ELECTRONICS & DEFENSE

WHITE RABBIT Z16

The reliable precise time fan-out for White Rabbit distribution on 1G Ethernet-based networks.

The reliable precise time fan-out for White Rabbit distribution on 1G Ethernet-based networks. The WR-Z16 is a standalone device with 16 SFP connectors which provides sub-nanosecond accuracy time over plug-and-play fiber links.

The WR-Z16 provides very precise IEEE 1588 (PTP) in all its optical interfaces and supports NTP interoperability. Picosecond-level frequency distribution is available through digital clock.

The WR-Z16 incorporates failover mechanisms which combine multi-source redundancy and holdover capabilities to ensure continued operation.

High Accuracy

The WR-Z16 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.

Safran Electronics & Defense is with you every step of the way, building in the intelligence that gives you a critical advantage in observation, decision-making and guidance.

SAFRAN

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Interoperability

Placed at the top of the rack the WR-Z16 can distribute standard PTP IEEE 1588-2008 for the last hop through its 16x fiber ports using the most common profiles such as Telecoms profiles (G.8265.1, G.8275.1) & Power profiles (IEEE C37.238-2011). It also provides NTP interoperability and 10MHz/PPS distribution.

Resiliency

To ensure continuous operation the WR-Z16 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 rethinking to allow straightforward configuration from the terminal to advanced users.

Advanced Management

The WR-Z16 enables extensive monitoring via SNMP including the combination of smart alerts with traps. By providing templates, it facilitates its integration within InfluxDB, Graphana and Zabbix tools. Moreover, it allows automatic topology discovery via LLDP and comprehensible remote logging through rsyslog.

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.

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Technical Specifications

System On-Chip	
SoC	Xilinx Zynq series
CPU	Dual ARM® Cortex™-A9 MP@ 1 GHz
Memory	• 512 MB DDR3 (32-bit bus) • 16GB SD Card
Timing	
Multi-sources	Failover mechanism to ensure continuous operation by switching over several timing sources in case of failure: • White Rabbit (accuracy <1ns) • External references (GNSS, AC)
PTP IEEE 1588-2008	• Supported Profiles: • Default • G.8265.1[1] • G.8275.1[1] • IEEE C37.238-2011[1] up to 16 clients
NTP	NTP v2, v3 & v4
Holdover (optional)	Accuracy (learning 3 days from GNSS) • < 100ns @ 4h • < 500ns @ 8h • < 1.5us @ 24h
Management	
OS	Linux (Kernel v4.9 & buildroot)
Control	CLI & Web-GUI: HTTP(s)
Authentication	• RADIUS • TACACS+
Monitoring	• SNMPv3 (SNMPv2) + Traps • Smart-Alerts
Network	• SSHv2 (OpenSSH 7.8) + SFTP/SCP • DHCP • LLDP • Rsyslog
Physical Specification	
Dimension	431 mm x 44 mm x 330 mm
Color	White (Metallic)
Certifications	ROHS, FCC, CE
Environmental Conditions	
Temperature	-10°C ~ +50°C
Humidity	0% ~ 90% RH

HIGHLIGHTS
Sub-nanosecond time accuracy
16 optical timing ports for WR and PTPv2
Multi-source time references
Distance range over 80 km using fiber
Linux OS
Datacenter Optimized design
Failover mechanisms
Holdover capability
Extended monitoring and management
Redundant hot swappable power supply & fans
Health monitoring

Front Panel

UART	RS232 Serial (RJ45 connector)
Ethernet	2x 100/1000 Base-T RJ45
SFP Ports	16x 1GbE for timing distribution (WR/PTPv2 selectable)
Clocks I/O	4x SMA connectors (3V @50Ω, TTL compatible): • 10MHz OUT (LVTTL) • PPS OUT (LVTTL) • PPS IN (LVTTL) • 10MHz IN (TTL/CMOS/ECL/clipped sine)

Back Panel Modules

Power Supply	2x Redundant & Hot-swappable • 100-240VAC, 50-60 Hz • 50W (max. 80W)
Fan	2 x Swappable fan modules Airflow: blowing out

[1]: License not included in default package

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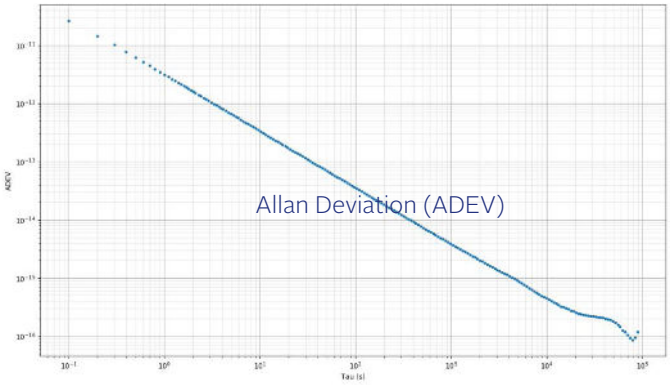
Phase noise (dBc/Hz)

	1 Hz	10 Hz	100 Hz	1 KHz	10 KHz	100 KHz
GM (with external reference)	-97.4	-105.2	-117.7	-140.0	-145.7	-145.2
1st hop slave	-92	-100.5	-119.8	-138.9	-145.3	-140.9
2nd hop slave	-90.2	-98.6	-117.6	-138.6	-143.9	-138.9

Long term stability (Allan Deviation)

0.1 s	1 s	10 s	100 s	1000 s	10000 s	80000 s
2.64^{-11}	3.13^{-12}	3.27^{-13}	3.65^{-14}	3.91^{-15}	4.50^{-16}	8.53^{-17}

ENBW 5 Hz



**Measurements taken in temperature-controlled test environment.*

Ordering information

P/N: EQP-WR-Z16-01

Low jitter expansion module

The low jitter expansion module for the WR-Z16 (optional) includes improved clock circuitry in order to improve the stability and accuracy of the timing outputs. As result of the improved performance, the WR-Z16 is able to meet the most demanding requirements in terms of time and frequency distribution.

P/N: EQP-WR-Z16-LJ-01

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