

MSP-M, MAP-M

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MSP[®]-M, MAP-M Audio Processor IC Family



The audio processor IC family MSP 44/46x1M, MSP 54/56x1M (MSP-M) and MAP 44/460yM, MAP 54/560yM (MAP-M) represents the latest generation of Micronas single-chip audio systems.

The MSP-M is dedicated for TVs receiving analog and digital broadcast, performs all the baseband processing and demodulates/decodes all analog TV audio standards, including NICAM and FM stereo radio.

The MAP-M is optimized for TVs which receive only digital broadcast and has the same functions, I/Os, and building blocks as MSP-M, except demodulator/stereo decoder.

Both ICs are fully pin- and SW-compatible and act as the audio core device in modern TVs. Thanks to its unique audio DSP and feature set, as well as its ultimate performance, MSP-M/MAP-M are essential for mid-range to high-end TV audio.

Nearly unlimited flexibility and maximum differentiation for TV manufacturers is realized by MSP-M/MAP-M's DSP code download option and CMP (Customizable Modular Processing).

Modern flat-panel TVs require interfaces for numerous audio signals. MSP-M/MAP-M provide a leading set of analog and digital interfaces to seamlessly connect all of the TV's audio. The S/PDIF and the I²S interfaces also accept audio from HDMI receivers. High-quality sampling rate converters at all digital inputs and outputs enable digital connectivity without worrying about clock systems and synchronization.

The on-chip high-end D/A converters or "Hi-Resolution PWM" modulators can directly be connected to analog (linear) or digital (class-D) amplifiers. D/A converters with low output impedance allow high noise immunity. Micronas "Hi-Resolution PWM" technology enables natural and detail-rich sound, combined with low power dissipation.

Patent Information
Digital BTSC decoding protected by Micronas Patents
Nr. US 6,492,913 and US 6,281,813

Baseband Audio Processing

- ◆ CMP (Customizable Modular Processing)
- ◆ DSP code download option
- ◆ Dolby Virtual Speaker (optional)

- ◆ Up to 160 ms/channel Lip Sync delay
- ◆ Micronas SOUNDFIELD[®]+
- ◆ Micronas POWER+ loudspeaker power enhancer
- ◆ Micronas VOICE[™]+ speech detection and processing
- ◆ Micronas BASS[™]+, Micronas NIGHT[®]+
- ◆ Micronas ALIGN+ automatic calibration in rooms
- ◆ 5-band parametric equalizers, 7-band graphic equalizer

Interfaces

- ◆ S/PDIF inputs and outputs
- ◆ Asynchronous 2...8-channel I²S inputs
- ◆ Asynchronous 2...8-channel I²S outputs
- ◆ "Hi-Resolution PWM" outputs
- ◆ Microphone/phono input with preamp
- ◆ High-end multibit $\Sigma\Delta$ -D/A converters with 108 dBA (typ.) dynamic range
- ◆ High-end A/D converters with 90 dBA (typ.) dynamic range
- ◆ Analog stereo line inputs and outputs

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Demodulator, Stereo Decoder

- ◆ Alignment-free decoding of all TV audio standards maintaining superb channel separation
- ◆ US BTSC audio with DBX noise reduction and SAP decoding
- ◆ Japanese EIA-J stereo
- ◆ Digital NICAM stereo
- ◆ All 2-carrier TV Audio standards
- ◆ (Very) High deviation modes HDEV2, 3
- ◆ Automatic Standard Detection (ASD)
- ◆ Automatic Sound Select (ASS) switches mono/stereo/bilingual without controller interaction

Evaluation Support

- ◆ DSP code programming
 - Micronas offers programming service and support
 - Simulator, Assembler and Documentation provided by Micronas
- ◆ Evaluation software suite
 - CMP block placement and linking
 - Micronas “Visual I²C”
 - “Visual MSP” application
- ◆ Micronas Audio Evaluation Board

