

Installation and Operation of the OSBDM

This chapter contains the following sections:

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- [Firmware Update Utility](#)
- [Firmware Recovery Utility](#)
- [Firmware Information Utility](#)
- [Troubleshooting Debug Driver](#)
- [Troubleshooting Virtual Serial Driver](#)
- [Troubleshooting Bootloader Drivers](#)

2.1 Installing Windows OSBDM and USB Drivers

The OSBDM circuitry uses two different USB drivers on the PC, one for debug and the other for virtual serial. The debug driver is open source and is based upon the libUSB. In OSBDM firmware version 30.xx and lower, the virtual serial driver is based on the Jungo USB driver and can only be used with P&E's virtual serial port utilities. The Jungo-based USB virtual serial port is not currently open source. At the same time, OSBDM firmware version 31.xx and higher relies on the CDC communication class to implement the USB virtual serial port. It allows for easy serial port enumeration and communication under Windows and Linux operating systems with built in CDC driver support.

P&E provides an installer which automatically installs OSBDM debug and virtual serial drivers on both Windows 32 and 64 bit machines for 30.xx firmware versions and lower. OSBDM firmware version 31.xx and higher includes built in CDC support for virtual USB serial port. The latest P&E driver installer may be downloaded from <http://www.pemicro.com/osbdm>. In the root install directory, the OSDLL can be found in case existing software packages need to be updated with this DLL.

The following procedure specifies how to install the Open Source BDM USB hardware drivers on the Windows operating system using the P&E installer. For this procedure, it is assumed that the Open Source BDM Windows USB driver package is already unpacked and being installed onto the development PC via the standalone installation of P&E hardware device drivers or when drivers are automatically installed as part of CodeWarrior 10.1 or a more recent layout installation.

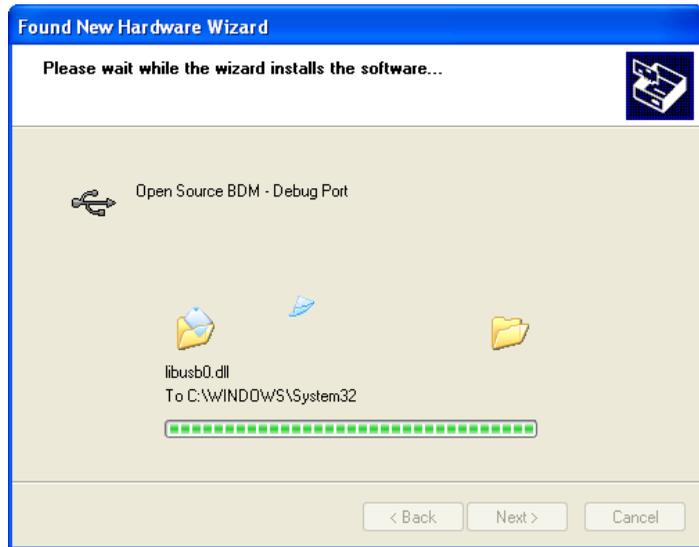
When OSBDM is connected to the PC for the first time, the Windows operating system will recognize a new composite USB device. Each OSBDM interface running firmware version 29.00 or greater will enumerate two USB devices. The OSBDM core device will enumerate as the primary USB device. At the same time, the virtual serial port will also be enumerated as a secondary USB device [Figure 2.1](#) illustrates that the initial connection starts the Windows driver installation and displays the Windows New Hardware Wizard dialog box. Both OSBDM and virtual serial port will enumerate as two different USB devices - therefore, each will have to be installed separately.

Figure 2.1 Found New Hardware Wizard



1. For this installation, select the **Install the software automatically** option and click **Next**.
2. This will initiate the installation of the Open Source BDM USB driver and DLL file, as shown in [Figure 2.2](#).

Figure 2.2 Driver Installation



3. Once the installation procedure is completed, as shown in [Figure 2.3](#), click **Finish**. Because of the plug-and-play nature of USB, a reboot of Windows is not required.

