

ECLIPSE ANSI
Platform Datasheet



Powers Wireless Backhaul Networks



Eclipse combines all PDH, SONET and Ethernet point-to-point wireless applications into a single product platform to dramatically reduce the total cost of using wireless backhaul, and change the way networks are planned, deployed and maintained.

- ① Direct Mount Antenna
- ② Compact Outdoor Unit
- ③ Low-cost Coaxial Cable Interface
- ④ Modular Nodal Indoor Unit

Eclipse Nodal Wireless Solution

Eclipse is the leading wireless backhaul solution available, combining a number of compelling features:

Software Defined

A highly scalable, software-driven architecture gives operators total control over their networks, so they can adapt to changing conditions and anticipate future needs.

Optimized Wireless Nodes

The Eclipse nodal solution supports multiple outdoor units (ODUs) with built-in traffic routing, add-and-drop, aggregation and concentration, and selectable traffic interfaces, including DS1, DS3, OC3 and 10/100 Base-T and Gigabit Ethernet.

Efficient Terminal Options

Eclipse supports a number of simple, application-specific Indoor Units to provide cost-efficient terminal solutions for the transport of DS1, OC3 and Ethernet data.

Scalable Capacity Architecture

Only pay for the capacity you need today. Super-PDH™ capacity migration enables smooth network upgrades and expansion at minimal cost and service disruption.

High-Speed Data Transport

Eclipse 'Liquid Bandwidth' supports high-speed Ethernet plus TDM traffic over a single radio channel, configurable bandwidth assignment up to 311 Mbit/s with low latency, built-in Layer 2 operation, service differentiation and QoS features.

Control and Intelligence

The Eclipse software suite enables advanced network control and intelligence through a suite of Java-based Local and Network Management tools.

System Parameters

01. General

Operating Frequency Range	5 to 23 GHz
Digital Line Rate	1.544 Mbit/s (DS1) 44.736 Mbit/s (DS3) 155.52 Mbit/s (OC-3)
Capacity Range Options	4, 8, 14, 16, 28, 32, 56, 61, 70, 84, 100, 127x 1.5 Mbit/s (DS1) 1, 2, 3, 4x 45 Mbit/s (DS3) 1, 2x 155 Mbit/s (OC-3) 6 - 360 Mbit/s Ethernet
Modulation Options	QPSK, 16, 32, 64, 128, 256 QAM
Error Correction	FEC, Reed Solomon Decoding
Adaptive Equalization	24 tap T/2 equalizer

Eclipse has it covered, whatever your wireless application.

- 5 to 23 GHz,
- PDH, SONET and Ethernet,
- QPSK to 256 QAM,
- 4x DS1 to 2x OC3,
- 6 - 360 Mbit/s Ethernet.

02. Radio Path Protection Options

Non Protected, 1+0	5 to 23 GHz
Protected Hot Standby, 1+1	5 to 23 GHz
Space Diversity, 1+1	5 to 15 GHz
Frequency Diversity, 1+1	5 to 15 GHz
Dual Path, Non-Protected, 2+0	5 to 23 GHz
Dual Path, Protected, 2+2	5 to 23 GHz

XPIC Optional
XPIC Optional
XPIC Optional

An array of flexible configuration choices, including optional diversity and XPIC co-channel support.

03. Standards Compliance

EMC	INU/INUe IDU Outdoor Units Indoor Units	EN 301 489-1, EN 301 489-4 (EN 55022 Class A) EN 301 489-1, EN 301 489-4 (EN 55022 Class B) ETS 300 019, Class 4.1 ETS 300 019, Class 3.2 ETS 300 019, Class 1.2 ETS 300 019, Class 2.3 UL 60950-1
Operation		CFR 47, Part 101
Operation		UL 50, Class 3
Storage		IEC 61000-4-5 Class 5, GR-10890-CORE 4.11 Type 1, 3, 5 & 6
Transportation		
Safety		
Radio Frequency		
Water Ingress		
Lightning Protection		

Secure and reliable operation in licensed frequency bands, with full compliance to applicable FCC, SRSP, NTIA and ITU Standards.

04. Environmental

Operating Temperature	Indoor Units INU/INUe/IDU Outdoor Units ODU	Guaranteed Extended ^[1] Guaranteed Extended ^[1]	-5° to +45° C (23° to +113° F) -5° to +55° C (23° to +131° F) -33° to +55° C (-27° to +131° F) -50° to +65° C (-58° to +149° F)
Humidity	Indoor Units Outdoor Units	Guaranteed Guaranteed	0 to 95%, Non-Condensing 0 to 100%
Altitude		Guaranteed	4,500 Meters (15,000 ft)

Eclipse designs are hardened for maximum survivability, in any and all installation environments.

Accelerated lifetime testing ensures reliable operation over the full 15 year equipment lifetime.

05. Fault and Configuration Management

Protocol	SNMP v2
Interface, Electrical	Ethernet 10/100 Base-T or RS232
Interface, Physical	RJ-45
Local/Remote Configuration and Support Tool	Eclipse Portal
Performance Monitoring	To ITU-T Rec. G.826
Routing Protocols Supported	Static and Dynamic Routing, RIP I, RIP II, OSPF
Network Management	Harris Stratex Networks ProVision or NetBoss
Engineering Orderwire	Via Optional VoIP Handset or External RS-422 Digital Orderwire Unit (eg: Ardash)

Java-based Portal local management software and ProVision Element Management system, are specifically designed to provide exceptional control for Eclipse wireless nodal networks.

