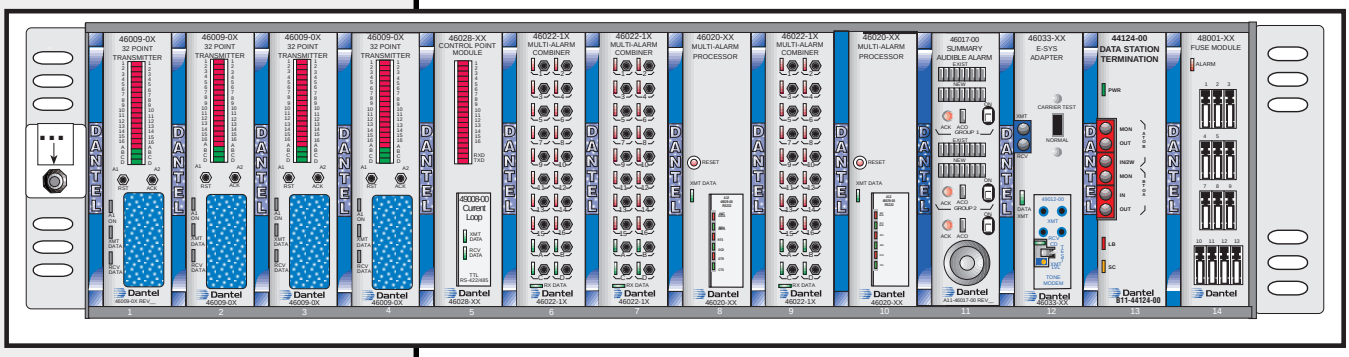
460 ALARM AND CONTROL SYSTEM (460ACS)



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About this Practice:

This practice has been reissued to:

- Change references to “X.25 Module”, “Multi Purpose Processor”, and “MPP” to NEXCON.

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

UPDATED

Issue date: March1998

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.

GENERAL DESCRIPTION

The Dantel 460 Alarm and Control System (460 ACS) is an integrated alarm and control system that uses:

- Individual 400-type modules.
- Add-on subassemblies.
- Firmware and software for building custom alarm or alarm and control systems.
- Local and remote alarm data collection. Alarm data reports to a central monitoring facility.

The 460 ACS can have a variety of options that include:

- Data communications modems and current loops
- Bridges
- Protocol interfaces
- Audible and visual alerting devices

For a list of major alarm system modules and subassemblies refer to the ***System Overview*** section.

System module and subassembly front panels can include:

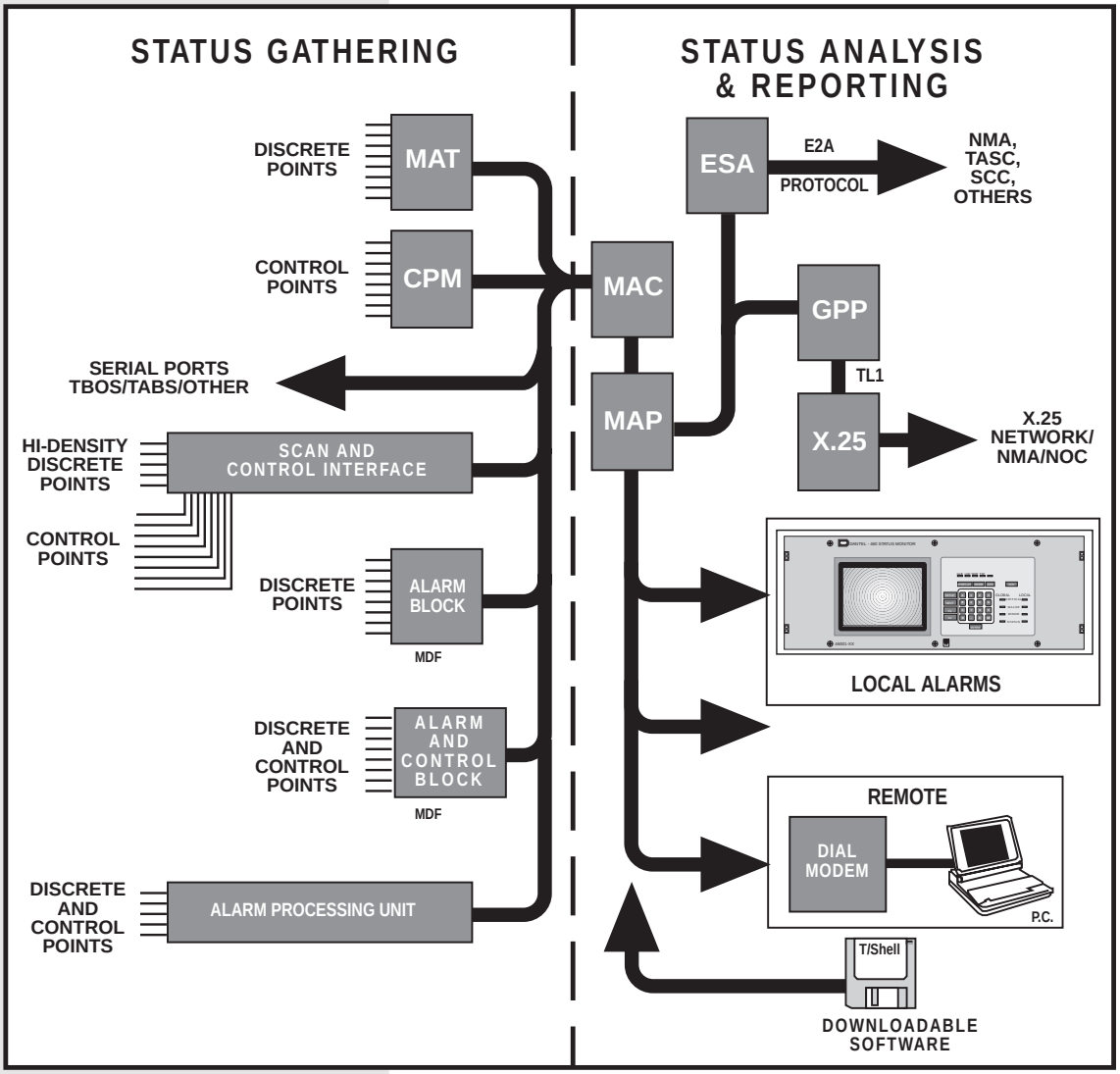
- Status and operation indicating LEDs
- Multi-functional switches
- Test points
- Monitoring jacks
- Audio alerting devices

Modules operate on -21 to -56 VDC input power. Subassemblies operate on power supplied by the host module.

SYSTEM OVERVIEW

Fig. 1 shows the 460 Alarm and Control System (460 ACS). System components are in two groups: the status gathering components and the status analysis and reporting components.

FIG. 1 - 460 ALARM AND CONTROL SYSTEM (460ACS)



The 460 ACS can report the status of local alarm and convert the data into one of many protocols for transmission to a central location. Front panel LEDs on the following devices display the local alarm status:

- Alarm modules
- Audible or visual alerting devices
- A 46001 Status Monitor that provides a video display of system information
- A 46062 General Purpose Processor connected to a personal computer

The 460 ACS can operate control points by local command or from a central location. You can have the control points respond automatically to an alarm condition.

STATUS GATHERING COMPONENTS

The 460 Alarm and Control System has seven Status Gathering components.

Multiple Alarm Transmitter (MAT)

The basic alarm input module is a Multiple Alarm Transmitter (MAT). The MAT is a 400-type module that monitors discrete alarm points and reports alarm conditions.

The MAT contains:

- A microprocessor.
- An EPROM that contains the module program which controls all features and functions.
- Input and output ports.

The 46009 MAT can monitor up to 32 alarm points and accepts ground inputs for alarms. The 46010 MAT can monitor up to 16 alarm points, and accepts ground, negative battery or TTL inputs for alarms.

The 46009 and 46010 MAT have the following standard features and options:

- An LED display indicates alarm status which can be used for installation and troubleshooting.
- The alarm point inputs are optically isolated.
- You can select between ground alarm inputs and battery alarm inputs on the 46010 MAT.
- You can switch select a half-second delay before initiating an alarm.
- You can switch select reverse alarm logic in groups.
- You can switch select the alarm point latching. The alarm reports to the master assembly before clearing.
- Annunciate local audible and/or visual alarms by category (such as major or minor) with up to four relay contact outputs.
- You can switch select data transmission speeds (from 75 to 9600 baud).
- You can switch select MAT addresses (from 1 to 128). Each group of 16 alarm points is one address. 32 point MATs use 2 addresses. Each master assembly can poll up to 128 MAT addresses.
- The MAT has a subassembly slot for interfacing the MAT to the 460 ACS.

