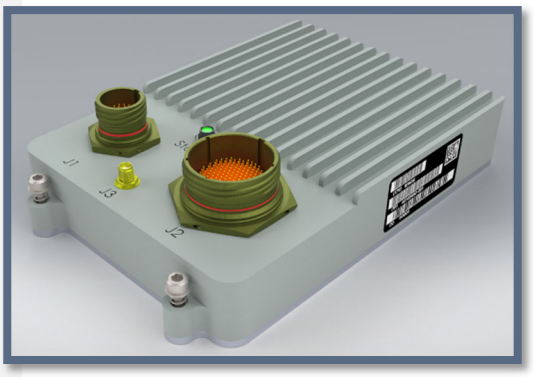
Gigabit Ethernet Switch GES-NXT-16

The Aeronix Gigabit Ethernet Switch (GES) NXT-16 is a fully manageable, MIL-Qualified 16-Port Ethernet Switch/Router equipped with sixteen 1Gbps BASE-T ports. It is designed for use in highly rugged commercial, industrial, and military applications that require very-high data transfer rates in a self-contained ruggedized package resistant to environmental effects.

The GES-NXT-16 is certified for harsh military environments making it ready to use for nearly any application. The unit has very low radiated emissions, surpassing all vehicle EMI/EMC requirements, particularly important to avoid interference with radio communications such as SINGCARS. The rugged design requires no forced air or conductive cooling, operating in a broad range of harsh environments including uninhabited aircraft bays.

The NXT-16 supports vehicle-location-based, customer-specific configurations stored in non-volatile memory and loaded at startup to fulfill application specific requirements. All configurations are authenticated at startup, and if tampered with, the unit is placed in a fail-safe mode.



KEY FEATURES

Part Number: AE103692-001

Ethernet Ports

- 16 10/100/1000 BASE-T Copper Ports

Enhanced Features

- Boot Time < 90s
- Tri-Color Power/status LED
  Red (Error), Yellow (Booting), Green (Operational)
  Can be turned off in startup-config
- Rescue account via time-sensitive, cryptographic exchange
- Enhanced Built-In Test (Startup, Periodic, Initiated)
  PHY veriphy using Time-Domain Reflectometry
  MAC Bouncing (spoofing) detection
- Port Mirroring, Flow Mirroring, Jumbo frames
- Store and Forward (default), Cut-through
- Monitoring alarms through SNMP or JSON-RPC

Standards Compliance & Compatibility

- G.8032 v1/v2 Ring Protection
- IEEE 802.3 Ethernet, IEEE 802.1AB MAC Discovery, IEEE 802.1D MAC learning, aging, static
- IEEE 8021.Q VLAN, PVLAN, Port Isolation, Trunking, Native VLAN, GVRP, GARP, MRP, MVRP
- IEEE 801.2ad Native or Translated VLAN
- IEEE 802.1p QoS
- IEEE 802.1s MSTP, IEEE 802.1w RSTP
- IEEE 802.1ad Link Aggregation
- IEEE 802.1X Port Based Network Access Control
- IEEE 1588 v2 PTP, IEEE 802.1AS Improved PTP timing
- IEEE 802.1AB-2005 Link layer discovery
- SNMP MIBs: VLAN, RMON, Traps, Bridge, IP Forwarding, IP, Multicast Group, RADIUS, Ethernet, SMI v2, MAU, Entity, Link OAM, SNMP Framework, User-based, View-based, SMON, MSTP, LLDP, LACP, PAE, Private MIBs

Configurations

- 8 possible based on strapping pins
- Human-readable

Management Interfaces

- In-band HMI: SSHv2 CLI, Telnet CLI, HTTP/S Web
- In-band MMI: SNMPv1/v2/v3, HTTP/S JSON-RPC
- Out-of-band HMI: RS232 CLI
  All interfaces can be individually disabled via startup-config.

