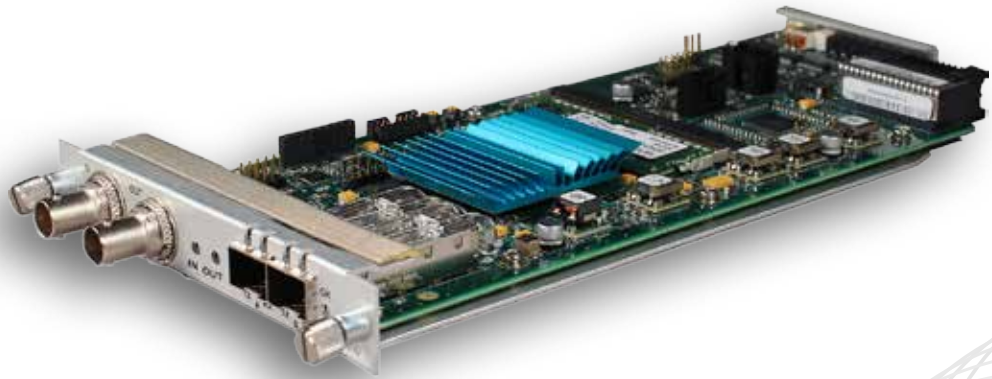




DIGILINK DLC910 FUNCTION MODULE



Quad 3G/HD/SD Multiviewer Installation and Operations Manual



DLC910 Function Module

Quad SD-HD-3G SDI Multiviewer

Installation and Operations Manual

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Revision history for the *DLC910 Function Module Installation and Operations Manual*.

Table 0-1. Manual Revision History

Revision History			
Revision	Document Number	Date	Reason for Change
A	AR200-008910-B03_A	April, 2016	Initial release.
B	AR200-008910-B03_B	December, 2016	Updated copy and images.



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About This Manual

This manual provides instructions for installing, configuring, and operating the DLC910 function module.

Audience

This manual is intended for the following trained and qualified service personnel who are responsible for installing and operating the DLC910 module:

- System installer
- Hardware technician
- Artel Customer Support

Related Documentation

The following documentation contains material related to the DLC910 function module:

Document	Provides . . .
<i>DLC910 Data Sheet</i>	Product operating and environmental specifications, and regulatory conformance information.
<i>DLC910 Quick Start Guide</i>	Product configuration information and descriptions of the front and rear panel status LED operations.
<i>DigiLink Media Transport Platform Chassis Installation and Operations Manual</i>	Overview and installation instructions for the DigiLink media transport platform chassis options, including the following: <ul style="list-style-type: none">• DL4360X chassis—Installation of this 12-slot chassis, power supplies, switch module, and function modules.• DL4300 chassis—Installation of this 12-slot chassis, power supplies, and function modules.• DL4000 chassis—Installation of this 4-slot chassis, power supplies, and function modules.
<i>DigiLink Media Transport Platform Chassis Data Sheet</i>	Overview of the DigiLink media transport platform chassis options.
<i>DigiLink Manager Setup and Operations Manual</i>	Overview and operating instructions for the DigiLink Manager element management systems including instructions for updating software and firmware remotely.

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

Artel Customer Service

You can reach Customer Service by e-mail at customer@artel.com or by telephone:

In the US call (800) 225-0228, then select 1 for technical support.

Outside the US call (978) 263-5775, then select 1 for technical support.

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.

Do not return any items to Artel until you obtain instructions from Customer Service.

Report the problem or deficiency to Customer Service along with the model number and serial number. Upon receipt of this information, Artel will provide service instructions, or a *Return Authorization Number* and shipping information.

