

T6Pro AdvancedTCA® Multi-GigE Aggregation Routing Switch

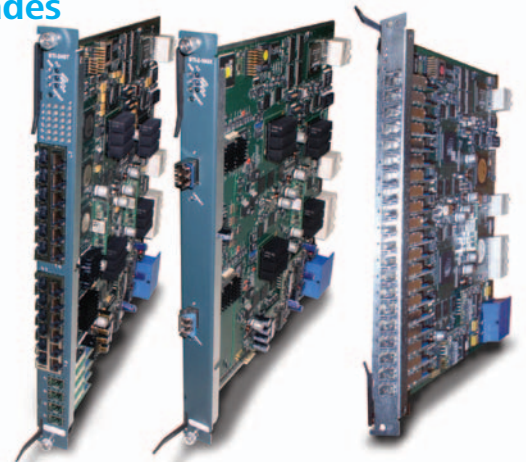
Benefits and Features

- ❑ **Carrier-Class** metro and large enterprise routing switch
- ❑ < 50ms switch recovery time in GigE/10GigE aggregation and multi-ring applications
- ❑ Standardized **ITU approved AdvancedTCA®** architecture
- ❑ **Standalone ATCA** switching and HUB blades
- ❑ **Up to 288 Gigabit Ethernet** ports or **24 10Gigabit Ethernet** ports or any equivalent
- ❑ 4 Classic T6Pro Chassis can be mounted in a standard **42RU rack delivering up to 1,152 Gigabit** ports
- ❑ Integrated cable management and fans enable the T6Pro to be directly stacked
- ❑ **Pay-as-you-grow** – add line cards as needed
- ❑ **Non-blocking** architecture, wire-speed **guaranteed**
- ❑ **Most Compact, lowest power** consumption on the market
- ❑ 2 configurations available for **maximum savings**:
 - T6Pro Classic - 14-slot, **12RU** (stackable as 10RU - 4 chassis in 42RU rack)
 - T6Pro Compact - 5-slot, **4RU**
- ❑ All modules interchangeable between Classic and Compact chassis - reduces costs
- ❑ **Savings** in cost-of-ownership and logistics can reach up to 90%, compared to existing systems!
- ❑ Front and rear I/O connections
- ❑ Programmable, powerful network processor for maximum flexibility
- ❑ High resiliency with redundant CPU, switching fabric, and power supplies
- ❑ Enhanced security and maximum protection
- ❑ Unique option for standard Gigabit Ethernet plug-in transceivers:
 - Extra long-haul (more than 100Km), CWDM, bi-directional, and many more
- ❑ Embedded All-Telco Systems-Platforms uniform BiNOS Operating System
- ❑ Complete professional management tools for best network control
 - IB and OOB management with CLI (Industry Standard), WEB management via Embedded Java™ and unique alarms management
 - SNMPc
 - HPOV API
- ❑ Unique **feature-rich** support including **IPv6** and **MPLS***

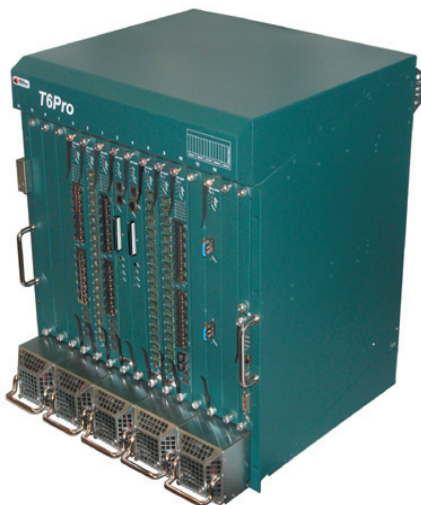
T6Pro Compact



ATCA Blades



T6Pro Classic



Carrier-Class Metro Optimized Gigabit Ethernet Aggregation Routing Switch

T6Pro is a carrier-class, multi-layer routing switch optimized for metro and aggregation applications. T6Pro implements the full scope of the latest AdvancedTCA® (ATCA) architecture.

T6Pro is available in two non-blocking chassis configurations – T6Pro Compact is 4RU and T6Pro Classic is 12RU (stackable as 10RU). T6Pro's key features include: 10/100/1000 and 10 Gigabit Ethernet copper and fiber, rapid spanning tree ensures <50ms switch recovery time for 1Gbps and 10Gbps carrier-class metro Ethernet, QoS, IPV6 dual stack, and MPLS awareness.

