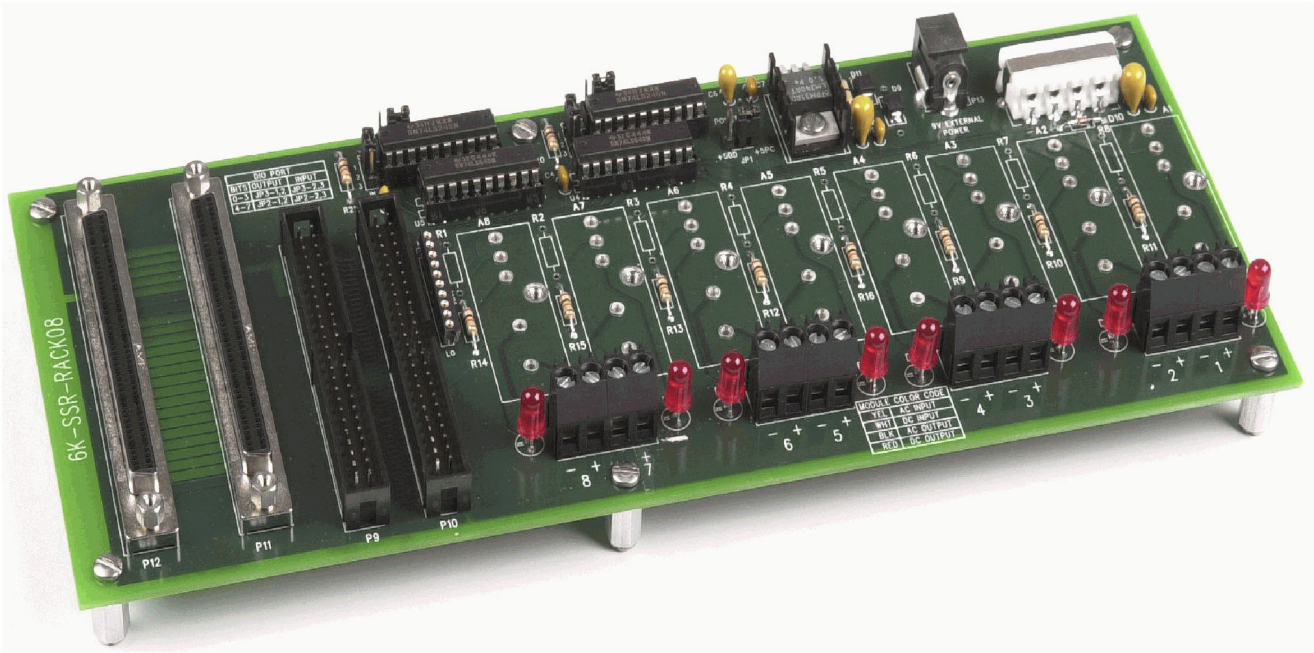
6K-SSR-RACK08

Eight Solid-state Relay Accessory Board
For use with PCI-DAS6000 Series and
PCI-DAC6700 Series Boards

User's Guide



MEASUREMENT COMPUTING™

6K-SSR-RACK08

8-solid state relay accessory board for use with PCI-DAS6000 Series and PCI-DAC6700 Series boards

User's Guide

Document Revision 2A, July, 2006

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Table of Contents

About this User's Guide

What you will learn from this user's guide

This user's guide explains how to install, configure, and use the 6K-SSR-RACK08 so that you get the most out of its features.

This user's guide also refers you to related documents available on our web site, and to technical support resources.

Conventions in this user's guide

For more information on …

Text presented in a box signifies additional information and helpful hints related to the subject matter you are reading.

Caution! Shaded caution statements present information to help you avoid injuring yourself and others, damaging your hardware, or losing your data.

<#:#> Angle brackets that enclose numbers separated by a colon signify a range of numbers, such as those assigned to registers, bit settings, etc.

bold text **Bold** text is used for the names of objects on the screen, such as buttons, text boxes, and check boxes. For example:
1. Insert the disk or CD and click the **OK** button.

italic text *Italic* text is used for the names of manuals and help topic titles, and to emphasize a word or phrase. For example:
The *Insta*Cal installation procedure is explained in the *Quick Start Guide*.
Never touch the exposed pins or circuit connections on the board.

Where to find more information

The following electronic documents provide information that is relevant to the operation of the 6K-SSR-RACK08.

- MCC's *Specifications: 6K-SSR-RACK08* (the PDF version of the *Specifications* chapter in this guide) is available on our web site at www.mccdaq.com/pdfs/SSR-RACK08.pdf.
- MCC's *Quick Start Guide* is available on our web site at www.mccdaq.com/PDFmanuals/DAQ-Software-Quick-Start.pdf.
- MCC's *Guide to Signal Connections* is available on our web site at www.mccdaq.com/signals/signals.pdf.
- MCC's *Universal Library User's Guide* is available on our web site at www.mccdaq.com/PDFmanuals/sm-ul-user-guide.pdf.
- MCC's *Universal Library Function Reference* is available on our web site at www.mccdaq.com/PDFmanuals/sm-ul-functions.pdf.
- MCC's *Universal Library for LabVIEW™ User's Guide* is available on our web site at www.mccdaq.com/PDFmanuals/SM-UL-LabVIEW.pdf.

6K-SSR-RACK08 User's Guide (this document) is also available on our web site at www.mccdaq.com/PDFmanuals/SSR-RACK08.pdf.

Links to the hardware manuals for each board supported by the 6K-SSR-RACK08 are provided below:

PCI-DAS6000 Series boards	**Online User's Guide**
PCI-DAS6013, PCI-DAS6014	www.mccdaq.com/PDFmanuals/pci-das6013-6014.pdf
PCI-DAS6023, PCI-DAS6025	www.mccdaq.com/PDFmanuals/pci-das6025-23.pdf
PCI-DAS6030, PCI-DAS6032	www.mccdaq.com/PDFmanuals/pci-das6030-32.pdf
PCI-DAS6031, PCI-DAS6033	www.mccdaq.com/PDFmanuals/pci-das6031-33.pdf
PCI-DAS6034, PCI-DAS6035, PCI-DAS6036	www.mccdaq.com/PDFmanuals/pci-das603x.pdf
PCI-DAS6040	www.mccdaq.com/PDFmanuals/pci-das6040.pdf
PCI-DAS6052	www.mccdaq.com/PDFmanuals/pci-das6052.pdf
PCI-DAS6070	www.mccdaq.com/PDFmanuals/pci-das6070.pdf
PCI-DAS6071	www.mccdaq.com/PDFmanuals/pci-das6071.pdf
PCI-DAC6700 Series boards	
PCI-DAC6702, PCI-DAC6703	www.mccdaq.com/PDFmanuals/pci-dac670x.pdf

Introducing the 6K-SSR-RACK08

Overview: 6K-SSR-RACK08 features

This manual explains how to install, configure, and use the 6K-SSR-RACK08 with supported Measurement Computing hardware. The 6K-SSR-RACK08 is designed for use in your control applications to switch on and off a variety of devices, such as fans, blowers, pumps, etc.

The 6K-SSR-RACK08 is a mounting rack for eight solid state relay (SSR) modules. The AUXPORT digital I/O lines (DIO0 – DIO7) on your on your PCI-DAS6000 Series board or PCI-DAC6700 Series board directly control the SSR modules on your 6K-SSR-RACK08. The PCI-DAS6000 Series board and PCI-DAC6700 Series board are referred to as the "6000 Series control board" for the remainder of this guide.

The 6K-SSR-RACK08 backplane is divided into two groups of four modules each. You can configure each module group for input or output using an on-board jumper. You cannot mix input and output modules within a group. The following configurations are possible.

- four input and four output modules
- eight input modules
- eight output modules

You can set the relays for each module group for active high or low logic with an on-board jumper. Independent LEDs at each module position indicate the on/off status of each module. The board has an open component location where you can install a pull-up or pull-down resistor to pull the digital relay control line low when disconnected from the 6000 Series control board or when the digital lines on the 6000 Series control board are in high impedance (or input) mode.

The 6K-SSR-RACK08 has eight independent screw terminal pairs for your field wiring connections. Each SSR module has a dedicated positive and negative screw terminal.

You can power the 6K-SSR-RACK08 from your 6000 Series control board, from your computer's power connectors, or from the AC adapter included with your 6K-SSR-RACK08.

The 6K-SSR-RACK08 has multiple interface connectors that you can use to daisy chain to other accessory board types.

Software features

For information on the features of *Insta*Cal and the other software included with your 6K-ERB08, refer to the *Quick Start Guide* that shipped with your device. The *Quick Start Guide* is also available in PDF at www.mccdaq.com/PDFmanuals/DAQ-Software-Quick-Start.pdf.

Check www.mccdaq.com/download.htm for the latest software version or versions of the software supported under less commonly used operating systems.

