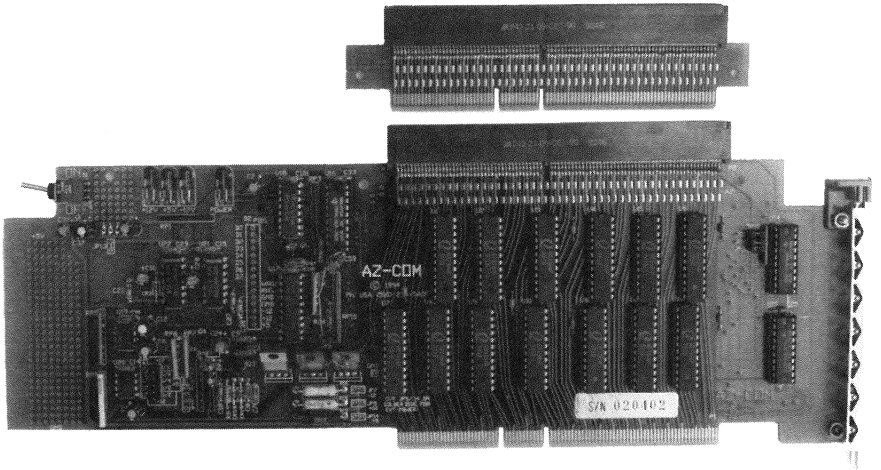
UNIVERSAL MC EXTENDER 32

USER'S GUIDE



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THE INDUSTRY LEADER IN ELECTRONIC EXTENDERS

LIMITED ONE YEAR WARRANTY

Your Universal MC Extender 32 has a one year warranty covering all parts and functions with the exception of the top connector and the CMOS switches. Within 12 months of delivery, **AZ-COM** will repair or replace this product if we find the product defective in parts or labor, with the exception of the aforementioned parts. This warranty is limited to the original purchaser of this equipment.

CERTIFICATION

AZ-COM certifies that this instrument was carefully inspected and tested at the factory prior to shipment and was found to meet all requirements of the specification under which is was furnished.

DISCLAIMER

In no event will **AZ-COM** be responsible for direct, indirect, special or incidental damages resulting from the use of our product.

TRADEMARKS

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EMI/RFI WARNING

This equipment generates, uses and can emit radio frequency energy. It has not been tested to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of the FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user, at their own expense, may be required to take whatever measures necessary to correct the interference.

AZ-COM
UNIVERSAL MC EXTENDER 32

FOR TESTING AND DEVELOPING
16 AND 32 BIT
MICRO CHANNEL CARDS

INDEX

GENERAL DESCRIPTION

The UNIVERSAL MC EXTENDER 32 is a device designed to enhance the process of testing and developing MC Bus products. It allows you to disconnect power and bus signals from the tested MC CARD so it can be removed or inserted without turning the PC OFF. This saves time otherwise wasted rebooting the PC and reloading any required software. It also protects components of the PC from damage due to constant POWER ON - POWER OFF cycling. PC power lines are protected by current sensing circuitry that automatically disconnects the Tested Card if overcurrent is detected. You can change the sensing threshold by simply changing jumper settings or the current sensing resistors.

- Overcurrent Sensing Circuitry that detects excessive current consumption and protects MC power lines by automatically disconnecting the tested card if overcurrent is detected. You can change the sensing threshold by simply changing jumper settings or the current sensing resistors

- Simple to use optional software interface capability including TSR POS initialization.

- Four LED's, one indicates whether the power to the top connector is on or off, the other three indicate an overcurrent condition and help detect faulty cards. An overcurrent condition can also be tested by reading the status register.

- A breadboard area for adding custom circuitry with all the crucial signals available at a dedicated connector.

- Bus switches installed in sockets for easy replacement if damaged by faulty tested cards.

- Ability to connect external power to the top connector to test cards under various power supply voltages.

INSTALLATION

If the cover is not already off your computer, you will have to remove it. Turn off the power to your computer and carefully insert the UME32 into an available slot in the mother board.

INDICATORS

There are four LED indicators on the UME32:

POWER - This LED is turned on when the power is applied to the top connector. DO NOT INSERT OR REMOVE A TESTED CARD WHEN THIS LED IS ON!

