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VIPC626-ET

4-Slot IndustryPack® 6U VMEbus Carrier

Version 1.0

User Manual

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VIPC626-ET

4-Slot IP 6U VMEbus Carrier

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1 Product Description

The VIPC626-ET is 6U VMEbus Carrier for up to 4 single-size or two double-size IndustryPack (IP) modules used to build modular, flexible and cost effective I/O solutions for applications in process control, medical systems, telecommunication and traffic control.

The VIPC626-ET is designed in accordance to VMEbus Specification ANSI/VITA 1-1994 and the IndustryPack Logic Interface Specification ANSI/VITA 4-1995. This guarantees compatibility with the wide range of IndustryPacks in a VMEbus system.

The VIP626-ET has been designed as a drop-in replacement for the SBS VIPC610 and VIPC616 IndustryPack carriers. In addition to the features of the VIPC610 and VIPC616, the VIPC326 also has extended temperature operation, fully programmable interrupts, and base address selection via rotary switches. Note that the VIPC626-ET does not have rear-panel I/O access for IndustryPack slots C and D.

IndustryPack I/O and ID spaces are mapped into the VME A16/D16 space.

IP Memory spaces are mapped into the VME A24 or A32 space. D08 and D16 accesses are supported. If mapped in the VME A24 space, the size of the required memory space is configurable. In VME A32 space, there is a fixed space of 8Mbyte for each IP Module.

Strobe signals of all IP Modules are accessible via a 4 pin jumper block on the VIPC626-ET.

DMA, 32 Bit-access and 32 MHz operations are not supported.

Four 50 pin, 0.1 inch flat ribbon cable connectors mounted in the front panel of the VIPC626-ET provide access to all IP-I/O lines. Status indicators for IP access, +5V and +/-12V are provided.

A set of 16-position rotary switches allows easy configuration of VME Short I/O and Memory addresses. Interrupt routing from the IP slots to the VME IRQ's are programmable by software or can be selected from predefined sets.

The IP power lines are fuse protected by self healing fuses and RF filtered. The operating temperature ranges from -40°C to +85°C.

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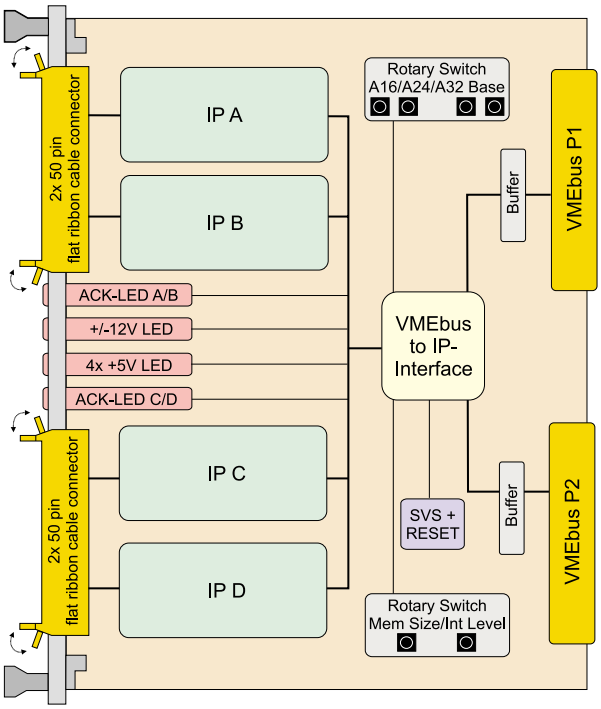


