4I70 MANUAL

PC/104-PLUS CABLED BRIDGE

PRELIMINARY V1.0

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GENERAL

DESCRIPTION

The 4I70 is a PCI to PCI Express or PCI express to PCI bridge on a PC/104-PCI card. Two 4I70 cards and a single lane Infiniband cable make a complete remote PCI bridge system for the PC/104-PLUS bus. The 4I70 allows remote expansion of PC/104-PCI systems and solving problems with PC/104-PCI card stack mechanical constraints. The 4I70 can also allow Data Acquisition and Wireless peripheral cards to be placed in ideallocations, which may be at some distance from the host CPU. The 4I70 also allows testing of PC/104-PCI cards without powering down the host.

Normally 4I70 cards are used in pairs, one jumpered for forward bridge mode (PCI-Express to PCI) and one jumpered for reverse bridge mode (PCI to PCI Express). The two 4I70 cards connect via a single lane Infiniband cable and bridge a PC-104/PCI stack with the CPU to a remote stack that can support up to 4 bus master PC/104-PCI peripheral cards. The remote 4I70 can be up to 5 meters from the local 4I70. The 4I70 has a built in 3.3V power supply and can provide up to 2.5 Amps of 3.3V power to the remote peripheral stack so that only a single 5V power supply is required.

HARDWARE CONFIGURATION

GENERAL

Hardware setup jumper positions assume that the 4I70 card is oriented in an upright position, that is, with the PC/104-PCI connectors towards the top of the card and the Inifiniband connector pointing to the right.

FORWARD/REVERSE BRIDGE MODE

The 4I70 can be operated in two different modes, forward and reverse. When in reverse mode, the 4I70 is PC/104 PCI peripheral. In reverse mode, there will be a PC/104-PCI CPU in the stack controlling the 4I70. In forward mode, the 4I70 is a PCI bus controller, replacing the CPU and driving PC/104-PCI peripheral cards. A working pair of 4I70 cards must always have one card jumpered for forward mode and one card jumpered for reverse mode. Jumper W2 selects forward or reverse mode. When W2 is in the up position, forward mode is selected. When W2 is in the down position, reverse mode is selected.

PC104-PLUS SLOT NUMBER

When use in reverse bridge mode, the 4I70 card must be assigned a slot number before use. In desktop PCI system the slot number is determined by the physical slot that the PCI card is inserted into. In PC104-PLUS systems, all signals on the bus are the same for each card, so a method is needed to differentiate each card. This is done with the slot number jumpers. Two jumpers, W4 and W5 determine the 4I66 slot assignment. The following table shown the jumper settings:

W4	W5	SLOT	REQ/GNT	NOTES
DOWN	DOWN	0	0	DEFAULT
DOWN	UP	1	1	
UP	DOWN	2	2	
UP	UP	3	3	

BUS SPEED

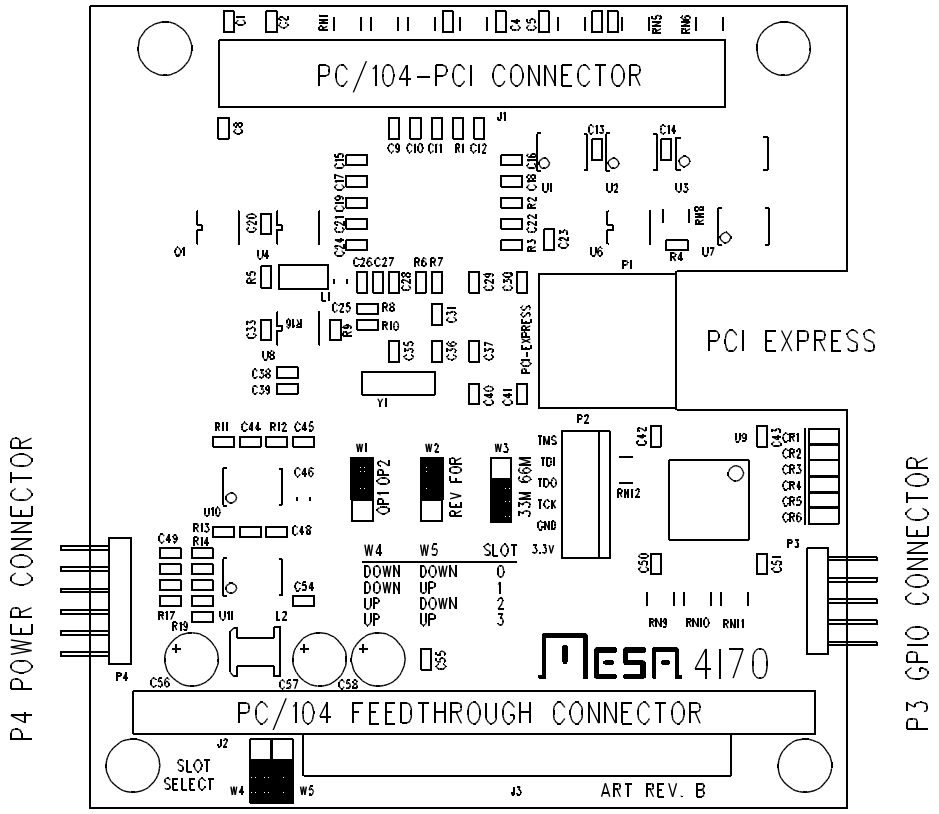
When operated in forward mode, the 4I70 can be set to generate a 33 MHz PCI clock or a 66 MHz PCI clock. Jumper W3 selects the PCI clock. When W3 is in the up position, 66 MHz PCI clock is selected. When W3 is in the down position, 33 MHz PCI clock is selected. W3 also controls the M66EN line on the PC/104-PCI bus, grounding it in the 33 MHz position. In reverse mode,this can be use to force the PC/104-PCI bus to run at 33MHz.