Networking

- Auto-negotiation with automatic downshifting, Auto MDIX
- IGMP v2/v3 Snooping, MLD v1/v2 Snooping, GARP (802.1ak)
- VLANs (802.1Q) up to 4K groups, Trunking, and Native VLAN movement supported
- VLAN Q-in-Q double-tagging (bridging) & PVLANs supported
- L3 Static Routing in Hardware, RIP v2, OSPF v2/v3
- Link Aggregation (802.3AD)
- IPv4 and IPv6 support
- DHCP

Anti-Tamper

- Secure Boot, Secure Update, Secure Config
  Hardware ASIC-enforced using asymmetric ECDSA P384
- Hardware signal Zeroize
  Flushes RAM and Resets to factory default condition

QoS

- Muti-Layer Classifier, Strict Queues, Fair Queues, ToS/DSCP supported
- Broadcasting and Storm Control
- Loop Guard and Ethernet Ring Protection Switching (802.1Q) 50ms ring recovery
- Spanning Tree (802.1d), RSTP (802.1w), MSTP (802.15) for VLAN-aware fast loop recovery
- PTPv2.0 IEEE-1588 and 802.1as
  Can support up to 3 time-domains
  Grandmaster (GM) capable via internal and external GPS
  Phase lock to GM in less than 20 seconds
  Jitter from GM less than 100 nanoseconds
- Time-Sensitive Networking (TSN)
  Low latency, Highest QoS, Assured bandwidth
  802.1AS,802.1Qbv, 802.1CB, 802.1Qci, 802.1Qcc*, 802.1Qbu, 802.3br, 802.1Qch, 802.1CM/D2.2, 802.1Qav

Security and Access Control

- Authentication required on all management interfaces, Encryption on SSH, JSON-RPC and Web
- User accounts and permission levels, Minimum password complexity, timeouts
- Hardware-enforced Secure Boot (HRoT)
- AAA, 802.1X, RADIUS, TACACS+
- Firewall, ACLs
- Port MAC Security, Sticky MACs
- ARP Inspection, IP Source Guard, DHCP Snooping
- BPDU Guard, Root Guard
- Syslog and audit trail to both UDP and TCP servers
- Traffic data never stored in non-volatile memory
- Fail-safe to port switching blocked
- Backup Image and recovery
- NTPsec

