



Intel® NetStructure™ DMN160TEC Network Interface Board

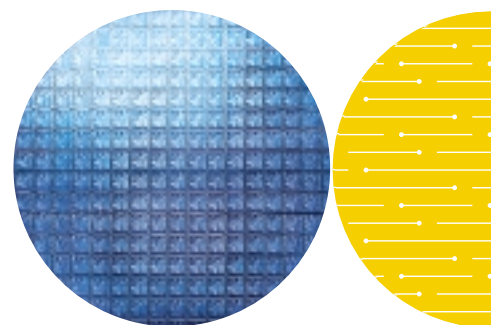
Supports 16 software-selectable mixed T-1 and E-1 connections on CompactPCI

Features	Benefits
Programmable digital telephony interfaces (DTI) for T-1, E-1, or a mix, on the same board with the ability to run multiple ISDN protocols simultaneously	Can be used globally and for international gateway applications
Supports applications and designs that require high non-blocking call rates such as programmable switches and transaction-intensive services	Support for high call rates
High port density saves valuable CompactPCI* slots	Service providers can reduce infrastructure "footprint" and power consumption
Works under Global Call, a common call control API	Allows existing applications to scale to higher densities with reduced development time Protects development investment in current Global-Call-supported applications
PICMG* 2.12 Basic Peripheral Hot Swap (PHS) support is provided on an Intel CompactPCI* chassis	Enables high availability solutions
On-board law conversion	Lets a single board support traffic for both T-1 and E-1 lines without requiring additional products to convert between A-law and μ -law
Clear channel support	Lets the board be used with Intel NetStructure SS7 products, and allows applications to make the most of SS7 features, cost savings, and reliability

Intel in Communications

The Intel® NetStructure™ DMN160TEC network interface board is a high-density, digital telephone interface on a CompactPCI form factor. The board supports up to 16 spans or 480 ports, and is programmable as T-1, E-1, or a mix of both (in units of four). The DMN160TEC offers developers a single, flexible product that supports worldwide network interfaces, and allows solutions to scale effectively as systems grow. The DMN160TEC also supports a number of features designed to enhance application development including

- A global set of ISDN protocol variants that can be run simultaneously
- A-law/ μ -law conversion on all incoming and outgoing channels
- Non-Facilities Associated Signaling (NFAS)
- D-channel backup
- High-availability support
- Board monitoring through a standard SNMP interface
- NEBS friendly



The DMN160TEC is designed for a next-generation communications architecture. As a basic building block for today's higher density telephony applications, the DMN160TEC can work within the Intel development environment, which has already been proven to accelerate time-to-market, while scaling to higher densities. The DMN160TEC is fully compatible with other media processing and IP resource boards available from Intel.

The DMN160TEC is H.110 compliant and supports the switching of voice paths over any CT Bus time

slot, allowing it to use the resources on other boards. Developers can keep up with the growing demands placed on next-generation platforms because of the higher density and multiple features of the DMN160TEC, which translate into fewer boards in a smaller chassis.

Configurations

The following diagrams illustrate some sample configurations that use the DMN160TEC to provide a PSTN network interface.

