SMIP

SWITCH MODULARITY AND INTERFACE PLATFORM

USER'S MANUAL

82-0036-000
Release April 7, 2003

VXI Technology, Inc.

2031 Main Street
Irvine, CA 92614-6509
(949) 955-1894

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CERTIFICATION

VXI Technology, Inc. (VTI) certifies that this product met its published specifications at the time of shipment from the factory. VTI further certifies that its calibration measurements are traceable to the United States National Institute of Standards and Technology (formerly National Bureau of Standards), to the extent allowed by that organization's calibration facility, and to the calibration facilities of other International Standards Organization members.

WARRANTY

The product referred to herein is warranted against defects in material and workmanship for a period of three years from the receipt date of the product at customer's facility. The sole and exclusive remedy for breach of any warranty concerning these goods shall be repair or replacement of defective parts, or a refund of the purchase price, to be determined at the option of VTI.

For warranty service or repair, this product must be returned to a VXI Technology authorized service center. The product shall be shipped prepaid to VTI and VTI shall prepay all returns of the product to the buyer. However, the buyer shall pay all shipping charges, duties, and taxes for products returned to VTI from another country.

VTI warrants that its software and firmware designated by VTI for use with a product will execute its programming when properly installed on that product. VTI does not however warrant that the operation of the product, or software, or firmware will be uninterrupted or error free.

LIMITATION OF WARRANTY

The warranty shall not apply to defects resulting from improper or inadequate maintenance by the buyer, buyer-supplied products or interfacing, unauthorized modification or misuse, operation outside the environmental specifications for the product, or improper site preparation or maintenance.

VXI Technology, Inc. shall not be liable for injury to property other than the goods themselves. Other than the limited warranty stated above, VXI Technology, Inc. makes no other warranties, express or implied, with respect to the quality of product beyond the description of the goods on the face of the contract. VTI specifically disclaims the implied warranties of merchantability and fitness for a particular purpose.

RESTRICTED RIGHTS LEGEND

Use, duplication, or disclosure by the Government is subject to restrictions as set forth in subdivision (b)(3)(ii) of the Rights in Technical Data and Computer Software clause in DFARS 252.227-7013.

VXI Technology, Inc.
2031 Main Street
Irvine, CA 92614-6509 U.S.A.

DECLARATION OF CONFORMITY

Declaration of Conformity According to ISO/IEC Guide 22 and EN 45014

MANUFACTURER'S NAME	VXI Technology, Inc.
MANUFACTURER'S ADDRESS	2031 Main Street Irvine, California 92614-6509
PRODUCT NAME	Switch Modularity and Interface Platform
MODEL NUMBER(S)	SMPXXXX
PRODUCT OPTIONS	All
PRODUCT CONFIGURATIONS	All

VXI Technology, Inc. declares that the aforementioned products conform to the requirements of the Low Voltage Directive 73/23/EEC *and the* EMC Directive 89/366/EEC *(inclusive* 93/68/EEC*) and carries the "CE" mark accordingly. The products have been designed and manufactured according to the following specifications:*

SAFETY	EN61010 (2001)
EMC	EN61326 (1997 w/A1:98) Class A CISPR 22 (1997) Class A VCCI (April 2000) Class A ICES-003 Class A (ANSI C63.4 1992) AS/NZS 3548 (w/A1 & A2:97) Class A FCC Part 15 Subpart B Class A EN 61010-1:2001

The products were installed into a C-size VXI mainframe chassis and tested in a typical configuration.

I hereby declare that the aforementioned products have been designed to comply with the relevant sections of the specifications listed above as well as complying with all essential requirements of the Low Voltage Directive.

April 2003

CE

Jerry Patton, QA Manager

GENERAL SAFETY INSTRUCTIONS

Review the following safety precautions to avoid bodily injury and/or damage to the product. These precautions must be observed during all phases of operation or service of this product. Failure to comply with these precautions, or with specific warnings elsewhere in this manual, violates safety standards of design, manufacture, and intended use of the product.

Service should only be performed by qualified personnel.

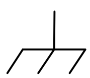
TERMS AND SYMBOLS

These terms may appear in this manual:

WARNING	Indicates that a procedure or condition may cause bodily injury or death.
CAUTION	Indicates that a procedure or condition could possibly cause damage to equipment or loss of data.

These symbols may appear on the product:

ATTENTION - Important safety instructions



Frame or chassis ground

WARNINGS

Follow these precautions to avoid injury or damage to the product:

Use Proper Power Cord	To avoid hazard, only use the power cord specified for this product.
Use Proper Power Source	To avoid electrical overload, electric shock or fire hazard, do not use a power source that applies other than the specified voltage.
Use Proper Fuse	To avoid fire hazard, only use the type and rating fuse specified for this product.

WARNINGS (CONT.)

Avoid Electric Shock

To avoid electric shock or fire hazard, do not operate this product with the covers removed. Do not connect or disconnect any cable, probes, test leads, etc. while they are connected to a voltage source. Remove all power and unplug unit before performing any service. ***Service should only be performed by qualified personnel.***

Ground the Product

This product is grounded through the grounding conductor of the power cord. To avoid electric shock, the grounding conductor must be connected to earth ground.

Operating Conditions

To avoid injury, electric shock or fire hazard:

- Do not operate in wet or damp conditions.
- Do not operate in an explosive atmosphere.
- Operate or store only in specified temperature range.
- Provide proper clearance for product ventilation to prevent overheating.
- DO NOT operate if any damage to this product is suspected. ***Product should be inspected or serviced only by qualified personnel.***

Improper Use

The operator of this instrument is advised that if the equipment is used in a manner not specified in this manual, the protection provided by the equipment may be impaired. Conformity is checked by inspection.

SUPPORT RESOURCES

Support resources for this product are available on the Internet and at VXI Technology customer support centers.

Internet Support

E-mail: support@vxitech.com
Web Address: http://www.vxitech.com

Telephone Support (U.S.)

Tel: (949) 955-1894 **West Coast**
(216) 447-8950 **East Coast**

Fax: (949) 955-3041 **West Coast**
(216) 447-8951 **East Coast**

VXI Technology Headquarters

Technical Support
VXI Technology, Inc.
2031 Main Street
Irvine, CA 92614-6509

Tel: (949) 955-1894
Fax: (949) 955-3041

SECTION 1

INTRODUCTION

INTRODUCTION

The SMIP™ (*Switch Modularity and Interface Platform*) is designed with density and cost in mind. As opposed to "traditional" VXIbus switching solutions, the SMIP family consists of switch modules that can be mixed and combined to form flexible high-density switch configurations.

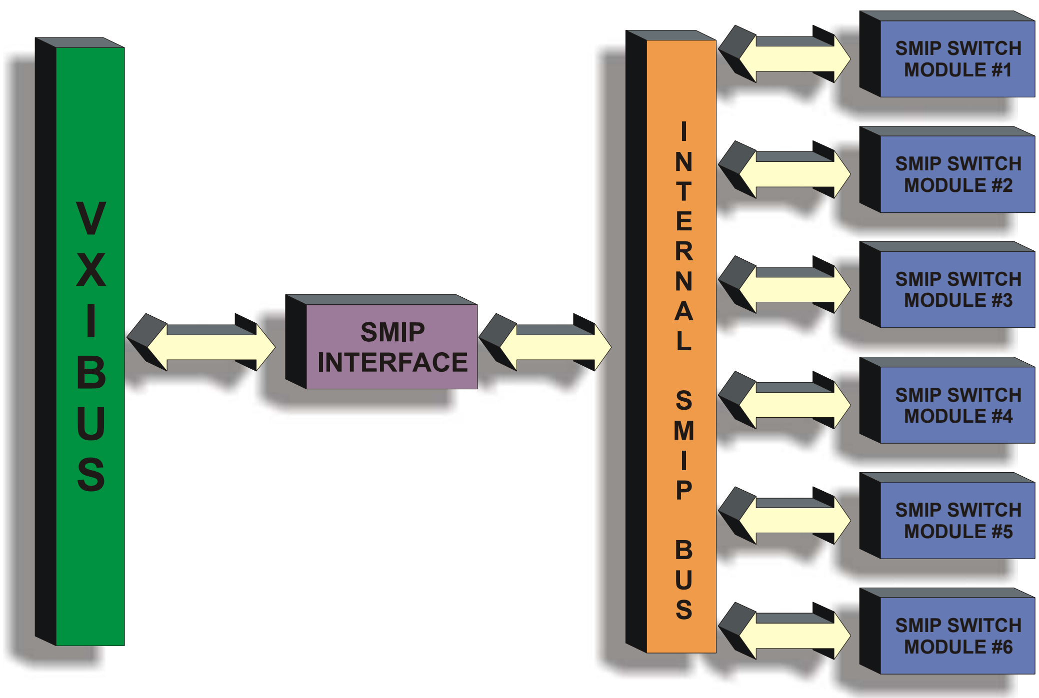


FIGURE 1-1 SMIP™ - SWITCH MODULARITY AND INTERFACE PLATFORM

All SMIP module designs are optimized to preserve signal integrity. All switch modules employ multi-layer PCB designs with extensive ground planes and shielding where appropriate. The relays are selected to maximize signal integrity. All signal ground planes are also isolated from the control circuit grounds, and the signal paths are designed to minimize crosstalk between channels. To further minimize digital noise, the control circuitry goes into a quiescent state when not processing commands. This allows for the switching of low-level signals.

PROGRAMMING

The SMIP family of switch modules is programmed using direct register access for fast data throughput.

Automatic Scanning

A predefined sequence of channels can be programmed into an extensive scan list that can be incremented by a trigger. This approach relieves the host controller from having to tie up the VXIbus backplane when scanning.

Programmable Timing Delays

A delay can be programmed between relay closures to allow for settling times of other system resources. When used with triggers, a controlled synchronous switching system can easily be configured.

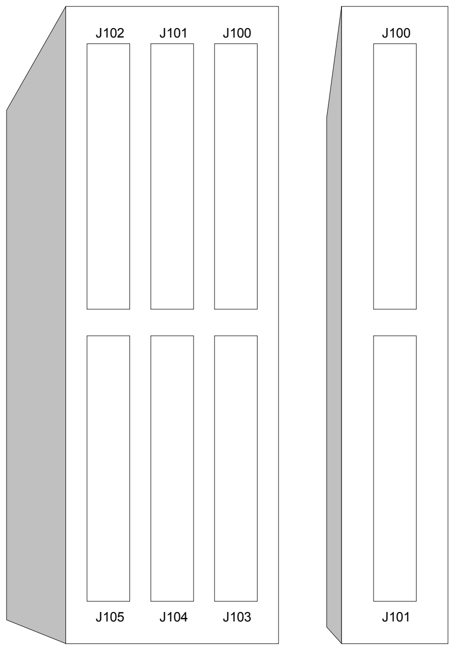
Safety Interrupt

This is a programmable fail-safe feature that allows all relays to open based upon external or TTL backplane triggers. This allows signals to be removed from the unit under test if a system fail-safe occurs, such as inadvertent removal of a test adapter.

Break-Before-Make / Make-Before-Break Operation

This feature allows automatic Break-Before-Make (BBM) and Make-Before-Break (MBB) operations. It is programmed simply by setting user configurable options. In BBM operation, all opening relays are guaranteed to open prior to any closing relays being set. The relay open or close time is user configurable as well. In MBB operation, the closing relays are guaranteed to be set prior to the opening relays being opened.

SM1000 SERIES



The SM1000 series consists of the SM1000A single-slot base unit and the SM1000B double-slot base unit. The SM1000A can house up to two high-density switch modules, and the SM1000B can house up to six high-density switch modules. Switching modules can be mixed and matched for flexibility and density.

For example, a 1 x 384 two-wire multiplexer can be accommodated in a double-slot VXIbus card (SM1000B).

FIGURE 1-2 SM1000 SERIES BASE UNITS

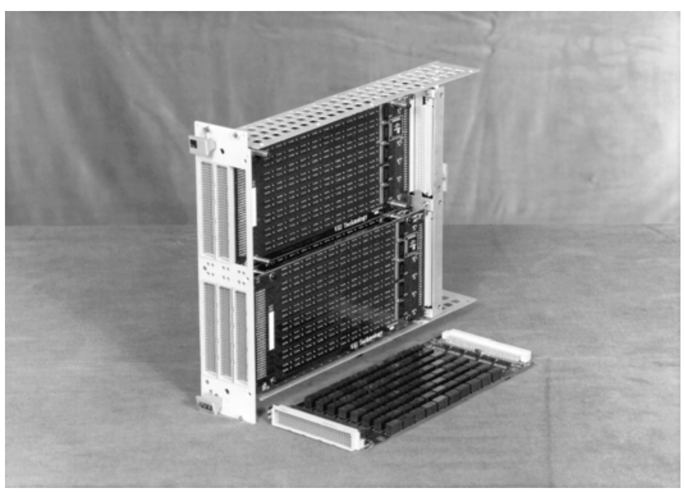


FIGURE 1-3 SM1000B DOUBLE-SLOT SIX-MODULE BASE UNIT

POWER SWITCHES

INTRODUCTION

The SM200X Series switch modules break the 8 A-switching barrier with 10-amp and 20-amp power-switching relays. Most relays are driven by the VXIbus +5 V supply line, since VXIbus mainframes always have ample current capability on this supply line.

SM2001A - 20 CHANNEL 16 AMP SPST SWITCH

Up to 120 16 A SPST relays can be accommodated in a SM1000B double-slot base unit for maximum density; or, mixed and matched with other SMIP cards for flexibility.

Since these relays switch power to the UUT or interface, a fail-safe interrupt input line is provided on the front panel that the user can open all relays automatically if a safety condition occurs. This approach instantly removes all power to the UUT or interface, protecting operators or the UUT.

SM2002 - 12 CHANNEL 10 AMP SPDT SWITCH

Up to 72 10 A SPDT relays can be accommodated in a SM1000B double-slot base unit for maximum density; or, mixed and matched with other SMIP cards for flexibility.

Since these relays switch power to the UUT or interface, a fail-safe interrupt input line is provided on the front panel that the user can open all relays automatically if a safety condition occurs. This approach instantly removes all power to the UUT or interface, protecting operators or the UUT.

SM2003 - 8 CHANNEL 20 AMP SPDT SWITCH

Up to 16 20 A SPDT relays can be accommodated in a SM1000A base unit for maximum density; or, mixed and matched with other SMIP cards for flexibility.

SM2004 - 12 CHANNEL 20 AMP SPST SWITCH

Up to 24 20 A SPST relays can be accommodated in a SM1000A base unit for maximum density; or, mixed and matched with other SMIP cards for flexibility.

SM2005 - 3 SP4T AND 3 SPDT - 20 AMP SWITCH

The SM2005 carries a mixture of SP4T and SPDT relays all on one card. Up to six 20 A SP4T relays and six 20 A SPDT relays can be accommodated in a SM1000A base unit for maximum density; or, mixed with another SMIP card for flexibility.

SM2008 - 16 CHANNEL – 500 V – 1 AMP DPST SWITCH

The SM2008 was designed for applications requiring high-voltage signal switching. Up to 96 DPST relays can be accommodated in a SM1000B base unit for maximum density, or mixed with other SMIP cards for flexibility.

SM2009 - 16 CHANNEL – 500 V – 1 AMP SPDT SWITCH

The SM2009 was designed for applications requiring high-voltage signal switching. Up to 96 SPDT relays can be accommodated in a SM1000B base unit for maximum density, or mixed with other SMIP cards for flexibility.

TABLE 1-1 SPECIFICATIONS - POWER SWITCHES

MODELS	SM2001A	SM2002	SM2003	SM2004	SM2005	SM2008	SM2009
Type	Power	Power	Power	Power	Power	Power	Power
Channels	20 SPST	12 SPDT	8 SPDT	12 SPST	3 SP4T 3 SPDT	16 DPST	16 SPDT
Switching Voltage Resistive	30 VDC, 250 VAC max.	30 VDC, 250 VAC max.	30 VDC 277 VAC max.	30 VDC 277 VAC max.	30 VDC 277 VAC max.	500 VDC max.	500 VDC max.
Switching Power Resistive	300 WDC, 2500 VA max.	300 WDC, 2500 VA max.	600 W 5440 VA max.	600 W 5440 VA max.	600 W 5440 VA max.	25 W max.	25 W max.
Switching Current	16 A max.	10 A max.	20 A max.	20 A max.	20 A max.	1 A max.	1 A max.
Minimum Contact Rating	5 VDC 0.1 A	5 VDC 0.5 A	5 VDC 0.5 A	5 VDC 0.5 A	5 VDC 0.5 A	TBD	TBD
Isolation	> 10e7 Ω	> 10e7 Ω	> 10e7 Ω	> 10e7 Ω	> 10e7 Ω	TBD	TBD
Path Resistance	< 0.10 Ω @ 5 A	< 0.10 Ω @ 5 A	< 0.03 Ω @ 18 A	< 0.03 Ω @ 18 A	< 0.03 Ω @ 18 A	< 1 Ω	< 1 Ω
VXI							
Device Type	Register Based	Register Based	Register Based	Register Based	Register Based	Register Based	Register Based
DRIVERS							
VXI *plug&play* Win95/NT	Yes	Yes	Yes	Yes	Yes	Yes	Yes

GENERAL PURPOSE SWITCHES

SM3001 - 64 X 1 TWO-WIRE 2 A PER CHANNEL MULTIPLEXER

The SM3001 high-density multiplexer module, designed for scanning of multiple points to a common bus, can be used in 1-, 2- or 4-wire configurations. It can be configured either synchronously with an instrument (i.e., using triggers), or asynchronously with individual relay control. Up to 384 two-wire channels can be accommodated in a double-slot VXIbus card (SM1000B) for maximum density, or mixed and matched with other SMIP cards for flexibility. All relays have individual relay control and each path allows for 2 A switching.

All relays are driven from the VXIbus +5 V supply line. Residual voltage discharge relays can be enabled to momentarily short out the measurement path when changing from one input channel to the next. This dissipates any voltage held by the wiring and the instrument input capacitance. This protects sensitive devices, such as CMOS circuits, from residual voltages caused by previous high-voltage measurements. This feature can also be disabled in the low-voltage applications where maximum throughput speed is important.

Module configurations include:

4-wire	2-wire	1-wire
4 - 1 x 8	8 - 1 x 8	8 - 1 x 16
2 - 1 x 16	4 - 1 x 16	4 - 1 x 32
1 - 1 x 32	2 - 1 x 32	2 - 1 x 64
	1 - 1 x 64	1 - 1 x 128

SM3001DR - 64 X 1 TWO-WIRE 2 A PER CHANNEL MULTIPLEXER

This version of the SM3001 is similar the one above except it utilizes the discharge relay (DR) circuit. When the DR circuit is in use, the one-wire function is not available. Refer to the DR circuit in the SM3001/DR schematic in the appendix section.

SM4001 - 9 x (4 x 4) 2 A per Channel Matrix

The SM4001 high-density matrix module is designed for applications that require a true non-blocking matrix where the user has the ability to connect any row to any column. The smallest building block is a 4 x 4 2-wire matrix, and rows and columns can easily be expanded to form larger matrices. Up to a 4 x 216 two-wire matrix channels can be accommodated in a double-slot VXIbus card (SM1000B) for maximum density, or mixed and matched with other SMIP cards for flexibility. All relays have individual relay control and each path allows for 2 A switching.

Optional SM4001 matrix module configurations include:

Model	**Configuration**	
SM4001	9 (4 x 4) two-wire	standard configuration
SM4002	1 (4 x 36) two-wire	optional configuration
SM4003	2 (4 x 16) two-wire + 1 (4 x 4) two-wire	optional configuration
SM4004	1 (8 x 16) two-wire + 1 (4 x 4) two-wire	optional configuration
SM4005	1 (12 x 12) two-wire	optional configuration
SM4006	3 (4 x 12) two-wire	optional configuration
SM4007	2 (8 x 8) two-wire + 1 (4 x 4) two-wire	optional configuration
SM4001-S	User Definable	user definable configuration

SM5001 - 80 SPST 2 A PER CHANNEL RELAYS

The SM5001 high-density basic switch module is designed for general purpose switching where individual relays can be used to route signals to and from the UUT or combined externally to form user-defined configurations. The latter approach allows the same switch module to be used for testing multiple UUTs by simply changing the configuration within an UUT-specific external adapter.

Up to 480 individual SPST relays can be accommodated in a double-slot VXIbus card (SM1000B) for maximum density, or mixed and matched with other SMIP cards for flexibility.

SM5002 - 50 SPDT 2 A PER CHANNEL RELAYS

The SM5002 high-density basic switch module is designed for general purpose switching where individual relays can be used to route a signal to one of two points. Up to 300 individual SPDT relays can be accommodated in a double-slot VXIbus card (SM1000B) for maximum density, or mixed and matched with other SMIP cards for flexibility.

SM5003 - 26 SP4T 2 A PER CHANNEL RELAYS

The SM5003 high-density basic switch module is designed for general purpose switching where individual relays can be used to route a signal to one of four points. Up to 156 individual SP4T relays can be accommodated in a double-slot VXIbus card (SM1000B) for maximum density, or mixed and matched with other SMIP cards for flexibility.

SM5004 - 30 SPDT 5 A PER CHANNEL RELAYS

The SM5004 high-density 5 A switch module is designed for switching applications such as process control, appliance pass/fail testing, and on/off control. Up to 180 individual SPDT relays can be accommodated in a double-slot VXIbus card (SM1000B) for maximum density, or mixed and matched with other SMIP cards for flexibility.

SM5005 - 48 SPST 5 A PER CHANNEL RELAYS

The SM5005 high-density 5 A switch module is designed for switching applications such as process control, appliance pass/fail testing, and on/off control. Up to 288 individual SPST relays can be accommodated in a double-slot VXIbus card (SM1000B) for maximum density, or mixed and matched with other SMIP cards for flexibility.

TABLE 1-2 SPECIFICATIONS - GENERAL PURPOSE SWITCHES

MODELS	SM3001/DR	SM400X	SM5001	SM5002	SM5003	SM5004	SM5005
Type	Multiplexer	Matrix	SPST	SPDT	SP4T	SPDT	SPST
Channels	64 x 1	As Configured	80	50	26	30	48
Switching Voltage	300 VDC, 300 VAC rms max.	300 VDC, 300 VAC rms max.	300 VDC, 300 VAC rms max.	300 VDC, 300 VAC rms max.	300 VDC, 300 VAC rms max.	110 VDC, 250 VAC rms max.	110 VDC, 250 VAC rms max.
Switching Power	60 WDC, 125 VA max.	60 WDC, 125 VA max.	60 WDC, 125 VA max.	60 WDC, 125 VA max.	60 WDC, 125 VA max.	60 WDC, 125 VA max.	60 WDC, 125 VA max.
Switching Current	2 A per channel	2 A per channel	2 A per channel	2 A per channel	2 A per channel	5 A per channel	5 A per channel
Minimum Contact Rating	100 mVDC 100 μA	100 mVDC 100 μA	100 mVDC 100 μA	100 mVDC 100 μA	100 mVDC 100 μA	5 VDC 100 mA	5 VDC 100 mA
Isolation	> 10e8 Ω	> 10e8 Ω	> 10e9 Ω	> 10e9 Ω	> 10e9 Ω	> 10e9 Ω	> 10e9 Ω
Crosstalk	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Path Resistance	< 0.5 Ω	< 0.5 Ω	< 0.5 Ω	< 0.5 Ω	< 0.5 Ω	< 0.5 Ω	< 0.5 Ω
Bandwidth (-3dB)	> 10 MHz	> 10 MHz	> 10 MHz	> 10 MHz	> 10 MHz	> 10 MHz	> 10 MHz
VXI							
Device Type	Register Based	Register Based	Register Based	Register Based	Register Based	Register Based	Register Based
DRIVERS							
VXI*plug&play* Win95/NT	Yes	Yes	Yes	Yes	Yes	Yes	Yes

RF SWITCHES

INTRODUCTION

The SM6001 and SM6002 are part of the SMIP family and can be mixed and matched with other SMIP modules to configure high-density systems.

SM6001 - 10 CHANNEL RF SP4T

The SM6001 is a high-density coaxial tree designed for general purpose RF switching. The front panel contains two high-density, 26-pin connectors. Excellent crosstalk and isolation is maintained by using RF relays with bandwidths in excess of 1.5GHz, along with short semi-rigid coaxial runs from the connector directly to the relays. The SM6001 is also configured to avoid any un-terminated stub effects.

SM6002 - 17 CHANNEL RF SPDT

The SM6002 is a high-density coaxial switch designed for general purpose RF switching. The front panel contains two high-density, 26-pin connectors. Excellent crosstalk and isolation is maintained by using RF relays with bandwidths in excess of 1.5GHz, along with short semi-rigid coaxial runs from the connector directly to the relays. The SM6002 is also configured to avoid any un-terminated stub effects.

SM6004 - 3 CH 1:8 MUX AND 3 CH 1:2 MUX COAXIAL SWITCH

The SM6004 is a RF switch module designed as a star configuration. A star switch allows any channel to be connected to any other channel. This configuration approach also allows for the creation of simple matrices (i.e. 4 x 1 x 4). The front panel contains two high-density, 26-pin connectors. The SM6004 is configured to avoid any un-terminated stub effects.

SM6005 - 8 CH 1:4 MUX COAXIAL SWITCH

The SM6005 is a RF switch module designed as a star configuration. A star switch allows any channel to be connected to any other channel. This configuration approach also allows for the creation of simple matrices (i.e. 4 x 1 x 4). The front panel contains two high-density, 26-pin connectors. The SM6004 is configured to avoid any un-terminated stub effects.

TABLE 1-3 SPECIFICATIONS - RF SWITCHES

MODELS	SM6001	SM6002	SM6004	SM6005
Type	RF SP4T	RF SPDT	RF MUX	RF MUX
Channels	10	17	3 (8-pole) and 3 (2-pole)	8 (4-pole)
Maximum Switching Voltage	100 VAC	100 VAC	100 VAC	100 VAC
Maximum Switching Power	10 W	10 W	10 W (1/2 watt into termination)	10 W (1/2 watt into termination)
Maximum Switching Current	0.5 A	0.5 A	0.5 A	0.5 A
Isolation	10MHz: <-45dB 100MHz: <-45dB 500MHz: <-40dB	10MHz: <-45dB 100MHz: <-45dB 500MHz: <-40dB	10MHz: <-45dB 100MHz: <-45dB 500MHz: <-40dB	10MHz: <-45dB 100MHz: <-45dB 500MHz: <-40dB
Path Resistance	< 1 Ω	< 1 Ω	< 1 Ω	< 1 Ω
Bandwidth (-3dB)	> 900 MHz	> 900 MHz	> 500 MHz	> 500 MHz
Insertion Loss	100 MHz: < 0.2dB 500 MHz: < 0.5dB	100 MHz: < 0.2dB 500 MHz: < 0.5dB	100 MHz: < 0.2dB 500 MHz: < 0.5dB	100 MHz: < 0.2dB 500 MHz: < 0.5dB
VSWR	< 1.2:1 at 100 MHz < 1.5:1 at 500 MHz	< 1.2:1 at 100 MHz < 1.5:1 at 500 MHz	< 1.2:1 at 100 MHz < 1.5:1 at 500 MHz	< 1.2:1 at 100 MHz < 1.5:1 at 500 MHz
VXI				
Device Type	Register Based	Register Based	Register Based	Register Based
DRIVERS				
VXI*plug&play* Win95/NT	Yes	Yes	Yes	Yes

SECTION 2

PREPARATION FOR USE

INTRODUCTION

When the SMIP is unpacked from its shipping carton, the contents should include the following items:

(1) SMIP VXIbus module
(1) SMIP User's Manual (this manual)

All components should be immediately inspected for damage upon receipt of the unit.

Once the SMIP is assessed to be in good condition, it may be installed into an appropriate C-size or D-size VXIbus chassis in any slot other than slot zero. The chassis should be checked to ensure that it is capable of providing adequate power and cooling for the SMIP. Once the chassis is found adequate, the SMIP's logical address and the backplane jumpers of the chassis should be configured prior to the SMIP's installation.

CALCULATING SYSTEM POWER AND COOLING REQUIREMENTS

It is imperative that the chassis provide adequate power and cooling for this module. Referring to the chassis operation manual, confirm that the power budget for the system (the chassis and all modules installed therein) is not exceeded and that the cooling system can provide adequate airflow at the specified backpressure.

It should be noted that if the chassis cannot provide adequate power to the module, the instrument might not perform to specification or possibly not operate at all. In addition, if adequate cooling is not provided, the reliability of the instrument will be jeopardized and permanent damage may occur. Damage found to have occurred due to inadequate cooling could also void the warranty of the module.

NOTE: Due to backplane power limitations, the maximum numbers of relays that should be closed at any given time is 80 relays per plug-in module. For instance, a fully loaded ***SMP1200*** should be limited to 80 x 6 or 480 relay closures at a time.

SETTING THE CHASSIS BACKPLANE JUMPERS

Please refer to the chassis operation manual for further details on setting the backplane jumpers.

SETTING THE CHASSIS BACKPLANE JUMPERS

Please refer to the chassis operation manual for further details on setting the backplane jumpers.

SETTING THE LOGICAL ADDRESS

The logical address of the SMIP is set by two rotary switches located on the top edge of the interface card, near the backplane connectors. Each switch is labeled with positions 0 through F. The switch closer to the front panel of the module is the least significant, and the switch located towards the back of the module is the most significant. To set the Logical Address (LA), simply rotate the pointer to the desired value. For example, to set the **LA** to **25**, first convert the decimal number to the hexadecimal value of **19**. Next, set the back switch to **1**, and the front switch to **9**. See Figure 2-1. Here are a couple of conversion examples:

Example 1

LA (decimal)	**Divide by 16**		**MSB**	**LSB**	
25	25 / 16	=	1	w/ 9 remaining	*Divide the decimal value by 16 to get the MSB and the LSB.*
		=	0001	1001	*The 1 is the MSB, and the remainder of 9 is the LSB.*
		=	1	9	*Convert to hexadecimal. Set the back switch to 1 and the front switch to 9.*

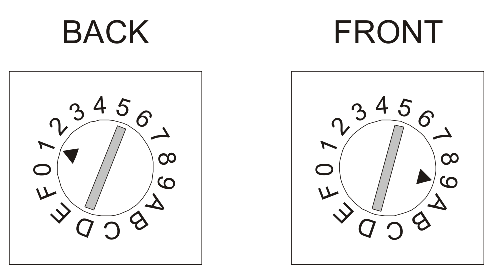


FIGURE 2-1 LOGICAL ADDRESS EXAMPLE 1

Here is another way of looking at the conversion:

LA = (back switch x 16) + front switch
LA = (1 x 16) + 9
LA = 16 + 9
LA = 25

Example 2

LA (decimal)	Divide by 16		MSB	LSB	
200	200 / 16	=	12	w/ 8 remaining	*Divide by 16.*
		=	1100	1000	*Convert to MSB and LSB.*
		=	C	8	*Convert to hexadecimal. Set the back switch to C and the front switch to 8.*

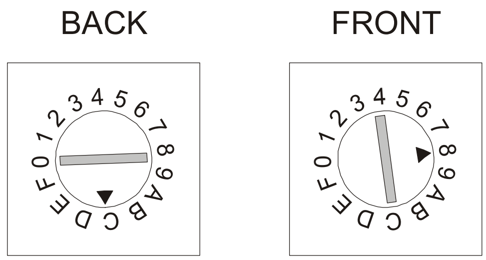


FIGURE 2-2 LOGICAL ADDRESS EXAMPLE 2

Set the address switches to **FF** (factory default) for dynamic configuration. Upon power-up, the resource manager will assign a logical address. See Section F - Dynamic Configuration in the *VXIbus Specification* for further information.

There is only one logical address per SMIP *II* base unit. Address assignments for individual modules are handled through the A24/A32 address space allocation.

SELECTING THE EXTENDED MEMORY SPACE

The Extended Memory Space of the SMIP is set by a dip-switch that is located on the bottom edge of the interface card. Position 1, located to the left on the dip-switch, selects between A24 and A32 memory address space. In the UP position, the SMIP will request A24 space. In the DOWN position, the SMIP will request A32 space. (Position 2 is not currently used.) The selection of the address space should be based upon the memory allocation requirements of the system that the SMIP module will be installed. The amount of memory allocated to the SMIP module is independent of the address space selected.

SECTION 3

FRONT PANEL INTERFACE

GENERAL

The first part details front-panel module locations. The tables show connector types and front-panel module locations in relation to either a SM1000A (single-wide) or SM1000B (double-wide).

The next part covers module connector configurations. It is divided into three groups: power switches, general-purpose switches and RF switches. Each group is organized by model and the front-panel connector layout is described in detail for each group.

Individual module connector pin assignments and schematic references can be found at the end of this manual in the appendices.

TABLE 3-1 CONNECTOR TYPES

Model	Connector Type
SM2001A/2002	one 41-pin power connector
SM2003/4/5	two 12-pin power connector
SM2008/9	one 80-pin DIN connector
SM3001/DR	one 160-pin DIN connector
SM400X	one 160-pin DIN connector
SM5001/2/3	one 160-pin DIN connector
SM5004/5	two 50-pin SMPL connectors
SM600X	two 26-pin connectors

Contact the factory for information on the mating connectors.

TABLE 3-2 INSTALLED MODULE LOCATIONS BY CONFIGURATION QUANTITY

Number of Modules	SM1000B						SM1000A	
	Module #0	Module #1	Module #2	Module #3	Module #4	Module #5	Module #0	Module #1
1								*
2							*	*
3				*	*	*		
4	*	*		*	*			
5	*	*		*	*	*		
6	*	*	*	*	*	*		

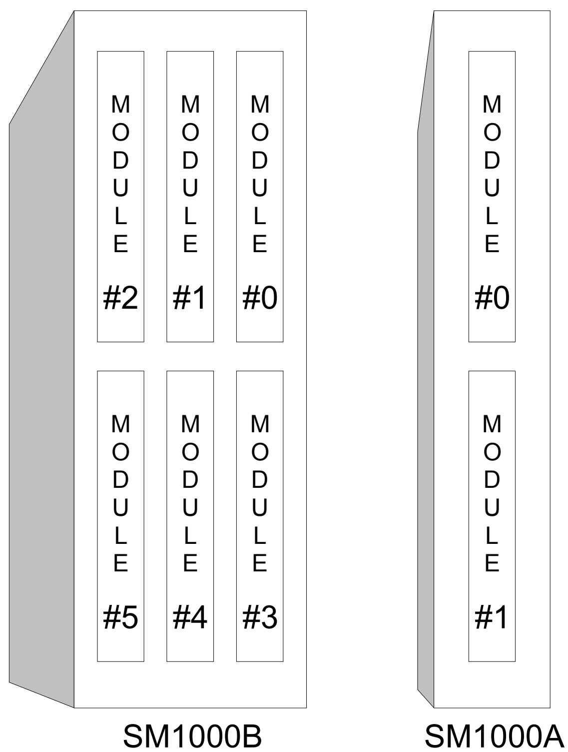
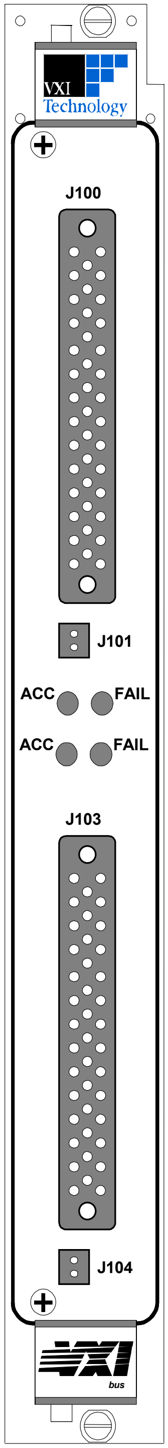


FIGURE 3-1 MODULE LOCATION ASSIGNMENTS

Note: These module locations are typical configurations for like connector types. When multiple connector types are combined in a SM1000B, the configuration may vary according to design specifications.

POWER SWITCHES



FRONT PANEL CONNECTION - SM2001A / SM2002

As part of the SMIP family of instruments, the SM2001A and SM2002 can be combined with up to five other modules to form a high-density VXIbus instrument.

Regardless of whether the SMIP is configured with other SMIP modules, each module is treated as an independent instrument in the VXIbus chassis. Each has its own front panel ACCESS and FAIL indicators. Each module connector set includes a heavy-duty forty one-pin power connector and a two-pin fail-safe connector that, when triggered, opens all the relays at once.

The SM2001A and SM2002 models have one 41-pin front-panel connector per module. See the tables in the appendices for connector-pin signal assignments.

FIGURE 3-2 FRONT PANEL LAYOUT - SM2001A / SM2002

The pin locations for a SM2001A or SM2002 power switch module, installed in a SM1000A (single-wide) or a SM1000B (double-wide), are shown in the following figures. Note that the connector orientation is opposite between the single-wide and double-wide platforms. The front-panel ACCESS and FAIL indicators are also opposite.

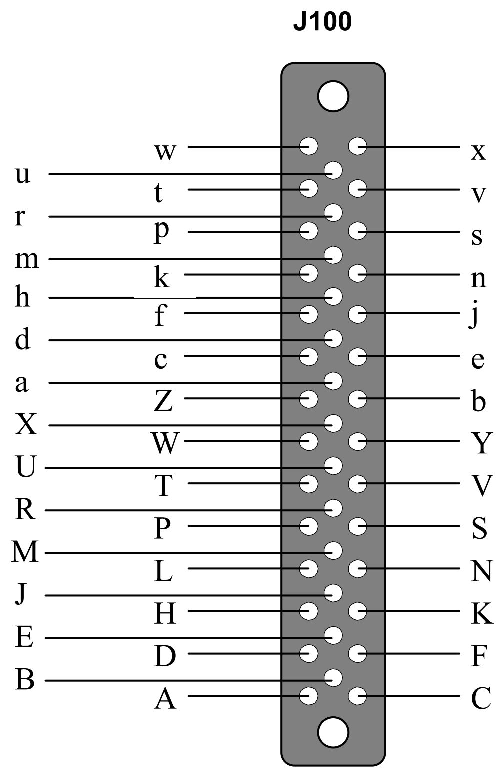


FIGURE 3-3 SM1000A SINGLE SLOT – CONNECTOR PIN LOCATIONS – 41P

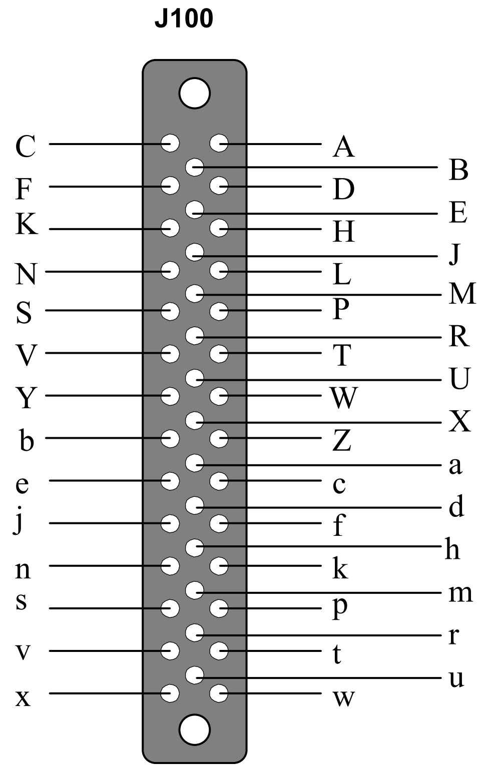
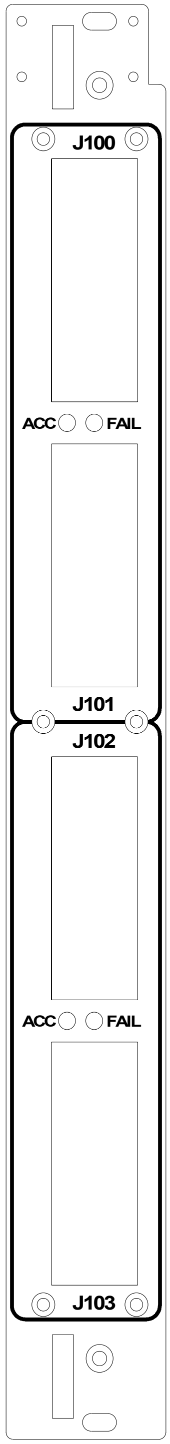


FIGURE 3-4 SM1000B DOUBLE SLOT - CONNECTOR PIN LOCATIONS – 41P



FRONT PANEL CONNECTION - SM2003 / SM2004 / SM2005

As part of the SMIP family of instruments, the SM2003, SM2004 and the SM2005 can be combined with another module for flexibility.

