

>> *RUGGED ETHERNET AND TIMING SOLUTIONS*

OnTime
networks

OVERVIEW

In today's aerospace and defense industries, mobile datacom platforms demand both impeccable synchronization and **rugged reliability**. As pioneers and makers of advanced timing technologies, OnTime Networks delivers proven solutions designed to endure the harsh climates and conditions of airborne, ground and naval defense applications.

Our innovative products incorporate time synchronization support, network clocks and IPs for distribution of precise time over Ethernet, enabling fast and flexible communication among dozens of network devices. With **Precision Time Protocol IEEE 1588** as our core technology, OnTime Networks provides clock accuracy in the submicrosecond range. This makes our solutions especially well suited for communication, measurement and control systems.

OnTime Networks is proud to provide leading-edge technologies for such renowned clients as Airbus, Boeing, Schlumberger, L-3 Communications, Northrop Grumman, Embraer, WesternGeco and Zodiac Aerospace, just to name a few. In addition to our rugged, high-performance products, we offer comprehensive network and software engineering services to help our clients solve unique challenges.

ETHERNET-BASED COMMUNICATION NETWORKS ARE FASTER, MORE FLEXIBLE AND OFFER GREATER FUNCTIONALITY THAN THE LOW-SPEED SERIAL COMMUNICATIONS SYSTEMS USED IN MOST HARSH ENVIRONMENTS.

CAPABILITIES

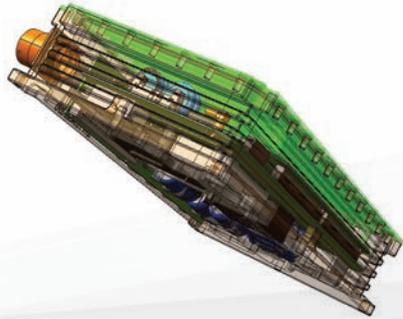
Customers rely on OnTime Networks for our expertise in a wide range of electronic, mechanical and software engineering applications — with a particular focus on **network switching, routing, "tapping" and timing technology**. From feasibility studies and due diligence through component design and turnkey implementation, OnTime Networks follows rigorous development and testing procedures to support even the most demanding timelines and quality control standards.

DEVELOPMENT CYCLE CAPABILITIES

- > Design reviews and architecture studies
- > System architecture and design
- > Electronic circuit design and analysis
- > Real-time software design
- > Control system modeling and design
- > Printed circuit board design
- > Product qualification testing and validation
- > Troubleshooting and reliability analysis
- > Mechanical packaging design

ENGINEERING FOR KEY CONSTRAINTS AND METRICS

- > Low power
- > Low noise
- > SwaP-C optimized
- > High speed up to 10 Gbps
- > Highly integrated, smallest size
- > High reliability
- > Long service life
- > Time synchronization accuracy in sub- μ s range
- > Guaranteed worst-case network latency for latency-sensitive data in sub-ms range



TURNKEY SOLUTIONS

OnTime Networks is a **one-stop solution** provider for finished or embedded Ethernet switching, routing and deterministic networking solutions. Our electrical and mechanical engineers combine technical expertise with creative thinking to take your ideas from concept to market.

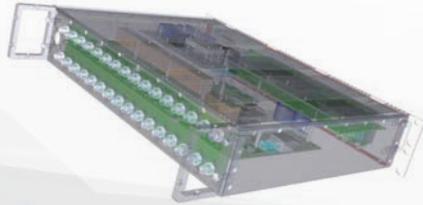
We specialize in rapid hardware and software development for a broad and diverse range of network products and applications, and we take great care to deliver a robust design that meets end-user requirements as well as cost objectives. Our internal processes provide added assurances that OnTime Networks will get it right the first time, keeping things on schedule and on budget by avoiding costly redesigns.

