NATIONAL INSTRUMENTS NI USB-621x OEM Multifunction Input or Output Device User Guide

Contents

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Product Information: USB-6216

The USB-6216 is an OEM device that belongs to the M Series family of National Instruments. It is a USB-based data acquisition device that provides analog input, analog output, digital input/output, and counter/timer functionality. The device is designed for use in a variety of applications including laboratory research, industrial automation, and embedded control systems.

Dimensions:
The dimensions of the USB-6216 OEM device are shown in Figure 3. The device measures 6.250 inches (158.75 mm) in length, 5.877 inches (149.28 mm) in width, and 0.420 inches (10.66 mm) in height.

Mounting Options:
The USB-6216 OEM device can be mounted using the four mounting holes provided on the device. The recommended mounting screws are M3 x 0.5 mm screws with a maximum length of 5 mm.

Connectors:
The USB-6216 OEM device has the following connectors:

- +5 V (power supply)
- PFI 0 to PFI 7 (programmable function interface)
- AO 0 and AO 1 (analog output)
- AI 0 to AI 15 (analog input)
- AI SENSE (analog input sense)
- AI GND (analog input ground)
- AO GND (analog output ground)
- D GND (digital ground)

Product Usage Instructions

To use the USB-6216 OEM device, follow these steps:

1. Connect the USB cable to the USB port on your computer and the USB-B connector on the USB-6216 OEM device.
2. Connect the appropriate cables to the input and output connectors on the device.
3. Install the necessary drivers and software for your application. These can be downloaded from the National Instruments website.
4. Configure the device using the software provided by National Instruments.

5. Start acquiring data or controlling your system using the software.

Note: It is important to refer to the NI USB-621x User Manual and Specifications document for more detailed information about the device and its usage.

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NI USB-621x OEM

M Series USB-6211/6212/6216/6218 OEM Devices
This document provides information about the dimensions, mounting options, connectors, and other components of the National Instruments USB-6211 OEM, USB-6212 OEM, USB-6216 OEM, and USB-6218 OEM devices. It also explains how to modify the USB device name in Microsoft Windows.

Caution There are no product safety, electromagnetic compatibility (EMC), or CE marking compliance claims made for the USB-6211/6212/6216/6218 OEM devices. Conformity to any and all compliance requirements rests with the end product supplier.

Figure 1 shows the USB-6211 OEM and USB-6212/6216/6218 OEM devices.

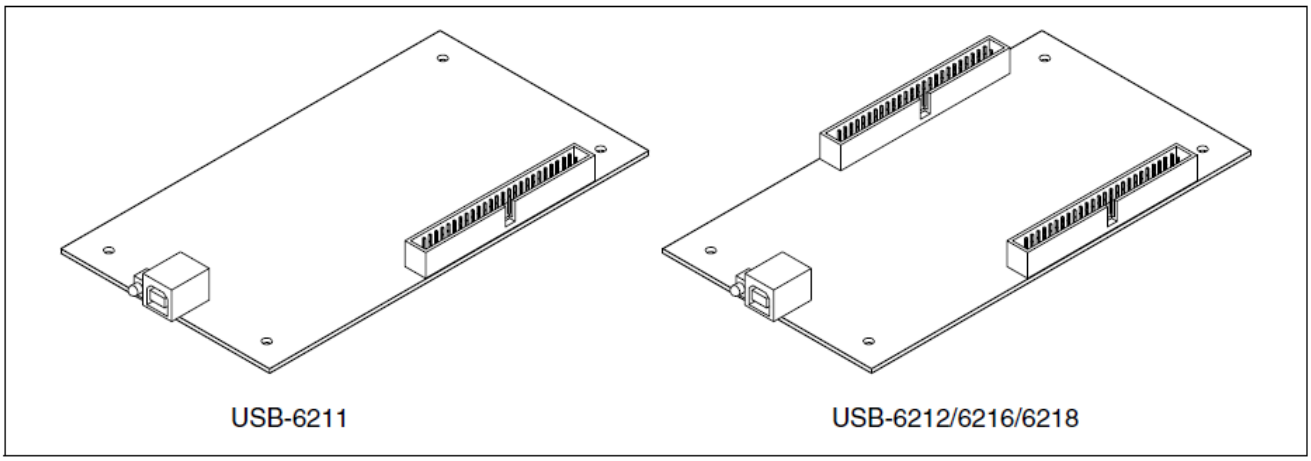


Figure 1. USB-621*x* OEM Devices

Refer to the NI USB-621x Specifications document for USB-6211/6212/6216/6218 specifications and the NI USB-621x User Manual for more information about USB-6211/6212/6216/6218 devices. You can find all documentation at ni.com/manuals.

Dimensions

Figure 2 shows the dimensions of the USB-6211 OEM device.

