Allen-Bradley

MessageView 421 Display Terminals

Type 421D,421N,421F

User Manual

Important User Information

Because of the variety of uses for the products described in this publication, those responsible for the application and use of this control equipment must satisfy themselves that all necessary steps have been taken to assure that each application and use meets all performance and safety requirements, including any applicable laws, regulations, codes and standards.

The illustrations, charts, sample programs and layout examples shown in this guide are intended solely for purposes of example. Since there are many variables and requirements associated with any particular installation, Allen-Bradley does not assume responsibility or liability (to include intellectual property liability) for actual use based upon the examples shown in this publication.

Allen-Bradley publication SGI-1.1, *Safety Guidelines for the Application, Installation, and Maintenance of Solid-State Control* (available from your local Allen-Bradley office), describes some important differences between solid-state equipment and electromechanical devices that should be taken into consideration when applying products such as those described in this publication.

Throughout this manual we use notes to make you aware of safety considerations:

ATTENTION: Identifies information about practices or circumstances that can lead to personal injury or death, property damage or economic loss.

Attention statements help you to:

- identify a hazard
- avoid the hazard
- recognize the consequences

Important: Identifies information that is critical for successful application and understanding of the product.

Table of Contents

Using this Manual

This preface explains the layout of the manual. You will learn about:

- Contents of this manual
- Intended audience
- Conventions used
- Terminology
- Related publications

Overview of this Manual

The following table describes the contents of each chapter.

Chapter	Title	Purpose
	Preface	Provides an overview of the manual.
1	Terminal Overview	Describes the main features and operating capabilities of the MessageView terminals.
2	Initial Setup	Describes initial setup and gives an overview of basic terminal operation.
3	Front Panel Editor	Provides instructions on how to set up the terminal using the Front Panel Editor.
4	Running Applications	Describes common operator functions.
5	Installing the MessageView Terminal	Provides procedures for mounting the terminal in an enclosure or panel.
6	Remote I/O and RS-232 Connections	Describes how to connect a MessageView terminal to other devices using the RS-232 and Remote I/O ports.
7	Troubleshooting and Maintenance	Provides assistance in identifying and correcting common operating problems. Procedures for routine maintenance items are also provided.
Appendix A	Specifications	MessageView specifications.
Appendix B	Terminal Messages and Self Test Numbers	Lists terminal error and fault messages.
Appendix C	European Union Directive Compliance	Declaration of Conformity
	Cutout Templates	Full size mounting templates.

Intended Audience

You do not require any special knowledge to operate the MessageView™ terminal. Before running an application, you should know how to respond to messages which allow data entry or other inputs. This information is available from the application designer.

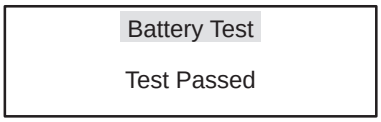
Equipment installers must be familiar with standard panel installation techniques.

For information relating to SLC™ or PLC® logic controllers or ASCII Triggering devices, refer to the appropriate user manuals.

Conventions

This manual uses the following conventions:

- we refer to a MessageView 421D, 421N or 421F Interactive Display Terminal as the terminal.
- we refer to MessageBuilder™ Configuration Software (Catalog No. 2706-MB1) as MessageBuilder software.
- we show MessageView terminal displays within a rectangular box:



Acronyms

You may see the following acronyms used in the MessageView user manual:

FPE	Front Panel Editor
HE Stack	Historical Event Stack
PLC	Programmable Logic Controller
POST	Power-On Self Test
RIO	Remote I/O
RTC	Real Time Clock
SLC	Small Logic Controller
VFD	Vacuum Fluorescent Display

Related Publications

The following table lists other publications related to the MessageView 421 terminals.

Publication Number	Description
2706-817	MessageBuilder Configuration Software User Manual
1770-4.1	Programmable Controller Wiring and Grounding Guidelines

Terminal Overview

This chapter covers the following topics:

- MessageView 421 Terminal types
- Intended uses
- 421D Terminal features
- 421N Terminal features
- 421F Terminal features
- Communications overview
- Applications
- Accessories and replacement parts.

MessageView 421 Terminal Types

The table below lists the types of MessageView 421 terminals. Differences in the terminals relate to the number of keys and communication port(s). Differences in the firmware relate to the communication protocols.

MessageView Terminal	Catalog Number	Number of Keys	Physical Port Main Daughter	Firmware Version (FRN)	Protocols
421D	2706-M1D1	4 Message Control Keys	RS-232 Remote I/O	1.02-1.xx	File Transfer, RIO
421N	2706-M1N1	4 Message Control Keys 12 Numeric Entry Keys	RS-232 Remote I/O	1.00-1.xx	File Transfer, RIO
421F	2706-M1F1	4 Message Control Keys 12 Numeric Entry Keys 16 Function Keys	RS-232 Remote I/0	1.00-1.xx	File Transfer, RIO
421D	2706-M1D1	4 Message Control Keys	RS-232 Remote I/O	2.00-2.xx	File Transfer, RIO, Slaving, ASCII Input
421N	2706-M1N1	4 Message Control Keys 12 Numeric Entry Keys	RS-232 Remote I/O	2.00-2.xx	File Transfer, RIO, Slaving, ASCII Input
421F	2706-M1F1	4 Message Control Keys 12 Numeric Entry Keys 16 Function Keys	RS-232 Remote I/0	2.00-2.xx	File Transfer, RIO, Slaving, ASCII Input
421D	2706-M1D	4 Message Control Keys	RS-232	1.00-1.xx	File Transfer, Slave Device, ASCII Triggering
421N	2706-M1N	4 Message Control Keys 12 Numeric Entry Keys	RS-232	1.00-1.xx	File Transfer, ASCII Triggering
421F	2706-M1F	4 Message Control Keys 12 Numeric Entry Keys 16 Function Keys	RS-232	1.00-1.xx	File Transfer, ASCII Triggering

All MessageView 421 terminals:

- require a 24V DC power source
- have a 128 x 32 pixel Vacuum Florescent Display (VFD)
- have an RS-232 port on the main board
- are programmed by an application created using MessageBuilder software
- can store up to 4096 messages and their data in a Historical Event Stack
- have multi-language capabilities
- support a debug and a simulate mode of operation.

Terminals with 2.xx firmware:

- can accept input from ASCII devices, such as bar code readers
- can act as a master device with one or more slaves.

2706–M1D, -M1N, and -M1F terminals:

- can be controlled via ASCII triggering
- (2706-M1D only) can act as a slave to a MessageView terminal or other master device.

Intended Uses

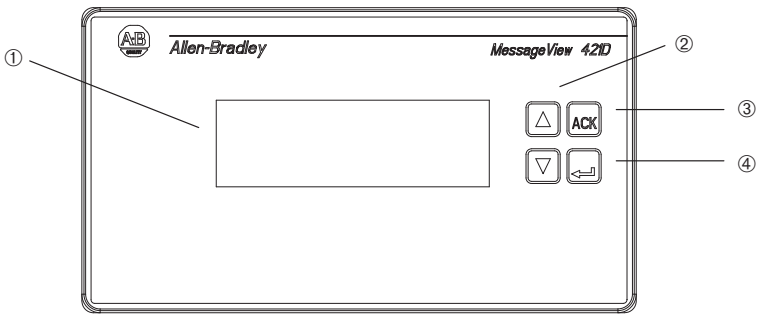
MessageView 421 terminals perform a variety of machine monitoring and control functions in a wide range of environmental conditions.

ATTENTION: Do not use a MessageView terminal for emergency stops or other controls critical to the safety of personnel or equipment. Use separate hard-wired operator interface devices that don't depend on solid state electronics.

421D Terminal Features

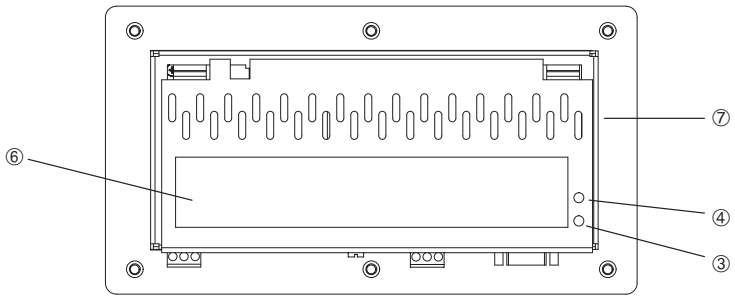
The following illustrations show the major features of the MessageView 421D terminals (Catalog Nos. 2706-M1D1 and -M1D).

Front View

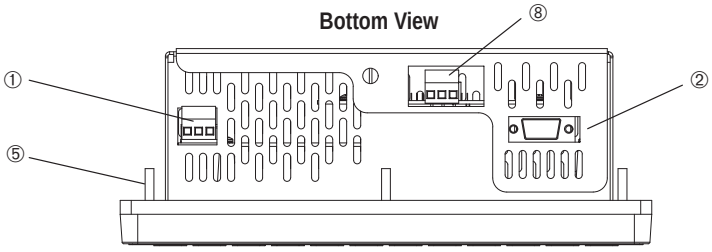


Item	Description
1	Vacuum Florescent Display (VFD) can display graphics and text: 4 lines of 21 quarter size characters 2 lines of 10 half size characters or 2 lines of 5 graphic symbols 1 line of 7 full size characters.
2	Up and Down cursor keys: Scroll through and highlight options on the Front Panel Editor menu Scroll through the Historical Event Stack.
3	ACK key acknowledges messages which require an operator response.
4	Enter key selects an option from the Front Panel Editor menu.

Back View



Bottom View

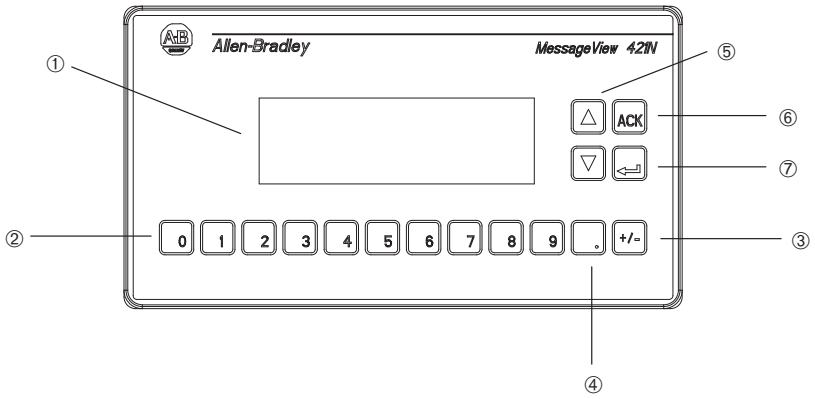


Item	Description
1	Terminal Power Port for 24V DC input. Accepts 18 to 30V DC.
2	RS-232 communications port connects to the RS-232 serial port of a computer for transferring applications.
3	Comm LED indicates when communication is occurring.
4	Fault LED indicates firmware and hardware faults.
5	Mounting studs secure the MessageView to an enclosure or panel.
6	Connection label provides connector pin descriptions and other product information.
7	Nameplate label provides catalog number, series letter, fuse rating, power input and other product information.
8	Remote I/O connector (Catalog No. 2706-M1D1).

421N Terminal Features

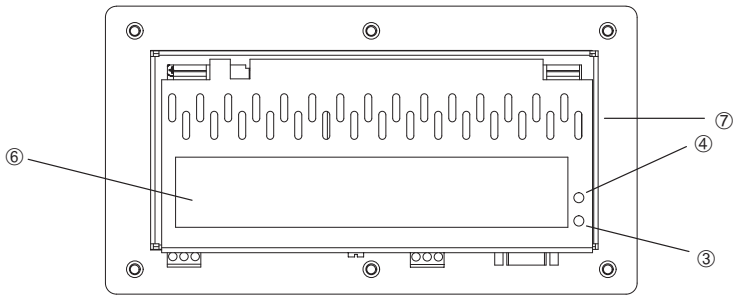
The following illustrations show the major features of the MessageView 421N terminals (Catalog No. 2706-M1N1 and -M1N).

Front View

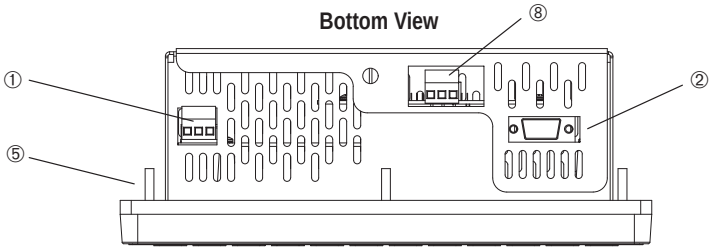


Item	Description
1	Vacuum Florescent Display (VFD) can display graphics and text: 4 lines of 21 quarter size characters 2 lines of 10 half size characters or 2 lines of 5 graphic symbols 1 line of 7 full size characters.
2	Numeric keys allow an operator to enter numeric values.
3	+ /- key for entering either positive or negative values.
4	Decimal point key for entering decimal values.
5	Up and Down cursor keys: Enter / edit numeric values Scroll through and highlight options on the Front Panel Editor menu Scroll through the Historical Event Stack Select data entry fields within a message.
6	ACK key acknowledges messages which require an operator response.
7	Enter key selects an option from the Front Panel Editor menu or sends data to a PLC/SLC.

Back View



Bottom View

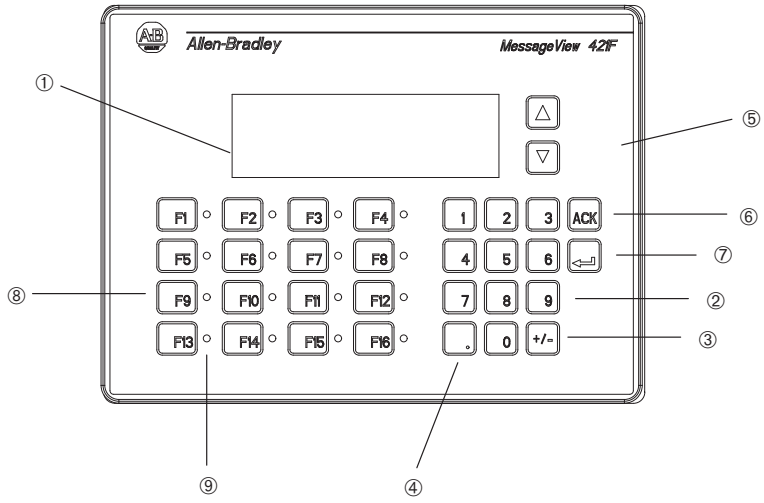


Item	Description
1	Terminal Power Port for 24V DC input. Accepts 18 to 30V DC.
2	RS-232 communications port connects to the RS-232 serial port of a computer for transferring applications.
3	Comm LED indicates when communications is occurring.
4	Fault LED indicates firmware and hardware faults.
5	Mounting studs secure the MessageView to an enclosure or panel.
6	Connection label provides connector pin descriptions and other product information.
7	Nameplate label provides catalog number, series letter, fuse rating, power input and other product information.
8	Remote I/O connector (Catalog No. 2706-M1N1).

421F Terminal Features

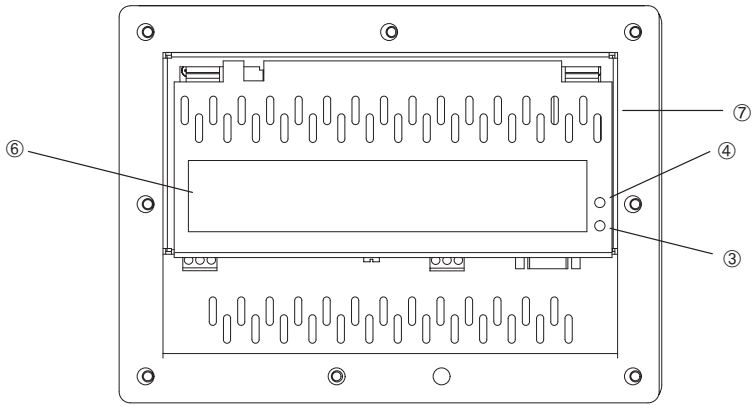
The following illustrations show the major features of the MessageView 421F terminals (Catalog No. 2706-M1F1 and -M1F).

Front View

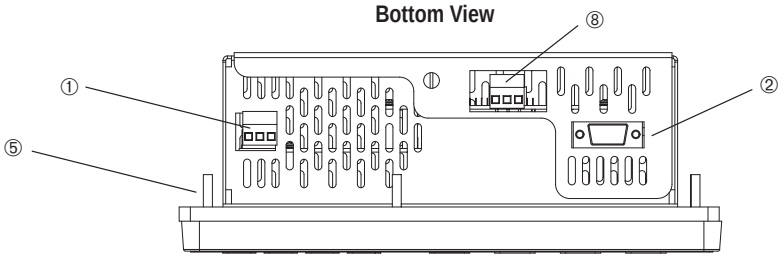


Item	Description
1	Vacuum Florescent Display (VFD) can display graphics and text: 4 lines of 21 quarter size characters 2 lines of 10 half size characters or 2 lines of 5 graphic symbols 1 line of 7 full size characters.
2	Numeric keys allow an operator to enter numeric values.
3	+ /- key for entering either positive or negative values.
4	Decimal point key for entering decimal values.
5	Up and Down cursor keys: Enter / edit numeric values Scroll through and highlight options on the Front Panel Editor menu Scroll through the Historical Event Stack Select data entry fields within a message.
6	ACK key acknowledges messages which require an operator response.
7	Enter key selects an option from the Front Panel Editor menu or sends data to a PLC/SLC.
8	Function keys may be assigned a variety of control functions and can operate in a momentary, maintained or latched mode.
9	LED indicators indicate the pressing of a function key or can be linked to any other process function.

Back View



Bottom View

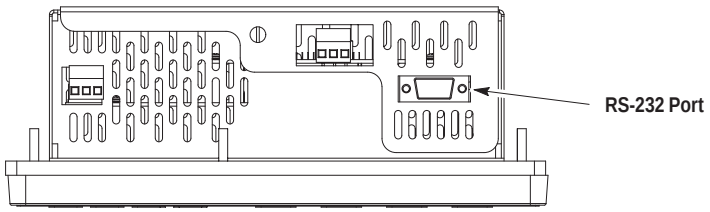


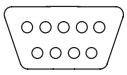
Item	Description
1	Terminal Power Port for 24V DC input. Accepts 18 to 30V DC.
2	RS-232 communications port connects to RS-232 serial port of a computer for transferring applications.
3	Comm LED illuminates when communications are occurring.
4	Fault LED indicates firmware and hardware faults.
5	Mounting studs secure the MessageView to an enclosure or panel.
6	Connection label provides connector pin descriptions and other product information.
7	Nameplate label provides catalog number, series letter, fuse rating, power input and other product information.
8	Remote I/O connector (Catalog No. 2706-M1F1).

Communications Overview

RS-232 Port

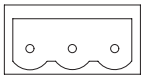
MessageView 421 terminals have a standard RS-232 port.





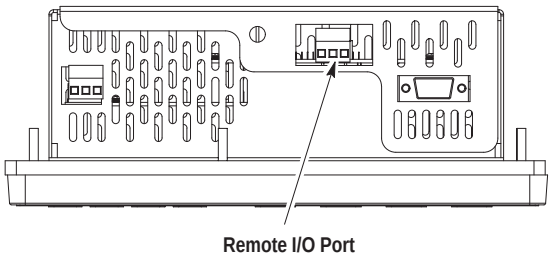
Use the RS-232 port to:

- download/upload MessageView applications from/to a personal computer
- upload Historical Event Stack to a personal computer
- download time and date to a MessageView terminal from a personal computer
- accept ASCII input or ASCII triggering
- send messages to a slave device
- accept commands as a slave device (Catalog No. 2706-M1D only).



Remote I/O Port

MessageView 421 terminals with a Remote I/O port (Catalog Nos. 2706-M1D1, -M1N1, -M1F1) can communicate with a logic controller on a Remote I/O network.

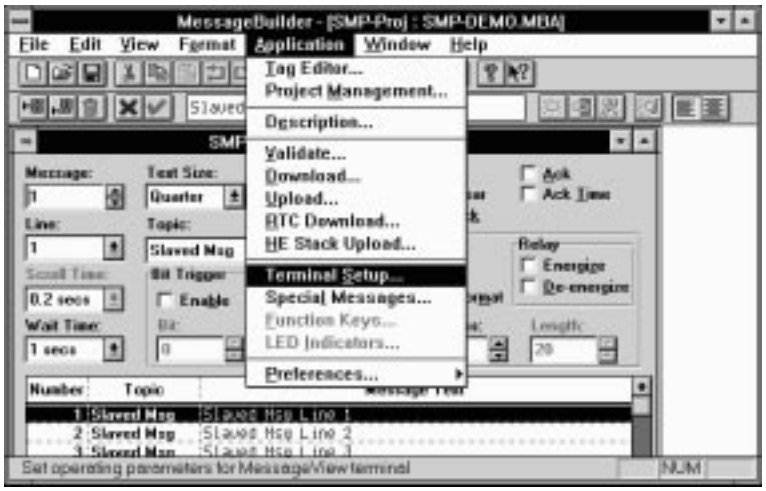


Use the Remote I/O port to:

- communicate with the Remote I/O scanner port on a PLC controller
- communicate with SLC controllers using a 1747-SN Remote I/O scanner module
- communicate with other Remote I/O scanners.

Applications

An application design engineer creates applications for the MessageView terminal using the MessageBuilder Configuration Software (Catalog No. 2706-MB1) on a personal computer.



An application consists of messages which are created and linked so that together they can display the status of an operation. The application also configures the terminal ports and defines the relationship between each variable and its logic controller address. The application is associated with a project, which defines the terminal and the devices connected to its ports.

Each message has its own display attributes, with graphic symbols, variable data displays, and variable data entry fields as required. The display attributes and data entry fields may be modified by the terminal operator, and will be discussed later in this manual.

When a message is triggered, it may appear in the terminal display, it may be sent to the Historical Event stack, and/or it may have other functions.

Accessories and Replacement Parts

Accessories

Item	Description	Catalog No.
MessageBuilder Software	Use MessageBuilder Software to create applications for the MessageView terminal. Windows based software runs on an IBM 386 compatible computer or better. Windows 3.1 or later is required.	2706-MB1
RS-232 Download / Upload Cable	Connects the MessageView terminal to the RS-232 port of a computer for application uploads or downloads. Both ends of the cable have female DB-9 connector. Length is 10 ft. (3 meters).	2706-NC13
Remote I/O Cable	Shielded, 3-conductor cable (Belden 9463), connects the Remote I/O port of a MessageView terminal to a Remote I/O network.	1770-CD

Replacement Parts

Item	Description	Part No.
Function Key Legend Kit	Set of 4 inserts on which you can write or type custom labels for 421F terminals. Each insert provides legends for 4 function keys.	W77128-116-52
Remote I/O Connector	Terminal block type connector plugs into the terminal's Remote I/O port. Screw terminals secure the cable wires.	22112-046-03
Power Connector	Terminal block type connector plugs into the Terminal Power Input connector. Screw terminals secure the cable wires.	22112-232-01
Fuse	2.0 Amp Slo-Blo 239 Series 2.0 Amp Time-Lag GMC Series	Purchase Locally

Initial Setup

This chapter covers the following topics:

- How to connect DC power
- Power-up sequence
- Terminal reset
- Front Panel Editor
- Function Key inserts
- Terminal messages.

How to Connect DC Power

The MessageView terminal accepts power supply voltages from 18 to 30 V DC (24V DC nominal). The terminal's power consumption is 20 W max. (833 mA @ 24 V DC). Electronic circuitry and an internal fuse protect the terminal from reverse polarity and over-voltage conditions.

Note: If the MessageView terminal is connected with reverse polarity, the terminal will not operate but is not damaged. As soon as the polarity is corrected, the terminal will operate normally.

ATTENTION: Do not connect the MessageView terminal to an AC power source. Connecting to an AC power source will damage the terminal.

ATTENTION: The MessageView terminal is designed for safe use when installed in a NEMA Type 12, 13 (4x indoor use only), IP65 enclosure.

To connect DC power to the terminal:

1. Unplug the 3-position removeable terminal block from the bottom rear of the terminal.

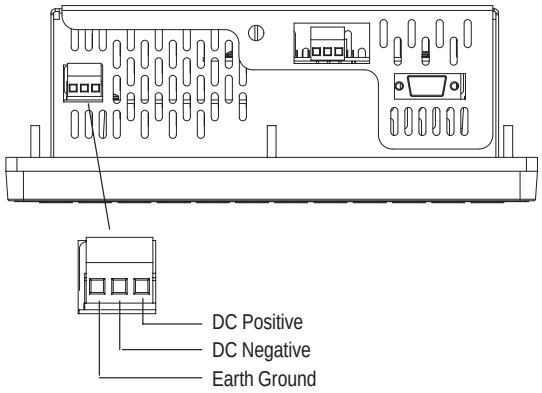
   Note: A terminal block connector plug is provided with each terminal. For additional plugs, order Replacement Part No. 22112-232-01.

2. Secure the DC power wires to the removeable terminal block via the terminal block screws.

ATTENTION: Improper wiring of the power terminals and Earth Ground may result in the terminal malfunctioning. Refer to power connection diagrams below when wiring.

Terminal Block Recommendations

Wire Size:	12-22 AWG
Strip Length:	.28 inches (7 mm)
Torque:	4.5 lbs./in (0.5 Nm)



3. Secure the Earth Ground wire to the removeable terminal block via the terminal block screws.

Important: Connect the Earth Ground wire to the nearest solid earth ground. (Earth ground signal path should be as short as possible).

4. Plug the removeable terminal block into the Terminal Power Port.

ATTENTION: Explosion Hazard – Do not connect or disconnect equipment while circuit is live unless area is known to be non-hazardous.

ATTENTION: Risque d’explosion - Ne pas brancher ou debrancher tant que le circuit est sous tension, a moins qu’il ne s’agisse d’un emplacement non dangereux.

