Data Sheet

Cisco 2-Channel SFP WDM Transponder

The Cisco® 2-Channel SFP WDM Transponder expands the range of applications and platforms supported by coarse wavelength-division multiplexing (CWDM) and dense wavelength-division multiplexing (DWDM) pluggable optics solutions from Cisco Systems®. It supports any client, any protocol, and any speed between 155 Mbps (OC-3/STM-1) and 2.488 Gbps (OC-48/STM-16).

PRODUCT OVERVIEW

The Cisco 2-Channel SFP WDM Transponder (Figure 1) is an unmanaged unit that can be used to convert any incoming optical (or copper) signal into a CWDM or DWDM channel. Its flexibility in terms of data rates, protocols, and WDM options is provided by Cisco pluggable optics, which reside both on the client and trunk side.

Figure 1. Cisco 2-Channel SFP WDM Transponder

The transponder effectively extends the range of client devices that can connect to the CWDM or DWDM network using pluggable optics: third-party SONET/SDH add/drop multiplexers (ADMs), storage and Ethernet devices, or Cisco platforms that do not support pluggable WDM optics can connect to the WDM network by using this transponder, which operates the wavelength conversion from older 850/1300/1550 nanometer (nm) signals to any CWDM or DWDM channels. This conversion is enabled by the WDM Small Form-Factor Pluggable (SFP) ports sitting on the line side (Figure 2).

Figure 2. SFP Ports on the Transponder

Each transponder supports up to two CWDM or DWDM line SFP optics (plugged into the ports labeled “NTWK1” and NTWK2”) as well as two client SFP optics (plugged in the ports labeled “EQPT1” and “EQPT2”). The range of Cisco SFP optics on the transponder supports any protocol and speed between 155 Mbps and 2.488 Gbps .

The transponder is compatible with the passive Cisco CWDM chassis (Figure 3) (part number CWDM-CHASSIS-2=). Two transponder devices can coexist together in the two-slot chassis. There is no limit to the number of chassis that can be stacked in a rack. Alternatively the transponder can coexist in the same chassis with any Cisco CWDM passive filters.

Figure 3. Cisco CWDM Chassis

Table 1 lists the compatible SFP optics required by each application.

