ELECTRONICS & DEFENSE

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
hw version >v4.0

The WR-ZEN TP-32BNC is 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.
- Seamless failover mechanisms & Holdover.
- Robusteness & Redundancy.
- 32x Configurable timing ouputs.
- Built-in precise timing sources monitoring.
- Support for HATI

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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 and Synchronous Ethernet 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.

Precise timing sources monitoring
The WRZ-OS incorporates a precise timing sources monitoring system which allow to evaluate the synchronization performance of multiple timing sources (WR, PTP, 1PPS+10MHz) received in the unit. Relevant metrics are computed and can be visualized in the WebUI. The monitoring data is collected and stored in a built-in database that can be exported using the integrated management tools.

Resiliency
The WR-ZEN devices incorporates seamless failover mechanisms to switch between multiple timing sources when a failure is detected, ensuring maximum availability and optimal synchronization performance even during the transitions. 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..

Low jitter enhacement
The low jitter/low phase noise version of the WR-ZEN TP 32 BNC includes improved clock circuitry in order to enhance the stability and accuracy of the timing outputs. As result of the improved performance, the WR-ZEN TP-FL is able to meet the most demanding requirements in terms of time and frequency distribution.

Technical Specifications

Timing & Synchronization	
Multi-sources	*Failover mechanism to ensure continuous operation by switching over multiple timing sources in case of failure:* • White Rabbit (accuracy <1ns) • External references (GNSS, Atomic Clocks) • PTP • NTP (Time of Day only) *Precise timing sources monitoring to evaluate the synchronization performance of multiple sources.*
WR	Supports HATI (Safran's High Accuracy IP Core) / Supports GM/ Master/ BC/ Slave modes
PTP IEEE 1588-2008	Supports GM/ Master/ BC/ Slave modes, E2E/P2P, L2/L3, Multicast/Unicast. Support for using PTP timing sources for WR fanout Supported Profiles: • Default • G.8265.1[1] • G.8275.1 [1][2] • IEEE C37.238-2011[1] • IEEE/IEC 61850-9-3 [1] • Enterprise [1] • IEEE 1588-2019 HA [1]
NTP	Supports Client & Server modes Supports NTP v2, v3 & v4 Supports hardware timestamping Multiple servers configuration NTS support
IRIG-B (optional)	Supported via configurable BNC outputs
SyncE	Available in all PTP ports Supports key sections of the ITU-T G.8261, G.8262 & G.8264
Holdover (optional)	Accuracy (learning 3 days from GNSS) below 1.5us @ 24h
Management & Communications	
Control	CLI & Web-GUI: HTTP(s)
Authentication	• RADIUS, TACACS+
Monitoring	• SNMPv3 (SNMPv2) + Traps with enterprise MIB, Smart-Alerts, REST-API
Network	• SSHv2 + SFTP/SCP, HTTP(s), DHCP, LLDP, Rsyslog

[1]: PTP License not included in default package

Security Features

- 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

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: LVTTL into 50 ohm, SMA

Specifications: 1PPS output

Accuracy when locked (WR or ext. reference)	< 1ns
Holdover (after 3 days locked to GNSS reference) *requires Holdover option	
After 4 hours	< 100 ns
After 8 hours	< 500 ns
After 24 hours	< 1.5us
Signal waveform & Levels: LVTTL into 50 ohm, SMA	

Front Panel

UART	• RS232 Serial, RJ45 connector (Management) • 1x ARM Mini- USB (B) UART (Management)
Ethernet	2x 100/1000 Base-T RJ45 (Management, NTP)
SFP Ports	2x 1GbE for timing distribution (WR/PTPv2/NTP selectable)
Timing I/O	5x SMA connectors (3V @50Ω, TTL compatible): • 10 MHz SIN OUT (LVTTL) • 10MHz OUT (LVTTL) • PPS OUT (LVTTL) • PPS IN (LVTTL) • 10MHz IN (TTL/CMOS/ECL/clipped sine)
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: • A&B: 10MHz/xPPS/IRIG-B (LVTTL, with selectable 50Ω termination). • C&D: xPPS/IRIG-B (LVTTL, with selectable 50Ω termination).
Power supply	2x Redundant & Hot-swappable • 100-240 VAC, 50-60 Hz • -48 VDC modules available (optional) • 50W (max. 80W)

Physical Specification

Dimension	428 mm x 88 mm x 220 mm (Designed for EIA 19" rack)
Color	White (Metallic)
Weight	4.2 kg

Environmental Conditions

Temperature	Operational: -10 to +50 ºC Storage: -30 to +70 ºC
Humidity	0% ~ 90% RH

Agency approvals

Certifications	CE, TUV, FCC part 15 class A, RoHS, REACH, WEEE

Ordering information

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

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