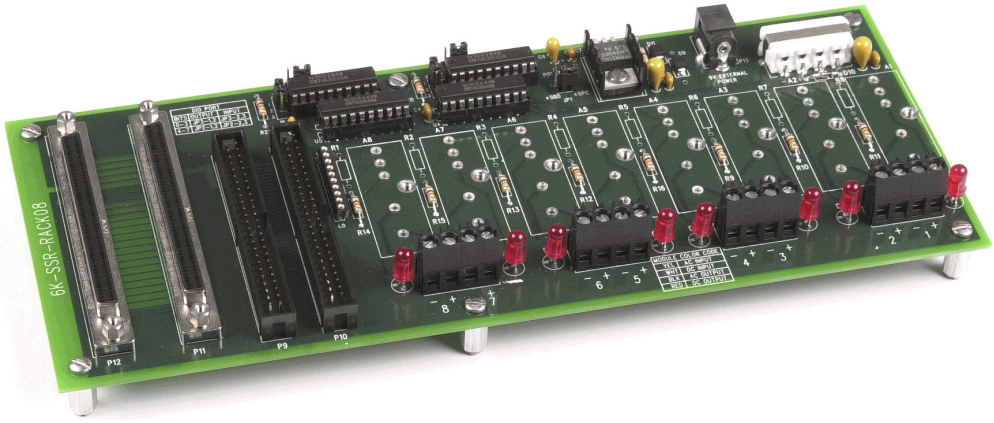
Installing the 6K-SSR-RACK08

What comes with your 6K-SSR-RACK08 shipment?

The following items are shipped with the 6K-SSR-RACK08.

Hardware

- 6K-SSR-RACK08 (shown with standoffs attached)



- C-PCPOWER-10 cable — 10 foot cable to connect with your computer's +5 V power supply connectors or to an external +5 V power supply.

- CB-PWR-9 AC adapter — 9 volt, 1 amp DC power supply, 110 VAC input

- Six (6) standoffs with screws for attaching to the 6K-SSR-RACK08 board

Additional documentation

In addition to this hardware user's guide, you should also receive the *Quick Start Guide* (available in PDF at www.mccdaq.com/PDFmanuals/DAQ-Software-Quick-Start.pdf). This booklet supplies a brief description of the software you received with your 6K-ERB08 and information regarding installation of that software. Please read this booklet completely before installing any software or hardware.

Optional components

- Cables

C100MMS-*x*

C100HD50-*x*

C50FF-*x*

Unpacking the 6K-ERB08

As with any electronic device, you should take care while handling to avoid damage from static electricity. Before removing the 6K-ERB08 from its packaging, ground yourself using a wrist strap or by simply touching the computer chassis or other grounded object to eliminate any stored static charge.

If any components are missing or damaged, notify Measurement Computing Corporation immediately by phone, fax, or e-mail:

- Phone: 508-946-5100 and follow the instructions for reaching Tech Support.
- Fax: 508-946-9500 to the attention of Tech Support
- Email: techsupport@mccdaq.com

Connecting the 6K-SSR-RACK08 for I/O operations

Follow the guidelines below when connecting the 6K-SSR-RACK08 to your computer and to your MCC hardware.

- Make sure your connections to the 6K-SSR-RACK08 do not exceed any of the specified maximum ratings, or you could damage the 6K-SSR-RACK08, your computer, and your 6000 Series control board. The maximum ratings for connections to the 6K-SSR-RACK08 are listed in Chapter 4 "Specifications."
- Turn off your PC and any 6K-SSR-RACK08 power sources before you connect or disconnect the cable from the 6K-SSR-RACK08 to the 6000 Series control board.
- Connect one of the 6K-SSR-RACK08 board's interface connectors to the I/O connector on the 6000 Series control board. Refer to Table 2-1 for appropriate cable and connector combinations. Use the remaining interface connectors to connect with other board types, such as the CIO-MINI50 or CIO-TERM100 screw terminal boards.
- Use the module type color coding chart on the 6K-SSR-RACK08 board as a guide when you install the SSR modules.

External power is required when using the C100HD50-x cable

The C100HD50-x cable does not provide power to the 6K-SSR-RACK08. If you use the C100HD50-x cable, power the 6K-SSR-RACK08 with an external power source.

Caution! Connect the 6K-SSR-RACK08 to a PCI-DAS6000 Series board or to a PCI-DAC6700 Series board only. Connecting to a board that is not supported by the 6K-SSR-RACK08 can damage both boards.

Connectors, cables – interface I/O connectors

The 6K-SSR-RACK08 board's eight SSR modules are controlled by your 6000 Series control board's digital channels DIO<0:7> through AUXPORT. Connect your signal cable from the 6000 Series control board's interface connector to one of the interface connectors on the 6K-SSR-RACK08 board.

The 6K-SSR-RACK08 has two 100-pin interface connectors labeled **P11** and **P12**, and two 50-pin interface connectors labeled **P9** and **P10**. Signals pass through each connector. Only connect one of the four interface connectors to your 6000 Series control board.

Daisy chaining to other 6K-SSR-RACK08 boards

Do not daisy chain additional 6K-SSR-RACK08 boards to the extra interface connectors, since any additional boards would be controlled with the same DIO lines.

Table 2-1 lists the board connectors, compatible cables, and compatible MCC hardware for the 6K-SSR-RACK08.

Table 2-1. Board connectors, compatible cables and hardware

Connector type	▪ P11 and P12: Shielded, SCSI 100-pin D-type ▪ P9 and P10: Unshielded 50 pin ribbon connector
Compatible cable (connect to P11 or P12)	C100MMS-x shielded round cable. (see Figure 2-1). x = 1, 2 or 3 meters
Compatible cable (connect to P9 or P10)	▪ C100HD50-x unshielded ribbon cable (see Figure 2-2). x = 3 or 6 feet ▪ C50FF-x unshielded ribbon cable (see Figure 2-3) x = 1, 2, 3, 4, 5, 10, 15, 20, 25 or 50 feet **Note**: These cables do not provide power to the 6K-SSR-RACK08. External power is required.
Compatible MCC hardware	**PCI-DAS6000 Series** analog input boards: ▪ PCI-DAS6013 ▪ PCI-DAS6036 ▪ PCI-DAS6014 ▪ PCI-DAS6052 ▪ PCI-DAS6030 ▪ PCI-DAS6023 ▪ PCI-DAS6031 ▪ PCI-DAS6025 ▪ PCI-DAS6032 ▪ PCI-DAS6040 ▪ PCI-DAS6033 ▪ PCI-DAS6070 ▪ PCI-DAS6034 ▪ PCI-DAS6071 ▪ PCI-DAS6035
	PCI-DAC6700 Series analog output boards: ▪ PCI-DAC6702 ▪ PCI-DAC6703

Pin out – interface connectors

Table 2-2. Connector P11 pin out

Signal Name	Pin		Pin	Signal Name
GND	100	••	50	GND
P12 Pass Through 99	99	••	49	P12 Pass Through 49
P12 Pass Through 98	98	••	48	P12 Pass Through 48
P12 Pass Through 97	97	••	47	P12 Pass Through 47
P12 Pass Through 96	96	••	46	P12 Pass Through 46
P12 Pass Through 95	95	••	45	P12 Pass Through 45
P12 Pass Through 94	94	••	44	P12 Pass Through 44
P12 Pass Through 93	93	••	43	P12 Pass Through 43
DIO7	92	••	42	P12 Pass Through 42
DIO6	91	••	41	P12 Pass Through 41
DIO5	90	••	40	P12 Pass Through 40
DIO4	89	••	39	PC +5V
DIO3	88	••	38	P12 Pass Through 38
DIO2	87	••	37	P12 Pass Through 37
DIO1	86	••	36	P12 Pass Through 36
DIO0	85	••	35	P12 Pass Through 35
P12 Pass Through 84	84	••	34	P12 Pass Through 34
P12 Pass Through 83	83	••	33	P12 Pass Through 33
P12 Pass Through 82	82	••	32	P12 Pass Through 32
P12 Pass Through 81	81	••	31	P12 Pass Through 31
P12 Pass Through 80	80	••	30	P12 Pass Through 30
P12 Pass Through 79	79	••	29	P12 Pass Through 29
P12 Pass Through 78	78	••	28	P12 Pass Through 28
P12 Pass Through 77	77	••	27	P12 Pass Through 27
P12 Pass Through 76	76	••	26	P12 Pass Through 26
P12 Pass Through 75	75	••	25	P12 Pass Through 25
P12 Pass Through 74	74	••	24	P12 Pass Through 24
P12 Pass Through 73	73	••	23	P12 Pass Through 23
P12 Pass Through 72	72	••	22	P12 Pass Through 22
P12 Pass Through 71	71	••	21	P12 Pass Through 21
P12 Pass Through 70	70	••	20	P12 Pass Through 20
P12 Pass Through 69	69	••	19	P12 Pass Through 19
P12 Pass Through 68	68	••	18	P12 Pass Through 18
P12 Pass Through 67	67	••	17	P12 Pass Through 17
P12 Pass Through 66	66	••	16	P12 Pass Through 16
P12 Pass Through 65	65	••	15	P12 Pass Through 15
P12 Pass Through 64	64	••	14	P12 Pass Through 14
P12 Pass Through 63	63	••	13	P12 Pass Through 13
P12 Pass Through 62	62	••	12	P12 Pass Through 12
P12 Pass Through 61	61	••	11	P12 Pass Through 11
P12 Pass Through 60	60	••	10	P12 Pass Through 10
P12 Pass Through 59	59	••	9	P12 Pass Through 9
P12 Pass Through 58	58	••	8	P12 Pass Through 8
P12 Pass Through 57	57	••	7	P12 Pass Through 7
P12 Pass Through 56	56	••	6	P12 Pass Through 6
P12 Pass Through 55	55	••	5	P12 Pass Through 5
P12 Pass Through 54	54	••	4	P12 Pass Through 4
P12 Pass Through 53	53	••	3	P12 Pass Through 3
P12 Pass Through 52	52	••	2	P12 Pass Through 2
P12 Pass Through 51	51	••	1	P12 Pass Through 1

