46020-40
MULTIPLE ALARM PROCESSOR
WITH 46640-01 FIRMWARE

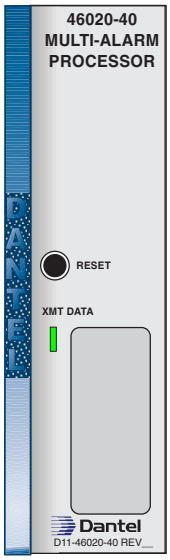


Table of Contents

About this Practice:

This practice has been reissued to:

- Remove 46640-91 firmware reference from ***Ordering Information*** section.
- Change C11-46020-40 to D11-46020-40 in ***Ordering Information*** section.

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

UPDATED

Issue date: March 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.**

UPDATED

OPTION NUMBER	FEATURES
D11-46020-40	Multiple Alarm Processor equipped with B17-46640-01 Firmware

GENERAL DESCRIPTION

The 46020-40 Multiple Alarm Processor (MAP) is part of a Dantel 460 Alarm and Control System. It is a 46020 MAP equipped with 46640-01 firmware. This chapter describes the features of the MAP and firmware, and how they work as part of a complete system.

MAP PORTS

The firmware allows a MAP to operate in several different applications of a 460 Alarm and Control System. The MAP provides three different data interface points, and all of them are affected by the firmware. Here is a brief description of each of the ports:

Master Port

- Reports alarm data to an alarm center and responds to control point commands.

  The alarm center may be a personal computer or an alarm system master. For example, it could be an E-System master the MAP communicates with through a 46033 E-System Adapter.

- May also connect to another device as an intermediary point in reporting data to an alarm center.

  This device could be a 46062 General Purpose Processor or another MAP (using DCP, TBOS or DCPF protocol).

- Uses TABS protocol to communicate with network elements and AT&T remotes that use TABS protocol for alarm reporting.

GENERAL DESCRIPTION

NOTE:

In order to work, the MAP must be configured. Configuration defines how the MAP will function, such as what alarms it will poll and what control points it will operate. The Printer Syntax in this manual cannot be used for configuring the system.
To configure, use T/Shell software with the MAP 40 Editor Module and an IBM-compatible computer. Refer to the software manual for complete instructions.

NOTE:

The 46020-40 MAP's Data Port is usually factory-wired to one or more 46023-12 Smart Multiple Alarm Combiners (SMACs). The SMAC serves to expand the MAP's single TTL Data Port out to multiple RS-422 Data Ports. In this situation, the MAP's port which communicates with the SMAC is referred to as the "MAP Port" - the "Data Port" having been relocated to the outputs of the SMAC. Refer to Figs. 2 & 3.

Printer Port

- Connects to a standard ASCII (VT-100) terminal, with or without a serial printer,

or

- Connects to Dantel's 46001 Status Monitor.

  You can use the terminal or status monitor for local alarm reporting. The terminal also can operate controls.

- May also operate as a master port (when configured for TABS, TBOS, DCP, or DCPF protocol).
- Works with PC software to configure MAP memory.

Data Port

- Can interrogate up to 4,096 remote alarm points (64 displays)

and

- Can operate up to 4,096 control points (64 displays). These may be discrete alarm points connected to 46009 or 46010 Multiple Alarm Transmitters (MATs) and control points wired to 46028 or 46029 Control Point Modules (CPMs).

  Can also communicate with alarm and control points through TBOS serial equipment.

  Uses TABS protocol to communicate with network elements and AT&T remotes that use TABS for alarm reporting.

- Can connect to another MAP (using TBOS, DCP, or DCPF protocol) that communicates with the alarm and control points.
- Is called the MAP port when it is connected to a 46023-12 Smart MAC and communicates with DCP or DCPF devices.

TYPICAL SYSTEMS

The following diagrams show examples of how the 46020 MAP is used in typical systems. Fig. 1 shows a basic system and Fig. 2 shows a system with an intermediate MAP.

FIG. 1 - MAP PORTS AND PROTOCOLS

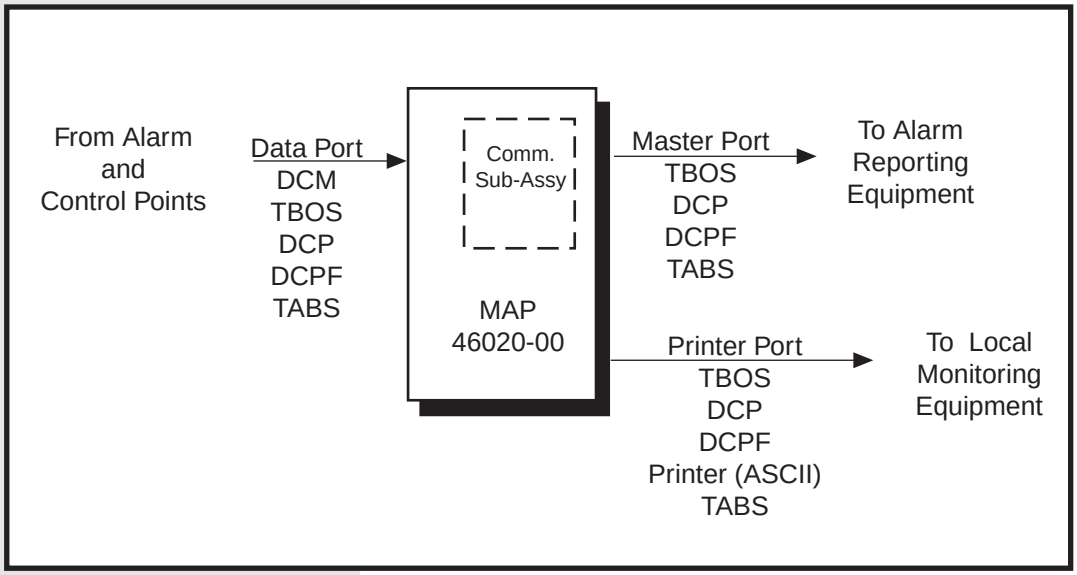


FIG. 2 - EXAMPLE SYSTEM WITH INTERMEDIATE MAP

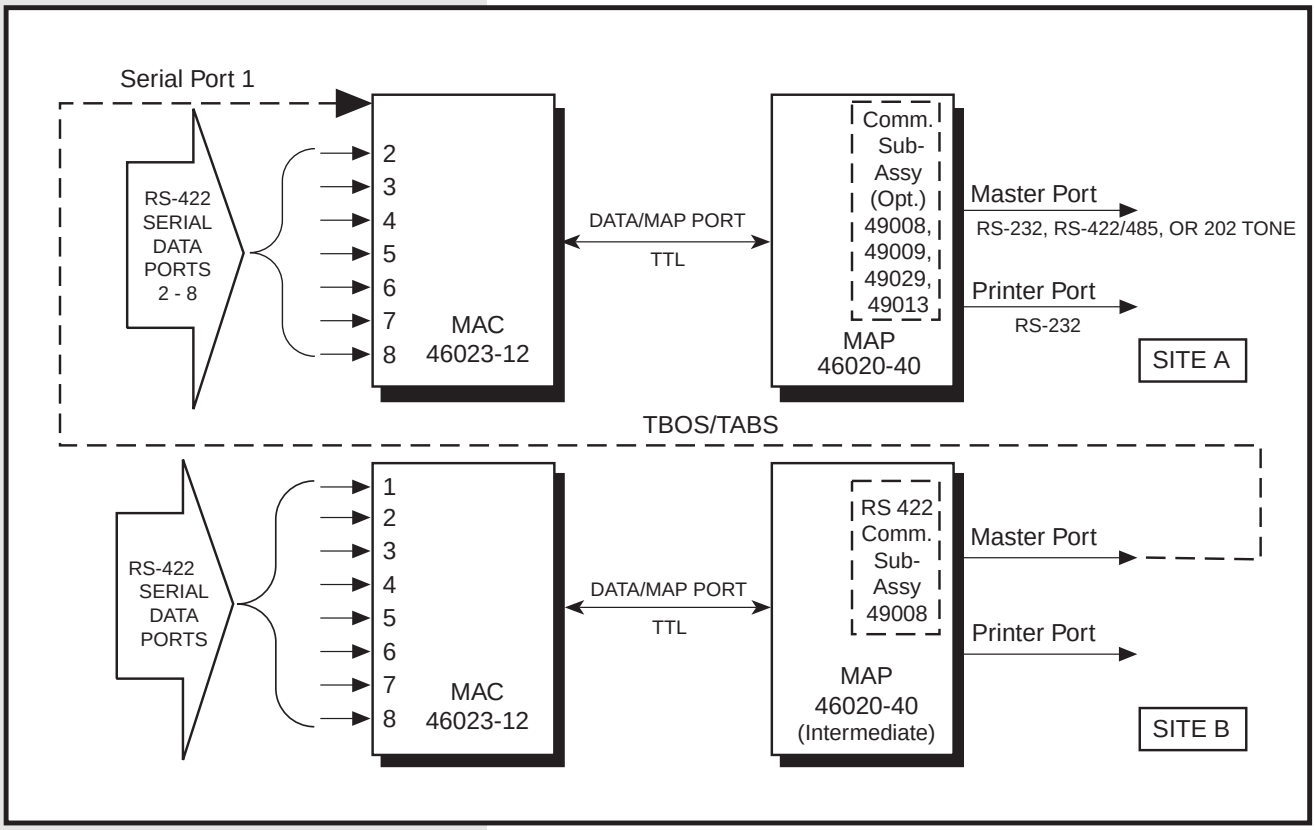
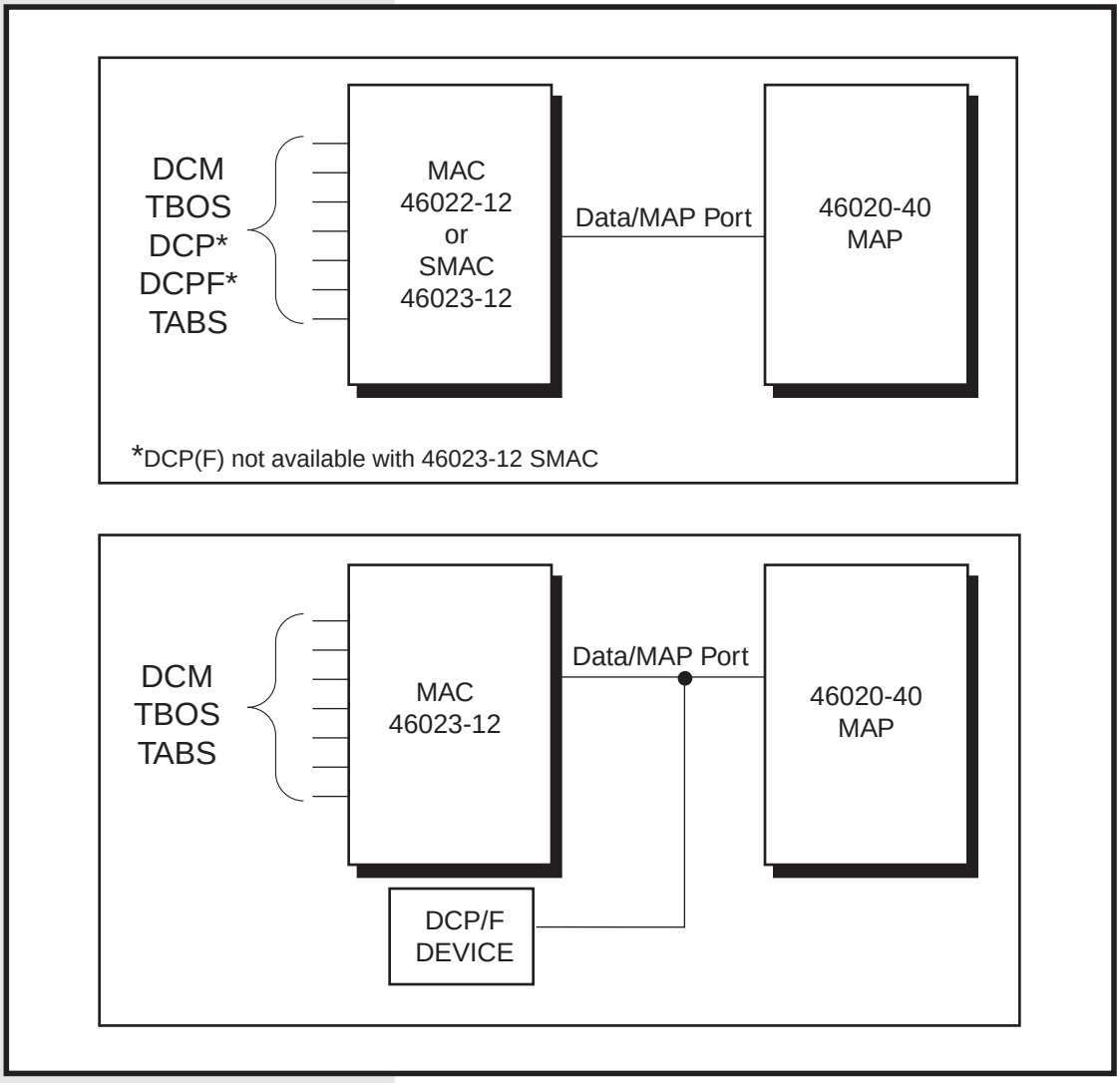


