

# SPIDER-HUB

HARDWARE SPECIFICATIONS (VERSION 1.0)



## INTRODUCTION

Designed and manufactured by Crystal Instruments, the Spider-HUB Ethernet switch supports the latest IEEE 1588v2 technology to fulfill precision time synchronization requirements for data acquisition and control applications. The Spider-HUB guarantees time-stamping accuracy within 50 nanoseconds and can be configured for 1588v2 Master, Boundary Clock, and Transparent Clock functionality.

With a total of ten Ethernet ports, the modular design of the Spider-HUB makes network planning easy, allowing for greater flexibility and quick expansion of multiple switches. Along with a choice of either front or rear wiring, its small size footprint and low energy consumption make the Spider-HUB suitable for a variety of industrial applications including high speed data acquisition and dynamic signal measurement.

The Precision Time Protocol (PTP), as defined in IEEE 1588v2, synchronizes the real-time clocks of devices in the network with nanosecond accuracy. Clocks are organized into a master-member hierarchy. PTP identifies the switch port that is connected to a device with the most precise clock, which is considered the Master Clock. All other devices on the network synchronize their clocks with the master and are referred to as members. Continually exchanged timing messages ensure synchronization. PTP is particularly useful for data acquisition, industrial automation systems and process control networks, where motion and precision control of instrumentation and test equipment are important. IEEE 1588 can be used together with Synchronous Ethernet (SyncE) to ensure the high quality transport of timing information across the network.

The IEEE 1588v2 and SyncE implementation on the Spider-HUB allow network devices to accurately time synchronize up to 20 ns with locked phase.

## PRODUCT DATA

MECHANICAL PARAMETERS	
<b>Ethernet Ports</b>	<ul style="list-style-type: none"> <li>• 10 ports (RJ45)</li> <li>• Supports up to 8 Spider front-ends (Spider front-ends are data acquisition and measurement devices produced by Crystal Instruments.)</li> </ul>
<b>Performance</b>	<ul style="list-style-type: none"> <li>• 10, 100, and 1000 Mbit/s line speed full or half duplex and autosensing of 10, 100 and 1000 Mbit/s port speeds;</li> <li>• Optionally programmable to fixed port speed; speed matching between 10, 100 and 1000 Mbit/s ports</li> </ul>
<b>Power Connector</b>	<ul style="list-style-type: none"> <li>• 2.5 mm center-pin power jack</li> </ul>
<b>A/C D/C Adapter</b>	<ul style="list-style-type: none"> <li>• 110 – 250 V<sub>AC</sub> Input, 15 V<sub>DC</sub> output, Max Amps 3 A</li> </ul>
<b>Size (H x W x D)</b>	<ul style="list-style-type: none"> <li>• 35 mm x 243 mm x 177 mm (1.38" x 9.57" x 6.97")</li> </ul>
<b>System Weight</b>	<ul style="list-style-type: none"> <li>• 1.28 kg (2.82 lbs)</li> </ul>
ENVIRONMENTAL RANGES	
<b>Humidity</b>	<ul style="list-style-type: none"> <li>• Operating humidity: 10% to 95% relative humidity, non-condensing</li> </ul>
<b>Temperature</b>	<ul style="list-style-type: none"> <li>• Operating: 0 to 40°C (32 to 104°F)</li> <li>• Non-operating: -10 to 70°C (14 to 158°F)</li> </ul>
<b>Shock</b>	<ul style="list-style-type: none"> <li>• Operating: 20 g, 6 ms half-sine</li> <li>• Non-operating: 33 g, 11 ms, Half sine</li> </ul>
<b>Vibration</b>	<ul style="list-style-type: none"> <li>• Operating: 0.5 g sine,</li> <li>• 0.4 grms random, 5 to 500 Hz</li> <li>• Non-operating: 2.0 g sine,</li> <li>• 1.1 grms random, 5 to 500 Hz</li> </ul>
POWER CONSUMPTION	
<b>System power consumption</b>	<ul style="list-style-type: none"> <li>• Average: 21 Watts</li> <li>• Max: 25 Watts</li> </ul>
<b>Input voltage range</b>	<ul style="list-style-type: none"> <li>• 10.8 – 18 VDC</li> </ul>
<b>Inrush current</b>	<ul style="list-style-type: none"> <li>• Maximum of 21.5 Amps for period between 10 to 150 ms at 50°C, hot or cold start</li> </ul>
SAFETY CERTIFICATIONS	
<b>Complies with the following safety certifications:</b>	<ul style="list-style-type: none"> <li>• Nemko EN60950:2000</li> <li>• TUV EN60950:2000 / IEC60950:1999</li> <li>• Low Voltage Directive (73/23/EEC) for CE Marking in European Union</li> </ul>
NETWORK FUNCTIONS	
<b>General Functions</b>	<ul style="list-style-type: none"> <li>• L2 fully managed switch turnkey solution</li> <li>• Green Ethernet power savings</li> <li>• Stacking: single point of management (SPOM), shortest path forwarding, and superior master re-elect performance</li> <li>• eCOS OS for small footprint and low bill of materials (BOM) cost</li> <li>• Efficient Web design easy to customize</li> <li>• Strong security support through authentication protocols and DOS</li> <li>• CLI and SNMP management</li> </ul>
<b>Port Control</b>	<ul style="list-style-type: none"> <li>• Port speed, duplex mode, and flow control</li> <li>• Port frame size (jumbo frames)</li> <li>• Port state (administrative status)</li> <li>• Port status (link monitoring)</li> <li>• Port statistics (MIB counters)</li> <li>• Port VeriPHY (cable diagnostics)</li> <li>• Power savings, ActiPHY, and PerfectReach</li> </ul>

