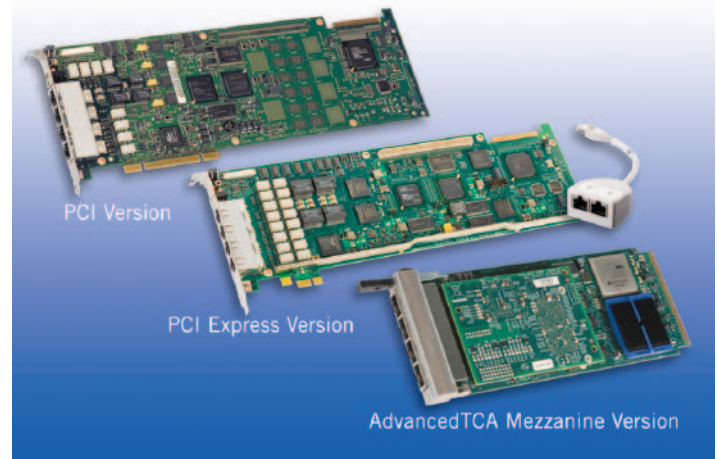


Diallogic® HMP Interface Boards

Full Size in Various Densities and Form Factors

Diallogic® HMP Interface Boards (DNI Boards) provide a native PSTN interface to Diallogic® PowerMedia™ Host Media Processing Software (PowerMedia HMP). As such, they enable efficient VoIP gateway functionality to be built into HMP telephony applications. They also break the traditional DSP-based media span paradigm by providing a digital network interface ready for use with virtually any configuration of host-based media resources, which complement the base gateway capability.



Products Discussed in this Datasheet

PCI Boards

- Diallogic® DNI/300TEPHMP Digital Network Interface Board
- Diallogic® DNI/601TEPHMP Digital Network Interface Board
- Diallogic® DNI/1200TEPHMP Digital Network Interface Board

PowerMedia HMP

- Diallogic® PowerMedia™ Host Media Processing Software Release 3.0WIN
- Diallogic® PowerMedia™ Host Media Processing Software Release 3.1LIN
- Diallogic® PowerMedia™ Host Media Processing Software Release 4.1LIN

PCI Express Boards

- Diallogic® DNI/310TEPEHMP Digital Network Interface Board
- Diallogic® DNI/610TEPEHMP Digital Network Interface Board
- Diallogic® DNI/1210TEPEHMP Digital Network Interface Board
- Diallogic® DNI/2410TEPEHMP Digital Network Interface Board

AdvancedTCA Mezzanine Card (AMC) Boards

- Diallogic® DNI/2410AMCTEHMP Digital Network Interface Board

Features

Interface to PowerMedia HMP

One, two, four, or eight digital network interfaces

Software-selectable trunks configure DNI Boards for either T1 or E1

Support for a wide range of PSTN protocols including ISDN and CAS signaling

Diallogic® Global Call Software

Host streaming interface

Soft H.100 CT Bus

Benefits

Allows host-based voice, speech, conference, fax, and IP transcoding to be accessible from the PSTN interface; can be configured in a wide range of densities, scalable in individual port increments

Provides four different densities to support a cost-effective range of solutions

Reduces the total cost of ownership by increasing flexibility, reducing inventory, and simplifying the purchasing process and test effort

Allows a choice of PSTN protocols

Provides a consistent programming interface for call control utilized by boards with Diallogic® DM3 architecture and by PowerMedia HMP

Enables a low-latency, 256-duplex channel interface to host-based media and IP networks

Provides a software-defined bus that extends the traditional board-based H.100 CT Bus to host-based media and IP networks

Applications

- 3G-324M video gateway
- Enhanced media gateway
- Converged contact center
- Converged IP-PBX
- IVR and voice portal
- Audio conferencing server
- Messaging
- Enhanced services
- Switching and call completion
- Prepaid/debit card
- IP media gateway

Traditional media span products require onboard DSPs to provide media and audio transcoding resources, creating fixed costs and often fixed or limited configurations of media to complement the network interface density. DNI Boards enable the flexibility of host-based media resources (scalable and licensed in single-unit increments) and allow those resources to be used with a network interface, providing developers and system integrators with a high level of configuration flexibility and cost efficiency.

Architectural Flexibility

Supported by PowerMedia HMP, the DNI Boards give application providers the ability to support a range of architectural designs as well. Traditional TDM, converged TDM and IP, or pure IP solutions can be deployed once an application is running in this environment, providing the flexibility to connect the solution to virtually any network type deployed in an enterprise or service provider environment.

This flexibility translates into a solution that is ready for IP connectivity today or a cost-efficient migration later. It is expected that the voice network will remain a hybrid of TDM and VoIP infrastructure for many years to come, both for the enterprise and service provider. Solutions developed on PowerMedia HMP and DNI Boards supply a cost-effective way to deliver an architecture that connects to the legacy TDM infrastructure today, with a path that provides a software upgrade to VoIP networks as needed. Since media and voice transcoders are delivered via software, field upgrades to VoIP and media expansions can be added to the platform remotely.

