INFINITYLINK ILC103A

3G/HD/SD-SDI, ASI Transmitter/Receiver

Installation and Operations Manual

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ILC103A Function Module

3G/HD/SD-SDI, ASI Transmitter/Receiver

Installation and Operations Manual

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Artel Video Systems Corporation
5B Lyberty Way
Westford, MA 01886
(978) 263-5775

www.artel.com

Revision history for the *ILC103A Function Module Installation and Operations Manual*.

Table 0-1.   **Manual Revision History**

Revision History			
Revision	**Document Number**	**Date**	**Reason for Change**
A	AR200-006215-00_A	November, 2016	Initial release.

Table of Contents

About This Manual

This manual provides instructions for installing, configuring, and operating the ILC103A function module.

Audience

This manual is intended for the following trained and qualified service personnel who are responsible for installing and operating the ILC103A:

- System installer
- Hardware technician
- System operator

Related Documentation

The following documentation contains material related to the ILC103A:

Document	Provides . . .
ILC103A Data Sheet	Product operating and environmental specifications, and regulatory conformance information.
ILC103A Quick Start Guide	Product configuration information and descriptions of the front panel status LED operations.
InfinityLink IL6000 Installation and Operations Manual	Overview and installation instructions for the InfinityLink media transport platform chassis options, including the following: • IL6000 chassis—Installation of this 4-slot chassis, power supplies, and function modules.
InfinityLink IL6000 Data Sheet	Overview of the InfinityLink IL6000 chassis.
InfinityLink Manager Setup and Operations Manual	Overview and operating instructions for the InfinityLink Manager element management system.

Note: To obtain the latest versions of this manual and related documents, go to www.artel.com.

Symbols and Conventions

This manual uses the following symbols and conventions.

Caution

A caution means that a specific action you take or fail to take could cause harm to the equipment or to the data transmission.

Warning

⚠ A warning describes an action you take or fail to take that could result in death, serious physical injury, or destruction of property.

Note: Important related information, reminders, and recommendations.

Italics—used for emphasis, for indicating the first occurrence of a new term, and for book titles

1.   Numbered list—where the order of the items is important

- Bulleted list—where the items are of equal importance and their order is unimportant

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When requesting assistance, please be ready to provide the following information:

- Your name and telephone number
- Product model and serial number
- Brief description of the problem
- List of symptoms
- Steps you have already taken to try to resolve the problem

If the product is damaged

If any portion of the unit is damaged, forward an immediate request to the delivering carrier to perform an inspection of the product and to prepare a damage report. Save the container and all packing materials until the contents are verified.

Concurrently, report the nature and extent of the damage to Artel Customer Service so that action can be initiated to either repair or replace the damaged items.

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ILC103A Function Module

3G/HD/SD-SDI, ASI Transmitter/Receiver

Information About the ILC103A

This manual introduces the ILC103A function module, which is a flexible, bi-directional fiber optic transport module for all standard digital video formats from 19.39 megabits per second (Mb/s) to 2.97 gigabits per second (Gb/s). The ILC103A supports both compressed and uncompressed HDTV as well as compressed and uncompressed SDTV.

You can configure the ILC103A module as a transmitter, receiver, repeater, transceiver, or distribution amplifier. The ILC103A can transmit and receive independent signals simultaneously. For example, an IL6000 chassis with four ILC103A modules provides four transmit and four receive circuits in a single rack unit. For transmitting and receiving optical signals, the ILC103A uses Small Form Factor Pluggable (SFP) optics.

The ILC103A can transmit and receive external signals using the following built-in options:

- BNC connectors and SFP ports for connecting to external devices

- Backplane connector for connecting to other function modules in the host chassis

Provisioning and monitoring is accomplished using DIP switches, LEDs, front panel monitor jack, or InfinityLink Manager (IL Manager), which is Artel's element management system (EMS). The ILC103A also has a set of major and minor alarms that indicate problems related to the power supplies, optics, temperature, and the input signals.

ILC103A Module Functional Description

The video formats that the ILC103A detects and reclocks include the following:

- Any 2.97 and 2.97/1.001 Gb/s—3G-SDI (SMPTE 424M)

- Any 1.485 and 1.485/1.001 Gb/s—HD-SDI (SMPTE 292M)

- Any 270 Mb/s:

  – SDI (SMPTE 259-C)

  – SDTI (SMPTE 305M)

  – DVB-ASI

Note: For signals other than those listed here, including ATSC 19.39 Mb/s (SMPTE 310), the ILC103A automatically operates in a transparent bypass mode, making it compatible with most video rates.

The ILC103A is compatible with Artel Video SFPs (1310, 1550, CWDM) up to 80 km.

This section contains the following topics:

ILC103A Functional Block Diagrams

This section contains functional block diagrams that illustrate how signals are routed between the ILC103A module's input and outputs depending on which mode you have the module configured to operate in.

This section contains the following topics:

Receiver Mode Functional Block Diagram

Figure 1 shows the functional block diagram for a ILC103A configured to operate in receiver mode where the SFP optical receive signal is routed to the BNC and backplane electrical output connectors.

