

# B17-46800-48

## FIRMWARE MANUAL

### (TELTRAC)

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#### About this Practice:

This practice has been reissued to:

- Reflect issue change from A17 to B17.

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

**Issue date: September 1999**

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

UPDATED

**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
B17-46800-48	MAP Firmware

## GENERAL DESCRIPTION

This section describes the functions and special features of the 46800-48 firmware. This firmware package mounts on the 46020 Multiple Alarm Processor (MAP).

### MAP PORTS

The firmware programs a MAP to function in the 460 Alarm and Control System. The MAP provides three data interface points, all of which are affected by the firmware. The points are:

- ◆ The MASTER PORT interfaces equipment using the TELCO SYSTEMS TELTRAC IV Communications Protocol.
- ◆ The PRINTER PORT interfaces a dumb terminal which can be used for secondary system reporting and control. This can be a serial printer.
- ◆ The DATA PORT interrogates remote alarm points to gather data and/or operate remote control points.

### APPLICATIONS

Applications for this firmware include:

- ◆ Communicating with remote TBOS serial ports and/or discrete points using the MAP data port.
- ◆ Providing a syntax for a dumb terminal to interrogate system status, operate control points and set options.
- ◆ Reconfiguring the system every 10 minutes to check for devices that have recently been installed or have come on-line. They can then be added to the configuration list. Reconfiguration can be done using a manual command if a 46022-12 Multiple Alarm Combiner (MAC) is present in the system.

# GENERAL DESCRIPTION

## CONFIGURATION/RECONFIGURATION

To reduce the polling time, a configuration function is performed by the microprocessor at power-up. This determines which remote devices are present and on-line in the system. Those devices not present or on-line will be excluded from the polling list. This reduces the polling time. The polling list is updated automatically every 10 minutes. During this cycle, every other poll is to an off-line device while status polling continues at the same time. This assures that status changes will not be missed during reconfiguration.

## DIP SWITCHES

There are four eight-lever DIP switches (S1, S2, S3, and S4) on the MAP. They are located at the top of the main printed circuit board and are used to set the configuration of the firmware.

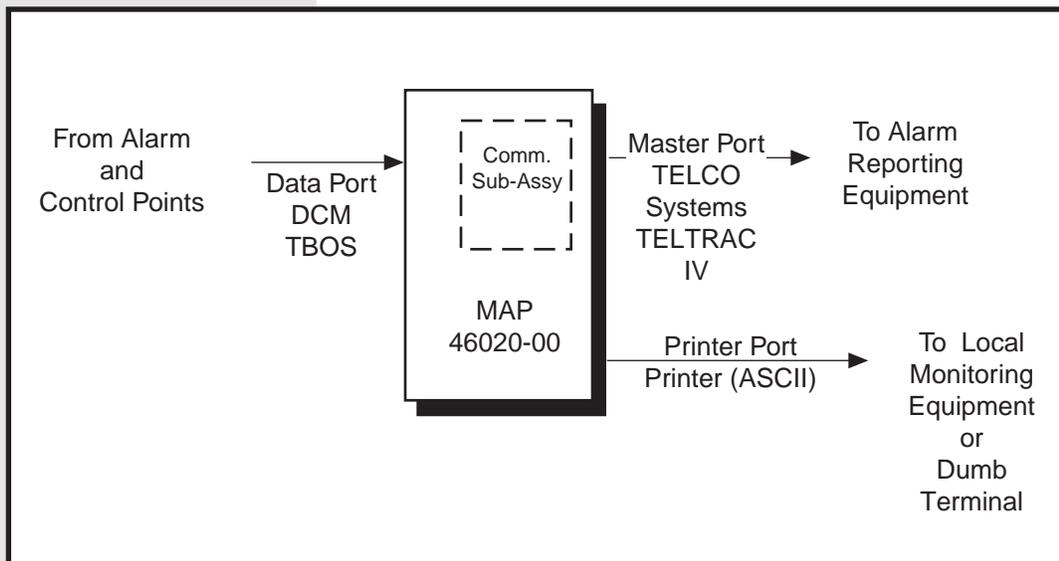
# SYSTEM ARCHITECTURE

This section discusses the architecture of the master, printer, and data ports of the MAP.

## MAP PORT FUNCTIONS

Fig. 1 depicts the MAP port functions.

FIG. 1 - MAP PORTS AND PROTOCOLS



# SYSTEM ARCHITECTURE

## MASTER PORT

The master port interfaces equipment using the TELCO SYSTEMS TELTRAC IV communications protocol.

## PRINTER PORT

The printer port interfaces a dumb terminal (with or without a printer) and can be used as a secondary reporting port for alarm points and for issuing control point commands. This port uses Printer III syntax only. Refer to the *Printer Syntax* section for commands available.

## DATA PORT

The data port interrogates alarm points and operates control points. There are two protocols available on the data port, TBOS and DCM.

### TBOS-Interrogate

This allows the MAP to interrogate TBOS serial ports and devices.

### DCM-Interrogate

This protocol interrogates discrete points only. When this protocol is enabled, however, the MAP can interrogate both discrete points and TBOS devices on separate ports of the MAC.

The MAP uses DCM protocol to interrogate Dantel Multiple Alarm Transmitters (MATs) for alarm data and to operate control points on Dantel Control Point Modules (CPMs). When using DCM protocol, the MATs and CPMs must be connected to port 1 of the MAC. Refer to Fig. 2.

## INTERFACES

### Master Port

The master port requires a subassembly to be mounted on the MAP in order to provide the proper interface to other equipment.

- ◆ The 49008 provides RS-422
- ◆ The 49029 provides RS-232
- ◆ The 49013 provides 202 Tone

# SYSTEM ARCHITECTURE

## Printer Port

The printer port has a built-in RS-232 interface. If a different interface is required on the printer port, add a Dantel 46035 Converter Module with the appropriate subassembly between the MAP and the other equipment. Refer to Fig. 2.

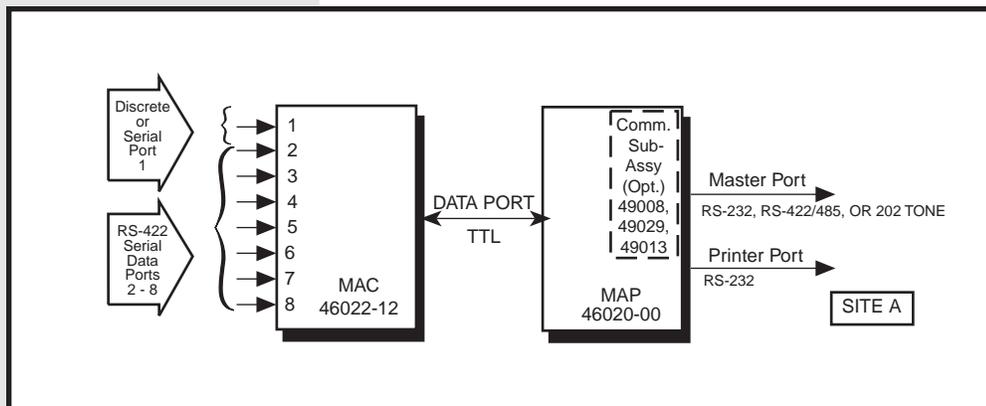
## Data Port

The data port of the MAP communicates through transistor-transistor logic (TTL). This means communications cannot extend beyond the shelf where the MAP is installed. To communicate beyond the shelf, the data port is connected to a 46035 Converter Module, 46022 Multiple Alarm Combiner (MAC) or other device (for example, a 46034 Hubbing Module) for conversion to the appropriate data communications interface.

