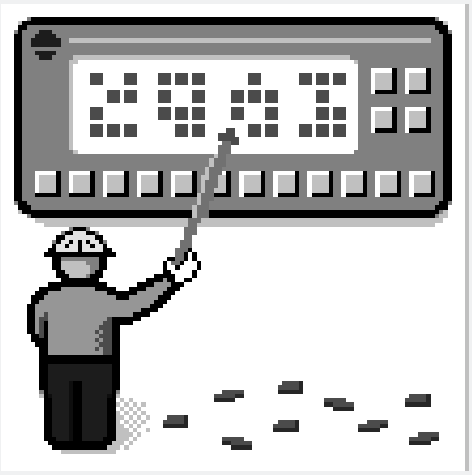
Allen-Bradley

MessageBuilder Configuration Software

User Manual

(Catalog No. 2706-MB1)



Important User Information

Solid state equipment has operational characteristics differing from those of electromechanical equipment. “Safety Guidelines for the Application, Installation and Maintenance of Solid State Controls” (Publication SGI-1.1) describes some important differences between solid state equipment and hard–wired electromechanical devices. Because of this difference, and also because of the wide variety of uses for solid state equipment, all persons responsible for applying this equipment must satisfy themselves that each intended application of this equipment is acceptable.

In no event will the Allen-Bradley Company be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, the Allen-Bradley Company cannot assume responsibility or liability for actual use based on the examples and diagrams.

No patent liability is assumed by Allen-Bradley Company with respect to use of information, circuits, equipment, or software described in this manual.

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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.

Attentions help you:

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

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

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Preface

Welcome to MessageBuilder™ Configuration Software. You can use this software to create control panel applications for MessageView™ 421 Operator Terminals.

MessageBuilder software allows you to create applications designed specifically to control processes in your plant. When you load a MessageBuilder application in a MessageView terminal, the terminal displays messages that:

- give information about the operation
- ask for input to control the operation.

Registering Your Copy of MessageBuilder Software

Your software registration card is located in the envelope with the software disks. To register your software, mail the card to this address:

Allen-Bradley
Global Technical Support
6680 Beta Drive
Mayfield Village, Ohio 44143.

Or fax the card to (216) 646-6770.

Intended Audience

This manual is a resource to help you design message display applications that will run in a MessageView 421 terminal. Since there are many options designed to give a smooth-running operation under any circumstances, you should become familiar with the choices to be made.

MessageBuilder Configuration Software runs under Microsoft Windows. You should know how to use a mouse, choose commands, and work with windows and dialog boxes. To learn basic windows techniques, read the User's Guide that came with your Microsoft Windows® package.

PLC® and SLC™ logic controllers and ASCII Triggering devices are an important part of the systems that MessageBuilder applications control. You should understand how controllers work, especially the program and data files. See the user manuals for the controllers used in your operation.

Software Package

The MessageBuilder Configuration Software package (Catalog No. 2706-MB1) comes with:

- 4 (3 $^1/_2$ inch) installation disks
  - 3 MessageBuilder Software disks (including INTERCHANGE™ utility)
  - 1 A-B Utilities disk.
- This manual: MessageBuilder Configuration Software manual (Publication No. 2706-817).
- MessageView 421 Display Terminal user manual (Publication No. 2706-816).

Conventions

This manual uses the following conventions:

- Software or MessageBuilder software refers to the MessageBuilder Configuration Software.
- Terminal refers to a MessageView 421 terminal.
- Windows (with a capital "W") refers to Microsoft Windows or to the Window menu in MessageBuilder. MessageBuilder windows are written with a small "w".
- Keys on the keyboard appear in boldface small capital letters:
  - the Shift key (on the computer) appears as **SHIFT** in the text
  - the Acknowledge key (on the terminal) appears as **ACK**.
- A hand with italicized text in the left margin gives helpful hints.

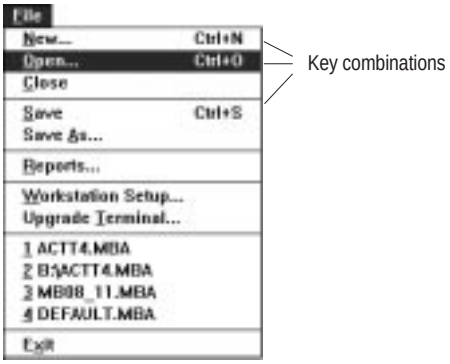
☞ *The Release.txt and Readmekt.txt files contain the most recent installation information.*

MessageBuilder software often gives a choice of methods for selecting a command. Use the most convenient one.

- Select a tool on the toolbar.

  A toolbar is displayed along the top of the screen specific to what you are doing. Simply click on the appropriate tool and it is activated. Appendix B illustrates all tools in all the toolbars.
- Use a key combination.

  Certain commands in the File and Edit menus have a key combination. Use it instead of selecting the command.



- Select a menu command.

  Click the menu name and then the command name. Or press the **ALT** key and the underlined letter of the menu name to drop the menu, then type the underlined letter of the command. Appendix A describes all commands in all the menus.

For example, to open an application from the initial MessageBuilder screen, do **one** of the following:

- click on the Open File tool, or
- press CTRL + O, or
- type ALT + F then type O, to select Open from the File menu,

and the File Open dialog appears.

Contents of the Manual

This manual is organized as follows:

Chapter	Title	Description
	Preface	Describes the purpose and contents of the manual, and its intended audience.
1	Introducing MessageBuilder Software	Describes MessageBuilder Configuration Software and some of its features.
2	Installing MessageBuilder Software	Explains how to install MessageBuilder and INTERCHANGE software on a personal computer.
3	MessageBuilder Basics	Explains how to use MessageBuilder software's menus, tools and dialogs. Also how to use the Help system.
4	Planning an Application	Gives guidelines for designing an application, including safety considerations.
5	Communications Overview	Gives guidelines for setting up MessageView terminal communications.
6	Working with Application Files	Explains how to open and close MessageBuilder software, and how to open, close and save application files.
7	Creating Messages	Shows how to create messages and set their attributes. Also how to embed variables and graphics in a message, and how function keys work.
8	Working with Tags	Explains how to use the Tag Editor feature of MessageBuilder software. Tags specify the addresses in which variable data are stored.
9	Managing Projects	Tells how to link a project to an application, and how to copy, rename or delete projects. Also shows how to work with devices in projects.
10	Terminal and Communication Setup	Tells how to set operating and runtime communication parameters for the MessageView 421 terminal and a logic controller.
11	Validating Applications and Transferring Files	Tells how to validate an application. Explains several methods that transfer it between a computer and a terminal or a disk file.
12	Creating Reports	Tells how to design a report and print it.

Related Publications

You should have the MessageView Display Terminal User Manual (Publication No. 2706-816) at hand while creating an application. Also refer as needed to the manual(s) for the controller the system will be using.

Information and procedures relating to INTERCHANGE Software and Microsoft Windows are given in this manual. For further details, refer to the manuals for these products.

Allen-Bradley Support

Local Product Support

Contact your local Allen-Bradley representative for:

- sales and order support
- product technical training
- warranty support
- support service agreements.

Technical Product Assistance

If you have questions about MessageBuilder Configuration software:

- check online Help
- review information on the subject in this manual
- review the release notes: these are separate icons in the MessageBuilder Group in the Windows Program Manager
- review any technical notes on the subject that you have received from Allen-Bradley.

If you still have a question, call your local Allen-Bradley representative.

If you need more help, call:

Allen-Bradley
Global Technical Support
6680 Beta Drive
Mayfield Village, Ohio 44143.

Phone numbers:

- In the USA and Canada, call 1-800-289-2279.
- Outside the USA and Canada, call your local Allen-Bradley office, or call USA (216) 646-6800.
- Fax number: (216) 646-6770.

Note: If you need to call Allen-Bradley for technical assistance, please have the serial number of your software available. It may be found in three places:

- on the software registration card
- on the welcome screen that appears when MessageBuilder starts
- in the main Help menu, choose About MessageBuilder to see the About MessageBuilder dialog, which has:
  - the release date and version number of MessageBuilder software
  - the release date and version number of the Allen-Bradley Utilities software.

Introducing MessageBuilder Configuration Software

This chapter covers the following topics:

- What is MessageBuilder?
- MessageBuilder software features
- Typical messages in an application
- Typical message contents.

What is MessageBuilder?

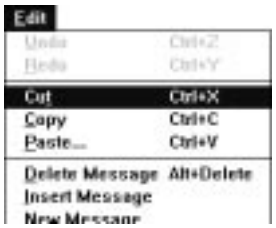
MessageBuilder is a Microsoft Windows software package. An application designer can use it to create custom applications for MessageView 421N, 421F and 421D terminals.

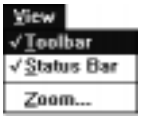
MessageBuilder software makes creating an application as easy as possible, by supplying dialog boxes, toolbars and menus. These include:

- menus and toolbars keyed to the current situation
- dialogs to set up the computer workstation, the MessageView terminal and the interface to controllers used in the process.
- dialogs in which applications and projects are created and edited
- the Message Editor Table View, in which messages are created and edited
- the Message Editor Terminal View, which previews individual messages
- the Tag Editor, in which tags are created and edited
- validation of the application before it is downloaded to a terminal, and on command while the application is being created
- printer dialogs for making permanent records of specific or general aspects of the application
- on-line and context-sensitive help.

MessageBuilder Software Features

MessageBuilder software has a number of features that make designing an application easier.





Tool or Menu Operation

MessageBuilder software runs under Microsoft Windows. Many functions can be performed using tools, keystrokes, or menu commands. Use any or all, whichever you find most convenient.

Selectable Preferences

MessageBuilder lets you set features of the workspace window to those you prefer. Options such as the Standard Toolbar and the Status Bar can be toggled on or off, and remain in that state until you change them. See Page 7–14 for other preferences. When you create a new application or when you start a new session, MessageBuilder uses the latest settings.

Status Bar Information

The Status Bar at the bottom of the screen explains what is happening at the moment. See Page 3–8.

- If you hold the left mouse button down while the cursor is over a tool, the status bar explains what it does.
- If a process is going on, the status bar reports on how it is doing.

The three spaces at the right end of the status bar give the status of the keyboard **CAPS LOCK**, **NUM LOCK**, and **SCROLL LOCK** keys.

Help

The Help tools and commands provide a quick way to find information about any part of MessageBuilder software. See Page 3–14 for a summary of the Help function. To access Help:

- Click on the Help Question tool and then on an item or command to get context–sensitive help.
- Press **F1** to get specific help on a subject.
- The Help Contents tool displays an index to Help topics.
- Select Contents, Search For Help On, or How To Use Help on the Help menu, depending on what you need to know.
- Select About MessageBuilder to find the copyright date and version number of MessageBuilder software if you need to call Allen-Bradley for assistance.

Message Editor Table View

Use this dialog to create and edit messages and their attributes used in the application program.

The Message Editor Table View contains the menu commands and tools needed to bring up all other dialogs, the Terminal View and the Tag Editor.

MessageView 421D

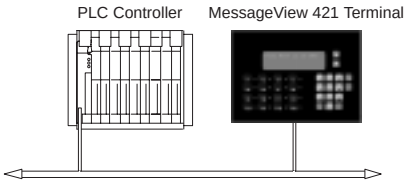
Message Editor Terminal View

Use this view to view the current message, approximately as it will appear in the MessageView terminal. An application is designed for a certain type of terminal. The Terminal View displays the face of that terminal type.

Tag Editor

Use the Tag Editor to enter, update, print, and import/export application tags. See Chapter 8. Each variable requires a tag, which defines how the variable interacts with a controller address.

Enter all the tags at once in the Tag Editor Table View before starting to create any messages. If a tag needs further editing when it is assigned to a variable, use the Tag Editor Form View.



Terminal and Communication Setup

Access all operating and runtime communication parameters for the MessageView 421 terminal from the Terminal Setup dialog. See Chapter 10. These include:

- Remote I/O and RS-232 runtime communication parameters
- power-up defaults
- time/date display format
- control and status tags
- display settings, handshake timeout and trigger priority
- set up slaving or a slave device
- ASCII triggering.

Application Validation

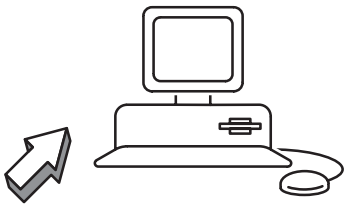
Use validation to check all elements of the application for correct input. See Chapter 11. When an application is downloaded to a terminal, MessageBuilder software validates it automatically. You can also validate the application at any time using the Validate menu option. View warnings or errors detected during validation, or send them to a printer or file.

Application Upload/Download Capabilities

Transfer applications between a MessageView 421 terminal and a computer running either:

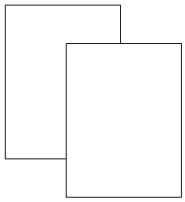
- MessageBuilder Configuration software
- MessageView File Transfer Utility.

See the section starting on Page 11–6.



Upload Historical Event Stack

The MessageView terminal maintains a running log of triggered messages in a Historical Event Stack file. Upload this file from the terminal to a computer that has either MessageBuilder software or the File Transfer Utility installed. See the section starting on Page 4–19 for information on the Historical Event Stack, and on Page 11–13 for information on how to upload it to the computer for analysis.



Reports

Use the report function to create customized reports for an application. See Chapter 12. Reports may include any or all of the following:

- application description
- messages
- message attributes
- terminal settings
- tags and their attributes
- function keys
- LED indicators.

Send reports to a printer supported by Microsoft Windows.

In addition to the report function, you may print information on tags and their attributes via the Tag Editor (see Page 8–13).

Terminal Upgrade

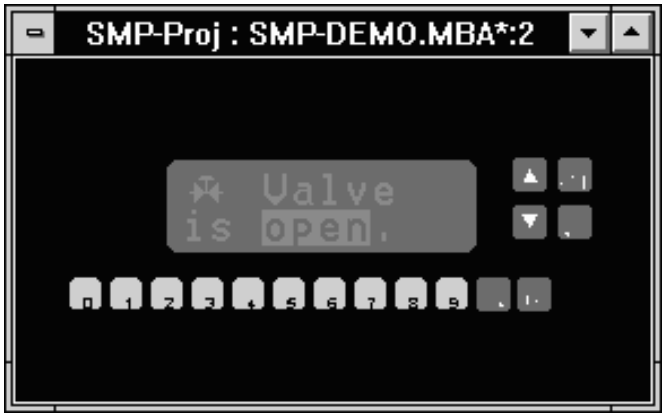
Use the Upgrade Terminal command to upgrade the firmware in your MessageView terminal(s). See Page 11–18.

Typical Messages in an Application

An application contains messages. Messages may contain embedded data variables, graphical symbols, and when designed for MessageView 421F terminals, may have function keys enabled.

This example of a 421N Terminal View has a message that contains:

- a graphic symbol
- an ASCII Variable Display.



This example of a 421F Terminal View has a message that contains:

- a Time Variable
- a Numeric Variable Display
- enabled Function Keys.

Note: One message may occupy more than one line in the Terminal View if the Line attribute is selected as “All”.

Typical Message Contents

Time or Date Display

Time is **16:23 CST**.

Time Displays indicate the current time (hours, minutes and seconds) according to the terminal's Real Time Clock. Specify the format of the display using the Terminal Setup dialog.

Date is **06/24/96**.

Date Displays indicate the current date (day, month and year) according to the terminal's Real Time Clock. Specify the format of the display using the Terminal Setup dialog.

Set the Real Time Clock using the RTC Download command in the Application menu.

Display Variables

Pressure is **300** PSI.

Numeric Variable Displays shows the current value at a specific controller address: binary, BCD or signed/unsigned integer. Scaling (y = mx + b) may be used.

Temperature **Too High**.

ASCII Variable Displays present status information to the terminal operator according to the current character array at a specific controller address.

Entry Variables

Enter Flow Rate:

Numeric Variable Entries may be used in applications designed for MessageView 421N and 421F terminals. These variables allow the terminal operator to enter a numeric value from the terminal keypad. Scaling (y = mx + b) may be used.

Bar Code Reading:

ASCII Variable Entries may be used in applications designed for MessageView 421D, 421N and 421F terminals if the terminal firmware can support these variables. These variables allow the terminal operator to enter ASCII characters from an ASCII Input device via the RS-232 port, or via the numeric keypad on the terminal.

Graphics

 Valve is open.

Graphics consist of a set of 32 ISA symbols illustrating manufacturing components such as motors and containers.

Function Keys

MessageView 421F terminals can use applications that have Function keys enabled. An enabled function key is assigned to one of these types:

A **Momentary Function Key** changes state when pressed and changes back to the original state when its hold time has expired after it is released.

A **Maintained Function Key** changes state when pressed and remains in the changed state when released. It changes back to the original state when the Function Key is pressed and released again.

A **Latched Function Key** changes state when pressed and remains in that state until the controller unlatches it.

ATTENTION: Function Keys are active only when they are enabled for a message currently displayed by the terminal. All other Function Keys are non-active.

Example

Suppose a message has function keys F1, F5, and F9 enabled. Whenever that message is displayed by the MessageView terminal, these three keys are activated, but the 13 other Function keys remain inactive.

When the message is terminated, the three Function keys are inactivated at once.

Note: A Latched Function key remains in its changed state until the controller unlatches it, but it is not active after its message is terminated.

Installing MessageBuilder Software

This chapter covers the following topics:

- System requirements
- Installing MessageBuilder software
- INTERCHANGE Device Configuration Utility
- Troubleshooting the installation procedure.

System Requirements

The minimum ***hardware*** requirements for installing and running MessageBuilder software are:

- a personal computer using Intel® 386 or 486 processor or equivalent
- a minimum 4 MB of memory (8 MB recommended) with minimum of 10 MB permanent swap under virtual memory
- a hard disk with 12 MB of free space
- a 3.5 inch high-density (1.44 MB) disk drive
- a VGA or better monitor that is supported by Windows
- an RS-232 communications port
- a cable for downloading/uploading applications between the computer and the RS-232 port of a MessageView 421 terminal. Order Catalog No. 2706-NC13.

Also highly recommended are:

- a mouse compatible with Windows
- a printer that supports graphics, compatible with Windows.

The minimum ***software*** requirements for installing and running MessageBuilder software are:

- MS-DOS® operating system version 3.31 or later (MS-DOS version 5.0 or later recommended)
- Microsoft Windows® version 3.1 or later, or Windows for Workgroups version 3.11 or later.

Note: MessageBuilder software utilizing INTERCHANGE™ V6.1 or later, is compatible with Microsoft Windows 95.

Installing MessageBuilder Software

To install MessageBuilder Configuration Software:

1. Insert MessageBuilder software disk 1 in the appropriate high-density floppy disk drive.
2. Start Windows (if necessary) by typing **win** at the DOS command prompt and pressing **ENTER.**
3. To start installing MessageBuilder:
   - with Windows 3.1x, in the Program Manager window choose Run from the File menu (**ALT** + **F, R**)
   - with Windows 95, in the Start menu choose Run (**MS key** + **R**)
4. In the command line box, type the drive letter of the drive containing the MessageBuilder Software disk 1, followed by a colon and the word **setup**. For example, type:

   a:setup.

   Then select OK or press **ENTER**.
5. You are prompted to begin the MessageBuilder installation. Select:
   - Yes to continue
   - No to cancel.
6. The installation software checks your system for AB Utilities software.

   If it detects an older version of AB Utilities software, it warns you that the previous version will be deleted before the new version is installed.

   If it detects the same or a newer version of AB Utilities software, it notifies you that there is no need to upgrade it.
7. If installation of AB Utilities is required, you are prompted to install the AB Utilities Software:
   - Insert the AB Utilities disk.
   - Enter target drive and directory for installing files.
     Recommended drive and directory is C:\AB.

   The files are copied to the target directory.
8. Re-insert MessageBuilder software disk 1 to continue installing the MessageBuilder software.

9. You are prompted to begin the MessageBuilder installation. The installation software checks your system for MessageBuilder software.

   If it detects a previous version of MessageBuilder software, it warns you that the previous version will be deleted before the new version is installed.

   If it detects the same version of MessageBuilder software, it gives you the option of re-installing or deleting the files.

   – Re-install writes over existing files
   – Delete removes the files; you must then run the installation again to install the new software.

10. Enter registration information: name, company name, and product serial number. The serial number is on your registration card.

11. Enter target drive and directory for installing files. Recommended drive and directory is C:\AB.

    The files are copied to the target directory.

12. Insert MessageBuilder disk 2 to install the remaining files.

13. You are prompted to install the INTERCHANGE software. Enter target drive and directory for installing files.

    Recommended drive and directory is C:\RSI\IC.

    The files are copied to the target directory.

    - If the installation detects a previous version of INTERCHANGE, the procedure replaces existing components with new components. The procedure will not overwrite configuration files.
    - If the installation detects the same version of INTERCHANGE, you are allowed to reinstall the components.

14. Insert MessageBuilder Disk 3 to install the remaining INTERCHANGE files.

15. The installation prompts you to update the AUTOEXEC.BAT file. It adds:
    - C:\AB\BIN to the path.
    - C:\RSI\IC\BIN to the path.
    - SHARE.EXE to the file (Windows 3.1x only).
    - Environment variable ABIC_CONFIG=C:\RSI\IC\BIN.
    - ABICRUN.BAT (starts INTERCHANGE software).

    Important: MessageBuilder Configuration software and INTERCHANGE Software will **no**t run without these lines.

    Note: If you do not update your AUTOEXEC.BAT file during MessageBuilder installation, MessageBuilder software writes the changes to the file AUTOEXEC.EXM for future reference.

16. The INTERCHANGE Device Configuration Utility opens. Use this utility to select and configure the "DF1 on COM Port" communication drivers that your computer (workstation) will use to transfer MessageView applications. See Page 2–8.

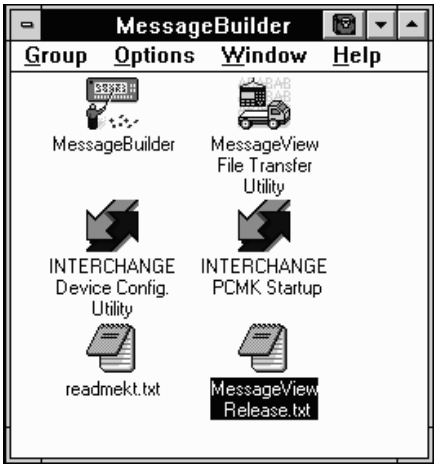
17. Review the release note that appears at the end of the installation procedure.

18. When the installation is complete, you must exit Windows and reboot your computer.

Installation Summary

MessageBuilder installation:

- copies MessageBuilder files to the hard disk under the target drive and directory (C:\AB) or the location specified during installation
- copies the AB Utilities files to disk under the target drive and directory (C:\AB) or the location specified during installation
- copies INTERCHANGE files to disk under the target drive and directory (C:\RSI\IC) or the location specified during installation
- adds SHARE.EXE to AUTOEXEC.BAT file (Windows 3.1x only)
- adds C:\AB\BIN and C:\RSI\IC\BIN to path
- adds ABIC_CONFIG=C:\RSI\IC\BIN to AUTOEXEC.BAT, which defines the location of the INTERCHANGE file CFG_KT.INI
- adds MBWIN.INI and ISP.INI to the Windows directory
- creates a MessageBuilder group in the Program Manager containing icons for MessageBuilder Software, the MessageView File Transfer Utility, INTERCHANGE Device Config. Utility, and the release notes.



Online Release Notes

Online release notes are available for the MessageBuilder Configuration Software. These files contain the most recent information on software and new functionality, proper configuration and work arounds, and the organization of MessageBuilder files.

Refer to:	For:
C:\AB\MBWIN\RELEASE.TXT	MessageBuilder Configuration Software
C:\RSI\IC\READMEKT.TXT	INTERCHANGE Software
C:\AB\README.TXT	AB Utilities Software

The same MessageBuilder and INTERCHANGE software text files are available through the MessageBuilder Group icon.

The RELEASE.TXT file or icon contains:

- last-minute updates to the manual
- installation notes
- a list of any known problems involving MessageBuilder software
- a list of all files installed in the default directories.

  Or if you chose not to use the default directories during installation, a list of all files installed in the directories you selected.

The READMEKT.TXT file or icon contains:

- information on software and hardware compatibility with INTERCHANGE software
- new and changed features in Release 1.00 and later
- a list of all files installed in C:\RSI\IC directory
- a list of problems, and of problems in previous releases that have been fixed
- application notes.

Installing with Windows 95

The installation procedure is the same when the operating system is Windows 95.

Note: The version of INTERCHANGE must be 6.1 or later to allow you to perform application uploads and downloads.

Registering Your Copy of MessageBuilder software

Please take time to complete and send in the registration card you received with MessageBuilder Configuration Software packet. Registration entitles you to:

- automatic notification of upgrades and revisions to MessageBuilder Configuration Software
- technical assistance.

INTERCHANGE Device Configuration Utility

The INTERCHANGE Device Configuration Utility configures communication drivers that the computer will use to transfer applications. It allows you to:

- view active communication drivers
- select and configure a communication driver
- edit a communication driver
- remove a communication driver
- access advanced driver parameters.

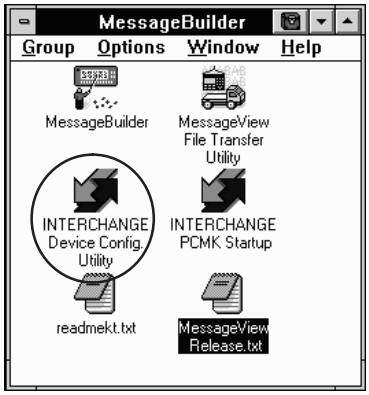
This utility automatically updates the file CFG_KT.INI when drivers are added, configured and removed.

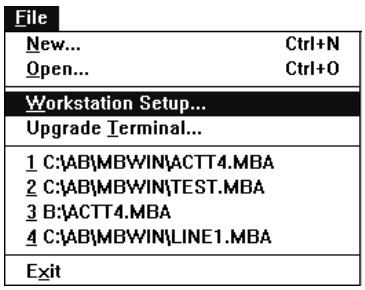
If you intend to transfer applications using an RS-232, DH–485 or Pass-Through connection you must first configure the appropriate drivers. MessageView uses only RS-232. However other Allen-Bradley products such as PanelView 900 might use other communication drivers.

Access the INTERCHANGE Device Configuration Utility in one of three ways:

- automatically as the final step in the MessageBuilder installation.
- as a separate icon in the MessageBuilder Group icon

  Note: If Interchange was installed via another programming software, such as AB PanelBuilder, the Interchange icon will be found in that software's group.





- through the Workstation Setup command in the MessageBuilder File menu.

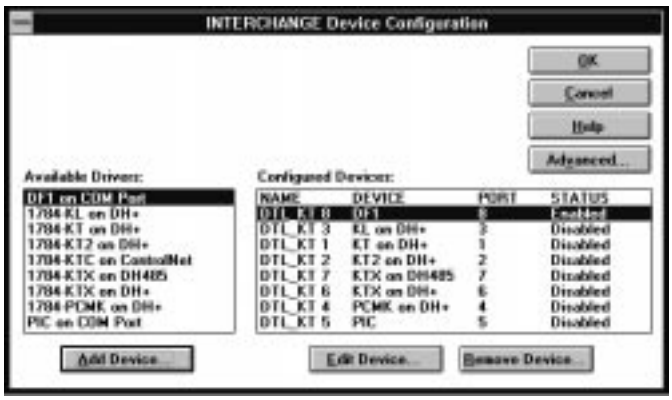
To select and configure an INTERCHANGE driver on your computer:

1. Double-click the utility icon in the MessageBuilder group icon, or choose Workstation Setup from the MessageBuilder File menu.

   Note: At the end of the MessageBuilder installation procedure, the INTERCHANGE Device Configuration dialog opens automatically.

Configured Devices

NAME	Refers to driver name
DEVICE	Refers to selected driver
PORT	Refers to unique number assigned to INTERCHANGE driver
STATUS	Shows whether driver is enabled or disabled



2. Select a driver from the **Available Drivers:** list. The selection depends on the type of MessageView terminal and the communication card installed in your computer.

Select:	For MessageView Terminal:	To:
DF1 on COM Port	2706-M1D1, -M1N1, -M1F1; 2706-M1D, -M1N, -M1F.	Transfer applications between the RS-232 port of a MessageView terminal and a computer using DF1 (RS-232) communications.
1784-KL on DH+ ①		Transfer applications between a computer on the DH+ link using a 1784-KL communications card and the Remote I/O port of a MessageView Terminal on a Remote I/O network.
1784-KT or 1784-KT2 on DH+ ①		Transfer applications between a computer on the DH+ link using a 1784-KT/B or -KT2 communications card and the Remote I/O port of a MessageView Terminal on a Remote I/O network.
1784-KTC on ControlNet ①		
1784-KTX on DH485 ①		Transfer applications between a computer on the DH-485 network using a 1784-KTX communications card and the DH-485 port of a MessageView Terminal.
1784-KTX on DH+ ①		Transfer applications between a computer on the DH+ link using a 1784-KTX communications card and the Remote I/O port of a MessageView Terminal on a Remote I/O network.
1784-PCMK on DH+ ①		Transfer applications between a computer on the DH+ link using a 1784-PCMK communications card and the Remote I/O port of a MessageView Terminal on a Remote I/O network.
PIC on COM Port ①		Transfer applications between a computer on the DH-485 network and the DH-485 port of a MessageView terminal using a 1747-PIC interface converter, or between a computer and the RS-232 port of a MessageView terminal.

① Not used by MessageBuilder Software.

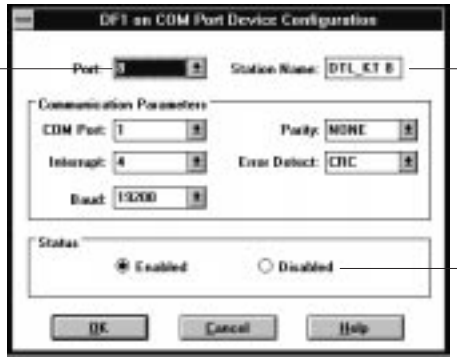
3. Select the **Add Device** button to add and open the configuration dialog for the selected driver.

   For example, if you select DF1 on COM Port this dialog opens:

Unique number assigned to INTERCHANGE driver (This is not the computer's COM port.)

DF1 parameters must be set to:
- Baud: 19200
- Parity: None
- Error Detect: CRC

Typical:
COM Port = 1 and Interrupt = 4, or
COM Port = 2 and Interrupt = 3



Default Driver Name (can be edited)

Disables driver configuration without removing it from Configured Drivers list.

   Note: Consult your personal computer's user manual for COM Port Interrupt settings.

4. Edit parameters and select **OK** when done.

   The parameters are specific to the communications card installed in your computer, or to the type of connection you will be using to transfer files.

   The configured driver appears under the **Configured Devices:** list in the Driver Configuration dialog.

Important: Do not configure more than one driver for the same communication port.

5. Reboot your computer to load the driver and its configuration.

Important: You must reboot your computer any time you add or remove a driver or change configuration parameters of a driver.

Exiting Windows and re-entering will not load the driver.

To configure an existing INTERCHANGE driver:

1. Select the driver from the **Configured Devices:** list.
2. Select the **Edit Device** button to open the configuration dialog for the selected driver.
3. Edit parameters and select **OK** when done.
4. Reboot your computer to load the driver and its configuration.

To remove a current driver:

1. Select a driver from the **Configured Devices:** list.
2. Select the **Remove Device** button.
3. A dialog asks for confirmation of the removal. Choose **OK**.
4. Reboot your computer to unload the driver.

To specify advanced parameters for drivers:

1. Select the **Advanced** button from the INTERCHANGE Device Configuration dialog.

2. Modify the settings as needed. See below.
3. Select the **OK** button to save the settings

   Or select the **Cancel** button to return to the Configuration menu without changing the parameters.

Memory Manager Options

Load drivers high when enabled (checked) loads INTERCHANGE drivers (executables) into high memory. Drivers are not loaded until you reboot the computer. If this option is disabled, drivers are loaded into the base 640K memory.

MessageBuilder recommends: Either enabled or disabled.

Memory Manager Selection allows you to specify the memory manager in use on your system. Select one of the radio buttons.

MessageBuilder recommends: EMM386.

Driver Self-Test

When enabled this option requires KT devices to run self-diagnostics before loading driver configuration.

MessageBuilder recommends: Perform the tests.

RNA Parameters

Use upper memory for packet buffers when enabled places packet buffer space in upper MS-DOS memory.

MessageBuilder recommends: Use upper memory.

Number of solicited buffers allocates the number of packet buffers (1 to 200). Each buffer uses 300 bytes of memory. The default is 20.

MessageBuilder recommends: 20 buffers.

Number of unsolicited data items allocates space for unsolicited messages (0 to 200).

MessageBuilder recommends: 0 data items, which allocates no space.

PCMK Enabler Selection

Specifies the Enabler to use for the 1784-PCMK on the DH+ Device Driver.

Specific Enabler uses PCMKINIT or RSIPCMK. This Enabler requires you to enter the socket number containing the card in the driver dialog. The INTERCHANGE socket numbers are (0 to 7). In Windows 95, the sockets are numbered (0 to 8).

Generic Enabler uses PCENABLE. This Enabler requires that you enter a Memory address and IRQ (Interrupt).

MessageBuilder recommends: (Ignores).

Troubleshooting the Installation Procedure

Possible difficulties with installation

- If you used the default installation procedure, the Path in your AUTOEXEC.BAT file now includes the \AB\BIN and \RSI\IC\BIN directories. In Windows 3.1x the AUTOEXEC.BAT file also includes SHARE.EXE. If you edit this file yourself, MessageBuilder software requires these modifications.
- If the computer has Windows for Workgroups installed, it has a virtual device driver (VxD) called VSHARE.386. If Windows for Workgroups uses this share driver, remove the SHARE.EXE file from the AUTOEXEC.BAT file. The Windows for Workgroups manual has details on using VSHARE.386.

  Note: Windows 95 does not need the SHARE.EXE file. It has its own virtual device driver installed.

Possible difficulties with INTERCHANGE drivers

The INTERCHANGE drivers may cause conflicts with other drivers sharing common interrupts or memory areas in the system. Here are some problems that may occur and what to do about them.

- If you are using a special Windows video driver, try using the standard Windows VGA driver; you may also have to edit the EMM386 line in the CONFIG.SYS file to remove specific memory exclusions added by the special video driver.

  Exit Windows and run ABICSTOP (see below). If ABICSTOP is not successful, comment out the ABICRUN line in the AUTOEXEC.BAT file and reboot, then run ABICSTOP again.
- If you are experiencing lockups when using a serial mouse in a DOS application, try waiting several seconds for the mouse to initialize. If mouse operation is still a problem, run ABICSTOP.

  It may be necessary to create a dual boot environment to manage conflicting drivers. Refer to the DOS user manual for information on this.
- If you experience error messages during a system reboot, they may indicate an incomplete or incorrect configuration of the INTERCHANGE drivers. See Page 2–8 for instructions on configuring the drivers.

For more details on INTERCHANGE Software, refer to the INTERCHANGE Software user manuals and the MessageBuilder online release notes.

Possible conflicts in using communication ports

If you plan to run other software on your computer that uses the same communication ports as MessageBuilder and INTERCHANGE Software (such as APS software), follow these steps.

1. Exit from Windows if necessary. Make sure that INTERCHANGE is not running.
2. Type **ABICSTOP** at the DOS prompt. For example, type:

   ```
   C:\> ABICSTOP.
   ```

3. If ABICSTOP is not successful, comment out ABICRUN in the AUTOEXEC.BAT file:

   ```
   REM CALL ABICRUN.BAT
   ```

   Reboot the computer and run ABICSTOP again.
4. Run the other software.

MessageBuilder Basics

This chapter covers the following topics:

- Windows environment
- MessageBuilder window
- Message Editor Table View
- Opening and closing menus
- Status bar and toolbars
- Message Editor Terminal View
- Dialogs
- Getting help.

Windows Environment

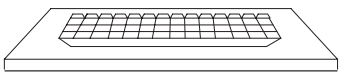
MessageBuilder software runs in a Microsoft Windows environment. It uses menus, dialog boxes and tools, and follows the same keyboard and mouse conventions used by Windows.

You should be familiar with basic Windows conventions. That is, you should know how to use the mouse, select commands from menus, and work with windows and dialog boxes.

If you use a mouse, here are the basic terms used:

Feature:	How to use it:
Click	Position the mouse pointer on the object, area, or field, then press and release the left button once.
Double-click	Position the mouse pointer on the object, area, or field, and click the left button twice quickly.
Choose an item or command	**Click** to highlight the item to be affected by the next command, or **click** on a dialog box option.
Select an item or command	**Click** on an tool, on a menu command, or on an item in a dialog box or Help window.
Drag	Point to an item, press and hold the left mouse button, and move the pointer, then release the mouse button. Use drag to highlight a text string.

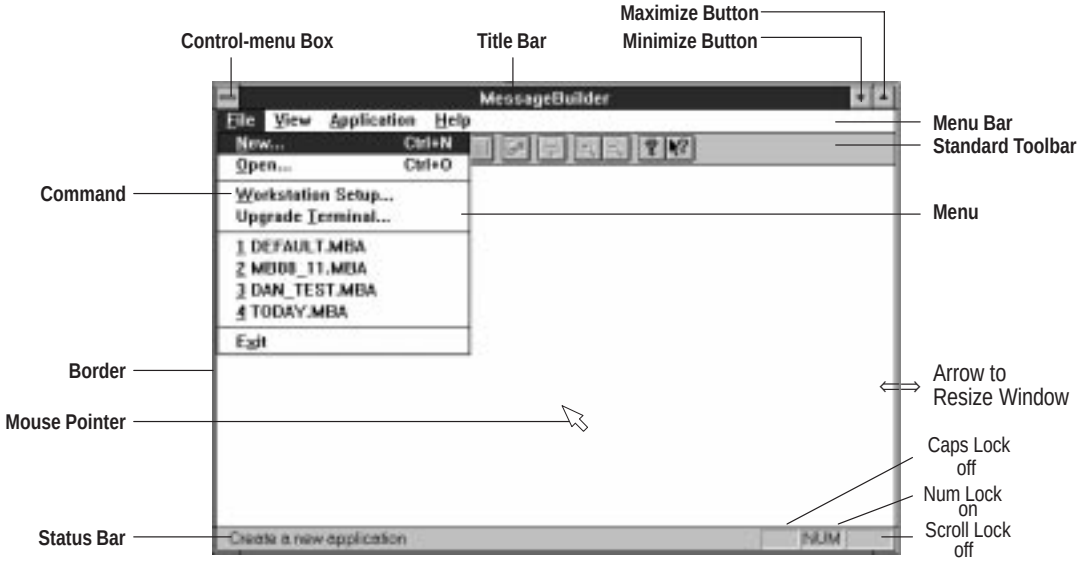
If you prefer to use the keyboard:



Action:	How to do it:
Select a command from a menu	Press the **ALT** key and type the letter underlined in the menu name simultaneously. Then type the letter underlined in the command name.
Choose an item or command	Use the arrow keys (or in a dialog, both the **TAB** and arrow keys) to move to the item
Select an item or command	Highlight an item, then press the **ENTER** key.

MessageBuilder Window

When you start MessageBuilder software, the MessageBuilder window opens.



Feature:	How to use it:
Control-menu Box	Click to open the Control menu. Or double-click to close the current window.
Title Bar	Drag to move a window.
Menu Bar	Click a name on the menu bar to open the menu and display its commands. Or press **ALT +** X, where X is the underlined letter in the menu name.
Standard Toolbar	Click a tool to carry out a command. Can be toggled on/off using the View menu.
Command	Click a command to choose it or to carry out its action. Or type the underlined letter in the command name.
Status Bar	Shows what the software is doing at the moment. Can be toggled on/off using the View menu.
Border	Drag to enlarge or shrink the window.
Mouse Pointer	Use to select an item or object.
Minimize Button	Click to reduce the window to an icon.
Maximize Button	Click to enlarge the window to the full size of the screen.

Here are the commands available on each menu when no application file is open.

File menu has commands that:

- create and open application files
- configure the computer workstation for file transfer
- download new firmware to a MessageView 421 terminal.
- list the last four applications that were opened, for easy reopening
- exit MessageBuilder software.

View menu has commands that:

- toggle the Standard Toolbar on and off
- toggle the Status Bar on and off.

Application menu has commands that:

- manage projects and their devices
- upload an application file or the Historical Event Stack file from a MessageView 421 terminal
- download the time and date to the terminal's Real Time Clock
- allow the user to set preferences.

Help menu has commands that:

- identify the versions of MessageBuilder and AB Utilities software and the registration serial number
- access topics in the MessageBuilder Help utility.

Four tools are active:

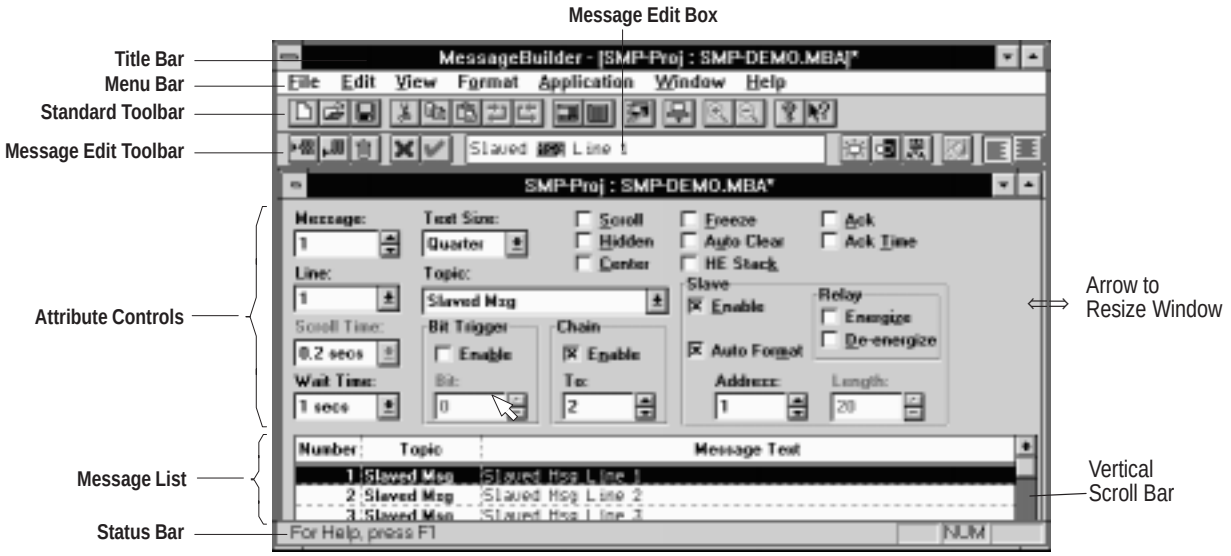
- New File
- Open File
- both Help tools.

Message Editor Table View

When an application is opened, the Message Editor Table View appears. Messages are created and edited in this View, and have their attributes set.

The Message Edit box displays the highlighted message from among those in the Message List.

Use the standard Windows resizing arrows as needed.



Feature:	How to use it:
Menu Bar	Select a name on the menu bar to open a menu and display its commands.
Standard Toolbar	Click a tool to edit message text or carry out other functions. Toggle it on/off using the View menu.
Message Edit Toolbar	Click a tool to edit messages and their variables.
Message Edit Box	Edit the message highlighted in the Message List.
Attribute Controls	Define attributes for the selected message.
Message List	Messages appear here as they are created. The selected one is highlighted and appears in the Message Edit box.
Status Bar	Shows what the software is doing at the moment. Toggle it on/off using the View menu.

Note: If the application file name in the title bar has an asterisk (*), the application has been edited but not saved to disk.

Here are the commands available on each menu when an application file is open.

File menu has commands that:

- create, open, close and save application files
- generate reports
- configure the computer workstation for file transfer
- download new firmware to a MessageView 421 terminal
- list the last four applications that were opened, for easy reopening
- exit to the Windows desktop.

Edit menu has commands that:

- copy, cut and paste text strings; undo and restore changes in a message
- insert, append and delete whole messages
- find, sort and renumber messages in the Message List
- replace text strings in one or many messages
- assign names to topics.

View menu has commands that:

- toggle the Standard Toolbar and the Status Bar on and off
- zoom the Terminal View in or out.

Format menu has commands that:

- specify what size the message text will be in the terminal display
- align text in the display
- display selected text in a message with Flash and Inverse Video
- insert and edit Time and Date Displays, Numeric and ASCII Display Variables in a message
- (for MessageView 421N and 421F terminals) insert and edit Numeric Entry variables in a message
- (for terminals whose firmware can support these variables) insert and edit Numeric Entry and ASCII Entry variables in a message
- insert graphic symbols and ASCII characters in a message
- (for MessageView 421F terminals) enable function keys for a message.

Application menu has commands that:

- create tags and their attributes that will be assigned to variables when messages are created
- manage projects and their devices
- enter a description of the application
- validate and download an application to a MessageView 421 terminal or to a DOS file
- upload an application file or the Historical Event Stack file from a terminal
- download the time and date to the terminal's Real Time Clock
- set up the terminal's communications, control and status tags, and global attributes
- assign bit triggers and date/time tags for special messages
- (for MessageView 421F terminals) set global attributes and assign tags for all the function keys and LEDs used in the application
- allow the user to set preferences.

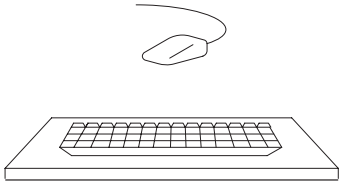
Window menu has commands that:

- open and arrange application windows and arrange their icons
- open the list of problems in the application ("Exceptions") that were identified after a Validate or Download command
- open the Terminal View and toggle it with the Table View
- list the windows currently open for easy access, with the active one checked.

Help menu has commands that:

- access topics in the MessageBuilder Help utility.
- identify the versions of MessageBuilder and AB Utilities software and the registration serial number

Opening and Closing Menus



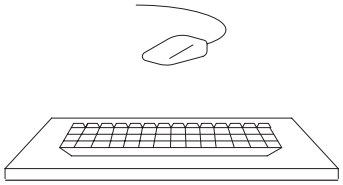
Each name on the menu bar opens a menu with a set of commands.

