

# DWDM Transponder (LR), 1310 Interfaces, Data Rate and Protocol Independent up to OC-48

## WSH 540



### Key Features

- 3R operation, any rate
- Data rate throttling for optical service demarcation
- Secure, low cost management communication channel: enables per-wavelength management
- Data rate independent: 55 Mb/s to 2488 Mb/s

### Applications

- DWDM reach extension
- Wavelength services and metro optical access overlay

### Compliance

- Telcordia NEBS Level 3
- GR-253-CORE, Issue 3, sections 4.1 (Physical Layer Classifications), 5.6.1 (Jitter for Regenerators), and 7 (Other Generic Criteria)
- UL 60950 Third Edition
- CAN/CSA C22.2 No. 60950-00 Third Edition

The JDSU WSH-540 is multirate, bidirectional transponder that converts 1310 nm optical signals to long reach, single mode, Dense Wavelength Division Multiplexing (DWDM) optical interfaces. The module is used with the WaveReady 3000 series platforms to enable DWDM multiplexing applications such as fiber relief, wavelength services, and metro optical DWDM access overlay on existing optical infrastructure. Thirteen of these modules can be used in conjunction with a 13 channel multiplexer/demultiplexer to support 13 DWDM channels per fiber. The channels supported are on the ITU grid.

The WSH-540 features the latest multirate clock and data recovery (CDR) technology to enable smart adaptability for bit rate and protocol independent services. Transparent data rate and typical protocols transported include: SONET/SDH, Gigabit Ethernet (GbE), and SAN (Fiber Channel, ESCON, and FICON). The module supports 3R (Reshape, Retime and Regenerate) operation at any rate.

The WSH-540 also has advanced demarcation capability for carrier service offerings. Capabilities include data rate throttling, loopback testing, and power monitoring. These functions facilitate fault location and correction, and simplify operations to enable proper service management and service level agreements.

The WaveReady communications module allows local and remote management over a cost effective and secure in-band management channel. Both TL1 and SNMP based management is supported. SNMP requires the WaveReady Node Manager application.

## 2

### Optical Specifications

Parameter	Minimum	Typical	Maximum
<b>Transport and Customer Interface Side</b>			
Input and output data rate	55 Mb/s	-	2488 Mb/s
FSK in-band management channel	-	9.6 Kb/s	-
<b>Transport Side</b>			
Input wavelength, port D	1527.99 nm	-	1563.86 nm
Output wavelength, eight DWDM frequencies, port C	All ITU C-band wavelengths		
Input sensitivity at OC-48, BER 10 <sup>-10</sup>	-	-	-28.5 dBm
Input sensitivity at 100 Base-F to GbE, BER 10 <sup>-10</sup>	-	-32 dBm	-30.0 dBm
Input overload power at BER 10 <sup>-10</sup>	-10 dBm	-	-
Wavelength/Temperature accuracy	-	-	±105 pm/°C
Dispersion penalty (70 km at OC-48 and BER 10 <sup>-10</sup> )	-	-	2 dB
Dispersion penalty (100 km at GbE and BER 10 <sup>-9</sup> )	-	-	1 dB
Output power level	-1 dBm	0 dBm	2 dBm
Jitter (generation, tolerance, transfer)	Meets GR-253/ITU-T G.958 and ANSI X3.230-1994		
<b>Customer Interface Side</b>			
Input wavelength, port A	1260 nm	-	1360 nm
Output wavelength, eight DWDM frequencies, port C	1266 nm	-	1360 nm
Input sensitivity at BER 10 <sup>-10</sup> and 100 Base-F to OC-48	-19 dBm	-	0.0 dBm
Output power level	-10 dBm	-	-3.0 dBm
Input fiber types	Single mode fiber (SMF) or multi-mode fiber (MMF)		

### Electrical Specifications<sup>1</sup>

Parameter	Minimum	Typical	Maximum
DC supply voltage	-	-48 V	10 V
Power dissipation	-	7.8 W	8.5 W
Loss of signal threshold activation	-	-	10 ms
Alarm relay signals	Dry contact major and minor alarms. Relay open under normal operation. Relay closed when power is off. Major (MAJ), Minor (MIN), Loss of Input (LOS A and LOS D) and Management (MGT)		

1. All specifications are guaranteed over the life, operating temperatures, wavelength range, and input voltage specified.

### Physical Specifications<sup>1</sup>

Parameter	Specification
Size (H x W x L)	6.8 x 1.0 x 8.8 inches (17.27 x 2.54 x 22.35 cm)
Weight (approximate)	1.4 lbs (0.635 kg)

1. All specifications are guaranteed over the life, operating temperatures, wavelength range, and input voltage specified.

**Environmental Specifications<sup>1</sup>**

Parameter	Minimum	Typical	Maximum
Operating ambient temperature	-5 °C	-	55 °C
Storage temperature	-40 °C	-	85 °C
Relative humidity (non-condensing)	5%	-	95%

1. All specifications are guaranteed over the life, operating temperatures, wavelength range, and input voltage specified.

**Interface Specifications**

Parameter	Specification
Optical	SC/PC bulkhead, SMF or MMF on input port A and output port B. SMF on input port D and output port C.
Craft	Requires WaveReady 3000 series shelf and a WaveReady communications module. TL1 or SNMP interfaces through RS-232/DB9 connector on front panel of a communications module or 10Base-T Ethernet connector on the rear of the shelf.
Front panel	Seven LEDs: Power (CARD); Major/Critical Alarm (MAJ/CRIT); Minor Alarm (MIN); Loss of input signal from the client side (LOS A); Loss of input signal from the network side (LOS D); Loop-back mode (LOOPBK); Management Channel (MGT)

**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](mailto:customer.service@jdsu.com).

**Sample: WSH-540DT24SA-023**

**WSH-540DT24SA-** 

Code	Channel Wavelength
023	1558.98 nm
025	1557.36 nm
027	1555.75 nm
031	1552.52 nm
033	1550.92 nm
035	1549.32 nm
037	1547.72 nm
045	1541.35 nm
047	1539.77 nm
049	1538.19 nm
053	1535.04 nm
055	1533.47 nm
059	1530.33 nm

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