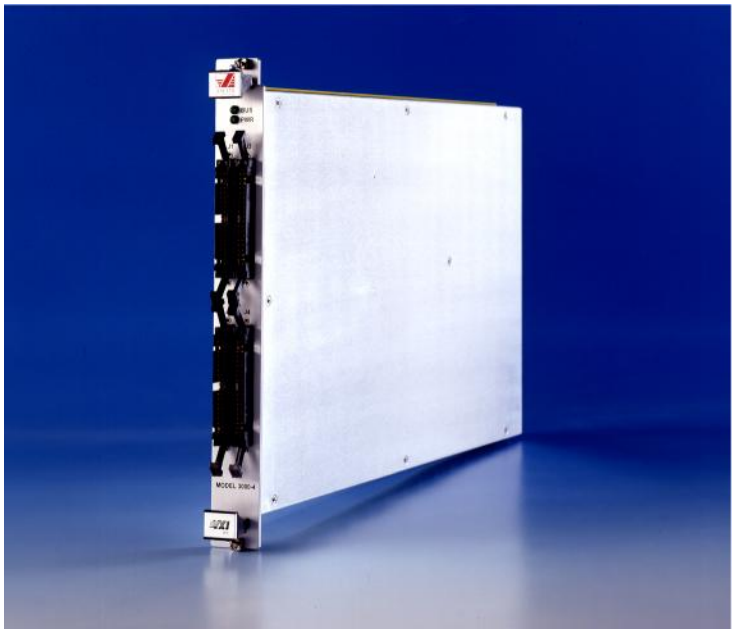
Model 3000-04
Peripheral Driver, Multi-Channel
90400660 & 90400660-001



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Warranty

Giga-tronics Series 3000 Switching Modules are warranted against defective materials and workmanship for three years from date of shipment, or as detailed in the warranty section of this manual. Giga-tronics will, at its option, repair or replace products that are proven defective during the warranty period. This warranty DOES NOT cover damage resulting from improper use, nor workmanship other than Giga-tronics service. There is no implied warranty of fitness for a particular purpose, nor is Giga-tronics liable for any consequential damages. Specification and price change privileges are reserved by Giga-tronics.

CONTACT INFORMATION

Giga-tronics, Incorporated
4650 Norris Canyon Road
San Ramon, California 94583
Telephone: 800.726.4442 (only within the United States)
925.328.4650
Fax: 925.328.4700
On the Internet: www.gigatronics.com

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	3000-04

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

Giga-tronics, Incorporated
4650 Norris Canyon Road
San Ramon, California 94583
Telephone: 800.726.4442 (only within the United States)
925.328.4650
Fax: 925.328.4700

Record of Changes to This Manual

Use the table below to maintain a permanent record of changes to this document. Corrected replacement pages are issued as Technical Publication Change Instructions (TPCI). When you are issued a TPCI, do the following:

1. Insert the TPCI at the front of the manual binder.
2. Remove the pages from the manual binder that are noted in the TPCI.
3. Replace the page(s) removed in the previous step with the corrected page(s).
4. Record the changes in the table below.

TPCI Number	TPCI Issue Date	Date Entered	Comments

Revision History			
Revision	**Description of Change**	**Chg Order #**	**Approved By**
A	Initial Release		
B	Updated 7/02		
C	Reformatted 2/10		
D	Reformatted 2/12		RCW

Contents

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

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.

Chapter 2 **Configuration Table**

MODEL 3000-04

90400660	TOP ASSEMBLY
PL90400660	PARTS LIST

85005010-010	PWA ASSEMBLY
PL85005010-010	PWA PARTS LIST
SCH85005010-010	PWA SCHEMATIC

MODEL 3000-04 (Option 1)

90400660-001	TOP ASSEMBLY
PL90400660-001	PARTS LIST

85005010-010	PWA ASSEMBLY
PL85005010-010	PWA PARTS LIST
SCH85005010-010	PWA SCHEMATIC

Chapter 3 **Functional Description**

3.1 General Description – Standard Module

The Model 3000-4 has 128 drivers provided by 16 solid state driver integrated circuits with 8 switching outputs per driver. Each of the 16 driver sections has a separate voltage reference jumper that can be set to +5 volts, +12 volts, +24 volts, or some external voltage (<45 volts). Voltage is set using shunts on the printed circuit assembly and is configured by removing the side cover that has the ASCOR part number on it. Refer to Section 1.5, Driver Reference Voltage Configuration Table.

The driver outputs have built in clamp diodes, which are referenced to the selected driver reference voltage. The open collector bipolar Darlington drivers are suitable for use with relays, solenoids, stepping motors, LED's, incandescent displays or other high power loads.

The Model 3000-4 Option 1 is similar to the standard model in that there are also 128 provided in the unit. However, the Option 1 has only 34 drivers connected to the front connectors J1 and J2. (See front panel connector pin assignment chart.) Each of the driver sections has a separate voltage reference jumper that can be set to +5 volts, + 12 volts or +24 volts. Voltage is set using shunts on the printed circuit card assembly and is configured by removing the side cover that has the ASCOR part number on it. Refer to Section 1.5, Driver Reference Voltage Configuration Table. The open collector Darlington drivers have built-in clamp diodes which are referenced to the selected driver reference voltage.

The 3000-4 Option 1 also differs from the standard 3000-4 in that the front panel connectors are SCSI III type 68 position connectors instead of the standard 40 position IDC connectors. The front connectors mate with and standard SCSI III position cables. The default factory setting for the Driver Reference Voltage is +12 volts.

The 3000-4 standard and option 1 are register based VXI modules. The register map is carefully laid out for easy software control. The Interface and mechanical constructions meets the specification of the VXIbus System Specification, rev 1.2 and 1.3.