Figure 1-1 : VIPC626-ET Block Diagram

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2 Technical Specification

VMEbus Slave Interface	According to VMEbus specification, ANSI / VITA 1-1994, 6U-Board	
Short I/O	VME A16, D08/16, Address Modifier: 29, 2D Size: 1KBytes (256Bytes / IP)	
Standard Memory	VME A24, D08/16, Address Modifier: 39, 3A, 3D, 3E Size: programmable from 32 Kbytes to 2 Mbytes per IP	
Extended Memory	VME A32, D08/16, Address Modifier: 09, 0A, 0D, 0E Size: fixed, 8 Mbytes per IP	
Interrupts	VME IRQ1-7	
IP Interface	According to IndustryPack specification ANSI / VITA 4-1995	
IP Slots	Four single size or two double size with front panel I/O	
Mapping of IP Interrupts to VMEbus	Programmable by software or selection of predefined sets by a rotary switch	
I/O access	50 pin 0,1 inch flat ribbon cable connector per IP, mounted in the front panel	
DMA **32MHz**	Not supported Not supported	
Status LEDs	ACK LED for each IP slot +5V Power LED for each IP slot +12V and –12V Power LED	
Protection	Self healing fuses and RF-filtering on all IP power lines	
Operating Data		
Power Requirements without IP-Modules	300 mA typical @+ 5 VDC 1 mA typical @+ 12 VDC 1 mA typical @ -12 VDC	
	Additional Power is required by IP modules	
Temperature Range	Operating Storage	– 40°C to + 85C – 40°C to + 125°C
MTBF	366341 h	
Weight	250 g – no IndustryPack inserted	
Size	Singe Size 6U Euro Card	
Humidity	5 – 95 % non-condensing	

Figure 2-1 : Technical Specification

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3 Configuration

Setting 6 rotary switches do all required configuration of the VIPC626-ET. Location of the switches is shown below:

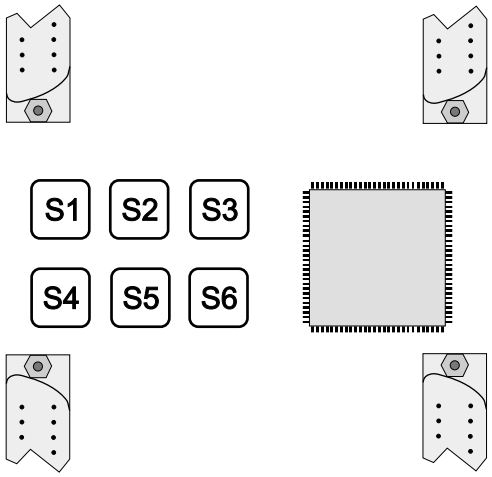


Figure 3-1 : Rotary Switch S1 – S6

Step	Rotary Switch	Function	Default Value
1	S1 / S2	VME A16 Base Address	0x6000
2	S3	Interrupt Mapping	VIPC610 and VIPC616 compatible
3	S4	VME A24/A32 Memory Enable and Memory Size	Disabled
4	S5 / S6	VME A24/A32 Memory Base Address	A24: 0xD00000 A32: 0xD0000000

Figure 3-2 : Configuration Steps

The VIPC626-ET is a drop-in replacement for the SBS VIPC610 and VIPC616 IndustryPack carrier cards. However, some configuration differences do exist, and these may require attention in your situation. See the following sections for information on how to configure the VIPC626-ET to replace a VIPC610 or VIPC616.

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3.1 VME A16 Base Address

The VME A16 Base Address of the VIPC626-ET is set by rotary switch S1 and S2.

Rotary switch S1 sets A[15:12] of the VME A16 Base Address.

Rotary switch S2 sets A[11:10] of the VME A16 Base Address.

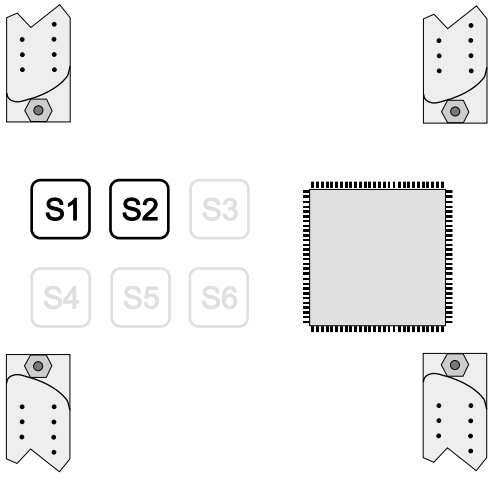
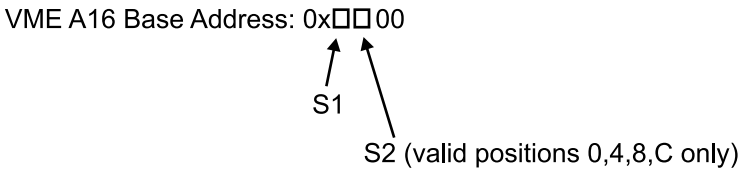


Figure 3-3 : VME A16 Base Address



The default value for the VME A16 Base Address is 0x6000 (S1=6, S2=0) . This is the same as the VIPC610 and VIPC616 default. The VIPC610 and VIPC616 use shunt groups E3 and E7 to set the I/O base address.

