CUBIX FiberNode User Guide

FiberNode is a desktop enclosure that connects using fiber-optic cable to a FiberBlade host computer in a Computer Operations room. When connected, FiberBlade and FiberNode form a single computer system.

FiberNode provides connection support for two business-class, single-wide or one workstation-class double-wide PCI Express (PCIe) graphics controllers. It also provides two standard or four optional USB 2.0 ports for peripherals such as keyboard and mouse, as well as 5.1 high-definition (HD) audio ports for speakers or headphones.

With four fiber cables and one workstation-class, double-wide graphics controller like NVIDIA Quadro M6000 or AMD FirePro W9100, FiberNode can support four to six digital monitors with 4096 x 2160 (4K / UHD) resolution. With four fiber cables and two business-class, single-wide graphics controller like NVIDIA Quadro M4000 or AMD FirePro W4100, FiberNode can support eight digital monitors with 4096 x 2160 (4K / UHD) resolution. A whisper-quiet fan provides cooling, and the internal power supply is auto-ranging. See illustration of FiberNode rear input / output panel at right.

Maximum fiber cable length with measured bandwidth performance	
Fiber Link x4: 150m	~3000MBytes/second
Fiber Link x2: 250m	~1600MBytes/second
Fiber Link x1: 750m	~760MBytes/second
Measured using Bandwidth Test from NVIDIA CUDA Toolkit.	

Install FiberNode at the operator's desktop with support for 4K / UHD and connect it to FiberBlade in Computer Operations up to 150meters from the operators using four strands of multi-mode fiber cable. For longer distances, connect at reduced resolution and performance to a distance up to either 250meters using two strands, or up to 750meters using one strand of multi-mode fiber. For maximum distance, connect at reduced resolution and performance to a distance up to 2000meters using one strand of single-mode fiber-optic cable.

FiberNode Technical Specifications

Expansion Slots	PCI Express Gen 3.0
Number	4 available slots
Spacing	Single-wide
Mechanical	x16
Electrical	x4 lanes using 4 x fiber-optic cables x2 lanes using 2 x fiber-optic cables x1 lanes using 1 x fiber-optic cable
Configuration, standard	1 or 2 single-wide graphics controllers
Configuration, optional	1 double-wide graphics controller
Transfer rate per lane	8.0Gbits/second, theoretical
Fiber-optic transceiver	SFP+
Multi-mode	850nm, 8.5Gb/s
Single-mode	1310nm, 8.5Gb/s
Fiber-optic cable	2 strands with a single twist, end-to-end, per cable
Multi-mode	OM1-62.5um: 21m OM2-50um: 50m OM3-50um: 150m OM4-50um: 190m
Single-mode	OS1-9/125: 2000m
Fiber-optic cable length	Maximum with **full** bandwidth performance, measured*
Fiber Link x4: 150m	~3000MBytes/second
Fiber Link x2: 250m	~1600MBytes/second
Fiber Link x1: 750m	~760MBytes/second
Fiber-optic cable length	Maximum with **reduced** bandwidth performance, measured*
Fiber Link x4: 250m	~2400MBytes/second
Fiber Link x2: 5000m	~1300MBytes/second
Fiber Link x1: 1000m	~700MBytes/second
Universal Serial Bus (USB)	USB 3.0
Ports	4 ports
Audio	ASUS Xonar DGX PCIe adapter with 5.1 surround
Processor	C-Media CMI8786 High Definition (HD)
Ports (analog)	Audio in (microphone) / out (front, side, sub-woofer)
Port (digital)	S/PDIF output connects to graphics card with HDMI
Signal-to-noise ratio out	100dB for 5.1 channel or headphones @ 150ohm loading
Front-panel LCD	Main menu = left button Sub-menu = right button
Start	Main board assembly and revision; management firmware revision; Cubix serial number
Power supply status	Standby, on – good or on – fault
Temperature status	Display temperature of 3 sensors in degrees Celsius.
Fan status	Fan speed controlled by adjusting fan voltage based on sensed temperature (see Temperature status above)
Fan profile	Fan profile shows the current fan profile setting
PCIe link status	Link speed and width of the PCIe fiber-optic interface and slots
Transceiver status	Fiber-optic transceiver SFP 1-4: transmitted and received Power in microWatts (uW)
LCD backlight control	Press the sub-menu button to toggle the LCD backlight on / off (default is off)