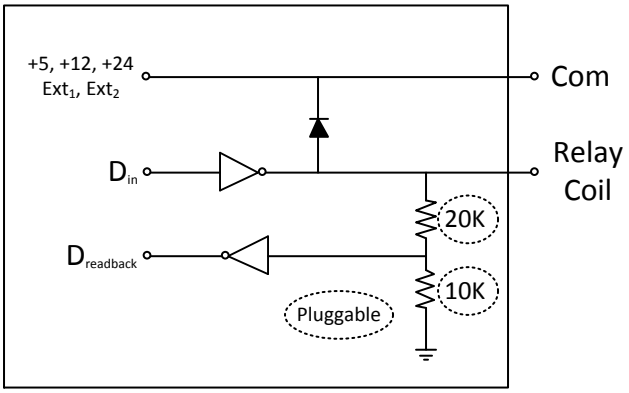
3.2 General Description - Option 1

The Model 3000-4, Opt 1, is similar to the standard in that there are 128 solid state IC drivers provided in the unit. However the Model 3000-4, Opt 1, has only 34 drivers connected to the front connectors J! and J2. (See Front Panel Connector Pin Assignment chart.) Each of the driver sections has a separate voltage reference jumper that can be set to +5 volts, +12 volts or + 24 volts. Voltage is set using shunts on the printed circuit card assembly and is configured by removing the side cover that has the ASCOR part number on it. Refer to Section 1.5, Driver Reference Voltage Configuration Table. The open collector Darlington drivers have built in clamp diodes which are referenced to the selected driver reference voltage.
The default factory setting for the Driver Reference Voltage is +12 volts.

The 3000-4, Opt 1, also differs from the standard 3000-4 in that the front panel connectors are SCSI III type 68 position connectors instead of the standard 40 position IDC connectors.
The front connectors mate with any standard SCSI III 68 position cables.

The 3000-4, Opt 1, is a register based VXI module. See the Register Map for the register addresses and which bits have been assigned to which drivers.

Chapter 4 **Block Diagram**



Typical Channel

Chapter 5 Controls and Indicators

The following controls and indicators are provided to select and display the functions of the ASCOR 3000-4 Module's operating environment.

5.1 VXI LOGICAL ADDRESS

The Logical Address Switch is a dual circular switch 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 Model 3000-4 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 3000-4

module is addressed by the system.

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 3000-4 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".

Chapter 7 **Specifications**

MECHANICAL:

Thickness:	1.200 inches
Width:	10.317 inches
Length:	13.78 inches
Weight:	5 lbs.

Mating Parts for the Front Panel Connectors :

ASCOR Installation Kit P/N 89800420

ELECTRICAL:

Number of drivers	128
Maximum sink current:	500 mA
Internal selectable drive reference voltage:	+5V, +12V, +24V (per 8 channels)
External drive reference voltage :	+45 V (MAX)
Maximum power dissipation:	2.25 Watts MAX.

[per driver switch section (group of eight switch outputs)]

Chapter 8 **Front Panel Connectors**

CONNECTOR - J1

Description	Pin	Pin	Description
SW1-8	40	39	SW1-7
SW1-6	38	37	SW1-5
SW1-4	36	35	SW1-3
SW1-2	34	33	SW1-1
N/C	32	31	SW1 (Ext Pwr)
SW2-8	30	29	SW2-7
SW2-6	28	27	SW2-5
SW2-4	26	25	SW2-3
SW2-2	24	23	SW2-1
N/C	22	21	SW2 (Ext Pwr)
SW3-8	20	19	SW3-7
SW3-6	18	17	SW3-5
SW3-4	16	15	SW3-3
SW3-2	14	13	SW3-1
N/C	12	11	SW3 (Ext Pwr)
SW4-8	10	09	SW4-7
SW4-6	08	07	SW4-5
SW4-4	06	05	SW4-3
SW4-2	04	03	SW4-1
N/C	02	01	SW4 (Ext Pwr)

CONNECTOR - J3

Description	Pin	Pin	Description
SW9-8	40	39	SW9-7
SW9-6	38	37	SW9-5
SW9-4	36	35	SW9-3
SW9-2	34	33	SW9-1
N/C	32	31	SW9 (Ext Pwr)
SW10-8	30	29	SW10-7
SW10-6	28	27	SW10-5
SW10-4	26	25	SW10-3
SW10-2	24	23	SW10-1
N/C	22	21	SW10 (Ext Pwr)
SW11-8	20	19	SW11-7
SW11-6	18	17	SW11-5
SW11-4	16	15	SW11-3
SW11-2	14	13	SW11-1
N/C	12	11	SW11 (Ext Pwr)
SW12-8	10	09	SW12-7
SW12-6	08	07	SW12-5
SW12-4	06	05	SW12-3
SW12-2	04	03	SW12-1
N/C	02	01	SW12 (Ext Pwr)

CONNECTOR - J2

Description	Pin	Pin	Description
SW5-8	40	39	SW5-7
SW5-6	38	37	SW5-5
SW5-4	36	35	SW5-3
SW5-2	34	33	SW5-1
N/C	32	31	SW5 (Ext Pwr)
SW6-8	30	29	SW6-7
SW6-6	28	27	SW6-5
SW6-4	26	25	SW6-3
SW6-2	24	23	SW6-1
N/C	22	21	SW6 (Ext Pwr)
SW7-8	20	19	SW7-7
SW7-6	18	17	SW7-5
SW7-4	16	15	SW7-3
SW7-2	14	13	SW7-1
N/C	12	11	SW7 (Ext Pwr)
SW8-8	10	09	SW8-7
SW8-6	08	07	SW8-5
SW8-4	06	05	SW8-3
SW8-2	04	03	SW8-1
N/C	02	01	SW8 (Ext Pwr)

