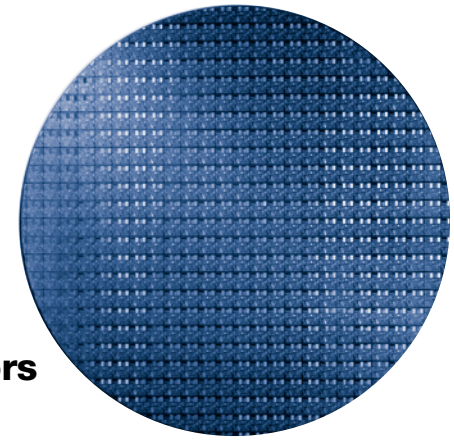
Intel® IXDP2805 and Intel® IXDP2855 Advanced Development Platforms



Modular Platforms Accelerate Development of Network Access and Edge Applications Based on Intel® IXP2805 and Intel® IXP2855 Network Processors

intel.com/go/networkprocessors

Product Highlights

- Support for a variety of applications to accelerate development time and extend time-in-market for products based on the Intel® IXP2805 and Intel® IXP2855 network processors
- Single-chip implementations, ideal for designing applications spanning OC-3 to OC-48/GbE line rates, such as security appliances, enterprise and edge switches, and 3G RNC data planes
- Support for Intel IXP2805 and IXP2855 network processors at 1.4 GHz, 1.0 GHz, and 650 MHz
- Standards-based, PICMG 3.0 Advanced Telecom Computing Architecture* (AdvancedTCA*)-compliant
- Modular platform architecture, including chassis, boards, and optional mezzanine cards for flexible I/O configurations and dataflow emulation
- Developers can emulate, optimize, and debug advanced networking products
- Rapid prototyping of an entire application with complete development environment, including hardware, development tools, and applications software
- Hardware and application software can be developed simultaneously to accelerate time to market
- Off-the-shelf PCI Mezzanine Card (PMC) can be added to enable simultaneous data plane and control plane development
- Facilitates integration of complementary hardware and software from third parties

Product Overview

Equipment designed for network access, edge, and enterprise applications requires robust network processing performance to support value-added network services at line rate. Quick implementation of new network services is a primary objective. To be competitive, however, vendors of network equipment must also minimize their development time and cost. To support these requirements, network processors need to combine high performance with flexible control of processing resources.

The Intel IXP2805 and IXP2855 network processors are designed to provide these capabilities through a fully programmable, parallel processing architecture on a single chip. They handle complex algorithms and perform deep packet inspection, traffic management, and forwarding at speeds up to 10 Gbps. In addition, the IXP2855 network processor has integrated cryptography engines that enable implementation of security features, eliminating the need for an additional specialized processor.

The Intel® IXDP2805 and Intel® IXDP2855 Advanced Development Platforms further enhance the value of the network processors by accelerating the development and validation of new products designed for OC-3 to OC-48 and multi-Gigabit line rates. Developers can use these platforms in several ways:

- Write code and run simulations in a Windows*-based PC environment using the graphical workbench and cycle-accurate simulator. They can then use the advanced development platform to verify system functionality even before customer hardware is available.
- Reuse platform schematic source files to jump-start board development.
- Validate a design using the base card and mezzanine cards available from Intel; or design and test a custom I/O subsystem using the advanced development platform prior to committing to a full board design.
- Add additional AdvancedTCA-compliant boards from Intel and third parties to prototype more complete systems.
- Design a proprietary switch fabric card or use a standard card from third-party vendors to implement switching and routing architectures.

In addition, flexibility is essential to meet rapidly evolving network requirements. The use of open standards and modular architecture allows for maximum flexibility to incorporate software, hardware, and add-on cards from Intel and its ecosystem of hardware and software providers, the Intel® Communications Alliance (www.intel.com/go/ica).

Components

The flexible, modular IXDP2805 and IXDP2855 Advanced Development Platforms include a PICMG 3.0, AdvancedTCA-compliant chassis, network processor base card, and a shelf manager to enable simultaneous development and testing of system management software. A selection of modular mezzanine cards supports a broad range of LAN and WAN I/O interfaces, and a standard PMC interface makes it easy for developers to incorporate third-party PMC cards for control plane processing or other specialized functions.

Chassis

A five-slot development chassis with full-mesh backplane enables rapid development. It supports inter-blade communication over the base interface and full-mesh fabric interfaces in accordance with PICMG 3.0 and PIGMG 3.x standards.