Figure 1.   ILC103A Module Functional Block Diagram: Receiver Mode
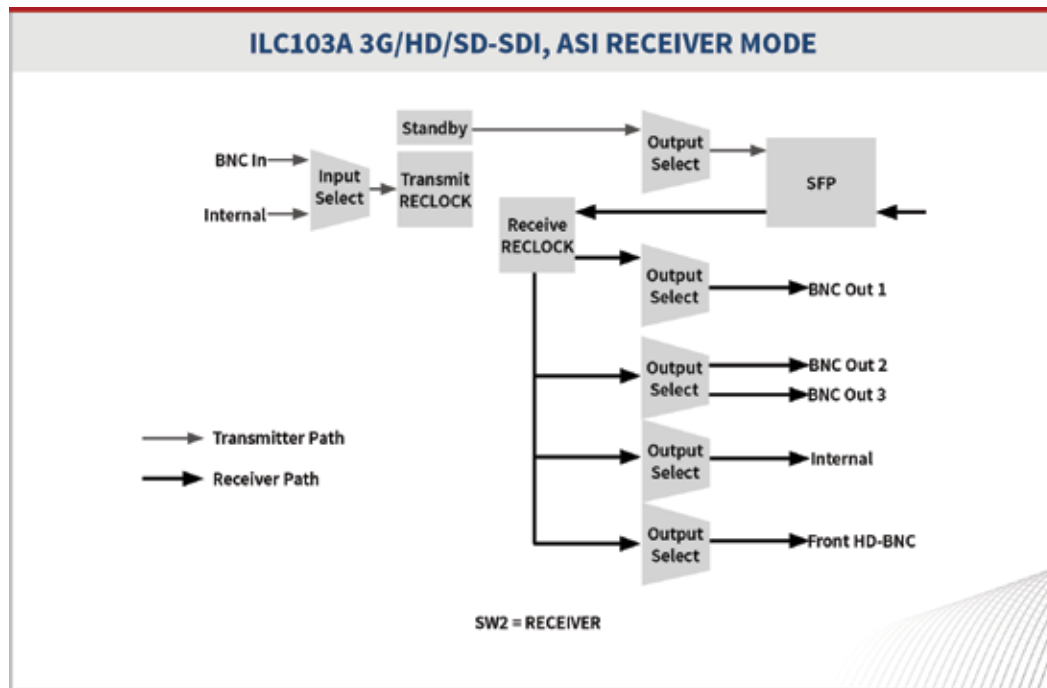
Note: When the ILC103A is operating in receiver mode, the BNC OUT 1 output is valid only when SW3:S5 is set to ON (see the "Setting the SW3 Configuration DIP Switch" section on page 13).

Note: Artel ships the ILC103A configured to operate in receiver mode.

Transmitter or Distribution Amplifier Mode Functional Block Diagram

Figure 2 shows the functional block diagram for a ILC103A configured to operate in transmitter or distribution amplifier (DA) mode where an electrical input from the BNC IN or backplane connector is made available to SFP TX (optical) and the BNC and backplane connectors (electrical).

Figure 2.   ILC103A Module Functional Block Diagram: Transmitter or DA Mode
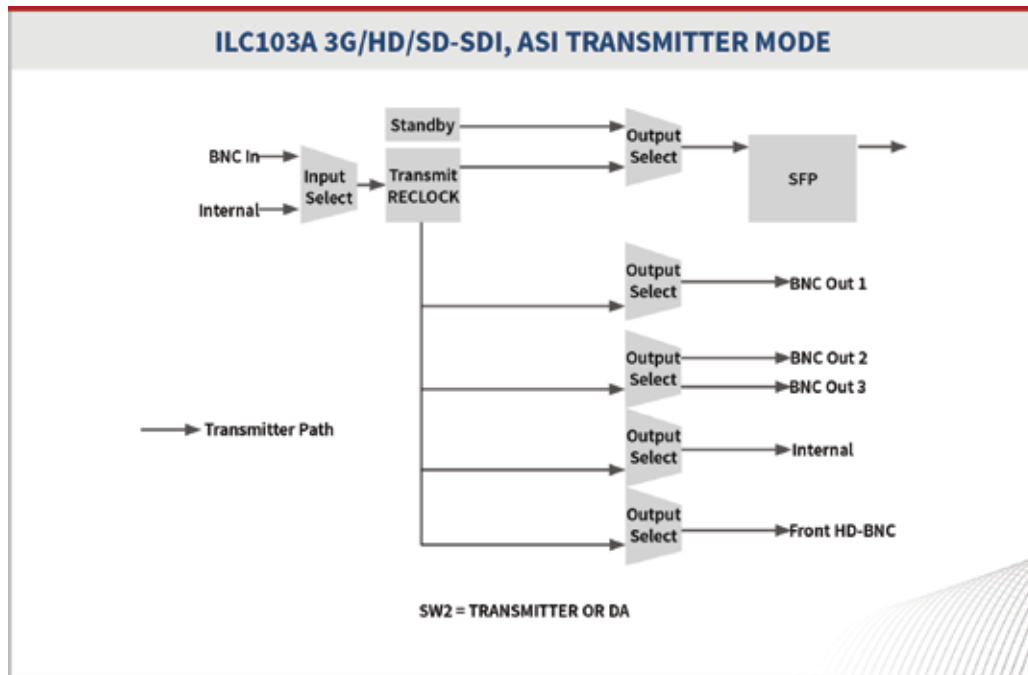
Note the following when the ILC103A is operating in transmitter or DA mode:

- In transmitter mode, the ILC103A issues an alarm if the SFP is missing or malfunctioning.

- In DA mode, the ILC103A does not issue an alarm if the SFP is missing.

- In both modes, the BNC OUT 1 output is the same regardless of how SW3:S5 is set.

Transceiver Mode Functional Block Diagram

Figure 3 shows the functional block diagram for a ILC103A configured to operate in transceiver mode, which combines the functionality of the receiver mode with the transmitter mode. The ILC103A operates as follows in transceiver mode:

- SFP optical receive signal is made available to all BNC and backplane electrical outputs.

- BNC IN or backplane electrical receive signal is made available to SFP TX (optical) and optionally to BNC OUT 1 (electrical).

Figure 3.   **ILC103A Module Functional Block Diagram: Transceiver or DA Mode**

Repeater Mode Functional Block Diagram

Figure 4 shows the functional block diagram for a ILC103A configured to operate in repeater mode where the SFP optical receive signal is made available to the SFP TX connector (optical) and the BNC and backplane electrical connectors.

