

Trizeps5 and ConXS

Getting Started

Version 1.0

This document guides you through the first steps of using the Trizeps5 running on the ConXS-Evaluation-Board.

1.0 Introduction

Thank you for purchasing the Trizeps5&ConXS-Evaluation-Kit.

The Trizeps5 is a small and complete SODIMM-size computer. Everything for a fully working module, like Flash-Storage, RAM etc. is already included and only a power-supply of 3.3V is needed to run it.

The ConXS-board is designed as motherboard for our SODIMM200-Trizeps-Modules. It contains several interfaces, and is a good starting point for your own product-design. A lighth-version of the ConXS-Board is available for use in your products.

Technical documentation can be found on the CD coming with this Evaluation-Board and on our FTP-Server [see chapter 4.6]. Sign the Non-Disclosure-Agreement [CD:\Board_Doc\DesignKits\ConXS\nda-conxs-englisch.pdf] to get additional information, like schematics and VHDL-code.

Support:

Hardware: hardware@keith-koep.com

Software: software@keith-koep.com

Sales: sales@keith-koep.com

2.0 Getting Started

2.1 Evaluation-Kit Contents

1. Trizeps5-Module
2. ConXS-Board with display
3. Power-Supply
4. Serial Null-Modem-Cable, USB-Cable
5. CD containing WinCE-Board-Support-Package, Tools and documentation.

2.2 Using the board

Normally the ConXS-Evaluation-Board should be assembled and ready to use. All you must do, is to connect the power-supply to the ConXS-Board and wait till the pre-installed WinCE-image boots up.

If the SODIMM is not fitted with a Trizeps module when you receive your board, follow the next instructions:

1. Slide the Trizeps into the socket taking account of the polarity mark. Do not touch the gold contacts. You can see that there is a polarization mark cut in the Trizeps ; this ensures that the module is adjusted correctly. Put the Trizeps module carefully at an angle of about 30 degrees into the socket.
2. Support the underside of the board and push the Trizeps down into the socket. It should click into its place.

2.3 Using the bootloader

The bootloader is the „BIOS“ of the Trizeps-module. It decides what to boot and may assist you in testing your hardware.

To enter the bootloader-command-interpretter:

1. Connect the ConXS-board with a serial null-modem-cable to your pc.
2. Open Hyperterminal with 38,4kBaud, 8 data-bits, no parity, 1 stop bit, no flow control.
3. Press ESC and hold it pressed while turning on the Evaluation-Board.
4. Take a look at the supported bootloader-functions: „?“.

TABLE 1.

Often used Bootloader-Commands

Command	Description
?	print supported functions.
tftp	load file from TFTP-server.
ereg	erase permanent registry (recommended, before loading a new WinCE-image).
eflasb0	erase everything from flash, except the bootloader.
epsm	erase persistant-storage (Flashdisk-folder in WinCE).
mount mmc or mount pcmcia	mount storage card. This must be called, before you can use the card.
cd, dir	navigate through the directory structure of a mounted storage card.
boot mmc <file> or boot pcmcia <file>	load a file from a storage card.
fb	flash boot. Boots image stored in flash.
contr, backlight	adjust contrast or brightness of a connected display.

2.3.1 Loading files

Files loaded from the bootloader must contain a bootheader (view [CD::\MT6N_BSP_CD_2.10_05\Bootloader\KuK\Doc\bootloader3.pdf] for details.). The bootheader describes what to do with the data appended to it. Typically the bootheader describes where to store the data (program code) and if to jump to a specified address in RAM/FLASH to execute this code.

Examples for loadable files:

- WinCE-Images:
[CD::\wince500\Images\CONXS\TRIZEPS-V]
- Boot-Bitmaps (Bitmap shown on boot):
[CD::\Bootloader\KuK\Tools\BitmapBoot]

The bootloader can load files from various locations:

- Ethernet using a BootP/TFTP-Server running on your PC.
- SD/MMC-Cards (formatted as FAT12/16/32).
- CompactFlash/PCMCIA-Cards (formatted as FAT12/16/32).

