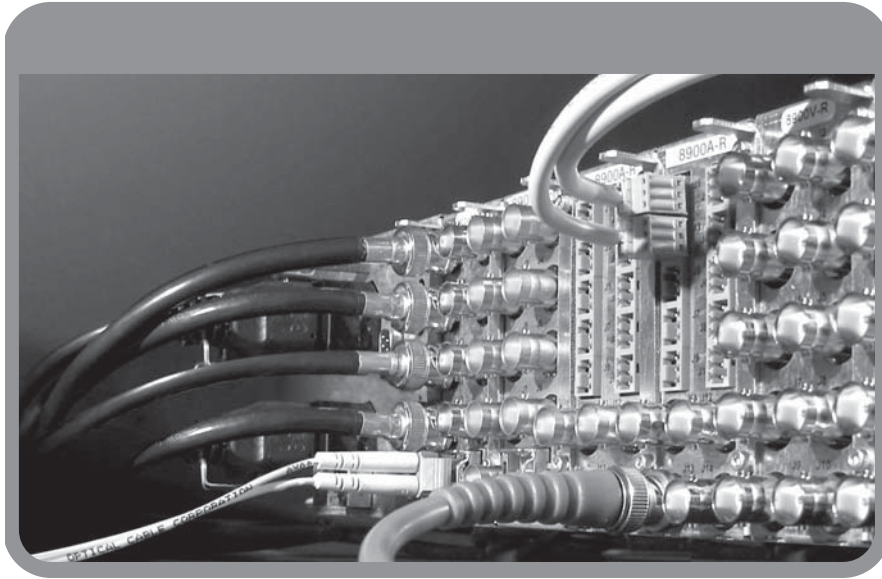


2040RDA-FR/16FR

FIBER READY DISTRIBUTION AMPLIFIERS



Instruction Manual

Software Version 2.1.1



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2040RDA-FR/16FR

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Instruction Manual
Software Version 2.1.1

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Preface

About This Manual

This manual describes the features of a specific 2000 Series module in the Kameleon Media Processing System. As part of this module family, it is subject to Safety and Regulatory Compliance described in the 2000 Series frame and power supply documentation (see the *Kameleon 2000 Series Frames Instruction Manual*).

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

www.grassvalley.com/docs/modular

2040RDA-FR, 2040RDA-16FR Fiber Ready Distribution Amplifiers

Introduction

The 2040RDA-FR and 2040RDA-16FR Fiber Ready Distribution Amplifiers provides one electrical input by either eight or sixteen non-inverting electrical outputs for distributing SD, HD, and DVB-ASI signals. The module also handles optical/electrical fiber conversion with optional low power single mode SFP (Small-form Factor Pluggable)/LC 1310nm optical transceiver (input/output) or dual transmitter submodules. This provides both optical inputs and outputs depending on the type of submodule installed in the rear module.

Auto-detection and reclocking capability are available at all SD (standard definition) and HD (high definition) data rates. The reclocking circuit can be bypassed to distribute signals down to 4 Mbps.

The 2040RDA-FR and 2040RDA-16FR features include:

- 2040RDA-FR: Eight BNC electrical outputs, one BNC electrical input, or
- 2040RDA-16FR: Sixteen BNC electrical outputs, one BNC electrical input,
- Single mode fiber optic submodule option for dual transmitter (2 outputs) or transceiver (1 input/1 output),
- Module and SFP submodule are both hot-swappable,
- Automatic data rate detection,
- Reclocks at 143 Mb/s, 177 Mb/s, 270 Mb/s, 360 Mb/s, 540 Mb/s, or 1485 Mb/s,
- Distributes transport streams in bypass mode,
- Auto-adjust rise/fall times to meet either the SD or HD standard, and
- Supports networked control and monitoring in frames with 2000NET module.

Installation

Installation of a 2040RDA-FR or 2040RDA-16FR module set is a process of:

- Setting on-board jumpers on the front media module for modules not using remote control or to set module defaults,
- Placing the 2040RDA-FR-R or 2040RDA-16FR-R rear module in a frame slot,
- Installing the fiber optic SFP submodule (optional),
- Placing the front media module in the corresponding front slot, and
- Cabling signal ports.

Front Module Onboard Jumper Settings

The 2040RDA-FR and 2040RDA-16FR modules have four onboard jumpers that can be configured for determining the following functions:

- Jumper JP1 – sets control mode for Local only or Remote and Local.
- Jumper JP2 and JP3 – set the input format for the module and/or optic output enables.
- Jumper JP4 – sets module for bypass or reclocking function.

Factory Defaults

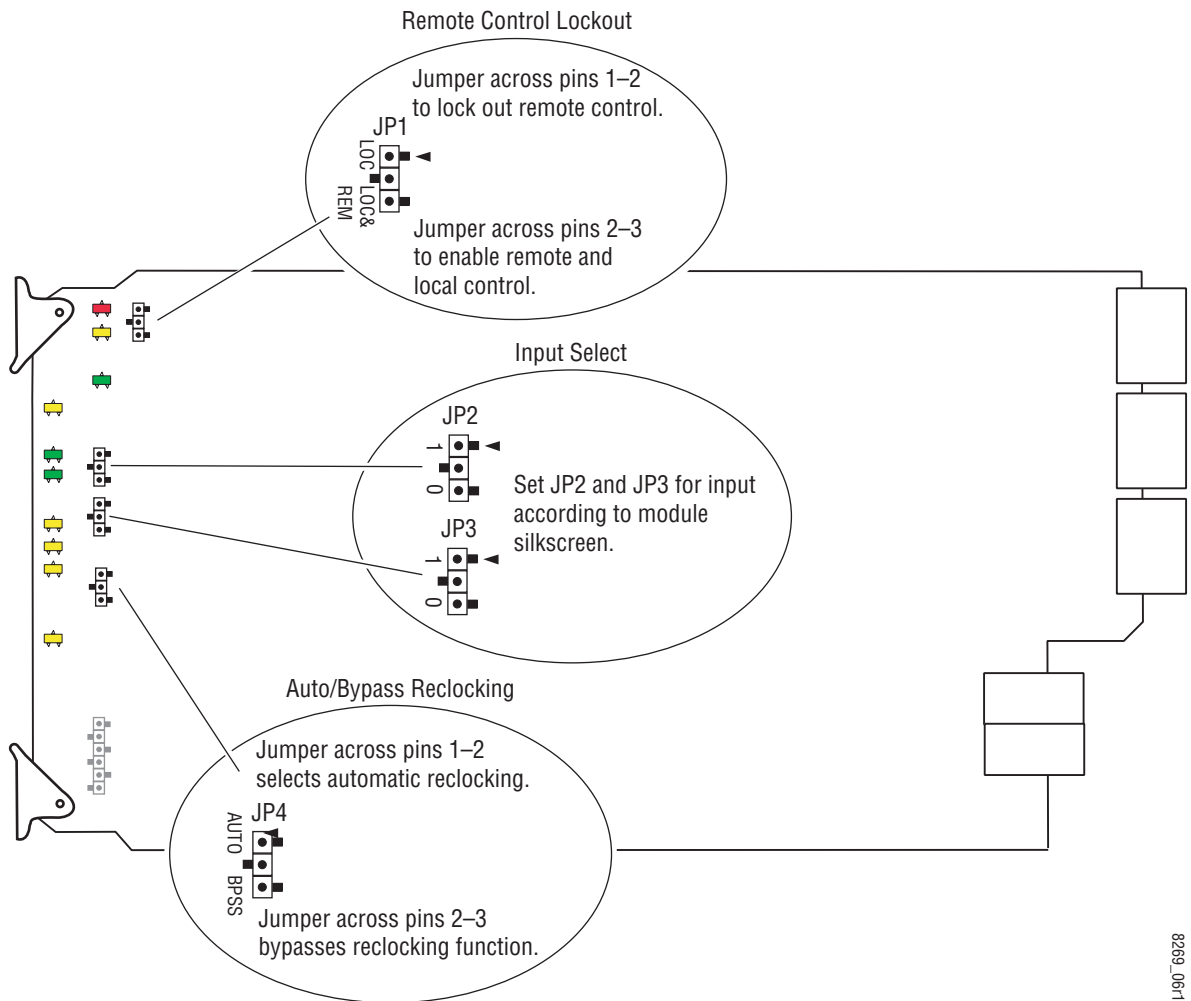
The local settings made on J2, J3, and J4 are the defaults for the module. Changing any local jumper setting while the module is powered up or removed and plugged back into the frame will immediately reset the module to the current local jumper settings. This will also occur when removing or installing an optic submodule.

Selecting the **Recall Fact. Defaults** button on the Recall Factory Defaults web page ([page 35](#)) will return the module to these local settings.

Remote Control Jumper

When the jumper is placed across pins 1 and 2 of jumper block JP1, module settings are changed from the on-board jumpers only; remote control is locked out. To have both Local and Remote access, set the jumper across pins 2 and 3.

Figure 1. Module Configuration Jumpers



Input/Output Select Jumpers


Set jumpers JP2 and JP3 to 0 (pins 2-3) or 1 (pins 1-2) to select the input/output type and/or optic output enable according to the silkscreen on the front module shown in [Figure 2](#).

Note The silkscreen on the module reflects an older version set of SFP submodules. The older version submodules may still be used, but newer submodules, SFP-13103G-M1TRX (DTL Dual Transmitter) and SFP-13103G-M1TRX (TRL Transceiver) will only work with the newer version software.

These jumper settings can be overridden by remote control. When this condition occurs, the front edge yellow REM OVR LED will light (refer to [Table 1 on page 23](#)).

Note The Dual Receiver function is not used at this time.

Figure 2. 2040RDA-FR and 2040RDA-16FR Front Module Silkscreen

REAR VIEW OF SFP MODULE			
			
SFP MODULE	FUNCTION	JP2	JP3
NONE	INPUT SELECT: COAX	-	-
ORL DUAL RECEIVER	INPUT SELECT: OPTIC 1	0	-
	OPTIC 2	1	0
	COAX	1	1
DTL DUAL TRANSMITTER	OPTIC 1 TX: ENABLE	0	-
	DISABLE	1	-
	OPTIC 2 TX: ENABLE	-	0
	DISABLE	-	1
TRL TRANSCEIVER	OPTIC 1 TX: ENABLE	0	-
	DISABLE	1	-
	INPUT SELECT: OPTIC 2	-	0
	COAX	-	1

Auto/Bypass Jumper

In Local mode, the module will operate in **Auto** or **Bypass** mode.

When set to **Auto** mode, the module will automatically relock the incoming signal to 143 Mb/s, 270 Mb/s, 360 Mb/s, 540 Mb/s, or 1.485 Gb/s rates (ASI 270 signals). If the input signal cannot lock to one of these rates, the relocking will be bypassed automatically.