The VIPC626-ET requires an address space of 1 Kbyte within the VME A16 address space. Each of the four IP slots occupies 256 bytes within this 1 Kbyte VME A16 address space.

The address space for each IP is divided into three areas: IP I/O space, IP ID space and the IP IRQ and Control Register.

See figure “VME A16 Address Map” below for more details.

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VME A16 Base Address	Description	Default
+ 0x0000	I/O Space IP A	0x6000
+ 0x0080	ID Space IP A	0x6080
+ 0x00C0	IRQ and Control Register IP A	0x60C0
+ 0x0100	I/O Space IP B	0x6100
+ 0x0180	ID Space IP B	0x6180
+ 0x01C0	IRQ and Control Register IP B	0x61C0
+ 0x0200	I/O Space IP C	0x6200
+ 0x0280	ID Space IP C	0x6280
+ 0x02C0	IRQ and Control Register IP C	0x62C0
+ 0x0300	I/O Space IP D	0x6300
+ 0x0380	ID Space IP D	0x6380
+ 0x03C0	IRQ and Control Register IP D	0x63C0

Figure 3-4 : VME A16 Address Map

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3.2 Interrupts

Each IndustryPack is able to generate interrupts on two interrupt request lines (INT0 and INT1). The VMEbus offers seven interrupt request level. IRQ7 has the highest priority, IRQ1 has the lowest priority.

IP interrupt requests can be mapped to any of the 7 VME interrupt request levels. Interrupt routing from the IP slots to the VME IRQs can be done programmable by software or via selection of predefined sets by a rotary switch.

For more information about fully programmable interrupt mapping please refer to chapter “IP IRQ and Control Register”.

Rotary switch S3 can be used to select predefined sets of mapping of the eight IP interrupt request (two requests per IP slot) to the seven VME interrupt request level.

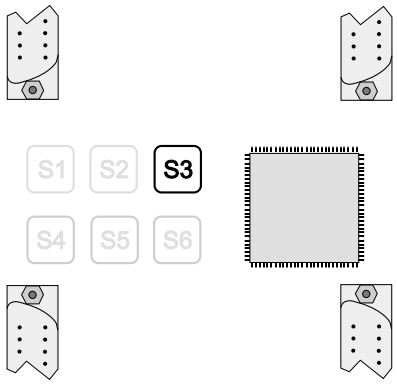


Figure 3-5 : Interrupt Mapping

S3 =	0	1	2	3	4	5…F
IPA, Int0	-	1	4	6	1	reserved
IPA, Int1	-	2	5	4	1	reserved
IPB, Int0	-	3	2	3	2	reserved
IPB, Int1	-	4	1	1	2	reserved
IPC, Int0	-	5	4	6	3	reserved
IPC, Int1	-	6	5	4	3	reserved
IPD, Int0	-	7	2	3	4	reserved
IPD, Int1	-	-	1	1	4	reserved

“-” = No VME-IRQ-Level mapped to IP INTx

Figure 3-6 : VME Interrupt Mapping by S3

S3 = “1” corresponds to the VME Interrupt Mapping of the VIPC610 and VIPC616. The VIPC610 and VIPC616 interrupt mappings are hard-coded.

S3 = “2” corresponds to the VME Interrupt Mapping of the VIPC610-01 (equal to two VIPC310s). The VIPC610-01 is a special version with custom GAL programming.

S3 = “3” corresponds to the VME Interrupt Mapping of another version of the VIPC310

The default value for S3 is “1”, compatible with the VIPC610 and VIPC616.

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3.3 VME A24/A32 Memory Enable and Size

If VME memory space is not required, switch S4 to “0” (VME A24/A32 memory disabled).

