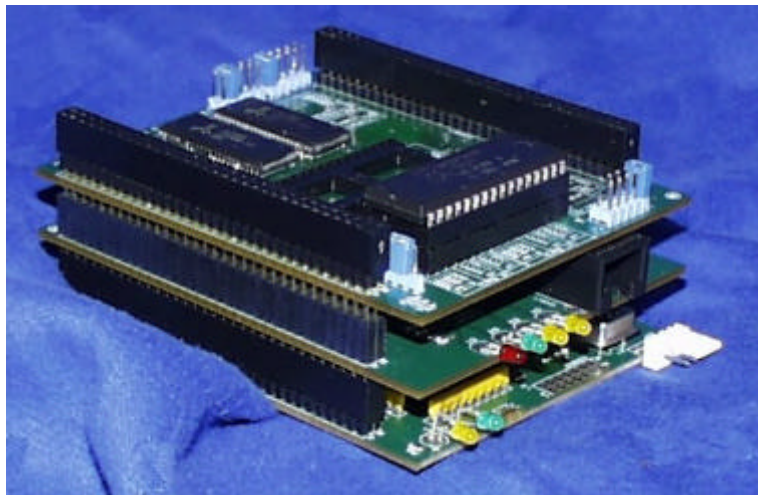

ARM Development Kit

Product Description



ARM Development Kit

Product Description

Manual revision 0.001 (Draft)

Date 06 September 2000

Software

Software version 0.01.0000

Package	Number:	
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For technical support

Please contact your supplier

For further information

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Acknowledgements

MPE would like to thank the following people for their involvement in the production of this product:

Steven (Harry) Coul, Stephen Pelc

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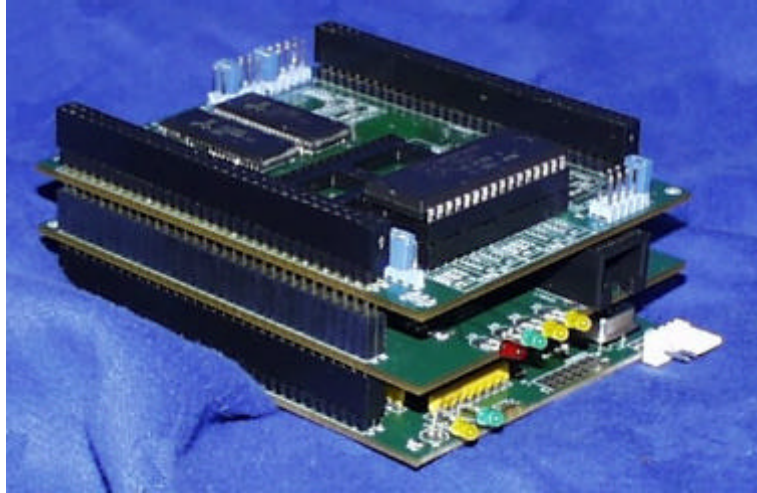
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1

Introduction



What is it

The MPE ARM Development Kit is a set of modular hardware for designing ARM-based products. The hardware and software are designed for rapid prototyping, as only the application specific hardware needs to be prototyped, and the interconnect is simple to deal with. The MPE hardware and software design can be licensed if you wish to produce or modify boards yourself.

Software support is available using a wide range of tools such as the ARM SDT, the gnu tools, or the MPE Forth 6 cross compiler and TCP/IP stack. . A Linux port to the base system is planned. Other operating systems can be ported as required, and driver code is available from MPE.

The hardware consists of four basic boards using a common stacking connector. The base system is targeted to embedded systems such as vending machines, instrumentation controllers, and PDAs of the performance of the Psion 5.

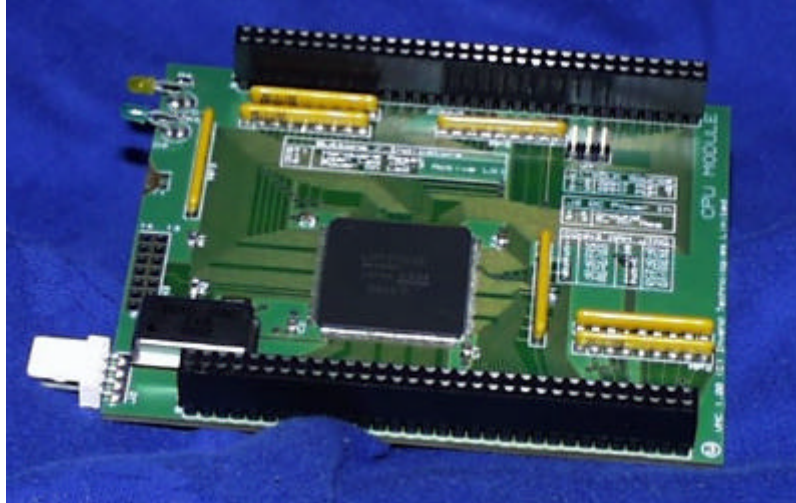
- CPU module – the base system uses the 25MHz Sharp LH77790B CPU which is ideal for embedded controllers and PDAs that do require the performance of a StrongARM CPU. One of the three serial ports is optionally available here for debug and development access. MPE can develop other modules for you as required, e.g StrongARM SA1100.
- Memory module – the base system includes 2 32pin DIP sockets for 8 bit boot Flash or EPROM and 512kb or 1Mb of fast static RAM. DRAM cards can be

