Digital Super Directional Array
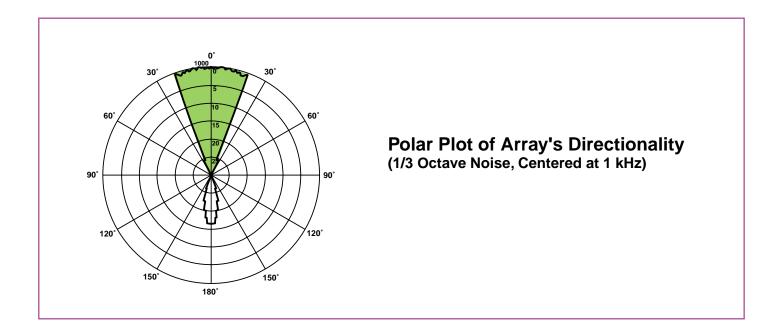
DSDA is a highly directional, digital far-field microphone solution for audio input. Based on adaptive beamforming, this algorithm creates a precise area of sensitivity for picking up audio signals. It adapts to the user environment, so as any interfering noise signals become present (or amplified), the beam contracts and focuses on the speaker. Noise sources are reduced by typically 25dB to 30dB, which can make a significant difference in a speech recognition implementation. Effectively overcoming the limitations imposed by close-talk microphones, DSDA achieves a natural user interface and broadens market acceptance of speech recognition.

Single-element microphones have limitations in their ability to identify noise from speech. The Array continuously samples the acoustic environment, identifying the audio data captured, and processes the input accordingly.

Polar Plot of Array's Directionality
(1/3 Octave Noise, Centered at 1 kHz)

Polar Plot Description

The above Polar Plot describes the sensitivity of the adaptive beamformer vs. angle of reception. Unlike a classic standard directional microphone the drop in sensitivity outside of the reception cone is sharp. Also note that the beam width is narrow and can be controlled by software parameters.

Market Applications

DSDA technology lends itself to those market areas using speech as the primary user interface.

Automotive: Telematics, AutoPC, Mobile Multimedia Systems, Hands-Free Carphone Kits, Global Positioning Systems (GPS), etc.
Desktop: Speech Recognition, Internet Telephony, Videoconferencing, Voice Verification
Embedded Devices: Handheld PDA's, Tablet PC, Set-top box, Professional Audio Systems, Surveillance devices, Intercoms (Home Automation), Camcorders, Hearing Aids, Interactive Kiosks, etc.

Integration

DSDA can be embedded directly into an application or device. Running the algorithm on a digital signal processor (DSP) or any other processor, using 2 microphones or more and structured in almost any shape that best fits the application. Furthermore, the algorithm can be optimized to perform in a specific environment.

Specifications:

Adaptive Beamforming	2-8 Microphones
Flexible Array Structure	
Sharp Noise Reduction	Outside of a Reception Cone
Software Controlled Beam Width	Typically 25˚ around the center of the reception cone
Wide Tailored Frequency Range	Within 0-20 kHz
No Delay and Seamless Adaptation Time	
No Effect on the Audio Quality	
Bandwidth	20 MIPS (0-16 kHz)
Memory Requirement	3 kwords Data RAM
	3 kwords Program/Coefficient RAM

Andrea's Building Blocks

Andrea offers DSDA as a stand-alone solution, but as a building block that can be combined together with other additional audio input technologies like PureAudio®, SuperBeam™, EchoStop™, and more. These building blocks will provide the optimum solution to the specific requirement under the given processing resources. The building block approach offers a large menu of solutions that can be tailored to the specific customer requirements.