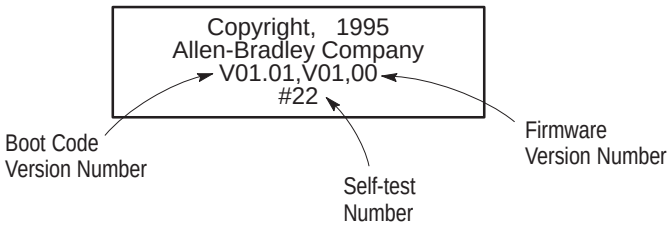
ATTENTION: Do not apply power to the terminal until all wiring connections have been made. Failure to do so may result in electrical shock.

5. Apply 24V DC power to the terminal.

Power-up Sequence

When power is first applied to the MessageView terminal or the terminal is reset, the terminal performs its Power-On Self Tests (POST). The initial display illuminates all of the display pixels in a random and varied brightness pattern.

Next the terminal displays copyright information and the status of the tests. As each test is performed its test number is displayed. See Page B–4 for descriptions of the tests.

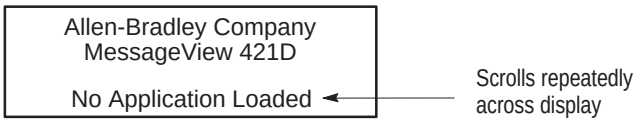


If a test fails, its test number is displayed. See Page B–4 for corrective action. Also take note of the boot code and firmware version numbers in case you have to call Allen-Bradley for technical support.

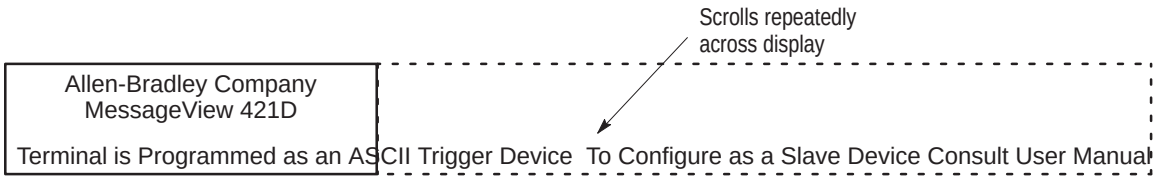
When the self-tests have completed and passed, the “Self-Tests Complete” message appears.

The MessageView terminal is shipped with a blank application in memory.

- A 421F or 421N terminal, or a 421D terminal with a daughterboard, displays this message:



- A 421D terminal without a daughterboard (Catalog No. 2706-M1D) may be controlled by an ASCII Trigger device or it may be configured as a slave device. This type of terminal displays the following message:



See Page 3–8 to configure the terminal as a 421D Slave Device.

Note: A 421D terminal used as a slave device does not need an application downloaded to it. The blank application allows it to display messages slaved to it.

If an application is loaded, one of these messages may be displayed if its attribute is set:

- startup message
  or
- background message

Terminal Reset

Terminal reset re-initializes the MessageView terminal, as if you turned the power off and on. To reset the terminal, simultaneously press the up arrow ▲, down arrow ▼ and Enter ↵ keys. The terminal performs the Power-On Self Test as it did during the power-up sequence.

Front Panel Editor

The Front Panel Editor allows you to:

- switch RS-232 port communication configuration, including viewing and changing communication settings
- select a language for Front Panel Editor and terminal messages
- change the type of values sent to the PLC on power–up or restart
- adjust several aspects of the display, including the startup and background messages
- run the application in debug or simulate mode
- run hardware and/or firmware tests on the terminal
- enable/disable password entry
- view or clear the Historical Event Stack
- set time and date.

Chapter 3 describes how to use the Front Panel Editor.

Function Key Inserts

MessageView 421F terminals (Catalog No. 2706-M1F1 and -M1F) have removeable function key legend inserts. The inserts are preprinted on one side with labels F1 through F16. The other side of the inserts have a blank white surface on which you can create custom labels.

Note: Two sheets of heavyweight paper are provided at the back of this manual so you can make your own custom inserts.

Replacement function key legend inserts are available by ordering the Function Key Legend Kit, Part No. W77128-116-52.

Terminal Messages

From time to time messages appear on the display that are not generated by the application. They:

- provide terminal status information during an operation
- indicate minor faults, errors or numeric/ASCII entry mistakes
- prompt operator to perform or not perform an action
- notify operator of an error that prevents further operations.

Downloading from a Computer

To download applications to the MessageView 421 terminals, refer to the MessageBuilder Configuration Software User Manual (Publication No. 2706-817).

To upgrade the firmware in your terminal, see the procedure in the MessageBuilder Configuration Software User Manual (Catalog Number 2706-817).

Note: The MessageView terminal shares its RS-232 port between communications with a computer that has MessageBuilder software installed, and communications with an Auxiliary Device. The terminal's RS-232 port must be switched (configured) to the proper setting before communications can be established. See Page 3–3 for instructions on switching the RS-232 port between MessageBuilder communication parameters and the auxiliary device communication parameters.

Front Panel Editor

This chapter covers the following topics:

- Functions of the Front Panel Editor (FPE)
- Accessing the Front Panel Editor
- “Change Port To:” menu item
- Selecting a Language
- Serial Communication
- Preset Operations
- Terminal Setup
- Self Tests
- Historical Event Stack
- Date/ Time.
- System Status

Functions of the Front Panel Editor (FPE)

Terminal configuration settings can be set from the terminal Front Panel Editor (with some restrictions) or from the MessageBuilder software when creating the application. You may change the terminal’s settings, or leave them as they are. The settings remain in effect even if the terminal is shut down or reset. When an application is downloaded, its settings override any changes made with the FPE for the last application.

The Front Panel Editor allows you to perform the following tasks:

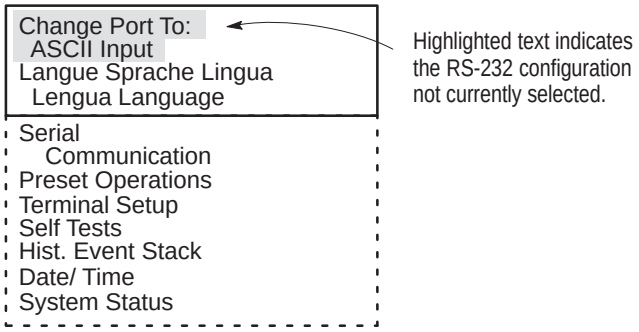
- switch between communicating with a computer and receiving input from an auxiliary ASCII device
- select a language for the Front Panel Editor and terminal messages (not including application messages)
- view and change communication settings
- change the type of values sent to the PLC on power–up or restart
- adjust brightness of the display
- set startup and background messages
- change the flash rate of characters, graphics etc. in messages
- run debug or simulate mode
- enable/disable password entry
- run Self Diagnostic tests
- change a 2706-M1D terminal from ASCII triggered device to a slave device, and back
- view or clear the Historical Event Stack
- set time and date.

Accessing the Front Panel Editor

Access the Front Panel Editor by simultaneously pressing the up ▲ and down ▼ arrow keys on the terminal keypad.

Note: While the Front Panel Editor is active, the terminal suspends Run Mode operations. No messages are triggered or displayed until you return the terminal to Run mode.

The Front Panel Editor has a menu which you can scroll through. Each item except the first opens a submenu with more options.



Note: The options enclosed by the solid rectangle represent the display when the Front Panel Editor is first brought up. The selected item is highlighted.

The options enclosed by the dotted line are other items in the FPE menu.

To select a menu item:

1. Use the up ▲ or down ▼ arrow keys to scroll to the item that you want to view or edit.
2. Press the Enter ↵ key to select the highlighted menu item.
3. If a menu appears, repeat the above two steps.
4. To return to the main menu, press the Ack ACK key.

To exit the Front Panel Editor and return to Run Mode:

Press the Ack ACK key

Or simultaneously press the up ▲ and down ▼ arrow keys.

Or reset the terminal by simultaneously pressing the up ▲ and down ▼ arrow and Enter ↵ keys.

"Change Port To:" Menu Item

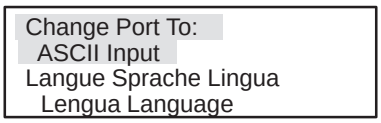
The first item on the menu is the "Change Port To:". This menu item toggles the RS-232 port configurations between the settings required for communicating with a computer containing MessageBuilder software and with an auxiliary device.

Note: MessageView terminal uses the same RS-232 port for communication with a computer containing MessageBuilder and with an auxiliary device. Thus the port must be configured to communicate with the correct device. To change the RS-232 port configuration, use this menu item.

To use the Change Port To: menu item:

1. Press the Enter key to change to the other option,
   - If the second line reads **MessageBuilder**, the terminal is configured to communicate with an auxiliary device.
   - If the second line reads the name of an auxiliary device, the terminal is configured to communicate with the computer containing MessageBuilder.
2. Press the Ack key to return to Run mode.

This display indicates that the RS-232 port is configured to communicate with a computer containing MessageBuilder:

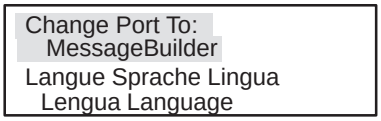


The terminal's RS-232 port is configured for communications with the computer containing MessageBuilder to:

- download an application so the terminal can run it
- upload the Historical Event Stack.
- upload an application for checking and revision
- download date and time to reset the RTC clock.

The terminal uses DF1 communications protocol to communicate with a computer containing MessageBuilder software. This protocol cannot be reconfigured from the terminal.

This display indicates that the RS-232 port is configured to communicate with an auxiliary device in the system:



The terminal can receive input from or transmit commands to a number of auxiliary devices. (See the previous page for the auxiliary devices.) The application has already configured the RS-232 Port for the device the system will be using. If necessary, you can change the settings by using the Serial Communication option (see Page 3–6).

Selecting a Language

Messages from the Front Panel Editor and the MessageView terminal can be displayed in any one of five languages:

- French
- German
- Italian
- Spanish
- English

Note: All Front Panel Editor and terminal messages are displayed in the selected language. Messages from the application are displayed in the language the application was written in.

To change the language:

1. Select **Language** from the Front Panel Editor (FPE) menu and press the Enter ↵ key.

   The Language submenu appears.

2. Use the up ▲ or down ▼ arrow keys to scroll through the available languages.
3. Press the Enter ↵ key to select and save the highlighted language.

   Or press the Ack ACK key to exit without changing the language.

The terminal returns to the FPE menu.

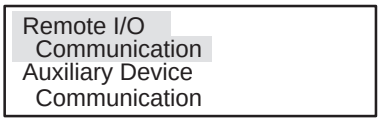
Serial Communication

This menu item allows the terminal operator to view and if necessary to modify the communication parameters used by the terminal's ports.

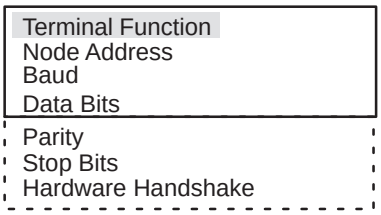
To select the type of communication:

Select **Serial Communication** from the FPE menu and press the Enter ↵ key. Depending on the type of MessageView terminal, one of these two menus will appear:

- Remote I/O terminals:



- ASCII Triggering or Slave Device terminals:

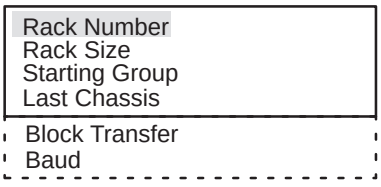


Remote I/O communication

The RIO port on the DaughterBoard is connected to a PLC or other logic controller. Its parameters are set via the application, and are view-only in the MessageView terminal FPE.

To view Remote I/O parameters:

1. Select **Remote I/O Communication** and press the Enter ↵ key to display the Remote I/O submenu.



Note: You can display the Remote I/O parameters in order to make sure the logic controller has the same settings.

This table lists the Remote I/O parameters.

Remote I/O Parameters	Description
Rack Number	Displays the current rack number (0 to 76) of the terminal.
Rack Size	Displays the current rack size of the terminal. The options are: $^1/_4$, $^1/_2$, $^3/_4$, Full rack.
Starting Group	Displays the starting module group of the terminal. The options are: 0,1 2,3 4,5 6,7
Last Chassis	Indicates if the terminal occupies the last module group in its assigned rack.
Block Transfer	Indicates whether block transfers are enabled or disabled for the terminal.
Baud Rate	Displays the Remote I/O baud rate. The options are: 57.6K (57600), 115.2K (115200), 230.4K (230400). With higher baud rates, you must use a shorter cable.

2. Use the up ▲ or down ▼ arrow keys to scroll through the communication parameters.
3. Press the Enter ↵ key to view one parameter at a time
4. Press the Ack ACK key to return to the Remote I/O submenu.
5. Press Ack ACK again to return to the Serial Communication submenu.
6. Press Ack ACK again to exit to the FPE menu.

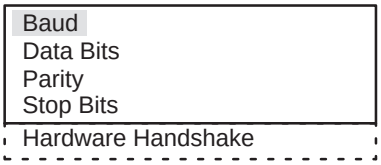
Auxiliary Device communication

The RS-232 port on the Main Board is initially connected to the computer that has MessageBuilder software installed. The DF1 parameters required for communicating with the computer cannot be changed either in the Front Panel Editor or in MessageBuilder software itself.

The RS-232 port may be set via the application to communicate with an auxiliary device required by the control system. You may view the settings or change them if necessary to match the communication parameters of the auxiliary device.

To view or edit RS-232 auxiliary device parameters in a RIO terminal:

1. Select **Auxiliary Device Communication** menu item and press the Enter key to display the Auxiliary Device submenu.



This table lists the RS-232 parameters you can edit using the Front Panel Editor.

RS-232 parameters	Description
Baud	Displays the current baud rate. The options are: 300, 1200, 2400, 9600, 19200, 38400.
Data Bits	Displays the current number of data bits. The options are: 7 and 8.
Parity	Displays the parity of the data. The options are: Odd, Even, and None.
Stop Bits	Displays the number of stop bits in the transmission. The options are: 1 and 2.
Hardware Handshake	Displays the status of the hardware handshake. The options are: Disabled and Enabled.

2. Use the up or down arrow keys to scroll through the communication parameters.
3. Press the Enter key to access the submenu for a selected parameter.
4. Use the up or down arrow keys to highlight an option.

   If the terminal has numeric keys, you can enter the numeric value.
5. Press the Enter key to save the highlighted setting and return to the Auxiliary Device submenu.

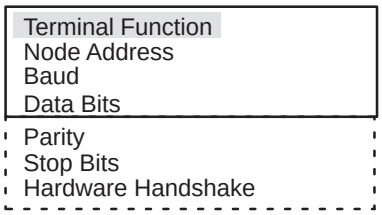
   Or press the Ack key to return to the Auxiliary Device submenu without changing the setting.
6. Press Ack again to return to the Serial Communication submenu.
7. Press Ack again to exit to the FPE menu.

ASCII Triggering or Slave Device communication

The RS-232 port is connected to an ASCII Triggering controlling device or to a master device. Its parameters are set via the application, and can be viewed and edited via the Front Panel Editor (FPE).

To view or edit RS-232 parameters in an ASCII Triggering or Slave Device terminal:

1. Select **Serial Communication** from the FPE main menu and press the Enter ↵ key to display the RS-232 port parameter submenu.



This table lists the RS-232 parameters you can edit using the Front Panel Editor.

RS-232 parameters	Description
Terminal Function	Displays the function of the terminal. (Not available on RIO terminals.) The options are: ASCII Trigger, Slave Device. ①
Node Address	Displays the node address of the MessageView terminal on the network. The options are: Integers from 1 to 127.
Baud	Displays the current baud rate. The options are: 300, 1200, 2400, 9600, 19200, 38400.
Data Bits	Displays the current number of data bits. The options are: 7 and 8.
Parity	Displays the parity of the data. The options are: Odd, Even, and None.
Stop Bits	Displays the number of stop bits in the transmission. The options are: 1 and 2.
Hardware Handshake	Displays the status of the hardware handshake. The options are: Disabled and Enabled.

① Slave Device is an option only for a 421D terminal without a daughterboard, Catalog No. 2706-M1D.

2. Repeat steps 2, 3 and 4 above.
3. Press the Enter ↵ key to save the highlighted setting and return to the Serial Communication submenu.

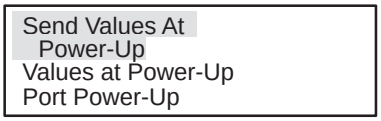
   Or press the Ack ACK key to return to the Serial Communication submenu without changing the setting.

4. Press Ack [ACK] to exit to the FPE menu.

Preset Operations

You can choose when and how the values in the logic controller are set when power to the terminal is applied, power is restored or the terminal is reset:

1. Highlight **Preset Operations** and press the Enter [↵] key to display the Preset Operations submenu.



2. Use the up [▲] or down [▼] arrow keys to scroll through the Preset Operations setup options.
3. Press the Enter [↵] key to access the submenu for a selected option.
4. Use the up [▲] or down [▼] arrow keys to highlight an option.
5. Press the Enter [↵] key to select and save the highlighted option.

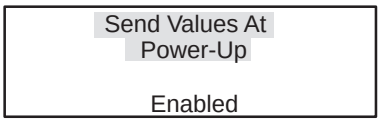
   Or press the Ack [ACK] key to exit without changing the option.
6. Press the Ack [ACK] key twice to return to the FPE menu.

Send Values At Power–Up

When the terminal is powered up, or is reset after an application has been running, values may be sent to the PLC or other logic controller for each variable.

To view or edit the Send Values at Power-Up option:

1. Select **Send Values At Power-Up** and press the Enter [↵] key to display the setting.



Note: This option is always disabled for ASCII Trigger or Slave Device MessageView terminal configurations (2706-M1D, -M1N, -M1F).

2. Use the up ▲ or down ▼ arrow keys to toggle between the options.

- Enabled: the terminal sends values at power-up
- Disabled: the terminal does not sent values at power-up.

3. Press the Enter ↵ key to save the displayed option and return to the Send Values at Power-up submenu.

   Or press the Ack ACK key to return to the Send Values at Power-up submenu without changing the option.

4. Press the Ack ACK key twice to return to the FPE menu.

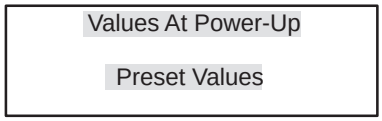
Values at Power-Up

The terminal may be shut down and restarted from time to time, with the same application loaded. You may choose whether the logic controller receives at every startup:

- the values of the variables when the application was downloaded
- the values of the variables just before the terminal was reset.

From the Preset Operations submenu:

1. Select **Values At Power-Up** and press the Enter ↵ key to display the Preset Values/Last Values option.



2. Use the up ▲ or down ▼ arrow keys to toggle between the options.

- **Preset Values** are the initial values assigned to each variable within the downloaded application.
- **Last Values** are the values of each variable prior to the power-down or reset of the MessageView terminal.

3. Press the Enter ↵ key to select the displayed option and return to the Values at Power-Up submenu.

   Or press the Ack ACK key to return to the Values at Power-Up submenu without changing the option.

4. Press the Ack ACK key twice to return to the FPE menu.

Important: One option was selected by the application designer when the application was created. If you need to change the setting, you must then reset the terminal. Either:

- cycle power to the terminal
- reset the terminal by pressing the up ▲, down ▼ and Enter ↵ keys simultaneously.

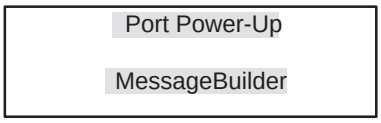
Note: This option defaults to Preset values and is read only for ASCII Trigger or Slave Device MessageView terminal configurations (2706-M1D, -M1N, or -M1F).

Port Power-Up (RS-232 port only)

The terminal may be shut down and restarted from time to time, with the same application loaded. You may choose which type of device the RS-232 port is set to communicate with at every startup:

- a computer which has MessageBuilder software loaded
- the auxiliary device in the system.

1. Select **Port Power-Up** and press the Enter ↵ key to display the Port option.



2. Use the up ▲ or down ▼ arrow keys to toggle between the options. Whenever the terminal is restarted:

- the **MessageBuilder** option configures the terminal to communicate with the computer containing MessageBuilder software.
- the **Auxiliary** option configures the terminal to communicate with the auxiliary device: ASCII Trigger device, slave device, ASCII Input device.

3. Press the Enter ↵ key to select the displayed option and return to the Port Power-Up submenu.

   Or press the Ack ACK key to return to the Port Power-Up submenu without changing the option.

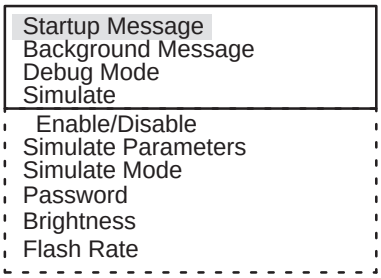
4. Press the Ack ACK key twice to return to the FPE menu.

Terminal Setup

The Terminal Setup option on the Front Panel Editor (FPE) menu allows you to select setup options and modes of operation.

To change the Terminal Setup:

1. Select **Terminal Setup** from the FPE menu and press the Enter ↵ key. The Terminal Setup submenu appears.



2. Use the up ▲ or down ▼ arrow keys to scroll through the Terminal Setup options.
3. Press the Enter ↵ key to select the highlighted option.
4. Use the up ▲ or down ▼ arrow keys to toggle between the options.
5. Press the Enter ↵ key to select the displayed option and return to the Terminal Setup submenu.

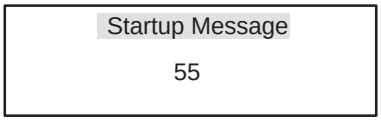
   Or press the Ack ACK key to return to the Terminal Setup submenu without changing the option.
6. Press the Ack ACK key to return to the FPE menu.

Startup Message

The Startup Message is the first message displayed at initial terminal powerup or reset. The default startup message is downloaded with the application.

To view or change the startup message number:

1. Select **Startup Message** from the Terminal Setup submenu. Press the Enter ↵ key to display the current Startup message



2. Use the up ▲ or down ▼ arrow keys to scroll through the available message numbers.

   Or enter a message number using the numeric keypad if the terminal is 421N or 421F.

   Note: If you use the numeric keypad to enter a Startup Message number, the arrow keys work as follows:

   ▲ Increments the number starting with the number you just entered.

   ▼ Deletes the last digit of the number you just entered.

3. Press the Enter ↵ key to select the displayed message number and return to the Terminal Setup submenu.

   Or press the Ack ACK key to return to the Terminal Setup submenu without changing the message number.

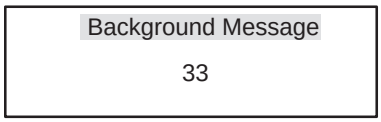
4. Press the Ack ACK key to return to the FPE menu.

Background Message

The Background Message is displayed when no other message is active. The default background message is downloaded with the application.

To view or change the background message:

1. Select **Background Message** from the Terminal Setup submenu. Press the Enter ↵ key to display the number of the current Background Message.



2. Use the up ▲ or down ▼ arrow keys to scroll through the available message numbers.

   Or enter a message number using the numeric keypad if the terminal is 421N or 421F.

   Note: If you use the numeric keypad to enter a Background Message number, the arrow keys work as follows:

   ▲ Increments the number starting with the number you just entered.

   ▼ Deletes the last digit of the number you just entered.

3. Press the Enter ↵ key to select the displayed message number and return to the Terminal Setup submenu.

   Or press the Ack ACK key to return to the Terminal Setup submenu without changing the message number.

4. Press the Ack ACK key to return to the FPE menu.

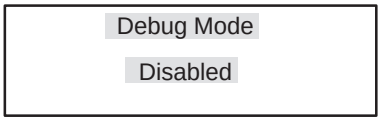
Debug Mode

In Debug Mode the terminal displays only message numbers as messages are triggered. Use Debug Mode to assist with troubleshooting.

Debug mode is either enabled or disabled. The default setting is downloaded with the application.

To enable or disable Debug Mode:

1. Select **Debug Mode** from the Terminal Setup submenu. Press the Enter key to display the current status of Debug Mode.



2. Use the up or down arrow keys to toggle between **Disabled** and **Enabled**. The current setting is displayed as highlighted text.
3. Press the Enter key to save the option and return to the Terminal Setup submenu.

   Or press the Ack key to return to the Terminal Setup submenu without changing the option.
4. Press the Ack key to return to the FPE menu.

Note: When Debug Mode is enabled, if a message number is triggered that is not defined in the application, the terminal will display an error message which includes the undefined number.

Simulate Message feature

The Simulate feature runs an application without being physically connected to a controller. This allows the terminal to display the application messages without being triggered from a remote controller.

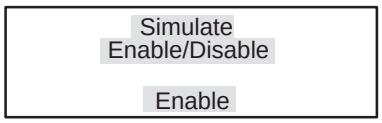
While the Simulate feature is enabled, the terminal stops all communications with the controller and does not display communication error messages. The terminal displays all application messages as though they were triggered. Variable data fields in messages are replaced with asterisks (****).

The Simulate feature may be enabled or disabled. When enabled it may be run as a single pass or cycle continuously. Any part of the application may be run by:

- specifying its start and stop message numbers
- chaining messages (in MessageBuilder software) to the assigned Start message.

To enable or disable the Simulate feature:

1. Select **Simulate Enable/Disable** from the Terminal Setup submenu and press the Enter key. The current Simulate Mode status is displayed as highlighted text.

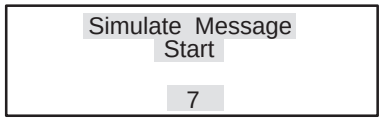


2. Use the up or down arrow keys to toggle between **Disabled** and **Enabled**.
3. Press the Enter key to save the selected status and return to the Terminal Setup submenu.

   Or press the Ack key to return to the Terminal Setup submenu without changing the status.
4. Press the Ack key to return to the FPE menu.

To specify the Simulate Start/Stop message numbers:

1. Select **Simulate Parameters** from the Terminal Setup submenu and press the Enter ↵ key. A dialog asks for the message number the Simulate feature will start with



2. Use the up ▲ or down ▼ arrow keys to increment or decrement the message number.

   Or enter a message number using the numeric keypad if the terminal is 421N or 421F.

