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UPort 2000 Series User's Manual

Edition 4.0, February 2017

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UPort 2000 Series User's Manual

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1

Introduction

Moxa's UPort 2000 Series of entry-level USB-to-serial converters are used to add 2 or 4 serial ports to a PC through the PC's USB port. The UPort 2000 converters are compatible with both new and legacy RS-232 devices, and are a perfect solution for mobile, instrumentation, and point-of sale applications.

The **UPort 2000 Series** includes two models:

- UPort 2210 2-port RS-232 USB-to-serial converter
- UPort 2410 4-port RS-232 USB-to-serial converter

In this manual, **UPort 2000** is used in examples and explanations to represent either the UPort 2210 or the UPort 2410.

The following topics are covered in this chapter:

- **Overview**
- **Package Checklist**
- **Product Features**
- **Product Specifications**
- **Panel Layout**
  - UPort 2210
  - UPort 2410
- **Dimensions**
  - UPort 2210
  - UPort 2410

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Overview

UPort 2000 Series products are easy to install and use. After installing the drivers on your PC, connect the UPort to your computer, plug in your serial devices, and you're ready to go. Programming is NOT required, and you do not need to worry about IRQs, configuring a board, power requirements, or connection schemes.

UPort 2000 Series products are compliant with USB 1.1, and 2.0 specifications, and meet the 480 Mbps high-speed requirement of Hi-Speed USB 2.0. Using your computer's USB ports to connect serial devices reduces the total cost of ownership, investment in hardware, and long term management and integration costs.

Package Checklist

Moxa's UPort 2000 Series products are shipped with the following items:

- UPort 2210 or 2410 USB-to-serial converter
- 1 USB cable
- Document and software CD
- Quick installation guide (printed)
- Warranty card

NOTE: *Notify your sales representative if any of the above items are missing or damaged.*

Product Features

UPort 2000 Series products have the following features:

- Hi-Speed USB 2.0 supported for up to 480 Mbps transmission through the USB port
- Additional I/O or IRQ not required
- Serial transmission rate up to 921.6 Kbps
- Windows 2000/XP/2003/Vista/2008/2012, Linux Kernel 2.6.x and 3.x drivers supported
- Easy maintenance with LED display and management software
- COM port assignments maintained across different PCs

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Product Specifications

USB Interface

Compliance: USB 1.1/2.0 compliant

Connector: USB type B

Speed: 480 Mbps (Hi-Speed USB) and 12 Mbps (Full-Speed USB)

Serial Interface

Number of Ports:

UPort 2210: 2

UPort 2410: 4

Serial Standards: RS-232

Connector: DB9 male

Performance

Baudrate: 50 bps to 921.6 kbps

Serial Communication Parameters

Data Bits: 5, 6, 7, 8

Stop Bits: 1, 1.5, 2

Parity: None, Even, Odd, Mark, Space

Flow Control: RTS/CTS, XON/XOFF

I/O Address: Assigned by BIOS

IRQ: Assigned by BIOS

FIFO: 16 bytes

Serial Signals

RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND

Operating Systems

Windows Real COM Drivers: Windows 2000, Windows XP/2003/Vista/2008/7/8/8.1 (x86/x64), Windows 2012 (x64)

Android Driver

Mac Driver: Mac OS X

Linux Real TTY Drivers: Linux 2.6.x, 3.x

Note: Please refer to Moxa's website for the latest driver support information.

Physical Characteristics

Housing: Polycarbonate (PC)

Weight:

Product only:

UPort 2210: 120 g (0.26 lb)

UPort 2410: 210 g (0.46 lb)

Packaged:

UPort 2210: 325 g (0.72 lb)

UPort 2410: 455 g (1 lb)

Dimensions:

UPort 2210: 70 x 35 x 120 mm (2.76 x 1.38 x 4.72 in)

UPort 2410: 80 x 35 x 185 mm (3.15 x 1.38 x 7.28 in)

Environmental Limits

Operating Temperature: 0 to 55°C (32 to 131°F)

Storage Temperature: -20 to 75°C (-4 to 167°F)

Ambient Relative Humidity: 5 to 95% (non-condensing)

Altitude: Up to 2000 m

Note: Please contact Moxa if you require products guaranteed to function properly at higher altitudes.

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Standards and Certifications

Safety: UL 60950-1

EMC: CE, FCC

EMI: EN 55032 Class B, EN 61000-3-2, EN 61000-3-3, FCC Part 15 Subpart B Class B

EMS: EN 55024, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC-61000-4-6, IEC 61000-4-8, IEC-61000-4-11

Green Product: RoHS, CRoHS, WEEE

Power Requirements

Power Consumption:

UPort 2210: 140 mA @ 5 VDC

UPort 2410: 240 mA @ 5 VDC

MTBF (mean time between failures)

Time:

UPort 2210: 4,221,778 hrs

UPort 2410: 3,901,775 hrs

Database: Telcordia (Bellcore), GB

Warranty

Warranty Period: 5 years

Details: See www.moxa.com/warranty

Panel Layout

UPort 2210



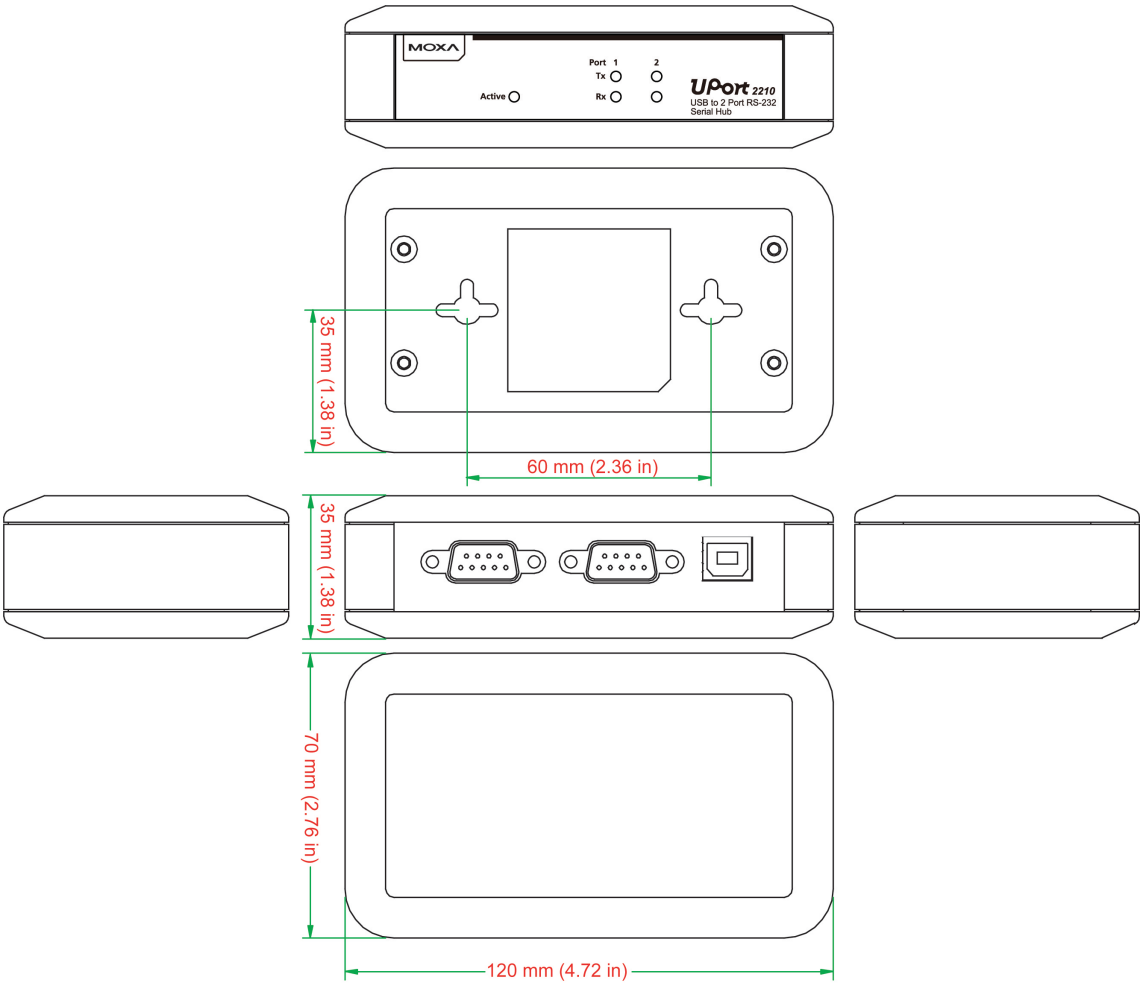
UPort 2410



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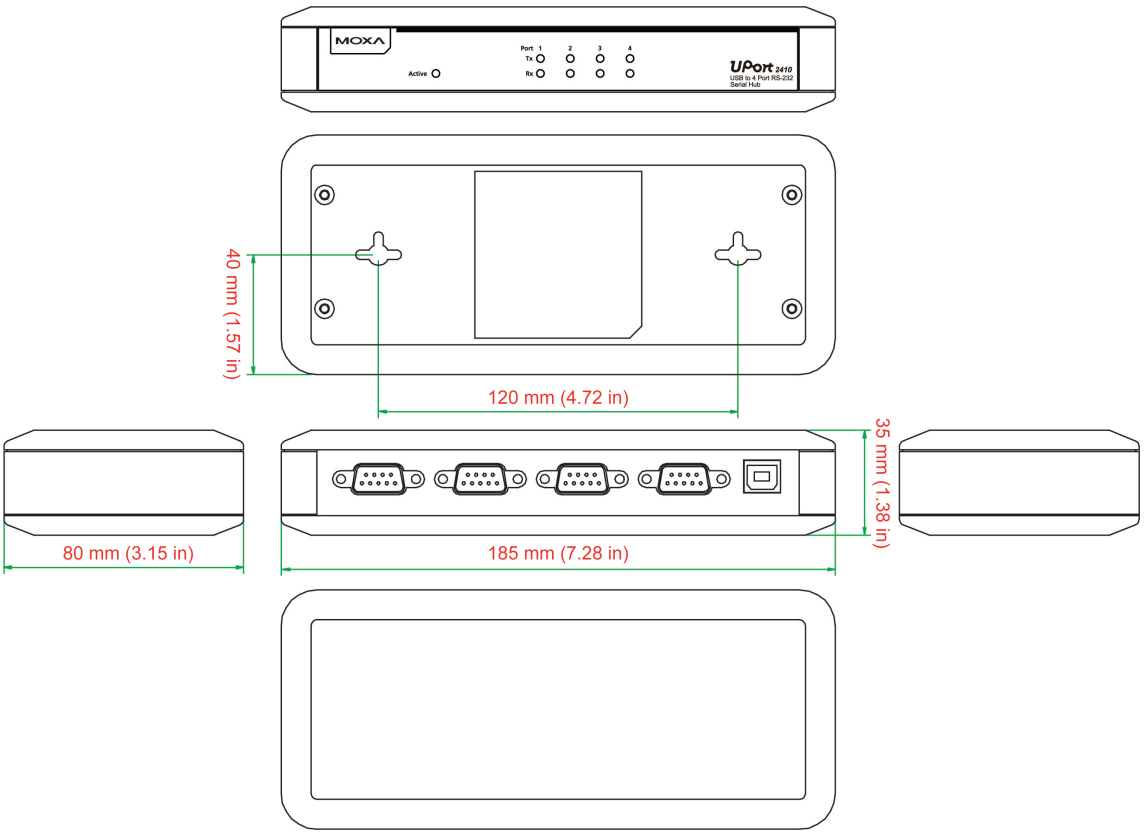
Dimensions

UPort 2210



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UPort 2410



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2

Driver Installation

In this chapter, we use Windows XP to illustrate how to install the UPort 2000 USB-to-serial converters. The procedures for Windows 2000/2003/2008/2012 and Windows Vista are essentially the same.

