

JETSTREAM 4000, 8500, LANSTREAM 2000,

Installation Guide

5500023-18

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FCC Note The Perle JETSTREAM 4000, JETSTREAM 8500 and LANSTREAM 2000 products have been found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions in this Guide, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his/her own expense.

EN 55022: 1998, Class A, Note

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



Caution: the JETSTREAM 4000, JETSTREAM 8500 and LANSTREAM 2000 are approved for commercial use only.

About this Guide

This guide describes how to install and complete the basic set-up of the JETSTREAM 4000, 8500 or LANSTREAM 2000. It covers hardware installation and entry of information such as internet address and subnet mask; you will need a terminal or terminal emulator. It is intended for a network system administrator, familiar with UNIX operating systems, Ethernet TCP/IP networks and, possibly, the RADIUS protocol.

Please note this Guide describes menu functions in the text-based menuing system (also named 'Full Screen Menus' or 'fsm'), thus:

```
server
servername      [stimp      ]
internet address [195.49.144.4 ]
broadcast address [195.49.144.255]
subnet mask     [255.255.255.0 ]
domain name     [perle.com     ]
ip_host        [193.101.34.89 ]
authentication  [both        ]
gui access      [off        ]
banner         [off        ]
```

However, all configuration parameters described in this Guide are the same parameters seen in JETset, the web-based graphical configuration utility.

For those familiar with the product range there is a Quick Start Guide; this Guide is a small folding leaflet supplied with the product.

Notes:

1. This guide explains how to configure the JETSTREAM 4000, 8500 or LANSTREAM 2000 to work with the RADIUS protocol. We do not intend to describe how to configure this protocol on your RADIUS host; we presume you have separate documentation supplied with your copy of the RADIUS protocol.
2. There is a separate JETSTREAM 8500, LANSTREAM, Configuration Guide. It is supplied on the CD.

Revision history

Date	Part number	Description
November 1997	5500023-10	Initial release of manual.
September 1998	5500023-11	Software Release Note 5600036-11 included in manual.
June 1999	5500023-12	Added new section to Initial setup chapter on using combinations of features.
October 1999	5500023-13	Minor update to manual content to resolve a PDF issue.
February 2000	5500023-14	Minor edit to reference page to cure problem with table of contents generation.
October 2000	5500023-15	Update of manual to include new Perle logos, revision and contact information.
November 2001	5500023-16	Update of manual to include details of selecting AUI interface type and to document the addition of 10/100Base-T functionality.
May 2003	5500023-17	Update of manual to include addition telnet support options and selection of ethernet RJ45 speed.
January 2004	5500023-18	Update of manual to include 32 and 48 port support and 48V Models

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Chapter 1 Installation

Chapter contents

- *Product Descriptions*
- *Installation Checklist*
- *Hardware Installation*
- *Multiple Stacking*
- *Connecting Mains Power and Network*
- *Power and Network LEDs*
- *RJ45 LEDs*
- *Software Installation*
- *Setting up a terminal*
- *The Admin Port*
- *Factory Reset Switch*
- *Software Upgrade*

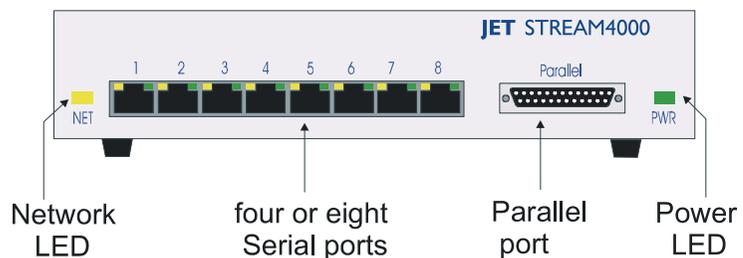
Note There is a detailed summary of the specifications of the product; see Technical Specification in *Technical Specification*.

Product Descriptions

JETSTREAM 4000

The JETSTREAM 4000 is a desktop network access server. It has front-mounted RS232 serial ports and one PS2 compatible parallel port. The parallel port has a standard Centronics interface. The product has 10BaseT and AUI network connections and an administration port for system management. [Figure 1](#) shows the front view of an eight port model:

Figure 1
JETSTREAM 4000 front view



You use the JETSTREAM 4000 on a desk. You can mount it in a 19 inch rack or against a wall; see [Figure 7](#) and [Figure 8](#) for rack-mounting and [Figure 10](#) for wall-mounting.

For a view of the rear panel see [Figure 12](#).

WARNING

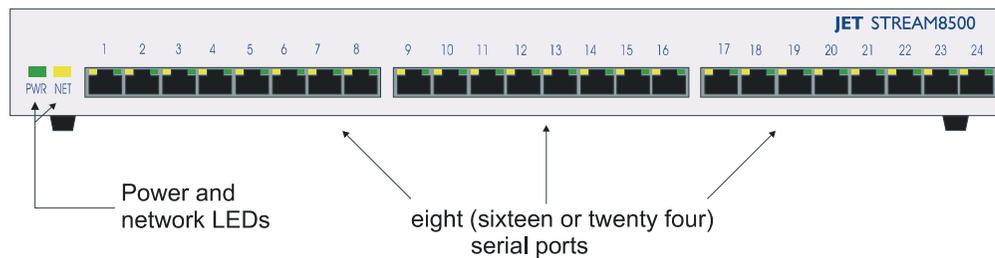
the JETSTREAM 4000 contains no user-serviceable parts

Any attempt to gain access to the inside of the chassis enclosure will nullify the product warranty. If you believe your product faulty please confirm with your supplier before taking any action.

JETSTREAM 8500

The JETSTREAM 8500 is a network access server with front-mounted RJ45 serial ports. It is designed for use in a rack. The serial ports can be either RS232 or RS422, depending on which model you have ordered. The product has 10/100BaseT and an Administration port for system management. [Figure 2](#) shows the front view of a 24 port unit.

[Figure 2](#) JETSTREAM 8500 front view



You can mount the JETSTREAM 8500 in a 19 inch rack ([Figure 6](#) and [Figure 9](#)), on a wall ([Figure 10](#)) or on a desk ([Figure 10a](#)) and [Figure 10b](#)).

For a view of the rear panel see [Figure 13](#).

WARNING

the JETSTREAM 8500 contains no user-serviceable parts.

Any attempt to gain access to the inside of the chassis enclosure will nullify the product warranty. If you believe your product faulty please confirm with your supplier before taking any action.

32 & 48 Port Models

The Jetstream 8500 is available in 16,24, 32 or 48 port models. The 32 and 48 port versions of the Jetstream 8500 contain 2 rows of ports (serial, ethernet and admin), identified as Row A and Row B. These rows are independent of each other and must be managed separately. For a front view of a 48 port JETSTREAM 4800 see [Figure 3](#). For a rear view of a 48 port JETSTREAM 8500 see [Figure 4](#)

[Figure 3](#) JETSTREAM 8500 48 port front view

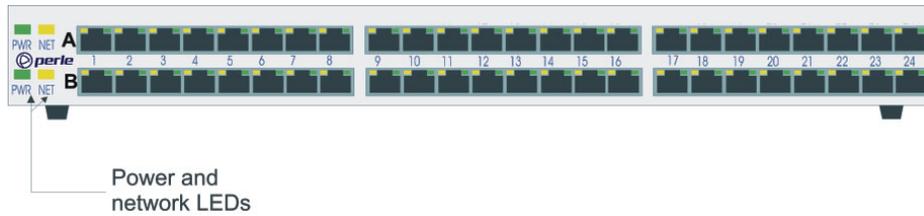
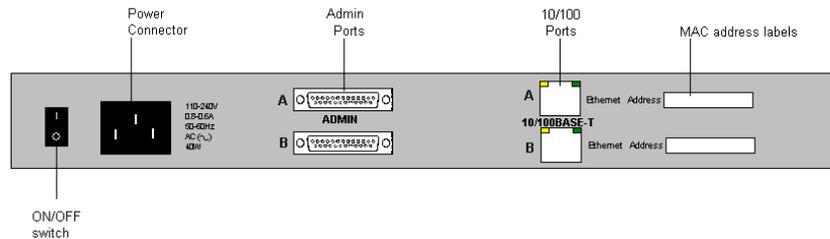


Figure 4 JETSTREAM 8500 48 port rear view

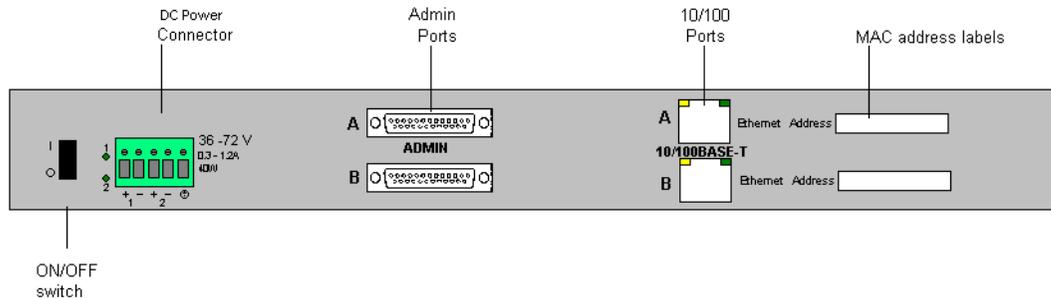


Jetstream48V Model

The Jetstream’s unique dual feed DC capability, provides power redundancy. In the event of a DC Power failure or if the voltage level falls below a threshold level, the Jetstream will automatically switch its source of DC power from the primary to secondary DC source increasing its availability to manage mission critical equipment. The Jetstream supports the accepted Telcoms “battery float” range of 36V to 72V DC so that it may fit into the various worldwide DC environments that exist.

The Jetstream will automatically switch to the alternate DC source and remain on-line providing important access to network equipment.

Jetstream 48V DC Dual Input Model



Electrical Supply Details

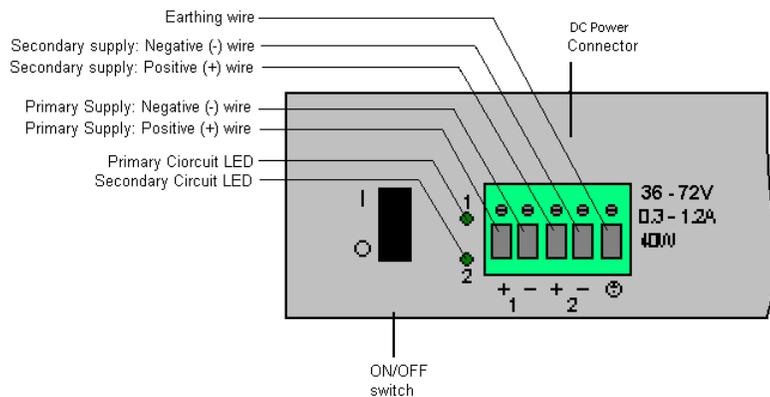
The unit is supplied with an integral Terminal Connections block to facilitate connection to a DC source(s). The DC supply(s) should have adequate over-current protection within the closed rack system and comply with local or national standards applicable to the installation territory.

WARNING: The equipment must be grounded for safety and to ensure ESD protection for correct operation and protection of the internal circuitry.

Connecting DC Power Supply(s) to Jetstream

For connecting the DC supply(s) to the Jetstream should be performed in the following sequence:

3. Switch off the Power Supplies and the Jetstream
4. Connect the attached devices to the serial ports
5. Connect the primary and secondary DC input using the following specifications:
 - a) Use wire gauge 20 to 22 AWG
 - b) Strip insulation 7mm from wire ends. (If using stranded wire, twist all strands together to ensure all wire strands are used for the connection.
 - c) Connect supply with reference to the terminal block diagram and electrical specifications:



Note. When connecting only a single power supply source ensure the connection is the primary supply and the secondary terminals are left unconnected.

Primary Supply:

Positive (+) wire to Circuit 1, terminal marked +
Negative (-) wire to Circuit 1, terminal marked -

Secondary (back-up) Supply:

Positive (+) wire to Circuit 2, terminal marked +

Negative (-) wire to Circuit 2, terminal marked -

Note. *When connecting dual power supply sources, the Jetstream supports a common positive (+) circuit arrangement ONLY.*

Earthing Wire

Ground wire to terminal marked with circular earthing symbol

Screws

Tighten terminal connector block screws to 7 lbs-inches torque.

4. Switch on the power supplies.
5. Switch on the Jetsream (The power LEDS 1 and 2 will indicate the status of the power source at the respective input. If both the primary and secondary power source are available both LED 1 and LED 2 next to the terminal block will be luminated indicated power detected from each input.)

Disconnecting 48V Power Supplies from the Jetstream

To disconnect the power supply(s) from the Jetstream, please follow these instructions:

1. Switch off the Jetstream unit
2. Switch off the power source(s).
3. Disconnect all DC power input cables from the Jetstream terminal connector block.
4. Remove any attached devices to the serial or ethernet port(s).

Your unit is ready to be moved.

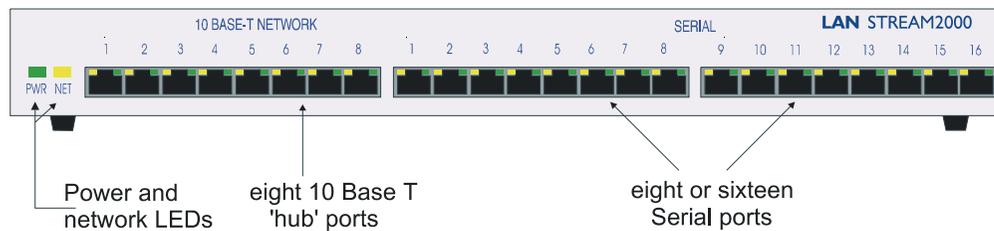
LANSTREAM 2000

The LANSTREAM 2000 is a network access server and hub, designed for use in a rack. It has 10BaseT ethernet ‘hub’ ports and also ‘serial’ ports (all on the front panel; see [Figure 5](#)). The product has a 10BaseT network connection on the rear panel; this connector is named the ‘uplink’ port. The unit also has an administration port for system management. For a view of the front panel see [Figure 5](#). For a view of the rear panel see [Figure 14](#).

You connect:

- network equipment such as management PCs to the ‘hub’ ports
- access equipment such as terminals, modems and ISDN terminal adapters to the serial ports
- your network (via a hub or router) to the ‘uplink’ port

Figure 5 LANSTREAM front view



mounting

You can mount the LANSTREAM 2000 in a 19 inch rack ([Figure 6](#) and [Figure 9](#)), on a wall ([Figure 10](#)) or on a desk ([Figure 10a](#)) and [Figure 10b](#)).

‘uplink’ port

The ‘uplink’ port on the rear panel has a switch to help you in cabling to other devices (see [Figure 15](#)). The difference between the ‘uplink’ 10BaseT port on the rear panel (with the switch in its default ‘hub’ position) and the ‘hub’ 10BaseT ports on the front panel is as follows:

the receive and transmit pins on the ‘uplink’ port are swapped compared with the receive and transmit pins on the ‘hub’ port.

You can make the pins on the uplink port identical with pins on the hub port by moving the switch on the uplink port to its non-default (‘uplink’) position. For details of pin-outs see [Parallel DB25 Port on page 76](#) and [PCs \(DB9 connectors\) on page 90](#).

The ‘hub’ ports are unmanaged; that is, you cannot configure them.

WARNING

the LANSTREAM contains no user-serviceable parts.

Any attempt to gain access to the inside of the chassis enclosure will nullify the product warranty. If you believe your product faulty please confirm with your supplier before taking any action.

Installation Checklist

In addition to the JETSTREAM 4000, 8500 or LANSTREAM 2000 hardware provided you will need:

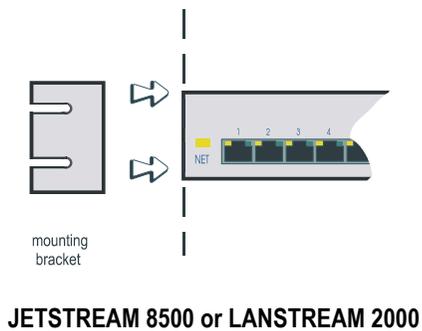
- a terminal (or computer with terminal emulation) to act as the console for the unit (for installation only).
- a cable to connect the terminal to the unit (either DB25-RJ45 or DB25-DB25, depending on which port you are using; this is covered in more detail in [Setting up a terminal on page 38](#)).
- a connection point on your network with either 10BaseT or AUI connector (for JETSTREAM) or 10BaseT connector (for LANSTREAM).
- an IP address for your unit. Information on obtaining an IP (Internet) address for your organization is in [Internet Registration on page 129](#).

Hardware Installation

Rack

To mount a single JETSTREAM 8500 or LANSTREAM 2000 into a 19 inch rack, use the two mounting brackets and four screws provided with the unit. See [Figure 6](#) and [Figure 9](#) for details.

Figure 6



For a side view of rack mounting see [Figure 9](#).

JETSTREAM 4000 To mount the JETSTREAM 4000 into a 19 inch rack do as follows:

- remove the four rubber feet, then,
 - for a single unit - use the two mounting brackets and four screws provided with the unit; see [Figure 7](#) and [Figure 9](#) for details.
 - for two units side-by-side - place them free-standing on the rack shelf; see [Figure 7](#).
 - for two or more units one of top of the other, stack them following our stacking recommendations; see [Figure 8](#).

Figure 7 rack-mounting a single JETSTREAM 4000

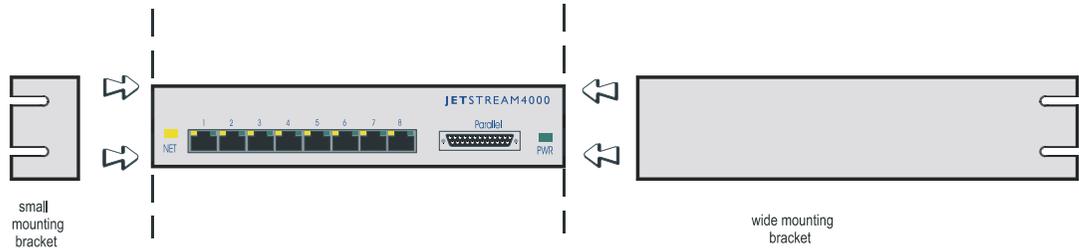
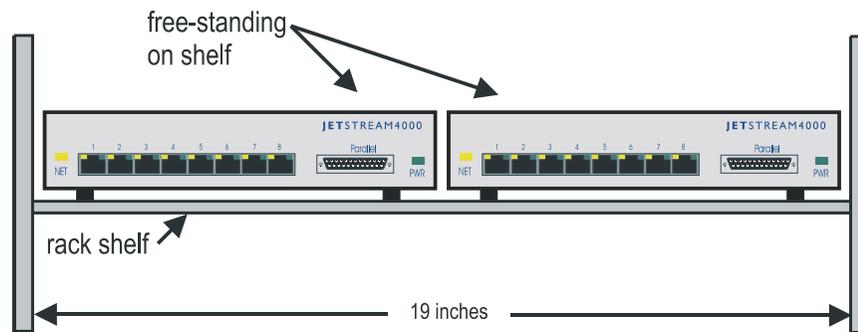
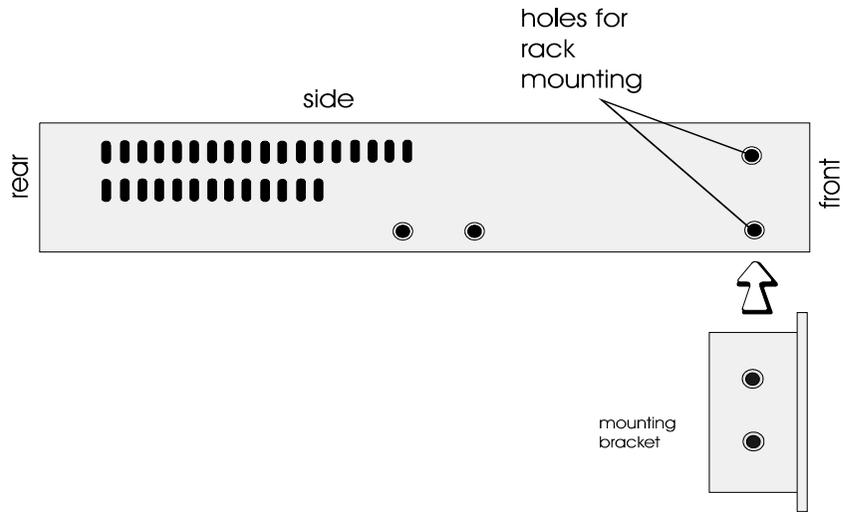


Figure 8 rack-mounting two JETSTREAM 4000s side-by-side



**JETSTREAM 4000,
8500 or
LANSTREAM 2000**

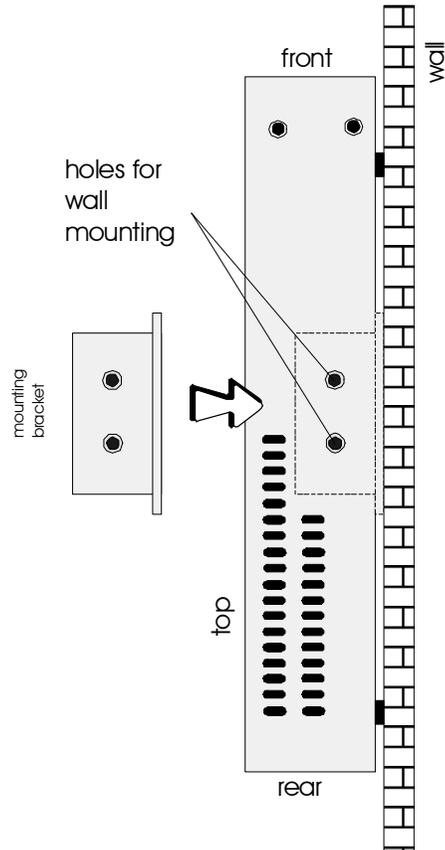
Figure 9
rack
mounting
(from side)



Wall

To mount the JETSTREAM 4000, 8500 or LANSTREAM 2000 onto a wall, use the two mounting brackets and four screws provided with the unit (the same brackets/screws used for rack mounting). See [Figure 10](#) for details.

