

## Dialogic® Diva® Media Boards and an Asterisk IP-PBX

To connect to the PSTN, Asterisk systems require a network interface board or a media gateway. Because most Dialogic® Diva® Media Boards have powerful Digital Signal Processors (DSPs) onboard and can move processor-intensive, low-level tasks to these DSPs, significant reductions in server CPU load are possible. Such reductions can positively impact overall performance and scalability in systems such as those using Asterisk software.

Figure 1 illustrates how a Diva Media Board can fit into an Asterisk-based telephony system.

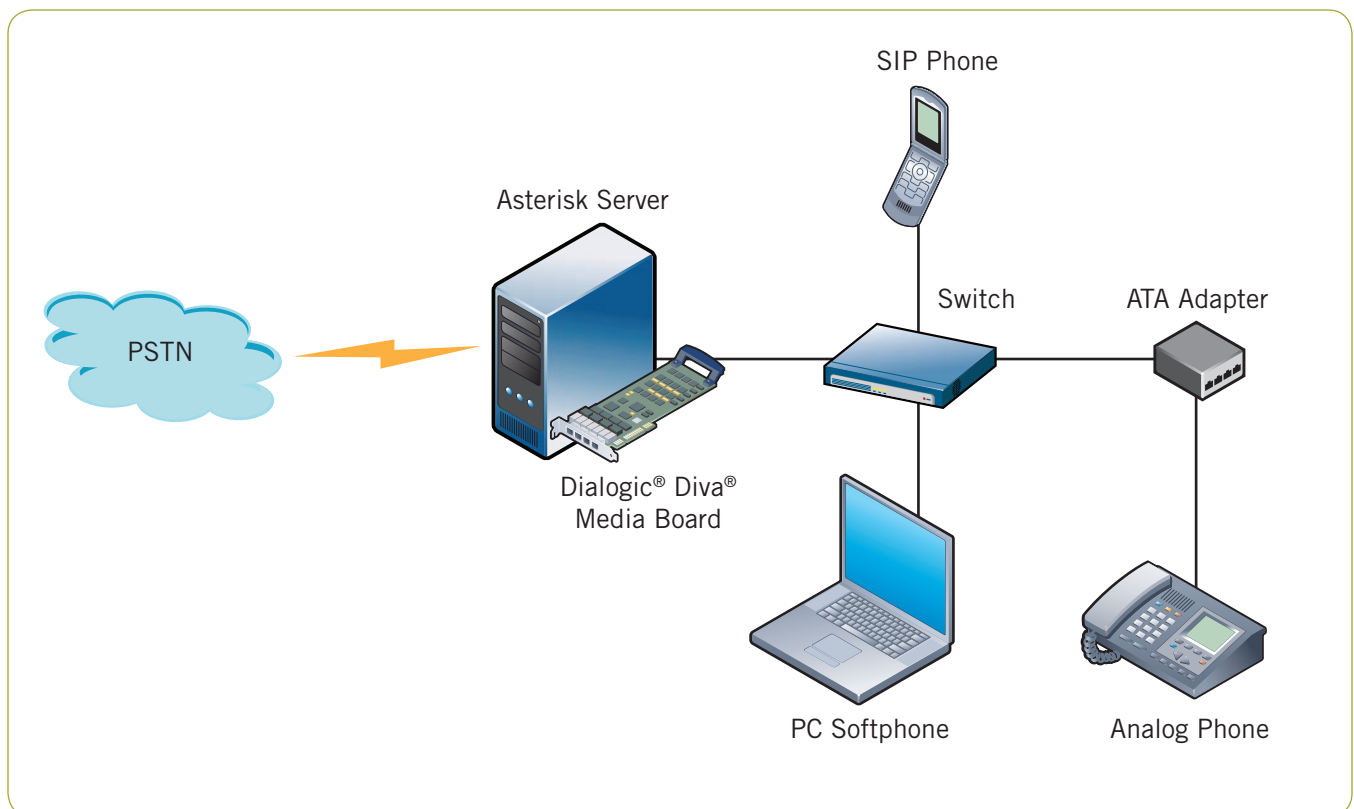


Figure 1. Diva Media Board in an Asterisk-Based System

### Dialogic® Diva® Media Boards Offload Work from CPU

Along with providing a connection to the PSTN, Diva Media Boards detect DTMF, MF, and PULSE signals, and recognize and generate fax, modem, busy signals, dial tones, and other intrusion tones – on the DSPs included on the Diva Media Boards. This can allow CPU-intensive, low-level tone-related telephony processing to be offloaded from the Asterisk's host CPU to the DSPs.

The Diva Media Boards also support a G.168 Echo Canceller (EC) with a 128 ms tail length (256ms on the 2 and 4 span T1/E1 boards) – again on their DSPs. Echo cancellation impacts Automatic Speech Recognition (ASR), Interactive Voice Response (IVR), normal conversation, and conferencing – all cases in which echo can be unacceptably intrusive.

