

Dialogic® NaturalAccess™ Software is a development and runtime environment for voice, fax, conferencing, and video applications with a consistent set of Application Programming Interfaces (APIs) in C, which are hardware and operating system independent to provide application portability. Supported standard features include call control, play/record, PSTN trunking, voice over IP, conferencing, fax, ASR/TTS integration, 3G and IP video services, and OAM. See Figure 1 for an illustration of the NaturalAccess Software development environment.

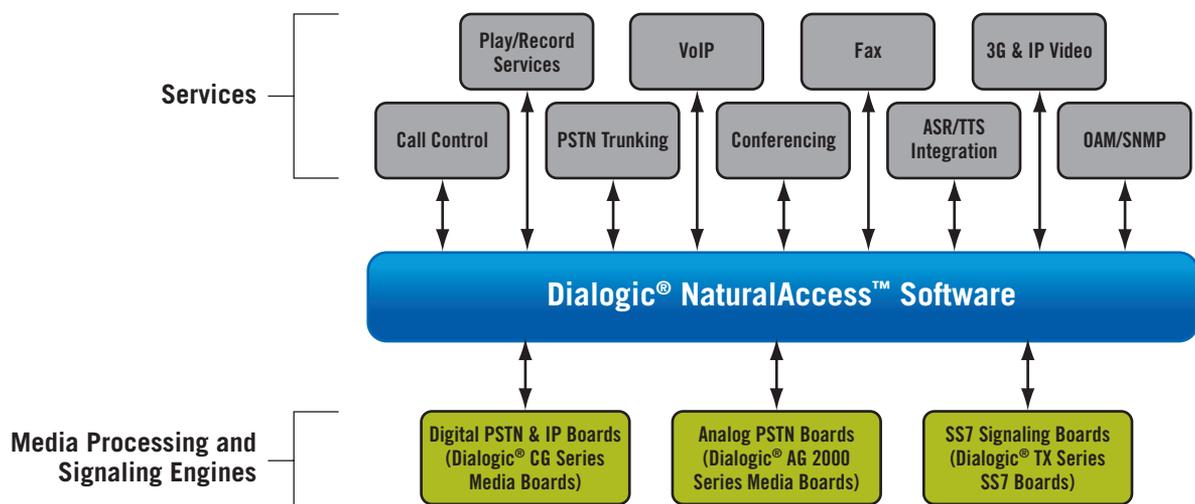


Figure 1. Dialogic® NaturalAccess™ Software Development Environment

NaturalAccess Software unifies application development across Dialogic® Media Board products that are supported by NaturalAccess Software, such as the Dialogic® CG Series Media Boards, and the Dialogic® TX Series SS7 Boards.

Feature Summary

- **Call control API for both PSTN and SIP call processing** — Enables development for multiple types of telecommunications interfaces
- **Support for CAS, ISDN, and SIP** — Allows a common call processing model
- **Full-duplex voice functions for play, record, and edit** — Simplifies IVR application development
- **Multiple voice file formats, including .WAV and .VOX** — Increases application compatibility
- **Universal tone detectors and generators** — Allows integration with PBX switches, paging terminals, and other specialized equipment
- **Embedded Voice Activity Detection (eVAD)** — Eliminates sending silence to the host, decreasing the load on the host CPU
- **H.100/H.110 switching** — Enables industry-standard interoperability

Call Control

By using the Dialogic® NaturalAccess™ NaturalCallControl™ API included with NaturalAccess Software, programmers can easily and quickly develop applications that run on multiple types of telecommunications interfaces with a single protocol-independent API. The NaturalCallControl API minimizes the processing overhead on the host CPU by executing most protocols on the board's control processor.

The syntax and semantics for placing, answering, and releasing calls are identical, regardless of the signaling protocol. In addition, signaling protocols are parameterized, allowing applications to interoperate quickly and easily with multiple networks. The NaturalCallControl API supports CAS, ISDN, SIP, and SS7 signaling, greatly simplifying programming and system integration to enable rapid and wide deployment with a single development effort.