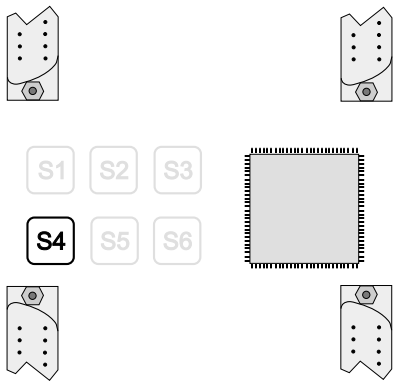


Figure 3-7 : VME A24/A32 Memory Enable and Size

IndustryPack Memory can be mapped into the VME A24 or VME A32 memory space. In VME A24 memory space, the memory size can be configured from 32KB to 2MB memory per IP slot. In VME A32 memory space, the memory size is fixed 8MB per IP slot.

Rotary switch S4 is used to enable/disable VME A24/A32 memory and to select the required VME memory size. Default setting of S4 is “0” means VME A24/A32 memory is disabled.

The VIPC616 uses shunt E1.A24 and E1.A32 to enable A24 or A32 memory addressing modes. For A24 mode only, shunt groups E4, E5 and E8 set the carrier board memory size and shunt group E2 sets the offset between the memory spaces of the IP slots. In A32 mode all IPs on the VIPC616 have 8M memory space if memory is enabled. The VIPC610 is the same except that it has no A32 addressing capabilities.

Positions “1” to “7” of S4 represent several memory spaces in VME A24, and with S4 = “F”, each IP has an 8MB memory space in VME A32 address space.

The memory spaces for all IPs have the same size. If one IP requires 128KB of memory, one IP requires 64KB and 2 IP require no memory then S4, must be set to “3” which selects a VME A24 memory size of 512 KB, 128KB memory for each IP.

Value of S4:	VME Memory Size:		
0x0	VME A24/A32 memory disabled		
0x1	A24	128KByte	32KByte / IP
0x2	A24	256KByte	64KByte / IP
0x3	A24	512KByte	128KByte / IP
0x4	A24	1MByte	256KByte / IP
0x5	A24	2MByte	512KByte / IP
0x6	A24	4MByte	1MByte / IP
0x7	A24	8MByte	2MByte / IP
0x8 – 0xE	reserved		
0xF	A32	32MByte	8Mbyte / IP-Slot

Figure 3-8 : VME Memory Size by S4

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3.4 VME A24/A32 Base Address

The memory space of IndustryPacks is mapped in the VME A24 or VME A32 space.

The memory base address for VME A24 or VME A32 is both set with the switches S5 and S6.

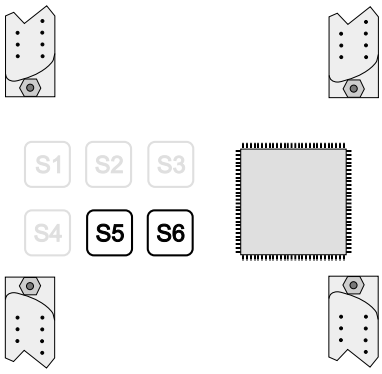
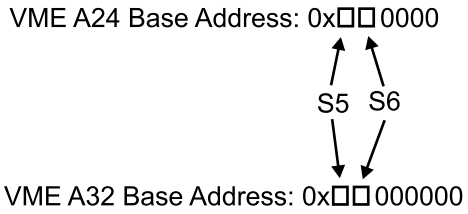


Figure 3-9 : VME A24/A32 Base Address

If memory space is located in VME A24, S5 represents A[23:20], and S6 represents A[19:16].

In VME A32, S5 represents [A31:28] and S6 represents A[27:24].



The memory base address of the VIPC626-ET must be set on a boundary, equal to the memory size as selected by S4! See Figure below for details.

The default value for VME A24 base address is 0xD00000 (S5=D, S6=0). This is the same as the VIPC610 and VIPC616.

The default value for VME A32 base address is 0xD0000000 (S5=D, S6=0). This is the same as the VIPC616.

The VIPC610 uses shunt groups E3 and E7 to set memory base address, mapped to A24/D16 space.These shunts are also used to set the I/O base address.

The VIPC616 uses shunt groups E20 and E21 to set the A24 and A32 memory base addresses.

