

**VX-Series**  
STD Bus Industrial Card Cages

**REFERENCE MANUAL**

VX-03R Rev. 0.01  
VX-03T Rev. 0.01  
VX-06R Rev. 0.01  
VX-06T Rev. 0.01  
VX-09R Rev. 0.01  
VX-09T Rev. 0.01  
VX-12R Rev. 0.01  
VX-12T Rev. 0.01

Doc. Rev. 03/23/94

**VersaLogic Corporation**  
3888 Stewart Rd. • Eugene, OR 97402

(503) 485-8575  
Fax (503) 485-5712

Contents Copyright 1994  
All Rights Reserved

**NOTICE:**

Although every effort has been made to ensure this documentation is error-free, VersaLogic makes no representations or warranties with respect to this product and specifically disclaims any implied warranties of merchantability or fitness for any particular purpose.

VersaLogic reserves the right to revise this product and associated documentation at any time without obligation to notify anyone of such changes.



MVX3/12

# Table of Contents

---

Introduction . . . . .	2
Card Orientation . . . . .	2
Mounting Options . . . . .	3
Dimensions . . . . .	4
Motherboard . . . . .	5
Termination . . . . .	5
Bus Speed . . . . .	5
Power Supply Options . . . . .	5
Priority Chain Signal . . . . .	5
Jumper Options . . . . .	5
Distributed Processing . . . . .	5
Connection Points . . . . .	6
Solder Pad Layout . . . . .	7
STD Bus Pinout . . . . .	8

## Introduction

---

The VX Series card cages are high quality STD Bus card cages especially suitable for industrial applications. They feature heavy-duty cold-rolled steel construction with sealed black oxide finish, 5/8" card spacing, card restraint bar, and the VXMB low noise motherboard with shielded signal lines and high reliability bus connectors.

The VX Series card cages are available in several sizes and configurations. Cages can be purchased in 3, 6, 9, and 12-slot versions, with or without motherboard, and are available with table or rack/panel-mount end plates. Other mounting positions are possible by rotating the left and right end plates 180 degrees. Additionally the mounting flanges can be oriented inwards or outwards.

The VXMB Series motherboards feature interleaved signal and ground traces for increased immunity to crosstalk and signal noise, high speed/low capacitance two-layer construction, high reliability card connectors with gold plated contacts, and clearly labeled power supply connection points.

## Card Orientation

---

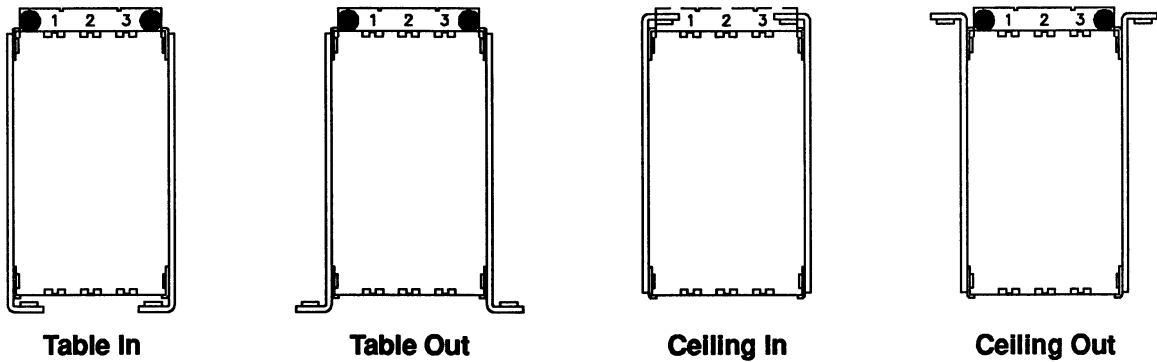
STD Bus cards which are inserted in the card cage must be oriented correctly. Most STD Bus board manufacturers provide a card ejector on the top edge of their cards. Be certain to position these card ejectors toward the top of the card cage. For upside down or unusual mounting positions note the large white arrow(s) on the motherboard (between connectors) that indicate the proper card ejector orientation.

