



Twisted Pair to Fiber Ethernet Media Converter

User's Manual

and ordering guide

FL-USA 200 Series

The FL-USA 200 series Fiber Media Converters provide SC type Fiber connections to your optic cable, and RJ-45 ports, (*straight through and crossover*) for the 10/100 Base-TX copper cable connections. When auto-negotiation is selected, the FL-USA 200s will automatically tailor themselves to convert both half-duplex full-duplex signals, adjusting network speeds for 10 Mbps or 100 Mbps. Depending on your specific network needs, you may manually configure the system to convert signals in full-duplex only, or half-duplex only. The FL-USA 200 Fiber Converters give you the freedom to reliably extend your 10/100Mbps cabling distance to meet your network needs. Eight LED indicators signal detailed operating status of the converter for clear, easy fault identification.

Package Content

Thank you for your purchase of the FL-USA 200 series Ethernet Media Converter. You should have three items in your package, this **User Manual**, the **Media Converter**, and the external **Power Adapter** (*if you have purchased the stand-alone version of the FL-USA Media Converter*).

Product Overview

The FL-USA 200 Series 10/100Base-TX to 100Base-FX SC converter is primarily designed for workgroups requiring high bandwidth optic extension of their existing Ethernet Network. The FL-USA 200 converts 10/100 Base-TX Ethernet Twisted Pair (TP) cable and 100Base-FX fiber cable, with no increase in hop count on the user's network.

Operating full-duplex, the system can extend distances up to two (2) kilometers for Multi-Mode fiber, and up to 20 or more kilometers on Single-mode fiber. Versions are available as dual-fiber, MM and SM, *as well as*, WDM for use bi-directionally over a single SM fiber.

The FL-USA 200 series Media Converters are designed for an absolute minimum footprint. Available in either a compact stand-alone, or 19" rack-mount AC powered chassis (*with optional redundant AC Power*) providing for 18 rack-mount FL-USA 200s, mounted in only 2RU— or 3.5" of rack space.

Installation

Please place the system where it will not be subject to extreme temperature changes, humidity or electromagnetic interference. Operating temperature range is between 32 and 122 degrees Fahrenheit, Humidity should be less than 90% and be non-condensing. Please ensure adequate ventilation is provided for system cooling. Do not block the ventilation holes on either side of the stand-alone chassis or exhaust fan vents on the 19" rack mount chassis. To ensure your Safety, avoid any direct Eye or Skin exposure to Laser Optic Source.

Installation *continued*

The FL-USA media converter is a plug and play device.
 No user settings are generally required for proper operation.

Connect the supplied AC to DC adapter to the DC Outlet at the back of the media converter and connect to AC main. The UL Listed adapter provides 5 volts DC at 1000ma.

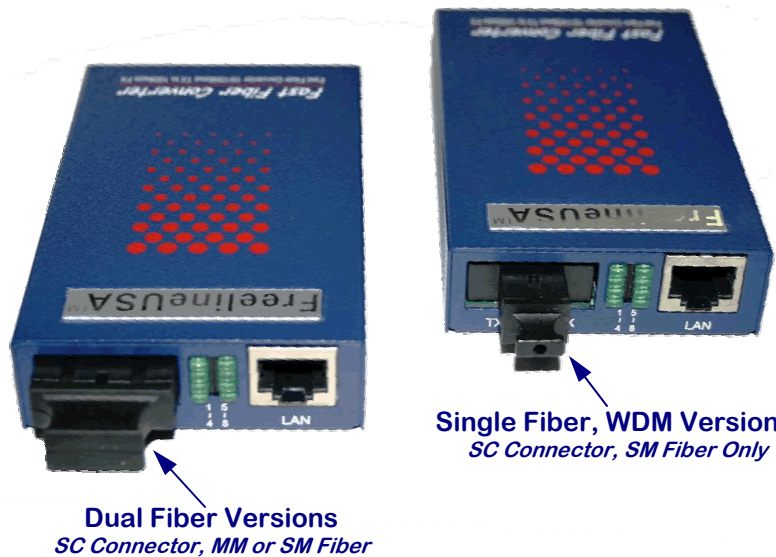
RJ-45

RJ-45 LAN PIN Connection (Use either straight through TP cable <i>or</i> cross-over cable)		
RJ-45 PIN	MDI Type	MDI-X type
1	Rx +	Tx +
2	Rx -	Tx -
3	Tx +	Rx +
6	Tx -	Rx -

