



UART Application Kit for Windows Embedded CE 6.0

User's Manual

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1 Introduction

1.1 Overview

The UART Application Kit is a product that extends the number of serial ports available on your Digi Development board or JumpStart board.

The UART Application Kit hardware board connects to the Development or JumpStart board via the Peripheral Application Header and the provided 50-pin flat cable. It mounts a quadruple UART chip and additional logic for providing 4 independent configurable RS-232/422/485 serial ports.

Each port can be configured, via an on-board switch, for RS-232, RS-422 or RS-485 asynchronous serial communication in either full-duplex or half-duplex mode. For more information about the configuration of the switches see UART Application Kit Hardware Reference Manual.

The UART Application Kit hardware board is powered from the Development or JumpStart board.

The UART Application Kit software contains the driver needed to support the extended UARTs in a Microsoft Windows® Embedded CE 6.0 OS Design.

This User's Manual assumes that the reader is able to create, compile and download a kernel image.

1.2 Features of the UART Application Kit

The following are major features of the UART Application Kit:

- Four independent configurable RS-232/422/485 serial ports
- 64-byte transmit/receive FIFO with error flags
- Up to 5Mbits/sec baud rate
- Full modem RS-232
- Configurable full-duplex or half-duplex RS-422/485 ports
- Configurable termination resistor for RS-422/485 ports
- Four 9 way D type connectors
- All ports accessible at TTL level (connector not mounted)
- One shared open collector interrupt for all the ports
- Power save mode
- ±15kV ESD protection

1.3 Conventions

Here is a list of the typographical conventions used in this manual:

- | | |
|--------------|--|
| <i>Style</i> | New terms and variables in commands, code, and other input. |
| <i>style</i> | In examples, to show the contents of files, the output from commands. In, text the C code. |
| | Variables to be replaced with actual values are shown in italics. |



Style	For menu items, dialogs, tabs, buttons, and other controls. In examples, to show the text that you enter
Menu name > option	A menu followed by one or more options; for example, File > New.

This manual also uses these frames and symbols:



This is a warning. It helps solve or avoid common mistakes or problems.



This is a hint. It contains useful information about a topic.



```
> This is a host computer session  
> Bold text indicates what must be entered.
```



```
> This is a target session  
> Bold text indicates what must be entered.
```

1.4 Acronyms and abbreviations

BSP	Board Support Package
CPU	Central Processing Unit
ESD	Electrostatic Discharge
FIFO	First Input First Output
FTP	File Transfer Protocol
MEI	Multiple Electrical Interface
OS	Operating System
PC	Personal Computer
UART	Universal Asynchronous Receiver Transmitter



2 Requirements

Host System requirements

The development system has to meet the following requirements:

- x86 PC with 500 MHz Pentium III or faster processor; 2 GHz Pentium 4 or equivalent recommended
- Microsoft Windows® 2000 Professional with Service Pack 4 or Windows XP Professional with Service Pack 1.
- Microsoft Windows® CE 6.0 with Service Pack 1 installed and updates
- Serial port
- Ethernet network card

2.1 BSP requirements

Display interface support recommended for development purposes, but not required.

2.2 Microsoft Windows® CE OS Configuration

2.2.1 Required components

Go to the Catalog and expand **Core OS > CEBASE**. Then include this element:

Core OS Services:

- Serial Port Support

2.2.2 Recommended catalog components

Other recommended networking utilities and services are:

Core OS > CEBASE > Communication Services and Networking:

- Networking General
 - Network Utilities
- Servers
 - FTP Server
 - Telnet Server



3 Installation

This release is installed by executing Setup.exe.

The installer wizard will guide you in all required steps.

After installation has finished, the following components will be on your PC:

%ProgramFiles%\Digi\AppKits\UART_AppKit:

- **Backup:** During the installation process some files might be overwritten, this folder create a backup of these files.
- **Uninstaller:** Executable to uninstall this release.
- **Release Notes** and **License Agreements.**

_%WINCEROOT%\OTHERS\Digi\AppKits\UART_AppKit\src\driver:

- Sources of the driver.



%ProgramFiles% is an environment variable of your system that provides the path to your Program Files directory (usually C:\Program Files)

_%WINCEROOT% is an environment variable of your system that provides the path to your Microsoft Windows® CE root directory (usually C:\WINCE600).



4 Integration

4.1 Integration overview

The UART Application Kit integration described in this chapter assumes that you have already performed the following steps. These steps are fairly general as they are highly dependant on the customer BSP and the Microsoft Windows® CE version used:

Before completing these steps, you will need to have the following applications already installed:

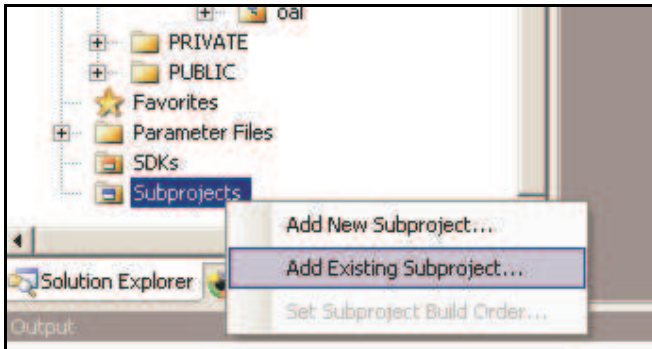
- Microsoft Windows® CE 6.0 as described in Chapter 2, and
- a BSP corresponding with the hardware that will be used.

4.2 Integration process

The source code of the driver can be integrated into a Windows Embedded CE 6.0 project as a subproject of it.

