

EQUIPMENT MANUAL

S.I. Tech Models 2170/2171/2172/2173 USB Fiber Products

INTRODUCTION

The S.I.Tech Models 2170 and 2171 products support USB 1.1 to fiber conversion.



The S.I.Tech Models 2172 and 2173 products support USB 2.0 to fiber conversion.



PRODUCT SPECIFICATIONS

Models 2170/2171

- Operation Mode: USB 1.1
- Input/Output Interface: USB 1.1 2170-Type B, 2171-Type A
- Transmission Line Interface: ST optical connector (standard)
- Transmission Distance: See distance chart below
- Transmitter Output Power: 25 μ w into 62.5/125 micron fiber
- System Wavelength: 850nm (1300nm option)
- Data Rate: USB 1.0 (Low Speed) USB 1.1 (Full Speed)
- Bit Error Rate: 10⁻⁹
- Receiver Sensitivity: 2 μ w
- Operating Temperature: 0°C to 50°C
- Weight: 1.0lb (454 grams)
- Power: External with power supply (S.I.Tech #2164-100 to 240VAC 50/60Hz to 12VDC, UL, CSA, CE & TUVGS listed). 10 to 32V, 2170-2 Watts Max, 2171-2 Watts Min/14 Watts Max.
- Metal Enclosure: 5.75" X 3.8" X 1.63" (14.6 X 9.6 X 4.2 cm)

Operating Distance for Fiber Optic Cable

Fiber Size (Microns)	Attenuation (dB/Km)	Distance (Meters)	Distance (Feet)
50	3.0	2000	6600
62.5	4.0	2000	6600
10*	1.0	5000	16000

* Single mode option-1300nm (Application limits may be exceeded)

Models 2172/2173

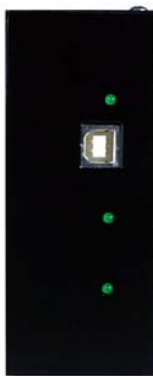
- Operation Mode: USB 2.0
- Input/Output Interface: USB 2.0 2172-Type B, 2173-Type A
- Transmission Line Interface: SC optical connector (standard)
- Transmission Distance: See distance chart below
- Transmitter Output Power: MMF -17dBm (20µw) typical 62.5 micron, SMF -11dBm typical
- System Wavelength: 850 or 1300nm
- Data Rate: USB 1.0 (Low Speed), USB 1.1 (Full Speed), USB 2.0 (High Speed)
- Bit Error Rate: 10⁻⁹
- Receiver Sensitivity: MMF(850nm) MMF(1300nm) -29dBm (1.2µw) typical, SMF(1300nm) -32dBm typical
- Operating Temperature: 0°C to 70°C
- Weight: 1.0 lb (454 grams)
- Power: 9-28VDC 7W Max. External with power supply-4W typical (S.I.Tech #2164-100 to 240VAC 50/60Hz to 12VDC, UL, CSA, CE & TUVGS listed). For fully loaded 2173 use S.I.Tech #2164A - 17W power supply. 9 to 28V, 2172-5 Watts Typical, 2173-5 Watts Min/17 Watts Max
- Metal Enclosure: 5.75" X 3.8" X 1.63" (14.6 X 9.6 X 4.2 cm)

Operating Distance for Fiber optic Cable

Fiber Size (Microns)	Attenuation (dB/Km)		Bandwidth (Mhz/Km)		Distance (Meters)		Distance (Feet)	
	850nm	1300nm	850nm	1300nm	850nm	1300nm	850nm	1300nm
50	3.0	1.5	600	600	1000	1000	3300	3300
62.5	4.0	1.5	200	600	400	1000	1300	3300
10*	Unspecified	0.4	Unspecified	Unspecified	--	5000	--	16000

* Single mode option-1300nm (Application limits may be exceeded)

USB Input/Output Interface



2170



2171



2172



2173

S.I.Tech supplies part # 7170 for USB 1.1 and part # 7172 for USB 2.0 type A to B cable assemblies to connect to computer's USB port. Use appropriate cable for your application.

Optical Input/Output Interface

S.I.Tech Models 2170 and 2171 come standard with ST connectors for both multimode and single mode. 2170 and 2171 are used in pairs. See typical application drawing Figure 1.

