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Intel® NetStructure™ DMVF2401T1PCIU and DMVF3001E1PCIU Combined Media Boards

Intel in Communications

The Intel® NetStructure™ DMVF2401T1PCIU and DMVF3001E1PCIU boards provide a highly integrated universal port platform. They are ideal for developers seeking to provide cost-effective, highly scalable, high-density communications applications that require multimedia resources such as voice, fax, and digital network interface in a single Universal PCI slot.
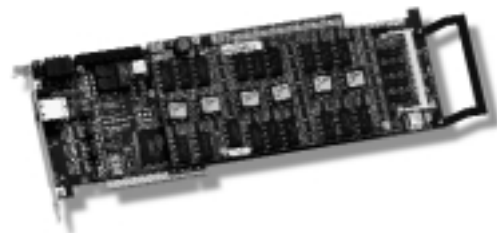
The DMVF2401T1PCIU and DMVF3001E1PCIU boards offer a rich set of advanced voice and full fax features and support state-of-the-art digital signal processing (DSP) technology and industry-standard Universal PCI and CT Bus technologies. Support under Global Call, a unified call control programming interface and protocol engine, lets the same application work on multiple signaling systems worldwide (i.e., ISDN PRI, T-1 robbed-bit, R2/MF, pulsed, and more) and offers the flexibility to scale systems to meet the growing needs of your business.

Features and Benefits

High density —The DMVF2401T1PCIU and DMVF3001E1PCIU boards provide 24 or 30 voice ports plus 24 or 30 send and receive intelligent fax ports, as well as on-board network interface —all in a single slot. By providing high density and eliminating the need for a separate network interface board, they can help reduce overall system size and cost.

Short transmission time —Fast 14.4 KB/s fax transmission, both sending and receiving, concurrently on all channels, helps shorten transmission time and save on phone costs.

Worldwide compatibility —Compatibility with T.30 protocol and modifications helps ensure high compatibility with fax devices worldwide. T-1 and E-1 ISDN and T-1 and E-1 CAS protocol support also provide freedom to build solutions for the global marketplace.

Fast throughput —On-board and on-the-fly MH, MR, and MMR compression mean fast throughput, maximizing the number of pages a user can fax per minute and minimizing the amount of time spent on the phone.

Operating system choice —These high-density fax boards support the Microsoft Windows NT, Windows 2000, Windows XP, and RedHat Linux operating systems.

Upgradable —These digital signal processor (DSP)-based boards provide maximum flexibility and future firmware upgradability.

