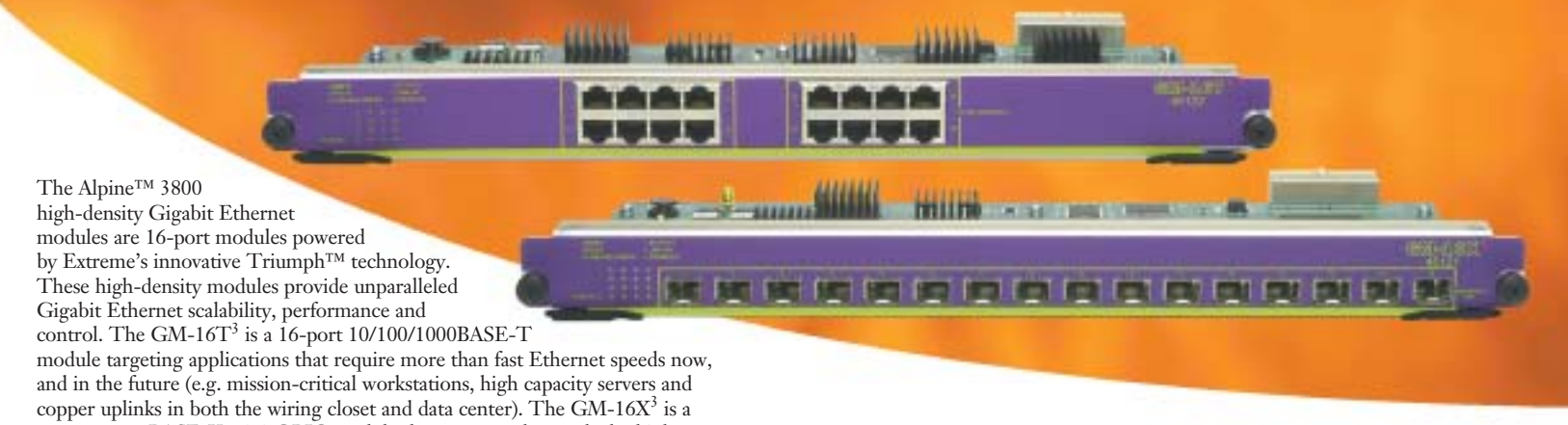
Alpine 3800 High-Density Gigabit Ethernet Modules

(GM-16T³ and GM-16X³)



The Alpine™ 3800 high-density Gigabit Ethernet modules are 16-port modules powered by Extreme's innovative Triumph™ technology. These high-density modules provide unparalleled Gigabit Ethernet scalability, performance and control. The GM-16T³ is a 16-port 10/100/1000BASE-T module targeting applications that require more than fast Ethernet speeds now, and in the future (e.g. mission-critical workstations, high capacity servers and copper uplinks in both the wiring closet and data center). The GM-16X³ is a 16-port 1000BASE-X mini-GBIC module that meets and exceeds the higher throughput requirements of gigabit uplinks from edge access distribution switches and high-capacity optical servers. Both high-density Gigabit Ethernet modules are focused on bringing the following critical network connectivity enhancements to the Alpine 3800:

- ***Scalability of 400% more Gigabit Ethernet ports to support fast growing high-capacity applications:*** The GM-16T³ and GM-16X³ support a 400% increase in Gigabit Ethernet density allowing up to 128 ports in an Alpine 3808 to better support additional high capacity applications, Gigabit Ethernet enabled servers, and end users demanding throughput far greater than the fast Ethernet connections they currently have.
- ***Gigabit performance and throughput, when needed.*** Up to a full gigabit of sustainable throughput per second is available on each and every GM-16T³ and GM-16X³ port. When high capacity applications need full Gigabit Ethernet network access, it's available and ready for use.
- ***Turn up the performance of your high capacity applications:*** High throughput becomes high performance when you can control and manage the Gigabit Ethernet traffic at every port. These Triumph based modules realize this ideal with T-Control. T-Control enables bi-directional, multi-tiered traffic shaping with industry-leading granularity, guaranteeing critical applications are always transported through the network.

The 3rd generation Triumph-based GM-16T³ and GM-16X³ modules are fully interoperable and compatible with Extremes 2nd generation "i" series Alpine products. As a result, Triumph delivers the industry's highest level of investment protection for Extreme's existing products and customers.

Scalability of 400% more Gigabit Ethernet ports to support fast growing high-capacity applications

The GM-16T³ and GM-16X³ modules satisfy the increasing need for more Gigabit Ethernet ports by supporting 400% more Gigabit Ethernet ports – allowing for both gigabit performance and high-densities (up to 128 Copper Gigabit Ethernet connections in an Alpine 3808 chassis).

High-capacity applications such as video, medical imaging and large file transfers/backups are only the beginning. As more and more end user devices are standardizing on embedded gigabit NICs and data centers are increasingly provisioned with dense gigabit-enabled servers, the demand for high-capacity switch ports is increasing at a rapid rate. The desire of IT managers to make smart infrastructure purchase decisions to future-proof the network is also behind the order of magnitude increase in demand for Gigabit Ethernet. The GM-16T³ and GM-16X³ modules allow the network administrator to easily and inexpensively increase bandwidth to both servers and end users without sacrificing density.