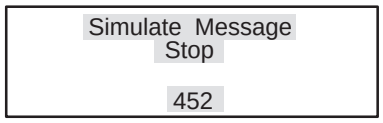
   Note: If you use the numeric keypad to enter a Start Message number, the arrow keys work as follows:

   ▲ Increments the number starting with the number you just entered.

   ▼ Deletes the last digit of the number you just entered.

3. Press the Enter ↵ key to select the displayed Start message number and display the ending message number entry screen.

   Or press the Ack ACK key to return to the Terminal Setup submenu without changing the Start message number.



   Note: In order to access the Stop message number dialog, you must press enter while in the Start message number screen.

4. Enter the message number as in #2 above.

5. Press the Enter ↵ key to save the message numbers and return to the Terminal Setup submenu.

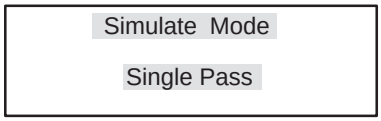
   Or press the Ack ACK key to return to the Terminal Setup submenu without saving anything.

6. Press the Ack ACK key to return to the FPE menu.

Note: In the above example, messages 7 to 452 will be simulated.

To specify the Simulate Mode

1. Select **Simulate Mode** from the Terminal Setup submenu and press the Enter ↵ key. A dialog allows you to toggle between a simulation lasting for only a single pass, and a simulation cycling continuously through many passes.



2. Use the up ▲ or down ▼ arrow keys to toggle between:

- **Single Pass.** This mode will trigger messages starting with the Simulate Message Start parameter (message number) and end with the Simulate Message Stop parameter. Each message within the start/stop range will be triggered once.
- **Continuous.** This mode will trigger messages starting with the Simulate Message Start parameter (message number) and end with the simulate Message Stop parameter. Once each message within the start/stop range is triggered, the process starts over. The MessageView terminal continues to cycle through the messages until the Simulate feature is disabled or the Simulate mode is set to Single Pass. In the latter case, it will run through the cycle one last time.

3. Press the Enter ↵ key to save the option and return to the Terminal Setup submenu.

   Or press the Ack ACK key to return to the Terminal Setup submenu without saving anything.

4. Press the Ack ACK key to return to the FPE menu.

Password Enable/Disable

A password provides a means of restricting access to the Front Panel Editor of the MessageView terminal. If a password has been specified in the application it can be enabled or disabled from the FPE, but it cannot be changed.

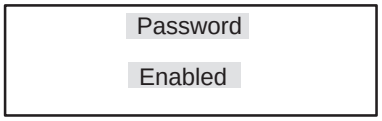
The password selection menu will be view-only if the password feature is not available, either:

- because it was not defined in the application, or
- because Terminal 421D cannot support it.

Note: The password option is not available on 421D versions of the MessageView terminal because the 421D terminal has no numeric keys.

To enable or disable Password Entry:

1. Select **Password** from the Front Panel Editor menu. Press the Enter ↵ key to display the current Password status.



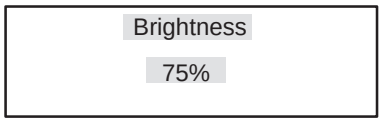
2. Use the up ▲ or down ▼ arrow keys to toggle between **Disabled** and **Enabled**. If the password option was not defined in the application software, the arrow keys are ineffective.
3. Press the Enter ↵ key to save the option and return to the Terminal Setup submenu.

   Or press the Ack ACK key to return to the Terminal Setup submenu without saving anything.
4. Press the Ack ACK key to return to the FPE menu.

Display Brightness

The display can be set to different brightness levels. You may prefer to have a different setting than that set by the application designer.

1. Select **Brightness** from the Front Panel Editor menu. Press the Enter ↵ key to display the current level of brightness.



2. Use the up ▲ or down ▼ arrow keys to select an available setting.

   Options are 12%, 25%, 38%, 50%, 60%, 75%, 87%, and 100%.

   Note: The brightness of the dialog box shows how the display will appear with the current setting. This helps you decide which level of brightness will work best.

3. Press the Enter ↵ key to save the setting and return to the Terminal Setup submenu.

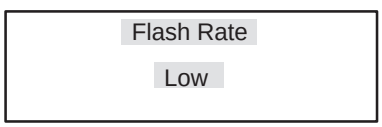
   Or press the Ack ACK key to return to the Terminal Setup submenu without saving anything.

4. Press the Ack ACK key to return to the FPE menu.

Flash Rate

A message may have flashing characters, or in some cases the whole message may flash. You may prefer to have a different flash rate than that set by the application designer.

1. Select **Flash Rate** from the Front Panel Editor menu. Press the Enter ↵ key to display the current level of brightness.



2. Use the up [▲] or down [▼] arrow keys to select an available setting:

Rate Selected	Speed (approximate)
None	Even if application uses Flash, it will not have any effect in the display.
Low	Once a second (1 sec. on/off)
Med	Twice a second (0.5 sec. on/off)
High	Ten times a second (0.1 sec. on/off)

Note: The flash rate of the text in the dialog box shows how flashing text will appear with the current setting. This helps you decide which flash rate will work best.

3. Press the Enter [↵] key to save the setting and return to the Terminal Setup submenu.

   Or press the Ack [ACK] key to return to the Terminal Setup submenu without saving anything.

4. Press the Ack [ACK] key to return to the FPE menu.

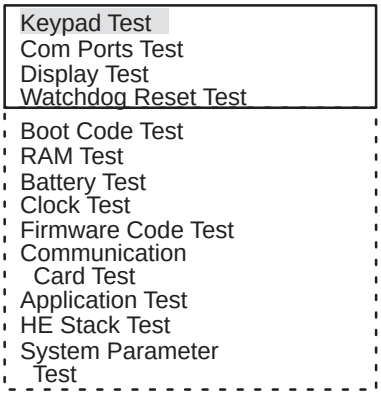
Self Tests

The status of the terminal is checked every time it is powered up or restarted, using the Power On Self Test (POST). Individual parts of the system may also be checked using the Self Tests on the Front Panel Editor menu.

Note: If you suspect that more than one test may be needed, don't select several tests from the menu. It is more efficient to cycle power, or to select the Watchdog Reset test, and have the terminal perform all its Power On Self Tests (POST).

To perform a Self Test:

1. Select **Self Tests** from the Front Panel Editor menu. Press the Enter [↵] key to display the Self Tests menu.



2. Use the up ▲ or down ▼ arrow keys to highlight a test.
3. Press the Enter ↵ key to run the highlighted test.

   Or press the Ack ACK key to return to the Self Tests submenu without running any (more) tests.

   Note: If one of these tests fails, see Page B–2 for a list of the tests and their explanation.

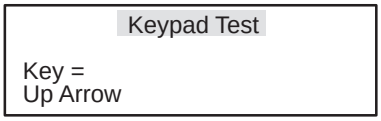
4. After the test is completed, press the Ack ACK key if necessary to return to the Self Tests submenu.
5. Press Ack ACK again to return to the Front Panel Editor (FPE) menu.

To perform the Keypad Test

This tests each key on the terminal's front panel.

1. Highlight **Keypad Test** and press the Enter ↵ key to initiate the test.
2. Press and hold each key to test its operation. If the key is operating correctly, the name of the key is displayed. When the key is released, the name is replaced by the word Released.

   For example, if you press the up ▲ arrow key, this message appears:



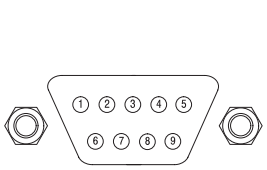
   If the test fails, see Page B–4.

3. Press the Ack ACK key last, to test the Ack key and to exit the Keypad Test and return to the Self Tests menu.
4. Press Ack ACK again to return to the FPE menu.

To perform the Com Ports Test

This tests the RS-232 port. The RIO port (if present) is tested in the Communication Card test.

1. Attach a 9–pin Sub-D loopback test connector to the RS-232 port:



RS-232 port

Pinout of Test Connector

1		
2	Jumper	
3	nc	
4	nc	
5	nc	
6	nc	
7		
8	Jumper	
9	nc	

2. Highlight **Com Ports Test** and press ↵ to run the test.

   The result of the test is displayed at once:

Comm Ports Test
Test Passed

   If the test fails, see Page B–4.

3. Press the Ack [ACK] key to return to the Self Tests submenu.

4. Press Ack [ACK] again to exit to the FPE menu.

To perform the Display Test

This test lights every pixel in an alternating pattern at two brightness levels. It verifies that each pixel is working properly. In 421F terminals, it also tests all the LEDs.

1. Highlight **Display Test** and press ↵ to run the test.

   The pixels in the display and (if present) the LEDs on the front panel are tested for a few seconds, then the result of the test is displayed.

Display Test
Test Passed

   If the test fails, see Page B–4.

2. Press the Ack [ACK] key to return to the Self Tests submenu.

3. Press Ack [ACK] again to return to the FPE menu.

To perform the Watchdog Reset Test

This tests the safety watchdog timer, which monitors terminal hardware and software. If there is a loss of activity (terminal lockup) during Run Mode, the watchdog timer resets the terminal.

1. Highlight **Watchdog Reset Test** and press [↵] to initiate the test.

2. Press the [ACK] key when requested.

   Or press [↵] to return to the Self Tests submenu.

   If the test fails, see Page B–4.

The terminal is reset and all the Self Tests are performed, just as they are when up [▲], down [▼] and [↵] keys are pressed simultaneously.

The terminal returns to Run mode after completing the Watchdog Reset Test.

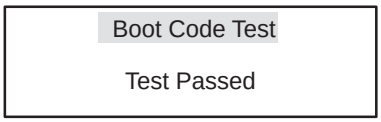
Note: When the Watchdog Reset Test runs it clears the message Queue and the terminal's internal buffers.

To perform the Boot Code Test

This tests the validity of the Boot Code, which allows the terminal to power up.

1. Highlight **Boot Code Test** and press [↵] to run the test.

   The result of the test is displayed at once.



   If the test fails, see Page B–4.

2. Press the Ack [ACK] key to return to the Self Tests submenu.

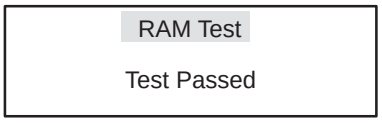
3. Press Ack [ACK] again to return to the FPE menu.

To perform the RAM Test

This tests the validity of the terminal's RAM memory. The Historical Event Stack, message Queue and internal buffer information are stored in RAM.

1. Highlight **RAM Test** and press ↵ to run the test.

   The result of the test is displayed at once.



   If the test fails, see Page B–4.

2. Press the Ack ACK key to return to the Self Tests submenu.

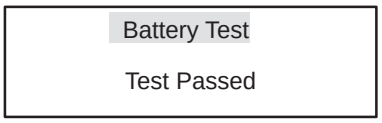
3. Press Ack ACK again to return to the FPE menu.

To perform the Battery Test

The terminal battery supplies power to the Real Time Clock and memory chips so that time, system parameters and HE Stack information are maintained while power is disconnected from the terminal.

1. Highlight **Battery Test** and press ↵ to run the test.

   The result of the test is displayed at once.



   If the test fails, see Page B–4.

2. Press the Ack ACK key to return to the Self Tests submenu.

3. Press Ack ACK again to return to the FPE menu.

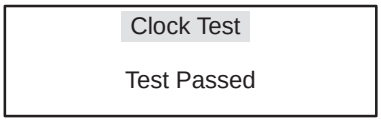
To perform the Clock Test

This tests the validity of the Real Time Clock (RTC) in the terminal. The RTC is used when a Date or Time variable is displayed in a message. It is also used to time-stamp messages sent to the HE Stack file.

Note: The Clock Test does not check if the time is correct.

1. Highlight **Clock Test** and press ↵ to run the test.

   The result of the test is displayed at once.



   If the test fails, see Page B–4.

2. Press the Ack ACK key to return to the Self Tests submenu.

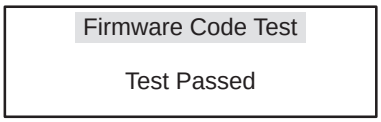
3. Press Ack ACK again to return to the FPE menu.

To perform the Firmware Code Test

This tests the validity of the firmware in the terminal's memory. Firmware configures and runs the terminal. (An application contains the communication parameters and user-defined messages.)

1. Highlight **Firmware Code Test** and press ↵ to run the test.

   The result of the test is displayed at once.



   If the test fails, see Page B–4.

2. Press the Ack ACK key to return to the Self Tests submenu.

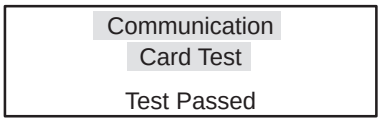
3. Press Ack ACK again to return to the FPE menu.

To perform the Communication Card Test

This verifies the communication connection between the internal Main Logic Board and the protocol-specific Remote I/O daughterboard. (The RS-232 port is checked in the Com Ports test.)

1. Highlight **Communication Card Test** and press ↵ to run the test.

   The result of the test is displayed at once.



   If the test fails, see Page B–4.

2. Press the Ack ACK key to return to the Self Tests submenu.

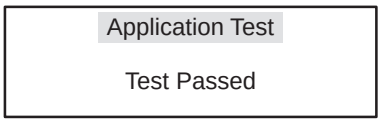
3. Press Ack ACK again to return to the FPE menu.

To perform the Application Test

This verifies the validity of the application stored in the terminal. An application is a program designed and downloaded using the MessageBuilder software.

1. Highlight **Application Test** and press ↵ to run the test.

   The result of the test is displayed at once.



   If the test fails, see Page B–4.

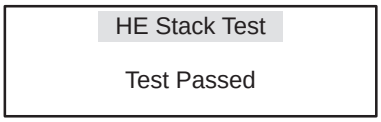
2. Press the Ack ACK key to return to the Self Tests submenu.

3. Press Ack ACK again to return to the FPE menu.

To perform the HE Stack Test

This tests the validity of the Historical Event Stack. See Page 3–29 for a discussion of what the HE Stack does and how to use it.

1. Highlight **HE Stack Test** and press ↵ to run the test.
   The result of the test is displayed at once.



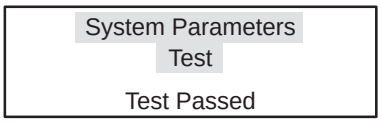
   If the test fails, see Page B–4.

2. Press the Ack ACK key to return to the Self Tests submenu.
3. Press Ack ACK again to return to the FPE menu.

To perform the System Parameters Test

This tests the validity of the terminal's internal parameters.

1. Highlight **System Parameters Test** and press ↵ to run the test.
   The result of the test is displayed at once.



   If the test fails, see Page B–4.

2. Press the Ack ACK key to return to the Self Tests submenu.
3. Press Ack ACK again to return to the FPE menu.

Historical Event Stack

The terminal can create an Historical Event (HE) Stack which is a log of selected triggered messages, including their embedded variable data.

- Messages that have the HE Stack attribute enabled in the MessageBuilder Software are logged to the Historical Event Stack every time they are triggered.
- Messages with this attribute disabled are not logged, no matter how often they are triggered.

Note: A message is not necessarily displayed after it is triggered. However it is logged if its HE Stack attribute is enabled, whether displayed or not.

Certain messages require the terminal operator to acknowledge them. If the Ack Time attribute is enabled for such a message, the time the ACK button is pressed will be logged into the HE Stack as well as the triggered time.

The date and time for each message is entered into the HE Stack as follows:

Message displayed	Message requires acknowledgement	Ack Time attribute	Date/Time Stamp entered in the HE Stack
No	No	Disabled	when triggered
Yes	No	Disabled	when triggered
Yes	Yes	Disabled	when triggered
Yes	Yes	Enabled	when triggered, also when acknowledged

You can view the Historical Event Stack in either of two formats:

- **Frequency of Occurrence**

  The contents of the Historical Event Stack appear in descending order of occurrences (maximum to minimum). This view displays up to 100 of the most frequent message events.

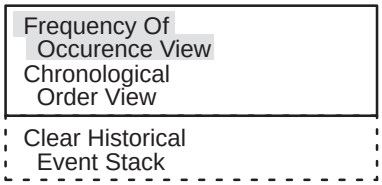
- **Chronological Order**

  The contents of the Historical Event Stack appears in the order the message occurred, oldest to newest message.

Note: The computer operator may also upload the HE stack using MessageBuilder software. Before this can be done, the terminal must be switched to the MessageBuilder option using the Change Port To: menu item on the on the FPE. See Page 3–3.

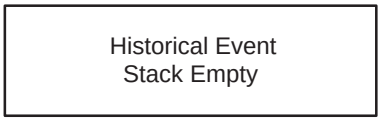
To view the contents of the Historical Event Stack

1. Select **Historical Event Stack** from the Front Panel Editor menu and press the Enter key to display the Historical Event Stack submenu.



2. Use the up or down arrow keys to highlight the **Frequency of Occurrence View** or the **Chronological Order View**.
3. Press the Enter key to select the highlighted option.

If there are no messages in the HE Stack, the following is displayed:



To view the HE Stack by Frequency of Occurrence

1. Select **Frequency of Occurrence View** from the Historical Event (HE) Stack submenu and press the Enter key.

   Note: You cannot view an empty HE Stack.

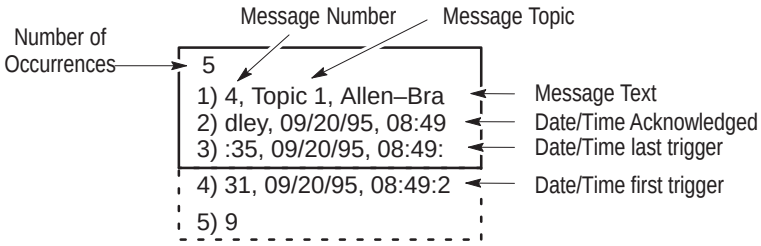
   The contents of the HE Stack are displayed. For each message the following are included:

   - number of occurrences

     Note: The message with the most occurrences in the HE Stack is displayed first.

   - message number
   - message topic
   - message text, including placeholders for embedded variables and graphic symbols
   - date/time message was acknowledged (if this option was enabled for the message)
   - date/time message first triggered
   - date/time message last triggered

The example below shows the Frequency of Occurrence View.



2. Use the up ▲ or down ▼ arrow keys to scroll through the HE Stack.

   Note: Hold down the ▲ or ▼ keys to scroll through the HE Stack rapidly.

3. Press the Ack ACK key to return to the HE Stack submenu.
4. Press Ack ACK again to return to the FPE menu.

To view the HE Stack in Chronological Order

1. Select **Chronological Order View** from the Historical Event (HE) Stack submenu and press the Enter ↵ key.

   Note: You cannot view an empty HE Stack.

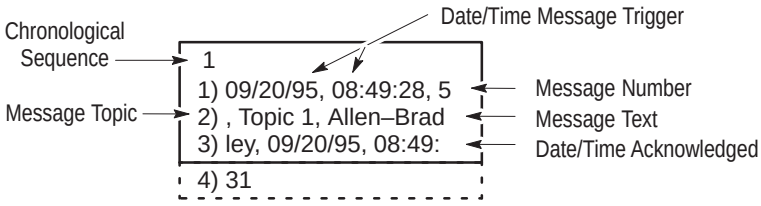
   The contents of the HE Stack are displayed. For each message the following are included:

   - date/time of message trigger

     Note: The message with the most recent date/time stamp in the HE Stack is displayed first.

   - message number
   - message topic
   - message text, data display variables, and placeholders for data entry variables
   - date/time message acknowledged (if this option was enabled for the message)

   The example below shows an example of the Chronological Order View.



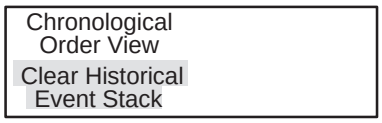
2. Use the up ▲ or down ▼ arrow keys to scroll through the HE Stack.

   Note: Hold down the ▲ or ▼ keys to scroll through the HE Stack rapidly.

3. Press the Ack ACK key to return to the HE Stack submenu.
4. Press Ack ACK again to return to the FPE menu.

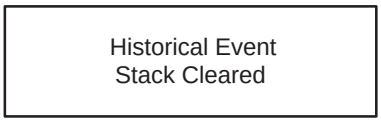
To clear the Historical Event Stack

1. Select **Clear Historical Event Stack** from the Front Panel Editor menu and press the Enter ↵ key to display the Historical Event Stack submenu.



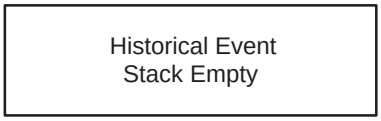
2. Use the down ▼ arrow key to highlight the **Clear Historical Event Stack** option.
3. Press the Enter ↵ key to clear the HE Stack contents.

- If the HE Stack contained data, this message is displayed.



  After 2 seconds, the display returns to the Historical Event Stack submenu.

- If there were no messages in the HE Stack, this message is displayed.



  After 2 seconds, the display returns to the Historical Event Stack submenu.

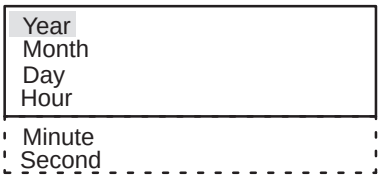
4. Press the Ack ACK key to return to the FPE menu.

Date/Time

The Date/Time option on the Front Panel Editor menu allows you to set the date and time of the terminal's Real Time Clock (RTC). The RTC Download feature of the MessageBuilder software may also be used to set the RTC. Refer to MessageBuilder Software manual.

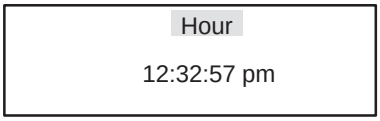
To set the time and date:

1. Select **Date/Time** from the Front Panel Editor menu. Press the Enter key to display the Date/Time submenu.



2. Use the up or down arrow keys to scroll through the available options.
3. Press the Enter key to select the highlighted option.

   The current date or time in the RTC is displayed. At the top of the display is the item you selected for change. For example:



4. Press the up or down arrow keys to change the selected time or date. Numeric keys are not active for this option.

Note: Seconds are displayed only if that option is enabled in the application. If you select the Second option when it is disabled, the display reads:

5. Press the Enter key to save the settings and return to the Date/Time submenu.

   Or press the Ack key to return to the Date/Time submenu without changing the settings.

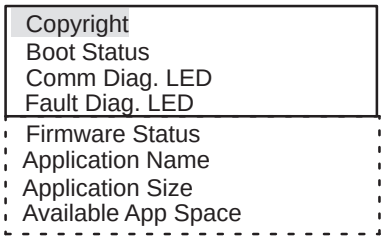
6. Press Ack again to return to the FPE menu.

System Status

Certain useful aspects of the MessageView terminal may be checked using the System Status menu on the Front Panel Editor (FPE).

To check the terminal:

1. Select **System Status** from the Front Panel Editor menu. Press the Enter ↵ key to display the System Status submenu.



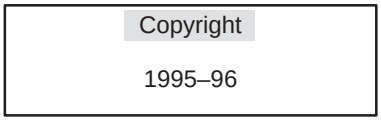
2. Use the up ▲ or down ▼ arrow keys to scroll through the available options.
3. Press the Enter ↵ key to select the highlighted option.

   Note: These options are all read-only.
4. Press the Ack ACK key to return to the System Status submenu.
5. Press Ack ACK again to return to the Front Panel Editor (FPE) menu.

To check the copyright date:

This displays the copyright date(s) of the terminal.

1. Highlight **Copyright** and press the Enter ↵ key to display the date.

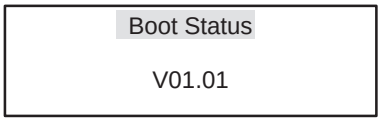


2. Press the Ack ACK key to return to the System Status submenu.
3. Press Ack ACK again to return to the FPE menu.

To check the boot code status:

This displays the version of the embedded boot code.

1. Highlight **Boot Status** and press ↵ to display the version number of the boot code.

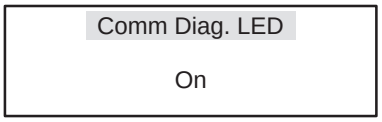


2. Press the Ack ACK key to return to the System Status submenu.
3. Press Ack ACK again to return to the FPE menu.

To check the Remote I/O communication diagnostic LED:

This displays the status of the Comm LED. Its location on the back of the terminal is shown in the diagram on Page 1–4.

1. Highlight **Comm Diag. LED** and press ↵ to display whether the LED on the back of the terminal is On (RIO communications active) or Off (RIO communications not active).



If the Comm LED is Off, and you can see no reason for its state in this table, see Page 7–3.

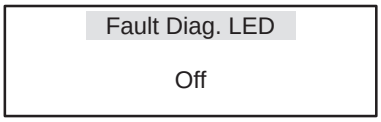
If the terminal	If the terminal is in:	The Comm. LED should be:
does not have a daughterboard	any mode	Off
has a daughterboard	Run Mode	On
	Simulate function	Off
	Debug Mode	On

2. Press the Ack ACK key to return to the System Status submenu.
3. Press Ack ACK again to return to the FPE menu.

To check the fault diagnostic LED:

This displays the status of the Fault LED. Its location on the back of the terminal is shown in the diagram on Page 1–4.

1. Highlight **Fault Diag. LED** and press ↵ to display whether the LED on the back of the terminal is **Off** (no problem) or **On**.



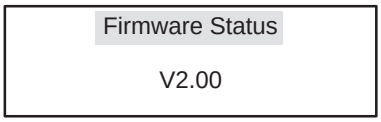
   If the LED is On, see Page 7–3.

2. Press the Ack ACK key to return to the System Status submenu.
3. Press Ack ACK again to return to the FPE menu.

To check the firmware status:

This displays the version number of the embedded firmware code.

1. Highlight **Firmware Status** and press ↵ to display the version number of the firmware.

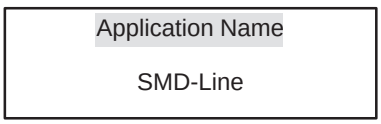


2. Press the Ack ACK key to return to the System Status submenu.
3. Press Ack ACK again to return to the FPE menu.

To check the name of the application currently installed:

This displays the name of the current application.