Table 1. Cisco Supported SFP Optics and Applications

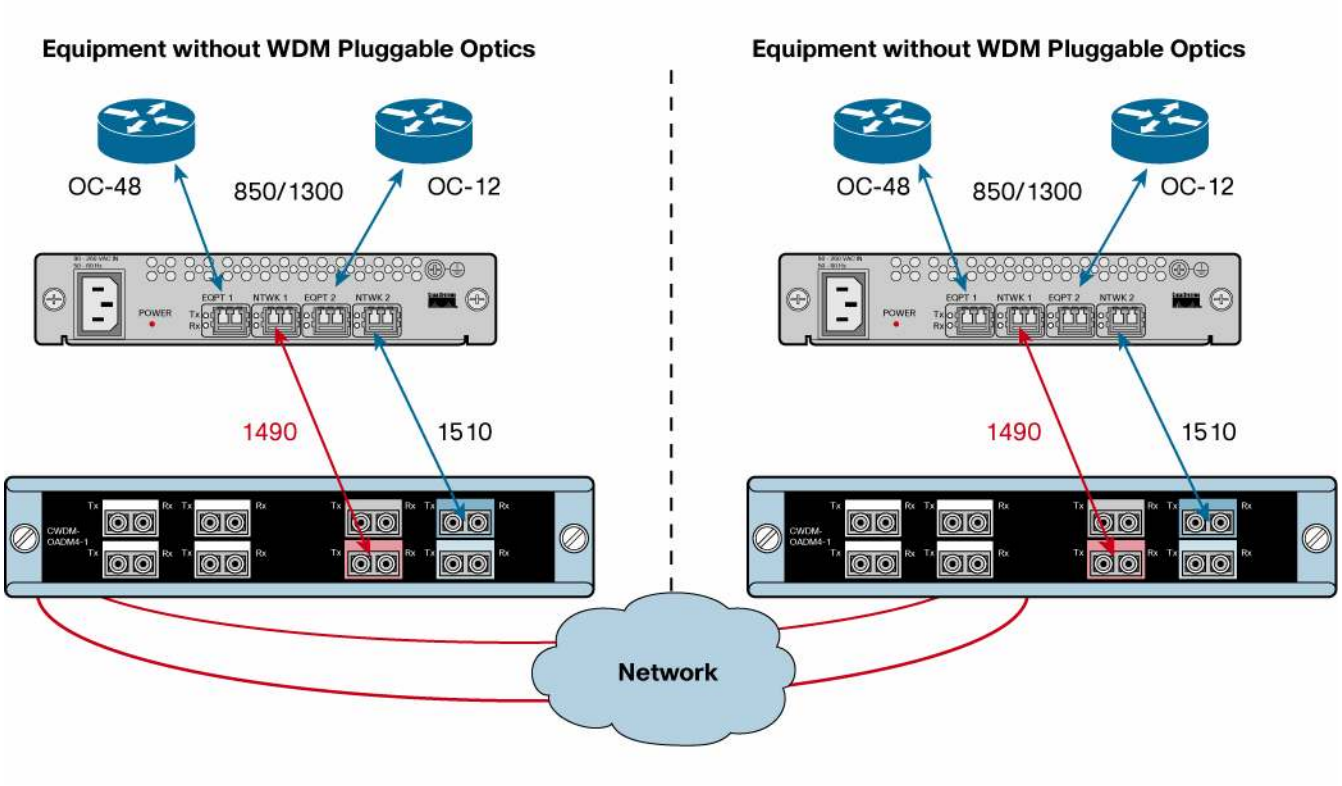
Client Protocol	Bit Rate (Mbps)	Client SFP (Product Number)	CWDM Line SFP (Product Number)	DWDM Line SFP (Product Number)
SONET/SDH	**2488**	SFP-OC48-SR	• CWDM-SFP-1470=	**SKUs with Shorter Lead Time**
		SFP-OC48-IR1	• CWDM-SFP-1490=	• ONS-SC-2G-54.1=
		SFP-OC48-LR2	• CWDM-SFP-1510=	• ONS-SC-2G-54.9=
	622	SFP-OC12-SR	• CWDM-SFP-1530=	• ONS-SC-2G-55.7=
		SFP-OC12-IR1	• CWDM-SFP-1550=	• ONS-SC-2G-56.5=
		SFP-OC12-LR1	• CWDM-SFP-1570=	• ONS-SC-2G-58.1=
		SFP-OC12-LR2	• CWDM-SFP-1490=	• ONS-SC-2G-58.9=
		SFP-OC12-MM	• CWDM-SFP-1610=	• ONS-SC-2G-59.7=
				• ONS-SC-2G-60.6=
				SKUs with Longer Lead Time
				• ONS-SC-2G-xx.x=
	155	SFP-OC3-SR	• ONS-SE-155-1470=	–
		SFP-OC3-IR1	• ONS-SE-155-1490=	
		SFP-OC3-LR1	• ONS-SE-155-1510=	
		SFP-OC3-LR2	• ONS-SE-155-1530=	
		SFP-OC3-MM	• ONS-SE-155-1550=	
			• ONS-SE-155-1570=	
			• ONS-SE-155-1590=	
			• ONS-SE-155-1610=	

Client Protocol	Bit Rate (Mbps)	Client SFP (Product Number)	CWDM Line SFP (Product Number)	DWDM Line SFP (Product Number)
Gigabit Ethernet	**1250**	GLC-LH-SM=	• CWDM-SFP-1470=	**SKUs with Shorter Lead Time**
		GLC-SX-MM=	• CWDM-SFP-1490=	• ONS-SC-2G-54.1=
		GLC-ZX-SM=	• CWDM-SFP-1510=	• ONS-SC-2G-54.9=
		GLC-T=	• CWDM-SFP-1530=	• ONS-SC-2G-55.7=
		GLC-BX-D=	• CWDM-SFP-1550=	• ONS-SC-2G-56.5=
		GLC-BX-U=	• CWDM-SFP-1570=	• ONS-SC-2G-58.1=
		SFP-GE-L=	• CWDM-SFP-1490=	• ONS-SC-2G-58.9=
		SFP-GE-S=	• CWDM-SFP-1610=	• ONS-SC-2G-59.7=
		SFP-GE-Z=		• ONS-SC-2G-60.6=
		SFP-GE-T=		**SKUs with Longer Lead Time**
Fibre Channel	**1063**	DS-SFP-FC-2G-LW=		• ONS-SC-2G-xx.x=
		DS-SFP-FC-2G-SW=		
	2125	DS-SFP-FC-2G-LW=		
		DS-SFP-FC-2G-SW=		

APPLICATIONS

The transponder is designed for situations where most of the equipment operates directly with pluggable optics, but a few platforms without WDM pluggable optics need to connect to the WDM network. Figure 4 shows an example of two sites connected through SONET links: The transponders at each location take the signals from the SONET equipment and convert them to CWDM channels, which communicate with passive Cisco CWDM devices.

