Dolphin MXH94x NTB Adapter Firmware Release Note

Feburary 15th, 2024

Version 1.9

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1 Introduction

This release note covers the MXH94x PCIe Gen4 x16 NTB Adapter card firmware. The firmware consists of PFX configuration data and Management processor (BMC) firmware. This release note contains a summary of the changes made. Please contact Dolphin for details.

1.1 Supported configurations

The latest released firmware supports the following NTB configurations:

- Dual host x16 Host
- Three hosts x8
- Five hosts x4

Please find additional information on supported topologies and functionalities in the eXpressWare release notes. Please note eXpressWare 5.18.0 or newer is required for this card.

1.2 BMC Firmware versions

The Firmware version is covering the MXH94x NXP firmware changes.

Firmware version	Release date	Note
1.0	September 24th 2020	Initial firmware release. Support for single x16 link.
1.2	December 3rd, 2020	• Adds Board Firmware Recovery support.
1.4	February 25th, 2021	• Adds firmware version reporting. • Adds FireFly temperature and voltage readouts.
1.5	March 9th, 2021	• Companion release with MXH94x Transparent cards. Bundled with eXpressWare 5.18
2.0	June 24th 2021	• Added longer delay before releasing PFX from reset after power on to allow clocks to stabilize. • Fixed link status issues with MR2 PFX firmware.
2.1	October 29th 2021	• Added support for MXH94x C revision cards. • Added support for overtemperature shutdown and DIP-switch to disable. • Bundled with eXpressWare 5.19
2.4	December 16th 2021	• No changes for MXH94x NTB cards
2.5	February 3rd 2022	• Fixes potential BMC code crash/auto restart issue. No customer impacts.
2.6	February 24th 2022	• No changes for MXH94x NTB cards
2.7	April 24th 2022	• Added support for extended serial number format
2.8	May 16th 2022	• Add support for FireFly G3 firmware 16.16 Bundled with eXpressWare 5.20.0
2.9	October 7th 2022	• Added support for MXH94x/95x Rev CD with PM40052 chip. Bundled with eXpressWare 5.20.2 and newer
2.10	February 5th, 2024	• Changed FireFly reset voltage to follow high level given by external pull-up. The previous value was too low but had no impact on functionality. • Improved the algorithm recording the overall FireFly maximum temperature stored in non-volatile memory. Prior to this fix, maximum temperature detected may erroneously be stored as value 0xFF. • Improved MCU Config upgrade process for older versions of firmware tool. Bundled with eXpressWare 5.22.0 and newer

1.3 PFX FLASH Versions

The PFX FLASH version changelog. Please note that the Dolphin software tools report the PFX FLASH version as the EEPROM version.

PFX Multiconfig version	Release date	Note
3	July 1st, 2020	• Initial internal firmware release, BB Boards. • Support for single link configurations.
4	August 4th, 2020	• Unified DIP switch setting.
5	October 2nd, 2020	• Applied Microchip firmware pm74605_pfx_03600049.
6	December 10th, 2020	• Fixed PFX firmware upgrade problem.
7	February 25th 2021	• Applied Microchip firmware MR2, 3.70.0.4f. Bundled with eXpressWare 5.18
8	July 6th 2021	• ChipLink version 1.62.00 • Enabled Reset Partition on USP link down. • Increased TLP throttling from 50.000 to 70.000 (Microchip recommendation) • Added support for MXH94x C revision cards. Bundled with eXpressWare 5.19.2
9	February 24th 2022	Applied Microchip MR4 3.90.0.5b • File format 3.90.0.5b • ChipLink version 1.68.00 • Fixes MR2 related problem with Optical support that could cause link to train to a lower speed or narrower links. • MR4 fixes two Node DMA issues. Note: MR4 requires eXpressWare 5.20.0 or newer.
10	16th May 2022	• Added GPIO control for improved cable present detection. Bundled with eXpressWare 5.20.0 and newer
11	February 15th, 2024	Applied Microchip MR5 Patch 3 • File format 3.90.0.6c • ChipLink version 1.80.05 • Enabled GAS access for all partitions. Improves diagnostic capabilities. • Changed default serial number from 00 00 00 00 to 00 00 00 01 – will be overwritten by actual serial number during initial manufacturing. • Enabled: "No link down for EP speed change" to avoid link down events by PCIe speed changes. • Improved Throttling Window from 120 us to 80 us to reduce number of throttling events during diagnostic testing. • Set "Port Down Hold-Off Time" to 20.000 us for the DSP – to have a slightly longer cable link down after link failures. • Number of MC Overlays changed from 1 to 16 (USP) in NTB mode • DMA Channel Error Vector set to 2 • DMA Channel Status Vector set to 1 • Increased MAX number of requester IDs for USP from 32 to 40 • MAX number of requester IDs for DSP : • 1x16 : 200 • 2x8 : 100

