Specifications

Note The terms "Unidirectional Path Switched Ring" and "UPSR" may appear in Cisco literature. These terms do not refer to using Cisco ONS 15xxx products in a unidirectional path switched ring configuration. Rather, these terms, as well as "Path Protected Mesh Network" and "PPMN," refer generally to Cisco's path protection feature, which may be used in any topological network configuration. Cisco does not recommend using its path protection feature in any particular topological network configuration.

This appendix contains shelf, card, and small-form factor pluggable (SFP) specifications for the Cisco ONS 15310-CL.

A.1 Shelf Specifications

This section includes hardware and software specifications.

A.1.1 Bandwidth

Total bandwidth: 2.054 Gbps

- Optical: 1.24 Gbps (2 x OC-12)
- Electrical: 188 Mbps
- Expansion: 622 Mbps (OC-12)

A.1.2 Expansion Slot

Total card slots: 1 expansion slot for CE-100T-8 and ML-100T-8 cards. A blank card (15310-EXP-FILLER) can also be plugged into the expansion slot.

A.1.3 Internal Cards

- Common Control, Timing, Cross-Connect Customer-Located (15310-CL-CTX)
- Interconnect card
- Connector expansion card

A.1.4 15310-CL-CTX

- Optical Ports
  - Two user upgradeable and hot swappable SFPs with SONET interface support
  - Support for multirate SFPs (155.520 Mbps and 622.080 Mbps)
  - Support for operating the two optical facilities at different line rates in unprotected facility mode (non 1+1 Automatic Protection Switching [APS] operation)
- T1 Ports
  - Supports GR499-compliant 1.544 Mbps (T1) interface
  - Performance monitoring is provided via the interface to allow validation of signal quality.
  - Any outgoing T1 signal can be retimed to eliminate accumulated jitter and wander at the point of egress from a synchronous network.
  - Any incoming T1 signal from the transport element can also be used as a timing source.
- T3/EC1 Ports
  - Supports GR499-compliant 44.736 Mbps (DS3) interfaces or EC1.
  - Performance monitoring is provided via the interface to allow validation of signal quality. Each port can be provisioned in any combination of T3 or EC1.
- BITS
  - Supports one BITS input and one BITS output
  - The BITS I/O ports support a 100-ohm termination for external 1.544 Mbps DS1 timing signals.
- Alarm
  - The alarm system provides three alarm inputs and two contacts for alarm outputs.
- LAN
  - Supports a 10/100 Mbps Ethernet interface for CTC/TL1 provisioning.
  - For node access in secure mode, SSL (for TL1) and HTTPS (for CTC) security protocols are supported.
- Craft Interface
  - An RS-232 Craft interface is provided and is used for TL1 provisioning.
  - The Craft interface is set to 9600 baud, no parity, and 1 stop bit by default.
- 64 kbps User Data Channel (UDC) Digital Interface
  - The 64 kbps Digital Interface provides a digital input and output.
  - Any F1 byte that is accessible on the system is interfaced at the UDC connector.
  - The UDC provides a simplex interface. Protection for UDC overhead channel(s) follows interface line protection for traffic.
  - The UDC can be enabled or disabled through the management interfaces. The default state is disabled.
  - The UDC supports a 64 kbps serial interface adaptation function to overhead byte F1.
  - The physical interface is defined in G.703 as a 120-ohm, twisted pair connection. The jitter specification is defined in G.823.

– The UDC supports a serial port interface adaptation function to overhead bytes F1. This is an RS-232 interface capable of 9.6, 19.2, 38.4, and 56 kbps operation. The rate is selectable through the management interface. The default is 56 kbps with no parity and 1 stop bit.