Based on the widely deployed DM3 architecture, optimized for host media processing, and controlled via the Global Call API, DNI Boards provide a smooth migration path for existing applications written to Dialogic® System Release Software. Applications utilizing PowerMedia HMP and Global Call APIs can easily migrate to the latest PowerMedia HMP, and add native support for the T1/E1 interfaces via the same call control API.

Application-Specific Boards

DNI Boards are suited for applications requiring IP media gateway functionality since they provide a cost-effective digital network interface to the PSTN, and a streaming interface to host-based resources and IP media streams via a host-based Ethernet NIC. DNI Boards also provide a suitable platform for developing pure IP media gateway white-box solutions, with the competitive advantage of adding HMP media resources and media applications on top of gateway functionality for an enhanced media gateway solution.

Converged contact centers and IP PBX can take advantage of the core gateway enablement of the boards to connect legacy PSTN endpoints with IP-based agents and IP hard and soft stations. Switching, messaging, IVR, ACD, conferencing, fax services, and speech applications can all be supported along with the core gateway functionality supported by PowerMedia HMP and related DNI Boards. The lower cost DNI Board hardware and cost-efficient PowerMedia HMP model combine to make a compelling and newly competitive platform for these applications.

Media servers required to support IVR and messaging applications can be successfully deployed on DNI Boards with the advantage of host-based IP connectivity as part of a converged solution, or as a software upgrade for a system that is initially deployed in a pure TDM environment. Large centralized systems can be deployed and connected to a legacy PBX or the PSTN network via T1/E1 connections, while tying in remote facilities with VoIP access to the media server over a data WAN.

Configurations

Media Gateway Architecture

DNI Boards and PowerMedia HMP support the development of cost-effective VoIP media gateway applications residing in a white box server. The unique ability to scale IP transcoding resources, and to add media resources such as voice, speech, and conferencing, creates a unique and flexible environment for developing enhanced gateway applications between TDM and IP networks.

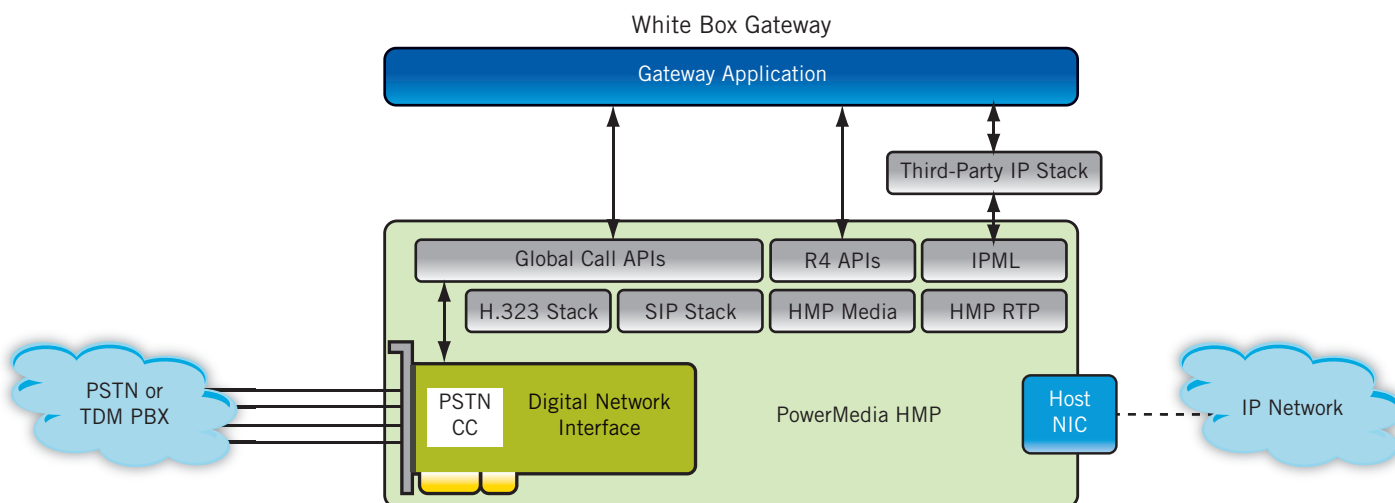


Figure 1. Media Gateway Architecture

Converged IP Contact Center Architecture

DNI Boards and PowerMedia HMP can combine to provide a platform for converged IP contact center applications. Connected to the PSTN network or PBX via T1/E1 network interfaces and supporting IP agent positions with soft or hard IP station positions, the platform delivers the media components for building IVR, ACD, predictive dialing, messaging, speech, and conferencing on top of a base switching application.

