46121
SCAN AND CONTROL INTERFACE

Y2K
Compliant

OPTIONAL 400
TYPE MODULE

SUBASSEMBLY

MST

SEL
ACK
CLR

TEST

OK I O

T R
X X
D D
MST
PTR
DAT

CPU WD FA

1111111
1234567890123456ABCD GRP
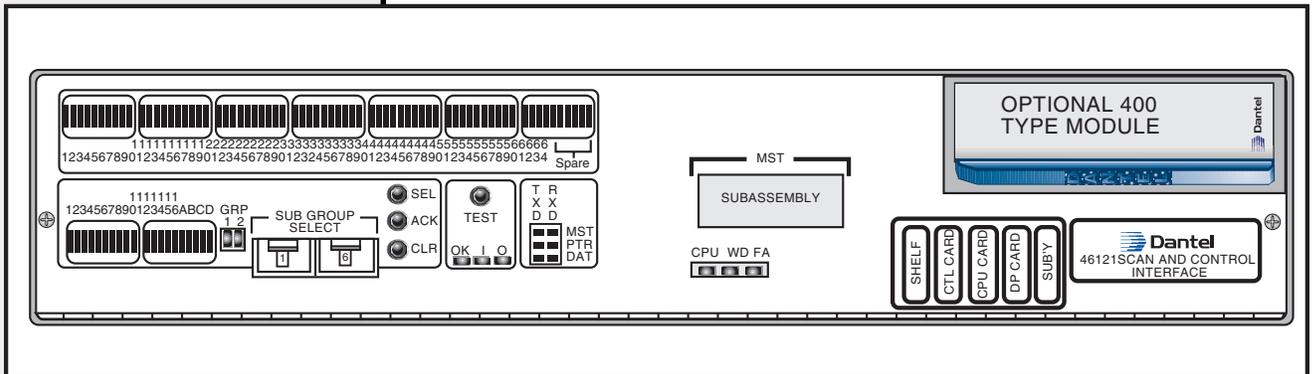1 2

SUB GROUP
SELECT

SHELF
CTL CARD
CPU CARD
DP CARD
SUBY

46121 SCAN AND CONTROL
INTERFACE

1111111111222222222233333333334444444444555555555566666
123456789012345678901234567890123245678901234567890123456789 01234 Spare

Table of Contents

About this Practice:

This practice has been reissued to:
• Update Table A.

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

UPDATED

Issue date: September 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
B15-46121-02	512 Alarm Points with Alarm LED Display; no Control Points
B15-46121-03	512 Alarm Points with Alarm LED Display and 64 Control Points
B15-46121-12	256 Alarm Points with Alarm LED Display; no Control Points

> *NOTE*: *Refer to Tables A through D in the **General Descriptions** section for a breakdown of these options and additional equipment available.*

GENERAL DESCRIPTION

The 46121 Scan and Control Interface (46121) monitors either 256 or 512 discrete alarm points. These inputs are then converted to TBOS, DCP, or DCPF protocol. In addition, the alarms are reported on the front panel LED display. A printer port can be used as a secondary master or auxillary port for reporting alarms when connected to a dumb terminal or printer.

64 control point outputs are offered as part of the 46121-03 unit and can be operated from the operations center or through the Printer Port.

> *NOTE:* *Refer to Tables A through D in this section for a breakdown of these options and additional equipment available.*

Relay contacts are provided to operate external alarm indicating devices such as lights or bells.

Configuration of the 46121 is done by setting switches on the unit.

A front panel slot is available to install a 400-type module to provide additional features. Dantel's 46033 E-System Adapter, for example, can be used in this slot when the 46121 communciates through the Master or Auxillary Port with an E-System master and DCP protocol must be converted to E2 or E2A.

The 46121 is 3.5 inches high and mounts in either 19 or 23-inch equipment racks. All connections to the 46121 are through rear panel connectors and barrier strips. The front panel folds down for access to switches.

GENERAL DESCRIPTION

TABLE A - 46121 ORDERING INFORMATION AND OPTION BREAKDOWN

MODEL NUMBER	BOARD PART NUMBERS	DESCRIPTION	CPR#	CLEI™ CODE
B15-46121-02	A13-46121-01	Scan and Control Interface Housing	035074	
	A11-46123-01	256 Point Scanner Board		RMPQADG7AA
	A12-46125-00	256 Point Expansion Board		RMPQ083AAA
B15-46121-03	A13-46121-02	Scan and Control Interface Housing	035075	
	A11-46123-01	256 Point Scanner Board		RMPQADG7AA
	A12-46125-00	256 Point Expansion Board		RMPQ083AAA
	A12-46124-00	64 Control Point Output Board		RMPQ082AAA
B15-46121-12	A13-46121-01	Scan and Control Interface Housing	035074	
	A11-46123-01	256 Point Scanner Board		RMPQADG7AA

TABLE B - 46121 COMMUNICATIONS SUBASSEMBLY ORDERING INFORMATION

PART NUMBER	DESCRIPTION	CLEI™ CODE
B12-49008-00	RS-422/485 Current Loop	RMPQ021AAA
A12-49029-00	RS-232 Current Loop	RMPQ022AAA
B12-49013-00	202 Tone Modem	RMPQ034AAA

TABLE C - 46121 CONNECTOR ORDERING INFORMATION

PART NUMBER	DESCRIPTION
A80-00403-00	Male DB9 connector with cable clamp and lock that connects to J1 or any of J3 through J7 on the rear of the 46121.
A88-00045-XX	Cable assembly with 64-pin female Centronics-type connector on one end that connects to any of P5 through P14 on the rear of the 46121. XX means to specify cable length from 01 to 99 feet.
A88-00046-00	Connectorized (64-pin Centronics-type) dual cross connect block to support 256 alarm point pairs, no mounting.
A88-00046-01	Connectorized (64-pin Centronics-type) dual cross connect blocks to support 512 alarm input pairs, with mounting hardware for 19 or 23-inch equipment racks.
907-00084-00	15-pin Molex connector that plugs into TB-2, TB-3, or TB-4.
907-00085-00	Contact (15 required) for Molex connector 907-00084-00.
916-00037-00	64-pin Centronics-type connector (female) that mates with any of P5 through P14 on the rear of the 46121.
929-00026-XX	Cable assembly with 64-pin female cinch connectors on each end. One end connects to P13 or P14 on the rear of the 46121. The other end goes to the mainframe terminal block. XX means to specify cable length from 01 to 99 feet.
929-00027-XX	Cable assembly with 64-pin female cinch connectors on each end. One end connects to any of P5 through P12 on the rear of the 46121. The other end goes to the mainframe terminal block. XX means to specify cable length from 01 to 99 feet.
999-00333-00	64-pin Centronics-type connector to 64-pin wire wrap adapter (plugs into any of P5 through P14 on the rear of the 46121 to provide an equal number of wire wrap pins.)

GENERAL DESCRIPTION

PART NUMBER	DESCRIPTION
FOR INTERFACING THE 46121 TO E-SYSTEMS	
B15-46033-00	Wiring, interconnect cable and connector assembly to support a 46033 E-System Adapter module, without the module.
A11-46033-01	E-System Adapter module
FOR INTERFACING THE 46121 TO TL1 SYSTEMS	
A15-46062-00	Wiring, interconnect cable and connector assembly to support a 46062 General Purpose Processor module, without the module.
B11-46062-22	General Purpose Processor module

APPLICATION INFORMATION

Fig. 1 shows an example of how the 46121 can be used.

The 256 or 512 descrete alarm inputs can be processed by the 46121 in the following ways:

1. Alarms can be converted to TBOS or DCP protocol and sent to the customer's operations center through the master or auxillary port. The auxillary port is an RS-422/485 interface. The master port requires that a communications subassembly be installed before it can operate.

NOTE: *This means that if an RS-422/485 interface is required, the auxillary port may be used. If any other interface is required, such as 202 tone, a communications subassembly must be installed on the master port.*

2. Alarms can be converted to DCPF protocol and sent to Dantel's 46001 Status Monitor through the printer port. The printer port uses an RS-232 interface.

   Control commands can be sent from the operations center through either port to operate up to 64 control points.

Alarm Reporting

When the master or auxillary port is connected to the customer's equipment using TBOS or DCP protocol, the printer port can be used in a secondary role for alarm reporting and control point operation by connecting it to a dumb terminal or printer. When connected to a dumb terminal or printer, the printer port communicates using printer syntax.

CONTINUED . . .

FIG. 1 - DISCRETE ALARMS CONVERTED TO TBOS OR DCP PROTOCOL
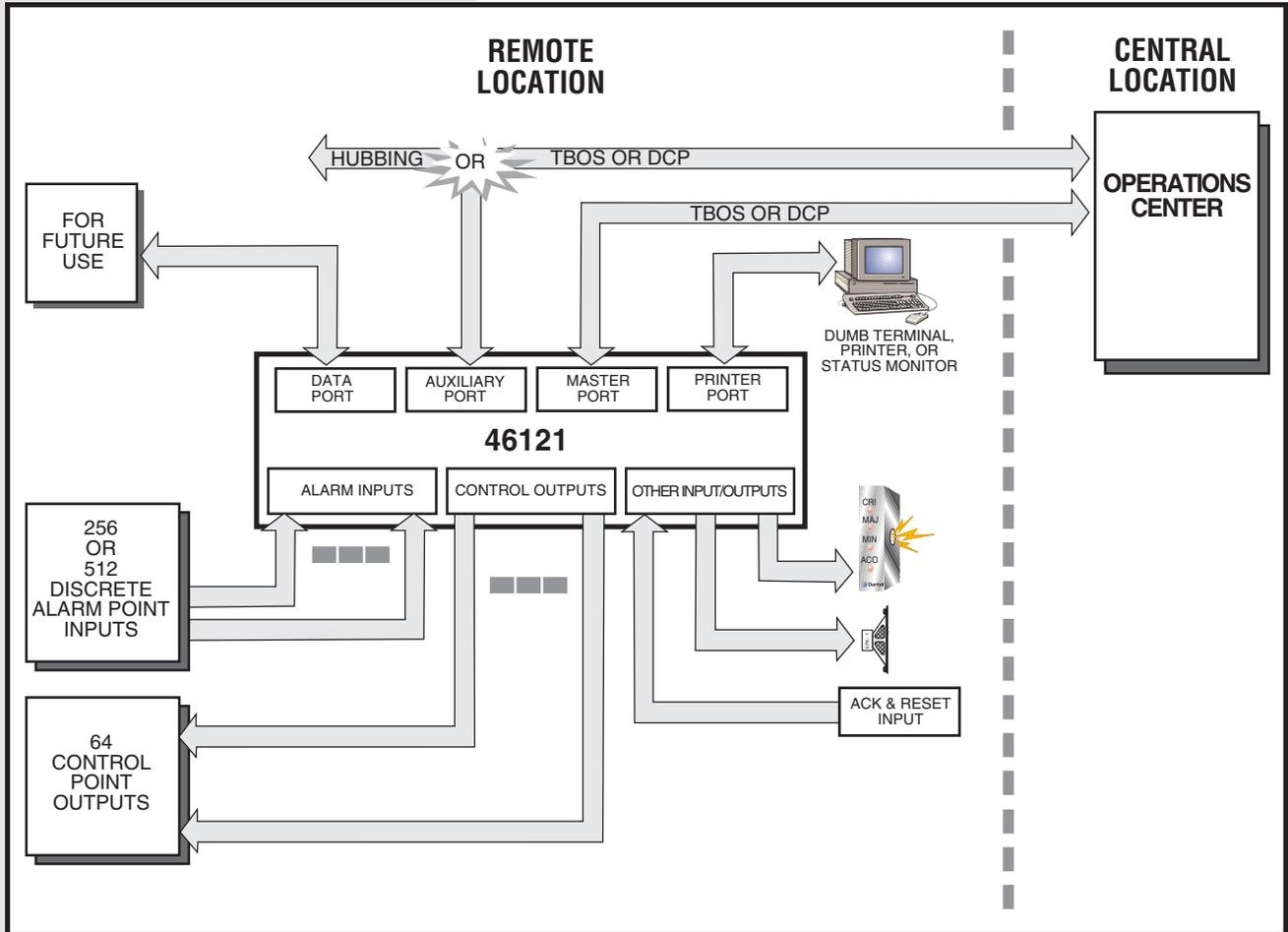
When DCP protocol is used, the 46121 can communicate directly through the master or auxillary port with a personal computer serving as an operations center, or it can communicate with a E-System master through Dantel's 46033 E-System Adapter. The 46121 has a front panel slot for a 400-type module, such as the E-System Adapter. If an E-System Adapter is desired, it must be specified at the time the 46121 is ordered. The additional rear panel connectors, mounting assembly, and cable assembly necessary to connect the module to the 46121 are supplied with the unit and installed at the factory.