Table 2-3. Connector P12 pin out

Signal Name	Pin		Pin	Signal Name
GND	100	• •	50	GND
P11 Pass Through 99	99	• •	49	P11 Pass Through 49
P11 Pass Through 98	98	• •	48	P11 Pass Through 48
P11 Pass Through 97	97	• •	47	P11 Pass Through 47
P11 Pass Through 96	96	• •	46	P11 Pass Through 46
P11 Pass Through 95	95	• •	45	P11 Pass Through 45
P11 Pass Through 94	94	• •	44	P11 Pass Through 44
P11 Pass Through 93	93	• •	43	P11 Pass Through 43
DIO7	92	• •	42	P11 Pass Through 42
DIO6	91	• •	41	P11 Pass Through 41
DIO5	90	• •	40	P11 Pass Through 40
DIO4	89	• •	39	PC +5V
DIO3	88	• •	38	P11 Pass Through 38
DIO2	87	• •	37	P11 Pass Through 37
DIO1	86	• •	36	P11 Pass Through 36
DIO0	85	• •	35	P11 Pass Through 35
P11 Pass Through 84	84	• •	34	P11 Pass Through 34
P11 Pass Through 83	83	• •	33	P11 Pass Through 33
P11 Pass Through 82	82	• •	32	P11 Pass Through 32
P11 Pass Through 81	81	• •	31	P11 Pass Through 31
P11 Pass Through 80	80	• •	30	P11 Pass Through 30
P11 Pass Through 79	79	• •	29	P11 Pass Through 29
P11 Pass Through 78	78	• •	28	P11 Pass Through 28
P11 Pass Through 77	77	• •	27	P11 Pass Through 27
P11 Pass Through 76	76	• •	26	P11 Pass Through 26
P11 Pass Through 75	75	• •	25	P11 Pass Through 25
P11 Pass Through 74	74	• •	24	P11 Pass Through 24
P11 Pass Through 73	73	• •	23	P11 Pass Through 23
P11 Pass Through 72	72	• •	22	P11 Pass Through 22
P11 Pass Through 71	71	• •	21	P11 Pass Through 21
P11 Pass Through 70	70	• •	20	P11 Pass Through 20
P11 Pass Through 69	69	• •	19	P11 Pass Through 19
P11 Pass Through 68	68	• •	18	P11 Pass Through 18
P11 Pass Through 67	67	• •	17	P11 Pass Through 17
P11 Pass Through 66	66	• •	16	P11 Pass Through 16
P11 Pass Through 65	65	• •	15	P11 Pass Through 15
P11 Pass Through 64	64	• •	14	P11 Pass Through 14
P11 Pass Through 63	63	• •	13	P11 Pass Through 13
P11 Pass Through 62	62	• •	12	P11 Pass Through 12
P11 Pass Through 61	61	• •	11	P11 Pass Through 11
P11 Pass Through 60	60	• •	10	P11 Pass Through 10
P11 Pass Through 59	59	• •	9	P11 Pass Through 9
P11 Pass Through 58	58	• •	8	P11 Pass Through 8
P11 Pass Through 57	57	• •	7	P11 Pass Through 7
P11 Pass Through 56	56	• •	6	P11 Pass Through 6
P11 Pass Through 55	55	• •	5	P11 Pass Through 5
P11 Pass Through 54	54	• •	4	P11 Pass Through 4
P11 Pass Through 53	53	• •	3	P11 Pass Through 3
P11 Pass Through 52	52	• •	2	P11 Pass Through 2
P11 Pass Through 51	51	• •	1	P11 Pass Through 1

Table 2-4. Connector P9 pin out

Signal Name	Pin		Pin	Signal Name
GND	50	• •	49	P10 Pass Through 99
P10 Pass Through 98	48	• •	47	P10 Pass Through 97
P10 Pass Through 96	46	• •	45	P10 Pass Through 95
P10 Pass Through 94	44	• •	43	P10 Pass Through 93
DIO7	42	• •	41	DIO6
DIO5	40	• •	39	DIO4
DIO3	38	• •	37	DIO2
DIO1	36	• •	35	DIO0
P10 Pass Through 84	34	• •	33	P10 Pass Through 83
P10 Pass Through 82	32	• •	31	P10 Pass Through 81
P10 Pass Through 80	30	• •	29	P10 Pass Through 79
P10 Pass Through 78	28	• •	27	P10 Pass Through 77
P10 Pass Through 76	26	• •	25	P10 Pass Through 75
P10 Pass Through 74	24	• •	23	P10 Pass Through 73
P10 Pass Through 72	22	• •	21	P10 Pass Through 71
P10 Pass Through 70	20	• •	19	P10 Pass Through 69
P10 Pass Through 68	18	• •	17	P10 Pass Through 67
P10 Pass Through 66	16	• •	15	P10 Pass Through 65
P10 Pass Through 64	14	• •	13	P10 Pass Through 63
P10 Pass Through 62	12	• •	11	P10 Pass Through 61
P10 Pass Through 60	10	• •	9	P10 Pass Through 59
P10 Pass Through 58	8	• •	7	P10 Pass Through 57
P10 Pass Through 56	6	• •	5	P10 Pass Through 55
P10 Pass Through 54	4	• •	3	P10 Pass Through 53
P10 Pass Through 52	2	• •	1	P10 Pass Through 51

Table 2-5. Connector P10 pin out

Signal Name	Pin		Pin	Signal Name
GND	50	• •	49	P9 Pass Through 99
P9 Pass Through 98	48	• •	47	P9 Pass Through 97
P9 Pass Through 96	46	• •	45	P9 Pass Through 95
P9 Pass Through 94	44	• •	43	P9 Pass Through 93
DIO7	42	• •	41	DIO6
DIO5	40	• •	39	DIO4
DIO3	38	• •	37	DIO2
DIO1	36	• •	35	DIO0
P9 Pass Through 84	34	• •	33	P9 Pass Through 83
P9 Pass Through 82	32	• •	31	P9 Pass Through 81
P9 Pass Through 80	30	• •	29	P9 Pass Through 79
P9 Pass Through 78	28	• •	27	P9 Pass Through 77
P9 Pass Through 76	26	• •	25	P9 Pass Through 75
P9 Pass Through 74	24	• •	23	P9 Pass Through 73
P9 Pass Through 72	22	• •	21	P9 Pass Through 71
P9 Pass Through 70	20	• •	19	P9 Pass Through 69
P9 Pass Through 68	18	• •	17	P9 Pass Through 67
P9 Pass Through 66	16	• •	15	P9 Pass Through 65
P9 Pass Through 64	14	• •	13	P9 Pass Through 63
P9 Pass Through 62	12	• •	11	P9 Pass Through 61
P9 Pass Through 60	10	• •	9	P9 Pass Through 59
P9 Pass Through 58	8	• •	7	P9 Pass Through 57
P9 Pass Through 56	6	• •	5	P9 Pass Through 55
P9 Pass Through 54	4	• •	3	P9 Pass Through 53
P9 Pass Through 52	2	• •	1	P9 Pass Through 51

Information on signal connections

General information regarding signal connection and configuration is available in the *Guide to Signal Connections* on our web site at www.mccdaq.com/signals/signals.pdf.

Signal cables

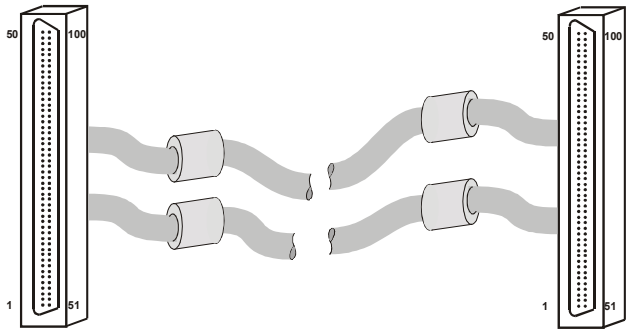


Figure 2-1. C100MMS-x cable

For more information on the C100MMS-*x* cable, go to www.mccdaq.com.