**\*\* CAUTION \*\*** Cards should be inserted or removed from the STD Bus card cage only when the system power is off.

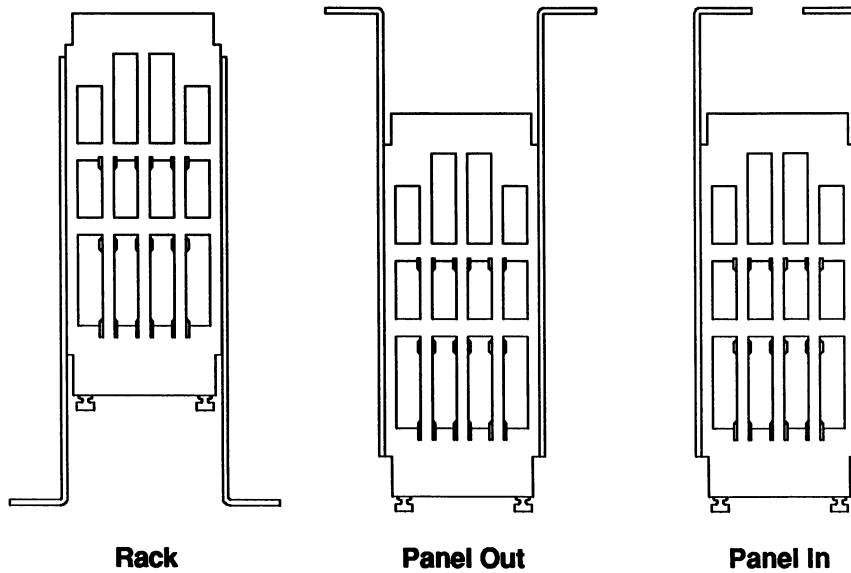
# Mounting Options

The VX Series cages can be mounted in a variety of ways by changing the orientation of the end plates. The figures below show the various combinations for the table and rack/panel-mount versions of the cage.

The four threaded mounting holes in the table-mount flanges accept #8-32 screws. The four 0.281" slots in the rack/panel flanges will clear #12 or smaller diameter screws.