Regardless of whether the SM2003, SM2004 or the SM2005 is configured with another SMIP module, each module is treated as an independent instrument in the VXIbus chassis. Each has its own front panel ACCESS and FAIL indicators.

The SM2003, SM2004 and SM2005 models have one 12-pin front-panel connector per module. See the tables in the appendices for connector-pin signal assignments.

FIGURE 3-5 FRONT PANEL LAYOUT - SM2003/SM2004/SM2005

The pin locations for a SM2003, SM2004 or SM2005 power switch module installed in a SM1000A (single-wide) are shown in the following figure. The SM2003, SM2004 and SM2005 are configured only for use with the SM1000A.

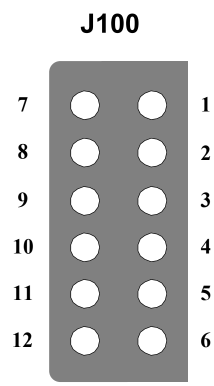
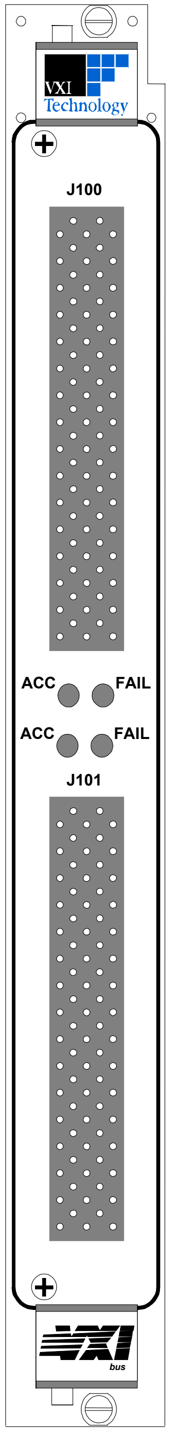


FIGURE 3-6 SM1000A SINGLE SLOT - CONNECTOR PIN LOCATIONS – 12P



FRONT PANEL CONNECTION - SM2008 / SM2009

As part of the SMIP family of instruments, the SM2008 and the SM2009 can be combined with another module for flexibility.

Regardless of whether the SM2008 or the SM2009 is configured with another SMIP module, each module is treated as an independent instrument in the VXIbus chassis. Each has its own front panel ACCESS and FAIL indicators.

The SM2008 and SM2009 models have one 80-pin front-panel connector per module. See the tables in the appendices for connector-pin signal assignments.

FIGURE 3-7 FRONT PANEL LAYOUT - SM2008/SM2009

The pin locations for a SM2008 or SM2009 switch module installed in a SM1000A (single-wide) or a SM10000B (double-wide) are shown in the following figures. Note that the connector orientation is opposite between the single-wide and double-wide platforms. The front-panel ACCESS and FAIL indicators are also opposite. The pin designations are odd-numbered for rows A, C and E, and even-numbered for rows B and D.

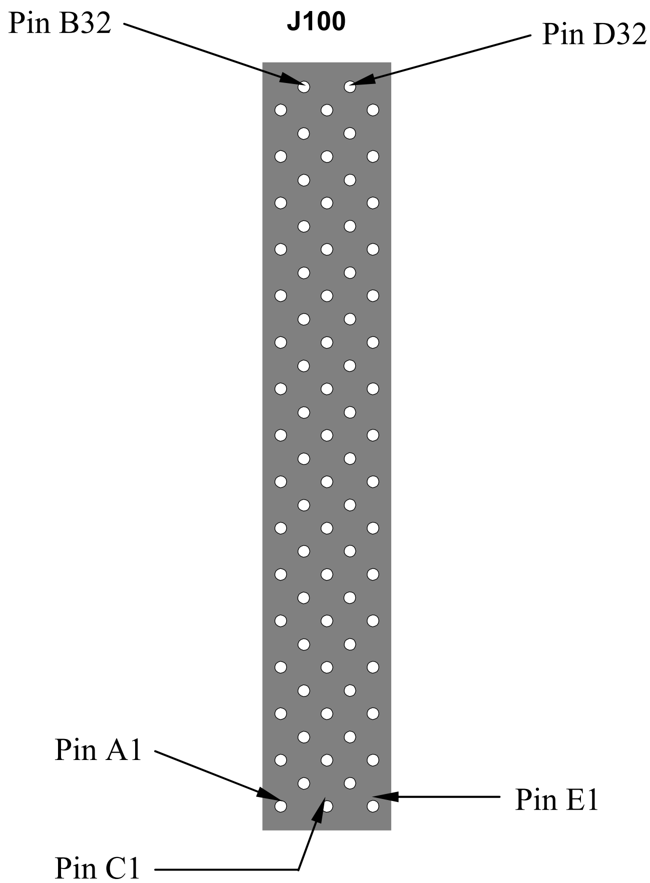


FIGURE 3-8 SM1000A SINGLE SLOT BASE UNIT - CONNECTOR PIN LOCATIONS – 80P

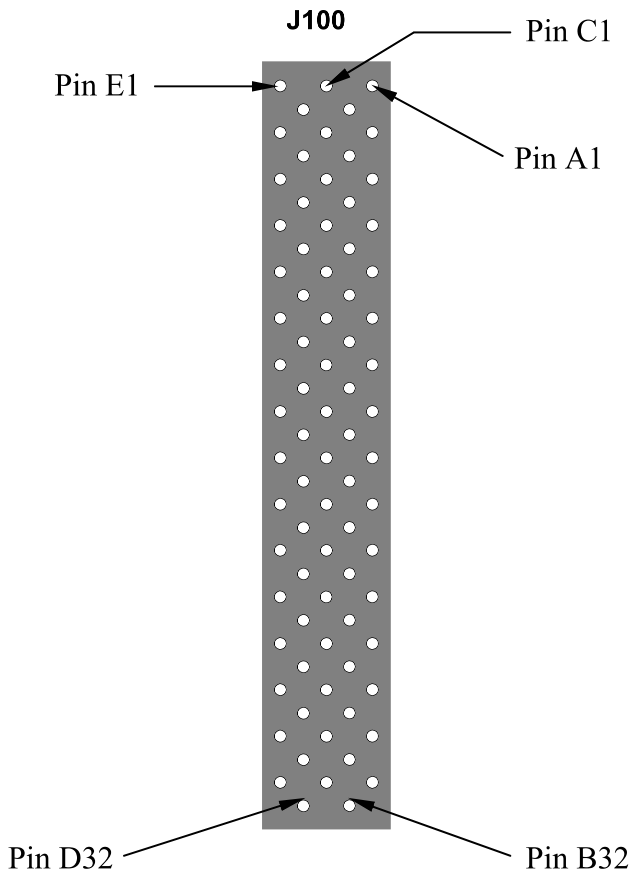
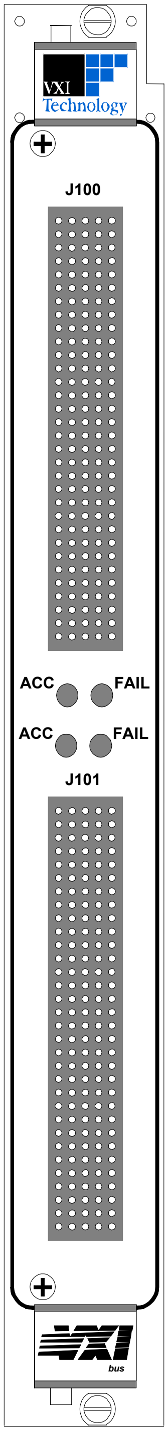


FIGURE 3-9 SM1000B DOUBLE SLOT BASE UNIT - CONNECTOR PIN LOCATIONS – 80P

GENERAL PURPOSE SWITCHES



FRONT PANEL CONNECTION - 300X / 400X / 5001/2/3

As part of the SMIP family of instruments, these modules can be combined with up to five other modules to form a high-density VXIbus instrument.

Regardless of whether the SMIP is configured with other SMIP modules, each module is treated as an independent instrument in the VXIbus chassis. Each has its own front panel ACCESS and FAIL indicators. Each module connector includes a fail-safe input that, when triggered, opens all the relays at once.

The SM300X, SM400X, SM5001, SM5002 and SM5003 models have one 160-pin front-panel connector per module. See the tables in the appendices for connector-pin signal assignments.

FIGURE 3-10 FRONT PANEL LAYOUT – 300X / 400X / 5001/2/3

The pin locations for a general switch module installed in a SM1000A (single-wide) or a SM10000B (double-wide) are shown in the following figures. Note that the connector orientation is opposite between the single-wide and double-wide platforms. The front-panel ACCESS and FAIL indicators are also opposite.

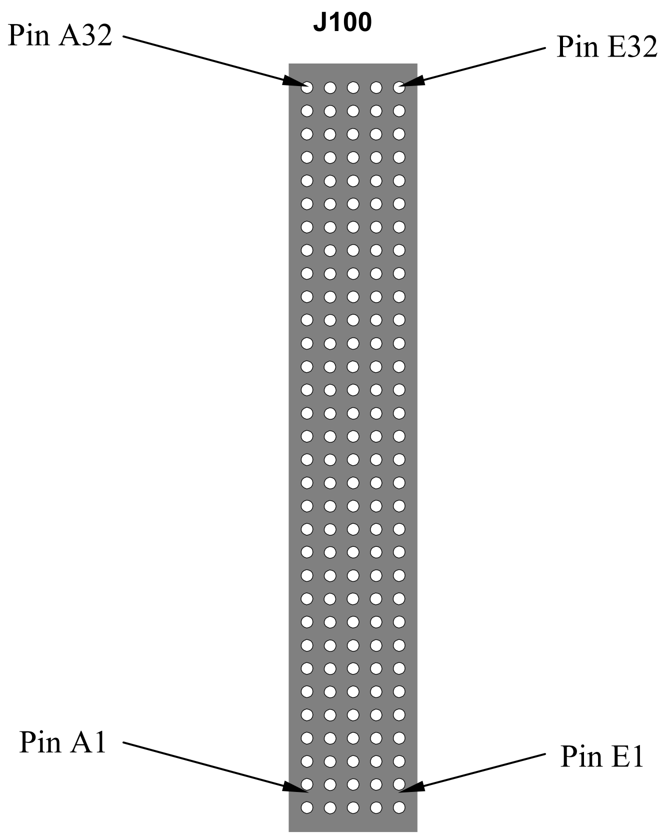


FIGURE 3-11 SM1000A SINGLE SLOT BASE UNIT - CONNECTOR PIN LOCATIONS – 160P

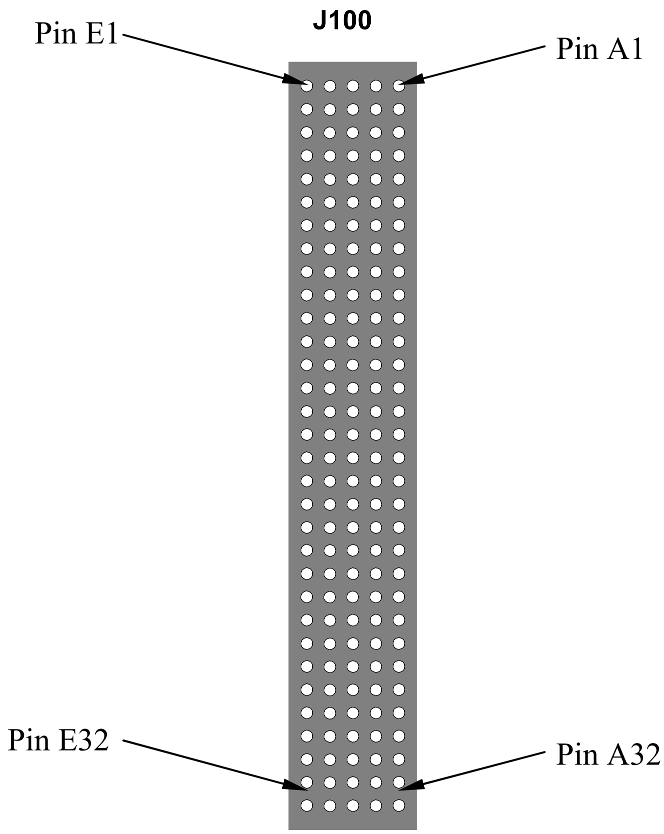
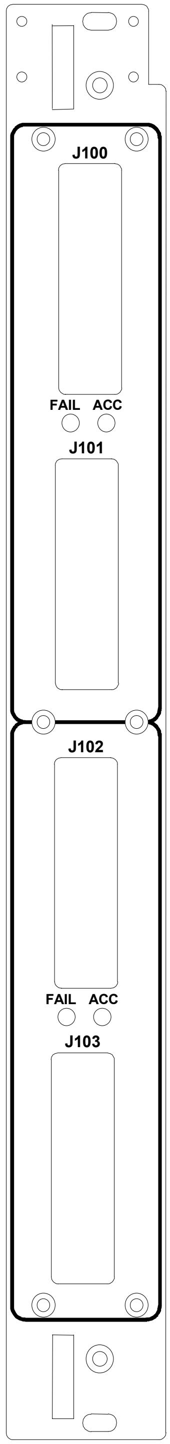


FIGURE 3-12 SM1000B DOUBLE SLOT BASE UNIT - CONNECTOR PIN LOCATIONS – 160P



FRONT PANEL CONNECTION – 5004/5

As part of the SMIP family of instruments, these modules can be combined with up to five other modules to form a high-density VXIbus instrument.

Regardless of whether the SMIP is configured with other SMIP modules, each module is treated as an independent instrument in the VXIbus chassis. Each has its own front panel ACCESS and FAIL indicators. Each module connector includes a fail-safe input that, when triggered, opens all the relays at once.

The SM5004 and SM5005 models have two 50-pin front-panel connectors per module. See the tables in the appendices for connector-pin signal assignments.

FIGURE 3-13 FRONT PANEL LAYOUT – 5004/5

The pin locations for a general switch module installed in a SM1000A (single-wide) or a SM10000B (double-wide) are shown in the following figures. Note that the connector orientation is opposite between the single-wide and double-wide platforms.

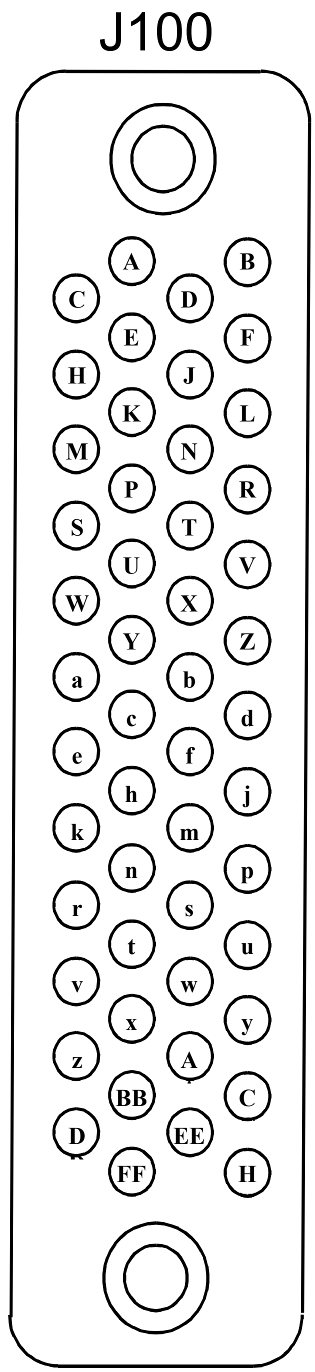


FIGURE 3-14 SM1000A SINGLE SLOT BASE UNIT - CONNECTOR PIN LOCATIONS – 50P

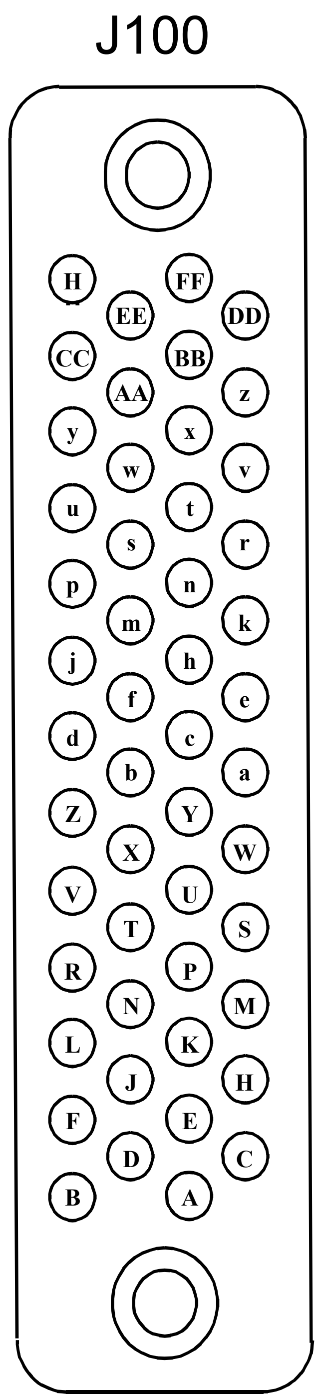
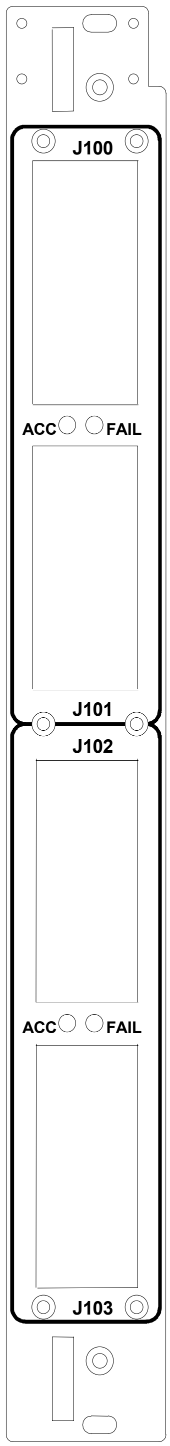


FIGURE 3-15 SM1000B DOUBLE SLOT BASE UNIT - CONNECTOR PIN LOCATIONS – 50P

RF SWITCHES



FRONT PANEL CONNECTION - SM600X

As part of the SMIP family of instruments, the SM6001 and SM6002 can be combined with up to five other modules to form a high-density VXIbus instrument.

Regardless of whether the SM600X modules are configured with other SMIP modules, each module is treated as an independent instrument in the VXIbus chassis. Each has its own front panel ACCESS and FAIL indicators.

The SM600X models have two 26-pin front-panel connector per module. See the tables in the appendices for connector-pin signal assignments.

FIGURE 3-16 FRONT PANEL LAYOUT - SM600X

The pin locations for a RF switch module installed in a SM1000A (single-wide) or a SM1000B (double-wide) are shown in the following figures. Note that the PCBA and connector orientation is opposite between the single-wide and double-wide platforms.

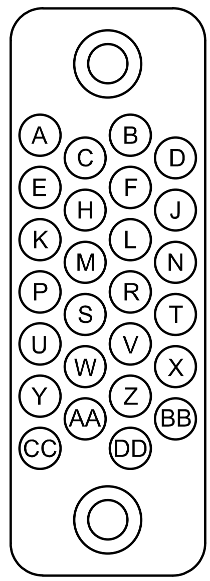


FIGURE 3-17 SM1000A SINGLE SLOT - CONNECTOR PIN LOCATIONS – 26P

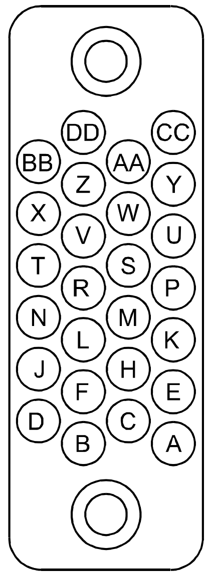


FIGURE 3-18 SM1000B DOUBLE SLOT - CONNECTOR PIN LOCATIONS – 26P

SECTION 4

PROGRAMMING

REGISTER ACCESS

The SMIP modules are VXIbus register-based devices for high-speed data retrieval. Register-based programming is a series of **reads** and **writes** directly to the switch module registers. This eliminates the time for command parsing thus increasing speed.

ADDRESSING

The VTI switching modules utilize either the A24 or A32 space of the shared-memory architecture. To read or write to a module register, a register address needs to be specified. This is done by using the offset value (assigned by the resource manager) and multiplying it by 256 or 64K to get the base address in A24 or A32 address space, respectively

A24 Base Address = Offset value * 0x00FF *(or 256)*

A32 Base Address = Offset value * 0xFFFF *(or 65,535)*

The A24 or A32 offset value, assigned by the resource manager, can also be accessed by reading the A16 Offset Register. To address the A16 Offset Register use the following formula:

A16 Base Address = (Logical Address * 64) + 0xC000 *(or 49,152)*

then

A16 Offset Register Address = A16 Base Address + 6

See following for the A16 Memory Map and the A24/A32 address space allocation.

TABLE 4-1 SMIP REGISTER MAP - A16

OFFSET	WRITE FUNCTION	READ FUNCTION
3E	Trace Advance	Board Busy
3C	Busy Trigger Control	Busy Trigger Control
3A	Trace RAM Control	Trace RAM Control
38	TTL Trigger Polarity	Reserved
36	Open Trigger Select	Reserved
34	Trace ADV Trigger Select	Reserved
32	Trace RAM Address LOW	Trace RAM Address LOW
30	Trace RAM Address HIGH	Trace RAM Address HIGH
2E	Trace RAM End LOW	Trace RAM End LOW
2C	Trace RAM End HIGH	Trace RAM End HIGH
2A	Trace RAM Start LOW	Trace RAM Start LOW
28	Trace RAM Start HIGH	Trace RAM Start HIGH
26	Module 5, 4 Used Address	Reserved
24	Module 3, 2 Used Address	Reserved
22	Module 1, 0 Used Address	Reserved
20	NVM Access Register	NVM Access Register
1E	Reserved	Subclass Register
1C	Interrupt Control	Interrupt Control
1A	Reserved	Interrupt Status
18	Reserved	Reserved
16	Reserved	Reserved
14	Reserved	Reserved
12	Reserved	Reserved
10	Reserved	Reserved
E	Reserved	Version Number
C	Reserved	Serial Number LOW
A	Reserved	Serial Number HIGH
8	Reserved	Reserved
6	Offset Register	Offset Register
4	Control Register	Status Register
2	Reserved	Device Type Register
0	LA Register	ID Register

DESCRIPTION OF REGISTERS - A16

The following describes the registers shown in the SMIP Register Map for A16 address space.

ID Register - Read only		
D11-D0	Manufacturer's ID	VXI Technology, Inc., set to $F4B_{16}$
D13-D12	Address Space	A16/A24 = 00_2 A16/A32 = 01_2
D15-D14	Device Class	Extended register based device, set to 01_2

Logical Address Register - Write Only		
D7-D0	Logical Address	Sets the new logical address in a dynamically configured module. When set for dynamic configuration (set to FF_{16}) a soft reset will not alter the configured logical address, while a hard reset will set the register back to FF_{16}.
D15-D8	Reserved	Writing to this range has no effect.

Device Type Register - Read Only		
D11-D0	Model Code	Model 277, set to 115_{16}
D15-D12	Required Memory	2 Mbytes, set to 2_{16}, for A24 2 Mbytes, set to A_{16}, for A32

Status Register - Read Only		
D15	A24/A32 Active	1 = indicates that A24/A32 memory space access is enabled 0 = indicates that A24/A32 memory space access is locked out
D14	MODID*	1 = indicates that the module is not selected by the MODID line 0 = indicates that the module is selected by the MODID line.
D13-D4	Reserved	These bits always read as $11,1111,1111_2$
D3	Ready	This bit always reads as 1_2
D2	Passed	This bit always reads as 1_2
D1-D0	Reserved	These bits always read as 11_2

Control Register - Write Only		
D15	A24/A32 Enable	1 = write a 1 to this bit to enable A24/A32 memory access 0 = to disable access
D14-D2	Reserved	Writes to these bits have no effect.
D1	Sysfail Inhibit	Write a 1 to this bit to prevent the module from asserting the SYSFAIL* line.
D0	Reset	1 = write a 1 to this bit to force the registers on the SMIP interface board into a reset state 0 = write a 0 to release this soft reset state **Note: This does not reset relays on the SMIP plug-in modules.**

Offset Register - Read and Write		
D15-D0	A24/A32 Memory Offset	The value written to this 16-bit register, times 256, sets the base address of the A24 memory space used by the module. The value written to this 16-bit register, times 65,536, sets the base address of the A32 memory space used by the module. A read from this register reflects the previously written value. Because of the required memory size, bits D4-D0 are disregarded on writes and always read back as 0s. Upon receiving a hard reset, all bits in this register are set to 0s. A soft reset does not effect the value in this register.

Serial Number High Register- Read Only		
D15-D0	Not Implemented	Always read back as $FFFF_{16}$

Serial Number Low Register - Read Only		
D15-D0	Not Implemented	Always read back as $FFFF_{16}$

Version Number Register - Read Only		
D15-D8	Firmware Version Number	Not applicable, reads back as FF_{16}
D7-D4	Major Hardware Version Number	Depends on the specific hardware revision of the SMIP interface board.
D3-D0	Minor Hardware Version Number	Depends on the specific hardware revision of the SMIP interface board.

Interrupt Status Register - Read Only		
D15	Scan Function done	The latest scan list update is complete.
D14	Openbus Active Event true	The Openbus was activated by one or more programmed inputs. See description of the Openbus in the module register section.
D13-D8	Modules 0-5 Busy complete	D13 = Module 5 …, and D8 = Module 0. The programmed Busy signal from one of the modules has timed out. This indicates that the relays actuated for that Busy cycle have settled and a measurement may take place.
D7-D0	Reserved	Always reads back as $FFFF_{16}$
Note: This status register may be used in a polled fashion rather than allowing the events above to generate an Interrupt. A read of this register will clear any active bits. Bits that are not set, or are about to be set, are not effected by a read of this register.		

Interrupt Control Register - Read and Write		
D15	Scan Function done mask bit	0 = enabled 1 = disabled
D14	Openbus Active Event true mask bit	0 = enabled 1 = disabled
D13-D8	Module 0-5 Busy complete	0 = enabled 1 = disabled D13 = Module 5,… and D8 = Module 0.
D7	IR ENA*	0 = writing a 0 to this bit enables interrupter capabilities 1 = writing a 1 to this bit disables interrupter capabilities
D6	IH ENA*	The module has no interrupt handler capability, therefore writing a 1 or 0 has no effect. A 1 is always read back for this bit.
D5-D3	Interrupter IRQ Line	The complement of the value programmed into these three bits reflects the selected IRQ line used by the module. A value of 011_2 would select IRQ4, a value of 000_2 would select IRQ7, and a value of 111_2 would disconnect the IRQ lines.
D2-D0	Handler IRQ Line	The module has no interrupt handler capability; therefore writing to these bits has no effect. A 111_2 is always read back for these bits.
Note that all bits in this register are set to 1s upon receipt of a hard or soft reset.		

Subclass Register - Read Only		
D15	VXIbus Extended Device	Always reads as 1.
D14-D0	Extended Memory Device	Always reads as $7FFD_{16}$

NVM Access Register - Read		
D15-D1	Unused	All Bits are always 1.
D0		Reads back the serial data stream from the selected SMIP board. Note that only one SMIP board may be read back at a time.

NVM Access Register - Write		
D15-D7	Unused	Data written to these bits have no effect.
D6		Serial clock for module 5; should be a logic 1 when not used.
D5		Serial clock for module 4; should be a logic 1 when not used.
D4		Serial clock for module 3; should be a logic 1 when not used.
D3		Serial clock for module 2; should be a logic 1 when not used.
D2		Serial clock for module 1; should be a logic 1 when not used.
D1		Serial clock for module 0; should be a logic 1 when not used.
D0		Serial data input for all modules; must be a logic 1 when not used.

Board X, Y Used Address Register - Read and Write		
D15-D8		Sets the actual number of words of address space used by the relays on board's X.
D7-D0		Sets the actual number of words of address space used by the relays on board's Y.

Trace RAM Start High Register - Read and Write		
D15-D4	Unused	Data written to these bits have no effect and always read back as 1s.
D3-D0		Sets the four most significant bits of the starting address of the Trace RAM, allowing the available RAM to be divided into multiple traces.

Trace RAM Start Low Register - Read and Write		
D15-D0		Sets the 16 least significant bits of the starting address of the Trace RAM, allowing the available RAM to be divided into multiple traces.

Trace RAM End High Register - Read and Write		
D15-D4	Unused	Data written to these bits have no effect and always read back as 1s.
D3-D0		Sets the four most significant bits of the ending address of the Trace RAM, allowing the available RAM to be divided into multiple traces.

Trace RAM End Low Register - Read and Write		
D15-D0		Sets the 16 least significant bits of the ending address of the Trace RAM, allowing the available RAM to be divided into multiple traces.

Trace RAM Address HIGH Register - Read and Write		
D15-D4	Unused	Data written to these bits have no effect and always read back as 1s.
D3-D0		Sets and reads back the four most significant bits of the current address of the Trace RAM, allowing the current trace RAM address to be queried and changed.

Trace RAM Address LOW Register - Read and Write		
D15-D0		Sets and reads back the sixteen least significant bits of the current address of the Trace RAM, allowing the current trace RAM address to be queried and changed.

Trace Advance Trigger Select Register - Write Only		
D15-D8		Sets the TTLTRIG line or lines, which are configured as outputs, and will toggle when Trace Advance condition occurs in the module. D15 corresponds to TTLTRIG7, D14 to TTLTRIG6, … and D8 to TTLTRIG0. Setting a bit to a 1 enables the trigger line, setting a bit to 0 disables the corresponding line. All bits are set to 0s when either a soft or a hard reset is received by the module.
D7-D0		Sets the TTLTRIG line or lines, which are configured as inputs, and will cause a Trace Advance event to occur in the module. D7 corresponds to TTLTRIG7, D6 to TTLTRIG6, … and D0 to TTLTRIG0. Setting a bit to a 1 enables the trigger line, setting a bit to 0 disables the corresponding line. All enabled TTLTRIG lines are or'd together to allow more than one TTLTRIG line to cause a Trace Advance event to occur. All bits are set to 0s when the module receives either a soft or a hard reset.

Open Trigger Select Register - Write Only		
D15-D8		Sets the TTLTRIG line or lines, which are configures as outputs, and will toggle when Relay Open condition occurs in the module. D15 corresponds to TTLTRIG7, D14 to TTLTRIG6, … and D8 to TTLTRIG0. Setting a bit to a 1 enables the trigger line, setting a bit to 0 disables the corresponding line. All bits are set to 0s when either a soft or a hard reset is received by the module.
D7-D0		Sets the TTLTRIG line or lines, which are configured as inputs, and will cause a Relay Open event to occur in the module. D7 corresponds to TTLTRIG7, D6 to TTLTRIG6, … and D0 to TTLTRIG0. Setting a bit to a 1 enables the trigger line, setting a bit to 0 disables the corresponding line. All enabled TTLTRIG lines are or'd together to allow more than one TTLTRIG line to cause a Relay Open event to occur. All bits are set to 0s when the module receives either a soft or a hard reset.

TTL Trigger Polarity Register - Write Only		
D15-D14	Unused	Data written to these bits have no effect.
D13-D8	FAIL LED Control	D13 is for module 5, … D8 is for module 0. 0 = off, 1 = on.
D4	Board Busy Trigger Slope	0 acts on the falling edge, 1 acts on the rising edge.
D3	Relay Open Input Slope	0 acts on the falling edge, 1 acts on the rising edge.
D2	Relay Open Output Slope	0 sets the falling edge active, 1 sets the rising edge active.
D1	Trace Advance Input Slope	0 advances on the falling edge, 1 advances on the rising edge.
D0	Trace Advance Output Slope	0 sets the falling edge active, 1 sets the rising edge active.
Note: A hard or a soft reset sets D3-D0 to 0s.		

Trace RAM Control Register - Read and Write		
D15-D10	Modules Installed	D15 is for module 5, D10 is for module 0. Set to 0 if the module is installed or set to a 1 if not installed. These bits are set to 0 at power on. By setting a 1, the SMIP Interface PCB will generate $\overline{\text{DTACK}}$ for any read or write cycles to the memory space of the uninstalled plug-in modules.
D9-D4	Modules used in trace mode	D9 is for module 5, D4 is for module 0. Set to 1 if the module is used in trace mode, set to 0 if not in trace mode.
D3-D2	Unused	Data written to these bits have no effect. The value written is read back.
D1	LOOP ENABLE	1 = enabled, 0 = disabled. If enabled, the trace resumes at the start of active RAM and continues from there. If disabled, the trace stops at the end of active RAM and clears the TRACE ENABLE bit.
D0	TRACE ENABLE	1 = enabled, 0 = disabled. If the LOOP ENABLE bit is set and the end of active trace RAM is reached, this bit will not be reset.

Busy Trigger Control Register - Read and Write		
D15-D8	TTLTRIG Select	Sets the TTLTRIG Line or Lines, which are configured as outputs, and will toggle at the de-assertion of a Board Busy condition sent by the plug-in modules. D15 corresponds to TTLTRIG7, D14 to TTLTRIG6, … and D8 to TTLTRIG0. Setting a bit to a 1 enables the trigger line, setting a bit to a 0 disables the corresponding line. All bits are set to 0's when either a soft or a hard reset is received by the module.
D7-D6	Unused	Data written to these bits have no effect. The value written is read back.
D5-D0	Busy Trigger Enable	Enables the Board Busy signals received from the plug-in modules to generate a trigger condition on the TTL Trigger Bus. D5 corresponds to Board Busy Module 5, D4 to Board Busy Module 4, … and D0 to Board Busy Module 0. Setting a bit to a 1 enables the generation of a Trigger condition, setting a bit to a 0 disables the corresponding line. All bits are set to 0's when either a soft or a hard reset is received by the module. Software can be written to enable the last board updated to generate the TTLTrigger condition, alerting any other instruments that the plug0in modules' relays have settled. Alternatively, all of the plug-in modules may be enabled to generate the TTLTrigger condition.

Trigger Advance Register - Write Only		
D15-D0	Unused	The act of writing to this location causes a Trace Advance event to occur in the module. The specific data written to these bits has no effect.

Board Busy Register - Read Only		
D15-D7	Unused	These bits always read back as 1s.
D6		Indicates whether the SMIP platform is a single or double wide. 0 = single wide 1 = double wide
D5		A 0 read from this bit indicates the relays on module 5 have settled, a 1 indicates that the relays on module 5 are still changing state.
D4		A 0 read from this bit indicates the relays on module 4 have settled, a 1 indicates that the relays on module 4 are still changing state.
D3		A 0 read from this bit indicates the relays on module 3 have settled, a 1 indicates that the relays on module 3 are still changing state.
D2		A 0 read from this bit indicates the relays on module 2 have settled, a 1 indicates that the relays on module 2 are still changing state.
D1		A 0 read from this bit indicates the relays on module 1 have settled, a 1 indicates that the relays on module 1 are still changing state.
D0		A 0 read from this bit indicates the relays on module 0 have settled, a 1 indicates that the relays on module 0 are still changing state.

Reserved Registers - Read and Write		
D15-D0	Unused	Writing to these registers has no effect and will always read back as $FFFF_{16}$.

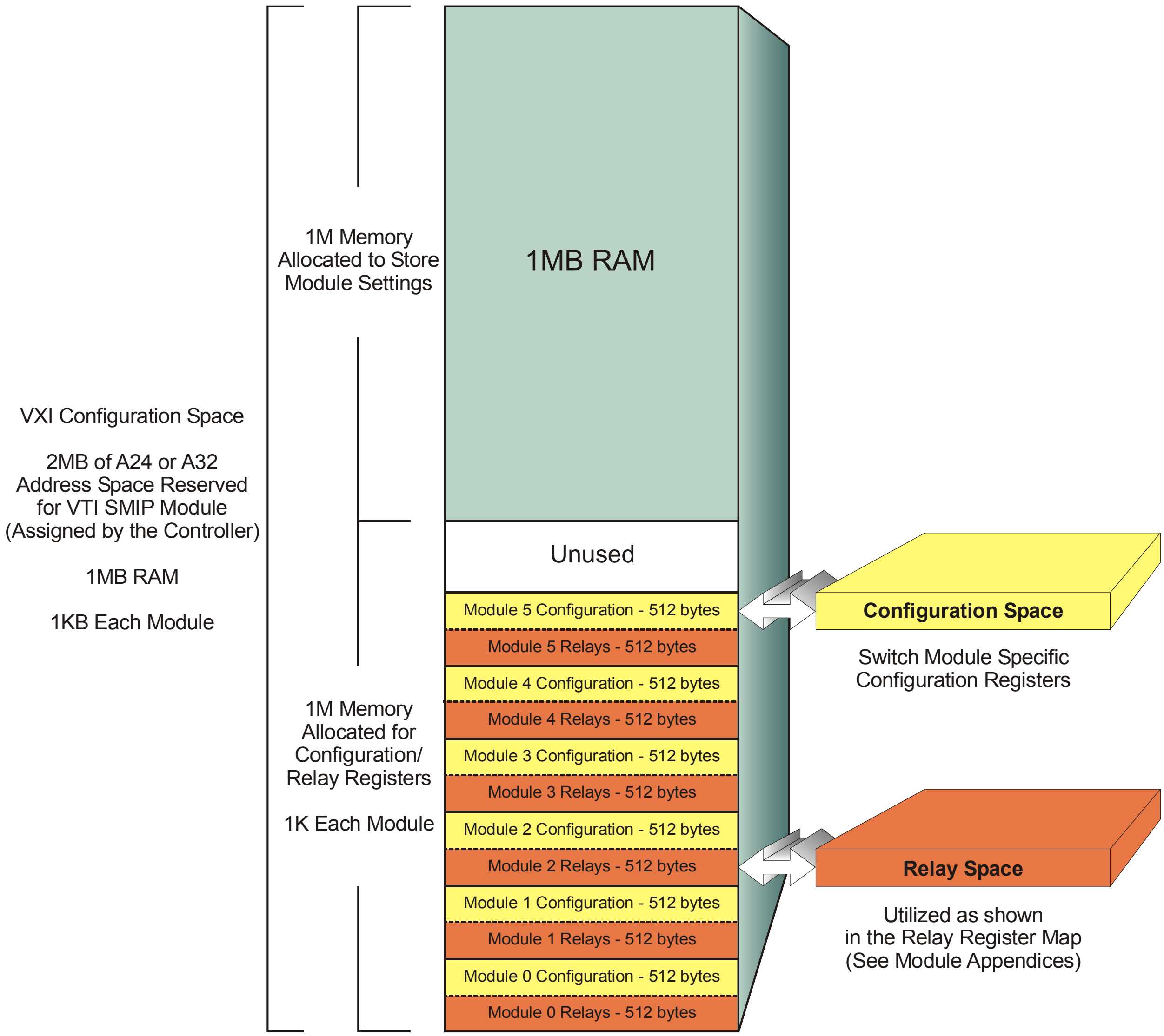


FIGURE 4-1 A24/A32 ADDRESS SPACE

Description of SMIP Module Registers - A24 / A32 - Extended Memory

Each module is assigned 1K (1024) bytes of memory as shown in the SMIP Configuration/Relay Register Map for A24/A32 address space. The upper 512 bytes of memory space are used for module configuration registers. The following describes these registers.