A.1.5 Configurations

- Two-fiber path protection
- 1+1 protection
- Path protected mesh network (PPMN)
- Add-drop multiplexer
- Point-to-point terminal mode

A.1.6 Cisco Transport Controller

- 10/100 Base-T
- 15310-CL-CTX access: RJ-45 connector

A.1.7 TL1 Craft Interface

- Speed: 9600 baud, no parity, 1 stop bit
- 15310-CL-CTX: RS-232 with RJ-45 type connector

A.1.8 LEDs

Table A-1 describes the possible LED colors and their significance.

Table A-1 LED Description

LED	Color
FAIL	Red for system failure or during initialization
ALARM	Red (Major and Critical) Amber (Minor)
PWR	Green (AC source present or both DC sources present) Amber (one DC source present)
SYNC	Green (primary and secondary reference sync) Amber (only one reference) Red (loss of both references)

A.1.9 Alarm Interface

- Visual: Critical (red LED), Major (red LED), Minor (amber LED)

- Three alarm inputs and two alarm contacts, all on the same RJ-45 connector (ALARM port)

A.1.10 DS1 Interface

- 21 DS-1 (1.544 Mbps) ports
- Connector: LFH96 (100-ohm balanced)
- Any two ports can be used as primary and secondary timing sources
- A DS01 output can be retimed to system clock on a per-port basis

The DS-1 connector pin assignments are shown in Table A-2.

Table A-2 DS-1 Connector Pin Assignments

Pin	Transmit Cable Signal Connection	Conductor Color	Pin	Receive Cable Signal Connection	Conductor Color
1	TX11-	blue-black	49	TX21-	blue-violet
2	TX11+	black-blue	50	TX21+	violet-blue
3	TX10-	gray-red	51	TX20-	gray-yellow
4	TX10+	red-gray	52	TX20+	yellow-gray
5	TX9-	brown-red	53	TX19-	brown-yellow
6	TX9+	red-brown	54	TX19+	yellow-brown
7	TX8-	green-red	55	TX18-	green-yellow
8	TX8+	red-green	56	TX18+	yellow-green
9	TX7-	orange-red	57	TX17-	orange-yellow
10	TX7+	red-orange	58	TX17+	yellow-orange
11	TX6-	blue-red	59	TX16-	blue-yellow
12	TX6+	red-blue	60	TX16+	yellow-blue
13	TX5-	gray-white	61	TX15-	gray-black
14	TX5+	white-gray	62	TX15+	black-gray
15	TX4-	brown-white	63	TX14-	brown-black
16	TX4+	white-brown	64	TX14+	black-brown
17	TX3-	green-white	65	TX13-	green-black
18	TX3+	white-green	66	TX13+	black-green
19	TX2-	orange-white	67	TX12-	orange-black
20	TX2+	white-orange	68	TX12+	black-orange
21	TX1-	blue-white	69	Unused	—
22	TX1+	white-blue	70	Unused	—
23	Unused	—	71	Unused	—
24	Unused	—	72	Unused	—
25	RX11-	blue-black	73	RX21-	blue-violet

Table A-2 DS-1 Connector Pin Assignments (continued)

Pin	Transmit Cable Signal Connection	Conductor Color	Pin	Receive Cable Signal Connection	Conductor Color
26	RX11+	black-blue	74	RX21+	violet-blue
27	RX10-	gray-red	75	RX20-	gray-yellow
28	RX10+	red-gray	76	RX20+	yellow-gray
29	RX9-	brown-red	77	RX19-	brown-yellow
30	RX9+	red-brown	78	RX19+	yellow-brown
31	RX8-	green-red	79	RX18-	green-yellow
32	RX8+	red-green	80	RX18+	yellow-green
33	RX7-	orange-red	81	RX17-	orange-yellow
34	RX7+	red-orange	82	RX17+	yellow-orange
35	RX6-	blue-red	83	RX16-	blue-yellow
36	RX6+	red-blue	84	RX16+	yellow-blue
37	RX5-	gray-white	85	RX15-	gray-black
38	RX5+	white-gray	86	RX15+	black-gray
39	RX4-	brown-white	87	RX14-	brown-black
40	RX4+	white-brown	88	RX14+	black-brown
41	RX3-	green-white	89	RX13-	green-black
42	RX3+	white-green	90	RX13+	black-green
43	RX2-	orange-white	91	RX12-	orange-black
44	RX2+	white-orange	92	RX12+	black-orange
45	RX1-	blue-white	93	Unused	—
46	RX1+	white-blue	94	Unused	—
47	Unused	—	95	Unused	—
48	Unused	—	96	Unused	—

