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Reference Manual

V32 Series

STD Bus Industrial Card Cages

STD32™

VERSALOGIC
C O R P O R A T I O N

V32-Series
STD Bus Industrial Card Cages

STD32™

REFERENCE MANUAL

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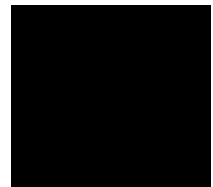(503) 485-8575
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Note

MV32

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Introduction **1**

The V32 Series card cages are high quality STD Bus card cages especially suitable for industrial applications. They feature heavy-duty cold-rolled steel construction with a sealed black oxide finish, 5/8" card spacing, card restraint bar, and the V32 five layer backplane with high reliability STD 32 bus connectors.

The V32 Series card cages are available in several sizes and configurations. Cages can be purchased in 4, 6, 8, and 12-slot versions, 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 V32 Series backplanes are compatible with STD 32 (8, 16, or 32 data bits) and STD 80 (8 data bits) cards. Cards with different data bus sizes can be mixed in a system. The high speed backplane features a .093" multilayer circuit board which provides controlled impedance, reduced capacitance signal lines. STD 32 slot specific functions are provided through slot X (leftmost slot) per the STD 32 specifications. Therefore, slot X is not bused as the other card slots are.

Card Orientation

STD Bus cards must be oriented correctly when inserted in the card cage. Most board manufacturers provide a card ejector at the top corner of their cards. Be certain to position these card ejectors toward the top of the card cage. For upside down or unusual mounting positions the card ejectors are positioned next to the card retainer bar.

Card Retainer Bar
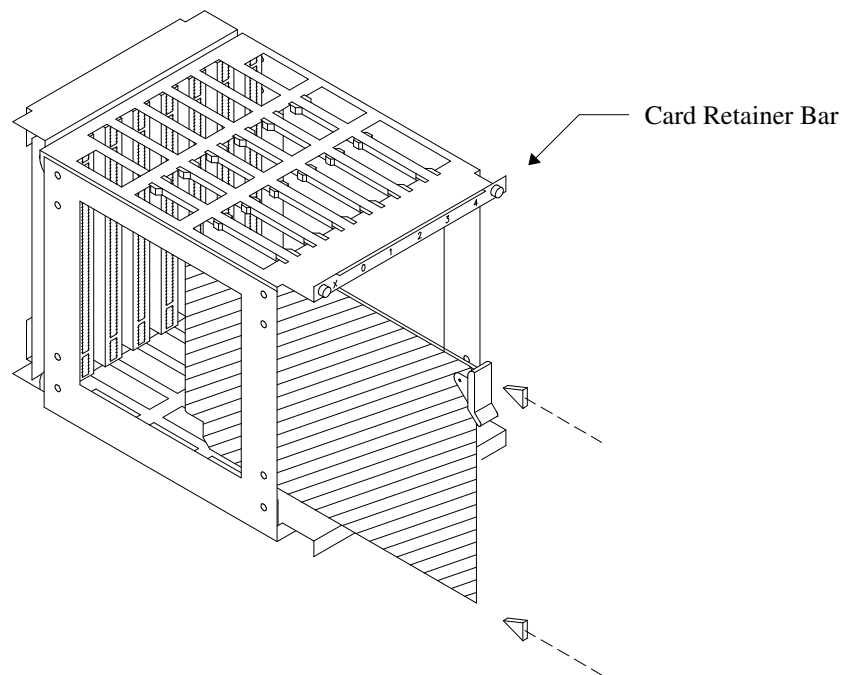
Figure 1. Card Orientation

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

Mounting Options

The V32 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 clearance holes are suitable for mounting the cage using #6 bolts.

The four 0.281" slots in the rack/panel flanges will clear #12 or smaller diameter bolts.

| **Table In** | **Table Out** | **Ceiling In** | **Ceiling Out** |
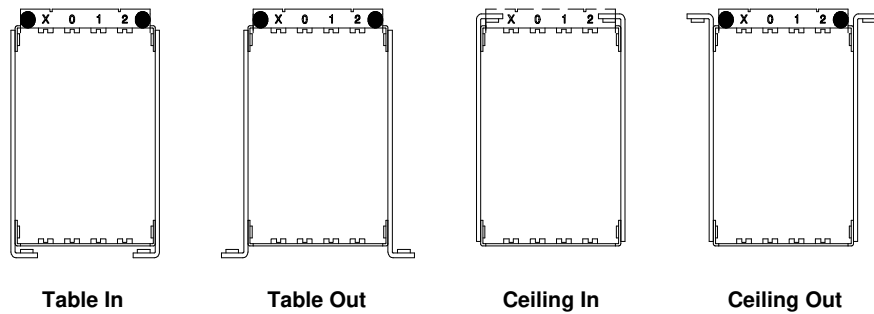
Figure 2. Mounting Configurations (Table Mount)

