherwise
AT&Xn	Accepted but ignored.	OK n=0 or 1 ERROR Otherwise
AT&Yn	Accepted but ignored.	OK n=0 or 1 ERROR Otherwise
AT&Zn	&Zn=x - Store Telephone Number. Currently not supported	OK n=0 or 3 ERROR Otherwise
AT\An	Accepted but ignored.	OK n=0 to 3 ERROR Otherwise
AT\Gn	Accepted but ignored.	OK n=0 or 1 ERROR Otherwise

AT Command	Function	Result Code
AT\Kn	Accepted but ignored.	OK n=0 to 5 ERROR Otherwise
AT\Nn	Operating Mode This command controls the preferred error correcting mode to be negotiated in a subsequent data connection. \N0 Selects normal speed buffered mode \N1 Serial interface selected - Selects direct mode \N2 Accepted but ignored. \N3 Accepted but ignored. \N4 Accepted but ignored. \N5 Accepted but ignored.	OK n=0 to 5 ERROR Otherwise
AT\Vn	Accepted but ignored.	OK n=0 or 1 ERROR Otherwise
AT+MS	Accepted but ignored.	OK
AT+MI	Accepted but ignored.	OK
AT%Cn	Accepted but ignored.	OK n=0 to 3 ERROR Otherwise

S-Registers

Register	Function	Range	Units	Saved	Default
S0	Rings to Auto-Answer Sets the number of rings required before the Device Server automatically answers a call. Setting this register to Zero disables auto-answer mode.	0-255	Rings	*	0
S1	Ring Counter S1 is incremented each time the modem detects a ring signal on the telephone line. S1 is cleared if no rings occur over an eight second interval.	0-255	Rings		0
S2	Escape Character S2 holds the decimal value of the ASCII character used as the escape character. The default value corresponds to an ASCII '+'. A value over 127 disables the escape process, i.e., no escape character will be recognized.	0-255	ASCII	*	43
S3	Carriage Return Character Sets the command line and result code terminator character. Pertains to asynchronous operation only.	0-127	ASCII		13
S4	Line Feed Character Sets the character recognized as a line feed. Pertains to asynchronous operation only. The Line Feed control character is output after the Carriage Return control character if verbose result codes are used.	0-127	ASCII		10
S5	Backspace Character Sets the character recognized as a backspace. Pertains to asynchronous operation only. The modem will not recognize the Backspace character if it is set to a value that is greater than 32 ASCII. This character can be used to edit a command line. When the echo command is enabled, the modem echoes back to the local DTE the Backspace character, an ASCII space character and a second Backspace character; this means a total of three characters are transmitted each time the modem processes the Backspace character.	0-32	ASCII		8
S6	Accepted but ignored.	2-255	s	*	2
S7	Accepted but ignored.	1-255	s	*	50
S8	Accepted but ignored.	0-255	s	*	2
S9	Accepted but ignored.	1-255	0.1 s	*	6
S10	Accepted but ignored.	1-255	0.1 s	*	14
S11	Accepted but ignored.	50-255	0.001 s	*	95
S12	Escape Prompt Delay Defines the maximum period, in fiftieths of a second, allowed between receipt of the last character of the three escape character sequence from the DTE and sending of the OK result code to the DTE. If any characters are detected during this time, the OK will not be sent. Note that sending of the OK result code does not affect entry into command mode.	0-255	0.02 s	*	50

Register	Function	Range	Units	Saved	Default
S13	Reserved	-	-		-
S14	General Bit Mapped Options Status Indicates the status of command options. Default:138 (8Ah) (10001010b) Bit 0This bit is ignored. Bit 1Command echo (En) 0 =Disabled (E0) 1 =Enabled (E1) (Default.) Bit 2Quiet mode (Qn) 0 =Send result codes (Q0) (Default.) 1 =Do not send result codes (Q1) Bit 3Result codes (Vn) 0 =Numeric (V0) 1 =Verbose (V1) (Default.) Bit 4Reserved Bit 5Tone (T)/Pulse (P) 0 =Tone (T) (Default.) 1 =Pulse (P) Bit 6Reserved Bit 7Originate/Answer 0 =Answer 1 =Originate (Default.)			*	138 (8Ah)
S15	Reserved	-	-		-
S16	Accepted but ignored.	-	-		0
S17	Reserved	-		-	-
S18	Accepted but ignored.	0-255	s	*	0
S19	Accepted but ignored.	-	-		0
S20	Accepted but ignored.	0-255	-	*	0

