

WHITE RABBIT Z16



SEVEN
Solutions

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.

Technical Specifications / WR-Z16

System On-Chip	
SoC	Xilinx Zynq series
CPU	Dual ARM® Cortex™-A9 MP@ 1 GHz
Memory	<ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • White Rabbit (accuracy <1ns) • External references (GNSS, AC)
PTP IEEE 1588-2008	<ul style="list-style-type: none"> • 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 (<i>learning 3 days from GNSS</i>) <ul style="list-style-type: none"> • < 100ns @ 4h • < 500ns @ 8h • < 1.5us @ 24h
Management	
OS	Linux (Kernel v4.9 & buildroot)
Control	CLI & Web-GUI: HTTP(s)
Authentication	<ul style="list-style-type: none"> • RADIUS • TACACS+
Monitoring	<ul style="list-style-type: none"> • SNMPv3 (SNMPv2) + Traps • Smart-Alerts
Network	<ul style="list-style-type: none"> • 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): <ul style="list-style-type: none"> • 10MHz OUT (LVTTTL) • PPS OUT (LVTTTL) • PPS IN (LVTTTL) • 10MHz IN (TTL/CMOS/ECL/clipped sine)

Back Panel Modules



Power Supply	2x Redundant & Hot-swappable <ul style="list-style-type: none"> • 100-240VAC, 50-60 Hz • 50W (max. 80W)
Fan	2 x Swappable fan modules Airflow: blowing out

[1]: License not included in default package

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.

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

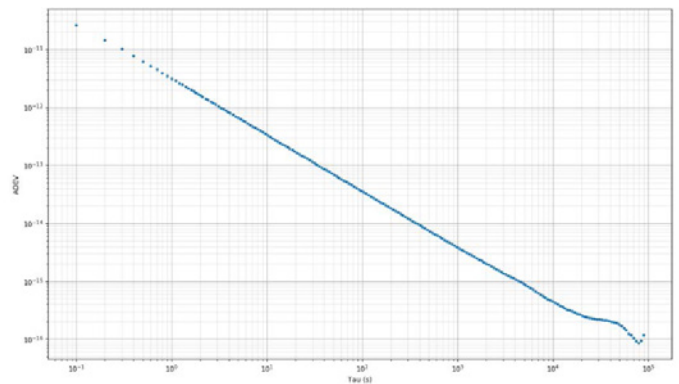


Long term stability (Allan Deviation)

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

ENBW 5 Hz

Allan Deviation (ADEV)



*Measurements taken in temperature-controlled test environment.

Ordering information

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