Figure 4.   ILC103A Module Functional Block Diagram: Repeater Mode
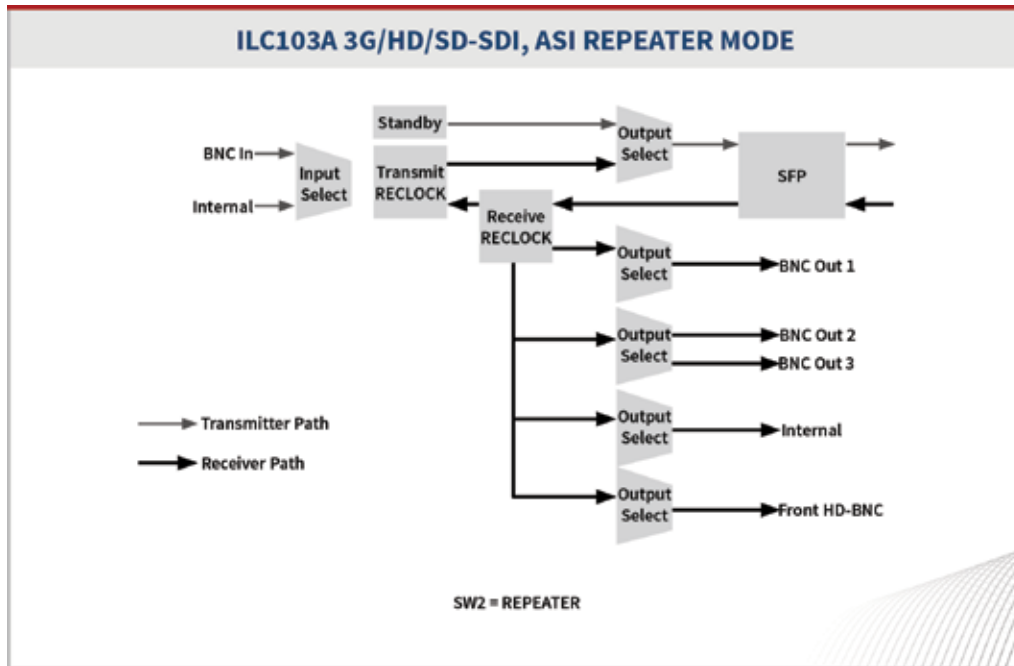
Note the following when the ILC103A is operating in repeater mode:

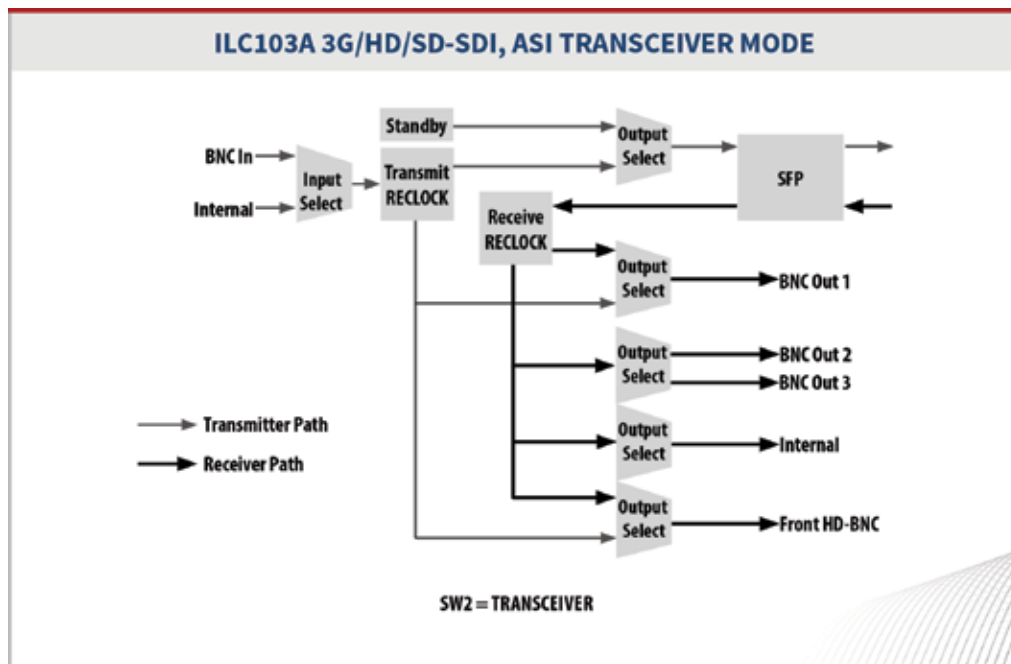- The BNC OUT 1 output is the same regardless of how SW3:S5 is set.

- The video monitor (MON) output is the same regardless of how it is set (TX or RX).

Signal Paths

The ILC103A contains the following two primary signal paths:

- Electrical input to optical transmit (transmitter mode)

- Optical receive to electrical output (receiver mode)

Both hardware and software provide flexibility in routing, such as allowing optical to optical repeater and the selection of input and output paths.

The ILC103A allows you to select one the following transmitter sources:

- Electrical input from BNC IN or one of the other host chassis slots (transmitter and transceiver modes)

- Optical receiver output (repeater mode)

The monitor output is selectable to allow access to the optical transmit or receive paths.

Electrical Input

The electrical input is a precision 75 Ohm BNC (IN) and includes an automatic cable equalizer. This input passes through a multi-rate reclocker that detects the signal rate but is format transparent.

When no electrical input signal is connected, the ILC103A transmits a standby signal to the optical receiver to maintain the optical link between modules.