Register	Function	Range	Units	Saved	Default
S21	General Bit Mapped Options Status Indicates the status of command options. Default:52 (34h) (00110100b) Bit 0Set by &Jn command but ignored otherwise. 0 =&J0 (Default.) 1 =&J1 Bit 1Reserved Bit 2CTS behavior (&Rn) 0 =CTS tracks RTS (&R0) 1 =CTS always on (&R1) (Default.) Bits 3-4DTR behavior (&Dn) 0 =&D0 selected 1 =&D1 selected 2 =&D2 selected (Default.) 3 =&D3 selected Bit 5RLSD (DCD) behavior (&Cn) 0 =&C0 selected 1 =&C1 selected (Default.) Bit 6DSR behavior (&Sn) 0 =&S0 selected (Default.) 1 =&S1 selected Bit 7Long space disconnect (Yn) 0 =Y0 (Default.) 1 =Y1	-	-	*	52 (34h)
S22	Accepted but ignored.	-	-	*	117 (75h)

Register	Function	Range	Units	Saved	Default
S23	General Bit Mapped Options Status Indicates the status of command options. Default:62 (3Dh) (00111110b) Bit 0Grant RDL 0 =RDL not allowed (&T5) (Default.) 1 =RDL allowed (&T4) Bits 1-3DTE Rate 0 =0 - 300 bps 1 =600 bps 2 =1200 bps 3 =2400 bps 4 =4800 bps 5 =9600 bps 6 =19200 bps 7 =38400 bps or higher (Default.) Bits 4-5Assumed DTE parity 0 =even 1 =not used 2 =odd 3 =none (Default.) Bits 6-7not action applied			*	62 (3Dh)
S24	Accepted but ignored.	0-255	s	*	0
S25	Delay to DTR Off Sets the length of time that the modem will ignore DTR for taking the action specified by &Dn. Its units are seconds for synchronous modes and one hundredths of a second for other modes	0-255	s or 0.01 s		5
S26	RTS-to-CTS Delay Sets the time delay, in hundredths of a second, before the modem turns CTS ON after detecting an OFF-to-ON transition on RTS when &R0 is commanded. Pertains to synchronous operation only.	0-255	0.01 s		1
S27	General Bit Mapped Options Status	-	-	*	73 (49h)
S28	Accepted but ignored.	-	-	*	0
S29	Accepted but ignored.	0-255	10 ms		70
S30	Accepted but ignored.	0-255	10 s		0
S31	Accepted but ignored.	-	-	*	194 (C2h)
S32	XON Character	0-255	ASCII		17 (11h)
S33	XOFF Character	0-255	ASCII		19 (13h)
S34	S35 Reserved	-	-		-
S36	Accepted but ignored.	-	-	*	7

Register	Function	Range	Units	Saved	Default
S37	General Bit Mapped Options Status Telnet support for modem emulation. Default:0 Bit 0-1 Send TCP transmit data timer 0 = 100ms 1 = 200 ms 2 = 300 ms 3 = 500 ms Bits 2-3 Service TCP transmit data watermark 0 = 256 1 = 512 2 =768 3 =1024 Bits 4-5 Service TCP receive data watermark 0 = 256 1 = 512 2 =768 3 =1024 Bits 6-7 Telnet support (RFC 2217) 0 = Disabled 1 = Receive Telnet support enabled 2 = Transmit Telnet support enabled 3 = Receive and Transmit Telnet support enabled	-	-	*	0
S38	Accepted but ignored.	0-255	s		20
S39	Flow Control Bit Mapped Options Status Default:3 (00000011b) Bits 0-2Status of command options 0 =No flow control 3 =RTS/CTS (&K3) (Default.) 4 =XON/XOFF (&K4) 5 =Transparent XON (&K5) 6 =Both methods (&K6) Bits 3-7Reserved	-	-	*	3
S40	Accepted but ignored.	-	-	*	104 (68h)
S41	Accepted but ignored.	-	-	*	195 (C3h)
S42 - S45	Reserved	-	-		-
S46	Accepted but ignored.	-	-	*	138
S48	Accepted but ignored.	-	-	*	7
S82	Accepted but ignored.	-	-		128(40h)
S86	Accepted but ignored.	0-255	-		-

Register	Function	Range	Units	Saved	Default
S91	Accepted but ignored.	0-15	dBm		10 (Country dependent)
S92	Accepted but ignored.	0-15	dBm		10 (Country dependent)
S95	Accepted but ignored.	-	-	*	0
* Register value may be stored in one of two user profiles with the &W command.					