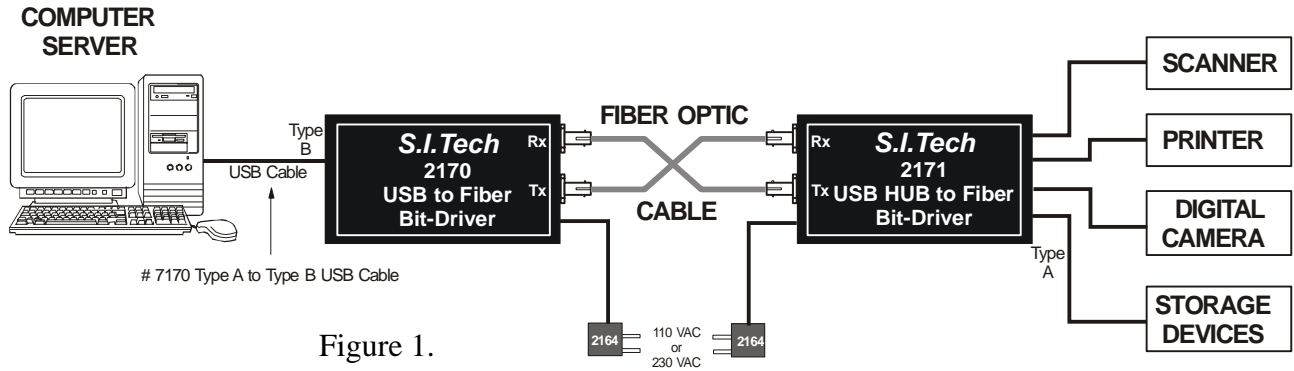


Figure 1.

S.I.Tech Models 2172 and 2173 come equipped with SC connectors for both multimode and single mode fibers. 2172 and 2173 are used in pairs and connected as shown in typical application drawing Figure 2.

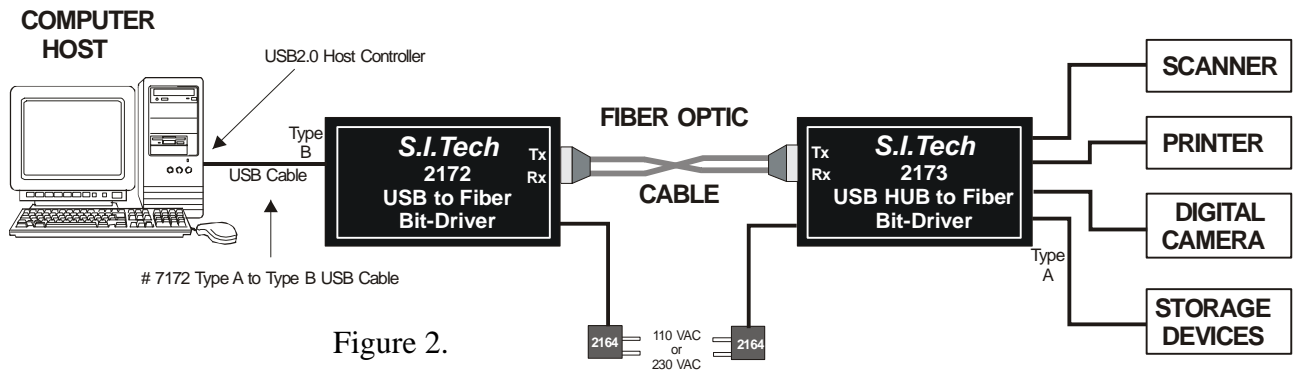


Figure 2.

S.I. TECH MODELS 2170 AND 2171 (USB 1.1 PRODUCTS)

LED Definition

LED	2170	2171
POWER	Power ON	Power ON
LINK	Optical signal from 2171 detected	Host USB data detected
HOST	2170/2171 pair enumerated with host USB	
PORT		Host USB data detected at port

Installation

1. Connect fibers between Model 2170 and Model 2171
2. Apply power to model 2170 and model 2171

2170 LEDs			2171 LEDs		
PWR	LINK	HOST	PWR	LINK	PORT
On	On	Off	On	Off	Off

3. Connect 2170 to PC with USB cable

2170 LEDs			2171 LEDs		
PWR	LINK	HOST	PWR	LINK	PORT
On	On	On	On	On	Off

4. Connect 2171 USB hub ports to USB devices with USB cables

2170 LEDs			2171 LEDs		
PWR	LINK	HOST	PWR	LINK	PORT
On	On	On	On	On	On

USB Device Removal

1. Quit USB device application
2. Remove USB device

Models 2170 and 2171 Removal

1. Remove all USB devices from 2171
2. Disconnect host USB cable from 2170
3. Disconnect power and remove fibers from 2170 and 2171

Operational Notes

A 2170/2171 pair cannot be cascaded with another 2170/2171 pair due to cumulative delays and possibility of exceeding the capabilities of the protocol. Cascading may sometimes work but is not reliable.