CUSTOM DESIGN

- > Embedded hardware and software design and development
- > System-level architecture and system concept development
- > Prototype production
- > Design verification and validation
- > Hardware production
- > System integration on the platform and with other systems
- > Post-production support
- > Manufacturing

ELECTRICAL ENGINEERING

- > Single-board switches and routers (10/100/1000/10000 Ethernet)
- > I/O interfaces (digital I/O, analog I/O, analog-to-digital designs)
- > Power systems (AC/DC power supplies, low voltage (28V))
- > Diverse application software products
- > Field-programmable gate arrays
- > Embedded Linux, eCos and other operating systems
- > Design optimized for best EMC/EMI and climatic properties



*OUR RUGGED SYSTEMS ADDRESS COMPLEXITY,
ENABLE MODULARITY AND PROVIDE FOR GROWTH.*

SYSTEM DESIGN

Beyond advanced technology and innovative engineering, ultimate test is a product's ability to survive in the real world — not only in challenging environments, but also within your business landscape. That's why our experts are here to guide your program through these and other issues:

- > Business-related requirements, including, cost, schedule and manufacturability
- > Hardware specifications, such as electrical, mechanical and environmental requirements
- > Software documentation controls, responses and system operation
- > Interactions with other engineering components and disciplines
- > Subjective issues in the form of the user interface and human factors

ELECTRONIC CIRCUIT DESIGN & ANALYSIS

Our deep circuit design experience allows us to implement the necessary circuitry to meet customer requirements while avoiding problems induced by EMI, extreme temperature, pressure excursions, and high shock or vibration impetus, to name a few. Our scalable design solutions have included high-speed multiprocessor systems, microcontrollers, power and analog circuits and more — and our extensive experience in diverse markets puts our in-depth understanding of Ethernet switching, routing and timing solutions at your command.

NETWORK ENGINEERING

In order to support applications with strict service demands, OnTime Networks places particular importance on quality of service (QoS), traffic shaping and network redundancy. Our network engineers can help you enhance network utilization and productivity, reduce architecture complexity, increase throughput and agility, and adapt and optimize network systems to meet changing demands. Our network engineering capabilities include:

- > Layout and design of logical and physical network architectures
- > Network optimization, based on QoS and traffic shaping
- > Ethernet hardware selection
- > Project management
- > Network redundancy
- > Security
- > Routing
- > Firewalls
- > Network management
- > Troubleshooting of network problems
- > Copper, wireless, fiber
- > Digital/serial
- > Audio/visual

ENVIRONMENTAL QUALIFICATION TESTING & ANALYSIS

Our engineering team has the know-how to test for compliance, including experience in:

- > Developing individual test plans or coordinating entire test programs
- > Designing test equipment and software
- > MTBF and FMECA analysis
- > Coordinating, monitoring and documenting laboratory tests
- > Troubleshooting and debugging hardware and software solutions
- > Performing successful qualification tests on platforms such as manned and unmanned flight vehicles, ground vehicles, submersibles and ships, including:
 - >> Environmental conditions testing for airborne equipment
 - >> Electromagnetic interference and compatibility testing
 - >> Customer-defined environmental testing

ELECTRONIC MANUFACTURING

When it comes to the manufacture and assembly of your electronic product, OnTime Networks oversees quality at every step. We provide detailed product acceptance test documentation, reports and failure analyses, and we have the ability to perform 100 percent functional testing, at load, of every deliverable unit. In support of these activities, we routinely develop various levels of simulators and automatic test equipment to produce repeatable, static or dynamic test conditions to validate your product or system.

CORE TECHNOLOGIES



IEEE 1588 PTP AND OTHER TIMING SOLUTIONS

OnTime Networks not only helped pioneer the IEEE 1588 standard for precision time protocol — we also invented the IEEE1588 transparent clock, which is a core part of the IEEE1588-2008 (PTPv2) standard. This protocol is used on local area networks to synchronize clocks with accuracy in the submicrosecond range, making it ideal for measurement and control systems.

