MANUAL

FiberLink®
Flex Series

Bidirectional Video, Audio, Data and Contact Closure over one or two Fibers

Installation and Operations Manual

WWW.ARTEL.COM

Contents

Welcome 3
Package Contents 3
Technical Specifications 4
Loss Budgets & Distance Specifications 5
Installation Instructions 6
System Jumper Settings 7
- Video Transmitter Interface Board 7
- Video Receiver Interface Board 7
- Audio Input Two Channel Interface Board 7
- Audio Output Two Channel Interface Board 8
- Data Input/Output Plug-In 8

Alarm Switch Settings 9
System Terminal Block Connections 10
- Two Channel Audio Input Board in the Audio 3/4 Slot on the base board 10
- With a Two Channel Audio Input Board in the Audio 1/2 Slot on the base board 10
- With a Two Channel Audio Output Board in the Audio 3/4 Slot on the base board 10
- With a Two Channel Audio Output Board in the Audio 1/2 on the base board 11
- With Data Board in the Contact/Data A Slot on the base board 11
- With Data Board in the Contact/Data B Slot on the base board 12
- Contact Closure Input/Output Connector on the base board 12
- With Contact Card in the Contact/Data A Slot on the base board 12
- With Contact Card in the Contact/Data B Slot on the base board 13

Indicator LEDs and Alarm Circuitry 13
Troubleshooting 14
Maintenance and Repairs 14
Flex Part Number Configuration Example 15
Certifications 15

Welcome

The FiberLink® Flex System is a fully configurable fiber optic transmission system designed to transmit a wide combination of video, audio, data and contact closure signals in one or both directions, over one or two fiber optic cables. The system uses all digital processing and signaling techniques, assuring high quality, noise-free transmissions that retain all of the initial parameters, regardless of fiber optic cable attenuation. In addition, integral indicator LEDs are provided on each unit to continuously signify the presence of video, data or audio, ensuring proper operation of each side of the system.

The specific functionality of the system you purchased can be determined by deciphering the part numbers shown on the product labels. Most likely, each end of transmitter/receiver or transceiver pair that you purchased is configured differently, so it is important to determine which unit belongs at each end of your installation. Use the chart located on the last page of this manual to determine the functionality of each unit.

Package Contents

- One FiberLink® Flex Unit
- This User's Manual

Technical Specifications

General Specifications	
LED Indicators	Power; Signal Present (Link); Alarm LED (card version only)
Power Requirements*	9-24 volts AC or DC, 6 watts
Operating Temperature Range	-35° to +75° C
Optical Connectors	ST or FCPC
Physical Size	5.1 W x 1.25 H x 7.25 L (inches) 127 W x 32 H x 184 L (mm)
Weight	approx. 1 lb.; 0.45 kg
Slots Filled in 6000A Card Cage	2
Video Specifications	
Number of Channels	1, one-way or bidirectional
Frequency Response	20 Hz to 8 MHz (+0, -3 dB) 50 Hz to 5 MHz (+/- 0.2 dB)
Input/Output Impedance	75 Ohms
Input/Output Voltage:	1 V p-p nom., 1.3 V p-p max.
Signal-to-Noise Ratio	60 dB (CCIR weighted)
Differential Gain and Phase	1% typical; 1° typical
Video Connectors	BNC
Audio Specifications	
Number of Audio Channels	2 or 4 one-way or 2 bidirectional (balanced or unbalanced)
Frequency Response	20 Hz to 20 kHz (+0, -3 dB)
Input/Output Impedance	600 Ohms terminated; >24 k Ohms unterminated
Input/Output Voltage	0 dBu nom. +10 dBu max.
Signal-to-Noise Ratio	85 dB
THD+N	0.1% typical
Audio Connectors	Removeable terminal block

Technical Specifications

Data/PTZ and Contact Closure Specifications

Number of Channels	2, which may be used for 2 data channels, 2 contact closure channels, or one of each
Data Protocols Supported	RS-232, RS-422, RS-485 (2 or 4-wire)
Data Rate	DC to 115 kb/s
Contact Closure Input	Dry contact or TTL level referenced to GND
Contact Closure Output	Isolated reed relay contacts; 115 Volts AC; 50/60 Hz @ 0.2 A or 24 Volts DC @ 1 A
Data and Contact Closure Connectors	Removeable terminal block

Operating Loss Budget & Maximum Usable Distance*

Wavelength	Loss(dB)	Distance (km)
2-way over 2 fibers and 1-way systems		
850 MM	0-15	0-3
1310 MM	0-7	0-5
1310 SM	0-28	0-70
1550 SM	0-26	0-85
2-way over 1 fiber systems		
850/1310 MM	0-5	0-3
1310/850 MM	0-5	0-3
1310/1550 SM	0-25	0-60
1550/1310 SM	0-25	0-60

SM = Single Mode Fiber
MM = MultiMode Fiber

*Distance specifications are only approximate and are not guaranteed. Operating loss budget must not be exceeded.