<b>QoS</b>	<ul style="list-style-type: none"> <li>• Traffic classes (1, 2, or 4/8 active priorities)</li> <li>• Port default priority</li> <li>• User priority, Scheduler priority</li> <li>• QoS control list (QCL mode)</li> <li>• Storm control for UC, MC, and BC</li> <li>• Policing and shaping per port and per queue</li> </ul>
<b>L2 Switching</b>	<ul style="list-style-type: none"> <li>• IEEE 802.1D Bridge, auto MAC address learning/aging and MAC addresses (static)</li> <li>• IEEE 802.1Q static VLAN</li> <li>• Private VLAN (static)</li> <li>• Port isolation (static)</li> <li>• IEEE 802.1Q-2005 Rapid spanning tree (RSTP)</li> <li>• IEEE 802.3ad Link Aggregation, static and LACP</li> <li>• IGMPv2 snooping</li> <li>• Voice VLAN</li> <li>• DHCP client, DHCP snooping</li> <li>• DNS client proxy</li> <li>• ARP inspection</li> <li>• Port mirroring</li> </ul>
<b>Security</b>	<ul style="list-style-type: none"> <li>• Port Limit Control</li> <li>• Network Access Server (NAS)</li> <li>• Port-based 802.1X</li> <li>• Multiple 802.1X</li> <li>• Web and CLI authentication and authorization</li> <li>• ACLs for filtering, policing, and port copy, including ACL wizards</li> </ul>
<b>Power Saving</b>	<ul style="list-style-type: none"> <li>• ActiPHY, PerfectReach</li> <li>• Ethernet Energy Efficient power management</li> <li>• LED power management</li> <li>• Thermal protection</li> <li>• Adaptive fan control</li> </ul>
<b>Management</b>	<ul style="list-style-type: none"> <li>• HTTP server</li> <li>• Web with stack management</li> <li>• CLI console port, CLI Telnet</li> <li>• Management access filtering</li> <li>• System Syslog</li> <li>• Software download through Web</li> <li>• SNMPv1/v2c/v3Agent</li> <li>• IEEE 802.1AB-2005 Link Layer Discovery, LLDP</li> <li>• sFlow</li> <li>• Configuration download or upload</li> <li>• Loop detection default restore</li> </ul>
<b>MIBs</b>	<ul style="list-style-type: none"> <li>• RFC 1213 MIB II</li> <li>• RFC 3411 SNMP Management Frameworks</li> <li>• RFC 3621 LLDP-MED Power</li> <li>• RFC 3635 Ethernet-like MIB</li> <li>• RFC 4188 Bridge MIB</li> <li>• Private MIB framework</li> <li>• IEEE 802.1 MSTP MIB</li> <li>• IEEE 802.1AB LLDP MIB</li> </ul>

<b>Clock Synchronous IEEE1588v2 and SyncE</b>	<ul style="list-style-type: none"><li>• Support IEEE 1588v2</li><li>• Five PTP Modes: Ordinary Boundary, P2P-Transparent, E2E-Transparent, Master Only, Slave Only</li><li>• Three Protocols For PTP message deliver: Ethernet; IPv4 Multicast; IPv4 Unicast</li><li>• Support Synchronous Ethernet</li></ul>
<b>Time Sync Accuracy</b>	<ul style="list-style-type: none"><li>• 20 ns, phase-locked</li></ul>