Gigabit performance and throughput, when needed

Servers and users expect more than just high Gigabit Ethernet port density; they require and demand full Gigabit Ethernet capacity be available when they need it. Every Gigabit Ethernet port in the Triumph based GM-16T³ and GM-16X³ modules provides full gigabit-level connectivity to support the most demanding high capacity applications, enabling high rates of throughput even when all other ports on the module are being used.

Networks have periods of intense activity. It's important for the next generation Gigabit Ethernet switches to reliably forward at high rates of speed simultaneously on all interfaces. Failing to provide adequate forwarding causes dropped traffic and retransmissions, further aggravating network congestion and lowering overall performance. Unlike competitors that provide a gigabit link but only support sustained performance comparable to fast Ethernet, the GM-16T³ and GM-16X³ modules provide the true gigabit performance one expects from a gigabit connection with a sustained forwarding rate more than double the competition's rate.

Make high-capacity application throughput a reality with T-Control

The GM-16T³ module enables unprecedented control over network traffic using T-Control, a new technology transforming Gigabit Ethernet throughput into a true high performance solution.

T-Control allows network administrators to determine how much bandwidth each port can service and how much bi-directional bandwidth each individual application being transported through the port will receive. T-Control guarantees network access to the most important applications and conditional access for the remaining applications if capacity is present. Enterprise networks benefit from T-Control's per-application traffic classification in that they can ensure mission critical services, such as Voice-over-IP (VoIP), always receives the network resources they require. T-Control guarantees that money spent on deploying enterprise wide applications isn't wasted because of congestion in the network. T-Control makes sure that all users get fair access to the network but power-users can burst to gigabit rates if network resources are present. T-Control makes the most of the network investment.

Advanced bandwidth control allows service providers to offer a whole new range of metro Ethernet services to end-users such as tiered rate shaping services by allowing dynamically settable rates from 1kbps to 1Gbps in 1kbps increments. With the GM-16T³ and GM-16X³ modules, metro service providers can now deploy robust revenue generating Gigabit Ethernet services on a dense Gigabit Ethernet, NEBS compliant platform, increasing bandwidth while decreasing capital expenditure.

Protecting the enterprise "last mile" with non-invasive cable testing

The most advanced Gigabit Ethernet port in the world is useless if the cable connecting it to the end-station doesn't work. Triumph provides the telecom manager the ability to manage the network copper infrastructure down to the individual wire pair. This feature provides savings in both time and money when the network is undergoing migration from fast Ethernet to copper Gigabit Ethernet as well as when those unforeseen cable outages occur.

In modern networks, managing cable infrastructure is becoming more difficult because not only is the density of copper Gigabit Ethernet increasing but Gigabit Ethernet over copper (IEEE 802.3ab) demands much more out of the cabling infrastructure than fast Ethernet did (i.e. all 4 wire pairs are used instead of the 2 pairs used in Fast Ethernet). The GM-16T³

module removes this burden by providing advanced 802.3ab cable diagnostic and fault detection technology. This capability allows the network administrator to test copper cables to identify and isolate faults in the cable to within 1 meter of any defect or abnormality, without ever having to physically touch a cable. This feature provides:

- Open/short/crossed pair detection
- Improper termination detection
- Cable length detection through advanced per port Time Domain Reflectometry circuitry

Given that cabling is often one of the greatest challenges for any network deployment, Triumph's cabling system fault isolation technology promises to greatly improve network uptime and manageability.

Alpine High-Density Gigabit Ethernet Turns Throughput into Performance

The Triumph based GM-16T^3 and GM-16X^3 modules provide fast and reliable transport for high-capacity applications. Gigabit Ethernet scalability enabled by a 400% increase in Gigabit Ethernet port density, the performance necessary to provide the gigabit network access when required, and the necessary control to individually guarantee the most important network applications means that with these modules the network is used in the most optimum and efficient manner possible. The GM-16T^3 and GM-16X^3 modules protect the network investment now and in the future by both maintaining full inoperability with the existing Alpine infrastructure and through high-performance Gigabit Ethernet interfaces that will handle all future bandwidth requirements.

GM-16T^3 and GM-16X^3 Feature Summary

- Scales to 128 10/100/1000 copper or mini-GBIC Gigabit Ethernet connections in an Alpine 3808, with 64 and 20 Gigabit Ethernet connections in a 3804 and 3802 respectively.
- Advanced T-Control traffic management providing bi-directional rate shaping relevant for growing Enterprises and metro Ethernet providers.
- The GM-16T^3 module integrates physical cable testing functionality directly into the switch port, which greatly simplifies troubleshooting and shortens cable based outages.
- Byte based traffic accounting based on ingress port, application, VLAN or traffic priority.
- Hardware-based IP/IPX routing using RIP v1/v2 OSPF, IS-IS, BGP4, PIM and DVMRP.
- Hardware-based Access Control Lists (ACLs) can be linked to a class of service, while performing Layer 1-4 packet-level security and controlling traffic flows – all without sacrificing forwarding performance.
- Backward compatible with existing Alpine products.