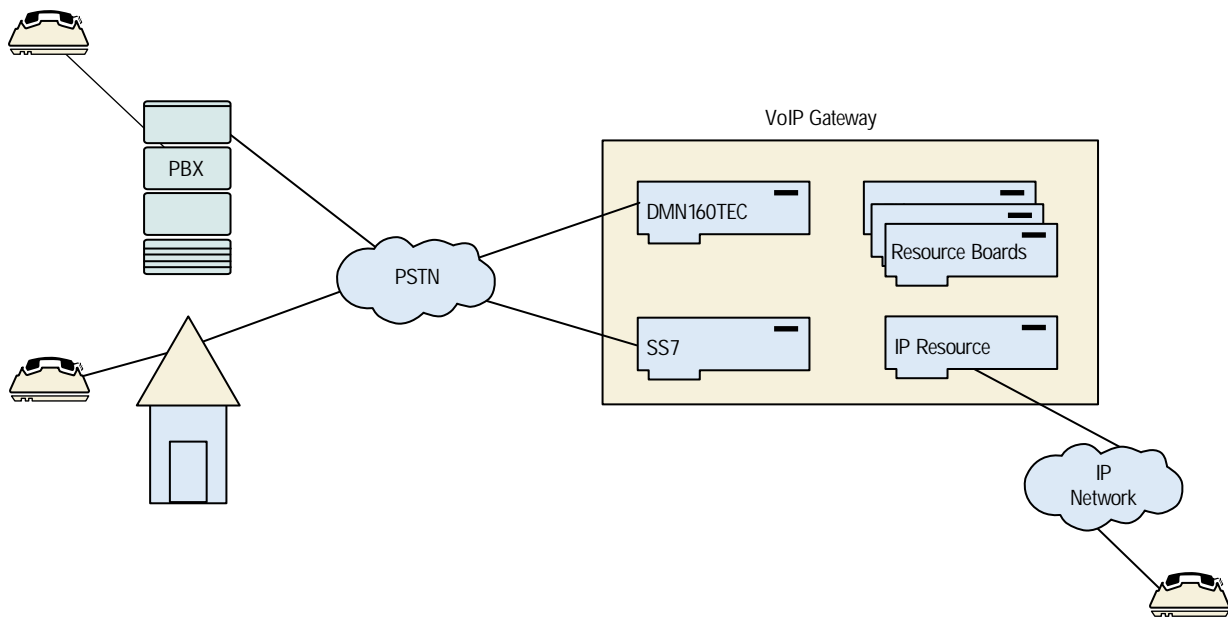


Figure 1: Voice over Internet Protocol (VoIP) Gateway Example

Applications

- Enhanced programmable switches
- Media servers
- VoIP media gateways
- Pre-paid calling cards
- High-density wireless applications
- Access gateways
- International PSTN gateways
- High-density contact center applications