Note: For optimal performance, follow the recommendations stated in the ILC103A data sheet for cable lengths and cable types.

Electrical Outputs

The electrical outputs are three precision 75 Ohm BNCs (OUT 1, OUT 2, and OUT 3). Electrical outputs are provided on the output BNCs with coax drivers directly connected to the reclocker. The electrical output signals are also made available to the function modules located in the remaining chassis slots using the chassis backplane.

The 75 Ohm HD-BNC monitor jack (MON) located on the front panel also provides an electrical output. The user-selectable signals on this connector are the signals that the ILC103A optically transmits or receives.

Note: For optimal performance, follow the recommendations stated in the ILC103A data sheet for cable lengths and cable types.

Optical Input and Output

The optical interface is provided by installing one of a variety of Video SFPs available from Artel into the SFP socket. Consult Artel for available SFP options including reach and fiber type.

ILC103A Module Overview

Figure 5 provides a view of the major components of the ILC103A.

Figure 5.   ILC103A Module Major Components
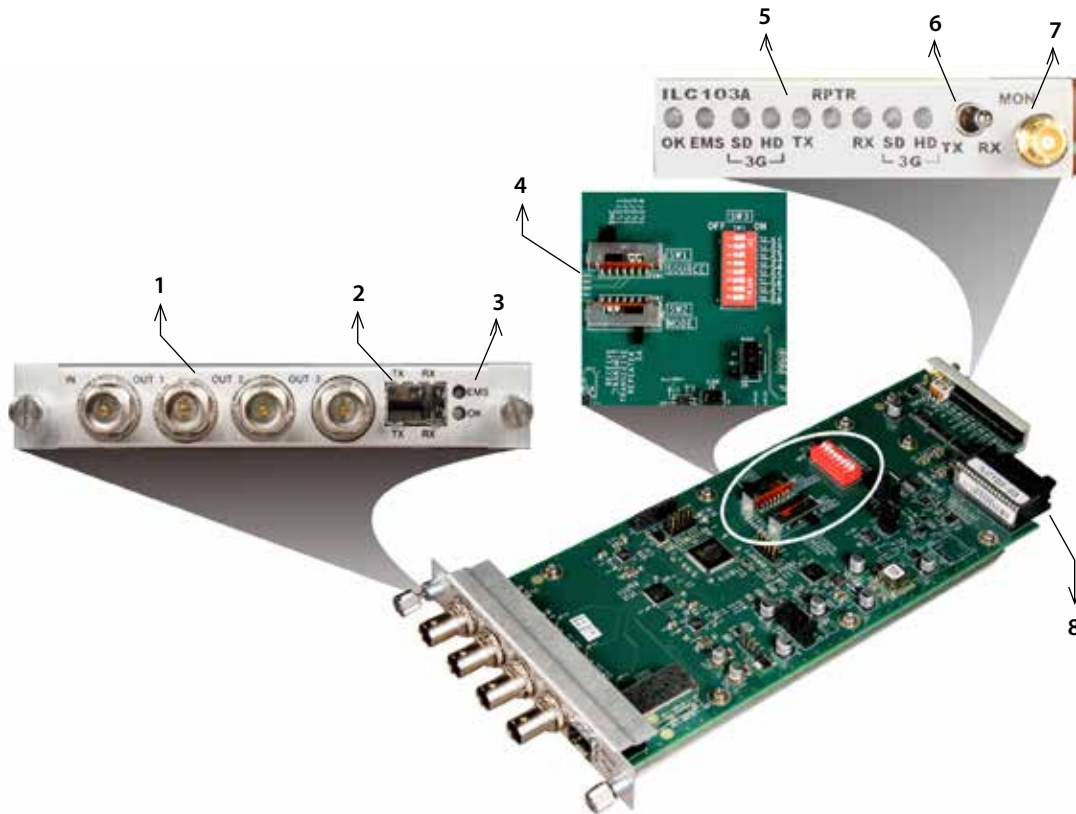
Table 1 describes the components called out in Figure 5.

Table 1.   ILC103A Elements

Item	ILC103A Element	for details, see...
1	Rear panel BNC connectors for the following electrical connections: • IN—Video in • OUT 1—Video out 1 • OUT 2—Video out 2 • OUT 3—Video out 3	Cabling the ILC103A Module (page 17)
2	SFP socket for the following optical connections: • TX—Transmit • RX—Receive	Cabling the ILC103A Module (page 17)

Table 1.   **ILC103A Elements (Continued)**

Item	ILC103A Element	for details, see...
3	Rear panel status LEDs as follows: • EMS—Element Management System indicator • OK—Alarm indicator	Understanding the Status LEDs (page 18)
4	Configuration switches: • SW1—Transmit source select • SW2—Mode select • SW3—3G disable, reclocking disable, OUT 1 configuration, SFP alarm disable, video loss alarm enable, and EMS control disable	• Setting the SW1 Transmit Source Select Switch (page 12) • Setting the SW2 Mode Select Switch (page 11) • Setting the SW3 Configuration DIP Switch (page 13)
5	Front panel status LEDs: • OK—Alarm indicator • EMS—Element Management System indicator • SD—Standard definition and ASI transmit indicator* • HD—High definition transmit indicator* • TX—Transmit signal indicator • RPTR—Repeater indicator • RX—Receive signal indicator • SD—Standard definition and ASI receive indicator* • HD—High definition receive indicator* * The SD and HD LEDs are used in combination for the 3G indicator.	Understanding the Status LEDs (page 18)
6	Front panel monitor select switch that determines the signal available at the monitor output jack. Switch operation depends on the ILC103A operating mode.	Using the Monitor Jack (page 21)
7	Front panel monitor 75 Ohm HD-BNC output jack (MON).	
8	Backplane connector that provides power to the module, allows the module to share signals with other function modules, and is used for alarm and management signals.	N/A

Note: When the ILC103A has been configured by IL Manager and the EMS LED is illuminated, the on-board switches no longer have any effect.