All T6Pro modules have optional redundant power supplies and redundant CPUs and are hot swappable and field upgradeable with 99.999% availability. They are all interchangeable between the Classic and Compact T6Pro chassis types minimizing cost of ownership, spares, and reducing training time.

Among the most popular modules available :

Interface	COPPER	SFP	
Ports per module	10/100/1000	1000BaseX	10-Gigabit
Max. config. T6Pro Classic*	24	20	2
Max. config. T6Pro Compact**	288	240	24
	96	80	8

*Max. Configuration assumes the presence of dual CPM (CPU/Switch Fabric) cards

**Max. Configuration assumes the presence of a single CPM (CPU/Switch Fabric) card

Modern networks require high performance, reliability, security, and QoS as basic features, the T6Pro fulfills all of these at wire speed performance levels. It provides all Layer 2 and Layer 3 routing and switching services at wire speed up to 10Gbps. The platform is fully managed via SNMP, an industry standard CLI and Web management with both in-band (IB) and out-of-band (OOB) tools. BiNOS, BATM's Inter-Networking Operating System, meets the most stringent requirements of service providers' networks.

AdvancedTCA®

ATCA, the PICMG 3.X family, is a new series of PICMG specifications standardized by ITU, that meets the requirements for next-generation, carrier-grade communications equipment. This standard incorporates the latest trends in high-speed interconnect technologies and next-generation processors that improves reliability, manageability, and serviceability.

ATCA provides standardized platform architecture for high-demand telecommunication applications, it complements existing solutions (CompactPCI) by providing a higher level of performance and scalability.

ATCA allows the deployment of very fast and reliable IP based networks and smooth, powerful migration paths from legacy to IP networks while dramatically reducing OPEX and CAPEX.

Telco Systems is driving the IP revolution with the most advanced and powerful ATCA platform currently available.

T6Pro

T6Pro is available in two configurations, The T6Pro Classic – 12RU (stackable as 10RU in a 4 chassis total in 42RU rack with 14 service slots) and the T6Pro Compact – 4RU with 5 service slots. All T6Pro modules are interchangeable between the two configurations and software versions are identical. Both systems are fully redundant and modules are hot swappable and field upgradeable.

The non-blocking core capacity of the T6Pro's core matrix crossbar is 576 Gbps with 2 CPMs (288Gbps per CPM). This translates to maximum of 288 Gigabit Ethernet ports with a maximum forwarding rate of 428 Mpps.

Modularity and Flexibility

T6Pro is a multi-service, multi-layer platform with high modularity, flexibility, redundancy, and resiliency.

- ❑ All modules are interchangeable between all chassis
- ❑ BiNOS software versions are the same for all modules
- ❑ Pay as you grow allows the use of one or two line blades without the use of CPM modules
- ❑ Every fiber optic line card can be installed with pluggable transceivers (SFP) supporting any mix of single mode, multi mode, bidirectional (single fiber), CWDM, and long haul (up to 200 km at 10Gbps)
- ❑ Variety of routing and switching multi layer copper and fiber blades are available

Redundancy and Resiliency

The T6Pro architecture incorporates multiple levels of redundancy designed for carrier class services and mission critical applications.

- ❑ Backplane provides 1 + 1 redundancy
- ❑ Redundant CPU and matrix modules
- ❑ Redundant power supplies
- ❑ All modules, power supplies and fan drawers are hot swappable
- ❑ Faster-than-SONET recovery on IP including ring architecture (< 50ms)
- ❑ Many more features...