Figure 2.3 Finish Installation Open Source BDM Windows USB Drive



4. Once the OSBDM Debug port is installed, repeat steps 1-3 when installing the Virtual Serial port. Once the OSBDM Debug port and Virtual Serial port are installed correctly, the OSBDM device will be ready to use.

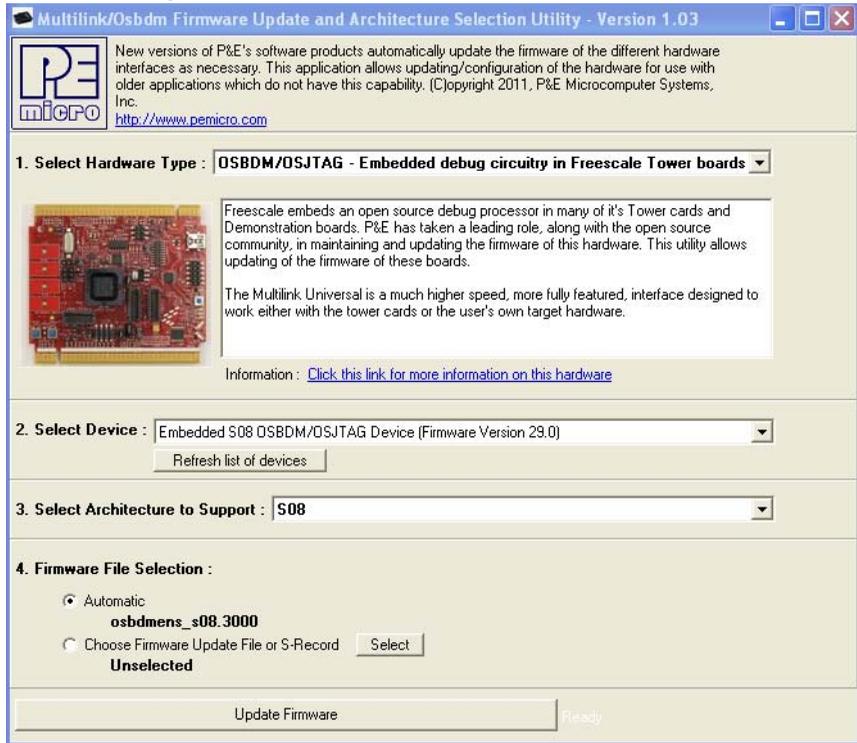
2.2 Firmware Update Utility

For development tools or custom applications which use the P&E UNIT library interface (which relies on OSDLL), the firmware of the OSBDM will automatically be updated if it is old. This requires the user's intervention to boot the device into bootloader mode.

For development tools or custom applications which use the OSDLL directly, the firmware is not automatically updated (although the OSDLL does have some provisions for firmware updating). In this case, P&E provides a firmware update utility which may be downloaded from <http://www.pemicro.com/osbdm>. This utility can be used to update the firmware automatically to the latest version (the default), or the user may specify a firmware update file or S19 to program into the OSBDM 9S08JM60 processor. The following directions demonstrate a typical update scenario using this utility.

1. Run PEFirmwareUpdater.exe (See [Figure 2.4](#))
2. From the drop box labeled “1. Select Hardware Type”, select “OSBDM/OSJTAG – Embedded debug circuitry in Freescale Tower boards”.
3. From the drop box labeled “2. Select Device”, select the board that needs the firmware updated. If the device is not showing up, use the “Refresh list of devices” to repopulate the device list.
4. From the drop labeled “3. Select Architecture to Support”, select the OSBDM board design type. This field may be auto populated after selecting the device in step 3.
5. From the field “4. Firmware file selection”, indicate the firmware version by either having the utility automatically select the firmware, or by manually selecting the firmware by clicking on the “Select” button. The version number is labeled without the decimal period. Example: Selecting *osbdmens_s08.3021* means the OSBDM firmware version 30.21 for the HCS08 design type is selected.
6. Click on the “Update Firmware” button and follow the instructions to update the firmware.

