

**Quick Start
System 3 Installation Guide**

System 3 Quick Start Installation Guide

© 2002 - 2010 Tucker-Davis Technologies, TDT. All rights reserved.

No part of this manual may be reproduced or transmitted in any form or by any means, electronic or mechanical, for any purpose without the express written permission of TDT.

Licenses and Trademarks

Windows, Windows 7, Windows Vista, Windows XP, and Windows 2000 are registered trademarks of Microsoft Corporation.

Printed in U.S.A.

Updated: 12/20/2010 4:34 PM

~

About This Guide

This manual provides installation instructions for System 3 workstations with an Optibit or USB PC interface. Each section of this manual guides you through system installation. You should work through each relevant section in order.

Important! TDT Drivers must be installed before connecting any TDT hardware to your PC.

Note for Gigabit Users: As of version 71 TDT drivers, the Gigabit (non-optical, black and yellow cables) interface is no longer supported. If your system uses a Gigabit (non-optical) interface, please use the Gigabit Install Guide available from TDT.

System Requirements

Operating system:

- The Optibit and USB interfaces require Windows 2000 or above with current service pack.

Note: The Optibit interface supports 64-bit operating systems; however, the USB interface requires a 32-bit operating system.

Expansion slots (most PCs include PCI slots suitable for PO5/PO5e operation):

- The Optibit (PO5) PCI interface cards require a 3.3 Volt compliant PCI slot (v 2.2 or greater).
- The PO5e interface card must be installed in a PCI Express slot. The PO5e card uses a single lane (x1) but may be used in any PCIe slot size (x1, x2, x4, x8 or x16).
- The LO5 ExpressCard interface requires a 34mm (26-pin) ExpressCard slot in your laptop.

Unpacking Your System

System 3 is a modular, programmable platform with modules available in a variety of form factors. You will need to identify the devices in your system and determine what type of PC interface your system uses to complete installation.

The RZ form factor (shown below) uses an onboard Optibit interface.



Many modules are shipped pre-installed in a ZB1PS zBus device chassis (shown below with no modules installed).



The device chassis includes a powerful high speed bus system that distributes communication and power throughout the system. One or two modular devices can be mounted in the chassis' front bays and an interface module must be mounted in the rear bay of any chassis housing a programmable device.

The RM form factor (not shown) uses an onboard USB interface.

Some modules, such as amplifiers and headstages are shipped loose and all of the accessory cables you will need to connect your system are included in the shipping box. These may include fiber optic cables, power cables, USB cables, and blue interconnect cables.

For more information about each device in your system, see the System 3 manual.

The TDT Drivers

The TDT Drivers are required for all programmable devices under computer control. They can be found on the TDT CD supplied with your system or may be downloaded from our website.

Identifying the Hardware

Before you install the TDT drivers you must determine what interface your system uses. The System 3 hardware platform can use an Optibit (FO5) or USB (UZ2) interface. Check the back of the zBUS chassis to determine which interface is installed.

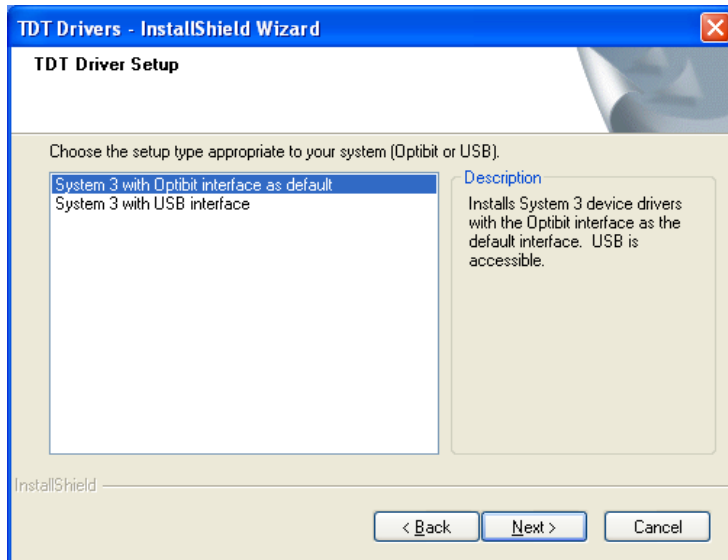
Note: RZ devices use a built in Optibit (FO5) zBUS interface.

Installing TDT Drivers

The TDT Drivers must be installed before connecting any TDT hardware to your PC.

To install the TDT Drivers:

1. Insert the TDT CD in your computer's primary CD or CD/DVD Drive. The TDT CD will start automatically.
2. Click the **TDT Drivers** button to run the TDT Driver and RpvdsEx installation. The InstallShield Wizard opens and will guide you through the installation.



System 3 with Optibit interface as default - Choose this if your system uses an Optibit interface card (PO5/PO5e) or LO5 ExpressCard interface.

System 3 with USB interface - Choose this option if your system uses only the USB interface (UZ2).

3. Restart the computer to complete the driver installation.

After the TDT Drivers have been installed, the system interface and hardware should be setup and tested. After you have installed your hardware you can return to the TDT CD and install any other software included with your system.