OVERCURRENT - Three LED's indicate an overcurrent condition in the power supply lines for their respective current designations: +12V, +5V, and -12V. When an overcurrent condition is detected, the corresponding LED is turned on, and stays on until the power to the top connector of the UME32 is turned off.

OVERCURRENT SENSING CIRCUITRY

Your UME32 comes equipped with overcurrent sensing circuitry. The overcurrent sensing detects excessive current consumption by tested cards, preventing possible problems with tested cards that seem to operate normally. For example, a faulty capacitor that leaks current may operate properly until the amount of leakage exceeds a certain value. This could occur after your product leaves the factory. To ensure maximum quality assurance, it is recommended that you adjust the overcurrent sensing threshold to match the current consumption of the card that you are testing. (See Page 3 for instructions.)

Overcurrent detection works by sensing a voltage drop across the resistors that are inserted in series with the power supply lines. When

the voltage drop exceeds the limit (listed below), the hardware on the UME32 disconnects the power and bus signals from the top connector. The appropriate bit in the status register is cleared and the corresponding LED indicator is turned on. The overcurrent status is cleared by turning the power to the top connector OFF (please see CONTROLLING YOUR UME32, below).

Overcurrent sensing levels:
+ 5V activates at 100 mV drop across R13. Factory set to 4A.
+ 12V activates at 250 mV drop across R15. Factory set to 0.5A.
- 12V activates at 250 mV drop across R16. Factory set to 0.5A.

You can lower the overcurrent sensing threshold by removing JP8 through JP12 located near the breadboard area.

JUMPER	VOLTAGE	THRESHOLD CHANGE
JP8	+12V	-125 mV
JP9	+12V	-12.5 mV
JP10	+5V	-25 mV
JP11	+5V	-50 mV
JP12	-12V	-125 mV

Example: The legend on the card shows that removing JP11 will lower the sensing threshold for +5V by a factor of 1/2, i.e., from 4A to 2A. Removing JP10 would further lower the threshold by 1/4 of the original value, i.e., 2A to 1A.

CONTROLLING YOUR UME32

Operation of the UME32 can be controlled by two different methods:

1. Using the hardware switch and jumpers.
2. Using software control.

1. Using Hardware Switches and Jumpers

To control the power to the top connector simply turn the power switch on or off. Switch it on and power is applied to the top connector together with the RESET signal (HIGH). Approximately 60 milliseconds later, the bus signals are connected, and the RESET signal to the tested card follows the state of the RESET signal on the MC bus. Installing a jumper on JP6 will disable connection of the bus signals. When you turn the power to the top connector OFF, the reverse sequence takes place: first the bus is disconnected, then approximately 60 ms later the power is disconnected.

WARNING! *DO NOT REMOVE OR INSTALL A TESTED CARD WHEN THE POWER LED IS TURNED ON. THIS CAN DAMAGE THE UNIVERSAL MC EXTENDER 32, THE COMPUTER MOTHER BOARD, AND/OR THE TESTED CARD.*

JP1, JP2 and JP3 are used to select the base address for the Status/ Control registers. (See I/O ADDRESS SELECTION on Page 10 for details.)

2. Using Software Control

The Software interface consists of one status register (READ ONLY) and one control register (WRITE ONLY). The status register is located at the address equal to the Base Address selected by JP1, JP2, and JP3.

The bit assignment in the status register is as follows:

Bit 7 NOT USED

Bit 6 BUS STATE

This bit reflects the state of the signal directly enabling connection of the MC bus to the top connector.

0 -➢ Bus is connected
1 -➢ Bus is disconnected.

Bit 5 MAIN SWITCH

This bit reflects the state of the main switch (S1) regardless of whether S1 controls the power or the software register controls the power.