Result Codes

Short	Long Form		Short	Long Form		Short	Long Form
0	OK		13	CONNECT 7200		84	CONNECT 33600
1	CONNECT		14	CONNECT 12000		91	CONNECT 31200
2	RING		15	CONNECT 14400		165	CONNECT 32000
3	NO CARRIER		16	CONNECT 19200		166	CONNECT 34000
4	ERROR		17	CONNECT 38400		167	CONNECT 36000
5	CONNECT 1200		18	CONNECT 57600		168	CONNECT 38000
6	NO DIALTONE		19	CONNECT 115200		169	CONNECT 40000
7	BUSY		20	CONNECT 230400		170	CONNECT 42000
8	NO ANSWER		59	CONNECT 16800		171	CONNECT 44000
9	CONNECT 0600		61	CONNECT 21600		172	CONNECT 46000
10	CONNECT 2400		62	CONNECT 24000		173	CONNECT 48000
11	CONNECT 4800		63	CONNECT 26400		174	CONNECT 50000
12	CONNECT 9600		64	CONNECT 28800			

Chapter 6 Special Features: Power Over the Serial Ports

Serial Power Feature

The Serial Power feature available for the 2-Port Device Server and 4-Port Device Server allows you to power a serial device (power out) or use a serial device to power the Device Server (power in). The advantage of this feature is to eliminate an external power supply.

Power out is available on all ports through Ring Indicator (RI) or Data Terminal Ready (DTR). Power in is available only through RI and **only** on port one (1). The Serial Power feature is active on a specific port when that port is configured for RS 232 operation.

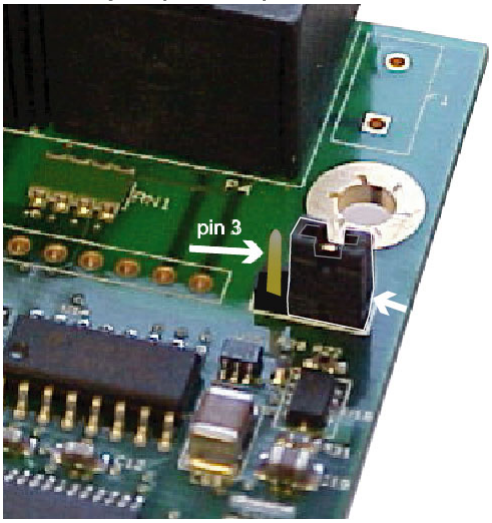
- The power out budget equals one (1) watt (the total amount of power available). The available power can be divided in any combination between the ports but the following rules must be observed:
  - RI = 5 volts @ up to 200 mA (max)
  - DTR = 9 volts @ up to 100 mA (max)
  - You may use DTR or RI as the source of power (power out) on any port but you may not use both DTR and RI on the same port.
- Pinout information
  - RI is pin 1
  - DTR is pin 9
- RI signaling is lost when the pin is used for power

Configuring RI Power

RI Power In

Ring Indicator (RI) power in accepts power into the Device Server **only** on port one. Power in is available using the RI pin. The Device Server requires power in the range of 9-30 VDC @ 525mA (max). Ports 2, 3, and 4 can still supply power to a serial device through the RI or DTR pins for each port. When using power in through the RI, the external power supplies (both powered Ethernet and the barrel connector power supply) are inoperative. Altpin will not work for RI power in.

1. Open the device case and move the black jumper to the following settings:
   P-6 jumper on pins 1 and 2



Note When the jumper is placed correctly for power in, the jumper will set on the pins closest to the edge of the board. The left arrow indicates the open pin and the right arrow is pointing to the jumper.

2. Close the device unit enclosure.

RI Power Out

Ring Indicator (RI) power out is available on all ports. The total power budget for this feature is one (1) watt not to exceed 5 volts @ up to 200mA on any single port. The following procedure assumes the unit will only be used for RI power out.