Figure 10
wall
mounting



Desk (JETSTREAM 8500 and LANSTREAM 2000 only)

To prepare the JETSTREAM 8500 or LANSTREAM 2000 for use on a desk use the four self-adhesive rubber feet provided with the unit. Stick the four feet to the underside of the unit, one in each corner, approximately one inch from each adjacent edge. See [Figure 10a\)](#) and [Figure 10b\)](#).

Figure 10a)
Desk
mounting

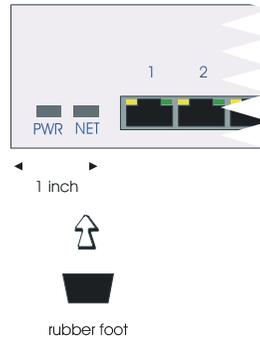
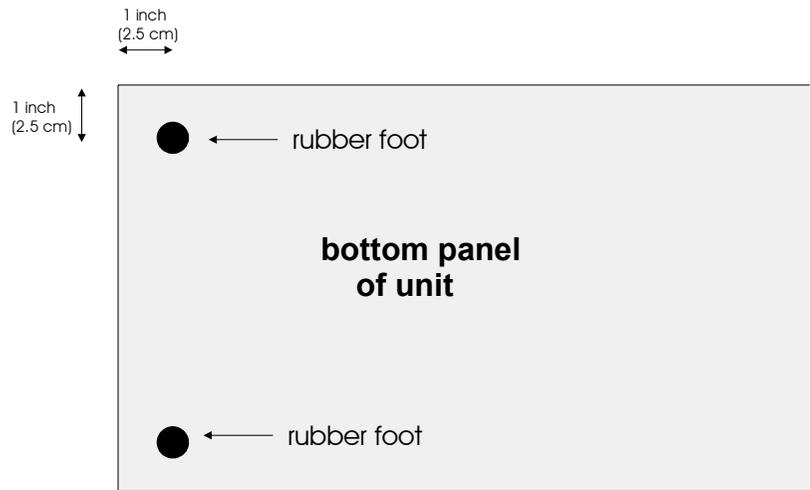


Figure 10b)
Desk
mounting

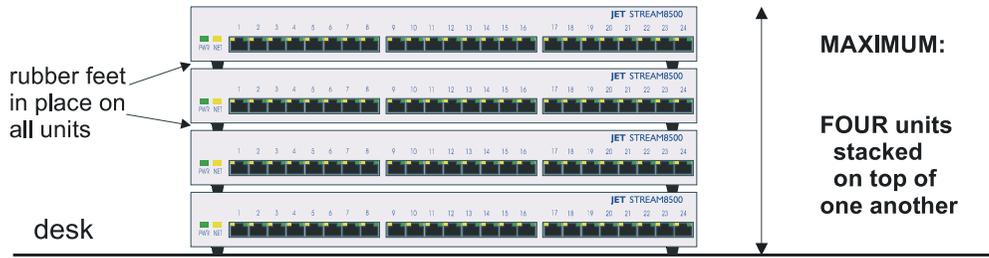


Note *the JETSTREAM 4000 is designed for use on a desk, so is supplied with the four rubber feet attached.*

Multiple Stacking

When stacking your unit on a desk we recommend that you stack no more than four JETSTREAM 4000, 8500 or LANSTREAM 2000s high. See [Figure 11](#) (below) for more information.

Figure 11 [stacking recommendation](#)



The diagram above ([Figure 11](#)) shows JETSTREAM 8500s. The same stacking recommendation applies to also to the JETSTREAM 4000 and LANSTREAM 2000.

This precaution ensures that you keep within the maximum operating temperatures of the units. If you have JETSTREAM 8500 or LANSTREAM 2000 make sure you fit the rubber feet to all units before stacking.

When mounting several JETSTREAM 8500s or LANSTREAM 2000s adjacent to one another on shelves in a 19" rack, the mounting brackets ensure adequate vertical separation between adjacent units. However we advise the following caution:

Caution

observe maximum ambient operating temperatures within a rack; you may have to use forced air cooling.

The same caution applies to the JETSTREAM 4000 when you mount several units - side by side or on top of one another - inside a rack.

Connecting Mains Power and Network

Before connecting your JETSTREAM 4000, 8500 or LANSTREAM 2000 (*the 'unit'*) to mains power, check that you have been supplied with a mains cable (power cord) suitable for the mains supply in your country.

The power range which the unit will accept is printed next to the power input connector on the rear panel. The power range is repeated in the technical specification in [Appendix A \(Technical Specification\)](#). There is no need to adjust the unit for different mains supply ratings, as the internal power supply unit is auto-sensing.

Cable your unit to the network connection; you have a choice of either 10/100 BaseT or AUI connector for JETSTREAM 8500, 10BaseT or AUI connector for JETSTREAM 4000, or 10BaseT connector for LANSTREAM.

The mains power switches and network connections for the various products are shown in the diagrams below.

Figure 12
JETSTREAM 4000
rear panel

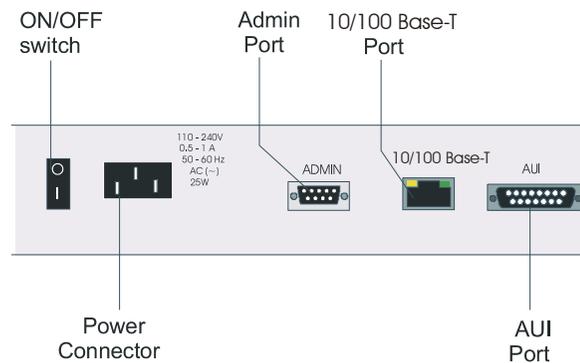
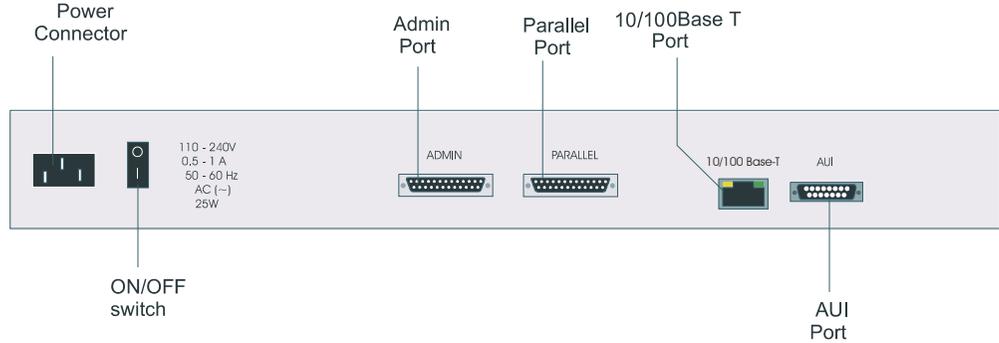
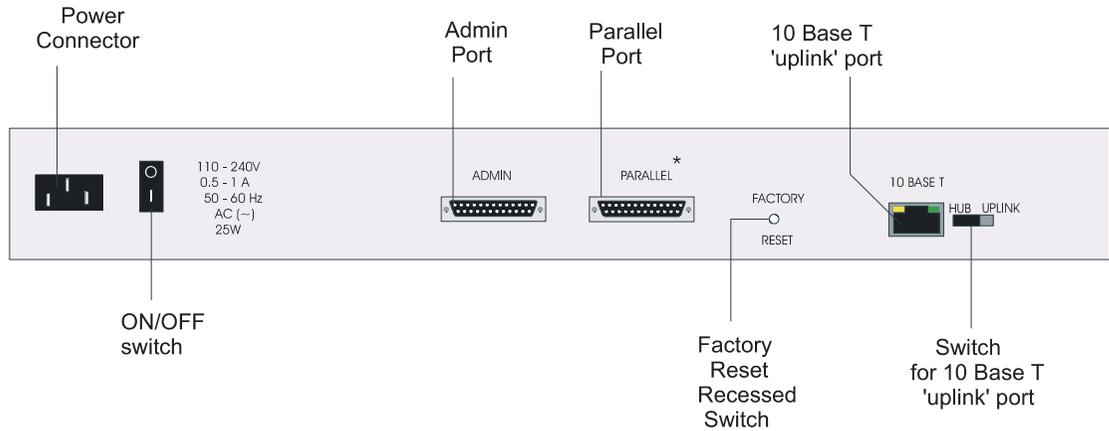


Figure 13 JETSTREAM 8500 rear panel



* the parallel port is only fitted to some models.
 The Admin Port is a 9-way 'D' type on some models.

Figure 14 LANSTREAM 2000 rear panel

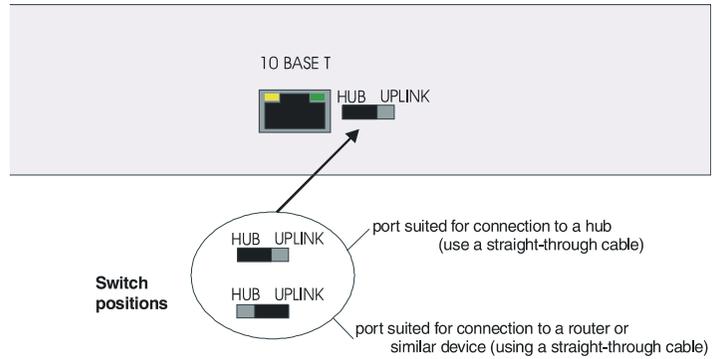


* the parallel port is only fitted to some models.
 The Admin Port is a 9-way 'D' type on some models.

LANSTREAM 2000 'uplink' switch

On the rear panel the switch marked 'HUB UPLINK' helps you when cabling to/from the adjacent RJ45 10BaseT port. The switch has two positions; see [Figure 15](#) below:

Figure 15 LANSTREAM 'Uplink' port switch positions

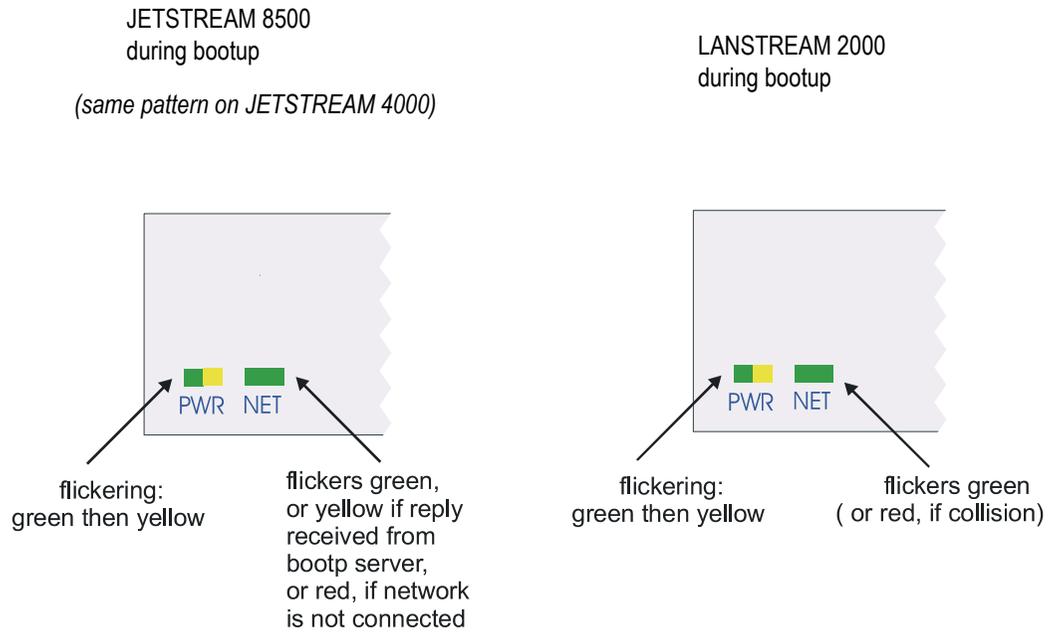


For an explanation of changes to the pin signals, and pin-out details see [Overview on page 75](#).

Power and Network LEDs

During bootup you should see power and network LEDs display the following colours (*Figure 15a*).

Figure 15a) appearance of Power and Network LEDs

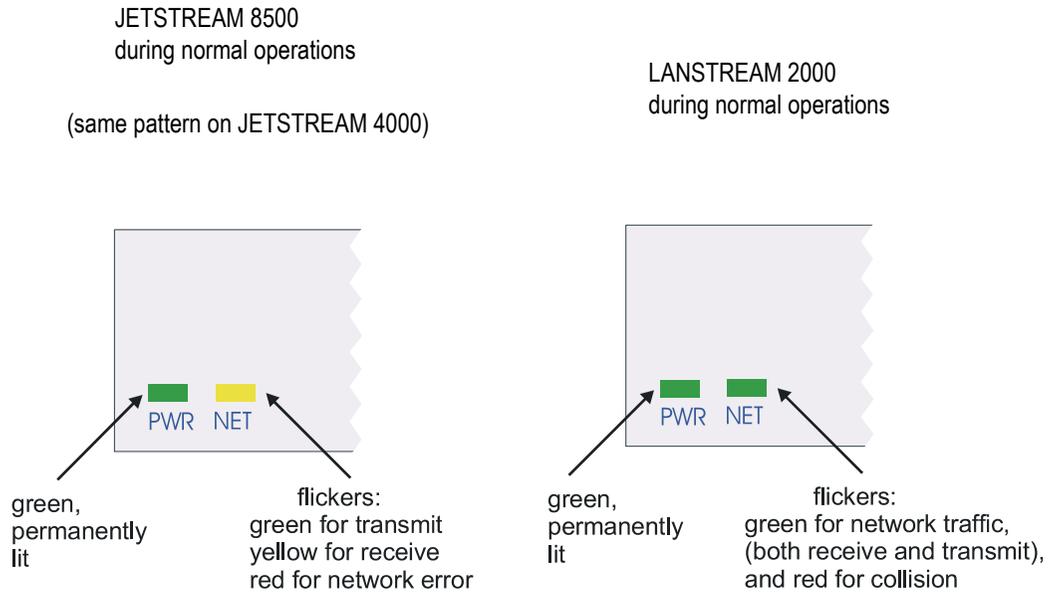


Note on the JETSTREAM 4000 the NET LED is on the left hand side; see *Figure 1*.

On LANSTREAM if you have not connected the network, the network LED flickers green.

Once power is on and the network is connected, the power and network LEDs will display the following colours (*Figure 15b*):

Figure 15b) appearance of LEDs (continued)



Note on the JETSTREAM 4000 the NET LED is on the left hand side of the unit.

On LANSTREAM the network LED does **not** display yellow.

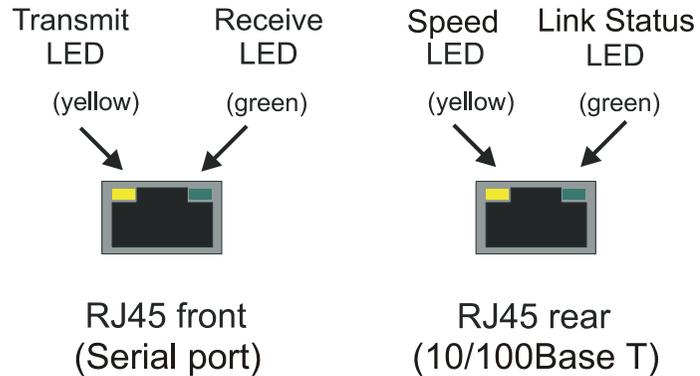
On both JETSTREAM and LANSTREAM:

- the network LED flickers on and off because it registers network activity.
- when the unit is receiving or transmitting large amounts of data you may see the network LED display colours steadily (for a second or more); this is quite normal.

RJ45 LEDs

JETSTREAM 8500

On the JETSTREAM 8500, there are bi-colour LEDs on the RJ45 connectors on both the front and rear panels. These LEDs flicker briefly during bootup and then display the following colours:



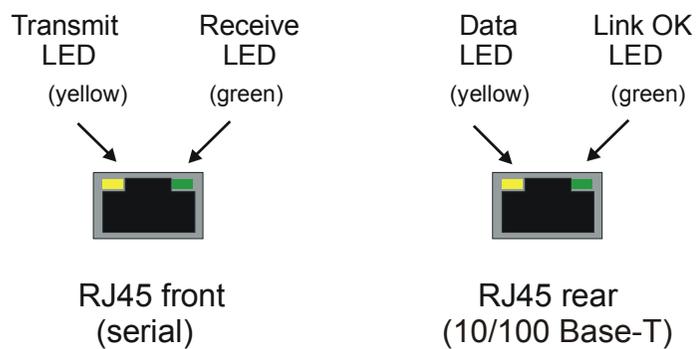
Note

The Speed LED is only illuminated when the network connection uses the 100 Mbps data rate.

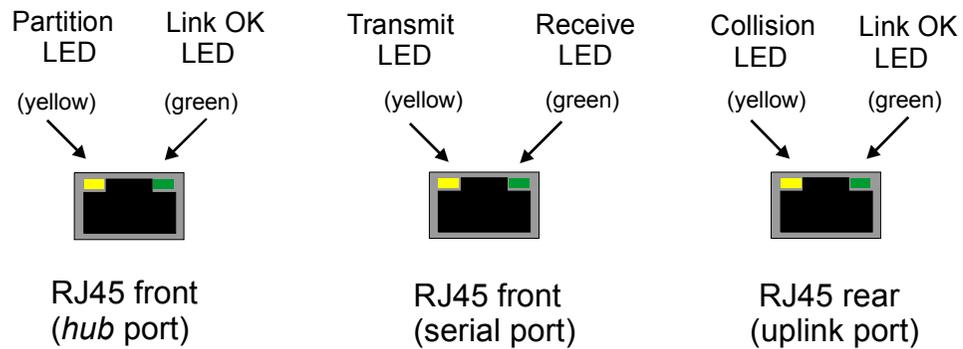
The link Status LED is constantly illuminated when the link is active, flashing when receiving or transmitting data and is turned off when no link is present.

