

ZX1900

5U Packet Processing Platform



Target Applications:

- Load Balancer
- Security Appliance
- Deep Packet Inspection
- Dense Media Processing

Product Description

The ZX1900 is a unique platform for packet processing and switching. The standard configuration includes a 5U chassis, 10-Gigabit Ethernet switch plus three closely-coupled payload slots for user applications.

The ZX1900 uses an innovative port-breakout architecture to consolidate multiple Fabric and Base links at the front of the chassis. With a total of 35 egress ports, the ZX1900 is compatible with “bump in the wire” processing applications as well as backbone deployments for large networks. Sixteen (16) of the front ports can host 1-Gigabit or 10-Gigabit links via copper or fiber pluggable modules (SFP+). The link speed and type is auto-detected from the SFP+ module. Twelve (12) of the front ports can host 1-Gigabit links via pluggable modules (SFP). Three (3) front-panel and four (4) rear-panel ports are fixed RJ45 ports, supporting 10/100/1000 Ethernet over UTP cable.

In addition to massive egress bandwidth totaling over 175 Gigabits/second, the ZX1900 can support three (3) payload boards for closely-coupled packet processing applications, including Deep Packet Inspection (DPI).

Packet Processing at 10G-Per-Second

At link speeds surpassing 10-Gigabits, offload hardware is often required to enable advanced applications. Each payload slot of the ZX1900 is equipped with dual 10-Gigabit Fabric links (Active/Active) for incredible bearer-plane throughput, plus a separate 1-Gigabit Base link for control-plane tasks. The 10-Gigabit ports in each payload slot can support processing blades with either 10-Gigabit (Option 9) or 1-Gigabit (Option 1) Fabric ports. Using the OpenArchitect® environment, application blades can participate directly in the processing, mangling, forwarding, and inspection of every packet.

Ordering Information

Part Number	Description
ZX1900	5U platform with 10G switch & 31 front panel egress ports
ZX1900-RTM	4 10/100/1000 Ethernet RJ45, 1 Serial, 1 OOB ports

Features

- **35 egress ports**
 - 16 SFP+ ports for 10GigE or 1GigE (auto-detect)
 - 12 SFP ports for 1GigE
 - 7 RJ45 ports for 10/100/1000Base-T
- **3 PICMG 3.0 compliant payload slots for applications**
 - 20GigE bearer-plane throughput to each slot
 - 1GigE control-plane link to each slot
- **Integrated shelf management**
 - Front Panel 10/100 & RS-232 over RJ45
 - Serial-Over-LAN (SOL)
- **Network management & configuration**
 - OpenArchitect® Linux Switch Control Software
 - Serial and Ethernet OOB ports
- **ZNYX application extensions**
 - Content Aware Processor (CAP) for packet vectoring with OpenArchitect/PV
 - Flow-Based Classifier & Load Balancer
 - Scalable IPsec Security Gateway

ATCA Fabric Ethernet

- **20-port 10GigE Fabric Switch**
 - 20-port 10GigE switch (Broadcom BCM56800)
 - ATCA Fabric ports servicing three payload nodes with dual Option 1 or Option 9 links
 - Five SFP+ ports for 1 or 10GigE to front panel
 - IPv4 switching at Layer 3, IPv6 capable
 - VLANs with flexible Class of Service (CoS)

ATCA Base Ethernet

- **26-port 1/10GigE Base Switch**
 - 24-port 1GigE + 2-port 10GigE switch silicon (Broadcom BCM56502)
 - ATCA Base ports servicing three payload nodes
 - 12 SFP ports for 1GigE to front panel
 - 2 SFP+ ports for 10GigE to front panel
 - 3 RJ45 ports for 10/100/1000Base-T to front panel
 - 4 RJ45 ports for 10/100/1000Base-T to RTM
 - IPv4 switching at Layer 3, IPv6 capable
 - VLANs with flexible Class of Service (CoS)

Control Processors

- OpenArchitect® Linux Switch Control Software
- Freescale 8270VV at 450MHz (50MHz PCI bus)
- 256MB ECC SDRAM (100MHz SDRAM bus)
- 128MB Flash ROM for redundant system image
- Recessed front-panel reset button
- RS-232 Console RJ45 to front panel & RTM
- 10/100 Ethernet RJ45 OOB to front panel & RTM

OpenArchitect®

The core software technology of the ZX1900 goes far beyond simple Ethernet switch management. The field proven OpenArchitect® embedded operating system provides Linux-enabled flexibility in management protocols, configuration, packet vectoring, and high-availability features. Only ZNYX OpenArchitect® uses familiar, industry-standard Linux interfaces, enabling simple system configuration and true transparency for network integration.