The 2170/2171 pair can be connected in a cascaded arrangement with up to four USB hubs. The level of the 2170/2171 pair in the cascade is not important. A 2170 can be connected to a port of an upstream USB hub and hubs can be connected to 2171 ports. 2170s can be connected to any or all of the ports on an USB hub. USB hubs can be connected to each port on a 2171.

S.I. TECH MODELS 2172 AND 2173 (USB 2.0 PRODUCTS)

The 2172 / 2173 pair provides a remote 4-port USB2.0 hub carried over optical fiber. Each of the ports supports any combination of USB2.0 (high-speed), USB1.1 (full-speed) or USB1.0 (low-speed) devices. Before using, confirm that the host PC has USB2.0 host controller (the 2172 / 2173 pair is not compatible with other host controllers). **To check the USB host controller, open the Windows Device Manager and review the Universal Serial Bus Controller list; verify that the list contains an “Enhanced” or “Enhanced Host Controller Interface” or “EHCI” controller.**

Installation

The 2172 and 2173 must be connected together before connecting to the USB2.0 host or USB devices. Connect appropriate fiber (62.5 micron multimode fiber <500 meters, or 9 micron single mode fiber <2 km), and apply power to both units.

Connect the 2172 to the USB2.0 host using a USB Type A to Type B cable. The Windows Device Manager lists the 2172 / 2173 pair as a Generic USB Hub and its Properties show per port Power Required (Available, 0mA, 100mA, and 500mA).

Connect USB devices to the 2173. The Device Manager lists each device attached to the 2173 USB ports.

Condition	2172 LEDs				2173 LEDs				
	PWR (green)	OSD (green)	Link (green)	Host (green)	PWR (green)	Link (green)	Port Act (green)	Port OC (yellow)	OSD (green)
Power on	On	Off	Off	Off	On	Off	Off	Off	Off
Fibers connected	On	On	On	Off	On	Off	Off	Off	On
2172 to USB2.0 host	On	On	On	On	On	Blinking	Off	Off	On
Device on 2173 port	On	On	On	On	On	On	On	Off	On
2173 port in over-current	On	On	On	On	On	On	Off	On	On

Removal

Stop all USB devices on the 2172 / 2173 hub before physically disconnecting the USB devices; e.g., use the Windows “Safely Remove Hardware” icon found in System Tray. Disconnect the 2172 USB cable, and then remove power and the connecting fibers.

Overcurrent

Each 2173 USB port can provide +5VDC power up to 500mA to the attached device and each port has an overcurrent monitor. When the 2173 USB hub detects a port overcurrent condition, +5VDC power on that port is removed. Power can be restored by disconnecting and reconnecting the USB host cable at the 2172.

Caution

Unexpected results may occur if the fibers are disconnected while the 2172 host USB cable is connected.

Operational Notes

For best results, connect 2172 directly to host (not an USB hub). USB hubs may be connected to the 2173 and cascaded to depths of 4 hubs. There is a limit of 14 USB devices connected to the 2173 (in this context, each cascaded USB hub also count as a device). Some USB devices may have sensitivities to the additional timing required by the 2172 / 2173 and fail to perform as expected.

LED Definitions

Power	2172	2173
	Power ON	Power ON
OSD	Optical signal detected	Optical signal detected
LINK	Logically connected to 2173	Logically connected to 2172 with host data detected
HOST	Host communication with 2173 hub detected	--
OPR	--	Port operational
FAULT	--	Port overcurrent fault

POWER

The Models 2170/2171/2172/2173 can be powered from normal 12VDC power. Use S.I.Tech Model 2164 (5W) power module as it has 110VAC or 240VAC input and 12VDC output. For 2173-4 port Hub, depending upon attached devices you may need high power, power supply. S.I.Tech Model 2164A can be used (17W).

Both 2164 and 2164A are suitable for use in most countries.

Power cord supplied with these devices is international color code. It may require a suitable plug assembly for your specific country e.g. UK. [Green/yellow conductor is ground. The other two are for AC power terminals.]

DIAGNOSTICS

1. Check step by step setup per above given installation and LED indications.
2. Make sure you have USB 1.1 Bit-drivers (2170 and 2171) for USB 1.1 application. USB 2.0 bit-drivers (2172/2173) for USB 2.0 applications.
3. For USB 2.0, make sure you have USB 2.0 root hub support from USB 2.0 host controller. The USB 2.0 host controller will be identified in the Windows device manager as “Enhanced” or EHCI controller*.
4. Make sure you have multimode cable for multimode 2170, 2171, 2172 and 2173 or single mode cable for single mode equipped bit-drivers.
5. Make sure you have 12VDC power and in case of 2173 if it is fully loaded, use high power (17W or higher) power supply.

*Refer to 2172/2173 USB 2.0 host as device combinations.

