Big River NTX-16
Real-time Disk System

Installation and User Manual

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About This Manual

This manual is intended to serve the following purposes:

* to provide an overview of the StreamStor NTX-16 Real-Time Storage Controller;
* to act as a guide for hardware installation;
* to act as a reference for the operator;
* to provide guidance on software capabilities and choices; and
* to provide specifications, operational, non-operational and environmental.

We suggest that you periodically check the Conduant web site for the most recent software updates, application notes, and technical bulletins.

If you are unable to locate the information you need, please feel free to contact us by e-mail or phone.

About the NTX-16 Real-Time Storage System

Thank you for purchasing the Conduant NTX-16 Real-Time Storage System. Your StreamStor based system is a disk-based, real-time recording system. External data sources can send or receive data over the PCI Express (PCIe) interface or using external interfaces directly supported by the NTX-16. The NTX-16 can also operate standalone (Ethernet) or connected directly to a host computer using cabled PCI Express. The system consists of a 4U chassis housing a StreamStor Amazon Express controller and high performance disk drives. Included with your system are the device drivers, software development tools, and additional utility software required to adapt the system to your specific application. The NTX-16 system may include an optional mezzanine board to provide external data interfaces for data recording and playback.

The PCI Express ("PCIe") interface is a high performance I/O interface designed for attaching peripheral devices to computer systems. It is found in computing systems from many different manufacturers and is supported by most major operating systems. The NTX-16 system includes a cabled 8 lane PCIe interface that provides a cabled bridge to the computer PCIe bus. By utilizing the PCIe interface instead of a proprietary interface, the NTX-16 provides an open platform recording system accessible from software applications running the Windows or Linux operating system on the host computer. The PCIe interface also provides a common interface to thousands of PCI Express IO boards for direct peer-to-peer data streaming in order to achieve the highest performance and reliability of transfer. The NTX-16 provides a large capacity and cost effective alternative to system memory or other storage solutions for these applications.

The NTX-16 System is able to receive data over the PCIe bus directly from the data acquisition device at very high average (sustained) data rates. Virtually all of the available PCIe cards that can record data to system memory are compatible with the NTX-16. Only minor software modifications are generally required to redirect data to the NTX-16 PCIe interface from a PCIe IO board. This capability is often in the software provided by the manufacturers of such data acquisition devices.

The StreamStor technology used in the NTX-16 was specifically designed to record sequential data without interruption at very high data rates. This is in contrast to traditional storage systems that are designed for data processing purposes and cannot sustain these high data rates. Unlike typical computer disk storage solutions that are designed for optimum performance during random data reads and writes, StreamStor has been designed for optimum performance in sequential read and write operations. The StreamStor system has also been designed to operate without host computer intervention. This eliminates any bottlenecks or interruptions in the data stream due to heavy computer loads or delays.

The NTX-16 system includes the capability of adding daughter (mezzanine) boards to provide different types of external interfaces such as the SerialFPDP interface. Available interfaces include FPDPII, Serial FPDP (optical), SerialLiteII and 10 GigE. These daughter boards move data to/from the NTX-16 system at very high data rates with very little overhead. This provides a seamless method of interfacing to nearly any external data interface for high performance recording. Conduant can also develop custom daughter boards for unique or proprietary interface requirements.

The StreamStor SDK includes the device drivers and an API (Application Programming Interface) to provide a smooth integration of the NTX-16 with the data acquisition device and/or analysis software. Many examples are provided with the SDK and more are available upon request.

The NTX-16 system is a flexible and powerful platform for high performance recording applications. The system also has the capability to provide a web based interface to allow command/control from nearly any networked computer. Many custom and unique capabilities are available that are beyond the scope of this documentation so please contact Conduant with your questions and special requirements.

Specifications

Weight	70 lbs. + Drive weight (Typically 1.7 lbs. per drive)
Size	H 6.0" (15.24 cm) x W 19.0" (48.26 cm) x D 21.5" (54.61 cm)
Power Supply rating	100 – 240v ~, 400W, 50-60 Hz (total for both power supplies) ☞ ***NOTE: AC supply variations are not to exceed ± 10% of the rated 100-240v ~ supply voltage.***
Environmental Note that environmental specifications will vary with disk drive selection.	**Operating:** **Indoor use only** Temperature: 5C to 50C operating Shock (half sine wave): 300G/2 ms, 160G/1 ms Ordinary Protection (not protected against harmful ingress of moisture) Maximum Relative Humidity: 5 – 95% relative humidity, non-condensing **Non-Operating:** Storage Temperature: -40C to 65C Transportation Temperature: -40C to 65C Shock (half sine wave): 1000G/1 ms Altitude: 0 to 2,000 meters
Pollution Degree	2 per EN 61010-1
Capacity	Varies with disk model, up to 16 internal 3.5" SATA disk drives (magnetic or solid-state)
Interfaces	PCIe (8x cable), 10/100 Ethernet Various data interfaces including FPDP2, Serial FPDP (optical), High Speed Copper