FIG. 3 - DATA PORT CONFIGURATION



DATA CAPACITY

Master and Printer Ports

The MAP can handle 4,096 alarm points (64 displays) and 4,096 controls (64 displays) except when you use TBOS protocol.

When TBOS is used on the master and printer ports, the amount of alarm data the MAP can address is limited. TBOS is limited to eight displays of alarms and controls on the master port and an additional eight displays of alarms and controls on the printer port (a total of 16 displays).

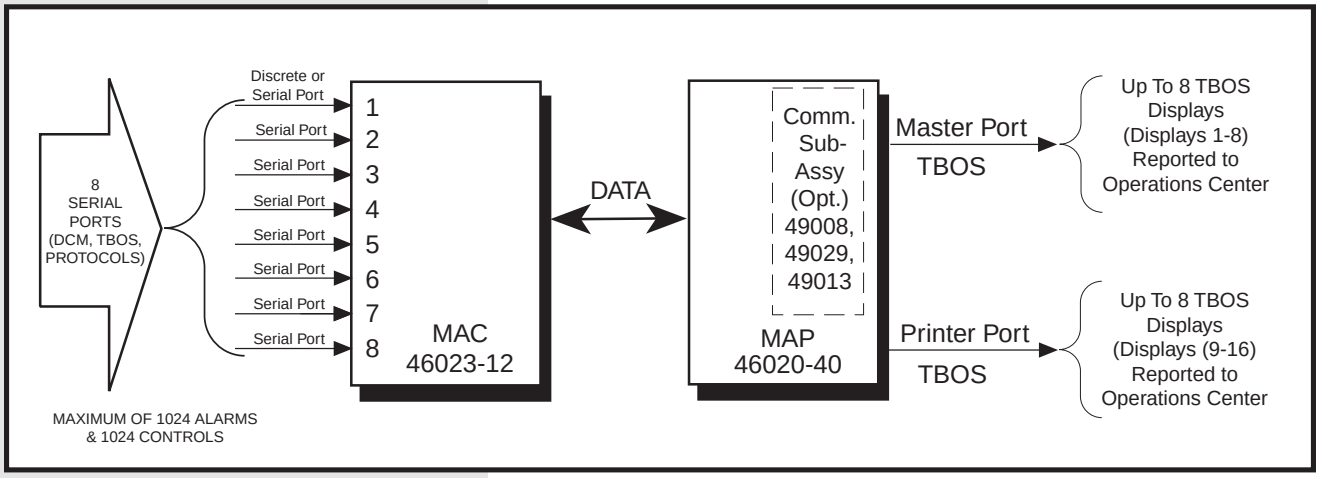
Data Port

With TABS, DCP, or DCPF protocols on the master and/or printer ports, the data port can communicate with up to 4,096 alarm points and 4,096 control points. See Fig. 1 for an illustration of these protocols.

If TBOS is used on the master port, the data port is limited to 512 alarm and 512 control points (eight displays).

If TBOS is used on both master and printer ports, the data port can communicate with up to 1,024 alarm and 1,024 control points. See Fig. 4 for an illustration of TBOS on master and printer ports.

FIG. 4 - TBOS ON THE MASTER AND PRINTER PORTS



PROTOCOLS

There are four communications protocols available for the master port, four for the printer port (plus a printer syntax using ASCII format), and five for the data port. Refer to Fig. 1.

Master and Printer Ports

TABS - This protocol is used to communicate with network elements and AT&T remotes that use this protocol for alarm reporting.

DCP - This protocol is used when the MAP interfaces another MAP, a personal computer, or an external alarm master (such as an E-System master interfaced through an E-System Adapter).

DCPF - This is a modified DCP protocol with improved error detection. It is used when the MAP interfaces another MAP, a General Purpose Processor, or a Status Monitor.

CONTINUED . . .

TBOS - This protocol is used when the MAP interfaces a TBOS serial port, such as on an E2A remote or on the data port of another MAP (refer to Fig. 2).

Printer - This syntax establishes the coding for the printer port to interface a standard ASCII (VT-100) terminal. The Printer Syntax chapter contains the user commands for operating the terminal.

Data Port

TABS - This protocol is used to communicate with network elements and AT&T remotes that use this protocol for alarm reporting.

NOTE:
If you use a Smart MAC with the MAP, only the DCM, TABS, and TBOS protocols are available on the data port.

TBOS - This allows the MAP to communicate with TBOS serial equipment, such as another MAP as shown in Fig. 2.

DCM - This protocol communicates with discrete points only. The MAP interrogates MATs (Multiple Alarm Transmitters) for alarm data and operates control points on CPMs (Control Point Modules).

DCP - This protocol communicates with another MAP using DCP protocol (similar to the TBOS example shown in Fig. 2).

DCPF - This protocol communicates with another MAP using DCPF protocol (similar to the example shown in 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. When TBOS or TABS is used on the master port, the most common is a 49008 subassembly providing an RS-422 interface. Other subassemblies are available for special applications.

The most common protocols are DCP or DCPF. The subassembly is usually a 49009 or 49029 that provides an RS-232 interface.

Printer Port

The printer port has a built-in RS-232 interface. If you require a different interface on the printer port, you can add a Dantel 46035 Converter Module with the appropriate subassembly between the MAP and the other equipment.

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, you must connect the data port to a

NOTE:
The 46023-12 Smart MAC cannot be used at the same time with the 46022-12 or -20 MACs.

46035 Converter Module, 46022 Multiple Alarm Combiner (MAC), or 46023 Smart MAC for conversion to the appropriate data communications interface.

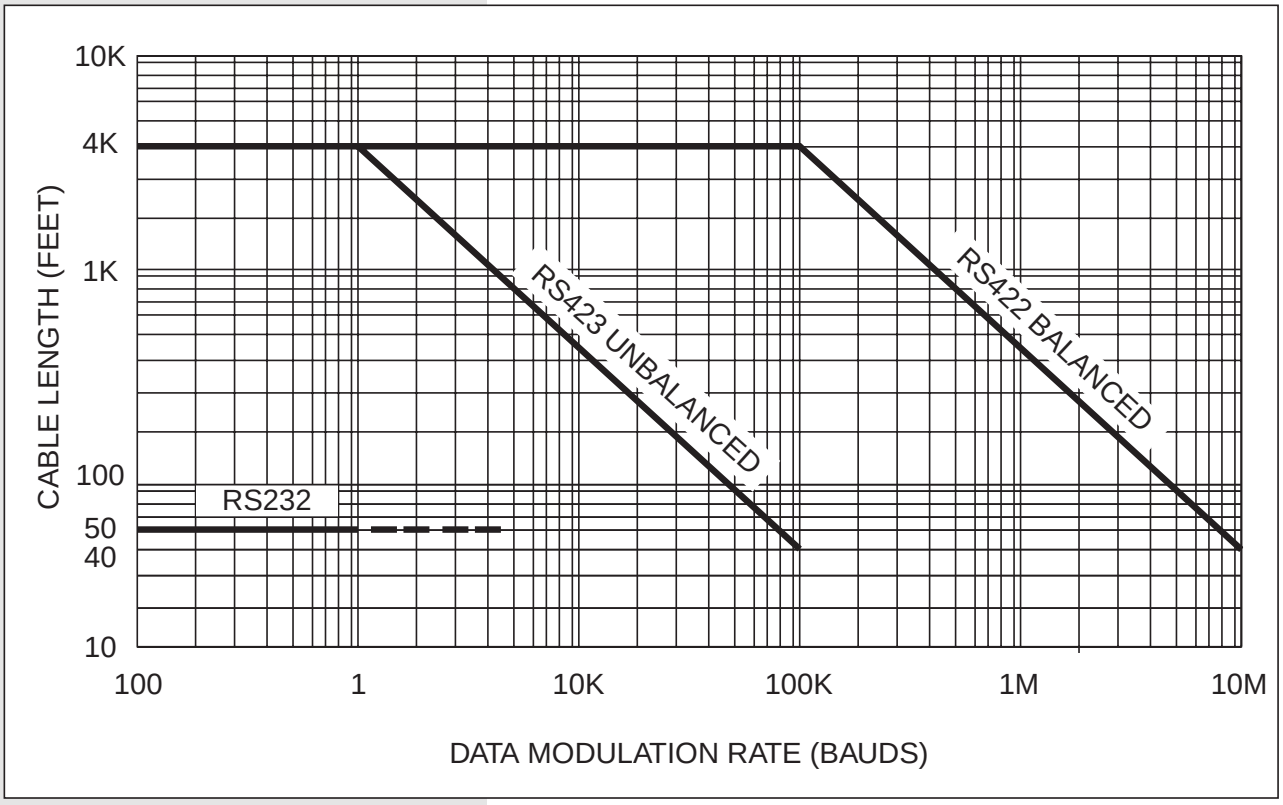
A 46022-12 MAC or a 46023-12 Smart MAC has eight communications channels or ports. A 46022-20 MAC has one channel. The data port supports multiple MACs.

