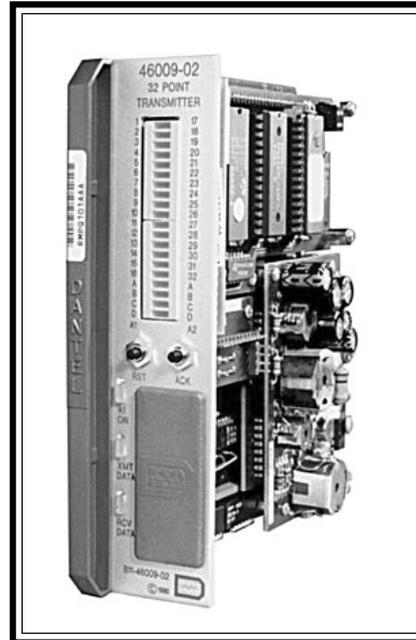


# 46009

## MULTIPLE ALARM TRANSMITTER (MAT)



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#### About this Practice:

This practice has been reissued to:

- Assign a document control number.
- Meet ISO 9001 requirements.

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

**Issue date: July 1998**

UPDATED

### 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
B11-46009-00	32-point Multiple Alarm Transmitter (no display; one alarm level relay output)
B11-46009-02	32-point Multiple Alarm Transmitter (led display; one alarm level relay output)
C11-46009-03	32-point Multiple Alarm Transmitter (led display; four alarm level relay output; battery backup)

## GENERAL DESCRIPTION

The 46009 Multiple Alarm Transmitter (MAT) is part of Dantel's 460 Alarm and Control System. It does the following:

- ◆ Reports the alarm status for 32 independent discrete alarm inputs.
- ◆ Reports the alarms in either DCM or TBOS format, depending on how the module's switches are set.
- ◆ Reports alarms locally through 1-4 relays to audible or visual devices.
- ◆ Provides alarm acknowledgment.

The 46009 MAT has a regulated power supply that uses -21 to -56 VDC input power. It is available in three different options. Refer to the **Ordering Information** section.

**NOTE:** *In these instructions, any mention of LED displays (other than A1 ON, XMT DATA, and RCV DATA) refers only to the -02 and -03 options. The -00 option does not have these LEDs.*

### On all options:

Green LEDs on the front panel (labeled XMT DATA and RCV DATA) light up to show that the unit is sending or receiving data.

A third green LED (labeled A1 ON) lights when alarm points 1-16 are being displayed on the red LED display (-02 and -03 options only). When the A1 ON LED is off, alarm points 17-32 are shown.

### On options -02, -03:

There are 20 red LEDs on the upper half of the front panel, arranged in a vertical row. The first 16 are numbered 1-16 on the left side and 17-32 on the right side. The last four are lettered A-D. The first 16 LEDs show the alarm status of each point. The last four (A-D) show the level of alarm. These LEDs operate in different modes, depending on how you set the