Features

The T6Pro routing switch, with BiNOS OS, incorporates a large number of features. These features comply with international standards and are targeted at carrier-class applications. Main features include:

❑ General Features

- IP, UDP, TCP, TFTP, ICMP/IRDP, ARP, BootP, CIDR, DNS, IP over Ethernet

❑ L2 Features

- IEEE 802.3/u/z/ac/ae, 802.3x flow control and backpressure, IEEE 802.1p/q VLAN, IEEE 802.1d/s/w STP/MSTP/RSTP, MPLS, IEEE 802.3ad, LACP, TLS/QinQ/L2VPN

❑ L3 Features

- RIPv1/v2, OSPFv2, BGP4, IS-IS, VRRP, VRF/L3VPN, DHCP server/ relay with option 82, MD5 with routing

❑ IP Multicast Features

- IGMPv1/v2, PIM-DM/SM, DVMRP

❑ QoS Features

- IEEE 802.1p with 8 priority queues, TOS, Diffserv, rate limiting and traffic shaping, bandwidth provisioning, WRED

❑ Security Features

- ACLs, MAC security, Secure TELNET, RADIUS, TACACAS+, SSH, SNMPv3, IEEE 802.1x, DoS, CERT, SCP

❑ Management Features

- Industry standard CLI, TELNET, RMON, SNMPv1/v2c/v3, Java Based GUI, HTTP, MIB/ MIB II, HPOV/SNMPC plug-in, BiNOSCentr EM,

❑ Resiliency Features

- Hot swapping, critical-mission redundancy, resilient port, download without service interruption
- Less than 50ms switch-over recovery time in Ethernet ring topologies

For the complete and updated standards compliance list, please see the BiNOS technical specifications and general description documents.

*Future implementation

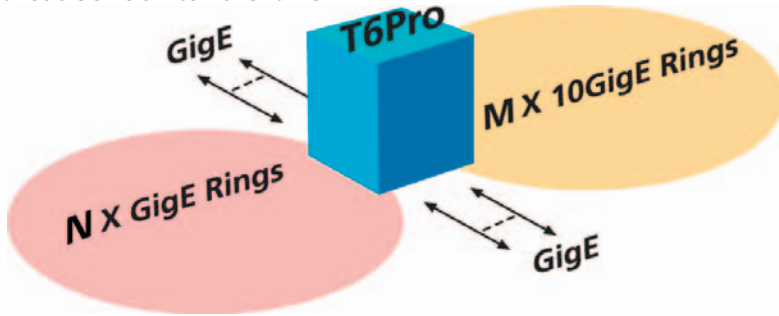
Applications

The T6Pro is designed especially for the metro access layer. It is optimized to aggregate a maximum number of ports per single platform, conforming to service provider demands.

- Up to 288 GbE ports or 24x10GbE ports or equivalent. Any mix is possible.
- Non-blocking wire speed architecture and a wide choice of hot swappable and field upgradeable fiberoptic transmitters / receivers that enable simple implementation of ETTx projects
- Sub 50ms switchover convergence time in IP networks (SDH /SONET similar)
- Single T6Pro can "close" several Ethernet rings at speeds of 1 Gbps and 10 Gbps
- Ethernet ring topology can be used for DSLAM aggregation and cellular backhauling applications
- The T6Pro ATCA architecture enables using each blade for different switched network applications (based on MAC and VLAN address count). Each blade can operate independently, yet using common T6Pro management and control.

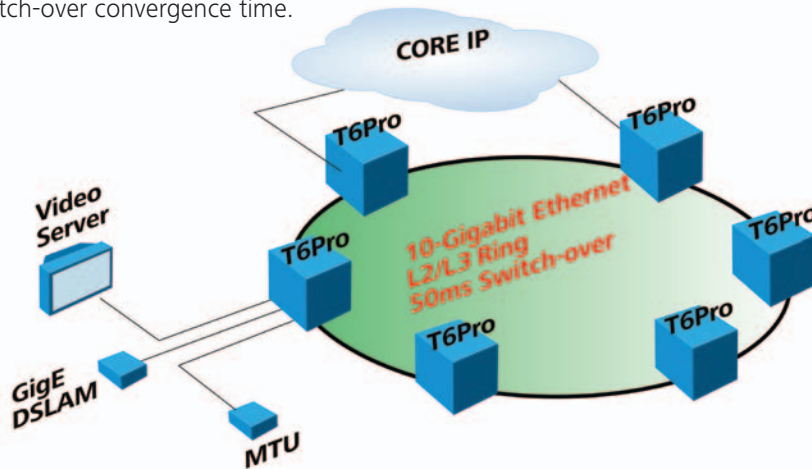
Ethernet Rings

T6Pro as a Multi-GigE and Multi-10GigE rings "closure" carrier-class node, with sub 50ms switch-over time.



