

Benefits and Features

- ❖ Modular multilayer aggregation and multiplexing Gigabit Ethernet routing switch
- ❖ Up to 31 Gigabit Ethernet optical and copper ports non-blocking full wire speed
- ❖ All modules hot swappable and field upgradeable
- ❖ Ultra Compact Size – 5RU height, under 12" depth
- ❖ Maximum savings on infrastructure. Use a single fiber instead of two!
- ❖ Unique option for plug-in Gigabit Ethernet transceivers, including:
 - CWDM, Extra Long-Haul, Bi-Directional and many more...
- ❖ High level of redundancy including AC and DC Power Supplies
- ❖ Embedded All-Telco-Platforms uniform BiNOS Operating System - learn once for all our platforms
- ❖ Enhanced Security and Maximum Protection with:
 - SNMPv3, 802.1x, SSH, RADIUS, Secured Telnet, Advanced Access Control List (ACL), and many more.
- ❖ Complete Professional Management tools for best control of your network
 - IB and OOB management with CLI (full compatible with Cisco), WEB management via Embedded Java™ and unique Alarms management
 - HPOV and SNMPc integration keys
 - BiNOSCenter – your EMS platform
- ❖ Comprehensive traffic shaping, 802.1p, TOS and Diffserv. Unique feature-rich support including:
 - DHCP Relay and Server
 - TLS for E-2-E tunneling
 - RIP, OSPF, BGP

T6 All Layer Gigabit Routing Switch



Modular All-Layer Gigabit Ethernet Aggregation and Multiplexing Routing Switch

Telco Systems' T6 all layer switch delivers high performance for enterprises and service providers.

The T6's unique ASIC based architecture offers a wire-speed non-blocking switching solution with up to 31 Gigabit Ethernet ports. Comprehensive policy enforcement and traffic shaping capabilities enable the T6 to efficiently manage precious network resources. With an unmatched level of modularity, which includes fixed copper 10/100/1000 and pluggable miniGBIC (SFP) Gigabit Ethernet interfaces; the T6 can provide infrastructure for dynamic high-performance networks. In Metro network arenas driven by the need to minimize fiber usage, Bi-directional and CWDM transceivers make the T6 Routing Switch an attractive, high-density multi-Gigabit Ethernet platform.

New age networks demand performance, reliability, security, and connectivity. BiNOS (Telco Systems' Inter Networking Operating System) provides the robust administration, management, QoS, and security performance requirements of enterprise networks by supporting a wide breadth of IEEE standards and industry conventions, such as Access Control Lists. Hardware based implementation of BiNOS-mandated policies enables the T6 to provide wire-speed routing for mission critical applications, such as voice over the network, multimedia transmission, surveillance, and other nascent technologies in the enterprise LAN.

The T6 Routing Switch provides a non-traffic affecting, L2 to L3 migration path, utilizing a single CPU. The T6 is capable of Layer 2 switching or Layer 3 routing at full wire-speeds over 48 Mpps.

T6 Routing Switches are fully manageable via SNMP, CLI, or the Web with either In-band (IB) or Out-of-Band (OOB) management tools. The CLI complies with the de facto industry standard and enables administration via a user friendly interface. Web management is made possible by utilizing embedded Java™ based user friendly management technology. Administrators can use industry-standard SNMP based network management systems, or BiNOSCenter. The BiNOSCenter is Telco Systems EMS/NMS Element/Network Management System and provides the network operator with a state-of-the-art, powerful, SNMP based configuration, monitoring and maintenance platform. The BiNOSCenter can manage any SNMP based element.

Performance

Wire speed Layer 2–7 performance is achieved using custom ASICs that perform all switching, routing, and bandwidth allocation in hardware. Therefore, the T6 is capable of reaching a line rate of over 48,000,000 packets per second, the theoretical limit, across its robust 76.8 Gbps backplane. The combination of hardware-based wire speed throughput and a non-blocking architecture provides unprecedented performance at a very affordable price.

