# grass valley

# 8943FC
## 4 CH FIBER TO ELECTRICAL CONVERTER

## Instruction Manual

### Software Version 1.0.2

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# grass valley

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# *Preface*

## About This Manual

This manual describes the features of a specific 8900 module in the GeckoFlex Signal Processing System families. As part of this module family, it is subject to Safety and Regulatory Compliance described in the GeckoFlex 8900 Series frame documentation (see the *GeckoFlex Frames 8900FX/FF/FFN Signal Processing System Instruction Manual*).

All Modular product manuals can be found on-line in PDF format at this link:

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# 8943FC 4 Channel Fiber to Electrical Converter Module

## Introduction

This manual covers installation, configuration, and operation of the 8943FC 4 Channel Fiber to Electrical Converter module.

### Module Features

The 8943FC module is a four channel optical to electrical converter (receiver) with four optical input channels each with two electrical BNC outputs. The module can accommodate a variety of high definition video inputs up to 3 Gb/s as well as DVB/ASI, AES, and MADI interfaces..

The following features are available with this module:

- Two module set including a hot-swappable front and rear module and up to two optional single mode dual receiver fiber optic SFP devices mounted on the front module. Model options are given in Table 1 on page 10.

- Up to ten 8943FC modules in the same 2 RU GeckoFlex frame.

- Two electrical BNC outputs for each of the four fiber optic input channels.

- Two re-clocked outputs for each fiber input for stable long distance reception of each optical feed.

- Re-clock bypass for non-SDI signal types.

- Supports both HD or SD formats and passes embedded audio present in the incoming video stream.

- SNMP and product health monitoring is supported through the 8900NET module with applications such as NetCentral.

- Software updating using the NetConfig Networking application.

The 8943FC can be populated with the dual receiver SFP devices listed in Table 1. SFP devices come in kits containing the SFP device, a mounting bracket, and a fiber cable assembly. Kit part numbers are indicated by a -K at the end of the part number. Refer to Figure 3 on page 14 for a kit example.

The SFP devices are capable of handling bit rates from 143 Mb/s up to 3 Gb/s. Refer to Table 1 for the current SFP devices for use with the 8943FC module.

**Note** This manual shows 8943CF and 8943FC CWDM functionality in conjunction with the 8939FCA and 8939FCB fiber optic Mux/Demux modules. There are other applications for CWDM application not covered here.

These receivers will accept all CWDM frequencies from the SFP transmitter modules on the 8943FC. Refer to Table 1 for SFP models available.

*Table 1.  Fiber Optic SFP Device Dual Receiver Options*

| SFP Device | Type | Frequencies | |
|---|---|---|---|
| SFP-13103G-M1DRX-K (Full Kit) | Dual Receiver | 1270nm | 1610nm |
| SFP-13103G-M1TRX[1] | | | |
| SFP-13103G-M2TRX[1] | | | |

[1] Spare SFP devices can be purchased without a kit, but initial installation requires the full kit.

# Installation

The 8943FC model consists of a front and rear module set that can only be installed in a GeckoFlex frame. Two fiber optic dual transmitter SFP device kits, shipped separately, must also be installed for full functionality of the module.

Installation of the 8943FC module set is a process of:

1. Placing the 8943FC-R rear module in a rear frame slot,

2. Installing the fiber optic SFP devices on the front module,

3. Placing the front module in the corresponding front slot,

4. Cabling the signal ports, and

5. Setting module parameters with on-board switches or with the web browser interface.

All GeckoFlex front and rear modules can be inserted and removed from an GeckoFlex frame with power on.

**Note**    Modules and SFP devices are sensitive to static damage, use standard anti-static precautions when handling components.

## Module Placement in the GeckoFlex Frame

There are ten front and rear cell locations in the 2 RU GeckoFlex frame (Figure 1) to accommodate either audio, analog and digital video modules.

*Figure 1.  GeckoFlex Frame*
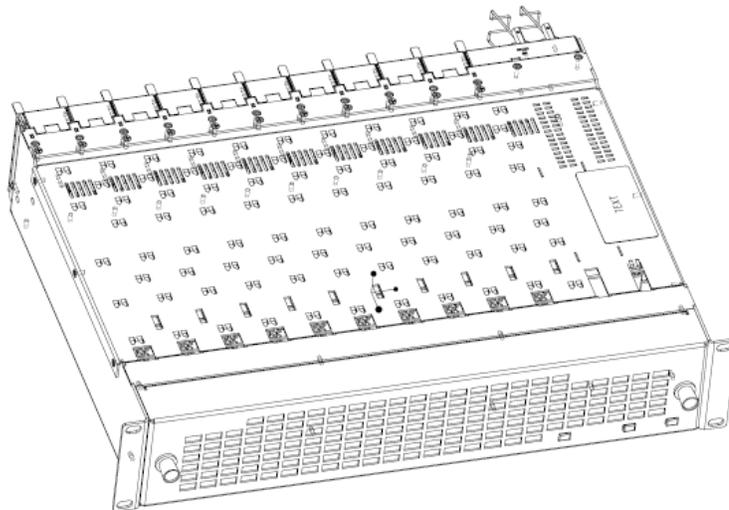
## Module Installation Precautions

Please read and follow the precautions listed below before installing the front and rear modules and any optional fiber optic SFP devices:

- Use standard anti-static procedures during installation. As modules can be installed or removed when the GeckoFlex frame is powered up, before removing the cover, please use an anti-static bracelet tied to a metal part of the frame.

- Install the rear module first, then install the option fiber optic SFP devices on the front module, then install the front module.

- When installing or removing a rear module, loosen or tighten the screws holding the retainer clips to the frame manually with the retainer clip tool provided inside the front cover of the frame or use a 2 mm (5/64") hex screwdriver. Please do not use an electric screwdriver.

**Note**    On newer 751- version GeckoFlex frames, a Rear Retainer Clip removal tool and 2 extra retainer clips and screws for installing them are provided on the inside of the frame cover.

- Make every effort to leave the screws holding the retainer clips in place (do not remove them completely). They are very small and can easily drop into other equipment causing a shorting hazard. (Two turns of the screw should be enough to loosen the screws, 3 turns or more will remove it.)

- When installing a rear module, tighten the screws on the retainer clips just until snug. Do not apply more force than is necessary to seat the rear module. Refer to the **Mechanical** specifications given in Table 6 on page 53.

- If using a fiber optic SFP device on the fiber-ready front module, handle it carefully, use anti-static precautions, and read the *Installation* on page 11 before cabling.

## Rear Module Installation

To install the rear module, refer to Figure 2 and the instructions below:

1. To remove a blank rear adapter cover (or a rear module already present), manually loosen the two screws holding each retainer clip on the rear adapter cover or rear module to the frame with the retainer clip tool provided inside the front cover of the frame (newer model frames only) or a 2 mm (5/64") hex screwdriver. Do not remove the screws.

**Note** To remove a rear module already installed, follow the same steps. It is helpful to first remove the front module so the rear can be pulled out more easily.

2. After loosening the retainer clip screws, pull up on each retainer and completely remove it, leaving the screws in place.

3. Remove the blank rear adapter cover by inserting needlenose pliers into the slots in the blank cover and pulling it off.

4. Insert the rear module into the empty slot, guiding it carefully.

5. Replace each retainer clip over the two screws on both sides of the module and push down to seat the retainer clip.

6. Tighten the two screws on each retainer clip just until they come into contract with the retainer clip then tighten about a 1/4 turn more (maximum torque is 4-5 inch-lb/0.45-0.6Nm). Do not force or torque the screws too tightly. The clips should not bend or be bowed.

**Note** All unused rear slots in a GeckoFlex frame should have a blank rear adapter cover installed.

*Figure 2. Installing Rear Module*



Use retainer clip or needlenose pliers to pull out blank after removing retainer clips
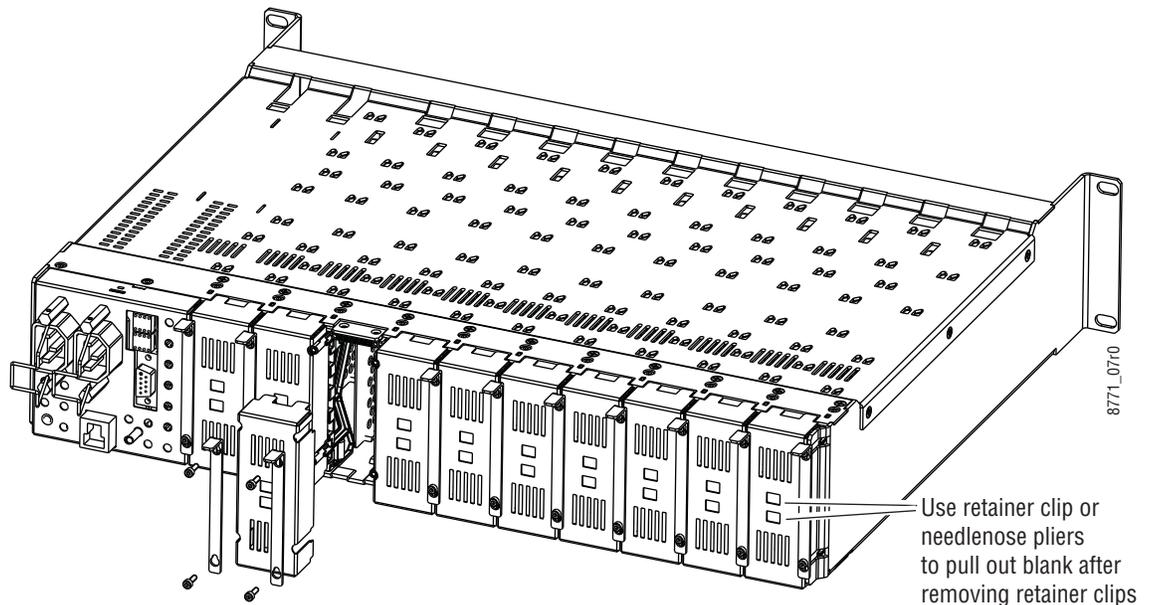
## SFP Device Installation

Two optional dual channel CWDM receiver SFP devices can be installed on an 8943FC module. Both are installed on the front of the module circuit board. The type of SFP device depends on the application of the module and the 8939FCA or 8939FCB module it will be feeding. Refer to Table 1 on page 10.

The optional strap-mount SFP Fiber Optic kit (Figure 3) for GeckoFlex fiber-ready modules includes:

• One Strap Mount Fiber Optic SFP Device (labeled for type)

• Mounting bracket for SFP device installation

• Fiber cable assembly for connecting SFP device to front module rear connector

*Figure 3.  SFP Device Kit*
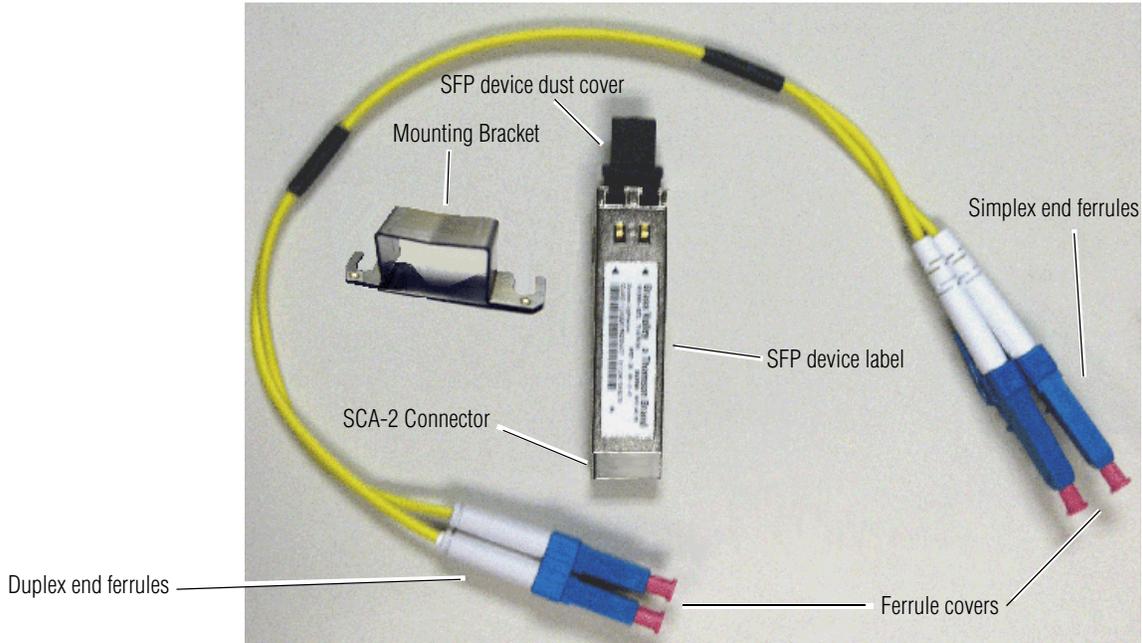


### Fiber Optic Cleaning Requirement

Before making any fiber optic cable mating connections to the SFP device or cabling and after every de-mating cycle, use an industry standard fiber optic cleaning kit, including oil-free compressed air, to clean the fiber connectors and the connectorized fiber end faces. This helps ensure optimum performance of the fiber optic interface. Industry standard fiber optic cleaning kits can be purchased on the web and in electronics stores.

Installation of each SFP device involves three steps:

1.   Mount the metal bracket to the SFP device,

2.   Mount the SFP device and bracket on the top side of the 8943FC front module, and

3.   Install the fiber cable assembly to the SFP device and the rear LC adapters.

**CAUTION**   The Fiber Optic SFP device is static sensitive. Use static handling precautions when installing or removing it.

