

DA - 60x - KIT

Evaluation systems with software framework for A/V Receiver audio applications

Preliminary

Texas Instruments Floating Point Audio DA607™ and DA601™ Evaluation System

Momentum Data Systems DA-60x-KIT series product are an off-the-shelf audio processing evaluation platform for evaluating the latest low cost DA60x A/V Receiver devices from Texas Instruments.

The kit consist of three cards:

- Audio card
- Processor card. Currently two versions are available, one using the DA601, the other the DA607
- Host to PC interface card

The Performance Audio software is configured and downloaded using Texas Instruments' standard Code Composer Studio development environment. The A/V Receiver code is controlled via a Windows application talking to the evaluation system via a RS232 port.

The DA-60x-KIT series products are intended as an evaluation platform. Also available is MDS' Mozart-II system, which is powerful development system for DA6xx series devices and offers multiple digital I/O, dual 8 channel analog output zones, front panel, and several other features to simplify prototyping and software development.

For small volume applications, MDS offers OEM decoder modules (DAE-5, DAE-7) for quick time to market.

For OEMs and integrators needing assistance with digital, analog, system, or software design, MDS' Audio Services Group can provide design services ranging from consulting through complete product design.

Complete details of the Performance Audio Framework can be found on the Audio Framework datasheet.

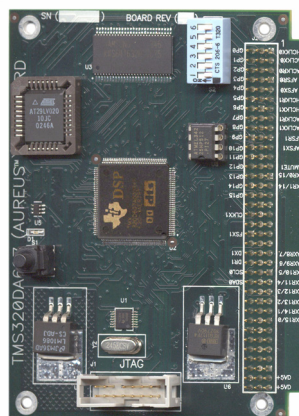
Common features

- Four stereo 24 bit 48/96 kHz A/D
- 8 Channel 24 bit 32 - 192 kHz D/A
- S/PDIF receiver 32, 44.1, 48, 88, 96 kHz (coax or optical)
- S/PDIF transmit (coax)
- Volume up/down buttons connected to GPIO allow experimentation with local user (front panel) interface
- Uses external unregulated supply.
- On board linear regulators to reduce EMI/RFI
- SPI control or I2C control (DA601 only)
- Converter dongle for controlling system from PC via RS232
- Performance Audio Framework Software

Floating point processor card

Texas Instruments' DA6xx series VLIW DSPs are the only low cost consumer oriented surround sound decoders for Dolby and DTS that support native 32 and 64 bit floating point capability.

60x-Processor Card



McASP
SPI
GPIO

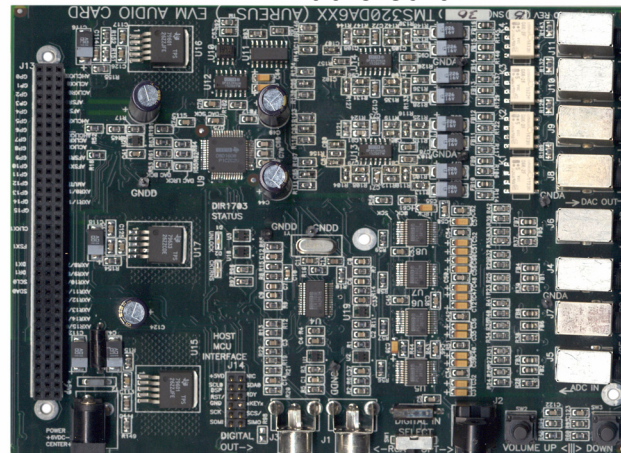
I²C
(DA601 only)



RS232
to PC



Audio Card



LB/RB
C/SW
LS/RS
LF/RF
LB/RB
C/SW
LS/RS
LF/RF

OUT

IN

SPDIF I/O

SPI or I²C (DA601 only) host interface

SPI/I²C Dongle

DA-60x-KIT : Evaluation system for A/V receiver audio

The DA-60x-KIT uses the Texas Instruments DA601 or DA607 VLIW processor. Executing multiple instructions per clock cycle (up to 225 MHz), these parts provide the computational power (1800 MIPS/1350 MFLOPs) to perform all I/O and decoder operations with enough CPU bandwidth left over for additional post decode sound field processing.