Figure 2.4 PEFirmwareUpdater



A problem may occur where the user is making use of an application (Such as CodeWarrior 6.3) which relies on an older version of OSDLL (named either osbdm-jm60.dll or peosbdmv1.dll). The latest version of OSDLL is backwards API compatible with previous version. In the root directory of the firmware Update Utility install is both latest copies of OSDLL, which are identical to one another (osbdm-jm60.dll/peosbdmv1.dll).

If this occurs, both the Device manager in Windows and P&E's Firmware Information Utility will properly display the hardware, but older development software will not recognize it. In this case, the user should update the copies of the DLL in those distributions, as well as the [Windows\System32] folder ([Windows\SysWow64] on 64-bit systems).

2.3 Firmware Recovery Utility

The firmware update utility described in the previous section requires that the OSBDM hardware be booted into bootloader mode. If for any reason the firmware is corrupt to the

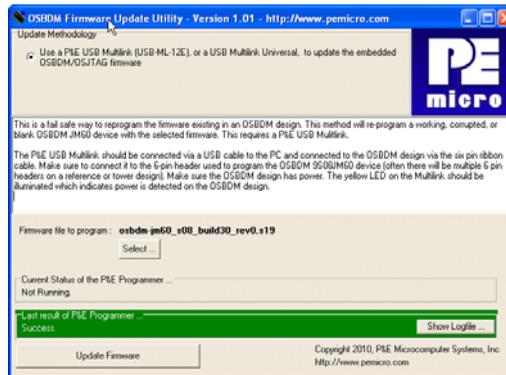
point where it cannot boot into bootloader mode, P&E provides a Firmware Recovery Utility. This utility requires either a USB Multilink Universal or a USB-ML-12 Multilink in order to reprogram the OSBDM circuitry via the 6-pin OSBDM debug connector. This is a fail-safe way to reprogram the firmware in an existing OSBDM design. This method will re-program a working, corrupted, or blank OSBDM 9S08JM60 device with the selected firmware.

The P&E USB Multilink (USB-ML-12E) should be connected via a USB cable to the PC and connected to the OSBDM design via the 6-pin ribbon cable. Make sure to connect it to the 6-pin header used to program the OSBDM 9S08JM60 device (often there will be multiple 6-pin headers on a reference or tower design). Make sure the OSBDM design has power. The yellow LED on the Multilink should be illuminated which indicates power is detected on the OSBDM design.

This utility may be downloaded from <http://www.pemicro.com/osbdm>. The following are typical steps to getting the firmware recovery utility to work:

1. Run the P&E Firmware Recovery Utility
2. Click the "Select" button and choose the firmware to be programming into the unit. Default firmware for each architecture configuration is included with the utility.
3. Click the "Update Firmware" button. A window should pop up that displays the status of the programming process, and when complete the Firmware Recovery Utility should indicate a positive result.

Figure 2.5 Firmware Recovery Utility

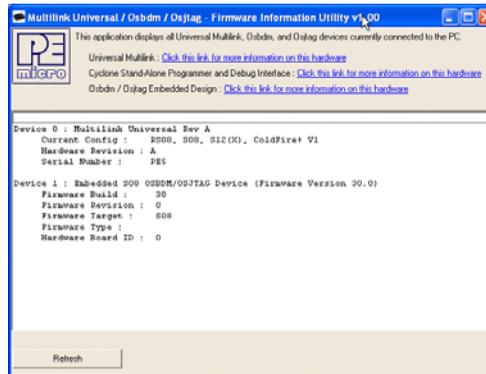


2.4 Firmware Information Utility

This utility will query the USB bus for any attached OSBDM and USB Multilink devices. It will then display information about these devices, such as configuration and version number information. This is very useful to understand which USB devices are properly

configured (driver-wise) and what their current state is. An image of the utility is shown here:

Figure 2.6 Firmware Information Utility



2.5 Troubleshooting Debug Driver

If you are having trouble connecting to an OSBDM-based device, the first step is to verify in the Windows Device Manager that the OSBDM device has enumerated properly. For example, on Windows XP the user would click the START button, select Control Panel, double click System, select the Hardware Tab, and click the Device Manager button.