Hardware Set-up

The modular nature of the system supports flexible configuration. Most systems are comprised of an RZ device with a built-in Optibit interface and/or devices shipped in a ZB1PS zBUS device chassis with an interface module mounted in the back slot. In either case, the system must be connected to a PC. Setup is dependent on the type of PC interface.

- If you have an Optibit interface card (PO5/PO5e), proceed to the **Installing the Optibit Interface** section on page 6.
- If you have an LO5 Optibit interface, proceed to the **Installing the LO5 Optibit Interface** section on page 9.
- If you have a USB interface, proceed to the **Installing the USB Interface** section on page 17.

Installing the Optibit Interface

Desktop based systems using the Optibit interface (FO5 zBUS modules pre-installed in the ZB1PS device chassis and/or built into the RZ processor) ship with fiber optic connector cables (two 5 meter cables to connect the PO5 or PO5e to the TDT modules and possibly one or more 30 cm cables to connect multiple TDT chassis) and a PCI (PO5) or PCI Express (PO5e) card.

If the computer for your system was purchased from TDT, all your software and hardware is preinstalled so you can skip to **Assembling the zBUS Chassis with Optibit Interface** (page 12).

Installing the PCI Card in the Computer



To install the PO5 or PO5e Optibit Interface card:

1. Turn off the PC and open the cover.



WARNING!: To prevent damage to the PO5/PO5e card and computer, turn off the computer before installing the PO5/PO5e card. Leave the computer plugged into a surge strip or battery backup so that it remains grounded.

2. If you are installing a PO5 card, insert the card into an available 3.3V compliant PCI slot (v 2.2 or greater) in your computer. You may experience communication problems if you install a PO5 card in a PCI-X slot.

If you are installing the PO5e card, insert the card into an available PCI Express slot. Make sure that the card is firmly seated in the slot.

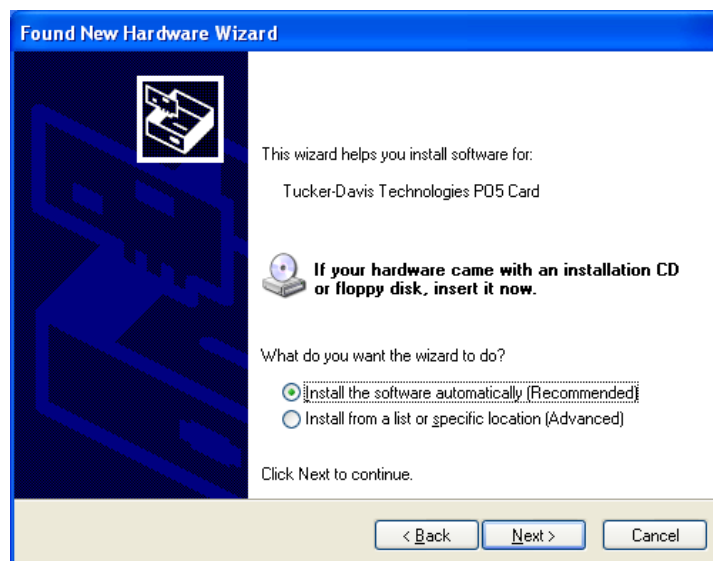
If you are upgrading from the Gigabit interface (PI5/FI5), you must remove the PI5 Gigabit PCI card at this time.

3. Reconnect hardware devices such as a monitor, mouse, and keyboard; as needed.
4. Restart the PC.

Once the computer has gone through its startup sequence, the Found New Hardware Wizard will open.



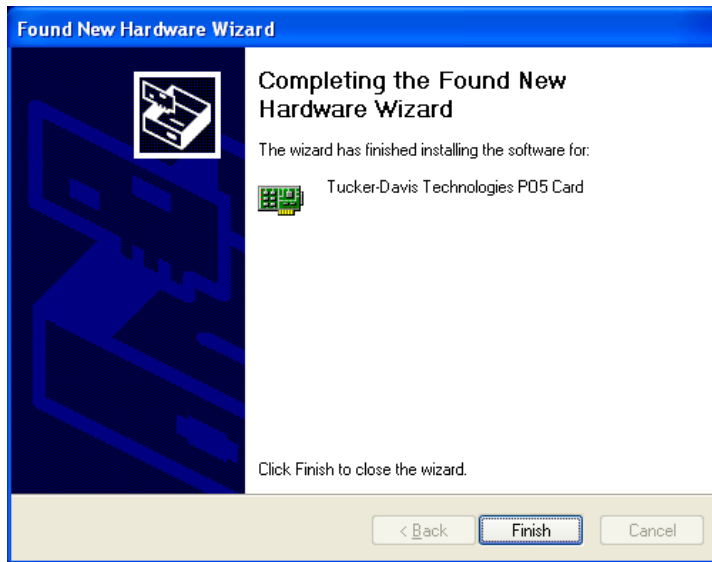
5. On the first page of the Found New Hardware Wizard, select **No, not this time** and click **Next**.
6. On the next page, select **Install the software automatically (Recommended)** option and click **Next**.



The wizard searches for the device drivers.