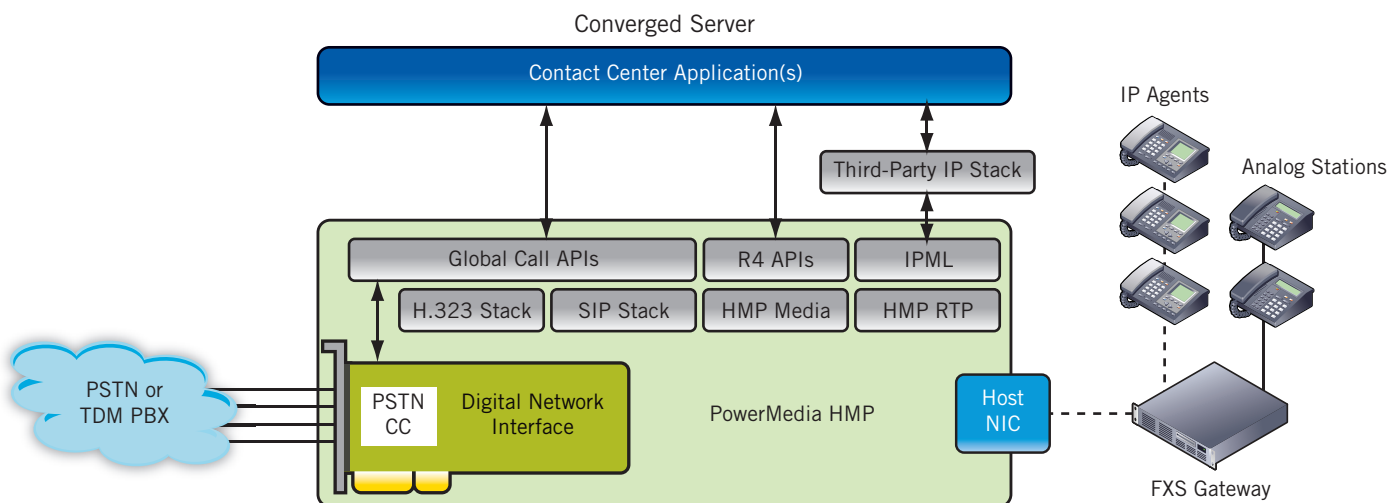


Figure 2. Converged IP Contact Center Architecture

Converged Media Server Architecture

DNI Boards and PowerMedia HMP combine to provide a converged media server platform for deploying applications, such as messaging, with both PSTN and IP access. Converged media servers can provide a central and efficient messaging server in existing TDM voice infrastructures by servicing remote locations via an IP network and Dialogic® Media Gateways.

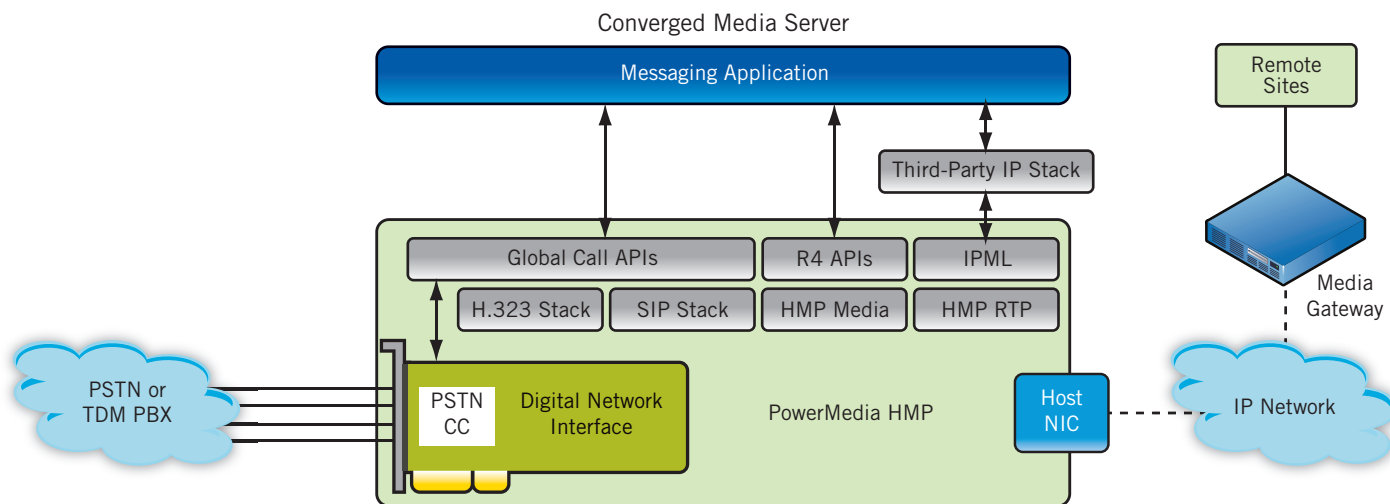


Figure 3. Converged Media Server Architecture

3G-324M Video

Figure 4 provides a view of a 3G-324M implementation using DNI Boards and PowerMedia HMP 4.1. This configuration supports media as well as SIP call control and can be implemented with Dialogic® DSI Protocol Stacks and Dialogic® DSI SS7 Boards. PowerMedia HMP 4.1 runs on a video telephony server, providing play, record, playback, and synchronization used to display video on 3G wireless, IP soft clients, and IP video phones.