Configuring the ILC103A Module Operation

This section describes how to configure the ILC103A mode of operation and the function of the transmit and receive signal connections. The three switches that control the functionality of the ILC103A are as follows:

- SW1: Transmit source slide switch

- SW2: Mode select slide switch

- SW3: Configuration attributes DIP switch

Note: You configure the ILC103A while the module is out of the host chassis because the configuration switches are mounted to the top of the module printed circuit board (see Figure 5).

Artel ships the ILC103A configured to operate in receiver mode, which means that the ILC103A operates as follows:

- Operating mode: Receive
  A function of the SW2 switch, the ILC103A receives an optical signal and transmits an electrical signal.

- Transmit signal source: SFP RX
  The ILC103A transmits electrically the optical signal that it receives through the SFP RX connector.

- TX 3G operation: Enabled
  A function of SW3, the ILC103A accepts electrical 3 Gbps signals.

- RX 3G operation: Enabled
  A function of SW3, the ILC103A accepts optical 3 Gbps signals.

- TX reclock: Auto
  A function of SW3, transmit signals are reclocked.

- RX reclock: Auto
  A function of SW3, receive signals are reclocked.

- Signal at OUT1
  A function of SW3, the output signal of BNC OUT1 is the same as BNC OUT 2 and 3.

- SFP alarms: Enabled
  A function of SW3, the ILC103A issues an alarm when the SFP is not installed or is malfunctioning.

- Video-loss alarm: Disabled
  A function of SW3, the ILC103A does not issue an alarm when it does not detect an input video signal.

- EMS override: Remote
  A function of the SW3 switch, IL Manager can change the ILC103A configuration.

When installing a new ILC103A, you modify the settings of the configuration DIP switches only when you need to modify the functionality of the ILC103A module. For example, to disable the 3G operation and block 3G signals, you modify the settings of the SW3 configuration DIP switch as described in this section.

This section contains the following topics:

Setting the SW2 Mode Select Switch

To select the operating mode for your ILC103A, use the SW2 mode select switch.

Figure 6. **SW2 Mode Select Switch**
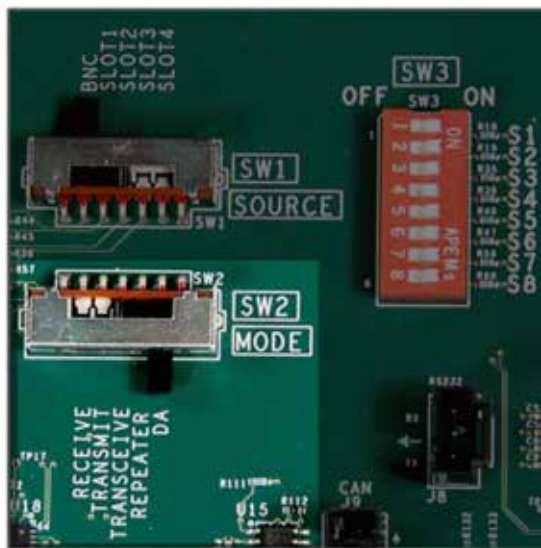
Table 2 describes the operating mode options.

Table 2. **SW2 Mode Select Switch Settings**

Setting	The ILC103A module . . .	Electrical Signal				Optical Signal	
		IN	OUT1	OUT2	OUT3	RX	TX
RECEIVE	Receives optical signals only. The SFP laser used to transmit signals is turned off and the transmit alarms are disabled. Artel ships the ILC103A module set for receive mode.		X	X	X	X	
TRANSMIT	Transmits signals only. The SFP receiver is disabled and the receive alarms are disabled.	X	X	X	X		X
TRANSCEIVE	Receives and transmits signals. The SFP laser and receiver are enabled as are the associated alarms.	X	X	X	X	X	X

Table 2. **SW2 Mode Select Switch Settings** (Continued)

| Setting | The ILC103A module . . . | Electrical Signal | | | | Optical Signal | |
		IN	OUT1	OUT2	OUT3	RX	TX
REPEATER	Reclocks the received optical signal and transmits the signal back out. The optical receive signal is also available on the electrical outputs.		X	X	X	X	X
DA	Distributes the electrical input signal to all three electrical outputs and the optional SFP transmitter.[1]	X	X	X	X		X

1. If the SFP is not installed, there is no SFP alarm. If it is installed, the input signal is sent to the SFP TX.

Setting the SW1 Transmit Source Select Switch

To specify the input source that the ILC103A is to use, use the SW1 transmit source select switch.

Figure 7. **SW1 Transmit Source Select Switch**
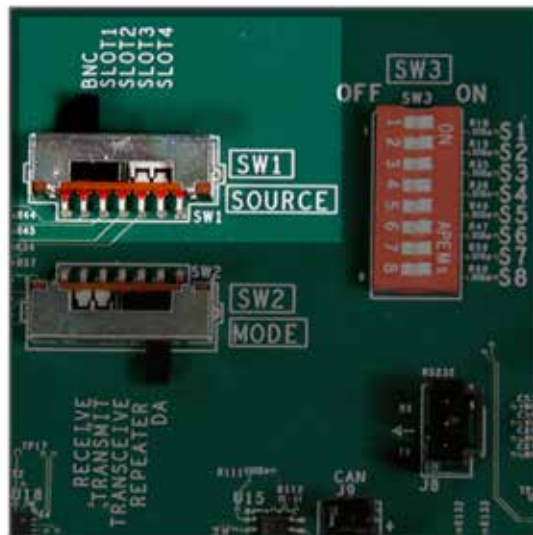
Slide the switch to select the required transmit source:

- **BNC**—Transmit source is the BNC IN connector. This is the default setting.