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VIPC626-ET VME A24/A32 Size		IP Memory Size	IP Slot	IP Memory Location: Mem. Base Address +	VMEbus Address Boundary
A24	128 Kbyte	32 kbyte 32 kbyte 32 kbyte 32 kbyte	A B C D	0x000000 0x008000 0x010000 0x018000	multiple of 0x020000
A24	256 Kbyte	64 kbyte 64 kbyte 64 kbyte 64 kbyte	A B C D	0x000000 0x010000 0x020000 0x030000	multiple of 0x040000
A24	512 Kbyte	128 kbyte 128 kbyte 128 kbyte 128 kbyte	A B C D	0x000000 0x020000 0x040000 0x060000	multiple of 0x080000
A24	1 Mbyte	256 kbyte 256 kbyte 256 kbyte 256 kbyte	A B C D	0x000000 0x040000 0x080000 0x0C0000	multiple of 0x100000
A24	2 Mbyte	512 kbyte 512 kbyte 512 kbyte 512 kbyte	A B C D	0x000000 0x080000 0x100000 0x180000	multiple of 0x200000
A24	4 Mbyte	1 Mbyte 1 Mbyte 1 Mbyte 1 Mbyte	A B C D	0x000000 0x100000 0x200000 0x300000	multiple of 0x400000
A24	8 Mbyte	2 Mbyte 2 Mbyte 2 Mbyte 2 Mbyte	A B C D	0x000000 0x200000 0x400000 0x600000	multiple of 0x800000
A32	32 Mbyte	8 Mbyte 8 Mbyte 8 Mbyte 8 Mbyte	A B C D	0x00000000 0x00800000 0x01000000 0x01800000	multiple of 0x02000000

Figure 3-10: VME A24/A32 Address Map

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4 IP IRQ and Control Register

Each IP has a set of two registers: The IP IRQ Configuration Register and the IP Control Register.

4.1 IP IRQ Configuration Register

The IP IRQ Configuration Register is divided in 2 equal parts, one for each interrupt. The Bits[0, 4] are the LSBs, and the Bits[2,6] are the MSBs of the programmed IRQ level.

IPA IRQ Configuration Register		**VME A16 Base Address + 0x00C1**		
Bit	**Symbol**	**Description**	**Access**	**Reset Value**
7				
6	IPA, INT1	VME IRQ Level 000 = interrupt is disabled [6:4] 001 to 111 = VMEbus IRQ-levels IRQ1 to IRQ7	R/W	Depends on S3 jumper setting
5			R/W	
4			R/W	
3			R/W	
2	IPA, INT0	VME IRQ Level 000 = interrupt is disabled [2:0] 001 to 111 = VMEbus IRQ-levels IRQ1 to IRQ7	R/W	Depends on S3 jumper setting
1			R/W	
0			R/W	

IPB IRQ Configuration Register		**VME A16 Base Address + 0x01C1**		
Bit	**Symbol**	**Description**	**Access**	**Reset Value**
7				
6	IPB, INT1	VME IRQ Level 000 = interrupt is disabled [6:4] 001 to 111 = VMEbus IRQ-levels IRQ1 to IRQ7	R/W	Depends on S3 jumper setting
5			R/W	
4			R/W	
3			R/W	
2	IPB, INT0	VME IRQ Level 000 = interrupt is disabled [2:0] 001 to 111 = VMEbus IRQ-levels IRQ1 to IRQ7	R/W	Depends on S3 jumper setting
1			R/W	
0			R/W	

Figure 4-1 : IP IRQ Configuration Registers (IP A / IP B)

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IPC IRQ Configuration Register		VME A16 Base Address + 0x02C1		
Bit	**Symbol**	**Description**	**Access**	**Reset Value**
7				
6	IPC, INT1	VME IRQ Level 000 = interrupt is disabled [6:4] 001 to 111 = VMEbus IRQ-levels IRQ1 to IRQ7	R/W	Depends on S3 jumper setting
5			R/W	
4			R/W	
3			R/W	
2	IPC, INT0	VME IRQ Level 000 = interrupt is disabled [2:0] 001 to 111 = VMEbus IRQ-levels IRQ1 to IRQ7	R/W	Depends on S3 jumper setting
1			R/W	
0			R/W	

IPD IRQ Configuration Register		VME A16 Base Address + 0x03C1		
Bit	**Symbol**	**Description**	**Access**	**Reset Value**
7				
6	IPD, INT1	VME IRQ Level 000 = interrupt is disabled [6:4] 001 to 111 = VMEbus IRQ-levels IRQ1 to IRQ7	R/W	Depends on S3 jumper setting
5			R/W	
4			R/W	
3			R/W	
2	IPD, INT0	VME IRQ Level 000 = interrupt is disabled [2:0] 001 to 111 = VMEbus IRQ-levels IRQ1 to IRQ7	R/W	Depends on S3 jumper setting
1			R/W	
0			R/W	

Figure 4-2 : IP IRQ Configuration Registers (IP C / IP D)

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4.2 IP Control Register

Four IP Control Registers are located in the VMEbus A16 space.