0 - ➢ Main switch is 'OFF'
1 - ➢ Main switch is 'ON'

Bit 4 +5V SENSING 0 -➢ +5V not present at top connector
1 -➢ +5V present at top connector

Bit 3 +12V OVERCURRENT 0 -➢ +12V overcurrent detected
1 -➢ no overcurrent condition

Bit 2 +5V OVERCURRENT 0 -➢ +5V overcurrent detected
1 -➢ no overcurrent condition

Bit 1 -12V OVERCURRENT 0 -➢ -12V overcurrent detected
1 -➢ no overcurrent condition

Bit 0 POWER ENABLE (to the top connector) 0 -➢ Power is enabled
1 -➢ Power is disabled

A. Control Registers

Control registers can be used to enhance and automate the testing process. Operation of the UME32 can be controlled by eight COMMANDs:

BUS ON COMMAND	10 HEX
BUS OFF COMMAND	00 HEX
POWER ON COMMAND	11 HEX
POWER OFF COMMAND	01 HEX
SOFTWARE ENABLE COMMAND	12 HEX
SOFTWARE DISABLE COMMAND	02 HEX
RESET ON COMMAND	13 HEX
RESET OFF COMMAND	03 HEX

BUS ON COMMAND

Writing 10 HEX to CONTROL REGISTER enables the connection between the MC Bus and the top connector.

Example: out (800H), 10H.

BUS OFF COMMAND

Writing 00 HEX to CONTROL REGISTER disconnects the BUS signal between the MC Bus and the top connector.

Example: out (800H), 00H.

THESE TWO COMMANDS TAKE EFFECT WHEN POWER TO THE TOP CONNECTOR IS APPLIED (USING "POWER ON" COMMAND) AND WHEN SOFTWARE CONTROL IS ENABLED (USING "SOFTWARE ENABLE" COMMAND). SINCE THIS COMMAND IS SUBJECT TO POWER CONTROL COMMAND, UNDER NORMAL OPERATION BUS CAN BE ENABLED ONCE AND ONLY POWER CONTROL COMMAND NEEDS TO BE USED TO CONNECT ALL SIGNALS BETWEEN MC BUS AND TOP CONNECTOR.

POWER ON COMMAND

Writing 11 HEX to CONTROL REGISTER connects power to the top connector.

Example: out (800H), 11H.

Power will be disconnected regardless of this command if an overcurrent condition is detected in any of the three power lines.

POWER OFF COMMAND

Writing 01 HEX to CONTROL REGISTER disconnects power to the top connector.

Example: out (800H), 01H.

In order for the POWER ON COMMAND and the POWER OFF COMMAND to have any effect, software control has to be enabled using SOFTWARE ENABLE COMMAND.

SOFTWARE ENABLE COMMAND

Writing 12 HEX to CONTROL REGISTER enables software control (BUS and Power will be connected/disconnected according to last issued BUS ON/OFF COMMAND and POWER ON/OFF COMMAND).

Example: out (800H), 12H.

SOFTWARE DISABLE COMMAND

Writing 02 HEX to CONTROL REGISTER disables software control (BUS and Power will be connected according to the S1 and JP6).

Example: out (800H), 02H.

If software is disabled, switch S1 and jumper JP6 control the power and bus signals.

RESET ON COMMAND

Writing 13 HEX to CONTROL REGISTER forces the RESET signal to the top connector to HIGH (+5V) regardless of the state of Reset line on the MC Bus.

Example: out (800H), 13H.

RESET OFF COMMAND

Writing 03 HEX to CONTROL REGISTER forces the RESET signal to the top connector to follow the state of the RESET signal on the MC Bus.

Example: out (800H), 03H.

This register should be used when the RESET pulse required for the tested card is longer than the automatic reset generated every time the power to the top connector is turned ON.

This register is active all the time regardless of the state of the SOFTWARE ENABLE register.

JUMPER FUNCTIONS

The following describes the jumper functions on the UME32.

JP6 - BUS DISABLE

OFF - BUS is enabled.	All bus signals are disconnected from the top connector.
ON - Bus is disabled.	The bus signals will be connected to the top edge connector if power is enabled. IRQ lines and DATA lines can be individually disabled by JP5 and JP6.

NOTE: This jumper can be overwritten by software control.

JP1, JP2, JP3 - Base address selection. (See Page 10 for details.)

I/O ADDRESS SELECTION

To avoid conflict with other devices installed in the Computer (including the test card), the selected I/O address should be different from the address of any other device on the MC Bus. Control and status registers occupy one I/O location equal to the base address. Breadboard area -WR and -RD are activated when the I/O address equal to the BASE ADDRESS + 1 is selected.