When set to **Bypass** mode, the relocking will be bypassed completely.

Set jumper JP4 for auto-relocking (AUTO pins 1-2) or to bypass relocking (BPSS pins 2-3). This jumper setting can be overridden by remote control. When the module is in Bypass, the front edge LD LED will be off (refer to [Table 1 on page 23](#)).

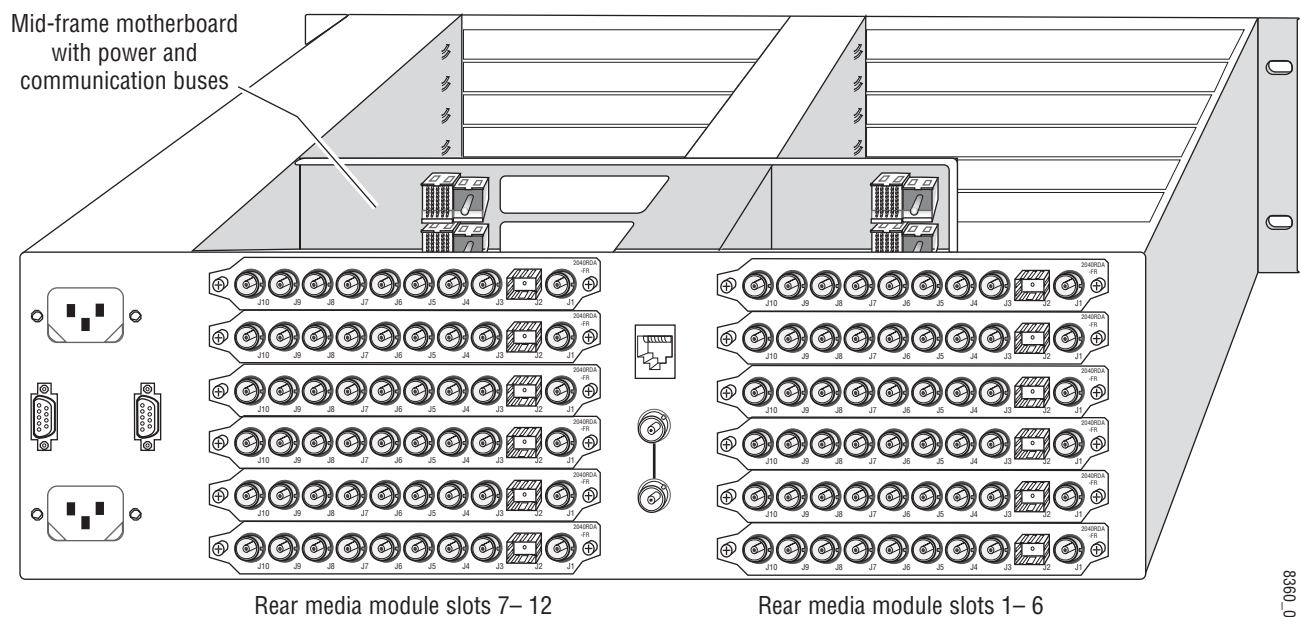
Module Placement in the 2000 Frame

There are twelve slot locations in both the front and rear of a Kameleon 3 RU frame to accommodate 2000 Series modules. The 2040RDA-FR and 2040RDA-16FR module set consists of a front media module and a rear module for the 2040RDA-FR or a dual height rear module for the 2040DRA-16FR that requires two module slots.

Each 2040RDA-FR or 2040RDA-16FR front media module plugs into the front of the 2000 frame mid-plane. The rear module plugs into the corresponding rear slot to provide the input and output interface connectors. Stacked BNCs on the 2040RDA-16FR passive rear module require two rear slots. The fiber optic SFP submodule option installs in the connector cage on the top right of the rear module.

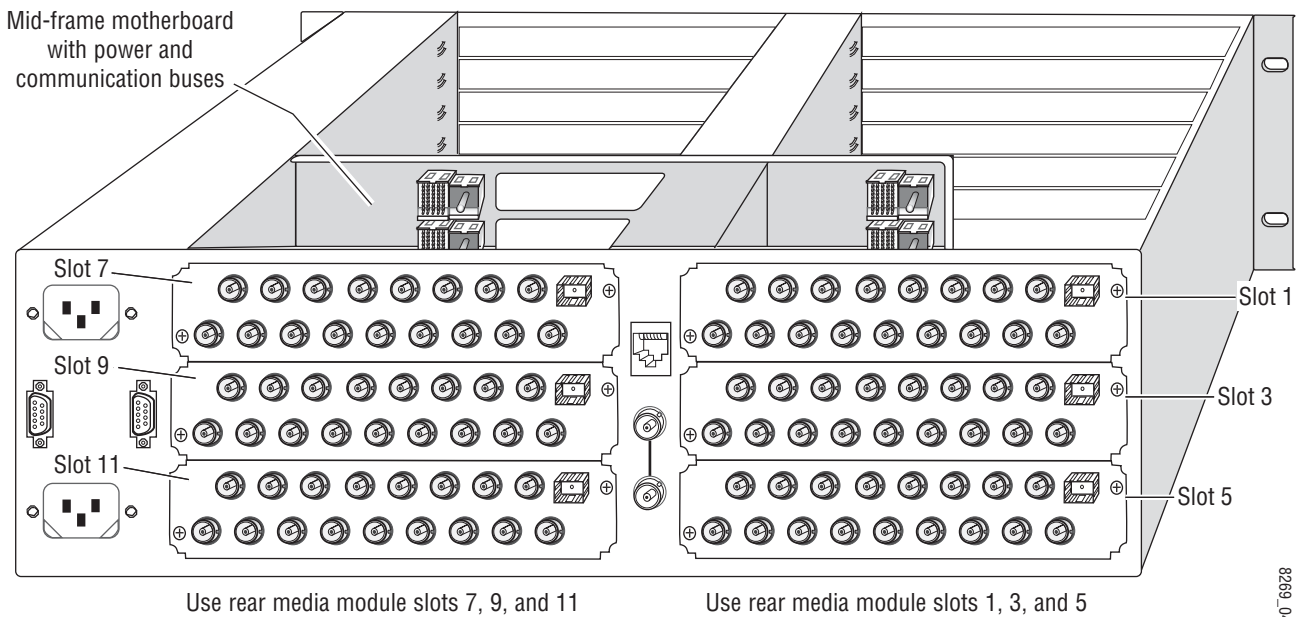
A 3 RU 2000T3 frame fully stuffed with 2040RDA-FR front and rear modules will accommodate up to twelve module sets as shown in [Figure 3](#). A 1 RU 2000T1 frame will accommodate up to 4 module sets.

Figure 3. 2040RDA-FR 3 RU Frame, Rear View



A 3 RU 2000T3 frame fully stuffed with 2040RDA-16FR front and rear modules will accommodate up to six module sets as shown in [Figure 4](#). A 1 RU 2000T1 frame will accommodate up to 2 module sets.

Figure 4. 2040RDA-16FR 3 RU Frame, Rear View

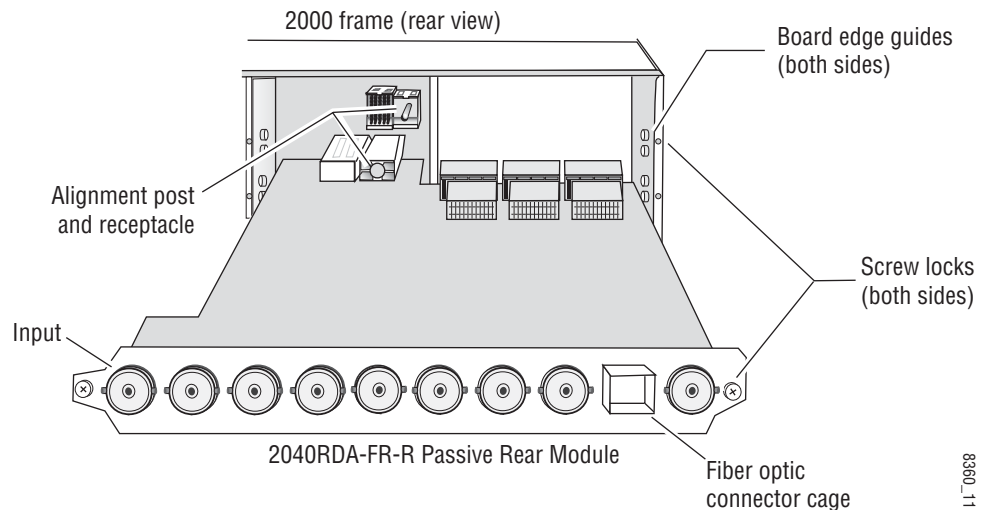


The 2040RDA-FR and 2040RDA-16FR front and rear modules and fiber optic submodules can be plugged in and removed from a Kameleon 2000 Series frame with power on. When power is applied to the module, LED indicators reflect the initialization process (see [Power Up on page 22](#)).

To install a 2040RDA-FR module set in the frame:

1. Locate a vacant slot in slot 1-12 in the rear of the 1 RU or 3 RU frame (3 RU frame shown in [Figure 3](#)).
2. Insert the rear module into a vacant rear slot in the frame as illustrated in [Figure 5](#).

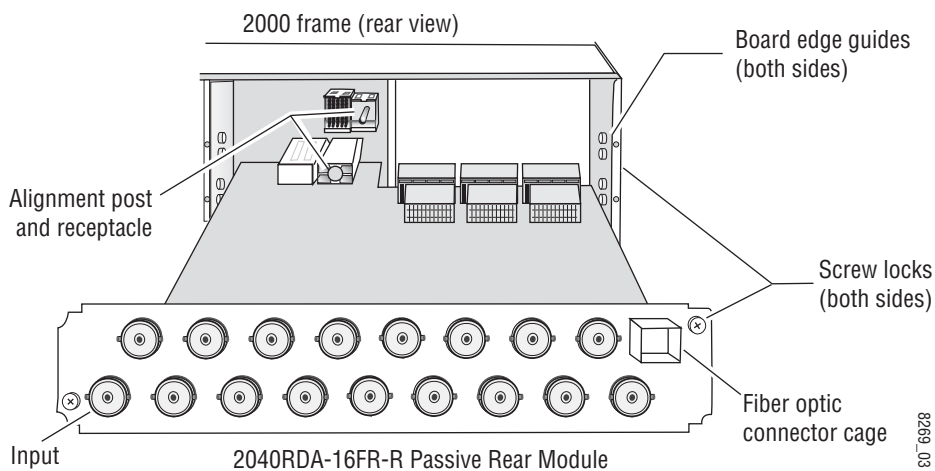
Figure 5. Installing 2040RDA-FR Rear Module



To install a 2040RDA-16FR module set in the frame:

1. Locate a vacant slot in slot 1, 3, 5, 7, 9, or 11 of the rear of the 3 RU frame (Figure 4). The rear module uses two slots.
2. Insert the rear module into vacant rear slot 1, 3, 5, 7, 9, or 11 of the frame as illustrated in Figure 6.