IPA Control Register		VME A16 Base Address + 0x00C3		
Bit	**Symbol**	**Description**	**Access**	**Reset Value**
7	IP A, Reset	1 = reset is initiated Remains '1', until the IP reset has been completed and is then set to '0' by the on board logic. It can be read to verify the status of the reset.	R/W	0
6	reserved	Carry random information	R	undefined
5	reserved		R	undefined
4	reserved		R	undefined
3	reserved		R	undefined
2	IP A, Error	1 = error signal is active	R	0
1	IP A, INT1	Interrupt status 1 = indicates a pending interrupt request	R	0
0	IP A, INT0		R	0

IPB Control Register		VME A16 Base Address + 0x01C3		
Bit	**Symbol**	**Description**	**Access**	**Reset Value**
7	IP B, Reset	1 = reset is initiated Remains '1', until the IP reset has been completed and is then set to '0' by the on board logic. It can be read to verify the status of the reset.	R/W	0
6	reserved	Carry random information	R	undefined
5	reserved		R	undefined
4	reserved		R	undefined
3	reserved		R	undefined
2	IP B, Error	1 = error signal is active	R	0
1	IP B, INT1	Interrupt status 1 = indicates a pending interrupt request	R	0
0	IP B, INT0		R	0

Figure 4-3 : IP Control Registers (IP A / IP B)

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IPC Control Register		VME A16 Base Address + 0x02C3		
Bit	**Symbol**	**Description**	**Access**	**Reset Value**
7	IP C, Reset	1 = reset is initiated Remains '1', until the IP reset has been completed and is then set to '0' by the on board logic. It can be read to verify the status of the reset.	R/W	0
6	reserved	Carry random information	R	undefined
5	reserved		R	undefined
4	reserved		R	undefined
3	reserved		R	undefined
2	IP C, Error	1 = error signal is active	R	0
1	IP C, INT1	Interrupt status 1 = indicates a pending interrupt request	R	0
0	IP C, INT0		R	0

IPD Control Register		VME A16 Base Address + 0x03C3		
Bit	**Symbol**	**Description**	**Access**	**Reset Value**
7	IP D, Reset	1 = reset is initiated Remains '1', until the IP reset has been completed and is then set to '0' by the on board logic. It can be read to verify the status of the reset.	R/W	0
6	reserved	Carry random information	R	undefined
5	reserved		R	undefined
4	reserved		R	undefined
3	reserved		R	undefined
2	IP D, Error	1 = error signal is active	R	0
1	IP D, INT1	Interrupt status 1 = indicates a pending interrupt request	R	0
0	IP D, INT0		R	0

Figure 4-4 : IP Control Registers (IP C / IP D)

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5 IP Strobe Signal

The IP strobe signal is an uncommitted line of the IP logic interface, which may be used as an optional input to or output from an IP module. It is reserved for a digital strobe or clock signal related to the functionality of the IP.

Strobe signals of each of the four IP slots are accessible on the VIPC626-ET via a 4 pin jumper field.

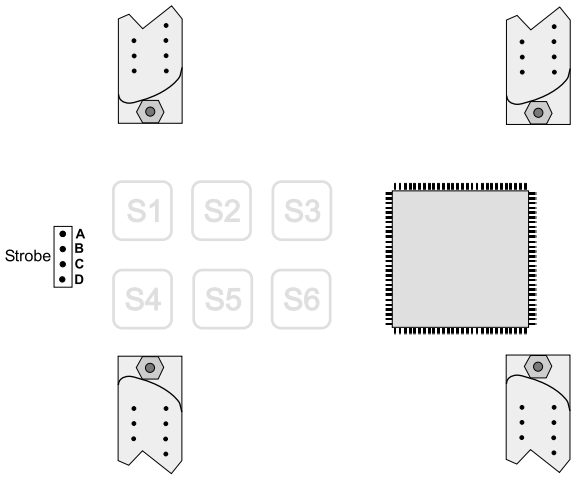


Figure 5-1 : IP Strobe Signal

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6 Installation of IndustryPacks

Before installing an IndustryPack, be sure that the power supply for the VIPC626-ET is turned off.