The most common application, a 46022-12 MAC, has eight communications channels or ports. The MAP's data port supports multiple MACs.

In communicating with alarm and control points, the data port can use DCM protocol (port one only) or TBOS protocol on any of the MAC channels. However, only one protocol can be used on any one channel. The protocol(s) used on the data port do not have to be the same as those used on the printer and master ports. For example, Teltrac IV is used on the master port, PRINTER syntax on the printer port, and DCM and TBOS on the data port. Refer to Fig. 1.

FIG. 2 - MAP PORT INTERFACES



# SYSTEM ARCHITECTURE

## DATA LIMITATIONS

The MAP is limited in the amount of data it can process. A MAP equipped with 46800-48 firmware can handle data from a maximum of 2,048 alarm points and 2,048 control points. When referring to discrete points, this is the same as 128 MAT addresses and 128 CPM addresses. (Each MAT or CPM address is 16 points. 2,048 divided by 16 equals 128.)

When referring to serial TBOS ports, 2,048 points is the same as 32 displays (each display having 64 points).

The MAP can communicate with the MATs and CPMs and TBOS displays at the same time. Fig. 2 shows that all discrete points (if any) must be connected to port 1, of the MAC-12. Ports 2-8 are only for TBOS displays.

Regardless of how many TBOS displays and discrete alarm points are used, the MAP is still limited to 2,048 points total.

## SWITCH SETTINGS

This chapter describes, in a logical sequence, how to set the switches on the MAP to properly operate the firmware.

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**NOTE:** Refer to the tables in the next section, **Switch Tables**, while going through this section. Once you are familiar with how to set the switches, the **Switch Tables** section will be all you need to set the switches.

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### DATA PORT PROTOCOLS

Switch 3, lever 8 (S3-8) determines whether the data port communicates with serial ports only (TBOS) or both TBOS and discretetes (DCM). In the ON position, the MAP will poll for DCM on port one of the MAC and TBOS on ports 2-8.

### PRINTER PORT DATA RATE

S3-6 and S3-7 set the baud rate for the printer port. Three choices are available: 1200, 2400, and 9600 baud.

# SWITCH SETTINGS

## ALARM POINTS

### DISCRETE ALARMS ONLY

If the data port communicates with discrete points only, a 46022-20 MAC is all that is needed to interface with those remote points. For MATs and CPMs located in the same shelf as the MAP, no MAC is required.

S2-6 through S2-8 determine the number of displays of MATs and CPMs in the system. A display is the equivalent of four MAT or CPM addresses.

S4-1 through S4-7 set the master port base address. Each set of eight displays of MATs and CPMs requires one MAP Master Port address. For example: if S2-6 through S2-8 are set for 16 displays, and the master port base address is set for 1, the MAP will respond as addresses 1 and 2.

S1-1 through S1-8, S2-1 through S2-5, and S3-1 through S3-5 should all be set in the DOWN positions. These switches apply to serial TBOS ports. S4-8 should be UP.

When using only discrete points, this concludes the switch settings.

### TBOS PORTS AND DISCRETE POINTS

If discrete points and/or TBOS ports are to be used, the MAP data port communicates through MAC-12s. Each MAC-12 has eight communications ports.

#### Number of MACs

The first step is to determine the number of ports needed. Use one port for each location. A serial port can handle from one to eight TBOS displays, so more than one port may be needed at a location requiring more than eight displays.

A maximum of four MACs may be connected to each MAP. Configured for one display per port, for example, four MACs would be necessary to handle 32 display of TBOS alarm information.

If the system contains a combination of TBOS alarms and discrete alarms, all the discrete alarms are routed through port one of the first MAC - that is, the MAC addressed 1. There is no limit to the number of discrettes that can go through the first port, excepting that the combined total of TBOS displays and discrete displays cannot exceed 32.

Once the number of ports is determined, the number of MACs can be estimated. The number of MACs required may be affected by the number of TBOS displays per port, discussed in the next part of this section.

# SWITCH SETTINGS

S1-7 and S1-8 sets the number of MACs with which the MAP will communicate.

## TBOS Displays Per Port

Once you determine the number of ports, you can estimate the number of 46022-1X MACs. The number of MACs depends on the number of TBOS displays per port.

There are limitations on the number of displays each MAC port can handle. Divide the number of ports available into four equal groups. The number of ports in each group depends on how many MACs are in use. Refer to Figs. 3 and 4.

Once the ports are divided into four equal groups (there are no switches to set), determine and set the number of displays per port in each group. This could affect the number of MACs required.

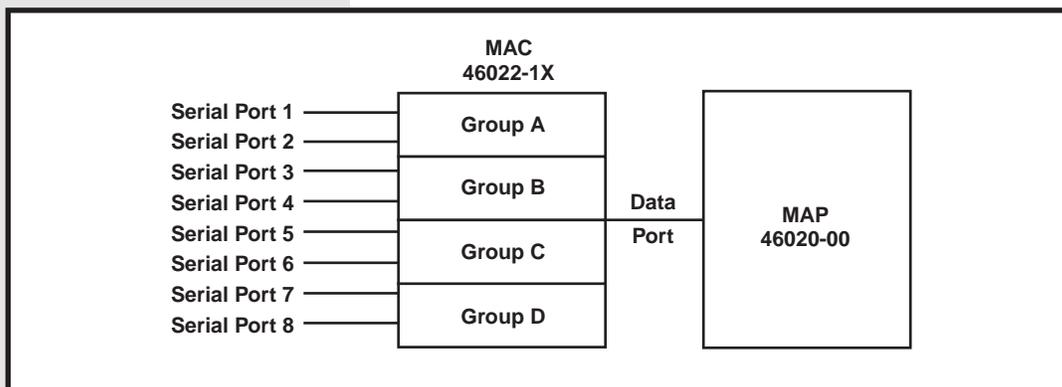
- ◆ Switches S1-1 through S1-3 set Group A displays per port.
- ◆ Switches S1-4 through S1-6 set Group B displays per port.
- ◆ Switches S2-1 through S2-3 set Group C displays per port.
- ◆ Switches S2-4 through S2-5 set Group D displays per port.

Groups A, B, and C can be set for one to eight displays per port. Group D can be set for one, two, four, or eight displays only.

If the DCM-Int switch (S3-8) is ON, the MAP automatically ignores the displays-per-port setting for the first port of the first MAC.