In communicating with alarm and control points, the data port can use DCM, DCP, DCPF, TABS, or TBOS protocols 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, DCP could be used on the master port, PRINTER syntax on the printer port, and DCM and TBOS on the data port.

Transmission Distances

Fig. 5 shows the maximum cable lengths for data transmission interfaces.

FIG. 5 - MAXIMUM CABLE LENGTHS FOR DATA TRANSMISSION INTERFACES



BATTERY BACKUP

The MAP has a battery backup to preserve the system configuration information that has been placed in memory. You can set switches on the MAP to retain the information in memory, even if the power to the MAP is interrupted. If you do not set the switches to retain the memory's contents, configuration information is erased when the power is restored. To learn how to set these switches, refer to the ***Switch Settings*** chapter.

RESET

On the front panel of the MAP, there is a recessed reset button. When you push this button, it executes a complete, or hard, reset. The effect is the same as removing power from the MAP. When power is restored later, the information in the MAP's memory is saved ... ***only*** if you have set the switches to retain it (see Battery Backup paragraph). If you have not set the switches to save the memory, it will be erased.

The MAP also has a protective ("watchdog") circuit. If the software encounters a problem and is unable to refresh the protective circuit, a complete reset automatically occurs after 1.2 seconds.

DERIVED DISPLAY

The 46640-01 firmware supports a derived display, in which you can set alarm points based on the condition of actual alarms. The derived display determines when to set an alarm based on a series of and/or conditions. For example, you can set an alarm in the derived display if Alarm Point 1 ***and*** Alarm Point 2 ***or*** Alarm Point 3 in Display 1 are showing failures.

EXTENDED DEVICE FAILURE

The extended device failure feature allows the firmware to set an alarm bit to some location other than the standard ones. If you have a special need, you can reassign the communications failure bit to another alarm bit on the same display or even on a different display.

DIP SWITCHES

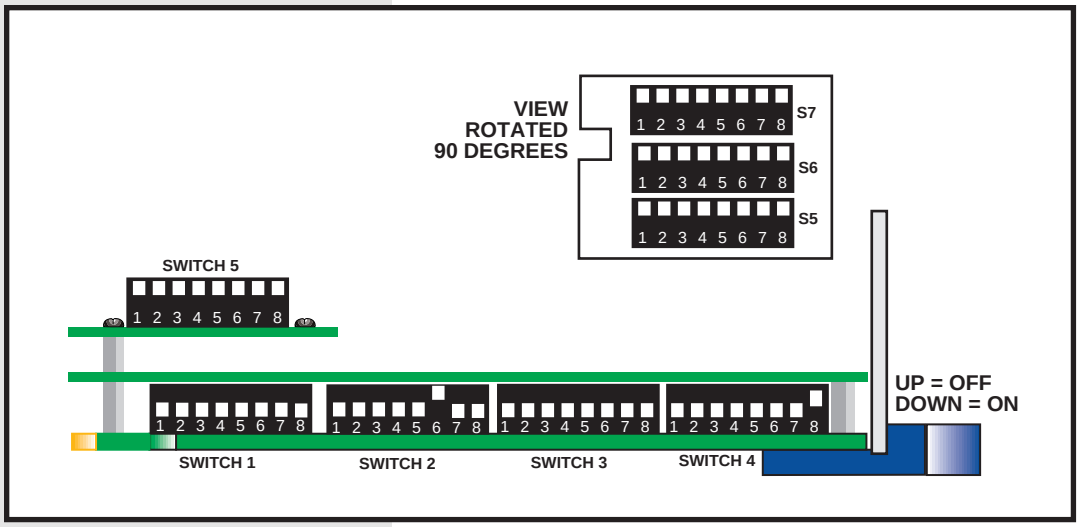
There are seven banks of DIP switches on the MAP. Each bank has eight levers, and the banks are numbered S1 through S7.

S1 through S6 are used to set the default settings, and S7 is not used.

Refer to Fig. 6 for a DIP switch location diagram.

GENERAL DESCRIPTION

FIG. 6 - 46020 MAP VIEWED FROM THE TOP



CIRCUIT DESCRIPTION

Fig. 7 shows the functional schematic of a 46020 MAP equipped with 46640-01 Firmware. The circuit consists of the following:

- A microprocessor with EPROM (Erasable Programmable Read-Only Memory).
- Three ports:

  Master port
  Printer port
  Data port

- Three parallel input/output interfaces (must be connected to other modules in the same shelf as the MAP):

  Interface for Dantel's 46022-XX or 46023-12 Multiple Alarm Combiners (MACs).

  Interface for Dantel's 46019 Summary Alarm Module (SAM).

  An unassigned auxiliary input/output.

- Regulated power supply.

Binary data goes to and from the microprocessor by way of the system's input/output. It is applied to each port through a series of protectively buffered ACIAs (Asynchronous Communications Interface Adapters).

Master port

Communicates with an external personal computer or other alarm reporting equipment through a plug-in subassembly.

Printer port

Communicates with an external standard ASCII (VT-100) terminal, personal computer, or other alarm reporting equipment through an on-board RS-232 interface.

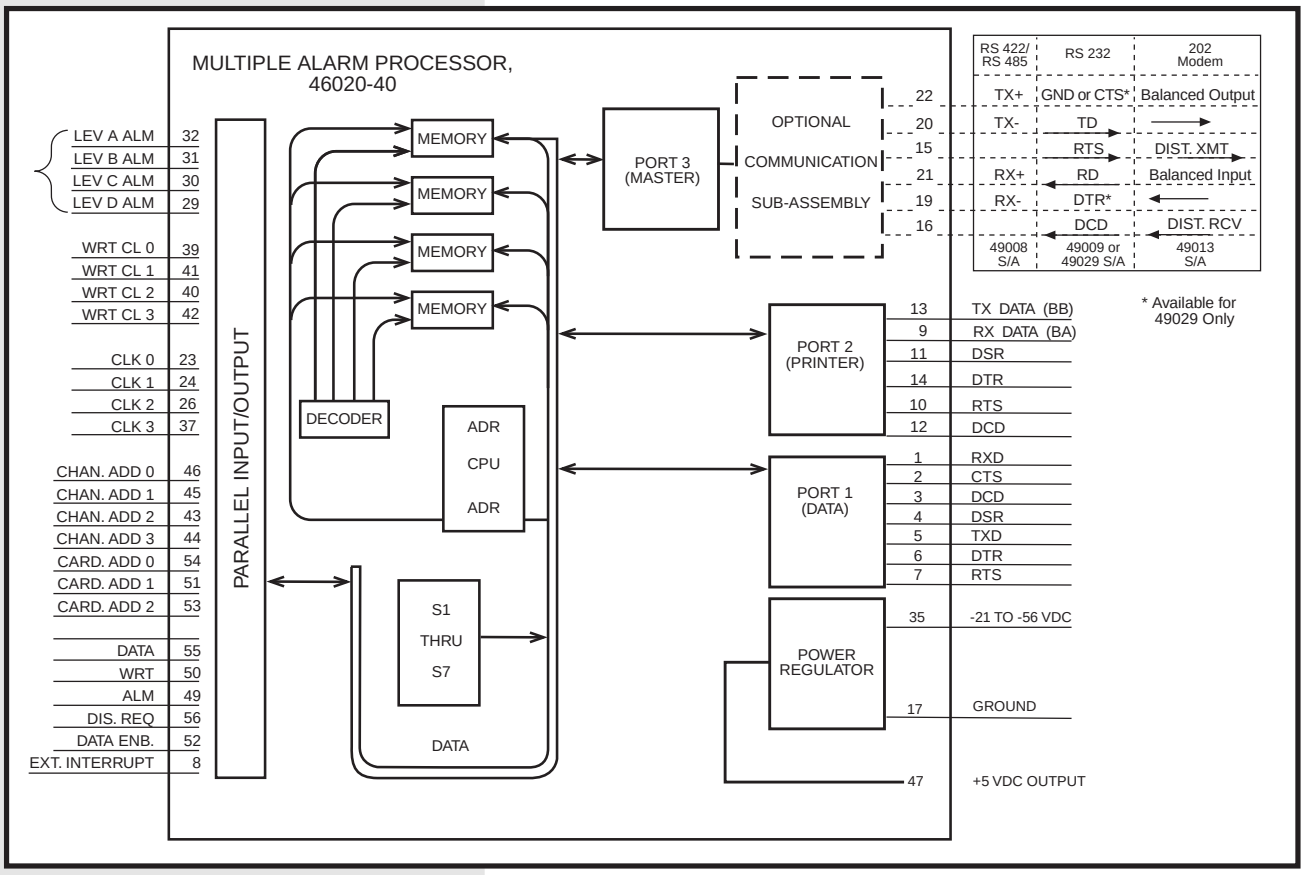
Data port

Communicates either directly or through other Dantel interface modules with remote alarm and control devices using seven TTL buses designated TXD, RXD, RTS, CTS, DCD, DSR, and DTR.

By setting switches, you can determine the default configurations of the ports. These configurations affect the way the MAP functions when you begin operation.

The on-board regulated power supply uses -21 to -56 VDC input power to provide +5 and ± 12 VDC regulated power for the module's circuits. The power supply also provides operating power for the master port communications subassembly.

FIG. 7 - FUNCTIONAL SCHEMATIC



APPLICATION INFORMATION

Fig. 8 shows a TBOS and discrete alarms interfaced to an E- system using several 46020-40 MAPs. Fig. 9 shows a system using a 46020-40 MAP to report discrete points.

TBOS (SERIAL PORTS) AND DISCRETE POINTS INTERFACED TO AN E-SYSTEM

NOTE:
You can configure each MAP with one or two addresses. Therefore, in Fig. 8, MAPs 1 and 2 may be the same physical module and MAPs 3 and 4 may be the same physical module.

Refer to Fig. 8. An E-System Adapter can interface up to four MAP addresses using DCP protocol between the master port of the MAP(s) and the E-System Adapter. The data port of each MAP is interfaced to remote sites through a MAC or 46035 Converter Module. The #1 and #3 MAPs are communicating through one port of the MAC-12s using TBOS protocol to the master port of a MAP at the remote sites.

