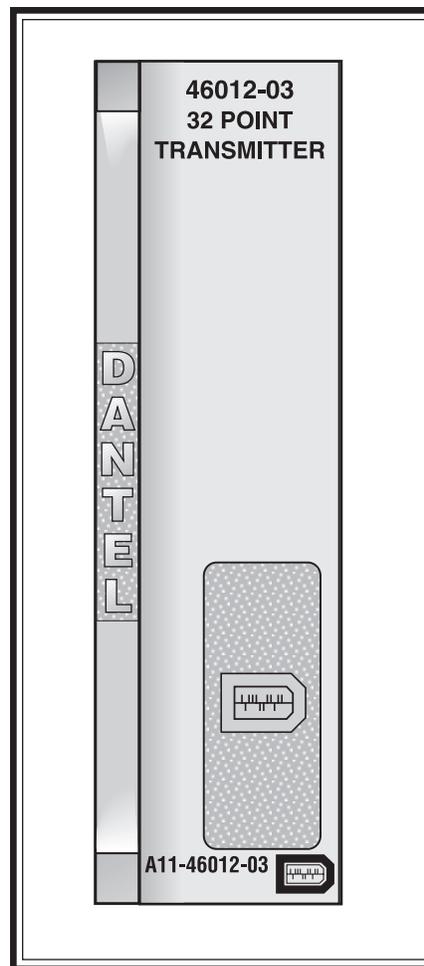


46012 MULTIPLE ALARM TRANSMITTER (MAT)



DANTEL[®]

INSTALLATION & OPERATION MANUAL



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.

PROTECT YOUR EQUIPMENT

- Remove and install circuit boards only in a static-safe environment (use anti-static wrist straps, smocks, footwear, etc.).
- Keep circuit boards in their anti-static 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.

Dantel is a registered trademark of Dantel, Inc.
Copyright 1996 by Dantel, Inc.
Printed in the U.S.A.

TABLE OF CONTENTS

General Description	1
Circuit Description.....	3
Installation	5
Checkout.....	15
Operation	17
Application Information.....	19
Technical Specifications	21
Warranty	23

This practice has been reissued:

- ◆ To add the Application Information section.
- ◆ To add Fig. 3.

Previous issue: August 1995



GENERAL DESCRIPTION

The 46012 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 four relays to audible or visual devices. If you do not use the relays to report alarms, you can use the relays to operate controls.
- ◆ Provides alarm acknowledgment.

The 46012 MAT has a regulated power supply that uses -21 to -56 VDC input power.

The module has 23 LEDs. The top two are green and are labeled XMT DATA and RCV DATA. They light when the MAT is sending or receiving data.

The third LED is yellow and is labeled A1. It indicates whether the next group of 16 red LEDs are showing alarms for points 1-16 or for points 17-32.

Below the 16 alarm LEDs are four more red LEDs labeled A-D. These indicate the level of alarms.