Control Point Modules (CPMs)

The 46028 and 46029 Control Point Modules (CPMs) are 400-type modules that provide 16 relays you can use for controlling remote devices from a central point. You can operate these relays for a preset amount of time or leave the relays on until release (latch).

Standard 46028 and 46029 CPM features and options include:

- Relay contact outputs.
- A front panel LED display that indicates the status of the 16 control points.
- Switch-selectable data transmission speeds (from 75 to 9600 baud).
- Switch-selectable CPM addresses (from 1 to 128). Each module (16 control outputs) is one address. Each master assembly can poll up to 128 CPM addresses.
- A subassembly slot for interfacing the CPM to the system.

Voltage Detector Module (VDM)

The Voltage Detector Module (VDM) monitors up to 16 analog voltage points and initiates alarms when voltage exceeds your voltage threshold.

Standard VDM features and options include:

- An analog input voltage range from +60 to -60 VDC.
- Autoranging of all input points.
- High input impedance for analog points.
- A 2.5 volt, 10-bit resolution A/D converter.
- Switch-selectable data transmission speeds (75 to 9600 baud).
- Four-digit alphanumeric display for point monitoring and configuration.
- Threshold levels you can set.
- Battery backup.

Each analog point has four voltage alarm points you enter that surround a normal operating value: HIGH major, HIGH minor, LOW major and LOW minor. Each analog module is equivalent to four MAT addresses (64 alarm points).

You can enter thresholds by using the VDM front panel switches from a PC at the site or by connecting a dumb terminal to the configuration port.

Scan and Control Interface (SCI)

The 46121 Scan and Control Interface (SCI) is an assembly that mounts in an equipment rack and:

- Monitors up to either 256 or 512 discrete alarm points.
- Reports alarm conditions.

You can order the SCI with 64 control points with you can use for controlling remote devices from a central location. You can operate these control points for a preset amount of time or the control points can remain on until released (latch).

A front panel LED display indicates alarm and control point status and you can use the LEDs for installation and trouble-shooting. You can use up to four relay outputs for local audible or visual indications of alarm status by category (such as major or minor).

Alarm Block

The 46210 Alarm Block monitors 256 discrete alarm points and reports alarm conditions. The circuitry installs in a wire-wrap terminal block. You can mount the terminal block on a main distribution frame or equipment rack.

Alarm and Control Block (ACB)

The 46220 Alarm and Control Block (46220 ACB) monitors discrete alarm points and reports alarm conditions. This module also provides relays you can use for controlling remote devices from a central point. You can operate these relays for a preset amount of time or these relays can remain on until released (latch).

The 46220-00 ACS monitors 128 alarm points and provides up to 32 control points.

The 46220-01 ACS monitors 192 alarm points and provides up to 16 control points.

The circuitry installs in a wire-wrap terminal block. You can mount the terminal block on a main distribution frame or equipment rack.

Alarm Processing Unit (APU)

The 46131 Alarm Processing Unit (46131 APU) is an assembly that mounts in an equipment rack. The 46131 APU monitors up to 32 discrete alarm inputs and provides eight control outputs (relays). An expansion option doubles the capacity to 64 alarms and 16 controls.The 46131 APU also has eight TBOS serial interrogator ports.

You can wire at the front of the 46131 APU which lets you install the 46131 APU against a wall such as in a controlled environment fault (CEV).

STATUS ANALYSIS AND REPORTING COMPONENTS

There are five 460 ACS Status Analysis and Reporting components.

Multiple Alarm Combiner (MAC)

The Multiple Alarm Combiner (MAC) is a 400-type module that interfaces data signals between 460 ACS remote components. The MAC has eight data ports for acquiring discrete and serial alarm information. You can order the MAC with a front panel LED display that indicates alarm status.

Multiple Alarm Processor (MAP)

The Multiple Alarm Processor (MAP) is a 400-type module that:

- Interrogates alarm reporting devices.
- Operates control points.
- Reports alarm and control status.