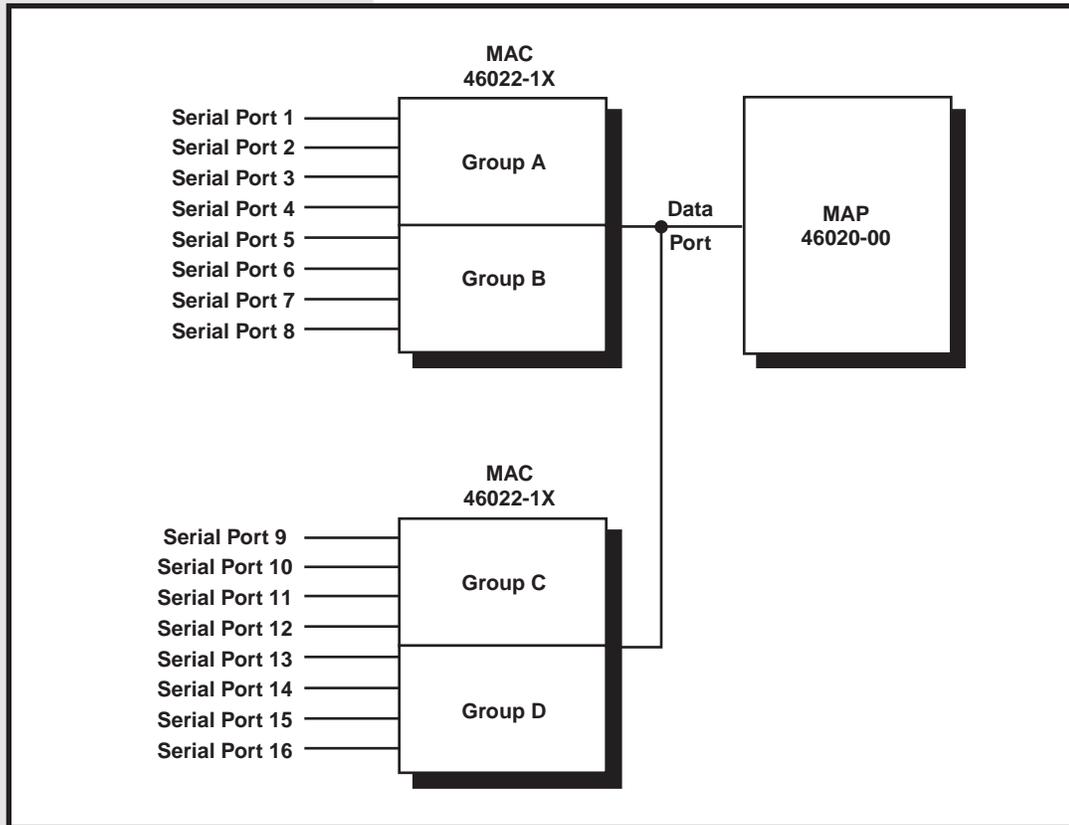
After you set the displays per port, set the total number of TBOS displays the MAP interrogates. See Switch S3 for information.

FIG. 3 - GROUP DIVISIONS WITH ONE MAC



# SWITCH SETTINGS

FIG. 4 - GROUP DIVISIONS WITH TWO MACs



## Number of TBOS Displays

After setting the displays per port, there may be more displays dedicated to TBOS serial ports than desired. All unused displays must be counted until the TBOS system total size is reached, after which all displays are ignored.

Look at Fig. 5. In this example, the total number of TBOS displays configured using S1 and S2 is 24. Because the MAP knows that port one is for discretes, not TBOS, the total drops to 21. Note that this includes 2 TBOS displays on port 8 which are not needed.

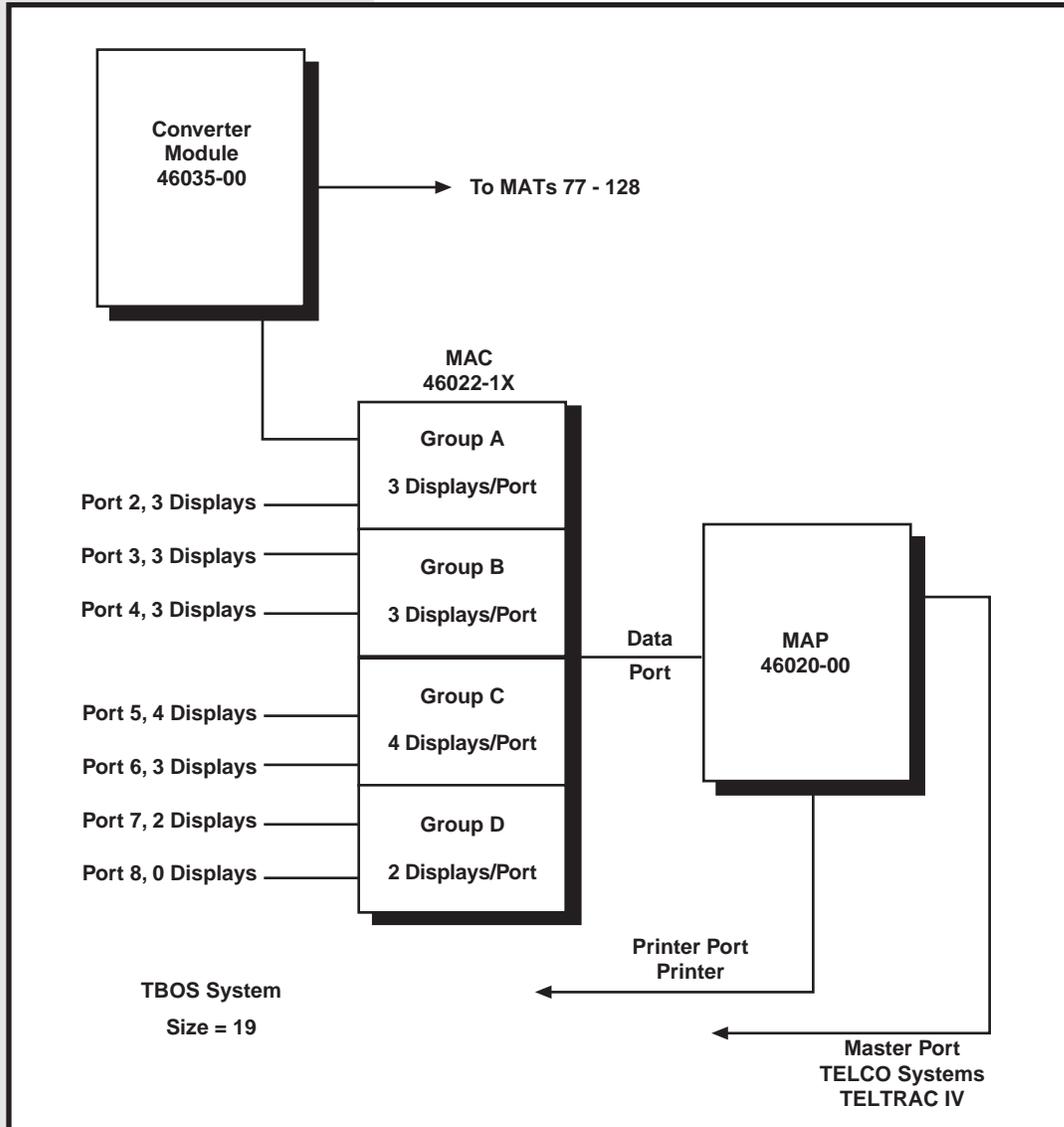
S3-1 through S3-5 set the total number of TBOS displays that the MAP will interrogate. By setting this to 19, the MAP will poll ports 2 through 7, and ignore port 8. The unused display on port 6, however, must be counted in the total.

In a system with no discrete alarm points (S3-8 OFF), the MAP can poll 32 displays of TBOS. Where there are discrete alarm points, a maximum of 31 TBOS displays can be polled, with 0 only being used in those systems with no TBOS.

If all the TBOS displays are not used, the remaining capacity of the MAP may be used for discrete points connected through port 1.

