Title: MultiFlex ETH 1000 Series Configuration and Update Management
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Summary

PMC's MultiFlex ETH 1000 Series motion controllers have a set of powerful and convenient tools for firmware and hardware updates and system and network reconfiguration which are conveniently accessible via any standard web browser.

More Information

The MultiFlex ETH 1000 Series controllers feature two TCP/IP network servers that allow users to quickly perform firmware and hardware factory updates as well as reconfiguration of controller functions. The first is a web server that can be accessed via any standard web browser by entering
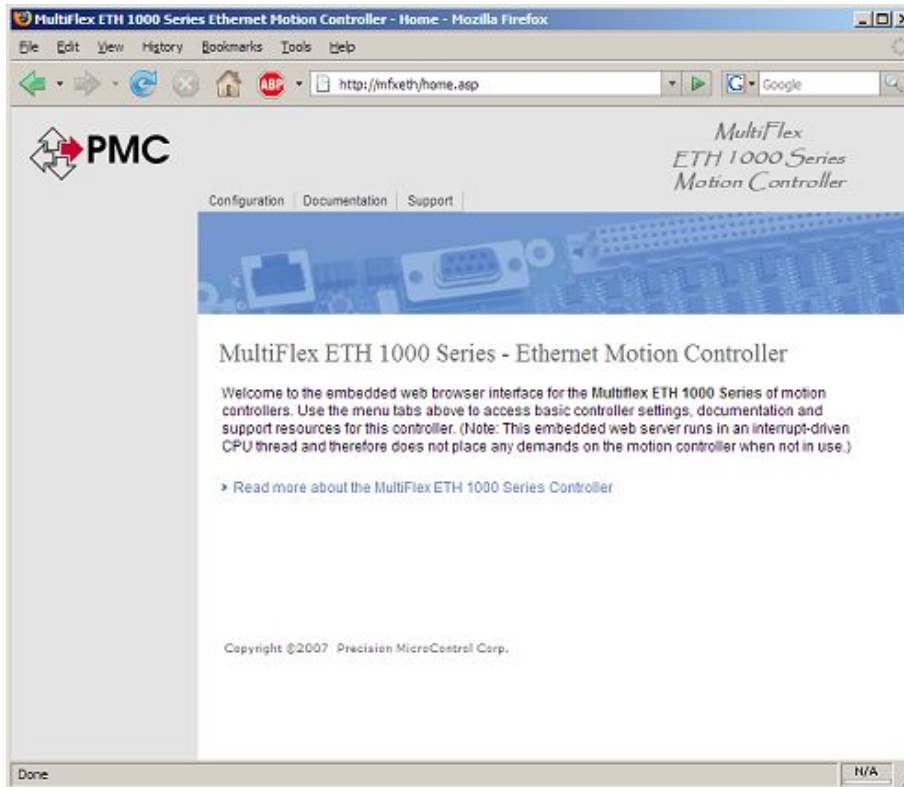
> http://192.168.1.100/index.html

in the browser's URL address box when the controller is connected to the host PC. The controller's embedded web server is illustrated in Figure 1 and provides the following basic functionality:

- Links to online support resources such as product downloads and documentation (if internet connectivity is available on the host computer)
- Basic motion control of servo and stepper axes
- System configuration utilities for:
  - o network address management
  - o firmware update installation
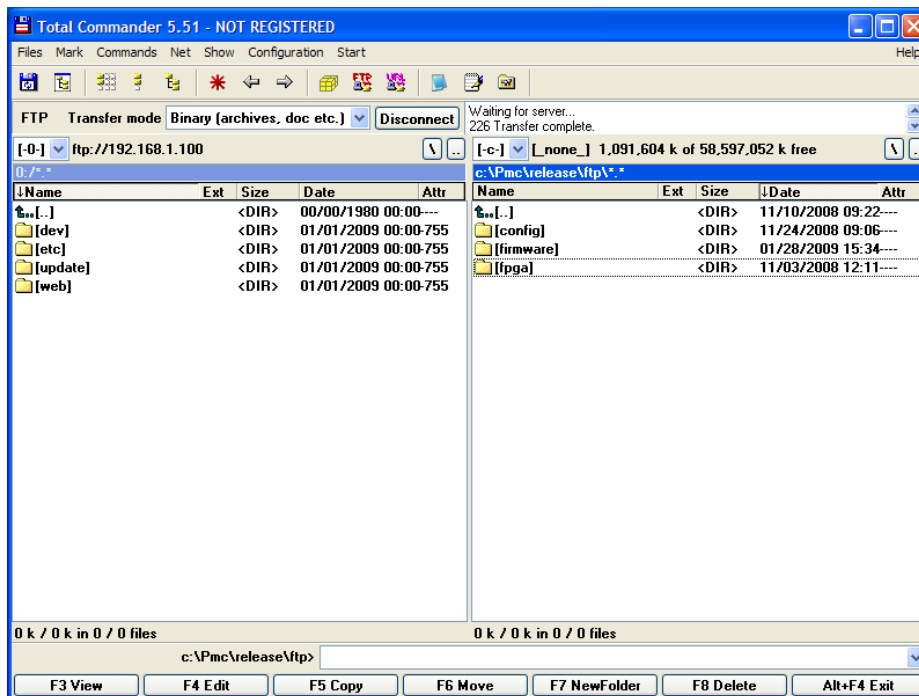 - o logic (FPGA) update installation
  - o board re-configuration utilities