| **Rack** | **Panel Out** | **Panel In** |
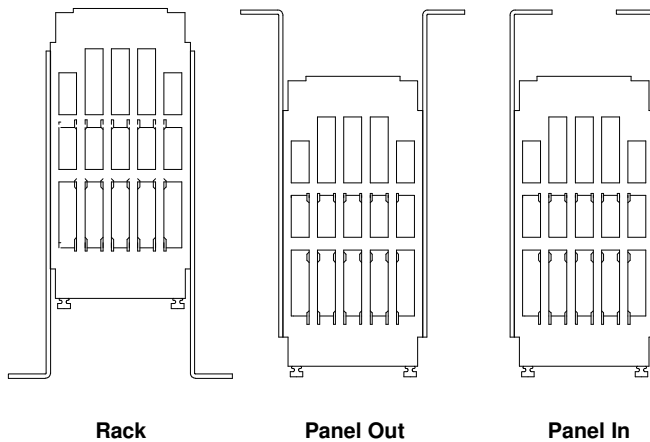
Figure 3. Mounting Configurations (Rack/Panel Mount)

Dimensions
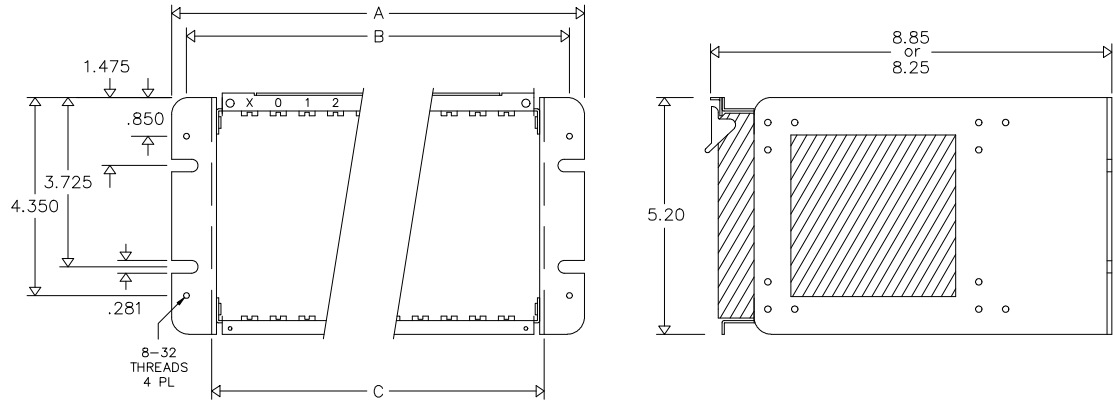
Model	Slots	A	B	C
V32-04R	4	5.25"	4.56"	3.46"
V32-06R	6	6.50"	5.81"	4.71"
V32-08R	8	7.75"	7.06"	5.96"
V32-12R	12	10.25"	9.56"	8.46"

Tolerance = ±0.02"

Figure 4. Overall Dimensions (Panel-Mount Configuration)
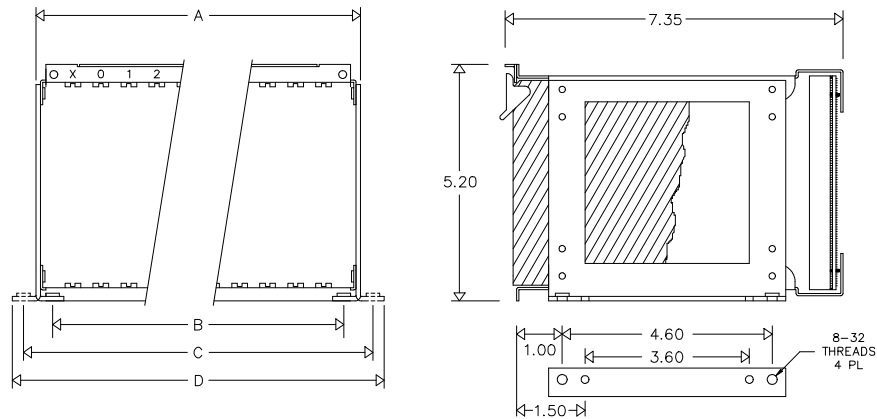
Model	Slots	A	B	C	D
V32-04T	4	3.46"	2.70"	4.04"	4.54"
V32-06T	6	4.71"	3.95"	5.29"	5.79"
V32-08T	8	5.96"	5.20"	6.54"	7.04"
V32-12T	12	8.46"	7.70"	9.04"	9.54"

Tolerance = ±0.02"

Figure 5. Overall Dimensions (Table-Mount Configuration)