We recommend installing the UPort 2000 Series driver first, before connecting the UPort 2000 USB-to-serial converter to your computer's USB port.

The following topics are covered in this chapter:

- **UPort's USB Usage Limitation**
- **Installing the Windows Driver**
  - Connecting the Hardware
  - Installing the Driver for the Converter
  - Installing the Driver for the Ports
  - Configuring the Ports
  - Uninstalling the UPort 2000
  - Advanced UPort 2000 Driver Functions
  - Uninstalling the Driver
- **Linux Kernel 2.6.x and 3.x**
  - Installing the Linux Driver
  - Loading the Moxa Driver
  - Unloading the Moxa Driver
  - Removing the Moxa Driver and Utility Files
  - Using the mxustty Utility
- **MAC OS X Driver**
  - Installing the MAC OS X Driver
  - Verifying the Installation
  - Using the Utility

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UPort's USB Usage Limitation

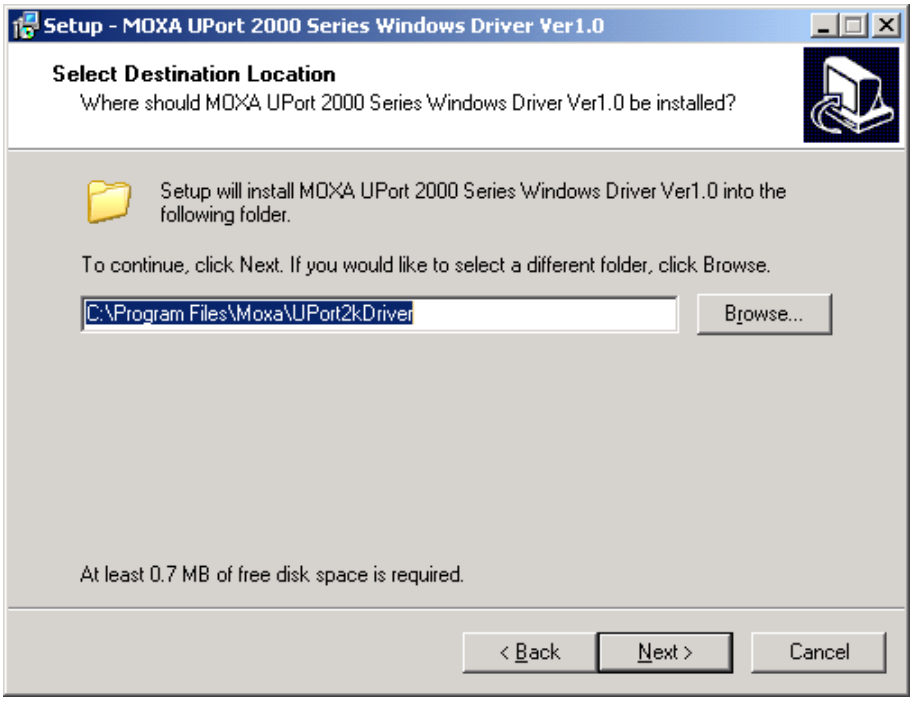
1. A maximum of 4 UPort 2000 converters can be connected to one PC host. Connecting more than 4 UPort 2000 converters will put a strain on system resources, and could cause the computer to become unstable.
2. We recommend connecting the UPort 2000 directly to your PC's USB port.
3. Although your UPort 2000 supports USB 1.1, we recommend using a USB 2.0 host controller or HUB to get the best and most stable performance.

Installing the Windows Driver

1. Run the Setup Wizard located on the UPort 2000 Series Document and Software CD-ROM. Click **Next** to start installing the driver.

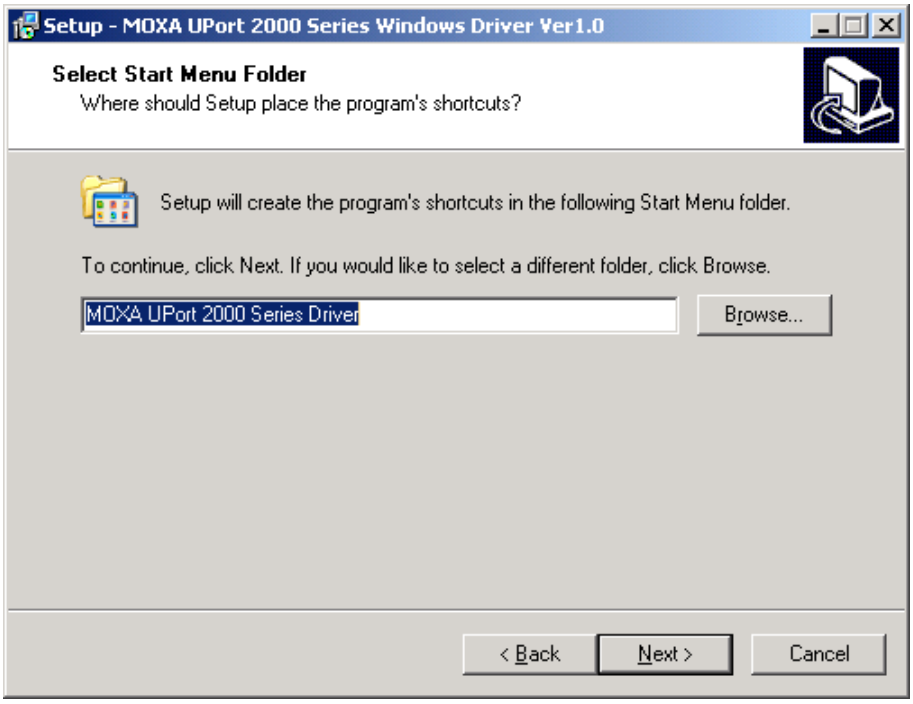


2. Click **Next** to install the driver in the indicated folder.

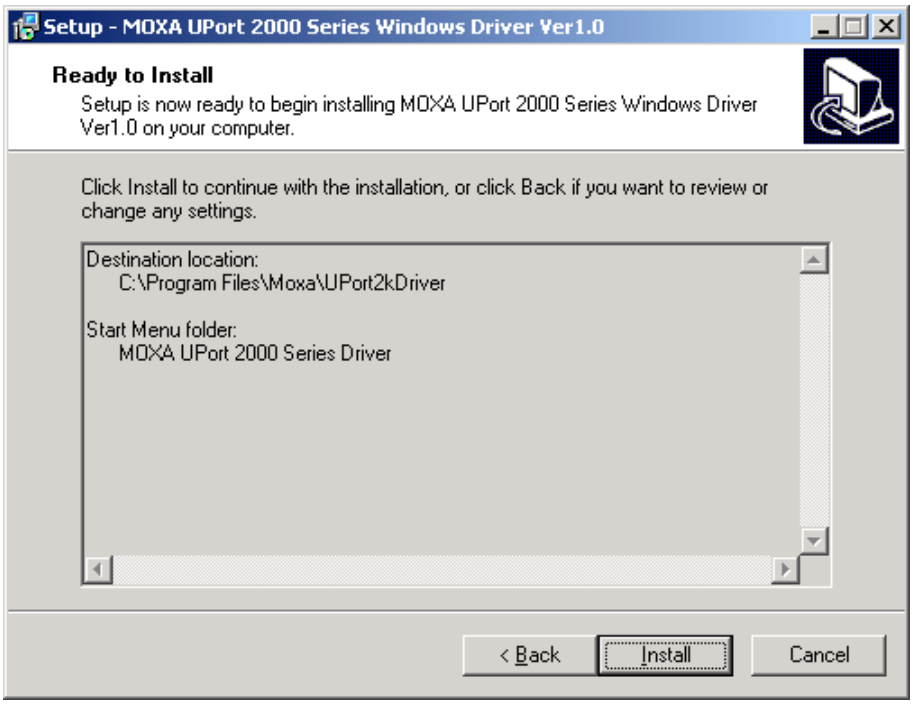


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3. Click **Next** to create the program's shortcuts in the indicated folder.

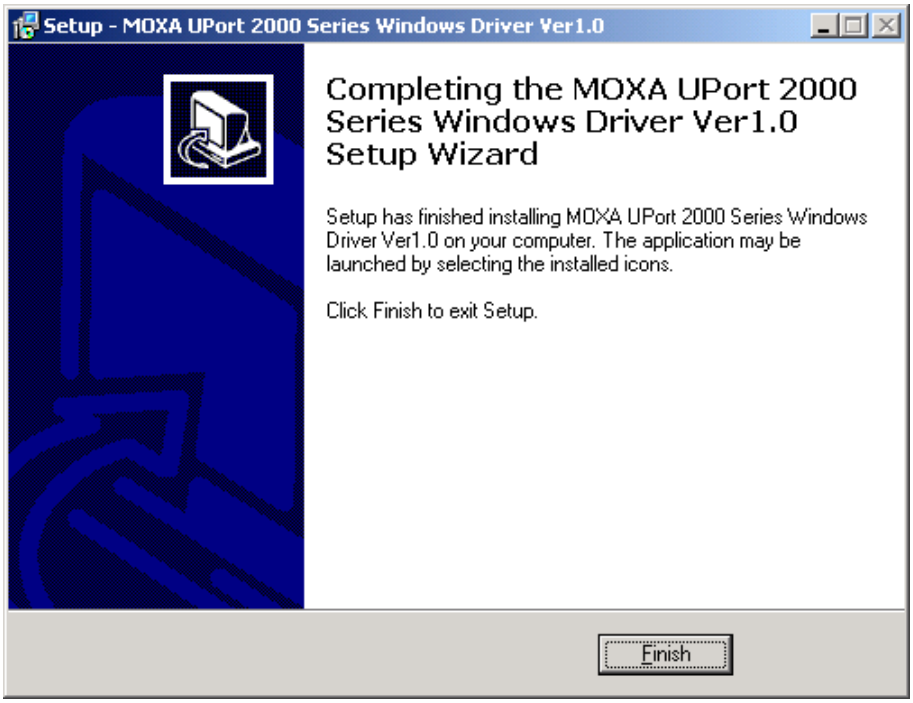


4. Click **Install** to proceed with the installation.



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5. Click **Finish** to complete the driver installation.



Connecting the Hardware

Please install the driver before connecting the UPort 2000 to your PC's USB port. See the previous section for details.