2.3.2 Loading files using Ethernet

To load a file through Ethernet, you must set up a BootP/TFTP-Server:

1. Download boottft.zip from our FTP-Server [ftp://www.keith-koep.com/pub/bootloader/BootTftpServer_Windows].
2. Unpack and install Cabletron tftp/Bootp-Server.
3. Connect Evaluation-Board with Host-PC (Ethernet and serial connection).
4. Open Hyperterminal and enter the bootloader-command-interpretter.
5. Clear registry: „ereg“. This is extremely recommended for every new image you load. Old registry-settings may result in misbehaviour of the system.
6. Obtain MAC-address of the Ethernet-Controller: „mac“. This will print the current mac-address. If you wish to change this, enter a new one, else press ESC. (All Trizeps4-modules with Ethernet-Controller have an unique MAC-address shown on the label).
7. Start Cabletron TFTP/BOOTP-Server. Choose BootP-Tab and enter Ethernet-Address, a free IP-Address, and the place, where your image-file resides. Push „Update“. **Note:** The MAC-address must use „-“ seperators (i.e. 00-50-C2-0E-CD-12). You must have „Broadcast Reply to Bootp Request“ selected.
8. Type „tftp“.
9. Wait till upload finished. If you loaded a RAM-Image (nk_ram.nb0) it will start automatically, else (if ROM-Image (nk_rom.nb0, nk_zip.nb0)) type „fb“ to start image.

2.3.3 Loading files using storage-card-interface

To load a file using a SD/MMC or CompactFlash-Card:

1. Copy the file to a SD/MMC or CompactFlash-Card.
2. Insert it into the ConXS-Evaluation-Board.
3. Type „mount mmc“ or „mount pcmcia“ to mount the card.
4. Type „boot mmc <filename>“ or „boot pcmcia <filename>“.
5. Loading should begin.

or

1. Copy the file to a SD/MMC or CompactFlash-Card:
2. Create a file named autoboot.bat.
3. Fill it with boot-loader-commands. i.e. „boot mmc nk_ram.nb0“
4. Insert card and switch on power of the Evaluation-board.
5. While booting, the boot-loader will check if a file named „autoboot.bat“ exists on a connected storage-media and will boot it.

3.0 Using the WinCE Board-Support-Package (BSP)

The WinCE-BSP helps you in creating your own custom WinCE-images. Prebuild WinCE-Images may be found at [CD::\wince500\PRJ\IMG_COREMAX_TR5CONXS_<year>Q<quarter>] or on our FTP-Server [see chapter 4.6].

3.1 Installing the Trizeps4 Board-Support-Package

You will need Platform-Builder 5.00 from Microsoft (free Eval-Versions are available) and our BSP [CD::\wince500\BSP\BSP_TR5CONXS_<year>Q<quarter>.msi].

First install Microsofts Platform-Builder, than run the BSP-install-file.

3.2 Creating an image with existing project CoreMax

The CoreMax-project is a good starting point for an own custom-project. It includes almost all needed components and may still be licensed under Microsofts WinCE-Core-License.

1. Copy and unzip
[CD::\wince500\PRJ\PRJ_COREMAX_TR5CONXS_<year>Q<quarter>.zip] to [c:\wince500\pbworkspaces\]
2. Open the CoreMax-project through:
File-> Open Workspace...
3. Choose to build a release-build:
Build OS-> Set Active Configuration...
4. Build a WinCE-image (this will take 20 minutes to up an hour) :
Build OS-> Build and Sysgen...
5. The build process should finish with no errors and some warnings.

Note:

If no errors occurred, the build process runs makeimg.exe. which will create a nk.bin file in your _FLATRELEASEDIR (Build OS-> Open Release Directory). This file is not the binary image. After nk.bin is created, PostMakeImg.bat will run. This batch will create 3 binaries, patched with a bootheader (see [CD::\MT6N_BSP_CD_2.10_05\Bootloader\Doc\bootloader3.pdf] for further details).

- nk_ram.nb0 Image will be loaded to RAM and execute.
- nk_rom.nb0 Image will be stored to flash (uncompressed).

- nk_zip.nb0 Image will be stored to flash (compressed).

The maximum size for a WinCE-image build with this Board-Support-Package is 82MB.

3.3 Creating an image from scratch

1. Choose File-> New Platform.
2. Push Next.
3. Choose TR5ConXS and press Next.
4. Select a configuration (i.e. Industrial Controller).
5. Push Finish.
6. Choose Build OS-> Build and Sysgen...
7. Wait till build finishes.

Note:

(View notes from 3.2).