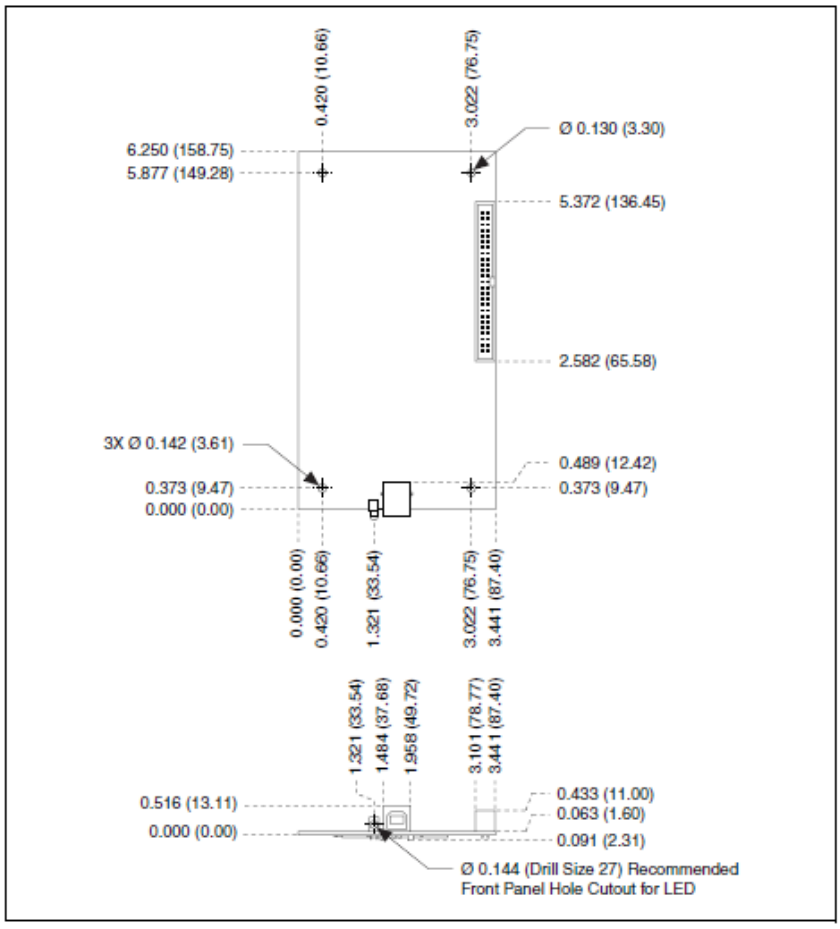


Figure 2. USB-6211 OEM Dimensions in Inches (Millimeters)

Figure 3 shows the dimensions of the USB-6212/6216/6218 OEM device.

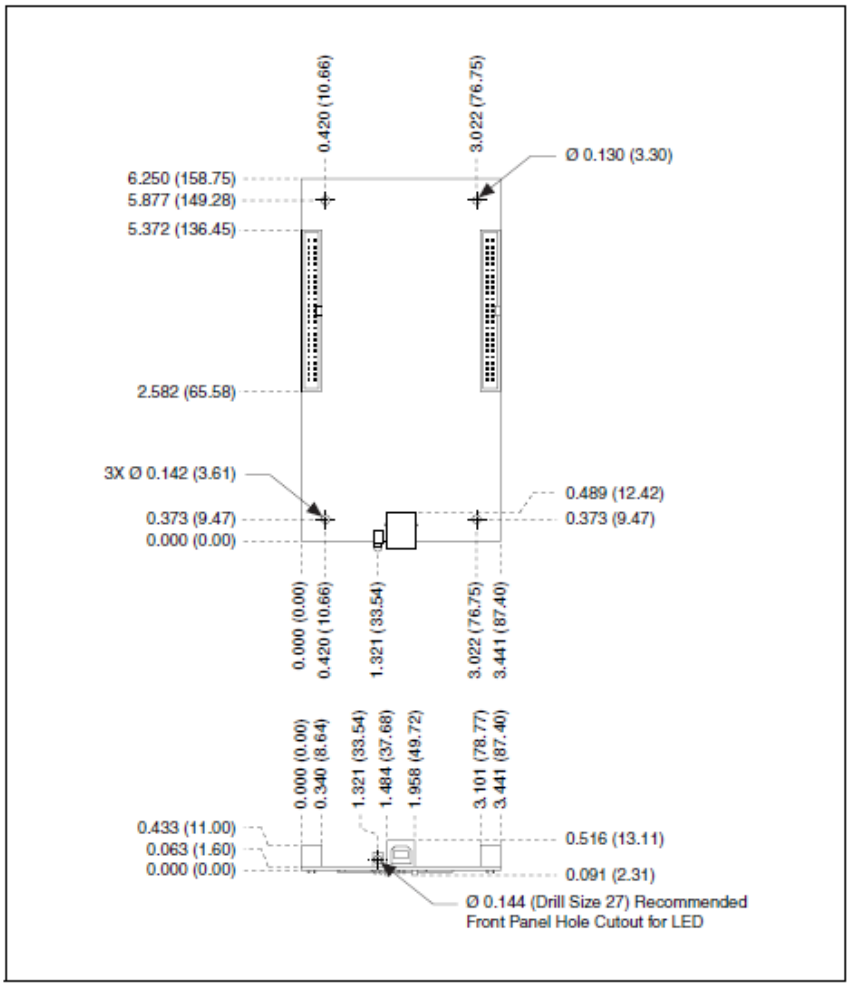


Figure 3. USB-6212/6216/6218 OEM Dimensions in Inches (Millimeters)

I/O Connector Pinouts

Refer to the NI USB-621x User Manual at ni.com/manuals for more information about USB-6211/6212/6216/6218 signals and how to connect them.
Figure 4 shows the connector pinout on the USB-6211 OEM device.

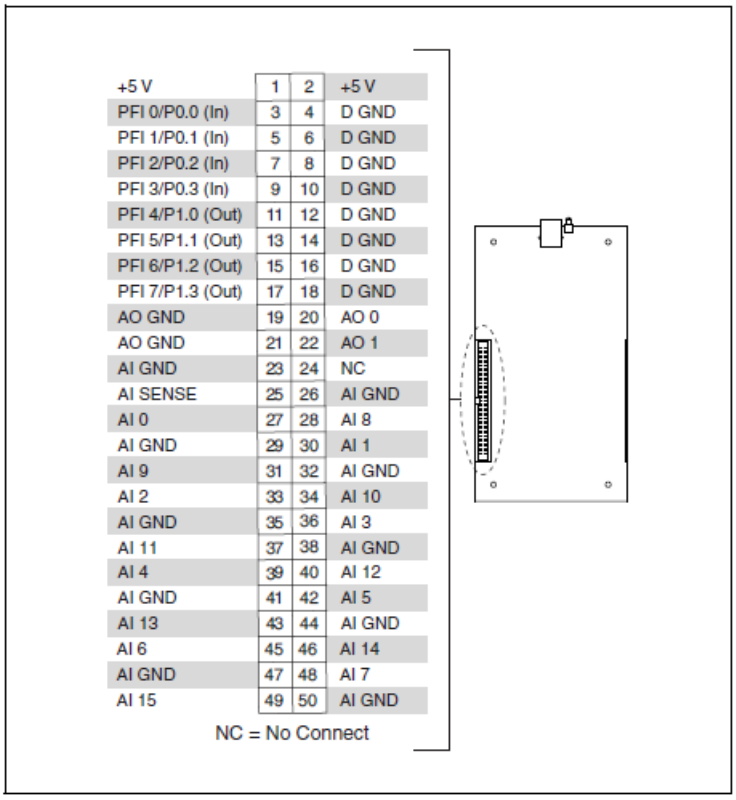


Figure 4. USB-6211 OEM Connector Pinout

Figure 5 shows the connector pinouts on the USB-6212 OEM and USB-6216 OEM devices.