At the remote sites, each MAP is communicating through Port #1 of the MAC-12s using DCM protocol to discrete alarm and control points. You can connect Ports 2-8 to TBOS serial alarm and control equipment. MAP #4 is communicating through a MAC-20 with discrete alarm and control points using DCM protocol.

DISCRETE POINTS INTERFACED TO ALARM AND CONTROL SYSTEM

Refer to Fig. 9. This example application uses one MAP to process data between an alarm system master or personal computer, a printer or standard ASCII (VT-100) terminal, and remote discrete alarm and control points. The 46022-20 MAC is equipped with a data communications subassembly to interface the remote MATs and CPMs.

OTHER MODULES

Refer to Fig. 9. The 46019 Summary Alarm Module (SAM) controls audible and/or visual alarm devices. This module provides:

- ♦ TTL (Transistor-Transistor Logic) and/or optically coupled inputs,
- ♦ Latching or following mode,
- ♦ Selectable time-out for quadruple alarm levels.

You can use the 46018 Audible Alarm Module with the 46019 to provide the audible signal. For more information, refer to the manuals for these devices.

FIG. 8 - TBOS AND DISCRETE ALARMS INTERFACED TO AN E-SYSTEM ADAPTER

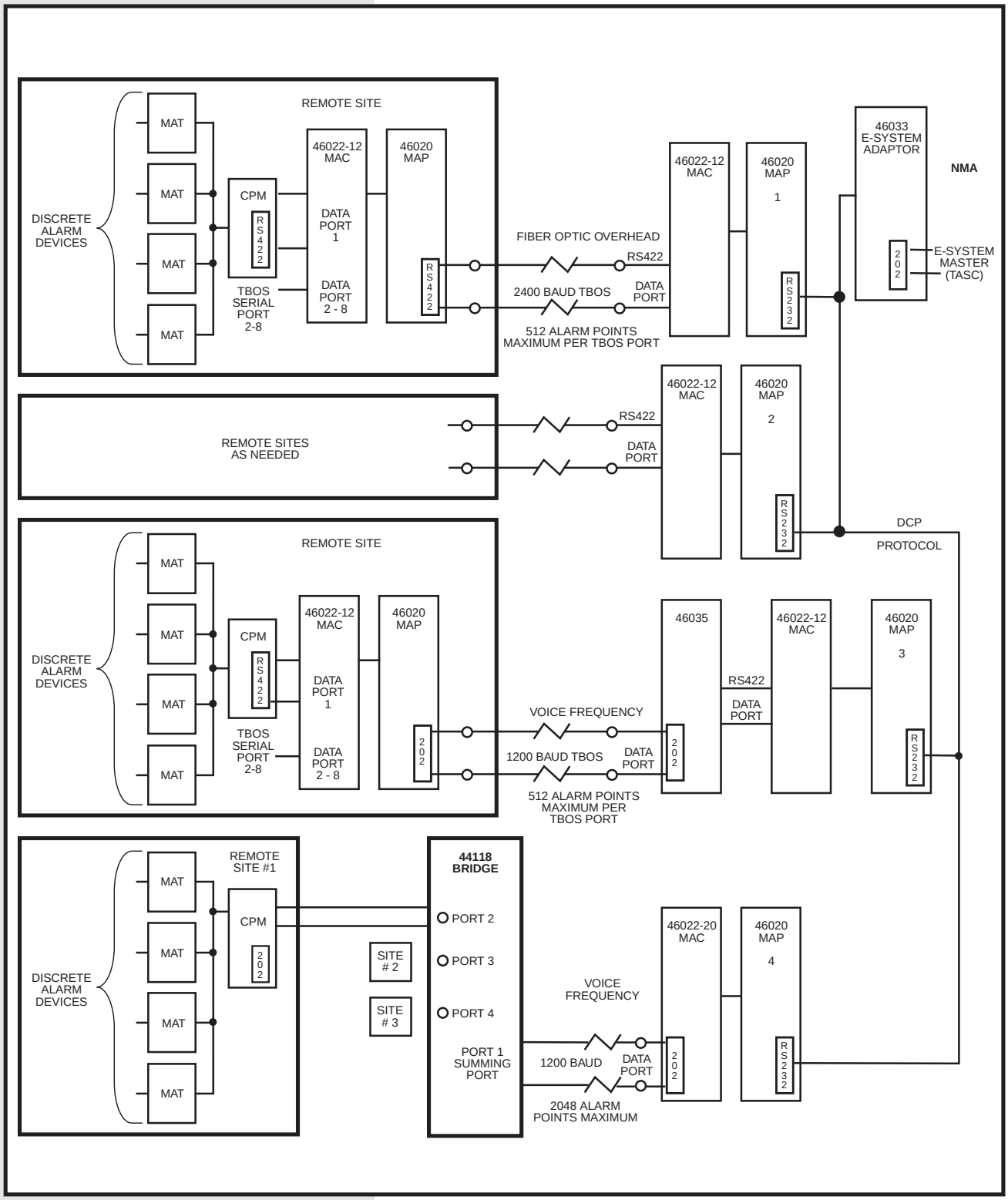
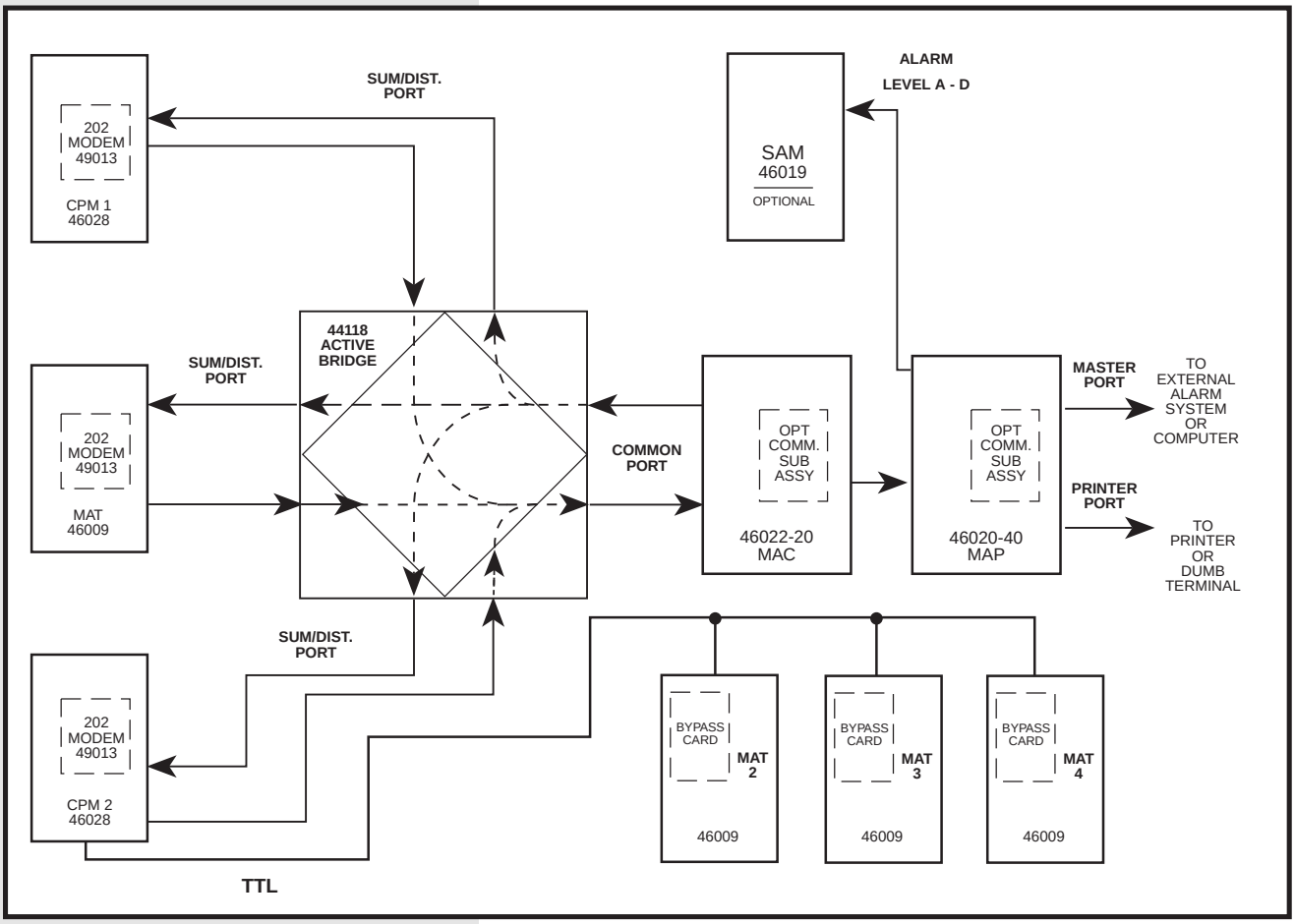


FIG. 9 - SYSTEM REPORTING DISCRETE POINTS



Installation consists of installing the firmware subassembly, installing the communications subassembly, setting switches, installing the module in the shelf, clearing memory, configuring the system, and testing the system.

1. Install the firmware subassembly, if necessary.

To install the subassembly:

1. Remove the four screws from the subassembly standoffs on the MAP. Refer to Fig. 10 for the location of the firmware subassembly.
2. Separate the subassembly top board from the main board. Be careful not to bend any connector pins.
3. Insert the main subassembly board into the connectors on the MAP.
4. Install two screws at the end of the main subassembly board next to the front panel of the MAP.
5. At the other end of the main subassembly board, install the two standoffs supplied with the firmware.
6. Insert top subassembly board into the connectors on the main subassembly board.
7. Install three screws to fasten the top subassembly.

2. Install communications subassembly, if necessary.

Refer to Fig. 10 for the location of the master port communications subassembly mounting. Follow these steps:

1. If a subassembly is not already installed, remove the three screws from the mounting standoffs.
2. Remove the hole plug from the front panel of the module.
3. To place the subassembly, insert the subassembly pins into the module sockets.
4. Examine the connector pins to be sure each one goes straight into the socket.
5. Install the screws in the mounting standoffs.

For information on how to set the strap options and how to operate the subassembly, refer to the manual for that subassembly.

