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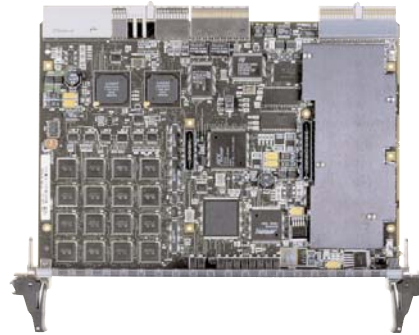
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# CG 6500C Series

## High-density PSTN, VoIP, and Voice Processing platform

The NMS Communications CG 6500C Series, part of the Open Access framework, is the ideal CompactPCI (cPCI) platform for cost-effective, scalable, highly reliable telephony solutions. By combining up to 16 T1/E1 PSTN trunks with high-density DSP voice processing power and built-in IP capability, the CG 6500C is the perfect choice for powerful applications ranging from media servers and enhanced communications service platforms to IP gateways. Voice-over-IP (VoIP) gateways are easily implemented using NMS' rich and flexible software development environments, Natural Access™ and Fusion.™

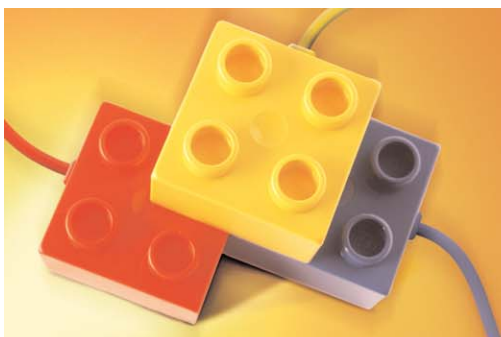


### FEATURES

- Channelized T1/E1 interfaces for up to 480 DS0 streams
- 8 or 16 digital PSTN trunks, software selectable between T1 and E1 (120 ohm)
- A-law or  $\mu$ -law PCM encoding
- Dual 10/100Base-T interfaces either on rear panel or connected to PICMG 2.16 backplane
- On-board RTP/RTCP processing by fast PowerPC
- Voice processing DSP resource pool of up to 9,600 MIPS
- Supports Fusion VoIP gateway and media server development environments
- Low-latency media streaming
- Single-slot 6U CompactPCI solution
- Supports all popular signaling protocols
- Full-speed H.110 bus with 4,096 timeslots to support interoperability with other boards in open-architecture, high-capacity systems
- Uses MVIP-95 switching model
- Supports full PICMG hot-swap standard
- Feature-rich Natural Access software development kits support Microsoft Windows®, Intel® and SPARC® Solaris,™ and Linux®

### APPLICATIONS

- IVR and conferencing engines with up to 480 ports per cPCI slot
- VoIP gateways with up to 360 ports per cPCI slot
- IP media servers
- Enhanced services platforms
- Wireless/IP gateways
- VoIP and PSTN telephony testing systems
- High-density voice processing (DSP) resource



**Open Access**  
The Foundation of Innovation

# CG 6500C SERIES

## TECHNICAL DESCRIPTION

The architecture of the CG 6500C Series integrates PSTN interfaces, telephony protocols, comprehensive IVR functionality, full-duplex echo cancellation, speech encoding, fax processing, conferencing, Fast Ethernet interfaces, and packet protocols into a single-slot package. This integration results in a cost-effective and scalable platform for OEMs building next-generation convergence solutions requiring capacities of 120 ports or more.

The CG 6500C is a carrier-grade platform targeted at in-the-network deployments,

where scalability and reliability are absolute requirements. NMS' leadership position in the CompactPCI industry is visible in the platform with first-to-market hot swap driver support, rear-panel I/O connections, and low power consumption.

### Natural Access Support

The CG 6500C Series is supported by NMS' Natural Access development and runtime environment. Natural Access provides a consistent set of APIs that are operating system independent,

thereby delivering true application portability. With Natural Access' Natural Call Control™ Service, programmers can easily and quickly develop applications that run on multiple types of telecommunications interfaces by using a single protocol-independent API. Natural Call Control minimizes the processing overhead on the host CPU by executing protocols on the board's control processor. Natural Access unifies application development across NMS Alliance Generation® and Convergence Generation products.

## FUSION, AND MEDIA STREAMING ARCHITECTURE

The CG 6500 Series is supported by NMS Fusion 4 software for IP-based enhanced services applications. This development environment offers significant advantages in development time, performance, and most importantly, scalability. Fusion 4 provides a common software development environment that can be used to create IP telephony gateways, IP-enabled enhanced communications services platforms, and wireless IP telephony gateways.