An external 1200W power supply and AdvancedTCA-compliant Shelf Management Module (SMM) complete the AdvancedTCA environment. The SMM understands Intelligent Platform Management Interface (IPMI) commands and uses them to communicate with field replaceable units (FRUs) such as boards, fan trays, or power entry modules over the Intelligent Platform Management Bus (IPMB), allowing the SMM to monitor and manage system health. Developers can use the SMM's standard interface to implement and test high-availability features from the start of product development.

The chassis dissipates up to 200W per board and is designed to meet NEBS requirements for cooling, noise, and shielding. The backplane provides mounting provision for five 8Ux280 mm AdvancedTCA-compliant boards, five Rear Transition Modules (RTMs), and two 4Ux4HP shelf managers.

Shelf Manager

The AdvancedTCA-defined shelf manager is composed of a Pigeon Point Systems* ShMM-300 mezzanine module hosted in a Schroff* Shelf Management Mezzanine AdvancedTCA Carrier Board version II (ShMM-ACB). For more information on the ShMM-300 mezzanine module, please visit www.pigeonpoint.com. For more information on the ShMM-ACB, please see www.a-tca.com.

Single Network Processor Base Cards

The Intel® IXMB2805 and Intel® IXMB2855 base cards are PICMG 3.0 AdvancedTCA-compliant boards, each designed to support a single IXP2805 or IXP2855 network processor at 1.4 GHz, 1.0 GHz, or 650 MHz. Each base card features a modular architecture and includes five mezzanine sites with well-defined interfaces to mount optional mezzanine cards. Two high-speed mezzanine interfaces are provided for I/O modules, or to add other application-specific functions such as digital signal processing and deep packet inspection.