Modularity and Flexibility

Switches must conform to the needs of the network, and not vice versa. In recognition of the growing deployment of Small Form Factor (SFF) and pluggable (SFP) fiber solutions, the T6 supports Gigabit Ethernet interfaces for the popular miniGBIC interfaces. The T6 also supports cost-effective 10/100/1000BaseT modules for local Gigabit Ethernet connections. To complete the broad range of interface modules, CWDM, long-haul and Bi-directional (single fiber usage) transceiver modules provide the ultimate configuration flexibility to suit application requirements.

A high port density of 8 Gigabit Ethernet ports per slot enables the T6 to fit up to 31 Gigabit Ethernet ports with one port providing physical redundancy in one compact switching unit

Features

The T6 Routing Switch, under the BiNOS umbrella, incorporates a large number of features, such as IEEE 802.3ad link aggregation, IEEE 802.1q VLAN, IEEE 802.1d Spanning Tree Algorithm, 802.1w and 802.1s Rapid and Multiple Spanning Tree Algorithm, IEEE 802.3x Flow Control and Backpressure, Resilient Ports, IGMP, Access Control Lists, bandwidth reservation, DHCP server/ relay with option 82 support, Diffserv and IEEE 802.1p based Quality of Service with four (4) priority queues.

• Link Aggregation (802.3ad & LACP)

Link Aggregation helps broaden the bandwidth between different switches dynamically. This important feature helps circumvent possible network bottlenecks by aggregating bandwidth on crucial network connections. In addition to adding robustness, link aggregation also serves as a form of redundancy by ensuring that even if one link fails, all network traffic will still be propagated over the remaining links in the aggregation group.

• Virtual LANs

Virtual LANs allow network administrators to improve bandwidth capabilities and reduce administrative overhead by segmenting users into different logical groups that adhere to corporate policies. In order to implement a VLAN across a network the T6 supports the full 4K range of VLANs according to the IEEE 802.1q standard and auto-VLAN detection capabilities.

• IGMP Multicast Support

Network multicasts are geared toward reducing the amount of bandwidth needed for applications like video-conferencing and online learning. Hardware support for IGMP allows the T6 Routing Switch to forward only single copies of transmissions to destination ports. The T6 Routing Switch has the unique ability to automatically recognize IGMP join and leave messages, freeing network administrators from the strain of multicast management.

• Security and Policy Enforcement

Network security and policy enforcement consists of RADIUS and Secure Telnet for access, port-based MAC security and user-defined rules that determine how, where, and when various network functions are performed. While many early implementations focused on QoS across a number of network devices, the goal of policy-based networking is to allow the management of any type and number of policies across a network. BiNOS SSH server provides a more secure connection by providing authenticated services. In addition, all Telco Systems Routing Switches support IEEE 802.1x and SNMPv3 authentication features for enhanced security and encryption applications.

• Access Control Lists

The T6 Routing Switch's wire speed Access Control Lists (ACLs) enable the implementation of QoS, security, and marking for Differentiated Services at DiffServ Code Points upon entry to the switch. ACLs ensure that only authorized users have access to specific resources and block any unwarranted attempts to reach network resources. The policies implemented in the ACLs are used to provision bit rates IP or applications.

• Quality of Service

Quality of Service is vital to ensure proper flow control and bandwidth management in a network. Four (4) priority queues give the T6 Routing Switch the capability to differentiate between time sensitive VoIP applications and other network data transmissions. In addition to IEEE 802.1p support, the T6 Routing Switch also supports Differentiated Services (Diffserv). Diffserv is used for specifying and controlling network traffic by class so that certain types of traffic get precedence. Diffserv avoids simple priority tagging and depends on a policy which determines how to forward a given network transmission. One of the T6 Routing Switch's more unique qualities is its ability to provide adaptive bandwidth control. Thresholds can be set by using Weighted Random Early Detection (WRED) to start segregating TCP traffic when it exceeds a given threshold. This allows networks a great amount of flexibility and the ability to avoid unnecessary static bandwidth provisioning.

