80C186 STD BUS Computer SB8186

Features

- ✓ 80C186 processor, 10, 12.5, 16 MHz
- ✓ 512K 16-bit RAM, 384K EPROM
- ✓ 80C187 math coprocessor option
- ✓ 8/16-bit STD BUS transfers
- ✓ CMOS construction, 5V only
- ✓ RUN.EXE™ firmware for PC languages
- ✓ COM1, COM2, LPT1, KBD, clock
- ✓ Watchdog timer
- ✓ COM1 serial port RS232 or RS485
- ✓ Built-in Turbo Debugger™ support

The SB8186 Single Board Computer forms the basis of high performance, easy to implement STD BUS systems. High performance is provided by a 16-bit CMOS 80C186 processor operating at 10 MHZ, 12.5 MHz, or 16 MHz with 16-bit wide memory transfers on-board. Ease of implementation is provided by RUN.EXE™ firmware that allows the SB8186 to run any IBM-PC language as if it were a native language to the board.

A high degree of integration allows much of a system's basic I/O resources to be included on the SBC. IBM-PC™-compatible keyboard input, COM1 (RS232/RS485) and COM2 (RS232) serial ports, LPT1 parallel printer port, and 8259A interrupt controller are all included. A PC-compatible battery-backed clock/calendar and RAM option is also available. The SB8186 is supplied with 512K on-board RAM, and sockets for 384K on-board EPROM. A math coprocessor option is available.

Software Support

DOS emulation, RUN.EXE™
MSDOS™ 5.0 in ROM
Turbo Debugger™
Comm library, CommBLOK™
PID loop library, PidBLOK™
BITBUS™ library, NetBLOK™
OPTOMUX™, OptoBLOK™
C, BASIC, Pascal compilers
[Items above in Section 6]
Third party PC libraries

Compatible Hardware

STD BUS cards
LCD and keypad interface,LCDKBD1
[Items above in Section 4]
RS232, RS485 devices
Custom

Mounting/Packaging

STD BUS cardracks
MR8800, MR8800-PS
[Items above in Section 5]

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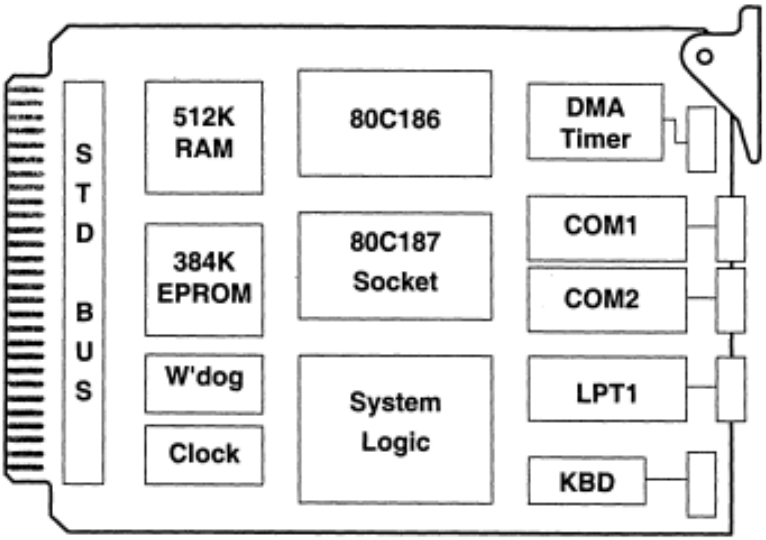

Technical Details:

On-board memory is composed of three sections. 512K of dynamic RAM is located at the bottom of the 80C186 memory map, and is transparently refreshed by on-board circuitry. Each of two EPROM sections includes a pair of EPROM sockets. The first EPROM section is accessed as 16-bit memory, and resides at the top of the memory map, including the power-on vector. This section is where the RUN.EXE firmware option is installed. The second EPROM section is accessed as 8-bit memory, and resides at address 8000:0. This section is where a user .EXE file is installed. RUN.EXE firmware "loads" the .EXE file by copying it from 8-bit EPROM into 16-bit RAM, and executing the user program from 16-bit RAM.

Two serial ports are implemented. The first serial port is mapped as COM1 and, under RUN.EXE firmware, C statements "printf()/scanf()" and Pascal statements "Writeln/Readln" directly access this serial port. The COM1 port is shipped with both RS232 and RS485 drivers installed. RS422 drivers can also be installed. Plug jumpers are available for configuring COM1 for RTS/CTS or DTR/DSR loopback in RS232 mode, and for 2-wire or 4-wire operation in RS485 mode. The second serial port is mapped as COM2, and is RS232 only. COM2 is used by Turbo Debugger to communicate with the target STD BUS system. Both serial ports are brought to 10-pin headers. Connecting a ribbon cable to a 9-pin male D connector creates an IBM-PC AT compatible interface (cable available from Micro/sys).

