



**J2ME Developer's Guide  
For Windows Mobile 2003**

**First Edition (month 2000)**

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## Chapter 1. Getting Started

This section describes how to prepare the Windows Mobile 2003 device (from this point referred to as the "target" device) and the development environment by showing you how to:

- Establish an ActiveSync connection.
- Copy files onto the target.
- Configure the target device.
- Debug from the target device.

Devices with an Xscale processor running Windows Mobile 2003 are supported, for example the iPAQ 5500 series devices.

**Note:** These tutorials are cumulative in nature. In this section, the MIDlet created in the **Getting Started: MIDP Applications** section will be used and set up to run on the target.

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### Establish an ActiveSync Connection

Before the application can be launched or debugged on the target, an ActiveSync connection must be established between the development machine and the target and then the required files must be copied onto the target's file system.

Refer to the documentation for the particular device and/or connection software on setting up an ActiveSync connection.

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### Copy Files onto the Target

To prepare the target, files must be copied to it. For documentation on the required files and the procedure for copying them, refer to the **Task: Copy Files onto the Target**.

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### Configure the Target

A detailed description of the target's configuration is provided in the following subsections:

- Creating a Device Configuration.
- Creating a Build Configuration.
- Creating a Launch Configuration.

#### Creating a Device Configuration

To begin with, a device configuration must be created for the target.

1. Click **Devices** on the Workbench tool bar.

**Note:** You must be in the Java™ perspective in order to access the **Devices** icon.

2. Select **Pocket PC Handheld** from the list and click **New**.

3. In the **Device Configurations - Edit** dialog, fill in the fields **Location of J9 runtime**, **Location to install**, and **Location for shortcut** to match the target's directory structure.

**Note:** Select **Browse** to search the file system on the target for these locations. For more information refer to **Target Configuration**.

4. Click **OK**.

## Creating a Build Configuration

**Note:** These tutorials are cumulative in nature. To start at the beginning of the tutorial, refer to **Getting Started: MIDP Applications**.

Follow these steps to create a Windows Mobile 2003 build:

1. Open the Java perspective by choosing **Window | Open Perspective | Other...** and then choosing Java.
2. In the Java perspective, select **My MIDP Project**.
3. On the workbench toolbar, click the **Manage builds for this project** icon.
4. Create a new build, selecting **J9 for PocketPC ARM** as the **Platform**.

**Note:** For additional build instructions, refer to **Set Up a Build**.

## Creating a Launch Configuration

The launch must be configured to combine:

- The application resulting from the build (refer to **Create a Build Configuration**).
  - The target device configured earlier (refer to **Create a Device Configuration**).
1. In the Java perspective, select **My MIDP Project**.
  2. Click the arrow next to **Run** on the workbench toolbar.
  3. From the drop-down menu, select **Run...**
  4. In the **Run** dialog, select **MIDlet Suite** from the list and click **New**.
  5. In the **Name** field, enter **My Pocket PC MIDlet**.
  6. From the **Project** field, click **Browse** and enter **My MIDp Project**. Then click **OK**.
  7. From the **Device or JRE** field, select **My Pocket PC**.
  8. From the **Midlet Suite** field, select the build created in **Creating the Build Configuration**.
  9. Select **MyMIDlet.jad** from the list, and click **Run**.

**Result:** The application is copied to the target and executed there. Later, the application can be relaunched by tapping the **My MIDlet** icon on the target.

**Note:** On some targets, to view the output of the program you might need to tap the screen.

10. Click **Exit** on the target.

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## Debug from the target device

To debug from a Launch Configuration on the target, you need the following:

- The application resulting from the build (refer to **Create a Build Configuration**)
- The target device configured earlier (refer to **Create a Device Configuration**)
- The launch configured earlier (refer to **Creating a Launch Configuration**)

1. Click the arrow next to **Debug** on the workbench toolbar.
2. From the drop-down menu, select **Debug...**
3. In the **Debug** dialog box, select the launch you created earlier.
4. Select **Debug**.

**Result:** The application is copied to the target and executed.

**Note:** The shortcut that is created is for debugging and is not suited for launching the application without the debugger running. If any part of the debug launching fails, either the application or the shortcut may be deleted from the device.

5. Click **Exit** on the target.





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## Chapter 2. Concepts

This section is divided into three parts:

- Prerequisites.
- Windows Mobile 2003 Runtime.
- Supporting Software.

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### Prerequisites

The following devices are supported:

- Devices with an Xscale processor running Windows Mobile 2003. **Example:** the iPAQ 5500 series devices.
- Devices with a StrongARM™ processor running Windows Mobile 2003. **Example:** the iPAQ 5400 series devices.

Devices with other ARM™ processors running Windows Mobile 2003 may also function, but they are not supported.

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### Windows Mobile 2003 Runtime

The J9 runtime for Windows Mobile 2003 on a Xscale processor is distributed as a collection of executable and shared library files. These files are located in the IVEHOME\runtimes\wm2003\arm\Example: \midp20).

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### Supporting Software

The following software can be used when using WebSphere® Studio Device Developer to develop applications for Windows Mobile 2003.