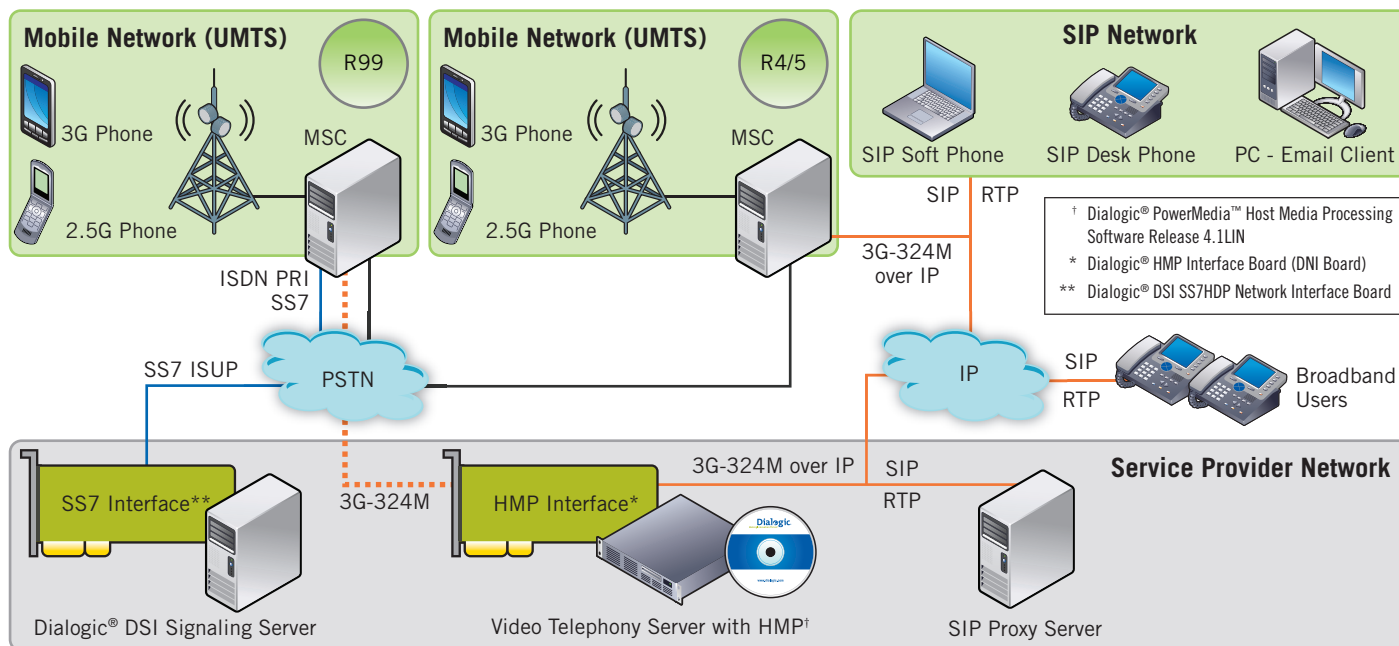


Figure 4. 3G-324M Video with Dialogic® PowerMedia™ Host Media Processing Software Release 4.1LIN Linux

Software Support

DNI Boards support the releases of PowerMedia HMP shown in Table 1.

	PowerMedia HMP Releases		
	4.1	3.1	3.0
DNI/300P	x	x	x
DNI/601P	x	x	x
DNI/1200P	x	x	x
DNI/310PE	x	x	x
DNI/610PE	x	x	x
DNI/1210PE	x	x	x
DNI/2410PE	x	x	x
DNI/2410AMC	x		

Table 1. DNI Boards and PowerMedia HMP Releases

PowerMedia HMP performs media processing tasks on general-purpose servers without using specialized hardware. The software provides media services for building flexible, scalable, and cost-effective IP media servers. DNI Boards and PowerMedia HMP combine to provide a cost-effective platform for converged TDM-IP applications.

PowerMedia HMP is a communications building-block technology. When installed on a system, the customer's application "sees" a Dialogic® board with DM3 architecture, but all media processing occurs on the host processor. To help customers accelerate their time-to-market and migrate existing applications to IP, the software also supports two direct APIs: Dialogic® R4 API for media processing and Global Call API for call control.

PowerMedia HMP includes digital network PSTN protocols such as ISDN and CAS, equivalent to those found in Dialogic® System Release 6.1 for Linux and Dialogic® System Release 6.1 for Windows®. The protocols are available for download to the DNI Boards during installation and configuration.

Dialogic® Global Call Software

The DNI Boards support Global Call Software, which is a unified call control programming interface and protocol engine that makes it easier to provide worldwide application portability and which can shorten development time by allowing the same API to be used for almost any network protocol.

Global Call Software provides a common signaling interface for network-enabled applications, regardless of the signaling protocol needed to connect to the local telephone network. Global Call Software is the API for unified call control for boards with DM3 architecture and Dialogic® JCT/Springware architecture. The signaling interface provided by Global Call Software facilitates the exchange of call control messages between the telephone network and virtually any network-enabled application. Global Call Software lets developers create an application that can work with signaling systems worldwide, regardless of the network to which they are connected.

Global Call Software is excellent for high-density, network-enabled solutions for voice and data where the supported hardware and signaling technology can vary widely. Rather than requiring the application to handle the low-level details, Global Call Software offers a consistent, high-level interface to the user, handling each country's unique protocol requirements in a way that is transparent to the application, thereby simplifying and expanding global opportunities.

