

NSW-16GT

16-Port Gigabit Airborne Network Switch with IEEE 1588 Time

**CURTISS-
WRIGHT**

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Key Features

- 16-port switch consisting of twelve 1000BASE-T ports and four 10GBASE-SR ports
- Ruggedized for airborne applications
- Connects data acquisition systems, control panels, recorders, gateways and network management interfaces and systems
- Supports IEEE 1588 V1 or V2 (configurable on a per-port basis) for distribution of coherent global timing information between network components
- Supports SNMP V2c/V3 network management
- Full line rate non-blocking switching capacity
- Supports 32,768 multicast addresses

Applications

- Airborne networked data acquisition
- High-speed packet switching in harsh environmental conditions includes excessive heat and cold, shock and vibration
- Time coherency distribution over an avionics network
- Airborne high-speed camera systems

Overview

The [NSW-16GT](#) provides packet switching and the IEEE 1588 time distribution necessary to support networked data acquisition components. The switch supports managed operation, allowing for dynamic configuration, statistics gathering and health monitoring using Simple Network Management Protocol (SNMP). IEEE 1588 is supported with an IRIG-B time code reader and generator and a built-in battery-backed real-time clock and GPS receiver.

Additional Features

- Port capabilities and media include
 - + Ports 1-12: 100/1000BASE-T, 10Gb
 - + Ports 1-4: 10GBASE-SR, 1000BASE-SX
- Built-in GPS receiver and IRIG-B time code reader and generator for IEEE 1588 grandmaster clock operation
- Can synchronize IRIG time from 1588 time or 1588 time from IRIG time
- Support for port mirroring
- Rapid and Multiple Spanning Tree Protocols (RSTP, MSTP)
- Link aggregation (IEEE 802.3ad)
- Jumbo frame support
- IGMP v3 snooping
- Support for port and tagged-based VLANs
- Support for Quality of Service (QOS)
- Supports TELNET and SSH (secure shell)
- Configurable via TTCWare, CLI and web page
- Field upgradable
- Compatible with Curtiss-Wright networked acquisition and recording systems