Power	Auto-ranging, 100-240VAC, 3.5Amp-1.5Amp, 50/60Hz, total output power is not to exceed 300Watts
Operating environment	0° to 30° Celsius (32° to 86° Fahrenheit) temperature 5% to 80% non-condensing humidity
Dimensions	4.250" H x 5.250" W x 10.000" D (10.795cm H x 13.335cm W x 25.40cm D)
Weight	6.000lbs (2.722kg)
Warranty / period	Parts & labor return to manufacturer / 2 years
Ext. warranty period	Optional 3rd year
**Note: measured using Bandwidth Test from the NVIDIA CUDA Toolkit*	

Connections

FiberNode provides four ports for fiber connectivity to a FiberBlade computer (See Installation and Startup Procedure on the next page). It also provides two USB 2.0 ports, multiple DisplayPorts or Digital Visual Interface (DVI) video ports, depending upon the video controller(s). FiberNode provides two PCIe 16x expansion slots, usually occupied by two single-wide controllers or one double-wide controller providing multiple DisplayPorts or DVI-I ports. FiberNode also provides audio and 2 x USB 2.0 ports.

Caution

Disconnect power before connecting or disconnecting fiber on FiberBlade or FiberNode. When you disconnect a fiber cable, also remove that fiber transceiver from its port.

FiberNode-Desktop Remote Switch Box

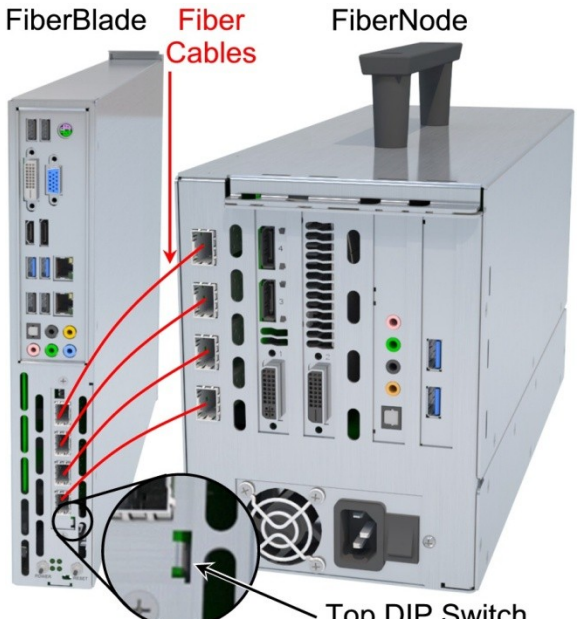
Cubix optional Remote Switch Box (RSB) provides power on/off and reset control in a small, desktop box (see the illustration at the right). RSB also provides optional access to the two FiberNode USB ports via USB extension cables. RSB connects to FiberNode via a PS/2 cable and, if desired, two USB cables. The LEDs provide the status of the power and fiber link for the FiberNode.

Remote Switch Box Technical Specifications

Controls	2 buttons and LEDs
Buttons	Power on / off and reset
LEDs	Link status and power
Universal Serial Bus (USB)	USB 2.0
Ports	2 USB 2.0 ports
Operating Environment	0° to 30° Celsius (32° to 86° Fahrenheit) temperature 5% to 80% non-condensing humidity
Dimensions	1.40" H x 3.70" W x 2.75" D (3.56cm H x 9.39cm W x 6.988cm D)
Weight	1.00 lbs (0.45kg)
Warranty / Period	Parts & Labor Return to Manufacturer / 2 years
Ext. Warranty Period	Optional 3rd year

Installation and Startup Procedure

1. Power down FiberBlade and remove power from FiberNode.
2. With FiberBlade and FiberNode powered down, connect a fiber cable to the top fiber port on FiberBlade and the top fiber port on FiberNode.
3. Repeat the procedure for the other ports down from the top port. See image at right.
4. Enable fiber at the FiberBlade. Note: Make sure you have fully enabled both switches. Disable fiber for local operation such as installing an operating system or drivers.
5. Power up FiberBlade. It will power up and down again, which is normal operation.
6. Press both FiberNode Menu and Sub-menu buttons simultaneously; it will power up.
7. After powering down FiberNode, wait 10 seconds before powering it up again.



Power down FiberBlade. Move top DIP switch right to enable / left to disable fiber.

Front Panel LCD

FiberNode front panel LCD provides enclosure details and status. Beneath the LCD are two buttons: Menu (left) button scrolls through main-menu items and Sub-Menu (right) button scrolls through sub-menu items.

When you first connect power, FiberNode comes up in standby mode. The LCD displays the Start Menu with Cubix Corporation. Access all other main menu items by pressing the Menu button.