To open a menu:

- point to a name on the menu bar and click the left mouse button
- or press **ALT** and the underlined letter in the menu name simultaneously. For example, to open the File menu, press **ALT** + **F**.

MessageBuilder menus look like this:

Note: Appendix A lists the commands on each menu and briefly explains what each one does.

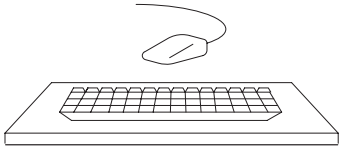


To choose a menu command:

- click the command name
- or type the underlined letter in the command name
- or use the **UP** and **DOWN ARROW** keys to choose an item; then press **ENTER** to select it.

Menu conventions are listed in this table:

Menu convention:	What it means:
Greyed command name	The command is not available at this time.
A check mark (✓) before the name	The command is active. Select the command to inactivate the command; the check mark disappears. Select it again to activate it.
A key combination after the name	A shortcut for the command. Use the shortcut keys if you prefer instead of the menu command or tool.
An ellipsis (...) after the command	The command opens a dialog box that contains options that must be selected before MessageBuilder software can carry out the command.
A triangle (▶) to the right of a menu command	The command opens a submenu.



To close a menu:

- click the menu name or anywhere outside the menu
- or press **ALT** or **F10** to close the menu and move back to the workspace
- or press **ESC** to close the menu and remain on the menu bar.

Status Bar and Toolbars

The status bar appears at the bottom of the MessageBuilder window.

- It indicates what the software is doing at the moment.
- It explains a tool's function when the left mouse button is pressed down while the cursor is over a tool.
- It explains the command when a menu command is highlighted.
- It gives the status of the Caps Lock, Num Lock and Scroll Lock keys on the keyboard.

To toggle the status bar on or off:

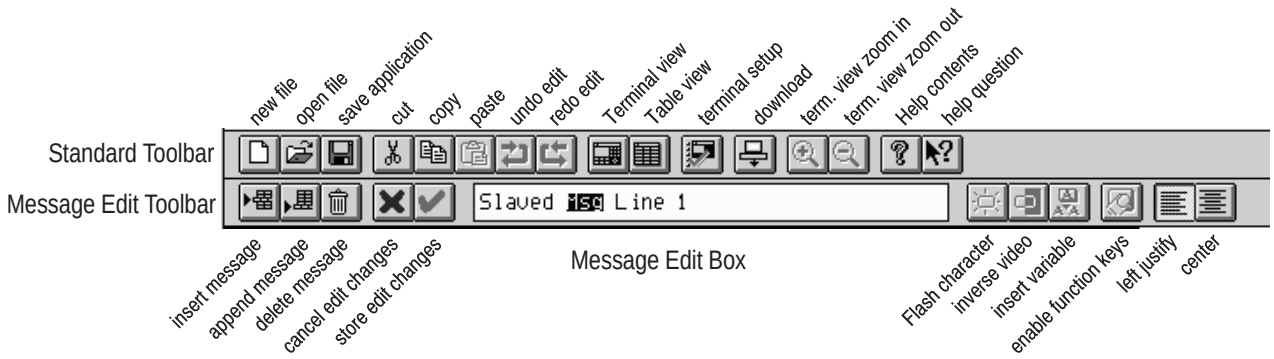
1. Choose View from the menu bar.
2. Choose Status Bar from the View menu.

   A check mark (✓) appears next to the Status Bar command when it is active. To turn the status bar off, choose the command again.

Standard and Message Edit toolbars

Two toolbars are located at the top of the application window. Tools provide easy access to commonly used commands. Instead of opening a menu and choosing a command, simply click a tool to carry out an action. Some tools complete the action immediately; others open a dialog or a menu for further input.

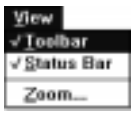
Note: Tools on a toolbar can be accessed only with a mouse. All toolbar commands are available on one of the menus or in the Applications area.



To identify a tool, move the cursor arrow to the tool. Press and hold the left mouse button while watching the status bar.

- If the tool is correct, release the mouse button.
- If the tool is not correct, move the cursor off the icon before releasing the mouse button.

Note: Appendix B lists all the available tools and briefly explains what each one does.



To toggle the Standard Toolbar on and off:

1. Choose View from the menu bar.
2. Choose Toolbar from the View menu.

A check mark (✓) appears next to the Toolbar command when it is active. To disable the Toolbar command, choose the command again.

Note: The Message Edit toolbar cannot be turned off.

MessageBuilder defaults

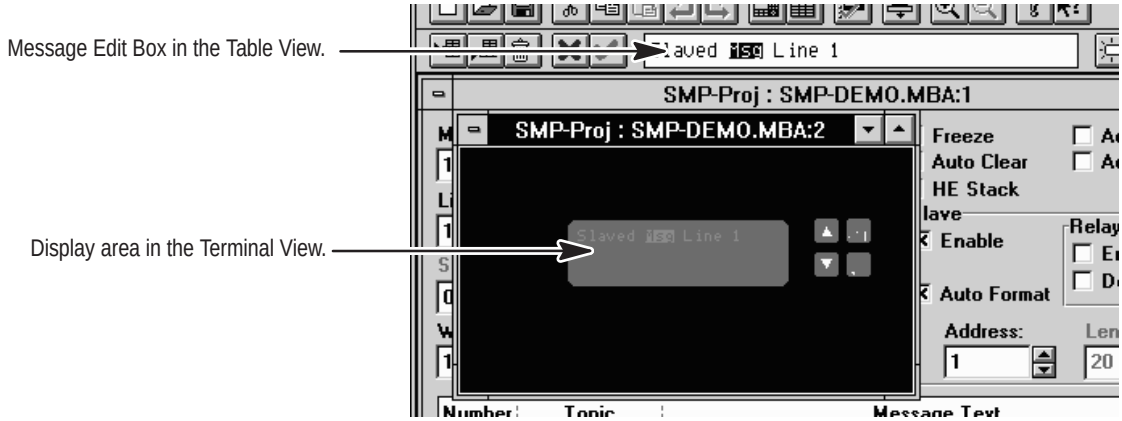
MessageBuilder software keeps the most recent Standard Toolbar and Status Bar settings as its default settings. Default settings are used:

- the next time MessageBuilder software is opened
- when a new application is created.

In addition, the Preferences command on the Application menu offers other selectable options. See Page 7–14.

Message Editor Terminal View

The Terminal View displays messages approximately as they will appear on a MessageView 421 terminal. This view represents the front face of the type of terminal the application is designed for.



The Message Edit box on the Table View is active while the Terminal View is displayed. If the Terminal View is the active window, as a message is edited the changes appear in the Terminal View display.

The Terminal View may be enlarged or reduced using the Zoom tools or the Zoom command on the View menu. See Page 7–17.

Note: The Terminal View, like the MessageView terminal, can display only:

21 characters in Quarter text size

10 characters in Half text size

7 characters in Full text size.

If the message is longer than the Terminal View can display, scroll through the message in the Message Edit box to see the remainder of the message. When the Terminal View is the active window, its display will follow the insertion point in the Message Edit box. That is, it will scroll through the message up to the cursor point.

Dialogs

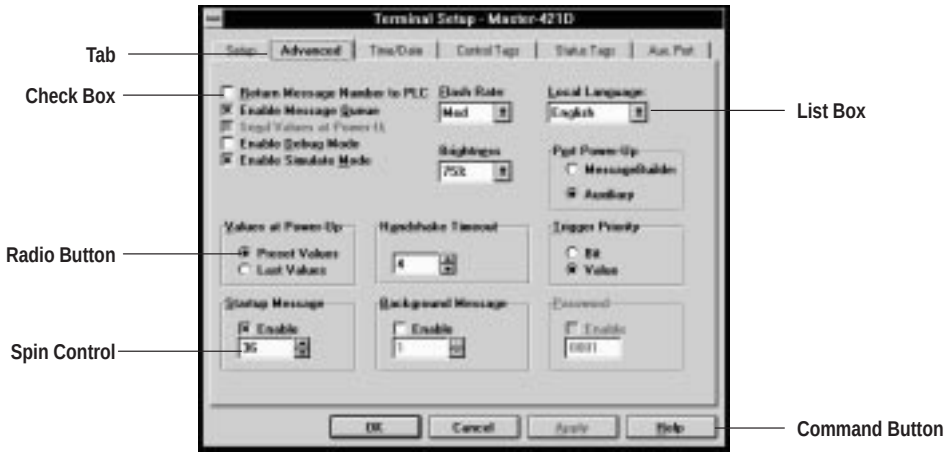
MessageBuilder software uses dialogs to request information it needs to carry out a command. After you supply the requested information, select a command button to confirm or cancel the command.

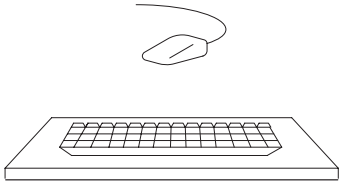
Dialogs also display additional information and warnings, or explain why a requested task could not be accomplished.

An ellipsis (...) after a dialog command means another dialog will open when you choose that command.

Some dialogs provide different sets of options, each on a separate tab. Select the tab to work with a specific set of options.

A sample dialog:





To move around a dialog:

- move the mouse pointer to a field and click the left mouse button
- or press **TAB** to move forward through fields and **SHIFT**+**TAB** to move backward through fields. Use the arrow keys to select a radio button
- or press the **ALT** key and the underlined letter of a field name simultaneously. For example, to move to the Return Message Number check box, press **ALT**+R.

Features of dialogs

Command Buttons

Short rectangles with text explaining their function. Select a command button to invoke the command.

Text Boxes

Long rectangles with instructions about what should be entered in them. Sometimes these boxes contain a default value or text, sometimes they are empty. The mouse pointer changes to an I-beam when it is on a text box.

- To add text, place the cursor point where the new text goes and start typing.
- To delete text, highlight it and press the **DELETE** or **BACKSPACE** key.
- To replace some or all text, highlight it and type the new text.

List Boxes

Boxes with a down-arrow at the right. To configure an item within a List Box:

- Click on the down arrow to the right of a list box to display its list, then click on an item to select that option.
- Or move the highlight to a list box and press **ALT** + the down-arrow key to display the list. Then use the up or down arrow key to select an option.

If there are more items than can fit in the list, a scroll bar appears.

Some list boxes let you use the mouse to select multiple items. Click on the first item, press and hold the **SHIFT** key, then click the last item. Or click the first item and drag the pointer to the last item. To deselect a range, click the first item on the list.

Drop-Down Text Boxes

Text boxes with a down-arrow at the right, separated from the text box. To configure an item within a Drop-Down Text Box:

- Click on the down arrow to the right of a list box to display its list, then click on an item to select that option.
- Or move the highlight to a list box and press **ALT** + ↓ (the down-arrow key) to display the list, then use the up or down arrow key to select an option.
- Or highlight existing text in the box and type the appropriate name or number.

Check Boxes

Square boxes that may contain an X or ✓. Check boxes are used to select or clear an option. An X or ✓ in the box means the option is selected. A blank (cleared) box means the option is not selected.

- Click on a check box to select or deselect the option.
- Or select a check box and press the **Spacebar** to toggle it.

Radio Buttons

Circles that function as a group. One of the group has a solid dot in the middle (it is selected), and all the others are blank. Choose a button in the group to select that option and clear all other options.

- Click on a radio button to select it.
- Or select a group of radio buttons and press the up or down arrow key to toggle them.

Spin Controls

Small boxes with up/down arrows at the right. To configure an item within a Spin Control box:

- Click the up or the down arrow until the required number appears in the box.
- Or highlight the text and type the number.

Tabs and Dialog Buttons

Some dialog boxes have tabs which open to give new sets of options. Others have buttons that open a Tag Form or other dialog. Select a tab or button to display a new set of options.

Getting Help

MessageBuilder software has both context-sensitive and online help. Help may be invoked by any of the following commands.

- Click the Help Question tool and the mouse arrow changes to a question mark. Click the question mark on an item for context-sensitive help.

- Click the Help Contents tool to display an index to Help topics.

- Choose a command from the Help menu. The Contents command brings up the same index as the Help Contents tool.
- Select a dialog's Help button to get help about the its topic.
- Press the **F1** key at any time to get context-sensitive help.

Using Help

This is a very brief overview of the Help features. For further information on using Help, select How To Use Help or see the Microsoft Windows manual.

All of the methods of finding information on a topic produce the same textual information. Choose the method most convenient for you among those listed here.

Helpful hints:

- If a term is underlined, you may select it to bring up a new screen defining or describing that subject.
- If scroll bars appear, you may use them to see more items on the list or more information on the subject.
- To return to a previous screen, use either the Back button (which steps through each screen you have called up) or the History button (which lists all the screens you have called up, so you can double-click on the one you want to return to).
- To see text on a related subject, use the Previous (<<) or Next (>>) button.

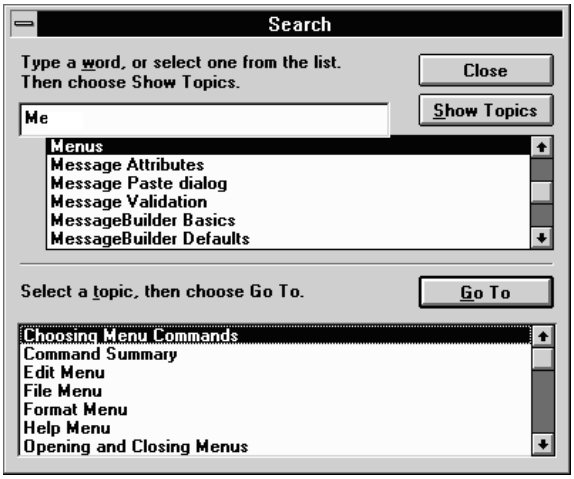
Contents

The Help Contents screen is illustrated above.

1. Double-click a subject on this index to bring up a new screen, which contains a subindex of subjects on the topic.
2. Then double-click on a subject in the subindex, until you reach text describing the topic you want information on.

Search

The Search button at the top of the Contents screen brings up a dialog with an alphabetical list of all the Help headings.



To locate a topic:

- use the scroll bar
- type one or a few letters to display the part of the alphabet that contains the subject you are interested in.

When you see the name of a Help subject that you want:

1. Highlight the name or type it in the Word box.
2. Select the Show Topics button.
3. Select the Go To button.

A screen appears with text describing or explaining the selected topic.

Help Topics:Contents

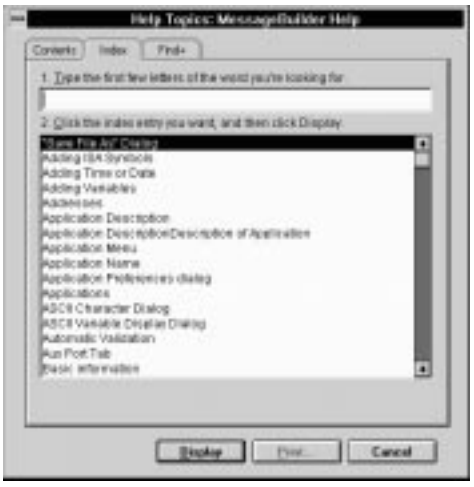
The Help Topics button at the top of the Help Contents screen brings up a tabbed dialog. The first tab is Contents.

In this screen, if the button next to a subject is:

- a book, double-click on it to display a list of subtopics
- a question mark, double-click on it to bring up text on the subject.

Help Topics: Index

The Index tab displays a dialog with an alphabetical list of all the Help headings.



To locate a topic:

- use the scroll bar
- type one or a few letters in the Type box to display the part of the alphabet that contains the subject you are interested in.

When you see the name of the subject that you want help with:

1. Highlight the name in the Click box, or type it in the Type box.
2. Select the Display button.

A screen appears with text describing or explaining the selected topic.

Help Topics: Find+

The Find+ tab displays a dialog you may use to find every instance of a word that appears in Help text.

To locate all instances of a term anywhere in the Help files:

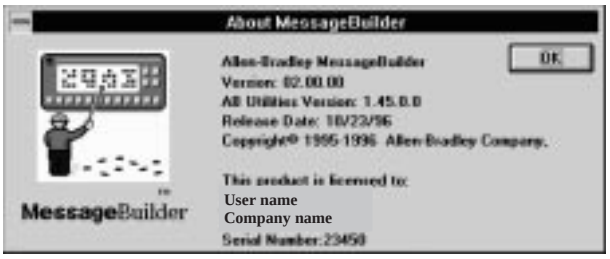
1. Type part of a word or a whole word in the Enter search text box.
   If you want to be more specific, type several words. Find+ locates exactly what you type, provided it is in the Help text.
2. If it will narrow the search, select one or more of the check boxes below the Enter box.
3. Select the Find button. The Select a Topic box fills with all the Help topics that contain the term. The topic that has the most examples of the term is listed first and highlighted.
4. The first instance of the term in the highlighted topic appears in the Topic text box. To move from one instance of the term to another:

- use the Term up/down arrows at the bottom of the screen
- use the scroll bars if they are present to display more of the text.

5. To select another topic, do one of the following:
   - click on a topic to highlight it
   - use the Topic up/down arrows at the bottom of the screen to move the highlight
   - use the scroll bars if they are present to display more of the list.
6. When you find a subject about which you want to read more, click the Display button. A full screen appears with the Help text.

About MessageBuilder

If you must call Allen–Bradley for assistance, you will have to provide the release date and version number of MessageBuilder software. Choose About MessageBuilder from the Help menu to get this dialog:



It gives you:

- the version number and release date of MessageBuilder software
- the version number of the Allen-Bradley Utilities software
- the serial number of this particular software package.

Planning an Application

This chapter covers the following topics:

- Design checklist
- Safety considerations
- Applications and projects
- Messages
- Triggering a message
- Controlling devices
- Slaving
- Slave Device
- Historical Event Stack
- Function keys
- Function key types
- LED indicators
- Handshaking
- Tags
- Data types
- Address worksheet
- Defining tags
- Scaling data display variables
- Scaling data entry variables
- Precision and rounding.

Design Checklist

Before creating an application, check the following:

☑ Plan the application: what is it supposed to do, and how?

☑ Outline the documentation the operator will work from. Finish it after the application is completed.

☑ Consider safety requirements.

☑ Review data types and data formats.

☑ Fill in the Address Worksheet (Appendix H).

☑ Review communications (Chapter 5).

Safety Considerations

The application designer must make sure that an application **cannot** be used in an unsafe manner. Failsafes must be built into each application.

ATTENTION: Do not configure Function Keys as emergency stops or other controls critical for safe operation. Use separate hard-wired operator interface devices.

Refer to “Safety Guidelines for the Application, Installation and Maintenance of Solid State Controls” (Publication SGI-1.1).

Communications interruptions

The MessageView 421 terminal relies on communications with the logic controller or ASCII Triggering device.

- Communications are interrupted within the terminal when it:
  - is in the Front Panel Editor mode
  - is receiving an application download from a personal computer
  - has a major fault
  - loses power
  - detects that the Remote I/O link has failed.

The logic controller considers the terminal as a faulted I/O rack when it does not communicate. The controller must be programmed to cope with this situation. Specifically, it must:

- return any machine or process to a safe state
- monitor the rack fault bit associated with the MessageView terminal’s assigned rack.

Refer to the controller’s user manual.

Applications and Projects

Here are the steps needed to create an application:

1. The designer should *document* the application carefully. This documentation should include the purpose of the application, what information the operator will need to make good decisions, and what choices the operator will have to make. The designer and operator should discuss this document together before the application is run.

ATTENTION: Documentation is often neglected, but is very important. The operator can make better decisions if the designer explains what is going on.

2. The designer creates an *application*, the basic design unit of MessageBuilder software. It is designed to be loaded in a specific type of MessageView terminal, run using a specific type of controller, and direct a specific operation. It includes:
   - messages, with their attributes, triggers, embedded graphics, and embedded display and entry variables
   - configuration parameters for communications port(s) of a specific MessageView terminal
   - global attributes that apply to all messages in the application
   - tags, which are named references to data addresses in a specific logic controller (ASCII Triggering devices use the tags as memory references)
   - function keys and LEDs (MessageView 421F terminals only).
3. The designer associates the application with a *project*, which is assigned or created when an application is created. A project can support more than one application, provided that all of them are designed for the same type of terminal and the same type of logic controller. It links the application(s) to:
   - the tag database
   - the specific devices – the MessageView terminal and the PLC, SLC or ASCII Triggering device – that the application will interact with.
4. Values associated with variables are stored in controller memory addresses, and are referenced by the application via named *tags*. The designer usually enters all the tags in the Tag Editor Table View before creating any messages. Tags may also be edited later when they are assigned to their variables.

5. The application designer can *validate* an application at any time, using the Validate command on the Application menu. Incompatibilities are caught during validation. See Page 11–2.

   Note: An application is automatically validated by MessageBuilder software before it is downloaded to a terminal.

6. The designer or operator can monitor how the application is running. Messages that have their HE Stack attribute set are logged into the Historical Event Stack file each time they are triggered. These logged messages include the value of their display variables at the instant of triggering, and the current date and time. The HE Stack file is uploaded to the computer on request.

Messages

A MessageView terminal has memory reserved for an application with up to 4096 standard messages. Messages are triggered individually by the Logic Controller or ASCII Triggering device as required by the interaction between:

- the MessageBuilder application, and
- feedback from the machinery to the Logic Controller or ASCII Triggering Device.

The content of a message is determined by:

- the MessageBuilder application
- information transferred between the MessageView terminal and its controller.

Each message has a unique number, which is used to identify it in the application. Numbers in the range:

- 1 to 9900 are used for application messages
- 9901 to 9999 are reserved for Special Messages
- greater than 9999 are not supported by the MessageView terminal.

A message's number is its value trigger. A message may also have a bit trigger assigned to it. To trigger a specific message in the terminal display, assert its corresponding bit or value trigger at the proper location in controller memory. See the section on Triggering on Page 4–9.

A message may be up to 100 characters long, and can include any combination of text, graphics, and variables. It can have:

- up to one date variable
- up to one time variable
- up to 10 entry or display data variables in any combination, provided the total message length is 100 characters or fewer
- up to 50 graphics symbols, provided the total message length is 100 characters or fewer.

Variable and Graphic display characteristics in the Message Editor

Message Component	Table View	Terminal View
Time	Sample Time	Sample Time
Date	Sample Date	Sample Date
Numeric Data Entry	Placeholder (^^^)	Placeholder (^^^)
Numeric Data Display	Placeholder (###)	Placeholder (###)
ASCII Data Entry	Placeholder (EEE)	Placeholder (EEE)
ASCII Data Display	Placeholder (AAA)	Placeholder (AAA)
ASCII Character	Placeholder (~)	Placeholder (~)
Graphics	Placeholder (GR)	Actual graphics symbol
Message text	Alphanumeric	Alphanumeric

Special Messages

The MessageView terminal supports a predefined set of Special Messages. Message numbers 9901 to 9999 are reserved for Special Messages.

Special Messages are triggered just like any other message while an application is running. When triggered, they are typically not displayed by the terminal, but acted upon.

Special Messages:

- cannot be edited, although bit triggers may be assigned to them
- are not displayed in the Message Editor Table View
- are not displayed in the Message Editor Terminal View
- cannot be chained to another message
- are not logged into the Historical Event stack.

The Special Messages dialog is found on Page 7–54.

This table gives the current Special Messages.

Message Number	Message	Description	ASCII Triggering Device Requirements
9901	Clear Display	Clears all active display messages. The display/slave buffers and Slave Devices are not cleared.	Use the [Ctrl-T] command: to terminal: [Ctrl-T]9901\ MV Address [CR]
9902	Clear Value Triggered Message Queue	Clears the Value Triggered Message Queue and any display/slave buffers.	Use the [Ctrl-T] command: to terminal: [Ctrl-T]9902\ MV Address [CR]
9903	Reset MessageView Terminal	Aborts all terminal functions in progress. Resets the terminal, which then goes through its Power On Self Test (POST).	Use the [Ctrl-T] command: to terminal: [Ctrl-T]9903\ MV Address [CR]
9904	Display Test	Tests every pixel in the terminal display. During the test, the terminal suspends all message activity. When the test is completed the terminal resumes normal Run Mode operation.	Use the [Ctrl-T] command: to terminal: [Ctrl-T]9904\ MV Address [CR]
9905	Set Clock – Time – Date	Sets or updates the Real Time Clock in the terminal from addresses in the logic controller. Valid only if the tags are defined in the Special Messages dialog.	Use six [Ctrl-V] commands: year, month, day, hour, minute, second: to terminal: [Ctrl-T]9905\ MV Addr [CR] to terminal: [Ctrl-V]Year Value\ 1\ MV Addr [CR] [Ctrl-V]Month Value\ 2\ MV Addr [CR] [Ctrl-V]Day Value\ 3\ MV Addr [CR] [Ctrl-V]Hour Value\ 4\ MV Addr [CR] [Ctrl-V]Minute Value\ 5\ MV Addr [CR] [Ctrl-V]Second Value\ 6\ MV Addr [CR]
9906	Get Real Time Clock Time/Date	Sends the terminal Real Time Clock time and date to addresses in the logic controller. Valid only if the tags are defined in the Special Messages dialog.	Use six [Ctrl-I] responses: year, month, day, hour, minute, second: to terminal: [Ctrl-T]9906\MV Addr [CR] from terminal: [Ctrl-I]9906\ Year Value\ 1 [CR] [Ctrl-I]9906\ Month Value\ 2 [CR] [Ctrl-I]9906\ Day Value\ 3 [CR] [Ctrl-I]9906\ Hour Value\ 4 [CR] [Ctrl-I]9906\ Minute Value\ 5 [CR] [Ctrl-I]9906\ Second Value\ 6 [CR]
9907	Battery Test	Tests the battery for sufficient power. If the Battery Test passes, a 1 is sent to the battery status bit. If the Battery Test fails, a 0 is sent. Valid only if the tag is defined in the Special Messages dialog.	Use the [Ctrl-I] response: to terminal: [Ctrl-T]9907\ MV Addr [CR] from terminal: [Ctrl-I]9907\ 1 or 0\ 1 [CR]
9908	Display Brightness Adjustment[1]	Adjusts the brightness of the display according to the value input in the Special Message. If an incorrect value is input for the brightness level, the terminal will ignore the command. Valid only if the tag is defined in the Special Messages dialog.	Use the [Ctrl-V] command: to terminal: [Ctrl-T]9905\ MV Addr [CR] to terminal: [Ctrl-V]0 to 7\ 1\ MV Addr [CR]

[1] This table shows the brightness level corresponding to each value in Special Message 9908's Ctrl-V command:

Value	0	1	2	3	4	5	6	7
Levels	12%	25%	38%	50%	60%	75%	87%	100%

Controlling Devices

A MessageView terminal can accept commands from one of these two types of controlling devices:

- a logic controller such as an Allen-Bradley PLC or SLC

  A logic controller communicates with a MessageView terminal through the Remote I/O port on the daughterboard card. Terminals with daughterboard cards are Catalog Nos. 2706-M1D1, -M1N1 and -M1F1.

- an ASCII Triggering device, such as an Allen-Bradley computer product or SLC BASIC Module. See Page 5–7 for a list.

  An ASCII Triggering device communicates through the RS-232 port on the main board of the terminal. It is used with terminals that do not have daughterboard cards: Catalog Nos. 2706-M1D, -M1N and -M1F.

MessageView features supported by a controlling device

A MessageView terminal can support the following features when controlled by either type of device:

- displaying triggered messages with or without embedded variables
- queuing messages
- chaining messages
- supporting Special Messages
- supporting hidden messages to be sent to the Historic Event Stack when triggered
- displaying messages with Numeric Entry variables embedded, in 421N and 421F terminals
- implementing Handshaking for latched function keys, in 421F terminals
- scaling Numeric Display and Numeric Entry variables
- returning Message Numbers to the controlling device
- displaying Startup and Background messages
- supporting Debug Mode
- supporting Simulate Mode

MessageView features supported by a logic controller

A MessageView terminal can support the following additional features when controlled by a PLC or other logic controller:

- supporting Handshaking for numeric entry and ACK messages as well as for latched function keys
- supporting bit triggering
- supporting Startup and Background messages that contain embedded display variables
- sending Preset or Last values for variables to the controller

ASCII Triggering Device limitations:

- If the ASCII network has more than one device, the terminal operator must not send data (such as Entry variables embedded in a message) from the MessageView terminal to the ASCII Triggering device. This could cause data collisions. Consider this when creating an application for such a network.

  Data is sent from a terminal when:

  – the ACK key is pressed (all terminals)
  – numeric keys are used (421N and 421F terminals)
  – an enabled Function key is pressed (421F terminals)

- The MessageView terminal supports an output buffer to process outgoing data responses. The buffer is designed to handle at least two of the largest responses (such as 20 Ctrl-I responses or 2 messages that contain the maximum of 10 Entry Variables).

  If the output buffer becomes full (for instance, if someone repeatedly presses a Momentary Function Key before the data can be sent), any new outgoing data is lost until the output buffer is available again.

- ASCII Trigger applications require a value trigger tag name to be defined. See Page 10–21. Only the tag name is used; the node address and node name may be left blank. The tag name is used internally by the MessageView terminal as a reference.

Communication setup

In MessageBuilder software, a logic controller is specified by its PLC/SLC/Scanner type. An ASCII Triggering device is a single device that does not require a device type.

Triggering a Message

All messages, including Special Messages, must be triggered to be displayed on, or used by, the MessageView terminal. A message may be defined as only value trigger, or both value trigger and bit trigger.

- Value trigger is acquired from either a logic controller or from an ASCII Triggering Device.
- Bit trigger is acquired only from a logic controller, using Remote I/O communication.

Note: In time-critical or priority type applications, bit triggering is recommended if available.

Important: An ASCII Triggering device cannot use Bit Triggering.

Value triggering

This method uses the message number as a trigger. Each message in an application has its own unique number, so there are as many value triggers in the application as there are messages.

When the terminal receives the message number value trigger, it

- displays the message if its assigned lines are free and its Hidden attribute is disabled
- queues the message if its lines are occupied, the Hidden attribute is disabled and the Message Queue is enabled
- logs the message into the HE Stack whether is is displayed or not, if its HE Stack attribute is enabled
- ignores the message if the line(s) are occupied and the HE Stack attribute and the Message Queue are disabled.
- slaves the message whether displayed by the master device or not if the slave attribute is enabled.

Some messages may be triggered but are not displayed:

- messages with the Hidden attribute set
- Special Messages.

Note: Any message that has its HE Stack or slave attribute set, is sent to the Historic Event Stack or the slave device when it is triggered. The message does not have to be displayed.

From a logic controller using Remote I/O

The MessageView terminal supports a Value Trigger tag in the PLC or other logic controller. When a message is to be triggered, the logic controller writes the message number to this tag address.

Only one message may be value-triggered at a time. The terminal scans the Value Trigger tag address at regular intervals. A triggered message number must remain stable in the Value Trigger tag address for a minimum of 100 milliseconds, to allow for the terminal scan times.

The message is not triggered again until the value in the Value Trigger tag address is changed to a different number and then changed back. Thus the ladder logic application designer may use a message number of 0 (zero) to change the Value Trigger tag address without triggering a message.

From an ASCII Triggering Device using RS-232

The MessageView terminal supports the triggering of messages using the Value Trigger method. The format of this method is:

```
[Ctrl-T]Message Number\MessageView Address[CR]
```

- [Ctrl-T] is the control code for a command to the terminal
- Message Number is the value trigger for the message
- MessageView Address is the node in the network where the terminal is located
- [CR] is the carriage return that ends a packet.

Note: The delimiter in ASCII triggering packets uses the backslash \.

In order to trigger a message, the ASCII Triggering Device transmits a [Ctrl-T] packet sequence. When the terminal receives this packet, it displays or queues the message.

Note: A MessageView terminal in an ASCII network that has an address from 1 to 126 will respond to messages addressed to it, and also to messages addressed to 127. A terminal with an address of 127 will respond to messages addressed to 127 only.

The Message Queue

Queuing is important in situations where multiple message triggers are likely to occur. Value triggered messages that are triggered but cannot be displayed at once are stored in the terminal's Message Queue if the Queue is enabled.

Note: A bit–triggered message is not queued. The bit remains set until the controller resets it.

The MessageView terminal supports two fixed Message Queue lengths, set in the Terminal Setup Advanced dialog. See Page 10–13. The length may be:

- 64 messages deep (the Queue is enabled)
- 1 message deep (in effect, the Queue is disabled)

The MessageView terminal processes messages according to the following criteria:

- A triggered message is displayed at once if possible.
- If the specified line for a value–triggered message is not free, it is placed at the bottom of the Message Queue Stack.
- Messages are processed from the Queue Stack in a top-to-bottom First In, First Out (FIFO) priority.
- The topmost message is displayed when its assigned display line is available. The terminal continues to queue additional triggered messages while it waits to display the topmost message.

  Note: Messages in the Queue are not displayed until they reach the top of the Queue, even if their line is available.
- If the Queue reaches Full status, the next message that is queued will be entered at the top of the Queue, overwriting a pre–existing queued message.

Note: The Message Queue is not cleared when the terminal operator enters the Front Panel Editor (FPE). When the operator closes the FPE, Run mode resumes and the queued messages are displayed as if there was no interruption.

The Message Queue is cleared if:

- the terminal has processed all queued messages
- the terminal is reset
- the controller triggers a Clear Queue (9902) Special Message
- the controller triggers a Terminal Reset (9903) Special Message.

Bit triggering

This method uses bits within a designated word of memory, the Bit Trigger tag address, to trigger messages. The Bit Trigger tag is defined in the Terminal Setup dialog (see Page 10–21). Starting with this tag address, you may reserve up to 64 words (1024 bits) in sequence for all the bit triggers in the application.

If the system uses Remote I/O to transfer data, the maximum number of bit triggers may be reduced.

RIO Method	Rack Size	Maximum # of Bit Triggers
Discrete I/O	1/4	32
Discrete I/O	1/2	64
Discrete I/O	3/4	96
Discrete I/O	Full	128
Block Transfer	1/4 to Full	1024

When the Bit Trigger attribute is enabled for a message, its bit is also assigned. Only one message may be assigned to a particular bit address.

When a message is to be bit triggered, the logic controller writes a 1 to a specific bit at the Bit Trigger tag address.

- When the logic controller resets the bit to 0, the corresponding message is not displayed.
- When the logic controller sets the bit to 1, the terminal displays the message if its assigned display line is available.

  Important: If its line is not available and the bit remains set (1), the terminal will display the message when the corresponding line becomes available.

  If the bit is reset to 0 before the line is available, the terminal will ignore the message.
- In order to trigger the same message again, its corresponding bit must be changed to 0 and back to 1.

Note: Any message that has its HE Stack or slave attribute set, is sent to the Historic Event Stack or the slave device when it is triggered. The message does not have to be displayed.

Bit trigger priority

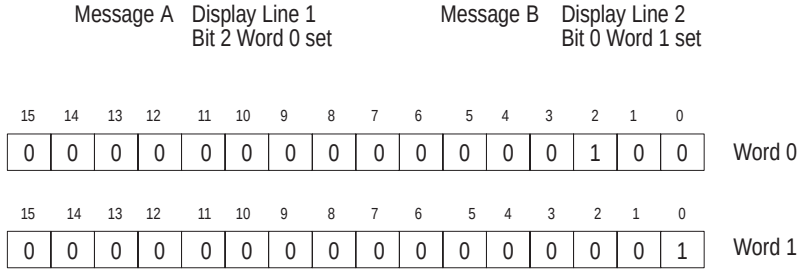
Bit triggered messages are not queued as value trigger messages are. However, bit triggering does provide a way to prioritize messages. If two or more bits are set at the same time, the terminal processes them according to the following criteria:

1. Bit triggered messages are prioritized from Least Significant Bit (LSB) to Most Significant Bit (MSB):
   - within a word, from Bit 0 to Bit 15
   - if more than one word is assigned to bit triggering, from Word 0 to Word 63.
2. The terminal scans the area of memory assigned to bit triggering in prioritized order, from LSB to MSB.
3. When the terminal detects a set bit, the message corresponding to that bit is triggered. It is displayed or not, according to the following rules:

if the Bit Trigger is:	and the Display Line:	then the message is:
set (1)	is available	displayed
set (1)	is occupied	not displayed
set (1)	becomes available	displayed
reset (0)	becomes available	not displayed

Example 1

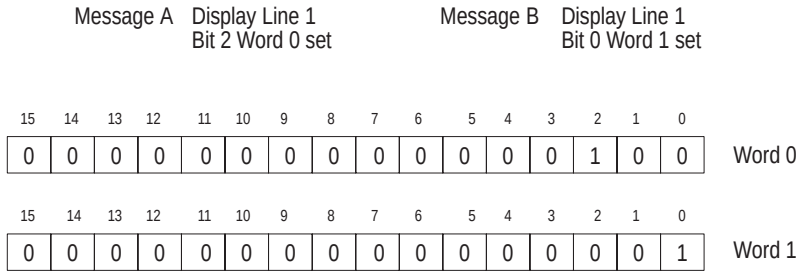
Two messages are bit triggered at the same time. Assume all display lines are available and the messages are assigned to different lines.



Result: Messages A and B are displayed at once.

Example 2

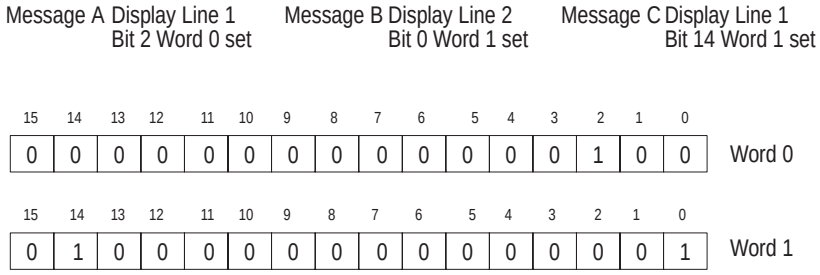
Two messages are bit triggered at the same time. Assume all display lines are available and the messages are assigned to the same line.



Result: Message A is displayed at once. After Message A is terminated, Message B will be displayed if its corresponding bit is still set. If its bit is no longer set, Message B will not be displayed unless it is triggered again.

Example 3

Three messages are bit triggered at the same time. Assume all display lines are available and two of the messages are assigned to the same line.



Result: Messages A and B are displayed at once. After Message A is terminated, Message C will be displayed if its corresponding bit is still set.

Bit and Value trigger priority

A bit triggered message and a value triggered message may be triggered at the same time.

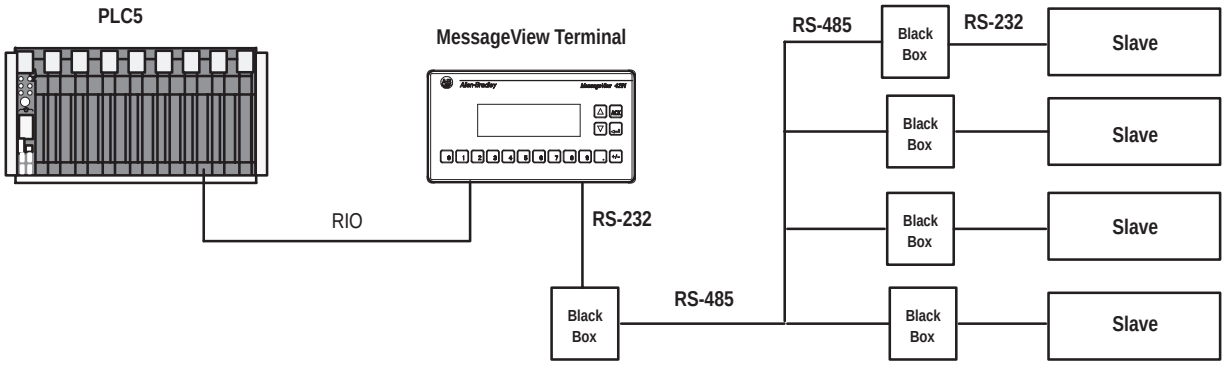
- If the messages are assigned to different display lines, both messages will be displayed.
- If the messages are assigned to the same display line, priority is determined by the Trigger Priority attribute in the Terminal Setup Advanced dialog. See Page 10–17.

Slaving

A MessageView terminal with a RIO daughterboard (Catalog Nos. 2706-M1D1, -M1N1 or -M1F1) and firmware that supports a Slave Port can act as a master device with up to 126 slave devices.

Note: A MessageView 421D terminal without a daughterboard can be used as a slave device. A list of slave devices is given on Page 5–6.

An example of a master terminal setup with four slaves



MessageView Terminal slave buffers

Each slave device is addressed individually. The MessageView terminal has 14 buffers that store messages that are monitored, updated, and continuously displayed by the slave(s). Each slave on the network has its own node address. Each message is directed to a specific slave to be displayed on a specific line.

The MessageView Terminal buffer system works as follows:

1. Message 1, sent to the slave at node 6 slated for line 1, is stored in one of the buffers and displayed immediately by the slave.
2. Message 2, sent to the slave at node 2 slated for line 1, is stored in another buffer and displayed by the second slave.
3. Message 3, sent to the slave at node 6 slated for line 2, is stored in a third buffer and displayed concurrently with Message 1.
4. Message 4, sent to the slave at node 6 slated for line 1, overwrites the message in the first buffer and is slaved at once.
5. If all the buffers are full, and if no buffer has a message for the slave at node 6 line 4, a new message for the slave at node 6 line 4 overwrites the message in the oldest node 6 buffer. If none of the buffers has a message for node 6, then the oldest buffer is overwritten, no matter which node it was addressed to.

6. A message slated for Any Line is displayed on the same line that it was displayed on by the Master Device. If the message was a Hidden Any Line message, it is displayed on line 1 of the slave's display.
7. A message with address 127 is placed in a buffer and is sent to all slaves. All other buffers with the same Line Number attribute (e.g., Line 3) are cleared.
8. A message with address 127 slated as an All Lines message is placed in a buffer and is sent to all slaves. All other buffers are cleared.

Note: If the terminal operator accesses its Front Panel Editor, or switches the RS-232 port to MessageBuilder parameters, all slaving activities are interrupted. Slaving activities are resumed when the operator sets the RS-232 port to Aux. Port parameters and exits the Front Panel Editor.

Slave Message embedded variables

Numeric and ASCII Entry variables and Function keys are supported in slaved messages, but they are active only on the Master Device. The terminal removes the embedded entry variables, enabled Function keys and (unless Ctrl-G is used) embedded Graphic symbols before transmitting the message to the Slave Device(s).

If the following are embedded in messages, they are supported on both the Master and the Slave Device(s):

- date and time
- graphics (if Ctrl-G is used; see Page 7–41)
- Numeric and ASCII Display variables

Data variables are continuously updated in the slave display as long as the slave message is active.

Other features include:

- Numeric Display variable data may be scaled.
- Messages with the Hidden and Slave Enable attributes set are not displayed by the master, but are displayed by the slave device

Slave Packet

A message intended for transmission to a slave device has the following format:

```
[Optional Control Byte][ASCII Text][Optional Display
Mode Byte][Slave Address Byte][Line Number Byte][CR]
```

MessageBuilder software allows for the automatic or manual insertion of the Optional Control Byte and Optional Display Mode Byte.

If you choose to embed them manually, the individual control codes are found on Page 7–42. The slave packet fields are:

- Control Byte: specifies text size or clears the slave display.
- ASCII Text: the message itself, including embedded variables and graphics. The maximum length for any message is 100 characters; in a slave packet the control codes are not counted.
- Display Mode Byte: specifies scrolling, centering and hold message options.
- Slave Address Byte: specifies the Slave Device node address, an integer from 1 to 127. Addresses 1-126 specify an individual node where a Slave Device is connected. Address 127 addresses all Slave Devices.
- Line Number Byte: specifies a Display Line number. An integer from 1 to 4 specifies a specific line; 50 clears all lines if Control Byte was Ctrl-C.
- CR: a carriage return, to signal the end of the message.

Note: Non–printable codes and characters are not included in the character count for slaved messages.

Slave device alarm relay

The MessageView terminal supports a slave device alarm relay. A message with the Relay attribute enabled will energize the slave device alarm relay when the slave device receives the relay packet.

The alarm will remain energized until a message with the Relay attribute disabled is slaved to that node and line number, replacing the alarm message and de-energizing the alarm.

The following slave device supports an alarm relay:

- DL50

Slave Device

A MessageView 421D terminal without a daughterboard (Catalog No. 2607-M1D only) is a Slave Device. MessageView 421D Slave Devices are shipped with an application downloaded. The application provides the ASCII characters and graphics needed to display messages.

The MessageView 421D Slave Device terminal does not support a Startup or Background message. It acts as a “dumb terminal”, which can receive data but not transmit it. It can accept commands from a variety of slaving (master) devices. A list of master devices is given on Page 5–8.

A message is displayed as soon as it is received from the master device. There is no buffering or Message Queue. If a message is received that is slated for a line which has another message displayed, the old message is terminated at once and the new message is displayed.

Embedded variables are treated as follows:

- Display, time and date variables in slaved messages are displayed by the 421D Slave Device. They are updated by the Master Device as long as they are displayed.
- ASCII Characters are displayed.
- Graphics may be displayed if the Ctrl-G control code is inserted.

The slave packet format and control codes are given on Page 7–42.

Historical Event Stack

The MessageView terminal features a Historical Event (HE) Stack. The HE Stack file supports up to 4000 messages, each 21 alphanumeric characters long. Messages with the HE Stack attribute enabled are recorded in the Historical Event Stack each time they are triggered.

The Historical Event Stack file includes for each message:

- Message number.
- Message text, which includes:
  - data display variables at the time of triggering
  - placeholders for data entry variables
  - placeholders for graphic symbols.
- Message topic.
- Time and date when the message was triggered.
- Time and date when the message was acknowledged, if the Ack Time attribute was enabled. See Page 7–39.

Historical Event Stack messages are stored in the terminal's memory in chronological order.

The terminal can alert the operator when the Historical Event Stack file is 85%, 95% and 100% full, so that overflows can be avoided. If the Stack file is full, new messages overwrite messages in the file, starting with the oldest.

Viewing the Historical Event Stack

The Historical Event Stack may be viewed using either:

- the terminal's Front Panel Editor
- the personal computer via the HE Stack Upload command.

When using the Front Panel Editor, the terminal operator may view the Historical Event Stack in either of two formats:

- frequency of occurrence
- chronological order.