Under the LibUSB-Win32 Devices, the OSBDM device should be shown. If it is not, the user should follow these steps:

1. Install the latest drivers as per [Installing Windows OSBDM and USB Drivers](#).
2. Unplug and Replug the OSBDM device. If it is shown with a yellow exclamation mark, select it, right mouse click, and select re-install driver.
3. See if the device is shown properly in the Windows Device Manager
4. If the device still does not show up in the Device Manager, place the OSBDM device into bootloader mode and run the Firmware Update Utility as shown in [Firmware Update Utility](#). Place the device backing into normal mode (remove IRQ jumper).
5. Unplug and Replug the OSBDM device. If it is shown with a yellow exclamation mark, select it, right mouse click, and select re-install driver.

2.6 Troubleshooting Virtual Serial Driver

Before attempting to fix any virtual serial drivers, make sure that the device debug function shows up properly as detailed in [Troubleshooting Debug Driver](#). Once this is

complete, refer to [Figure 2.7](#) for an example of what the drivers should look like for both the debug and virtual serial functions.

If the Jungo tab does not show up for firmware version 30.xx and lower, or if OSBDM/ OSJTAG - CDC serial port does not appear under Ports for firmware version 31.21 and higher, or if the CDC serial port does not enumerate under Ports tab for firmware version 31.21 and higher, re-install the drivers as detailed in [Installing Windows OSBDM and USB Drivers](#). If the PEMICRO USB Serial Port does not show up under the Jungo tab for OSBDM firmware version 30.xx and lower, select the OSBDM device listed in the LibUSB-Win32 Devices list, right-click, and choose reinstall driver.

If the driver still does not show up, then most likely the OSBDM-based development board has older firmware. The firmware should be updated to 30.07 or newer.

In firmware version 30.07, the USB device ID (PID) was changed so that Windows would always recognize both interfaces of the USB device. A corresponding change was made to the OSDLL to recognize both the older and new PID devices. The firmware is available in the P&E Firmware Update Utility. Run the Firmware Update Utility as detailed in [Firmware Update Utility](#) to update the firmware to version 30.07 or higher.

In firmware version 31.21 and higher, the USB device ID (PID) had to be changed again, to add support for the CDC serial port driver. The embedded CDC virtual serial port is supported by CDC drivers that are part of the Windows and Linux operating systems. Support for CDC-based OSBDM firmware is included in the Codewarrior 10.2 and higher IDE. To work with OSBDM version 31.21 and higher under Codewarrior 10.1, the user should update the copies of osbdm-jm60.dll and peosbdm.dll in distribution, as well as the [Windows\System32] or [Windows\SysWow64] folder on 64-bit systems.

After the OSBDM Drivers are installed properly on the PC and/or after the target firmware has been successfully updated, the device manager will properly enumerate the virtual serial and the utilities will be able to use it. Refer to [Firmware Update Utility](#) for instructions on how to update the target's firmware.

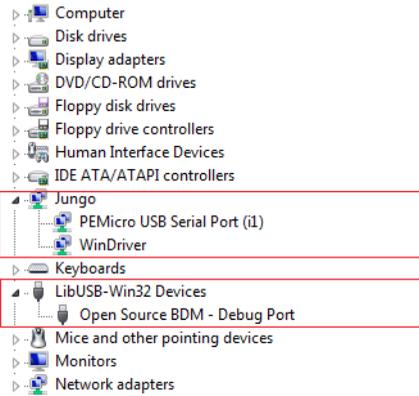
The device manager should show the following devices for OSBDM firmware versions 30.xx and lower (see [Figure 2.7](#)):

Jungo -> PEMicro USB Serial Port (i1)

Jungo -> WinDriver

LibUSB-Win32 Devices -> Open Source BDM – Debug Port

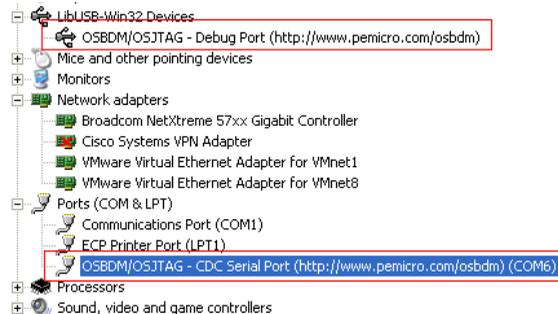
Figure 2.7 Device Manager - Virtual Serial and Debug Ports Enumerated



For CDC-based firmware versions 31.21 and higher, the device manager should show the following devices (see [Figure 2.8](#)).