Connecting to a Serial Device

Use the proper serial cables to connect your serial devices to the UPort 2000's serial ports, which support the RS-232 interface. The UPort 2000's serial ports use DB9 male connectors with standard RS-232 pin assignment.

LED Indicators

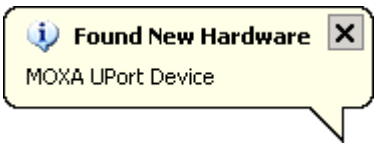
The UPort 2000 has LEDs on the front panel. The "Active" LED indicates the power status, and the "TxD" and "RxD" LEDs indicate the transmission status of each serial port. In addition, when you click "Locate" for a particular UPort, that UPort's "Active" LED will blink to indicate its location.

LED Name	LED Color	LED Function
Active	Green	Power is on
	Off	Power is off, or power error condition exists
TxD, RxD	Orange	Port is receiving data from attached device
	Green	Port is transmitting data to attached device
	Off	No data is being transmitted or received

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Installing the Driver for the Converter

1. After connecting the USB cable from UPort to host the PC, Windows XP will automatically detect the new UPort, and the **Found New Hardware** balloon will open in the bottom right corner of the Windows desktop.



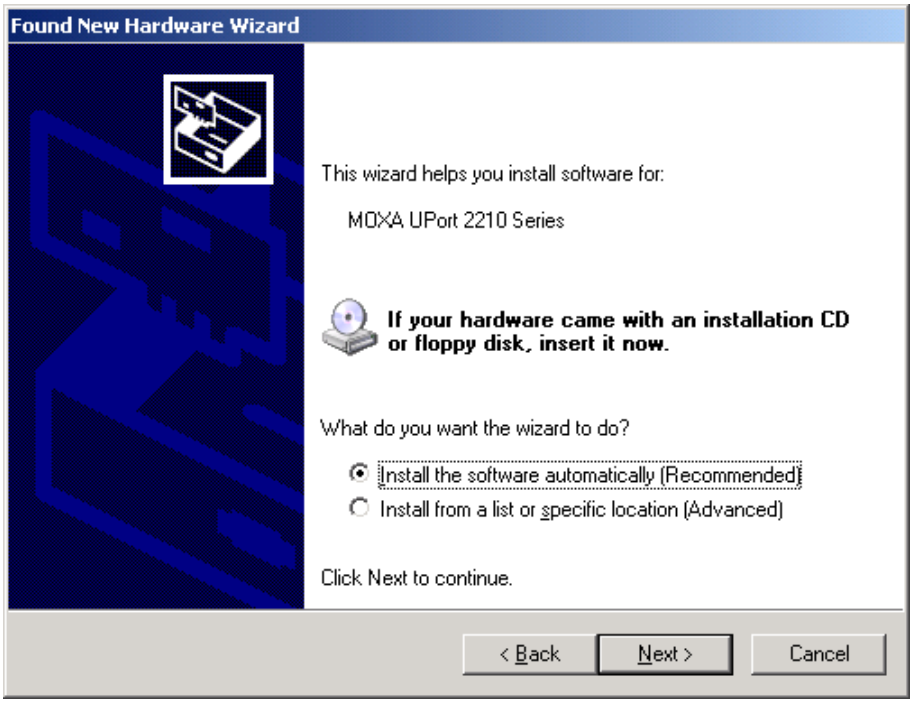
2. **Case 1: The UPort Driver is Certified**
   If the UPort driver that you installed has been certified by Microsoft, the UPort and the UPort's serial ports will be installed automatically when you plug the UPort into your computer's USB port.

   Case 2: The UPort Driver is NOT Certified
   If the UPort driver that you installed has not been certified by Microsoft, then plugging the driver into your computer's USB port will activate the UPort installation program. The first part of the installation procedure installs the software for the UPort itself (the second part of the procedure installs the serial ports).
   Select **No, not at this time**. Click **Next** to start the installation.

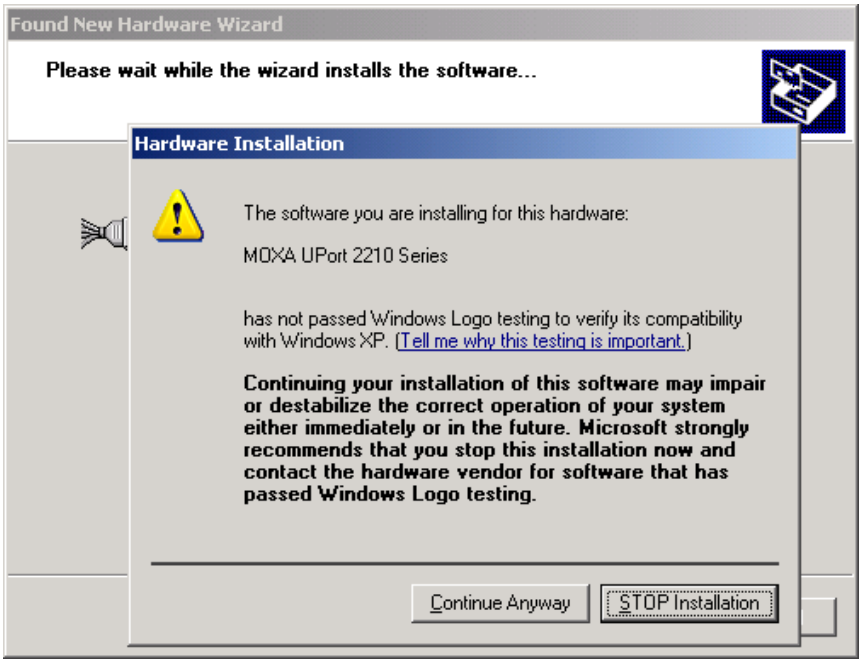


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3. Select **Install the software automatically (Recommended)**, and then click **Next** to continue.

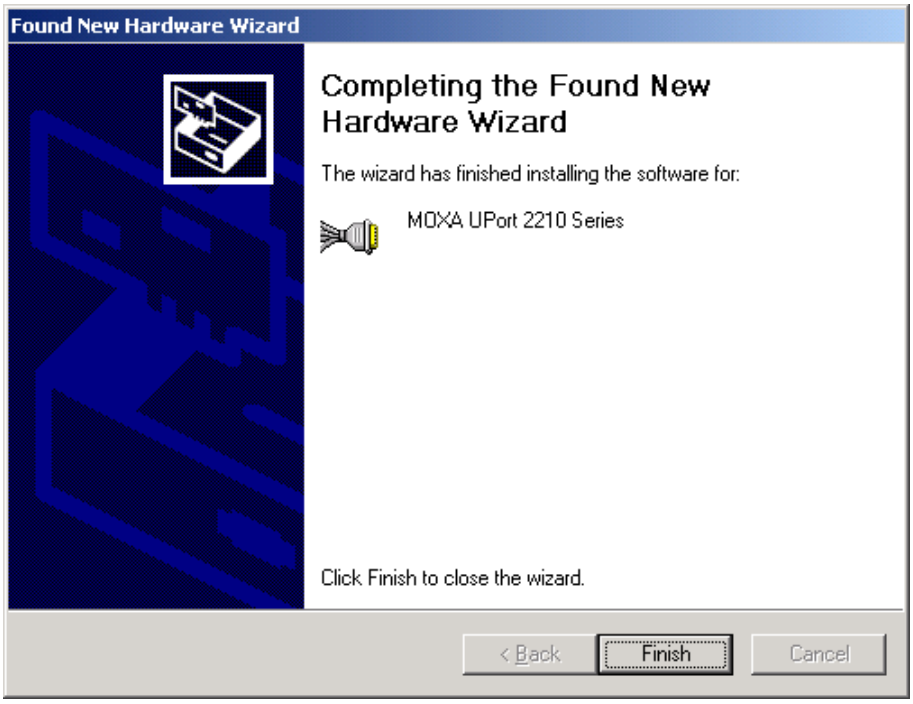


4. Wait while the installation wizard searches for the correct drivers. The next window that opens cautions you that although this software has not passed Windows logo testing, this driver has already been tested and shown that it can support the Windows operating system. Click **Continue Anyway** to proceed.

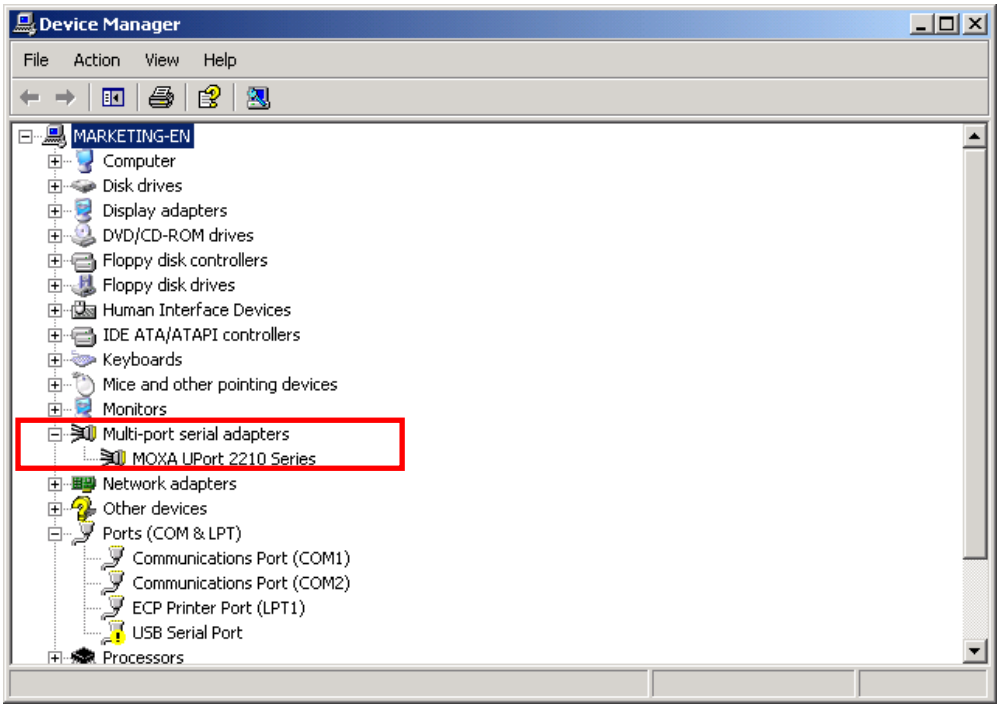


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5. The next window shows the model name of the board, and indicates that Windows has completed the driver installation. Click **Finish** to proceed with the rest of the installation procedure.



6. Open the Windows Device Manager to check that the installation was successful. The UPort USB-to-serial converter should appear under **Multi-port serial adapters**.