# SWITCH SETTINGS

FIG. 5 - EXAMPLE; TBOS SYSTEM SIZE WITH DISCRETES



## Addressing Discrete Devices (MATs)

TBOS displays take precedence over discrete points. This means that the MAP assigns memory and displays for TBOS devices first. Whatever is left, after all the TBOS displays have been assigned, is available for discrettes. Therefore, when setting the address switches on MATs, start addressing immediately after the last TBOS display used. (Remember; a TBOS display is the equivalent of four MAT addresses.)

To calculate where to start addressing MATs, multiply the number of TBOS displays, by four and start the MAT addressing with the next number. For example, in the example of Fig. 5, there are 19 TBOS displays assigned. 19 times 4 equals 76. This means that the MAT addressing can start at 77 (one higher than 76).

# SWITCH SETTINGS

Four MAT addresses and four CPMs are the equivalent of one display. S2-6 through S2-8 set the number of DCM displays.

## Master Port Base Address

S4-1 through S4-7 set the master port base address. Each set of eight TBOS displays and each set of eight displays of MATs and CPMs, is considered a MAP address. If the base address is set for 1 and there are 16 displays, the MAP will recognize addresses 1 through 2.

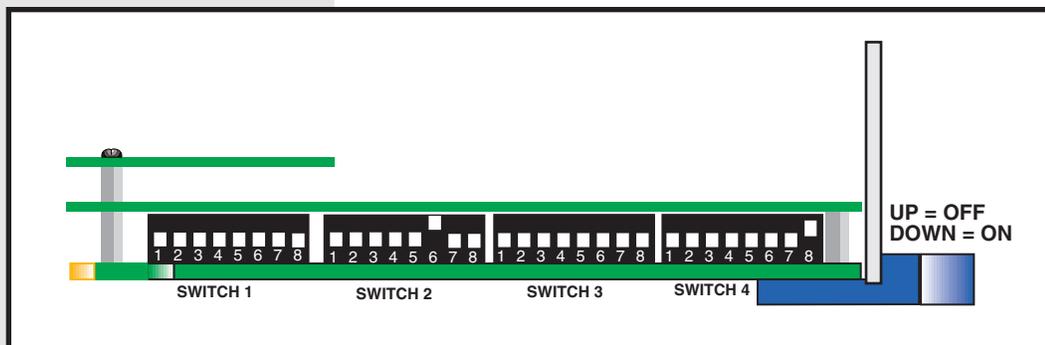
S4-8 is not used, and must be left in the UP position.

# SWITCH TABLES

The switch setting tables are laid out to look like the switches, when viewed from the top of the MAP, with the front panel on the right. Refer to Fig. 6.

If you are not familiar with how to set the switches, refer to the previous section, *Switch Settings*.

FIG. 6 - 46020 MAP SWITCH LOCATIONS



# SWITCH TABLES

## Switch 1

Refer to Table A for the switch settings for S1.

**TABLE A - SWITCH S1 (UP IS OFF, DOWN IS ON)**

TBOS DISPLAYS PER PORT IN GROUP A				TBOS DISPLAYS PER PORT IN GROUP B				NUMBER OF 46022-1X MACS		
	S1-1	S1-2	S1-3		S1-4	S1-5	S1-6		S1-7	S1-8
1	DOWN	DOWN	DOWN	1	DOWN	DOWN	DOWN	1	DOWN	DOWN
2	UP	DOWN	DOWN	2	UP	DOWN	DOWN	2	UP	DOWN
3	DOWN	UP	DOWN	3	DOWN	UP	DOWN	3	DOWN	UP
4	UP	UP	DOWN	4	UP	UP	DOWN	4	UP	UP
5	DOWN	DOWN	UP	5	DOWN	DOWN	UP			
6	UP	DOWN	UP	6	UP	DOWN	UP			
7	DOWN	UP	UP	7	DOWN	UP	UP			
8	UP	UP	UP	8	UP	UP	UP			

## Switch 2

Refer to Table B for the switch settings for S2.

**TABLE B - SWITCH S2 (UP IS OFF, DOWN IS ON)**

TBOS DISPLAYS PER PORT IN GROUP C				TBOS DISPLAYS PER PORT IN GROUP D			NUMBER OF DCM DISPLAYS WHEN S3-8 IS ON			
	S2-1	S2-2	S2-3		S2-4	S2-5		S2-6	S2-7	S2-8
1	DOWN	DOWN	DOWN	1	DOWN	DOWN	4	DOWN	DOWN	DOWN
2	UP	DOWN	DOWN	2	UP	DOWN	8	UP	DOWN	DOWN
3	DOWN	UP	DOWN	4	DOWN	UP	12	DOWN	UP	DOWN
4	UP	UP	DOWN	8	UP	UP	16	UP	UP	DOWN
5	DOWN	DOWN	UP				20	DOWN	DOWN	UP
6	UP	DOWN	UP				24	UP	DOWN	UP
7	DOWN	UP	UP				28	DOWN	UP	UP
8	UP	UP	UP				32	UP	UP	UP

# SWITCH TABLES

## Switch 3

Refer to Table C for the switch settings for S3.

**TABLE C - SWITCH S3 (UP IS OFF, DOWN IS ON)**

NUMBER OF TBOS DISPLAYS						
DCM (S3-8)						
ON	OFF	S3-1	S3-2	S3-3	S3-4	S3-5
0	1	DOWN	DOWN	DOWN	DOWN	DOWN
1	2	UP	DOWN	DOWN	DOWN	DOWN
2	3	DOWN	UP	DOWN	DOWN	DOWN
3	4	UP	UP	DOWN	DOWN	DOWN
4	5	DOWN	DOWN	UP	DOWN	DOWN
5	6	UP	DOWN	UP	DOWN	DOWN
6	7	DOWN	UP	UP	DOWN	DOWN
7	8	UP	UP	UP	DOWN	DOWN
8	9	DOWN	DOWN	DOWN	UP	DOWN
9	10	UP	DOWN	DOWN	UP	DOWN
10	11	DOWN	UP	DOWN	UP	DOWN
11	12	UP	UP	DOWN	UP	DOWN
12	13	DOWN	DOWN	UP	UP	DOWN
13	14	UP	DOWN	UP	UP	DOWN
14	15	DOWN	UP	UP	UP	DOWN
15	16	UP	UP	UP	UP	DOWN
16	17	DOWN	DOWN	DOWN	DOWN	UP
17	18	UP	DOWN	DOWN	DOWN	UP
18	19	DOWN	UP	DOWN	DOWN	UP
19	20	UP	UP	DOWN	DOWN	UP
20	21	DOWN	DOWN	UP	DOWN	UP
21	22	UP	DOWN	UP	DOWN	UP
22	23	DOWN	UP	UP	DOWN	UP
23	24	UP	UP	UP	DOWN	UP
24	25	DOWN	DOWN	DOWN	UP	UP
25	26	UP	DOWN	DOWN	UP	UP
26	27	DOWN	UP	DOWN	UP	UP
27	28	UP	UP	DOWN	UP	UP
28	29	DOWN	DOWN	UP	UP	UP
29	30	UP	DOWN	UP	UP	UP
30	31	DOWN	UP	UP	UP	UP
31	32	UP	UP	UP	UP	UP
PRINTER PORT DATA RATE				DCM (MATS & CPMS)		
		S3-6	S3-7		S3-8	
1200		UP	UP	ON	DOWN	
2400		DOWN	UP	OFF	UP	
9600		DOWN	DOWN			
Don't Use		UP	DOWN			

# SWITCH TABLES

## Switch 4

Refer to Table D for the switch settings for S4.

