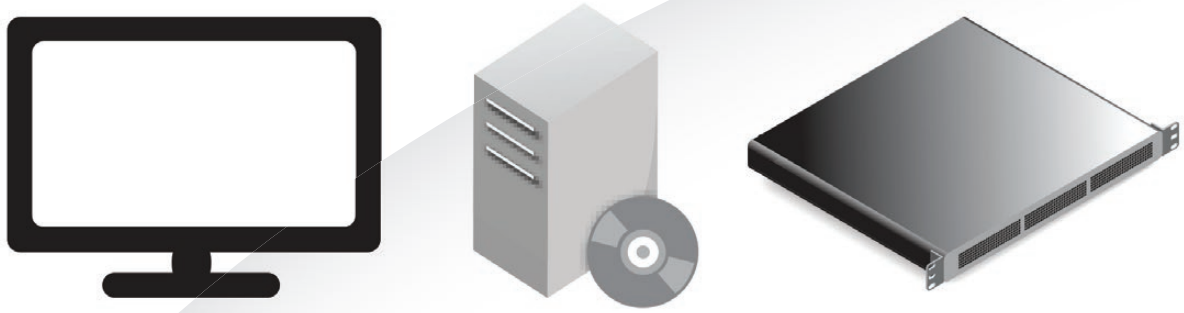
Active physical and software verifier



A critical component for end-to-end visibility

SPEC SHEET

KEY FEATURES AND BENEFITS

Physical and software verifiers managed by the same EXFO Worx platform

Mix and match verifiers type depending on available computer resources or required performance

Centralized management

Scalable solution to manage the lifecycle of thousands of verifiers remotely including software updates, configuration and functional state

Versatile L2-L7 capabilities

Test and validate performance from L2 transport to L7 applications through a single verifier deployment delivering superior quality of experience (QoE) visibility

Interface rate performance

Leverages powerful FPGA acceleration to reach line rate performance on physical verifiers and hardware acceleration for maximum throughput in software verifiers

Powerful and flexible deployment options

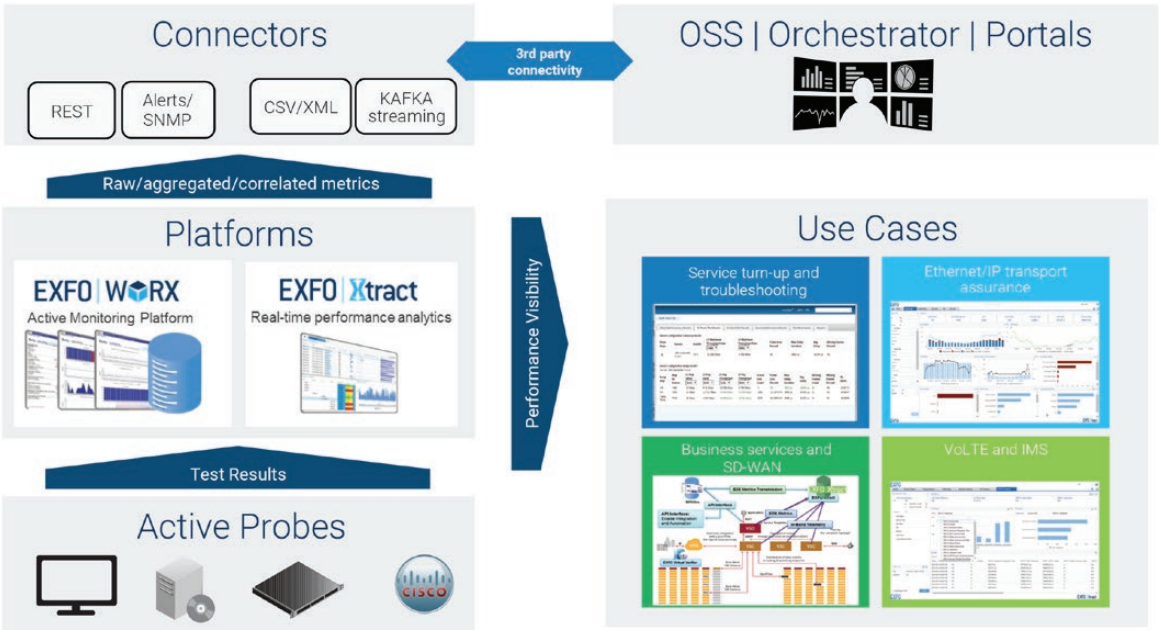
Broad range of hardware verifiers to meet the most demanding performance requirements