ISDN

NaturalAccess Software uses a highly developed and widely deployed ISDN stack. The NaturalCallControl API provides support both at the Q.931 call control level and at the Q.921 LAPD level, giving developers the ability to choose the control level of detail needed. NFAS and Supplementary Services are also supported.

PSTN interfaces for NaturalAccess Software have been tested successfully with a wide variety of network switches and network switching standards worldwide.

CAS

NaturalAccess Software allows applications to be developed on the CG Series Media Boards independently of Channel Associated Signaling (CAS) protocol variations and country-specific requirements. Each protocol is parameterized, giving developers the ability to adapt the protocol to multiple target networks. For example, the MFC-R2 protocol states and events are identical for all countries, but certain parameters, such as tone duration, vary. NaturalAccess Software exposes these parameters to the programmer, allowing the protocol to be adapted to different environments. The embedded CPU coordinates the DSP signal detectors and generators so that call setup and teardown procedures execute wholly on the board. This minimizes host CPU overhead, leaving more power for application programs and features.

SIP

Session Initiation Protocol (SIP) is used to set up calls in most VoIP networks and is provided as a NaturalCallControl API option. Dialogic® NaturalAccess™ SIP under NaturalCallControl™ Software, licensed separately on a per-session basis, allows users to develop a SIP User Agent as part of their application, using the NaturalCallControl API to place, receive, reject, or redirect VoIP calls in a manner similar to PSTN calls.

Commonly used Session Description Protocol (SDP) fields are available to the application in a C structure. Alternatively, the application can access the raw SDP content for access to other SDP fields. An SDP user library is provided to help in reading and writing "raw" SDP.

Voice over IP

The Dialogic® NaturalAccess™ Fusion™ VoIP API is part of NaturalAccess Software and enables the development of IP-based enhanced service applications using the CG Series Media Boards. This API offers significant advantages in reducing development time, improving performance, and providing easy scalability.

The Fusion VoIP API enables a common software development environment that can be used to create IP telephony gateways, IP-enabled enhanced services platforms, and wireless IP telephony and video gateways. The Fusion VoIP API can also support a combination of IP and PSTN originating or terminating calls for basic applications, such as unified communications, prepaid calling, and conferencing, and innovative web-based applications, such as voice portals, voice browsers, and wireless web access.

The powerful media streaming capability provided by the Fusion VoIP API provides functions for creating media channels that transfer data between endpoints. Supported endpoints include DSO, T1/E1, RTP/IP, UDP/IP-T.38 fax, and host-based functions such as play/record. This media streaming capability works seamlessly with other NaturalAccess Software capabilities to provide an interface for PSTN call control and IVR.

Fax

The Dialogic® NaturalAccess™ NaturalFax™ API enables the development of fax server products for enterprise fax applications, IP telephony gateways, and large-scale fax service provider systems. Applications can transmit and receive ITU Group 3 faxes at rates of up to 14,400 bps for LAN fax, fax broadcast, fax-on-demand, store-and-forward, and real-time fax-over-IP data networks. The NaturalFax API handles MH, MR, and MMR fax image formats and can convert between formats either off-line or on-the-fly while a fax is being sent or received.

The NaturalFax API supports the T.37 protocol, which provides a high-performance, low-cost store-and-forward IP fax solution for developers of fax servers and IP media gateways. In conjunction with the Fusion VoIP API, the NaturalFax API supports real-time fax (T.38 protocol).

The NaturalFax API requires licensing for active fax sessions, making it possible to add fax licenses for only some of ports on a CG Series Media Board.

Conferencing

NaturalAccess Software includes support for the Dialogic® NaturalAccess™ NaturalConference™ API (licensed separately) for developing audio conferencing applications using CG Series Media Boards. The NaturalConference API provides real-time, multi-party conferencing capabilities of up to 128 conference participants. In addition to audio mixing, the NaturalConference API enables:

- **Active talker status** — Allows the capability of determining which participants are talking at a given time
- **Coaching mode** — Provides selective control of which conference members can hear chosen participants, a feature typically used to allow a “coach” to listen to a call and provide input to one or more colleagues or “agents” without the knowledge of other call participants
- **Echo cancellation** — Prevents disturbing feedback and echo during a conference
- **DTMF tone clamping** — Prevents participant-generated DTMF tones from disturbing other parties in a conference
- **Data logging** — Records a full-duplex conference call
- **Automatic gain control** — Equalizes the volume levels of different participants either at the input or output of the mixing module
- **Flexibility** — Supports flags that allow individual members to have different settings, such as listen-only, talker, self-echo, and talker-privilege
- **Less noise build-up** — Includes a robust algorithm that prevents noise build-up and maintains audio clarity

Speech

Speech vendors are now providing speech capabilities, including Automatic Speech Recognition (ASR) and Text-To-Speech (TTS) components, supported by the Media Resource Control Protocol (MRCP) standard. Dialogic® NaturalAccess® Universal Speech Access Software (licensed separately) runs on an application server and provides MRCP control over speech servers. A CG Series Media Board with NaturalAccess Software provides voice media as a VoIP stream (G.711) to the speech server.

NaturalAccess Universal Speech Access helps alleviate one of the major development challenges inherent in writing speech applications — the difficulty of using multiple types of speech resources efficiently. With NaturalAccess Universal Speech Access and NaturalAccess Software, developers are able to write applications once and then access many speech resources supporting the MRCP standard. Additional resources can be used with minimal adjustments and with no specific dependence on operating systems, versions, or other components — saving valuable time and money.

Video

Developers can rapidly implement video solutions using the Dialogic® NaturalAccess™ Video Access Toolkit in conjunction with NaturalAccess Software and CG Series Media Boards. The NaturalAccess Video Access Toolkit (licensed separately) can be the foundation for a wide range of powerful video applications, including 3G-324M-to-SIP video gateways, video media servers, and wireless video messaging and streaming servers. See [An Introduction to the Dialogic® NaturalAccess™ Video Access Toolkit](#) for more information.

Video transcoding can be added with the Dialogic® Software Video Transcoder, also licensed separately. See [An Introduction to the Dialogic® Software Video Transcoder](#) for more information.

Management Service (OAM)

The Management (OAM) Service provided with NaturalAccess Software enables configuration, monitoring, and testing functions across telephony resources on one or more CG Series Media Boards. A configuration database is supported by board plug-ins. Extended management components support hot swap, clock management, and clock failover. Support is provided for SNMP, including a chassis MIB and a MIB for digital trunks (RFC 2495).

Operating System Independence

The APIs provided in NaturalAccess Software are operating-system-independent. After an application is developed on a specific operating system with these APIs, it can be ported to another supported operating system, normally without changes to the application program.

The NaturalAccess Software architecture also allows developers to capitalize on desired operating-system features, such as system-specific event-triggering functions. This flexibility allows system developers to adapt their applications for a broad market, or they can tailor them for specific markets.

For specific information on operating system support, see [Guide to Dialogic® System Software, Operating Systems, and Dialogic® Products](#).

For More Information

[Dialogic® CG Series Media Boards](#)

[An Introduction to the Dialogic® NaturalAccess™ Video Access Toolkit](#)

[Guide to Dialogic® System Software, Operating Systems, and Dialogic® Products](#)

Technical Information

System Requirements

Bus	PCI, PCI Express, CompactPCI
Processors and Operating Systems	- Windows® and X86 Solaris: 1, 2, or 4 Pentium-class - SPARC Solaris: 1, 2, or 4 SPARC - Red Hat Linux: 1 or 2 Pentium-class

Obtaining Third-Party Licenses

Using the AMR-NB resource or the EVRC resource in connection with Dialogic® NaturalAccess™ Software does not grant the right to practice either such standard. To seek a patent license agreement to practice the AMR-NB standard, visit www.voiceage.com/licensing.php. To seek a patent license agreement to practice the EVRC standard, contact Qualcomm Inc. at qtl.info@qualcomm.com. Neither such license is provided by Dialogic.