Figure 6. Installing 2040RDA-16FR Rear Module



To continue installation of 2040RDA-FR and 2040RDA-16FR modules set in the frame:

1. Verify that the module connector seats properly against the midplane.
2. Using a crossblade screwdriver, tighten the two screw locks to secure the module in the frame.
3. To install the optional SFP submodule in the 2040RDA-FR, refer to Figure 7. The SFP submodule is hot-pluggable and may be installed or removed with power applied to the module.
4. To install the optional SFP submodule in the 2040RDA-16FR, refer to Figure 8. The SFP submodule is hot-pluggable and may be installed or removed with power applied to the module.

The module type is identified by name on the label or can be identified by the direction of the two arrow indicators on the label.

Note Installing or removing the optical submodule while the module is powered up will reset the module to a default state—that of the jumper settings currently set for JP2, JP3, and JP4 (see [Factory Defaults on page 10](#)).

5. With the handle in the up position, slide the metal casing, label side up, into the cage connector on the top right of the rear module.

Note When installed properly, the front end of the submodule will line up with the BNCs. Do not try to force it in further.

Figure 7. Installing SFP Submodule on 2040RDA-FR

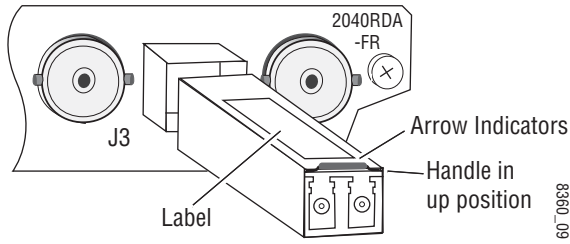
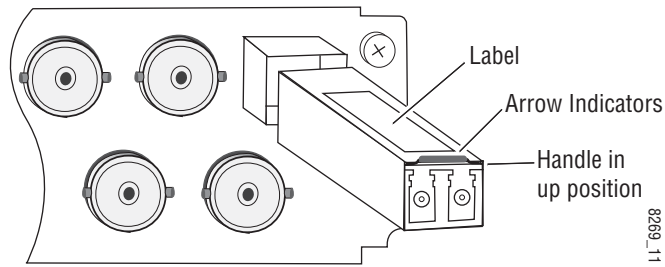
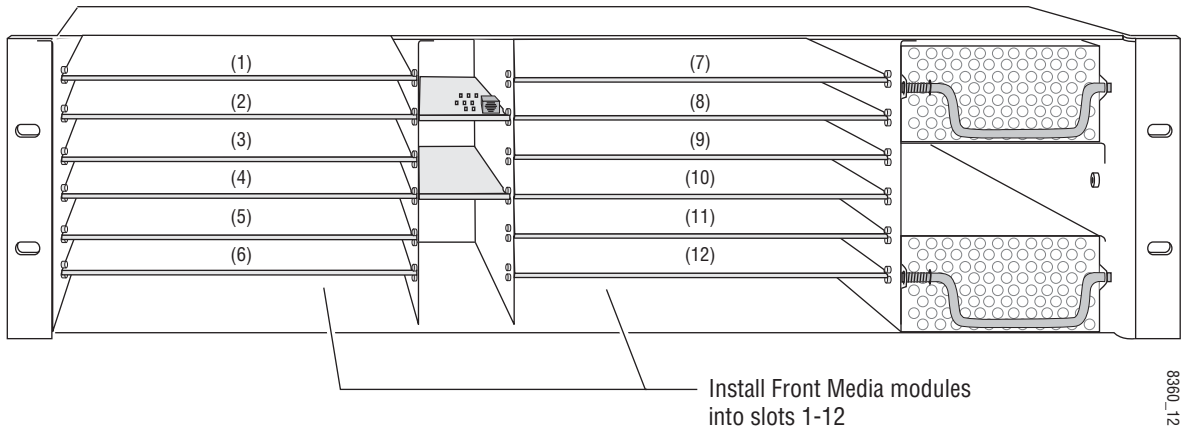


Figure 8. Installing SFP Submodule on 2040RDA-16FR



6. For the 2040RDA-FR locate the front slot 1-12 in the frame corresponding to the rear module circuit board. The 3 RU frame front view is illustrated in [Figure 9](#).

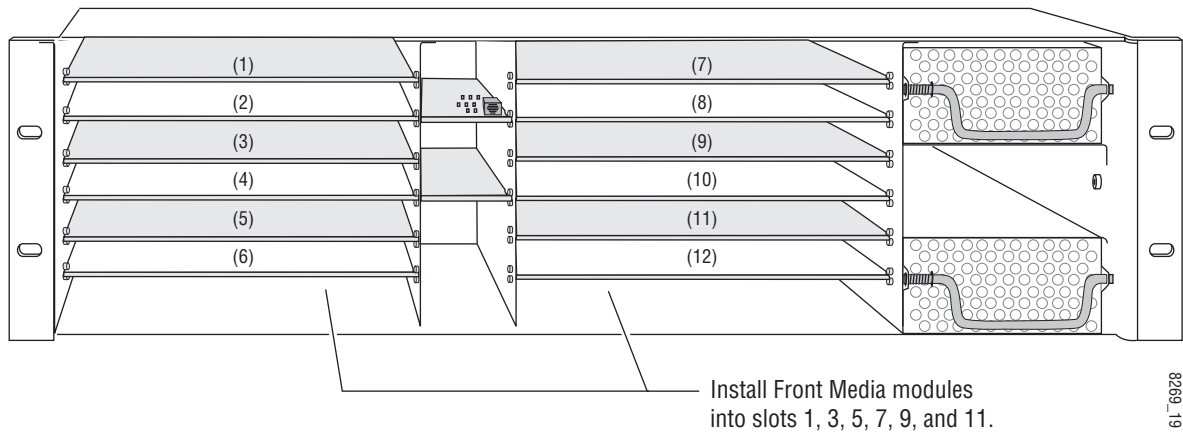
Figure 9. 2000 Series 3 RU Frame, 2040RDA-FR Frame Slots



7. For the 2040RDA-16FR locate the front slot 1, 3, 5, 7, 9, or 11 in the frame corresponding to the rear module circuit board. The 3 RU frame front view is illustrated in [Figure 10](#). Module slots where the 2040RDA-16FR should be installed for a fully stuffed 2000 frame are highlighted in gray.

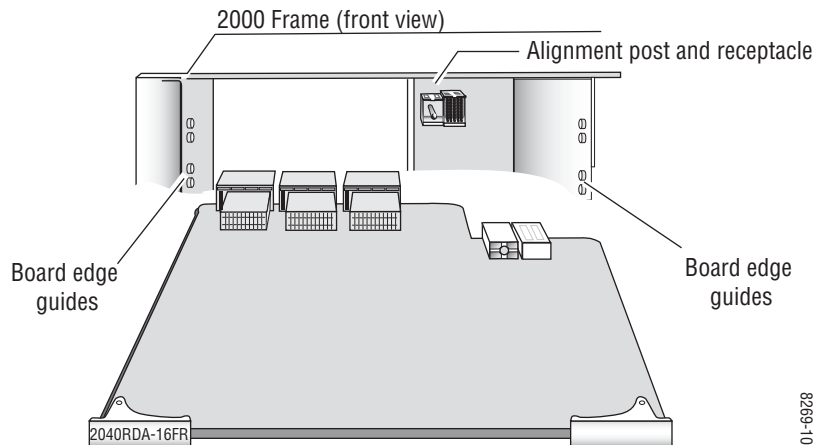
Note 2040RDA-16FR modules are not limited to these slots. The dual height rear and corresponding front module can be placed in any location as long as there is enough space.

Figure 10. 2000 Series 3 RU Frame, Front Slots



8. With the component side up, insert the front media module in the corresponding front slot (see [Figure 11](#)).
9. Verify that the module connector seats properly against the midplane and rear module connector.
10. Press firmly on both ejector tabs to seat the module.

Figure 11. Installing Front Media Module



Cabling

All cabling to the 2040RDA-FR or 2040RDA-16FR module sets is done on the corresponding Single Height 2040RDA-FR or Dual Height 2040RDA-16FR rear module at the back of the 2000 frame.

Cabling of the rear module depends on what SFP option is installed as follows:

- 2040RDA-FR or 2040RDA-16FR with no SFP Optical submodule option (electrical only) ([page 18](#))
- 2040RDA-FR or 2040RDA-16FR with SFP-13103G-M1DXTX (Dual Optical Transmitter) option ([page 20](#))
- 2040RDA-FR or 2040RDA-16FR with SFP-13103G-M1TRX (Optical Transceiver) option ([page 21](#))

2040RDA-FR or 2040RDA-16FR with No SFP Option

The 2040RDA-FR or 2040RDA-16FR can input one electrical SD/HD/ASI input with either eight or sixteen electrical outputs. On-board jumpers JP2 and JP3 on the circuit board have no effect and can be set for any configuration. Refer to [Figure 12](#) for an illustration of the input and output BNCs for 2040RDA-FR or refer to [Figure 13](#) for an illustration of the input and output BNCs for 2040RDA-16FR.

