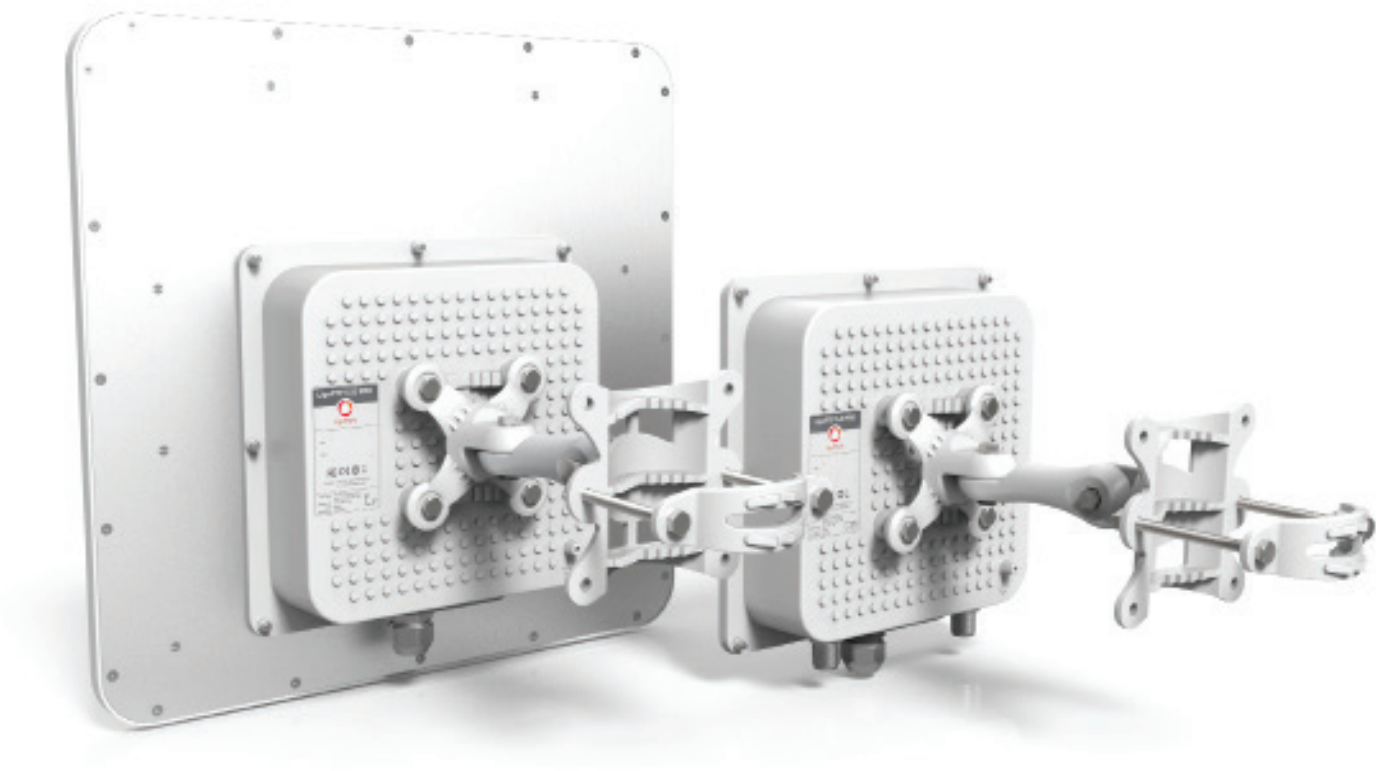
LigoWave



LigoPTP 5-N/5-23 MiMO PRO

5 GHz point-to-point integrated /connectorized backhaul device

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Product Overview

LigoWave unleashes its highest capacity, license-free PTP device with the release of the LigoPTP PRO series product line. Making use of ground breaking 2x2 MiMo technology, the LigoPTP 5-23/5-N PRO delivers real aggregate throughput capability of up to 220 Mbps (110 Mbps full-duplex) combined with high packets-per-second perfor-mance.