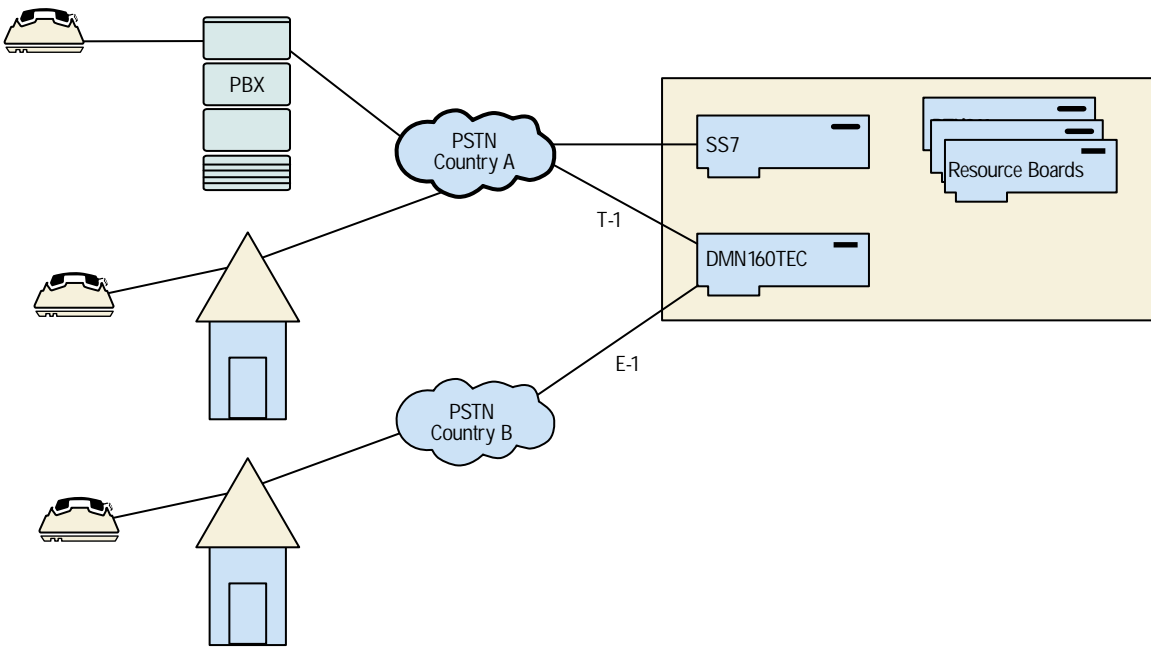


Figure 2: International Gateway Example

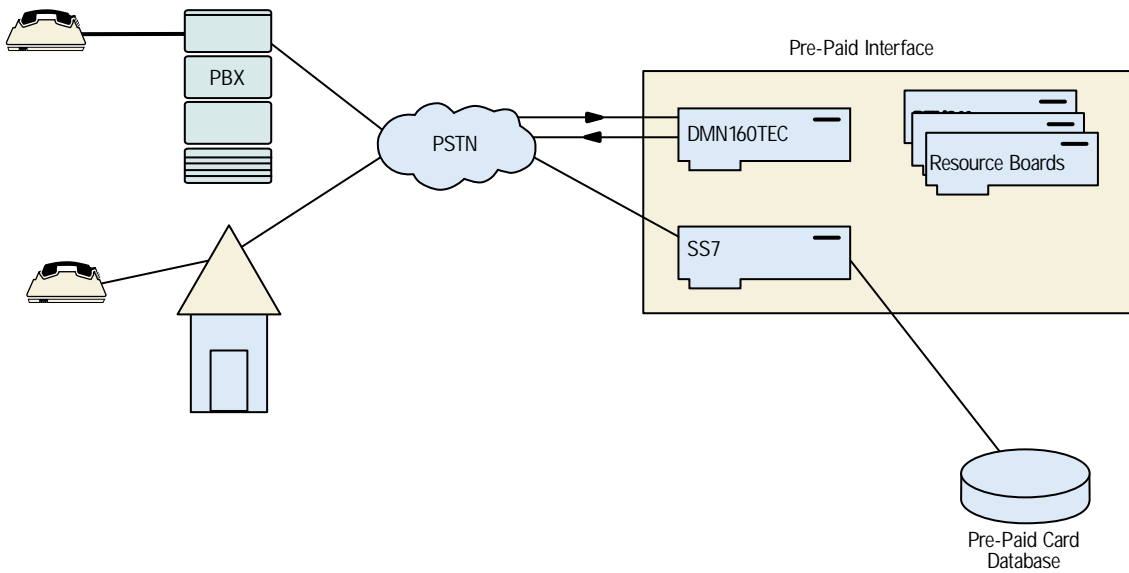


Figure 3: Pre-Paid Calling Card Example

ISDN-PRI Support

The DMN160TEC provides ISDN Primary Rate Interface (PRI) access firmware as a standard feature. This enables applications to capitalize on the speed, power, and flexibility of ISDN. To provide additional flexibility, the DMN160TEC can run multiple versions of ISDN at the same time, supplying the resources needed to run both T-1 and E-1 network interfaces simultaneously. NFAS and D-channel backup are also provided to enhance T-1 deployments.

Software Support

The DMN160TEC is supported under software development kits for Windows* 2000, and Linux*. These kits contain a set of tools for developing complex, high-density, multichannel applications.

Global Call, a high-level call control API, simplifies the development of almost any application requiring call control.

