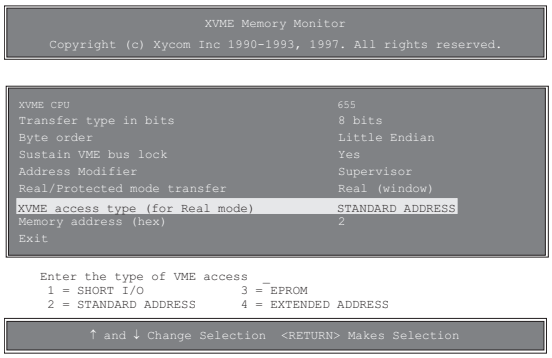
XYCOM AUTOMATION

XVME-983 MS-DOS®
Board Support Package



Xycom Automation's MS-DOS® Board Support Package is a comprehensive software package that simplifies the process of designing VMEbus application programs for Xycom Automation VME PC hardware in a MS-DOS environment. The package consists of example programs and 16-bit library routines used to develop VMEbus programs.

FEATURES

- Example programs
- 16-bit library routines for
  - VMEbus read and write routines with DMA support
  - Dual-access memory management functions
  - Support for read-modify-write operations
  - Virtual memory mapping operation for VMEbus address space
  - VMEbus interrupt generation routines
  - Routines for handling VMEbus interrupts
- Supports
  - Analog I/O
  - Digital I/O
  - Counter modules
  - Communication modules
  - All Legacy processors

BENEFITS

Get a Comprehensive Package

With the example programs and 16-bit library routines bundled together, Xycom Automation's MS-DOS Board Support Package is a comprehensive solution for your VME board support needs.

Simple Configuration

The example programs, which use many of the library routines, provide users with consolidated options for configuring VME systems. These example programs include all source code and make files.

Save Development Time

The 16-bit library routines provide a collection of C language subroutines and header files, which allow users to get their applications up and running quickly by simplifying the design and implementation of applications for Xycom Automation VMEbus PC processors. The development time and effort required to handle VMEbus data and interrupts in applications are significantly reduced.

A Range of Modules Supported

The MS-DOS Board Support Package supports:

XVME processor modules
- XVME-653
- XVME-654
- XVME-656
- XVME-658
- XVME-659

Analog I/O
- XVME-500/590
- XVME-505/595
- XVME-530
- XVME-531
- XVME-540
- XVME-542
- XVME-560
- XVME-564
- XVME-566

Digital I/O
- XVME-200/290
- XVME-202
- XVME-212
- XVME-220
- XVME-240
- XVME-244
- XVME-260

Counter modules
- XVME-203/293
- XVME-230

XVME boards supported with MS-DOS drivers
- XVME-400/490
- XVME-401/491

EXAMPLE PROGRAMS

Example programs demonstrate the use of the library routines. All source code and make files are included.