The parallel port may be configured for standard parallel printer operations, or general purpose bidirectional operation by installing plug jumpers. In parallel printer mode, a ribbon cable attached between the 26-pin header and a 25-pin female D connector creates an IBM-PC parallel adaptor pinout (cable available from Micro/sys). For reliable OEM system operation, the SB8186 is designed with CMOS technology. A watchdog timer subsystem allows a system reset to be initiated automatically upon abnormal system operation. Three 16-bit timers and two DMA channels are also included.

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A memory mapping PAL generates decoding signals for 8/16-bit transfers and on-board/off-board transfers. Memory is mapped in 64K blocks.

An I/O mapping PAL generates similar signals for I/O transfers. I/O is mapped in blocks of 32 sequential addresses. Micro/sys offers customized memory and I/O mapping to OEMs by modifying these PAL devices. Contact the factory for details.

The RUN.EXE firmware available for the SB8186 automatically creates a BIOS/DOS environment upon power-up. Any application program .EXE file that has been placed in EPROM on the SBC will be executed as if MS-DOS were present. Therefore, the SB8186 is directly programmable in such languages as Microsoft C, Turbo Pascal, QuickBASIC, Turbo C, and MASM without any further development expense.

When power is applied, RUN.EXE looks for a user-installed .EXE file in an EPROM or flash EPROM. If an .EXE file is present, it is “loaded” and run, full speed, from 16-bit memory.

If an .EXE file is not present, a debugger kernel is entered that communicates with Turbo Debugger. By connecting a cable between the SB8186 COM2 port and any PC, full remote source-level debugging can be performed on software running on the SB8186.

The flash EPROM option allows programs to be downloaded into installed SB8186 systems using the XMODEM protocol. For instance, a laptop computer may be carried to an installed SB8186 system, connected through a download cable, and a new version of the application program cona be downloaded into the system using any common PC terminal program such as PROCOMM.

Specifications:

Mechanical:

- ❑ Meets all STD BUS general mechanical specifications, except I/O connectors extend beyond user card edge and DRAM/ battery height greater than 0.5"
- ❑ 4.5" x 7.3" x 0.75"

Power Requirements:

- ❑ +5V ± 5% at 575mA max

Environmental:

- ❑ 0° - +70°C operating
- ❑ -25° - +85°C storage
- ❑ 5%-95% relative humidity, non-condensing

Processor Core Section:

- ❑ 80C186 16-bit CPU
- ❑ 10, 12.5, or 16 MHz clock rate
- ❑ Math coprocessor adaptor available to add socket for 80C187
- ❑ Includes 2 DMA channels, three 16-bit timers
- ❑ PC-compatible 8259A interrupt controller

STD BUS Interface:

- ❑ STDMG STD-80 Series standard timing, 5 or 8 MHz
- ❑ 20-bit addressing presented for both memory and I/O cycles
- ❑ Supports 8-bit and 16-bit STD BUS data transfers
- ❑ BUSRQ* and BUSAK* supported for secondary masters, no arbitration
- ❑ Capable of responding to interrupts on STD BUS pins 46 (NMIRQ*), 44 (INTRQ*), and 37 (INTRQ1*)
- ❑ IOEXP driven low for I/O accesses in selected port address range (default 100-1FF) to allow unique area for I/O cards with 8-bit addressing

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Configuration Header:
- ❑ 8-bit input port reads state of 8 plug jumpers
- ❑ Useful for soft configuration of card at power-up

On-board Memory:
- ❑ 512K of 16-bit wide on-board dynamic RAM
- ❑ On-board RAM based at 0000:0000
- ❑ 128K of 16-bit wide EPROM from E000:0000 to F000:FFFF
- ❑ 256K of 8-bit wide EPROM from 8000:0000 to 9000:FFFF, used by RUN.EXE firmware as ROM disk for user's program
- ❑ 114 bytes of battery-backed RAM included with clock/calendar option, accessed through I/O ports

Serial Ports:
- ❑ PC-compatible devices and mapping for COM1 and COM2
- ❑ Full modem controls per AT 9-pin connector definition
- ❑ COM1 can be configured as RS232, RS422, or RS485
- ❑ COM2 is RS232
- ❑ 50 to 115,200 baud operation

