46023-14
SMART MAC
(MULTIPLE ALARM COMBINER)

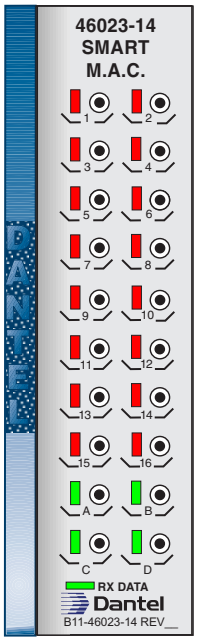


Table of Contents

About this Practice:

This practice has been reissued to:

- Update front panel views.

Reissued Practices: Updated and new content can be identified by a banner in the right margin.

UPDATED

Issue date: July 1999

CAUTION

- Install or remove modules from the shelf only when the power is off. If you install a module in the shelf with the power on, the internal circuitry may suffer damage and the product warranty will be void.
- Remove and install circuit boards only in a static-safe environment (use antistatic wrist straps, smocks, footwear, etc.).
- Keep circuit boards in their antistatic bags when they are not in use.
- Do not ship or store circuit boards near strong electrostatic, electromagnetic, magnetic, or radioactive fields.
- For more complete information on electrostatic discharge safety precautions, refer to Bellcore™ Technical Reference # TR-NWT-000870.

ORDERING INFORMATION

NOTE: This section lists the different options available for this product. To order any of the available options, contact Dantel Inside Sales through our toll-free number, **1-800-432-6835.**

OPTION NUMBER	FEATURES
B11-46023-14	Smart MAC (Multiple Alarm Combiner)

GENERAL DESCRIPTION

The Smart MAC acquires alarm information from remote devices and sends it to a 46020 Multiple Alarm Processor (MAP). There are eight data ports for communicating with remote alarm devices. The module can poll all eight data ports and respond to the MAP simultaneously. It can also receive controls from the MAP and send them to the remote devices. Up to four Smart MACs may be connected to one MAP.

The difference between a 46023-12 Smart MAC and a 46023-14 Smart MAC is that 46023-14 can communicate with SLC 96 or Series 5 devices and Dantel's 46004 Voltage Detector Module, which the 46023-12 cannot do.

***NOTE**: When you connect more than one MAC to the MAP's data port, if one is a 46023-14 Smart MAC, all the others must be 46023-14 Smart MACs as well. You cannot use the 46023-14 Smart MAC in combination with other MACs.*

Here are some features of the 46023 Smart MAC:

- The front panel has an alarm status LED display that shows MAP status and port communications.
- The ports have RS-422 interface and support DCM, TABS, and TBOS protocols.
- The Smart MAC:
  - Operates on -21 to -56 VDC input power.
  - Is a plug-in printed circuit module that fits any Dantel 400-type or similar equipment housing.
  - Fits into an existing Dantel shelf wired for a 46022-12 MAC.

Two Versions

The 46023-14 exists in two forms; the older "thru-hole" version, and the newer "surface-mount (SMT) version". Both types function in identical ways. The only difference from a user's point of view is the change from straps on the thru-hole to switches on the SMT version.

Differences in board layout and configuration instructions are highlighted in the ***Installation*** section of this manual.

