INDUSTRIAL COMPUTER SOURCE

TM

Model EMC-CH6AT
Product Manual

MANUAL NUMBER : 41417-021-1A

FORWARD

This instruction manual provides the necessary user information for the referenced product(s) manufactured or distributed by Industrial Computer Source for the user to install, operate and/or program the product properly. Please refer to the following pages for information regarding the warranty and repair policies.

Technical assistance is available at (619) 271-9340.

Manual Errors, Omissions and Bugs: A Bug Sheet is included as the last page of this manual. Please use it if you find a problem with the manual you believe should be corrected.

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Some sales items and custom systems are not subject to the guarantee and limited warranty. However in these instances , any deviations will be disclosed prior to sales and noted in the original invoice. ***Industrial Computer Source reserves the right to refuse returns or credits on software or special order items.***

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Current Revision 1A

February 1994

Chapter 1: Product Description

This manual contains the information required to install and use the EMC-CH6AT chassis.

The EMC-CH6AT chassis can hold up to six EXM modules, plus an additional 8-bit or 16-bit PC/AT add-in card. Any AT card up to seven inches long fits inside the EMC-CH6AT.

The chassis contains a "utility" printed board assembly (PBA) that provides battery-backed RAM memory, a watchdog timer, and a software-readable switch.

Mounting possibilities are two-fold. For most configurations, the chassis can be slid into a Eurocard module and secured using four front panel mounting screws.

Alternatively, the chassis can be attached to a frame or wall using the supplied mounting brackets. The brackets attach to either the rear of the chassis or to the right side.

Specifications

Table 1 defines the environmental and electrical specifications of the EMC-CH6AT chassis.

Enviromental Specifications		
Temperature	operating	0°C to +60°C
	storage	-40°C to +85°C
Humidity	operating	5% to 95% non condensing
	storage	5% to 95% non condensing
Vibration	operating	.025" Peak to Peak
	storage	.030" Peak to Peak
Shock	operating	30g 11ms duration, half-sine wave
	storage	50g 11ms duration, half-sine wave
Dimension		
	Height	262mm (10.3 in)
	Width	122mm (4.8 in)
	Depth	221mm (8.7 in)
	Weight	2.07 kg (4.56 lb)
Power Load (50W max)		
	+5VDC	10A
	+12VDC	4A
	-12VDC	.5A
	-5V	.5A (for AT card)

Table 1: EMC-CH6AT Specifications

* Upper temperature limit degrades 2° C per 1000 ft. elevation. maximum elevation 10,000 ft.

Chapter 2: Installation

Before installing the chassis, unpack and inspect it for shipping damage.

- Do not remove the chassis from its anti-static bag unless you are in a static-free environment. the EMC-CH6AT, like most other electronic devices, is susceptible to ESD damage. ESD damage is not always immediately obvious, in that it can cause a partial breakdown in semiconductor devices that might not immediately result in a failure.

- Ensure that the installation process as described herein is also performed in a static-free environment.

Mounting Instructions

There are two options for mounting the chassis:

- Using the enclosed mounting brackets

- Inserting into a Eurocard-type cabinet

Mounting Brackets

The enclosed brackets allow the chassis to be installed in two different configurations: bolting the back to a wall or frame, or bolting the right side to a wall or frame.
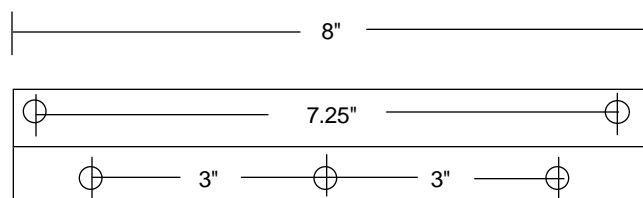
Refer to the figure below.