The 46121 can be hubbed to other devices, such as other 46121s or Dantel's 46020 Multiple Alarm Processors. The other devices are connected to the auxillary port and the alarm and control data is hubbed to the master port or the printer port. The auxillary port uses the same protocol as the port to which it is hubbed; that is, TBOS or DCP when hubbed to the master port, or DCPF or printer syntax when hubbed to the printer port.

The 46121 comes from the factory set for TBOS on the master port and printer syntax on the printer port.

INSTALLATION

Installation of the 46121 consists of the following steps. Follow these steps in order.

1. Equipment Mounting

2. Installing Rear Panel Cables and Wiring

    ♦ J1; Master Port

    ♦ J2; Data Port (not used)

    ♦ J3; Printer Port

    ♦ J4; Auxillary Port

    ♦ P5 - P12; Alarm Inputs

    ♦ P13 - P14; Control Point Outputs

    ♦ TB1; Power

    ♦ TB2; Alarm Outputs, External Reset and Acknowledge, Grounds

3. Setting Switches

    ♦ Switch 1; Master and Printer Port Protocols

    ♦ Switch 2; Master Port TBOS Displays

    ♦ Switch 3; Printer Port Address

    ♦ Switch 4; Data Rates, Alarm Input, and LED Operation

    ♦ Switch 5; Auxillary Port Configuration, Reset, Miscellaneous

    ♦ Switch 6; Control Point Timer Periods

    ♦ Switches 2 and 3; DCP Address

EQUIPMENT MOUNTING

The 46121 is shipped from the factory for installation in a 19-inch equipment rack. If the unit is to be installed in a 23-inch rack:

1. Detach the mounting brackets by removing the screws that hold the brackets on the side of the housing.

2. Reverse the brackets and reinstall them using the same screws. Refer to Fig. 2.

3. Mount the unit in the equipment rack.

4. This completes the equipment mounting procedure.

CONTINUED . . .

FIG. 2 - 19 AND 23 INCH MOUNTING BRACKET POSITIONS

.820

.340

2.820

.340

3.50

1111111111222222222
1234567890123456789012345678901

1111111
1234567890123456ABCD GRP
1

11111111
1234567890123456

1111111
1234567890123456

0.234

0.250 DIA

MOUNTING POSITION
FOR 19" SHELF

MOUNTING POSITION
FOR 23" SHELF

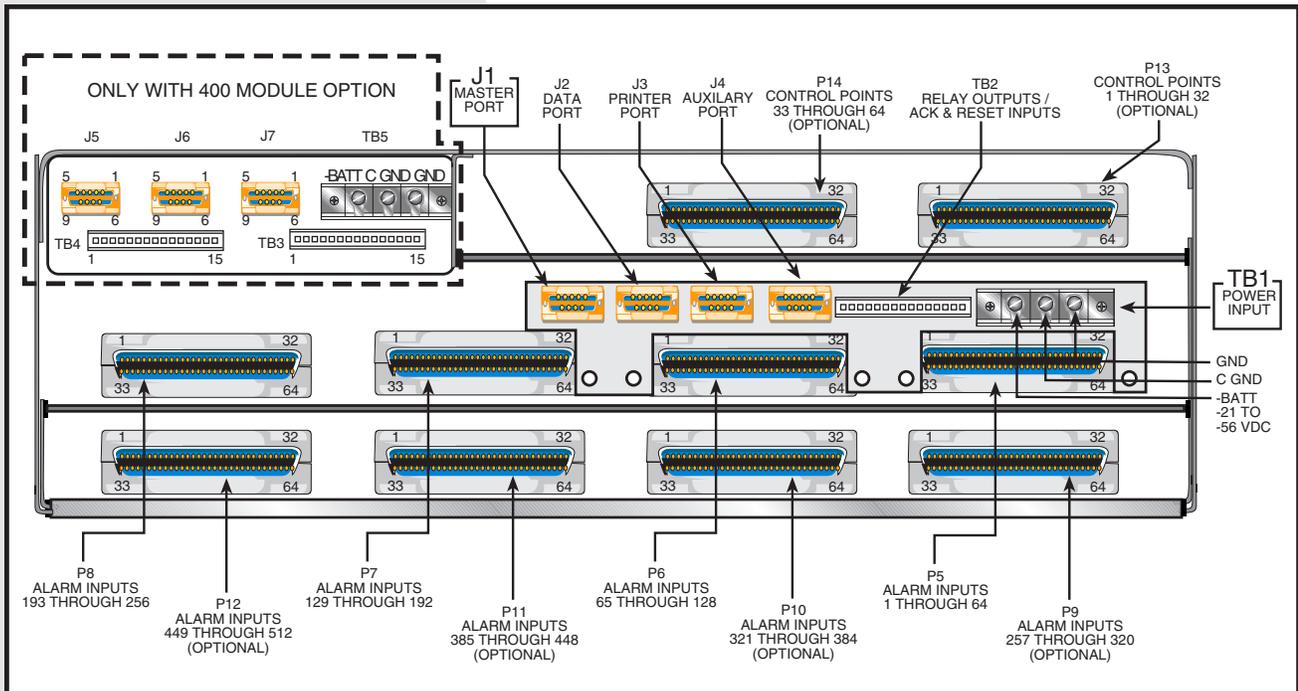## 19/23-Inch Mounting Bracket Positions
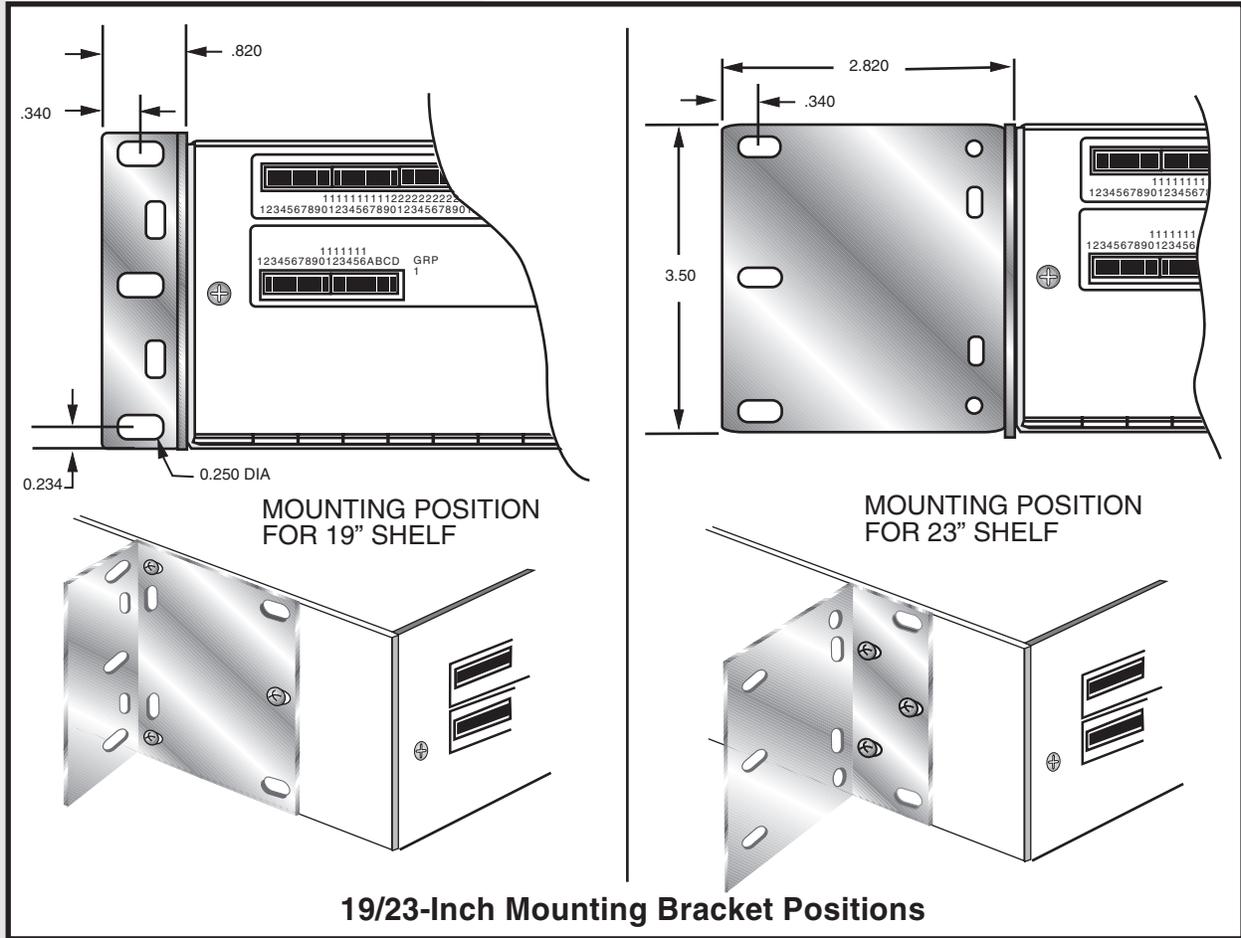
INSTALLATION

REAR PANEL CABLING

Refer to Fig. 3 to identify the locations of the connectors on the rear panel of the 46121.

FIG. 3 - REAR PANEL VIEW, INPUT/OUTPUT CONNECTORS

J1: MASTER PORT

J1 is the connector for the master port. To use this port, a communications subassembly must be installed on the 46121.

