

Instruction Manual

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2041RDA

WIDEBAND REAR RECLOCKING DISTRIBUTION AMPLIFIER

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Software Downloads — Software updates, drivers, and patches can be downloaded.

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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 *2000 Series Frames Instruction Manual*).

2041RDA Wideband Rear Reclocking DA

Introduction

The 2041RDA Wideband Rear Reclocking Distribution Amplifier provides high HDTV distribution density with eight non-inverting outputs. It has auto-detect and reclocking capability at all SD (standard definition) and HD (high definition) data rates. The reclocking circuit can be bypassed to distribute compressed signals down to 4 Mbps. The 2041RDA can be removed from the rear of the frame without powering down the frame (hot-swappable).

The 2041RDA features include:

- Eight outputs
- Module is hot-swappable
- Automatic data rate detection
- Reclocks at 143 Mbps, 177 Mbps, 270 Mbps, 360 Mbps, or 1.5 Gbps
- Distributes transport streams in bypass mode
- Auto-equalizing up to 100 meters for reclocked HD video or a bypassed carrier and 300 meters for reclocked SD video
- Supports networked control and monitoring

Installation

Installation of the 2041RDA module is a process of:

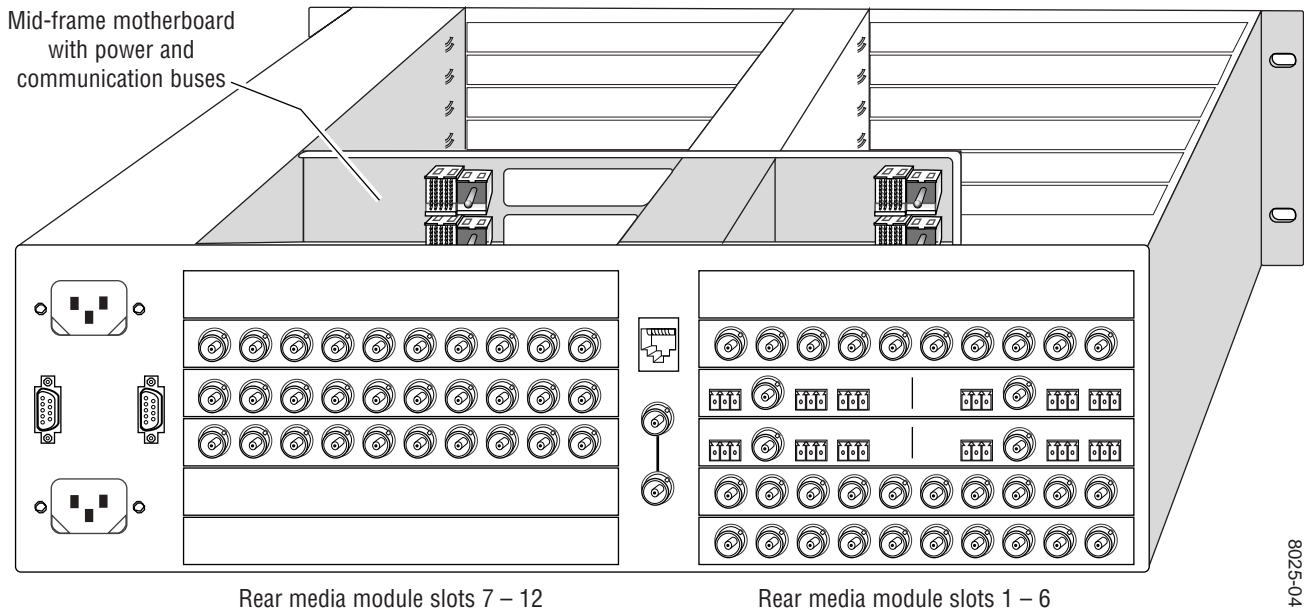
- Placing the 2041RDA rear module in the selected rear frame slot, and
- Cabling signal ports.

The 2041RDA module 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 11).

Module Placement in the 2000 Frame

There are twelve rear media module slot locations in the 3 RU frame to accommodate either analog or digital modules (see [Figure 1](#)). The 2041RDA is a rear media module that can be plugged into any of the 12 rear media module slots.