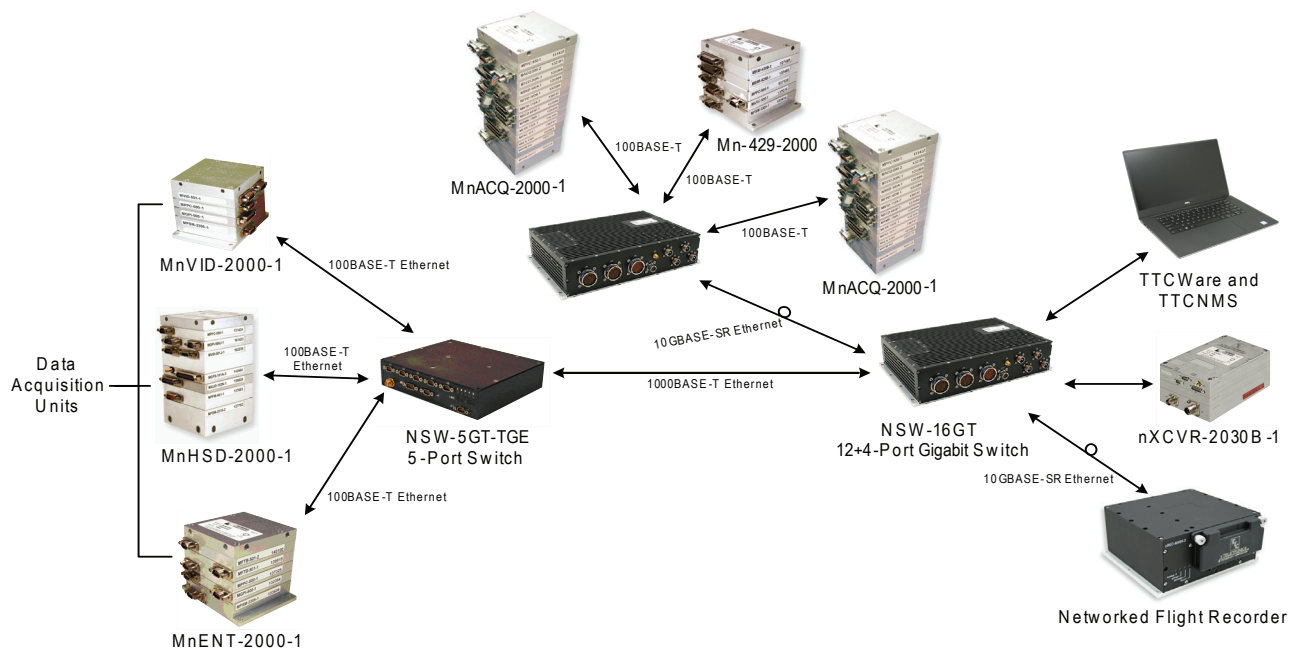


Figure 1: Gigabit airborne switch network diagram

Specifications

Electrical

- Power input: 22 to 36VDC
- Supply current: 0.7A @ 28V typical
- Power consumption: 20W typical
- Grounding: Isolated power, signal and chassis grounds

Environmental

- Temperature:
 - + Operating: -40°C to +85°C (ambient)
 - + Storage: -55°C to +100°C
- Random vibration: 15 Grms, 20 to 2,000 Hz, 10 minutes, any axis
- Acceleration: 25 G indefinite duration, any axis
- Shock: 15 G, half-sine, 11 ms, 6 shocks, any axis
- Humidity: 5-95% RH, non-condensing
- Altitude: 0 to 70,000 ft.
- EMI/EMC: Per MIL-STD-461

Dimensions and Mechanical

- Dimensions (W x L x H): 10.75 x 7.0 x 2.5" (273.1 x 177.8 x 63.5 mm)
- Weight: 6.67 lbs (3.03 kg)
- Interface: Front panel RGB LEDs

GPS Antenna

- Source impedance: 50-ohm, passive and active software selectable antennae
- Active antenna recommendations:
 - + Minimum gain 10 to 15 dB (compensates for signal loss in RF cable)
 - + Maximum noise 1.5 dB
 - + Maximum gain 45 dB
- RF input power: -61 dBm (max)
- Output current: 100 mA max (short circuit protected)
- Voltage levels:
 - + Passive antenna: 0V
 - + Active antenna: 3.3V or 5V
- Sensitivity (normal mode):
 - + Acquisition: -138 dBm
 - + Tracking: -146 dBm

Switching

- Multicast addresses: 32K (max)
- MAC addresses: 32K (max)
- Packet forwarding: Full line rate
- Switch management: Fully managed using SNMP

Network Ports

- Number of ports: 12 + 4
- Port speed:
 - + Ports 1-12: 100/1000BASE-T
 - + 10G Ports 1-4: 10GBASE-SR, 1000BASE-SX
- Interface type:
 - + Ports 1-12: Electrical
 - + 10G Ports 1-4: Optical, 50/125µm Multimode Fiber

IRIG-B

- IRIG-B AC input:
 - + 15 K-Ohm input impedance @ 1 KHz
 - + 0.5Vpp to 5Vpp input voltage range
 - + 1:6 to 1:3 input amplitude modulation index
- IRIG-B AC output:
 - + Adjustable output voltage level:
 - › 0 to 6Vpp (> 10K-Ohm load)
 - › 0 to 5Vpp (@ 100 Ohm load)
 - › 0 to 4Vpp (@ 50 Ohm load)
 (The default output level is 5Vpp @ > 10 K-Ohm)
 - + 1:3 amplitude modulation index
 - + Maximum output current: 250 mA (internally limited)
- IRIG-B DC input:
 - + RS-422 level compatible
 - + Selectable 120 Ohm termination resistor
 - + Differential input threshold voltage: 200 mV
- IRIG-B DC output:
 - + RS-422 level compatible
 - + Differential output @ 100 Ohm: 2.0V minimum

IEEE 1588 Time Support

- Operation: IEEE 1588 master, slave, transparent and boundary clock for V1 or V2
- Timing synchronization: < 50 nsec point to point
- Internal clock: ± 0.28 PPM over temperature range; free-running function during loss of synchronization with master clock. ± 3.5 PPM while powered down

- Time source:
 - + IRIG-B reader
 - + External grandmaster
 - + Built-in GPS receiver
 - + Internal battery-backed real-time clock

Flexible I/O (FIO)

- Six (6) flexible I/O signals configurable as
 - + RS-422/485 input, with or without termination
 - + RS-422/485 output
 - + TTL compatible input
 - + TTL compatible output
- FIO Output functions:
 - + 1 pulse per second
 - + Built-in self test (BIST) status
 - + Time lock status
 - + Pulse generator
 - + IRIG-B DC