Additionally, the new product is compatible with previous LigoPTP 5-23 MiMo and LigoPTP 5-N MiMo models. This product enables carrier-class point-to-point capability, ideal for dedicated access or backhaul applications (in-cluding VOIP or other small packet applications). The Ligo PTP PRO product family couples flexible channel width capability (20 or 40 MHz) and industry-leading proprietary software mechanisms to set the utmost standard in spec-tral efficiency.

The LigoPTP 5-23/5-N PRO products feature either an inte-grated dual-polarized antenna or two N-type connectors. They are housed in rugged, cast aluminum enclosures. Combining digital signal processing, dual polarization antennas and proprietary W-Jet 2 MiMo protocol these bridges have a high spectral efficiency of 7.5bit/Hz.

The LigoPTP 5-23/5-N PRO showcase an array of advanced software mechanisms that provide optimal point-to-point connectivity for high-throughput, long distance links. LigoWave's proprietary PTP mechanisms utilize techniques such as Dynamic Time Division Duplexing (TDD) to dy-namically allocate bandwidth in the direction needed, thus increasing link efficiency and greatly decreasing the impact that distance has on throughput of the link.

The LigoWave point-to-point products also features selec-tive repeat ARQ technology, an enhanced error-correction software mechanism that optimizes data traffic to provide very high throughput over high-bandwidth, long-range links even in the presence of interference.

The new PRO series products have an extremely powerful integrated 30 dB (1000 mW) radio which allows building solid long-distance links even with an integrated antenna. The output power on highest modulation (MCS 15) is 24 dBi which is not available elsewhere in the market today.

Gigabit Ethernet port and 802.3 af standard support makes the PRO series product line even more flexible. Im-prove-ments on the SURGE and ESD protection side make this product ideal for mission critical and harsh-weather condition installations. SURGE and ESD protection was designed according to IEC 61000-4-2 (ESD) and IEC 61000-4-5 (SURGE) standards.

The LigoPTP 5-23/5-N PRO is also compatible with Ligo-Wave's online link calculator and WNMS, a centralized configuration, firmware, and statistics server offered by LigoWave for remote diagnostic and configuration.

Key Features

- 5 GHz PTP bridge, ideal for:
  - Dedicated Access
  - Backhaul
  - Private networks
- Flexible center channel and channel width capability (20/40 MHz) for throughput optimization
- Radio rate of up to 300Mbps
- True aggregate throughput up to 220 Mbps
- Advanced proprietary W-jet MiMo 2 wireless protocol
- High packet-per-second (PPS) rate – ideal for VOIP backhaul applications
- Low packet latency (2ms)
- Great spectral efficiency (7.5 bit/ Hz)
- ARQ (Selective Repeat) for very high throughput
- Dynamic TDD for allocating bandwidth in real-time to the direction needed
- Integrated dual-polarized antenna (2 N-type conec-tors for the LigoPTP 5-N PRO product)
- PoE built-in for single cable installation (802.3 af com-patible)
- 1000 BaseT Ethernet port
- 30 dB (1000 mW) integrated radio (24 dB on MCS 15)
- Advanced security technologies
- Comprehensive management features
  - Web GUI
  - Command line management via SSH
  - WNMS server support for configuration
  - SNMP V1 with traps supporting MIBs:802.11, 802.1x, MIBII
  - Syslog support
  - Compatible with LigoWave link calculator
  - Real-time alerts
- Rugged articulating bracket solution for multi-facet mounting
- OLED screen for antenna alignment
- IP-67 compliant

W-jet

W-Jet is Ligowave's proprietary wireless protocol that combines special techniques to achieve superior perfor-mance and reliability even over long distances. The W-Jet protocol is the result of years of development and gives Ligowave PTP products the ability to outperform higher cost products on the market while simultaneously reducing the return on investment.



