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Model 3000-52
(8x32) 2-wire Matrix
90400810



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Regulatory compliance information

This product complies with the essential requirements of the following applicable European Directives, and carries the CE mark accordingly.

89/336/EEC and 73/23/EEC	EMC Directive and Low Voltage Directive
EN61010-1 (1993)	Electrical Safety
EN61326-1 (1997)	EMC – Emissions and Immunity
Manufacturer's Name:	**Manufacturer's Address**
Giga-tronics, Incorporated	4650 Norris Canyon Road San Ramon, California 94583 U.S.A.
Type of Equipment:	**Model Series Number**
Switching Module	3000-52

Declaration of Conformity on file. Contact Giga-tronics at the following;

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TPCI Number	TPCI Issue Date	Date Entered	Comments

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Revision History			
Revision	**Description of Change**	**Chg Order #**	**Approved By**
A	Initial Release		
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Chapter 1 **Introduction**

1.1 Safety and Manual Conventions

This manual contains conventions regarding safety and equipment usage as described below.

1.1.1 Product Reference

Throughout this manual, the term “Common Core Switching Platform, Series 8800” refers to all models of within the series, unless otherwise specified.

1.1.2 Personal Safety Alert



WARNING: Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

1.1.3 Equipment Safety Alert



CAUTION: Indicates a situation which can damage or adversely affect the product or associated equipment.

1.1.4 Notes

Notes are denoted and used as follows:

NOTE: Highlights or amplifies an essential operating or maintenance procedure, practice, condition or statement.

1.1.5 Electrical Safety Precautions

Any servicing instructions are for use by service-trained personnel only. To avoid personal injury, do not perform any service unless you are qualified to do so.

For continued protections against fire hazard, replace the AC line fuse only with a fuse of the same current rating and type. Do not use repaired fuses or short circuited fuse holders.

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Chapter 2 **Configuration Table**

90400810	STD, 8X32, W/ IDC CONNECTORS 85002310, 85002320
90400810-001	OPT1, DUAL 8X16, W/ IDC CONNECTOR 85002310, 85002320-001
90400810-002	OPT2, 8X32, W/ AIRBORN CONNECTORS 85002310-001, 85002320-001
90400810-003	OPT3, DUAL 8X16, W/ AIRBORN CONNECTORS 85002310-001, 85002320-003
90400810-004	DUAL 8X16, W/ IDC CONNECTORS with LATCHES
90400810-101	DUAL 8X16, W/ IDC CONNECTORS with LATCHES (Originally sent out as a 9040810-004) 85002310, 85002320-001

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Chapter 3 **Functional Description**

3.1 Introduction

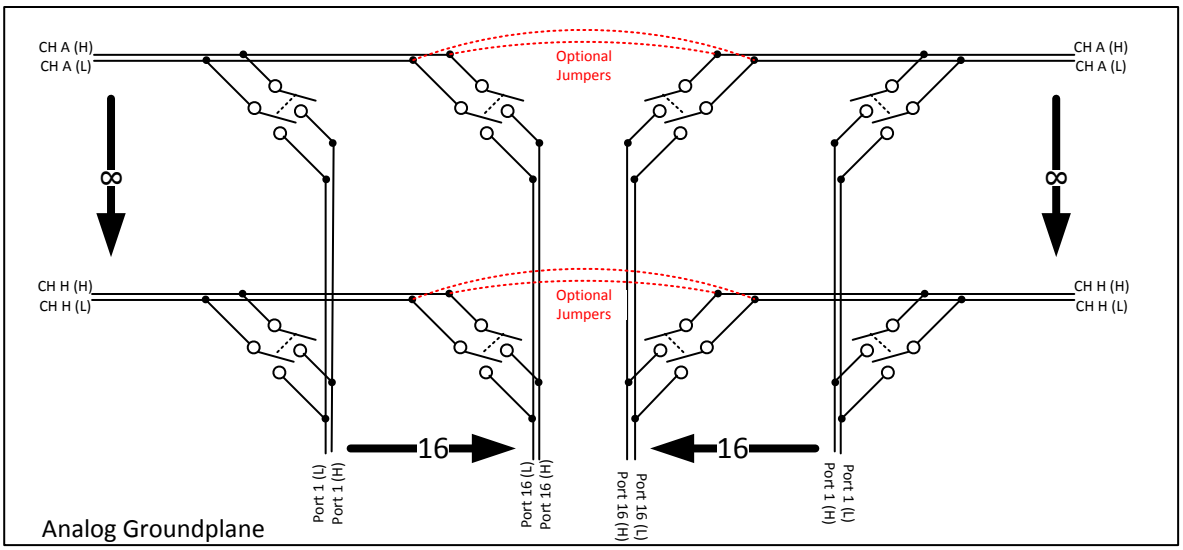
This manual provides the necessary information for the maintenance of the Model 3000-52, 8x32 Switch Matrix.

3.2 General Description

This module is a dual wire 8x32 matrix switch. Each relay in the module is individually controlled. Any and all relays can be closed. The module is designed to support precision testing designs such as ATE. This module is ideal for quality multi-channel measurement or stimulus switching. The Interface and mechanical construction meets the specification of the VXIbus System Specification, rev 1.2 through 1.4.

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Chapter 4 **Block Diagram**



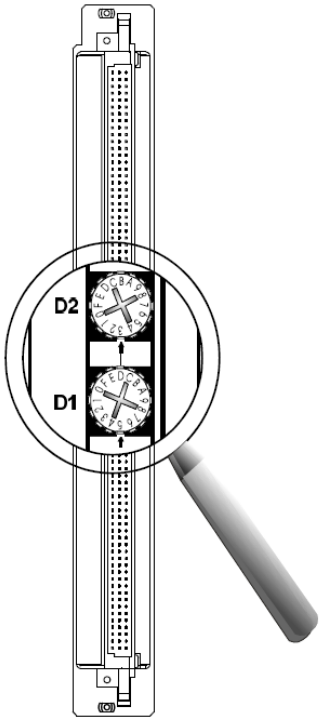
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Chapter 5 Controls and Indicators

The following controls and indicators are provided to select and display the functions of the ASCOR 3000-52 Module's operating environment.

5.1 VXI Logical Address

The Logical Address Switch is dual circular switches, D1 and D2 which are located at the rear of the module. The address can be set to any value between 1 and 255 (decimal) or 1 and FF (hexadecimal), (address 0 is reserved for the resource manager). However, the Module fully supports Dynamic Configuration as defined in ***Section F of the VXI specification,*** address 255 (FF) should be selected only if the Resource Manager also supports Dynamic Configuration.



5.2 LEDs

The following LEDs are visible at the Module's front panel to indicate the

status of the module's operation:

5.2.1 "BUS" LED

This green color LED is normally off and will flash on when the module is addressed by the system.

5.2.2 "PWR" LED

This red color LED is normally on when the Module is Powered up.

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Chapter 6 **Internal Settings**

The following items are inside the module and can be reached by removing the side cover.

6.1 Fuse

The ASCOR VXI 3000-52 uses a 10 Amp fuse in the +5 Volt line and is located on the Mother Board (MB) assembly.

6.2 VXI_{bus} Interrupt Level Selection

The VXIbus interrupt level is set with three bits in the “3Eh” register.

See the section on “A16 ADDRESS SPACE REGISTER DESCRIPTION”.

The interrupt level is factory set to “no interrupt”.

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Chapter 7 **Specifications**

Electrical:

Switching voltage:	220 Volts DC Max
Switching current:	2 Amps Max
Switch Power:	60W Max
Nominal Switching Capacity:	2A @ 30 V DC
Contact Resistance:	1Ω Max
UL Rating:	2A, 30 V DC 0.3A, 110 V DC 0.5A, 125 V AC

AC Parameters:

Bandwidth:	>50MHz into 50Ω, each line with respect to shield

Life Expectancy:

Mechanical:	$100x10^6$
Electrical:	100,000

Mechanical:

Thickness:	1.200 inches
Width:	10.317 inches
Length:	13.78 inches
Weight:	4 lbs. 11 oz.

Connectors:

Idc Connector = P/N 56103850-008 = Amp 746143-8
Airborn Connector , Airborn Wtb36pr7j342
Latches (Ejectors), Amp 102312-2 = 0.474 Latch
Latches (Ejectors), Amp 102320-1 = 0.576 Latch
Latches (Ejectors), Amp 102312-1 = 0.416 Latch

Mate:

34-pos, MT Receptacle Assemblies, Double-Row,
AMP # 1-102398-5
34 pos, STD Profile Front Cover, AMP # 1-102537-5
34 pos, STD Profile Back Cover, AMP # 1-102536-5

Installation Kit:

Installation Kit, 89800430, Available on request (Optional). Includes a full complement of mating connectors.

Environmental Specifications

Temperature:	
Operating:	0º to 55ºC
Storage:	- 40º to 75ºC
Relative Humidity:	
Operating:	0 to 90% non-condensing
Storage:	0 to 95% non-condensing

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Chapter 8 Register Map

8.1 General Information

The Model 3000-52 is a high density, dual wire 8x32 non-blocking switch matrix. The module is designed to support precision measurement instruments where high bandwidth and/or low level signal switching is required. The relays are 60 watt, DPST relays 200 MHz. The module utilized shielded circuit boards with controlled transmission line design for superior performance. Minimum bandwidths of 50 MHz from signal input to ground or differentially across the signal pairs (hi/lo) is provided.

The 3000-52 is organized as four 8x8 matrices. Two of the 8x8 matrices are located on the main circuit board. The other two 8x8 matrices are located on the daughter board. The four matrices are joined together through isolation relays to form the 8x32 matrix. Since the matrix is non-blocking, multiple closures is possible. The matrix is organized as pins and channels. There are 8 pairs of channels and 32 pairs of pins. The paths are bi-directional. Programming of the matrix is done in pairs. The high (+) and low (-) side of a differential path are programmed together.

The signal pins are located on J1, J3, J4, and J6. The channel ports are located on J2. Pins 1-8 are located on J1. Pins 9-16 are located on J3. Pins 17-24 are located on J4. Pins 25-32 are located on J6. Channels 1-8 are located on J2. Refer to connector diagram for exact location of the signal. If ribbon cable is used, then the analog ground pins will provide a ground-signal-ground wiring scheme. Pins 1 and 2 of each connector is connected to chassis ground. The analog ground pins are analog ground. These pins are associated with the signal pins and are not tied to chassis or digital ground. The analog ground should be tied to the associated grounds of the signal source. This avoids ground loops and minimized noise pickup through the analog ground.

The Model 3000-52 is a register based VXI module. Each register is 16 bits. Each pin control registers controls two pins. The first eight bits(0-7) controls the channel selection (1 through 8) for the first pin. The last eight bits (8-15) control the channel selection (1-8) for the second pin. The isolation register connects the selected pin to the channel connector, J2. Refer to the register map for detail programming assignments and the programming guide.

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8.2 Memory Map

Offset (hex) This offset is added to the A16 Base Address of the module. The A16 Base Address for the Switch Matrix is equal to the VXIbus logical address assigned to the Switch Matrix shifted left six times and ORed with hex C000. These registers reside in the VXI Interface circuitry on the Motherboard (85002310).

00 VXIbus ID Register

02 Device Type Register

04 VXIbus Status/Control Register

06 Offset Register

3E ASCOR Relay Control Register

A24 Space The A24 Base Address of the 3000-52 can be derived from the value stored in the Offset Register (06h). To obtain the A24 base address, take the 8 most significant bits of the Offset register and map them to the 8 most significant bits of the A24 Base Address. All other bits in the A24 Base Address are set to zeroes.

A subset of the ASCOR 3000-52 Custom Registers are relay registers.

See connector assignments for pin and channels assignments with associated relays.