MCU Heartbeat. The upper right corner of the LCD shows a flashing asterisk *. This indicates that the on-board Micro-Controller Unit (MCU) is running properly. If the asterisk is not flashing or the LCD is not responding, shut down the host computer and reset the MCU by pressing and holding the left button for 3 seconds. A corresponding HB (for heartbeat) LED on the MIB also shows the MCU is working properly.

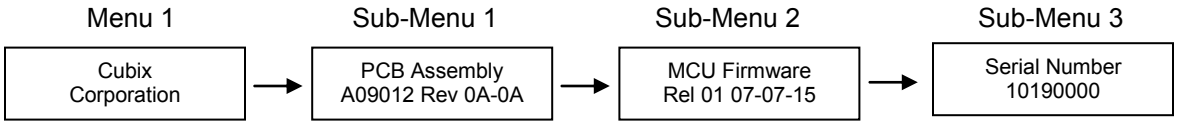
Power off the host computer so FiberNode is in standby power mode before you reset the MCU by pressing the Menu button for 3 seconds,.

Fault Condition. When a fault occurs, the LCD will jump to that fault and the LCD backlight will flash on / off. Press the left button to acknowledge the fault and the LCD will stop flashing and enable normal operation. The LCD will continue to display the fault at the applicable sub-menu until you clear the fault. If multiple faults have occurred, after acknowledgement of the first fault, the LCD will jump to the next fault and the LCD backlight will once again flash on/off. This continues until all faults have been acknowledged.

LCD Menu and Sub-Menu Switch Operation.

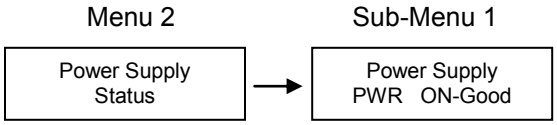
- Main LCD Menu Advance: Press Menu switch
- Sub-LCD Menu Advance: Press Sub-Menu switch
- Power On/OFF Control: Press Menu and Sub-Menu switches simultaneously
- System Reset: Press Sub-Menu switch for 3 second
  The Sub-Menu will advance when the switch is pressed and upon reset go back to the previous menu.
- MCU Reset: Press Menu switch for 3 seconds. Reset MCU only in standby power mode.

Menu 1: Start Menu



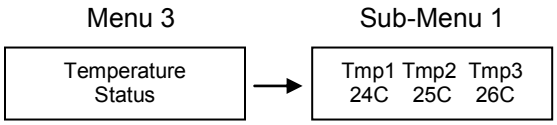
Menu 1: Default initial applied power start up menu
Sub-Menu 1: Cubix Circuit board assembly and revision
Sub-Menu 2: Micro Controller Firmware revision
Sub-menu 3: Cubix Serial Number

Menu 2: Power Supply Status



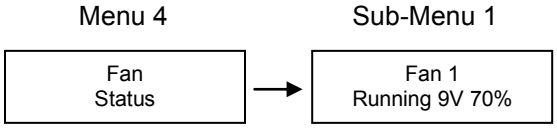
Menu 2: System Power Supply Status
Sub-Menu 1: Main Power Status:
Status 1: PWR Standby = Main Power is off, System is in standby
Status 2: PWR ON-Good = Main Power is on, +3.3V, +5V, +12, -12V are in spec
Status 3: PWR ON-FAULT = Main Power is on, +3.3V or +5V, or +12V, or -12V is out of spec.

Menu 3: Temperature Status



Menu 3: Temperature Status
Sub-Menu 1: Display the temperature of the 3 temperature sensors in degree Celsius. In the event of a temperature sensor failure, "FLT" is displayed under the failed sensor.

Menu 4: Fan Status

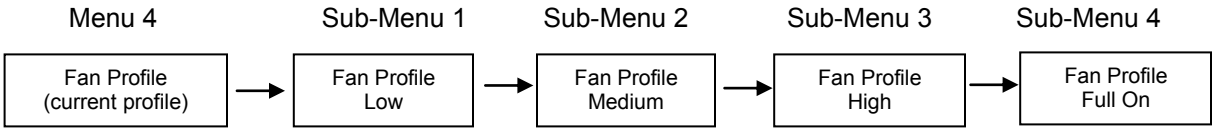


Menu 4: Fan Status
Sub-Menu 1: Indicates the fan status for fan 1

Fan speed is controlled by adjusting fan voltage based on sensed system temperature. Fan voltage adjusts from 6V min to 12V max. Temperature range is determined by the fan profile selected in Menu 5. Fan Profile.