FIG. 10 - MAP SUBASSEMBLY LOCATIONS

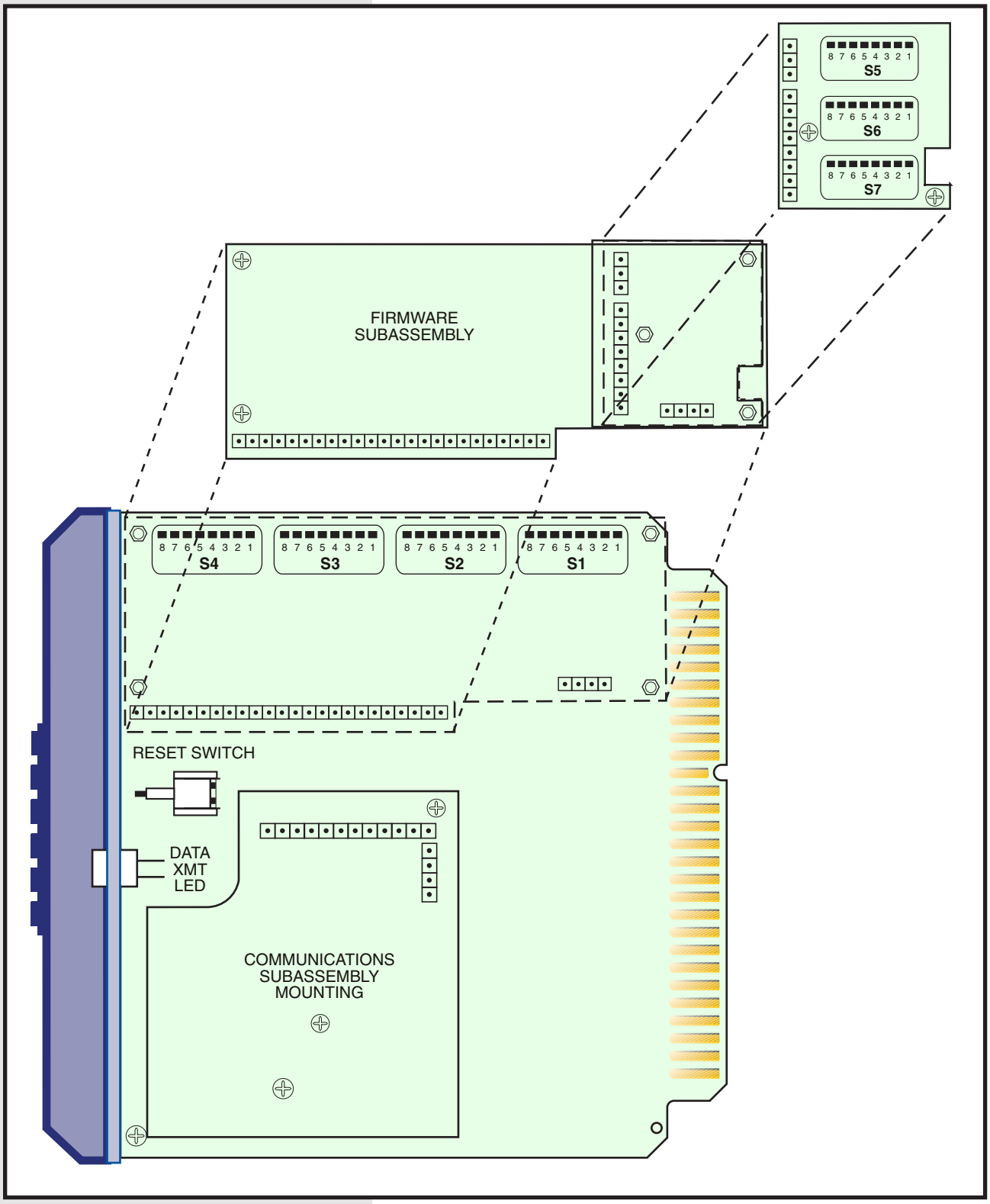
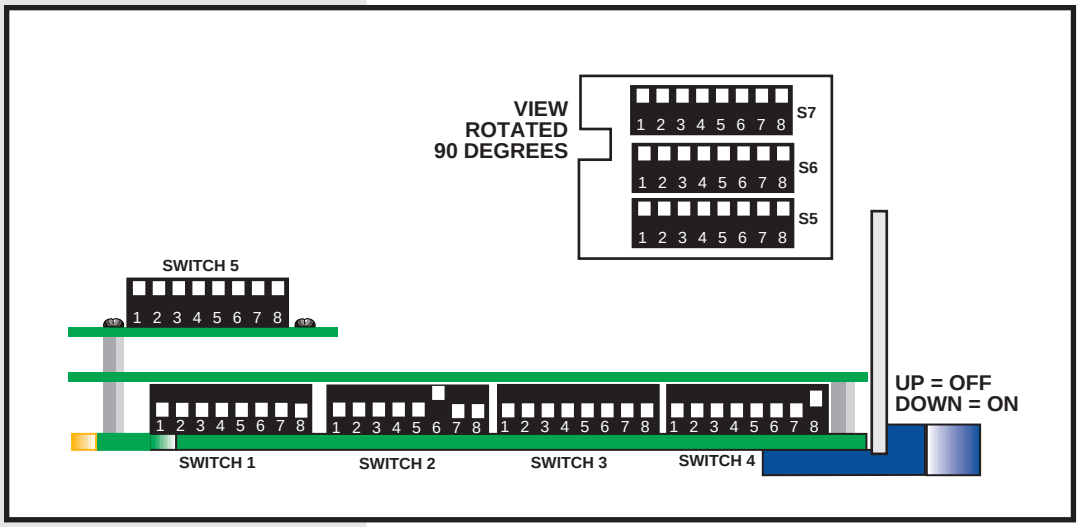


FIG. 11 - 46020 MAP VIEWED FROM THE TOP



3. Set switches.

Set switches S1 through S7 on the MAP. Refer to the chapter on ***Switch Settings.***

4. Install the module in the shelf.

Slide the MAP module along the card guides of the correct slot. Firmly seat the module in the 56-pin edge connector.

The shelf is usually wired at the factory, and you do not have to wire the 56-pin edge connector. If it is necessary for you to wire it, refer to Fig. 12.

5. Clear memory, if necessary.

The following paragraph tells you how to clear the memory in the MAP. Follow these instructions ***only*** if you are installing the MAP in a system for the first time or if you need to clear all memory.

The MAP has a battery-backed memory that can retain system configuration in the event of a power interruption to the MAP. To clear the memory, follow these steps:

- Set switch S5-2 in the DOWN position (refer to Fig. 11).
- Plug the MAP into your system and apply power.
- Wait ten seconds, then turn off power to the MAP.
- Remove the MAP from the system and set switch S5-2 in the UP position.

6. Configure the system.

Before you can use the system to poll remote devices, you must specify how you want it to operate. Without this configuration step, the system will not poll.

- Before making connections, refer to the block diagram that comes with the shelf.
- Connect an IBM-compatible computer to the printer port of the MAP and apply power to the shelf.
- Use the T/Shell software with the 40 MAP Editor Module to configure the MAP.

Refer to the T/Shell software manual for complete instructions on how to use the software.

7. Test the system.

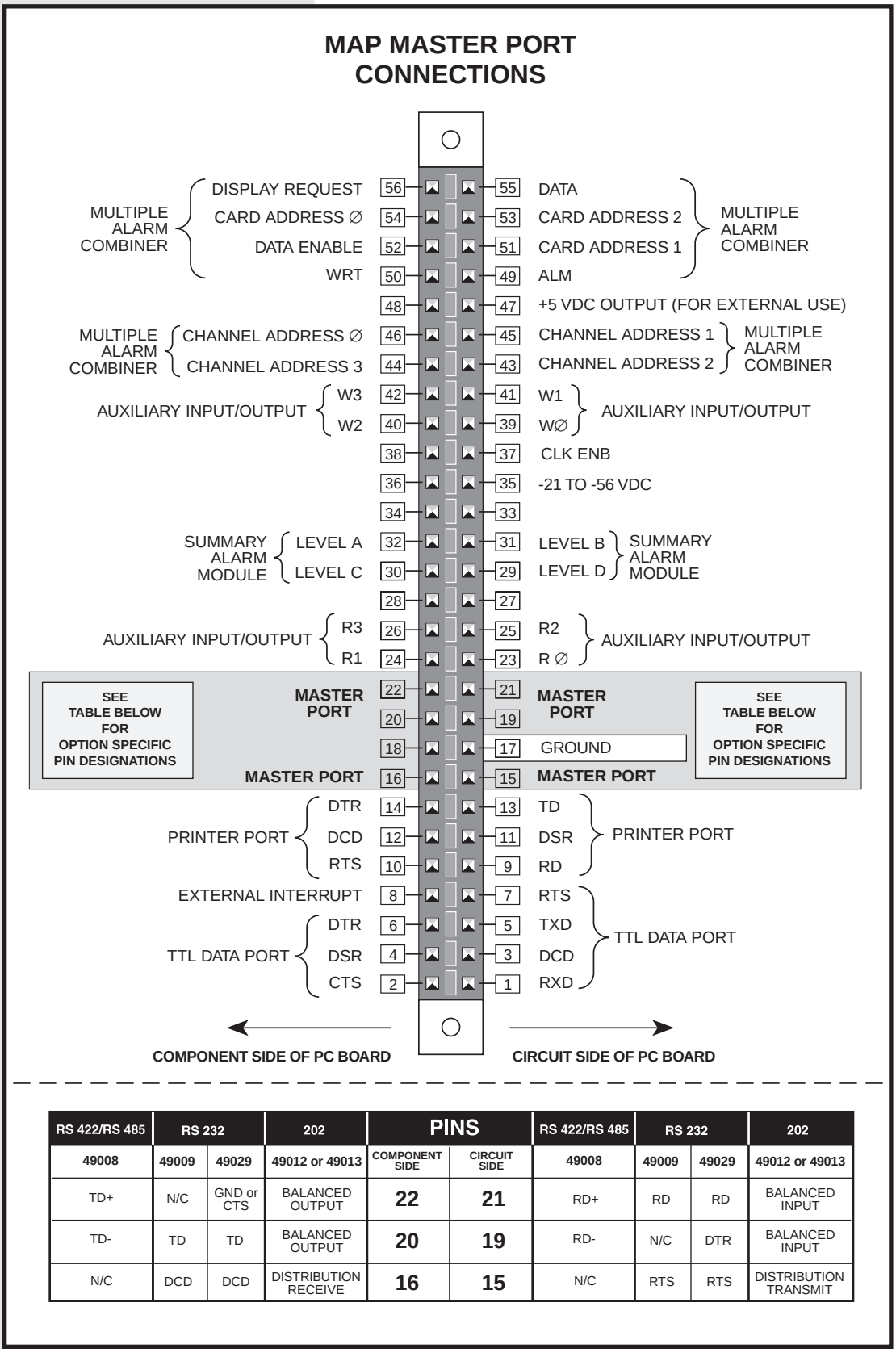
Once you have configured the system, test it for proper operation:

- Apply power and perform a simple operation check-out. If the MAP is communicating through the data port, the XMT DATA light on the front panel will be blinking.
- Create some alarms. Observe that the correct responses are going through the master or printer port to the alarm center or to a standard ASCII terminal connected to the printer port.
- Operate some control points and verify correct operation.

If the MAP does not function properly, check the following:

- Switch settings and/or the communications wiring at the MAP slot.
- Switch settings on modules the MAP is communicating with.