General-Purpose I/O (GPIO)

- Five (5) TTL compatible general-purpose I/O signals
- One (1) electrically isolated general-purpose I/O signal
 - + Configurable as input or output
- GPIO output functions:
 - + 1 pulse per second
 - + Built-in self test (BIST) status
 - + Time lock status
 - + Pulse generator (TTL GPIO only)
 - + IRIG B (TTL GPIO only)

Additional Ports

- Time: 1PPS output
- GPS antenna connector: Sub-miniature A (SMA)
- One RS-232/422 port: Diagnostic/factory use only
- One RS-232 port: Management console

Switching Requirements

For Avionics Networks

Responsible for directing packets to and from network nodes, the packet switch is the core of the data acquisition network. Network Products' network nodes include data acquisition units, flight recorders and telemetry transceivers. Expansion is achieved by linking multiple switches together within the network, allowing additional data acquisition units, recorders and gateways. High-speed bidirectional communication paths offer new flexibility and functionality when instrumenting the test vehicle.

Curtiss-Wright network switches also deliver network time packets to all of the data acquisition nodes that require time synchronization. The NSW-16GT supports the IEEE 1588 protocol and handles and distributes nanosecond resolution network time on all of its ports. An airborne network switch must be configurable, be able to distribute data accurately between network nodes, occupy very little space, operate with limited or no external cooling and accommodate time information distribution.

Configurable

The NSW-16GT operates in several configurations as it transports and aggregates data between data sources and data sinks, connecting a variety of devices operating at aggregate data rates up to 52 gigabits per second.

Rugged

The NSW-16GT is designed to operate in an airborne environment where it is subjected to extreme shock, vibration, temperature, altitude and contaminants.

Time Coherency

Avionics data acquisition systems have unique time-coherency requirements. The NSW-16GT switch terminates the IEEE 1588 time protocol and distributes time data accurately to all of its ports.

Multicasting

Airborne network switches must be designed to minimize bandwidth usage, so the NSW-16GT uses multicasting technology to transmit only to registered nodes.

Management

The NSW-16GT is managed using TTCWare, CLI or web page, allowing for reconfiguration on-the-fly, flow control, fault detection, Quality of Service (QoS) maintenance and reporting and performance statistics.

Speed

Curtiss-Wright networked switches support devices that collect and transmit data at speeds ranging from kilobits to gigabits per second.

Ordering Information

Contact Curtiss-Wright for ordering information

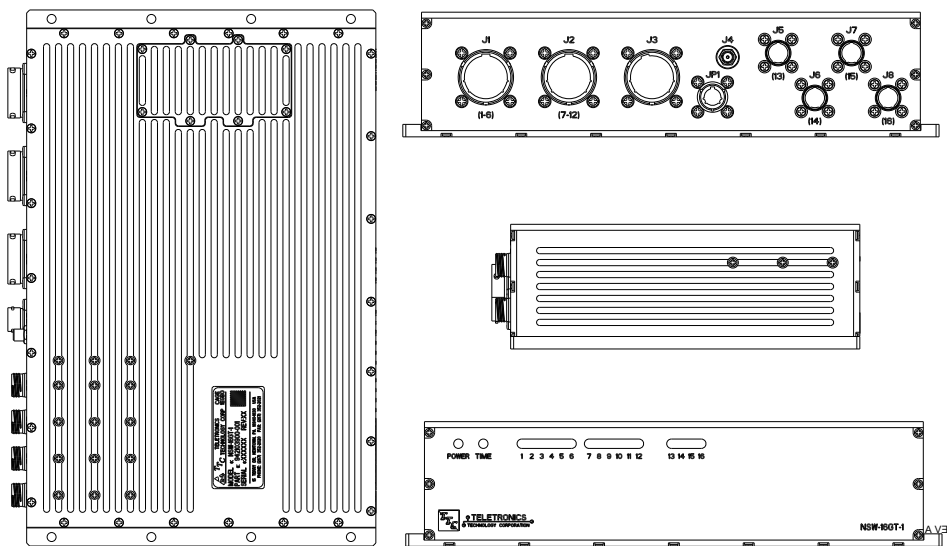


Figure 2: NSW-16GT outline drawing