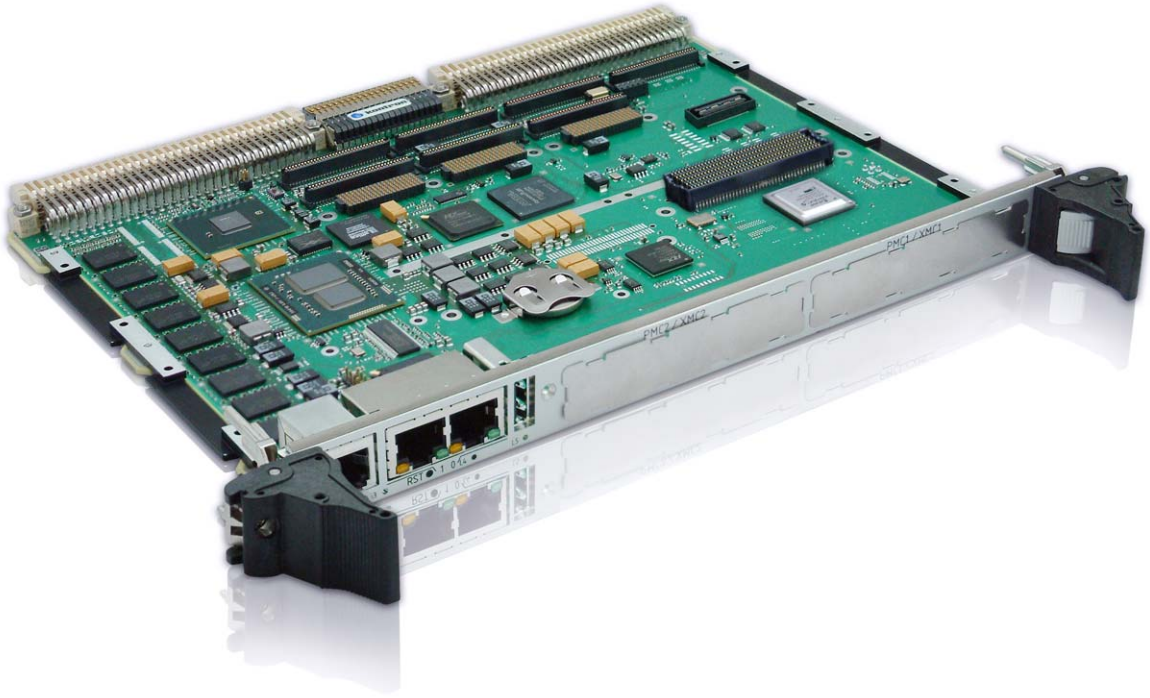
# » VM6050 «



## User's Guide for Windows XP Embedded BSP

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## Environmental Protection Statement

This product has been manufactured to satisfy environmental protection requirements where possible. Many of the components used (structural parts, printed circuit boards, connectors, batteries, etc.) are capable of being recycled.

Final disposition of this product after its service life must be accomplished in accordance with applicable country, state, or local laws or regulations.

**Environmental protection is a high priority with Kontron.**

**Kontron follows the DEEE/WEEE directive.**

**You are encouraged to return our products for proper disposal.**

The Waste Electrical and Electronic Equipment (WEEE) Directive aims to:

- reduce waste arising from electrical and electronic equipment (EEE)
- make producers of EEE responsible for the environmental impact of their products, especially when they become waste
- encourage separate collection and subsequent treatment, reuse, recovery, recycling and sound environmental disposal of EEE
- improve the environmental performance of all those involved during the lifecycle of EEE

## Conventions

This guide uses several types of notice: Note, Caution, ESD.

Note: this notice calls attention to important features or instructions.


Caution: this notice alert you to system damage, loss of data, or risk of personal injury.


ESD: This banner indicates an Electrostatic Sensitive Device.

All numbers are expressed in decimal, except addresses and memory or register data, which are expressed in hexadecimal. The prefix `0x' shows a hexadecimal number, following the `C' programming language convention.

