

# WHITE RABBIT ZEN TP-32BNC

The reliable node that provides multiple legacy 10MHz/xPPS timing outputs.



## WHITE RABBIT ZEN TIME PROVIDER: WR-ZEN TP-32BNC

The reliable node that provides multiple legacy 10MHz/xPPS timing outputs for all equipment in your rack cabinet through White Rabbit time transfer and its redundant connections.

The WR-ZEN TP-32BNC easily distributes time and frequency to other equipment by implementing standard timing protocols such as PTP, NTP, IRIGB, 10MHz/xPPS, etc.

The WR-ZEN TP-32BNC combines ultra-stable clocks with low jitter and temperature compensated clock resources to enhance its synchronization accuracy.

- Sub-nanosecond time accuracy and picosecond level precision.
- WR, PTPv2 and NTP over optical interfaces.
- Extended management and monitoring.
- Distance range over 80km using fiber.
- Multi-source time references.
- Linux-based WRZ OS.
- Failover mechanisms & Holdover.
- Robustness & Redundancy.
- 32x Configurable timing outputs.

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### High Accuracy

The WR-ZEN TP-32BNC implements the White-Rabbit (WR) protocol, an high-accuracy extension of PTP based on SyncE, that allows to easily distribute sub-nanoseconds timing within Metro Area Network distances and beyond. Worth to mention, that a timing network using WR protocol is not affected by the traffic load nor the number of hops.

### Interoperability

Used as time provider or interoperability node, the WR-ZEN TP-32BNC can distribute standard PTP IEEE 1588-2008 for the last hop through its 2x fiber ports using the most common profiles such as Telecoms profiles (G.8265.1, G.8275.1) & Power profiles (IEEE C37.238-2011 and IEEE/IEC 61850-9-3). It also provides NTP interoperability and 10MHz/PPS distribution.

### Advanced Management

The WR-ZEN TP devices enable extensive monitoring via REST-API and SNMP including the combination of smart alerts with traps. By providing templates, it facilitates its integration with third-party networking and monitoring tools. Moreover, it allows automatic topology discovery via LLDP and comprehensible remote logging through rsyslog.

### Resiliency

To ensure continuous operation the WR-ZEN TP-32BNC incorporates a failover mechanism. It provides a safer version of the “Best-Master-Clock” algorithm as it only allows switching over multiple (predetermined) timing sources when a failure is detected. Additionally, an optional Holdover oscillator can be included to maintain high accuracy (1.5us < 24h) even if all timing references are down.

### Intuitive configuration

The new version of WRZ-OS introduces a complete web interface redesigned to provide an excellent user experience: By the means of timing presets, a complex configuration can be done in a few clicks. Simultaneously, the CLI tool has also been rethought to allow straightforward configuration from the terminal to advanced users.

### Enhanced Security

TACACS+/RADIUS have been integrated to enable remote authentication for networked access control through a centralized server. The secure version of most of the protocols such as SFTP, HTTPS, SNMPv3 has been implemented and a firewall has been incorporated to provide a robust system against malicious users..

## Technical Specifications

| Timing & Synchronization    |  |
|-----------------------------|--|
| Multi-sources               | <i>Failover mechanism to ensure continuous operation by switching over multiple timing sources in case of failure:</i> <ul style="list-style-type: none"><li>White Rabbit (accuracy &lt;1ns)</li><li>External references (GNSS, Atomic Clocks)</li></ul> |
| WR                          | Supports GM/ Master/ BC/ Slave modes   |
| PTP<br>IEEE 1588-2008       | Supports Master mode, E2E/P2P, L2/L3, Multicast/Unicast.<br>Supported Profiles: <ul style="list-style-type: none"><li>Default</li><li>G.8265.1[1]</li><li>G.8275.1 [1][2]</li><li>IEEE C37.238-2011[1]</li><li>IEEE/IEC 61850-9-3 [1]</li></ul>          |
| NTP                         | Supports Client & Server modes<br>Supports NTP v2, v3 & v4<br>Supports hardware timestamping   |
| IRIG-B (optional)           | Supported via configurable BNC outputs   |
| Holdover<br>(optional)      | Accuracy (learning 3 days from GNSS)<br>below 1.5us @ 24h  |
| Management & Communications |  |
| Control                     | CLI & Web-GUI: HTTP(s)   |
| Authentication              | <ul style="list-style-type: none"><li>RADIUS</li><li>TACACS+</li></ul>   |
| Monitoring                  | <ul style="list-style-type: none"><li>SNMPv3 (SNMPv2) + Traps with enterprise MIB</li><li>Smart-Alerts</li><li>REST-API</li></ul>  |
| Network                     | <ul style="list-style-type: none"><li>SSHv2 (OpenSSH 8.1) + SFTP/SCP</li><li>HTTP(s)</li><li>DHCP</li><li>LLDP</li><li>Rsyslog</li></ul>   |