Figure 12. 2040RDA-FR Rear Module Input/Output Connectors

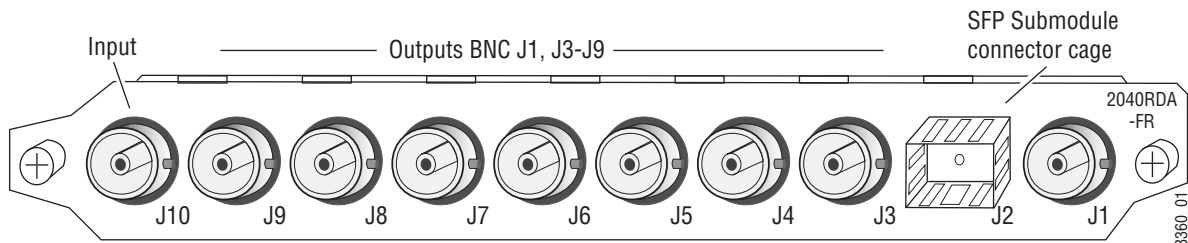
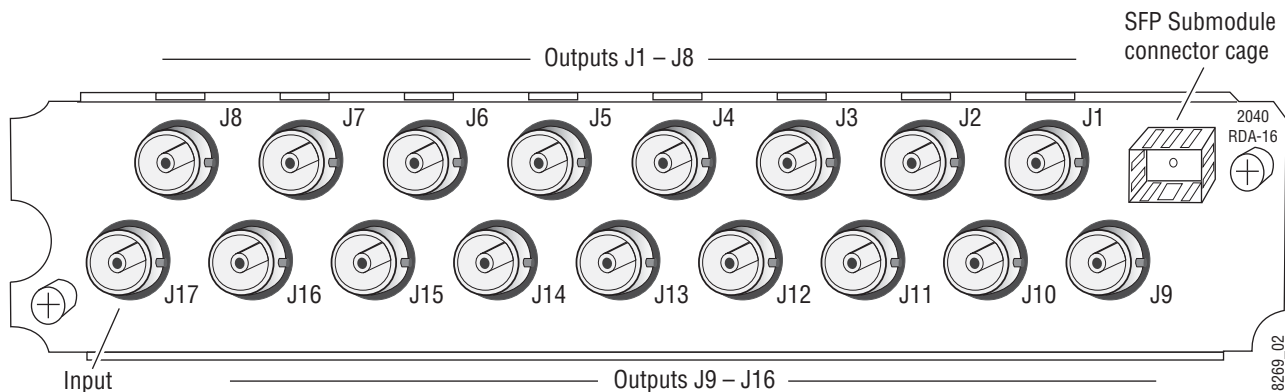


Figure 13. 2040RDA-16FR Rear Module Input/Output Connectors



Electrical Input

Connect an electrical SD, HD, or ASI video input to BNC J10 on the 2040RDA-FR or BNC J17 on the 2040RDA-16FR. The 2040RDA-FR and 2040RDA-16FR will accept any of the serial digital component video signals conforming to the following formats:

- SMPTE 259M (143 Mb/s, 177 Mb/s, 270 Mb/s, and 360 Mb/s)
- SMPTE 292M (1.485 and 1.485/1.001 Gb/s)
- SMPTE 344M (540 Mb/s)
- 4 Mbps to 1.5 Gb/s
- SMPTE 310M (MPEG up to 38.78 M/bps)
- DVB-ASI

Electrical Outputs

On the 2040RDA-FR the input signal is distributed to 8 output BNCs. Connect video output devices to outputs J1 and J3 through J9 provided on the 2040RDA-FR rear module ([Figure 12 on page 18](#)).

On the 2040RDA-16FR the input signal is distributed to 16 output BNCs. Connect video output devices to outputs J1 through J8 and J9 through J16 provided on the 2040RDA-16FR rear module ([Figure 13 on page 18](#)).

2040RDA-FR or 2040RDA-16FR with Dual Optical Transmitter

With the Dual Optical Transmitter installed the module can operate in the following modes:

- Electrical input to eight electrical outputs and two optical outputs on the 2040RDA-FR, or
- Electrical input to sixteen electrical outputs and two optical outputs on the 2040RDA-16FR.

Electrical Input

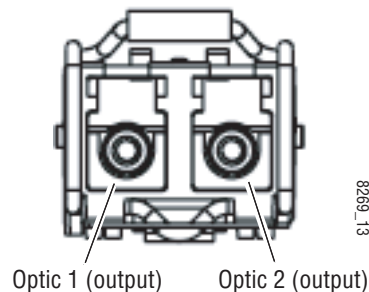
Connect an SD, HD, or ASI video input to BNC J10 on 2040RDA-FR or BNC J17 on 2040RDA-16FR as described in [Electrical Input](#) on page 19.

Electrical and Optical Outputs

The input signal is distributed to eight or sixteen electrical output BNCs. Connect video output devices to outputs J1 and J3 through J9 provided on the 2040RDA-FR ([Figure 12](#) on page 18) or J1 through J8 and J9 through J16 provided on the 2040RDA-16FR rear module ([Figure 13](#) on page 18).

The output signal can also be accessed from both optical outputs from the SFP submodule, Optic 1 (left) and Optic 2 (right), shown in [Figure 14](#). Set on-board jumpers JP2 and JP3 to enable or disable one or both of the optical outputs as described in [Input/Output Select Jumpers](#) on page 12. With the submodule handle in the up position, connect optical cables to one or both outputs.

Figure 14. Dual Transmitter Optical Outputs



2040RDA-FR or 2040RDA-16FR with Optical Transceiver

With the Optical Transceiver SFP option installed the module supports the following modes:

- Electrical input to eight or sixteen electrical outputs and two optical outputs, or
- Optical input to eight or sixteen electrical outputs and one optical output.

Electrical or Optical Input

To use the electrical input, connect an SD, HD, or ASI video input to BNC J10 on the 2040RDA-FR or BNC J17 on the 2040RDA-16FR as described in [Electrical Input on page 19](#). Set on-board jumper JP3 to the Coax input as described in [Input/Output Select Jumpers on page 12](#).

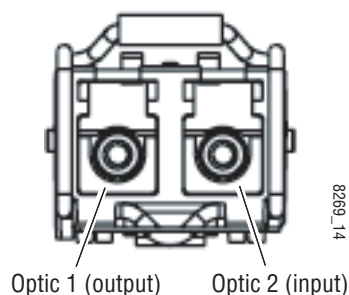
For an optical input, connect the fiber cable to the Optic 2 input (right), as shown in [Figure 15](#). Set on-board jumper JP3 to enable the optic input as described in [Input/Output Select Jumpers on page 12](#).

Electrical and Optical Outputs

The input signal is distributed to eight or sixteen electrical output BNCs. Connect video output devices to outputs J1 and J3 through J9 provided on the 2040RDA-FR rear module ([Figure 12 on page 18](#)) or J1 through J8 and J9 through J16 provided on the 2040RDA-16FR rear module ([Figure 13 on page 18](#)).

The output signal can also be accessed from the Optic 1 (left) connector shown in [Figure 15](#). Enable or disable this output with on-board jumper JP2 as described in [Input/Output Select Jumpers on page 12](#). With the submodule handle in the up position, connect an optical cable to this output.

Figure 15. Dual Transceiver Optical Input and Output

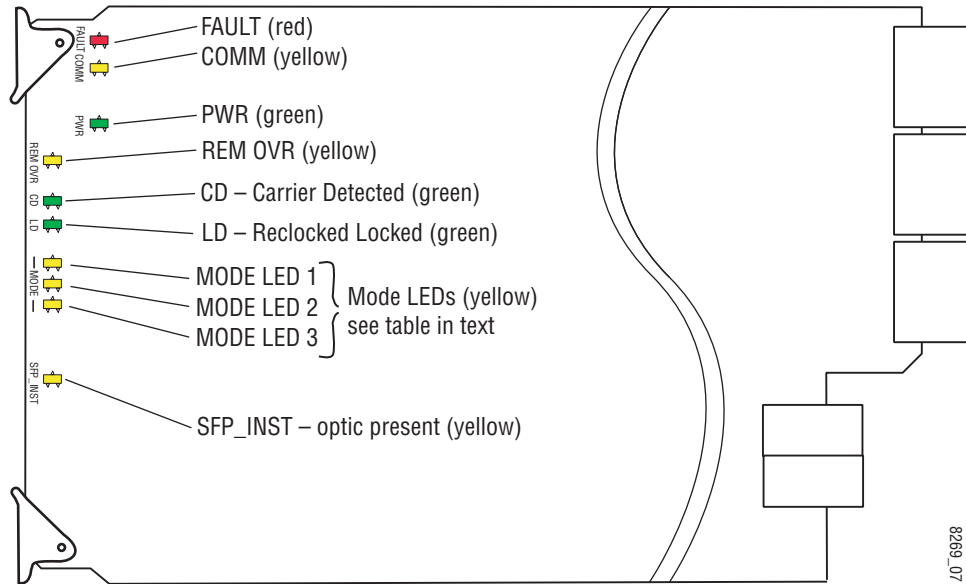


Power Up

The front LED indicators are illustrated in [Figure 16](#). Upon power-up, the green PWR LED should light.

Refer to [Table 1 on page 21](#) to see a complete list of possible operating conditions and the resulting indicator status.

Figure 16. LEDs and Configuration Switches



A red FAULT LED indicates an error situation and, when noted with the other indicator LEDs, can indicate a specific problem area. [Table 1](#) describes signal output and LED indications for the various input combinations and user settings.

Table 1. Indicator LEDs and Conditions Indicated

LED	Indication	Condition
FAULT (red)	Off	Normal operation.
	On continuously	Module has detected an Optic 1 or Optic 2 internal fault from the submodule or a write failure has occurred on the front module.
	Long flash	No input is detected for the input or the input does not match the format selected manually, no rear module is present, or the wrong rear module is present.
COMM (yellow)	Off	No activity on frame communication bus.
	3 Short Flashes	Location Command received by the module from a remote control system.
	Short flash	Activity present on the frame communication bus.
PWR (green)	Off	No power to module, fuse blown, or module's DC/DC converter failed.
	On continuously	Normal operation, module is powered.
REM OVR (yellow)	On	Remote control is overriding on-board jumper settings.
	Off	Module is operating according to on-board jumper settings.
CD (green)	On	Carrier is detected for the selected input to the module.
	Off	No carrier is detected for the selected input to the module or input signal is missing.
LD (green)	On	Selected input carrier is locked to a valid frequency for the module (143M, 177M, 270M, 360M, 540M, or 1485M).
	Off	Module is in bypass mode or not locking to valid frequency or input signal is missing.
MODE (yellow) ¹	See Table 2	LED On/Off states indicate auto-reclocking signal rate detected by module or reclock rate manually selected on web page.
SFP_INST (yellow)	On	Indicates SFP submodule option installed in rear module.
	Off	Indicates no SFP submodule option installed in rear module.

¹ These LEDs are green on some earlier modules.

[Table 2](#) gives the reclock rates reported by the sequence of the three MODE LEDs on the front of the module. This information is also silkscreened on the circuit board. The LED on/off states reflect the auto-reclocking signal rate detected by module or the reclock rate manually selected on web page.

Table 2. Reclock Mode Table

Reclock Rate	Mode LED 1 (DS4)	Mode LED 2 (DS5)	Mode LED 3 (DS6)
No reclock	Off	Off	Off
143M	Off	Off	On
177M	Off	On	Off
270M	Off	On	On
360M	On	Off	Off
540M	On	Off	On
1.5 G	On	On	On

Configuration and Adjustments

Configuration and monitoring can be performed using local jumper controls, a web browser GUI interface, or a networked Newton Control Panel. This section provides an overview of each of these controls along with the configuration parameters available with each type of control device.

Configuration Summary

The configuration parameters and monitoring functions available with the local on-board jumpers, web browser interface, and the Newton Control Panel are summarized in [Table 3](#). The parameter defaults, choices, ranges, and resolution are provided for each function.

