

# LigoPTP PRO

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



## 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 performance.

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 (including VOIP or other small packet applications). The LigoPTP PRO product family couples flexible channel width capability (20 or 40 MHz) and industry-leading proprietary software mechanisms to set the utmost standard in spectral efficiency.

The LigoPTP 5-23/5-N PRO products feature either an integrated 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 dynamically 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 selective 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 28 dBm (+/-2 dBm) radio which allows building solid long-distance links even with an integrated antenna. The output power on highest modulation (MCS 15) is 23 dBm (+/- 2 dBm) which is hard to find elsewhere in the market today.

Gigabit Ethernet port and 802.3 af standard support makes the PRO series product line even more flexible. Improvements 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 LigoWave's online link calculator and WNMS, a centralized configuration, firmware, and statistics server offered by LigoWave for remote diagnostic and configuration.

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### 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 connectors for the LigoPTP 5-N PRO product)
- PoE built-in for single cable installation (802.3 af compatible)
- 1000 BaseT Ethernet port
- 28 dBm (per chain) integrated radio
- Advanced security technologies
- Comprehensive management features
  - Web GUI
  - Command line management via SSH
  - WNMS server support for configuration
  - SNMP V1/2/3 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 is LigoWave's proprietary wireless protocol that combines special techniques to achieve superior performance 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.

### 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/v2c/v3 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

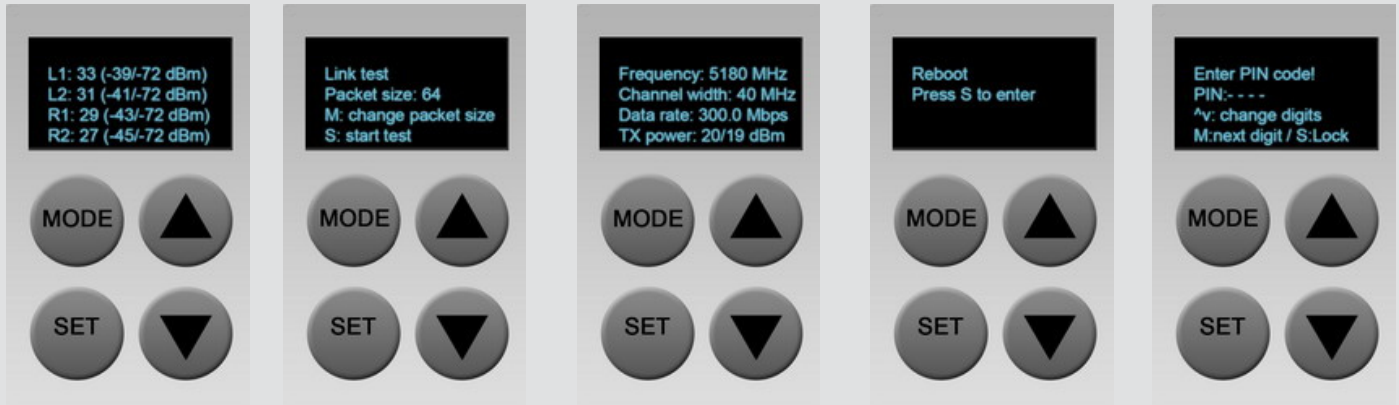
- Antenna alignment
- Site survey
- Link test
- Spectrum analyzer