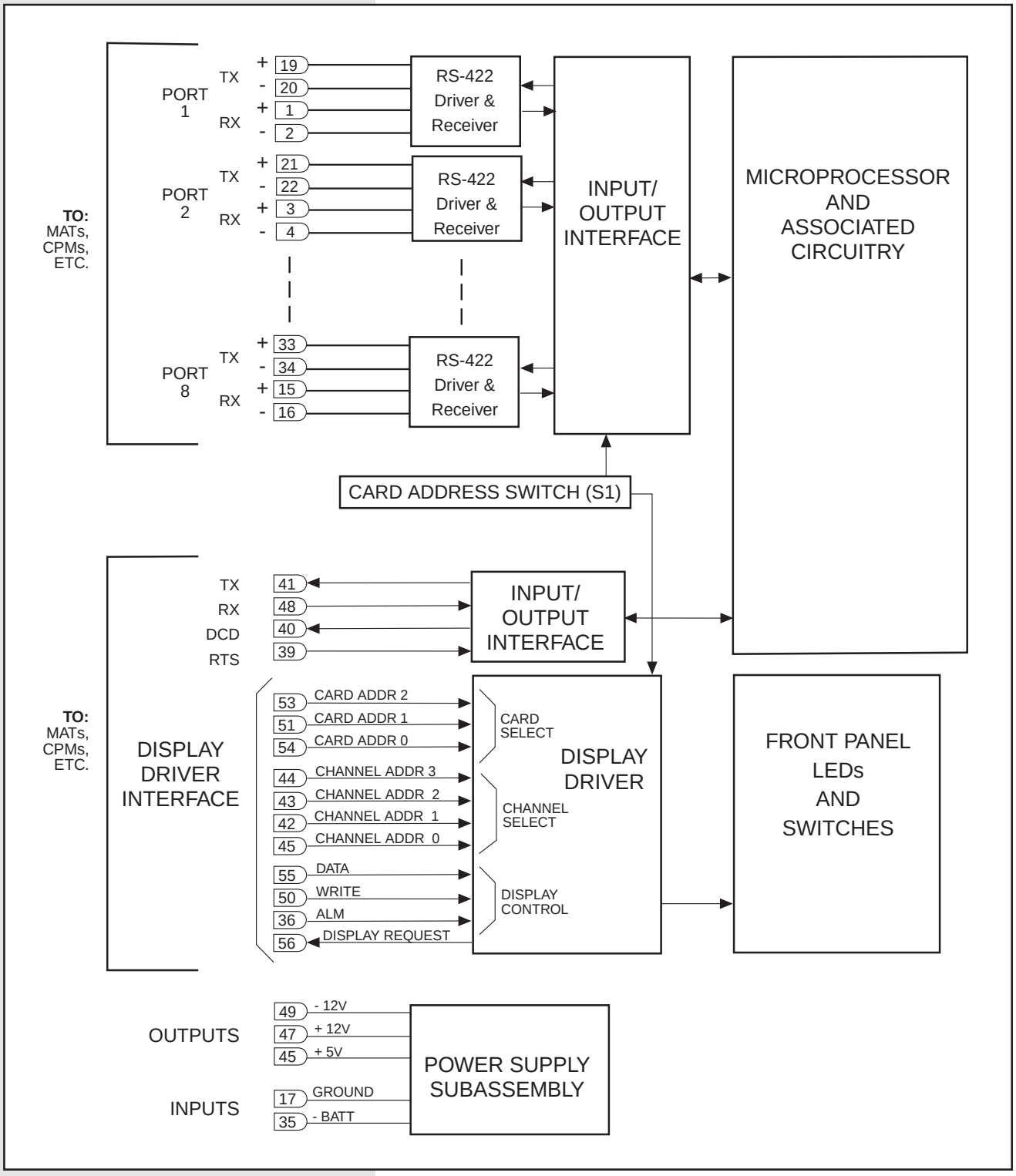
CIRCUIT DESCRIPTION

The functional schematic for the 46023-14 Smart Multiple Alarm Combiner (MAC) is shown in Fig. 1.

- The Smart MAC uses a 68008 microprocessor operating at 10 MHz to process data between the eight data ports and the master port. If the microprocessor malfunctions, a watchdog timer generates a hardware reset.
- The address of the Smart MAC is defined by a selectable DIP switch setting.
- An eight-port Universal Asynchronous Receiver Transmitter (UART) is used for serial communications with remote alarm and control equipment. Data is transmitted and received through RS-422 drivers and receivers. The receive lines have an optional strap selection for 100-ohm termination. The configuration of the MAP determines the data rate and protocol of each port.
- The master port is used for serial communications with the MAP. It has a single-port UART with a TTL/CMOS interface. Select the data rate and protocol by DIP switches.
- Front panel displays and switches provide several modes for alarm status reporting and acknowledgment. The firmware of the MAP determines the functions that are displayed and controlled.
- The regulated power supply uses -21 to -56 VDC input power to supply ±12VDC and +5VDC to the module's circuit board. In addition, the output from the power supply is available off-board through edge connector pins 45 (+5 VDC), pin 47 (+12 VDC), and pin 49 (-12 VDC).

CIRCUIT DESCRIPTION

FIG. 1 - FUNCTIONAL SCHEMATIC, 46023-14



1. Port Termination

You can strap the 46023-14 MAC to have its alarm inputs (receive lines) either terminated or unterminated. The terminating load is 100 ohms. Each alarm port must have a current path at some point of termination, which is normally set at the MAC.