LibUSB-Win32 Devices -> Open Source BDM - Debug Port
Ports (COM & LPT) -> OSBDM/OSJTAG - CDC Serial Port

Figure 2.8 Device Manager - CDC-Based Serial and Debug Ports Enumerated (31.21 and higher)



A problem may occur where the user is making use of an application (Such as CodeWarrior 6.3) which relies on an older version of OSDLL (named either osbdm-jm60.dll or peosbdmv1.dll). The latest version of OSDLL is backwards API compatible with previous version. In the root directory of the firmware Update Utility install is both latest copies of OSDLL, which are identical to one another (osbdm-jm60.dll/peosbdmv1.dll).

If this occurs, both the Device manager in Windows and P&E's Firmware Information Utility will properly display the hardware, but older development software will not recognize it. In this case, the user should update the copies of the DLL in those

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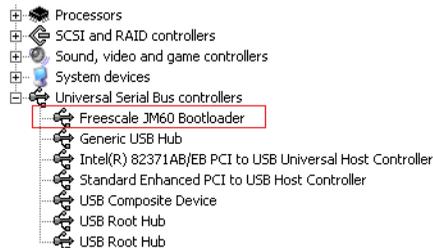
2.7 Troubleshooting Bootloader Drivers

Bootloader mode is a firmware mode that an OSBDM design can be placed in to allow it to be updated. In newer software applications, such as CodeWarrior 10.1 or P&E's firmware update utility, you may be prompted to boot the device into bootloader mode in order to update the firmware. Entering bootloader mode is as simple as unplugging the USB cable from the OSBDM design, placing a two pin jumper on the bootloader header (connecting IRQ to GND), and plugging the USB cable back in. If all goes well, the device will boot properly into bootloader mode.

If however, the update software doesn't recognize the USB device, there may be a driver issue on the PC. This is generally due to older utilities and drivers being installed on the PC. The simplest way to diagnose this is to open the Windows Device Manager. If the device appears under the "libUSB-Win32 devices" tab as "Open Source BDM - Bootloader Port", then all is well with the drivers. This is shown in [Figure 2.15](#).

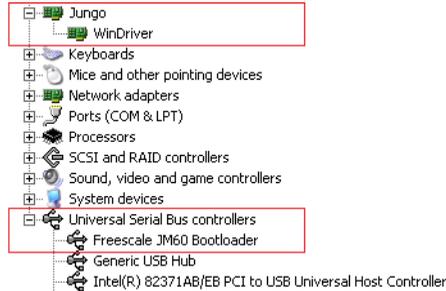
If there is a previous driver installation from Freescale JM60 Demo Applications and the JM60 board is enumerated in bootloader, the device may be using older drivers and the device manager will look as shown in [Figure 2.9](#) below.

Figure 2.9 Bootloader drivers after Freescale JM60 Demo Application



The first step is to install the drivers install on P&E's website at <http://www.pemicro.com/osbdm> to make sure the latest system drivers are installed on the machine. After installing the drivers and re-plugging the board in bootloader mode, the user will notice it is still using the Freescale JM60 Bootloader drivers ([Figure 2.9](#)), which makes it unrecognizable by applications (See [Figure 2.10](#) and).