JETSTREAM 4000

On the JETSTREAM 4000, there are bi-colour LEDs on the RJ45 connectors on both the front and rear panels. These LEDs flicker briefly during bootup and then display the following colours:



LANSTREAM 2000



Collision means collision detected by the Ethernet chip in the LANSTREAM on any part of the network inside the LANSTREAM. The LED indicating collision is useful when you have your unit mounted in a rack and you are viewing the unit from the rear.

On the hub port, the 'Link OK' LED is on (steady green) constantly while the link is good. It flickers on and off when there is data transmission (receive or transmit).

On the uplink port, the 'Link OK' LED is on (steady green) constantly while the link is good. It remains steady green when there is data transmission.

Software Installation

For a brand new JETSTREAM 4000, 8500 or LANSTREAM 2000, the software is pre-installed. There is no further action required on your part.

If you need to upgrade your software see [Software Upgrade on page 42](#).

Using the GUI (JETset)

You may wish to use the JETSTREAM 4000, 8500 or LANSTREAM 2000's Graphical User Interface - named 'JETset' - as soon as possible. Since this is a web-browser program you will firstly need to give the unit an ip address using a terminal, or PC with terminal emulation. Then you will be able to access JETset over a network.

Go now to [Setting up a terminal on page 38](#).

Setting up a terminal

You now need to set up a terminal or PC running terminal emulation. The set up is shown at [Figure 16](#). You will connect your terminal to a front-mounted RJ45 serial port; alternatively you can connect via the Admin DB25 port. The front-mounted serial ports offer more emulation types than the Admin port; see [Table 1](#).

Table 1

JETSTREAM 4000, 8500 or LANSTREAM 2000 port	connector type required	emulation required
front-mounted RJ45 'serial'	RJ45	Wyse60, VT100, ANSI
Admin Port	DB25 male, or DB9 male	VT100

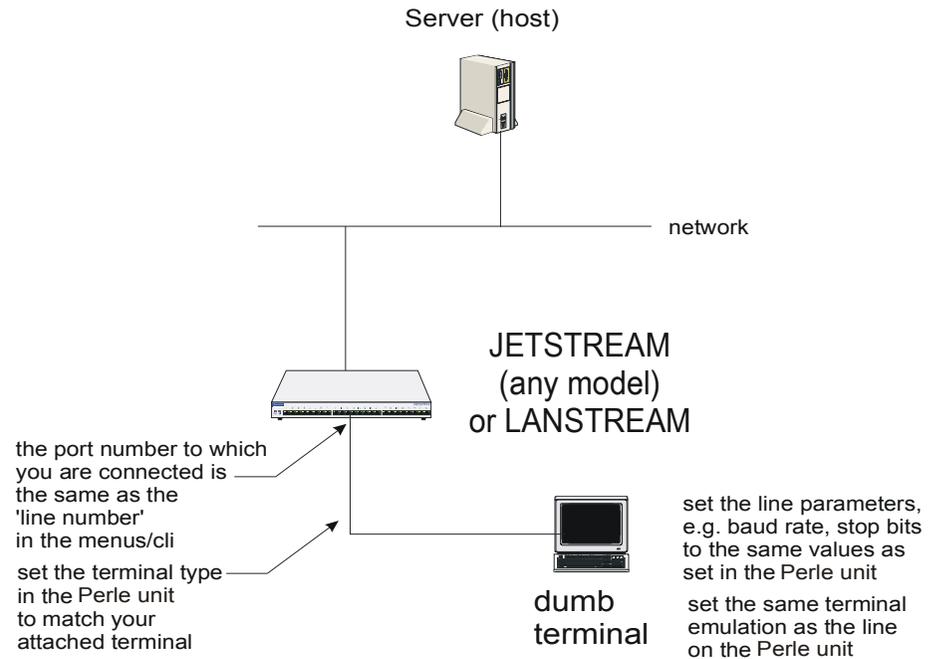
If you prefer to connect via the Admin Port you will see a display of diagnostic and bootup messages (not seen on front-mounted serial ports).

Note *If you cannot emulate one of these terminal types, you will have to use the Command Line Interface (cli); (the cli commands are described in full in the JETSTREAM 4000, 8500, LANSTREAM 2000, Configuration Guide, [Chapter 9](#)). Once you have done a basic installation and can communicate with a host you can download additional terminal definitions. This is described in the JETSTREAM 4000, 8500, LANSTREAM 2000, Configuration Guide, [Downloading Terminal Definitions on page 96](#). You will then be able to use the text-based menus.*

To connect via the front-mounted serial ports refer to [Connecting via front-mounted RJ45 serial ports on page 39](#).

To connect via the Admin Port refer to [The Admin Port on page 40](#).

Figure 16
Setting up a terminal



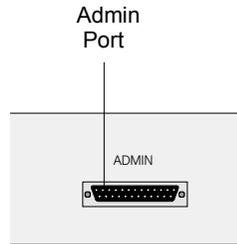
Connecting via front-mounted RJ45 serial ports

To connect your terminal to a *serial* port on the front of the JETSTREAM 4000, 8500 or LANSTREAM 2000 do the following (see [Figure 16](#)):

1. Obtain an appropriate cable; see [Appendix B \(Cabling information\)](#) for cabling requirements.
2. Connect to any of the *serial* ports on the front of the unit.
3. Switch the terminal on. Set it to 9600 baud, 8 data bits, 1 stop bit, no parity. Select emulation of either VT100, Wyse60 or ANSI. Save your terminal setup. Press <return> and a login prompt (login:) should be displayed.
4. After the prompt 'login' type 'admin'; after the prompt 'password:' do not enter characters - just press the <return> key on your keyboard.
5. Type 'set line <line number> termtype <termtype>', where <line number> is the line/port to which you are connected and <termtype> is your terminal type; e.g. set line 3 termtype ansi.
6. Check you have changed the terminal type by typing the command 'show line <line number>'. Alternatively type 'show line .' where the period (.) means 'this line'.
7. The next step is basic configuration; see [Logging On on page 48, Step 3](#).

The Admin Port

Figure 17
Admin Port
(25-way 'D' type
connector shown)



Overview

The Admin Port is a on the rear of the unit; see [Figure 13](#). It can be either 9-way or 25-way. As well as configuration of the product using the text-based menus or cli, use this port for the following purposes:

- display boot up messages
- when you do not see a login to the JETSTREAM 4000, 8500 or LANSTREAM 2000 on any of the serial ports on the front of the product

It has the following characteristics:

- only users with admin level privileges can login through it
- has line settings of 9600 baud, 8 bits, no parity, 1 stop bit; (fixed)
- the terminal type is fixed at VT100
- the line type is fixed at 'jslogin'

Connecting to the Admin Port

To connect to the Admin Port you will need an appropriate cable; for pin and signal specifications see [Overview on page 75](#).

1. Connect your terminal to the Admin port. If your unit is already booted you should see a login prompt:
login:
2. After the prompt 'login' type 'admin'; after the prompt 'password' do not enter characters - just press the <return> key on your keyboard.
3. after logging in the prompt should appear as <product_name(abbreviated)>#, for example:

```
JS_8500#
```

The # sign indicates that you are logged in as the system administrator.

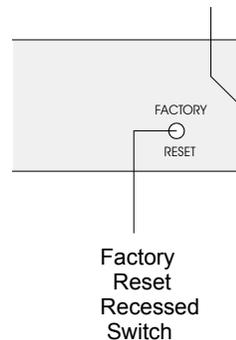
You are in command line interface mode; you can now use the text menus (type 'screen') or remain in the cli.

You can set a password (the 'Admin' password); see [Setting the Admin Password on page 59](#).

The next step is to go to [Initial Configuration on page 49](#).

Factory Reset Switch

Figure 18



On the rear of the LANSTREAM 2000 product there is a recessed push-button switch located behind a small hole in the chassis; see [Figure 13](#). Use the tip of a pen or pencil to press this switch. The LANSTREAM 2000 will then reboot and reset itself to factory default settings.

Software Upgrade

cli syntax: You may have been supplied with a software upgrade. To check the version of software your unit is running see the information displayed at the top of any menu display, e.g. :
version

```
user [admin]                JETSTREAM 1.0                telnet 1
```

The text in the middle of the line (JETSTREAM) will display the name of your product.

Compare this with the version number of software which you have obtained. If you have a more recent version of software, you should install it.

There are three methods for upgrading the software in the unit:

- Using the administrative Command Line Interface (CLI) on the unit (see [Using TFTP from a host on page 43](#)).
- Using a BOOTP server (see [Using BOOTP from a boothost on page 45](#))
- Using the JETset web configuration tool (see [Upgrade Using JETset, the web browser interface on page 45](#)).

The method you choose will depend on how you operate your unit.

Before you upgrade the software on your JETStream or LANStream unit we recommend you save the existing configuration information to a network file server.

In all cases the software upgrade process requires that the software has been installed to a readable directory on a network fileserver and that the TFTP service has been enabled. The unit's FLASH firmware can be identified by the file name and type and will always be of the form: **js85vXXX.cfg**, where

js85 is the product type, here JETSREAM 8500, and

XXX is the firmware version number.

Saving your existing Configuration

Saving the existing configuration will allow the configuration information in the unit to be restored at a later date.

Note *Upgrading the software on the unit does not alter the stored configuration information which will be preserved during the upgrade.*

Section **5.11** in the Configuration Guide (Saving Configuration to a File) gives details of this procedure. The procedure requires the presence of a write enabled empty file on a suitable network fileserver. The fileserver must have the TFTP (Trivial File Transport Protocol) service enabled and running.

1.0.0.1 Example of saving a configuration file

The following is an example of how to save the configuration of a JETSTREAM 8500 on a UNIX fileserver called **BIGSERVER**, the file will be saved to the file **/home/jetstream/js8500.cfg**. The procedure is the same for the JETSTREAM 4000 and LANSTREAM 2000, but the file names will reflect the different names of the product.

In this example the administrator issues the CLI command:

```
netsave configuration BIGSERVER /home/jetstream/js8500.cfg
```

Using TFTP from a host

1. Place the new software file on a host machine. Ensure the file has global read/execute permissions for its entire path.

cli syntax:
netload software

2. Exit the menus and go into the CLI. Type:
`netload software <hostname> <filename>`
3. Press <return>. The JETSTREAM 4000, 8500 or LANSTREAM 2000 will download the new software file using TFTP.

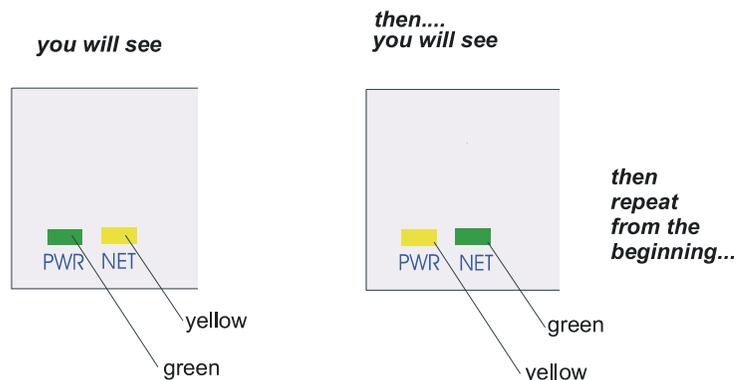
1.0.0.2 Writing to FLASH Memory

The JETSTREAM 4000, 8500 or LANSTREAM 2000 will load the software into RAM, perform checks, and then write the software into FLASH memory. The writing to FLASH will take a few minutes and during this time the unit will not respond to user input. While the new software is being loaded into FLASH memory, the power and network LEDs on the front of the unit display a pattern; see [Figure 19](#) and [Figure 20](#).

WARNING

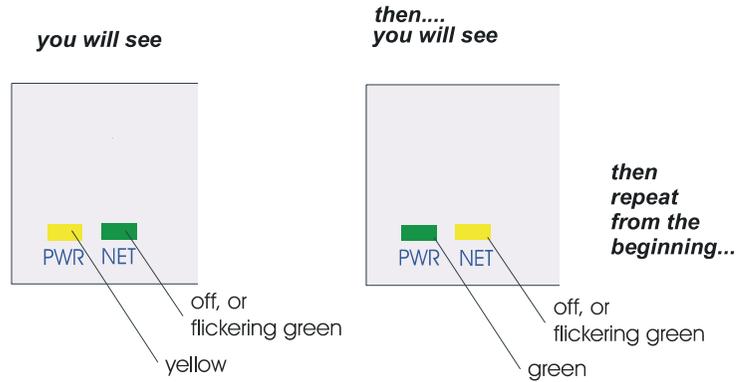
do not turn the power off/on while the unit is writing to FLASH memory

Figure 19
pattern of JETSTREAM 4000 and
JETSTREAM 8500 LEDs during load of
software into FLASH



This pattern is repeated approximately once per second.

Figure 20
pattern of LANSTREAM LEDs during
load of software into FLASH



The Network LED flickers green if network traffic is identified on the network ports.

The pattern on each LED is repeated approximately once per second.

reboot

When the software has finished downloading you must reboot the unit. To do this, type the command:

```
reboot
```

Using BOOTP from a boothost

When installing with BOOTP, the SW_FILE parameter in your BOOTFILE will need to be changed to point to the new software image. We recommend that you keep the name of the image file as supplied as this will guarantee that the software is recognised as a new version by the existing software installation.

Reboot your unit. The new software will download and write to FLASH memory, see Writing to FLASH Memory on page 43. You can monitor the progress of this operation with a terminal (or terminal emulation) connected to the Admin port at the rear of the unit.

WARNING

DO NOT SWITCH OFF THE UNIT whilst the unit is programming the FLASH memory.

You can use BOOTP to compare a software version placed on the boot host and one loaded in the JETSTREAM 4000, 8500 or LANSTREAM 2000; if there is a newer version on the host, it will be downloaded to the unit.

For a full description of how to use BOOTP to download a new software file from a host, see JETSTREAM 4000, 8500, LANSTREAM 2000, Configuration Guide, [How to setup BOOTP on page 102](#).

Upgrade Using JETset, the web browser interface

1. Start JETset by pointing your network browser at the Internet Address of your the unit.
2. Log in as the Admin user and select file transfer from the main menu.
3. Complete the file transfer form by selecting software download from the pull-down menu, and completing the internet address of the TFTP server and the download software image filename.
4. Select save from the main menu to start the download process. Your browser may ask you to confirm this action before the download will start.

The new software will download and written to FLASH memory, see Writing to FLASH Memory on page 43. You can monitor the progress of this operation with a terminal (or terminal emulation) connected to the Admin port at the rear of the unit.

WARNING

DO NOT SWITCH OFF THE UNIT whilst the unit is programming the FLASH memory.

Enabling BOOTP/DHCP after Upgrading Software

If you require automatic BOOTP/DHCP configuration, be sure to set the server DHCP parameter to ON:

```
set server dhcp on
```

Save the configuration:

```
Save
```

Disable BOOTP/DHCP

The server parameter DHCP is used to disable BOOTP/DHCP (set server dhcp on/off). Setting DHCP to OFF prevents the unit from initiating a BOOTP/DHCP request. This parameter is only accessible from the CLI.

RARP is unaffected by this parameter.

After any software upgrade you should always check that DHCP is set to ON if you require BOOTP/DHCP to configure your unit.

Chapter 2 Initial Set-up

Introduction

This chapter details the initial configuration of a JETSTREAM 4000, 8500 or LANSTREAM 2000 (the 'unit'). It contains the following sections:

- *Logging On*
- *Initial Configuration*
- *JETset*
- *Hardware Details*
- *Setting Date and Time*
- *Setting Up the Host Table*
- *Setting the Admin Password*
- *RADIUS configuration*
- *DNS configuration*
- *WINS configuration*
- *Gateways*
- *Resetting to Factory Defaults*
- *Verify Installation*
- *Reboot*
- *Save to non-volatile memory*
- *Resetting to Factory Defaults*
- *Using combinations of features*

Logging On

We assume you have connected and set up the terminal which is acting as the console; if not, refer to [Setting up a terminal](#).

1. At the console, with the login prompt displayed, type *admin* and press <return>. At the password prompt, just press <return>. This is the default admin user password. The command line prompt will be displayed: <product name (abbreviated)> e.g. JS_8500, followed by the hash # sign, indicating that you are now logged in as the system administrator. No other user accounts exist on the system at this point.
2. To use Full Screen mode (text-based menus), you must first set your terminal type (if you haven't already done so). Use the 'set line' command as follows, for example:

```
set line 7 termttype termttype
```

where *termttype* is wyse60, vt100 or ansi. If you want to emulate one of these terminal types, remember to change the terminal's setup as well.

3. To enter Full Screen mode (the text-based menus), type *screen* and press <return>. The main menu will be displayed:



For operators on terminals there is a description of Full Screen mode, and how to use it, in JETSTREAM 4000, 8500, LANSTREAM 2000, Configuration Guide, [Chapter 7](#).

Initial Configuration

Note If you are unable to use the menus, you must configure the JETSTREAM 4000, 8500 or LANSTREAM 2000 using the Command Line Interface (cli). The command is 'set server' followed by various parameters. The command is described in full in the JETSTREAM 4000, 8500, LANSTREAM 2000, Configuration Guide Chapter 9.

Initial configuration procedure

Note The 32 and 48 port versions of the JETSTREAM 8500 have ports (serial, ethernet and admin) identified as row A and row B. These ports are unique and separate of each other. Each row must be configured separately and have its own unique configuration.

cli syntax:
set server

1. At the main menu, select 'server configuration'. The following form will be displayed:

```

+server+
servername[Perle_js8500 ]
internet address[172.16.28.206 ]
subnet mask[255.255.0.0 ]
broadcast address[172.16.255.255 ]
domain name[ ]
ip_host[ ]
authentication[both(local+radius)]
dhcp[off]
gui access[on ]
banner[off]
OEM_mode[4 ]
  
```

2. Move between the fields using the arrow keys. Use the key to backspace if necessary.
 - **servername** (also known as hostname or alias) - this is a familiar name for your JETSTREAM 4000, 8500 or LANSTREAM 2000. You will probably already have a naming scheme for the hosts in your network. The hosts in this guide are named after Ancient Greeks.
 - **Internet Address (IP Address)** - this is the JETSTREAM 4000, 8500 or LANSTREAM 2000's unique address in the network.
 - **Broadcast Address** - if you wanted to send information to all hosts on your network simultaneously, the JETSTREAM 4000, 8500 or LANSTREAM 2000 would use the broadcast address. The broadcast address must cover all the hosts you want to reach. Once you have entered an IP address and subnet mask, the broadcast address will default to the IP address with the host part(s) set to 255.
 - **Subnet Mask** - this allows interconnected local networks to coexist with the same network ID. This hides complicated local environment and routing information from external hosts and gateways. If you want the JETSTREAM 4000, 8500 or LANSTREAM 2000 to belong to the same subnet as other hosts, give it the same subnet mask as them.

Note We recommend you set a subnet mask on initial configuration.

- **Domain Name** - a unique name which describes your domain - your location in the global network. Like Hostname, it is a symbolic rather than a numerical identifier.

- **ip_host** - the default ip host for all *users* who login to the JETSTREAM 4000, 8500 or LANSTREAM 2000. Enter an internet address in dot decimal notation; e.g. 192.101.34.202. The default is 0.0.0.0. The IP address entered here does not affect the host table or any line configuration. We recommend you enter an address here; this will save you work when configuring users.
- **Authentication** - you can authenticate all users connecting to the JETSTREAM 4000, 8500 or LANSTREAM 2000 in one of three ways:
 - both** - (the default) firstly with the unit's own user table. If the username is found in unit but the password is incorrect, an authentication request is sent to the RADIUS host. If the username is not found in the unit, authentication is passed up to the RADIUS host. (The exception is the 'admin' user; if you supply an incorrect password, the unit will not go to the RADIUS host; it will fail the authentication).

When the unit uses the RADIUS host, it will try firstly the primary RADIUS host and then - if one is specified - the secondary RADIUS host; (see [RADIUS configuration](#)).
 - local** - with the unit's user table (only)
 - RADIUS** - with the RADIUS host's user table (only); does not apply to username 'admin' who is always authenticated locally.
- **dhcp** - this parameter enables or disables the dhcp daemon.
- **gui access** - this parameter controls access to the JETSTREAM 4000, 8500 or LANSTREAM 2000's graphical configuration programme JETset .