GENERAL DESCRIPTION

CIRCUIT DESCRIPTION

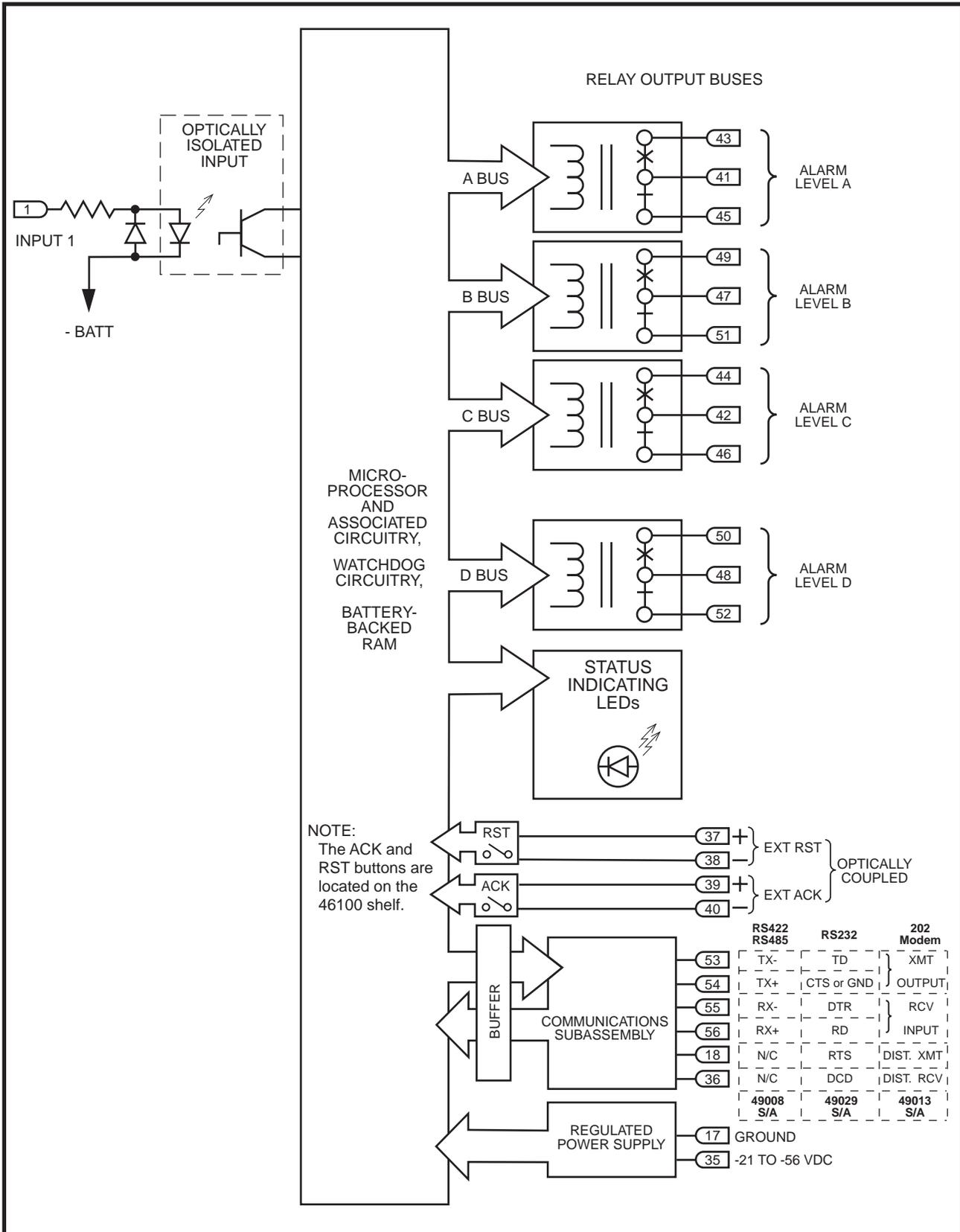
PC PIN ASSIGNMENT FOR ALARM INPUT 2 - 32

STATUS INPUT No.	PC PIN No.
2	3
3	5
4	7
5	9
6	11
7	13
8	15
9	19
10	21
11	23
12	25
13	27
14	29
15	31
16	33
17	2
18	4
19	6
20	8
21	10
22	12
23	14
24	16
25	20
26	22
27	24
28	26
29	28
30	30
31	32
32	34

Fig. 1 shows the 46012 MAT functional schematic.

CIRCUIT DESCRIPTION

FIG. 1 - MULTIPLE ALARM TRANSMITTER FUNCTIONAL SCHEMATIC



INSTALLATION

The 46012 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. When reporting alarms in the TBOS format, the MAT operates in the “Alarm with Levels” mode only.

INSTALLATION

1. Set the switches and straps.

- ◆ Set the switches as described in Tables A, B, C if the alarms are going to be reported 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 module is addressed, it will respond to that address and the next consecutive address; for example, if the MAT address is set for 1, the MAT will respond 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 are going to be reported in TBOS format. Refer to Fig. 2 or the drawing accompanying the table for the switch locations.

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

- ◆ Set the straps on the communications subassembly. Refer to the manual for the subassembly. If it is necessary to install a different subassembly, refer to the next step.