E-System Adapter

The E-System Adapter is a 400-type module that provides an interface between the 460 ACS and an operations center (TASC, SCOTS, TCAS, SCC, NMA, etc.) that operates in E2 or E2A protocol.

General Purpose Processor (GPP)

The General Purpose Processor (GPP) is a 400-type module that provides a programmable microprocessor that monitors up to 32,768 alarms.

The Status Monitor GPP polls DCPF devices and is used for local alarm reporting. The TL1 GPP polls DCP, DCPF, or E2A devices and converts that alarm information into TL1 messages.

NEXCON

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The NEXCON is a 400-type module that occupies two slots in a 400-type enclosure. The NEXCON module provides TL1 data concentration within the 460 ACS which converts alarm and control data to X.25 format for transmission to and from operation centers.

Local Alarm Displays

LEDs mounted on the front panels of individual modules or the following modules provide local alarm displays:

Status Monitor

The 46001 Status Monitor provides a rack-mounted terminal for local monitoring of the 460 ACS. You can use the Status Monitor for:

- Displaying alarm system data.
- Displaying messages you define for individual alarm points.

Depending on the option you order, the Status Monitor can monitor a maximum of 8,192 or 32,768 alarm points.

Audible and Visual Devices

You can wire bells, lights or modules (such as the 46017 Summary Audible Alarm Module) to MAT and MAP relay outputs.

460 ACS Major Components

00458/00459 Test Sets

The 00458 and 00459 Test Sets are portable test units for testing alarm and control equipment using TBOS or TABS protocols.

The 00459 Test Set has the added capability of testing E-telemetry equipment.

44118 Active Distribution Bridge (ADB)

The 44118 ADB provides an active, four-way, four-wire bridge. You can also use the 44118 ADB as a quadruple summing and distribution amplifier. You can wire multiple bridges together to form large, multi-port and active four-wire bridges.

44124 Data Channel Termination (DCT)

The 44124 DCT provides data channel line conditioning that consists of:

- Impedance matching
- Selectable gain and attenuation control
- Adjustable 309B-type post equalization

The 44124 DCT also provides loopback capability.

44210 Dial-Up Modem

The 44210 Dial-Up Modem provides single-line, dial-up modem service and a 212A-type digital interface. You can use the Dial-Up Modem as a Hayes-type compatible modem or with a dial-up alarm system. An optional 49210 subassembly provides a two-line interface.

46001 Status Monitor

The 46001 Status Monitor is a rack-mounted CRT monitor with a 46062 General Purpose Processor (GPP) for accessing alarm and control equipment. The Status Monitor mounts in a 19" or 23" equipment rack and requires five vertical rack units (8¾"). The Status Monitor monitors up to 32,768 alarm points. See the ***Firmware and Software*** section for more information.

46004 Voltage Detector Module (VDM)

The 46004 VDM monitors voltage levels between -60 VDC and +60 VDC for up to 16 individual channels.

46009 Multiple Alarm Transmitter (MAT)

The 46009 MAT provides 32 ground-activated alarm inputs and alarm acknowledgement.

46010 Multiple Alarm Transmitter (MAT)

The 46010 MAT is similar to the 46009 MAT but provides 16 ground-activated, voltage-activated (from -21 to -56 VDC) or TTL-activated (0 to +5 VDC) alarm inputs.

46017 Summary Audible Alarm Module (SAAM)

The 46017 SAAM provides audible and visual indication for 16 alarm inputs summed in two groups of eight (which gives two priority levels of alarm indication). The 46017 SAAM also provides alarm-enabled relays for controlling external audible and visual alarm devices. The 46017 SAAM automatically acknowledges new alarms and resets relays.

46020 Multiple Alarm Processor (MAP).

The 46020 MAP is the central unit of the Dantel alarm system and has three firmware-operated input/output ports. See the ***Firmware and Software*** section for more information.

46022 Multiple Alarm Combiner (MAC)

The 46022 MAC interfaces data between remote alarm and control equipoment and the 46020 MAP. 46022 MACs with an LED display and switches provide alarm indication and acknowledgement and control point operation.

46023 Smart Multiple Alarm Combiner (Smart MAC)

The Smart MAC interfaces data between remote alarm and control equipment and the 46020 MAP. The Smart MAC is an improved, faster version of the 46022 MAC. An LED display and switches provide alarm indication and acknowledgement and control point operation. Use the Smart MAC only with 46020-40 or 46020-41 MAPs.