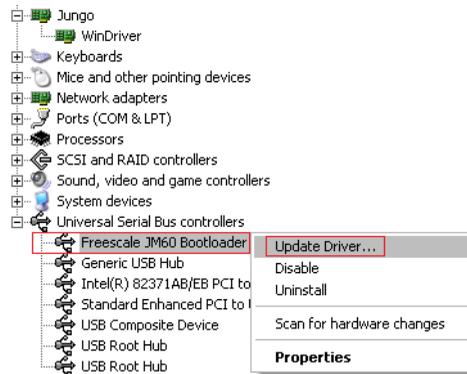
Figure 2.10 OSBDM Bootloader drives NOT installed



In order to get the OSBDM Bootloader to enumerate properly and be able to use the Firmware Update utility, the user will need to update the drivers by following the steps below:

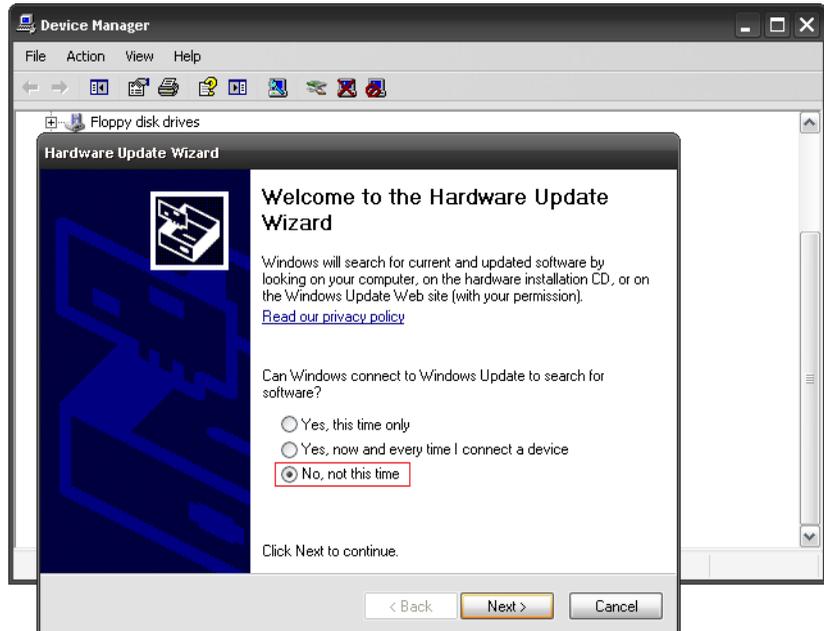
1. On the device manager, right click on Freescale JM60 Bootloader and select "Update Driver..."

Figure 2.11 Step 1 - Select "Update Driver"



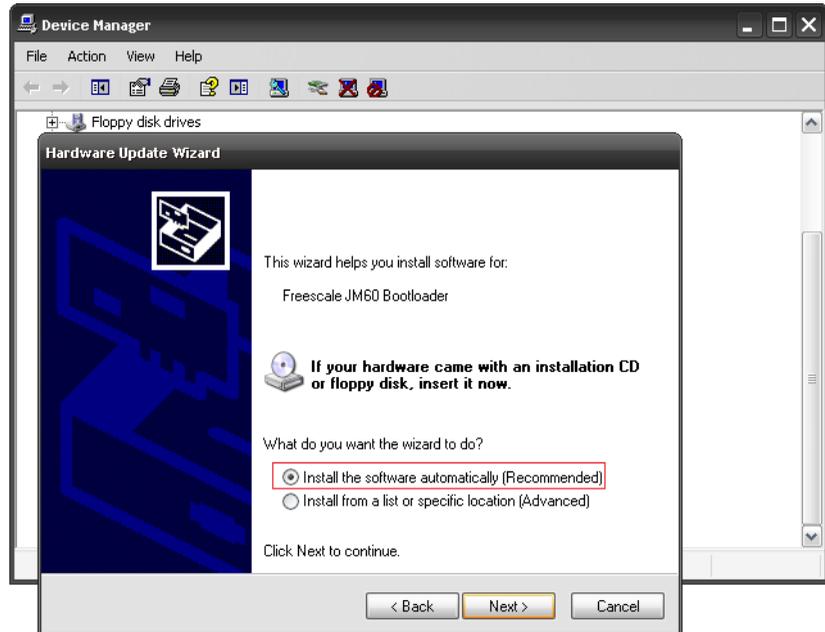
2. When prompted if Windows can connect to Windows Update to search for software, select "No, not this time" option and press Next.