Packet Processing at 10G-Per-Second

OpenArchitect® uses open-source, industry compatible APIs for networking. This allows any Linux-compatible protocol stack to work, giving ISVs flexibility in the choice of protocol stacks.

OpenArchitect® Features

Features	Benefit
bash shell	Familiar command-line interface with scripting capability
ssh	Secure remote sessions
BusyBox toolkit	All the familiar UNIX/Linux/POSIX tools
vi editor	Widely used text editor for maintaining configuration files
tftp/ftp	Standard file transfer mechanisms
telnet	Remote session access
thttpd daemon	Web-based file service
net-SNMP	The latest in SNMP v1, v2, and v3 protocol support
STP/RSTP/MSTP	IEEE 802.1D automatic network configuration
iptables	Filter/Forward packets based on arbitrary rules for security
dhcpcd	DHCP server for auto-configuration of payload and other nodes
port-based DHCP	IP Address assignment based on chassis slot number
zconfig	Complete control over VLAN configuration

OpenArchitect®/High Availability (OA/HA)

Continuous (“five nines” or better) operation is a hard requirement in most networks, making hardware redundancy a must. Software facilities are equally critical to enable automatic, rapid re-convergence of the network around failed components. OpenArchitect/HA fills this need with the fastest fail-over performance possible in packet-switched networks. Instead of convergence in seconds or minutes as is typical for STP/RSTP failover schemes, OpenArchitect/HA can fail-over in milliseconds, often faster than the dual-SONET standard of 50 milliseconds.

Packet Processing at 10G-Per-Second

A bonus feature unique to ZNYX Networks OpenArchitect® switches is also found on the ZX1900. Packet Vectoring refers to the ability of the switch to send packets port to port using any information within the packet. This enables load balancing, security monitoring, and many other applications that would otherwise not be possible. Because the silicon handles the real-time decision making, all packet vectoring happens at full line rate without restrictions.

The OA/PV implementation uses the familiar Linux iptables control interface to implement packet vectoring rules. With very little learning curve, network technicians can configure packet vectoring subsystems that eliminate the need for expensive external load balancing or network processing systems.

Features

Serviceability Features

- **5U Form Factor**
 - Provides cooling for 200W per slot
 - Status LED suite
 - Positive-latch ejector handles
- **IPMI Management Module (IPMC)**
 - Thermal & Fuse-Failure sensors for switch
 - Voltage Sensors for each power rail
 - Serial-Over-LAN (SOL)
 - I2C FRU ROM
- **Multiple-mode LED status Display**
 - Link/Activity/Speed Status for Base and Fabric Interface by port number
 - Operational Status of each link
 - Front panel mode-select button

Networking Features

- **Layer 2 and Layer 3**
 - Wire-speed L2/L3 Switching
 - Wire-speed L2-L7 Packet Classification
 - IEEE 802.1Q VLANs
 - IEEE 802.1P Class-of-Service
 - IEEE 802.3ad Link Aggregation (static)
 - IEEE 802.1D Spanning Tree (STP)
 - IEEE 802.1D-2004 Rapid Spanning Tree (RSTP)
 - Virtual Router Redundancy Protocol (VRRP)
 - Common Open Policy Service (COPS)
 - Differentiated Services (DiffServ)
 - Sophisticated Load Balancing
 - Port Mirroring in hardware
- **Management**
 - Linux shell interface (bash, et.al.)
 - SNMP management (v1, v2, v3)
 - Secure Shell daemon (SSH v2)
 - DHCP server / client / relay
 - Network Time Protocol (NTP) client
 - Web server (HTTPD) for browser access