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LigoOS overview

Software running on the LigoPTP devices is extremely easy to use and designed with a point-to-point application in mind. The main functionality of the OS is outlined below:

Wireless Modes

Master
Slave

Wireless Network Configuration

W-Jet 2 transparent point-to-point
SISO/MIMO radios modes
Selectable Channel Width: 20/40 MHz
Channel Selection: Automatic/Manual
Data rate control: Automatic/Manual
Transmit Power Control: Automatic/Manual
SSID Broadcast Disabling
Wireless Security: AES 128-bit encryption
Adjustable Aggregation Frames
Multipath protection: ON/OFF
Comply regulations option: ON/OFF

Device Configuration

Administrator Access
Location: Latitude and Longitude
OLED control
HTTP/HTTPS/SSH//SFTP Access
System alerts
NTP Client
SNMP v1 Support
Local system log
Statistical performance reporting, representation data on a graph

Network Modes

Transparent Layer 2 Bridge

Network Configuration

Separate VLAN for management
VLAN, double VLAN, ISL, MPLS pass-through
Static and dynamic management IP
Supported frame size 3794 bytes

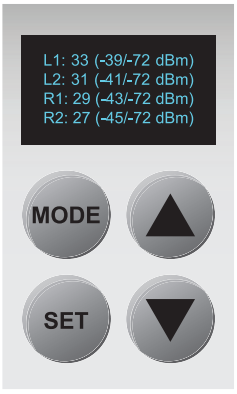
Management

WNMS agent
Firmware Recovery via TFTP
Reset to Factory Defaults
Configuration Management: Backup/Restore
Special Troubleshooting file
OLED screen

Tools

Antenna alignment
Site survey
Link test
Spectrum analyzer

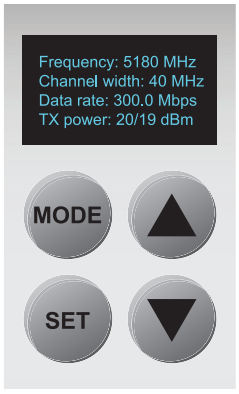
OLED screen overview



During the antenna alignment procedure current RSSI level of the local and remote unit can be seen



After the link deloyment it can be initailly tested with a different packet sizes for additional performance optimization



Various statistical information reviewing:
- Wireless settings
- TX/RX information
- Ethernet statistics
- Device information
- IP settings



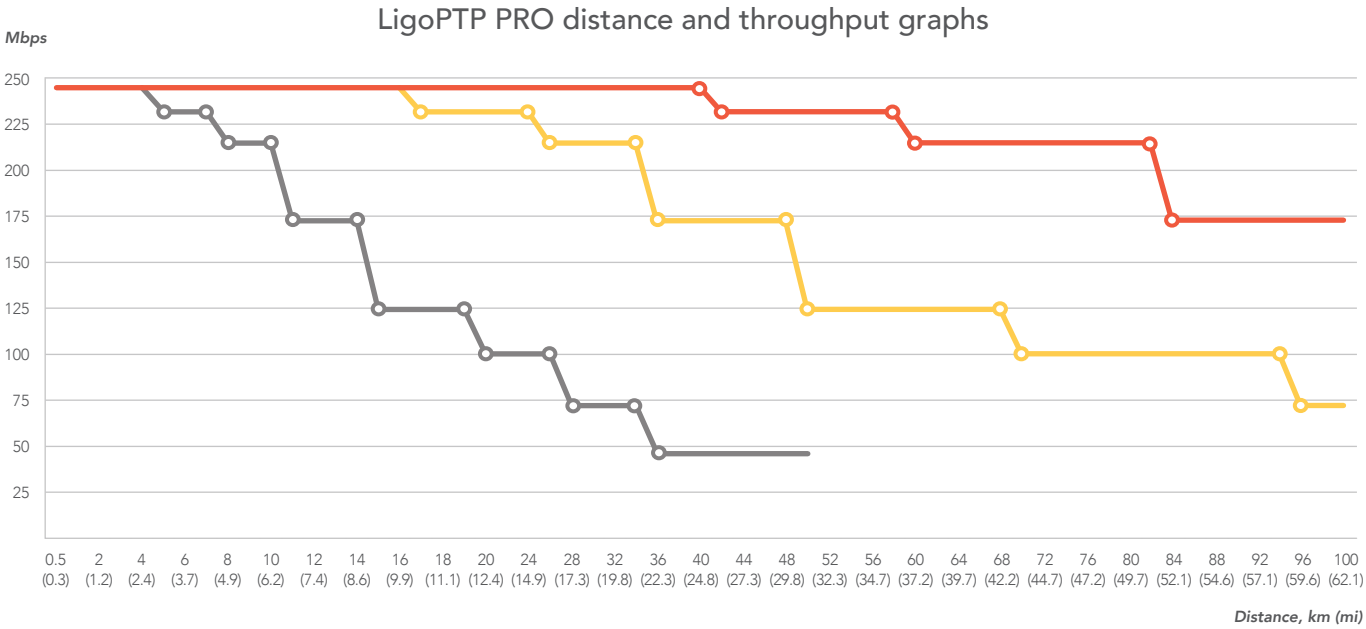
External OLED screen allows easy rebooting and resetting the unit to defauls