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3000-52 Relay Registers,

8000h	Relays K1-16	Pin 1 (Ch. 1-8)	Pin 2 (Ch. 1-8)
8002h	Relays K17-32	Pin 3 (Ch. 1-8)	Pin 4 (Ch. 1-8)
8004h	Relays K33-48	Pin 5 (Ch. 1-8)	Pin 6 (Ch. 1-8)
8006h	Relays K49-64	Pin 7 (Ch. 1-8)	Pin 8 (Ch. 1-8)
8008h	Relays K65-80	Pin 9 (Ch. 1-8)	Pin 10 (Ch. 1-8)
800Ah	Relays K81-96	Pin 11 (Ch. 1-8)	Pin 12 (Ch. 1-8)
800Ch	Relays K97-112	Pin 13 (Ch. 1-8)	Pin 14 (Ch. 1-8)
800Eh	Relays K113-128	Pin 15 (Ch. 1-8)	Pin 16 (Ch. 1-8)
8010h	Relays K129-144	isolation relays	group 1+2
8020h	Relays K1-16	Pin 17 (Ch. 1-8)	Pin 18 (Ch. 1-8)
8022h	Relays K17-32	Pin 19 (Ch. 1-8)	Pin 20 (Ch. 1-8)
8024h	Relays K33-48	Pin 21 (Ch. 1-8)	Pin 22 (Ch. 1-8)
8026h	Relays K49-64	Pin 23 (Ch. 1-8)	Pin 24 (Ch. 1-8)
8028h	Relays K65-80	Pin 25 (Ch. 1-8)	Pin 26 (Ch. 1-8)
802Ah	Relays K81-96	Pin 27 (Ch. 1-8)	Pin 28 (Ch. 1-8)
802Ch	Relays K97-112	Pin 29 (Ch. 1-8)	Pin 30 (Ch. 1-8)
802Eh	Relays K113-128	Pin 31 (Ch. 1-8)	Pin 32 (Ch. 1-8)
8030h	Relays K129-144	isolation relays	group 3+ 4

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Register Map

DESCRIPTION: 8X16 DUAL WIRE MATRIX, MOTHER BOARD PCB NUMBER: 85002290

		MSB															LSB
	Mode:16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	Mode:32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
8000h-lower	8000h	K16	K15	K14	K13	K12	K11	K10	K9	K8	K7	K6	K5	K4	K3	K2	K1
8000h-upper	8002h	K32	K31	K30	K29	K28	K27	K26	K25	K24	K23	K22	K21	K20	K19	K18	K17
8004h-lower	8004h	K48	K47	K46	K45	K44	K43	K42	K41	K40	K39	K38	K37	K36	K35	K34	K33
8004h-upper	8006h	K64	K63	K62	K61	K60	K59	K58	K57	K56	K55	K54	K53	K52	K51	K50	K49
8008h-lower	8008h	K80	K79	K78	K77	K76	K75	K74	K73	K72	K71	K70	K69	K68	K67	K66	K65
8008h-upper	800ah	K96	K95	K94	K93	K92	K91	K90	K89	K88	K87	K86	K85	K84	K83	K82	K81
800ch-lower	800ch	K112	K111	K110	K109	K108	K107	K106	K105	K104	K103	K102	K101	K100	K99	K98	K97
800ch-upper	800eh	K128	K127	K126	K125	K124	K123	K122	K121	K120	K119	K118	K117	K116	K115	K114	K113
8010h-lower	8010h	K144	K143	K142	K141	K140	K139	K138	K137	K136	K135	K134	K133	K132	K131	K130	K129

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Register Map (Continued)

REGISTER: 8000h
MODE: 16/32 bit
FUNCTION: Control Matrix Pins 1-2, Channels 1-8

BIT	CONNECTION	PIN CONN. H, L (Shlds.)	CHAN CONN. H, L (Shlds.)	RELAY
0	Chan 1, Pin 1	J1-31, 33 (32, 34)	J2- 31, 33 (32, 34)	K1
1	Chan 2, Pin 1	J1-31, 33 (32, 34)	J2- 27, 29 (28, 30)	K2
2	Chan 3, Pin 1	J1-31, 33 (32, 34)	J2- 23, 25 (24, 26)	K3
3	Chan 4, Pin 1	J1-31, 33 (32, 34)	J2-19, 20 (20, 22)	K4
4	Chan 5, Pin 1	J1-31, 33 (32, 34)	J2- 15, 17 (16, 18)	K5
5	Chan 6, Pin 1	J1-31, 33 (32, 34)	J2- 11, 13 (14, 16)	K6
6	Chan 7, Pin 1	J1-31, 33 (32, 34)	J2- 7, 9 (8, 10)	K7
7	Chan 8, Pin 1	J1-31, 33 (32, 34)	J2- 3, 5 (4, 6)	K8
8	Chan 1, Pin 1	J1-27, 29 (28, 30)	J2- 31, 33 (32, 34)	K9
9	Chan 2, Pin 2	J1-27, 29 (28, 30)	J2- 27, 29 (28, 30)	K10
10	Chan 3, Pin 2	J1-27, 29 (28, 30)	J2- 23, 25 (24, 26)	K11
11	Chan 4, Pin 2	J1-27, 29 (28, 30)	J2-19, 20 (20, 22)	K12
12	Chan 5, Pin 2	J1-27, 29 (28, 30)	J2- 15, 17 (16, 18)	K13
13	Chan 6, Pin 2	J1-27, 29 (28, 30)	J2- 11, 13 (14, 16)	K14
14	Chan 7, Pin 2	J1-27, 29 (28, 30)	J2- 7, 9 (8, 10)	K15
15	Chan 8, Pin 2	J1-27, 29 (28, 30)	J2- 3, 5 (4, 6)	K16

REGISTER: 8000h, MODE: 32 bit, BITS 16-31
REGISTER: 8002h, MODE: 16 bit
FUNCTION: Control Matrix Pins 3-4, Channels 1-8

BIT	CONNECTION	PIN CONN. H, L (Shlds.)	CHAN CONN. H, L (Shlds.)	RELAY
0 (16)	Chan 1, Pin 3	J1-23, 25 (24, 26)	J2- 31, 33 (32, 34)	K17
1 (17)	Chan 2, Pin 3	J1-23, 25 (24, 26)	J2- 27, 29 (28, 30)	K18
2 (18)	Chan 3, Pin 3	J1-23, 25 (24, 26)	J2- 23, 25 (24, 26)	K19
3 (19)	Chan 4, Pin 3	J1-23, 25 (24, 26)	J2-19, 20 (20, 22)	K20
4 (20)	Chan 5, Pin 3	1-23, 25 (24, 26)	J2- 15, 17 (16, 18)	K21
5 (21)	Chan 6, Pin 3	J1-23, 25 (24, 26)	J2- 11, 13 (14, 16)	K22
6 (22)	Chan 7, Pin 3	J1-23, 25 (24, 26)	J2- 7, 9 (8, 10)	K23
7 (23)	Chan 8, Pin 3	J1-23, 25 (24, 26)	J2- 3, 5 (4, 6)	K24
8 (24)	Chan 1, Pin 3	J1-23, 25 (24, 26)	J2- 31, 33 (32, 34)	K25
9 (25)	Chan 2, Pin 4	J1-19, 21 (20, 22)	J2- 27, 29 (28, 30)	K26
10 (26)	Chan 3, Pin 4	J1-19, 21 (20, 22)	J2- 23, 25 (24, 26)	K27
11 (27)	Chan 4, Pin 4	J1-19, 21 (20, 22)	J2-19, 20 (20, 22)	K28
12 (28)	Chan 5, Pin 4	J1-19, 21 (20, 22)	J2- 15, 17 (16, 18)	K29
13 (29)	Chan 6, Pin 4	J1-19, 21 (20, 22)	J2- 11, 13 (14, 16)	K30
14 (30)	Chan 7, Pin 4	J1-19, 21 (20, 22)	J2- 7, 9 (8, 10)	K31
15 (31)	Chan 8, Pin 4	J1-19, 21 (20, 22)	J2- 3, 5 (4, 6)	K32

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Register Map (Continued)

REGISTER: 8004h,MODE: 16/32 bit
FUNCTION: Control Matrix Pins 5-6, Channels 1-8

BIT	CONNECTION	PIN CONN. H, L (Shlds.)	CHAN CONN. H, L (Shlds.)	RELAY
0	Chan 1, Pin 5	J1-15, 17 (16, 18)	J2- 31, 33 (32, 34)	K33
1	Chan 2, Pin 5	J1-15, 17 (16, 18)	J2- 27, 29 (28, 30)	K34
2	Chan 3, Pin 5	J1-15, 17 (16, 18)	J2- 23, 25 (24, 26)	K35
3	Chan 4, Pin 5	J1-15, 17 (16, 18)	J2-19, 20 (20, 22)	K36
4	Chan 5, Pin 5	J1-15, 17 (16, 18)	J2- 15, 17 (16, 18)	K37
5	Chan 6, Pin 5	J1-15, 17 (16, 18)	J2- 11, 13 (14, 16)	K38
6	Chan 7, Pin 5	J1-15, 17 (16, 18)	J2- 7, 9 (8, 10)	K39
7	Chan 8, Pin 5	J1-15, 17 (16, 18)	J2- 3, 5 (4, 6)	K40
8	Chan 1, Pin 5	J1-11, 13 (12, 14)	J2- 31, 33 (32, 34)	K41
9	Chan 2, Pin 6	J1-11, 13 (12, 14)	J2- 27, 29 (28, 30)	K42
10	Chan 3, Pin 6	J1-11, 13 (12, 14)	J2- 23, 25 (24, 26)	K43
11	Chan 4, Pin 6	J1-11, 13 (12, 14)	J2-19, 20 (20, 22)	K44
12	Chan 5, Pin 6	J1-11, 13 (12, 14)	J2- 15, 17 (16, 18)	K45
13	Chan 6, Pin 6	J1-11, 13 (12, 14)	J2- 11, 13 (14, 16)	K46
14	Chan 7, Pin 6	J1-11, 13 (12, 14)	J2- 7, 9 (8, 10)	K47
15	Chan 8, Pin 6	J1-11, 13 (12, 14)	J2- 3, 5 (4, 6)	K48

REGISTER: 8004h , , , MODE: 32 bit, BITS 16-31
REGISTER: 8006h , , , MODE: 16 bit
FUNCTION: Control Matrix Pins 7-8, Channels 1-8

BIT	CONNECTION	PIN CONN. H, L (Shlds.)	CHAN CONN. H, L (Shlds.)	RELAY
0 (16)	Chan 1, Pin 7	J1-7, 9 (8, 10)	J2- 31, 33 (32, 34)	K49
1 (17)	Chan 2, Pin 7	J1-7, 9 (8, 10)	J2- 27, 29 (28, 30)	K50
2 (18)	Chan 3, Pin 7	J1-7, 9 (8, 10)	J2- 23, 25 (24, 26)	K51
3 (19)	Chan 4, Pin 7	J1-7, 9 (8, 10)	J2-19, 20 (20, 22)	K52
4 (20)	Chan 5, Pin 7	J1-7, 9 (8, 10)	J2- 15, 17 (16, 18)	K53
5 (21)	Chan 6, Pin 7	J1-7, 9 (8, 10)	J2- 11, 13 (14, 16)	K54
6 (22)	Chan 7, Pin 7	J1-7, 9 (8, 10)	J2- 7, 9 (8, 10)	K55
7 (23)	Chan 8, Pin 7	J1-7, 9 (8, 10)	J2- 3, 5 (4, 6)	K56
8 (24)	Chan 1, Pin 7	J1-7, 9 (8, 10)	J2- 31, 33 (32, 34)	K57
9 (25)	Chan 2, Pin 8	J1-3, 5 (4, 6)	J2- 27, 29 (28, 30)	K58
10 (26)	Chan 3, Pin 8	J1-3, 5 (4, 6)	J2- 23, 25 (24, 26)	K59
11 (27)	Chan 4, Pin 8	J1-3, 5 (4, 6)	J2-19, 20 (20, 22)	K60
12 (28)	Chan 5, Pin 8	J1-3, 5 (4, 6)	J2- 15, 17 (16, 18)	K61
13 (29)	Chan 6, Pin 8	J1-3, 5 (4, 6)	J2- 11, 13 (14, 16)	K62
14 (30)	Chan 7, Pin 8	J1-3, 5 (4, 6)	J2- 7, 9 (8, 10)	K63
15 (31)	Chan 8, Pin 8	J1-3, 5 (4, 6)	J2- 3, 5 (4, 6)	K64