Functional Description

DNI Boards are based on DM3 architecture (mediastream). The architecture consists of a set of core specifications and firmware modules that are implemented on boards with various processors and interfaces, including:

- Processor technology for centralized control
- TDM bus interface (H.100/H.110)
- One, two, four, or eight software-selectable digital telephony network interfaces
- PCI bus interface (DNI/300P, DNI/601P, DNI/1200P)
- PCI Express (PCIe) bus interface (DNI/310PE, DNI/610PE, DNI/1210PE, DNI/2410PE)
- Advanced TCA Mezzanine Card (AMC) Interface (DNI/2410AMC)

Downloadable Firmware

The hardware for DNI Boards consists of a baseboard with a microprocessor and one, two, four, or eight DS-1 digital network interfaces. The DNI/601P includes four DSPs on the baseboard that support onboard G.168 echo cancellation up to 64 ms tail length, onboard tone signal and detection, and onboard Call Progress Analysis (CPA).

Telephony signaling protocols and media processing features are downloaded as firmware to the boards on startup and reside on the various onboard processors. This downloadable firmware approach enables easy feature upgrade and expansion. Individual firmware components, such as a network interface protocol or a tone-generating function, are referred to as resources.

Echo Cancellation for Boards with AMC and PCI Express Form Factors

AMC (DNI/2410AMC) and PCI Express (DNI/310PE, DNI/610PE, DNI/1210PE, and DNI/2410PE) boards include an ASIC on the baseboard that supports onboard G.168 echo cancellation up to 64 ms (AMC) and 128 ms (PCI Express) tail length. This feature can be enabled or disabled via an API.

Network Interface

DNI Boards have software-selectable trunks that can enable them to be configured as T1 or E1 to increase flexibility, simplify the purchasing process and test effort, and help reduce inventory and the total cost of ownership. DNI Boards with the PCI and PCI Express form factor also support ISDN PRI access for both T1 and E1.

- **Configured as a T1** — DNI Boards with the PCI and PCI Express form factor support T1 robbed-bit signaling protocols and are compatible with interface devices that use, or can be set to use, 1.544 MHz clocking and μ -law pulse code modulation (PCM). In addition, configured as a T1, the boards also support the clear channel feature, thus providing up to 192 bearer channels when used in this mode. T1 protocol implementations comply with the North American standard ISDN PRI and the INS-1500 standard used in Japan. In North America and Japan, the ISDN Primary Rate includes 23 voice/data channels (B channels) and one signaling channel (D channel).
- **Configured as an E1** — DNI Boards support CEPT Channel Associated Signaling (CAS) protocols and are compatible with interface devices that use, or can be set to use, 2.048 MHz clocking and A-law PCM. In addition, configured as an E1, these boards also support the clear channel feature, thus providing up to 248 bearer channels when used in this mode. E1 protocol implementations comply with the E1 ISDN PRI protocols. The E1 ISDN Primary Rate includes 30 voice/data channels (B channels) and two additional channels: one signaling channel (D channel) and one framing channel to handle synchronization.

ISDN PRI features include:

- **Non-Facility Associated Signaling (NFAS)** — Allows a single D channel to control up to 10 PRI trunks, providing significant savings in ISDN service subscription costs available on NI-2, 4ESS, Lucent 5ESS, DMS100, and DMS250
- **D channel backup (on NI-2 only)** — Allows another D channel to take over should the main D channel fail
- **Facility, notify, and optional Information Elements (IEs)** — Allows applications to work with network-specific supplementary services
- **Direct Dialing In (DDI)** — Allows an application to route incoming calls by automatically identifying the number the caller dialed. Also known as Dialed Number Identification Service (DNIS)
- **Call-by-call service selection** — Allows an application to select the most efficient bearer channel service, such as a toll-free line or a WATS line, on a call-by-call basis
- **User-to-user information** — Allows an application to send proprietary messages to remote systems during call establishment
- **LAP-D Layer 2 access** — Allows developers to build a customized Layer 3 protocol
- **Dynamic setting of protocol timers** — Allows setting through a configuration file
- **Maskable Layer 2 Control** — Allows an application to toggle between bringing Layer 2 up and down as desired

The latest information on the protocols supported by each board can be found in the Configuration Guides and Release Updates for PowerMedia HMP accessible from <http://www.dialogic.com/manuals>.

Dialogic maintains an extensive number of product approvals in international markets. See the list of globally approved products at <http://dialogic.com/declarations>.

Onboard Tone Signaling (DNI/601P Only)

In addition to the Dual Tone Multi-Frequency (DTMF) signaling commonly used for voice processing, the DNI/601P contains a robust set of features used for network tone signaling and control without requiring additional voice resources from PowerMedia HMP. The Global Tone Detection (GTD) and Global Tone Generation (GTG) features provide the capability to detect and generate user-defined tones for special application situations, such as integration with a PBX or dealing with unique tones. Dialogic® Perfect Call CPA Software accurately monitors outbound calls, detects when calls are answered, and distinguishes:

- Line ringing with no answer
- Line busy
- Problem completing call (such as operator intercept)
- Call answered by a human or answering machine
- Call answered by a fax machine or modem

Perfect Call is intelligently tolerant of the wide variation in call progress signaling tones found in central offices and PBXs around the globe and offers accurate performance right out of the box. DSP-based algorithms are used to accurately discriminate human speech from recorded human voice and network noise.