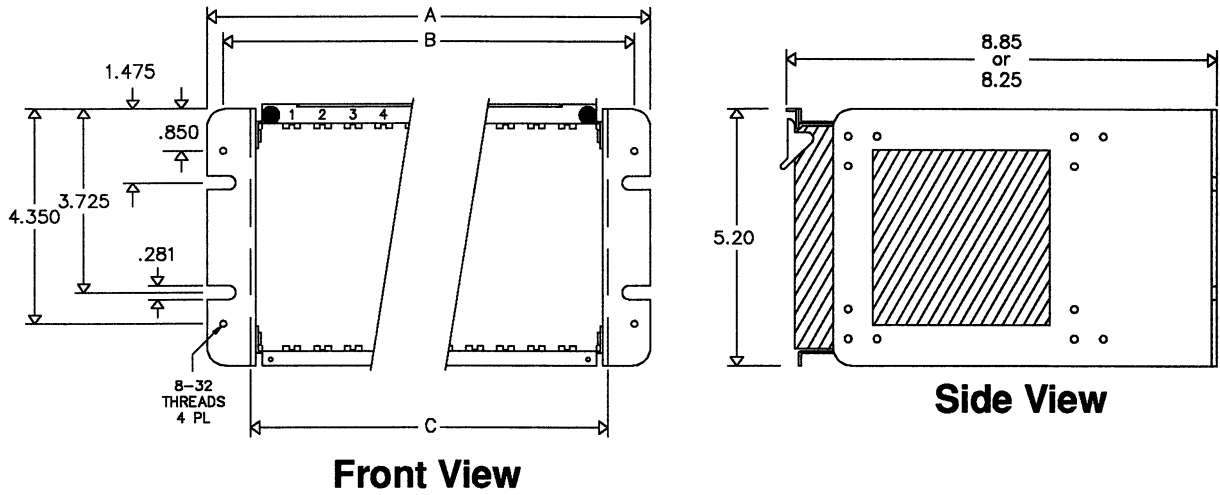


**Table-Mount End Plates – Front View**



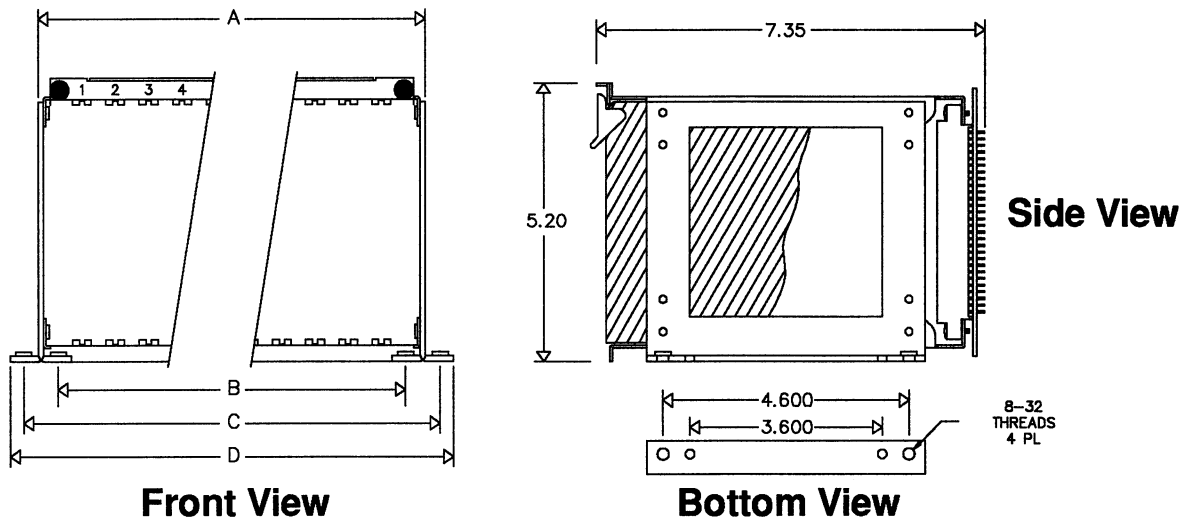
**Rack-Mount End Plates – Top View**

*Figure 1. Mounting Configurations*



Model	Slots	A	B	C	(Inches)
VX-03R	3	4.62	3.93	2.83	
VX-06R	6	6.50	5.81	4.71	
VX-09R	9	8.37	7.68	6.58	
VX-12R	12	10.25	9.56	8.46	

Figure 2. Overall Dimensions (Rack / Panel-Mount Models)



Model	Slots	A	B	C	D	(Inches)
VX-03T	3	2.83	2.07	3.41	3.91	
VX-06T	6	4.71	3.95	5.29	5.79	
VX-09T	9	6.58	5.82	7.16	7.66	
VX-12T	12	8.46	7.70	9.04	9.54	

Figure 3. Overall Dimensions (Table-Mount Models)

# **Motherboard**

## **Termination**

The VXMB motherboard used in the VX Series card cages features fully shielded signal lines (interwoven ground plane) to reduce noise and signal crosstalk on the bus. This design provides excellent, high speed performance and does not require any other type of noise control such as bus termination networks. The two-sided PCB design reduces the capacitive loading and associated problems that occur with multilayer mother board designs.

## **Bus Speed**

All VX Series motherboards are designed to operate correctly, unterminated, when run at clock speeds less than or equal to those set forth in the STD Z-80 6 MHz, or STD-80 Series Compatible 8 MHz bus timing specifications. Operation at the high end of these specifications requires the use of 74LSxxx or 74HCxxx bus driving components on the CPU (bus master). All motherboards work properly at 10 MHz when using CPU cards manufactured by VersaLogic.

## **Power Supply Options**

The STD Bus system can be powered with a plug-in, in-slot power supply such as VersaLogic's PSC card, or by connecting an external power supply to the solder pads on the back of the motherboard.