The multipliers `k', `M' and `G' have their conventional scientific and engineering meanings of $*10^3$, $*10^6$ and $*10^9$ respectively. The only exception to this is in the description of the size of memory areas, when `K', `M' and `G' mean $*2^{10}$, $*2^{20}$ and $*2^{30}$ respectively.

When describing transfer rates, `k' `M' and `G' mean $*10^3$, $*10^6$ and $*10^9$ *not $*2^{10}$ $*2^{20}$ and $*2^{30}$.*

In PowerPC terminology, multiple bit fields are numbered from 0 to n, where 0 is the MSB and n is the LSB. PCI and CompactPCI terminology follows the more familiar convention that bit 0 is the LSB and n is the MSB.

Signal names ending with an asterisk (*) or a hash (#) denote active low signals; all other signals are active high.

Signal names follow the PICMG 2.0 R3.0 CompactPCI Specification and the PCI Local Bus 2.3 Specification.

## For Your Safety

Your new Kontron product was developed and tested carefully to provide all features necessary to ensure its compliance with electrical safety requirements. It was also designed for a long fault-free life. However, the life expectancy of your product can be drastically reduced by improper treatment during unpacking and installation. Therefore, in the interest of your own safety and of the correct operation of your new Kontron product, you are requested to conform with the following guidelines.

### High Voltage Safety Instructions


**Warning!**
All operations on this device must be carried out by sufficiently skilled personnel only.


**Caution, Electric Shock!**
Before installing a not hot-swappable Kontron product into a system always ensure that your mains power is switched off. This applies also to the installation of piggybacks. Serious electrical shock hazards can exist during all installation, repair and maintenance operations with this product. Therefore, always unplug the power cable and any other cables which provide external voltages before performing work.

## Special Handling and Unpacking Instructions

**ESD Sensitive Device!**
Electronic boards and their components are sensitive to static electricity. Therefore, care must be taken during all handling operations and inspections of this product, in order to ensure product integrity at all times

Do not handle this product out of its protective enclosure while it is not used for operational purposes unless it is otherwise protected.

Whenever possible, unpack or pack this product only at EOS/ESD safe work stations. Where a safe work station is not guaranteed, it is important for the user to be electrically discharged before touching the product with his/her hands or tools. This is most easily done by touching a metal part of your system housing.

It is particularly important to observe standard anti-static precautions when changing piggybacks, ROM devices, jumper settings etc. If the product contains batteries for RTC or memory backup, ensure that the board is not placed on conductive surfaces, including anti-static plastics or sponges. They can cause short circuits and damage the batteries or conductive circuits on the board.

## General Instructions on Usage

In order to maintain Kontron's product warranty, this product must not be altered or modified in any way. Changes or modifications to the device, which are not explicitly approved by Kontron and described in this manual or received from Kontron's Technical Support as a special handling instruction, will void your warranty.

This device should only be installed in or connected to systems that fulfill all necessary technical and specific environmental requirements. This applies also to the operational temperature range of the specific board version, which must not be exceeded. If batteries are present, their temperature restrictions must be taken into account.

In performing all necessary installation and application operations, please follow only the instructions supplied by the present manual.

Keep all the original packaging material for future storage or warranty shipments. If it is necessary to store or ship the board, please re-pack it as nearly as possible in the manner in which it was delivered.

Special care is necessary when handling or unpacking the product. Please consult the special handling and unpacking instruction on the previous page of this manual.

# Table Of Contents

# Chapter 1 - Scope

This document describes Microsoft Windows XP Embedded (XPE) Board Support Package (BSP) for Kontron VM6050 board. This document provides:

1. XPE image building environment requirements;
2. BSP installation procedures.
3. KEAPI services and test program for VM6050 platform

# Chapter 2 - Glossary

| | |
|---|---|
| CPLD | Complex Programmable Logic Device. On VM6050 this logic allows to access many feature such as GPIO, Watchdog, EEPROM, NVFRAM, Temperature sensors… |
| KEAPI | Kontron Embedded API. This includes a server that handled all access to platform features. A specified API is proposed to communicate with the KEAPI server. The server can be accessed locally or by network. Any Kontron BSP will includes KEAPI interface. |
| KEAPI-GUI | Kontron Embedded API Graphic User Interface. This is a tool that demonstrates how to connect to a KEAPI server and get/set many board platform features. It is delivered with the BSP. |
| PBIT/POST | Power-On Built In Test or Power-On Self Test.<br>On VM6050 this is the complete test that can be executed at BIOS level (this is an optional product ordered with the board). |
| UFD | USB Flash Device. |