Fiber Connection

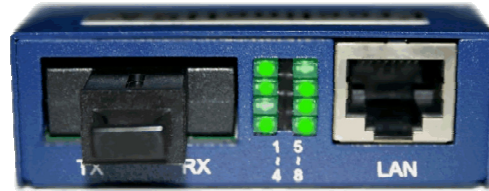
The FL-USA 200 Series is designed to terminate fiber with **SC Fiber Connectors**. Depending on the model, either a Single Mode or Multi-Mode fiber can be used for the fiber link.

Compact Stand Alone Package 2.5" W x 4" D x 7/8" H



LED Status Lamps

1	5
2	6
3	7
4	8



LED Indicators			
Led No.	Function	State	LED Status Indication
1	FX SD	On	Fiber Signal Detected
		Off	Fiber is unplugged
2	FX FDX	On	Fiber in FULL DUPLEX Mode
		Off	Fiber in half duplex mode
		Flash	Fiber is Half Duplex and Collision has Occurred
3	FX LINK	On	Fiber Link is UP
		Off	Fiber link is down
		Flash	Receiving Data from the Fiber
4	POWER	On	Power in ON
		Off	Power to converter is off
5	FX FEF DET	On	No Far End Fault pattern is received
		Off	Far End Fault pattern is being received
6	TP FDX	On	Twisted Pair is in FULL DUPLEX Mode
		Off	Twisted Pair is in Half Duplex Mode
		Flash	TP is in Half Duplex and Collision has Occurred
7	TP LINK	On	10/100BT Twisted Pair Link is UP
		Off	10/100BT Twisted Pair Link is down
		Flash	Receiving Data Copper Twisted Pair Interface
8	TP SPD	On	Twisted Pair is operating in 100 MBPS Mode
		Off	Twisted Pair is in 10 MBPS Mode

Quick Table for LED Diagnostics

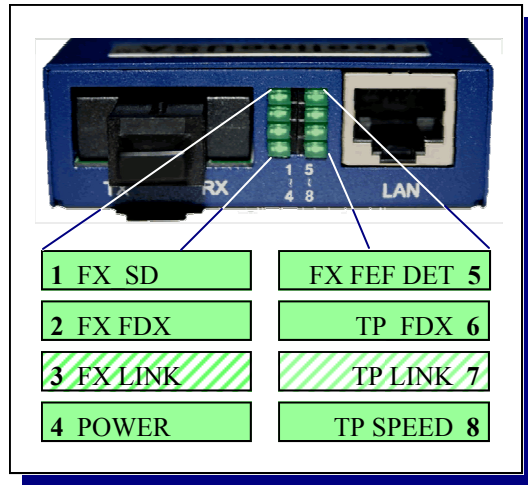
Legend for Chart Below: ON Off NA Flashing

Link is OK

1	5
2	6
3	7
4	8

Link is OK and Active

1	5
2	6
3	7
4	8



Remote Copper Twisted Pair Link is Down, or Off

1	5
2	6
3	7
4	8

Fiber Receive (RX) Off *or* Fiber Transmit and Receive is Off

1	5
2	6
3	7
4	8

Fiber Transmit (TX) is Off

1	5
2	6
3	7
4	8

FL-USA 200RM Chassis Specifications



FL-USA 200 RM Chassis

(Desk Top *or* 19" rack Mounted w/ RM Ears for up to 18 RM Media Converters)

Compact Chassis is only W * D * H 18" x 10" x 3.5"

- ☑ Complies with IEEE 802.3 10Base-T, IEEE 802.3u, 100Base-TX&FX standards
- ☑ The FL-USA 200 system occupies only 2 RU (3.5 inches) of rack space and will support up to 18 rack mount media converters. It may be optionally equipped with two, fully redundant AC power supplies, each providing 60 watts. Each provisioned media converter consumes approximately 3.5 watts.

LED status display card, indicates the status of both power supplies and fan.