Orchestrate and automate

Automate the delivery, instantiation and operation of the verifiers through a rich site of APIs for zero-touch operation

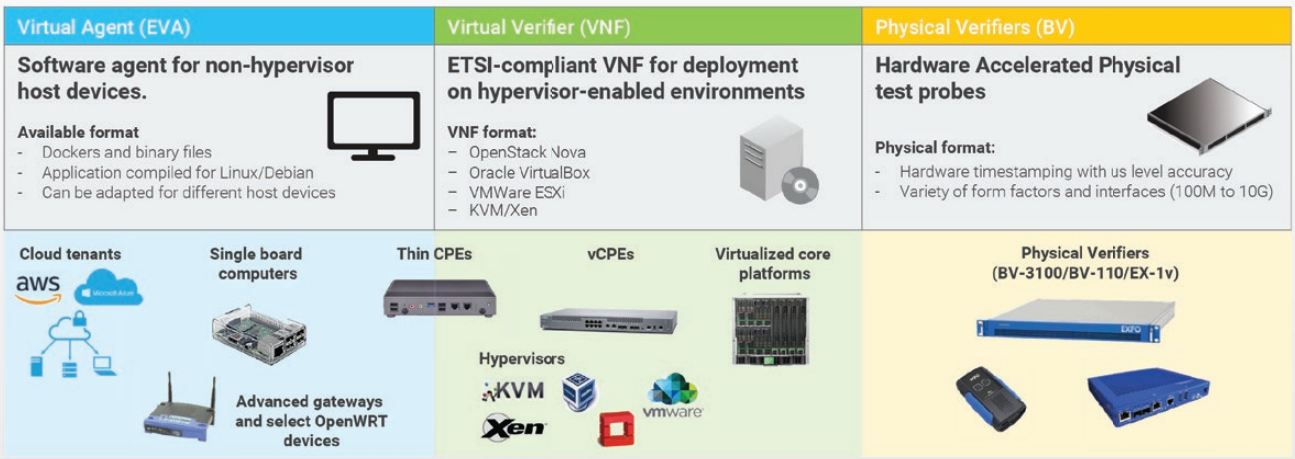
ACTIVE VERIFIERS

Active Verifiers are the workhorse of the EXFO Worx Active Assurance Platform. This essential component of the EXFO Worx Active Assurance System, executes active test sequences that measure end-to-end and segmented performance across all layers of the service and deliver an accurate view of delivered quality of service and experience. Verifiers can combine multiple tests to accurately pinpoint degradation and faults in the transport, service, infrastructure and application layer, accelerating the troubleshooting of faults and isolating potential issues.



Active Verifiers are managed by the element management system, EXFO Worx. All Verifiers maintain a secure and encrypted communication channel to EXFO Worx which guarantees the integrity and security of the test process and collected metrics. EXFO Worx is used to manage the entire lifecycle of the verifiers, tracking configuration changes, verifier status, recovery and operational state.

All active verifiers utilize the same core software, the Verifier Monolith, which contains all the intelligence and capability to execute active performance tests. This ensures that a same common routine can be executed similarly by different type of verifiers, reducing the need to manage tests scenarios when deploying multiple verifier types. The verifier engine executes all of the tests from a catalog of over 150 different performance tests covering layers L2-L7. Verifiers can execute multiple tests simultaneously, combining different tests to provide visibility of performance at multiple layers simultaneously. Please refer to the Active test catalog document for more information about the available tests.