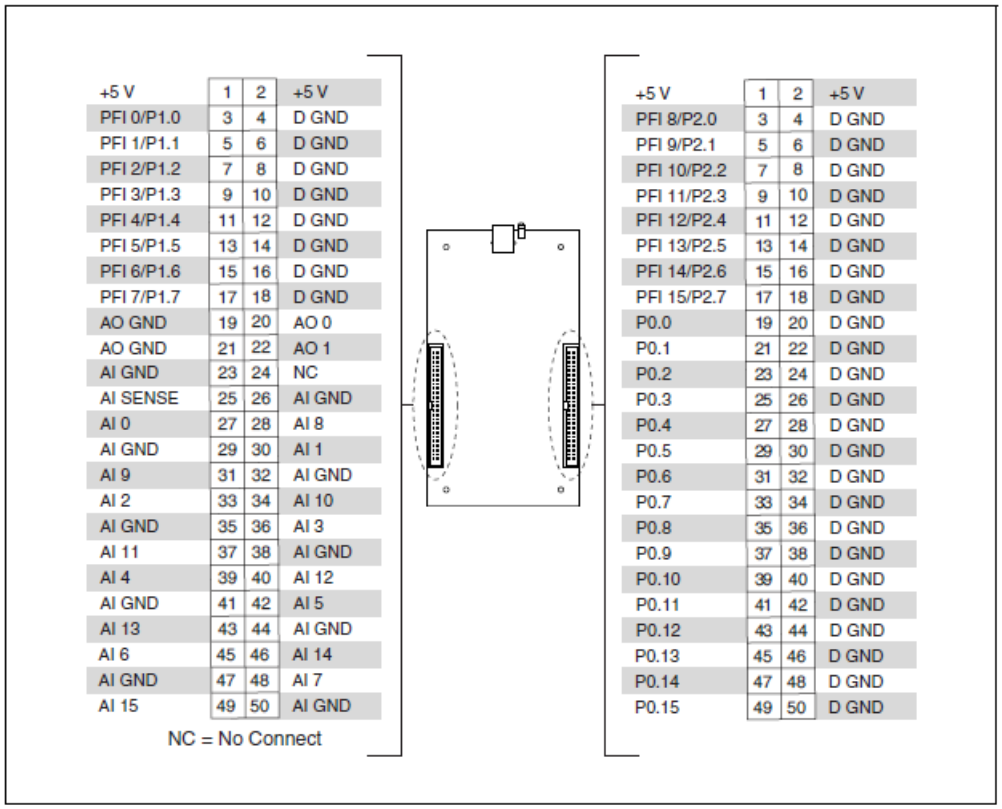
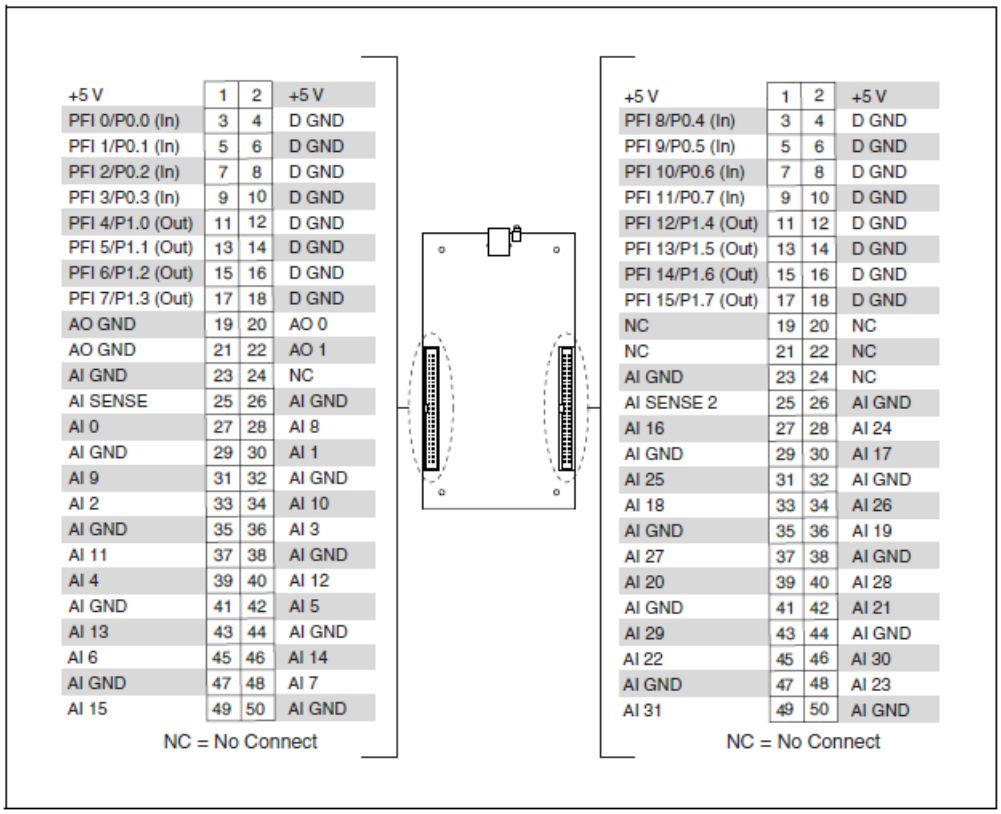


Figure 5. USB-6212/6216 OEM Connector Pinout

Figure 5 shows the connector pinouts on the USB-6218 OEM device.