Figure 2.12 Step 2 - Skip Software Search



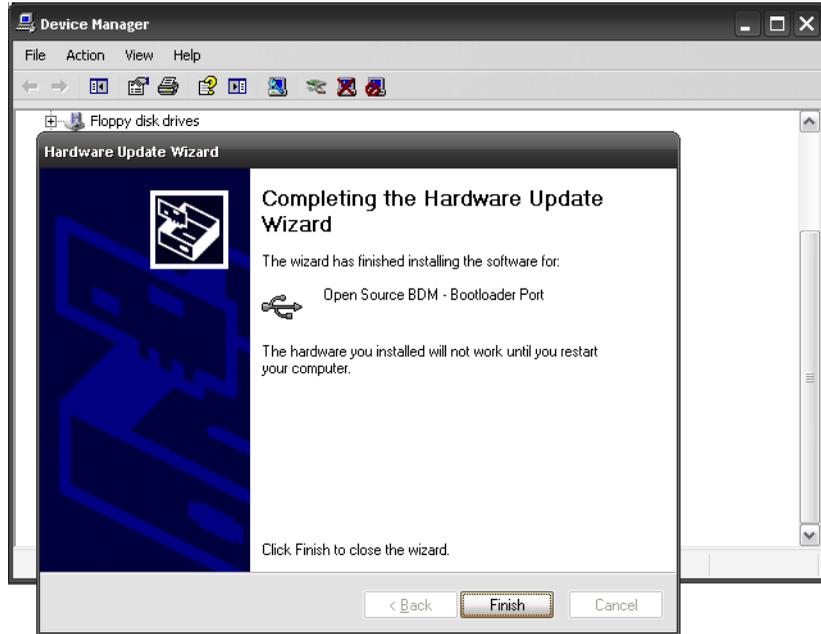
3. When asked "What do you want to the wizard to do?", select Install software automatically and press Next.

Figure 2.13 Step 3 - Select “Install Software Automatically”



4. Complete the installation and the OSBDM Bootloader drivers will be successfully updated to work with P&E applications.

Figure 2.14 Step 4 - Complete Installation



5. The device manager should now enumerate properly

Figure 2.15 Properly Enumerated Device Manager (firmware version 30.xx and lower)

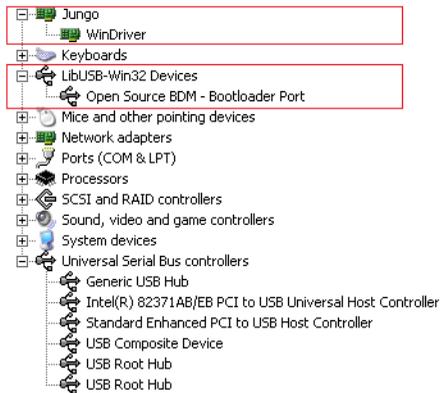
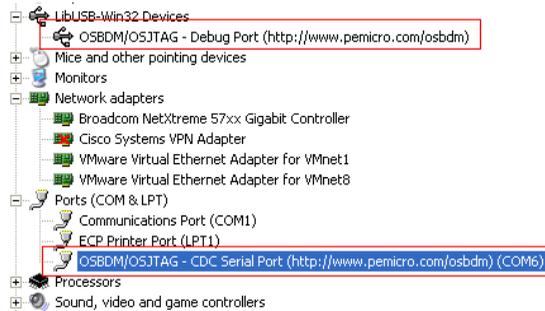


Figure 2.16 Properly Enumerated Device Manager with CDC serial port support (v.31.21 and higher)



6. The firmware updater utility (or the update mechanism in many development tools) will now recognize the OSBDM board in bootloader mode.

Figure 2.17 OSBDM Boatloader Mode Recognized In Firmware Updater