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Register Map (Continued)

REGISTER: 8008h, MODE: 16/32 bit
FUNCTION: Control Matrix Pins 9-10, Channels 1-8

BIT	CONNECTION	PIN CONN. H, L (Shlds.)	CHAN CONN. H, L (Shlds.)	RELAY
0	Chan 1, Pin 9	J3-31, 33 (32, 34)	J2- 31, 33 (32, 34)	K65
1	Chan 2, Pin 9	J3-31, 33 (32, 34)	J2- 27, 29 (28, 30)	K66
2	Chan 3, Pin 9	J3-31, 33 (32, 34)	J2- 23, 25 (24, 26)	K67
3	Chan 4, Pin 9	J3-31, 33 (32, 34)	J2-19, 20 (20, 22)	K68
4	Chan 5, Pin 9	J3-31, 33 (32, 34)	J2- 15, 17 (16, 18)	K69
5	Chan 6, Pin 9	J3-31, 33 (32, 34)	J2- 11, 13 (14, 16)	K70
6	Chan 7, Pin 9	J3-31, 33 (32, 34)	J2- 7, 9 (8, 10)	K71
7	Chan 8, Pin 9	J3-31, 33 (32, 34)	J2- 3, 5 (4, 6)	K72
8	Chan 1, Pin 10	J3-27, 29 (28, 30)	J2- 31, 33 (32, 34)	K73
9	Chan 2, Pin 10	J3-27, 29 (28, 30)	J2- 27, 29 (28, 30)	K74
10	Chan 3, Pin 10	J3-27, 29 (28, 30)	J2- 23, 25 (24, 26)	K75
11	Chan 4, Pin 10	J3-27, 29 (28, 30)	J2-19, 20 (20, 22)	K76
12	Chan 5, Pin 10	J3-27, 29 (28, 30)	J2- 15, 17 (16, 18)	K77
13	Chan 6, Pin 10	J3-27, 29 (28, 30)	J2- 11, 13 (14, 16)	K78
14	Chan 7, Pin 10	J3-27, 29 (28, 30)	J2- 7, 9 (8, 10)	K79
15	Chan 8, Pin 10	J3-27, 29 (28, 30)	J2- 3, 5 (4, 6)	K80

REGISTER: 8008h , , , MODE: 32 bit, BITS 16-31 ,
REGISTER: 800Ah , , , MODE: 16 bit ,
FUNCTION: Control Matrix Pins 11-12, Channels 1-8 , , , ,

BIT	CONNECTION	PIN CONN. H, L (Shlds.)	CHAN CONN. H, L (Shlds.)	RELAY
0 (16)	Chan 1, Pin 11	J3-23, 25 (24, 26)	J2- 31, 33 (32, 34)	K81
1 (17)	Chan 2, Pin 11	J3-23, 25 (24, 26)	J2- 27, 29 (28, 30)	K82
2 (18)	Chan 3, Pin 11	J3-23, 25 (24, 26)	J2- 23, 25 (24, 26)	K83
3 (19)	Chan 4, Pin 11	J3-23, 25 (24, 26)	J2-19, 20 (20, 22)	K84
4 (20)	Chan 5, Pin 11	J3-23, 25 (24, 26)	J2- 15, 17 (16, 18)	K85
5 (21)	Chan 6, Pin 11	J3-23, 25 (24, 26)	J2- 11, 13 (14, 16)	K86
6 (22)	Chan 7, Pin 11	J3-23, 25 (24, 26)	J2- 7, 9 (8, 10)	K87
7 (23)	Chan 8, Pin 11	J3-23, 25 (24, 26)	J2- 3, 5 (4, 6)	K88
8 (24)	Chan 1, Pin 11	J3-23, 25 (24, 26)	J2- 31, 33 (32, 34)	K89
9 (25)	Chan 2, Pin 12	J3-19, 21 (20, 22)	J2- 27, 29 (28, 30)	K90
10 (26)	Chan 3, Pin 12	J3-19, 21 (20, 22)	J2- 23, 25 (24, 26)	K91
11 (27)	Chan 4, Pin 12	J3-19, 21 (20, 22)	J2-19, 20 (20, 22)	K92
12 (28)	Chan 5, Pin 12	J3-19, 21 (20, 22)	J2- 15, 17 (16, 18)	K93
13 (29)	Chan 6, Pin 12	J3-19, 21 (20, 22)	J2- 11, 13 (14, 16)	K94
14 (30)	Chan 7, Pin 12	J3-19, 21 (20, 22)	J2- 7, 9 (8, 10)	K95
15 (31)	Chan 8, Pin 12	J3-19, 21 (20, 22)	J2- 3, 5 (4, 6)	K96

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REGISTER: 800Ch,MODE: 16/32 bit
FUNCTION: Control Matrix Pins 13, 14, Channels 1-8

BIT	CONNECTION	PIN CONN. H, L (Shlds.)	CHAN CONN. H, L (Shlds.)	RELAY
0	Chan 1, Pin 13	J3-15, 17 (16, 18)	J2- 31, 33 (32, 34)	K97
1	Chan 2, Pin 13	J3-15, 17 (16, 18)	J2- 27, 29 (28, 30)	K98
2	Chan 3, Pin 13	J3-15, 17 (16, 18)	J2- 23, 25 (24, 26)	K99
3	Chan 4, Pin 13	J3-15, 17 (16, 18)	J2-19, 20 (20, 22)	K100
4	Chan 5, Pin 13	J3-15, 17 (16, 18)	J2- 15, 17 (16, 18)	K101
5	Chan 6, Pin 13	J3-15, 17 (16, 18)	J2- 11, 13 (14, 16)	K102
6	Chan 7, Pin 13	J3-15, 17 (16, 18)	J2- 7, 9 (8, 10)	K103
7	Chan 8, Pin 13	J3-15, 17 (16, 18)	J2- 3, 5 (4, 6)	K104
8	Chan 1, Pin 14	J3-11, 13 (12, 14)	J2- 31, 33 (32, 34)	K105
9	Chan 2, Pin 14	J3-11, 13 (12, 14)	J2- 27, 29 (28, 30)	K106
10	Chan 3, Pin 14	J3-11, 13 (12, 14)	J2- 23, 25 (24, 26)	K107
11	Chan 4, Pin 14	J3-11, 13 (12, 14)	J2-19, 20 (20, 22)	K108
12	Chan 5, Pin 14	J3-11, 13 (12, 14)	J2- 15, 17 (16, 18)	K109
13	Chan 6, Pin 14	J3-11, 13 (12, 14)	J2- 11, 13 (14, 16)	K110
14	Chan 7, Pin 14	J3-11, 13 (12, 14)	J2- 7, 9 (8, 10)	K111
15	Chan 8, Pin 14	J3-11, 13 (12, 14)	J2- 3, 5 (4, 6)	K112

REGISTER: 800Ch , , , MODE: 32 bit, BITS 16-31 ,
REGISTER: 800Eh , , , MODE: 16 bit ,
FUNCTION: Control Matrix Pins 15-16, Channels 1-8 , , , ,

BIT	CONNECTION	PIN CONN. H, L (Shlds.)	CHAN CONN. H, L (Shlds.)	RELAY
0 (16)	Chan 1, Pin 15	J3-7, 9 (8, 10)	J2- 31, 33 (32, 34)	K113
1 (17)	Chan 2, Pin 15	J3-7, 9 (8, 10)	J2- 27, 29 (28, 30)	K114
2 (18)	Chan 3, Pin 15	J3-7, 9 (8, 10)	J2- 23, 25 (24, 26)	K115
3 (19)	Chan 4, Pin 15	J3-7, 9 (8, 10)	J2-19, 20 (20, 22)	K116
4 (20)	Chan 5, Pin 15	J3-7, 9 (8, 10)	J2- 15, 17 (16, 18)	K117
5 (21)	Chan 6, Pin 15	J3-7, 9 (8, 10)	J2- 11, 13 (14, 16)	K118
6 (22)	Chan 7, Pin 15	J3-7, 9 (8, 10)	J2- 7, 9 (8, 10)	K119
7 (23)	Chan 8, Pin 15	J3-7, 9 (8, 10)	J2- 3, 5 (4, 6)	K120
8 (24)	Chan 1, Pin 15	J3-7, 9 (8, 10)	J2- 31, 33 (32, 34)	K121
9 (25)	Chan 2, Pin 16	J3-3, 5 (4, 6)	J2- 27, 29 (28, 30)	K122
10 (26)	Chan 3, Pin 16	J3-3, 5 (4, 6)	J2- 23, 25 (24, 26)	K123
11 (27)	Chan 4, Pin 16	J3-3, 5 (4, 6)	J2-19, 20 (20, 22)	K124
12 (28)	Chan 5, Pin 16	J3-3, 5 (4, 6)	J2- 15, 17 (16, 18)	K125
13 (29)	Chan 6, Pin 16	J3-3, 5 (4, 6)	J2- 11, 13 (14, 16)	K126
14 (30)	Chan 7, Pin 16	J3-3, 5 (4, 6)	J2- 7, 9 (8, 10)	K127
15 (31)	Chan 8, Pin 16	J3-3, 5 (4, 6)	J2- 3, 5 (4, 6)	K128

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Register Map (Continued)

REGISTER: 8010h, MODE: 16/32 bit
FUNCTION: Control Matrix, Isolation relays, Channels 1-8, GROUP 1

BIT	FUNCTION	CONNECTION: H@ L (ShldS.)	RELAY
0	Isolation Chan 1@ Grp 1	J2-31@ 33 (32@ 34)	K129
1	Isolation Chan 2@ Grp 1	J2-27@ 29 (28@ 30)	K130
2	Isolation Chan 3@ Grp 1	J2-23@ 25 (24@ 26)	K131
3	Isolation Chan 4@ Grp 1	J2-19@ 21 (20@ 22)	K132
4	Isolation Chan 5@ Grp 1	J2-15@ 17 (16@ 18)	K133
5	Isolation Chan 6@ Grp 1	J2-11@ 13 (12@ 14)	K134
6	Isolation Chan 7@ Grp 1	J2-7@ 9 (8@ 10)	K135
7	Isolation Chan 8@ Grp 1	J2-3@ 5 (4@ 6)	K136
8	Isolation Chan 1@ Grp 2	J2-31@ 33 (32@ 34)	K137
9	Isolation Chan 2@ Grp 2	J2-27@ 29 (28@ 30)	K138
10	Isolation Chan 3@ Grp 2	J2-23@ 25 (24@ 26)	K139
11	Isolation Chan 4@ Grp 2	J2-19@ 21 (20@ 22)	K140
12	Isolation Chan 5@ Grp 2	J2-15@ 17 (16@ 18)	K141
13	Isolation Chan 6@ Grp 2	J2-11@ 13 (12@ 14)	K142
14	Isolation Chan 7@ Grp 2	J2-7@ 9 (8@ 10)	K143
15	Isolation Chan 8@ Grp 2	J2-3@ 5 (4@ 6)	K144