## Mount Metal Bracket to SFP Device

Attach the mounting bracket to the SFP device as shown below.

1.   Insert the narrow end (SCA-2 connector) of the SFP device into the mounting bracket, label side up with the open slots on the bracket pointing to the rear as shown by the direction of the arrow in Figure 4.
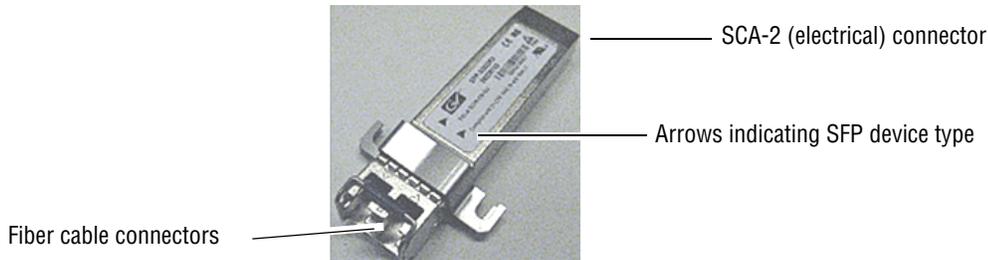
*Figure 4.  Mounting Bracket*
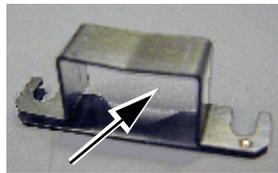


2.   Attach the mounting bracket to the SFP device by sliding the bottom part of the bracket as far as it will go (Figure 5) on the bottom side of the SFP device to hold it in place without forcing it. Make sure the open bracket slots point towards the SCA-2 (electrical) connector on the SFP device.

*Figure 5.  Attach Bottom of Bracket to SFP Device*

V-connection



SCA-2 (electrical) connector
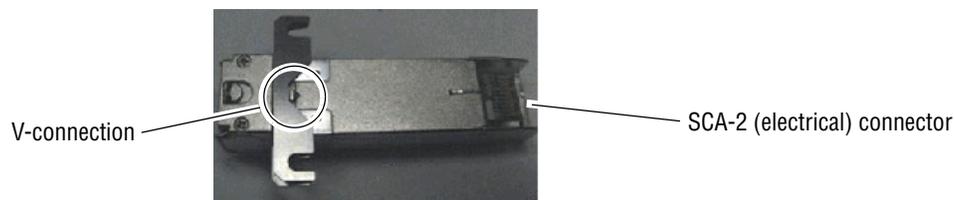
**3.** The finished installation should look like the example in Figure 6. The label will list the GV Model number, the GV part number, and the manufacturer's part number. Also note the two arrows on the label will indicate signal direction as shown in the dual receiver example in Figure 6 (arrows pointing in). A dual transmitter will have two arrows pointing out, and a transceiver will have one input and one output arrow.

*Figure 6.  Finished Bracket Mounting*



SCA-2 (electrical) connector

Arrows indicating SFP device type

Fiber cable connectors

Once you have put the mounting brackets onto the two SFP devices, install them on the top side of the circuit board and cable them to the output connectors on the main module with the fiber cable assembly provided. Figure 7 shows an example of a finished SFP installation on a 8943FC module with the locations of the hardware components, connectors, and plastic cable guides.

*Figure 7.  Example of a Finished SFP Installation*



J4 - F3/F4

J6 - F1/F2
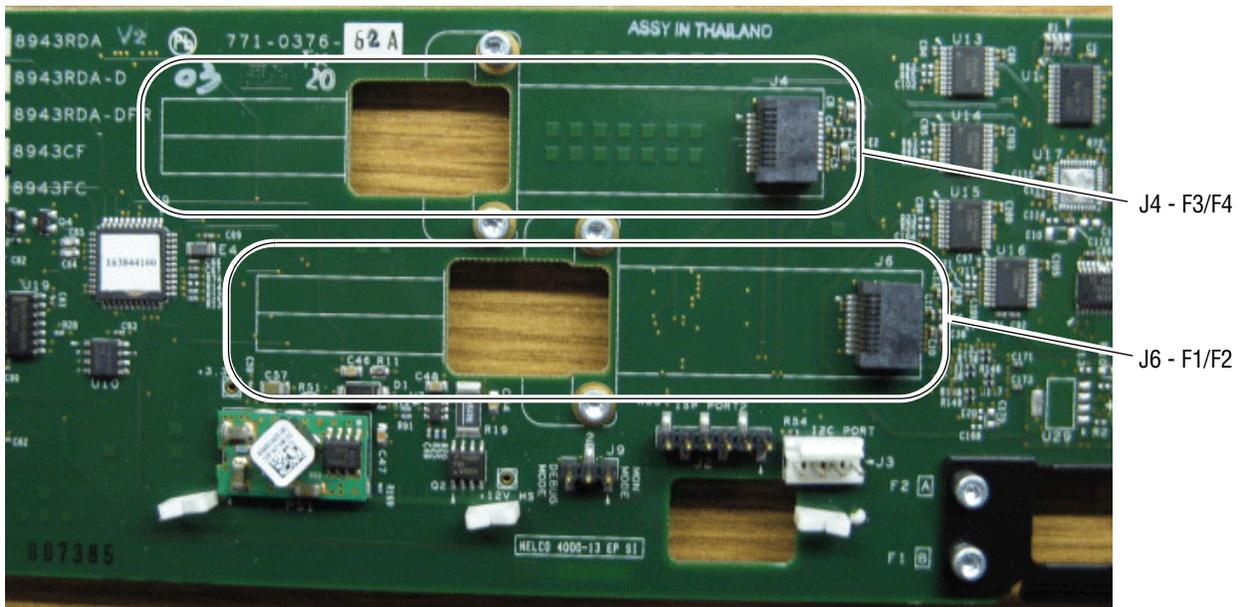
## Fiber Channel 1 and 2 SFP Device and Fiber Cable Installation

**Note** Before making any fiber connections, refer to the *Installation* on page 11.

After preparing the SFP devices for installation, install the Receiver SFP devices required for the Fiber Channel 1 and Fiber Channel 2 outputs as follows:

**Note** This example uses a dual fiber receiver that will receive frequencies from 1270 to 1610nm as shown in Figure 8.

1. Remove the black rubber dust cover from the SFP device and clean the fiber faces of both the SFP device and connector J6 as described in *Installation* on page 11.

2. Align the SFP device with the right angle bottom SCA-2 connector (J6) and the mounting screws on the 8943FC module (Figure 8).

3. Loosen the two screws slightly (do not remove them completely) with a torx screwdriver so the mounting bracket straps can slide under the screws.

4. Slide the SFP device towards the SCA-2 connector so the electrical connector on the SFP device engages with the SCA-2 connector and the straps are underneath the two screws.

5. Tighten the screws to secure the SFP device to the front module.

*Figure 8. Installing F1 and F2 SFP Devices*



Now install the fiber cable assembly from the SFP device to the rear connector as described below.

1. Remove the dust covers from the fiber cable assembly connectors to expose the LC ferrules (the ends of the fiber optic cable).

**2.** Clean the LC ferrules of the connectors (and after every de-mating cycle) using an industry standard fiber optic cleaning kit as described in *Installation* on page 11. Also visually inspect the LC ferrules for damage or blockage before installing them into the SFP device.

**3.** Remove the rubber dust cover from the SFP device connector end. Insert the duplex end of the fiber cable assembly (the two fiber optic cables connected together) into the SFP device by holding the strain relief boot directly behind the connector housing as shown in Figure 9. Push on the strain relief until you hear a click, indicating the connectors are properly mated.

**4.** Route the fiber cable assembly through the two plastic fiber guides as shown in Figure 9 to hold it in place.

*Figure 9.  SFP Device Installation for Ch 1 and Ch 2 SFP*
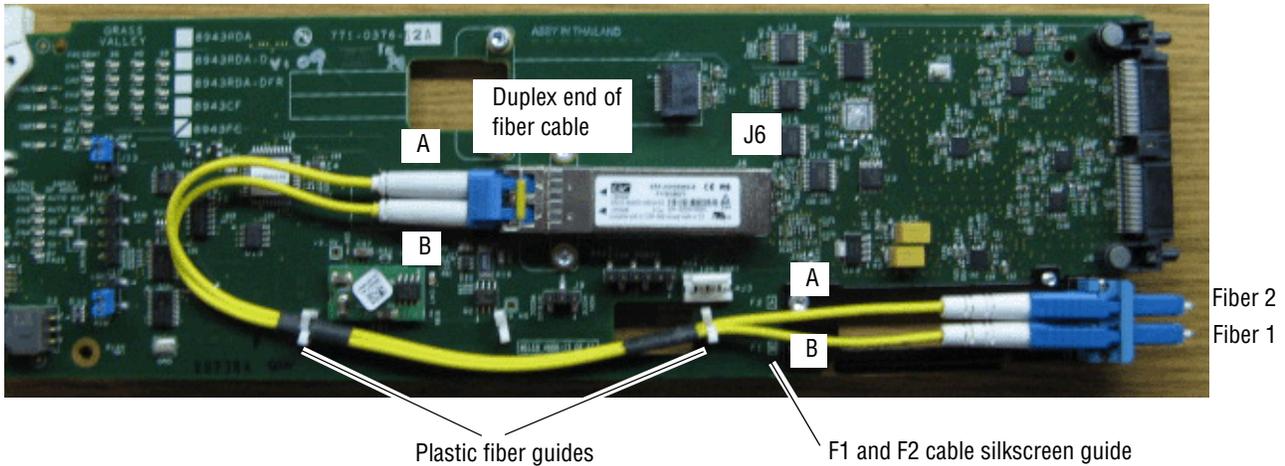


**5.** Insert the simplex ends of the fiber cable assembly (the two fiber optic connectors are separate) into the LC adapter ports at the rear of the module. Fiber 1 (B) is the bottom cable from the SFP device and Fiber 2 (A) is the top cable. Note the silkscreened F1 (B) and F2 (A) as shown in the detail in Figure 10.

*Figure 10.  F1 and F2 Fiber Cable Silkscreen Guide Detail*
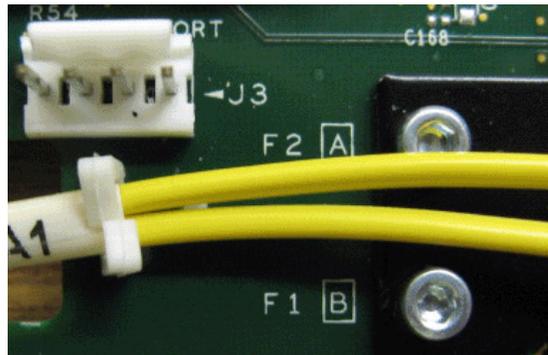
**Channel 3 and Channel 4 SFP Device and Fiber Cable Installation**

Repeat the SFP device installation procedure for the second SFP device in the top SCA-2 connector, J4, of the module. This SFP device is also a dual receiver with the same part number as the SFP device in J6.

Follow the instructions for installing the SFP device in connector J4 in the same manner as the instructions for J6 starting on page 17, steps 1 through 5. The finished installation of the Fiber Channel 3 and Fiber Channel 4 SFP device should resemble the one in Figure 11.

*Figure 11. SFP Device Installation for Ch 3 and Ch 4*



Now install the Fiber Channel 3 and 4 fiber cable assembly from the SFP device to the rear connector as described below.

1. Remove the dust covers from the fiber cable assembly connectors to expose the LC ferrules (the ends of the fiber optic cable).

2. Clean the LC ferrules of the connectors (and after every de-mating cycle) using an industry standard fiber optic cleaning kit as described in *Installation* on page 11. Also visually inspect the LC ferrules for damage or blockage before installing them into the SFP device.

3. Remove the rubber dust cover from the SFP device connector end. Insert the duplex end of the fiber cable assembly (the two fiber optic cables connected together) into the SFP device by holding the strain relief boot directly behind the connector housing as shown in Figure 12 on page 20. Push on the strain relief until you hear a click, indicating the connectors are properly mated.

**4.** Route the Fiber Channel 3 and 4 fiber cable assembly through the remaining top side plastic fiber guide as shown in Figure 12 then insert the simplex ends through the square opening below ISP connector, J2, to the back side of the module.
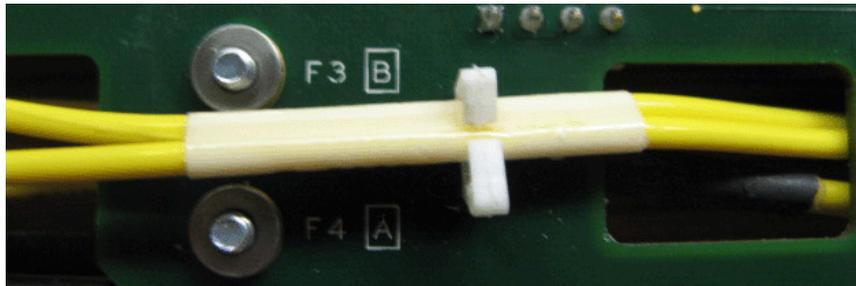
*Figure 12. SFP Device Installation for Fiber Ch 3 and Ch 4*
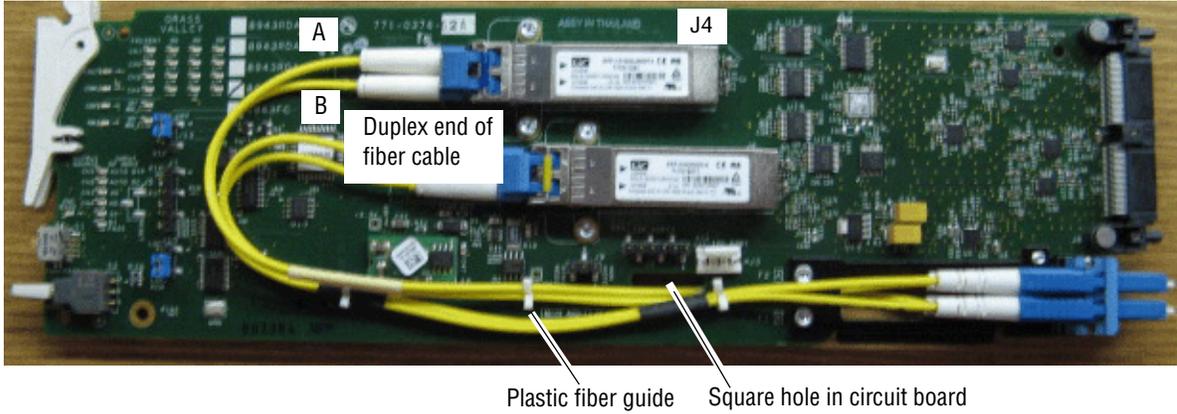


**5.** Put the fiber cable assembly through the cable guide on the back of the circuit board to hold it in place (Figure 13).

