

HIGHLIGHTS

- High-speed Internet communications
- Pay-per-view
- Video-on-demand
- Telephony
- Security
- Alternative access
- Local origination
- Direct customer feeds

The highly efficient Harmonic RDR 4002 return digital receiver uses state-of-the-art technology to increase system reliability and enables operators to expand network services. The use of Harmonic’s digital return path solution in a network offers advantages including:

- High package density (ten RDR 4002 units in a three rack-unit platform provide 40 return data streams)
- Outstanding performance over long links, since the performance of a digital return transmission system is independent of link loss over the operating range of the receiver
- Increased system reliability and reduced operational costs as a result of greater network segmentation

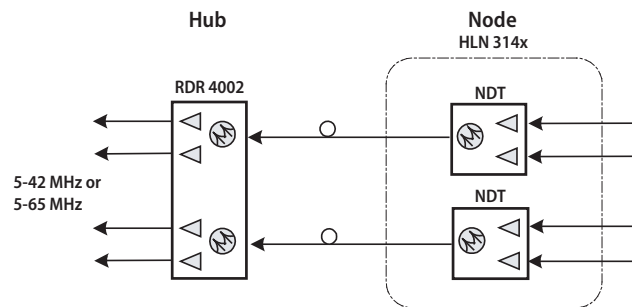
The RDR 4002 works in conjunction with Harmonic’s NDT series return digital transmitters. It mounts in the HLP 4200 chassis and takes two optical data streams at up to 3.1 Gbps. Each input is demultiplexed into its two component data streams, resulting in four independent data streams received per module. These are converted back to analog waveforms by four digital-to-analog (D/A) converters.



The four analog output channels from the RDR4002C/E have a 5-65 MHz passband and the RDR4002A has a 5-42 MHz passband. The RDR 4002 uses advanced digital signal processing to optimize dynamic range.

Auto-switching capabilities allow the RDR 4002 to function as a standalone unit or in a redundant pair configuration. One RDR 4002 is used for a primary fiber path and the second for the backup fiber path. The RF outputs of the two units are combined.

For maximum reliability, the RDR 4002 units comprising the redundant pair can be located in different platforms, or even different racks. Automatic switching is triggered by link loss, low optical input or high BER. The RDR 4002 supports hot swapping, which allows a card to be added or removed without disrupting service. This results in improved network management and availability. The RDR 4002 also allows the operator to set the optical level at which an alarm is generated.



Standard Configuration

OPTICAL INPUT

Number of Fiber Optic Inputs	2
Maximum Input	0 dBm
Minimum Input	
RDR 4002A	-20 dBm
RDR 4002C	-18 dBm
RDR 4002E	-18 dBm
Wavelength	1250 to 1620 nm
Input Line Rate	
RDR 4002A	2.1 Gbps
RDR 4002C	3.1 Gbps
RDR 4002E	3.1 Gbps

RF OUTPUT

Number of Analog Outputs	4
Passband	
RDR 4002A	5-42 MHz
RDR 4002C	5-65 MHz
RDR 4002E	5-65 MHz
Impedance	75 Ω
Flatness ¹	± 1 dB from 5 to 65 MHz
Channel-to-channel isolation	60 dB
RF output connector type	Female F
RF output return loss	16 dB
RF output level with 0 dB attenuator setting	-35 dBmV/Hz min for a Gaussian noise signal at -20 dBm of received optical power
RF attenuator range	0 to 17.5 dB
RF attenuator step size	0.5 dB
Spurious noise	-60 dBc max
Switching time primary to backup	50 mS max
Switching time backup to primary	2 to 4 S

OPTICAL INTERFACE

Connector Type	
RDR 4002x-AS	SC/APC
RDR 4002x-AE	E2000

USER INTERFACE

Front Panel	
Bi-Color Status LED	Normal = Green, Alarm = Red
Module Selection Indicator	Yellow LED
Monitor Point	
Level	-20 dB +/- 1.0 dB relative to output
Return Loss	-16 dB
Impedance	75 Ω
Connector Type	Female F

LINK PERFORMANCE²

Link Gain	
RDR 4002A	37 to 39 dB
RDR 4002C	29 to 31 dB
RDR 4002E	37 to 39 dB
Dynamic Range	
RDR4002A	11 dB @ NPR=41 with 5 to 42 MHz passband ³
RDR4002C	26 dB @ NPR=41 with 5 to 42 MHz passband ⁴
RDR4002C	20 dB @ NPR=41 with 5 to 65 MHz passband ⁴
RDR4002E	12 dB @ NPR=41 with 5 to 42 MHz passband ⁴
RDR4002E	9 dB @ NPR=41 with 5 to 65 MHz passband ⁴

POWER REQUIREMENTS

Input Voltage	+24 VDC; supplied by HLP 4200 bus
Consumption	15 W maximum

ENVIRONMENTAL

Operating Temperature Range	0° to 50° C 32° to 122° F
Storage Temperature Range	-40° to +85° C -40° to +185° F
Operating Humidity	90% non-condensing

PHYSICAL

Dimensions (WxHxD)	1.25" x 4.4" x 11.5" (3.2 cm x 11.2 cm x 29.2 cm)
Weight	3.3 lbs (1.5 kg)
Mounting	HLP 4200 platform, via HMC 4008 module carrier

ELEMENT MANAGEMENT

Monitorable and controllable via NETWatch Site Controller

Notes:

1. When used in conjunction with a corresponding Harmonic digital transmitter. For a list of compatible digital transmitters, refer to the user's manual for RDR 4002.
2. RDR 4002A link specifications include NDT 3049A and NDT3349A transmitter. RDR 4002C link specifications include NDT 3147C transmitter. RDR 4002E link specifications include NDT 3249E transmitter.
3. Dynamic range specified with Gaussian noise loading and -27 dBmV/Hz at receiver output.
4. Dynamic range specified with Gaussian noise loading and -41 dBmV/Hz at receiver output.