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DESCRIPTION: 8X16 DUAL WIRE MATRIX, DAUGHTER BOARD
PCB NUMBER: 85002300

		MSB															LSB
	Mode:16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	Mode:32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
8020h-lower	8020h	K16	K15	K14	K13	K12	K11	K10	K9	K8	K7	K6	K5	K4	K3	K2	K1
8020h-upper	8022h	K32	K31	K30	K29	K28	K27	K26	K25	K24	K23	K22	K21	K20	K19	K18	K17
8024h-lower	8024h	K48	K47	K46	K45	K44	K43	K42	K41	K40	K39	K38	K37	K36	K35	K34	K33
8024h-upper	8026h	K64	K63	K62	K61	K60	K59	K58	K57	K56	K55	K54	K53	K52	K51	K50	K49
8028h-lower	8028h	K80	K79	K78	K77	K76	K75	K74	K73	K72	K71	K70	K69	K68	K67	K66	K65
8028h-upper	802ah	K96	K95	K94	K93	K92	K91	K90	K89	K88	K87	K86	K85	K84	K83	K82	K81
802ch -lower	802ch	K112	K111	K110	K109	K108	K107	K106	K105	K104	K103	K102	K101	K100	K99	K98	K97
802ch -upper	802eh	K128	K127	K126	K125	K124	K123	K122	K121	K120	K119	K118	K117	K116	K115	K114	K113
8030h-lower	8030h	K144	K143	K142	K141	K140	K139	K138	K137	K136	K135	K134	K133	K132	K131	K130	K129

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Register Map (Continued)

REGISTER: 8020h, MODE: 16/32 bit
FUNCTION: Control Matrix Pins 17-18, Channels 1-8

BIT	CONNECTION	PIN CONN. H, L (Shlds.)	CHAN CONN. H, L (Shlds.)	RELAY
0	Chan 1, Pin 17	J4-31, 33 (32, 34)	J5- 31, 33 (32, 34)	K1
1	Chan 2, Pin 17	J4-31, 33 (32, 34)	J5- 27, 29 (28, 30)	K2
2	Chan 3, Pin 17	J4-31, 33 (32, 34)	J5- 23, 25 (24, 26)	K3
3	Chan 4, Pin 17	J4-31, 33 (32, 34)	J5-19, 20 (20, 22)	K4
4	Chan 5, Pin 17	J4-31, 33 (32, 34)	J5- 15, 17 (16, 18)	K5
5	Chan 6, Pin 17	J4-31, 33 (32, 34)	J5- 11, 13 (14, 16)	K6
6	Chan 7, Pin 17	J4-31, 33 (32, 34)	J5- 7, 9 (8, 10)	K7
7	Chan 8, Pin 17	J4-31, 33 (32, 34)	J5- 3, 5 (4, 6)	K8
8	Chan 1, Pin 17	J4-27, 29 (28, 30)	J5- 31, 33 (32, 34)	K9
9	Chan 2, Pin 18	J4-27, 29 (28, 30)	J5- 27, 29 (28, 30)	K10
10	Chan 3, Pin 18	J4-27, 29 (28, 30)	J5- 23, 25 (24, 26)	K11
11	Chan 4, Pin 18	J4-27, 29 (28, 30)	J5-19, 20 (20, 22)	K12
12	Chan 5, Pin 18	J4-27, 29 (28, 30)	J5- 15, 17 (16, 18)	K13
13	Chan 6, Pin 18	J4-27, 29 (28, 30)	J5- 11, 13 (14, 16)	K14
14	Chan 7, Pin 18	J4-27, 29 (28, 30)	J5- 7, 9 (8, 10)	K15
15	Chan 8, Pin 18	J4-27, 29 (28, 30)	J5- 3, 5 (4, 6)	K16

REGISTER: 8020h , , , MODE: 32 bit@ BITS 16-31 ,
REGISTER: 8022h , , , MODE: 16 bit ,
FUNCTION: Control Matrix Pins 3-4@ Channels 1-8 , , , ,

BIT	CONNECTION	PIN CONN. H, L (Shlds.)	CHAN CONN. H, L (Shlds.)	RELAY
0 (16)	Chan 1, Pin 3	J4-23, 25 (24, 26)	J5- 31, 33 (32, 34)	K17
1 (17)	Chan 2, Pin 3	J4-23, 25 (24, 26)	J5- 27, 29 (28, 30)	K18
2 (18)	Chan 3, Pin 3	J4-23, 25 (24, 26)	J5- 23, 25 (24, 26)	K19
3 (19)	Chan 4, Pin 3	J4-23, 25 (24, 26)	J5-19, 20 (20, 22)	K20
4 (20)	Chan 5, Pin 3	J4-23, 25 (24, 26)	J5- 15, 17 (16, 18)	K21
5 (21)	Chan 6, Pin 3	J4-23, 25 (24, 26)	J5- 11, 13 (14, 16)	K22
6 (22)	Chan 7, Pin 3	J4-23, 25 (24, 26)	J5- 7, 9 (8, 10)	K23
7 (23)	Chan 8, Pin 3	J4-23, 25 (24, 26)	J5- 3, 5 (4, 6)	K24
8 (24)	Chan 1, Pin 3	J4-23, 25 (24, 26)	J5- 31, 33 (32, 34)	K25
9 (25)	Chan 2, Pin 4	J4-19, 21 (20, 22)	J5- 27, 29 (28, 30)	K26
10 (26)	Chan 3, Pin 4	J4-19, 21 (20, 22)	J5- 23, 25 (24, 26)	K27
11 (27)	Chan 4, Pin 4	J4-19, 21 (20, 22)	J5-19, 20 (20, 22)	K28
12 (28)	Chan 5, Pin 4	J4-19, 21 (20, 22)	J5- 15, 17 (16, 18)	K29
13 (29)	Chan 6, Pin 4	J4-19, 21 (20, 22)	J5- 11, 13 (14, 16)	K30
14 (30)	Chan 7, Pin 4	J4-19, 21 (20, 22)	J5- 7, 9 (8, 10)	K31
15 (31)	Chan 8, Pin 4	J4-19, 21 (20, 22)	J5- 3, 5 (4, 6)	K32

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Register Map (Continued)

REGISTER: 8024h, MODE: 16/32 bit
FUNCTION: Control Matrix Pins 5-6, Channels 1-8

BIT	CONNECTION	PIN CONN. H, L (Shlds.)	CHAN CONN. H, L (Shlds.)	RELAY
0	Chan 1, Pin 5	J4-15, 17 (16, 18)	J5- 31, 33 (32, 34)	K33
1	Chan 2, Pin 5	J4-15, 17 (16, 18)	J5- 27, 29 (28, 30)	K34
2	Chan 3, Pin 5	J4-15, 17 (16, 18)	J5- 23, 25 (24, 26)	K35
3	Chan 4, Pin 5	J4-15, 17 (16, 18)	J5-19, 20 (20, 22)	K36
4	Chan 5, Pin 5	J4-15, 17 (16, 18)	J5- 15, 17 (16, 18)	K37
5	Chan 6, Pin 5	J4-15, 17 (16, 18)	J5- 11, 13 (14, 16)	K38
6	Chan 7, Pin 5	J4-15, 17 (16, 18)	J5- 7, 9 (8, 10)	K39
7	Chan 8, Pin 5	J4-15, 17 (16, 18)	J5- 3, 5 (4, 6)	K40
8	Chan 1, Pin 5	J4-11, 13 (12, 14)	J5- 31, 33 (32, 34)	K41
9	Chan 2, Pin 6	J4-11, 13 (12, 14)	J5- 27, 29 (28, 30)	K42
10	Chan 3, Pin 6	J4-11, 13 (12, 14)	J5- 23, 25 (24, 26)	K43
11	Chan 4, Pin 6	J4-11, 13 (12, 14)	J5-19, 20 (20, 22)	K44
12	Chan 5, Pin 6	J4-11, 13 (12, 14)	J5- 15, 17 (16, 18)	K45
13	Chan 6, Pin 6	J4-11, 13 (12, 14)	J5- 11, 13 (14, 16)	K46
14	Chan 7, Pin 6	J4-11, 13 (12, 14)	J5- 7, 9 (8, 10)	K47
15	Chan 8, Pin 6	J4-11, 13 (12, 14)	J5- 3, 5 (4, 6)	K48

REGISTER: 8024h, MODE: 32 bit, BITS 16-31
REGISTER: 8026h, MODE: 16 bits
FUNCTION: Control Matrix Pins 7-8, Channels 1-8

BIT	CONNECTION	PIN CONN. H, L (Shlds.)	CHAN CONN. H, L (Shlds.)	RELAY
0 (16)	Chan 1, Pin 7	J4-7, 9 (8, 10)	J5- 31, 33 (32, 34)	K49
1 (17)	Chan 2, Pin 7	J4-7, 9 (8, 10)	J5- 27, 29 (28, 30)	K50
2 (18)	Chan 3, Pin 7	J4-7, 9 (8, 10)	J5- 23, 25 (24, 26)	K51
3 (19)	Chan 4, Pin 7	J4-7, 9 (8, 10)	J5-19, 20 (20, 22)	K52
4 (20)	Chan 5, Pin 7	J4-7, 9 (8, 10)	J5- 15, 17 (16, 18)	K53
5 (21)	Chan 6, Pin 7	J4-7, 9 (8, 10)	J5- 11, 13 (14, 16)	K54
6 (22)	Chan 7, Pin 7	J4-7, 9 (8, 10)	J5- 7, 9 (8, 10)	K55
7 (23)	Chan 8, Pin 7	J4-7, 9 (8, 10)	J5- 3, 5 (4, 6)	K56
8 (24)	Chan 1, Pin 7	J4-7, 9 (8, 10)	J5- 31, 33 (32, 34)	K57
9 (25)	Chan 2, Pin 8	J4-3, 5 (4, 6)	J5- 27, 29 (28, 30)	K58
10 (26)	Chan 3, Pin 8	J4-3, 5 (4, 6)	J5- 23, 25 (24, 26)	K59
11 (27)	Chan 4, Pin 8	J4-3, 5 (4, 6)	J5-19, 20 (20, 22)	K60
12 (28)	Chan 5, Pin 8	J4-3, 5 (4, 6)	J5- 15, 17 (16, 18)	K61
13 (29)	Chan 6, Pin 8	J4-3, 5 (4, 6)	J5- 11, 13 (14, 16)	K62
14 (30)	Chan 7, Pin 8	J4-3, 5 (4, 6)	J5- 7, 9 (8, 10)	K63
15 (31)	Chan 8, Pin 8	J4-3, 5 (4, 6)	J5- 3, 5 (4, 6)	K64

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Register Map (Continued)

REGISTER: 8028h , , , MODE: 16/32 bit ,
FUNCTION: Control Matrix Pins 9-10@ Channels 1-8 , , , ,

BIT	CONNECTION	PIN CONN. H, L (Shlds.)	CHAN CONN. H, L (Shlds.)	RELAY
0	Chan 1, Pin 9	J6-31, 33 (32, 34)	J5- 31, 33 (32, 34)	K65
1	Chan 2, Pin 9	J6-31, 33 (32, 34)	J5- 27, 29 (28, 30)	K66
2	Chan 3, Pin 9	J6-31, 33 (32, 34)	J5- 23, 25 (24, 26)	K67
3	Chan 4, Pin 9	J6-31, 33 (32, 34)	J5-19, 20 (20, 22)	K68
4	Chan 5, Pin 9	J6-31, 33 (32, 34)	J5- 15, 17 (16, 18)	K69
5	Chan 6, Pin 9	J6-31, 33 (32, 34)	J5- 11, 13 (14, 16)	K70
6	Chan 7, Pin 9	J6-31, 33 (32, 34)	J5- 7, 9 (8, 10)	K71
7	Chan 8, Pin 9	J6-31, 33 (32, 34)	J5- 3, 5 (4, 6)	K72
8	Chan 1, Pin 10	J6-27, 29 (28, 30)	J5- 31, 33 (32, 34)	K73
9	Chan 2, Pin 10	J6-27, 29 (28, 30)	J5- 27, 29 (28, 30)	K74
10	Chan 3, Pin 10	J6-27, 29 (28, 30)	J5- 23, 25 (24, 26)	K75
11	Chan 4, Pin 10	J6-27, 29 (28, 30)	J5-19, 20 (20, 22)	K76
12	Chan 5, Pin 10	J6-27, 29 (28, 30)	J5- 15, 17 (16, 18)	K77
13	Chan 6, Pin 10	J6-27, 29 (28, 30)	J5- 11, 13 (14, 16)	K78
14	Chan 7, Pin 10	J6-27, 29 (28, 30)	J5- 7, 9 (8, 10)	K79
15	Chan 8, Pin 10	J6-27, 29 (28, 30)	J5- 3, 5 (4, 6)	K80