PIN code functionality is available for additional security of the LigoPTP units

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Product comparison



The graph above represents LigoPTP 5-23 PRO and LigoPTP 5-N PRO capacity at different distances. The calculations were done with a 15 dB fade margin and no interference on the link.

Wireless network management system

WNMS is a FREE enterprise grade Wireless Network Management system available for download at LigoWave's web¬site. A single software solution simplifies a large number of management and monitoring tasks for network the administrator. Comprehensive network management software supports several thousand devices. Main WNMS tasks:

- Supporting LigoWave, Deliberant and 3rd party equipment*
- Multiple OS support (Windows, Virtual Machine, Linux)
- Network visualization on Google Maps
- Configuration and maintenance
- Monitoring and alerting
- Smart discovery and provisioning
- Statistical data collection and reporting



** For the control and monitoring of 3rd party equipment the SWEAP application is necessary*

WNMS Cloud is a new mobile way to manage your network. The setup is as easy as 1-2-3 and you get your virtual WNMS server running online. With the current WNMS version LigoWave, Deliberant and 3rd party devices can be monitored and controlled remotely. (3rd party device monitoring and alerting requires additional hardware, working as a data collector). To try WNMS cloud go to: http://www.wnmscloud.com.

Highlights:

- Easy and quick WNMS server setup
- World-wide availability
- High reliability (based on Amazon cloud)
- Strong security (HTTPS and OpenVPN)
- No hardware and maintenance costs – reduces CAPEX and OPEX
- Third party equipment monitoring through WNMS remote agent (SWEAP application)*



**Need additional hardware to run SWEAP application*

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LinkCalc™

Link calculator is a link planning tool available online. The link calculator allows users to calculate link perfor-mance expectations taking into account geographical information, distance between the units, antenna height and gain, transmit power, and other factors in order to choose the most suitable product available from the LigoWave and Deliberant extensive product portfolios. In addition, custom calculations using other vendors' equipment specs can be used, making link calculator the ultimate link planning tool.

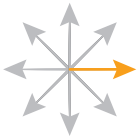
Available at: http://www.ligowave.com/linkcalc



Maps integration



Downloadable PDF reports



PTP and PTMP mode support



Online storage for saved calculations

Package contents



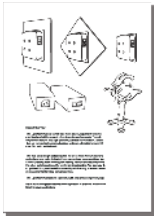
48 V 802.3 af PoE with grounding and lightining protection