The default is 'off'. When set to 'on' the admin user can access the JETset from a Web browser, using the unit's internet address. Entry to the programme is then controlled by password.

If you are not using the JETset to configure the unit, we suggest you set this parameter to 'off'; access will be denied to any person who tries to connect to the unit from their browser.

How to access the JETset is described in [JETset on page 52](#).
- **banner** - this parameter concerns the banner information (product name/software version). This banner information is presented to a user with a login prompt. For security reasons you may wish to turn off the display of this information. The choices are ON or OFF. The default is OFF.

This parameter does not affect logins using Telnet/Rlogin or the Admin Port; in both these cases the banner information shall always be displayed
- **OEM mode** - .

Tip If you are not using the RADIUS service, you can leave authentication set to 'both'. You will have entered users in the JETSTREAM 4000, 8500 or LANSTREAM 2000's user table. The unit will authenticate users via its own user table and, provided usernames and passwords are valid, should not need recourse to a RADIUS host.

Example settings for all the JETSTREAM 4000, 8500 or LANSTREAM 2000 configuration fields are shown below:

- When you have completed the form, press <return>. You will be presented with the following display:

```
+server+
servername[Perle js8500 ]
internet address[172.16.28.206 ]
subnet mask[255.255.0.0 ]
broadcast address[172.16.255.255 ]
domain name[ ]
ip_host[ ]
authentication[both(local+radius)]
dhcp[off]
gui access[on ]
banner[off]
OEM_mode[4 ]
```

```
+options+
accept and exit form
```

- Accept the form; you will be returned to the Main Menu.
(You may want to save your configuration changes permanently; see [Save to non-volatile memory](#))
- Reboot the unit. Rebooting will ensure that other network devices can communicate with it.

JETset

At this point in the set-up process, now you have allocated an ip address, you can use the Graphical User Interface, named 'JETset'. This is a web-based program which you access from the web browser on your networked PC/computer. A summary of the program is in *JETset program Summary*.

To access JETset:

1. Make sure you set 'gui_access' to 'on', see *Initial Configuration*
2. Open your web browser and enter the ip address of your JETSTREAM 4000, 8500 or LANSTREAM 2000; e.g.

`http://192.101.34.211`

You should be presented with the login page:

The program prompts you for a password (for user of name 'admin').

Caution

the only access permitted is username 'admin'. JETSTREAM 4000, 8500 or LANSTREAM 2000 assumes this username and so prompts you for the password for this user.

On successful login you will be presented with the JETset home page. From the home page you can now configure your unit.

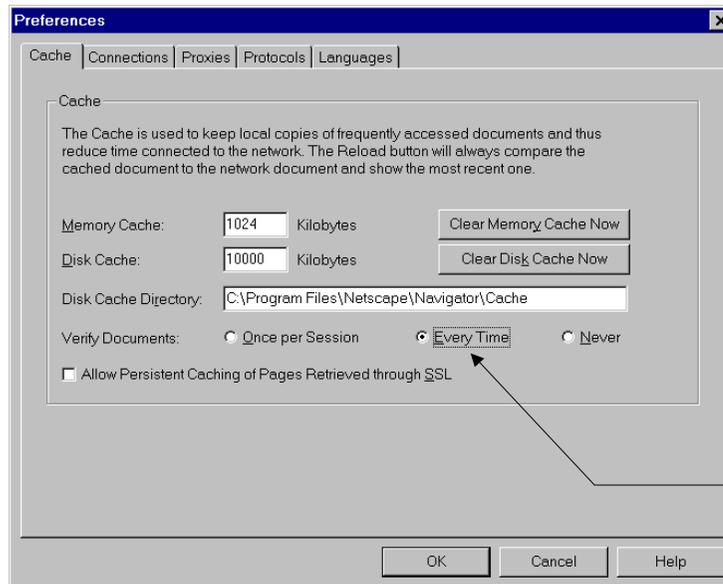
Using JETset

Note the following guidelines about JETset:

- JETset uses the 'Frames' feature of HTML, which allows you to see four different 'windows' simultaneously inside your main browser window. This viewing method will make configuration easier. However, in common with all programs which use Frames there are particular ways of using JETset:
 - navigate using the main JETset buttons; we do not recommend using the 'Forward' or 'Backward' buttons of your Browser
 - set your browser to always check if there is a newer version of the page than the version stored in cache. This action will ensure that JETset will display the most up-to-date information; see [Figure 21](#) and [Figure 22](#).

Figure 21

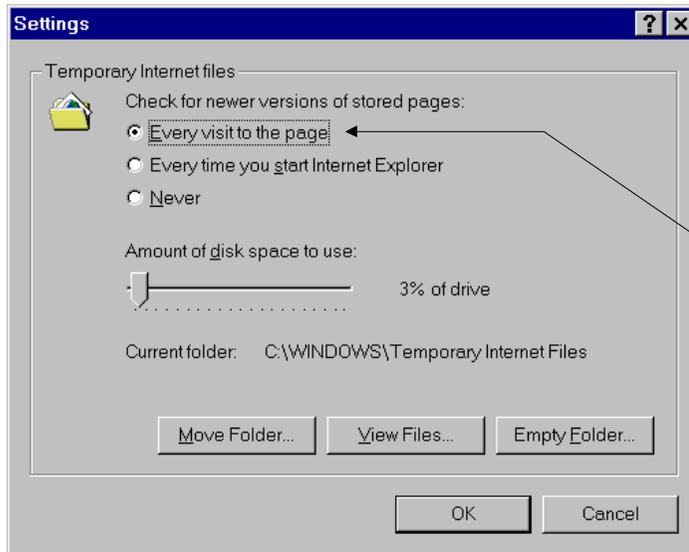
Netscape Navigator - configuration



in the 'Preferences' dialog box, click on the 'every time' radio button

- press the JETset 'Save' button before moving from one area, e.g. 'line' to another area, e.g. 'user'. This action will save your changes in volatile memory (RAM); the saving process is instantaneous.
- to save your configuration changes to non-volatile memory, press the 'Admin' button and then select the 'Save to FLASH' button. The unit will spend a few seconds writing to FLASH memory, so we suggest you save to FLASH periodically (e.g. once every thirty minutes)

Figure 22 Internet Explorer - configuration



in the 'Settings' dialog box, click on the 'every visit to the page' radio button

- if you visit another URL (address on the World Wide Web) and then wish to return to JETset you can either:
 - use the 'JETset' bookmark/favorite entry (the JETset home page), or
 - use the 'Go' feature of your browser (if 'JETset' is listed - this is the JETset home page), or
 - re-type the ip address of the unit in your 'location' field; e.g.
`http://192.101.34.211`
the login page will be displayed; you will need to login again.

JETset program Summary

- compatible with Microsoft Internet Explorer® or Netscape Navigator®, both at version 3 or more recent versions
- you can configure most JETSTREAM 4000, 8500 or LANSTREAM 2000 parameters
- you can display the interface in one of the supplied languages (French, German, etc.; see the Configuration Guide, *Language support*) or a translated language of your own
- access is restricted to the person with username 'admin'
- JETset's help is this set of Guides you are now reading. In these Guides you will find technical information on the configuration parameters you see in JETset. You will not find an explanation of how to use the JETset program
- although you can configure JETSTREAM 4000, 8500 or LANSTREAM 2000 sessions, you cannot run them from JETset (sessions are character-based features suited to terminals)
- you can use the 'bookmark/add to favorites' feature of your browser only with the login and home pages
- you can use the 'Go' navigation method of your browser (history file) of your browser only with the login and home pages

Hardware Details

You can view the hardware details of your JETSTREAM 4000, 8500 or LANSTREAM 2000 (the 'unit'). From the Main Menu select `Hardware`. You will see a form similar to the one shown below; it is view-only, except the `date` and `time` fields.

```
+hardware+
mac address 0080ba60330c
board id JS4300076R1.5
processor 80386
  uarts 3 * Serial ASIC
flash rom 1 x 1MB
  ram 2 x 2MB
battery ram 32kB
serial ports 24
parallel ports 0
ethernet interface auto
ethernet speed 10M
  date[13/5/2003 ]
  time[16:36:52 ]
```

Use this hardware information to identify your unit. To view hardware details in command line mode (cli) use the command `show hardware` (this command is in full in the JETSTREAM 4000, 8500, LANSTREAM 2000, Configuration Guide, [Chapter 9](#)).

You can set the date and time; see [Setting Date and Time](#).

Setting Date and Time

The JETSTREAM 4000, 8500 or LANSTREAM 2000 (the ‘*unit*’) has a real-time clock which you can set and view. It is battery-backed and therefore will operate when power is off and over reboots. The clock is year 2000 compliant.

To set the date and time select ‘hardware’ from the Main Menu and enter details in the ‘hardware’ form. Move the cursor to the start of the field using the ‘delete’ key; then enter information in the format (for the date):

DD/MM/YYYY e.g. 30/03/1999

and in the format (for the time):

HH:MM:SS e.g. 20:32:00

Note that you do not have to enter the number of seconds.

In command line mode (cli) enter the commands ‘set date’ and ‘set time’; (this command is described in full in the JETSTREAM 4000, 8500, LANSTREAM 2000, Configuration Guide, [Chapter 9](#)).

To view the date and time select ‘hardware’ from the Main Menu and check the ‘hardware’ form; see [Hardware Details on page 56](#). In command line mode enter the commands *show date*, *show time* or *show hardware*.

The specification for the battery is shown in [Appendix A \(Technical Specification\)](#).

Setting Up the Host Table

The JETSTREAM 4000, 8500 or LANSTREAM 2000 (the ‘*unit*’) needs to know the hostnames and internet addresses of the other hosts in the network (or any hosts anywhere on the Internet) which you want to communicate with on a regular basis. These hostnames are added to the unit’s Host Table. You can add up to twenty hosts.

Select ‘Host Table’ from the Network Configuration menu; the Host Table menu will be displayed:

```
+host table+
+add host
+change host
+delete host
```

Adding a Host

cli syntax:
add host

Select ‘Add Host’ from the Host Table menu; this option enables you to add the *hostname* of a host to the host table. You will be asked to enter the hostname:

```
enter host name: █
```

Type in the name of the host (14 characters maximum) and press <return>.

Changing a Host

**set host,
show host**

Select 'Change Host' from the Host Table menu; this option enables you to add or change a host's internet address:

```
+-----+
| hostname | internet address |
| pc       | [172.16.28.100]  |
| Solaris  | [172.16.0.2]    |
| router312| [172.16.1.2]    |
| sco      | [172.16.113.115]|
+-----+
```

This form will list all hosts added to the host table. The default internet address is 0.0.0.1. Enter the correct internet address of each host. Use the key to backspace if necessary.

Delete Host

delete host

This option enables you to delete an entry from the host table. If a host is referenced by a predefined session, or is defined as a gateway or name server, you won't be allowed to delete it. When you select 'Delete Host', the host table will be displayed:

```
+-----+
| pc       |
| Solaris  |
| router312|
| sco      |
+-----+
```

Select the host that you want to delete and press <return>. You will be asked to confirm the deletion:

```
Confirm Delete Host 'Solaris' (y/n)
```

Type 'y' to delete the host, 'n' to cancel the command.

Tip *You may want to save your configuration changes permanently; see [Save to non-volatile memory](#)*

Setting the Admin Password

cli syntax: Select 'Set Password' from the Users menu.

set user
password Select 'admin' user from the list displayed.

You will be prompted to enter a password. This can be up to sixteen characters. Use the key to backspace if necessary. Enter the password and press <return>.

When prompted, re-enter the password and press <return>.

The password change will take effect next time you log in.

RADIUS configuration

cli syntax: You can configure how the JETSTREAM 4000, 8500 or LANSTREAM 2000 (the 'unit') interacts with the RADIUS host(s). From the Main menu select '**radius configuration**':
set radius
add radius

```
+radius configuration+
add authentication host
delete authentication host
add accounting host
delete accounting host
change radius settings
```

Selecting from one of add/delete authentication/accounting host will present a list of hosts from the unit's host table (see [Setting Up the Host Table](#)):

```
+hosts+
pc
Solaris
router312
sco
```

Highlight your selection and press <return>.

You will be asked to enter a 'secret' (a password):

```
secret: *****
```

Key a maximum of sixteen alphanumeric characters. You cannot see what you type; each character is displayed as an asterisk *. To change the secret you must delete the host and then add it again; when you add a host you are prompted for a secret.

The first host entered becomes the primary authentication/accounting host, the next host entered becomes the secondary host. You can enter a maximum of two hosts in each of the authentication or accounting fields.

You must enter the same secret in the RADIUS host (see your RADIUS documentation); the secret is not transmitted over the network.

Note to set RADIUS authentication on/off, go to back to the Main Menu and select 'server configuration'. See [Initial Configuration](#).

When you select '**change radius settings**', you are presented with the following:

```
+radius configuration+
  retry[5 ]
  timeout[3 ]
  accounting[off]
  acct_port[1646 ]
  auth_port[1645 ]
  acct_authenticator[on ]
  session id[20000000]
```

The RADIUS parameters are as follows:

retry

(for authentication) the number of times the unit will re-send a request to a RADIUS authentication host, before re-presenting another login to the user.

(for accounting) the number of times the unit will re-send a request to a RADIUS accounting host, before understanding that the accounting request has failed.

The default retry value is 5; the unit will try the primary host up to 5. You can enter values between 0 (don't retry) and 255. If you have different authentication and accounting hosts unit will retry first the authentication host(s) and then the accounting host(s).

timeout - the time in seconds between unit sending a request to a RADIUS accounting or authentication host and receiving a reply. If no reply is received before the expiry of the timeout period, the unit will retry the same host up to and including the number of retry attempts specified under 'retry'.

The default timeout period is 3 seconds (you can enter values between 1 and 255) .

accounting - turns accounting on or off within the unit; the default is off.

Table 2
RADIUS
accounting

RADIUS host specified	accounting flag	state of RADIUS host	result
no	off	-	no accounting
yes	on	up	accounting in both JETSTREAM 4000, 8500 or LANSTREAM 2000 and RADIUS host
yes	on	down	accounting in JETSTREAM 4000, 8500 or LANSTREAM 2000 only

Notes on Table above:

1. 'accounting' within the JETSTREAM 4000, 8500 or LANSTREAM 2000 is an increment of the session id (see below).
2. 'accounting' in the RADIUS accounting host means that you should be able to see accounting information by interrogating the host (see your RADIUS documentation).

acct_port - the UDP port number for RADIUS accounting. The default value is 1646 which should match most RADIUS implementations. Change this value if your RADIUS host is using a different UDP port number.

auth_port - the UDP port number for RADIUS authentication. The default value is 1645 which should match most RADIUS implementations. Change this value if your RADIUS host is using a different UDP port number.

acct_authenticator - a flag to instruct the unit to check the authenticator field in the accounting reply transmission from a RADIUS host to the unit. The authenticator field contains the secret, encrypted. The options are 'on' (the unit will check this field) or 'off' (the unit will not check this field); the default is 'on'. Make sure the setting in your RADIUS host is the same as the unit.

session id - displays in real-time the hexadecimal value of the current session (incrementing with each session). The current session is the most recent connection into the unit when the line service is set to 'jslogin' (the default line service).

You can reset the session id to zero; enter 0s from your keyboard.

An explanation of the eight digit value displayed in the session id field is as follows:

the first two digits show the number of reboots which have taken place. The maximum number which will be shown is ff (255); on the next reboot, this value will reset itself to 01 (1).

the last six digits show the number of user sessions which have started since the last reboot (on reboot these six digits are reset to zero). The first session will be 000001, the second session will be 000002, etc. The maximum number of sessions is approximately 16 million, i.e. ffffff, at which point the counter would reset itself to all zeros, i.e. 000000.

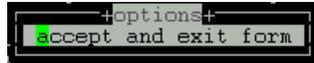
An example of all eight digits in a session id is:

0a000006

which means there have been 10 reboots (0a) of this unit (since the counter was reset or wrapped around) and 6 (000006) sessions started since that reboot.

Sessions are measured through the RJ45 ports on the front panel; connections through any of the ports on the rear panel are not shown.

When you have completed the form, press <return>. You will be presented with the following display:



Accept the form; you will be returned to the menu.

Tip You may want to save your configuration changes permanently; see [Save to non-volatile memory](#)

DNS configuration

You can enter the addresses of two DNS hosts in the JETSTREAM 4000, 8500 or LANSTREAM 2000 (the 'unit'); one will be the primary host, the other a secondary host. The DNS hosts do not have to be the same hosts as entered in your unit's host table. On a remote access connection the unit will transmit these addresses to a dial-up Windows NT/95 client. Therefore, your remote user does not have to configure DNS parameters in his/her computer. For more information on DNS see [DNS on page 118](#).

From the Main menu select '**network configuration**':



```
r+network configuration+
|reset
|snmp
|tftp
|host table
|DNS
|WINS
|gateways
|security
|reboot server
```

cli syntax: Selecting DNS will prompt you to enter an internet address; enter this address in dot decimal notation. If you wish, it can be the same address as a machine already entered in the unit's host table.

The first host entered becomes the primary DNS host, the next host entered becomes the secondary host. You can enter a maximum of two DNS hosts.

delete DNS To change a DNS entry, delete it then re-input it.

Tip You may want to save your configuration changes permanently; see [Save to non-volatile memory](#)

WINS configuration

WINS (Windows Internet Name Service) is a database of hostnames and corresponding internet addresses. It is a Microsoft specific name resolution service. The basic function of WINS is the similar to DNS, i.e. it maps computer names to TCP/IP addresses for client computers on a network. For more information on WINS see [WINS on page 118](#).

You can enter the addresses two WINS hosts in the unit; one will be the primary host, the other a secondary host. On a remote access connection the unit will transmit these addresses to a dial-up Windows NT/95 client. Therefore, your remote user does not have to configure WINS parameters in his/her computer.

From the Main menu select '**network configuration**':



```
network configuration
reset
snmp
tftp
host table
DNS
WINS
gateways
security
reboot server
```

cli syntax:
add WINS

Selecting WINS will prompt you to enter an internet address; enter this address in dot decimal notation. If you wish, it can be the same address as a machine already entered in the unit's host table.

The first host entered becomes the primary WINS host, the next host entered becomes the secondary host. You can enter a maximum of two WINS hosts.

delete WINS

To change a WINS entry, delete it then re-input it.

Tip

You may want to save your configuration changes permanently; see [Save to non-volatile memory](#)

Gateways

Gateways are hosts that connect Local Area Networks (LANs) together. If you want to access a host which isn't on your local network you will be connected via a gateway. Gateways route data via other gateways until the destination local network is reached. There are three types:

- **Default** - this is a gateway which provides general access beyond your local network.
- **Host** - this a gateway reserved for accessing a specific host external to your local network.
- **Network** - this is a gateway reserved for accessing a specific network external to your local network.

The unit allows you enter a maximum of twenty gateways.

Particularly useful when checking routes to/from gateways is the *show routes* command;(this command is described in full in the JETSTREAM 4000, 8500, LANSTREAM 2000, Configuration Guide, [Chapter 9](#)).

Active and Passive Gateways

The unit supports both active and passive gateways. The default is active. Definitions of these types are as follows:

Active gateway: a gateway which is temporarily listed in the unit's routing table (while RIP packets are received). If the unit detects that the gateway is no longer operating (no RIP packets received) it will be deleted from the routing table.

Passive gateway: a gateway which is permanently listed in the unit's routing table. It is thus always available.

Configuring a Gateway

- cli syntax:** Select 'Gateway' from the Network Configuration menu. Select 'Add Gateway' and the host table will be displayed; select a host. Note that you can define a host only once as a gateway.
- add gateway**
- set gateway** When you have added a gateway, you must define its type. Select 'Change Gateway' and the Gateways form will be displayed (for example):
- show gateways**

```

+gateways+
hostname      service internet address status
router312    [default][172.16.1.2 ] [active ]
  
```

This form lists all gateways defined for your network. In this example, only one has been defined.