The component is an Electrostatic Sensitive Device (ESD). Use an anti-static mat connected to a wristband when handling or installing the components.

Installing IndustryPacks on the VIPC626-ET is done by simply snapping them into one of the four IP slots. The connectors are keyed, so the IndustryPack can only be installed correctly.

After an IP has been installed it can be secured on the carrier board. This is normally necessary only in high vibration or shock environments.

Screws and spacers required to fix a single IP on the VIPC626-ET can be ordered from SBS Technologies.

All IPs mate with 50-pin flat cable receptacle connectors for their I/O. On the VIPC626-ET all connectors have latches and are accessible from the front panel. The front panel labeling indicates which connector is associated with the according IP slot. Pin 1 for each cable is identified by the mark on the connector or a square solder pad.

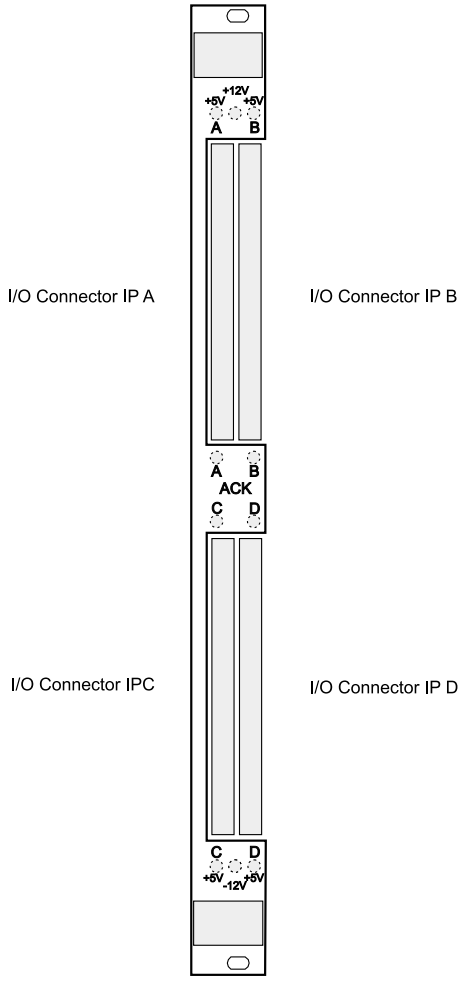


Figure 6-1 : Front Panel

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7 Front Panel Indicators

7.1 ACK and Power LEDs

For a quick visual inspection the VIPC626-ET offers a total of 10 LEDs in the front panel.

Each IndustryPack has its own “ACK”-LED, which is lit for about 200ms whenever an access to the corresponding IP happens.

Function	Label	Color	Description
IP A ACK	A	green	Indicates access to IP A
IP B ACK	B	green	Indicates access to IP B
IP C ACK	C	green	Indicates access to IP C
IP D ACK	D	green	Indicates access to IP D

Figure 7-1 : IP ACK LED

Additionally there are 6 green Power-LEDs in the front panel of the VIPC626-ET:

Function	Label	Color	Description
IP A +5V	+5V A	green	LED = “on”: IP power supply ok
IP B +5V	+5V B	green	
IP C +5V	+5V C	green	
IP D +5V	+5V D	green	
+12V common to all IP	+12V	green	LED = “on”: +12V power ok
-12V common to all IP	-12V	green	LED = “on”: –12V power ok

Figure 7-2 : IP Power LED

7.2 Fuses and Filters

All IP slots are fuse protected. The fuses used on the VIPC626-ET are self-healing fuses. For improved performance the VIPC626-ET provides RF filtering and decoupling capacitors an all IP power lines.

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8 Pin Assignment

8.1 IP Connectors

The table below shows the complete IP J1 logic interface pin assignments. Some of these signals are not used on the VIPC626-ET.