+5 V	1	2	+5 V
PFI 0/P0.0 (In)	3	4	D GND
PFI 1/P0.1 (In)	5	6	D GND
PFI 2/P0.2 (In)	7	8	D GND
PFI 3/P0.3 (In)	9	10	D GND
PFI 4/P1.0 (Out)	11	12	D GND
PFI 5/P1.1 (Out)	13	14	D GND
PFI 6/P1.2 (Out)	15	16	D GND
PFI 7/P1.3 (Out)	17	18	D GND
AO GND	19	20	AO 0
AO GND	21	22	AO 1
AI GND	23	24	NC
AI SENSE	25	26	AI GND
AI 0	27	28	AI 8
AI GND	29	30	AI 1
AI 9	31	32	AI GND
AI 2	33	34	AI 10
AI GND	35	36	AI 3
AI 11	37	38	AI GND
AI 4	39	40	AI 12
AI GND	41	42	AI 5
AI 13	43	44	AI GND
AI 6	45	46	AI 14
AI GND	47	48	AI 7
AI 15	49	50	AI GND

NC = No Connect

+5 V	1	2	+5 V
PFI 8/P0.4 (In)	3	4	D GND
PFI 9/P0.5 (In)	5	6	D GND
PFI 10/P0.6 (In)	7	8	D GND
PFI 11/P0.7 (In)	9	10	D GND
PFI 12/P1.4 (Out)	11	12	D GND
PFI 13/P1.5 (Out)	13	14	D GND
PFI 14/P1.6 (Out)	15	16	D GND
PFI 15/P1.7 (Out)	17	18	D GND
NC	19	20	NC
NC	21	22	NC
AI GND	23	24	NC
AI SENSE 2	25	26	AI GND
AI 16	27	28	AI 24
AI GND	29	30	AI 17
AI 25	31	32	AI GND
AI 18	33	34	AI 26
AI GND	35	36	AI 19
AI 27	37	38	AI GND
AI 20	39	40	AI 28
AI GND	41	42	AI 21
AI 29	43	44	AI GND
AI 22	45	46	AI 30
AI GND	47	48	AI 23
AI 31	49	50	AI GND

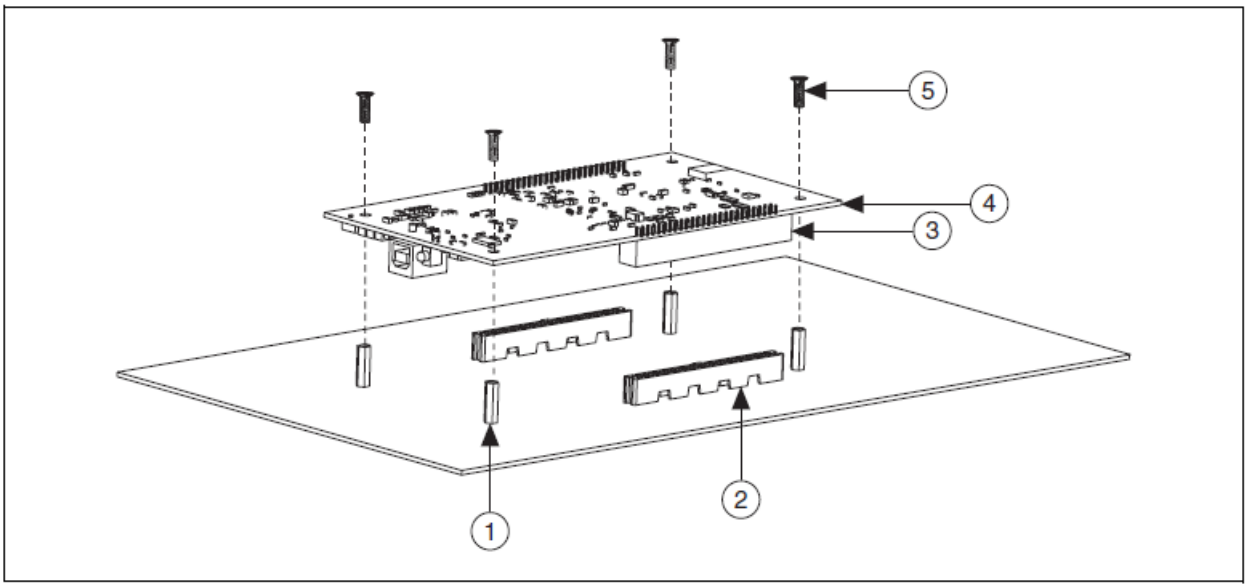
NC = No Connect

Figure 6. USB-6218 OEM Connector Pinout

Note In non-referenced single-ended (NRSE) mode, the USB-6218 OEM device measures AI <0..15> relative to the AI SENSE input, and AI <16..35> relative to AI SENSE 2.

Board Mounting the USB-621x OEM

The USB-621x OEM device can be mounted on a motherboard using the 50-pin connector(s) and board mount socket(s), as shown in Figures 7 and 8.
Note You can use either one or both 50-pin connectors to board mount the USB-6212/6216/6218 OEM device.