Routing and Multicast Routing

Layer 3 routing capabilities are critical for improving network utilization. Routers are responsible for forwarding packets towards their destinations via adjacent networks. Routers "decide" which way to forward a packet based on the current state of the connected networks. Special network routing hardware enables the T6 Routing Switch to perform MAC resolution, CRC checks, and TTL updates on a packet-by-packet basis at wire speed. The information used to forward packets is gathered by using special protocols, such as Routing Information Protocol (RIP), Open Shortest Path First (OSPF) and Border Gateway Protocol 4 (BGP4). When routing between VLANs, the T6 Routing Switch is capable of replacing the 802.1Q based VLAN tags at wire speed. The T6 Routing Switch VRRP eliminates the single point of failure inherent in the static default routed environments. The T6 Routing Switch supports Routing Multicasts features such as PIM (Protocol Independent Multicast).

Compatibility

IEEE 802.3 CSMA/CD method and physical layer specifications
 IEEE 802.1p Priority Queuing, IEEE 802.1q VLAN tagging
 IEEE 802.1d Spanning Tree Algorithm,
 IEEE 802.1w Rapid Spanning Tree
 IEEE 802.1s Multiple Spanning Tree, IEEE 802.3ac VLAN Tagging
 IEEE 802.1x Authentication, IEEE 802.3ad Link Aggregation
 IEEE 802.3ae 10Gigabit Ethernet (Draft), IEEE 802.3x Flow Control
 IEEE 802.3 Ethernet, IEEE 802.3u Fast Ethernet
 IEEE 802.3z Gigabit Ethernet, IEEE 802 Networks
 RFC 768 UDP, RFC 791 IP, RFC 792 ICMP, RFC 793 TCP, RFC 826 ARP
 RFC 854 Telnet Client & Server, RFC 951 BootP, RFC 862 Echo Protocol
 RFC 863 Discard Protocol, RFC 867 Daytime Protocol
 RFC 868 Time Protocol
 RFC 904 Exterior Gateway Protocol Formal Specification
 RFC 919 Broadcasting Internet Datagrams
 RFC 922 Broadcasting Internet Datagrams in the Presence of Subnets
 RFC 1024,1035 Domain names
 RFC 1027 Using ARP to Implement Transparent Subnet Gateways
 RFC 1042 Standard for the Transmission of
 IP Datagrams over Networks
 RFC 1058 RIP, RFC 1059, 1119 NTPv1/2, RFC 1112 IGMP
 RFC 1122 Host Requirements, RFC 1166 Internet Numbers
 RFC 1191 Path MTU Discovery,
 RFC 1256 ICMP Router discovery protocol
 RFC 1267 A Border Gateway Protocol 3 (BGP-3)
 RFC 1305 NTPv3,
 RFC 1332 The PPP Internet Protocol Control Protocol (IPCP)
 RFC 1334 PPP Authentication Protocols (specifies PAP)
 RFC 1388 RIP Version 2 Carrying Additional Information
 RFC 1403 BGP OSPF Interaction
 RFC 1519 CIDR (Classless Inter-domain Routing)
 RFC 1542 Bootstrap Extensions & DHCP
 RFC 1548 The Point-to-Point protocol
 RFC 1587 OSPF NSSA, RFC 1701 Generic Routing Encapsulation*
 RFC 1702 Generic Routing Encapsulation over IPv4 Networks*
 RFC 1771 BGP4, RFC 1745 BGP4/OSPF,
 RFC 1765 OSPF Database Overflow
 RFC 1812 Requirements for IP Version 4 Routers
 RFC 1851 The ESP Triple DES Transform, RFC 1866 HTML
 RFC 1965 Autonomous system configuration for BGP*
 RFC 1966 BGP Route Reflection
 RFC 1997 BGP Communities Attribute
 RFC 2068 HTTP, RFC 2131 DHCP Server
 RFC 2132 DHCP Options and BOOTP Vendor Extensions
 RFC 2138 RADIUS, RFC 2139 RADIUS Accounting*
 RFC 2236 IGMPv2, RFC 2328 OSPF V2, RFC 2338 VRRP
 RFC 2362 PIM-SM*/DM, RFC 2370 The OSPF Opaque LSA Option
 RFC 2439 Route Flap Damping, RFC 2453 RIPv2
 RFC 2474 DiffServ Precedence
 RFC 2475 DiffServ Core and Edge Router Functions
 RFC 2597 DiffServ Assured Forwarding
 RFC 2598 DiffServ Expedited Forwarding
 RFC 2644 Directed Broadcasts
 RFC 2792 DSA and RSA Key and Signature Encoding
 for the KeyNote TMS
 RFC 2865 Remote Authentication Dial In User Service (RADIUS)
 RFC 3046, DHCP Relay Agent Information Option
 RFC 3084 COPS-PR*, RFC 3140 PHB Identification Codes
 RFC 3222 Forwarding Information Base (FIB)
 DVMRP v3*, GMRP, GVRP, RSVP*, SSH2, SCP, IGMP snooping, SNMPv3,
 BiNOS enabled
 * - future implementation

