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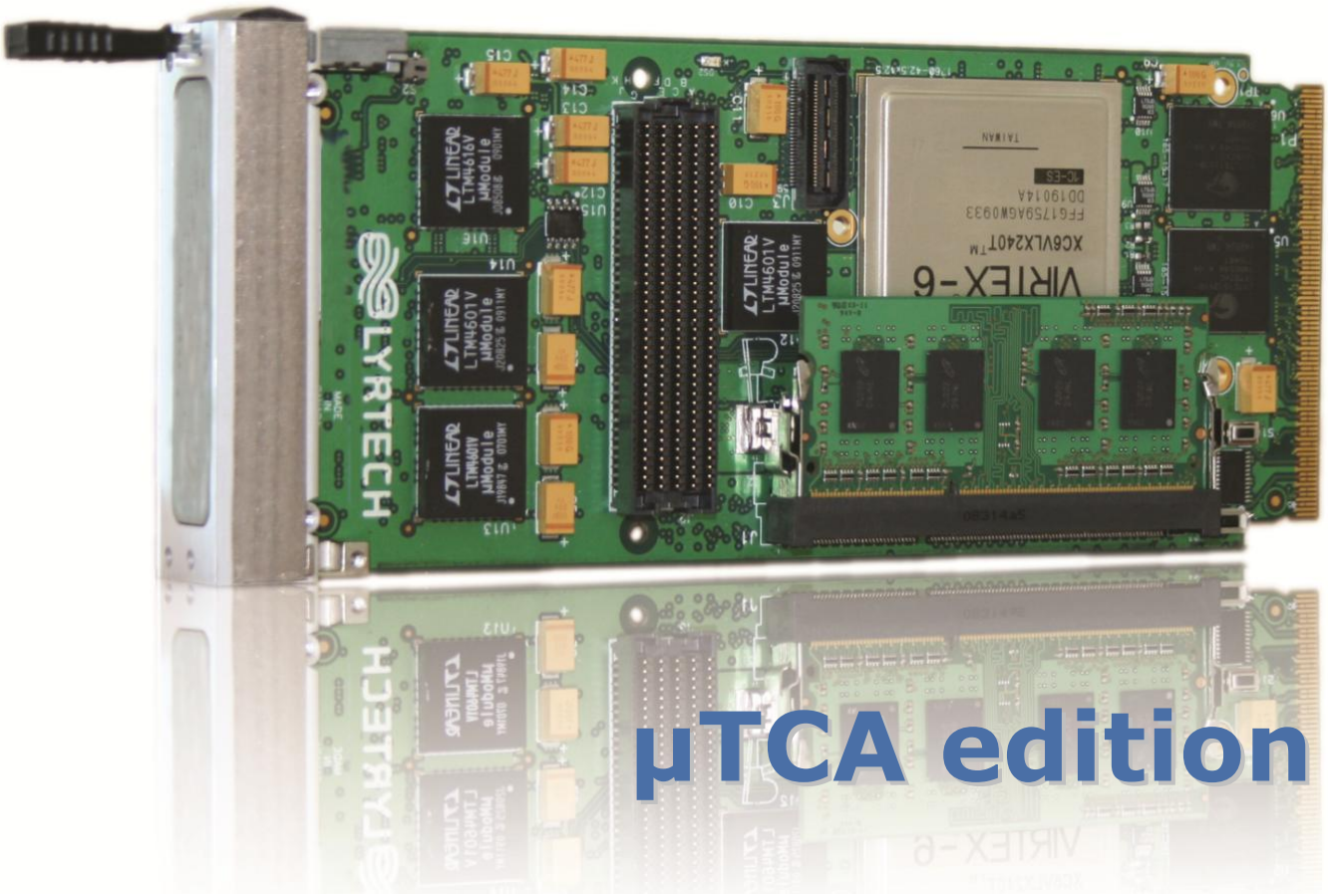
Upgrading to ADP 6.5



µTCA edition

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1 Introduction

The release 6.5 of the ADP Software Tools adds useful features to the Nutaq AXI-based software suite introduced with the release 6.0.

The main additions to the ADP Software Tools in version 6.5 are:

- Full support of the MI125 Wideband FMC (BSP,BSDK,MBDK)
- Full support of the Mestor daughter card (BSP,BSDK,MBDK)
- Full support of data streaming and GNU Radio on the ADAC250 (BSDK, MBDK, GNU Radio)
- Support storage of two bitstreams in the Perseus flash
- Simplified Perseus firmware update procedure
- Modified RTDEx Host to Perseus Example and library
- Updated Record/Playback examples for MI125, Radio420x and ADAC250
- Inclusion of Nutaq's GNU Radio Plugin in the Linux installer

This document lists the changes the users will face while upgrading to version 6.5

Important:
A Perseus firmware update is necessary to use the features of the new release.

