Gigabit Airborne Network Switch with IEEE 1588 Time

Applications

- Airborne networked data acquisition
- Data switching in harsh environmental conditions includes excessive heat and cold, shock and vibration
- Time coherency distribution over an avionics network

Features

- 8-port non-blocking Ethernet network switch
- Ruggedized for airborne applications
- Connects data acquisition systems, the control system, recorders, gateways and network management interfaces and systems
- Supports IEEE 1588 for distribution of coherent global timing information between network components
- Supports SNMP network management
- 20 million packets per second non-blocking switching capacity
- Supports 4000 multicast addresses
- Compatible with TTC networked acquisition and recording systems
- Port capabilities and media include:
  - Ports 1-7: 100/1000BASE-T
  - Port 8: 100BASE-T
- Built-in generator for IEEE 1588 grandmaster clock operation

Description

The NSW-8GT-D-1 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 SNMP (Simple Network Management Protocol). The switch uses D-subminiature connectors.

Management System
AS9100C
ISO 9001:2008

DEKRA
Certified
Accredited by ANAB

Revision 05/13/2015

NSW-8GT-D-1 Datasheet

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NSW-8GT-D-1 – Gigabit Airborne Network Switch with IEEE 1588 Time
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. Expandability is achieved by linking multiple switches together within the network, allowing additional data acquisition units, recorders and gateways. High-speed bi-directional communication paths offer new flexibility and functionality when instrumenting the test vehicle.

TTC network switches also deliver network time packets to all of the data acquisition nodes that require time synchronization. The NSW-8GT-D-1 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-8GT-D-1 operates in several configurations as it transports and aggregates data between data sources and data sinks, connecting a variety of devices operating at data rates ranging from a few thousand bits per second to several gigabits per second, over twisted pair copper.

Rugged

The NSW-8GT-D-1 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-8GT-D-1 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. To this end, the NSW-8GT-D-1 uses multicasting technology so that data is broadcast-only to registered nodes.

Management

The NSW-8GT-D-1 is managed using a specially-designed application that allows reconfiguration on-the-fly, and provides flow control, fault detection, Quality of Service (QoS) maintenance and reporting and performance statistics.

Speed

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

NSW-8GT-D-1 – Gigabit Airborne Network Switch with IEEE 1588 Time
Technical Specifications

Network Ports

Number of ports: 8

Port speed: Ports 1-7: 100/1000 Mbps

Port 8: 100Mbps

Interface type: Electrical

IEEE 1588 Time Support

Operation: IEEE 1588 master, slave, and boundary clock

Timing synchronization: < 300 nsec between nodes

Internal clock: 2 PPM over temperature range; free-running function during loss of synchronization with master clock.
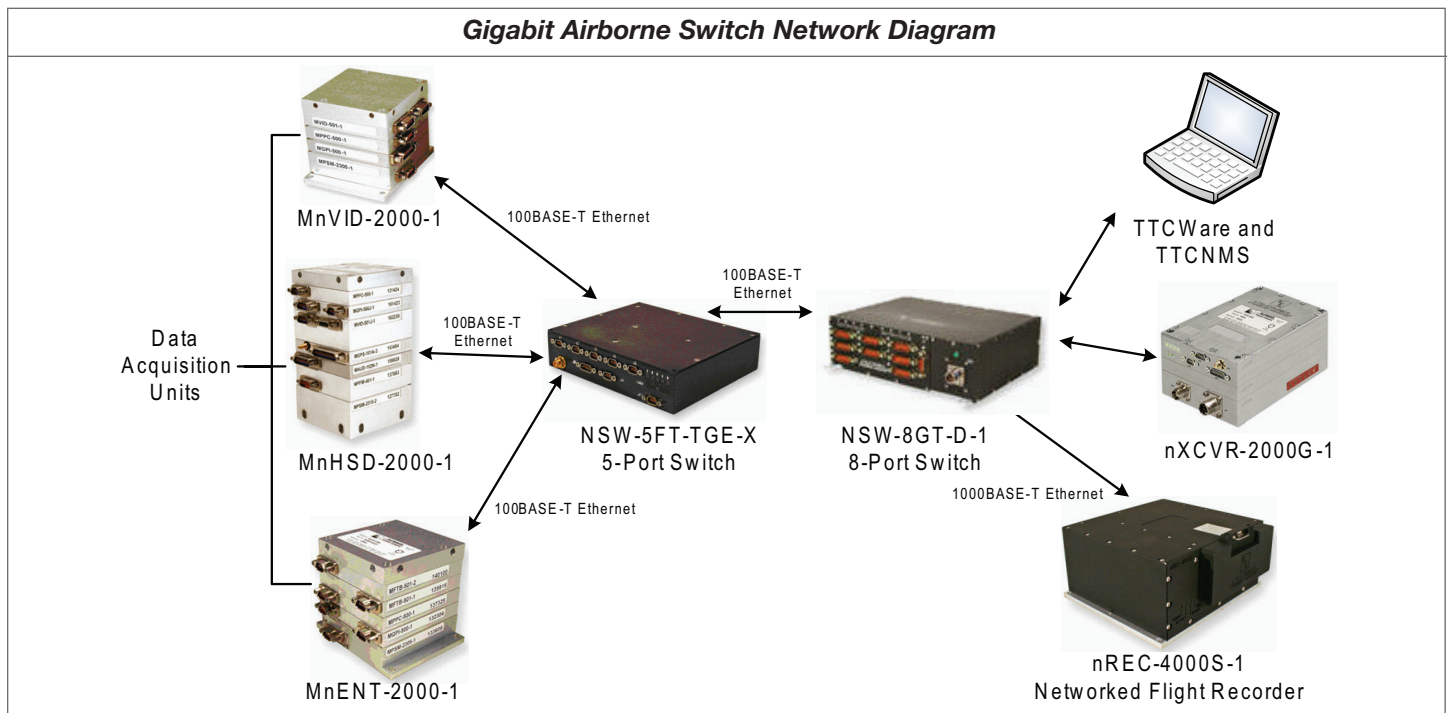
Time source:

• External grandmaster

• Internal real-time clock

Additional Ports

Time: 1PPS output

RS-232/422 serial port: Diagnostic use only

Gigabit Airborne Switch Network Diagram

MnVID-2000-1

100BASE-T Ethernet

Data Acquisition Units

MnHSD-2000-1

100BASE-T Ethernet

100BASE-T Ethernet

MnENT-2000-1

100BASE-T Ethernet

NSW-5FT-TGE-X 5-Port Switch

100BASE-T Ethernet

NSW-8GT-D-1 8-Port Switch

TTCWare and TTCNMS

nXCVR-2000G-1

1000BASE-T Ethernet

nREC-4000S-1 Networked Flight Recorder

Environmental Specifications

Operating temperature: -40° C to +85° C (ambient)

Storage temperature: -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-461/462

Electrical Specifications

Power input: 22 to 36 VDC

Supply current: 0.7 Amp @ 28 V typical

Power consumption: 20 W typical

Grounding: Isolated power, signal and chassis grounds

Dimensions and Mechanical

Size: 2.5" H x 8.3" W x 7.13" D

Weight: 6 lbs. 7 oz., excluding mating connectors

Connectors: D-subminiature

Interface: Front panel RGB LEDs

Switching Specifications

Multicast addresses: 4000 (max)

Number of nodes: 64 K (max)

Packet forwarding: Up to 20 million/sec

Switch management: Fully managed using SNMP

Ordering Information

Gigabit Airborne Network Switch **NSW-8GT-D-1**

Contact TTC for additional information on switch configurations

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NSW-8GT-D-1 Datasheet