showmem.exe

Read and write to or from the VMEbus with options to select different parameters easily. Results are displayed in a convenient window.

```
C:\XVME983\EXAMPLES\BCEXAMPL>showxmem

Copyright (C) Xycom Inc. 1990-1993, 1997. All rights reserved.

This program was written for Xycom XVME CPU products.
Enter the type of transfer (8,16,32): 16
Enter the type of byte-endian (0 = BIGENDIAN, 1 = LITTLEENDIAN): 1
Do you want to lock the VME bus?(Y/N) y
Enter the type of VME access:
    0 = IACK
    1 = SHORT I/O
    2 = STANDARD ADDRESS
    3 = ROM
    4 = EXTENDED ADDRESS  : 2
Enter memory address (hex): 000000_
```

```
            0  1  2  3  4  5  6  7  8  9  A  B  C  D  E  F
00000000  49 A9 00 00 44 AA 00 00 84 AA 00 00 08 A0 00 00  I...D...........
00000010  54 E0 00 00 80 2A 00 00 E0 20 00 00 46 AA 00 00  T....*... ..F...
00000020  00 0E 00 00 45 A8 00 00 C8 20 00 00 00 0A 00 00  ....E.... ......
00000030  40 28 00 00 19 02 00 00 00 8A 00 00 00 E2 00 00  @(..............
00000040  07 AB 00 00 40 AA 00 00 41 E2 00 00 04 AC 00 00  ....@...A.......
00000050  04 AA 00 00 02 A2 00 00 84 22 00 00 06 06 00 00  ........."......
00000060  84 AA 00 00 D2 30 00 00 40 2A 00 00 60 A8 00 00  .....0..@*..`...
00000070  05 82 00 00 04 A0 00 00 82 A0 00 00 88 88 00 00  ................
00000080  40 2A 00 00 0A 8A 00 00 C8 0A 00 00 4C AA 00 00  @*..........L...
00000090  44 A8 00 00 84 AA 00 00 46 AB 00 00 F4 26 00 00  D.......F....&..
000000a0  80 A2 00 00 23 A2 00 00 04 00 00 00 04 E2 00 00  ....#...........
000000b0  42 80 00 00 80 22 00 00 04 B6 00 00 48 8A 00 00  B....".......H...
000000c0  54 82 00 00 0B 2E 00 00 40 AB 00 00 4E CA 00 00  T.......@...N...
000000d0  10 20 00 00 02 0A 00 00 01 EA 00 00 06 2E 00 00  . ..............
000000e0  C2 2A 00 00 00 A8 00 00 00 80 00 00 02 C2 00 00  .*..............
000000f0  00 2C 00 00 40 8A 00 00 08 08 00 00 20 2A 00 00  .,..@....... *..
00000100  C4 AA 00 00 44 AC 00 00 40 80 00 00 48 0A 00 00  ....D...@...H...
00000110  04 AA 00 00 C3 20 00 00 80 28 00 00 0C 08 00 00  ..... ...(......
00000120  C0 E8 00 00 9C A3 00 00 43 E0 00 00 00 AE 00 00  ........C.......
00000130  50 A0 00 00 80 8A 00 00 42 AA 00 00 C0 AA 00 00  P.......B.......
00000140  45 A8 00 00 C4 6A 00 00 06 AA 00 00 CC A8 00 00  E....j..........
00000150  14 AA 00 00 4A 42 00 00 84 AE 00 00 46 AE 00 00  ....JB......F...
00000160  60 68 00 00 02 6A 00 00 44 28 00 00 40 A0 00 00  `h...j..D(..@...
Press Q to QUIT or any other key to continue_
```

```
C:\XVME983\EXAMPLES\INT>vintmon

        VINTMON - VMEbus Interrupt Monitor Program
              Copyright (c) Xycom, Inc. 1997

VINTMON acknowledged VMEbus IRQ3*, Read VMEbus IACK Vector 0x16
VINTMON acknowledged VMEbus IRQ3*, Read VMEbus IACK Vector 0x4E
VINTMON acknowledged VMEbus IRQ3*, Read VMEbus IACK Vector 0x00
VINTMON acknowledged VMEbus IRQ1*, Read VMEbus IACK Vector 0x00
VINTMON acknowledged VMEbus IRQ5*, Read VMEbus IACK Vector 0x62
VINTMON acknowledged VMEbus IRQ7*, Read VMEbus IACK Vector 0x7A
VINTMON acknowledged VMEbus IRQ2*, Read VMEbus IACK Vector 0x00
VINTMON acknowledged VMEbus IRQ5*, Read VMEbus IACK Vector 0x08
<press any key to exit>
```

vintmon.exe

The VMEbus has seven levels of interrupts. This program aids in the setup and use of these interrupts with XVME processors. Source code for the program can be used to understand interrupt code.