Typical Configuration
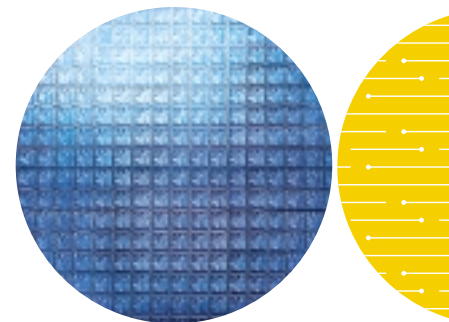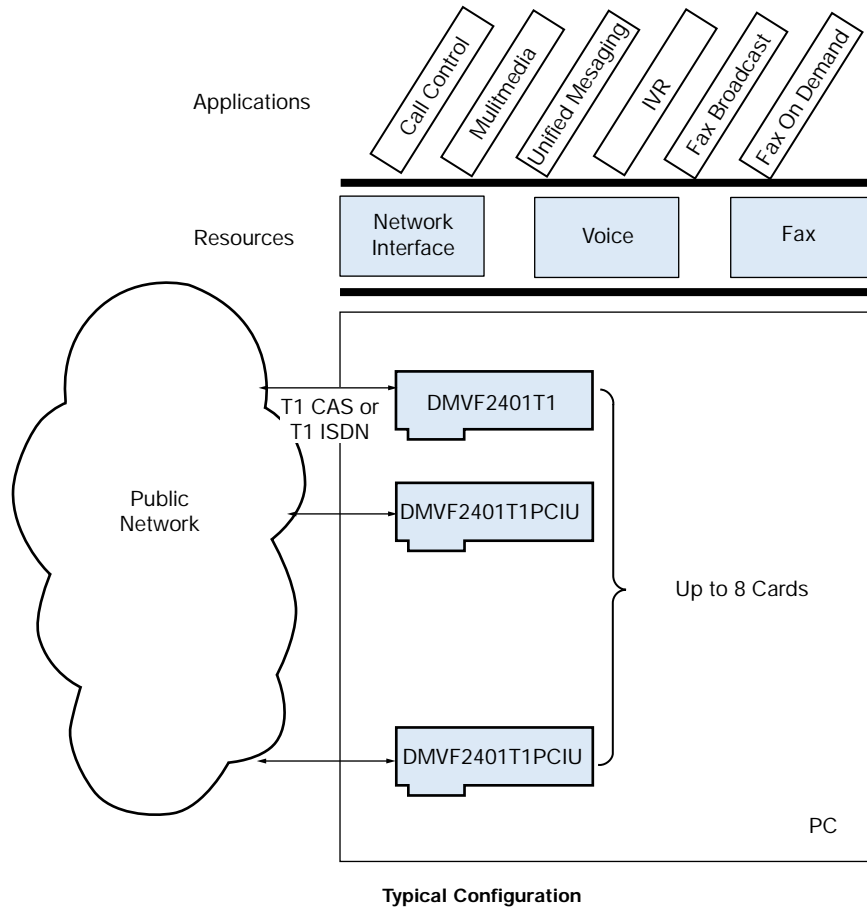
The platform offers a universal set of voice, fax, and tone resources and network interface in a 1:1:1:1 ratio, available on any call at any time. Create high-density, multimedia solutions that support from 24 to 192 T-1 or 30 to 240 E-1 channels per chassis. These boards are positioned to fulfill the needs and demands of the fax server and unified messaging market segments.

Configurations

Use the DMVF2401T1PCIU and DMVF3001E1PCIU boards to build sophisticated, converged communications systems to which you can easily add capabilities like voice response, fax-on-demand, fax broadcast, unified messaging, and call control services.

The DMVF2401T1PCIU and DMVF3001E1PCIU boards share a common hardware and firmware architecture with the other Intel NetStructure and Intel® Dialogic® CT Bus boards for maximum flexibility and scalability. You can add features and grow your systems while protecting your investment in hardware and application code. With only minimum modifications, applications can be easily ported to lower- or higher-line-density platforms. The DMVF2401T1PCIU and DMVF3001E1PCIU boards install in any Universal PCI-based personal computer or server and compatible computers (PC platforms based on the Intel® Pentium® processor). The DMVF2401T1PCIU and DMVF3001E1PCIU boards provide everything required for building high-density, integrated voice and fax solutions scalable from one to

Applications

■ **Fax broadcast** —A fax broadcast system, which sends out numerous fax messages such as press releases in one easy operation, is an efficient way to save money on communications costs.

■ **Unified messaging** —With high densities that allow for maximum lines in a minimal footprint, these boards are the ideal choice for adding fax capabilities to open, modular unified messaging solutions.

■ **Fax server** —Using these high-density boards in a fax server application makes it simple and affordable to add fax to the communications infrastructure.

■ **Fax on demand** —It's easy to reach out to customers by giving them easy telephone access to faxed information with no operator involvement. This is an ideal way to stretch a company's communications budget.