<table>
<tr><th colspan="3">Control Register - Read and Write</th></tr>
<tr><td>ADDR</td><td colspan="2">Plug-In LA+0x200</td></tr>
<tr><td>D15-D10</td><td>Unused</td><td></td></tr>
<tr><td>D9</td><td>Relay Data Read Back Polarity Bit</td><td>0 = Normal polarity relay data is read back from this module
1 = Inverted polarity relay data is read back from this module
Pon state = 0

This bit may be used to invert the relay data read back from the plug-in module. Control, Delay, and Status Register read backs are not effected by this bit.</td></tr>
<tr><td>D8</td><td>ACFAILN Enable Bit</td><td>0 = ACFAILN is enabled to reset this module's relays
1 = ACFAILN is disabled from resetting this module's relays
Pon state = 0</td></tr>
<tr><td>D7</td><td>BBM/MBB Enable Bit</td><td>0 = BBM (Break-Before-Make) / MBB (Make-Before-Break) operation on this plug-in module is disabled
1 = BBM/MBB operation on this plug-in module is enabled
Pon state = 0

If this bit is set, the relays on this module will be sequenced to effect proper BBM or MBB operation. If this bit is not set, the plug-in module will process the newly written relay data as immediate data, writing it directly to the relay driver ports. No BBM or MBB sequencing will take place.

While this feature is enabled, the initial write to the module will start the delay timer running and begin the BBM or MBB operation. Since the relays are controlled by the 16-bit registers, only the effected 16 relays will perform the BBM/MBB operation. To overcome this fact, any subsequent writes to the module, during the initial delay timer time-out period, will be accepted and processed. In addition, the delay time will be reset and begin counting down again. Once the delay timer has timed-out (this indicates that the relays have settled into their BBM/MBB state), writes to the module will not be accepted and may result in a Bus Error depending on the value programmed into the delay timer. This is because the delay timer is reset at the end of the initial time-out and is used to time the final relay closure into their post BBM/MBB state. The module Busy signal will only complete once the final relay closure state is reached.

If this bit is set and no value has been loaded into the Delay Register, the plug-in module will act as if this enable bit is not set and load all of the relay drivers with immediate data.</td></tr>
<tr><td>D6</td><td>BBM/MBB Select Bit</td><td>0 = BBM operation on this plug-in module is selected
1 = MBB operation on this plug-in module is selected
Pon state = 0</td></tr>
</table>

Control Register - Read and Write (cont.)		
D5	Access LED Fail Bit	0 = non-active 1 = active Pon state = 0 Lights the Access LED red when activated.
D4	Relay Reset Enable Bit	0 = The Openbus and Front Panel Open signals are not enabled to reset this module's relays 1 = The Openbus or Front Panel Open signal may be selected to reset this module's relays Pon state = 0
D3	Relay Reset Select Bit	0 = Front Panel Open signal is selected to reset this module's relays 1 = The Openbus signal is selected to reset this module's relays Pon state = 0 Many plug-in modules may be programmed to be listeners on the Openbus.
D2	Openbus Out Enable Bit	0 = Disables this module's Front Panel Open signal from driving the Openbus signal 1 = Enables this module's Front Panel Open signal to drive the Openbus Pon state = 0 Many plug-in modules may be programmed to be talkers on the Openbus.
D1	Front Panel Open Signal Polarity Bit	0 = Non-inverted Front Panel Open signal polarity 1 = Inverted Front Panel Open signal polarity Pon state = 0 Non-inverted: If set in pulse mode, the Front Panel Open signal will generate a reset pulse on a falling edge. If set in level mode, the Front Panel Open signal will generate a reset signal on a low input signal. Inverted: If set in pulse mode, the Front Panel Open signal will generate a reset pulse on a rising edge. If set in level mode, the Front Panel Open signal will generate a reset signal on a high input signal.

Control Register - Read and Write (cont.)		
D0	Front Panel Open Signal Operation Select Bit	0 = Pulse mode 1 = Level mode Pon state = 0 Pulse mode: An edge seen at the Front Panel Open signal pin will generate a reset pulse that may be used to reset system relays. The pulse is of approximately 300ns duration. Level mode: A level present on the Front Panel Open signal pin will generate a reset signal that may be used to reset system relays. This signal will remain active as long as the input is active. On the front panel of most SMIP plug-in modules, there are two pins for access to the Front Panel Open signal of the module. These are the Front Panel Open signal pin (FP-OPEN) and a ground reference pin (FP-GND). The purpose of the Front Panel Open signal is to allow user access to a configurable interlock feature that will reset all of the SMIP system relays. The Front Panel Open signal may be used to reset the relays only on the module, which initiated the Front Panel Open signal fault condition. It also may be used to broadcast to all the other SMIP plug-in modules installed in a SMIP Interface Module via what is called the Openbus. Any plug-in module may be programmed to drive and/or listen to the Openbus. The Openbus signal may also be used to generate a wider chassis level fault signal via the TTL Trigger Bus (see the register definitions for A16 address space). The Front Panel Open signal is meant to be driven by either a switch closure or TTL/CMOS logic gate. It is pulled high on the module.

Delay Register - Read and Write		
ADDR	Plug-In LA+0x202	
D15-D0	Data Bus 16 Bit	This register is used to set the time that the plug-in module will hold the Board Busy signal active. The Board Busy signal is set every time the plug-in receives a Write to a relevant Relay Register memory space. The Board Busy signal will be removed at the end of the time out that is set by the value contained in this register. For each count loaded into this register, the Board Busy signal will be held active for 1μs. The delay may be set from 0 to approximately 65ms, thus accommodating a wide variation in test station requirements. The Board Busy signal may be monitored by the user, in either a polled or an interrupt fashion, and is to be used as an indication that the relays in the newly actuated path have settled. Alternatively, the Board Busy signal may also be used to drive the TTL Trigger Bus. See the Board Busy, Interrupt Control and Busy Trigger Control Register descriptions in the A16 address space.

Status Register - Read Only		
ADDR	Plug-In LA+0x204	
D15-D13	Hardware Revision Code	
D12-D1	Unused	
D0	Front Panel Open signal set by this module	0 = Indicates that this module's Front Panel Open signal was not activated by the user 1 = An indication that this module's Front Panel Open signal was activated as programmed by the user Pon state = 0 A read of this bit location will indicate whether the Front Panel Open signal was triggered from this plug-in module's front panel. In the event that multiple talkers have been programmed to drive the Openbus signal, this bit may be queried by the user to discover which module's Front Panel Open signal caused the Openbus Active Event to occur. A read of this register clears this bit to 0.

DEVICE MEMORY MAPS

MODULE RELAY CONTROL ADDRESS

Each module is assigned 1K (1024) bytes of memory as shown in the SMIP Configuration/Relay Register Map for A24/A32 address space. The lower 512 bytes of each module's memory are used for relay control. Each module is assigned its own base address. These base addresses are in 1K increments as follows:

Module 0 (J100) Base Address = H0000
Module 1 (J101) Base Address = H0400
Module 2 (J102) Base Address = H0800
Module 3 (J103) Base Address = H0C00
Module 4 (J104) Base Address = H1000
Module 5 (J105) Base Address = H1400

The Module Base Address is then added to the A24/A32 Base Address to access a specific module's relays:

Module Relay Address = A24/A32 Base Address + Module Base Address

RELAY REGISTER OFFSET

The Relay Register Offset is located within the module's A24/32 address space. When you send data to the register, the relay register offset is added to the A24/A32 base address and module base address:

Relay Register Address = A24/A32 Base Address + Module Base Address + Register Offset

or

Relay Register Address = Module Relay Address + Register Offset

WRITING TO THE RELAYS

Each bit of a 16-bit register represents the state of the relay (1 = closed, 0 = open). To change the state of any relay, it is only necessary to write a 16-bit integer to the specified register with the new configuration:

Relay Register Address, **data**

For example:

- writing a data value of "0" to the register at offset "0" would open the first sixteen relays
- writing a data value of 65535 to the same register would close the first 16 relays
- writing a data value of 65534 to the same register would close all relays except K1, which would be open

PROGRAMMING

With the introduction of VISA, sending a command to a register-based device is as simple as sending a command to a message-based device. Whether the application is graphical or standard, sending commands to the register-based device is just as intuitive. The VISA template for transferring data to a register-based device, utilizing A32 extended memory space, is as follows:

```
viOut16 (Handle, VI_A32_SPACE, Offset, Data)
```

Handle is passed by reference whenever a VISA session to a particular device is opened.

VI_A32_SPACE is defined in the VISA header file. (VI_A16_SPACE and VI_A24_SPACE are also valid.)

Offset is determined from the memory map and is in decimal format.

Data is a 16-bit signed integer value representing the state of the relays.

The following example is for a SM5001, 80 channel SPST relay card utilizing A32 extended memory space. To close relays K1, K33 and K48 while leaving the other relays open, the following commands would be sent:

```
viOut16 (Handle, VI_A32_SPACE, 0, 1)       'closes relay 1
viOut16 (Handle, VI_A32_SPACE, 4, 32769)   'closes relay 33 and 48
```

VISA is the software architecture standard instituted by the VXI*plug&play* Alliance and is at a very high level of communication to a VXIbus device. The same philosophy and simplicity applies if the instrument is being programmed via lower level commands of an API (Application Programmer's Interface).

The individual device Relay Register Maps can be found in the appendix section.

SECTION 5

OPTIONS

INTRODUCTION

This section is for assembly and installation instructions for SMIP product options. For a full listing of current options and accessories, please contact our sales department.

TRIPLE FLOATING-WIRE SHROUD

VTI P/N 52-0111-002

Kit Includes:

1. Shroud Assembly
2. 2 - extra mounting tabs: 41-0201-002 and 41-0201-003
3. 6 - 2-56 x 10mm screws
4. 6 - 2-56 lock nuts

Required Tools:

1. Phillips screwdriver
2. Slot screwdriver
3. 5mm open end wrench

Assembly Procedure:

1. Pre-assemble wiring into 160-position connector housings - P/N 52-0103-002 - using crimp pins - P/N 52-0109-000 or 52-0109-001. (To aid in assembly, the wires may also be routed through the shroud before they are inserted into the connector.)
2. Remove the left cover from the shroud by removing six (6) phillips-head screws.
3. Remove the four (4) right phillips-head screws so that the three (3) fiberglass boards are free to be moved around within the shroud. The boards may also be removed to aid in assembly, but make sure that they are placed back into the shroud in the same order.
4. Mount the right connector first:

   a) Feed the wires through the shroud to the left of the right-most fiberglass strain-relief board. **The wires must lie to the LEFT of the strain-relief board.** Note that the wires can be routed out the back of the shroud, or through the top or the bottom by removing one of the plates. (These plates can also be used to close the back of the shroud if no wiring is routed through there.)
   b) The connector mounts to the front of the shroud from the outside using two (2) 2-56 x 10mm screws. Thread the screws through the connector, then through the shroud, then through two (2) 2-56 lock nuts.
   c) Tighten the screws to "finger-tightness" using the phillips screwdriver while holding the nuts in place with the 5mm open-end wrench. Then back off the screws one-half turn each. This allows the connector to "float" in the shroud.

5. Secure or tie-wrap the wires as necessary using the holes in the fiberglass board.

6. Repeat steps 4 and 5 for the middle connector and then the left-side connector.

7. Attach the fiberglass strain-relief boards to the shroud by threading through and tightening the four (4) 4-40 phillips-head screws removed from the right side earlier.

9. Attach the left shroud cover using the six (6) 4-40 x 3/16" screws removed earlier.

10. The shroud is pre-configured with tabs for the top position. To install it in the bottom position, replace tabs -000 and -001 with tabs -002 and -003 as shown in Figure 5-1.

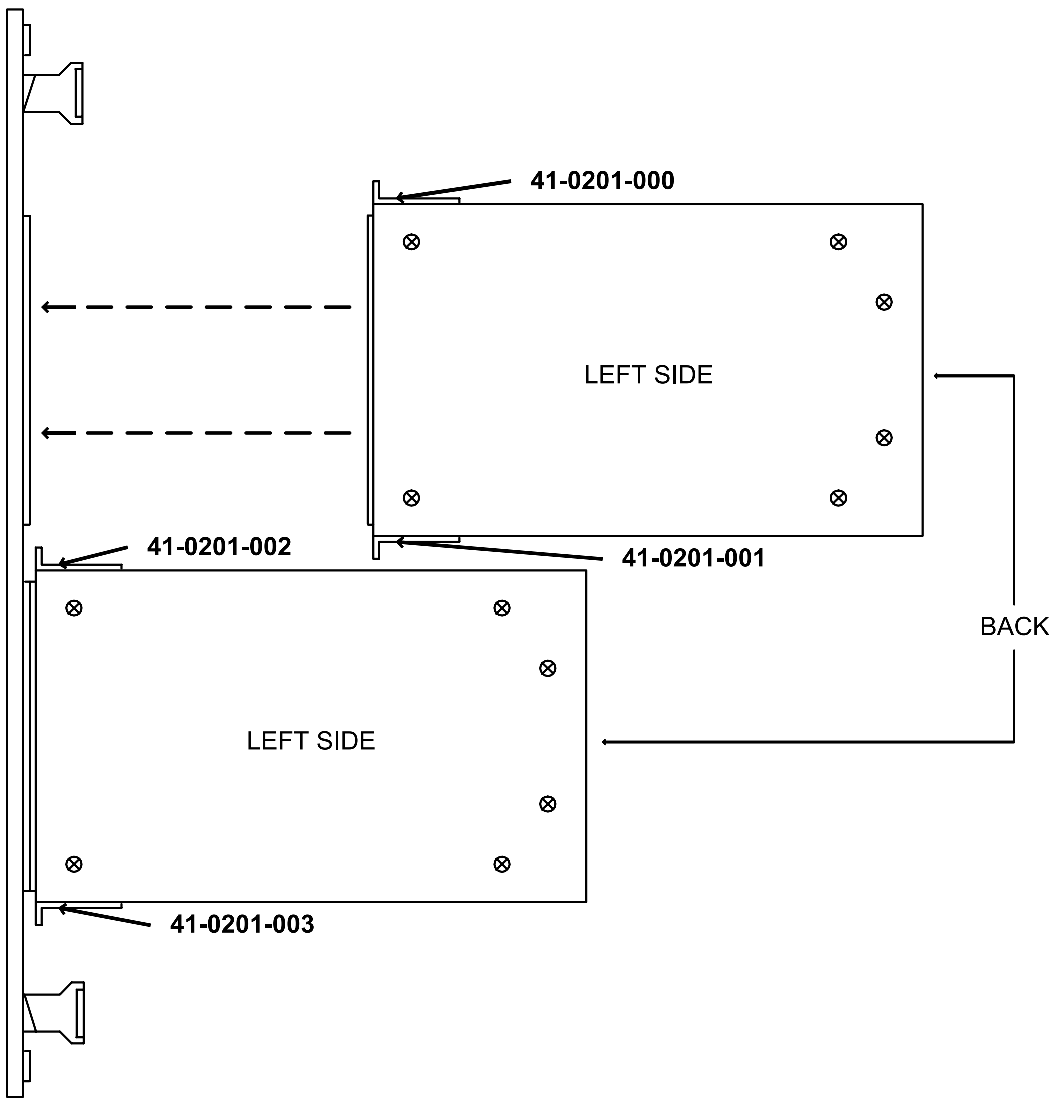


FIGURE 5-1 TRIPLE-SHROUD MOUNTING TAB LOCATIONS

TRIPLE TERMINAL SHROUD

VTI P/N 52-0112-002

Kit Includes:

1. Shroud Assembly
2. 2 - extra mounting tabs: 41-0201-002 and 41-0201-003

Required Tools:

1. Phillips screwdriver
2. Slot screwdriver

Assembly Procedure:

1. Remove the left cover from the shroud by removing six (6) phillips-head screws.
2. Remove the four (4) right phillips-head screws so that the three (3) fiberglass boards are free to be moved around within the shroud. The boards may also be removed to aid in assembly, but make sure that they are placed back into the shroud in the same order.
3. Mount the right connector first:
   a) Mount the wires into the screw terminals as necessary.
   b) Secure or tie-wrap the wires as necessary using the holes in the board.
4. Repeat step 3 for the middle connector and then the left-side connector.
5. Attach the fiberglass strain-relief boards to the shroud by threading through and tightening the four (4) 4-40 phillips-head screws removed from the right side earlier.
6. Attach the left shroud cover using the six (6) 4-40 x 3/16" screws removed earlier.
7. The shroud is pre-configured with tabs for the top position. To install it in the bottom position, replace tabs -000 and -001 with tabs -002 and -003 as shown in Figure 5-2.

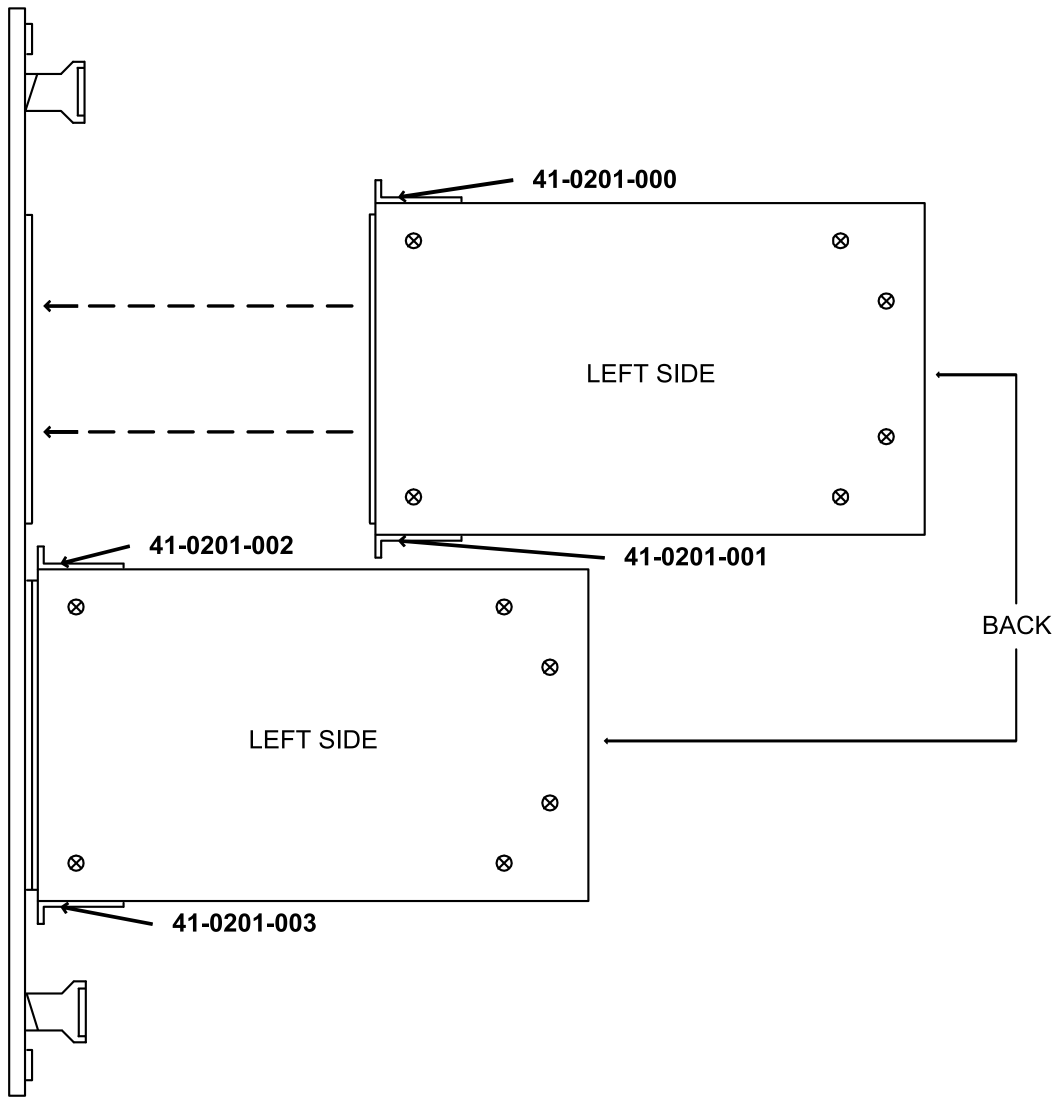


FIGURE 5-2 TRIPLE-SHROUD MOUNTING TAB LOCATIONS

APPENDIX A

SM2001A - 20 CH / 16 AMP POWER SWITCH - SPST

This appendix shows the connector, connector pin assignments, schematic and relay register map for this module. Some information in this appendix is a repeat from other sections. It is grouped here again for easy referencing.

Note that the connector pictured below is for the single-wide (SM1000A) only. If this module is used in a double-wide (SM1000B), the front panel interface may by opposite (upside-down). Refer to the Front Panel Interface section for more information.

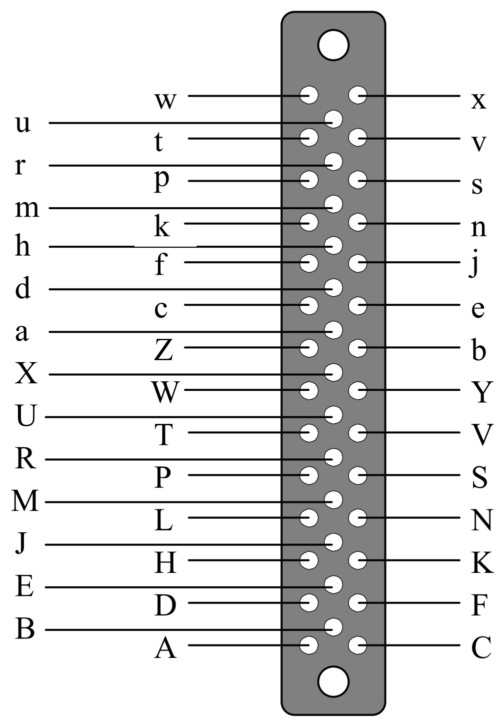


FIGURE A-1 SM2001A CONNECTOR PIN LOCATIONS – 41P

Table A-1 SM2001A Connector Pin / Signal Assignments

J100			
PIN	SIGNAL	PIN	SIGNAL
A	CH1-A	Z	CH11-B
B	CH1-B	a	CH12-A
C	CH2-A	b	CH12-B
D	CH2-B	c	CH13-A
E	CH3-A	d	CH13-B
F	CH3-B	e	CH14-A
H	CH4-A	f	CH14-B
J	CH4-B	h	CH15-A
K	CH5-A	j	CH15-B
L	CH5-B	k	CH16-A
M	CH6-A	m	CH16-B
N	CH6-B	n	CH17-A
P	CH7-A	p	CH17-B
R	CH7-B	r	CH18-A
S	CH8-A	s	CH18-B
T	CH8-B	t	CH19-A
U	CH9-A	u	CH19-B
V	CH9-B	v	CH20-A
W	CH10-A	w	CH20-B
X	CH10-B	x	N/C
Y	CH11-A		

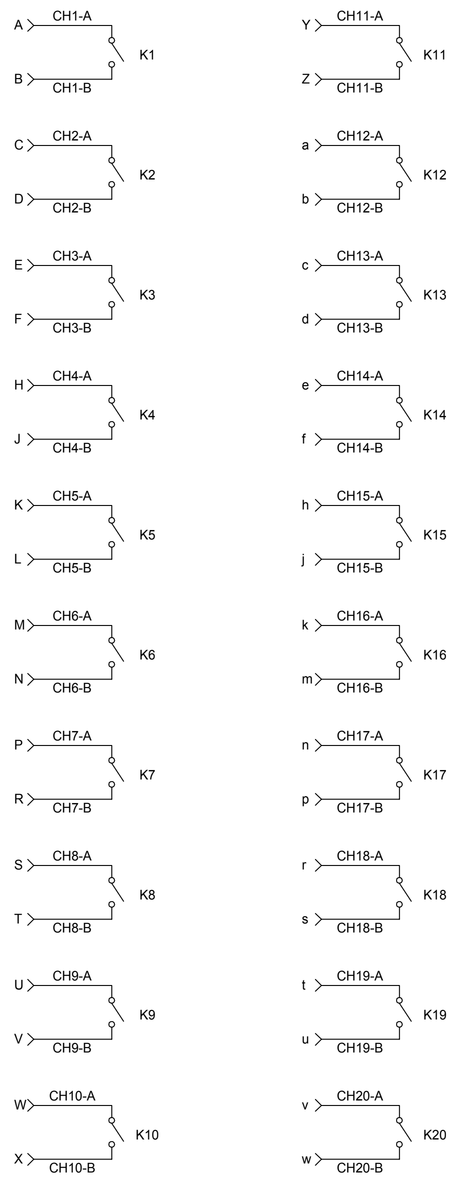


FIGURE A-2 SM2001A SCHEMATIC

Table A-2 SM2001A Relay Register Map

Offset (Hex)																
12																
10																
E																
C																
A																
8																
6																
4																
2													K20	K19	K18	K17
0	K16	K15	K14	K13	K12	K11	K10	K9	K8	K7	K6	K5	K4	K3	K2	K1

APPENDIX B

SM2002 - 12 CH / 10 AMP POWER SWITCH - SPDT

This appendix shows the connector, connector pin assignments, schematic and relay register map for this module. Some information in this appendix is a repeat from other sections. It is grouped here again for easy referencing.

Note that the connector pictured below is for the single-wide (SM1000A) only. If this module is used in a double-wide (SM1000B), the front panel interface may by opposite (upside-down). Refer to the Front Panel Interface section for more information.

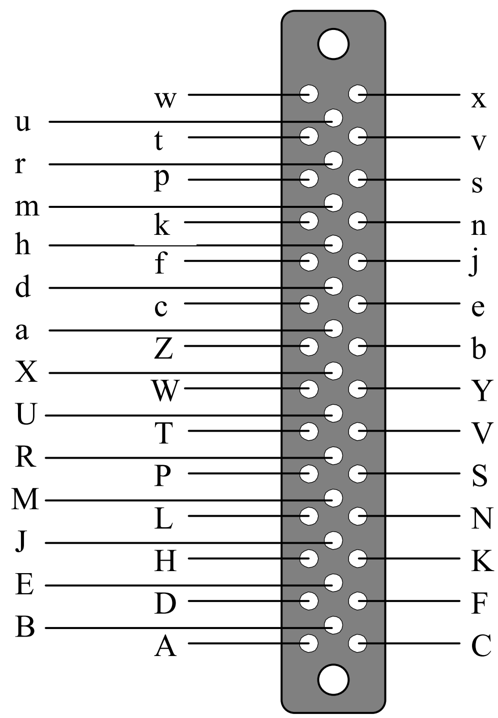


FIGURE B-1 SM2002 CONNECTOR PIN LOCATIONS – 41P

TABLE B-1 SM2002 CONNECTOR PIN / SIGNAL ASSIGNMENTS

J100			
PIN	SIGNAL	PIN	SIGNAL
A	CH1 - NO	Z	CH8 - NO
B	CH1 - COM	a	CH8 - COM
C	CH1 - NC	b	CH8 - NC
D	CH2 - NO	c	CH9 - NO
E	CH2 - COM	d	CH9 - COM
F	CH2 - NC	e	CH9 - NC
H	CH3 - NO	f	CH10 - NO
J	CH3 - COM	h	CH10 - COM
K	CH3 - NC	j	CH10 - NC
L	CH4 - NO	k	CH11 - NO
M	CH4 - COM	m	CH11 - COM
N	CH4 - NC	n	CH11 - NC
P	CH5 - NO	p	CH12 - NO
R	CH5 - COM	r	CH12 - COM
S	CH5 - NC	s	CH12 - NC
T	CH6 - NO	t	N/C
U	CH6 - COM	u	N/C
V	CH6 - NC	v	N/C
W	CH7 - NO	w	N/C
X	CH7 - COM	x	SHIELD
Y	CH7 - NC		

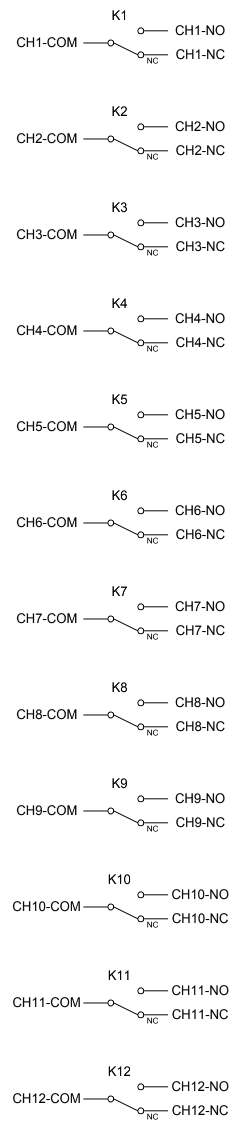


FIGURE B-2 SM2002 SCHEMATIC

TABLE B-2 SM2002 RELAY REGISTER MAP

Offset (Hex)																
12																
10																
E																
C																
A																
8																
6																
4																
2																
0					K12	K11	K10	K9	K8	K7	K6	K5	K4	K3	K2	K1

APPENDIX C

SM2003 - 8 CH / 20 AMP POWER SWITCH - SPDT

This appendix shows the connector, connector pin assignments, schematic and relay register map for this module. Some information in this appendix is a repeat from other sections. It is grouped here again for easy referencing.

Note that the connector pictured below is for the single-wide (SM1000A) only. If this module is used in a double-wide (SM1000B), the front panel interface may by opposite (upside-down). Refer to the Front Panel Interface section for more information.

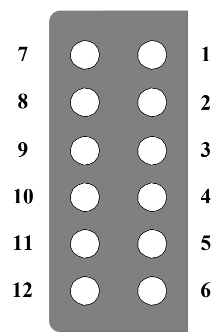


FIGURE C-1 SM2003 CONNECTOR PIN LOCATIONS – 12P

TABLE C-1 SM2003 CONNECTOR PIN / SIGNAL ASSIGNMENTS

J100		J101	
PIN	SIGNAL	PIN	SIGNAL
1	CH1 - NO	1	CH5 - NO
2	CH1-COM	2	CH5-COM
3	CH2-NO	3	CH6-NO
4	CH3-NO	4	CH7-NO
5	CH3-COM	5	CH7-COM
6	CH4-NO	6	CH8-NO
7	CH1-NC	7	CH5-NC
8	CH2-COM	8	CH6-COM
9	CH2-NC	9	CH6-NC
10	CH3-NC	10	CH7-NC
11	CH4-COM	11	CH8-COM
12	CH4-NC	12	CH8-NC

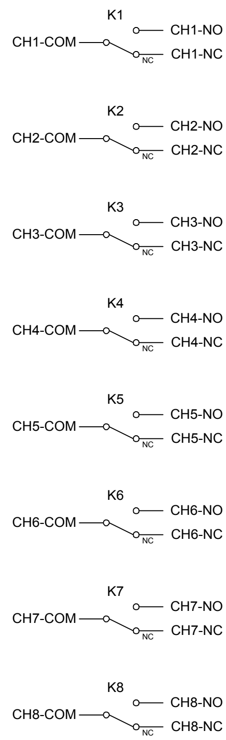


FIGURE C-2 SM2003 SCHEMATIC

TABLE C-2 SM2003 RELAY REGISTER MAP

Offset (Hex)																
12																
10																
E																
C																
A																
8																
6																
4																
2																
0									K8	K7	K6	K5	K4	K3	K2	K1

APPENDIX D

SM2004 - 12 CH / 20 AMP POWER SWITCH - SPST

This appendix shows the connector, connector pin assignments, schematic and relay register map for this module. Some information in this appendix is a repeat from other sections. It is grouped here again for easy referencing.

Note that the connector pictured below is for the single-wide (SM1000A) only. If this module is used in a double-wide (SM1000B), the front panel interface may by opposite (upside-down). Refer to the Front Panel Interface section for more information.

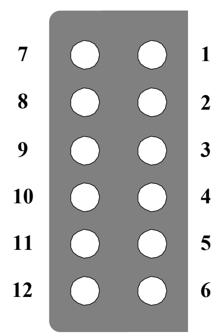


FIGURE D-1 SM2004 CONNECTOR PIN LOCATIONS – 12P

TABLE D-1 SM2004 CONNECTOR PIN / SIGNAL ASSIGNMENTS

J100		J101	
PIN	SIGNAL	PIN	SIGNAL
1	CH1-A	1	CH7-A
2	CH2-A	2	CH8-A
3	CH3-A	3	CH9-A
4	CH4-A	4	CH10-A
5	CH5-A	5	CH11-A
6	CH6-A	6	CH12-A
7	CH1-B	7	CH7-B
8	CH2-B	8	CH8-B
9	CH3-B	9	CH9-B
10	CH4-B	10	CH10-B
11	CH5-B	11	CH11-B
12	CH6-B	12	CH12-B

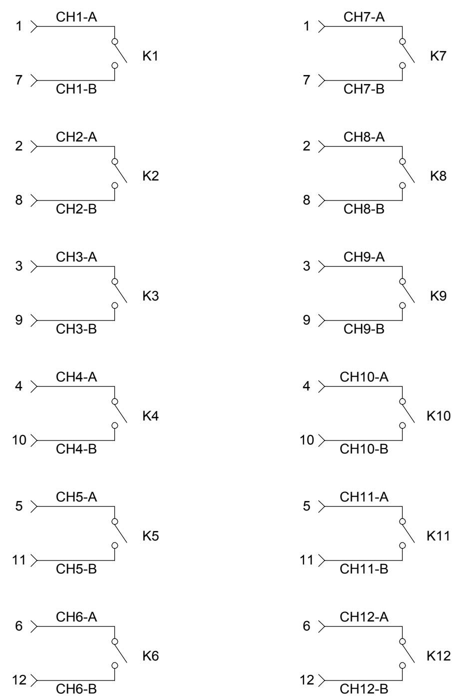


FIGURE D-2 SM2004 SCHEMATIC

TABLE D-2 SM2004 RELAY REGISTER MAP

Offset (Hex)																
12																
10																
E																
C																
A																
8																
6																
4																
2																
0					K12	K11	K10	K9	K8	K7	K6	K5	K4	K3	K2	K1

APPENDIX E

SM2005 - 3 SP4T AND 3 SPDT, 20 AMP SWITCH

This appendix shows the connector, connector pin assignments, schematic and relay register map for this module. Some information in this appendix is a repeat from other sections. It is grouped here again for easy referencing.

Note that the connector pictured below is for the single-wide (SM1000A) only. If this module is used in a double-wide (SM1000B), the front panel interface may by opposite (upside-down). Refer to the Front Panel Interface section for more information.

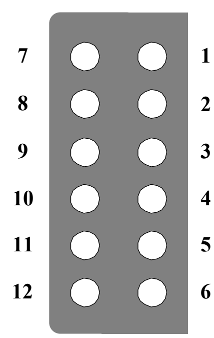


FIGURE E-1 SM2005 CONNECTOR PIN LOCATIONS – 12P

TABLE E-1 SM2005 CONNECTOR PIN / SIGNAL ASSIGNMENTS

J100		J101	
PIN	SIGNAL	PIN	SIGNAL
1	CH1-COM	1	CH4-COM
2	CH1-NO-1	2	CH5-NO
3	CH1-NO-3	3	CH6-NO
4	CH2-COM	4	CH3-NO-1
5	CH2-NO-3	5	CH3-COM
6	CH4-NO	6	CH3-NO-3
7	CH1-NC	7	CH5-NC
8	CH1-NO-2	8	CH5-COM
9	CH2-NO-2	9	CH6-NC
10	CH2-NC	10	CH6-COM
11	CH2-NO-1	11	CH3-NC
12	CH4-NC	12	CH3-NO-2

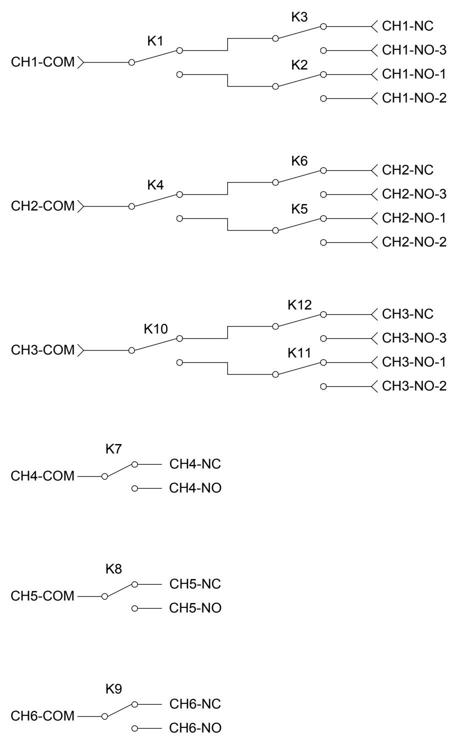


FIGURE E-2 SM2005 SCHEMATIC

TABLE E-2 SM2005 RELAY REGISTER MAP

Offset (Hex)																
12																
10																
E																
C																
A																
8																
6																
4																
2																
0					K12	K11	K10	K9	K8	K7	K6	K5	K4	K3	K2	K1

APPENDIX F

SM2008 - 16 CHANNEL - 500V – 1 AMP DPST SWITCH

This appendix shows the connector, connector pin assignments, schematic and relay register map for this module. Some information in this appendix is a repeat from other sections. It is grouped here again for easy referencing.