Thru-Hole Version

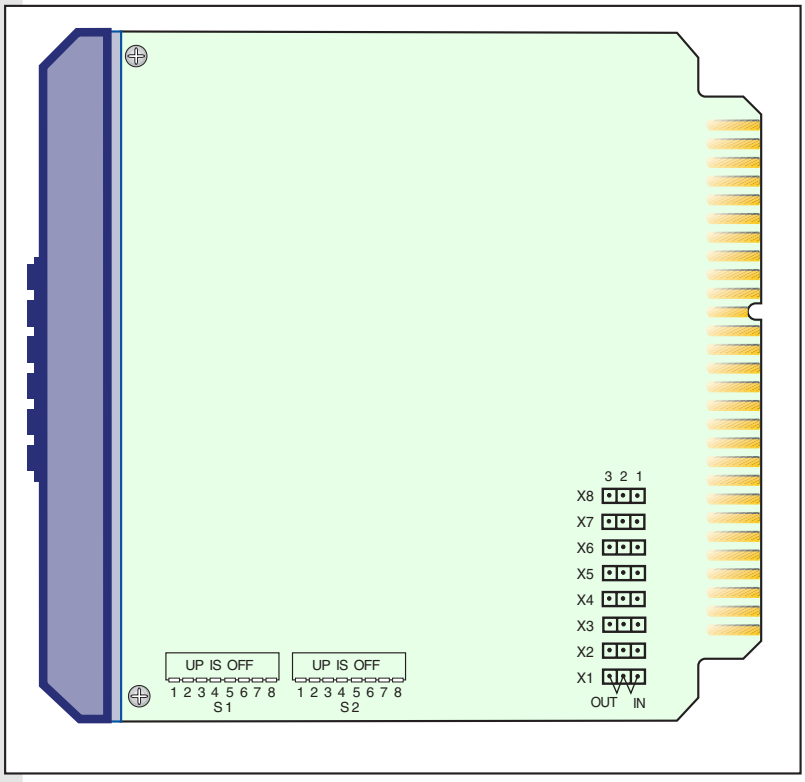
- If a channel is connected to communications lines, the resistor is normally strapped IN (position 1-2).
- If termination for a channel is provided at the source, strap the resistor OUT.

Refer to Table A and Fig. 2.

Table A - Receive Line Termination (Thru-Hole Version)

ALARM PORT NUMBER	STRAP NUMBER
1	X1
2	X2
3	X3
4	X4
5	X5
6	X6
7	X7
8	X8

Fig. 2 - Switch and Strap Option Locations (Thru-Hole Version)



NOTE: *Switch S2 is not used.*

SMT Version

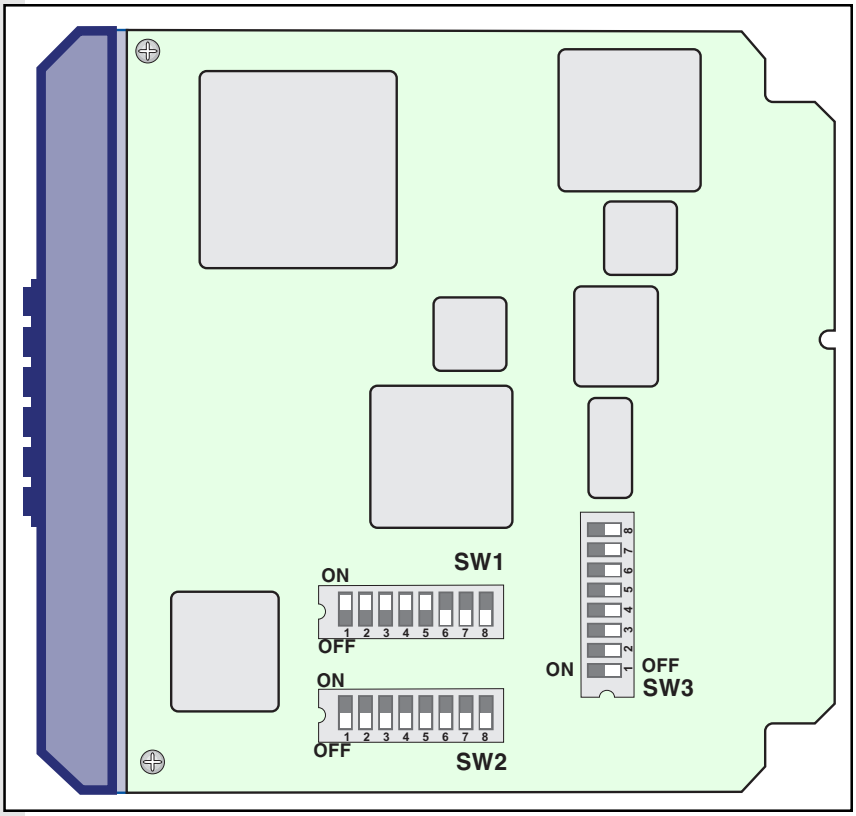
- If a channel is connected to communications lines, the resistor is normally switched in (SW3-1 through 8 ON).
- If termination for a channel is provided at the source, switch the resistor OFF.

