



# Product Sheet



## EXM 32

### MSC EXM-SH7760

#### Renesas SH7760 CPU Module



#### Features

- Renesas SH7760 RISC CPU with 16kB data and 8kB instruction caches
- 64MB SDRAM
- Up to 32MB Flash
- Integrated LCD TFT/STN graphics
- Optional Silicon Motion SM501 graphics controller with integrated frame buffer
- 10/100Base-T Ethernet interface
- USB, CAN, Serial
- FireWire® (1394a)
- AC'97 / I<sup>2</sup>S / SPDIF Audio
- RTC
- GPIO accessible
- Processor bus accessible
- EXM32 compliant



65 x 90



2.5 W



Entry / Mid

#### Description

The **EXM32** system-on-module (SOM) standard was developed by MSC for use in challenging environments like industrial and automotive computing applications.

EXM32 modules contain the rich feature set of a complete embedded computer and are connected to carrier boards via high-density elastomeric connectors. Expansion modules can add more I/O functionality being mounted easily on top of the CPU module.

The compact and rugged EXM32 modules offer high computing power and are specified for the industrial temperature range.

The **EXM-SH7760** CPU module provides high-performance computing power at extremely low power consumption. It incorporates a high performance 32-bit RISC CPU, Flash memory, SDRAM and an extensive set of interface controllers. Additionally the module gives access to all CPU features including processor busses.

For evaluation and design-in of the EXM-IMX35 CPU module, development platforms and starter kits are available.

## Technical Data – MSC EXM-SH7760

### Core Logic, Memory

#### CPU

Very low power, high performance 32-bit SH4 core based Renesas SH7760 RISC CPU, 200MHz, 360 MIPS, 1.4 GFLOPS, 16 kB data and 8 kB instruction cache

#### RAM

16 / 64 MB SDRAM (soldered)

#### Flash

16 / 32 / 60 MB Flash memory (soldered)

### Storage Interfaces

#### Memory Card Interfaces

2 x PCMCIA / CompactFlash  
1 x MMC / SD / SDIO Card

### Standard Interfaces

#### Serial

2 x UART

#### USB

1 x USB host (integrated controller, QNX /Linux support available)  
or  
2 x USB (Cypress CY7C67200 USB controller, 1x host, 1x host/client, Windows CE support available)

#### CAN

2 x CAN 2.0B (ISO11898, IDB-C)

#### I<sup>2</sup>C

1 x 400 kbit/s, 1 x 100 kbit/s

### Bus Interfaces

#### EXM32 Bus

fully compliant to EXM32 specification;  
I/O interfaces, GPIO and the complete CPU Bus are available

### Display Interfaces

#### Integrated Graphics

LCD TFT/STN graphics integrated, uses CPU memory (UMA), max. 640x480 pixel, 18 Bit TTL interface

#### Optional Graphics Controller

Silicon Motion SM501 graphics controller, 8MB frame buffer integrated, optional wide screen and dual display support  
TFT/STN: 320x240 to 1280x1024, (18 Bit TTL)  
CRT: VGA to SXGA (640x480 to 1280x1024)

### Network Interface

#### Ethernet

SMSC 91C111 10/100Base-T Fast Ethernet controller

### Audio Interface

AC'97 or I<sup>2</sup>S

### Additional Interfaces

#### FireWire

2 x IEEE1394a (option)

#### Digital Video

2 x BT.656/BT.601 Digital Video Interface (with FireWire)

### Miscellaneous

#### Real Time Clock

on I<sup>2</sup>C Bus

#### ID EEPROM

2 kbit on I<sup>2</sup>C Bus

### Operating Systems

#### Windows® CE

Starter Kit Image, Bootloader supporting:  
- download image into Flash via Ethernet or CompactFlash,  
- launch downloaded image

Windows® CE Board support package, OAL SH7760 Kernel Drivers, BSP Drivers available

#### QNX®

Available

#### Linux

Available

#### VxWorks®

on request

### Power Supply

#### Power

+3.3V DC, 800mA, typical 2.5 W  
0.18 W in sleep mode (maximum configuration)

### Environment

#### Ambient Temperature

-25° ... 85° C (operating, standard version)  
-40° ... 85° C (operating, extended version)

#### Humidity

0 ... 95% (non condensing)

### Mechanical

#### Dimensions

Length: 90 mm,  
Width: 65 mm,  
Height: max. 9.1 mm (incl. connector)

#### Cooling

no active cooling or heat spreader required

## Order Reference – MSC EXM-SH7760

Order Number	Description	Reference
32480 (Win CE) 32479 (QNX/Linux)	64 MB SDRAM, 32 MB Flash, Ethernet, USB, FireWire, CAN, SM501 Graphics	EXM32 SH7760-FULL
32488 (Win CE) 32481 (QNX/Linux)	64 MB SDRAM, 32 MB Flash, Ethernet, USB, CAN, SM501 Graphics	EXM32 SH7760-EVA

## Accessories

Order Number	Description	Reference
32482	<b>Expansion Modules</b>	
32502	EXM32 Navigation and Communication Module "ECO" model Quad band 850/900/1800/1900 MHz GSM/GPRS; GPS Receiver; Dual Antenna Connector; Dual UART	MSC EXM-NAVCOM-EXT-STD00030002I
	Antenna kit including cables for EXM-NAVCOM navigation and Communication module. Dual antenna for GSM and GPS.	MSC EXM-ANTENNA-2
32490	<b>Carrier Boards</b>	
	Small form factor evaluation and development base board for EXM32 modules.	MSC EXM-MB-LITE2

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