- **Slot 1, Slot 2, Slot 3, or Slot 4**—Transmit source is the output of the function module located in the corresponding chassis slot number.

Setting the SW3 Configuration DIP Switch

The SW3 configuration DIP switch determines the ILC103A operating parameters, such as allowing 3G signals, signal reclocking, and alarm notifications.

Figure 8.   SW3 Configuration DIP Switch
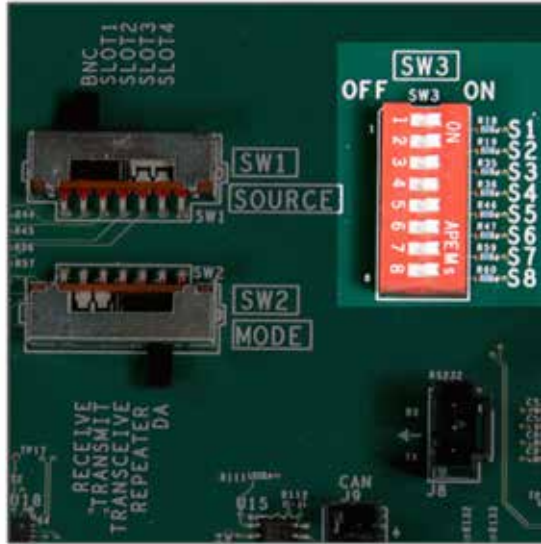
Table 3 describes the SW3 configuration options. The factory-set configuration settings are shown in bold type.

Table 3.   SW3 Configuration DIP Switch

Function	Selected Operation	Position							
		S1	S2	S3	S4	S5	S6	S7	S8
TX 3G	Enabled: 3G-SDI signal operation enabled in the transmit direction.	**ON**							
	Disabled: 3G-SDI signal operation disabled in the transmit direction.	OFF							
RX 3G	Enabled: 3G-SDI signal operation enabled in the receive direction.		**ON**						
	Disabled: 3G-SDI signal operation disabled in the receive direction.		OFF						

Table 3. SW3 Configuration DIP Switch (Continued)

Function	Selected Operation	Position							
		S1	S2	S3	S4	S5	S6	S7	S8
TX Reclock	Auto: Automatically reclocks SD (270 Mb/s) and HD (1.485 Gb/s, 1.485/1.01 Gb/s) signals in the transmit direction and passes through all other rates.			**ON**					
	Bypass: Allows all rates to pass through without reclocking. **Note:** Although all rates are passed without reclocking, faster signals may contain unacceptable jitter.			OFF					
RX Reclock	Auto: Automatically reclocks SD (270 Mb/s) and HD (1.485 Gb/s, 1.485/1.01 Gb/s) in the receive direction and passes through all other rates.				**ON**				
	Bypass: Allows all rates to pass through without reclocking. **Note:** Although all rates are passed without reclocking, faster signals may contain unacceptable jitter.				OFF				
OUT1 Signal	Same as BNC OUT2 and OUT3.					**ON**			
	Same as SFP TX.					OFF			
SFP Alarm	Enabled: Alarm generated when no SFP is detected or when the SFP causes an alarm.						**ON**		
	Disabled[1]: No alarm generated when the SFP is not detected.						OFF		
Video Loss Alarm	Disabled: No alarm generated when a video input signal is not detected.							**ON**	
	Enabled: Major alarm generated when a video input signal is not detected.							OFF	
EMS Override	Enabled: IL Manager can change the module configuration.								**ON**
	Disabled: IL Manager cannot change the module configuration.[2]								OFF

1. Disable the SFP alarms when you do not install an SFP because you want the output signal available at the backplane connectors only.

2. If the module is operating in EMS Override mode, as indicated by a green EMS LED on the front panel, then the EMS Override DIP switch has no effect until you use IL Manager to take the module out of override mode and set it to local mode (see the *InfinityLink Manager Setup and Operations Manual*).

Installing the ILC103A Module and SFP

The ILC103A module and associated SFP are hot swappable, enabling you to safely install them while power is applied to the host chassis.

Before installing your ILC103A, do the following:

- See the ILC103A data sheet for a detailed description of the ILC103A product specifications including environmental requirements that you must adhere to when installing the module.

- Ensure that you have configured the module for your specific application (see the "Configuring the ILC103A Module Operation" section on page 10).

To install the ILC103A in the host chassis (see Figure 9), perform the following steps:

1. From the back of the host chassis, remove the two screws that secure the blank tray to one of the unused function module slots (if necessary). Use any available function module slot.

2. Slide the ILC103A into the slot using the printed circuit board guide rails located on both sides of the slot.

3. Push the ILC103A in until it is firmly seated into the backplane and flush with the chassis.

4. Tighten the two mounting screws that secure the module to the chassis.

   Note: Failure to properly secure the ILC103A to the chassis with the two mounting screws can result in disconnecting the module from the backplane when you attach a cable to the monitor connector located on the front panel.

5. Install the SFP into the ILC103A with the handle on top as shown in Figure 9. Push the SFP into the socket located on the right side of the function module until it is firmly seated into the socket.

   Note: When you do not install an SFP, the TX and RX status LEDs located on the ILC103A front panel both flash. See Table 4 for other status LED indications.

