

# CableOS® Wave-1

REMOTE PHY SHELF



**The Harmonic CableOS® Wave-1 Remote PHY Shelf (RPS) is a 1-RU indoor platform for networks tasked with delivering data, voice and video services over coax.**

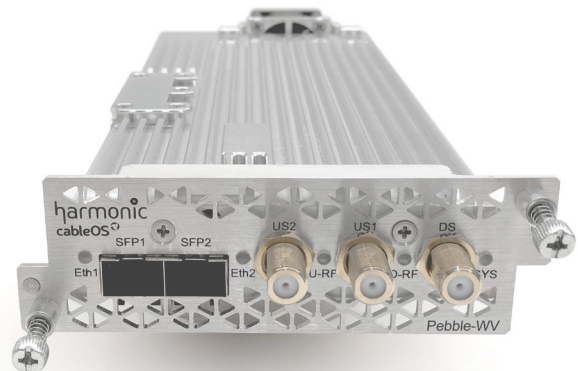
Compact and cost-effective, the Wave-1RPS houses the CableOS Pebble-1WV Remote PHY device (RPD), which supports distributed access architectures defined by CableLabs MHA v2 specification. Three Pebble-1WV RPDs can be installed in a single Wave-1 chassis.

Wave-1 and Pebble-1WV are both part of the Harmonic CableOS software-based CCAP system, which also includes CableOS Core CMTS software, the NSG™ Pro cable access platform and Ripple-1 Remote PHY Node. Fundamentally changing the business dynamics of cable delivery, CableOS introduces cable operators to unprecedented scalability, agility and cost savings. The end-to-end solution supports centralized and distributed cable access architectures that enable the fast deployment of IP-based and legacy data, video, and voice services — and sustainable capacity growth. All CableOS components work together to resolve space and power constraints in the headend and hub, eliminate dependence on hardware upgrade cycles, and provide multi-dimensional scaling.

Multiple configurations of the Wave-1 using one, two or three Pebble-1WV RPDs are available, each with one downstream and one or two upstream ports. The Pebble-1WV RPD includes added features such as per-port RF output power monitoring and closed-loop output power control, allowing for temperature-insensitive gain and tilt stability.

For added reliability, the Wave-1 supports a dual redundant power supply option, which can be AC or DC. With dual power supplies installed, the Wave-1 can be deployed with one or two Pebble-1WV RPDs.

The Wave-1 and Pebble-1WV RPDs support an extended temperature range from -25C to +60C.



