



Title:MultiFlex ETH 1000 Series Configuration and Update ManagementProducts(s):All MultiFlex ETH 1000 Series Ethernet motion controllersKeywords:MultiFlex ETH, Ethernet, configuration, update, firmware, web browserID#:TN1074Date:Feb. 3, 2009

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

Total Commander 5.51 -	NOT REGIST	FFRFD							
Files Mark Commands Net Sh	ow Configu	ation Start							Help
		- 		4 🔳					
FTP Transfer mode Binary	archives, d	oc etc.) 🔽 Disa	connect	Waiting for	server				
[-0-] v ftp://192.168.1.100				I-c-l V	f none 1 1.091.60	14 k o	58.597.	052 k free	NÖ
0:/*.*			00	c:\Pmc\	release\ftp*.*				00
↓Name Ex	t Size	Date	Attr	Name		Ext	Size	↓Date	Attr
6 []	<dir></dir>	00/00/1980 00:	00	t []			<dir></dir>	11/10/200	8 09:22
(dev]	<dir></dir>	01/01/2009 00:	00-755	🚞 (confi	ig]		<dir></dir>	11/24/200	8 09:06
[etc]	<dir></dir>	01/01/2009 00:	00-755	🛄 (firm#	iare]		<dir></dir>	01/28/200	9 15:34
[update]	<dir></dir>	01/01/2009 00:	00-755	🦲 [fpga]		<dir></dir>	11/03/200	8 12:11
🧾 [web]	(DIR)	0170172009 00:	00-755						
0 k / 0 k in 0 / 0 files				0 k / 0 k	in 0 / 0 files				
c:\Pn	ic\release\l	tp>							*
F3 View F4 E	fit 🗌 🗌	F5 Copy	F6 M	ove	F7 NewFolder		F8 Delet	e 🔼 🗛	lt+F4 Exit

Figure 2. Embedded FTP Server

Precision MicroControl Corp. Intelligent Motion Control Since 1987 2075-N Corte del Nogal Carlsbad, CA 92011 • USA **Tel: (760) 930-0101** Fax: (760) 930-0222 E-Mail: support@pmccorp.com Web: http://www.pmccorp.com





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

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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.

Index of ftp://ftp.pmcco	orp.com/pub/mfxeth1000/r	elease/4.7c/ftp/config - Mo	zilla Firefox	
<u>File E</u> dit <u>View</u> Hi <u>s</u> tory <u>B</u> i	ookmarks <u>T</u> ools <u>H</u> elp			<u>.</u>
🗣 • 🔶 • 😴 🚳 🚹 💽] ftp://ftp.pmccorp.com/pub/mfxe	th 1000/release/4.7c/ftp/config	• Þ G•	Google
<u>G</u> Google 🔅 PMC				
😵 Main Page - PMCNet	CVI Laser		Index of ftp://ftp.pmccorp.com	🖬 🔹
Index of ftp://ftp.pm	ccorp.com/p	oub/mfxeth1	000/release/4.7c	/ftp/config
Up to higher level o	lirectory			
mfxeth1040 0.hex	5 KB 1/29/2009 5:07:	:00 PM		
mfxeth1040 1.hex	5 KB 1/29/2009 5:07:	:00 PM		
mfxeth1040 2.hex	5 KB 1/29/2009 5:07:	:00 PM		
mfxeth1040 3.hex	5 KB 1/29/2009 5:07:	:00 PM		
mfxeth1262 2.hex	5 KB 1/29/2009 5:07:	:00 PM		
mfxeth1440 0.hex	5 KB 1/29/2009 5:07:	:00 PM		
mfxeth1440 1.hex	5 KB 1/29/2009 5:07:	:00 PM		
mfxeth1440 2.hex	5 KB 1/29/2009 5:07:	:00 PM		
mfxeth1440 3.hex	5 KB 1/29/2009 5:07:	:00 PM		
mfxeth1802 2.hex	5 KB 1/29/2009 5:07:	:00 PM		
mfxeth1840 0.hex	5 KB 1/29/2009 5:07:	:00 PM		
mfxeth1840 2.hex	5 KB 1/29/2009 5:07:	:00 PM		
mfxeth1848 2.hex	5 KB 1/29/2009 5:07:	:00 PM		
Done				

Figure 4. Release Configuration Data Directory







Figure 5. Release Firmware Directory



Figure 6. Release FPGA Directory

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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.