46028 Control Point Module (CPM)

The 46028 CPM provides 16 relay outputs and time-out or latching relay operation. (You must wire both relay contacts.)

46029 Control Point Module (CPM)

The 46029 CPM is similar to the 46028 CPM except that one side of each 46029 CPM relay contact is bused together. You can connect the bused side of relays to ground or a voltage source.

46033 E-System Adapter

The 46033 E-System Adapter interfaces the 46020 MAP master port to an E-System alarm master and has front panel test jacks.

46034 Hubbing Module

The 46034 Hubbing Module provides eight RS-232 or RS-422 digital data ports that allow digital data summing, distribution or bridging. The ninth data port can be TTL, RS-232, RS-422, RS-485 or 202 tone.

46035 Converter Module

The 46035 Converter Module converts data communications from one interface to another. Interfaces supported are:

- TTL
- RS-232
- RS-422
- RS-485
- 108 and 202-type modem

The 46035 Converter Module has CA and CF interfacing.

46062 General Purpose Processor (GPP)

The 46062-02/03 GPP is part of the 46001 Status Monitor. The 46062-22 TL1 GPP with the TL1 GPP Editor converts standard alarm protocols to TL1 messages. See the ***Firmware and Software*** section for more information.

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46095 NEXCON

The 46095 NEXCON is a concentrator that combines eight ports of asynchronous data or X.25 synchronous data into a single high-speed X.25 port. This X.25 port transmits TL1 data and operates at up to 64 kilobits per second. The NEXCON supports switched virtual circuit (SVC) and permanent virtual circuit (PVC) operation. See the ***Firmware and Software*** section for more information.

46097 Optocoupler Interface Module

The 46097 Optocoupler Interface Module converts voltage alarm inputs to ground alarm outputs.

The module has 16 independent inputs and outputs. LEDs on the front panels light for each output when an alarm condition exists. Each alarm input can handle different voltage ranges depending on how you strap the module, such as 0V to +5V, +5V to 0V and –Batt. The module's optocoupler IC has an operating current range from 600 mA to 2 mA.

The module supplies voltage references of +5V, -12V and +12V.

You can connect the ground output to any of the following devices:

- 46009 and 46010 Multiple Alarm Transmitters (MATs)
- 46121 Scan and Control Interface
- 46131 and 46132 Alarm Processing Units
- 46210 Alarm Block
- 46220 Alarm and Control Block

46121 Scan and Control Interface (SCI)

The 46121 SCI is a remote alarm unit that scans 256 or 512 discrete alarm points and an optional 64 control point outputs.

46131 Alarm Processing Unit (APU)

The 46131 APU gathers alarm information from TBOS interrogator ports and local discretes and sends the information to alarm reporting equipment in the following protocols:

- TBOS
- TABS
- DCP
- DCPF

The 46131 APU also operates controls. Front panel wiring allows installation against a wall, such as in a controlled environment vault (CEV).

46210 Alarm Block

The 46210 Alarm Block is a remote alarm scanner for 256 inputs. The circuitry installs inside a wire-wrap terminal block. The terminal block mounts on a main distribution frame or 19" or 23" equipment rack.

46220 Alarm and Control Block (ACB)

The 46220 ACB contains remote alarm and control circuitry that installs inside a wire-wrap terminal block. The terminal block mounts on a main distribution frame or 19" or 23" equipment rack. The 46220 ACB has up to 192 alarm inputs and 32 control outputs.

48001 Fuse Module

The 48001 Fuse Module provides 13 indicating-type (GMT) fuses that are mounted on the front panel for easy replacement. The 48001 Fuse Module has one dual form-C relay for remote audible and visual indications of a blown fuse. The front panel contains fuse value indicators and an LED that indicates a tripped fuse.

49008 Current Loop Interface Subassembly (CLI)

The 49008 CLI provides current loop interfaces for EIA RS-422 and RS-485 standards. Use the 49008 CLI with any 460 ACS module that accepts subassemblies. Front panel LEDs indicate data transmission and receipt.