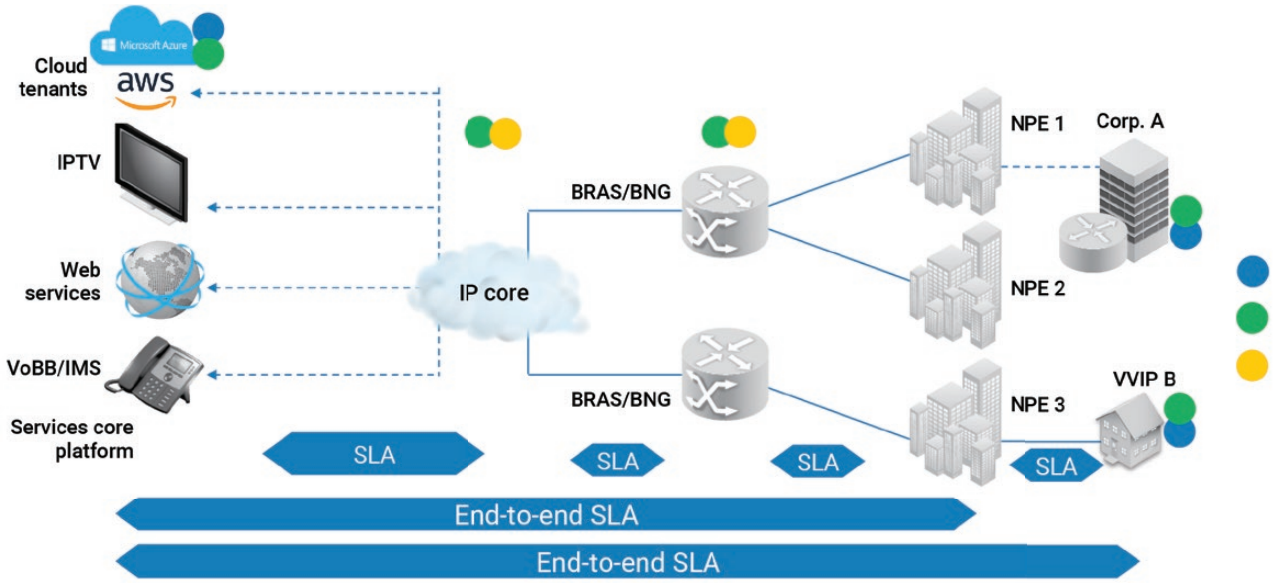


Active verifiers are available in a range of deployment formats:

› BV Series: a range of physical appliances leveraging purpose-built hardware to deliver guaranteed performance, throughput and to address specific connectivity needs

› Virtual Verifier: A fully virtualized solution, available as an ETSI-compliant virtual network function (VNF), designed for deployment on Hypervisors or baremetal environments

› EXFO Virtual Agent (EVA): A lightweight software agent, compiled for Linux-based operating systems



EXFO VIRTUAL AGENT (EVA)

EVA is a lightweight software agent, designed for deployment in non-hypervisor environment. EVA is available as a simple software package which can be downloaded and installed on a host of environment. Once deployed, it provides the ability to run L2 to L7 performance testing and help gain visibility from the installed platform.

SPECIFICATIONS		
Minimum resource requirements	64MB RAM 50 MB Storage	
Architecture	X86	ARM
Compatibility	› 32 bit and 64 bit X86 architecture	› ARM 64 bit support › Raspberry Pi and SBC equivalents
Supported OS	› Linux › Ubuntu › Centos	› Ubuntu › Debian/Rasbian
Available packages	› OPK › Deb › RPM › Docker	› OPK › Debian

VIRTUAL VERIFIER

The verifier capability is also available as an VNF package called the Virtual Verifier. The Virtual Verifier is built as an extensible VNF package which can be deployed in hypervisor environments, to provide L2 to L7 visibility. Available as an ETSI VNF, the Virtual Verifier can be integrated into a NFVI VNF catalog to be deployed via an orchestrator.

SPECIFICATIONS		
Minimum resource requirements	1x vCPU 512MB RAM 2GB storage Openstack small flavor	
Virtualization support	NFV/SDN/NFVI: › Openstack › VmWare ESX › XEN › Microsoft Hyper-V	Hypervisors: › KVM › QEMU › Virtual Box › VmWare › XEN › Hyper-V
Available formats	VMDK Image QCOW2	

BV: PHYSICAL VERIFIERS

Physical verifiers are a collection of dedicated physical appliances, designed for guaranteed performance. Physical verifiers combine a powerful computer platform with FPGA-based acceleration to deliver line rate traffic generation capability and active tests scalability.

Available in a range of sizes, interface rate and compute resources, the BV Verifiers are designed to adapt to any scenario. Physical Verifiers can be mixed and matched to deliver segmentation from high speed cores to subscriber-level edge locations, offering the same variety of interfaces and speeds to connect to different network locations, from high speed cores to customer premises.