Note: On 64-bit operating systems the card will be identified as “Tucker-Davis Technologies PO5 Card (64-bit driver)”

7. Click **Finish** on the final page of the Wizard.



The driver installation is complete. Now you can connect the Optibit interface to the FO5 modules in the zBUS device chassis. See **Assembling the zBUS Chassis with Optibit Interface** on page 12.

Installing the LO5 Optibit Interface

Laptop based systems (or any system using an ExpressCard interface) using the Optibit interface (FO5 zBUS modules pre-installed in the ZB1PS device chassis and/or built into the RZ processor) ship with fiber optic connector cables (two 5 meter cables to connect the LO5 to the TDT modules and possibly one or more 30 cm cables to connect multiple TDT chassis), an LO5 ExpressCard adapter, and a power cable.

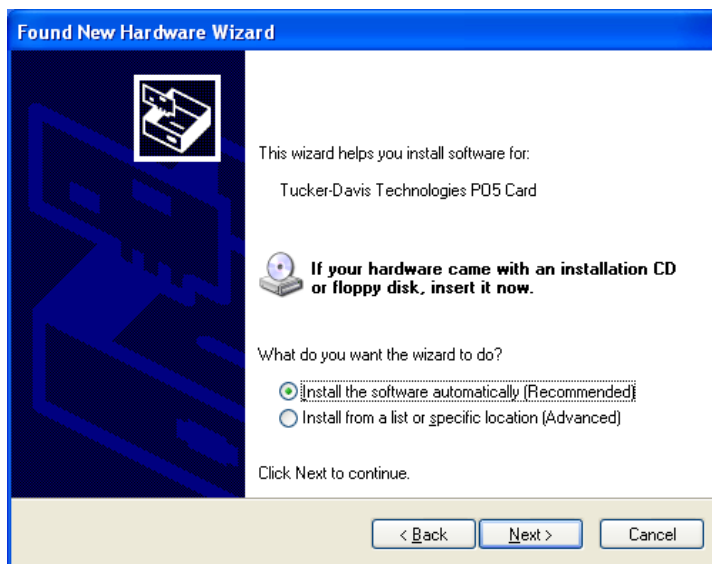


1. Install the TDT drivers and reboot your laptop.
2. Connect the power cable to the LO5.
3. Plug the power cable into a surge strip or battery backup.
4. Power on the LO5. **Note:** the LO5 interface will only work if it is powered on BEFORE it is connected to the laptop.
5. Connect the ExpressCard adapter to the HDMI cable coming from the LO5. The full assembly, before connecting to the laptop, is shown to the right.
6. Plug the ExpressCard into the laptop. In Windows Vista or Windows 7, if Windows is able to install a device driver automatically you'll be notified that the device is ready to use. Skip to the **Assembling the zBUS Chassis with Optibit Interface** on page 12. Otherwise, Windows will prompt you to install the device.
7. On the first page of the Found New Hardware Wizard, select **No, not at this time** and click **Next**.



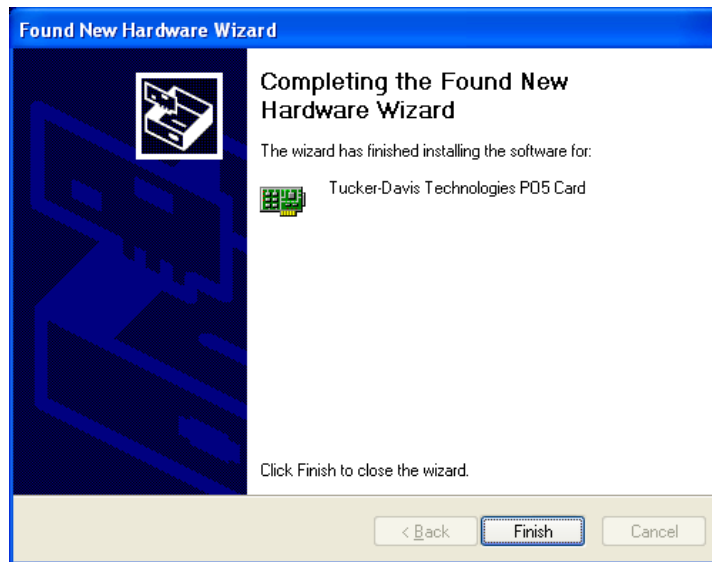


8. On the next page select **Install the software automatically (Recommended)** option and click **Next**.



The wizard searches for the device drivers.