Product Specifications

Number of ports per module:
GM-16T^3: 16 ports of 10/100/1000BASE-T using RJ-45 physical interface
GM-16X^3: 16 ports of 1000BASE-X using mini-GBIC (SFP) slots

Connectors:
GM-16T^3: RJ-45
GM-16X^3: LC for Optical SFPs

Port density per chassis:
Alpine 3808: 128 ports
Alpine 3804: 64 ports
Alpine 3802: 20 ports (one GM-16T^3 or GM-16X^3 with 4-port GM-4Ti/Xi)

Distance:
GM-16T^3: 100meters
GM-16X^3:

- SX SFP GBIC: 550 Meters over Multi-mode Fiber
- LX SFP GBIC: 10 Kilometers over Single-mode Fiber
- ZX SFP GBIC: 70 Kilometers over Single-mode Fiber

Physical Specifications

Occupies a single I/O slot on a Alpine 3800 series chassis.
Module dimensions (H x W x D): 1.5 x 16.25 x 8.0 in (3.8 x 41.3 x 20.3 cm)

Module weight:
GM-16T^3: 4.0lb (1.8 kg)
GM-16X^3: 3.75lb (1.81kg)

- Shipping box dimensions (H x W x D): 4.25 x 20.0 x 11.25 in (10.8 x 50.8 x 28.6 cm)

Meantime before failure:
GM-16X^3: 401,666 hours
GM-16T^3: 277,778 hours

Environmental Compliance & Conditions

Operating temperature: 0° to 40° C
Storage temperature: -40° to 70° C
Operating relative humidity: 10% to 95%, non-condensing
ETSI/EN 300 019-2-1: 2000 class 1.2 (Storage Environment)
ETSI/EN 300 019-2-2: 1999 class 2.3 (Transportation Environment)
ETSI/EN 300 019-2-2: 1999 class 3.1e (Operational Weather Protected Environment)
ASTM D5276 (Drop - packaged)
ASTM D3580 (Random Vibration 1.5g min, operational)
ASTM D3332 (Shock 30g min, operational)

Safety Compliance

UL 60950 3rd Edition, Listed Accessory (North American Safety of ITE)
cULus, Listed Accessory, Equivalent to CAN/CSA-C22.2 No. 60950-00 (Canadian Safety)
EN60950: 2000 with Deviations (European Safety of ITE)
IEC60950: 2000 CB Scheme with Deviations (International Safety of ITE)
TUV-R GS Mark (German Notified Body)
Low Voltage Directive (LVD) (European Safety of ITE)
AS/NZX 3260 (Australia / New Zealand Safety Standard)
NOM/NYCE (Mexico Safety & EMC Approval)
S-Mark (Argentina Safety)

EMI/EMC Compliance

FCC 47 CFR Part 15 Class A (USA Emissions Standard)
ICES-003 Class A (Canada Emissions Standard)
89/336/EEC EMC Directive (European Directive)
EN 55022: 1998 Class A (European Emissions Standard)
EN 55024: 1998 includes IEC 61000-4-2, 3, 4, 5, 6, 8, 11 (European Immunity Standards)
CISPR 22: 1997 Class A (International Emissions Standard)
CISPR 24: 1998 (International Immunity Standard)
ETSI/EN 300 386: 2001 (EU Telecom Emissions & Immunity Standard)
EN 61000-3-2,3 (European Harmonics & Flicker Standards)
CNS 13438: 1997 Class A (Taiwan BSMI Approval)
VCCI Class A (Japan EMC Standard)
AS/NZS 3548 (Australia/New Zealand EMC Standard)
MIC Approval (Korean EMC Approval)
NOM/NYCE (Mexico Product Safety & EMC Approval)
GOST (Russia)

Ordering Information

Part Number	Description
45122	GM-16T^3 - Alpine 3800 16-port 10/100/1000BASE-T Module with RJ-45 connections
45121	GM-16X^3 - Alpine 3800 16-port 1000BASE-X Module with mini-GBIC (SFP) connections
10051	Extreme Mini-GBIC, SFP, 1000BASE-SX, LC Connector, for use with multi-mode fiber with distances up to 550 meters
10052	Extreme Mini-GBIC, SFP, 1000BASE-LX, LC Connector, for use with single mode fiber, distances up to 10 Km
10053	Extreme Mini-GBIC, SFP, 1000BASE-ZX Extra long distance SMF 70 Km/21 dB budget, LC connector

For more product information from Extreme Networks, please call 1.888.257.3000. 3585 Monroe Street, Santa Clara, CA 95051-1450 Phone 408.579.2800 Fax 408.579.3000 Email info@extremenetworks.com Web www.extremenetworks.com

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