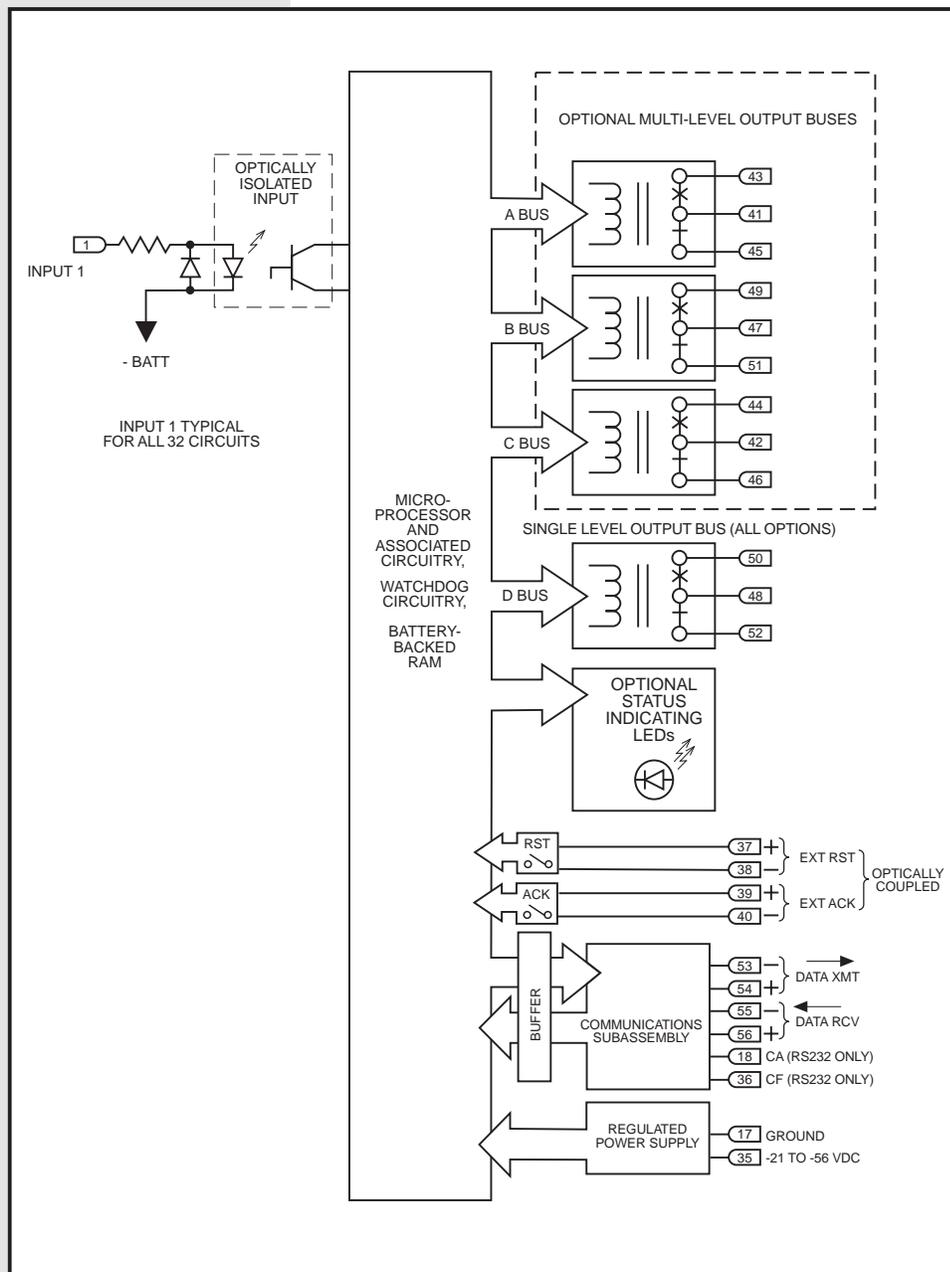
# GENERAL DESCRIPTION

switches S3-1, S3-2, S4-3, and S5-1. Table A explains how to set these switches for the type of operation you want. When the MAT is configured to report alarms in the TBOS format, it operates in the "Alarm with Levels" mode only.

# CIRCUIT DESCRIPTION

Fig. 1 shows the 46009 MAT functional schematic.

**FIG. 1 - FUNCTIONAL SCHEMATIC, 46009 MAT**



# INSTALLATION

The 46009 MAT can operate in one of several modes if it is reporting alarms in the DCM format. Study Table A carefully and make the proper switch settings for the mode of operation you choose. The MAT operates in the “Alarm with Levels” mode only when reporting alarms in the TBOS format.

## 1. Set switches.

Set the switches as described in Tables A, B and C if the alarms report in DCM format. Refer to Fig. 2 or the drawing with Table C for the switch locations. Addressing for the MAT is in multiples of two. When the MAT is addressed, the MAT responds to that address and the next consecutive address; for example, if the MAT address is set for 1, the MAT responds to addresses 1 and 2. The first address is alarm points 1-16 and the second address is points 17-32.

Set the switches as described in Table D if the alarms report in TBOS format. Refer to Fig. 2 or the drawing with Table D for the switch locations.

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**NOTE:** *Leave the A-B strap in the A position.*

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## 2. Mount a subassembly, if necessary.