AERONIX
an ATG™ Company

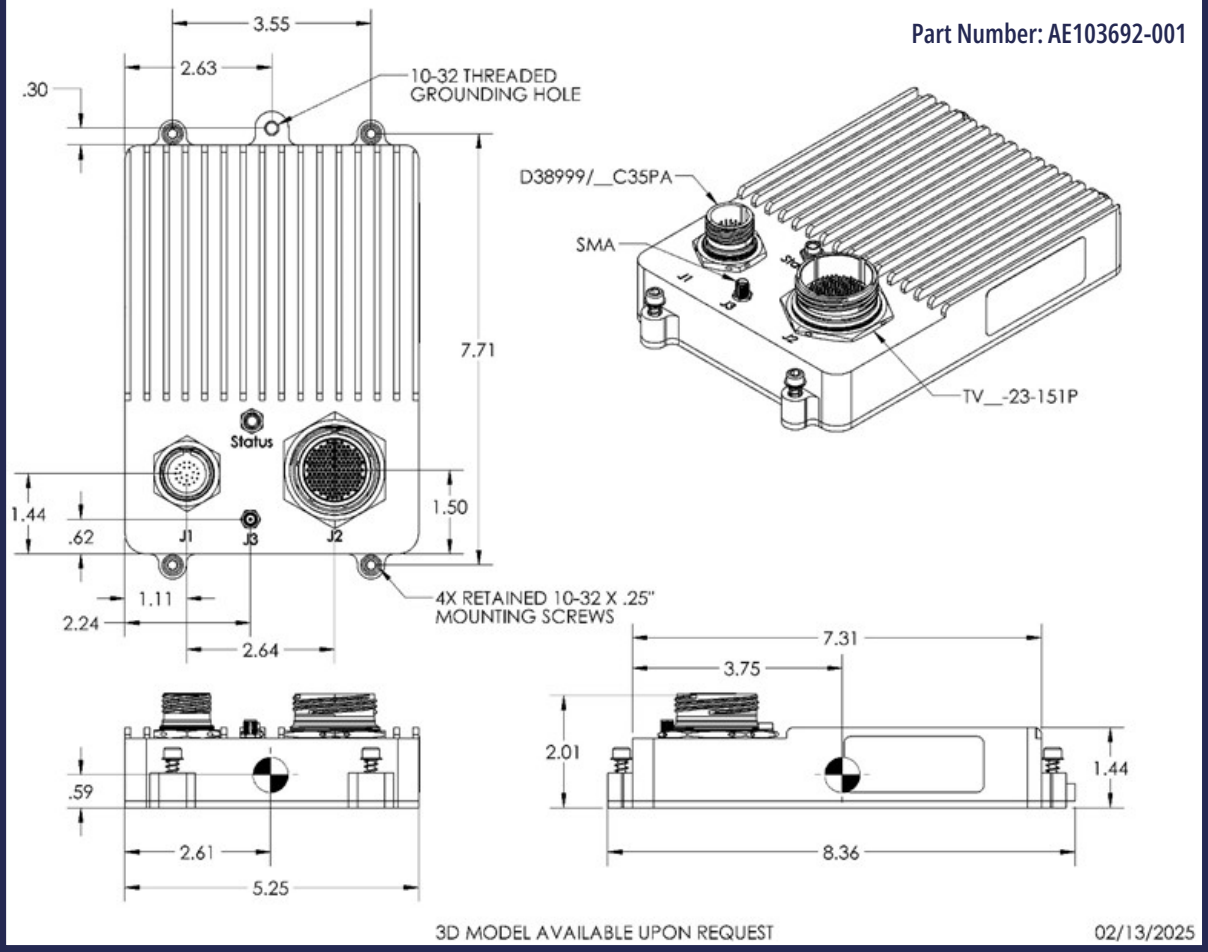
ATG
AERONIX TECHNOLOGIES GROUP
1775 West Hibiscus Blvd Suite 200
Melbourne Florida 32901
Tel. (321) 984-1671 Fax. (321) 984-0366
www.aeronix.com - mailto:ethernet@aeronix.com

GES NXT-16 Qualifications – Part Number AE103692-001

Characteristic	Detail	Characteristic	Detail
Ports	16 x 10/100/1000Mbps IEEE 802.3ab compatible	Connectors	1 x TV07RW-13-35P, and 1x TV07RW-23-151P (Power)
Dimensions	8.36" x 2.01" x 5.25"	Cooling	No moving parts, no forced air or conduction cooling required
Weight	3 lbs (1.36 kg)	Mounting Hardware	4x 10-32 captive screws
Processor/Switch	Microchip VSC7552TSN	Coating	CARC-compliant, scratch resistant
MTBF	44.943 hrs @ +70°C Airborne Uninhabited Fighter Environment		