Dimensions with Bolt-On Power Supply

Model	Slots	A	B	C
V32-04R	4	7.50"	6.81"	5.71"
V32-06R	6	8.75"	8.06"	6.96"
V32-08R	8	10.00"	9.31"	8.21"
V32-12R	12	12.50"	11.81"	10.71"
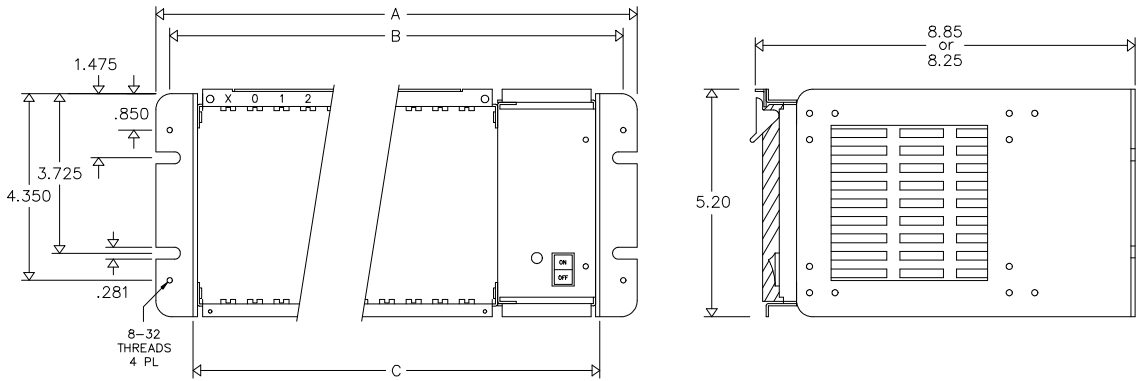
Tolerance = ±0.03"

Figure 6. Overall Dimensions (Panel-Mount Configuration)

Model	Slots	A	B	C
V32-04R	4	7.50"	6.81"	5.71"
V32-06R	6	8.75"	8.06"	6.96"
V32-08R	8	10.00"	9.31"	8.21"
V32-12R	12	12.50"	11.81"	10.71"
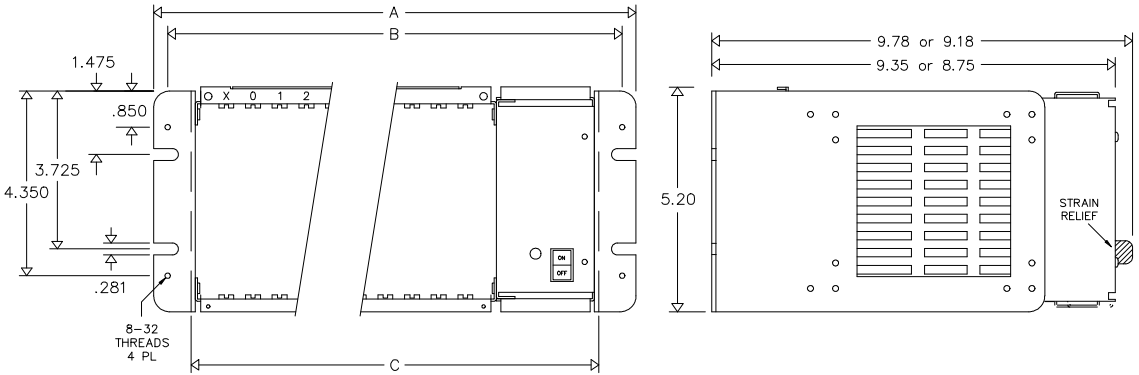
Tolerance = ±0.03"

Figure 7. Overall Dimensions (Rack-Mount Configuration)

Dimensions with Bolt-On Power Supply
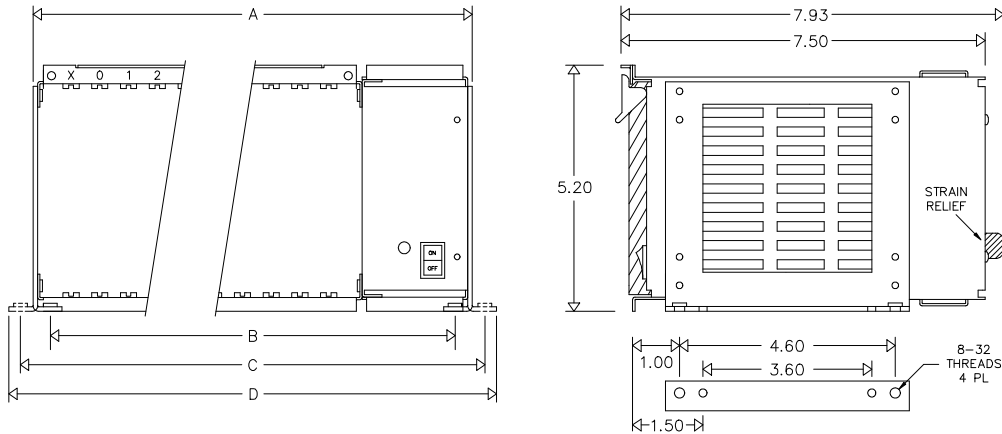
Model	Slots	A	B	C	D
V32-04T	4	5.71"	4.95"	6.29"	6.79"
V32-06T	6	6.96"	6.20"	7.54"	8.04"
V32-08T	8	8.21"	7.45"	8.79"	9.29"
V32-12T	12	10.71"	9.95"	11.29"	11.79"

Tolerance = ±0.030"

Figure 8. Overall Dimensions (Table-Mount Configuration)

Tolerance = ±0.030"

Figure 9. Overall Dimensions (12-Slot, EIA 19" Rack Configuration)