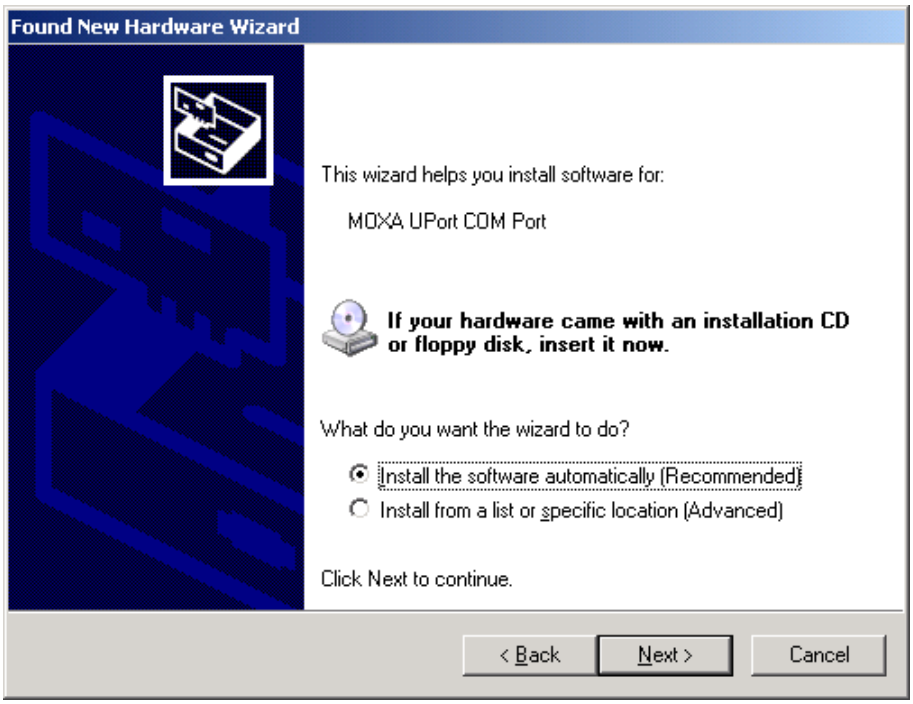
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Installing the Driver for the Ports

1. The **Found New Hardware Wizard** window will open to help you install the driver. This window will offer to connect to the Windows update site to search for a driver. Select **No, not at this tim**e and then click **Next** to continue.

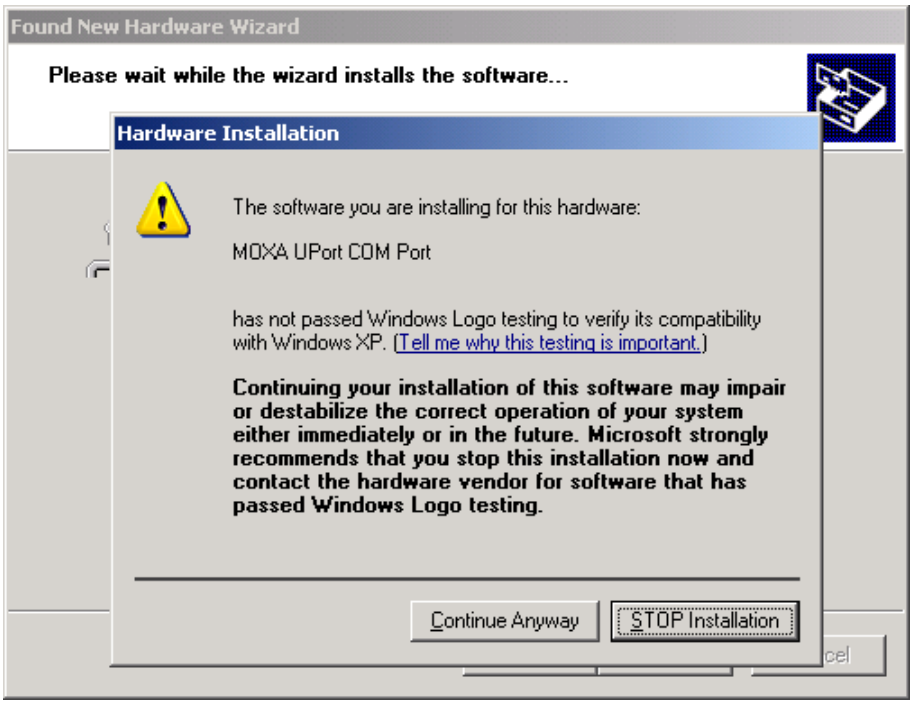


2. Select Install **the software automatically (Recommended**), and then click **Next** to continue.

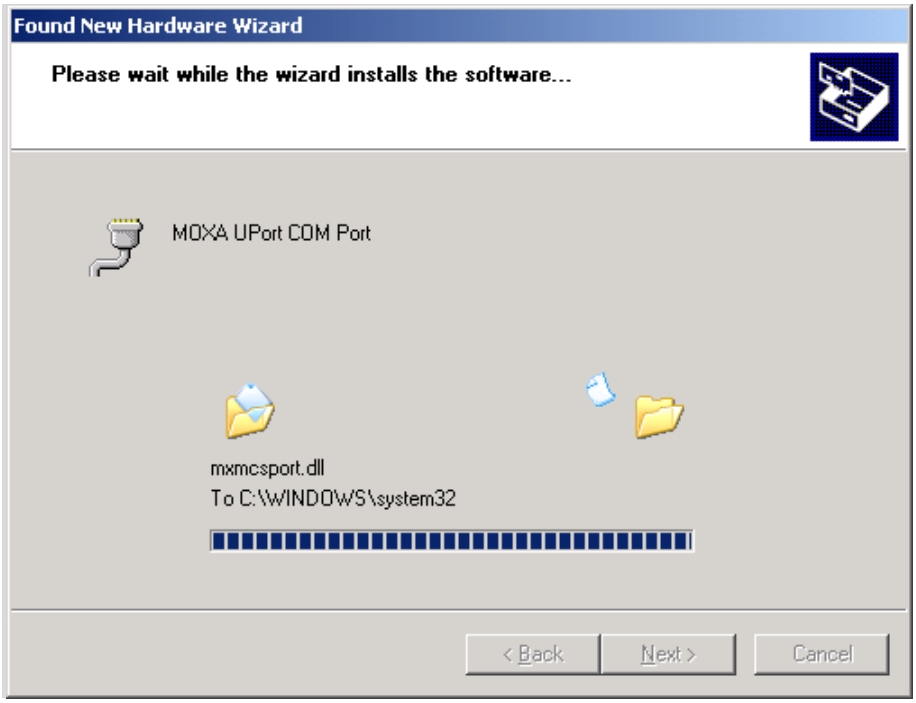


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3. Wait while the installation wizard searches for the correct drivers. The next window that opens cautions you that although this software has not passed Windows logo testing, this driver has already been tested and shown that it can support the Windows operating system. Click **Continue Anyway** to proceed.

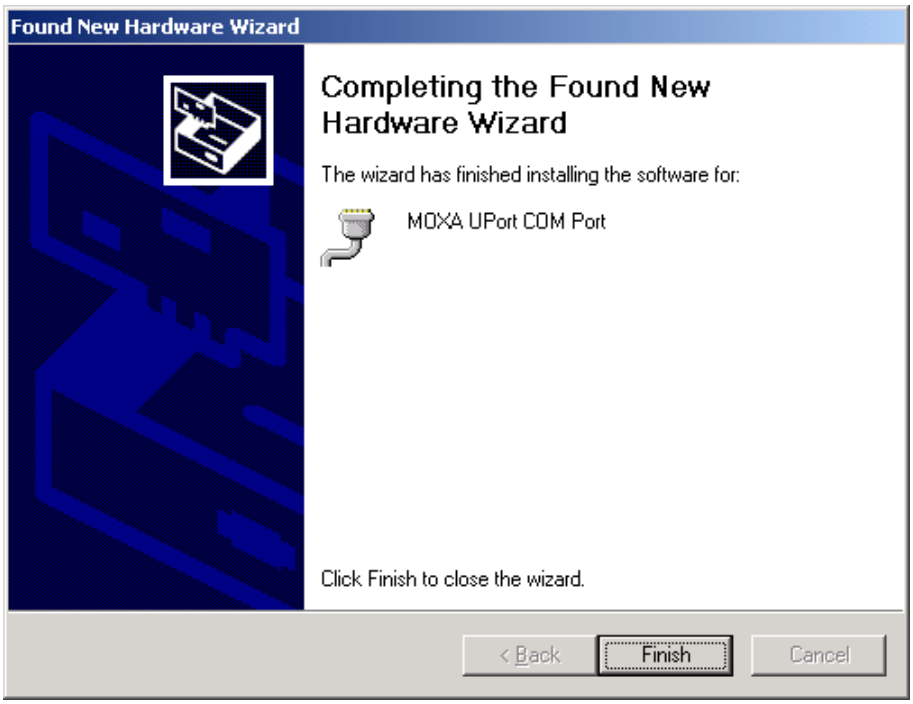


4. Wait while the driver is installed.



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5. After all files have been copied to the system, the **Completing the Found New Hardware Wizard** window will open to indicate that it has finished installing driver. Click **Finish** to proceed with the rest of the installation.



6. Repeat Step 1 through Step 5 for each of the remaining ports (1 port for the UPort 2210, and 3 ports for the UPort 2410).
7. The **Found New Hardware** balloon will reappear to inform you that the hardware was installed successfully.

