

Model 3000-27

10 Channel

Programmable Resistance

90400250



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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

EN61010-1 (1993)

EN61326-1 (1997)

Manufacturer's Name:

Giga-tronics, Incorporated

EMC Directive and Low Voltage Directive

Electrical Safety

EMC – Emissions and Immunity

Manufacturer's Address

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Type of Equipment:

Switching Module

Model Series Number

3000-27

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

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TPCI Number	TPCI Issue Date	Date Entered	Comments

Revision History			
Revision	Description of Change	Chg Order #	Approved By
A	Initial Release		
B	Updated		
C	Reformatted 3/12		RCW

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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.

Chapter 2 Configuration Table

CONFIGURATIONS

Part Number	Number of Channels	Minimum Resistance	Incremental Resistance	Resistance Range
90400250	10	20 Ohms	20 Ohms	20Ohms → 1.31 MOhms
90400250-001	8	20 Ohms	20 Ohms	20 Ohms → 1.31 MOhms
90400250-002	5	13 Ohms ?	20 Ohms	13 Ohms → 1.31 MOhms ??
90400250-003	10	20 Ohms	20 Ohms	20 Ohms → 1. 31 MOhms ????
90400250-004	5			
90400250-005	10	20 Ohms	.005 Ohms	20 Ohms → 350 Ohms

DOCUMENTATION

TOP ASSEMBLY	PWA MB ASSY	PWA MB PL	PWA MB SCH	PWA DB ASSY	PWA DB PL	PWA DB SCH
90400250	85002000	PL85002000	SCH85002000	85002010	PL85002010	SCH85002010
90400250-001	85002000-001	PL85002000-001	SCH85002000	85002010-001	PL85002010-001	SCH85002010
90400250-002	85002000	PL85002000	SCH85002000	-----	-----	-----
90400250-003	85002000-002	PL85002000-002	SCH85002000-002	85002010-002	PL85002010-002	SCH85002010-002
90400250-004	85002000-003	PL85002000-003	SCH85002000-003	-----	-----	-----
90400250-005	85002000-004	PL85002000-004	SCH85002000-004	85002010-004	PL85002010-004	SCH85002010-004

Functional Description

2.1 Introduction

This manual provides the necessary information for the operation and maintenance of the Model 3000-27 Multi Channel Programmable Resistor VXI Module.

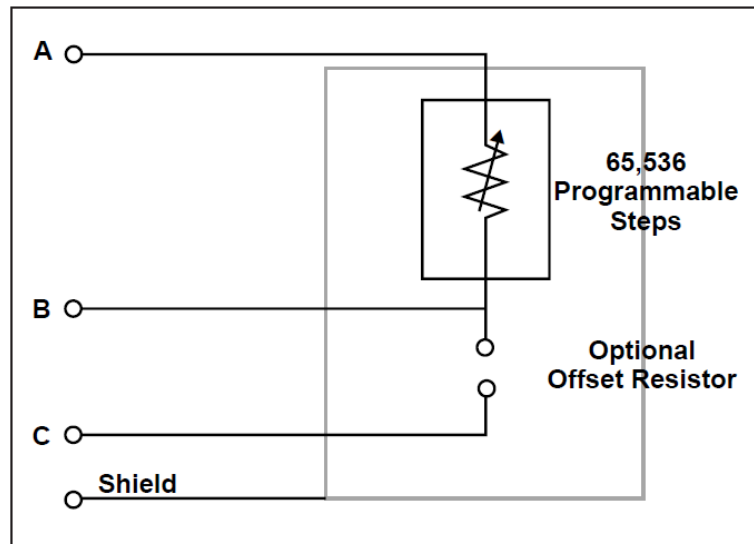
2.2 General Description

This User Guide provides a basic description of the Model 3000-27 Multi Channel Programmable Resistor Module. Also included are installation and input connection procedures, programming information, service and maintenance information. note: The Model 3000-27 is supplied as a five (5) channel programmable resistor. Optionally, an additional five channels can be added with the addition of a daughter card. The ten (10) channel version only occupies a single slot. Additional groups of five (5) channels can be added. Consult the factory for more information. Special versions are available. The current versions are:

Model 3000-27	Ten (10) channel programmable resistor module
Model 3000-27, option -002	Five (5) channel programmable resistor module
Model 3000-27, option -004	Five (5) channel programmable resistor module

This module contains multi channels of programmable resistors. The standard version contains ten channels. Option -002 contains five channels. The five channel version (option -002) can be expanded to ten channels (consult the factory). Multiple daughter boards can be added. This will increase the number of channels in increments of five channels. Each channel contains 16 precision resistors which are in binary increments. The lowest value of the resistor chain is twenty (20) ohms which made up from a fix resistor and a multi-turn potentiometer. An additional resistor position is available at the end of each resistor string for the user to use as a fixed offset value. The basic module can be expanded by adding one or more daughter boards. Each daughter board will add an additional five (5) channels of programmable resistors. Option -002 is the five channel version with no daughter board added. The 3000-27 is specially designed to support ATE testing and it is designed to support shielded measurements. Each channel is individually shielded to its own isolated ground plane. This ground is brought out to the front panel connector. This allows individually guarding the programmable resistor to the Users' requirements. The 3000-27 is a register based VXI module. 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.