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## OLED screen overview



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

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

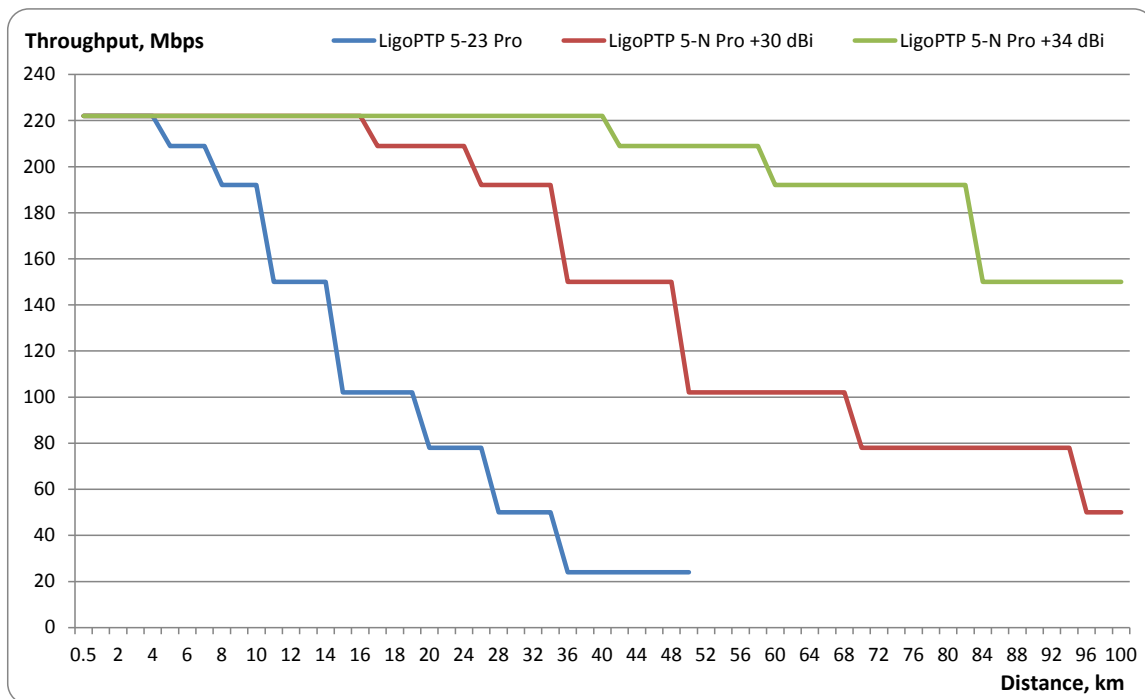
Various statistical information reviewing:

- Wireless settings
- TX/RX information
- Ethernet statistics
- Device information
- IP settings

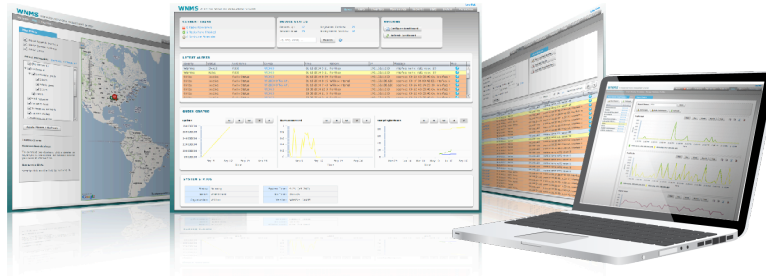
External OLED screen allows easy rebooting and resetting the unit to defaults

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

## LigoPTP PRO distance and throughput graphs



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 website. 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).

### 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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Available at: <http://www.ligowave.com/linkcalc>

## LinkCalc™

Link calculator is a link planning tool available online. The link calculator allows users to calculate link performance 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.



Maps integration



Downloadable PDF reports

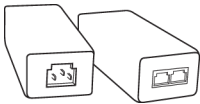


PTP and PTMP mode support

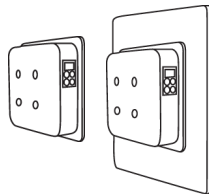


Online storage for saved calculations

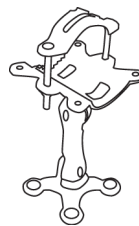
## Package contents:



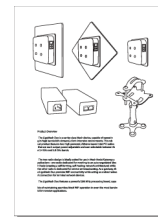
48 V 802.3 af PoE with grounding and lightning protection



LigoPTP 5-23/5-N PRO outdoor unit



Professional mounting kit



Quick install guide

## Antenna patterns (only for LigoPTP 5-23 PRO product):

RF patterns (vertical)