- ☑ **FCC Class A, CE Mark Installation**

- ☑ **Electrical Interfaces**

One auto-MDIX RJ-45 connector interface is available on each FL-USA 200, Full-Duplex, Half-Duplex, or Auto-Negotiation with support for packet lengths up to 1600 bytes. Compliant with 802.3 10Base-T and 802.3u 100 Base-TX standard. Supports Auto-Negotiation on 10/100 Base-Tx and Half/Full Duplex Mode. 10 Base-T interface packet transmission rate is 14,880packets/sec(64bits). 100 Base-Tx interface packet transmission rate is 148,800packets/sec. Supported TP cabling is Cat.3/5 for 10Base-T operation and Cat.5/6/6e for 100Base-T operation.

- ☑ **Fiber Interfaces**

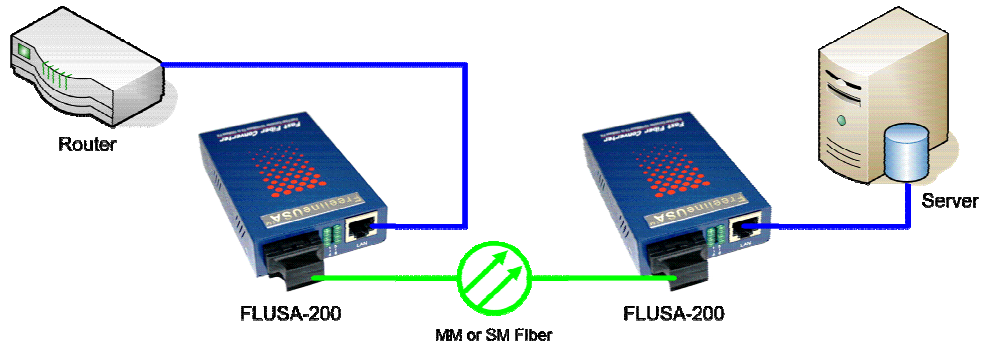
The FL-USA 200 system provides fiber connectivity up to 2km using (MM) multimode fiber and 20 to 60km using single-mode fiber. It provides for SC SM, SC MM, or Bi-directional WDM SC (single mode only) fiber connectors, SM fiber 9/125µm, MM fiber 62.5/125µm, SM fiber power gain is 18 dbm. System uses 1310 nm for MM fiber and 1310/1550 for Single Mode Fiber.

- ☑ **Diagnostics**

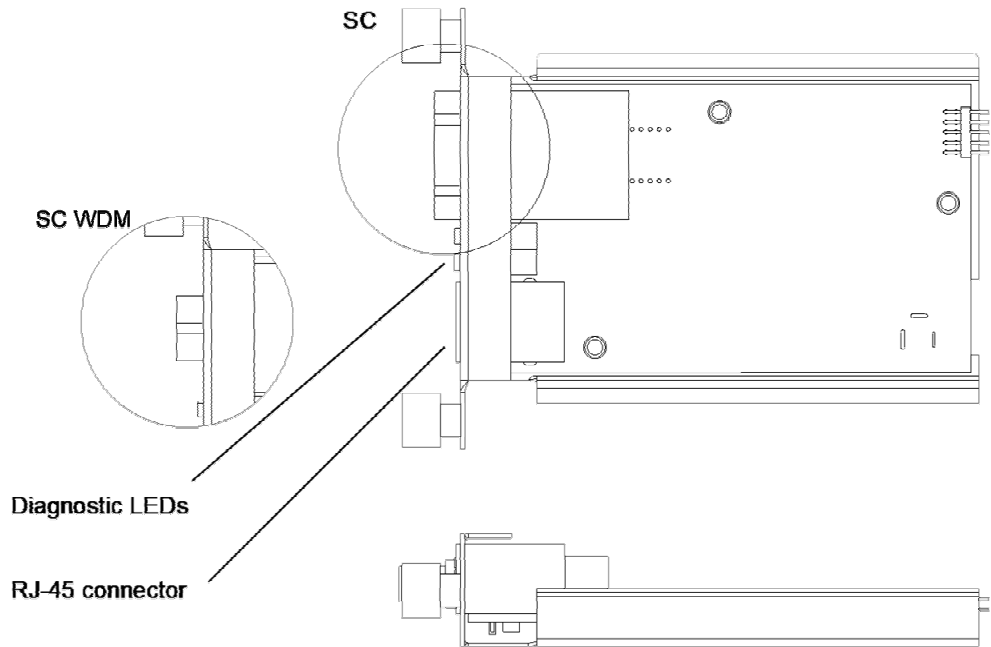
8 diagnostic LEDs (100Mbps, fiber full duplex, UTP full duplex, fiber link, UTP link, fiber signal detect, fiber far-end-fault detect and power). The FL-USA 200 Provides for TP Link fault propagation function for easy cable fault detection, a remote TP failure (link down) propagates to near end TP, and relayed to user NIC.