The HE Stack Upload command, on the Application menu, uploads the HE Stack file to a computer file in CSV (Comma Separated Variable) format. This format allows the user to import the file into a spreadsheet or database software package for analysis. See Page 11–13.

Function Keys

A MessageView 421F terminal supports 16 Function keys (F1 to F16) and 16 LEDs on the front panel.

A typical message with Function keys enabled informs the operator the intended function of each enabled function key. For instance:

F1 Start F2 Stop Pump

Pressing a Function key sets or clears a bit value assigned to the Function key's write tag address. The controller logic program can use the write tag address for a variety of control operations such as a machine's start and stop functions.

ATTENTION: Do not use a MessageView terminal for emergency stops or other controls critical for the safety of personnel or equipment. Use separate hard-wired operator interface devices.

Global attributes

Individual Function key attributes are globally defined. For instance, if F1 is defined as momentary, every time it is enabled for a message it is a Momentary Function Key. If a Latched Function Key is needed, you must enable a different key.

The MessageView terminal supports three types of Function key operations as global attributes:

- momentary
- maintained
- latched.

See the section on each type starting on Page 4–23. Other global attributes are discussed in these sections.

Enabling and disabling function keys:

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

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

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

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

ATTENTION: As a safety precaution, enable only the function keys that are used in the message. Unused function keys should remain disabled, since adverse effects could result.

All 16 Function keys may be enabled for a single message if required. However, only one message assigned to Function key operation can be displayed at a time.

Jog and non-jog modes

Messages with momentary, maintained or latched function keys enabled may be defined as either jog or non-jog.

- Messages are defined as **non-jog** if their Auto Clear attribute is enabled. Non-jog messages are terminated at the completion of a Function key operation, including Hold Time. For example:

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

The message is terminated after any of F1, F2 or F3 is pressed and released, and the Hold Time, if any, expires.

- Messages are defined as **jog** if their Auto Clear attribute is disabled. Jog messages, including their associated Function keys, remain displayed (active) even after a function key is pressed and its Wait Time has expired. For example:

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

The message remains active after any of F1, F2 or F3 is pressed and released, and the Hold Time, if any, expires.

Jog mode is an aspect of the Auto Clear attribute which becomes apparent in messages that have Function keys enabled. It is non-global. For example, Message 5 with F1 enabled may be jog mode and Message 25 with F1 enabled may be non-jog, in the same application.

Terminating Function Key messages

A Function key message in Jog mode remains displayed until it is specifically terminated. Another message triggered to be displayed on the same line will not clear it.

Function key enabled messages are terminated by:

- pressing the Function key, if the Auto Clear attribute is set (non–jog)
- pressing the **[0]** and **[+/-]** keys on the terminal at the same time
- triggering Special Message 9901, Clear Display
- performing a terminal reset.

When the controller is an ASCII Triggering device

Each time a Function key is pressed, the MessageView terminal sends a [Ctrl-F] command to the ASCII Triggering device.

```
[Ctrl-F]Message #\F-Key #\F-Key Action[CR]
```

- Message # is the number of the displayed message
- F-Key # is the function key being pressed
- F-Key Action is the resulting state, 0=OFF and 1=ON.

If the Function key is of Latched type, the ASCII Triggering device sends a [Ctrl-U] command to the terminal to unlatch it.

```
[Ctrl-U]Function Key #\MessageView Address[CR],
```

- Function Key # is the Function key being unlatched, and the
- MessageView Address is the node address of the terminal in the ASCII network.

Function Key Types

Momentary Function Keys

A Momentary Function Key remains in a changed state as long as the key is pressed. When it is released, after a preset Hold Time has expired the key changes back to its original state. The Hold Time value represents a brief delay in which the control function remains active after the operator releases the Function key. This Hold time is set in the Function Keys dialog, which is accessed through a command on the Application menu.

The MessageView terminal supports Hold Times of 0, 50, 250, 500, 750 or 1000 milliseconds.

A Momentary Function Key does not have a definitive handshake tag.

ATTENTION: If communication with the logic controller uses Remote I/O protocol with block transfer, the Function key write tags must all be assigned to the same block as the Function Key Return Message Number tag.

Maintained Function Keys

A Maintained Function Key changes state (0 to 1, or 1 to 0) when pressed, and remains in the changed state when released. It returns to its original state when the function key is pressed and released again.

A Maintained Function Key retains its current state after the message is terminated.

Since a Maintained Function Key toggles between two states, its Initial state (0 or 1) must be specified independently of its Contact Normally Open/Normally Closed state. The initial state of a Maintained Function Key after a powerup or terminal reset depends on the Values At Startup attribute, which is set in the Terminal Setup Advanced Dialog.

- Preset: the Function key's state at startup is the same as its initial state, set in the application.
- Last: the Function key's state at startup is its last state before the power down or reset.

A Maintained Function Key does not have a definitive handshake tag.

ATTENTION: If communication with the logic controller uses Remote I/O protocol with block transfer, the function key write tags must all be assigned to the same block as the Function Key Return Message Number tag.

Toggling a Maintained Function Keys

The procedure for toggling a Maintained Function key depends on whether the initial message is in Jog or non-Jog mode.

To return the Function key's associated bit to its former state:

- If the message is in jog mode, the operator may press and release the Function key a second time. If the operator continues to press and release the Function key the associated bit will be toggled.
- If the message is in non-jog mode, a second message that has the same Function key enabled must be triggered. It tells the operator to press and release the Function key.

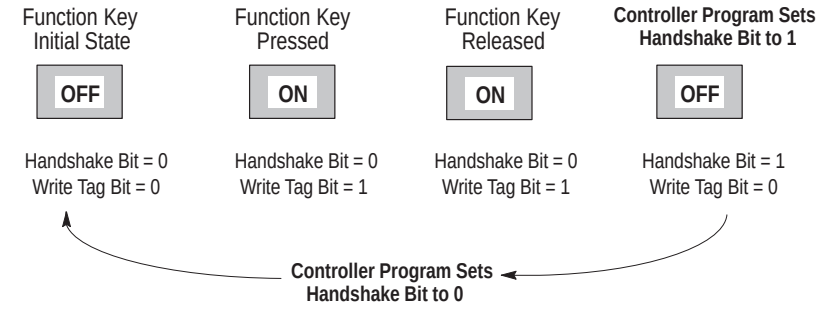
Latched Function Keys

A Latched Function Key changes state (0 to 1 or 1 to 0) when pressed, and remains in the changed state when released. It does not unlatch if it is pressed again. A Latched Function Key returns to its original state only when the logic controller sets the latch handshake bit.

For the procedure when the controller is an ASCII Triggering device, see Page 4–22.

A Latched Function Key retains its latched state after the message is terminated. After a terminal reset or powerup, the initial state of a Latched Function Key is always its released state.

A Latched Function Key **requires** a handshake tag. The handshake tag unlatches the Function key when the bit at the handshake tag address is set to 1 by the logic controller.



ATTENTION: If communication with the logic controller uses Remote I/O protocol with block transfer, the Function key write tags must all be assigned to the same block as the Function Key Return Message Number tag.

LED Indicators

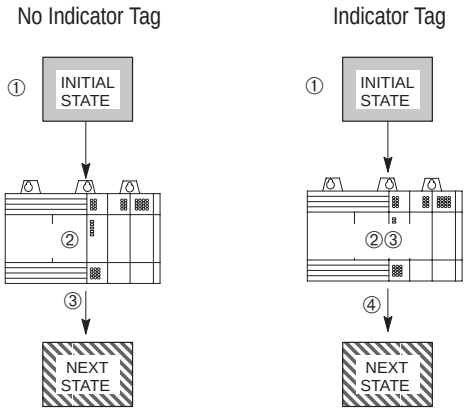
MessageView 421F terminals have a red LED located next to each function key. Each LED may or may not have an Indicator tag assigned to it.

Indicator tags are globally defined in the LED dialog.

- When a LED is assigned a certain tag, that tag remains assigned to it throughout the application.
- When an LED does not have a tag assigned to it, the LED has no tag any time it is used in the application.

When the LED ***does not have*** an Indicator tag assigned to it, the LED follows the state of the associated Function key (LED1 with F1, LED 16 with F16). For example, LED4 will light when Function key F4 is pressed. LED4 remains lit as long as the Function key is in the On state and the message displayed remains active.

When the LED ***has*** an Indicator tag assigned to it, the LED operates independently of the associated Function key. For example, pressing and releasing Function key F1 will have no effect on the operation of LED1. The controller program turns the LED On and Off by setting or clearing the bit at the Indicator tag address. Thus the logic controller can indicate a process status to the operator without displaying a message.



Step	Description
①	Function Key pressed
②	Bit set to 1 in F-key Write Tag address
③	LED changes state based on bit read from Write Tag address

Step	Description
①	Function Key pressed
②	Bit set to 1 in F-key Write Tag address
③	Bit at Indicator Tag address set by logic controller
④	LED changes state based on bit read from Indicator Tag address

An ASCII Triggering device sends the [Ctrl-L] command to control a tagged LED:

```
[Ctrl-L]LED #\LED State\MessageView Address[CR]
```

- LED # is the LED being toggled
- LED State is 1 (On) or 0 (Off)
- MessageView Address is the node address of the terminal in the ASCII network.

Handshaking

Handshaking is a means of acknowledging that a command has been received and performed by either the MessageView terminal or the logic controller.

The MessageView terminal supports handshaking for:

- latched function keys
- numeric and ASCII data entry variables
- Auxiliary Port devices (hardware handshaking).

The MessageView terminal supports pseudo handshaking for:

- momentary function keys
- maintained function keys
- acknowledge messages
- all other messages.

Latched Function Key handshake

Latched Function Keys require a defined handshake tag. When a message uses a Latched Function Key, the Function key write tag notifies the logic controller that the Function key bit assigned is latched in the On state. The controller then uses the handshake tag to notify the MessageView terminal when the Function key is to be unlatched.

The handshake tag for a Latched Function Key is globally defined in the Function Key dialog. That is, the tag assigned to a Latched Function Key is the same tag every time that Function key is enabled for a message.

Numeric and ASCII Data Entry handshake

Numeric and ASCII data entry variables do not require a defined handshake tag. However if you want to enable the handshake feature of a data entry variable message, both a notification tag and a handshake tag must be defined.

- When a notification tag is assigned, the MessageView terminal has a means of signalling that data entered from the terminal has been transferred to the logic controller.
- When a handshake tag is assigned, the logic controller has a means of signalling the MessageView terminal that it received the data.

Note: Define **both** notification and handshake tag or **neither**. If only one is defined, the application will not pass validation.

Note: If a message contains more than one data entry variable, each variable is supported by its own write tag address. However the notification and handshake tags are shared by all data entry variables in the message. Consider the write tag to be local to the individual data entry variable, and the notification and handshake tags global to the message as a whole.

Example:

Message A contains:

Enter Air Temperature: XXX; Enter Water Temperature: YYY.

where XXX and YYY are data entry variables.

If XXX is assigned these tag addresses:

Write Tag Address:	TAG_A
Notification Tag address:	TAG_NOTIFY
Handshake Tag Address:	TAG_HAND

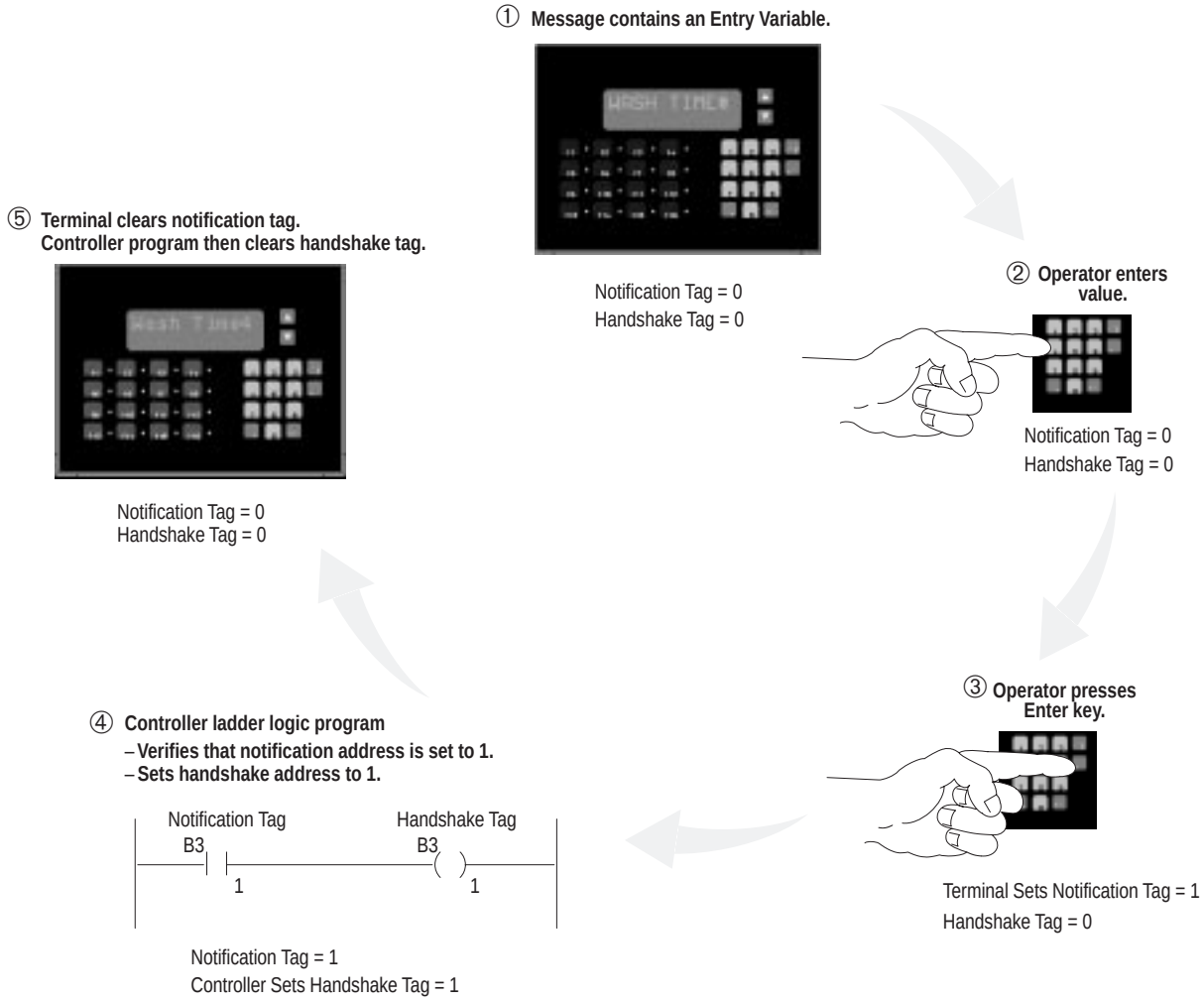
Then YYY would be assigned these tag addresses:

Write Tag Address	(any tag address but TAG_A)
Notification Tag Address	TAG_NOTIFY
Handshake Tag Address	TAG_HAND

If the notification or handshake tag is changed in one of the data entry variables in a message, the change affects all data entry variables in that message.

When data entry handshaking is used, the controller logic is required to set the handshake tag bit before the user-defined handshake timeout occurs. If the terminal does not receive the handshake bit before time expires, it will display a handshake timeout message. The terminal operator must acknowledge the timeout message before the application can resume. See page 10–16 to adjust the timeout time.

Example of handshaking with Entry Variables:



WHEN THE TERMINAL SETS THE NOTIFICATION TAG, IT WAITS FOR THE CONTROLLER TO SET THE HANDSHAKE TAG.
IF THE HANDSHAKE TAG IS NOT SET BEFORE THE SPECIFIED TIMEOUT TIME, THE TERMINAL NOTIFIES THE OPERATOR THAT THERE IS A COMMUNICATIONS PROBLEM.

Hardware handshake for an auxiliary port

A MessageView terminal may have its RS-232 port connected to an auxiliary device. A number of auxiliary devices are listed on Pages 5–6 and 5–7.

The RS-232 cable has an RTS line from the terminal to notify the device when it is ready to receive, and a CTS line from the device to notify the terminal when it is ready to receive. These are used as follows:

- If the terminal's input buffer is full, the terminal asserts the RTS line so the auxiliary device will stop sending data.
- If the terminal detects an asserted CTS line, it will not send any more data.
- If the terminal detects an asserted CTS line after 30 seconds, the terminal displays a CTS error message. This message remains active for 2 seconds, then it is cleared from the display. After 30 seconds the terminal tests the CTS line again and if necessary displays the CTS error message again. This cycle is repeated until the communications problem is corrected and the CTS line is non–asserted.

Momentary or Maintained Function Keys pseudo handshake

The MessageView terminal supports a pseudo handshake for Momentary and Maintained Function Keys. The pseudo handshake uses the Function Key Return Message Number tag defined in the Terminal Setup Control Tags dialog. See Page 10–24.

If the Function Key Return Message Number tag is defined, the MessageView terminal will return the message number associated with the Function key each time the Function key is pressed. This provides a means of signalling to the logic controller that a Function key bit has been set or reset.

The Function Key Return Message Number tag is globally defined. That is, the Return Message Number tag address is the same for all messages using a Function key.

Acknowledge messages pseudo handshake

The MessageView terminal supports a pseudo handshake for acknowledgeable messages. The pseudo handshake uses the Acknowledge Return Message Number tag defined in the Terminal Setup Control Tags dialog. See Page 10–23.

If the Acknowledge Return Message Number tag is defined, the MessageView terminal will return the message number associated with a message each time an acknowledgeable message is acknowledged. If a message is not acknowledged, no message number is returned. This provides a means of signalling to the logic controller that a message has been acknowledged.

The Acknowledge Return Message Number tag is globally defined. That is, the Return Message Number tag address is the same for all acknowledgeable messages.

All messages pseudo handshake

The MessageView terminal supports a pseudo handshake for all messages not included in the above handshake types. The pseudo handshake uses the Return Message Number tag defined in the Terminal Setup Control Tags dialog. See Page 10–21.

If the Return Message Number tag is defined, the MessageView terminal will return the message number associated with a message that does not have the Ack attribute or function keys, each time the message is displayed. If a message is not displayed, no message number is returned. This provides a means of signalling to the logic controller that a message has been displayed.

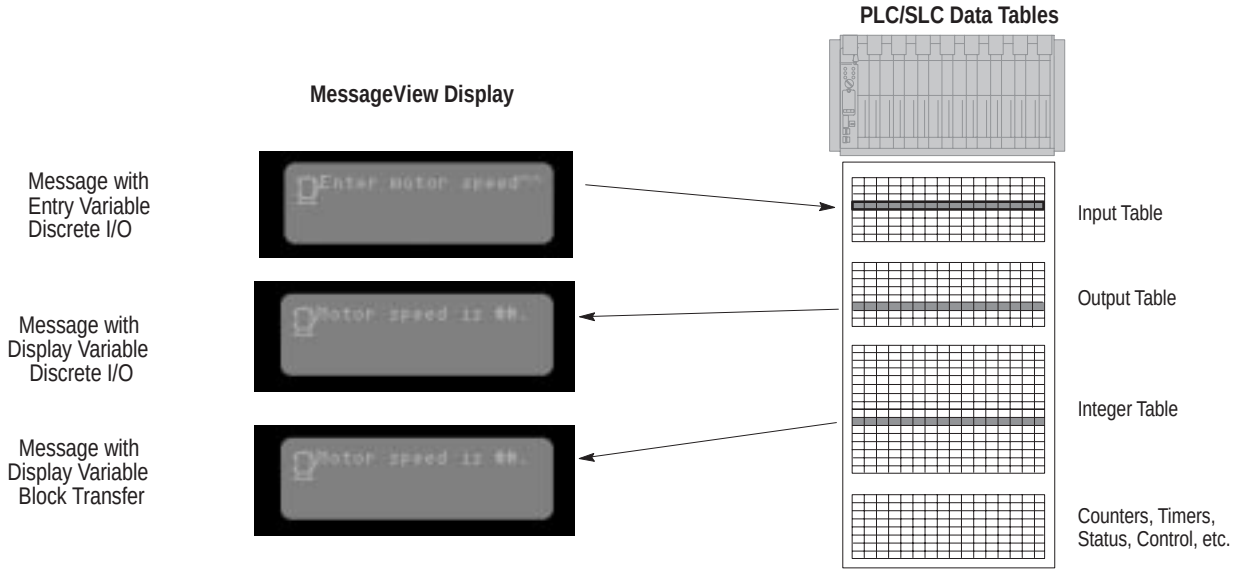
Note: Hidden messages do not return a message number when they are processed, since they are not displayed.

The Return Message Number tag is globally defined. That is, the Return Message Number tag address is the same for all messages.

Tags

Create tags in the Tag Editor to link message triggers and message variables with specific controller addresses. A tag specifies the address and data type, whether a value should be written to that address or read from it, and other information. Chapter 8 shows how tags are used in MessageBuilder applications.

Message triggers and each embedded variable in a message must be linked to a controller data table. The MessageView terminal either reads the data for a message trigger or a display variable, or writes data for an entry variable.



Assign a tag to any data type the PLC or SLC supports.

SLC File Types

File Type	Read/Write	Identifier	File Number	Element	Integer Sub-Element	Bit Number
Output	Read	O	0	0-255	n/a	0-15
Input	Read	I	1	0-255	n/a	0-15
Status	Read/Write	S	2	0-82	n/a	0-15
Bit (Binary)	Read/Write	B	3, 9-255	0-255	n/a	0-4094
Timer	Read/Write	T	4, 9-255	0-255	PRE, ACC	EN, TT, DN
Counter	Read/Write	C	5, 9-255	0-255	PRE, ACC	CU, CD, DN, OV, UN
Control	Read/Write	R	6, 9-255	0-255	LEN, POS	EN, EU, DN, EM, ER, UL, IN , FD
Integer	Read/Write	N	7, 9-255	0-255	n/a	0-15
String	Read	ST	9-255	0-255	LEN, DATA	n/a
ASCII	Read	A	9-255	0-255	n/a	0-15

PLC-5 File Types

File Type	Read/Write	Identifier	File Number	Element	Integer Sub-Element	Bit Number
Output	Read	O	0	0-277①	n/a	0-17①
Input	Read②	I	1	0-277①	n/a	0-17①
Status	Read/Write	S	2	0-127	n/a	0-15
Bit (Binary)	Read/Write	B	3-999	0-999	n/a	0-15999
Timer	Read/Write	T	3-999	0-999	PRE, ACC	EN, TT, DN
Counter	Read/Write	C	3-999	0-99	PRE, ACC	CU, CD, DN, OV, UN
Control	Read/Write	R	3-999	0-999	LEN, POS	EN, EU, DN, EM, ER, UL, IN , FD
Integer	Read/Write	N	3-999	0-999	n/a	0-15
BCD	Read/Write	D	3-999	0-999	n/a	0-15
Block Transfer	Read/Write	BT	3-999	0-999	n/a	n/a
Message	Read	MG	3-999	0-584	ERR, RLEN, DLEN, DATA	NR, TO, EN, ST, DN, ER, CO, EW, SD, SE
PID	Read/Write	PD	3-999	n/a	n/a	n/a
SFC	Read/Write	SC	3-999	n/a	n/a	n/a
String	Read	ST	9-255	0-255	LEN, DATA	n/a
ASCII	Read	A	9-255	0-255	n/a	0-15

① Octal format, all other values are decimal.

② Remote I/O allows the MessageView to write its own output words.

Data Types

The MessageView terminal can read and write both of these data types:

- single bit data type
- value data type.

Bit data

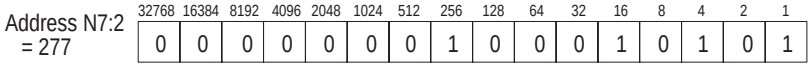
Bit data occupies a single bit address and represent an On (closed) or Off (open) condition.

Use a bit address:

- to read or write a value of 0 or 1 in a variable
- to trigger a message.

Value data

Value data types occupy a word (2 bytes or 16 bits) address that represents a numeric value. No matter how large or small the value, a whole word must be assigned to it.



Data Formats

The MessageView terminal recognizes and transfers 5 data formats.

Data Format	Range
Bit	0 or 1
Unsigned Integer	0 to 65535
Signed Integer	-32768 to +32767
BCD	0 to 9999
Character Array	alphanumeric characters

Bit

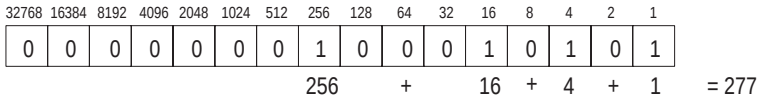
Data in bit format occupies only one bit of memory. Its address is given not as a word (N7:2), but as a bit (N7:2/10). A bit is a location, and depends on its position in the word. It can be set or reset.

Signed and Unsigned Integers

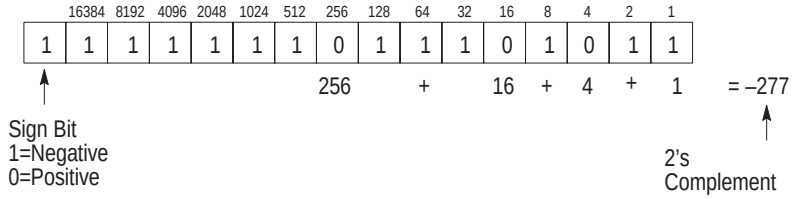
Data in signed and unsigned integer format occupy one word (2 bytes or 16 bits) of memory, no matter how small the value is.

Every bit has a value that depends on its position in the word. The value encoded is the sum of the bits that are set.

Unsigned Integer



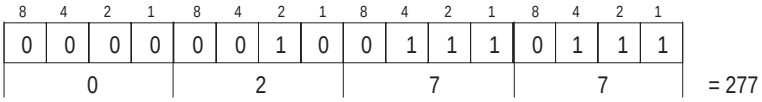
Signed Integer



BCD

Data in BCD format (also called 4-BCD) occupy one word of memory. Every four bits encodes a single decimal digit 0 → 9.

BCD



Character Array

Data in Character Array format are assigned to ASCII variables. The length of a character array is from 1 to 32 bytes.

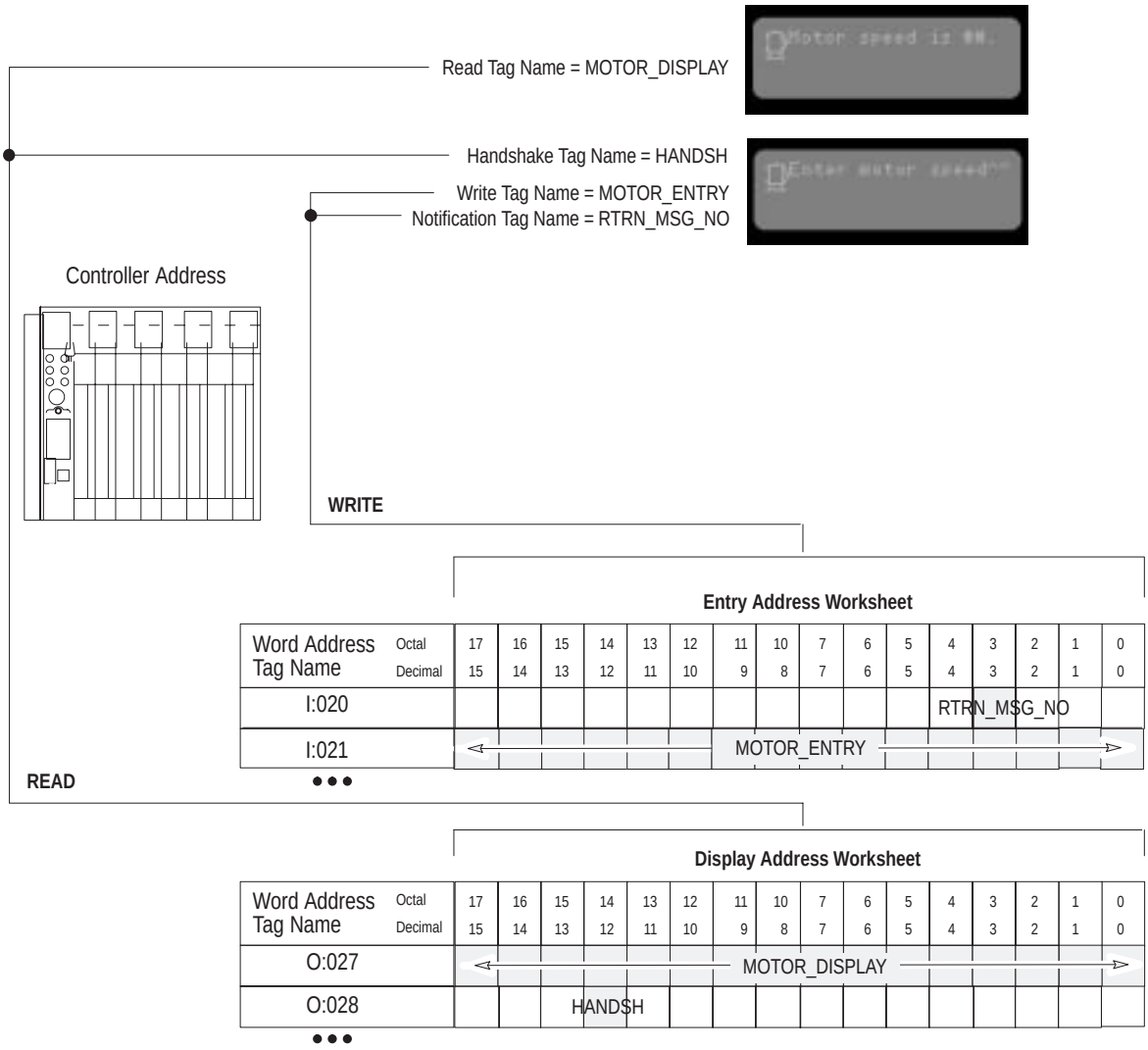
The ST file type is a character array. Other file types can also be viewed as characters.

Address Worksheet

Before entering tags in the Tag Editor dialog, use a copy of the Address Worksheet in Appendix H to record them. Each line in the worksheet is 1 word (2 bytes or 16 bits), since this is the unit of controller address memory. Use separate worksheets for display (logic controller write) and for entry (logic controller read) variables, since these are stored in different memory areas.

The figure shows two examples of recording addresses. For proper address formats, refer to the controller's user manual. Assign:

- a whole word (16 bits) to signed and unsigned integers and 4BCD data types
- specific bits to bit data types
- a word (or words adjacent to one another) for bit triggers
- character arrays to ASCII data types.



Defining Tags

Read or Write tags that define controller addresses for variables are entered in the Tag Editor. See Page 8–2. A tag has the following attributes:

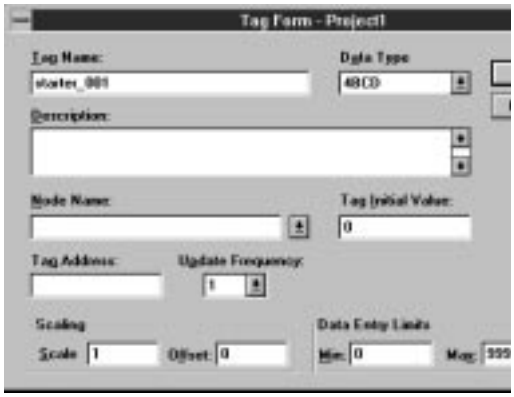
Tag Attributes	Description
Tag Name	Unique name identifying tag address
Data Type	Bit, BCD, Unsigned/Signed Integer, Character Array
Array Size	Number of elements in a character array. For other data types, leave blank.
Description	General description of the variable
Node Name	Name of the logic controller that will store the address
Tag Address	Specifies word or bit location in controller memory
Initial Value	Value in tag address at powerup
Update Frequency	How often the tag address will be updated while the operation is running
Scaling①	Scale and scale offset values
Data Entry Limits①	Upper and lower limits of data stored at tag address

① Usage depends on the variable. These attributes can be entered only in the Form View.

The Tag Editor supports two different methods for entering tags:

- Table View for entering multiple tags.
- Form View for entering a single tag.

Table View



Form View

Tags are stored in a database that is referenced by a project name. The project name is entered when creating a new application file.

Note: A project can be created only when a new application is created. However, once it has been created, existing or new applications may be assigned to it.

Scaling Data Display Variables

Scaled Data Display Variables take raw numeric values and mathematically manipulate them so the values can be shown in standard units such as:

- gallons
- feet per second
- pounds per square inch.

Values from the logic controller address are scaled using the formula:

$$y = mx + b$$

y = scaled (displayed) value

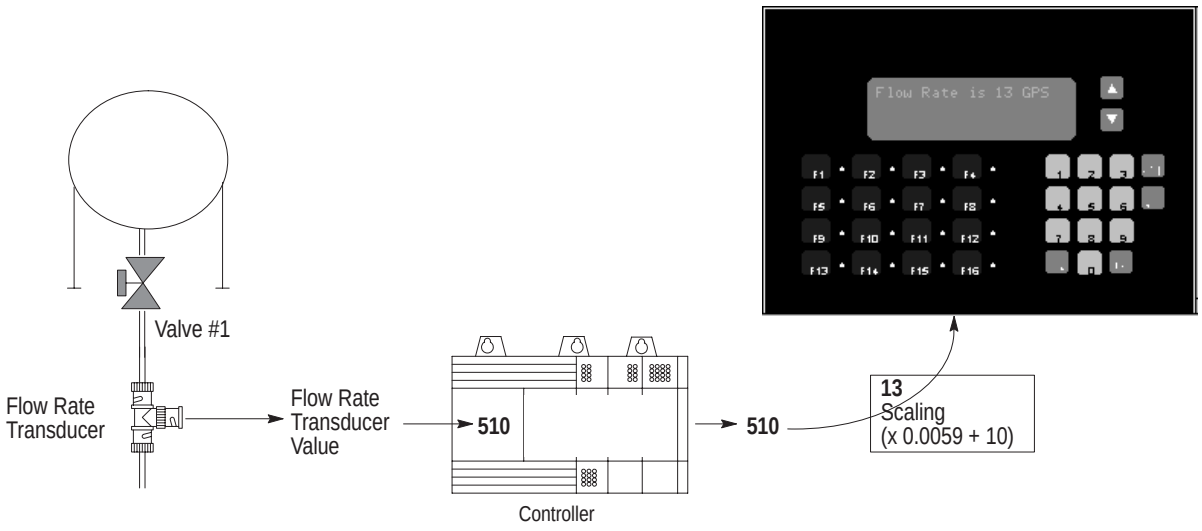
x = value stored in controller address

m = scale (multiplier)

b = offset.

The scale and offset values are entered in the Tag Editor.

Example: Scaling a Display Variable



Note: Messages sent to slave devices may contain scaled variables. The variable tag contains the scaling information.

Scaling Data Entry Variables

Data entered by a MessageView terminal operator can be scaled from engineering units such as:

- gallons
- pounds per square inch.

to machine control values.

Values entered at the terminal are scaled according to the formula:

$$y = mx + b$$

y = scaled value (entered by operator)

x = controller value

m = scale (multiplier)

b = offset.

To calculate value (x) stored at the controller address, the formula becomes:

$$x = \frac{y - b}{m} = \frac{\text{Entered Value - Offset}}{\text{Scale}}$$

The scale and offset values are entered in the Tag Editor. Scaled values affect the controller values as follows:

- A scale (m) entered as a value >1 generates an x value smaller than y - b.
- A scale (m) entered as a value <1 generates an x value larger than y - b.

Note: An ASCII Input device may transmit either numeric or alphanumeric data.

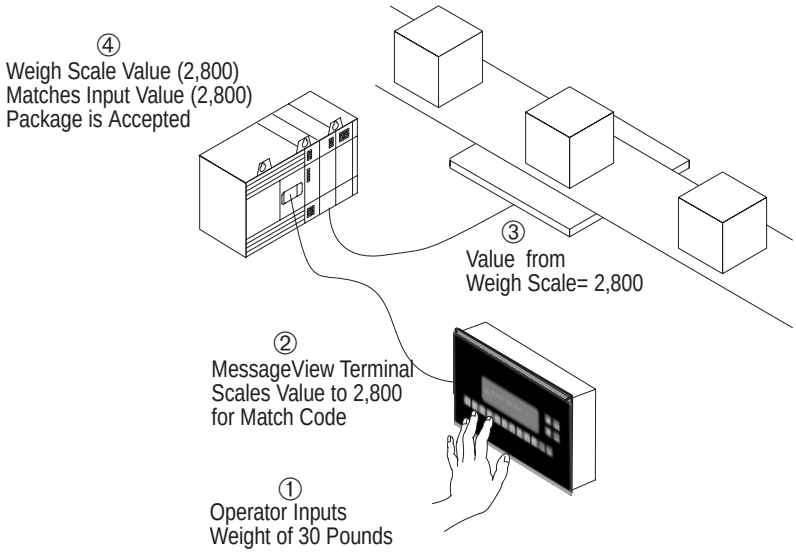
- If it sends numeric data, it may enter the data in a Numeric Entry variable where it may be scaled if necessary.
- If it sends alphanumeric data, it enters the data in an ASCII Entry variable, where it cannot be scaled.

Example: Scaling a data entry variable

The offset (b) is specified as 2 and the scale (m) is specified as .01. If an operator enters a value of 30 for (y):

$$x = \frac{y - b}{m} = \frac{30 - 2}{.01} = 2800$$

The terminal sends a value of 2,800 to the controller, which compares it to the value from the weigh scale transducer:



Data Limits for a scaled variable

If a value exceeds the range for the selected data type, the terminal will display a “Value Not in Range” warning. When using scaling, it is a good idea to limit the minimum and maximum values an operator can enter. These values are set in the Tag Editor Form View.

The range for scaled values should be calculated before the Tag Form dialog is filled out. Use the following formula to determine scaled minimum and maximum values:

Maximum Input Value = Maximum Value for Data Type x Scale + Offset

Minimum Input Value = Minimum Value for Data Type x Scale + Offset

Example:

Scale = 1.8 and Offset = 32 (Fahrenheit to Celsius conversion)

Data type is Signed Integer (-32,768 to +32,767)

The minimum and maximum values an operator can enter without truncating:

Maximum Input Value = 32,767 x 1.8 + 32 = 59012

Minimum Input Value = -32,768 x 1.8 + 32 = -58950

Initial value of a scaled variable

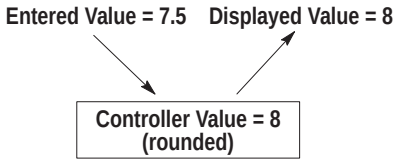
The initial value specified in the Tag Form dialog is written to the controller upon powerup or reset. This initial value is not scaled, so it must be entered in the units used by the logic controller.

For instance, assume the terminal uses °C and the controller uses °F. To initialize the terminal to a value of 32 °F, the initial value in the Tag Editor needs to be 32, not 0.

Precision and Rounding

The logic controller stores values only as integers. Digits to the right of the decimal are rounded off. However the terminal can scale decimal values to or from integer values.

In this illustration, the entered value of 7.5 is rounded up to 8. When this value is displayed or used in a mathematical formula, the result may be incorrect.



If decimal precision is needed, select appropriate values for scale and offset.

Example:

Use scaling to convert a decimal value from degrees Fahrenheit to degrees Celsius.

Equations for Scaling Example

$$\text{Controller Value} = \frac{\text{Entered Value} - \text{Offset}}{\text{Scale}}$$

Displayed Value = Controller Value x Scale + Offset

Fixed Decimal

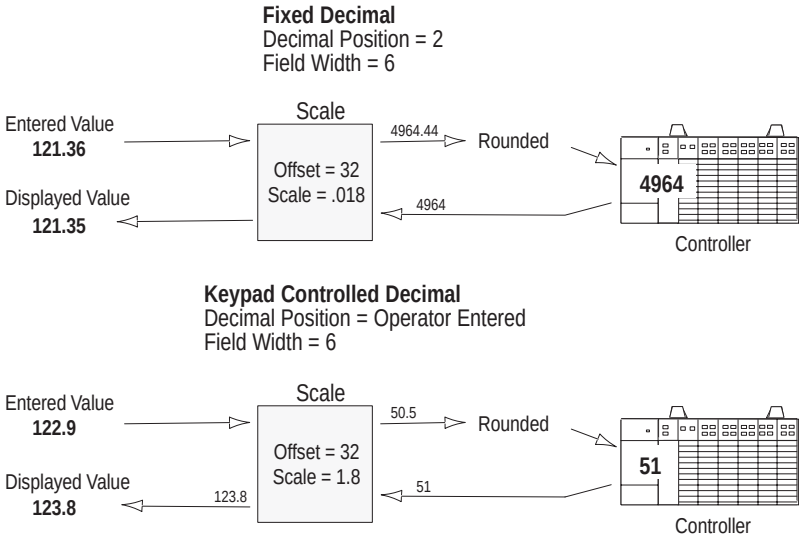
$$\text{Stored Value} = \frac{121.36 - 32}{0.018} = 4964.44 = 4964$$

Displayed Value = (4964 x 0.018) + 32 = 121.35

Keypad Controlled Decimal

$$\text{Stored Value} = \frac{122.9 - 32}{1.8} = 50.5 = 51$$

Displayed Value = (51 x 1.8) + 32 = 123.8



The decimal point is positioned to provide a display appropriate to the scaled value.

The terminal stores the full precision value and the controller stores the rounded value.

Note: The value stored in the terminal may be different than the value sent to the controller because of rounding that occurs during pre-scaling.

Communications Overview

This chapter covers the following topics:

- MessageView 421 terminal ports
- RS-232 Port communication
- ASCII Triggering commands
- Remote I/O communication
- Discrete I/O
- Block transfer.

MessageView 421 Terminal Ports

Each Message View 421 terminal has a standard RS-232 port on the Main Logic Board. It may also include an optional Remote I/O (RIO) Communications daughterboard card.

The MessageView terminal's two available ports are used as follows:

- The Remote I/O Port (optional) connects to a logic controller on a Remote I/O network.
- The RS-232 Port connects to:
  - the RS-232 port of a personal computer
  - other devices set up in the application to be used when the terminal is in Run Mode, which are listed on Page 5–3.

Remote I/O Port

Certain MessageView terminals have a Remote I/O Port installed (Catalog Nos. 2706-M1D1, -M1N1 and -M1F1). The RIO port is used for the sole purpose of communicating with:

- a logic controller, which runs the operation

The Remote I/O port of a MessageView terminal, when connected to a logic controller, is used to transmit and receive data utilizing discrete I/O and block transfer modes.

Each MessageView terminal is configured to match the device type and communication parameters of the Logic Controller in its Remote I/O system. The configuration is set up when the application is created, so a terminal may be used in a variety of systems according to the application downloaded into it. This will be discussed starting on Page 5–12.

RS-232 Port

All MessageView terminals incorporate an RS-232 port for serial communications.

Use the RS-232 port to connect the terminal to:

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.

RS-232 port: DF1 configuration

The RS-232 port of a MessageView terminal is used to transfer files to and from a computer using DF1 point-to-point communication protocol.

- DF1 parameters in the MessageView terminal used in point-to-point communications with a computer containing MessageBuilder software are predefined and non-configurable.
- DF1 parameters in the computer were defined when the INTERCHANGE Configuration Utility was installed. See Page 2–7.

DF1 parameters are given here for reference only.

Parameter:	DF1 Settings:
Baud Rate	19.2K
Parity	None
Data Bits	8
Stop Bits	1
Hardware Handshaking	None
Error Type	CRC

RS-232 port: Auxiliary Device configuration

If the terminal is to communicate with an Auxiliary Device (one of those listed on Page 5–3), you must configure the RS-232 port communication parameters for that device.

Configuration options will be discussed starting on Page 5–3, and configuration procedures starting on Page 10–9.

RS-232 Port Communication

The RS-232 port of the MessageView terminal may be used to communicate with:

- a personal computer running MessageBuilder (see Page 11–6) or the File Transfer Utility (see Page 11–15).
- an ASCII Triggering Device (see the list on Page 5–7)
- an ASCII Input Device (see the list on Page 5–6)
- one or more slave devices (see the list on Page 5–6)
- a master device (see the list on Page 5–8)

Switching RS-232 settings in the MessageView terminal

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.

Example: The terminal's RS-232 port's last communication was from a bar code reader (an ASCII Input device). Next, the HE Stack file has to be uploaded to a personal computer that has MessageBuilder software running. The terminal operator must configure the RS-232 port as a MessageBuilder port to establish communication with the computer.

To do this, the operator enters the terminal's Front Panel Editor. The first menu item, "Change Port To: MessageBuilder" allows the operator to switch to the MessageBuilder port settings in one quick step without entering half a dozen communication parameters. After the HE Stack file has been uploaded, the terminal operator switches the "Change Port To:" menu item to ASCII Input and returns the terminal to Run Mode.

Important: If you find your computer cannot communicate with the MessageView terminal, verify that the RS-232 port is set to the correct communication device.

If the Front Panel Editor “Change Port To:” menu item reads:

- “Change Port To: MessageBuilder”, the RS-232 port is currently set to communicate with the Auxiliary Device the application is designed for.
- “Change Port To: [ASCII Triggering, Slave Device, Slave Port, or ASCII Input]”, the RS-232 port is currently set to communicate with the computer.

  The name in the “Change Port To:” menu item is the type of Auxiliary Device the application is designed for.

Note: The physical connection between the computer and the terminal does not have to be maintained after an application is downloaded. If it is not maintained, the connection must be re-established when a file is to be uploaded to or downloaded from the computer.

RS-232 Port Power-Up attribute

The application sets the MessageView terminal’s RS-232 port to power up to one of the two possible settings when the application starts running:

- MessageBuilder parameters
- auxiliary port parameters.

The Port Power-Up attribute is configured in the Advanced tab in the Terminal Setup dialog. See Page 10–16.

MessageView terminal hardware/firmware

MessageBuilder software has been designed to configure the RS-232 port parameters for communication with a device compatible with the MessageView terminal’s hardware/firmware configuration.

If the terminal’s RS-232 port is used to communicate with:

- the computer only, the port parameters do not have to be configured in the application. They are predefined in the INTERCHANGE Configuration Utility (see Page 5–2) and the MessageView terminal’s firmware.
- an Auxiliary Device while the application is running, the port parameters must be configured in the application to match those of the auxiliary device.