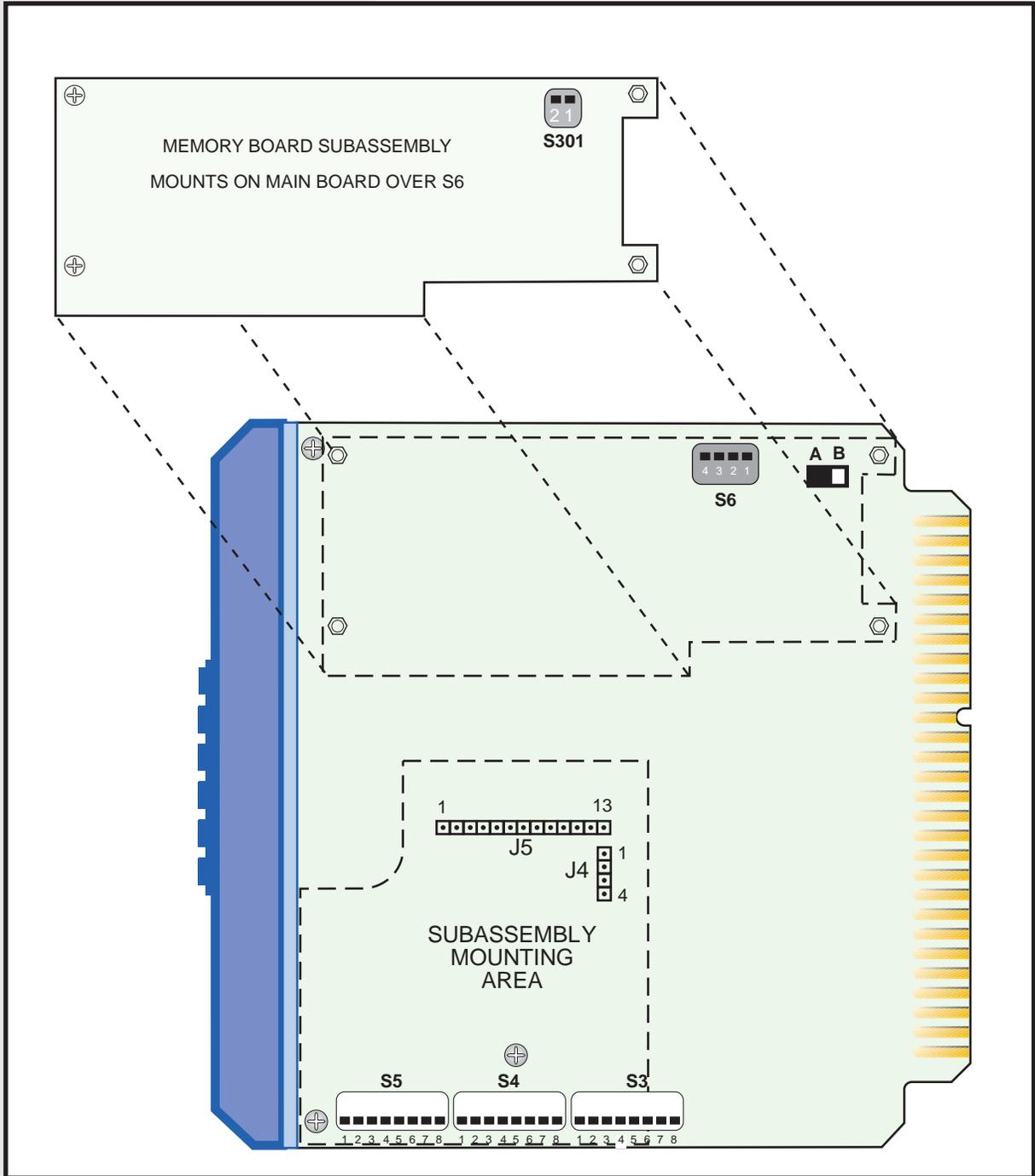
The module comes equipped with a subassembly. To install a different subassembly, follow these steps:

1. If there is a hole plug in the front panel of the MAT, remove the plug.
2. Remove the three screws from the subassembly standoffs (refer to Fig. 2).
3. Take the subassembly off the board.
4. Place the new subassembly on the board:
  - Insert P4 into J4 and P5 into J5.
  - Make sure each connector pin goes straight into the socket.
  - Make sure the subassembly fits closely on the standoffs.
  - The panel should be straight in the opening.
5. Replace the three screws in the standoffs.
6. Refer to the subassembly manual for strapping information.