1. Set the port DIP switches to the following places: switch 1 and 3 are up and 2 and 4 are down (see "Serial Power Table" on page 57 for illustration).
2. Enable the RI power through the web interface.
3. Connect power supply with the barrel-connector power supply provided with the device or use powered Ethernet.

   Note: If the unit will be used with RI power in (port 1 only), set the jumper to the following setting:
   P-6 jumper on pins 1and 2
   and do not use an external power source. Port 1 cannot be used for both power in and power out.

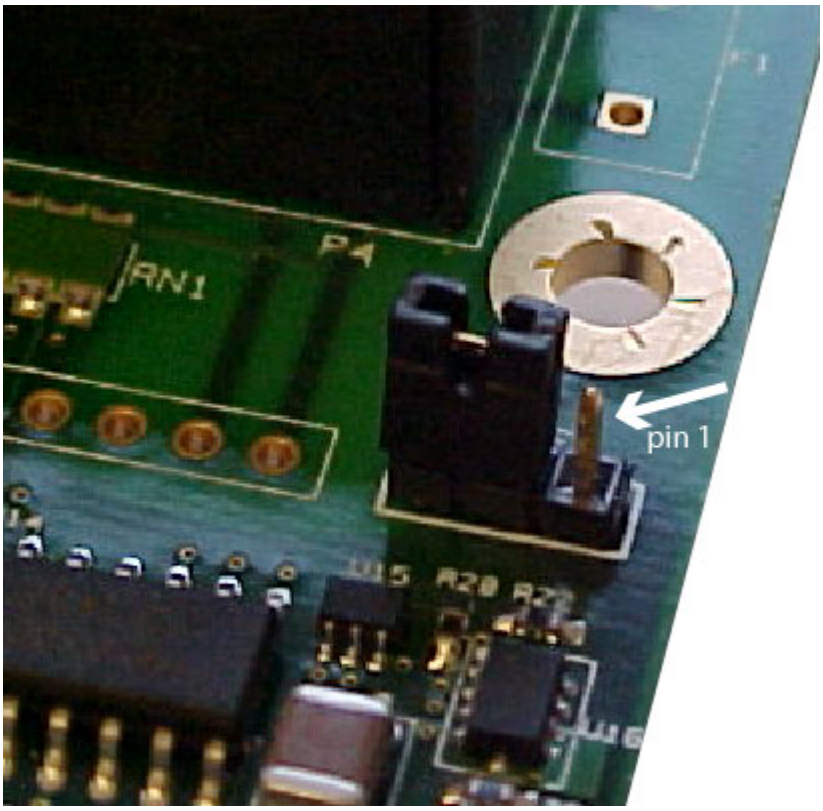
Configuring DTR Power

Power Out

Data Terminal Ready (DTR) power out is the factory default on the Device Server. Total power budget for this feature is one (1) watt not to exceed 9 volts @ up to 100mA to any single port.

1. Set the port DIP switches to EIA 232 (switch 1 is up, 2, 3, and 4 are down) to enable DTR power.

2. Open the port and set DTR high.



Note Here are the pins to verify the jumper position. The **default** position has the jumper on the two pins furthest from the edge. DO NOT MOVE THE JUMPER FROM THE DEFAULT UNLESS USING RI POWER IN.

If you are having trouble with your unit after using the Power over port feature, you may have tripped the circuit breaker in the unit. You can identify this by the RI or DTR signal indicators found in the System Information under Administration on the main menu in the web interface. Click the port number using serial power. (Remember serial power out is unavailable if the MEI settings are not 232.)

Under serial power will be a message if the breaker is tripped. Follow the instructions to reset.

From the command line use the two examples below for additional information.

```
display circuitbreaker
```

Display the status of the circuit breaker

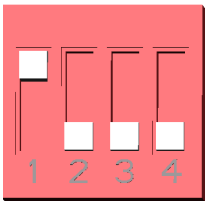
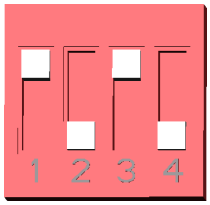
```
set config circuitbreaker=reset
```

Reset the circuit breaker

Note: set config will also give the status of the circuitbreaker state.

Serial Power Table

Use this table for summary information for a serial power setup.