The use of floating point arithmetic throughout overcomes the inherent dynamic range limitations of fixed point (integer) processors. The DA60x has 4 floating point ALUs and 2 floating point multipliers, so there is no performance penalty associated with preferred floating point operations.

Unlike fixed decoder devices, the DA60x uses a software architecture based on the Performance Audio Framework. This open and extensible framework allows for software customization (e.g. to add specific audio processing), as well as in-the-field software upgrades to support new decoder standards.

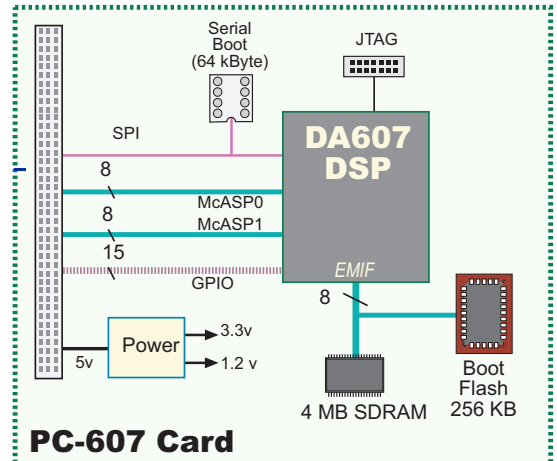
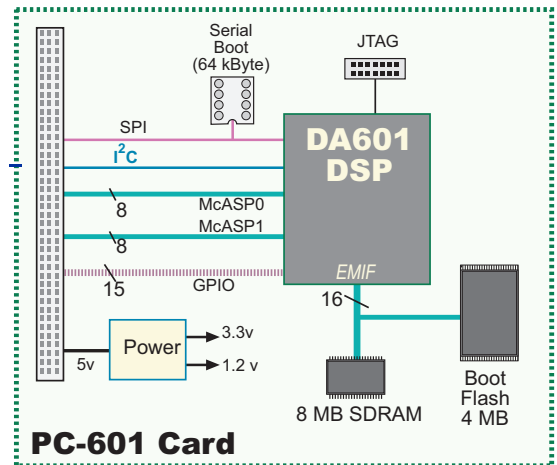
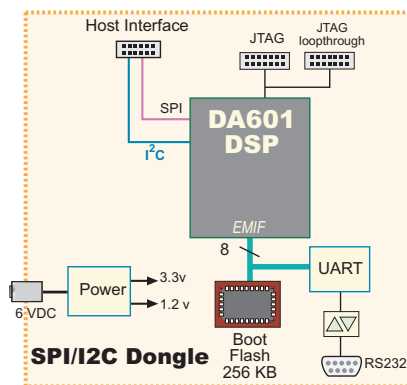
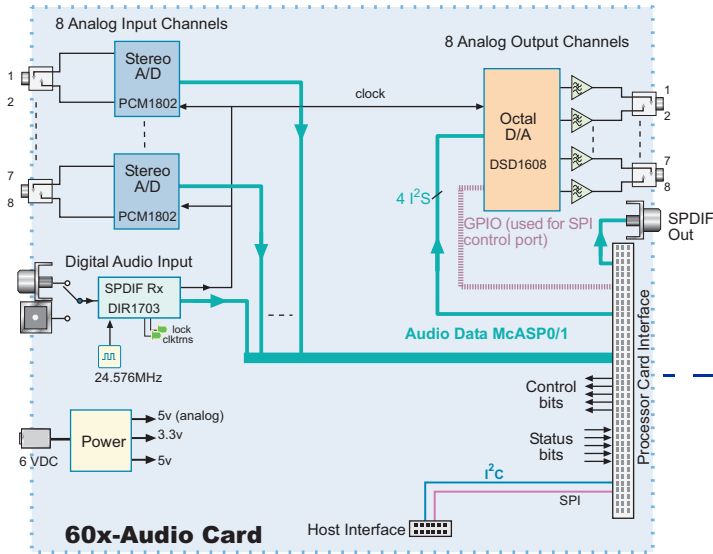
The system's device drivers automatically recognize the type of source encoding and automatically switch operation to the correct decoder with no artifacts in the output audio stream. The stream manager architecture simplifies development of post processing/effects such as room equalization, dynamic range compression, and surround modes.