Complete the Type field; the values are 'host', 'network' or 'default'. If you set the field to 'host' or 'network', you must include the internet address of the target host or network. If you change a gateway from 'host' or 'network' to 'default', the internet address will be ignored.

Complete the 'Status' field; the values are 'active' or 'passive'.

Note *the gateways configured in this table will be ignored if you have used bootp to download a single passive gateway into the unit; see 8500 Configuration Guide, [How to setup BOOTP](#).*

Delete Gateway

- delete gateway** If a host on your network is retired from gateway duty, you can use this option to delete it from the list of gateways. Note that the host will NOT be deleted from the host table. Select 'Delete Gateway' to list your gateways:

```

+delete gateway+
router312
  
```

Delete the gateway.

Tip *You may want to save your configuration changes permanently; see [Save to non-volatile memory](#)*

Verify Installation

To check that you have installed the JETSTREAM 4000, 8500 or LANSTREAM 2000 (the ‘unit’) successfully, try to ping a remote host using the following command:

```
ping hostname
```

Choose a host that you have defined in the host table. If no packet loss is reported, your unit is ready to use. If the command returns an error, refer to the ping cli command;(this command is described in full in the JETSTREAM 4000, 8500, LANSTREAM 2000, Configuration Guide, [Chapter 9](#)).

Reboot

cli syntax: reboot

Whenever you set or change the basic JETSTREAM 4000, 8500 or LANSTREAM 2000 (the ‘unit’) Configuration (parameters detailed in this chapter) we advise you to reboot the unit. Select ‘Reboot’ from the Network Configuration menu. You will be asked whether you wish to save your configuration changes to non-volatile memory:

```
Save config to FLASH ROM(y/n)
```

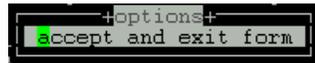
When the unit has been rebooted the login prompt will be displayed.

For more information on how unit reboots, see the Configuration Guide, BOOTP, [Overview](#).

Rebooting does not reset the unit to factory default settings.

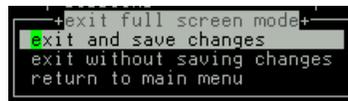
Save to non-volatile memory

When you exit a text menu screen (form) after making changes, you will be presented with the ‘options’ form:



If you choose to ‘accept and exit form’ your changes will be retained in RAM (volatile memory).

To save your changes permanently you will need to exit the text menu system completely. Return to the Main Menu and select ‘command line mode’; you will be presented with a form:



Choose ‘exit and save changes’. All the changes made since last entering the menus will be saved to FLASH (permanent, non-volatile) memory.

You will now be at the command line prompt. To return the menus type:

```
screen
```

Saving to a file

cli syntax:
netsave

You can also save your configuration information to a file on a host. This can only be done in the cli; (this command is described in full in the JETSTREAM 4000, 8500, LANSTREAM 2000, Configuration Guide, [Chapter 9](#)).

Resetting to Factory Defaults

reset factory

This feature enables you to reset the JETSTREAM 4000, 8500 or LANSTREAM 2000 (the ‘unit’) to its factory default settings. This will clear all configuration data entered by the admin user. All user accounts, except the default admin user, will be deleted. Select ‘Reset’ from the Network Configuration menu; you will be asked to confirm the reset:

```
Confirm Reset To Factory Defaults (y/n)
```

The unit will save the factory default settings to FLASH memory; this saving will take a few seconds. You will be presented with a new login prompt.

Alternatively you can reset the factory default settings using the Factory Reset Switch on the rear of the unit; see [Factory Reset Switch on page 41](#) for more information on using this switch.

Using combinations of features

The software suite that runs in JETstream and LANstream terminal/access servers provides a rich set of features to support terminals, printers, POS, data capture, and other devices such as modems for remote dial-in and dial-out applications.

It is technically possible to configure the highest port density products in such a way that they do not perform correctly. This section describes what this configuration is, and how to calculate when it will apply, so that the product can be correctly installed in an overall system design.

Processes

The Perle software provides a number of 'processes' that supply the software environment in which the each feature of the product operates. There are 63 processes available to be used by the features of each unit. Each feature can be switched on or off, depending on the application to which the product is applied.

Non-login Features

Each serial port on a JETstream or LANstream product can be set to provide one of the following features as the product is switched on:

- telnet
- rlogin
- reverse telnet
- reverse raw
- silent raw
- ppp
- slip
- printer

Set in this way, each port using one of these features uses one process.

Login Features

A port on the product can instead be set to prompt a user to login to the port, and then offer a series of services (typically applications running on hosts on the LAN) to which the user can connect. The login feature uses 2 processes on each port for which this feature is used. The service which the user selects creates a session which is a 3rd process on each port that uses the login feature.

Each port can also be set to provide multi-session support. This allows hot-keying between up to 4 concurrently open sessions. In this case each session that remains open, whether or not it is currently in view, uses a process. It is thus possible to set up a port with the login feature and hot-key between 4 sessions, using 6 processes. Note that if multi-session (hot key) support isn't required, connecting to up to 4 services (one at a time) uses a total of 3 processes per port.

Calculating the Total

Calculating the total number of processes is as simple as totalling the processes used by the features that have been configured for each port. The total number of processes used should not exceed 63 for correct operation of the product.

Note The use of non-login services (which includes ports used for printers, for example) frees up processes that can be used by other ports. Experience reveals it is rare that a large number of users simultaneously use large numbers of concurrently active sessions so it is correspondingly rare that the total number of processes required exceeds the total number available.

Appendix A Technical Specification

Introduction

This appendix contains the technical specification for the JETSTREAM 4000, 8500 or LANSTREAM 2000 (the 'unit').

For pin specifications on the unit's connectors see Appendix B (Cabling information).

Contents

This appendix is divided into the following sections:

- *Environmental*
- *Accommodation*
- *Power*
- *Processors*
- *Battery*
- *Protocols supported*

Specifications

Environmental

Ambient Temperature	Operating	0°C to +40°C
	Storage	-40°C to +85°C
Relative Humidity	Operating	5% to 95% non-condensing
	Storage	0% to 100% non-condensing
		5% to 95% condensing
Safety of IT equipment including electrical business equipment	Conforms to BS EN60950:1992/A3:1996, UL1950 and CAN/CSA C22.2 No.950:1995 Revised 5 July 1996	
Emissions	Conforms to EN55022 Class A, FCC Part 15, Subpart B, Class A	
Immunity	Conforms to EN50082-1 and EN50082-2	

Accommodation

Dimensions of chassis (without brackets or feet)	Height:	44mm (1U)	
	Width:	430mm	JETSTREAM 8500, LANSTREAM 2000
		230mm	JETSTREAM 4000
	Depth:	230mm	JETSTREAM 8500, LANSTREAM 2000
200mm		JETSTREAM 4000	
Dimension of brackets	Height:	55mm (1.25U)	
	Width:	25mm	
Mounting	19 inch rack, wall or desk		
Stacking (on a flat surface)	maximum four JETSTREAM 4000, 8500 or LANSTREAM 2000s high, with rubber feet in place on each unit		
Weight	1.9kg (4.2lb)	JETSTREAM 8500 24 port version	LANSTREAM 2000 24 port version
	0.6kg (1.9lb)	JETSTREAM 4000 8 port version	

Power The unit connects directly to mains power. The internal power supply converts mains voltage to the required operating voltage.

Input	110V - 240V, 50-60 Hz AC, 1.0 - 0.5A (peak)	
Power consumption	less than 25W	JETSTREAM 8500 and LANSTREAM 2000
	less than 10W	JETSTREAM 4000

The socket outlet shall be installed near the equipment and easily accessible.

Processors

Main processor	80386 25MHz
ASIC	proprietary octal UART with hardware PPP processing

Battery

Type	Rechargeable;	continuously recharged while power to the unit is on; operates while power is off
Rating	3.6V 110mAh	
Life	Fitted for the life of the unit	
Replacement	only if faulty and by approved Perle service agents	WARNING: replace only with the same or equivalent type as recommended by the manufacturer. ATTENTION: remplacer seulement par le même type ou modèle équivalent selon les préconisations du fabricant .

Protocols supported

ARP	HTTP	RADIUS accounting	SLIP
BOOTP	ICMP	RADIUS authentication	SNMP
CBCP	IP	RCP	TCP
CHAP	IPCP	RIP	Telnet
Ethernet	PAP	Rlogin	TFTP
	PPP	Rshd	UDP

Some of the above protocols are defined in Request for Comment (RFC) documents. There is a list of the RFCs supported by the unit in the JETSTREAM 4000, 8500, LANSTREAM 2000, Configuration Guide, [Appendix D](#).

Appendix B Cabling information

Overview

This appendix describes pin specifications of all the connectors on the ports of the JETSTREAM and LANSTREAM. It also shows examples of connections to various types of equipment.

Pin specifications:

- *Parallel DB25 Port*
- *RJ45 10BaseT Hub ports (LANSTREAM only)*
- *RJ45 RS232 Serial ports*
- *RJ45 RS422 Serial ports*
- *RJ45 10/100BaseT port JETSTREAM 8500*
- *RJ45 10BaseT port JETSTREAM 4000*
- *RJ45 10BaseT port LANSTREAM 2000*
- *Admin Port (25-pin)*
- *Admin Port (9-pin)*

Note. we recommend you use shielded cables when connecting to an RS232 port on either the JETSTREAM or LANSTREAM.

Connection examples:

- for Direct (1:1) connections, see mini-Table of Contents at [Example Connections on 85](#).
- for Structured Cabling Systems, see mini-Table of Contents at [Example Connections on 96](#)

Parallel DB25 Port

Some units are fitted with a parallel port. This single DB25 port is PS2 compatible and provides a Centronics-type interface for Parallel printers.

The pin-outs of the parallel port are shown below ([Table 3](#)):

Table 3 Parallel pin-outs

Pin	Circuit	Direction	Signal/Function
1	STROBEN*	Output	STROBE
2	D0	Input and Output	DATA 1
3	D1	Input and Output	DATA 2
4	D2	Input and Output	DATA 3
5	D3	Input and Output	DATA 4
6	D4	Input and Output	DATA 5
7	D5	Input and Output	DATA 6
8	D6	Input and Output	DATA 7
9	D7	Input and Output	DATA 8
10	PACKN*	Input	ACKNLG
11	PBUSY	Input	BUSY
12	PPE	Input	PE
13	PSLCT	Input	SLCT
14	AUTOFDXT*	Output	AUTOFEED
15	PERRORN*	Input	ERROR
16	PINITN*	Output	INIT
17	PSLINN*	Output	SLCT IN
18	GND	—	GROUND
19	GND	—	GROUND
20	GND	—	GROUND
21	GND	—	GROUND
22	GND	—	GROUND
23	GND	—	GROUND
24	GND	—	GROUND
25	GND	—	GROUND

* = Active low

For a connection example of a cable from our port to a Centronics 36-pin connector, see [Parallel Printers on 93](#).

RJ45 10BaseT Hub ports (LANSTREAM only)

The RJ45 10BaseT hub ports have 8-pin shielded connectors. They are wired for a straight-through connection (pin 1 to pin 1, pin 2 to pin 2) to a PC.

The pin-outs are shown below.

Table 4
10BaseT
RJ45 pin-outs
(hub ports)

Pin	Signal
1	Receive Data +
2	Receive Data -
3	Transmit Data +
4	(do not connect)
5	(do not connect)
6	Transmit Data -
7	(do not connect)
8	(do not connect)

RJ45 RS232 Serial ports

The RS232 RJ45 serial ports are 8-pin shielded and surge-suppressed to 15KV. Note that DCD is an input.

The pin-outs are shown in [Table 5](#).

Table 5

shielded RJ45 pin-outs
RJ45 pin-outs
(serial ports)

Pin	Circuit	Direction	Function
1	DCD	Input	Data Carrier Detect
2	DSR	Output	Data Set Ready
3	DTR	Input	Data Terminal Ready
4	S/GND	—	Signal Ground
5	TXD	Output	Transmit Data
6	RXD	Input	Receive Data
7	CTS	Output	Clear To Send
8	RTS	Input	Request To Send
Shield	P/GND	—	Protective (Chassis) Ground

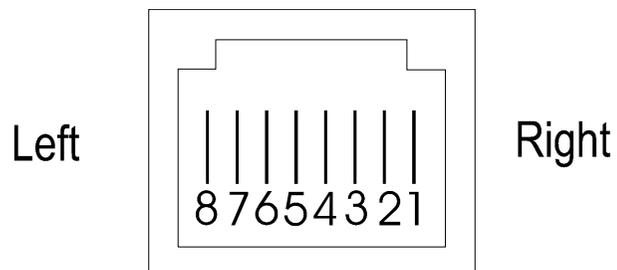
Notes:

1. P/GND means Protective (Chassis) Ground
2. S/GND means Signal Ground

Pin locations RJ45 connectors

The pins in all the RJ45 connectors (front and rear panels) are located at the bottom, with pin 1 on the right; (see [Figure 23](#), below).

Figure 23 Pin numbering in the RJ45 connectors



RJ45 RS422 Serial ports

Some units are fitted with RS422 serial ports. The ports are RJ45 connectors, shielded, and are surge suppressed to 15kV.

The ports provide hardware flow control signals (CTS/RTS) at RS232 levels only (there is a limitation of eight pins in the connector). We advise the following caution:

Caution

If you wish to use hardware flow control, ensure the device you are connecting supports hardware flow control at RS232 voltage levels.

The RS422 pin-outs are shown below ([Table 6](#)):

Table 6
RJ45 RS422
pin-outs
(serial ports)

Pin	Circuit	Direction	Function
1	RTS	Input	Request To Send
2	S/GND	—	Signal Ground
3	RXD-	Input	Receive Data
4	TXD-	Output	Transmit Data
5	TXD+	Output	Transmit Data
6	RXD+	Input	Receive Data
7	CTS	Output	Clear To Send
8	S/GND	—	Signal Ground
Shield	P/GND	—	Protective (Chassis) Ground

Notes:

two ‘Signal Ground’ pins are provided so that you can twist RTS and CTS with earth in the connecting cable, to reduce cross-talk.

RJ45 10/100BaseT port JETSTREAM 8500

The RJ45 port on the *rear* panel, labelled ‘10/100 BaseT’ is 8-pin shielded RJ45. The positions of the pins inside the connector are shown in [Figure 23](#).

Pinouts of 10/100
BaseT port on the
rear panel

Pin	Signal	Function
1	TXD+	Transmit Data+
2	TXD-	Transmit Data-
3	RXD+	Receive Data+
4	-	do not connect
5	-	do not connect
6	RXD-	Receive Data-
7	-	do not connect
8	-	do not connect

RJ45 10BaseT port JETSTREAM 4000

The RJ45 port on the *rear* panel, labelled '10BaseT' is 8-pin shielded RJ45. The positions of the pins inside the connector are shown in [Figure 23](#).

Pinouts of 10BaseT port on the rear panel

Pin	Signal	Function	switch position on LANSTREAM
1	TXD+	Transmit Data+	in 'hub' position
2	TXD-	Transmit Data-	
3	RXD+	Receive Data+	
4	-	do not connect	
5	-	do not connect	
6	RXD-	Receive Data-	
7	-	do not connect	
8	-	do not connect	

RJ45 10BaseT port LANSTREAM 2000

The RJ45 port on the *rear* panel, labelled ‘10BaseT’ (on the LANSTREAM it is referred to as the ‘uplink’ port) is 8-pin shielded RJ45..The positions of the pins inside the connector are shown in [Figure 23](#).

Pinouts of 10BaseT port on the rear panel

Pin	Signal	Function	switch position on LANSTREAM
1	TXD+	Transmit Data+	in ‘hub’ position
2	TXD-	Transmit Data-	
3	RXD+	Receive Data+	
4	-	do not connect	
5	-	do not connect	
6	RXD-	Receive Data-	
7	-	do not connect	
8	-	do not connect	

Caution

LANSTREAM: move of switch to ‘uplink’ position.

When you move the switch next to the 10BaseT port to the ‘uplink’ position, you swap the receive and transmit signal pairs in the adjacent RJ45 10BaseT port. The pin-outs of the 10BaseT port are changed and become the same as the ‘hub’ ports (detailed in [RJ45 10BaseT Hub ports \(LANSTREAM only\) on 77](#)).

Admin Port (25-pin)

The port labelled ‘Admin’ is on the rear of the unit. When fitted with a 25-pin female D-type connector the wiring is as follows:

Table 7

Pin	Signal	Function
2	RXD	Receive
3	TXD	Transmit
7	S/GND	Signal Ground
all others	-	(do not connect)

If you wish to connect a terminal into the Admin Port, see the connection example in [Terminals on 87](#).

If you wish to connect a PC fitted with a DB9 connector into the Admin Port, see the connection example in [PCs \(DB9 connectors\) on 90](#).

Admin Port (9-pin)

The port labelled ‘Admin’, on the rear of the unit. Your unit may be fitted with a 9-pin female D-type. The connector is wired for use with a straight-through cable to a PC, as follows:

Table 8

Pin	Signal	Function
3	RXD	Receive
2	TXD	Transmit
5	S/GND	Signal Ground
all others	-	(do not connect)

If you wish to connect a terminal into the Admin Port, see the connection example in [Terminals on 87](#). You will need to use a cross-over cable.

If you wish to connect a PC fitted with a DB9 connector into the Admin Port, see the connection example in [PCs \(DB9 connectors\) on 90](#).

Direct (1:1) Connections

This section describes direct (1:1) connections (definition below) and shows you connection examples. For structured cabling systems, go to [Section Structured Cabling Systems](#).

Definition of a Direct (1:1) connection:

a single length of cable joins the Perle device and your equipment; there is *no* structured cabling system or any other connection in-between.

Notes:

1. Some user equipment need additional signals on the connector. These may not be supported by the Perle device or your cable. The normal way to overcome this is to loopback - on your equipment - one of the output lines to the required input. Refer to the documentation supplied with your equipment, or the supplier of the equipment, for information on which loop-backs, if any, are required.
2. Other than a specific requirement at your equipment (as in note 1), do not connect unused pins on either connector.
3. Protective Ground (P/GND) terminates on the connector and so does not have a pin number.

B.0.1 Example Connections

In this section we show example connections between Perle ports and the following devices:

Terminals

Terminals (slow speed or using software flow control) [Terminals \(slow speed or using software flow control\) on 87](#)

including:

connection from the 25-pin Admin Port to a Terminal

connection from the 9-pin Admin Port to a Terminal

Terminals (faster speed or using Hardware Flow Control) [Terminals \(faster speed or using Hardware Flow Control\) on 88](#)

Modems

direct (1:1) connections:

[direct \(1:1\) connections: on 89](#)

PCs (DB9 connectors)

direct (1:1) connections

*PCs (DB9 connectors)
on 90*

including:

connection from the 25-pin Admin Port to a PC

connection from the 9-pin Admin Port to a PC

Serial Printers

with software flow control

*with software flow
control on 91*

with hardware flow control

*with hardware flow
control on 92*

Parallel Printers

direct (1:1) connections

Parallel Printers on 93

Terminals

B.0.2 Terminals (slow speed or using software flow control)

For a standard terminal operating at slow speeds, or using software flow control, a simple 3-pin connection can be used:

Perle RS232 RJ45				Terminal DB25	
RXD	6	<-----	2	TXD	
TXD	5	----->	3	RXD	
S/GND	4	-----	7	S/GND	

Notes:

1. In addition to the signals shown in the examples above, you may connect Protective Ground (P/GND) if you have shielded twisted-pair (STP) cable. Connect P/GND at *either* your equipment *or* the Perle device (but not both). P/GND will reduce interference in noisy environments.

connection from the 25-pin Admin Port to a Terminal

Perle 25-pin Admin Port DB25				Terminal DB25	
TXD	3	----->	3	RXD	
RXD	2	<-----	2	TXD	
GND	7	-----	7	GND	

connection from the 9-pin Admin Port to a Terminal

Perle 9-pin Admin Port DB9				Terminal DB25	
TXD	2	----->	3	RXD	
RXD	3	<-----	2	TXD	
GND	5	-----	7	GND	

B.0.3 Terminals (faster speed or using Hardware Flow Control)

For a terminal operating at speeds faster than 9600 baud, or for a terminal which cannot use xon/xoff flow control, the following connections are required:

Perle device				Terminal
RS232	RJ45			DB25
RXD	6	<-----	2	TXD
TXD	5	----->	3	RXD
RTS	8	<-----	4 or 20	RTS or DTR
*CTS	7	----->	5	*CTS
S/GND	4	-----	7	S/GND

Notes:

1. In addition to the signals shown in the examples above, you may connect Protective Ground (P/GND) if you have shielded twisted-pair (STP) cable. Connect P/GND at *either* your equipment *or* the Perle device (but not both). P/GND will reduce interference in noisy environments.
2. * asterisk denotes that you connect CTS to CTS only if input flow control (from the Terminal to the Perle device) is required.