Note that the connector pictured below is for the single-wide (SM1000A) only. If this module is used in a double-wide (SM1000B), the front panel interface may by opposite (upside-down). Refer to the Front Panel Interface section for more information.

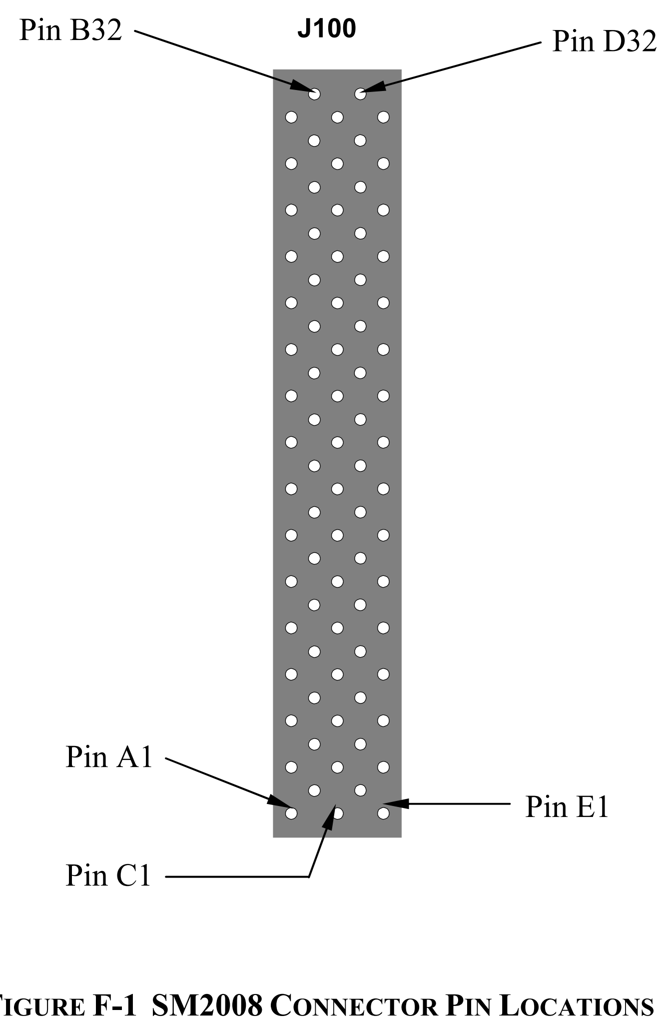


FIGURE F-1 SM2008 CONNECTOR PIN LOCATIONS – 80P

TABLE F-1 SM2008 CONNECTOR PIN / SIGNAL ASSIGNMENTS

ROW A	SIGNAL	ROW B	SIGNAL	ROW C	SIGNAL	ROW D	SIGNAL	ROW E	SIGNAL
1	SHIELD	2	CH1-B INPUT	1	CH1-A INPUT	2	CH1-B OUTPUT	1	CH1-A OUTPUT
3	SHIELD	4	CH2-B INPUT	3	CH2-A INPUT	4	CH2-B OUTPUT	3	CH2-A OUTPUT
5	SHIELD	6	CH3-B INPUT	5	CH3-A INPUT	6	CH3-B OUTPUT	5	CH3-A OUTPUT
7	SHIELD	8	CH4-B INPUT	7	CH4-A INPUT	8	CH4-B OUTPUT	7	CH4-A OUTPUT
9	SHIELD	10	CH5-B INPUT	9	CH5-A INPUT	10	CH5-B OUTPUT	9	CH5-A OUTPUT
11	SHIELD	12	CH6-B INPUT	11	CH6-A INPUT	12	CH6-B OUTPUT	11	CH6-A OUTPUT
13	SHIELD	14	CH7-B INPUT	13	CH7-A INPUT	14	CH7-B OUTPUT	13	CH7-A OUTPUT
15	SHIELD	16	CH8-B INPUT	15	CH8-A INPUT	16	CH8-B OUTPUT	15	CH8-A OUTPUT
17	SHIELD	18	CH9-B INPUT	17	CH9-A INPUT	18	CH9-B OUTPUT	17	CH9-A OUTPUT
19	SHIELD	20	CH10-B INPUT	19	CH10-A INPUT	20	CH10-B OUTPUT	19	CH10-A OUTPUT
21	SHIELD	22	CH11-B INPUT	21	CH11-A INPUT	22	CH11-B OUTPUT	21	CH11-A OUTPUT
23	SHIELD	24	CH12-B INPUT	23	CH12-A INPUT	24	CH12-B OUTPUT	23	CH12-A OUTPUT
25	SHIELD	26	CH13-B INPUT	25	CH13-A INPUT	26	CH13-B OUTPUT	25	CH13-A OUTPUT
27	SHIELD	28	CH14-B INPUT	27	CH14-A INPUT	28	CH14-B OUTPUT	27	CH14-A OUTPUT
29	FP-OPEN	30	CH15-B INPUT	29	CH15-A INPUT	30	CH15-B OUTPUT	29	CH15-A OUTPUT
31	FP-GND	32	CH16-B INPUT	31	CH16-A INPUT	32	CH16-B OUTPUT	31	CH16-A OUTPUT

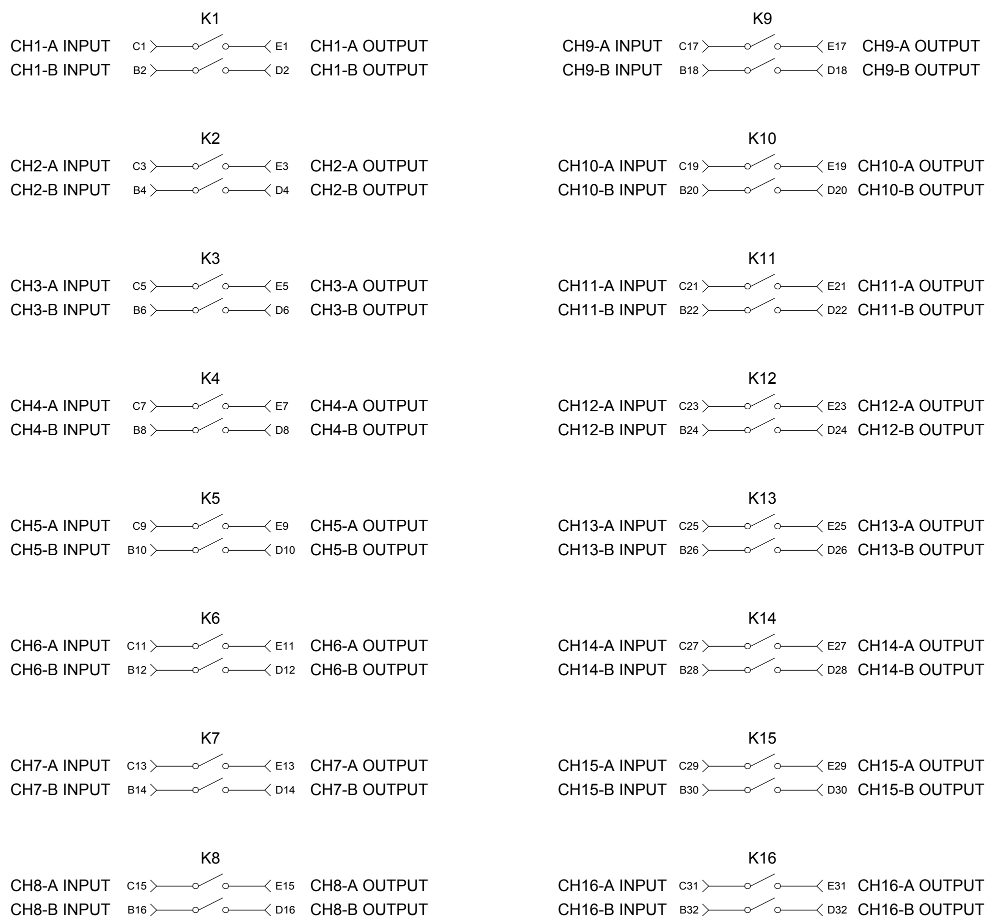


FIGURE F-2 SM2008 SCHEMATIC

TABLE F-2 SM2008 RELAY REGISTER MAP

Offset (Hex)																
12																
10																
E																
C																
A																
8																
6																
4																
2																
0	K16	K15	K14	K13	K12	K11	K10	K9	K8	K7	K6	K5	K4	K3	K2	K1

APPENDIX G

SM2009 - 16 CHANNEL - 500V – 1 AMP SPDT SWITCH

This appendix shows the connector, connector pin assignments, schematic and relay register map for this module. Some information in this appendix is a repeat from other sections. It is grouped here again for easy referencing.

Note that the connector pictured below is for the single-wide (SM1000A) only. If this module is used in a double-wide (SM1000B), the front panel interface may by opposite (upside-down). Refer to the Front Panel Interface section for more information.

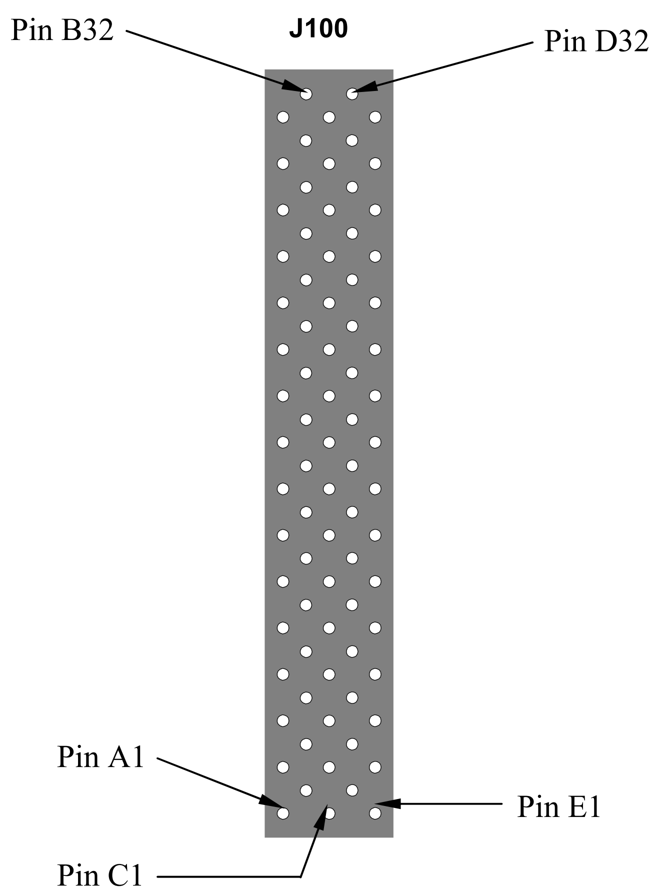


FIGURE G-1 SM2009 CONNECTOR PIN LOCATIONS – 80P

TABLE G-1 SM2009 CONNECTOR PIN / SIGNAL ASSIGNMENTS

ROW A	SIGNAL	ROW B	SIGNAL	ROW C	SIGNAL	ROW D	SIGNAL	ROW E	SIGNAL
1	SHIELD	2	NC	1	CH1 INPUT	2	CH1 OUTPUT2	1	CH1 OUTPUT1
3	SHIELD	4	NC	3	CH2 INPUT	4	CH2 OUTPUT2	3	CH2 OUTPUT1
5	SHIELD	6	NC	5	CH3 INPUT	6	CH3 OUTPUT2	5	CH3 OUTPUT1
7	SHIELD	8	NC	7	CH4 INPUT	8	CH4 OUTPUT2	7	CH4 OUTPUT1
9	SHIELD	10	NC	9	CH5 INPUT	10	CH5 OUTPUT2	9	CH5 OUTPUT1
11	SHIELD	12	NC	11	CH6 INPUT	12	CH6 OUTPUT2	11	CH6 OUTPUT1
13	SHIELD	14	NC	13	CH7 INPUT	14	CH7 OUTPUT2	13	CH7 OUTPUT1
15	SHIELD	16	NC	15	CH8 INPUT	16	CH8 OUTPUT2	15	CH8 OUTPUT1
17	SHIELD	18	NC	17	CH9 INPUT	18	CH9 OUTPUT2	17	CH9 OUTPUT1
19	SHIELD	20	NC	19	CH10 INPUT	20	CH10 OUTPUT2	19	CH10 OUTPUT1
21	SHIELD	22	NC	21	CH11 INPUT	22	CH11 OUTPUT2	21	CH11 OUTPUT1
23	SHIELD	24	NC	23	CH12 INPUT	24	CH12 OUTPUT2	23	CH12 OUTPUT1
25	SHIELD	26	NC	25	CH13 INPUT	26	CH13 OUTPUT2	25	CH13 OUTPUT1
27	SHIELD	28	NC	27	CH14 INPUT	28	CH14 OUTPUT2	27	CH14 OUTPUT1
29	FP-OPEN	30	NC	29	CH15 INPUT	30	CH15 OUTPUT2	29	CH15 OUTPUT1
31	FP-GND	32	NC	31	CH16 INPUT	32	CH16 OUTPUT2	31	CH16 OUTPUT1

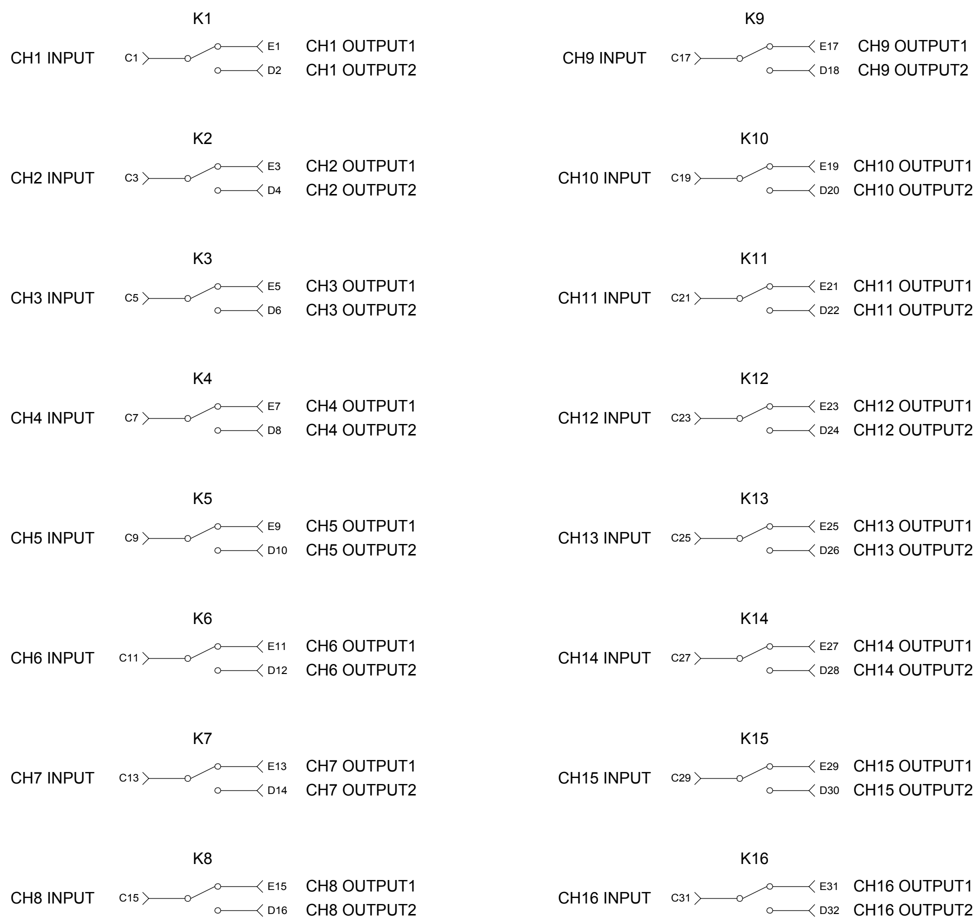


FIGURE G-2 SM2009 SCHEMATIC

TABLE G-2 SM2009 RELAY REGISTER MAP

Offset (Hex)																
12																
10																
E																
C																
A																
8																
6																
4																
2																
0	K16	K15	K14	K13	K12	K11	K10	K9	K8	K7	K6	K5	K4	K3	K2	K1

APPENDIX H

SM3001/DR - 8 X 8 TO 1 MULTIPLEXER

This appendix shows the connector, connector pin assignments, schematic and relay register map for this module. Some information in this appendix is a repeat from other sections. It is grouped here again for easy referencing.

Note that the connector pictured below is for the single-wide (SM1000A) only. If this module is used in a double-wide (SM1000B), the front panel interface may by opposite (upside-down). Refer to the Front Panel Interface section for more information.

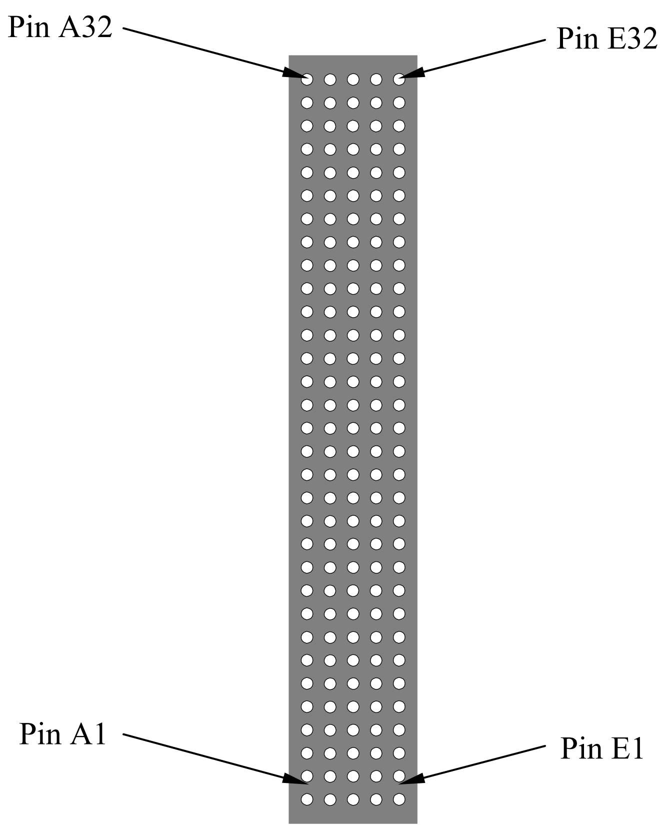


FIGURE H-1 SM3001/DR CONNECTOR PIN LOCATIONS – 160P

TABLE H-1 SM3001/DR CONNECTOR PIN / SIGNAL ASSIGNMENTS

ROW A	SIGNAL	ROW B	SIGNAL	ROW C	SIGNAL	ROW D	SIGNAL	ROW E	SIGNAL
1	CH1.1W	1	CH1.CA	1	CH1.1A	1	CH1.2A	1	CH1.3A
2	SHIELD	2	CH1.CB	2	CH1.1B	2	CH1.2B	2	CH1.3B
3	CH1.4A	3	CH1.5A	3	CH1.6A	3	CH1.7A	3	CH1.8A
4	CH1.4B	4	CH1.5B	4	CH1.6B	4	CH1.7B	4	CH1.8B
5	CH2.1W	5	CH2.CA	5	CH2.1A	5	CH2.2A	5	CH2.3A
6	SHIELD	6	CH2.CB	6	CH2.1B	6	CH2.2B	6	CH2.3B
7	CH2.4A	7	CH2.5A	7	CH2.6A	7	CH2.7A	7	CH2.8A
8	CH2.4B	8	CH2.5B	8	CH2.6B	8	CH2.7B	8	CH2.8B
9	CH3.1W	9	CH3.CA	9	CH3.1A	9	CH3.2A	9	CH3.3A
10	SHIELD	10	CH3.CB	10	CH3.1B	10	CH3.2B	10	CH3.3B
11	CH3.4A	11	CH3.5A	11	CH3.6A	11	CH3.7A	11	CH3.8A
12	CH3.4B	12	CH3.5B	12	CH3.6B	12	CH3.7B	12	CH3.8B
13	CH4.1W	13	CH4.CA	13	CH4.1A	13	CH4.2A	13	CH4.3A
14	SHIELD	14	CH4.CB	14	CH4.1B	14	CH4.2B	14	CH4.3B
15	CH4.4A	15	CH4.5A	15	CH4.6A	15	CH4.7A	15	CH4.8A
16	CH4.4B	16	CH4.5B	16	CH4.6B	16	CH4.7B	16	CH4.8B
17	CH5.1W	17	CH5.CA	17	CH5.1A	17	CH5.2A	17	CH5.3A
18	SHIELD	18	CH5.CB	18	CH5.1B	18	CH5.2B	18	CH5.3B
19	CH5.4A	19	CH5.5A	19	CH5.6A	19	CH5.7A	19	CH5.8A
20	CH5.4B	20	CH5.5B	20	CH5.6B	20	CH5.7B	20	CH5.8B
21	CH6.1W	21	CH6.CA	21	CH6.1A	21	CH6.2A	21	CH6.3A
22	SHIELD	22	CH6.CB	22	CH6.1B	22	CH6.2B	22	CH6.3B
23	CH6.4A	23	CH6.5A	23	CH6.6A	23	CH6.7A	23	CH6.8A
24	CH6.4B	24	CH6.5B	24	CH6.6B	24	CH6.7B	24	CH6.8B
25	CH7.1W	25	CH7.CA	25	CH7.1A	25	CH7.2A	25	CH7.3A
26	CH7.4A	26	CH7.CB	26	CH7.1B	26	CH7.2B	26	CH7.3B
27	CH7.4B	27	CH7.5A	27	CH7.6A	27	CH7.7A	27	CH7.8A
28	CH8.1W	28	CH7.5B	28	CH7.6B	28	CH7.7B	28	CH7.8B
29	CH8.CA	29	CH8.1A	29	CH8.2A	29	CH8.3A	29	CH8.4A
30	CH8.CB	30	CH8.1B	30	CH8.2B	30	CH8.3B	30	CH8.4B
31	CH8.5A	31	CH8.6A	31	CH8.7A	31	CH8.8A	31	FP-OPEN
32	CH8.5B	32	CH8.6B	32	CH8.7B	32	CH8.8B	32	FP-GND

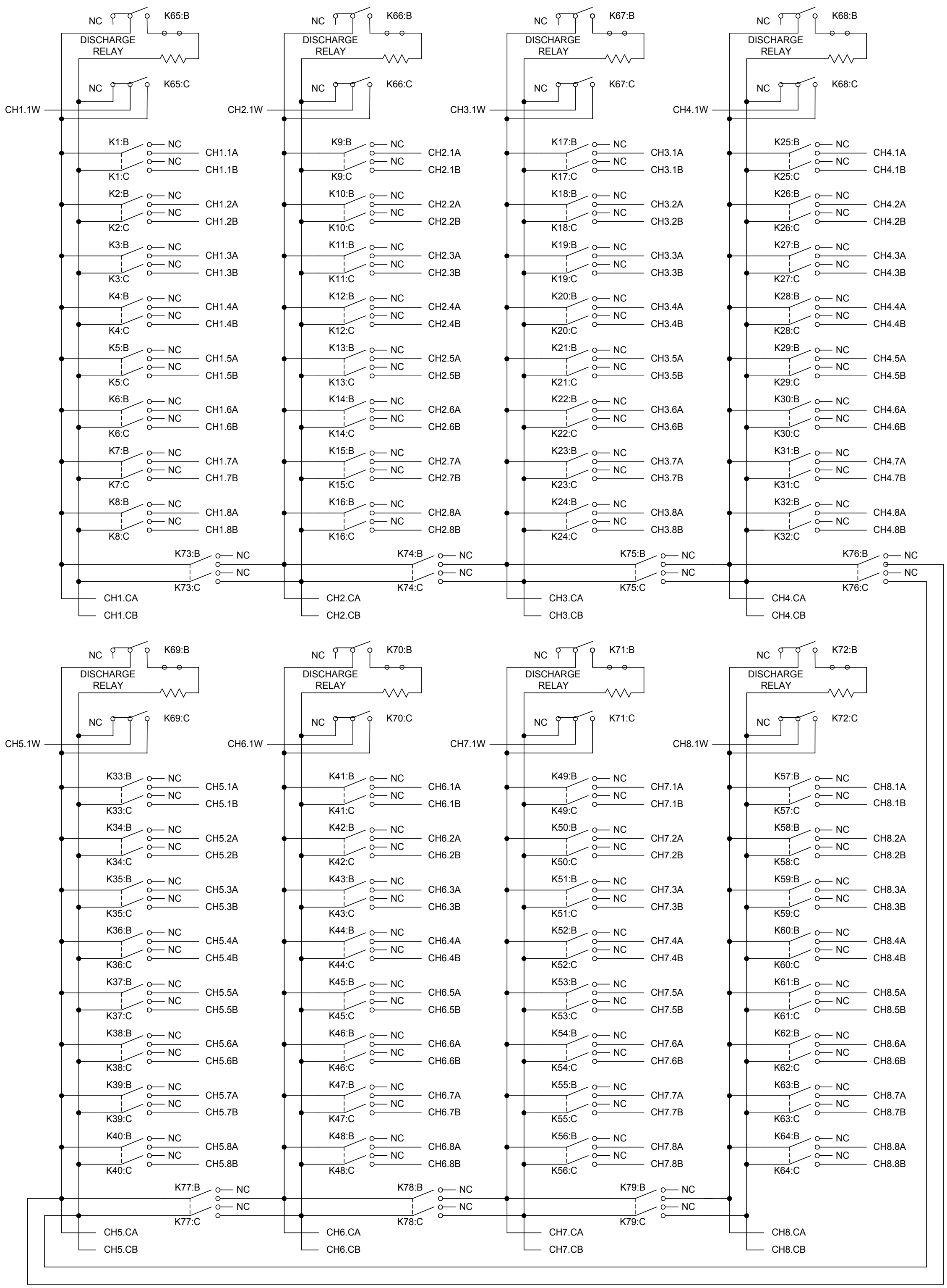


FIGURE H-2 SM3001/DR SCHEMATIC

TABLE H-2 SM3001/DR RELAY REGISTER MAP

Offset (Hex)																
12																
10																
E																
C																
A																
8		K79	K78	K77	K76	K75	K74	K73	K72	K71	K70	K69	K68	K67	K66	K65
6	K64	K63	K62	K61	K60	K59	K58	K57	K56	K55	K54	K53	K52	K51	K50	K49
4	K48	K47	K46	K45	K44	K43	K42	K41	K40	K39	K38	K37	K36	K35	K34	K33
2	K32	K31	K30	K29	K28	K27	K26	K25	K24	K23	K22	K21	K20	K19	K18	K17
0	K16	K15	K14	K13	K12	K11	K10	K9	K8	K7	K6	K5	K4	K3	K2	K1

Note: **K1** - **K64** are channel relays. **K65** - **K79** are for 1, 2 or 4-wire configuration. The 1-wire configuration is not available with a SM3001DR that uses the discharge relay circuit, **K65** - **K72**. See schematic.

APPENDIX I

SM4001 - 9 (4 X 4) MATRIX

This appendix shows the connector, connector pin assignments, schematic and relay register map for this module. Some information in this appendix is a repeat from other sections. It is grouped here again for easy referencing.

Note that the connector pictured below is for the single-wide (SM1000A) only. If this module is used in a double-wide (SM1000B), the front panel interface may by opposite (upside-down). Refer to the Front Panel Interface section for more information.

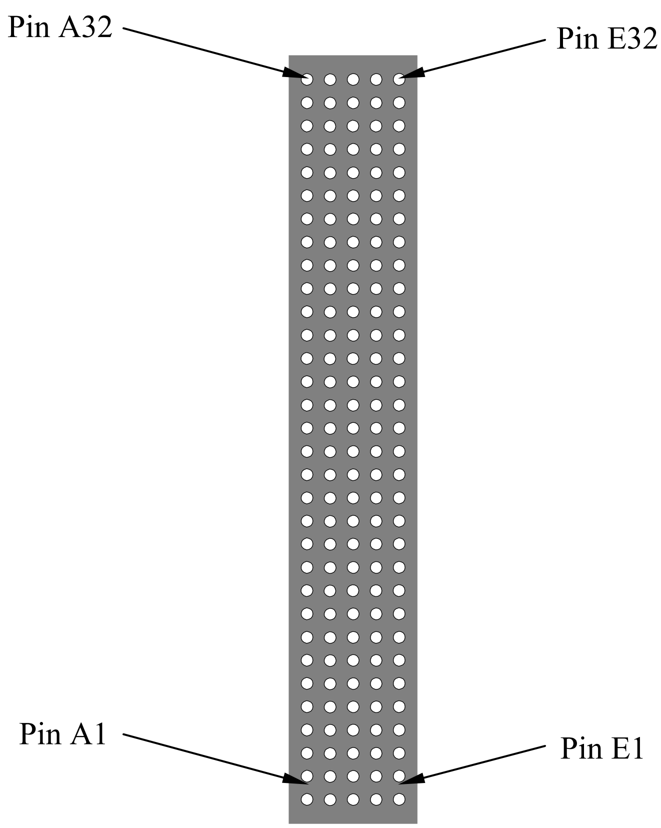


FIGURE I-1 SM4001 CONNECTOR PIN LOCATIONS – 160P

TABLE I-1 SM4001 CONNECTOR PIN / SIGNAL ASSIGNMENTS

ROW A	SIGNAL	ROW B	SIGNAL	ROW C	SIGNAL	ROW D	SIGNAL	ROW E	SIGNAL
1	X7.A4	1	SHIELD	1	Y7.A4	1	SHIELD	1	Y1.A4
2	X7.B4	2	X7.A3	2	Y7.B4	2	Y4.A4	2	Y1.B4
3	X7.A2	3	X7.B3	3	Y7.A3	3	Y4.B4	3	Y1.A3
4	X7.B2	4	X7.A1	4	Y7.B3	4	Y4.A3	4	Y1.B3
5	X4.A4	5	X7.B1	5	Y7.A2	5	Y4.B3	5	Y1.A2
6	X4.B4	6	X4.A3	6	Y7.B2	6	Y4.A2	6	Y1.B2
7	X4.A2	7	X4.B3	7	Y7.A1	7	Y4.B2	7	Y1.A1
8	X4.B2	8	X4.A1	8	Y7.B1	8	Y4.A1	8	Y1.B1
9	X1.A4	9	X4.B1	9	X1.A2	9	Y4.B1	9	SHIELD
10	X1.B4	10	X1.A3	10	X1.B2	10	X1.A1	10	SHIELD
11	X2.A1	11	X1.B3	11	SHIELD	11	X1.B1	11	SHIELD
12	X2.B1	12	X2.A2	12	Y8.A4	12	SHIELD	12	Y2.A4
13	X2.A3	13	X2.B2	13	Y8.B4	13	Y5.A4	13	Y2.B4
14	X2.B3	14	X2.A4	14	Y8.A3	14	Y5.B4	14	Y2.A3
15	X5.A1	15	X2.B4	15	Y8.B3	15	Y5.A3	15	Y2.B3
16	X5.B1	16	X5.A2	16	Y8.A2	16	Y5.B3	16	Y2.A2
17	X5.A3	17	X5.B2	17	Y8.B2	17	Y5.A2	17	Y2.B2
18	X5.B3	18	X5.A4	18	Y8.A1	18	Y5.B2	18	Y2.A1
19	X8.A1	19	X5.B4	19	Y8.B1	19	Y5.A1	19	Y2.B1
20	X8.B1	20	X8.A2	20	X8.A3	20	Y5.B1	20	SHIELD
21	X3.A1	21	X8.B2	21	X8.B3	21	X8.A4	21	SHIELD
22	X3.B1	22	X3.A2	22	SHIELD	22	X8.B4	22	SHIELD
23	X3.A3	23	X3.B2	23	Y9.A4	23	SHIELD	23	Y3.A4
24	X3.B3	24	X3.A4	24	Y9.B4	24	Y6.A4	24	Y3.B4
25	X6.A1	25	X3.B4	25	Y9.A3	25	Y6.B4	25	Y3.A3
26	X6.B1	26	X6.A2	26	Y9.B3	26	Y6.A3	26	Y3.B3
27	X6.A3	27	X6.B2	27	Y9.A2	27	Y6.B3	27	Y3.A2
28	X6.B3	28	X6.A4	28	Y9.B2	28	Y6.A2	28	Y3.B2
29	X9.A1	29	X6.B4	29	Y9.A1	29	Y6.B2	29	Y3.A1
30	X9.B1	30	X9.A2	30	Y9.B1	30	Y6.A1	30	Y3.B1
31	X9.A3	31	X9.B2	31	X9.A4	31	Y6.B1	31	FP-OPEN
32	X9.B3	32	SHIELD	32	X9.B4	32	SHIELD	32	FP-GND

TABLE I-2 SM4001 - FRONT PANEL PIN-OUT CONFIGURATION

	Y1.A1 [E7] Y1.B1 [E8]	Y1.A2 [E5] Y1.B2 [E6]	Y1.A3 [E3] Y1.B3 [E4]	Y1.A4 [E1] Y1.B4 [E2]
X1.A1 [D10] X1.B1 [D11]	K1	K2	K3	K4
X1.A2 [C9] X1.B2 [C10]	K5	K6	K7	K8
X1.A3 [B10] X1.B3 [B11]	K9	K10	K11	K12
X1.A4 [A9] X1.B4 [A10]	K13	K14	K15	K16

	Y2.A1 [E18] Y2.B1 [E19]	Y2.A2 [E16] Y2.B2 [E17]	Y2.A3 [E14] Y2.B3 [E15]	Y2.A4 [E12] Y2.B4 [E13]
X2.A1 [A11] X2.B1 [A12]	K17	K18	K19	K20
X2.A2 [B12] X2.B2 [B13]	K21	K22	K23	K24
X2.A3 [A13] X2.B3 [A14]	K25	K26	K27	K28
X2.A4 [B14] X2.B4 [B15]	K29	K30	K31	K32

	Y3.A1 [E29] Y3.B1 [E30]	Y3.A2 [E27] Y3.B2 [E28]	Y3.A3 [E25] Y3.B3 [E26]	Y3.A4 [E23] Y3.B4 [E24]
X3.A1 [A21] X3.B1 [A22]	K33	K34	K35	K36
X3.A2 [B22] X3.B2 [B23]	K37	K38	K39	K40
X3.A3 [A23] X3.B3 [A24]	K41	K42	K43	K44
X3.A4 [B24] X3.B4 [B25]	K45	K46	K47	K48

	Y4.A1 [D8] Y4.B1 [D9]	Y4.A2 [D6] Y4.B2 [D7]	Y4.A3 [D4] Y4.B3 [D5]	Y4.A4 [D2] Y4.B4 [D3]
X4.A1 [B8] X4.B1 [B9]	K49	K50	K51	K52
X4.A2 [A7] X4.B2 [A8]	K53	K54	K55	K56
X4.A3 [B6] X4.B3 [B7]	K57	K58	K59	K60
X4.A4 [A5] X4.B4 [A6]	K61	K62	K63	K64

	Y5.A1 [D19] Y5.B1 [D20]	Y5.A2 [D17] Y5.B2 [D18]	Y5.A3 [D15] Y5.B3 [D16]	Y5.A4 [D13] Y5.B4 [D14]
X5.A1 [A15] X5.B1 [A16]	K65	K66	K67	K68
X5.A2 [B16] X5.B2 [B17]	K69	K70	K71	K72
X5.A3 [A17] X5.B3 [A18]	K73	K74	K75	K76
X5.A4 [B18] X5.B4 [B19]	K77	K78	K79	K80

	Y6.A1 [D30] Y6.B1 [D31]	Y6.A2 [D28] Y6.B2 [D29]	Y6.A3 [D26] Y6.B3 [D27]	Y6.A4 [D24] Y6.B4 [D25]
X6.A1 [A25] X6.B1 [A26]	K81	K82	K83	K84
X6.A2 [B26] X6.B2 [B27]	K85	K86	K87	K88
X6.A3 [A27] X6.B3 [A28]	K89	K90	K91	K92
X6.A4 [B28] X6.B4 [B29]	K93	K94	K95	K96

	Y7.A1 [C7] Y7.B1 [C8]	Y7.A2 [C5] Y7.B2 [C6]	Y7.A3 [C3] Y7.B3 [C4]	Y7.A4 [C1] Y7.B4 [C2]
X7.A1 [B4] X7.B1 [B5]	K97	K98	K99	K100
X7.A2 [A3] X7.B2 [A4]	K101	K102	K103	K104
X7.A3 [B2] X7.B3 [B3]	K105	K106	K107	K108
X7.A4 [A1] X7.B4 [A2]	K109	K110	K111	K112

	Y8.A1 [C18] Y8.B1 [C19]	Y8.A2 [C16] Y8.B2 [C17]	Y8.A3 [C14] Y8.B3 [C15]	Y8.A4 [C12] Y8.B4 [C13]
X8.A1 [A19] X8.B1 [A20]	K113	K114	K115	K116
X8.A2 [B20] X8.B2 [B21]	K117	K118	K119	K120
X8.A3 [C20] X8.B3 [C21]	K121	K122	K123	K124
X8.A4 [D21] X8.B4 [D22]	K125	K126	K127	K128

	Y9.A1 [C29] Y9.B1 [C30]	Y9.A2 [C27] Y9.B2 [C28]	Y9.A3 [C25] Y9.B3 [C26]	Y9.A4 [C23] Y9.B4 [C24]
X9.A1 [A29] X9.B1 [A30]	K129	K130	K131	K132
X9.A2 [B30] X9.B2 [B31]	K133	K134	K135	K136
X9.A3 [A31] X9.B3 [A32]	K137	K138	K139	K140
X9.A4 [C31] X9.B4 [C32]	K141	K142	K143	K144

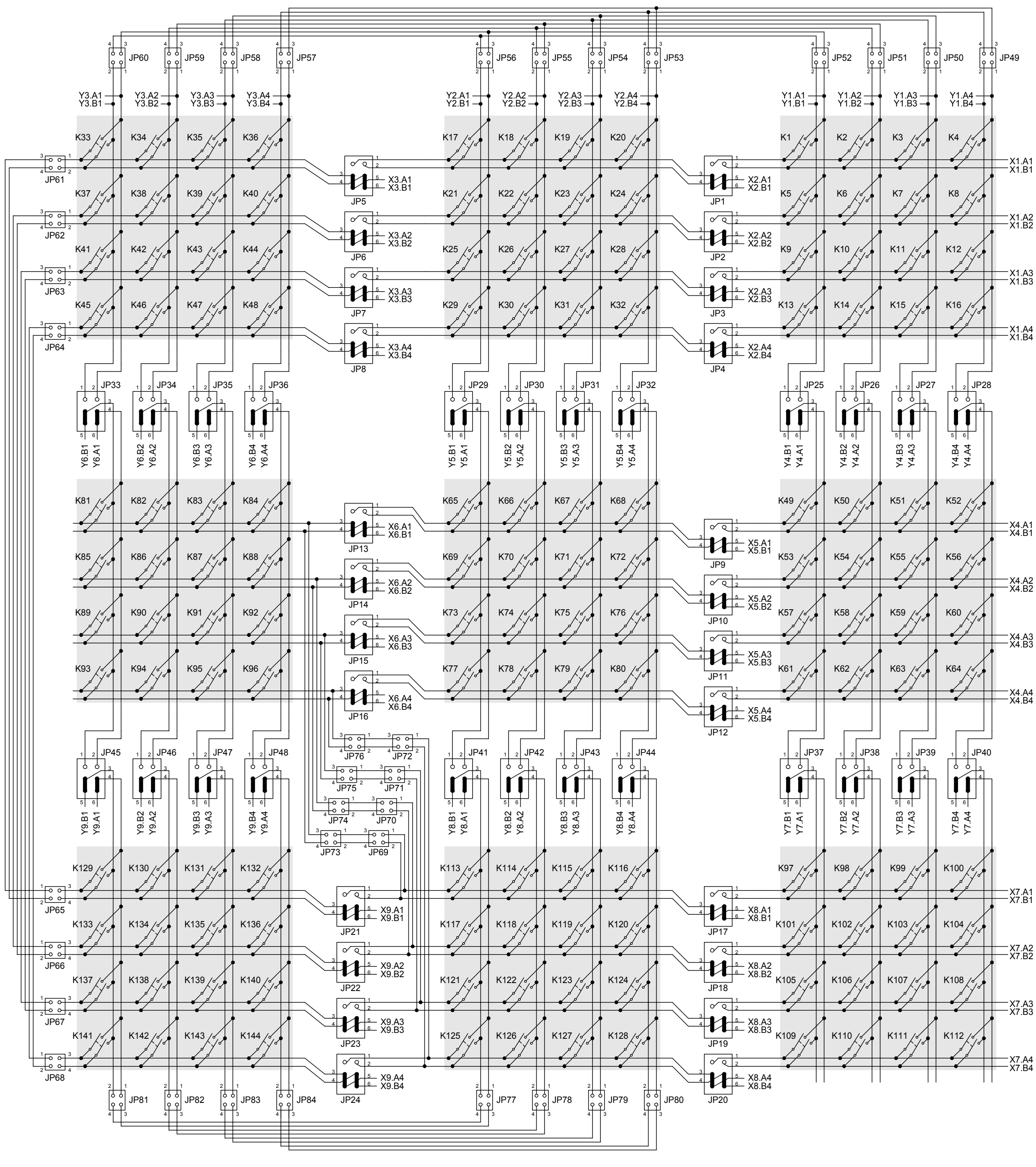


FIGURE I-2 SM4001 SCHEMATIC

TABLE I-3 SM4001 RELAY REGISTER MAP

Offset (Hex)																
12																
10	K144	K143	K142	K141	K140	K139	K138	K137	K136	K135	K134	K133	K132	K131	K130	K129
E	K128	K127	K126	K125	K124	K123	K122	K121	K120	K119	K118	K117	K116	K115	K114	K113
C	K112	K111	K110	K109	K108	K107	K106	K105	K104	K103	K102	K101	K100	K99	K98	K97
A	K96	K95	K94	K93	K92	K91	K90	K89	K88	K87	K86	K85	K84	K83	K82	K81
8	K80	K79	K78	K77	K76	K75	K74	K73	K72	K71	K70	K69	K68	K67	K66	K65
6	K64	K63	K62	K61	K60	K59	K58	K57	K56	K55	K54	K53	K52	K51	K50	K49
4	K48	K47	K46	K45	K44	K43	K42	K41	K40	K39	K38	K37	K36	K35	K34	K33
2	K32	K31	K30	K29	K28	K27	K26	K25	K24	K23	K22	K21	K20	K19	K18	K17
0	K16	K15	K14	K13	K12	K11	K10	K9	K8	K7	K6	K5	K4	K3	K2	K1

APPENDIX J

SM4002 - 4 X 36 MATRIX

This appendix shows the connector, connector pin assignments, schematic and relay register map for this module. Some information in this appendix is a repeat from other sections. It is grouped here again for easy referencing.