06. Emission Designator

Bandwidth		2.5MHz	5MHz	10MHz	20MHz	30MHz	40MHz	50MHz
Emission Designator	QPSK QAM	N/A 2M50D7W	5M00G7W 5M00D7W	10M0G7W 10M0D7W	20M0G7W 20M0D7W	30M0G7W 30M0D7W	40M0G7W 40M0D7W	N/A 50M0D7W

07. Dispersive Fade Margin (DFM)

Capacity/ Modulation	Gross Bit Rate, Mbit/s ^[2]	Modulation Options	Symbol Rate, Mbaud	DFM, dB
4x DS1	7.0	QPSK	3.6	76
8x DS1	14.0	QPSK / 16 QAM / 32 QAM	6.98 / 3.5 / 2.8	85 / 88 / 79
16x DS1	27.3	QPSK / 16 QAM / 128 QAM	13.63 / 6.8 / 3.9	74 / 74 / 76
28x DS1, 50Mbit/s	47.2	QPSK / 16 QAM / 64 QAM	23.6 / 11.8 / 7.9	68 / 68 / 68
32x DS1, 50Mbit/s	54.2	QPSK / 16 QAM	27.1 / 13.5	60 / 71
100Mbit/s	103.8	64 QAM	17.3	50
70x DS1, 100Mbit/s	117.8	16 QAM / 32 QAM / 128QAM	29.5 / 23.6 / 16.8	56 / 55 / 53
84x DS1	140.8	32 QAM / 64 QAM	28.4 / 23.5	55 / 53
100x DS1, 150Mbit/s	168.1	16 QAM / 32 QAM / 128 QAM	42.0 / 33.6 / 24.0	52 / 52 / 50
127xDS1, 200Mbit/s	231.6 / 230.3 / 210.4	64 QAM / 128QAM / 256 QAM	38.6 / 32.9 / 210.4	37 / 47 / 40
1x DS3	48.9	QPSK / 16 QAM / 64 QAM	24.5 / 12.2 / 8.2	67 / 67 / 68
3x DS3	145.6	64 QAM	24.3	52
4x DS3	188.8	64 QAM	31.5	43
1x OC3, 150Mit/s	167.0	16 QAM / 64QAM / 128 QAM	41.8 / 27.8 / 23.9	52 / 52 / 52
260 Mbit/s	280.0	256 QAM	35.0	40
2x OC3, 310Mbit/s	334.0	256 QAM	41.8	40
330 Mbit/s	336.0	256 QAM	42.0	40
360 Mbit/s	384.0	256 QAM	48.0	40

Eclipse standard features include adaptive equalization, and forward error correction with interleaving, for superior performance in the most demanding propagation conditions.

All specifications are typical values unless otherwise stated, and are subject to change without notice.

01. Over full Extended Operating Temperature Eclipse may be subject to reduced performance. Contact Harris Stratex Networks for more details.

02. Gross bit rate includes usable customer payload plus radio overhead for FEC, NMS, AUX traffic, etc.

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Eclipse Indoor Units provide a simple and economical solution for terminal configurations, where support for only one radio path is required. IDU options are available for software configurable transport of DS1, OC3 and Ethernet traffic.



IDU 20x

Supports software scalable, enhanced PDH link capacities between 4 and 32x DS1.

IDU 155o

SONET IDU that enables transport of a single OC3 channel using selectable 16, 64 or 128 QAM modulation.

IDU ES

Combines 4x 10/100 Base-T Ethernet traffic and up to 8x DS1 wayside channels, with programmable aggregate link speeds up to 200 Mbit/s.

IDU GE 20x

Combines 3x Gigabit Ethernet ports (two electrical and one optical) with up to 20xDS1 TDM channels, and programmable aggregate link speeds up to 360 Mbit/s.

Eclipse Terminal, Indoor Unit (IDU) Options

01. General

Configuration memory, removable			Up to 128 Mbyte CompactFlash card (rear access)
LED Indicators			2x Tri-state LEDs ('IDU Status', 'ODU Status')
Line Interface, DS1 electrical	Standards Compliance		Compliant to ITU-T Rec. G.703, G.823
	Line Code		AMI or B8ZS
	Impedance		100Ω balanced
IF Cable Connector		Transmit	N-Type
IF Interface Parameters		Receive	311 MHz, -8 to -12 dBm
			126 MHz, -8 to -27 dBm
Protection Connector (where available)			9 pin D-SUB
Auxiliary Data ^[1]	Aux Data Channels		1
	Interface		RS232 or RS422
	Line Rate, configurable		1.2 to 19.2 kbps, asynchronous
			64 kbit/s, synchronous
	Connector type		9 pin D-SUB
Alarm I/O	External Alarm Inputs		2x TTL
	External Alarm Outputs		4x Form C Relay
	Connector type		15 pin D-SUB
NMS LAN interface	Type		10/100 Base-T Ethernet
	Connector		8-pin RJ45
Serial Maintenance Interface	Standard		Complies to TIA/EIA-561
	Speed		1.2 to 115.2 Kbit/s
	Connector		8-pin RJ45
Electrical	Input Voltage Range		-40.5 to -60.0 VDC
	Power Consumption		12 W
	Protection Circuit		5A Slow-Blow Fuse
Mechanical	Dimensions		44mm (1RU)x 482mm (19in) x 277mm (10.9in)
	Weight		1.6 kg (3.5 lb)