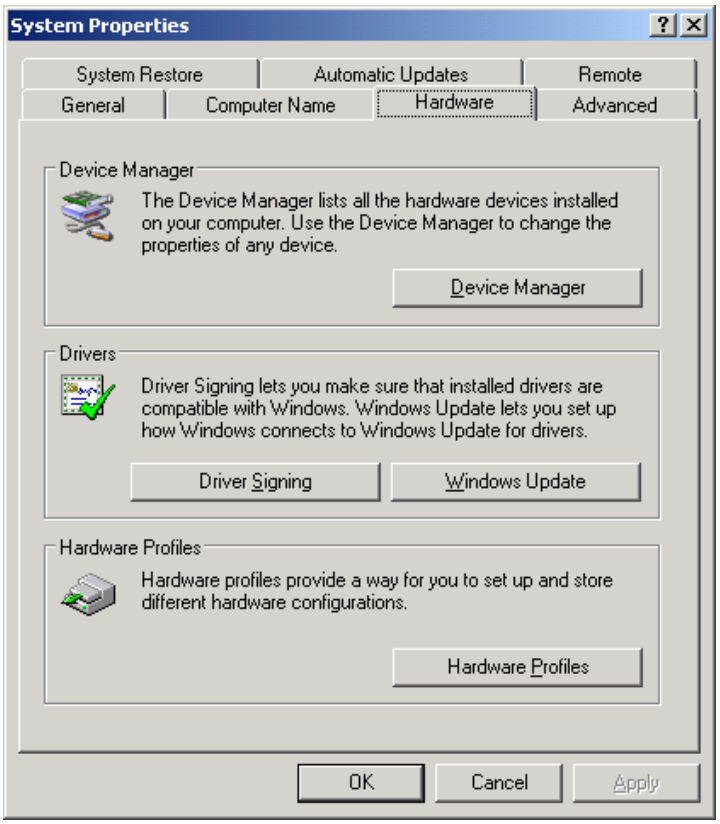


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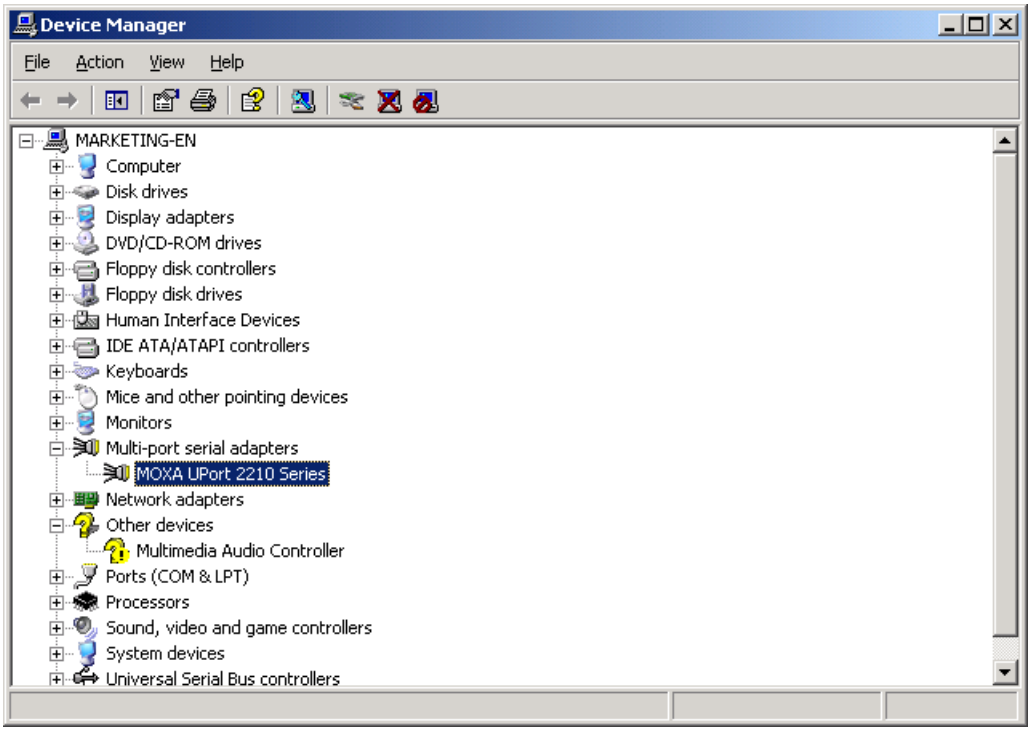
Configuring the Ports

After the driver has been installed, use Windows' **Device Manager** to configure the UPort serial ports.

1. With the **System Properties** window open, click on the **Hardware** tab, and then click on **Device Manager**.

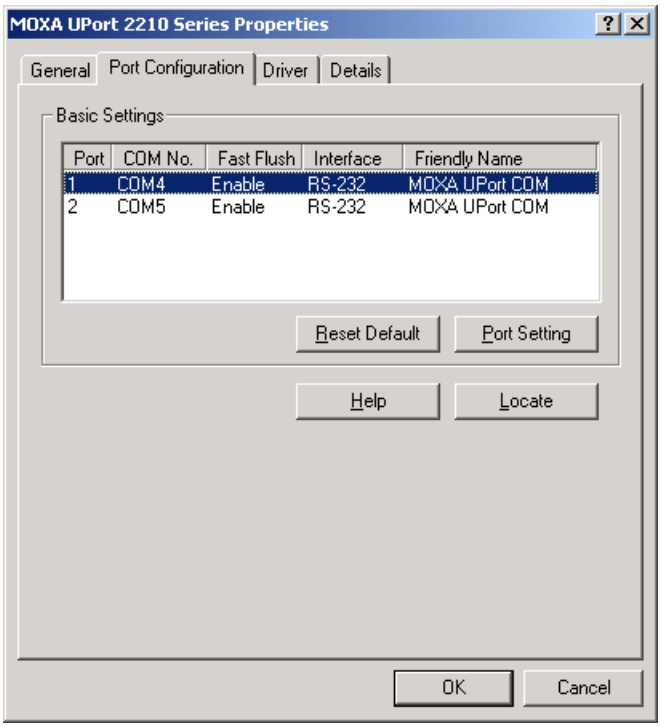


2. Expand the **Multi-port serial adapters** tab, right click **MOXA UPort 2210** (or 2410), and then click **Properties** to open the UPort's configuration panel.



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The **Ports Configuration** page settings are described below.



Port Settings

Auto Enumerating COM Number

If the **Auto Enumerating COM Number** checkbox is checked, COM numbers will be assigned automatically and in sequence to the ports. E.g., COM3 to Port 1, COM4 to Port 2, etc.

If you do not enable this check box, only the COM number for the selected port will be changed to the COM number listed in the drop-down list box. Enable this function if you want to configure the UPort's serial ports with sequential COM numbers.

Friendly Name

Setting	Factory Default	Necessity
1 to 20 characters (E.g., UPort 2210)	Moxa UPort COM	Optional

Users can assign a **Friendly name** to each of the UPort 2000's serial ports. The friendly name gives users an easy way to identify the serial devices connected to the UPort's serial ports. If you enable **set the change to all ports** and then click **OK**, the same friendly name will be assigned to all ports.

Fast Flush

Setting	Factory Default	Necessity
Enable/Disable	Enable	Required

The ***Fast Flush*** setting is designed for applications that call the Win32 ***PurgeComm()*** function before reading or writing data. If Fast Flush is not enabled, then instead of just flushing the local buffer, the UPort's driver will query the UPort's firmware repeatedly in a short period of time to make sure that no data is queued in the UPort's firmware buffer. For this reason, you may find that your PC's native COM ports respond much more quickly when making PurgeComm() function calls compared to the UPort's serial ports. In this case, enable ***Fast Flush*** (enabled by default) to speed up the reaction of the UPort's serial ports.

Interface

Setting	Factory Default	Necessity
RS-232	RS-232	Required

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Other Settings

Reset default

If you click the **Reset default** button, all the settings will return to the factory default settings:

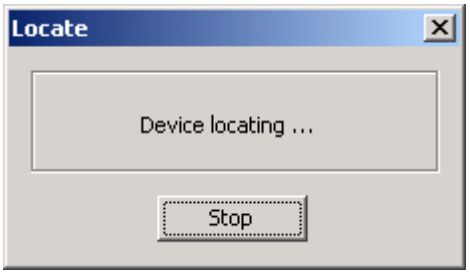
COM Number: <Assign available COM number automatically>
Fast Flush: Enable
Interface: RS-232

Help

Click on **Help** to open the UPort 2000's online help utility.

Locate

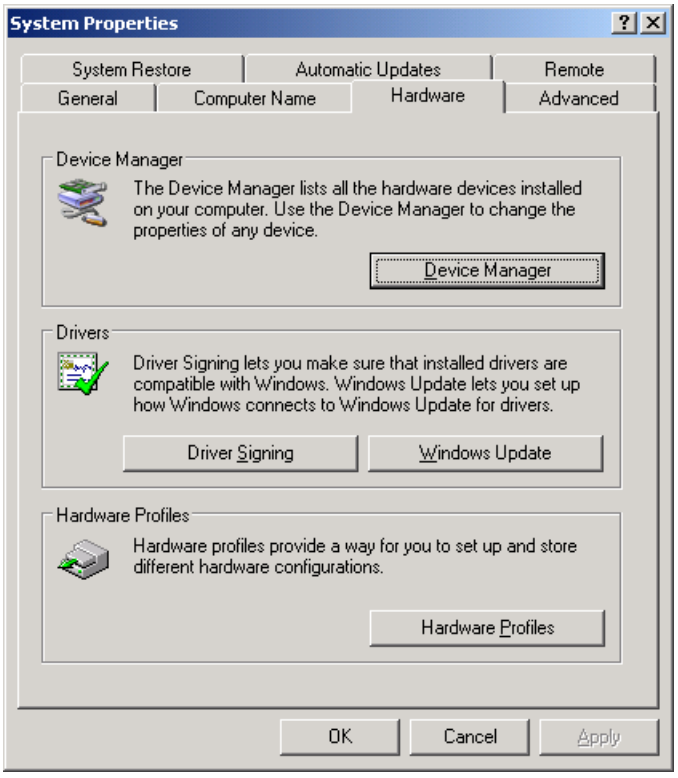
Use the **Locate** function to determine the location of a particular UPort 2000. This function is particularly useful when two or more UPorts are installed on the same PC. The Locate function will cause the selected UPort 2000's LED to flash, and UPort 2410 will sound the buzzer.



Uninstalling the UPort 2000

To remove a particular UPort 2000 from you PC, simply remove that UPort 2000 from the **Device Manager**. However, the UPort driver will NOT be removed so that other UPort 2000 converters connected to the PC will continue to work properly.

1. To uninstall the UPort 2000, click **Start → Settings → Control Panel → System**, select the **Hardware** tab, and then click **Device Manager**.



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2. Expand the **Multi-port serial adapters** tab, right click **MOXA UPort 2210 Series**, and then click **Remove** to uninstall this UPort 2000. A window will pop up to confirm that you want to remove this UPort.



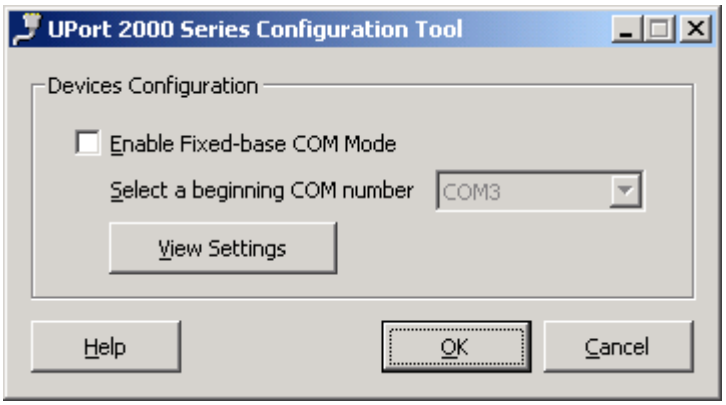
3. Click **OK** to continue uninstalling the UPort device. The UPort device will be removed from the list of **Multi-port serial adapters**.

Advanced UPort 2000 Driver Functions

Moxa's UPort 2000 Series Utility gives users a convenient tool for configuring and maintaining products from the UPort 2000 Series. In this section, we introduce the difference between "Normal COM Mode" and "Fixed-base COM Mode".

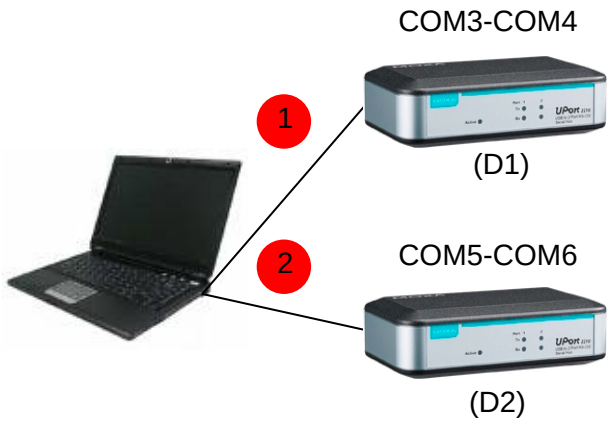
The Default Setting is Normal COM Mode

Each of Moxa's UPort 2000 products comes with a unique serial number to register with the Windows OS. If your UPort is reconnected to a different USB port, the host will recognize that it's the same UPort and then utilize the same COM port numbers.