A.1.11 DS3/EC1 Interface

- Three DS3 (44.736 Mbps)/EC1 (51.84 Mbps) ports
- Connector: 75-ohm mini-BNC connector
- Ports can be any combination of DS-3 and EC-1

A.1.12 Nonvolatile Memory

- 128 MB, Compact Flash card

A.1.13 BITS Interface

- 1 DS-1 BITS input
- 1 derived DS-1 output

A.1.14 RJ-45 Connector Pin Assignments

Table A-3 details wiring for the BITS.

Table A-3 RJ-45 Connector Pin Assignments

Pin	Connector					
	BITS	ALARM	CRAFT	UDC		LAN
				RS232 Mode	64K Mode	
1	BITS Output +	Alarm Contact Port 1 +	RTS	NC	TX +	TX +
2	BITS Output –	Alarm Contact Port 1 –	DTR	DTR	TX –	TX –
3	BITS Input +	Alarm Contact Port 2 +	TXD	TXD	RX +	RX +
4	—	Alarm Contact Port 2 –	GND	GND	GND	NC
5	—	Alarm Input Port 1	GND	GND	GND	NC
6	BITS Input –	Alarm Input Port 2	RXD	RXD	RX –	RX –
7	—	Alarm Input Port 3	DSR	NC	NC	NC
8	—	Alarm Input Common	CTS	NC	NC	NC

A.1.15 Pushbuttons

- Lamp test: when momentarily pushed, lights all LEDs on the ONS 15310-CL front panel. If an LED has more than one color, all the colors will be cycled when the lamp test button is pushed.

Note Another use for the lamp test button is to reset the CTC password to its default value (otbu+1). To reset the password, press the lamp test button for at least five seconds, release it for a maximum of five seconds, then press it again for at least five seconds. After the button is released, the default password is set.

- System reset: when pressed, performs a soft reset (does not impact traffic).

A.1.16 System Timing

- +/- 20 ppm SONET Minimum Clock (SMC) free-running internal clock
- Maintains SMC holdover (+/- 4.6 ppm for first 24 hours) in the event of reference frequency loss
- Timing reference: External BITS, line optical port, any DS-1 clock, and internal clock

A.1.17 Power Specifications

- Input power: -48 VDC (dual DC power supply model) or 100/240 VAC (AC power model)
- Maximum power consumption
  - DC chassis with no expansion board: 60W
  - DC chassis with expansion board: 115W
  - AC chassis with no expansion board: 70W
  - AC chassis with expansion board: 140W
- Power requirements: –42 to –56 VDC or 100/240 VAC (+/- 10%)
- Power terminals: Three-prong male locking connector for DC power supply model or three-prong male AC connector for AC power model

Note An ONS 15310-CL that uses DC power is classified as DC-I (DC Isolated). This means that the DC return (RET) conductor at the DC power input connector is not bonded to the chassis frame ground.