NOTE: *If you are using RS-422/485 interface, and there is no subassembly on the master port, connect your equipment to the auxillary port (J4). This assumes that the auxillary port is not already used to connect to some other equipment. The auxillary port is RS-422/485 and requires no subassembly.*

SUBASSEMBLY STRAPPING

1. If a communications subassembly was ordered with the 46121, it will have been installed at the factory.

   To set the straps on that subassembly, open the front of the 46121 and slide the main board containing the subassembly out far enough to reach the straps.

2. Set the straps on the subassemby.

  ♦ Use Fig. 4 to set the straps if a 49008 RS-422/485 subassembly is used.

  ♦ Use Fig. 5 if a 49029 RS-232 subassembly is used.

  ♦ Use Fig. 6 if a 49013 Tone Modem subassembly is used..

3. Gently push the main board back into the housing and close the front panel.
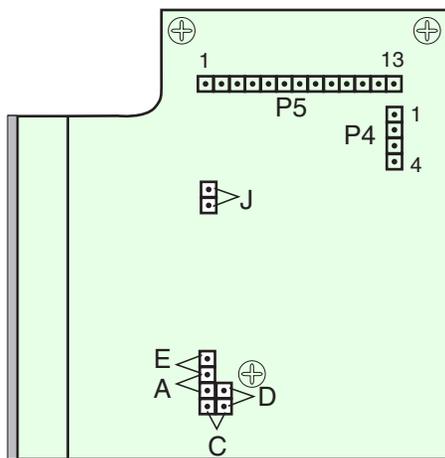
OPTION	STRAP
Input	
Terminated	J Strap installed.
Unterminated	J Strap removed.
Interface	
RS-422	Straps A and C installed.
RS-485	Straps C and E installed.

CONNECTOR	PIN NUMBER	DESIGNATION	DESCRIPTION
J1 (Female DB9)	1	-	
	2	RXD+ (input)	Receive Data, Positive
	3	TXD- (output)	Transmit Data, Negative
	4	GND	Signal Ground
	5	TXD+ (output)	Transmit Data, Positive
	6	-	
	7	-	
	8	-	
	9	RXD- (input)	Receive Data, Negative

FIG. 5 - 49029 SUBASSEMBLY STRAPPING AND CONNECTOR PIN DESIGNATIONS
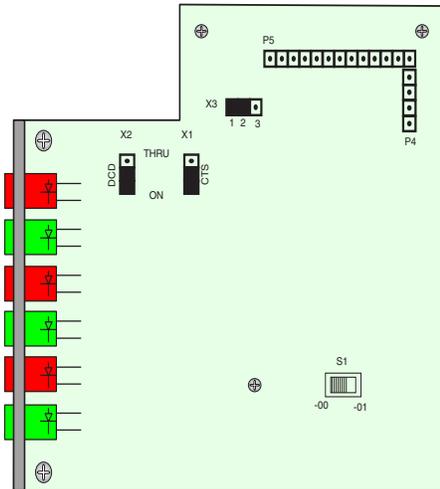
OPTION	SWITCH OR STRAP SETTING
Normal Position	S1 set to -00 Mode
TXD, RXD, RTS, & DCD reversed	S1 set to -01 Mode
CTS used for handshaking	X1 - THRU
CTS not used for handshaking	X1 - ON
DCD used for handshaking	X2 - THRU
DCD not used for handshaking	X2 - ON
Parallel Option	
YES	X3 - Jumper pins 2 & 3
NO	X3 - Jumper pins 1 & 2

CONNECTOR	PIN NUMBER	DESIGNATION	DESCRIPTION
J1 (Female DB9)	1	DCD (input)	Data Carrier Detect
	2	RXD (input)	Receive Data
	3	TXD (output)	Transmit Data
	4	GND	Signal Ground
	5	GND	Signal Ground
	6	-	
	7	RTS (output)	Request To Send
	8	-	
	9	-	

INSTALLATION

FIG. 6 - 49013 SUBASSEMBLY STRAPPING AND CONNECTOR PIN DESIGNATIONS
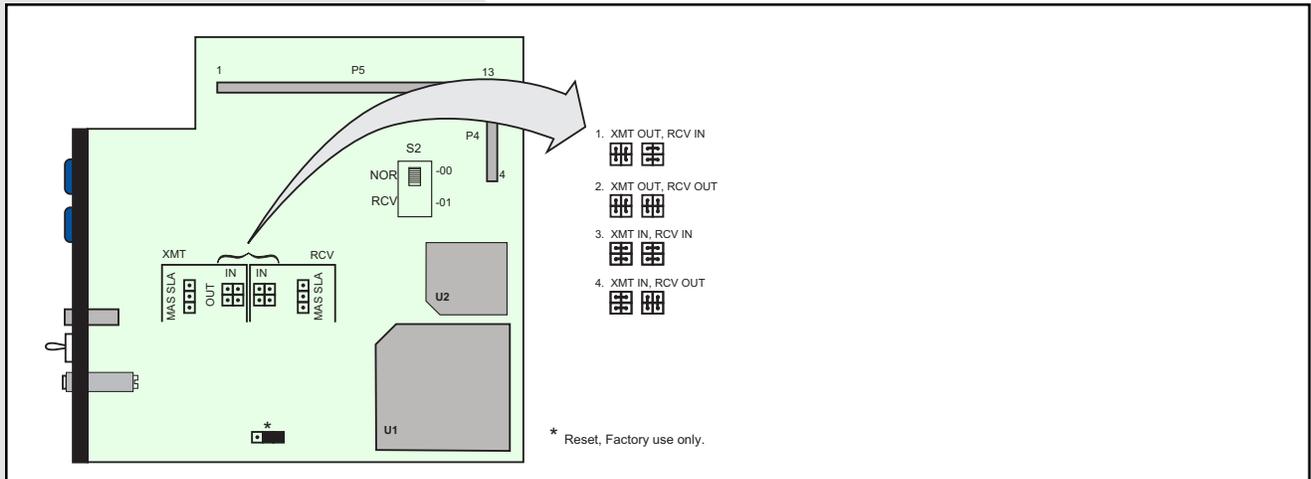
OPTION	INSTALL STRAP
MODE	
Master Modem in Master/Slave system	XMT MAS and RCV MAS
Slave Modem in Master/Slave system	XMT SLA and RCV SLA
Single Modem (no Master/Slave) Store straps in non-operative position or remove.	XMT and RCV open (no straps)
RCV PAD	
RCV Pad IN (input level between 0 and -20 dBm)	Jumpers parallel to P5
RCV Pad OUT (input level between -20 and -40 dBm)	Jumpers perpendicular to P5
XMT PAD	
XMT Pad IN (output adjustable from -20 to -40 dBm)	Jumpers parallel to P5
XMT Pad OUT (output adjustable from -1 to -20 dBm)	Jumpers perpendicular to P5

CONNECTOR	PIN NUMBER	DESIGNATION	DESCRIPTION
J1 (Female DB9)	1	DIST RCV	Distributed Receive
	2	RCV	Receive
	3	XMT	Transmit
	4	GND	
	5	XMT	Transmit
	6	-	
	7	DIST XMT	Distributed Transmit
	8	-	
	9	RCV	Receive

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MASTER PORT WIRING - J1

Install a cable from the master port of the 46121 to your equipment.

No Optional 400-Type Module in 46121

Connect a cable between J1 and the master port equipment. Depending on the subassembly used, the designations of the pins will vary. Refer to Figs. 4-6.

Optional 400-Type Module installed in 46121

If it is wired to J1, refer to the documentation specific to that module.

J2: DATA PORT

J2 is the connector for the data port. This port is reserved for future use. Do not use connector J2.

J3: PRINTER PORT

J3 is the connector for the printer port. It is an RS-232 interface. Install a cable between J3 and the printer port equipment. Refer to Fig. 7 and Table E.

TABLE E - PRINTER PORT CONNECTOR PIN DESIGNATIONS

CONNECTOR	PIN NUMBER	DESIGNATION	DESIGNATION
J3 (Female DB9)	1	DCD (input)	Data Carrier Detect
	2	RXD (input)	Receive Data
	3	TXD (output)	Transmit Data
	4	DTR	Data Terminal Ready
	5	GND	Signal Ground
	6	-	
	7	RTS (output)	Request To Send
	8	-	
	9	-	

J4: AUXILLARY PORT

J4 is the connector for the auxillary port. It is an RS-422/485 interface.

Install a cable between J4 and the auxillary port equipment. Refer to Fig. 7 and Table F. Install a jumper wire between pins 6 and 8 if termination is required.

NOTE: *If an optional 400-type module is installed in the 46121, a cable may already be connected between J4 and that module.*

FIG. 7 - REAR PANEL VIEW, INPUT/OUTPUT CONNECTORS
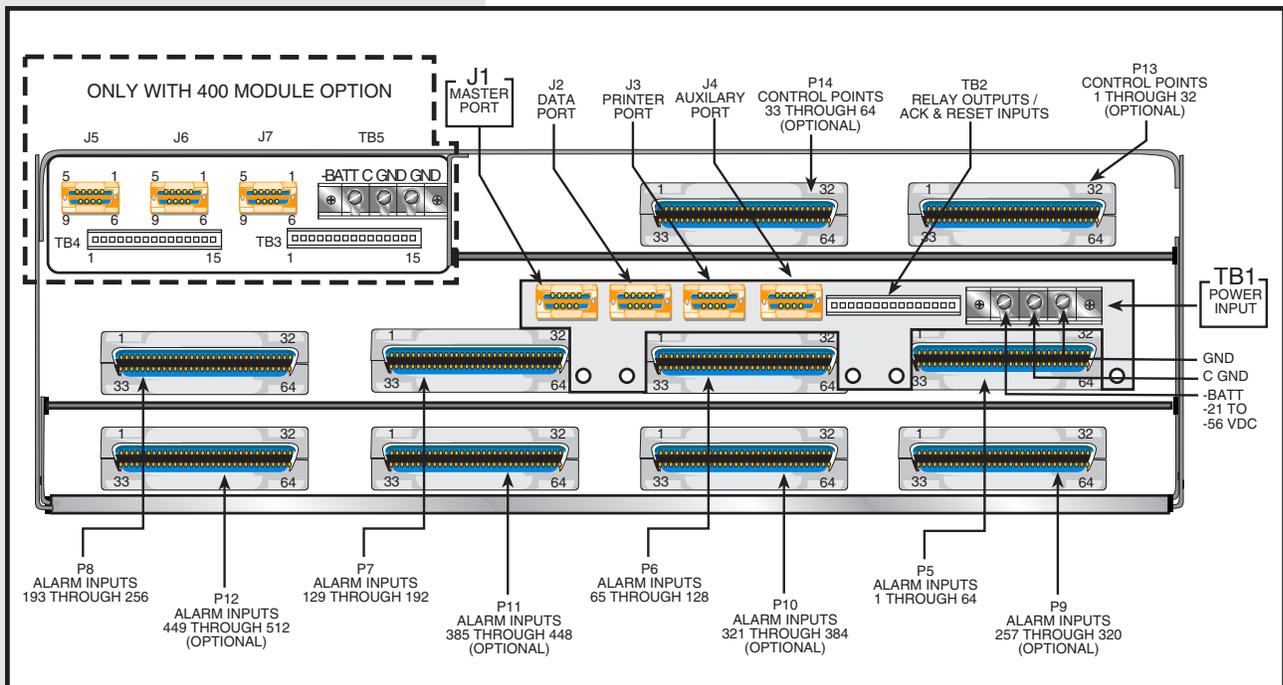
INSTALLATION

TABLE F - AUXILLARY PORT CONNECTOR PIN DESIGNATIONS

CONNECTOR	PIN NUMBER	DESIGNATION	DESIGNATION
J4 (Female DB9)	1	-	
	2	RXD+ (input)	Receive Data, Positive
	3	TXD- (output)	Transmit Data, Negative
	4	GND	Signal Ground
	5	TXD+ (output)	Transmit Data, Positive
	6	TERM	Termination Resistor (strap to 8)
	7	-	
	8	TERM	Termination Resistor (strap to 6)
	9	RXD- (input)	Receive Data, Negative

P5 THROUGH P8: DISCRETE ALARM INPUTS

P5 through P8 are standard connectors to which are wired 256 discrete alarm inputs. Alarm points must be ground inputs. Connect cables as required from P5 through P8 to the alarm inputs. Refer to Figs. 7 and Table G.