Fusion offers the capability to support a combination of IP and PSTN originating or terminating calls. It supports services ranging from basic applications such as unified communications, prepaid calling, and conferencing to innovative new web-based applications such as voice portals, voice browsers, and wireless web access.

The powerful media streaming capability is presented as a standard Natural Access service that provides functions for creating media channels that transfer data between endpoints. Supported endpoints include T1/E1, RTP/IP, UDP/IP-T.38 fax, and host-based functions such as play/record. This media streaming service can be used in combination with other Natural Access services, such as Natural Call Control, to provide an interface for PSTN call control and IVR.

When using the media streaming service, the application creates a connection to describe the flow of data through the CG 6500C Series platform. Applications establish connections by creating media streaming endpoints and channels, and then connecting sets of endpoints with channels. The service provides programmers

with a standard set of endpoint and channel types with which to build connections.

For more information regarding Natural Access and Fusion, refer to their individual data sheets.

### Dual Redundant Ethernet

The CG 6500C Series features dual 10/100Base-T Ethernet interfaces. These can be used either as two independent subnets or in an automatic failover mode that switches traffic to the alternate interface without interruption of in-progress calls. This feature protects against wire cuts or hub failures. These interfaces may either be accessed from back panel connectors or may connect to the PICMG 2.16 Ethernet on the chassis backplane.

### Diagnostics

In addition to diagnostics run at boot-up time, the CG 6500C performs run-time diagnostics for the following events:

- **Rear transition board missing:** If the CG 6500C senses that the rear transition board is not properly inserted, interrupting the trunk paths, it will send an alarm to the application.
- **Temperature measurements:** The application can request current temperature from sensors placed on the board.

## CONFIGURATIONS

Name	T1/E1 Trunks	DSP MIPS	Typical Applications
CG 6500C/64	0	6400	DSP resource card (no T1/E1 and no IP)
CG 6500C/96	0	9600	DSP resource card (no T1/E1 and no IP)
CG 6500C-2L/8TE	8	3200	240 PSTN ports of IVR
CG 6500C/64-2L/8TE	8	6400	240 PSTN universal media ports or DSP resource card
CG 6500C/96-2L/8TE	8	9600	240 ports of IVR, fax, and PSTN conferencing or DSP resource card
CG 6500C/64-2L/16TE	16	6400	480 PSTN ports of IVR
CG 6500C/96-2L/16TE	16	9600	360 ports of IVR + fax or 480 ports of IVR + conferencing
Fusion/CG 6500C-2L/8TE	8	3200	120 port Fusion license
Fusion/CG 6500C/64-2L/8TE	8	6400	240 ports of Fusion for gateway or IP media server
Fusion/CG 6500C/96-2L/8TE	8	9600	Example: Mixed PSTN/IP conference engine with 240 PSTN + 240 IP members
Fusion/CG 6500C/96-2L/16TE	16	9600	360 ports of Fusion for gateway or IP media server

The CG 6500C hardware supports the capability for software configuration as either E1 or T1 trunks.

PICMG 2.16 compliant versions are available for all variants shown in the table. To specify a PICMG 2.16 compliant version, replace "2L" with "0L" in the product name.

## NMS SERVICES

NMS provides a complete range of services designed to complement your needs at every stage — design, evaluation, development, and deployment. NMS offerings include product support, technical training, logistics, and the best developer support program in the industry. With NMS Services you are able to reduce time-to-market, ensure quality, and focus on your unique competitive advantage.

## TECHNICAL DESCRIPTION

### General

- PowerPC Microprocessor (MPC 7410): The PowerPC Microprocessor is a high-performance 500 MHz RISC processor with 128 MB SDRAM and external cache.
- PCI universal expansion board: Keyed for 5.0 V and 3.3 V signaling environment
- Input/output: Via CompactPCI rear-panel transition card

### Host Interface

- Electrical: PCI Local Bus specification Revision 2.1
- Mechanical: PICMG 2.0, R2.1 CompactPCI
- Bus speed: DC to 33 MHz
- Bus type: 32-bit master or slave
- I/O mapped memory: Memory-mapped interface for efficient block data transfers
- Address/interrupts: Address and interrupts automatically configured by PCI BIOS (no jumpers or switches)

