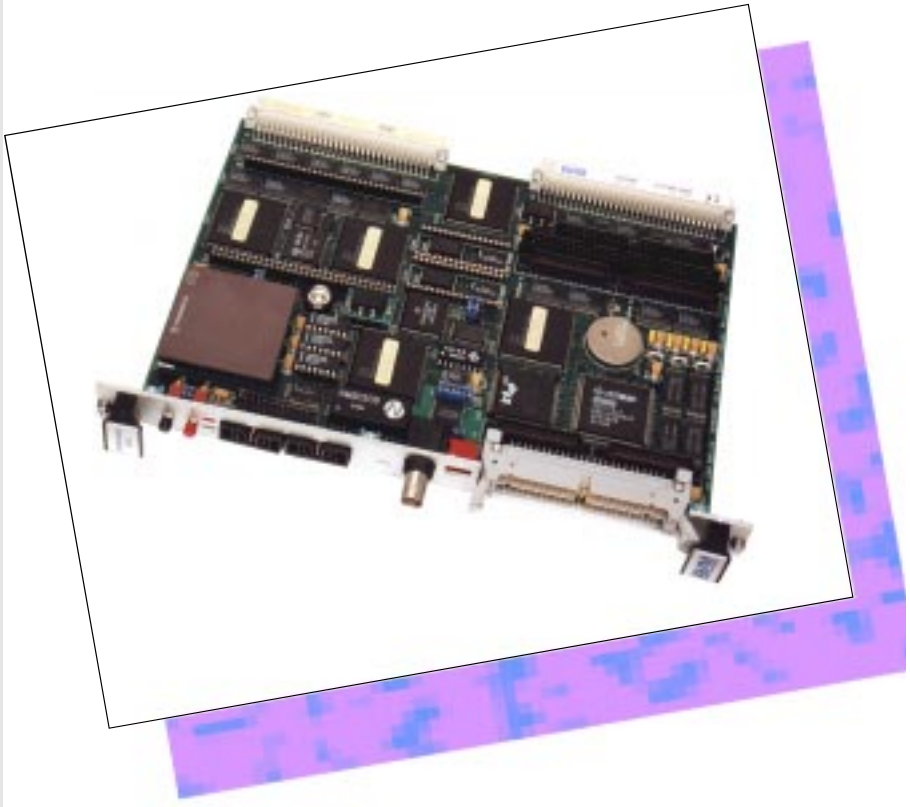
BVME4000

68040 SBC with IndustryPacks

- MC68040/MC68EC040 CPU
- 25/33MHz CPU clock
- 4096 byte instruction and data caches
- 32-bit wide burst fill dual ported memory interface with Bus Snooping
- Extensive choice of memory options providing up to:
  16Mbytes of FLASH EPROM
  512Mbytes DRAM
- 2Mbyte EPROM pair (16 bit wide)
- 2Mbyte Non Volatile (battery backed) SRAM (32 bit wide)
- High Performance DMA driven 10Mbyte/sec SCSI Interface
- High Performance DMA driven Ethernet/Cheapernet
- Two 16 bit IndustryPack sites
- IndustryPack expansion connector
- Two Interrupt driven serial I/O ports RS232, RS422, RS485
- Real Time Clock with battery backup
- Bi-directional parallel port
- Optimized master/slave VMEbus interface
- Location monitor - Mailbox Interrupts
- Four level Arbiter
- Single slot 6U form factor
- Available as integrated system module complete with disc drives
- Extensive software support including OS-9, Linux and VxWorks
- VMEbus rev C.1 compatible

The BVME4000 is a high performance **S**ingle **B**oard **C**omputer with a flexible I/O expansion scheme using the popular IndustryPack I/O expansion modules. The basic module features a 68040 CPU with 2Mbytes of battery backed SRAM with an expansion bus to accommodate BVM's standard memory modules giving up to 512Mbytes of memory in various combinations of FLASH or DRAM.



The high performance SCSI and Ethernet interfaces make it an ideal choice for development environments in addition to many target applications. Various depopulated options are available to provide cost effective solutions for target applications both in the VMEbus environment or in stand-alone applications. An integrated module is also available complete with disc drives to simplify system configuration.

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BVME4000

CPU
The BVME4000 uses the MC68040/MC68EC040 CPU with speed options of 25MHz and 33MHz.

Memory
The BVME4000 has an extensive range of memory options. The basic module contains the SRAM and EPROM and a memory expansion interface which takes BVM's standard memory expansion module. The memory complement includes:

Non volatile SRAM
512K or 2Mbytes of battery backed 32 bit wide SRAM. Access performance of 5/3/3/3 at 50 MHz.

EPROM
Twin DIL sockets (16 bit wide access) for up to 2Mbyte of EPROM with 5 clock cycles per access at 25MHz.

Memory Module Interface
A full 32 bit 68060 bus supporting up to 2/1/1/1 (no wait state) access to various memory module configurations. Addition of the MEM390 or MEM400 memory modules provides a wide choice of DRAM and Flash options up to 512Mbyes.

SCSI
The SCSI interface is built around the NCR 53C710 and provides asynchronous transfers of up to 5Mbyte/sec. or synchronous up to 10Mbytes/sec. The 32 bit DMA driven interface allows direct access to the entire memory map of the BVME4000. The burst mode interface stacks up 16 bytes at a time and transfers them as a line transfer. This gives a 400nS burst every 3.2 S (at 5 Mbyte/s) or 12.5% bus bandwidth requirement at 25MHz. The 53C710 is an intelligent Processor in its own right, running SCSI SCRIPTS software. This enables very high level commands to be issued to the SCSI interface further minimising processor overhead.

