Product Operation Manual

VL-RRX-04 RETURN RECEIVER MODULE

Ver 1.0

VALE SYSTEMS INC.
10400 Overland Road #408 Boise, ID 83709-1449, USA
Tel: 208.935.6317 Fax: 208.935.6234

Contents

1. Introduction

1.1 Overview

The VL-RRX-04 is a CATV Return Path Receiver Module with four optical inputs. The module has a low noise PIN diode and a high output level RF amplifier. The module features four independent RF out-put ports, which are located on the rear panel of the receiver module, providing up to 45dBmV output level. Monitoring and configuration settings of the receiver module are all achieved via the front panel and VL-EMS equipment management module.

1.2 Features

- Four independent return path receivers in a single module
- Hot-swap capability
- Bandwidth 5~200MHz
- 45dBmV output level
- -18 to 0dBm input optical power
- Manual attenuation control
- RF output test point

1.3 Specifications

Parameter	Unit	Spec	Note
Optical Performance			
Optical wavelength	nm	1200 to 1610	--
Number of receiver	--	4	--
Optical input power	dBm	-18 to 0	--
RF Performance			
RF Bandwidth	MHz	5 to 200	--
RF flatness	dB	± 0.5	--
RF output return loss	dB	≤-18	--
RF output impedance	ohm	75	Unbalance
RF output level	dBmV	≥45	1
CNR	dB	≥50	--
IMD2	dBc	>55	2
IMD3	dBc	>60	2
Wink switch	dB	0 to 20 or 30	--
Monitor Port Performance			
RF monitor point	dB	-20	--
RF monitor point accuracy	dB	± 0.5	--
Connectors			
RF connector	--	F-female	--
Optical connector	--	SC/APC	--
General			
Operation Temperature	℃	0 to 50	--
Storage Temperature	℃	-40 to 70	--
Relative Humidity	%	Max.85%, non-condensing	--
Dimensions	cm	2.4W x 11H x 39.5D	--
Weight	Kg	1.2	--
Power Consumption	W	<10	--

1. @-7dBm optical input, OMI = 16%, 0dB attenuator setting.

2. @45dBmV output, two tone test, f1=13MHz, f2=19MHz

All specifications are subject to change without notice

2. Operation panel description

The components and features of the Return Receiver Module are shown in Figure 2.1 and described in Table 2.1 and 2.2.

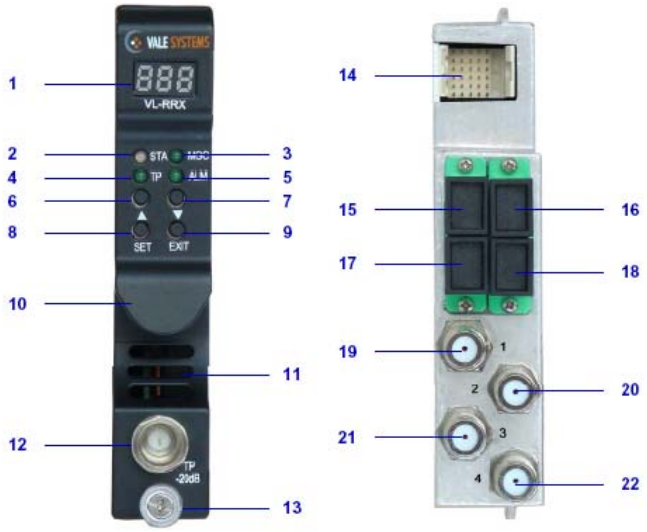


Figure 2.1 Return Path Receiver View

Table 2.1 Return Receiver Components

Component	Function
Module Housing	The enclosure, with guide rails on the top and bottom, contains the receiver module, rear panel with connectors, and front panel.
Rear Panel	Includes the optical in/RF out ports, backplane connector, which provide signal and power connections to the chassis backplane.
Front Panel	Includes display LED, D LED indicators, push buttons, and test point.