2. Install a subassembly, if necessary.

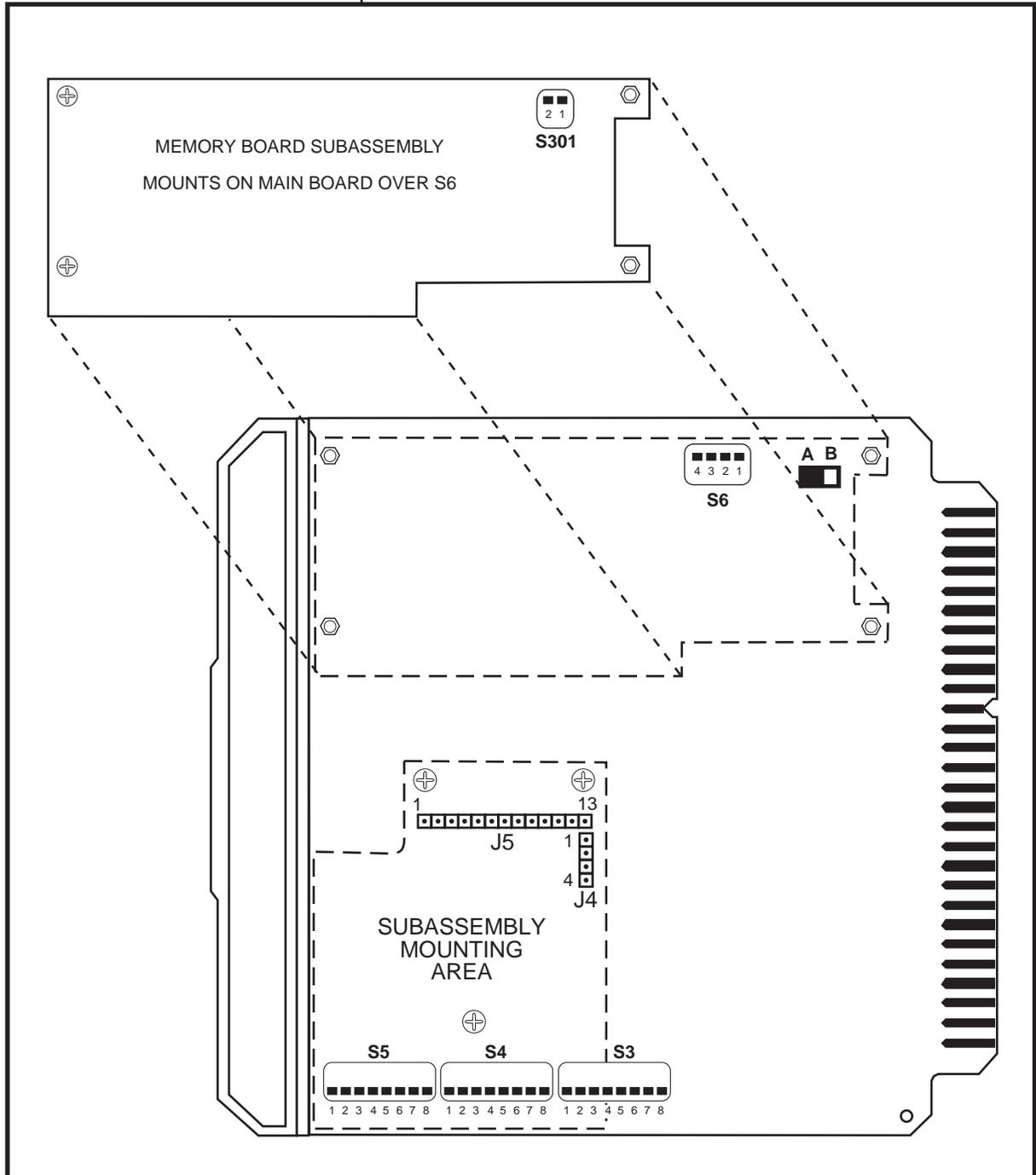
The module comes equipped with a subassembly. To install a different subassembly, follow these steps:

- ◆ If there is a hole plug in the front panel of the MAT, remove the plug.
- ◆ Remove the three screws from the subassembly standoffs (refer to Fig. 2).
- ◆ Take the subassembly off the board.
- ◆ 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.
- ◆ Replace the three screws in the standoffs.
- ◆ Refer to the subassembly manual for strapping information.

3. Install the module in the 46100 Wall-Mount Shelf.

INSTALLATION

FIG 2 -
SWITCH AND SUBASSEMBLY LOCATIONS



INSTALLATION

4. Wire the shelf.

Wiring is done on the 46100 Wall-Mount Shelf. Refer to the 46100 manual for wiring instructions.

