Application Note

Upgrading ePipe Firmware for ML-IP Products

Contents

1   Introduction

ePipe periodically releases updates to the ePipe firmware for ML-IP products to add new features to the ePipe and fix bugs or other problems. To allow this, ePipe's operating system image is held in a type of erasable memory commonly called flash memory. Flash memory is memory based on an erasable and programmable memory technology. This allows you to "flash" ePipes and perform upgrades without removing and replacing memory or ROM chips on the ePipe circuit board. Flash memory does not require power or batteries and the information in flash memory is retained even when ePipe is turned off.

There are two methods of upgrading the ePipe firmware:

1. **Use the ePipe ML-IP Manager and a TFTP server**
   You will need to download the firmware image from the ePipe web site (http://www.ml-ip.com/).

2. **Use the ePipe CLI (Command Line Interface) and a TFTP server**
   You will need to download the firmware image from the ePipe web site (http://www.ml-ip.com/).

Before performing a firmware upgrade, please take note of the following important information:

Firmware is periodically released by ePipe and is available from the ePipe web site in the Support area. Please check the web site for the latest firmware release prior to upgrading your ePipe.

During the firmware upgrade the following events occur:
1. ePipe unit reboots for the first time.
2. ePipe unit downloads the firmware and checks the validity of the file.
3. ePipe unit downloads the firmware for a second time. ePipe erases its flash memory in preparation for writing the new firmware image into flash memory and then writes the firmware image into flash memory.
4. ePipe unit reboots for the second time, and is now running the new firmware.

NOTE: Due to the fact that the ePipe unit will reboot during the upgrade process, you can only upgrade the firmware via Ethernet 1, not via any other link such as a dial-up modem, ADSL service or any other Ethernet port. Ethernet 1 should always be used to connect the ePipe to your internal LAN.

CAUTION: Never terminate the update process once it has been started. Always allow the firmware upgrade process to complete or recover itself. If the upgrade process stops half way through, data in the flash ROM may be corrupted. The ePipe unit may not be able to start up; if so, contact ePipe Technical Support.

2   Upgrading Firmware via the ePipe ML-IP Manager and a TFTP server

ePipe supplies firmware updates as binary flash firmware image files which can be downloaded directly into the ePipe from a TFTP server. To be able to do this you must already have a functioning TFTP server on your network. Most UNIX operating systems have a TFTP server, although it may not be ready for use until it is configured. Windows operating systems are not supplied with a TFTP server, however there are third party TFTP servers that can be downloaded from the Internet. An easy to use example of a TFTP server for Windows is "Pumpkin" from Klever Group, Inc. (http://www.klever.net/) [1]. Please view section 7 in this document for notes on configuring Pumpkin. For extra information on configuring your chosen TFTP server, consult your TFTP server or operating system documentation.

The ePipe ML-IP Manager is the internal configuration software of the ePipe and can be accessed using a Java-enabled web browser, as described in the ML-IP documentation.

Follow these steps to upgrade your ePipe using a TFTP server and the ePipe ML-IP Manager:

1. Ensure your TFTP server is operational and files can be downloaded from the server's download directory.

2. Download the flash firmware image file from the ePipe web site (http://www.ml-ip.com/) and copy it to the download directory of your TFTP server.   All downloads are available from the download options in the Support area. The name of the file will be similar to "mlip-XXXX-NNN.flash" where X is the series number of the ePipe (2300 for example) and NNN is the firmware version number. E.g. mlip-2300-244.flash is the file name of ML-IP firmware image for a 2300 series ePipe with version number 2.4.4.

3. Using a web browser, browse to the ePipe's IP address and click on the 'Start ML-IP Manager'. If you are prompted to login, provide the name and password of a privileged user. The default privileged user is "root" and the default password is "system".

4. Select the "General Settings" option on the bar on the left side of the screen.   Go to the "Firmware Upgrade" tab of the right side of the screen.

5. On this page, type in the name of the firmware image file and the IP address of your TFTP server in the spaces provided (*"Enter flash file name:"* and *"Enter host address:"* respectively). When finished, click on the *"Apply"* button.

   NOTE: Once the *"Apply"* button has been pressed, the ePipe will immediately <u>reboot</u> and start the firmware upgrade process. This will <u>disconnect</u> all users and other connections.