## **Priority Chain Signal**

The STD Bus includes a Priority Chain In (PCI) and a Priority Chain Out (PCO) signal line which can be used in a daisy chain (i.e., card slot dependent) interrupt structure. The VX Series motherboards connect each PCO line to the PCI line of the card slot on its left. This results in the card slot in the far right position being the highest priority slot. The far left slot is the lowest priority slot.

## **Jumper Options**

Jumper V1 ties STD Bus pin 5 (VBB1) and pin 6 (VBB2) together for applications which require these two pins to be common. Jumper V2 ties AUXGND (pins 53 and 54) to GND (pins 3 and 4). Refer to the solder pad layout drawings for jumper locations.

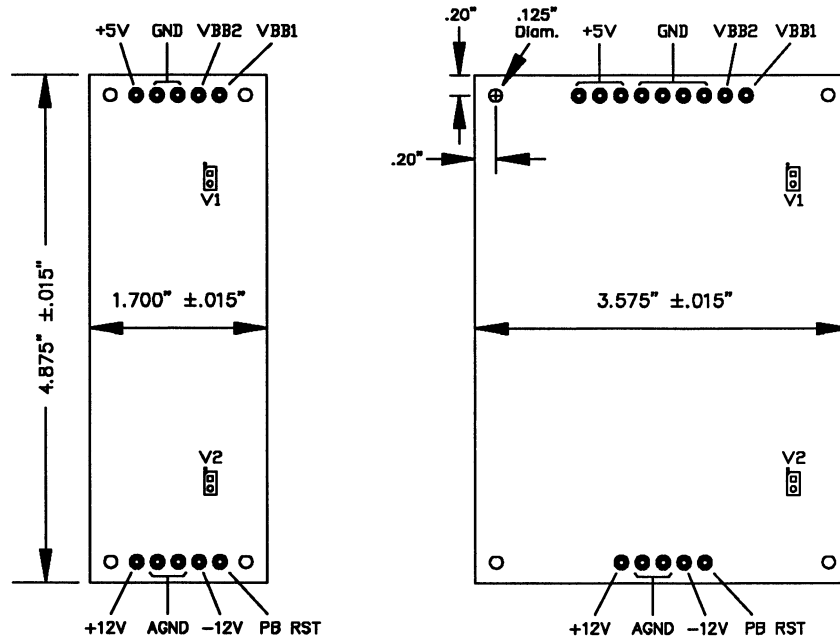
## **Distributed Processing**

The VX Series card cages are designed to allow the mounting of several electrically isolated motherboards within a single cage. Multiple motherboards can be combined without the loss of a card slot (e.g., a 6 and 3-slot motherboard installed into a 9-slot cage).

## Connection Points

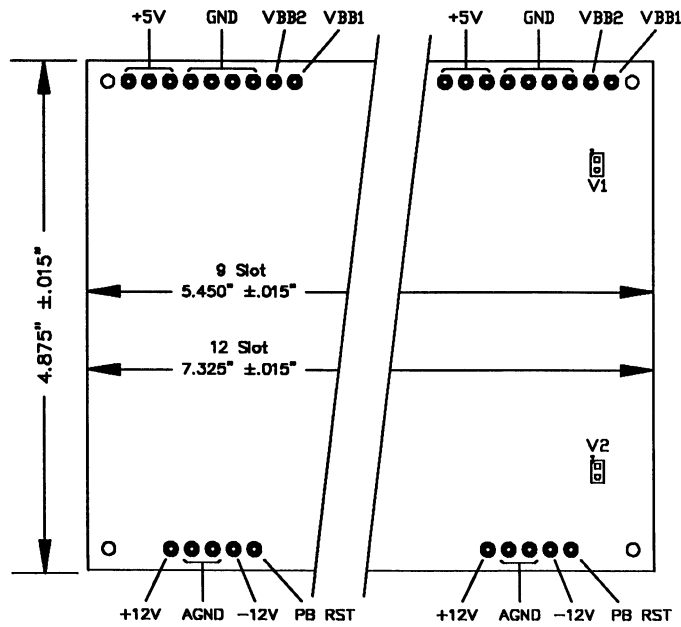
In addition to the STD Bus boards which plug into the bus, a number of external connections may be made to the motherboard. Pads for these connections are provided along the top and bottom edges of the motherboard. The available connection points are:

- +5V** Connection to the +5 volt power supply line.
- GND** Ground connection for the +5 volt power supply.
- VBB1** Connection for -5 volt or battery backup voltage (VBAT) STD Bus pin 5. By soldering a shorting wire across jumper V1, bus pins 5 and 6 can be tied together. Refer to the solder pad layout drawings for jumper location.
- VBB2** Connection for loss-of-power indication (DCPD\*) STD Bus pin 6. Note, if jumper V1 is inserted, this pad is tied in common with VBB1.
- +12V** Connection to +12 volt power input (if used).
- AGND** Ground connection for the ±12 volt power supply (AUXGND). By soldering a shorting wire across jumper V2, AUXGND can be tied to GND for systems which need these two grounds to be common. Refer to the solder pad layout drawings at the end of this manual for jumper location.
- 12V** Connection to -12 volt power input (if used).
- PB RST** Connection to a system reset push button switch (normally open).



**SOLDER SIDE**

*Figure 4. Solder Pad Layout (3 and 6-slot motherboards)*



**SOLDER SIDE**

*Figure 5. Solder Pad Layout (9 and 12-slot motherboards)*

# STD Bus Pinout

The connector pin assignments for STD Bus cards are shown below. Pins 1 and 2 are at the top (card ejector) edge of the board. As noted below the odd numbered pins are on the component side of the board, while the even numbered pins are on the solder side. Direction of signal flow is referenced to the bus master (i.e., processor card).

## COMPONENT SIDE

Pin	Signal	Flow	Description
1	+5V	In	+5 volt power
3	GND	In	Digital ground
5	V <sub>BB1</sub>	In	-5V or Bat Backup
7	D3 / A19	I/O	Data / Address bus
9	D2 / A18	I/O	Data / Address bus
11	D1 / A17	I/O	Data / Address bus
13	D0 / A16	I/O	Data / Address bus
15	A7	Out	Address bus
17	A6	Out	Address bus
19	A5	Out	Address bus
21	A4	Out	Address bus
23	A3	Out	Address bus
25	A2	Out	Address bus
27	A1	Out	Address bus
29	A0	Out	Address bus
31	WR*	Out	Write strobe
33	IORQ*	Out	I/O addr. select
35	IOEXP	I/O	I/O expansion
37	REFRESH*	Out	Refresh timing
39	STATUS1*	Out	CPU status
41	BUSAK*	Out	Bus acknowledge
43	INTAK*	Out	Interrupt acknowledge
45	WAITRQ*	In	Wait request
47	SYSRESET*	Out	System reset
49	CLOCK*	Out	CPU clock
51	PCO	Out	Priority chain out
53	AUXGND	In	±12 volt ground
55	AUX+V	In	+12 volt Output

## SOLDER SIDE

Pin	Signal	Flow	Description
2	+5V	In	+5 volt power
4	GND	In	Digital ground
6	V <sub>BB2</sub>	In	-5V or Power Down
8	D7 / A23	I/O	Data / Address bus
10	D6 / A22	I/O	Data / Address bus
12	D5 / A21	I/O	Data / Address bus
14	D4 / A20	I/O	Data / Address bus
16	A15	Out	Address bus
18	A14	Out	Address bus
20	A13	Out	Address bus
22	A12	Out	Address bus
24	A11	Out	Address bus
26	A10	Out	Address bus
28	A9	Out	Address bus
30	A8	Out	Address bus
32	RD*	Out	Read strobe
34	MEMRQ*	Out	Memory addr. select
36	MEMEX	I/O	Memory expansion
38	MCSYNC*	Out	Machine cycle sync.
40	STATUS0*	Out	CPU status
42	BUSRQ*	In	Bus request
44	INTRQ*	In	Interrupt request
46	NMIRQ*	In	Non-maskable Interrupt
48	PBRESET*	In	Push button reset
50	CNTRL*	In	AUX timing
52	PCI	Out	Priority chain in
54	AUXGND	In	±12 volt ground
56	AUX-V	In	-12 volt Output