CONTINUED . . .

# INSTALLATION

FIG. 2 - SWITCH AND STRAP LOCATIONS, 46009 MAT



# INSTALLATION

TABLE A - MODES OF OPERATION (DCM)

OPTION	SWITCH NUMBER	SETTING
<b>NORMAL MODE</b>		
When an alarm occurs, that alarm's LED goes on but the level LED does not. When the alarm goes away, the alarm LED goes off. The ACK button does not function. The output relays remain inoperative.	S3-1	OFF
	S3-2	OFF
	S4-3	OFF
	S5-1	OFF
<b>LATCHING MODE</b>		
When an alarm occurs, both the alarm LED and the level LED go on. Press the ACK button. The level LED goes off. When the alarm goes away, the level LED goes back on. Press the ACK button. Both LEDs go off.	S3-1	OFF
	S3-2	ON
	S4-3	OFF
	S5-1	OFF
<b>ANNUNCIATOR MODE</b>		
When an alarm occurs, the alarm LED flashes. The level LED goes on. Press the ACK button. The level LED goes off and the alarm LED does not flash but stays on. When the alarm goes away, the level LED goes back on and the alarm LED flashes again. Press the ACK button. Both LEDs go off.	S3-1	ON
	S3-2	ON
	S4-3	OFF
	S5-1	OFF
<b>ALARM WITH LEVELS MODE</b>		
When an alarm occurs, that alarm's LED and the level LED go on. Press the ACK button. The level LED goes off. When the alarm goes away, both LEDs go off.	S3-1	ON
	S3-2	OFF
	S4-3	OFF
	S5-1	OFF
<b>TRANSMIT CONTINUOUS</b>		
ONLY FOR MAT/CPM MODE APPLICATIONS. Serial data is transmitted continuously. No external command is required to start data transmission.	S3-6	ON
<b>REVERSED INPUTS</b>		
Reverses the normal alarm status current from (A) Current Flow (TTL High) = Alarm Status, to (B) No Current Flow (TTL Low) = Alarm Status. The number of inputs reversible are 4, 8, 16, or none.	S4-1	Refer to Table B
	S4-2	
<b>LATCHING INPUTS</b>		
Holds and alarm point in the alarm status, even if the alarm is very brief. Reports the alarm data during the next transmission cycle. To restore the alarm point to normal, press the RST button.	S4-3	ON
	S5-1	OFF
<b>DELAYED INPUTS</b>		
Adds a short delay (1/2 second) to the alarm detection function. Brief signals caused by non-alarm conditions are not reported as alarms.	S4-4	ON
	S4-3	OFF
<b>AUTO LATCH RELEASE</b>		
Applies automatic reset to all latching inputs. The inputs are released as soon as the MAT transmits its status. The RST button is inactive.	S5-1	ON
	S4-3	ON
<b>MANUAL RELEASE</b>		
After an alarm is reported, the RST button must be pressed to return the alarm point to normal.	S5-1	OFF
	S4-3	ON
<b>ADDRESS</b>		
Sets the address of the MAT.	S5-2 thru S5-8	Refer to Table C.