High Speed Backplane

Termination

The V32 series backplanes feature a multilayer circuit board with controlled impedance signal lines. Selected signal lines are terminated on 12 slot backplanes to provide excellent, high speed perf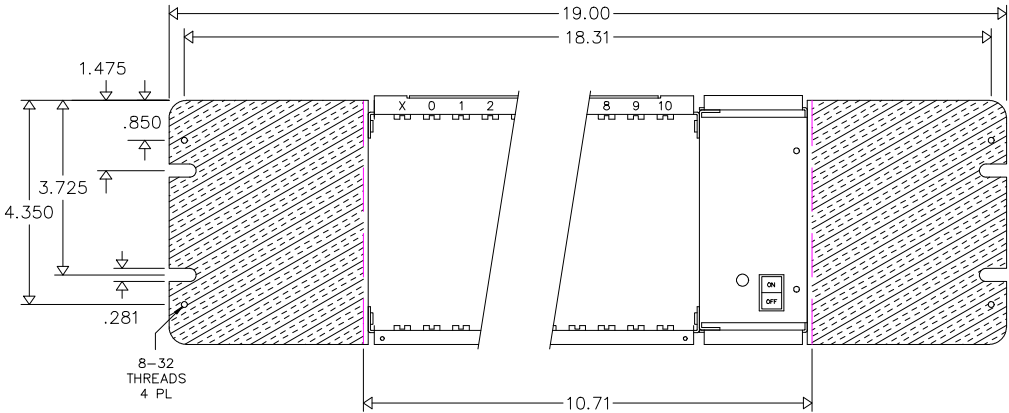ormance. The termination is applied on both ends of the circuit board with schottky diode clamps to +5V and GND rails. V32 backplanes are designed to operate at bus speeds to 16 MHz.

Compatibility

Full compatibility with STD 80 cards and STD 32 cards is maintained with the V32 backplanes. A variety of STD 80 (8 data bit) and STD 32 (8, 16, or 32 data bit) cards may be mixed in a card cage. STD 32 dynamic bus sizing signals determine which size of data bus is in use at any given time.

Slot X

The leftmost card slot in all STD 32 (V32-Series) cages is designated as Slot X and is not bussed to the other slots. This slot is available to control slot specific signal lines of the STD 32 bus and usually works in conjunction with the permanent master in Slot 0. Slot specific functions include multimaster control, interrupt control, DMA control, and slot addressing. Slot X can accommodate an in-rack power supply if desired.

Priority Chain Signal

On 4, 6, and 8 slot cages, the Priority Chain In (PCI) and a Priority Chain Out (PCO) signal lines can be used as a daisy chain (i.e., card slot dependent) interrupt structure. Each PCO line is connected 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. Slot 0 is the lowest priority slot. Slot X is not included in the priority chain.

On 12 slot cages, the PCI and PCO signals are connected together and bussed across all connectors to distribute +3.3V power.

Ground Lines

The two power supply ground lines, GND (+5V ground) and AUX GND (±12V ground), are not tied together on the backplane. Normally these two grounds must be connected together. The ideal location for this connection is at the power supply or at the STD card that requires the common ground. All VersaLogic power supplies connect both grounds together.

Power Supply Options

The STD Bus system can be powered with an in-slot power supply such as VersaLogic's VL-PSC card in Slot X, a VL-PS35/50/80/100 series bolt on power supply, or an external stand alone power supply. Connection points are supplied on the backplane for power supply and push button reset switch connections.

External Connections

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 left and right edges of the backplane. The available connection points are:

Signal	Description
+5V	Connection to the +5 volt power supply line.
GND	Ground connection for the +5 volt power supply.
AUX+ (+12V)	Connection to +12 volt power supply line.
AUX GND	Ground connection for the ±12 volt power supply. AUX GND should be tied to GND at the power supply for systems which need these two grounds to be common.
AUX− (−12V)	Connection to the −12 volt power supply line.
PBRESET	Connection to a system reset push button switch (normally open). Short to GND to initiate a system reset.
+3.3V	Connection to the +3.3 volt power supply line. (12 slot cage only).