Quick Summary Table for Setup of Serial Power	DTR Power	RI Power	
	OUT	OUT	IN
Switch Settings			
DTR setting	DTR ON	DTR OFF	DTR OFF
Ports Allowed	1, 2, 3, 4	1*, 2, 3, 4 *unless port 1 is used for power in	1
Jumper Pin Settings	P-6 jumper on pins 2 & 3 (Factory Default)	P-6 jumper on pins 2 & 3 (Factory Default)	P-6 jumper on pins 1 & 2
Power Budget	9v @ up to 100mA one watt	5v @ up to 200 mA one watt	9 -30 v @ up to 525mA (max)

This chapter describes configuring SNMP, the network management protocol that governs the exchange between nodes and stations.

About SNMP and the Device Server Agent

This section introduces SNMP and network management in TCP/IP networks and it describes the device server agent. It discusses the following:

- Network management components
- SNMP agent
- SNMP traps
- MIB (management information base) support of the Device Server agent
- Support traps of the Device Server agent

Network Management Components

The TCP/IP network management architecture contains the following components:

- Managed nodes such as host systems, routers, terminal and communications servers (such as device server) and other network devices.
- One or more network managers (also called network management stations), which are the points from which the network is managed
- Agents that reside on managed nodes and retrieve management information and communicate this information to network managers.
- The network management protocol, SNMP, which governs the exchange of information between the nodes and stations.
- Management information, which is the database of information about managed objects. This database is called the *management information base* (MIB).

SNMP Management Agent

Each managed node contains at least one agent—a component that responds to requests from the network manager—that retrieves network management information from its node and notifies the manager when significant events occur.

SNMP Traps

An ‘eventing’ mechanism defined by SNMP is called a trap, which is a report or “alarm” from a managed node to an SNMP manager that a significant event has occurred.

MIB Support

The SNMP management agent supports the following MIBs:

- Read-write for MIB II (RFC 1213), which is an Internet-standard MIB, consisting of managed objects from the systems, interfaces, IP, ICMP, TCP, UDP, transmission, and SNMP group
- Read-write for the character-stream devices using SMIv2 MIB (RFC 1658)
- Read-write for the RS-232-like hardware devices MIB (RFC 1659)
- Read-write for the device server IP Network Control Protocol of the Point-to-Point Protocol MIB (RFC 1473)

Message Support

The SNMP agent supports the Set, Get, GetNext, and Trap messages as defined in RFC 1157. These messages are used as follows:

- Set, which means set the value of a specific object from one of the supported MIBs
- Get, which means retrieve the value of a specific object form one of the supported MIBs
- GetNext, which means retrieve the value of the next object in the MIB
- Trap, which means send traps to the manager when a particular type of significant event occurs

Supported Traps

The agent can send traps when any of the following occur:

- Cold starts (device server initializes)
- Authentication failures
- Login attempts

Configuration Procedure: Web Interface

1. Click **SNMP** under System from the menu.
2. Fill in the configuration fields and click Apply to save settings.
3. Click **Reboot** for changes to take effect.

Chapter 8 Configuration Management

This chapter describes configuration management activities, including firmware upgrades and restoring the device configuration to defaults.

Upgrading the Firmware

Firmware upgrades can be performed from the web interface, using TFTP.

TFTP Upgrade Procedure

If your hardware is connected correctly, make sure you are running the latest firmware version available.

1. Download a copy of the firmware file.
2. Access the Device Server's web interface by entering the Device Server's IP address in a browser's URL window and log on (User Name **`root`**, Password **`dbps`**).
3. Choose **Update Firmware** under Administration from the main menu.
4. Browse to the location on your system where the firmware has been saved, select the correct file, and click Update.
5. Reboot the device when prompted.
6. Access the Device Server's web interface and verify on the Information Page that the Firmware version has been successfully updated.

Do not leave your browser until you are prompted to reboot.

Copying the Configuration to and from a Remote Host

You can copy the configuration to a remote host and from a remote host, which means you can configure the Device Server remotely by entering commands in a text file and then copying the file to the Device Server.

When To Use Remote Configuration

Typically, you use remote configuration when you have several device servers with similar configurations and want to keep a master configuration on a remote host, from which you can easily create variations for downloading to individual device servers.

