Transponders for Opti Max™ Nodes and Flex Max® Amplifiers

DOCSIS® and Value Max® Transponders

DOCSIS Transponder Technical Specifications (Note1)

Characteristic	Specification
Powering	
Power Consumption	PIN 2
Maximum	4.4 W @ +24 VDC ±5%
Typical, assuming <5% Transmit time)	<4.0 W @ +24 V, 25°C ambient
Power Conversion Efficiency (+24 V to +3.3 V, ±5%)	85%, min.; goal >90%
RF Requirements (Forward RF in Port A; Return RF out Port B)	
Input Return Loss (75 ohm nominal)	-15 dBmV to +15 dBmV, 88 to 860 MHz, min.
Output Return Loss (75 ohm nominal)	+8 dBmV to +58 dBmV, 5 to 42 MHz
Spurious from Input Return Loss (Note2)	-55 dBc 50-1000 MHz or <-35 dBmV 50 to 1500 MHz
Spurious from Output Return Loss (+40 dBmV transmitted)	-55 dBc 5-200 MHz or <-15 dBmV 5 to 200 MHz
Return Loss	Greater than 8 dB typical
I²C Requirements and EMS Interface (PIN 19 I²C clock; PIN 3 I²C Data)	
Specification	Phillips I²C Spec 2.1
Mode	I²C Master
Voltage	+3.3 VDC
eMAP Rebuild/download (Note 3)	At power up and plug-in module change
Alarm limit values (Note 4)	Default values from plug-in module at 1st power up. User values from daughter card subsequently
Indicators	
DOCSIS Functionality Indicators (LEDs 1 - 5, all green)	Power, DS, US, ONLINE (Link Activity), LOCAL (E-link Activity)
Status (LED 6, green)	Varies (see Table 1.5, in the DOCSIS Transponder Equipment Manual (P/N 1506534)
Environmental Operation	
Operating Temperature	–40 to 185°F (–40 to 85° C)
Storage Temperature	–40 to 194°F (–40 to 90° C), compliant to IEC 68
Humidity	0 to 95%, noncondensing
Physical	
Size (L x W x H)	6.0 x 1.2 x 4.84 in. (152.4 x 30.48 x 122.94 mm)
Weight (eCMM + TMB and its components), max.	16 oz. (453.59 grams), typical
Interface Connector (to node or amplifier)	CVI LUX25W3PCH32175I12 (on transponder)
Local port connector(s)	RJ-45
Programming development/Debug Connector	RJ-45 Ethernet Port (Local Port)
Tamper Switch-optical sensor type	Phototransistor sensor

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Notes:

1. The DOCSIS Transponder is presently available for the Opti Max4100 node and the Opti Max2700 node.
2. Typical OM4100 Forward DOCSIS RF levels at DC-16 Transponder pick-off are +9/+2 dBmV minimum, 860/55 MHz, with 0 dB, plug in attenuator in Transponder input. Typical OM2700 Forward DOCSIS RF levels at Transponder input are -4 dBmV/6 MHz flat, minimum.
3. eMAP download-Transponder provides function to download and display eMap data via Telenet.
4. Alarm limit values are the user alarms if a module of the same part number is substituted; default alarms if a different part is substituted. Remote Factory Reset causes the default alarms to be reloaded into the eMAP.

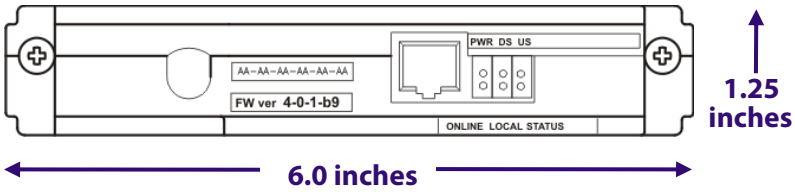
For more information, refer to the DOCSIS Transponder Installation manual, P/N1506534.