6.   Repeat this procedure for each ILC103A that you are installing in the host chassis.

Figure 9.   ILC103A Module and SFP Installation
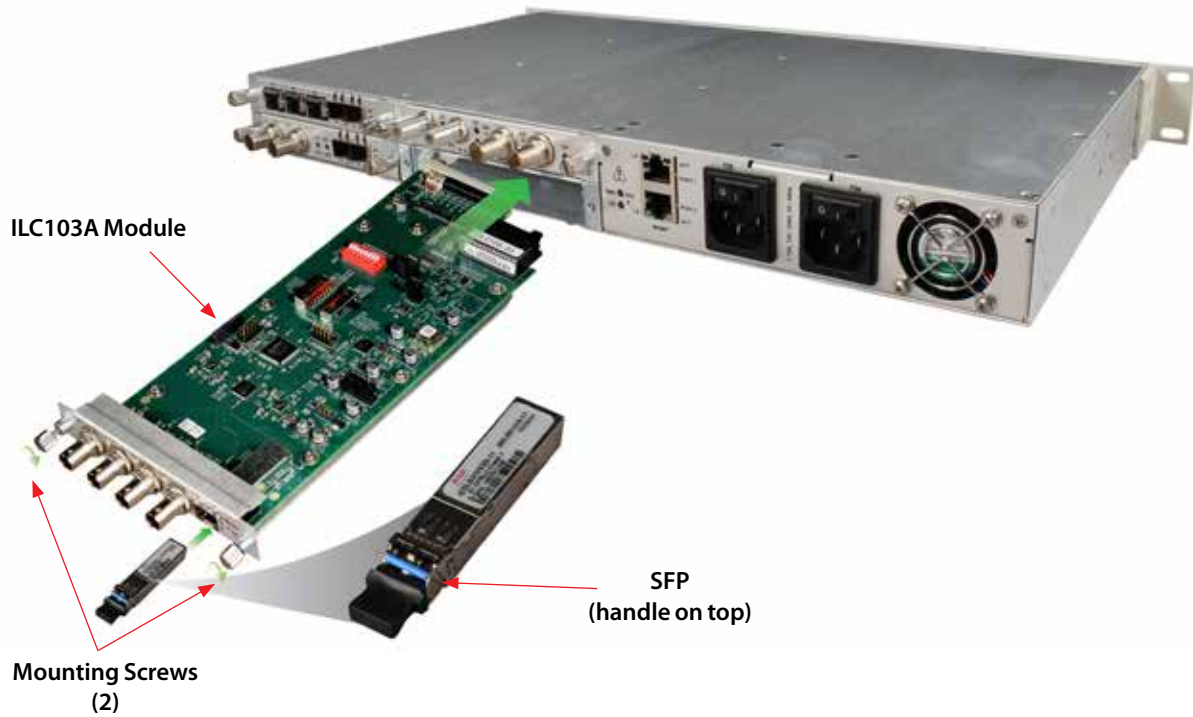
Note: Insert a blank tray in any unused chassis module slots to maintain proper ventilation.

Cabling the ILC103A Module

The ILC103A allows you to transmit and receive signals over electrical and fiber optic cable connections. The cabling configuration that you use depends on your application. You can have electrical in and out, optical in and out, or any combination of the two. The electrical and optical connectors are located on the back panel of the ILC103A.

Figure 10.   **ILC103A BNC Electrical and SFP Optical Connectors**

Note: When handling fiber optic cables, adhere to the standard safety practices for handling a Class 1 laser product.

This section contains the following topics:

Cabling the Electrical Connections

Use a high quality 75 Ohm precision video coax cable, such as Belden 1694A cable, when cabling to the ILC103A BNC connectors.

To cable the electrical connections, perform the following tasks:

- Input signal—Connect the signal cable to the ILC103A BNC receive connector (IN) and the source device's electrical transmit connector.
- Output signal—Connect the electrical cable to one or more of the following ILC103A BNC connectors and the destination device's electrical receive connector:
    - OUT 1
    - OUT 2
    - OUT 3

Cabling the Optical Connections

Use a single mode fiber when connecting to the LC connectors on the ILC103A SFP.

To cable the optical connections, perform the following tasks:

1. Remove the SFP safety plug that protects the TX and RX ports. Cover any unused optical port to keep the port clean.

2. Cable the optical connections as follows:

- Receive signal—Connect the fiber optic cable to the source device's optical transmit connector and the SFP receive optical connector (RX) on the ILC103A module.

- Transmit signal—Connect the fiber optic cable to the destination device's optical receive connector and the SFP transmit optical connector (TX) on the ILC103A module.

Monitoring the ILC103A Module Operations

You monitor the operation of the ILC103A using the status LEDs and monitor jack located on the front panel of the module.

Figure 11.   ILC103A Status LEDs and Monitor Connector

Note: You can also use IL Manager to monitor the module operations (see the *InfinityLink Manager Setup and Operations Manual*).

This section contains the following topics:

- Understanding the Status LEDs (page 18)

- Using the Monitor Jack (page 21)

Understanding the Status LEDs

Table 4 describes the different states of the ILC103A status LEDs (see Figure 11).

Table 4.   ILC103A Status LEDs

LED		Indicates . . .	State	Description	Alarms	Action
OK (also located on the rear panel (see Figure 10))		ILC103A status	Off	If power is applied to the system, an internal fault with the ILC103A may exist.	None	Replace the ILC103A.
			Green	Normal operation.	None	None.
			Yellow	If the RX LED is not flashing yellow, then a temperature alarm is indicated.	Minor	Address the problem indicated by the RX alarm or check that there is adequate inlet and exhaust airflow.
			Red	TX or RX LEDs may indicate the cause of the alarm or the alarm condition can indicate an internal error.[1]	Major	Address the problem indicated by the TX or RX alarm or replace the ILC103A.
EMS (also located on the rear panel (see Figure 10))		Element Management System (IL Manager) status	Off	Module is in local mode and its configuration is controlled by the onboard configuration switches.	None	None.
			Green	Module is in remote mode and the configuration has been set by the IL Manager EMS. When in remote mode, the actual configuration of the module will likely not match the settings of the configuration switches and changing the configuration switches will have no effect on the module's operation.	None	None.
TX	SD	270Mb/s SDI, ASI (and 2.97Gb/s) status	Off	SD/ASI signal is not detected (also 3G signal not detected).	None	None.
			Green	SD/ASI signal is detected (or 3G signal detected when TX HD LED is also Green).	None	None.
			Red	3G signal is detected, but blocked (when TX HD LED is also Red).[2]	Major	Check the ILC103A configuration.
	HD	1.485 Gb/s SDI (and 2.97Gb/s) status	Off	HD signal is not detected (also 3G signal not detected).	None	None.
			Green	HD signal is detected (or 3G signal detected when TX SD LED is also Green).	None	None.
			Red	3G signal is detected, but blocked (when TX SD LED is also Red).[2]	Major	Check the ILC103A configuration.