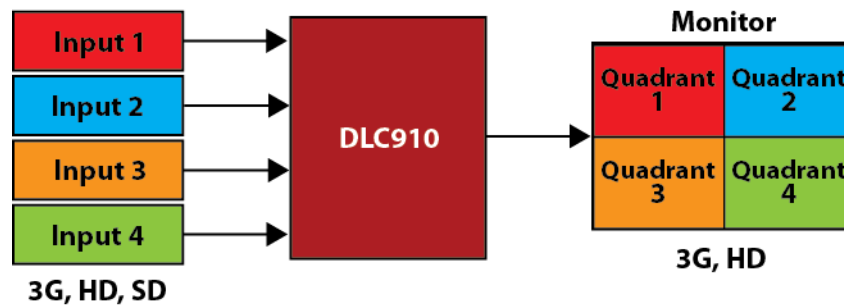
DLC910 Function Module

Quad SD-HD-3G SDI Multiviewer

Information About the DLC910 Module

This manual introduces the DLC910 function module and includes information for installing and configuring the module. The DLC910 enables users to monitor the status of up to four independent SD, HD, and 3G-SDI video and audio channels.

Figure 1. DLC910 Quad SD-HD-3G SDI Multiviewer



Additional features include the following:

- Automatic video format detection and display
- Audio detection with visual activity displays
- 16 character labels per monitor quadrant (quad)
- Automatic aspect ratio
- Quad or full screen display
- Wide options for inputs and output are available using external BNCs, optical or HDMI SFPs, or other modules in a chassis using DigiLink's innovative integrated routing capabilities

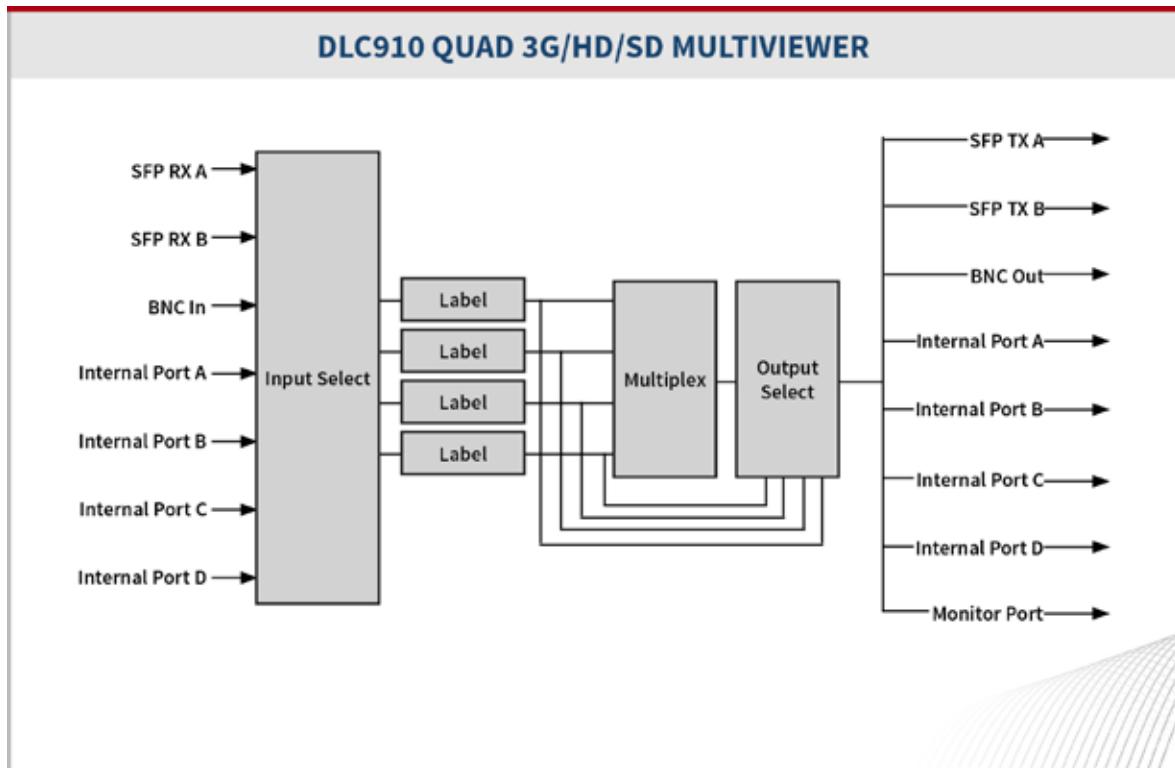
Provision and monitor the DLC910 modules as follows:

- Provision and monitor the module remotely using DigiLink Manager. For more information, see the *DigiLink Manager Setup and Operations Manual*.
- Monitor the module locally using the front and rear panel status LEDs.
- Update software and firmware remotely using DigiLink Manager. For more information, see the *DigiLink Manager Setup and Operations Manual*.

DLC910 Module Functional Description

This section provides a functional description of the DLC910 module, including [Figure 2](#), which is a functional block diagram of the module.

Figure 2. DLC910 Module Functional Block Diagram



Module Inputs and Outputs

The DLC910 module uses the following inputs and outputs:

- Two electrical rear panel connections as follows:
 - One input BNC connector (IN).
 - One output BNC connector (OUT).
- Two rear panel SFP transceiver sockets that support the use of optical, HD-BNC, or HDMI SFPs. For details, see the ["Supported SFP Types" section on page 3](#).
- Backplane connections for sharing signals with other host chassis modules.
- Front panel 75 Ohm HD-BNC output jack (MON) for local signal monitoring (see the ["Using the Monitor Jack" section on page 11](#)).

Input Formats

The DLC910 supports the following input formats:

- 720 x 480i 59.94
- 720 x 576i 50
- 1280 x 720p, 23.98, 24, 25, 29.97, 30, 50, 59.94, 60 frame rate
- 1920 x 1080i, 48, 50, 59.94, 60 field rate
- 1920 x 1080p, 23.98, 24, 25, 29.97, 30, 50, 59.94, 60 frame rate

Output Formats

The DLC910 supports the following user-selectable output formats:

- 720p, 50 or 59.94 frame rate
- 1080i, 50 or 59.94 field rate
- 1080p, 50 or 59.94 frame rate

Supported SFP Types

The DLC910 supports the following SFP types:

Optical

The DLC910 can transmit the combined multiviewer output over any Artel standard optical SFP. You can use this SFP type in a transport system to provide remote viewing of the multi-viewer output. The receiver portion of an Artel SFP can also be used as a source for the multi-viewer.

HD-BNC

Artel HD-BNC SFPs can simultaneously transmit and receive. The DLC910 can transmit the combined multi-viewer output over coax cable using the transmitter portion of an Artel DLSEHDBNC. This feature enables you to route the signal to another module or other local equipment. You can use the receiver portion of an Artel DLSEHDBNC as a source for the multi-viewer.

HDMI

Artel HDMI transmitter SFPs are available. The DLC910 can transmit the combined multi-viewer output to an HDMI monitor using an Artel DLSEHDMI-TX. This feature enables you to route the signal to a monitor, television, or similar equipment.

Overview of the DLC910 Module

This section provides an overview of the components that make up the DLC910 module.