Table 2.2 VL-RRX-04 Controls, Indicators, and Connectors

(Refer to Figure 2.1)

Item	Description	Function
1	**Display LED**	Display the status, MGC value and alarm code of the receiver
2	**STA** LED	Green indicates the module is operating normally. Red indicates the module has alarms.
3	**MGC** LED	Green indicates the VL-RRX-04 module is working under “MGC” operation interface
4	**TP** LED	Green indicates the VL-RRX-04 module is working under “TP” operation interface
5	**ALM** LED	Green indicates the VL-RRX-04 module is working under “ALM” operation interface
6	**UP**	Push button, for function selection or parameter setting
7	**DOWN**	Push button, for function selection or parameter setting
8	**SET**	Push button, for function selection or parameter setting confirmation
9	**EXIT**	Push button, exit certain operation mode
10	**Handle**	Used for module install and uninstall
11	**Heat dissipation hole**	Airflow for heat dissipation of the module
12	**TP**	Test point for RF output, -20dB, F type male connector
13	**Thumbscrew**	Fix the power supply module onto the chassis
14	**30pin connector**	Provides power and signals to the chassis backplane, connector type is male
15	**Optical input port**	Port 1 for optical input, connector type is SC/APC
16	**Optical input port**	Port 2 for optical input, connector type is SC/APC
17	**Optical input port**	Port 3 for optical input, connector type is SC/APC
18	**Optical input port**	Port 4 for optical input, connector type is SC/APC
19	**RF output port**	Port 1 for RF output, connector type is F-female
20	**RF output port**	Port 2 for RF output, connector type is F-female
21	**RF output port**	Port 3 for RF output, connector type is F-female
22	**RF output port**	Port 4 for RF output, connector type is F-female

3. Precautions

Failure to comply with these general safety precautions and with the specific precautions described elsewhere in this manual violates the safety standards of the design, manufacture, and intended use of the device. Vale Systems Inc. assumes no liability for the customer's failure to comply with these precautions.

> ***CAUTION**: Do not operate the receiver outside of its ratings. Doing so may result in unsatisfactory performance, receiver failure, shortened receiver life span, or a safety hazard.*
> ***CAUTION**: Do not attempt to modify or service any part of a receiver module. Doing so voids the warranty. Return the unit to Vale Systems Inc. for service and repair.*
> ***CAUTION**: Do not restrict airflow in front of or behind the chassis. The return receiver should be operated in an ambient environment between 0 and 50ºC (32 and 122ºF).*
> ***CAUTION**: Store the module away from corrosive materials, at a temperature between -40 and +70ºC (-40 and +158ºF), and with no more than 85% humidity, non-condensing.*

4. Install and Uninstall the Receiver Module

4.1 Installation

This section describes the installation process for the Return Path Receiver.

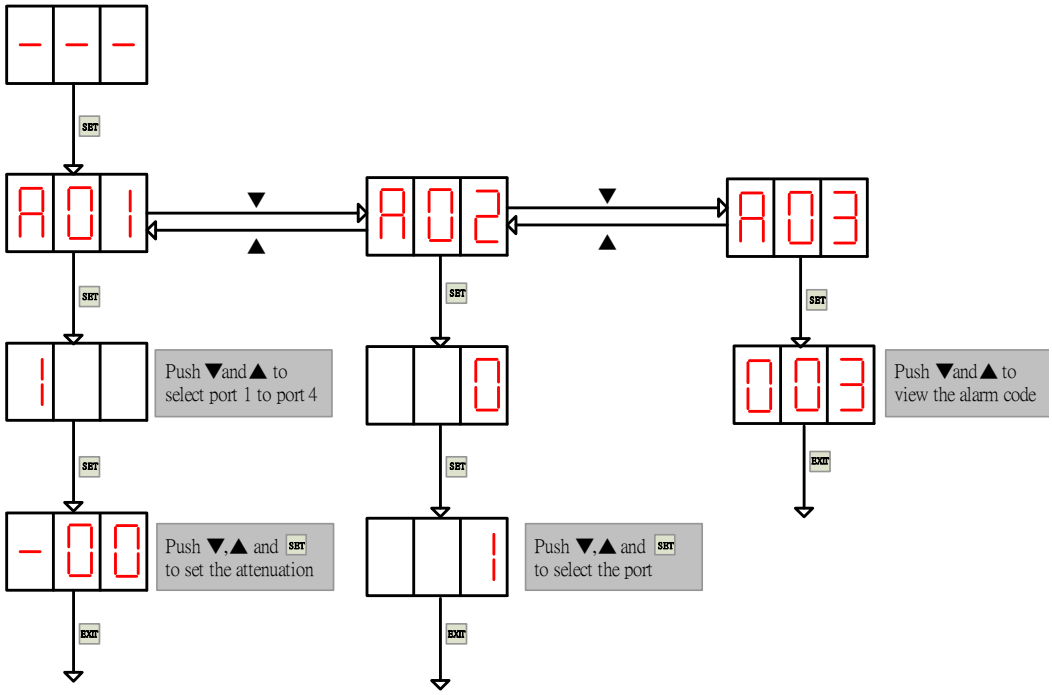
1. Inspect for bent pins on the backplane connector at the rear of the module. Straighten any bent pins before installing the module.
2. Gently insert each module into a slot in the front of the chassis. Be careful to align the metal guide rails on the top and bottom of the module with the nylon guides in the interior of the chassis housing.
3. Then lock the thumbscrew on the front of the module.
4. Repeat steps 1 through 3 to install the remaining modules in the chassis.
5. Use an optical power meter to verify that the optical input level on specification value.