02. IDU options

Capacity Options (configurable)	IDU 20x	IDU 155o
Modulation Options (configurable)	4, 8, 16, 28, 32x 1.544 Mbit/s (DS1)	1x 155.52 Mbit/s (OC3)
Traffic Connectors	QPSK, 16 to 128 QAM	16, 64, 128 QAM
Configuration Options	20x RJ45	SC ^[2]
	Non Protected (1+0)	Non Protected (1+0)
	Protected Hot Standby (1+1)	Protected Hot Standby (1+1)
	Protected Space Diversity (1+1)	Protected Space Diversity (1+1)

03. IDU Ethernet options

Capacity Options (configurable by downloadable License)	IDU ES	IDU GE 20x
Modulation Options (configurable)	50, 100, 150, 200 Mbit/s	50, 100, 150, 200, 260, 330, 360 Mbit/s
Ethernet Traffic Interface, electrical	QPSK, 16, 32, 64, 128, 256 QAM	QPSK, 16, 32, 64, 128, 256 QAM
	4x 10/100 Base-T	2x 10/100/1000 Base-T
	4x 8-pin RJ45	2x 8-pin RJ45
Ethernet Traffic Interface, optical (optional)		1x optical IEEE 802.3z 1000 Base-LX
Frame sizes supported	64 - 1536 bytes	1x LC (SFP) ^[3]
Wayside Traffic Channels	8x 1.544 Mbit/s (DS1)	64 - 9600 bytes
	8x RJ45	20x 1.544 Mbit/s (DS1)
Configuration Options	Non Protected (1+0)	20x RJ45
		Non Protected (1+0)
		Protected Hot Standby (1+1)
		Protected Space Diversity (1+1)

All specifications are typical values unless otherwise stated, and are subject to change without notice.

01. AUX channel not supported by IDU GE 20x.

02. For IDU 155o optical interface specifications refer to the Optical Interface Parameters under Transparent DAC Options.

03. For IDU GE 20x optical interface specifications refer to the DAC GE Optical Interface Parameters.

Eclipse Node, Intelligent Node Unit (INU) Common Units

01. IDC, Indoor Chassis 1RU

Dedicated plug-in card slots

Universal plug-in card slots

Maximum number of ODUs supported

Dimensions (including mounting brackets)

Weight

Empty

2 (NCC, FAN)
4
3
44mm (1RU) x 482mm (19in) x 282.5mm (11.1in)
2.6 kg (5.8 lb)

02. IDCe, Extended Indoor Chassis 2RU

Dedicated plug-in card slots

Universal plug-in card slots

Maximum number of ODUs supported

Dimensions (including mounting brackets)

Weight

Empty

4 (NCC, NPC, 2x FAN)
9
6
88mm (2RU) x 482mm (19in) x 282.5mm (11.1in)
4.8 kg (10.6 lb)

03. NCC, Node Controller Card

NMS LAN interface

Serial Maintenance Interface

Configuration memory, removable

Electrical

Type
Connector
Standard
Speed
Connector

4-port 10/100baseT Hub
4x 8-pin RJ45
Complies to TIA/EIA-561
1200 bit/s to 115.2 kbit/s
8-pin RJ45
Up to 128 Mbyte CompactFlash card (on-board)
-40.5 to -60 VDC
25A fast-acting ceramic body cartridge
< -70 VDC
-32 VDC
2-pin DSUB power type
< 4 W
2x Tri-state ('Test', 'Status')
22mm (0.5RU) x 260mm (10.2in) x 268mm (10.6in)
0.6 kg (1.35 lb)

Power consumption (including DC/DC efficiency)

LED Indicators

Dimensions (including front panel and rear connector)

Weight

04. NPC, Node Protection Card

Electrical

DC Supply input range
DC Fuse type and rating
Over voltage protection
Under voltage protection
DC connector type

-40.5 to -60 VDC
25A fast-acting ceramic body cartridge
< -70 VDC
-32 VDC
2-pin DSUB power type
< 4 W
2x Tri-state ('Protect', 'Status')
22mm (0.5RU) x 130mm (5.1in) x 268mm (10.6in)
0.4 kg (0.88 lb)

Power consumption (including DC/DC efficiency)

LED Indicators

Dimensions (including front panel and rear connector)

Weight

05. FAN, Fan Card

Fans

LED Indicators

Power consumption

Dimensions (including front panel and rear connector)

Weight

2
1x Red LED ('Fault')
< 2 W
44mm (1RU) x 40mm (1.6in) x 264mm (10.4in)
0.23 kg (0.5 lb)

06. FAN, Fan Card 2RU

Fans

LED Indicators

Power consumption

Dimensions (including front panel and rear connector)

Weight

2
1x Red LED ('Fault')
< 4 W
88mm (2RU) x 40mm (1.6in) x 264mm (10.4in)
0.46 kg (1.0 lb)

07. AUX, Auxiliary Services Card

Aux Data Channels

Interface

Line Rate

Aux Data Connector

External Alarm Inputs

External Alarm Outputs

Alarms Connector

LED Indicators

Power consumption

Dimensions (including front panel and rear connector)

Weight

Asynchronous
Synchronous

TTL Inputs

TTL input thresholds

Form C Relays (NC)

3
RS232 or RS422
1.2 to 19.2 kbit/s
64 kbit/s
High Density DSUB26
Up to 6 [1]
0.8V min low, 2.0V min high
Up to 4 [1]
High Density DSUB15
1x Tri-state ('Status')
< 3 W
22mm (0.5RU) x 130mm (5.1in) x 268mm (10.6in)
0.35 kg (0.77 lb)

The Eclipse Intelligent Node Unit (INU) and Extended INU (INUe) provide optimized wireless nodal networking, supporting multiple radio paths from a single unit. Each node consists of a standard Chassis equipped with common cards listed below. Additional hot-swappable Radio (RAC) and Data Access (DAC) Cards are added to provide required node functionality.