Ethernet
The Ethernet Interface, built around the Intel 82596CA, provides a 32 bit DMA driven interface to both Ethernet (via the AUI interface) and Cheapernet (via a front panel BNC). The 32 bit DMA driven interface allows direct access to the entire memory map of the BVME4000, allowing full packet management by the 82596. Each 32 bit transfer requires 320nS max (including arbitration) to execute the cycle. A transfer will occur no more frequently than every 4 S (4 bytes at 1Mbyte per second). Thus worst case bus bandwidth requirement is 8% at 25MHz CPU clock.

IndustryPack I/O
Two standard IndustryPack compatible sites are provided implementing the full IndustryPack specification with the exception that DMA transfers are not supported. A standard double IndustryPack may be fitted to the sites in which case, 32 bit wide data transfers are supported. The BVME4000 supports standard 8 and 32MHz IndustryPack transfers and additionally BVM's Source Synchronous operation for enhanced throughput.

A further four IndustryPacks can be added by the addition of the EXP100. This allows a total of six IndustryPacks to be fitted in a double width VMEbus module. The EXP100 provides a very flexible I/O connection scheme allowing best use to be made of the available external connectors. I/O from the IndustryPacks can be routed to 100 way front panel connectors or selectively jumpered to the required pins on the P2 connector. This selective jumpering allows the signals to appear on whichever pin of rows a or c that is required, allowing simple ribbon cable connections to P2 in many cases.

RTC and Timers
A Real Time Clock and periodic tick alarm are available together with a small amount of battery backed SRAM for configuration data. Two versatile 16 bit timers are also available giving resolution of up to 500nS and are capable of one shot and periodic interrupt generation.

Parallel I/O
An 8 bit, bi-directional I/O port with interrupt driven handshake is implemented in a 68230 device which allows direct connection to a Centronics style printer. A further 24 bit timer is also available.

Serial Communications
Two serial communications interfaces are provided from the 85230. The 85230 provides both synchronous (SDLC / HDLC) and asynchronous protocols. Asynchronous baud rates of up to 76.8 Kbit/s are supported. Field changeable buffer modules allow RS232, RS422 or RS485 electrical interfaces to be selected for either (or both) channels.

VMEbus Interface
A comprehensive master/slave 32 bit bus interface is implemented with programmable interrupt handler and generator. The on-board SRAM and memory module interface are dual ported onto the VMEbus the location of which and the window size are software programmable. The Location Monitor generates an interrupt when specific VMEbus locations are accessed.

PSU Monitor / Watchdog
A MAX791 provides power up / power down control for the battery switching for the non volatile RAM and processor RESET. It also provides a processor watchdog capability.

System Module
The BVME4000 is available built into a System Module complete with Winchester and floppy disc drives. This greatly simplifies system building and configuration, both for desktop systems and for target applications. The system module can also contain two IndustryPacks. Although primarily designed to plug into a VMEbus backplane some applications can be satisfied by merely applying power to the VMEbus connectors.

Real-time Software
Designed as a real-time system platform, BVM have ported the OS-9 Operating System and a number of utilities and network products. Other operating systems, including VxWorks, are available from third parties. Consult your supplier for details.

Custom Configurations
The BVME4000 by its very nature has many configuration options both by being depopulated or by custom programming of the on-board logic. Consult your supplier to discuss your project requirements.

EXP100 expansion module providing four additional IndustryPack sites

Specification

CPU
MC68040/MC68EC040 CPU at 25 or 33MHz
Serial Ports
85230 Dual Serial RS232 (422/485 options)
Timer/Clock
DP8570A calendar-clock 3 timers 44byte NVR
Parallel Interface/Timer
MC68230
SCSI
NCR53C710 DMA SCSI Controller
Ethernet
i85296CA DMA Ethernet/Cheapernet Controller
Watchdog
MAX791 refresh period = 900mS
Memory
2 x 32-pin CPU PROM sockets 16-bit wide to accept 512Kbit to 8Mbit EPROMs
512K or 2Mbytes CMOS SRAM 32-bit wide battery backed
Memory Module Interface
32-bit wide with burst-fill up to 2/1/1/1
VMEbus Master/Slave interface
A32, A24, A16 / D32, D16, D08 (EO)
RMW AM6
LOCATION MONITOR
VMEbus System Controller Functions
ARBITER
SGL, PRI or RRS, software programmable
FAIR ROR (RWD option)
SYSCLK
Driver
SYSRESET
Driver/Monitor power-up and switch
VMEbus RESET
minimum period = 500mS
BUS TIMEOUT
period 128µS
ACFAIL
monitor (level 7 auto-vectored interrupt)
VMEbus Interrupts
Interrupter D08(O) ROAK
I(1-7) single level, software programmable
Interrupt vector ID software programmable
Interrupt handler D08(O)
I(1-7) all levels, software maskable
IndustryPack Functions
Two IndustryPack compatible sites with front panel I/O
2 x Single IPs (16-bit) or 1 x Double IP (32-bit)
8/32MHz or CPU synchronous IP clocks, software selectable
Software programmable IP interrupts
IndustryPack expansion connector
Up to six additional IndustryPack compatible sites (four with EXP100 option)
IP DMA to local memory over expansion interface
Board Configuration Switch
4-bit, software readable
Indicators
RED LED indicates VMEbus MASTER access
GREEN LED indicates processor status
Switches
RESET switch link selectable
ABORT switch (level 7 auto-vectored interrupt)
Dimensions
160mm x 233.35mm (6U) single slot
Power
+5v 3.4A typ. +12V 150mA Max -12V OA
(excl IP, Memory Module & Disc Drive power)
Environmental
0 to 70ºC, 95% humidity non-condensing
(Wider specification available to order)
Options
System Module
Adds SCSI and floppy disc drives in plug-in module
EXP100
Adds an additional 4 IP sites (total 6)
Consult your supplier for details of these factory fit options.

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