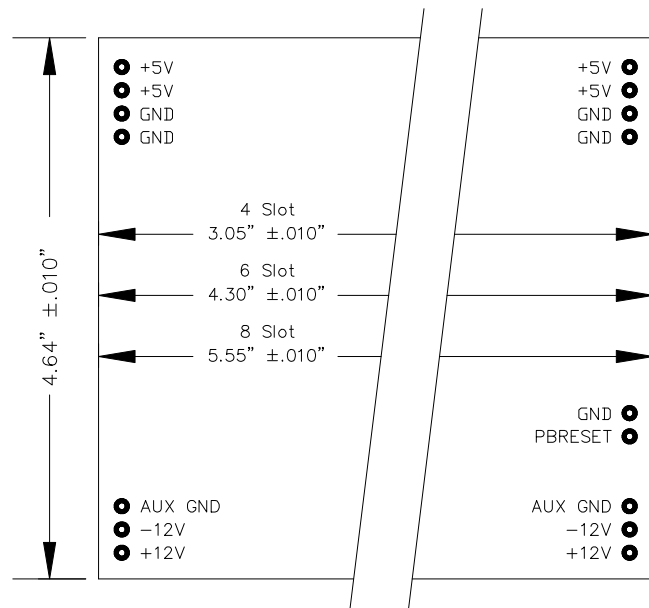# External Connections

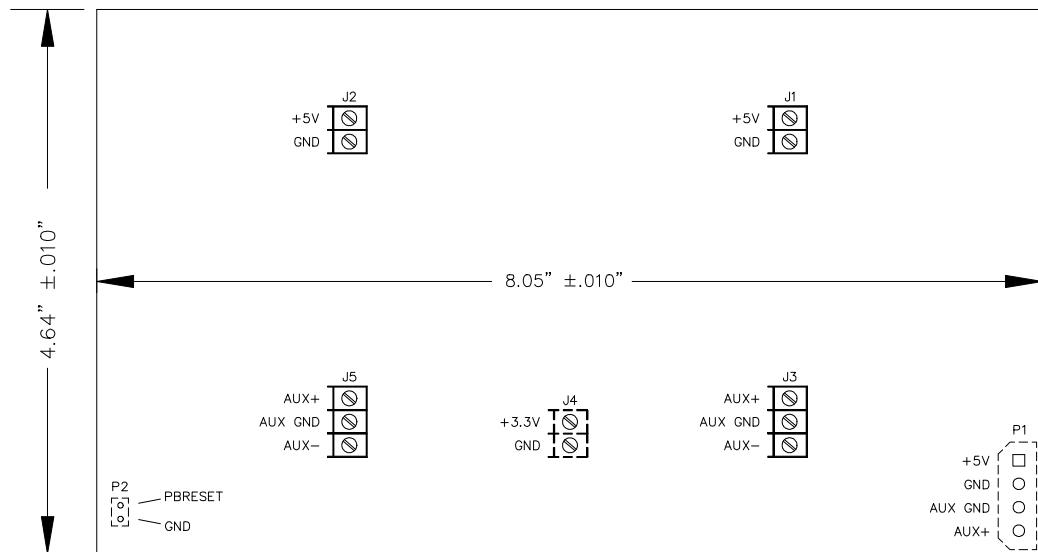**Figure 10. External Connections (4, 6, and 8-Slot Backplanes)**

Figure 11. External Connections (12-Slot Backplane)