Note that the connector pictured below is for the single-wide (SM1000A) only. If this module is used in a double-wide (SM1000B), the front panel interface may by opposite (upside-down). Refer to the Front Panel Interface section for more information.

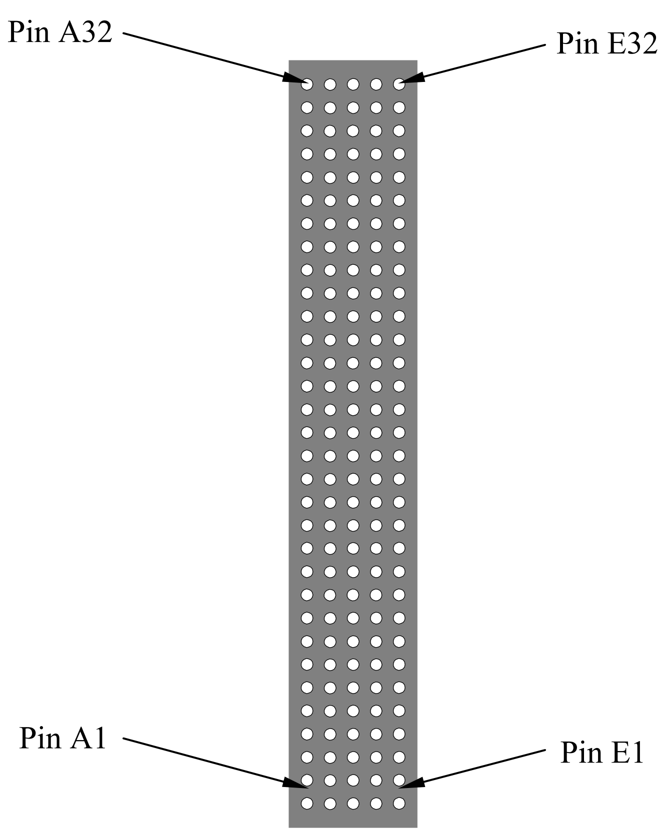


FIGURE J-1 SM4002 CONNECTOR PIN LOCATIONS – 160P

TABLE J-1 SM4002 CONNECTOR PIN / SIGNAL ASSIGNMENTS

ROW A	SIGNAL	ROW B	SIGNAL	ROW C	SIGNAL	ROW D	SIGNAL	ROW E	SIGNAL
1	X7.A4	1	SHIELD	1	Y7.A4	1	SHIELD	1	Y1.A4
2	X7.B4	2	X7.A3	2	Y7.B4	2	Y4.A4	2	Y1.B4
3	X7.A2	3	X7.B3	3	Y7.A3	3	Y4.B4	3	Y1.A3
4	X7.B2	4	X7.A1	4	Y7.B3	4	Y4.A3	4	Y1.B3
5	X4.A4	5	X7.B1	5	Y7.A2	5	Y4.B3	5	Y1.A2
6	X4.B4	6	X4.A3	6	Y7.B2	6	Y4.A2	6	Y1.B2
7	X4.A2	7	X4.B3	7	Y7.A1	7	Y4.B2	7	Y1.A1
8	X4.B2	8	X4.A1	8	Y7.B1	8	Y4.A1	8	Y1.B1
9	X1.A4	9	X4.B1	9	X1.A2	9	Y4.B1	9	SHIELD
10	X1.B4	10	X1.A3	10	X1.B2	10	X1.A1	10	SHIELD
11	X2.A1	11	X1.B3	11	SHIELD	11	X1.B1	11	SHIELD
12	X2.B1	12	X2.A2	12	Y8.A4	12	SHIELD	12	Y2.A4
13	X2.A3	13	X2.B2	13	Y8.B4	13	Y5.A4	13	Y2.B4
14	X2.B3	14	X2.A4	14	Y8.A3	14	Y5.B4	14	Y2.A3
15	X5.A1	15	X2.B4	15	Y8.B3	15	Y5.A3	15	Y2.B3
16	X5.B1	16	X5.A2	16	Y8.A2	16	Y5.B3	16	Y2.A2
17	X5.A3	17	X5.B2	17	Y8.B2	17	Y5.A2	17	Y2.B2
18	X5.B3	18	X5.A4	18	Y8.A1	18	Y5.B2	18	Y2.A1
19	X8.A1	19	X5.B4	19	Y8.B1	19	Y5.A1	19	Y2.B1
20	X8.B1	20	X8.A2	20	X8.A3	20	Y5.B1	20	SHIELD
21	X3.A1	21	X8.B2	21	X8.B3	21	X8.A4	21	SHIELD
22	X3.B1	22	X3.A2	22	SHIELD	22	X8.B4	22	SHIELD
23	X3.A3	23	X3.B2	23	Y9.A4	23	SHIELD	23	Y3.A4
24	X3.B3	24	X3.A4	24	Y9.B4	24	Y6.A4	24	Y3.B4
25	X6.A1	25	X3.B4	25	Y9.A3	25	Y6.B4	25	Y3.A3
26	X6.B1	26	X6.A2	26	Y9.B3	26	Y6.A3	26	Y3.B3
27	X6.A3	27	X6.B2	27	Y9.A2	27	Y6.B3	27	Y3.A2
28	X6.B3	28	X6.A4	28	Y9.B2	28	Y6.A2	28	Y3.B2
29	X9.A1	29	X6.B4	29	Y9.A1	29	Y6.B2	29	Y3.A1
30	X9.B1	30	X9.A2	30	Y9.B1	30	Y6.A1	30	Y3.B1
31	X9.A3	31	X9.B2	31	X9.A4	31	Y6.B1	31	FP-OPEN
32	X9.B3	32	SHIELD	32	X9.B4	32	SHIELD	32	FP-GND

TABLE J-2 SM4002 - FRONT PANEL PIN-OUT CONFIGURATION

	Y2.A1 [E18] / Y2.B1 [E19]	Y2.A2 [E16] / Y2.B2 [E17]	Y2.A3 [E14] / Y2.B3 [E15]	Y2.A4 [E12] / Y2.B4 [E13]
X1.A1 [D10] / X1.B1 [D11]	K1	K2	K3	K4
X1.A2 [C9] / X1.B2 [C10]	K5	K6	K7	K8
X1.A3 [B10] / X1.B3 [B11]	K9	K10	K11	K12
X1.A4 [A9] / X1.B4 [A10]	K13	K14	K15	K16
X2.A1 [A11] / X2.B1 [A12]	K17	K18	K19	K20
X2.A2 [B12] / X2.B2 [B13]	K21	K22	K23	K24
X2.A3 [A13] / X2.B3 [A14]	K25	K26	K27	K28
X2.A4 [B14] / X2.B4 [B15]	K29	K30	K31	K32
X3.A1 [A21] / X3.B1 [A22]	K33	K34	K35	K36
X3.A2 [B22] / X3.B2 [B23]	K37	K38	K39	K40
X3.A3 [A23] / X3.B3 [A24]	K41	K42	K43	K44
X3.A4 [B24] / X3.B4 [B25]	K45	K46	K47	K48
X4.A1 [B8] / X4.B1 [B9]	K49	K50	K51	K52
X4.A2 [A7] / X4.B2 [A8]	K53	K54	K55	K56
X4.A3 [B6] / X4.B3 [B7]	K57	K58	K59	K60
X4.A4 [A5] / X4.B4 [A6]	K61	K62	K63	K64
X5.A1 [A15] / X5.B1 [A16]	K65	K66	K67	K68
X5.A2 [B16] / X5.B2 [B17]	K69	K70	K71	K72
X5.A3 [A17] / X5.B3 [A18]	K73	K74	K75	K76
X5.A4 [B18] / X5.B4 [B19]	K77	K78	K79	K80
X6.A1 [A25] / X6.B1 [A26]	K81	K82	K83	K84
X6.A2 [B26] / X6.B2 [B27]	K85	K86	K87	K88
X6.A3 [A27] / X6.B3 [A28]	K89	K90	K91	K92
X6.A4 [B28] / X6.B4 [B29]	K93	K94	K95	K96
X7.A1 [B4] / X7.B1 [B5]	K97	K98	K99	K100
X7.A2 [A3] / X7.B2 [A4]	K101	K102	K103	K104
X7.A3 [B2] / X7.B3 [B3]	K105	K106	K107	K108
X7.A4 [A1] / X7.B4 [A2]	K109	K110	K111	K112
X8.A1 [A19] / X8.B1 [A20]	K113	K114	K115	K116
X8.A2 [B20] / X8.B2 [B21]	K117	K118	K119	K120
X8.A3 [C20] / X8.B3 [C21]	K121	K122	K123	K124
X8.A4 [D21] / X8.B4 [D22]	K125	K126	K127	K128
X9.A1 [A29] / X9.B1 [A30]	K129	K130	K131	K132
X9.A2 [B30] / X9.B2 [B31]	K133	K134	K135	K136
X9.A3 [A31] / X9.B3 [A32]	K137	K138	K139	K140
X9.A4 [C31] / X9.B4 [C32]	K141	K142	K143	K144

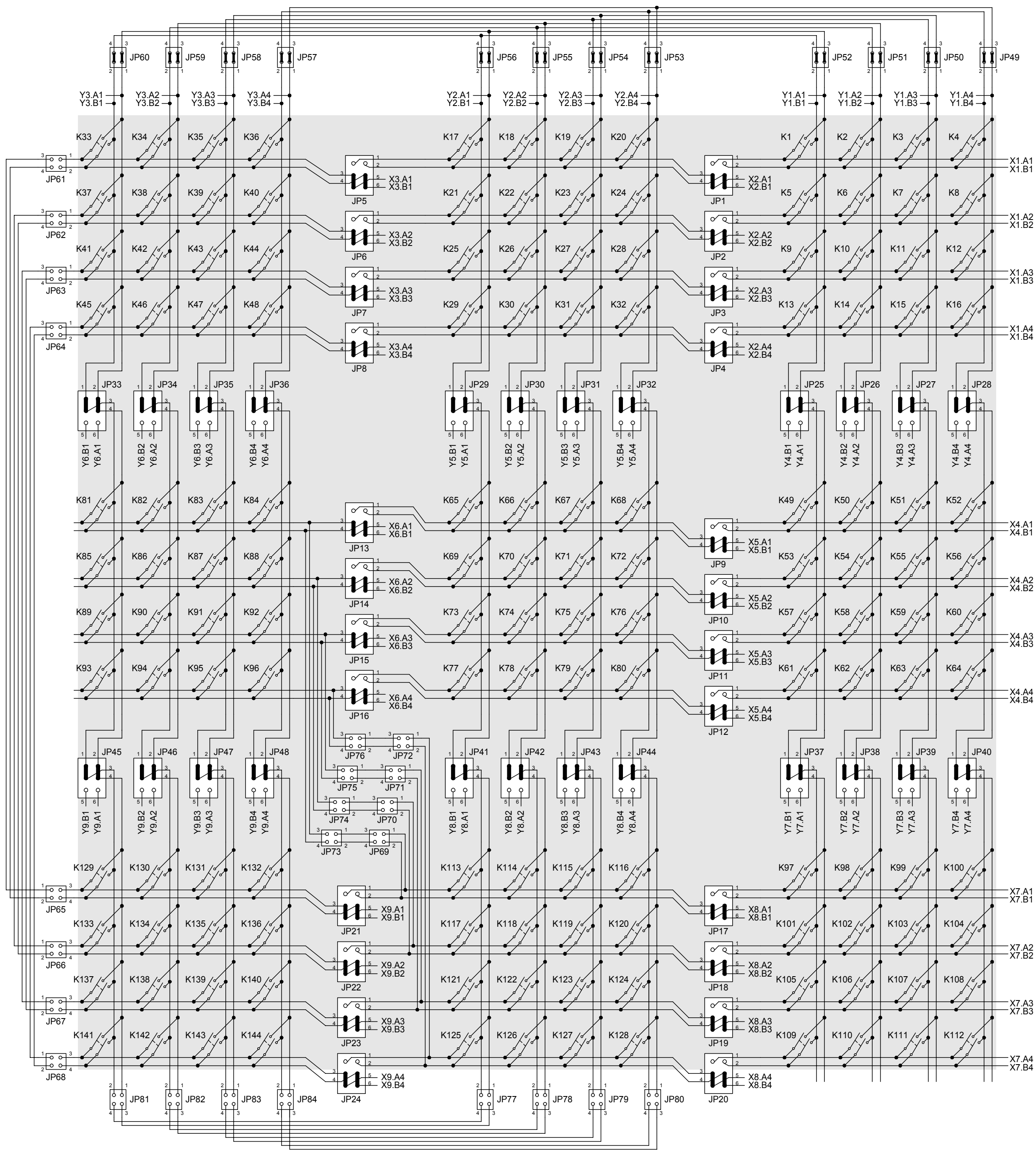


FIGURE J-2 SM4002 SCHEMATIC

TABLE J-3 SM4002 RELAY REGISTER MAP

Offset (Hex)																
12																
10	K144	K143	K142	K141	K140	K139	K138	K137	K136	K135	K134	K133	K132	K131	K130	K129
E	K128	K127	K126	K125	K124	K123	K122	K121	K120	K119	K118	K117	K116	K115	K114	K113
C	K112	K111	K110	K109	K108	K107	K106	K105	K104	K103	K102	K101	K100	K99	K98	K97
A	K96	K95	K94	K93	K92	K91	K90	K89	K88	K87	K86	K85	K84	K83	K82	K81
8	K80	K79	K78	K77	K76	K75	K74	K73	K72	K71	K70	K69	K68	K67	K66	K65
6	K64	K63	K62	K61	K60	K59	K58	K57	K56	K55	K54	K53	K52	K51	K50	K49
4	K48	K47	K46	K45	K44	K43	K42	K41	K40	K39	K38	K37	K36	K35	K34	K33
2	K32	K31	K30	K29	K28	K27	K26	K25	K24	K23	K22	K21	K20	K19	K18	K17
0	K16	K15	K14	K13	K12	K11	K10	K9	K8	K7	K6	K5	K4	K3	K2	K1

APPENDIX K

SM4003 - 2 (4 X 16) + 1 (4 X 4) MATRIX

This appendix shows the connector, connector pin assignments, schematic and relay register map for this module. Some information in this appendix is a repeat from other sections. It is grouped here again for easy referencing.

Note that the connector pictured below is for the single-wide (SM1000A) only. If this module is used in a double-wide (SM1000B), the front panel interface may by opposite (upside-down). Refer to the Front Panel Interface section for more information.

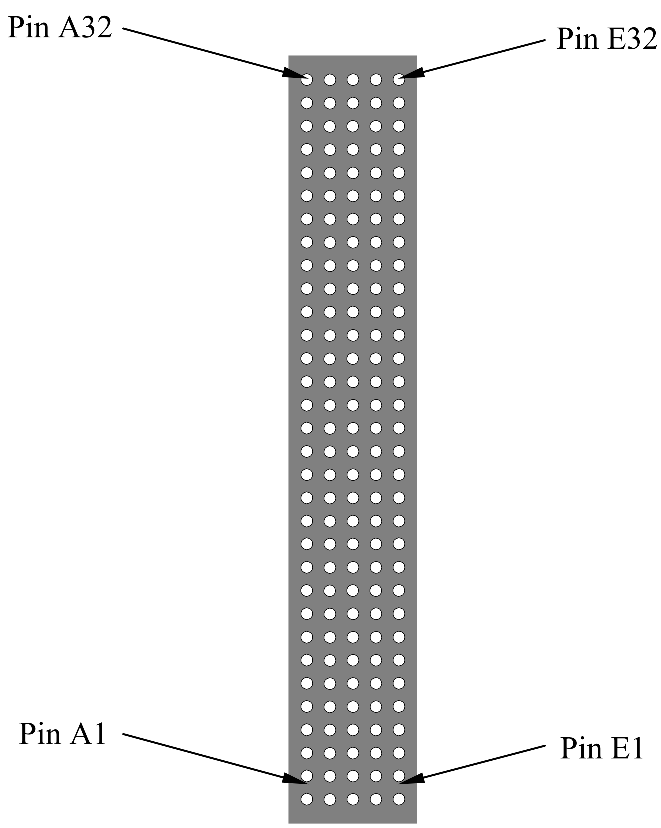


FIGURE K-1 SM4003 CONNECTOR PIN LOCATIONS – 160P

TABLE K-1 SM4003 CONNECTOR PIN / SIGNAL ASSIGNMENTS

ROW A	SIGNAL	ROW B	SIGNAL	ROW C	SIGNAL	ROW D	SIGNAL	ROW E	SIGNAL
1	X7.A4	1	SHIELD	1	Y7.A4	1	SHIELD	1	Y1.A4
2	X7.B4	2	X7.A3	2	Y7.B4	2	Y4.A4	2	Y1.B4
3	X7.A2	3	X7.B3	3	Y7.A3	3	Y4.B4	3	Y1.A3
4	X7.B2	4	X7.A1	4	Y7.B3	4	Y4.A3	4	Y1.B3
5	X4.A4	5	X7.B1	5	Y7.A2	5	Y4.B3	5	Y1.A2
6	X4.B4	6	X4.A3	6	Y7.B2	6	Y4.A2	6	Y1.B2
7	X4.A2	7	X4.B3	7	Y7.A1	7	Y4.B2	7	Y1.A1
8	X4.B2	8	X4.A1	8	Y7.B1	8	Y4.A1	8	Y1.B1
9	X1.A4	9	X4.B1	9	X1.A2	9	Y4.B1	9	SHIELD
10	X1.B4	10	X1.A3	10	X1.B2	10	X1.A1	10	SHIELD
11	X2.A1	11	X1.B3	11	SHIELD	11	X1.B1	11	SHIELD
12	X2.B1	12	X2.A2	12	Y8.A4	12	SHIELD	12	Y2.A4
13	X2.A3	13	X2.B2	13	Y8.B4	13	Y5.A4	13	Y2.B4
14	X2.B3	14	X2.A4	14	Y8.A3	14	Y5.B4	14	Y2.A3
15	X5.A1	15	X2.B4	15	Y8.B3	15	Y5.A3	15	Y2.B3
16	X5.B1	16	X5.A2	16	Y8.A2	16	Y5.B3	16	Y2.A2
17	X5.A3	17	X5.B2	17	Y8.B2	17	Y5.A2	17	Y2.B2
18	X5.B3	18	X5.A4	18	Y8.A1	18	Y5.B2	18	Y2.A1
19	X8.A1	19	X5.B4	19	Y8.B1	19	Y5.A1	19	Y2.B1
20	X8.B1	20	X8.A2	20	X8.A3	20	Y5.B1	20	SHIELD
21	X3.A1	21	X8.B2	21	X8.B3	21	X8.A4	21	SHIELD
22	X3.B1	22	X3.A2	22	SHIELD	22	X8.B4	22	SHIELD
23	X3.A3	23	X3.B2	23	Y9.A4	23	SHIELD	23	Y3.A4
24	X3.B3	24	X3.A4	24	Y9.B4	24	Y6.A4	24	Y3.B4
25	X6.A1	25	X3.B4	25	Y9.A3	25	Y6.B4	25	Y3.A3
26	X6.B1	26	X6.A2	26	Y9.B3	26	Y6.A3	26	Y3.B3
27	X6.A3	27	X6.B2	27	Y9.A2	27	Y6.B3	27	Y3.A2
28	X6.B3	28	X6.A4	28	Y9.B2	28	Y6.A2	28	Y3.B2
29	X9.A1	29	X6.B4	29	Y9.A1	29	Y6.B2	29	Y3.A1
30	X9.B1	30	X9.A2	30	Y9.B1	30	Y6.A1	30	Y3.B1
31	X9.A3	31	X9.B2	31	X9.A4	31	Y6.B1	31	FP-OPEN
32	X9.B3	32	SHIELD	32	X9.B4	32	SHIELD	32	FP-GND

TABLE K-2 SM4003 - FRONT PANEL PIN-OUT CONFIGURATION

	Y2.A1 [E18] / Y2.B1 [E19]	Y2.A2 [E16] / Y2.B2 [E17]	Y2.A3 [E14] / Y2.B3 [E15]	Y2.A4 [E12] / Y2.B4 [E13]
X1.A1 [D10] / X1.B1 [D11]	K1	K2	K3	K4
X1.A2 [C9] / X1.B2 [C10]	K5	K6	K7	K8
X1.A3 [B10] / X1.B3 [B11]	K9	K10	K11	K12
X1.A4 [A9] / X1.B4 [A10]	K13	K14	K15	K16
X2.A1 [A11] / X2.B1 [A12]	K17	K18	K19	K20
X2.A2 [B12] / X2.B2 [B13]	K21	K22	K23	K24
X2.A3 [A13] / X2.B3 [A14]	K25	K26	K27	K28
X2.A4 [B14] / X2.B4 [B15]	K29	K30	K31	K32
X4.A1 [B8] / X4.B1 [B9]	K49	K50	K51	K52
X4.A2 [A7] / X4.B2 [A8]	K53	K54	K55	K56
X4.A3 [B6] / X4.B3 [B7]	K57	K58	K59	K60
X4.A4 [A5] / X4.B4 [A6]	K61	K62	K63	K64
X7.A1 [B4] / X7.B1 [B5]	K97	K98	K99	K100
X7.A2 [A3] / X7.B2 [A4]	K101	K102	K103	K104
X7.A3 [B2] / X7.B3 [B3]	K105	K106	K107	K108
X7.A4 [A1] / X7.B4 [A2]	K109	K110	K111	K112

	Y3.A1 [E29] / Y3.B1 [E30]	Y3.A2 [E27] / Y3.B2 [E28]	Y3.A3 [E25] / Y3.B3 [E26]	Y3.A4 [E23] / Y3.B4 [E24]
X3.A1 [A21] / X3.B1 [A22]	K33	K34	K35	K36
X3.A2 [B22] / X3.B2 [B23]	K37	K38	K39	K40
X3.A3 [A23] / X3.B3 [A24]	K41	K42	K43	K44
X3.A4 [B24] / X3.B4 [B25]	K45	K46	K47	K48
X6.A1 [A25] / X6.B1 [A26]	K81	K82	K83	K84
X6.A2 [B26] / X6.B2 [B27]	K85	K86	K87	K88
X6.A3 [A27] / X6.B3 [A28]	K89	K90	K91	K92
X6.A4 [B28] / X6.B4 [B29]	K93	K94	K95	K96
X8.A1 [A19] / X8.B1 [A20]	K113	K114	K115	K116
X8.A2 [B20] / X8.B2 [B21]	K117	K118	K119	K120
X8.A3 [C20] / X8.B3 [C21]	K121	K122	K123	K124
X8.A4 [D21] / X8.B4 [D22]	K125	K126	K127	K128
X9.A1 [A29] / X9.B1 [A30]	K129	K130	K131	K132
X9.A2 [B30] / X9.B2 [B31]	K133	K134	K135	K136
X9.A3 [A31] / X9.B3 [A32]	K137	K138	K139	K140
X9.A4 [C31] / X9.B4 [C32]	K141	K142	K143	K144

	Y5.A1 [D19] / Y5.B1 [D20]	Y5.A2 [D17] / Y5.B2 [D18]	Y5.A3 [D15] / Y5.B3 [D16]	Y5.A4 [D13] / Y5.B4 [D14]
X5.A1 [A15] / X5.B1 [A16]	K65	K66	K67	K68
X5.A2 [B16] / X5.B2 [B17]	K69	K70	K71	K72
X5.A3 [A17] / X5.B3 [A18]	K73	K74	K75	K76
X5.A4 [B18] / X5.B4 [B19]	K77	K78	K79	K80

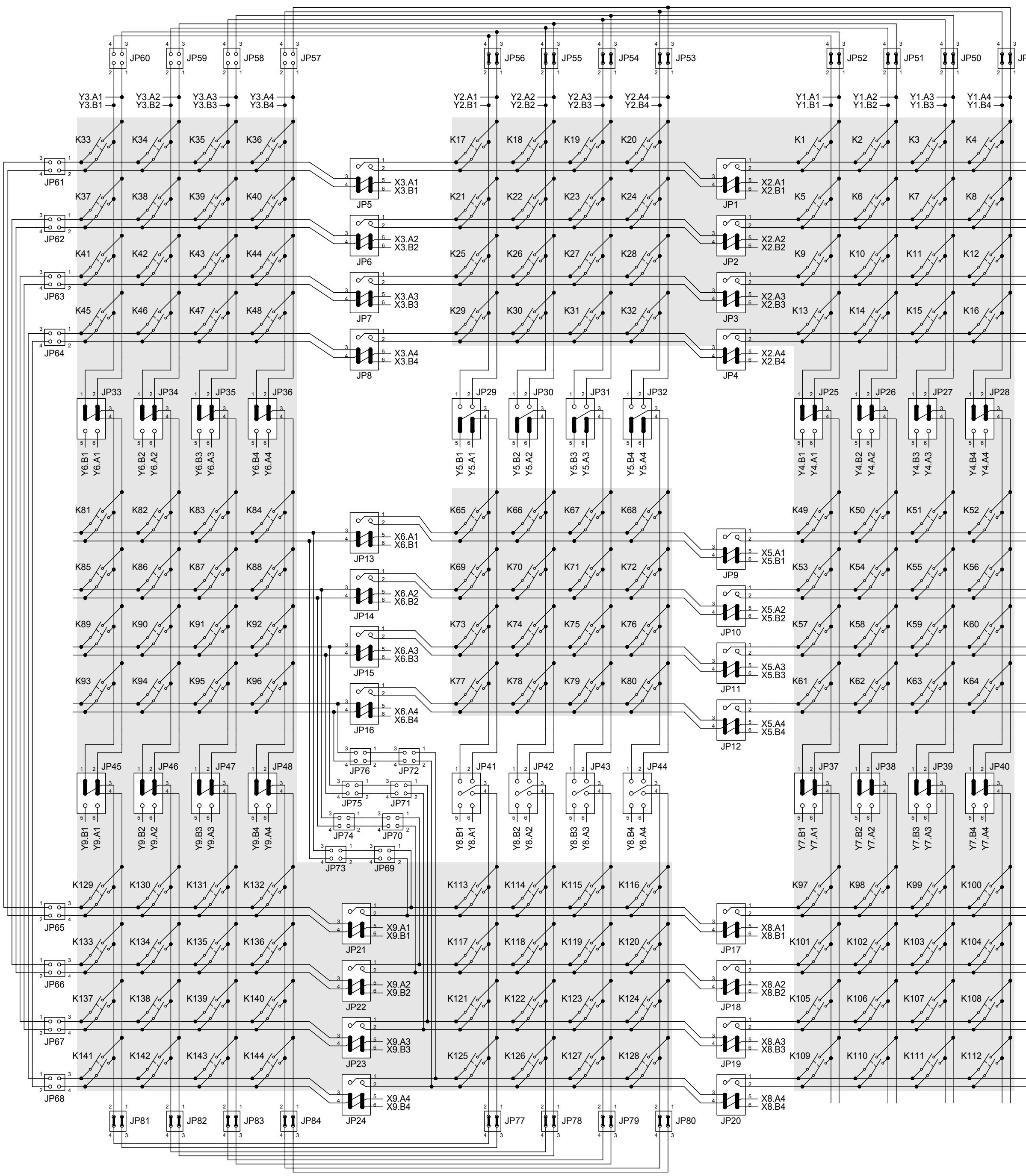


FIGURE K-2 SM4003 SCHEMATIC

TABLE K-3 SM4003 RELAY REGISTER MAP

Offset (Hex)																
12																
10	K144	K143	K142	K141	K140	K139	K138	K137	K136	K135	K134	K133	K132	K131	K130	K129
E	K128	K127	K126	K125	K124	K123	K122	K121	K120	K119	K118	K117	K116	K115	K114	K113
C	K112	K111	K110	K109	K108	K107	K106	K105	K104	K103	K102	K101	K100	K99	K98	K97
A	K96	K95	K94	K93	K92	K91	K90	K89	K88	K87	K86	K85	K84	K83	K82	K81
8	K80	K79	K78	K77	K76	K75	K74	K73	K72	K71	K70	K69	K68	K67	K66	K65
6	K64	K63	K62	K61	K60	K59	K58	K57	K56	K55	K54	K53	K52	K51	K50	K49
4	K48	K47	K46	K45	K44	K43	K42	K41	K40	K39	K38	K37	K36	K35	K34	K33
2	K32	K31	K30	K29	K28	K27	K26	K25	K24	K23	K22	K21	K20	K19	K18	K17
0	K16	K15	K14	K13	K12	K11	K10	K9	K8	K7	K6	K5	K4	K3	K2	K1

APPENDIX L

SM4004 - 1 (8 X 16) + 1 (4 X 4) MATRIX

This appendix shows the connector, connector pin assignments, schematic and relay register map for this module. Some information in this appendix is a repeat from other sections. It is grouped here again for easy referencing.

Note that the connector pictured below is for the single-wide (SM1000A) only. If this module is used in a double-wide (SM1000B), the front panel interface may by opposite (upside-down). Refer to the Front Panel Interface section for more information.

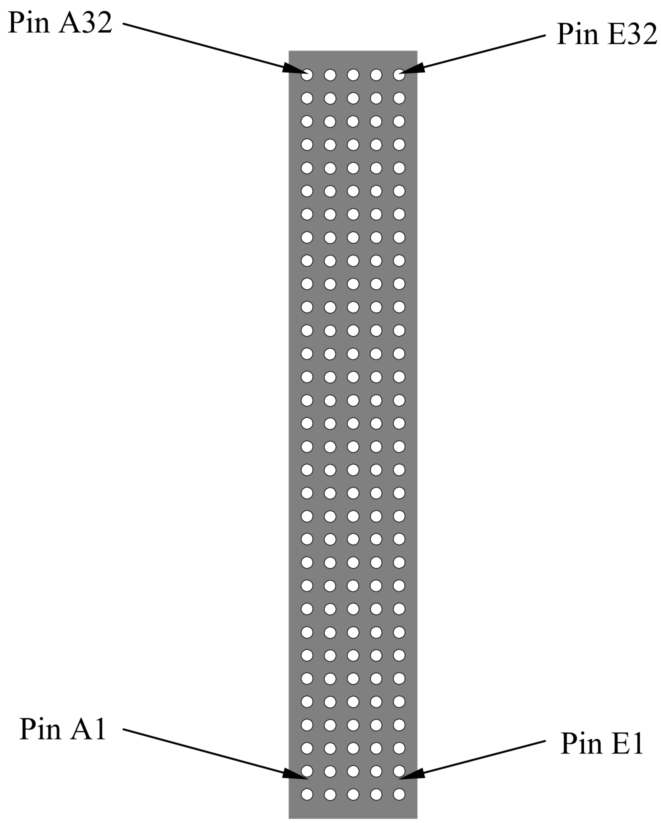


FIGURE L-1 SM4004 CONNECTOR PIN LOCATIONS – 160P

TABLE L-1 SM4004 CONNECTOR PIN / SIGNAL ASSIGNMENTS

ROW A	SIGNAL	ROW B	SIGNAL	ROW C	SIGNAL	ROW D	SIGNAL	ROW E	SIGNAL
1	X7.A4	1	SHIELD	1	Y7.A4	1	SHIELD	1	Y1.A4
2	X7.B4	2	X7.A3	2	Y7.B4	2	Y4.A4	2	Y1.B4
3	X7.A2	3	X7.B3	3	Y7.A3	3	Y4.B4	3	Y1.A3
4	X7.B2	4	X7.A1	4	Y7.B3	4	Y4.A3	4	Y1.B3
5	X4.A4	5	X7.B1	5	Y7.A2	5	Y4.B3	5	Y1.A2
6	X4.B4	6	X4.A3	6	Y7.B2	6	Y4.A2	6	Y1.B2
7	X4.A2	7	X4.B3	7	Y7.A1	7	Y4.B2	7	Y1.A1
8	X4.B2	8	X4.A1	8	Y7.B1	8	Y4.A1	8	Y1.B1
9	X1.A4	9	X4.B1	9	X1.A2	9	Y4.B1	9	SHIELD
10	X1.B4	10	X1.A3	10	X1.B2	10	X1.A1	10	SHIELD
11	X2.A1	11	X1.B3	11	SHIELD	11	X1.B1	11	SHIELD
12	X2.B1	12	X2.A2	12	Y8.A4	12	SHIELD	12	Y2.A4
13	X2.A3	13	X2.B2	13	Y8.B4	13	Y5.A4	13	Y2.B4
14	X2.B3	14	X2.A4	14	Y8.A3	14	Y5.B4	14	Y2.A3
15	X5.A1	15	X2.B4	15	Y8.B3	15	Y5.A3	15	Y2.B3
16	X5.B1	16	X5.A2	16	Y8.A2	16	Y5.B3	16	Y2.A2
17	X5.A3	17	X5.B2	17	Y8.B2	17	Y5.A2	17	Y2.B2
18	X5.B3	18	X5.A4	18	Y8.A1	18	Y5.B2	18	Y2.A1
19	X8.A1	19	X5.B4	19	Y8.B1	19	Y5.A1	19	Y2.B1
20	X8.B1	20	X8.A2	20	X8.A3	20	Y5.B1	20	SHIELD
21	X3.A1	21	X8.B2	21	X8.B3	21	X8.A4	21	SHIELD
22	X3.B1	22	X3.A2	22	SHIELD	22	X8.B4	22	SHIELD
23	X3.A3	23	X3.B2	23	Y9.A4	23	SHIELD	23	Y3.A4
24	X3.B3	24	X3.A4	24	Y9.B4	24	Y6.A4	24	Y3.B4
25	X6.A1	25	X3.B4	25	Y9.A3	25	Y6.B4	25	Y3.A3
26	X6.B1	26	X6.A2	26	Y9.B3	26	Y6.A3	26	Y3.B3
27	X6.A3	27	X6.B2	27	Y9.A2	27	Y6.B3	27	Y3.A2
28	X6.B3	28	X6.A4	28	Y9.B2	28	Y6.A2	28	Y3.B2
29	X9.A1	29	X6.B4	29	Y9.A1	29	Y6.B2	29	Y3.A1
30	X9.B1	30	X9.A2	30	Y9.B1	30	Y6.A1	30	Y3.B1
31	X9.A3	31	X9.B2	31	X9.A4	31	Y6.B1	31	FP-OPEN
32	X9.B3	32	SHIELD	32	X9.B4	32	SHIELD	32	FP-GND