REGISTER: 8028h , , , MODE: 32 bit@ BITS 16-31 ,
REGISTER: 802Ah , , , MODE: 16 bit ,
FUNCTION: Control Matrix Pins 11-12@ Channels 1-8 , , , ,

BIT	CONNECTION	PIN CONN. H, L (Shlds.)	CHAN CONN. H, L (Shlds.)	RELAY
0 (16)	Chan 1, Pin 11	J6-23, 25 (24, 26)	J5- 31, 33 (32, 34)	K81
1 (17)	Chan 2, Pin 11	J6-23, 25 (24, 26)	J5- 27, 29 (28, 30)	K82
2 (18)	Chan 3, Pin 11	J6-23, 25 (24, 26)	J5- 23, 25 (24, 26)	K83
3 (19)	Chan 4, Pin 11	J6-23, 25 (24, 26)	J5-19, 20 (20, 22)	K84
4 (20)	Chan 5, Pin 11	J6-23, 25 (24, 26)	J5- 15, 17 (16, 18)	K85
5 (21)	Chan 6, Pin 11	J6-23, 25 (24, 26)	J5- 11, 13 (14, 16)	K86
6 (22)	Chan 7, Pin 11	J6-23, 25 (24, 26)	J5- 7, 9 (8, 10)	K87
7 (23)	Chan 8, Pin 11	J6-23, 25 (24, 26)	J5- 3, 5 (4, 6)	K88
8 (24)	Chan 1, Pin 11	J6-23, 25 (24, 26)	J5- 31, 33 (32, 34)	K89
9 (25)	Chan 2, Pin 12	J6-19, 21 (20, 22)	J5- 27, 29 (28, 30)	K90
10 (26)	Chan 3, Pin 12	J6-19, 21 (20, 22)	J5- 23, 25 (24, 26)	K91
11 (27)	Chan 4, Pin 12	J6-19, 21 (20, 22)	J5-19, 20 (20, 22)	K92
12 (28)	Chan 5, Pin 12	J6-19, 21 (20, 22)	J5- 15, 17 (16, 18)	K93
13 (29)	Chan 6, Pin 12	J6-19, 21 (20, 22)	J5- 11, 13 (14, 16)	K94
14 (30)	Chan 7, Pin 12	J6-19, 21 (20, 22)	J5- 7, 9 (8, 10)	K95
15 (31)	Chan 8, Pin 12	J6-19, 21 (20, 22)	J5- 3, 5 (4, 6)	K96

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Register Map (Continued)

REGISTER: 802Ch, MODE: 16/32 bit
FUNCTION: Control Matrix Pins 13, 14, Channels 1-8

BIT	CONNECTION	PIN CONN. H, L (Shlds.)	CHAN CONN. H, L (Shlds.)	RELAY
0	Chan 1, Pin 13	J6-15, 17 (16, 18)	J5- 31, 33 (32, 34)	K97
1	Chan 2, Pin 13	J6-15, 17 (16, 18)	J5- 27, 29 (28, 30)	K98
2	Chan 3, Pin 13	J6-15, 17 (16, 18)	J5- 23, 25 (24, 26)	K99
3	Chan 4, Pin 13	J6-15, 17 (16, 18)	J5-19, 20 (20, 22)	K100
4	Chan 5, Pin 13	J6-15, 17 (16, 18)	J5- 15, 17 (16, 18)	K101
5	Chan 6, Pin 13	J6-15, 17 (16, 18)	J5- 11, 13 (14, 16)	K102
6	Chan 7, Pin 13	J6-15, 17 (16, 18)	J5- 11, 13 (14, 16)	K103
7	Chan 8, Pin 13	J6-15, 17 (16, 18)	J5- 3, 5 (4, 6)	K104
8	Chan 1, Pin 14	J6-11, 13 (12, 14)	J5- 31, 33 (32, 34)	K105
9	Chan 2, Pin 14	J6-11, 13 (12, 14)	J5- 27, 29 (28, 30)	K106
10	Chan 3, Pin 14	J6-11, 13 (12, 14)	J5- 23, 25 (24, 26)	K107
11	Chan 4, Pin 14	J6-11, 13 (12, 14)	J5-19, 20 (20, 22)	K108
12	Chan 5, Pin 14	J6-11, 13 (12, 14)	J5- 15, 17 (16, 18)	K109
13	Chan 6, Pin 14	J6-11, 13 (12, 14)	J5- 11, 13 (14, 16)	K110
14	Chan 7, Pin 14	J6-11, 13 (12, 14)	J5- 7, 9 (8, 10)	K111
15	Chan 8, Pin 14	J6-11, 13 (12, 14)	J5- 3, 5 (4, 6)	K112

REGISTER: 802Ch , , , MODE: 32 bit@ BITS 16-31 ,
REGISTER: 802Eh , , , MODE: 16 bit ,
FUNCTION: Control Matrix Pins 15-16@ Channels 1-8 , , , ,

BIT	CONNECTION	PIN CONN. H, L (Shlds.)	CHAN CONN. H, L (Shlds.)	RELAY
0 (16)	Chan 1, Pin 15	J6-7, 9 (8, 10)	J5- 31, 33 (32, 34)	K113
1 (17)	Chan 2, Pin 15	J6-7, 9 (8, 10)	J5- 27, 29 (28, 30)	K114
2 (18)	Chan 3, Pin 15	J6-7, 9 (8, 10)	J5- 23, 25 (24, 26)	K115
3 (19)	Chan 4, Pin 15	J6-7, 9 (8, 10)	J5-19, 20 (20, 22)	K116
4 (20)	Chan 5, Pin 15	J6-7, 9 (8, 10)	J5- 15, 17 (16, 18)	K117
5 (21)	Chan 6, Pin 15	J6-7, 9 (8, 10)	J5- 11, 13 (14, 16)	K118
6 (22)	Chan 7, Pin 15	J6-7, 9 (8, 10)	J5- 7, 9 (8, 10)	K119
7 (23)	Chan 8, Pin 15	J6-7, 9 (8, 10)	J5- 3, 5 (4, 6)	K120
8 (24)	Chan 1, Pin 15	J6-7, 9 (8, 10)	J5- 31, 33 (32, 34)	K121
9 (25)	Chan 2, Pin 16	J6-3, 5 (4, 6)	J5- 27, 29 (28, 30)	K122
10 (26)	Chan 3, Pin 16	J6-3, 5 (4, 6)	J5- 23, 25 (24, 26)	K123
11 (27)	Chan 4, Pin 16	J6-3, 5 (4, 6)	J5-19, 20 (20, 22)	K124
12 (28)	Chan 5, Pin 16	J6-3, 5 (4, 6)	J5- 15, 17 (16, 18)	K125
13 (29)	Chan 6, Pin 16	J6-3, 5 (4, 6)	J5- 11, 13 (14, 16)	K126
14 (30)	Chan 7, Pin 16	J6-3, 5 (4, 6)	J5- 7, 9 (8, 10)	K127
15 (31)	Chan 8, Pin 16	J6-3, 5 (4, 6)	J 5- 3, 5 (4, 6)	K128

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Register Map (Continued)

REGISTER: 8030h, MODE: 16/32 bit
FUNCTION: Control Matrix, Isolation relays, Channels 1-8, GROUP 1

BIT	FUNCTION	CONNECTION: H, L (ShldS.)	RELAY
0	Isolation Chan 1, Grp 1	J2-31, 33 (32, 34)	K129
1	Isolation Chan 2, Grp 1	J2-27, 29 (28, 30)	K130
2	Isolation Chan 3, Grp 1	J 2-23, 25 (24, 26)	K131
3	Isolation Chan 4, Grp 1	J2-19, 21 (20, 22)	K132
4	Isolation Chan 5, Grp 1	J2-15, 17 (16, 18)	K133
5	Isolation Chan 6, Grp 1	J2-11, 13 (12, 14)	K134
6	Isolation Chan 7, Grp 1	J2-7, 9 (8, 10)	K135
7	Isolation Chan 8, Grp 1	J2-3, 5 (4, 6)	K136
8	Isolation Chan 1, Grp 2	J2-31, 33 (32, 34)	K137
9	Isolation Chan 2, Grp 2	J2-27, 29 (28, 30)	K138
10	Isolation Chan 3, Grp 2	J2-23, 25 (24, 26)	K139
11	Isolation Chan 4, Grp 2	J2-19, 21 (20, 22)	K140
12	Isolation Chan 5, Grp 2	J2-15, 17 (16, 18)	K141
13	Isolation Chan 6, Grp 2	J2-11, 13 (12, 14)	K142
14	Isolation Chan 7, Grp 2	J2-7, 9 (8, 10)	K143
15	Isolation Chan 8, Grp 2	J2-3, 5 (4, 6)	K144

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Chapter 9 Connector Configuration

J1, 34 pin AMP type 746143-8

SIGNAL NAME	PIN	PIN	SIGNAL NAME
Analog Ground	32	31	Pin 1A (+)
Analog Ground	34	33	Pin 1B (-)
Analog Ground	28	27	Pin 2A (+)
Analog Ground	30	29	Pin 2B (-)
Analog Ground	24	23	Pin 3A (+)
Analog Ground	26	25	Pin 3B (-)
Analog Ground	20	19	Pin 4A (+)
Analog Ground	22	21	Pin 4B (-)
Analog Ground	16	15	Pin 5A (+)
Analog Ground	18	17	Pin 5B (-)
Analog Ground	12	11	Pin 6A (+)
Analog Ground	14	13	Pin 6B (-)
Analog Ground	8	7	Pin 7A (+)
Analog Ground	10	9	Pin 7B (-)
Analog Ground	4	3	Pin 8A (+)
Analog Ground	6	5	Pin 8B (-)
Chassis Ground	2	1	Chassis Ground

J2, 34 pin AMP type 746143-8

SIGNAL NAME	PIN	PIN	SIGNAL NAME
Analog Ground	32	31	Channel 1A (+)
Analog Ground	34	33	Channel 1B (-)
Analog Ground	28	27	Channel 2A (+)
Analog Ground	30	29	Channel 2B (-)
Analog Ground	24	23	Channel 3A (+)
Analog Ground	26	25	Channel 3B (-)
Analog Ground	20	19	Channel 4A (+)
Analog Ground	22	21	Channel 4B (-)
Analog Ground	16	15	Channel 5A (+)
Analog Ground	18	17	Channel 5B (-)
Analog Ground	12	11	Channel 6A (+)
Analog Ground	14	13	Channel 6B (-)
Analog Ground	8	7	Channel 7A (+)
Analog Ground	10	9	Channel 7B (-)
Analog Ground	4	3	Channel 8A (+)
Analog Ground	6	5	Channel 8B (-)
Chassis Ground	2	1	Chassis Ground

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J3, 34 pin AMP type 746143-8