Figure 1. Mounting Brackets.
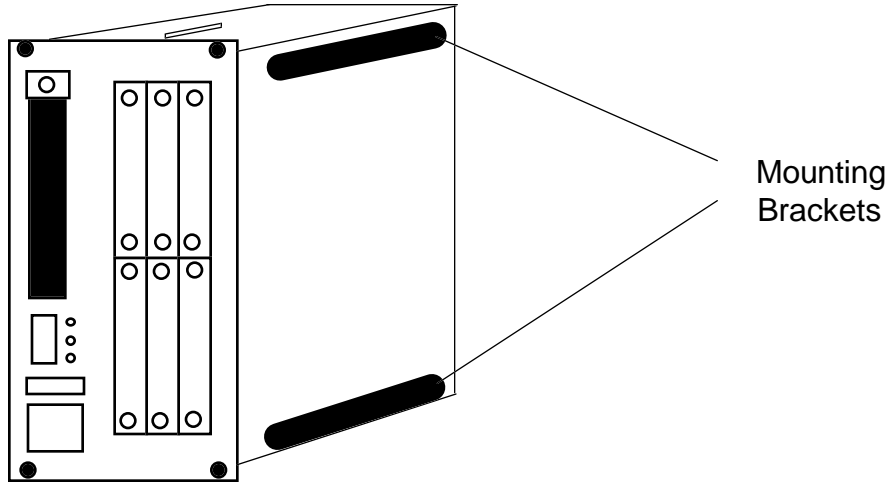
Figure 2. Mounting Bracket Positions.

Eurocard Guides

The chassis has guides or tabs on top and on the bottom to enable insertion into a Eurocard cabinet. Refer to the figure below.
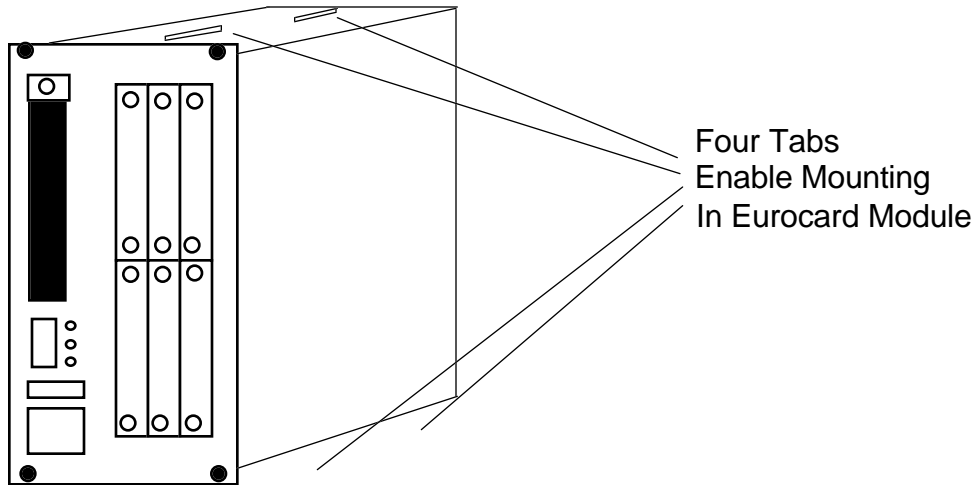

Figure 3. Eurocard Mounting Slots.

Secure the chassis using the front mounting screws provided. The screws are shipped uninstalled, and are found in a small plastic bag that accompanies the chassis. For a list of accessories provided with the chassis, refer to Chapter 3, *Operations*. Do not over tighten the screws. Refer to the figure below.
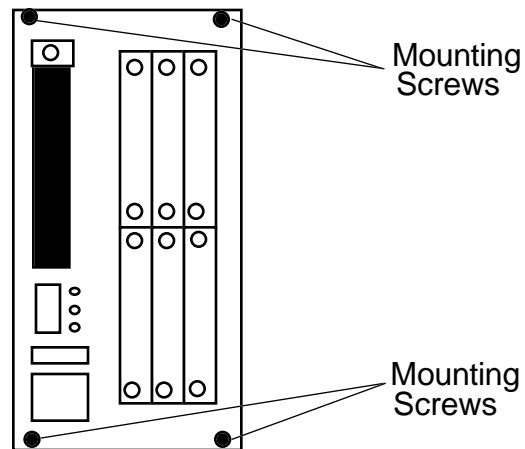
Figure 4. Front Panel Mounting Screws.