Components

The NTX-16 real-time storage system generally consists of the following components:

- NTX-16 System Chassis
- PCIe host board (optional)
- External AC power cords
- PCIe Cable (optional)
- StreamStor Software Development Kit (SDK)
- User Manual(s)

☠ CAUTION: *Please read the entire installation section before starting to install the NTX-16 hardware. This manual assumes that the user is knowledgeable and comfortable with basic computer work, including installation and safety considerations. If you are unsure as to how to proceed, please contact Conduant support.*

Unpacking / Handling

Carefully inspect all shipping packages for any sign of damage. In particular, look for wrinkled or bent corners, holes, or other signs of bad handling or abuse. If you notice any damage to the packaging, immediately open the boxes and inspect the contents for damage. Pay close attention to the components near the area where the packing material was damaged. Report any damage to the carrier and Conduant immediately.

Disk Drives

Hard disk drives such as those that have been included within your system are susceptible to damage from excess shock and careless handling. Please observe the following handling precautions:

* Allow the disk drives to reach room temperature BEFORE applying power to the system. This may take several hours depending on shipping conditions. Disk drive damage can occur if the system is powered while the drives are at temperature extremes.

* Do not drop, jar or bump the system. Even setting the chassis on a hard surface too roughly can damage the recording surfaces, heads, or other mechanical components inside the disk drives.

PCIe Host Board (optional)

The NTX-16 system is shipped with an optional PCIe host board and cable in a specially designed box or bag to prevent electrostatic damage to the board. There should be separate installation instructions included with that board. To avoid damage in handling the board, take the following precautions:

* Ground yourself with a grounding strap or grasp a conductive, grounded object to dissipate any static charge while handling the board.

* Always store the board in its antistatic package when not installed in a computer system.

* Inspect the board carefully before installing in the computer. Do not install a damaged board into your computer.

* Never touch any exposed connector pins or component leads.

* Avoid bending or twisting the board.

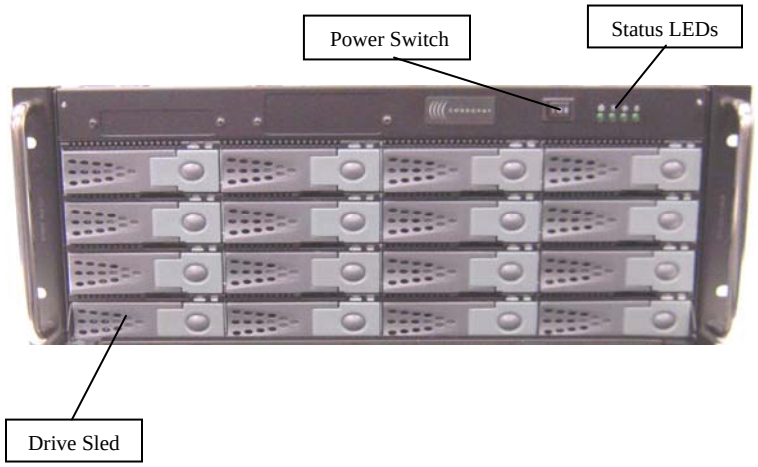
Planning Your Installation

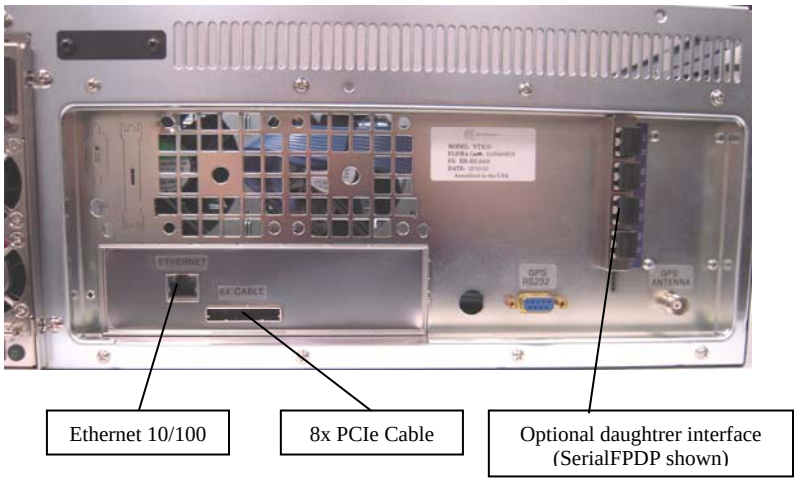
The NTX-16 is designed to allow rack mounting or table top operation. There are optional mounting brackets available to adapt the unit to a standard EIA equipment rack. Please contact your Conduant sales representative for more information.

