Celeron EPIC Computer with GUI and Dual Ethernet
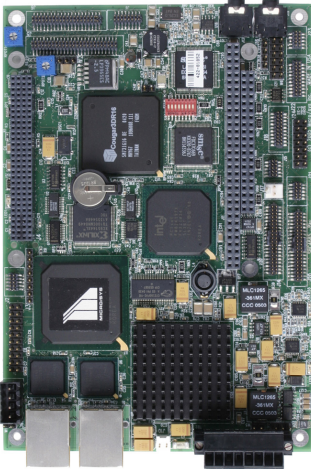# SBC4685

Features

✓ Ready to run Celeron/Pentium III computer

✓ Color flat-panel support

✓ Four serial ports

✓ Dual 10/100BASE-T Ethernet

✓ CAN Bus interface

✓ PC/104 & PC/104-*Plus* expansion

The SBC4685 packs a fast Celeron or Pentium III processor with advanced multimedia user interface capabilities into an EPIC form-factor board. The VGA interface supports both TTL and LVDS flat panel displays, as well as CRTs.

An AC97 audio interface allows output of sound from digital files or CDs or DVDs. The combination of the audio and video interfaces means that kiosk or point-of-sale applications can be easily implemented.

The SBC4685 also has a multitude of data communications channels. Dual Ethernet, quad serial, dual USB, and a CAN bus interface allow fast, reliable transfer of data.

If additional capabilities are needed, PC/104 and PC/104-Plus expansion allows a wide variety of I/O cards to be stacked on the SBC4685.
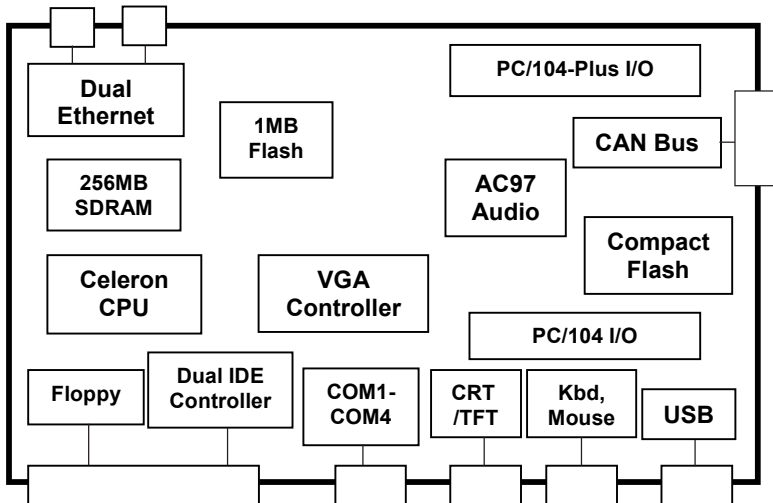
Software Support

DOS emulation, MSDOS 5.0,
Linux, VxWorks®,
Windows CE
Windows XP
RTOS
Comm Library,
*   CommBLOK™*
PID loop library, PidBLOK™
C, compilers
* [Items above in Section 6]*

Compatible Hardware

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

Mounting/Packaging

Standoffs, STDOFF01
* [Items above in Section 5]*
Custom

Micro/sys 3730 Park Place, Montrose, CA 91020 (818)244-4600 Fax (818)244-4246
email: info@embeddedsys.com

Technical Details:

The SBC4685 core is built around an Intel Ultra-Low Voltage Celeron processor running at 400 or 650 MHz or a Low Power Pentium III running at 700MHz. All of these CPUs include hardware floating point math and multimedia acceleration extensions.

The Pentium III and Celeron allow compatibility with both real mode and 32-bit protected mode programs. These CPUs are paired with the Intel 440BX chipset, which integrates many PC-compatible peripherals. Dual USB ports, a battery-backed real-time clock, a dual EIDE controller, two cascaded 82C59A interrupt controllers, three timer/counters (82C54 compatible), and a dual DMA controller are all present.

The memory subsystem on the SBC4685 allows many programs to be run without any external storage. 256 Mbytes of synchronous DRAM (SDRAM) is more than sufficient for many complex, protected-mode programs and operating systems.

The 1-Mbyte Flash memory chip contains both the BIOS and a user application code space. The user space can be configured as a 768k read/write flash disk.