Installation Instructions

The FiberLink Flex System units are normally preset for immediate use as ordered. There are several indicator LEDs on the units for monitoring purposes, and user selectable options for the various signals accommodated. The following instructions describe the typical installation procedure, the function of the LED indicators and a description of how to change the configuration of the various signals.

1) The various options, as already mentioned, have been preset. When or if changes are required, please consult the next section.

2) If connecting more than one FiberLink unit on one data line (daisy chaining) while in either the RS-422 or RS-485 4-wire modes, you must set the unit to the RS-485 4-wire multidrop mode.

3) Connect the fiber optic cable or cables between two FiberLink Flex System units.

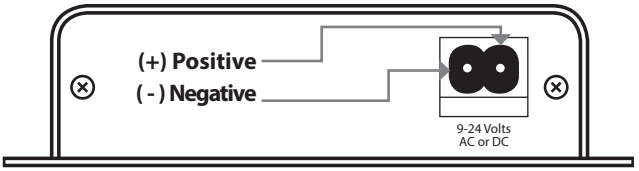
4) Connect the various input signals to the proper positions on the removable terminal blocks. Check all connections, making sure that inputs and outputs are not intermixed.
(Refer to the next section.)

5) Apply power to both units. Refer to Figure 1 for DC power connections.

6) When power is applied, the green PWR LED will light, indicating the presence of operating power. The other LEDs on the unit should be used to diagnose whether the system is now operating properly. Steady and flashing LEDs mean different things. Please refer to pages 11 and 12 for a complete explanation.

7) If LEDs on both units indicate presence of the right type of signals, the system should now be operational.

Figure 1:
Power Connector
DC Input Polarity



The transmitting element in the FiberLink® Flex unit contains a solid state Laser Diode located in the optical connector. This device emits invisible infrared electromagnetic radiation which can be harmful to human eyes. The radiation from this optical connector, if viewed at close range with no fiber optic cable connected to the optical connector, may be sufficient intensity to cause instantaneous damage to the retina of the eye. Direct viewing of this radiation should be avoided at all times!

System Jumper Settings

Some of the plug-in interface boards used in the product have on-board jumpers that are used to configure the various signal options. These are pre-set at the time of shipment based on the customer order information. If changes are required, the positions of these jumpers will have to be changed in accordance with the following procedure:

1) Turn off all operating power and remove all external connectors and terminal blocks.

2) For stand-alone box versions, remove the two screws holding the rear panel (terminal block side). Then, slowly and carefully slide open the bottom cover plate until the internal circuit boards are visible. Be very careful not to disturb the coiled fiber optic cables in the unit.

3) Unplug the interface board to be changed

4) Determine the function desired and set the jumper positions accordingly. All jumper positions are clearly numbered directly on the interface boards.

5) Return the interface board to the proper position.

6) For box versions, slide the bottom cover back onto the unit, taking care not to disturb or crimp the coiled fiber optic cable. Then, replace the rear panel screws.

7) Reapply power.

System Jumper Settings	
Video Transmitter Interface Board:	
	There are no jumpers used on this interface board.
Video Receiver Interface Board:	
	There are no jumpers used on this interface board.
Audio Input Two Channel Interface Board:	
Jumper 1:	
	When installed, the input impedance of Channel A will be 600 Ohms.
	When not installed, the input impedance of Channel A will be 24k Ohms.
Jumper 2:	
	When installed, Channel A will have an unbalanced input.
	When not installed, Channel A will have a balanced input.

System Jumper Settings (Continued)

Jumper 3:

When installed, the input impedance of Channel B will be 600 Ohms.

When not installed, the input impedance of Channel B will be 24k Ohms.

Jumper 4:

When installed, Channel B will have an unbalanced input.

When not installed, Channel B will have a balanced input.

Jumpers 5,6,7 and 8:

These are storage positions for unused jumpers.

Audio Output Two Channel Interface Board:

Jumper 1:

When installed, Channel A will have an unbalanced output.