2172/2173 USB 2.0 extension firmware tested HOST/OS combinations

USB Host Chipset	Computer	Operating System
Intel 82891FB	Dell Optiplex GX280	Fedora Core3 (kenel 2.6.9-1.667)
Intel 82891EB	Generic	Win XP SP2
Intel 82891EB	Dell Dimension 3000	Win 2000 SP4
Intel 82891EB	Dell Dimension 3000	Fedora Core3 (kenel 2.6.11-1.27)
Intel 82891DB	Shuttle XPC	Win 2000 SP4
SiS 7001	Generic	Win XP SP1
SiS 7001	Generic	Win 2000 SP4
NEC PD 720100	PCI exp card	Win XP SP2
Apple G5 USB 2.0 host	Apple PowerMac G5	OS X (10.3.9)

2172/2173 USB 2.0 extension firmware incomplete device test list

Not all devices were tested on every HOST/OS combination.

USB 2.0

Plextor PX712-UF external DVD writer

Epson Stylus PHOTO R300 USB 2.0 printer with card reader

Canon LiDE 80 USB 2.0 Scanner

IOGear 160GB USB 2.0 HDD
Creative WebCam Live! Pro
Creative WebCam Live! Motion
ADS USB 2.0 Turbo Webcam
Sony Micro Vault 128MB Flash
Lexar Pro Jumperdrive 2GB Flash
SanDisk Cruzer Mini Flash Drive 128MB
Sony Combo flash drive and Memory Stick Reader
Passmark Loop back plug
BAFO USB 2.0 Hub (NEC Chip)
Belkin Tetra Hub (Cypress Chip)
D-Link DUB7 7port Hub (Philips Chip)

USB 1.1

Digital Persona 4000 fingerprint reader
Logitech 4000 webcam
3Com Camera
MS USB Hub/Keyboard + Optical Mouse
Dell enhanced Hub/Keyboard + Optical Mouse
Lexar Jumperdrive 128MB USB 1.1 Flash
Lomega Zip drive
Zebsex Z-3080 Barcode Scanner
Wacom Intuous Tablet
Edgeport/4 Serial Converter
Griffen PowerMate USB volume knob

DISASSEMBLY PROCEDURE

1. Disconnect power
2. There are 6 (4x40) Phillips head screws (see drawing below). Remove screws using suitable screwdriver.



3. Carefully remove cover from the device.
4. To remove PCB from base, remove 4 (6 X 32) binding head screws using a screwdriver.

NOTICE: End of Life Product Disposal



In accordance with Waste Electrical & Electronic Equipment (WEEE) directive of European Union countries, do not throw (dispose) these products into household waste containers. Products should be taken to authorized material recyclers in your country. For further information, contact <http://www.erp-recycling.org>.

IMPORTANT

If after performing troubleshooting, the unit is still not working, check with an S.I. Tech application engineer. For optical unit service, call or write S.I. Tech Inc. at P.O. Box 609, Geneva, IL 60134, USA. Phone: 630-761-3640. Web site: <http://www.sitech-bitdriver.com>. Email: tech@sitech-bitdriver.com.

WARNING

This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of part 15 of FCC rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at user's expense will be required to take whatever action may be required to correct the interference.

WARRANTY

S.I. Tech, Inc. warrants that this item is free from defects in material and workmanship. Our warranty is limited to repair or replacement, at our sole discretion, of any item that fails within one year of sale*.

This warranty does not apply if the item has undergone repair or alteration not authorized by S.I. Tech or if it has been subjected to misuse, negligence or accident or other similar or dissimilar use.

S.I. TECH IS NOT RESPONSIBLE FOR INJURY, PROPERTY DAMAGE OR OTHER INDIRECT CONSEQUENTIAL OR SPECIAL DAMAGES ARISING DIRECTLY OR INDIRECTLY OUT OF THE USE OF THIS ITEM, NOTWITHSTANDING THE FACT THAT SAID INJURY, PROPERTY DAMAGE OR OTHER CONSEQUENTIAL DAMAGES AROSE DIRECTLY OR INDIRECTLY FROM AN ACTUAL OR ALLEGED DEFECT IN MATERIAL AND/OR WORKMANSHIP.

*For a nominal fee, an extended warranty is available upon request.

Warranty Registration Form

Company _____
 Address _____
 City _____ State _____ Zip Code _____
 Date Purchased _____ Part Number _____
 Type of Bit-Driver Purchased _____
 Serial Number _____
 Approximate Distance between Terminals _____
 Environment _____
 Name of Registrant _____
 Telephone Number _____
 Fax Number _____
 E-Mail Address _____

Warranty registration card must be completed and returned to:
 S.I.Tech, P.O.Box 609, Geneva, IL 60134, for warranty to apply.