produced as required. A Disk-On-Chip module can be fitted in one of the 32 bit Flash/EPROM sockets.

- Ethernet module – a 10Mbit RJ45 board using the SMC91C96 single chip controller. Packet level driver code is supplied, and a TCP/IP stack is available from MPE and other vendors.
- Application module – the base system comes with a simple card that interfaces a 1/4VGA grey scale or colour LCD, three serial ports and parallel I/O. You can prototype your interfaces based on this card, or add new ones. This is the only card that needs to change during prototyping.

2 Hardware

CPU module – base system



The Sharp LH77790 controller contains an ARM7DI core, cache, debug controller, clock and power management, memory controller, interrupt controller, watchdog, timer/counters, three serial ports (one with IrDA support), 24 digital I/O lines, PWM outputs, and an LCD controller. See www.sharpmeg.com for further details.

32-Bit ARM7DI RISC Core

- Built-In Debug and ICE Support
- Fast Interrupt Response
- Powerful Instruction Set

26-bit External Address Bus

- 512MB Addressable Space

16-bit External Data Bus

- 2KB Data/Instruction Cache
- 4 Way Set Associative
- Write Back Policy

-
- Flexible Modes of Operation

2KB Static RAM

- Expandable to 4KB without Cache

Programmable Clock and Power Management

Programmable Monochrome LCD Controller

- 1024 (V) \times 2048 (H)
- Four Gray Shades
- Frame buffer in Main Memory

On-Chip Interrupt Controller

- Six External Interrupts
- Seven Internal Interrupts
- ARM7DI Wake-Up

Three UARTs - 16C450-class

- Full Modem Support on UART0
- Partial Modem Support on UART1
- IrDA-1.0/DASK Support on UART2

IrDA/DASK IR Interface

- IrDA-1.0 (2.4 kbps to 115.2 kbps)
- DASK (2.4 kbps to 57.6 kbps)

Three Pulse Width Modulator Channels

- PWM0 and PWM1 have 8-Bit Resolution
- PWM2 has 16-Bit Resolution

Flexible Memory Interface

- Six Multiplexed Chip Enables/CAS pins
- Two RAS pins
- Fully Programmable
- Six SRAM Banks (64MB each)
- Two DRAM Banks (128MB each)

- Access Privileges (System/User)

On-Chip DRAM Controller

- Fast Page Mode
- Normal Mode
- CAS before RAS Refresh

Programmable Peripheral Interface (PPI)

- 24 Programmable I/O Signals
- Three Modes of Operation

Three 16-Bit Counter/Timer Channels

- Six Modes of Operation
- Binary or BCD Counting

Hardware Watchdog Timer

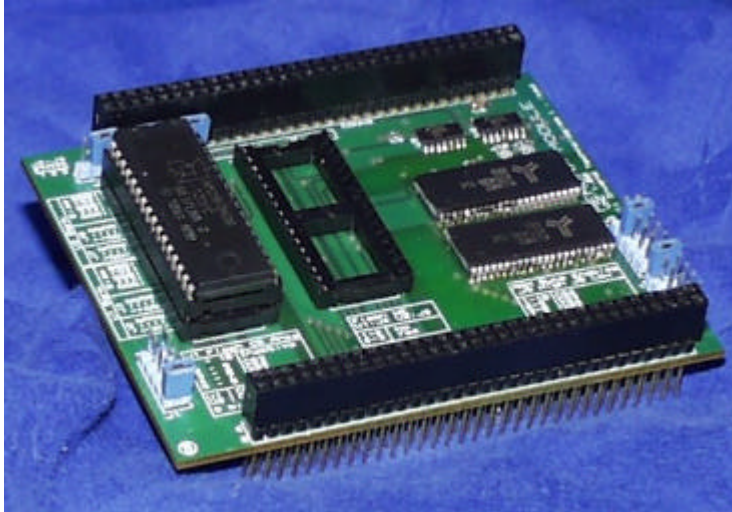
- Eight Time-out Intervals
- Protection Mechanism
- Three Time-out Actions