5. Download the alarm levels to the MAT.

NOTE: Do this step only if the MAT is using the DCM format to report alarms and switches S3-3 and S3-4 are set for alarm reporting.

◆ Set the default level for alarms to D:

- Verify that the power to the shelf is off.
- Press and hold the RST button (switches SW1-1 through SW1-3 on the 46100 Wall-Mount Shelf must be ON).
- Turn on power.
- Release the RST button after three seconds.

NOTE: Stop here if S3-3 is ON and S3-4 is OFF. The MAT will report D-level alarms only. If S3-3 and S3-4 are both OFF, continue with the downloading procedure.

◆ 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.

INSTALLATION

TABLE A - MODES OF OPERATION - DCM

OPTION	SWITCH NUMBER	SETTING
Normal Mode 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 work. The output relays do not operate.	S3-1 S3-2 S4-3 S5-1	OFF OFF OFF OFF
Latching Mode* 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 S3-2 S4-3 S5-1	OFF ON OFF OFF
Annunciator Mode* 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 S3-2 S4-3 S5-1	ON ON OFF OFF
Alarm With Levels Mode* 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 S3-2 S4-3 S5-1	ON OFF OFF OFF
Transmit Continuous Only for MAT/CPM mode applications. Serial data is transmitted continuously. No external command is required to start data transmission.	S3-6	ON
Reversed Inputs Reverses the normal alarm status current from Current Flow = Alarm Status to No Current Flow = Alarm Status The number of inputs reversed can be 4, 8, 16, or none.	S4-1 S4-2	See Table B for all possible settings
Latching Inputs* Holds an 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
Delayed Inputs Adds a short delay (about 1/2 second) to the alarm detection function. Brief signals caused by non-alarm conditions are not reported as alarms.	S4-4	ON
Auto Latch Release* Applies automatic reset to all latching inputs. The inputs are released as soon as the MAT transmits its status. The RST button does not work.	S5-1 S4-3	ON ON
Manual Release* After an alarm is reported, you must press the RST button to return the alarm point to normal.	S5-1 S4-3	OFF ON
Address Sets the address of the MAT.	S5-2 S5-3 S5-4 S5-5 S5-6 S5-7 S5-8	See Table C for all possible settings

* The operation of the level LEDs and output relays to report alarms or operate controls depends on the settings of S3-3 and S3-4. Refer to Table B. The ACK and RST buttons are located on the 46100 Wall-Mount Shelf. The operation of the buttons depends on the settings of switch SW1 on the 46100 shelf.