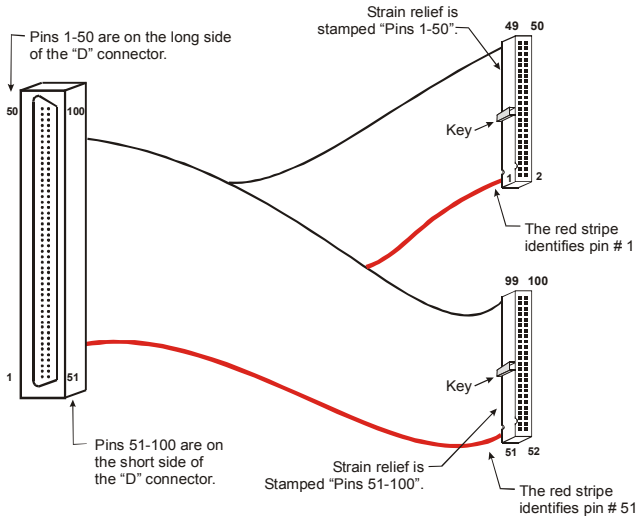


Figure 2-2. C100HD50-x cable

For more information on the C100HD50-*x* cable, go to www.mccdaq.com.

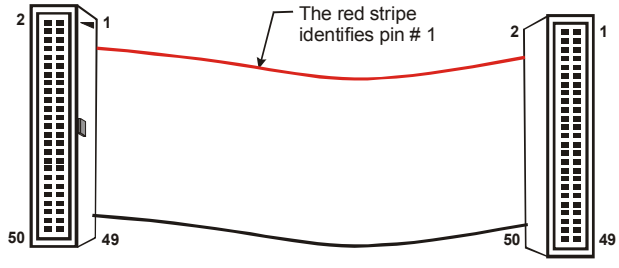


Figure 2-3. C50FF-x cable

For more information on the C50FF-*x* cable, go to www.mccdaq.com.

Connecting to your 6000 Series control board

Perform the following procedure to connect the 6K-SSR-RACK08 to the 6000 Series control board.

1. Turn off your computer and open the cover.
2. Install your PCI-DAS6000 Series or PCI-DAC6700 Series board in the computer.
3. Connect the digital signal cable from one of the interface connectors on the 6K-SSR-RACK08 to the 100-pin I/O connector on the 6000 Series control board.
   - **C100MMS-x cable**: Connect one end to either 100-pin interface connector (**P12** or **P11**) on the 6K-SSR-RACK08. Connect the other end to the 100-pin interface connector on the 6000 Series control board.
   - **C100HD50-x cable**: Connect the 50-pin end (stamped **Pins 51 to 100**) to either 50-pin connector (**P9** or **P10**) on the 6K-SSR-RACK08. Connect the 100-pin cable end to the 100-pin interface connector on the 6000 Series control board.

External power is required when using the C100HD50-x cable

The C100HD50-x cable does not provide power to the 6K-SSR-RACK08. If you use the C100HD50-x cable, power the 6K-SSR-RACK08 with an external power source.

4. To connect other accessory boards or devices to your 6K-SSR-RACK08, use the remaining 100-pin interface connector and/or the two 50-pin connectors for the connection(s). The following typical configurations are possible:
   - When using a C100MMS-x cable, you can use a second C100MMS-x cable to daisy chain to an SCB-100 accessory board, OR you could use a C50FF-x cable to daisy chain to a 50-pin accessory board.
   - When using a C100HD50-x cable, you can use a C50FF-x cable to daisy chain to a 50-pin accessory board.

Configuring the 6K-SSR-RACK08 board

The 6K-SSR-RACK08 has jumpers that you set to configure the power source and relay logic control. Factory-configured default settings are listed in Table 2-6.

Table 2-6. Default hardware configuration

Board label	Description	Default setting
POWER IN **JP1**	Sets the power source to one of three options: ▪ **+5BD**: +5V power from the connected 6000 Series control board. ▪ **+5PC**: power from the computer's internal power supply. ▪ **9V EXT**: power from an AC adapter.	+5BD
JP2	Jumper to set the I/O module type for SSR modules 1-4.	output
JP3	Jumper to set the I/O module type for SSR modules 5-8.	output
JP5	Jumper to set the I/O module parity for SSR modules 1-4. Options are invert (active high) and non-invert (active low).	NON-INVERT (active low)
JP6	Jumper to set the I/O module parity for SSR modules 5-8. Options are invert (active high) and non-invert (active low).	NON-INVERT (active low)

Figure 2-4 shows the location of the jumpers and power connectors on the 6K-SSR-RACK08.

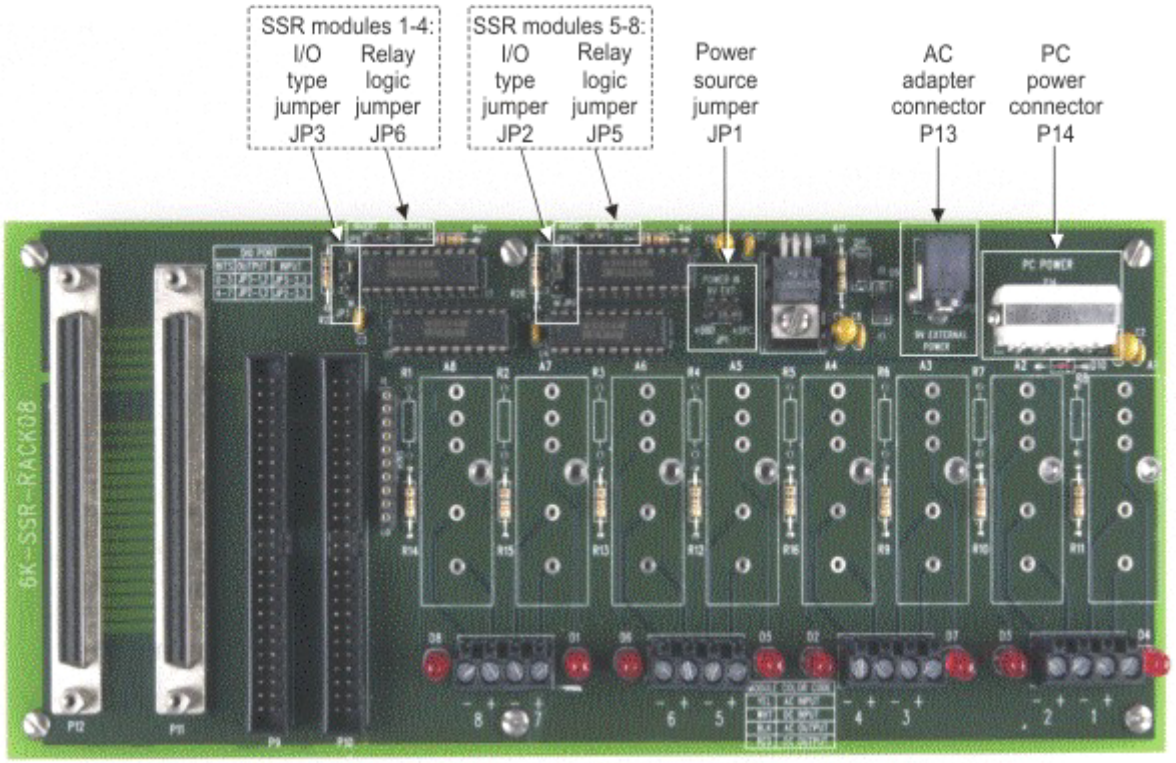


Figure 2-4. 6K-SSR-RACK08 board jumpers and external power connectors

Power source

Set the power source with jumper **JP1** (labeled **POWER IN**). You can power the 6K-SSR-RACK08 using one of the following sources.

- the 6000 Series control board's internal +5 V power supply (default)
- your computer's +5 V power supply, or external +5 V supply (power cable supplied)
- AC adapter (supplied)

Figure 2-5 shows the **POWER IN** jumper configured for each power source.

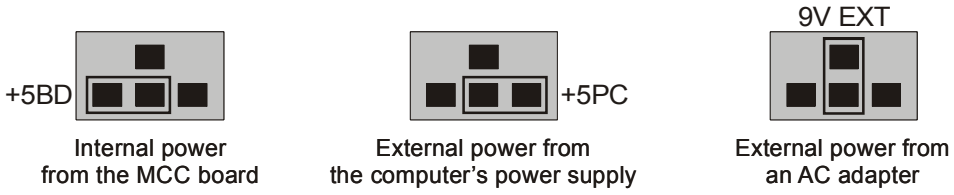


Figure 2-5. Power source jumper JP1 configurations

External +5 V PC power connections

You can power the 6K-SSR-RACK08 with your computer's +5 V power supply using the **C-PCPOWER-10** cord that was shipped with the board. Each end of the cable has a keyed MOLEX type connector. To connect to your computer's internal power connectors, do the following:

1. Turn off power to the computer and remove the cover.
2. Connect one end of the C-PCPOWER10 power cord to one of your computer's internal power connectors. If necessary, refer to your computer's user manual for the location of the power supply connectors.

3. Run the power cable out the back of the computer through an expansion slot or other opening, and replace the cover on the computer.