Once the chassis is mounted, install the EXM modules according to the instructions in each EXM hardware reference module.

- Make sure that power to your system is off. EXM modules are not designed to be inserted or removed from a live system.

- When inserting the EXMs, avoid touching the circuit board, and make sure the environment is static-free.

- Insert EXMs with adequate continuous force rather than tapping or hammering ON IT.

Power

Power connection is provided by a standard IEC-type computer power cord that plugs into the front panel.

Figure 5. Power Connection.

An on/off power switch and power-on LED are located on the front panel.

The user-replaceable fuse is a 1 amp, 250V fuse. It is located in the power cord connector and is covered by a thin black plastic tab. Refer to Figure 5.
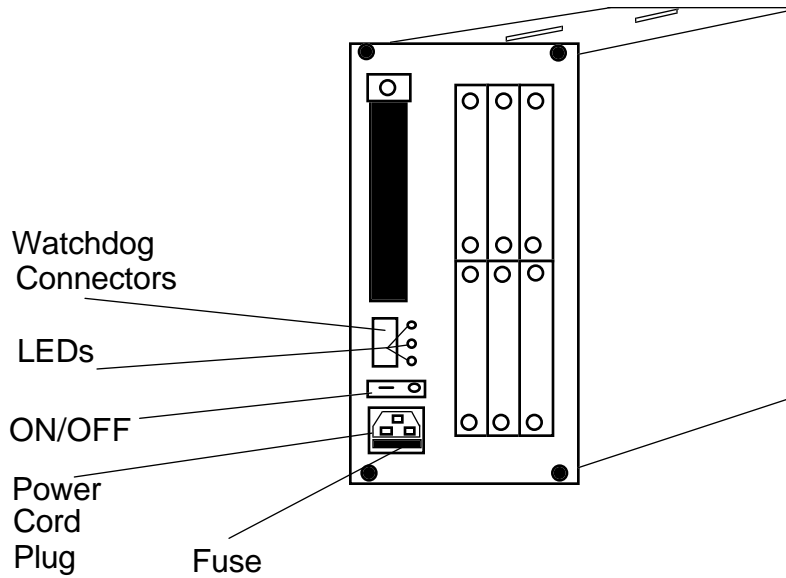
An AC power fail circuit is present to detect power failure or indicate power below 90V RMS. This circuit may be configured to cause an interrupt. Refer to Chapter 3, *Operations*.

Configuring the BIOS Setup

Configuration Registers

The configuration registers are used to program various options. These registers are defined as follows: the utility PBA at slot 6 responds to I/O reads of address 100h, if the signal EXMID is asserted. The PBA responds with an ID of **7B**. Refer to Chapter 3, *Operations*, for more information on the Configuration Registers.

EXM Slot Numbering

EXM slot numbers are used in the CPU BIOS Setup to configure installed EXM modules. The seven slots are numbered 0 through 6 with slot 0 on the lower left. See the diagram below.
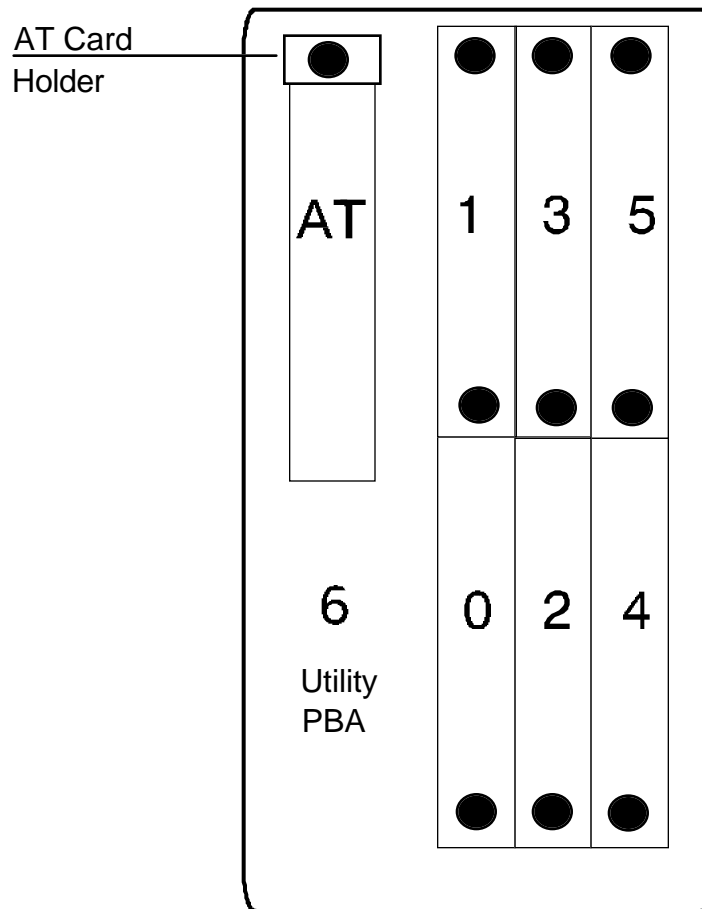
Figure 6. EXM Slot Numbering.

