The Global Leader in
Resilient **PNT**

White Rabbit Switch - Low Jitter

The **White Rabbit Switch Low Jitter** is a new version of the White Rabbit Switch which counts with a series of improvements that enable its use in more demanding time and frequency distribution applications.

The WRS-LJ distributes Time and Frequency within sub-nanosecond accuracy to thousands of nodes through standard optical fiber, providing very low noise and accurate timing outputs.

The WRS-LJ provides deterministic delivery and a reliable communication. Currently, highly demanding industrial and scientific facilities in more than fourteen countries are already using WR Switches for time-critical applications.

System On-Chip	
FPGA	Xilinx Virtex-6
CPU	ARM Atmel AT91 SAM9G45
Core	400MHz (ARM926E)
Memories	64MB DDR2 (16-bit bus chip), 256MB NAND flash chip

Timing protocols	
White Rabbit	Supported on 18xSFP ports
IEEE1588-2008 (PTP)	Default profile (layer 2) supported on 18xSFP ports
NTP	NTP v2, v3 & v4 supported in Ethernet interfaces. ToD supported via NTP.

Front Panel	
Clocks I/O	5 SMC coaxial connectors(male): • 10 MHz reference clock input (GPS/Cesium), 50 ohm • 10MHz & 62.5 MHz output reference clock, 50 ohm • 1xPPS Input & 1xPPS Output, 50 ohm
Ports	18 x SFP cages* * SFP transceivers are not included in all packages. Seven Solutions recommends 1.25Gbps, 1490/1310 nm, Single Fiber Bi-directional SFP.
Management	100Base-T Ethernet (Remote) USB Mini-B (Local)

Back Panel	
Debug	USB Mini-B FGPA, USB Mini-B ARM
Input port	RS232

Certification	
Several	ISO-9001, ISO-14001, CE, RoHS,FCC,SE

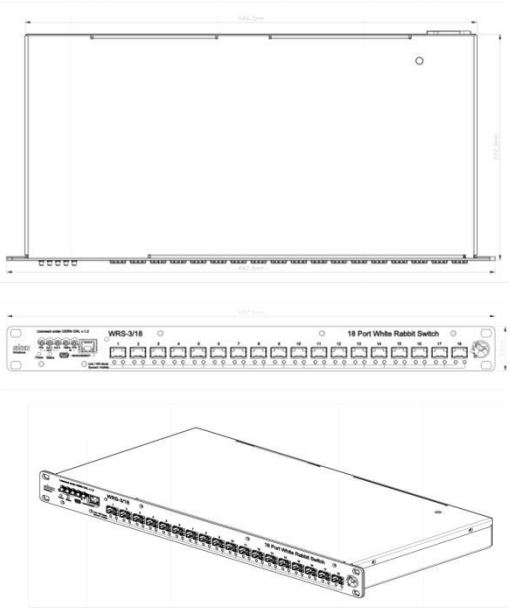
Power Supply	
Input	100-240VAC, 2.0A 50-60 Hz
Output	12V DC, 6.66A – 80W max

HIGHLIGHTS

- Sub-nanosecond time accuracy
- 18 SFP 1GbE ports
- Time and frequency distribution
- Distance range over 100km in 1-hop
- Remote monitoring
- Improved clocking design in HW and FPGA
- Cleaner and more accurate 1PPS output.
- Improved clock jitter and phase noise.
- Lower power consumption and better thermic dissipation
- High reliability and improved MTFB

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

Physical Specification	
Dimension	447 mm x 44 mm x 223 mm
Color	White (Metallic)



Monitoring	
Internal tools	1 SNMP (Supports v1, v2c, and v3 with Enterprise MIB)
External tools	Icinga, Grafana, MySQL

SNMP set of data is provided to be used by Icinga and integrated with MySQL. Grafana can be added on the top of the monitoring system for extracting the information introduced by Icinga in the database and visualizing in graphical interface.

Management	
OS	Linux (Kernel v3.16.38)
Switching	IEEE802.1x protocols (multicasting, spanning tree, GMRP/-GARP) VLAN Tagging SNMP switch management
Control	CLI & Web-GUI: HTTP(s)
Network	TCP/IP, SSH, SNMP, NTP, TFTP, DHCP, ARP, DNS

Clock performance (10 MHz output)

Phase noise (dBc/ Hz)

	1 Hz	10 Hz	100 Hz	1 KHz	10 KHz	100 KHz
GM	-97.1	-105.2	-117.7	-140,00	-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)

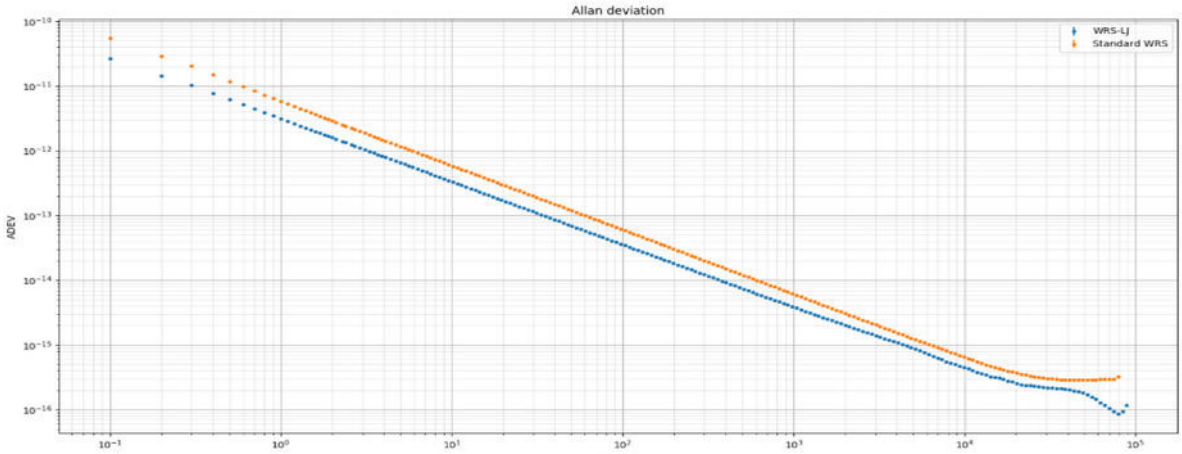
0.1 s	1 s	10 s	100 s	1000s	10000 s	80000s
2.64E-11	3.13E-12	3.27E-13	3.65E-14	3.91E-15	4.50E-16	8.53E-17

ENBW 5 Hz

Signal waveform: LVTTL, 50 ohm, SMC connector

Comparison with standard WR Switch

PPS output	
Stability	<10ps
Signal waveform	LVTTL, 50 ohm, SMC connector



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