CONNECTOR - J4

Description	Pin	Pin	Description
SW13-8	40	39	SW13-7
SW13-6	38	37	SW13-5
SW13-4	36	35	SW13-3
SW13-2	34	33	SW13-1
N/C	32	31	SW13 (Ext Pwr)
SW14-8	30	29	SW14-7
SW14-6	28	27	SW14-5
SW14-4	26	25	SW14-3
SW14-2	24	23	SW14-1
N/C	22	21	SW14 (Ext Pwr)
SW15-8	20	19	SW15-7
SW15-6	18	17	SW15-5
SW15-4	16	15	SW15-3
SW15-2	14	13	SW15-1
N/C	12	11	SW15 (Ext Pwr)
SW16-8	10	09	SW16-7
SW16-6	08	07	SW16-5
SW16-4	06	05	SW16-3
SW16-2	04	03	SW16-1
N/C	02	01	SW16 (Ext Pwr)

Chapter 9 **Front Panel Pin Assignments**

Model 3000-04, Standard

CONN	FUNCTION	REGISTER ADDRESS	BIT #
J1-01	SWT1-PWR	N/A	
J1-02	SWT1-DR2	8000h	1
J1-03	SWT1-DR4	8000h	3
J1-04	SWT1-DR6	8000h	5
J1-05	NC		
J1-06	SWT2-DR1	8000h	8
J1-07	SWT2-DR3	8000h	10
J1-08	SWT2-DR5	8000h	12
J1-09	NC		
J1-10	SWT3-PWR	N/A	
J1-11	SWT3-DR2	8002h	1
J1-12	SWT3-DR4	8002h	3
J1-13	SWT3-DR6	8002h	5
J1-14	NC		
J1-15	SWT4-DR1	8002h	8
J1-16	SWT4-DR3	8002h	10
J1-17	NC		
J1-18	NC		
J1-19	NC		
J1-20	NC		
J1-21	NC		
J1-22	NC		
J1-23	NC		
J1-24	NC		
J1-25	NC		
J1-26	NC		
J1-27	NC		
J1-28	NC		
J1-29	NC		
J1-30	NC		
J1-31	NC		
J1-32	NC		
J1-33	DGND-SWT3	N/A	
J1-34	DGND-SWT4	N/A	

CONN	FUNCTION	REGISTER ADDRESS	BIT #
J1-35	SWT1-DR1	8000h	0
J1-36	SWT1-DR3	8000h	2
J1-37	SWT1-DR5	8000h	4
J1-38	NC		
J1-39	SWT2-PWR	N/A	
J1-40	SWT2-DR2	8000h	9
J1-41	SWT2-DR4	8000h	11
J1-42	SWT2-DR6	8000h	13
J1-43	NC		
J1-44	SWT3-DR1	8002h	0
J1-45	SWT3-DR3	8002h	2
J1-46	SWT3-DR5	8002h	4
J1-47	NC		
J1-48	SWT4-PWR	N/A	
J1-49	SWT4-DR2	8002h	9
J1-50	SWT4-DR4	8002h	11
J1-51	NC		
J1-52	NC		
J1-53	NC		
J1-54	NC		
J1-55	NC		
J1-56	NC		
J1-57	NC		
J1-58	NC		
J1-59	NC		
J1-60	NC		
J1-61	NC		
J1-62	NC		
J1-63	NC		
J1-64	NC		
J1-65	NC		
J1-66	DGND-SWT5	N/A	
J1-67	DGND-SWT1	N/A	
J1-68	DGND-SWT2	N/A	

DGND = DIGITAL GROUND
SWT1-PWR = IC SWITCH #1, +12V POWER OUTPUT
SWT1-DR1 = IC SWITCH #1, DRIVER #1 OUTPUT (REF: Schematic # SCH85005010-010)
NC = NO CONNECTION
N/A = NOT APPLICABLE

CONN	FUNCTION	REGISTER ADDRESS	BIT #
J2-01	SWT5-PWR	N/A	
J2-02	SWT5-DR2	8004h	1
J2-03	NC		
J2-04	NC		
J2-05	NC		
J2-06	SWT6-DR1	8004h	8
J2-07	NC		
J2-08	NC		
J2-09	NC		
J2-10	SWT7-PWR	N/A	
J2-11	SWT7-DR2	8006h	1
J2-12	NC		
J2-13	NC		
J2-14	NC		
J2-15	SWT8-DR1	8006h	8
J2-16	NC		
J2-17	NC		
J2-18	NC		
J2-19	SWT9-PWR	N/A	
J2-20	SWT9-DR2	8008h	1
J2-21	NC		
J2-22	NC		
J2-23	NC		
J2-24	SWT10-DR1	8008h	8
J2-25	NC		
J2-26	NC		
J2-27	NC		
J2-28	NC		
J2-29	NC		
J2-30	NC		
J2-31	NC		
J2-32	NC		
J2-33	DGND-SWT8	N/A	
J2-34	DGND-SWT9	N/A	

CONN	FUNCTION	REGISTER ADDRESS	BIT #
J2-35	SWT5-DR1	8004h	0
J2-36	NC		
J2-37	NC		
J2-38	NC		
J2-39	SWT6-PWR	N/A	
J2-40	SWT6-DR2	8004h	9
J2-41	NC		
J2-42	NC		
J2-43	NC		
J2-44	SWT7-DR1	8006h	0
J2-45	NC		
J2-46	NC		
J2-47	NC		
J2-48	SWT8-PWR	N/A	
J2-49	SWT8-DR2	8006h	9
J2-50	NC		
J2-51	NC		
J2-52	NC		
J2-53	SWT9-DR1	8008h	0
J2-54	NC		
J2-55	NC		
J2-56	NC		
J2-57	SWT10-PWR	N/A	
J2-58	SWT10-DR2	8008h	9
J2-59	NC		
J2-60	NC		
J2-61	NC		
J2-62	NC		
J2-63	NC		
J2-64	NC		
J2-65	NC		
J2-66	DGND-SWT10	N/A	
J2-67	DGND-SWT6	N/A	
J2-68	DGND-SWT7	N/A	