TABLE L-2 SM4004 - FRONT PANEL PIN-OUT CONFIGURATION

	Y1.A1 [E7] / Y1.B1 [E8]	Y1.A2 [E5] / Y1.B2 [E6]	Y1.A3 [E3] / Y1.B3 [E4]	Y1.A4 [E1] / Y1.B4 [E2]	Y2.A1 [E18] / Y2.B1 [E19]	Y2.A2 [E16] / Y2.B2 [E17]	Y2.A3 [E14] / Y2.B3 [E15]	Y2.A4 [E12] / Y2.B4 [E13]
X1.A1 [D10] / X1.B1 [D11]	K1	K2	K3	K4	K17	K18	K19	K20
X1.A2 [C9] / X1.B2 [C10]	K5	K6	K7	K8	K21	K22	K23	K24
X1.A3 [B10] / X1.B3 [B11]	K9	K10	K11	K12	K25	K26	K27	K28
X1.A4 [A9] / X1.B4 [A10]	K13	K14	K15	K16	K29	K30	K31	K32
X4.A1 [B8] / X4.B1 [B9]	K49	K50	K51	K52	K65	K66	K67	K68
X4.A2 [A7] / X4.B2 [A8]	K53	K54	K55	K56	K69	K70	K71	K72
X4.A3 [B6] / X4.B3 [B7]	K57	K58	K59	K60	K73	K74	K75	K76
X4.A4 [A5] / X4.B4 [A6]	K61	K62	K63	K64	K77	K78	K79	K80
X7.A1 [B4] / X7.B1 [B5]	K97	K98	K99	K100	K113	K114	K115	K116
X7.A2 [A3] / X7.B2 [A4]	K101	K102	K103	K104	K117	K118	K119	K120
X7.A3 [B2] / X7.B3 [B3]	K105	K106	K107	K108	K121	K122	K123	K124
X7.A4 [A1] / X7.B4 [A2]	K109	K110	K111	K112	K125	K126	K127	K128
X3.A1 [A21] / X3.B1 [A22]	K33	K34	K35	K36	K129	K130	K131	K132
X3.A2 [B22] / X3.B2 [B23]	K37	K38	K39	K40	K133	K134	K135	K136
X3.A3 [A23] / X3.B3 [A24]	K41	K42	K43	K44	K137	K138	K139	K140
X3.A4 [B24] / X3.B4 [B25]	K45	K46	K47	K48	K141	K142	K143	K144

	Y6.A1 [D30] / Y6.B1 [D31]	Y6.A2 [D28] / Y6.B2 [D29]	Y6.A3 [D26] / Y6.B3 [D27]	Y6.A4 [D24] / Y6.B4 [D25]
X6.A1 [A25] / X6.B1 [A26]	K81	K82	K83	K84
X6.A2 [B26] / X6.B2 [B27]	K85	K86	K87	K88
X6.A3 [A27] / X6.B3 [A28]	K89	K90	K91	K92
X6.A4 [B28] / X6.B4 [B29]	K93	K94	K95	K96

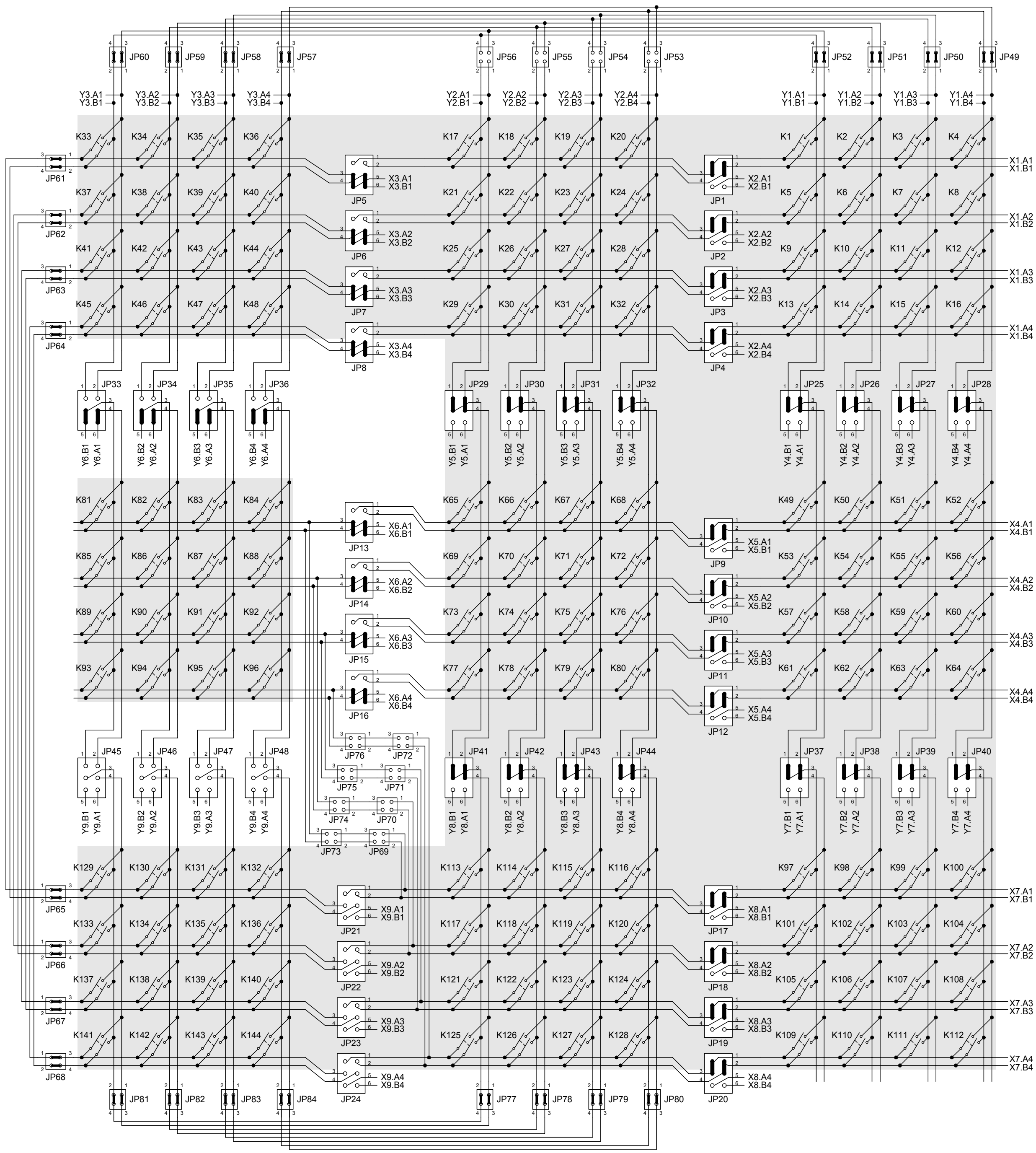


FIGURE L-2 SM4004 SCHEMATIC

TABLE L-3 SM4004 RELAY REGISTER MAP

Offset (Hex)																
12																
10	K144	K143	K142	K141	K140	K139	K138	K137	K136	K135	K134	K133	K132	K131	K130	K129
E	K128	K127	K126	K125	K124	K123	K122	K121	K120	K119	K118	K117	K116	K115	K114	K113
C	K112	K111	K110	K109	K108	K107	K106	K105	K104	K103	K102	K101	K100	K99	K98	K97
A	K96	K95	K94	K93	K92	K91	K90	K89	K88	K87	K86	K85	K84	K83	K82	K81
8	K80	K79	K78	K77	K76	K75	K74	K73	K72	K71	K70	K69	K68	K67	K66	K65
6	K64	K63	K62	K61	K60	K59	K58	K57	K56	K55	K54	K53	K52	K51	K50	K49
4	K48	K47	K46	K45	K44	K43	K42	K41	K40	K39	K38	K37	K36	K35	K34	K33
2	K32	K31	K30	K29	K28	K27	K26	K25	K24	K23	K22	K21	K20	K19	K18	K17
0	K16	K15	K14	K13	K12	K11	K10	K9	K8	K7	K6	K5	K4	K3	K2	K1

APPENDIX M

SM4005 - 12 X 12 MATRIX

This appendix shows the connector, connector pin assignments, schematic and relay register map for this module. Some information in this appendix is a repeat from other sections. It is grouped here again for easy referencing.

Note that the connector pictured below is for the single-wide (SM1000A) only. If this module is used in a double-wide (SM1000B), the front panel interface may by opposite (upside-down). Refer to the Front Panel Interface section for more information.

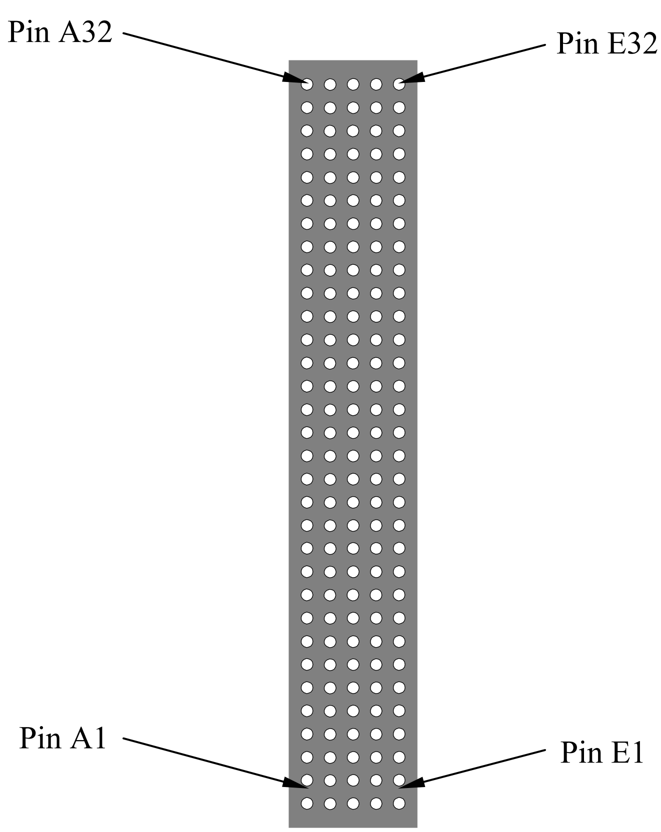


FIGURE M-1 SM4005 CONNECTOR PIN LOCATIONS – 160P

TABLE M-1 SM4005 CONNECTOR PIN / SIGNAL ASSIGNMENTS

ROW A	SIGNAL	ROW B	SIGNAL	ROW C	SIGNAL	ROW D	SIGNAL	ROW E	SIGNAL
1	X7.A4	1	SHIELD	1	Y7.A4	1	SHIELD	1	Y1.A4
2	X7.B4	2	X7.A3	2	Y7.B4	2	Y4.A4	2	Y1.B4
3	X7.A2	3	X7.B3	3	Y7.A3	3	Y4.B4	3	Y1.A3
4	X7.B2	4	X7.A1	4	Y7.B3	4	Y4.A3	4	Y1.B3
5	X4.A4	5	X7.B1	5	Y7.A2	5	Y4.B3	5	Y1.A2
6	X4.B4	6	X4.A3	6	Y7.B2	6	Y4.A2	6	Y1.B2
7	X4.A2	7	X4.B3	7	Y7.A1	7	Y4.B2	7	Y1.A1
8	X4.B2	8	X4.A1	8	Y7.B1	8	Y4.A1	8	Y1.B1
9	X1.A4	9	X4.B1	9	X1.A2	9	Y4.B1	9	SHIELD
10	X1.B4	10	X1.A3	10	X1.B2	10	X1.A1	10	SHIELD
11	X2.A1	11	X1.B3	11	SHIELD	11	X1.B1	11	SHIELD
12	X2.B1	12	X2.A2	12	Y8.A4	12	SHIELD	12	Y2.A4
13	X2.A3	13	X2.B2	13	Y8.B4	13	Y5.A4	13	Y2.B4
14	X2.B3	14	X2.A4	14	Y8.A3	14	Y5.B4	14	Y2.A3
15	X5.A1	15	X2.B4	15	Y8.B3	15	Y5.A3	15	Y2.B3
16	X5.B1	16	X5.A2	16	Y8.A2	16	Y5.B3	16	Y2.A2
17	X5.A3	17	X5.B2	17	Y8.B2	17	Y5.A2	17	Y2.B2
18	X5.B3	18	X5.A4	18	Y8.A1	18	Y5.B2	18	Y2.A1
19	X8.A1	19	X5.B4	19	Y8.B1	19	Y5.A1	19	Y2.B1
20	X8.B1	20	X8.A2	20	X8.A3	20	Y5.B1	20	SHIELD
21	X3.A1	21	X8.B2	21	X8.B3	21	X8.A4	21	SHIELD
22	X3.B1	22	X3.A2	22	SHIELD	22	X8.B4	22	SHIELD
23	X3.A3	23	X3.B2	23	Y9.A4	23	SHIELD	23	Y3.A4
24	X3.B3	24	X3.A4	24	Y9.B4	24	Y6.A4	24	Y3.B4
25	X6.A1	25	X3.B4	25	Y9.A3	25	Y6.B4	25	Y3.A3
26	X6.B1	26	X6.A2	26	Y9.B3	26	Y6.A3	26	Y3.B3
27	X6.A3	27	X6.B2	27	Y9.A2	27	Y6.B3	27	Y3.A2
28	X6.B3	28	X6.A4	28	Y9.B2	28	Y6.A2	28	Y3.B2
29	X9.A1	29	X6.B4	29	Y9.A1	29	Y6.B2	29	Y3.A1
30	X9.B1	30	X9.A2	30	Y9.B1	30	Y6.A1	30	Y3.B1
31	X9.A3	31	X9.B2	31	X9.A4	31	Y6.B1	31	FP-OPEN
32	X9.B3	32	SHIELD	32	X9.B4	32	SHIELD	32	FP-GND

TABLE M-2 SM4005 - FRONT PANEL PIN-OUT CONFIGURATION

	Y1.A1 [E7] Y1.B1 [E8]	Y1.A2 [E5] Y1.B2 [E6]	Y1.A3 [E3] Y1.B3 [E4]	Y1.A4 [E1] Y1.B4 [E2]	Y2.A1 [E18] Y2.B1 [E19]	Y2.A2 [E16] Y2.B2 [E17]	Y2.A3 [E14] Y2.B3 [E15]	Y2.A4 [E12] Y2.B4 [E13]	Y3.A1 [E29] Y3.B1 [E30]	Y3.A2 [E27] Y3.B2 [E28]	Y3.A3 [E25] Y3.B3 [E26]	Y3.A4 [E23] Y3.B4 [E24]
X1.A1 [D10] X1.B1 [D11]	K1	K2	K3	K4	K17	K18	K19	K20	K33	K34	K35	K36
X1.A2 [C9] X1.B2 [C10]	K5	K6	K7	K8	K21	K22	K23	K24	K37	K38	K39	K40
X1.A3 [B10] X1.B3 [B11]	K9	K10	K11	K12	K25	K26	K27	K28	K41	K42	K43	K44
X1.A4 [A9] X1.B4 [A10]	K13	K14	K15	K16	K29	K30	K31	K32	K45	K46	K47	K48
X4.A1 [B8] X4.B1 [B9]	K49	K50	K51	K52	K65	K66	K67	K68	K81	K82	K83	K84
X4.A2 [A7] X4.B2 [A8]	K53	K54	K55	K56	K69	K70	K71	K72	K85	K86	K87	K88
X4.A3 [B6] X4.B3 [B7]	K57	K58	K59	K60	K73	K74	K75	K76	K89	K90	K91	K92
X4.A4 [A5] X4.B4 [A6]	K61	K62	K63	K64	K77	K78	K79	K80	K93	K94	K95	K96
X7.A1 [B4] X7.B1 [B5]	K97	K98	K99	K100	K113	K114	K115	K116	K129	K130	K131	K132
X7.A2 [A3] X7.B2 [A4]	K101	K102	K103	K104	K117	K118	K119	K120	K133	K134	K135	K136
X7.A3 [B2] X7.B3 [B3]	K105	K106	K107	K108	K121	K122	K123	K124	K137	K138	K139	K140
X7.A4 [A1] X7.B4 [A2]	K109	K110	K111	K112	K125	K126	K127	K128	K141	K142	K143	K144

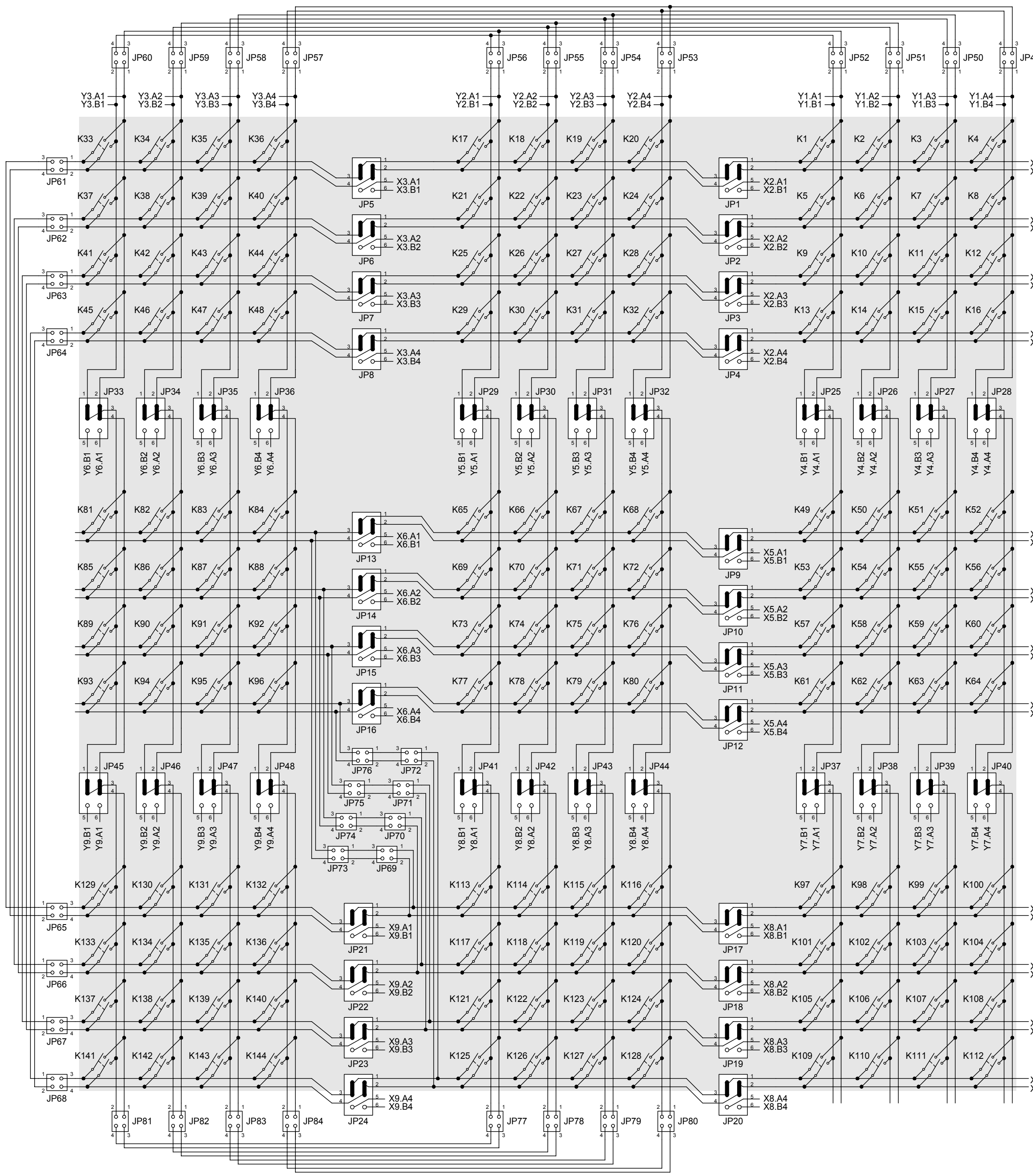


FIGURE M-2 SM4005 SCHEMATIC

TABLE M-3 SM4005 RELAY REGISTER MAP

Offset (Hex)																
12																
10	K144	K143	K142	K141	K140	K139	K138	K137	K136	K135	K134	K133	K132	K131	K130	K129
E	K128	K127	K126	K125	K124	K123	K122	K121	K120	K119	K118	K117	K116	K115	K114	K113
C	K112	K111	K110	K109	K108	K107	K106	K105	K104	K103	K102	K101	K100	K99	K98	K97
A	K96	K95	K94	K93	K92	K91	K90	K89	K88	K87	K86	K85	K84	K83	K82	K81
8	K80	K79	K78	K77	K76	K75	K74	K73	K72	K71	K70	K69	K68	K67	K66	K65
6	K64	K63	K62	K61	K60	K59	K58	K57	K56	K55	K54	K53	K52	K51	K50	K49
4	K48	K47	K46	K45	K44	K43	K42	K41	K40	K39	K38	K37	K36	K35	K34	K33
2	K32	K31	K30	K29	K28	K27	K26	K25	K24	K23	K22	K21	K20	K19	K18	K17
0	K16	K15	K14	K13	K12	K11	K10	K9	K8	K7	K6	K5	K4	K3	K2	K1

APPENDIX N

SM4006 - 3 X (4 X 12) MATRIX

This appendix shows the connector, connector pin assignments, schematic and relay register map for this module. Some information in this appendix is a repeat from other sections. It is grouped here again for easy referencing.

Note that the connector pictured below is for the single-wide (SM1000A) only. If this module is used in a double-wide (SM1000B), the front panel interface may by opposite (upside-down). Refer to the Front Panel Interface section for more information.

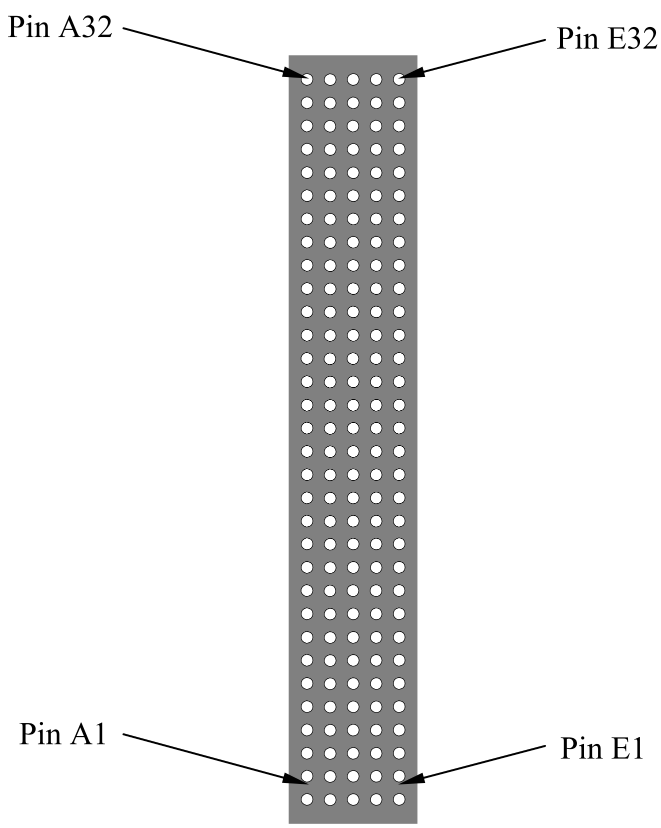


FIGURE N-1 SM4006 CONNECTOR PIN LOCATIONS – 160P

TABLE N-1 SM4006 CONNECTOR PIN / SIGNAL ASSIGNMENTS

ROW A	SIGNAL	ROW B	SIGNAL	ROW C	SIGNAL	ROW D	SIGNAL	ROW E	SIGNAL
1	X7.A4	1	SHIELD	1	Y7.A4	1	SHIELD	1	Y1.A4
2	X7.B4	2	X7.A3	2	Y7.B4	2	Y4.A4	2	Y1.B4
3	X7.A2	3	X7.B3	3	Y7.A3	3	Y4.B4	3	Y1.A3
4	X7.B2	4	X7.A1	4	Y7.B3	4	Y4.A3	4	Y1.B3
5	X4.A4	5	X7.B1	5	Y7.A2	5	Y4.B3	5	Y1.A2
6	X4.B4	6	X4.A3	6	Y7.B2	6	Y4.A2	6	Y1.B2
7	X4.A2	7	X4.B3	7	Y7.A1	7	Y4.B2	7	Y1.A1
8	X4.B2	8	X4.A1	8	Y7.B1	8	Y4.A1	8	Y1.B1
9	X1.A4	9	X4.B1	9	X1.A2	9	Y4.B1	9	SHIELD
10	X1.B4	10	X1.A3	10	X1.B2	10	X1.A1	10	SHIELD
11	X2.A1	11	X1.B3	11	SHIELD	11	X1.B1	11	SHIELD
12	X2.B1	12	X2.A2	12	Y8.A4	12	SHIELD	12	Y2.A4
13	X2.A3	13	X2.B2	13	Y8.B4	13	Y5.A4	13	Y2.B4
14	X2.B3	14	X2.A4	14	Y8.A3	14	Y5.B4	14	Y2.A3
15	X5.A1	15	X2.B4	15	Y8.B3	15	Y5.A3	15	Y2.B3
16	X5.B1	16	X5.A2	16	Y8.A2	16	Y5.B3	16	Y2.A2
17	X5.A3	17	X5.B2	17	Y8.B2	17	Y5.A2	17	Y2.B2
18	X5.B3	18	X5.A4	18	Y8.A1	18	Y5.B2	18	Y2.A1
19	X8.A1	19	X5.B4	19	Y8.B1	19	Y5.A1	19	Y2.B1
20	X8.B1	20	X8.A2	20	X8.A3	20	Y5.B1	20	SHIELD
21	X3.A1	21	X8.B2	21	X8.B3	21	X8.A4	21	SHIELD
22	X3.B1	22	X3.A2	22	SHIELD	22	X8.B4	22	SHIELD
23	X3.A3	23	X3.B2	23	Y9.A4	23	SHIELD	23	Y3.A4
24	X3.B3	24	X3.A4	24	Y9.B4	24	Y6.A4	24	Y3.B4
25	X6.A1	25	X3.B4	25	Y9.A3	25	Y6.B4	25	Y3.A3
26	X6.B1	26	X6.A2	26	Y9.B3	26	Y6.A3	26	Y3.B3
27	X6.A3	27	X6.B2	27	Y9.A2	27	Y6.B3	27	Y3.A2
28	X6.B3	28	X6.A4	28	Y9.B2	28	Y6.A2	28	Y3.B2
29	X9.A1	29	X6.B4	29	Y9.A1	29	Y6.B2	29	Y3.A1
30	X9.B1	30	X9.A2	30	Y9.B1	30	Y6.A1	30	Y3.B1
31	X9.A3	31	X9.B2	31	X9.A4	31	Y6.B1	31	FP-OPEN
32	X9.B3	32	SHIELD	32	X9.B4	32	SHIELD	32	FP-GND

TABLE N-2 SM4006 - FRONT PANEL PIN-OUT CONFIGURATION

	Y1.A1 [E7] Y1.B1 [E8]	Y1.A2 [E5] Y1.B2 [E6]	Y1.A3 [E3] Y1.B3 [E4]	Y1.A4 [E1] Y1.B4 [E2]	Y2.A1 [E18] Y2.B1 [E19]	Y2.A2 [E16] Y2.B2 [E17]	Y2.A3 [E14] Y2.B3 [E15]	Y2.A4 [E12] Y2.B4 [E13]	Y3.A1 [E29] Y3.B1 [E30]	Y3.A2 [E27] Y3.B2 [E28]	Y3.A3 [E25] Y3.B3 [E26]	Y3.A4 [E23] Y3.B4 [E24]
X1.A1 [D10] X1.B1 [D11]	K1	K2	K3	K4	K17	K18	K19	K20	K33	K34	K35	K36
X1.A2 [C9] X1.B2 [C10]	K5	K6	K7	K8	K21	K22	K23	K24	K37	K38	K39	K40
X1.A3 [B10] X1.B3 [B11]	K9	K10	K11	K12	K25	K26	K27	K28	K41	K42	K43	K44
X1.A4 [A9] X1.B4 [A10]	K13	K14	K15	K16	K29	K30	K31	K32	K45	K46	K47	K48

	Y4.A1 [D8] Y4.B1 [D9]	Y4.A2 [D6] Y4.B2 [D7]	Y4.A3 [D4] Y4.B3 [D5]	Y4.A4 [D2] Y4.B4 [D3]	Y5.A1 [D19] Y5.B1 [D20]	Y5.A2 [D17] Y5.B2 [D18]	Y5.A3 [D15] Y5.B3 [D16]	Y5.A4 [D13] Y5.B4 [D14]	Y6.A1 [D30] Y6.B1 [D31]	Y6.A2 [D28] Y6.B2 [D29]	Y6.A3 [D26] Y6.B3 [D27]	Y6.A4 [D24] Y6.B4 [D25]
X4.A1 [B8] X4.B1 [B9]	K49	K50	K51	K52	K65	K66	K67	K68	K81	K82	K83	K84
X4.A2 [A7] X4.B2 [A8]	K53	K54	K55	K56	K69	K70	K71	K72	K85	K86	K87	K88
X4.A3 [B6] X4.B3 [B7]	K57	K58	K59	K60	K73	K74	K75	K76	K89	K90	K91	K92
X4.A4 [A5] X4.B4 [A6]	K61	K62	K63	K64	K77	K78	K79	K80	K93	K94	K95	K96

	Y7.A1 [C7] Y7.B1 [C8]	Y7.A2 [C5] Y7.B2 [C6]	Y7.A3 [C3] Y7.B3 [C4]	Y7.A4 [C1] Y7.B4 [C2]	Y8.A1 [C18] Y8.B1 [C19]	Y8.A2 [C16] Y8.B2 [C17]	Y8.A3 [C14] Y8.B3 [C15]	Y8.A4 [C12] Y8.B4 [C13]	Y9.A1 [C29] Y9.B1 [C30]	Y9.A2 [C27] Y9.B2 [C28]	Y9.A3 [C25] Y9.B3 [C26]	Y9.A4 [C23] Y9.B4 [C24]
X7.A1 [B4] X7.B1 [B5]	K97	K98	K99	K100	K113	K114	K115	K116	K129	K130	K131	K132
X7.A2 [A3] X7.B2 [A4]	K101	K102	K103	K104	K117	K118	K119	K120	K133	K134	K135	K136
X7.A3 [B2] X7.B3 [B3]	K105	K106	K107	K108	K121	K122	K123	K124	K137	K138	K139	K140
X7.A4 [A1] X7.B4 [A2]	K109	K110	K111	K112	K125	K126	K127	K128	K141	K142	K143	K144

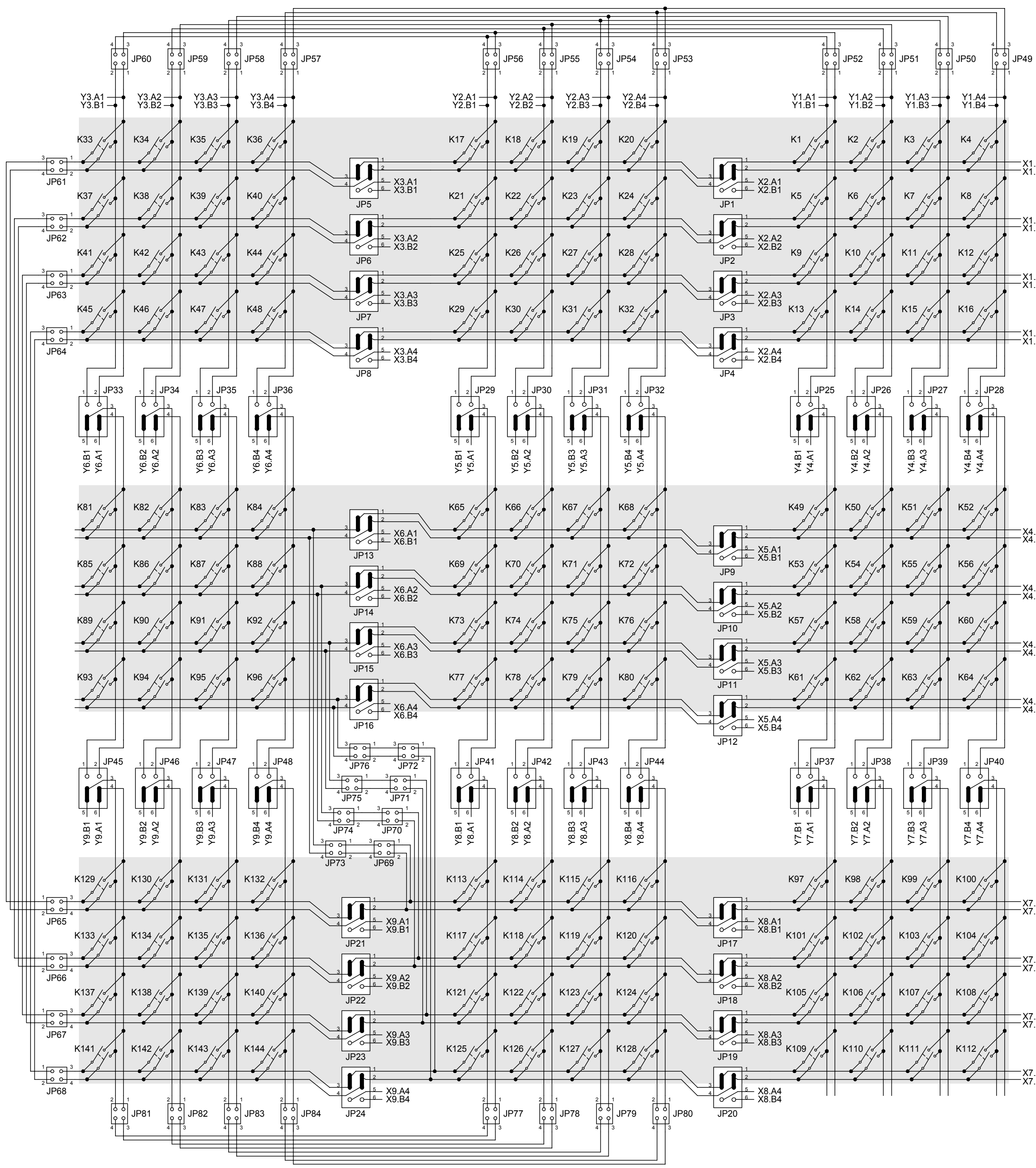


FIGURE N-2 SM4006 SCHEMATIC

TABLE N-3 SM4006 RELAY REGISTER MAP

Offset (Hex)																
12																
10	K144	K143	K142	K141	K140	K139	K138	K137	K136	K135	K134	K133	K132	K131	K130	K129
E	K128	K127	K126	K125	K124	K123	K122	K121	K120	K119	K118	K117	K116	K115	K114	K113
C	K112	K111	K110	K109	K108	K107	K106	K105	K104	K103	K102	K101	K100	K99	K98	K97
A	K96	K95	K94	K93	K92	K91	K90	K89	K88	K87	K86	K85	K84	K83	K82	K81
8	K80	K79	K78	K77	K76	K75	K74	K73	K72	K71	K70	K69	K68	K67	K66	K65
6	K64	K63	K62	K61	K60	K59	K58	K57	K56	K55	K54	K53	K52	K51	K50	K49
4	K48	K47	K46	K45	K44	K43	K42	K41	K40	K39	K38	K37	K36	K35	K34	K33
2	K32	K31	K30	K29	K28	K27	K26	K25	K24	K23	K22	K21	K20	K19	K18	K17
0	K16	K15	K14	K13	K12	K11	K10	K9	K8	K7	K6	K5	K4	K3	K2	K1

APPENDIX O

SM4007 - 2 (8 X 8 + 1 (4 X 4) MATRIX

This appendix shows the connector, connector pin assignments, schematic and relay register map for this module. Some information in this appendix is a repeat from other sections. It is grouped here again for easy referencing.

Note that the connector pictured below is for the single-wide (SM1000A) only. If this module is used in a double-wide (SM1000B), the front panel interface may by opposite (upside-down). Refer to the Front Panel Interface section for more information.