IEEE 1588 fills a niche not well served by either of the two dominant protocols, NTP and GPS. IEEE 1588 is designed for local systems requiring accuracies beyond those attainable using NTP. It is also designed for applications that cannot bear the cost of a GPS receiver at each node, or for which GPS signals are inaccessible.



ETHERNET SWITCHING

Network switches are networking devices that are used to connect other devices together on a computer network by performing a form of packet switching. Our advanced switching technology provides multiport network-bridging capabilities for processing and forwarding data at the data link layer [layer 2], as well as the ability to route packets [layer 3]. Our switching expertise encompasses various types of networking technologies, including Fibre Channel, Ethernet and others.



ETHERNET ROUTING

Network routers are the devices that direct data traffic between computer networks, forwarding data packets from one router to another until they reach their destination node. OnTime Networks provides sophisticated router solutions that forward data at high speeds along network backbones. Routers are typically dedicated hardware devices; however, OnTime Networks can also provide software-based routing solutions.



POWER OVER ETHERNET

OnTime Networks has developed and produced a number of network-switching solutions that deliver electrical power over Ethernet, also known as PoE. Equipment with PoE functionality allows a single cable to provide both data connectivity and electrical power to devices such as wireless access points or IP cameras. Power may be carried on the same conductors as the data, or on dedicated conductors in the same cable.



FIBER-OPTIC CONNECTIONS

Although we have developed and produced network-switching solutions using copper as well as fiber-optic connections, it's important to note that fiber connections significantly outperform copper, offering greater speeds over longer distances.



RUGGED DESIGN

Sometimes a commercial off-the-shelf solution doesn't meet all the needs of a particular military or aerospace application. OnTime Networks can combine our packaging and design expertise to engineer a solution to satisfy your exact needs, meeting DO-160 or MIL-STD-810 standards. The engineering expertise and problem-solving capabilities of OnTime Networks are comprehensive and industry-tested.



EMBEDDED SOFTWARE APPLICATIONS

Our software engineers develop, document and test deterministic embedded software ranging from simple equipment monitoring to sophisticated, real-time system applications. OnTime Networks can design and implement advanced algorithms using model-based design and perform auto-code generation where advantageous. In addition to real-time embedded software development, OnTime Networks develops graphical user interfaces, providing man-machine interfacing for features such as in-circuit reprogramming, data logging, and system monitoring from on- or off-site locations.



The **CloudberryAERO Series** is a rugged, fully managed, Commercial-Off-The-Shelf (COTS) Gigabit Ethernet switch product line, providing timing solutions according to the IEEE 1588 PTP standard. The product line is optimized for aircraft and military flight test network system applications and comply with RTCA DO-160G, MIL-STD 461D, MIL-STD 704E and MIL-STD 810G standards to enhance network-centric test instrumentation environments onboard airborne platforms.



The **CloudberryMIL Series** is a rugged, fully managed, military-grade Gigabit Ethernet switch product line, providing timing solutions according to the IEEE 1588 PTP standard. The CloudberryMIL products are optimized for military network system applications and comply with MIL-STD 461D, MIL-STD 704E and MIL-STD 810G standards to enhance network-centric systems onboard airborne, ground and naval defense applications. The unit serves as an ideal solution for connecting IP-enabled devices and operates with 28VDC power input.

It is designed for today's modern platforms that demand sophisticated communication technologies and a reduction in system Size, Weight, Power and Cost (SwaP-C) to comply with operational life and budgetary constraints.



The **CloudberrySIS Series** is a rugged, fully managed, Commercial-Off-The-Shelf (COTS) Gigabit Ethernet switch product line, providing timing solutions according to the IEEE 1588 PTP standard. The product line is optimized for advanced sensing, control and measurement network solutions required in the subsea oil and gas industry. The CloudberrySIS products are hardened to withstand high temperature, pressure, water, moisture and humidity and can help monitor, protect, and control critical assets, processes and applications.

WE DELIVER OPTIMAL PERFORMANCE WITHIN GIVEN CONSTRAINTS FOR SPACE, WEIGHT, POWER OR COST.

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