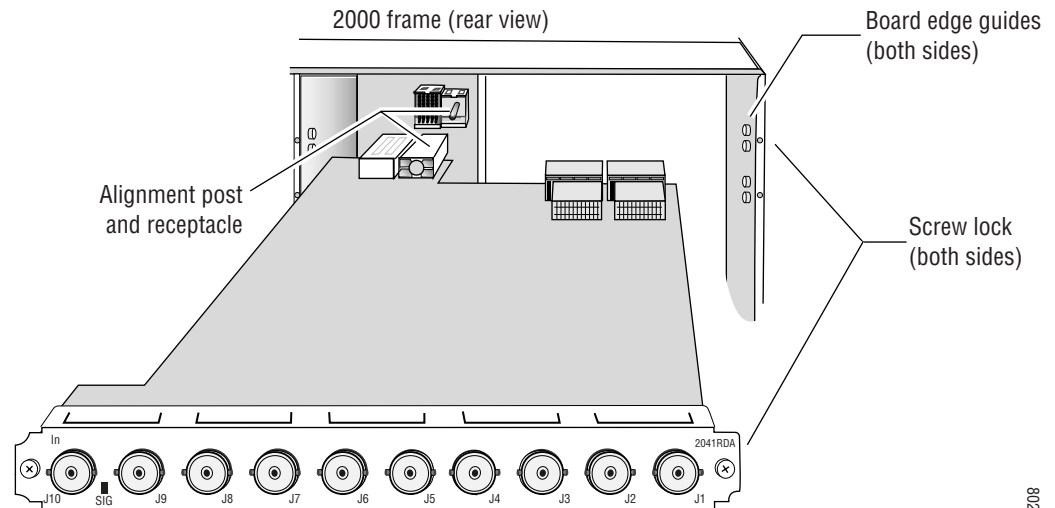
Figure 1. 2000 Frame Rear Media Module Slots



Installing the Rear Module

1. Install the 2041RDA rear module by inserting it into any rear slot (1 through 12) of the frame as illustrated in [Figure 2](#).

Figure 2. Installing the 2041RDA Rear Module



8026_05

2. Verify that the module connector seats properly against the midplane.
3. Secure the module to the rear of the frame with the two screw locks on either side of the back panel using a crossblade screwdriver.

Cabling

All cabling to the 2041RDA module is done on the connectors on the module at the back of the 2000 frame. Refer to [Figure 3 on page 10](#) for a detailed illustration of the rear connections referenced in the steps below.

Input

Connect an HD or SD video input to BNC J10. The 2041RDA module will accept any of the serial digital component video signals conforming to the following SMPTE formats:

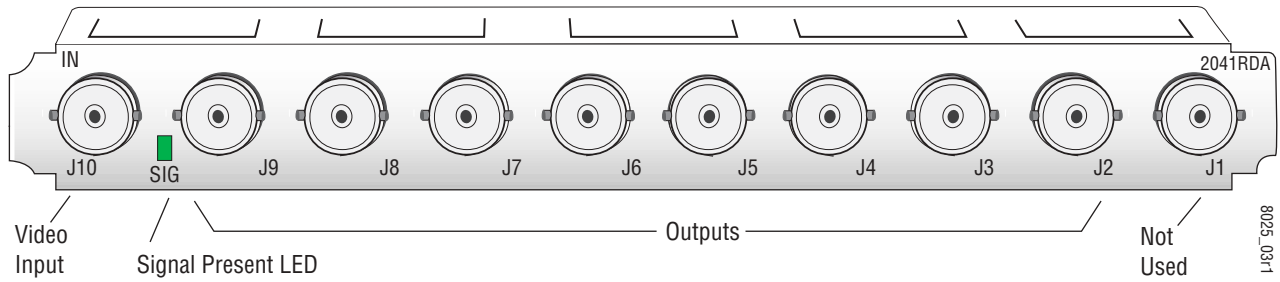
- SMPTE 292M
- 259M (143 Mbps, 177 Mbps, 270 Mbps, 360 Mbps)
- 4 Mbps to 1.5 Gbps (tested with PN20 pseudonoise sequence ratio, maximum 19:1)
- SMPTE 310M
- DVB-ASI

Outputs

The input signal is distributed to eight output ports. Connect video output devices to outputs J2 through J9 provided on the 2041RDA rear module.

Note BNC J1 is not used on this module. On earlier versions of the 2041RDA labeled with part number 671-4961-00, BNC J1 provided an output.