# INSTALLATION

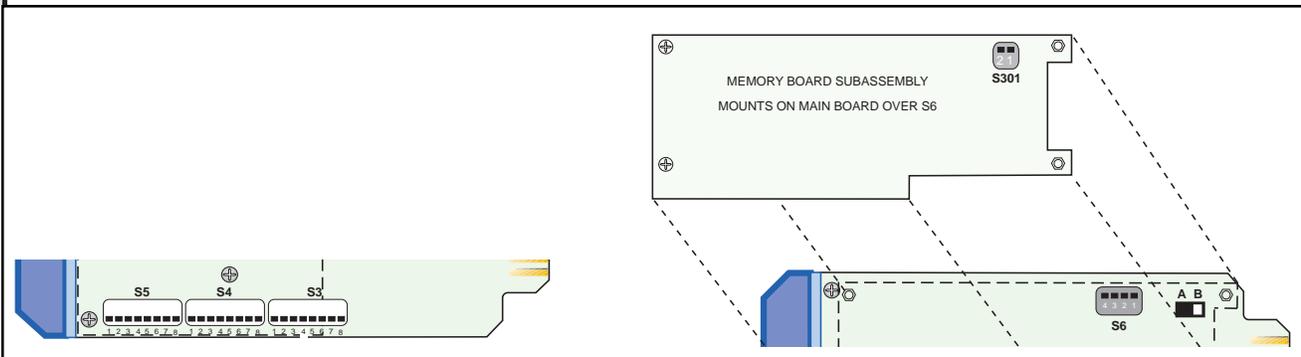
**TABLE B - SWITCH SETTINGS (DCM)**

OPTION	SWITCH SETTINGS							
	S3-1	S3-2	S3-3	S3-4	S3-5	S3-6	S3-7	S3-8
Display Function Normal Latching Annunciator Alarm with Levels	OFF OFF ON ON	OFF ON ON OFF						
Not Used			OFF	OFF	OFF		OFF	OFF
Transmit Continuous MAT/CPM Mode Only All other applications						ON OFF		
	S4-1	S4-2	S4-3	S4-4	S4-5	S4-6	S4-7	S4-8
Input Reversal Normal (current flow generates an alarm) Points 1-4 and 17-20 Reversed (no current flow generates an alarm) Points 1-8 and 17-24 Reversed All Points Reversed	OFF OFF ON ON	OFF ON OFF ON						
Latching Input			ON	OFF				
Delayed Input (500 m.s.)			OFF	ON				
Data Rate 50 Baud 75 Baud 110 Baud 135 Baud 150 Baud 300 Baud 600 Baud 1200 Baud 1800 Baud 2400 Baud 3600 Baud 4800 Baud 7200 Baud 9600 Baud					OFF OFF OFF OFF OFF OFF ON ON ON ON ON ON ON ON ON	OFF OFF ON ON ON ON OFF OFF OFF OFF ON ON ON ON ON	OFF ON ON OFF ON ON OFF OFF ON ON OFF OFF OFF OFF ON	ON OFF ON OFF ON ON OFF OFF ON ON OFF OFF ON OFF OFF
	S5-1	S5-2	S5-3	S5-4	S5-5	S5-6	S5-7	S5-8
Latch Release (When S4-3 is ON) Automatic Release (On Poll) Manual Release (Use RST button)	ON OFF							
Address	See Table C							
	S6-1	S6-2	S6-3	S6-4				
Not Used	OFF	OFF	OFF	OFF				
	S301-1	S301-2						
Protocol Selector DCM	ON	OFF						

# INSTALLATION

**TABLE C - ADDRESS SELECTION (DCM)**

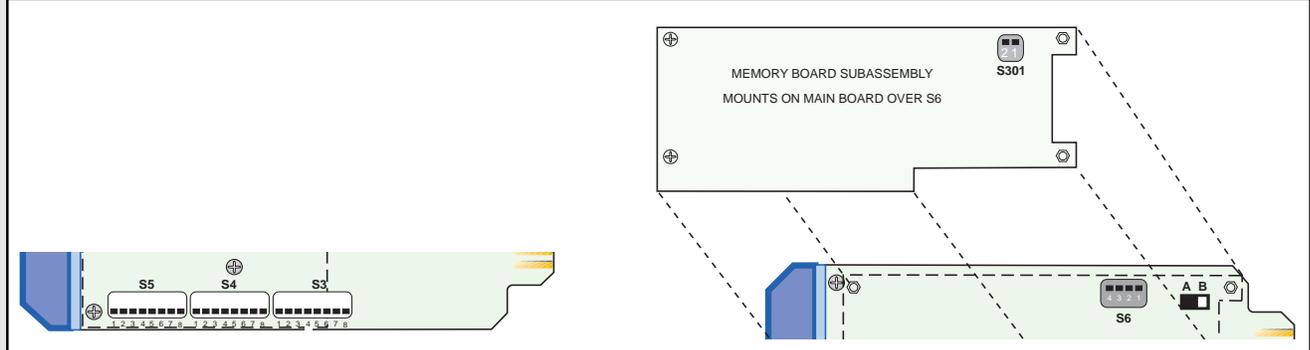
1 	14 	27 	40 	53 	66 	79 	92 	105 	118 
2 	15 	28 	41 	54 	67 	80 	93 	106 	119 
3 	16 	29 	42 	55 	68 	81 	94 	107 	120 
4 	17 	30 	43 	56 	69 	82 	95 	108 	121 
5 	18 	31 	44 	57 	70 	83 	96 	109 	122 
6 	19 	32 	45 	58 	71 	84 	97 	110 	123 
7 	20 	33 	46 	59 	72 	85 	98 	111 	124 
8 	21 	34 	47 	60 	73 	86 	99 	112 	125 
9 	22 	35 	48 	61 	74 	87 	100 	113 	126 
10 	23 	36 	49 	62 	75 	88 	101 	114 	127 
11 	24 	37 	50 	63 	76 	89 	102 	115 	128 
12 	25 	38 	51 	64 	77 	90 	103 	116 	
13 	26 	39 	52 	65 	78 	91 	104 	117 	