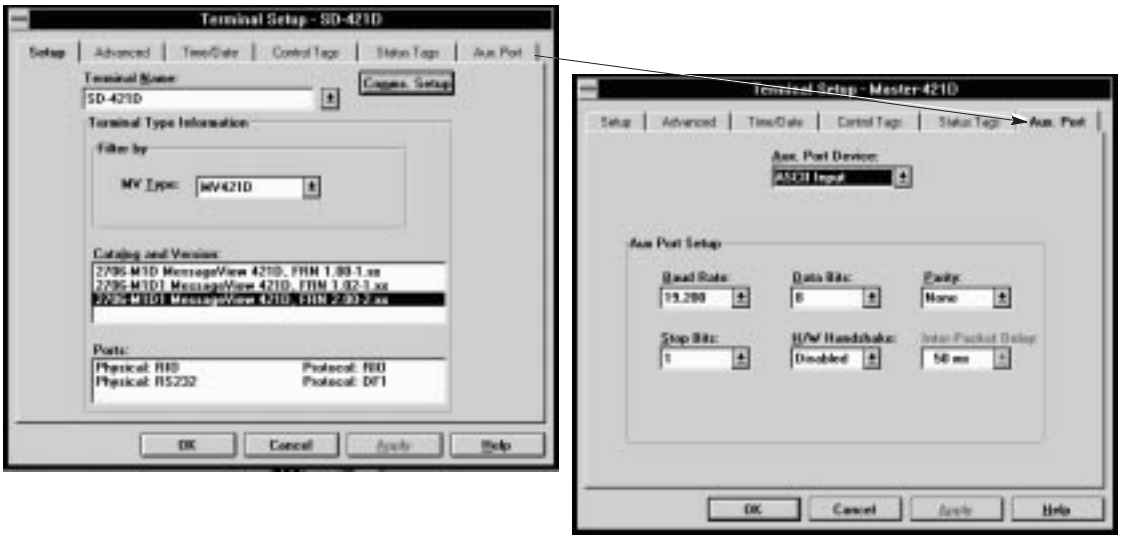
The RS-232 port parameters may be configured in the Terminal Setup dialog using either the Aux. Port tab (see Page 10–27) or the Comms. Setup button (see Page 10–9). This table shows where to configure parameters for each type of terminal.

Catalog #	Firmware Protocol	RS-232 Port Parameter Configuration	Remarks
2706-M1D	ASCII Triggering Slave Device	Comms. Setup button	Terminal controlled by an ASCII Triggering device. Terminal acting as a Slave Device.
2706-M1N	ASCII Triggering	Comms. Setup button	Terminal controlled by an ASCII Triggering device.
2706-M1F	ASCII Triggering	Comms. Setup button	Terminal controlled by an ASCII Triggering device.
2706-M1D1	Remote I/O Slave Port ASCII Input	Comms. Setup button Aux. Port tab	Terminal controlled by a logic controller through the Remote I/O port. Connection to an ASCII Input device. Connection to a slave device or devices.
2706-M1N1	Remote I/O Slave Port ASCII Input	Comms. Setup button Aux. Port tab	Terminal controlled by a logic controller through the Remote I/O port. Connection to an ASCII Input device. Connection to a slave device or devices.
2706-M1F1	Remote I/O Slave Port ASCII Input	Comms. Setup button Aux. Port tab	Terminal controlled by a logic controller through the Remote I/O port. Connection to an ASCII Input device. Connection to a slave device or devices.

Using the Aux. Port tab

The Aux. Port tab in the Terminal Setup dialog allows you to configure an alternate set of communication parameters for the RS-232 port on the terminal.

This tab is used when the terminal specified in the Terminal Setup dialog has a Remote I/O port (Catalog Nos. 27006-M1D1, -M1N1 or -M1F1).



The Auxiliary Device uses the same RS-232 port that MessageBuilder software uses to download the application, but the port parameters may be different.

- See Page 10–27 for the procedure to configure the RS-232 port to communicate with one of the auxiliary devices listed below.
- See Page 5–3 for an outline of the procedure the terminal operator uses to switch from one set of port parameters to the other.

Note: Parameters for communication between the MessageView terminal and the computer are built into the terminal firmware, and cannot be edited.

ASCII Input device

A MessageView terminal with a RIO daughterboard and firmware that supports ASCII Input, can accept data from an ASCII Input device. Data from such a device is entered into ASCII or Numeric Entry variables embedded in a message.

ASCII Input devices include the following:

- bar code scanner
- AdaptaScan™ reader
- PLC® port 0.
- other devices with serial communication that can send ASCII data.

To set up a terminal to communicate with an ASCII Input device, see Page 10–27.

Slave Port (master device)

A MessageView terminal with a RIO daughterboard and firmware that supports slaving can command up to 126 slave devices. The slave devices display messages as they are commanded. Each slave device may be addressed individually, or a command may be sent to all slaves at the same time using node address 127.

Slave devices include:

- Allen-Bradley Dataliner™ DL10
- Allen-Bradley Dataliner™ DL20
- Allen-Bradley Dataliner™ DL50
- MessageView 421D terminal without a daughterboard (Catalog No. 2706-M1D). See Page 5–8 for the 421D Slave Device.

To set up a terminal as a master device to communicate with slave devices, see Page 10–27.

Using the Comms. Setup button

The Comms. Setup button in the Terminal Setup dialog allows you to configure communication parameters for the RS-232 port on the terminal.

This dialog may be accessed only when the terminal specified in the Terminal Setup dialog is a slave device or is controlled by an ASCII Triggering device (Catalog Nos. 2706-M1D, -M1N and -M1F).

When the MessageView terminal communicates with an ASCII Triggering device or acts as a slave to a master device, it uses the same RS-232 port that Message Builder software uses to download the application, but the port parameters may be different.

- See Page 10–9 for the procedure to configure the RS-232 port to communicate with one of these devices.
- See Page 5–3 for an outline of the procedure the terminal operator uses to switch from one set of port parameters to the other.

Note: Parameters for communication between the MessageView terminal and the computer are built in to the terminal firmware, and cannot be edited.

ASCII Triggering device

An ASCII Triggering device is used to trigger messages on the MessageView terminal using RS-232 ASCII protocol.

ASCII Triggering devices include:

- SLC 5/03™, SLC 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.

To set up a terminal to communicate with an ASCII Triggering device, see Page 10–9.

For the format of commands to and from an ASCII Triggering device, see the section starting on Page 5–8.

MessageView 421D Slave Device

A MessageView 421D Slave Device (Catalog No. 2706-M1D) is a MessageView terminal with no daughterboard and no numeric or function keys. It is shipped with an application loaded. The application supplies the alphanumeric fonts and graphic characters needed to display the messages sent from the master device.

The slave terminal may receive commands from any one of the following slaving devices (masters):

- Allen-Bradley Dataliner™ DL20
- Allen-Bradley Dataliner™ DL40
- MessageView™ 421D terminal whose firmware supports slaving
- MessageView™ 421N terminal whose firmware supports slaving
- MessageView™ 421F terminal whose firmware supports slaving
- Allen-Bradley Industrial Computers.

To set up a terminal as a Slave Device, see Page 10–9.

For the format of commands to a slave device, see the section starting on Page 7–42.

ASCII Triggering Commands

Messages to the MessageView terminal

Trigger a message with [Ctrl-T]

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

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 in the terminal. 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 in the terminal.

- 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 in the terminal.

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

  Note: Variable position is the position of the variable in the message, counting from left to right. If the message contains only one entry variable, the position is 1.
- 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 to inform the ASCII Triggering device that the operator has pressed 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 inform the ASCII Triggering device that the operator has pressed a function key.

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 informs the ASCII Triggering device that the function key has 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]. The terminal uses the [Ctrl-N] command 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 to the ASCII Triggering device 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.

Remote I/O Communication

On a remote I/O network, the MessageView 421 terminal appears like any other Remote I/O rack. Configure the terminal to occupy all or part of a single rack, up to 128 I/O.

Two types of addresses can be assigned to application variables on a Remote I/O network:

- discrete - a single input or output bit address
- block transfer - a series of contiguous word addresses transferred as a unit.

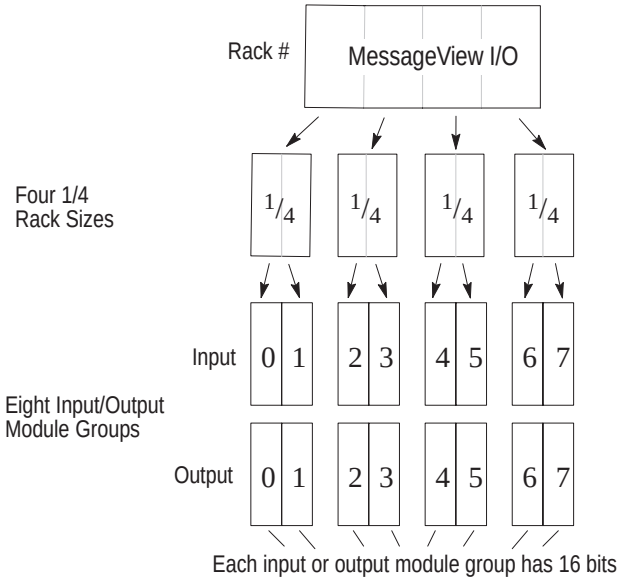
Important: Plan the addresses before starting to create the application for most efficient use of memory.

The direction of data transfer over a remote I/O link is from the point of view of the logic controller:

- entry variables are BTR (block transfer read): data from the terminal to the controller
- display variables are BTW (block transfer write): data from the controller to the terminal.

Module groups

The MessageView 421 I/O can occupy $^1/_4$, $^1/_2$, $^3/_4$, or a Full rack. Each $^1/_4$ rack contains two module groups (32 input and 32 output bits). An entire rack contains 8 module groups that are numbered from 0 to 7.



If a MessageView terminal does not occupy a full rack, another terminal or device can be configured for the unused modules. For example:

Parameter	MessageView 421	Other Rack Device
Rack Number	1	1
Starting Module Group	0	6
Rack Size	$^3/_4$	$^1/_4$
Last Chassis?	No	Yes

Important: Two I/O systems can **not** share the same module.

The maximum rack number that can be assigned to the terminal depends on the type of logic controller.

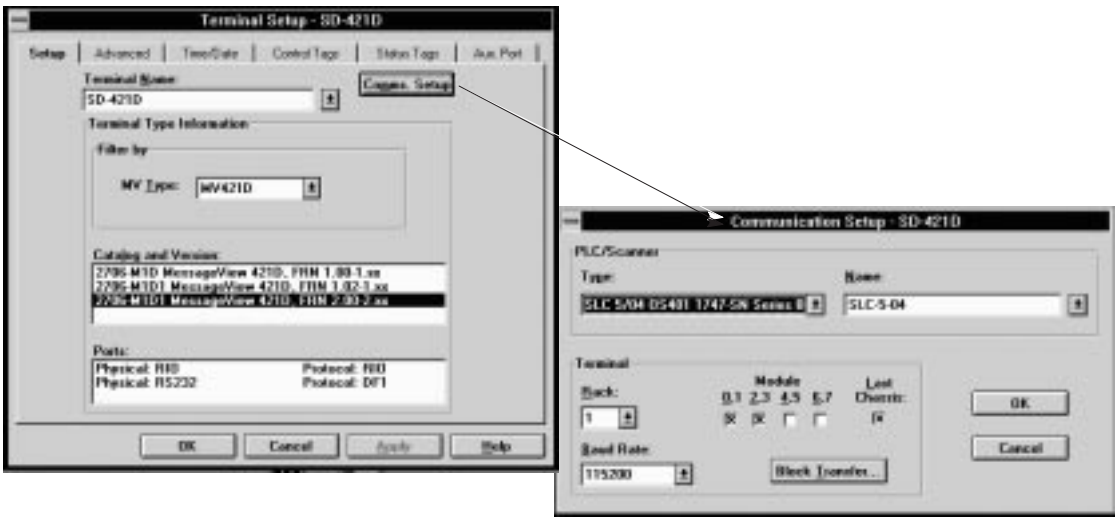
Controller Types

The Remote I/O port can communicate with any of the PLC or SLC controller/scanner types listed below.

Controller/Scanner Type	Lowest Rack #	Highest Rack #	Supports Block Transfer?
IBM PC 6008-SI VME 6008-SV DEC QBUS 6008-SQ	0	7	Yes
PLC 5/11	3	3	Yes
PLC 5/15 PLC 5/20	1	3	Yes
PLC 5/25 PLC 5/30	1	7	Yes
PLC 5/40	1	17_{octal}	Yes
PLC 5/60 PLC 5/80	1	27_{octal}	Yes
SLC 1747-SN Series A	0	3	No
SLC 1747-SN Series B	0	3	Yes
Other 1771-SN Subsystem	1	7_{octal}	No

Remote I/O Communication parameters

Define RIO communication parameters in the Communication Setup dialog, which is accessed from the Terminal Setup dialog.



The options in this dialog are:

Remote I/O Device	Remote I/O Parameter	Description	Options
PLC/Scanner	Type	Type of controller that will communicate with the RIO port of the terminal	See Table on Page 5–14
	Name	Unique name assigned to controller. Enter it in the Node Name field in the Tag Editor	User assigns it
Terminal	Rack Address	Unique node address of MessageView 421 terminal on Remote I/O link	$0\text{-}76_{octal}$
	Module Group	Module groups occupied by the terminal in the rack; they must be next to one another	0,1 2,3 4,5 6,7
	Baud Rate	The baud rate of the RIO link determines the maximum cable length.	57.6 K to 10,000 ft. 115.0 K to 5,000 ft. 230.4 K to 2,500 ft.
	Last Chassis	Specifies whether the terminal occupies the highest assigned module group within the rack	Yes, No

To configure Remote I/O:

Parameter	Range	Default
Rack Number	0 to 76_{octal} (0 to $62_{decimal}$)	02_{octal} ($4_{decimal}$)
Rack Size	$^1/_4$, $^1/_2$, $^3/_4$, Full	Full
Last Chassis	Yes, No	Yes
Starting Module Group	0, 2, 4, 6	0
Pass-Through	*(This option is not available.)*	
Block Transfer	Enabled, Disabled	Disabled
Baud Rate	57.6K, 115.2K, 230.4K	57.2K
Number of Files in Block Transfer	1	
Number of Bytes in Block Transfer	128	Use Block Transfer Length
Number of Bytes of Discrete I/O	16	

Discrete I/O

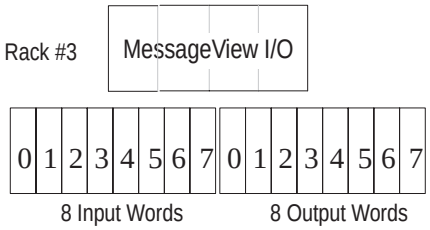
Discrete I/O addresses communicate directly with the PLC (or other logic controller). Discrete I/O is recommended for any critical values that you want updated immediately.

The number of I/O points in the PLC rack is limited to 16 bytes (128 bits). In planning a large application assign tag addresses of variables that are less time-sensitive to block transfer. Use copies of the Tag Address worksheet in Appendix H to help design the application.

Example: Discrete I/O

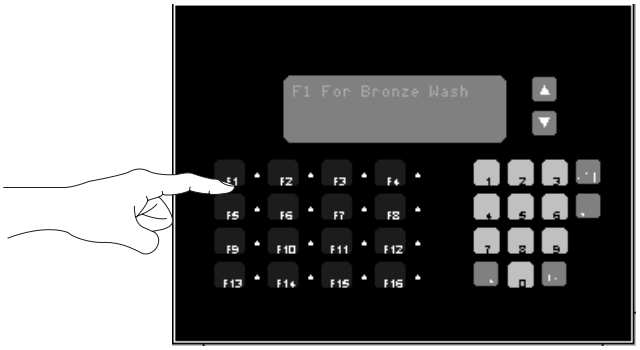
The MessageView 421 terminal occupies rack #3 in which its starting module group is 0. The F1 key is addressed as I:030/03, and the bit trigger for the next message as O:031/01.

① The MessageView monitors the status of the 8 input words in its rack assignment.



② The PLC ladder program monitors address I:030/03.

③ The operator presses F1. The terminal sets a bit in the address assigned to that function key and clears the message.



④ The ladder program reads bit 03 at address I:030/03.

	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
030	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0

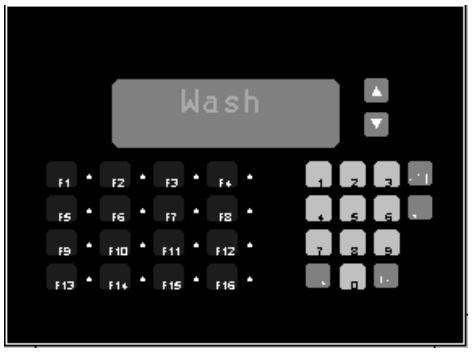
Input Word

⑤ The ladder program sets bit 01 at address O:031/01.

	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
031	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0

Output Word

⑥ The terminal reads the address, which is assigned as a bit trigger for the next message. The next message is displayed.



Block Transfer

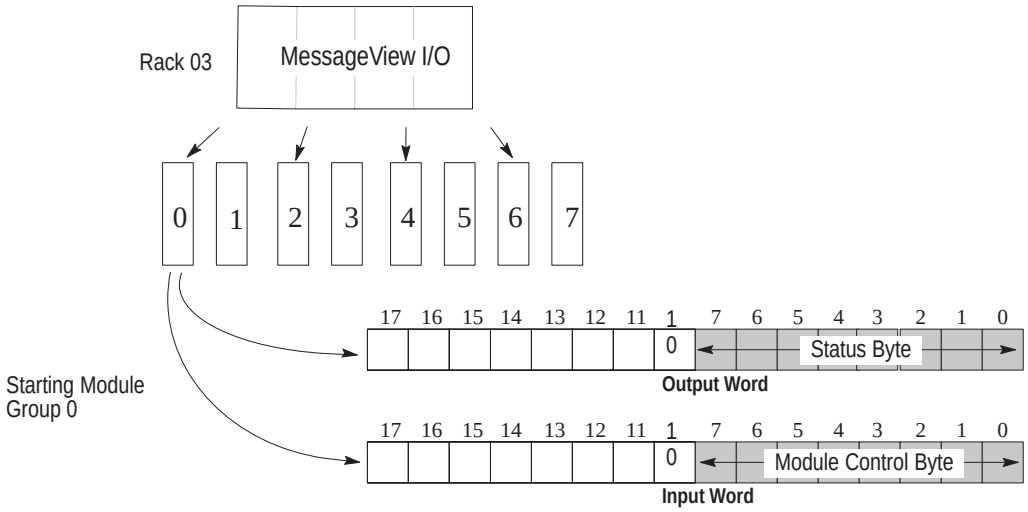
The RIO interface on the MessageView RIO daughterboard supports the transfer of blocks of data between a PLC and a MessageView 421 terminal.

Note: Some logic controllers do not support block transfer. Check the user manual for the controller used in the system.

Using Block Transfers

Block transfers are assigned to a single byte of input data (module control byte) and output data (module status byte) within the rack assigned to the terminal. These two bytes control the operation of the block transfer and are no longer available for discrete I/O.

These bytes always occupy the low byte of the lowest module group in the terminal rack assignment. For example, if the starting module group is 0:

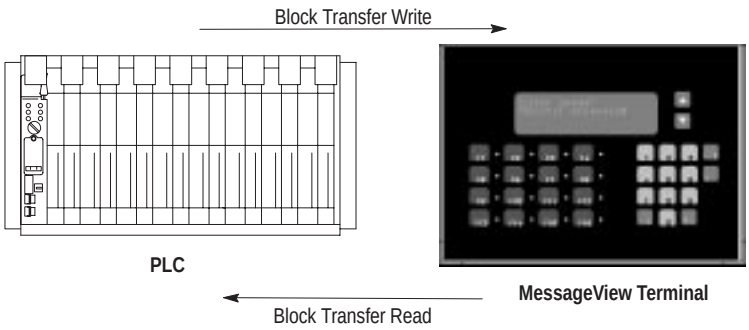


No matter how many block transfers are assigned (1 to 10), one byte is reserved in the input and and one in the output rack.

Note: Two copies of the worksheet in Appendix H are used for Discrete I/O (input and output). Be sure to block off the status byte and module control byte in these worksheets if the application uses block transfer.

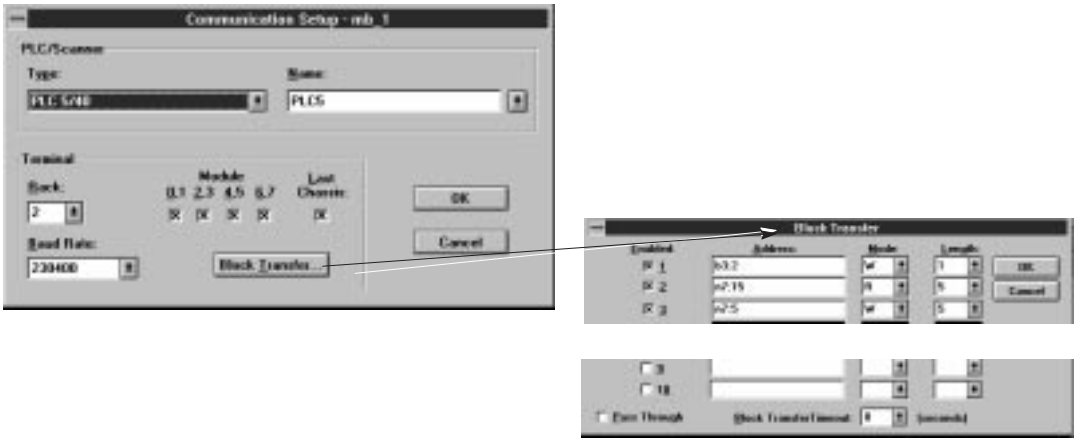
Block transfer directions are in reference to the PLC:

- Block Transfer Reads (BTR) are inputs to the PLC. They are used to transfer data from data entry variables on the MessageView terminal.
- Block Transfer Writes (BTW) are outputs from the PLC. They are used to transfer data to data display variables on the MessageView terminal.



Configuring a Block Transfer

Configure MessageView 421 block transfers using the Block Transfer dialog which is accessed from the Communication Setup dialog.



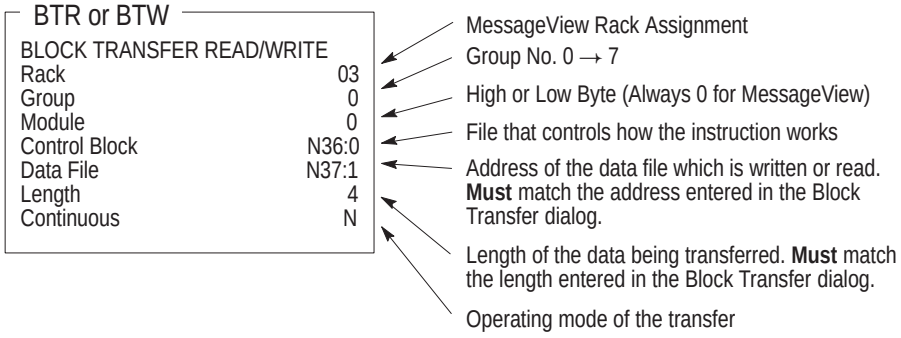
Note: When a block transfer starting address is assigned in the Block Transfer dialog, the size of the block (up to 64 words) is also specified. The terminal uses the block size (length) to identify the data segment being transferred.

Each block transfer must have certain information specified:

- **Enabled:** whether the block transfer enabled or disabled.
- **Address:** the starting address to read or write the block transfer.
- **Mode:** select R for a Read operation or W for a Write operation.
- **Length:** how many words are transferred (1 to 64). The MessageView terminal uses the length to identify data blocks.

  Each block transfer read must be a unique length and each block transfer write must be a unique length. However a read block can be the same length as a write block.

  A length of 63 is reserved for Pass-Through.
- **Pass-Through:** *(This option is not available at this time.)*
- **Block Transfer Timeout:** specifies a timeout value for transferring applications using Pass-Through. A value of 0 disables the timeout.
- Each block transfer requires a corresponding Block Transfer Write or Block Transfer Read instruction in the ladder program for the controller. The Data File and Length settings **must** match the Data File and Length settings in the Block Transfer dialog.



Helpful Hints for Block Transfers

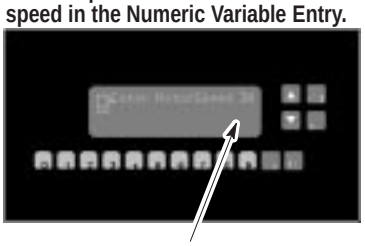
Keep these suggestions in mind when using block transfers:

- Read and Write Blocks can use the same address.
- Read and Write Blocks may overlap partially or completely.
- Since Remote I/O scanners usually make only one block transfer in one I/O scan:
  - improve response times by compacting the data into the fewest possible blocks (no unused bits)
  - if the Function Key Return Message Number global attribute is enabled, make sure that the tags for function keys are in the same block as the Function Key Return Message Number tag.

Example: Block Transfer Read

In this example, the MessageView 421 terminal is assigned to rack #3 and its starting module group is 0. A Numeric Variable Entry variable has the address N7:2, and its value is read by the logic controller in a part of the data block being transferred.

① The operator enters 30 as the motor speed in the Numeric Variable Entry.



Entry variable with
Tag Name “Motor_Speed” to
Address N7:2

② Using information supplied by the Communication Setup utility, the MessageView determines the position of the data and the block size.

③ The MessageView terminal places the data in the first word of a 4 word block.

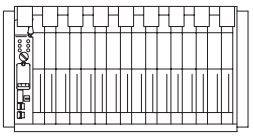
Word 1	30
Word 2	
Word 3	
Word 4	

④ The PLC reads the 4 word block of data and stores it at the Data File address.

BTR

BLOCK TRANSFER READ		(EN)
Rack	03	Read From MessageView
Group	0	
Module	0	
Control Block	N36:0	
Data File	N7:2	Data To PLC
Length	4	
Continuous	N	

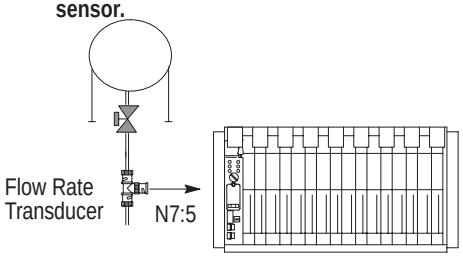
⑤ The value (30) entered on the MessageView terminal display is now stored at N7:2.



Example: Block Transfer Write

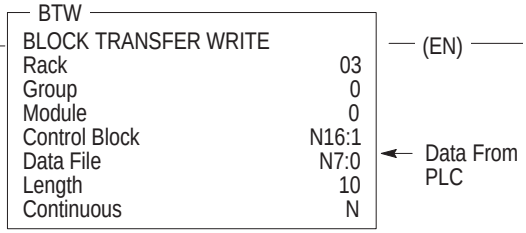
In this example, the MessageView 421 terminal is assigned to rack #3 and its starting module group is 0. A Numeric Variable Display variable has the address N7:0, and its value is written by the logic controller to a portion of the data block being transferred.

① The PLC receives and stores data from an input device, in this example a flow sensor.



Tag Name = Flow_Rate

② The PLC ladder logic program initiates a block transfer of a data block (10 words) containing the display data.

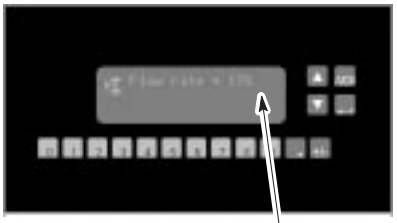


③ The MessageView terminal receives the data and determines the starting address where the data is written by matching the block size with the address entered in the Communication Setup utility.

④ The MessageView now carries a copy of that segment of the logic controllers data table.

	10 WORDS
N7:0	
N7:1	
N7:2	
N7:3	
N7:4	
N7:5	**Flow Rate Data**
N7:6	
N7:7	
N7:8	
N7:9	

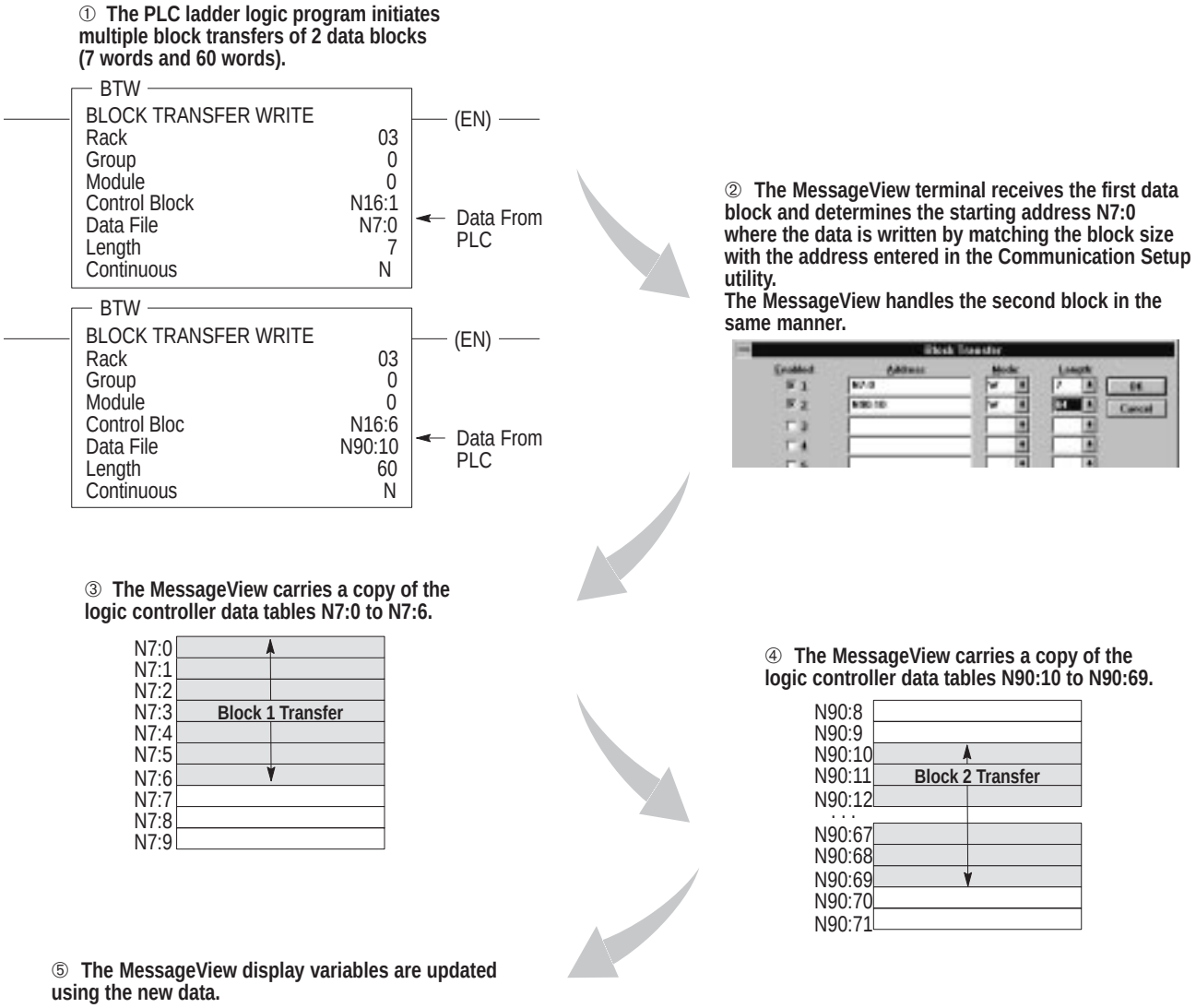
⑤ The MessageView updates the Numeric Variable Display using the data from the controller.



Display variable with
Tag Name “Flow_Rate” from
Address N7:5

Example: Transferring Multiple Blocks

Multiple block transfers use a single channel (single Module Control and Status Bytes defined). Each block transfer read or block transfer write must be a unique length since the MessageView terminal uses the block size to determine the starting location of the read or write. The following is an example of a block transfer write of two blocks.



Note: If interfacing to an Allen-Bradley PLC2, single block transfer is recommended.

Working with Application Files

This chapter covers the following topics:

- Starting MessageBuilder
- Creating a new application
- Opening an existing application
- Saving an application
- Renaming and describing an application
- Closing an application
- Exiting MessageBuilder.

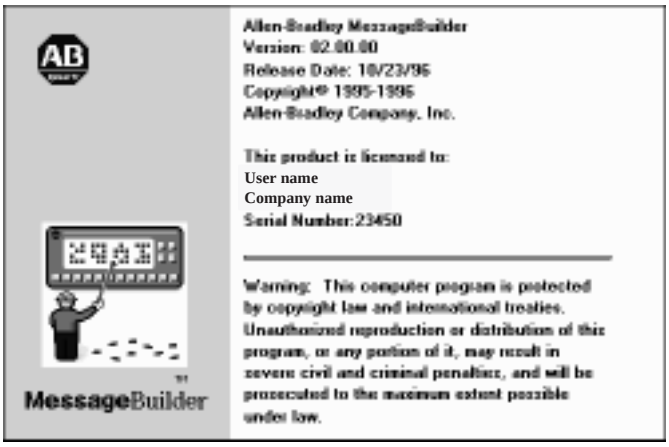
Starting MessageBuilder

MessageBuilder opens like any other Windows application.

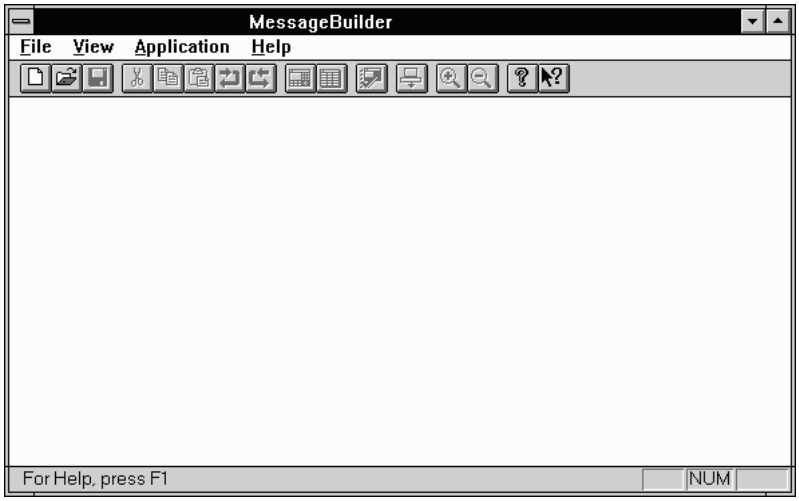
To start MessageBuilder:

1. At the DOS prompt, type **win** and press ENTER.
2. Double-click the MessageBuilder group icon in the Program Manager. Then double-click the MessageBuilder icon to open the welcome screen showing copyright and release information.

   Or use the Run command in the File menu of the Program Manager, and type the path and file name.

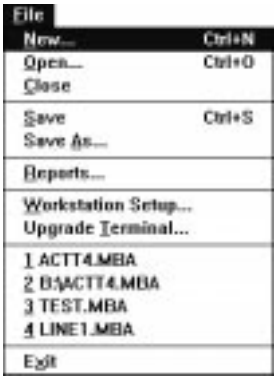


The MessageBuilder window opens, ready to display a new or existing application file.



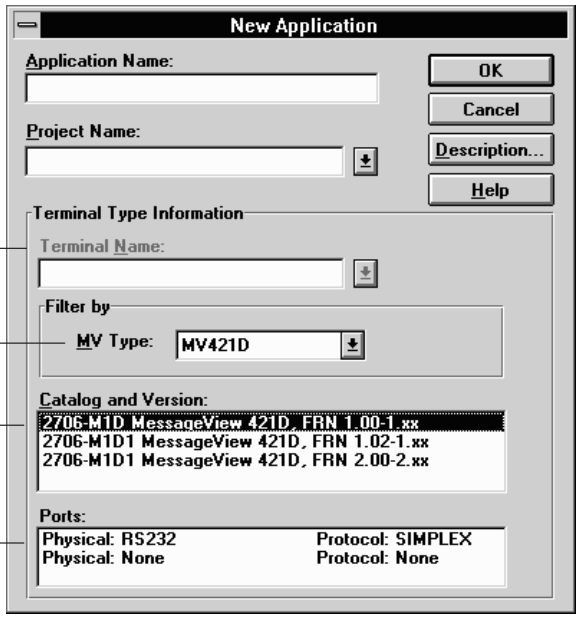
Creating a New Application

A MessageBuilder application is a unified set of messages with the associated tags and devices. To create a new application, specify the name of the application and its project.



1. Click the New File tool on the Standard Toolbar to open the New Application dialog.

Or choose New from the File menu.



Greyed until a valid Project Name is entered

Terminal Type list box

List box of available Catalogs and Versions of the selected Terminal Type

Communication ports and protocols of the selected Catalog and Version

Note: When you select an **MV Type** option, its three catalog numbers are displayed. When you highlight one of the **Catalog and Version** options, its **Ports** are displayed.

2. In the **Application Name** box, enter a name up to 32 characters long. This name cannot start with a number or contain spaces.

   When MessageBuilder software saves the application, the default file name is the first 8 characters of the application name, with the extension .MBA. Page 6–6 explains how to save under a different file name.

3. In the **Project Name** box, select or enter a name up to 32 characters long. This name cannot start with a number or contain spaces.

   The **Project Name List** box gives all existing project names. Select one of these if the new application will use the same tag definitions and devices as a previous application.

   The Project Name links the application with a database of tag definitions and device (terminal and controller) information.

☞ *To copy, rename, or delete devices from a project, see Page 9–1.*

ATTENTION: If a project name must be changed in MessageBuilder software, or a project deleted from the software, **DO NOT** use a DOS or Windows command. Use the Project Management command on the Application menu.

☞ *For an existing terminal, the dialog displays defined terminal information.*

4. Define the specific MessageView 421 terminal that will run the application. If the terminal device with its catalog information is not already associated with the project, add it now.
   - In the **Terminal Name** box, select or enter a name (up to 32 characters long) for the terminal.
   - In the **Filter by MV Type** list box, select the correct MessageView terminal type for the application.
   - In the **Catalog and Version** list, highlight the catalog number and firmware version (FRN x.xx) installed in the terminal.

     Note: Make sure that the Catalog number and Firmware Version selected matches the Catalog number and Firmware Version of the terminal in which the application will reside.

   - The **Ports** box displays the physical ports and protocol for the selected terminal type. This box is read only.
5. If a description will be useful, select the **Description** button to open another dialog. See Page 6–8.
6. Select the **OK** button to begin creating the MessageBuilder application.

Opening an Existing Application

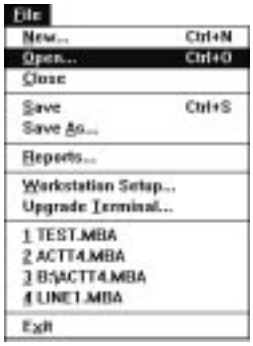
To reopen an application:

The bottom of the File menu lists up to four application files, the ones that were opened most recently. To reopen one of them, simply select it.

Note: The paths for files in the File menu are given if different from the current directory. In the File menu illustrated at the left below, one file (ACCT4.MBA) was opened from a floppy disk and saved to the current directory.

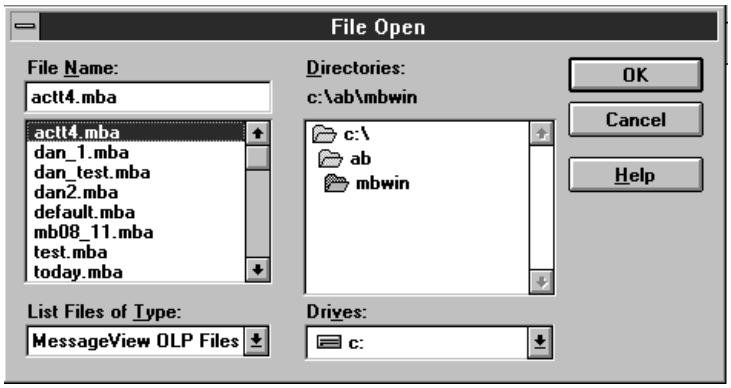
Note: Devices or tags in a reopened application may not match those in its assigned project. See Page 9–8 for details on how to reconcile the project with its application.

To open an application file that is not listed on the File menu:



1. Click the File Open tool on the Standard Toolbar to display the File Open dialog .

   Or choose Open from the File menu.



   The **File Name** list box shows all MessageBuilder application (MBA) files in the current drive and directory.

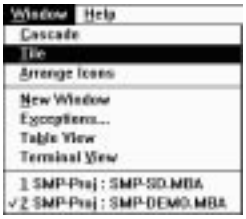
   - To locate a file on another drive, select the drive name in the **Drives** list box.
   - To locate a file in another directory, use the scroll bars if needed to locate the correct directory in the **Directories** list box, or find it through its parent directory. Select the directory name.

2. Double-click the name of a file in the **File Name** list box to select and open the file.

- Or highlight the name and select **OK.**
- Or enter the path name and name of the file in the **File Name** box and select **OK**.

Multiple applications open

MessageBuilder supports multiple open applications. Create new application files or open existing files as needed.



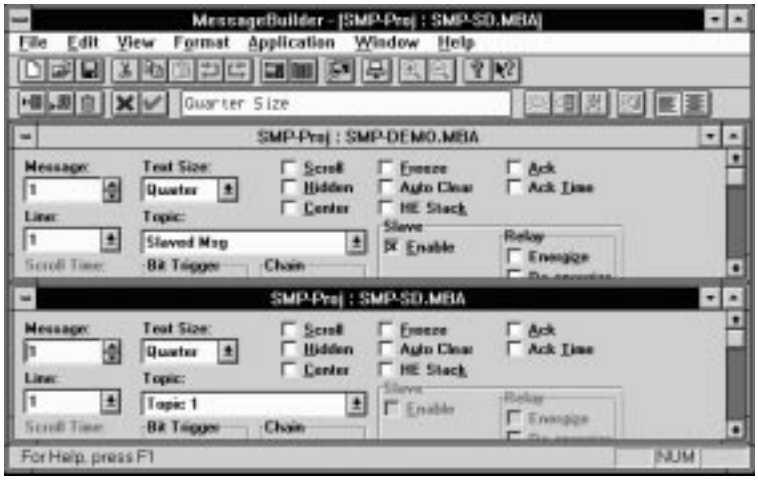
When you open a second application, it is cascaded over the first. Use the commands on the Window menu to toggle between Cascade and Tile. The active application in the Window menu is checked.

To activate a different open application, either:

- select it on the Window menu
- click on its title bar.

The application with its title bar highlighted is the active one. The Edit Box, menu commands and tool icons apply only to the active application.

This illustration shows tiled applications with the lower one active.



If too many applications are open for available computer memory, this dialog appears. Close some applications before opening any more new ones.

Saving an Application

The File menu provides two commands for saving an application:

- Use the **Save** command to save the application to the default drive and directory, overwriting the previous version.
- Use the **Save As** command to save a revised application with a new name so the previous version is not overwritten.

Important: It is good practice to save an application frequently.

The first time an application is saved, the Save As dialog opens so the file can be named.

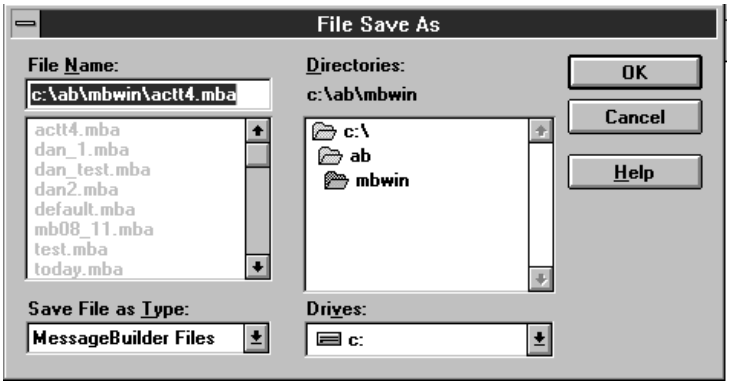
To save an existing application file:

- click the Save File tool on the Standard Toolbar
- choose Save from the File menu.

MessageBuilder replaces the previous version of the application on disk with the new version.

To save a new or existing application with a new name:

1. Choose Save As from the File menu to open the Save As dialog.

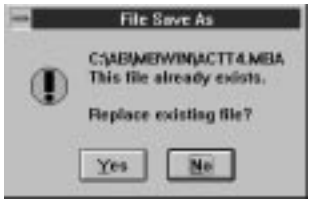


The first time an application is saved, its default name is the first 8 letters of the application name.

2. Accept the default or enter another name (1 to 8 characters long) in the **File Name** box. MessageBuilder automatically adds the .MBA filename extension to the name.

   Note: You may save the file with another file type (filename extension). However do not use .MVA, which is used for the translated form that runs on a MessageView terminal.

3. If a file has already been saved to the name entered in the **File Name** box, this dialog appears:



   Select **Yes** to overwrite the file, and **No** to return to the File Save As dialog.

4. To save the file to a different directory, select the directory name in the **Directories** box. To save it to another drive, select a drive name in the **Drives** box.

5. Select the **OK** button.

   The name under which you save the application becomes the default for the next save (Save or Save As command).

Note: MessageBuilder tracks the date/time and version of an application when it is saved. Choose Description from the Application menu to see this information.

When an application has been edited but not saved, its name in the title bar has an asterisk.