Note the silkscreened F3 (B) and F4 (A) guides as shown in the detail in Figure 13.

*Figure 13. F3 and F4 Fiber Cable Silkscreen Guide Detail*

6. Insert the simplex ends of the fiber cable assembly (the two fiber optic connectors are separate) into the LC adapter ports at the rear of the module (shown in Figure 14). Fiber Channel 4 (A) is the bottom cable from the SFP device and Fiber Channel 3 (B) is the top cable.

*Figure 14.  F3 and F4 Fiber Cabling on Back of Circuit Board*
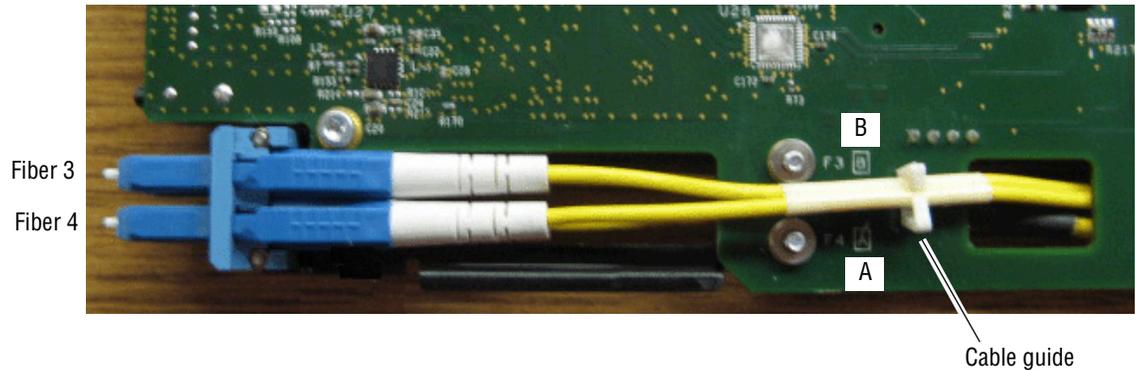


The fiber optic inputs from the rear module are shown in Figure 15.

*Figure 15.  Fiber Optic Outputs*
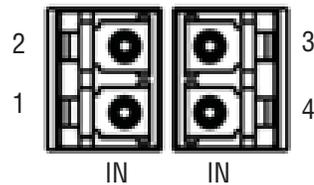


For the SFP device types and cabling examples used in this 8943CF/FC manual set, the following frequencies should be input from this connector:

- Fiber In 1 = 1610nm

- Fiber In 2 = 1590nm

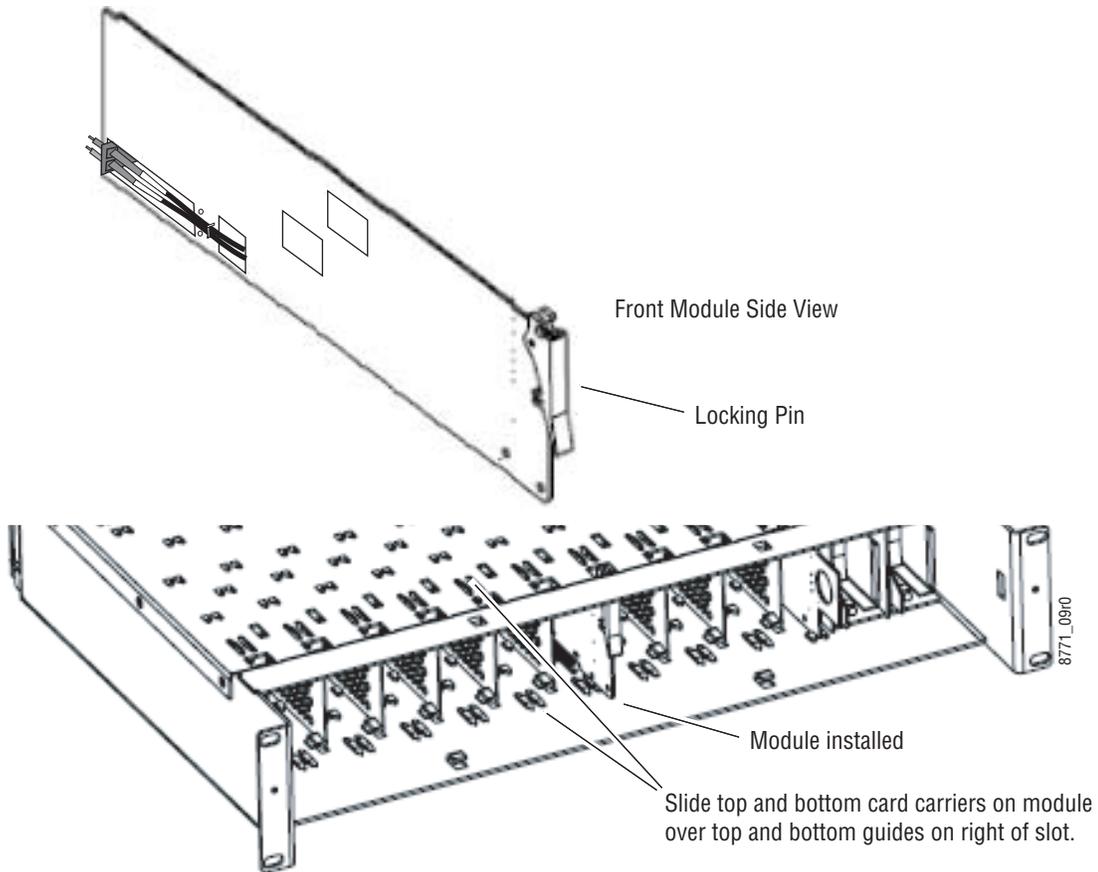- Fiber In 3 = 1570nm

- Fiber In 4 = 1550nm

If you are using 8943FCs to multiplex 8 or 16 frequencies through the 8939FCA/FCB modules, the other 8943FCs should be equipped with the SFP devices as described in *CWDM 16 Channel Configuration* on page 28.

## Front Module Installation

After installing the rear module and SFP devices on the front module, install the front module as follows:

1. Remove the front cover of the frame.

2. Locate the corresponding front slot.

3. Before installing the module, set the Local/Remote onboard jumper as described in *Local/Remote Jumper* on page 37.

4. Clean the fiber optic connections as described in the *Installation* on page 11.

5. Insert the front module so that the plastic card guides on the module top and bottom edges go over the upper and lower raised rail guides on the right of the top and bottom of the slot (Figure 16).

6. Carefully slide the module into the rear connector of the slot.

7. Lock the front module ejector tab into the locking pin.

8. Replace the front cover for configuring the module using remote controls.

*Figure 16. Front Module Installation*



Front Module Side View

Locking Pin

Module installed

Slide top and bottom card carriers on module over top and bottom guides on right of slot.

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# Cabling

Cabling is done on the rear BNCs of the 8943FC-R module illustrated in Figure 17.

**Note**    Before making any fiber connections, refer to the *Fiber Optic Cleaning Requirement* on page 14.

*Figure 17.  8943FC-R Rear Module*
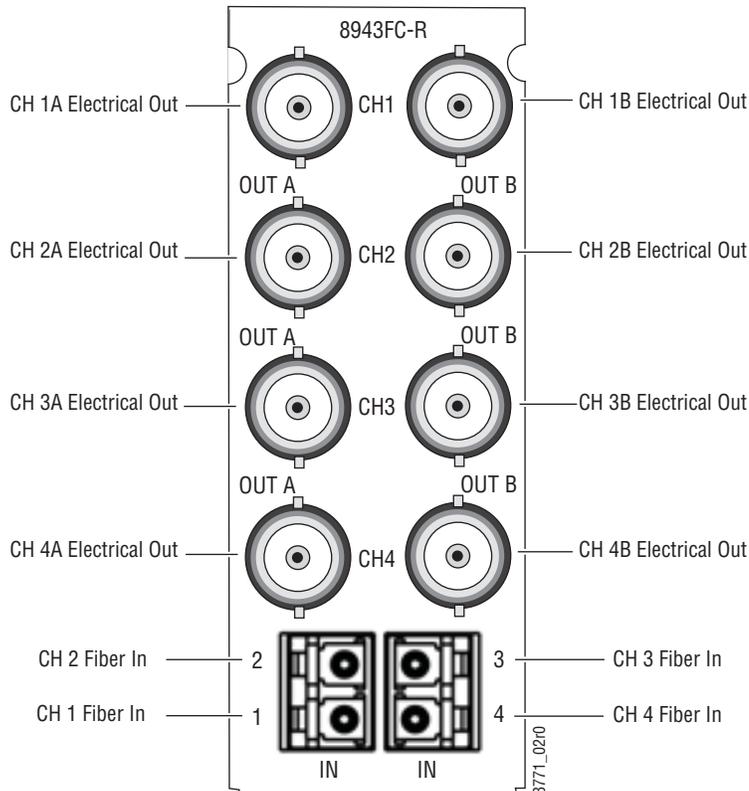


## Attenuation Requirements

Some shorter length cable runs will require attenuation to prevent over-driving the receiver causing bit errors to occur on the fiber link. Use the following guidelines for adding attenuation:

• The 1310nm Dual Transmitter (SFP-13103G-M1DTX) requires no attenuation between fiber transmitter and receiver connections at any cable lengths.

• CWDM devices used with 8939FCA modules for a mux/demux configuration (page 28) with a cable run from 0-12 km (7.5 miles), must be attenuated by 3 dB between 8939FCA COM ports.

• All CWDM devices used in a point-to-point configuration with a cable run from 0-20 km (12.4 miles), must be attenuated by 5 dB between fiber transmitter and receiver connections.
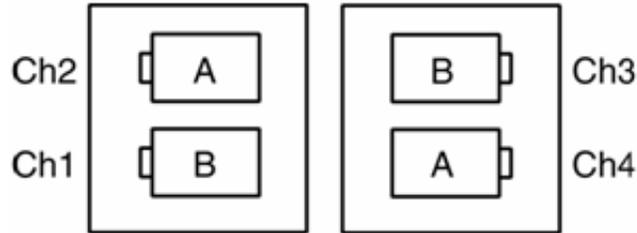
## Fiber Optic Inputs

There are four fiber optic input ports corresponding to Channel 1-4 as labeled on the rear of the 8943FC-R module (Figure 17 on page 23).

**Note**   Before making any fiber connections, follow the required fiber optic cleaning recommendations given in *Installation* on page 11.

For the fiber input ports, the 8943FC-R rear module shall follow the channel allocation convention shown in Figure 18. Optical channel 1 and channel 3 are mapped to the B side of standard duplex fiber connector and channel 2 and channel 4 are mapped to the A side of a standard duplex fiber connector.

**Note**   For external attenuation specifications requirements, refer to *Attenuation Requirements* on page 23.

*Figure 18. 8943FC Fiber Receiver Channels*



### 8943FC to 8943CF Connections

When connecting an 8943FC module directly to a 8943CF (electrical to fiber module), a non-crossing duplex fiber cable is required as shown in Figure 19. Refer to *Attenuation Requirements* on page 23 for cable length attenuation notes.

Non-crossing is in reference to the logical A/B nomenclature associated with the duplex connector illustrated below. Side 1A connects to side 2A and side 1B connects to side 2B.

*Figure 19. Non-Crossing Duplex Fiber Cable*



## Electrical Outputs

There are two electrical coax video outputs per channel corresponding to Channel 1-4 as labeled on the rear of the 8943FC-R module (Figure 17 on page 23). Connect the output BNCs as desired for each channel.

# CWDM Configuration

The 8943FC module can be used for CWDM (Coarse Wavelength Division Multiplexing) in various configurations in conjunction with 8939FCA and 8939FCB modules and 8943CF modules as well as other fiber-ready modules from Grass Valley. Two main examples are given in this manual.

## CWDM Configuration for 9 Channels

One use of CWDM involves the ability to multiplex and demultiplex up to 9 channels of video in as shown in the simple block diagram in Figure 20.