LigoPTP 5-N/5-23 PRO outdoor unit



Professional mounting kit



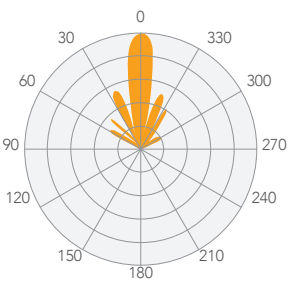
Quick install guide

Antenna patterns

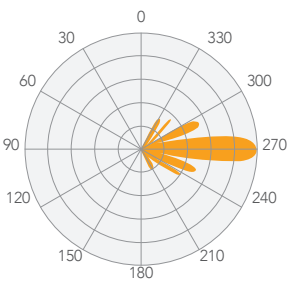
(only for LigoPTP 5-23 PRO product)

RF patterns (vertical)

Vertical cut

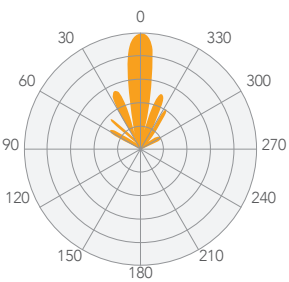


Horizontal cut

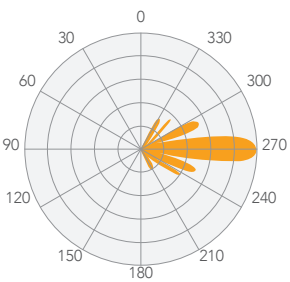


RF pattern (horizontal)

Vertical cut



Horizontal cut



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Radio specifications

Wireless technology	Proprietary W-Jet protocol, 2x2 MIMO
Operating mode	Point-to-point
Radio frequency band	5.150 - 5.915 GHz
Channel size	Configurable 20, 40 MHz
Max transmit power	30 dBm*
Modulation schemes	BPSK, QPSK, 16QAM, 64QAM
Receive sensitivity	Varying between -94 and -72 dBm depending on modulation and channel size
Error correction	FEC, Selective ARQ
Duplexing scheme	Dynamic time division duplex

Antenna

Type	Integrated directional panel (LigoPTP 5-23 PRO) or 2 N-Type connectors (LigoPTP 5-N PRO)
Polarization	Dual (LigoPTP 5-23 PRO)
Gain V/H	23/23 dBi (LigoPTP 5-23 PRO)
3dB Beam-width V/H	8/8 degrees (LigoPTP 5-23 PRO)

Data Interface

Physical interface	10/100/1000 BaseT
Protocol	Ethernet IEEE 802.3
Connector type	RJ45
Surge protection	Built-in (IEC 61000-4-2 (ESD) and IEC 61000-4-5 (SURGE))

Link performance

Real data throughput	220 Mbps aggregate (110 Mbps full-duplex)
Max packets per second	65,000
Packet latency	2 ms (64 bytes packet)
Recommended link distance**	More than 100 km (62,17 mi)

Security

Data encryption	Hardware based AES

Physical

Dimensions (PTP 5-N PRO)	Width 218 mm (8.5 ”), height 218 mm (8.5 ”), depth 70 mm (2.7 ”)
Dimensions (PTP 5-23 PRO)	Width 335 mm (13 ”), height 335 mm (13 ”), depth 90 mm (3.5 ”)
Weight (PTP 5-N PRO)	2 kg (4.4 lb) (mount included)
Weight (PTP 5-23 PRO)	3.3 kg (7.3 lb) (mount included)
Power supply	48 VDC, active PoE (802.3af)
Power source	100 – 240 VAC via included adapter
Power consumption	8 W

Environmental

Operating temperature	-40°C (-40 F) ~ +85°C (+185 F)
Humidity	0 ~ 90 % (non-condensing)

Management

Installation assistant	OLED screen
System configuration interfaces	User-friendly web GUI, SSH CLI, SNMP v1 with traps, centralized Remote
Management system	WNMS, WNMS Cloud

Regulatory

Certification	FCC/IC/CE
Ingress protection	IP-67
Safety	RoHS compliant

** Country dependent*
*** Link distance recommendation with an external antenna*

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