All electrical connections are designed to come off the rear panel.

Basic Operation

During device initialization (performed when the system is first powered on), the power LED may briefly extinguish until the disk drives are powered on. The power switch has 3 positions, Standby, Off, and On. In standby the system will remain off until the host is powered on. The PCIe cabled connection must be installed and connected for this functionality. In the "On" position the system will be powered on immediately regardless of the host power. The "Standby" position is symbolized on the power switch with the "I" symbol, "On" is symbolized with "II" and "Off" is symbolized by "O".





Upon completion of device initialization, the power and ready LED's should be illuminated although it may take an additional 30 seconds before the system will respond to commands.

The NTX-16 can be connected to a host system with Ethernet or a PCIe cable connection. When using the PCIe interface, the NTX-16 will operate identically to having a StreamStor Amazon Express board installed in the system. Either interface can

be used to provide command/control to the system. Note that the Ethernet port is NOT intended to be used for data read or write.

The TX and RX ports that are labeled as "Link 1" on the NTX-16 are equivalent to "L0" or "Link 0" on the PCIe host card. The TX and RX ports that are labeled as "Link 2" on the NTX-16 are equivalent to "L1" or "Link 1" on the PCIe host card.

Connections

☠ **CAUTION:** ***Over-flexing the circuit board will damage the host adapter.***

1. Ensure that both the host PC and the NTX-16 are powered off.
2. Plug in the PCIe cable.
3. Plug in the Ethernet cable.
4. Turn the NTX-16's power switch to either the on or standby position.
5. Power on the host PC and make sure that both the standby and power LED's are illuminated green on the NTX-16.

☞ **NOTE:** ***The NTX-16 must be powered on or in standby mode BEFORE the host PC is powered on, otherwise the host PC will NOT recognize the NTX-16/StreamStor.***

Operation

Upon completion of the host PC boot process, install the SDK if it is not already installed. Windows users may be required to install a driver via the driver wizard. If so, point the driver wizard to the SDK DVD and follow the prompts. Upon completion of the installation routine, run the StreamStor Config-Test utility.

Network Connectivity

The Big River NTX-16 is equipped with a 10/100 Ethernet port which allows command and control of the NTX-16 over a standard TCP/IP network. Note that this port is not intended or designed for data movement to/from the unit. The NTX-16 can be assigned a static IP address or can be configured via DHCP. This interface is not required if a PCIe interface is available.

Configuration

The NTX-16 Ethernet port is configured at the factory with a static IP configuration of:

- IP address: 10.1.249.101
- Port: 10001

- Netmask: 255.255.255.0
- Gateway: 10.1.249.254

The serial port settings must be:

- Baud rate: 57600
- Data bits: 8
- Parity: N (none)
- Stop bits: 2

There are two alternatives for configuring the NTX-16 Ethernet port. For Windows operating systems, it is suggested that you use the Lantronix installation/configuration tool. For other operating systems you must use telnet as described below to configure the network settings. Once you have installed the StreamStor SDK you will find a sub-directory named "support" which contains the Lantronix Windows configuration tool and a user manual for this tool. To install this tool simply execute the program DI_Web.exe from the "support" directory. This will install the tool onto your system and allow configuration of the NTX-16 network interface. See the Lantronix manual "Xport_userguide.pdf" in the StreamStor SDK directory "Docs" for further instructions on using this tool to configure the NTX-16.

For either installation method the NTX-16 must be connected to the network with a standard CAT6 cable. A direct connection to a host with a loopback cable is also possible for configuration purposes. Note that the NTX-16 must be on the same network segment (no router) to perform this configuration.

Perform the following steps to modify the NTX-16's default IP address and configuration using a telnet connection:

1. Connect the NTX-16's Ethernet port (via CAT6) to a standard 10/100 Ethernet hub, switch, or to a host PC via a loopback cable. Note that this configuration must be performed with the two devices on the same network segment.

2. Open a command prompt (Start->Run "cmd") and type "telnet 10.1.249.101 9999". 9999 is the special NTX-16 port number for telnet configuration. This is NOT the port described above.