Modems

B.0.4 direct (1:1) connections:

Modems; example connections,

Perle device				Modem	
RS232	RJ45			DB25	
	RXD	6	<-----	3	RXD
	TXD	5	----->	2	TXD
	RTS	8	<-----	5	CTS
	CTS	7	----->	4	RTS
	DSR	2	----->	20	DTR
	S/GND	4	-----	7	S/GND
	DCD	1	<-----	8	DCD
	DTR	3	<-----	6	DSR

Notes:

1. At the modem, signal RXD is received data from the PSTN; signal TXD is transmitted data to the PSTN.
2. In addition to the signals shown in the examples above, you may connect Protective Ground (P/GND) if you have shielded twisted-pair (STP) cable. Connect P/GND at *either* your equipment *or* the Perle device (but not both). P/GND will reduce interference in noisy environments.

PCs (DB9 connectors)

PC, example connections,

with a Perle RS232 RJ45 connector and a direct (1:1) connection to the PC (connection not through a structured cabling system), and using hardware flow control:

Perle RS232 RJ45				PC DB9	
DSR	2	<-----	4	DTR	
DTR	3	----->	6	DSR	
S/GND	4		5	S/GND	
TXD	5	----->	2	RXD	
RXD	6	<-----	3	TXD	
CTS	7	<-----	7	RTS	
RTS	8	----->	8	CTS	

1. If your PC is fitted with a DB25 connector, use the same DB25 pin-outs as for modems, shown in [Section Modems](#)
2. We assume you are connecting your PC directly to the Perle device (no structured cabling system).
3. In addition to the signals shown in the examples above, you may connect Protective Ground (P/GND) if you have shielded twisted-pair (STP) cable. Connect P/GND at *either* your equipment *or* the Perle device (but not both). P/GND will reduce interference in noisy environments.
4. The application of the connection example is a PC running terminal emulation software set to 'hardware flow control'.

connection from the 25-pin Admin Port to a PC

Perle 25-pin Admin Port DB25				PC DB9	
TXD	3	----->	2	RXD	
RXD	2	<-----	3	TXD	
GND	7	-----	5	GND	

connection from the 9-pin Admin Port to a PC

Perle 9-pin Admin Port DB9				PC DB9	
TXD	2	----->	2	RXD	
RXD	3	<-----	3	TXD	
GND	5	-----	5	GND	

Serial Printers

B.0.5 with software flow control

Perle device				Printer			
RS232 RJ45				DB25			
	RXD	6	<-----	2	TXD		
	TXD	5	----->	3	RXD		
	S/GND	4	-----	7	S/GND		

Notes:

1. In addition to the signals shown in the examples above, you may connect Protective Ground (P/GND) if you have shielded twisted-pair (STP) cable. Connect P/GND at *either* your equipment *or* the Perle device (but not both). P/GND will reduce interference in noisy environments.
2. Some printers require additional pins to be held high (connected). Check your printer's documentation and follow any instructions.

Serial Printers, example connections, continued:

B.0.6 with *hardware* flow control

Perle device				Printer	
RS232	RJ45			DB25	
	RXD	6	<-----	2	TXD
	TXD	5	----->	3	RXD
	RTS	8	<-----	20	DTR
	S/GND	4	-----	7	S/GND

Notes:

1. The printer has independent hardware flow control, using its DTR pin. Check your printer is doing the same.
2. In addition to the signals shown in the examples above, you may connect Protective Ground (P/GND) if you have shielded twisted-pair (STP) cable. Connect P/GND at *either* your equipment *or* the Perle device (but not both). P/GND will reduce interference in noisy environments.
3. Some printers require additional pins to be held high (connected). Check your printer's documentation and follow any instructions.

Parallel Printers

example connections

a direct (1:1) connection to the printer (no structured cabling system present)

Perle device			Printer		
DB25 Female Parallel			Centronics 36-pin		
STROBE	1	----->	1	STROBE	
DATA 1	2	<---and---	2	DATA 1	
DATA 2	3	<---and---	3	DATA 2	
DATA 3	4	<---and---	4	DATA 3	
DATA 4	5	<---and---	5	DATA 4	
DATA 5	6	<---and---	6	DATA 5	
DATA 6	7	<---and---	7	DATA 6	
DATA 7	8	<---and---	8	DATA 7	
DATA 8	9	<---and---	9	DATA 8	
ACKNLG	10	<-----	10	ACKNLG	
BUSY	11	<-----	11	BUSY	
PE	12	<-----	12	PE	
SLCT	13	<-----	13	SLCT	
AUTOFEED	14	----->	14	AUTOFEED	
ERROR	15	<-----	32	ERROR	
INIT	16	----->	31	INIT	
SLCT IN	17	----->	36	SLCT IN	
GND	18	-----	19	GND	
GND	19	-----	20	GND	
GND	20	-----	21	GND	
GND	21	-----	22	GND	
GND	22	-----	23	GND	
GND	23	-----	24	GND	
GND	24	-----	25	GND	
GND	25	-----	26	GND	

Notes:

<---and---> means input *and* output

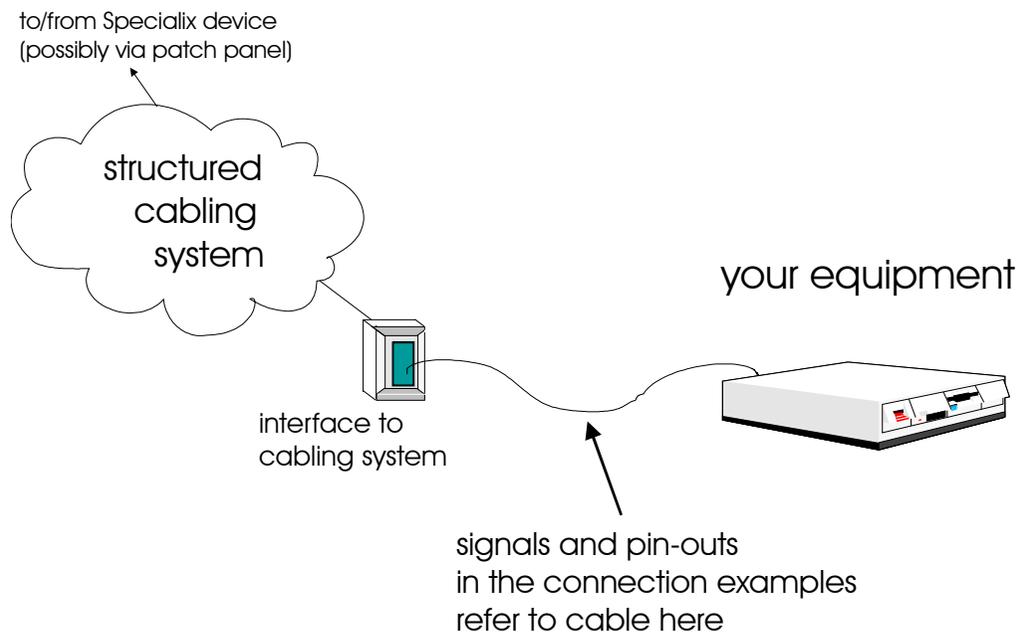
Structured Cabling Systems

This section details structured cabling systems. For direct (1:1) connections, go to [Section Direct \(1:1\) Connections](#).

Notes:

1. In the connection examples which follow, the signals shown refer to the connection at the end of the cabling system to which your equipment is attached - see [Figure 24](#). At the other end of the cabling system, where the Perle device is attached, we assume - and recommend - you use a straight-through RJ45 cable to connect our Perle device to the cabling system.

Figure 24 structured cabling system environment



2. *Within* (inside) the structured cabling system, we presume you use straight-through cabling, i.e. pin 1 to pin 1, pin 2 to pin 2, etc.

3. Some user equipment need additional signals on the connector. These may not be supported by the Perle device, or your cable. The normal way to overcome this is to loopback - on the your equipment - one of the output lines to the required input. Refer to the documentation supplied with your equipment, or the supplier of the equipment, for information on which loop-backs, if any, are required.
4. At each end of the cable, you must terminate all pairs of wires on connector pins. An unconnected wire will receive electromagnetic radiation and possibly create interference in the cable.
5. If you have wiring other than shown in the connection examples, and DCD is an input on your equipment, ensure that it is **not** connected to DCD in the Perle device.
6. On the RJ45 connector, Protective Ground (P/GND) terminates on the connector and so does not have a pin number.

B.0.7 Example Connections

In this section we show example connections between Perle ports and the following devices:

Terminals

structured cabling system

*structured cabling
system on 97*

Modems

structured cabling system

*structured cabling
system on 98*

PCs (DB9 connectors)

structured cabling system

*structured cabling
system on 99*

Serial Printers

structured cabling system

*structured cabling
system on 100*

Terminals, example connections:

B.0.8 structured cabling system

With a structured cabling system, use the example below to connect any type of terminal. The pins and signals refer to the end of the cabling system to which the terminal is attached - see [Figure 24](#). We have shown the signals of a Wyse 60 terminal; for any other type of terminal, refer to the terminal's documentation.

Interface to cabling system				Terminal	
RJ45				DB25	
RXD	6	<-----	2	TXD	
TXD	5	----->	3	RXD	
RTS	8	<-----	20	DTR	
CTS	7	----->	5	CTS	
DSR	2	----->	6	DSR	
S/GND	4	-----	7	S/GND	
DCD	1	<-----	4	RTS	
DTR	3	<-----			
		(n/c)		DCD	

Notes:

1. In addition to the signals shown in the examples above, you may connect Protective Ground (P/GND) if you have shielded twisted-pair cable. Connect P/GND at *either* your equipment *or* the interface to cabling system (but not both). P/GND will reduce interference in noisy environments.
2. *Meaning of ' | ':* the DCD and DTR signals to the interface to the cabling system originate/terminate jointly on the RTS pin at the terminal.
3. The DCD pin at the terminal is not connected (n/c); (devices other than the Wyse 60 may require that the DCD pin is held high).
4. At the end of the cabling system to which the Perle device is attached, use a straight-through cable.
5. The minimum connection requirement is the RXD/TXD, TXD/RXD, RTS/RTS or DTR, CTS/CTS (if input flow control required) and S/GND signals (Interface to Cabling System/Terminal). The other pins may be connected (as in our example) to ensure minimum interference from unconnected pins.
6. For general advice on structured cabling systems, see [Section Structured Cabling Systems](#).

Modems, example connections:

B.0.9 structured cabling system

with a structured cabling system present, the example below is shown at the modem end - see [Figure 24](#); (use a straight-through cable at the Perle device end).

Interface to cabling system				Modem	
RJ45				DB25	
RXD	6	<-----	3	RXD	
TXD	5	----->	2	TXD	
RTS	8	<-----	5	CTS	
CTS	7	----->	4	RTS	
DSR	2	----->	20	DTR	
S / GND	4	-----	7	S / GND	
DCD	1	<-----	8	DCD	
DTR	3	<-----	6	DSR	

Notes:

1. At the modem, signal RXD is received data from the PSTN; signal TXD is transmitted data to the PSTN.
2. In addition to the signals shown in the examples above, you may connect Protective Ground (P/GND) if you have shielded twisted-pair (STP) cable. Connect P/GND at *either* your equipment *or* the interface to cabling system (but not both). P/GND will reduce interference in noisy environments.
3. For general advice on structured cabling systems, see [Section Structured Cabling Systems](#).

PC, example connections:

B.0.10 structured cabling system

Interface to cabling system				PC	
RJ45				DB9	
TXD	5	----->	2	RXD	
RXD	6	<-----	3	TXD	
RTS	8	<-----	7	RTS	
CTS	7	----->	8	CTS	
S / GND	4	-----	5	S / GND	
DCD	1	<-----	1	DCD	
DSR	2	----->	6	DSR	
DTR	3	<-----	4	DTR	

1. If your PC is fitted with a DB25 connector, use the same DB25 pin-outs as for modems, shown in Section [B.0.9](#)
2. In addition to the signals shown in the examples above, you may connect Protective Ground (P/GND) if you have shielded twisted-pair (STP) cable. Connect P/GND at *either* your equipment *or* the interface to cabling system (but not both). P/GND will reduce interference in noisy environments.
3. The minimum connection requirement is the TXD/RXD, RXD/TXD, RTS/RTS, S/GND and CTS/CTS signals (Interface to Cabling System/Terminal). The other pins may be connected (as in our example) to ensure minimum interference from unconnected pins.
4. For general advice on structured cabling systems, see [Section Structured Cabling Systems](#).

Serial Printers, example connections:

B.0.11 structured cabling system

With a structured cabling system present, the example below is shown at the printer end; (use a straight-through cable at the Perle device end).

Interface to cabling system				Printer	
RJ45				DB25	
RXD	6	<-----	2	TXD	
TXD	5	----->	3	RXD	
RTS	8	<-----	20	DTR	
CTS	7	----->	5	CTS	
DSR	2	----->	6	DSR	
S/GND	4	-----	7	S/GND	
DCD	1	<-----	4	RTS	
DTR	3	<-----			
		(n/c)		DCD	

Notes:

1. *Meaning of ' | '* :the DCD and DTR wires at the cabling system originate/terminate jointly on the RTS pin at the printer.
2. The DCD pin at the printer is not connected (n/c); (other printers may require that the DCD pin is held high).
3. The minimum connection requirement is the RXD/TXD, TXD/RXD, RTS/DTR and S/GND connections (Interface to Cabling System/Printer). The other pins may be connected (as in our example) to ensure that there is minimum interference from unterminated pins.
4. In addition to the signals shown in the examples above, you may connect Protective Ground (P/GND) if you have shielded twisted-pair (STP) cable. Connect P/GND at *either* your equipment *or* the interface to cabling system (but not both). P/GND will reduce interference in noisy environments.
5. The printer is using its DTR pin for hardware flow control. Check your printer is doing the same.
6. For general advice on structured cabling systems, see [Structured Cabling Systems on 94](#)

Appendix C Troubleshooting

Introduction

This appendix contains solutions for problems that may arise while JETSTREAM 4000, 8500 or LANSTREAM 2000 (the 'unit').

- if you bought your unit from a registered Perle Supplier, you must contact their Technical Support department; they are qualified to deal with your problem.
- if you are a registered Perle Supplier, and bought your unit from Perle, please contact the Technical Support department of your nearest Perle office. The addresses and telephone numbers of your nearest Perle office are contained in [Appendix F \(Contacting Perle\)](#).

Contents

- [General communication matters](#)
- [Host problems](#)
- [Hub problems \(LANSTREAM only\)](#)
- [JETset problems](#)
- [Login problems](#)
- [Saving to FLASH memory](#)
- [Problems with terminals](#)
- [Emergency Recovery](#)

General communication matters

General communication checks and practices are as follows:

- ping your host; if you cannot ping at all, check the cabling between the unit and your network. If you can ping but packet loss is reported, ping another host/device on the same network. You will appreciate whether the problem is specific to a host/device or general to the network. If there is a problem with the network check the state of the network, including number of nodes.
- after entering or changing ip information for your unit (internet address, broadcast address, subnet mask) *reboot the unit* (does not apply when using BOOTP or DHCP). Once the unit has rebooted other network devices can communicate with it (ping, telnet, etc.). Also, protocols such as ARP and proxy-ARP will work properly
If you don't reboot unit the ip information you have entered/changed will not be recognised by other network devices.
- use the *show routes* command (command line only). See if there a route to the host?
- implement load-balancing in your network by distributing the processing. For example, try not to cluster on the unit devices which require high throughput.
- ensure routes to/from your host are as direct as possible; e.g. ensure the unit is on the same network as your host so that bridges/routers do not act as bottlenecks.
- if your network is congested, subnet it with a bridge; however, bear in mind the recommendations in the previous paragraph.

Host problems

Cannot access a host by name

- if using DNS or if DNS is required, ensure a nameserver is configured on your unit and is accessible (ping it).
- if not using DNS, ensure the host is configured in the host table. Check access to the host by pinging it using the host's IP address.

Cannot access a host on a local network

ensure:

- the network address is correct.
- the subnet mask is set correctly and reflects the network configuration.
- the broadcast address is set correctly and reflects the network configuration.

Cannot access a host on a remote network

- use the *show route* command to verify that there is a route to the remote host. If no gateway is specified, ensure a default gateway is specified. Ping the default gateway to check if it is working.
- Consider the situation beyond the gateway; e.g. are intermediate gateways and the remote host available? Also, check the messages returned by the *show route* command; e.g. that a particular host or gateway is unreachable.

Gateways added into the gateway table are ignored by the unit

- have you used BOOTP and entered a single static gateway in the bootptab file entry? If yes, the other gateways will be ignored. See 8500 Configuration Guide How to setup BOOTP on page 102 for more information

Access to host lost after a few minutes

- If the route to this host goes through routers, make sure those routers are all sending RIP packets across the networks.

You see a message saying your host is in use.

- delete your host as either, a DNS or WINS host, or a gateway, then retry the 'delete host' command/menu item. You may have configured your host as a DNS or WINS host, or a gateway.

The connection fails when the user 'ip_host' parameter is set to 0.0.0.0

other factors: several hosts are entered in the unit's host table

- check the host ip address entered in the server configuration; it is this ip address - and not hosts in the host table - which the unit will use when a user's ip_host is set to 0.0.0.0

Hub problems (LANSTREAM only)

You have a connection into the 10BaseT 'uplink' port (on rear panel), but you cannot communicate to your connected device.

- On the 'uplink' port check if the green 'Link OK' LED is on. If the LED is off you have a bad link. This is probably caused by the switch marked 'HUB - UPLINK'(next to the port) being in the wrong position. Move the switch to the opposite position. Now see whether the 'Link OK' LED is on (steady green); if the LED is on you have a good link.
- Check that the Receive and Transmit signal pairs are connected as follows:

Connected device	direction of signal	LANSTREAM
Receive pair	<-----	Transmit pair
Transmit pair	----->	Receive pair

JETset problems

Trying to access JETSET you see an 'alert' dialog box, e.g. :

Figure 25



- change the parameter 'gui_access' to 'on'.

Login problems

User is waiting up to 60 seconds before login is accepted or denied

other factors: authentication is set to 'both' or 'RADIUS'. User has entered username and password, and has pressed <return> key.

- check RADIUS configuration of primary and secondary authentication/accounting hosts specified, and you have retry and timeout values greater than the default, the unit will be spending time trying each of these hosts and keeping the user waiting.
- adjust RADIUS configuration: specify just one host, reduce timeout and retry values to the default or less than default.

You cannot progress beyond the 'login' and 'password' prompts (when authentication is set to either 'both' or 'RADIUS')

- check the setting of 'account_authenticator' flag is the same in the unit and the RADIUS host; either they should both check or both ignore the authenticator field. If you are not sure, change the setting in the unit; see if this fixes the problem.
- on the RADIUS host check the secret (password); you should see it displayed in clear text in the RADIUS clients file. If you are unsure whether it is the same secret which you entered in the unit, go to the unit and re-enter a new secret.
- on the RADIUS host check there is only one entry for a particular user; do not have multiple entries of the same username (although passwords may be different).

You cannot obtain a login on *any* of the front-mounted ports

- Connect via the Admin port and check the settings of the front-mounted ports; they have probably been set to 'direct' or 'silent' telnet/rlogin.