SIGNAL NAME	PIN	PIN	SIGNAL NAME
Analog Ground	32	31	Pin 9A (+)
Analog Ground	34	33	Pin 9B (-)
Analog Ground	28	27	Pin 10A (+)
Analog Ground	30	29	Pin 10B (-)
Analog Ground	24	23	Pin 11A (+)
Analog Ground	26	25	Pin 11B (-)
Analog Ground	20	19	Pin 12A (+)
Analog Ground	22	21	Pin 12B (-)
Analog Ground	16	15	Pin 13A (+)
Analog Ground	18	17	Pin 13B (-)
Analog Ground	12	11	Pin 14A (+)
Analog Ground	14	13	Pin 14B (-)
Analog Ground	8	7	Pin 15A (+)
Analog Ground	10	9	Pin 15B (-)
Analog Ground	4	3	Pin 16A (+)
Analog Ground	64	5	Pin 16B (-)
Chassis Ground	2	1	Chassis Ground

J4, 34 pin AMP type 746143-8

SIGNAL NAME	PIN	PIN	SIGNAL NAME
Analog Ground	32	31	Pin 17A (+)
Analog Ground	34	33	Pin 17B (-)
Analog Ground	28	27	Pin 18A (+)
Analog Ground	30	29	Pin 18B (-)
Analog Ground	24	23	Pin 19A (+)
Analog Ground	26	25	Pin 19B (-)
Analog Ground	20	191	Pin 20A (+)
Analog Ground	22	21	Pin 20B (-)
Analog Ground	16	15	Pin 21A (+)
Analog Ground	18	17	Pin 21B (-)
Analog Ground	12	11	Pin 22A (+)
Analog Ground	14	13	Pin 22 (-)
Analog Ground	8	7	Pin 23A (+)
Analog Ground	10	9	Pin 23B (-)
Analog Ground	4	3	Pin 24A (+)
Analog Ground	6	5	Pin 24B (-)
Chassis Ground	2	1	Chassis Ground

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J5, 34 pin AMP type 746143-8

SIGNAL NAME	PIN	PIN	SIGNAL NAME
Analog Ground	32	31	Channel 1A (+)
Analog Ground	34	33	Channel 1B (-)
Analog Ground	28	27	Channel 2A (+)
Analog Ground	30	29	Channel 2B (-)
Analog Ground	24	23	Channel 3A (+)
Analog Ground	26	25	Channel 3B (-)
Analog Ground	20	19	Channel 4A (+)
Analog Ground	22	21	Channel 4B (-)
Analog Ground	16	15	Channel 5A (+)
Analog Ground	18	17	Channel 5B (-)
Analog Ground	12	11	Channel 6A (+)
Analog Ground	14	13	Channel 6B (-)
Analog Ground	8	7	Channel 7A (+)
Analog Ground	10	9	Channel 7B (-)
Analog Ground	4	3	Channel 8A (+)
Analog Ground	6	5	Channel 8B (-)
Chassis Ground	2	1	Chassis Ground

Note: *Use J2. Connection to J2 and J5 may result in a poor signal switching due to undesirable stubs in the transmission lines.*

J6, 34 pin AMP type 746143-8

SIGNAL NAME	PIN	PIN	SIGNAL NAME
Analog Ground	32	31	Pin 25A (+)
Analog Ground	34	33	Pin 25B (-)
Analog Ground	28	27	Pin 26A (+)
Analog Ground	30	29	Pin 26B (-)
Analog Ground	24	23	Pin 27A (+)
Analog Ground	26	25	Pin 27B (-)
Analog Ground	20	19	Pin 28A (+)
Analog Ground	22	21	Pin 28B (-)
Analog Ground	16	15	Pin 29A (+)
Analog Ground	18	17	Pin 29B (-)
Analog Ground	12	11	Pin 30A (+)
Analog Ground	14	13	Pin 30 (-)
Analog Ground	8	7	Pin 31A (+)
Analog Ground	10	9	Pin 31B (-)
Analog Ground	4	3	Pin 32A (+)
Analog Ground	6	5	Pin 32B (-)
Chassis Ground	2	1	Chassis Ground

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Chapter 10 **Programming**

This section provides the necessary information for programming the Model 3000-52 8x32 Dual Wire Switch Matrix VXI Module.

10.1 ASCOR 3000-52 Module Overview

10.2 VXI Register Based Modules

The ASCOR 3000-52 8x32 Switch Matrix VXI Module is a register based device and supports VXIbus register maps. All controls to the 3000-52 is done through registers. All registers can be accessed with the use of slot 0 computers, host computers with VXI-MXI, or host computers with GPIB and GPIB-VXI slot 0 controllers. The 3000-52 is not a message based device and does not support VXIbus communication protocols.

10.3 ASCOR VXI Module Type

The 3000-52 has operational registers in the A16 and A24 address spaces. The registers located in the A16 address space are VXI Device Registers. They are accessed as a 16-bit word. The registers located in the A24 address space are ASCOR Module Custom registers, and they can be accessed as a 16-bit word. Additionally, since the 3000-52 is equipped with VXIMAX™ 16/32, these Custom registers can also be accessed as a 32-bit word.

10.4 VXI Device Registers

VXI Device Registers are located in the A16 address space, which can be accessed by A16 address mode. VXI Device Registers are separated into Configuration, Device Class Dependent, and Device Dependent registers. The 3000-52 provides all 4 Configuration Registers and one Device Dependent register. The rest of the A16 register space is not populated. Programming examples are shown in Sections 4.1 - 4.3 using several popular interface libraries.

10.5 ASCOR Module Custom Registers

The 3000-52 Custom registers are located in the A24 address space and they can only be accessed with A24 address mode. The method of accessing these Registers in the A24 address space is different from accessing the VXI Device Registers in the A16 address space. Therefore, care must be taken whenever accessing registers that are located in different address spaces. Programming examples are shown in Section 4.4 using several popular interface libraries.

10.6 Static and Dynamic Configurations

The 3000-52 supports both Static Configuration and Dynamic Configuration of Logical Address. In Static Configuration mode the Logical Address of the module is set and cannot be changed by the resource manager. In Dynamic Configuration mode the Logical Address is determined by the resource manager based on other devices in the system. Procedures for changing the Logical Addresses for the 3000-52 are discussed in ***5.3: (Page 26) How to change the 3000-52 Module's Logical Address.***

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10.7 VXI Device Register Description

The ASCOR 3000-52, 8x32 Dual Wire Switch Matrix has VXI Device Registers located in the A16 address space. The VXI Specification defines 32 VXI Device Registers and they are all 16 bits wide. The first 4 registers are VXI Configuration Registers. The next 12 registers are VXI Device Class Dependent Registers. The last 16 registers are VXI Device Dependent Registers. The 3000-52 supports 5 of the 32 VXI Device Registers, four in VXI Configuration Registers and one in VXI Device Dependent Register. All other registers are not supported.

VXI Device Registers forASCOR 3000-52

VXI Device Dependent Registers

Control Register

3Ch	Register Not Used
3Ah	Register Not Used
38h	Register Not Used
36h	Register Not Used
34h	Register Not Used
32h	Register Not Used
30h	Register Not Used
2Eh	Register Not Used
2Ch	Register Not Used
2Ah	Register Not Used
28h	Register Not Used
26h	Register Not Used
24h	Register Not Used
22h	Register Not Used
20h	Register Not Used

VXI Device Class Dependent Registers

1Eh	Register Not Used
1Ch	Register Not Used
1Ah	Register Not Used
18h	Register Not Used
16h	Register Not Used
14h	Register Not Used
12h	Register Not Used
10h	Register Not Used
0Eh	Register Not Used
0Ch	Register Not Used
0Ah	Register Not Used
08h	Register Not Used

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VXI Configuration Registers

06h	Offset Register
04h	Status / Control Register
02h	Device Type Register
00h	ID / Logical Address Register

VXI Device Register Description (Continued)

10.8 VXI Configuration Registers

The first four registers in the A16 address space are Configuration Registers. Each register is 16-bits wide. They are explained below.

Offset Description

00h **ID Register (read) / Logical Address Register (write)**

A read of this 16-bit register provides information about the 3000-52 Module's configuration.

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Device Class		Address Space		Manufacturer ID											

(Bits 15-14) Device Class: This field indicates the classification of the VXIbus device.
00b = Memory
01b = Extended
10b = Message Based
xxx = Register Based (ASCOR VXI Module)

Bits 13-12) Address Space: This field indicates the addressing mode(s) of the device's operational registers.
00b = A16/A24
01b = A16/A32
10b = RESERVED
11b = A16 Only

(Bits 11-0) Manufacturer ID: This field uniquely identifies the manufacturer of the device.
FB5h = ASCOR

For the 3000-52 Module, the register should read back a value of CFB5h. A write to this 16-bit register is provided for Dynamic Configuration protocol. This register should only be written to by a resource manager. Do not write to this register.

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15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Do not write to this register															

10.9 VXI Device Register Description (Continued)

Offset Description

02h **Device Type (read/write)**

A read of this 16-bit register provides information about the 3000-52 Module's device Type. This register indicates how much VMEbus memory is required by the VXI module, as well as the manufacture's unique model code.

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Required Memory				Model Code											

(Bits 15-12) Required Memory: This field contains the value used for determining the A24 or A32 memory space resident on the device
7h = 64K bytes in A24 Address Space
Fh = 64K bytes in A32 Address Space

(Bits 11-0) Model Code: This field contains the manufacturer's unique module identifier.

F2Fh = The ASCOR Model Code for the 3000-52. This number is different from the ASCOR Model number.

For the 3000-52 Module, the register should read back a value of 7F2Fh.

A write to this 16-bit register is provided for VXIbus definition. **Do not write to this register**.

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Do not write to this register															

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VXI Device Register Description (Continued)

Offset	Description
04h	**Status Register (read) / Control Register (write)**

A read of this 16-bit register provides information about the 3000-52 status.

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
A24/A32	MODID	Device Dependent (Not used)										Rea-dy	Pas-sed	Dev. Dep.	

(Bit 15) A24/A32 Active: This bit indicates the accessibility of A24 or A32 registers.

1b = A24 or A32 Address Space Active

0b = A24 or A32 Address Space not Active (for A16 only devices)

(Bit 14) MODID: This bit indicates if the device is selected via the P2 MODID line.

1b = Device is not selected via the P2 MODID line. Used by the resource manager during Dynamic Configuration.

(Bits 13-4) Device Dependent (Not used)

(Bit 3) Ready: This bit indicates if the device is ready to accept operational commands.

1b = Device is ready after power-on initialization sequence

(Bit 2) Passed: This bit indicates if the power-on self test has successfully completed.

1b = Device does not support power-on self test (always pass)

(Bits 1-0) Device Dependent

00b = State of the corresponding bits of the Control register. For the 3000-52 Module, the register should read back a value of FFFCh.

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VXI Device Register Description (Continued)

A write to this 16-bit register causes specific actions to be executed.

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
A24/A32	Device Dependent (Not used)													Sys-fail	Dev.Rst

(Bit 15) A24/A32 Enable: This bit enables or disables A24 / A32 VMEbus registers.

1b = Enables A24 or A32 VMEbus registers. This bit must always remain a one after being set to one by the resource manager.

0b = Disables A24 or A32 VMEbus registers. This bit must always remain a zero after being cleared to zero by the resource manager. (for A16 only devices)

(Bits 14-2) Device Dependent (Not used)

(Bit 1) Sysfail Inhibit: This bit controls the device's ability to drive the SYSFAIL line.
0b = Always set to zero (Sysfail not inhibited)

(Bit 0) Device Reset: This bit controls the state of the device.
1b = Reset the device to power-on state.
0b = Normal operational mode

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06h **Offset Register (read/write)** A read of the 16-bit register provides information for calculating the base address of the 3000-52 A24 operational registers.

