SEMIHALF
EMBEDDED SYSTEMS

HASE-1

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HASE-1 is a compact, configurable and universal board. Based on Texas Instruments DaVinci digital media system-on-chip, it is particularly well fit for video processing applications. The CPU is an ARM9 core, augmented with a C64x+ digital signal coprocessor unit, both integrated into one chip.

Designed with most commonly used interfaces readily available, the board can be extended with custom daughter card add-ons for extra functionality. The system also supports easy field upgrades and allows for minimal effort maintenance.

The device can operate in extended thermal range from -40°C to 85°C (-40°F to 185°F) and in 98% humidity, making it a perfect candidate for heavy duty applications. It has been designed to comply with environmental requirements (EMI, EMC).

HASE-1 overview

- Texas Instruments DaVinci dual-core system-on-chip
- Lattice MachXO system extender and integrator
- DDR2-400 (up to 256MB)
- NOR Flash (up to 64MB)
- NAND Flash (up to 16GB)
- Interfaces
  - Audio/Video
  - Ethernet (with PoE option)
  - USB 2.0 High Speed
  - Flash Cards
- Wide power supply range: VDC 6 to 36V
- Industrial temp. range: -40°C to 85°C
- Humidity: 98%
- Dimensions: 95mm x 58mm x 20mm
- Complete software support

HASE-1 features

Digital Media System-on-Chip

The design of HASE-1 is based on the DaVinci DM644x SoC, which incorporates ARM and DSP cores together with a specialized video processing subsystem. This powerful combination makes the chip a great choice for high performance networked video applications (encoding and decoding, embedded video playback, recording, transcoding and analytics).

Extensible, stackable

To extend functionality offered by the main board, an additional daughter card can be connected, providing user-defined functional elements and interfaces. HASE-1 lets the extension boards be also stacked using passthrough connections, so that a product can grow new functionality flexibly.

Demanding environmental requirements

The device has been assembled from high quality materials, electronic components and mechanical elements, so that it can operate under very demanding environmental conditions. HASE-1 has been designed to work in industrial temperature and humidity ranges.

In-the-field firmware update

HASE-1 allows for authorized update of embedded software without complex tools or on-site human assistance. This is particularly valuable when existing base of shipped products needs to be updated in the field at minimal cost. This secure upgrade process can be carried out remotely over Ethernet.

Power over Ethernet (IEEE 802.3af)

The board can take advantage of the Power over Ethernet (PoE) technology, which lets the device be powered from the network. This more and more popular approach is transparent to network nodes, and allows HASE-1 cable connections to be reduced down (PoE requires a daughter card).

MachXO - user defined programmable logic

The MachXO is a family of non-volatile reconfigurable Programmable Logic Devices (PLDs). These devices are designed for applications traditionally implemented using CPLDs or low-capacity FPGAs - like glue logic, general purpose I/O expansion, bus bridging and control logic.

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HASE-1 applications

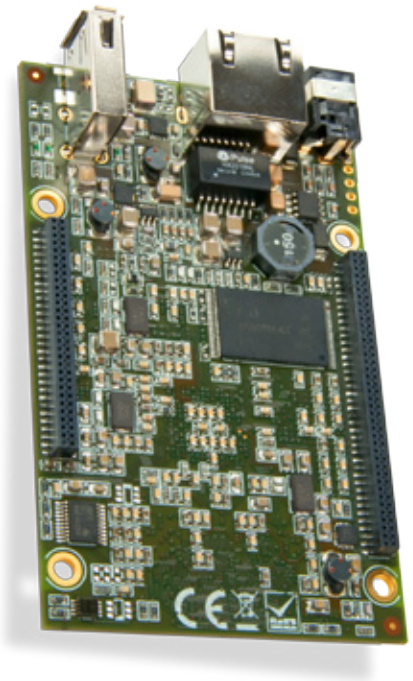
High-quality multimedia
- IP network cameras (e.g. video surveillance)
- IP set-top boxes, digital TV
- IP-based video phones, video conferencing terminals
- Intelligent kiosk/point of sale
- Entertainment platform