When not installed, Channel A will have a balanced output.

Jumper 2:

When installed, Channel B will have an unbalanced output.

When not installed, Channel B will have a balanced output.

Data Input/Output Plug-In:

Jumpers 1,2,3,7,8,9 and 10 are used to select the desired protocol. Connections for these are as follows:

Protocol	**J1-1**	**J1-2**	**J1-3**	**J1-7**	**J1-8**	**J1-9**	**J1-10**
RS-232	OFF	OFF	OFF	OFF	OFF	OFF	OFF
RS-422/485	OFF	ON	OFF	OFF	OFF	ON	ON
(4 wire point-to-point)							
RS-485 (2 wire Auto xmit/receive)	OFF	OFF	ON	ON	ON	ON	OFF
RS-485 (4 wire multidrop)	OFF	ON	ON	OFF	OFF	ON	ON

System Jumper Settings (Continued)

Data Input/Output Plug-In Continued:

Jumpers 4,5 and 6 are used in the RS-485 2-wire auto transmit/receive and RS-485 4-wire multidrop configurations to select the time interval that the unit will wait before switching back to the receive mode (tri-state).

Baud Rate	Time	J1-4	J1-5	J1-6
2400	4.73ms	ON	OFF	OFF
4800	2.20ms	ON	ON	OFF
9600	1.10ms	ON	ON	ON
19.2K	620usec	OFF	ON	OFF
38.4K	300usec	OFF	ON	ON
57.6K	180usec	OFF	OFF	ON
76.8K	150usec	OFF	OFF	OFF

Positions 11,12 and 13 are provided as positions for storing unused jumpers.

Contact Closure Input/Output Interface Board:

There are no jumpers used on this interface board.

Alarm Switch Settings – Only For Use with Card Versions

Position 1 (RX SIG DETECT)
When enabled, the card module will detect whether an optical signal has been received. Alarm activates if signal is not present.

Position 2 (RX VID DETECT)
When enabled, the card module will detect whether video is present within the received optical signal. Alarm activates if video is not present.

Position 3 (TX VID DETECT)
When enabled, the card module will detect whether a video signal has been detected coming into the unit via the BNC connector. Alarm activates if signal has not been detected or processed correctly.

System Terminal Block Connections

The various input and output connections for the FiberLink Flex System are as follows:

Video Input and/or Output:	BNC Connectors
Audio Connector:	Audio terminal block positions can be used as audio inputs or outputs, depending on which Two-Channel Audio plug-in interface board is used.

With a Two Channel Audio Input Board in the Audio 3/4 Slot on the base board:

Position 3-	Audio Channel 3 Input (-)
Position 3+	Audio Channel 3 Input (+)
Position G	Audio Ground
Position 4-	Audio Channel 4 Input (-)
Position 4+	Audio Channel 4 input (+)

With a Two Channel Audio Input Board in the Audio 1/2 Slot on the base board:

Position 1-	Audio Channel 1 Input (-)
Position 1+	Audio Channel 1 Input (+)
Position G	Audio Ground
Position 2-	Audio Channel 2 Input (-)
Position 2+	Audio Channel 2 Input (+)

With a Two Channel Audio Output Board in the Audio 3/4 Slot on the base board:

Position 3-	Audio Channel 3 Output (-)
Position 3+	Audio Channel 3 Output (+)
Position G	Audio Ground
Postion 4-	Audio Channel 4 Output (-)
Position 4+	Audio Channel 4 Output (+)

System Terminal Block Connections (Continued)

With a Two Channel Audio Output Board in the Audio 1/2 on the base board:

Position 1-	Audio Channel 1 Output (-)
Position 1+	Audio Channel 1 Output (+)
Position G	Audio Ground
Position 2-	Audio Channel 2 Output (-)
Position 2+	Audio Channel 2 Output (+)

Data Input/Output Connector:

Data terminal block positions 1 through 5 are for a data card in Slot A and 6 through 10 for a data card in Slot B. They can be used as data inputs or outputs, depending on the protocol selected.