Table 4.   ILC103A Status LEDs (Continued)

LED		Indicates . . .	State	Description	Alarms	Action
TX		Transmitter status	Off	Receiver mode is selected.	None	None.
			Green	Normal TX operations (input signal is present). An unknown rate is indicated if the TX SD and TX HD LEDs are off.	None	None.
			Yellow	Standby operation (no input signal).	None.	Check the source signal.
			Red (flashing)	No SFP is installed or an SFP failure exists.[3]	Major	Install the SFP or replace the existing one. Check the ILC103A configuration.
RPTR		Repeater status	Off	Repeater mode is not selected.	None	None.
			Green	Repeater mode is selected.	None	None.
RX		Receiver status	Off	Transmitter mode is selected.	None	None.
			Green	Normal RX operations (input signal is present). An unknown rate is indicated if the RX SD and RX HD LEDs are off.	None	None.
			Yellow	Standby signal is detected.	None	None.
			Yellow (flashing)	Receive optical power is high.	Minor	Check the input signal.
			Red (flashing)	Low light, loss of SFP RX signal, or an SFP failure exists.[3]	Major	Apply proper optical signal, install the SFP, or replace the SFP.
RX	SD	270Mb/s SDI, ASI (and 2.97Gb/s) status	Off	SD/ASI signal is not detected (also 3G signal not detected).	None	None.
			Green	SD/ASI signal is detected (or 3G signal detected when HD LED is also Green).	None	None.
			Red	3G signal is detected, but blocked (when RX HD LED is also Red).[2]	Major	
	HD	1.485 Gb/s SDI (and 2.97Gb/s) status	Off	HD signal is not detected (also 3G signal not detected).	None	None.
			Green	HD signal is detected (or 3G signal detected when RX SD LED is also Green).	None	None.
			Red	3G signal is detected, but blocked (when RX SD LED is also Red).[2]	Major	Check the ILC103A configuration.

1. A red OK LED can also indicate loss of video when the Video Loss Alarm is enabled.

2. 3G is blocked when a non-3G SFP is installed and a 3G signal is applied, or when SW3:S1 (TX 3G) or SW3:S2 (RX 3G) are set to OFF.

3. TX and RX flashing red together indicates either no SFP is installed or that an unsupported SFP is installed (for example, a non-video DWDM SFP).

Using the Monitor Jack

To monitor the ILC103A transmit and receive signals, perform the following steps:

1. Connect the monitor cable to the 75 Ohm HD-BNC monitor jack (MON) located on the ILC103A front panel (see Figure 11).

2. Switch the monitor select switch to the desired position as follows:

Operating Mode	Switch Setting	
	TX	RX
Receiver (see Figure 1)	View signal being received optically and transmitted electrically.	No signal.
Transmitter or DA (see Figure 2)	View signal being received and transmitted electrically.	No signal.
Transceiver (see Figure 3)	View signal being received electrically and transmitted optically.	View signal being received optically and transmitted electrically.
Repeater (see Figure 4)	View signal being received optically and transmitted optically and electrically.	Same as TX.

Removing the SFP and ILC103A Module

You can safely remove either the SFP from the ILC103A or the ILC103A from the host chassis while power is applied to the module.

This section contains the following topics:

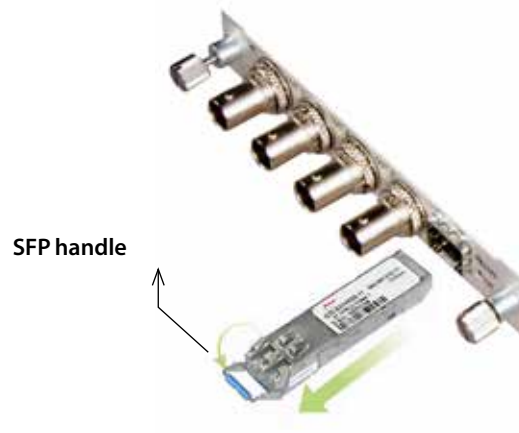- Removing the SFP (page 21)
- Removing the ILC103A Module (page 22)

Removing the SFP

To remove the SFP from the ILC103A, perform the following steps:

1. Remove the fiber optic cables from the SFP.

2. Pull down on the SFP handle to unlock the SFP from the ILC103A module (see Figure 12).

3.   Using the SFP handle, pull the SFP out of the ILC103A.

Figure 12.   Removing the SFP

SFP handle

Removing the ILC103A Module

To remove the ILC103A from the host chassis, perform the following steps:

1.   Remove the fiber optic cables from the ILC103A SFP.

2.   Remove the coaxial cables from the BNC connectors.

3.   Loosen the two mounting screws that secure the ILC103A to the host chassis.

4.   Using the two mounting screws, pull the ILC103A out of the host chassis.

Caution

To avoid problems associated with overheating, do not leave a function module slot open when power is applied to the chassis. Every module slot must contain a module or blank tray to ensure proper ventilation when power is applied.

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