A.1.18 Environmental Specifications

- Operating Temperature: 0 to +55 degrees Celsius (32 to +131 degrees Fahrenheit) for AC chassis; -40 to +65 degrees Celsius (-40 to +149 degrees Fahrenheit) for dual DC chassis.
- Operating Humidity: 5 to 95%, non-condensing

A.1.19 Shelf Dimensions

- Height: 1 Rack Unit (RU), 1.75 inches (4.45 cm)
- Width:
  - 19.0 inches (48.3 cm)
  - 23.0 inches (58.4 cm) including rackmount brackets
- Depth:
  - 15.0 inches (38.1 cm) sheet metal only
  - 15.8 inches (40.2) including mini-BNC and DC inlet connectors
- Weight:
  - 11.5 lb. empty
  - 12.5 lb. maximum (line card installed)

A.2 Card Specifications

This section provides specifications for the cards that can be installed in the 15310-CL expansion slot: CE-100T-8, ML-100T-8, and Filler cards. For compliance information, refer to the Cisco Optical Transport Products Safety and Compliance Information document.

A.2.1 CE-100T-8 and ML-100T-8 Cards

- Environmental
  - Operating temperature

    C-Temp: 0 to +55 degrees Celsius (32 to 131 degrees Fahrenheit)
  - Operating humidity: 5 to 95%, noncondensing
  - Power consumption: 1.10A, 53 W
- Dimensions
  - Height: 176 mm (6.93 in.)
  - Width: 34.29 mm (1.35 in.)
  - Depth: 238.25 mm (9.38 in.)
  - Weight (not including clam shell): 0.499 kg (1.1 lb)

A.2.2 Filler Card

- Environmental
  - Operating temperature

    I-Temp: -40 to +65 degrees Celsius (-40 to 149 degrees Fahrenheit)
  - Operating humidity: 5 to 95%, noncondensing
- Dimensions
  - Height: 176 mm (6.93 in.)
  - Width: 34.29 mm (1.35 in.)
  - Depth: 238.25 mm (9.38 in.)
  - Card weight (not including clam shell): 0.45 kg (0.9 lb)

A.3 SFP Specifications

Table A-4 lists specifications for available small-form factor pluggables (SFPs) that can be used with the 15310-CL-CTX card. The 15310-CL-CTX card does not have a faceplate because it is located inside the chassis; therefore, the two SFP slots are located on the 15310-CL faceplate, just to the left of the LAN port.

Table A-4 SFP Specifications

SFP Product ID	Interface	Transmitter Output Power Min/Max (dBm)	Receiver Input Power Min/Max (dBm)
ONS-SI-155-L1	OC-3	–5.0 to 0	–34 to –10
ONS-SI-155-L2	OC-3	–5.0 to 0	–34 to –10
ONS-SI-155-I1	OC-3	–15 to –8.0	–28 to –8
ONS-SI-622-L1	OC-12	–3.0 to 2.0	–28 to –8

Table A-4 SFP Specifications (continued)

SFP Product ID	Interface	Transmitter Output Power Min/Max (dBm)	Receiver Input Power Min/Max (dBm)
ONS-SI-622-L2	OC-12	–3.0 to 2.0	–28 to –8
ONS-SI-622-I1	OC-12/OC-3	–15 to –8.0	–28 to –8

Table A-5 provides cabling specifications for the 15310-CL-CTX single-mode fiber (SMF) SFPs. The ports of the listed SFPs have LC-type connectors.

Table A-5 Single-Mode Fiber SFP Port Cabling Specifications

SFP Product ID	Wavelength[1]	Fiber Type	Cable Distance
ONS-SI-155-L1 Long Reach	1310 nm	9 micro SMF	50 km (31.07 miles)
ONS-SI-155-L2 Long Reach	1550 nm	9 micro SMF	100 km (62.15 miles)
ONS-SI-155-I1 Intermediate Reach	1310 nm	9 micro SMF	21 km (13.05 miles)
ONS-SI-622-L1 Long Reach	1310 nm	9 micro SMF	42 km (26.10 miles)
ONS-SI-622-L2 Long Reach	1550 nm	9 micro SMF	85 km (52.82 miles)
ONS-SI-622-I1 Intermediate Reach	1310 nm	9 micro SMF	21 km (13.05 miles)

1. Typical loss on a 1310 nm wavelength SMF is .6 dB/km.