editmem.exe

Perform VMEbus reads and writes. The program auto detects the type of Xycom Automation processor and configures the VME interface for the type of transfer. The program also allows for short I/O (A16), standard space (A24), and extended space (A32) reads and writes.

```
                XVME Memory Monitor
Copyright (c) Xycom Inc 1990-1993, 1997. All rights reserved.

XVME CPU                                  655
Transfer type in bits                     8 bits
Byte order                                Little Endian
Sustain VME bus lock                      Yes
Address Modifier                          Supervisor
Real/Protected mode transfer              Real (window)
XVME access type (for Real mode)          STANDARD ADDRESS
Memory address (hex)                      2
Exit

   Enter the type of VME access _
    1 = SHORT I/O              3 = EPROM
    2 = STANDARD ADDRESS       4 = EXTENDED ADDRESS

   ↑ and ↓ Change Selection  <RETURN> Makes Selection
```

```
                Analog Boards Example
Copyright (c) Xycom Inc 1990-1993, 1997. All rights reserved.

                Digital Boards Example
Copyright (c) Xycom Inc 1990-1993, 1997. All rights reserved.

                Counter Boards Example
Copyright (c) Xycom Inc 1990-1993, 1997. All rights reserved.

XVME-500/590
XVME-505/595
XVME-530
XVME-531
XVME-540
XVME-542
XVME-545
XVME-560
XVME-564
XVME-566
EXIT

XVME-200/290
XVME-201
XVME-202
XVME-210
XVME-212
XVME-220
XVME-240
XVME-244
XVME-260
EXIT

XVME-203/293
XVME-230
EXIT

↑ and ↓ Change Selection  <RETURN> Makes Selection
```

analog.exe

Access and setup Xycom Automation I/O boards. This program can also confirm the correct hardware setup and operation of analog I/O. Use the source code to build new applications.

digital.exe

Setup and access Xycom Automation digital I/O boards (2xx).

counter.exe

Setup and access Xycom Automation counter modules (2xx).

LIBRARY ROUTINES

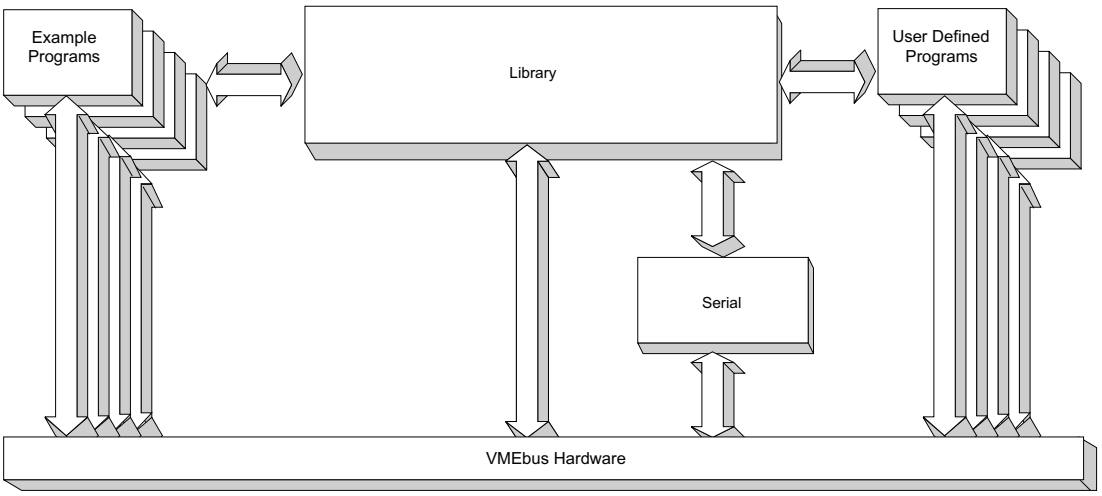
The 983 software support library is a comprehensive set of 16-bit routines that simplify the development of VMEbus application programs. Simply link in the correct library routine when developing an application. All source code for library routines is provided so that each can be customized if needed.