Figure 3. 2041RDA Rear Module Input/Output Connectors



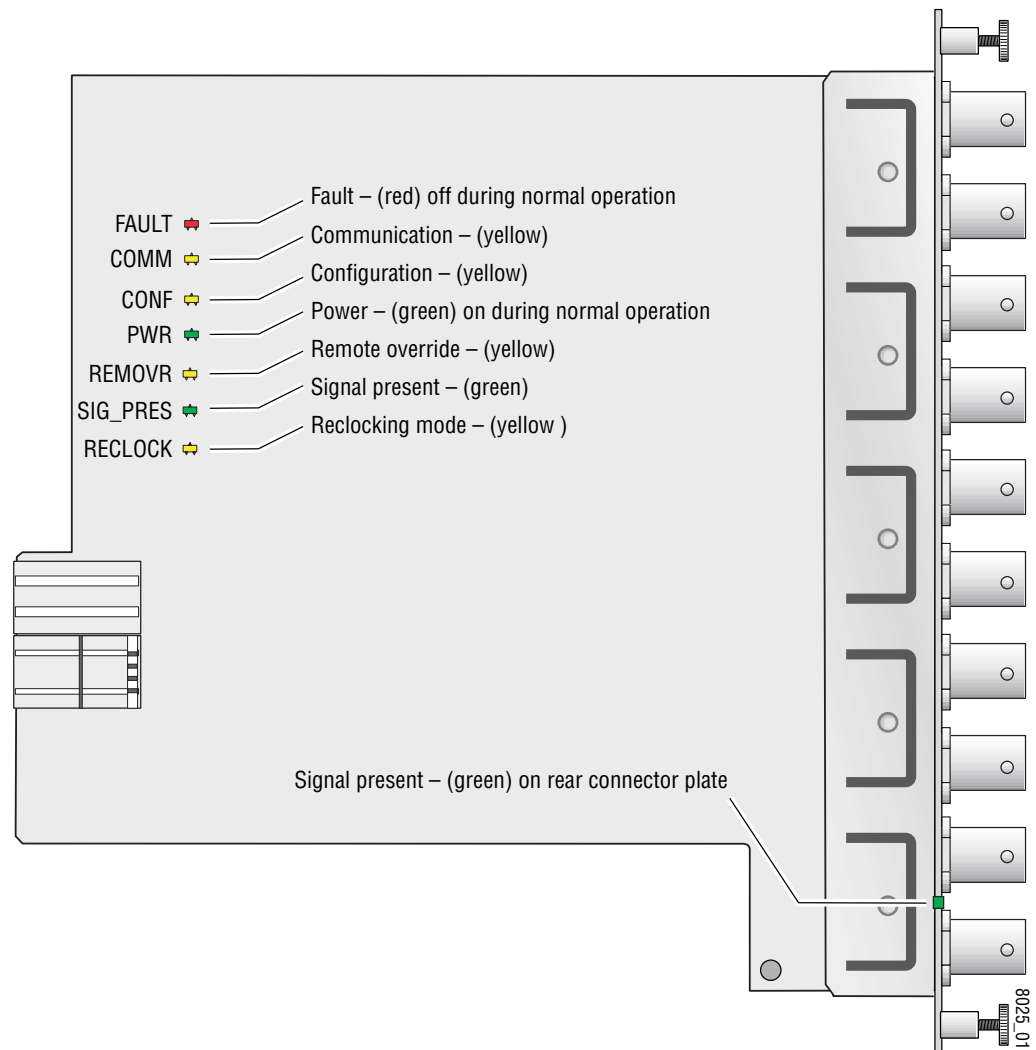
Power Up

The front LED indicators and configuration switches are illustrated in [Figure 4](#). Upon power-up, the green PWR LED should light and the yellow CONF LED should illuminate for the duration of module initialization.

Operation Indicator LEDs

With factory default configuration and a valid input signal connected, the green PWR LED, the green Signal present LED and the detected signal data rate LED should be on. Refer to [Table 1 on page 12](#) to see a complete list of possible operating conditions and the resulting indicator status.

Figure 4. 2041RDA Status LEDs



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/reference combinations and user settings.