The Linux based ADP software tools are Kernels version dependent, especially the PCI Express driver. The software tests executed on the Linux installers were done with these kernel versions:

Linux OS	Kernel Version
Fedora 20 64-bits	3.11.10.301
Ubuntu 12.04 LTS	3.11.0.23

2 Installation on Windows 7, 64 Bits

The first step in the ADP 6.5 software upgrade process is the installation of the software tools on a computer running the Windows 7, 64 bits operating system. The tools and files necessary to complete the upgrade are located in the installation. Please uninstall your prior version of ADP before installing ADP 6.5. Make sure to back up your work correctly before performing any update.

3 New Central Command Engine and Firmware Update

To use the new functionalities of the ADP Software Tools 6.5.0, it is mandatory to perform a Perseus firmware update.

The firmware update will install the new Central Command Engine (2.12.24) and the new Linux environment which allows the storage of two bitstreams in flash.

To perform the firmware update, please follow the instructions available in the *Perseus Firmware Update.pdf* document in the %ADPROOT%/documentation/pdf/Perseus folder of the Windows installation.

4 Full Support of the MI125WB

The MI125WB is a wideband version of the MI125 FMC cards. The 6.5 release offers full support of the BSP, BSDK and MBDK development flow for the MI125WB. The version 2.12.24 CCE and the release 6.5 host API are mandatory for the MI125WB detection and operation.

The MI125WB module support consists in:

- BSP: MicroBlaze Library, MI125 FPGA core and addition of the MI125 BSP standalone example.
- BSDK: Integration to the Central Command Engine and MI125 BSDK example.
- MBDK: MI125 MBDK System Generator blockset and MI125 MBDK example.

For more information on the MI125WB module, please refer to the *MI125 User's Guide* and the *Programmer's Reference Guide MI125.pdf* documents in the %ADPROOT%/documentation/pdf/MI125 folder of the Windows installation.

5 Support of the Mestor LVDS Daughter Card

The Mestor daughter card offers a connector with 15 LVDS pairs on its front panel. The ADP Software Tools Release 6.5 offers the full BSP, BSDK and MBDK support of this daughter card. All LVDS pairs can be used either as GPIO or as a synchronized bus.

For more information on the Mestor software module, please refer to the *Programmer's Reference Guide LVDS.pdf* document in the %ADPROOT%/documentation/pdf/LVDS folder of the Windows installation.

6 Support of the Data Streaming and GNU Radio for the ADAC250

An RTDEx streaming demonstration as been added to the BSDK and the MBDK ADAC250 examples for Gigabit Ethernet and PCI Express.

In addition, full support of the ADAC250 FMC in GNU Radio (control and data streaming) have been implemented within the release.

For more information on the ADAC250 additions, please refer to the *Perseus_Examples_ADAC250.pdf* document in the %ADPROOT%/documentation/pdf/ADAC250 folder of the Windows installation and the *Nutaq's GNU Radio Plug-in User Guide.pdf* document available in the GNU Radio plug-in.

7 Multi-Bitstream Boot

ADP Software Tools Release 6.5 offers the possibility of storing two bitstreams in the flash memory through the *Command Line Interface,* and to choose which bitstream will be loaded during the FPGA boot process. This feature allows a quick reconfiguration of the system without the use of a JTAG or the need for a reflash.

For more information on how to use the flashing tools, please refer to the *Programming an FPGA bitstream into Flash memory* section in the *Perseus User's Guide.pdf* document in the %ADPROOT%/documentation/pdf/Perseus folder of the Windows installation.

8 Modifications to the RTDEx Library and Example

The RTDExReceive function of the RTDEx library for Gigabit Ethernet has been modified. The function uses a timeout to prevent locking when no RTDex packets are being received. Prior to release 6.5, the RTDEx timeout relied on the underlying PCAP library to manage the timeout. However, through the release 6.5 tests, PCAP was found to not manage the timeout effectively across all operating systems. The RTDEx library has therefore been modified managing the timeout itself.

Warning:
When updating your C projects using the RTDExReceive function validate that the timeout value is large enough for the transaction to complete or you might see unexpected behavior in the termination of the data transfers.

The RTDEx Host to Perseus has been modified to introduce the following features:

- Detection of the RTDEx media used (PCIe or GigE) instead of a static build-time choice of media.
- Calculation and display of achieved throughput.

9 Modifications to the Record/Playback Examples

The Record Playback example, as well as the MI125, ADAC250 and Radio420 Record Playback examples have been modified to use the Record/Playback utility files (as well as the RTDEx Media detection) available in the release at this location: %ADPROOT%/sdk/utils.

The adp_record_playback.c allows the recovery of all data on Gigabit Ethernet without errors by enabling retries when packets are missed. The file is now used in the Record Playback, MI125, ADAC250 and Radio 420 examples.

10 Update of the GNU Radio Plug-In

The following additions were made to the Nutaq GNU Radio plug-in:

- ADAC250 control and data streaming support
- Programmable block priorities in GNU Radio Companion
- OFDM reference design GNU Radio Companion example model
- Availability of the plug-in in the Linux installer, instead of a web download