The controller also provides an embedded FTP server, as shown in Fig. 2, for file transfer to and from the controller. It can be accessed by a remote FTP client such as Filezilla (no username / no password required) or by connecting to

> ftp://192.168.1.100.

FTP file transfer can provide a fast and convenient alternative for updating controller configuration files and sharing data between the controller and a PC application.

Figure 1. Embedded Web Server

Figure 2. Embedded FTP Server

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As shown in the left pane of the FTP session in Fig. 2, the controller contains an embedded file system with several sub-directories. The target of all FTP file transfers related to update and configuration by the web browser is the **update** directory.
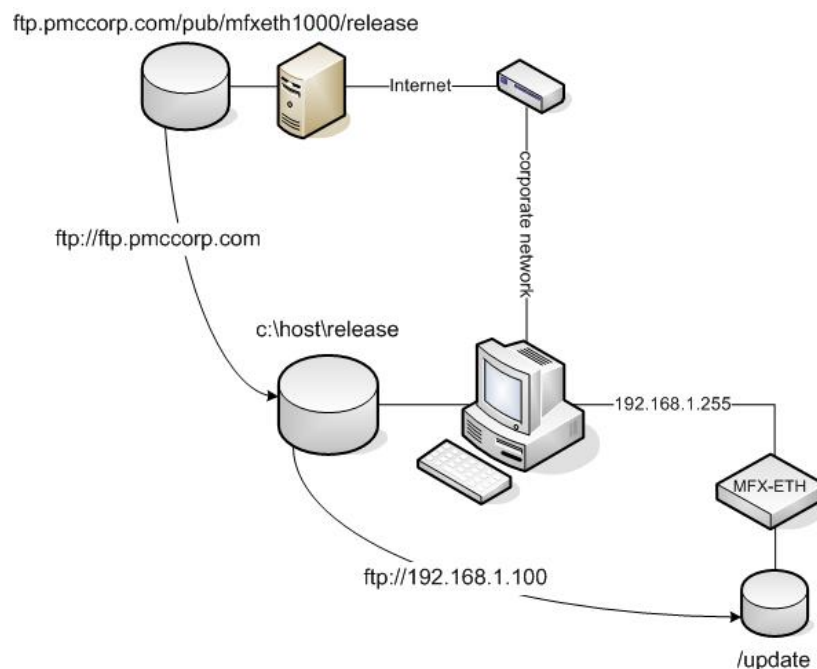
The release files that will be referenced in this document can be found on the PMC public FTP site at:

ftp://ftp.pmccorp.com/pub/mfxeth1000/release/

The latest release directory can be determined by date and by the alpha-numeric ascending order of the release package (e.g. 4.6b supersedes 4.6a).

The first step in preparing an environment on the host computer for performing updates and configuration management on the controller is to create a directory structure on that machine that is similar to the one illustrated here on the PMC FTP server. Files can then be transferred to the host computer and from there subsequently to the controller.

This two-step process is recommended because the preferred installation of the controller is one in which it occupies a separate Ethernet subnet whose address is factory configured as 192.168.1.255. This network is usually isolated from the corporate infrastructure network where the gateway to the Internet resides and is typically on a distinct network interface card that is not bridged, as shown in Figure 3.
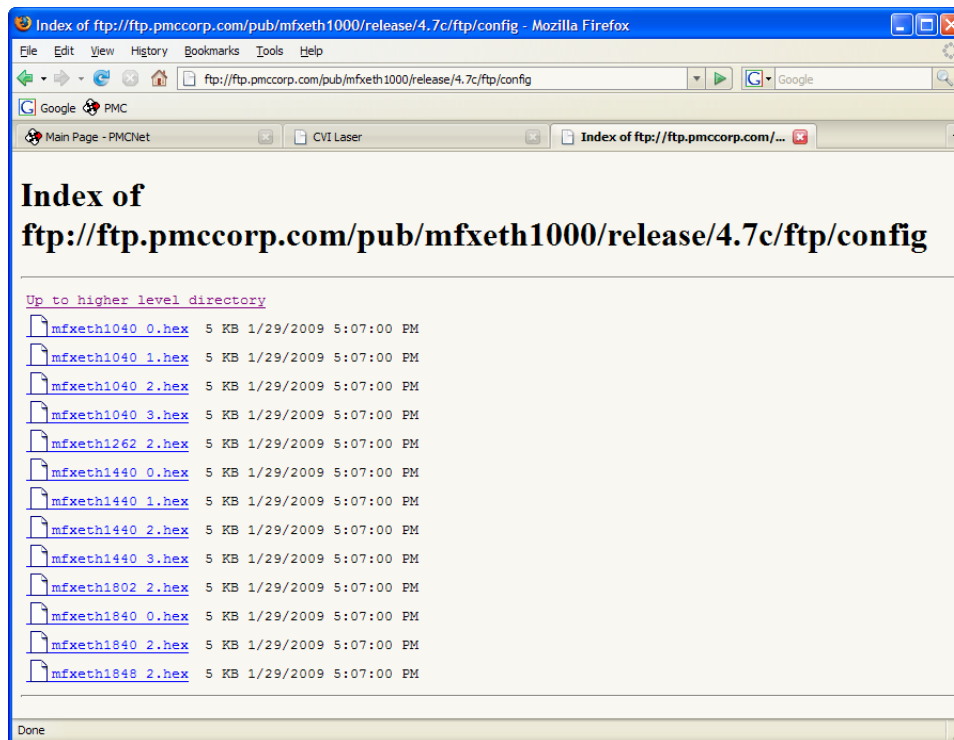