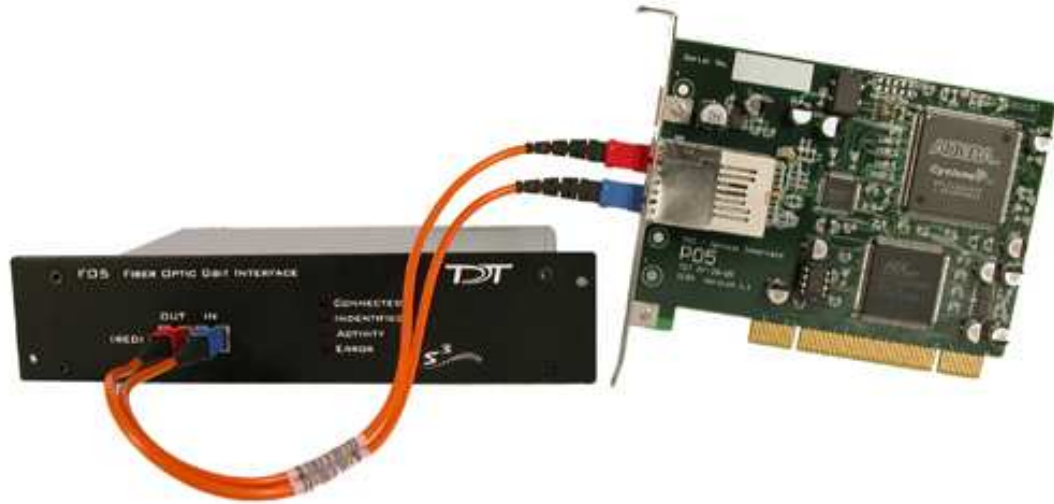
Note: On 64-bit operating systems the interface will be identified as “Tucker-Davis Technologies PO5 Card (64-bit driver)”



9. Click **Finish** on the final page of the Wizard.

The driver installation is complete. Now you can connect the LO5 interface to the FO5 modules in the zBUS device chassis. See **Assembling the zBUS Chassis with Optibit Interface** on page 12.

Assembling the zBUS Chassis with Optibit Interface



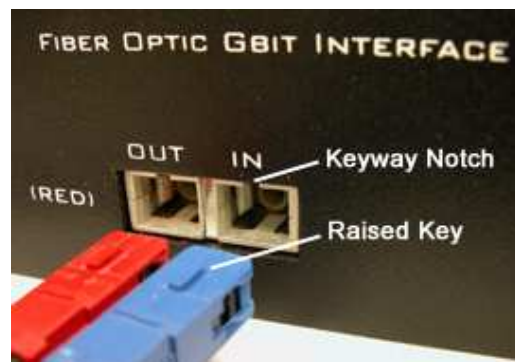
The RZ or zBUS chassis (racks) connect to the PO5/PO5e/LO5 through the Optibit interface to form a communication loop between the PC and the TDT hardware. With the RZ, access to the Optibit interface is found on the back panel. In a zBUS chassis, the Optibit interface is an FO5 module mounted in a rear bay. Use the provided fiber optic cables to make the connections described in the step-by-step instructions below. Be sure to remove the clear plastic protective plugs from the ends of the cables first.

The fiber-optic cables have raised keys on one side of the connector. There are also keyway notches on the inside of the connectors on the RZ or FO5 module and the PO5/PO5e/LO5 interface; the fiber-optic cable should be oriented so that the keys on the cable connectors line up with the keyway notches on the modules.

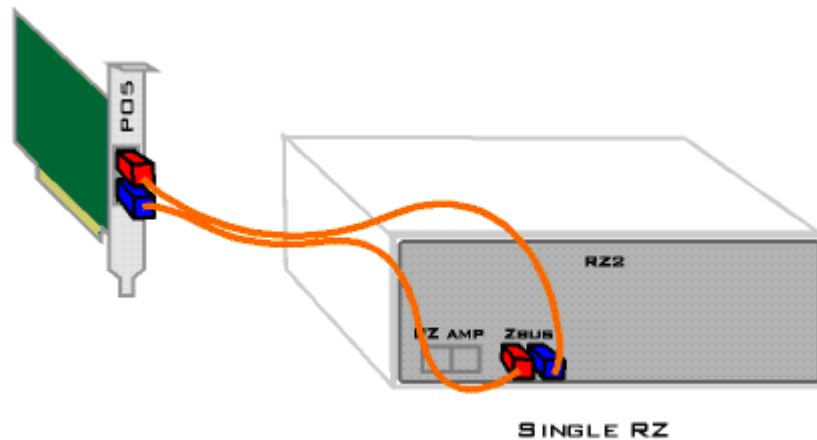
When connecting the fiber optic cable, grasp the cable by the red or blue cap and push firmly. You will hear a click when the cable is connected securely. When disconnecting, grasp the colored cap and pull straight out. You will first notice the cap sliding backward slightly. This unlocks the cable and allows it to be removed. This locking connection prevents accidental disconnects.

To connect one Optibit interface (see image on page 13 for complete diagram):

1. Connect the red end of a 5-meter cable to the output of the PO5/PO5e/LO5. The PO5/PO5e is marked with a red dot labeled OUT. The LO5 has the text "{RED}".
2. Connect the other end of this cable (blue) to the input on the Optibit interface (labeled IN).
3. Connect the red end of the second 5-meter cable to the output of the Optibit interface (labeled OUT).

