Acoustic Beamformer

PRODUCT DESCRIPTION

The Adaptive Digital Acoustic Beamformer algorithm improves the signal to noise ratio of speech signals by coherently summing signals obtained from a linearly spaced microphone array. The algorithm assumes that each microphone is positioned in a straight line on a flat surface with an equal spacing.

FEATURES

- Scalable number of microphones from 2 to 8
- Supports fixed-angle or dynamic array steering
- Programmable sampling rate
- Programmable frame size
- Programmable number of microphones
- Programmable microphone spacing
- Programmable microphone delay
- Programmable microphone gain/loss
- specify per microphone delay OR microphone to microphone spacing
- Can be integrated with Adaptive Digital's Acoustic Echo Canceller
- Functions are C-callable
- Multi-channel operation
- C callable
- Designed for half-wave microphone separation

AVAILABILITY

ADT Acoustic Beamformer is available on the following Platforms: Other configurations are available upon request.

Product	Platform	Memory Model	Endian	Code Gen Tool Version
ADT_ ac-bfmr _c67x	TI TMS320C67x	MmL3	Little	N/A
ADT_ ac-bfmr _c55x	TI TMS320C55x	Far	Little	N/A
ADT_ ac-bfmr _c54x	TI TMS320C54x	N/R	N/A	N/A

*Endian, byte order: "Little Endian" means that the low-order byte of the number is stored in memory at the lowest address, and the high-order byte at the highest address. "Big Endian" means that the high-order byte of the number is stored in memory at the lowest address, and the low-order byte at the highest address.

Acronyms

Mm – Memory Model: Memory Model is specific to Texas Instruments processors.

N/A – Not Applicable

N/R – Not Recorded

SPECIFICATIONS

Maximum frequency: 4 kHz

Sampling Rate: 8 kHz

Sound wave velocity: 331 meters/sec

TI TMS320C6000

C67x

CPU UTILIZATION & MEMORY REQUIREMENTS

Memory and MIPS data were recorded at a 48kHz-sampling rate, adaptive beam.
All Memory usage is given in units of bytes.

Variant	MIPS Peak loading	Program Memory	Data Memory	Per-Channel	Scratch
4 Microphones	148	4736	124	3160	8192

Note: Memory specified for builds that include both AGC and Noise Reduction

TI TMS320C5000

C55x

CPU UTILIZATION & MEMORY REQUIREMENTS

Memory and MIPS data were recorded at a 16kHz-sampling rate, fixed beam.
All Memory usage is given in units of bytes.

Variant	MIPS Peak loading	Program Memory	Data Memory	Per-Channel	Scratch
2 Microphones	2.4	2300	330	2180	0
4 Microphones	4.8	2300	330	2180	0

C54x

CPU UTILIZATION & MEMORY REQUIREMENTS

Memory and MIPS were recorded at an 8 kHz sampling rate and using an adaptive beam.
All Memory usage is given in units of 16 bit word.

Variant	MIPS Peak loading	Program Memory	Data Memory	SNR Improvement
2 Microphones	19.8	1948	4061	3.1 dB
4 Microphones	39.7	1967	6187	6.2 dB

FUNCTIONS

API function call summary

`beamform_ADT_init(…)`	`Performs Beamforming initialization function`
`beamform_ADT_run(…)`	`Performs Beamforming function`

Deliverables

The deliverable items are platform dependent. In general, there is one library. (Sometimes multiple variants of the library are included in the deliverables.) There are also header files, some of which are specific to the product and others are common across many of Adaptive Digital's products. Also included in the deliverables is product documentation, which includes a users guide and usually includes release notes and a data sheet. Sample/test code may be included as well.

Adaptive Digital is a member of the Texas Instruments Developer Network, and ARM Connected Community.

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