Node Controller Card (NCC)

Provides node management and control, primary DC power, and interfaces for Portal and NMS. A removable Compact Flash card holds configuration data and software License.



Node Protection Card (NPC)

Provides redundancy for the NCC control and DC power supply functions for higher reliability nodes.



Fan Card (FAN)

The FAN module includes two long-life axial fans to provide forced air cooling. One FAN is fitted in the INU; two FANS in the INUe.



Auxiliary Services Card (AUX)

The AUX card provides user configurable auxiliary data channels and alarm input/output (I/O) options. One or more AUX cards can be fitted to a node.

All specifications are typical values unless otherwise stated, and are subject to change without notice.

01. For applications requiring additional alarm inputs or outputs, multiple AUX cards can be installed if free INU/INUe slots are available. Optional stand-alone Alarm Interface Unit is available. Contact Harris Stratex Networks for further details.

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RACs provide the conversion of TDM and Ethernet traffic for interfacing between the node and an ODU. Functions include modulation/demodulation, FEC, adaptive equalization, IF conversion, IF loopback and automatic protection switching for hot standby, diversity and ring configurations.



RAC 30

Supports software configurable capacities up to 100x DS1, 3x DS3 or 1x OC3, modulations from QPSK to 128 QAM and bandwidths up to 30 MHz.



RAC 3X

Supports capacity options requiring channel bandwidths greater than 30 MHz, with modulations up to 256 QAM, including higher capacities up to 2x OC3.



RAC 40

Provides co-channel operation with cross-pole interference cancellation (XPIC), for selected capacity options with bandwidths up to 30 MHz and modulations to 128 QAM.



RAC 4x

Combines the functions of the RAC 3X and RAC 40 cards, by providing co-channel operation with cross-pole interference cancellation (XPIC), for selected capacity options with bandwidths up to 56 MHz and modulations to 256 QAM.

Radio Access Cards (RAC)

01. General

IF connector		SMA ^[1]
IF interface	Transmit	311 MHz, -8.0 to -12.0 dBm
	Receive	126 MHz, -8 to -27 dBm
LED Indicators		2x Tri-state ('Online', 'Status')
Dimensions (including front panel and rear connector)		22mm (0.5RU) x 130mm (5.1in) x 268mm (10.6in)
Weight		< 0.38 kg (0.84 lb)
Secondary Lightning protection		Gas tube, 150 V

02. RAC 30

Capacities supported	4-100x DS1, 1-4x DS3, 1x OC3, 6 - 150 Mbit/s Ethernet
Modulations supported	QPSK, 16, 32, 64, 128, 256QAM
Power consumption	8 W

03. RAC 3X (>30Mbaud)

Capacities supported	32, 70, 84, 100xDS1, 4x DS3, 1-2x OC3, 50 - 310 Mbit/s Ethernet
Modulations supported	16, 64, 128, 256 QAM
Power consumption	< 6.5 W

04. RAC 40 with XPIC

Capacities supported	70, 84, 100x DS1, 1x OC3, 100 - 150 Mbit/s Ethernet
Modulations supported	32, 64, 128 QAM
XPD Improvement	20 dB
XPIC connectors	2x SMB
Power consumption	12 W

05. RAC 4X with XPIC

Capacities supported	127xDS1, 1-2x OC3, 200 - 310 Mbit/s Ethernet
Modulations supported	16, 64, 128, 256 QAM
XPD Improvement	20 dB
XPIC connectors	2x SMB
Power consumption	12 W

All specifications are typical values unless otherwise stated, and are subject to change without notice.
01. RAC Installation Kit includes 3 meter jumper cable, SMA to N-type.

Data Access Cards (DAC)

01. General

LED Indicators	1x Tri-state ('Status')
Power consumption (nominal)	< 3 W
Dimensions (including front panel and rear connector)	22mm (0.5RU) x 130mm (5.1in) x 268mm (10.6in)
Weight (nominal)	< 0.34 kg (0.74 lb)

02. Transparent DAC Options

Interface, configurable	DAC 4x DAC 16x DAC 3xDS3M DAC 155o DAC 2x155o DAC 2x155e Standards Compliance	Electrical Electrical Electrical Optical Optical Electrical DS1, DS3 OC3 Line code DS1 DS3 OC3 Connectors DAC 4x DAC 16x DAC 3xDS3M DAC 2x155e DS3, OC3 OC3	1 to 4x 1.544 Mbit/s (DS1) 1 to 16x 1.544 Mbit/s (DS1) 1 to 3x 44.736 Mbit/s (DS3) 1x 155.52 Mbit/s (OC3) 1 or 2x 155.52 Mbit/s (OC3) 1 or 2x 155.52 Mbit/s (OC3) Compliant to ITU-T Rec. G.703, G.823 Compliant to ITU-T Rec. G.703, G.825 AMI or B8ZS B3ZS G703/CMI RJ45 48 pin mini-RJ21 Slimline BNC BNC 75Ω unbalanced Compliant to ITU-T Rec. G.957, G.825 Short Range S-1.1 SC
Electrical interface parameters	Standards Compliance Optical interface Connectors Tx Output Center Wavelength, λ_c Tx Average Optical Output Power, P_o Rx Input Operating Center Wavelength, λ_c Rx Sensitivity, P_{in} Rx Input Power Saturation, P_{in}	Standards Compliance Optical interface Connectors Tx Output Center Wavelength, λ_c Tx Average Optical Output Power, P_o Rx Input Operating Center Wavelength, λ_c Rx Sensitivity, P_{in} Rx Input Power Saturation, P_{in}	1261 to 1310 nm -15 to -8 dBm 1100 to 1600 nm -34 dBm -7 dBm
Optical interface parameters	Standards Compliance Optical interface Connectors Tx Output Center Wavelength, λ_c Tx Average Optical Output Power, P_o Rx Input Operating Center Wavelength, λ_c Rx Sensitivity, P_{in} Rx Input Power Saturation, P_{in}	Standards Compliance Optical interface Connectors Tx Output Center Wavelength, λ_c Tx Average Optical Output Power, P_o Rx Input Operating Center Wavelength, λ_c Rx Sensitivity, P_{in} Rx Input Power Saturation, P_{in}	1261 to 1310 nm -15 to -8 dBm 1100 to 1600 nm -34 dBm -7 dBm