Technical Specifications

Comparison of Important Features

	PCI Express	PCI	AMC
Boards	DNI2410TEPEHMP DNI1210TEPEHMP DNI610TEPEHMP DNI310TEPEHMP	DNI1200TEPHMP DNI600TEPHMP DNI601TEPHMP DNI300TEPHMP	DNI2410AMCTEHMP
Digital interfaces	1, 2, 4, 8 T1/E1	1, 2, 4 T1/E1	8 T1/E1
Form factor	PCel long card x1, single-slot width	PCIe long card, single-slot width	AMC mid-size module (baseboard with daughter board)
Dimensions	Height: 4.2 in (10.67 cm) Width (excluding bracket): 0.65 in (1.65 cm) Width (including bracket): 0.7 in (1.78 cm) Length (excluding edge connector): 12.3 in (31.24 cm)	Height: 4.2 in (10.67 cm) Width (excluding bracket): 0.65 in (1.65 cm) Width (including bracket): 0.7 in (1.78 cm) Length (excluding edge connector): 12.3 in (31.24 cm)	AMC mid-size module (baseboard with daughter board): 180.6 mm x 73.5 mm
Bus compatibility	PCI Express Specification Version 1.0a Compliant	Rev 2.2 of PCI Bus Specification Compliant	PCI Express Specification Version 1.0a Compliant, AMC.1 Compliant
Computer telephony bus	ECTF H.100 compliant CT Bus	ECTF H.100 compliant CT Bus	None

Technical Specifications for Boards with PCI and PCI Express Form Factor

Control processor Intel 80200 processor @ 600 MHz
Control processor memory 48 MB DRAM
Baseboard global memory 16 MB DRAM accessible to all signal processors and control processor

Host Interface

Host interface memory 512 KB
Bus mode Target and DMA master mode operation
Support PCI only: 3.3 V or 5 V signaling environment (universal connectivity)
PCIe: 1.0a compliant
Network connectors One, two, or four RJ-48C on front bracket
BNC adapter (not included) for 75 Ohm lines

Platforms

Digital signal processors Motorola 56321
4 DSPs @ 220 MHz: DNI/601
Octasic OCT6104E-256S: DNI/310, DNI/610, DNI/1210, DNI/2410
DSP memory 512 K word SRAM local to each
Bus mode Target and DMA master mode operation
Computer telephony bus ECTF H.100 compliant CT Bus
Onboard switching access to 4096 bi-directional 64 kb/s DS0 time
68-pin ribbon cable connector

Power Requirements

Configuration	+5 VDC	+12 VDC	-12 VDC	+3.3 VDC
DNI/300P	4.0 A	N/A	N/A	N/A
DNI/601P	4.0 A	N/A	N/A	N/A
DNI/1200P	4.0 A	N/A	N/A	N/A
DNI/310PE	N/A	1.0 A	N/A	1.8 A
DNI/610PE	N/A	1.0 A	N/A	1.8 A
DNI/1210PE	N/A	1.0 A	N/A	1.8 A
DNI/2410PE	N/A	1.0 A	N/A	1.8 A

Cooling Requirements

Operating temperature	0° C to +50° C
Cooling condition for maximum operating temperatures	50° C, 2.3 CFM per board 40° C, 1.5 CFM per board 30° C, 1.1 CFM per board
Storage temperature	-20° C to +70° C
Humidity	8% to 80% noncondensing

Safety and EMI Certifications

United States	FCC: EBZUSA-31207-XD-T UL: E96804
Estimated MTBF	Per Telcordia Method I: DNI/300P: 236,000 hours DNI/601P: 180,000 hours DNI/1200P: 180,000 hours DNI/310PE: 131,000 hours DNI/610PE: 131,000 hours DNI/1210PE: 131,000 hours DNI/2410PE: 131,000 hours

Technical Specifications for Boards with AMC Form Factor

Control processor	Freescale MPC8378 PowerQUICC II Pro @ 667 MHz
Control processor memory	104 MB DRAM

Host Interface

Host interface memory	24 MB
Bus mode Support	AMC.0 and AMC.1 compliant
Network connectors	Four RJ-48C jacks on front panel (each jack supports two T1/E1 digital interfaces). Optional splitter cable set BNC adapter (not included) for 75 Ohm lines

Platforms

Digital signal processors	Dialogic® e256 EC Chip
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Dialogic® HMP Interface Boards

Full Size in Various Densities and Form Factors

Datasheet
HMP Interface Boards

Power Requirements

Configuration	+12 VDC	+3.3 VDC
	1.6 A	0.1 A

Cooling Requirements

Operating temperature	0° C to +55° C
Storage temperature	-40° C to +70° C
Humidity	Non-operating: 50% to 85% relative humidity for 25° C to 70° C