Typical Network Drawing

Please consult with your dealer if you have any technical questions about your installation requirements before ordering.

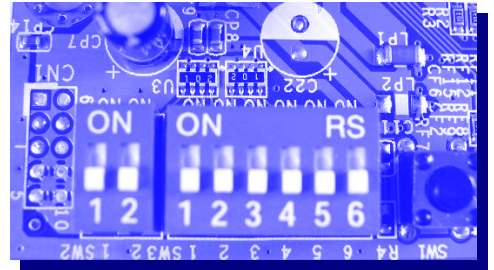


Rack Mount Version of the FL-USA 200 Media Converter



Internal DIP Switch Settings

There are two sets of DIP switches on the PCB. The DIP switch marked by SW2 contains two switches; while the DIP switch marked by SW3 contains six switches. Observe the “ON” marking on the DIP switch. The default status of all switches is “OFF”. Open the case to change the default settings only if required.



Switch 1	Switch 2	Status
Off	Off	Store-and-forward switch mode (default setting)
Off	On	Modified cut-through switch mode
On	Off	Converter Mode
On	On	Converter mode with auto-change-forward function

Note:

1. Store-and-forward switch mode: FL-USA 200 will begin to transmit a frame right after the completion of receiving a frame.
2. Modified cut-through mode: FL-USA 200 will begin to forward a frame after the first 64 bytes data received. TP port should be forced at 100Mbps at this port.
3. Converter mode: Incoming frames are not buffered in the converter to achieve the minimum latency. TP port should be forced at 100 Mbps at this mode.
4. Converter mode with auto-change-forward function: FL-USA 200 will change to store-and-forward mode if it detects the speed is different in TP port and fiber port.
5. In converter mode, FL-USA 200 forwards IEEE 802.3x pause frames directly. In the other modes, FL-USA 200 sends out IEEE 802.3x pause frames when its internal buffer is full.

Switch 3 Settings		
Switch No.	State	Function
1	Off	Link fault pass-through (LFP) disabled (default setting)
	On	Link Fault pass-through enabled
2	Off	TP port supports full auto-negotiation with 10/100 Mbps and full/half duplex capability (default setting)
	On	TP port supports auto-negotiation with limited capability as defined by Switch 4 and 5
3	Off	IEEE 802.3x flow control is enabled (default setting)
	On	IEEE 802.3x flow control is disabled
4	Off	TP Port can operate at 100 Mbps only (default setting)
	On	TP Port can operate at 10 Mbps only
5	Off	TP Port can operate at full-duplex mode only (default setting)
	On	TP Port can operate at half-duplex mode only
6	Off	Fiber Port can operate at full-duplex mode only (default setting)
	On	Fiber Port can operate at half-duplex mode only

Internal DIP Switch Settings (Quick Table for SW 3 Settings)

Quick Table for speed and duplex setting of TP on Switch 3 (SW3)			
Switch 1	Switch 4	Switch 5	Operating Status
Off	Off	Off	100/10M, full/half-duplex with auto-negotiation (default setting)
Off	Off	On	
Off	On	Off	
Off	On	On	
On	Off	Off	
On	Off	On	10/100M, half-duplex with auto-negotiation
On	On	Off	10M, full/half-duplex with auto-negotiation
On	On	On	10M, half-duplex only