03. SONET Multiplexer DAC Options

Interface	Optical	1x 155.52 Mbit/s (OC3) 1x OC3 (Interface) to 84x DS1 (TDM Bus) Mux Long Range L1.1
Functionality	Standard	
Optical interface type (hot-swappable SFP)	Optional Connectors	Intermediate Range (IR) LC Long Range L1.1
Optical interface parameters	Tx Output Center Wavelength, λ_c Tx Average Optical Output Power, P_o Rx Input Operating Center Wavelength, λ_c Rx Sensitivity, P_{in} Rx Input Power Saturation, P_{in} Maximum Range	1261 to 1360 nm -15 to -8 dBm 1260 to 1600 nm -34 dBm 0 dBm 40 km 15 km
Timing modes, configurable		Loop Time (Clock recovered from received OC3) Local Reference Clock (XO)

04. Ethernet DAC Options

Transport channels	DAC ES 2	DAC GE 2
Throughput capacity, per channel	1.5 - 98 Mbit/s, 1.5 Mbits/s increments	1.5 to 150 Mbit/s 1.5 Mbit/s increments 155 or 311 Mbit/s
Ethernet Traffic Interface, electrical	Interfaces Connectors 4x 10/100 Base-T 4x 8-pin RJ45	3x 10/100/1000 Base-T 3x 8-pin RJ45
Ethernet Traffic Interface, optical	Interfaces Connectors	1x optical IEEE 802.3z 1000 Base-LX 1x LC (SFP)
Optical interface parameters	Tx Output Center Wavelength, λ_c Tx Average Optical Output Power, P_o Rx Input Operating Center Wavelength, λ_c Rx Sensitivity, P_{in} Rx Input Power Saturation, P_{in}	1270 to 1355 nm -9.5 to -3 dBm 1260 to 1610 nm -20 dBm -3 dBm
LED Indicators	1x Tri-state ('Status')	1x Tri-state ('Status')
Frame sizes supported	64 - 1536 bytes	64 - 9600 bytes

DACs provide customer traffic access for full termination of payload traffic or partial add and drop node configurations. DACs provide transparent mapping or optional multiplexing of TDM or Ethernet data from the INU backplane, and are independent of link or node capacity.



DAC NxDS1

DAC options provide either 4x DS1 or 16x DS1 interfaces per card.



DAC 3xDS3M

A configurable multi-function DAC, providing three transparent DS3 interfaces, or two M13 interfaces (multiplexing 28xDS1 to 1xDS3 on the front interface).



DAC NxOC3

SONET DAC options provide one or two optical 155 Mbit/s interfaces, or two 155 Mbit/s electrical interfaces.



DAC ES

Provides 4x 100 Base-T Fast Ethernet interfaces, with configurable aggregate throughput capacity from 6 to 152 Mbit/s interfaces.



DAC GE

Provides 3x 1000 Base-T and one optical IEEE 802.3z 1000 Base-LX Gigabit Ethernet interfaces, with configurable aggregate throughput capacity up to 311 Mbit/s.

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Eclipse Outdoor Units

Eclipse ODUs are compact, fully environmentally sealed units that are entirely independent of link capacity and payload. Wideband diplexers also provide a wide tuning range via software to increase flexibility and minimize sparing.

ODU options are available with differing maximum capacity and RF performance specifications. All ODUs are designed to mount directly to the antenna, and connect to the INU/IDU by a single coaxial cable.

ODU300

Delivers *High Performance* operation with QPSK to 256 QAM modulation and scalable capacity up to 127xDS1, 2xOC3, or 360Mbit/s of Ethernet data in licensed frequency bands from 5 to 23 GHz.



General ODU Specifications

01. General

Frequency Band options
Capacity support

Modulation support
Lightning Protection

ODU300

5, L6, U6, 7, 8, 10, 11, 15, 18, 23 GHz
4, 8, 16, 28, 32, 56, 61, 70, 84, 100, 127x DS1
1 to 6x DS3
1 to 2x OC3
6 - 360 Mbit/s Ethernet
QPSK, 16, 32, 64, 128, 256 QAM
ODU300hp: standard internal; ODU300ep: optional external

02. IF Specifications

Intermediate Frequency

Transmit

311 MHz

Receive

126 MHz

INU/IDU to ODU IF Cable, recommended

CNT-300 Type

0.3 inch/copper braid/solid copper centre conductor, 50Ω

Maximum IF Cable length 150 meters (500 ft)

CNT-400 Type

0.4 inch/copper braid/copper clad aluminum centre conductor, 50Ω

Maximum IF Cable length 300 meters (1,000 ft)