Chapter 3 Block Diagram



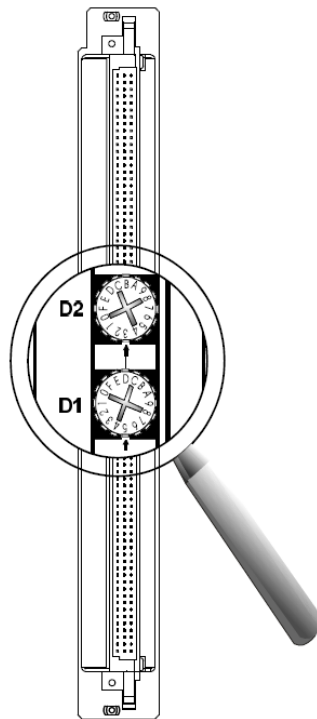
Typical Channel

Chapter 4 Controls and Indicators

The following controls and indicators are provided to select and display the functions of the ASCOR 3000-27 Module's operating environment.

4.1 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.



4.2 LEDs

The following LEDs are visible at the Module's front panel to indicate the status of the module's operation:

4.2.1 "BUS" LED

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

4.2.2 "PWR" LED

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

Chapter 5 Internal Settings

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

5.1 Fuse

The ASCOR VXI 3000-27 uses a 10 Amp fuse in the +5 Volt line and is located on the Mother Board (MB) assembly.

5.2 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 6 Specifications

Electrical:

Number of channels	10
	5 (option -002)
Resistor range:	20 Ω to 1,312,191 Ω
Offset resistor	USER selected
Tolerance, individual resistor	0.1% , type RN60
Total overall accuracy	1%, 0.5% typical
Maximum power dissipation	1/4 watt

Mechanical:

Thickness:	1.200 inches
Width:	10.317 inches
Length:	13.78 inches
Weight:	3 lbs.

Connector:

Type:	Airborne WTB26PR7J
Mating Connector:	Airborne WTAX26SACJT

Environmental Specifications

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

Chapter 8 Register Map

ASCOR Model 3000-27

Features

ASCOR's Model 3000-27 single slot, Multi Channel Programmable Resistor is the industry's highest density, most comprehensively shielded VXI resistor module. Its up to 10 individually programmable and shielded channels provide 5 times the capacity of other Leading single slot resistor modules, making it the most flexible, cost effective choice for high performance resistance simulation and sourcing applications.

- From 20 Ohms to 1.31 MegaOhms per Channel.
- Programmable in 20 Ohm Increments (variable steps are optionally available).
- Up to 1,000 value Changes per Second.
- Each Channel Has Own Isolated Ground.

Register Map

The following register map shows the signal name and register assignments for the Model 3000-27.

A16 Registers

Offset	Value
00h	CFB5h C = Register Based, A16/A24 Module FB5 = VXI Manufacturer ID, ASCOR
02h	7F19h 7 = A24 space requirement F19 = 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

A24 Registers

The program registers for the Resistor Channels are located in the A24 address area. The program registers are located with the offset as shown in table below.

Channel	Register Offset
1	0x40
2	0x42
3	0x44
4	0x46
5	0x48
6	0x50
7	0x52
8	0x54
9	0x56
10	0x58

Each resistor channel consists of a fixed 20Ω plus sixteen more binary weighted resistance values. Each of the sixteen resistors has a relay which is used to switch a resistor in or out of the circuit. Each resistor channel is controlled by a 16-bit register which controls the sixteen relays. Setting a bit false in the register will add the resistor into the circuit. The maximum resistance is obtained when all sixteen relays are open (register value 0x0000). The minimum resistance (register value 0xffff) is the fixed 20 ohms. To calculate the register value for a particular resistance, the following formula can be applied:

$$\text{RegVal} = \text{DesiredVal} / -20.0 \text{ (decimal value)}$$

As long as the desired resistance is an integer multiple of twenty the output resistance will be within +/- 1% of desired value.