- PocketTweak.
- vxUtil.

#### PocketTweak

PocketTweak helps configure the settings on the target without using registry editors. This program can be used to associate JXE files with the J9 executable on the device. PocketTweak can be obtained from the **Tillanosoft Web site** (<http://tillanosoft.com/ce/ptweak.html>).

#### vxUtil

vxUtil is a program used to test and verify network connectivity on Windows Mobile 2003 platforms. vxUtil can be obtained from the **Cambridge Computer Corporation Web site** (<http://www.cam.com/windowsce.html>).



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## Chapter 3. Tasks

This section provides information on working with Windows Mobile 2003 targets, including instructions and details on the following subjects:

- Configuring a Target.
- Setting Device Configurations.

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### Configuring a Target

Before launching or debugging the application on the target, an ActiveSync connection must be established between the development machine and the target and the required files must be copied onto the target's file system:

- Establishing an ActiveSync Connection
- Copying Files onto the Target
- Creating a Device Configuration

#### Establishing an ActiveSync Connection

Refer to the documentation for the particular device and/or connection software for information on setting up an ActiveSync connection.

#### Copying Files onto the Target

There are 2 different ways the J9 executables can be copied to the target device:

- Copy the CAB file to the target device and execute it.
- Manually copying all the necessary files to your target device.

##### The Simplest Method - Using the CAB file

Using the CAB file is the simplest method to copy the proper files onto the target. Follow these steps to get the CAB file onto your target device:

1. Open ActiveSync on your development machine and click **Explore**.
2. Click **My Mobile device** to get to the root directory.
3. Copy the CAB file from the desired feature location.

**Example:** If you want the MidP 2.0 feature, copy  
IVEHOME\runtimes\wm2003\arm\midp20\cab\\*.cab

4. On the target, select the CAB file.

**Result:** The CAB file executes and installs the needed files on the target.

##### The Manual Method - Copying the files manually

The files that should be copied onto the target vary depending on a number of factors, such as which class library configuration the application uses.

**Note:** In these instructions for manually installing J9 (instead of using the .cab file), the IVEHOME directory refers to the runtime directory within the WSDD install tree, for example: C:\Program Files\IBM\Device Developer\wsdd5.0\ive-2.2.

Follow these steps to copy files onto your target.

1. Create a directory on the device to contain shortcuts. To create the directory, from the ActiveSync window, click **Explore**, and then click **My Mobile device**.

Next, select **Windows | Start Menu**, then right-click and select **New Folder**. This folder is the location you will use later as the **Shortcut Install Location** in the Device Configuration window.

2. On the development machine, navigate to the IVEHOME\runtimes\wm2003\arm\<feature>\bin directory.

**Note:** To find the value for the IVEHOME variable, do the following in WSDD:

- a. Select **Windows | Preferences | Java | Installed JREs**.
- b. Find the location value under **JRE Type=J9 VM**. This is the value of IVEHOME.

3. In the ActiveSync window on the development machine, click **Explore**.
4. Create a new folder for your J9 files by selecting **Program Files**, then right-clicking and selecting **New Folder**. Name this new folder, **J9**.
5. Create a new subfolder of the **J9** folder specific to the feature you are installing by right-clicking the **J9** folder and selecting **New Folder**. Name this folder to indicate the feature you are installing. **Example:** MIDP20
6. Copy the following files from the **bin** on the development machine into the **bin** directory on the target:

**Note:** Your J9 runtime setting for your application should be \Program Files\J9\MIDP20\bin. You will use the value \Program Files\J9\MIDP20 later in the Device Configurations window for the J9 Runtime or Emulator location value.

- emulator.exe (MIDP 2.0 emulator version of J9)
- iverel2\*.dll
- j9.exe (console version of J9)
- j9dyn2\*.dll
- j9gc2\*.dll
- j9midp20.exe (MIDP 2.0 version of J9)
- j9prt2\*.dll
- j9thr2\*.dll
- j9vm2\*.dll
- j9w.exe (no-console version of J9)
- j9zlib2\*.dll
- jclmidp20\_2\*.dll (or other feature-specific jcl\*\_\*.dll. **Example:** jclfoun10\_2\*.dll)

To debug on the target, copy the following additional files in the target's bin directory:

- j9dbg2\*.dll
- j9dbgi2\*.dll
- j9hook2\*.dll

7. Copy the following files from the **lib** on the development machine, into the **lib** directory on the target:

**Note:** A class library for the feature needs to be copied to the target. For this example, MIDP 2.0 is used. The **local.zip** and **charconv.zip** files are needed only for development in languages other than English.

- charconv.zip
- j2me.keystore
- security.policy

8. Copy the following files from the lib\jclMidp20 on the development machine into the lib\jclMidp20 directory on the target:

- classes.zip
- AMS.jad
- jclMidp20.jxe

## Creating a Device Configuration

Before creating a device configuration for the target device, enable an active sync connection with the device and copy the j9 runtime files to the device (refer to **Copy Files onto the Target**).

Then create a device configuration for the target as described in **Create a Device Configuration**.