Optional Disk
Drive Power
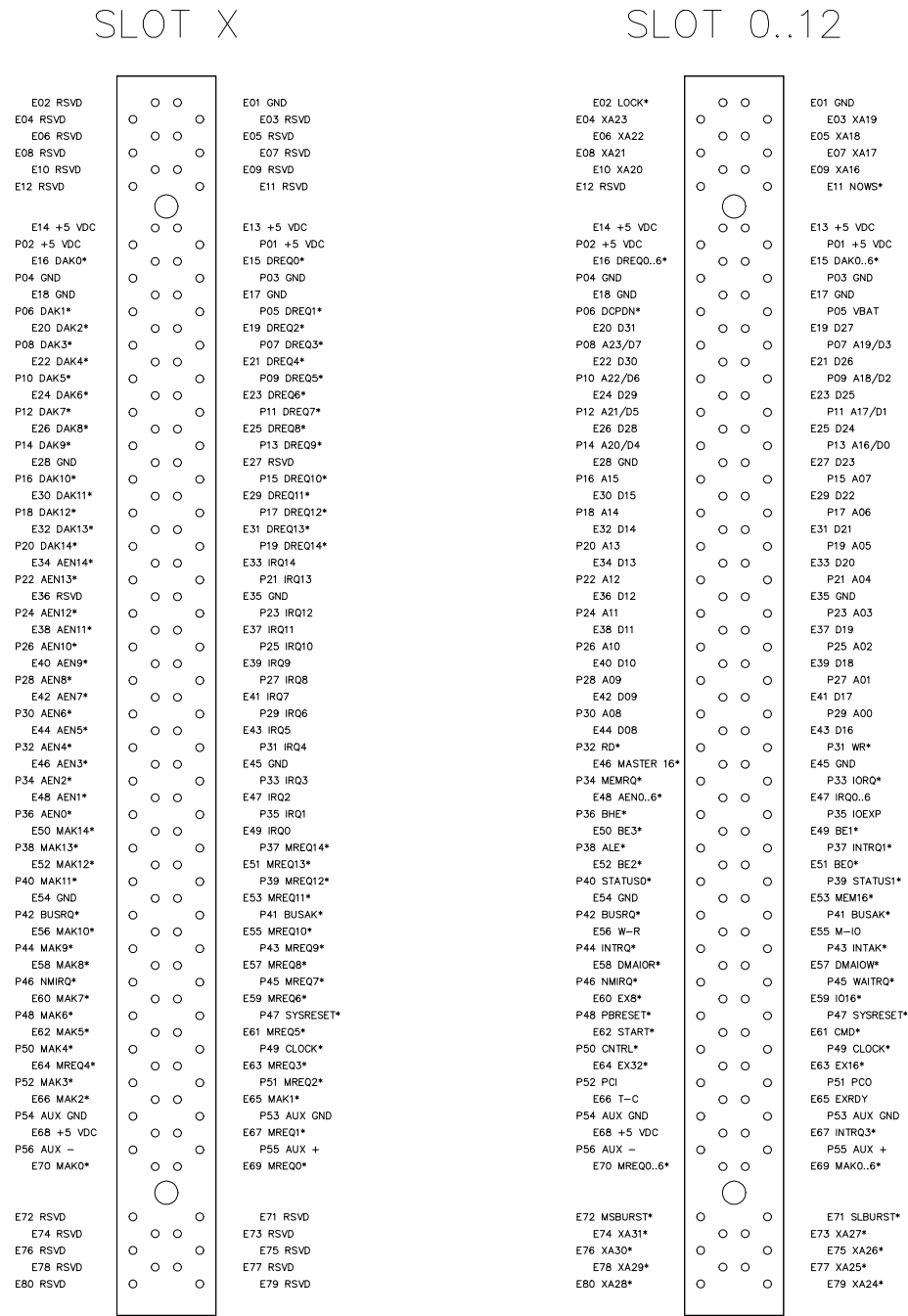Connector

STD 32 Connector Pinouts

SLOT X

E02 RSVD	E01 GND
E04 RSVD	E03 RSVD
E06 RSVD	E05 RSVD
E08 RSVD	E07 RSVD
E10 RSVD	E09 RSVD
E12 RSVD	E11 RSVD
E14 +5 VDC	E13 +5 VDC
P02 +5 VDC	P01 +5 VDC
E16 DAK0*	E15 DREQ0*
P04 GND	P03 GND
E18 GND	E17 GND
P06 DAK1*	P05 DREQ1*
E20 DAK2*	E19 DREQ2*
P08 DAK3*	P07 DREQ3*
E22 DAK4*	E21 DREQ4*
P10 DAK5*	P09 DREQ5*
E24 DAK6*	E23 DREQ6*
P12 DAK7*	P11 DREQ7*
E26 DAK8*	E25 DREQ8*
P14 DAK9*	P13 DREQ9*
E28 GND	E27 RSVD
P16 DAK10*	P15 DREQ10*
E30 DAK11*	E29 DREQ11*
P18 DAK12*	P17 DREQ12*
E32 DAK13*	E31 DREQ13*
P20 DAK14*	P19 DREQ14*
E34 AEN14*	E33 IRQ14
P22 AEN13*	P21 IRQ13
E36 RSVD	E35 GND
P24 AEN12*	P23 IRQ12
E38 AEN11*	E37 IRQ11
P26 AEN10*	P25 IRQ10
E40 AEN9*	E39 IRQ9
P28 AEN8*	P27 IRQ8
E42 AEN7*	E41 IRQ7
P30 AEN6*	P29 IRQ6
E44 AEN5*	E43 IRQ5
P32 AEN4*	P31 IRQ4
E46 AEN3*	E45 GND
P34 AEN2*	P33 IRQ3
E48 AEN1*	E47 IRQ2
P36 AEN0*	P35 IRQ1
E50 MAK14*	E49 IRQ0
P38 MAK13*	P37 MREQ14*
E52 MAK12*	E51 MREQ13*
P40 MAK11*	P39 MREQ12*
E54 GND	E53 MREQ11*
P42 BUSRQ*	P41 BUSAK*
E56 MAK10*	E55 MREQ10*
P44 MAK9*	P43 MREQ9*
E58 MAK8*	E57 MREQ8*
P46 NMIRQ*	P45 MREQ7*
E60 MAK7*	E59 MREQ6*
P48 MAK6*	P47 SYSRESET*
E62 MAK5*	E61 MREQ5*
P50 MAK4*	P49 CLOCK*
E64 MREQ4*	E63 MREQ3*
P52 MAK3*	P51 MREQ2*
E66 MAK2*	E65 MAK1*
P54 AUX GND	P53 AUX GND
E68 +5 VDC	E67 MREQ1*
P56 AUX –	P55 AUX +
E70 MAK0*	E69 MREQ0*
E72 RSVD	E71 RSVD
E74 RSVD	E73 RSVD
E76 RSVD	E75 RSVD
E78 RSVD	E77 RSVD
E80 RSVD	E79 RSVD