1. Mounting StandoffBoard Mount Socket
2. 50-Pin Connector
3. USB-6218 OEM Device

4. Mounting Screws

Figure 7. USB-621x OEM Mounting Using 50-Pin Connectors (USB-6218 OEM Device Shown)

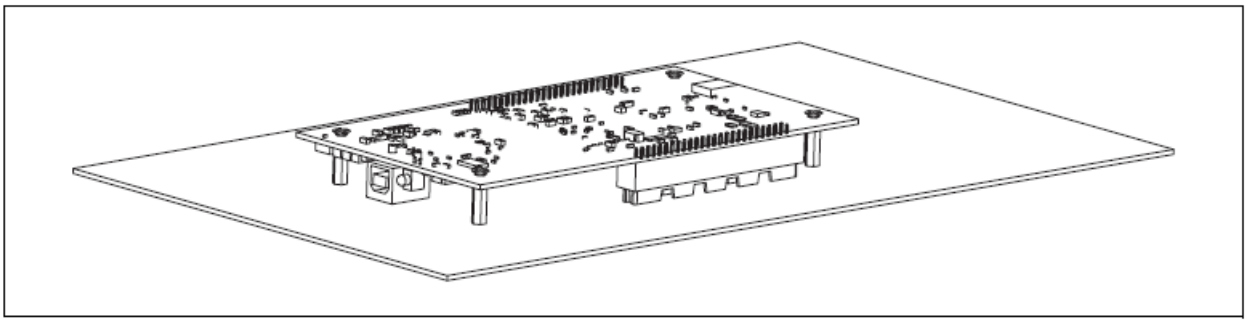


Figure 8. USB-621x OEM Device Installed on Motherboard (USB-6218 OEM Device Shown)

Refer to the Device Components section for more information about mounting components.

Device Components

Table 1 contains information about the components used for interfacing and interacting with the USB-621x OEM device.

Table 1. USB-621x OEM Components

Component	Reference Designator(s) on PCB	Manufacturer	Manufacturer Part Number
50-pin connector	J6*, J7	3M	N2550-6002UB
USB connector	J5	AMP	787780-1
50-pin board mount socket†	—	3M	8550-4500PL (or equivalent)
Mounting standoff, using board mount socket	—	RAF Electronic Hardware	M1261-3005-SS‡ with M3 ´ 0.5 screw
Mounting standoff, using ribbon cable	—	RAF Electronic Hardware	2053-440-SS** with 4-40 screw
* J6 is available on USB-6212/6216/6218 OEM devices only. † You can use either one or both 50-pin connectors to board mount the USB-6212/6216/6218 OEM device. ‡ 3/16 in. HEX female-to-female, 14 mm long. ** 3/16 in. HEX female-to-female, 1/4 in. long.			

Modifying the USB Device Name in Microsoft Windows

You can change how the USB-621x OEM device name appears when users install the device in both the Found New Hardware Wizard that appears when the device is initially installed and in the Windows Device Manager.

Windows Vista/XP Users
Figure 9 depicts how a USB-6211 (OEM) device name appears in the Found New Hardware Wizard and Windows

Device Manager.

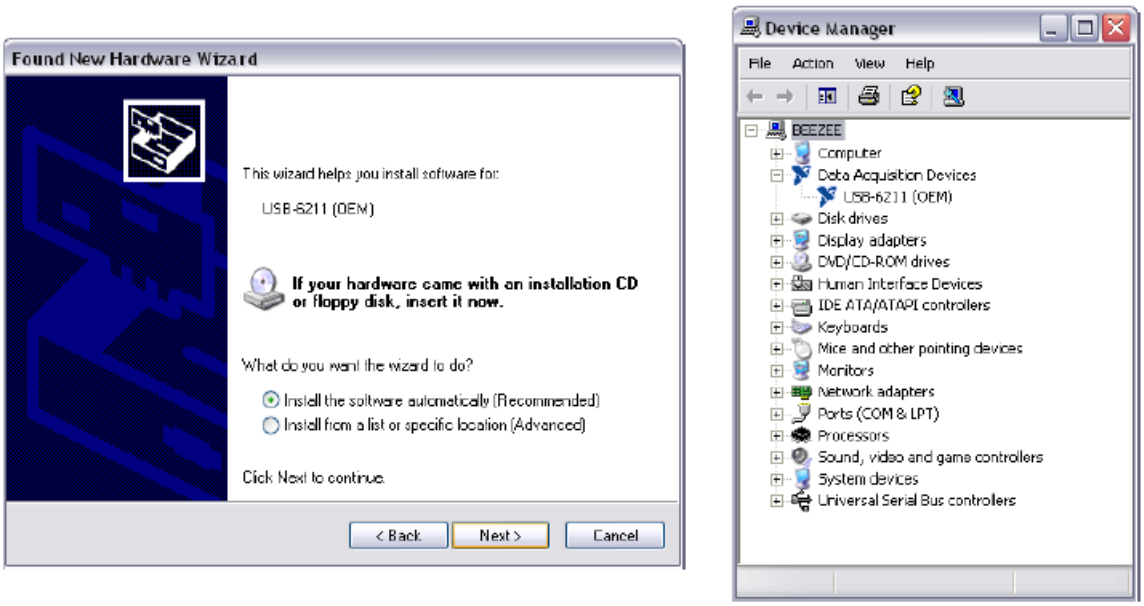


Figure 9. USB-6211 OEM Device in the Found New Hardware Wizard and Device Manager (Windows Vista/XP)
To modify the device name in the Found New Hardware Wizard and Windows Device Manager in Microsoft Windows Vista/XP, complete the following steps.

Note You must have NI-DAQmx 8.6 or later installed on your PC.

1. Locate the OEMx.inf file in the y:\WINDOWS\inf\ directory, where x is the random number assigned to the INF file by Windows, and y:\is the root directory where Windows is installed.
   Note New security updates to Microsoft Vista and NI-DAQ 8.6 create random INF files for NI hardware. Windows assigns random file numbers to all INF files, which causes the user to search through several INF files until the correct file is located.
   If you want to revert back, save a copy of this file as OEMx_original.inf in a different location.
2. Edit the device INF file by opening OEMx.inf with a text editor. At the bottom of this file are the descriptors where Windows looks to identify the device. Locate the two lines of text that contain in quotes the descriptors for the device name you are modifying. Change the descriptor on both lines to the new device name, as shown in Figure 10.