INSTALLATION

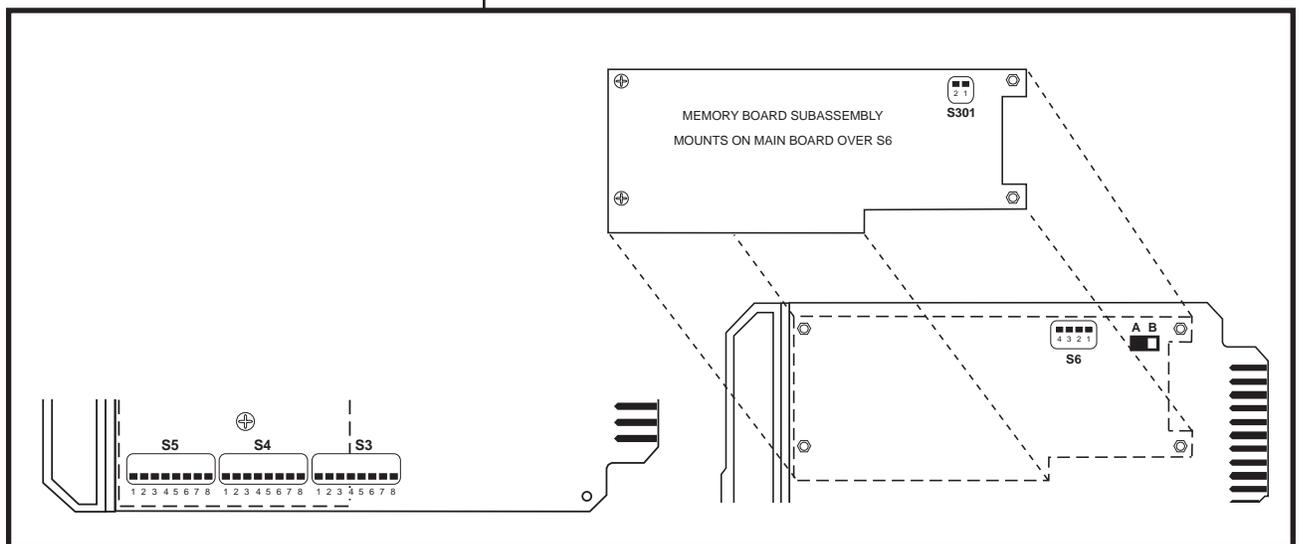
TABLE B - SWITCH SETTINGS- DCM

OPTION	SWITCH SETTINGS							
	S3-1	S3-2	S3-3	S3-4	S3-5	S3-6	S3-7	S3-8
Display Function								
Normal	OFF	OFF						
Latching	OFF	ON						
Annunciator	ON	ON						
Alarm with Levels	ON	OFF						
All relays operate controls			ON	ON				
First three relays operate controls; fourth relay reports alarms (level D)			ON	OFF				
All relays report alarms (levels A-D)			OFF	OFF				
Not Used					OFF		OFF	OFF
Transmit Continuous MAT/CPM Mode Only						ON		
All other applications						OFF		
	S4-1	S4-2	S4-3	S4-4	S4-5	S4-6	S4-7	S4-8
Input Reversal								
Normal	OFF	OFF						
(current flow generates an alarm)								
Points 1-4 and 17-20 Reversed	OFF	ON						
(no current flow generates an alarm)								
Points 1-8 and 17-24 Reversed	ON	OFF						
All Points Reversed	ON	ON						
Latching Input			ON					
Delayed Input (500 m.s.)				ON				
Data Rate								
50 Baud					OFF	OFF	OFF	ON
75 Baud					OFF	OFF	ON	OFF
110 Baud					OFF	OFF	ON	ON
135 Baud					OFF	ON	OFF	OFF
150 Baud					OFF	ON	OFF	ON
300 Baud					OFF	ON	ON	OFF
600 Baud					OFF	ON	ON	ON
1200 Baud					ON	OFF	OFF	OFF
1800 Baud					ON	OFF	OFF	ON
2400 Baud					ON	OFF	ON	OFF
3600 Baud					ON	OFF	ON	ON
4800 Baud					ON	ON	OFF	OFF
7200 Baud					ON	ON	OFF	ON
9600 Baud					ON	ON	ON	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							
(On Poll)								
Manual Release	OFF							
(Use RST button)								
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
S5-2 THROUGH S5-8 (S5-1 IS NOT PART OF ADDRESS SWITCH SETTINGS)