Model 3000-04, Option 1

FRONT PANEL CONNECTOR PIN ASSIGNMENTS

FUNCTION	FRONT CONN	FRONT PWA	INTERNAL CONN	REGISTER ADDRESS	REGISTER BIT #	REF
SWT1-PWR	J1-01	J4A-01	J01-01	N/A		1X6(+12V)
SWT1-DR2	J1-02	J4A-02	J01-06	8000h	1	
SWT1-DR4	J1-03	J4A-05	J01-10	8000h	3	
SWT1-DR6	J1-04	J4A-06	J01-07	8000h	5	
NC	J1-05	J4A-09				
SWT2-DR1	J1-06	J4A-10	J05-04	8000h	8	
SWT2-DR3	J1-07	J4A-13	J05-08	8000h	10	
SWT2-DR5	J1-08	J4A-14	J05-09	8000h	12	
NC	J1-09	J4A-17				
SWT3-PWR	J1-10	J4A-18	J04-01	N/A		1X6 (+12V)
SWT3-DR2	J1-11	J4A-21	J04-06	8002h	1	
SWT3-DR4	J1-12	J4A-22	J04-10	8002h	3	
SWT3-DR6	J1-13	J4A-25	J04-07	8002h	5	
NC	J1-14	J4A-26				
SWT4-DR1	J1-15	J4A-29	J08-04	8002h	8	
SWT4-DR3	J1-16	J4A-30	J08-08	8002h	10	
NC	J1-17	J4A-33				
NC	J1-18	J4A-34				
NC	J1-19	J3A-31				
NC	J1-20	J3A-32				
NC	J1-21	J3A-27				
NC	J1-22	J3A-28				
NC	J1-23	J3A-23				
NC	J1-24	J3A-24				
NC	J1-25	J3A-19				
NC	J1-26	J3A-20				
NC	J1-27	J3A-15				
NC	J1-28	J3A-16				
NC	J1-29	J3A-11				
NC	J1-30	J3A-12				
NC	J1-31	J3A-07				
NC	J1-32	J3A-08				
DGND-SWT3	J1-33	J3A-03	J04-02	N/A		DGND
DGND-SWT4	J1-34	J3A-04	J08-02	N/A		DGND

DGND = DIGITAL GROUND
SWT1-PWR = IC SWITCH #1, +12V OUTPUT
SWT1-DR1 = IC SWITCH #1, DRIVER #1 OUTPUT (REF: Schematic # SCH85005010-010)
NC = NO CONNECTION
N/A = NOT APPLICABLE

Model 3000-04, Option 1

FRONT PANEL CONNECTOR PIN ASSIGNMENTS

FUNCTION	FRONT CONN	FRONT PWA	INTERNAL CONN	REGISTER ADDRESS	REGISTER BIT #	REF
SWT1-DR1	J1-35	J4A-03	J01-04	8000h	0	
SWT1-DR3	J1-36	J4A-04	J01-08	8000h	2	
SWT1-DR5	J1-37	J4A-07	J01-09	8000h	4	
NC	J1-38	J4A-08	NC			
SWT2-PWR	J1-39	J4A-11	J05-01	N/A		1X6 (+12V)
SWT2-DR2	J1-40	J4A-12	J05-06	8000h	9	
SWT2-DR4	J1-41	J4A-15	J05-10	8000h	11	
SWT2-DR6	J1-42	J4A-16	J05-07	8000h	13	
NC	J1-43	J4A-19				
SWT3-DR1	J1-44	J4A-20	J04-04	8002h	0	
SWT3-DR3	J1-45	J4A-23	J04-08	8002h	2	
SWT3-DR5	J1-46	J4A-24	J04-09	8002h	4	
NC	J1-47	J4A-27				
SWT4-PWR	J1-48	J4A-28	J08-01	N/A		1X4 (+12V)
SWT4-DR2	J1-49	J4A-31	J08-06	8002h	9	
SWT4-DR4	J1-50	J4A-32	J08-10	8002h	11	
NC	J1-51	J3A-33				
NC	J1-52	J3A-34				
NC	J1-53	J3A-29				
NC	J1-54	J3A-30				
NC	J1-55	J3A-25				
NC	J1-56	J3A-26				
NC	J1-57	J3A-21				
NC	J1-58	J3A-22				
NC	J1-59	J3A-17				
NC	J1-60	J3A-18				
NC	J1-61	J3A-13				
NC	J1-62	J3A-14				
NC	J1-63	J3A-09				
NC	J1-64	J3A-10				
NC	J1-65	J3A-05				
DGND-SWT5	J1-66	J3A-06	J11-02	N/A		DGND
DGND-SWT1	J1-67	J3A-01	J01-02	N/A		DGND
DGND-SWT2	J1-68	J3A-02	J02-02	N/A		DGND