Renaming and Describing an Application

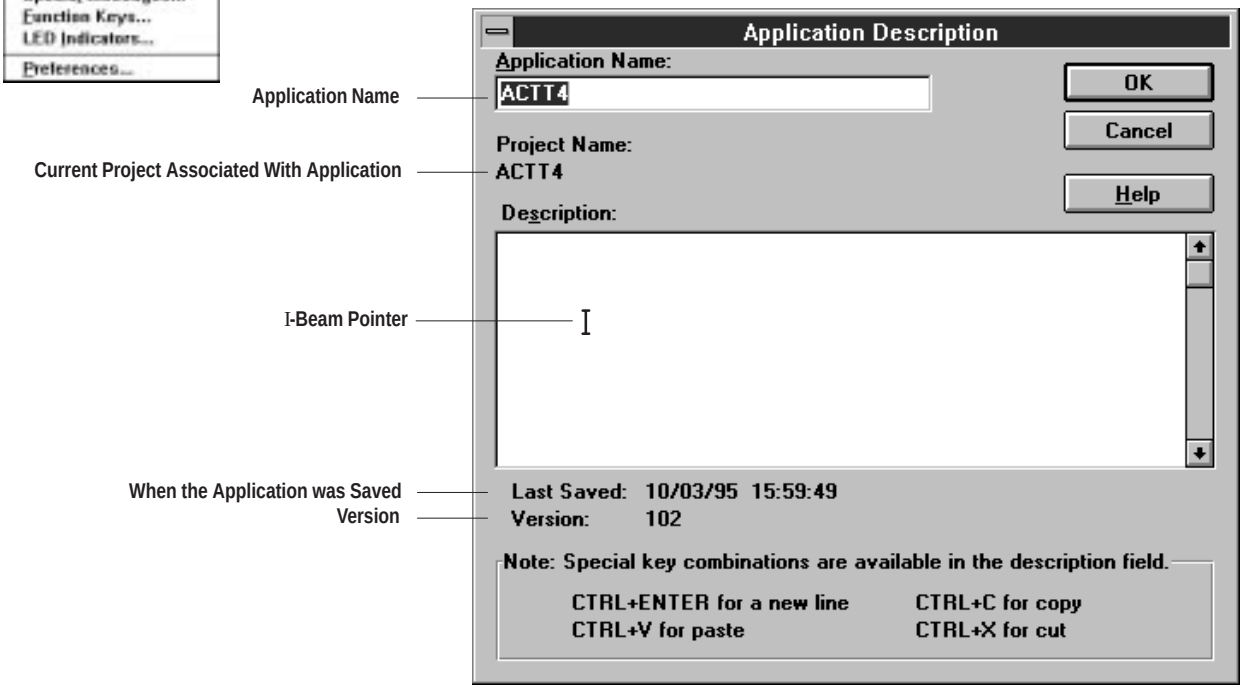
Use the Description command on the Application menu to:

- enter an application description which can be included in a report
- view the version number of an application and when it was last saved.

To open the Application Description dialog:

- choose Description from the Application menu
- select the Description button in the New Application dialog.

Note: The Application Name and Project Name do not appear when the Description dialog is accessed from the New Application dialog.



This dialog gives the date and time of the last save, and the current version. Each time an application file is edited and saved, the version number is automatically incremented.

To enter or edit an application description:

Important: The description is downloaded to the terminal with the application, so it uses terminal memory.

1. Select the **Description** box and type the description. The text automatically wraps.

   To change the location of the insertion point in the **Description** box, move the I-beam pointer or use the arrow keys. The insertion point moves with the text when the scroll bar is used.

   - To start a new line, press CTRL+ENTER.
     Note: ENTER alone closes the Description dialog.
   - To delete text, drag pointer over the text to highlight it, then press BACKSPACE or DELETE.
   - To replace text, drag pointer over the text to highlight it, then type the new text.
   - To add text, position the cursor where you want to insert text and then type the new text.
   - Use any of the standard Window editing functions to edit text.

2. When done, select **OK** to close the dialog.

To edit a description in a different application:

Change the application name in this dialog if you want to enter or revise a description in a different application than the open one. This change does not affect the open application.

1. Select the **Application Name** box. Highlight the text, then type a new name.
2. Create or edit the dialog for this application file.
3. Select **OK** to close the dialog.

Closing an Application

To close an application file:

- double-click the control-menu box on the Application dialog, or
- choose Close from the File menu.

If you made changes to the application since the last save, MessageBuilder gives you the option of saving the file before closing it.

Exiting MessageBuilder

When you exit MessageBuilder to the Windows desktop, all open applications are closed.

Note: Always exit MessageBuilder software before turning off the computer.

To quit MessageBuilder:

- double-click the Control-menu box on the MessageBuilder window, or
- choose Exit from the File menu.

If any applications are open and unmodified, they are closed automatically.

If any or all were modified since the last save, a dialog for each application asks if it should be saved before closing.

Select **Yes** to save the application and exit, **No** to exit without saving, and **Cancel** to return to MessageBuilder.

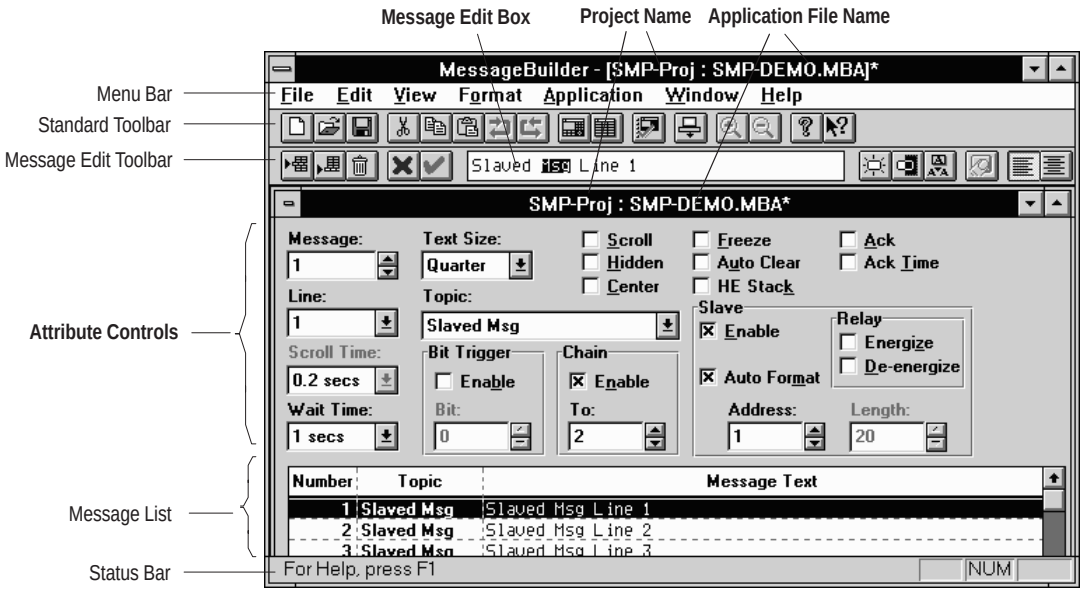
Creating Messages

This chapter covers the following topics:

- The Message Editor dialog
- Working with messages
- Selecting messages
- Editing messages
- Set Preferences
- Message Editor Terminal View
- Embedded variables and graphics
- Numeric variable display
- ASCII variable display
- Numeric variable entry
- ASCII variable entry
- Message attributes
- Slaving
- Function keys
- LED attributes
- Special Messages.

The Message Editor Dialog

When a new or existing application is opened, the Message Editor Table View appears. It is the main window for application design.



In the Message Editor Table View you can:

- create and revise individual messages
- enter and revise attributes for each message
- work with many commands and tools which are available only when an application is open.

The Message List at the bottom of the Message Editor Table View lists all messages in the application.

- The Number column displays the Message number, which is used as the Value Trigger.
- The Topic column displays the message subgroup to which the message is assigned.
- The Message Text column displays the text and placeholders that make up the message text.

Working with Messages

Each message in an application is created and edited individually.

To create a new message:

MessageBuilder software has four ways to create a message and add it to the Message List.

To append a message at the end of the Message List:

- click the Append Message tool on the Message Edit Toolbar
- select New Message in the Edit menu.

To insert a message **above** the currently highlighted message:

- click the Insert Message tool on the Message Edit Toolbar
- select Insert Message in the Edit menu.

Each new message is highlighted in the Message List, and is displayed in the Message Edit box. It has default text of “Message #X”, where X is its Message Number.

To delete a message:

Highlight the message in the Message List, then:

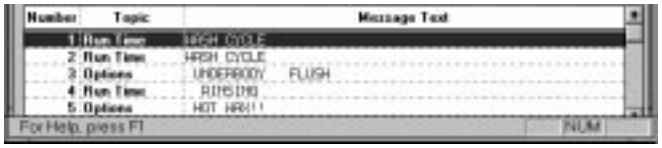
- click the Delete Message tool
- press **ALT** + **DEL**
- select Delete Message on the Edit menu.

To restore a deleted message:

- click the Undo tool
- press **CTRL** + **Z**
- select Undo on the Edit menu.

Selecting Messages

When a message is selected in the Message List, the message text appears in the Message Edit box, and its attributes are displayed in the Attribute Controls section of the Message Editor Table View.



Selecting a message for editing

Select (highlight) a message in the Message List:

- manually
- by using the Find command in the Edit menu.

Important: The attribute box labelled Message changes the message number of the selected message. It does **not** select a message in the Message List.

To select a message manually:

If the message is visible, highlight it. A highlighted message is selected and its message text appears automatically in the Message Edit box. To highlight (select) a message:

- click on the message
- select the Message List and use the up or down arrow keys.

Note: Double-click a message to highlight the message's text in the Message Edit box.

If the message is not visible, select the Message List and scroll it up or down through the list until the message is visible, using:

- arrow keys
- Page Up or Page Down keys
- the vertical scroll bar.

The Message List vertical scroll bar appears when there are more messages than the application window can display at once.

Note: Make the Application window wider if necessary to display this scroll bar.

To select a message using the Find command:

1. Press **CTRL** + **F** to open the Find Message dialog box.
   Or select the Find command in the Edit menu.

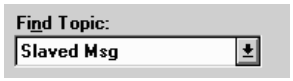
2. Under **Search** select **Up** or **Down** for the direction of search.
3. To specify the type of search, select one of the options under the **Search For** command. The **Find ...** box changes its title to suit the option.
4. Enter text or a value in the **Find ...** box as follows:

- **Text** – in the **Find Text** box, type a text string, which can be any part of a message's text. Include spaces and punctuation. Variables and graphics cannot be part of the search.

  Note: The **Match Case** option is active only when Text is selected. Select it if capitalization is important in the search string; otherwise Search is not case-sensitive.

- **Message Number** – in the **Find Message Number** spin control:
  - type the message number
  - use the spin control to display the desired number.

- **Bit Trigger Bit** – in the **Find Bit Trigger Bit** spin control:
  - type the number of the bit trigger for the message
  - use the spin control to display the desired number.



- **Topic** – in the **Find Topic** list box, select the list box and highlight the correct topic.

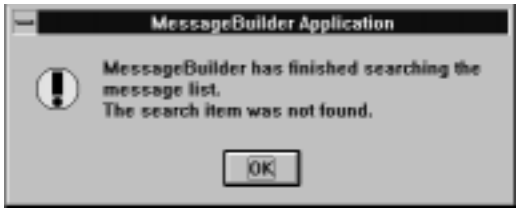
  Note: **Search For Topic** locates messages scattered through the application. If you want to edit all messages assigned to a topic, they can be brought together in the Message List by Sorting.

5. Select the **Find Next** button.

   When a match is found, the matching message is highlighted in the Message List and appears in the Message Edit box.

   If a match is not found by the bottom (top) of the list, the Find function wraps to continue the search through the rest of the list.

   If there is no match, a dialog appears:



6. Select the **Find Next** button again to locate the next message that meets the search criteria. The Find Message dialog remains open until **Close** is selected.
7. Select the **Close** button to return to the Message Editor Table View at the last found message.

Editing Messages

To edit a message, select it by highlighting it in the Message List. The selected message's text appears in the Message Edit box. A vertical bar appears at the insertion point.

To highlight text in the Message Edit box:

- in the Message List, double-click on the message to highlight the whole message in the Message Edit box
- in the Message Edit box, click and drag to highlight all or part of a message
- in the Message Edit box, double-click to highlight the word or placeholder under the cursor
- in the Message Edit box, hold down the **SHIFT** key and use the left or right arrow keys to highlight all or part of the message.

Creating a text string

To add or insert text in a message:

1. Click in the Message Edit box where the text is to go.

   Or select the Message Edit box and move the insertion pointer using the left/right arrow keys or the Home/End keys.
2. Start typing.

Important: Highlighted text is overwritten.

Accented characters

Characters that do not appear on the computer keyboard, such as accented characters used in European languages, may be added to any MessageBuilder message. These characters and their ASCII numbers are given in the ASCII tables in Appendix I.

When ASCII and Extended ASCII characters are added to MessageBuilder messages, they are treated as text characters. See Page 7–21 for a discussion of ASCII Control characters.

To use ASCII characters in a message:

1. Set the insertion pointer in the Message Edit box where the ASCII character is to go.
2. Look up the ASCII character on Page I–2 or I–3, and note decimal number.

   The range of valid ASCII and Extended ASCII characters is 032 to 0255. Characters numbered 0 to 31 are reserved for control characters.
3. Press ALT + #, where # is the decimal representation of the character preceded by a zero. For instance:

- 065 represents the letter **A**.
- 055 represents the number **7**.
- 0160 represents the accented character **á**.
- 0248 represents the degree sign °.

The character appears in the Message Edit box at the insertion point.

To cut a text string:

1. Set the insertion pointer in the Message Edit box at the start or end of the text to be cut.
2. Drag the mouse pointer over the text to highlight it.

   Or hold down the **SHIFT** key and use the left or right arrow keys.

3. Click the Cut tool.

- Or press **CTRL** + **X**.
- Or select Cut from the Edit menu.

The selected text is removed and is copied to the Windows clipboard. It may be Pasted to the same or another message.

To copy a text string:

1. Set the insertion pointer in the Message Edit box at the start or end of the text to be copied.
2. Drag the mouse pointer over the text to highlight it.

   Or hold down the **SHIFT** key and use the left or right arrow keys.
3. Click the Copy tool.

- Or press **CTRL** + **C**.
- Or select Copy from the Edit menu.

The selected text remains highlighted and is copied to the Windows clipboard. It may be Pasted to the same or another message.

Note: If it is to be pasted in the same message, move the insertion pointer to remove the highlighting.

To paste a text string:

1. Cut or copy the text string to the Windows clipboard.
2. If necessary, use the Find command or scroll bar to bring up the destination message in the Message Edit box.
3. Set the insertion pointer in the Message Edit box.
4. Click the Paste tool.

- Or press **CTRL** + **V**.
- Or select Paste from the Edit menu.

Note: A text string may be pasted repeatedly. Any cut or copied text string remains on the clipboard until:

- some other text string is cut or copied
- Microsoft Windows is closed.

Note: Text can be copied to or from another Windows application using these techniques.

Important: When a **text string** is Copied, Cut and Pasted, or Replaced, any embedded variables or graphics are lost in transit. They must be recreated using the Embedded Variable tool or commands. However, see the next section to copy a **message** and its attributes.

Copying and Pasting a message with its variables and attributes:

1. Select the source message in the Message List.

2. Click the Copy tool to copy the message, including its text, embedded variables and attributes, to the Windows Clipboard.

   Or select Copy from the Edit menu.

Important: Make sure that the insertion pointer is not in the Message Edit box, and that text in the Message Edit box is not selected.

If text is highlighted in the Message Edit box and then copied, the Message Paste dialog will have just the Text Only option active. In other words, if you highlight and copy part or all of the message in the Message Edit box, the text is pasted into the destination message, but its variables and attributes are not.

3. Create a destination message, see Page 7–2.

   Or highlight an existing message in the Message List, which will be replaced by the copied message.

Important: Make sure that the insertion pointer is not in the Message Edit box, and that text in the Message Edit box is not selected.

When the insertion pointer is in the Message Edit box, the Paste command simply copies the text string into the destination message. The Message Paste dialog does not appear.

4. Click the Paste tool, and the Message Paste dialog appears.

   Or select Paste from the Edit menu.

The dialog displays the destination message number and the text string copied in the Windows clipboard.

5. Select one of these options:

Option:	Message Text:	Embedded Variables:	Attributes:
Text Only	Copied	n/a	n/a
Text with Embedded Variables	Copied	Copied	n/a
Attributes Only	n/a	n/a	Copied
All	Copied	Copied	Copied

6. Select OK to implement the choice.

Replacing a text string in a message or messages

1. Press **CTRL** + **H** to bring up the Replace dialog.

   Or select Replace in the Edit menu.

2. Enter the **Find Text** string and the **Replace Text** string.

   Find Text and **Replace Text** can **not** include graphics or variables. However they may have spaces and punctuation.

3. Select the **Match Case** check box if capitalization is important in the Find Text string.
4. Select one of the **Search** radio buttons to choose whether the search should go up or down through the Message List.
5. Select **Find Next** and then for each message found, decide whether to replace the text string.

   Or select **Replace All** and the text string is replaced automatically in every message where it occurs.

Storing changes to the current message

To store changes to a message, do one of the following:

- Click the Store Message tool to store and update the edited message and its attributes into the highlighted message in the Message List.
- Highlight a different message in the Message List. Before a new message appears in the Message Edit box, changes to the previous message are stored.

To cancel all changes in the current message:

Click the Cancel Changes tool to return the message in the Message Edit box to the last time it was stored. Changes include additions, deletions or edits to attributes, embedded variables and text.

Undoing and Redoing editing changes

Undo reverses all editing changes, including changes in the message's attributes, to the currently selected message. It can even restore a deleted message.

To Undo changes:

- Click on the Undo tool.
- Or press **CTRL** + **Z.**
- Or select Undo on the Edit menu.

Until the message has been stored once, the Undo tool or command is greyed out. After it has been stored, additions or cuts to the message are reversed one at a time until the Undo tool or command is greyed out again.

Redo reverses the effects of an Undo, restoring the editing and attribute changes to the message.

To Redo the changes:

- Click on the Redo tool.
- Or press **CTRL** + **Y.**
- Or select Redo on the Edit menu.

The message's Undo changes are restored, one item at a time, until the Redo tool or command is greyed out again. Even if another message is highlighted, the last message that had changes undone is returned to the Message Edit box.

Sorting messages

1. Select Sort on the Edit menu to open the Sort Messages dialog.

2. To specify which attribute of the messages in the Message List to sort on, select one of the radio buttons under the **Sort On** command.

- **Message Number** arranges messages in numerical order.

  Each message keeps its own message number in a Sort, so you can restore the original list by Sorting on Message Number.
- **Trigger** arranges messages in order of the address of their bit triggers. Messages without bit triggers appear first in the list in their original order.
- **Text** arranges messages in order by the initial item. Priority goes in order to:
  - a variable
  - a space
  - a number
  - a letter.
- **Topic** places messages with the same topic together.

  Note: If you want messages to be sorted within the topic, do a preliminary Sort on the other attribute(s) before sorting on Topic.

3. Select **Master List** to retain this sort as a default when the application is closed and reopened.

   If Master List is not enabled, the Sort is used temporarily while editing. In fact, a number of Table Views can be displayed at the same time with different sort orders for their Message Lists.
4. Select **OK** to perform the Sort. Messages are rearranged in the Message List according to the option chosen.

Renumbering messages

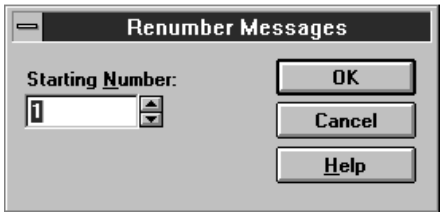
ATTENTION: When you renumber a message or messages, recheck chained messages. They must be edited if they refer to a number that was changed.

Message numbers may be changed in two ways.

- To change the number of a message, select the **Message** attribute.

  Use the up/down arrow to display a new number for the highlighted message, or enter a value in the spin control, then click the Store Message tool.
- To change the numbers of all messages in the Message List, select Renumber on the Edit menu to bring up a dialog:



In the Renumber Messages dialog:

1. Type the number the Message List should start with.

   Or use the spin control to display the correct number.
2. Select OK to return to the Message Editor Table View.

All messages in the Message List are renumbered in order following the initial number.

Note: This command simply renumbers messages, it does not change their order in the Message List. However it may be used after a Sort command to get the numbers back in sequence.

Topic

The **Topic** attribute allows messages in an application to be organized or grouped by subject matter or function.

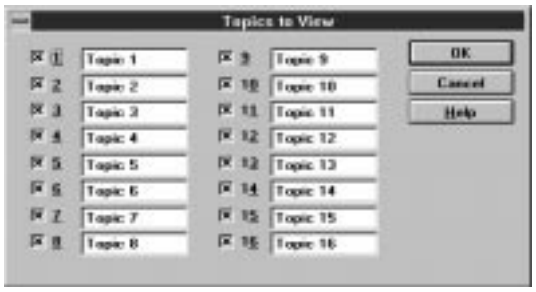
Use the **Topic** list box to assign a topic to each message; default is Topic 1. Assign all messages concerned with one aspect of the application to the same topic.

You can Sort messages by topic. See the Sort option on Page 7–11.

To rename topics:

Rename any or all topics used in the application. The new text can have up to 12 ASCII characters, including spaces.

1. Select Topics on the Edit menu to open the Topics to View dialog:



2. Select a text box and type an informative Topic name.
3. Repeat for every topic used in the application if desired.
4. Select **OK** to confirm the changes.

Every message that is assigned to a named topic will have that name shown in its Topic column in the Message List. In addition, the **Topic** dropdown list now has the new topic names.

To view only messages with the same Topic:

Messages assigned to the same topic may be scattered through the Message List. You can filter messages so the Message List displays only certain selected topics, to make editing more convenient.

1. Select Topics on the Edit menu to open the Topics to View dialog.
2. Deselect the check boxes beside topics that you don't want in the Message List at the moment.
3. Select **OK**. The Message List now displays only messages assigned to the selected topic(s).
4. Select all the check boxes to return to the original Message List.

Validating messages

MessageBuilder software validates applications and messages so that all attributes, variables, tags and devices are compatible with one another. Appendix D contains a list of Validation error messages.

- MessageBuilder software automatically validates all applications before they are downloaded.
- You may validate an application at any time by selecting Validate on the Application menu.
- You can also set up MessageBuilder to validate each message individually when it is stored or updated. See Page 7–15.

Note: Whenever you use the Paste command MessageBuilder validates the message, to make sure the destination terminal can support all its attributes. For instance, if you try to paste a message containing the Enable Slave attribute into an application intended to run on a terminal whose firmware cannot support Slave Port, you will be unable to do so.

Error messages

If an error or warning message appears while you are:

- creating or editing an application, see Appendix C.
- validating an application, see Appendix D.
- uploading or downloading an application, see Appendix E.

These appendices list the error messages and what to do for each one.

Set Preferences

When you set preferences, they remain as you set them even when the computer is shut down and restarted. Preferences include:

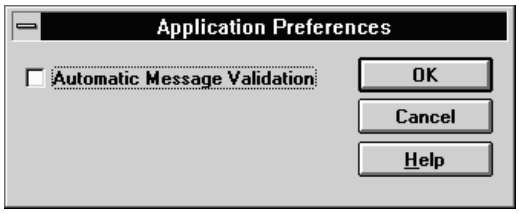
- validate individual messages
- change the colors that distinguish Flash text and Embedded characters in the Message Edit box.

To set preferences:

1. Select Preferences on the Application menu.
2. Select one of the options on the Preferences submenu.
3. Configure the option.
4. Select **OK** to return to the Message Editor Table View.

Message Options

This option allows you to decide whether MessageBuilder software should validate each message as it is created and stored. Select Message Options to display the Application Preferences dialog:



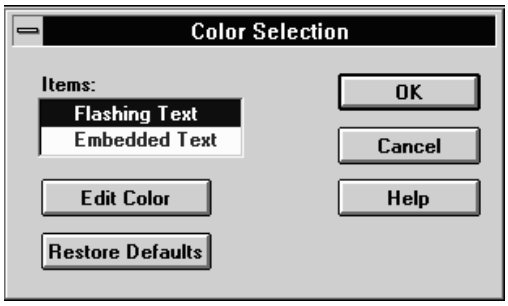
Enable or disable the Automatic Message Validation option by clicking in the check box.

Default is to disable this option.

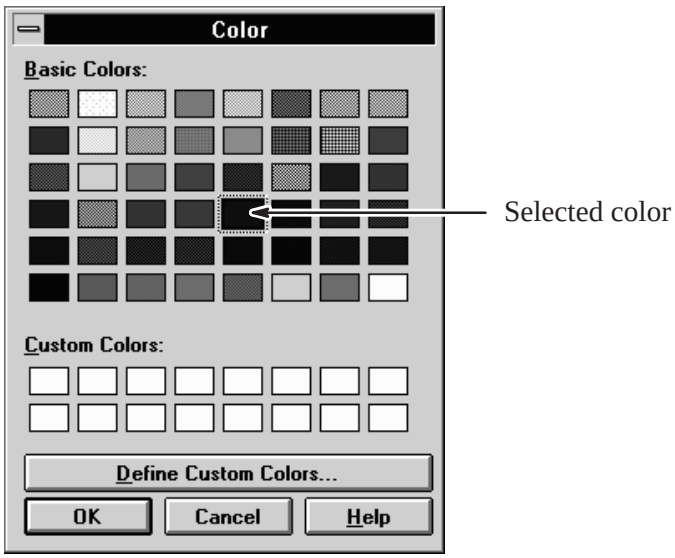
Colors

Flashing Text defaults to blue in the Message Edit box, and Embedded Text to red. Embedded text includes variables and graphics. Inverse Video appears with black and white inverted, so it does not need a special color to emphasize it.

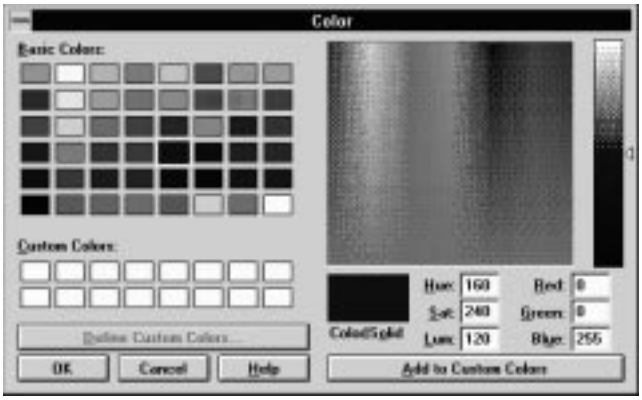
When you select this option, the Color Selection box is displayed:



1. Select the type of text whose color you would like to change.
2. Select the Edit Color button. The Color dialog appears with the current color selected.



3. If you prefer to create a custom color, select the **Define Custom Colors** button, and a color mixing dialog appears:



4. Experiment by selecting values in the boxes, or by moving the cursor about in the color panel.
5. When the current color suits you, select the **Add to Custom Color** button, and the color appears in the first Custom Color square on the other side of the dialog. Repeat as often as you like.

   Note: The original color remains selected until you change it.
6. Select the basic or custom color you prefer, and press **OK** to return to the Message Editor Table View.
7. If you later decide the default color was better, call up the Color Selection dialog and select the **Restore Defaults** button.

Message Editor Terminal View

It is useful to see how a message will look on the terminal display. To open the Terminal View:

- click the Terminal View tool
- select Terminal View on the Window menu.

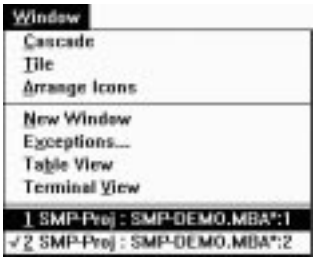
Note: The application is designed for a particular type of terminal. The Terminal View shows the front face of that terminal type.

The Terminal View displays the active (highlighted) message. If the Terminal View is the active window, when a message is being edited in the Message Edit box, the changes appear in the Terminal View display. (An active window has its Title Bar highlighted.)

- Text appears as entered, in its correct display mode size.
- Variables are represented by placeholders (see the table on Page 7–18).
- Graphics appear as they will appear on the terminal display.
- Scrolling is not supported in the Terminal View, but Flash and Inverse Video appear as they will on the terminal display.

Note: If the message is longer than the Terminal View can display, scroll through the message in the Message Edit box to see the remainder of the message. When the Terminal View is the active window, its display will follow the insertion point in the Message Edit box. That is, it will scroll through the message up to the cursor point.

To return to the Message Editor Table View, select:



- The Table View tool.
- The Table View command in the Window menu.
- At the bottom of the Window menu is a list of open windows. Two of them have the same name. The name that is checked represents the active Terminal View, so the Table View is represented by the name that is not checked (inactive). Select it to activate the Table View.

Zoom

The Terminal View can be resized in one of two ways:

- Click on one of the Zoom tools.

  The Zoom In [+] and Zoom Out [-] tools may be clicked up to four times. When the display reaches the maximum or minimum size, the tool you have used becomes inactive and is greyed out.

- Or select the Zoom command on the View menu to open a dialog:

Select a **Zoom To** percentage increase over the basic size. Select **OK**, and the Terminal View is resized.

Embedded Variables and Graphics

Variables of several kinds, and graphics, may be embedded in a message. Specifics and limitations of each type are given in Chapter 4; see page references in each section below.

When the insertion pointer is in the Message Edit box, open the Format menu or click the Embedded Variables tool to display a list of the types of variables, graphics and ASCII Control Characters.

This table represents the available Embedded Variables and Graphics.

Variable	Placeholder	Maximum Field Length	Decimal Point	Tags	Tag Format	Displayed by Slave Device?
Time	Sample time	10	n/a	None	n/a	Yes
Date	Sample date	10	n/a	None	n/a	Yes
Numeric Variable Display	#	12	Fixed/ Floating	Read	Signed or Unsigned Integer, BCD Scaled if required	Yes
ASCII Variable Display	A	32	n/a	Read	Character Array	Yes
Numeric Variable Entry	^	12	Fixed/ Keyboard Controlled	Write Optional: Notification **and** Handshake	Signed or Unsigned Integer, BCD Scaled if required Bit Bit	No
ASCII Variable Entry	E	32	n/a	Write Optional: Notification **and** Handshake	Character Array Bit Bit	No
ASCII Control Character	~	n/a	n/a	None	n/a	No
Graphics	Gr	n/a	n/a	None	n/a	Only if Ctrl-G is inserted before Gr

Placeholders

The number of symbols in the placeholder for a variable represents the field width specified in its dialog.

Placeholders for all the variables in this table are displayed in the Message Edit box in a different color from the rest of the text. You can change this color using the Preferences dialog. See Page 7–15.

A placeholder may be removed using the Backspace key or the Cut tool or command. It can be pasted only when the entire message is copied and pasted as described on Page 7–8.

Adding Time or Date to a message

Time and Date displays may be included in messages, but not more than one of each per message.

To add either time or date to a message:

1. Set the insertion pointer in the Message Edit box where the time or date display should be placed.
2. Click on the Embedded Variable tool to display a menu of choices.

   Or select the Format menu to display a similar menu.
3. Select Time Display or Date Display.

A placeholder for Time or Date is added to the message at the insertion point. The placeholder value is an arbitrary time or date which does not change.

When a message containing a Time or Date variable is displayed by a MessageView terminal, the terminal continually updates the Time or Date variable according to its Real Time Clock.

You can change the format in which time or date are displayed on the terminal. Use the Time/Date tab on the Terminal Setup dialog, see Page 10–18.

Note: A Time or Date placeholder may be removed using the Backspace key or the Cut tool or command. It can be pasted only when the entire message is copied and pasted as described on Page 7–8.

Slave devices

Slave devices support the display of Time and Date variables in messages. The time and date are updated while the slave message is actively displayed.

Adding graphics to a message

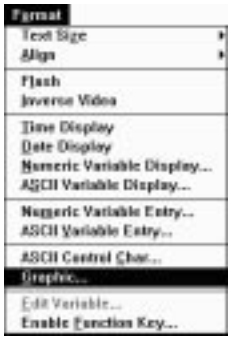
A set of 32 ISA bitmap graphics is supplied with MessageBuilder software. They illustrate components commonly used in manufacturing. See Page B–6 for the list of ISA symbols.

Graphics may be embedded in a message. Each graphic occupies an area 24 x 16 pixels: the area required by two half display mode characters. Since a message has a maximum of 100 characters, it can theoretically have up to 50 graphics symbols. Graphics cannot be resized.

Note: Graphics may be embedded only in **half text size display mode** messages. If they are used in quarter or full text size display mode messages, the application will not pass Validation.

To add a graphic to a message:

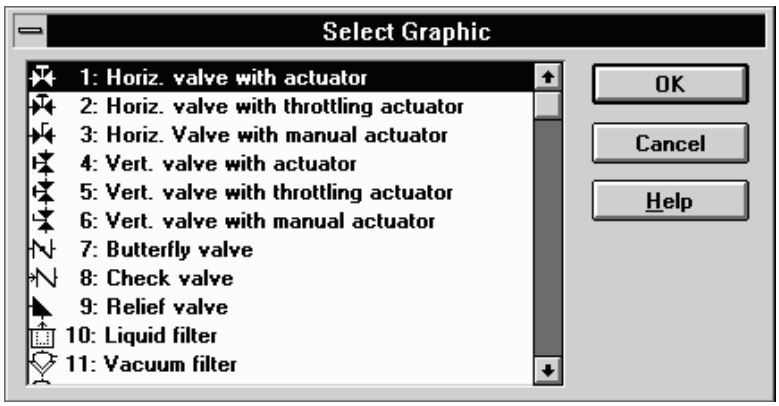
1. Set the insertion pointer in the Message Edit box where the graphic should be placed.



2. Click on the Embedded Variable tool to display a menu of choices.

   Or select the Format menu to display a similar menu.

3. Select Graphic to display the Select Graphic dialog which illustrates and names all 32 ISA symbols:



4. Use the scroll bar if necessary to display the required graphic symbol.
5. Double-click on the symbol.

   Or highlight the symbol and select OK.

A placeholder, Gr, is added to the message at the insertion point.

Note: A Graphic placeholder may be removed using the Backspace key or the Cut tool or command. It can be pasted only when the entire message is copied and pasted as described on Page 7–8.

Slave devices

Slave devices support and display graphics embedded in messages only if a Ctrl-G is inserted before each graphic. If this control character is not inserted, the terminal replaces the graphic with two spaces before sending the message to the slave.

Adding ASCII Control Characters to a message

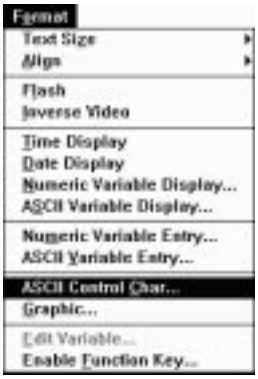
This option is used to embed ASCII control characters in a message. ASCII control characters are used to embed Control Mode and Display Mode Control Bytes in a message to be slaved. Slaving is discussed in the section starting on Page 7–41.

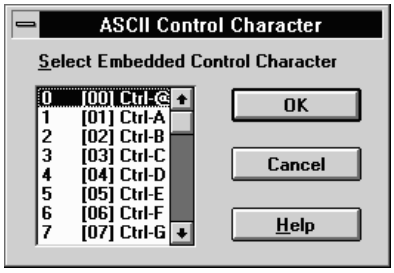
Important: This option is not used to embed ASCII and Extended ASCII characters, which include the accented characters used in European languages. See Page 7–6.

To add an ASCII Control Character to a message:

1. Set the insertion pointer in the Message Edit box where the Control Character should be placed.
2. Click on the Embedded Variable tool to display a menu of choices.

   Or select the Format menu to display a similar menu.
3. Select ASCII Char to display the ASCII Characters dialog:





4. Select the number corresponding to the ASCII character you want.

   See the ASCII Table on Page I–2. ASCII characters with decimal numbers 0 to 31 are reserved for control characters.
5. Select OK.

A placeholder, ~, is added to the message at the insertion point.

Note: ASCII characters with numbers 0 to 31 are reserved for control characters. If #32 or higher is selected in this dialog, it will be represented in the Message Edit box by a placeholder, even though that number does not represent a control character.

Note: An ASCII Control Character placeholder may be removed using the Backspace key or the Cut tool or command. It can be pasted only when the entire message is copied and pasted as described on Page 7–8.

Adding numeric and ASCII variables to a message

A message may contain embedded numeric and ASCII variables. They may be:

- **display** variables that display values in the logic controller
- **entry** variables that allow the terminal operator to enter values at the terminal via:
  - the front panel keypad
  - an ASCII Input device.

A message may have up to 10 display/entry variables, provided the total message length is not over 100 characters.

To add a variable to a message:

1. Set the insertion pointer in the Message Edit box where the variable should be placed.
2. Click on the Embedded Variable tool to display a menu of choices.

   Or select the Format menu to display a similar menu.
3. Select the name of the variable type to display its dialog box.

   Each type of variable has its own dialog box. They are discussed in detail in the next few pages.
4. Edit the attributes for the variable.
5. Select OK.

A placeholder is added to the message at the insertion pointer:

- # for Numeric Display variables
- A for ASCII Display variables
- ^ for Numeric Entry variables
- E for ASCII Entry variables.

The number of symbols in the placeholder for each entry and display variable represents the field width specified in its dialog.

Note: A Variable placeholder may be removed using the Backspace key or the Cut tool or command. It can be pasted only when the entire message is copied and pasted as described on Page 7–8.

To edit a variable:

1. Double-click on the placeholder to select the variable.
   Or click and drag the mouse pointer over the placeholder.
   Or hold down the **SHIFT** key and use the left or right arrow keys.
2. Click on the Embedded Variable tool to display the dialog for the selected variable type.
   Or select the Edit Variable command on the Format menu.
3. Revise as necessary.
4. Select OK.

Numeric Variable Display

A Numeric Variable Display provides a numeric readout of a value stored at a controller tag address.

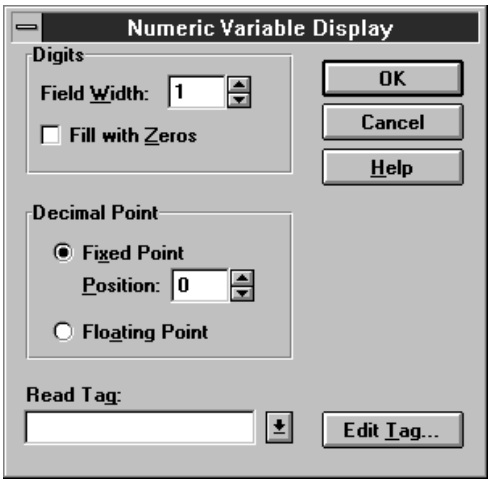
To create the variable, set the insertion pointer in the Message Edit box where the variable should be placed.

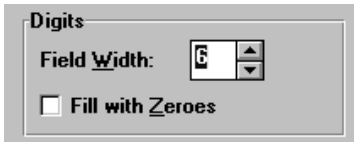
- Click the Embedded Variable tool on the Message Edit toolbar and select Numeric Variable Display on the dialog.
- Or select the Numeric Variable Display command on the Format menu.

To edit the variable, highlight the variable placeholder in the message.

- Click the Embedded Variable tool.
- Or select the Edit Variable command on the Format menu.

When a variable is created or edited, its dialog appears:



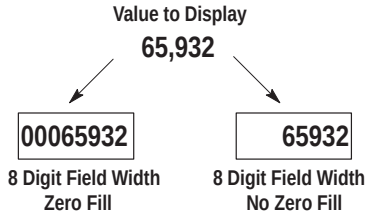


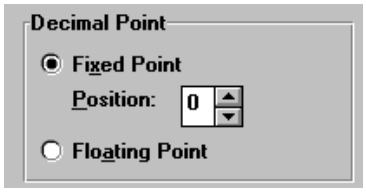
Digits

The **Field Width** spin control specifies the maximum number of characters (0 to 9, +, -, and .) that can appear in the display. If the value from the logic controller exceeds the specified field width, the field on the terminal display fills with >>> symbols.

Default is 12. To change the field width, select or enter a value in the spin control.

To fill empty data positions with zeros rather than leaving them blank, enable the **Fill With Zeros** check box. Default is disabled.

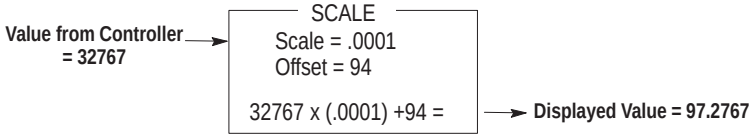




Decimal Point

A logic controller can store only integer values, so the value sent to a display variable is always an integer. However if the value is scaled, it may be displayed as a decimal. See the section on scaling beginning on Page 4–37.

The **Decimal Point** area specifies whether a scaled value displays with a fixed or floating point decimal.



- Select **Fixed Point** to position the decimal point 0 to 4 places to the left of the rightmost character. Select or enter the number of decimal places in the **Position** spin control. The decimal position must be less than the field width.

Select:	For This Position:
0	97
1	97.2
2	97.27
3	97.276
4	97.2767

- Select **Floating Point** to have the terminal position the decimal.

Read Tag

The **Read Tag** specifies the name of the tag address from which the **terminal** will **read** the display data. Select a tag from the Read Tag list box or type in a new Read Tag name. Valid data types for the read tag are unsigned/signed integer or BCD.

Note: It is easier to create an application if all its tags are entered in the Tag Editor before you start to write messages. If a new Read Tag name is used, its parameters must be edited when it is assigned.

If the variable will be scaled, needs different data limits, or has a new Read Tag assigned:

1. Put the insertion pointer in the Read Tag box.
2. Select the **Edit Tag** button to bring up the Tag Form dialog.

3. Edit the tag's attributes (see the section starting on Page 8–2).
4. Select **OK**.

Slave devices

Slave devices support the display of Numeric Display variables in messages. They are updated while the slave message is actively displayed.

ASCII Triggering devices

Tag Node Name and Address attributes are ignored by an ASCII Triggering device. They may be omitted when creating applications for use with such a device.

ASCII Variable Display

An ASCII Variable Display provides an alphanumeric readout of a ASCII text string stored at a controller tag address.

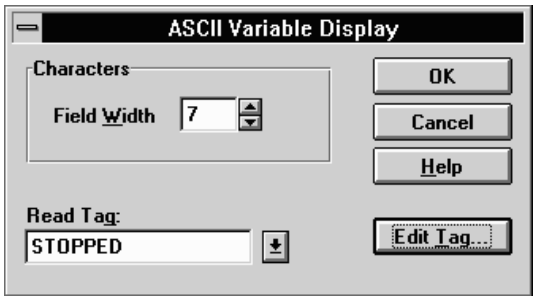
To create the variable, set the insertion pointer in the Message Edit box where the variable should be placed.

- Click the Embedded Variable tool on the Message Edit toolbar and select ASCII Variable Display on the dialog.
- Or select the ASCII Variable Display command on the Format menu.

To edit the variable, highlight the variable placeholder in the message.

- Click the Embedded Variable tool.
- Or select the Edit Variable command on the Format menu.

When a variable is created or edited, its dialog appears:



Characters

The **Field Width** spin control specifies the maximum number of alphanumeric characters that can be entered in the variable.

Note: The message will not pass Validation if the Field Width is greater than the Read Tag's Character Array value.

Default is 32. To change the field width, select or enter a value in the spin control.

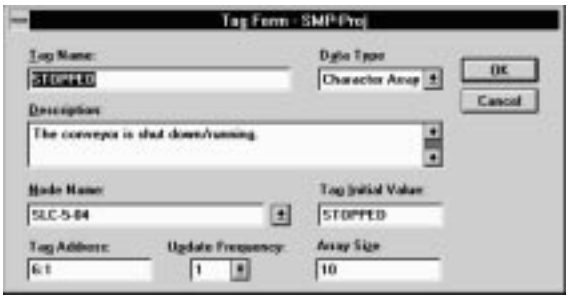
Read Tag

The **Read Tag** specifies the name of the tag address from which the **terminal** will **read** the display data. Select a tag from the **Read Tag** list box, or type in a new Read Tag name. The only valid data type for the read tag is Character Array.

Note: It is easier to create an application if all its tags are entered in the Tag Editor before you start to write messages. If a new Read Tag name is used, its parameters must be edited when it is assigned.

If the Read Tag is new, or its parameters need to be edited:

1. Put the insertion pointer in the Read Tag box.
2. Select the **Edit Tag** button to bring up the Tag Form dialog.



3. Edit the tag's attributes (see the section starting on Page 8–2).
   Note: Character Array size must be between 1 and 32.
4. Select **OK**.

Slave devices

Slave devices support the display of ASCII Display variables in messages. They are updated while the slave message is actively displayed.

ASCII Triggering devices

Tag Node Name and Address attributes are ignored by an ASCII Triggering device. They may be omitted when creating applications for use with such a device.

Numeric Variable Entry

A Numeric Variable Entry allows the terminal operator to change or enter a value stored at a controller address. It may be used for this purpose in any application designed for a MessageView 421N or 421F terminal.

In addition, this variable may be used with an ASCII Input device when the input is in numeric form. It may be used for this purpose in an application designed for a terminal that has both a daughterboard (Catalog No. 2706-M1D1, -M1N1 or -M1F1) and firmware that can support ASCII Input.

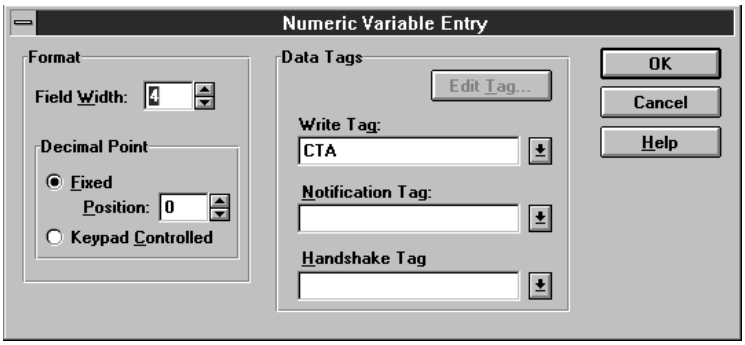
To create the variable, set the insertion pointer in the Message Edit box where the variable will be placed.

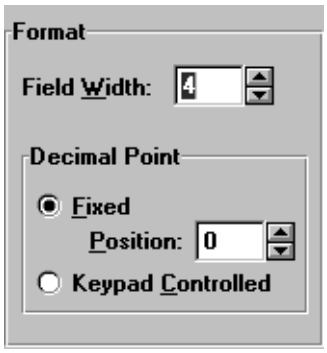
- Click the Embedded Variable tool on the Message Edit toolbar and select Numeric Variable Entry on the dialog.
- Or select the Numeric Variable Entry command on the Format menu.

To edit the variable, highlight the variable placeholder in the message.

- Click the Embedded Variable tool.
- Or select the Edit Variable command on the Format menu.

When a variable is created or edited, its dialog appears:





Format

The **Field Width** spin control specifies the maximum number of characters (0 to 9, +, -, and .) that can be entered in the variable.