Table 3. Summary of 2040RDA-FR and 2040RDA-16FR Configuration Functions

Function Type	Defaults	Range/Choices Resolution	Web Page/ Function Name	On-Board Jumper Setting	Newton Control Panel
Mode	Current JP4 jumper setting Factory = Auto	Auto ASI Auto 177M Bypass Reclk 143M Reclk 177M Reclk 270M Reclk 360M Reclk 540M Reclk 1485M	Settings/ Mode Pulldown	JP4 pins 1&2=AUTO JP4 pins 2&3=BYPASS	Mode
Optic 1 Tx (Tx-Tx SFP installed)	Current JP2 jumper setting Factory = Disable	Enable or Disable	Settings/ Optic 1 TX pulldown	SFP-13103G-M1DTX JP2: 0 = Optic 1 Tx Enable JP2: 1 = Optic 1 Tx Disable JP3: N/A	OptTx1En
Optic 2 Tx (Tx-Tx SFP installed)	Current JP3 jumper setting Factory = Disable	Enable or Disable	Settings/ Optic 2 TX pulldown	SFP-13103G-M1DTX JP2: N/A JP3: 0 = Optic 2 Tx Enable JP3: 1 = Optic 2 Tx Disable	OptTx2En
Optic 1 Tx (Tx-Rx SFP installed)	Current JP2 jumper setting Factory = Disable	Enable or Disable	Settings/ Optic Tx 1 pulldown	SFP-13103G-M1TRX JP2: 0 = Optic 1 Tx Enable JP2: 1 = Optic 1 Tx Disable JP3: N/A	OptTx1Out
Select Input (Tx-Rx SFP installed)	Current JP3 jumper setting Factory = Coax	Optic 2 or Coax	Settings/ Input pulldown	SFP-13103G-M1TRX JP2: N/A JP3: 0 = Optic 2 Input Select JP3: 1 = Coax Input Select	InSelTR

Newton Control Panel Configuration

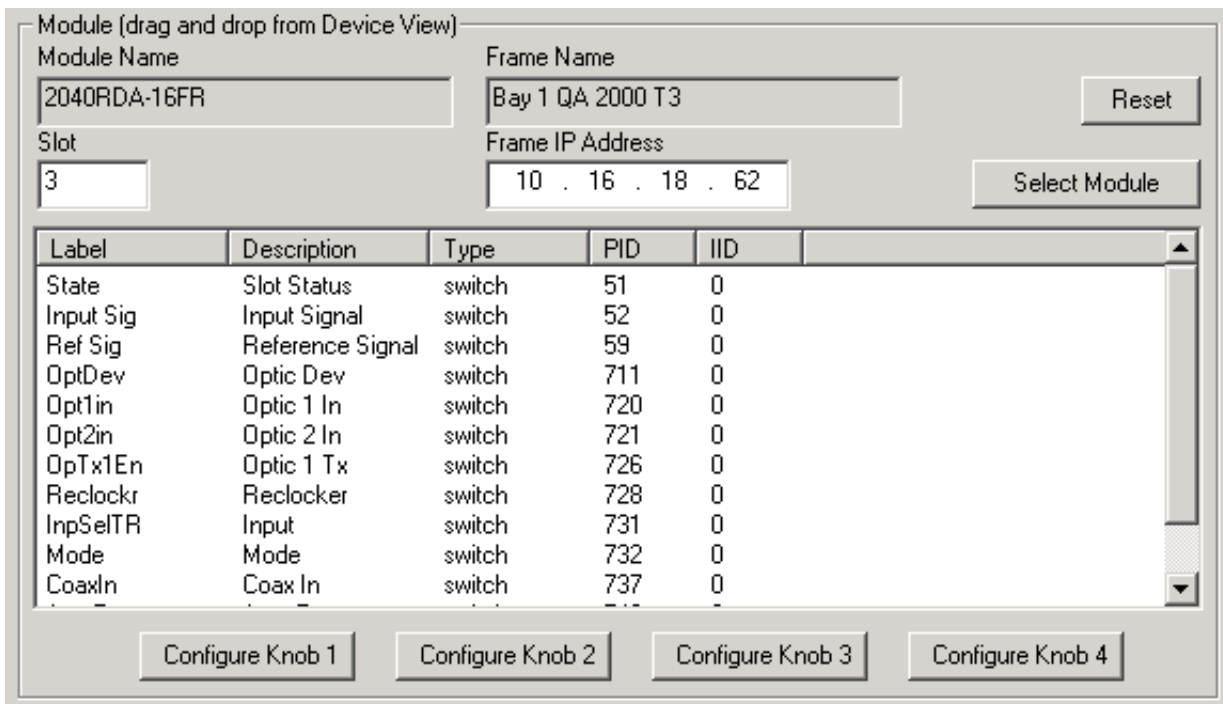
A Newton Control Panel (hard or soft version) can be interfaced to the Kameleon 2000 Series frame over the local network. Control panel access offers the following considerations for module configuration and monitoring:

- 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 Not all module functions are available with the control panel, such as factory default recalls. The available control panel controls for the module are listed in [Table 3 on page 24](#).

An example of the Newton Configurator is shown in [Figure 17](#).

Figure 17. Newton Configurator Example



Refer to the documentation that accompanies the Newton Modular Control System for installation, configuration, and operation information.

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:

- Provides complete access to all module status and configuration functions, including naming of inputs and outputs, factory parameter and name default recalls, E-MEM functions, 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 the **Apply** button or **Enter**, upload processing time, and a manual screen refresh to become effective.
- Web interface recommended for setting up module signal and slot names, E-MEMs, and reporting status for SNMP and monitoring.

Refer to the Frame Status page shown in [Figure 18 on page 27](#). The Kameleon and 2000 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 2000NET 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 2000NET software installed in your system. This manual reflects 2000NET software version 4.0.2 required for this release.

Figure 18. 2000NET GUI

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

Bay 2 QA 2000 Frame

- [Status](#)
- [Configuration](#)
- [Connections](#)
- [LED Reporting](#)
- [SNMP Reporting](#)
- [Power Supply/Demand](#)
- [1 Media Slot 1](#)
- [2 2040RDA-FR](#)
- [3 2040RDA-16FR](#)
- [4 Media Slot 4](#)
- [5 Media Slot 5](#)
- [6 Media Slot 6](#)
- [7 Media Slot 7](#)
- [8 Media Slot 8](#)
- [9 Media Slot 9](#)
- [10 Media Slot 10](#)
- [11 Media Slot 11](#)
- [12 Media Slot 12](#)
- [13 2000NET](#)
- [15 2000GEN](#)
- [19 Power Sled 19](#)
- [20 Fan Sled 20](#)
- [21 Power Sled 21](#)

Status

Model: 2000T3N Description: Module Frame
 Frame Location: Mod Lab - Bay 2
 Frame Health Alarm **ALARM** Temperature Status **Pass**
 Fan Status **PASS**

Media Module	Net Card	Empty	Power Sled
Media Module		Media Module	Power Sled
Media Module	Aux Card	Media Module	Empty
Media Module		Empty	Empty
Media Module		Empty	Power Sled
Media Module		Media Module	Power Sled

Properties

Vendor Thomson, Grass Valley Software Version 4.0.2
 Media Slots 13

8269_2012

2040RDA-16FR Links and Web Pages

The 2000 GUI provides the following links and web pages for the 2040RDA-FR or 2040RDA-16FR module (Figure 19):

- Status – reports input signal status and module information including software and hardware version (page 29),
- Settings – provides controls for setting input type, optic output enable, reclocking mode (page 31),
- Recall Factory Defaults - restores factory default settings (page 31), and
- Slot Config – provides a Locate Module function, Slot Identification, Slot Memory, enabling and disabling Frame Heath reporting and SNMP traps (page 36).

Figure 19. 2040RDA-FR or 2040RDA-16FR Web Page Links

<u>2 2040RDA-FR</u>	<u>3 2040RDA-16FR</u>
Status	Status
Settings	Settings
Recall Factory Defaults	Recall Factory Defaults
Slot Config	Slot Config
R - Rear Slot 2	R - Rear Slot 2

Note The web pages for the 2040RDA-FR are identical to the ones shown in this manual except for the Model name in the heading (2040RDA-FR) or where otherwise indicated.

Status Web Page

Use [3 2040RDA-16FR](#)
 this link — [Status](#)
[Settings](#)
[Recall Factory Defaults](#)
[Slot Config](#)
[R - Rear Slot 2](#)

The Status web page (Figure 20 for the 2040RDA-FR and Figure 21 on page 30) shows the status of the input signal(s) and the frame bus communication. Color coding of the display indicates the signal status. In general, colors used on the frame and modules indicate:

- Green – normal operation, (Pass) or signal present, module locked.
- Red – On continuously = fault condition, flashing = internal error.
- Yellow – On continuously = active condition (configuration mode or communication), flashing in sequence = module locator function.

Rear slot status is not reported from the passive rear module. If a wrong or missing rear module is detected, the front edge FAULT LED will flash as described in Table 1 on page 23 and the Internal State block will be yellow to report a Front/Rear module mismatch.

Information about the module, such as part number, serial number, hardware revision and software and firmware versions are given in a read-only **Properties** section at the bottom of the display.

Figure 20. 2040RDA-FR Status Web Page

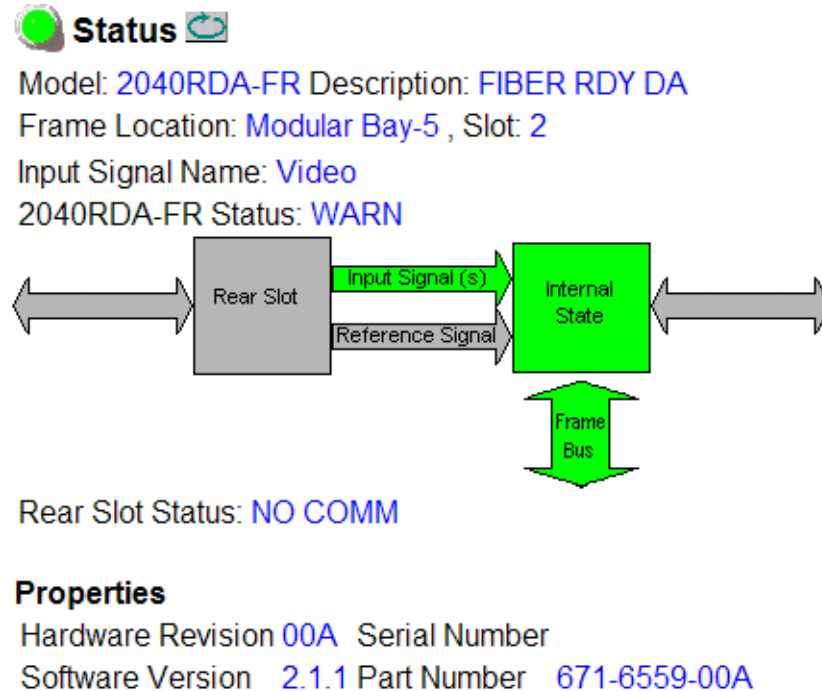


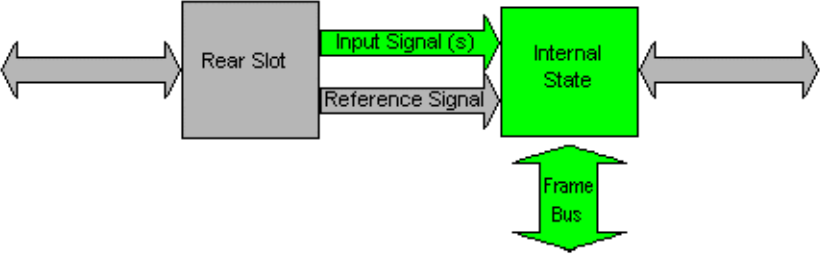


Figure 21. 2040RDA-16FR Status Web Page

 **Status** 

Model: [2040RDA-16FR](#) Description: [FIBER RDY DA](#)
Frame Location: [Modular Bay-5](#) , Slot: [3](#)
Input Signal Name: [not assigned](#)
2040RDA-16FR Status: [WARN](#)