### Conferencing

Diva Media Boards can enable high-quality conferencing for up to 120 active speakers in one conference onboard, without CPU load. Conferencing is handled on DSPs and can span several Diva Media Boards using cross-board conferencing resources via Direct Memory Access (DMA) on the PCI bus.

Cross-board conferencing and cross-board switching are available between different types of Diva Media Boards (analog, E1/T1, and BRI), maintaining high quality interconnected lines. Fax and modem connections forwarded via a Diva Media Board are of comparably high quality.

Diva Media Boards offer a variety of additional conferencing features, including Automatic Gain Control (AGC) and Active Speaker Recognition. (AGC is also useful when recording voice streams, providing all recordings with the same volume level.) DTMF clamping, which removes DTMF tones from the voice stream, can help improve the audio signal during a conference and avoid unnecessary tone processing.

Diva Media Boards include a Part.168 Audio Signal Limiter to keep loud signals from disturbing the other participants in a conference. This signal limiter is also implemented on the board's DSPs, not an Asterisk server's CPU.

## Other Techniques Conserve CPU Resources

Diva Media Boards provide other techniques for conserving CPU resources if used with an Asterisk IP-PBX. For example, since Asterisk servers handle each voice channel as a separate thread, the number of threads that need to be managed by the CPU and operating system during concurrent calls can be very high. The architecture of Diva Media Boards and their rich processing tools can address this limitation.

## VoIP Support

The DSPs on the Diva Media Boards can generate RTP streams that can enable an Asterisk server to drive many types of VoIP devices, such as SIP phones, without requiring an expensive multi-CPU system to do resource-consuming calculations.

## Protocol Independence for Asterisk

If it incorporates Diva Media Boards, an Asterisk system is protocol-independent. Each Diva Media Board used in a system can run its own signaling protocol (QSIG, 5ESS, or others) because the Diva Media Board software (CAPI and SDK) provides abstraction, allowing protocol independence and a mix of signaling protocols in one Asterisk server.

The following signaling protocols are supported (as of March 2008): QSIG, Path Replacement Invite, Path Replacement Forward, Path Replacement, Two B-Channel call transfer, Single Step Call Transfer, Blind Call Transfer, and Calling/ Called Names.

Diva Media Boards also support SS7 Signaling Protocols, allowing the option of connecting an Asterisk-based PBX directly to an SS7 network.

## Additional Features

Diva Media Boards support a broad range of additional features that include:

- Rich Hunt Group Mode support, which is transparent to Asterisk
- Automatic detection of the QSIG dialect in use (ISO, ECMA, vendor specific extensions, and others)
- Emulation of Supplementary Services, even when calls are connected via different Diva Media Boards. Cross-board emulation is automatically handled via call tromboning (Line Interconnect) and/or Cross Board Switching and is transparent to Asterisk. Network- or vendor-specific supplementary services are also made available to Asterisk.
- Explicit Call Transfer (ECT) emulation for independent network connection. For example, calls to QSIG and 5ESS lines can be handled even if the callers are on different lines. In QSIG networks, ECT emulation uses completion path replacement and completion notification to release local resources.
- Support for different “message waiting” procedures

## Technical Specifications

Diva Media Boards can provide rich voice and other functionality if implemented in an Asterisk server, as well as to other applications running on the same server, including RAS servers, Fax servers, POS servers, and other services related to phone lines.

Up to eight Diva Media Boards supporting up to 480 channels can be combined in a single server and used with Asterisk. Consult the individual datasheet for each Diva Media Board for additional information about specific features, including certification:

- Dialogic® Diva® Analog-2 Media Board
- Dialogic® Diva® Analog-4 Media Board
- Dialogic® Diva® Analog-8 Media Board
- Dialogic® Diva® BRI-2 Media Board
- Dialogic® Diva® 4BRI-8 Media Board
- Dialogic® Diva® PRI/E1/T1-8 Media Board
- Dialogic® Diva® PRI/T1-24 Media Board
- Dialogic® Diva® PRI/E1-30 Media Board
- Dialogic® Diva® V-PRI/T1-24 Media Board
- Dialogic® Diva® V-PRI/E1-30 Media Board
- Dialogic® Diva® V-2PRI/T1-48 Media Board
- Dialogic® Diva® V-4PRI/T1-96 Media Board
- Dialogic® Diva® V-2PRI/E1-60 Media Board
- Dialogic® Diva® V-4PRI/E1-120 Media Board

Information about Linux distribution support for Diva Media Boards can be found at <http://www.dialogic.com/systemreleases>.

To learn more about Dialogic® products, go to [www.dialogic.com](http://www.dialogic.com)

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