*Figure 20.  Simple CWDM Block Diagram*
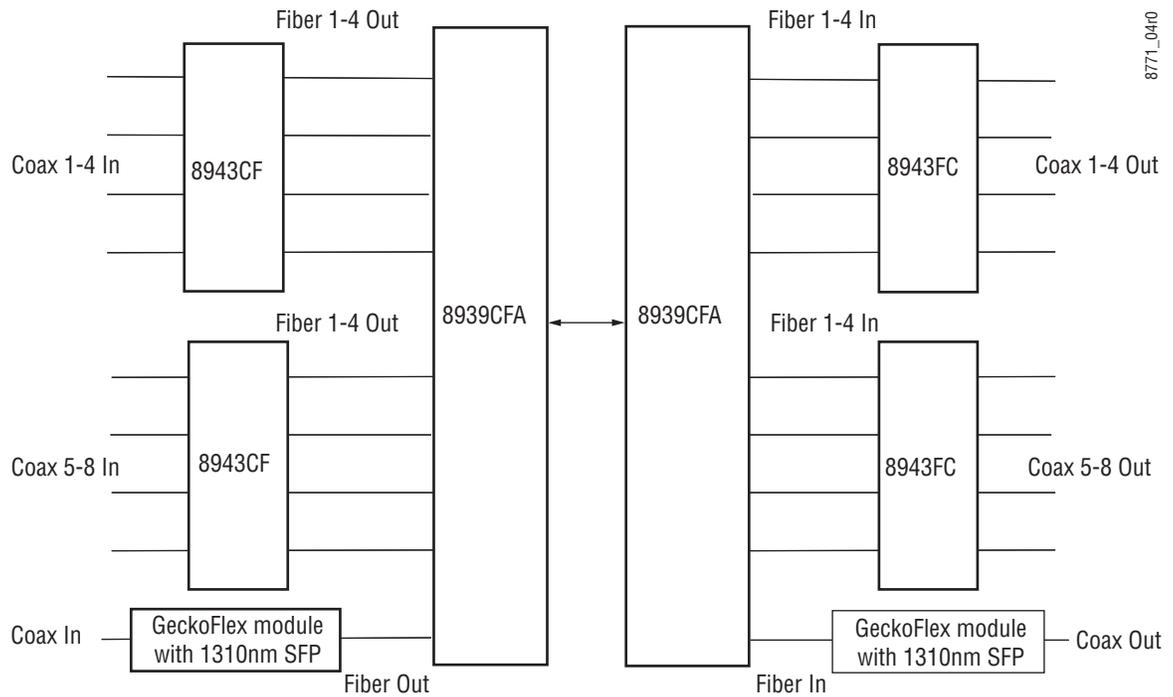


When an 8943FC module is populated with CWDM SFP devices, a standard crossing duplex cable is required when connecting the 8943FC modules to the 8939FCA modules.

Crossing is in reference to the logical A/B nomenclature associated with the duplex connector illustrated in Figure 21 where side 1A connects to side 2B and side 1B connects to side 2A.

*Figure 21.  Standard Crossing Duplex Fiber Cable*
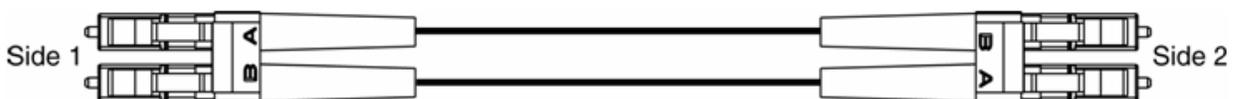
To utilize this 9 channel Mux/Demux application, the following Grass Valley modules are needed:

* Two 8943CF 4 Channel Electrical to Fiber Converter modules with one of each type of CWDM SFP device

* Two 8943FC 4 Channel Fiber to Electrical Converter modules with one of each type of CWDM SFP device

* Two fiber-ready Grass Valley GeckoFlex modules with 1310nm SFP devices

As shown in the detailed block diagram in Figure 22 on page 27, two 8943CF (Electrical to Fiber converters) at Location A are used to feed 8 channels of video to an 8939FCA. To utilize this application, one of each of the following four CWDM SFP device types must be installed on the two 8943CF modules:

* SFP-CWDM3G-1-K Dual Transmitter (1470nm/1490nm frequencies)

* SFP-CWDM3G-2-K Dual Transmitter (1510nm/1530nm frequencies)

* SFP-CWDM3G-3-K Dual Transmitter (1550nm/1570nm frequencies)

* SFP-CWDM3G-4-K Dual Transmitter (1590nm/1610nm frequencies)

**Note**     The four SFP devices can be installed in any location on the two 8943CF modules as long as the outputs are cabled to the correct frequency input on the 8943FCA. The installation configuration shown here is for clarity only.

The 1310nm fiber output from a Grass Valley GeckoFlex module is cabled to the EXP (Expansion) port on the 8939FCA.

The 8939FCA module multiplexes these 9 frequencies down to a single output from the COM port. A single fiber cable carries these 9 video fiber channels to the COM port of the 8939FCA at Location B.

The 8939FCA at Location B acts as a demultiplexer and outputs 9 fiber video channels to two 8943FC (fiber to electrical) modules, each with two SFP-13103G-M1DRX-K Dual Receiver SFP devices installed and a Grass Valley fiber-ready module. The dual receiver SFP device will accept input frequencies from 1270nm to 1610nm.

Refer to *Attenuation Requirements* on page 23 concerning the attenuation needed depending on the length of cable run between 8939FCA COM ports.

*Figure 22. CWDM Configuration Channels 1-8*
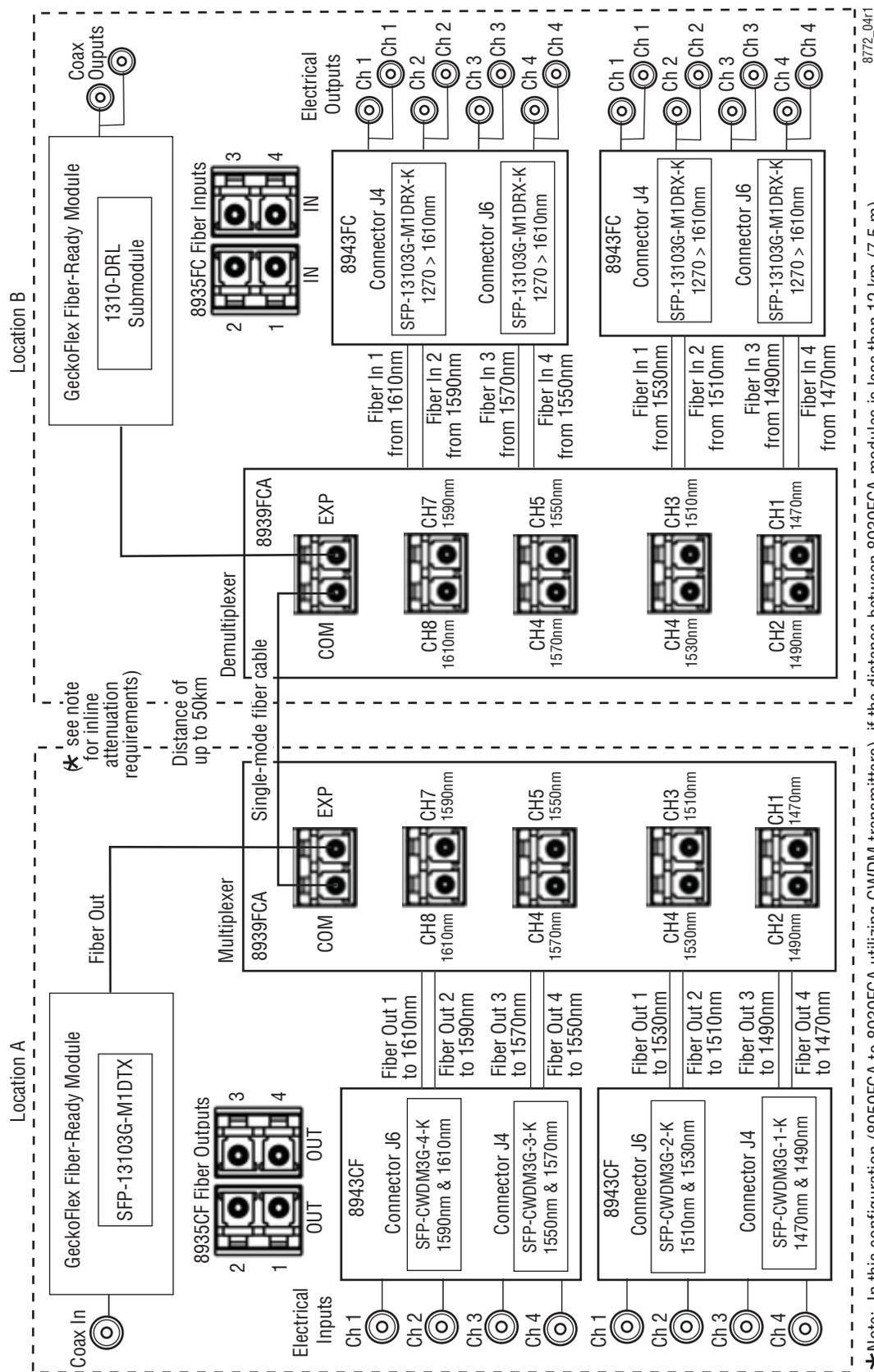
## CWDM 16 Channel Configuration

The 8943FC can also be used with the 8939FCA and 8939FCB to provide 16 channels of video over a single fiber connection.

As shown in the simple block diagram in Figure 23, the two 8939FCB module COM ports can be connected to the 8939FCA module expansion ports to provide another eight channels of video, for a total of 16 channels over one fiber.

The 8939FCB must be set up in a similar manner as the 8939FCA only using a different set of CWDM fiber optic SFP devices with frequencies pairs from 1310nm to 1450nm.

*Figure 23.  8939FCA and 8939FCB Simple Block Diagram*
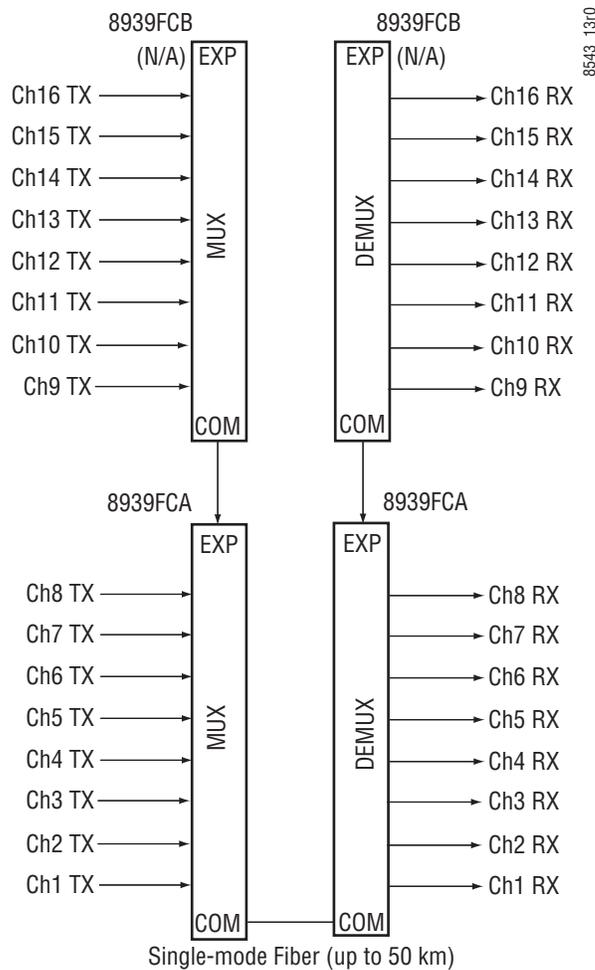
To utilize a 16 channel configuration using the 8939FCA and 8939FCB, follow the setup below.

Install the CWDM fiber optic SFP devices on the 8939FCA as described in *CWDM 16 Channel Configuration* on page 28. You will be using the EXP ports to connect to the 8939FCB instead of a 1310nm GeckoFlex fiber-ready module.

The 8943CF modules feeding the 8939FCA should have the following fiber optic SFP devices installed for channels 1-8:

• SFP-CWDM3G-1-K Dual Transmitter (1490nm/1470nm frequencies)

• SFP-CWDM3G-2-K Dual Transmitter (1510nm/1530nm frequencies)

• SFP-CWDM3G-3-K Dual Transmitter (1550nm/1570nm frequencies)

• SFP-CWDM3G-4-K Dual Transmitter (1590nm/1610nm frequencies)

The 8943FC modules receiving the fiber signals from the 8939FCA should have SFP-13103G-M1DRX-K Dual Receivers installed in each of the four locations. Refer to the detailed diagram in Figure 22 on page 27.