Interfaces

10/100/1000BaseT:

Connectors: RJ-45
 Transmission: Full/Half-Duplex
 Auto-Negotiation
 Range: 100m

1000BaseSX/1000BaseLX:

Connectors: SFP LC
 Transmission: Full/Half-Duplex
 Optical Budget: 9db
 Fiber: 50/125 micron, 850nm, 9/125 micron, 1310nm
 Range: 550m (50/125), 10Km (9/125)

Switching Characteristics:

Technology: ASIC based parallel Store-and-Forward
 Bridging: IEEE 802.1d Spanning Tree Algorithm
 Address Table: 64K MAC Addresses:
 Forwarding Rate: Up to 148,800 pps/100 Mbps port
 Up to 1,488,000 pps/1 Gbps port
 Flow Control: 802.3x for full duplex transmission,
 back-pressure for half duplex transmission

Routing Characteristics

Technology: ASIC based
 IP routing Address
 Table: 64K IP addr. 17 default gateways
 Forwarding Rate: Up to 148,800 pps/100 Mbps ports
 Up to 1,480,000 pps/1000 Mbps ports

Management:

STD-15 SNMPv1, STD-16 SMIv1, STD-17 MIB-II, STD-50 EtherLike MIB,
 STD-58 SMIv2, STD-59 RMON, STD-62 SNMPv3, SNMPv2c, SNMPv1,
 RFC2668 MAU, RFC2925 Ping MIB, BATM/Telco Systems Private MIBs
 CLI: Serial, Telnet, SSH
 Internet: JAVA based Web management
 Interface: In-Band/Out-of-Band
 Local Interface: RJ-45, RS-232
 SW Download: via TFTP

Management Features:

VLANs: Up to 4K VLANs per 802.1q
 Bridging: Spanning Tree, Aging
 Class of Service: 4 queues per port
 Monitoring: Single/Multi port mirroring

General:

Dimensions: (W) 438 x (H) 222 x (L) 292 mm
 (17" x 8.75" x 11.5")
 Power: -48VDC or 85 – 260 VAC, 50 – 60 Hz, 290W
 max.
 Weight: 15kg (33 lb)
 Operating Temp.: 0° C ~ 45° C
 Operating Humidity: 10% to 90%, non condensing

Emission and Safety Regulations:

Safety - EN/IEC 60950, EN 60825
 EMC - EN55022
 Immunity - EN 61000
 FCC, VCCI, UL/CUL, CE (EMI, EMS, LVD)