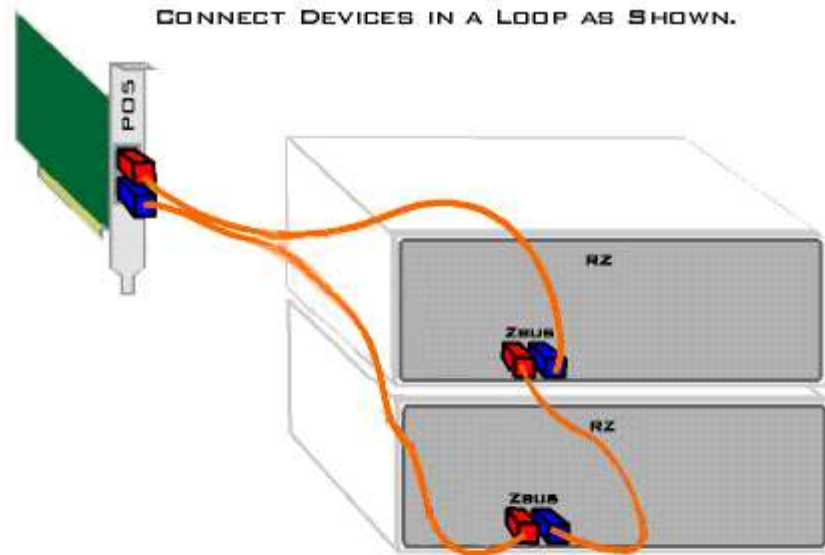


4. Connect the other end of the second cable to the input of the PO5/PO5e/LO5 (not labeled).

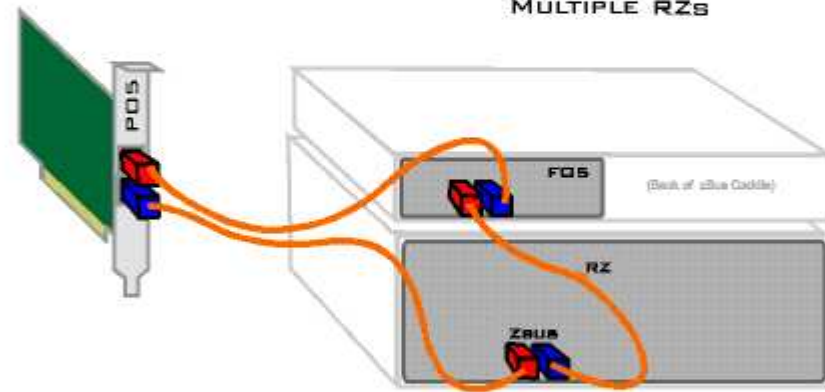


To connect multiple Optibit interfaces (see image on page 14 for complete diagram):

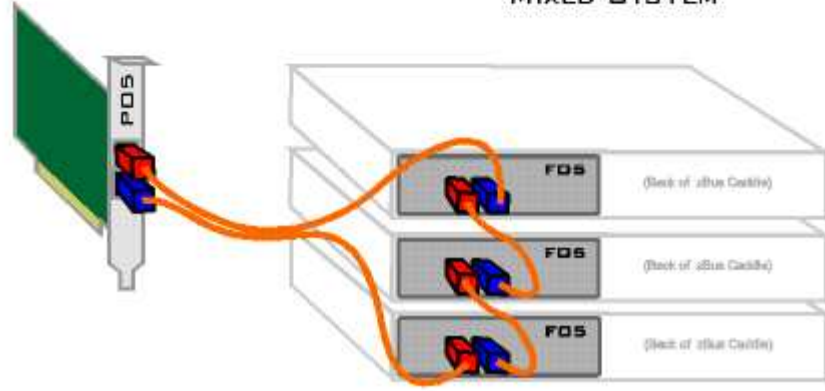
1. Connect the red end of a 5-meter cable to the output of the PO5/PO5e/LO5 (marked with a red dot labeled OUT).
2. Connect the other end of this cable (blue) to the input on the first Optibit interface (labeled IN).
3. Connect the red end of a 30 cm cable to the output of the first Optibit interface (labeled OUT).
4. Connect the other end of the first 30 cm cable (blue) to the input on the second Optibit interface (labeled IN).
5. Repeat with 30 cm cables for each additional Optibit interface.
6. Connect the red end of the second 5-meter cable to the output of the last Optibit interface (labeled OUT).
7. Connect the other end of this cable (blue) to the input on the PO5/PO5e/LO5 (not labeled).



MULTIPLE RZs



MIXED SYSTEM



MULTIPLE R/P/RX CADDIES

Powering the Optibit System On

To test the Optibit interface, turn on the PC, plug the RZ or zBUS device chassis power cable(s) into a surge strip or battery backup, then power on. The zBUS chassis do not need to be powered on in any particular order.

The RZ devices have a blue indicator light to show that the device is powered on. The RZ2 LCD screen will display interface connection information, however, other RZ devices do not display this information. zBusMon can be used to test the device connection.