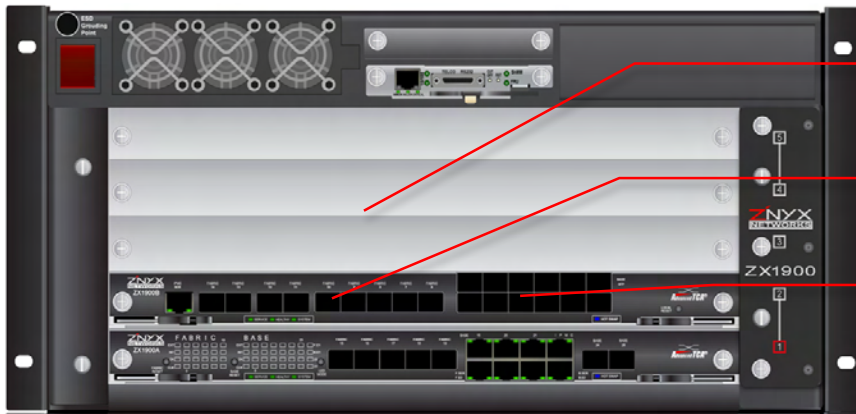
Additional Features

- **Capacitor-backed Real-time Clock**
- **Write protect switch for Flash ROMs**
- **OpenArchitect® LED Status Display**
 - CLK indicates CPU health
 - OK indicates software ready
 - EXT Fault indicates external cable/link problem
 - INT Fault indicates internal hardware fault
- **Telco Compliance Engineering Standards**
 - NEBS / ETSI

Auxiliary Features

- **Switch RTM available**
 - 4 Base 1GigE ports (RJ45)
 - OOB port for Base and Fabric
 - Mirrored RS-232 console ports via RJ45

Front View



Three payload slots, each with 20GigE Fabric connectivity for advanced applications

Sixteen 10GigE ports (SFP+) for 160Gbps egress bandwidth

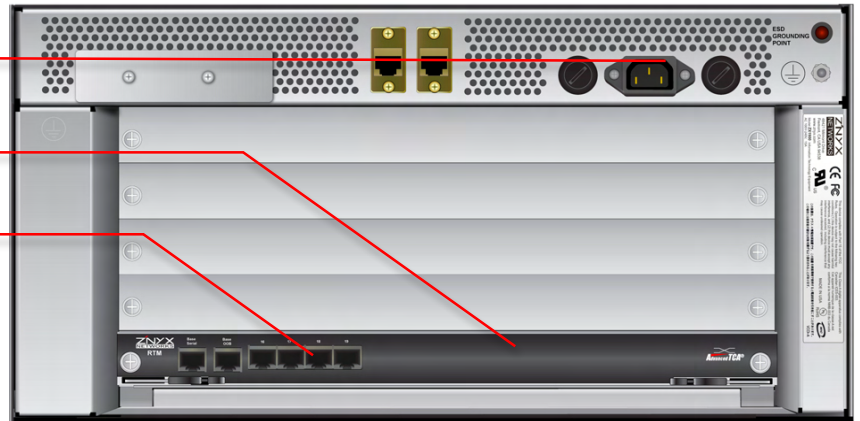
Twelve 1GigE ports (SFP) for arbitrary link-types

Rear View

Dual AC or DC power supplies

RTM with 4 1GigE ports (RJ-45), 1 Console port (RJ-45) and 1 OOB Ethernet port (RJ-45)

OOB connectivity on front and rear for Console (RS232) and Management LAN (10/100 Ethernet)



Standards and Specifications

Standard	Revision	Description	Status
ATCA 3.0	2.0	AdvancedTCA® Base Specification	At the time of this document writing, the R2.0 version of ATCA 3.0 has not been ratified. No changes are expected from the draft version. ATCA 3.0 was formerly known as PICMG 3.0.
ATCA 3.1	1.0	AdvancedTCA® for Ethernet	Fully adopted.
IEEE 802.3-2005	9 Dec. 3005	IEEE 802.3 Ethernet Specifications	Fully adopted.
IPMI	2.0	Intelligent Platform Management Interface	Fully adopted.
SFF-8431	Rev. 1.2 21 Dec. 2006	SFP Committee Specification for Enhanced 8.5 and 10 Gigabit Small Form Factor Pluggable Module "SFP+"	Marked "This is not a final draft"
Standard		Agency/Report Format	Description
CFR 47, Part 15, Subpart B 1998 (ANSIC63.4 1992)		FCC	United States
EN300-386-2 VI.1.3 (1997-12)		EN55022 (1998), EN50082-1 (1996)	European Union
VCCI (ANSI C63.4-1992 / CISPR 22-1997)		VCCI	Japan / International
AS/NZS 3548 (1997)		AS/NZS 3548	Australia / New Zealand
ICES-003, Issue 3		ICES 003	Canada
CNS 13438		BSMI	Taiwan
UL 1950 3 rd Edition			United States
CAN/CSA 22.2 No 950 - 95			Canadian
IEC 950 (1991) 2 nd Edition with Amendments No. 1 (1992), No. 2(1993), No 3 (1995), and No. 4 (1996)			International
EN 60950 (1992) Amendments 1, 2, 3, 4 & 11			European Union

ZNYX Networks

ZNYX specializes in the development of blade-based Switching Platforms for proprietary and open-standards based systems including PICMG 2.16 and AdvancedTCA®.