Table 1. Indicator LEDs and Conditions Indicated

LED	Indication	Condition
FAULT (red)	Off	Normal operation
	On continuously	Module has detected internal fault
	Long flash	Configuration problems, check inputs and settings
COMM (yellow)	Off	No activity on frame communication bus
	Long flash	Location Command received by the module from a remote control system
	Short flash	Activity present on the frame communication bus
CONF (yellow)	Off	Module is in normal operating mode
	On continuously	Module is initializing, changing operating modes or updating firmware
PWR (green)	Off	No power to module or module's DC/DC converter failed
	On continuously	Normal operation, module is powered
REMOVR (yellow)	Off	Module settings match those indicated by module jumpers
	On	Settings on the modules jumpers are overridden by remote control
SIG_PRES LEDs (green)	Off	No input signal detected
	On	Input carrier signal detected
RECLOCK (yellow)	Off	Reclocking enabled and auto-rate detection mode is active
	On	Bypass mode, input signal will not be reclocked

[Table 2](#) provides the various output conditions possible for a given input and module setting.

Table 2. Possible Output Conditions

Input	Setting	Output Condition
Standard Definition SDI video	Auto or Bypass	Standard Definition SDI video
High Definition SDI video	Auto or Bypass	High Definition SDI video
Other carrier	Auto or Bypass	Other carrier
No signal or over EQ range	All modes	Muted

Configuration

The 2041RDA can be configured locally using on-board jumpers or remotely using the 2000NET network interface.

The following parameter options can be set on the 2041RDA module:

- Remote control and monitoring lockout (on-board only),
- Automatic signal locking and reclocking mode,
- Reclock/Bypass mode (enabled/disabled reclocking), and
- Manual input signal selection mode (remote only).

Local On-board Module Configuration

The 2041RDA module can be configured locally using the jumpers shown in [Figure 5 on page 14](#). The CONF LED indicates status of the configuration process.

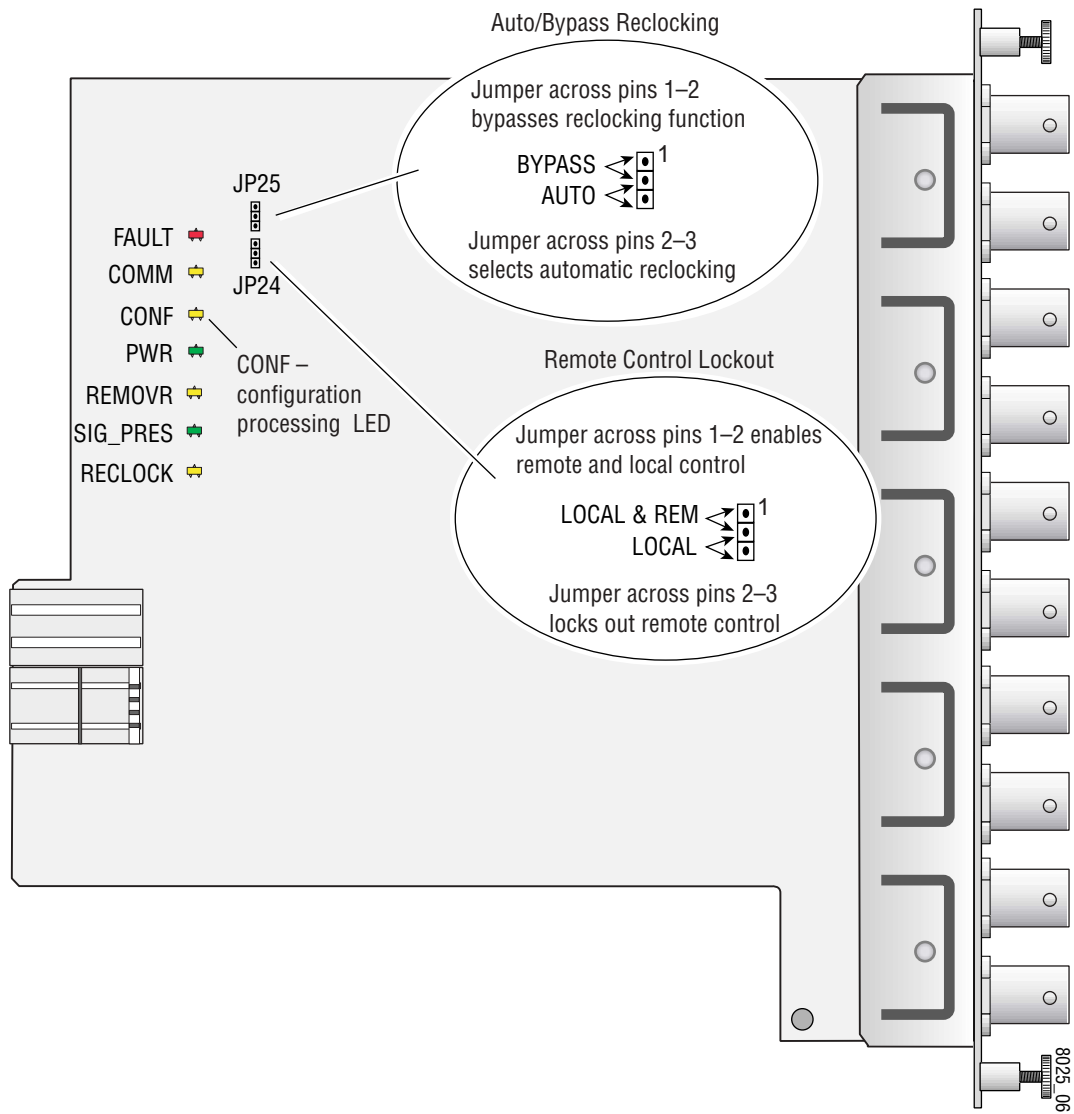
These components perform the following:

- Jumper J24 – sets control mode for Local only or Remote and Local.
- Jumper J25 – enables or disables the reclocking function.
- CONF (configuring) LED – when on, indicates the module is initializing or processing configuration information.

Remote Control Jumper

When the jumper is placed across pins 2 and 3 of jumper block J24, module settings are changed from the on-board jumpers only. To have both Local and Remote access, set the jumper across pins 1 and 2.

Figure 5. Module Configuration Jumpers



Auto/Bypass Jumper

When the jumper is placed across pins 2 and 3 of jumper block J25, the detected video signal will be reclocked at the appropriate rate. With the jumper across pins 1 and 2, all reclocking is bypassed.

Remote Configuration and Monitoring

2041RDA configuration and monitoring can be performed remotely using the 2000NET interface (see Figure 6). This section describes the GUI access to the module configuration functions. Refer to the *2000NET Network Interface Module Instruction Manual* for information on setting up and operating the 2000 frame network.

For remote access, make sure jumper block J24 on the module is set for both Local and Remote access (Figure 5 on page 14).

Note The physical appearance of the menu displays 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.

Figure 6. 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 refresh of page

Online Manual Link

Frame
[Status](#)
[Configuration](#)
[1 Media Slot 1](#)
[2 KAM-AV](#)
[3 Media Slot 3](#)
[4 KAM-SD](#)
[5 Media Slot 5](#)
[6 Media Slot 6](#)
[7 Media Slot 7](#)
[8 KAM-AV](#)
[9 Media Slot 9](#)
[10 Media Slot 10](#)
[11 Media Slot 11](#)
[12 Media Slot 12](#)
[13 2000NET](#)
[15 2000GEN](#)
[19 Power Slot 19](#)
[20 Fan Slot 20](#)
[21 Power Slot 21](#)

Status

Model: 2000T3N Description: Module Frame

Frame Location: not assigned

Temperature Status Pass Fan Status PASS

Media Module	Net Card	Media Module	Power Slot
Media Module		Media Module	
Media Module	App Card	Media Module	Fan Slot
Media Module		Media Module	
Media Module		Media Module	
Empty		Media Module	Empty

Properties
 Vendor: Grass Valley Group Software Version 3.1.0
 Media Slots: 13

The 2000 modules can be addressed by clicking 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.

Module Configuration Displays

The 2000 GUI provides the following links and displays for the 2041RDA module (see [Figure 7](#)):

- Status and Slot Configuration displays showing module status and slot configuration information (location and user assigned names),
- Standard Selection and Recall displays, and
- Software Update display.

The Module Status and Slot Configuration displays are the same for all remote controllable 2000 modules. Refer to the 2000NET manual for more information on these displays. Some functions listed may not be supported by a particular module. These will be indicated as not supported.

Figure 7. 2041RDA Display Links



Software Update Displays

The Software Update display allows you to download new software versions for the module. Refer to the 2000NET manual and the Grass Valley Group web site at <http://www.thomsongrassvalley.com> for complete details and new software versions.

Standard Selection and Recall Displays

This section discusses the Standard Selection and Recall Factory Defaults Displays available to set and monitor the 2041RDA module parameters remotely.