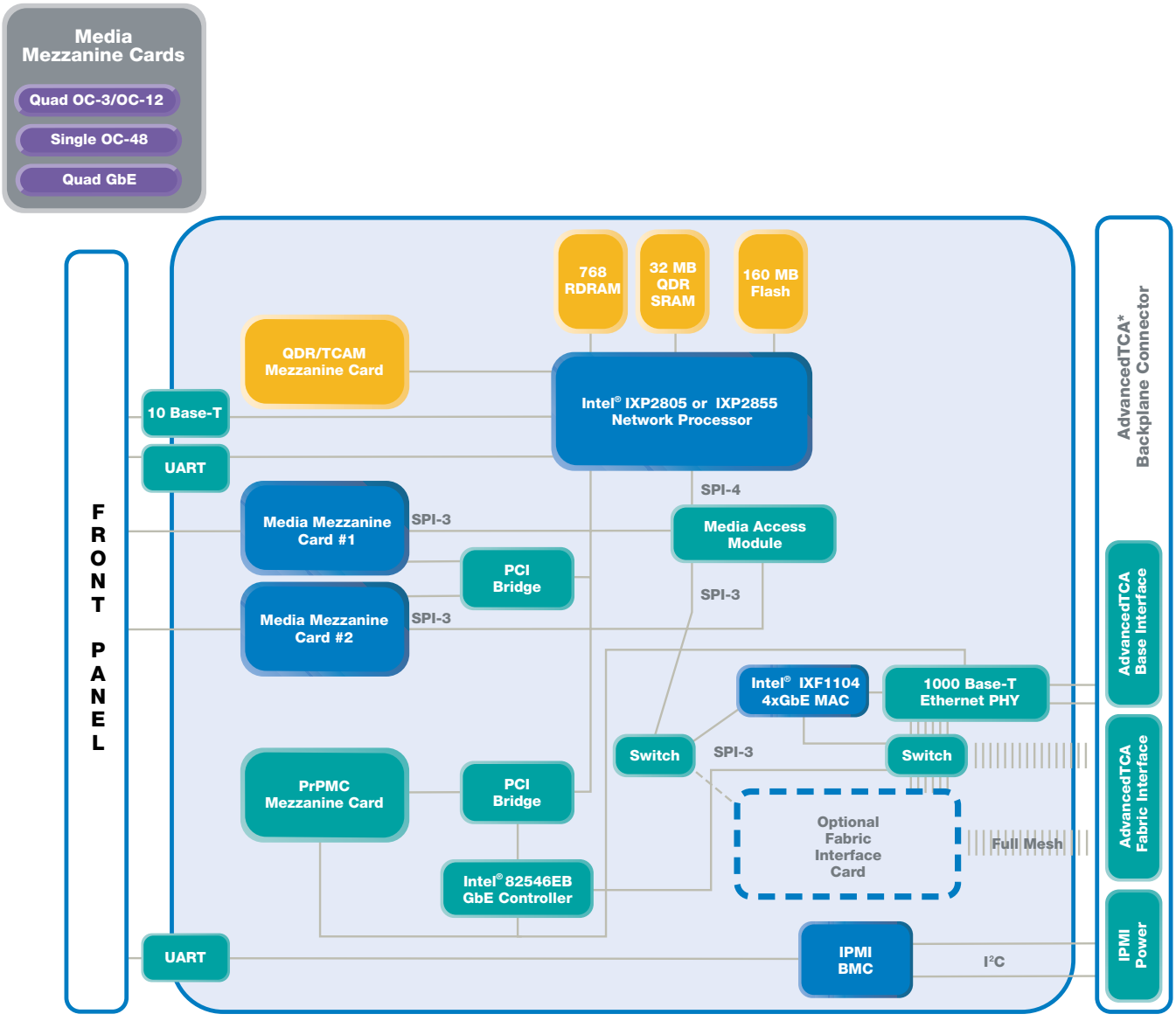


Figure 1: Intel® IXMB2805 or Intel® IXMB2855 Single Network Processor Base Card Functional Block Diagram

Provides a single network processor implementation in a standards-compliant AdvancedTCA form factor.

The Intel IXMB2805 and IXMB2855 base cards include a SPI-4 to SPI-3 bridge ASIC (a component of the Media Access Module shown in Figure 1) that provides one SPI-4 interface and three SPI-3 or UTOPIA-3 ATM/POS mezzanine/fabric interfaces. Each mezzanine interface is serviced by a dedicated 32-bit SPI-3 bus that enables data plane traffic between the I/O modules and the network processor. The SPI-3 bus operates at speeds up to 133 MHz and supports both SPHY and MPHY addressing in SPI-3 and UTOPIA Level 3 formats. In addition to the two I/O module mezzanine sites, a third dedicated SPI-3 bus provides a high-speed communication path to support Gigabit Ethernet traffic over the AdvancedTCA-compliant backplane. An Intel® 82546EB GbE Controller is included to provide connectivity from the PMC mezzanine to the AdvancedTCA Base or Fabric Interface. It also provides a connection from the network processor to the Base Interface via PCI to Gigabit Ethernet. Where additional memory or processing headroom is desirable, the base cards support optional QDR-II memory or Ternary Content-Addressable Memory (TCAM) to offload tasks such as table lookups.

Base cards connect to the base interface on the backplane[‡] and communicate with other boards in the chassis over 10/100/1000 Base-T ports. They also offer an option for a Fabric Interface Card (FIC) to connect to the fabric interface of the backplane.

The base cards also include an IPMI v1.5-compliant Board Management Controller (BMC) that communicates with the SMM using IPMI protocol over the backplane IPMB interconnect. This feature, along with the shelf manager, provisions system management using standard interfaces such as Remote Management Control Protocol (RMCP), Common Information Model (CIM), Lightweight Directory Access Protocol (LDAP), Simple Management Network Protocol (SNMP), and HTTP.

To speed development time, base cards include the following debug features:

- Two UART serial ports for board support package debugging
- 10 Base-T Ethernet MAC providing an IP-based development environment
- Metrowerks NetROM* connector to facilitate code development
- JTAG header provided for flexible debug testing and boundary scans

[‡]PICMG defines the Base Interface in the PICMG 3.0 specification with additional specifications for the fabric interfaces specified in PICMG 3.1 for Ethernet, PICMG 3.2 for InfiniBand, PICMG 3.3 for Star Fabric, and PICMG 3.4 for PCI Express/Advanced Switching.

Mezzanine Cards

A selection of modular mezzanine cards addresses a broad range of LAN and WAN I/O interfaces and enables simultaneous control plane and data plane development. The choice of I/O mezzanine cards includes Quad OC-3/OC-12, Quad GbE, and single OC-48 and a 16-MB QDR-II memory module. Additional cards such as a TCAM and control plane processor cards are available from third parties.