Rear Slot Status: [NO COMM](#)

Properties

Hardware Revision [01A](#) Serial Number [BT05210986](#)
Software Version [2.1.1](#) Part Number [671-6559-01A](#)

Settings Web Page

Use this link

- [3 2040RDA-16FR](#)
- [Status](#)
- [Settings](#)
- [Recall Factory Defaults](#)
- [Slot Config](#)
- [R - Rear Slot 2](#)

The Settings web page provides the controls for the module depending on the type of submodule installed. Select the **Apply** button after each selection to activate the choices. Also use the **Refresh** button to update the changes.

Coax Input/Output Settings (No Submodule)

With no submodule installed, the Settings web page (Figure 22) will provide the following controls for the module:

- **Mode** – set the reclocking mode to one of the following with the Mode pulldown:
 - **Auto ASI** – set to ASI default mode for most multiple applications for auto detection of the reclocking rate. If the signal cannot lock, it will bypass reclocking automatically. DVB-ASI signals are supported in this mode, while 177M signals are not.
 - **Auto 177M** – set to 177M default mode for applications where specific rate requirements are needed to differentiate from ASI. If the signal cannot lock, it will bypass reclocking automatically. 177M signals are supported in this mode, while DVB-ASI signals are not.
 - **Bypass** – reclocking is completely bypassed.
 - **Reclk 143M, Reclk 177M, Reclk 270M, Reclk 360M, Reclk 540M, or Reclk 1485M** – set the module to lock to a specific reclk rate. If the signal cannot lock to the selected rate, the output will be invalid.

Figure 22. Coax settings Web Page (No SPF Module)

Settings

Model: 2040RDA-16FR Description: FIBER RDY DA
 Frame Location: Modular Lab , Slot: 3

Optic Dev: No Dev
 Optic Dev Status: N/A
 Coax In: Present
 Optic 1 In: N/A
 Optic 2 In: N/A
 Reclocker: Locked
 Auto Rate: 270M

Mode: Auto ASI Auto ASI

Settings Web Page Status Reporting

The following read-only status items are also reported on the Settings web page:

- **Warning: Front Rear Mismatch** – when a 2040RDA-16FR module is installed with a 2040RDA-FR-R rear module (only 8 outputs) this warning will appear on the Settings page. The Status page will report the Internal State condition as yellow ([Status Web Page on page 29](#)) and the front edge FAULT LED will flash ([Table 1 on page 23](#)).

Note This will not occur when a 2040RDA-FR is installed with a 2040RDA-16FR-R rear module, but only 8 of the 16 BNC outputs will be active.

- **Opt Dev:** – the type of optic device installed will be reported as **No Dev, Error, Unknown Device, Tx-Tx 1310nm** (Dual Transmitter), **Tx-Rx 1310nm** (Input/Output Transceiver),
- **Opt Dev Status:** – the status of the optic device will be reported as **Pass, Fault,** or **N/A.**
- **Coax In:** – reports the presence of a valid signal on the Coax input as **Present, Not Present,** or **N/A** (not enabled).
- **Optic 1 In:** – reports the presence of a valid signal on the Optic 1 input as **Present, Not Present,** or **N/A** (not available or enabled).
- **Optic 2 In:** – reports the presence of a valid signal on the Optic 2 input as **Present, Not Present,** or **N/A** (not available or enabled).
- **Reclocker:** – reports whether the signal is **Locked, Unlocked** or **N/A.**
- **Auto Rate:** – reports the bit rate currently detected (**143M, 177M, 270M, 360M, 540M,** or **1485M**), **N/A,** or **Unknown.**

Dual Optical Transmitter Settings (Tx-Tx 1310NM Submodule)

With the Dual Optical Transmitter submodule installed, the Settings web page (Figure 23) will provide the following controls for the module:

- **Mode** – set the reclocking mode to one of the following with the Mode pulldown:
 - **Auto ASI** – set to ASI default mode for most multiple applications for auto detection of the reclocking rate. If the signal cannot lock, it will bypass reclocking automatically. DVB-ASI signals are supported in this mode, while 177M signals are not.
 - **Auto 177M** – set to 177M default mode for applications where specific rate requirements are needed to differentiate from ASI. If the signal cannot lock, it will bypass reclocking automatically. 177M signals are supported in this mode, while DVB-ASI signals are not.
 - **Bypass** – reclocking is completely bypassed.
 - **Reclk 143M, Reclk 177M, Reclk 270M, Reclk 360M, Reclk 540M, or Reclk 1485M** – set the module to lock to a specific reclk rate. If the signal cannot lock to the selected rate, the output will be invalid.
- **Optic 1 TX**– enable or disable the Optic 1 output with the pulldown.
- **Optic 2 TX**– enable or disable the Optic 2 output with the pulldown.

Figure 23. Dual Transmitter Settings Web Page

Settings

Model: [2040RDA-FR](#) Description: [FIBER RDY DA](#)
 Frame Location: [Modular Lab](#) , Slot: [2](#)

Optic Dev: [TX-TX 1310nm](#)
 Optic Dev Status: [Pass](#)
 Coax In: [Present](#)
 Optic 1 In: [N/A](#)
 Optic 2 In: [N/A](#)
 Reclocker: [Unlocked](#)
 Auto Rate: [1485M](#)

	selection	current setting
Mode:	<input type="text" value="Reclk 1485M"/>	Reclk 1485M
Optic 1 Tx:	<input type="text" value="Enable"/>	Enable
Optic 2 Tx:	<input type="text" value="Disable"/>	Disable
	<input type="button" value="Apply"/>	

Transceiver Settings (Tx-Rx 1310NM Submodule)

With the Optical Transceiver submodule installed, the Settings web page (Figure 24) will provide the following controls for the module:

- **Mode** – set the reclocking mode to one of the following with the Mode pulldown:
 - **Auto ASI** – set to ASI default mode for most multiple applications for auto detection of the reclocking rate. If the signal cannot lock, it will bypass reclocking automatically. DVB-ASI signals are supported in this mode, while 177M signals are not.
 - **Auto 177M** – set to 177M default mode for applications where specific rate requirements are needed to differentiate from ASI. If the signal cannot lock, it will bypass reclocking automatically. 177M signals are supported in this mode, while DVB-ASI signals are not.
 - **Bypass** – reclocking is completely bypassed.
 - **Reclk 143M, Reclk 177M, Reclk 270M, Reclk 360M, Reclk 540M, or Reclk 1485M** – set the module to lock to a specific relock rate. If the signal cannot lock to the selected rate, the output will be invalid.
- **Input** – select the **Coax** or **Optic 2** as the input with the pulldown.
- **Optic 1 Tx** – enable or disable the **Optic 1** output with the pulldown.

Figure 24. Transceiver Settings Web Page

Settings

Model: [2040RDA-16FR](#) Description: [FIBER RDY DA](#)
 Frame Location: [Modular Lab](#) , Slot: [3](#)
 Optic Dev: [TX-RX 1310nm](#)
 Optic Dev Status: [Pass](#)
 Coax In: [Present](#)
 Optic 1 In: [N/A](#)
 Optic 2 In: [Present](#)
 Reclocker: [Locked](#)
 Auto Rate: [270M](#)

	selection	current setting
Mode:	<input type="text" value="Auto ASI"/>	Auto ASI
Input :	<input type="text" value="Optic2"/>	Optic2
Optic 1 Tx:	<input type="text" value="Disable"/>	Disable

Recall Factory Defaults Web Page

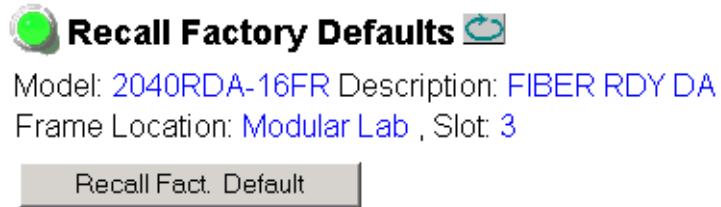
Use
this
link

- [3 2040RDA-16FR](#)
- [Status](#)
- [Settings](#)
- [Recall Factory Defaults](#)
- [Slot Config](#)
- [R - Rear Slot 2](#)

The Recall Factory Defaults web page (Figure 25) provides a **Recall Fact. Default** Button to restores the module to the default values shown in Table 3 on page 24.

Note The module will return to the current onboard jumper settings as the factory defaults. Be sure to set these jumpers as desired during installation. Refer to *Factory Defaults* on page 10.

Figure 25. Recall Factory Defaults Web Page



Slot Config Web Page

Use
this
link →
[3 2040RDA-16FR](#)
[Status](#)
[Settings](#)
[Recall Factory Defaults](#)
[Slot Config](#)
[R - Rear Slot 2](#)

Use the Slot Config web page shown in [Figure 26](#) to perform the following functions on the module:

- Slot Identification
- Locate Module
- Slot Memory
- Frame Health Reporting (2000T3 Frame only)
- LED Reports
- SNMP Trap Reporting

Each of these functions is described in detail below.

Figure 26. Slot Configuration Web Page



Model: [2040RDA-16FR](#) Description: [FIBER RDY DA](#)
Frame Location: [Modular Lab](#) , Slot: [3](#)

Locate Module

Flash Off

Slot Identification

Name:

Input Signal Name:

Slot Memory

Restore upon Install

[Frame Health Reports](#)

[LED Reports](#)

[SNMP Trap Reports](#)

Slot Identification

You may identify the module by typing a specific name in the **Name** field. The assigned name is stored on the 2000NET module and travels with the 2000NET 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.

