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OPEN ACCESS PRODUCT DATA SHEET

NMS COMMUNICATIONS

AG 2000C

Versatile, High-density CompactPCI Analog Loopstart Interface

The NMS Communications AG 2000C, part of the Open Access framework, is a powerful and versatile CompactPCI (cPCI) analog telephony interface platform with on-board DSP resources. It is designed to provide developers of high-performance telecommunications systems with an optimal, cost-effective solution that saves valuable cPCI slots over traditional designs by combining up to 24 analog loopstart connections with DSP-based enhancements such as interactive voice response (IVR), fax, conferencing, speech recognition, text-to-speech, and IP telephony capabilities. A PCI version (AG 2000, described in a separate data sheet) is also available with up to 8 analog ports.



The AG 2000C is supported by the Natural Access™ development and runtime environment, which 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 AG 2000C's control processor. Natural Access unifies application development across all NMS AG and CG products.

FEATURES

- Up to 24 analog loopstart interfaces with call control and switching in a single cPCI slot
- On-board DSP resources may be used to implement call control, switching, and enhancements such as voice play/record, DTMF/MF, call progress functions, echo cancellation, IVR, fax, conferencing, speech recognition, text-to-speech, and up to 8 ports of VoIP
- Full-speed H.110 bus with 4,096 timeslots to support iteroperability with other boards in open-architecture, high-capacity systems
- Natural Call Control protocol-independent API minimizes system development and deployment efforts
- Feature-rich Natural Access software development kit support for Windows,® Intel® and SPARC® Solaris,™ and Linux®
- Universal port capability supports IVR, NaturalConference,™ NaturalFax™ and Fusion™ IP telephony software
- Efficiently manages DSP resources to minimize host overhead and maximize host processing time for applications
- Built on AG Series architecture to ensure scalability, compatibility, and high performance to leverage developer time and application investment



AG 2000C

CONFIGURATIONS

The AG 2000C analog interfaces are loopstart (LS) ports that provide basic trunk connection to the PSTN or to a PBX. The AG 2000C is available in three basic versions:

- 24-trunk configuration with DSP-based on-board call control and switching
- 16-trunk configuration with DSP-based on-board call control, switching, and IVR
- 8-trunk configuration with DSP-based on-board call control, switching, and additional enhancements, such as IVR, NaturalFax, NaturalConference and Fusion VoIP. This configuration is identical in functionality to the AG 2000-8LS (PCI version, described in a separate data sheet)

Each of these three configurations is available in both a European version ("LSE") and a version that is applicable everywhere except Europe ("LS"). AG 2000C models are denoted according to the number of analog ports and the style of loopstart. For example, a 16-trunk platform configured for use in Europe would be denoted as an "AG 2000C-16LSE."

All AG 2000Cs have an H.110 interface that provides an interface to other H.110 boards.

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

On-board Resources Reduce Host Overhead

The AG 2000C Series includes a powerful embedded control processor, which manages the host interface, DSP resources, and an on-board memory cache. The control processor dynamically assigns algorithms to DSPs as needed and executes signaling protocols. As a result, host-processing overhead is reduced dramatically, which reserves more host processing power for the application.

Dynamic, Efficient Task Processing

The AG Series was the first to implement true media streaming on DSP resource boards, through an efficient task processing design, which ensures flexibility and scalability. The AG 2000C uses four high-performance, low-power 'C549 DSPs. Each DSP can be assigned a mix of specific tasks or services such as voice recording and playback, DTMF reception and generation, call progress analysis, speech compression, echo cancellation, fax functions, or vocoding. The tasks are dynamically started, stopped, and interconnected as needed. Any of these tasks or services is available for use by any of the ports on the AG 2000C.

Global Deployment Features

The use of Quad Subscriber Line Audio Circuits (QSLACs), which are software-programmable, permits specific line parameter alterations for either performance reasons or for complying with country-specific regulations. The QSLAC files for each selected country are specified within the installation program. With the flexibility of the QSLACs, there are only two variations in hardware to support the globe — one for Europe and another for the rest of the world.

The analog interfaces are also supported by software modules called trunk control protocols (TCPs) which provide the signaling schemes required by each analog interface, and by country- and PBX-specific requirements. The combination of standard analog modules, specific QSLAC files, and TCPs give the AG 2000C the flexibility to serve virtually any analog telephony requirement worldwide.

Natural Access Program Development

The AG 2000C is supported by NMS Communications' Natural Access software development and runtime environment. Natural Access provides a consistent set of APIs that are operating system-independent, delivering application portability. With Natural Access' Natural Call Control API, developers can easily and quickly integrate applications into multiple networks via a single protocol-independent API. Natural Call Control minimizes the processing overhead on the host CPU by executing protocols on the AG 2000C's control processor.

Natural Access unifies application development across NMS Communications' AG Series and CG Series products, including PCI and CompactPCI-based platforms, as well as the four-port QX™ 2000, the 32-port CX 2000 call center station product, and the 48-port CX 2000C PBX station product. This allows applications to scale from four to hundreds of ports all within the same application.

H.110 Bus Assures Open Architecture, Vendor Independence

The AG 2000C includes an H.110 bus, allowing developers to integrate the AG 2000C with other H.110-based products. The H.110 bus provides 4,096 bi-directional timeslots operating at 8 MHz. The AG 2000C uses the Lucent Ambassador™ chip family to implement the H.110 bus.