Figure 4. Example Deployment Scenario



PRODUCT SPECIFICATIONS

The Cisco 2-Channel SFP WDM Transponder is an unmanaged unit that runs no software. The front-panel LEDs (Figure 5) report various alarm conditions as summarized in Table 2. Tables 3 to 5 list product and optical specifications.

Figure 5. Front-Pane LEDs

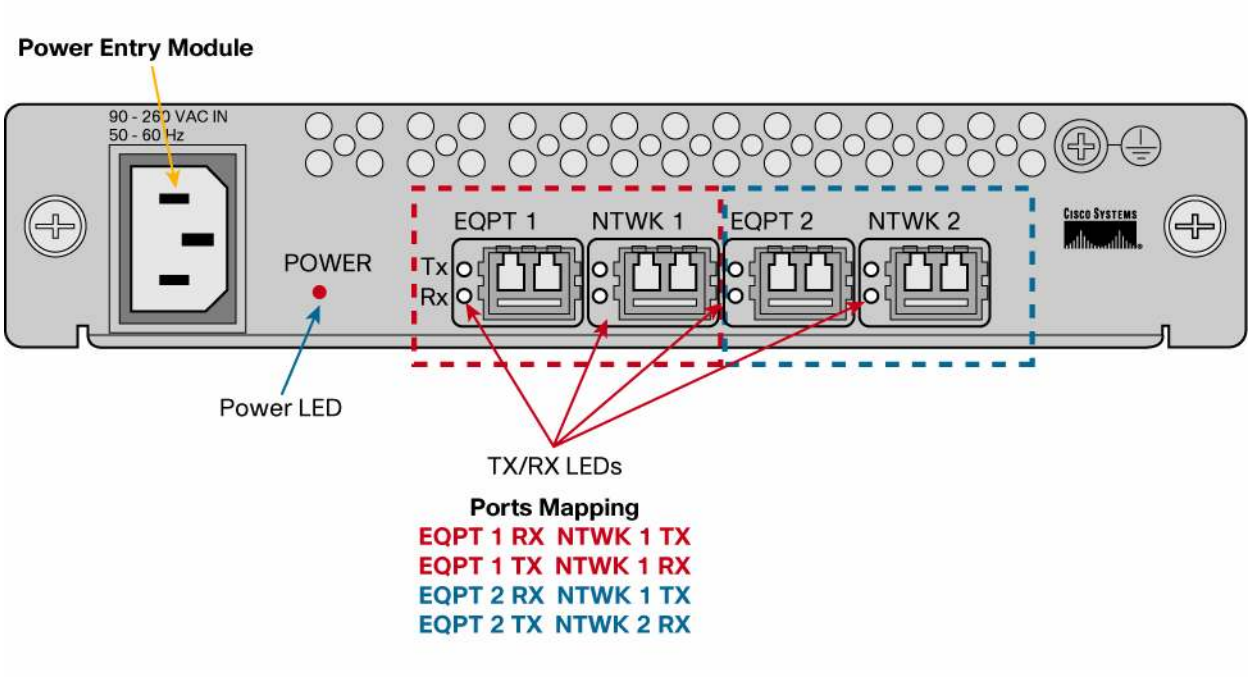


Table 2. LED Description

Led Name	Color	Description
POWER	Green	Power on
	Off	Power off
EQPT1/2 TX	Green	Equipment 1 laser on
	Red	Equipment 1 laser off
	Off	Equipment 1 SFP not present
EQPT1/2 RX	Green	Equipment 1 signal detected
	Red	Equipment 1 loss of signal
	Flashing green	Equipment 1 loss of lock
	Off	Equipment 1 SFP not present
NTWK1/2 TX	Green	Network 1 laser on
	Red	Network 1 laser off
	Off	Network 1 SFP not present

Led Name	Color	Description
NTWK1/2 RX	Green	Network 1 signal detected
	Red	Network 1 loss of signal
	Off	Network 1 SFP not present