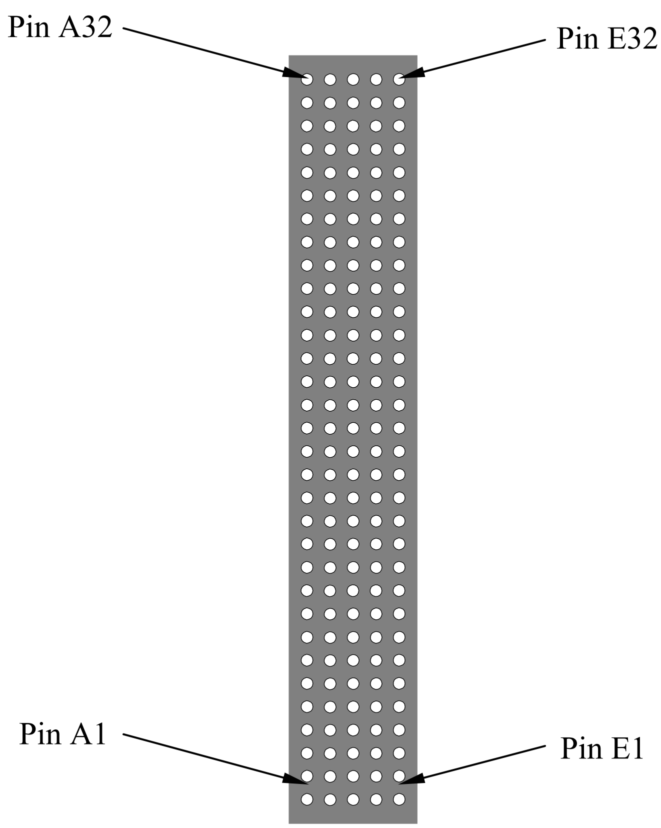


FIGURE O-1 SM4007 CONNECTOR PIN LOCATIONS – 160P

TABLE O-1 SM4007 CONNECTOR PIN / SIGNAL ASSIGNMENTS

ROW A	SIGNAL	ROW B	SIGNAL	ROW C	SIGNAL	ROW D	SIGNAL	ROW E	SIGNAL
1	X7.A4	1	SHIELD	1	Y7.A4	1	SHIELD	1	Y1.A4
2	X7.B4	2	X7.A3	2	Y7.B4	2	Y4.A4	2	Y1.B4
3	X7.A2	3	X7.B3	3	Y7.A3	3	Y4.B4	3	Y1.A3
4	X7.B2	4	X7.A1	4	Y7.B3	4	Y4.A3	4	Y1.B3
5	X4.A4	5	X7.B1	5	Y7.A2	5	Y4.B3	5	Y1.A2
6	X4.B4	6	X4.A3	6	Y7.B2	6	Y4.A2	6	Y1.B2
7	X4.A2	7	X4.B3	7	Y7.A1	7	Y4.B2	7	Y1.A1
8	X4.B2	8	X4.A1	8	Y7.B1	8	Y4.A1	8	Y1.B1
9	X1.A4	9	X4.B1	9	X1.A2	9	Y4.B1	9	SHIELD
10	X1.B4	10	X1.A3	10	X1.B2	10	X1.A1	10	SHIELD
11	X2.A1	11	X1.B3	11	SHIELD	11	X1.B1	11	SHIELD
12	X2.B1	12	X2.A2	12	Y8.A4	12	SHIELD	12	Y2.A4
13	X2.A3	13	X2.B2	13	Y8.B4	13	Y5.A4	13	Y2.B4
14	X2.B3	14	X2.A4	14	Y8.A3	14	Y5.B4	14	Y2.A3
15	X5.A1	15	X2.B4	15	Y8.B3	15	Y5.A3	15	Y2.B3
16	X5.B1	16	X5.A2	16	Y8.A2	16	Y5.B3	16	Y2.A2
17	X5.A3	17	X5.B2	17	Y8.B2	17	Y5.A2	17	Y2.B2
18	X5.B3	18	X5.A4	18	Y8.A1	18	Y5.B2	18	Y2.A1
19	X8.A1	19	X5.B4	19	Y8.B1	19	Y5.A1	19	Y2.B1
20	X8.B1	20	X8.A2	20	X8.A3	20	Y5.B1	20	SHIELD
21	X3.A1	21	X8.B2	21	X8.B3	21	X8.A4	21	SHIELD
22	X3.B1	22	X3.A2	22	SHIELD	22	X8.B4	22	SHIELD
23	X3.A3	23	X3.B2	23	Y9.A4	23	SHIELD	23	Y3.A4
24	X3.B3	24	X3.A4	24	Y9.B4	24	Y6.A4	24	Y3.B4
25	X6.A1	25	X3.B4	25	Y9.A3	25	Y6.B4	25	Y3.A3
26	X6.B1	26	X6.A2	26	Y9.B3	26	Y6.A3	26	Y3.B3
27	X6.A3	27	X6.B2	27	Y9.A2	27	Y6.B3	27	Y3.A2
28	X6.B3	28	X6.A4	28	Y9.B2	28	Y6.A2	28	Y3.B2
29	X9.A1	29	X6.B4	29	Y9.A1	29	Y6.B2	29	Y3.A1
30	X9.B1	30	X9.A2	30	Y9.B1	30	Y6.A1	30	Y3.B1
31	X9.A3	31	X9.B2	31	X9.A4	31	Y6.B1	31	FP-OPEN
32	X9.B3	32	SHIELD	32	X9.B4	32	SHIELD	32	FP-GND

TABLE O-2 SM4007 - FRONT PANEL PIN-OUT CONFIGURATION

	Y1.A1 [E7] / Y1.B1 [E8]	Y1.A2 [E5] / Y1.B2 [E6]	Y1.A3 [E3] / Y1.B3 [E4]	Y1.A4 [E1] / Y1.B4 [E2]	Y2.A1 [E18] / Y2.B1 [E19]	Y2.A2 [E16] / Y2.B2 [E17]	Y2.A3 [E14] / Y2.B3 [E15]	Y2.A4 [E12] / Y2.B4 [E13]
X1.A1 [D10] / X1.B1 [D11]	K1	K2	K3	K4	K17	K18	K19	K20
X1.A2 [C9] / X1.B2 [C10]	K5	K6	K7	K8	K21	K22	K23	K24
X1.A3 [B10] / X1.B3 [B11]	K9	K10	K11	K12	K25	K26	K27	K28
X1.A4 [A9] / X1.B4 [A10]	K13	K14	K15	K16	K29	K30	K31	K32
X4.A1 [B8] / X4.B1 [B9]	K49	K50	K51	K52	K65	K66	K67	K68
X4.A2 [A7] / X4.B2 [A8]	K53	K54	K55	K56	K69	K70	K71	K72
X4.A3 [B6] / X4.B3 [B7]	K57	K58	K59	K60	K73	K74	K75	K76
X4.A4 [A5] / X4.B4 [A6]	K61	K62	K63	K64	K77	K78	K79	K80

	Y3.A1 [E29] / Y3.B1 [E30]	Y3.A2 [E27] / Y3.B2 [E28]	Y3.A3 [E25] / Y3.B3 [E26]	Y3.A4 [E23] / Y3.B4 [E24]	Y9.A1 [C29] / Y9.B1 [C30]	Y9.A2 [C27] / Y9.B2 [C28]	Y9.A3 [C25] / Y9.B3 [C26]	Y9.A4 [C23] / Y9.B4 [C24]
X3.A1 [A21] / X3.B1 [A22]	K33	K34	K35	K36	K129	K130	K131	K132
X3.A2 [B22] / X3.B2 [B23]	K37	K38	K39	K40	K133	K134	K135	K136
X3.A3 [A23] / X3.B3 [A24]	K41	K42	K43	K44	K137	K138	K139	K140
X3.A4 [B24] / X3.B4 [B25]	K45	K46	K47	K48	K141	K142	K143	K144
X6.A1 [A25] / X6.B1 [A26]	K81	K82	K83	K84	K113	K114	K115	K116
X6.A2 [B26] / X6.B2 [B27]	K85	K86	K87	K88	K117	K118	K119	K120
X6.A3 [A27] / X6.B3 [A28]	K89	K90	K91	K92	K121	K122	K123	K124
X6.A4 [B28] / X6.B4 [B29]	K93	K94	K95	K96	K125	K126	K127	K128

	Y7.A1 [C7] / Y7.B1 [C8]	Y7.A2 [C5] / Y7.B2 [C6]	Y7.A3 [C3] / Y7.B3 [C4]	Y7.A4 [C1] / Y7.B4 [C2]
X7.A1 [B4] / X7.B1 [B5]	K97	K98	K99	K100
X7.A2 [A3] / X7.B2 [A4]	K101	K102	K103	K104
X7.A3 [B2] / X7.B3 [B3]	K105	K106	K107	K108
X7.A4 [A1] / X7.B4 [A2]	K109	K110	K111	K112

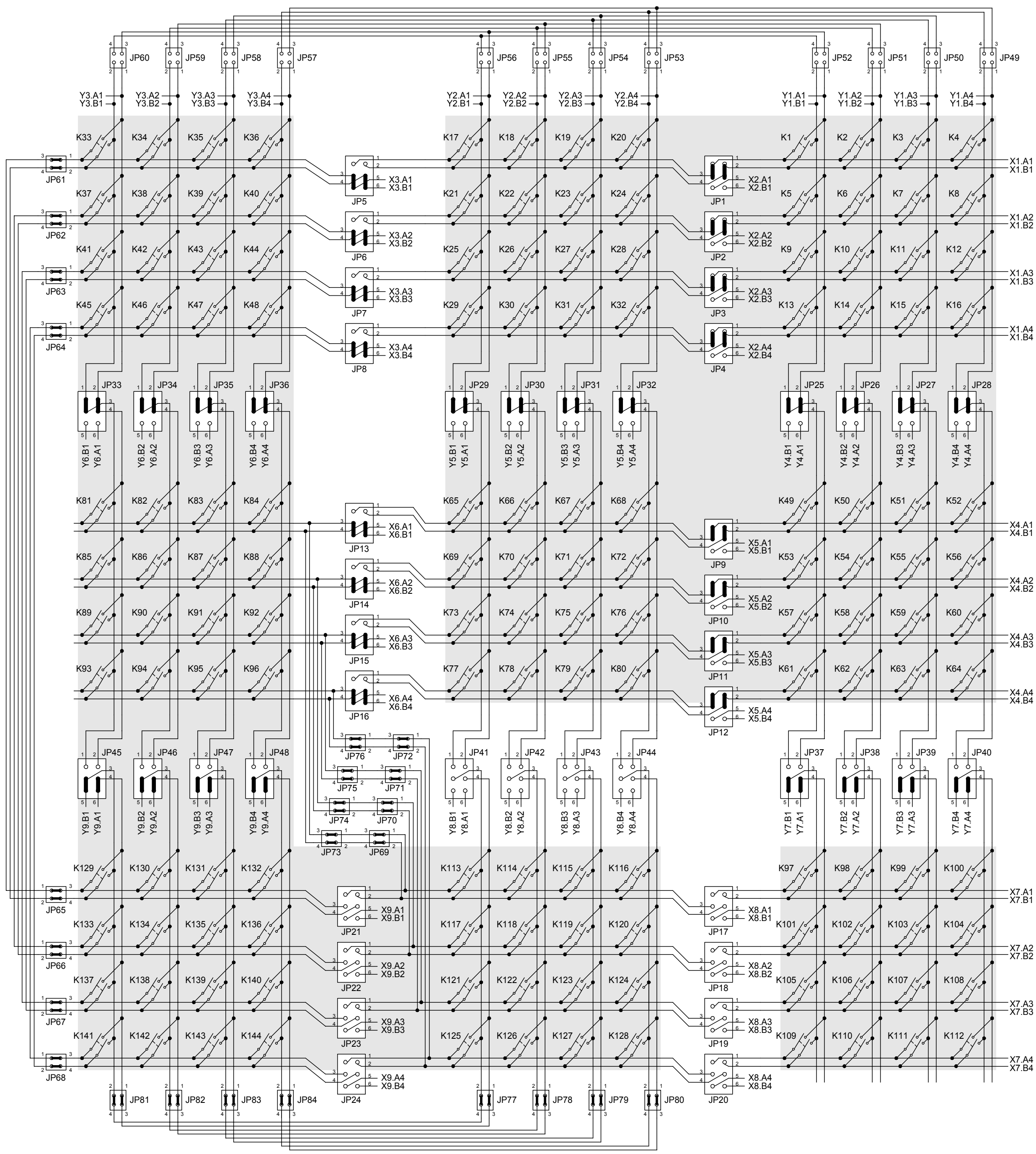


FIGURE O-2 SM4007 SCHEMATIC

TABLE O-3 SM4007 RELAY REGISTER MAP

Offset (Hex)																
12																
10	K144	K143	K142	K141	K140	K139	K138	K137	K136	K135	K134	K133	K132	K131	K130	K129
E	K128	K127	K126	K125	K124	K123	K122	K121	K120	K119	K118	K117	K116	K115	K114	K113
C	K112	K111	K110	K109	K108	K107	K106	K105	K104	K103	K102	K101	K100	K99	K98	K97
A	K96	K95	K94	K93	K92	K91	K90	K89	K88	K87	K86	K85	K84	K83	K82	K81
8	K80	K79	K78	K77	K76	K75	K74	K73	K72	K71	K70	K69	K68	K67	K66	K65
6	K64	K63	K62	K61	K60	K59	K58	K57	K56	K55	K54	K53	K52	K51	K50	K49
4	K48	K47	K46	K45	K44	K43	K42	K41	K40	K39	K38	K37	K36	K35	K34	K33
2	K32	K31	K30	K29	K28	K27	K26	K25	K24	K23	K22	K21	K20	K19	K18	K17
0	K16	K15	K14	K13	K12	K11	K10	K9	K8	K7	K6	K5	K4	K3	K2	K1

APPENDIX P

SM5001 - 80 CHANNEL SPST

This appendix shows the connector, connector pin assignments, schematic and relay register map for this module. Some information in this appendix is a repeat from other sections. It is grouped here again for easy referencing.

Note that the connector pictured below is for the single-wide (SM1000A) only. If this module is used in a double-wide (SM1000B), the front panel interface may by opposite (upside-down). Refer to the Front Panel Interface section for more information.

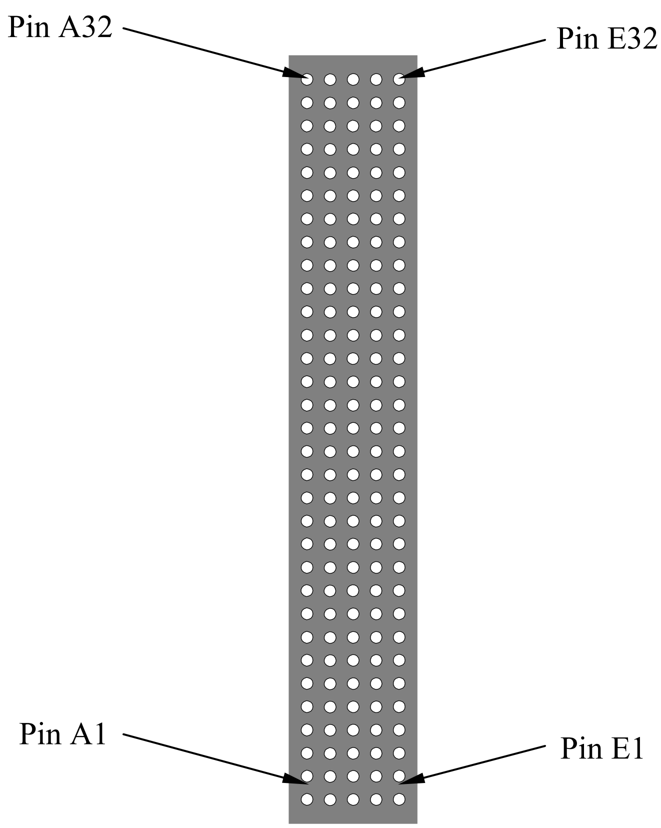


FIGURE P-1 SM5001 CONNECTOR PIN LOCATIONS – 160P

TABLE P-1 SM5001 CONNECTOR PIN / SIGNAL ASSIGNMENTS

ROW A	SIGNAL	ROW B	SIGNAL	ROW C	SIGNAL	ROW D	SIGNAL	ROW E	SIGNAL
1	CH1-A	1	CH2-A	1	CH3-A	1	CH4-A	1	CH5-A
2	CH1-B	2	CH2-B	2	CH3-B	2	CH4-B	2	CH5-B
3	CH6-A	3	CH7-A	3	CH8-A	3	CH9-A	3	CH10-A
4	CH6-B	4	CH7-B	4	CH8-B	4	CH9-B	4	CH10-B
5	CH11-A	5	CH12-A	5	CH13-A	5	CH14-A	5	CH15-A
6	CH11-B	6	CH12-B	6	CH13-B	6	CH14-B	6	CH15-B
7	CH16-A	7	CH17-A	7	CH18-A	7	CH19-A	7	CH20-A
8	CH16-B	8	CH17-B	8	CH18-B	8	CH19-B	8	CH20-B
9	CH21-A	9	CH22-A	9	CH23-A	9	CH24-A	9	CH25-A
10	CH21-B	10	CH22-B	10	CH23-B	10	CH24-B	10	CH25-B
11	CH26-A	11	CH27-A	11	CH28-A	11	CH29-A	11	CH30-A
12	CH26-B	12	CH27-B	12	CH28-B	12	CH29-B	12	CH30-B
13	CH31-A	13	CH32-A	13	CH33-A	13	CH34-A	13	CH35-A
14	CH31-B	14	CH32-B	14	CH33-B	14	CH34-B	14	CH35-B
15	CH36-A	15	CH37-A	15	CH38-A	15	CH39-A	15	CH40-A
16	CH36-B	16	CH37-B	16	CH38-B	16	CH39-B	16	CH40-B
17	CH41-A	17	CH42-A	17	CH43-A	17	CH44-A	17	CH45-A
18	CH41-B	18	CH42-B	18	CH43-B	18	CH44-B	18	CH45-B
19	CH46-A	19	CH47-A	19	CH48-A	19	CH49-A	19	CH50-A
20	CH46-B	20	CH47-B	20	CH48-B	20	CH49-B	20	CH50-B
21	CH51-A	21	CH52-A	21	CH53-A	21	CH54-A	21	CH55-A
22	CH51-B	22	CH52-B	22	CH53-B	22	CH54-B	22	CH55-B
23	CH56-A	23	CH57-A	23	CH58-A	23	CH59-A	23	CH60-A
24	CH56-B	24	CH57-B	24	CH58-B	24	CH59-B	24	CH60-B
25	CH61-A	25	CH62-A	25	CH63-A	25	CH64-A	25	CH65-A
26	CH61-B	26	CH62-B	26	CH63-B	26	CH64-B	26	CH65-B
27	CH66-A	27	CH67-A	27	CH68-A	27	CH69-A	27	CH70-A
28	CH66-B	28	CH67-B	28	CH68-B	28	CH69-B	28	CH70-B
29	CH71-A	29	CH72-A	29	CH73-A	29	CH74-A	29	CH75-A
30	CH71-B	30	CH72-B	30	CH73-B	30	CH74-B	30	CH75-B
31	CH76-A	31	CH77-A	31	CH78-A	31	CH79-A	31	CH80-A
32	CH76-B	32	CH77-B	32	CH78-B	32	CH79-B	32	CH80-B

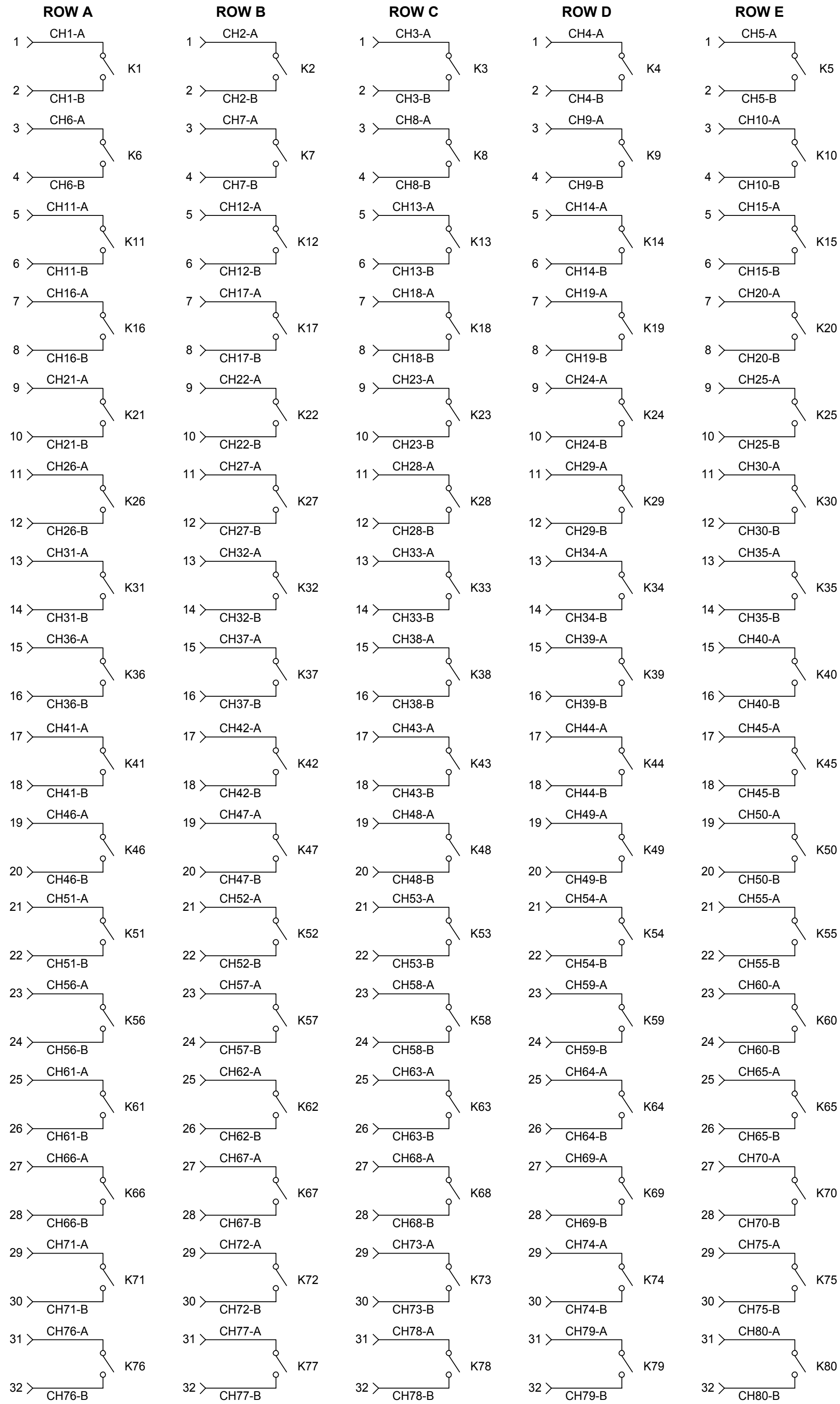


FIGURE P-2 SM5001 SCHEMATIC

TABLE P-2 SM5001 RELAY REGISTER MAP

Offset (Hex)																
12																
10																
E																
C																
A																
8	K80	K79	K78	K77	K76	K75	K74	K73	K72	K71	K70	K69	K68	K67	K66	K65
6	K64	K63	K62	K61	K60	K59	K58	K57	K56	K55	K54	K53	K52	K51	K50	K49
4	K48	K47	K46	K45	K44	K43	K42	K41	K40	K39	K38	K37	K36	K35	K34	K33
2	K32	K31	K30	K29	K28	K27	K26	K25	K24	K23	K22	K21	K20	K19	K18	K17
0	K16	K15	K14	K13	K12	K11	K10	K9	K8	K7	K6	K5	K4	K3	K2	K1

APPENDIX Q

SM5002 - 50 CHANNEL SPDT

This appendix shows the connector, connector pin assignments, schematic and relay register map for this module. Some information in this appendix is a repeat from other sections. It is grouped here again for easy referencing.

Note that the connector pictured below is for the single-wide (SM1000A) only. If this module is used in a double-wide (SM1000B), the front panel interface may by opposite (upside-down). Refer to the Front Panel Interface section for more information.

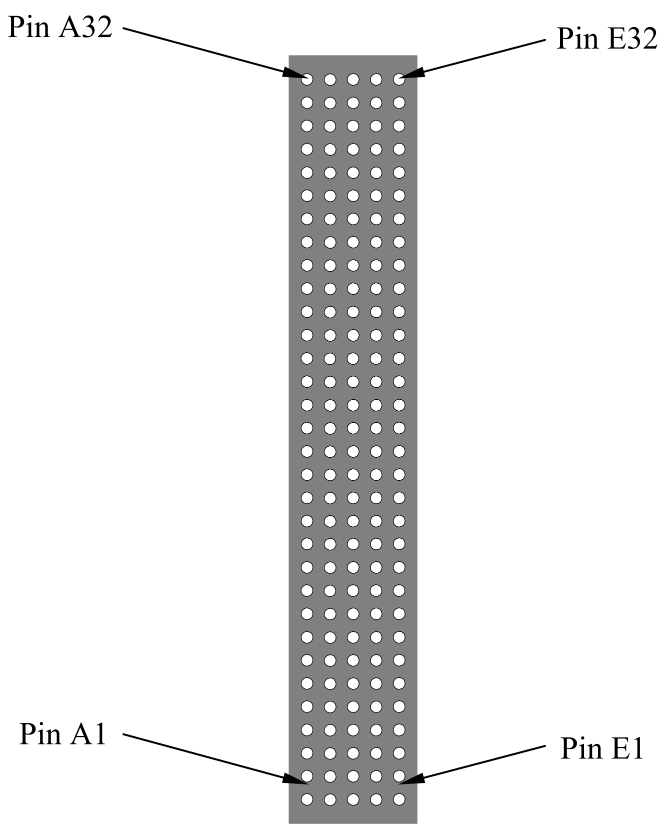


FIGURE Q-1 SM5002 CONNECTOR PIN LOCATIONS – 160P

TABLE Q-1 SM5002 CONNECTOR PIN / SIGNAL ASSIGNMENTS

ROW A	SIGNAL	ROW B	SIGNAL	ROW C	SIGNAL	ROW D	SIGNAL	ROW E	SIGNAL
1	CH1-COM	1	CH2-COM	1	CH3-COM	1	CH4-COM	1	CH5-COM
2	CH1-NO	2	CH2-NO	2	CH3-NO	2	CH4-NO	2	CH5-NO
3	CH1-NC	3	CH2-NC	3	CH3-NC	3	CH4-NC	3	CH5-NC
4	CH6-COM	4	CH7-COM	4	CH8-COM	4	CH9-COM	4	CH10-COM
5	CH6-NO	5	CH7-NO	5	CH8-NO	5	CH9-NO	5	CH10-NO
6	CH6-NC	6	CH7-NC	6	CH8-NC	6	CH9-NC	6	CH10-NC
7	CH11-COM	7	CH12-COM	7	CH13-COM	7	CH14-COM	7	CH15-COM
8	CH11-NO	8	CH12-NO	8	CH13-NO	8	CH14-NO	8	CH15-NO
9	CH11-NC	9	CH12-NC	9	CH13-NC	9	CH14-NC	9	CH15-NC
10	CH16-COM	10	CH17-COM	10	CH18-COM	10	CH19-COM	10	CH20-COM
11	CH16-NO	11	CH17-NO	11	CH18-NO	11	CH19-NO	11	CH20-NO
12	CH16-NC	12	CH17-NC	12	CH18-NC	12	CH19-NC	12	CH20-NC
13	CH21-COM	13	CH22-COM	13	CH23-COM	13	CH24-COM	13	CH25-COM
14	CH21-NO	14	CH22-NO	14	CH23-NO	14	CH24-NO	14	CH25-NO
15	CH21-NC	15	CH22-NC	15	CH23-NC	15	CH24-NC	15	CH25-NC
16	CH26-COM	16	CH27-COM	16	CH28-COM	16	CH29-COM	16	CH30-COM
17	CH26-NO	17	CH27-NO	17	CH28-NO	17	CH29-NO	17	CH30-NO
18	CH26-NC	18	CH27-NC	18	CH28-NC	18	CH29-NC	18	CH30-NC
19	CH31-COM	19	CH32-COM	19	CH33-COM	19	CH34-COM	19	CH35-COM
20	CH31-NO	20	CH32-NO	20	CH33-NO	20	CH34-NO	20	CH35-NO
21	CH31-NC	21	CH32-NC	21	CH33-NC	21	CH34-NC	21	CH35-NC
22	CH36-COM	22	CH37-COM	22	CH38-COM	22	CH39-COM	22	CH40-COM
23	CH36-NO	23	CH37-NO	23	CH38-NO	23	CH39-NO	23	CH40-NO
24	CH36-NC	24	CH37-NC	24	CH38-NC	24	CH39-NC	24	CH40-NC
25	CH41-COM	25	CH42-COM	25	CH43-COM	25	CH44-COM	25	CH45-COM
26	CH41-NO	26	CH42-NO	26	CH43-NO	26	CH44-NO	26	CH45-NO
27	CH41-NC	27	CH42-NC	27	CH43-NC	27	CH44-NC	27	CH45-NC
28	CH46-COM	28	CH47-COM	28	CH48-COM	28	CH49-COM	28	CH50-COM
29	CH46-NO	29	CH47-NO	29	CH48-NO	29	CH49-NO	29	CH50-NO
30	CH46-NC	30	CH47-NC	30	CH48-NC	30	CH49-NC	30	CH50-NC
31	SHIELD	31	SHIELD	31	SHIELD	31	SHIELD	31	FP-OPEN
32	SHIELD	32	SHIELD	32	SHIELD	32	SHIELD	32	FP-GND

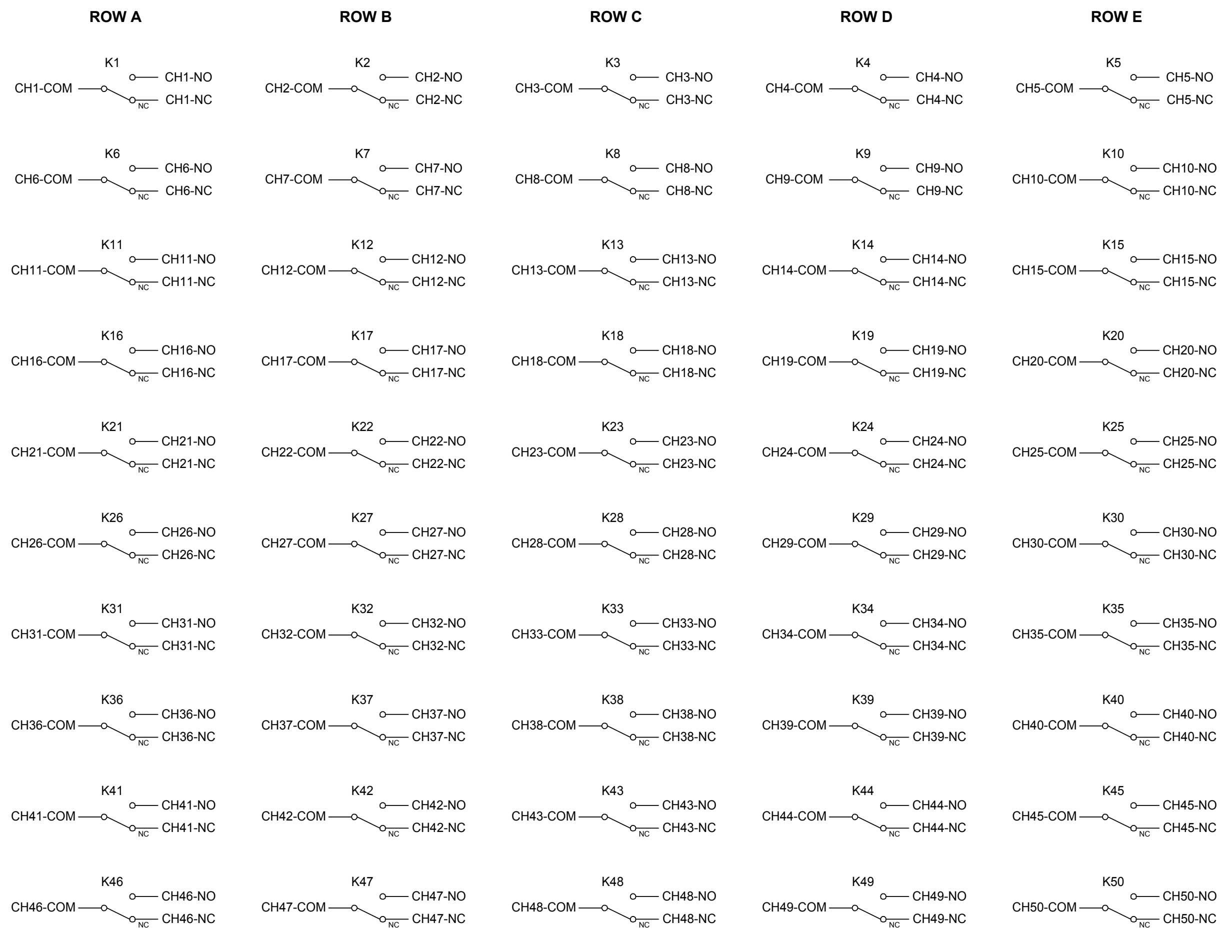


FIGURE Q-2 SM5002 SCHEMATIC

TABLE Q-2 SM5002 RELAY REGISTER MAP

Offset (Hex)																
12																
10																
E																
C																
A																
8																
6															K50	K49
4	K48	K47	K46	K45	K44	K43	K42	K41	K40	K39	K38	K37	K36	K35	K34	K33
2	K32	K31	K30	K29	K28	K27	K26	K25	K24	K23	K22	K21	K20	K19	K18	K17
0	K16	K15	K14	K13	K12	K11	K10	K9	K8	K7	K6	K5	K4	K3	K2	K1

APPENDIX R

SM5003 - 26 CHANNEL SP4T

This appendix shows the connector, connector pin assignments, schematic and relay register map for this module. Some information in this appendix is a repeat from other sections. It is grouped here again for easy referencing.

Note that the connector pictured below is for the single-wide (SM1000A) only. If this module is used in a double-wide (SM1000B), the front panel interface may by opposite (upside-down). Refer to the Front Panel Interface section for more information.

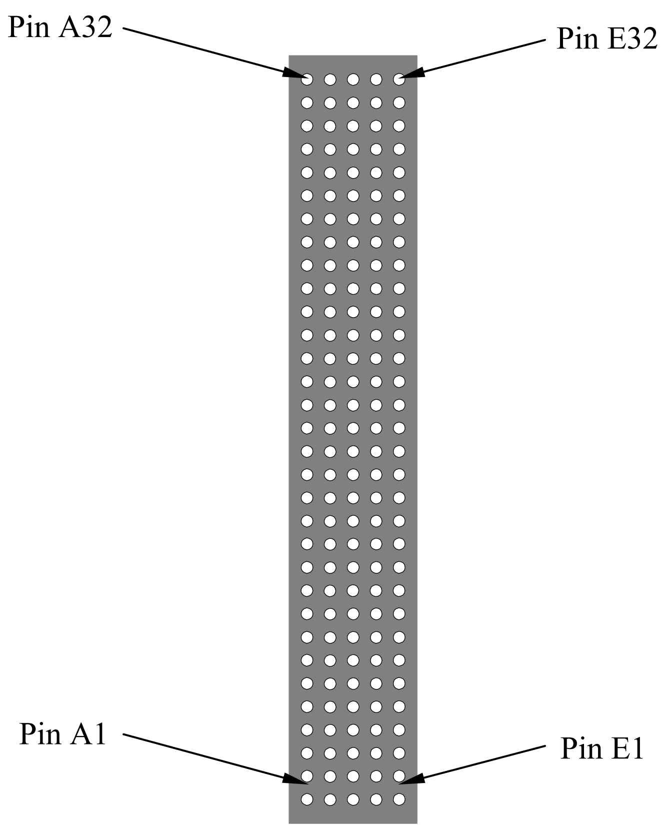


FIGURE R-1 SM5003 CONNECTOR PIN LOCATIONS – 160P

TABLE R-1 SM5003 CONNECTOR PIN / SIGNAL ASSIGNMENTS

ROW A	SIGNAL	ROW B	SIGNAL	ROW C	SIGNAL	ROW D	SIGNAL	ROW E	SIGNAL
1	SHIELD	1	SHIELD	1	SHIELD	1	SHIELD	1	SHIELD
2	CH1-COM	2	CH1-NC	2	CH1-NO-1	2	CH1-NO-2	2	CH1-NO-3
3	CH2-COM	3	CH2-NC	3	CH2-NO-1	3	CH2-NO-2	3	CH2-NO-3
4	CH3-COM	4	CH3-NC	4	CH2-NO-1	4	CH3-NO-2	4	CH3-NO-3
5	CH4-COM	5	CH4-NC	5	CH4-NO-1	5	CH4-NO-2	5	CH4-NO-3
6	CH5-COM	6	CH5-NC	6	CH5-NO-1	6	CH5-NO-2	6	CH5-NO-3
7	CH6-COM	7	CH6-NC	7	CH6-NO-1	7	CH6-NO-2	7	CH6-NO-3
8	CH7-COM	8	CH7-NC	8	CH7-NO-1	8	CH7-NO-2	8	CH7-NO-3
9	SHIELD	9	SHIELD	9	SHIELD	9	SHIELD	9	SHIELD
10	CH8-COM	10	CH8-NC	10	CH8-NO-1	10	CH8-NO-2	10	CH8-NO-3
11	CH9-COM	11	CH9-NC	11	CH9-NO-1	11	CH9-NO-2	11	CH9-NO-3
12	CH10-COM	12	CH10-NC	12	CH10-NO-1	12	CH10-NO-2	12	CH10-NO-3
13	CH11-COM	13	CH11-NC	13	CH11-NO-1	13	CH11-NO-2	13	CH11-NO-3
14	CH12-COM	14	CH12-NC	14	CH12-NO-1	14	CH12-NO-2	14	CH12-NO-3
15	CH13-COM	15	CH13-NC	15	CH13-NO-1	15	CH13-NO-2	15	CH13-NO-3
16	SHIELD	16	SHIELD	16	SHIELD	16	SHIELD	16	SHIELD
17	CH14-COM	17	CH14-NC	17	CH14-NO-1	17	CH14-NO-2	17	CH14-NO-3
18	CH15-COM	18	CH15-NC	18	CH15-NO-1	18	CH15-NO-2	18	CH15-NO-3
19	CH16-COM	19	CH16-NC	19	CH16-NO-1	19	CH16-NO-2	19	CH16-NO-3
20	CH17-COM	20	CH17-NC	20	CH17-NO-1	20	CH17-NO-2	20	CH17-NO-3
21	CH18-COM	21	CH18-NC	21	CH18-NO-1	21	CH18-NO-2	21	CH18-NO-3
22	CH19-COM	22	CH19-NC	22	CH19-NO-1	22	CH19-NO-2	22	CH19-NO-3
23	SHIELD	23	SHIELD	23	SHIELD	23	SHIELD	23	SHIELD
24	CH20-COM	24	CH20-NC	24	CH20-NO-1	24	CH20-NO-2	24	CH20-NO-3
25	CH21-COM	25	CH21-NC	25	CH21-NO-1	25	CH21-NO-2	25	CH21-NO-3
26	CH22-COM	26	CH22-NC	26	CH22-NO-1	26	CH22-NO-2	26	CH22-NO-3
27	CH23-COM	27	CH23-NC	27	CH23-NO-1	27	CH23-NO-2	27	CH23-NO-3
28	CH24-COM	28	CH24-NC	28	CH24-NO-1	28	CH24-NO-2	28	CH24-NO-3
29	CH25-COM	29	CH25-NC	29	CH25-NO-1	29	CH25-NO-2	29	CH25-NO-3
30	CH26-COM	30	CH26-NC	30	CH26-NO-1	30	CH26-NO-2	30	CH26-NO-3
31	SHIELD	31	SHIELD	31	SHIELD	31	SHIELD	31	FP-OPEN
32	SHIELD	32	SHIELD	32	SHIELD	32	SHIELD	32	FP-GND

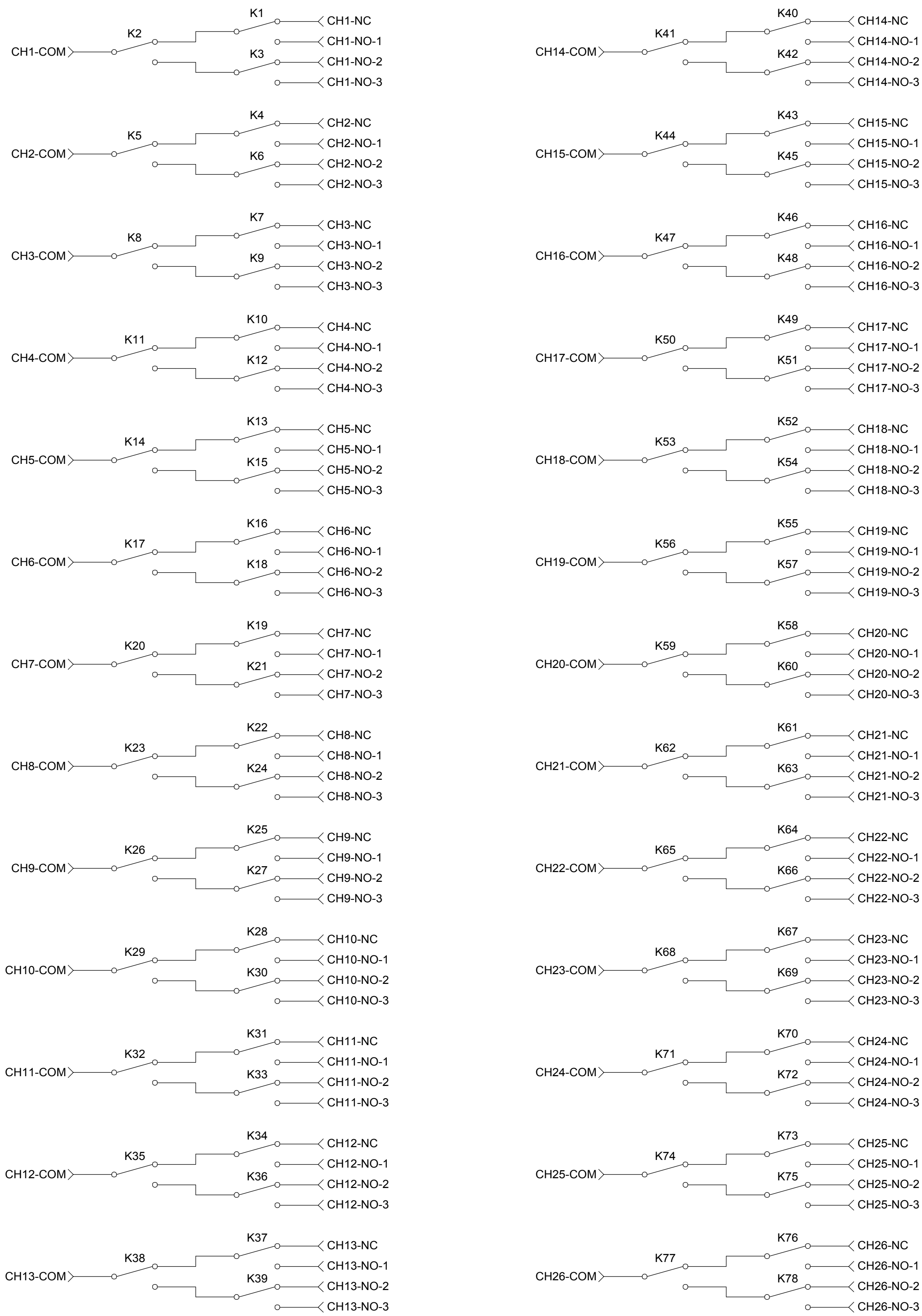


FIGURE R-2 SM5003 SCHEMATIC

TABLE R-2 SM5003 RELAY REGISTER MAP

Offset (Hex)																
12																
10																
E																
C																
A																
8			K78	K77	K76	K75	K74	K73	K72	K71	K70	K69	K68	K67	K66	K65
6	K64	K63	K62	K61	K60	K59	K58	K57	K56	K55	K54	K53	K52	K51	K50	K49
4	K48	K47	K46	K45	K44	K43	K42	K41	K40	K39	K38	K37	K36	K35	K34	K33
2	K32	K31	K30	K29	K28	K27	K26	K25	K24	K23	K22	K21	K20	K19	K18	K17
0	K16	K15	K14	K13	K12	K11	K10	K9	K8	K7	K6	K5	K4	K3	K2	K1

APPENDIX S

SM5004 – 30 CHANNEL SPDT

This appendix shows the connector, connector pin assignments, schematic and relay register map for this module. Some information in this appendix is a repeat from other sections. It is grouped here again for easy referencing.