P9 THROUGH P12: OPTIONAL DISCRETE ALARM INPUTS

P9 through P12 are optional connectors to which are wired an additional 256 discrete alarm inputs. Alarm points must be ground inputs. Connect cables as required from P9 through P12 to the alarm inputs. Refer to Figs. 7 and Table G.

P13 AND P14: OPTIONAL CONTROL POINT OUTPUTS

P13 and P14 are optional connectors to which are wired 64 control point outputs. These are 64 relays, one for each control point output. The relays are Form-C (normally-open) relays and are rated at 1A @ 24VDC and .5A @ 120VAC.

Connect cables as required from P13 and P14 to the control points. Refer to Fig. 7 and Table G.

TABLE G - ALARM INPUT AND CONTROL POINT OUTPUT CONNECTORS AND PIN DESIGNATIONS

CONNECTOR	TYPE	DESCRIPTION
P5	Centronics, 64-pin, Male	Discrete point inputs 1 through 64 (Pin 1 = Alarm 1, Pin 2 = Alarm 2, and so forth.)
P6	Centronics, 64-pin, Male	Discrete point inputs 65 through 128 (Pin 1 = Alarm 65, Pin 2 = Alarm 66, and so forth.)
P7	Centronics, 64-pin, Male	Discrete point inputs 129 through 192 (Pin 1 = Alarm 129, Pin 2 = Alarm 192, and so forth.)
P8	Centronics, 64-pin, Male	Discrete point inputs 193 through 256 (Pin 1 = Alarm 193, Pin 2 = Alarm 256, and so forth.)
P9	Centronics, 64-pin, Male	Discrete point inputs 257 through 320 (Pin 1 = Alarm 257, Pin 2 = Alarm 320, and so forth.) -02 & -03 options only.
P10	Centronics, 64-pin, Male	Discrete point inputs 321 through 384 (Pin 1 = Alarm 321, Pin 2 = Alarm 384, and so forth.) -02 & -03 options only.
P11	Centronics, 64-pin, Male	Discrete point inputs 385 through 448 (Pin 1 = Alarm 385, Pin 2 = Alarm 448, and so forth.) -02 & -03 options only.
P12	Centronics, 64-pin, Male	Discrete point inputs 449 through 512 (Pin 1 = Alarm 449, Pin 2 = Alarm 512, and so forth.) -02 & -03 options only.
P13	Centronics, 64-pin, Male	Control point outputs 1 through 32. (Pin 1 = Control Point 1A, Pin 2 = Control Point 1B, etc.) -03 option only.
P14	Centronics, 64-pin, Male	Control point outputs 33 through 64. (Pin 1 = Control Point 33A, Pin 2 = Control Point 33B, etc.) -03 option only.

TB-1: POWER

Wire TB-1 to power. Refer to Fig. 7 for the location of TB-1.

1. Screw terminal 1 connects to -21 to -56 VDC input. Connect the power feed to the terminal through a 1 1/3 amp fuse (not supplied).

NOTE: *If a 400-type module is installed in the shelf, the fuse rating may need to be increased to 3 amps, depending on the module installed.*

2. Screw terminal 2 goes to chassis ground.

3. Screw terminal 3 goes to ground.

TB-2: ALARM LEVEL OUTPUTS, UNIT ALARM OUTPUT, RESET AND ACKNOWLEDGE, G

Wire TB-2 as required. Refer to Fig. 7 for the location of TB-2. Refer to Table H for the TB-2 pin designations.

INSTALLATION

TABLE H - TB-2 PIN DESIGNATIONS

PIN NUMBER	DESIGNATION
1	Alarm Level A Output, Relay Contact
2	Alarm Level A Output, Relay Contact
3	Alarm Level B Output, Relay Contact
4	Alarm Level B Output, Relay Contact
5	Alarm Level C Output, Relay Contact
6	Alarm Level C Output, Relay Contact
7	Alarm Level D Output, Relay Contact
8	Alarm Level D Output, Relay Contact
9	Unit Alarm Output, Relay Contact (indicates unit failure, fuse alarm, watchdog alarm)
10	Unit Alarm Output, Relay Contact (indicates unit failure, fuse alarm, watchdog alarm)
11	External Reset Input (ground to operate)
12	External Aknowledge Input (ground to operate)
13	Ground
14	Ground
15	Ground

SWITCH SETTINGS

Open the front panel to gain access to the DIP switches. To configure the 46121 properly, set the switches as shown in Tables I through O. Refer to Fig. 8 for switch locations.

FIG. 8 - SWITCH LOCATIONS

SWITCH LOCATIONS
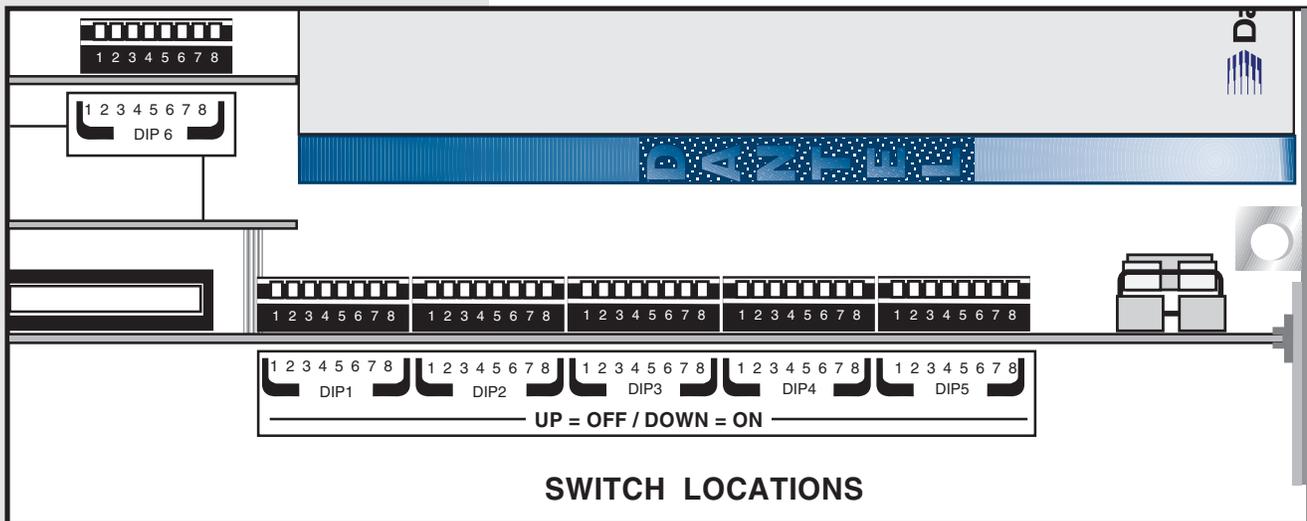
INSTALLATION

SWITCH 1: MASTER AND PRINTER PORT PROTOCOLS

Refer to Table I to set the protocols for the master and printer ports.

NOTE: *Because the auxillary port uses the same protocol as the port to which it is hubbed, there are no switches to set the protocol on the auxillary port.*

TABLE I - S1 SWITCH SETTINGS

PROTOCOL	S1-1	S1-2	S1-3	S1-4	S1-5	S1-6	S1-7	S1-8
MASTER PORT								
TBOS*	UP*	UP*	UP*	UP*				
DCP	UP	UP	UP	DOWN				
PRINTER PORT								
Printer*					UP*	DOWN*	DOWN*	
DCPF					UP	DOWN	UP	
UNUSED*								UP*
* Factory Setting								

SWITCH 2: TBOS ON MASTER PORT

Refer to Table J only if the master port has been configured for TBOS protocol. If the master port has been configured for DCP protocol, refer to Table K to set the address of the master port.

TABLE J - S2 SWITCH SETTINGS (TBOS ON MASTER PORT)

	S2-1	S2-2	S2-3	S2-4	S2-5	S2-6	S2-7	S2-8
BEGINNING DISPLAY NUMBER								
1 (default)	UP*	UP*	UP*					
2	DOWN	UP	UP					
3	UP	DOWN	UP					
4	DOWN	DOWN	UP					
5	UP	UP	DOWN					
6	DOWN	UP	DOWN					
7	UP	DOWN	DOWN					
8	DOWN	DOWN	DOWN					
NUMBER OF DISPLAYS								
1				UP	UP	UP		
2				DOWN	UP	UP		
3				UP	DOWN	UP		
4 (default for -12 option)				DOWN	DOWN	UP		
5				UP	UP	DOWN		
6				DOWN	UP	DOWN		
7				UP	DOWN	DOWN		
8 (default for -02 & -03 options)				DOWN*	DOWN*	DOWN*		
Not Used (default)							UP*	UP*

TABLE K - S2 AND S3 SWITCH SETTINGS (S2 = DCP ON MASTER PORT; S3 = DCPF ON PRINTER PORT)

The table contains DIP switch setting diagrams numbered 1 through 255, each showing an 8-position switch (positions 1 2 3 4 5 6 7 8) with OFF/ON positions indicated.

INSTALLATION

SWITCH 3: DCPF ON PRINTER PORT

If the printer port has been configured for printer syntax, switch 3 is not used and all its bits should be left in the UP position. Printer syntax is used when the port is connected to a dumb terminal or printer

If the printer port is set for DCPF protocol, use Table K to set the address of the printer port. DCPF protocol is used when the printer port is taken to a Dantel Status Monitor.

SWITCH 4: DATA RATES, ALARM INPUT, AND LED OPERATION

Refer to Tables L and M to set the data rate for the master and printer ports, alarm input operation, and operation of the optional alarm LED display.