Figure 3. FTP File Transfers

Once the user has navigated to the desired release directory on the PMC server, it will contain the following file systems:
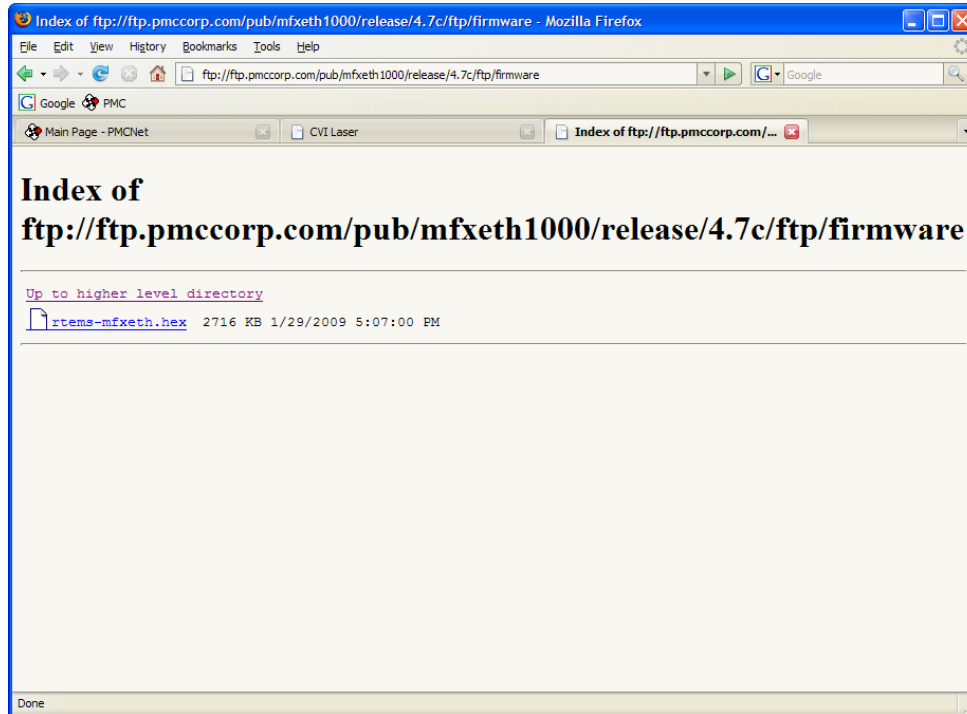
> ~/flash wizard
> ~/ftp