FIG. 12 - PIN DESIGNATIONS, 46020

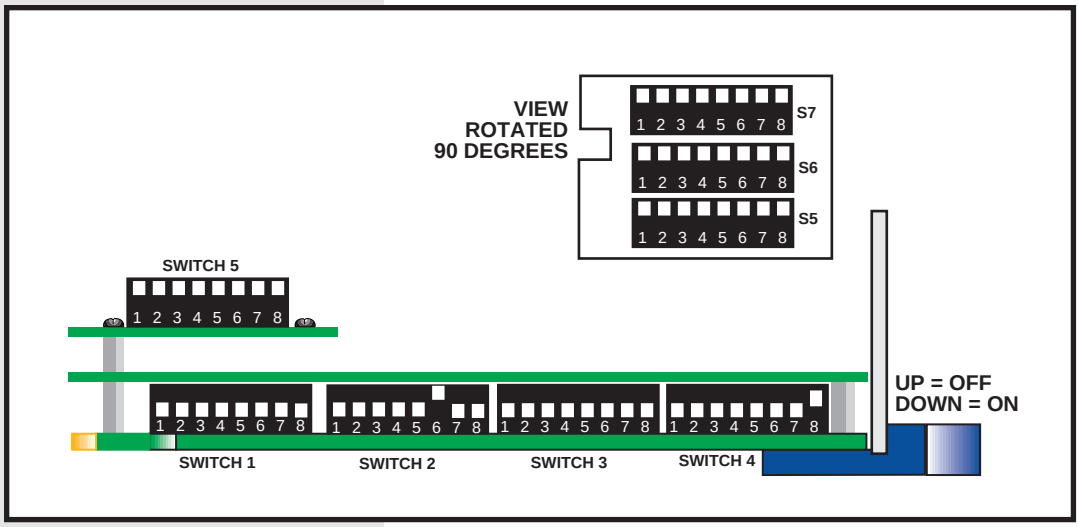


RS 422/RS 485	RS 232		202	PINS		RS 422/RS 485	RS 232		202
49008	49009	49029	49012 or 49013	COMPONENT SIDE	CIRCUIT SIDE	49008	49009	49029	49012 or 49013
TD+	N/C	GND or CTS	BALANCED OUTPUT	22	21	RD+	RD	RD	BALANCED INPUT
TD-	TD	TD	BALANCED OUTPUT	20	19	RD-	N/C	DTR	BALANCED INPUT
N/C	DCD	DCD	DISTRIBUTION RECEIVE	16	15	N/C	RTS	RTS	DISTRIBUTION TRANSMIT

SWITCH SETTINGS

The tables in this section refer to Fig. 13, which represents the way the switches look when the module is viewed from the top, with the front panel of the MAP on the right side.

FIG. 13 - 46020 MAP VIEWED FROM THE TOP



SWITCH S1 - MASTER PORT ADDRESS

NOTE:

You must make address settings before downloading the MAP's database configuration, and you cannot change them by downloading. The master and printer port addresses are independent and do not have to be set to the same number. For information about database configuration and downloading, see the manual for the T/Shell with 40 MAP Editor Module.

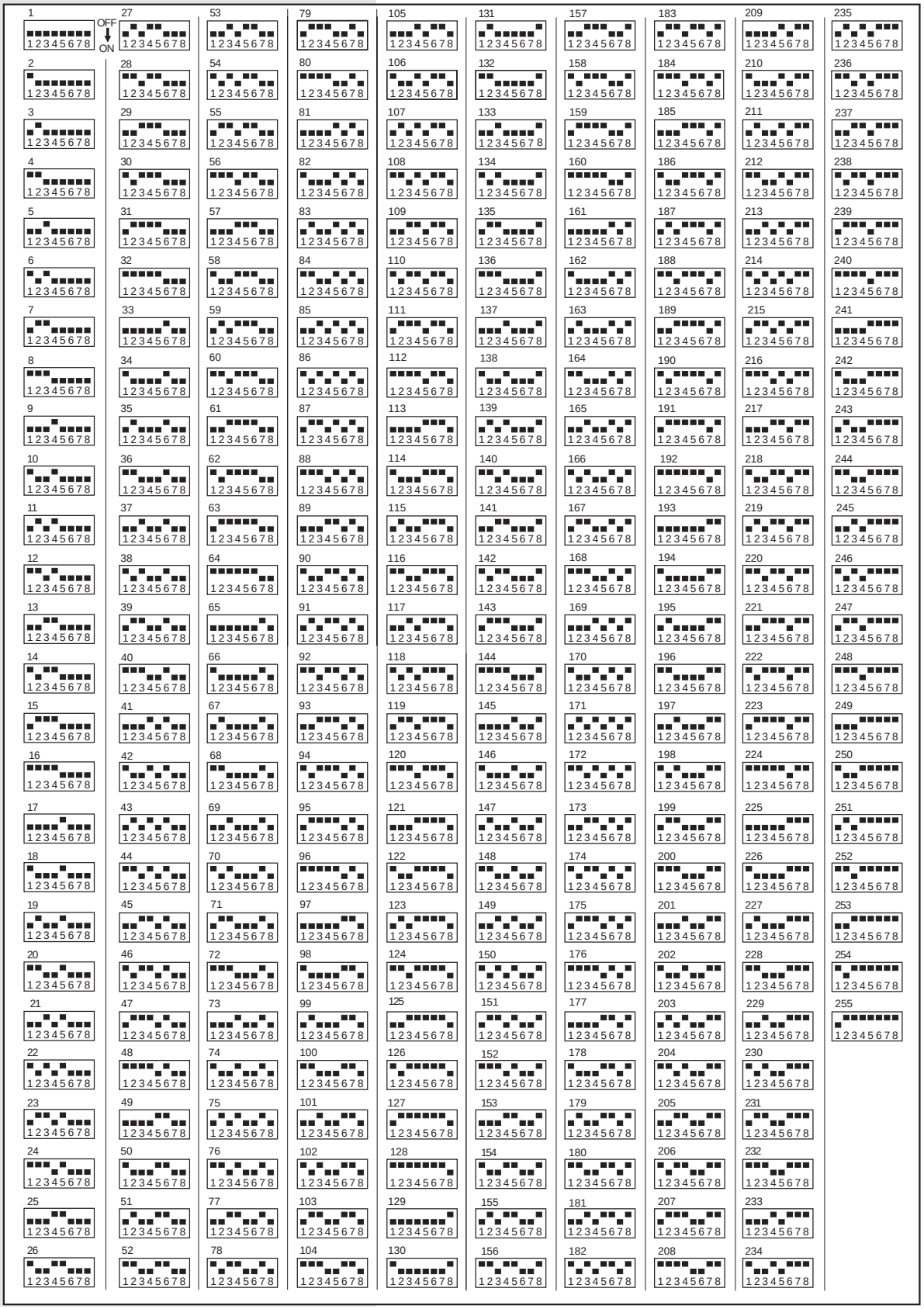
This switch allows you to define the address for the **Master Port** of the MAP. You can choose an address number from 1 to 255. Table A shows you how to set the address switch.

SWITCH S2 - PRINTER PORT ADDRESS

This switch allows you to define the address for the **Printer Port** of the MAP. You can choose an address number from 1 to 255. Table A shows you how to set the address switch.

SWITCH SETTINGS

TABLE A - SWITCHES S1 AND S2



SWITCH S3 - MASTER PORT PARAMETERS

NOTE:

If the database configuration is going to be downloaded through a Dantel 46001 Status Monitor using the master or printer port, the protocol must be DCPF. The data rate must be 1200 or 9600 baud. Set the parity, stop bits, and word length for none, 1, and 8. Refer to Table B.

You can change the data rate, parity, stop bits, and word length by downloading - regardless of switch settings.

This switch allows you to define the data rate (baud), parity, stop bits, and word length for the **Master Port**. Refer to Table B for the switch settings.

SWITCH S4 - PRINTER PORT PARAMETERS

This switch allows you to define the data rate (baud), parity, stop bits, and word length for the **Printer Port**. Refer to Table B for the switch settings.

TABLE B - SWITCHES S3 AND S4

MASTER (S3) AND PRINTER (S4) PORT DATA RATE				
	S3-1 S4-1	S3-2 S4-2	S3-3 S4-3	S3-4 S4-4
Not Used	DOWN	DOWN	DOWN	DOWN
50	UP	DOWN	DOWN	DOWN
75	DOWN	UP	DOWN	DOWN
110	UP	UP	DOWN	DOWN
135	DOWN	DOWN	UP	DOWN
150	UP	DOWN	UP	DOWN
300	DOWN	UP	UP	DOWN
600	UP	UP	UP	DOWN
1200	DOWN	DOWN	DOWN	UP
1800	UP	DOWN	DOWN	UP
2400	DOWN	UP	DOWN	UP
3600	UP	UP	DOWN	UP
4800	DOWN	DOWN	UP	UP
7200	UP	DOWN	UP	UP
9600	DOWN	UP	UP	UP
19,200	UP	UP	UP	UP

CONTINUED . . .

TABLE B (CONTINUED) - SWITCHES S3 AND S4

PARITY		
	S3-5 S4-5	S3-6 S4-6
None	DOWN	DOWN
Odd	UP	DOWN
Even	DOWN	UP

STOP BITS	
	S3-7 S4-7
1	DOWN
2	UP

WORD LENGTH	
	S3-8 S4-8
7	DOWN
8	UP

PROTOCOL	PARITY	STOP BITS	WORD LENGTH
Printer	None	1	8
DCP or DCPF	None	1	8
TBOS	Odd	1	8
TABS	Odd	1	8

SWITCH S5 - MAP PARAMETERS

The S5 switches allow you to determine how the MAP operates during startup.

Depending on the type of system you have, set switch S5-1 according to Table C.

TABLE C - S5-1

CONDITION	SWITCH SETTING
46023-12 Smart MACs connected to MAP	S5-1 DOWN
46022-12, -20, -30 MACs connected to MAP	S5-1 UP
No MACs connected to MAP	S5-1 UP

S5-2 is usually used when you are applying power to the MAP for the first time. Refer to Table D. Refer to the ***Installation*** chapter for more information.

TABLE D - S5-2,3

SWITCH S5-2 AND S5-3		
CONDITION	**S5-2**	**S5-3**
When power is applied to the MAP, all information in the memory to define the data port configuration is erased. Configurations of printer and master ports go to default conditions as defined by switches S3, S4, and S6.	DOWN	UP or DOWN
When power is applied to the MAP, a reset occurs, but all information in memory to define the data port configuration is retained. Configurations of printer and master ports go to default conditions as defined by switches S3, S4, and S6.	UP	DOWN
If there is a configuration in memory, the system resumes normal operation upon startup. This is the setting for normal operation.	UP	UP
If there is no configuration in memory, the configurations of printer and master ports go to default conditions as defined by switches S3, S4, and S6.	UP	UP

NOTE: *Place Switch S5-3 in the UP position before downloading a database configuration to the MAP. After the database is downloaded, keep the switch in the UP position.*

If you place the switch in the DOWN position after the database is downloaded and later remove power from the MAP, the MAP reconfigures the master and printer ports according to the switch settings on the module. These settings define only one address for each port. If the database has information for two addresses on a port, the MAP no longer reports any alarms for the second address.