Automotive
- Car entertainment
- Navigation systems
- Electronic Driving Aids (parktronic, road sign recognition, collision avoidance)

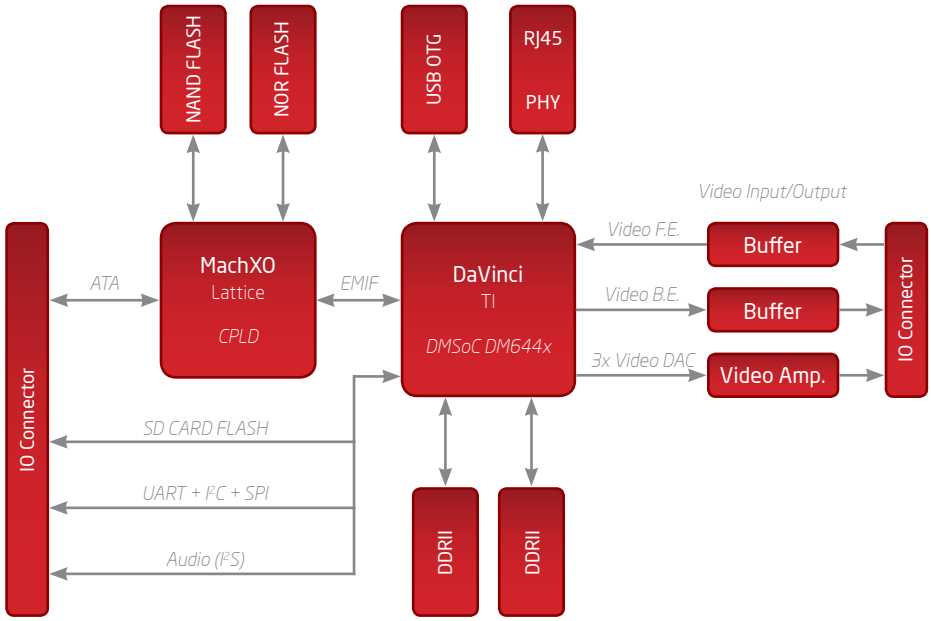
Industrial
- Machine-vision and process control

HASE-1 software specification

Complete software support
- U-Boot firmware
- Operating System
  - FreeBSD
  - Linux
  - QNX
- Drivers for all integrated peripherals



HASE-1 block diagram



HASE-1 hardware specification

High-Performance Digital Media System-on-chip
- Texas Instruments DaVinci dual-core DM644x
  - CPU ARM926EJ-S (200-300 MHz)
  - DSP C64x+ (400-600 MHz)
- Lattice MachXO - system extender and integrator

Extensibility
- Several configurations of the system available
  - DM357, DM6441, DM6443 or DM6446 models
  - Different RAM, FLASH sizes
  - Extension daughter board with custom designed connections and additional peripherals
- Stackable - more than one daughter board can be stacked onto each other

Environmental
- Wide power supply range: VDC 6V to 36V
- Industrial temp. range: -40°C to 85°C
- Dimensions: 95mm x 58mm x 20mm
- Power consumption: max. 6W

Optional functionality
- Power over Ethernet IEEE 802.3af
- Firewire IEEE 1394
- HDMI ports
- USB-A or OTG miniUSB headers

USB 2.0
- High- and Full-Speed Client mode
- High-, Full- and Low-Speed Host mode

Audio/Video Processing
- Frontend resizer, image processing engine, 16-bit digital input
- Backend integrated OSD, 3x video DAC, 24-bit digital RGB output
- Video processor decode and encode capabilities: up to HD 720p (30fps) for MPEG-2, MPEG-4, VC1/WMV9 and H.264
- Audio in/out with AC97 codecs

Ethernet 10/100Mbps
- IEEE 802.3 Compliant

Memory
- DDR2-400 (64MB-256MB)
- NOR Flash (8MB - 64MB)
- NAND Flash (128MB - 16GB)
- Flash Cards
  - Compact Flash
  - MMC/SD
  - SmartMedia/xD

Peripherals
- ATA (with UDMA)
- I²C, SPI
- MMC/SD
- UART, GPIO

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