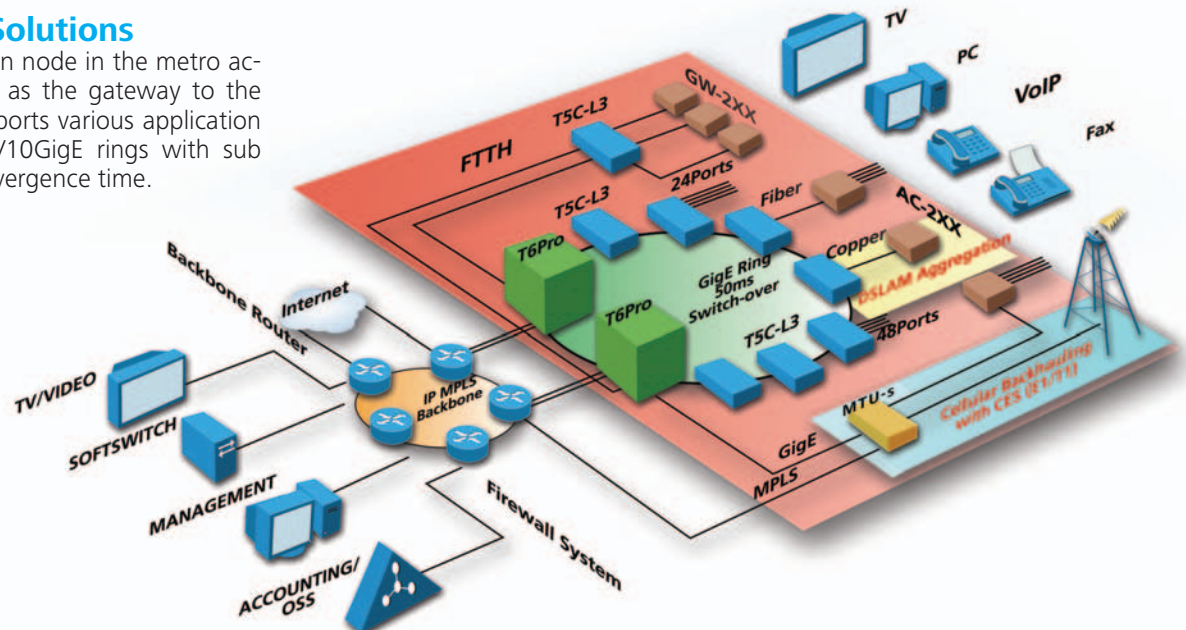
Services Backhauling

Services Backhauling with GigE and 10GigE aggregation and distribution over GigE/10GigE rings with sub 50ms switch-over convergence time.



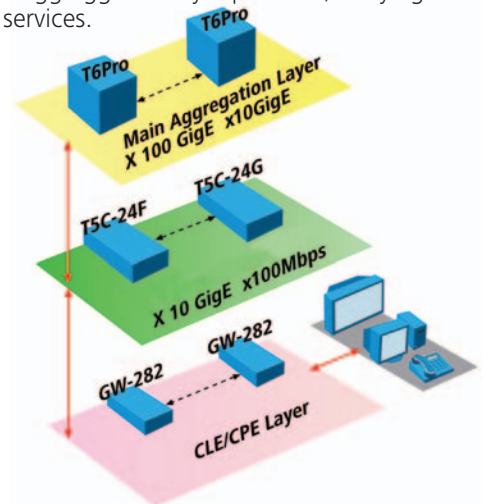
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T6Pro is an aggregation node in the metro access network, as well as the gateway to the MPLS core. T6Pro supports various application types over multi-GigE/10GigE rings with sub 50ms switch-over convergence time.



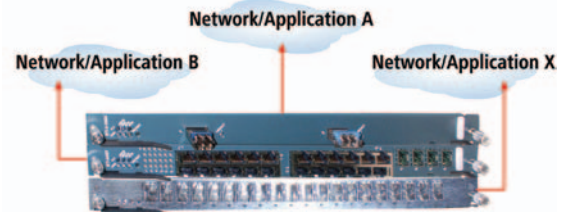
Active Ethernet FTTH

T6Pro for Active Ethernet FTTH as a Multi-GigE/10GigE carrier-class aggregation layer platform, carrying triple-play services.