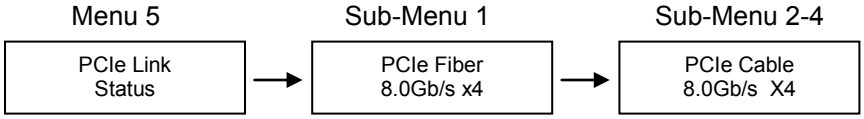
Status 1: Pwr-off 0V 00% System is in standby.
Status 2: Running aaV pp% Fan is good, aa = fan voltage, pp = percent fan speed
Status 3: FAULT 12V 100% Fan Fault; Fan voltage is full on but fan is not running.
Status 4: OVERRIDE12V 100% GPUManager Fan Over-ride control.

Menu 5: Fan Profiile



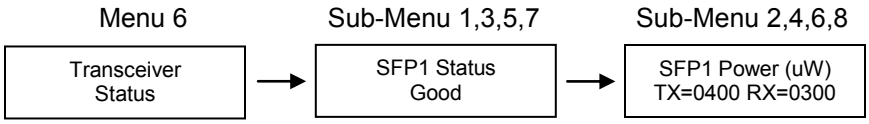
Menu 4: Fan Profile (shows current fan profile setting, sub-menu toggles setting in order)
Low: Tmin=30C (Vmin~6V), Tmax = 65C (Vmax~12V)
Medium: Tmin=20C (Vmin~6V), Tmax = 55C (Vmax~12V)
High: Tmin=10C (Vmin~6V), Tmax = 45C (Vmax~12V)
Full On: Temperature over-ride, Van~12V

Menu 6: PCIe Link Status



Menu 5: PCIe Link Staus
Sub-Menu 1: Link speed and link width of the x4 PCIe Fiber Optic Interface
Speed: 2.5Gb/s or 5Gb/s or 8.0Gb/s (Fiber-optic link speed is always 8.0Gb/s)
Width: x4 (4 fibers), x2 (2 fibers), x1 (1 fiber)
No Link (unsuccessful link, or system is in standby power)
Sub-Menu 2-5: Link speed and link width for slots 1-4.
Speed: 2.5Gb/s or 5Gb/s or 8.0Gb/s
Slot 1-4 width: X1, X2, X4
"NO Link" when slot is empty, unsuccessful link, or system is in standby power

Menu 7: Transceiver Status



Menu 6: Fiber Optic Transceiver Status
Sub-Menu 1,3,5,7: Fiber Optic Transceiver SFP 1-4 Status:
Sub-Menu 2,4,6,8: Fiber Optic Transceiver SFP 1-4: Transmitted and Received Power (uW)
See Table 'Small Form Pluggable (SFP) Optical Transceiver Status'.

Menu 8: LCD Backlight Control

Menu8: Press "Sub-Menu" button to toggle LCD backlight On/Off (Default is off.).

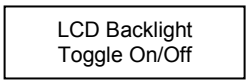


Table: Small Form Pluggable (SFP) Optical Transceiver Status

PWR Standby	System is in standby power mode
Not-Detected	Transceiver is not installed or has not been detected by the MCU
Good	Transceiver is in normal operating mode
RX Power High	Received average optical power exceeds the high threshold
RX Power Low	Received average optical power exceeds the low threshold
Temp High	Transceiver internal temperature exceeds the high threshold
Temp Low	Transceiver internal temperature exceeds the low threshold
VCC High	Transceiver internal supply voltage exceeds the high threshold
VCC Low	Transceiver internal supply voltage exceeds the low threshold
TX Bias High	Transceiver laser bias current exceeds the high threshold
TX Bias Low	Transceiver laser bias current exceeds the low threshold
TX Power High	Transmitted average optical power exceeds the high threshold
TX Power Low	Transmitted average optical power exceeds the low threshold
Minimum Transmitter Optical Power = 302uW Minimum Receiver Optical Power = 155uW	

Frequently Asked Questions

Q: FiberNode is connected to FiberBlade, but when I press the FiberNode Menu and Sub-menu buttons simultaneously, it does not start.

A: Check the following: [1] power is connected to FiberBlade and FiberNode; [2] fiber cables connect FiberBlade to FiberNode; each fiber cable has a single twist from end to end; and fiber is enabled via the DIP switch at FiberBlade rear panel.

Q: How do I run FiberBlade without FiberNode for applying OS and driver updates?

A: Disable fiber at the FiberBlade using the front-panel DIP switch. Doing this allows you to run FiberBlade locally, without FiberNode. When you have finished applying updates, shut down, enable fiber and boot.

If you have questions, contact Cubix. Provide your product serial number, which is an 8-digit number that begins with 10xxxxxx on a white label with a barcode.