Model 3000-04, Option 1

FRONT PANEL CONNECTOR PIN ASSIGNMENTS

FUNCTION	FRONT CONN	FRONT PWA	INTERNAL CONN	REGISTER ADDRESS	REGISTER BIT #	REF
SWT5-PWR	J2-01	J6A-01	J11-01	N/A		1X2 (+12V)
SWT5-DR2	J2-02	J6A-02	J11-06	8004h	1	
NC	J2-03	J6A-05				
NC	J2-04	J6A-06				
NC	J2-05	J6A-09				
SWT6-DR1	J2-06	J6A-10	J15-04	8004h	8	
NC	J2-07	J6A-13				
NC	J2-08	J6A-14				
NC	J2-09	J6A-17				
SWT7-PWR	J2-10	J6A-18	J14-01	N/A		1X2 (+12V)
SWT7-DR2	J2-11	J6A-21	J14-06	8006h	1	
NC	J2-12	J6A-22				
NC	J2-13	J6A-25				
NC	J2-14	J6A-26				
SWT8-DR1	J2-15	J6A-29	J18-04	8006h	8	
NC	J2-16	J6A-30				
NC	J2-17	J6A-33				
NC	J2-18	J6A-34				
SWT9-PWR	J2-19	J5A-31	J19-01	N/A		1X2 (+12V)
SWT9-DR2	J2-20	J5A-32	J19-06	8008h	1	
NC	J2-21	J5A-27				
NC	J2-22	J5A-28				
NC	J2-23	J5A-23				
SWT10-DR1	J2-24	J5A-24	J23-04	8008h	8	
NC	J2-25	J5A-19				
NC	J2-26	J5A-20				
NC	J2-27	J5A-15				
NC	J2-28	J5A-16				
NC	J2-29	J5A-11				
NC	J2-30	J5A-12				
NC	J2-31	J5A-07				
NC	J2-32	J5A-08				
DGND-SWT8	J2-33	J5A-03	J18-02	N/A		DGND
DGND-SWT9	J2-34	J5A-04	J19-02	N/A		DGND

Model 3000-04, Option 1

FRONT PANEL CONNECTOR PIN ASSIGNMENTS

FUNCTION	FRONT CONN	FRONT PWA	INTERNAL CONN	REGISTER ADDRESS	REGISTER BIT #	REF
SWT5-DR1	J2-35	J6A-03	J11-04	8004h	0	
NC	J2-36	J6A-04				
NC	J2-37	J6A-07				
NC	J2-38	J6A-08				
SWT6-PWR	J2-39	J6A-11	J15-01	N/A		1X2 (+12V)
SWT6-DR2	J2-40	J6A-12	J15-06	8004h	9	
NC	J2-41	J6A-15				
NC	J2-42	J6A-16				
NC	J2-43	J6A-19				
SWT7-DR1	J2-44	J6A-20	J14-04	8006h	0	
NC	J2-45	J6A-23				
NC	J2-46	J6A-24				
NC	J2-47	J6A-27				
SWT8-PWR	J2-48	J6A-28	J18-01	N/A		1X2 (+12V)
SWT8-DR2	J2-49	J6A-31	J18-06	8006h	9	
NC	J2-50	J6A-32				
NC	J2-51	J5A-33				
NC	J2-52	J5A-34				
SWT9-DR1	J2-53	J5A-29	J19-04	8008h	0	
NC	J2-54	J5A-30				
NC	J2-55	J5A-25				
NC	J2-56	J5A-26				
SWT10-PWR	J2-57	J5A-21	J23-01	N/A		1X2 (+12V)
SWT10-DR2	J2-58	J5A-22	J23-06	8008h	9	
NC	J2-59	J5A-17				
NC	J2-60	J5A-18				
NC	J2-61	J5A-13				
NC	J2-62	J5A-14				
NC	J2-63	J5A-09				
NC	J2-64	J5A-10				
NC	J2-65	J5A-05				
DGND-SWT10	J2-66	J5A-06	J23-02	N/A		
DGND-SWT6	J2-67	J5A-01	J15-02	N/A		
DGND-SWT7	J2-68	J5A-02	J14-02	N/A		

Chapter 10 **Driver Reference Config Table**

DRIVER REFERENCE VOLTAGE CONFIGURATION TABLE

SWITCH #	+5V	+12V	+24V	EXT VOLTAGE
SWITCH 01	J3-PIN 5/6	J3-PIN 3/4	J3-PIN 1/2	NO CONNECT
SWITCH 02	J7-PIN 5/6	J7-PIN 3/4	J7-PIN 1/2	NO CONNECT
SWITCH 03	J2-PIN 5/6	J2-PIN 3/4	J2-PIN 1/2	NO CONNECT
SWITCH 04	J6-PIN 5/6	J6-PIN 3/4	J6-PIN 1/2	NO CONNECT
SWITCH 05	J13-PIN 5/6	J13-PIN 3/4	J13-PIN 1/2	NO CONNECT
SWITCH 06	J17-PIN 5/6	J17-PIN 3/4	J17-PIN 1/2	NO CONNECT
SWITCH 07	J12-PIN 5/6	J12-PIN 3/4	J12-PIN 1/2	NO CONNECT
SWITCH 08	J16-PIN 5/6	J16-PIN 3/4	J16-PIN 1/2	NO CONNECT
SWITCH 09	J21-PIN 5/6	J21-PIN 3/4	J21-PIN 1/2	NO CONNECT
SWITCH 10	J25-PIN 5/6	J25-PIN 3/4	J25-PIN 1/2	NO CONNECT
SWITCH 11	J11-PIN 5/6	J11-PIN 3/4	J11-PIN 1/2	NO CONNECT
SWITCH 12	J12-PIN 5/6	J12-PIN 3/4	J12-PIN 1/2	NO CONNECT
SWITCH 13	J29-PIN 5/6	J29-PIN 3/4	J29-PIN 1/2	NO CONNECT
SWITCH 14	J33-PIN 5/6	J33-PIN 3/4	J33-PIN 1/2	NO CONNECT
SWITCH 15	J28-PIN 5/6	J28-PIN 3/4	J28-PIN 1/2	NO CONNECT
SWITCH 16	J32-PIN 5/6	J32-PIN 3/4	J32-PIN 1/2	NO CONNECT

Only one jumper can be connected at one time for any particular switch. All the other voltage settings for that switch will be "no connects".

Chapter 11 **Register Map**

11.1 Register Map Standard Model

The following register map shows the signal name and register assignments for the Model 3000-04.