ATCA Standalone Blades

Standalone blades for physical differentiation of application types as well as ATCA hubs and switching blades for any third-party ATCA chassis.



Interfaces:

10/100/1000BaseT:

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

1000BaseSX/LX/EX/ZX:

Connectors: SFP LC
Transmission: Full/Half-Duplex
Fiber: 50/125 micron, 850nm, 9/125 micron,
1310nm, 1550nm
Range: 550m (50/125), 10/40/70Km (9/125)

Switching/ Routing Characteristics

Technology: ASIC based parallel Store-and-Forward
Address Tables – Switching: 16K MAC addresses per blade, Routing: 256K
IP Addresses, 16K Default Gateways
Forwarding Rate: Up to 148,810 pps / 100 Mbps ports Up to 1,488,100
pps / 1 Gbps ports and Up to 11,904,800 pps/ 10 Gbps 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, Telco Systems Private MIBs, SNMP
MIB Extensions, RFC 1493 Bridging MIB

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
Diagnostics: LEDs for HW monitoring

Specifications Compliance

General Routing/Switching protocol

IEEE: 802.3, 802.1d, 802.1p, 802.1q, 802.1s, 802.1u-2001, 802.1w, 802.3ac, 802.3ad, 802.3ae, 802.3u, 802.3x, 802.3z

RFC : 768, 783/1350, 791/2/3, 826, 854, 877, 887, 894, 903, 919, 922, 925, 951/1542, 961, 1027, 1042, 1122, 1166, 1191, 1256, 1513, 1519,
1591, 1812, 2338/3768, 1930, 2131/32, 2270, 2474/75, 2597/98, 3046, 3069, 3222, MVR, Resilient ports

TLS, (VLAN Nesting) – Q-in-Q, Multiplexer

Management and SNMP

RFC, 854, 865/7/8, 959, 1034/5, 1059, 1094*, 1119, 1123, 1155/6/7, 1212/3/5, 1305, 1493, 1542, 1643, 1650, 1724, 1757, 1850, 1866, 1901,
1907, 1918, 1945, 2011, 2012, 2013, 2021, 2068, 2096, 2233, 2239, 2576, 2578, 2579, 2580, 2613, 2644, 2674, 2742, 2786, 2787, 2819, 2863*,
2925, 3164, 3410/11/12/13/14/15/16/17/18, STD0015/16/17/58/62

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, Telco Systems Private MIBs, SNMP MIB Extensions, RFC 1493 Bridging MIB

Software download without service interruption - HTML/HTTP management, Telnet and SSHv2 clients, Configuration logging, Automatic boot via FTP
(image download), Syslog logging facility, Hot swap Multiple management levels (privilege levels), Java web-based management, CLI management
(direct or via Telnet), IETF Dot1p, Dot1q bridge MIB, Event scheduler, Configuration upload/download via network, BATM enterprise MIB , Tracing
software tasks problems Software download without service interruption static protocols one CPU system, Metro Ethernet Forum OA&M

Security

Layer 2/3/4/7 Access Control Lists (ACLs), IEEE 802.1x

RFC :1851, 2138/39, 2792, 2856, 2865/66*/69

SSHv2: draft-ietf-secsh-architecture-07, draft-ietf-secsh-transport-09, draft-ietf-secsh-connect-09, draft-ietf-secsh-userauth-09, FIPS 186 (Digital
Signature Standard), FIPS 180-1 (Secure Hash Algorithm), RFC 1851, RFC 2792, HMAC-SHA1 MAC algorithm, SCPv2, MAC address security / lockdown

Quality of Service

RFC :2475, 2597, 2598, 2697, 2698, 2998*, 3084*, 3140, Rate Limiting, Traffic Shaping, IP Precedence reading and re-marking, IP ToS reading and re-
marking, ISP application, Server load balancing*