Test	Detail	Specification	Comment/Tailoring
Power Qualifications			
Power Input	Operational	+28 Vdc nominal	+22 Vdc to +32 Vdc range
Power Consumption	Operational	MIL-STD-704	Startup 56W, Steady State 20W
Startup	Operational	MIL-STD-704F Chg1, MIL-HDBK-704-8 LDC-102	+22 Vdc to +29 Vdc, Tests A, B, C
Voltage Distortion	Operational	MIL-STD-704F Chg1 Fig 15, MIL-HDBK-704-8 LDC-103	Tests A thru K
Total Ripple	Operational	MIL-STD-704F Chg1 Fig 15, MIL-HDBK-704-8 LDC-104	Table LDC104-II
Spikes and Surges	Operational	MIL-STD-704F Chg1 Fig 13, MIL-HDBK-704-8 LDC-105	Tests AA thru RR ,18 Vdc to 29Vdc
Power Interrupt	Operational	MIL-STD-704A, MIL-HDBK-704-8 LDC-201	Transfer Interrupt, 50 ms, 24 Vdc to 29 Vdc
Steady State Limits	Abnormal	MIL-STD-704F Chg1 MIL-HDBK-704-8 LDC-102	22 Vdc to 29 Vdc Tests A, B, C
	Emergency	MIL-STD-704F Chg1, MIL-HDBK-704-8 LDC-401	18 Vdc to 29 Vdc
Abnormal Transients	Operational	MIL-STD-704A, MIL-HDBK-704-8 LDC-302	Tests A thru V, 6 V to 80 V
Auto-Recovery	Operational	MIL-STD-704F Chg1, MIL-HDBK-704-8 LDC-601	Tests A thru D, Power failure, from 100ms to 7 seconds
Power Failure	Operational	MIL-STD-704F Chg1, MIL-HDBK-704-8 LDC-602	Phase reversal protection/prevention
EMI/EMC Qualifications			
Conducted Emissions	Operational	MIL-STD-461G CE101 Par 5.4, CE101-4 Curve #2	Power Leads, 30 Hz to 10 kHz
		MIL-STD-461G CE102 Par 5.5, CE102-1 Basic Curve	Power Leads, 10 kHz to 10MHz
Conducted Susceptibility	Operational	MIL-STD-461G CS101 Par 5.7, CS101-1 Curve #2	Power leads, 30Hz to 150 kHz
		MIL-STD-461G CS114 Par 5.12, CS114-1 Curve #5	Bulk cable injection, 10 kHz to 200MHz
		MIL-STD-461G CS115 Par 5.13, CS115-1	Bulk cable injection, impulse excitation, 30Hz for one minute
		MIL-STD-461G CS116 Par 5.14, CS116-1 and CS116-2	Damped sinusoidal transients, cables, & power leads, 10kHz to 100MHz, 5 mins
		MIL-STD-461G CS118 Level 4	Personnel borne ESD, Level 4, 5 positive, 5 negative discharges, 3 test points
Radiated Emissions	Operational	MIL-STD-461G RE101 Par 5.17, RE101-1 and RE101-2	Magnetic field, 30Hz to 100kHz
		MIL-STD-461G RE102 Par 5.18, RE102-3	Fixed wing external and Fixed wing internal < 25m; Electric field, 10kHz to 18GHz
Radiated Susceptibility	Operational	MIL-STD-461G RS101 Par 5.20 RS101-2, Army	Magnetic field, 30 Hz to 100 kHz
		MIL-STD-461G RS103 Par 5.21, Table XI	Aircraft Internal AirForce; Electric field, 2 MHz to 18 GHz
Environmental Qualifications			
Low Pressure (Altitude)	Storage	MIL-STD-810G Method 500.4 Procedure I	-57°C @ 50,000 feet
	Operational	MIL-STD-810G Method 500.4 Procedure II	-40°C @ 40,000 feet
	Explosive Decomp	MIL-STD-810G Method 500.4 Procedure IV	8,000 feet to 40,000 feet in not more than 0.1Sec
High Temperature	Storage	MIL-STD-810G Method 501.5 Procedure I	7 cycles up to +71°C
	Operational	MIL-STD-810G Method 501.5 Procedure II	Cyclic = 3 Cycles up to +71°C Constant = +71°C for min 2 hours
Low Temperature	Storage	MIL-STD-810G Method 502.5 Procedure I	-57°C