6. After about 90 seconds, the firmware upgrade process should have finished and the browser should load the ePipe's home page. You can also click on the "Refresh" button on this page to manually load the ePipe home page. (Note that the "Refresh" button does <u>NOT</u> refer to the browser's refresh button.)

This completes the upgrade. See the chapters "Viewing the Firmware Upgrade Process" for problem diagnosis and "Checking the Current Firmware Version" to check the revision of firmware before and after the upgrade.

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[1] NOTE: ePipe makes no warranty, either expressed or implied, as to the usefulness or capabilities of any software herein mentioned. Use of any software referred to in this document is at the sole discretion of the reader.

3 Upgrading Firmware via the ePipe CLI and a TFTP server

ePipe also supplies firmware updates as binary flash firmware image files which can be downloaded directly into the ePipe from a TFTP server. To be able to do this you must already have a functioning TFTP server on your network. Most UNIX operating systems have a TFTP server, although it may not be ready for use until it is configured. Windows operating systems are not supplied with a TFTP server, however there are third party TFTP servers that can be downloaded from the Internet. An easy to use example of a TFTP server for Windows is "Pumpkin" from Klever Group, Inc. (http://www.klever.net/) [2].   Please view section 7 in this document for notes on configuring Pumpkin. For extra information on configuring your chosen TFTP server, consult your TFTP server or operating system documentation.

Follow these steps to upgrade your ePipe using a TFTP server and the CLI (Command Line Interface):

1. Login to the ePipe via the console port as a privileged user. The default privileged user is "root" and the default password is "system".

    If you login via the console port you will need a dumb terminal or terminal emulation software on your PC to access the console and it will need to be configured at the following serial communication parameters:

Speed:	9600 bps
Data bits:	8
Parity:	None
Stop bits:	1
Flow control:	Software (XON/XOFF)

    NOTE: If your current firmware version supports it, and you login via a telnet session, you will <u>not</u> be able to see the progress of the firmware upgrade process. You will need to use the ePipe console port to see the upgrade status information. (See Section 4, below.)

2. Type in the following command to configure the ePipe for the upgrade. Note that the upgrade will not start until the ePipe is rebooted.

    >> DEFINE SERVER FLASHFILE file_name HOST ip_address TRACE ENABLED

    Where: file_name is the name of the firmware image file on the TFTP server.
                ip_address is the IP address of the TFTP server.

3. Reboot the ePipe using the "REBOOT" command. The reboot will happen immediately and all active users and connections will be disconnected. Once the ePipe has started, the upgrade process will commence. The ePipe will download the firmware from the TFTP server twice and, once the firmware has been written to flash memory, the ePipe will reboot for the second and last time. If you are using the console port then you will see the progress of the upgrade.

This completes the upgrade. See the chapters "Viewing the Firmware Upgrade Process" for problem diagnosis and "Checking the Current Firmware Version" to check the revision of firmware before and after the upgrade.

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4 Viewing the Firmware Upgrade Process

If you wish to view the progress of the firmware upgrade via the ePipe console port then follow the steps below:

1. Attach a dumb terminal or PC with a terminal emulator to the ePipe console port. A convenient alternative is to use the HyperTerminal software that comes with most versions of Microsoft Windows and is available in 'Accessories'. Use the supplied DB9 console cable or any cross-over serial cable to connect the terminal or PC COM port to the console port of the ePipe.

2. Configure the dumb terminal or terminal emulator on its local serial port with the following serial communication parameters:

Speed:	9600 bps
Data bits:	8
Parity:	None
Stop bits:	1
Flow control:	Software (XON/XOFF)

3. Start the firmware upgrade process and watch the output on the screen of the terminal. Ensure that you set the trace option to enabled to see the full output. The figure below shows an example output of a firmware update starting at the first reboot.

5 Checking the Current Firmware Version

Before a firmware upgrade is started, checking the current version of firmware is recommended in the ePipe, to ensure that the upgrade is needed, and also to enable the user to check whether the upgrade is successful. When using either of the upgrade methods requiring a TFTP server, the upgrade process does not check or show the current firmware version in the ePipe, so it is important to check the current version prior to doing the upgrade.

There are several ways to check the current version of firmware in the ePipe.

5.1 Using the ePipe ML-IP Manager

You can check the current version of firmware at any time by simply browsing to the ePipe and navigating to the *"Information"* section, and then the *"General"* tab. This will display a page similar to that displayed below. Note that the model and firmware version are shown.