Note: please remember to reset power if DIP switch setting is changed

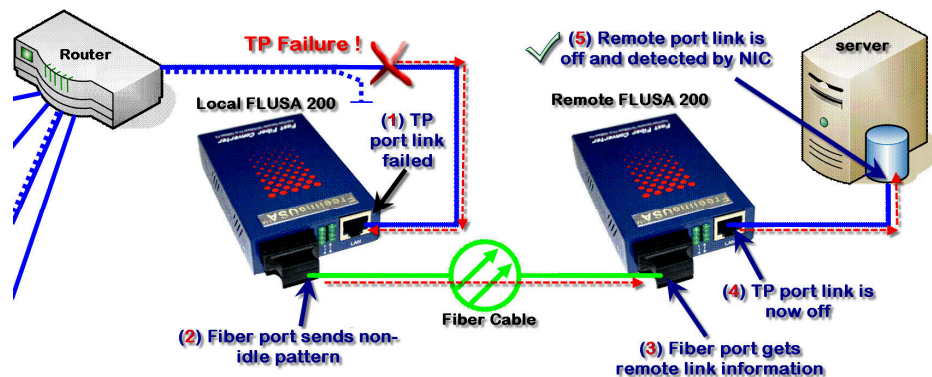
Link fault pass through Option *

When the link fault pass through function is enabled, (controlled by setting of SW3-Position # 1) the link status of the TP port of will be transferred to the fiber port on FL-USA 200, and vice versa.

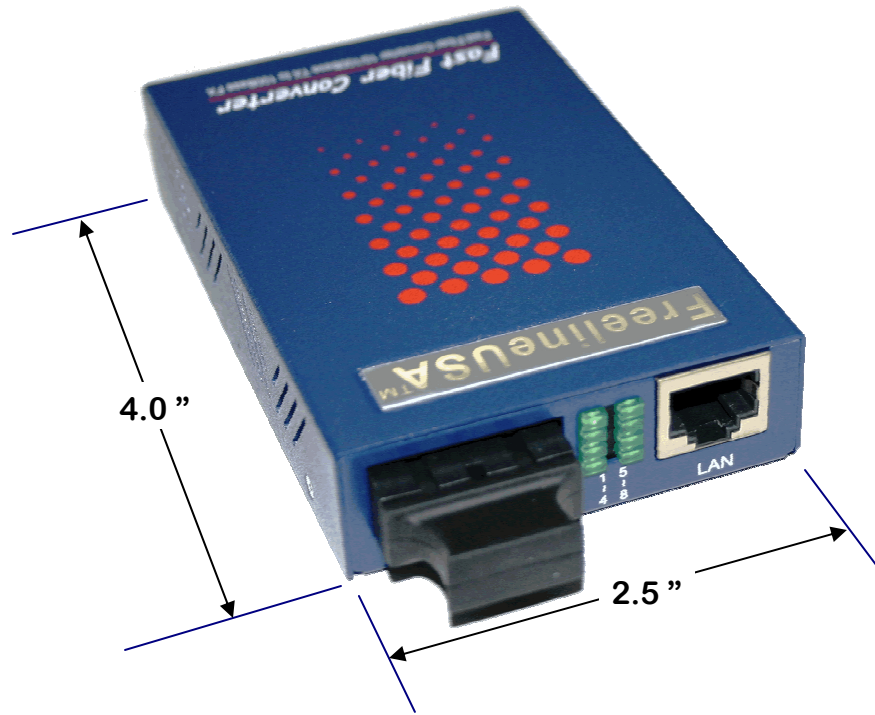
If the TP port of a local FL-USA 200 has failed (1), the fiber port then sends *non-idle pattern* to inform the fiber port of the remote FL-USA 200 (2). After receiving the non-idle pattern (3) the remote FL-USA 200 forces its TP port to be off (4). Finally, the TP link of the remote switch or NIC will detect the Link is off (5).
(see diagram below)

* The FL-USA 200 Automatically detects and reports loss of link on a connection using Link Fault Pass Through. This feature allows the equipment at the remote end of a link failure to "see" this failure and respond it with corrective actions, such as Spanning Tree fail-over links, proprietary alternate IP trunk links, or failure reports through SNMP or RMON procedures built into the switch, router or hub.

In other words, this mechanism will alert the link fault status of the local TP port to the remote FL-USA 200 TP port, and the link status of the remote TP port will be off. The link status LEDs will be off for both local and remote FL-USA 200s.



Actual Size FL-USA 200 Series Media Converter



FL-USA 200 Media Converter