Caution! Be careful not to pinch the cable when you replace the cover — if this cable is cut, the resulting short circuit can damage the computer.

4. Connect the other end of the power cord to the connector labeled **PC POWER** connector (**P14**) on the 6K-SSR-RACK08. Refer to Figure 2-4 for the location of this connector.

5. Set the **POWER IN** jumper (**JP1**) for **+5PC**.

External +9V AC adapter power connection

You can power the 6K-SSR-RACK08 using the AC power adapter (part number CB-PWR-9). This adapter provides 9 volts, 1 amp DC power, 110 VAC power. To connect the AC adapter, do the following:

1. Turn off power to the computer.

2. Connect the CB-PWR-9 cable to the **9V EXTERNAL POWER** connector (**P13**) on the 6K-SSR-RACK08. Refer to Figure 2-4 for the location of this connector.

3. Plug the AC adapter into a power outlet.

4. Set the **POWER IN** jumper (**JP1**) for **9V EXT**.

I/O type

Set the type for each module group for either input or output (default). You cannot mix the I/O configuration within a group.

- Jumper **JP2** sets the I/O type for SSR modules 1-4
- Jumper **JP3** set the I/O type for SSR modules 5-8.

Refer to Figure 2-4 for the location of these jumpers. Figure 2-6 shows the SSR modules 1-4 configured for input (jumper position 2-3), and SSR modules 5-8 configured for output (jumper position 1-2).

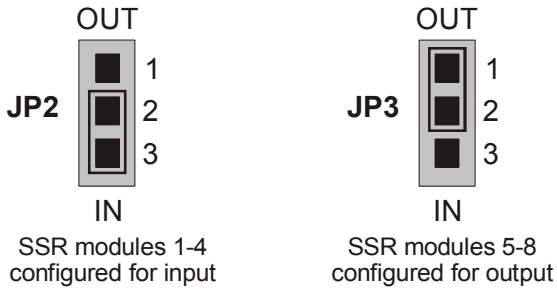


Figure 2-6. I/O module type jumpers

Relay logic

Set the relay logic for each module group to be either inverted (active high) or non-inverted (active low, default). Jumper **JP5** sets the logic for SSR modules 1 to 4. Jumper **JP6** sets the relay logic for SSR modules 5 to 8. The logic settings are labeled **INVERT** and **NON-INVERT** on the board.

- When you set the logic jumper to NON-INVERT, the SSR modules activate when the digital output signal is low.
- When you set the logic jumper to INVERT, the SSR modules activate when the digital output signal is high.

Figure 2-7 shows SSR modules 1-4 set to invert logic (active high), and modules 5-8 set to non-invert logic (active low).

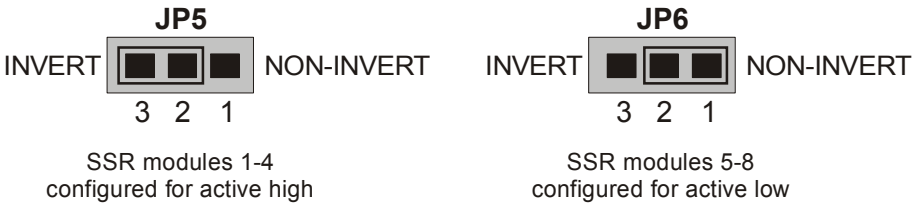


Figure 2-7. Relay logic jumpers JP5 and JP6

The I/O type and the relay logic settings control what happens when a module activates. For example, a module group configured for SSR input with non-inverted logic outputs a low logic level when the module is ON. A module group configured for SSR output with non-inverted logic requires a low logic level to turn the output module ON.

Functional Details

6K-SSR-RACK08 functions are illustrated in the block diagram shown here.

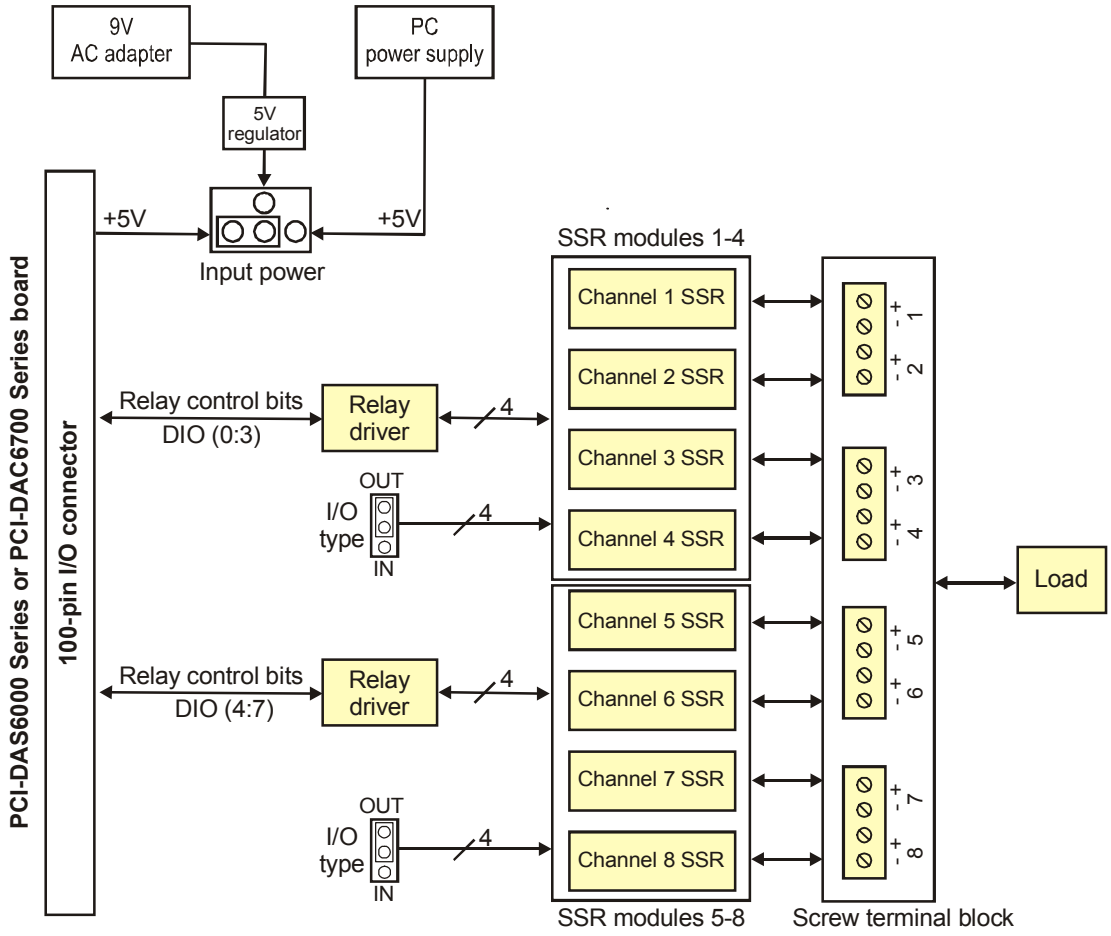


Figure 3-1. 6K-SSR-RACK08 functional block diagram

Components

Major components on the 6K-SSR-RACK08 are shown in Figure 3-2.

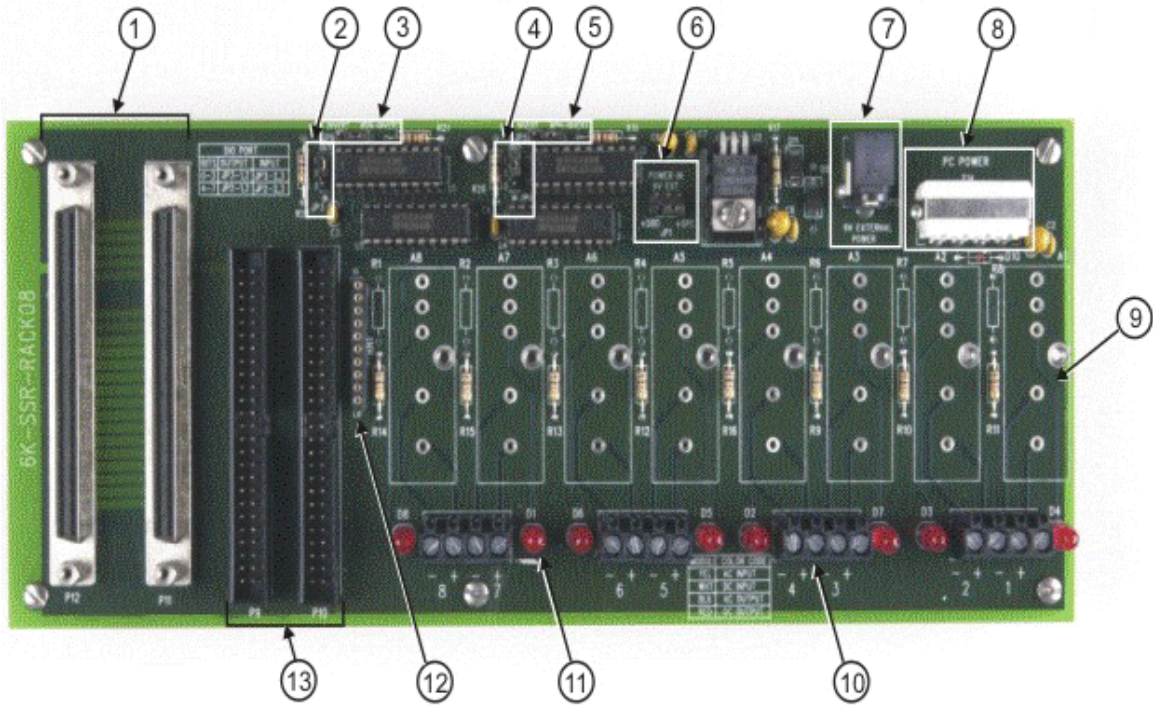


Figure 3-2. 6K-SSR-RACK08 component locations

Table 3-1 describes each component.