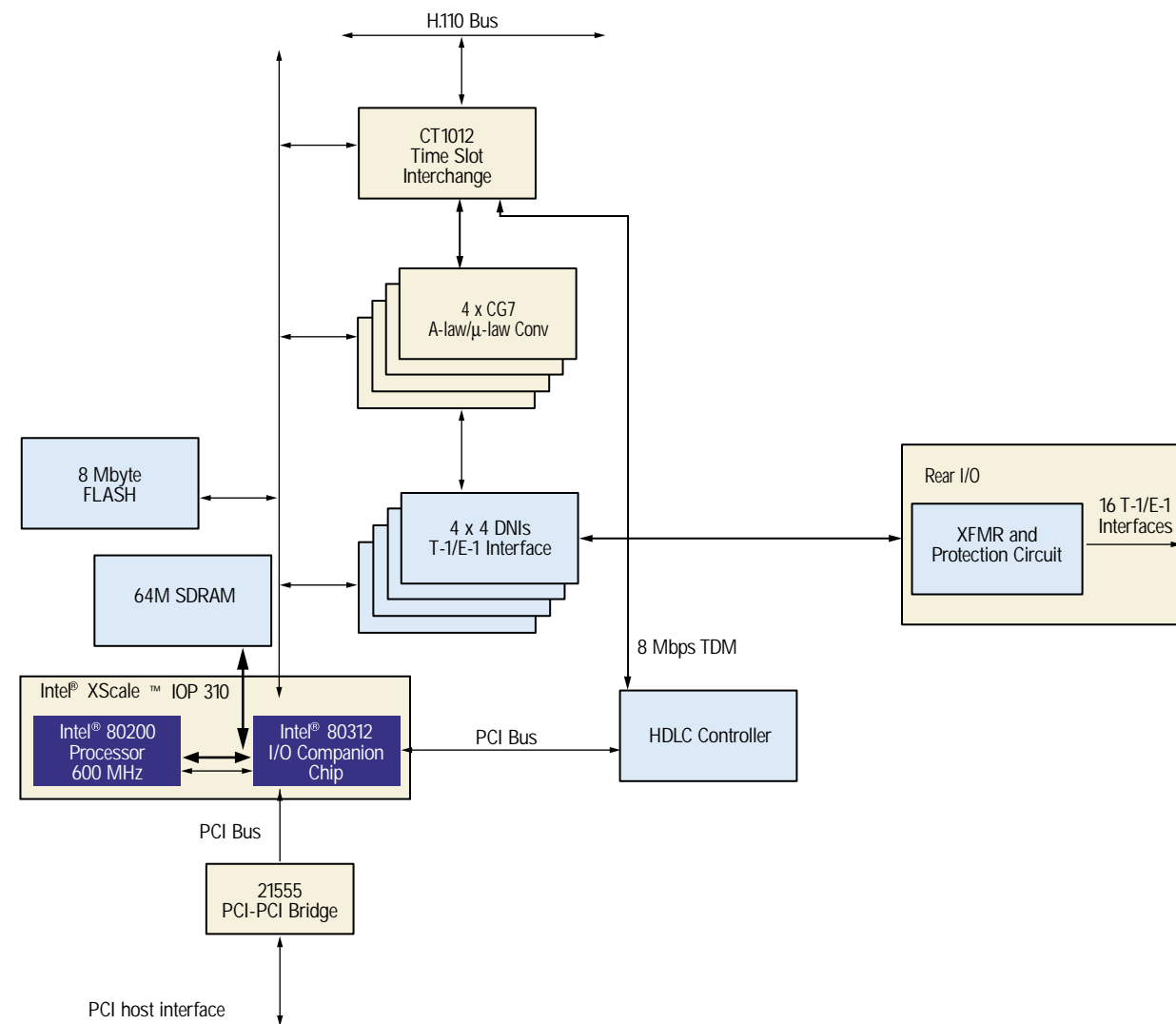


Figure 4: Block Diagram

Functional Description

The architecture of the DMN160TEC consists of a set of core specifications and firmware modules that are implemented on boards with various processors including

- RISC processor for centralized control
- TDM CT Bus interface
- Digital telephony network interfaces
- Host computer bus interface

The DMN160TEC supports up to 16 programmable E-1 and/or T-1 digital telephone interfaces. These circuits can contain CCS ISDN signaling variants for global deployment plus any alarm handling and line

maintenance services required by service provider networks. Each DTI includes software switchable network clock circuits that can be set to

- System mode (transmit clocking is slaved to the CT Bus; receive clocking is always slaved to the trunk interface)
- Loop mode (transmit clocking is slaved to the external network)
- Independent mode (transmit clocking is derived from an onboard oscillator)

The control processor has a general-purpose Intel® XScale™ microarchitecture. It is responsible for the initialization, configuration, and control of the various elements that make up the DMN160TEC.