Audio Signal Processing

Sampling rates	8 k samples/sec (telephone industry standard)
Speech compression	- 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 μ -law or A-law per ITU-T G.711 - 16, 24, and 32 kbps ADPCM using Dialogic® algorithm with Dialogic® 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 play back - IMA-compatible ADPCM 32 kbps with up to 2x speedup on play back - G.726-compatible ADPCM 32 kbps - MS-GSM with up to 2x speedup on play back - AMR-NB - G.723.1 - G.729a

Codec Support

Encode and decode using Fusion	G.711, G.723, G.726, G.729a, AMR-NB, GSM-FR, EVRC, ILBC
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Fax (optional)

Fax protocol	ITU T.30, T.37 (store-and-forward)
Image formats	MH, MR (ITUT.4), MMR (ITUT.6)
Error Correction Mode (ECM)	Yes
Resolution	Standard, fine, super-fine
Page format	A3, A4, B4
Requirements	Dialogic® NaturalAccess™ NaturalFax™ API license, Dialogic® NaturalAccess™ Software, and at least one Dialogic® CG Series Media Board
Fax modems	- V.21 (300 bps) for T.30 fax negotiation - V.27ter (2,400/4,800 bps, required by Group 3) - V.29 (9,600, 7,200 bps) - V.17 (14.4, 12, 9.6, 7.2 kbps) transmit/receive

Conferencing (optional)

Maximum conference size	128 members
Line echo cancellation delay	10 ms or 20 ms

Technical Information *(continued)*

MRCP v1 Speech Engine Support (optional)

- Nuance ASR: Nuance Recognizer 9.0
- Nuance TTS: Nuance RealSpeak 4.5
- Telisma ASR: teliSpeech 1.1
- Loquendo ASR and TTS: Loquendo Speech Suite 7.0

SIP Signaling Support (optional) Requirements

Dialogic® SIP for NaturalCallControl™ Software license, Dialogic® NaturalAccess™ Software, and at least one Dialogic® CG Series Media Board

Supported transport layer protocols

UDP, TCP

SIP methods supported

INVITE, ACK, BYE, CANCEL, REGISTER, INFO, PRACK, REFER, SIP Session Timer

IETF standards and drafts

Supports many IETF SIP standards, including:

- RFC3261 (SIP: Session Initiation Protocol)
- RFC3262 (Reliability of Provisional Responses in SIP)
- RFC3264 (An Offer/Answer Model with SDP)
- RFC3265 (SIP Specific Event Notification)
- RFC3515 (SIP: REFER Method)
- RFC4566 (SDP: Session Description Protocol)

Also supports numerous Internet Drafts for SIP extensions and various IETF and 3GPP SIP and SDP extensions

Video

See [An Introduction to the Dialogic® NaturalAccess™ Video Access Toolkit](#) for details

Protocols

ISDN PRI

NI-2, 4ESS, 5ESS, DMS100, DMS250, INS1500, EuroISDN, VN6, QSIG, Austel

CAS

- Worldwide MFC-R2 variants
- Feature Groups A, B, and D
- OPS/OPX
- Loop Start
- Ground Start
- SS5
- International wink start
- Digital E&M variants
- NEC PBX
- MD110 EL7
- MELCAS
- MF Socotel
- European country-specific variants of CAS
 - Italy (Norma CEI 103-1/7)
 - Sweden (P7/P8)
 - Netherlands (ALS70D)
 - CAS R1.5
 - Australian P2

Ordering Information

Dialogic® NaturalAccess™ NaturalConference™ API Runtime License

80741 NaturalConference license - 16 ports

Dialogic® NaturalAccess™ NaturalFaxAPI™ Runtime License

8785-01 NaturalFax 1-port license

Dialogic® NaturalAccess™ SIP under NCC

82298-08 SIP under NCC Runtime License - 8 Sessions

82298-16 SIP under NCC runtime license - 16 sessions

82298-32 SIP under NCC runtime license - 32 sessions

82298-64 SIP under NCC runtime license - 64 sessions

82298-128 SIP under NCC runtime license - 128 sessions

82298-256 SIP under NCC runtime license - 256 sessions

82298-512 SIP under NCC runtime license - 512 sessions

83080 SIP Evaluation License- 90 days, 128 sessions

Dialogic® NaturalAccess™ Universal Speech Access Interface Release 1.1 Runtime Licenses

82764-16 USAI - 16 ports/sessions

82764-32 USAI - 32 ports/sessions

82764-128 USAI - 128 ports/sessions

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