If a larger program or data storage space is required, or if removability is needed, the CompactFlash interface can provide hundreds of megabytes of storage. CompactFlash is used in the True IDE mode, where it is register compatible with an EIDE hard drive. Thus, it does not require any special drivers for most operating systems.

The SM731 VGA controller has 16Mbytes of video memory and supports resolutions up to 1600 x 1200. It includes hardware acceleration for fast graphic updates. The output can drive a standard RGB CRT monitor, and an LCD flat panel display. Active matrix (TFT) LCD panels are supported, in 18-bit or 24-bit color. The two-channel LVDS interface is compatible with many displays and ensures that the signal integrity is maintained.

Four serial ports allow communication with many different devices. COM1 through COM4 are 16C550-compatible UARTs (with transmit and receive FIFOs). These serial ports are capable of speeds up to 115200 baud, have RS-232 transceivers, and have RTS and CTS modem control lines. Additionally, COM1 is configurable for half- or full-duplex RS-485 or RS-422 communication with jumperable termination resistors.

Dual 10/100BASE-T Ethernet allows the SBC4685 to operate as a node on a network or as a gateway. The Ethernet connectivity also allows the SBC4685 to be used as a protocol converter.

Additionally, the CAN Bus interface allows fast, reliable industrial or automotive network capability. This interface supports CAN v2.0, parts A and B.

The PC/104 connector provides support for both 8-bit and 16-bit expansion boards and operates with standard PC/104 bus protocol and timing. The default configuration is non-stackthrough connectors, allowing the SBC4685 to be the bottom card in a stack. The stackthrough option (SBCOPT16ST) allows the SBC4685 to be plugged into a custom-designed OEM I/O board as an automation component.

The SBC4685 can support application development under numerous strategies. If 16-bit DOS or DOS-extended software is sufficient, Micro/sys offers a free DOS-compatible operating system preinstalled on the SBC4685. For a small royalty fee, true MSDOS 5.0 can be preinstalled. Powerful, cost-effective remote debug capabilities are provided through Borland's Turbo Debugger.

For true 32-bit application development, the SBC4685 supports a number of alternatives. Due to its PC compatibility, 32-bit real time operating systems (RTOS) such as Linux, PharLap® ETS, and VxWorks® can be booted on the SBC4685. All support 32-bit linear protected mode operation, and have full tool suites available, including compilers and debuggers.

The firmware suite that is preinstalled in flash on the SBC4685 includes an industrial BIOS that allows configuration of many of its features. In addition to allowing configuration of the normal PC-compatible peripherals such as floppy drives and hard drives, it allows 768k of the system flash to be used as a read/write wear-leveled flash drive. Another feature of the BIOS is its ability to redirect the console out COM1, COM2, or the VGA/keyboard so that even "headless" systems can have a user console when needed for configuration or debug.

For pre-configured sets of options, Micro/sys can provide OEMs with a single part number for ordering. In addition, custom versions of the SBC4685 are available. Please call Micro/sys Technical Sales for details.

Specifications:

Mechanical:
- ❑ EPIC standard
- ❑ 4.53" x 6.50" x .6"
- ❑ Installed CompactFlash card extends past edge of board

Power Requirements:
- ❑ +5v ±5% at TBD typical, TBD max
- ❑ +12v required only if used by PC/104 modules or flat-panel displays

Environmental:
- ❑ 0° to +70°C operation
- ❑ -40° to +85°C storage
- ❑ 5%-95% relative humidity, non-condensing

Processor Core Section:
- ❑ Intel Celeron or Pentium III CPU
- ❑ 400, 650, or 700 MHz clock rate
- ❑ Hardware floating point math
- ❑ AT-compatible timers, interrupts, DMA

On-board Memory:
- ❑ 256M Synchronous DRAM based at 0
- ❑ 1M of Flash at top of memory map with

BIOS and operating system installed; 768k available for user application

Watchdog Timer:
- Program must refresh watchdog timer periodically, or system will be reset
- Enabled through software

COM1-COM4 Serial Ports:
- Four async serial ports, PC compatible
- 16550-compatible
- RTS and CTS modem controls
- RS232 on all channels
- COM1 RS485 full duplex

SVGA Video Output:
- CRT and color TFT LCD outputs
- Resolutions to 1600 x 1200
- Direct connect to TFT flat panels
- 18-bit and 24-bit panel color support
- TTL and dual channel LVDS drivers