The folders that contain the required data exist within the ftp directory and are:
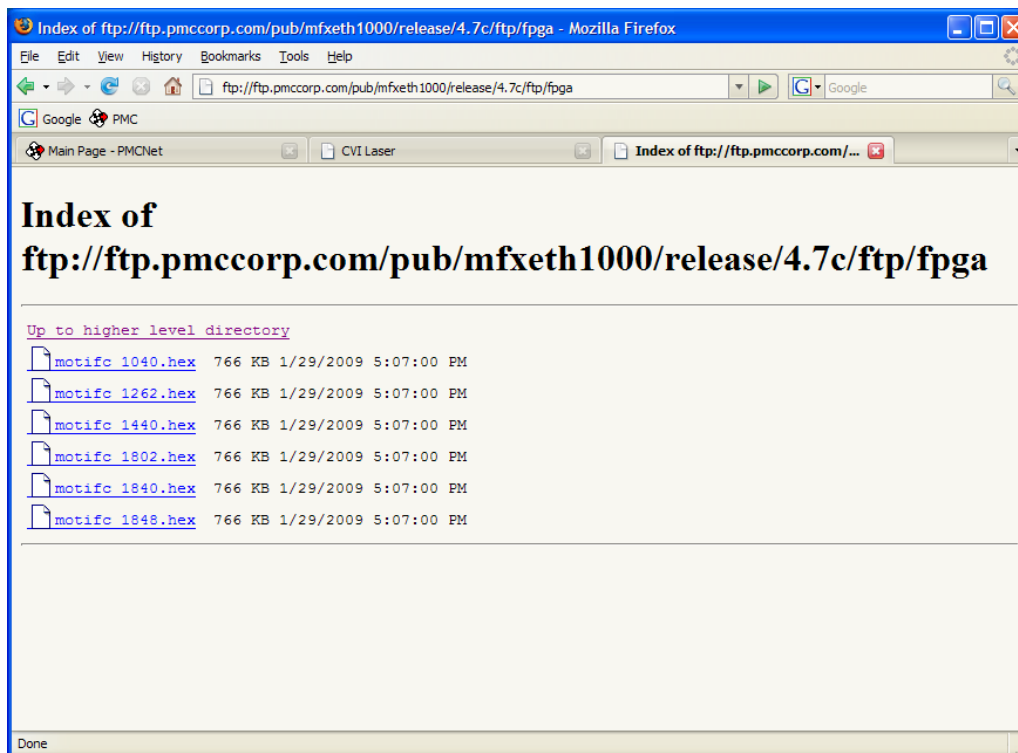
> ~/ftp/config
> ~/ftp/firmware
> ~/ftp/FPGA

Figures 4 through 6 show the typical contents of each of these directories.

Figure 4. Release Configuration Data Directory

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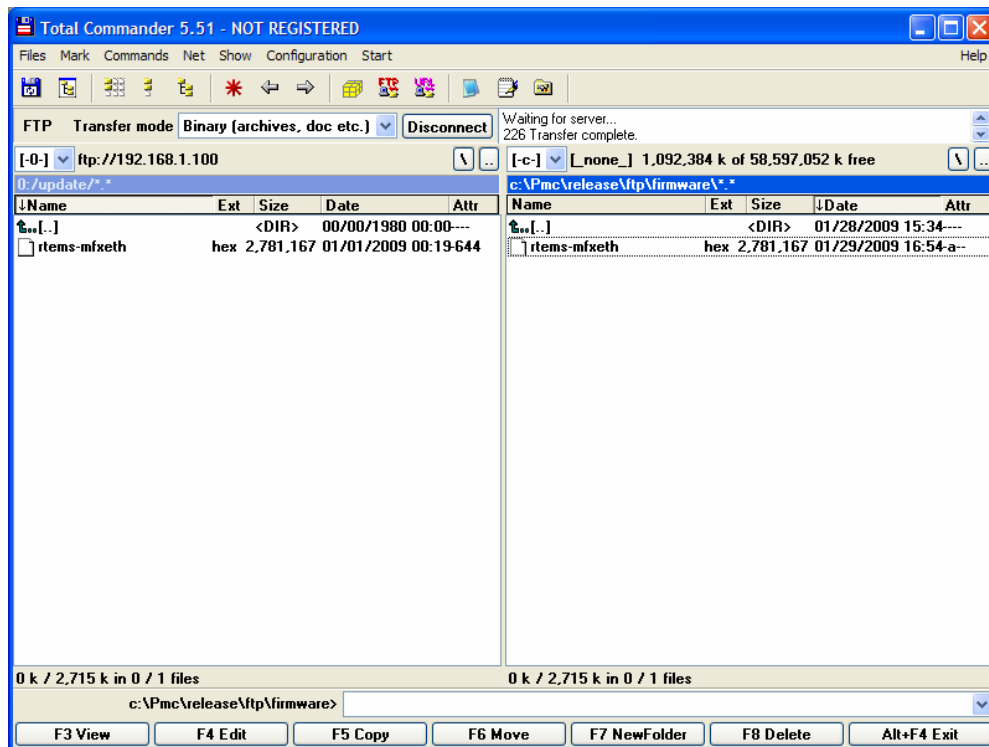**Figure 5. Release Firmware Directory**