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	

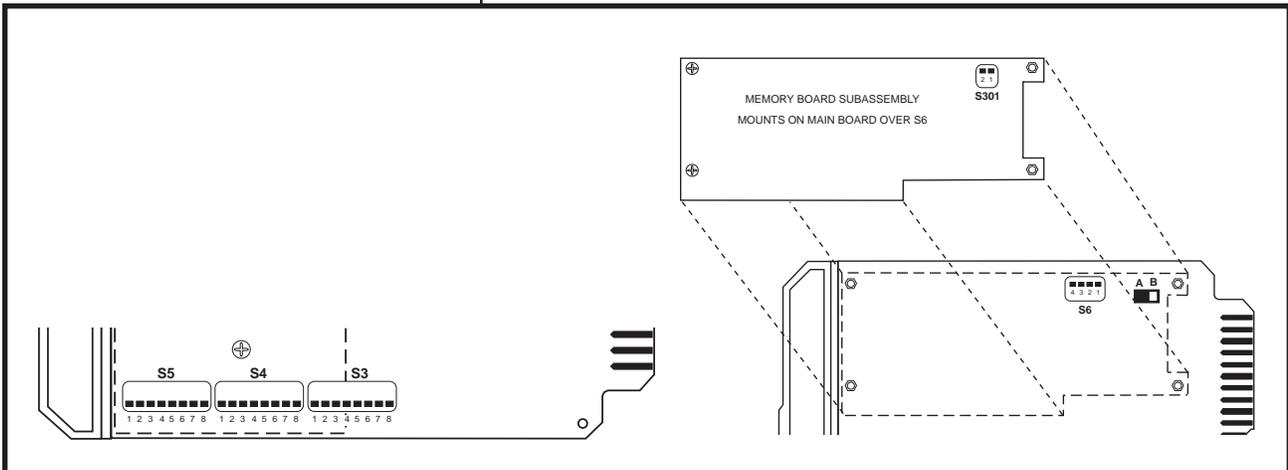


INSTALLATION

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
All relays operate controls			ON	ON				
First three relays operate controls; fourth relay reports alarms (level D)			ON	OFF				
All relays report alarms (levels A-D)			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)	OFF	OFF						
Points 1-4 and 17-20 reversed (no current flow generates an alarm)	OFF	ON						
Points 1-8 and 17-24 Reversed	ON	OFF						
All Points Reversed	ON	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					OFF	OFF	OFF	ON
75 Baud					OFF	OFF	ON	OFF
110 Baud					OFF	OFF	ON	ON
135 Baud					OFF	ON	OFF	OFF
150 Baud					OFF	ON	OFF	ON
300 Baud					OFF	ON	ON	OFF
600 Baud					OFF	ON	ON	ON
1200 Baud					ON	OFF	OFF	OFF
1800 Baud					ON	OFF	OFF	ON
2400 Baud					ON	OFF	ON	OFF
3600 Baud					ON	OFF	ON	ON
4800 Baud					ON	ON	OFF	OFF
7200 Baud					ON	ON	OFF	ON
9600 Baud					ON	ON	ON	OFF

continued . . .