Refer to Table B and Fig. 3.

TABLE B - RECEIVE LINE TERMINATION (SMT VERSION)

ALARM PORT NUMBER	SWITCH NUMBER
1	SW3-1
2	SW3-2
3	SW3-3
4	SW3-4
5	SW3-5
6	SW3-6
7	SW3-7
8	SW3-8

FIG. 3 - SWITCH AND STRAP OPTION LOCATIONS (SMT VERSION)



NOTE: *Switch S2 is not used.*

2. Switch Settings

Refer to Table C and Fig. 2 or 3 (per your unit) for specific information to set the switches. Here are some general guidelines that apply to **both** versions of Smart MAC:

Card Address Switches S1-1 through S1-3

The MAP uses this card address to sequence up to four MACs in an alarm system. The address also defines the ports the Smart MAC supports. For example, Address 1 supports ports 1-8; Address 4 supports 25-32.

Master Port Data Rate Switches S1-4

Unless system requirements dictate otherwise, set the master port data rate for 9600 baud.

Master Port Protocol Switches S1-5 through S1-8

Unless system requirements dictate otherwise, set the master port protocol to DCPF.

Port Termination (SMT Version Only)

The individual bits on S3 set the termination on the receive ports. Refer to the Port Termination section discussed earlier.

3. Module Mounting

Determine the proper shelf slot where the module will be installed. Slide the module along the guide slots in the equipment housing, then firmly seat the edge connector in its receptacle.

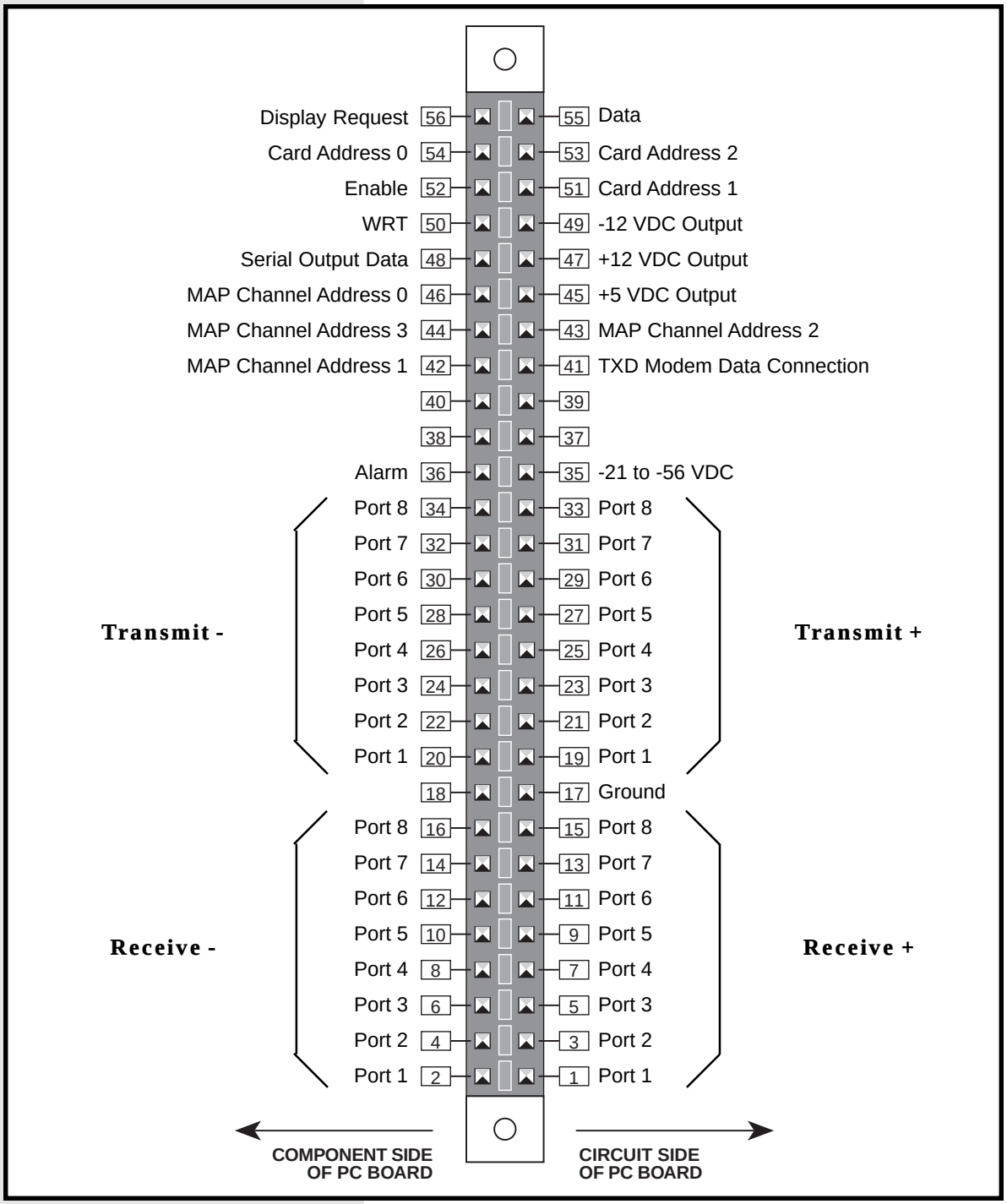
Normally the 56-pin edge connector for the slot is prewired at the factory. To wire the connector, refer to Fig. 4 for module connector pin wiring assignments. Also refer to Fig. 1, the functional schematic, if necessary.