Safety and Telecom Certifications

United States	US: EBZXDANGEMA8 UL: E96804
Canada	IC: 885A-GEMA8 ULc: E96804
Europe	EN 60950-1:2006 +A11:2009 ETSI TBR 012/A1:1996 ETSI TBR 013:1996
Estimated MTBF	Per Telcordia Method I: 111,000 hours

Technical Specifications Applicable to All Boards

Telephone Interface

Clock rate	DSX-1 T1 1.544 Mb/s \pm 32 ppm
Level	3.0 V (nominal)
Pulse width	323.85 ns (nominal)
Line impedance	100 Ohm \pm 10%
Other electrical characteristics	Complies with AT&T TR62411 and ANSI T1.403-1989
Framing	SF (D3/D4) ESF for ISDN
Line coding	AMI AMI with B7 stuffing B8ZS
Clock and data recovery	Complies with AT&T TR62411 and Telcordia TA-TSY-000170
Jitter tolerance	Complies with AT&T TR62411 and ANSI T1.403-1989
Loopback	Supports jumper-selectable local analog loopback and software-selectable local digital loopback
Zero code suppression	Bell ZCS (Jam bit 7) GTE ZCS (Jam bit 8) Digital Data Service ZCS No zero code suppression

Telephone Interface

Network clock rate	2.048 Mb/s \pm 50 ppm
Internal clock rate	2.048 Mb/s \pm 32 ppm
Level	3.0 V (nominal) for 120 Ohm lines
Pulse width	244 ns (nominal)
Line impedance	120 Ohm, balanced
Other electrical characteristics	Complies with ITU-T Rec. G.703
Framing	ITU-T G.704-1988 with CRC4
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	Supports jumper-selectable local analog loopback and software-selectable local digital loopback

Audio Signal

Usable receive range	-40 dBm0 to 0 dBm0 nominal, configurable by parameter**
Automatic gain control	Application can enable/disable output level, configurable by parameter**
Silence detection	-40 dBm nominal, software adjustable**
Transmit level (weighted average)	-12.5 dBm nominal, configurable by parameter**
Transmit volume control	40 dB adjustment range, with application-definable increments and legal limit cap

Frequency Response

24 Kb/s	300 Hz to 2600 Hz \pm 3 dB
32 Kb/s	300 Hz to 3400 Hz \pm 3 dB
64 Kb/s	300 Hz to 3400 Hz \pm 3 dB

Audio Digitizing

8.5 Kb/s	TrueSpeech
13 Kb/s	GSM (TIPHON, MSGSM)
16 Kb/s, 24 Kb/s, 32 Kb/s, and 40 Kb/s	G.726
24 Kb/s	OKI ADPCM @ 6 kHz sampling
32 Kb/s	OKI ADPCM @ 8 kHz sampling
32 Kb/s	IMA ADPCM @ 8 kHz sampling
48 Kb/s	G.711 PCM (μ -law for T1 and A-law for E1) @ 6 kHz sampling rate
64 Kb/s	G.711 PCM (μ -law for T1 and A-law for E1) @ 8 kHz sampling rate
64 Kb/s	Linear 8 kHz 8-bit WAV
88 Kb/s	Linear 11 kHz 8-bit WAV
128 Kb/s	Linear 8 kHz 16-bit WAV
176 Kb/s	Linear 11 kHz 16-bit WAV
A-law/ μ -law conversion	Standard
Digitization selection	Selectable by application on function call-by-call basis
Playback speed control	<ul style="list-style-type: none"> • Pitch controlled • Available on the following 8 kHz coders: OKI ADPCM, G.711 PCM, Linear • Adjustment range: \pm50% • Adjustable through application or programmable DTMF control

Approvals, Compliance, and Warranty

Hazardous substances

RoHS compliance information at <http://www.dialogic.com/rohs>

Country-specific approvals

See the global product approvals database at <http://www.dialogic.com/declarations>

Warranty

See warranty information at <http://www.dialogic.com/warranties>

Additional Tone-Related Specifications for DNI/601P Only

Note: The additional technical specifications for DNI/601P apply to its onboard tone resources. For tone resource specifications on the host, refer to the documentation for PowerMedia HMP available at <http://www.dialogic.com/manuals>.

DTMF Tone Detection

DTMF digits

0 to 9, *, #, A, B, C, D per Telcordia LSSGR Sec. 6

Dynamic range

T1: -36 dBm to +3 dBm per tone, configurable by parameter**

E1: -39 dBm to 0 dBm per tone, configurable by parameter**

Minimum tone duration

32 ms, can be increased with software configuration

Interdigit timing

- Detects like digits with a >45 ms interdigit delay
- Detects different digits with a 0 ms interdigit delay

Acceptable twist and frequency variation

T1: Meets Telcordia LSSGR Sec 6 and EIA 464 requirements

E1 : Meets ITU-T Q.23 recommendations**

Noise tolerance

Meets Telcordia LSSGR Sec 6 and EIA 464 requirements for Gaussian, impulse, and power line noise tolerance

Cut-through

T1: Local echo cancellation permits 100% detection with a >4.5 dB return loss line

E1: Digital trunks use separate transmit and receive paths to network. Performance dependent on far-end handset's match to local analog loop.