TABLE D - SWITCH S4 (UP IS OFF, DOWN IS ON)

0 	15 	30 	45 	60 	75 	90 	105 
1 	16 	31 	46 	61 	76 	91 	106 
2 	17 	32 	47 	62 	77 	92 	107 
3 	18 	33 	48 	63 	78 	93 	108 
4 	19 	34 	49 	64 	79 	94 	109 
5 	20 	35 	50 	65 	80 	95 	110 
6 	21 	36 	51 	66 	81 	96 	111 
7 	22 	37 	52 	67 	82 	97 	112 
8 	23 	38 	53 	68 	83 	98 	
9 	24 	39 	54 	69 	84 	99 	
10 	25 	40 	55 	70 	85 	100 	
11 	26 	41 	56 	71 	86 	101 	
12 	27 	42 	56 	72 	87 	102 	
13 	28 	43 	58 	73 	88 	103 	
14 	29 	44 	59 	74 	89 	104 	

# MAC OPERATION

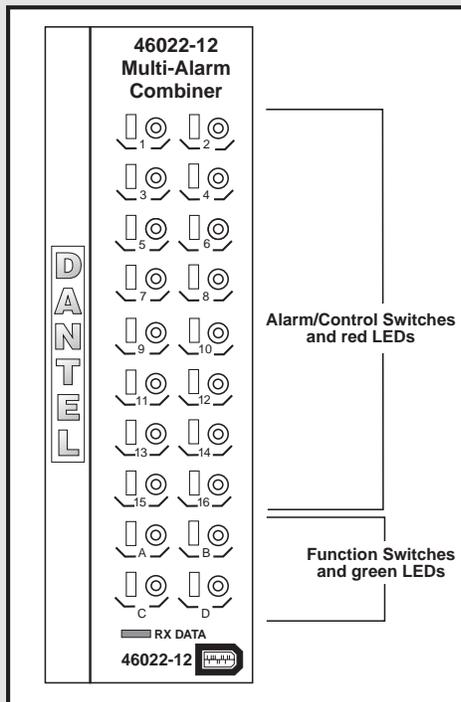
The MAC may be used to display alarm and communication status. The firmware affects the operation of the LEDs and switches on the 46022-12 MACs. The following operating instructions apply only when this firmware is used in a MAP that is operating with a 46022-12 MAC.

## Applications

One MAC front panel has a capacity of 32 displays. This represents 2,048 alarm and control points. Through the use of function switches, the MAC front panel reports individual alarm point status.

If the MAP communicates with more than one MAC (whenever more than eight serial ports are needed), only the number one MAC provides all front panel functions. Other MACs provide only communications status reports for their own ports.

FIG. 7 - MAC-XX FRONT PANEL



## Functions:

Refer to Fig. 7. These functions are performed at the MAC front panel:

- A. Change of Status Alarm Reporting
- B. Change of Status Alarm Acknowledgement
- C. Acknowledged Alarm Status
- D. Acknowledge All (ACK ALL)
- E. Control Point Operations
- F. Control Point Status
- G. Communications Status Report for all MAC Ports
- H. Lamp Test

## Operation Steps

The MAC function begins from the default mode. To return to default mode at any time, press buttons A and C at the same time.

# MAC OPERATION

## CHANGE OF STATUS

**46022-12  
Multi-Alarm  
Combiner**

D  
A  
N  
T  
E  
L

**STEP 1  
Default Mode**

1. Press A & C to return to Default Mode.
  
2. D LED flashes to show Default Mode.
  
3. A & B LEDs come on alternately to show which displays are being shown on Alarm LEDs. (A=1-16, B = 17-32).
  
4. Alarm LEDs show displays that have alarms. (Indicated by flashing LED, see LED #4.)

**46022-12  
Multi-Alarm  
Combiner**

D  
A  
N  
T  
E  
L

**STEP 2  
Group Selection**

1. Press A to show to displays 1-16.  
Press B to show displays 17-32.
  
2. A LED on if displays 1-16.  
B LED on if displays 17-32.
  
3. Alarm LEDs show display status.  
OFF = No alarms  
FLASHING = Unacknowledged alarms.  
ON = Acknowledged alarms.

**CONTINUED . . .**

# MAC OPERATION

## CHANGE OF STATUS (CONTINUED)

D  
A  
N  
T  
E  
L

**46022-12  
Multi-Alarm  
Combiner**

— RX DATA  
46022-12

### STEP 3 Display Section

1. Press button for desired display.  
Alarm LEDs will show status of points 1 - 16.
2. LED A on shows points 1-16 selected.  
(First MAT in the display).
3. Press button B to show points 17-32.  
(Second MAT in display) LED B comes on.
4. Press button C to show points 33-48.  
(Third MAT in display) LED C comes on.
5. Press button D to show points 49-64.  
(Fourth MAT in display) LED D comes on.
6. Press button A to return to points 1-16.  
LED A comes on.

D  
A  
N  
T  
E  
L

**46022-12  
Multi-Alarm  
Combiner**

— RX DATA  
46022-12

### STEP 4 Point Selection

1. LED flashing indicates a change of status at that point, see example at LED #4.
2. Acknowledge by pressing button next to flashing LED.  
  
LED ON shows acknowledged alarm state, see example at LED #6.  
  
LED OFF shows acknowledged normal state.

# MAC OPERATION

## CONTROL POINT OPERATION

**46022-12 Multi-Alarm Combiner**

**DANTE L**

**STEP 1**  
**Return to Default Mode**

1. Press A & C to return to Default Mode.
2. D LED flashes to show Default Mode.

**46022-12 Multi-Alarm Combiner**

**DANTE L**

**STEP 2**  
**Control Mode Selection**

1. Press button C to select Control Mode.
2. LED C on to indicate Control Mode selected.
3. LEDs A & B flash.

CONTINUED . . .

# MAC OPERATION

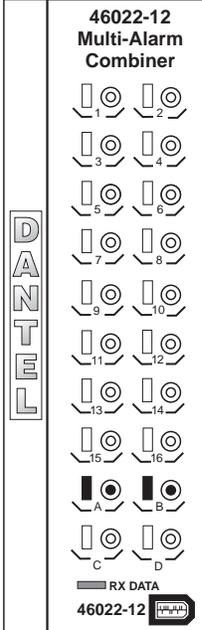
## CONTROL POINT OPERATION (CONTINUED)

**46022-12 Multi-Alarm Combiner**

**STEP 3 Select Group**

1. Press A to select displays 1-16.  
Press B to select displays 17-32.

2. A LED on if displays 1-16 selected.  
B LED on if displays 17-32 selected.



**46022-12 Multi-Alarm Combiner**

**STEP 4 Display Selection**

1. Press button for desired display.  
See example button #3.  
Alarm LEDs will all come on.

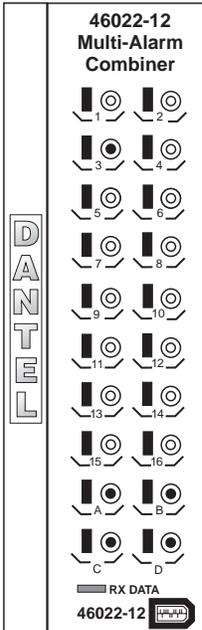
2. LED A on show points 1-16 selected.  
(First CPM in display.)