Default is 12. To change the field width, select or enter a value in the spin control.

Decimal Point

A logic controller can store only integer values. If the entered value is a decimal, it will be rounded by the logic controller. However if the value is scaled, it may be entered as a decimal, but stored as an integer. See the section on entry scaling beginning on Page 4–38.

The **Decimal Point** area specifies whether the decimal point is fixed (formatted), or keypad controlled.

- Select **Fixed** to position the decimal point 0 to 4 places to the left of the rightmost character. As the terminal operator enters the value the numbers are shifted to the left around the decimal point.

  Select or enter a value in the **Position** spin control. The decimal position must be less than the field width.

Select:	For This Position:
0	6
1	6.5
2	6.55
3	6.553
4	6.5535

- Select **Keypad Controlled** to allow the operator to enter the decimal point using the keypad.

Tags

The **Write Tag** list box specifies the name of the tag address to which the **terminal** will **write** the entered data. Select a tag from the Write Tag list box, or enter a new tag name. Valid data types for the write tag are unsigned/signed integer or BCD.

The **Notification Tag** list box specifies the name of the tag address where the terminal sets a bit to 1 when a value is sent to the logic controller.

Handshake Tag list box specifies the name of the tag address where the controller sets a bit to 1 when a notification has been received.

Select these tags from their tag list boxes or type in new tag names. The only valid data type for either Notification or Handshake tag is bit.

Note: Use **both** Notification and Handshake Tag, or **neither**. See the section on handshaking on Page 4–26. If only one tag is entered, the application will not pass Validation.

Note: It is easier to create an application if all its tags are entered in the Tag Editor before you start to write messages. If a new Read Tag name is used, its parameters must be edited when it is assigned.

If the variable will be scaled, needs different data limits, or has a new Read Tag assigned:

1. Put the insertion pointer in the Read Tag box.
2. Select the **Edit Tag** button to bring up the Tag Form dialog:

3. Edit the tag's attributes (see the section starting on Page 8–2).
4. Select **OK**.

Slave devices

Slave devices do not support the display of Numeric Entry variables in messages. Numeric Entry variables are removed from a message by the master MessageView terminal before the message is slaved.

Although slave devices do not display Numeric Entry variables in a message, the master terminal does display them whenever it displays the message.

ASCII Triggering devices

Tag Node Name and Address attributes are ignored by an ASCII Triggering device. They may be omitted when creating applications for use with such a device.

ASCII Variable Entry

An ASCII Variable Entry allows the terminal operator to change to change or enter a value stored at a controller address. This variable may be used in an application designed for a terminal that has both a daughterboard (Catalog No. 2706-M1D1, -M1N1 or -M1F1) and firmware that can support an ASCII Input device.

An ASCII Variable Entry allows the entry of:

- numeric values from the front keypad
- alphanumeric characters from an ASCII Input device; input devices are listed on Page 5–6.

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.

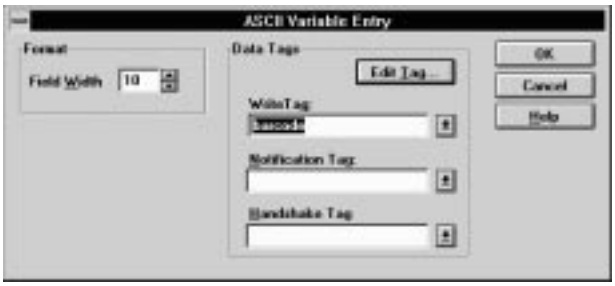
To create the variable, set the insertion pointer in the Message Edit box where the variable should be placed.

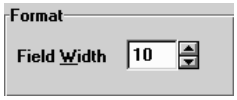
- Click the Embedded Variable tool on the Message Edit toolbar and select Numeric Variable Entry on the dialog.
- Or select the ASCII Variable Entry command on the Format menu.

To edit the variable, highlight the variable placeholder in the message.

- Click the Embedded Variable tool.
- Or select the Edit Variable command on the Format menu.

When a variable is created or edited, its dialog appears:





Format

The **Field Width** spin control specifies the maximum number of alphanumeric characters that can be entered in the variable.

Note: The message will not pass Validation if the Field Width is greater than the Write Tag's Character Array value.

Default is 32. To change the field width (range 1 to 32), select or enter a value in the spin control.

Note: If the input device sends more characters than fit in the Field Width, the extra characters are ignored.

Tags

The **Write Tag** list box specifies the name of the tag address to which the **terminal** will **write** the entered data. Select a tag from the Write Tag list box or enter a new Write Tag name. The only valid data type is Character Array.

The **Notification Tag** list box specifies the name of the tag address where the terminal sets a bit to 1 when a value is sent to the logic controller.

Handshake Tag list box specifies the name of the tag address where the controller sets a bit to 1 when a notification has been received.

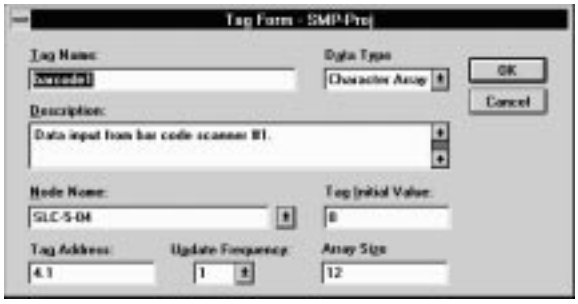
Select these tags from their tag list boxes or enter new tag names. The only valid data type for either Notification or Handshake tag is bit.

Note: Use **both** Notification and Handshake Tag, or **neither**. See the section on handshaking on Page 4–26. If only one tag is entered, the application will not pass Validation.

Note: It is easier to create an application if all its tags are entered in the Tag Editor before you start to write messages. If a new tag name is used, its parameters must be edited when it is assigned.

If the tags are new, or if a tag needs to have its parameters edited:

1. Put the insertion pointer in the tag to be edited.
2. Select the **Edit Tag** button to bring up the Tag Form dialog:



3. Edit the tag's attributes (see the section starting on Page 8–2)

   Note: Character array tags must have length in the range 2 to 33.
4. Select **OK**.

Slave devices

Slave devices do not support the display of ASCII Entry variables in messages. ASCII Entry variables are removed from a message by the master MessageView terminal before the message is slaved.

Although slave devices do not display ASCII Entry variables in a message, the master terminal does display them whenever it displays the message.

ASCII Triggering devices

Tag Node Name and Address attributes are ignored by an ASCII Triggering device. They may be omitted when creating applications for use with such a device.

Message Attributes

The message's attributes appear in the Attributes section of the Message Editor Table View.

Attributes for each message may be set using the Message Editor Table View:

- at the time the message is created
- at any later time when the message is selected (highlighted) in the Message List and displayed in the Message Edit box.

Click the Store Message tool to store the current text and attribute settings for the selected message.

Note: A message is stored automatically when another message is selected for editing.

Click the Cancel Changes tool to restore the message as it was before editing. All changes, whether adding, deleting or editing attributes, revert to their condition when the message was last stored.

To edit related messages together, use the Topics command on the Edit menu. See Page 7–12. In the Topics dialog, deselect all topics but the one(s) needed at the moment. The Message List now contains only messages assigned to the selected topic(s).

To view the original Message List, simply bring up the Topics dialog and select all the topics.

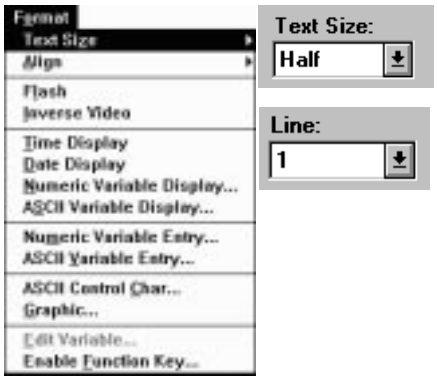
Message

Use the **Message** spin control to assign a new number to the currently selected message. This attribute does not change the position of the message in the list.

Important: The message number is often used as a trigger. If a message number is changed, verify that another message does not chain to the old message number.

To change the order of messages in the list but not their numbers, use the Sort command on the Edit menu. See Page 7–11.

Text Size and Line Number



Select one of the available text sizes from the **Text Size** list box or from the Text Size menu that opens from the Format menu. Options are Quarter, Half, and Full.

Select an option from the **Line** list box. Options are 1, 2, 3, 4, All and Any. Default is Quarter Display mode and Line 1.

This table gives the available options depending on which text size is selected. If a message is assigned to a line too close to the bottom of the display for its size, the error will be caught when the application is validated.

Text Size	Occupies:	Characters:	Starting Line
Quarter	1 display line	21	1, 2, 3, 4, All, Any
Half	2 display lines	10	1, 2, 3, All, Any
Full	all 4 display lines	7	1

Select **All** to use the whole display for the message. This may be useful for complex messages.

After it is triggered, a message with Starting Line All must wait until:

- all lines on the display are available, or
- Special message 9901, Clear Display, is triggered.

Select **Any** to display the message on the first available line starting from the top of the display.

Note: Graphics may be used only in Half Text Display mode messages. Each graphic is as wide as two characters. If graphics are used in a Quarter or Full Display mode message, the application will not pass Validation.

Example of priorities in displaying a message:

The terminal display has a quarter display mode message on Line 2. A half display mode message is value triggered. If it is assigned to:

- Line 3, it is displayed at once.
- Any, it is displayed at once on Line 3.
- Line 1 or 2, it is put in the Message Queue until the first message is terminated.
- All, it is put in the Message Queue until the first message is terminated.
- Line 4, it cannot be displayed; this discrepancy is caught during Validation of the application.

To display more than one message:

Assign messages to different lines if they are to be displayed at the same time. The terminal can display:

- four different messages in Quarter Display mode
- two messages in Quarter Display mode and one in Half Display mode
- two messages in Half Display mode.

When messages require action by the operator, consider the following:

- Only one message may be displayed at a time that requires the operator to use either:
  - numeric keys, although one message can have up to 10 Numeric Entry variables (MessageView 421N or 421F terminals)
  - the **ACK** key (all terminal types)
- In MessageView 421F terminals, only one message may be displayed at a time that requires the operator to press a Function key. However another message can be displayed that contains either Numeric Entry variables or the Ack attribute.

Clearing messages from the terminal display

Wait Time

Select the **Wait Time** list box to specify the minimum time the message will be displayed. Wait time may be 0 to 31 seconds; default is 1 second.

Note: If **Scroll** is disabled and **Auto Clear** is enabled, **Wait Time** cannot be 0. If it is 0, the application will not pass Validation.

Auto Clear

Use the **Auto Clear** check box to clear the message from the display after its **Wait Time** has expired. Disable **Auto Clear** to display the message until another message is triggered (or comes to the top of the queue) that is assigned to the same line(s).

Note: If **Wait Time** is 0 and **Scroll** is disabled, **Auto Clear** must be disabled. If it is enabled, the application will not pass Validation.

If a message has a Function key or keys enabled, the Jog Mode aspect of the Auto Clear attribute is used.

- Non–jog mode: if **Auto Clear** is enabled, the Function key message is terminated as soon as a Function key operation is completed (including Hold Time if any)
- Jog mode: if **Auto Clear** is disabled, the Function key message remains active until:
  - the the terminal operator presses the **[0]** and **[+/-]** keys on the terminal at the same time
  - the controller triggers Special Message 9901, Clear Display
  - the controller triggers Special Message 9903, Reset Terminal
  - the terminal operator resets the terminal manually.

Jog mode is discussed in detail on Page 4–21.

Scrolling

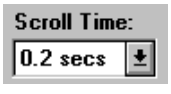
Use the **Scroll** check box to enable scrolling.

- The **Scroll** attribute is disabled to pop the message onto the display.

  A message longer than the display is wide appears in segments, each remaining for the **Wait Time** specified for the message.
- The **Scroll** attribute is enabled to scroll the message onto the display from the right side, one character at a time.

  A message too long for the display scrolls off the display at the left. When the last character appears, the message remains for its Wait Time before it is terminated.

  If the **Auto Clear** attribute is not set, the message will continue to scroll until another message is triggered or queued for the same line(s).



When **Scroll** is enabled, the **Scroll Time** list box is activated. Use the Scroll Time list box to set the time interval between one character appearing and the next. Range is 0.1 to 5 seconds; default is 0.2 seconds.

Note: A long message may be checked in the Terminal View if you:

- set the insertion pointer in the Message Edit box at different points along the message; the message in the Terminal View starts with the insertion point.
- if the All Line attribute is set, use the Return (Enter) key to break up the message into segments.

Note: If **Auto Clear** is enabled and **Wait Time** is 0, **Scroll** must be enabled. If it is disabled, the application will not pass Validation.

If **All** is selected in the Line attribute, **Scroll** must be disabled.

Hidden

A **Hidden** message is triggered like any other message but not displayed. When the **Hidden** attribute is enabled its message never appears on the terminal display.

Since a **Hidden** message is not displayed, it cannot support any type of operator action.

Note: Set the **HE Stack** attribute for a **Hidden** message to log a Display Variable into the stack without displaying it.

Note: Set the **Slave Enable** attribute for a **Hidden** message to have a slave device display a message that does not appear on the master device's display.

Text Attributes

Several attributes define the way in which a message is displayed.

Center

A message is left justified by default. To toggle between centered and left justified for the message in the Message Edit box, do one of the following:

- select the Center check box to enable or disable centering
- click the Center or Left Justify icon
- select Align from the Format menu, and choose Left or Center in the menu that appears.

If you want a message to be right justified, insert spaces at the start of the message in the Message Edit box, and check the result in the Terminal View.

Note: The number of displayable characters in a centered message must be less than or equal to the number of characters per display line available for the selected text size.

Inverse

A message or any part of a message may be displayed with black and white reversed. In the Message Edit box, highlight:

- text
- a variable
- a graphic
- the entire message.

Then either:

- click the Inverse Video icon
- select Inverse Video from the Format menu.

Any text, variables or graphics entered in the message while the Inverse Video icon is selected, will be in Inverse Video setting.

The selected text will be displayed with black and white reversed in the Message Edit box and in the Terminal View.

Flash

A message or any part of a message may be displayed flashing on and off. In the Message Edit box, highlight:

- text
- a variable
- a graphic
- the entire message.

Then either:

- click the Flash icon
- select Flash from the Format menu.

Any text, variables or graphics entered in the message while the Flash icon is selected, will be in Flash setting.

The selected text will be displayed in a different color in the Message Edit box. It will flash on and off in the Terminal View and in the MessageView terminal.

Note: To change the color distinguishing Flashing text in the Message Edit box, see Page 7–15.

Freeze

Use the **Freeze** check box to keep display variables at the value they had when their message was triggered. If the **Freeze** attribute is disabled the terminal continually updates display variables as long as the message is displayed.

Note: The value sent to the Historical Event Stack (if the **HE Stack** attribute is enabled) is the value at the moment of triggering.

Historical Event Stack

Use the **HE Stack** check box to enable this attribute. The message will be logged into the Historical Event Stack file each time it is triggered.

The logged message includes the time and date when the message is triggered, and the value in each display variable at the moment it is triggered. See Page 4–19 for a discussion of the Historical Event Stack.

Acknowledge Time

The **Ack Time** attribute may be used to log into the HE stack with the message, the time and date when the message was acknowledged if both the following apply:

- the message requires the operator to press the **ACK** key on the terminal, and
- the **HE Stack** attribute is enabled.

Acknowledgeable Message

Messages may be defined as acknowledgeable messages which require operator intervention.

Acknowledgeable messages remain displayed (active) until the terminal operator presses the **ACK** key and the preset acknowledge hold time (50 ms) has expired. The bit at the global Acknowledge tag address is set. The controller program checks this bit to make sure the terminal operator has pressed the key before triggering another message.

Use the **Ack** check box to define a message as acknowledgeable. When **Ack** is enabled, **Wait Time** is overridden.

While a message requiring acknowledgement is displayed, other messages may not be displayed if they:

- require an acknowledgement, or
- contain entry variables.

Note: On a MessageView 421F terminal, a message with function keys enabled may be displayed at the same time as a message requiring acknowledgement.

ATTENTION: When using Remote I/O, if the Acknowledge Message Return number global attribute is enabled, assign the bit for the ACK key to the same Block transfer block as the Acknowledge Message Return number.

Bit Trigger

A Bit Trigger is optional, since a message can be triggered using its Message Number. A Bit Trigger address must be unique, and a bit address can be used to trigger only one message in the application.

Select the **Enable** check box to enable the **Bit** spin control. To edit the number of the bit trigger:

- select a value on the **Bit** spin control, or
- highlight the current number, then type the correct bit address.

An application can have up to 1024 bit triggers if Block Transfers are used, but the maximum number of bit triggers is much smaller if only discrete I/O is used.

Note: In an application designed for use with an ASCII Triggering device, bit triggers are not supported.

Triggering is discussed in the section starting on Page 4–9.

Chain

A message may be chained to another. That is, a message can trigger another message by invoking its message number. A chained message has exactly the same attributes as if it were not chained.

When the first message in a chain is triggered, it is displayed or queued. After it is terminated, if the next message in the chain:

- has the same display line as the previous message, it has priority over messages in the queue and is displayed
- has a different display line assigned, and that line is free, the message is displayed
- has a different display line assigned, and that line is occupied, the message is appended to the Message Queue.

- Select the **Enable** check box, then select the chained Message Number from the **To:** spin control.
- Or highlight the current number and type the chained Message Number.

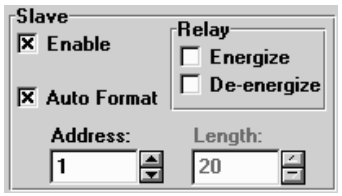
Any message in the application may be chained to another. A chain may even be circular, with the last message triggering the first message. A circular chain can be useful in certain cases. To break the chain:

- tell the terminal operator to do a Powerup Reset, or
- trigger Special message 9901, Clear Display.

ASCII Triggering devices

ASCII Triggering devices do not support embedded display variables in chained messages.

Slaving



A MessageView terminal with a Remote I/O daughterboard (Catalog Nos. 2706-M1D1, -M1N1 or -M1F1) and firmware that supports a Slave Port can act as a master device with up to 126 slave devices. Each Slave device at a specific Node Address displays the messages sent to its Node Address.

Slaved messages may contain variables, graphics and message attributes set up by the MessageBuilder software, with the following cautions:

- A graphic must be preceded by a Ctrl-G, or the terminal will replace the graphic with two spaces before sending the message to the slave.
- The terminal removes embedded data entry variables from a message before sending the message to the slave.

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 or 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.

Slaving attributes

Enable

Select **Enable** to send this message out the RS-232 port to the slave device specified in the address attribute.

If **Enable** is not selected, the message is used by the slaving (master) terminal only.

Auto Format

If **Auto Format** is enabled, the MessageView terminal sends the entire message to a slave at once, up to the maximum message length of 100 characters. The terminal also embeds the optional Control byte, ASCII Text Code bytes, Optional Display Mode byte and Line Number byte automatically.

- Optional Control byte is set according to the Text Size attribute.
- Flashing, Inverse Video and embedded Graphics have the proper control characters set according to the corresponding attributes.
- Optional Display Mode byte is set according to the Scroll and Center attributes.
- Line Number is set according to the Line attribute.

Note: If you place an embedded Control Byte:

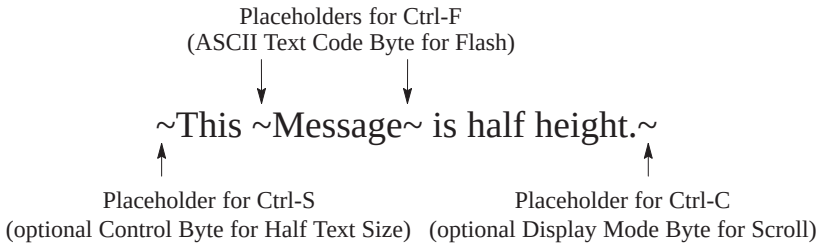
- at the beginning of the text portion of the message, it will override an automatically placed Control Byte.
- at the end of the text portion of the message, it will override an automatically placed Display Mode Control Byte.

If **Auto Format** is disabled, the MessageView terminal:

- sends the message to the slave device in package lengths corresponding to the value set in the **Length** attribute.
- does not embed the optional Control Byte, ASCII Text Code Bytes, or Display Mode Byte in the message packet.

In this case these optional bytes must be placed manually in the text portion of the message, using the **ASCII Control Characters** dialog (accessed through the Format menu). See Page 7–21.

Example:



Note: If the slave device is a MessageView 421D Slave Device terminal (Catalog No. 2706-M1D), it is recommended that you enable **Auto Format**.

Address

Use the **Address** spin control to specify the Node Address to which the message is to be slaved. Each slave device has its own node address. See Page 4–15 for a diagram of a possible network.

The address for an individual slave device is a number from 1 to 126. Address 127 sends the message to all slave devices on the network.

Length

The **Length** attribute is enabled if **Auto Format** is disabled, so a packet length may be selected.

Use the up/down arrow keys to select a number from 7 to 100 in the **Length** spin control.

If the message is larger than the selected Length, the MessageView terminal will divide it up into packets. The last packet will have spaces inserted after the last character in the message if necessary to meet the **Length** requirements.

For instance, a message 28 characters long with a Length of 10 is sent in three packets. The last packet contains 8 characters and 2 spaces to fill it.

Note: If Auto Format is disabled and the Line attribute is “All”, only the number of characters in the Length attribute will be sent, even if each line portion of the message is longer. For example, if Text Size attribute is Quarter (21 characters per line) and the Length attribute is set at 10, the last eleven characters of each line will never be sent to the slave if each line contains 21 characters.

Relay

Enable the **Relay Energize** attribute to trigger (enable) an alarm relay in a DL50 slave device.

The message with the Relay attribute set is displayed at the same time as the alarm is triggered, and should explain why the alarm was triggered.

If the message is divided into packets, the MessageView terminal sends the packets in this order:

```
Message Packet #1 – Relay Packet – Message Packet #2 –
Message Packet #3 ...
```

Important: The alarm relay will not de-energize until another message is slaved to that Alarm Relay, disabling it.

ATTENTION: Use the alarm relay as a warning only. Do not use it for control.

Slave Packet transmission rate

Slave Packets are sent to the slave at a user-defined rate called the **Inter-Packet Delay**. This delay is the time allowed between successive packets sent from the master to the slave device. **Inter-Packet Delay** is set in the Aux. Port tab of the Terminal Setup dialog, see Page 10–28.

Function Keys

MessageView 421F terminals have 16 Function keys on their keypad. Function keys may be used in any application designed for a MessageView 421F terminal. See the section starting on Page 4–20 for a discussion of Function keys.

Note: Function keys are **not** “embedded”in the message. The message enables one or more Function keys based on the Function key enable dialog (Format menu) and typically tells the terminal operator which keys to press. The text description is developed by the application designer.

A message with Function keys enabled:

- can **not** be displayed with another message that has Function keys enabled
- may be displayed with a message that contains entry variables **or** with a message which requires acknowledgement.

Function key attributes

When the application is designed, make a list of the Function keys that will be used. Set them all up before any messages are created, and then enable them for specific messages as needed.

Important: Function key attributes are global. That is, once a Function key’s attributes are set, they are the same every time that Function key is used in any message within the application. If attributes are changed in one instance, they are changed for all instances.

Select Function Keys in the Application menu to open the Function Keys dialog.

Function Key: Select a Function key from the **Function Key** list box. After all its attributes are set, you may select another Function key and set its attributes.

Type: Select the **Type** list box and highlight the type needed.

- **None:** the Function key is not used.
- **Momentary:** changes state (0 to 1 or 1 to 0) when pressed and released. Changes back to its initial state after the defined Hold Time has expired.
- **Maintained:** changes state (0 to 1 or 1 to 0) when pressed and remains in the changed state when released.
  - If the message is in Jog mode, the Function key returns to its original state when pressed and released again.
  - If the message is in non-Jog mode, a new message must be triggered and displayed with the same Function key enabled, so the key can be pressed and released again.
- **Latched:** changes state (0 to 1 or 1 to 0) when pressed and remains in the changed state when released. To return the Function key to its original state, the logic controller must set a handshake bit. See Page 4–24 for a discussion of Latched Function Keys and handshaking.

Initial State: If a Maintained Function Key was selected under **Type**, select Open or Closed initial state. This option is greyed out when another type is selected. A Maintained Function Key toggles between two states, so the state on powerup does not need to be the same as the Contact Open/Closed state.

Contacts: Select either **Normally Open** or **Normally Closed**, depending on how the Function key is to be used.

Hold Time: If a Momentary Function Key was selected under **Type**, select a Hold Time. This option is greyed out when another type is selected. Hold Time can be 0, 50, 250, 500, 750 or 1000 milliseconds; default is 500 ms.

The terminal holds the Function Key bit set/cleared for the **Hold Time**, even if the key is physically released at once. The **Hold Time** should be longer than the scan time of the controller, to ensure that the bit is read at least once.

Function key tags

Write Tag: Select a write tag from the list box or type in a new Write Tag name. A write tag is required for each enabled Function key. The only valid data type for a Function key Write tag is bit type.

The write tag is the address location used by both the MessageView terminal and the logic controller to reflect the On or Off state of the Function key.

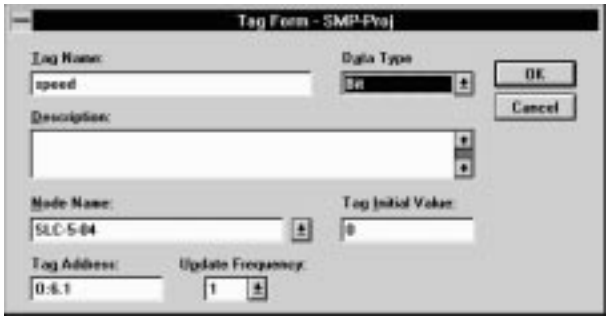
Handshake Tag: If a Latched Function Key was selected under **Type**, select a handshake tag from the list box or type in a new Handshake Tag name. This option is greyed out for Momentary and Maintained Function Keys. The only valid data type for a Function key Handshake tag is bit type.

The value at this tag address is set/reset by the controller. When the bit is set, the terminal releases the Latched Function Key, and it returns to its initial state.

Indicator Tag: The indicator tag is a read-only tag in the Function Keys dialog. It is discussed in the section on LED attributes on Page 7–52.

To edit the Write or Handshake tag attributes:

1. Put the insertion pointer in the tag box.
2. Select the **Edit Tag** button to bring up the Tag Form dialog:



3. Edit the tag's attributes (see the section starting on Page 8–2).
4. Select **OK**.

ASCII Triggering devices

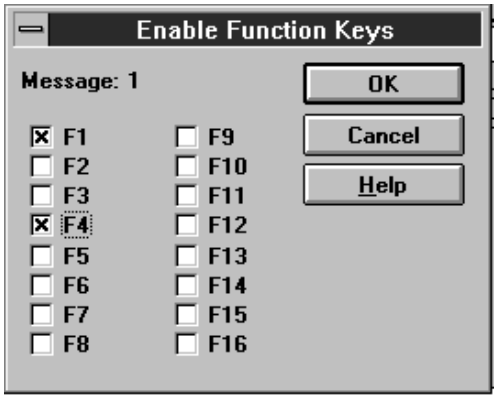
Tag Node Name and Address attributes are ignored by an ASCII Triggering device. They may be omitted when creating applications for use with such a device.

Enable Function Keys

Any or all of the Function keys may be enabled for any message. To enable Function keys for the current message:

1. Select the Enable Function Keys tool to bring up the Enable Function Keys dialog.

   Or select Enable Function Key on the Format menu.



   The dialog displays the message number.

2. Select the check box in front of each Function key the current message will use.
3. Select **OK** to return to the Message Editor Table View.

The text of the message typically tells the operator what to do with each enabled function key. For instance:

```
F1 Start Conveyor F4 Enable Paint Sprayer.
```

Using jog mode in messages with Function keys enabled

Jog mode is discussed in detail on Page 4–21.

Example 1: When Auto Clear is enabled the message is terminated as soon as a Function key is pressed, and if a Momentary Function key, its Hold Time is expired. To enable Jog mode, disable the **Auto Clear** attribute for the message. The message then remains active on the display until:

- the the terminal operator presses the **[0]** and **[+/-]** keys on the terminal at the same time
- the controller triggers Special Message 9901, Clear Display
- the terminal is reset.

Example 2: A Maintained Function Key that has been pressed only once remains in the changed state after the message is terminated. It may be returned to its original state in either of two ways.

- Enable jog mode by disabling the **Auto Clear** attribute. The message tells the operator to press and release the Function key twice.
- **Chain** or trigger another message that has the same Function key enabled. The second message tells the operator to press the Function key again.

LED Attributes

The LED located beside the Function key may or may not have its Indicator tag defined. LEDs may be used in any application designed for a MessageView 421F terminal. See Page 4–25 for a discussion of LEDs.

When the application is designed, make a list of the LEDs to be used and note which ones need an Indicator tag defined. Set them all up before any messages are created.

Important: LED attributes are global.

- When an LED does not have a tag assigned to it, the LED has no tag any time it is used in the application.
- When a LED is assigned a certain tag, that tag remains assigned to it throughout the application.

When the LED ***does not have*** an Indicator tag assigned to it, then the LED follows the state of the associated Function key (LED1 with F1, LED 16 with F16). For example, LED4 will light when Function key F4 is pressed, and LED4 remains lit for the duration of the Function key's On state while the message associated with the Function key is actively displayed.

When the LED ***has*** an Indicator tag assigned to it, the LED operates independently of the associated Function key. 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 setting or clearing the bit at the Indicator tag address. Thus the controller can indicate a process status without displaying a message.

Note: All assigned LED tags are monitored on a continuous basis except when the terminal is in its Front Panel Editor mode.

Defining LED tags

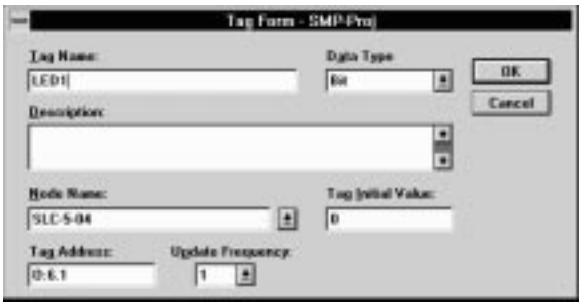
1. Select LED Indicators on the Application menu to open the LED Indicator Tags dialog.

2. For each LED that needs an indicator tag, choose an existing tag name from the list box or create a new tag.

   The only valid data type for an LED Indicator tag is bit.
3. Select **OK** to return to the Message Editor Table View.

To edit the LED tag attributes:

1. Put the insertion pointer in the LED Tag box.
2. Select the **Edit Tag** button to bring up the Tag Form dialog:



3. Edit the tag's attributes (see the section starting on Page 8–2).
4. Select **OK**.

ASCII Triggering devices

Tag Node Name and Address attributes are ignored by an ASCII Triggering device. They may be omitted when creating applications for use with such a device.

Special Messages

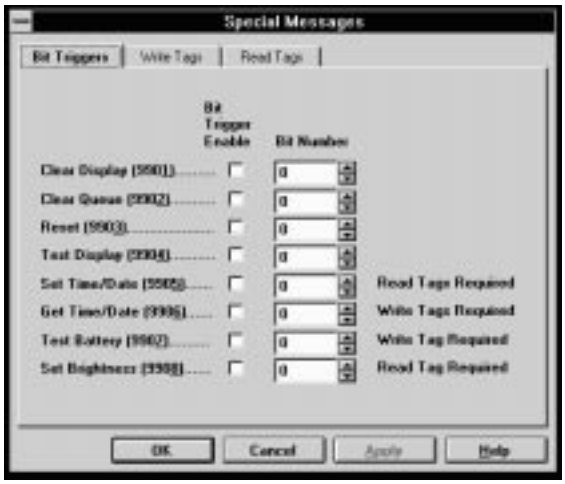
Special Messages give commands to the terminal. They may be called up using either a value trigger (the message number) or a bit trigger, just like other messages. See Page 4–5 for a list of Special Messages.

The Special Messages dialog is used **only** when:

- one or more Special Messages need to be defined as a bit trigger.
- the Special Messages Set Time/Date or Set Brightness will be used, and needs to have its read tags assigned.
- the Special Messages Get Time/Date or Test Battery will be used, and needs to have its write tags assigned.

To assign a bit trigger to a Special Message

1. Select Special Messages on the Application menu to bring up the Special Messages dialog:



2. Select the **Bit Trigger Enable** box for the special message.
3. Use the **Bit Number** spin control to assign an address to the bit trigger.
4. When all special messages are edited, select **OK** to return to the Message Editor Table View.

Important: Bit triggers cannot be used when the terminal is controlled by an ASCII Triggering Device.

Write Tags

If the Get Date/Time or Test Battery Special Message is used, its tags need to be defined. Select the **Write Tags** tab. This dialog appears:

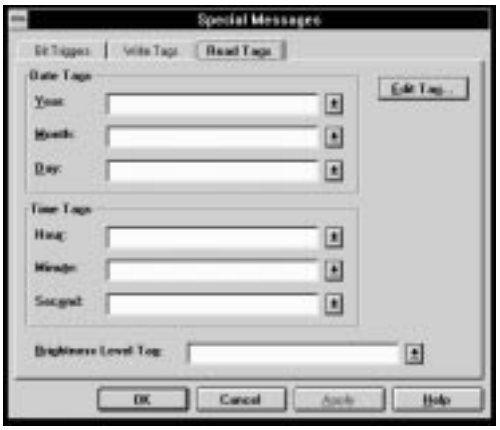
1. For each variable, choose an existing tag name from the List Box, or create a new tag. The only valid data type for:

- a Date or Time Write Tag is Unsigned Integer.
- the Test Battery tag is Bit.

2. Select **OK** to return to the Special Messages dialog.
3. Select **OK** to return to the Message Editor Table View.

Read Tags

If the Set Time/Date or Set Brightness Special Message is used, its tags need to be defined. Select the **Read Tags** tab. This dialog appears:



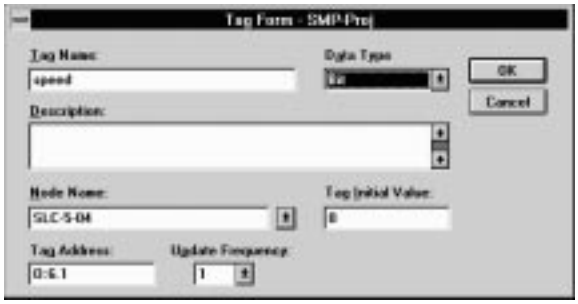
1. For each variable, choose an existing tag name from the List Box, or create a new tag. The only valid data type for:

- a Date or Time Read Tag is Unsigned Integer.
- the Brightness Level tag is Bit.

2. Select **OK** to return to the Special Messages dialog.
3. Select **OK** to return to the Message Editor Table View.

To edit the Special Message tag attributes:

1. Put the insertion pointer in the tag box.
2. Select the **Edit Tag** button to bring up the Tag Form dialog:



3. Edit the tag's attributes (see the section starting on Page 8–2).
4. Select **OK**.

ASCII Triggering devices

Tag Node Name and Address attributes are ignored by an ASCII Triggering device. They may be omitted when creating applications for use with such a device.

Working with Tags

This chapter covers the following topics:

- Using the tag editor
- Validating tag addresses
- Defining tags
- Working with tags
- Finding tags
- Sorting tags
- Printing tags
- Using tools
- Tag import/export utility
  - importing tags
  - exporting tags
  - examining the results of an import/export.

Using the Tag Editor

Tags define the link between each variable and its assigned address in the logic controller. See the section starting on Page 4–31 for a discussion of how tags work.

Enter tag information in either of two ways:

Table View

Enter and edit all tags for the application in a table which has its own toolbar, and columns for tag attributes. This is also called the Summary View.

Form View

Enter or edit a single tag from an Edit Tag dialog, available through the variable's dialog in the Message Editor Table View.

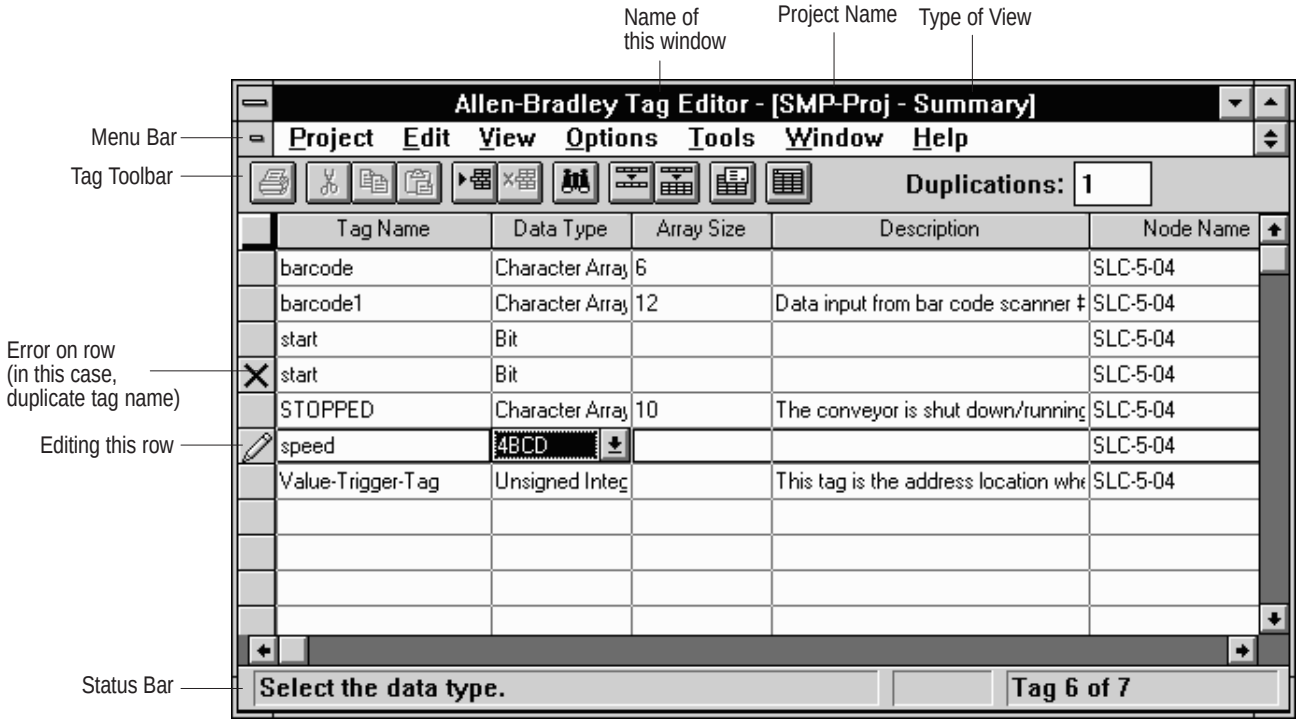
If Numeric Variables are to be scaled, change from the Tag Editor Table View to the Form View as needed.

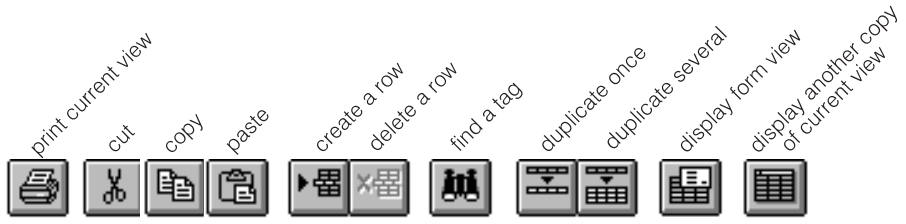
Opening the Tag Editor

To open the Table View 68

Choose Tag Editor from the Application menu.

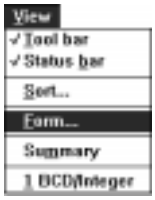
You can toggle the Status Bar and Tool Bar on and off just as with the Message Editor Table View. Simply select the appropriate command in the View menu.



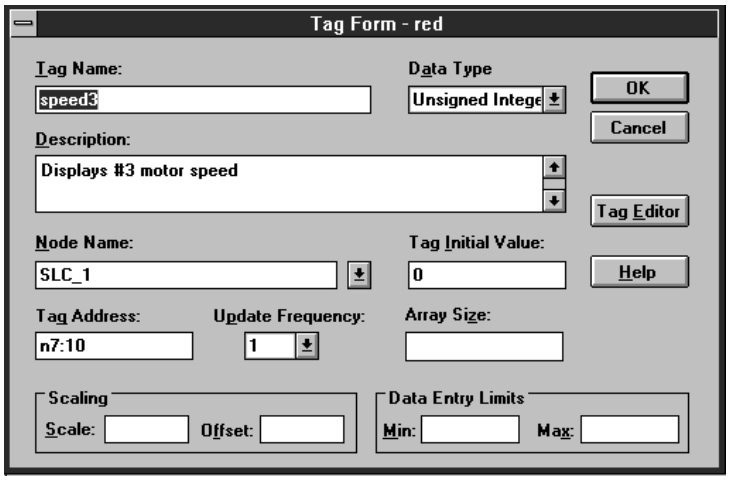


To open the Form View:

- From a dialog in MessageBuilder, select or enter a tag name and select the **Edit Tag** button.



- From the Tag Editor Table View, choose Form from the View menu.



Navigating through the Tag Editor

To move between fields in Form View or Table View:

Move the mouse pointer to the field and click the left button.

- Or press TAB to move forward through fields and SHIFT+TAB to move backward.
- Or in Form View, press **ALT** + *X*, where *X* is the underlined letter in the field name.

To change from Table View to Form View:

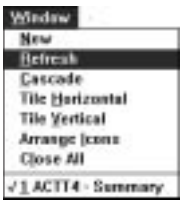
Click the Form tool on the toolbar.

- Or choose Form from the View menu.
- Or choose Form Editor from the Tools menu.

To change from Form View to Table View:

Select the **Tag Editor** button in the Tag Form View.

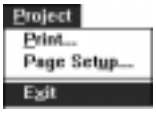
- Or select Summary from the View menu.
- Or choose List Editor from the Tools menu.



Note: If you enter data in the Form View, it will not appear in the Table View when you switch views. Choose Refresh from the Window menu to display the new data.

To exit the Tag Editor:

Double-click the Control-menu box at the top left of the window.



- Or in Table View, choose Exit from the Project menu to return to the Message Editor Table View.
- Or in Form View, select **OK** or **Cancel** to return to the Table View, then exit from the Table View.

Validating Tag Addresses

Table View only

Before starting to create tags, set up the Tag Editor to validate tag addresses. Address Validation checks only tags that are entered or modified while it is active.

Important: Addresses for existing tags are not validated.

To activate address validation

Choose Address Validation from the Options menu. A check mark next to the command indicates that the option is activated.

The Tag Editor checks each address against the type of device specified in the **Node Name** field. If the address is not valid for that device, the Tag Editor displays the following warning:

Select:	To:
Yes	Return to the invalid address in the Table View
No	Save the tag in the database with the invalid address

For information on valid addresses for a specific type of controller, refer to the user manual for that controller.

Note: In Form View, address validation is always active.

Defining Tags 69

Table View

Form View

Field	Description	Valid Characters	Notes
Tag Name ①	The name of the tag	Maximum characters = 32. ● A to Z, a to z, 0 to 9 ● hyphen (–), underscore(_), percent (%).	If an invalid character is entered, the Tag Editor beeps and does not display it. ● Do not use blanks, tabs, carriage returns or non-printable characters. ● Tag names cannot begin with 0 – 9, hyphen, or percent. ● Tag names are not case-sensitive: LIST, List, and list are all the same to the Tag Editor. ● Tag names must be unique in a project.
Data Type ①	The data format for the tag	**Select one of the following:** ● bit ● 4BCD ● unsigned integer ● signed integer ● character array **Use either of these methods:** ● Type the letter of the data type, for example, b for bit. ● Use TAB to move to the Data Type field, press ALT + ↓ to display the list of data types.	The tag Data Type determines the data format for the variable.
Array Size (Character Array type only)	The number of characters in the array	Range of characters = 2 to 33; ● A to Z, 1 to 9.	● Do not use blanks, tabs, carriage returns or non-printable characters. ● Array size must be an integer.

Field	Description	Valid Characters	Notes
Description ②	A description of the tag	Maximum characters = 255. • any printable character. **Use either of these methods:** Select the box and type, or Use the Description Editor (see below).	• Do not use blanks, tabs, carriage returns or non-printable characters.
Node Name ①	The node on the network where the device is located	A node name cannot be the same as a tag name or a terminal name. Maximum characters = 32. • A to Z, a to z, 0 to 9 • hyphen (–), underscore(_), percent (%).	The node name must match the controller name entered in the Communication Setup dialog. See Page 10–6. If an invalid character is entered, the Tag Editor beeps and does not display it. • Do not use blanks, tabs, carriage returns or non-printable characters. • Node names cannot begin with 0 – 9, hyphen, or percent. • Node names are not case-sensitive: SLC, Slc and slc are all the same to the Tag Editor.
Address ①	The data table address in the logic controller for the tag	Maximum characters = 32 For more information on valid addresses, refer to the controller's user manual.	• Do not use blanks, tabs, carriage returns or non-printable characters.
Initial Value (Numeric Entry variables only)	The starting value for the tag in **engineering** units, which may not be the same units used by the controller.	If the Data Type is a bit, enter either • 0 or 1. Maximum characters for other Data Types = 24; they can be: • 0 to 9 • e, E, +, –, and period (.).	• Do not use blanks, tabs, carriage returns or non-printable characters. • Maximum precision is 6 places to the right of the decimal point. • If present, a sign (+ or –) for the number must be first. Default is +. • If present, a sign for the exponent must immediately follow the e or E. Default is +. • Default initial value is 0.
Update Frequency	How often the terminal should read the data in the tag address	• 1 to 9, where 1 is the fastest update rate. **Use either of these methods:** • Click the down arrow and click on the rate. • Use TAB to move to the Update Frequency field, press ALT + ↓ to display the list of frequencies.	Does not apply to Remote I/O.