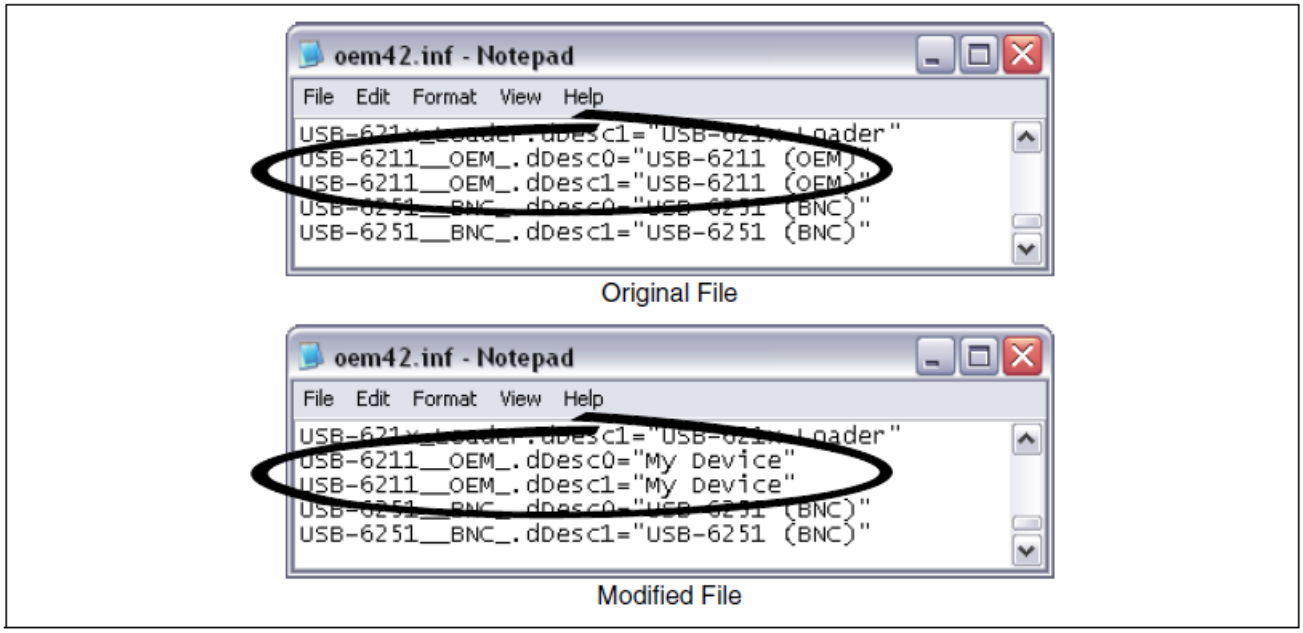


Figure 10. INF File Descriptors Changed to “My Device” (Windows Vista/XP)

3. Save and close the INF file.
4. Go to the Windows Device Manager.

   (Windows Vista) In the Device Manager, notice that the OEM device now appears as My Device, as shown in Figure 11.

   (Windows XP) In the Device Manager, right-click the OEM device under Data Acquisition Devices, and select Uninstall. Disconnect the USB cable from your PC.

When you reconnect the device, it appears as My Device in the Found New Hardware Wizard and Windows Device Manager, as shown in Figure 11.

Note When the device is initially installed, the Windows alert message may display the following: Found New Hardware: M Series USB 621x (OEM). This message appears for a few seconds until the custom name appears and the Found New Hardware Wizard is launched. This alert message device name cannot be changed.

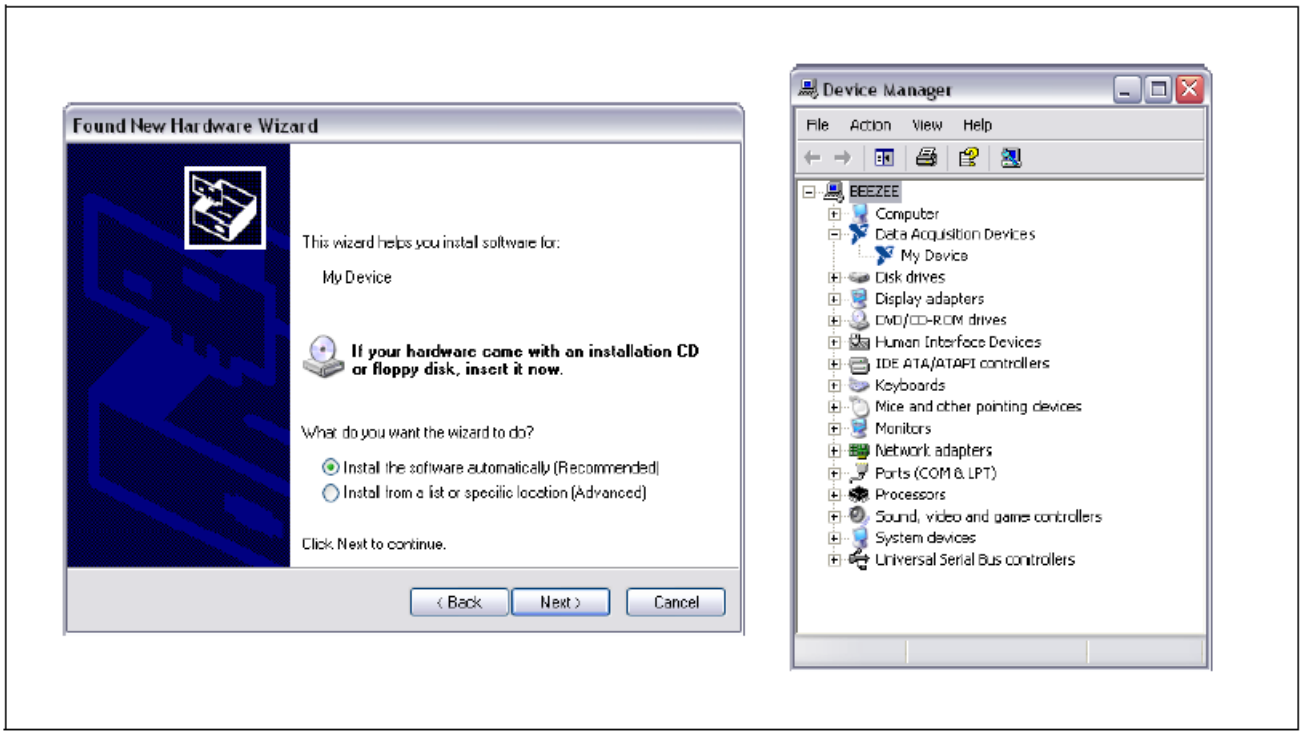


Figure 11. “My Device” in the Found New Hardware Wizard and Device Manager (Windows Vista/XP)

Note Modifying the INF file will not change the USB-621x OEM device name in Measurement & Automation Explorer (MAX).