- [Status](#)
 - [Slot Config](#)
 - [Standard Selections](#)
 - [Recall Factory Defaults](#)
 - [Software Update](#)
- Use This Link

Standard Selection

The Standard Selection display is shown in Auto mode in [Figure 8](#). In this mode, if the module does not detect a valid data rate, the **Current Bit Rate** will display **Bypass**.

Figure 8. Standard Selection Display in Auto Mode

2041RDA Standard Selections
 Model : [2041RDA](#) Description : [WB Reclocking DA](#)
 Frame Location : [Modular Lab](#) , Slot : 1
 Input Signal : [Signal Not Present](#)

Mode: Selection Current Setting

Auto Auto

Current Bit Rate : [Bypass](#)

✓ **Auto**
Manual
Bypass

A valid input data rate has not been detected

To select one input signal standard, pull down the **Selection** window and choose **Manual**. After selecting manual mode, click the **Apply** button to activate it. In manual mode (see [Figure 9](#)), a pull-down window is available to choose one of the various input standard data rates.

Figure 9. Manual Standard Selection Display

2041RDA Standard Selections
 Model : [2041RDA](#) Description : [WB Reclocking DA](#)
 Frame Location : [Modular Lab](#) , Slot : 1
 Input Signal : [Signal Present](#)

Mode: Selection Current Setting

Manual Manual

Standard Selection: Selection Current Setting

360 Mb 360 Mb

143 Mb
 177 Mb
 270 Mb
 ✓ 360 Mb
 1.5 Gb

Manual allows selection of a specific input signal data rate

These selections appear in manual mode only

- Use
This
Link
- [Status](#)
 - [Slot Config](#)
 - [Standard Selections](#)
 - [Recall Factory Defaults](#)
 - [Software Update](#)

Recall Factory Default Settings

To recall the original factory default setting (Auto selection mode), click on the **Recall Factory Default** button.

Figure 10. Recall Factory Defaults Display

2041RDA Recall Factory Defaults

Model : [2041RDA](#) Description : [WB Reclocking DA](#)

Frame Location : [Modular Lab](#) , Slot : 1

Recall Fact. Default

Specifications

Table 3. 2041RDA Specifications

Parameter	Value
Serial Digital Component Input	
Number and type of inputs	One 75 Ω BNC
Input signal formats	Serial digital component video conforming to the following formats: <ul style="list-style-type: none"> • SMPTE 292M • SMPTE 259M (143 Mbps, 177 Mbps, 270 Mbps, 360 Mbps) • 4 Mbps to 1.5 Gbps with PN20 pseudonoise sequence, maximum ratio 19:1 • SMPTE 310M • DVB-ASI
Signal level	SDI 800 mV peak to peak \pm 10% maximum
Return loss	>15 dB 0.004 to 1.5 GHz
Auto equalization	HD signal in reclocking or bypass mode <ul style="list-style-type: none"> • Up to 90 meters using Belden 8281 cable or equivalent • Up to 120 meters using Belden 1694a cable or equivalent SD signal in reclocking mode <ul style="list-style-type: none"> • Up to 300 meters using Belden 8281 cable or equivalent Signals up to 540 Mbps in bypass mode <ul style="list-style-type: none"> • Up to 100 meters using Belden 8281 cable
Serial Digital Component Outputs	
Number and type of outputs	Eight 75 Ω BNCs
Output signal formats	Serial digital component video conforming to the following formats: <ul style="list-style-type: none"> • SMPTE 292M • 259M (143 Mbps, 177 Mbps, 270 Mbps, 360 Mbps) • 4 Mbps to 1.5 Gbps with PN20 pseudonoise sequence, maximum ratio 19:1 • SMPTE 310M • DVB-ASI
Output level	SDI 800 mV peak to peak \pm 10%
Auto mute	Output is muted if detected cable length is: <ul style="list-style-type: none"> • >350 meters for reclocked SD • Between 200 meters to 300 meters for HD and bypassed signal
Return loss	>15 dB 0.004 to 1.5 GHz
Error checking	Transparent to embedded EDH
Electrical length	23 ns \pm 1 ns @ 143 Mbps 21 ns \pm 1 ns @ 177 Mbps 18 ns \pm 1 ns @ 270 Mbps 14 ns \pm 1 ns @ 360 Mbps 16 ns \pm 1 ns @ 1.5 Gbps 10 ns \pm 1 ns for bypass
Rise and fall time	160-270 ps between 20-80%
Output polarity	Non-inverted
Jitter	<0.2 UI