3. Press button B to show points 17-32.  
(Second CPM in display.) LED B comes on.

4. Press button C to show points 33-48.  
(Third CPM in display.) LED C comes on.

5. Press button D to show points 49-64.  
(Fourth CMP in display.) LED D comes on.

6. Press button A to return to points 1-16.  
LED A comes on.



CONTINUED . . .

# MAC OPERATION

## CONTROL POINT OPERATION (CONTINUED)

**46022-12  
Multi-Alarm  
Combiner**

DANTELL

### STEP 5 Control Point Selection

1. All alarm LEDs on to show Control Mode.
2. Select control point by pressing button for desired point, see example button #6.
3. LED flashes to show selected status, see example LED #6.

**46022-12  
Multi-Alarm  
Combiner**

DANTELL

### STEP 6 Control Point Selection

1. Press button for selected point a second.
2. LED comes on to show point operated.

(With TBOS, point will return to normal after a short delay. CPM points should be optioned for momentary operation. Latched points can be set from the MAC but cannot be reset.)

# MAC OPERATION

## ACKNOWLEDGE ALL (ACK ALL)

D  
A  
N  
T  
E  
L

**46022-12  
Multi-Alarm  
Combiner**

RX DATA  
46022-12

**STEP 1  
Return to Default Mode**

1. Press A & C to return to Default Mode.
  
2. D LED flashes to show Default Mode.

D  
A  
N  
T  
E  
L

**46022-12  
Multi-Alarm  
Combiner**

RX DATA  
46022-12

**STEP 2  
Select Display Group**

1. Press A to select displays 1-16.  
Press B to select displays 17-32.
  
2. A LED on if displays 1-16 selected.
  
3. B LED on if displays 17-32 selected.

CONTINUED . . .

# MAC OPERATION

## ACKNOWLEDGE ALL (ACK ALL) (CONTINUED)

**46022-12  
Multi-Alarm  
Combiner**

DANTELE

RX DATA

46022-12

### STEP 3 Acknowledge All

1. Press C & D buttons together to acknowledge all alarms within the selected group of displays.

## COMMUNICATIONS TEST

**46022-12  
Multi-Alarm  
Combiner**

DANTELE

RX DATA

46022-12

### STEP 1 Start from Default mode.

### STEP 2 Use button D to set Comm Test Mode.

1. Press button D to test communications.
2. D LED comes on to show Comm Test Mode.
3. Odd numbered Alarm LEDs blink to show data transmitted at each port.  
(LED 1 corresponds to port 1, LED 3 corresponds to port 2, etc.)
4. Even numbered Alarm LEDs blink to show data received at each port.  
(LED 4 is port 2, etc.)

# MAC OPERATION

## LAMP TEST

### Step 1

Start from Default Mode.

### Step 2

Use buttons B & D to set Lamp Test Mode.

### Step 3

All LEDs should light.

## CONFIGURATION CONTROL

**46022-12  
Multi-Alarm  
Combiner**

**STEP 1**  
Start from Default mode.

**STEP 2**  
Configuration mode selection.

1. Press buttons A & D to select configure mode.
2. LED's A & D come on.

**Note:** Entire system will now be reconfigured unless Steps 3 - 5 are performed.

**46022-12**

CONTINUED . . .

# MAC OPERATION

## CONFIGURATION CONTROL (CONTINUED)

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**STEP 3  
Group selection.**

1. Press A to select 1 - 16 or if using MAC -22.  
Press B to select 17 - 32.
2. A & D LED's on if ports 1 - 16 selected.  
B & D LED's on if ports 17 - 32 selected.

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Combiner**

**STEP 4**

1. Press button for port to be configured.  
(Press 1 on MAC -22)
2. Odd numbered Alarm LED's blink to show data transmitted at the selected port.  
(LED 1 corresponds to port 1, LED 3 corresponds to port 2, LED 5 to port 3, etc.)
3. Even numbered Alarm LED's blink to show data received at the selected port.  
(LED 2 corresponds to port 1, LED 4 corresponds to port 2, LED 6 to port 3, etc.)

**NOTE:** If default mode not selected (step 5), the system will be locked on the selected port for configuration only. No status reports will be received for any other ports.

LED's A & D on show ports 1 - 16 selected.  
LED's B & D show ports 17 - 32 selected.

CONTINUED . . .

# MAC OPERATION

## CONFIGURATION CONTROL (CONTINUED)

<b>D A N T E L</b>	<b>46022-12 Multi-Alarm Combiner</b>		
	 		
	 		
	 		
	 		
	 		
	 		
	 		
	 		
	 		
	 		
			
	<b>46022-12</b> 		

**STEP 5**

1. LED's stop blinking.  
Means configuration is complete. Additional ports may now be selected for configuration.
2. Press A & C to return to Default Mode.

**NOTE:**  
On MAC -22 the LED's will not stop blinking unless a full complement of 128 MAT's and 128 CPM's is present and working.

3. D LED flashes to show Default Mode.

# PRINTER SYNTAX

This section contains the commands for MAP printer port operation. This syntax establishes the coding for the printer port to interface to a standard ASCII (VT-100) terminal or a personal computer with terminal emulation software. The printer syntax allows communication with the alarm and control system to find out the status of alarms and to operate control points.

## GETTING STARTED

The terminal must be set for the same data rate (baud) as those set on Switch S3 (See *Switch Tables*).

- ◆ Make these settings before connecting the terminal to the MAP.
- ◆ If the system is operating properly, a prompt > appears on the screen. The MAP is ready to accept command inputs.
- ◆ If the terminal and MAP do not communicate, remove power from the MAP. Then check the settings at the terminal and also at the MAP.

Type UNLOCK and press Enter.

This command unlocks the MAP so commands can be entered. If there is a password in the MAP, type the password to unlock the MAP. See the Password command in this section for instructions on setting up a password.

## ENTERING COMMANDS

Press Enter after typing the command to execute that command.

Some standard ASCII terminals (or computers operating as terminals) have function keys you can program to do frequently used keystroke sequences in a single keystroke. Refer to your terminal's user manual for instructions on how to program the function keys.

## ERROR MESSAGES

Two error messages may appear on the terminal screen:

MESSAGE	MEANING	ACTION
COMMAND ERROR	Command not understood	Enter the command correctly
SYNTAX ERROR	Entry does not follow the rules of syntax	Enter the command correctly

# PRINTER SYNTAX

## 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 the MAP.)	Hold down the CTRL key and press D. (CTRL-D)
Backspace	Backspace or CTRL-H
Recall Previous Line (Use to edit command line after receiving an error message.)	CTRL-K
Recall Current Line (Use when interrupted by a system status message.)	CTRL-R
Pause Output (Interrupt data flow from MAP.)	CTRL-S (CTRL-Q to restart)
Re-execute Last Command	CTRL-X

## ABBREVIATIONS AND SUBSTITUTIONS

Several of the syntax commands in the following section can be abbreviated or replaced by other commands. Here is a list of alternate commands that will work in place of the regular commands:

REGULAR COMMAND	ABBREVIATION OR SUBSTITUTION
BELL	BEEP or DING
DISPLAY	DISP or D
POINT	PNT or P
QUERY	Q or ?
STATUS	STAT
SWITCHES	DIPS
LINEFEED	LF
SYSTEM	SYS

# PRINTER SYNTAX

## SYNTAX COMMANDS

---

### ACKNOWLEDGE

---

**Purpose:**

Acknowledges all alarms at the MAT(s), MAP and MAC, and control points at the MAP.