Windows 2000 Users

Figure 12 depicts how a USB-6211 (OEM) device name appears in the Found New Hardware Wizard and Windows Device Manager.

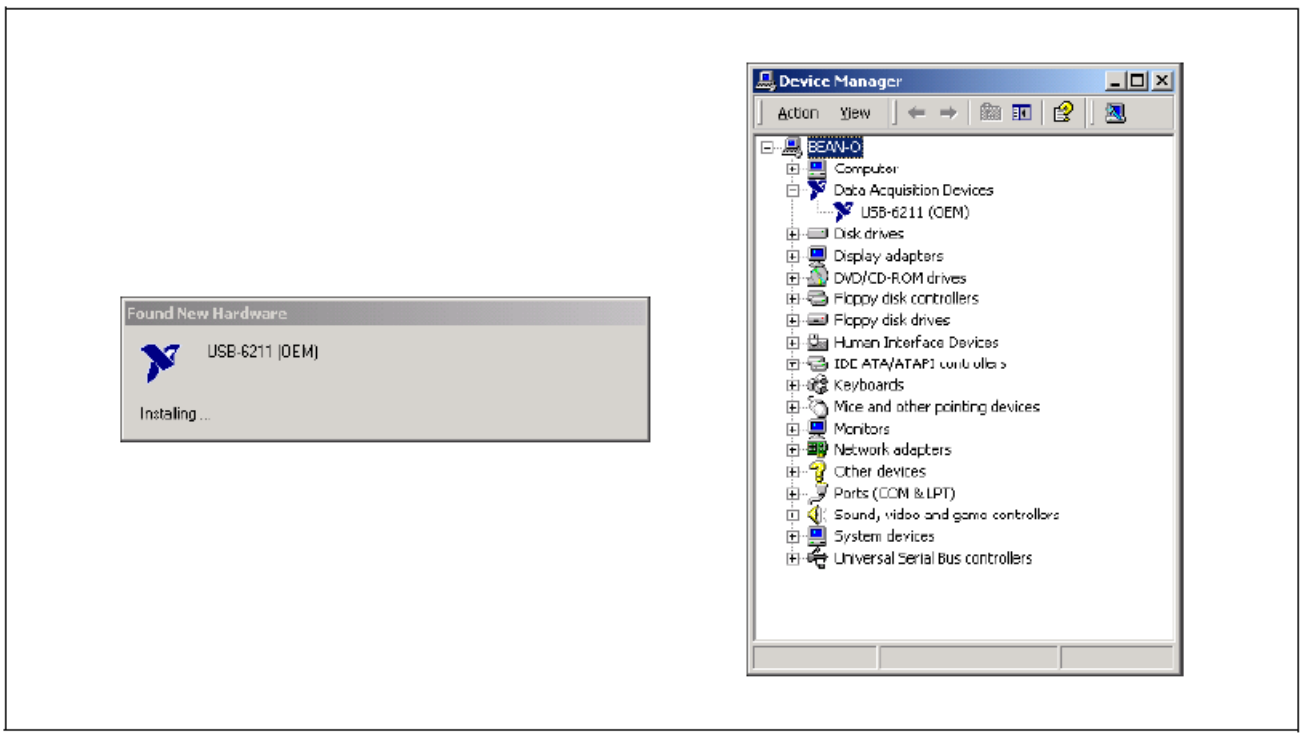


Figure 12. USB-6211 OEM Device in the Found New Hardware Wizard and Device Manager (Windows 2000)
To modify the device name in the Found New Hardware Wizard and Windows Device Manager in Windows 2000,

complete the following steps.

Note You must have NI-DAQmx 8.6 or later installed on your PC.

1. Locate the nimioxsu.inf file in the x:\WINNT\inf\ directory, where x:\ is the root directory where Windows is installed.
   If you want to revert back, save a copy of this file as nimioxsu_original.inf in a different location.
2. Edit the device INF file by opening nimioxsu.inf with a text editor. At the bottom of this file are the descriptors where Windows looks to identify the device. Locate the two lines of text that contain in quotes the descriptors for the device name you are modifying. Change the descriptor on both lines to the new device name, as shown in Figure 13.