# INSTALLATION

**TABLE D - SWITCH SETTINGS (TBOS)**

OPTION	SWITCH SETTINGS							
	S3-1	S3-2	S3-3	S3-4	S3-5	S3-6	S3-7	S3-8
Use these settings only (See Table B for switch definitions)	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
	S4-1	S4-2	S4-3	S4-4	S4-5	S4-6	S4-7	S4-8
Input Reversal Normal (current flow generates an alarm) Points 1-4 and 17-20 reversed (no current flow generates an alarm) Points 1-8 and 17-24 Reversed All Points Reversed	OFF OFF ON ON	OFF ON OFF ON						
Latching Input Do Not Use			ON OFF					
Delayed Input (500 m.s.) 40 m.s. 500 m.s.				OFF ON				
Data Rate 50 Baud 75 Baud 110 Baud 135 Baud 150 Baud 300 Baud 600 Baud 1200 Baud 1800 Baud 2400 Baud 3600 Baud 4800 Baud 7200 Baud 9600 Baud					OFF OFF OFF OFF OFF OFF OFF ON ON ON ON ON ON ON ON ON	OFF OFF OFF ON ON ON ON OFF OFF OFF OFF OFF ON ON ON ON	OFF ON ON OFF OFF ON ON OFF OFF ON ON ON OFF OFF OFF ON	ON OFF ON OFF ON OFF ON ON OFF OFF OFF ON ON OFF ON OFF