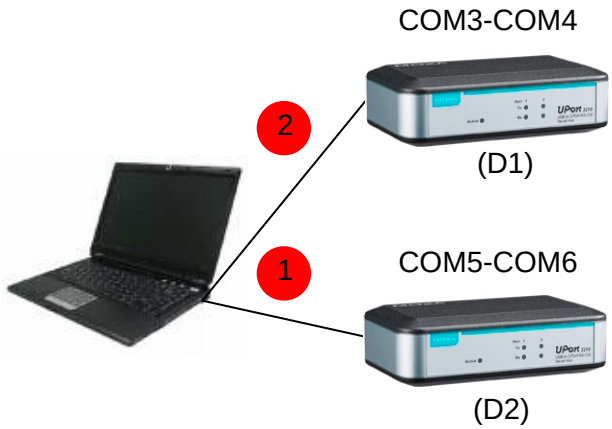
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To use Normal COM Mode, be sure to the leave **Enable Fixed-base COM Mode** unchecked. For the sake of argument, assume that we are using two UPort 2210 USB-to-serial converters configured for "Normal COM Mode." Each UPort 2210 has two serial ports. When you plug UPort D1 (please refer to the figure below) into your computer, your computer's operating system assigns the first two available COM numbers (COM3 and COM4 in this example) to the UPort's serial ports. If you now plug UPort D2 into another of your computer's USB ports, your computer will again assign the first two available COM numbers (COM5 and COM6 in this example). At this point you can use the UPort utility to assign different COM numbers to these ports.



The UPort's "Normal COM Mode" has an added twist. Your computer uses the serial number of each UPort to record which COM numbers are assigned to the UPort's serial ports. If one or both of the UPorts are unplugged from the computer, and then plugged back in, the COM numbers of the UPorts' serial ports will be the same as they were before the UPorts were unplugged.

For example, if both D1 and D2 are unplugged, and then D2 is plugged back in first, your computer will assign COM5 and COM6 to D2's serial ports. When D1 is plugged back in, your computer will assign COM3 and COM4 to D1's serial ports.

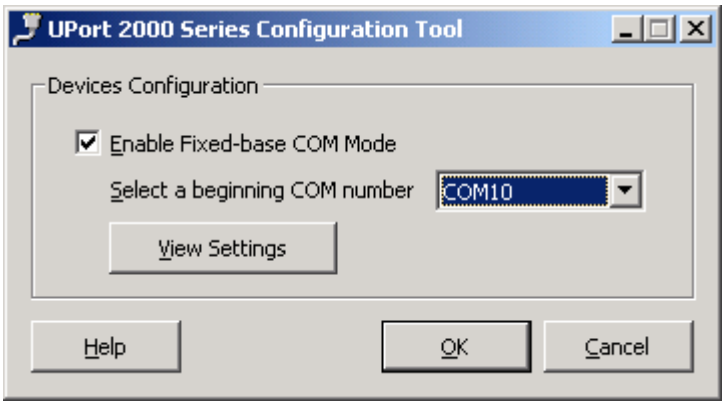


In "Normal COM Mode" you can reset the COM numbers and configuration parameters of individual ports to the values needed for your application at any time.

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Fixed-base COM Mode

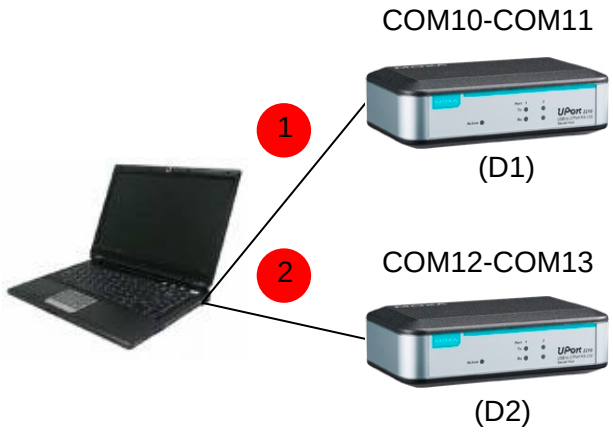
Moxa's UPort 2000 series provides a unique fixed-base COM function that allows users to set a specific initial COM port number. Regardless of which UPort is plugged into the host, the COM port numbers for the UPort's serial ports will be numbered sequentially starting with the initial COM port number.



To use "Fixed-base COM Mode," be sure to check the "Enable Fixed-base COM Mode" check box.

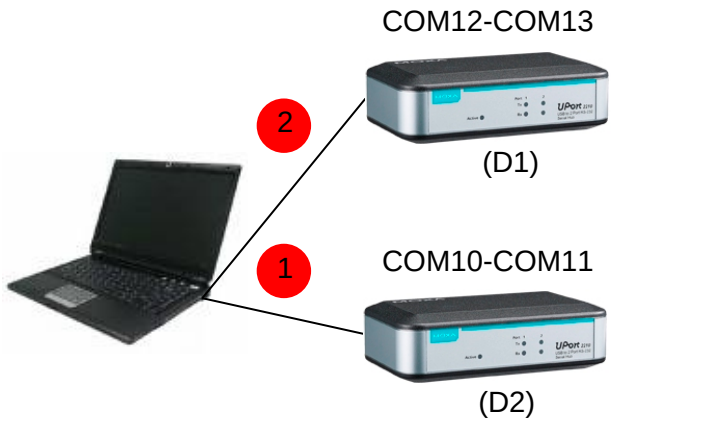
"Fixed-base COM Mode" allows users to specify which COM number will be assigned first. In addition, COM numbers are assigned sequentially, and are not tied to specific UPort converters.

For example, assume that you have set COM10 as the first COM number that will be assigned. If UPort D1 is plugged into your computer first, your computer will assign COM10 and COM11 to the UPort's serial ports. When UPort D2 is plugged in, the computer will assign COM numbers COM12 and COM13.



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If both UPorts are unplugged from the computer, and then UPort D2 is plugged back in, the computer will now assign COM10 and COM11 to the UPort's serial ports. When UPort D1 is plugged back in, COM numbers COM12 and COM13 will be assigned the UPort's serial ports.



When "Fixed-base COM Mode" is enabled for the first time, all COM port numbers and serial port parameters will be reset to their default values. You can then set the COM numbers and configuration parameters to the values needed for your application.

For example, let's assume that before you enable "Fixed-base COM Mode" you set the parameters of the UPort 2000 as follows:

Port Number: COM5
Friendly Name: POS Device 1
Fast Flush: Disable.

If you now enable "Fixed-base COM Mode," all parameters will be reset to their default values:

Port Number: COM3
Friendly Name: MOXA UPort COM
Fast Flush: Enable

At this point you can set the COM numbers and other serial parameters to the values needed for your application. If you subsequently disable "Fixed-base COM Mode," all parameters will be restored to the original settings:

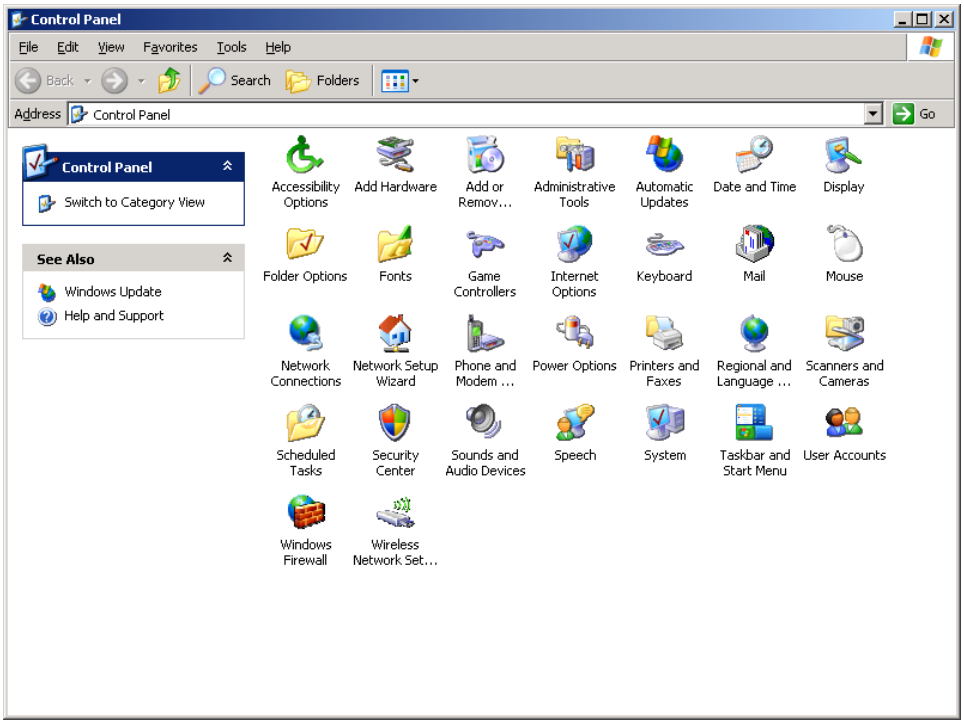
Port Number: COM5
Friendly Name: POS Device 1
Fast Flush: Disable

In "Fixed-base COM Mode," you can reset the COM numbers and configuration parameters of individual ports to the values needed for your application at any time.