A16 Registers

Offset	Value
00h	7FB5h 7 = Register Based, A16/A24 Module FB5 = VXI Manufacturer ID, ASCOR
02h	7F03h 7 = A24 space requirement d14 = Model Number for this module
04h	FFFCh Bit 0, reset, is supported. Toggling this bit will clear all relay registers.
06h	(assigned by Resource Manager)

Control	Bit	
3Eh	0	Low true output enable to the relay coil driver IC's.
	1	When low enables read back of relay coil state When high enables read back of data registers
	2	High true EEPROM write enable
	3-15	Don't Care

Register Map, 16 Bit

Description: SWITCH DRIVER

Address Offset: 8000h lower bits

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
SW 2-8	SW 2-7	SW 2-6	SW 2-5	SW 2-4	SW 2-3	SW 2-2	SW 2-1	SW 1-8	SW 1-7	SW 1-6	SW 1-5	SW 1-4	SW 1-3	SW 1-2	SW 1-1

Address Offset: 8002h

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
SW 4-8	SW 4-7	SW 4-6	SW 4-5	SW 4-4	SW 4-3	SW 4-2	SW 4-1	SW 3-8	SW 3-7	SW 3-6	SW 3-5	SW 3-4	SW 3-3	SW 3-2	SW 3-1

Address Offset: 8004h

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
SW 6-8	SW 6-7	SW 6-6	SW 6-5	SW 6-4	SW 6-3	SW 6-2	SW 6-1	SW 5-8	SW 5-7	SW 5-6	SW 5-5	SW 5-4	SW 5-3	SW 5-2	SW 5-1

Address Offset: 8006h

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
SW 8-8	SW 8-7	SW 8-6	SW 8-5	SW 8-4	SW 8-3	SW 8-2	SW 8-1	SW 7-8	SW 7-7	SW 7-6	SW 7-5	SW 7-4	SW 7-3	SW 7-2	SW 7-1

Address Offset: 8008h

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
SW 10 8	SW 10 7	SW 10 6	SW 10 5	SW 10 4	SW 10 3	SW 10 2	SW 10 1	SW 9-8	SW 9-7	SW 9-6	SW 9-5	SW 9-4	SW 9-3	SW 9-2	SW 9-1

Address Offset: 800Ah

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
SW 12 8	SW 12 7	SW 12 6	SW 12 5	SW 12 4	SW 12 3	SW 12 2	SW 12 1	SW 11 8	SW 11 7	SW 11 6	SW 11 5	SW 11 4	SW 11 3	SW 11 2	SW 11 1

Address Offset: 800Ch

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
SW 14 8	SW 14 7	SW 14 6	SW 14 5	SW 14 4	SW 14 3	SW 14 2	SW 14 1	SW 13 8	SW 13 7	SW 13 6	SW 13 5	SW 13 4	SW 13 3	SW 13 2	SW 13 1

Address Offset: 800Eh

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
SW 16 8	SW 16 7	SW 16 6	SW 16 5	SW 16 4	SW 16 3	SW 16 2	SW 16 1	SW 15 8	SW 15 7	SW 15 6	SW 15 5	SW 15 4	SW 15 3	SW 15 2	SW 15 1

Register Map, 16 Bit

Description: SWITCH DRIVER

Address Offset: 8000h lower bits

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
SW 2-8	SW 2-7	SW 2-6	SW 2-5	SW 2-4	SW 2-3	SW 2-2	SW 2-1	SW 1-8	SW 1-7	SW 1-6	SW 1-5	SW 1-4	SW 1-3	SW 1-2	SW 1-1

Address Offset: 8000h upper bits

31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
SW 4-8	SW 4-7	SW 4-6	SW 4-5	SW 4-4	SW 4-3	SW 4-2	SW 4-1	SW 3-8	SW 3-7	SW 3-6	SW 3-5	SW 3-4	SW 3-3	SW 3-2	SW 3-1

Address Offset: 8004h lower bits

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
SW 6-8	SW 6-7	SW 6-6	SW 6-5	SW 6-4	SW 6-3	SW 6-2	SW 6-1	SW 5-8	SW 5-7	SW 5-6	SW 5-5	SW 5-4	SW 5-3	SW 5-2	SW 5-1

Address Offset: 8004h upper bits

31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
SW 8-8	SW 8-7	SW 8-6	SW 8-5	SW 8-4	SW 8-3	SW 8-2	SW 8-1	SW 7-8	SW 7-7	SW 7-6	SW 7-5	SW 7-4	SW 7-3	SW 7-2	SW 7-1

Address Offset: 8008h lower bits

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
SW 10 8	SW 10 7	SW 10 6	SW 10 5	SW 10 4	SW 10 3	SW 10 2	SW 10 1	SW 9-8	SW 9-7	SW 9-6	SW 9-5	SW 9-4	SW 9-3	SW 9-2	SW 9-1

Address Offset: 8008h upper bits

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
SW 12 8	SW 12 7	SW 12 6	SW 12 5	SW 12 4	SW 12 3	SW 12 2	SW 12 1	SW 11 8	SW 11 7	SW 11 6	SW 11 5	SW 11 4	SW 11 3	SW 11 2	SW 11 1

Address Offset: 800Ch lower bits

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
SW148	SW147	SW146	SW145	SW144	SW143	SW142	SW141	SW138	SW137	SW136	SW135	SW134	SW133	SW132	SW131

Address Offset: 800Ch upper bits

31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
SW168	SW167	SW166	SW165	SW164	SW163	SW162	SW161	SW158	SW157	SW156	SW155	SW154	SW153	SW152	SW151