The EXM Setup Screen displays the EXM configuration data (in hexadecimal) stored in non-volatile memory which the EPC uses at power-up to recognize and configure each installed EXM. An example of configuration data for the AT slot is shown in bold in slot 6. The displayed data shows SLOT, ID, OB1 and OB2. These are defined as follows:

SLOT   indicates the slot in where the module is installed. The number of slots in an EMC-CH6AT system (7) is entered in the CPU BIOS.

ID   is a hard-wired ID value. Each EXM has a unique ID value.

OB1/OB2   are two bytes of option information.

All slots **not** occupied by an EXM module should show an ID of FF and OB1/OB2 of   00 00 indicating that no EXM is present.

	ID	OB1	OB2
Slot 0	FF	00	00
1	DB	C1	00
2	D5	C1	00
3	DE	01	00
4	F5	05	00
5	DC	F5	91
6	**7B**	**FB**	**FF**

Figure 7. EXM Setup Screen.

To add or change an EXM configuration, use the cursor keys (arrows) to move between the fields on the screen. Move the cursor to the appropriate slot entry and type in the correct value.

The **ID** for the internal utility board (slot 6) should be set to **7B**h.

OB1 is a hexadecimal value derived by combining the following:

AC Fail IRQ Select	Watchdog Timer IRQ Select	Watchdog Relay Enable	SRAM Enable
(bits 7-5)	(bits 4-2)	(bit 1)	(bit 0)
See Table 2	See Table 2	0 - disabled 1 - enabled	0 - disabled 1 - enabled

Figure 8. OB1 Register.

IRQs are encoded for the AC Fail IRQ Select and the Watchdog Timer IRQ Select in Table 2 below.

000	no IRQ	**011**	IRQ5	**110**	IRQ11
001	NMI	**100**	IRQ7	**111**	IRQ15
010	Reset CPU	**101**	IRQ9 (2)		

Table 2. IRQ Selections.

For example, a typical OB1 value is **FB**h (11111011) indicating AC Fail IRQ at IRQ15, Watchdog Timer IRQ at IRQ11, and both Watchdog Relay and RAM enabled.

OB2 is used to read the remote inputs and the software readable switch.

Reserved	Remote Input	Wathcdog Timer Output	Software Readable Switch
(bits 7-3)	(bit 2)	(bit 1)	(bit 0)
11111	0 - disabled	0 - disabled	0 - disabled
	1 - enabled	1 - enabled	1 - enabled

Figure 9. OB2 Register.

OB2 is read-only and is always set to **FF** in the EXM Setup Screen.

Installing the AT Card

Installing the AT card is simple. The chassis provides an interface for an 8-bit or 16-bit "short" PC add-in card. The maximum size add-in card that will fit is 7 inches long.

To install an add-in card, first remove the side panel that is on the left, or AT card slot side of the chassis. Unscrew the screws holding the side cover and set aside.