SLOT 0..12

E02 LOCK*	E01 GND
E04 XA23	E03 XA19
E06 XA22	E05 XA18
E08 XA21	E07 XA17
E10 XA20	E09 XA16
E12 RSVD	E11 NOWS*
E14 +5 VDC	E13 +5 VDC
P02 +5 VDC	P01 +5 VDC
E16 DREQ0..6*	E15 DAK0..6*
P04 GND	P03 GND
E18 GND	E17 GND
P06 DCPDN*	P05 VBAT
E20 D31	E19 D27
P08 A23/D7	P07 A19/D3
E22 D30	E21 D26
P10 A22/D6	P09 A18/D2
E24 D29	E23 D25
P12 A21/D5	P11 A17/D1
E26 D28	E25 D24
P14 A20/D4	P13 A16/D0
E28 GND	E27 D23
P16 A15	P15 A07
E30 D15	E29 D22
P18 A14	P17 A06
E32 D14	E31 D21
P20 A13	P19 A05
E34 D13	E33 D20
P22 A12	P21 A04
E36 D12	E35 GND
P24 A11	P23 A03
E38 D11	E37 D19
P26 A10	P25 A02
E40 D10	E39 D18
P28 A09	P27 A01
E42 D09	E41 D17
P30 A08	P29 A00
E44 D08	E43 D16
P32 RD*	P31 WR*
E46 MASTER 16*	E45 GND
P34 MEMRQ*	P33 IORQ*
E48 AEN0..6*	E47 IRQ0..6
P36 BHE*	P35 IOEXP
E50 BE3*	E49 BE1*
P38 ALE*	P37 INTRQ1*
E52 BE2*	E51 BE0*
P40 STATUS0*	P39 STATUS1*
E54 GND	E53 MEM16*
P42 BUSRQ*	P41 BUSAK*
E56 W–R	E55 M–IO
P44 INTRQ*	P43 INTAK*
E58 DMAIOR*	E57 DMAIOW*
P46 NMIRQ*	P45 WAITRQ*
E60 EX8*	E59 IO16*
P48 PBRESET*	P47 SYSRESET*
E62 START*	E61 CMD*
P50 CNTRL*	P49 CLOCK*
E64 EX32*	E63 EX16*
P52 PCI	P51 PC0
E66 T–C	E65 EXRDY
P54 AUX GND	P53 AUX GND
E68 +5 VDC	E67 INTRQ3*
P56 AUX –	P55 AUX +
E70 MREQ0..6*	E69 MAK0..6*
E72 MSBURST*	E71 SLBURST*
E74 XA31*	E73 XA27*
E76 XA30*	E75 XA26*
E78 XA29*	E77 XA25*
E80 XA28*	E79 XA24*

Figure 12. STD 32 Connector Pinouts
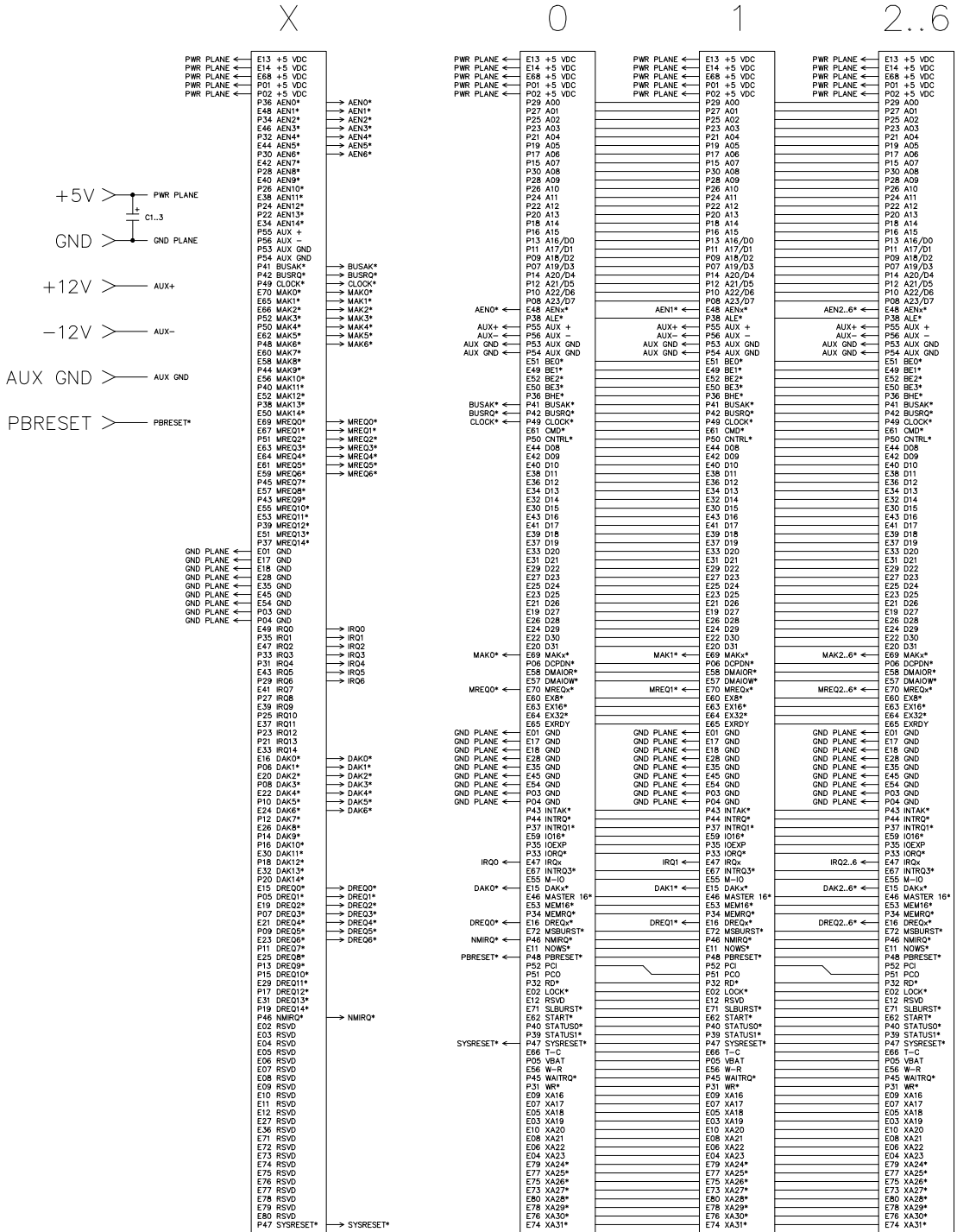
Schematics