Advanced Development Platform Software

Boot Monitor and Diagnostics

These advanced development platforms support startup features prior to operating system load, providing assurance that the system is properly configured and operational. A basic power-on self-test is performed at power-up to detect memory and processor errors before more complex operations are enabled.

Standard diagnostics assist in the configuration of blades and validate that all communication paths are operational. Extended diagnostics can be developed and downloaded to the platform through the Ethernet console port. Full source code and design information is provided for the Intel modules.

The boot monitor for the IXDP2805 and IXDP2855 Advanced Development Platforms is based on the industry standard RedBoot* from Red Hat*. The boot manager enables developers to load alternate versions of applications, diagnostics, and the operating system to fine-tune the capabilities of the platform. These images can be stored in the onboard flash memory or downloaded through the Ethernet port from the customer's development host.

Board Support Package and Linux* Support Package

These advanced development platforms offer a choice of Wind River VxWorks* or MontaVista* Linux operating systems, each providing a comprehensive board support package. Intel provides additional driver support for the extended features of the base cards and optional media mezzanine interfaces including baseboard, ATM/POS, and Gigabit Ethernet drivers, as well as management interface libraries to enable communication between the network processor and base management subsystem.

Please contact Wind River Systems (www.windriver.com) or MontaVista (www.mvista.com) directly for additional details.

Configuration Specifications

Processors	• Single Intel® IXP2805 or Intel® IXP2855 network processor—16 independent RISC microengines @ 1.4 GHz; Intel XScale® core @ 700 MHz
Interfaces	• Three SPI-3 or UTOPIA-3 ATM/POS for mezzanine/fabric
Memory	• Rambus* RDRAM—768 MB at up to 533 MHz/1066 Transfer Rate • Four QDR SRAM channels: – one with 16-MB QDR-II SRAM – two with 8-MB QDR-II SRAM (total of 32 MB for three channels) – one with a modular QDR-II interface for an optional 16-MB QDR-II SRAM module (up to 200 MHz/400 Transfer Rate) or a TCAM module (available from third parties)
I/O Option Cards	• Intel® IXD4OC12T1F Quad OC-3/OC-12 I/O Option Card • Intel® IXD1OC48T1F Single OC-48 I/O Option Card • Intel® IXD4GETOC Quad Gigabit Ethernet I/O Option Card—Copper
Memory Module	• Intel® IXQDR2416 16-MB QDR-II SRAM Memory Module

Chassis Specifications

Regulatory Testing and Safety Approval	US FCC/IC DOC Class A, UL/cUL, CE, VCCI, RRL MIC, GOST
Physical Dimension	436 mm/17.2" x 386 mm/15.2" x 5U
Weight	31 lbs. (chassis only)/17 lbs. (external power supply)
Power Input	Autosensing 100–240 VAC, 50/60 Hz, 15 Amps max
Power Supply Output	-48 VDC (25A), 1200W
Operating Temperature	0° to 40° C (32° to 104° F)
Storage Temperature	-40° to 70° C (-40° to 158° F)

Complementary Development Tools

Intel® Internet Exchange Architecture Hardware Development Kit (Intel® IXA HDK)

The Intel® IXA HDK provides network equipment manufacturers with detailed information regarding system architecture, physical specifications, and schematics to speed development. This information is made available to developers at www.intel.com/go/hdk

Specific content may include:

- a system architecture overview
- component models (IBIS)
- mechanicals and searchable schematics
- board design files (Gerber files)
- signal integrity and thermal analyses
- manufacturing (bill of materials and manufacturer information/part numbers)
- design guides and user manuals

Intel® IXA Software Applications, Tools, and Services

Intel offers a broad range of software and tools to enable efficient development of applications for the IXP2805 and IXP2855 network processors. By using these tools and services, a design team can achieve an unparalleled time-to-market advantage.

Intel® IXA Software Development Kit (SDK) Tools

Tools provided by the Intel IXA SDK enable hardware and software development to proceed in parallel. The tools provide an easy-to-use graphical development and simulation environment for developing, debugging, and optimizing a network application at the same time that a hardware team is working on device design and prototyping. The tools also include a compiler tool chain that simplifies development of high-performance and easy-to-maintain networking applications using C programming techniques. This can result in shorter time-to-market and higher return on investment. For more information on the Intel IXA SDK, visit www.developer.intel.com/design/network/products/npfamily/sdk_download.htm

Intel® IXA Software Framework

The Intel IXA Software Framework, along with software building blocks (individual microblocks for standards-based protocols such as ATM, IPv4, IPv6, MPLS, etc.), includes infrastructure software and defines the programming model to create reusable software building blocks. These building blocks are example implementations of commonly used protocols that allow developers to use, extend, or modify these implementations to suit their target markets.