The following table lists standard and optional software components. Not all algorithms can run on a DA607 at same time and may require a DA601 or DA610 to provide the needed silicon performance.

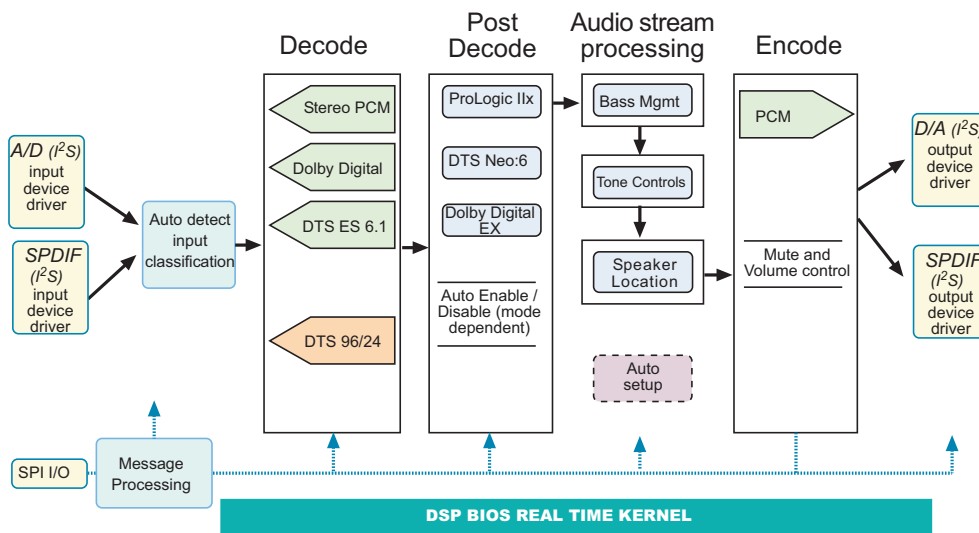
DA-60x Performance Audio Framework Software Features

- Decoders
 - Dolby Digital
 - DTS-96/24, DTS-ES Discrete, DTS 5.1
 - PCM-96/24
 - MPEG AAC (optional)
- Matrix Processing
 - Pro Logic IIx, Dolby Digital EX
 - DTS-ES Matrix, DTS Neo:6
- Standard Post Processing
 - Comprehensive Bass Management
 - THX Ultra 2 (optional)
 - Soundfield effects (optional)
 - EQ (optional)
- Premium Post Processing (all items optional)
 - Virtualization, Dolby Headphone
 - MP3
 - WMA
 - SRS Circle Surround II
 - Waves' MaxxBass Technology
- Custom post processing code can be written in C and integrated into the Performance Audio Framework
- Supported via Texas Instruments' Code Composer Studio IDE

Items marked as optional can be supported on DA60x devices but are not present on the EVM system, and may incur extra software license costs.



DA-60x-KIT : Evaluation system for A/V receiver audio



The DA6xx software is based on the Open Audio System using the Performance Audio Framework (PA/F). This framework, pictured at left, creates a modular software environment that simplifies product customization. Processing can be inserted into the chain without disrupting the environment.

Hardware Specifications

Preliminary, performance specifications subject to change

Analog input stage

- 10 k Ω input impedance
- Approximately \pm TBD V for FS A/D output
- AC Coupled, Fc TBD Hz
- A/D: 24 bit delta-sigma A/D: PCM1802
- Sample clock:
 - internal osc if no SPDIF input: 48 96 kHz
- minimum performance
 - Fs = 48 kHz, 997 Hz, -1dBFS input, 22 Hz - 22k kHz, A-weighting: < TBD dB THD+N, > TBD dB dynamic range (AES-17 method)
 - input crosstalk: 1kHz FS input to any other input >TBD dB
- 8 channels

S/SPDIF coax input

- 75 Ω input impedance
- 32 kHz to 96 kHz sample clock recovery

Analog output stage

- 2.2k Ω output impedance
- relay based mute circuit
- \pm TBD V for FS D/A output at max level
- AC Coupled, Fc TBD Hz
- Anti-Imaging filter: 2nd order, Fc = TBD kHz
- Sample clock: slaves to input source, 2x, or 4x input up to 192 kHz
- minimum performance
 - Fs = 44.1 kHz, 997 Hz, -1dBFS output, 22 Hz - 22k kHz, A-weighting:< TBD dB THD+N, > TBD dB dynamic range (AES-17)
 - output crosstalk: 1kHz FS output to any other output > TBD dB