The eight additional channels are provided by two 8943CF modules feeding the 8939FCB with the following CWDM transmitter SFP devices:

• SFP-CWDM3G-5-K Dual Transmitter (1310nm/1330nm frequencies)

• SFP-CWDM3G-6-K Dual Transmitter (1350nm/1370nm frequencies)

• SFP-CWDM3G-7-K Dual Transmitter (1390nm/1410nm frequencies)

• SFP-CWDM3G-8-K Dual Transmitter (1430nm/1450nm frequencies)

*Figure 24. 8939FCB Configuration – Channels 9 -16*
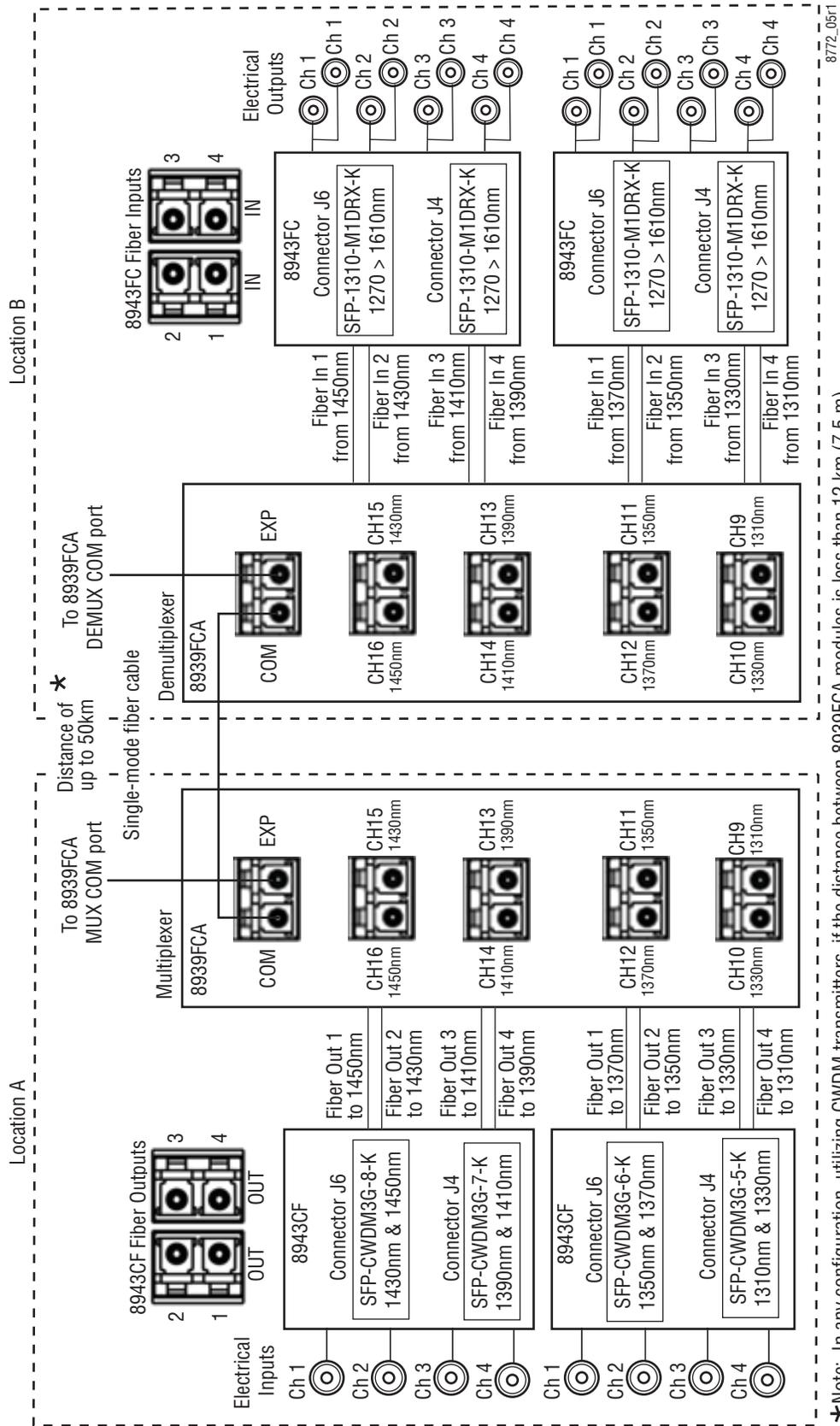
# Configuration and Monitoring

8943FC module configuration and monitoring can be performed locally using the onboard controls or using a web browser GUI interface when the 8900NET Network Interface module is present in the GeckoFlex frame. Control and monitoring is described in the following sections:

- Input Operating Modes Overview – page 31
- Local Configuration and Monitoring – page 34
- Remote Configuration and Monitoring – page 39

## Input Operating Modes Overview

Each of the four channels must be configured for the desired operating mode. This can be done using the onboard switches or on the Settings web page using the web browser interface. The five different modes of operation are described in this section. Input signal monitoring differs between modes as described in each mode section below. For an input signal monitoring summary, refer to Table 3 on page 36.

The 8943FC supports the following modes of operation:

- Auto Reclock/Bypass mode
- Auto Reclock/Mute mode
- 3G 2970M mode
- HD 1485M mode
- SD 270M mode
- Manual Bypass HD/3G
- Manual Bypass SD

### Auto Reclock/Bypass Mode (Default)

In this mode, the electrical inputs are equalized and fed to the reclocker. If the specific bit rates of 270 Mb/s , 1.5 Gb/s, or 3 Gb/s are analyzed by the module, it will reclock the signal at the determined bit rate and feed this signal to both the electrical BNC and the fiber optic outputs. With input reporting enabled, the input signal will be reported as Present.

If a bit rate other than 270 Mb/s, 1.5 Gb/s, or 3 Gb/s is detected by the module or no input signal is detected, reclocking will not be performed and the signal will be automatically bypassed to the outputs. With input reporting enabled, the input signal will be reported as Not Monitored.

## Auto Reclock/Mute Mode

In this mode, the electrical inputs are equalized and fed to the reclocker. If the specific bit rates of 270 Mb/s, 1485 Mb/s, or 2970 Mb/s are analyzed by the module, it will reclock the signal at the determined bit rate and feed this signal to both the electrical BNC and the fiber optic outputs. With input reporting enabled, the input signal will be reported as Present.

If the input signal is not 270Mb/s, 1485Mb/s, or 2970Mb/s, or the signal input is not present, the output of the reclocker will be muted and the outputs will be static (muted). With input reporting enabled, the input signal will be reported as Not Present.

## 3G 2970M Mode

In this mode, the electrical inputs are equalized and fed to the reclocker. If the bit rate is analyzed as 2970Mb/s (3G), the module will reclock the signal at the determined bit rate and feed this signal to both the electrical BNC and the fiber optic outputs. With input reporting enabled, the input signal will be reported as Present.

If no input signal or a signal other than 2970Mb/s (3G) is detected by the module, the output of the reclocker will be muted and the outputs will be static (muted). With input reporting enabled, the signal input will be reported as Not Present.

## HD 1485M Mode

In this mode, the electrical inputs are equalized and fed to the reclocker. If the bit rate is analyzed as 1485Mb/s (HD), the module will reclock the signal at the determined bit rate and feed this signal to both the electrical BNC and the fiber optic outputs. With input reporting enabled, the input signal will be reported as Present.

If no input signal or a signal other than 1485Mb/s is detected by the module, the output of the reclocker will be muted and the outputs will be static (muted). With input reporting enabled, the signal input will be reported as Not Present.

## SD 270M Mode

In this mode, the electrical inputs are equalized and fed to the reclocker. If the bit rate is analyzed as 270Mb/s (SD), the module will reclock the signal at the determined bit rate and feed this signal to both the electrical BNC and the fiber optic outputs. With input reporting enabled, the input signal will be reported as Present.

If no input signal or a signal other than 270Mb/s is detected by the module, the output of the reclocker will be muted and the outputs will be static (muted). With input reporting enabled, the signal input will be reported as Not Present.

## Manual Bypass HD/3G Mode

In this mode, the electrical inputs are equalized and fed to the reclocker. The bit rate is analyzed by the module. If the bit rate is analyzed as 1485Mb/s or 2970Mb/s, the module will reclock the signal at the determined bit rate and feed this signal to the both the electrical BNC and the fiber optic outputs. With input reporting enabled, the input signal will be reported as Present.

If a bit rate other than 1485Mb/s or 2970Mb/s is detected by the module or no input signal is detected, reclocking will not be performed and the signal will be automatically bypassed to the outputs. With input reporting enabled, the input signal will be reported as Not Monitored.

## Manual Bypass SD Mode

In this mode, the electrical inputs are equalized and fed to the reclocker. The bit rate is analyzed by the module. If the bit rate is analyzed as 270Mb/s, the module will reclock the signal at the determined bit rate and feed this signal to the both the electrical BNC and the fiber optic outputs. With input reporting enabled, the input signal will be reported as Present.

If a bit rate other than 270Mb/s is detected by the module or no input signal is detected, reclocking will not be performed and the signal will be automatically bypassed to the outputs. With input reporting enabled, the input signal will be reported as Not Monitored.

# Local Monitoring and Configuration

The 8943FC module can be configured and monitored locally using on-board rotary and paddle switches and the status and configuration LEDs mounted on the top of the module circuit board. If an 8900NET (Net Card) module is present for providing remote monitoring, refer to *Remote Monitoring and Controls* on page 39..

## Local On-board Status Monitoring LEDs

As shown in Figure 25, there are three sets of on-board status LEDs on the top of the circuit board for local monitoring:

- Module status for FAULT, POWER, COMM, and CONF.

- Signal PRESENT and RATE DETECTED (3G, HD, or SD).

- Fiber optic SFP device PRESENT.

Refer to Table 2 on page 35 for an description of each LED color and function.
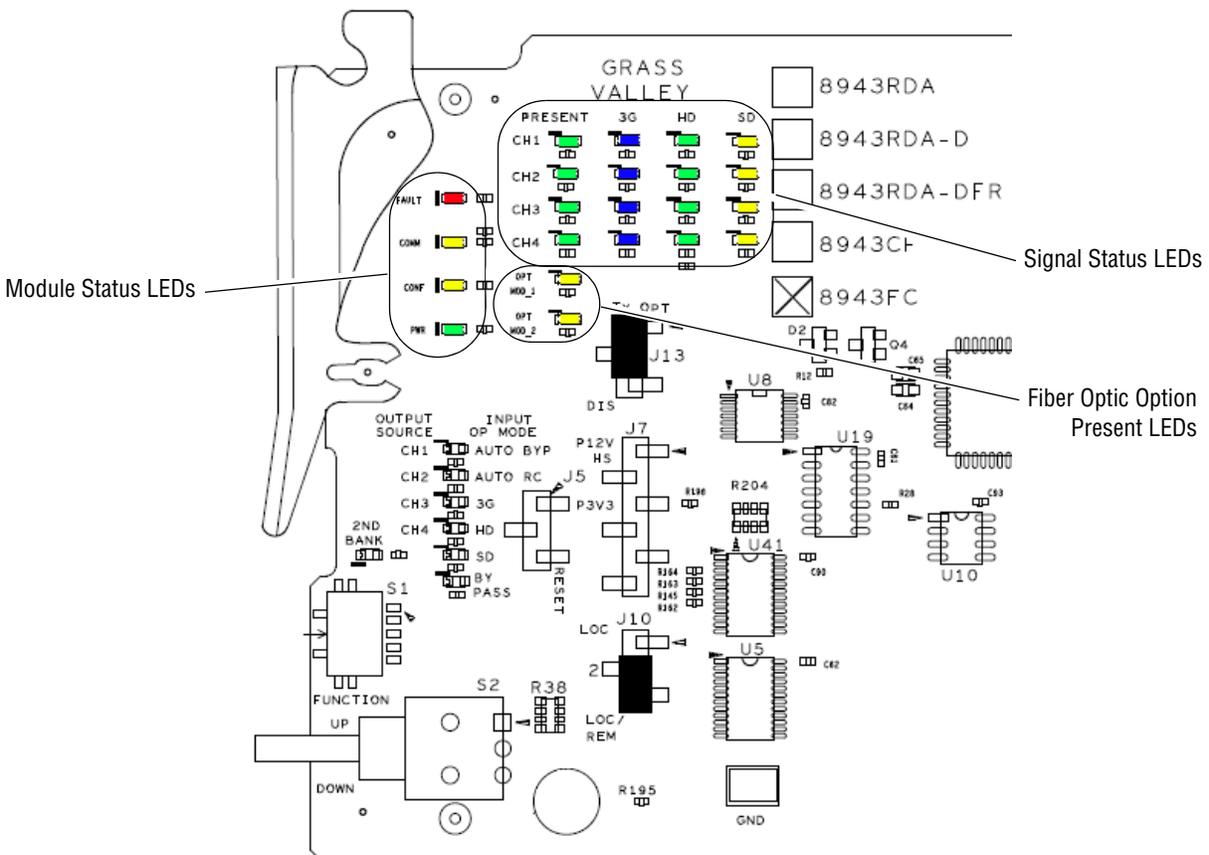
*Figure 25. On-board Status LED Monitoring*

*Table 2.  On-board Module Status LED Names and Conditions*

| LED | Indication | Condition |
|---|---|---|
| **Module Status LEDs** | | |
| **FAULT (red)** | Off | Normal operation, module OK. |
| | On continuously | Module has detected an internal fault. |
| | Flashing | Configuration problems. Check inputs and settings. Missing video input. |
| **COMM (yellow)** | Off | No activity on frame communication bus. |
| | Flashing | Locate Module command received by the module from a remote control system. |
| | Pulse (short duration | Activity present on the frame communication bus. |
| **CONFIG (yellow)** | Off | Module is in normal operating mode, no configuration change in progress or initialization complete. |
| | On continuously | Module is initiating or changing operating modes. |
| | Flashing | Locate Module command received by the module from a remote control system. |
| **PWR (green)** | Off | No power to module or module's DC/DC converter failed. |
| | On continuously | Normal operation, module is powered. |
| **Input Signal Status LEDs** | | |
| **CH1-4 PRESENT (green)** | Off | No signal is present. |
| | On continuously | Input signal is either, 270 Mb/s, 1485 Mb/s, or 2970 Mb/s. |
| **CH1-4 3G (blue)** | Off | Input signal is not 2970 Mb/s. |
| | On continuously | Input signal is 2970 Mb/s. |
| **CH1-4 HD (green)** | Off | Input signal is not 1485 Mb/s. |
| | On continuously | Input signal is 1485 Mb/s. |
| **CH1-4 SD (yellow)** | Off | Input signal is not 270 Mb/s. |
| | On continuously | Input signal is 270 Mb/s. |
| **SFP Device OPTION PRESENT LEDs** | | |
| **OPT MOD_1** | Off | No fiber option transmitter SFP device is installed in position J6. |
| | On continuously | Fiber optic option transmitter SFP device is installed in position J6. |
| **OPT MOD_2** | Off | No fiber option transmitter SFP device is installed in position J4. |
| | On continuously | Fiber optic option transmitter SFP device is installed in position J4. |

Table 3 on page 36 outlines the conditions that will result in the reported state of the input being **Present** or **Not Present** with the onboard LEDs and the conditions of the output based on the operating mode, the input presence, the actual input standard, and the Input Reporting State.