eight PRI trunks. The maximum number of lines that can be supported depends on the application, the amount of disk I/O required, the host computer CPU, and the power supply.
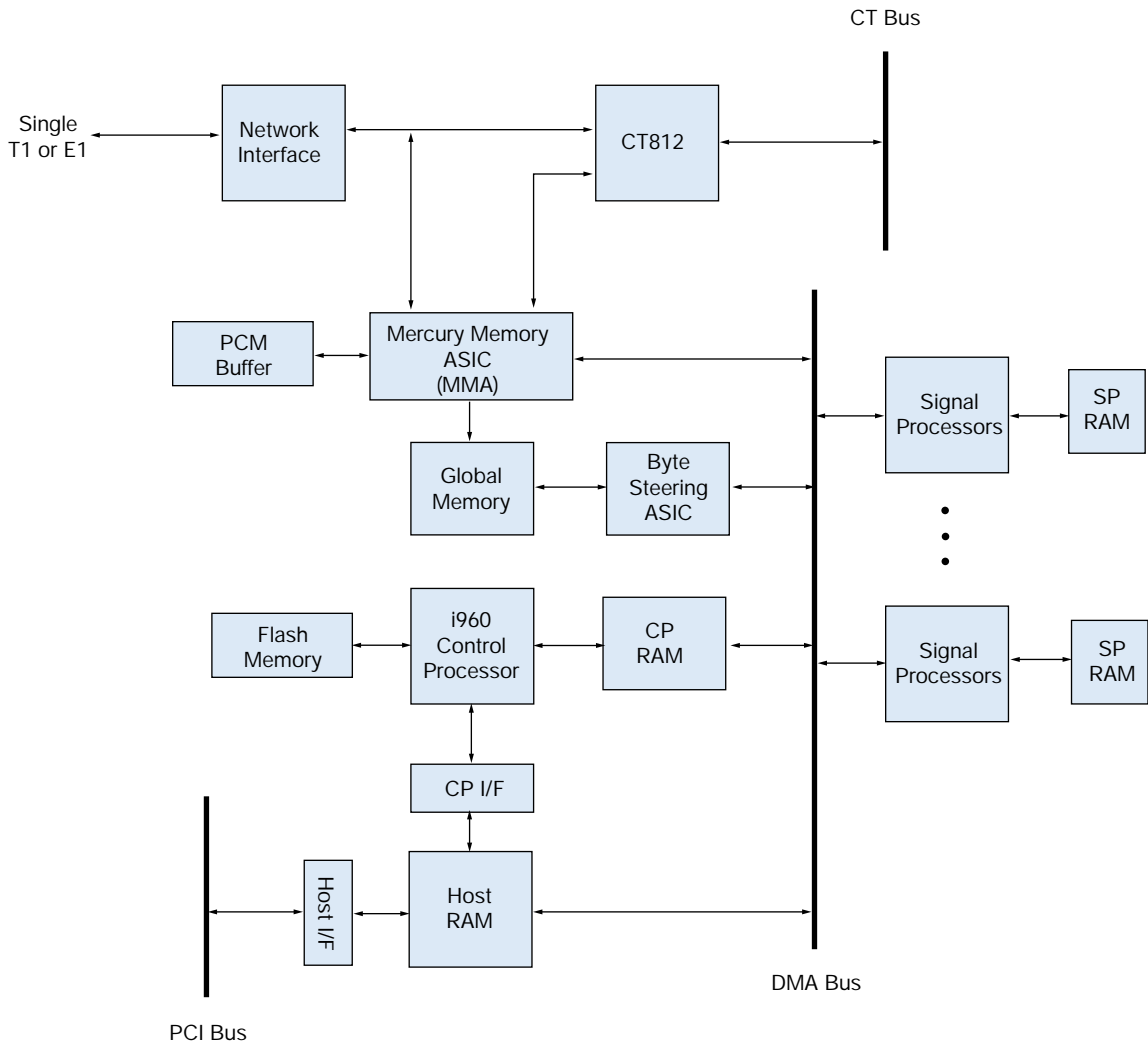
The DMVF2401T1PCIU and DMVF3001E1PCIU boards can operate within a mixed chassis containing Intel® PCIU products. The boards' forward-looking design incorporates the H.100 connector to simplify connection to next-generation CT Bus products. They can also connect to existing SCbus products through the use of an optional CT Bus/SCbus adapter. The adapter provides both SCbus and H.100 physical connectors required to link the DMVF2401T1PCIU and DMVF3001E1PCIU boards to current SCbus products.