💾 Total Commander 5.5	1 - NC	T REGIST	TERED							
Files Mark Commands Net	Show	Configura	ation Start							Help
🖬 🔁 👯 🕴 🐿	*	⇔ ⇒	2 🔁	X9 🗩 (¥ 🖻					
FTP Transfer mode Bin	ary (ar	chives, da	oc etc.) 🔽 🛛	Disconnect	Waiting for 226 Transl	r server fer complete.				*
[-0-] 🔽 ftp://192.168.1.10	0			N	[-c-] 🔽	[_none_] 1,092	,384 k	of 58,597,0)52 k free	١.
0:/update/*.*					c:\Pmc\	\release\ftp\firmw	vare*.*	:		
↓Name	Ext	Size	Date	Attr	Name		Ext	Size	↓Date	Attr
\$ []		<dir></dir>	00/00/1980	00:00	£ []			<dir></dir>	01/28/2009	15:34
] rtems-mfxeth	hex 2	2,781,167	01/01/2009	00:19-644] rtems	s-mfxeth	hex	2,781,167	01/29/2009	16:54-a
0 k / 2,715 k in 0 / 1 files					0 k / 2,	715 k in 0 / 1 file	s			
c:\Pmc\rel	ease\f	tp\firm w ai	re>							*
F3 View F	4 Edit		F5 Сору	F6 M	ove	F7 NewFolde		F8 Delete	e Alt	+F4 Exit

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.

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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.





- 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.

💾 Total Commander 5.51	- NOT REGIS	TERED							
Files Mark Commands Net	Show Configu	iration Start							Help
📓 🔁 👯 🕴	* ⇔ ⊰	> 🗃 🚟	VB 🗩 🗈	2 🖻					
FTP Transfer mode Bina	ary (archives, o	loc etc.) 🔽 🛛	Disconnect	Waiting for se 226 Transfer	erver complete.				×
[-0-] 🗸 ftp://192.168.1.10	0		<u>\</u>	[-c-] 🔽 [none_] 151,250	,908 I	c of 244,04	13,412 k free	<u>\</u>
0:/update/*.*				c:\Pmc\re	lease\ftp\fpga*.				
↑Name	Ext Size	Date	Attr	Name		Ext	Size	↓Date	Attr
얍 。。[]	<dir></dir>	00/00/1980	00:00	\$[]			<dir></dir>	09/02/2010	10:46
motifc_1440	hex 784,13	8 01/01/2010	05:20-644	🗋 motifc_	1040	hex	784,138	08/04/2010	10:01-a
) motifc	1080	hex	784,138	08/04/2010	10:01-a
] motifc	1400	hex	784,138	08/04/2010	10:01-a
					1440	hex	784,138	08/04/2010	10:01-a
				motife_	1800	nex	704,138	08/04/2010	10:01-a 10:01 -
				mourc_	1840	nex	784,138	08/04/2010	10:01-a
0 k / 765 k in 0 / 1 files				0 k / 4,59	4 k in 0 / 6 files				
c:\Pmc\	vrelease\ftp\fp	ga>							*
F3 View F4	l Edit	F5 Сору	F6 M	ove	F7 NewFolder		F8 Delete	Alt	+F4 Exit

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.







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.





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.

