



486DX Network Computer with TTL I/O, A/D, D/A, Ethernet, PC/104 SBC2486DX



Features

- ✓ 66MHz, 100MHz, or 133MHz with cache and math coprocessor
- ✓ Up to 64MB RAM and 72MB flash
- ✓ AT-compatible peripherals include KBD, Mouse, IDE, Interrupt, DMA
- ✓ 22 I/O lines, 6 timers, RTC, watchdog
- ✓ 8-channel A/D, 4-channel D/A Optional
- ✓ 10BASE-T Ethernet port Optional
- ✓ PC/104 I/O expansion

The SBC2486DX Single Board Computer offers the system designer the high performance of the 486DX architecture in a cost effective PC/104-expandable format. With a rich mix of on-board analog and digital I/O, and an optional Ethernet port, the SBC2486DX can serve as a powerful network computer node in a larger system.

In standalone systems, the SBC2486DX offers exceptional performance, with sufficient on-board memory and I/O resources to be a fully operational computer control system by itself.

On-board memory and I/O options provide a flexible foundation for almost any system. The addition of PC/104 add-on cards to the SBC2486DX offer simple, low cost expansion

With full 32-bit on-board data paths, 66MHz, 100MHz, or 133MHz operation, systems based on the SBC2486DX have lots of computer power at their disposal.

The SBC2486DX is shipped with preloaded firmware. It gives a sign-on message upon powerup.

Software Support

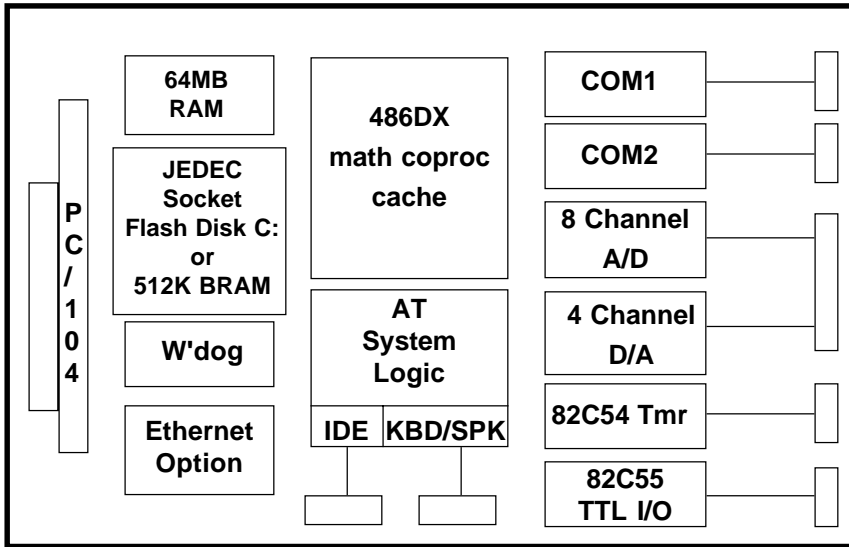
*DOS emulation, RUN.EXE™
MSDOS™ 5.0 in flash,
Turbo Debugger™
Comm library, CommBLOK™
PID loop library, PidBLOK™
C, BASIC, compilers
[Items above in Section 6]
Third party PC libraries
VxWorks®, Linux*

Compatible Hardware

*PC/104 cards
[Items above in Section 4]
RS232, RS485 devices
Custom*

Mounting/Packaging

*Enclosure, ENC104-3
Standoffs, STD0FF01
[Items above in Section 5]
Custom*



Technical Details:

The SBC2486DX core implements a 486DX AT computer. The SBC2486DX core includes the Intel Enhanced 486DX CPU, up to 64MB RAM, up to 72MB of flash EPROM, a JEDEC socket for RAM or EPROM, and AT-compatible controllers for timer, DMA, interrupt, IDE, keyboard, mouse, COM1, and COM2.

Also included are a real-time clock, a watchdog timer, 22 TTL I/O lines, 3 additional timers. Options include an A/D converter, a D/A converter, and a 10BASE-T Ethernet port. The 8 and 16-bit PC/104 connector allows application-specific local on-board I/O and memory to be added.

On-board memory is composed of four sections: DRAM, BIOS/firmware flash, user flash, and JEDEC socket. All addresses not in these 4 blocks is off-board PC/104 memory.

From 4MB to 32MB of 32-bit wide on-board dynamic RAM is located at the bottom of the 486DX memory map.

The BIOS/firmware flash is mapped at the top of memory, including the power-on vector. For enhanced performance, all firmware is moved from the flash to shadow RAM during startup.

A second flash memory is mapped into the protected memory space of the 486DX. It can be used by the application for various mass storage purposes.