For example: If the desired value is 1000Ω then

$$\text{RegVal} = 1000 / -20.0 \text{ (decimal value)}$$

$$\text{RegVal} = -50 \text{ (decimal value)}$$

$$\text{RegVal} = 0xffce \text{ (hex value)}$$

$$\text{RegVal} = 1111\ 1111\ 1100\ 1110 \text{ (binary value)}$$

RegVal will set the relays for bits 5, 4, and 0 open. This will set the resistor channel for:

$$642 \, \Omega + 320 \, \Omega + 20 \, \Omega + 20 \, \Omega \text{ (fix min. resistor)} = 1002 \, \Omega$$

which is 0.2% of the desired 1000 Ω .

Below is a table for the sixteen register bits and the resistor value at that point in the chain.

Bit	Resistor Value	Register Program	Output Resistance
0	20.0	0xffffe	40.0
1	40.2	0xffffd	60.2
2	79.6	0xffffb	99.6
3	160	0xffff7	180
4	320	0xffef	340
5	642	0xffdf	662
6	1270	0xffbf	1290
7	2550	0xff7f	2570
8	5110	0xfeff	5130
9	10200	0xfdff	10220
10	20500	0xfbff	20520
11	40700	0xf7ff	40720
12	81600	0xefff	81620
13	164000	0xdfff	164020
14	328000	0xbfff	328020
15	657000	0x7fff	657020

Note: when no resistor is programmed, the minimum resistance is 20 ohms.

Chapter 9 Connector Pin Assignment Main Board

Standard and Option -002

Type: Airborne WTB26PR7J

Mating Connector: Airborne WTAX26SACJT

Channel	Pin	Description
1	1	Channel 1 input
1	14	Channel 1 Offset input
1	2	Channel 1 output
1	15	Channel 1 shield
1	3	Not used
2	16	Channel 2 input
2	4	Channel 2 Offset input
2	17	Channel 2 output
2	5	Channel 2 shield
2	18	Not used
3	6	Channel 3 input
3	19	Channel 3 Offset input
3	7	Channel 3 output
3	20	Channel 3 shield
3	8	Not used
4	21	Channel 4 input
4	9	Channel 4 Offset input
4	22	Channel 4 output
4	10	Channel 4 shield
4	23	Not used
5	11	Channel 5 input
5	24	Channel 5 Offset input
5	12	Channel 5 output
5	25	Channel 5 shield
5	13	Not used
	26	Not used

Connector Pin Assignment Daughter Board

(Not Installed In Option -002)

Type: Airborne WTB26PR7J

Mating Connector: Airborne WTAX26SACJT

Channel	Pin	Description
6	1	Channel 6 input
6	14	Channel 6 Offset input
6	2	Channel 6 output
6	15	Channel 6 shield
6	3	Not used
7	16	Channel 7 input
7	4	Channel 7 Offset input
7	17	Channel 7 output
7	5	Channel 7 shield
7	18	Not used
8	6	Channel 8 input
8	19	Channel 8 Offset input
8	7	Channel 8 output
8	20	Channel 8 shield
8	8	Not used
9	21	Channel 9 input
9	9	Channel 9 Offset input
9	22	Channel 9 output
9	10	Channel 9 shield
9	23	Not used
10	11	Channel 10 input
10	24	Channel 10 Offset input
10	12	Channel 10 output
10	25	Channel 10 shield
10	13	Not used
	26	Not used

Chapter 10 Calibration Procedure

10 Channel Version and 5 Channel Version (option -002)

The calibration procedure is used to set the minimum resistance to 20 ohms.

Equipment required: 4-wire digital multimeter, accuracy 0.01% or better on resistance.

On the front panel, access holes have been provided to adjust the minimum resistance. Adjust the DMM to 4-wire resistance mode and connect to the pair of pins in the table shown below.

Also in the table is the register to program and the resistor to adjust. *Note* that the connectors and resistors refer to the front panel reference designations and the each register address is the offset which must be added to the A24 address assigned to the module. In each case, program the register to 0xffff. Adjust the resistor for the desired channel (see table below) for the value of 20 ohms) $\pm 0.01\%$.

Channel	Measure To	Adjust Resistor	Register Address
1	J1 - 2	R5	0x40
2	J1 -17	R4	0x42
3	J1 -7	R3	0x44
4	J1 - 22	R2	0x46
5	J1 - 12	R1	0x48
6	J2 - 2	R10	0x50
7	J2 - 17	R9	0x52
8	J2 - 7	R8	0x54
9	J2 - 22	R7	0x56
10	J2 -12	R6	0x58