REGISTER MAP OPTION 1

REGISTER ADDRESS	BIT #	FUNCTION	CONN
8000h	0	SWT1-DR1	J1-35
	1	SWT1-DR2	J1-02
	2	SWT1-DR3	J1-36
	3	SWT1-DR4	J1-03
	4	SWT1-DR5	J1-37
	5	SWT1-DR6	J1-04
	6	NC	
	7	NC	
	8	SWT2-DR1	J1-6
	9	SWT2-DR2	J1-40
	10	SWT2-DR3	J1-7
	11	SWT2-DR4	J1-41
	12	SWT2-DR5	J1-8
	13	SWT2-DR6	J1-42
	14	NC	
	15	NC	
8002h	0	SWT3-D1	J1-44
	1	SWT3-D2	J1-11
	2	SWT3-D3	J1-45
	3	SWT3-D4	J1-12
	4	SWT3-D5	J1-46
	5	SWT3-D6	J1-13
	6	NC	
	7	NC	
	8	SWT4-DR1	J1-15
	9	SWT4-DR2	J1-49
	10	SWT4-DR3	J1-16
	11	SWT4-DR4	J1-50
	12	NC	
	13	NC	
	14	NC	
	15	NC	
8004h	0	SWT5-DR1*	J2-35
	1	SWT5-DR2*	J2-02
	2	NC	
	3	NC	
	4	NC	
	5	NC	
	6	NC	
	7	NC	
	8	SWT6-DR1*	J2-06
	9	SWT5-DR2*	J2-40
	10	NC	
	11	NC	
	12	NC	
	13	NC	
	14	NC	
	15	NC	

REGISTER ADDRESS	BIT #	FUNCTION	CONN
8006h	0	SWT7-DR1*	J2-44
	1	SWT7-DR2*	J2-11
	2	NC	
	3	NC	
	4	NC	
	5	NC	
	6	NC	
	7	NC	
	8	SWT8-DR1*	J2-15
	9	SWT8-DR2*	J2-49
	10	NC	
	11	NC	
	12	NC	
	13	NC	
	14	NC	
	15	NC	
8008h	0	SWT9-DR1*	J2-53
	1	SWT9-DR2*	J2-20
	2	NC	
	3	NC	
	4	NC	
	5	NC	
	6	NC	
	7	NC	
	8	SWT10-DR1*	J2-24
	9	SWT10-DR2*	J2-58
	10	NC	
	11	NC	
	12	NC	
	13	NC	
	14	NC	
	15	NC	

***Coils to be programmed simultaneously within system.**

Chapter 12 **Programming**

12.1 VXI Register Based Modules

The ASCOR 3000-04 is a register based device and supports VXIbus register maps. All controls to the 3000-04 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 3000-04 is not a message based device and does not support VXIbus communication protocols.

12.2 ASCOR VXI Module Type

The 3000-04 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 3000-04 is equipped with VXIMAXTM 16/32, these Custom registers can also be accessed as a 32-bit word.

12.3 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 3000-04 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.

12.4 ASCOR Module Custom Registers

The 3000-04 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.

12.5 Static and Dynamic Configurations

The 3000-04 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 3000-04 are discussed in *Section 0: How to change the 3000-04 Module's Logical Address*.

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12.6 VXI Device Register Description

The ASCOR 3000-04 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 3000-04 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.

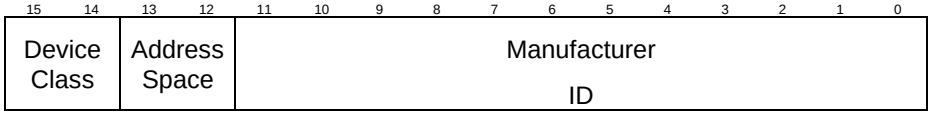
VXI Device Registers for ASCOR 3000-04	
VXI Device Dependent Registers	
3Eh	ASCOR Control Register
3Ch	Register Not Used
3Ah	Register Not Used
38h	Register Not Used
36h	Register Not Used
34h	Register Not Used
32h	Register Not Used
30h	Register Not Used
2Eh	Register Not Used
2Ch	Register Not Used
2Ah	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
VXI Configuration Registers	
06h	Offset Register
04h	Status / Control Register
02h	Device Type Register
00h	ID / Logical Address Register

12.7 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 3000-04 Module's configuration.



(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

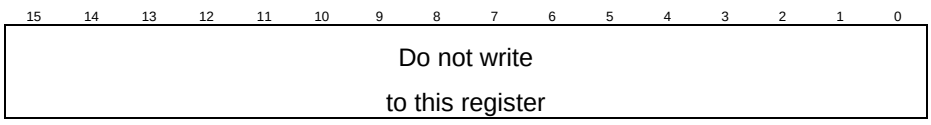
11b = A16 Only

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

FB5h = ASCOR

For the 3000-04 Module, the register should read back a value of CFB5h.

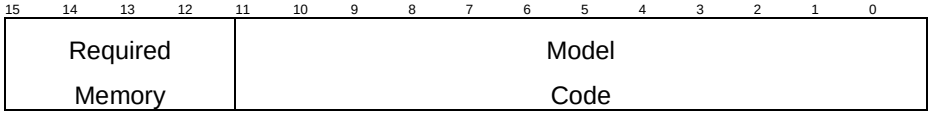
A write to this 16-bit register is provided for Dynamic Configuration protocol. This register should only be written to by a resource manager. Do not write to this register.



Offset Description

02h Device Type (read/write)

A read of this 16-bit register provides information about the 3000-04 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.



(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

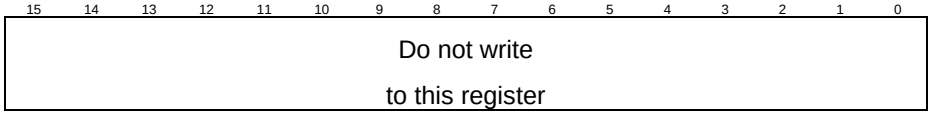
Fh = 64K bytes in A32 Address Space

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

D14h = The ASCOR Model Code for the 3000-04. This number is different from the ASCOR Model number.

For the 3000-04 Module, the register should read back a value of 7D14h.

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



Offset **Description**

04h Status Register (read) / Control Register (write)

A read of this 16-bit register provides information about the 3000-04 status.

15	14	13 12 11 10 9 8 7 6 5 4	3	2	1 0
A24/A32	MODID	Device Dependent (Not used)	Ready	Passed	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 3000-04 Module, the register should read back a value of FFFCh.