# Chapter 3 - XPE Image Building Environment Requirements

For this BSP the mandatory XPE version is Windows XP Embedded Standard 2009 (WES2009) updated with the "Windows XP Embedded Standard 2009 Monthly Updates and features" of June 2011 or later. You must have an account access to https://ece.partners.extranet.microsoft.com/ece/ to get these updates

# Chapter 4 - XPE Image Deployment

## 4.1 Import of the SLD-Files

The installation can be done by importing the .sld files into the component database by using the Microsoft Component Database Manager:

1. Install delivered .sld files (Components directory) to a temporary location;
2. Open component database manager;
3. Under tab “database“, choose import and select the .sld files from the temporary location;
4. Close database

## 4.2 Building of the Project

Follow the steps below to build a XPE project with support for VM6050:

1. Open the Target Designer Environment;
2. Open the **“VM6050_base_IDyyddd.slx”**; yyddd is the ID of the WINXPE BSP release (yy for year and ddd for days of the year)
3. Execute dependencies check (F5) and resolve dependencies from menu `"Configuration"` select “Build Target Image“;
4. Verify that build type is set to Release, then choose “build“.

After the build process, the result can be found in the “Windows Embedded Images“ folder.

Created files and folders:

- Documents and Settings
- Program Files
- Windows
- CPLDUtils
- NTDETECT.COM
- NTLDR
- WERUNTIME.INI
- BOOT.INI

## 4.3 Preparation of the Bootable Media

### 4.3.1 Hard Disk Drive Preparation


Workstation is a Windows7 operating system

Procedure:

1. Disconnect hard disk from the target and connect it to the host
2. Open Computer Management by clicking the **Start** button, clicking **Control Panel**, clicking **System and Maintenance**, clicking **Administrative Tools**, and then double-clicking **Computer Management**. If you are prompted for an administrator password or confirmation, type the password or provide confirmation.
3. In the Navigation pane, under **Storage**, click **Disk Management**.
4. Right-click your hard disk, and then click **Delete Volume.**
5. Right-click an unallocated region on your hard disk, and then click **New Simple Volume**.
6. In the **New Simple Volume Wizard**, click **Next**.
7. Type the size of the volume you want to create in megabytes (MB) or accept the maximum default size, and then click **Next**.
8. Accept the default drive letter or choose a different drive letter to identify the partition, and then click **Next**.
9. In the Format Partition dialog box, apply following settings:
    9.1. File system: **NTFS**
    9.2. Allocation unit size: **Default**
    9.3. Volume label: **XPE**
    9.4. Perform a **quick format**
10. Review your choices, and then click **Finish**.
11. Right-click your created partition, and then click **Mark Partition as Active.**

### 4.3.2 Bootable USB Flash Device (UFD) Creation


Workstation is a Windows7 operating system

Procedure:

1. Plug UFD to host;
2. From a Windows 7 run the `DiskPart` tool. For example, at the command prompt, type the following:

    ```
    diskpart
    ```

3. Use the DiskPart tool to determine the disk number and device size to be used for the next step by typing the following at the DiskPart command prompt:

    ```
    list disk
    ```

4. Use the `DiskPart` tool to partition and format the device and make it bootable. For example, if the UFD is Disk 1, type the following at the `DiskPart` command prompt, replacing <device_size> with the capacity of the UFD (in MB).

```
select disk <disk_number>
clean
create partition primary size=<device_size>
select partition 1
active
format fs=ntfs quick
assign
exit
```

## 4.4 Transfer the Build to the Prepared Hard Disk

Copy the created files and folder from the Windows project folder (see 4.2) to the hard disk or bootable UFD.


if bootable device is UFD replace `USBSTOR.SYS` from `Windows\System32\Drivers` with `USBSTOR.SYS` from Patch directory in archive. In any case it is advised to do this to prevent `Restart/Shutdown` malfunctioning when an USB device is plugged.