3. Press Enter when prompted and the main menu will appear.

4. Press 0 to enter "Server Configuration" and follow the prompts to enter a new static IP address. If DHCP configuration is desired enter 0s for the IP address and follow the prompts.

5. When finished press 9 to save and exit.

The following screen shot shows the IP address configuration being changed from the default static IP assignment to a DHCP configuration:

The following screen shot shows the static IP address being changed from the 10.1.249.92 to 10.1.249.90:

Perform the following steps to change the default IP port number:

1. Connect the NTX-16's Ethernet port (via CAT6) to a standard 10/100 Ethernet hub, switch, or to a host PC via a loopback cable.

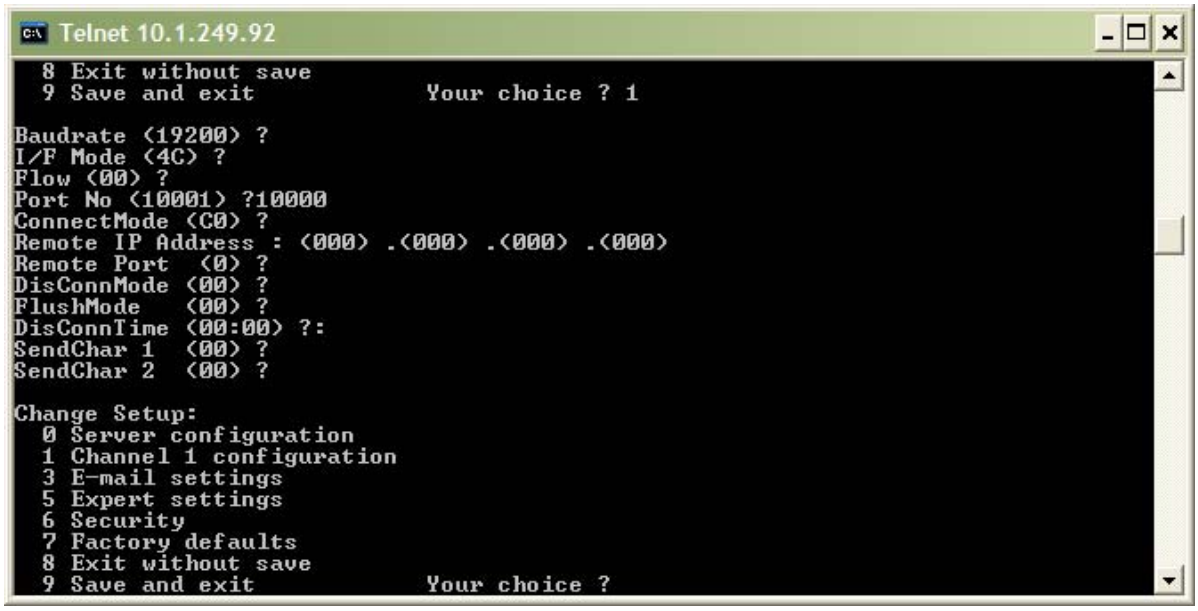
2. Open a command prompt (Start->Run "cmd") and type "telnet x.x.x.x 9999" where x.x.x.x is the default IP address (listed above). 9999 is the special NTX-16 port number for telnet configuration. This is NOT the port described above.

3. Press Enter when prompted and the main menu will appear.

4. Press 1 to enter "Channel 1 configuration." At each prompt press enter to leave it blank except for the "Port No" prompt. Enter a new port number at this prompt and press enter. The following screen shot shows the port number being changed from the default 10001 to 10000.

5. When finished press 9 to save and exit.

The following screen shot shows the TCP/IP port number being changed from the default (10001) to 10000:



Installing the Software

Your system was shipped with the Software Development Kit on DVD. Install the software prior to installing the hardware if possible. On Windows systems, when ready, run the `setup.exe` program on the DVD to start the installation process.

Plug and play operating systems such as Windows will detect the StreamStor board if the NTX-16 is connected via the PCIe bus. If detected, the operating system will attempt to configure the StreamStor using the hardware plug and play wizard program. The required installation information file for plug and play installation is included on the DVD. Make sure the plug and play wizard includes the DVD drive in its search so that the StreamStor drivers will be properly installed. You should not cancel the plug and play wizard since this can create hardware conflicts in the system when using the StreamStor controller. Note that the `setup.exe` program must still be executed to install the StreamStor SDK onto your system.

The software installation procedure will install the device drivers, library files, example programs and all other components of the SDK onto your system.