Download Procedure

1. Access the web interface by entering the Device Server's IP address in a browser's URL window.
2. Log on to the Device Server as **`root`**. The default password is **`dbps`**.
3. From the main menu, choose **Backup/Restore** > Backup.
4. Enter the location to save the file and click Save.
5. Access the device to configure.
6. Enter the location of the configuration file saved in step 4 and click Open.
7. Click **Backup/Restore** > **Restore**.

TFTP Procedure for Backup or Restore

1. Ensure that TFTP is running on the remote host.
2. Access the web interface by entering the Device Server's IP address in a browser's URL window.
3. Log on to the Device Server as **root**. The default password is **dbps**.
4. From the main menu, choose **Backup/Restore** > **TFTP Server**.
5. Enter the name of the file and the IP address of the TFTP server and click Backup (to save the file) or Restore (to apply the file).

Resetting Configuration to Defaults

To reset the configuration to defaults, follow these steps:

Note: The reset procedure causes the Device Server to lose all configuration changes including IP settings. If you have a complex configuration, contact Black Box before performing for information on saving your configuration. See "Reference and Certifications" on page 63 for information.

1. Use a pen, the point of a paper clip, or some other device to press the recessed button on the front panel. Although the object used to access the reset button must be pointed, be sure it is not sharp or it may damage the reset button.
2. While holding down the button, power on the Device Server.
3. When the 1-5-1 LED pattern is displayed, release the button.

   Note: It may take approximately two minutes for the device to boot up.

The device boots up.

Interpreting the LEDs

LEDs

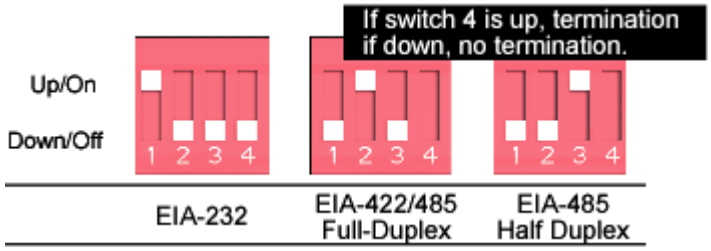
LED		Color	State	Indicates
Power LEDs	Power (labeled PWR)	Green	On	Power detected
			Steady blinking	Waiting for an IP address or seeking an IP address from a DHCP server
			Blinking 1-1-1	Starting the EOS
		Single-Port PWR LED is red	Blinking 1-3-1	Starting the TFTP process
			Blinking 1-5-1	Configuration returned to factory defaults
			Blinking 9-1-1	Contact Tech Support for help.
			Off	No power detected
Ethernet LEDs	Link (labeled Link)	Green	On	Physical network detected
			Off	No physical network detected
	ACT (labeled ACT)	Yellow	On	Bad initialization
			Off	Ready
			Blinking	Network activity

Note: For the 2-Port and 4-Port Device Servers, if LED activity is solid it means the boot completed successfully.

2-Port and 4-Port Device Server EIA 232/422/485 Switch Settings

Note: MEI Switch settings apply only to devices with external MEI switches.

Function	Switch Settings			
	1	2	3	4
EIA-232	Up	Down	Down	Down
EIA-422/485 Full-duplex	Down	Up	Down	If up, termination. If down, no termination
EIA-485 half-duplex	Down	Down	Up	



RJ-45 Pinouts

RJ-45 Pin	EIA-232	EIA-422/485 Full-Duplex	EIA-485 Half-Duplex
1	RI	TxD-	TxD-
2	DSR	RxD-	RxD-
3	RTS	RTS+	NA
4	GND	GND	GND
5	TxD	TxD+	TxD+
6	RxD	RxD+	RxD+
7	SG	SG	SG
8	CTS	CTS+	NA
9	DTR	RTS-	NA
10	DCD	CTS-	NA

Safety Statements

WARNING: To prevent electric shock, do not remove the cover of this module while unit is powered up. There are no user-serviceable parts inside. Refer servicing to qualified personnel.