The JEDEC socket accepts a variety of byte-wide devices. The socket can be powered by the on-board battery for battery-backed RAM. This socket is also mapped into the protected memory space of the 486DX.

Standard COM1 and COM2 serial ports are included. RS232 and RS485 operation is supported. COM2 can be used to debug SBC2486DX applications through Turbo Debugger on an attached PC, and to download final programs into application flash memory.

An 82C55 device and an 82C54 device provide 22 lines of TTL I/O, and an additional 3 counter/timers, respectively. A battery-backed real time clock and a watchdog timer are also provided. An optional 8 channel, 12-bit A/D converter is available, as is a 4-channel 12-bit D/A converter. The optional Ethernet port operates in 10BASE-T mode.

The PC/104 connector can be used to add additional memory and I/O resources to the local bus of the SBC2486DX. The I/O space on the PC/104 connector is shared with AT-compatible peripherals, i.e. DMA controllers, COM ports, etc.

The unique Micro/sys RUN.EXE operating system firmware, BIOS Boss utility, and Flash Setup system are preloaded into flash. BIOS Boss provides application program download, and Flash Setup provides system configuration similar to CMOS setup, but without the need for a battery. The RUN.EXE system loads and runs the downloaded application program upon system startup.

For embedded applications, especially where disk drives are not used, the RUN.EXE firmware on the SBC2486DX allows programmers to create PC language programs (compiled with Microsoft, Borland, or other PC compilers) to be executed directly upon system powerup. No special startup code, run-time libraries, or locator utilities are needed.

RUN.EXE firmware maps keyboard and screen BIOS calls to COM1 if there is no VGA installed on the PC/104 connector. Therefore, C statements "printf()/scanf()" directly access the COM1 serial port.

SBC2486DX support software includes drivers for execution with Borland's Turbo Debugger™ running in remote mode. By attaching a PC to the SBC2486DX COM2 port and running Turbo Debugger, full source-level symbolic debugging is available.

Specifications:

Mechanical

- 5.0" x 8.5" x 1.25"
- Total height 2" with two PC/104 cards
- Standard PC/104 mounting holes

Power Requirements:

- 66MHz at 1.3A
- 100MHz at 1.5A

Environmental:

- 0° - +70°C operating
- 40° - +85°C storage
- 5%-95% relative humidity, non-condensing

Processor Core Section:

- 486-AT computer core
- Intel Enhanced 486DX2, DX4, or DX5 CPU
- 66MHz, 100MHz, or 133MHz clock rate
- Integral math coprocessor
- AT-compatible DMA and timers
- AT-compatible interrupt controllers
- AT speaker interfaces

Memory Mapping:

- 4MB, 8MB, 32MB, 64MB of 32-bit wide DRAM based at 0000_0000
- 512K system flash with BIOS, RUN.EXE O/S, and utilities based at FFF8_0000
- JEDEC 32-pin socket mapped 1MB at 8000_0000, and 64K window at 000E_0000 in real mode
- JEDEC socket supports up to 512K BRAM, or up to 72M flash disk

Serial Ports:

- AT-compatible COM1 and COM2
- CTS and RTS modem controls supported
- 300 baud to 300K baud
- RS232 levels on separate connectors
- RS485 levels on shared connector, COM1 full duplex, COM2 half duplex Watchdog

Memory Map

Start	Usage
0000_0000	640K RAM
000A_0000	Offboard (PC/104) Video RAM
000C_0000	Offboard (PC/104) Video BIOS
000D_0000	Offboard (PC/104) Option ROMs
000E_0000	Offboard (PC/104) Option ROMs
000F_0000	Flash BIOS
0010_0000	1M, 7M, or 31M DRAM
0020_0000	PC/104 memory start if 2M DRAM
0070_0000	PC/104 memory start if 8M DRAM
8000_0000	Byte-wide JEDEC Socket
8040_0000	Optional 4MB flash memory
FF80_0000	Flash BIOS and firmware

Watchdog Timer:

- If enabled, program must periodically strobe watchdog timer or reset will occur

Keyboard, Mouse, Speaker:

- AT-compatible keyboard port
- PS2-style mouse port
- AT-compatible TTL speaker drive signal

IDE interface:

- Standard interface for 40-pin IDE devices such as hard disks and CDROMs

Digital I/O and Extra Timers:

- 82C55 provides 22 lines of TTL-level digital I/O, 2.5mA source/sink
- 82C54 provides 3 extra 16-bit timer/counters

A/D Converter Option:

- Eight 12-bit channels
- 1/2 LSB linearity
- 6usec conversion time
- 0 to +5, 0 to +10, ± 5 , $\pm 10V$ input ranges
- Software-programmable input range

D/A Converter Option:

- Four 12-bit channels
- 1/2 LSB linearity
- 3 us settling time
- 0 to +10V output range

Ethernet Option:

UDP/IP Network Version Ordered as Netsock/400 (refer to separate data sheet)

- 10BASE-T twisted-pair interface
- RJ45 connector on-board
- Flash Setup configuration utility, including IRQ, IP address, and DHCP options
- UDP/IP driver stack preloaded into flash
- Implements subset of Winsock functions
- SOCK_DGRAM (UDP datagram) and SOCK_RAW (low level) sockets supported
- IP, UDP, ARP, DHCP, ICMP protocols supported
- Dynamically linked with application program

CPU Serial Port Connector

Pin	Direction	Signal
1		
2		
3	I	RXD
4	O	RTS
5	O	TXD
6	I	CTS
7		
8		
9	--	GND
10		

RS485 Connector

Pin	RS485
1	GND
2	TX1+
3	TX1-
4	RX1+
5	RX1-
6	TXRX2+
7	TXRX2-
8	--
9	TXEN1
10	TXEN2

Analog I/O Connector	
Signal	Pin
AIN7	1
AIN6	3
AIN5	5
AIN4	7
AIN3	9
AIN2	11
AIN1	13
AIN0	15
--	17
AOUT3	19
AOUT2	21
AOUT1	23
AOUT0	25
GND	All even pins

Parallel I/O Connector			
Signal	Pin	Pin	Signal
PIO_A0	1	2	PIO_A1
PIO_A2	3	4	PIO_A3
PIO_A4	5	6	PIO_A5
PIO_A6	7	8	PIO_A7
PIO_B0	9	10	PIO_B1
PIO_B2	11	12	PIO_B3
PIO_B4	13	14	PIO_B5
PIO_B6	15	16	PIO_B7
--	17	18	PIO_C1
PIO_C2	19	20	PIO_C3
PIO_C4	21	22	PIO_C5
PIO_C6	23	24	--
GND	25	26	GND

PC/104 I/O Expansion:

- Standard PC/104 mechanicals
- 8 and 16-bit I/O operation
- VGA and disk accessories available
- Analog I/O, communication, GPIB, TTL I/O
- Interrupts and DMA supported

DK2486DX Development Kit:

- Free with first SBC2486DX order
- No DOS or other royalties
- Loads and executes standard .EXE file from user EPROMs
- Support for Turbo Debugger
- Download programs into on-board flash
- Includes cables, documentation, drivers

Timer Connector			
Signal	Pin	Pin	Signal
-EXTSMI	1	2	TOUT0
TCLK1	3	4	TGATE1
TOUT1	5	6	GND
TCLK2	7	8	TGATE2
TOUT2	9	10	GND

I/O Connections:

- 10-pin headers for each COM port, RS232
- 10-pin header for COM1/COM2, RS485
- 14-pin header for SPKR, KBD, MOUSE
- 26-pin header for digital I/O
- 26-pin header for analog I/O
- 10-pin header for timer I/O
- 40-pin header for IDE drive
- Off-board battery, 4-pin header
- Power, 7-post removable terminal strip

Ordering Information:

Single Board Computer:

SBC2486DX	486DX2 SBC, 66 MHz, 4MB RAM
SBC2486DX-100	486DX4 SBC, 100MHz, 4MB RAM
DK2486DX	No charge development kit, available with first order only
SDK-Linux	Linux kit (must also purchase 2486DXOPT50)
Netsock/400	SBC2486DX with built-in UDP/IP networking
Netsock/400-100	SBC2486DX-100 with built-in UDP/IP networking
DK400N	Development kit, includes DK2486DX (refer to separate data sheet)

2486DXOPT1	8MB RAM total
2486DXOPT3	32MB RAM total
2486DXOPT5	64MB RAM Upgrade
2486DXOPT10	A/D Converter, 8-Channel
2486DXOPT11	D/A Converter, 4-Channel
2486DXOPT20	10BASE-T Ethernet
2486DXOPT25	MSDOS 5.0 in Bootable Flash ROMdisk A:
2486DXOPT30-8	8MB Flash Disk C:
2486DXOPT30-24	24MB Flash Disk C:
2486DXOPT30-48	48MB Flash Disk C:
2486DXOPT30-64	64MB Flash Disk C:
2486DXOPT50	Linux startup kernel installed in flash

Accessories:

MPC204	VGA, keyboard, touchscreen
MPC405	Floppy/IDE interface
ATBATT	AT-type battery with 4-pin connector
CA4020	COM port DB9 breakout cable
CA4053	Keyboard breakout cable

RUN.EXE trademark Micro/sys, Inc.
CommBLOK, PidBLOK, OptoBLOK trademark Drumlin
IBM, PC trademark IBM Corp.
MSDOS, QuickBASIC, Microsoft trademark Microsoft Corp.
Turbo Debugger trademark Borland International
VxWorks trademark Wind River