With Data Board in the Contact/Data A Slot on the base board:

RS-232

Position 2	Signal to be transmitted out over fiber
Position 4	Signal being received in from fiber
Position 1	Signal common

RS-422/RS-485 4-wire (point-to-point or multidrop)

Position 2	Signal to be transmitted (+) out over fiber
Position 3	Signal to be transmitted (-) out over fiber
Position 4	Signal being received (+) in from fiber
Position 5	Signal being received (-) in from fiber
Position 1	Shield Ground

RS-485 2-wire

Position 2	Signal being transmitted or received (+) over fiber
Position 3	Signal being transmitted or received (-) over fiber
Position 1	Shield Ground

System Terminal Block Connections (Continued)

With Data Board in the Contact/Data B Slot on the base board:

RS-232	
Position 6	Signal to be transmitted out over fiber
Position 8	Signal being received in from fiber
Position 10	Signal common
RS-422/RS-485 4 wire (point-to-point or multidrop)	
Position 6	Signal to be transmitted (+) out over fiber
Position 7	Signal to be transmitted (-) out over fiber
Position 8	Signal being received (+) in from fiber
Position 9	Signal being received (-) in from fiber
Position 10	Shield Ground
RS-485 2-wire	
Position 6	Signal being transmitted or received (+)
	over fiber
Position 7	Signal being transmitted or received (-)
	over fiber
Position 10	Shield Ground

Contact Closure Input/Output Connector on the base board:

Contact terminal block positions 1, 3, 4 and 5 are used as contact inputs and outputs for a contact card in Slot A and positions 7, 8, 9 and 10 are used for a contact card in Slot B.

With Contact Card in the Contact/Data A Slot on the base board:	
Position 4	Contact output (floating)
Position 5	Contact output (floating)
Position 3	Contact or TTL input
Position 1	Contact or TTL input (common to case and power supply)

System Terminal Block Connections (Continued)

With Contact Card in the Contact/Data B Slot on the base board:

Position 8	Contact output (floating)
Position 9	Contact output (floating)
Position 7	Contact or TTL input
Position 10	Contact or TTL input (common to case and power supply)

Indicator LEDs and Alarm Circuitry

The stand-alone box versions of the FiberLink Flex System units have three indicator LEDs that are used to monitor the state of the unit.

POWER (Green):	On: Indicates that correct power has been applied
TX LINK(Green):	
Off:	Indicates no video detected on input BNC and no active data or audio detected to or from transmitter unit.
Steady Green:	Indicates video detected on input BNC and no active data or audio detected to or from transmitter unit
On Blinking Off:	Indicates video detected on input BNC and active data or audio detected to or from transmitter unit
Off Blinking On:	Indicates no video detected on input BNC and active data or audio detected to or from transmitter unit.
RX LINK (Green):	
Off:	Indicates no video detected over fiber and, as a result, no video present on output BNC. No active data or audio detected to or from receiver unit.
Steady Green:	Indicates video detected over fiber and, as a result, video present on output BNC. No active data or audio detected to or from receiver unit.
On Blinking Off:	Indicates video detected over fiber and, as a result, video present on output BNC. Active data or audio detected to or from receiver unit.
Off Blinking On:	Indicates no video detected over fiber and, as a result, no video present on output BNC. Active data or audio detected to or from receiver unit.

The card module units of the FiberLink Flex System have an additional red indicator LED that lights when an alarm condition exits. The card cage unit also provides an output to drive a model 6020 Alarm Sensing Module which provides an audible tone and activates a set of contacts for external signaling purposes.

Troubleshooting

Optical Fiber:
Versions of the FiberLink Flex System are available to operate with most multimode (MM) and single mode (SM) optical fibers. Be certain that the correct size fiber is being used for the particular transmitter/receiver combination.

General:
The status of any of the LINK indicator LEDs should provide the first clue as to the origin of any operation failure. If the RX link LED is off, it usually means that the fiber is broken or has too much attenuation.

Next, be certain that the input and output signal connections are proper. Due to the number of positions, it is possible that there may be wrong connections.

Finally, although multimode and single mode devices may look the same, they will not operate properly together. Using the wrong device or fiber can easily add more attenuation than specified, resulting in poor overall performance.

Data Circuit:
Even when installed exactly as directed, it is possible that the data function may fail to operate properly when using the Flex System units in the RS-485 2-wire auto xmit/receive mode. If this problem occurs, it may be that your units are attempting to interface with other manufacturers' products that have resting states opposite to the way in which your Flex System units are programmed. (No standard exists.) You can compensate for this condition by simply switching the polarities of the (+) and (-) pins. To do this, first swap the Tx (+) and Tx (-) pins with one another and then do the same for the Rx (+) and Rx (-) pins. Make sure to do this on both the transmitter and receiver units.

If, after reviewing the above possibilities, the system is still not operating, please contact the Customer Service Department for further assistance.