ZNYX's OpenArchitect® Switch Management Software and HA Suite provide a highly integrated solution based on a hardened Linux environment. Developers and Integrators can leverage the Linux environment to customize and re-use application code across multiple switching/routing platforms. ZNYX products service the following markets:

- Mobile
- Communications
- Telephony
- Military
- Homeland Security
- Aerospace
- Medical
- Automation
- Storage
- Enterprise

Product Specifications

PICMG 3.0 Interfaces

- (12) 1GigE to front panel (SFP)
- (2) 10GigE to front panel (SFP+)
- 10/100/1000Base-T to each payload slot
- (4) 10/100/1000Base-T to RTM (RJ45)
- 10/100/1000Base-T to front panel (RJ45)
- 10/100Base-T to Shelf Manager (ECN.001)

Base / Fabric CPU (each)

- Broadcom BCM56502 Switch Fabric
- Freescale 820VV at 450MHz (50MHz PCI bus)
- 256MB ECC SDRAM (100MHz SDRAM bus)
- 128MB Flash ROM

Front / Rear Panel Interfaces

- (15) 1GigE Egress (SFP & RJ45)
- (16) 10GigE Egress (SFP+)
- (1 ea) 10/100Base-T Base/Fabric OOB (RJ45)
- (1 ea) RS-232 Base/Fabric Console (RJ45)
- Serial-Over-LAN (SOL) to IPMC

Layer 2 / 3 Switch/Routing Features

- IEEE 802.1Q VLANs with double tagging
- IEEE 802.1D Spanning Tree Protocol (STP)
- IEEE 802.1D-2004 Rapid Spanning Tree (RSTP)
- IEEE 802.3ad Link Aggregation (static)
- IEEE 802.3x Full Duplex Flow Control
- Jumbo Frames Support (9kB, L2, non-host)
- On-Chip MAC table (16k addresses)
- Port Mirroring in hardware
- Per-port traffic shaping, policies, broadcast control
- Line-Rate Layer 3 Forwarding (8k IP addresses)

Management Features

- Command Line Interface (CLI)
- IPMI v1.5 client SNMP v1, v2, v3 with extensive MIB support
- RMON counters

Status Indicators

- Network status, per channel Link, Activity LEDs
- PICMG 3.0 status indicators (Out-of-Service, Health, System, HotSwap)
- OpenArchitect® status indicators (Ext Fault, Int Fault, Clock, OK)

PICMG 3.1 Interfaces

- (2) 10GBase-BX4 (XAUI) to each of three payload slots for Channel Option 9, individually selectable to 1000Base-BX for Option 1
- (14) 10GigE to front panel (SFP+)

AdvancedTCA® Features

- PICMG 3.0 compliant HotSwap Power Management Controller
- PICMG 3.0/3.1 Extended Mode Support
- PICMG 3.0 Status Indicators
- PICMG 3.0 FRUID support
- PICMG 3.0 compliant IPMI controller (IPMC)
- Compliant with PICMG 3.0 ECN.001 for shelf manager cross-connect
- Power plane sensors
- Temperature sensor

Network Services

- FTP / TFTP servers for remote file transfer
- HTTP server for web-based access
- DHCP server / client / relay
- NFS client for remote filesystems
- NTP client for network-based time service
- SSH / Telnet server for remote session access

QoS and Priority Queues

- IEEE 802.1p Class of Service (CoS) with 8 priority queues per VLAN
- Supports IETF DiffServ DSCP marking
- Supports IETF Type-of-Service (TOS)
- Supports IETF Common Open Policy Services (COPS) architecture

High Availability Features

- Power-On Diagnostics
- Switch-to-Switch Failover (policy-based)
- VLAN-to-VLAN Failover (policy-based)
- Port-to-Port Failover (policy-based)
- Automatic Reconfiguration after HotSwap
- Redundant OpenArchitect® runtime image in flash Full PICMG 2.1 / 3.0 HotSwap support
- Bonding driver for transparent failovers on client Scriptable, policy-based link failure correction



Specifications Subject to Change

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