**TABLE D CONTINUED . . .**

# INSTALLATION

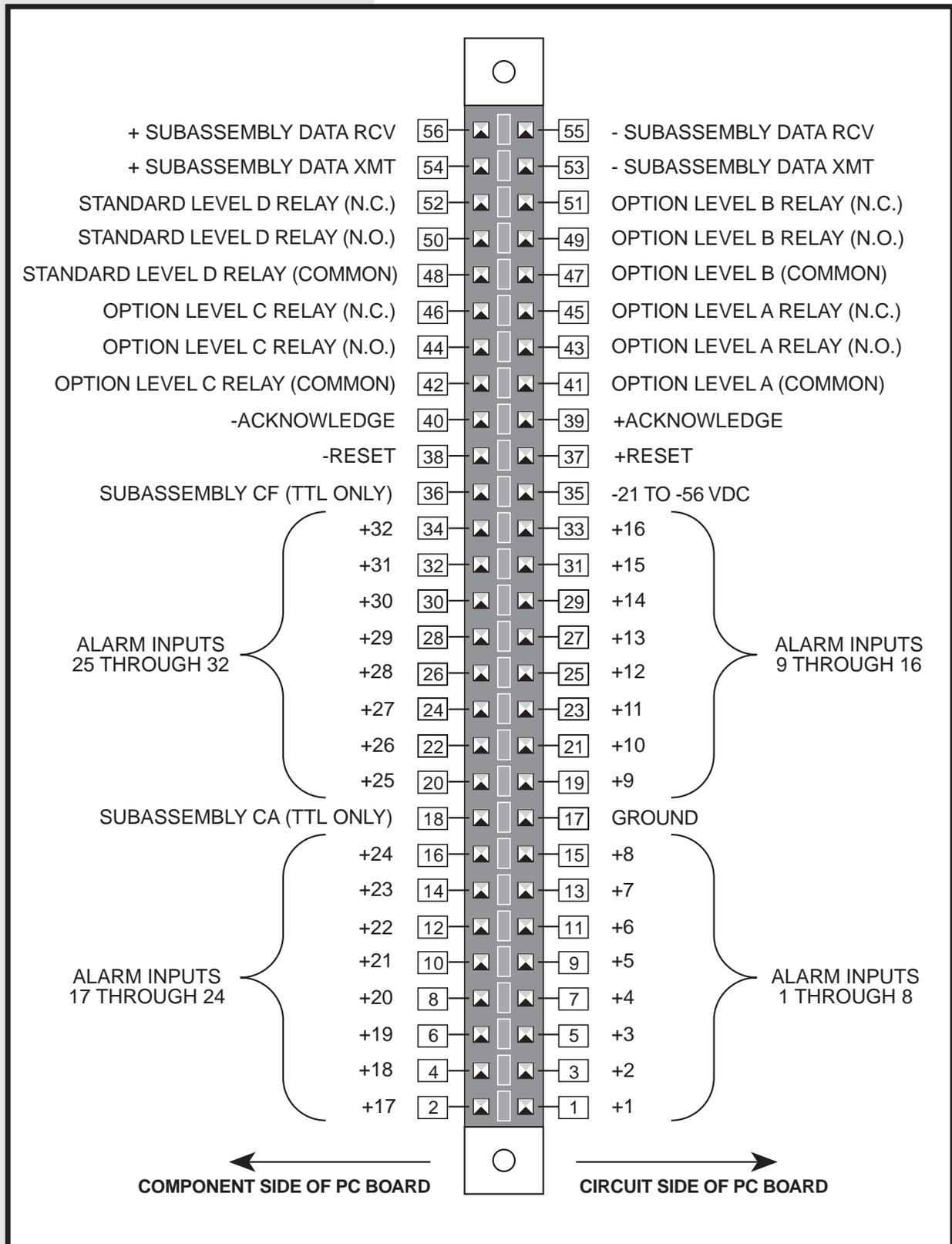
**TABLE D (CONTINUED) - SWITCH SETTINGS (TBOS)**

OPTION	SWITCH SETTINGS							
	S5-1	S5-2	S5-3	S5-4	S5-5	S5-6	S5-7	S5-8
Latch Release Release on poll Do not use	ON OFF							
Not used		OFF	OFF	OFF				
TBOS Display*								
Disp. 1 Char. 1-4					OFF	OFF	OFF	OFF
Disp. 1, Char. 5-8					OFF	OFF	OFF	ON
Disp. 2 Char. 1-4					OFF	OFF	ON	OFF
Disp. 2, Char. 5-8					OFF	OFF	ON	ON
Disp. 3 Char. 1-4					OFF	ON	OFF	OFF
Disp. 3, Char. 5-8					OFF	ON	OFF	ON
Disp. 4, Char. 1-4					OFF	ON	ON	OFF
Disp. 4, Char. 5-8					OFF	ON	ON	ON
Disp. 5 Char. 1-4					ON	OFF	OFF	OFF
Disp. 5, Char. 5-8					ON	OFF	OFF	ON
Disp. 6 Char. 1-4					ON	OFF	ON	OFF
Disp. 6, Char. 5-8					ON	OFF	ON	ON
Disp. 7 Char. 1-4					ON	ON	OFF	OFF
Disp. 7, Char. 5-8					ON	ON	OFF	ON
Disp. 8, Char. 1-4					ON	ON	ON	OFF
Disp. 8, Char. 5-8					ON	ON	ON	ON
	S6-1	S6-2	S6-3	S6-4				
TBOS Function	OFF*	OFF	OFF	OFF				
	ON*							
	S301-1	S301-2						
Protocol Selection								
TBOS	ON	ON						

\* A TBOS display consists of eight characters (64 points). A MAT can handle four characters (32 points). If S6-1 is OFF, the MAT will respond only to the four characters (32 points) selected by switches S5-5 through S5-8. If S6-1 is ON, the MAT will respond to the four characters selected by switches S5-5 through S5-8; it will also respond to the other four characters of the same display, reporting no alarms. Set S6-1 OFF if two MATs are being used for a display. Set S6-1 ON if only one MAT is being used.