CPU Serial Port Connector			
Pin	Direction	RS232	RS485
1	I	DCD	
2	I	DSR	RXD*
3	I	RXD	
4	O	RTS	TXD
5	O	TXD	
6	I	CTS	TXD*
7	O	DTR	RXD
8	I	RI	
9		GND	GND
10		GND	GND

Printer Port Connector		
Pin	Direction	Signal
1	O	Strobe*
2	O	AutoFD*
3	I/O	D0
4	I	Error*
5	I/O	D1
6	O	Reset*
7	I/O	D2
8	O	Set In*
9	I/O	D3
11	I/O	D4
13	I/O	D5
15	I/O	D6
17	I/O	D7
19	I	Ack*
21	I	Busy
23	I	Paper Out
24		
25	I	Select
26		
Even pins 10-26 are GND		

Parallel Printer Port:
- ❑ Complete Centronics interface, per PC standard
- ❑ 8 buffered data lines, 5 buffered input and 4 buffered output control lines
- ❑ Can be used as bidirectional 8-bit port using printer control line for direction

Watchdog Timer:
- ❑ Program must refresh watchdog timer every 1.6 seconds, or SYSRESET* will be issued.
- ❑ Enabled or disabled with jumper

PC Keyboard Input Port:
- ❑ Standard PC keyboard port
- ❑ Implements clock, data, reset, power, and ground interface

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Default Ports, Interrupts		
Ports	Interrupt	Function
276-27A	IRQ5	LPT1
2C0-2C1	IRQ7	CLK/RAM
2F8-2FF	IRQ3	COM2
3F8-3FF	IRQ4	COM1
100-1FF		STD BUS 8-bit I/O IOEXP low

Battery-backed Clock Option:

- ❑ Implements year, month, date, day of week, hours, minutes, and seconds
- ❑ Alarm registers can be programmed to generate an interrupt at a specific time, or periodically
- ❑ Includes 114 bytes of battery-backed RAM accessible through I/O ports

RUN.EXE Firmware Option:

- ❑ Free with first SB8186 order
- ❑ BIOS and DOS compatible O/S
- ❑ "Implied AUTOEXEC.BAT" on reset
- ❑ Allows SB8186 to directly execute programs written in Microsoft C, Turbo Pascal, QuickBASIC, Turbo C, etc.
- ❑ No modified libraries or start-up code
- ❑ No DOS or other royalties
- ❑ Support for Turbo Debugger
- ❑ Download programs into on-board flash
- ❑ Includes cables, documentation

DMA/Timer Connector				
Direction	Signal	Pin	Pin	Signal
I	DRQ0	1	2	GND
I	DRQ1	3	4	GND
O	DMA AK	5	6	GND
I	TI0	7	8	GND
O	TO0	9	10	GND
I	TI1	11	12	GND
O	TO1	13	14	GND
	VCC	15	16	GND

Keyboard Connector		
Pin	Signal	Direction
1	KBD CLOCK	O
2	KBD DATA	I/O
3	KBD RESET	O
4	GND	
5	VCC	
6	N/C	
7	N/C	

External Connections:

- ❑ COM1 and COM2 Serial I/O Ports: 10-pin header, mating connector Ansley 609-1001M
- ❑ LPT1: 26-pin header, mating connector Ansley 609-2601M
- ❑ Keyboard: 7-pin connector, mating connector Berg 65039-030 with 47747 pins
- ❑ DMA/Timer: 10-pin header, mating connector Ansley 609-1001M

Ordering Information:

Single Board Computer:

SB8186	80C186, 512K RAM, 10MHz
SB8186-12	80C186, 512K RAM, 12MHz
SB8186-16	80C186, 512K RAM, 16MHz
DK8186	No charge development kit, available with first order only
186OPT1	Battery-backed Clock Option
186OPT2	32K battery-backed RAM
186OPT3	128K battery-backed RAM
186OPT10	Socket Adaptor for 80C187
186OPT11	80C187 Math Corocessor

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Accessories:

LCDKBD1	LCD and Keypad interface
TB1485-2	RS485 Terminator Board
CA4020	RS232/RS485 cable to male 9-pin D connector
CA4021	Parallel printer cable to female 25-pin D connector
CA4022	IBM keyboard cable to female 5-pin DIN connector
CA5051	Cable to LCDKBD1
CA5052	Cable to TB1485-2
STDPack	Bundled SBC, multi-tasking library, and application library (async comm, PID loop, OPTOMUX™, or BITBUS™)

Cables nominally 15", other lengths available

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