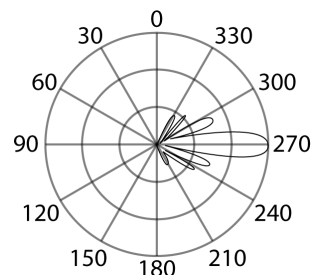
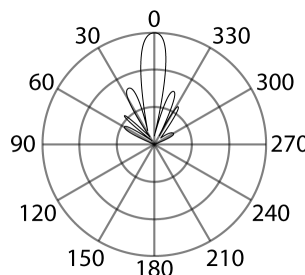
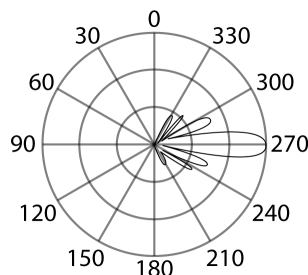
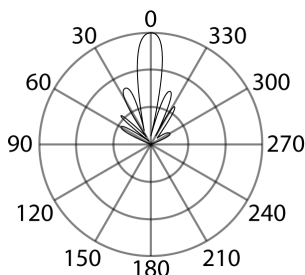
RF pattern (horizontal)

Vertical cut

Horizontal cut

Vertical cut

Horizontal cut



# LigoPTP PRO

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

### Sales offices:

#### EMEA:

Veiveriu 150-IIIa. Kaunas,  
LT-46931, Lithuania

Sauletekio al. 15-610, Vilnius, LT-  
20000, Lithuania

#### Americas:

138 Mountain Brook Dr.  
Canton, GA 30115, USA

984 Shetland Ave. Winter Springs, FL  
32708 USA

#### Asia Pacific:

##### China-Beijing

Room 602, Everlast Plaza, No. 39,  
Anding Road, Chaoyang District, Bei-  
jing, China 100029

##### China-Shanghai

4H, No. 92, Guiping Road, Zuhui Dis-  
trict, Shanghai, China 200233

##### China-Huizhou

No. 6, Huifeng East 2 Road, Zhongkai  
Hi-Tech Industrial Development Zone  
Huizhou, Guangdong, China

##### China-Shenzhen

No. 9, Dragon Jade Industrial District,  
Bantian Village Buji Town Longgang  
District, Shenzhen, China

##### Hong-Kong

Unit A, 25/F., MG Tower  
133 Hoi Bun Road, Kwun Tong  
Kowloon, Hong Kong

##### Singapore

60 Kaki Bukit Place, #08-04/05 Eunos  
Tech Park, Singapore 415979

##### Indonesia

Gedung Starpage Jl. Salemba Tengah  
No. 5 Lt. 3, Jakarta Pusat, Indonesia

##### Taiwan

12F., No.33 Sec. 2, Roosevelt Road,  
Taipei, Taiwan

##### Malaysia

No. 17 Jalan P2/12, Bandar Teknologi  
Kajang, 43500 Semenyih, Selangor,  
Malaysia

##### Philippines

3rd Floor. ETPI Bldg. #2161 Soler St,  
Conner Calero St. Sta Cruz, Manila  
City, Philippines

##### Thailand

169 Soi Sirindhorn 7, Charansanitwong  
Road, Bangbamu, Bangplad, Bangkok  
10700, Thailand

##### India

New No. 6, Old No. 16, Rajagopalan  
Street, Valmiki Nagar, Thiruvanniyur,  
Chennai 600041, India

### Radio specifications

Wireless technology	Proprietary W-Jet protocol, 2x2 MIMO
Operating mode	Point-to-point
Radio frequency band	5.150 - 5.915 GHz (country dependent - FCC 5.745 to 5.825 GHz)
Channel size	Configurable 20, 40 MHz
Max transmit power	28 (+/- 2) 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	60,000
Packet latency	2 ms (64 bytes packet)
Recommended link distance**	More than 100 km (62,17 mi)

### Security

Data encryption	Hardware based AES
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### 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 v1/2c/3 with traps, centralized Remote
Management system	WNMS, WNMS Cloud

### Regulatory

Certification	FCC/IC/CE
Ingress protection	IP-67
RoHS	Compliant

\* Country dependent

\*\* Link distance recommendation with an external antenna