Application Note

AN-010

Support for
Microsoft's Windows XP Embedded
Operating System

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Introduction

This document provides a procedure to utilize Condor Engineering PCI or ISA devices with Microsoft's Windows XP Embedded (XPe) operating system. The procedure uses the Microsoft Windows XP Embedded development tools, which consist of the Component Designer and the Target Designer. This procedure is not inclusive of all target run-time image design requirements.

This document is organized into the following sections:

- Preliminaries
- Device Drivers
- API Distributions
- Troubleshooting
- Contact Information

Preliminaries

Microsoft has developed Windows XP Embedded to be a componentized version of Windows XP, they are identical operating systems. Refer to Microsoft's documentation and tutorials concerning the development of a Windows XP Embedded target run-time image at http://msdn.microsoft.com/embedded/windowsxpembedded.

Before attempting to build a target run-time image to include any Condor Engineering software (driver or API), you should be comfortable with the design and building of target run-time images for the target system. Condor Engineering does not offer support with the use of Microsoft's development tools nor in the designing of a Windows XP Embedded target run-time image.

It is required that you install all Condor Engineering device(s) that are to be used on the Windows XP Embedded target system onto a Windows XP system to retrieve all necessary files for the target run-time image.

Keep in mind the following:

- The device driver for the ISA devices (**winrt.sys**) and the device driver for the PCI devices (**ceidev.sys**) cannot be used concurrently on the same target system.

- A target run-time image may not contain all of the required component(s) needed by this procedure. Missing components will need to be added to the target run-time image by using the Target Designer.

Device Drivers

PCI Devices

There are two methods to install the PCI device driver onto a Windows XP Embedded system. The first is the recommend way, which uses the PCI device's **inf** file to install the PCI device directly into the Windows XP Embedded system. In the Windows XP Embedded target run-time image:

1. Copy the **ceidev.sys** to the target's **\windows\system32\drivers** directory.

2. Copy the PCI device(s) **inf** file to the **\windows\inf** directory.

3. Export the **HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Servic es\WinRT** registry branch from the host system's Windows registry.

   Copy the registration file (*.reg) to a directory on the Windows XP Embedded target. After the target system is running you will need to import the registration file into the target's Windows registry.

Note: After starting the target system, if the PCI devices are not displayed in the **Condor Engineering** category in the target system's device manager, check the **other devices** category to determine if the target system has installed the PCI device(s) as **unknown device**. If so, you will need to update the driver with the appropriate **inf** for the PCI device(s).

The alternative method imports the **inf** file to include the files and registry keys needed by the PCI device driver for the target run-time image:

1. In the Component Designer development tool, import the **inf** file associated with the Condor device.

2. In **Repositories** add a repository with the source path for the files that are reported in the **Files** category (they should have **ceidev.sys** and an associated PCI **inf** file for each device installed). The name of the **inf** file is **PCI_**<PART NUMBER>_<X>**.inf**. The <X> identifies the dev number that was selected when the device was installed on the host Windows XP system. The <PART NUMBER> identifies the type of board:

    - For MIL-STD-1553 devices: 1553

    - For Arinc devices: the number represents the product number (for example, 0520 for the CEI-520). The only exception is the CEI-820tx which is 0821.

3. In **Registry Data** add all of the necessary registry branches:

    - **HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\WinRT**

    - Look for the registry branch with VEN_0x13C6 in **HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Enum\PCI**

    - Look for the registry branch with Condor Engineering in **HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\Class**

    If a board fails to execute in a target run-time image, then it may be neccesary to search the entire host system's Windows registry for other required keys/branches that need to be added to the target run-time image.

4. The following components may be necessary to include in the target run-time image:

    - Software : System : System Services : Base : Pnp (Kernel mode)

    - Software : System : System Services : Base : Pnp (User mode)

    - Hardware: Devices : System devices: Plug and Play Software Device Enumerator

ISA Devices

To install the ISA device driver, import the **inf** file.

1. In the Component Designer development tool, import the **inf** file associated with the Condor device.

2. In **Repositories** add a repository with the source path for the files that are reported in the Files category (should have **winrt.sys** and an associated ISA **inf** file for each device installed). The **inf** file is **CEI_ISA_**<X>**.inf** where <X> identifies the dev number that was selected when the device was installed on the host Windows XP system.

3. In **Registry Data** add the following registry branches for WinRT:

   - **HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\WinRT**

   - **HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Enum\Root\LEGACY_WINRT**

4. The following components (from Software:System:System Services:Base:) are necessary for the target run-time image:

   - Device: Legacy Driver

   - Class Installer - Non-Plug and Play Drivers

API Distributions

A special build of the API dynamic link library (DLL) for Windows XP Embedded is not required. The API dynamic link libraries that exist in the API distribution are compatible. Target run-time builds will need to have a component with the following API files and registry keys:

1. In **Files** add the **cei_install.dll** library to be included in the **\windows\system32** directory.

2. In **Files** add the needed API library(s) to be included in the **\windows\system32** directory:

   - Bustools/1553 API: **busapi32.dll** (API library for all 1553 devices)

   - CEI-x20 API:

     - **cei22032.dll** (standard API library for the CEI-220/420(A))

     - **ceix2032.dll** (enhanced API library for the CEI-520(A)/620/820)

- **ceix820tx.dll** (API library for the CEI-820TX)

  The ceix2032.dll and the **ceix820tx.dll** must be renamed to cei22032.dll.

- CEI-x30 API:
  - **cei_ll.dll** (lowlevel library for all x30 devices)
  - **cdev_api.dll** (API library for all x30 devices)

3. In **Repositories** add a repository with the source path to the directory where the API libraries that were added in Files. It is suggested that you create a directory and copy all the needed files there.

4. In **Registry Data** add the registry branch:

- **HKEY_LOCAL_MACHINE\SOFTWARE\Condor Engineering**

It is possible to copy all of the library files and export/import the registry key directly to the target run-time image without the need for a component in the Target Designer.

Troubleshooting

All questions concerning the use of the Microsoft Windows XP Embedded development tools (Component Designer and Target Designer), the Windows XP Embedded operating system, the designing of run-time images, and the use of the Windows registry should be directed to Microsoft.