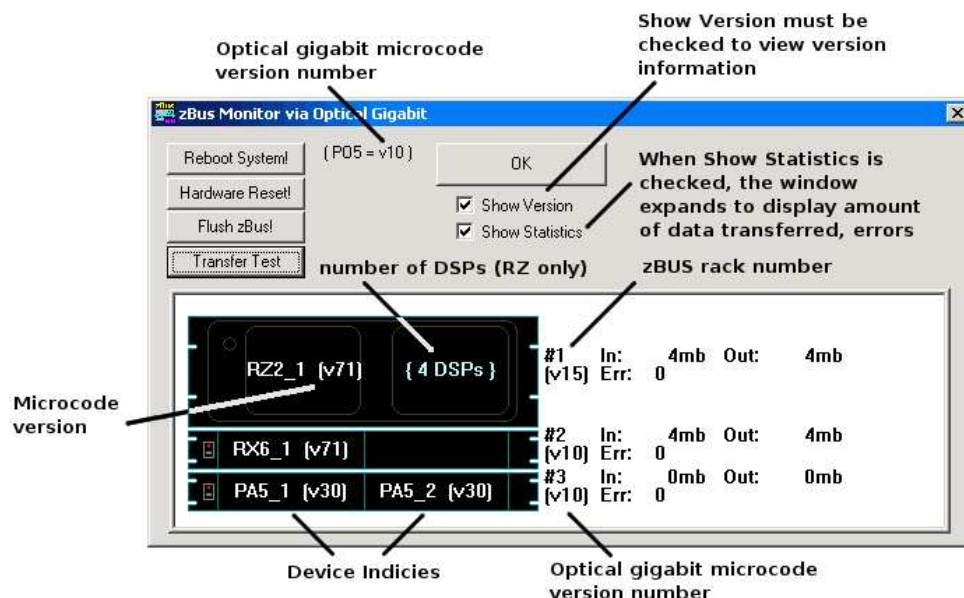
Once a zBUS chassis is powered on, the green indicator light on the power switch will flash regularly (~1 Hz) until communication is initiated by TDT software, such as zBUSmon, RPvdsEx or OpenEx. After this initial communication, the green indicator light will glow steadily. You will also notice the green indicator light pulsing when data is being transferred to or from the zBUS chassis.

Testing the Optibit Interface

When all devices are connected correctly, open the zBUSmon program.

To open zBUSmon:

- Click the **Start** button on the Windows taskbar, point to **Programs**, point to **TDT Sys3**, and click **zBUSmon**. Alternatively, run the **zBUSmon** shortcut that installs to the Desktop.



This program allows you to test the connection from the PC to the System 3 hardware. The hardware diagram displays all zBUS chassis and programmable devices (e.g. RP2.1, RX6, RZ2 and PA5) that are connected to the PC. The hardware diagram will not show most non-programmable devices (e.g. HB7 or SM5), however, non-programmable devices that require a connection to the PC (e.g. RA8GA, HTI3) will appear as an empty zBUS chassis.

System 3 Installation Guide

If you have an RZ device in your configuration the number of DSPs installed on that RZ device will be displayed.

The programmable devices are given a logical index starting with 1 so that multiple devices of the same type can be distinguished in software. This is the number in the device name after the underscore. The logical number of the zBUS chassis, displayed to the right of the chassis, reflects the order of the connections between chassis.

When the **Show Version** check box is selected, the microcode version of the interface and of each programmable device is displayed. The microcode version of all real-time processors (RZn, RXn, RPx, etc.) must match the current version of TDT drivers that is installed on the PC. If you installed the drivers that came with your system then your devices were preprogrammed with the correct microcode. If you update your TDT drivers in the future, you must also manually update the microcode for each of your real-time processors using **System 3 Device Programmer**. See “Updating Your System” on page 20 for more information.

Note that the interface version number (v10 or v15) is fixed and can not be changed by the user. The microcode on the PA5 programmable attenuators (v30) is also fixed.

When the **Show Statistics** box is checked, the amount of data transferred from the TDT modules to the PC and from the PC to the TDT modules and error status is displayed. If you see an error value other than 0, click **Hardware Reset!** to reset all connected hardware.

A Transfer Test can be used to test data transfer both to and from the PC.

To perform a transfer test:

- Ensure the **Show Statistics** check box is selected.
- Click the **Transfer Test** button in zBUSmon.

If successful, you should see a “Test Passed” message. The amount of data transferred to and from the PC will be displayed with no errors.

Installing the USB Interface

Important!: The TDT drivers must be installed before connecting the zBUS chassis to your PC (see page 2).

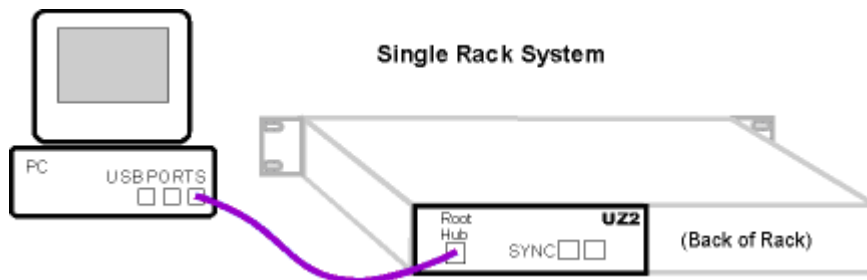
When using the USB interface, a UZ2 interface module is required for every chassis which houses a programmable module such as the RX Multiprocessor modules or the PA5 Programmable Attenuator. The UZ2 is installed in the back bay of the chassis and should be connected to the PC USB port. If you have multiple chassis housing programmable modules you will need an available USB2.0 port on the host PC for each UZ2 in a multi-chassis system. We typically recommend upgrading to an Optibit interface if a system requires more than three chassis.