Pin #	Signal	Pin #	Signal	Pin #	Signal	Pin #	Signal
1	GND	2	CLK	26	GND	27	+5V
3	Reset#	4	D0	28	R/W#	29	IDSel#
5	D1	6	D2	30	DMAReq0#	31	MemSel#
7	D3	8	D4	32	DMAReq1#	33	IntSel#
9	D5	10	D6	34	DMAck#	35	IOSel#
11	D7	12	D8	36	Reserved	37	A1
13	D9	14	D10	38	DMAEnd#	39	A2
15	D11	16	D12	40	Error#	41	A3
17	D13	18	D14	42	IntReq0#	43	A4
19	D15	20	BS0#	44	IntReq1#	45	A5
21	BS1#	22	-12V	46	Strobe#	47	A6
23	+12V	24	+5V	48	ACK#	49	Reserved
25	GND			50	GND		

Figure 8-1 : IP J1 Logic Interface Pin Assignment

The IP J2 I/O connector routes the IP I/O lines directly to the appropriate pins of the 50 pin IP I/O ribbon cable connector. The pin assignment of the IP J2 I/O connector is IP specific.

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8.2 VMEbus Connectors

8.2.1 VMEbus P1 Connector

Pin	Row A	Row B	Row C
1	VME_D0	VME_BBSY#	VME_D8
2	VME_D1	VME_BCLR#	VME_D9
3	VME_D2	VME_ACFAIL#	VME_D10
4	VME_D3	VME_BGIN0#	VME_D11
5	VME_D4	VME_BGOUT0#	VME_D12
6	VME_D5	VME_BGIN1#	VME_D13
7	VME_D6	VME_BGOUT1#	VME_D14
8	VME_D7	VME_BGIN2#	VME_D15
9	GND	VME_BGOUT2#	GND
10	VME_SYSCLK	VME_BGIN3#	VME_SYSFAIL#
11	GND	VME_BGOUT3#	VME_BERR#
12	VME_DS1#	VME_BR0#	VME_SYSRST#
13	VME_DS0#	VME_BR1#	VME_LWORD#
14	VME_WRITE#	VME_BR2#	VME_AM5
15	GND	VME_BR3#	VME_A23
16	VME_DTACK#	VME_AM0	VME_A22
17	GND	VME_AM1	VME_A21
18	VME_AS#	VME_AM2	VME_A20
19	GND	VME_AM3	VME_A19
20	VME_IACK#	GND	VME_A18
21	VME_IACKIN#	NC	VME_A17
22	VME_IACKOUT#	NC	VME_A16
23	VME_AM4	GND	VME_A15
24	VME_A7	VME_IRQ7#	VME_A14
25	VME_A6	VME_IRQ6#	VME_A13
26	VME_A5	VME_IRQ5#	VME_A12
27	VME_A4	VME_IRQ4#	VME_A11
28	VME_A3	VME_IRQ3#	VME_A10
29	VME_A2	VME_IRQ2#	VME_A9
30	VME_A1	VME_IRQ1#	VME_A8
31	-12V	NC	+12V
32	+5V	+5V	+5V

Figure 8-2 : VMEbus P1 Connector

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8.2.2 VMEbus P2 Connector

Pin	Row A	Row B	Row C
1	NC	+5V	NC
2	NC	GND	NC
3	NC	NC	NC
4	NC	VME_A24	NC
5	NC	VME_A25	NC
6	NC	VME_A26	NC
7	NC	VME_A27	NC
8	NC	VME_A28	NC
9	NC	VME_A29	NC
10	NC	VME_A30	NC
11	NC	VME_A31	NC
12	NC	GND	NC
13	NC	+5V	NC
14	NC	NC	NC
15	NC	NC	NC
16	NC	NC	NC
17	NC	NC	NC
18	NC	NC	NC
19	NC	NC	NC
20	NC	NC	NC
21	NC	NC	NC
22	NC	GND	NC
23	NC	NC	NC
24	NC	NC	NC
25	NC	NC	NC
26	NC	NC	NC
27	NC	NC	NC
28	NC	NC	NC
29	NC	NC	NC
30	NC	NC	NC
31	NC	GND	NC
32	NC	+5V	NC

Figure 8-3 : VMEbus P2 Connector

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