[1]: PTP License not included in default package

[2] Not supported in firmware version v5.0

## Security Features

- Configurable Password Policy
- Authentication: RADIUS; TACACS+
- Enable/Block protocols
- SFTP/SCP: Securely transfers files to and from the device over an SSH session
- SNMP v3: Remotely configure and manage over an encrypted connection
- HTTPS support
- Firewall configuration
- Alert notifications via SNMP traps and email
- Signed software updates

## Specifications: 10MHz output

| Phase noise (dBc/Hz) | GM     | Slave  |
|----------------------|--------|--------|
| 1 Hz                 | -86.2  | -76.5  |
| 10 Hz                | -87.6  | -79.7  |
| 100 Hz               | -107.2 | -112.4 |
| 1 kHz                | -140.8 | -143.6 |
| 10 kHz               | -143.0 | -145.3 |
| 100 kHz              | -146.0 | -149.1 |

Signal waveform & Levels: LVTTTL into 50 ohm, SMA

## Specifications: 1PPS output

|   |          |
|---|----------|
| Accuracy when locked (WR or ext. reference)                                   | < 1ns    |
| Holdover (after 3 days locked to GNSS reference)<br>*requires Holdover option |          |
| After 4 hours   | < 100 ns |
| After 8 hours   | < 500 ns |
| After 24 hours  | < 1.5us  |

Signal waveform & Levels: LVTTTL into 50 ohm, SMA

## Front Panel

|              |   |
|--------------|---|
| UART         | <ul style="list-style-type: none"> <li>• RS232 Serial, RJ45 connector (Management)</li> <li>• 1x ARM Mini- USB (B) UART (Management)</li> </ul>   |
| Ethernet     | 2x 100/1000 Base-T RJ45 (Management NTP)  |
| SFP Ports    | 2x 1GbE for timing distribution (W WR/PTPv2/NTP selectable)   |
| Timing I/O   | 5x SMA connectors (3V @50Ω, TTL compatible): <ul style="list-style-type: none"> <li>• 10 MHz SIN OUT (LVTTTL)</li> <li>• 10MHz OUT (LVTTTL)</li> <li>• PPS OUT (LVTTTL)</li> <li>• PPS IN (LVTTTL)</li> <li>• 10MHz IN (TTL/CMOS/ECL/clipped sine)</li> </ul> |
| LCD display  | Information panel for alerts and basic network configuration  |
| LEDs         | 3xLEDs for status information   |
| BNC Fanout   | 32x BNC configurable outputs divided in 2 blocks: <ul style="list-style-type: none"> <li>• A&amp;B: 10MHz/xPPS/IRIG-B (LVTTTL, with selectable 50Ω termination).</li> <li>• C&amp;D: xPPS/IRIG-B (LVTTTL, with selectable 50Ω termination).</li> </ul>        |
| Power supply | 2x Redundant & Hot-swappable <ul style="list-style-type: none"> <li>• 100-240 VAC, 50-60 Hz</li> <li>• 48 VDC modules available (optional)</li> <li>• 50W (max. 80W)</li> </ul>   |

## Physical Specification

|                |   |
|----------------|---|
| Dimension      | 428 mm x 88 mm x 220 mm (Designed for EIA 19" rack) |
| Color          | White (Metallic)                                    |
| Certifications | ROHS, FCC, CE, SE                                   |
| Soldering      | IPC-A-610 Ver E Class 2                             |

## Environmental Conditions

|             |               |
|-------------|---------------|
| Temperature | -10°C ~ +50°C |
| Humidity    | 0% ~ 90% RH   |

## Ordering information

|                               |                     |
|-------------------------------|---------------------|
| Base unit                     | P/N: EQP-TP32BNC-02 |
| <b>Product configuration</b>  | <b>P/N</b>          |
| WR ZEN TP-32BNC with Holdover | EQP-TP32BNC-03      |



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