Figure 3. DLC910 Module Major Components

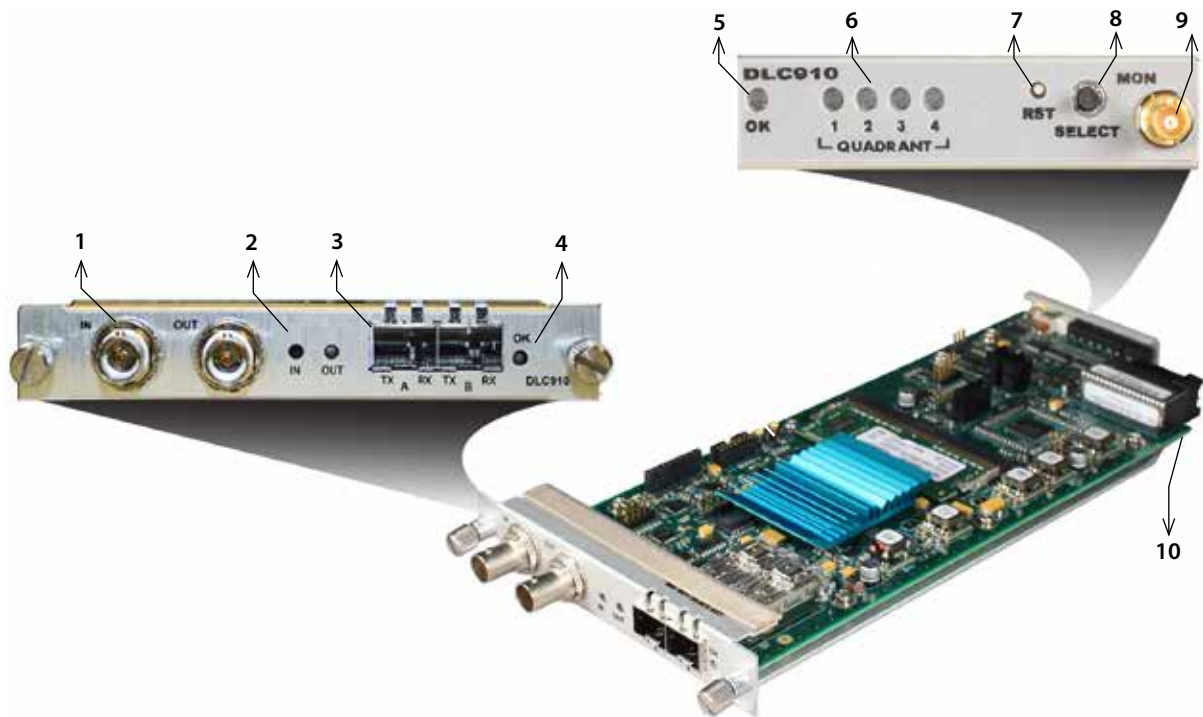


Table 1. DLC910 Elements

Item	Module Element	for details, see...
1	Rear panel BNC connectors for the following electrical connections: <ul style="list-style-type: none"> IN—Video in OUT—Video out 	<ul style="list-style-type: none"> Cabling the BNC Connections (page 7)
2	Signal indicator LEDs: <ul style="list-style-type: none"> IN—Input signal OUT—Output signal 	<ul style="list-style-type: none"> Understanding the Rear Panel Status LEDs (page 11)
3	SFP sockets A and B.	<ul style="list-style-type: none"> Supported SFP Types (page 3) Cabling the SFP Connections (page 7) Understanding the Rear Panel Status LEDs (page 11)
4	Rear panel alarm indicator OK LED.	Understanding the Rear Panel Status LEDs (page 11)

Table 1. DLC910 Elements (Continued)

Item	Module Element	for details, see...
5	Front panel alarm indicator OK LED.	Understanding the Front Panel Status LEDs (page 10)
6	Front panel status indicator LEDs for Quadrants 1, 2, 3, and 4.	
7	Front panel reset switch (RESET) to reset the DLC910 module.	Using the DLC910 Reset Switch (page 14)
8	Monitor select switch (SELECT) to select the output to the monitor jack: Full 1, Full 2, Full 3, or Full 4.	Using the Monitor Jack (page 11)
9	Front panel monitor 75 Ohm HD-BNC output jack (MON).	
10	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.	Configuring the Module with DigiLink Manager (page 7)

Installing the DLC910 Module

The DLC910 module and associated SFPs are hot swappable, enabling you to safely install them while power is applied to the host chassis. Before you install the module, see the DLC910 data sheet for a detailed description of the module specifications, including environmental requirements, that you must adhere to when installing the module.

Note: You must install the DLC910 module in a chassis that includes DL Manager functionality as the module requires DL Manager for configuration and monitoring purposes. For more information, see the [“Configuring the Module with DigiLink Manager”](#) section on page 7.