INSTALLATION

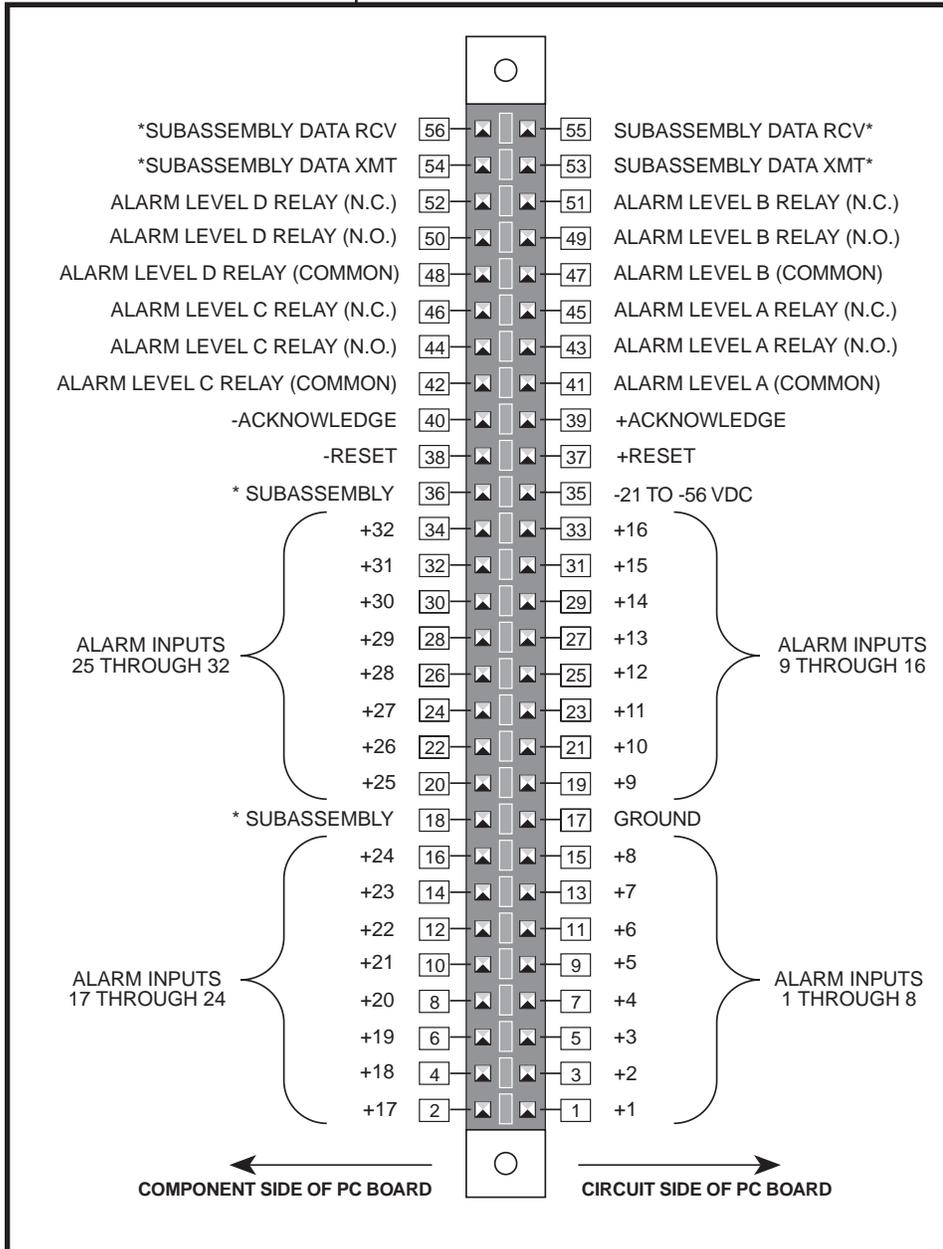
TABLE D - CONTINUED

OPTION	SWITCH SETTINGS							
	S5-1	S5-2	S5-3	S5-4	S5-5	S5-6	S5-7	S5-8
Latch Release								
Release on poll	ON							
Do not use	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
TBOS Display*								
Disp. 1 Char. 1-4					ON	OFF	OFF	OFF
Disp. 1, Char. 5-8					ON	OFF	OFF	ON
Disp. 2 Char. 1-4					ON	OFF	ON	OFF
Disp. 2, Char. 5-8					ON	OFF	ON	ON
Disp. 3 Char. 1-4					ON	ON	OFF	OFF
Disp. 3, Char. 5-8					ON	ON	OFF	ON
Disp. 4, Char. 1-4					ON	ON	ON	OFF
Disp. 4, 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 - MULTIPLE ALARM TRANSMITTER PIN DESIGNATIONS



* See Functional Schematic (Fig. 1) on Page 4 for Pin Out Designation depending on Sub-Assembly (49008-00, 49029-00 or 49013-00) installed.

CHECKOUT

Follow the procedure in Table F to see if the 46012 MAT is working properly.

TABLE E - 46012 CHECKOUT PROCEDURES

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 the ACK and RST buttons* at the same time and 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 MAT's 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 also is sent to the alarm center.
If relays on the MAT are configured to operate controls, test their operation.	The level LEDs and relays operate.

* The ACK and RST buttons are located on the 46100 Wall-Mount Shelf. The operation of the buttons depends on the settings of switch SW1 on the 46100 shelf.

CHECKOUT

OPERATION

Once the 46012 MAT is installed, 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.

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

NOTE: The ACK and RST buttons are located on the 46100 Wall-Mount Shelf. The operation of the buttons depends on the settings of SW1 on the shelf.

CONTROL POINT OPERATION

You can operate control points from a computer equipped with the appropriate protocol software.

DCP OR DCPF PROTOCOL

If the MAT is communicating in the DCM format, you can use DCP or DCPF protocol to issue the following commands:

- DLON** (direct latch on)
- DLOF** (direct latch off)
- DMON** (direct momentary on)
- SLON** (select latch on)
- SLOF** (select latch off)
- SMON** (select momentary on)
- EXCC** (execute)

The EXCC command executes any of the select commands.

TBOS PROTOCOL

If the MAT is communicating in TBOS format, you can use TBOS protocol to issue the following commands:

- OPR** (operate)
- RLS** (release)
- MOM** (momentary)