Figure 6. Release FPGA Directory
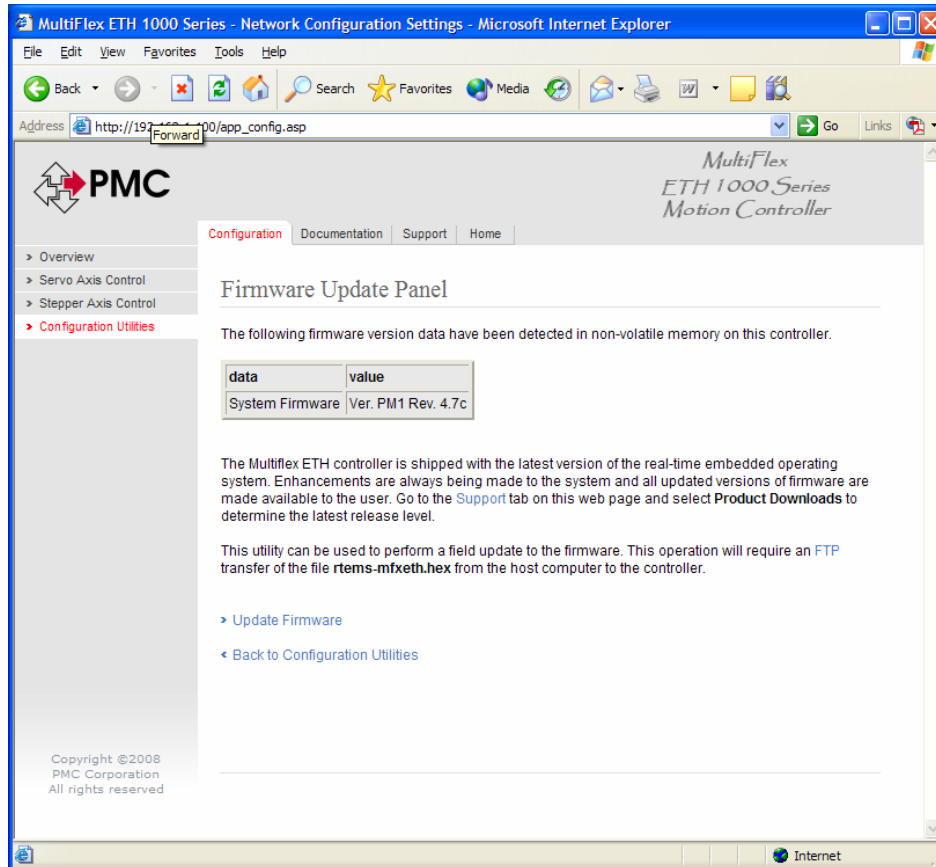
Firmware Update Procedure

After the procedure outlined in the previous section has been completed and the host computer has the desired version of update files in local storage, the following steps should be followed to perform a firmware update to the controller.

1. Establish an FTP session with the controller and change directories to **/update**.
2. Change directories on the host computer to **/ftp/firmware**
3. Drag the file **rtems-mfxeth.hex** from the host computer to the controller, as shown in the following figure.

Figure 7. Firmware Update FTP Transfer

4. The FTP client can now be closed and a web browser opened to the controller's embedded web server
5. Navigate to **Configuration Utilities->Firmware Update Management** and select **Update Firmware**, as shown in the following figure.
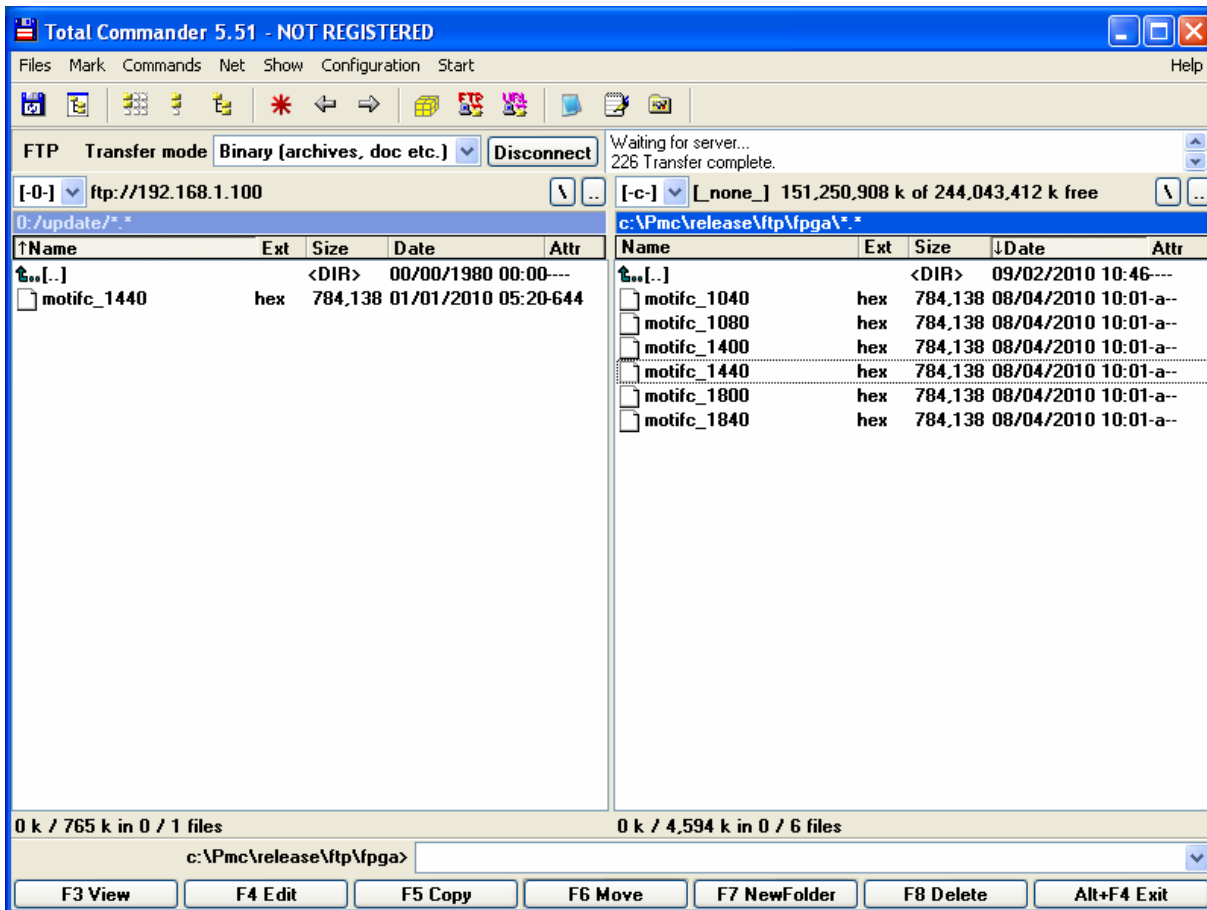
Figure 8. Firmware Update Utility