If a component added is excluded from build (red-cross in the right corner of the icon), you get the reason by pressing the right-mouse-button on that icon and choosing „Show why item is Excluded from image...“. RightClick on the catalog, choose „Find“ and search for the missing item. If the reason is a PLAT_XXX-variable, you have to remove or set it in the [%_WINCEROOT%\TR5CONXS\Custom\TR5CONXS.bat].

Sometimes drivers need additional components from the Microsoft Platform-Builder to function as expected!

- To use Compact-Flash storage cards, include the ATADISK and the FAT-Filesystem component.
- To use a SD/MMC storage card, you have to include the FAT-Filesystem component.
- To use Active-Sync, you have to include ActiveSync and the Network User interface (SYSGEN_CONNMC):

SD/MMC: add „SD Memory“ SYSGEN_SD_MEMORY

USB-Slave: add one of the USB-Function clients (RNDIS, Serial(ActivSync), Mass Storage) (i.e. Serial: SYSGEN_USBFN_SERIAL).

Wave driver: add „Waveform Audio“ SYSGEN_AUDIO.

Known Issues:

If you want to use the UCB-Touch driver, always include the Wave driver. Otherwise the system may hang after suspend/resume!

3.4 Using Debug-Images

After building a Debug-Image, using configuration „TR5CONXS_Debug“, you can connect to this image using ethernet.

- 1.) Using DM9000-Ethernetcontroller.

Copy nk_ram.nb0 to a SD-card and create an autoboot.bat-file with this content:

```
boot mmc nk_ram.nb0 kitl
```

The device needs a BootP or DHCP-server to obtain an IP-address.

Start the device with the created SD-Card.

Open Target->Connectivity Options... and select Ethernet as transport (download set to none, debugger set to KdStub).

Press the settings button next to the transport-lisbox and wait till an active target device shows up. Select this one and press OK, Apply and Close.

Select Target-> Attach Device.

Debugger should connect.

4.0 Things you can do with WinCE

With WinCE you can do almost everything, that you can do with a „big“ computer. Although a full OS can be squizzed into images with less than 32MB (the Core-Max-image has a size of 16MB), many interfaces from the bigger Desktop-Windows can be used. Simple Applications written for Windows would recompile for WinCE with no major changes.

4.1 ActiveSync Tools

ActiveSync is a tool, that helps you connect the Trizeps4-Evaluation-Board to your development workstation. Besides the functionality you know from PDA's or other devices, that use ActiveSync to synchronise your phone-book or download programs, you may also use ActiveSync to debug your program or use some of the remote tools (i.e. Remote Registry Editor). If not already installed, you can get ActiveSync from Microsoft for download.

To use ActiveSync, just connect the EvaluationBoard through an USB-cable. ActiveSync will connect automatically. If not, open Microsoft ActiveSync and choose „File->Connection Settings...“ and validate that „Allow USB connections“ is selected.

4.2 KuK-Tools, drvlib_app.dll and the persistant registry

drvlib_app.dll is a DLL which contains many useful functions to do device-specific things like reset, storing and erasing the registry and i2c-communication.

KuK-Tools is a simple program that uses drvlib_app.dll. The main feature of the KuK-Tools is, that you can store and erase the persistant registry. If you don't store the registry, changed values are lost on the next cold-boot.

4.3 RotateScreen

There exist a little tool named RotateScreen, which is shown in the taskbar:



- Tap it once to rotate the screen.
- Tap it twice to open a control-panel, which lets you set the rotation-angles.

4.4 FTP, HTTP, VNC-Server

Most images include an FTP and HTTP-server. To attach to these servers, obtain the IP-address of the connected ethernet-card (,double-tap the network-symbol in the task-bar) and open your browser with:

- `ftp://wince:secret@<IP-Address (i.e. 195.8.230.20)>`
View [HKEY_LOCAL_MACHINE\COMM\FTPD] registry keys.
The ftp-server is configured to use the „\temp“-directory.
- `http://<IP-Address (i.e. 195.8.230.20)>/ADMIN`
View [HKEY_LOCAL_MACHINE\COMM\HTTPD] registry keys.
- Execute VncViewer.exe contained in [%_WINCEROOT%\PLATFORM\Tr5conxs\Vnc_4_customers\vnc.zip]. You must have included the VNC-server item to your image!

4.5 Application-Notes, Samples and Updates

You will find application-notes, samples and updates in the private part of our ftp-server at:

`ftp://ce500:ce500@www.keith-koep.com`