To install the DLC910 module in the host chassis (see [Figure 4](#)), perform the following steps:

1. From the back of the chassis, remove the two screws that secure the blank tray to the unused function module slot.
Use any available function module slot.
2. Slide the module into the chassis slot using the printed circuit board guide rails on either side of the slot.
3. Push the module 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.
5. Install an Artel approved SFP in sockets A and B of the module.
Push the SFP into the socket until it is firmly seated in the socket.
6. Insert a blank tray in any unused chassis module slot to maintain proper ventilation.

Caution

To maintain proper operating temperature all chassis slots must be filled. Use a blanking tray in any unused chassis slot. Failure to fill all slots may result in over heating of some modules.

Figure 4. DLC910 Module and SFP Installation



Cabling the DLC910 Module

This section describes how to cable the external connections of the DLC910 module, which can receive and transmit external signals over its BNCs and SFPs. The cabling configuration that you use depends on your application.

Figure 5. DLC910 BNC Connectors and SFP Sockets



Cabling the BNC Connections

To connect to the BNC connectors on the DLC910, use a high quality 75 Ohm precision video coax cable, such as Belden 1694A cable.

To cable the electrical connections, perform the following tasks:

- Input signal—Connect the coax cable to the DLC910 receive connector (IN) and the source device's electrical transmit connector.
- Output signal—Connect the coax cable to the DLC910 transmit connector (OUT) and the destination device's electrical receive connector.

Cabling the SFP Connections

The type of cable connection that you make to the SFPs depends upon the type of SFP that you use as described in the ["Supported SFP Types" section on page 3](#).

When using optical SFPs, use a single mode fiber when connecting to the LC connectors of the SFPs and cover any unused optical port to keep the port clean.

Configuring the Module with DigiLink Manager

You configure the DLC910 module operation using the DigiLink Manager (DL Manager) element management system and the module's configuration page.

Prerequisites

To configure the DLC910 module, you must access the DL Manager that manages the module. For details about accessing and setting up DL Manager, see the *DigiLink Manager Setup and Operations Manual*.

To configure the DLC910 module operation, perform the following steps:

1. From a browser window, enter the IP address of the DL Manager that manages the module.
The Home page displays.

2. From the Home page menu bar, click **Shelf View**.

The Shelf View page displays, which shows the rear chassis panel along with the Installed Modules table.

3. From the Installed Modules table, click the **DLC910** link listed in the Module Type column.

The Module Status page displays, which shows the module's current configuration, alarm conditions (if any), and SFP status.

4. From the menu bar, click **Configuration**.

The Configuration page displays.

5. Configure the module operations as follows:

- From the Input Settings panel, configure the following items for each display quadrant:
 - **Video Source**—Enable or disable a video source. From the drop-down list of available source inputs, select the input source to enable or select **Disabled**. The sources that display in the drop-down list depends on the function modules installed in the host chassis. Input source ports are as follows:

- BNC Input (1)
- Available backplane inputs
- SFP Inputs (2)—Optical or HD-BNC

Note: You cannot use HDMI SFPs as an input source because the output signal, which is always routed to all SFPs, is internally looped backed by the SFP as an input inside HDMI SFPs. This causes an infinite recursion in of output signal being fed back as an input.

- **OSD (On Screen Display) Text**—Enter the text string to display along with the source input. You can enter a maximum of 16 ASCII characters.
- **Video Alarm**—Enable or disable the video alarm for the quadrant. If the video source is disabled, no alarm occurs.
- From the On Screen Display Settings panel, configure the following items:
 - **OSD Text**—Enable or disable the display of the OSD text in both Quad Mode and Fullscreen Mode.
 - **Audio Channel Levels**—Enable or disable the display of audio level meters and status indications across all quadrants in both Quad Mode and Fullscreen Mode. A single green segment displays at the beginning of any active audio channel meter if the channel is detected in the input stream, even if the audio level is zero.
 - **Input Signal Formats**—Globally enable or disable the display of the current video input format detected (if any) in both Quad Mode and Fullscreen Mode. If the format is not supported, "Invalid Format" displays. No Input displays if the input is disabled.

