

WaveReady SFP for the WRT-740/760 Transponder



Applications

- 100Base-FX Ethernet
- Gigabit Ethernet
- ESCON
- Fibre Channel
- FICON
- OC-3 to OC-48

Compliance

- GR-253-CORE
- ITU-T G.957
- SFF-8472
- Class 1 laser safe
- EMI emission below FCC Class B
- UL, CDRH, and TUV certified
- SFP MSA compliant
- IEC 60825 and IEC 60950 compliant
- Ethernet 802.3 compliant
- Fibre Channel FC-PI compliant
- CE Mark
- CTIK approved
- Telcordia GR-468-CORE stress tested

Key Features

- **Multi-rate SFPs**
 - SFP MSA compatible
 - Fully SONET-compliant at all reaches: SR-1, IP-1, IR-2, LR-1, and LR-2
 - Microprocessor-based design fully implements the digital diagnostics monitoring interface (DDMI)
 - Automatic output power and extinction ratio control over temperature and lifetime compensate for laser efficiency degradation
 - Both PIN and APD versions meet the -27 dB standard reflectance requirement
 - Optical parameters are tuned and optimized over temperature in production testing
- **Ethernet and Fibre Channel SFPs**
 - Proven high reliability at <100 FIT
 - Low bit error rate at <10⁻¹²
 - Hot plug surge protection
 - 850 nm VCSEL, 1310 nm Fabry Perot, 1550 nm DFB
 - Ethernet and/or Fibre Channel data rates
 - Tri-speed versions for stocking simplicity

JDSU's WaveReady SFPs provide the client side interface for the WaveReady WRT-740/760 series of transponders. The SFP modules are optimized for a wide range of protocols and are available for both singlemode and multimode fiber.

Supported protocols include 100Base-FX Ethernet, Gigabit Ethernet, (GigE), ESCON, Fibre Channel, FICON, and OC-3 to OC-48. Supported data rates range from 125 Mb/s to 2.7 Gb/s.

The bit rate and protocol independence of JDSU's transponders and SFPs give service providers the flexibility they need in order to meet the shifting demands of customers without the need to change installed equipment.

The following SFPs are available:

- SFP1: WRT-SFP-S24SB1310
- SFP2: WRT-SFP-S12SB1310
- SFP3: WRT-SFP-M20SB0850
- SFP4: WRT-SFP-S20SB1310
- SFP5: WRT-SFP-S10SB1310
- SFP6: WRT-SFP-S10SB1550
- SFP7: WRT-SFP-S24SB1550
- SFP8: WRT-SFP-S24SB1310IR1
- SFP9: WRT-SFP-S24SBIR2

2

Compatibility of Client SFPs

Protocol	Bit Rate	SFPs
Singlemode Fiber (SMF)		
100Base-FX Ethernet	125 Mb/s	SFP1, SFP7, SFP8, SFP9
OC-3 IR-1/STM-1 S-1.1	155.52 Mb/s	SFP1, SFP2, SFP7, SFP8, SFP9
ESCON	200 Mb/s	SFP1, SFP7, SFP8, SFP9
D1 Video	270 Mb/s	SFP1, SFP7, SFP8, SFP9
OC-12/STM-4 S-4.1	622.08 Mb/s	SFP1, SFP2, SFP7, SFP8, SFP9
FICON LX	1.0625 Gb/s	SFP1, SFP7, SFP8, SFP9
100-SM-LL-L Fibre Channel	1.0625 Gb/s	SFP1, SFP4, SFP5, SFP6, SFP7, SFP8, SFP9
1000Base-LX Gigabit Ethernet	1.250 Gb/s	SFP1, SFP5, SFP6, SFP7, SFP8, SFP9
200-SM-LL-I Fibre Channel	2.125 Gb/s	SFP1, SFP4, SFP7, SFP8, SFP9
OC-48/STM-16 I-16	2.48832 Gb/s	SFP1, SFP7, SFP8, SFP9
OC-48 FEC	2.7 Gb/s	SFP1, SFP7, SFP8, SFP9
Multimode Fiber (MMF)		
100Base-FX Ethernet	125 Mb/s	SFP1 ¹ , SFP7 ¹ , SFP8 ¹ , SFP9 ¹
ESCON	200 Mb/s	SFP1 ¹ , SFP7 ¹ , SFP8 ¹ , SFP9 ¹
FICON LX	1.0625 Gb/s	SFP1 ¹ , SFP7 ¹ , SFP8 ¹ , SFP9 ¹
FICON SX	1.0625 Gb/s	SFP1 ¹ , SFP7 ¹ , SFP8 ¹ , SFP9 ¹
100-M5-SN-I Fibre Channel	1.0625 Gb/s	SFP3
1000Base-SX Gigabit Ethernet	1.250 Gb/s	SFP3
200-M5-SN-I Fibre Channel	2.125 Gb/s	SFP3