Anti Network Attack

CERT (<http://www.cert.org>), CA-1996-21, CA-1997-28 , CA-1998-01, CA-1996-26

MPLS

RFC:2205, 2547, TLS, (VLAN Nesting) – Q-in-Q

Multicasts

RFC :1075, 1112, 2236 , 2362, IETF , PIM-DM, DVMRP , IGMP snooping

Routing

RIP, RFC: 1058, 1388, 1389, 1723, 1724, 1923, 2082, 2453, STD 56

OSPF, RFC: 1253, 1370, 1403, 1587, 1765, 1850, 1997, 2154, 2178, 2328, 2370 , 2370, STD 54

BGP4, RFC : 904, 1267, 1403, 1657, 1745, 1771/2/3/4, 1965/66, 1997/98, 2385, 2439, 2796, 2842, 2858, 2918, 3065

IS-IS, ISO 10589 (ISO 8473), RFC: 1195*, 2763, 2966*, 3373*, 3567*

10Gigabit Ethernet:

Connectors: XFP LC
Transmission: Full/Half-Duplex
Fiber: 9/125 micron, 1310nm/1550nm
Range: 300m/10Km/40Km

Management Features:

VLANs: Up to 4k VLANs per 802.1q
Bridging: Spanning Tree, Aging
Class of Service: 8 queues per port
Monitoring: Single/Multi port mirroring

General:

Dimensions: (W*H*L) 483 * 484 * 375/ 483 * 178 * 385 mm
(19" * 21" * 15"/ 19" * 7" * 15")
Power: -40.5VDC -60VDC or 85 – 260 VAC, 50 – 60 Hz,
1500W/600W max.
Weight: 43.7kg (96.3 lb) / 15kg (33 lb)

Safety & Electro Magnetic Compatibility:

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



http://www.telco.com

T6Pro

Telco Systems



Ordering Information:

Chassis

Part Number

Description

- BTI-0630P Classic Chassis with 14 free slots, dual shelf managers FANs drawer included. Dual - 48VDC feed. Does not include CPU and Matrix modules. Requires at least single CPU & Matrix card.
- BTI-0630PC Compact chassis with 5 free slots, single shelf manager and FANs drawer included. Dual-48VDC feed. Does not include CPU and Matrix modules.

Accessories

- BTI-0630P-CPM Management CPU and Matrix (Switching Fabric) module.
- BTI-6P-MNG Shelf Manager redundant module.
- BTI-RPS2 2-slot, rack mount & hot-swap power supply 1RU bay, requires ACPS modules. Can support more than a single shelf. (Only RPS2-ACPS type can be used in the compact chassis).
- BTI-RPS2-ACPS 1,200W AC PS single module (At list two are required for redundancy), Can be used only with RPS2 bay.
- BTI-RPS4 4-slot, rack mount & hot-swap power supply 2RU bay, requires AC PS modules (only RPS4-ACPS type can be used).
- BTI-RPS4-ACPS 1,200W AC PS single module (At list two are required for redundancy), Can be used only with RPS4 bay.

100Mbps Modules

Part Number

Description

Connector

Distance

- | | | | |
|------------------|---|-------|--------|
| BTI-24GT | 24 Ports 10/100/1000BaseT plus 4x1000BaseX miniGBIC | (SFP) | module |
| BTI-20GF | 20 ports unpopulated 1000BaseX miniGBIC (SFP) module | RJ-45 | 100m |
| BTI-MGBIC-GZX-LC | 1 port 1000BaseX single-mode miniGBIC transceiver (1550nm) | LC | 70Km |
| BTI-MGBIC-GEX-LC | 1 port 1000BaseX single-mode miniGBIC transceiver (1550nm) | LC | 40Km |
| 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 |
| BTI-SFP-FSM-LC | 1 port 100Mbps SFP transceiver SM 1310nm | LC | 15km |
| BTI-SFP-FMM-LC | 1 port 100Mbps SFP transceiver MM 1310nm | LC | 2km |

10-Gigabit Ethernet Modules

- BTI-2-10GX 2 ports 10-Gigabit Ethernet unpopulated XFP module
- BTI-10GLR-SC 1 port 10-Gigabit Ethernet single mode XFP transceiver (1310nm) SC 10Km
- BTI-10GER-SC 1 port 10-Gigabit Ethernet single mode XFP transceiver (1550nm) SC 40Km

Elements Management Software

- BiNOSCenter-Single User Elements Management System for Single Users license
- BiNOSCenter-Multi User Elements Management System for Multiple Users license
- BTIVIEW-OVV 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

☎ For other transceiver types please call Telco Systems

***Future implementation**