Field	Description	Valid Characters	Notes
Scaling ③ Scale = 'm' in y = mx + b Offset: = 'b' in y = mx + b	The values that convert the tag's controller integer values ("x") to engineering units ("y")	Maximum characters = 12 ● 0 to 9 ● e, E, +, –, and period (.)	● Do not use blanks, tabs or carriage returns. ● Maximum precision for scale is 4 places to the right of the decimal point. ● Maximum precision for offset is 6 places to the right of the decimal point. ● If present, a sign (+ or –) for the number must be first. Default is no sign, which represents +. ● If present, a sign for the exponent must immediately follow the e or E. Default is no sign, which represents +.
Data Entry Limits ③ 70	The minimum and maximum values that the operator can enter for the tag	Maximum characters = 12 ● 0 to 9 ● e, E, +, –, and period (.)	● Do not use blanks, tabs or carriage returns. ● Maximum precision is 4 places to the right of the decimal point. ● If present, a sign (+ or –) for the number must be first. Default is +. ● If present, a sign for the exponent must immediately follow the e or E. Default is +.

① **Required fields for either Table View or Form View.**

② **To bring up the Description Editor:**

1. Select the Description field.
2. Click the **right** mouse button.
3. Choose Editor from the menu that appears.
4. When finished entering the description, select OK.

③ **Scaling and Data Entry fields**

In Form View, these fields are present only when the Data Type is signed/unsigned integer or BCD.
In Table View, these fields are not present.

Working With Tags

Saving Tags

To save tag definitions in Form View: 71

Select **OK.**

- Or press ENTER..
- Or select the **Tag Editor** button to move to the Table View.

To close the form without saving anything, select the Cancel button.

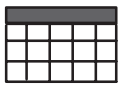


Table View only

To save tag definitions in Table View:

Double-click in the Status Column for that tag.

- Or in the last column press ENTER.
- Or use the arrow keys to move the highlight to a different (existing) row.
- Or use the scroll bar or the Page Up or Page Down keys to move to a different row.
- Or insert a new tag in the table.
- Or change to the form view.

Different Views

To display:	Do this:
only data types unsigned or signed integer, BCD, or character array (if you are in the Table View)	choose BCD/Integer from View menu
all tags in the project (if you are in the BCD/Integer View)	choose Summary from View menu.
another copy of the current view	click  or choose New from the Windows menu.

Inserting and Deleting Tags

To select a row (a tag), click the left mouse button in the Status Column for its row.

For this result:	Do this:
insert a tag	click  or choose Insert from Edit menu. A blank line appears in the table on which to enter a new tag.
delete a tag	click  or choose Delete from Edit menu. The tag is deleted from the application and cannot be retrieved.
cut a tag	click  or choose Cut from Edit menu. The tag is cut from the current project. It may be added to this or another application using the Paste command.

Copying tags

Table View only

Select, Copy and Paste entire tags or individual fields. Then edit their attributes as needed. See also Duplicating Tags below. 72

In fact, since tags and fields are copied to the Microsoft Windows clipboard, they can be pasted in another application, even an application in another project.

When a tag is copied, the new tag's name is the same as the original tag's name in the Tag Editor Table View. An X appears in the Status column for the new tag's row until its name is changed.

For this result:	Do this:
select a field	click the left mouse button in the field
select a row	click the left mouse button in the Status column for the row (the column at the far left)
select several adjoining rows	click the left mouse button in the Status column for the first row. Then either: drag the mouse down the column, or press and hold the SHIFT key and press the Page Up or Page Down key
select several separated rows	click the left mouse button in the Status column for the first row. Then press and hold the CTRL key and click in the Status column of the other rows.

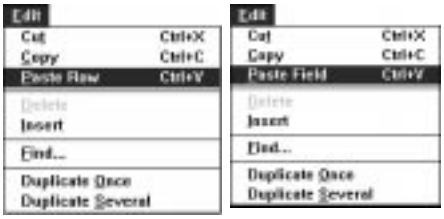
To copy and paste tag information:

1. Select the row that you want to copy, or the contents of a field.
2. Click the Copy tool.

   Or choose Copy from the Edit menu.
3. Use the up/down arrow keys to move the cursor to the new location.

4. Click the Paste tool.

   Or choose Paste from the Edit menu.



If a tag is pasted, it is inserted above the current row.

If a field is pasted, it replaces the contents of the field that contains the insertion point. Be careful to paste it in a field in the same column.

To copy tags into another application:

1. Copy the tag(s) and exit the Tag Editor.
2. Open another application in the same or another project (see Page 6–4).
3. Open its Tag Editor Table View and paste the tags in it.

Duplicating tags

Use this option when a number of tags have similar attributes but are assigned to different variables in the application. Create one tag and duplicate it as many times as needed. Then change the name and address on each new tag to suit the variable it will be assigned to.

To duplicate a tag once: 73

1. Select the tag name that you want to duplicate.

2. Click the Duplicate Once tool.

   Or choose Duplicate Once from the Edit menu.

The Tag Editor duplicates the tag row and places it after the current row. The tag name is incremented according to the options specified in the Duplication dialog.

To duplicate a tag several times:

1. Select the tag name you want to duplicate.

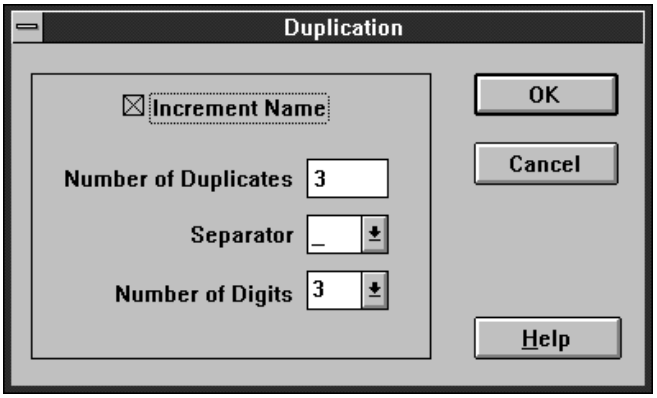
2. Click the Duplicate Several tool.

   Or choose Duplicate Several from the Edit menu.

The Tag Editor duplicates the current row and increments the tag names according to options specified in the Duplication dialog.

To set the number of duplicates:

1. Select Duplication on the Options menu to open the Duplication dialog.



2. Select the **Increment Name** check box to choose whether or not to distinguish names of duplicated tags by adding a number to the name. Default is to add a number.
3. Select a separator from the **Separator** list box that will go between the name and number of duplicated tags.
4. Select a number from 1 to 4 from the **Number of Digits** list box. This sets the number of characters to the right of the separator.
5. Highlight the value in the **Number of Duplicates** text box and type a number.

The number of duplicates is also displayed in a Duplications text box on the toolbar. The value in the Duplications text box may be highlighted and changed without entering the Duplication dialog.

Finding Tags

Use this tool or command to locate any tag or tags in the Tag Editor by name. Other tag attributes cannot be used in the Find dialog.

Important: If the active View is BCD/Integer, the Find command cannot locate tags with bit addresses.

1. Click the Find tool to open the Find dialog.

   Or choose Find on the Edit menu.

2. Type the name of the tag and press **ENTER**. The Find command locates tag names containing the sequence of characters.

   The command is not case sensitive. For example, if you enter **switch**, the Find command locates: switch, Switch, SWITCH, Switch_5, Limit_switch, LimitSwitch, etc.
3. Select the appropriate button to move among the occurrences of the tag name.

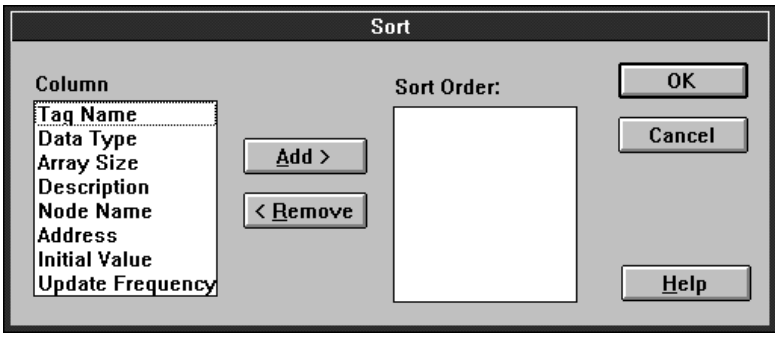
Click:	To Move To:
First	the first occurrence in the current view
Previous	the previous occurrence
Next	the next occurrence
Last	the last occurrence in the current view

4. When done, select the **Exit** or **Cancel** button, or press **ESC** on the keyboard.

Sorting Tags

Tags may be sorted on any field or any number of fields in a user-selected order. When tags are rearranged in the table so that similar tags are together, they may be edited more easily.

1. Choose Sort from the View menu to open the Sort dialog.



2. Specify which field(s) to sort by:

- Double-click on a field name in the **Column** box to add it to the **Sort Order** box.
- Or highlight a field and then select **Add**.

  The Tag Editor moves the field name to the **Sort Order** box on the right. You can specify any number of fields in your sort. The default (no fields in the **Sort Order** box) is: Sort by Tag Name.

3. When all fields for this sort are entered, select **OK**.

The Tag Editor sorts the tags and displays them in the Table View.

The fields are sorted in the order in which they are added to the **Sort Order** box. To change the order:

1. Highlight a field or fields in the **Sort Order** box.
2. Select **Remove** to delete them.
3. Highlight a field or fields in the **Column** box.
4. Select **Add** to append them at the end of the list in the Sort Order box.

Or select **Cancel** and start over.

Printing Tags

Table View only

Tags may be printed if the personal computer is connected to a printer and the correct drivers are installed. See the manual for the printer and the Windows manual. 74

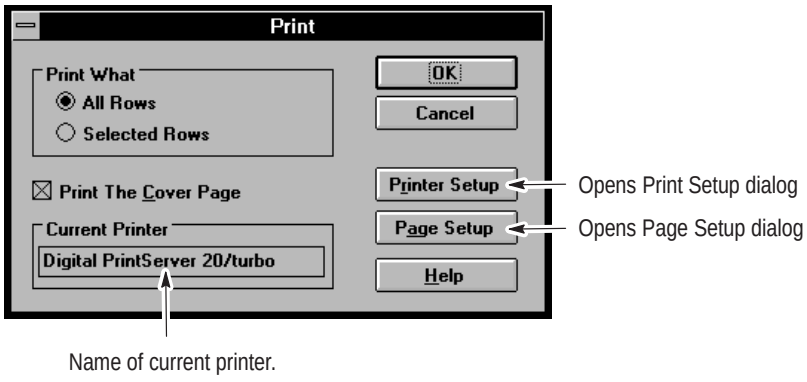
ATTENTION: Make sure your printer is connected and online.

Important: If a row is being edited, signalled by a “pencil” in the Status Column (the first column on the left), the Print command is not active. Select a different row (which stores the edited row) before calling up the Print dialog.

To print tags:

1. Click the Print tool to open the Print dialog.

   Or choose Print from the Project menu.



   Note: The name of the current printer is displayed. To change to a different printer, see the next section. The printer used in this session will be the default printer next time this dialog is opened.

2. Under **Print What**, specify whether to print All Rows in the current tag view or only selected rows.

   See Page 8–9 for details on how to select contiguous or noncontiguous rows.

3. Select the **Print The Cover Page** box to print the cover page. Information for the cover page is entered automatically: it includes product, project and view name, date and time.

   The product is: Allen-Bradley Tag Editor.

4. If the **Current Printer** default printer should be changed, select the **Printer Setup** button to open the Print Setup dialog.
5. If the setup should be checked or edited, select the **Page Setup** button to open the Page Setup dialog.
6. Select **OK**.

Other information

- The column width of the printed output is based on the column width in the Tag Editor.
- The Tag Editor prints as many columns as fit on the width of the page (minus the margins). If a column does not fit, it is printed on the next page.

  The Tag Editor does not print a column that is less than one character wide, that is, an empty column.
- If a row does not fit on the page, it is printed on the next page (each row is one text line high).

To set up the printer:

Printer Setup

1. Select the **Printer Setup** button in the Print dialog to open the standard Windows Print Setup dialog.

   The dialog entries are based on the computer's system configuration and installation options.

2. Select the default or another printer and specify its settings.

ATTENTION: Check the Microsoft Windows user manual to make sure the settings are correct for the type of printer.

3. Select the **Options** button to open a dialog to fine-tune the specific printer. This dialog is different for each type of printer.
4. Select **OK** to return to the Print dialog.

If the printer is not listed:

1. Check for hardware compatibility between the printer and one of the printers listed.
2. Check if your printer has an emulation mode that is compatible with one of the printers listed.
3. It may be necessary to install a printer driver for your printer. Refer to the Windows User's Guide.

To set up the page:

Page Setup

1. Select the **Page Setup** button in the Print dialog to open the Page Setup dialog.

   Or choose Page Setup from the Project menu.

2. Enter a number to specify each page **Margin** (Top, Bottom, Left, Right). Default is 0.5” for each margin.
3. Select the **Show Gridlines** box if the Table View gridlines should be printed.
4. Select the box, **Use Maximum Width for Each Column**, if each field should be the maximum width allowed for it.

   Deselect the box if the printed output should be based on the contents of the columns. The number of characters that fit in a column may be different from the printed output depending on the fonts available.
5. Set up **Header** Lines 1 and 2 as required. Each line can be up to 255 characters long. See Header shortcuts below.
6. Select **OK**, then select **OK** in the Print dialog.

Entering Header Information

Do this to enter Header text:	For example:
Most text prints as typed.	To print this: This is the header. type `This is the header.`
Type one of the following character sequences to save time: [1] [2] &D = current date [3] &N = page number [3] &T = current time &V = view name &P = project name &B = space (use this to print a blank line) &A = product name: Allen-Bradley Tag Editor	To print this: `2/2/95 Project 1` type `&D &P` To print a blank line, type `&B`. To print an &, type `&&`. A character sequence that is not defined is printed as is. For example, if you enter `&Z`, then &Z is printed.

[1] Character sequences are not case sensitive.

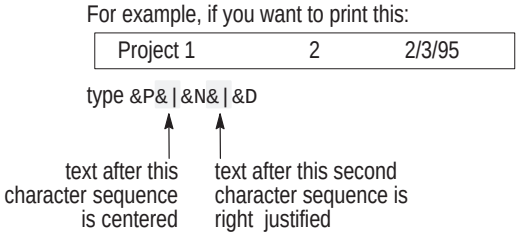
[2] If the expanded text is larger than 255 characters, the printed output may be distorted or cut off.

[3] These values are based on the computer's Control Panel settings. See the Microsoft Windows user manual for information about the Control Panel.

Aligning the Headers

Left justified text is the default alignment.

- For centered text: type **&|** before the text or character sequence.
- For right justified text: type **&|&|** before the text or character sequence.



Important: If alignment is specified in part of a header line, make sure the text does not overlap. For instance, if left justified text runs to the center of the page, it will overlap centered text.

Tag Import/Export Utility

If the Status column or Tag Name column for a specific tag is selected, the Tools menu gives a list of available tools. From the list select the tool needed.

In some cases, the Tools menu commands may depend on what software is installed the the computer system.

List Editor is the same as the Summary command on the View menu: it brings up a new Tag Editor Table View.

Form Editor is the same as the Form command on the View menu: it brings up the Tag Form dialog for the selected tag.

Import and **Export** access the Tag Import/Export Utility.

Supported file formats

The Tag Import/Export utility copies SLC and PLC-5 tag information from a supported file format to a MessageBuilder software project and vice versa. The supported ASCII file formats are:

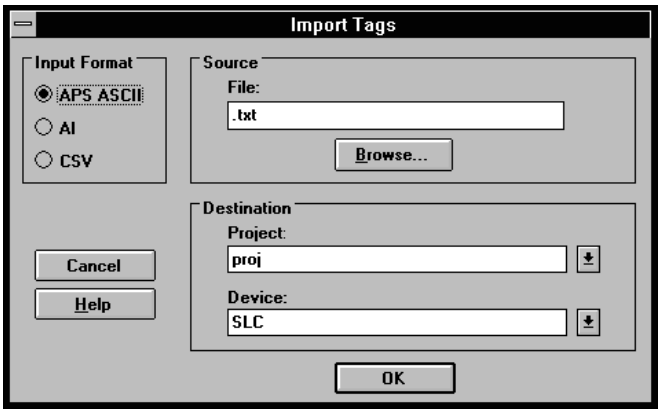
File Format	Description
Advanced Programming Software (APS)	The ASCII documentation file produced by the APSIE utility, for the SLC processor only. See the APS Import/Export Utility user manual, publication 1747-NM006.
Comma Separated Value (CSV) format	This format is used by certain software packages, such as Excel. See the user manual for the software.
Advanced Interface (AI) series software	The WINtelligent series version of the CSV format.

Importing tags

Note: The Import function does not import:

- files created without keywords
- files created with annotations.

1. Choose Import from the Tools menu to open the Import Tags dialog.



2. Select an input format (APS ASCII, AI, or CSV).

   When you import from APS ASCII format:

   The Import function automatically translates special characters in address comments (AC) used by APS software:

   - backslash (\) is changed to carriage return (<cr>)
   - double quotation marks ("") are changed to single (")
   - tilde preceding a backslash (~\) is changed to a backslash (\).

3. Type a source file in the **File** box.

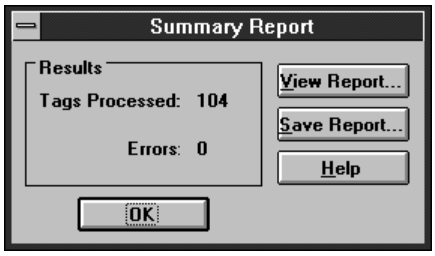
   Or select **Browse** to search for a source file.

4. Under **Destination**, select a project and the logic controller used by the project.

5. Select **OK**.

   The Reading Source File dialog opens, followed by the Importing Tags to Project dialog. Each of these dialogs displays the percentage complete.

When the Import function has finished importing the tags, the Summary Report dialog opens.



- Select **View Report** to check it over.
- Select **Save Report** to save it to a file. A report must be saved before it can be printed.
- Select **OK** to return to the Tag Editor Table View.

To handle data collisions

If two or more tags have the same name, this dialog opens.

Important: The Import function does not check for duplicate addresses, only duplicate names.

Click:	The Import utility will:
Discard Tags	Ignore conflicting tags. The tags in the project remain, and the conflicting ones in the Import source file are discarded.
Rename Tags	Rename conflicting tags. The Import function adds an extension to duplicate tags _# (where # is 1, 2 or 3) After three tags of the same name are renamed, any more imported tags of that name are discarded.
Update Tags	Update the tags in the project with the data from the imported tags.
Abort	Exit the Import/Export utility and return to the Tag Editor.

Exporting tags

1. Choose Export from the Tools menu to open the Export Tags dialog.

2. Select an output format (APS ASCII, AI, or CSV).

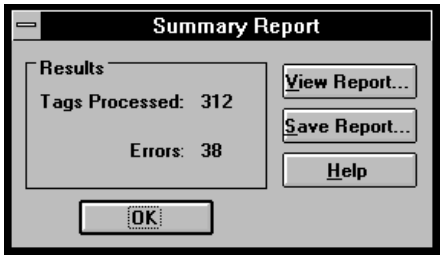
ATTENTION: The Export function automatically adjusts tag names and descriptions to fit the new format. If this will cause problems, edit the tags and their names before opening the Export tool.

- When you export to an **APS ASCII** file:
  - If the tag name is longer than 10 characters, the Export function truncates the name.
  - If the description is longer than 50 characters, the Export function truncates the description.
  - If special characters in the description are equivalent to those used by APS, the Export function translates them:
    carriage return (<cr>) to backslash (\)
    quotation mark (”) to double quotation marks (””)
    backslash (\) to tilde-backslash (~\).
  - If the tag name contains other special characters, the Export function deletes them.
- When you export to an **AI** file:
  - If the tag name is longer than 15 characters, the Export function truncates the name.
  - If the description is longer than 75 characters, the Export function truncates the description.
- When you export to a **CSV** file:
  - If the comment (description) field contains quotation marks, commas or carriage returns, the Export function puts quotation marks around the comment field.
  - If the comment field contains embedded quotation marks, the Export function changes them to double quotation marks (””).

3. Under **Source**, select a project and the logic controller associated with it.
4. Under **Destination**, type a destination file in the File box or select **Browse** to search for a destination file.
5. Select **OK**.

The Exporting Tags From Project dialog opens, followed by the Writing Destination File dialog. Each of these dialogs display the percentage complete.

When the Export function has finished exporting the tags, the Summary Report dialog opens.



- Select **View Report** to check it over.
- Select **Save Report** to save it to a file. A report must be saved before it can be printed.
- Select **OK** to return to the Tag Editor Table View.

Examining the Results of an Import/Export

View Report...

To examine detailed results of an import or export, select the **View Report** button from the Summary Report dialog. For example, if a file has been imported, View Report produces this dialog:

Interpreting Import/Export error messages 75

This error:	Means that:	What to do:
device error - no device specified	a device has not been specified	Select OK, then select or enter a device.
device error - device does not exist	the specified device has not been defined	Select No to select or enter another device. Select Yes to create a new device. This dialog box opens:  1. Select the type of device. 2. Enter the device address. 3. Select OK.
device error - device not an SLC processor[1]	a file imported from APS format requires an SLC processor, which was not defined	Select OK, then select an SLC device.
parse error[1]	the selected source file was: • corrupted • unsupported type, or a type other than the type selected • manually edited, with uncorrected mistakes	Select OK to abort the Tag Import/Export utility. Fix the bad file if necessary. Choose Import from the Tools menu again and select the same or another file to be imported.
file error - the file does not exist[1]	the selected source file does not exist	Select OK. Select another source file or cancel.
file error - the file already exists[2]	the selected destination file is already in the project	Select Yes to replace the file with the imported file. Select No to cancel the import.
project error	the selected project does not exist	Select OK. Select another project or cancel.

[1]Import only
[2]Export only

Managing Projects

This chapter covers the following topics:

- About projects
- Managing projects
- Managing devices in projects
- Loading/replacing tags or devices in projects
- Restoring a project.

About Projects

Each MessageBuilder application (MBA file) is associated with a project. The project stores: 76

- tag definitions
- device information (devices are MessageView terminals and logic controllers).

Tags and devices are specific to the type of communications, so a project must be equally specific. Different applications can share a project as long as they all use the same type of communications.

For example, a remote I/O application requires a MessageView terminal with a Remote I/O port, and either:

- a valid PLC controller and tags with PLC formatted addresses, or
- a SLC with SN scanner and tags with SLC formatted addresses.

Each project is created as a separate subdirectory in the C:\AB\PROJECTS directory. The project stores tag definitions and device information for an application or applications.

Use the Project Management dialog to:

- change the project associated with an application
- copy, rename or delete projects and devices.

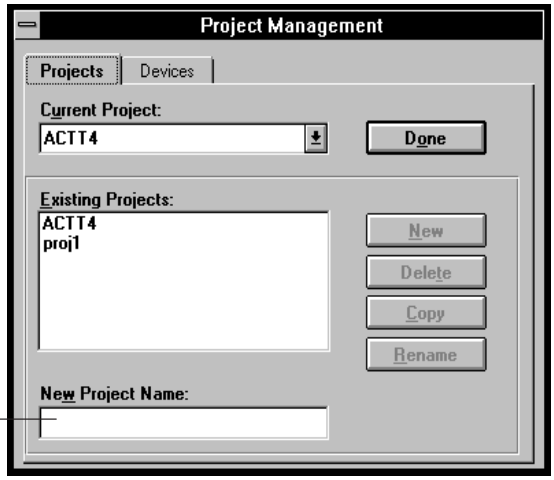
Managing Projects

Use the Project tab in the Project Management dialog to work with projects. You can: 77

- view the current project for an open application
- change the current project for an application
- create a new project
- rename a project
- make a copy of an existing project
- delete a project.

To manipulate projects:

1. Choose Project Management from the Application menu to open the Project Management dialog.



The New Project box is used when creating, renaming or copying a project.

2. Select the **Projects** tab.

The **Projects** tab shows the project that is currently used by the opened application, and a list of existing projects.

If no application is open, the **Current Project** field is blank.

3. Perform a task as defined on the next page.

4. Select the **Done** button to close the dialog and return to the Message Editor Table View (if an application is open) or the MessageBuilder window (if no application is open).

To change the project associated with an application 78

Note: If an application's project must be changed, the application must be open. Any other task on this dialog does not require an open application.

1. Select a project name from the **Current Project** list box.
2. Select the **Done** button.
3. A dialog asks for confirmation of the change. Select **Yes** to change the project or **No** to keep the current project.

To rename a project

1. Select the **New Project Name** box and type a unique name up to 32 characters long.

   It cannot start with a number, or contain spaces.
2. Highlight the name to be changed in the **Existing Projects** box.
3. Select the Rename button.
4. A dialog asks for confirmation of the rename. Select **Yes** to rename the project or **No** to cancel the rename.

The **Existing Projects** box now contains the new name, not the old one.

To delete a project

1. Highlight a name or names in the **Existing Projects** box.
2. Select the **Delete** button.
3. A dialog with the name of the project asks for confirmation that it should be deleted. Select **Yes** to delete it, or **No** to retain it.

   If more than one project is to be deleted, choose either the **Yes** button for each project or the **Yes to All** button.

The deleted project and all its tags are removed permanently.

ATTENTION: Do not use DOS or Windows delete commands to delete projects.

Important: If a project is deleted accidentally, see the section on Restoring a Project on Page 9–9.

To create a new project 79

1. Select the **New Project Name** box and type a unique name up to 32 characters long.

   It cannot start with a number, or contain spaces.
2. Select the **New** button.

The Existing Projects box now lists the new name.

To copy a project

1. Select the **New Project Name** box and type a unique name up to 32 characters long.

   It cannot start with a number, or contain spaces.
2. Highlight the name of the project to be copied in the **Existing Projects** box.
3. Select the **Copy** button.

   If the project has an application open it cannot be copied. A dialog appears:

4. A dialog asks for confirmation of the copy. Select **Yes** to copy the project or **No** to cancel the copy.

The **Existing Projects** box now lists two copies of the same project under different names.

Managing Devices in Projects

The **Devices** tab in the Project Management dialog lets you: 80

- view MessageView terminal devices and PLC/SLC devices that are currently defined for a project
- rename a device
- make a copy of an existing device
- delete a device.

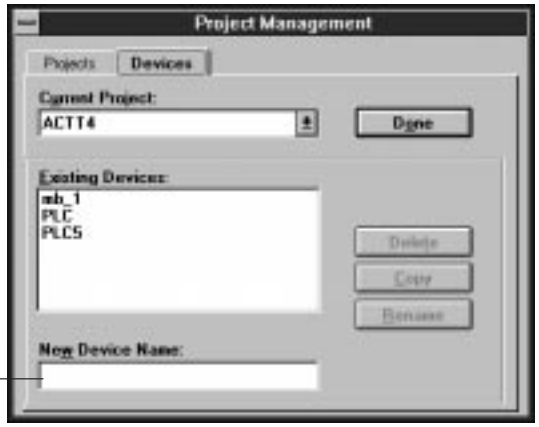
ATTENTION: Do **not** use the Devices tab of the Project Management dialog to create a new device. Device parameters cannot be specified here.

Use other dialogs to add devices to a project:

- MessageView terminal devices are added to a project when an application is first created using the New Application dialog.
- Controller devices are added to a project using the Comms. Setup button on the Terminal Setup dialog.

To manipulate devices:

1. Choose Project Management from the Application menu to open the Project Management dialog.



The New Device Name box is used when deleting, copying or renaming devices.

2. Select the **Devices** tab, if not selected.

The **Devices** tab lists all devices that are defined for the current project.

3. Perform a task as defined on the next page.

4. Select the **Done** button to close the dialog.

Note: An application does not have to be open when devices in its project are manipulated.

To delete a device

1. Highlight a name or names in the **Existing Devices** box.
2. Select the **Delete** button.
3. A dialog with the name of the device asks for confirmation that it should be deleted. Select **Yes** to delete it or **No** to retain it.

   If more than one device is to be deleted, choose either the **Yes** button for each device or the **Yes to All** button.

The device is permanently removed from the project, and all occurrences of the device name are removed from the application(s) in the project.

To copy a device

1. Select the **New Device Name** box and type a unique name up to 32 characters long.

   It cannot start with a number, or contain spaces.
2. Highlight in the **Existing Devices** box the name of the device to be copied.
3. Select the **Copy** button.
4. A dialog asks for confirmation of the copy. Select **Yes** to copy the device or **No** to cancel the copy.

The **Existing Device**s box now has two copies of the same device under different names.

To rename a device

1. Select the **New Device Name** box and type a unique name up to 32 characters long.

   It cannot start with a number, or contain spaces.
2. Highlight the name to be changed in the **Existing Devices** box.
3. Select the **Rename** button.
4. A dialog asks for confirmation of the rename. Select **Yes** to rename the device or **No** to cancel the rename.

The **Existing Devices** box now has the new name, not the old one.

To edit devices in a different project than the current one

If an application is open, the project associated with it is listed in the **Current Project** box. However a different project can be selected and its devices edited.

Select a project name in the **Current Project** list box. The **Existing Devices** box lists all devices in the selected project.

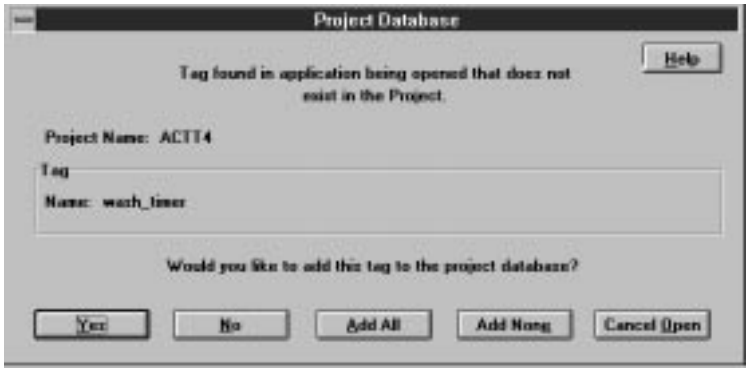
Loading/Replacing Tags or Devices in a Project

When reopening an application, it is possible that the devices or tags in the application are not in the project or are different from the devices or tags in the project. This section shows how to:

- load unknown devices or tags in a project
- replace devices or tags in a project.

If application devices or tags are not in its project:

MessageBuilder displays the following dialog if the application you are opening contains devices (terminal/controller) or tags that are not stored in the project.



MessageBuilder must be told what to do. The options are:

Select:	To:
Yes	Add the named device or tag to the project database.
No	Ignore the device or tag, do not add it to the database.
Add All	Add all unknown devices or tags to the database.
Add None	Ignore all unknown devices or tags, and open the application.
Cancel Open	Do not open the application.

If **Yes** or **No** was chosen, the dialog reappears with the next application tag or device not found in the project.

If **No** or **Add None** was selected, the following caution appears:

Select **OK** to accept the warning. The application opens as usual.

If application devices or tags are different than those in its project: 81

MessageBuilder displays the following dialog if the application you are opening contains different devices (terminal/controller) or tags than those of the same name stored in the application's project:

Discrepancies that may exist between the application and project:

- The application and project reference the same **device name** but the **device types** are different.
- A **tag** in the application has the same name as a **device** in the project. For example, the application contains a tag named GRIPPER and the project contains a MessageView terminal named GRIPPER.
- A **device** in the application has the same name as a **tag** in the project. For example, the application contains a device named MOTOR and the project contains a tag named MOTOR.

For each discrepancy, MessageBuilder must be told what to do. The options are:

Select:	To:
Yes	Replace the project device or tag with the application device or tag.
No	Ignore the device or tag, do not replace it to the database.
Replace All	Replace all project devices or tags with the application devices or tags.
Replace None	Ignore all unresolved devices or tags, and open the application.
Cancel Open	Close the application.

If **Yes** or **No** was chosen, the dialog reappears with the next different application tag or device.

If **No** or **Replace None** is selected, a dialog warns that the application may not validate because of the differences.

Restoring a Project

If a project is deleted accidentally, an application associated with it may be used to recreate the project. 82

1. Open the application. This dialog appears:

2. Select **Yes**. The project is recreated with all the device and tag data required by the application.

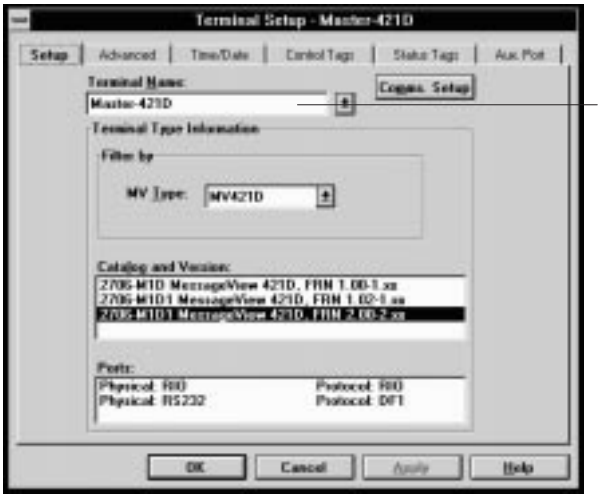
Terminal and Communication Setup

This chapter covers the following topics:

- Overview of terminal setup
- Changing the terminal type
- Remote I/O communications
- Block transfers
- RS-232 main port communications
- Setting advanced terminal options
- Setting format for time and date
- Defining control tags
- Defining status tags
- Auxiliary port setup.

Overview of Terminal Setup

The Terminal Setup tool or the Terminal Setup command on the Application menu opens the Terminal Setup dialog. This dialog defines both operating parameters and runtime communication parameters.



Terminal Name was defined when the application was created.

The Terminal Setup dialog uses tabs to organize its tasks by function.

Tab	Function
Setup	change terminal type of MessageView device
	define runtime communication parameters between the terminal and controlling device (accessed via Comms. Setup button)
Advanced	set a variety of terminal options
Time/Date	specify how the time and date will display in the terminal
Control Tags	define tags for: Message Trigger (bit and value) Return Message Number Acknowledge Acknowledge Handshake Acknowledge Return Number Function Key Return Number
Status Tags	define tags for HE Stack Status
Aux. Port	define Auxiliary Port (RS-232) device parameters

Note: The control buttons at the bottom of this set of tabbed dialogs apply to all tabs. **OK** saves parameters on all tabs, **Cancel** does not save any parameter.

Terminal Port dialogs

MessageBuilder software has two dialogs where communication parameters for a terminal port may be set up.

Terminal Ports	Where they are configured
Remote I/O and RS-232 Catalog Nos. 2706-M1D1, -M1N1, -M1F1.	**Remote I/O** in the dialog accessed by the Comms. Setup button. See Page 10–4. **RS-232** in the Aux. Port tab. See Page 10–9.
RS-232 only Catalog Nos. 2706-M1D, -M1N, -M1F.	**RS-232** in the dialog accessed by the Comms. Setup button. See Page 10–27.

The Comms. Setup button dialog is used to configure the communications between the MessageView terminal and the controlling device. This configuration is commonly called Controlling Communications.

The Aux. Port tab dialog is used to configure the communications between the MessageView terminal and an input or output device that is not a controlling device. This configuration is commonly called Auxiliary Device Communication.

Changing the Terminal Type

To change the type of MessageView terminal assigned to an existing application:

1. Choose Terminal Setup from the Application menu.

   The **Setup Tab** shows the information that was associated with the terminal name when the application was first created.
2. Change the **Terminal Type** to the type of terminal that the application will be designed for.
3. Select an existing **Terminal Name** that matches the new terminal type from the list box

   Or highlight the entry in the box and type in a new name.
4. If you typed a new name, select a **Catalog** number and firmware **Version**; only the choices that fit the selected terminal type are displayed.
5. The Ports list box displays the ports available on the terminal you defined. Select **OK**.

Special considerations

Each application is designed for a certain type of MessageView terminal.

If the selected terminal type and the application type do not match, a dialog asks if the application should be changed.

Select **Yes** to convert the application.

- Select **No** to keep the application as it is, even though it may not pass validation.
- Select **Cancel** to keep the original terminal type.

If messages in the application before conversion consisted of embedded Function keys or Entry variables, and the new designated terminal type does not support these functions, the conversion process will display an error dialog box.

The error dialog box reports the message numbers of any incompatible messages in the application.

If the terminal is changed from:	To:	Remove:
MessageView 421F	MessageView 421N	Function keys LEDs
MessageView 421F	MessageView 421D	Function keys LEDs Entry Variables
MessageView 421N	MessageView 421D	Entry Variables
MessageView 421N	MessageView 421F	none
MessageView 421D	MessageView 421N MessageView 421F	none none

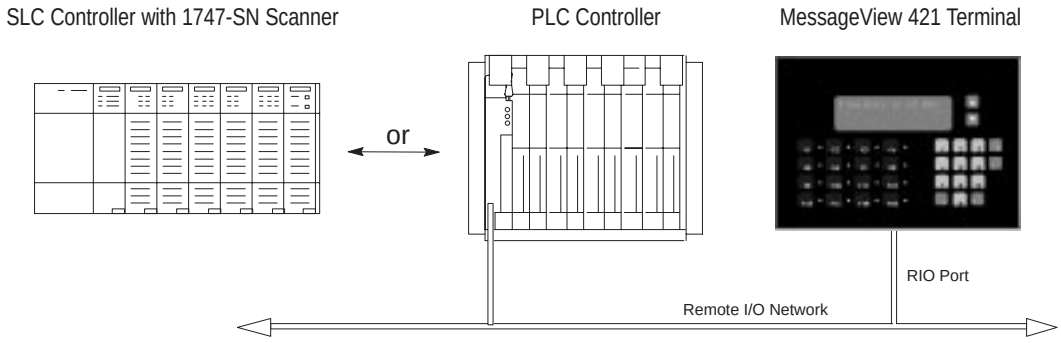
Note: The conversion will not take place (aborts) if these incompatibilities exist. Each of the messages reported in the error dialog must be edited individually before the application can be converted.

Remote I/O Communications

This section shows how to define runtime parameters for a MessageView terminal and a PLC or SLC, that will communicate over a Remote I/O (RIO) link.

The MessageView terminal operates as a single rack on the network. Its RIO communication parameters are set to match those of the logic controller it will exchange data with, while the application is running.

MessageView terminals with RIO daughterboards are Catalog Nos. 2706-M1D1, -M1N1, and -M1F1.



This table lists the controller types and options supported by MessageView terminals with RIO daughterboard.

Controller/Scanner Type	Lowest Rack	Highest Rack	Supports Block Transfer?
IBM PC 6008-SI VME 6008-SV DEC QBUS 6008-SQ	0	7	Yes
PLC 5/11	3	3	Yes
PLC 5/15 PLC 5/20		3	Yes
PLC 5/25 PLC 5/30	1	7	Yes
PLC 5/40	1	7_{octal}	Yes
PLC 5/60 PLC 5/80	1	7_{octal}	Yes
SLC 1747-SN Series A	0	3	No
SLC 1747–SN Series B	0	3	Yes
Other 1771-SN Subsystem	1	7	Yes

☞ *The terminal type was defined when the application was created.*

Comms. Setup

To configure Remote I/O communications:

1. In the Terminal Setup dialog, verify the terminal type selected in the Catalog and Version field.
2. Select the Comms. Setup button to open the Communications Setup dialog.

   When the selected terminal in the Terminal Setup dialog has a RIO port, the Comms. Setup button opens a dialog to configure this port.

Note: The Rack setting limits are determined by PLC/Scanner type.

To set up the logic controller:

☞ *To copy, rename or delete a controller or terminal in a project, use the Devices tab in the Project Management dialog. See page 9–5.*

1. Select a logic controller name from the **Name** list box. MessageBuilder software validates the settings for the selected controller/scanner.

   Or highlight the name in the **Name** box and type a unique name for the selected logic controller.
2. Select the type of logic controller from the **Type** list box. See the list on Page 10–5.

   If a name already exists, the controller type will be entered automatically as defined by that name.

To set up the terminal port:

Use:	To:
Rack	Use only rack numbers supported by the controller or scanner.
Module Group	Specify the module groups used by the terminal in the rack; they must be contiguous.
Last Chassis	Check this box if these module groups have the highest numbers assigned in the rack.
Baud Rate	Specify the baud rate used on the RIO link. The options are: 57.6 K 10,000 feet 115.2 K 5,000 feet 230.4 K 2,500 feet
Block Transfer	Discussed in detail in the next section.

3. Select **OK** to save the Remote I/O settings and return to Terminal Setup dialog.

Block Transfers

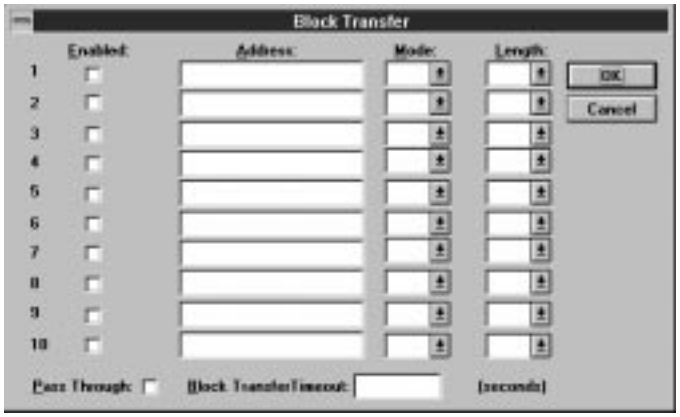
Use block transfers on a Remote I/O link to transfer a large block of data between the MessageView 421 terminal and the logic controller. See the section starting on Page 5–17.

Create up to 10 block transfer channels, numbered 1 to 10. Each channel is associated with a block transfer read or write instruction (BTR or BTW) in the controller ladder logic.

To define block transfers:

1. Select the **Block Transfer** button in the Communication Setup dialog.

   Note: If the controller/scanner does not support block transfer, the Block Transfer button is dimmed and inactive.



2. Enter the parameters for each block transfer to be used.

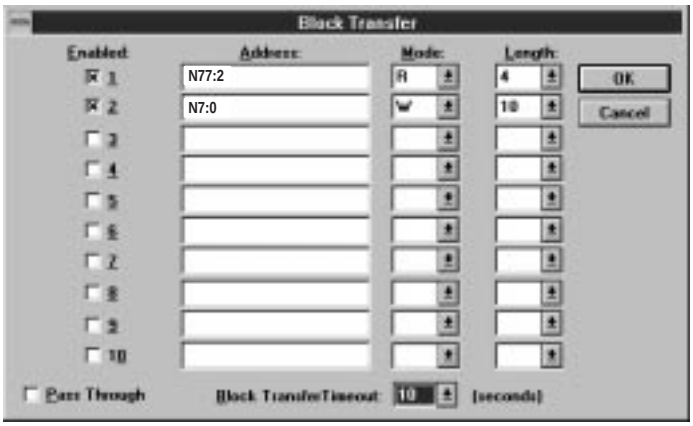
Use:	To:
Enabled	Enable or disable the block transfer.
Address	Specify the starting address of the block transfer in a native SLC or PLC (Remote I/O) link.
Mode	Select Read or Write.
Length	Select the number of words (1 to 64) required by the block transfer. A length of 63 is reserved for Pass-Through.

3. Select **OK** to return to the Communication Setup dialog.

Note: Pass-Through Enable and Block Transfer Timeout are future enhancements. Ignore them in this dialog.

Example

In this example, two block transfer assignments are specified.



ATTENTION: When block transfer is used, be **certain** that if the Return Message Number global attribute is selected:

The Acknowledge bit tag is assigned to the same block as the Acknowledge Return Message Number tag.

Function Key write tags are assigned to the same block as the Function Key Return Message Number tag.

RS-232 Main Port Communications

A MessageView terminal's RS-232 port may be used as:

- A MessageBuilder communications link port (all terminals)
- an ASCII Trigger controlling port (Catalog Nos. 2706-M1D, -M1N, -M1F)
- a slave device port (Catalog No. 2706-M1D)
- an Auxiliary Device port (Catalog Nos. 2706-M1D1, -M1N1, -M1F1)

MessageBuilder communications link port

The RS-232 port on all MessageView 421 terminals is used in one of its configurations as the link between the terminal and MessageBuilder Configuration software. The RS-232 port parameters for this link are fixed (not user configurable). See Page 5–2 for the DF1 parameters.

The section starting on Page 11–6 explains uploading to and downloading from the MessageBuilder software. You can configure the terminal to default to MessageBuilder configuration parameters on power–up, see Page 10–16.

ASCII Trigger controlling port or Slave Device port

This section shows how to define runtime parameters for a terminal controlled by an ASCII Triggering device and a terminal as a slave device. Both devices communicate via an ASCII serial port, the main RS-232 port.

To configure the RS-232 communications for ASCII Triggering and Slave Device:

1. In the Terminal Setup dialog, verify the terminal type selected in the Catalog and Version field.

Comms. Setup

2. Select the Comms. Setup button to open the Communications Setup dialog.

   When the selected terminal in the Terminal Setup dialog has only an RS-232 port, the Comms. Setup button opens a dialog to configure this port.

3. Select the radio button for either ASCII Triggered or Slave Device.
4. Set the parameter values as needed.

Parameter Names	Default Parameters	Options
Node Number (The node address of the MessageView terminal.)	1	1 to 127.
Baud Rate	9600	300, 600, 1200, 2400, 9600, 19,200, 38,400 bps
H/W Handshake	Disabled	Enabled, Disabled
Parity	None	None, Odd, Even
Data Bits	8	7, 8
Stop Bits	1	1, 2

   Note: For information on the Hardware Handshake parameter, see Page 4–29.

5. Select **OK** to save the RS-232 settings and return to Terminal Setup dialog.

Note: The RS-232 communication parameters may be changed by the terminal operator via the Front Panel Editor.

Note: The application may be Password enabled to prevent the terminal operator from changing the settings and disrupting communications. See Page 10–18.

Note: Since the same RS-232 port on the terminal is used for communications with an ASCII Triggering device or a master device, and also with MessageBuilder programming software, the terminal must be set to the correct port configuration before proper communications can be established. See the discussion on Page 5–3.

MessageView terminal as a slave device

When a MessageView terminal is set up as a slave device, it is considered to be a slave in a master/slave relationship. The slave device terminal receives commands from a slaving (master) device, but does not initiate communications itself. See Page 4–18 for a discussion of slave devices.

Because of the architecture of the MessageView 421D Slave Device terminal (Catalog No. 2706-M1D), an application with the communication parameters and a blank message needs to reside in the terminal's memory. All MessageView 421D terminals (Catalog No. 2706-M1D) are shipped with an application residing in memory for this purpose.