💾 Total Commander 5.51 - NOT REGISTERED										
<u>Files M</u> ark <u>C</u> ommands <u>N</u> et Sho <u>w</u> C <u>o</u> n	figuration <u>S</u> tart						<u>H</u> elp			
FTP Transfer mode Binary (archives, doc etc.) Disconnect Waiting for server 226 Transfer complete. Image: Complete complete. Image: Complete complete. Image: Complete complete.										
[-0-] 🗸 ftp://192.168.1.100		<u>\</u>	[-c-] 🖌 [_i	none_] 151,250,86	0 k of 244,0	43,412 k free	N			
0:/update/*.*			c:\Pmc\rel	ease\ftp\config*.*						
↑Name Ext Size	Date	Attr	Name	E	xt Size	↓Date	Attr			
ቴ [] <dir< th=""><th>> 00/00/1980 0</th><th>0:00</th><th>mfxeth1</th><th>080_0_126 he</th><th>x 4,324</th><th>12/29/2009</th><th>16:03-a 🔼</th></dir<>	> 00/00/1980 0	0:00	mfxeth1	080_0_126 he	x 4,324	12/29/2009	16:03-a 🔼			
mfxeth1440_3_120 hex 4,	324 01/01/2010 0	0:05-644	mfxeth1	080_1_126 he	x 4,324	12/29/2009	16:03-a			
			mfxeth1	080_2_126 he	x 4,324	12/29/2009	16:03-a			
			mfxeth1	080_3_126 he	x 4,324	12/29/2009	16:03-a			
			mfxeth1	400_0_120 he	x 4,324	12/29/2009	16:03-a			
			mfxeth1	400_2_120 he	x 4,324	12/29/2009	16:03-a			
				44U_U_12U he	x 4,324	12/29/2009	16:03-a			
				44U_U_125 he	× 4,324	12/29/2009	16:03-a 16:03 -			
				44U_I_IZU NE	X 4,324 4,324	12/23/2003	16:03-a 16:03 -			
				440_1_123 ne 440_2120 be	× 4,324	12/23/2003	16:03:2			
				440_2_120 ne	v 4,324	12/29/2009	16:03-a			
				440_2_123 he	v 4.324	12/29/2009	16:03-a			
			mfxeth1	440 3 125 he	x 4.324	12/29/2009	16:03-a			
			mfxeth1	800 0 120 he	x 4,324	12/29/2009	16:03-a			
			mfxeth1	800 ⁰ 125 he	x 4,324	12/29/2009	16:03-a			
			mfxeth1	800_2_120 he	x 4,324	12/29/2009	16:03-a			
			mfxeth1	800_2_125 he	x 4,324	12/29/2009	16:03-a			
			📑 mfxeth1	840_0_120 he	x 4,324	12/29/2009	16:03-a			
			mfxeth1	840_0_125 he	x 4,324	12/29/2009	16:03-a			
			mfxeth1	840_2_120 he	x 4,324	12/29/2009	16:03-a			
			mfxeth1	840_2_125 he	x 4,324	12/29/2009	16:03-a 🥃			
0 k / 4 k in 0 / 1 files			0 k / 109 k	in 0 / 26 files						
c:\Pmc\release\ftp\	config>						~			
F3 View F4 Edit	F5 Сору	F6 M	ove	F7 NewFolder	F8 Delete	e Alt-	⊧F4 Exit			

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.

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🗿 MultiFlex ETH 1000 Se	ries - Network Configur	ation Settings - Microsoft Internet Ex	plorer	
<u>File E</u> dit <u>V</u> iew F <u>a</u> vorites	<u>T</u> ools <u>H</u> elp			A
🌀 Back 🝷 🌍 🕤 🗙	👔 🏠 🔎 Search	🛧 Favorites 🚱 🔗 🍓 📝	•	
Address 🙋 http://192.168.1.3	100/hw_config.asp			🖌 🄁 Go 🛛 Links 🂙
рмс	Configuration Documentat	ion Support Home	MultiFlex ETH 1000 Series Motion Controller	<u>^</u>
» Overview				
» Servo Axis Control	Hardware Conf	figuration Panel		
 Stepper Axis Control 		ligaration r anor		
 FTP File Transfer Instructions 	The following hardware	e configuration data have been detected b	y the system on this controller.	
 Hardware Configuration Instructions 	data	value		
 Configuration and Update 	Controller Type	MFX-ETH1840-2 Motion Controller		≡.
Utilities	Interconnect Board	ICN-120		
» Digital I/O Control Panel	Configuration File	mfxeth1840_2_120		
	The Multiflex ETH contr functional characteristi configuration file can be This utility can be used an FTP transfer of the a controller.	oller is shipped with a default hardware c cs to the system. Detailed instructions for e found under Hardware Configuration Ins to program the controller with a new harc appropriate configuration files listed below	onfiguration file that identifies many of its selecting the correct alternate structions ware configuration file and will require r from the host computer to the	
	 MFX-ETH 1400 Confi MFX-ETH 1440 Confi MFX-ETH 1880 Confi MFX-ETH 1840 Confi MFX-ETH 1840 Confi MFX-ETH 1840 Confi Restore Factory Confi 	guration guration guration guration guration īguration		<u>×</u>
ê				Internet

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.