Software Support

The DMVF2401T1PCIU and DMVF3001E1PCIU fax boards support the Microsoft Windows NT 4.0, Windows 2000, Windows XP, and RedHat Linux operating systems.

The DMVF2401T1PCIU and DMVF3001E1PCIU fax boards include the Intel Dialogic R4 API for the voice and for the fax part, which help to ensure a clear migration path and seamless integration into existing applications, protecting the developer's investment in code. Support for Global Call, a unified call control programming interface and protocol engine, lets the same application work on multiple signaling systems worldwide (i.e., ISDN PRI, T-1 robbed-bit, R2/MF, pulsed, and more) and offers the flexibility to scale systems to meet the growing needs of your business.

As an alternative, developers can choose the Intel® Dialogic® DMF2401T1PCIU and DMF3001EPCIU fax-only boards, or the Intel® Dialogic, CPi24001T1PCIU and CPi30001E1PCIU fax boards, which can be programmed through the legacy GammaLink API.

Functional Diagram

Functional Description

The DMVF2401T1PCIU and DMVF3001E1PCIU boards combine 24 T-1 or 30 E-1 lines of voice processing with 14,400 b/s (v.17) facsimile that can perform all standard functions of a fax machine and more, including sending and receiving multiple documents, polling, broadcasting, and turnaround polling. The boards use a dual-processor architecture that combines the signal processing capabilities of a DSP with the decision-making and data movement functionality of a general-purpose control microprocessor. The boards provide call processing for either T-1 or E-1 telephony signals from the telephone network or resource sharing for digital signaling and digital voice information input via the CT Bus.

Technical Specifications**

Hardware

Form factor	Universal PCI (5 VDC or 3.3 VDC)
Size	Full size
Telephony bus	CT Bus, H.100 (Voice, fax, and network resources are fully exportable.)
Power requirements	+5 VDC (19 watt) +12 VDC (N/A) -12 VDC (N/A) +3.3 VDC (N/A)
Cooling (per board)	50°C 2.3 CFM 40°C 1.5 CFM 30°C 1.1 CFM
Operating temperature	0°C to +50°C
Storage temperature	-20°C to +70°C
Humidity	8 to 80% non-condensing

Software

Operating system	Windows NT 4.0 Windows 2000 Windows XP RedHat Linux
API	R4 (voice) R4 (fax) Global Call (call control)

Audio Signal

Usable receive range	-40 dBm0 to 0 dBm0 nominal, configurable by parameter[†]
Automatic gain control	Application can enable/disable. Above -21 dBm results in full-scale recording, configurable by parameter.[†]
Silence detection	-40 dBm nominal, software adjustable.[†]
	Transmit level (weighted average) is12.5 dBm nominal, configurable by parameter.[†]
	Transmit volume control is 40 dB adjustment range with application definable increments and legal limit.

Frequency Response

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

Audio Digitizing

24 Kb/s	OKI ADPCM @ 6 kHz sampling
32 Kb/s	OKI ADPCM @ 8 kHz sampling
64 Kb/s	G.711 PCM (m-law for T-1 and A-law for E-1)
48 Kb/s	G.711 PCM (m-law for T-1 and A-law for E-1) Linear 11 KHz MS WAV 11 KHz linear 16-bit wave G.726 (32 Kb exact) GSM (TIPHON, MSGSM)
Digitization selection	Selectable by application on function call-by-call basis.

Technical Specifications** (cont.)

DTMF Tone Detection

DTMF digits	0 to 9, *, #, A, B, C, D per Bellcore* LSSGR Sec. 6
Dynamic range	(T-1) -36 dBm to +3 dBm per tone, configurable by parameter† (E-1) -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	(T-1) Meets Bellcore LSSGR Sec. 6 and EIA 464 requirements (E-1) Meets ITU-T Q.23 recommendations†
Noise tolerance	Meets Bellcore LSSGR Sec. 6 and EIA 464 requirements for Gaussian, impulse, and power line noise tolerance.
Cut-through	(T-1) Local echo cancellation permits 100% detection with a >4.5 dB return loss line. (E-1) digital trunks use separate transmit and receive paths to network. Performance depends on far-end handset's match to local analog loop.
Talk-off	Detects less than 10 digits while monitoring Bellcore 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 tones
Maximum number of tones	Application-dependent
Frequency range	Programmable within 300 to 3500 Hz
Maximum 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	T-1 default set at -36 dBm to +3 dBm per tone, programmable. E-1 default set at -39 dBm to 0 dBm per tone, programmable.