Specifications

Power Requirements

<table>
<tr><th>Product</th><th colspan="2">Typical Power Consumption DC Current @ 120 Vac (mA)</th><th>Max Power Consumption (watts)</th><th>Recommended Power Supply Input Rating (watts)</th></tr>
<tr><td>• 2-Port Device Server
• 4-Port Device Server</td><td colspan="2">4W @ 330mA</td><td>12W (1A @ 12Vdc)</td><td>42W (120V * .35A)
External power supply provided with product purchase</td></tr>
<tr><td>• Single-Port Device Server</td><td colspan="4">Device is intended to be powered by a listed LPS or Class II power supply rated 9-30 VDC (barrel connector), 0.37 A minimum or its equivalent..</td></tr>
<tr><td>• 2-Port Device Server
• 4-Port Device Server</td><td>  </td><td colspan="3">Power over Ethernet IEEE 802.3af compliant</td></tr>
</table>

Physical Requirements

Attributes	2-Port Device Server 4-Port Device Server	Single-Port Device Server
Ambient Temperature	0-50° C 32-122° F	10 - 45°C 50-113°F
Relative humidity	5%-90% non-condensing	
Altitude	0 to 12,000 feet 0 to 3,658 meters	
Length	13.31cm 5.42 in	9.4 cm 3.7 in.
Width	8.46 cm 3.3 in	4.3 cm 1.72 in.
Height	2.42 cm .952 in	2.3 cm 0.93 in.
Weight	189.9 g 6.1oz	59.5 g 2.1 oz

Regulatory Notices

Product	FCC P15 Subpart B, Class B	FCC P15 Subpart B, Class A	ICES-003, Class B	ICES-003, Class A	EN 55022 Class B	EN 55022 Class A	AS/NZS 3548	VCCI	EN 61000-3-2	EN 61000-3-3	EN 61000-6-2	EN 301 489-3	EN 55024	UL 60950-1/ CSA C22.2 No.60950-1	UL 60950/ CSA C22.2 No.60950	UL 1604 Class 1 Div 2	IEC 60950/ EN 60950	IEC 60950-1/ EN 60950-1
2-Port Device Server	x	-	x	-	x	-	x	x	x	x	-	-	x	-	x	-	x	-
4-Port Device Server	x	-	x	-	x	-	x	x	x	x	-	-	x	-	x	-	x	-
Single-Port Device Svr	-	x	-	x	-	x	x	x	x	x	-	-	x	-	x	-	x	-

Certifications

FCC Part 15 Class A or B

These devices comply with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) These devices may not cause harmful interference, and (2) These devices must accept any interference received, including interference that may cause harmful operation.

Radio Frequency Interference (RFI) (FCC 15.105)

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

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

Cables (FCC 15.27)

Shielded cables *must* be used to remain within the Class A or Class B limitations.

ICES 003 Class A or B

This digital apparatus does not exceed the Class A or B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le present appareil numerique n'emet pas de bruits radioelectriques depassant les limites applicables aux appareils numeriques de la class A / B prescrites dans le Reglement sur le brouillage radioelectrique edicte par le ministere des Communications du Canada.

Black Box Contact Information

Country	Web	Email Sales	Email Tech	Telephone
Austria	www.black-box.at	rai@black-box.at	support@ black-box.at	+43 (0)1 256 98 56
Belgium	www.blackbox.be	sales@blackbox.be	techsupport@ blackbox.be	+32 (0)2 725 85 50
Denmark	www.blackbox.dk	blackbox@blackbox.dk	blackbox@ blackbox.dk	+45 56 63 30 10
Finland	www.blackbox.fi	info@blackbox.fi	tuki@blackbox.fi	+358 (0)201 888 888
France	www.blackbox.fr	sales@blackbox.fr	tech@blackbox.fr	+33 (0)1 45 60 67 00
Germany	www.black-box.de	info@black-box.de	techsupp@ black-box.de	+49 (0)811 5541-210
Italy	www.blackbox.it	supporto.commerciale @blackbox.it	supporto.tecnico@ blackbox.it	+39 (0)2-27.404.311
Norway	www.blackboxnorge.no	salg@blackboxnorge.no	support@ blackboxnorge.no	+47 55 300 700
Spain	www.blackbox.es	comercial@blackbox.es	tecnico@blackbox.es	+34 916590191
Sweden	www.blackboxab.se	sales@blackboxab.se	support@ blackboxab.se	+46 8 44 55 870
Switzerland	www.black-box.ch	sales@black-box.ch	support@ black-box.ch	+41 (0)55 451 70 70
The Netherlands	www.blackbox.nl	sales@blackbox.nl	techsupport@ blackbox.nl	+31 (0)30-2417788
United Kingdom	www.blackbox.co.uk	sales@blackbox.co.uk	techhelp@ blackbox.co.uk	+44 (0)118 965 5100