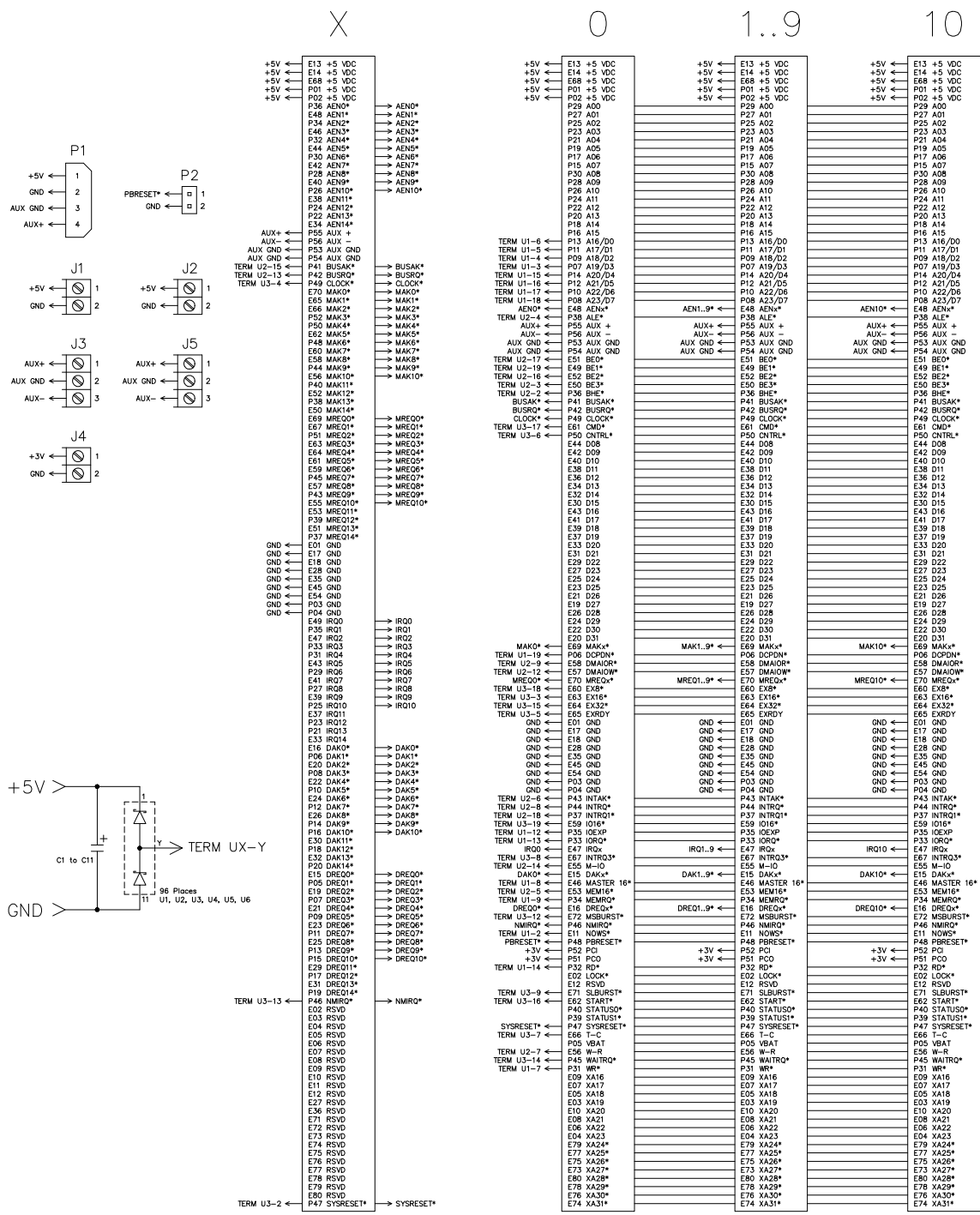**Figure 13. Schematic Diagram (4, 6, 8-Slot Backplane)**

Figure 14. Schematic Diagram (12-Slot Backplane)

Specifications

MOTHERBOARD CONSTRUCTION:

- Controlled impedance, high speed, low capacitance signal lines
- Multilayer .093" PCB
- Gold-plated, hemispherical knuckle card connector contacts

CARD CAGE CONSTRUCTION:

- Sturdy cold rolled steel with sealed black finish
- Fully ventilated card slots
- Anti-vibration/latch bar with slot numbers

OPERATING TEMPERATURE:

- −40°C to +85°C

POWER BUS RATING:

- +5V @ 20 Amps (4 Amps per slot) maximum
- +12V @ 5 Amps (2.5 Amps per slot) maximum
- +3.3 @ 5 Amps (2.5 Amps per slot) maximum