03. ODU Interfaces

IF cable connector

N-Type

AGC monitor point

BNC

Antenna port Interface

5 GHz

Coax, 7/16 DIN F

Antenna port Interface

6-23 GHz

Standard EIA rectangular waveguide, refer to ODU System specifications

Polarisation, field selectable

Vertical (standard) or Horizontal

Antenna Mounting

5 GHz, Standard
Standard

Remote mount via coax connection

Proprietary direct mount for antenna diameters 0.3 to 1.8m (1 to 6ft)

Remote mount for antenna diameters >1.8m (>6ft)

Optional

Remote mount via flex/elliptical waveguide

04. General Transmitter Specifications

Transmit Power Tolerance

5 to 23 GHz

± 2 dB

Transmitter Source

Synthesized

Frequency Stability

± 10 ppm

Manual Transmitter Power Control range

5 GHz

6-23 GHz

QPSK

30 dB

20 dB

16 QAM

26 dB

18 dB

32 QAM

25.5 dB

17.5 dB

64 QAM

25 dB

17 dB

128 QAM

24 dB

16 dB

256 QAM

22 dB

14 dB

Resolution

0.1 dB steps

Accuracy

± 2 dB

Automatic Transmitter Power Control

Range

Configurable over full available manual attenuation range

Resolution / Speed

0.1 dB steps / 6 dB per second

Transmitter Mute

> 50 dB

Channel Selection

By software control within tuning range of ODU

Synthesizer Resolution

0.25 MHz

General ODU Specifications (contd.)

05. General Receiver Specifications

Receiver Source		Synthesized
Frequency Stability		± 10 ppm
Receiver Overload	BER = 1×10^{-6}	-22 dBm
Residual (Background) Bit Error Rate		Better than 10^{-13}
RSSI Accuracy ^[1]	-40 to -70 dBm, 0 to +35°C	± 2 dB
	-25 to -85 dBm, -33 to +55°C	± 4 dB

06. Additional Protection Losses

	Frequency Band	Main Channel	Protection Channel
Coupler option	5 GHz / 6 to 18 GHz / 21 to 23 GHz	1.5 dB / 1.6 dB / 1.8 dB	6.4 dB / 6.6 dB / 6.8 dB

07. Electrical

ODU 300 Power Consumption, nominal	5 GHz / 6-23 GHz	40 W / 30 W
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08. Mechanical

	Size (HxWxD)	Weight
ODU300, 5 GHz	287mm (11.3 in) x 287mm (11.3 in) x 175mm (6.9 in)	8.3 kg (18.7 lb)
ODU300, 6-23 GHz	287mm (11.3 in) x 287mm (11.3 in) x 119mm (4.7 in)	6.4 kg (14 lb)
ODU Protection Splitter/Coupler (RW)	555mm (22.0 in) x 215mm (8.5 in) x 75mm (3.0 in)	7.5 kg (16.5 lb)
ODU Protection Splitter/Coupler (P)	535mm (21.0 in) x 210mm (8.25 in) x 100mm (4.0 in)	9.0 kg (19.8 lb)

All specifications are typical values unless otherwise stated, and are subject to change without notice.

01. RSSI accuracy is only valid when there is no unwanted signal or potential interferer present within ±30MHz of the RX frequency.