You have lost or don't know your password (as 'admin' user)

- you must reset the unit to its factory default settings using the 'reset' switch on the rear panel. There is no procedure to access the unit without a password.

at the remote end the client software locks up

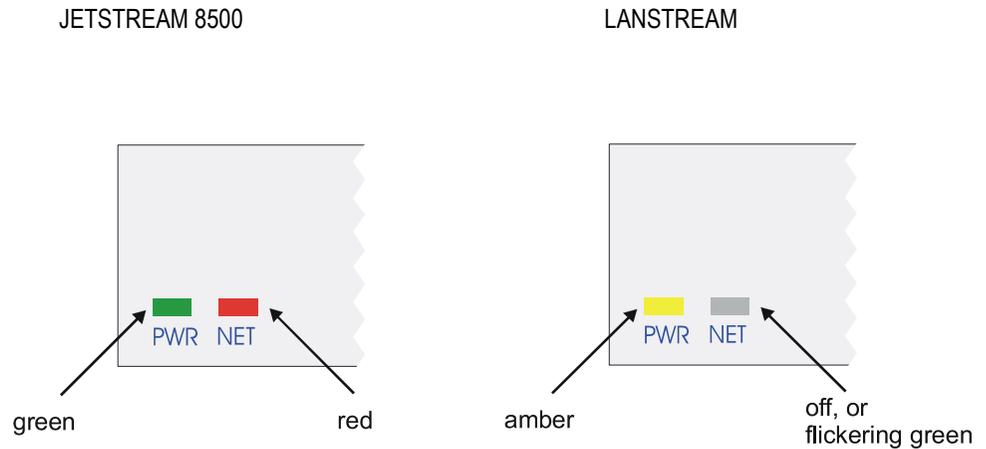
other factors: security (CHAP) is enabled on the line.

- disable CHAP re-challenge parameter (challenge_interval) in the unit. Some PPP client software does not work when receiving CHAP re-challenges.

Saving to FLASH memory

The POWER and NETWORK LEDs display the following colours:

Figure 26 LED display: failure of load to FLASH



The Network LED flickers green if network traffic is identified on the network ports.

- If you were loading a new version of software try again using the Admin Port. The save to FLASH has failed.

Problems with terminals

see also: Section Login problems.

The following section concerns problems with the appearance of data on your terminal screen:

The unit logs me out after a few minutes

- Change the idle timeout value set for the user. The idle timeout for all users is set to 300 seconds (5 minutes) by default, because the unit is designed for remote access connections (using SLIP or PPP).

Corrupt data

- check your line settings (baud rate, stop bits, etc.)

Missing data

- ensure the same type of flow control is set in both your terminal and on the unit's port.

Error message 'not permitted on a dumb terminal' after typing the cli command 'screen'

- set your line to 'termtype' VT100, ansi or Wyse60 (or other form of terminal emulation, if you have downloaded one). The default line type in the unit is 'dumb' which does not support the graphics characters necessary to view the text-based menus.

Screen corruption when using the text-based menu system

- check that the terminal setup in the unit matches your terminal.
- check that entries in the term file match your terminal setup.
- if using a PC/computer, ensure the type of terminal emulation selected in your application matches those supported by the unit. If you still have the problem, you may be suffering with poorly written terminal emulation in your application. Instead use the command line mode; if you have a web browser use JETset.

When using the function keys on your keyboard, nothing happens or your sessions keep swapping.

- Change your screen switch character. The function keys on the keyboards of some terminals (e.g. Wyse 60) send character sequences which begin with ^a; unfortunately, ^a is also the default screen switch character, or 'hot- key', which you use to switch between sessions. A valid alternative would be ^b (hex=02).

If you are the system administrator, you can change any user's screen switch character.

When using a downloaded terminal definition, you are having problems using arrow keys.

- Use Ctrl-K, Ctrl-J, Ctrl-H and Ctrl-L for up, down, left and right respectively.

When switching from a session back to the text menus, both screen images are superimposed.

- Press ^r to redraw the screen.

INIT: Error in terminal file <filename>

- This error indicates that you have exceeded the 80 character limit for one or more of the terminal capabilities defined in the reported file.

INIT: Error on line *n* in terminal file <filename>

- You have omitted the '=' sign from the reported line.

Emergency Recovery

Problem:

You have a unit already configured and,

- you do know your password, but
- have lost, misconfigured or don't know the IP address of the unit, and
- you cannot obtain a login on any port (including the console port)

The emergency recovery method is to use BOOTP (see How to setup BOOTP).

- Setup a host machine on your network to run BOOTP. Using the ethernet address of the unit (printed on the base of the product) BOOTP will assign the unit a known IP address.
- Now, you should be able to telnet into the unit and change its IP address.

Using BOOTP to recover access to your unit in this manner will preserve all configuration settings - apart from the IP address.

Appendix D RADIUS & Networking

Introduction

The purpose of this appendix is to provide general information on the RADIUS protocol and general networking concepts, for those who are unfamiliar with the technology. The aim is to provide sufficient information to allow installation and testing of products on a TCP/IP network, where a RADIUS host may or may not be in use.

Contents

The contents of this appendix is:

- *RADIUS*
- *TCP/IP*
- *Network Addressing*
- *Subnet Masking*
- *Hostnames*
- *DNS*
- *WINS*
- *Address Resolution Protocol*
- *TCP/IP Applications - Terminal Access*
- *TCP/IP Applications - File Transfer*
- *RIP*
- *Internet Registration*

RADIUS

Overview

RADIUS is an acronym for the Remote Dial-In User Service, a client/server security protocol. It was originally developed by Livingston Enterprises and is now commercially available and subject to various RFCs (Request for Comments).

The main functions of the RADIUS service are authentication and accounting. Authentication provides a centralized means of checking the validity of users connecting to devices on the network. Accounting is a logging capability for network connections and is used for billing purposes.

RADIUS works as follows: a server (host) on the network acts as a RADIUS host and stores security information. Devices on the network - such as JETSTREAM 4000, 8500 or LANSTREAM 2000 - who wish to use the RADIUS service, are known as RADIUS clients. These clients communicate with the RADIUS host to authenticate users; they also provide session details from which the RADIUS host calculates accounting information.

The advantages of RADIUS are tight security, flexibility, simplified management and extensive logging capabilities.

JETSTREAM 4000, 8500 or LANSTREAM 2000 and RADIUS

JETSTREAM 4000, 8500 or LANSTREAM 2000 (the '*unit*') supports the RADIUS protocol and is therefore able to take advantage of the RADIUS service. You can configure RADIUS authentication and accounting within the unit.

A typical use of the unit with RADIUS may be as follows: details of all users are entered on the RADIUS host. In the unit you set authentication to take place on the RADIUS host. If authentication is successful (username and password valid) the unit begins a service (e.g. telnet or PPP) for each user based on instructions received from the RADIUS host. Periodically you go to your RADIUS host and review the accounting log of connections made through the the unit.

The authentication and accounting functions apply to the whole the unit - you cannot apply the functions on a per user basis. Note however that username 'admin' will always be authenticated by the unit, even if authentication is set to 'RADIUS' (i.e. RADIUS only). You can turn authentication and accounting on/off independently, should you wish to use only authentication and not accounting, or vice versa. It also means that the unit can not use the RADIUS service at all, if you prefer to operate that way.

You will most likely want to use the RADIUS service on remote access connections, with a home or mobile user, or connections to another branch office. The unit can use RADIUS on terminal server connections (character processing), with the exception of 'direct' and 'silent' type connections (which are specific to the unit).

The *authentication* and *accounting* functions in the unit are described in the next sections.

authentication

Until you add a RADIUS host in the unit, authentication will happen only in the unit. Once a RADIUS host is added, the unit will authenticate against its own user table; if unsuccessful, the unit will ask the RADIUS host to authenticate.

When the unit uses the RADIUS host for authentication, it submits user information (mainly name and password). If the unit receives no response it can resend the information. You can configure the number of times that the unit sends this information and how long it waits for a response before resending it. Should there be no response after the specified number of retries, the unit will try a secondary RADIUS host (provided you have one and you have configured it in the unit).

Once a RADIUS host (either primary or secondary) receives the authentication request, it consults a database of users. The user entry in the database contains a list of requirements which must be met to allow access for the user. These requirements include verification of the password, but can also specify the client(s) or port(s) to which the user is allowed access.

If all requirements are met, a list of configuration values for the user are sent to the unit. These values include the type of service (e.g. rlogin, SLIP) and all values necessary to deliver the desired service. For SLIP this may include values such as IP address, subnet mask and desired compression. For character mode users (i.e. terminal server connections on the unit) this may include values such as desired protocol (e.g. rlogin) and host. The unit begins a service for that user with the values passed down by the RADIUS host. An important point to note is these values passed down by a RADIUS host override those configured within the unit.

If any requirement is not met, the RADIUS host sends a message to the unit saying that the user request is invalid. The unit in turn denies access to the user and provides another login prompt. For security reasons the unit does not give a message to the user saying why login has failed.

accounting

Accounting is off in the unit by default. When turned on, with an accounting host specified, JETSTREAM 4000, 8500 or LANSTREAM 2000 accounting depends on user action. Very simply, accounting in the unit starts when service for a user begins ('user' service such as 'telnet, SLIP' etc.) and ends when the user logs out.

When accounting starts, the unit increments the session id within the unit and sends a message to the RADIUS host that an accounting session has started. When accounting stops, the unit sends a message to the RADIUS host that accounting has stopped on that session.

If a user is to be called-back the unit sends an accounting message to the RADIUS host indicating that accounting has started; when callback has finished the unit sends another message stating that accounting has stopped - both messages will be sent whether or not callback was successful.

The unit's accounting 'stop' messages will include information such as:

- the session id number (same as shown in the unit)
- number of seconds the user received service
- how many octets were received and sent from/to the port
- how many packets were received and sent from/to the port (SLIP/PPP only)
- how the user was authenticated

By interrogating the RADIUS' host log file, you should be able to retrieve the above information on a per session basis. No log file is recorded in the unit.

Interrupted sessions. If there is a power-cut (to the unit only, not the RADIUS accounting host) and the unit is without power for a period, all sessions which were open in the unit will show as open sessions in the RADIUS hosts' log file. When power is re-supplied, the unit - once it has rebooted - will send an accounting stop message to the RADIUS host with information that all those same sessions are now closed. While the unit is without power, session information is stored in battery-backed RAM.

If you reboot the unit from the menus/cli, the unit will firstly send an accounting stop message to the RADIUS host with information that all sessions are now closed. the unit will then reboot.

If a user's machine/terminal is unplugged or crashes whilst a session is open, the unit will send a message to the RADIUS host that accounting on that session has stopped.

Exceptions to accounting. When connecting to a branch office (using two units back-to-back across the public network) accounting will happen when the PPP protocol is used and PAP/CHAP are on; (PAP/CHAP require a username and password). If PAP/CHAP are off or the SLIP protocol is used, no accounting will happen because there is no mechanism to provide a username and password.

When line service is set to 'direct' or 'silent' (e.g. direct telnet, silent rlogin) the user will be connected direct to a specified host and will be presented with a login by that host. Accounting will not take place because the login process is not happening in either the unit or the RADIUS host.

When a user logs in to the unit to start pre-configured sessions (users may have a maximum of four simultaneous sessions on different hosts) accounting will record only one session. The recorded session will be from the user login to the user logout on the unit; individual sessions to hosts made by a user while logged on to the unit are not recorded.

TCP/IP

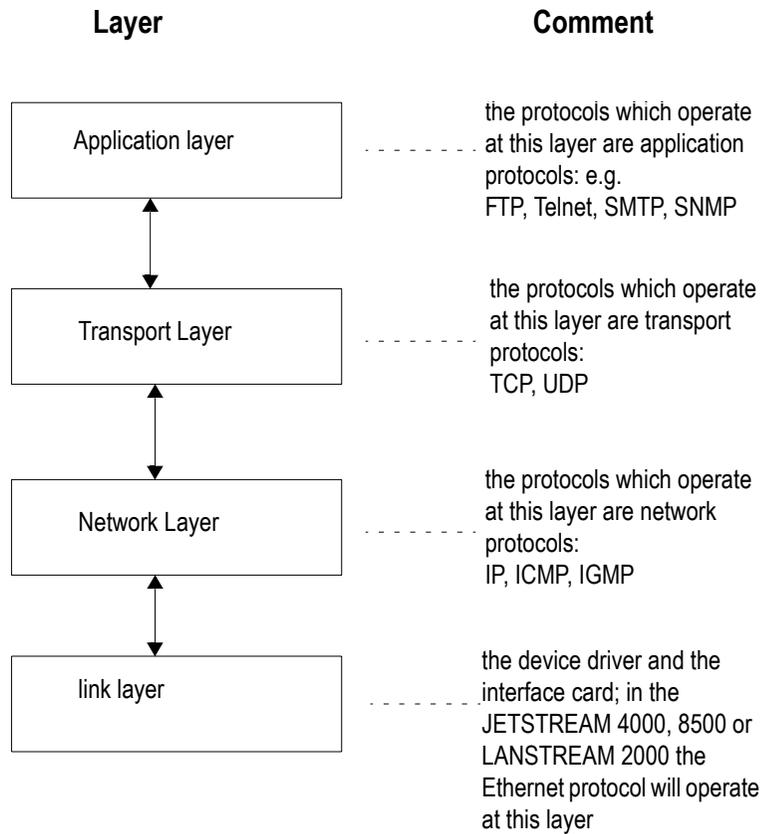
TCP/IP means ‘Transport Control Protocol/Internet Protocol’ - however TCP and IP are two of several protocols in TCP/IP. TCP/IP is a suite of protocols. It allows computers made by different manufacturers with different operating systems to communicate with one another. You can describe TCP/IP as a communication mechanism for networked computers.

TCP/IP started life as a government-financed research project into packet switched networks (see [History on page 114](#)). Over the years TCP/IP has been phenomenally successful; today it is the most widely used form of networking. It is also the basis of the Internet, with which we are all familiar.

Overview

There are many protocols which form TCP/IP such as UDP and ICMP; TCP and IP are just two of the many protocols. The protocols - like all network protocols - are developed in layers; TCP/IP, as a protocol suite, is therefore a combination of protocols operating at different layers. The general view of TCP/IP is of a 4-layer system, as shown in [Figure 27](#).

Figure 27 the TCP/IP protocol suite



Each layer is responsible for a different aspect of a communications link between two computers. It is also responsible to adjacent layers, above or below.

History

TCP/IP networking is generally associated with UNIX. Its origins, however, lie with the US government's Defence Advance Research Projects Agency (DARPA).

DARPA sponsored the development of TCP/IP to provide a coherent suite of network protocols for ARPANET, which links key defence, government and research computer systems. Many of these sites use supercomputers, employing proprietary operating systems, but to encourage academic involvement, and offer broader access, DARPA funded the development of TCP/IP software for use with 'Berkeley Standard Distribution' (BSD) UNIX.

By the mid-eighties, the National Science Foundation (NSF) had realised the value of ARPANET, but saw the benefit of expanding access to a wider community, it therefore funded the development of a higher-performance, wider-access network system. This network became today what we know as the INTERNET or World Wide Web.

With the growth in demand for remote access, two protocols were developed. Firstly there was SLIP (Serial Line Interface Protocol) and then there was PPP (Point to Point Protocol). By allowing the transmission of IP packets over a serial line these protocols fuelled the remote access market. These protocols are described in the JETSTREAM 4000, 8500, LANSTREAM 2000, Configuration Guide, [Appendix C \(SLIP and PPP overview\)](#).

The originators of the internet, DARPA, assumed in the early design that a small number of sites, with potentially large numbers of computers at each site, would be the norm. However once it became obvious that a broader academic and commercial involvement would occur, the addressing scheme had to be expanded to allow more sites. As a result of the growing number of computer networks, internet addresses exist in three classes; these classes are discussed in the next section.

Network Addressing

To construct a worldwide internet, some mechanism has to be provided to ensure each network node (or host) has a unique address. Because TCP/IP supports many transmission media (not just Ethernet but also Token Ring and various WAN link technologies), its addressing scheme must be independent of the network connection method used.

All TCP/IP nodes have an 'internet address'; these can be set autonomously, but to be connected to the internet, the address must be provided by the Internet authorities. In most cases your local Internet Service Provider will take care of the Internet administration for you.

The basic internet address is a 32 bit number. To allow ease of representation this address is divided into 4 bytes and shown as 'dotted decimal' notation, e.g. 128.213.120.151. There is a meaning to the pattern of four bytes: each byte is either a part of the network address or a part of the host address (a host being any equipment that can be attached to a network). To identify the parts of an IP address there are three basic classes of address, as described below:

Class A

Class A is identified by the first byte in the range 1 to 127; e.g. 89.12.183.34. So in the address 89.12.183.34, the network part of the address is 89 and the host part of the address is 12.183.34.

In detail, the 32 bits in a Class A address are divided as shown below:

1	27	832
0	netid	hostid

The 4-byte format could be represented thus:

1.host.host.host - 127.host.host.host

Class A supports 128 networks of 16 million nodes.

Class B

Class B is identified by the first octet in the range 128 to 191; e.g. 145.12.183.34. So in the address 145.12.183.34, the network part of the address is 145.12 and the host part of the address is 183.34.

In detail, the 32 bits in a Class B address are divided as shown below:

1	2	316	17	32
1	0	netid	hostid	

The 4-byte format could be represented thus:

128.network.host.host - 191.network.host.host

Class B supports 16 thousand networks of 64 thousand nodes.

Class C

Class C is identified by the first octet in the range 192 to 223; e.g. 201.12.183.34. So in the address 201.12.183.34, the network part of the address is 201.12.183 and the host part of the address is 34.

In detail the 32 bits in a Class C address are divided as shown below:

1	2	3	424	25	32
1	1	0	netid	hostid	

The 4-byte format could be represented thus:

192.network.network.host - 223.network.network.host

Class C supports one million networks of 223 nodes.

Subnet Masking

Subnet masking allows you to divide your network into smaller logical networks. You mask part of the ip address and create a new part called the 'subnet' part.

An example of where you want to implement subnet masking is as follows: you have a LAN with a single ip address. Over time the LAN has become very large; it covers a large geographical area and there are many devices attached. You want to divide the network into smaller logical networks so that routers can filter the traffic, thereby reducing the activity seen on each individual network. The solution is subnet masking.

Hostnames

Although, all hosts have a unique internet address, it is normal in day-to-day use to use hostnames. Example hostnames are: names of characters in science fiction series, planets or other stellar bodies. In more commercial concerns, structured name schemes may be used.

To convert hostnames to internet addresses, a lookup table is used, much like a telephone directory. In a small system this is normally performed by a file called `/etc/hosts`, but on larger systems, or if connected to the internet, management of this list becomes very difficult. A number of systems are available for managing larger networks including DNS (Domain Name Service) and SUN's NIS (which used to be called Yellow Pages). The operation of these schemes is outside the remit of this manual, but they are well covered in UNIX documentation.

Below is an example of an `/etc/hosts` file:

```
***** *
*
*          SAMPLE etc/hosts File          *
*
***** *
#          @ (#)      1.2 Lachman System V STREAMS
          hosts      TCP Source
#          SCCS IDENTIFICATION
127.0.0.1          localhost
192.65.131.1      mercury mercury.perle.com
192.65.131.2      venus  venus.perle.com
192.65.131.3      earth
192.65.131.4      mars
192.65.131.5      jupiter
192.65.131.6      saturn
192.65.131.7      uranus   nameserver
192.65.131.8      neptune
192.65.131.9      pluto    sipport
192.65.131.10     titan
192.65.131.11     moon
```

DNS

DNS (Domain Name Service) is a database of hostnames and corresponding internet addresses. It will contain the details of all the hosts in your local network and possibly other regularly used hosts beyond. You will be operating the DNS on a host in your network; if the unit cannot resolve a hostname it will consult this host.

WINS

WINS (Windows Internet Naming Service) is used to register NetBIOS computer names and resolve them to IP addresses. The WINS server maintains a database of these computer names and IP addresses; this

database is updated dynamically so it is always current. The currency of the database eliminates the need for an LMHOSTS file to be maintained at any TCP/IP host that uses WINS.