1. Due to the dual media (singlemode and multimode) support of the SFP, fulfillment of this protocol requires a singlemode fiber offset launch mode conditioning patch cord. The offset launch mode conditioning patch cord lowers the launch power by 0.5 dB and incurs a similar penalty on the sensitivity.

Optical Specifications

SFP1: WRT-SFP-S24SB1310

Customer Interface Side	Minimum	Typical	Maximum
Data rate supported	100 Mb/s	-	2700 Mb/s
Output wavelength	1266 nm	1310 nm	1360 nm
Output power level (EOL)	-10 dBm	-6.5 dBm	-3 dBm
Input sensitivity at BER 10 ⁻¹² for 100Base-FX to OC-48	-18 dBm	-	-3 dBm
Extinction ratio	8.2 dB	11 dB	15 dB
Input fiber types	Singlemode fiber (SMF) or multimode fiber (MMF) ¹		
Jitter generation – RMS	-	6 mUI RMS	7 mUI RMS
Optical path penalty	-	1 dB	-
BER floor	-	10 ⁻¹⁵	-
Dispersion tolerance	-	-	12 ps/nm
Maximum link budget at OC-48	-	8 dB	-
Digital diagnostics capable with receiver input power monitors	-	Yes	-

1. Due to the dual media (singlemode and multimode) support of the SFP, fulfillment of this protocol requires a singlemode fiber offset launch mode conditioning patch cord. The offset launch mode conditioning patch cord lowers the launch power by 0.5 dB and incurs a similar penalty on the sensitivity.

3

Optical Specifications **SFP2: WRT-SFP-S12SB1310**

Customer Interface Side	Minimum	Typical	Maximum
Data rate supported	155 Mb/s	-	622 Mb/s
Output wavelength	1261 nm	1310 nm	1360 nm
Output power level (EOL)	-15 dBm	-11 dBm	-8 dBm
Input sensitivity at BER 10 ⁻¹⁰ for OC-3 to OC-12	-23 dBm	-27 dBm	-
Extinction ratio	8.2 dB	-	15 dB
Input fiber types	Singlemode fiber (SMF) or multimode fiber (MMF) ¹		
Jitter generation – RMS	-	4 mUI RMS	-
Optical path penalty	-	1 dB	-
BER floor	-	10 ⁻¹⁵	-
Dispersion tolerance	-	-	13 ps/nm
Maximum link budget at OC-12	-	8 dB	-
Digital diagnostics capable with receiver input power monitors	-	Yes	-

1. Due to the dual media (singlemode and multimode) support of the SFP, fulfillment of this protocol requires a singlemode fiber offset launch mode conditioning patch cord. The offset launch mode conditioning patch cord lowers the launch power by 0.5 dB and incurs a similar penalty on the sensitivity.

Optical Specifications **SFP3: WRT-SFP-M20SB0850**

Customer Interface Side	Minimum	Typical	Maximum
Data rate supported	1.0625 Gb/s (1xFC), 1.25 Gb/s (GigE SX), 2.125 Gb/s (2xFC)		
Output wavelength	830 nm	850 nm	860 nm
Output power level (EOL)	-9.5 dBm	-4 dBm	-
Input sensitivity at BER 10 ⁻¹²	-27 dBm	-	-4 dBm
Extinction ratio	-	9 dB	-
Input fiber types	Multimode fiber (MMF) 62.5/125 μm and 50/125 μm		
Jitter generation	-	0.26 UI (pk-pk)	-
Maximum link budget at GigE	-	17.5 dB	-
Digital diagnostics capable with receiver input power monitors	-	No	-