.

*Table 3. Reported Input/Output Status Summary*

| Operating Mode | Input Carrier Detect[1] | Reclocker Locked | PRES LED | 3G LED | HD LED | SD LED | Output | Reporting | Reported Input State |
|---|---|---|---|---|---|---|---|---|---|
| Auto Reclock/Bypass | Not Present | N/A | Off | Off | Off | Off | N/A | Disabled | Not Monitored |
|  |  |  |  |  |  |  |  | Enabled | Not Monitored |
| Auto Reclock/Bypass | Present | N/A | Green | Off | Off | Off | Input Signal | Disabled | Not Monitored |
|  |  |  |  |  |  |  |  | Enabled | Present |
| Auto Reclock/Bypass | Present | Not 270M, 1485Mb/s, or 2970Mb/s | Green | Off | Off | Off | Input Signal | Disabled | Not Monitored |
|  |  |  |  |  |  |  |  | Enabled | Present |
| Auto Reclock/Bypass | Present | 270Mb/s | Green | Off | Off | Yellow | Reclocked 270Mb/s | Disabled | Not Monitored |
|  |  |  |  |  |  |  |  | Enabled | Present |
| Auto Reclock/Bypass | Present | 1485Mb/s | Green | Off | Green | Off | Reclocked 1485Mb/s | Disabled | Not Monitored |
|  |  |  |  |  |  |  |  | Enabled | Present |
| Auto Reclock/Bypass | Present | 2970Mb/s | Green | Blue | Off | Off | Reclocked 2970Mb/s | Disabled | Not Monitored |
|  |  |  |  |  |  |  |  | Enabled | Present |
| Auto Reclock/Mute | Not Present | N/A | Off | Off | Off | Off | Muted | Disabled | Not Monitored |
|  |  |  |  |  |  |  |  | Enabled | Not Present |
| Auto Reclock/Mute | Present | Not 270M, 1485Mb/s, or 2970Mb/s | Off | Off | Off | Off | Muted | Disabled | Not Monitored |
|  |  |  |  |  |  |  |  | Enabled | Not Present |
| Auto Reclock/Mute | Present | 270Mb/s | Green | Off | Off | Yellow | Reclocked 270Mb/s | Disabled | Not Monitored |
|  |  |  |  |  |  |  |  | Enabled | Present |
| Auto Reclock/Mute | Present | 1485Mb/s | Green | Off | Green | Off | Reclocked 1485Mb/s | Disabled | Not Monitored |
|  |  |  |  |  |  |  |  | Enabled | Present |
| Auto Reclock/Mute | Present | 2970Mb/s | Green | Blue | Off | Off | Reclocked 2970Mb/s | Disabled | Not Monitored |
|  |  |  |  |  |  |  |  | Enabled | Present |
| Fixed 270M/Mute | Not Present | N/A | Off | Off | Off | Off | Muted | Disabled | Not Monitored |
|  |  |  |  |  |  |  |  | Enabled | Not Present |
| Fixed 270M/Mute | Present | Not 270Mb/s | Off | Off | Off | Off | Muted | Disabled | Not Monitored |
|  |  |  |  |  |  |  |  | Enabled | Not Present |
| Fixed 270M/Mute | Present | 270Mb/s | Green | Off | Off | Yellow | Reclocked 270Mb/s | Disabled | Not Monitored |
|  |  |  |  |  |  |  |  | Enabled | Present |
| Fixed 1485M/Mute | Not Present | N/A | Off | Off | Off | Off | Muted | Disabled | Not Monitored |
|  |  |  |  |  |  |  |  | Enabled | Not Present |
| Fixed 1485M/Mute | Present | Not 1485Mb/s | Off | Off | Off | Off | Muted | Disabled | Not Monitored |
|  |  |  |  |  |  |  |  | Enabled | Not Present |
| Fixed 1485M/Mute | Present | 1485Mb/s | Green | Off | Green | Off | Reclocked 1485Mb/s | Disabled | Not Monitored |
|  |  |  |  |  |  |  |  | Enabled | Present |
| Fixed 2970M/Mute | Not Present | N/A | Off | Off | Off | Off | Muted | Disabled | Not Monitored |
|  |  |  |  |  |  |  |  | Enabled | Not Present |
| Fixed 2970M/Mute | Present | Not 2970Mb/s | Off | Off | Off | Off | Muted | Disabled | Not Monitored |
|  |  |  |  |  |  |  |  | Enabled | Not Present |
| Fixed 2970M/Mute | Present | 2970Mb/s | Green | Blue | Off | Off | Reclocked 2970Mb/s | Disabled | Not Monitored |
|  |  |  |  |  |  |  |  | Enabled | Present |

[1] When an input is missing on any input, the red FAULT LED will flash on the front of the module circuit board.
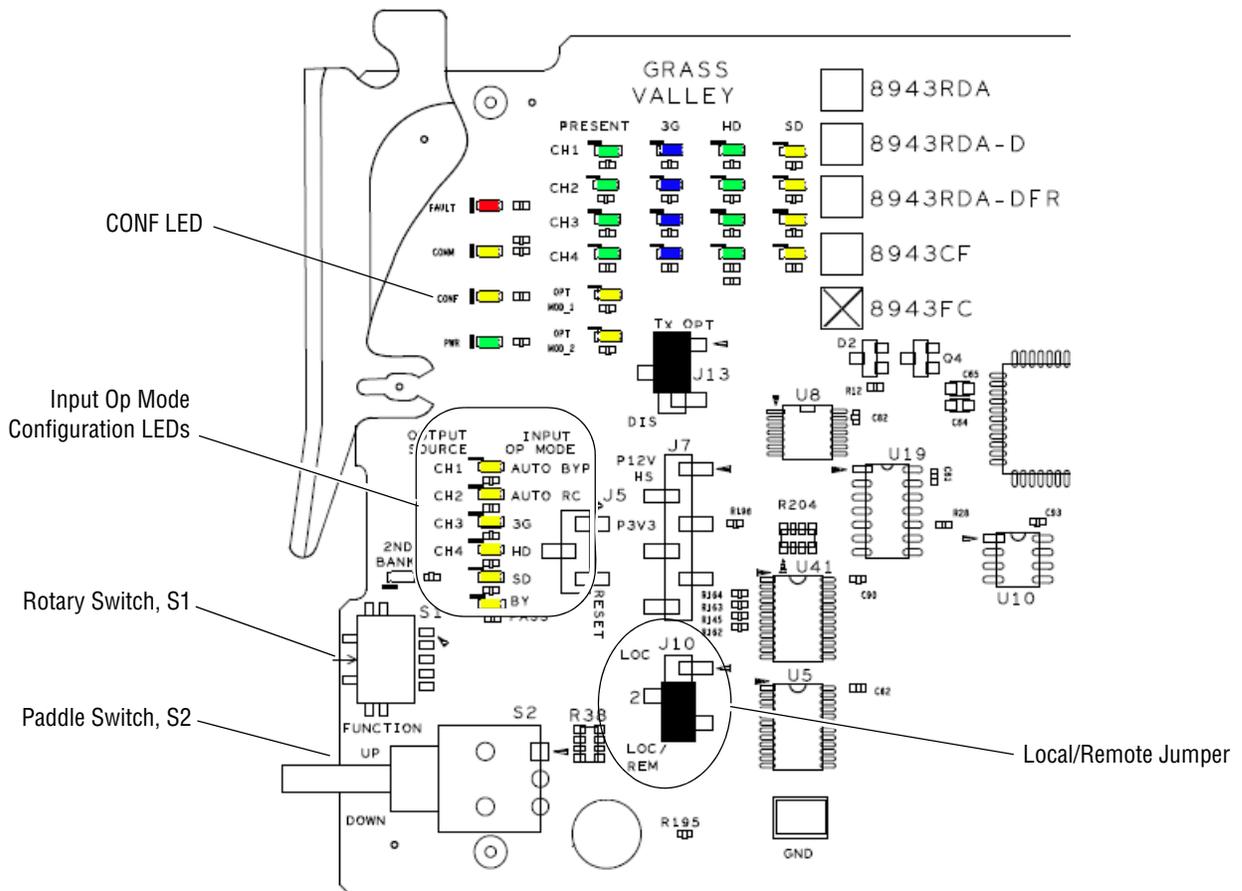
## Local Mode Configuration

The module may be configured using the local on-board rotary switch and paddle switch in conjunction with the configuration LEDs shown in Figure 26. If an 8900NET (Net Card) module is present for providing remote configuration, refer to *Remote Monitoring and Controls* on page 39.

### Local/Remote Jumper

The on-board jumper Local/Remote jumper, J10, (Figure 26) is set at the factory for local and remote (LOC/REM position, pins 2-3) to allow remote control. It can be changed to lock out remote control if desired (LOC position, pins 1-2).

*Figure 26.  On-board Configuration Switches and LEDs*

The local configuration controls are described below and shown in Figure 26 on page 37. Refer to Table 4 for the switch settings to set each parameter.

- Function (rotary) switch (S2) – this switch is used to access each of the four channels for configuration. The switch has 16 possible positions (0 through 9 and A through F). Only positions 1, 2, 3, 4, and F are used (see Table 4). The **Bank 2** LED is also not used.

- Paddle switch (S1) – scrolls through the available modes for the selected channel when the switch is held momentarily in either the up or down position.

- CONFIG (configuring) LED – when on, indicates the module is initializing or processing configuration information.

*Table 4. Mode Configuration Functions*

| Function Switch Setting | Paddle Switch Up | Paddle Switch Down | Function Description |
|---|---|---|---|
| 0 | – | – | Park position for normal operation (paddle switch has no effect) |
| 1 | Auto By, Auto RC, 3G, HD, SD, or By. | | Scroll to Channel 1 input operating mode |
| 2 | | | Scroll to Channel 2 input operating mode |
| 3 | | | Scroll to Channel 3 input operating mode |
| 4 | | | Scroll to Channel 4 input operating mode |
| 5-9 | – | – | Not used |
| A-E | – | – | |
| F | Recall | | Recall factory defaults (all channels have Reporting Enabled and Auto/Mute mode selected). |

**Note**    When configuration is complete, the **Function** switch should be parked in an unused position such as 0 during normal operation to avoid changing the mode accidently with the paddle switch.

# Remote Monitoring and Controls

The 8943FC module can be configured and monitored remotely when an 8900NET module is installed in the GeckoFlex frame using the web-based GUI or the Newton Control Panel.

## 8900NET Module Information

Refer to the *8900NET Network Interface Module Instruction Manual* for information on the 8900NET Network Interface module and setting up and operating the GeckoFlex frame network.

**Note**    The 8900NET module in the GeckoFlex frame must be running software version 4.0.2 or higher for proper remote and control panel operation. Upgrade software and instructions for the 8900NET can be downloaded from the Grass Valley web site.

ftp://ftp.grassvalley.com/modular/8900/8900net/v4.3.0/

## Newton Control Panel Configuration

A Newton Control Panel (hard and/or soft version) can be interfaced to the GeckoFlex frame over the local network when the 8900NET (Net Card) is present. Refer to the documentation that accompanies the Newton Modular Control System for installation, configuration, and operation.

Control panel access offers the following considerations for module configuration and monitoring:

- Ability to separate system level tasks from operation ones, minimizing the potential for on-air mistakes.

- Ability to group modular products—regardless of their physical locations—into logical groups (channels) that you can easily manipulate with user-configured knobs.

- Update software for applicable modules and assign frame and panel IP addresses with the NetConfig Networking application.

- Recommended for real-time control of module configuration parameters, providing the fastest response time.

**Note**    All module functions may not be available with the control panel.

An example of the Newton Configurator is shown in Figure 27. Newton Control Panel parameters are listed in Table 8 on page 59.

*Figure 27. Newton Configurator Example*
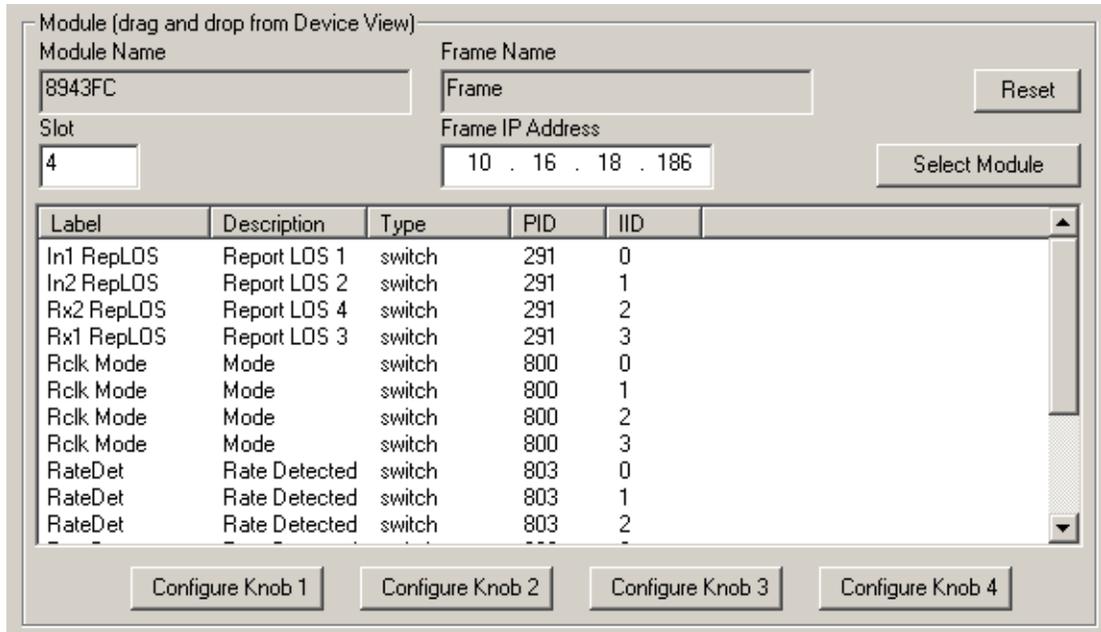


## Web Browser Interface

The web browser interface provides a graphical representation of module configuration and monitoring.