1. Highlight **Application Name** and press ↵ to display the name.

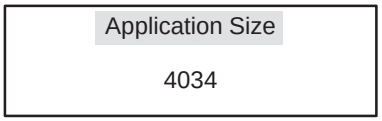


2. Press the Ack ACK key to return to the System Status submenu.
3. Press Ack ACK again to return to the FPE menu.

To check the application size:

This displays the size of the current application.

1. Highlight **Application Size** and press ↵ to display the number of bytes of memory the application uses.



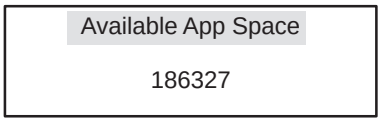
   The terminal has a total of about 190K RAM available to an application.

2. Press the Ack ACK key to return to the System Status submenu.
3. Press Ack ACK again to return to the FPE menu.

To check the amount of memory available:

This displays the amount of memory not used by the application.

1. Highlight **Available App Space** and press ↵ to display the number of bytes of memory available for an application.



   The terminal has a total of about 190K RAM available to an application.

2. Press the Ack ACK key to return to the System Status submenu.
3. Press Ack ACK again to return to the FPE menu.

Running Applications

This chapter covers the following topics:

- Application information
- Messages with ASCII Display variables
- Messages with Numeric Display variables
- Messages with Time or Date displays
- Messages with ASCII Entry variables
- Messages with Numeric Entry variables
- Data scaling
- Historical Event Stack
- Function keys
- LED indicators
- Slave Ports
- Slave Devices
- ASCII Input devices
- ASCII Triggering devices.

Application Information

It is the responsibility of the application designer to document the operation of an application program. Before running an application, read the documentation so you can understand what processes are being controlled and monitored.

An application allows the controller to perform the following operations on the terminal while an application is running:

- trigger messages
- set or receive the time and date in the RTC
- clear the display
- clear the message queue and any slave buffers
- change the display brightness level
- test the display and the battery
- reset the MessageView terminal.

Message contents

Messages and their contents are displayed when triggered by a controller. Messages may contain:

- alphanumeric text
- data entry variables
- data display variables
- graphics
- time and date.

Messages with ASCII Display Variables

Messages may contain ASCII display variables. An ASCII display variable informs an operator of the status of a control process. These variables may receive their information from either a controller or an ASCII Input device.

An example of a typical display with an ASCII variable is:

where CLOSED is the ASCII variable.

The application determines the maximum length of the ASCII display field, from 1 to 32 characters.

MessageView terminals support a maximum of 10 embedded variables of all kinds per message. Each message may have up to 100 characters (combined text, graphics and variables).

Messages with Numeric Display Variables

Messages may contain numeric display variables. A numeric display variable informs an operator of the status of a control process. These variables may receive their information from either a controller or an ASCII Input device.

An example of a typical display with a numeric display variable is:

where 550 is the numeric display variable.

Numeric display variables may have:

- leading zeros
- maximum of 4 decimal places (for example, 0.1234)
- fixed, floating or no decimal point
- different field widths (1 to 12 digits)
- scaled data

Numeric variables may be displayed as a scaled value if this option is specified in the application. Scaling allows the operator to view machine control values in standard engineering units such as °C, psi, or lbs. Scaling is described in the section starting on Page 4–6.

The application determines the maximum length of the Numeric Display field, from 1 to 12 characters.

MessageView terminals support a maximum of 10 embedded variables of all kinds per message. Each message may have up to 100 characters (combined text, graphics and variables).

Messages with Time or Date Displays

MessageView terminals support one time and one date variable per message. Time and date variables occupy 10 character spaces each. Time and date variables can be displayed with or without supporting text.

Messages with ASCII Entry Variables

ASCII Entry variables are used primarily to enter data from an ASCII Input Device. They may also be used, when defined as integers, to enter data from the terminal keypad.

If the ASCII Entry variable is defined as:

- an integer (signed or unsigned) the entered data is displayed in numeric format. It may be scaled like data in a Numeric Entry variable.
- a character array, the entered data is displayed in alphanumeric format. It cannot be scaled.

MessageView terminals which support ASCII Entry variables may be connected to an ASCII Input Device through the RS-232 port. ASCII Input devices include:

- bar code scanners
- AdaptaScan bar code readers
- PLC Serial Port 0.

The ASCII Input device may send either alphanumeric or numeric data.

Note: The connection between the ASCII Input Device and the MessageView terminal is ASCII, not Simplex.

The application determines the maximum length of the ASCII entry field, from 1 to 32 characters.

A MessageView terminal supports a maximum of 10 embedded variables per message. Each message may have up to 100 characters (combined text, graphics and variables).

Messages with Numeric Entry Variables

Messages on a 421N or 421F terminal (or a 421D terminal with supporting firmware) may contain numeric entry variables that allows an operator to enter data manually. The application sets the format and range of data that can be entered, as indicated in the message itself.

An example of a typical message with a data entry variable is:

Numeric data entry supports the following data types:

Variable Data Type	Maximum Range ①
Bit	0 or 1
Unsigned Integer	0 to 65535
Signed Integer	–32768 to 32767
Unsigned BCD (4 digit)	0 to 9999

① The application may restrict the actual range of data that may be entered in a given variable, except for Bit type.

Numeric data entry values may have:

- fixed, floating (keypad) or no decimal point
- different field widths (1 to 12 digits)
- scaled data

The terminal can scale the data entered by the operator if this option is specified in the application. Scaling allows an operator to enter values in engineering units such as °C, psi, or lbs. while the terminal converts them to machine control values. Scaling is described in the section starting on Page 4–6.

A MessageView terminal supports a maximum of 10 embedded variables per message. Each message may have up to 100 characters (combined text, graphics and variables).

Selecting a Numeric Entry Variable

A message is initially displayed with the entry variable highlighted. If the message has more than one entry variable, the first one is highlighted.

Use these edit keys:

To move from one entry variable to another (the cursor keys are not used in entering values):

Up Arrow ▲	Cursor moves left to the previous entry variable in the displayed message.
Down Arrow ▼	Cursor moves right to the next entry variable in the displayed message.

To enter a value:

0 9	Numeric keys 0 through 9.
±	Plus/minus key.
•	Decimal point (floating positions only)
ACK	Erases the number in the highlighted entry variable

To terminate the message:

↵	Sends the data to a controller address and terminates the displayed message. If a message contains more than one entry variable, all data from the message is sent to the controller at the same time. **Note:** If no information was entered into a variable, nothing will be sent to the controller when the Enter key is pressed.
± •	Terminates the displayed message without transmitting the data.

To enter a numeric data entry variable:

1. Use the ▲ or ▼ arrow keys to highlight each data entry variable in the message.
2. Enter a numeric value in the highlighted variable using the keys shown above:

3. **Note:** If you enter a value outside the range set for that variable, an error message appears:

Value Not in Range Minimum = –1000 Press ACK to continue	Value Not in Range Maximum = 100 Press ACK to continue

   Press the Ack [ACK] key to clear the error message, and enter the correct value.

4. Press the Enter [↵] key to terminate the message and transmit its entered data to the controller.

5. Press the Decimal Point [•] and Plus/Minus [±] keys to terminate the message without saving any input data.

Data Scaling

MessageView terminals can scale

- Numeric Display variables
- ASCII Display variables (if the entered data is displayed in numeric format)
- Numeric Entry variables
- ASCII Entry variables (if the entered data is displayed in numeric format)

The application program specifies if data scaling is used. The MessageView terminal uses the following equation to scale data.

$$Y = mX + b$$

Where:

- Y = scaled display or entered value
- m = application scaling factor
- X = machine control values (raw data)
- b = application offset factor

Display variables

MessageView terminals provide automatic rounding and truncating of scaled numeric data for display.

If the number of digits to the left of the decimal point fits within the display variable field, the data is displayed with the digits to the right truncated. For example:

Variable Field Width =	**5**
Scaled Value =	**22.1234**
Displayed Value =	**22.12**

If the number of digits to the left of the decimal **does not** fit the display window, the terminal displays:

>>>>>>

This indicates that the data is available but is too large to fit into the display.

For example:

Variable Field Width =	**3**
Scaled Value =	**1234.12**
Displayed Value =	**>>>**

For further information on scaling, see the MessageBuilder Software manual.

Acknowledging Messages

Messages may be defined as acknowledgeable messages which require operator intervention. Only one acknowledgeable message can be displayed at a time.

Acknowledgeable messages remain displayed (active) until an operator presses the Ack ACK key and the preset acknowledge hold time (50 ms) has expired.

Pressing the Ack ACK key sets a momentary type bit assigned to the message acknowledge control tag address for 50ms. The controller program uses this tag address as an indication that an operator has acknowledged the message.

Historical Event Stack

After being triggered, messages configured for the Historical Event (HE) Stack are logged into a history file. This operation takes place automatically.

The terminal may display three messages indicating the status of the Historical Event Stack:

- HE Stack is 85% Full
- HE Stack is 95% Full
- HE Stack is 100% Full

The 100% Full message **requires** you to press the Ack ACK key to acknowledge the message.

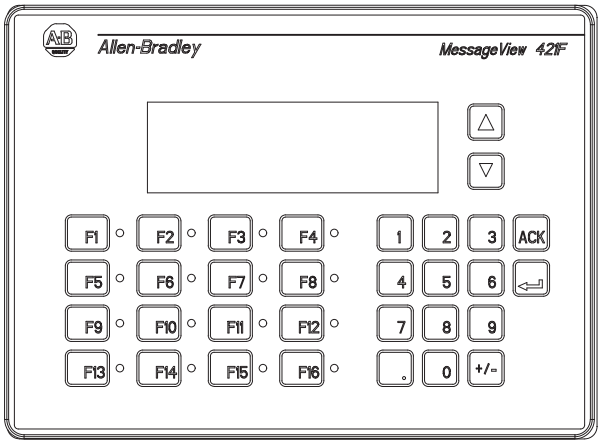
The 85% and 95% Full messages display for approximately 2 seconds before they terminate.

You may respond to the messages with one of these options:

- Clear the HE Stack using the Front Panel Editor.
- Ask the computer operator to upload the HE Stack and clear the Stack after the upload is complete. See the MessageBuilder Software manual.
- Do nothing. If the HE Stack is full, new messages will overwrite the current HE Stack contents beginning with the oldest message.

Function Keys

The MessageView 421F terminals (Catalog No. 2706-M1F1 and -M1F) support 16 function keys [F1] to [F16] on the front panel to control the operation of an application.



Function Key Operation

Function keys are active **only** when they are associated with (enabled for) a **displayed** message.

While a message associated with a function key [F1] to [F16] is active, pressing that function key sets or clears a bit value assigned to the function key's write tag address. The controller logic program can use the function key's write tag address for a variety of control operations such as a machine start/stop functions.

ATTENTION: Do not use a MessageView terminal for emergency stops or other controls critical to the safety of personnel or equipment. Use separate hard-wired operator interface devices that don't depend on solid state electronics.

The MessageView terminal supports three types of function key operations.

- momentary
- maintain
- latch

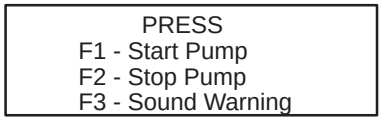
Each function key operation supports two message modes:

- non-jog mode
- jog mode

The MessageBuilder Configuration Software assigns one of these operations and modes to each function key. In addition, function keys can be assigned normally open (NO) or normally closed (NC) contacts.

Enabled/Disabled Function Keys

Function keys are enabled **only** when a message assigned function key operations is **displayed** (active). For example:



F1, F2 and F3 are enabled.
F4 through F16 are disabled.

Function keys are disabled when the message linked to the function keys is terminated on the display.

Note: Unless a function key is specifically enabled for the active message, the key is disabled on the terminal.

Momentary Function Keys

Momentary function keys remain in a changed state as long as the key is pressed. When a momentary function key is released, the key changes back to its original state after a preset hold time (0 to 1000 ms) has expired.

After a terminal reset or powerup, the initial state of a momentary function key is always its released state.

Maintained Function Keys

Maintained function keys change state (0 to 1, or 1 to 0) each time the key is pressed. The maintained function key remains in the changed state until you press it a second time.

After a terminal reset or powerup, a maintained function key retains its last state.

Note: If a maintained function key is activated for a message in a non-jog mode (see below), a second message with the same function key enabled needs to be displayed so you can change the function key back to its original state.

Latched Function Keys

Latched function keys remain in a changed state after being pressed. The latched function key returns to its original state only after a handshake bit is set by the controller. Pressing a latched function key twice will not toggle it on and off.

After a terminal reset or powerup, the initial state of a latch function key is its original unlatched state.

Jog feature

Messages with enabled function keys (maintained, momentary, latch) may have the jog feature assigned. This feature affects the operation of the function keys.

The jog feature is not a global attribute, but specific to the individual message. That is, a given function key may be enabled in both jog and non-jog messages in the application.

Non-Jog Messages

Messages defined as non-jog are terminated as soon as a function key operation is completed (the function key has been pressed and released). For momentary function keys, this includes the hold time. For example:

```
PRESS
F1 - Start Pump
F2 - Stop Pump
F3 - Sound Warning
```

Message is terminated after one of F1, F2, or F3 is pressed and released and the assigned hold time expires.

Jog Messages

Messages defined as jog remain displayed (active) even after the function key has been released. The Jog message allows you to:

- press the same function key more than once
- press more than one function key, if more than one is enabled for the message.

For example:

```
PRESS
F1 - Start Pump
F2 - Stop Pump
F3 - Sound Warning
```

Message remains active after F1, F2, and F3 are pressed and released and the assigned hold time expires.

Messages with enabled function keys are terminated by:

- pressing an enabled function key (non-jog)
- pressing the Plus/Minus ± key and Zero 0 key simultaneously
- pressing the up arrow ▲, down arrow ▼ and Enter ↵ keys simultaneously (resetting the terminal)
- controller sending a Clear Display command (Special Message 9901)
- controller sending a Reset Terminal command (Special Message 9903).

Note: The application designer needs to inform the operator which messages are non–jog and which are jog.

LED Indicators

MessageView 421F Terminals (Catalog No. 2706-M1F1 and -M1F) have a red LED located next to each function key. An LED can be assigned (tagged) to a specific output bit of a logic controller by the application.

LED Operation

An LED may be assigned one of two functions:

1. To provide visual feedback to the operator when an associated function key is pressed (indicator tag not assigned).
2. To allow the logic controller to indicate a process status to an operator without displaying a message (indicator tag is assigned).

Indicator Tag Not Assigned

When the LED indicator ***is not*** assigned to an output bit, then the LED follows the state of the associated function key (F1 = LED1, F16 =LED16). For example, LED4 will light when function key F4 is pressed.

Indicator Tag Assigned

When the LED indicator ***is*** assigned (tagged) to an output bit, then the LED indicators operate independently of the function keys. For example, pressing and releasing function key F1 will have no effect on the operation of LED1.

The controller logic program controls the LED by clearing or setting the bit at the indicator tag address. The terminal continuously monitors all LED indicators (with indicator tag assigned) in the background. When it detects that an indicator bit is set, it turns on the LED at once, independently of any messages that may be displayed.

The application description explains what each LED's function is.

Slave Ports

A MessageView terminal set up as a Slave Port can address up to 14 slave devices individually. The slave devices display messages sent to them by the master device.

The following Allen–Bradley products may be used as slaves:

- Dataliner™ DL10
- Dataliner™ DL20
- Dataliner™ DL50 (short and long versions)
- MV421D terminal **without** Daughterboard card; see Page 4–14.

Note: The connection between the master and each slave device is RS-232/Simplex. See the wiring diagrams and pinouts in Chapter 6.

Slave Port setup

Follow this procedure to set up a MessageView terminal as a slaving (master) device:

1. Download a MessageBuilder application to the MessageView terminal master device.
2. Connect the master terminal to its slave(s). See wiring diagrams and pinouts in Chapter 6.
3. Access the Front Panel Editor by simultaneously pressing the up ▲ and down ▼ arrow keys on the terminal keypad.
4. Verify that the terminal's RS-232 port is set to Slave Port. See Page 3–3.
5. Exit the Front Panel Editor. Messages are displayed on the terminal and sent to the individual slave devices as specified by the application.

Slave Device

A slave terminal has no processing ability. When the master device sends it a message, the slave displays it at once. If another message arrives that is assigned to the same display line, the slave terminates the previous message and displays the new one.

Every MV421D terminal (Catalog Number 2706–M1D) intended as a slave device is shipped with a blank application. The application supports the text fonts and graphics required to display the messages sent by the master device.

The following Allen–Bradley products may be used as a master device slaving to a MessageView 421D terminal Slave Device:

- Dataliner™ DL20
- Dataliner™ DL40
- MessageView 421D terminal **with** Daughterboard card
- MessageView 421N terminal **with** Daughterboard card
- MessageView 421F terminal **with** Daughterboard card
- PanelView ™ 550
- PanelView ™ 900
- PLC®
- SLC™

Slave Packet format

The MessageView terminal supports transmission of messages to a slave device, using Simplex protocol.

The Simplex protocol consists of a data packet with 6 data fields:

Field	Field 1	Field 2	Field 3	Field 4	Field 5	Field 6
Contents	Optional Control Byte	ASCII Text and special Control Characters	Optional Display Mode Byte	Slave Address	Line Number	Carriage Return (CR]
Number of Bytes	1	0 to 100	1	1	1	1

Note: Simplex protocol is compatible with Allen-Bradley DL20, DL40, DL50 and MessageView 421D slave devices.

Field 1: Optional Control Byte

This is an optional field which indicates the text size of the slaved message as it is transmitted. The following characters are used:

Byte	Decimal Value	Definition
Default	–	Quarter height text
Ctrl-S	19	Half height text
Ctrl-W	23	Full height text
Ctrl-C	3	Clear Display line, based on Line Number Byte. Used with Line Number Byte to specify line.

The optional Control Byte may be omitted. If omitted, the default size will be Quarter height text.

If the **Auto Format** attribute is enabled, the Optional Control Byte is automatically embedded, based on the text size selected in the message's Text Size attribute.

The Optional Control Byte may be placed in the message manually, embedding it as the first character in the text portion of the message. It overrides a Control Byte embedded by **Auto Format**.

Field 2: ASCII Text

This field contains the ASCII characters and/or special ASCII control characters that are to be displayed by, or to control, a slave device.

The ASCII text can include embedded variables, graphics and control codes for Flash and Inverse Video. It can have up to 100 characters.

The following codes may be embedded in the ASCII text:

Byte	Decimal Value	Definition
Ctrl-F	6	toggle between Flashing and non–Flashing characters
Ctrl-I	9	toggle between Inverse Video and non–Inverse Video characters
Ctrl-G	7	Embedded Graphic, where the next byte is a graphic, ISA symbol 1 to 32

If **Auto Format** is enabled, Flash and Inverse Video control characters will be embedded automatically, based on whether the attribute is enabled in the Message Edit box.

If the first or last byte of the ASCII Text field is a control character, it will be interpreted as the Optional Control Byte and the Optional Display Mode Byte, respectively.

Note: An embedded Carriage Return control character (decimal 13) is not allowed in the ASCII Text portion of the slave packet.

Field 3: Optional Display Mode Byte

This optional field indicates how the message text is to be displayed. The following characters are used:

Byte	Decimal Value	Definition
Default	–	Holding message, non-Auto Clear If the message is longer than the display width, Wait Time between segments of the message is 1 second.
Ctrl-A	1	Holding message, non-Auto Clear If the message is longer than the display width, Wait Time is 3 seconds.
Ctrl-C	3	Scrolling message, non-Auto Clear, Scroll Time 0.2 seconds, Wait Time is 1 second.
Ctrl-V	22	Center message (message length must be less than or equal to the number of characters in the display line for that text size).

If the Optional Display Mode Byte is omitted, the message will remain displayed on the slave device unless it is cleared. If the message is longer than the packet length, the first segment of the message remains displayed for 1 second. After 1 second the second packet is sent with the next portion of the message, and so on until all packets have been sent. The message will repeat this cycle unless it is cleared.

If **Auto Format** is enabled,the Optional Display Byte defaults to the default status unless the Scroll or Center Message attribute is enabled.

The Optional Display Mode Byte may be manually placed in the message by embedding it as the last character in the text portion of the message. It overrides a character embedded by **Auto Format**.

Field 4: Slave Address

The Slave Address Byte is a single byte field that specifies the Node Address of the receiving slave device. Valid slave node addresses are integers from 1 to 127, **except for 13**.

Note: If a Slave Device has a Node Address of 127, it will respond to all messages, regardless of the slave packet address. If a message packet has a Node Address of 127 it will be received by all slave devices on the network.

Field 5: Line Number Byte

The Line Number Byte indicates the display line on which the message will appear. The Line Number Byte is automatically embedded in the slave packet based on the message's Line attribute.

Line Attribute Selected	Line Number Embedded
1	1
2	2
3	3
4	4
Any	1 to 4, depending on the line where the Master device displays the message
All	50

The "All" Line attribute (50) is used with the Ctrl-C Optional Control Byte to clear all lines on the slave device.

The Line Number Byte function depends on the slave device and its functions. Consult the slave device's user manual for the line configurations it supports.

Field 6: Carriage Return

The Carriage Return (decimal 13) indicates the end of a message packet. It is embedded at the end of the Slave Packet automatically.

Embedded variables in a slaved message

If a message sent to a MessageView 421D Slave Device terminal contains:

- embedded ISA graphic symbols, each graphic symbol must be preceded by a Ctrl-G (See Field 2: ASCII Text)
- entry variables (numeric or ASCII), these variables are not supported.
- display variables (numeric, ASCII or a date/time), the message needs to be sent continuously to the MessageView 421D Slave Device in order to have the variables updated.

  Note: If a message contains display variables and is sent to the slave device on a continuous basis, only the variables are updated, not the text portion of the message.

Follow this procedure to set up a 421D terminal as a slave:

1. Connect the master device to the MessageView 421D Slave Device via the RS-232 port.
2. Access the Front Panel Editor by simultaneously pressing the up ▲ and down ▼ arrow keys on the terminal keypad.
3. Verify that the terminal's RS-232 port is set to Slave Device. See Page 3–3.
4. Check that the slave device Serial Communication parameters match those of the master device. See Page 3–8.
5. Exit the Front Panel Editor. The slave terminal displays messages when received from the master device.

ASCII Input Device

A MessageView terminal which supports ASCII input displays the input data in ASCII or Numeric Entry variables that are embedded in a triggered message.

An ASCII Input device may be:

- a bar code scanner
- an AdaptaScan™ reader
- a PLC-5® Port 0.

Follow this procedure to set up the MessageView terminal with an ASCII Input device:

1. Download a MessageBuilder application to the MessageView terminal.
2. Connect the terminal to the ASCII Input device via a 485 network. See the diagrams and pinouts in Chapter 6.
3. Access the Front Panel Editor by simultaneously pressing the up ▲ and down ▼ arrow keys on the terminal keypad.
4. Verify that the terminal's RS-232 port is set to ASCII Input. See Page 3–3.
5. Check that the Serial Communication parameters match those of the ASCII Input device. See Page 3–6.
6. Exit the Front Panel Editor. The terminal starts to run its application.

ASCII Triggering Device

MessageView terminals without daughterboards (Catalog Numbers 2706-M1D, -M1N, or -M1F) are controlled by ASCII Triggering devices.

ASCII Triggering devices include the following Allen-Bradley products:

- SLC 5/03™, 5/04™ Port 0
- SLC BASIC Module
- PLC-5 Port 0
- other logic controllers with serial ports
- Allen-Bradley Industrial Computers
- any ASCII Transmitting device, including a VT100 Dumb Terminal.

Follow this procedure to set up the MessageView terminal with an ASCII Triggering device as the controller:

1. Download a MessageBuilder application to the MessageView terminal.
2. Connect the terminal to the ASCII Triggering device via a 485 network. See the diagrams and pinouts in Chapter 6.
3. Access the Front Panel Editor by simultaneously pressing the up [▲] and down [▼] arrow keys on the terminal keypad.
4. Verify that the terminal's RS-232 port is set to ASCII Trigger. See Page 3–3.
5. Check that the Serial Communication parameters match those of the ASCII Triggering device. See Page 3–8.
6. Exit the Front Panel Editor. The terminal starts to run its application.

Messages to the MessageView terminal

Trigger a message with [Ctrl-T]

Used by the ASCII Triggering device to trigger a specific message.

Format: [Ctrl-T]Message#\ MV Address[CR]

- Message# range: 1 to 9999; limited to the subset used in the application
- MV Address range: 1 to 127 for a single node; 127 to address all devices

Example: [Ctrl-T]24\ 6[CR]

- The terminal at node #6 displays message #24 in the downloaded application

Send data to a display variable with [Ctrl-V]

Used by the ASCII Triggering device to send data to a specific display variable. Each variable must be addressed individually. Numeric data may be scaled.

Format: [Ctrl-V]Variable Data\ Variable Position\ MV Address[CR]

- Variable Data range: –32768 to +65535 for numeric data
  any ASCII character for ASCII data
- Variable Position range: 1 to 10

  Note: Variable position is the position of the variable in the message, counting from left to right. If the message contains only one display variable, the position is 1.
- MV Address range: 1 to 127 for a single node; 127 to address all devices

Data enclosed in quotation marks is interpreted as ASCII data, even if it consists of numbers.

Example: [Ctrl-V]“Press “ACK””\ 1\ 2[CR]

- The terminal at node #2 displays **Press “ACK”** in the first display variable in the currently active message.

Activate/Deactivate an LED with [Ctrl-L]

Used by the ASCII Triggering device to toggle a specific LED.

- Format: [Ctrl-L]LED#\ LED State\ MV Address[CR]
- LED# range: 1 to 16
- LED State range 0 or 1; 0 represents the LED Off state, 1 represents the LED On state
- MV Address range: 1 to 127 for a single node; 127 to address all devices

Example: [Ctrl-L]4\ 1\ 22[CR]

- The terminal at node #22 turns LED #4 On.