Intel® IXA SDK Example Designs, Application Kits, and Custom Solutions

Example designs demonstrate advanced silicon features and methods of programming and assembling microblocks into applications on Intel hardware. They also provide performance benchmarks for those applications. Application kits are complete data plane applications ready to be “plugged-in” to developers’ products and integrated with their control plane, management, and proprietary software. Intel can also extend or modify the application kits to meet the unique needs of developers, port to unique hardware, or perform the “plugging-in” to developers’ existing software. For more information on custom solutions, visit the Intel® Communications Support and Software Services Web at www.intel.com/go/css.

Features	Benefits
Modular platform architecture	Wide choice of optional I/O, control processor, QDR-II and TCAM mezzanine cards for flexible configurations that enable rapid prototyping of an entire application
High-speed, well-defined mezzanine interfaces connected to the Intel® IXP2805 or Intel® IXP2855 network processor	Option to add up to two I/O mezzanine cards or build custom mezzanine cards to meet specific processing requirements
Industry-standard PMC mezzanine site connected to PCI interface of Intel IXP2805 or IXP2855 network processor	Option to add off-the-shelf PMC modules such as an adjunct processor for control plane processing
Fabric interface mezzanine site	Option to connect to different backplane fabric (e.g., Ethernet, PCI Express*/ Advanced Switching) and/or use full-mesh, dual-star, or dual-dual-star topology
UART serial port, 10 Ethernet port, JTAG port, and NetROM* connector	Range of ports assists debug and development for software/firmware on the network processor and associated peripherals
Extended diagnostics	Provides detailed and thorough testing of all the hardware components on the platform, including tests for network processor, memory, I/O interfaces, backplane, and media
Board Support Package for Linux* and VxWorks* provided by the OS vendor	Choice of operating systems

Product Names	Order Codes
Intel® IXDP2805 Advanced Development Platform: includes PICMG 3.0 5-slot AdvancedTCA-compliant chassis, shelf manager, and 1200W external power supply	KIXDP2805TAA
Intel® IXDP2855 Advanced Development Platform: includes PICMG 3.0 5-slot AdvancedTCA-compliant chassis, shelf manager, and 1200W external power supply	KIXDP2855TAA
Intel® IXMB2805 Single Network Processor Base Card (AdvancedTCA)	BIXMP2805TAA
Intel® IXMB2855 Single Network Processor Base Card (AdvancedTCA)	BIXMP2855TAA
Optional I/O Cards	
Intel® IXD4OC12T1F Quad OC-3/OC-12 I/O Option Card	BIXD4OC12T1F
Intel® IXD1OC48T1F Single OC-48 I/O Option Card	BIXD1OC48T1F
Intel® IXD4GETOC Quad Gigabit Ethernet I/O Option Card	BIXD4GETOC
Intel® IXQDR2416 16-MB QDR-II SRAM Memory Module Option Card	BIXQDR2416AA

Advanced Telecom Computing Architecture (AdvancedTCA)

AdvancedTCA is the largest specification effort in the history of PCI Manufacturer's Group (PICMG), with more than 100 companies participating. AdvancedTCA, the PICMG 3.0 family, is a new series of PICMG specifications targeted to requirements for the next generation of carrier-grade communications equipment. This series of specifications defines a new form-factor for boards and chassis optimized for communications, and incorporates the latest trends in high-speed interconnect technologies, next-generation processors, and improved reliability, manageability, and serviceability. Additional information on AdvancedTCA is available at the following Web sites:

Intel Web site—www.intel.com/technology/atca/index.htm
PICMG Web site—www.picmg.org

Intel Access

Intel® Network Processors Home Page	intel.com/go/networkprocessors
Developer's Site	developer.intel.com
Intel in Communications	intel.com/communications
General Information Hotline	(800) 628-8686 or (916) 356-3104 5 a.m. to 5 p.m. PST
Intel® Literature Center	(800) 548-4725 7 a.m. to 7 p.m. CST (U.S. and Canada) International locations please contact your local sales office.

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