Refer to Table E for S5-4 through 8.

TABLE E - S5-4 THROUGH 8

SWITCH S5-4 THROUGH S5-8	
CONDITION	**SWITCH SETTINGS**
Not Used	All switches UP

SWITCH S6 - DEFAULT PROTOCOLS FOR MASTER AND PRINTER PORTS

This switch allows you to define the default protocols of the master and printer ports. Refer to Table F for switch settings.

TABLE F - SWITCH S6

MASTER PORT PROTOCOL				
	S6-1	S6-2	S6-3	S6-4
DCP	DOWN	DOWN	DOWN	DOWN
TBOS	UP	DOWN	DOWN	DOWN
Not Used	DOWN	UP	DOWN	DOWN
DCPF	UP	UP	DOWN	DOWN
TABS	DOWN	DOWN	UP	DOWN
PRINTER PORT PROTOCOL				
	S6-5	S6-6	S6-7	S6-8
DCP	DOWN	DOWN	DOWN	DOWN
TBOS	UP	DOWN	DOWN	DOWN
Printer	DOWN	UP	DOWN	DOWN
DCPF	UP	UP	DOWN	DOWN
TABS	DOWN	DOWN	UP	DOWN

NOTE: *If the database configuration is going to be downloaded through a Dantel 46001 Status Monitor using the master or printer port, the protocol must be DCPF.*

You can change the protocol by downloading regardless of switch settings.

SWITCH S7 - NOT USED

This switch is not used with this firmware. Set all the S7 switches to UP.

MAP OPERATION

The front panel of the MAP has a green LED labeled XMT DATA. This LED flashes when data is being transmitted from the data port.

On the front panel of the MAP, there is a recessed reset button. When you push this button, it executes a complete, or hard, reset. The effect is the same as removing power from the MAP. When power is restored later, the information in the MAP's memory is saved ... ***only*** if you have set the switches to retain it (see ***Switch Settings***). If you have not set the switches to save the memory, it will be erased.

For operation of the printer port using Printer Syntax, see the ***Printer Syntax*** chapter.

If you install a subassembly on the master port, refer to the subassembly manual for operation information.

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 and 46023-12 MACs. The following operating instructions apply only when this firmware is used in a MAP that is operating with a 46022-12 or 46023-12 MAC.

NOTE:

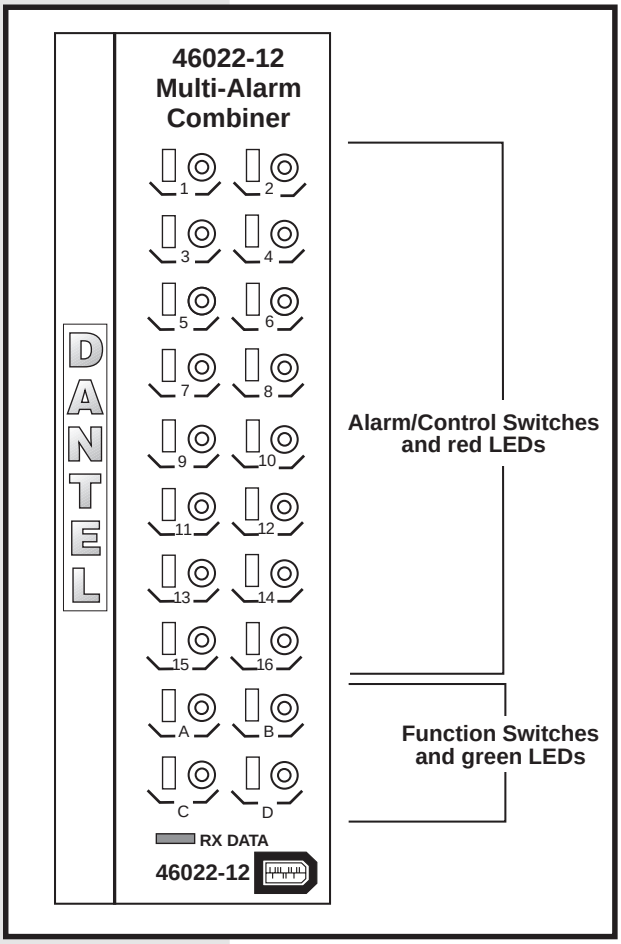
The MAP is capable of handling 64 displays (4,096 alarm points and 4,096 control points). Since the MAC's capacity is 32 displays, it reports the first 32.

Applications

One MAC front panel has a capacity of 32 displays (See Fig. 14). This represents 2,048 alarm and 2,048 control points, or 128 MATs and 128 CPMs. 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. MACs two, three, and four provide only communications status reports for their own ports.

FIG. 14 - MAC-XX FRONT PANEL



NOTE:

The steps described in this section apply to the 46022-12, 46023-12, and 46023-14 MACs.

Functions:

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

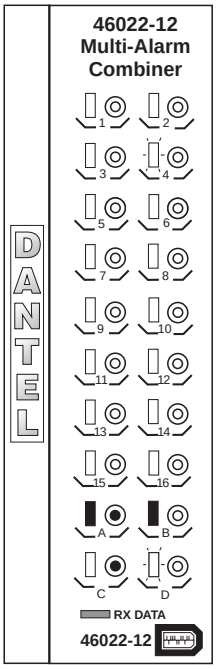
G. Communications Status Report for all MAC Ports

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.

CHANGE OF STATUS



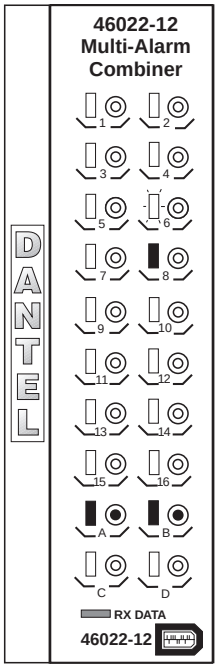
STEP 1
Default Mode

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.)



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.

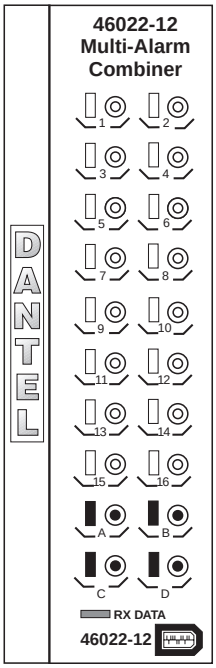
   OFF = No alarms

   FLASHING = Unacknowledged alarms.

   ON = Acknowledged alarms.

CONTINUED . . .

CHANGE OF STATUS (CONTINUED)



STEP 3
Display Section

1. Press button for desired display.
   Alarm LEDs will show status of points 1 - 16.

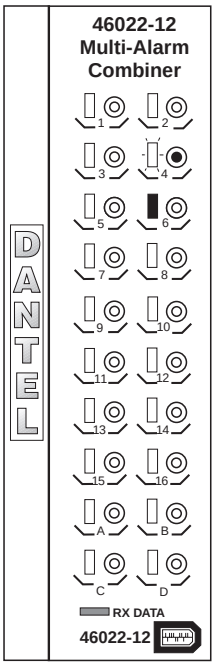
2. LED A on shows points 1-16 selected.
   (First MAT in the display).

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.



STEP 4
Point Selection

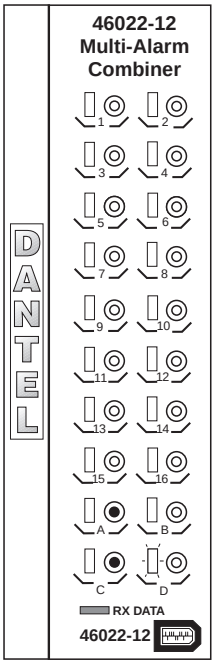
1. LED flashing indicates a change of status at that point, see example at LED #4.

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.

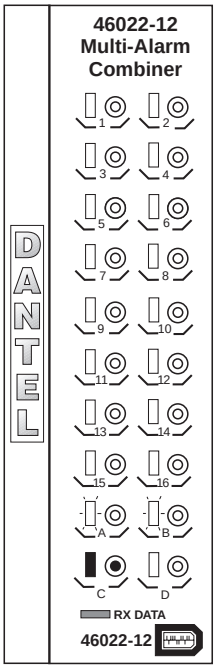
CONTROL POINT OPERATION



STEP 1
Return to Default Mode

1. Press A & C to return to Default Mode.

2. D LED flashes to show Default Mode.



STEP 2
Control Mode Selection

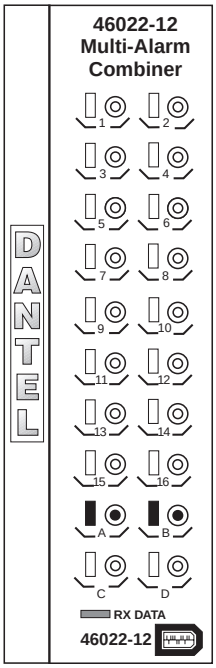
1. Press button C to select Control Mode.

2. LED C on to indicate Control Mode selected.

3. LEDs A & B flash.

CONTINUED . . .

CONTROL POINT OPERATION (CONTINUED)



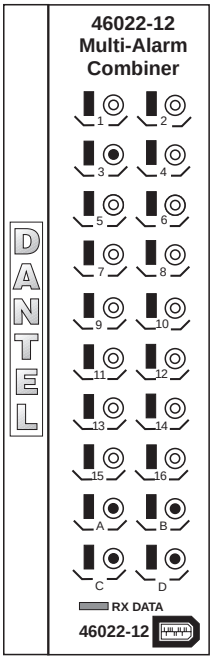
STEP 3
Select Group

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.



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.

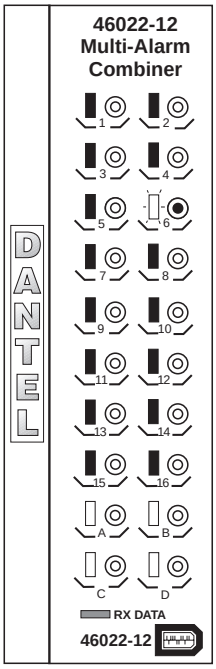
4. Press button C to show points 33-48.
   (Third CMP in display.) LED C comes on.

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.

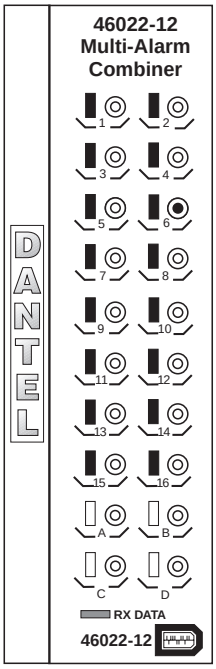
CONTINUED . . .