Unlatch a latched function key with [Ctrl-U]

Used by the ASCII Triggering device to unlatch a specific latched function key.

Format: [Ctrl-U]F-key#\ MV Address[CR]

- F-key# range: 1 to 16
- MV Address range: 1 to 127 for a single node; 127 to address all devices

Example: [Ctrl-U]7\ 22[CR]

- The terminal at node #22 unlatches function key #7. The terminal then sends a Ctrl-F message when the message is received and acted upon.

Messages from the MessageView terminal:

Send data from entry variables [Ctrl-I]

Used by the terminal to send input data to the ASCII device.

Format: [Ctrl-I]Message#\ Variable Data\ Variable Position[CR]

- Message# range: 1 to 9999; limited to the subset used in the application
- Variable Data range: –32768 to +65535 for numeric data
  any ASCII character for ASCII data
- Variable Position range: 1 to 10
- MV Address range: 1 to 127 for a single node; 127 to address all devices

Example: [Ctrl-I]64\ 44232\ 3[CR]

- The terminal sends the value 44232 which was input in the third variable in message #64.

Note: If users are entering data [Ctrl-I] at the same time at different terminals in the network, they may cause data collisions. The MessageView node address was intentionally left off the Data Entry [Ctrl-I] response message to discourage this situation.

ATTENTION: If the ASCII network has more than one terminal, data should not be sent from any terminal to the ASCII device. Data collisions may result if the ASCII device has data coming from more than one source.

Acknowledge an alarm message with [Ctrl-K]

Used by the terminal when the operator presses the ACK key in response to an alarm message.

Format: [Ctrl-K]Message#[CR]

- Message# range: 1 to 9999; limited to the subset used in the application

Example: [Ctrl-K]75[CR]

- The terminal displayed message #75, which was defined as an acknowledgeable message. The operator pressed the ACK key, and this response message was sent to the ASCII Triggering device.

Report a function key press with [Ctrl-F]

Used by the terminal to report that a function key was pressed.

Format: [Ctrl-F]Message#\ F-key#\ F-key action[CR]

- Message# range: 1 to 9999; limited to the subset used in the application
- F-key# range: 1 to 16
- F-key action range: 0 or 1; the application defined the function key as Normally Open or Normally Closed; this Normal state is defined as 0.

Example: [Ctrl-F]33\ 5\ 1[CR]

- When the terminal operator pressed function key #5 which was enabled in Message #33, the terminal sent this message that the function key had changed to the altered state.

  Note: If the operator presses a momentary function key, the terminal will automatically send another [Ctrl-F] message when its Hold Time is up:

  – [Ctrl-F]33\ 5\ 0[CR]

  Note: If a latched function key is unlatched after the terminal receives a [Ctrl-U] message, the Message# parameter in the [Ctrl-F] message is 0.

Return message number with [Ctrl-N]

Certain types of messages have their message number returned to the ASCII Triggering device using [Ctrl-K], [Ctrl-I] or [Ctrl-F]. [Ctrl-N] is used by the terminal to report all other types of messages when they are triggered.

Format: [Ctrl-N]Message#[CR]

- Message# range: 1 to 9999; limited to the subset used in the application

Example: [Ctrl-N]637[CR]

- The terminal reports that message #637 was triggered.

Report the HE Stack status with [Ctrl-H]

Used by the terminal to report that the Historical Event Stack is 85%, 95% or 100% full.

Format: [Ctrl-H]HE Stack Status[CR]

- HE Stack Status range: 85, 95 or 100

Example: [Ctrl-H]85[CR]

- The Historical Event Stack is 85% full.

Terminal output buffer

The terminal is designed to handle at least 20 outgoing response messages via an output buffer. If the ASCII Triggering device's serial baud rate is set low and an enormous number of data entry inputs or function key presses occurs, the output buffer will overflow. While the buffer is in this condition, any new data input will be lost.

Hardware Handshaking

The terminal monitors the CTS/RTS lines between the terminal and the ASCII Triggering device if the embedded application has the Hardware Handshake attribute enabled.

- If the MessageView terminal input buffer is full, the terminal will assert its RTS line so the ASCII device stops sending commands.
- If the MessageView terminal detects an asserted CTS line, it will stop sending character information. After 30 seconds it displays a CTS error message for 2 seconds and then clears the display. If the CTS line is still asserted, after 30 seconds it displays the CTS error message again for 2 seconds and then clears the display. This cycle is repeated until the CTS signal is non-asserted.

Installing the MessageView Terminal

This chapter covers the following topics:

- Enclosures
- Equipment required
- Mounting dimensions
- Clearances
- Cutout dimensions
- Installation procedures
- Connect DC power
- Firmware upgrade.

Enclosures

The MessageView 421 terminal must be mounted in a panel or enclosure to protect the internal circuitry. The terminal meets NEMA Type 12 / 13 and Type 4X (indoor use) only when mounted in a panel or enclosure with the equivalent rating.

The MessageView 421 terminal must be mounted in an environment that provides IEC-1131-2 Pollution degree 2 protection.

Allow enough space within an enclosure for adequate ventilation. For some applications, you may have to consider heat produced by other devices within a panel. The ambient temperature around the terminal must be between 32° and 131°F (0° and 55° C).

Make sure that provisions are made for accessing the back and bottom of the terminal for wiring, routine maintenance, and troubleshooting.

Equipment Required

Other than the tools required to make the panel cutout, the tools required for installation are:

- small slotted screwdriver
- torque wrench (in. / lbs) with 7mm (M4) deep well socket.

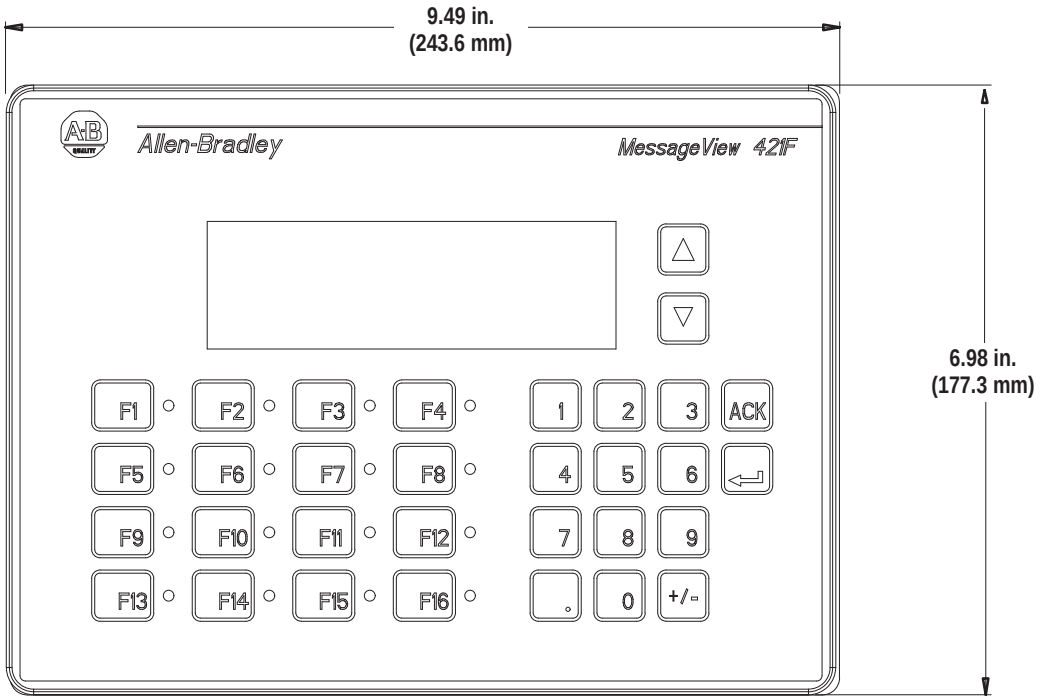
The terminal is tightened against the panel with self-locking nuts.

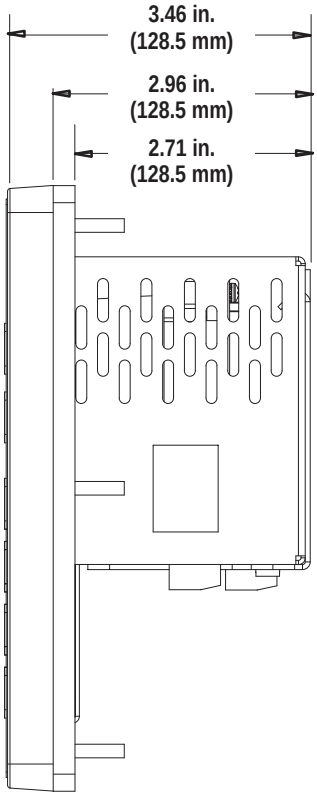
- six nuts (421D & 421N terminals)
- eight nuts (421F terminals)

Use a torque of 15 inch-pounds (1.7 Nm). to tighten the terminal against the panel with the self-locking nuts.

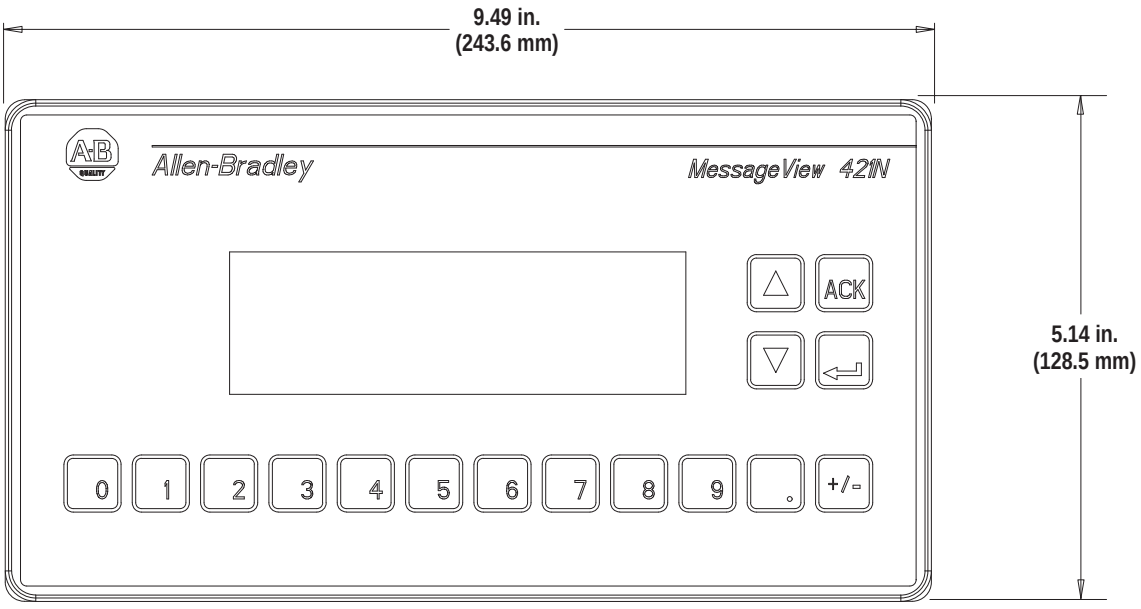
Mounting Dimensions

MessageView 421F Mounting Dimensions

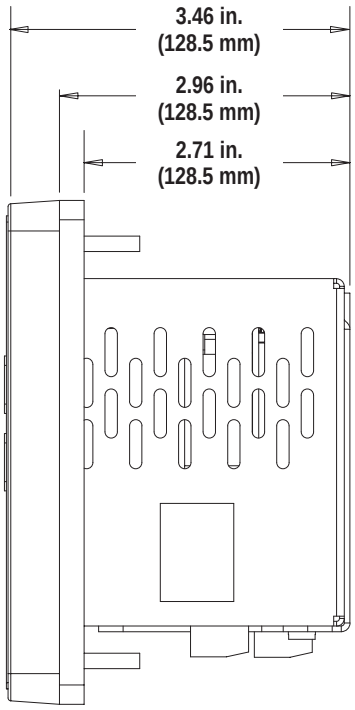




MessageView 421D and 421N Mounting Dimensions



421N Terminal shown, 421D Terminal has similar dimensions

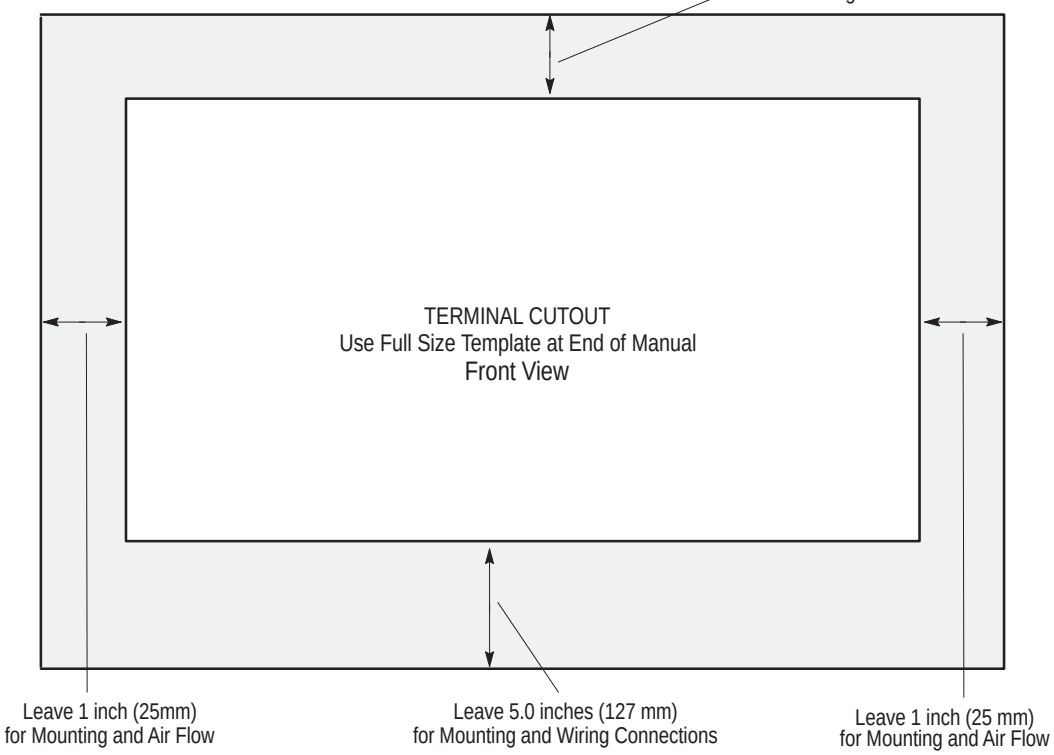


Clearances

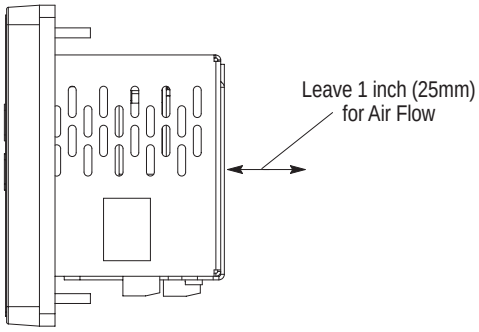
Make sure that you leave adequate room for mounting and air flow.

All Terminals

Side, Top and Bottom Clearances



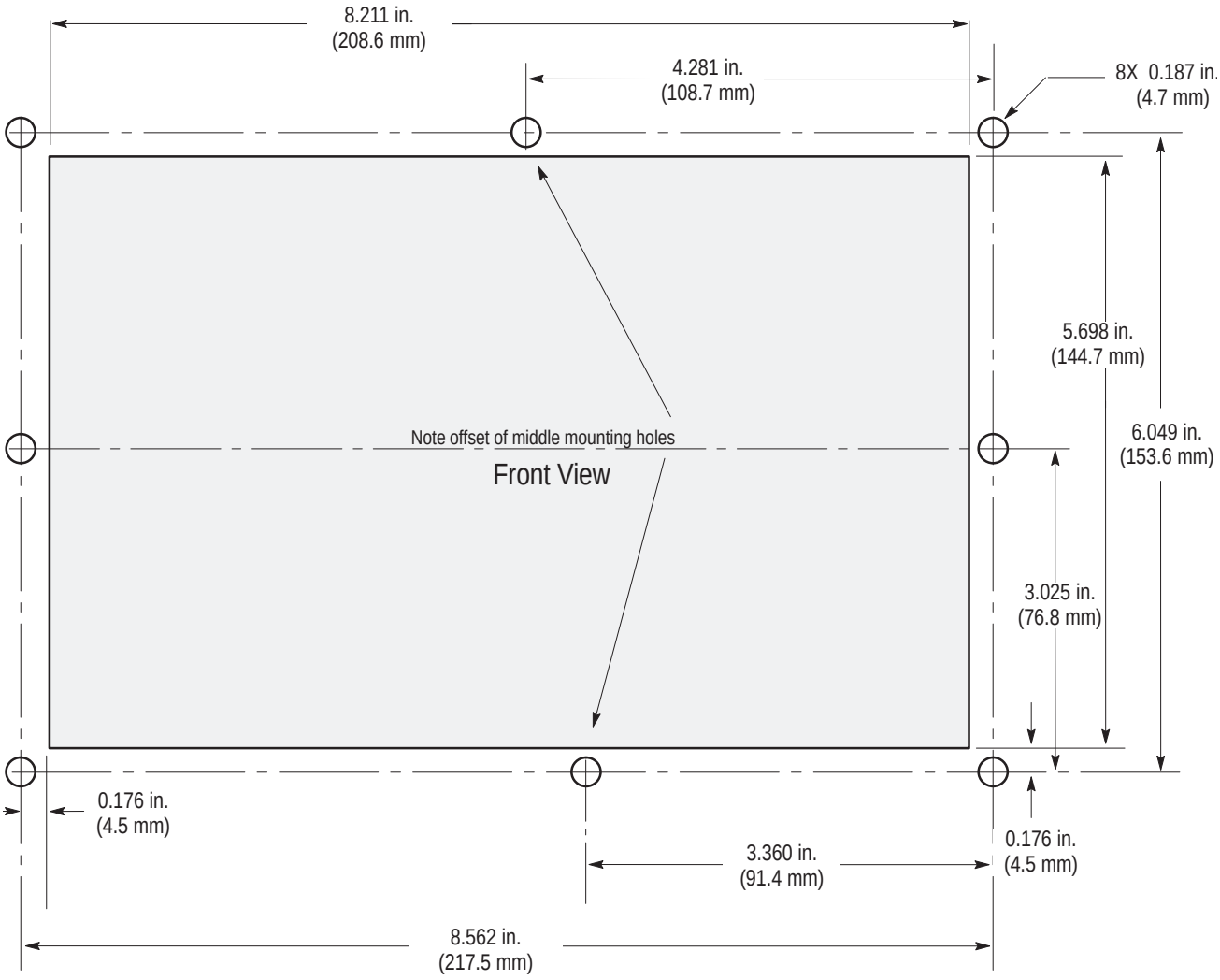
Back Clearance



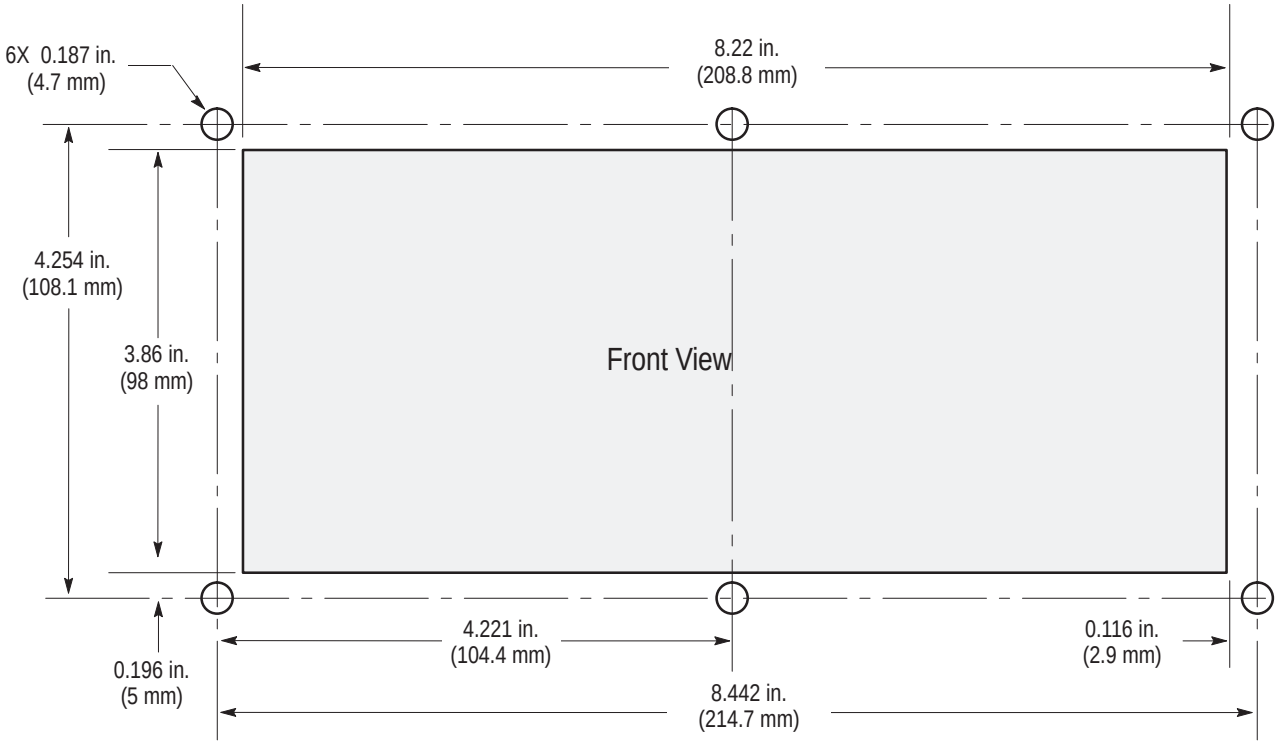
Cutout Dimensions

Use the full size templates at the end of this manual to mark the cutout dimensions. The following illustrations provide reduced size versions of the cutouts along with dimensions.

MessageView 421F Terminal Cutout Dimensions



MessageView 421D and 421N Terminal Cutout Dimensions



Installation Procedures

ATTENTION:
Disconnect all electrical power from the panel before making cutout.

Make sure that area around the panel cutout is clear.

Take precautions so that metal cuttings do not enter any components that may already be installed in panel.

If you do not follow this warning, you may injure yourself or others, or damage components in the panel.

To install the MessageView terminal:

ATTENTION: When mounting the MessageView 421F terminal, note the alignment of the middle top and bottom mounting holes.

1. Cut an opening in the panel. Use the templates provided in the back of this manual. Remove any sharp edges or burrs.

   Note: The 421F terminal has removeable function key legend strips that can be replaced with custom labeled strips. Custom strips must be inserted before the terminal is installed. Make sure that the legend inserts will not interfere with the sealing gasket during mounting. Trim legend strips as necessary.

2. Make sure the terminal sealing gasket is properly positioned on the terminal. This gasket forms a compression type seal. Do not use sealing compounds.

3. Place the terminal in the panel cutout.

4. Install the six or eight self-locking mounting nuts (depending on terminal type). Tighten the mounting nuts hand tight.

5. Tighten the mounting nuts alternately until the terminal is held firmly against the panel. Tighten mounting nuts to a torque of 15 inch-pounds (1.7 Nm). Do not over-tighten.

ATTENTION: Tighten mounting nuts to a torque of 15 inch-pounds (1.7 Nm) to provide a proper seal and to prevent damage to the terminal. Allen-Bradley assumes no responsibility for water or chemical damage to the terminal or other equipment within the enclosure because of improper installation.

Connecting DC Power

The MessageView terminal accepts power supply voltages from 18 to 30 V DC (24V DC nominal). The terminal's power consumption is 20 W max. (833 mA @ 24 V DC). Electronic circuitry and an internal fuse protect the terminal from reverse polarity and over-voltage conditions.

Note: If the MessageView terminal is connected with reverse polarity, the terminal will not operate but should not be damaged. As soon as the polarity is corrected, it should operate normally.

ATTENTION: Do not connect the MessageView terminal to an AC power source. Connecting the MessageView terminal to an AC power source will damage the terminal.

ATTENTION: The MessageView terminal is designed for safe use when installed in a NEMA Type 12, 13, 4x (indoor use only), IP65 enclosure.

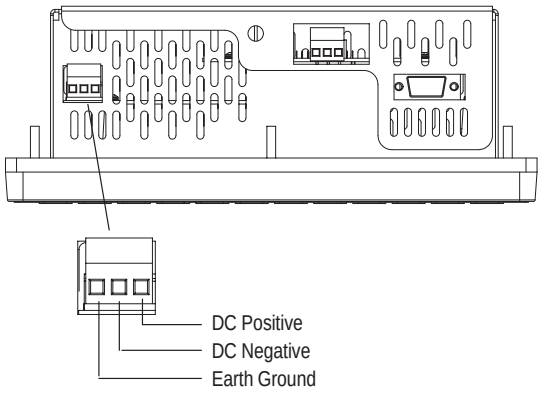
To connect DC power to the terminal:

1. Unplug the 3-position removeable terminal block from the bottom rear of the terminal.

   Note: A terminal block connector plug is provided with each terminal. For additional plugs, order Replacement Part No. 22112-232-01.

2. Secure the DC power wires to the removeable terminal block via the terminal block screws.

ATTENTION: Improper wiring of the power terminals and Earth Ground may result in the terminal malfunctioning. Refer to power connection diagrams below when wiring.



Terminal Block Recommendations

Wire Size:	12-22 AWG
Strip Length:	.28 inches (7 mm)
Torque:	4.5 lbs./in (0.5 Nm)

3. Secure the Earth Ground wire to the removeable terminal block via the terminal block screws.

   Important: Connect the Earth Ground wire to the nearest solid earth ground. Earth ground signal path should be as short as possible.

4. Plug the removeable terminal block into the Terminal Power Port.

ATTENTION: Explosion Hazard – Do not connect or disconnect equipment while circuit is live unless area is known to be non-hazardous.