Talk off

Detects less than 10 digits while monitoring Telcordia TR-TSY-000763 standard speech tapes. (LSSGR requirements specify detecting no more than 470 total digits.) Detects 0 digits while monitoring MITEL speech tape #CM 7291.

Global Tone Detection

Tone type

Programmable for single or dual

Max. number of tones

Application-dependent

Frequency range

Programmable within 300 Hz to 3500 Hz

Max. frequency deviation

Programmable in 5 Hz increments

Frequency resolution

±5 Hz. Separation of dual frequency tones is limited to 62.5 Hz at a signal-to noise ratio of 20 dB.

Timing

Programmable cadence qualifier, in 10 ms increments

Dynamic range

T1: Default set at -36 dBm to +3 dBm per tone, programmable

E1: Default set at -39 dBm to +0 dBm per tone, programmable

Global Tone Generation

Tone type

Generate single or dual tones

Frequency range

Programmable within 200 Hz to 4000 Hz

Frequency resolution

1 Hz

Duration

10 ms increments

Amplitude

T1: -43 dBm0 to -3 dBm0 per tone nominal, programmable

E1: -40 dBm0 to +0 dBm0 per tone nominal, programmable

MF Signaling (T1)

MF digits
Transmit level
Signaling mechanism
Dynamic range for detection
Acceptable twist
Acceptable freq. variation

R1

0 to 9, KP, ST, ST1, ST2, ST3 per Telcordia LSSGR Sec 6, TR-NWT-000506 and CCITT Q.321
Complies with Telcordia LSSGR Sec 6, TR-NWT-000506
Complies with Telcordia LSSGR Sec 6, TR-NWT-000506
–25 dBm to +3 dBm per tone
6 dB
Less than ± 1 Hz

MF Signaling (E1)

MF digits
Transmit level
Signaling mechanism
Dynamic range for detection
Acceptable twist
Acceptable freq. variation

R2

All 15 forward and backward signal tones per ITU-T Q.441
–8 dBm0 per tone, nominal, per ITU-T Q.454; programmable
Supports the R2 compelled signaling cycle and non-compelled pulse requirements per ITU-T Q.457 and Q.442
–35 dBm to –5 dBm per tone
7 dB
Less than ± 1 Hz

Call Progress Analysis

Busy tone detection

Ring back detection

Positive voice detection
Positive voice detection speed
Positive answering machine detection
Fax/modem detection
Intercept detection
Dial tone detection before dialing

Default setting designed to detect 74 out of 76 unique busy/congestion tones used in 97 countries as specified by ITU-T Rec. E., Suppl. #2. Default uses both frequency and cadence detection. Application can select frequency only for faster detection in specific environments.

Default setting designed to detect 83 out of 87 unique ring back tones used in 96 countries as specified by ITU-T Rec. E., Suppl. #2. Uses both frequency and cadence detection.

Standard

Detects voice in as little as 1/10th of a second

Standard

Preprogrammed

Detects entire sequence of the North American tri-tone. Other intercept tone sequences can be programmed.

- Application enable/disable
- Supports up to three different user-definable dial tones
- Programmable dial tone drop out debouncing (when not part of regulatory approval)

Tone Dialing

DTMF digits
Frequency variation
Rate
Level

0 to 9, *, #, A, B, C, D per Telcordia LSSGR Sec 6, TR-NWT-000506, ITU-T Q.23

Less than ± 1 Hz

10 digits/s, configurable by parameter**

T1: –4.0 dBm per tone, nominal, configurable by parameter**

E1: –7.0 dBm per tone, nominal, country-specific**

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Full Size in Various Densities and Form Factors

Datasheet
HMP Interface Boards

Ordering Information

Product Code	Order Code	Description
DNI300TEPHMPW	884-147-31	Single T1/E1
DNI601TEPHMPW	884-146-33	Dual T1/E1 with tone, G.168 echo cancellation, and call progress analysis
DNI1200TEPHMPW	884-148-33	Quad T1/E1
DNI300TEPHMPWJ	888-885-30	Single T1/E1; JATE approved for Japan
DNI601TEPHMPWJ	888-884-30	Dual T1/E1 with one, G.168 echo cancellation, and call progress analysis; JATE approved for Japan
DNI1200TEPHMPWJ	888-878-30	Quad T1/E1; JATE approved for Japan
DNI310TEPEHMPQ	310-881-50	Single T1/E1 with G.168 echo cancellation, PCIe
DNI610TEPEHMPQ	310-880-50	Dual T1/E1 with G.168 echo cancellation, PCIe
DNI1210TEPEHMPQ	310-882-50	Quad T1/E1 with G.168 echo cancellation, PCIe
DNI2410TEPEHMPQ	306-328-51	Octal T1/E1 with G.168 echo cancellation, PCIe
DNI2410AMCTEHMP	306-421-50	Octal T1/E1 with G.168 echo cancellation AMC

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02/13 9818-08

The logo for Network Fuel, featuring the words "NETWORK FUEL" in a bold, sans-serif font. The text is white and set against a dark, rounded rectangular background. The entire logo is centered within a decorative footer area that consists of a complex network of interconnected nodes and lines, resembling a data network or fiber optic layout.