> ***CAUTION**: Using mismatched connectors will damage the connectors and degrade system performance. Ensure that each fiber has a matching connector*

6. Verify that the correct optical connector will be attached to the optical connector on the module. Clean both the bulkhead and fiber connectors.
7. Connect the optical fibers to the appropriate OPT **IN** adaptor on the rear panel.
8. Connect the RF cord to the appropriate **RF OUT** connector on the rear panel.
9. Push SET button, Set **RF TP** Channels per instruction of section **4.2**. Using a signal level meter, measure the RF output at the **RF TP** test point (20 dB below actual level) on the front panel and verify that it is set at the specified value for that channel. Further adjust the RF output level if required using MGC function (per instruction of section **4.2**).

4.2 Front Panel numeric display Operation Description

First push **SET** into LED display and set function



4.3. Un-install the Return Receiver

> ***DANGER: Laser Radiation****—Avoid direct exposure to beam. Inbound laser radiation associated with this optical input jump is generated by a Class IIIb laser product. Disconnected optical connectors might emit invisible optical radiation. Laser light, visible or invisible, can seriously injure eyes and even cause blindness.*

1. Disconnect the optical fiber(s) from the rear panel of the receiver. Immediately place protective caps over the bulkhead and fiber connector.
2. Disconnect the RF cables from the F-connectors.
3. Loosen the thumbscrew on the front panel of the module.

> ***CAUTION****: Do not pull on the thumbscrew to remove the module. Pull on the handle that the thumbscrew goes through to remove the module.*

4. Gently pull the module from the chassis using the handle that the thumbscrew goes through.

5. Alarms

Displayed Message	Alarm Status	System Response
001	Optical input low for port 1	STA LED turns to red
002	Optical input high for port 1	STA LED turns to red
003	Optical input low for port 2	STA LED turns to red
004	Optical input high for port 2	STA LED turns to red
005	Optical input low for port 3	STA LED turns to red
006	Optical input high for port 3	STA LED turns to red
007	Optical input low for port 4	STA LED turns to red
008	Optical input high for port 4	STA LED turns to red
009	Module temperature high	STA LED turns to red

6. Maintenance and Troubleshooting

This chapter describes the maintenance and troubleshooting information for the receiver module. Authorized personnel should undertake all maintenance and troubleshooting work mentioned hereunder.

5.1 Troubleshooting

Problem	Steps to take
Status LED is lit red	1. Verify optical input power range is between 0 to -18dBm. 2. If all is normal, contact manufacturer.
No RF output power	1. Clean optical connector. 2. Verify optical input power using required optical power meter. 3. Try to adjust RF output through MGC function. 4. Measure RF power at output port. 5. If there is no RF output power, the unit will require a factory check; contact manufacturer.
RF output power lower than specified	1. Ensure all optical connector are clean. 2. Verify fiber cable ferrule end is used with right type. 3. Verify optical input power in normal range. 4. Try to adjust RF output through MGC function. 5. Measure RF power at output port. 6. If the optical power still is lower, the unit will require a factory check; contact manufacturer.

DANGER/CAUTION: Do not remove the cover of the receiver under any circumstances. Removing the cover could cause irreparable damage to the unit, and will void your warranty.

DANGER/CAUTION: Do not attempt to modify or service any part of the device. Doing so will void the warranty. Return it to Vale Systems Inc. for service and repair. Contact the Customer Service Department of Vale Systems Inc. for a return authorization number.