TABLE L - S4 SWITCH SETTINGS

	S4-1	S4-2	S4-3	S4-4	S4-5	S4-6	S4-7	S4-8
MASTER PORT BAUD RATE								
9600	UP	UP						
2400*	UP*	DOWN*						
1200	DOWN	UP						
300	DOWN	DOWN						
PRINTER PORT BAUD RATE								
9600**			UP**	UP**				
2400			UP	DOWN				
1200			DOWN	UP				
300			DOWN	DOWN				
ALARM POINT LATCHING**								
Latch until transmitted and acknowledged					DOWN			
Latch until transmitted*					UP*			
ALARM POINT DELAY**								
500 milliseconds						DOWN		
200 milliseconds*						UP*		
LED DISPLAY MODE***								
Annunciator							DOWN	
Alarm with Level*							UP*	
Always UP								UP*

*   Factory Setting
**   If errors occur with dropped characters, use 2400 baud.
***   Alarm points are "active" until the alarm data is transmitted to the alarm system master or until they are reset either manually through the front panel alarm reset button or the RESET command. For TBOS protocol, use the UP setting; for DCP or DCPF protocol, use the DOWN setting.
****   To avoid spurious alarms, a 500 millisecond delay can be set before an alarm will be recognized as valid. The delay also may be set using the DELAY command.
***** Refer to Table M for operation of the LED display in the annunciator and alarm with levels modes.

TABLE M - LED DISPLAY OPERATION

EVENT	ANNUNCIATOR MODE		ALARM WITH LEVELS MODE	
	LEVEL LED/RELAY	SUBGROUP LED	LEVEL LED/RELAY	SUBGROUP LED
1. Alarm occurs	ON	Flashes	ON	ON
2. Alarm is acknowledged	OFF	ON	OFF	ON
3. Alarm returns to normal	Back ON	Flashes	OFF	OFF
4. Alarm is acknowledged	OFF	OFF	OFF	OFF

SWITCH 5: MISCELLANEOUS PARAMETERS

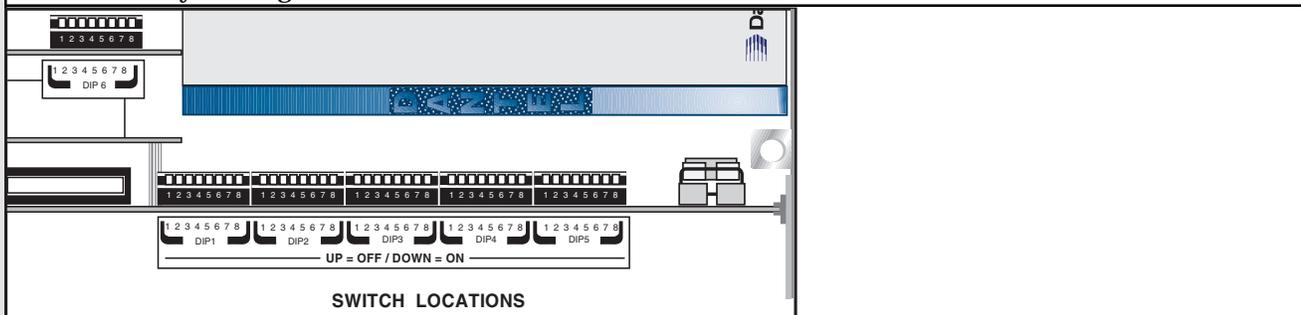Refer to Table N to configure the auxillary port and to set miscellaneous parameters.

TABLE N - S5 SWITCH SETTINGS

OPTION	S5-1	S5-2	S5-3	S5-4	S5-5	S5-6	S5-7	S5-8
46121 Interface w/ E-System Equipment								
Yes	DOWN							
No***	UP***							
Level D Alarms								
Status*		DOWN						
Normal***		UP***						
Reset**								
Cold***			UP***					
Warm			DOWN					
Always UP				UP***				
Not Used					UP***	UP***		
Auxillary Port								
Hubbed to Master Port***							UP***	
Hubbed to Printer Port							DOWN	
Auxillary Port Interface								
RS-422								DOWN
RS-485***								UP***

*   Useable only when a Status Monitor is connected to the printer port. Eliminates reporting of D-level alarms to the Status Monitor.

**   When set for a cold reset, the memory is cleared and the 46121 is reconfigured to the DIP switches. When set for a warm reset, the memory and configuration are saved.

***   Factory Setting.

1 2 3 4 5 6 7 8

1 2 3 4 5 6 7 8
DIP 6

1 2 3 4 5 6 7 8 1 2 3 4 5 6 7 8 1 2 3 4 5 6 7 8 1 2 3 4 5 6 7 8 1 2 3 4 5 6 7 8

1 2 3 4 5 6 7 8 1 2 3 4 5 6 7 8 1 2 3 4 5 6 7 8 1 2 3 4 5 6 7 8 1 2 3 4 5 6 7 8
DIP1   DIP2   DIP3   DIP4   DIP5

—— UP = OFF / DOWN = ON ——

SWITCH LOCATIONS
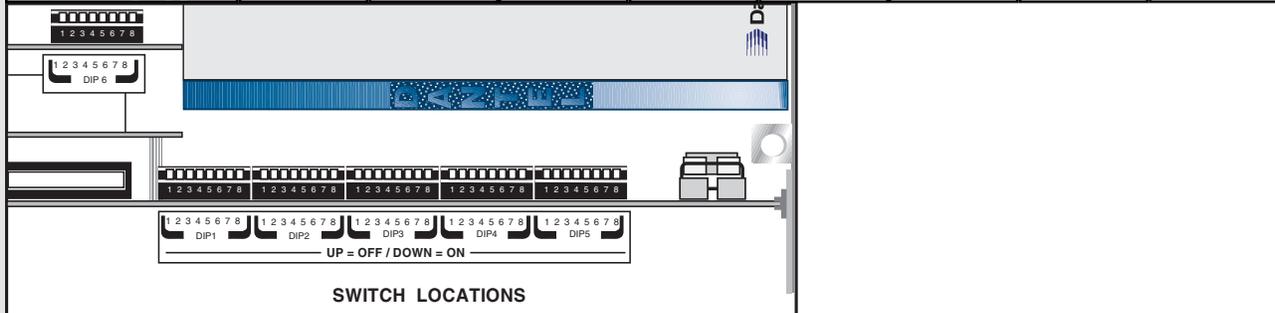
SWITCH 6: CONTROL POINT TIME PERIODS

Refer to Table O to set the time periods for the operation of the control points (-03 option only). If the unit is not equipped with control points, use the switch settings "not equipped".

♦ Short momentary will operate the control points for 300 milliseconds.

♦ Long momentary will operate the control points for 3 seconds.

♦ Latching will operate the control points until released by command.

The time periods may also be set using the OPTION command.

TABLE O - S6 SWITCH SETTINGS

POINTS	S6-1	S6-2	S6-3	S6-4	S6-5	S6-6	S6-7	S6-8
Points 1-16								
Short Mom.	UP	DOWN						
Long Mom.	DOWN	DOWN						
Latching	DOWN	UP						
Not Equipped	UP	UP						
Points 17-32								
Short Mom.			UP	DOWN				
Long Mom.			DOWN	DOWN				
Latching			DOWN	UP				
Not Equipped			UP	UP				
Points 33-48								
Short Mom.					UP	DOWN		
Long Mom.					DOWN	DOWN		
Latching					DOWN	UP		
Not Equipped					UP	UP		
Points 49-64								
Short Mom.							UP	DOWN
Long Mom.							DOWN	DOWN
Latching							DOWN	UP
Not Equipped							UP	UP

UP = OFF / DOWN = ON

SWITCH LOCATIONS

OPERATION AND MAINTENANCE

This section is divided into three parts:
♦ Operation of LEDs and switches
♦ Checkout
♦ Troubleshooting

OPERATION OF LEDS AND SWITCHES

Refer to Fig. 9 for a close-up view of the left end of the 46121 front panel. This is where the standard and optional LEDs and switches are located.

FIG. 9 - FRONT PANEL LED AND SWITCH LOCATIONS

OPERATION AND MAINTENANCE

Standard LEDs and Switches

These LEDs and push-button switches are standard on all 46121s.

MST TXD: This green LED indicates the transmission of data out of the master port.

MST RXD: This green LED indicates the receipt of data into the master port.

PTR TXD: This green LED indicates the transmission of data out of the printer port.

PTR RXD: This green LED indicates the receipt of data into the printer port.

DAT TXD: This green LED is reserved for the future use of the data port.

DAT RXD: This green LED is reserved for the future use of the data port.

OK: This green LED indicates if the alarm inputs are good. If one or more alarm inputs are defective, the 1 or 0 LED will come on. This will indicate whether the alarm or non-alarm condition of the input is bad.

1: This red LED indicates that the 1's test of an alarm input failed. This LED will stay on until the problem is corrected.

0: This red LED indicates that the 0's test of an alarm input failed. This LED will stay on until the problem is corrected.

CPU: This green LED indicates activity on the microprocessor's data bus.

WD: This red LED indicates that the watchdog circuit has timed out and there is a microprocessor or memory failure. This LED will stay on until the problem is corrected.

FA: This red LED indicates that a fuse has blown. There is a 0.5 amp fuse on the main board of all units. In addition, if the optional control point board is installed, there is 0.75 amp fuse on it. Both fuses are located behind the front panel.

TEST: Pushing this button causes a test to be performed of the alarm inputs, the LED display, and causes the momentary interruption of the normal operation of the data communication ports.

Reset: This push-button, located behind the front panel, resets the microprocessor. A unit reset can also be accomplished by grounding the EXT RESET pin (TB-2, pin 11) or by the RESET command (refer to the ***Printer Syntax*** section).

In all cases, the reset depends on the status of switch S5-3. When the unit is set for a cold boot (S5-3 UP), the memory is cleared and the 46121 re-reads the switches and reconfigures itself to those settings.

When S5-3 is set for a warm boot (S5-3 DOWN), the memory and configuration are saved and the switches are not re-read.

Optional LED Display and Operation

The front panel display shows sub-groups of 16 alarm points. There are also four LEDs to indicate the level of alarms (A, B, C, or D). The LEDs operate as explained below.

1. Each of the 16 alarm LEDs represents a sub-group of 16 alarm points. If the 46121 is equipped with 256 alarm points, there are 16 sub-groups of 16 points each. If the 46121 is equipped with 512 alarm points, there are 32 sub-groups of 16 points each.

    There are two additional LEDs labeled GRP 1 and GRP 2. These indicate whether the LED display is showing sub-groups 1-15 (GRP 1) or 17-32 (GRP 2). Refer to Table P.

TABLE P - ALARM POINTS WITHIN SUB-GROUPS

GRP 1		GRP 2	
ALARM POINT NUMBERS	SUB-GROUP NUMBER	ALARM POINT NUMBERS	SUB-GROUP NUMBER
1 through 16	1	257 through 272	17
17 through 32	2	273 through 288	18
33 through 48	3	289 through 304	19
49 through 64	4	305 through 320	20
65 through 80	5	321 through 336	21
81 through 96	6	337 through 352	22
97 through 112	7	353 through 368	23
113 through 128	8	369 through 384	24
129 through 144	9	385 through 400	25
145 through 160	10	401 through 416	26
161 through 176	11	417 through 432	27
177 through 192	12	433 through 448	28
193 through 208	13	449 through 464	29
209 through 224	14	465 through 480	30
225 through 240	15	481 through 496	31
241 through 256	16	497 through 512	32

2. The LEDs operate in one of two modes: annunciator or alarm with levels. The mode is selected by switch S4-7. When there is an alarm present within a sub-group, the LED for that sub-group will operate as shown in Table M, in the *Installation* section.