Table 3. 2041RDA Specifications - (continued)

Parameter	Value
Power	
Input power maximum	<7 Watts
Environmental	
Operating temperature range	0 to 45 ° C
Non-operating Temperature	-10 to +70 ° C
Operating Humidity Range	10 to 90% non-condensing

Service

The 2041RDA 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

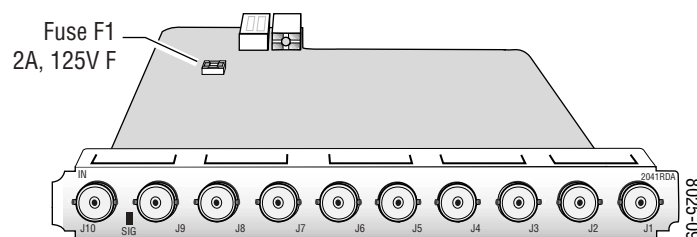
If the module has not passed self-diagnostics, do not attempt to troubleshoot. Return the unit to Grass Valley (see [Module Repair](#)).

Troubleshooting

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

- Check frame and module power.
- If module power is not present, check fuse F1 (see [Figure 11](#)).
- Check for presence and quality of input signals.
- Verify that source equipment is operating correctly.
- Check cable connections.

Figure 11. 2041RDA Fuse Location



Module Repair

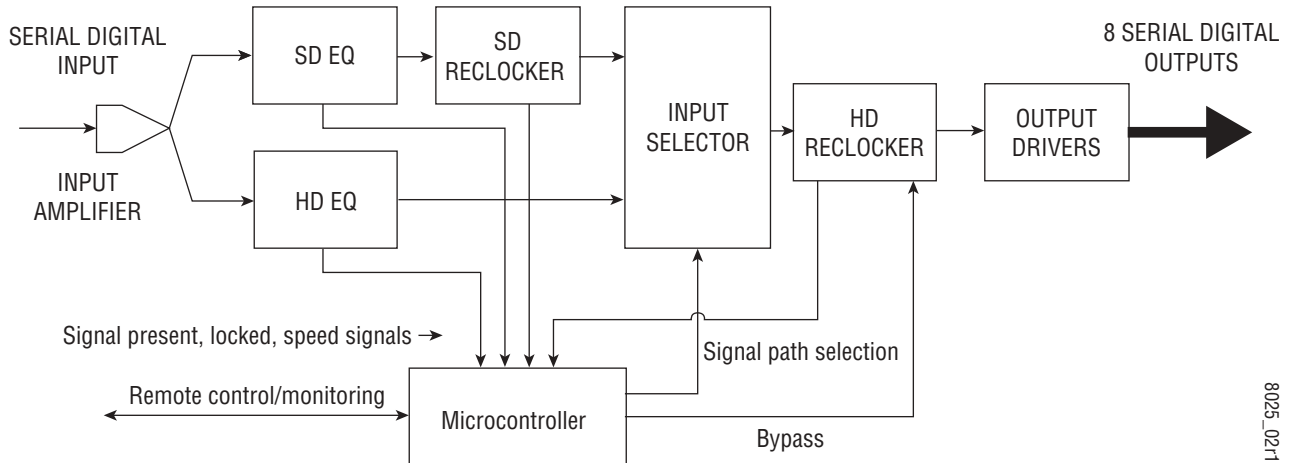
If the module is still not operating correctly, replace it with a known good spare and return the faulty module to a designated Grass Valley repair depot. Call your Grass Valley representative for depot location.

Refer to [Contacting Grass Valley Group](#) at the front of this document for the Grass Valley Customer Service Information number.

Functional Description

A block diagram of the 2041RDA is shown in Figure 12.

Figure 12. 2041RDA Block Diagram



Input and Output Processing

The input section has a parallel input path from the passive rear input module for SD (standard definition) and HD (high definition) signal equalizing and reclocking. The input section can also bypass the signal through the HD EQ and HD Reclocker directly to the output amplifiers. The output amplifiers drive eight equal-phase outputs.

Microprocessor and Input Selector

The primary purpose of the microprocessor is to provide remote control and monitoring capability for the 2041RDA. 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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