Routine	Description
AutoInitLib	Determines which XVME-CPU module is being used and initializes the XVME SSL
InitLib	Initializes the XVME SSL for a particular XVME CPU model
ReleaseVMEBus	Releases the VMEbus from CPU control
LockVMEBus	Gains access to the VMEbus within the specified time
Set_RM_Window*	Maps the Real Mode Window to the desired VMEbus address space
ReadVMEBusMemoryRM*	Reads a block of memory on the VMEbus through the Real Mode Window
WriteVMEBusMemoryRM*	Writes a block of memory out on the VMEbus through the Real Mode Window
ReadVMEBusMemoryPM*	Reads a block of memory out on the VMEbus with the CPU in Protected Mode
WriteVMEBusMemoryPM*	Writes a block of memory out on the VMEbus with the CPU in Protected Mode
SetIntVect	Sets the desired IRQ (0-15) vector to point to the user defined interrupt handler
ReadIntVect	Returns the current interrupt vector for the desired IRQ (0-15) level
Mask8259	Sends the appropriate mask to the slave 8259 interrupt controller to enable or disable the desired IRQ level
DisableVMEInterrupts	Disables the AT Auxiliary Maskable Interrupts used for VME interrupt levels 1-7 and the dual port interrupt
EnableVMEInterrupts	Enables the AT Auxiliary Maskable Interrupts used for VME interrupt levels 1-7 and the dual port interrupt
SetNMIVect	Sets the NMI vector to point to the user defined interrupt handler
ReadNMIVect	Returns the current NMI interrupt vector
EnableNMIInt	Enables the ANMI error conditions
DisableNMIInt	Disables the ANMI error conditions
GenVMEBusInt	Generates a VMEbus interrupt on the specified level
EnableWDTimer	Enables the Watchdog Timer
DisableWDTimer	Disables the Watchdog Timer
StrobeWDTimer	Retriggers the Watchdog Timer
ResetWDTimer	Resets the Watchdog Timer after it has timed out
ClearXVMEInt	Resets and disables all interrupts to the XVME and disables the INT in the 8259
GetCPUAttributes	Returns the Xycom Automation CPU model number
FindPCIDevice	Reads the PCI bus space for PCI device IDs and vendor ID
BIOSReadConfigByte	Reads the BIOS PCI space in byte format
BIOSReadConfigWord	Reads the BIOS PCI space in word format
BIOSReadConfigDword	Reads the BIOS PCI space in long word format
BIOSWriteConfigByte	Writes the BIOS PCI space in byte format
BIOSWriteConfigWord	Writes the BIOS PCI space in word format
BIOSWriteConfigDword	Writes the BIOS PCI space in long word format
UNIVReadConfigByte	Reads the Universe chip's setup configuration in byte format
UNIVReadConfigWord	Reads the Universe chip's setup configuration in word format
UNIVReadConfigDword	Reads the Universe chip's setup configuration in long word format
UNIVWriteConfigByte	Writes the Universe chip's setup configuration in byte format
UNIVWriteConfigWord	Writes the Universe chip's setup configuration in word format
UNIVWriteConfigDword	Writes the Universe chip's setup configuration in long word format
ATirqEOI	Send a nonspecific EOI to the appropriate 8259 interrupt controller(s)
FindUnivIRQ	Returns the ATbus IRQ level to which the Universe's PCI interrupt is currently mapped
GetIntMask	Returns a bitmask representing the current state of the VMEbus and Auxiliary interrupt sources
SetIntMask	Sets the VMEbus and Auxiliary interrupt sources per the bitmask provided
EnableIntSource	Enables the specified VMEbus or Auxiliary interrupt source(s) up to, but not including, the 8259 interrupt controller
Disable IntSource	Disables the specified VMEbus or Auxiliary interrupt source(s) at the interrupt source
ClearIntSource	Clears the source(s) of the specified VMEbus or Auxiliary interrupts
GetIntStatus	Returns a bitmask showing which VMEbus and Auxiliary interrupt sources are currently being asserted
AcknowledgeVMEbusInt	Acknowledges the highest priority VMEbus interrupt and returns the interrupt level and IACK vector

**Does not function on XVME-65X processors*

Digital I/O, Analog I/O, Counter I/O, Communication Driver, and Interrupt routines also are included.

BOARD SUPPORT PACKAGE COMPONENTS



ORDERING INFORMATION

Standard Configurations

Order Number	Description
XVME-983	MS-DOS Board Support Package

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