    The sub-group LED will remain on as long as there is an alarm present in the sub-group. If a second alarm occurs before the first alarm is acknowledged, the level LED will pulse off momentarily.

3. Use the front panel thumbwheel switches to view the 16 alarm points within a sub-group. Adjust the switches to select the sub-group desired (refer to Table P) and press SELect. The LED display will now indicate the status of the 16 alarm points within the sub-group selected.

CONTINUED . . .

OPERATION AND MAINTENANCE

The LEDs will operate the same as when displaying sub-groups. Refer to Table M, in the **Installation** section. After approximately 30 seconds, the LED display will return to the sub-group level. The LED display can also be returned to the sub-group level by pressing the CLR button on the front panel.

Alarm Acknowledgement

Alarms may be acknowledged by either using the ACK command or by pressing the front panel ACK button.

If the button is pressed when the LED display is in the sub-group level, it acknowledges all the alarms. Pressing the button while the LED display is indicating individual alarm points within a sub-group acknowledges those alarms in that sub-group.

Alarms may also be acknowledged by grounding the EXT ACK pin (TB-2, pin 12)

Optional Control Point LEDs

The 46121's optional 64 control point board has 64 red LEDs to indicate control point operation. When a LED is on, it indicates that the corresponding relays is active. These relays are operated by a command from the operations center, or by command through the printer port.

Printer Port Operation

The printer port may be connected to a dumb terminal or a Dantel Status Monitor to observe the status of the alarm points and to operate control points. Refer to the **Printer Syntax** section for commands available to a dumb terminal. For operation of the Status Monitor, refer to the documentation specific to that device.

CHECKOUT

When power is applied to the 46121, the LEDs on the front panel will operate as follows:

♦ The CPU LED will blink to indicate that the unit is working.

♦ The master (MST) and printer (PTR) transmit (TXD) and receive (RXD) LEDs will blink whenever there is data activity on that port.

♦ If the unit has 512 alarm points, the GRP 1 and GRP 2 LEDs will toggle back and forth as the unit polls the first group of 256 points and then the second group. Only the GRP 1 LED will come on if the unit only has 256 points.

♦ All other LEDs are off.

1. Press the front panel TEST button.

CONTINUED . . .

A test will be performed of the LED display and alarm inputs. During the test, the first 16 LEDs of the display will cycle on and off. (Note that the level LEDs, A-D, will not light.) Also, the GRP 1 and GRP 2, OK, 1, and 0 LEDs will turn on and off.

If the alarm inputs are good, the OK LED will light for two seconds at the end of the test. If one or more alarm inputs are defective, the 1 or 0 LED will come on indicating either the alarm or non-alarm condition of the input is bad.

A defective LED display will be indicated only by observing that one or more of the LEDs do not light.

2.   Create an alarm at each input and verify that each alarm is reported correctly at the operations center.

Also verify that each alarm is reported properly at the printer port. If external alarm indicating equipment, such as lights or bells, are connected to the alarm level relay outputs at TB-2, verify their operation.

Verify that the front panel display operates correctly per the discussion earlier in this section.

Acknowledge the alarms and verify the correct response.

3.   From the operations center or the printer port, operate control points and verify that they function correctly, including the front panel LEDs.

4.   If an external indicating device, such as a light or a bell, is connected to the unit's alarm output (TB-2, pins 9 and 10) test its operation by opening the front panel and inserting a small screwdriver into one of the fuses between the fuse wire and the alarm indicating contact.

5.   If TB-2, pin 11 is wired to an external reset, ground that input and verify that the unit restarts.

TROUBLESHOOTING

If trouble is experienced with this unit, check the following:

♦ Switch and strap settings

♦ Signal levels

♦ Connections between the Dantel equipment and your equipment.

1's/0's Failure

The 1 or 0 LED lights and the unit alarm (TB-2, pins 9 and 10) operates.

CONTINUED . . .

This indicates that an alarm input is not functioning properly in either the alarm or non-alarm condition. A failure can happen during a test started manually by pushing the front panel TEST button.

A 1's/0's test is also performed automatically by the 46121 periodically and a fault can be found during these periodic tests. The failing point may be identified from the display. Refer to the operation of the LED display described earlier. Check the alarm input. If the input is good, press the reset button again to restart the unit, the push the test button again.

If the failure still exists, the unit is defective and should be replaced.

Fuse Failure

The FA LED lights and the unit alarm (TB-2, pins 9 and 10) operates.

Open the front panel and check the condition of the two fuses. If either fuse is bad, replace it. If the fuse blows again, the unit is defective and should be replaced.

Watchdog Circuit

The WD LED lights and the unit alarm (TB-2, pins 9 and 10) operates.

There is a microprocessor or memory failure. Open the front panel and push the reset button. If the problem still exists, the unit is defective and should be replaced.

Transmission Errors

If the unit is not communicating correctly, check the wiring and the switch and strap settings.

A loopback test can be performed to check the master or auxillary port using the TEST MASTER command described in the *Printer Syntax* section. Equipment connected to the master or auxillary port may be tested by cross-connecting the distant end transmit and receive leads. The TEST MASTER command is then issued.

This causes the 46121 to generate data, transmit that data, and read the returned data. If an error occurs, the dumb terminal used to enter the TEST MASTER command will display the nature of the failure (such as no data received or an error in the data that was received.)

The unit alarm operates if an internal error checking routine indicates errors in the data transmission. If the alarm operates, open the front panel and push the reset button. If the problem persists, the unit is defective and should be replaced.

PRINTER SYNTAX

This syntax establishes the coding for the printer port to interface to a dumb terminal or a personal computer operating as a dumb terminal. Using the printer syntax, commands can be issued to check the status of alarm points and operate control points.

TERMINOLOGY

The terminology used in the printer syntax can be confusing. The 46121 is equipped with either 256 or 512 discrete alarm inputs. These alarm inputs are divided into sub-groups, each containing 16 points. Refer to Table Q.

When entering commands using the printer syntax, the term "MAT" is often used instead of "Sub-Group". They mean the same thing. When alarm points are displayed, they can be shown either as sub-groups (SG) or MATs. Refer to the RTUSG MODE command, later in this section.

The 46121 can also be equipped with 64 control point outputs. These outputs are divided into four sub-groups, each containing 16 points (the same as alarm sub-groups 1-4 in Table Q). When entering commands using printer syntax, the term "CPM" is often used instead of "Sub-Group". They mean the same thing.

TABLE Q - ALARM POINTS WITHIN SUB-GROUPS

GRP 1		GRP 2	
ALARM POINT NUMBERS	SUB-GROUP NUMBERS	ALARM POINT NUMBERS	SUB-GROUP NUMBERS
1 through 16	1	257 through 272	17
17 through 32	2	273 through 288	18
33 through 48	3	289 through 304	19
49 through 64	4	305 through 320	20
65 through 80	5	321 through 336	21
81 through 96	6	337 through 352	22
97 through 112	7	353 through 368	23
113 through 128	8	369 through 384	24
129 through 144	9	385 through 400	25
145 through 160	10	401 through 416	26
161 through 176	11	417 through 432	27
177 through 192	12	433 through 448	28
193 through 208	13	449 through 464	29
209 through 224	14	465 through 480	30
225 through 240	15	481 through 496	31
241 through 256	16	497 through 512	32

PRINTER SYNTAX

GETTING STARTED

The terminal must be set for

♦ The correct data rate (must match the data rate set by switch S4, bits 3 and 4).

♦ Eight data bits

♦ One stop bit

♦ No parity

Make these settings before connecting the terminal to the 46121. If the system is operating properly, a prompt (">") will appear on the screen. This indicates that the 46121 is ready to accept command inputs. If the terminal and 46121 do not communicate, power down and check the settings at the terminal. Also verify the 46121 switches S1-5 through 8, and S4-3 & 4.

First Command

The first command that should be entered is UNLOCK. This command will unlock the system so that the rest of the commands can be entered.

Type UNLOCK and press the ENTER key. If there is a password in the system, you will need to enter that password before the system can be unlocked. If a password is not in the system, you may enter one at this time, if desired. Refer to the PASSWORD command later in this section.

Entering Commands

Each command typed on the terminal must be followed by pressing the ENTER key to enter the command for execution. The screen will display a ">" prompt to indicate readiness for a command input.

Some dumb terminals or computer have function keys that can be programmed to perform frequently used keyboard operations with a single keystroke. Refer to your operator's manual for instructions on how to program the function keys.

The following are examples of how ranges of numbers can be entered:

COMMAND	DESCRIPTION
CPM 4	Control Sub-Group 4 (control points 49-64)
MAT -10	Alarm Sub-Groups 1-10 (alarm points 1-160)
MAT 10-	Alarm Sub-Groups 10-16 (or 32, depending on option)
MAT 10-20	Alarm Sub-Groups 10-20
MAT ALL	All alarms

NOTE: *When entering commands, the letter M can be substituted for MAT; the letter C, for CPM.*

PRINTER SYNTAX

Error Messages

Two error messages may appear on the terminal screen:

MESSAGE	MEANING	ACTION
COMMAND ERROR	Command not understood.	Reenter command correctly.
SYNTAX ERROR	Entry doesn't follow the rules of syntax.	Reenter command correctly.

Editing

The following table shows how to do some common editing tasks. The term **Ctrl** refers to the Control key on the terminal keyboard.

TASK	KEYSTROKES
Stop Output (stop data flow from processor)	CTRL-D
Backspace	CTRL-H or backspace key
Recall Previous Line (Used to edit command after receiving an error message.)	CTRL-K
Recall Current Line (Used when interrupted by a system status message.)	CTRL-R
Pause Output (Interrupt data flow from processor.)	CTRL-S (Press CTRL-Q to restart)
Re-execute Last Command	CTRL-X

PRINTER SYNTAX COMMANDS

ACKNOWLEDGE

Purpose:

Acknowledges alarms and control points.

Format:

ACK ALL

ACK MAT #

ACK CPM #

Remarks:

The command ACK ALL acknowledges all alarms and control point operations at the 46121. The commands ACK MAT # and ACK CPM # apply only to the MATs and CPMs specified.

CONTINUED . . .

After MAT, # can be a range of sub-groups from 1 through 16 for a 46121 with 256 alarm inputs or from 1 through 32 for a 46121 with 512 alarm inputs. After CPM, # can be a range of sub-groups from 1 through 4.

Examples:

```
>ACK ALL
```

```
>ACK MAT 10
```

The first example would acknowledge all alarms. The second example would acknowledge all alarms in sub-group 10 (alarm points 145 through 160).

BELL

Purpose:

Reports if the terminal bell is on or off. Turns the bell on or off. When the bell is on, sounds the bell when a change of alarm status occurs.

Format:

BELL

BELL ON

BELL OFF

Remarks:

The command BELL shows if the bell is on or off. The other commands turn the bell on or off.

CPM POINT ACTIVATE

Purpose:

Operates a control point.

Format:

CPM # ACT (or ACTIVATE) point number

CONTINUED . . .