ATTENTION: Risque d'explosion - Ne pas brancher ou debrancher tant que le circuit est sous tension, a moins qu'il ne s'agisse d'un emplacement non dangereux.

ATTENTION: Do not apply power to the terminal until all wiring connections have been made. Failure to do so may result in electrical shock.

5. Apply 24V DC power to the terminal.

Remote I/O and RS-232 Connections

This chapter covers the following topics:

- Wiring and safety guidelines
- Communication ports
- Remote I/O Port connections
- RS-232 Port connections
- Compatible devices
- Compatible controllers.

Wiring and Safety Guidelines

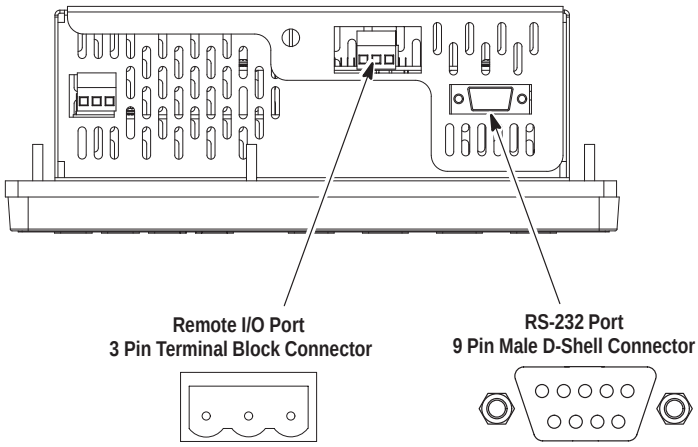
Connect the MessageView terminal to the devices it will be using in the system, using publication NFPA 70E, Electrical Safety Requirements for Employee Workplaces. In addition to the NFPA general guidelines, we have added some specific recommendations:

- Careful wire routing helps reduce or minimize electrical noise. Route incoming power to the terminal by a separate path from the communications cables.
- Do not run communications wiring and power wiring in the same conduit.
- Where communications and power wiring must cross, make their intersection perpendicular.
- Proper grounding helps to limit the effects of noise due to Electromagnetic Interference (EMI). To avoid problems caused by EMI, all cables must be shielded and grounded at both ends. Grounding is also an important safety measure in electrical installations.

A source for grounding recommendations is the National Electrical Code published by the National Fire Protection Association of Boston Massachusetts.

Communication Ports

MessageView terminals with Catalog No. 2706-M1D, -M1N, -M1F have an RS-232 port. MessageView terminals with Catalog No. 2706-M1D1, -M1N1 and-M1F1 have both a Remote I/O and an RS-232 port.



Remote I/O Port

A MessageView terminal uses its Remote I/O port:

- to communicate with a Remote I/O network which contains a logic controller.

RS-232 Port

A MessageView terminal uses its RS-232 port:

- to transfer applications and other information between the MessageView terminal and a personal computer
- to communicate with an ASCII Input device (terminals which support ASCII Input)
- to communicate with one or more slave devices (terminals which support the slaving feature)
- to communicate with an ASCII Triggering device (Catalog Nos. 2706-M1D, -M1N and -M1F)
- to connect a 421D slave device (Catalog No. 2706-M1D) to a master device.

Remote I/O Connections

To connect the MessageView terminal to a Remote I/O scanner, use cable Catalog No. 1770-CD (equivalent to Belden 9463).

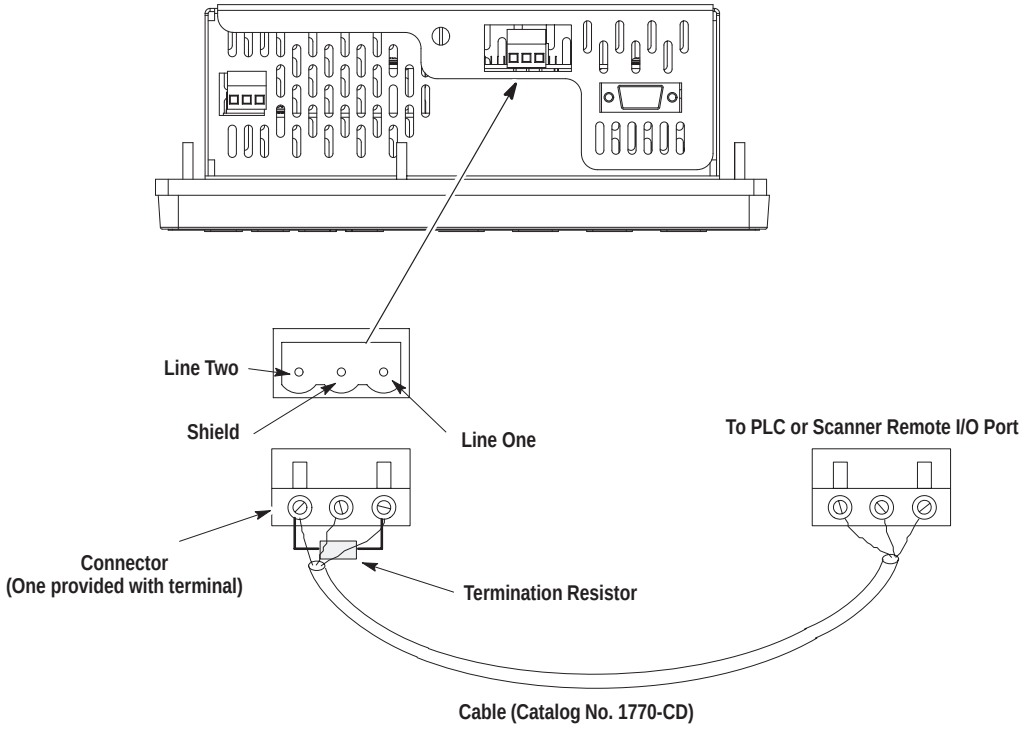
Refer to the Programmable Controller Wiring and Grounding Guidelines (Publication 1770-4.1). The user manual for the I/O scanner module also provides cabling information.

The maximum cable length (link distance) is determined by the baud rate:

RIO port Communicates at:	Nodes Supported	Maximum Cable Length	Line Termination Resistor
57.6K baud	16	10,000 ft. (2800 m)	150 ohm
115.2K baud	16	5,000 ft. (1400 m)	150 ohm
230.4K baud	32	2,500 ft. (700 m)	82 ohm

A terminal block connector plug is provided with each terminal. For additional connector plugs, order Replacement Part No. 22112-046-03.

Remote I/O Port Connection

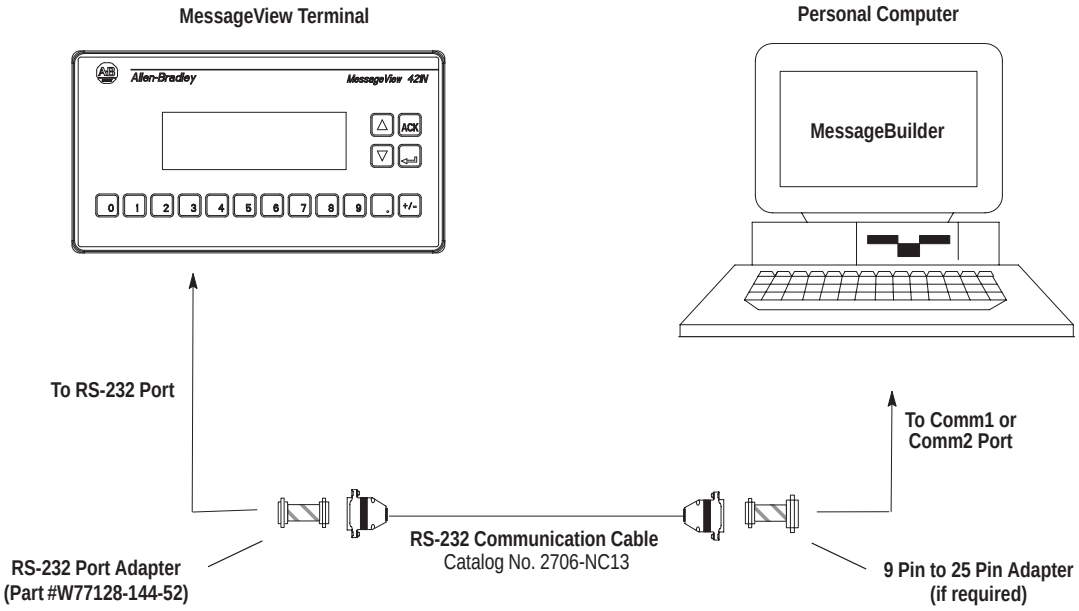


RS-232 Port Connections

To connect a personal computer to the RS-232 port of the MessageView terminal, use a 10 foot (3 meter) RS-232 communication cable (Catalog Number 2706-NC13):

For details on transferring application files between a computer and the MessageView terminal, see the MessageBuilder Configuration Software manual (Publication 2706-817).

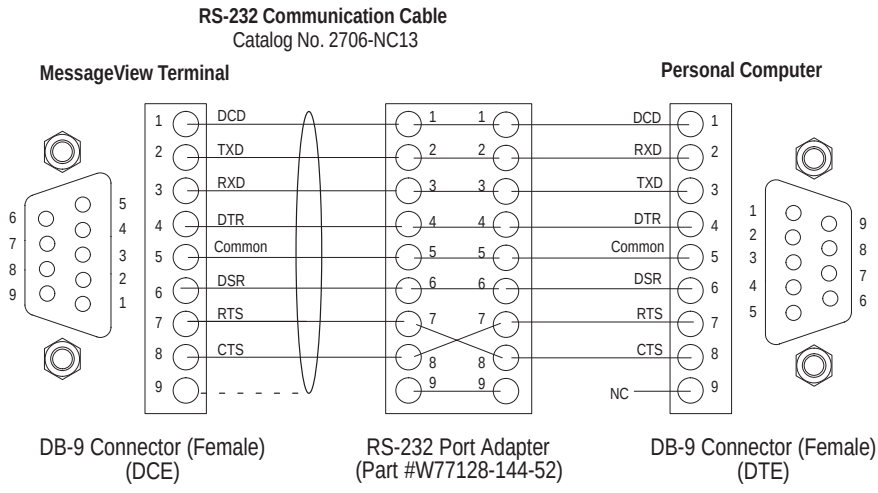
Connecting the RS-232 Port to a Computer



Pin Connections for RS-232 Communication Cables

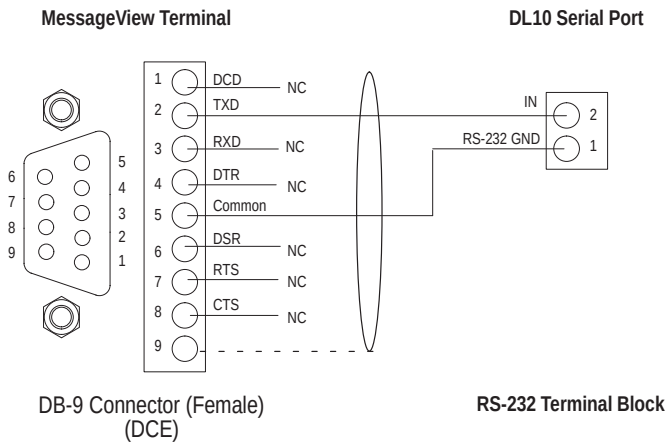
Note: When gender is specified, it is for the cable connectors.

To a personal computer



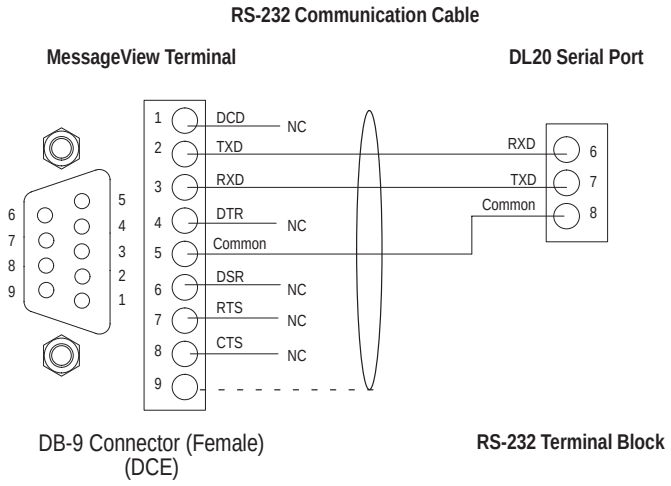
Note: If you create a cable, connect the cable shield to metal housing or pin 9 of MessageView terminal connector.

To Allen-Bradley Dataliner DL10



Note: If you create a cable, connect the cable shield to metal housing or pin 9 of MessageView terminal connector.

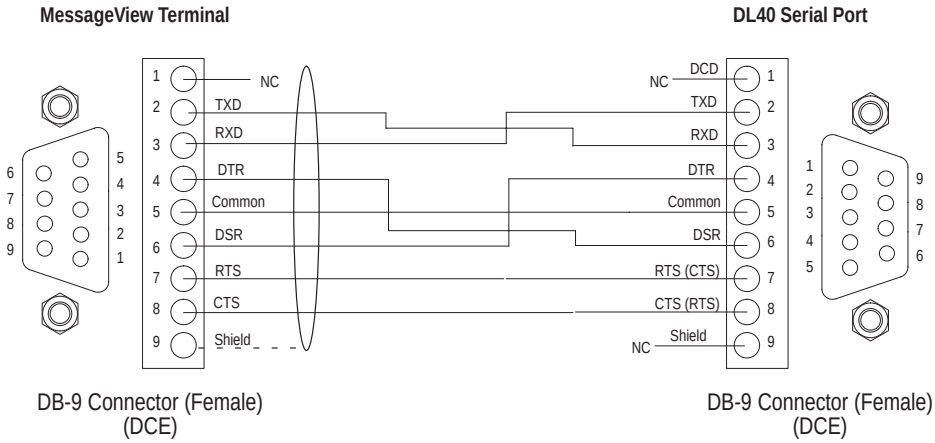
To Allen-Bradley Dataliner DL20



Note: If you create a cable, connect the cable shield to metal housing or pin 9 of MessageView terminal connector.

To Allen-Bradley Dataliner DL40

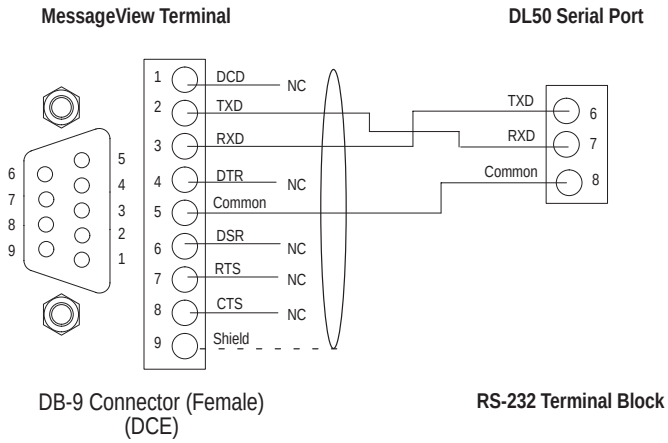
RS-232 Communication Cable



Note: If you create a cable, connect the cable shield to metal housing or pin 9 of MessageView terminal connector.

To Allen-Bradley Dataliner DL50

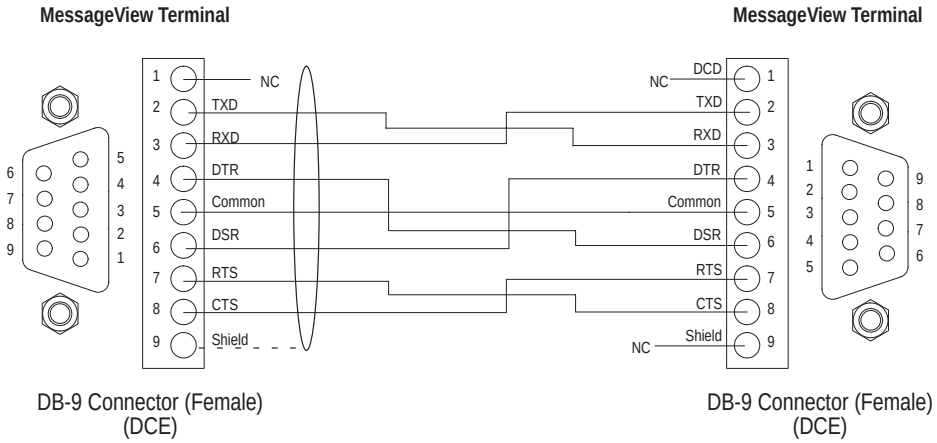
RS-232 Communication Cable



Note: If you create a cable, connect the cable shield to metal housing or pin 9 of MessageView terminal connector.

To another MessageView terminal

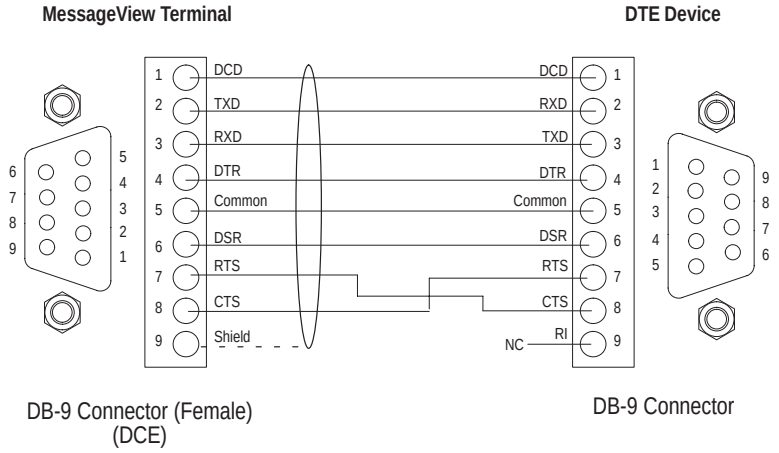
RS-232 Communication Cable



Note: If you create a cable, connect the cable shield to metal housing or pin 9 of MessageView terminal connector.

To a DTE Device

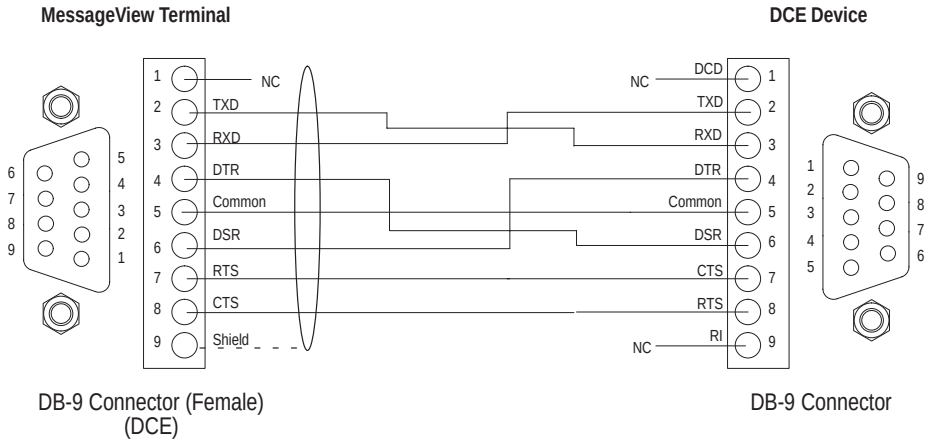
RS-232 Communication Cable



Note: If you create a cable, connect the cable shield to metal housing or pin 9 of MessageView terminal connector.

To a DCE Device DB-9 Connector

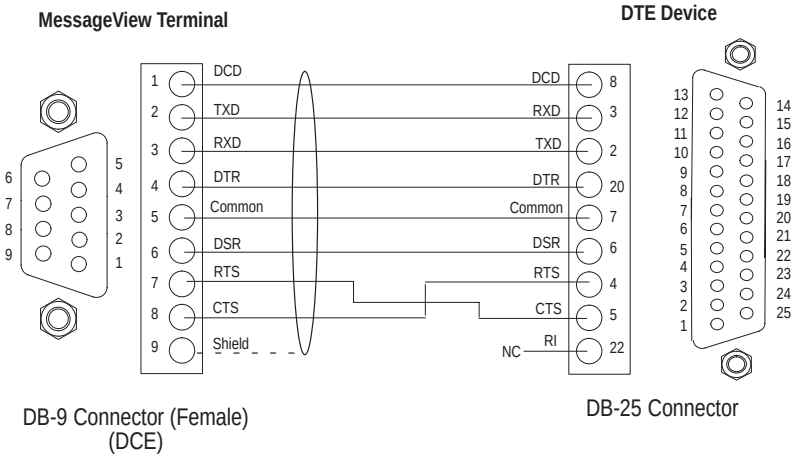
RS-232 Communication Cable



Note: If you create a cable, connect the cable shield to metal housing or pin 9 of MessageView terminal connector.

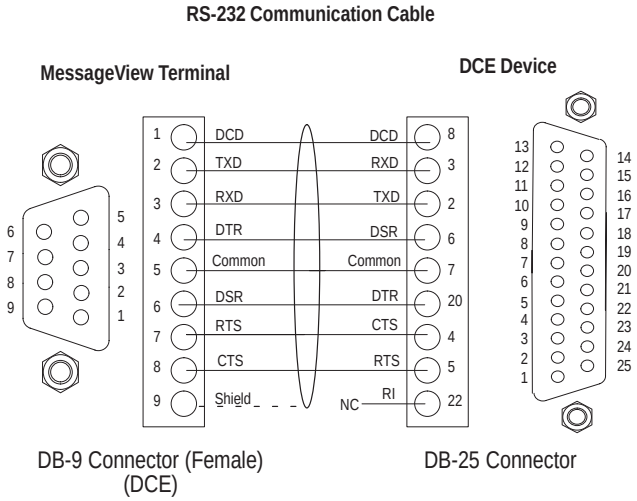
To a DTE Device DB-25 connector

RS-232 Communication Cable



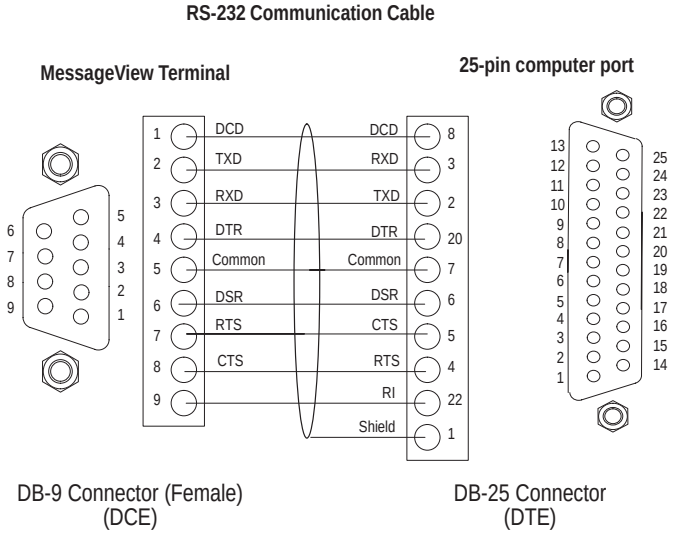
Note: If you create a cable, connect the cable shield to metal housing or pin 9 of MessageView terminal connector.

To a DCE Device DB-25 connector



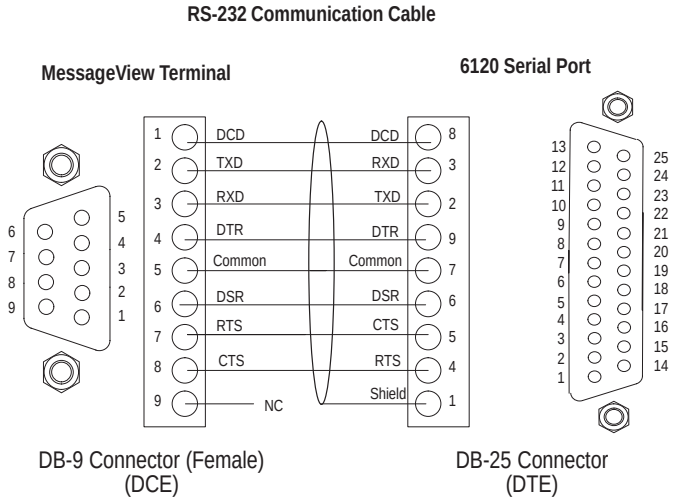
Note: If you create a cable, connect the cable shield to metal housing or pin 9 of MessageView terminal connector.

To an Allen-Bradley 1784-T45 or -T47 Laptop, a VT100 Terminal, or an IBM AT™ Compatible Personal Computer – 25 pin



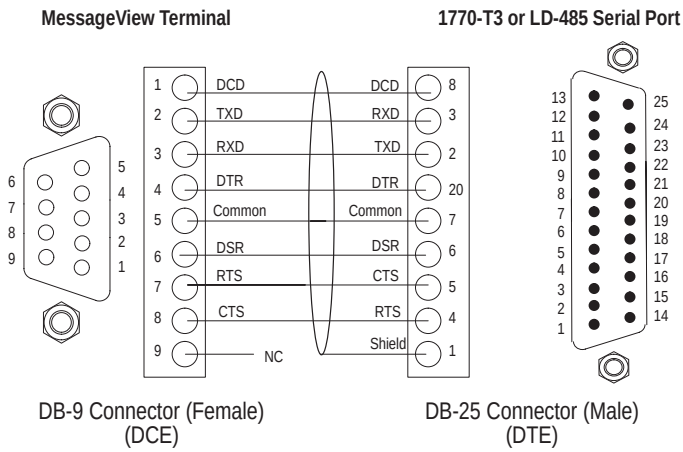
Note: If you create a cable, connect the cable shield to metal housing or pin 1 of the computer connector.

To an Allen-Bradley 6120 Serial Port



Note: If you create a cable, connect the cable shield to metal housing or pin 1 of the 6120 connector.