6. After selecting **Update Firmware**, the user will be given a final prompt to perform the update. If this selection is made, the controller will de-activate the run relay and flash memory programming will begin. The web browser session should be closed at this time. This process will take approximately 2-3 minutes. After that time, the controller will reset and begin execution of the updated firmware.
7. A new web browser session can be started to verify the changes, if desired.
8. This completes the firmware update process.

FPGA Update Procedure

The controller is shipped with the most current version of FPGA files. If an updated version is released and the user wishes to install the update, the following steps should be followed. The FPGA file for an MFX-ETH-1440 model will be used in this example.

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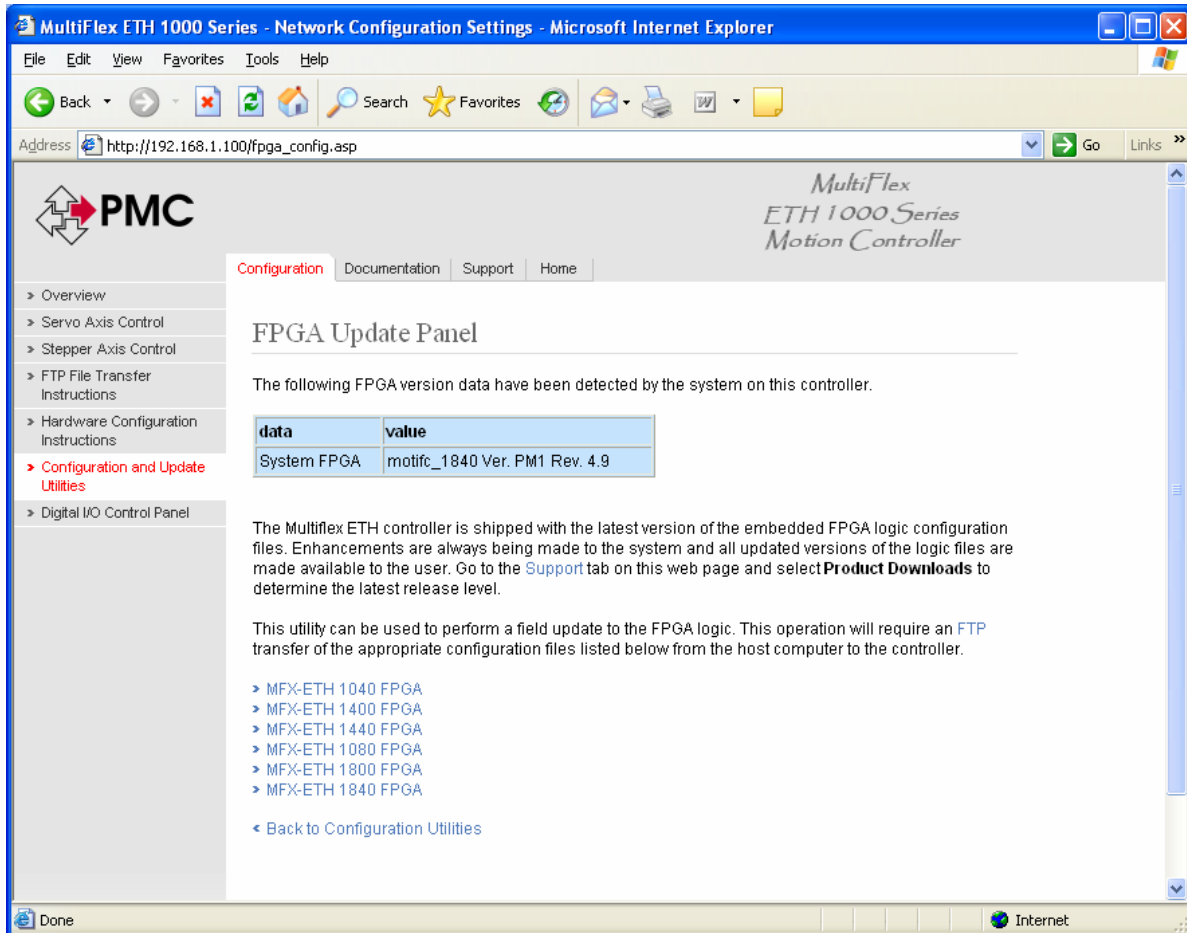*Web: http://www.pmccorp.com*