			TEST INTERFACES	10 / 100 / 1000	1Gbe (SFP)	10Gbe (SFP+)	DEDICATED MGMT	GPS OPTION	1588v 2 PTP	FPGA
BV - 1	Customer premise	Premise delivery for mass-deployments, triple-play delivery from subscriber premises.	1	●						
BV-EX1-V	Customer premise	WiFi enabled customer premise verifier	2 + WiFi	●	●		●			●
BV - 10	Performance reflector	High performance reflector for L2-L4 service assurance.	1	●	●		●			●
BV - 110	Edge scale verifier	Complete L2-L7 performance visibility and assurance from a compact format.	2	●	●				●	
BV - 1100	Metro-scale verifier	L2-L7 performance in 1 RU platform. 3X scalability over BV-110 in aggregation location.	2	●	●		●	●	●	
BV - 1500	Metro-scale verifier	FPGA acceleration delivers up to 1Gbit/s. L2-L7 performance in 1 RU platform. 3X scalability over BV-110 in aggregation location.	2	●	●	●	●	●	●	●
BV - 3100	Core-scale verifier	Top of line, combining powerful FPGA with scalable compute platform, guaranteed throughput at up to	2	●	●	●	●	●	●	●

TEST COVERAGE

SPECIFICATIONS										
		Virtual Agent (EVA)	Virtual Verifier (VV)	Physical Verifiers (BV)						
		EVA	VV	BV1	BV-EX1-V	BV-10	BV-110	BV-1100	BV-1500	BV-3100
Reflectors	Smart loopback					•	•		•	•
	OAM reflector	•	•		•	•	•	•	•	•
	TWAMP responder (Light/Full)	•	•	Light	•	Light	•	•	•	•
Throughput tests	Y.1564 service activation (L2-L4)	•	•		•		•		•	•
	RFC-2544 (L2-L4) service activaton						•		•	•
	RFC-6349 (TCP performance)		•						•	•
	iPERF	•	•		•		•	•	•	•
L2 / L3 QoS tests	L2 Y.1731 SOAM-PM	•	•		•		•	•	•	•
	L3 RFC-5357 TWAMP	•	•	•	•		•	•	•	•
	UDP, TCP Echo	•	•	•	•	Resp. only	•	•	•	•
IP services	ICMP Ping/ Traceroute	•	•	•	•	Resp. only	•	•	•	•
	FTP	•	•	•	•		•	•	•	•
	NTP/NNTP	•	•		•		•	•	•	•
	Email performance	•	•				•	•	•	•
Internet performance	HTTP/ HTTPs	•	•	•	•		•	•	•	•
	DNS/DHCP	•	•	•	•		•	•	•	•
VoIP and video infrastructure and media	SIP VoIP (signalling, media)	•	•	•	•		•	•	•	•
	VoIP gateways		•				•	•	•	•
	IPTV video		•				•	•	•	•
Mobile services and infrastructure	VoLTE		•				•	•	•	•
	Diameter		•				•	•	•	•

PHYSICAL VERIFIERS SPECS

BV1

POWER

AC power (external AC adapter)	100 V to 240 V; 50 Hz to 60 Hz Output: 5.35 W; 2A
USB power	Type-B USB connector; supplied with type-B-to-type-A conversion cable

INTERFACES

- 1 x Ethernet RJ45 (10/100/1000)
- 1 x USB (USB 2.0) for select Wi-Fi/wireless/serial dongles
- 1 x SD card slot
- Power: High-power USB (Type B) + AC adapter
- 1 x reset button

PHYSICAL

Size (H x W x D) (without mounting plate)	166 mm x 117 mm x 30 mm (6 $^{17}/_{32}$ in x 4 $^{19}/_{32}$ in x 1 $^{5}/_{16}$ in)
Weight	0.265 kg (0.584 lb)

Optional VESA mounting plate for flat wall-mount installation

ENVIRONMENTAL

Temperature	Operating	0 °C to 40 °C (32 °F to 104 °F)
	Storage	–40 °C to 70 °C (–40 °F to 158 °F)
Relative humidity		5 to 95 % non-condensing
Altitude	Operating	–60 m to 1800 m (–197 ft to 5906 ft)
	Storage (at minimum)	–300 m to 12 000 m (–984 ft to 39 370 ft)

REGULATORY

EMC standards	EN 55022/55024; (Title 47 CFR) FCC Part 15, Subpart B; ICES-003 Class B
Safety	IEC/EN CSA/UL 60950-1 Information Technology Equipment, Safety–Part 1: General requirements
Certification marks	CE, cULus
Compliance	RoHS

BV-EX1-V

GENERAL SPECIFICATIONS	
Size (H x W x D)	125 mm x 75 mm x 45 mm (5 in x 3 in x 1 ¾ in)
Weight	0.45 kg (1 lb)
Temperature	
Operating	0 °C to 40 °C (32 °F to 104 °F)
Storage With battery (short term < 1 month)	−10 °C to 40 °C (14 °F to 104 °F)
Relative humidity range	≤ 93 %, non-condensing