AG 2000C BOARD SPECIFICATIONS

General

- Capacity: 8, 16, or 24 loopstart (LS or LSE) analog interfaces per board
- Connectors: One RJ-21 connector
- TDM bus: H.110 bus interface
- DSP processing power: 400 MIPS per board, regardless of the number of analog interfaces. For this reason, the per-port media support capability depends on the total number of ports installed. The AG 2000C can support 8 ports of IVR, fax, Fusion (VoIP), and call control, 16 ports of both IVR and call control, or 24 ports of only call control. Conferencing may be substituted for either fax or Fusion on the 8-port version.

Software

- Software development kits: Natural Access for Windows 2000, Intel Solaris 8, SPARC Solaris 8 (32-bit, 64-bit, and mixed-mode), and Red Hat® Linux 7.2. Contact NMS sales or visit the NMS web site at www.nmscommunications.com for more options.
- Software switching support through Natural Access

Host Interface

- Bus: 33 MHz, 32-bit master or slave
- I/O mapped memory: 23 kB on-board interface memory at DMA rates via 16-bit I/O string move. Memory-mapped interface for efficient block data transfers. Address and interrupts automatically configured by PCI BIOS (no jumpers or switches).

Audio Signal Processing

- Sampling rates: 8 ksamples/sec (telephone industry standard)
- Speech compression:
  - 11 kHz, 8- or 16-bit linear (.WAV); 16-bit may reduce the number of ports per board in some configurations (such as NaturalFax)
  - 8 kHz 16-bit linear (.WAV)
  - 64 kbps µ-law or A-law per ITU-T G.711
  - 16, 24, and 32 kbps ADPCM using NMS algorithm with NMS framing and bit packing; up to 2x speed-up on playback
  - OKI-compatible ADPCM 24 kbps @ 6 kHz or 32 kbps @ 8 kHz; up to 2x speed-up on playback
  - IMA-compatible ADPCM; 32 kbps
  - G.726-compatible ADPCM; 32 kbps
  - MS-GSM

Tone Dialing

- DTMF digits: 0 to 9, *, # , and ABCD per ITU Q.23 and Q.24
- Rate: Programmable (10 digits/sec nominal)
- Wait-for-dial tone capability
- Dialing parameters: Software configurable (see Note*)
- Dialing amplitude: Software configurable; range -33 dBm to +1 dBm (see Note*)

Pulse Dialing

- 10 digits: 0 to 9
- Pulsing rate: 10 pulse/sec (nominal)
- Make/break ratio: Software configurable; 40/60 nominal (see Note*)

***Note:** NMS Communications supplies configuration files that conform to national regulations for countries where certification has been received.

DTMF Tone Generation

- DTMF digits: 0 to 9, *, #, ABCD
- Dynamic range: -47 dBm to 0 dBm per tone, programmable
- Tone duration: 40 ms (minimum)
- Acceptable twist: 10 dB
- Talk-off: Exceeds Bellcore TR-TSY-000763 tests

Analog Display Services Interface (ADSI)

- Capable of sending and receiving Frequency Shift Key (FSK) data for ADSI
- Transmit FSK function implements modem portion of Bellcore advisory TA-NWT-000030
- 1200 baud FSK support
- Caller ID support (in select countries)
- Easy-to-use API support in Natural Access

On-board Processors

- Microprocessor: One 25 MHz 80486-compatible embedded processor
- DSP: Four Texas Instruments TMS320C549 DSPs at 100 MIPS each

H.110 Bus

- Flexible connectivity between analog trunks, DSPs, and H.110 bus
- 128 full-duplex connections to bus
- 1,024 local connections
- Switchable access to any of 4,096 bi-directional timeslots
- H.110 bus clock master or clock slave (software selectable)
- H.110 bus terminations (switch enabled)
- Lucent Microelectronics Ambassador chip family

Environment

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

Power Requirements

- +12 V @ 125 mA
- -12 V @ 200 mA
- +5.0 V @ 1.5 A
- +3.3 V @ 375 mA

NMS COMMUNICATIONS

INTERFACE MODULE SPECIFICATIONS

North American Loopstart Line Interface

- T-R input impedance (300 to 3200 Hz): 600 ohms + 2.2 µF
- Return loss (ref. T-R input impedance): 20 dB min. (ERL)
- Gain tolerance (4-to-2 and 2-to-4 wire): +/- 1 dB
- Gain range (4-to-2 and 2-to-4 wire): +6 to -6 dB
- Frequency response (300 to 3200 Hz, reference to 1 KHz): +/- 0.8 dB
- Trans-hybrid loss (into matching impedance): 17 dB min. @ 300 to 3000 Hz
- Signal overload level: +3 dBm at 0 dB gain
- CMRR: > 80 dB
- Idle channel noise through connection: < 20 dBrnC
- Crosstalk transmit to receive channels: < -70 dB @ 1 kHz
- T-R isolation to SELV: > 1500 Vrms
- Off-hook detect:
  - Guaranteed detect: Current > 10 mA
  - Guaranteed no detect: Current < 3.3 mA
- Operating loop current: 18 mA to 70 mA
- Loop current and polarity detect: Single bit indicates if the current is flowing from Tip to Ring or Ring to Tip
- Ring detection:
  - Guaranteed detect: > 30 Vrms, 17 to 33 Hz
  - Guaranteed no detect: < 15 Vrms (0 to 5 kHz)

EU Loopstart Line Interface

EU specifications differ from North American version only where required to conform to regulation CTR-21.

Differences are:

- T-R input impedance (300 to 3200 Hz): 270 ohms in series with a parallel combination of 750 ohms and 150 µF
- Operating loop current: 18 mA to 55 mA

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.

OPEN ACCESS PRODUCT FAMILIES

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.

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For the latest information on supported features and operating systems, refer to our web site at **www.nmscommunications.com**.

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NMS also has offices throughout North America, Europe, and Asia. Visit the NMS web site for a complete listing.

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