# INSTALLATION

FIG. 3 - PIN DESIGNATIONS, 46009 MAT



# INSTALLATION

3. Install the module in the proper slot of the equipment shelf.

4. Download the alarm levels to the MAT.

**NOTE:** Do this step only if the MAT is a -03 option and is using the DCM format to report alarms.

- ◆ Set the default level for alarms to D:
  - Verify that the power to the shelf is off.
  - Press and hold the RST button.
  - Turn on power.
  - Release the RST button after three seconds.
- ◆ Download the alarm levels (A-D) from the 46020 Multiple Alarm Processor (MAP).

For MAPs that require a T/Shell software program to configure (such as those with 46640-01 or 46641-00 firmware), refer to the **Data Port Definition** section of the **MAP System Definition** chapter of the software manual to set the levels. Refer to the **Transfer** chapter to download the settings.

For MAPs that do *not* require a T/Shell software program to configure (such as those with 46600-35 or 46600-38 firmware), refer to the PUT command in the **Printer Syntax** chapter of the firmware manual.

A battery on the memory board subassembly prevents the alarm levels from being lost if there is a power failure.

# CHECKOUT

Follow the procedure in Table E to verify proper operation.

TABLE E - 46009 CHECKOUT PROCEDURE

PROCEDURE	RESULT
Turn on power to the shelf and begin polling the MAT	The RCV DATA LED blinks in response to all polling, but the XMT DATA LED flashes only when its two addresses are polled.
Press ACK and RST buttons at the same time. Hold them for a few seconds.	All LEDs except the A1 ON, XMT DATA, and RCV DATA light up and remain on until you release the buttons.
Generate alarms on each of the MATs inputs. Acknowledge the alarms. Reset the inputs to the non-alarm state.	The alarm and level LEDs operate according to the mode of operation you have chosen. The A1 ON LED turns on and off at six-second intervals. When the A1 ON LED is on, alarms 1-16 appear on the alarm LEDs. When the A1 ON LED is off, alarms 17-32 appear. The correct information is also sent to the alarm center.

# OPERATION

Once you install the 46009 MAT, observe the LED display. When the A1 ON LED is on, alarms 1-16 appear on the alarm LEDs. When the A1 ON LED is off, alarms 17-32 appear.

Reset and acknowledge alarms according to the mode you have chosen by pressing the RST and ACK buttons. (For switch settings, see Tables A and B for DCM alarm reporting or Table D for TBOS alarm reporting.)

# TECHNICAL SPECIFICATIONS

DESCRIPTION	VALUE			
Input Voltage Range	-21 to -56 VDC			
Input Current (ratings are +/-20 percent)	Idle		Operate	
	@-24 VDC	@-48 VDC	@-24 VDC	@-48 VDC
	65 mA	50 mA	115 mA	70 mA
	70 mA	52 mA	115 mA	80 mA
-03 Option	70 mA	52 mA	155 mA	120 mA
Heat Dissipation				
-00 Option (@-48 VDC)	11.5 Btu/Hr			
-02 Option (@-48 VDC)	13.1 Btu/Hr			
-03 Option (@-48 VDC)	19.6 Btu/Hr			
Alarm, Acknowledge and Reset Inputs				
Voltage Range	-21 to -56 VDC			
Current Range	600 uA to 2.0 mA			
Resistance	33K ohms + 1 Diode (0.6 volt)			
TTL Levels				
Logic 0	0 to 1.0 VDC			
Logic 1	2.6 to 5.25 VDC			
Alarm Bus Output				
Contact Type	Single Form-C Dry Contact			
Contact Ratings	Max. 1 Amp @ 24 VDC Max. 0.5 Amp @ 125 VAC			
Data Rates (selectable)	50 through 9600 baud			
Weight				
-00 Options	10.25 ounces			
-02 Options	12 ounces			
-03 Options	13 ounces			
Physical Dimensions	1.4" W x 6" x 5.6" H			
Operating Temperature Ranges	0 to 55 Degrees 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**