ODU300 System Specifications

				5 GHz [®]	L6/U6 GHz	7/8 GHz	10 GHz	11 GHz	15 GHz	18 GHz	23 GHz
01. System											
Frequency Range, GHz				4.4 - 5.0	5.925 - 7.11	7.125 - 8.275	10.5 - 10.68	10.7 - 11.7	14.4 - 15.35	17.7 - 19.7	21.2 - 23.632
T-R Spacings supported, MHz				300, 312	160, 170, 252.04, 340	150, 175, 300	65	490, 500	475, 640	1560	600, 1200
Standard				NTIA Red Book EN 302 217	FCC Part 101 SRSP 306.4	SRSP 307.1 SRSP 307.7 NTIA Red Book	FCC Part 101 SRSP 310.5	FCC Part 101 SRSP 310.7	SRSP 314.5 NTIA Red Book	FCC Part 101 SRSP 317.8	FCC Part 101 SRSP 321.8
Maximum Tuning Range (dependent upon T-R spacing), MHz				56	56	140	165	165	245	380	370
02. Antenna Interface											
Waveguide Type				N/A	R70 (WR137)	R84 (WR112)	R100 (WR90)	R100 (WR90)	R140 (WR62)	R220 (WR42)	R220 (WR42)
Flange Type				Coax	UDR70	UDR84	UDR100	UDR100	UBR140	UBR220	UBR220
Mating Flange Type				7/16"	PDR70 or CDR70	PDR84 or CDR84	PDR100 or CDR100	PDR100 or CDR100	PBR140 or CBR140	PBR220	PBR220
03. System Gain											
System Gain at 10 ⁻⁶ BER ⁽¹⁾	4xDS1	5 MHz	QPSK	124.0 dB	122.5 dB	122.5 dB			115.5 dB	112.5 dB	112.5 dB
	8xDS1	10 MHz	QPSK	121.5 dB		120.0 dB			113.0 dB	110.0 dB	110.0 dB
	8xDS1	5 MHz	16 QAM					109.5 dB	107.0 dB	104.5 dB	104.0 dB
	8xDS1	3.75 MHz	32 QAM		111.0 dB		103.5 dBm	106.0 dB			
	16xDS1	20 MHz	QPSK	118.5 dB		116.5 dB			109.5 dB	107.0 dB	106.5 dB
	16xDS1	10 MHz	16 QAM	110.5 dB		111.0 dB		106.0 dB	104.0 dB	101.0 dB	101.0 dB
	16xDS1	5 MHz	128 QAM		102.0 dB		95.0 dB	97.5 dB			
	28xDS1/1xDS3	30 MHz	QPSK			114.5 dB			107.5 dB	104.5 dB	104.5 dB
	28xDS1	20 MHz	16 QAM	108.5 dB		108.5 dB			101.5 dB	99.0 dB	98.5 dB
	28xDS1, 1xDS3, 50 Mbit/s	10 MHz	64 QAM	103.0 dB	103.0 dB	103.0 dB		98.5 dB	96.0 dB	93.5 dB	93.0 dB
	32xDS1, 50 Mbit/s	40 MHz	QPSK						109.0 dB	106.5 dB	106.0 dB
	32xDS1, 50 Mbit/s	20 MHz	16 QAM	107.5 dB		108.0 dB			101.0 dB	98.0 dB	98.0 dB
	100 Mbit/s	20 MHz	64 QAM	99.5 dB	99.5 dB	99.5 dB		95.0 dB	92.5 dB	90.0 dB	89.5 dB
	70xDS1, 100 Mbit/s	40 MHz	16 QAM						100.0 dB	97.5 dB	97.0 dB
	70xDS1, 100 Mbit/s	30 MHz	32 QAM	101.5 dB		101.5 dB		97.0 dB	94.5 dB	92.0 dB	91.5 dB
	70xDS1, 100 Mbit/s	20 MHz	128 QAM	95.5 dB	96.0 dB	96.0 dB		91.0 dB	89.0 dB	86.0 dB	86.0 dB
	84xDS1	40 MHz	32 QAM					98.5 dB	96.5 dB	93.5 dB	93.5 dB
	84xDS1/3xDS3	30 MHz	64 QAM	98.0 dB	98.0 dB	98.0 dB		93.5 dB	91.0 dB	88.5 dB	88.0 dB
	100xDS1, 1xOC3, 150 Mbit/s	50/80 MHz	16 QAM							92.5 dB	92.5 dB
	100xDS1, 150 Mbit/s	40 MHz	32 QAM					96.0 dB	94.0 dB	91.0 dB	91.0 dB
	1xOC3, 150 Mbit/s	40 MHz	64 QAM					95.0 dB	92.5 dB	90.0 dB	89.5 dB
	100xDS1, 1xOC3, 150 Mbit/s	30 MHz	128 QAM	94.0 dB	94.0 dB	94.0 dB		89.5 dB	87.0 dB	84.5 dB	84.0 dB
	1xOC3, 150 Mbit/s ⁽²⁾	30 MHz	128 QAM	95.5 dB	95.5 dB	95.5 dB		91.0 dB	88.5 dB	86.0 dB	85.5 dB
	127xDS1, 200 Mbit/s	50/80 MHz	64 QAM							88.0 dB	87.5 dB
	127xDS1, 200 Mbit/s	40 MHz	128 QAM					89.5 dB	87.5 dB	84.5 dB	84.5 dB
	127xDS1, 200 Mbit/s	30 MHz	256 QAM	88.0 dB	88.0 dB	88.0 dB		83.0 dB	81.0 dB	78.0 dB	78.0 dB
	4xDS3	40 MHz	64 QAM					87.0 dB	85.0 dB	82.0 dB	82.0 dB
	4xDS3	30 MHz	256 QAM	89.0 dB	89.0 dB	89.0 dB		84.0 dB	82.0 dB	79.0 dB	79.0 dB
	260 Mbit/s	40 MHz	256 QAM					82.0 dB	79.5 dB	77.0 dB	76.5 dB
	2xOC3, 310 Mbit/s	50/80 MHz	256 QAM							76.5 dB	76.5 dB
	330 Mbit/s	50/80 MHz	256 QAM							76.0 dB	75.5 dB
	360 Mbit/s	80 MHz	256 QAM							75.5 dB	

All specifications are referenced to the ODU antenna flange, and are typical values unless otherwise stated, and are subject to change without notice. For Guaranteed values (over time and operational range) subtract 2 dB from Power Output, add 2dB to Threshold values, and subtract 4dB from System Gain values.

01. System Gain & Threshold values are for BER=10⁻⁶. Values for BER=10⁻³ are improved by 1dB.

02. High System Gain option (+1.5dB) is available as standard on the RAC 40 and as an option on the RAC 30v3.

03. For switchable diplexer option, 5GHz system gain is reduced by 4 dB.

ODU300 Transmit and Receive Specifications

5 GHz L6/U6 GHz 7/8 GHz 10 GHz 11 GHz 15 GHz 18 GHz 23 GHz

01. Transmitter Specifications

Power Output, nominal	QPSK	30.5 dBm	28.5 dBm	28.5 dBm		24.0 dBm	22.0 dBm	19.5 dBm	19.5 dBm
	16 QAM	26.5 dBm	26.5 dBm	26.5 dBm		22.0 dBm	20.0 dBm	17.5 dBm	17.5 dBm
	32 QAM	26.0 dBm	26.0 dBm	26.0 dBm	22.0 dBm	21.5 dBm	19.5 dBm	17.0 dBm	17.0 dBm
	64 QAM	25.5 dBm	25.5 dBm	25.5 dBm		21.0 dBm	19.0 dBm	16.5 dBm	16.5 dBm
	128 QAM	24.5 dBm	24.5 dBm	24.5 dBm	20.5 dBm	20.0 dBm	18.0 dBm	15.5 dBm	15.5 dBm
	256 QAM	22.5 dBm	22.5 dBm	22.5 dBm		18.0 dBm	16.0 dBm	13.5 dBm	13.5 dBm