Next, loosen the thumbscrew on the clamp on top of the AT card slot and slide up. Take care not to remove the thumbscrew and clamp, as the backing plate will fall inside the chassis. Lift out the AT slot front panel dust cover and set it aside.

Bring the AT card into the chassis from the side panel direction. Notice that there is a short metal slot that will hold the bottom of the AT card front panel connector. Place the AT card above the AT slot, with the front panel connector in position, and prepare to seat it. Push straight down on the AT card's front panel connector until it seats, then press firmly from the back of the AT card until the card is completely in position.

Move the thumbscrew/clamp and holder back into position and tighten.

Replace the side panel and tighten the holding screws.

The data bus passes directly from the backplane to the AT card slot, as do all other signals. Address, control strobes, and clock signals are buffered.

The AT bus interface does not support "bus master" cards in the AT card slot.

There is no provision for disabling the AT card except for removing it.

Cooling Requirements

Cooling requirements are minimal for the chassis. The EMC-CH6AT is convection cooled, requiring no forced air in or around the unit. The system should have a minimum of five inches of air space on all sides if mounted using the brackets. Otherwise, the fan inside the Eurocard module provides sufficient cooling.

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Watchdog Timer

The watchdog timer is a relay contact that opens when the timer times out. If enabled, the watchdog timer will cause an interrupt to be asserted to the CPU, or may activate a relay closure to reset the hardware or perform some other programmed function. The watchdog timer is enabled via software using the EXM configuration mechanism.
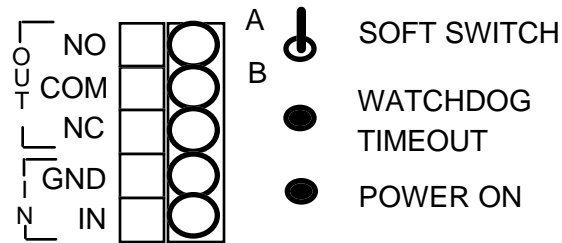
Figure 10. Watchdog Timer.

The timeout period is set via jumpers at JP2 on the EMC-CH6AT chassis' printed board assembly (PBA).
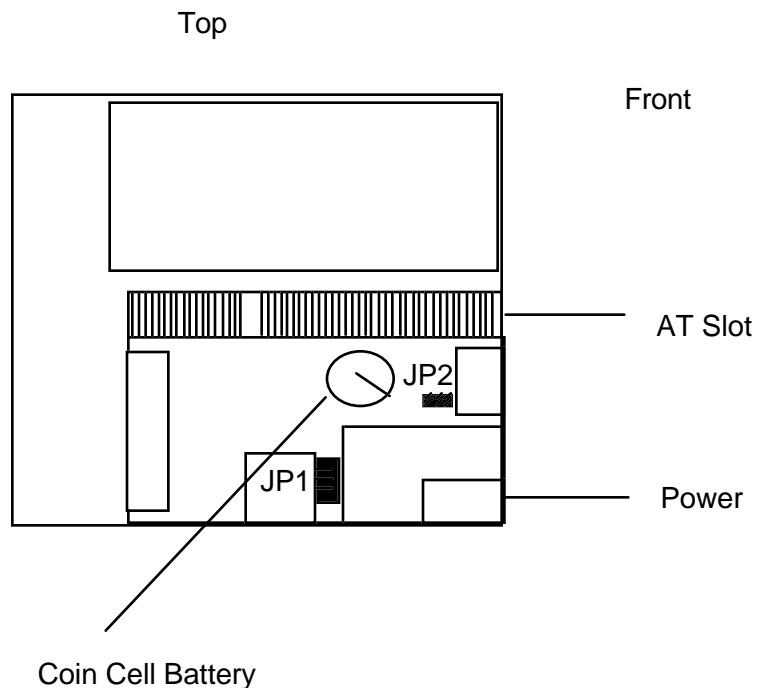
Figure 11. Location of JP1 and JP2 and Coin Cell Battery.