## 4.5 Image First Boot

Connect the above mentioned HDD or UFD to the target system and boot the system. The FBA (first boot agent) should start and complete.

# Chapter 5 - Image Installation from Norton Ghost Image

For this procedure 2 media are needed. The first is supposed to be a bootable USB disk and it will contain the executable tool GHOST.exe and Win XPE image VM6050_IDyyddd.gho. The second media will be the target device where to install and boot Win XPE.

Procedure:

1. Create bootable USB disk from a Windows computers:
   - run `HPUSBFW.EXE` (must be executed with administrative right);
   - select `USB flash drive`;
   - set `"Quick format"` and `"Create a DOS startup disk"`;
   - Select directory DOS in Open File `dialog`;
   - Press `start`;
2. Copy files `VM6050_IDyyddd.gho GHOST.EXE` from Ghost directory to the USB flash root;
3. Connect the USB disk and the targeted disk to VM6050
4. Check or Set current time in BIOS;
5. Boot from USB disk including `GHOST.EXE` and `Ghost WINXPE Image`;
6. Run `GHOST.EXE`;
7. select Disk->from partition and choose `VM6050_IDyyddd.gho file`. Then select target disk (if target disk is UFD make sure that it is bootable - see 0). Press `OK`;
8. Reboot system after deploying completion. The boot is fast because there is no First boot agent started with this procedure.

Just for information this Ghost image has been slightly configured after the WinXPE installation and First Boot Agent Execution. Here is a summary of what have been done before cloning the image:

- Account is login: `administrator`; password `adminis`
- Display setting (screen size) is modified and automatic configuration is deactivated;
- Classical view is set from Control Panel;
- IP addresses are set in static mode. Con1 (front Ethernet 0) IP address is set to static address
  - `169.254.220.118 : 255.255.0.0. Con2 (front Ethernet 1)` IP address is set to static address
  - `169.254.220.118 : 255.255.0.0. Con3 (rear Ethernet)` IP address is set to static address
  - `169.254.27.123 : 255.255.0.0 and Con4(rear Ethernet)` is set to `169.254.47.60 : 255.255.0.0`
- Delete bad Links or useless links in Menu such as Game, Accessibility, Remote Assistance …

Check Firewall is OFF is order to allow Remote Desktop Accesses (useful if there is no graphic connected)

- Run in command tool: fbreseal
  - this will regenerate a new Computer SID at next boot. So before rebooting this image it must be cloned to have a different COMP SID on every machine. This will avoid conflict on network in some specific cases;
- Then image can be cloned with tool like Ghost. Use `GHOST.EXE -> From Disk -> To Image => VM6050_IDyyddd.GHO`. After that copy this Ghost image on boot device: `GHOST.EXE -> From Image -> To Disk`

# Chapter 6 - Delivered “Windows Embedded Images“ Folder

A Win XPE image folder obtained after WES2009 compiling is also delivered in “Windows Embedded Images” folder. It can be copied directly to a bootable device as described in (see 4.3.1). When booting the first time the system will execute the FBA. The FBA will take 10-15 minutes to execute.

# Chapter 7 - VM6050 Drivers

This chapter describes the specific VM6050 features added to WINXPE generated image when it is built with components VM6050_yyddd HAL.sld (this component includes CPLD drivers, KEAPI server, KEAPI-GUI and KEAPI tools). See associated PDF documentation for Kontron EAPI installation guide, KEAPI-GUI_and_tools_user_guide and KEAPI specification.