Table 3-1. 6K-SSR-RACK08 component descriptions

Callout	Board label	Description
1	P12, P11	100-pin interface connectors. Connect to the 6000 Series control board or accessory board.
2	JP3	I/O type jumper for SSR modules 1-4.
3	JP6	Relay logic jumper for SSR modules 1-4.
4	JP2	I/O type jumper for SSR modules 5-8.
5	JP5	Relay logic jumper for SSR modules 5-8.
6	JP1	Main +5 V power jumper to select the power source — internal power from the 6000 Series control board, external power from the computer, or external power from the AC adapter.
7	P13	External power connector. Connect to the AC adapter.
8	P14	External power connector. Connect to the computer's +5 V supply.
9	A1 to A8	Mounting locations for SSR modules <1:8>.
10	±1 to ±8	Relay screw terminals for field wiring connections. Two screw terminals are dedicated to each SSR module.
11	D1 to D8	LEDs that indicate the status of the SSR modules. Refer to page 3-4 for a summary of the LED states.
12	RN1	Pull-up / pull-down resistor location.
13	P9, P10	50-pin interface connectors. Connect to the 6000 Series control board or accessory board.

Compatible SSR modules

The 6K-SSR-RACK08 board has locations for eight solid state relay modules that you can install in your 6K-SSR-RACK08 board. The SSR modules use a standard color scheme so you can quickly identify what module type is installed. Mounting screw threads are provided for you to easily install the SSR modules.
MCC offers SSR modules that are compatible with the 6K-SSR-RACK08:

- SSR-IAC-05
- SSR-IAC-05A
- SSR-IDC-05
- SSR-IDC-05NP
- SSR-OAC-05
- SSR-OAC-05A
- SSR-ODC-05
- SSR-ODC-05A
- SSR-ODC-05R

Details on these SSR modules are available from our web site at www.mccdaq.com/cbicatalog/directory.asp?dept_id=246&top_id=25.

Screw terminal connections

Use the board's screw terminals to connect external devices to the SSR modules. Two terminals are dedicated to each module (one positive and one negative terminal).

Caution! Before connecting wires to the screw terminals, turn off the power to the 6K-SSR-RACK08, and make sure that the signal wires do not contain live voltages.

Wire gauge

Use 12 AWG to 22 AWG wire to connect field devices. Properly insulate the wires to avoid any short circuit to the other channels, ground, or other points on the board.

Signal level control and power up conditions

To ensure a known relay state when the 6K-SSR-RACK08 is disconnected from the 6000 Series control board, or when the digital lines on the 6000 Series control board are in high impedance (or input) mode, install a 2.2 K single inline package (SIP) resistor network.

In a 2.2 K SIP, one side of each resistor connects to a single common point and brought out to a pin. The common point is marked with a line at one end of the resistor network. A typical SIP resistor network is shown in Figure 3-3.

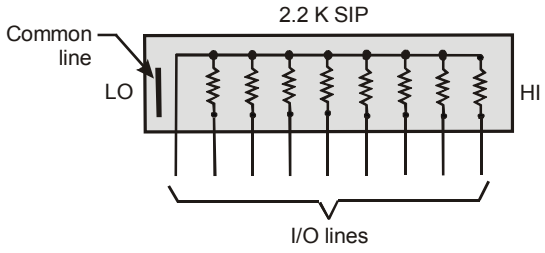


Figure 3-3. SIP resistor location

The 6K-SSR-RACK08 has a location for installing a 2.2 K SIP resistor network (see Figure 3-4). When installing pull-up and pull-down resistor SIP packs, we recommend using a 2.2 K, eight-resistor SIP (MCC part number SP-K2.29C).

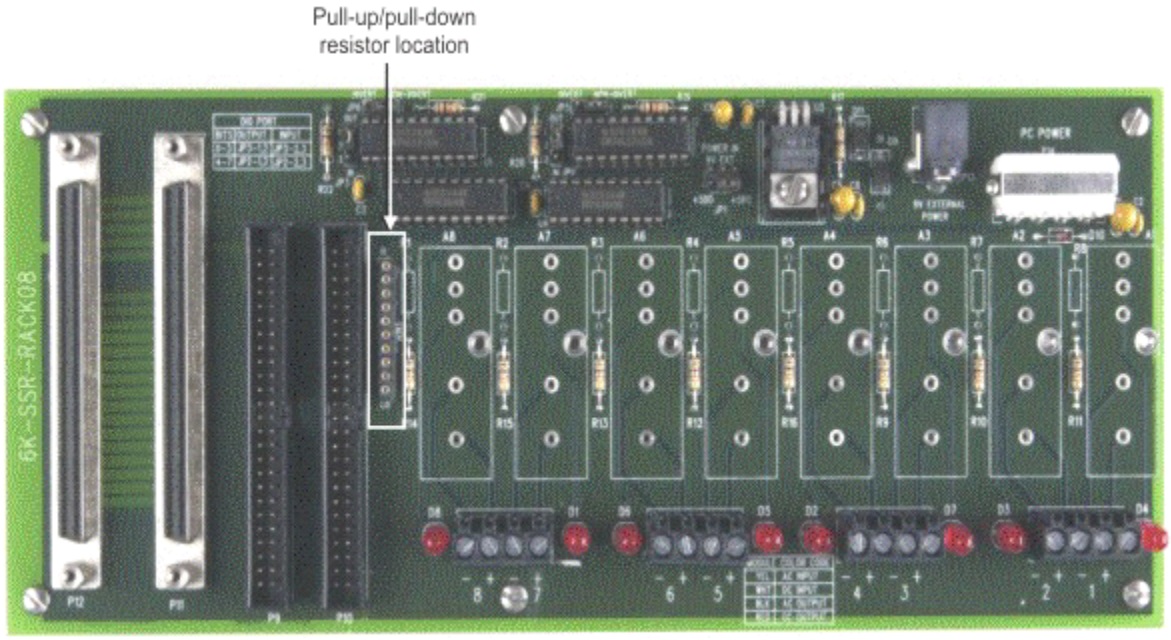


Figure 3-4. SIP resistor location

To pull up the digital line for a particular port, install the resistor with the common line at the **HI** end. To pull down a digital line, install the resistor with the common line at the **LO** end. The SIP establishes a high or low logic level at each digital I/O line when disconnected from the 6000 Series control board or when the digital lines on the 6000 Series control board are in high impedance (or input) mode.

When the 6K-SSR-RACK08 is disconnected from the 6000 Series control board or when the digital lines on the 6000 Series control board are in high impedance (or input) mode, the solid state relays are undriven. The state of the solid state relays when not driven is dependent on the invert/non-invert logic jumper setting and the pull-up/pull-down resistor configuration. Table 3-1 summarizes the undriven state of the SSR output modules for each configuration.

