



## WHITE RABBIT SWITCH

### WRS

It is the **main element** of the White Rabbit Technology. It **distributes Time and Frequency** within a sub-nanosecond accuracy to thousands of nodes through **standard optical fiber**.

The WRS provides deterministic delivery and a reliable communication using redundant network topology. In addition, the WR-Switch dynamically calibrates timing links. Currently, highly demanding industrial and scientific facilities in more than fourteen countries are already using the WR-Switch for time- critical applications.



# Technical Specifications / WRS

## FPGA

<b>Type</b>	Xilinx Virtex-6 (LX240T)
<b>Package</b>	1156-pin BGA
<b>Slices</b>	37,680 (4 LUTs and 8 flip-flops)
<b>Memories</b>	416x36 Kb Block RAM
<b>Softcore</b>	LatticeMico32 (LM32)
<b>I/O</b>	20 GTX transceivers for SFP links 40 GPIO for generic purpose (LEDs, SFP detection, ...)
<b>Monitoring</b>	Monitoring power supply Temperature sensor control

## On-Chip Clock Generation

<b>PLL</b>	AD9516 (14-Output Clock Generator with Integrated 1.6 GHz VCO)
<b>Synthesizer</b>	TI CDCM61002RHBT (28-683MHz)
<b>DAC</b>	2xAD5662BRJ (16bit; 2.7-5.54V)

## Front Panel

<b>Clocks I/O</b>	5 SMC coaxial connectors: <ul style="list-style-type: none"> <li>10 MHz reference clock input (GPS/Cesium)</li> <li>10MHz &amp; 62.5 MHz output reference clock</li> <li>1xPPS Input &amp; 1xPPS Output</li> </ul>
<b>Ports</b>	18 x SFP cages* <i>*SFP transceivers are not included in all packages. Seven Solutions recommends 1.25Gbps, 1490/1310 nm, Single Fiber Bi-directional SFP.</i>
<b>Management</b>	100Base-T Ethernet (Remote) USB Mini-B (Local)

## Back Panel

<b>Debug</b>	USB Mini-B FPGA USB Mini-B ARM
<b>Input port</b>	RS232

## Certification

<b>Soldering</b>	IPC-A-610 Rev E Class 2
<b>Others</b>	ISO-9001, ISO-14001, CE, RoHS,FCC,SE

## Power Supply

<b>Input</b>	100-240VAC, 2.0A 50-60 Hz
<b>Output</b>	12V DC, 6.66A – 80W max

## Environmental Conditions

<b>Temperature</b>	-10°C ~ +50°C
<b>Humidity</b>	0% ~ 90% RH

## HIGHLIGHTS

- ✓ Sub-nanosecond time accuracy
- ✓ Thousands of nodes
- ✓ 18 SFP 1GbE ports
- ✓ Time and frequency distribution
- ✓ Remote monitoring
- ✓ Dynamic calibration
- ✓ Open hardware

## CPU

<b>Type</b>	ARM Atmel AT91 SAM9G45
<b>Core</b>	400MHz (ARM926E)
<b>Memories</b>	64MB DDR2 (16-bit bus chip) 256MB NAND flash chip
<b>I/O</b>	32bit Async Bridge with FPGA 100Base-T Ethernet

## Software

<b>OS</b>	Linux (Kernel v2.6.39)
<b>Timing</b>	White Rabbit
<b>Switching</b>	IEEE802.1x protocols (multicasting, spanning tree, GMRP/-GARP) VLAN Tagging SNMP switch management
<b>Protocols</b>	TCP/IP, SSH, SNMP, NTP, TFTP, DHCP, ARP, DNS

## Physical Specification

<b>Dimension</b>	447 mm x 44 mm x 223 mm
<b>Color</b>	White (Metallic)