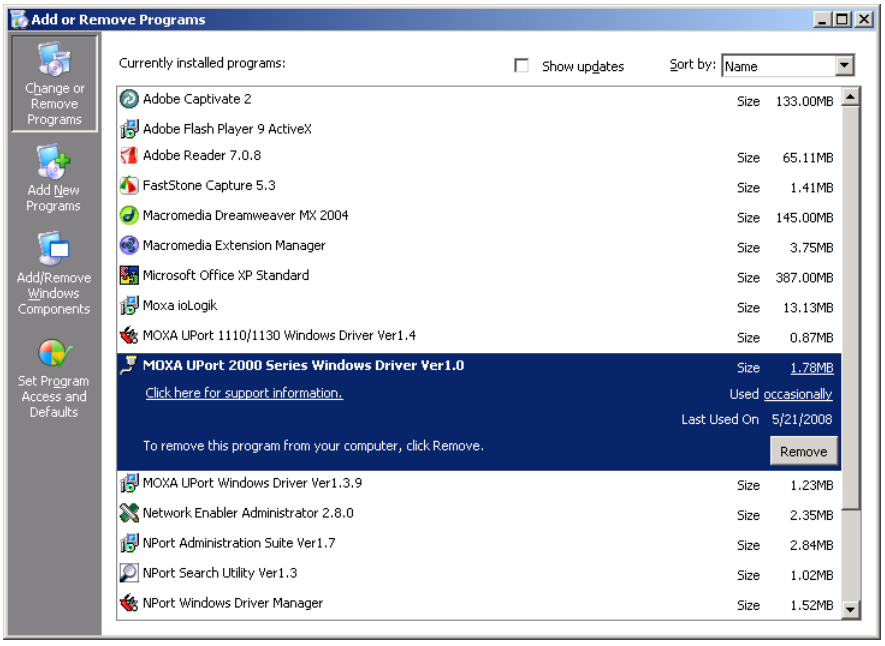
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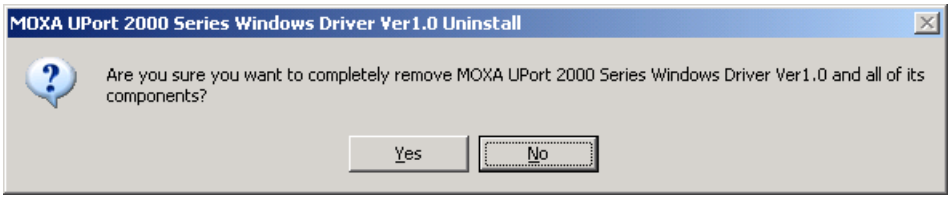
Uninstalling the Driver

1. To uninstall the driver, open the Windows' Control Panel, and click **Add/Remove Programs**.



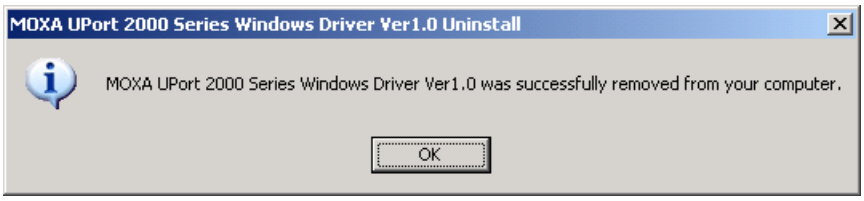
2. Select Moxa **UPort 2000 Series Windows Driver Ver1.0**, and then click the **Remove** button. Wait while the driver software is uninstalled.





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3. Click **OK** to proceed with the un-installation procedure.



Linux Kernel 2.6.x and 3.x

The Linux driver for Moxa's UPort 2000 Series of USB-to-serial converters maps a Linux host's ttyUSBxx ports to the UPort's serial ports. Once the mapping has been established, Linux users and applications can connect to a device port as if it were a ttyUSBxx port. The Linux drivers have been tested with the majority of Linux distributions, including Linux kernel 2.6.x and 3.x. Please check Moxa's website (http://www.moxa.com) for the latest Linux kernel support information.

In this section, we explain how to complete the following tasks:

1. Installing the Linux Driver
2. Loading the Moxa Driver
3. Unloading the Moxa Driver
4. Removing the Moxa Driver and Utility files
5. Using the mxustty Utility

Installing the Linux Driver

Obtain the driver file from the Document and Software CD, or from the Moxa website at http://www.moxa.com.

To install and load the Linux drivers, execute the following commands from the Linux prompt:

```
# mount /dev/cdrom /mnt
# cd /
# mkdir moxa
# cd /moxa
# cp /mnt/cdrom/<driver directory>/driv_linux_uport2000_vx.x_build_xx.tgz /moxa
# tar -xvfz driv_linux_uport2000_vx.x_build_xx.tgz
# cd /moxa/mxuport2000
# make install
```

Loading the Moxa Driver

After installing the driver, you will be able to load the Moxa driver. The driver will be loaded automatically when you plug the UPort 2000 into your PC, or you can load the driver manually by issuing the following command:

```
# modprobe mxuport2000
```

If the driver has loaded successfully, you should see a message such as the following:
_MOXA UPort 2000 series driver ver 1.0 loaded successfully.

You can verify that the driver has loaded by entering the following command:

```
# lsmode
```

For additional information, please refer to readme.txt file in the mxuport2000 directory.

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Unloading the Moxa Driver

The driver will not unload automatically when you unplug the UPort 2000 from the PC. To unload the Moxa driver, you must remove it manually by issuing the following command:

#rmmod mxuport2000

You can verify that the driver was unloaded by entering the following command:

 # lsmode

For additional information, please refer to readme.txt file in the mxuport2000 directory.

Removing the Moxa Driver and Utility Files

To remove the Moxa driver and utility files, navigate to the path **/moxa/mxuport2000**, and then execute the following command:

#make clean;

Both the driver and utility files will be removed.

Using the mxustty Utility

To determine which UPort 2000 a particular serial device is connected to, use the "l" option with the "mxustty" utility.

General usage:

mxustty <option> device

option = **h** to activate the help file

option = **l** (ell) to locate a particular UPort device

Use the following function call to locate the device ttyUSB3:

 # mxustty -l /dev/ttyUSB3

MAC OS X Driver

The MAC OS X driver remains traditional in serial devices properties. There are two serial ports—Dial-in port, which waits for the carrier signal before opening, and the Callout port. Please check Moxa's website (http://www.moxa.com) for the latest information and support for MAC OS X (version 10.4 or later).

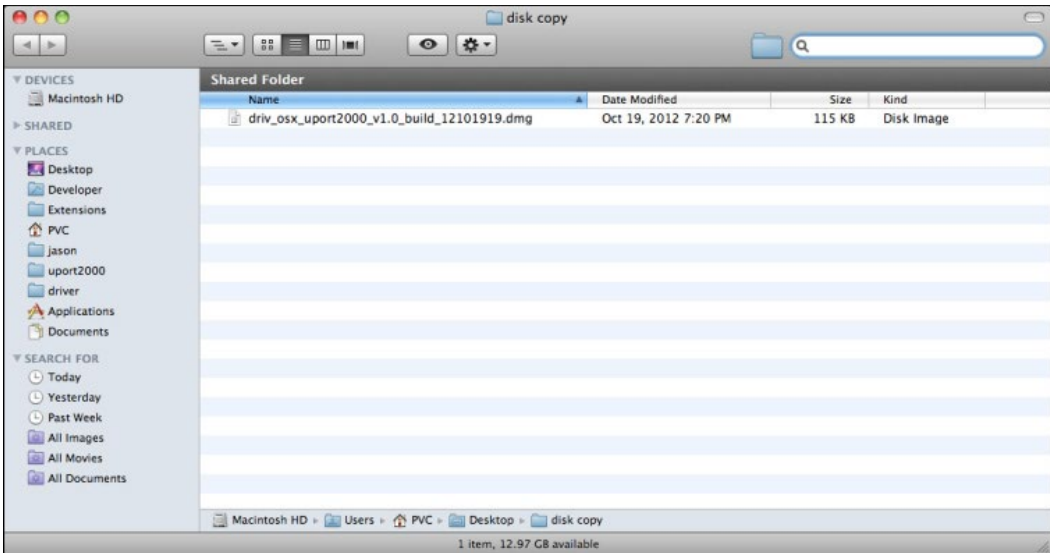
In this section, we explain how to complete the following tasks:

1. Installing the MAC OS X Driver
2. Verifying the Installation
3. Using the Utility

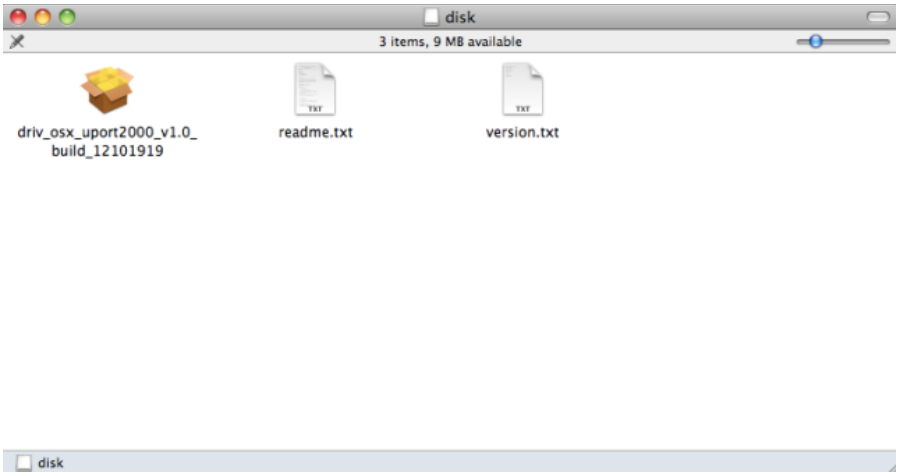
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Installing the MAC OS X Driver

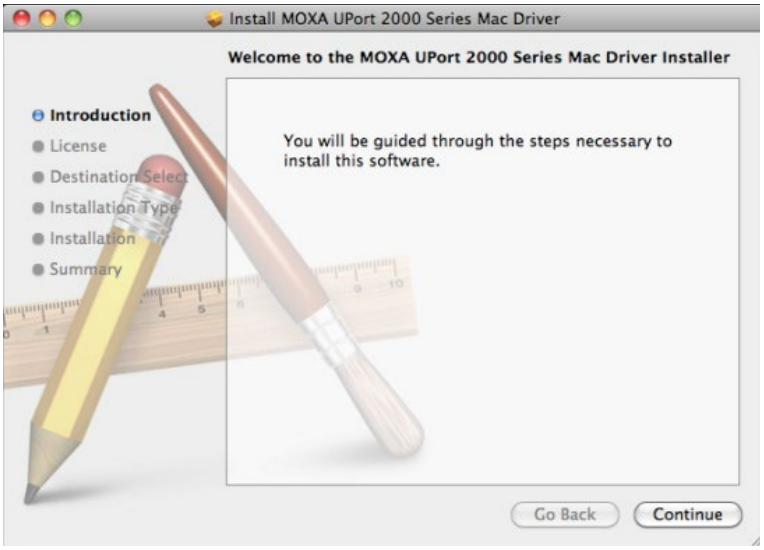
1. Download the driver file from the Document and Software CD, or from the Moxa website at http://www.moxa.com.



2. Extract the files (driv_osx_uport2000_vX.Y_build_yymmddhh.mpkg, readme.txt, version.txt). Double click the .mpkg file to start the installation.



3. Click **Continue**.

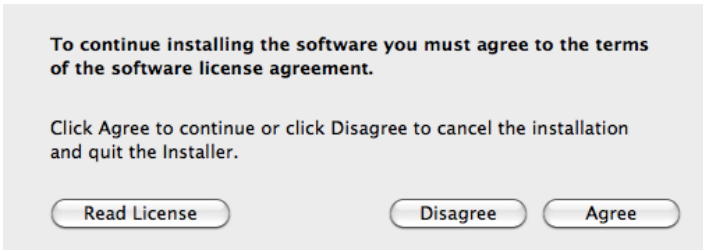


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4. After reading the License Agreement, click **Continue**.