5.2   Using the CLI

You can check the current version of firmware at any time by using the ePipe CLI (Command Line Interface). The CLI can be accessed via a telnet session or via the console port of the ePipe. Simply login as a privileged user and run either of the following commands:

>> IDENTIFICATION

OR

>> SHOW SERVER

The diagram below shows a sample of the output you would expect to see. The output of both commands is shown. In this case, HyperTerminal was used to access the console port.
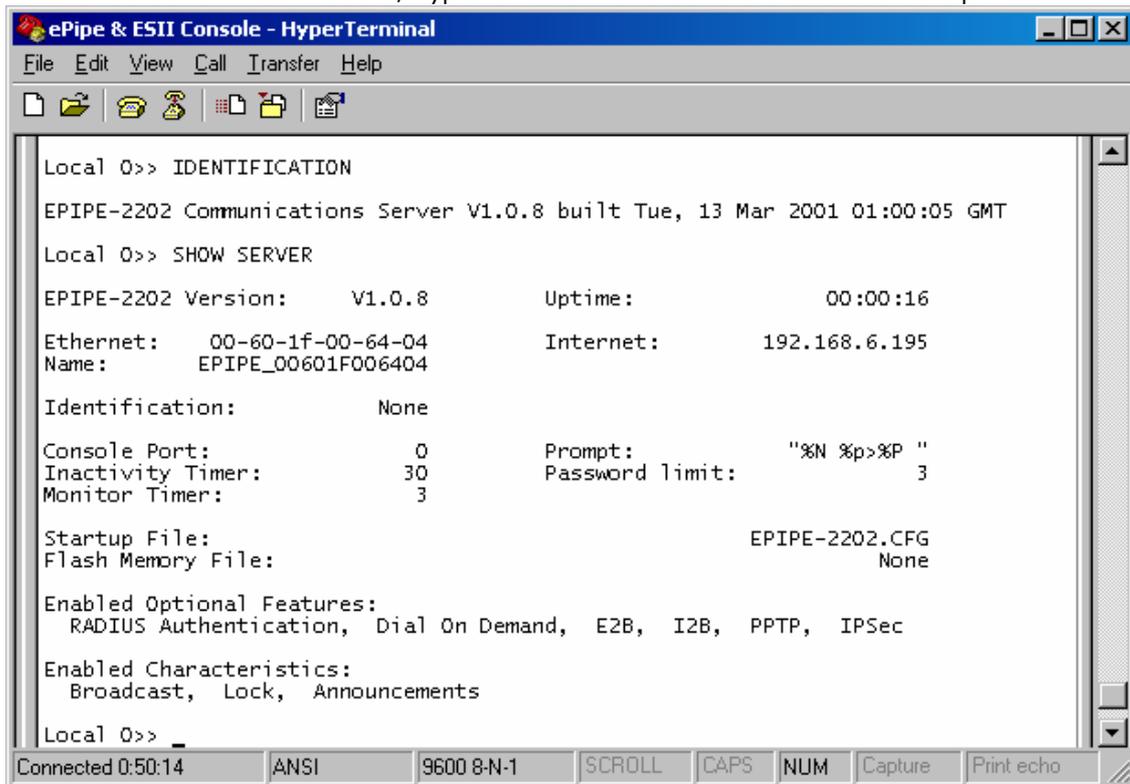
```
ePipe & ESII Console - HyperTerminal
File  Edit  View  Call  Transfer  Help

Local 0>> IDENTIFICATION

EPIPE-2202 Communications Server V1.0.8 built Tue, 13 Mar 2001 01:00:05 GMT

Local 0>> SHOW SERVER

EPIPE-2202 Version:     V1.0.8           Uptime:              00:00:16

Ethernet:    00-60-1f-00-64-04          Internet:        192.168.6.195
Name:        EPIPE_00601F006404

Identification:         None

Console Port:           0               Prompt:              "%N %p>%P "
Inactivity Timer:       30              Password limit:              3
Monitor Timer:          3

Startup File:                                           EPIPE-2202.CFG
Flash Memory File:                                                None

Enabled Optional Features:
  RADIUS Authentication,  Dial On Demand,  E2B,  I2B,  PPTP,  IPSec

Enabled Characteristics:
  Broadcast,  Lock,  Announcements

Local 0>> _

Connected 0:50:14    ANSI    9600 8-N-1    SCROLL   CAPS   NUM   Capture   Print echo
```
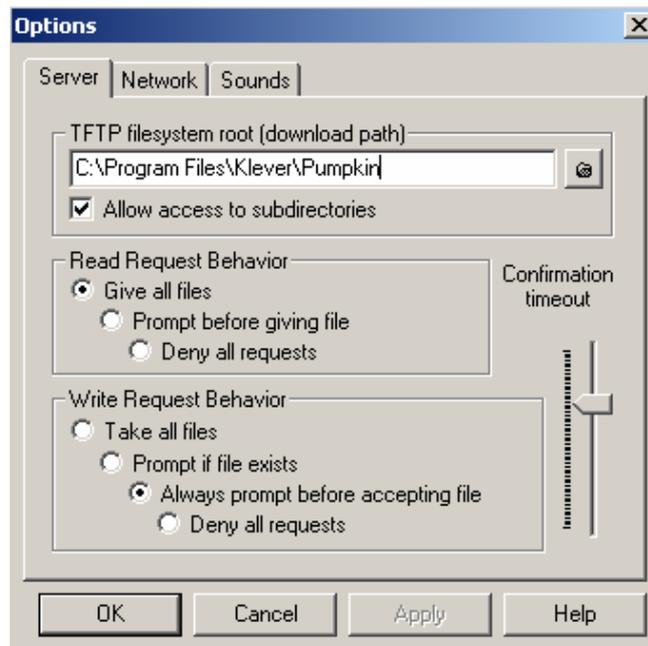
6   Common Problems