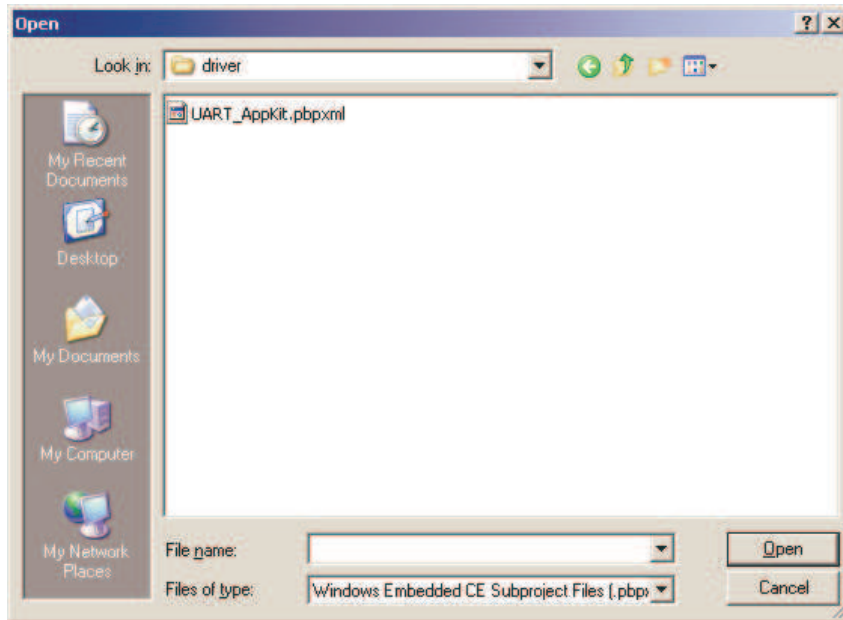
After you have completely built your Project, it's time to add a new subproject for the UART Application Kit.

Open the Solution Explorer and right-click over the Subprojects. Choose **Add Existing Subproject**:





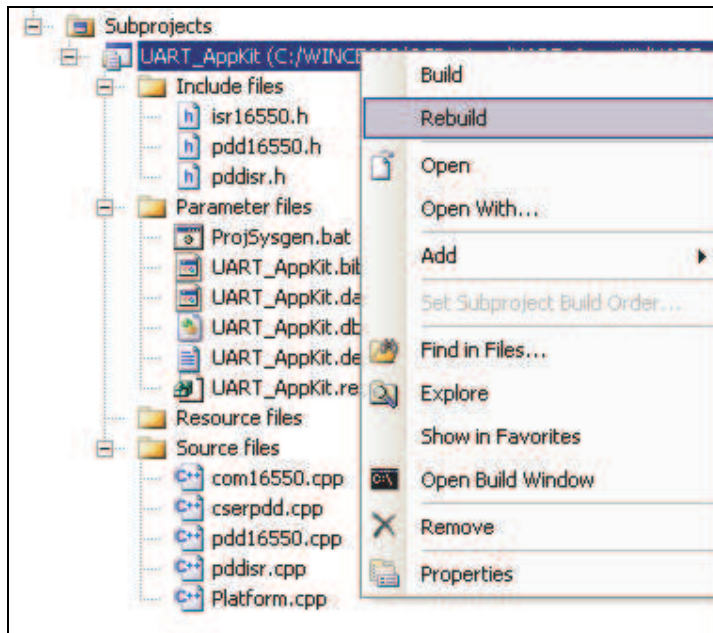
Navigate to %_WINCEROOT%\OTHERS\Digi\AppKits\UART_AppKit\src\driver directory and select UART_AppKit.pbpxml:



Now you can see the parameter files and the source files.

Right click over UART_AppKit and select **Rebuild** and then right click over the project and select **Make Run-Time Image**.

The driver build should be rebuilt and included in the final **nk.bin** image, together with the necessary registry entries.





4.3 Driver starts

Verify that the **UART_AppKit.dll** is inside the new image and that the correct registry entries are placed in the final registry file (reginit.ini), located in your **Flat Release Directory**.

Once the project has been built, download it to the target device and start it up.

If you have the UART Application Kit connected to the peripheral application header of the target, it should be automatically detected, and you should see a console message similar to the following:



```
[UART_AppKit]: Loading External Serial 0... OK.  
[UART_AppKit]: Loading External Serial 1... OK.  
[UART_AppKit]: Loading External Serial 2... OK.  
[UART_AppKit]: Loading External Serial 3... OK.
```



More information may be shown depending on the debug level established in the driver.



5 Using the serial ports

The UART Application Kit driver is a stream driver built into a DLL called UART_AppKit.dll.

The UART Application Kit serial ports can be handled like any other serial port in Windows Embedded CE 6.0. Once loaded four new devices:

- 'COM5:', corresponding to serial port A in the Application Kit hardware board.
- 'COM6:', corresponding to serial port B in the Application Kit hardware board.
- 'COM7:', corresponding to serial port C in the Application Kit hardware board.
- 'COM8:', corresponding to serial port D in the Application Kit hardware board.

should be available to be opened from applications through the CreateFile() call.

The normal operation from an application will be open the driver (CreateFile), and perform read or write operations (ReadFile and WriteFile). Finally close the driver (CloseHandle).

Please for information about serial port programming refer to **Help->Search** into the Visual Studio and look for "Serial Communication Reference".



6 Uninstalling

The UART Application Kit can be uninstalled separately using Windows Control Panel.

Add or Remove Programs:

- **UART Application Kit for Windows Embedded CE 6.0**