---

**Format:**

ACK ALL  
ACK [MAT number]  
ACK [CPM number]  
ACK [TBOS number]  
[MAT number] ACK

---

### BELL

---

**Purpose:**

Reports if the terminal bell is on or off. Turns bell on or off. When bell is on, it sounds 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 one listed point at the specified CPM.

---

**Format:**

CPM [number] ACT (or ACTIVATE) [points]

CONTINUED . . .

# PRINTER SYNTAX

---

**Remarks:**

The point operates during the time period set by option switches or programming. (See OPTION and CPM POINT TIME PERIOD commands.)

---

**CPM POINT CLEAR**

---

**Purpose:**

Resets one listed point at the specified CPM.

---

**Format:**

CPM [number] CLR (or CLEAR) [point number]

---

**CPM POINT DIRECT OPERATE**

---

**Purpose:**

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

---

**Format:**

CPM [number] DLON [point numbers]

CPM [number] DLOF [point numbers]

CPM [number] DMON [point numbers]

CPM [number] DMOF [point numbers]

---

**Remarks:**

This group of commands overrides the CPM(s) option switch settings (momentary/latching).

List point numbers individually with a comma between them, as a group with a hyphen between them, or use the word ALL.

The DLON command latches CPM points on.

The DLOF command resets the latched points.

The DMON command operates CPM points for three seconds.

The DMOF command turns latched CPM points off for three seconds, then back on.

CONTINUED . . .

# PRINTER SYNTAX

## Example:

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

```
>CPM DEVICE 1 POINT 1 OPERATE OCT 22, 1996 10:20:03  
CPM DEVICE 1 POINT 3 OPERATE OCT 22, 1996 10:20:04  
CPM DEVICE 1 POINT 5 OPERATE OCT 22, 1996 10:20:04
```

## CPM POINT RELEASE

### Purpose:

Resets CPM specified points.

### Format:

CPM [point number] [RLS point number(s)]

### Remarks:

List point numbers individually with a comma between them, as a group with a hyphen between them, or use the word ALL.

## CPM POINT SELECT OPERATE

### Purpose:

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

### Format:

CPM [number] SLON [point number(s)]

CPM [number] SLOF [point number(s)]

CPM [number] SMON [point number(s)]

CPM [number] SMOF [point number(s)]

### Remarks:

This group of commands overrides the CPM(s) option switch settings (momentary/latching).

List point numbers individually with a comma between them, as a group with a hyphen between them, or use the word ALL.

The SLON command latches CPM points on.

The SLOF command resets the latched points.

The SMON command operates CPM points for three seconds.

CONTINUED . . .

# PRINTER SYNTAX

The SMOF command turns latched CPM points off for three seconds, then back on.

## Example:

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

```
>CPM 1 EXE
```

```
>CPM DEVICE 1 POINT 1 OPERATE OCT 22, 1996 10:20:03
CPM DEVICE 1 POINT 3 OPERATE OCT 22, 1996 10:20:04
CPM DEVICE 1 POINT 5 OPERATE OCT 22, 1996 10:20:04
```

## CPM POINT SET

### Purpose:

Operates CPM points.

### Format:

CPM [number] SET [point number(s)]

### Remarks:

List point numbers individually with a comma between them, as a group with a hyphen between them, or use the word ALL.

Points operate during the time periods set by the options switches or programming. (See OPTION and CPM POINT TIME PERIOD commands).

## CPM POINT TIME PERIOD

### Purpose:

Sets the time period for momentary operation of CPM points.

### Format:

CPM [number] LONG [time]

CPM [number] SHORT [time]

CPM [number] PER (or PERIOD) [point number] [time]

### Remarks:

Time is in tenths of a second, from 0.1 to 25.5 seconds. Specify the time from 1-255 tenths of a second.

CONTINUED . . .

# PRINTER SYNTAX

The CPM LONG command sets the time period for extended (E) operation CPM control points.

The CPM SHORT command sets the time period for short (S) operation CPM control points.

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

Operate the control points using the CPM [number] SET [point number(s)] command.

See the OPTION command for more information.

---

**Note:**

When setting long or short time periods, the CPM options return to the default settings. You must reset CPM options (see OPTION command) before you operate the control points if you want settings other than the default.

---

**Example:**

```
>CPM 1 LONG 200
```

If CPM points default to something other than extended (E) operation, you must reset the options:

---

```
>CPM 1 OPT E E E E E E E E E E E S S S S
```

---

---

**DATE**

---

**Purpose:**

Displays or sets the system date.

---

**Format:**

DATE

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

---

**Remarks:**

The command DATE displays the system date.

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

If the TIME command is set for TIME OFF, the date will not change.

# PRINTER SYNTAX

---

## DCM

---

### Purpose:

Shows if the MAP's DCM switch (S3-8) is on or off.

---

## DEFAULT

---

### Purpose:

Restores CPM and MAT options to their default (switch) settings. This command does not apply to TBOS.

---

### Format:

CPM [number] DEF

MAT [number] DEF

---

### Remarks:

The command CPM [Number] DEF changes the S, E and L time options on the CPM relays.

The command MAT [number] DEF changes the MAT A, B, C and D alarm level option settings. The command does not change the MAP alarm level option settings.

---

## LINEFEED

---

### Purpose:

Reports if the linefeed is 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.

# PRINTER SYNTAX

---

## Lock

---

### Purpose:

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

---

### Format:

LOCK

---

## Log

---

### Purpose:

Reports the logging feature as on or off. Turns the logging feature on or off.

---

### Format:

LOG  
LOG ON  
LOG OFF

---

### Remarks:

The LOG command reports the logging feature as on or off.

The LOG ON command turns logging on. Whenever there is a MAT alarm point status change, or a CPM control point status change, the system issues a report. The system also issues a report when there is a device failure.

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

Example of a change of status report:

---

ALM	DISP	1	POINT	1	FAIL	ALM	LVL	A	OCT	22,	1995	10:22:00
CTL	DISP	1	POINT	1	NORM	ALM	LVL	D	OCT	22,	1995	15:36:09

---

# PRINTER SYNTAX

---

## MODE

---

### Purpose:

Shows if the system is locked or unlocked.

---

### Format:

MODE

---

## OFF, OFFLINE, ON

---

### Purpose:

Puts a device or devices in or out of service.

---

### Format:

MAT [number] ON [data rate]

CPM [number] ON [data rate]

TBOS [number] ON [data rate]

MAT [number] OFF

CPM [number] OFF

TBOS [number] OFF

---

### Remarks:

The ON command followed by the data rate puts a device in service that interrogates at the defined baud rate. Up to 32 remote device channels (ports) can communicate with the data port through 46022 Multiple Alarm Combiners. All devices on any one channel must be set to the same data rate.

The OFF command puts a device out of service. When the device is out of service, the MAP does not interrogate the device, but lists the device as OFF in system status reports.

The OFFLINE command changes a MAT or CPM status to “not in service.” The MAP does not interrogate the device and does not list the device in system status reports. The device returns to service with the ON command or at the next system reconfiguration, which occurs 10 minutes after completion of the last configuration.

# PRINTER SYNTAX

---

## OPTION, PUT, SHOW

---

### Purpose:

Displays or sets CPM, MAT and MAP options.

---

### Format:

CPM [number] OPT [option letters]

MAT [number] OPT [option letters]

MAT [number] SHW (or SHOW)

MAT [number] PUT

---

### Remarks:

The OPT command displays the MAT alarm level option settings and CPM control point options. The MAP memory maintains the listed settings and the settings are not necessarily the same as the device option settings.