Note that the connector pictured below is for the single-wide (SM1000A) only. If this module is used in a double-wide (SM1000B), the front panel interface may by opposite (upside-down). Refer to the Front Panel Interface section for more information.

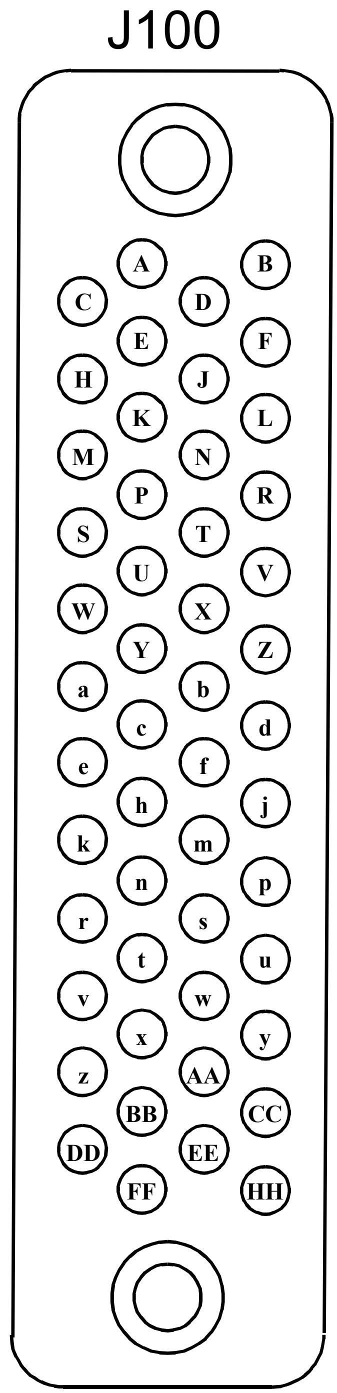


FIGURE S-1 SM5004 CONNECTOR PIN LOCATIONS – 50P

TABLE S-1 SM5004 CONNECTOR PIN / SIGNAL ASSIGNMENTS

J100				J101			
PIN	SIGNAL	PIN	SIGNAL	PIN	SIGNAL	PIN	SIGNAL
A	CH1-COM	d	CH9-NO	A	CH16-COM	d	CH24-NO
B	CH1-NO	e	CH9-NC	B	CH16-NO	e	CH24-NC
C	CH1-NC	f	CH10-COM	C	CH16-NC	f	CH25-COM
D	CH2-COM	h	CH10-NO	D	CH17-COM	h	CH25-NO
E	CH2-NO	j	CH10-NC	E	CH17-NO	j	CH25-NC
F	CH2-NC	k	CH11-COM	F	CH17-NC	k	CH26-COM
H	CH3-COM	m	CH11-NO	H	CH18-COM	m	CH26-NO
J	CH3-NO	n	CH11-NC	J	CH18-NO	n	CH26-NC
K	CH3-NC	p	CH12-COM	K	CH18-NC	p	CH27-COM
L	CH4-COM	r	CH12-NO	L	CH19-COM	r	CH27-NO
M	CH4-NO	s	CH12-NC	M	CH19-NO	s	CH27-NC
N	CH4-NC	t	CH13-COM	N	CH19-NC	t	CH28-COM
P	CH5-COM	u	CH13-NO	P	CH20-COM	u	CH28-NO
R	CH5-NO	v	CH13-NC	R	CH20-NO	v	CH28-NC
S	CH5-NC	w	CH14-COM	S	CH20-NC	w	CH29-COM
T	CH6-COM	x	CH14-NO	T	CH21-COM	x	CH29-NO
U	CH6-NO	y	CH14-NC	U	CH21-NO	y	CH29-NC
V	CH6-NC	z	CH15-COM	V	CH21-NC	z	CH30-COM
W	CH7-COM	AA	CH15-NO	W	CH22-COM	AA	CH30-NO
X	CH7-NO	BB	CH15-NC	X	CH22-NO	BB	CH30-NC
Y	CH7-NC	CC	N/C	Y	CH22-NC	CC	N/C
Z	CH8-COM	DD	N/C	Z	CH23-COM	DD	FP-OPEN
a	CH8-NO	EE	N/C	a	CH23-NO	EE	FP-GND
b	CH8-NC	FF	SHEILD	b	CH23-NC	FF	SHEILD
c	CH9-COM	HH	SHEILD	c	CH24-COM	HH	SHEILD

Note: For a SM1000B configuration, J100 and J101 are reversed.

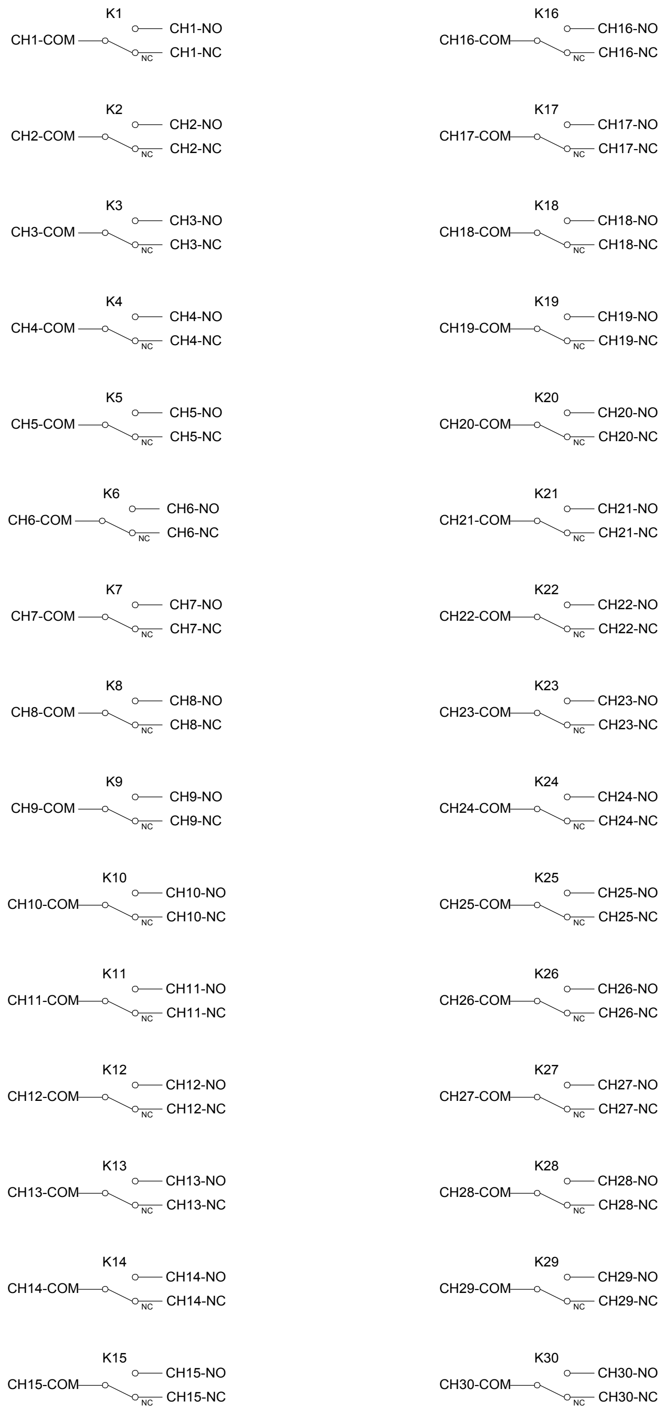


FIGURE S-2 SM5004 SCHEMATIC

TABLE S-2 SM5004 RELAY REGISTER MAP

Offset (Hex)																
12																
10																
E																
C																
A																
8																
6																
4																
2			K30	K29	K28	K27	K26	K25	K24	K23	K22	K21	K20	K19	K18	K17
0	K16	K15	K14	K13	K12	K11	K10	K9	K8	K7	K6	K5	K4	K3	K2	K1

APPENDIX T

SM5005 – 48 CHANNEL SPST

This appendix shows the connector, connector pin assignments, schematic and relay register map for this module. Some information in this appendix is a repeat from other sections. It is grouped here again for easy referencing.

Note that the connector pictured below is for the single-wide (SM1000A) only. If this module is used in a double-wide (SM1000B), the front panel interface may by opposite (upside-down). Refer to the Front Panel Interface section for more information.

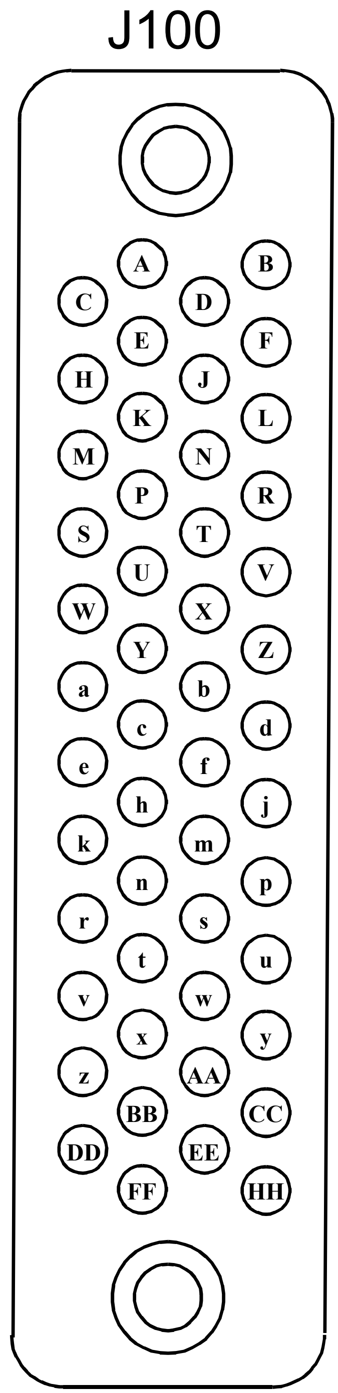


FIGURE T-1 SM5005 CONNECTOR PIN LOCATIONS – 50P

TABLE T-1 SM5005 CONNECTOR PIN / SIGNAL ASSIGNMENTS

J100				J101			
PIN	**SIGNAL**	**PIN**	**SIGNAL**	**PIN**	**SIGNAL**	**PIN**	**SIGNAL**
A	CH1-COM	d	CH13-NO	A	CH26-COM	d	CH38-NO
B	CH1-NO	e	CH14-COM	B	CH26-NO	e	CH39-COM
C	CH2-COM	f	CH14-NO	C	CH27-COM	f	CH39-NO
D	CH2-NO	h	CH15-COM	D	CH27-NO	h	CH40-COM
E	CH3-COM	j	CH15-NO	E	CH28-COM	j	CH40-NO
F	CH3-NO	k	CH16-COM	F	CH28-NO	k	CH41-COM
H	CH4-COM	m	CH16-NO	H	CH29-COM	m	CH41-NC
J	CH4-NO	n	CH17-COM	J	CH29-NO	n	CH42-COM
K	CH5-COM	p	CH17-NO	K	CH30-COM	p	CH42-NO
L	CH5-NO	r	CH18-COM	L	CH30-NO	r	CH43-COM
M	CH6-COM	s	CH18-NO	M	CH31-COM	s	CH43-NO
N	CH6-NO	t	CH19-COM	N	CH31-NO	t	CH44-COM
P	CH7-COM	u	CH19-NO	P	CH32-COM	u	CH44-NO
R	CH7-NO	v	CH20-COM	R	CH32-NO	v	CH45-COM
S	CH8-COM	w	CH20-NO	S	CH33-COM	w	CH45-NO
T	CH8-NO	x	CH21-COM	T	CH33-NO	x	CH46-COM
U	CH9-COM	y	CH21-NO	U	CH34-COM	y	CH46-NO
V	CH9-NO	z	CH22-COM	V	CH34-NO	z	CH47-COM
W	CH10-COM	AA	CH22-NO	W	CH35-COM	AA	CH47-NO
X	CH10-NO	BB	CH23-COM	X	CH35-NO	BB	CH48-COM
Y	CH11-COM	CC	CH23-NO	Y	CH36-COM	CC	CH48-NO
Z	CH11-NO	DD	CH24-COM	Z	CH36-NO	DD	FP-OPEN
a	CH12-COM	EE	CH24-NO	a	CH37-COM	EE	FP-GND
b	CH12-NO	FF	CH25-COM	b	CH37-NO	FF	SHEILD
c	CH13-COM	HH	CH25-NO	c	CH38-COM	HH	SHEILD

Note: For a SM1000B configuration, J100 and J101 are reversed.

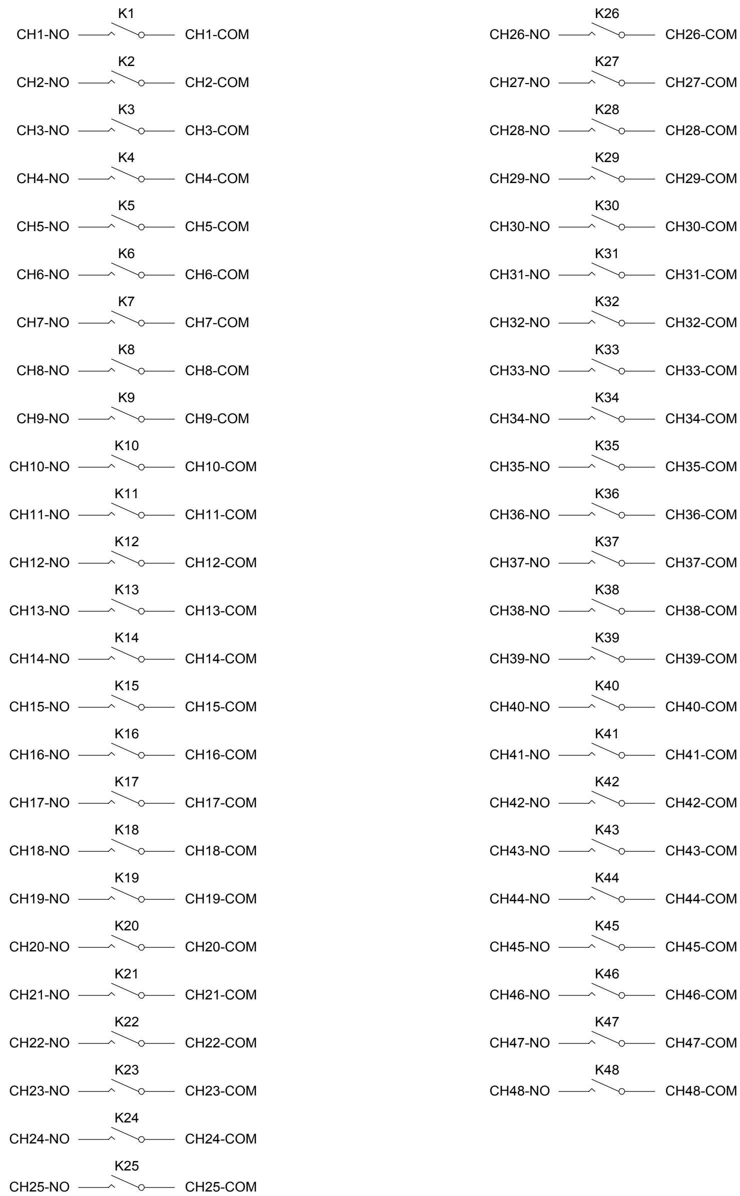


FIGURE T-2 SM5005 SCHEMATIC

TABLE T-2 SM5005 RELAY REGISTER MAP

Offset (Hex)																
12																
10																
E																
C																
A																
8																
6																
4	K48	K47	K46	K45	K44	K43	K42	K41	K40	K39	K38	K37	K36	K35	K34	K33
2	K32	K31	K30	K29	K28	K27	K26	K25	K24	K23	K22	K21	K20	K19	K18	K17
0	K16	K15	K14	K13	K12	K11	K10	K9	K8	K7	K6	K5	K4	K3	K2	K1

APPENDIX U

SM6001 - 10 CHANNEL RF SP4T

This appendix shows the connector, connector pin assignments, schematic and relay register map for this module. Some information in this appendix is a repeat from other sections. It is grouped here again for easy referencing.

Note that the connector pictured below is for the single-wide (SM1000A) only. If this module is used in a double-wide (SM1000B), the front panel interface may by opposite (upside-down). Refer to the Front Panel Interface section for more information.

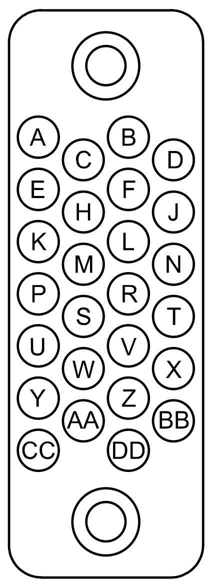


FIGURE U-1 SM6001 CONNECTOR PIN LOCATIONS – 26P

TABLE U-1 SM6001 CONNECTOR PIN / SIGNAL ASSIGNMENTS

J100		J101	
PIN	SIGNAL	PIN	SIGNAL
A	CH1-4	A	CH6-4
B	CH3-4	B	CH8-4
C	CH2-4	C	CH7-4
D	CH4-4	D	CH9-4
E	CH1-COM	E	CH6-COM
F	CH3-COM	F	CH8-COM
H	CH2-COM	H	CH7-COM
J	CH4-COM	J	CH9-COM
K	CH1-1	K	CH6-1
L	CH3-1	L	CH8-1
M	CH2-1	M	CH7-1
N	CH4-1	N	CH9-1
P	CH1-2	P	CH6-2
R	CH3-2	R	CH8-2
S	CH2-2	S	CH7-2
T	CH4-2	T	CH9-2
U	CH1-3	U	CH6-3
V	CH3-3	V	CH8-3
W	CH2-3	W	CH7-3
X	CH4-3	X	CH9-3
Y	CH5-1	Y	CH10-1
Z	CH5-2	Z	CH10-2
AA	CH5-3	AA	CH10-3
BB	CH5-4	BB	CH10-4
CC	CH5-COM	CC	CH10-COM
DD	UNUSED	DD	FP-OPEN

Note: For a SM1000B configuration, J100 and J101 are reversed.

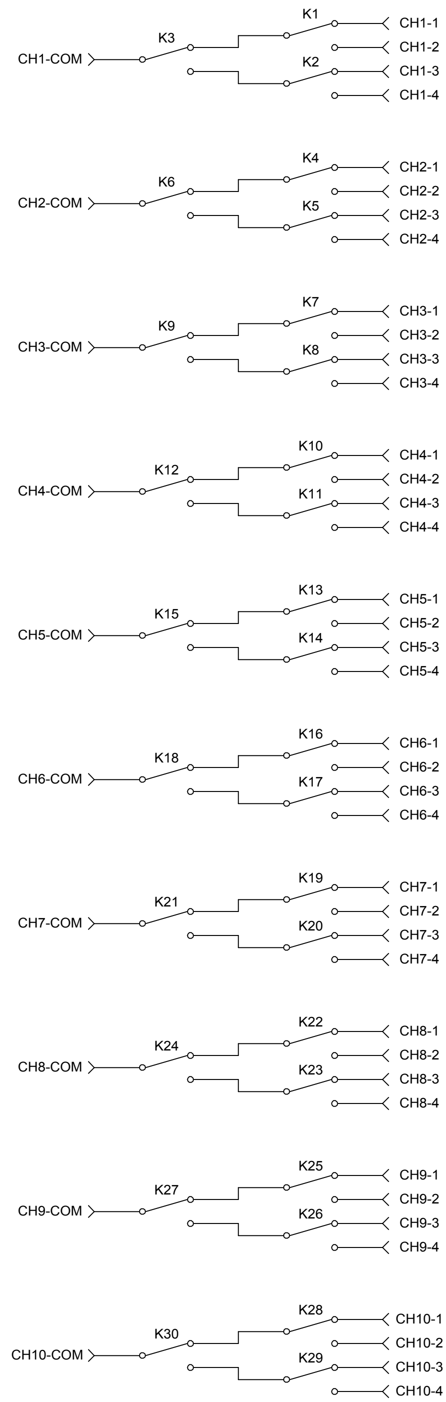


FIGURE U-2 SM6001 SCHEMATIC

TABLE U-2 SM6001 RELAY REGISTER MAP

Offset (Hex)																
12																
10																
E																
C																
A																
8																
6																
4																
2			K30	K29	K28	K27	K26	K25	K24	K23	K22	K21	K20	K19	K18	K17
0	K16	K15	K14	K13	K12	K11	K10	K9	K8	K7	K6	K5	K4	K3	K2	K1

APPENDIX V

SM6002 - 17 CHANNEL RF SPDT

This appendix shows the connector, connector pin assignments, schematic and relay register map for this module. Some information in this appendix is a repeat from other sections. It is grouped here again for easy referencing.

Note that the connector pictured below is for the single-wide (SM1000A) only. If this module is used in a double-wide (SM1000B), the front panel interface may by opposite (upside-down). Refer to the Front Panel Interface section for more information.

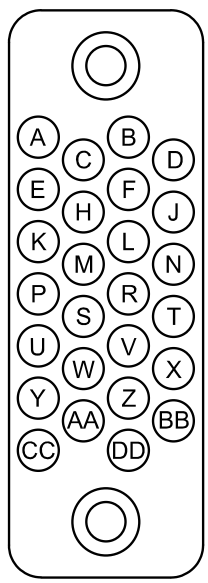


FIGURE V-1 SM6002 CONNECTOR PIN LOCATIONS – 26P

TABLE V-1 SM6002 CONNECTOR PIN / SIGNAL ASSIGNMENTS

J100		J101	
PIN	SIGNAL	PIN	SIGNAL
A	CH1-NC	A	CH9-NC
B	CH2-NC	B	CH10-NC
C	CH3-NC	C	CH11-NC
D	CH4-NC	D	CH12-NC
E	CH1-COM	E	CH9-COM
F	CH2-COM	F	CH10-COM
H	CH3-COM	H	CH11-COM
J	CH4-COM	J	CH12-COM
K	CH1-NO	K	CH9-NO
L	CH2-NO	L	CH10-NO
M	CH3-NO	M	CH11-NO
N	CH4-NO	N	CH12-NO
P	CH5-NC	P	CH13-NC
R	CH6-NC	R	CH14-NC
S	CH7-NC	S	CH15-NC
T	CH8-NC	T	CH16-NC
U	CH5-COM	U	CH13-COM
V	CH6-COM	V	CH14-COM
W	CH7-COM	W	CH15-COM
X	CH8-COM	X	CH16-COM
Y	CH5-NO	Y	CH13-NO
Z	CH6-NO	Z	CH14-NO
AA	CH7-NO	AA	CH15-NO
BB	CH8-NO	BB	CH16-NO
CC	CH17-NO	CC	CH17-NC
DD	CH17-COM	DD	FP-OPEN

Note: For a SM1000B configuration, J100 and J101 are reversed.

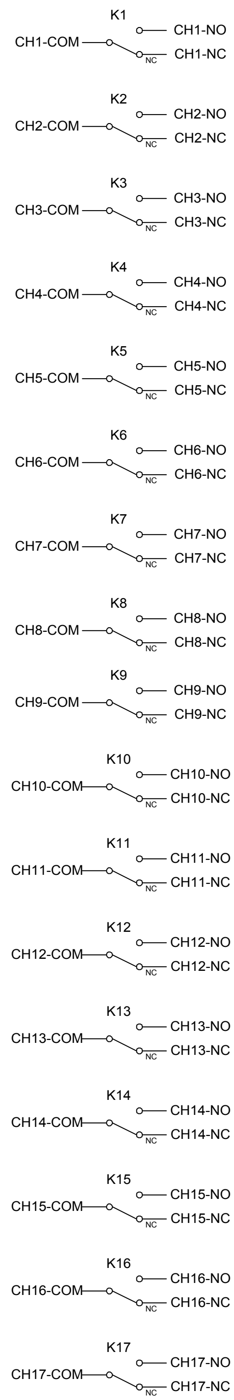


FIGURE V-2 SM6002 SCHEMATIC

TABLE V-2 SM6002 RELAY REGISTER MAP

Offset (Hex)																
12																
10																
E																
C																
A																
8																
6																
4																
2																K17
0	K16	K15	K14	K13	K12	K11	K10	K9	K8	K7	K6	K5	K4	K3	K2	K1

APPENDIX W

SM6004 - 3 CH 1:8 MUX AND 3 CH 1:2 MUX

This appendix shows the connector, connector pin assignments, schematic and relay register map for this module. Some information in this appendix is a repeat from other sections. It is grouped here again for easy referencing.

Note that the connector pictured below is for the single-wide (SM1000A) only. If this module is used in a double-wide (SM1000B), the front panel interface may by opposite (upside-down). Refer to the Front Panel Interface section for more information.

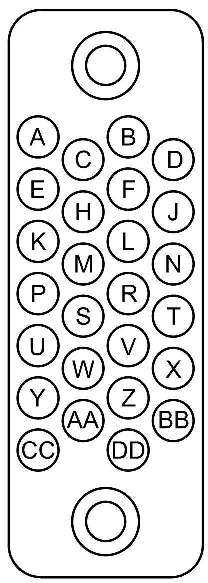
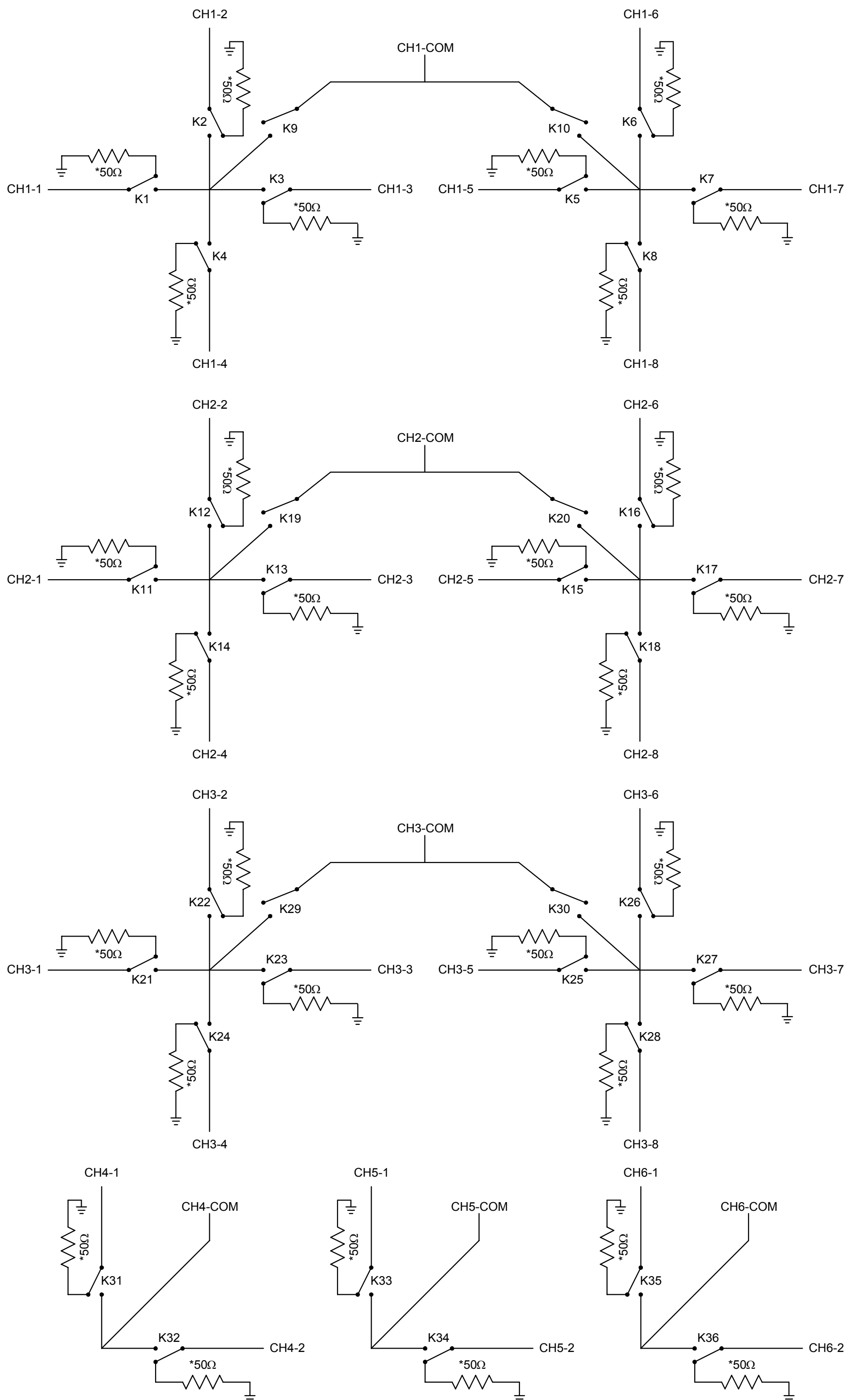


FIGURE W-1 SM6004 CONNECTOR PIN LOCATIONS – 26P

TABLE W-1 SM6004 CONNECTOR PIN / SIGNAL ASSIGNMENTS

J100		J101	
PIN	SIGNAL	PIN	SIGNAL
A	CH1-6	A	CH1-2
B	CH3-2	B	CH3-6
C	CH2-2	C	CH2-6
D	CH4-1	D	CH6-1
E	CH1-5	E	CH1-1
F	CH3-1	F	CH3-5
H	CH2-1	H	CH2-5
J	CH4-COM	J	CH6-COM
K	CH1-7	K	CH1-3
L	CH3-3	L	CH3-7
M	CH2-3	M	CH2-7
N	CH4-2	N	CH6-2
P	CH1-8	P	CH1-4
R	CH3-4	R	CH3-8
S	CH2-4	S	CH2-8
T	CH5-1	T	UNUSED
U	CH1-COM	U	UNUSED
V	CH3-COM	V	UNUSED
W	CH2-COM	W	UNUSED
X	CH5-COM	X	UNUSED
Y	UNUSED	Y	UNUSED
Z	UNUSED	Z	UNUSED
AA	UNUSED	AA	UNUSED
BB	CH5-2	BB	UNUSED
CC	UNUSED	CC	UNUSED
DD	UNUSED	DD	FP-OPEN

Note: For a SM1000B configuration, J100 and J101 are reversed.



* Optional 50Ω Terminations

FIGURE W-2 SM6004 SCHEMATIC

TABLE W-2 SM6004 RELAY REGISTER MAP

Offset (Hex)																
12																
10																
E																
C																
A																
8																
6																
4													K36	K35	K34	K33
2	K32	K31	K30	K29	K28	K27	K26	K25	K24	K23	K22	K21	K20	K19	K18	K17
0	K16	K15	K14	K13	K12	K11	K10	K9	K8	K7	K6	K5	K4	K3	K2	K1

APPENDIX X

SM6005 - 8 CH 1:4 MUX

This appendix shows the connector, connector pin assignments, schematic and relay register map for this module. Some information in this appendix is a repeat from other sections. It is grouped here again for easy referencing.

Note that the connector pictured below is for the single-wide (SM1000A) only. If this module is used in a double-wide (SM1000B), the front panel interface may by opposite (upside-down). Refer to the Front Panel Interface section for more information.

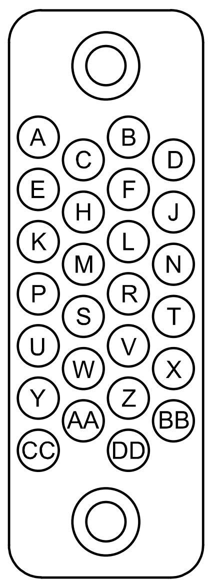
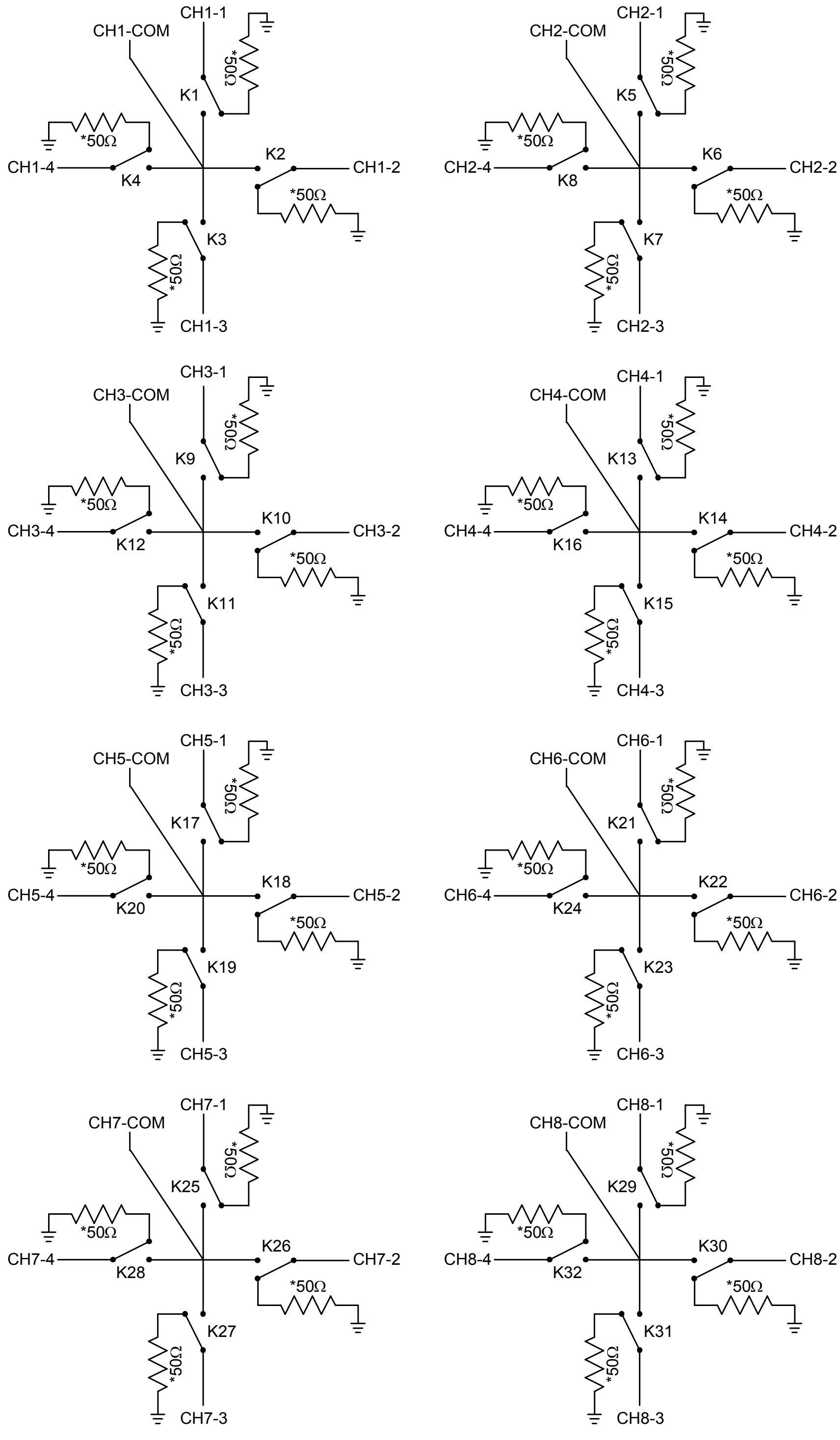


FIGURE X-1 SM6005 CONNECTOR PIN LOCATIONS – 26P

TABLE X-1 SM6005 CONNECTOR PIN / SIGNAL ASSIGNMENTS

J100		J101	
PIN	**SIGNAL**	**PIN**	**SIGNAL**
A	CH1-4	A	CH5-4
B	CH3-4	B	CH7-4
C	CH2-4	C	CH6-4
D	CH4-4	D	CH8-4
E	CH1-COM	E	CH5-COM
F	CH3-COM	F	CH7-COM
H	CH2-COM	H	CH6-COM
J	CH4-COM	J	CH8-COM
K	CH1-1	K	CH5-1
L	CH3-1	L	CH7-1
M	CH2-1	M	CH6-1
N	CH4-1	N	CH8-1
P	CH1-2	P	CH5-2
R	CH3-2	R	CH7-2
S	CH2-2	S	CH6-2
T	CH4-2	T	CH8-2
U	CH1-3	U	CH5-3
V	CH3-3	V	CH7-3
W	CH2-3	W	CH6-3
X	CH4-3	X	CH8-3
Y	UNUSED	Y	UNUSED
Z	UNUSED	Z	UNUSED
AA	UNUSED	AA	UNUSED
BB	UNUSED	BB	UNUSED
CC	UNUSED	CC	UNUSED
DD	UNUSED	DD	FP-OPEN

Note: For a SM1000B configuration, J100 and J101 are reversed.



* Optional 50Ω Terminations

FIGURE X-2 SM6005 SCHEMATIC

TABLE X-2 SM6005 RELAY REGISTER MAP

Offset (Hex)																
12																
10																
E																
C																
A																
8																
6																
4																
2	K32	K31	K30	K29	K28	K27	K26	K25	K24	K23	K22	K21	K20	K19	K18	K17
0	K16	K15	K14	K13	K12	K11	K10	K9	K8	K7	K6	K5	K4	K3	K2	K1

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