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Offset Value								not used							

(Bits 15-8) Offset Value: This field is used for calculating the A24 Base Address.

(Bits 7-0) Don't Care bits (Not used) To obtain the A24 base address for the 3000-52, take the 8 most significant bits of the Offset register and map them to the 8 most significant bits of the A24 Base Address. All other bits in the A24 Base Address are set to zeroes. For more detail refer to ***Section 5.2: (Page 25) Q: How do I calculate the 3000-52 Module's A24 Base Address?.***

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VXI Device Register Description (Continued)

A write to this 16-bit register is provided for Dynamic Configuration protocol. This register should only be written to by a resource manager. Do not write to this register.

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Do not write to this register															

VXI Device Class Dependent Registers

The ASCOR 3000-52 8x32 Switch Matrix VXI Module does not use nor provide any of the 12 Device Class Dependent Registers.

Offset	**Description**
08h	Not Used
0Ah	Not Used
0Ch	Not Used
0Eh	Not Used
10h	Not Used
12h	Not Used
14h	Not Used
16h	Not Used
18h	Not Used
1Ah	Not Used
1Ch	Not Used
1Eh	Not Used

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VXI Device Register Description (Continued)

VXI Device Dependent Registers for the 3000-52

The VXI Specification defines 16 Device Dependent Registers in the A16 address space following the Device Class Dependent Register space. Each register is 16 bits wide. The first 15 registers are not used nor provided by the ASCOR 3000-52 8x32 Switch Matrix, only the last register is used.

Offset	**Description**
20h	Not Used
22h	Not Used
24h	Not Used
26h	Not Used
28h	Not Used
2Ah	Not Used
2Ch	Not Used
2Eh	Not Used
30h	Not Used
32h	Not Used
34h	Not Used
36h	Not Used
38h	Not Used
3Ah	Not Used
3Ch	Not Used

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VXI Device Register Description (Continued)

3Eh Control Register (read/write)

A read of the 16-bit register provides the module control status.

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Reserved										IRQ Level Select			Rvd	Reg Bit	Coil Ena

(Bits 15-6) Reserved

0h = Should always readback zeroes

(Bits 5-3) IRQ Level Select: These bits reflect the module's Interrupt Request Level

0h = No IRQ Level Selected, module Interrupt disabled.
1h = IRQ Level 1 Selected, module Interrupt enabled.
2h = IRQ Level 2 Selected, module Interrupt enabled.
3h = IRQ Level 3 Selected, module Interrupt enabled.
4h = IRQ Level 4 Selected, module Interrupt enabled.
5h = IRQ Level 5 Selected, module Interrupt enabled.
6h = IRQ Level 6 Selected, module Interrupt enabled.
7h = IRQ Level 7 Selected, module Interrupt enabled.

(Bit 2) Reserved
0h = Should always readback zero

(Bit 1) Reg Bit: This bit indicates the device's readback mode.
0b = Relay coil state readback is enabled

(Bit 0) Coil Enable This bit indicates the device's coil driver state.
0b = Relay coil driver is enabled
1b = Relay coil driver is disabled

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VXI Device Register Description (Continued)

A write to this 16-bit register is sets the module control.

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Reserved										IRQ Level Select			Rvd	Reg Bit	Coil Ena

(Bits 15-6) Reserved
0h = Should always be set to zeroes

(Bits 5-3) IRQ Level Select: These bits select the module's Interrupt Request Level
0h = No IRQ Level Selected, module Interrupt disabled.
1h = IRQ Level 1 Selected, module Interrupt enabled.
2h = IRQ Level 2 Selected, module Interrupt enabled.
3h = IRQ Level 3 Selected, module Interrupt enabled.
4h = IRQ Level 4 Selected, module Interrupt enabled.
5h = IRQ Level 5 Selected, module Interrupt enabled.
6h = IRQ Level 6 Selected, module Interrupt enabled.
7h = IRQ Level 7 Selected, module Interrupt enabled.

(Bit 2) Reserved
0h = Should always be set to zero

(Bit 1) Reg Bit: This bit controls the device's readback mode.
0b = Enable relay coil state readback
1b = Enable data register state readback

(Bit 0) Coil Enable: This bit controls the device's relay coil driver.
0b = Enable relay coil driver
1b = Disable relay coil driver

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10.10 ASCOR Custom Registers for the ASCOR 3000-52 Module

The ASCOR 3000-52 Custom Registers are located in the A24 Address Space. The custom registers start at offset 8000h within the A24 address space assigned by the resource manager. All 3000-52 custom registers can be accessed as a 16-bit word. Additionally, since the ASCOR 3000-52 8x32 Switch Matrix features VXIMAX™, the custom registers can also be accessed as 32-bit words. **Offset Address in 16-Bit Mode** The 3000-52 Custom Registers can be accessed in 16-bit mode. Address offsets for the custom registers increment by two (2). Sample offsets for the ASCOR Custom Registers in 16-bit word mode:

Offset	**Description**
8000h	First Custom Register
8002h	Second Custom Register
8004h	Third Custom Register
8006h	Fourth Custom Register
. . . and so on . . .	

Offset address in 32-Bit Mode The 3000-52 Custom Registers can also be accessed in 32-bit mode. Address offsets for the custom registers increment by four (4). Sample offsets for the ASCOR Custom Registers in 32-bit word mode:

Offset	**Description**
8000h	First Custom Register
8004h	Second Custom Register
8008h	Third Custom Register
800Ch	Fourth Custom Register
. . . and so on . . .	

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10.11 ASCOR Relay Registers

A subset of the ASCOR 3000-52 Custom Registers are relay registers. See connector assignments for pin and channels assignments with associated relays.

3000-52 Relay Registers	
8000h	Relays K1-16 , Pin 1 (Ch. 1-8) , Pin 2 (Ch. 1-8)
8002h	Relays K17-32 , Pin 3 (Ch. 1-8) , Pin 4 (Ch. 1-8)
8004h	Relays K33-48 , Pin 5 (Ch. 1-8) , Pin 6 (Ch. 1-8)
8006h	Relays K49-64 , Pin 7 (Ch. 1-8) , Pin 8 (Ch. 1-8)
8008h	Relays K65-80 , Pin 9 (Ch. 1-8) , Pin 10 (Ch. 1-8)
800Ah	Relays K81-96 , Pin 11 (Ch. 1-8) , Pin 12 (Ch. 1-8)
800Ch	Relays K97-112 , Pin 13 (Ch. 1-8) , Pin 14 (Ch. 1-8)
800Eh	Relays K113-128 , Pin 15 (Ch. 1-8) , Pin 16 (Ch. 1-8)
8010h	Relays K129-144 , isolation relays , group 1, 2
8020h	Relays K1-16 , Pin 17 (Ch. 1-8) , Pin 18 (Ch. 1-8)
8022h	Relays K17-32 , Pin 19 (Ch. 1-8) , Pin 20 (Ch. 1-8)
8024h	Relays K33-48 , Pin 21 (Ch. 1-8) , Pin 22 (Ch. 1-8)
8026h	Relays K49-64 , Pin 23 (Ch. 1-8) , Pin 24 (Ch. 1-8)
8028h	Relays K65-80 , Pin 25 (Ch. 1-8) , Pin 26 (Ch. 1-8)
802Ah	Relays K81-96 , Pin 27 (Ch. 1-8) , Pin 28 (Ch. 1-8)
802Ch	Relays K97-112 , Pin 29 (Ch. 1-8) , Pin 30 (Ch. 1-8)
802Eh	Relays K113-128 , Pin 31 (Ch. 1-8) , Pin 32 (Ch. 1-8)
8030h	Relays K129-144 , isolation relays , group 3, 4

Note: relays K1-144 in address space 8020h through 8030h are located on the daughter board, 85002300. These registers, which are also located in the A24 Address Space, have a few unique properties:

Read / Write ASCOR Relay Registers are read / write registers. When a relay register is read the states of the coils associated to that register are returned. Normally, the states of the coils should match the values which were written. They may not match when error conditions occur or when relay coil drivers are disabled. On some rare occasions, the design of the module may not permit matching results.

Read Mode The read mode of the Relay Registers can be switched between reading the states of the coils and reading data registers used for programming coils. The default read mode is reading the coil states. Any module reset brings the read mode back to reading coil states.

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10.12 Programming with Registers

The 3000-52 VXI Device Registers are read / write registers, but some device registers must be written only by the resource manager. See Section 2: VXI Device Register Description for registers reserved for the resource manager access. Since all 16 bits are programmed with a single write operation, care must be taken when values are written to the device registers in order to prevent unintended function enabling or disabling. In order to preserve the states of the functions that you do not want to alter, perform the following sequence of operations:

1. Read the device register first,
2. Modify only the bits you intend to program using the copy of the device register,
3. Write the new value back to the device register.

Here are some example codes for reading the 3000-52 ID Register.

Example using National Instruments NI-VXI calls with the Logical Address of 5

```
/*  C code segment for reading the ID Register using VXIinReg call.  */
int16     ret;
uint16   la= 5;     /* Logical Address */
uint16   reg       = 0;       /* ID Register offset */
uint16   value16;           /* Read the ID Register */
ret = VXIinReg (la, reg, &value16);          /* Check for read error */
if (ret << 0)                  /*  Error occurred during read.  */;
 /*  C code segment for reading the ID Register using VXIin call.  */
int16     ret;
uint16    accessparms     = 1;       /* A16, Nonprivileged data access, Motorola Byte Order */
uint32   address = 0xC140;          /* LA * 0x40 + 0xC000 + ID Register offset  */
uint16   width    = 2;       /* 16-bit word */
uint16    value16;    /* Read the ID Register */
ret = VXIin (accessparms, address, width, &value16);  /* Check for read error */
if (ret << 0)                  /*  Error occurred during read.  */;
```


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Programming with Registers (Continued)

Example using VXIplug&play VISA calls

```
/*  C code segment for reading the ID Register using ViIn16 call.  */
ViStatus                as3xxx_status;
ViSession       vi;             /*  vi from previous call to as3xxx_init  */
ViUInt16        space   = VI_A16_SPACE;
ViBusAddress    offset  = 0x00; /*  Offset of the ID Register  */
ViUInt16        val16;          /* Read the ID Register */
as3xxx_status = viIn16 (vi, space, offset, &val16);       /* Check for read error */
if (as3xxx_status << VI_SUCCESS)                /*  Error occurred during read.  */;
```


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Resetting ASCOR VXI Module

The ASCOR 3000-52 8x32 Switch Matrix can be reset to a power up state by setting the Device Reset bit of the Status / Control (04h) register in the VXI Configuration Registers. Care must be taken when writing to this register since all bits other than the Device Reset bit must not be changed. In order to preserve the states of all other bits, perform the following sequence of operations:

1. Read the Status / Control register,
2. Set only the Device Reset bit,
3. Write the modified word to the Status / Control register.