49013 Tone Modem Subassembly (49013 TM)

The 49013 TM is a Bell 202-compatible full-duplex modem that operates at 1200 baud. Use the 49013 TM on any 460 ACS module that accepts subassemblies. The 49013 TM features:

- Front panel test points
- Transmit level adjustment
- A carrier-detect LED
- Master/slave operation

49029 RS-232 CLI Subassembly

The 49029 CLI converts TTL data to RS-232 data and has more handshaking lines than the 49009 CLI. Use the 49029 CLI on any 460 ACS module that accepts subassemblies.

FIRMWARE AND SOFTWARE

The 46020 Multiple Alarm Processor (MAP) requires firmware installed in the 460 ACS. Firmware is a subassembly that provides system programming instructions. The subassembly mounts on the MAP.

Dantel also offers a variety of software packages for use with an IBM or compatible computer interfaced to the 460 ACS system.

MAP FIRMWARE

The most common firmwares are:

46600-35

Configure this firmware with switches that support three ports (and their corresponding protocols):

- Master port with DCP and TBOS.
- Printer port with DCP, TBOS and Printer Syntax.
- Data port with DCM, CPM Echo and TBOS.

The 46600-35 firmware monitors up to 2,048 alarms.

46600-38

This firmware is included in the 46020-38 MAP.

This firmware is the same as the 46600-35 firmware and also includes interrupt polling and DCPF protocol on the master and printer ports.

46640-01

This firmware is included in the 46020-40 MAP.

Configure this firmware with switches and -40 MAP Editor software that support three ports (and their corresponding protocols):

- Master port with DCP, DCPF, TBOS and TABS.
- Printer port with DCP, DCPF, TBOS, TABS and Printer Syntax.
- Data port with DCM, DCP, DCPF, TBOS, TABS and E-telemetry.

The 46640-01 firmware monitors up to 4,096 alarms.

46641-00

(included in the 46020-41 MAP)

This firmware is the same as the 46640-01 firmware and also includes additional support of SLC 96 and Series 5 devices.

Configure this firmware with switches and -41 MAP Editor software.

The 46641-00 firmware monitors up to 8,192 alarms.

Communication Ports

The firmware has three communication ports.

1. The data port communicates with remote alarm inputs and control point outputs.
2. The master port interfaces the alarm and control data to an operation center (such as TASC, SCOTS, TCAS, and NMA), using an E-System Adapter or TL1 GPP.
3. The printer port interfaces an ASCII printer, dumb terminal or a personal computer emulating a dumb terminal. The printer port can also act as a second master port.

Protocols

The 460 ACS supports a variety of protocols.

- DCM (Dantel CPM/MAT) protocol interrogates discrete alarm points at 46009 and 46010 MATs and operates control points at 46028 and 46029 CPMs. Custom DCM versions are available.
- CPM-Echo is an option used with DCM protocol. The ACS uses a CPM to "echo" an alarm from a MAT.
- TBOS (Telemetry Byte-Oriented Serial) protocol communicates with TBOS equipment.
- DCP (Data Communications Protocol (Iris 750 version)) communicates with a personal computer, Dantel's E-System Adapter or other MAPs.
- DCP Stacker protocol allows the MAP to take inputs from other MAPs, combine (stack) the data and report the data as a single output.
- DCPF is DCP protocol modified for improved error detection. A MAP uses DCPF protocol for communicating with Dantel's 46001 Status Monitor or 46062 TL1 GPP.
- TABS (Telemetry Asynchronous Block Serial) protocol communicates with equipment using TABS protocol.
- PRINTER is an ASCII format syntax that sends alarm system data to a printer. When you use the syntax with a dumb terminal, the syntax not only monitors alarm data but also operates control points and performs other command functions.

Upgrades

Dantel ships the latest firmware version with each order. The firmware resides in EPROMs mounted in sockets on the firmware subassembly. If a newer version becomes available, simply change the firmware by changing the EPROMs.

SOFTWARE

Dantel's T/Shell is a shell program where 460 ACS application-specific programs are loaded. Application-specific programs include:

- The Status Monitor Editor configures the 46001 Status Monitor.
- The TL1 GPP Editor configures the 46062 TL1 GPP for handling TL1 messages.
- The X.25 Editor configures the 46095 NEXCON.
- The 40 MAP Editor configures the 46020-40 MAP (with 46640-01 firmware).
- The 41 MAP Editor configures the 46020-41 MAP (with 46641-00 firmware).

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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