TABLE B - SWITCH SETTINGS

SWITCH S1	S1-1	S1-2	S1-3	S1-4	S1-5	S1-6	S1-7	S1-8
CARD ADDRESS								
1 (Ports 1-8) *	OFF	OFF	OFF					
2 (Ports 9-16)	ON	OFF	OFF					
3 (Ports 17-24)	OFF	ON	OFF					
4 (Ports 25-32)	ON	ON	OFF					
MASTER PORT DATA RATE								
9600 Baud *				OFF				
1200 Baud				ON				
MASTER PORT PROTOCOL								
DCP					ON	ON	ON	ON
DCPF *					OFF	ON	ON	ON
SWITCH S2	**S2-1**	**S2-2**	**S2-3**	**S2-4**	**S2-5**	**S2-6**	**S2-7**	**S2-8**
Not Used *	ON	ON	ON	ON	ON	ON	ON	ON
SWITCH S3 (SMT VERSION ONLY)								
Port Termination								
Port 1 Terminated *	ON							
Port 2 Terminated *		ON						
Port 3 Terminated *			ON					
Port 4 Terminated *				ON				
Port 5 Terminated *					ON			
Port 6 Terminated *						ON		
Port 7 Terminated *							ON	
Port 8 Terminated *								ON

* Default

FIG. 4 - PIN DESIGNATIONS, 46023-14

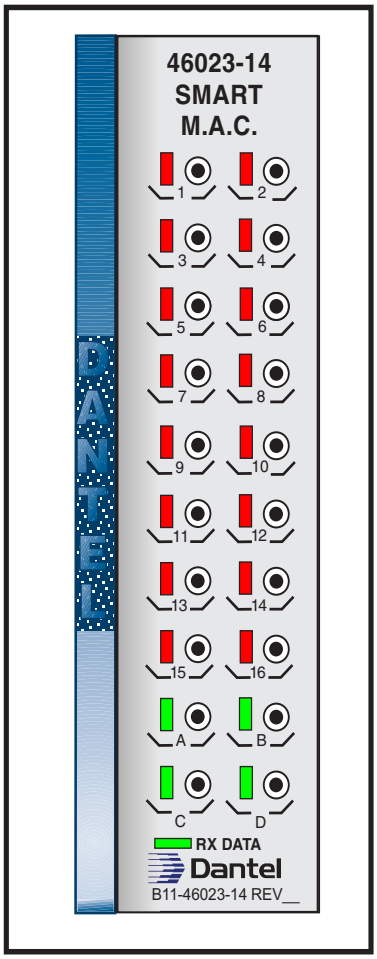


OPERATION

The 46023 Smart MAC has the following indicators on the front panel:

- Sixteen red LEDs indicate alarm site and individual alarm point status. A momentary contact switch next to each LED is for alarm acknowledgment and other functions.
- Four green LEDs indicate the individual alarm level (A, B, C, or D).
- One green LED labeled RX DATA indicates that the data ports are receiving data.