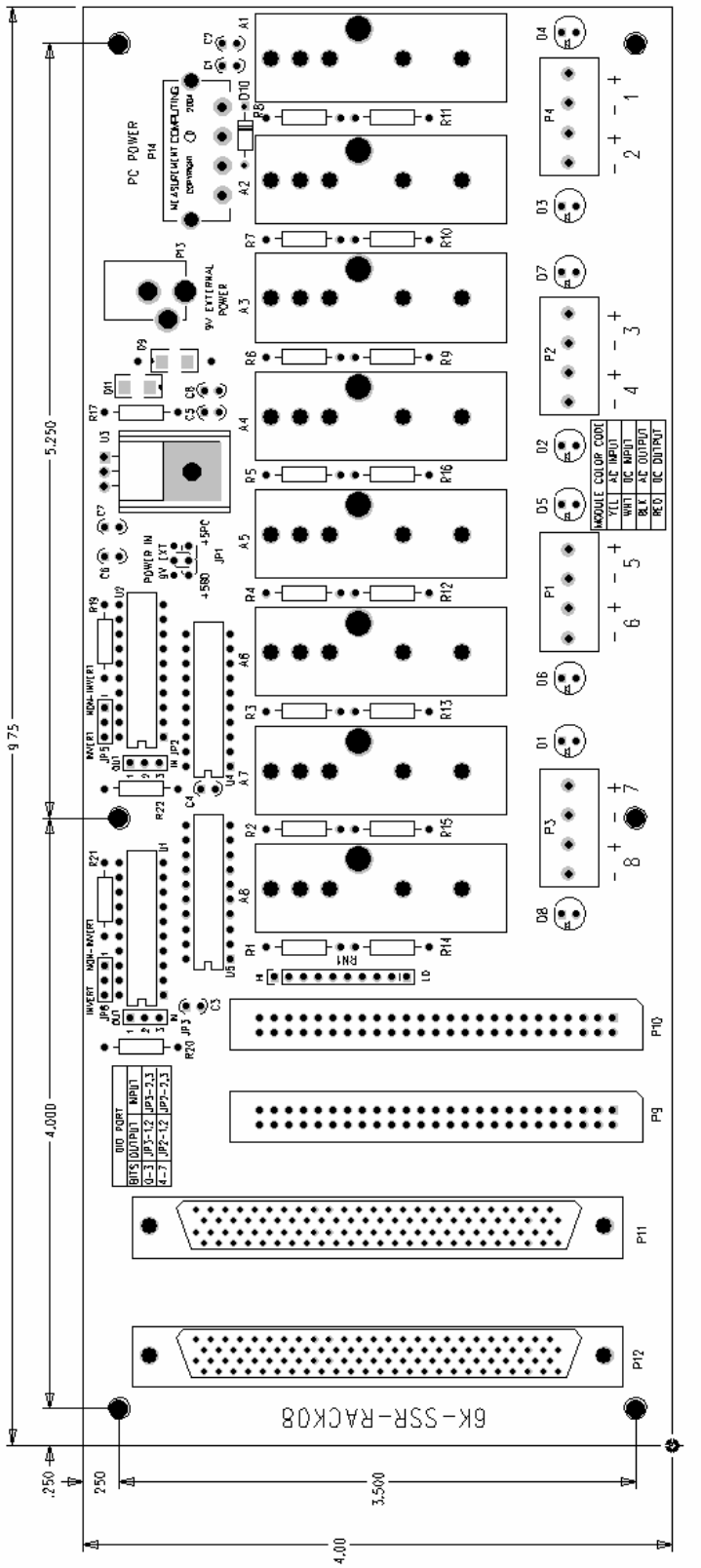
Table 3-1. SSR output module power up and reset conditions

I/O type	Logic jumper setting	Pull-up / down installed	Power up / reset state
output	invert (logic high)	none	high state = on
		pull-up	high state = on
		pull-down	high state = off
output	non-invert (logic low)	none	low state = on
		pull-up	low state = off
		pull-down	low state = on

LED states

The LEDs indicate the on/off status of the SSR modules. The LED illuminates when an output module is active (turned on) or when an input module detects an input voltage (logic high).

6K-SSR-RACK08 assembly diagram



Specifications

Typical for 25 °C unless otherwise specified.
Specifications in *italic text* are guaranteed by design.

Power consumption

Table 1. Power consumption specifications

5 V PC auxiliary power / PCI bus power	All modules off	200 mA typical, 230 mA max.
	All modules on	260 mA typical, 320 mA max.
External (9 V to 15 V) unregulated supply	All modules off	210 mA typical, 240 mA max.
	All modules on	270 mA typical, 330 mA max.

Environmental

Table 2. Environmental specifications

Operating temperature range	0 to 70 °C
Storage temperature range	-40 to 100 °C
Humidity	0 to 95% non-condensing

Mechanical

Table 3. Mechanical specifications

Card dimensions with modules (without standoffs)	248 mm (L) x 102 mm (W) x 41 mm (H) 9.75" (L) x 4.0" (W) x 1.625" (H)

Relay screw terminals

Table 4. Relay screw terminal specifications

Wire gauge range	*12 AWG to 22 AWG*

Table 5. Screw terminal pin out

Pin	Signal Name
1+	Module 1+
1-	Module 1-
2+	Module 2+
2-	Module 2-
3+	Module 3+
3-	Module 3-
4+	Module 4+
4-	Module 4-
5+	Module 5+
5-	Module 5-
6+	Module 6+
6-	Module 6-
7+	Module 7+
7-	Module 7-
8+	Module 8+
8-	Module 8-

Power in jumper (JP1)

Table 6. JP1 specifications

+5PC	Use cable C-PCPOWER-10
+9V EXT	Use Adapter CB-PWR-9
+5 BD (default)	Powered from 100-pin connector

I/O module type selection (JP2, JP3)

Table 7. JP2 and JP3 specifications

Modules 1-4	Selectable via JP2 as either input modules or output (default) modules. Do not mix input and output modules within this bank of four.
Modules 5-8	Selectable via JP3 as either input modules or output (default) modules. Do not mix input and output modules within this bank of four.
Pull-up/pull-down on digital I/O lines	Configurable at RN1 with 2.2 K resistor network. Not populated by default.

I/O module polarity selection (JP5, JP6)

Table 8. JP5 and JP6 specifications

Modules 1-4	Inverted (active high) or non-inverted (active low, default), selectable via JP5.
Modules 5-8	Inverted (active high) or non-inverted (active low, default), selectable via JP6.

Bypass resistors

Table 9. Bypass resistor specifications

Resistors R1 – R8 (Normally 0 Ω)	Transceiver bypass resistors for bit-wise I/O configuration. NOT populated by default. Bypass resistors are mutually exclusive of 74LS245 and 74LS640 transceivers.

Compatible products

Table 10. Compatible product specifications

Analog input boards	▪ PCI-DAS6013 ▪ PCI-DAS6014 ▪ PCI-DAS6030 ▪ PCI-DAS6031 ▪ PCI-DAS6032 ▪ PCI-DAS6033 ▪ PCI-DAS6034 ▪ PCI-DAS6035 ▪ PCI-DAS6036 ▪ PCI-DAS6052 ▪ PCI-DAS6023 ▪ PCI-DAS6025 ▪ PCI-DAS6040 ▪ PCI-DAS6070 ▪ PCI-DAS6071
Analog output boards	▪ PCI-DAC6702 ▪ PCI-DAC6703

Note 1: The 6K-SSR-RACK08 requires external power (for all products above) when used with the C100HD50 (pins 51-100) ribbon cable.

Main connectors and pin out

User connector P11

Table 11. Connector P11 specifications

Connector type	Shielded SCSI 100 D-type
Compatible cables	C100MMS-x, shielded round cable. x = 1, 2 or 3 meters

Table 12. P11 pin out

Pin	Signal name	Pin	Signal name
1	P12 Pass Through 1	51	P12 Pass Through 51
2	P12 Pass Through 2	52	P12 Pass Through 52
3	P12 Pass Through 3	53	P12 Pass Through 53
4	P12 Pass Through 4	54	P12 Pass Through 54
5	P12 Pass Through 5	55	P12 Pass Through 55
6	P12 Pass Through 6	56	P12 Pass Through 56
7	P12 Pass Through 7	57	P12 Pass Through 57
8	P12 Pass Through 8	58	P12 Pass Through 58
9	P12 Pass Through 9	59	P12 Pass Through 59
10	P12 Pass Through 10	60	P12 Pass Through 60
11	P12 Pass Through 11	61	P12 Pass Through 61
12	P12 Pass Through 12	62	P12 Pass Through 62
13	P12 Pass Through 13	63	P12 Pass Through 63
14	P12 Pass Through 14	64	P12 Pass Through 64
15	P12 Pass Through 15	65	P12 Pass Through 65
16	P12 Pass Through 16	66	P12 Pass Through 66
17	P12 Pass Through 17	67	P12 Pass Through 67
18	P12 Pass Through 18	68	P12 Pass Through 68
19	P12 Pass Through 19	69	P12 Pass Through 69
20	P12 Pass Through 20	70	P12 Pass Through 70
21	P12 Pass Through 21	71	P12 Pass Through 71
22	P12 Pass Through 22	72	P12 Pass Through 72
23	P12 Pass Through 23	73	P12 Pass Through 73
24	P12 Pass Through 24	74	P12 Pass Through 74
25	P12 Pass Through 25	75	P12 Pass Through 75
26	P12 Pass Through 26	76	P12 Pass Through 76
27	P12 Pass Through 27	77	P12 Pass Through 77
28	P12 Pass Through 28	78	P12 Pass Through 78
29	P12 Pass Through 29	79	P12 Pass Through 79
30	P12 Pass Through 30	80	P12 Pass Through 80
31	P12 Pass Through 31	81	P12 Pass Through 81
32	P12 Pass Through 32	82	P12 Pass Through 82
33	P12 Pass Through 33	83	P12 Pass Through 83
34	P12 Pass Through 34	84	P12 Pass Through 84
35	P12 Pass Through 35	85	DIO0
36	P12 Pass Through 36	86	DIO1
37	P12 Pass Through 37	87	DIO2
38	P12 Pass Through 38	88	DIO3
39	PC +5V	89	DIO4
40	P12 Pass Through 40	90	DIO5
41	P12 Pass Through 41	91	DIO6
42	P12 Pass Through 42	92	DIO7
43	P12 Pass Through 43	93	P12 Pass Through 93
44	P12 Pass Through 44	94	P12 Pass Through 94
45	P12 Pass Through 45	95	P12 Pass Through 95
46	P12 Pass Through 46	96	P12 Pass Through 96
47	P12 Pass Through 47	97	P12 Pass Through 97
48	P12 Pass Through 48	98	P12 Pass Through 98
49	P12 Pass Through 49	99	P12 Pass Through 99
50	GND	100	GND