- From the Output Settings panel, configure the following items:
 - **View Mode**—From the drop-down list, select one of the following monitor display options:
 - **Quad**—Displays the input from all four input sources, where each input displays simultaneously in a separate display quadrant (see [Figure 1](#)). The DLC910 scales and re-formats (if necessary) each input and places it in one of the four quadrants of the output signal.
 - **Full 1, Full 2, Full 3, or Full 4**—Displays only the specified source across the entire monitor screen.

The output signal is driven to all of the following ports simultaneously:

- BNC Output (1)
 - Monitor Output (1)
 - Backplane Output (1)
 - SFP Outputs (2) – (HDMI, Optical, or HD-BNC)
- **Format**—From the drop-down list select one of the following output video formats to generate:
 - **1080i**—Interlaced video.
 - **720p**—Progressive scan video.
 - **1080p**—Progressive scan video.

The selected format is applied to the ports listed under View Mode above.

- **Frequency**—From the drop-down list select one of the following frequencies (frames per second):
 - **50**
 - **59.94**
- Click **Submit**.

The configuration is saved and the module is ready to process video.

Note: The DLC910 automatically scales the incoming video and converts it to the selected output format. For example, if the DLC910 is set to 1080i/50 and an SD-SDI input is selected to be full screen, the output is converted to 1080i/50.

Note: When an input is selected to be Full screen, the first audio group channel pair is passed through to the output so that program audio can be monitored. The presence and level of all audio channels are displayed in both Full and Quad mode.

Monitoring DLC910 Operations

This section describes how to monitor DLC910 operations using the front and rear panel status LEDs or Digilink Manager and contains the following topics:

- [Using the Module Status LEDs \(page 10\)](#)
- [Using DL Manager \(page 12\)](#)

Using the Module Status LEDs

This section describes how to monitor the module's operations using the front and rear panel LEDs and contains the following topics:

- [Understanding the Front Panel Status LEDs \(page 10\)](#)
- [Understanding the Rear Panel Status LEDs \(page 11\)](#)

Understanding the Front Panel Status LEDs

Table 2 describes the states of the DLC910 front panel status LEDs as shown in Figure 6.

Figure 6. DLC910 Front Panel Status LEDs



Table 2. DLC910 Front Panel Status LEDs

LED	Indicates ...	State	Description
OK	Module status	Off	No power or unprogrammed.
		Green	Normal operation.
		Yellow	Minor alarm condition exists.
		Yellow (flashing)	Field upgrade in progress.
		Red	Major alarm condition exists.
QUADRANT 1, 2, 3, 4	Input status	Off	Not enabled.
		Green	Valid SDI signal detected.
		Yellow	Enabled but no valid input signal detected.
		Red	Unsupported input signal detected.

Understanding the Rear Panel Status LEDs

Table 3 describes the states of the DLC910 rear panel status LEDs as shown in Figure 7.

Figure 7. DLC910 Rear Panel Status LEDs



Input is enabled and valid video detected

Table 3. DLC910 Rear Panel Status LEDs

LED	Indicates ...	State	Description
IN	Input status indicator	Off	Input is disabled.
		Green	Input is enabled and valid video detected.
		Yellow	Input is enabled but no input detected.
		Red	Input is enabled but invalid format detected.
OUT	Transmit status indicator	Off	Not enabled.
		Green	Valid SDI signal output.
SFP A, B TX	SFP transmit status	Off	No SFP installed.
		Green	Normal operation.
		Red	SFP TX fault.
SFP A, B RX	SFP receive status	Off	No SFP installed.
		Green	Input enabled and signal detected.
		Yellow (flashing)	RX optical power high.
		Red	Loss of signal.
		Red (flashing)	RX fault or RX optical power low.
OK	Module status	--	Same operation as the front panel OK LED (see Table 2).