If you are having problems upgrading the firmware of your ePipe, read the following list of problems and solutions for assistance.

Problem	Explanation/Solution
Cannot see any progress information on the console when doing a firmware upgrade.	• This is most likely due to the 'trace' option not being enabled on the CLI. • This may also be due to a communications problem between the console port and the terminal. Check the serial port configuration of your terminal and the cable between the terminal and the ePipe console port. • Ensure that the terminal or terminal emulation software you are using is 'connected' to the ePipe console port. You can test this by logging into the ePipe to ensure communication to the console port is working correctly.
Connection refused message like: TFTP: recvfrom: Connection refused	• This is typically due to an incorrect IP address or name specified for the TFTP server. Check the IP address or DNS/host name of your TFTP server and try again. • This could also be due to the TFTP server not being enabled or not functioning properly on the host. Check that your TFTP server is working correctly.
File error message like: FLASH file "<file_name>" not readable.	This is a generic error and could be due to any of the following problems: • TFTP server is not enabled or working. • The file name to be downloaded is not correct or the file is not located in the TFTP server's download directory. • The IP address or DNS/host name specified for the TFTP server may be incorrect.
File error message like: TFTP: file "<file_name>" not found	This error indicates the specified file cannot be found by the TFTP server and usually is caused by an incorrectly specified firmware file name or the firmware file not being present in the TFTP server's download directory.
File Error message like: FLASH Memory file is not a valid image.	This is caused by the firmware image file on the TFTP server being corrupt or the incorrect file is being downloaded to the ePipe. ePipe does an integrity check on the firmware image before writing the firmware into flash memory. If this check fails this error will be displayed.
File Error message like: FLASH Memory file download failed too many times.	This is a generic message indicating several attempts have been made to download a firmware file, all of which failed. The ePipe will then reboot into the original firmware. This message is shown at the end of the upgrade attempt. Other errors will indicate the actual problem.
Error message like: TFTP: send: No route to host	This problem is caused by the ePipe attempting to download a file from a host that it does not have a route to. This is usually caused by an incorrectly specified IP address or by the user attempting to download the firmware from a TFTP server on another IP subnet. Try upgrading the ePipe from a TFTP server located on the same IP subnet as the ePipe.

7 Notes on configuring the Pumpkin TFTP Server

An easy to use example of a TFTP server for Windows is "Pumpkin" from Klever Group, Inc. (http://www.klever.net/)[3]. When configuring the Pumpkin TFTP server we recommend that you set the "Read Request Behaviour" to "Give all files". Otherwise the download of the flash image will timeout if the prompt from Pumpkin is not answered quickly enough.

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