Note: The USB 2.0 interface requires a 32-bit operating system, such as 32-bit Windows 7, 32-bit Windows Vista (SP2), 32-bit Windows XP (with Service Pack 3) or Windows 2000 (with Service Pack 5).

Note: The UZ2 is designed for USB 2.0 ports. Some systems might use the UZ1 and UB4 interfaces designed for USB 1.1 ports. Connections for 2.0 and 1.1 compatible devices are similar; however, each system should use EITHER the UZ2 OR the UZ1/UB4 configuration. The two groups of devices should not be combined. If you are unsure how your system should be configured, contact our technical support staff for assistance. Also note that the UB4/UZ1 USB interfaces should not be used with the high performance processors, such as RX5, RX6, RX7 and RX8.

Connecting the Interface to the Host PC

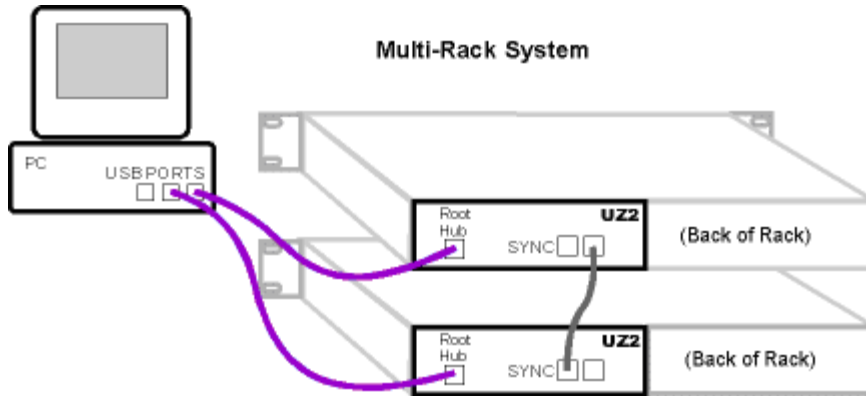
To connect a device chassis (with UZ2 connector on the back of the chassis), use the supplied A-to-B type USB cable to connect the UZ2 chassis to the USB port on your computer.



Using the UZ2 Sync

Each USB module has its own clock which will drift relative to each other. The Sync (see diagram below) allows users to synchronize several modules that are mounted in different device chassis. The Sync line uses the clock from one USB module, the master, to synchronize the clocks across all zBUS device chassis.

System 3 Installation Guide



Connect the Sync Out of the master clock to the Sync In of the slave with a short patch cable.

To connect several device chassis, daisy chain the connections between the slave chassis. When the Sync lines are connected correctly the LED to the left of the Sync connectors should be lit on each slave devices. The LED on the master will remain unlit. The LED should only flash when the Sync lines are not connected.

Sync LEDs	Indicates ...
Flashing (on slave)	Connected incorrectly
Master device not lit and slave devices lit	Connected correctly
No devices lit	Not synced to any device

Starting the zBUS Hardware System

After connecting the zBUS chassis, plug the power cable(s) into a surge strip or battery back-up and turn on each chassis. When the chassis are turned on for the first time, the computer recognizes the TDT hardware as a new device and searches for and loads the USB driver for TDT System 3. The Found New Hardware wizard may appear twice for each zBUS chassis in your system. It is important that you allow Windows to install the driver both times.

Once powered, the green indicator light on the power switch of the zBUS chassis will flash regularly (~1 Hz) until communication is initiated by TDT software such as zBUSmon, RpvdsEx or OpenEx. After this initial communication, the green light will glow steadily. You will also notice the power indicator light pulsing when data is being transferred to or from the zBUS rack.

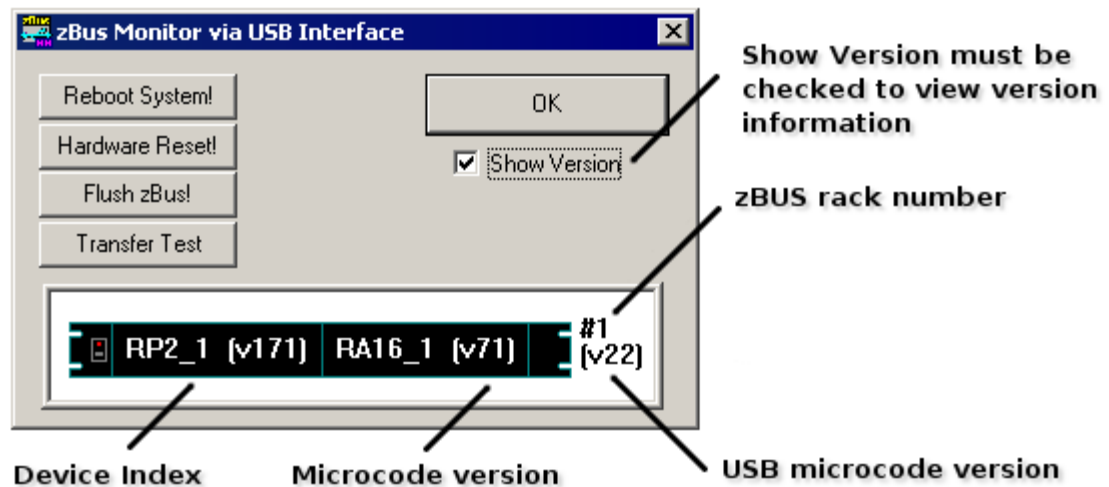
Testing the USB Interface

When all devices are connected correctly open up the zBUSmon program.