LED OPTIONS

The bridge chip on the 4I70 has 4 GPIO bits available. Some of the on-card LEDs can be driven by the GPIO bits if desired. Alternatively the LEDS can be driven by the PC/104-PCI interrupt lines. When jumper W1 is in the up position, CR2 through CR5 display the interrupt status of INTA through INTD. When W1 is in the down position, CR2 through CR4 display GPIO bits 1 through 3, and CR5 is illuminated when any interrupt occurs.

CONNECTORS

CONNECTOR LOCATIONS AND DEFAULT JUMPER POSITIONS



CONNECTORS

POWER CONNECTOR

In PC/104 systems it is expected that the CPU will supply power to the stack. When the 4I70 is operated in forward mode it replaces a CPU so it has a power input connector in order to power the stack. P4 is the 4I70's power input connector. P4 pin-out is as follows:

PIN	FUNCTION
1	+5V
2	GND
3	GND
4	+5V
5	+12V
6	-12V

Note that +12 and -12 are not needed by the 4I70, the connections are provided to supply +12V and -12V to the bus if required.

GPIO CONNECTOR

The P3 connector gives access to the bridge chips GPIO pins. P3 pinout is as follows:

1	GPIO 0
2	GPIO 1
3	GPIO 2
4	GPIO 3
5	GROUND

Note: with the current CPLD configuration these are all output bits

OPERATION

LED STATUS INDICATORS

Five LED status indicators are used, CR1 through CR5. LEDs CR2 through CR5 have different meanings depending on the position of the option jumper. With the current CPLD configuration these LEDs indicate:

LED	OPTION1	OPTION2
CR1	PWR OK	PWR OK
CR2	GPIO1	INTA
CR3	GPIO2	INTB
CR4	GPIO3	INTC
CR5	ANY IRQ	INTD
CR6	LINK OK	LINK OK

The LINK OK LED is especial important. If it is not illuminated, there is no link between cards.

FORWARD/REVERSE MODE

The 4I70 is always used with either another 4I70 or a 5I70 PCI card. When pairs of 4I70s are used, one must be jumpered for forward mode and one must be jumpered for reverse mode. When used with a 5I70, the 4I70 must be jumpered for forward mode , because the 5I70 is hardwired to reverse mode.

The card that is jumpered for reverse mode must be in a system with a CPU. The card that is jumpered for forward mode must be in a stack without a CPU (The forward mode 4I70 replaces the CPU in this case)

SPECIFICATIONS

	MIN	MAX	
POWER SUPPLY	4.5V	5.5V	
POWER CONSUMPTION:			
5V SUPPLY CURRENT	----	200 mA	No external load
3.3V SUPPLIED TO STACK	----	2500 mA	Forward mode only
OPERATING TEMP.	0^{o}C	+70^{o}C	
OPERATING TEMP. (-I version)	-40^{o}C	+85^{o}C	
OPERATION HUMIDITY	0	95%	Non-condensing