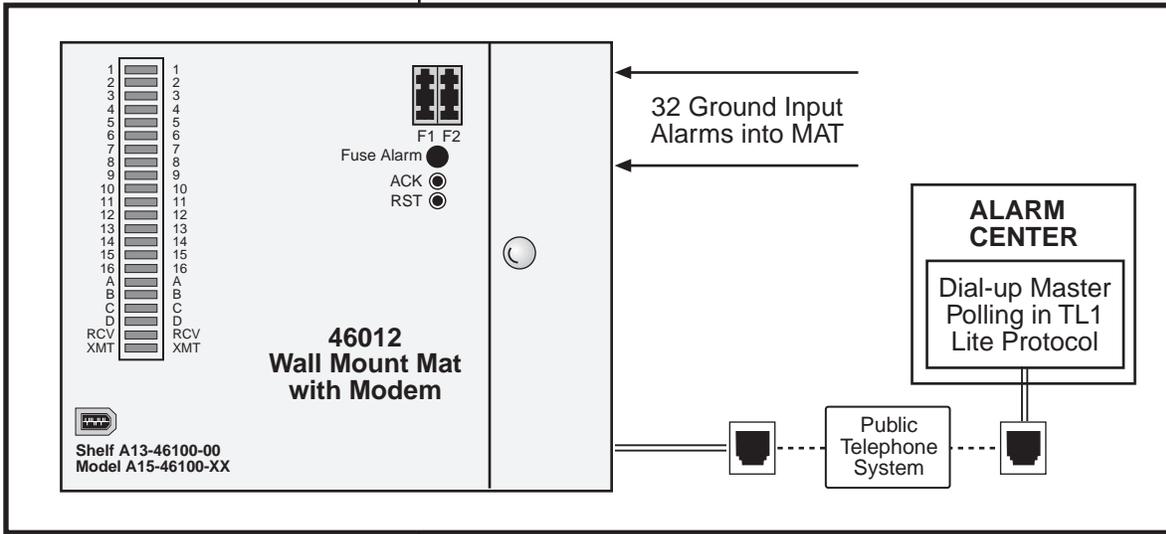
OPERATION

APPLICATION INFORMATION

Fig. 4 shows a 46012 Wall Mount MAT application. Thirty-two ground input alarms connect to the 46012 Wall Mount MAT. The MAT modem connects to the master Alarm Center, which polls the MAT using TL1 protocol.

APPLICATION INFORMATION

FIG. 4 - 46012 WALL MOUNT MAT APPLICATION



TECHNICAL SPECIFICATIONS

A11-46012-03 MULTIPLE ALARM TRANSMITTER

DESCRIPTION	VALUE				
Input Voltage Range	-21 to -56 VDC				
Input Current (ratings are ± 20 percent)	Idle				
	Operate				
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">@-24 VDC 70 mA</td> <td style="text-align: center;">@-48 VDC 52 mA</td> <td style="text-align: center;">@-24 VDC 155 mA</td> <td style="text-align: center;">@-48 VDC 120 mA</td> </tr> </table>	@-24 VDC 70 mA	@-48 VDC 52 mA	@-24 VDC 155 mA	@-48 VDC 120 mA
@-24 VDC 70 mA	@-48 VDC 52 mA	@-24 VDC 155 mA	@-48 VDC 120 mA		
Heat Dissipation (@-48 VDC, ± 20 percent)	19.6 Btu/Hr				
Alarm, Acknowledge and Reset Inputs Voltage Range Current Range Resistance	-21 to -56 VDC 600 μ A to 2.0 mA 33K ohms + 1 Diode (0.6 volt)				
Alarm Bus Output Contact Type Contact Ratings	Single Form-C Dry Contact Max. 1 Amp @ 24 VDC Max. 0.5 Amp @ 125 VAC				
Data Rates (selectable)	50 through 9600 baud				
Weight	13 ounces				
Physical Dimensions	1.4" W x 6" x 5.6" H				
Operating Temperature Ranges	0 to 55 Degrees C.				

TECHNICAL SPECIFICATIONS

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. Equipment returned for repair packaged in improper material against ESD damage is also 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:

Switch settings.

Signal levels.

Connections between Dantel's equipment and your equipment.

Software configuration.

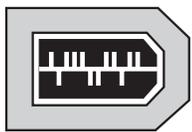
If there is still a problem, substitute equipment that is known to be good.

For additional assistance, call Dantel's Technical Field Service Department weekdays, 6 AM to 5 PM 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 equipment to:

Dantel, Inc. • 2991 North Argyle Avenue • Fresno, California 93727-1321



DANTEL[®]

P.O. Box 55013 • Fresno, California 93747-5013 • Phone: (209) 292-1111 • Fax: (209) 292-9355

46012-0496-PR