Remarks:

The point is activated for the time period set by the option switches or by programming. Refer to the OPTION and CPM POINT TIME PERIOD commands.)

can be a range of sub-groups from 1 through 4 or the word ALL. Point number can be a point number within the range of 1 through 16.

Example:

```
>CPM 2 ACT 5
>CPM DEVICE  2 POINT   5 OPERATE   OCT 22, 1988    10:18:02
```

This example would operate control point 21 (point 5 in sub-group 2).

CPM POINT CLEAR

Purpose:

Resets a control point.

Format:

CPM # CLR (or CLEAR) point number

Remarks:

can be a range of sub-groups from 1 through 4 or the word ALL. Point number can be a point number within the range of 1 through 16.

```
>CPM 2 CLR 5
>CPM DEVICE  2 POINT   5 RELEASE   OCT 22, 1988    10:18:05
```

This example would reset control point 21 (point 5 in sub-group 2).

CPM POINT DIRECT OPERATE

Purpose:

Momentarily turns control points on or off. Also latches control points on and resets latched points.

CONTINUED . . .

Format:

CPM # DLON point number(s)

CPM # DLOF point number(s)

CPM # DMON point number(s)

CPM # DMOF point number(s)

Remarks:

This group of commands overrides momentary/latching switch settings 6-1 through 6-8.

can be a range of sub-groups from 1 through 4 or the word ALL. List point numbers individually with a comma between them, as a group with a hyphen between them, or use the word ALL. Range can be from 1 through 16.

- ♦ The DLON command latches control points on.

- ♦ The DLOF command resets the latched points.

- ♦ The DMON command operates control points for three seconds.

- ♦ The DMOF command turns latched control points off for three seconds, then back on.

Example

```
>CPM 2 DLON 1,3,5

>CPM DEVICE  2 POINT   1 OPERATE   OCT 22, 1988      10:20:03
CPM DEVICE   2 POINT   3 OPERATE   OCT 22, 1988      10:20:04
CPM DEVICE   2 POINT   5 OPERATE   OCT 22, 1988      10:20:04
```

This example would latch control points 17, 19, and 21 (points 1, 3, and 5 of sub-group 2) on.

CPM POINT RELEASE

Purpose:

Resets control points.

Format:

CPM # RLS point number(s)

CONTINUED . . .

Remarks:

can be a range of sub-groups from 1 through 4 or the word ALL. List point numbers individually with a comma between them, as a group with a hyphen between them, or use the word ALL. Range can be from 1 through 16.

Example:

```
>CPM 2 RLS 3,5

>CPM DEVICE  2 POINT   3 RELEASE   OCT 22, 1988    10:20:20
 CPM DEVICE  2 POINT   5 RELEASE   OCT 22, 1988    10:20:20
```

This example would release control points 19 and 21 (points 3 and 5 of sub-group 2).

CPM POINT RESET

Refer to the RESET command.

CPM POINT SELECT OPERATE

Purpose:

Momentarily turns control points on or off. Also latches control points on and resets latched points.

Format:

The following commands prepare the control points for operation:

CPM # SLON point number(s)

CPM # SLOF point number(s)

CPM # SMON point number(s)

CPM # SMOF point number(s)

The following command executes the above commands:

CPM # EXE (or EXECUTE)

Remarks:

This group of commands overrides momentary/latching switch settings 6-1 through 6-8.

CONTINUED . . .

can be a range of sub-groups from 1 through 4 or the word ALL. List point numbers individually with a comma between them, as a group with a hyphen between them, or use the word ALL. Range can be from 1 through 16.

♦ The SLON command prepares control points for latching.

♦ The SLOF command prepares the latched points for resetting.

♦ The SMON command prepares control points to operate for three seconds.

♦ The SMOF command prepares latched control point to turn off for three seconds, then back on.

Example:

```
>CPM 2 SLON 1,3,5

>CPM 2 EXE

>CPM DEVICE   2 POINT    1 OPERATE    OCT 22, 1988      10:25:03
CPM DEVICE    2 POINT    3 OPERATE    OCT 22, 1988      10:25:04
CPM DEVICE    2 POINT    5 OPERATE    OCT 22, 1988      10:25:04
```

This example would latch control points 17, 19, and 21 (points 1, 3, and 5 of sub-group 2) on.

CPM POINT SET

Purpose:

Operates points at the CPM(s).

Format:

CPM # SET point number(s)

Remarks:

can be a range of sub-groups from 1 through 4 or the word ALL. List point numbers individually with a comma between them, as a group with a hyphen between them, or use the word ALL. Range can be from 1 through 16.

Points are operated for the time period set by switches 6-1 through 6-8, or by programming (refer to the OPTION and CPM POINT TIME PERIOD commands).

Example:

```
>CPM 2 SET 1,3,5

>CPM DEVICE  2 POINT   1 OPERATE   OCT 22, 1988      10:26:03
CPM DEVICE   2 POINT   3 OPERATE   OCT 22, 1988      10:26:04
CPM DEVICE   2 POINT   5 OPERATE   OCT 22, 1988      10:26:04
```

This example would operate control points 17, 19, and 21 (points 1, 3, and 5 of sub-group 2) on.

CPM POINT TIME PERIOD

Purpose:

Sets the time period for momentary operation of control points.

Format:

CPM # LONG time

CPM # SHORT time

CPM # PER (or PERIOD) point number time

Remarks:

can be a range of sub-groups from 1 through 4 or the word ALL. List point numbers individually with a comma between them, as a group with a hyphen between them, or use the word ALL. Range can be from 1 through 16.

Time is in tenths of seconds from 0.1 seconds to 25.5 seconds. To specify the time, use a number from 1 to 255; each number representing a tenth of a second.

The CPM LONG command set the time period for control points that are set for extended (E) operation (switches 6-1 through 6-8). The CPM SHORT command set the time period for control points that are set for short (S) operation (switches 6-1 through 6-8). Refer to the OPTION command for more information.

NOTE: *When setting long or short time periods, the 46121 will use the switch settings (S6-1 through S6-8) for extended and short operation to determine what control points to set for long or short time periods. Extended and short operation (see OPTION command) must be reset before operating the control points if something different from the switch settings is desired.*

CONTINUED . . .

The command CPM PER sets a unique time period for momentary operaton of a specific control point.

Use the command CPM # SET to operate the control points.

Example:

```
>CPM 2 LONG 200
```

If CPM points to be operated defaulted to something other than extended (E) operation, the CPM options must be reset, as shown below.

```
>CPM 2 OPT E E E E E E E E E E E E S S S S
```

```
>CPM 2 SET 1-12
```

This example would set control points 17-28 (points 1-12 of sub-group 2) for 20 seconds.

Example:

```
>CPM 2 PER 16 100
```

```
>CPM 2 SET 16
```

This example would set control points 32 (point 16 of sub-group 2) for 10 seconds.

DATE

Purpose:

Displays or sets the system date.

Format:

DATE

DATE mm/dd/yy (or mm-dd-yy)

CONTINUED . . .

Remarks:

The command DATE displays the system date.

The command DATE followed by the month-date-year entry sets the system date.

DISPLAY

Purpose:

Displays the status of the alarm and control points as stored in the 46121's memory.

Format:

DISP #

Remarks:

can be a range of memory dispays from 1 through 128 or the word ALL. A display consists of eight characters of eight points each for a total of 64 points. Two characters, or 16 points, is equal to one sub-group.

Example:

```
>DISPLAY

DISP 1.1  . . FB. . . . .    F
DISP 1.2  NA . F. . . . .
DISP 1.3  . . . . . . . .
DISP 1.4  . .CD .OD . . .
DISP 1.5  . . . . . . . .
DISP 1.6  . . . . . . . .
DISP 1.7  . . . . . . . .
DISP 1.8  . . . . . . . .
```

In the example above,

- ◆ Display 1.1 has an unacknowledged B-level alarm failure (F). It also is not responding to polling as indicated by the "F" at the far right.

- ◆ Display 1.2 has an unacknowledged A-level alarm that has returned to normal (N) operation. It also has an acknowledged alarm failure (F) that still exists.

- ◆ Display 1.4 shows control points; the first letter indicating whether the contacts are closed (C) or open (O). The second letter (D) is reserved for future use.

LINEFEED

Purpose:

Reports if the linefeed is on or off. Turns the linefeed on or off.

Format:

LINEFEED

LINEFEED ON

LINEFEED OFF

Remarks:

The command LINEFEED shows if the linefeed is on or off.
The other commands turn the linefeed on or off.

LOCK:

Purpose:

Locks the 46121's printer port so it will not accept commands
that change system configuration, acknowledge alarms, or set
control points.

Format:

LOCK

LOG

Purpose:

Reports if the logging feature is on or off. Turns on or off the
logging feature that reports changes of status or device failures.

Format:

LOG

LOG ON

LOG OFF

Remarks:

The LOG command shows if the logging feature is on or off.

PRINTER SYNTAX

The LOG ON command turns the logging on. Whenever there is a change of status of an alarm point on the MAT or a control point on a CPM, a report will be issued. A report also will be issued when there is a device failure.

The LOG OFF command turns the logging feature off. Changes of status and device failures will not be reported. The most recent changes, however, will be stored in memory and displayed when the logging feature is turned back on.

Example:

An example of a change of status report is shown below.

```
>MAT DEVICE 2 POINT 1 FAIL ALM LVL A NORM OCT 22, 1988 10:22:00
```

The example shows an A-level alarm failure at input 17 (point 1 of sub-group 2).

MAT # DELAY

Purpose:

Sets a 200 or 500 millisecond delay before recognizing alarms. The longer delay is to filter out spurious alarms.

Format:

MAT # DELAY 200

MAT # DELAY 500

Remarks:

can be a range of sub-groups from 1 through 16 for the 256 point unit or from 1 through 32 for the 512 point unit.

Example:

```
>MAT 3 DELAY 500
```

This example would set a 500 millisecond delay before recognizing alarms on inputs 33-48 (sub-group 3).

PRINTER SYNTAX

MAT # REVERSE

Purpose:

Reverses the alarm intput state from Open=Normal to Closed=Normal.

Format:

MAT # REVERSE #

Remarks:

After MAT, # can be a range of sub-groups from 1 to 16 for the 256 point unit or from 1 through 32 for the 512 point unit. After POINT, # can be a range of inputs from 1 through 16.

Example:

```
      MAT 9 REVERSE 9
```

This example would reverse the condition for reporting an alarm on input 137 (input 9 of sub-group 9).

MODE

Purpose:

Shows if the system is locked or unlocked.

Format:

MODE

OFF/OFFLINE/ON

Purpose:

Puts alarm and control sub-groups in service or takes them out of service.

Format:

MAT or CPM # ON

MAT or CPM # ON data rate

MAT or CPM # OFF

MAT or CPM #OFFLINE

CONTINUED . . .

Remarks:

After MAT, # can be a range of sub-groups from 1 to 16 for the 256 point unit or from 1 through 32 for the 512 point unit. After CPM, # can be a range of sub-groups from 1 through 4 or the word ALL.

The ON and OFF commands put a sub-group(s) in service or out of service. When out of service, the 46121 will not interrogate it, but continue to list it in the system status reports, with the status shown as OFF.