User connector P12

Table 13. Connector P12 specifications

Connector type	Shielded SCSI 100 D-type
Compatible cables	C100MMS-x, shielded round cable. x = 1, 2 or 3 meters

Table 14. P12 pin out

Pin	Signal name	Pin	Signal name
1	P11 Pass Through 1	51	P11 Pass Through 51
2	P11 Pass Through 2	52	P11 Pass Through 52
3	P11 Pass Through 3	53	P11 Pass Through 53
4	P11 Pass Through 4	54	P11 Pass Through 54
5	P11 Pass Through 5	55	P11 Pass Through 55
6	P11 Pass Through 6	56	P11 Pass Through 56
7	P11 Pass Through 7	57	P11 Pass Through 57
8	P11 Pass Through 8	58	P11 Pass Through 58
9	P11 Pass Through 9	59	P11 Pass Through 59
10	P11 Pass Through 10	60	P11 Pass Through 60
11	P11 Pass Through 11	61	P11 Pass Through 61
12	P11 Pass Through 12	62	P11 Pass Through 62
13	P11 Pass Through 13	63	P11 Pass Through 63
14	P11 Pass Through 14	64	P11 Pass Through 64
15	P11 Pass Through 15	65	P11 Pass Through 65
16	P11 Pass Through 16	66	P11 Pass Through 66
17	P11 Pass Through 17	67	P11 Pass Through 67
18	P11 Pass Through 18	68	P11 Pass Through 68
19	P11 Pass Through 19	69	P11 Pass Through 69
20	P11 Pass Through 20	70	P11 Pass Through 70
21	P11 Pass Through 21	71	P11 Pass Through 71
22	P11 Pass Through 22	72	P11 Pass Through 72
23	P11 Pass Through 23	73	P11 Pass Through 73
24	P11 Pass Through 24	74	P11 Pass Through 74
25	P11 Pass Through 25	75	P11 Pass Through 75
26	P11 Pass Through 26	76	P11 Pass Through 76
27	P11 Pass Through 27	77	P11 Pass Through 77
28	P11 Pass Through 28	78	P11 Pass Through 78
29	P11 Pass Through 29	79	P11 Pass Through 79
30	P11 Pass Through 30	80	P11 Pass Through 80
31	P11 Pass Through 31	81	P11 Pass Through 81
32	P11 Pass Through 32	82	P11 Pass Through 82
33	P11 Pass Through 33	83	P11 Pass Through 83
34	P11 Pass Through 34	84	P11 Pass Through 84
35	P11 Pass Through 35	85	DIO0
36	P11 Pass Through 36	86	DIO1
37	P11 Pass Through 37	87	DIO2
38	P11 Pass Through 38	88	DIO3
39	PC +5V	89	DIO4
40	P11 Pass Through 40	90	DIO5
41	P11 Pass Through 41	91	DIO6
42	P11 Pass Through 42	92	DIO7
43	P11 Pass Through 43	93	P11 Pass Through 93
44	P11 Pass Through 44	94	P11 Pass Through 94
45	P11 Pass Through 45	95	P11 Pass Through 95
46	P11 Pass Through 46	96	P11 Pass Through 96
47	P11 Pass Through 47	97	P11 Pass Through 97
48	P11 Pass Through 48	98	P11 Pass Through 98
49	P11 Pass Through 49	99	P11 Pass Through 99
50	GND	100	GND

User connector P9

Table 15. Connector P9 specifications

Connector type	Unshielded 50-pin ribbon connector - male
Compatible cables	C100HD50-x, C50FF-x, unshielded ribbon cable. x = 3 or 6 feet.

Table 16. P9 pin out

Pin	Signal name	Pin	Signal name
1	P10 Pass Through 51	26	P10 Pass Through 76
2	P10 Pass Through 52	27	P10 Pass Through 77
3	P10 Pass Through 53	28	P10 Pass Through 78
4	P10 Pass Through 54	29	P10 Pass Through 79
5	P10 Pass Through 55	30	P10 Pass Through 80
6	P10 Pass Through 56	31	P10 Pass Through 81
7	P10 Pass Through 57	32	P10 Pass Through 82
8	P10 Pass Through 58	33	P10 Pass Through 83
9	P10 Pass Through 59	34	P10 Pass Through 84
10	P10 Pass Through 60	35	DIO0
11	P10 Pass Through 61	36	DIO1
12	P10 Pass Through 62	37	DIO2
13	P10 Pass Through 63	38	DIO3
14	P10 Pass Through 64	39	DIO4
15	P10 Pass Through 65	40	DIO5
16	P10 Pass Through 66	41	DIO6
17	P10 Pass Through 67	42	DIO7
18	P10 Pass Through 68	43	P10 Pass Through 93
19	P10 Pass Through 69	44	P10 Pass Through 94
20	P10 Pass Through 70	45	P10 Pass Through 95
21	P10 Pass Through 71	46	P10 Pass Through 96
22	P10 Pass Through 72	47	P10 Pass Through 97
23	P10 Pass Through 73	48	P10 Pass Through 98
24	P10 Pass Through 74	49	P10 Pass Through 99
25	P10 Pass Through 75	50	GND

User connector P10

Table 17. Connector P10 specifications

Connector type	Unshielded 50-pin ribbon connector - male
Compatible cables	C100HD50-x, C50FF-x, unshielded ribbon cable. x = 3 or 6 feet

Table 18. P10 pin out

Pin	Signal name	Pin	Signal name
1	P9 Pass Through 51	26	P9 Pass Through 76
2	P9 Pass Through 52	27	P9 Pass Through 77
3	P9 Pass Through 53	28	P9 Pass Through 78
4	P9 Pass Through 54	29	P9 Pass Through 79
5	P9 Pass Through 55	30	P9 Pass Through 80
6	P9 Pass Through 56	31	P9 Pass Through 81
7	P9 Pass Through 57	32	P9 Pass Through 82
8	P9 Pass Through 58	33	P9 Pass Through 83
9	P9 Pass Through 59	34	P9 Pass Through 84
10	P9 Pass Through 60	35	DIO0
11	P9 Pass Through 61	36	DIO1
12	P9 Pass Through 62	37	DIO2
13	P9 Pass Through 63	38	DIO3
14	P9 Pass Through 64	39	DIO4
15	P9 Pass Through 65	40	DIO5
16	P9 Pass Through 66	41	DIO6
17	P9 Pass Through 67	42	DIO7
18	P9 Pass Through 68	43	P9 Pass Through 93
19	P9 Pass Through 69	44	P9 Pass Through 94
20	P9 Pass Through 70	45	P9 Pass Through 95
21	P9 Pass Through 71	46	P9 Pass Through 96
22	P9 Pass Through 72	47	P9 Pass Through 97
23	P9 Pass Through 73	48	P9 Pass Through 98
24	P9 Pass Through 74	49	P9 Pass Through 99
25	P9 Pass Through 75	50	GND

CE Declaration of Conformity

Manufacturer: Measurement Computing Corporation
Address: 10 Commerce Way
Suite 1008
Norton, MA 02766
USA

Category: Electrical equipment for measurement, control and laboratory use.

Measurement Computing Corporation declares under sole responsibility that the product

6K-SSR-RACK08

to which this declaration relates is in conformity with the relevant provisions of the following standards or other documents:

EU EMC Directive 89/336/EEC: Electromagnetic Compatibility, EN 61326 (1997) Amendment 1 (1998)

Emissions: Group 1, Class A

- EN 55011 (1990)/CISPR 11: Radiated and Conducted emissions.

Immunity: EN61326, Annex A

- IEC 1000-4-2 (1995): Electrostatic Discharge immunity, Criteria C.
- IEC 1000-4-3 (1995): Radiated Electromagnetic Field immunity Criteria A.
- IEC 1000-4-4 (1995): Electric Fast Transient Burst immunity Criteria B.
- IEC 1000-4-5 (1995): Surge immunity Criteria A.
- IEC 1000-4-6 (1996): Radio Frequency Common Mode immunity Criteria A.
- IEC 1000-4-8 (1994): Magnetic Field immunity Criteria A.
- IEC 1000-4-11 (1994): Voltage Dip and Interrupt immunity Criteria A.

Declaration of Conformity based on tests conducted by Chomerics Test Services, Woburn, MA 01801, USA in April, 2005. Test records are outlined in Chomerics Test Report #EMI3931.04.

We hereby declare that the equipment specified conforms to the above Directives and Standards.

Carl Haapaoja, Director of Quality Assurance

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