Global Tone Generation

Tone type	Single or dual tones
Frequency range	Programmable within 200 to 4000 Hz
Frequency resolution	1 Hz
Duration	10 ms increments
Amplitude	T-1: -43 dBm to -3 dBm per tone nominal, programmable E-1: -40 dBm to 0 dBm per tone nominal, programmable

T-1 MF Signaling

MF digits	0 to 9, KP, ST, ST1, ST2, ST3 per Bellcore LSSGR Sec. 6, TR-NWT-000506 and CCITT Q.321
Transmit level	Complies with Bellcore LSSGR Sec. 6, TR-NWT-000506
Signaling mechanism	Complies with Bellcore LSSGR Sec. 6, TR-NWT-000506V
Dynamic range for detection	-25 dBm to +3 dBm per tone
Acceptable twist	6 dB
Transmit frequency variation	Less than ±1 Hz

E-1 MF Signaling

MF digits	All 15 forward and backward signal tones per ITU-T Q.441
Transmit level	-8 dBm0 per tone nominal, per ITU-T Q.454; programmable
Signaling mechanism	Supports the R2 compelled signaling cycle and non-compelled pulse requirements per ITU-T Q.457 and Q.442
Dynamic range for detection	-35 dBm to -5 dBm per tone
Acceptable twist	7 dB
Acceptable frequency variation	Less than ±1 Hz

Technical Specifications** (cont.)

Call Progress Analysis

Busy tone detection	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.
Ring-back detection	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.
Positive voice detection accuracy	>98% based on tests on a database of real world calls
Positive voice detection speed	Detects voice in as little as 1/10th of a second
Positive answering machine detection accuracy	>85% accurate based on application and environment
Fax/modem detection	Preprogrammed
Intercept detection	Detects entire sequence of the North American tri-tone. Other intercept tone sequences can be programmed.
Dial tone detection before dialing	Application enable/disable; supports up to three different user definable dial tones; programmable dial tone drop out debouncing (when not part of regulatory approval).

Fax Features

ITU	T.30, T.4, T.6 V.17, V29, V27ter, V.21
Speed	14.4 Kbps with automatic fallback, send and receive, concurrently on all channels
TIFF	Single page, multi-page
Compression	MH (ITU T.4, 1D) MR (ITU T.4 2D) MMR (ITU T.6) On-board and on-the-fly
ASCII-to-TIFF	On-board and on-the-fly
Page headers	Generated on-board, on-the-fly
ECM	Supported
Width	A4, A3, B4
Polling	Normal and turnaround
Resolution	Standard (100 x 200) Fine (200 x 200) Superfine (200 x 400)
JPEG/JBIG	Color fax and grayscale fax pass through feature

Network

Type	T-1 (DM/VF240-1T1-PCIU) E-1 (DM/VF300-1E1-PCIU)
Connectors	RJ-48C

Protocols

T-1 CAS	E&M Loop start Ground start
T-1 ISDN	DMS100 AT&T 4ESS AT&T 5ESS INS1500
E-1 ISDN	Euro-ISDN
E-1 CAS	R2-MF

Technical Specifications** (cont.)

Safety and EMC Certifications

FCC	Approved
C-UL	Approved
UL	Approved
CE	Approved

Hardware System Requirements

- SR 5.1.1 call-out minimum for DM3 is 200MHZ with 128M (2 or fewer boards) or 512M (3 or more boards)
- Windows NT 4.0, Windows 2000, Windows XP, or RedHat Linux operating system

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