Technical Specifications†

Digital interfaces	16 T-1/E-1 programmable (in units of 4)
Max. boards per system	Application, call traffic, and system chassis dependent
Control processor	Intel® XScale™ microarchitecture IOP310 chipset
Baseboard global memory	64 MB
Law conversion	A-law/ μ -law conversion
Host bus compatibility	Rev 2.1 of PCI Bus Specification; 32/64 bit 33 MHz
Host bus mode	Target and DMA master mode operation
Computer telephony bus	ECTF H.110-compliant CT Bus 1024 64 Kb/s onboard local switching time slots 4096 CT Bus 64 Kb/s time slots
Network connectors	Provided through rear I/O transition modules RJ-48M for 100 and 120 Ohm
Hot swap	PICMG* 2.1 compliant

Telephone Interface (DSX-1)

Clock rate	1.544 Mb/s +32ppm
Level	3.0 V (nominal)
Pulse width	325.85 ns (nominal)
Line impedance	100 Ohms balanced
Other electrical characteristics	Complies with AT&T TR62411 and ANSI T1.403-1989
Framing	SF (D3/D4), ESF
Line coding	AMI, B8ZS
Clock and data recovery	Complies with AT&T TR62411 and Bellcore TA-TSY-000170
Jitter tolerance	Complies with AT&T TR62411 and ANSI T1.403-1989
Loopback	Selectable local digital loopback

Telephone Interface (E-1)

Clock rate	2.048 Mb/s +32ppm
Level	3.0 V (nominal) for 120-Ohm lines
Pulse width	244 ns (nominal)
Line impedance	120 Ohms balanced
Other electrical characteristics	Complies with ITU-T Rec. G.703
Framing	ITU-T Rec. G.704-1988 with CRC-4
Line coding	HDB3
Clock and data recovery	Complies with ITU-T Rec. G.823-1988
Jitter tolerance	Complies with ITU-T Rec. G.823, G.737, G.739, G.742-1988
Loopback	Selectable local digital loopback

Technical Specifications¹ (cont.)

Physical Requirements

Power	+3.3 VDC 4 amps +5 VDC 2 amps
Operating temperature	0°C to +50°C
Storage temperature	-20°C to +70°C
Humidity	8% to 80% noncondensing
Form factor	CompactPCI 6U Eurocard form factor, single-slot width

Safety and EMI Certifications

Warranty	18 months standard
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Protocols

T-1 ISDN	NI-2, 4ESS, 5ESS, DMS100, DMS250, INS1500, Q.Sig
E-1 ISDN	NET5, Q.Sig

Hardware System Requirements

- CompactPCI platform, PICMG 2.0 compatible, required
- Intel® Pentium® III 450 MHz processor with 256 MB memory or more recommended

Additional Components

The CompactPCI rear I/O module (model name: RIODMX160RJ48M) is also required since it provides connectivity for the 16 T-1/E-1 connections through the use of two RJ48M 50-pin connectors. Each RJ48M jack supports 8 spans.

Additionally, Intel provides a breakout box with 16 RJ48 jacks (model name: RJ48MTORJ45BOB) and the appropriate cable (model name: CBLRJ21XMSISC) to help developers get started quickly. Two cables are required to support 16 trunks. These products are for development use only.

Intel provides standard interfaces and pinouts for deployment use with third-party cables and breakout panels.

Some developers may prefer to build their own interfaces, so the RJ48M pinout mapping can be found on the Quick Install Card for the DMN160TEC.

To learn more, visit our site on the World Wide Web at <http://www.intel.com>.

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