Address Resolution Protocol

Those familiar with Ethernet will know that each ethernet device, be it a PC adaptor card, a complete computer system, terminal server or bridge has a unique address (48 bits long), allocated via the manufacturer by the IEEE.

All ethernet messages are passed using this address, which unfortunately bears no resemblance to the internet address. To establish connections between TCP/IP devices each has to be able to find out the ethernet address associated with a particular TCP/IP address. The mechanism used to achieve this is called ARP. It's operation is normally transparent to the network user, but direct intervention is sometimes required. Once a TCP/IP session is established the connection is normally used to run a standard application.

1. RARP Configuration and Operation

The RARP protocol is an alternative method to BOOTP/DHCP for a unit to discover its IP address on a network. It is useful on small, minimal configuration, or for non server based systems that do not wish to configure DHCP/BOOTP. RARP is the fallback configuration method if both DHCP/BOOTP have failed to establish a configuration.

The simplest method of configuring your JETSTREAM 4000, 8500 and LANSTREAM 2000 (*the 'unit'*) is to manually configure server parameters such as the unit Internet address and then rely on this stored configuration. Under some circumstances and on managed networks this may be undesirable and some automatic configuration process is demanded. The configuration processes BOOTP/DHCP are provided in the unit's software to cater for these environments. In some network configurations where BOOTP/DHCP are unavailable, an alternative simpler configuration method is desirable. RARP protocol allows for the configuration of the unit's Internet address only.

RARP is automatically invoked when the unit has no stored IP address **and** BOOTP/DHCP have failed to establish a configuration. No additional configuration is required in the unit to enable RARP, however your network server will need to have it's name to address resolution database configured for JETSTREAM/LANSTREAM clients and the RARP service should be enabled.

Consult your system documentation for details of configuring the RARP service on your server's operating system.

Note If automatic configuration of JETSTREAM or LANSTREAM clients is required, only one service DHCP, BOOTP or RARP should be enabled on your network server.

Proxy ARP Operation

This is a method by which the unit replies to ARP requests on behalf of remote clients connected via PPP/SLIP, remote clients thus appear to be directly connected to the LAN in the same way as the unit.

This is essential for proper internetworking on non routed networks.

Proxy ARP allows you to configure a dial-up client's Remote IP address to be an address on the same network or sub-network as the JETSTREAM 4000, 8500 and LANSTREAM 2000 (*the 'unit'*). The unit will then respond to ARP requests for PPP/SLIP connected clients.

In conjunction with the routing protocol changes for this software version, see Section Appendix D (RIP for Clients Configuration and Operation), support for Proxy ARP means that to configure dial-up clients the system administrator need only allocate one network address per SLIP/PPP link.

No additional configuration is required in the unit to enable Proxy ARP.

TCP/IP Applications - Terminal Access

Telnet

This is the most commonly used TCP/IP application. It provides a terminal level connection between devices. A user initiates a Telnet session from a terminal server or another network host. The target machine recognises the incoming message as a telnet session, and performs the necessary actions to attach a pseudo-tty and spawn a getty process. From this point onwards, the connection is treated by the host like any other terminal session.

Rlogin

Rlogin is similar to telnet; it was developed as part of the Berkeley TCP/IP suite. It offers additional features appropriate to UNIX operation, such as passing username and termtype. In addition, in a trusted environment, the identification of username can be used to bypass normal login security and provide a direct connection. On a UNIX system this operation is controlled by the file `/etc/hosts.equiv` for global machine access, and the file `.rhosts` in the home directory of individual users.

Although normally restricted to use on UNIX hosts supporting the Berkeley UNIX TCP/IP extensions, a number of third parties now support Rlogin to mnemonics hosts, e.g. Multinet (VAX and 9370) and DEC VMS-ULTRIX integration products.

TCP/IP Applications - File Transfer

FTP

This is a full function, interactive file transfer program. Normal host security mechanisms are maintained through the use of an interactive login. Once a connection is established remote file system directories can be listed and files transferred in both directions. In addition, data representation (ASCII, EBCDIC, Binary) can be specified. FTP is not currently supported on the unit.

TFTP

This is a reduced-security version of FTP, often used for downloading boot and configuration files to a network device or diskless client. No security checking is performed and the TFTP client has access to any globally readable file on the host system. Because of this, some security managers will not allow the TFTP daemon to be activated. Most systems support secure TFTP, this version limits file access to a particular directory branch. TFTP can be used by the unit to download software upgrades, terminal definitions, configuration files and custom language files.

LPD

lpd is the line printer daemon (spool area handler) and runs on the network file server/host. Microsoft Windows runs a version of lpd, using the term 'lp' followed by another letter, for example 'lpr'. JETSTREAM and LANSTREAM understand lpd jobs and direct them to the appropriate serial or parallel port.

RCP

This is the Berkeley file transfer program. It operates in the same way as the standard UNIX cp command, but to and from a remote system. Security is checked against the permission associated with the supplied username. Like Rlogin, security is controlled by the files */etc/hosts.equiv*, *\$HOME/.rhosts* and *etc/passwd*.

RCP is used by the unit to provide file copying to a printer port.

TCP/IP Ports

As TCP/IP supports a number of applications, the application type is identified, within an IP package, by the 'port number'. A number of these ports are defined in the various TCP/IP standards. A host system identifies incoming packets through a file `/etc/services` a sample of which is given below:

```

*****
*
*          SAMPLE etc/services File
*
*****
#          @ (#)      5.1 Lachman System V STREAMS TCP
          services Source
#
#          System V STREAMS TCP - Release 4.0
#
# Network services, Internet style
#
echo      7/tcp
echo      7/udp
discard   9/tcp      sink null
discard   9/udp      sink null
systat    11/tcp     users
daytime   13/tcp
daytime   13/udp
netstat   15/tcp
gotd      17/tcp     quote
chargen   19/tcp     ttytst source
chargen   19/udp     ttytst source
ftp       21/tcp
telnet    23/tcp
smtp      25/tcp     mail
time      37/tcp     timserver
time      37/udp     timeserver
rpl       39/udp     resource          # resource location
nameserve 42/tcp     name              # IEN 116
r
whois     43/tcp     nickname
domain    53/tcp     nameserver        # name-domain server
domain    53/udp     nameserver
bootps    67/udp     boots             # bootp server
bootpc    68/udp     bootpc           # bootp client
tftp      69/udp
finger    79/tcp
link      87/tcp     ttylink
hostnames 101/tcp    hostname          # usually from sri-nic
sunrpc    111/tcp
sunrpc    111/udp

```

```
auth      113/tcp  authentication
uucp-path 117/tcp
```

Once a packet type has been identified, the appropriate service is started using entries in the file */etc/inetd.conf*, an example of which is shown below:

```

*****
*
#      @ (#) inetd.conf  5.2 Lachman System V STREAMS TCP
#                               Source
#
#      System V STREAMS TCP - Release
#      4.0
#
#      Copyright 1990 Interactive Systems
#      Corporation,
#      Copyright 1987, 1988, 1989 Lachman Associates,
#      Inc(LAI)
#
#      SCCS IDENTIFICATION
ftp      stream      tcp      nowait  NOLUID  /etc/ftpd  ftpd
telnet   stream      tcp      nowait  NOLUID  /etc/      telnetd
shell    stream      tcp      nowait  NOLUID  /etc/rshd  rshd
login    stream      tcp      nowait  NOLUID  /etc/      rlogind
exec     stream      tcp      nowait  NOLUID  /etc/rexecd rexecd
finger   stream      tcp      nowait  nouser  /etc/      fingerd
#uucp    stream      tcp      nowait  NOLUID  /etc/uucpd  uucpd
# Enabling this allows public read files to be accessed via
# TFTP.
#tftp    dgram      udp      wait    nouser  /etc/tftpd  tftpd
# This is the more secure method, since only files from /
# tftpboot can
# be accessed via TFTP. This must be roof in order to de the
# chroot
# to /tftpboot. /tftpboot must be created by hand.
# tftp    dgram      udp      wait    root    /etc/tftpd tftpd -s
# /tftpboot
comsat   dgram      udp      wait    root    /etc/comsat comsat
ntalk    dgram      udp      wait    root    /etc/talkd  talkd
#bootp   dgram      udp      wait    root    /etc/bootpd bootpd
s
echo     stream      tcp      nowait  root    internal
discar   stream      tcp      nowait  root    internal
d
charge   stream      tcp      nowait  root    internal
n
daytim   stream      tcp      nowait  root    internal
e
time     stream      tcp      nowait  root    internal
echo     dgram      udp      wait    root    internal

```

```
discar dgram    udp    wait    root    internal
d
charge dgram    udp    wait    root    internal
n
daytim dgram    udp    wait    root    internal
e
time    dgram    udp    wait    root    internal
smtp    stream    tcp    nowait  mmdf    /usr/mmdf/chans/
smtpd   smtpd
        /usr/mmdf/chans/
smtpsrvr smtp
```

RIP

The Routing Information Protocol (RIP) is a routing protocol used with almost every TCP/IP implementation. Its function is to pass routing information from a router or gateway to a neighbouring router(s) or gateway(s). RIP messages contain information about destinations which can be reached and the number of hops which are required. The hop-count is the basic metric of RIP and so RIP is referred to as a ‘distance vector protocol’. RIP messages are carried in UDP datagrams.

The official specification for RIP is RFC1058; see JETSTREAM 4000, 8500, LANSTREAM 2000, Configuration Guide [Appendix D \(References\)](#).

RIP for Clients Configuration and Operation

The administrator may selectively advertise networks remotely connected via a SLIP/PPP link, and pass RIP routing information to remotely connected clients. As this may be undesirable in some environments this behavior is configurable and is defaulted to the non routing behavior.

2.0.0.1 Additional PPP and SLIP Functionality - RIP Packet Exchange

Transmission and reception of Routing Information Protocol (RIP) packets over PPP and SLIP connections can be configured on a per user basis or on a per line basis. The **routing** parameter associated with a line and each local user determines the exchange of RIP packets between the unit and remotely connected users. For a user authenticated by RADIUS the **Framed-Routing** parameter determines the exchange of RIP packets.

The administrator has four options for setting the **routing** and **Framed-Routing** parameters:

none	Routing information is not exchanged across the link. This is the default setting for a line and a locally defined user.
Send	Routing information is only transmitted to the remote user.
Listen	Routing information is only received from the remote user.
Send_and_listen	Routing information is transmitted to and received from the remote user.

The setting for line routing parameter is the default for a connection but the setting for the local user **routing** parameter or RADIUS **Framed-Routing** parameter is used if this differs from the line **routing** parameter.

At present the additional routing functionality is only configurable from the administrative Command Line Interface (CLI) and/or by using a RADIUS server. In the following example the commands are to the unit’s CLI.

To display the configuration options of the user **routing** parameter:

```
set user <username> routing ?
```

which will display:

```
none
send
listen
send_and_listen
```

To configure a remote user to transmit and receive RIP packets use the command:

```
set user <username> routing send_and_listen
```

To display the settings for a user use the command:

```
show user <username>
```

which would give a result such as

username	kconway
language	english
screen switch	01
level	normal
service	jsprompt
ip_host	192.65.144.46
tcp port	23
callback	off
phone number	01932793522
idle timer	300
session timer	0
framed ip	255.255.255.254
framed netmask	255.255.255.0
framed mtu	1500
framed compression	on
routing	send_and_listen

To configure a line to only transmit RIP packets use the command:

```
set line 1 routing send
```

To display the settings for a line use the command:

```
show line 1
```

which would give a result such as

speed	115200
terminal	dumb
dial	in
flow	hard
bits	8
parity	N
stop	1
pages	4
phone number	01633890145
modem name	motorola
idle timer	0
session timer	0
routing	send
service	ppp
hostname	RASCLIENT
host port	23
JS port	23
current user	

2.0.0.2 Automatic Local IP Address Configuration

For PPP and SLIP lines configured with a Remote IP (RIP) address but with a Local IP address set to 0.0.0.0, the LIP address is automatically set by the unit. The automatic LIP addresses for lines 1-24 are 192.0.0.1 - 192.0.0.24. This functionality removes the requirement to configure the LIP address for each line and should only be used for remote users connecting to the unit. This functionality cannot be used if two units are connected via a PPP or SLIP line or you require routing information exchange with computers on other networks connected via a SLIP/PPP connection.

Internet Registration

Before connecting to the Internet, you will need to register your company name and obtain valid IP addresses from the relevant authorities.

In the USA, Internet registration is controlled by InterNIC:

*Network Solutions
InterNIC Registration Services
505 Huntmar Park Drive
Herndon VA20170*

Tel: (703) 742-4777

Fax: (703) 742-9552

In Europe, registration activities are controlled by RIPE NCC (Reseaux IP Europeens) based in Amsterdam in the Netherlands. RIPE delegates the issuing of network numbers to authorised Internet service providers. Contact your local service provider.

In the Asia and Pacific region, registration is controlled by APNIC (Asian-Pacific Network Information Centre).

APNIC,
Tokyo Central Post Office Box 351
Tokyo, 100-91
Japan

Tel: +81-3-5500-0480

Fax: +81-3-5500-0481

Australian Internet Registry Services are provided by AUNIC:

AUNIC Registration Service
Locked Bag 5744
Canberra
ACT 2601

Fax: 06 248 6165

Appendix E Configuration record

Introduction

Print this page and use the table below to record configuration information on your JETSTREAM 4000, 8500 or LANSTREAM 2000 (s):

Unit #	NAME (descriptive)	ETHERNET ADDRESS	IP ADDRESS
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			

Unit #	NAME (descriptive)	ETHERNET ADDRESS	IP ADDRESS
17			
18			
19			
20			

Appendix F Contacting Perle

You need to read this appendix if you want to contact Perle for technical support or any other queries about this product.

appendix if you want to... This appendix includes the following sections;

- **Making a technical support query** on page **134**
- **Repair procedure** on page **137**
- **Perle support centres worldwide** on page **138**
- **Perle support centres worldwide** on page **138**

Internet access

Click here to access the our website at the following URL:
<http://www.perle.com>

Email

Click here to email Perle at the following address;
Email: support@perle.com

Making a technical support query

This section contains the following information about making a query;

- [Who to contact](#) on page **134**
- [Information needed when making a query](#) on page **135**
- [Making a support query via the Perle web page](#) on page **136**

Who to contact

If you bought your product from a registered Perle supplier, you must contact their Technical Support department; they are qualified to deal with your problem.

If you are a registered Perle supplier, and bought your product from Perle, contact Perle Technical Support at the offices listed below.

Information needed when making a query

When you make a technical support enquiry please have the following information ready;

Hint
Print out this page and fill in the table provided with the basic information you need.

Item	Write details here
Product name and version	
Problem description	
Operating system version	
Driver version	
Details of any other cards installed in your system	
Your name	
Company Name	
Country	
Phone number	
Fax number	
Email address (if available)	

Making a support query via the Perle web page

If you have an internet connection, please send details of your problem to Technical Support using the email links provided on the Perle web site in the 'Support' area.

See also [Perle support centres worldwide](#) on page [138](#) for email links and other contact details for the Perle technical support centres.

[Click here to access our website at the following URL:
http://www.perle.com](http://www.perle.com)

Repair procedure

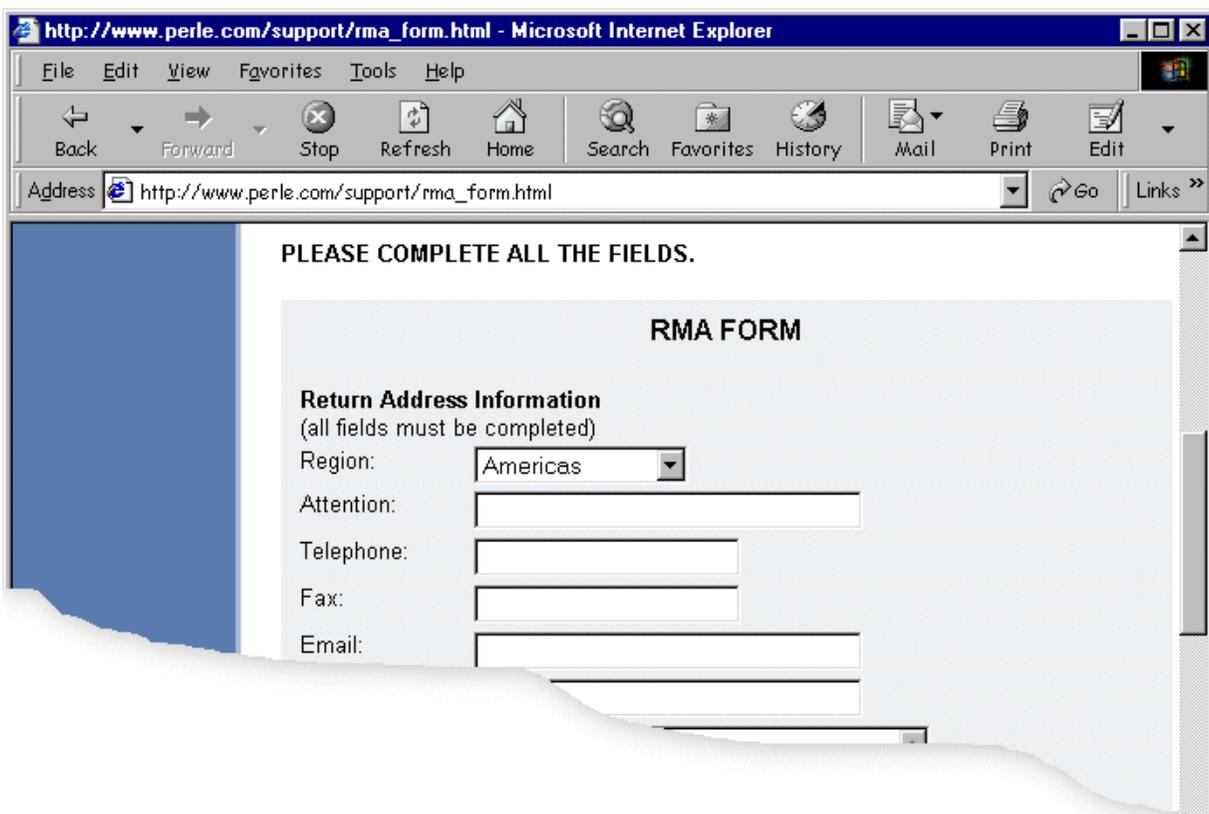
Before sending a unit for repair, you must contact your Perle supplier. If, however, you bought your product directly from Perle you can contact directly. See [Perle support centres worldwide](#) on page 138 for contact information.

Customers who are In Europe, Africa or Middle East can submit repair details via a website form shown in the next picture. This form is on the Perle website, www.perle.com, in the **Support** area.

Click here to access our web site at the following URL:
http://www.perle.com/support/rma_form.html

In the USA and Asia contact the office shown in the Technical Support section.

Website RMA (Return Material Authorisation) Form



The screenshot shows a Microsoft Internet Explorer browser window displaying the RMA Form at http://www.perle.com/support/rma_form.html. The browser's address bar shows the URL. The page content includes a blue sidebar on the left and a main content area with the following text:

PLEASE COMPLETE ALL THE FIELDS.

RMA FORM

Return Address Information
(all fields must be completed)

Region:

Attention:

Telephone:

Fax:

Email:

Perle support centres worldwide

Note

Perle offers free technical support to Perle Authorised Distributors and Registered Perle Resellers.

To access technical support please visit the Perle website at www.perle.com/support.

If you are unable to find the information you require, please feel free to contact our technical support teams by email using the addresses shown in the next table.

Country	Address	Email
North America	Perle Systems Ltd. 60 Renfrew Drive Markham Ontario Canada L3R OE1	<i>Email: ptac@perle.com</i>
Europe	Perle Systems Europe Ltd. 3 Wintersells Road Byfleet Surrey KT14 7LF UK	<i>Email: ptac@perle.com</i>
Asia	Perle Asia Pacific (Pte) Ltd. 190 Middle Road #19-05 Fortune Centre Singapore 188979	<i>Email: ptac@perle.com</i>
Worldwide	Perle Systems Ltd. 60 Renfrew Drive Markham Ontario Canada L3R OE1	<i>Email: ptac@perle.com</i>

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