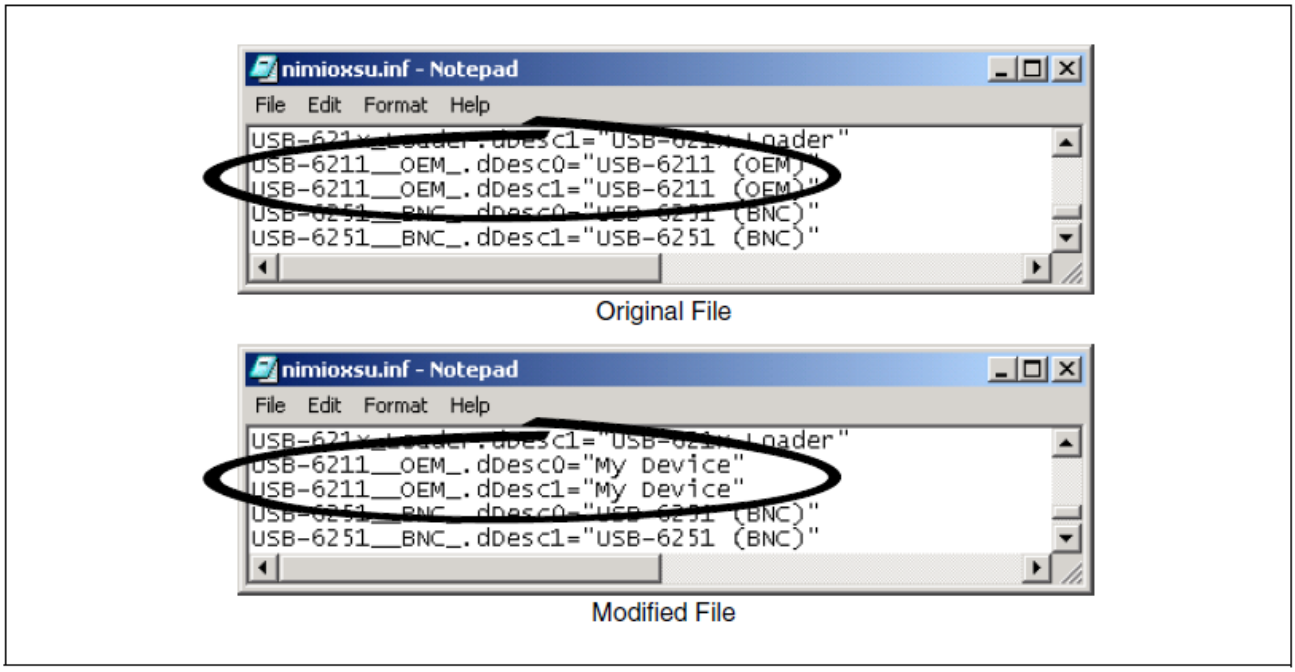


   Figure 13. INF File Descriptors Changed to “My Device” (Windows 2000)
3. Save and close the INF file.
4. Go to the Windows Device Manager, right-click the OEM device under Data Acquisition Devices, and select Uninstall.
5. Disconnect the USB cable from your PC.
   When you reconnect the device, it appears as My Device in the Found New Hardware Wizard and Windows Device Manager, as shown in Figure 14.

Note When the device is initially installed, the Windows alert message may display the following: Found New Hardware: M Series USB 621x (OEM). This message appears for a few seconds until the custom name appears and the Found New Hardware Wizard is launched. This alert message device name cannot be changed.

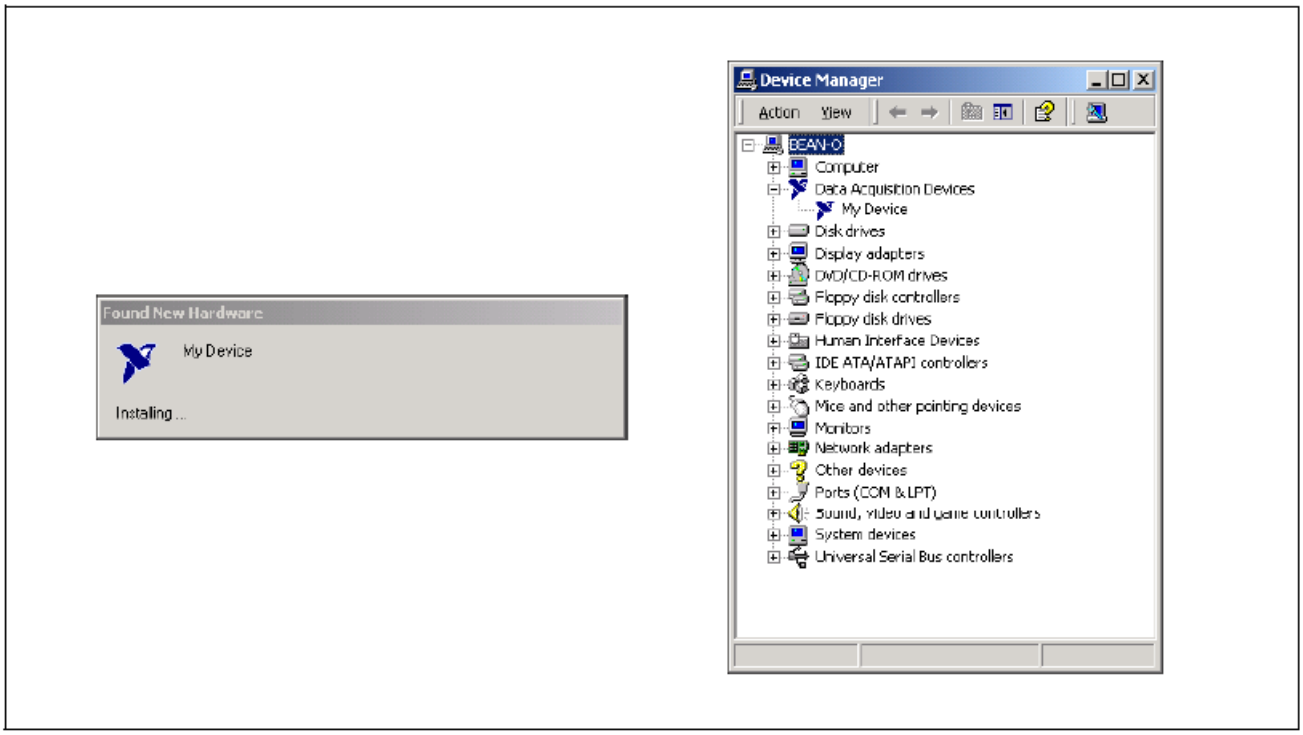


Figure 14. “My Device” in the Found New Hardware Wizard and Device Manager (Windows 2000)

Note Modifying the INF file will not change the USB-621x OEM device name in Measurement & Automation Explorer (MAX).

Documents / Resources

	NATIONAL INSTRUMENTS NI USB-621x OEM Multifunction Input or Output Device [pdf] User Guide USB-6211, USB-6212, USB-6216, USB-6218, NI USB-621x OEM Multifunction Input or Output Device, NI USB-621x OEM, Multifunction Input or Output Device

References

- Engineer Ambitiously - NI
- Legal Information - NI
- Product Documentation - NI
- National Instruments Patents - NI
- USB-6216 National Instruments Multifunction I/O Device | Apex Waves