The operation of the 46023 Smart MAC depends on the firmware on the MAP. Refer to the appropriate firmware manual for specific operating information.



UPDATED

TECHNICAL SPECIFICATIONS

DESCRIPTION	VALUE
Input Voltage	-21 to -56 VDC
INPUT CURRENT (±10%)	
Thru-Hole Version	
@ -21 VDC	300 mA
@ -24 VDC	268 mA
@ -48 VDC	155 mA
@ -56 VDC	140 mA
SMT Version	
@ -21 VDC	133 mA
@ -24 VDC	120 mA
@ -48 VDC	62 mA
@ -56 VDC	55 mA
HEAT DISSIPATION (±10%)	
Thru-Hole Version	
@ -21 VDC	21.5 Btu/Hr
@ -24 VDC	21.9 Btu/Hr
@ -48 VDC	25.4 Btu/Hr
@ -56 VDC	26.8 Btu/Hr
SMT Version	
@ -21 VDC	9.53 Btu/Hr
@ -24 VDC	9.82 Btu/Hr
@ -48 VDC	10.14 Btu/Hr
@ -56 VDC	10.50 Btu/Hr
Output Voltage and Current	+5 VDC @ 200 mA +12 VDC @ 20 mA -12 VDC @ 20 mA
DATA RATES	
Master Port	1200, 9600 baud
Data Port	75, 110, 150, 300, 600, 1200, 2400, 4800, 9600 baud
Physical Dimensions	1.4" x 6.0" x 5.6"
Weight	10.5 ounces
Operating Temperature Range	0° to 55° C.

WARRANTY

LIMITED WARRANTY

The Seller warrants that the standard hardware products sold will be free from defects in material and workmanship and perform to the Seller's applicable published specifications for a period of 18 months for hardware, and 3 months for software, from the date of the original invoice. The liability of the Seller hereunder shall be limited to replacing or repairing, at its option, any defective products which are returned F.O.B. to the Seller's plant, (or, at the Seller's option, refunding the purchase price of such products). In no case are products to be returned without first obtaining permission and a customer return authorization number from the Seller. In no event shall the Seller be liable for any consequential or incidental damages.

Equipment or parts which have been subject to abuse, misuse, accident, alteration, neglect, unauthorized repair or installation are not covered by warranty. The Seller shall make the final determination as to the existence and cause of any alleged defect. No warranty is made with respect to custom equipment or products produced to the Buyer's specifications except as specifically stated in writing by the Seller in the contract for such custom equipment.

This warranty is the only warranty made by the Seller with respect to the goods delivered hereunder, and may be modified or amended only by a written instrument signed by a duly authorized officer of the Seller and accepted by the Buyer.

Warranty and remedies on products not manufactured by the Seller are in accordance with warranty of the respective manufacturer. THE SELLER MAKES NO OTHER WARRANTY OF ANY KIND WHATSOEVER, EXPRESSED OR IMPLIED; AND ALL IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE WHICH EXCEEDS THE AFORESAID OBLIGATIONS IS HEREBY DISCLAIMED BY THE SELLER.

IN CASE OF DIFFICULTY

If you experience difficulty with this equipment, check the following, as appropriate:

1. **Switch settings**
2. **Signal levels**
3. **Software configuration**
4. **Connections between Dantel's equipment and your equipment.**

If there is still a problem, substitute equipment that is known to be good. For additional assistance, call Dantel's Technical Field Service Department weekdays, 6 A.M. to 5 P.M. pacific time:

1-800-4DANTEL (1-800-432-6835).

If a thorough checkout shows a piece of equipment has malfunctioned, you may return it to the factory. For repairs and emergency replacements, obtain a Return Material Authorization (RMA) number from the Customer Service Representative at **1-800-4DANTEL** (1-800-432-6835).

To ensure expedient processing of your order, provide a purchase order number and shipping and billing information when requesting an RMA number. Also, when the units are returned to Dantel, include a description of the failure symptoms for each unit returned. Send defective equipment to:

Dantel, Inc. • 2991 North Argyle Avenue • Fresno, California 93727-1388

Dantel

P.O. Box 55013 • Fresno, CA 93747-5013 Phone (559) 292-1111 Fax (559) 292-9355 http://www.dantel.com