To open zBUSmon:

- Click the **Start** button on the Windows taskbar, point to **Programs**, point to **TDT Sys3**,

and click **zBUSmon**. Alternatively, run the **zBUSmon** shortcut that installs to the Desktop.



This program allows you to test the USB connection from the PC to the System 3 hardware. The hardware diagram displays all zBUS chassis and programmable devices, such as the RP2.1, RX6 and PA5. The hardware diagram will not show most non-programmable devices, such as the HB7 or SM5, however non-programmable devices that require a connection to the PC (e.g. RA8GA, HTI3) will appear as an empty zBUS chassis.

The programmable devices are given a logical index starting with 1 so that multiple devices of the same type can be distinguished in software.

Important!: The device indices are dependent on the order in which the devices were powered on and recognized by the PC. Software applications connect to the devices by name and index value. If you have multiple devices of the same type it is very important that you power on the devices in the same order every time so that the device indices will be consistent in software.

The rack number of the zBUS chassis, displayed to the right of the chassis, reflects the order in which the USB devices were powered on.

When the **Show Version** check box is selected, the microcode version of the interface and of each programmable device is displayed. The microcode version of all real-time processors (RXn, RPx, etc) must match the current version of TDT drivers that is installed on the PC. If you installed the drivers that came with your system then your devices were preprogrammed with the correct microcode. If you update your TDT drivers in the future you must also manually update the microcode for each of your real-time processors using **System 3 Device Programmer**. See “Updating Your System” at the end of this guide for more information. Note that the USB microcode version number (v22) is fixed and can not be changed by the user. The microcode on the PA5 programmable attenuators (v30) is also fixed.

A Transfer Test can be used to test data transfer both to and from the PC.

To perform a transfer test:

- Ensure the **Show Statistics** check box is selected.

System 3 Installation Guide

- Click the **Transfer Test** button in zBUSmon.

Note: When using the UZ2 USB 2.0 interfaces, clicking the Hardware Reset button in zBUSmon will change the version numbers to 65535 and a transfer test will fail. After using the Hardware Reset button wait 20 seconds, then close and reopen zBUSmon. The correct version numbers should be displayed.

Updating Your System

Typically, when adding new modules to an existing system, you will need to update the microcode on existing programmable devices to match the latest version of drivers supplied with your new modules.

About the Microcode

The microcode is low-level software that resides in flash memory on the System 3 processor devices. The microcode contains the DSP instructions for the RPvdsEx processing components. Because the System 3 design allows users to update this software quickly and efficiently, users can take advantage of the latest software tools available without purchasing new equipment or sending devices to our manufacturing facility for upgrades.

When should the microcode be updated?

Every time a new version of TDT Drivers is installed on the host PC, the microcode should be updated on all processors in the system. This includes programmable devices that may have been purchased prior to your new system. New versions of the files needed to update the microcode are always included in the TDT Drivers installation.

How is the microcode updated?

Users must update the microcode using the System 3 Device Programmer (PrgG21K.exe). This program is copied to the host PC during TDT Drivers installation and is stored in the following directory: C:\TDT\RPvdsEx\RPProg. For detailed instructions on how the microcode is updated for specific TDT processors check the Updating Microcode FastFacts guide that was included with your system.

Removing Modules from the zBUS

Make sure the zBUS is powered off. Unscrew the thumbscrews on the corner of the module faceplate then firmly pull the module out of the chassis. It is a snug fit so you may need to use a thin flathead screwdriver to help pry it out. If the module has front-panel BNC connectors then a BNC 'T' connector makes a good handle for removing the device.

Adding Modules to the zBUS

Make sure the zBus is powered off. To add a module, insert the module into an empty bay and push straight back until it seats onto the connector. Secure the module in place with the thumbscrews.

Hardware Warranty

TDT System 3 hardware carries a five-year warranty on parts and labor. Custom hardware carries a one-year warranty on parts and labor. ES1 and EC1 carry a two-year warranty. Contact TDT to obtain an RMA (return merchandise authorization) number before returning any hardware. Repairs are usually completed within one week of receipt.

PDF Manuals and Electronic Documents

The TDT manuals include technical details about your system.

Every TDT driver installation includes the following two manuals:

- System 3 Manual, for information on system hardware.
- RpvdsEx Manual, for information on processor control.

The latest electronic documents and PDF versions of all TDT manuals are always available on our website at <http://www.tdt.com/downloads/sys3docs.htm>.

To view TDT manuals or electronic documents after installation:

- After installation, TDT Manuals are stored in the default help directory:
C:\TDT\TDTHelp\

Installation Anomalies and Tech Notes

A complete listing of anomalies is maintained in the Support area of the TDT Website. It can be found at: <http://www.tdt.com/support.htm>

Troubleshooting

Contact TDT at 386-462-9622 or support@tdt.com if you have any installation issues.