After the reset operation, the module must be brought back to a normal operational mode in order for the relays to close. The 3000-52 can be set back to the normal operation mode by clearing the Device Reset bit without modifying any other bits. Here are some example codes for resetting the 3000-52 Example using National Instruments NI-VXI calls with the Logical Address of 5.

```
/*  C code segment for resetting the ASCOR VXI module using VXIinReg and VXIoutReg calls  */
int16    ret;
uint16  la        = 5;       /* Logical Address */
uint16  reg       = 4;       /* Status / Control register offset */
uint16  value16;             /* Read the Status / Control Register */
ret = VXIinReg (la, reg, &value16);          /* Check for read error */
if (ret << 0)                /*  Error occurred during read.  */;
/* Set the Device Reset bit in the copy of the Status / Control Register */
value16 |= 0x0001;       /* Write to the Status / Control Register */
ret = VXIoutReg (la, reg, value16);          /* Check for write error */
if (ret << 0)                /*  Error occurred during write.  */;
```


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Programming with Registers (Continued)

```
/* Bring the module back to the normal operation by clearing the Device Reset bit in the copy of the
Status / Control Register */
value16 &= 0xFFFE;       /* Write to the Status / Control Register */
ret = VXIoutReg (la, reg, value16);          /* Check for write error */
if (ret << 0)                 /*  Error occurred during write.  */;
/*  C code segment for resetting the ASCOR VXI module using VXIin and VXIout calls  */
int16     ret;
uint16   accessparms     = 1;
/* A16, Nonprivileged data access, Motorola Byte Order */
uint32   address            = 0xC144;
 /* LA * 0x40 + 0xC000 + Control / Status Register */
uint16   width              = 2;        /* Word */
uint16    value16;          uint32   value32;
/* Read the Status / Control Register */
ret = VXIin (accessparms, address, width, &value16);       /* Check for read error */
if (ret << 0)                 /*  Error occurred during read.  */;
/* Set the Device Reset bit in the copy of the Status / Control Register */
value32 = value16;
value32 |= 0x0001;       /* Write to the Status / Control Register */
ret = VXIout (accessparms, address, width, value32);       /* Check for write error */
if (ret << 0)                 /*  Error occurred during write.  */;
```


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Programming with Registers (Continued)

```
/* Bring the module back to the normal operation by clearing the Device Reset bit in the copy of the
Status / Control Register */
 value32 &= 0xFFF;        /* Write to the Status / Control Register */
ret = VXIout (accessparms, address, width, value32);       /* Check for write error */
if (ret << 0)                  /*  Error occurred during write.  */;
```

Example using VXIplug&play VISA calls

```
/*  C code segment for resetting the ASCOR VXI Module  */
ViStatus                  as3xxx_status;
ViSession          vi;                  /*  vi from previous call to as3xxx_init  */
ViUInt16           space    = VI_A16_SPACE;
ViBusAddress       offset    = 0x04;  /*  Offset of the Status / Control Register  */
ViUInt16            value16;          /* Read the Status / Control Register */
as3xxx_status = viIn16 (vi, space, offset, &value16);        /* Check for read error */
if (as3xxx_status << VI_SUCCESS)                    /*  Error occurred during read.  */;
/* Set the Device Reset bit in the copy of the Status / Control Register */
value16 |= 0x0001;        /* Write to the Status / Control Register */
as3xxx_status = viOut16 (vi, space, offset, value16);         /* Check for write error */
if (as3xxx_status << VI_SUCCESS)                    /*  Error occurred during write.  */;
```


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Programming with Registers (Continued)

```
/* Bring the module back to the normal operation by clearing the Device Reset bit in the copy of the
Status / Control Register */

value16 &= 0xFFFE;       /* Write to the Status / Control Register */

as3xxx_status = viOut16 (vi, space, offset, value16);       /* Check for write error */

if (as3xxx_status << VI_SUCCESS)                    /*  Error occurred during write.  */;
```

Changing the Relay Register Read Mode for the 3000-52

The ASCOR 3000-52 Relay read mode can be changed to read the data register instead of the coil states. Change the mode by setting the Reg Bit of the Relay Control (3Eh) register in the VXI Device Dependent Registers. Care must be taken when writing to this register since all bits other than the Reg Bit must not be changed. In order to preserve the states of all other bits, perform the following sequence of operations:

1. Read the Relay Control register,
2. Set only the Reg Bit,
3. Write the modified word to the Relay Control register.

Subsequent reading of the Relay Registers will return the values of the data registers instead of the coil states. Reg Bit is cleared and the read mode is reset to reading the coil states when the 3000-52 is reset. Here are some example codes for changing the read mode of the 3000-52.

Example using National Instruments NI-VXI calls with the Logical Address of 5

```
/*  C code segment for switching to data register readback using VXIinReg and VXIoutReg calls  */

int16    ret;

uint16   la         = 5;       /* Logical Address */

uint16   reg        = 0x3E;  /* Relay Control register offset */

uint16   value16;           /* Read the Status / Control Register */

ret = VXIinReg (la, reg, &value16);          /* Check for read error */

if (ret << 0)                    /*  Error occurred during read.  */;

/* Set the Reg Bit in the copy of the Status / Control Register */

value16 |= 0x0002;       /* Write to the Status / Control Register */

ret = VXIoutReg (la, reg, value16);          /* Check for write error */

if (ret << 0)                    /*  Error occurred during write.  */;
```


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```
/*  C code segment for change to data register readback using VXIin and VXIout calls  */
int16    ret;
uint16   accessparms     = 1;          /* A16, Nonprivileged data access, Motorola Byte Order */
uint32    address                    = 0xC17E;   /* LA * 0x40 + 0xC000 + Relay Control Register  */
uint16   width             = 2;          /* Word */
uint16   value16;
uint32   value32;          /* Read the Status / Control Register */
ret = VXIin (accessparms, address, width, &value16);      /* Check for read error */
if (ret << 0)                 /*  Error occurred during read.  */;
/* Set the Reg Bit in the copy of the Status / Control Register */
value32 = value16;
 value32 |= 0x0002;       /* Write to the Status / Control Register */
ret = VXIout (accessparms, address, width, value32);      /* Check for write error */
if (ret << 0)                 /*  Error occurred during write.  */;
```

Example using VXIplug&play VISA calls

```
/*  C code segment for change to data register readback using VISA calls  */
ViStatus                  as3xxx_status;
ViSession         vi;                  /*  vi from previous call to as3xxx_init  */
ViUInt16          space    = VI_A16_SPACE;
ViBusAddress      offset    = 0x3E;  /*  Offset of the Relay Control Register  */
ViUInt16          value16;          /* Read the Status / Control Register */
as3xxx_status = viIn16 (vi, space, offset, &value16);       /* Check for read error */
if (as3xxx_status << VI_SUCCESS)                  /*  Error occurred during read.  */;
/* Set the Reg Bit in the copy of the Status / Control Register */
value16 |= 0x0002;       /* Write to the Status / Control Register */
as3xxx_status = viOut16 (vi, space, offset, value16);       /* Check for write error */
if (as3xxx_status << VI_SUCCESS)                  /*  Error occurred during write.  */;
```


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Programming the ASCOR 3000-52 Custom Registers

The ASCOR 3000-52 Custom Registers can be accessed through the registers in the A24 address space. Since all 16 or 32 bits are programmed with a single write operation, care must be taken when values are written to these registers in order to prevent unintended side effects. To preserve the configuration that you do not want to program, perform the following sequence of operations:

1. Read the register first,
2. Modify only the bits you intend to program using the copy of the register,
3. Write the new value back to the register.

Refer to Section (TBD) for the definition of the custom registers found in the 3000-52. All 3000-52 Custom Registers are located in the A24 address space. A unique A24 base address is assigned by the resource manager to the A24 module in the system. The assignment of the base address is performed every time when the resource manager is executed. The 3000-52 Custom Registers start at an offset from the module's assigned A24 base address. The sum of the two values, A24 base address and the custom register offset, gives the unique custom register address. Some interface library calls require the A24 custom register address. VXIplug&play library calls require only the offset of the register from the base address. The A24 base address is added to the offset internally. Here are some example codes for writing to the 3000-52 custom registers. Example using National Instruments NI-VXI calls

```
/*  C code segment for writing the value 0x1000 to the first custom register, assume A24 Base Address of 200000h */
int16     ret;
uint16   accessparms     = 2;       /* A24, Nonprivileged data access, Motorola Byte Order */
uint32   address;
uint16   width              = 2;       /* Word */
uint32    value32;
address  = 0x208000;     /*  A24 Base Address + offset of the first custom register  */
value32= 0x1000;          /*  Value to write to the first custom register  */
/* Write to the first custom register */
ret = VXIout (accessparms, address, width, value32);       /* Check for write error */
if (ret << 0)                 /*  Error occurred during write.  */;
```


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Example using VXIplug&play VISA calls

```
/*  C code segment for writing the value 0x1000 to the first custom register  */
ViStatus                as3xxx_status;
ViSession       vi;
ViUInt16        space   = VI_A24_SPACE;
ViBusAddress    offset  = 0x8000;       /*  Offset of the first custom register  */
ViUInt16         value16;
value16         = 0x1000;       /*  Value to write to the first custom register  */
/* Write to the first custom register */
as3xxx_status = viOut16 (vi, space, offset, value16);       /* Check for write error */
if (as3xxx_status << VI_SUCCESS)                    /*  Error occurred during write.  */;
```


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Chapter 11 Miscellaneous Questions and Answers

Q: How do I calculate the 3000-52 Module's A16 Base Address?

A: The A16 Base Address of the 3000-52 is derived from the Logical Address. The formula for calculating the A16 Base Address is as follows:

A16 Base Address = C000h + LA x 40h where LA is the Logical Address of a module

Logical Address	A16 Base Address
1	C040h
2	C080h
3	C0C0h
4	C100h
5	C140h
and so on . . .	

If the module's Logical Address is 5 then A16 Base Address is C140h and Device Register addresses are as follows:

Address	Device Registers
C140h	ID Register / Logical Address Register
C142h	Device Type Register
C144h	Status / Control Register
C146h	Offset Register
C17Eh	Relay Control Register

If the module's Logical Address is 8 then A16 Base Address is C200h and Device Register addresses are as follows:

Address	Device Registers
C200h	ID Register / Logical Address Register
C202h	Device Type Register
C204h	Status / Control Register
C206h	Offset Register
C23Eh	Relay Control Register

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Q: How do I calculate the 3000-52 Module's A24 Base Address?

A: The A24 Base Address of the 3000-52 can be derived from the value stored in the Offset Register (06h). To obtain the A24 base address, take the 8 most significant bits of the Offset register and map them to the 8 most significant bits of the A24 Base Address. All other bits in the A24 Base Address are set to zeroes.

Following are some examples of the Offset Register Values and the corresponding A24 Base Addresses.

Offset Register Values	Derived A24 Base Addresses
20XXh	200000h
30XXh	300000h
70XXh	700000h

Alternatively, A24 Base Address of a device can be obtained by issuing a library call.

Example using National Instruments NI-VXI calls with the Logical Address of 5

```
/*  C code segment for obtaining the device's A24 Base Address  */
int16     ret;
uint16   la          = 5;       /* Logical Address */
uint16   field      = 12;      /* Base of A24/A32 address space */
uint32    baseA24;          /* Get the A24 Base Address */
ret = GetDevInfo (la, field, &baseA24);              /* Check for function error */
if (ret << 0)                  /*  Error occurred during GetDevInfo.  */;
```

Q: How do I Change the 3000-52 Module's Logical Address?

A: The Logical Address of ASCOR 3000-52 Module can be changed manually using the two rotary switches located in the back of the module. These rotary switches represent the high and low hex digits of an eight bit Logical Address. Orient the 3000-52 module as shown in the illustration below. The rotary switch on the bottom (D1) represents the high hex digit and the rotary switch on the top (D2) represents the low hex digit. Each rotary switch can be turned clockwise or counter-clockwise. Turn each rotary switch until the desired hex digit is aligned with the small white dot on the left side of the rotary switch casing. Valid Logical Addresses for Static Configuration are between 01h (1) and FEh (254). The Logical Address of 00h (0) is reserved for Slot 0 computer. Do not set the Logical Address of ASCOR VXI Modules to 0. The example below show the rotary switch settings for a 3000-52 Logical Address of 53. ASCOR VXI Modules also supports Dynamic Configuration methods of assigning Logical Addresses. In order for Dynamic Configuration to work properly the resource manager software must also support Dynamic Configuration. Set the rotary switches on the modules to FFh (255) so that the resource manager software can dynamically assign Logical Addresses to ASCOR VXI Modules.

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