JP1	JP2	JP3	BASE ADDRESS
ON	ON	ON	800 HEX
ON	ON	OFF	1000 HEX
ON	OFF	ON	1800 HEX
ON	OFF	OFF	2000 HEX
OFF	ON	ON	2800 HEX
OFF	ON	OFF	3000 HEX
OFF	OFF	ON	3800 HEX

EXTERNAL POWER SUPPLY

The Universal MC Extender 32 allows you to connect an external power supply to the tested card without affecting the power supply to your PC. To connect an external power supply, make cuts in the traces (on the solder side) corresponding to the power lines as marked on the reverse side of JP5, 7, and 14. The external power supply needs to be connected into the left side of the corresponding jumper.

BREADBOARD AREA

The UME32 provides a small breadboard area, making it easy to add peripherals to your test circuitry. All the signals required to implement a parallel I/O port are conveniently located at the B2 connector. The signals are as follows:

Pin 1 - Pin 8 DO - D7	These are unbuffered data lines from the MC Bus.
Pin 9 WSEL	This pin is active low I/O write line. It is decoded by UME32 circuitry and it is activated when I/O write to address equal BASE ADDRESS +1 (for example 801 HEX) is executed on the MC Bus.
Pin 10 RSEL	This pin is active low I/O write line. It is decoded by UME32 circuitry and it is activated when I/O read from address equal BASE ADDRESS +1 is executed on the MC Bus.
Pin 11 and Pin 12	These pins are connected to the GND of the MC Bus.
Pin 13	This pin is connected to -12V power supply on the MC Bus
Pin 14	This pin is connected to +12V power supply on the MC Bus.
Pin 15	This pin is connected to +5V power supply on the MC Bus.

TROUBLESHOOTING

The following are some of the reasons that your Extender card may fail to operate correctly:

1. I/O address conflict

If any program that runs on your PC accesses the I/O address occupied by your UME32, then the following may happen:

A. The program may read the UME32 register instead of the desired register somewhere else (including the register on the tested card). In this case, erroneous data will be read. In addition, because more than one device will be driving the Bus at the same time, one of them is subject to damage. If the conflict includes the driver on the tested card, the corresponding DATA line bus switch on the UME32 may become damaged.

B. The program may write data into the UME32 register and disable the functions of the card. Make sure the selected I/O address for your UME32 registers do not conflict with any other devices and/ or software running on your PC.

2. Delay to the Signal propagation between the MC Bus and the Test Card

If the timing margin between the tested card and the MC Bus is narrow, additional delay in the signal propagation caused by resistance and capacitance of the CMOS switches (QS3384), combined with a voltage drop across the switch, may cause some or all of your cards to fail to operate correctly when inserted into the UME32.

To verify that timing is the problem you can:

1. Remove all unnecessary cards from the MC Bus.

OR

2. Talk to your design engineer to find out if there is any known marginal timing issue.

3. A damaged BUS switch

Bus switching components are exposed to damage resulting from faulty cards inserted into the top connector, or from removing and inserting tested cards without turning the power to the top connector off. Replace the damaged Bus switch with the same type/brand or send the card to AZ-COM for repair.

SPECIFICATIONS

Maximum Current:	+5V 8A All other, 2A	
Overcurrent setting:	+5V 4 A +12V 0.5A -12V 0.5A	*Factory setting with JP8 - JP12 installed
Bus switch:	5 Ohm Typical 7 Ohm Maximum, 10pF maximum at 0V/ 25 C.	
Signal's direction:	All signals except for the RESET signal are connected to the MC Bus via a bi-directional analog switch. The RESET signal is uni-directional from the MC bus into the top connector.	
LED indicators:	Power On (1) Overcurrent (3)	
Physical Traits:	Size: 4.6 inches high, 12.3 inches long. Weight: 10 oz.	
Temperature:	Operating 0 C to +50 C Storage -20 C to +70 C	

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Electronic Extenders and Mini's:

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ISA Electronic Extender (High Speed)	PC Mini
Universal MC Extender 16	MC 16V Mini
Universal MC Extender 32	MC 32 Mini
Smart NuBus Extender	NuBus Mini
EISA Electronic Extender	EISA Mini
VESA Electronic Extender	VESA Mini
PCI Electronic Extender	PCI Mini
Electronic MAC LC Extender	NuBus Mini

Passive Extender Cards with optional pin header below top:

Passive AT

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