1. Establish an FTP session with the controller and change directories to **/update**.
2. Change directories on the host computer to **/ftp/FPGA**
3. Drag the file **motifc_1440.hex** from the host computer to the controller, as shown in the following figure.

Figure 9. FPGA Update FTP Transfer

4. The FTP client can now be closed and a web browser opened to the controller's embedded web server
5. Navigate to **Configuration Utilities->FPGA Update Management** and select **MFX-ETH 1440 FPGA**, as shown in the following figure.

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Figure 10. FPGA Update Utility

6. After selecting **MFX-ETH 1440 FPGA**, the user will be given a final prompt to perform the update. If this selection is made, the controller will de-activate the run relay and flash memory programming will begin. The web browser session should be closed at this time. This process will take approximately 2-3 minutes. After that time, the controller will reset and begin execution with the updated FPGA logic.
7. A new web browser session can be started to verify the changes, if desired.
8. This completes the FPGA update process.

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Hardware Configuration Procedure

The controller supports a wide variety of optional axis configurations and interconnect board options. It can be reconfigured in the field to another controller type by installing an alternate configuration file (consult PMC Technical Support for details). In this example, an MFX-ETH 1840-2 model using an ICN-120 interconnect board will be converted to a 1440-3.

1. Establish an FTP session with the controller and change directories to **/update**.
2. Change directories on the host computer to **/ftp/config**
3. Drag the file **mfxeth1440_3_120.hex** from the host computer to the controller as shown in the following figure.
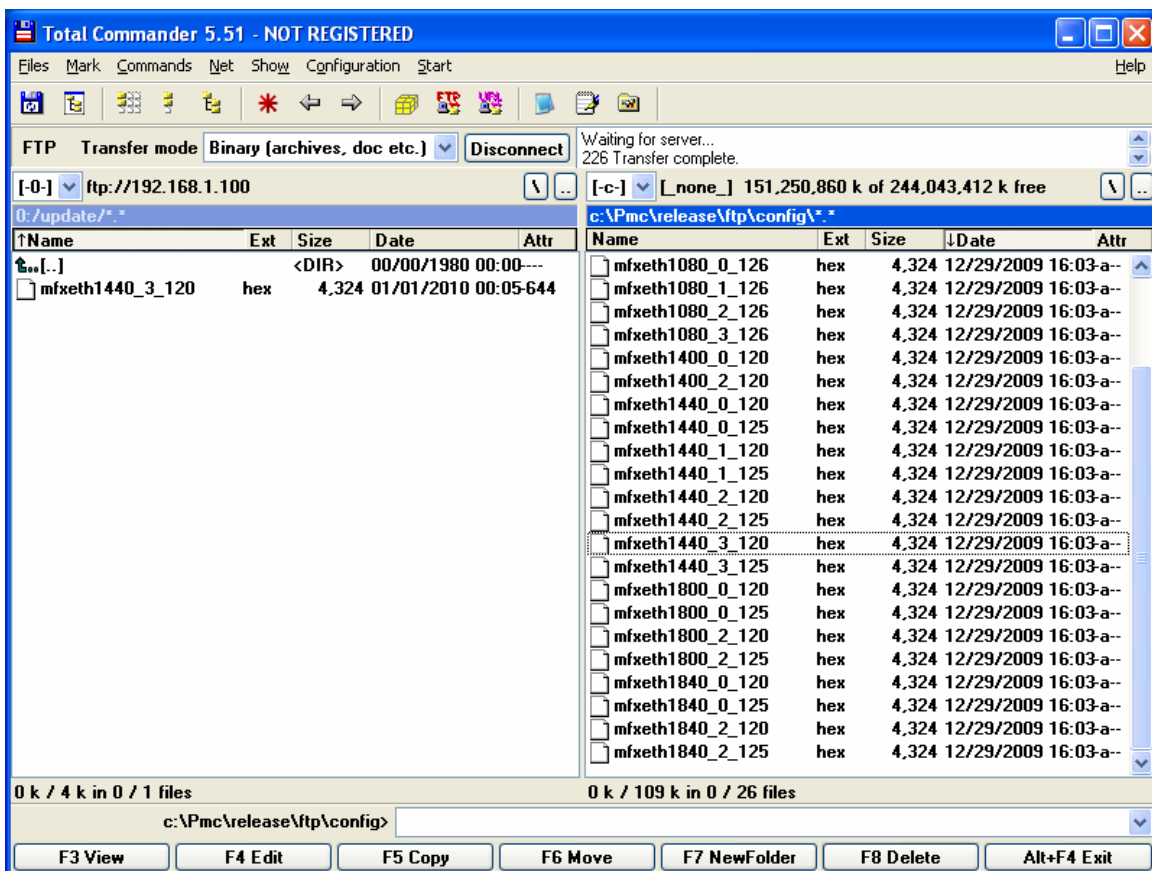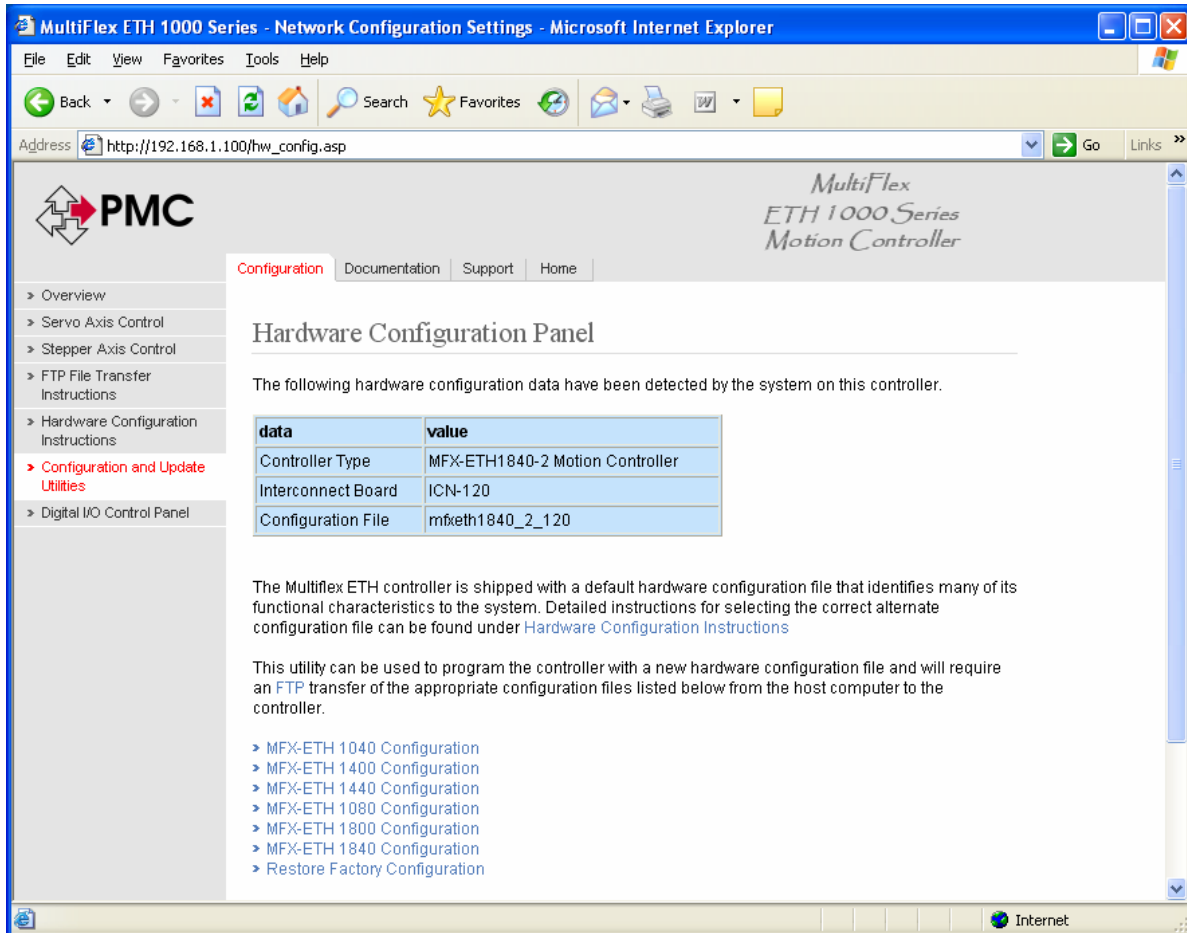

Figure 11. Hardware Configuration FTP Transfer

4. The FTP client can now be closed and a web browser opened to the controller's embedded web server
5. Navigate to **Configuration Utilities->Hardware Configuration Management** and select **MFX-ETH 1440 Configuration**, as shown in the following figure.

Figure 12. Hardware Configuration Utility

6. After selecting **MFX-ETH 1440 Configuration**, the user will be given a final prompt to perform the update. If this selection is made, the controller will de-activate the run relay and flash memory programming will begin. The web browser session should be closed at this time. This process will take approximately 30 seconds. After that time, the controller will reset and begin execution in the updated configuration.
7. A new web browser session can be started to verify the changes, if desired.
8. This completes the FPGA update process.

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