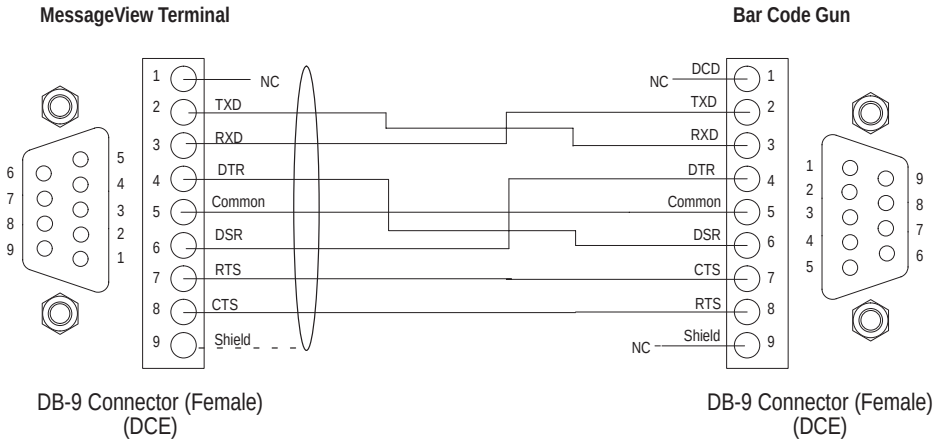
To an Allen-Bradley 1770-T3 Terminal Serial Port or Black Box LD-485 Converter Box



Note: If you create a cable, connect the cable shield to metal housing or pin 1 of the 1770-T3 or LD-485.

To an Allen-Bradley Bar Code Gun (Catalog No. 2755-G3D)

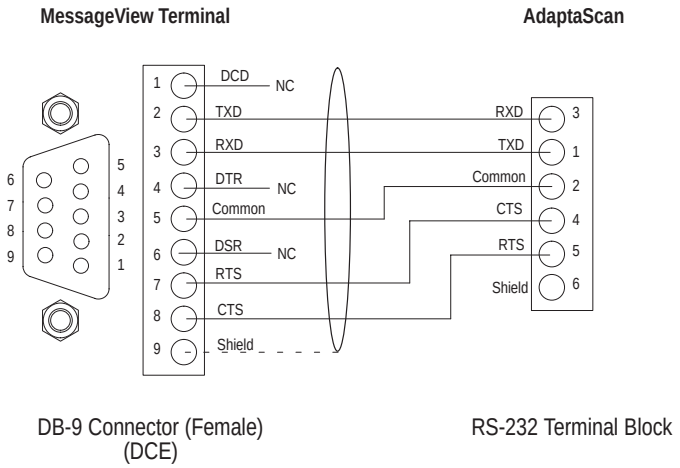
RS-232 Communication Cable



Note: If you create a cable, connect the cable shield to metal housing or pin 9 of MessageView terminal connector.

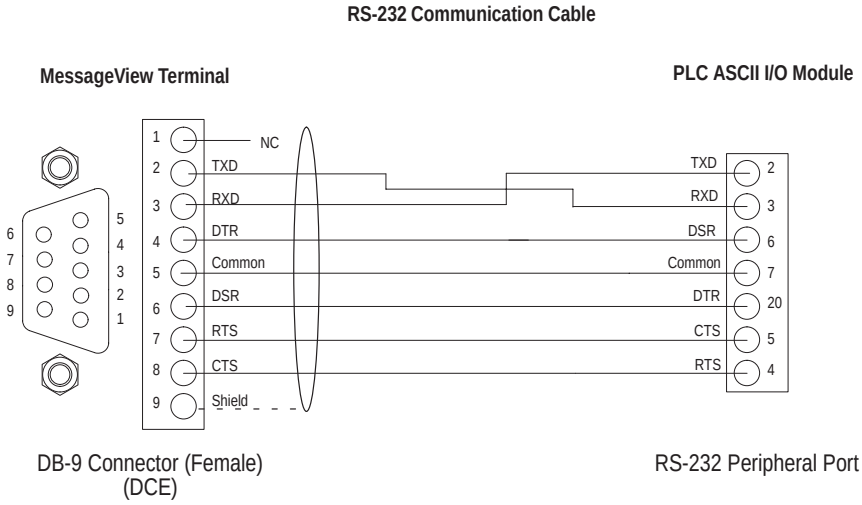
To an Allen-Bradley AdaptaScan Reader

RS-232 Communication Cable



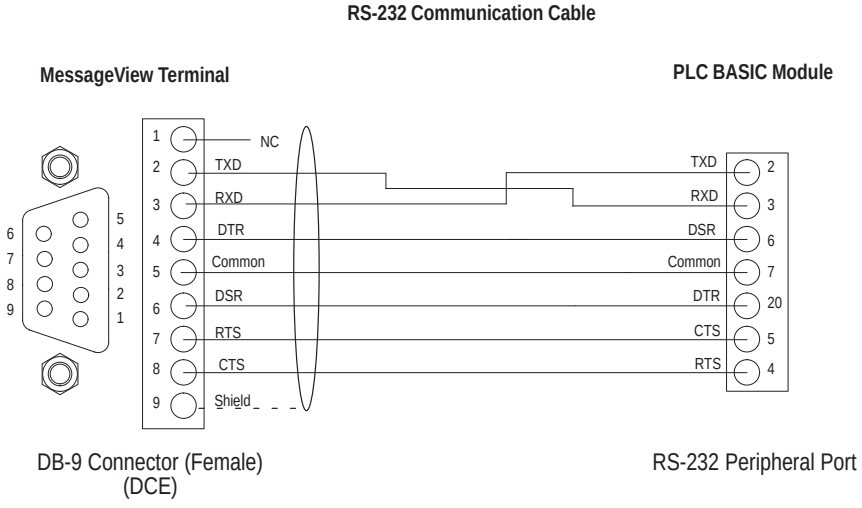
Note: If you create a cable, connect the cable shield to metal housing or pin 9 of MessageView Terminal Connector.

To an Allen-Bradley PLC ASCII I/O Module (Catalog No. 1771-DA)



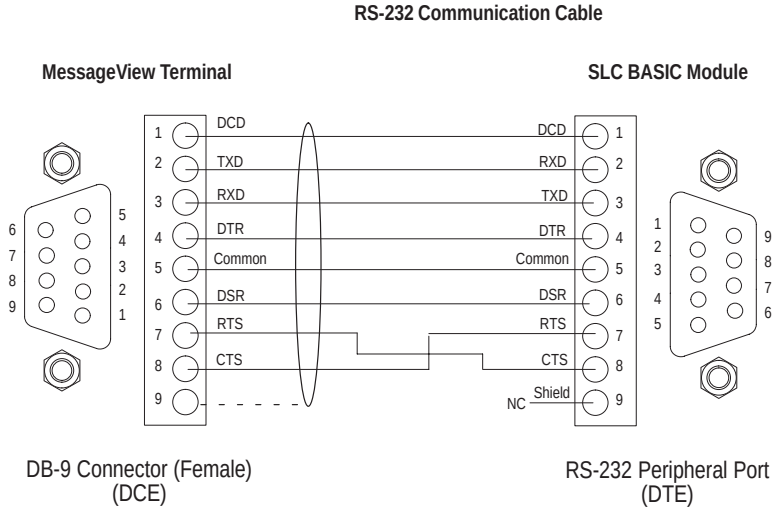
Note: If you create a cable, connect the cable shield to metal housing or pin 9 of MessageView terminal connector.

To an Allen-Bradley PLC BASIC Module (Catalog No. 1771-DB)



Note: If you create a cable, connect the cable shield to metal housing or pin 9 of MessageView terminal connector.

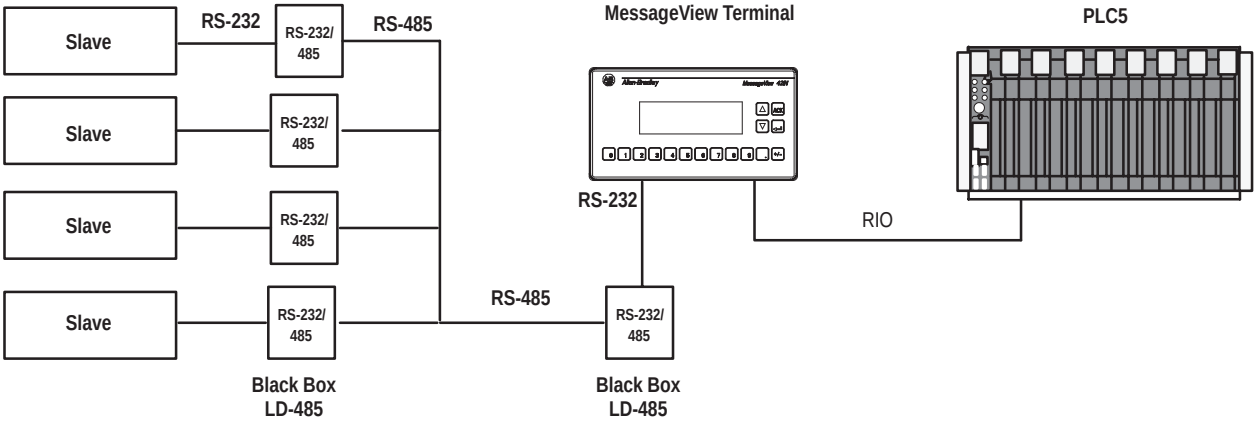
To an Allen-Bradley SLC BASIC Module (Catalog No. 1746-BAS)



Note: If you create a cable, connect the cable shield to metal housing or pin 9 of MessageView terminal connector.

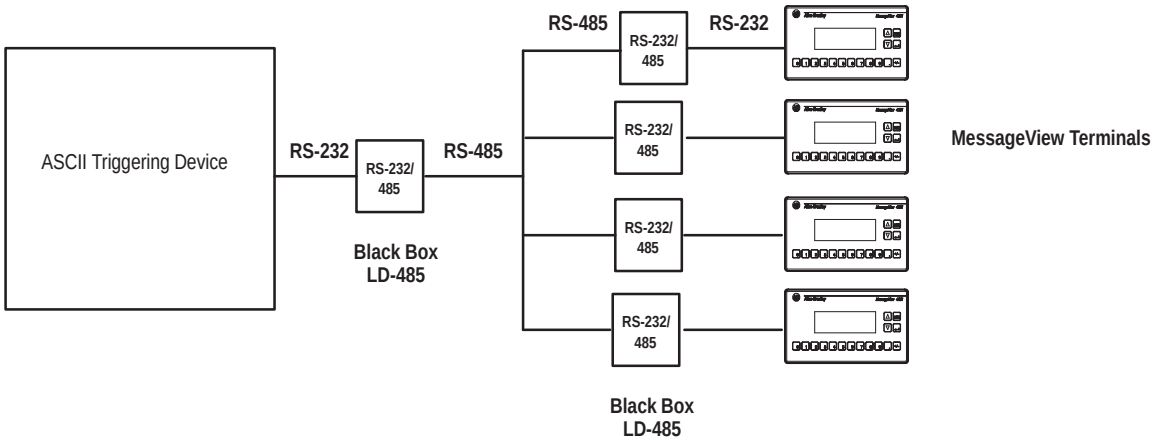
MessageView Terminal With Multiple Slave Devices

Catalog Nos. 2706-M1D1, -M1N1, M1F1 with FRN 2.00 or above.



ASCII Triggering Device With Multiple MessageView Terminals

Catalog Nos. 2706-M1D, -M1N, M1F.



Compatible Devices

MessageView terminals can be used in networks hosting a wide range of devices. Some representative examples include:

- MessageView terminals (multiple)
- PLCs
- SLC (using 1747-SN Remote I/O Subscanner)
- 1771-SN Subscanner Module
- Bulletin 2711 PanelView products
- Bulletin 2706 Dataliners (DL10, DL40, DL50)

Compatible Controllers

A MessageView terminal (Catalog No. 2706-M1D1, -M1N1, -M1F1) connects to any Allen-Bradley 1771 Remote I/O link. Applicable host controllers are listed in the table below

When connecting a MessageView terminal to a controller, refer to the user manual for the controller or scanner module for connection diagrams and any Remote I/O limitations. The table below provides a list of compatible controllers/scanners.

Controllers and Scanners Compatible with MessageView Terminals

Controller	Subscanner	Comments
PLC-5®/11, 5/15①, 5/20, 5/25, 5/30, 5/40, 5/60, 5/80, 5/250	PLC Integral	Connect MessageView terminals directly to the Remote I/O port (scanner mode).
	1771-SN	Connect MessageView terminals through the 1771-SN Subscanner Module.
PLC-5/10, 5/12	1771-SN	Connect MessageView terminals through the 1771-SN Subscanner Module.
PLC-3® and PLC-3/10	None	Connect MessageView terminals directly to a PLC-3.
	PLC 3/10 Remote I/O Scanner②	Connect MessageView terminals to the PLC-3/10 through the Remote I/O scanner.
PLC-2®③	1771–SN or 1772-SD2④	Connect MessageView terminals to the PLC-2 family of processors through a 1771-SN I/O Subscanner Module or 1772-SD2 Scanner/Distribution panel.
SLC-5/02, 5/03™, 5/04™	1747-SN	Connect MessageView terminals through the 1747-SN Subscanner Module. Each Subscanner Module provides an additional Remote I/O link for up to 4 racks. **Important:** Only Series B and later versions of the 1747-SN subscanner support block transfers.
IBM PC	6008-SI	6008-SI I/O Scanner is compatible with IBM PC or compatible personal computers. The scanner provides a personal computer access to the 1771 Remote I/O link.
VME™	6008-SV	6008-SV I/O Scanner provides access to the 1771 Remote I/O link for VME controllers.
DEC Q-BUS™	6008-SQ	6008-SQ I/O Scanner provides access to the 1771 Remote I/O link for DEC Q-BUS controllers.

① If you use a PLC-5/15 with partial rack addressing and block transfers, you must use Series B, Rev. J or later.

② If you use a 1775-S4A Remote Scanner/Distribution Panel, you must use Series B or later.

③ If you use a PLC-2 be sure to consult the manual on proper addressing.

④ If you use a 1772-SD2 Remote Scanner/Distribution Panel, you must use revision 3 or later.

Troubleshooting and Maintenance

This chapter covers the following topics:

- Using the Troubleshooting Chart
- Terminal Status LED Indicators
- Maintenance
- Replacing the battery module
- Replacing the internal fuse.

Using the Troubleshooting Chart

The terminal troubleshooting chart lists the most common operating problems, the probable causes, and steps to correct each one.

ATTENTION: Make sure that no objects are inserted or fall into the terminal through the ventilation slots. Always disconnect power when checking wiring connections. Failure to take adequate precautions may result in damage to the MessageView terminal.

- If a problem is detected during terminal powerup or reset self-tests, the number of the failed test appears on the display. Appendix B contains a list of the tests and offers suggestions as to what can be done to correct the condition.
- If a problem occurs while an application is running, a message may be displayed which gives the nature of the problem. Appendix B list all error messages and troubleshooting suggestions.
- If there seems to be a problem while an application is running but no message appears, select the appropriate Self Test on the Front Panel Editor menu. See Page 3–21. This may give more information on where the problem is centered.

Equipment Required

Other than verifying that the correct power source is connected to the terminal (use a voltmeter), no electronic diagnostic equipment is required for troubleshooting.

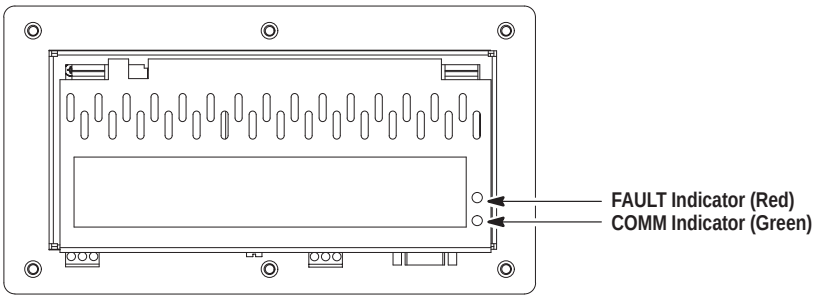
Refer to Page 1–11 for a list of replacement parts.

Problem	Probable Cause(s)	Corrective Action(s)
The terminal does not power up.	1. Improper connection to power source. 2. Internal fuse blown.	1. Verify correct voltage and polarity at power terminals on the back of the terminal. 2. Check condition of internal fuse. Determine reason for fuse blowing. Contact Allen-Bradley for fuse replacement.
The terminal powers up with a self-test error.	1. Terminal senses an internal problem.	1. Refer to Appendix B for self-test error codes.
The terminal does not communicate with the controller.	1. Communications (COMM) fault. 2. Cabling problem. 3. Baud rates not set properly. 4. Controller not in run mode. 5. Terminal node and maximum node numbers are not set properly. 6. Controller fault. 7. Terminal is in simulate mode.	1. Check status of COMM LED, refer to section “Terminal Status Indicators”. 2. Verify cable condition and connections using cable diagrams in Chapter 6. 3. Verify that terminal and controller are set at the same Baud rate. 4. Place controller in run mode. 5. Verify node number settings. 6. Refer to user manual for controller. 7. Disable simulate mode in the terminal from the Front Panel Editor.
The terminal does not communicate with a computer that has MessageBuilder installed.	1. Cabling problem. 2. RS-232 Port is configured to communicate with an auxiliary device (see Page 3–3).	1 Verify cable condition and connections using cable diagrams in Chapter 6. 2. Switch RS-232 port to communicate with MessageBuilder instead of an auxiliary device (see Page 3–3).
Terminal does not communicate with an ASCII Trigger device or an auxiliary device.	1. Communications (COMM) fault. 2. Cabling problem. 3. Baud rates not set properly. 4. Terminal node and maximum node numbers are not set properly. 5. Computer fault. 6. INTERCHANGE driver not properly loaded. 7. RS-232 Port is configured to communicate with MessageBuilder (see Page 3–3).	1. Check status of COMM LED, refer to section “LED Indicators”. 2. Verify cable condition and connections using cable diagrams in Chapter 6. 3. Verify that terminal is set at 19200 Baud. 4. Verify node number settings. 5. Refer to computer user manual. 6. Refer to the MessageBuilder Software User Manual (Publication 2706-817). 7. Switch RS-232 port to communicate with the ASCII Trigger device or the auxiliary device (see Page 3–3).
Variable data does not update or display.	1. Data is not present at display data tag address. 2. Communications problem.	1. Check logic controller program. Verify that data is present. Refer to user manual for controller. 2. Check status of Comm LED, refer to “Terminal Status Indicators” section. Refer to problem ‘The terminal does not communicate with the controller’ for additional troubleshooting instructions.
Variable data does not update in display but appears as asterisks ****.	1. Terminal is not communicating with controller. 2. The value is invalid or exceeds the field width defined for the variable.	1. Download application and try again. 2. Change the field width defined for variable.

Terminal Status Indicators

The MessageView terminal has two LEDs which function as terminal status indicators. These two indicators can be seen at the back of the MessageView terminal as shown below.

Back View



Use this table to interpret the state of the Status LEDs.

LED	Status	Description	What to do about it
COMM.	On (Steady Green)	Normal operating state	No problem.
	Off (power applied, but LED not lit)	Communication fault detected: • Controller does not have RIO enabled • Baud rates on terminal do not match those of the controller • Rack settings between terminal and controller do not match • RIO terminal connections incorrect	Check controller settings Set controller baud rate to match the terminal setting. See Page 3–5. Set controller rack settings to match the terminal settings. See Page 3–5. Check the RIO hardware connections.
	Blinking	Communications not established: • Controller/Scanner is in Program Mode	Communications not established Controller/Scanner is in Program Mode
FAULT (hardware)	On (Steady Red)	Terminal hardware fault detected: • Hardware fault • Firmware fault	Cycle power to the terminal so it will run its Power-On Self Tests (POST). See Page B–4. Cycle power to the terminal so it will run its Power-On Self Tests (POST). See Page B–4.
	Off (power applied, but LED not lit)	Normal operating state	No problem.

The status of these indicator LEDs can also be determined through Front Panel Editor (FPE) System Status options. See Page 3–35.

Maintenance

To clean the display window:

1. Disconnect DC power from the terminal at the power source.
2. Using a clean sponge or a soft cloth, clean the display with a mild soap or detergent.
3. Dry the display with a chamois or moist cellulose sponge to avoid water spots.

ATTENTION: Abrasive cleansers or solvents may damage the window. Do not scrub or use brushes on the window.

To remove paint and grease:

1. Disconnect DC power from the terminal at the power source.
2. Remove fresh paint splashes and grease before they dry by rubbing lightly with isopropyl alcohol.
3. Using a clean sponge or a soft cloth, clean the display with a mild soap or detergent.
4. Dry the display with a chamois or moist cellulose sponge to avoid water spots.

Replacing the Battery Module

The MessageView contains a small lithium battery used by the real time clock, and to maintain application and Historical Event Stack memory when the terminal is turned off. The battery has a typical life expectancy of 5 to 10 years.

The battery is tested every time the terminal is powered up or reset, as part of the Power On Self Test (POST). It may also be tested separately using the Front Panel Editor (FPE) Self Tests. See Page 3–25.

Contact an Allen-Bradley Field Service Center for battery replacement.

ATTENTION: Remove the MessageView terminal from a hazardous environment before replacing the battery. Contact Allen-Bradley Field Service Center for Battery Replacement.

ATTENTION: The battery module contains lithium. Do not attempt to dispose of it in a fire or incinerator, it may explode. Follow disposal regulations in your area for lithium battery disposal.

Replacing the Internal Fuse

A MessageView Terminal is protected by an internal fuse. Two conditions that can cause a fuse to blow are:

- overcurrent/overvoltage
- internal component failure

To determine the cause of the blown fuse:

1. Immediately disconnect the power from the terminal at the power source.
2. Verify that correct voltage source (24V DC) is connected to the MessageView terminal.

   If incorrect voltage source was applied to terminal, correct the voltage source.
3. Contact Allen-Bradley Field Service Center for fuse replacement.

ATTENTION: Allen-Bradley Field Service Center Representatives: Replace defective fuse with a Series 239 Slo-Blo 2.0 Amp fuse or Type GMC Time-Lag 2.0 Amp fuse.

ATTENTION: Remove the MessageView terminal from a hazardous environment before replacing the fuse.

Specifications

Electrical		
Supply Voltage (Recommended)		24 VDC
Supply Voltage Range		18 – 30 VDC
Power Consumption		20 Watts maximum (833 mA @ 24V DC)
Mechanical		
Enclosure		NEMA Type 12/13
		NEMA Type 4X (indoor use only)
Terminal Status Indicators		
COMM		Green
FAULT		Red
Dimensions – Chassis		
421D Terminals	inches	3.60 (H) x 7.95 (W) x 4.00 (D)
	mm	91 (H) x 202 (W) x 65 (D)
421N Terminals	inches	3.60 (H) x 7.95 (W) x 4.00 (D)
	mm	91 (H) x 202 (W) x 65 (D)
421F Terminals	inches	5.45 (H) x 7.95 (W) x 4.00 (D)
	mm	138 (H) x 202 (W) x 65 (D)
Dimensions – Front Bezel		
421D Terminals	inches	5.10 (H) x 9.45 (W) x 0.63 (D
	mm	130 (H) x 240 (W) x 16 (D)
421N Terminals	inches	5.10 (H) x 9.45 (W) x 0.63 (D)
	mm	130 (H) x 240 (W) x 16 (D)
421F Terminals	inches	6.95 (H) x 9.45 (W) x 0.63 (D)
	mm	177 (H) x 240 (W) x 16 (D)
Weight		
421D Terminals		3.2 lbs 1.45. kg)
421N Terminals		3.2 lbs 1.45. kg)
421F Terminals		3.8 lbs (1.72 kg)
Terminal Memory		
Application RAM		4096 messages x 21 characters
Historical Event Stack Memory		4000 messages x 21 characters
Value Trigger Queue		64 messages x 100 characters
Application EEPROM (Flash)		256 K Words x 16 bits
Battery-Backed SRAM		128 K Words x 16 bits

VFD Display

Size (all terminals):	inches	1.06 (H) x 4.27 (W)
	mm	26.9 (H) x 108.5 (W)
Pixels		128 x 32 dot matrix
Characters		
Quarter Size		21 x 4 lines
Half Size		10 x 2 lines
Full Size		7 x 1 line
Graphic Symbols		5 x 2 lines

Communications

Remote I/O	
Baud Rate/Distance	57.6K/10,000 feet (2800 meters) 115.2K/5,000 feet (1400 meters) 230.4K/2,500 feet (700 meters)
RS-232 Point-to-Point (PC Link)	
Baud Rate/Distance	19.2K/50 feet (6.1 meters)

Environment

Ambient Temperature	
Operating	0 to 55 C (32 to 131 F)
Storage	-40 to 85 C (-24 to 185 F)
Relative Humidity (Non-Condensing)	5 to 95%

Shock and Vibration

Impulse Shock (Operating/Non-operating)	30G/50G
Vibration (Operating)	10 to 57Hz (0.012 in / 0.3 mm) 58 to 150Hz (2G)

Battery/Fuse (to be replaced by an authorized Allen-Bradley Field Service Representative)

Battery Module Replacement Kit	Catalog No. 2706-NB
Fuse Replacement	Series 239 2.0 Amp Slo-Blo Type GMC 2.0 Amp Time-Lag

Certifications

	UL Listed for ordinary and hazardous locations (Class I Division 2 Groups A,B,C,D) Temperature Code T5
	CSA certified
European Union Directive 	Electromagnetic Compatibility Directive (89/336/EEC) EN 50082-2 – 1995 Generic Immunity Standard - Industrial Environment EN 50081-2 – 1993 Generic Emission Standard - Industrial Environment

Terminal Messages

This appendix covers the following topics:

- Messages that may be displayed during terminal operation
- Power On Self Test (POST) numbers and a description of each test.

Terminal Messages

Four types of messages may appear on the terminal from time to time. The table below describes each message and gives its type.

Status Messages

A Status Message indicates that

- the terminal is performing an operation that may limit access to the terminal (such as an application file download)
- the terminal has a communication problem.

The message disappears when the terminal completes the operation or when the communication problem is corrected.