5. Click **Agree** to continue the installation.

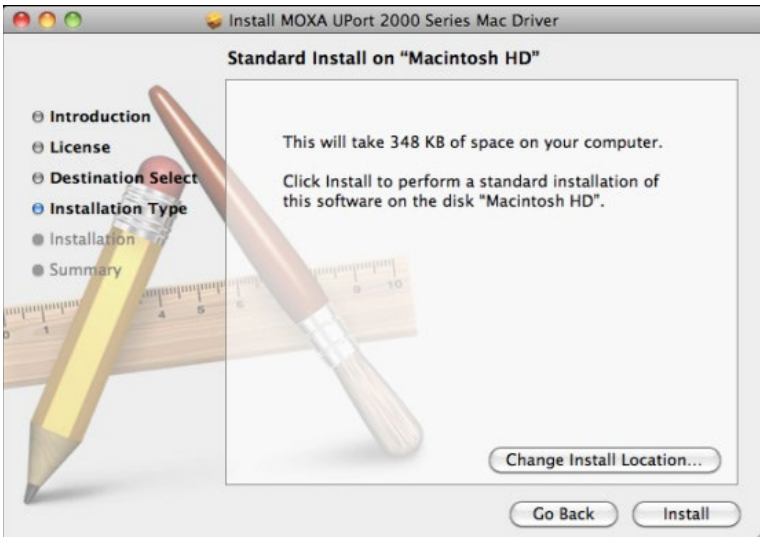


6. The **Select a Destination** window will pop up. Click **Continue**.



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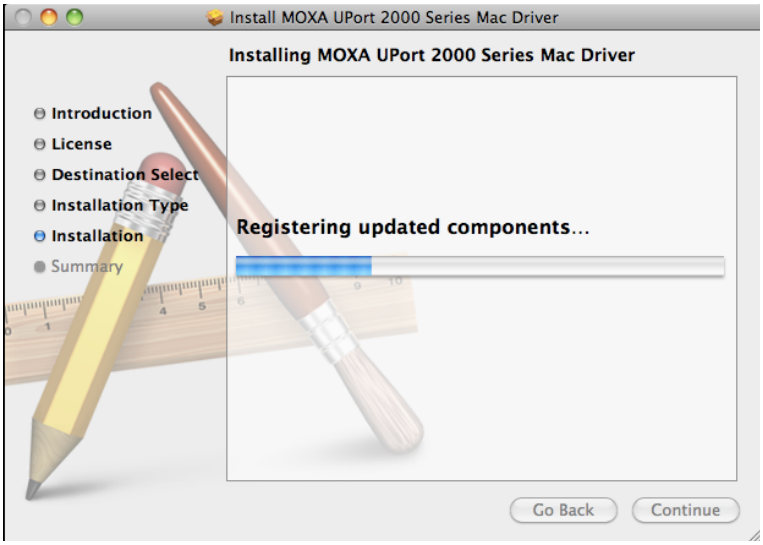
7. You will see a pop-up window indicating how much space will be used for the installation. Click **Install** to continue.



8. Enter your password to allow Installer to make changes. Click **OK** to continue.

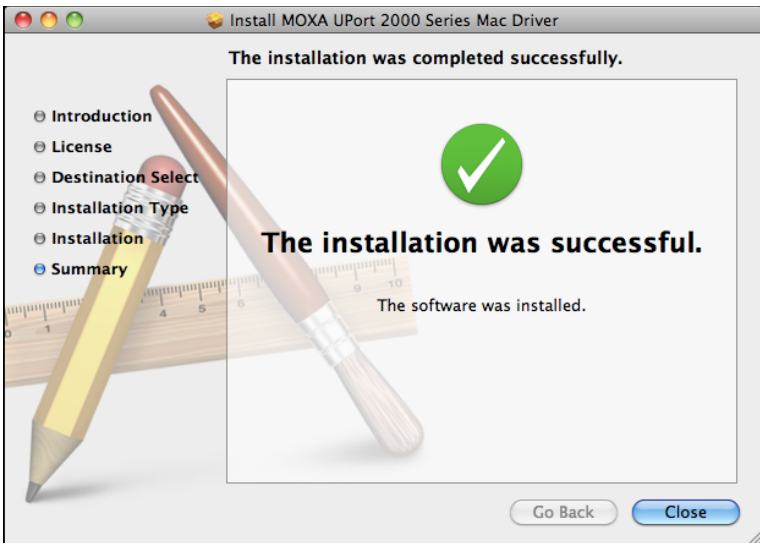


9. The installation will start automatically.



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10. You will see a message saying that the installation is successful. Click **Close** to finish the process.



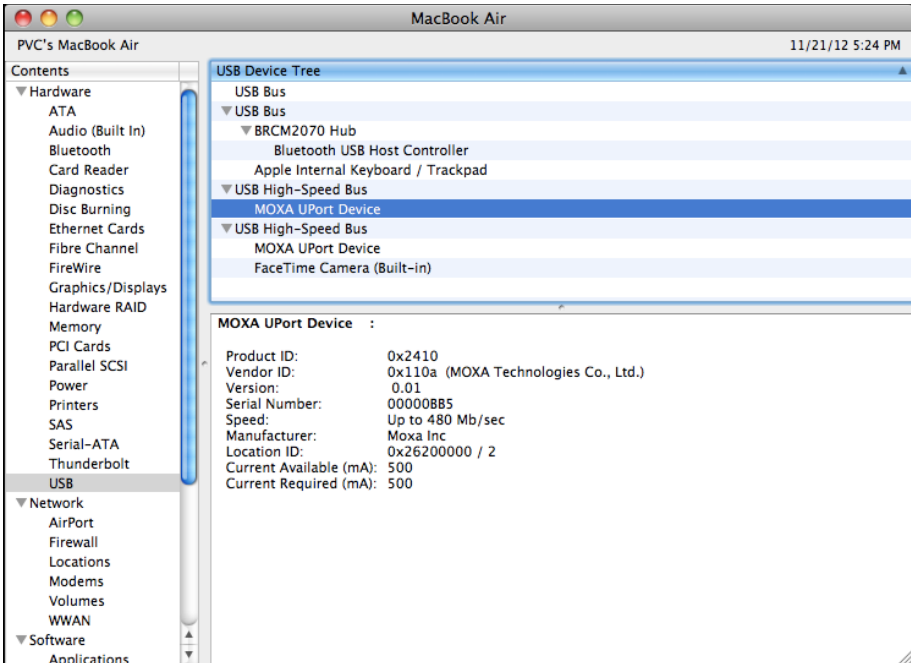
Verifying the Installation

1. Open the **Applications → Utilities → System Profiler**.

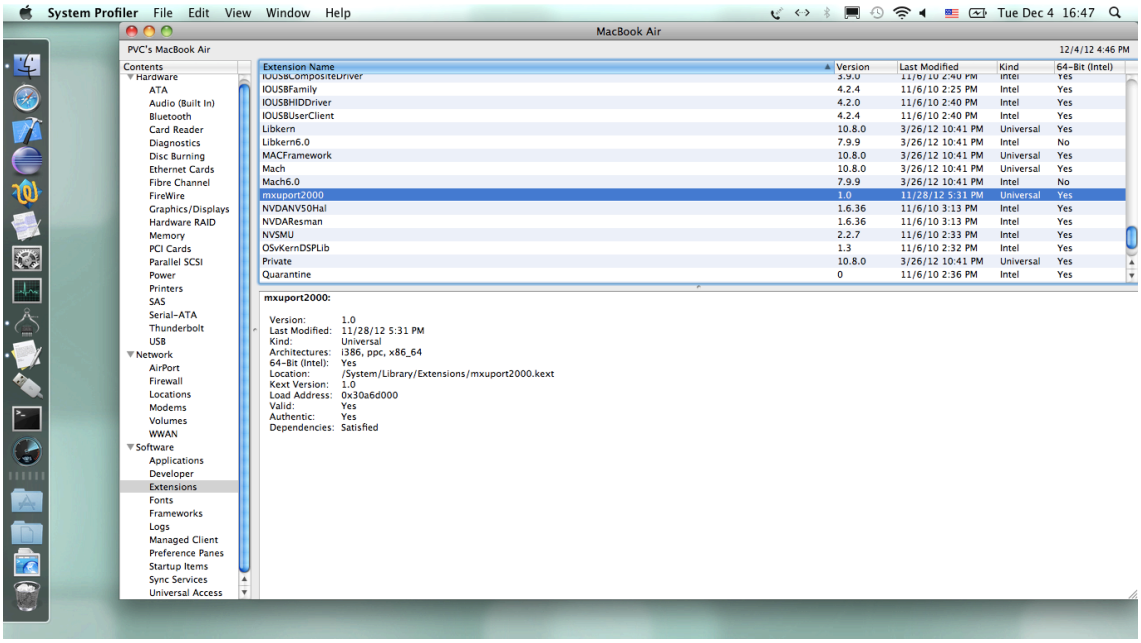


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2. Select **USB** under **Hardware** to open the USB Device Tree panel. Select **MOXA Uport Device** to display the information.



3. Select **Extensions** under **Software** to open content panel. Select **mxuport2000** to display the information.



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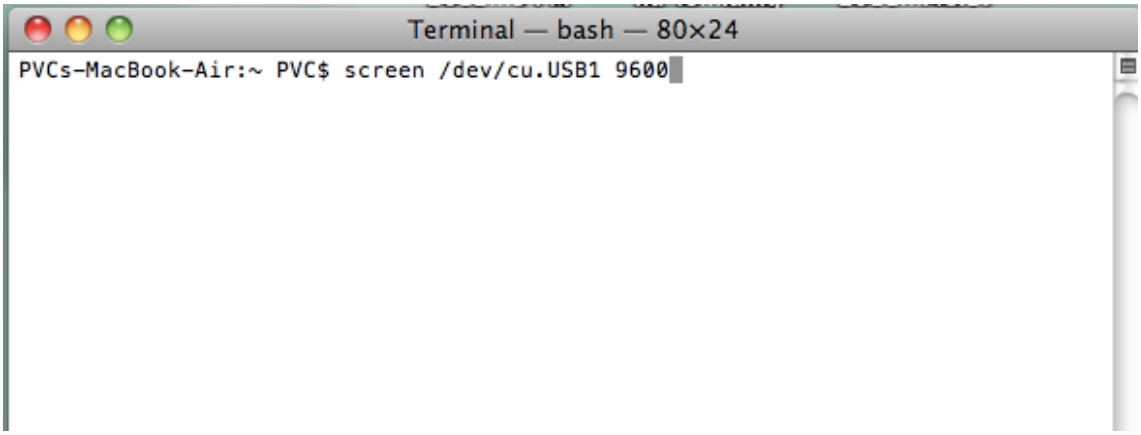
Using the Utility

The MAC OS system has a built-in terminal emulator like the Linux system. Use the loopback cable to connect serial port 1 and serial port 2.

Type **screen /dev/cu.USB0 9600** to open 1st serial port.



Type **screen /dev/cu.USB1 9600** to open 2nd serial port.



Data entered in the terminal emulator for serial port 1 will be displayed on the terminal emulator for serial port 2, and vice versa. The LEDs will blink as you type, showing that data is being transmitted and received between the two serial ports.

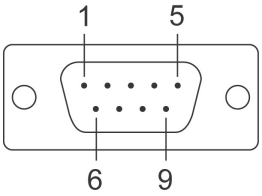
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3

Pin Assignment

The UPort 2210 has 2 ports RS-232 interface and UPort 2410 has 4 ports RS-232 interface.

DB9 Male RS-232 Port for UPort 2210/2410



Pin	RS-232
1	DCD
2	RxD
3	TxD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS

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