Optical Specifications **SFP4: WRT-SFP-S20SB1310**

Customer Interface Side	Minimum	Typical	Maximum
Data rate supported	1.0625 Gb/s (1xFC), 2.125 Gb/s (2xFC)		
Output wavelength	1280 nm	1310 nm	1350 nm
Output power level (EOL)	-8 dBm	-	-3 dBm
Input sensitivity at BER 10 ⁻¹²	-30 dBm	-	0 dBm
Extinction ratio	-	9 dB	-
Input fiber types	Singlemode fiber (SMF) or multimode fiber (MMF) ¹		
Jitter generation	-	0.26 UI (pk-pk)	-
Maximum link budget at 2.125 Gb/s	-	22 dB	-
Digital diagnostics capable with receiver input power monitors	-	No	-

1. Due to the dual media (singlemode and multimode) support of the SFP, fulfillment of this protocol requires a singlemode fiber offset launch mode conditioning patch cord. The offset launch mode conditioning patch cord lowers the launch power by 0.5 dB and incurs a similar penalty on the sensitivity.

4

Optical Specifications **SFP5: WRT-SFP-S10SB1310**

Customer Interface Side	Minimum	Typical	Maximum
Data rate supported	1.0625 Gb/s (1xFC), 1.25 Gb/s (GigE LX)		
Output wavelength	1280 nm	1310 nm	1350 nm
Output power level (EOL)	-9.5 dBm	-	-3 dBm
Input sensitivity at BER 10 ⁻¹²	-30 dBm	-	0 dBm
Extinction ratio	-	9 dB	-
Input fiber types	Singlemode fiber (SMF) or multimode fiber (MMF) ¹		
Jitter generation	-	160 ps	-
Maximum link budget at 2.125 Gb/s	-	20.5 dB	-
Digital diagnostics capable with receiver input power monitors	-	Yes	-

1. Due to the dual media (singlemode and multimode) support of the SFP, fulfillment of this protocol requires a singlemode fiber offset launch mode conditioning patch cord. The offset launch mode conditioning patch cord lowers the launch power by 0.5 dB and incurs a similar penalty on the sensitivity.

Optical Specifications **SFP6: WRT-SFP-S10SB1550**

Customer Interface Side	Minimum	Typical	Maximum
Data rate supported	1.0625 (1xFC), 1.25 Gb/s (GigE ZX)		
Output wavelength	1500 nm	1550 nm	1580 nm
Output power level (EOL)	0 dBm	-	5 dBm
Input sensitivity at BER 10 ⁻¹²	-30 dBm	-	0 dBm
Extinction ratio	-	9 dB	-
Input fiber types	Singlemode fiber (SMF) or multimode fiber (MMF) ¹		
Jitter generation	-	80 ps	-
Maximum link budget at 2.125 Gb/s	-	30 dB	-
Digital diagnostics capable with receiver input power monitors	-	Yes	-

1. Due to the dual media (singlemode and multimode) support of the SFP, fulfillment of this protocol requires a singlemode fiber offset launch mode conditioning patch cord. The offset launch mode conditioning patch cord lowers the launch power by 0.5 dB and incurs a similar penalty on the sensitivity.

Optical Specifications **SFP7: WRT-SFP-S24SB1550**

Customer Interface Side	Minimum	Typical	Maximum
Data rate supported	155 Mb/s	-	2700 Mb/s
Output wavelength	1500 nm	1550 nm	1580 nm
Output power level (EOL)	-1 dBm	0.5 dBm	2 dBm
Input sensitivity at BER 10 ⁻¹² for OC-48	-28 dBm	-32 dBm	-
Extinction ratio	8.2 dB	10 dB	12 dB
Input fiber types	Singlemode fiber (SMF) or multimode fiber (MMF) ¹		
Jitter generation – RMS	-	6 mUI RMS	7 mUI RMS
Optical path penalty	-	2 dB	-
BER floor	-	10 ⁻¹⁵	-
Dispersion tolerance	-	-	1600 ps/nm
Maximum link budget at OC-48	-	27 dB	-
Digital diagnostics capable with receiver input power monitors	-	Yes	-

1. Due to the dual media (singlemode and multimode) support of the SFP, fulfillment of this protocol requires a singlemode fiber offset launch mode conditioning patch cord. The offset launch mode conditioning patch cord lowers the launch power by 0.5 dB and incurs a similar penalty on the sensitivity.