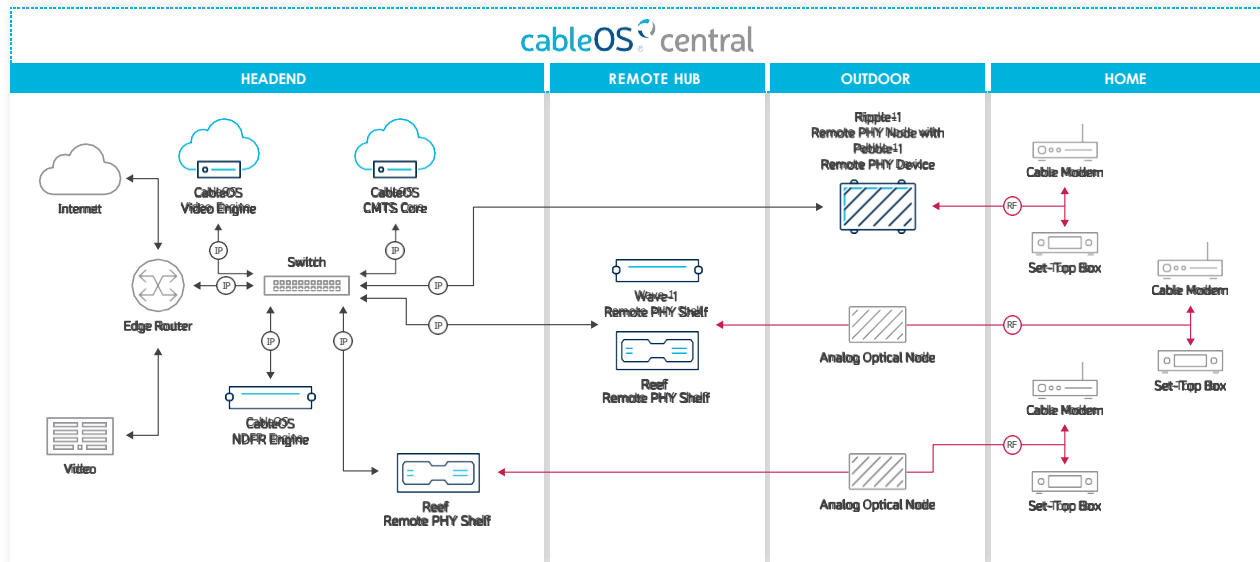
## HIGHLIGHTS

- 1-RU platform with
  - Single power supply and up to three Pebble-1WV RPDs or
  - Dual power supplies and up to two Pebble-1WV RPDs
- 300mm deep (not including RF F-type connectors)
- AC or DC power supply with option for dual redundant power supplies
- Modular design
- Low power consumption (less than 130W for fully configured platform)
- Supports up to 1218 MHz forward and 204 MHz return bandwidth on each RPD
- Configurable forward gain and tilt, closed-loop output RF power control
- Fully compliant with the CableLabs MHA v2 specification for Remote PHY architectures
- Two 10-GbE SFP+ Ports
- One DS port and one or two US ports per module
- Superior RF performance, compliant with DOCSIS DRFI Annex D and 3.1 PHY
- Precision IEEE 1588 PTP synchronization
- Support for DOCSIS 3.1 PNM
- Remote control via CableOS CLI

## World-Class Service and Support

With thousands of successful installations, Harmonic possesses unique, extensive knowledge of the cable edge environment and unsurpassed expertise in managing live production networks. Harmonic technical support and field engineers possess decades of collective experience in the cable industry and have the ability to go far beyond optimal deployment strategies and troubleshooting. The Harmonic

Global Service and Support organization also understands the intricacies of every ancillary system touched by the edge network, from back-office video control planes to IP backbones to deep-fiber HFC nodes.



## WAVE-1 SPECIFICATIONS

### PHYSICAL

Dimensions (HxWxD)	1-RU, 317 mm deep 44.45 mm x 482.6 mm x 317 mm 1.75 in x 19 in x 12.2835 in
Operating Temperature	Operating Temperature -13° to 131°F/-25° to +55° C
Mechanical Configuration Options	Single power supply with three Pebble-1WV RPDs Dual power supplies with two Pebble-1WV RPDs

### POWER

Power Supply Options	Single power supply Dual power supplies
AC or DC power supply	AC: 90V - 230V, 47-63Hz DC: typical -48V, from -75V to -18V
Power Consumption	130 W maximum for three installed Pebble-1WV RPDs

## PEBBLE-1WV SPECIFICATIONS

### RF

DS Channels	Any combination of up to 158 SC-QAMs or six 192-MHz OFDM channels
US Channels	Any combination of up to 12 SC-QAMS or two 96-MHz OFDMA channels
DS Ports	One
US Ports	Up to two
RF Performance	DRFI Annex D compliant DOCSIS
Output DS RF Power Level	64dBmV total

## CONFIGURATION AND MANAGEMENT

SSH, CLI, Syslog	Supported
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### SECURITY

Authentication	802.1x
Control Plane Encryption	IPSEC

### POWER

Power Consumption	≤35 W
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### TIMING

PTP Protocol	1588 slave mode
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## OOB AND NETWORK MAINTENANCE

OOB	SCTE 55-1, SCTE 55-2
Pilot Generation	Over operational band
PNM	DOCSIS PHY 3.1 compliant
Additional Capabilities	ALC pilots and alignment tones FCC and LTE leakage markers Telemetry for handhelds and addressable taps NDF/NDR

## ORDERING INFORMATION

Category	Part Number	Description
Wave-1 power supply (PS) options	COS-WAVE-1PS	Wave Shelf, 1x PS compartment, 3x PHY module compartments
	COS-WAVE-2PS	Wave Shelf, 2x PS compartments, 2x PHY module compartments
	COS-WAVE-PS-AC	AC power supply for Wave, 90 to 230 VAC input, 130W
	COS-WAVE-PS-DC	DC power supply for Wave, -44 to -52 VDC input, 130W
Wave-1PHY modules	COS-PBL1WV-1US	Pebble-1RPD for Wave, 1DSx1US RF ports
	COS-PBL1WV-1US	Pebble-1RPD for Wave, 1DSx2US RF ports
	COS-PBL1WV-NDR	NDF/NDR module for Wave

## CONVERGED INTERCONNECT NETWORK INTERFACE

Ports	Two 10 GbE SFP+ transceivers
Protocols	DEPI, UEPI, GCP and other Layer 2 protocols