The StreamStor SDK does not include software interfaces or drivers used for the control of data acquisition cards made by other manufacturers. However, it does include some sample programs to help in your software development efforts. Other drivers and examples may be available depending on your choice of data acquisition hardware. Contact Conduant support for more information.

Always review the **`readme.html`** file included with the SDK for the latest information not included in this manual. Also, check the Conduant web site periodically for additional information.

Software Functionality

The NTX-16 StreamStor controller supports recording and playback (or read) from the PCIe bus or a daughter board interface.

SDK and Network Operation

Most API commands will work in an identical fashion in either Network or PCIe modes. The main exception is the open command. `XLROpen` is used when the NTX-16 is connected to the host over PCIe. `XLRNetOpen` is required when the NTX-16 is connected to the host PC over Ethernet/TCP/IP. More details on each command can be found in the function reference section of the StreamStor SDK Users Manual.

Daughter Boards

The NTX-16 StreamStor controller may include the capability to add a daughter board (mezzanine) with its own connectors and electronics to provide an alternate method of transferring data into and out of StreamStor. These additional paths offer several advantages, including

- freedom from interaction with other devices on an arbitrated bus such as PCIe;
- the reduction or elimination of bus FIFO's that may otherwise be required to interface with an arbitrated bus;
- full isolation of the data path from operating system and computer hardware facilitates predictable and repeatable behavior;
- better or additional control over timing and other parameters;
- higher bus utilization efficiency due to a non-arbitrated nature;
- access to interface signals without risk of crashing host computer;
- higher data rates than the most common PCIe buses support; and
- the potential for dual-port operation (simultaneous transfers on both PCIe bus and external ports) while recording or playing back.

If an optional daughter board is ordered with your Amazon Express board, it will be preinstalled and ready to use. The `XLRSetDBMode` function in the API is used to program the behavior of the daughter boards. The modes and options are unique to the specific type of daughter board installed. Please refer to the programming manual provided for your specific daughter board. The daughter board manuals use the naming convention “DBxxxxx.pdf” where “xxxxx” is the interface type implemented by the daughter board (e.g. DBFPDP2.pdf). Manuals are in your StreamStor installation directory under “docs” as well as on the DVD delivered with your system.

Safety Symbols and Warnings

Safety Symbols

This section provides a description of the safety marking symbols that appear on the NTX-16 chassis. These symbols provide information about potentially dangerous situations.

 Located on the chassis, this symbol means "Caution Risk of Danger." Refer to the Manual for more information.

Safety Warnings

Warnings

 ***Caution***

Do not use the front handles for moving the unit. It's recommended that two people move the unit by placing both hands under both sides of the unit. The handles are not designed to carry the full weight of the unit.

 ***Caution***

The Standby/Off/On switch is a cycling type switch. The switch does not fully isolate or disconnect the power supplies from the unit when in the "standby" or "off" mode. AC line voltage is still present in the power supply.

Safety Warnings

Warnings

 ***Caution***

Do not block the rear of the unit or position the NTX-16 in such a way as to block access to the on/off switch on the rear of the unit where the power cord enters the back.

 ***Caution***

Do not block any air vents or position the NTX-16 in such a way as to block air flow through the chassis.

Cleaning Instructions

The unit should only be cleaned with a damp cloth, using water - no cleaning solutions should be used.

Rack Mount Precautions

If rack mounting the chassis, read and follow the instructions from the rack manufacturer.

If slide rails are to be used with the chassis, read and follow the instructions from the slide rail manufacturer.

Technical Support

Conduant wants to be sure that your NTX-16 StreamStor system works correctly and stays working correctly. In the event, however, that you are unable to get your new system to work properly, or if a working system ceases to function, we will do all that we can to get your system back online.

Solving the problem is largely a matter of data collection and steps that must be taken one at a time. In order for us to better serve you, we ask that you take the time to perform the following steps prior to calling us. This way, you can provide us with the most meaningful information possible that will help us solve the problem.

Is the problem one that obviously requires replacement parts due to physical damage to the system? If yes, then please gather the information described below and report the problem to tech support, by phone or through the Conduant web site.

Have you confirmed that no cabling has been inadvertently disconnected or damaged while working around the equipment?

Do all the systems have good power connections and voltages?

Does the confidence test sscfg.exe run OK?

Has the software installation been corrupted? Try re-installing software.

Have you checked the Conduant web site for technical bulletins?

If the above steps did not resolve the problem, then please initiate a trouble ticket on the support section of the Conduant website at www.conduant.com. Please provide as much information about your system and the problem as possible. We will do all that we can to resolve the problem as quickly as possible.

Contacting Technical Support

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