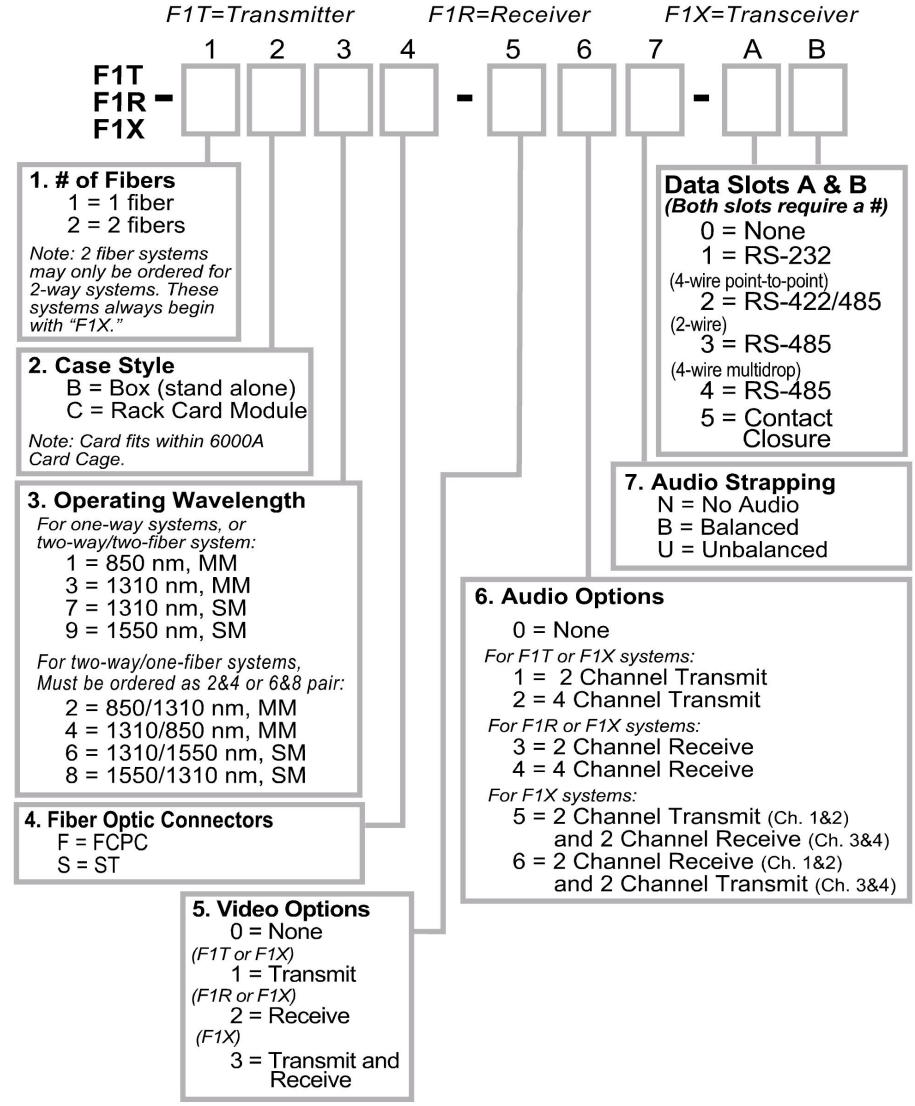
Maintenance and Repairs

The FiberLink® Flex Series has been manufactured using the latest semiconductor devices and techniques that electronic technology has to offer. They have been designed for long, reliable and trouble-free service and are not normally field repairable.

Should difficulty be encountered, Artel Video Systems maintains a complete service facility to render accurate, timely and reliable service of all products.

All other questions or comments should be directed to our Customer Service Department. It should be noted that many "problems" can easily be solved by a simple telephone call.

Flex System Configuration Example



Certifications

Proven Products, Unrivaled Service, and Great Support

- High performance plug and play products
- Stand alone and card cage versions available
- Solutions for most video, audio, and data formats
- Multimode and single mode versions
- Designed and manufactured in the USA
- Training and installation support available
- 24x7x365 technical support available

Artel Video Systems Corp.
5B Lyberty Way,
Westford, MA 01886 USA
T: 978-263-5775
F: 978-263-9755
sales@artel.com
customercare@artel.com
www.artel.com

All specifications subject to change without notice. ©2016
Updated 07/31/2016
CS200-121965-00_I