Processor: PC-601 card

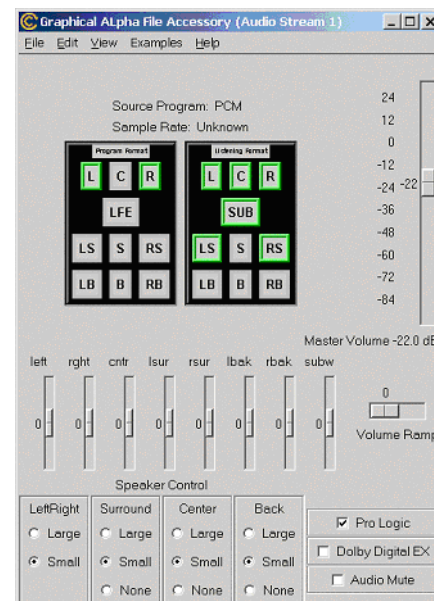
- 225 MHz DA601 DSP with ROM based Performance Audio Framework with built in decoders
- 8 MB SDRAM @ 100 MHz
- 64 kByte SRAM (socketed)
- 4 MByte program flash (utility included to reprogram)
- 14 pin JTAG header for use with TI XDS emulator or equivalent

Processor: PC-607 card

- 196 MHz DA607 DSP with ROM based Performance Audio Framework with built in decoders
- 4MB SDRAM @ 98 MHz
- 64 kByte SRAM (socketed)
- 256 kByte program flash (utility included to reprogram)
- 14 pin JTAG header for use with TI XDS emulator or equivalent

Power:

- External 6V DC @ TBD amp supply included



Windows control panel (talks to EVM via RS232)

DA-60x-KIT : Evaluation system for A/V receiver audio

Ordering information (order code is in *Italics*)

Shipment of DA-60x-KIT product requires appropriate license information from Dolby Labs, Digital Theater Systems, or THX, as needed.

Before ordering please check with MDS for exact DA60x IROM version on the processor cards. Please note that a previously purchased processor card can not be upgraded to a later IROM version, a new processor card must be purchased and the Performance Audio Software updated to match.

Please check with your local Texas Instruments office for code updates.

Texas Instruments Code Composer Studio (please check with MDS for minimum version requirements) and support JTAG card are required.

DA-607-KIT: Complete evaluation kit with:

- PC-607 card based on 196 MHz DA607 with 8 bit EMIF
- Audio card
- SPI/I2C dongle
- Power supply (please specify 110 or 220V)
- Audio cables
- RS232 cable
- CD with manuals and matching Performance Audio Framework software
- 90 Day Getting Started Support

DA-601-KIT: Complete evaluation kit with:

- PC-601 card based on 225 MHz DA601 with 16 bit EMIF
- Audio card
- SPI/I2C dongle
- Power supply (please specify 110 or 220V)
- Audio cables
- RS232 cable
- CD with manuals and matching Performance Audio Framework software
- 90 Day Getting Started Support

PC-607: Processor card upgrade - 196 MHz DA607 (8 bit EMIF)

PC-601: Processor card upgrade - 225 MHz DA601 PQFP (16 bit EMIF)

SPI-DONGLE: RS232 to SPI/I²C adapter

Consulting services are also available from Momentum Data Systems.

DA-60x-STD: 90 Day Startup Support (inc. with DA-60x-KIT)

- Help with installation of DA-60x-KIT hardware/software.
- Support for Code Composer Studio is provided by Texas Instruments
- How to use/run hardware or software that comes with the KIT.
- General questions on background information (standards, etc.)

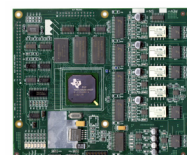
Related items

Please visit <http://www.mds.com> for more information on these and other products to speed your design to market.

MOZART: -
Development tool for
A/V Receivers



DAE-5: complete A/V
Receiver audio subsystem



DAE-7 series:

- Digital only A/V Receiver sub-system,
- speaker crossover
- EQ modules



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DA-60x-KIT Data Sheet rev 1d Feb 2004 PRELIMINARY

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