Locate Module

When enabled by selecting the **Flash** radio button, the **Locate Module** function flashes the yellow COMM and CONF LEDs on the front of the module to make it easy to locate in the frame (see [Figure 16 on page 22](#)).

Slot Memory

The slot configuration for each media module is automatically saved periodically (once an hour) to the 2000NET module in that frame. 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 2000NET module. If the 2000NET module is removed or powered down, the stored configurations are not saved.

When the **Restore upon Install** box has been checked, the current configuration saved to this slot is saved as slot memory. When the current module is removed and another module of the same type and software version is installed, the configuration saved to the 2000NET module will be downloaded to the new module. The box must be checked before the current module with the saved configuration is removed.

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.

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

Frame Health Reports Link

Select the Frame Health Reports link to open the 2000NET module Frame Alarm Reporting web page. 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 2000T3 frame.

Note The external Frame Health Alarm is not present on the 2000T1 frame.

LED Reports Link

Select the LED Reports link to open the 2000NET LED Reporting web page. Normally, every module in the frame will report to the 2000NET module any Fault, Signal Loss, Reference Loss, or Config Error conditions. These conditions will be reflected by the status LEDs on the 2000NET module. Using this web page, any of these conditions can be disabled from being reported to the 2000NET module for each individual module in the frame.

SNMP Trap Reports Link

Select the SNMP Trap Reports link to open the 2000NET SNMP Reporting web page. This link will only be present when SNMP Agent software has been installed on the 2000NET module. This web page allows configuration of which alarms and warnings that are reported to the SNMP management software.

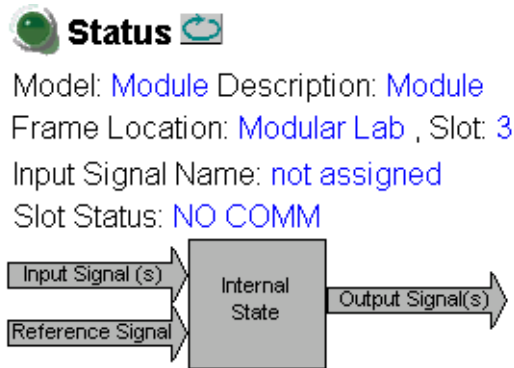
Refer to the *2000NET Instruction Manual* for complete details on using the 2000NET web pages.

Rear Module Web Page

The R-2040RDA-FR or R-2040RDA-16FR rear module web page (Figure 27) is not active in this application as it is a passive rear module with no communication capabilities.

If no rear module is present or the wrong rear module is installed, the front edge FAULT LED will light as described in Table 1 on page 23.

Figure 27. Rear Module Web Page



Properties

Software Updating

Software updating for the module is done using the 8900-FLOAD-CBL assembly available from Grass Valley Customer Service.

The 8900-FLOAD-CBL assembly consists of a circuit board and serial and ribbon cables that connect between a serial port on a PC and the ISP connector on an 8900 or 2000 module. The software upgrade requires downloading files from a PC to the module through the cable assembly.

Equipment Required

The following items are required for this procedure:

- 8900-FLOAD-CBL assembly kit (circuit board and 2 cables),
- Removable media device containing ModLoad.exe application (comes with the 8900-FLOAD-CBL kit) and 8900/2000 module software files and Release Notes, and
- PC with unused Serial Com port that can be connected serially to the 8900 or 2000 frame.

Acquiring Software Updates

For information on acquiring the upgrade kit and available software updates, contact Grass Valley Customer Service at the location given in *Contacting Grass Valley* [on page 4](#) at the front of this manual.

Specifications

Table 4. 2040RDA-FR or 2040RDA-16FR Specifications

Parameter	Value
Serial Digital Component Inputs	
Coax Input	
Number and type of inputs	One 75 $\frac{3}{4}$ BNC
Return loss	>15 dB 0.004 to 1.5 GHz
Signal type (auto equalizing only)	1 Mb/s to 540 Mb/s NRZ PRBS Pattern $X^{23} + X^5 + 1$ Rise/fall time (20 to 80%): 400-800 pS Signal level: 800 mV p-p \pm 10%
	AES 3id-2001 (32 k to 96 k sample rates, 0.8 to 1.2 V p-p)
	SMPTE 310M-1998 (10.76 Mb/s, 19.39 Mb/s, 38.78 Mb/s)
Signal type (auto equalizing and reclocking)	SMPTE 259M-1997 with the following tolerances on bit rates: 143 Mb/s \pm 0.5% 177 Mb/s \pm 0.5% 270 Mb/s \pm 0.5% 360 Mb/s \pm 0.5%
	ETSI TR 101 891v1.1.1 (DVB-ASI) with bit rate tolerance on 270 Mb/s of \pm 0.5%
	SMPTE 344M- 2000 with bit rate tolerance on 540 Mb/s of \pm 0.5%
	SMPTE 292M- 1998 with bit rate tolerance on 1.485 Mb/s of \pm 0.5%
Auto equalization cable length (for any of the above signal types)	Up to 300 m of Belden 1694A cable for bit rates up to 270 Mb/s Up to 100 m of Belden 1694A cable for bit rates > 270 Mb/s and < 1.5 Gb/s
Input jitter (on any of the above signal types)	δ 1 UI p-p, 10 Hz to 200 Hz δ 0.2 UI p-p, 200 Hz to 10 MHz
Serial Digital Component Outputs	
Coax Outputs	
Number and type of outputs	Eight 75 $\frac{3}{4}$ BNCs on 2040RDA-FR-R or Sixteen 75 $\frac{3}{4}$ BNCs on 2040RDA-16FR-R
Return loss	>15 dB 0.004 to 540 MHz, >10 dB from 540 MHz to 1.5 GHz
Signal level	800 mV p-p \pm 10% maximum
Rise and fall time (20-80%)	< 270 ps for reclocked HD 400-800 ps for SD and Bypass mode
Output polarity	Non-inverting, all outputs
Jitter	For input with < 0.1 UI jitter, < 0.2 UI
Fiber Outputs	
Connector	Up to two LC (IEC 61754-20)
Fiber type	Single mode, complying with ANSI/TIA/EIA-492CAAA (class 1Va dispersion -unshifted, 9/125 micron step index {SI} fiber) Maximum attenuation of 1.0 dB per kilometer at 1310 nm
Wavelength	1274 to 1356 nm
Output power	-12 to -7.5 dBm (average @ 1310 nm)
Standard	Other than LC connectors, conforms to SMPTE 297M-2000
Polarity	Non-inverting
Jitter	For input with < 0.1 UI jitter, < 0.2 UI
Input to Output	
Jitter transfer	TBD

Table 4. 2040RDA-FR or 2040RDA-16FR Specifications - (continued)

Parameter	Value
Electrical Lengths	
Coax to coax	143 Mb/s: 15.1 ns ± 1 ns, reclocked 177 Mb/s: 13.6 ns ± 1 ns, reclocked 270 Mb/s: 11.7 ns ± 1 ns, reclocked 360 Mb/s: 10.8 ns ± 1 ns, reclocked 1.485 Gb/s-1.485 Gb/s/1.001: 9.8 ns ± 1 ns, reclocked Bypass modes from 143 Mbs to 1.485 Gb/s: 8.3 ns ± 1 ns
Fiber to coax	Bypass mode: TBD Reclocked (270 Mb/s): TBD
Coax to fiber	Bypass mode: TBD Reclocked (270 Mb/s): TBD
Fiber to fiber	Bypass mode: TBD Reclocked (270 Mb/s): TBD
Coax to fiber to coax	Bypass mode: 14 ns ± 1 ns Reclocked (270 Mb/s): 22 ns ± 1 ns
Environmental	
Operating temperature range	See specifications for Kameleon 2000 frame
Non-operating Temperature	-10 to 70 ° C
Operating Humidity Range	10 to 90% non condensing
Frame compatibility	2000T3 – 12 module sets per frame, no special restrictions for 2040RDA-FR 2000T1 – 4 modules sets per frame, no special restrictions for 2040RDA-FR 2000T3 – 6 module sets per frame, no special restrictions for 2040RDA-16FR 2000T1 – 2 modules sets per frame, no special restrictions for 2040RDA-16FR

Table 5. SFP Receiver/Transceiver Fiber Optic Submodule Specifications

Model Number	SFP-13103G-M1DRX ¹	SFP-13103G-M1TRX
Low wavelength	1260nm	1260nm
High wavelength	1620nm	1620nm
Receiver channels	2	1
Connector type	LC	
Fiber support	Single mode	
Data rate	50Mb/s to 3Gb/s	
Maximum distance @ 3Gb/s	10km	
Minimum distance	30km	

¹ Not used at this time for this module

Table 6. SFP Transmitter/Transceiver Fiber Optic Submodule Specifications

Model Number	SFP-1310G3-M1DTX	SFP-13103G-M1TRX
Wavelength 1	1310 nm	1310 nm
Wavelength 2	1310 nm	N/A
Transmit channels	2	1
Connector type	LC	
Fiber support	Single-mode	
Data rate	143 Mb/s to 2.97 Gb/s	
Power output	-5 to 0 dBm (-2dBm typical)	
Maximum distance	10 km ¹	
Maximum distance	20 km	

¹ The 1310 nm Dual Transmitter (SFP-13103G-M1DTX) and Transceiver (SFP-13103G-M1TRX) require no attenuation between fiber transmitter and receiver connections at any length.

Service

The 2040RDA-FR and 2040RDA-16FR modules make extensive use of surface-mount technology and programmed parts to achieve compact size and adherence to demanding technical specifications. Circuit modules should not be serviced in the field unless as directed by Grass Valley Customer Service.

Power-up Diagnostics Failure

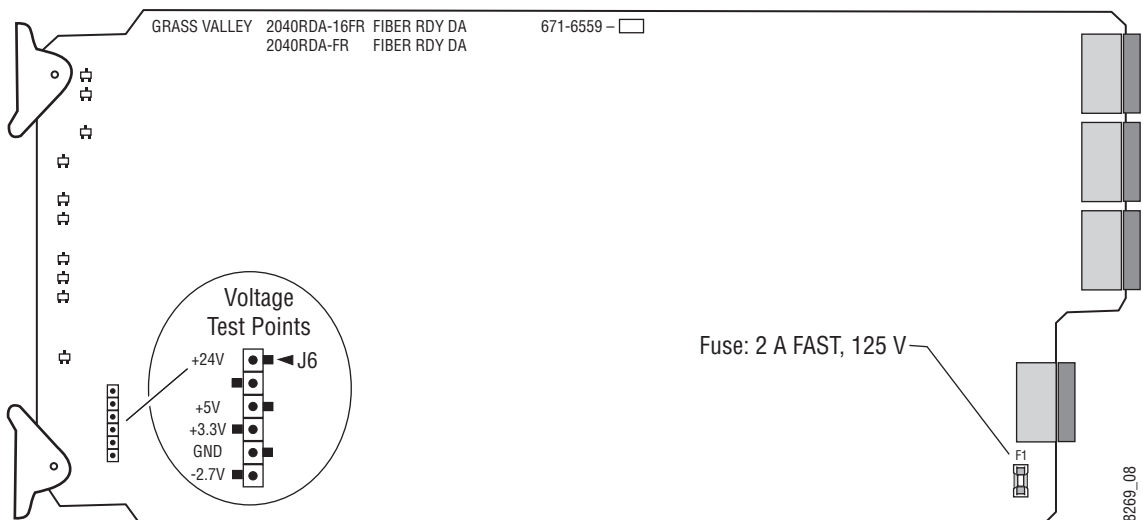
If the module has not passed self-diagnostics, do not attempt to troubleshoot. Return the unit to Grass Valley (see [Module Repair on page 45](#)).