INTERFACES	
Electrical RJ45 test port	10/100/1000 Mbit/s
Optical SFP test port [a]	Optical 1GE SFP
USB port	USB 3.0 type-C port
Bluetooth and WiFi	Bluetooth v4.2 and WiFi 802.11 ac/a/b/g/n
Processor	ARM dual cortex-A53 ARMv8 1.0 GHz
Memory	1 GB
Storage	8 GB

BATTERY/POWER SUPPLY	
Type	Rechargeable Li-ion smart battery
Battery autonomy	One full day of customer visits (i.e., average of 10 residential broadband customer visits)
Charging time	3.5 h using supplied wall charger
AC/DC adapter/charger	Input: 100–240 VAC; 50/60 Hz; 1.0 A max, output: 5 V; 2.4 A

Note

a. Future capability.

BV10

ELECTRICAL INTERFACE			
Electrical interface	One 10/100/1000 Base-T port		
Tx bit rate	10 Mbit/s	125 Mbit/s	1 Gbit/s
Rx bit rate	10 Mbit/s	125 Mbit/s	1 Gbit/s
Duplex mode	Half and full duplex	Half and full duplex	Full duplex
Jitter compliance	IEEE 802.3	IEEE 802.3	IEEE 802.3
Connector	RJ-45	RJ-45	RJ-45
Maximum reach (m)	100	100	100

GENERAL SPECIFICATIONS	
Temperature	0 °C to 50 °C (32 °F to 122 °F)
Humidity	5 % to 95 % relative humidity, non-condensing
Size (H x W x D)	38 mm x 103 mm x 210 mm (1 ½ in x 4 1/16 in x 8 ¼ in)
Weight	0.6 kg (1.3 lb)

OPTICAL INTERFACE			
Optical interface	One GigE port		
Available wavelengths (nm)	850, 1310 and 1550		
	1000 Base-SX	1000 Base-LX	1000 Base-ZX
Wavelength (nm)	850	1310	1550
Tx level (dBm)	–9 to –3	–9.5 to –3	0 to 5
Rx level sensitivity (dBm)	–20	–22	–22
Maximum reach	550 m	10 km	80 km
Transmission bit rate (Gbit/s)	1.25	1.25	1.25
Reception bit rate (Gbit/s)	1.25	1.25	1.25
Tx operational wavelength (nm)	830 to 860	1270 to 1360	1540 to 1570
Maximum Rx before damage (dBm)	6	6	6
Jitter compliance	IEEE 802.3	IEEE 802.3	
Ethernet classification	IEEE 802.3	IEEE 802.3	
Laser type	VCSEL	FP	DFB
Eye safety	Class 1	Class 1	Class 1
Connector	LC	LC	LC
Transceiver type	SFP	SFP	SFP

BV110

INDICATORS AND INTERFACES

Two Ethernet test ports	Each combo port includes: › 1 Gbit/s fiber SFP interface › 10/100/1000 bit/s RJ45 interface › Link and activity LEDs › In-band management
Console port	
AC or dual feed DC power	
Power status LED	
Reset button	

PHYSICAL

Size (H x W x D)	35 mm x 205 mm x 192 mm (1 3/8 in x 8 1/16 in x 7 9/16 in)
Weight	AC version: 1.35 kg (3 lb) DC version: 1.4 kg (3.1 lb)
Optional 19-inch rack mount kit	Supports 1 or 2 BV-110 side-by-side in a 1RU space

POWER

AC power	AC adapter: ~ 100 – 240 V; 50/60 Hz; 2.5 A
DC power	Built-in –48 V dual feed ⎓ –48 - –60 V; 0.75 A

ENVIRONMENTAL

Temperature	
Operating	0 °C to 50 °C (32 °F to 122 °F)
Storage	–40 °C to 70 °C (–40 °F to 158 °F)
Relative humidity	5 to 90% non-condensing
Operating altitude	4000 m (13 000 ft)
External AC power adapter	
Temperature	
Operating	–20 °C to 70 °C (–4 °F to 158 °F)
Storage	–20 °C to 80 °C (–4 °F to 176 °F)
Relative humidity	
Operating	20 to 80%
Storage	10 to 95%
Operating altitude	2000 m (6562 ft)

REGULATORY

EMC standards	IEC/EN-61326-1; (Title 47 CFR) FCC Part 15, Subpart B; ICES-003
Safety	IEC/EN CSA/UL 61010-1 Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use – Part 1: General Requirements
Certification marks	CE, c(Nemko)us
Compliance	RoHS