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## Setting Device Configurations

WebSphere Studio Device Developer allows the user to define the devices that the applications can run on. This can be done by using the **Device Configuration** wizard.

For more information, see **Configuring a Device**.



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## Chapter 4. Reference

This section provides information on the Windows Mobile 2003 Workbench, including instructions and details on the following subjects:

- Device Configuration.
- Target Resources.
- ActiveSync Connection.

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### Device Configuration

The device configurations are accessed from **Devices** on the toolbar. The following table defines the fields:

Field	Description
Device name	The name given to the device configuration.
J9 runtime location	Root directory where the J9 runtimes are installed. This typically contains two subdirectories called "bin" and "lib", which contain the J9 executable and the Windows Mobile 2003 runtimes respectively.
Application install location	Contains the newly created applications.
Shortcut install location	New shortcuts are created in this directory.
Host	The host name or IP of the device.
Port	The port to connect to for debugging.
Debug timeout (ms)	The timeout for connecting, displayed in milliseconds.
JRE (used for debugging)	JRE to launch locally for connecting to the device. Select a local VM whose version matches the VM on the device.
Debug options	The debugging options that are provided.

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### Target Resources

In order to launch and/or debug on the target, certain files must be copied from the IVEHOME\runtimes directory (on the machine where WebSphere Studio Device Developer was installed) to the WSDD directory on the target machine.

In the tables below:

- "Source" file locations are relative to the IVEHOME\runtimes directory.
- "Target" file locations are relative to the WSDD directory (for example, \Program Files\WSDD).

J2ME Configurations and Profiles **Libraries:**

	Type	Location
Base Console J9	Source	wm2003\arm\<feature>\bin\j9.exe
	Target	bin\j9.exe
Base No-console J9	Source	wm2003\arm\<feature>\bin\j9w.exe
	Target	bin\j9w.exe

	Type	Location
Base Dynamic class loader	Source	wm2003\arm\<feature>\bin\j9dyn2*.dll
	Target	bin\j9dyn2*.dll
Base J9 port library	Source	wm2003\arm\<feature>\bin\j9prt2*.dll
	Target	bin\j9prt2*.dll
Base JXE file relocater	Source	runtimes\wm2003\arm\<feature>\bin\iverel2*.dll
	Target	bin\iverel2*.dll
Base Thread library	Source	wm2003\arm\<feature>\bin\j9thr2*.dll
	Target	bin\j9thr2*.dll
Base VM library	Source	wm2003\arm\<feature>\bin\j9vm2*.dll
	Target	bin\j9vm2*.dll
Base Zlib data compression library	Source	wm2003\arm\<feature>\bin\j9zlib2*.dll
	Target	bin\j9zlib2*.dll
Debugger natives	Source	wm2003\arm\<feature>\bin\j9dbg2*.dll
	Target	bin\j9dbg2*.dll
Hookable components library (needed for debugging, MicroAnalyzer)	Source	wm2003\arm\<feature>\bin\j9hook2*.dll
	Target	bin\j9hook2*.dll
Mobile Information Device Profile for ARM	Source	wm2003\arm\<feature>\lib\jclMidp20\jclMidp20.jxe
	Target	lib\jclMidp20\jclMidp20.jxe
Foundation Class Library	Source	wm2003\arm\<feature>\lib\jclFoundadtion10\classes.zip
	Target	lib\jclFoundation10\classes.zip
Non-English Language Support	Source	wm2003\arm\<feature>\lib\charconv.zip
	Target	lib\charconv.zip

## ActiveSync Connection

An ActiveSync connection can be accomplished using either an Ethernet or wireless connection, a USB connection, or a serial connection. If possible, it is recommended that an Ethernet (that is, TCP/IP) connection is used, which is much faster than using either a USB or a serial connection.

Connection Method	Typical Connection Speed
Ethernet/wireless (TCP/IP LAN)	Fastest (10 Mb/sec for wireless, or more for wired)
USB cradle connection	Faster (up to 12 Mb/sec)
Serial cradle connection	Slower (56kb/sec to 115kb/sec)

For more information on the available ActiveSync connection methods, see:

- <http://www.microsoft.com/mobile/pocketpc>
- <http://www.soti.net>
- <http://www.cewindows.net/commlink/ppcethernet.htm>

Refer to the documentation for the particular device and/or connection software for information on setting up an ActiveSync connection.



**Note:** To debug a Windows Mobile 2003 application on the target, a TCP/IP connection is necessary.

The following section gives you more information on networking.

## Networking

In order to debug a Windows Mobile 2003 application on the target, the IP address of the target is required. If using DHCP, ask the system administrator for the device's IP address.

This snippet can also be launched (using JCL Foundation) on the target to discover its IP address:

```
public class MyIpAddress {
    public static void main(String []args) {
        try {
            System.out.println("My IP Address:\n " +
                java.net.InetAddress.getLocalHost());
        } catch (java.net.UnknownHostException e) {
            System.out.println("I don't know my own ip address!");
        }
    }
}
```



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## Appendix. Additional information

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### Further Information

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