5

Optical Specifications **SFP8: WRT-SFP-S24SB1310IR1**

Customer Interface Side	Minimum	Typical	Maximum
Data rate supported	155 Mb/s	-	2700 Mb/s
Output wavelength	1260 nm	1310 nm	1360 nm
Output power level (EOL)	-4 dBm	-2.5 dBm	-1 dBm
Input sensitivity at BER 10 ⁻¹² for OC-48	-18 dBm	-	0 dBm
Extinction ratio	8.2 dB	10.5 dB	14 dB
Input fiber types	Singlemode fiber (SMF) or multimode fiber (MMF) ¹		
Jitter generation – RMS	-	6 mUI RMS	7 mUI RMS
Optical path penalty	-	1 dB	-
BER floor	-	10 ⁻¹⁵	-
Maximum link budget at OC-48	-	14 dB	-
Digital diagnostics capable with receiver input power monitors	-	Yes	-

1. Due to the dual media (singlemode and multimode) support of the SFP, fulfillment of this protocol requires a singlemode fiber offset launch mode conditioning patch cord. The offset launch mode conditioning patch cord lowers the launch power by 0.5 dB and incurs a similar penalty on the sensitivity.

Optical Specifications **SFP9: WRT-SFP-S24SBIR2**

Customer Interface Side	Minimum	Typical	Maximum
Data rate supported	155 Mb/s	-	2700 Mb/s
Output wavelength	1430 nm	1550 nm	1580 nm
Output power level (EOL)	-4 dBm	-2.5 dBm	-1 dBm
Input sensitivity at BER 10 ⁻¹² for OC-48	-18 dBm	-	0 dBm
Extinction ratio	8.2 dB	10 dB	12 dB
Input fiber types	Singlemode fiber (SMF) or multimode fiber (MMF) ¹		
Jitter generation – RMS	-	6 mUI RMS	7 mUI RMS
Optical path penalty	-	1 dB	-
BER floor	-	10 ⁻¹⁵	-
Dispersion tolerance	-	-	800 ps/nm
Maximum link budget at OC-48	-	14 dB	-
Digital diagnostics capable with receiver input power monitors	-	Yes	-

1. Due to the dual media (singlemode and multimode) support of the SFP, fulfillment of this protocol requires a singlemode fiber offset launch mode conditioning patch cord. The offset launch mode conditioning patch cord lowers the launch power by 0.5 dB and incurs a similar penalty on the sensitivity.

Ordering Information

For more information on this or other products and their availability, please contact your local JDSU account manager or JDSU directly at 1-800-498-JDSU (5378) in North America and +800-5378-JDSU worldwide or via e-mail at customer.service@jdsu.com.

Sample: WRT-SFP-S24SB1310

Product Code	Description
WRT-SFP-S24SB1310	SFP1: OC-48, multi-rate, SR-1, 1310 nm
WRT-SFP-S12SB1310	SFP2: OC-3 to OC-12, SR-1, 1310 nm
WRT-SFP-M20SB0850	SFP3: GigE SX, 1x and 2x FC, tri-speed SR-1 w/o DDMI, 850 nm
WRT-SFP-S20SB1310	SFP4: 1x and 2x FC, LR, 1310 nm
WRT-SFP-S10SB1310	SFP5: GigE LX, 1xFC, 1310 nm
WRT-SFP-S10SB1550	SFP6: GigE ZX, 1xFC, 1550 nm
WRT-SFP-S24SB1550	SFP7: OC-48, multi-rate, LR-2, 1550 nm
WRT-SFP-S24SB1310IR1	SFP8: OC-48, multi-rate, IR-1, 1310 nm
WRT-SFP-S24SBIR2	SFP9: OC-48, multi-rate, IR-2, 1310 nm

All statements, technical information and recommendations related to the products herein are based upon information believed to be reliable or accurate. However, the accuracy or completeness thereof is not guaranteed, and no responsibility is assumed for any inaccuracies. The user assumes all risks and liability whatsoever in connection with the use of a product or its application. JDSU reserves the right to change at any time without notice the design, specifications, function, fit or form of its products described herein, including withdrawal at any time of a product offered for sale herein. JDSU makes no representations that the products herein are free from any intellectual property claims of others. Please contact JDSU for more information. JDSU, Waveready, and the JDSU logo are trademarks of JDS Uniphase Corporation. Other trademarks are the property of their respective holders. ©2006 JDS Uniphase Corporation. All rights reserved. 30137551 Rev. 001 06/06 SFPWRT740760.DS.CMS.AE