Use of the web interface offers the following considerations (when applicable for the module):

- Provides complete access to all module status and configuration functions, including factory parameter default recalls, slot configuration, and SNMP monitoring controls.

- Web access will require some normal network time delays for processing of information.

- Configuration parameter changes may require pressing **Apply** button or **Enter**, upload processing time, and a manual screen refresh to become effective.

- Web interface recommended for setting up module and reporting status for SNMP and monitoring.

Refer to the Frame Status page shown in Figure 28 on page 41. The modules can be addressed by clicking either on a specific module icon in the frame status display or on a module name or slot number in the link list on the left.

**Note**    The physical appearance of the menu displays on the web pages shown in this manual represent the use of a particular platform, browser and version of 8900NET module software. They are provided for reference only. Displays will differ depending on the type of platform and browser you are using and the version of the 8900NET software installed in your system. The only recommended browser for optimum performance is the latest version of Internet Explorer. This manual reflects 8900NET software version 4.3.0, the latest release recommended.

For information on status and fault monitoring and reporting shown on the Status page, refer to *Specifications* on page 53.

*Figure 28.  GeckoFlex Frame Status Page*

The Links section lists the frame and its current modules. The selected link's Status page is first displayed and the sub-list of links for the selection is opened. The sub-list allows you to select a particular information page for the selected device.

Content display section displays the information page for the selected frame or module (frame slot icons are also active links).

Refresh button for manual update of page

## Web Page Links

The web interface GUI provides the following links and web pages for the 8943FC modules (Figure 29):

- Status – reports input video status for each of the fiber optic inputs 1-4, presence, type, and status of Fiber Optic SFP devices, module slot serial number, software/firmware version, and Asset Tag assignment, (page 43),

- I/O Config – shows the presence/status of the signals on a specific connector, allows naming of each input and allows enabling or disabling of the signal reporting (page 47)

- Settings – allows selection of the input operating mode for each channel, reports the rate detected and signal state, and allows setting of factory defaults for input modes (page 48),

- Slot Config – provides Locate Module and Slot Memory functions along with links to the 8900NET SNMP, LED Reporting, and Frame Alarm configuration web pages (page 50)

*Figure 29.  8943FC Web Page Links*



4 8943FC
Status
I/O Config
Settings
Slot Config

## Status Web Page

Use this link

4 8943FC
Status
I/O Config
Settings
Slot Config

The Status web page reports the status of the input signal for each of the optical video inputs (Channel 1-4), front and rear module information and status, and information and status on the top and bottom fiber optic SFP devices.

### GeckoFlex Module Physical Structure

This graphic reports the status for each of the following items:

- Fiber Input 1-4 – indicates the status of the video input to the module from the fiber transmitters. Refer to the *Settings Web Page* on page 48 for information on disabling the input status reporting.

- 2 BNC Out 1-4 – not monitored.

- Frame Bus – indicates the status of the communication bus to the 8900NET module.

- Rear Module – indicates status of the 8943FC-R module.

- Front Processing Module – indicates status of the 8943FC front module.

- Fiber Module 1 – indicates the status of the optional fiber optic SFP device installed in connector J6 on the top side of the module.

- Fiber Module 2 – indicates the status of the fiber optic SFP device installed in connector J4 on the top side of the module.

Color coding of the display and the Status LED indicate status. Refer to *Specifications* on page 53 for a complete explanation of the color coding.

### Fiber Modules

The Fiber Modules read-only section reports the type (RX-RX), the wavelengths, if the SFP Device handles 3G signals (Y or N), and the part number, when an optional SFP transmitter device is installed in Fiber Module 1 (connector J6) or Fiber Module 2 (connector J4) on the top side of the front module circuit board.

### Warning Messages

When the module detects a fiber optic error, a warning message will appear in the Fiber Modules table. Other errors will be displayed based on color coding of the graphics as described in *Status Monitoring* on page 55.

### Other Status Reporting

A read-only section at the bottom of the Status web page gives information about the module, such as part number, serial number, hardware revision and software and firmware versions, and asset tag number (assigned on the Slot Config web page described on page 50).
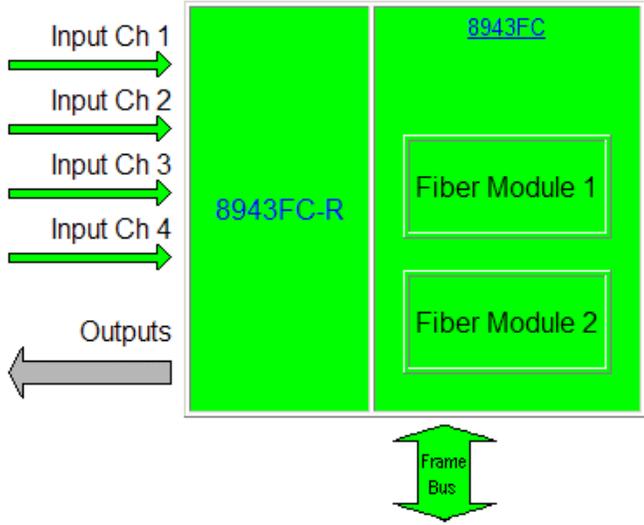
The Status web page shown in Figure 30 show all inputs present and locked and no errors of any type.

*Figure 30. 8943FC Status Web Page – No Error Messages*

Figure 31 illustrates the Status web page reporting that the top SFP device is not installed.

*Figure 31. 8943FC Status Web Page – No SFP Installed*
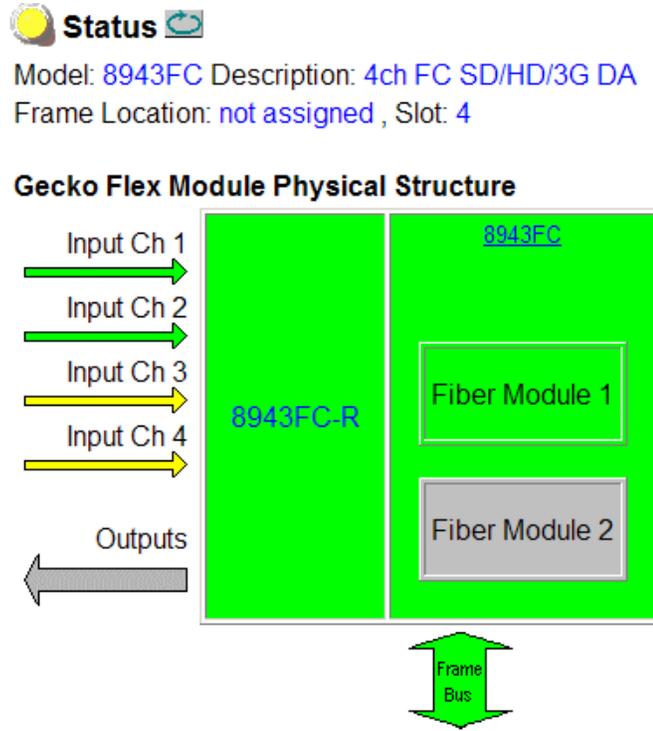
The input status of all four channels is reflected (in the Status LED on each web page) and reported (to upper level devices such as the 8900NET module and SNMP traps) remotely in a collective state. Table 5 shows how the collective input status of all four channels is generated and reported for various channels states.

*Table 5.  Collective Remote Reporting Status of All Channels*

| Channel 1 Input Status | Channel 2 Input Status | Channel 3 input Status | Channel 4 Input Status | Collective Input Status |
|---|---|---|---|---|
| Not Monitored | Not Monitored | Not Monitored | Not Monitored | Not Monitored |
| Not Present | N/A | N/A | N/A | Not Present |
| N/A | Not Present | N/A | N/A | Not Present |
| N/A | N/A | Not Present | N/A | Not Present |
| N/A | N/A | N/A | Not Present | Not Present |
| Present | Not Monitored | Not Monitored | Not Monitored | Present |
| Not Monitored | Present | Not Monitored | Not Monitored | Present |
| Not Monitored | Not Monitored | Present | Not Monitored | Present |
| Not Monitored | Not Monitored | Not Monitored | Present | Present |
| Present | Present | Not Monitored | Not Monitored | Present |
| Present | Not Monitored | Present | Not Monitored | Present |
| Present | Not Monitored | Not Monitored | Present | Present |
| Not Monitored | Present | Present | Not Monitored | Present |
| Not Monitored | Present | Not Monitored | Present | Present |
| Not Monitored | Not Monitored | Present | Present | Present |
| Present | Present | Present | Not Monitored | Present |
| Present | Present | Not Monitored | Present | Present |
| Present | Not Monitored | Present | Present | Present |
| Not Monitored | Present | Present | Present | Present |
| Present | Present | Present | Present | Present |

## I/O Config Web Page

Use this link

Use the I/O Config web page (Figure 32) for the 8943FC-R rear module for rear module configuration and signal status reporting.

All of the input and output connectors on the corresponding 8943FC-R rear module are illustrated on the I/O Config web page. The inputs can be configured with the following controls:

- **Signal Names** – type of the desired input name (up to 12 characters) into the corresponding boxes for each input. The status of each input is indicated by the color of the display. The color legend is under the table.

**Note**     The status color yellow can also indicate that the input is invalid.

- **Reporting Enabled** – the status reporting of the input can be enabled or disabled at the module level by selecting or deselecting the corresponding checkbox in the **Reporting Enabled** column for each input.

*Figure 32.  I/O Config Web Page – 8943FC-R Rear*

## Settings Web Page

4 8943FC
Status
I/O Config
Settings
Slot Config

Use
this
link

Use the Settings web page (Figure 33 on page 49) set the input operating
mode for each channel and monitor the rate detected and signal state for
each channel. A **Default** button can be used to return the module to factory
defaults (Auto Reclock/Mute and Reporting Enabled).

### Inputs

Select the input operating mode for each channel by selecting a mode from
the channel pulldown from one of the following choices:

- Auto Reclock/Bypass mode
- Auto Reclock/Mute mode
- 3G 2970M mode
- HD 1485M mode
- SD 270M mode
- Manual Bypass HD/3G
- Manual Bypass SD

Each of the operating modes are described in detail in *Input Operating
Modes Overview* on page 31.

*Figure 33. Settings Web Page – All Signals Present*

## Slot Config Web Page

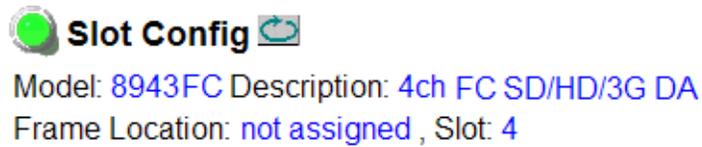4 8943FC
Status
I/O Config
Settings
Slot Config

Use this link
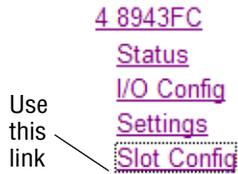
Use the Slot Config web page shown in Figure 34 to perform the following functions on the module:

• Locate Module

• Slot Identification

• Slot Memory

• Frame Health Reporting

• LED Reports

• SNMP Trap Reports

Each of these functions is described in detail below.

*Figure 34.  Slot Config Web Page*

**Slot Config**

Model: 8943FC Description: 4ch FC SD/HD/3G DA
Frame Location: not assigned , Slot: 4

**Locate Module**

Off

**Slot Identification**

Name: 8943FC    Default

Asset Tag:

**Slot Memory**

☐ Restore upon Install

Learn Module Config

Frame Health Reports

LED Reports

SNMP Trap Reports

### Locate Module

Selecting **Flash** from the **Locate Module** pulldown flashes the yellow COMM and CONF LEDs on the front of the module so it can be located in the frame.

### Slot Identification

You may identify the module by typing a specific name in the **Name** field. The assigned name is stored on the 8900NET module and travels with the 8900NET module if it is moved to another frame. Select **Default** to enter the factory default module name.

An asset identification may be entered in the **Asset Tag** field. This will appear on the module Status web page and in the NetConfig inventory report.

### Slot Memory

The slot configuration for each media module is automatically polled and refreshed periodically (about every 50 minutes) by the 8900NET module when the **Always Slot Refresh** checkbox on the 8900NET Configuration web page (with 4.3.0 software) and/or the **Restore upon Install** checkbox on any media module Slot Config web page is selected.

When the **Restore upon Install** checkbox on any media module Slot Config web page has been selected, the current configuration from that module is saved in slot memory on the 8900NET module. This allows the current module to be removed and when another module of the same part number, and software version is installed, the configuration saved to the 8900NET module will be downloaded to the installed module. The **Restore upon Install** checkbox must be selected before the current module with the saved configuration is removed.

**Note**     Make sure all modules of the same model type are running the same software version and have the same part number silk-screened on the printed circuit board. Downloading a configuration to a module with a different software version or part number can produce unexpected results.

If a different type of module is installed in this slot, a warning message will state that the original module type has been replaced with another module type. In this case, a **Clear** button will appear allowing you to clear the stored configuration from the previous module.