CONTROL POINT OPERATION (CONTINUED)



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.

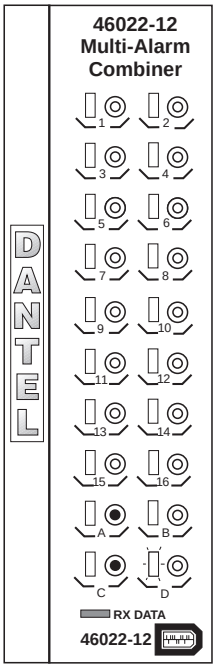


STEP 6
Control Point Selection

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.)

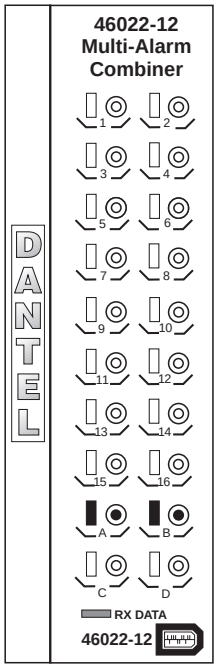
ACKNOWLEDGE ALL (ACK ALL)



STEP 1
Return to Default Mode

1. Press A & C to return to Default Mode.

2. D LED flashes to show Default Mode.



STEP 2
Select Display Group

1. Press A to select displays 1-16.

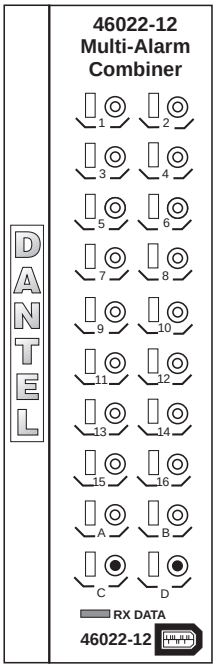
Press B to select displays 17-32.

2. A LED on if displays 1-16 selected.

3. B LED on if displays 17-32 selected.

CONTINUED . . .

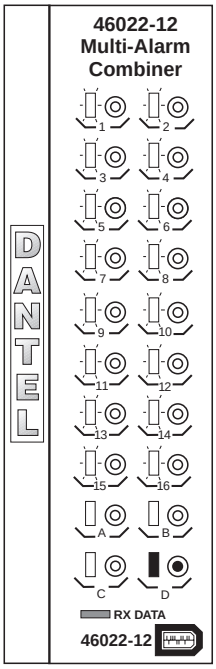
ACKNOWLEDGE ALL (CONTINUED)



STEP 3
Acknowledge All

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

COMMUNICATIONS TEST



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.)

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.

PRINTER SYNTAX

NOTE:

The Printer Syntax in this manual cannot be used for configuring the system. To configure, use T/Shell software with the MAP 40 Editor Module and an IBM-compatible computer. See the T/Shell manual for instructions on how to use the software.

Here are 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. After you download the memory, the printer syntax allows you to communicate with the alarm and control system to find out the status of alarms and to operate control points.

GETTING STARTED

NOTE:

If the printer port protocol on the MAP (switch S6) is set for a protocol other than PRINTER, type !!! to access the printer syntax. During, and for up to 20 seconds following, a database download the MAP will not respond to the "!!!" command.

The terminal must be set for the same data rate (baud), parity, stop bits, and word length as those set on Switch S4 (See ***Switch Settings***).

- 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 you can enter most of the other commands. If there is a password in the MAP, you will have to type the password in order to unlock the MAP. See the Password command in the ***Syntax Commands*** section for instructions on setting up a password.

PRINTER SYNTAX

ENTERING COMMANDS

After each command you type at the terminal, press Enter to execute the 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.	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

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	? or Q
STATUS	STAT
SWITCHES	DIPS
LINEFEED	LF
SYSTEM	SYS

SYNTAX COMMANDS

ACKNOWLEDGE

Purpose:

Acknowledges all alarms and control point operations at the MAP and the MAC.

Format:

ACK ALL

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.

CLEAR ALARMS

Purpose:

Clears the entire alarm data base, but does not change the polling list or configuration.

Format:

CLEAR ALARMS

CONTROL POINT OPERATION

Purpose:

Sets control points.

Format:

DISPLAY [display number] POINT [points] [command]

Remarks:

Display number is the display number of the point(s) to be set. Number can be from 1 to 64. It must be a single number, not a range of numbers.

Points is the point or points to be operated. Range can be from 1 to 64. The number can be a single number or a range of numbers. A range of numbers may not cross quadrant boundaries. The quadrant boundaries are between points 16 and 17, 32 and 33, and 48 and 49. A range specified as 33-48 would be legal, but a range of 48-53 would not.

Command is the DCP command to use and can be DLON, DLOF, DMON, DMOF, SLON, SLOF, SMON, SMOF, and EXE.

- The DLON command latches points on. The DLOF command resets the latched points.
- The DMON command operates points for three seconds.
- The DMOF command turns latched point off for three seconds, then back on.

The SLON, SLOF, SMON, and SMOF commands prepare points for operation and the EXE command executes them.

- The SLON command prepares points for latching. The SLOF command prepares points for resetting.
- The SMON command prepares points for operating for three seconds.
- The SMOF command prepares to turn latched points off for three seconds, then back on.

CONTINUED . . .

If the display and point to be set is defined in the control displays, the command is sent there. Otherwise, the command is sent to the alarm display.

You can send control commands only to devices that have controls turned on in T/Shell software with a MAP 40 Editor Module. See ***Controls*** in the ***Extended Provisioning*** section in the ***MAP System Definition*** chapter of the software manual for more information.

Example:

```
>DISP  1  POINT  5  SMON
>DISP  1  EXE
```

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.

DCP/DCPF MODE

Purpose:

Switches printer port to DCP or DCPF mode.

Format:

DCP MODE

DCP MODE baud

DCPF MODE

DCPF MODE baud

CONTINUED . . .

Remarks:

At *baud*, type the desired data rate. Available data rates are 50, 75, 110, 135, 150, 300, 600, 1200, 1800, 2400, 3600, 4800, 7200, and 9600.

Note:

To return to the printer syntax:

Type **!!!**

If you changed the baud, the printer port will *not* return to the original data rate.

Example:

```
>DCPF MODE  1200
```

INTERPOLL DELAY

Purpose:

To modify the timeout between responses when the MAP is polling DCM devices.

Format:

IPD

IPD [delay time]

Remarks:

The command IPD shows the current delay time setting.

The default setting for the time delay is zero. This means that the interpoll delay is not used.

To enter a delay time, type a number between 128 and 255. A delay of 128 equals 500 milliseconds. A delay of 255 equals one second.

Once a delay time is set, you cannot reset the delay to zero. To return the delay time to zero, follow the steps below.

- Turn off power to the MAP.
- On the MAP, place switch S5-2 DOWN.
- Install the MAP in the shelf.
- Apply power for ten seconds. This erases the configuration and resets the interpoll time delay to zero.
- Remove the MAP and place switch S5-2 UP.

CONTINUED . . .

- Install the MAP in the shelf.
- Turn on the power.
- Download the configuration file from the T/Shell program.

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.

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 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

CONTINUED . . .

Remarks:

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

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

The LOG OFF command turns logging off. Changes of status and device failures are not reported. However, 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
```

MODE

Purpose:

Shows if the system is locked or unlocked.

Format:

MODE

PASSWORD

Purpose:

Sets password for system security.

Format:

PASSWORD

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 eight characters - upper or lowercase, and any combination of letters and numbers.

CONTINUED . . .

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:  ****
```

PROVISIONING

Purpose:

Gives a report of the system. Displays the status of device(s) in the MAP's database. Displays the alarm levels and memory location of the device(s).

Format:

PROV

QUERY

Purpose:

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

Format:

QUERY

CONTINUED . . .

Example:

```
>?
Level  D  status:  OFF
Terminal Port:  Printer  IV
Terminal Port Baud = 9600 N,1,8

Master Port:  DCP
Master Port Baud = 1200 N,1,8
DCP  MAP  Id =  1 (64 disp)  ,--- ,  2 (64 disp) ,---
```

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.

STATUS

Purpose:

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

Format:

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)DDDDDUDD   3)DDDDDDDD   4)DDDDDDDD
DIP   5)UUUUUUUU   6)UUUUUUUU   7)DDDDUUUU
```

SYSTEM

Purpose:

Produces a report on the status of displays.

Format:

SYSTEM

DISPLAY [display number] SYSTEM

Remarks:

The SYSTEM command produces a report on all displays in the system. The DISPLAY SYSTEM command produces a report on only the displays you specify. For [display number], you can enter a single number or a range of numbers from 1 to 64.

Example:

```
DISP  20  SYS
  ALM  DISP   20. . . . . . . . . . . . . . . .
     . . . . . . . . . . FD. . . .
     . . . . . ND. . . . . . . . . .
     . . . . . . . F . . . . . . . .
  CTL  DISP   20. . . . . . . . . . . . . . . .
     . . . CD. . .  OD . . . . . . .
     . . . . . . C . . . . . . . . .
     (MEM NOT MAPPED)  (MEM NOT MAPPED)
```

CONTINUED . . .

In the alarm display, there can be two characters for each alarm point:

- The first character can be an N for Normal or an F for Failure.
- The second character can be an A, B, C, or D for the level of the alarm.

In the display example above, there is an unacknowledged D-level alarm (FD) and an unacknowledged alarm failure that has returned to normal condition (ND). The single character (F) indicates an acknowledged alarm that still exists.

In the control display:

- The character C indicates a control point is being operated (relay contacts are closed). The character O indicates the relay contacts are now open.
- The second character can be A, B, C, or D, assigned to the control point and indicating an unacknowledged control point.

The single character C indicates a control point is acknowledged, but still being operated.

MEM NOT MAPPED indicates that no device has been assigned to this part of the display.

See the command ACKNOWLEDGE for information on acknowledging alarms and control points.

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.

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
```

TECHNICAL SPECIFICATIONS

Description	Value			
Input Voltage Range	-21 to -56 VDC			
Input Current, @ Specified Voltages, in mA (without firmware or communications subassemblies)	-21 VDC 113	-24 VDC 104	-48 VDC 73	-56 VDC 71
Heat Dissipation @ Specified Voltages, in BTU/Hr. (without firmware or communications subassemblies)	-21 VDC 8.1	-24 VDC 8.5	-48 VDC 12.0	-56 VDC 13.6
Weight, without subassembly	11.25 ounces			
Physical Dimensions	1.4" x 6.0" x 5.6"			
Operating Temperature Range	0 to 55 Degrees C.			

Note: Input current and heat dissipation figures are nominal +/-15%

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