JTAG Interface

Dual Supply Voltage

- – 5 V TTL - 25 MHz
- – 3.3 V LVTTTL - 16.7 MHz

Memory module

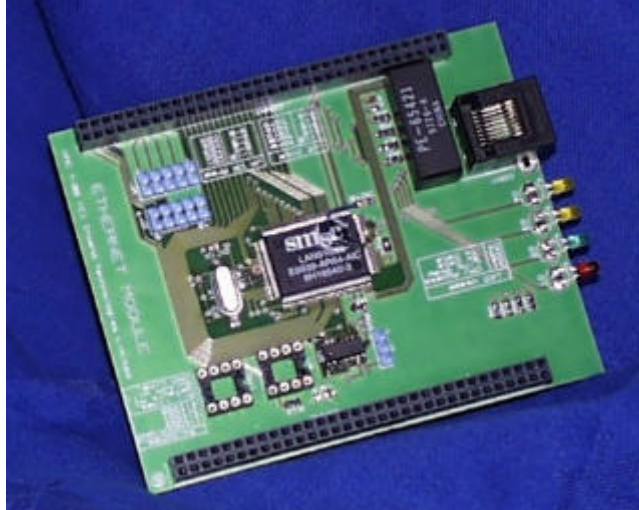


The base module contains 2 32 pin DIP memory sites and 512kb or 1Mb of 15ns static RAM. It is configured for 8-bit boot from the first EPROM socket.

The use of 32 pin DIP sockets allows easy connection of debug tools such as EPROM/Flash emulators, and also allows use of Disk-On-Chip modules which can provide up to 288Mb of on-board solid-state Flash disk, which can be used as a conventional disc drive and/or for datalogging.

Note that the memory module supplied may be dependent on the CPU module, as not all ARM CPUs can use 8 bit boot ROMs.

Ethernet module

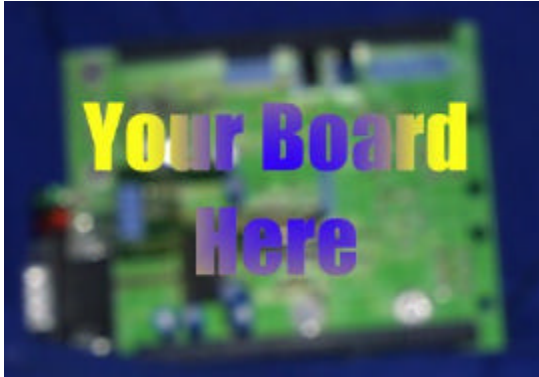


The Ethernet module provides a 10Mbps RJ45 connection using the SMC91C96 controller. This controller requires very little CPU overhead and includes 6kb of on-chip buffer RAM. Power management features are included.

The standard system is supplied with packet level drivers. TCP/IP stacks are available from MPE and many other suppliers.

Ethernet controllers for 100Mbps or using other chips can be supplied to special order.

Application module



This board is the hardware heart of your application. In general, you can start with the MPE base application module and later replace it with your own module, or add another module of your own design.

The base application module was designed for industrial datalogging applications, brings out the three serial ports, the parallel I/O with a keypad interface, a software I2C interface, and the PWM ports.

Power consumption

The ARM Development Kit requires about 260mA at 5 volts when running an Ethernet packet sniffer program and displaying results on the LCD controller while running three serial ports simultaneously at 9600 baud.

Significantly lower power consumption can be expected when:

the Ethernet controller power management features are enabled

the system is run at 3.3v.

Development assistance

MPE is available to help you with hardware design. Our designs can be licensed at very reasonable cost for modification and production by you.

3 Software

Development tools

A large range of software development tools is available from several suppliers for the ARM series of CPUs, including the MPE Forth 6 native code compiler and RTOS, ARM SDT, EPOC32 from Symbian, the Precise Technologies RTOS, and the gnu tools.

A version of the gnu tools will be made available pre-configured for a PC host and the base hardware configuration.

RTOS and Operating Sytems

The MPE Forth 6 system provides an industrial strength RTOS which is widely used in industrial applications. It produces fast compact code and is highly modular. All the target source code is provided.

A Linux port is planned.

Other operating systems can be ported on demand, and MPE's partners have experience with the Precise Technologies RTOS.

Development assistance

MPE is available to help you with software.