The ON command, followed by the data rate, will put a sub-group(s) in service and tell the 46121 what baud rate at which to interrogate the device(s).

The command OFFLINE will change the status of an alarm or control point sub-group(s) to "not in service". The 46121 will not interrogate it and will stop listing it in the system status reports. The sub-group(s) will return to service using the ON command or at the next system reconfiguration, which occurs approximately every 10 minutes.

OPTION

Purpose:

To display or set alarm levels or control point time periods.

Format:

CPM # OPT

CPM # OPT _____

MAT # OPT

MAT # OPT _____

Remarks:

The OPT command displays the alarm level option settings for the MAT(s) and the control point options for the CPM(s).

Options are displayed as A, B, C, and D for the MAT(s). These letters refer to the priority levels of alarms.

Options are displayed as L (latched), S (short momentary), E (extended momentary), and M (for a unique time period) for the CPM(s).

The command OPT, followed by 16 letters set the options for the MAT(s) and CPM(s). Use letters A, B, C, and D for the MAT(s) and the letters L, S, and E for the CPM(s). Enter all 16 letters in the sub-group desired. Put spaces between the letters. To set a unique time period for a CPM point, refer to the CPM POINT TIME PERIOD command

CONTINUED . . .

Example:

```
>CPM 1 OPT
CPM 1 OPTIONS S E L L S E L L S E L L S E L L
```

PASSWORD

Purpose:

Sets the password for system security.

Format:

PASSWORD

Remarks:

Entry is followed by a query for a new password. If an old password exists, it must be entered before setting a new one. As the password is entered, asterisks appear on the screen to safeguard the identity of the password. Maximum length is seven characters.

Example:

```
>PASSWORD
New password: ****
```

PROVISIONING

Purpose:

Displays the status of alarm and control sub-groups in the 46121's database.

Format:

PROV

Remarks:

The command PROV gives a report for all devices in the system. The example is a partial report. Each line shows:

♦ The port number (always 1)

♦ The device (MAT or CPM)

CONTINUED . . .

♦ Alarm level (disregard the level for CPMs)

♦ The location in memory where the data is stored (display 1.1, 1.2, and so forth).

Example:

```
>PROV
PORT  1  MAT 5  BBBBBBBBBBBBBBB    1.1   1.2
PORT  1  CPM 1  DDDDDDDDDDDDDDD    1.3   1.4
```

QUERY

Purpose:

Gives a report of the 46121's configuration.

Format:

? or Q or QUERY

Example:

```
>Q
Point latch until transmitted
Display mode :  Alarm with Level
Level D status  : OFF
Remote test  :  OFF
Downloadable :  OFF
Point delay  :  10ms
ESYS mode :  OFF
Data port :  DCM
Data port baud  : 9600
Printer port :  Printer IV
Printer port baud :    9600
Master port  :  TBOS
Master port baud  :    2400
```

RESET

Purpose:

Resets the system. Resets operated control points. Reset latched alarm inputs.

CONTINUED . . .

Format:

RESET (**Caution: See Remarks below**.)

CPM # RST (or RESET)

MAT # RST (or RESET)

Remarks:

The command RESET resets the 46121. The type of reset per-formed depend on the setting of switch S5-3. When set for a cold reset, the memory is cleared and the 46121 is reconfigured (the DIP switches are re-read by the processor). When set for a warm reset, the memory and configuration are saved and the DIP switches are not re-read.

The command MAT # RST resets latched alarm inputs. After MAT, # can be a range of sub-groups from 1 through 16 for a 46121 with 256 alarm inputs or from 1 through 32 for a 46121 with 512 alarm inputs. The command CPM # RST resets oper-ated control points. After CPM, # can be a range of sub-groups from 1 through 4.

Example:

```
>CPM 1 RST

>CPM DEVICE   1 POINT    1 RELEASE   OCT 22, 1988      10:21:01
 CPM DEVICE   1 POINT    2 RELEASE   OCT 22, 1988      10:21:01
```

REVISION

Purpose:

Gives the revision level of the 46121's firmware.

Format:

REVLIST

Example:

```
>REVLIST

DANTEL MULTI-ALARM SYSTEM
COPYWRITE 1989
A82-00125-00
```

PRINTER SYNTAX

RTUSG MODE

Purpose:

Shows or changes the current terminology being used to display alarms. Sub-groups can be designated either SG or MAT. Regardless of which terminology is used, they both represent a group of 16 alarm points and four SGs or MATs makes up one display.

Format:

RTUSG MODE

RTUSG MODE ON

RTUSG MODE OFF

Remarks:

RTUSG MODE displays whether the mode is on or off. When it is on, alarms are displayed using SG. When it is off, alarms are displayed using MAT.

RTUSG MODE ON causes alarms to be displayed using SG.

RTUSG MODE OFF causes alarms to be displayed using MAT.

STATUS

Purpose:

Produces a report on the status of alarms and control point sub-groups.

Format:

STAT (or STATUS)

CPM # STAT (or STATUS)

MAT # STAT (or STATUS)

Remarks:

After MAT, # can be a range of sub-groups from 1 through 16 for a 46121 with 256 alarm inputs or from 1 through 32 for a 46121 with 512 alarm inputs. The command CPM # RST resets operated control points. After CPM, # can be a range of sub-groups from 1 through 4.

The command STAT gives a report for the system. The other commands show reports for the sub-groups indicated.

CONTINUED . . .

The status report shows

♦ Whether the device is on or offline

♦ Whether it is turned on or off (in or out of service)

♦ The baud rate (internal; meaning the user cannot change it)

♦ Whether it is responding to polls (normal or fail)

Example:

```
>MAT 1 STAT
MAT STATUS  10:03:02  OCT 22,1988
MAT1 ON LINE IN SERVICE BAUD  INTRN NORM
```

SWITCHES

Purpose:

Gives a listing of how the 46121 switches are set.

Format:

SWITCHES

Remarks:

In the example below, D = DOWN and U = UP. Switch S6, which is part of the optional control point output board, is not shown.

Example:

```
>SWITCHES
DIP  1)DDDDDDDD  2)DDDDDUDD   3)DDDDDDDD  4)DDDDDUDD  5)UDUDUDUD
```

SYSTEM

Purpose:

Shows the status of alarm and control point sub-groups.

Format:

CPM #

MAT #

SYS (or LIST SYSTEM or LIST SYS)

PRINTER SYNTAX

Remarks:

CPM # shows the status of control point sub-groups. MAT # shows the status of alarm sub-groups. SYS shows the status of all sub-groups in the system.

After MAT, # can be a range of sub-groups from 1 through 16 for a 46121 with 256 alarm inputs or from 1 through 32 for a 46121 with 512 alarm inputs. The command CPM # RST resets operated control points. After CPM, # can be a range of sub-groups from 1 through 4.

Example:

```
>SYS
LIST SYSTEM  10:32:46   DEC 25, 1988
MAT 1 . . . AF. . F . . . BF. . . . .
MAT 2 . . . . . . . . . . . . . . . FAIL
MAT 3 . . CN. . . . . . . . . . . .
CPM 1 C;C;C;O;O;O;O;O;O;O;O;O;O;O;O;O
```

The display for sub-group 1 (MAT 1) shows unacknowledged A-level and B-level alarms (F) and an acknowledged alarm (F) that still exists.

Alarm sub-group 2 (MAT 2) is shown not responding to polling.

Alarm sub-group 3 (MAT 3) shows an unacknowledged C-level level alarm that has returned to normal operation.

The display for control point sub-group 1 (CPM 1) shows whether the control point relays are closed (C) or open (O). Semicolons indicate that the point operation has not been acknowledged.

Refer to the ACKNOWLEDGE command for more information on acknowledging alarms and control points.

TEST

Purpose:

Indicates a loopback test of the master port or a 1's/0's test.

Format:

TEST MASTER

TEST INPUT

Remarks:

The command TEST MASTER will perform a loopback test of the master port. Test data for the loopback will be generated internally, transmitted out the master port, and, assuming the transmit line has been looped back to the receive line, read by the 46121's processor. If the data received is not identical to the date transmitted, there is a error and the printer port will report the nature of the error (no data received or an error in the data received).

The data sent for the loopback test is "!"#$%&'()*+-./ 0123456789:;<=>?@ABCDEFGHIUJKLMNOPQRSTUV WXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}. If the command is issued without the transmit and receive leads of the port interconnected, the 46121 will signal a failure of the loopback test for the port.

The TEST MASTER command will also drive the auxillary port. Therefore, if the auxillary port TX+ is connected to the RX+ and the TX- is connected to the RX-, the test will succeed regardless of what is connected to the master port. To test the master port independently, switch S5-7 must be placed in the DOWN (ON) position temporarily.

The TEST INPUT command starts a 1's/0's test. If a failure occurs, the printer port will display the number of the alarm points that have failed.

TIME

Purpose:

Display or sets the system time.

Format:

TIME

TIME hh:mm:ss

TIME ON

Remarks:

TIME display the current time.

TIIME, followed by the hour:minute:second entry will set the time. (Time is entered in a 24-hour format.)

TIME ON starts the clock.

PRINTER SYNTAX

UNLOCK

Purpose:

Unlocks the 46121 so it will accept commands to change the system configuration, acknowledge alarms, and operate control points.

Format:

UNLOCK

Remarks:

If a password has been set, it will be requested before the system can be unlocked.

Example:

```
>UNLOCK
Password : ****
System Unlocked
```

TECHNICAL SPECIFICATIONS

DESCRIPTION	TABLE HEAD
POWER REQUIREMENTS	
Input Voltage (all options)	-21 to -56 VDC
Input Current (@ -48 VDC)	
-12 Option (256 alarms, no controls)	
Idle	85 mA
Maximum	150 mA
-02 Option (512 alarms, no controls)	
Idle	105 mA
Maximum	182 mA
-03 Option (512 alarms w/ controls)	
Idle	130 mA
Maximum	832 mA (all relays energized)
Heat Dissipation	
-12 Option (256 alarms, no controls)	
Idle	13.9 Btu/Hr
Maximum	24.6 Btu/Hr
-02 Option (512 alarms, no controls)	
Idle	17.2 Btu/Hr
Maximum	29.9 Btu/Hr
-03 Option (512 alarms w/ controls)	
Idle	21.3 Btu/Hr
Maximum	136.3 Btu/Hr (all relays energized)
ALARM POINT INPUTS	
Normal	Open or -21 to -56 VDC
Alarm Condition	Closed contact to ground
CONTROL POINT OUTPUTS	
Relay Type	Form-C (operating as Form-A)
Contact Ratings	1.0A @ 24 VDC; 0.5A @ 120 VAC
FUSE TYPES AND VALUES	
Alarm Input Board	0.5 Amp, GMT-type, Indicating
Control Output Board	0.75 Amp, GMT-type, Indicating
WEIGHT, DIMENSIONS, OPERATING TEMPERATURE RANGE	
Housing	11 lbs
256 Alarm Point Board	2.6 lbs
256 Alarm Point Expansion Board	1 lb
64 Control Point Board	1.6 lbs
Physical Dimensions	3.5"H x 17.5"W x 10.35"D
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