AC97 Audio I/O:
- Line in and CD-ROM in connectors
- Line output connector

Keyboard, Mouse, and Speaker:
- PS/2-compatible keyboard port
- PS/2-type mouse port
- AT-compatible TTL speaker output

Real Time Clock:
- RTC with onboard battery
- Driver software in BIOS

CAN Bus:
- Uses Intel 82527 CAN controller
- Supports CAN specification 2.0, Parts A and B
- Adds 16 bits of general-purpose digital I/O

Digital I/O:
- 16 bits of TTL-level, byte selectable I/O from 82527 chip
- 470-ohm current limiting resistors

PC/104 Interface:
- Non-stackthrough PC/104 connectors
- Standard mounting holes
- 8-bit and 16-bit PC/104 module support
- Full IRQ and DRQ support
- Stackthrough option available (SBCOPT16ST)

PC/104-Plus Interface:
- Non-stackthrough PC/104-plus connectors
- Full 32-bit PCI-type transfers supported
- Stackthrough option available (SBCOPT120ST)

USB:
- Dual USB 1.0 port
- Transfers at 12 or 1.5 Mbit/sec

Floppy Disk Interface:
- Two drives on single cable
- Standard connector pinout

IDE:
- Two connectors with two drives on each cable (CompactFlash counts as one drive) for a total of four drives
- Hard drive, CD-ROM support
- Flexible BIOS drive setup

Parallel Printer Port:
- Bi-directional LPT standard

CompactFlash Interface:
- Supports Type I CompactFlash
- Operates in True IDE mode
- CF+ cards not supported
- Not hot-swappable

DK4685 Development Kit:
- Free with first SBC4685 purchase
- Breakout cable to COM1-COM2
- Breakout cable to CRT, keyboard, mouse, speaker
- Download cable and utilities
- Documentation, schematics, sample software

External Connections:
- ❑ Two 40-pin high-density headers for IDE
- ❑ 10-pin high-density header for USB
- ❑ 20-pin header for digital I/O
- ❑ 14-pin header for COM1-COM2 RS232
- ❑ 10-pin high-density header for COM3-COM4 RS232
- ❑ 10-pin high-density header for COM4 RS485
- ❑ 16-pin high-density header for CRT
- ❑ 40-pin high-density header for TTL TFT flat panel
- ❑ 50-pin high-density header for LVDS TFT flat panel
- ❑ 10-pin high-density header for keyboard, mouse, speaker
- ❑ 20-pin high-density header for parallel port
- ❑ 20-pin high-density header for floppy
- ❑ 8-pin removable terminal strip for power input
- ❑ 4-pin removable terminal strip for CAN bus

DK4685	No charge development kit, available with first order only
SDK-Linux	Linux kit (requires Ethernet and SBC4685OPT50)
4685OPT1	256MB of RAM
4685OPT22	CAN Bus interface
4685OPT25	MS-DOS in flash
4685OPT40	TFT/CRT VGA interface
4685OPT45	Audio support
4685OPT50	Linux startup kernel in flash

Related Products:

CA4089	Breakout cable to two DB9 COM port connectors
BA4098	Breakout cable assembly for CRT, Kbd, mouse, speaker, TFT panel
SBCOPT16ST	Stackthrough PC/104
SBCOPT120ST	PC/104-Plus Stackthrough Option, 120-pin
CF-FL128	128MB CompactFlash Card
CF-FL256	256MB CompactFlash Card
CF-FL512	512MB CompactFlash Card

Ordering Information:

Single Board Computer:

SBC4685	Celeron CPU, 400MHz, 128MB RAM, 1M Flash
SBC4685-1	Celeron CPU, 400MHz, 128MB RAM, 1M Flash, Dual 10/100BASE-T Ethernet
SBC4685-650	Celeron CPU, 650MHz, 128MB RAM, 1M Flash,
SBC4685-650-1	Celeron CPU, 650MHz, 128MB RAM, 1M Flash, Dual 10/100BASE-T Ethernet
SBC4685-700	Pentium III CPU, 700MHz, 128MB RAM, 1M Flash
SBC4685-700-1	Pentium III CPU, 700MHz, 128MB RAM, 1M Flash, Dual 10/100BASE-T Ethernet

Cables nominally 15", other lengths available.

CommBLOK, PidBLOK trademark Drumlin
IBM, PC trademark IBM Corp.
MSDOS, Microsoft trademark Microsoft Corp.
Turbo Debugger trademark Borland International
VxWorks trademark Wind River