Timeouts of 250 ms, 500 ms, and 1 second (or any combination, up to 1.75 seconds) are select-
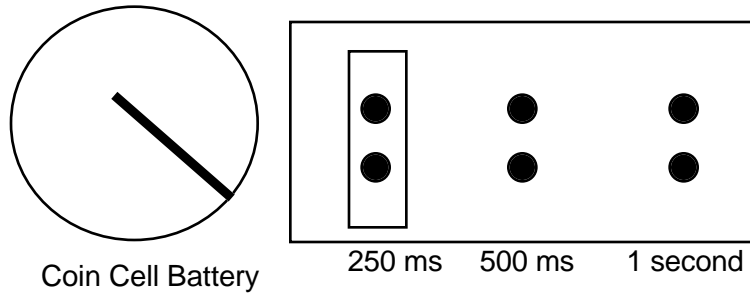able via JP2 using the jumpers included with this chassis.

Coin Cell Battery   250 ms   500 ms   1 second

Figure 12. JP2 Jumper Selection for 250 ms Timeout.

The watchdog timer relay contact is SPDT, rated at 1A 30VDC, .5A 125VAC. The relay con-
tact and remote input is accessed via a five-terminal pluggable terminal strap, LMI 202400 or
equivalent. A red LED on the front panel is illuminated while the watchdog relay is in the de
energized state.

Software-Readable Switch

The chassis contains a software readable switch and remote input on the front panel that pro-
vides a miniature toggle switch for user-defined functions read in OB2.

Remote Input

The watchdog timer contains a single-line input signal that is readable in OB2. The remote
input is TTL-compatible, and a pull-up is present on the utility printed board assembly. The
remote input is readable by software, and is accessed via the five-position terminal strip. The
other connection (-) on the front is logic ground.

To activate the remote input, either connect the IN+ and IN- terminals with a switch or relay, or
signal a TTL-compatible signal into the IN+ pin (IN- is logic ground).

Battery-backed CMOS SRAM

The utility PBA contains a 32K CMOS SRAM chip that is battery-backed with a socketed coin cell. The coin cell is located next to JP2 on the utility PBA. The battery supplied is a 23mm. 3V lithium "coin" battery or equivalent (e.g. Panasonic BR2330 or Rayovac BR2335). Should the battery fail or be removed, any SRAM data is invalidated. The figure below illustrates how to change the battery.
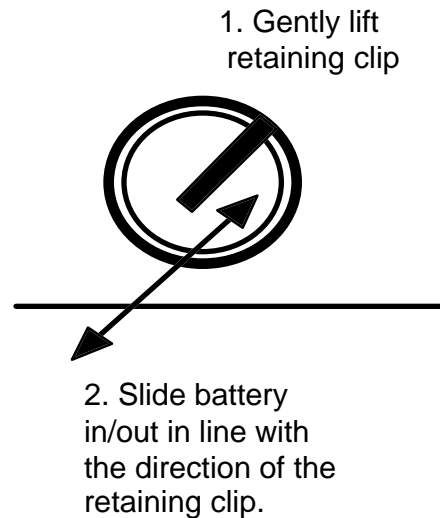
1. Gently lift
retaining clip

2. Slide battery
in/out in line with
the direction of the
retaining clip.

Figure 13. Battery Removal.

The SRAM is mapped into the I/O space of the computer, so no memory space is needed. The SRAM is accessed through three registers: two address registers and a data register. All three are 8-bit registers. The address automatically increments after a read or write of the data register. The data register is at fixed address 390h. The address register is at 392h and 393h, with the LSB at 392h and the MSB at 393h. The most significant bit of the MSB is unused, since a 32K device uses 15 address signals.

Additional Items Shipped With Chassis

In addition to the chassis itself, the following items are shipped in a plastic bag attached inside the chassis frame:

1. Four front-panel mounting screws & collars
2. Two mounting brackets
3. Four screws for use with mounting brackets
4. Three jumpers
5. Terminal strip

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BUG REPORT

While we have tried to assure this manual is error free, it is a fact of life that works of man have errors. We request you to detail any errors you find on this BUG REPORT and return it to us. We will correct the errors/problems and send you a new manual as soon as available. Please return to:

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Product: **EMC-CH6AT**

Manual Revision: **41417-021-1A**

Please list the page numbers and errors found. Thank you!