You may also select the **Learn Module Config** button at any time to save the current configuration for this slot. The configuration is saved on the 8900NET module. If the 8900NET module is removed or powered down, the stored configurations are not saved.

When no **Restore upon Install** checkboxes on any of the media module Slot Config web pages are selected and the **Always Slot Refresh** checkbox on the 8900NET Configuration web page is unchecked, the slot refresh polling function on the 8900NET module will be disabled. See the **Always Slot Refresh** checkbox description in the *8900NET (Net Card) Network Interface Module Instruction Manual* for more details.

**Note**     Uncheck the **Restore Upon Install** button before downloading new software.

### Frame Health Reporting

This web page allows configuration of the alarms and warnings that are reported to the external Frame Health Alarm connector on the rear of the GeckoFlex frame. Refer to *8900NET Instruction Manual* for more details.

### LED Reports Link

Select the LED Reports link to open the 8900NET LED Reporting web page. Normally, every module in the frame will report to the 8900NET module any Fault, Signal Loss, Reference Loss, or Config Error conditions. These conditions will be reflected by the status LEDs on the 8900NET module. Using this web page, any of these conditions can be disabled from being reported to the 8900NET module for each individual module and other components (power supplies, fans) in the frame

### SNMP Trap Reports Link

Select the SNMP Trap Reports link to open the 8900NET SNMP Reporting web page. This link will only be present when SNMP Agent software has been installed on the 8900NET module. This web page allows configuration of which alarms and warnings that are reported to the SNMP management software.

Refer to the *8900NET Instruction Manual* for complete details on using the 8900NET web pages.

# Software Updating

Software updating of the 8943FC modules is done using the NetConfig Networking Application PC option. This application is available free of charge from the Grass Valley web site.

The procedure for updating software with NetConfig is given in the 8943FC Release Notes when software updates become available. Check the Grass Valley web site for update information. Refer to *Contacting Grass Valley on page 4* for more information.

# Specifications

Table 6 gives the overall specifications for the 8943FC module. Refer to Table 7 on page 54 for Dual Receiver/Transceiver SFP detailed specifications.

*Table 6.  8943FC Specifications*

| Parameter | Value |
|---|---|
| **Serial Digital Coax Output** | |
| Connector | 2 BNCs per input channel (total of 8) |
| Output impedance | 75 ohm |
| Reclocking | SMPTE 259M-1997 and DVB-ASI at 270 Mb/s |
| | DVB/ASI (ETSI TR 101 891V1.1.1) with following tolerance on bit rate: 270Mb/s ± 0.5% |
| Non-reclocking | 1 to 540 Mb/s, AES3-id-2001 and MADI |
| Cable length (with Belden 1694A cable) | • Up to 300 meters for bit rates up to 270 Mb/s |
| | • Up to 140 meters for bit rates from 270 Mb/s to 1.485 Gb/s |
| | • Up to 100 meters for bit rates from 1.485 Gb/s to 2.97 Gb/s |
| Signal level | 800 mV p-p, ± 10% maximum |
| Rise/fall time (20-80%) | < 270 ps for reclocked HD<br>400-800 ps for SD and bypass mode |
| Return loss (typical) | • > 15 dB from 5 MHz to 1.5 GHz |
| | • > 10 dB from 1.5 GHz to 3 GHz |
| Output polarity | Non-inverted (all outputs) |
| Total jitter | ≤ 0.2 UI p-p |
| **Input to Output** | |
| Jitter transfer | < 1 dB peaking in jitter transfer function form 10Hz to 10 MHz |
| Intrinsic jitter | ≤ 0.1 UI p-p |
| Electrical length | |
|     Reclocked at 270 Mb/s | 10 ns |
|     Reclocked at 1.5 Gb/s | 8 ns |
|     Reclocked at 3 Gb/s | 8 ns |
|     Bypass | 7 ns |
| **Mechanical** | |
| Supported frame type | GeckoFlex |
| Number of frame slots | Single slot |
| Rear module type | 8943FC-R |
| Rear module retainer maximum screw torque | 4-5 inch-lb./0.45-0.6Nm |

*Table 6. 8943FC Specifications*

| Parameter | Value |
|---|---|
| **Environmental** | |
| Frame temperature range | Refer to GeckoFlex Frames 8900FX/FF/FFN Signal Processing Systems Instruction Manual at www.grassvalley.com/docs/modular |
| Operating humidity range | |
| Non-operating temperature | |
| **Power** | |
| Power consumption | 7.5 Watts with two SFP devices |

*Table 7. Optional Receiver/Transceiver Fiber Optic SFP Device Specifications*

| Model Numbers | SFP-13103G-M1DRX-K<br>SFP-13103G-M1DRX,<br>SFP-13103G-M2DRX | SFP-13103G-M1TRX-K<br>SFP-13103G-M1TRX<br>SFP-13103G-M2TRX |
|---|---|---|
| Low wavelength | 1270nm | 1270nm |
| High wavelength | 1610nm | 1610nm |
| Receiver channels | 2 | 1 |
| Connector type | LC | |
| Fiber support | Single-mode | |
| Data rate | 143 Mb/s to 2.97 Gb/s | |
| Maximum Receive Signal Levels @ 2.97 Gb/s, 360 Mb/s, and 270 Mb/s | -3 dBm<br>(0.501 mW) | |
| Minimum Receive Signal Levels @ 2.97 Gb/s, 360 Mb/s, and 270 Mb/s | -23 dBm<br>(0.500794 mW) | |

# Status Monitoring

There are a number of ways to monitor frame and module status. These methods are summarized here. For more detailed information, refer to the *8900NET (Net Card) Network Interface Module Instruction Manual* and the *8900 Gecko* or *8900 GeckoFlex Frame Instruction Manuals.*

All modular product documentation is available on-line in PDF format at this link*:*

[www.grassvalley.com/docs/modular](www.grassvalley.com/docs/modular)

The main status monitoring methods include the following:

• External frame alarm output on the rear of the 8900 frame with reporting from the Module Health Bus and other frame status alarm reports,

• LEDs on the Frame, 8900NET module, and individual frame media modules,

• Web browser status reporting for each frame component, and

• SNMP traps, captured by Grass Valley's NetCentral or another SNMP Manager Application.

**Note** SNMP trap information is only available when an SNMP Agent has been installed and configured.

## External Frame Alarm

An external Frame Alarm output is available on pins 8 and 9 of the RS-232 connector on the rear of the frame. The Frame Alarm outputs a voltage level indicating there is an alarm condition on the Module Health Bus or one of the other frame components reported to the Frame Monitor module in a Gecko 8900TF or GeckoFlex 8900FF frame or the 8900NET module in an 8900TFN and GeckoFlex 8900FFN frame.

• The Module Health bus is a separate line on the frame motherboard that provides a means for older or less capable modules (such as DAs with no microprocessor) that cannot communicate over the Frame (serial) bus to report warning and alarm conditions to the external Frame Alarm. All media modules in the frame report a voltage level to this line when a warning condition occurs on the module. The specific warning or module location is not reported, only an indication that an warning condition has occurred.

• Frame alarm reporting from other frame components can be enabled and disabled using DIP switches on the Frame Monitor and 8900NET module. For frames with an 8900NET module, the Frame Alarm Reporting web page allows configuration of the alarms and warnings that are reported to this external Frame Health Alarm*.*

## LED Reporting

LEDs on the front of media modules, the Frame Monitor or 8900NET modules, and the front covers of the 8900TF/TFN and GeckoFlex FF/FFN frames indicate status of the frame and the installed power supplies, fans in the front covers, and module status. (The 8900TX-V/A and GeckoFlex 8900FX frames have no LED indicators on the front cover.)

• LED reporting from the modules in the frame to the 8900NET module is configurable using the 8900NET LED Reporting web page.

• The Status LEDs for this module are described in *Local On-board Status Monitoring LEDs* on page 34. LEDs for the 8900NET module are described in the *8900NET (Net Card) Network Interface Instruction Manual*.

## Web Browser Interface

The 8900NET module controls a web browser GUI that indicates frame and module status on the following web pages:

• Frame Status web page – reports overall frame and module status in colored graphical and text formats. Refer to Figure 28 on page 41 for an example.

• Module Status web page (Figure 30 on page 44) – shows specific input and reference signal configuration error status to the module along with module status and information (part number, serial number, hardware version, software/firmware/boot versions, and Asset number (as assigned on the Slot Config web page).

• A Status LED icon on each web page reflects the module status on the module Status web page where warnings and faults are displayed and is a link to the module Status web page.

## SNMP Reporting

The GeckoFlex 8900 Series system uses the Simple Network Monitoring Protocol (SNMP) internet standard for reporting status information to remote monitoring stations. When SNMP Agent software is installed on the 8900NET module, enabled status reports are sent to an SNMP Manager such as the Grass Valley's NetCentral application.

DIP switch. Connection and use of the Frame Alarm is covered in detail in the *8900NET Network Interface Instruction Manual.*

# Service

The 8943FC modules make extensive use of surface-mount technology and programmed parts to achieve compact size and adherence to demanding technical specifications. Circuit boards should not be serviced in the field unless directed otherwise by Customer Service.

## Power-Up Diagnostic Failure

If the module has not passed self-diagnostics, do not attempt to trouble-shoot. Return the unit to Grass Valley Customer Service (see *Module Repair*).

## Troubleshooting

### Electronic Circuit Breaker

An electronic circuit breaker on the module works during a fault condition or an overcurrent to cut off power to the module in place of a fuse.

If power has been cut off to module, remove the module and replace it in the frame to reset. If the problem persists contact Grass Valley Customer Service.

## Module Repair

If the module is still not operating correctly, replace it with a known good spare and return the faulty module to a designated Grass Valley repair depot. Call your Grass Valley Customer Service representative for depot locations.

Refer to *Contacting Grass Valley on page 4* at the front of this document for the Grass Valley Customer Service contact information.

# Functional Description

An overall block diagram for the 8943FC module is shown in Figure 35.

*Figure 35.  8943FC Block Diagram*
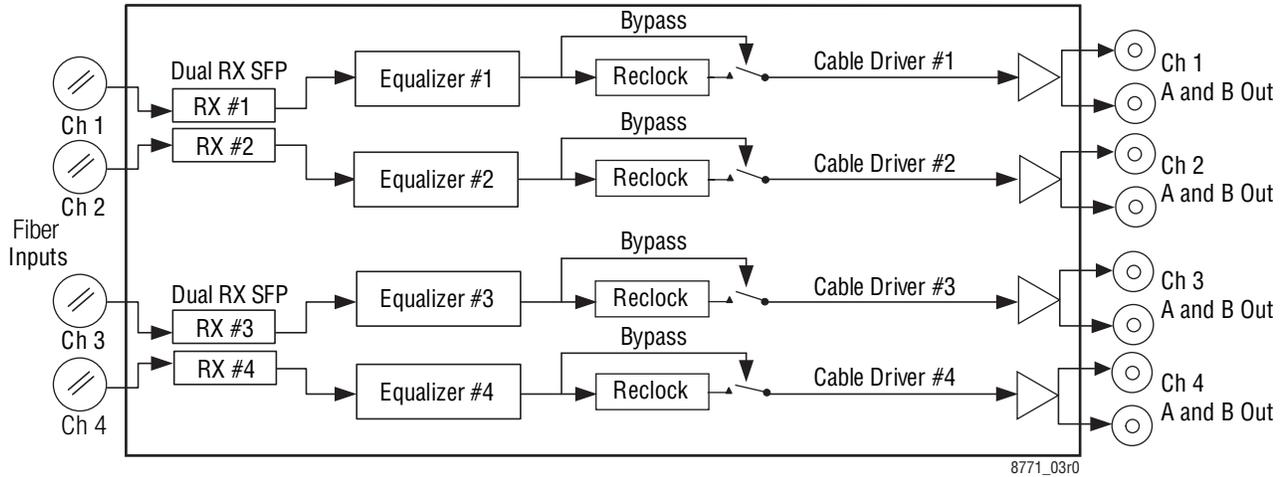
# Configuration Summary Table

Table 8 provides a complete summary of the 8943FC module functions and a comparison of the functionality available with each control type along with the ranges and default values for each parameter and notes on each control.

*Table 8.  Summary of 8943FC Configuration Functions*

| Function Type | Default | Range/Choices Resolution | Web Page/ Function Name | Local Onboard Controls | Newton Control Panel |
|---|---|---|---|---|---|
| Assign Signal names for channels 1-4 | Channel 1 Channel 2 Channel 3 Channel 4 | Type in name (up to 11 characters) | I/O Config/ Signal Name Name channel 1-4 | N/A (Defaults are used) | N/A |
| Reporting enable | Enabled | Enabled or Disabled | I/O Config/ Reporting Checkboxes for Ch1, Ch 2, Ch 3, and Ch 4 | N/A | In1 RepLOS In2 RepLOS Rx1 RepLOS Rx2 RepLOS |
| Set Input Mode for Ch 1-4 | Auto Reclock/Mute | Auto Reclock/Bypass, Auto Reclock/Mute, 3G 2970M, HD 1485M, SD 270M, Manual Bypass/HD 3G, or Manual Bypass SD. | Settings/ Inputs Ch 1 J1, Ch 2, J3, Ch 3 J5, Ch 4 J7 | S2 = Pos 1, Ch 1 S1 = pos 2, Ch 2 S1 = Pos 3, Ch 3 S1 = Pos 4, Ch 4 Use paddle switch S1 to cycle to desired mode for selected channel. | Rclk Mode |
| Recall factory defaults | – | – | Settings/ **Set Defaults** button | S1 = F Push paddle switch S2 up | Defaults |

# *Index*

## Numerics

## A

## B

## C

## D

## F

## G

## H

## I

# W