Using the Monitor Jack

The front panel MON (monitor) jack provides an additional copy of the DLC910 output. Pressing the Select button scrolls through the full screen and four quadrant views. Pressing this button changes all DLC910 outputs and has the same function as changing the View Mode in DL Manager.

To connect a monitor to the DLC910, connect the monitor cable between the monitor and the 75 Ohm HD-BNC monitor jack located on the DLC910 front panel (see Figure 3).

Using DL Manager

This section shows how to use DL Manager to view the module's current configuration, major and minor alarm status, and the status of SFP A and B.

Prerequisites

To monitor the DLC910 module using DL Manager, you must access the DL Manager that manages the module. For details about accessing and setting up DL Manager, see the *DigiLink Manager Setup and Operations Manual*.

To monitor the DLC910 module operation, perform the following steps:

1. From a browser window, enter the IP address of the DL Manager that manages the module.
The Home page displays.
2. From the Home page menu bar, click **Shelf View**.
The Shelf View page displays, which shows the rear chassis panel along with the Installed Modules table.
3. From the Installed Modules table, click the **DLC910** link listed in the Module Type column.

The Module Status page displays, which shows the following information:

HD

Table 4. Module Status Page

Pane	Field	Description
Input Configuration (Quadrants 1 to 4)	Source	Configured operating mode: Receiver or Transmitter
	Format	Configured video format: HD, SD, or 3G
	Video Alarms	Configured operating state: Enabled or Disabled.
	On Screen Display	Configured text to display.
Output Configuration	View	Configured output view: Quad, Full 1, Full 2, Full 3, Full 4.
	Format	Configured format: 1080P, 720P, 1080I
	Frequency	Configured frequency: 50 or 59.94
Alarms	Major Alarms	Detected major alarm status of monitored entities as follows: <ul style="list-style-type: none"> • Green—No alarms detected. • Red—Alarm detected that requires immediate attention. When the alarm indicator is red, DL Manager provides a descriptive list of any detected alarms to indicate the source of the problem.
	Minor Alarms	Detected minor alarms (if any).

Table 4. Module Status Page

Pane	Field	Description
Optical Status (SFP A and B)	Electrical SFP	
	Model Number	Assigned model number.
	Cable Type	Detected value: HDMI or HD-BNC
	Serial Number	Assigned serial number.
	SFP port status	Detected SFP port status: <ul style="list-style-type: none"> • SFP: NOT PRESENT • HDMI SFP present • HD-BNC SFP present • Optical SFP
	Optical SFP	
	Model Number	Assigned model number.
	Wavelength	Detected wavelength.
	Serial Number	Assigned serial number.
	Rx Power	Receive power.
	Tx Power	Transmit power.

Using the DLC910 Reset Switch

The DLC910 front panel includes a recessed, push-button reset switch (RST) that resets the module. Resetting the module does not erase any user-selected parameters.

Figure 8. DLC910 Reset Switch



To reset the DLC910, press and hold the reset button for more than 4 seconds before releasing it.

Removing an SFP or Module

You can safely remove either an SFP from a DLC910 module, or the module from the host chassis while power is applied to the module.

This section contains the following topics:

- [Removing an SFP \(page 14\)](#)
- [Removing a Module \(page 14\)](#)

Removing an SFP

To remove an SFP from a DLC910 module, perform the following steps:

1. Remove the cables from the SFP.
2. Pull down on the SFP handle to dislodge it from the module.
3. Using the SFP handle, pull the SFP out of the module.

Removing a Module

To remove a DLC910 module from the host chassis, perform the following steps:

1. Remove the cables from the BNC connectors.
2. Remove the cables from the SFPs.
3. Loosen the two mounting screws that secure the module to the host chassis.
4. Using the two mounting screws, pull the module 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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