DOCSIS Transponder Dimensions

Characteristic	Uncrated Measurements	Crated Measurements
Width	6 inches (15.2 cm)	9.25 inches (23.5 cm)
Height	4.75 inches (12.1 cm)	8.25 inches (21.0 cm)
Depth	1.25 inches (3.2 cm)	3.0 inches (7.6 cm)
Weight	1.04 pounds (0.47 kg)	1.48 pounds (0.67 kg)

Side View

Top View



Value Max Transponder Technical Specifications (Note1)

Characteristic	Specification
Receiver Specifications	
Frequency Range	Agile, 48 to 162 MHz
Frequency Resolution	0.1 MHz steps
Modulation Type	FSK
Modulation Tolerance	±2 kHz
Frequency Deviation	±50 kHz or ±67 kHz
Data Rate	38.4 kbps
Data Format	asynchronous, NRZ, burst packet
Input Levels	
Maximum	+20 dBmV
Nominal	0 dBmV
Minimum	–20 dBmV
Input Return Loss (75 Ohms)	14 dB, 50 to 1002 MHz
Interference Rejection	±300 kHz, 0 dB, ±600 kHz, 20 dB
Spurious Outputs	–15 dBmV max., 50 to 1002 MHz
Transmitter Specifications	
Frequency Range	Agile, 5 to 21 MHz
Tuning Resolution	0.1 MHz steps
Frequency Tolerance	0.01%, unmodulated mark
Modulation Type	FSK
Modulation Tolerance	±2 kHz
Frequency Deviation	±50 kHz or ±67 kHz
Data Rate	38.4 kb/s
Data Format	asynchronous, NRZ, burst packet
Output Levels	
Maximum	+40 dBmV, ±3 dB (0 dB attenuation)
Minimum	+10 dBmV, ±3 dB (30 dB attenuation)
Output Attenuator	0 to 30 dB in 2 dB steps, ±1 dB
Bandwidth	300 kHz @ –40 dB, 500 kHz @ –50 dB
Output Return Loss (75 Ohms)	14 dB, 5 to 42 MHz
Spurious Outputs	–55 dBc max. relative to transponder transmit carrier or –15 dBmV max., 5 to 88 MHz (referred to a 6 MHz measurement bandwidth)
Low Frequency Disturbances (LFD), defined as power supply switching frequency, etc., below band spurious that may have harmonics to high frequencies.	<–65 dBc with transponder installed. Note: This is different from single in-band spurious requirement because these spurs are closely spaced.
Power Requirements	
Power Consumption	
Typical	40 mA @ 24 Vdc (0.96 Watt)
Maximum	42 mA @ 24 Vdc (1 Watt)
Supply Tolerance	±5%
I²C Requirements	
Specification	Phillips I²C Spec 2.1 (Not fully I²C compatible)
Mode	I²C Master
Voltage	3.3 Vdc

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Value Max Transponder Technical Specifications (Note1) continued

Characteristic	Specification
Indicator	
Green LED	Polling, status, and power indicator
Environmental Operation	
Temperature	-40 to 185° F (–40 to 85° C)
Humidity	0 to 90%, noncondensing
Physical	
Size	1.97 x 1.38 x 0.59 in. (50 x 35.5 x 15 mm)
Weight	2.5 oz. (71 grams)
Connectors	
Interface Connector	JST 15R-JET-P
Local Control Port	2 x 5, miniature, keyed
Tamper Photo Detector	
Optical Type	Photo transistor sensor

Notes:

1. The Value Max Transponder is available for the following nodes and amplifiers:
   - Opti Max4100
   - Opt Max3100
   - Opti Max2700
   - Opti Max2100
   - Opti Max1220
   - Flex Max901e/901
   - Flex Max401
   - Flex Max331
   - Flex Max220 Plus

For more information, refer to the Value Max Transponder Installation Manual, P/N 1500848.