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Naming System and Versions

Feature	IC	v	w	x	y	M
No Download RAM	MSP/MAP	4				
Download RAM	MSP/MAP	5				
D/A (analog) out	MSP/MAP		4			
“Hi-Resolution PWM” out	MSP/MAP		6			
Demodulator / Global without NICAM	MSP			4		
Demodulator / Global with NICAM	MSP			5		
No Demodulator	MAP			0		
D/A or PWM output configuration	MSP/MAP				1	
					2	

e.g. MSP 5651M: MSP-M with Download RAM, “Hi-Resolution” PWM and NICAM

System Architecture

The unique 24/48-bit QuadMAU[®] DSP (quadruple mathematical arithmetic unit) is the core of the MSP-M/MAP-M and performs all the baseband- and TV-specific audio processing, sampling rate conversion, as well as the “Hi-Resolution PWM” modulation.

MSP-M/MAP-M are equipped with CMP, the revolutionary Customizable Modular Processing. Audio processing blocks can individually be placed and linked to allow the TV manufacturer to easily create exactly the processing structure required.

All basic functions such as equalizers, bass enhancement, and tone control are located in the internal ROM. No download is necessary to activate these features. An on-chip program code RAM in the MSP 54/56x1M / MAP 54/560yM enables downloading of additional DSP code allowing company-specific proprietary audio algorithms and ported 3rd party algorithms under license to be processed on MSP-M/MAP-M.

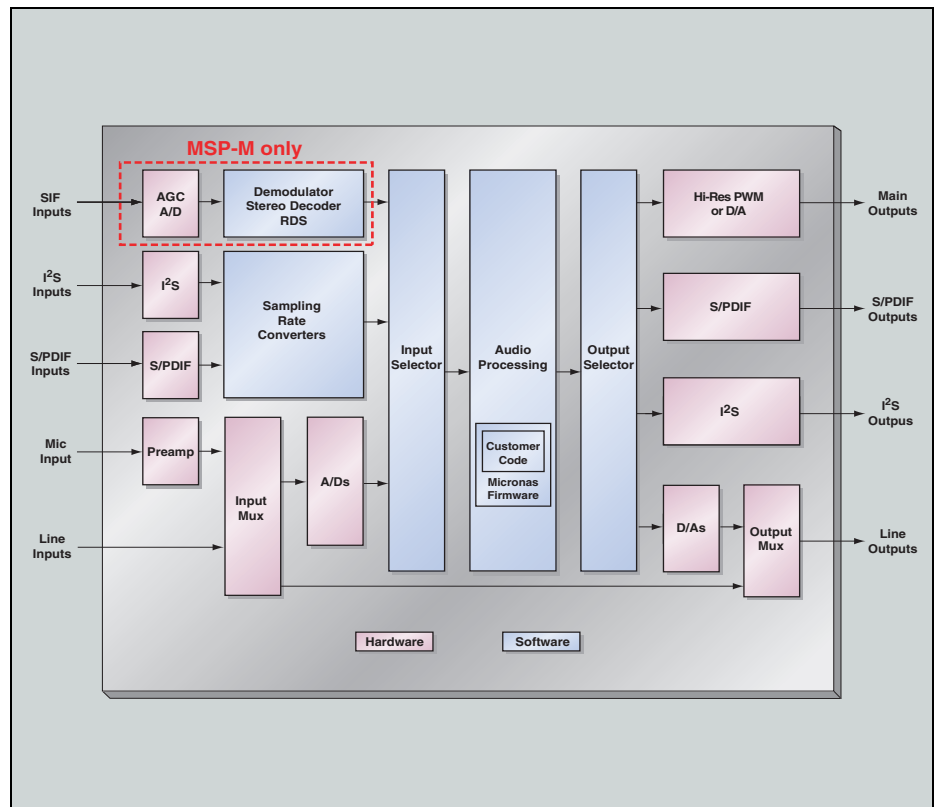


Fig. 1: Simplified block diagram of the MSP-M, MAP-M

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