02. Receiver Specifications

Threshold at 10 ⁻⁶ BER ⁽¹⁾	4xDS1	5 MHz	QPSK	-93.5 dBm	-94.0 dBm	-94.0 dBm		-93.5 dBm	-93.0 dBm	-93.0 dBm
	8xDS1	10 MHz	QPSK	-91.0 dBm		-91.5 dBm		-91.0 dBm	-90.5 dBm	-90.5 dBm
	8xDS1	5 MHz	16 QAM				-87.5 dBm	-87.0 dBm	-87.0 dBm	-86.5 dBm
	8xDS1	3.75 MHz	32 QAM		-85.0 dBm	-81.5 dBm	-84.5 dBm			
	16xDS1	20 MHz	QPSK	-88.0 dBm		-88.0 dBm		-87.5 dBm	-87.5 dBm	-87.0 dBm
	16xDS1	10 MHz	16 QAM	-84.0 dBm		-84.5 dBm	-84.0 dBm	-84.0 dBm	-83.5 dBm	-83.5 dBm
	16xDS1	5 MHz	128 QAM		-77.5 dBm	-74.5 dBm	-77.5 dBm			
	28xDS1/1xDS3	30 MHz	QPSK			-86.0 dBm		-85.5 dBm	-85.0 dBm	-85.0 dBm
	28xDS1	20 MHz	16 QAM	-82.0 dBm		-82.0 dBm		-81.5 dBm	-81.5 dBm	-81.0 dBm
	28xDS1, 1xDS3, 50 Mbit/s	10 MHz	64 QAM	-77.5 dBm	-77.5 dBm	-77.5 dBm	-77.5 dBm	-77.0 dBm	-77.0 dBm	-76.5 dBm
	32xDS1, 50 Mbit/s	40 MHz	QPSK					-87.0 dBm	-87.0 dBm	-86.5 dBm
	32xDS1, 50 Mbit/s	20 MHz	16 QAM	-81.0 dBm		-81.5 dBm		-81.0 dBm	-80.5 dBm	-80.5 dBm
	100 Mbit/s	20 MHz	64 QAM	-74.0 dBm	-74.0 dBm	-74.0 dBm	-74.0 dBm	-73.5 dBm	-73.5 dBm	-73.0 dBm
	70xDS1, 100 Mbit/s	40 MHz	16 QAM					-80.0 dBm	-80.0 dBm	-79.5 dBm
	70xDS1, 100 Mbit/s	30 MHz	32 QAM	-75.5 dBm		-75.5 dBm	-75.5 dBm	-75.0 dBm	-75.0 dBm	-74.5 dBm
	70xDS1, 100 Mbit/s	20 MHz	128 QAM	-71.0 dBm	-71.5 dBm	-71.5 dBm	-71.0 dBm	-71.0 dBm	-70.5 dBm	-70.5 dBm
	84xDS1	40 MHz	32 QAM				-77.0 dBm	-77.0 dBm	-76.5 dBm	-76.5 dBm
	84xDS1/3xDS3	30 MHz	64 QAM	-72.5 dBm	-72.5 dBm	-72.5 dBm	-72.5 dBm	-72.0 dBm	-72.0 dBm	-71.5 dBm
	100xDS1, 1xOC3, 150 Mbit/s	50/80 MHz	16 QAM						-75.0 dBm	-75.0 dBm
	100xDS1, 150 Mbit/s	40 MHz	32 QAM				-74.5 dBm	-74.5 dBm	-74.0 dBm	-74.0 dBm
	1xOC3, 150 Mbit/s	40 MHz	64 QAM				-74.0 dBm	-73.5 dBm	-73.5 dBm	-73.0 dBm
	100xDS1, 1xOC3, 150 Mbit/s	30 MHz	128 QAM	-69.5 dBm	-69.5 dBm	-69.5 dBm	-69.5 dBm	-69.0 dBm	-69.0 dBm	-68.5 dBm
	1xOC3, 150 Mbit/s ⁽²⁾	30 MHz	128 QAM	-71.0 dBm	-71.0 dBm	-71.0 dBm	-71.0 dBm	-70.5 dBm	-70.5 dBm	-70.0 dBm
	127xDS1, 200 Mbit/s	50/80 MHz	64 QAM						-71.5 dBm	-71.0 dBm
	127xDS1, 200 Mbit/s	40 MHz	128 QAM				-69.5 dBm	-69.5 dBm	-69.0 dBm	-69.0 dBm
	127xDS1, 200 Mbit/s	30 MHz	256 QAM	-65.5 dBm	-65.5 dBm	-65.5 dBm	-65.0 dBm	-65.0 dBm	-64.5 dBm	-64.5 dBm
	4xDS3	40 MHz	64 QAM				-72.5 dBm	-72.5 dBm	-72.0 dBm	-72.0 dBm
	4xDS3	30 MHz	256 QAM	-66.5 dBm	-66.5 dBm	-66.5 dBm	-66.0 dBm	-66.0 dBm	-65.5 dBm	-65.5 dBm
	260 Mbit/s	40 MHz	256 QAM				-64.0 dBm	-63.5 dBm	-63.5 dBm	-63.0 dBm
	2xOC3, 310 Mbit/s	50/80 MHz	256 QAM						-63.0 dBm	-63.0 dBm
	330 Mbit/s	50/80 MHz	256 QAM						-62.5 dBm	-62.0 dBm
	360 Mbit/s	80 MHz	256 QAM						-62.0 dBm	

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01. System Gain & Threshold values are for BER=10⁻⁶. Values for BER=10⁻³ are improved by 1dB.

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