Table 3. Product Specifications

Configuration	Number of Boxes	Memory Per Box	Disks Per Box
Electrical	Supply voltage	90–240	VAC
	Max power consumption	9.7	W
Reliability	Mean time between failures (MTBF)	24.68	Years
Mechanical	Dimensions	• 6.91 x W (faceplate 8.25) • 1.6 x H • 10 x D	Inches
	Weight (estimated with 4 x SFPs)	4–5	lbs
Environmental	Temperature	0–40	oC
Performance	Bit rate	100–2500	Mbps
	Regeneration	• 3R upstream (from client to trunk SFP) • 2R downstream (from trunk to client)	–

Table 4. CWDM SFP Optical Specification at 622 and 2488 Mbps (SONET/SDH Applications)

Parameter	Symbol	Minimum	Typical	Maximum	Units	Notes and Conditions
Transmitter Center Wavelength	$wavelength_c$	(x–4)		(x + 7)	nm	Available center wavelengths are 1470, 1490, 1510, 1530, 1550, 1570, 1590, and 1610 nm
Side-Mode Suppression Ratio	SMSR	30			dB	
Transmitter Optical Output Power	P_{out}	0		5.0	dBm	Average power coupled into single-mode fiber
Receiver Optical Input Power (BER < 10–12 with PRBS 2–7—1)	P_{in}	–28.0		–7.0	dBm	at 622 Mbps
Receiver Optical Input Power (BER < 10–12 with PRBS 2–7—1)	P_{in}	–27.0		–7.0	dBm	at 2488 Mbps
Receiver Optical Input Wavelength	$wavelength_{in}$	1450		1620	nm	
Transmitter Extinction Ratio	OMI	9			dB	
Dispersion Penalty at 100 km				3	dB	at 622 Mbps
Dispersion Penalty at 100 km				3	dB	at 2488 Mbps

Table 5. OC-3/STM-1 (155 Mbps) CWDM SFP Optical Specification

Parameter	Symbol	Minimum	Typical	Maximum	Units	Notes and Conditions
Transmitter Center Wavelength	$wavelength_c$	(x–4)		(x + 7)	nm	Available center wavelengths are 1470, 1490, 1510, 1530, 1550, 1570, 1590, and 1610 nm
Transmitter Optical Output Power	P_{out}	0		5.0	dBm	Average power coupled into single-mode fiber
Receiver Optical Input Power (BER <10–12 with PRBS 2–7—1)	P_{in}	–34.0		–7.0	dBm	at 155 Mbps
Receiver Optical Input Wavelength	$wavelength_{in}$	1450		1620	nm	
Dispersion Penalty at 100 km				1	dB	at 155 Mbps

Table 6. Multirate DWDM SFP Optical Specification

Parameter	Symbol	Minimum	Typical	Maximum	Units	Notes and Conditions
Transmitter						
Spectral Width				0.2	nm	Full width, –20dB from maximum, with resolution bandwidth (RBW) = 0.01 nm
Transmitter Center Wavelength		x – 100	x	x + 100	pm	Refer to Table 4 for center wavelengths
Side-Mode Suppression Ratio	SMSR	30			dB	
Transmitter Extinction Ratio	OMI	8.2			dB	
Transmitter Optical Output Power	P_{out}	0		4.0	dBm	Average power coupled into single-mode fiber
Receiver						
Receiver Optical Input Wavelength		1530		1565	nm	
Receiver Damage Threshold				–1	dBm	
Dispersion Tolerance		–500		1600	ps/nm	
Power-Limited Performance at OSNR of 20 dB (< 2000 Mbps) or 21 dB (> 2000 Mbps) at 0.1-nm RBW						
Optical Input Power	P_{in}	–28.0		–9.0	dBm	
Dispersion Power Penalty < 2000 Mbps				3	dB	–800/+3600 ps/nm
Dispersion Power Penalty > 2000 Mbps				3	dB	–800/+2400 ps/nm
Noise-Limited Performance at OSNR of 18 dB (< 2000 Mbps) or 19 dB (> 2000 Mbps) at 0.1-nm RBW						
Optical Input Power	P_{in}	–22.0		–9.0	dB	
Dispersion OSNR Penalty < 2000 Mbps				2	dB	-800/+3600 ps/nm
Dispersion OSNR Penalty > 2000 Mbps				3		-800/+2400 ps/nm

ORDERING INFORMATION

To place an order, visit the Cisco Ordering Home Page. Table 7 lists ordering information for the Cisco 2-Channel SFP WDM Transponder.

Table 7. Ordering Information

Product Name	Part Number
Cisco 2-Channel SFP WDM Transponder	WDM-SFP-2CH-CONV=

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