Troubleshooting

If your module is not operating correctly, proceed as follows:

- Check frame and module voltage testpoints shown in [Figure 28](#).
- If module power is not present, check fuse F1 (see [Figure 28](#)).
- Check for presence and quality of input signals.
- Verify that source equipment is operating correctly.
- Check cable connections.

Figure 28. Voltage Testpoints and Fuse Location



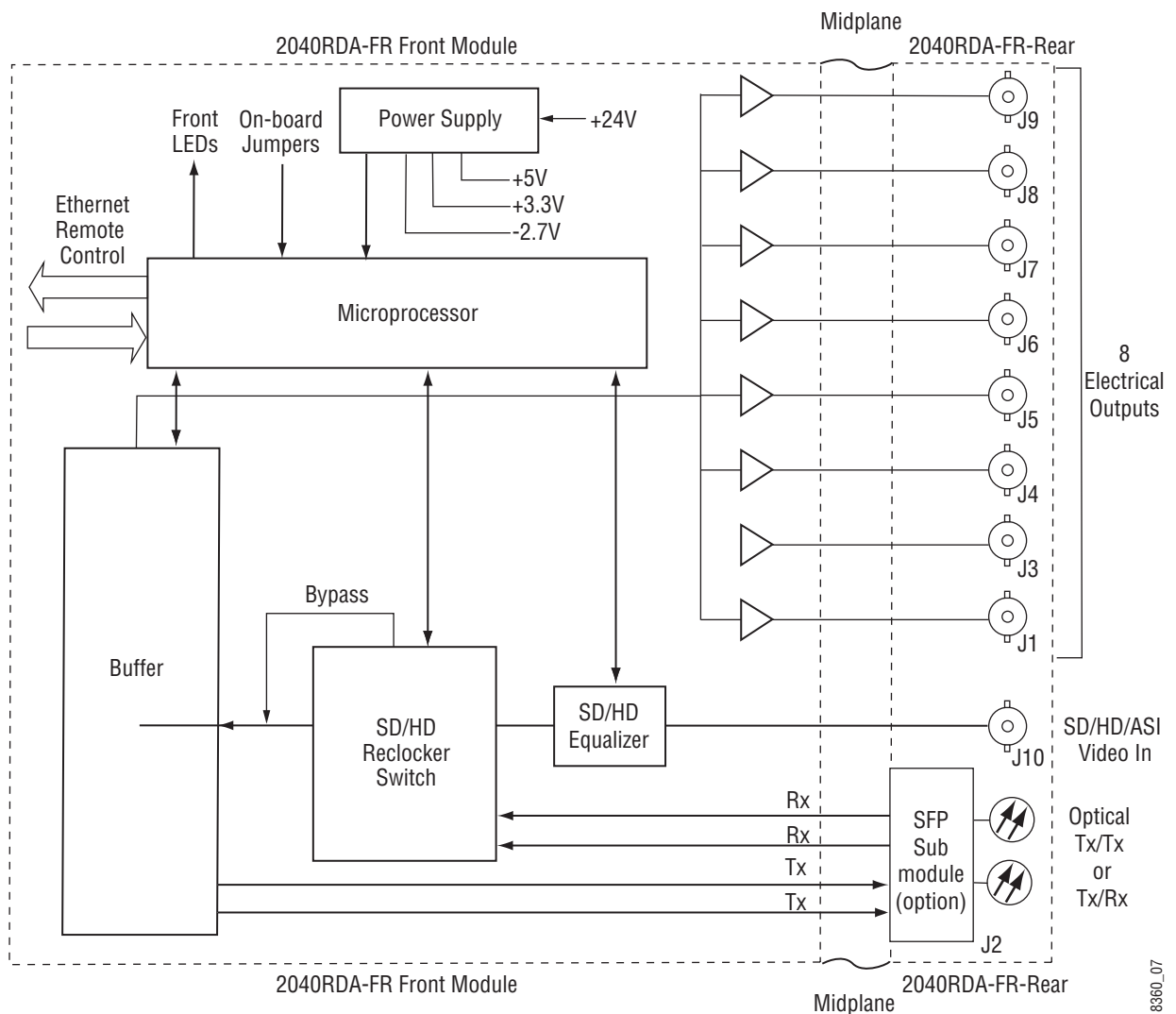
Module Repair

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 representative for depot location. Refer to *Contacting Grass Valley on page 4* at the front of this document for the Grass Valley Customer Service Information number.

Functional Description

A block diagram of the 2040RDA-FR is shown in [Figure 29](#).

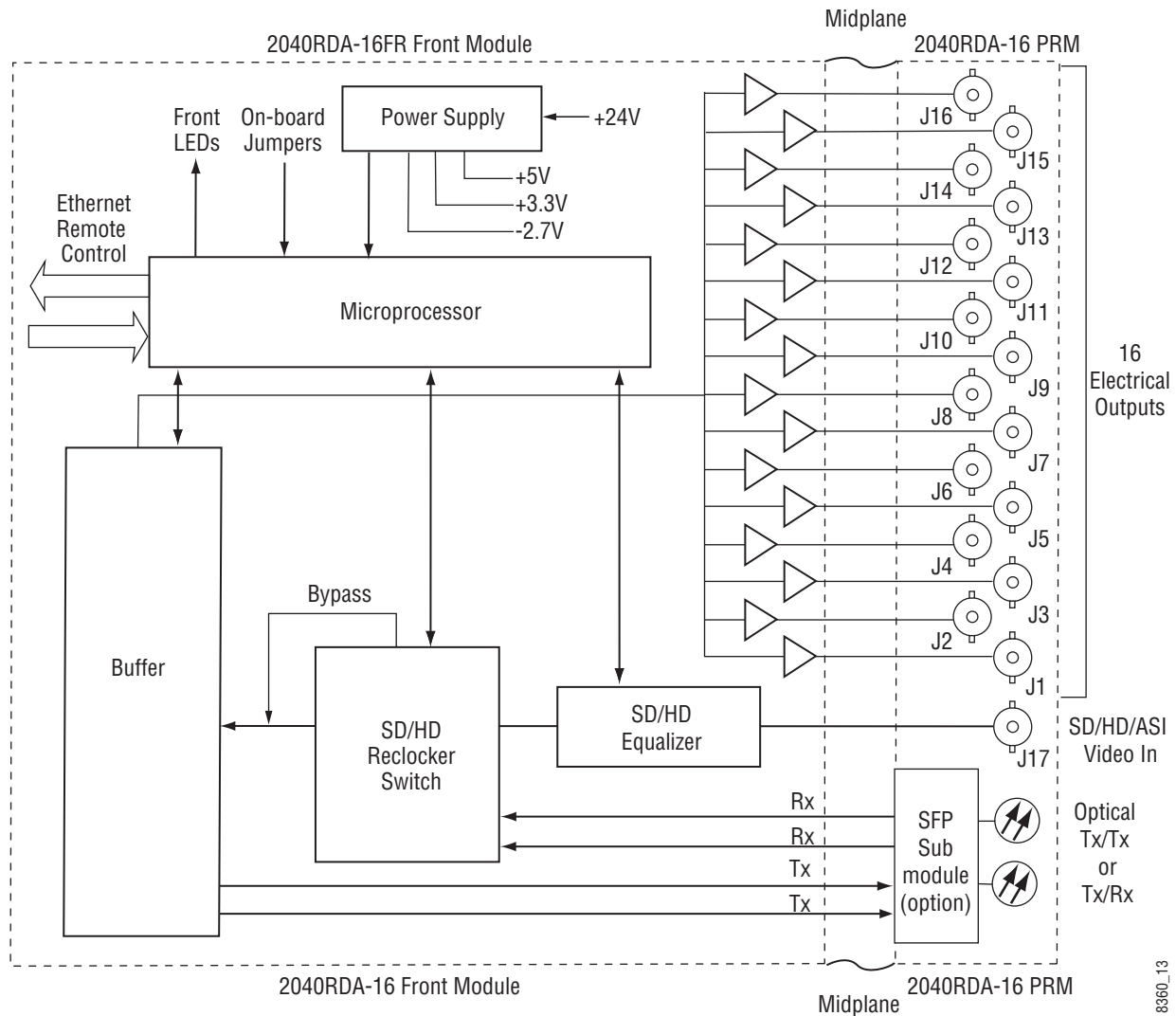
Figure 29. 2040RDA-FR Block Diagram



8360_07

A block diagram of the 2040RDA-16FR is shown in [Figure 30](#).

Figure 30. 2040RDA-16FR Block Diagram



8360_13

Electrical Input and Output Processing

The electrical input to the module enters a BNC at J10 on 2040RDA-FR or J17 on 2040RDA-16FR. The input section has an input path from the passive rear input module for SD (standard definition) and HD (high definition) signal equalizing and reclocking. The output amplifiers drive 8 equal-phase outputs on the passive rear module (BNCs J1, J3-J9) on the 2040RDA-FR or 16 equal-phase outputs on the passive rear module (BNCs J1 – J16) on the 2040RDA-16FR.

Optical Input and Output Processing

The optical inputs to and outputs from the module are accessed through the optional SFP (Small-form Factor Pluggable) submodule. The single mode fiber optic submodule is available in two configurations: dual receiver (2 inputs) or transceiver (1 input/1 output). Optical/electrical conversion is done on the submodule. Inputs and outputs must be defined or enabled by the user with the local jumper settings or using the web page interface.

Microprocessor and Input Selector

The primary purpose of the microprocessor is to provide remote control and monitoring capability for the 2040RDA-FR or 2040RDA-16FR. It receives signal present, signal lock, and speed detection signals from the equalizer and reclocker circuits. Using this information, local jumper settings, and remote control commands, the microprocessor selects the internal signal path and gives feedback through the LEDs and remote control bus.

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