Reminder Messages

A Reminder Message indicates a minor fault or mistake. Reminder messages appear when an operator attempts an operation that can't be performed (such as entering an out of range value). Press the ACK key to remove the message.

Warning Messages

A Warning Message indicates that an operation may produce undesirable results. You must respond to warning messages as indicated by the message.

Fault Messages

A Fault Message indicates that the terminal cannot operate and has halted the current application. The terminal must be reset (power cycled). If the problem persists, call your Allen-Bradley distributor for help.

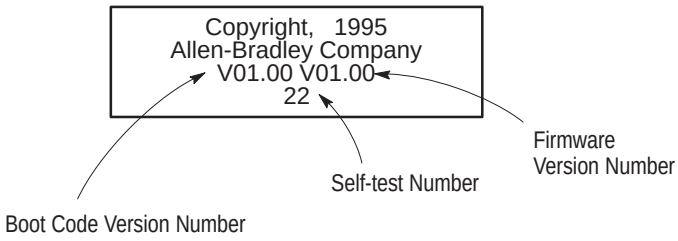
Status and Warning Messages.T

Terminal System Message:	Type:	Means:	Recommended Action Is:
Aux. port in MB Mode	Reminder	RS-232 port set to communicate with a computer than has MessageBuilder installed.	Go into the FPE and implement the "Change Port To:" menu item (see Page 3–3).
CTS Error	Comm. Status	Auxiliary device on RS-232 port has asserted its CTS line, thus signalling it is not ready to receive data from the terminal.	Clear auxiliary device input buffers. Check cabling.
Display Failure	Fault	Terminal display has a Fault	Reset terminal by simultaneously pressing the up, down, and enter keys on the terminal.
Handshake Timeout	Comm. Status	Auxiliary device on RS-232 port did not return handshake signal required for displayed message.	Check cabling and program of auxiliary device.
Historical Event Stack 100% full	Reminder/File Status	Terminal's HE Stack buffer is full. Any more entries will overwrite existing entries.	Upload the HE Stack to a computer running MessageBuilder software and/ or clear the HE Stack in the terminal. See Page 4–8.
Historical Event Stack 95% full	Reminder/File Status	Terminal's HE Stack buffer is 95% full.	Upload the HE Stack to a computer running MessageBuilder software and/ or clear the HE Stack in the terminal. See Page 4–8.
Historical Event Stack 85% full	Reminder/File Status	Terminal's HE Stack buffer is 85% full.	Upload the HE Stack to a computer running MessageBuilder software and/ or clear the HE Stack in the terminal. See Page 4–8.
Historical Event Stack cleared	Reminder	HE Stack has been cleared.	None.
Historical Event Stack empty	Reminder	No messages in the HE Stack file.	None.
HE Stack in use	Reminder	Terminal's HE Stack file is being uploaded to a computer.	Wait until the HE Stack has finished uploading before you try to view it. Ask the terminal operator not to clear it.
HE Stack integrity failure	Fault	HE Stack stored in terminal memory has been corrupted.	Reset terminal by simultaneously pressing the up, down, and enter keys on the terminal.
Incorrect Password entered	Reminder	Operator entered wrong password for the Front Panel Editor.	Enter correct password.
Invalid Message Number	Reminder	Message number triggered is out of acceptable range.	Check ladder logic for improper addressing. Check message number trigger range (0 – 4096).
Message not Programmed	Reminder	Message number triggered that does not exist.	Check ladder logic for improper addressing. Check message number trigger range (0 – 4096).
No PLC Communications	Comm Status	PLC is not communicating. Possible causes are: 1. cable disconnected 2. no power to PLC 3. if COMM LED is off also, baud rate or rack settings incorrect.	1. Check for pulled cables or incorrect wiring of connector. 2. Check PLC power 3. Check baud rate and rack settings for the RIO port (see Page 3–5) and the PLC port.
No PLC Handshake	Comm Status	PLC did not return a handshake signal required for the displayed message.	Check ladder logic for missing handshake signal tag address (instructions that are not enabled, or addressing errors).
Not Active	Reminder	Function not enabled via MessageBuilder application.	Revise the application using MessageBuilder software.

Terminal System Message:	Type:	Means:	Recommended Action Is:
PLC in Program Mode	Comm Status	PLC is not ready to communicate.	Set PLC to Run mode.
Value not in range	Reminder	The entered value is out of the acceptable range.	Enter a value within the acceptable range.

Self Test Numbers and Descriptions

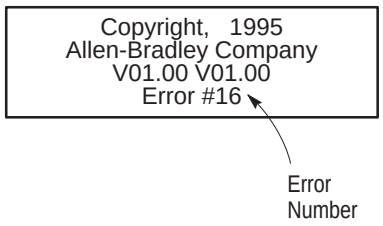
When power is first applied to the MessageView terminal or the terminal is reset, a series of self-tests are performed. The initial display shows copyright information and the status of the self-test (test number). As each test is performed, its test number appears.



Note: You may not see all of these test numbers during a power-up or reset. However all tests are performed.

When all the self–tests are completed, the message Self-Tests Complete is displayed for 2 seconds.

If a test has failed, a message is displayed showing the number of the failed test. Note the bootcode/firmware version numbers and error number when calling Allen-Bradley for technical support.



See the table below for a description of the self-test numbers, and what to do if one of the tests fails.

You can also run most of these tests using commands on the Front Panel Editor. See Page 3–21.

Note: To reset the MessageView terminal, simultaneously press the up arrow [▲], down arrow [▼], and Enter [↵] keys.

Terminal Power-Up Self Test Number Descriptions .U

Test Number	Power-Up Self Test	Description	Recommended Action if Failed
10	Display Test	Lights all pixels on the MessageView terminal's display so the user can identify any defective pixels.	Press ACK to continue.
12	Microprocessor Confidence Test	Checks the microprocessor's ability to read/write to its internal registers.	Press ACK and reset terminal. If failure continues contact Allen-Bradley.
14	WatchDog Timer Test	Enable WatchDog timer and allow the terminal to reset itself. If the terminal does not reset with the allotted time the test fails. The MessageView terminal continues with the Power-Up/Reset Self Tests only after a passed WatchDog timer test.	Press ACK and reset terminal. If failure continues contact Allen-Bradley.
16	Stuck Key Test	Check for a continuous key press during startup. If one is detected, a *"Key Pad"* failure is reported.	Press ACK and reset terminal.
18	Flash EPROM Boot Block Code Checksum	Performs a checksum calculation on the initial program boot loader code block and verifies against the stored checksum.	Reset terminal. If failure continues contact Allen-Bradley.
20	Product ID	Verifies application firmware with terminal hardware configuration.	Press ACK and reset terminal. If failure continues contact Allen-Bradley.
22	Scratch Pad NOVRAM System Parameters Checksum	Perform SRAM integrity check and verify RAM data links integrity.	Press ACK and reset terminal. If failure continues contact Allen-Bradley.
24	Battery Test	Checks the battery module for proper operation.	Press ACK. If failure continues contact Allen-Bradley.
26	RTC Integrity Test	Check the Real-Time Clock module dynamic operation and verify a valid time and date setting.	Press ACK and reset terminal. If failure continues contact Allen-Bradley.
28	Serial Communication Test	Perform a serial communications test, initialize the serial channels and verify correct register settings against system parameters.	Press ACK and reset terminal. If failure continues contact Allen-Bradley.
30	Boot code & Firmware Compatibility	Verifies boot code and firmware.	Press ACK, reset terminal. If failure continues contact Allen-Bradley.
32	Flash EPROM Firmware Code Checksum	Perform a checksum calculation on the firmware code block and verify against the stored checksum.	Press ACK and reset terminal. If failure continues upgrade terminal firmware.
34	Daughter Board Test	Verifies communications daughter board with terminal hardware configuration.	Press ACK and reset terminal. If failure continues contact Allen-Bradley.
36	Flash EPROM User Message Application Checksum	Perform a checksum calculation on the user message application storage block and verify against the stored checksum.	Press ACK and reset terminal. If failure continues download the application again.
38	NOVRAM Historical Event Stack Memory Integrity	Perform a presence test of the non-volatile battery-backed extended SRAM. Verifies the validity of the historical events stack contents.	Press ACK and reset terminal. If failure continues contact Allen-Bradley.
40	NOVRAM Backup System Parameter Checksum	Perform a checksum calculation on the backup system parameters stored in the Non-Volatile Static RAM and verify against the stored checksum.	Press ACK and reset terminal. If failure continues download the application again.

Glossary

Note: A word or words in **bold face** in an entry has its own entry in this Glossary.

A –

Address – See **Node Address.**

Application – A logical arrangement of messages, tags, and configuration Parameters for a specific type of **MessageView** terminal in a system with a specific type of **Controller**. When it is downloaded into a MessageView terminal, it allows the terminal operator to monitor and control a process.

ASCII Input Device – A bar code scanner or other device that sends alphanumeric data to a **MessageView** terminal. A terminal with two ports and **Firmware** that supports ASCII Input may have its **RS-232** port connected to an ASCII Input device.

ASCII Triggering Device – A device that can trigger messages in a MessageView terminal with **Firmware** that supports ASCII Triggering. It reads and writes data through the terminal's **RS-232** port.

Auxiliary Device – A device connected to the **RS-232** port of a **MessageView** terminal that is being controlled through its **Remote I/O** port by a **Logic Controller**. An auxiliary device may be an **ASCII Input device** such as an AdaptaScan reader, or a **Slave Device** such as a Dataliner DL50.

B –

Background Message – A message that is displayed by a **MessageView** terminal when no other message has been active for 2 seconds.

Baud – The rate at which data transmission occurs. One baud equals one bit per second.

Boot Code – Software in a **MessageView** terminal that allows **Firmware** and an **Application** to be loaded in the terminal. Its revision number may be seen. The Boot Code is tested every time the terminal is powered up, and may also be tested separately using the **Front Panel Editor**.

C –

Controller – A device that controls a **MessageView** terminal by **Triggering** messages and providing data for display variables. See **Logic Controller, ASCII Triggering Device.**

Cursor Keys – Up/down arrow keys on the **MessageView** terminal **Keypad** that are used to move a selection cursor or the active object indicator bar.

D –

Daughterboard – A communications card installed in a **MessageView** terminal. It provides a **Remote I/O** port for the terminal.

Debug Mode – A way of testing the application quickly. The **MessageView** terminal displays each message's message number as it is **Triggered**.

Device – Any of a number of mechanical units, such as **Logic Controllers**, **ASCII Input** devices and computers that may be connected to a **MessageView** terminal. A MessageView terminal is itself a device.

DF1 – An Allen-Bradley communications protocol used to transfer an application or other data between a computer and the **MessageView** terminal's **RS-232** port.

Display – The window in a **MessageView** terminal in which **Messages** appear as they are triggered. Error messages and **Front Panel Editor** menus also appear there. The display is a 128 x 32 pixel vacuum fluorescent display (VFD).

Vacuum Fluorescent Display – The **Display** of a **MessageView** terminal

Download – The process of transferring data from a computer to a **MessageView** terminal. Specific download commands load an **Application** in the terminal, change the date or time in the **RTC**, or update **Firmware**.

E –

EEPROM (Flash) – Acronym for Electrically Erasable Programmable Read Only Memory. A **MessageView** terminal uses a flash EEPROM to store its **Firmware** and an **Application**.

EMI – Acronym for Electromagnetic Interference. An extraneous signal in a circuit that can interfere with the desired signal.

EPROM – Acronym for Erasable Programmable Read Only Memory. It is a computer chip that can be written to and erased, but retains its stored data when power is turned off.

F –

Firmware – Software that allows the **MessageView** terminal to run an **Application**. Several versions of firmware are available, depending on how the terminal is to be used.

Flashing – A **Message** or part of a message that is emphasized by being turned on and off regularly in the **MessageView** terminal display.

Front Panel Editor – Firmware that allows the terminal operator to check on and to some extent reconfigure a **MessageView** terminal. Also referred to as FPE.

Function Keys – A set of keys labeled F1 to F16 (only on the **MessageView** 421F terminal) that may be enabled for a **Message**. When a displayed message has a function key or keys enabled, the terminal operator can use the key(s) to initiate a procedure. Function keys are disabled unless they are specifically enabled for a message being displayed.

G –

Graphic – One of 32 standard **ISA** bitmaps representing motors, valves and other objects used in manufacture.

H –

HE Stack – Acronym for the Historical Event Stack. A file in the **MessageView** terminal in which messages are logged as they are **Triggered**, with a time/date stamp. The file may be viewed by the terminal operator, or uploaded into a computer for analysis.

I –

Inverse Video – A **Message** or part of a message that is emphasized by having its colors reversed in the **MessageView** terminal display.

ISA – Acronym for Instrumentation Society of America. **MessageBuilder** software includes a set of standard ISA bitmap **Graphic** symbols that can be embedded in a message.

J –

Jog Feature – One aspect of the Auto Clear attribute. When Auto Clear is disabled for a **Message** that has embedded **Function Keys**, jog feature is activated. A message with jog feature enabled remains active until the terminal is reset or the display is cleared. A message with jog feature disabled is terminated after one of its function keys is pressed.

K –

Keypad – A set of keys on the **MessageView** terminal that the terminal operator uses to input data, acknowledge messages and access the Front Panel Editor. See also **Numeric Keypad** and **Function Keys**.

L –

LED – Acronym for Light Emitting Diode. Each **MessageView** terminal has two terminal status LEDs (Comm and Fault) on the back. Their state can be checked in the Front Panel Editor. In addition, a MessageView 421F terminal has a red LED beside each of the 16 **Function Key**s. These LEDs may or may not reflect the condition of the function key, depending on how they are set up in the **Application**.

Logic Controller – A device used to replace relay logic used for sequencing, timing, and counting. Instead of physical wiring devices such as relays, push buttons and limit switches, a logic controller tests the state of inputs and sets outputs according to stored programs. A **MessageView** terminal with an **Remote I/O** port receives commands from a logic controller to run an application. Also called programmable controller. See also **SLC**; **PLC**.

M –

Master Device – A device which controls one or more **Slave Devices**. It sends **Messages** to be displayed by its slaves, and controls the appearance of the message in the slave display. A **MessageView** terminal with a **Daughterboard** and **Firmware** that supports Slave Port can address up to 127 slave devices through its **RS-232** port.

Menu – A list of related commands in the **Front Panel Editor**. Highlight a menu name and use the Enter key to open a list of commands or options relating to the menu name.

Message – The basic unit of a MessageBuilder **Application**. It contains any or all of the following: text, embedded **Variables, Graphics** and enabled **Function Keys**. A message appears in the **MessageView** terminal's display after it has been **Triggered** by the **Controller**. Messages are not always displayed when they are triggered.

MessageBuilder Software – A Microsoft Windows based program used to develop an **Application** that will run in a **MessageView** terminal.

MessageView Terminal – An Allen-Bradley device which runs a MessageBuilder **Application** and controls a process. The terminal provides an operator display interface to a **Controller** and often to other **Devices** when the application is executing.

N –

NEMA – Acronym for National Electric Manufacturers Association.

Node – A point on a network to which a **Device** can be connected. The **MessageView** terminal may be at a node on a **Remote I/O network** or an **ASCII Triggering Device** network.

Node Address – A unique integer assigned to each node on a network. Data transfer between **Devices** on a network requires a destination address.

Numeric Keypad – On **MessageView** 421N and 421F terminals, keys the operator can use to input data in Numeric Entry variables.

P –

Parameter – A characteristic of a device or system that is defined as part of its set-up. For instance, a **MessageView** terminal's **Remote I/O** port must have the controller type, its baud rate, and other parameters specified so it can communicate with the specific type of **Logic Controller** the system will use. Communications parameters may be viewed using **Front Panel Editor** commands.

PLC – Acronym for Programmable **Logic Controller**, an Allen-Bradley trademarked device.

Port – The part of a **Device** through which it communicates with other devices. Before two devices can communicate, they must have a hardware connector (cable) joining their ports and both ports must have the correct software communication **Parameters** set. A **MessageView** terminal has an **RS-232** port and may also have a **Remote I/O** port.

Power-On Self Tests – The tests run by the terminal when it is powered up. The terminal operator can run any of these tests individually using a **Front Panel Editor** command. Also referred to as POST.

Preset Value – A value that is loaded into a **PLC** or **SLC** controller data table when an **Application** starts up in a **MessageView** terminal.

Programmable Controller – See **Logic Controller**.

R –

Real Time Clock – The **MessageView** terminal has its own battery-operated clock, referred to by this name or RTC. It provides values for time or date variables in displayed messages. The terminal's clock may be set using the **Front Panel Editor** or a command from **MessageBuilder** software.

RS-232 – A serial link for transmitting data to and from the RS-232 port of a **MessageView** terminal. All terminals have an RS-232 port. Communication with a personal computer requires a DF1 connection, whose parameters are set up in the terminal's **Firmware**. Communication with any other device requires that the RS-232 port **Parameters** are set up in the **Application**. Communication with a **Slave Device** requires a RS-232/Simplex connection.

Remote I/O – A serial link for transmitting data to and from a **PLC** or **SLC** processor/scanner and the Remote I/O port of a **MessageView** terminal. Some terminals do not have a Remote I/O port. Remote I/O supports **Block Transfer** of data that is moved using block transfer ladder instructions. Also referred to as RIO.

S –

Simulate Feature – This feature allows the **MessageView** terminal to run an **Application** without a controlling device. Messages are triggered and displayed, but although there is no input from the **Controller** the terminal does not display any "No response" messages.

Slave Device – A device that receives and displays messages from a **Master Device**, but does not initiate communication. Slave Devices include the **MessageView** 421D Slave Device terminal (Catalog 2706-M1D) and several of the Allen-Bradley Dataliner family.

Slaving – A system in which a **Master Device** controls one or more **Slave Devices** remotely. A **MessageView** terminal with a daughterboard and firmware that supports Slave Port can act as a master device for up to 127 Slave Devices.

SLC – Allen-Bradley trademarked name for Small **Logic Controller**.

Startup Message – The message displayed when the **MessageView** terminal powers up.

U –

Upload – The process of transferring an **Application** or a **HE Stack** file from a **MessageView** terminal to a computer.

V –

Variable – A number or an array of characters whose value in a message displayed by the **MessageView** terminal is sent from data in the **Controller**, or from the value input by the operator or by an **ASCII Input Device**.

Verify – The process by which a **MessageView** terminal checks an **Application** that has been **Downloaded** to make sure it is designed for the correct type of terminal.

Numbers

A

B

C

D

E

F

H

I

J

K

L

M

N

P

R

S

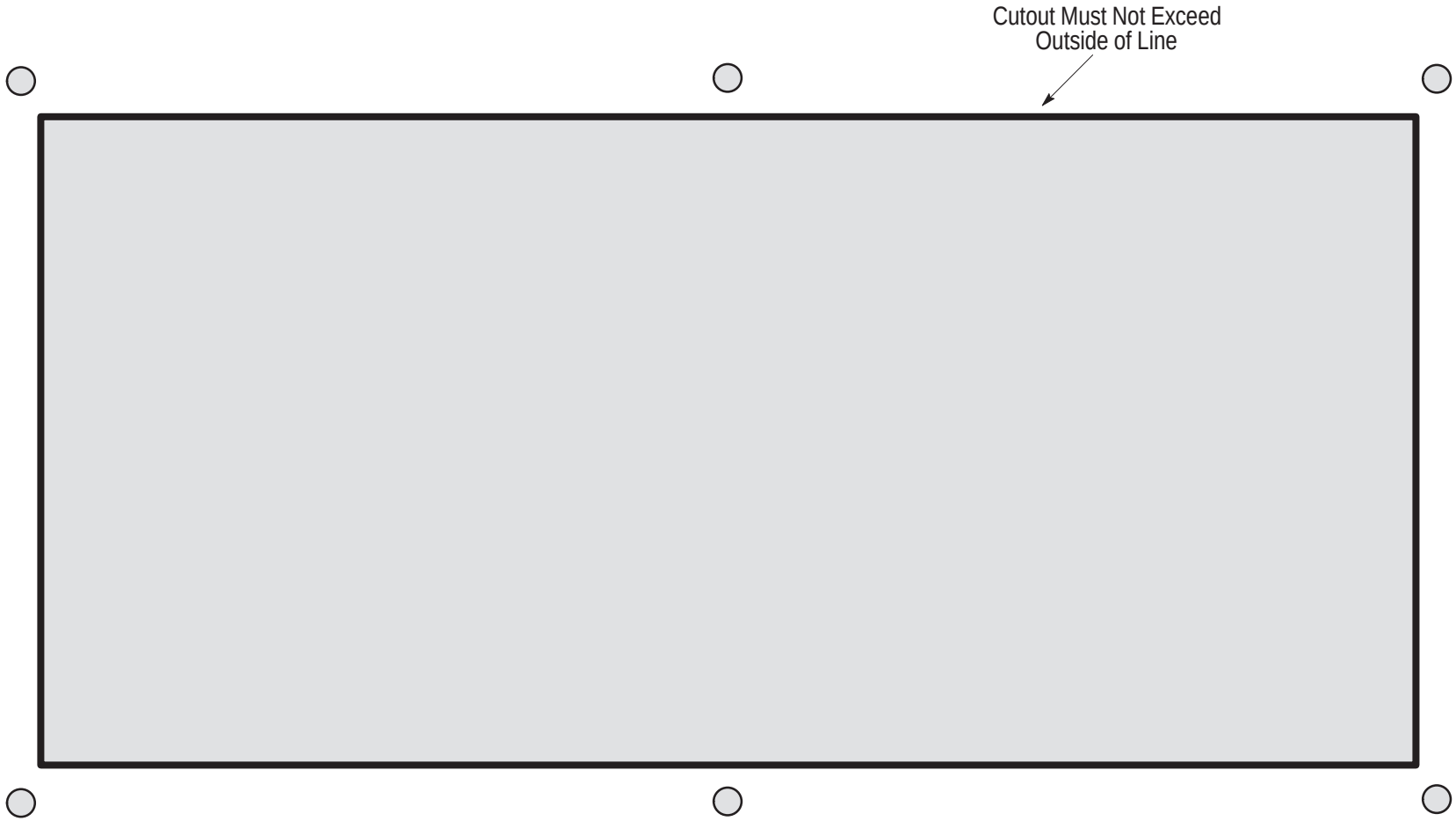
T

V

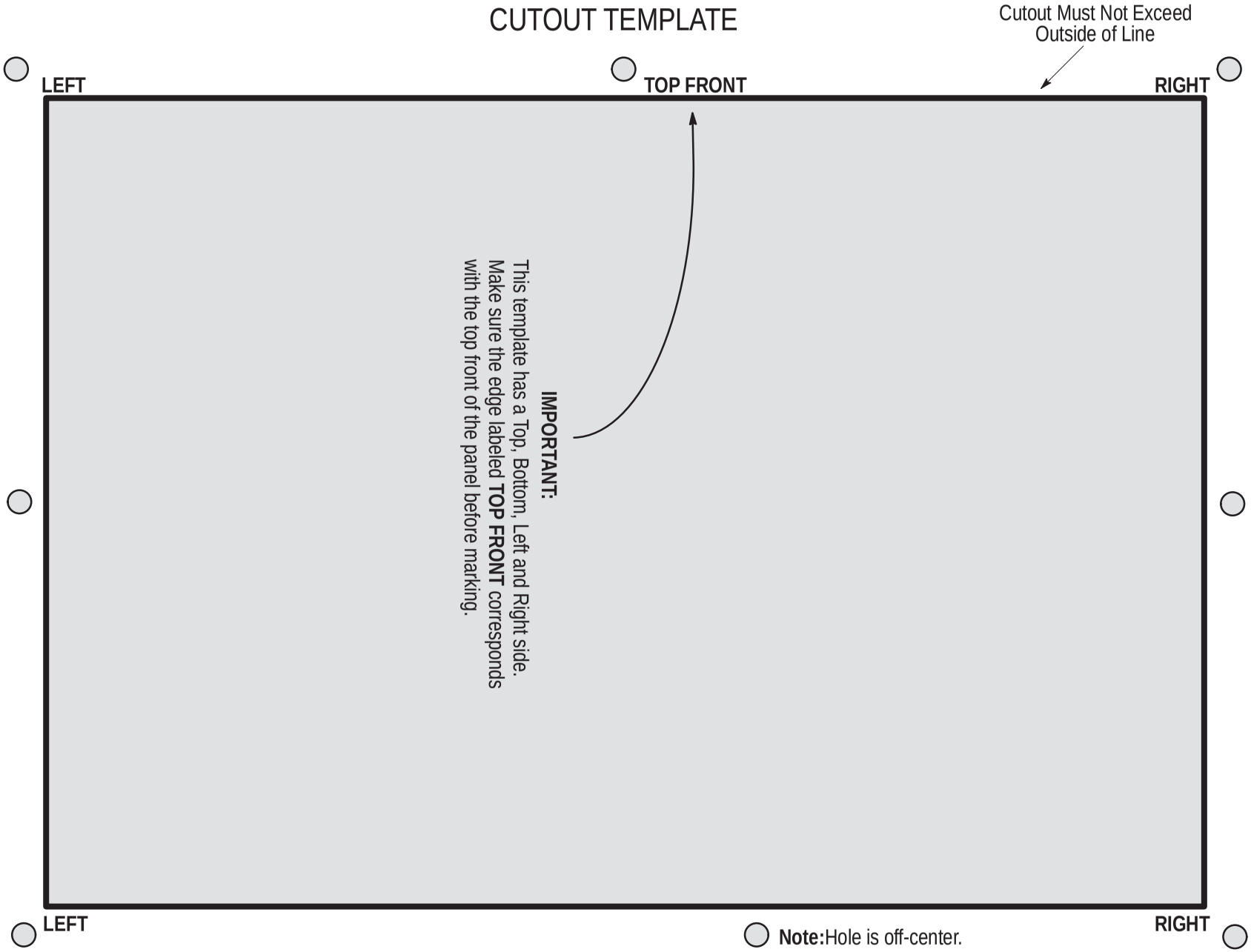
W

MessageView 421D & 421N

CUTOUT TEMPLATE



MessageView 421F Terminal
CUTOUT TEMPLATE



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