		• 2x4 : 50 • Increased "Max TLP to NT doorbells Per Seconds" to 200.000 • Decreased Throttling Window from 120 to 80 us • Set "Port Down Hold-Off Time" to 20.000 us for the DSP • Changed NTB config #11 to 2x8, 32GB BAR2 • Changed NTB config #13 to 4x4, 32GB BAR2 • Set BAR4 size on the DSPs to 0 (not in use) • NXP v2.10: emmentaler-main-nxp-v2.10.bin • NXP BL v5.0: emmentaler-bootloader-nxp-v5.bin Bundled with eXpressWare 5.22.0 and newer

2 Appendix

2.1 How to check Firmware and EEPROM version

The version of the firmware components can be retrieved using the **dis_diag** tool. This information is available by installing eXpressWare 5.18 or newer. Please see options using –h option. This software is available for both Windows and Linux.

2.1.1 Linux platforms

```
# cd /opt/DIS/sbin
# ./dis_diag
```

2.1.2 Windows platforms

```
> cd %ProgramFiles%\Dolphin Express MX\Util
> .\dis_diag
```

2.1.3 Example output:

```
# dis_diag
================================================================================
  Dolphin diagnostic tool -- dis_diag version 5.18.0 (Mon Oct 12 16:44:17 CET 2020)
================================================================================

dis_diag compiled in 64 bit mode
Driver : Dolphin IRM (GX) 5.18.0 Oct 24th 2020 (rev 33fff3a)
Date   : Mon Oct 12 12:59:28 CET 2020
System : Linux somenode 3.10.0-514.21.1.el7.x86_64 #1 SMP Thu Oct 12 17:04:51 UTC 2020
x86_64 x86_64 x86_64 GNU/Linux

Number of configured local adapters found: 1

Adapter 0 > Type                      : MXH940
            Mode                      : NTB
            NodeId                    : 4
            Serial number             : MXH940-CC-000015
            MXH chip family           : MICROSEMI - PFX GEN4
            MXH chip vendorId         : 0x11f8
            MXH chip device           : 0x4036
            MXH chip revision         : 0x0 (ZB)
            EEPROM version            : 11
            EEPROM vendor info        : 0x0000
            Firmware version          : 2.10
            Card revision             : CC
```

2.2 How to upgrade the firmware

The firmware can be upgraded using the upgrade_eeprom utility bundled with eXpressWare.

2.2.1 Linux platforms

```
# cd /opt/DIS/sbin
# ./upgrade_eeprom.sh --upgrade
```

2.2.2 Windows platforms

Start PowerShell with administrative capabilities (Press Windows+X, select Windows PowerShell (Admin))

```
PS > cd "${env:ProgramFiles}\Dolphin Express MX\Util"
PS > Set-ExecutionPolicy AllSigned -Scope Process
PS > .\upgrade_eeprom.ps1 --upgrade
```

Please carefully review the output from the upgrade utility.

A complete system power cycle (including AuxPower removal) is required. Please verify the firmware upgrade was successful after the system is powered on again, following the steps in section 2.1, How to check Firmware and EEPROM version above.

2.3 How to contact Dolphin Support

For general support questions, please contact Dolphin via the Jira Service Management portal:
https://www.dolphinics.com/csp