Specifications

Ordering Information

Chassis and Power Suppliers and accessories

Part Number Description

- BTI-0630 T6 Multi-gigabit routing switch chassis with 4 free slots, does not include power supplies, CPU module, or fan module.
- BTI-5P-6-DCPS -48VDC power supply for BTI-0530P and BTI-0630
- BTI-5P-6-ACPS 110/220V AC power supply for BTI-0530P and BTI-0630
- BTI-0630-CPU Management CPU module for BTI-0630
- BTI-0630-FAN Fan module for BTI-0630
- Minimum operating configuration: chassis + cpu module + fan module + 1 power supply

Part Number	Description	Connector	Distance
1000Mbps			
BTI-8GT	8 ports 10/100/1000BaseTX	RJ-45	100m
BTI-8G-SFP	8 ports unpopulated miniGBIC (SFP) module		

Pre-Configured options

BTI-8G-SFP-GSX	8 ports 1000BaseX module with 8 Gigabit Ethernet MM (850nm) miniGBIC	LC	550m
BTI-8G-SFP-GLX	8 ports 1000BaseX module with 8 Gigabit Ethernet SM (1310nm) miniGBIC	LC	10Km

miniGBIC transceivers:

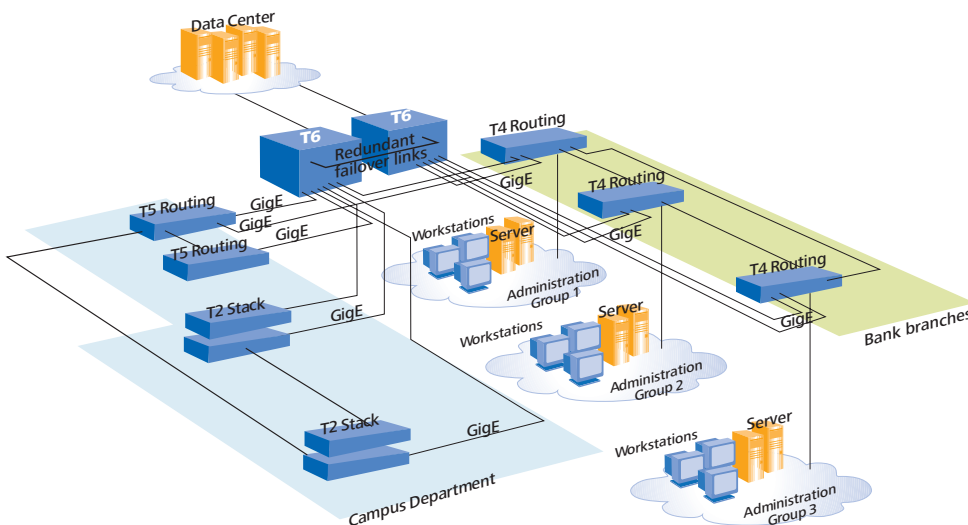
BTI-MGBIC-GLX-LC	1 port 1000BaseLX Single Mode miniGBIC transceiver (1310nm)	LC	10Km
BTI-MGBIC-GSX-LC	1 port 1000BaseSX Multi Mode miniGBIC transceiver (850nm)	LC	550m
BTI-MGBIC-GTX	1 port 1000BaseT miniGBIC transceiver	RJ-45	100m

Operating Software

BiNOS-ML-Adv. BiNOS-Multi-L + OSPF, BGP, PIM, VRRP

Elements Management Software

- BiNOSCenter-Single User Elements Management System for Single Users license
- BiNOSCenter-Multi User Elements Management System for Multiple Users license
- BTIView-OVW SNMP GUI for HP's OpenView management software
- BTIView-SUN SNMP GUI for HP's OpenView management software for Sun Systems
- BTIView-WIN SNMP GUI for Castle Rock's SNMPc management software



AIRLINX Communications, Inc.
 Box 253
 Greenville, NH 03048
 E-mail: sales@airlinx.com
 Tel: (888) 224-6814
 Fax: (603) 878-0530