## 7.1 CPLDUtils Folder

On booted WINXPE on C:/CPLDUtils folder, the following files can be found:

| Name | Description |
|---|---|
| LedTest.exe | Program to demonstrate LED handling |
| VpdInfo.exe | Access and Display VPD information |
| WdInit.exe | Set and Get the CPLD watchdog mode (reset, interrupt, timer) |
| devcon.exe | In CPLDUtils/Drivers : Binary tool. The DevCon utility is a command-line utility that acts as an alternative to Device Manager. Using DevCon, you can enable, disable, restart, update, remove, and query individual devices or groups of devices. |
| Post.exe | Get and display PBIT & POST (executed under BIOS) result |
| Interrupt.exe | Test GPIO interrupt expecting for interrupt |
| WdInterrupt.exe | Test watchdog interrupt expecting for interrupt |
| Registers.exe | Get and display CPLD registers values and information |
| InterruptInit.exe | Initialize interrupt GPIO mode |
| sleep.exe | In CPLDUtils/Drivers: Sleep binary tool to delay program execution |
| VxCpld.sys Vxcpld.cat<br>Vxcpldwd.cat VxCpld.dll<br>VxCpldWd.inf VxCpld.inf<br>VxCpldWd.sys | In CPLDUtils/Drivers: Library to access CPLD features |

Source code of these tools can be found on released DVDROM in folder BSP/WES2009_BSP_VM6050_yyddd/src/TestApplications

## 7.2 KEAPI - Program files/Kontron/KEAPI Folder

In Folder C:/Program Files/Kontron/Keapi, The Following Items Can Be Found:

- Keapi Documentation (Requires Pdf Reader Tool),
- Keapi Server Application,
- Keapi-Gui Application To Access Keapi Server,
- Keapi Tool To Access Basic Platform Feature From Keapi Server And
- Source Code For Keapi_gui And Tools.

### 7.2.1 Doc

In «Program Files/Kontron/Keapi/Doc»:

| Name | Description |
|---|---|
| KEAPI-GUI_and_tools_user_guide_v1.0_21_04_2011.pdf | Guide for KEAPI-GUI and shell tool |
| KEAPI_spec_v1.21_26_04_2011.pdf | KEAPI interface specification |
| Kontron_EAPI_installation_guide_v1.0.pdf | Installation guide for KEAPI driver & server |

### 7.2.2 KEAPI

In «Program files/Kontron/KEAPI/KEAPI» : KEAPI server

### 7.2.3 KEAPI-GUI

In «Program files/Kontron/KEAPI/KEAPI-GUI

| Name | Description |
|---|---|
| Keapi-GUI.exe | KEAPI graphical Interface to access KEAPI server (local or by network) |

### 7.2.4 KEAPI-Tools

In «Program files/Kontron/KEAPI/KEAPI-tools

All the tools included into this folder invokes KEAPI server (local or by network) to access VM6050 platform features.

| Name | Description |
|---|---|
| battery.exe | Get battery Count & State |
| cpu.exe | Get CPU info &Freq & Performance |
| disk.exe | Get Disk count, list, Partition information |
| display.exe | Get display count and set/get back light value |
| eeprom.exe | Get storage device count, size and Read Write device |
| fan.exe | Get/Set Fan characteristic (N/A for VM6050) |
| general.exe | Get general platform information |
| gpio.exe | Get GPIO count and Get/Set GPIO direction and level |
| i2c.exe | Perform I2C read/write operation |
| memory.exe | Get memory information |
| netdev.exe | Get network device count and list |
| pcidev.exe | Get PCI device count and list |
| smbus.exe | Get SMbus count and Read/Write Smbus bytes |
| temp.exe | Get temperature sensors count list and value<br>Get CPU temperature value |
| voltage.exe | Get Voltage sensors count list and value |
| watchdog.exe | Enable/Trigger and disable watchdog (CPLD watchdog on VM6050) |

### 7.2.5 Src

In «Program files/Kontron/KEAPI/src»

> Include folder: includes files for KEAPI services library

keapi.h, keapi_types.h, PicmgWrapper.h

> KEAPI-GUI folder: source code for KEAPI GUI

connectiondlg.cpp, connectiondlg.h, kstation.cpp, kstation.h, main.cpp, ui_connectiondlg.h, ui_kstation.h … etc

> KEAPI-tools folder: source code for KEAPI tools

Battery.c, Cpu.c, Disk.c, Display.c, Eeprom.c, Fan.c, General.c, Gpio.c, I2c.c, Makefile, Memory.c, Netdev.c, Pcidev.c, Smbus.c, Temp.c, Voltage.c, Watchdog.c

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