BV1100

INDICATORS AND INTERFACES

Two test ports:
› 1G fiber SFP
› 10/100/1000 Mbit/s copper SFPS
› Auto-sensing, auto-negotiating
› Hardware packet timestamp engine
› Link and activity LEDs

Two management ports:
› 10/100/1000 Mbit/s fixed RJ-45 copper
› Auto-sensing, auto-negotiating
› Link and activity LEDs

1PPS external clock input

Console port (EIA-232)

AC or dual feed DC power

System status LED (green/amber)

PHYSICAL

Dimensions (H x W x D)	43 mm x 425 mm x 485 mm (1 ¾ in x 17 in x 19 in)
Weight	8.43 kg (18.56 lb)

19-inch rackmount (front or slide rail mounted)

REGULATORY

EMC standards	IEC/EN-61326-1; FCC CFR Title 47, Part 15, Subpart B; ICES-003
Safety	IEC/EN CSA/UL 61010-1 Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use—Part 1: General Requirement
Certification marks	CE; cCSAus; NEBS

ENVIRONMENTAL

Temperature	operating	–5 °C to 55 °C (23 °F to 131°F)
	storage	–40 °C to 70 °C (–40 °F to 158 °F)
Relative humidity		90 % non-condensing
Operating altitude		4000 m (13 000 ft)

POWER

AC power	100-240 VAC 240W at 2A (120VAC)
DC power	–48 V dual feed 240W at 5A (–48VDC)

BV1500

INDICATORS AND INTERFACES

Two test ports:
- 1G fiber SFP
- 10/100/1000Mbit/s copper SFPS
- Auto-sensing, auto-negotiating
- Hardware packet timestamp engine
- Link and activity LEDs

Two management ports:
- 10/100/1000Mbit/s fixed RJ-45 copper
- Auto-sensing, auto-negotiating
- Link and activity LEDs

1PPS external clock input

Console port (EIA-232)

AC or dual feed DC power

System status LED (green/amber)

PHYSICAL

Dimensions (H x W x D)	43 mm x 425 mm x 485 mm (1 ¾ in x 17 in x 19 in)
Weight	8.43 kg (18.56 lb)
19-inch rackmount (front or slide rail mounted)	

POWER

AC power	100-240 VAC 240W at 2A at 120V
DC power	–48 V dual feed 240W at 5A at –48VDC

ENVIRONMENTAL

Temperature	operating	–5 °C to 55 °C (23 °F to 131°F)
	storage	–40 °C to 70 °C (–40 °F to 158 °F)
Relative humidity		90 % non-condensing
Operating altitude		4000 m (13 000 ft)

REGULATORY

EMC standards	IEC/EN-61326-1; FCC CFR Title 47, Part 15, Subpart B; ICES-003
Safety	IEC/EN CSA/UL 61010-1 Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use—Part 1: General Requirement
Certification marks	CE; cCSAus

BV3100

INDICATORS AND INTERFACES

Two test ports:
› 10G SFP+
› 1G fiber SFP
› 10/100/1000Mbit/s copper SFPS
› Auto-sensing, auto-negotiating
› Hardware packet timestamp engine
› Link and activity LEDs

Two management ports:
› 10/100/1000Mbit/s fixed RJ-45 copper
› Auto-sensing, auto-negotiating
› Link and activity LEDs

Optional GPS timing module

1PPS external clock input

Console port (EIA-232)

AC or dual feed DC power

System status LED (green/amber)

PHYSICAL

Dimensions (H x W x D)	43 mm x 425 mm x 485 mm (1 ¾ in x 17 in x 19 in)
Weight	8.43 kg (18.56 lb)
19-inch rackmount (front or slide rail mounted)	

POWER

AC power	100-240 VAC 240W at 2A at 120V
DC power	–48 V dual feed 240W at 5A at -48VDC

ENVIRONMENTAL

Temperature operating	–5 °C to 55 °C (23 °F to 131°F)
storage	–40 °C to 70 °C (–40 °F to 158 °F)
Relative humidity	90 % non-condensing
Operating altitude	4000 m (13 000 ft)

REGULATORY

NEBS	Level 3 certified (GR-63-CORE; GR-1089-CORE)
EMC standards	IEC/EN-61326-1; FCC CFR Title 47, Part 15, Subpart B; ICES-003
Safety	IEC/EN CSA/UL 61010-1 Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use—Part 1: General Requirement
Certification marks	CE; cCSAus

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