MAT alarm priority level options are A, B, C, and D. CPM control point options are L (latched points), S (short momentary time period (300 milliseconds)), E (extended momentary time period (3 seconds), and M (unique time period; see the CPM POINT TIME PERIOD command). Enter options for all 16 points and put spaces between the letters.

The MAT SHOW command displays the MAT alarm level options.

The MAT PUT command downloads the MAP options to the MAT(s).

---

### Example:

---

```
>CPM 1 OPT  
CPM1 OPTIONS  S E L L S E L L S E L L S E L L
```

---

---

## PASSWORD

---

### Purpose:

Sets password for system security.

---

### Format:

PASSWORD

CONTINUED . . .

# PRINTER SYNTAX

---

**Remarks:**

When you type PASSWORD, the screen prompts for a new password. If an old password exists, you must enter the old password before setting a new one.

As you type the password, the actual entry does not appear on the screen - a row of asterisks displays instead of the word. This feature prevents an unauthorized person from seeing the password on the screen and adds to the security of the password. Maximum length is seven characters.

Some commands are password protected. They include control point operation commands and the following:

ACK ALL  
CLEAR ALARMS  
DCP/DCPF MODE  
LOG ON  
LOG OFF  
PASSWORD  
RESET  
TIME ON

---

**Example:**

---

```
>PASSWORD  
New Password:  ****
```

---

---

**QUERY**

---

**Purpose:**

Provides information on the configuration of the master and printer (terminal) ports.

---

**Format:**

QUERY

CONTINUED . . .

# PRINTER SYNTAX

## Example:

```
>QUERY
Remote Port - Data Acquisition
TBOS System Size = 7 Displays
No. of Chan/Group = 2
No. of Disp Group = 1
No. of Disp Group 2 = 1
No. of Disp Group 3 = 1
No. of Disp Group 4 = 1
No. of Grps @ 1200 baud = 0
DCM is ON
Cpm Echo is OFF

Terminal Port: Printer III
Terminal Port baud = 9600

Master Port: DCP/S Responder
Master Port Baud = 1200
Esys Mode is ON
DCP/S Map Id = 1
```

## RESET

### Purpose:

Resets the system.

### Format:

RESET

### Remarks:

The command RESET tells the MAP to restart operation. It locks the printer port. However, it does not erase the system configuration downloaded into the MAP. This command performs the same function as pushing the reset button on the front panel of the MAP.

CONTINUED . . .

# PRINTER SYNTAX

---

## REVISION

---

### Purpose:

Gives the revision level of MAT(s), CPM(s) or the MAP.

---

### Format:

MAT [number] REV  
CPM [number] REV  
REVLIST

#### NOTE:

Time stamps for alarms, control point operations, and status reports are approximate, based on a derived clock. If more accurate time is required for your application, use the TIME command for resetting the system time periodically.

---

## STATUS

---

### Purpose:

Produces a report on the status of all devices in the system.

---

### Format:

STATUS  
CPM [number] STATUS  
MAT [number] STATUS  
TBOS [number] STATUS

---

### Remarks:

If Smart MACs are connected to the MAP, the STATUS command gives the status of the Smart MACs themselves, not the status of the devices connected to the Smart MACs.

---

## SWITCHES

---

### Purpose:

Gives listing of MAP switch settings.

---

### Format:

SWITCHES

---

### Example:

In this example, D = DOWN and U = UP.

---

```
>SWITCHES  
DIP 1) DDDDDDDD 2) DDDDUDD 3) DDDDDDDD 4) DDDDDDDD
```

---



# PRINTER SYNTAX

See the ACKNOWLEDGE command to acknowledge alarm and control points.

---

## TBOS POINT SET

---

**Purpose:**

Operates TBOS control points.

---

**Format:**

TBOS [display number] SET [point number(s)]

---

**Remarks:**

TBOS control points automatically reset.

Enter the full 64-point display number. You cannot enter a character (an 8-point portion of a display, for example, 5.1).

List point numbers (1-64) individually with a comma between them, as a group with a hyphen between them, or use the word ALL.

**NOTE:**

Time stamps for alarms, control point operations, and status reports are approximate, based on a derived clock. If more accurate time is required for your application, use the TIME command for resetting the system time periodically.

---

## TIME

---

**Purpose:**

Displays or sets system time.

---

**Format:**

TIME  
TIME hh:mm:ss  
TIME ON  
TIME OFF

---

**Remarks:**

The command TIME displays the current time.

To set the time, type TIME and then the hour-minute-second time in 24-hour format.

# PRINTER SYNTAX

TIME ON turns on the time and date functions. TIME OFF turns off the time and date functions and the time and date do not change.

---

## UNLOCK

---

### Purpose:

Unlocks the MAP so it will accept password-protected commands (see PASSWORD command).

---

### Format:

UNLOCK

---

### Remarks:

If a password has been set, you must enter it in order to unlock the system.

---

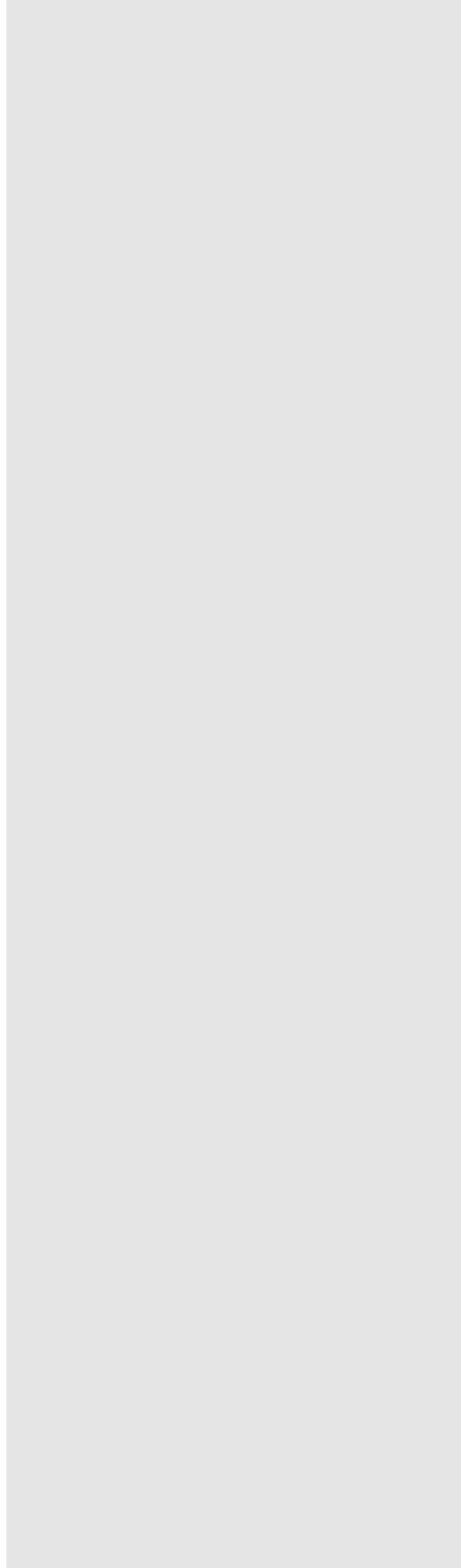
### Example:

---

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

---

# NOTES



# 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**