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)	Sysfail	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

06h Offset Register (read/write)

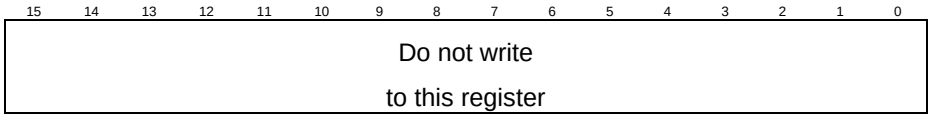
A read of the 16-bit register provides information for calculating the base address of the 3000-04 A24 operational registers.

(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 3000-04, 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* ***Error! Reference source not found.****:* ***Error! Reference source not found.****?*.

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.



12.8 VXI Device Class Dependent Registers

The ASCOR 3000-04 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

12.9 VXI Device Dependent Registers for the 3000-04

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 3000-04, 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

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 read back 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 read back zero

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

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 read back mode.
0b = Enable relay coil state read back
1b = Enable data register state read back

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

12.10 ASCOR Custom Registers for the ASCOR 3000-04 Module

The ASCOR 3000-04 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 3000-04 custom registers can be accessed as a 16-bit word. Additionally, since the ASCOR 3000-04 features VXIMAX™, the custom registers can also be accessed as 32-bit words.

Offset Address in 16-Bit Mode

The 3000-04 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 3000-04 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 . . .	

12.11 ASCOR Registers

A subset of the ASCOR 3000-04 Custom Registers are relay registers.

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

3000-04 Relay Registers	
8000h	Drivers 1-16
8002h	Drivers 17-32
8004h	Drivers 33-48
8006h	Drivers 49-64
8008h	Drivers 65-80
800Ah	Drivers 81-96
800Ch	Drivers 97-112
800Eh	Drivers 113-128

These registers, which are also located in the A24 Address Space, have a few unique properties:

Read / Write

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

Read Mode

The read mode of the 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.

Chapter 13 Programming with Registers

Programming VXI Device Registers

The 3000-04 VXI Device Registers are read / write registers, but some device registers must be written only by the resource manager. See *Section 0: 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 3000-04 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. */;
```

Example using VXI*plug&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. */;
```

Resetting ASCOR VXI Module

The ASCOR 3000-04 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 3000-04 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 3000-04.

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. */;
        /* 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. */;
        /* Bring the module back to the normal operation by
        clearing the Device Reset bit in the copy of the Status / Control Register */
        value32 &= 0xFFFE;
        /* 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 VXI*plug&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. */;
        /* 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 Register Read Mode for the 3000-04

The ASCOR 3000-04 Relay read mode can be changed to read the data register instead of the driver states. Change the mode by setting the Reg Bit of the 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 driver states. Reg Bit is cleared and the read mode is reset to reading the driver states when the 3000-04 is reset.

Here are some example codes for changing the read mode of the 3000-04.

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

```
/* C code segment for switching to data register read back 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. */;
```

```
/* C code segment for change to data register read back 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 VXI*plug&play* VISA calls

```
/* C code segment for change to data register read back 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. */;
```

Programming the ASCOR 3000-04 Custom Registers

The ASCOR 3000-04 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 2 for the definition of the custom registers found in the 3000-04.

All 3000-04 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 3000-04 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. VXI*plug&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 3000-04 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. */;
```

Example using VXI*plug&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. */;
```

Miscellaneous Questions and Answers

Q: How do I calculate the 3000-04 Module's A16 Base Address?

A: The A16 Base Address of the 3000-04 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	Control Register

Q: How do I calculate the 3000-04 Module's A24 Base Address?

A: The A24 Base Address of the 3000-04 can be derived from the value stored in the Offset Register (04h). 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.

Offset Register (04h)

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	0	1	0	0	0	0	0	x	x	x	x	x	x	x	x

A24 Base Address

23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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 3000-04 Module's Logical Address?

A: The Logical Address of ASCOR 3000-04 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 3000-04 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 3000-04 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.

Chapter 14 **ADDENDUM**

CLARIFICATION OF OPTION 1 RELAY BOX J DESIGNATIONS

Assembly 85006080 is a transition board which converts two SCSCI type connectors (J20 & J21) into 10 headers for wiring up to 10 microwave switches (up to eight drive lines each). They were designated SWT1 through SWT7 on J20 and SWT9 through SWT15 on J21. This transition board is mounted in the RELAY BOX.

On the Option 1 (85005010-010/904000660-001) the I/O is also connected through two SCSCI type connectors designated J1 and J2. These are part of assembly 85006090, which is mounted in the 3000-04 assembly. This is the Option 1 conversion to change the connector type from IDC style to SCSCI style so that an off-the-shelf SCSCI cable assembly could be used (68-pin). J1 and J2 (independent of 85006080) took on names called SWT1 through SWT4 on J1 and SWT5 through SWT10 on J2. Confusion happened when both assemblies took on the same names, but the system is wired correctly. For this series of Option 1 the cross reference is as follows.

3000-04 Option 1	Relay Box
J1 SWT1 to	J20 SWT1
J1 SWT2 to	J20 SWT2
J1 SWT3 to	J20 SWT3
J1 SWT4 to	J20 SWT4
J2 SWT5 to	J21 SWT9
J2 SWT6 to	J21 SWT10
J2 SWT7 to	J21 SWT11
J2 SWT8 to	J21 SWT12
J2 SWT9 to	J21 SWT13
J2 SWT10 to	J21 SWT14

Another way to look at this is to follow connector assignments of J1 to J20 and J2 to J21
Example: if you look at J2 pin 6 (SWT6-DR1), this connects to J21 pin 6 (SWT10-DR1).
This bit value is the same. J2 pin 7 (NC) would go to J21 pin 7 (SWT10-DR3).
However, as a 1x4 this bit is not used.