### Software Environment

- Development environment:
  - Natural Access 2002-1 or higher
  - Fusion 4.21 or higher
- Hot Swap: Per PICMG 2.
- Operating Systems:
  - Microsoft Windows 2000
  - Intel Solaris 8 (32-bit)
  - SPARC Solaris 8 (32-bit)
  - SPARC Solaris 8 (64-bit and mixed mode)
  - Red Hat® Linux 7.2
  - Future Operating Systems:
    - Microsoft Windows Enterprise Server 2003

### H.110 Bus

- Flexible connectivity between analog station ports and H.110 bus
- 512 full-duplex connections to bus
- 512 local connections
- Switchable access to any of 4,096 timeslots
- H.110 bus clock master or clock slave (software selectable)
- H.110 bus termination (switch enabled)
- Lucent Microelectronics Ambassador™ T8105 chips

### Media Stream DSP Processing

- Universal port capability:
  - Comprehensive IVR support
  - Echo cancellation
  - Vocoding: G.711, G.723.1, G.729a/b, G.726
  - Fax: T.38 real-time; T.37 store-and-forward
- Processors: TI TMS320C5420 each with dual 100 MHz core plus 200 kB SRAM
- Capacity: from 120 to 480 universal ports

### IP Network Connectivity

- Physical: Dual 10/100Base-T Ethernet interface via RJ-45 connectors on back panel or PICMG 2.16 on backplane
- Protocols: RTP/RTCP, H.323, DHCP, SNMP (Ethernet interfaces can not be used by the host processor as a network interface card)

### PSTN Network Connectivity

- Interface connectors: One or two RJ-48T connectors on rear transition board panel
- Interfaces to short-haul trunks

### Audio Signal Processing

- Sampling rates: 8 ksamples/sec (telephone industry standard)
- Speech compression (IVR):
  - 11 kHz, 8- or 16-bit linear (.WAV); 16-bit may reduce the number of ports per board
  - 8 kHz 16-bit linear (.WAV)
  - 64 kbps  $\mu$ -law or A-law per ITU-T G.711
  - 16, 24, and 32 kbps ADPCM using NMS algorithm with NMS framing and bit packing with up to 2x speedup on play back
  - OKI-compatible ADPCM 24 kbps @ 6 kHz or 32 kbps @ 8 kHz with up to 2x speedup on playback
  - IMA-compatible ADPCM 32 kbps
  - G.726-compatible ADPCM 32 kbps

### Power Requirements (typical)

Test Description	3.3 V	5.0 V	Total Power
120-port gateway (3200 MIPS)	1.5 A	3.3 A	18 W
240-port gateway (6400 MIPS)	2.2 A	4.0 A	24 W
360-port gateway (9600 MIPS)	2.9 A	4.3 A	29 W

### Environment

- Operating temperature: 0 °C to +50 °C
- Storage temperature: -20 °C to +70 °C
- Humidity: 5% to 80%, non-condensing

### CompactPCI Chassis Requirements

- J3 connector isolation rating: J3 connector must have 500 Vdc breakdown rating to all other paths

### Compliance and Regulatory Certification

This product meets EMC, safety and telecom requirements for the US, Canada and the EU. Please refer to the Global Approvals section of our web site for a complete list of countries in which we currently hold telecom approvals. If you need specific details on EMC, safety, or telecom approvals, please contact Technical Services at tech\_support@nmss.com or +1 508 271 1333.

### Standards

- **PCI SIG:** PCI Specification Revision 2.1
- **CompactPCI:** PICMG 2.0, Rev. 2.1
- **Hot Swap:** PICMG 2.1, Rev. 1.0

**Refer to the PSTN Digital Trunk Support data sheet for specifications, standards, and compliance information on protocols, T1 and E1 interfaces, and tone generation and detection.**

For the latest information on supported features and operating systems, refer to our web site at [www.nmscommunications.com](http://www.nmscommunications.com).

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Open Access is a comprehensive product framework for next-generation voice, data, and video applications and services. Open Access provides accessibility at any point — from enabling technology, to modular application platforms, to system-level products, satisfying business and technology requirements in one cohesive model.

Enabling Technology		Modular Application Platforms	Systems
<b>SOFTWARE</b> • PacketMedia™ HMP • Natural Access™ • Fusion™ • SS7	<b>HARDWARE</b> • CG Series • AG Series • CX Series • TX Series	• Video Messaging • IP/TDM Media Server • Speech Server	<b>NMS HearSay Mobile Services Delivery System</b> • Data Center • Central Office



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