	Operational	MIL-STD-810G Method 502.5 Procedure II	-40°C
Temperature Shock	Non-Operational	MIL-STD-810G Method 503.5 Procedure I-B	-40°C to +71°C at 125°C/Minute, 3 cycles
Comb Temp Alt/Humidity	Operational	MIL-STD-810G Method 520.3 Procedure III	Procedure III: -40°C to +71°C Sea level to 60,000ft
Rain	Operational	MIL-STD-810G Method 506.5 Procedure III	Dripping, 7 gal/ft2/hr for 15 minutes
Humidity	Exposure	MIL-STD-810F Method 507.5 Procedure II	95% ± 4% Humidity, +30°C to +60°C, 10 cycles
Fungus	Non-Operational	MIL-STD-810G Method 508.6	28 days
Salt Fog	Exposure	MIL-STD-810G Method 509.5	Four 24-hour wet/dry cycles
Sand and Dust	Exposure	MIL-STD-810G Method 510.5 Procedure I & II	< 150um dust, 150um to 850um sand at 18m/s and +71°C
Explosive Atmosphere	Operational	MIL-STD-810G Method 511.5 Procedure I	At sea level and 40,000ft altitudes
Structural Acceleration	Non-Operational	MIL-STD-810F Method 513.6 Procedure I	Withstand without structural failure at ±27g applied individually along all 3 axes
Operational Acceleration	Operational	MIL-STD-810F Method 513.6 Procedure II	Operational at ±18g applied individually along all 3 axes
Crash Hazard Acceleration	Non-Operational	MIL-STD-810F Method 513.6 Procedure III	Remain captive, 40g fore, 20g aft and down, 10g up, 18g left and right
Vibration	Operational	MIL-STD-810G Method 514.6 Pro. I Cat 12, Annex D	514.6D-I; 30 mins, 0.02 g2/Hz to 0.04 g2/Hz, 15 - 2000 Hz, Overall 7.4Grms
	Non-Operational	MIL-STD-810G Method 514.6 Pro. I Cat 12, Annex D	514.6D-I; 60 mins, 0.04 g2/Hz to 0.06 g2/Hz, 15 - 2000 Hz, Overall 9.2Grms
	Operational	MIL-STD-810G Method 519.6, Procedure III: Gunfire Shock	Four sine components @ 4g 100+/10Hz, 200+/-20Hz, 300+/-30Hz, 410+/-30Hz, 5s on/5s off, added to stationary random vibra. 100-1000Hz, Sweep 0.5 Oct/Min, 1 hr per axis
Acoustic Noise	Operational	MIL-STD-810G Method 515.6 Procedure I	30 mins, 145 dB overall, 50 to 10000 Hz
Shock	Functional	MIL-STD-810G Method 516.6 Procedure I	20g, 11ms nominal, 3 blows each direction, each axis (18 total), TPS
	Crash Hazard	MIL-STD-810G Method 516.6, Procedure V	40g, 11ms nominal, 2 blows each direction, each axis (12 total)
	Bench Handling	MIL-STD-810G Method 516.6, Procedure VI	4" drop, 1 drop per edge per face (24 total)

Gigabit Ethernet Switch GES-NXT-16



ORDERING INFORMATION

PART NUMBER	DESCRIPTION
AE103692-001	GES-NXT-16, Military Rugged Ethernet Switch/Router, Airborne and Ground Qualified, 16x 10/100/1000 BASE-T ports. Note: GES-NXT-16 HW ICD is document# AE303604-001.
Accessories (Intended for Lab Use Only)	
AE103557-001	Lab Breakout Box J1 to Power and Signaling for GES-NXT-16
AE103852-001	Lab Breakout Box J2 to RJ45 for GES-NXT-16

AERONIX
an ATG™ Company

ATG AERONIX TECHNOLOGIES GROUP
1775 West Hibiscus Blvd Suite 200
Melbourne Florida 32901
Tel. (321) 984-1671 Fax. (321) 984-0366
www.aeronix.com - mailto:ethernet@aeronix.com