Consult the Slave Device section of the MessageView terminal user manual for more details.

Auxiliary Device port

The MessageView terminal configured with a daughterboard communications card (Remote I/O) can use the RS-232 port as an auxiliary port for communications to:

- an ASCII Input device
- a slave device (the MessageView terminal is a master device)

The Auxiliary port parameters are configured under the **Aux. Port tab** in the Terminal Setup dialog. See the section starting on Page 10–27 to configure the auxiliary port.

Note: Since the same RS-232 port on the terminal is used for communications with an ASCII Triggering device or a slave device, and also with MessageBuilder programming software, the terminal must be set to the correct port configuration before proper communications can be established. See the discussion on Page 5–3.

Setting Advanced Terminal Options

The Advanced tab in the Terminal Setup dialog allows the application designer to define a variety of global configuration parameters for the MessageView terminal.

To set or modify advanced terminal options:

1. Select the **Advanced** tab from the Terminal Setup dialog.

2. Modify the settings as needed.
3. Select the **OK** button to save all the settings from the Terminal Setup dialog and return to the main Message Editor Table View.

- Or select another tab and continue setting up the terminal for the application.
- Or select the **Cancel** button to return to the Message Editor Table View without saving any Terminal Setup settings.

Return Message Number to PLC

If this option is enabled, the message number of the displayed message is sent to the controller, provided its global Return Message Number tag is defined. The controller may be a logic controller or an ASCII Triggering device.

The three classes of messages may have Return Number tags:

- messages with the Ack attribute enabled
- messages with Function Keys enabled
- messages of all other kinds.

Note: If the **Return Message Number to PLC** attribute is enabled, then one or more of the three Return Number tags in the Control Tags tab must be defined. See Page 10–21.

If the controller is an ASCII Triggering device, the Return Message Number is sent back as part of the Ctrl-N message. See Page 5–12.

ATTENTION: When this global attribute is selected, be **certain** that if block transfer is used:

The Acknowledge bit tag is assigned to the same block as the Return Message Number tag.

Function Key write tags are assigned to the same block as the Return Message Number tag,

The Function key Return Message Number is sent to the controller twice:

- when the message is displayed
- when the Function key is pressed and released.

If the controlling device is an ASCII Triggering device the Function key Return Message Number is sent back as part of the Ctrl-F command. See Page 5–11.

The Acknowledge Return Message Number is sent to the controller twice:

- when the message is displayed
- when the **ACK** key is pressed and released.

If the controlling device is an ASCII Triggering device the Acknowledge Return Message Number is sent back as part of the Ctrl-K command. See Page 5–11

If the Return Message Number option is disabled, messages that require operator input may need individual notification and handshake tags.

Note: A message with the Hidden Message attribute set will not return its number to the controlling device, since it is not displayed.

Enable Message Queue

The Message Queue in the MessageView 421 terminal stores value-triggered messages until the line(s) in which they will be displayed is available. Bit-triggered messages are not queued.

- If this option is enabled, up to 64 messages can be queued on a First In – First Out basis. They are displayed in turn as terminal display lines become available.

  With this option enabled, make sure to define a Value Trigger tag in the Control Tags tab dialog. See Page 10–23.
- If this option is disabled, a message is displayed only if the line assigned to it is available when it is triggered.

Send Values at Power-Up

If this option is enabled, the terminal sends variable data to the controller after power is cycled or the terminal is reset.

Note: This option is always enabled for Remote I/O communications.

If the Send Values at Power-Up option is enabled, select one of the radio buttons under the **Values at Power-Up** option:

Select	To
Preset Values	send the initial values set in the tags for the variables.
Last Values	send the runtime values at the moment when the terminal was reset or lost power.

If the **Send Values at Power-Up** option is disabled, the terminal does not send any data to the controller at power-up.

The terminal operator can use the Front Panel Editor to change the Values at Power-Up selection.

Note: The Send Values at Power-Up and Values at Power-Up features are not supported in ASCII Trigger applications.

Enable Debug Mode

Debug Mode is used to check the application in a MessageView terminal. In Debug Mode, as each message is triggered its message number is displayed on the terminal instead of message text. If this option is enabled, then the application will run in Debug Mode.

The terminal operator can use the Front Panel Editor to enable/disable the Debug Mode.

Enable Simulate feature

The Simulate feature may be used to test an application in a MessageView terminal. In this mode the terminal displays messages but has no input from a controlling device. No communications error messages appear on the display.

The terminal operator can use the Front Panel Editor to enable/disable the Simulate feature.

When both Debug Mode and the Simulate feature are disabled, the terminal runs the application in normal Run Mode.

Flash Rate

Flash Rate determines the speed at which a character, word or message flashes on the terminal display. The rates are:

Rate Selected	Speed (Approximate)
None	Even if the Flash attribute is used, it will not have any effect.
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)

The terminal operator can use the Front Panel Editor to change the Flash Rate.

Note: A MessageView terminal as a slave device uses this parameter to flash messages transmitted to it from the master device, with an embedded Ctrl-F.

Local Language

Local Language specifies the language in which the MessageView terminal's Front Panel Editor menus, and internal warning and error messages from the firmware, appear in the MessageView terminal display. Select a language from the list box.

The terminal operator can use the Front Panel Editor to change the Language selection.

Important: Application messages will always use the language in which they were written, even if the Local Language is different.

Brightness

Brightness determines the terminal display light level. Select a level from the list: 12, 25, 38, 50, 60,75, 87 or 100%. Default is 75%.

The terminal operator can use the Front Panel Editor to change the Brightness selection.

See Page 4–6 for the ASCII Triggering device command for a Special Message that changes display brightness.

Port Power-Up

This option determines how the RS-232 port is configured at Power-Up.

- The MessageBuilder option configures the terminal to power-up with the communication parameters defined to communicate with a computer where MessageBuilder software resides, for instance to upload the Historic Event Stack
- The Auxiliary option configures the terminal to power-up with an ASCII Triggering device or the communication device defined in the Aux. tab dialog.

The terminal operator can use the Front Panel Editor to toggle this option.

Note: This option may affect downloading an application, if the MessageView terminal is configured to the Auxiliary Device when an attempt is made at communicating with a computer. To correct this situation, change the port configuration of the receiving MessageView terminal via the Front Panel Editor. See the section on Page 5–3 that discusses switching RS-232 settings.

Handshake Timeout

Handshaking is an option used to confirm that the information has been received by the controller, whether a logic controller or an ASCII Triggering device. If the terminal does not receive the handshake within a certain time, a Timeout message appears on the display. See the discussion on handshaking on Page 4–26.

Set the Timeout time by selecting a value from the Handshake Timeout spin control. The range is 0 to 60 seconds, default is 4 seconds.

Trigger Priority

Two or more messages may be triggered at the same time and contend for the same display line(s). See the section on triggering that starts on Page 4–9.

- If the messages are value-triggered, priority is determined by which Message Number is entered into the Value Trigger address first.
- If the messages are bit-triggered, priority is determined by the lowest set bit in the Bit Trigger tag.
- If one message is value-triggered and one is bit-triggered, priority is determined by this option, the Trigger Priority global attribute:
  - if Bit is selected, the message with a bit trigger is displayed and the one with the value trigger is queued (if the Message Queue is enabled)
  - if Value is selected, the message with a value trigger is displayed and the one with the bit trigger waits. If the bit is still set when the value triggered message is terminated, its message is displayed.

Note: Bit triggering cannot be used by an ASCII Triggering device, so this option must be set to value trigger.

Startup Message

Enable this option if a certain message should be displayed whenever the terminal powers up.

- Select the message number in the spin control.
- Or highlight the current number and type the selected number.

Background Message

Enable this option if a certain message is to be displayed after 2 seconds in which no active message is displayed.

- Select the message number in the spin control.
- Or highlight the current number and type the selected number.

Note: ASCII Triggering applications do not support Startup or Background Messages with embedded display variables.

The terminal operator can use the Front Panel Editor to change the Startup and Background Messages.

Password

A password for the MessageView terminal is optional. It protects the MessageView terminal from an unauthorized person making changes to the system configuration using the Front Panel Editor. The terminal operator does not need a password to run the application.

Note: MessageView 421D terminals do not support the password option.

Select the check box to enable the password option. Then highlight the text in the box and type a 4-digit number as the password.

A password applies as long as the current application resides in the MessageView terminal. Other applications that run at different times in the same terminal may have the same or a different password, or none.

A terminal operator who knows the password can use the Front Panel Editor to disable and enable the password feature, provided it is enabled and defined in the application. If it is not defined, the operator cannot enable it.

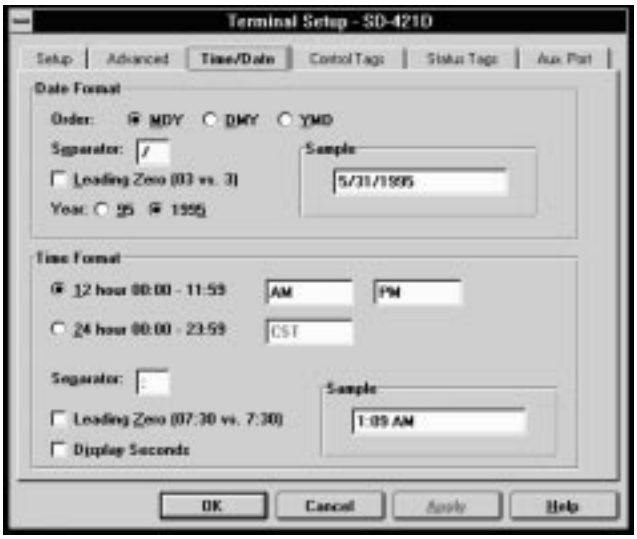
Setting Format for Time and Date

The Time/Date tab in the Terminal Setup dialog specifies how the time and date are displayed on the MessageView terminal. For example:

Date Formats		Time Formats	
Month/Day/Year **7/3/95**	With Leading Zeroes **07/03/95**	12-Hour Format **2:56**	With Time Zone & Time Standard Designations 2:56 PM CST
Day/Month/Year **3/7/95**	With 2-Digit Year Prefix **7/3/1995**	24-Hour Format **14:56**	With Leading Zeroes **02:56**
Year/Month/Day **95/7/3**	With User Defined Separator **7*3*95**	With Seconds **14:56:29**	With User Defined Separator **14*56*29**

To select the time or date format used by the terminal:

1. Select the **Time/Date** tab from the Terminal Setup dialog.



2. Set the **Date Format** and the **Time Format** as required.
3. Select the **OK** button to save all the settings from the Terminal Setup dialog and return to the main Message Editor Table View.

   Or select another tab and continue setting up the terminal for the application.

   Or select the **Cancel** button to return to the Message Editor Table View without saving any Terminal Setup settings.

Use the **Date Format** area to set the options for the date format. The Sample area (lower right) displays the format as it is selected.

Option:	Used to:
Order	Select the order of the month (M), day (D) and year (Y). Default is MDY.
Separator	Specify the symbol to separate the month, day and year. Any character may be used. Default is the slash (/).
Leading Zero	Specify that the day and month always have two digits. If this option is enabled, February 2 displays as 02/07. Default is leading zeros **not** displayed: 2/7.
Year	Specify whether the year is displayed as two or four digits. For example the year 1996 can be displayed as 96 or 1996.

Use the **Time Format** area to set the options for the time format. The Sample area (lower right) displays the format as it is selected.

Option:	Used to:
12-Hour/24 Hour	Display the time in numbers representing hours: Select 12-Hour to reset time to 00:00 after 11:59. Select 24-Hour to reset time to 00:00 after 23:59. The text boxes to the right display editable suffixes.
Separator	Specify a character to separate hours, minutes and seconds. Default is the colon (:).
Leading Zero	Display the hours before ten with a leading zero. If this option is enabled, 3:15 displays as 03:15. Default is leading zero **not** displayed: 3:15.
Display Seconds	Specify whether seconds are displayed. Default is to display seconds.

Set the time and date in the MessageView terminal using the RTC Download command. See Page 11–9.

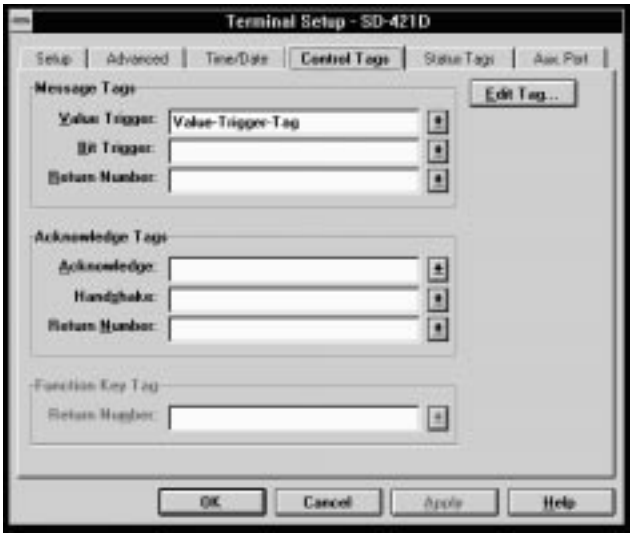
The terminal operator can use the Front Panel Editor to change the Time and Date in the Real Time Clock. The format can be changed only by using MessageBuilder software.

See Page 4–6 for the ASCII Triggering device command for the Special Messages that get or set the Real Time Clock time.

Defining Control Tags

The terminal uses control tags to specify addresses for global attributes.

1. Select the **Control Tags** tab from the Terminal Setup dialog.



2. Assign tags as needed.
3. Select the **OK** button to save all the settings from the Terminal Setup dialog and return to the main Message Editor Table View.

   Or select another tab and continue setting up the terminal for the application.

   Or select the Cancel button to return to the Message Editor Table View without saving any Terminal Setup settings.

Note: If the Return Message Number attribute is enabled in the Advanced tab, then one or more of the three Return Number tags in this tab must be defined.

Message Tags

The **Value Trigger** tag address contains the message number of the most recently triggered message. The terminal scans the integer value and displays or queues the message that has that message number. This tag is required if the Message Queue was enabled in the Advanced tab dialog.

The only valid data type for this tag is unsigned integer.

Note: In an ASCII Trigger application, only a tag name is required for the value trigger. Node name and address may be left blank. See Page 5–8 for the Ctrl-T command used to trigger a message.

The **Bit Trigger** tag is the base address for a table that contains up to 1024 bits (64 words). Specific messages are assigned one bit as their bit trigger. The terminal scans the bit table and triggers the message whose bit corresponds to the lowest set bit in the table.

This tag is required if at least one message in the application has a bit trigger assigned and enabled.

The only valid data type for this tag is unsigned integer.

Note: An ASCII Triggering device does not support bit triggers.

The **Return Number** tag is the address where the terminal writes the message number of the most recent active message on the display, provided:

- the message has no function keys enabled, **and**
- Acknowledge is not enabled, **and**
- the Return Message Number attribute is enabled in the Advanced tab dialog.

The only valid data type for this tag is unsigned integer.

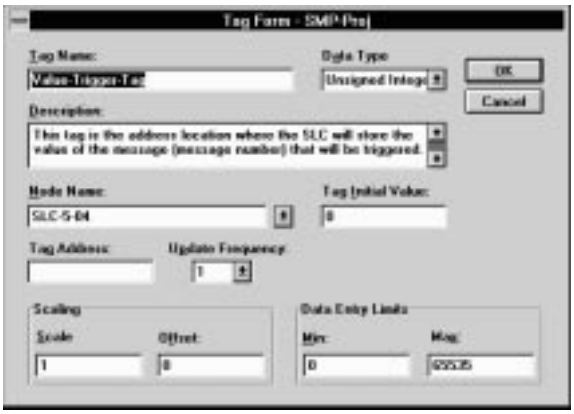
Note: If the controller is an ASCII Triggering device, the Return Message Number is sent back as part of the Ctrl-N message. See Page 5–12.

To enter these global Message Tags:

- select the name of a tag from the list box, or
- type a new tag name and select the **Edit Tag** button to define the tag.

To edit the Message Tag attributes:

1. Put the insertion pointer in the tag box.
2. Select the **Edit Tag** button to bring up the Tag Form dialog:



3. Edit the tag's attributes (see the section starting on Page 8–2).
4. Select **OK**.

Note: In an ASCII Trigger application, only a tag name is required for message tags. Node name and address may be left blank.

Acknowledge Tags

The **Acknowledge** tag is the address where the terminal writes a 1 when its **ACK** key is pressed in response to a message with the Acknowledge attribute enabled.

The only valid data type for this tag is bit.

Note: If the controller is an ASCII Triggering device, the Acknowledgement is sent back as part of the Ctrl-K message. See Page 5–11.

The **Handshake** tag is the address where the terminal scans for a 1 to confirm that the **ACK** key press was acquired by the logic controller. If this tag is not defined, Acknowledge handshaking is disabled.

The only valid data type for this tag is bit.

Note: An ASCII Triggering device does not support handshaking for an Acknowledgeable message.

The **Acknowledge Return Number** tag is the address where the terminal writes the message number of the most recent active message on the display if:

- the message has the Ack attribute enabled, **and**
- the Return Message Number attribute is enabled in the Advanced tab dialog.

The only valid data type for this tag is unsigned integer.

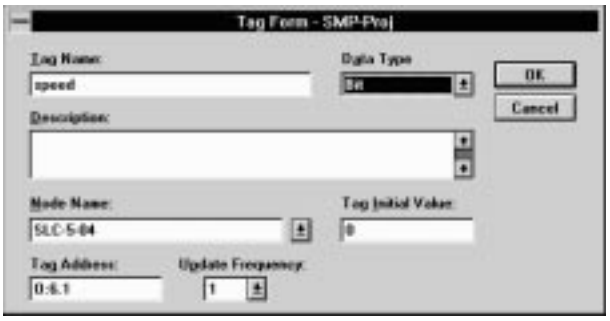
Note: If the controller is an ASCII Triggering device, the Return Message Number is sent back as part of the Ctrl-K message. See Page 5–11.

To enter these global acknowledge tags:

- select the name of a tag from the list box, or
- type a new tag name and select the **Edit Tag** button to define the tag.

To edit the Acknowledge Tag attributes:

1. Put the insertion pointer in the tag box.
2. Select the **Edit Tag** button to bring up the Tag Form dialog:



3. Edit the tag's attributes (see the section starting on Page 8–2).
4. Select **OK**.

Note: In an ASCII Trigger application, only a tag name is required for acknowledge tags. Node name and address may be left blank.

Function Key Tag

The **Return Number** tag is the address where the terminal writes the message number of the most recent active message on the display if:

- the message has Function key(s) enabled, **and**
- the Return Message Number attribute is enabled in the Advanced tab dialog.

The only valid data type for this tag is unsigned integer.

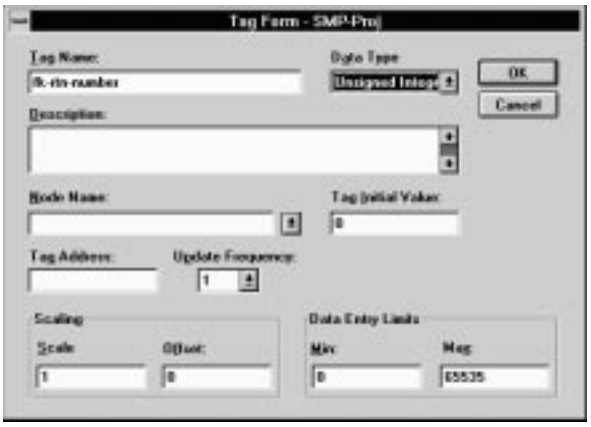
Note: If the controller is an ASCII Triggering device, the Return Function Key Message Number is sent back as part of the Ctrl-F message. See Page 5–11.

To enter the global Function key tag:

- select the name of a tag from the list box, or
- type a new tag name and select the **Edit Tag** button to define the tag.

To edit the Function Key Tag attributes:

1. Put the insertion pointer in the tag box.
2. Select the **Edit Tag** button to bring up the Tag Form dialog:



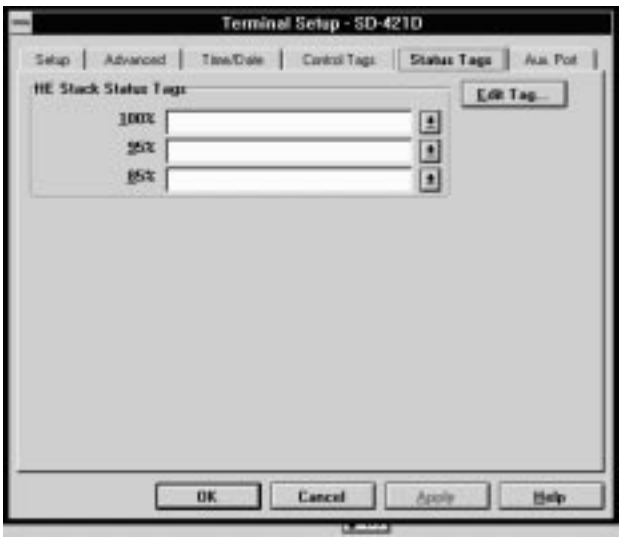
3. Edit the tag's attributes (see the section starting on Page 8–2).
4. Select **OK**.

Note: In an ASCII Trigger application, only a tag name is required for Function key tags. Node name and address may be left blank.

Defining Status Tags

The **HE Stack Status** tags provide an indication to the logic controller when the stack is nearly or completely full. The Historical Event Stack holds about 4000 alphanumeric text messages. See Page 4–19 for a discussion of the Historical Event Stack.

1. Select the **Status Tags** tab from the Terminal Setup dialog.



2. Select the name of a tag from the list box for one or all of these tags.

- **100%** is the address where the terminal writes a 1 when the stack is full.
- **95%** is the address where the terminal writes a 1 when the stack is 95% full.
- **85%** is the address where the terminal writes a 1 when the stack is 85% full.

The only valid data type for these tags is bit.

Once set, these status bits remain On until the condition has been cleared. Warning messages are displayed on the terminal for the corresponding conditions. The 100% warning message requires the operator to acknowledge the condition.

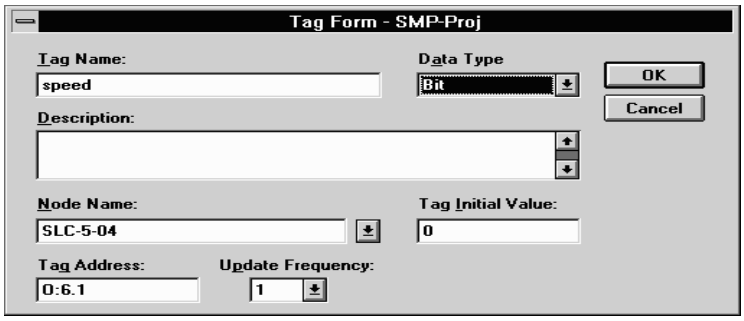
Note: An ASCII Trigger application supports the HE Stack Status tags. However the terminal returns the actual status number: 85, 95 or 100 to the controlling device, as part of the Ctrl-H command. See Page 5–12 for the HE Stack report the terminal sends to the ASCII Triggering device.

To enter these global status tags:

- select the name of a tag from the list box, or
- type a new tag name and select the **Edit Tag** button to define the tag.

To edit a Status Tag attributes:

1. Put the insertion pointer in the tag box.
2. Select the **Edit Tag** button to bring up the Tag Form dialog:



3. Edit the tag's attributes (see the section starting on Page 8–2).
4. Select **OK**.

Note: In an ASCII Trigger application, only a tag name is required for HE Stack tags. Node name and address may be left blank.

Auxiliary Port Setup

A terminal with a daughterboard (Catalog Nos. 2706-M1D1, -M1N1 or -M1F1) has both a Remote I/O (RIO) port and an RS-232 port. The RS-232 port may be configured to communicate with other devices, using the Aux. Port tab. For a terminal without a RIO port, see Page 10–9.

For details on RS-232 port configuration, see the section starting on Page 5–3.

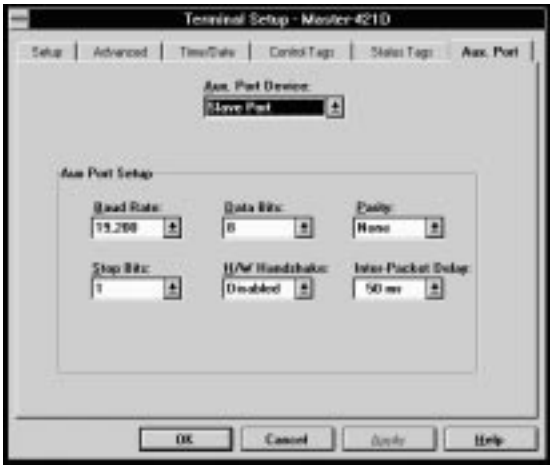
While the application is running, a terminal with a daughterboard and the appropriate firmware can communicate with a logic controller and with either:

- an ASCII Input device, see a list on Page 5–6.
- one or more slave devices as a slaving (master) device. Slave devices are listed on Page 5–6.

To configure the RS-232 Auxiliary Port:

1. In the Terminal Setup dialog, verify the terminal Catalog and Version field.
2. Select the Aux. Port tab.

   When the selected terminal in the Terminal Setup dialog has only an RS-232 port, this tab does not open.



3. Use the list box to select one of the following:
   - Slave Port
   - ASCII Input

4. Set the parameter values as needed.

Parameters	Default	Options
Baud Rate	9600	300, 600, 1200, 2400, 9600, 19,200, 38,400 bps
Data Bits	8	7, 8
Parity	None	None, Odd, Even
Stop Bits	1	1, 2
H/W Handshake	Disabled	Enabled, Disabled
Inter-Packet Delay	200 ms	50, 100, 150, 200, 250, 300, 350, 400, 450, 500 ms

For information on the Hardware Handshake parameter, see Page 4–29.

Note: The Inter-Packet Delay parameter is intended to allow a Dataliner DL10, DL20 or DL50 time to process each message packet before the next packet is sent from the master. The worst case for the Dataliner family is 300 ms.

If the port is configured for an ASCII Input device, this option does not apply.

5. Select **OK** to save the RS-232 settings and return to the Terminal Setup dialog.

Validating Applications and Transferring Files

This chapter covers the following topics:

- Helpful hints
- Validating applications
- Transfer utilities
- Downloading an application to a terminal
- Downloading to a DOS file
- Downloading time/date to Real Time Clock
- Uploading an application from a terminal
- Uploading the Historical Event Stack
- Using the MessageView File Transfer Utility
- Terminal upgrade.

Helpful Hints

- MessageBuilder applications are normally saved to MBA files. The MBA file is translated and saved as an MVA file during the download process, whether to a MessageView terminal or to a DOS file.
- Applications are validated (checked for errors) during the download process. It is also helpful to validate applications as part of the creation process, and correct any errors before trying to download.
- An application can be downloaded only to a terminal it is designed for. However MessageBuilder software can reconfigure an application for another type of terminal. See Page 10–3.
- Transferring applications between a computer and MessageView Terminal using an RS-232 connection requires the INTERCHANGE DF1 driver. This driver was installed as part of the MessageBuilder software installation.
- See the MessageView Operator Terminals user manual on how to connect the computer and with a MessageView 421 terminal's RS–232 port.

Validating Applications

MessageBuilder automatically validates an application before downloading it. When it has been downloaded, the MessageView terminal verifies the application before running it. 103

In validating, each message, each tag, and the application as a whole is checked. See Appendix D for a list of Exceptions messages.

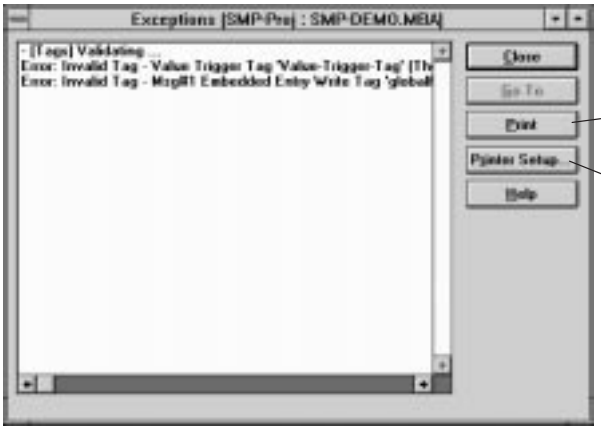
The Preferences dialog may be set up to validate each message as it is created. See Page 7–13. Or the application designer may validate the entire application at any time.

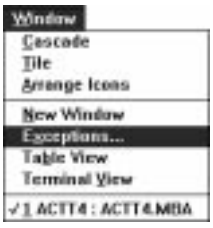
To validate an application:

Choose Validate from the Application menu.

- If the application passes validation, the following dialog opens.

- If the application does not pass validation, the Exceptions dialog opens with a list of all errors found. Correct the errors and then validate again.





While correcting errors, select the Exceptions command in the Window menu to access the Exceptions dialog.

Press:	To:
Close	close the dialog.
Print	send validation messages to a printer or file.
Printer Setup...	define printer settings.

Printing Validation Messages

To send validation messages to a printer:

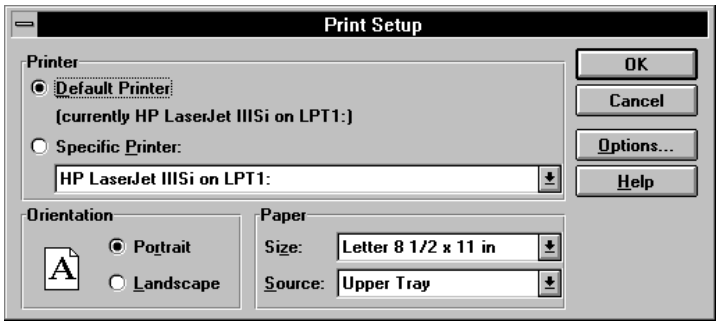
- A printer must be connected to your computer.
- The computer must recognize the printer as a valid printer.

See your Microsoft Windows User's Guide for details on installing printers.

To set up the printer:

Printer Setup...

1. Select the **Printer Setup** button in the Exceptions dialog to open the standard Windows Print Setup dialog.



2. If the default printer is not the one in use, select a printer from the **Specific Printer** list box.

   If it is not listed, see below.

3. Set appropriate attributes for the printer.
4. Select the **Options** button to enter options specific to the printer. The Options dialog is different for each type of printer.
5. When done, select the **OK** button.

Print

6. Select the **Print** button from the Exceptions dialog to print the validation messages.
7. Select **Close** to return to the Message Editor Table View.

If the printer connected to the computer is not listed:

1. Check for hardware compatibility between the printer and one of the printers listed.
2. Check if the printer has an emulation mode that is compatible with one of the printers listed.
3. It may be necessary to install a printer driver for the printer. Refer to the Microsoft Windows User's Guide.

Sending Validation Messages to a File

To send validation messages to a file, it is **necessary** to:

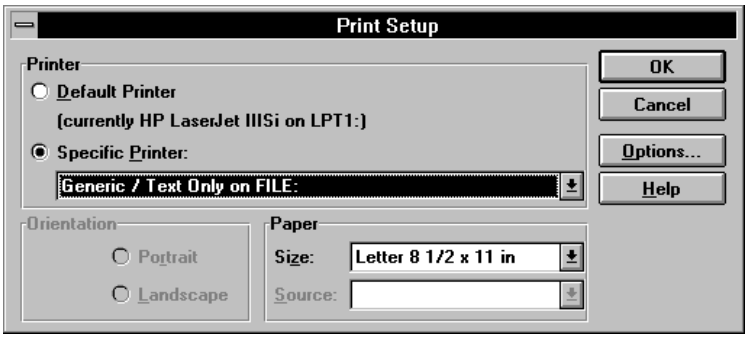
- add the Generic/Text Only printer to the Installed Printers list
- assign the printer to a FILE: port.

For details on how to add **Generic/Text Only on FILE:** to the Installed Printers list on your computer, see the Microsoft Windows User's Guide. This printer driver allows you to print text but not graphics.

To send validation messages to a file:

Printer Setup...

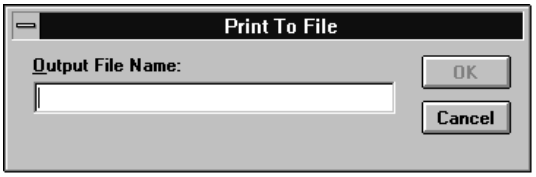
1. Select the **Printer Setup** button in the Exceptions dialog to open the standard Windows Print Setup dialog.



2. Select Generic/Text Only on FILE: from the list of **Specific Printers**. If it is not listed, it must be installed first.
3. Select **OK** to exit the Printer Setup dialog.

Print

4. Select the **Print** button in the Exceptions dialog to open the Print to File dialog.



5. Enter the name of the file in which to save the validation messages.
6. Select **OK** to output messages to the file.

   If the file name already exists, a dialog gives the option of overwriting it or entering another file name.

   Select **Cancel** at any time to abort the printing.
7. Select **Close** to return to the Message Editor Table View.

Transfer Utilities

Use one of these methods to transfer applications to/from a MessageView terminal:

- MessageBuilder Application menu.
- MessageView File Transfer utility.

MessageBuilder Application Menu

Most application transfers are initiated from the Application menu of the MessageBuilder software. Choose the Download or Upload command from the Application menu for application transfers.

Use the Download command to download an application to either a:

- MessageView terminal using the INTERCHANGE DF1 driver and an RS-232 serial connection.
- DOS file in MVA format (the terminal uses .MVA file type).

Use the Upload command to upload an application from a MessageView terminal using the INTERCHANGE DF1 driver and an RS-232 connection.

Other file transfer options available from the Application menu include:

- RTC Download for downloading the computer's time and date to the Real Time Clock (RTC) in the terminal.
- HE Stack Upload for uploading the Historical Event Stack file to the computer in CSV format.

MessageView File Transfer Utility

Use the MessageView File Transfer Utility (WINMFT.EXE) to transfer applications when MessageBuilder is not running. This utility is available as an icon in the MessageBuilder group. See Page 11–15.

Use tools or File menu commands to:

- download an application to a MessageView terminal from an MVA file
- upload an application from a MessageView terminal to an MVA file
- verify an application on the computer in the same way it is verified in the MessageView 421 terminal
- download the computer's time and date to the Real Time Clock (RTC) in the terminal
- upload the terminal's Historical Event Stack file to a CSV file.

Downloading an Application to a Terminal

An application may be downloaded to a MessageView terminal using the Application menu Download command.

Before downloading an application: 104

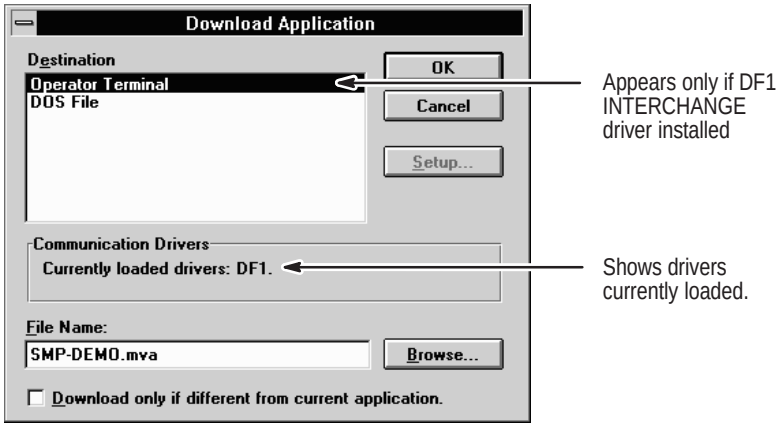
- DF1 INTERCHANGE communication driver must be installed and loaded on the computer. See Page 2–3.
- Driver communication parameters must be checked using the Workstation Setup command on the File menu. See Page 2–7.
- Cable connections must be correct. See the MessageView Terminal User Manual (Publication 2706-816) for details.
- **The MessageView terminal must have its RS-232 port set to MessageBuilder communication parameters.** See Page 5–3 for an example of how to switch settings.

To download an application to a MessageView terminal:

1. Open the application to be downloaded.

2. Select the Download tool to open the Download Application dialog.

   Or choose Download from the Application menu.



3. Under **Destination**, select Operator Terminal.

4. In the **File Name** box, enter the name of an MVA file in which to save the translated application. The MVA file is downloaded to the terminal.

   Default is the first 8 characters of the application name and the .MVA extension.

5. Select the **Download only if different from current application** check box to download the application only if it does not match the application currently loaded in the terminal.

   The default is to download the application even if a match exists.

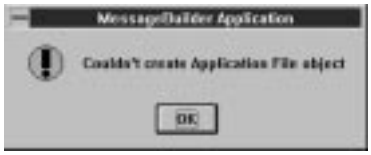
6. Select the **Setup** button to specify which port to use if more than one of the computer's COM ports is configured with a DF1 driver. The DF1 Setup dialog lists the available INTERCHANGE ports. Select the appropriate port and close the dialog.

7. Select **OK** from the Download Application dialog.

   The application is validated and translated to an MVA file.

8. If errors or warnings are detected, the Exceptions dialog opens and displays them.

- Errors must be corrected before the download can proceed.



- Warnings should be corrected, but the download will proceed if they are not corrected.

9. The download begins. The terminal enters Programming mode and erases the current application. MessageBuilder software displays the progress of the download.

When the download is complete, the terminal resets, runs its self-tests, verifies and starts the application.

Note: The terminal erases its current application to prepare for a new application to be downloaded. If the download is cancelled after this erasure, the terminal's powerup diagnostics will report that the terminal has no valid application.

Note: Error messages may appear during this download. See Appendix E for a list of error messages and how to correct the problems.

Downloading to a DOS file

An application may be downloaded to a file in the DOS environment. An application downloaded to a DOS file is translated from the MessageBuilder application file type (*.MBA) to the MessageView 421 terminal file type (*.MVA). 105

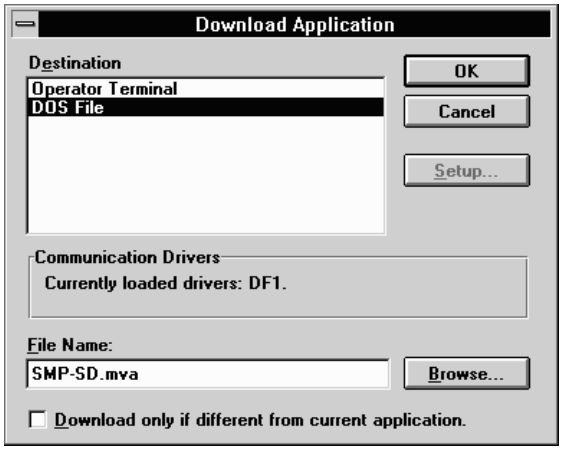
The MessageView File Transfer Utility may be used to transfer any MVA file between a computer and a MessageView terminal. See page 11–15.

To download an application to a DOS file:

1. Open the application to be downloaded.

2. Select the Download tool to open the Application Download dialog.

   Or choose Download from the Application menu.



3. Under **Destination**, select DOS File.

4. In the **File Name** box, enter the path and name of an MVA file in which to save the file on disk.

   Or select **Browse** to search for a specific MVA file that will be overwritten with this new application.

5. Select **OK** from the Download Application dialog. The application is validated, translated and saved to a DOS file.

Note: If errors or warnings are detected, the Exceptions dialog opens and displays them:

- Errors must be corrected before the download can proceed.
- Warnings should be corrected, but the download will proceed even if they are not corrected.

6. A dialog appears when the application has been successfully translated. Select **OK** to return to the Message Editor Table View.

Note: Error messages may appear during this download. See Appendix E for a list of error messages and how to correct the problems.

Downloading Date/Time to Real Time Clock

The computer's date and time may be downloaded to the Real Time Clock (RTC) in the MessageView terminal.

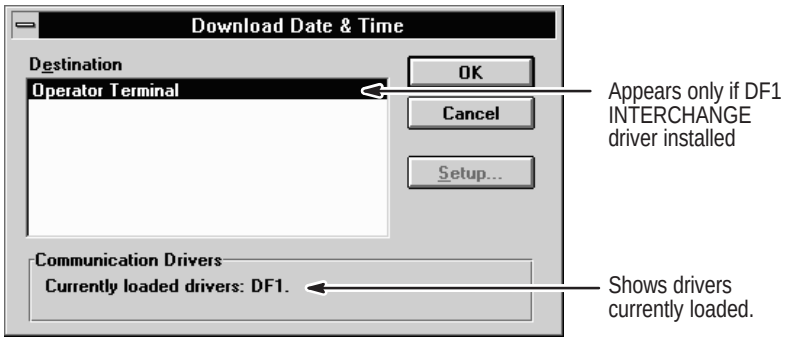
Before downloading the RTC file: 106

- DF1 INTERCHANGE communication driver must be installed and loaded on the computer. See Page 2–3.
- Driver communication parameters must be checked using the Workstation Setup command on the File menu. See Page 2–7.
- Cable connections must be correct. See the MessageView Terminal User Manual (Publication 2706-816) for details.
- **The MessageView terminal must have its RS-232 port set to MessageBuilder communication parameters.** See Page 5–3 for an example of how to switch settings.

To download the computer's real time clock to a terminal:

Note: An application file does not have to be open when this command is used.

1. Choose RTC Download from the Application menu to open the Download Date & Time dialog.



2. Under **Destination**, verify that Operator Terminal is selected. This is the only option available.
3. Select **OK**. The terminal remains in run mode. Its real time clock is updated in the background.

When the download is complete, you are returned to the Message Editor Table View.

Note: Error messages may appear during this download. See Appendix E for a list of error messages and how to correct the problems.

Uploading an Application from a Terminal

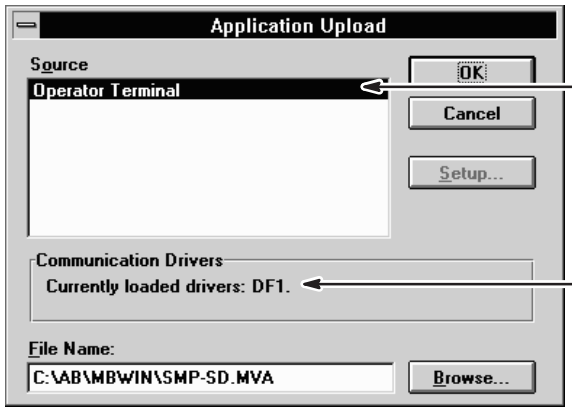
The application may be uploaded from the terminal if it needs to be revised. The upload saves the application to both an MVA file and an MBA file. Open the MBA file in MessageBuilder for editing. 107

Before uploading an application: 108

- DF1 INTERCHANGE communication driver must be installed and loaded on the computer. See Page 2–3.
- Driver communication parameters must be checked using the Workstation Setup command on the File menu. See Page 2–7.
- Cable connections must be correct. See the MessageView Terminal User Manual (Publication 2706-816) for details.
- **The MessageView terminal must have its RS-232 port set to MessageBuilder communication parameters.** See Page 5–3 for an example of how to switch settings.

To upload an application from a MessageView terminal:

1. Choose Upload from the Application menu.

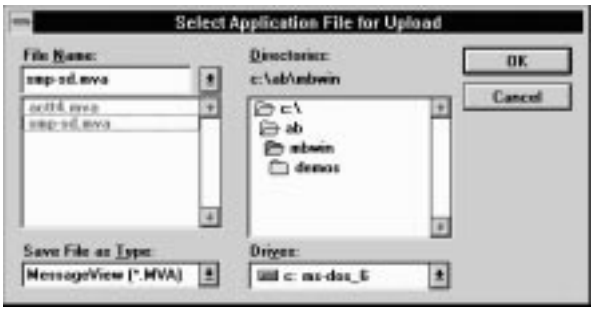


2. Under **Source**, verify that Operator Terminal is selected. This is the only option available.
3. In the **File Name** box, enter an MBA file name in which to save the uploaded application

   Or select **Browse** to search for an existing file which will be overwritten by the uploaded application file.
4. Select the **Setup** button to specify which port to use if more than one of the computer's COM ports is configured with a DF1 driver. The DF1 Setup dialog lists the available INTERCHANGE ports. Select the appropriate port and close the dialog.
5. Select **OK**.

   The upload begins. MessageBuilder software displays the progress of the upload.

6. A dialog opens asking for the name of the MBA file in which to save the uploaded application. The default file name is that of the uploaded application. Enter a file name and path, then select **OK**.



If the MBA file already exists, a dialog asks if the file should be overwritten.

7. A dialog verifies that the application file was saved to the specified MBA file. Select **OK** to return to the MessageBuilder workspace.

Note: Error messages may appear during this upload. See Appendix E for a list of error messages and how to correct the problems.

Uploading the Historical Event Stack

The Historical Event Stack file is a log of messages maintained by the MessageView terminal. It may be uploaded to the computer using MessageBuilder menu commands. 109

The file is a text file in CSV (Comma Separated Value) format. Many commercially available software packages, such as text editors, spreadsheets or databases are able to view, print, analyze or otherwise manipulate the HE stack data.

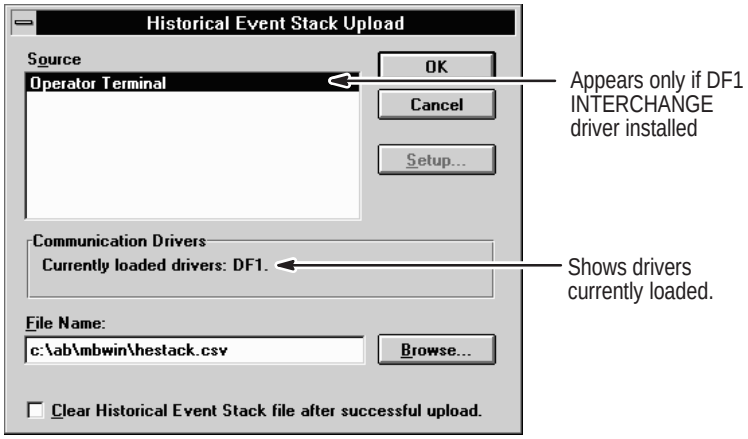
Before uploading the HE Stack:

- DF1 INTERCHANGE communication driver must be installed and loaded on the computer. See Page 2–3.
- Driver communication parameters must be checked using the Workstation Setup command on the File menu. See Page 2–7.
- Cable connections must be correct. See the MessageView Terminal User Manual (Publication 2706-816) for details.
- **The MessageView terminal must have its RS-232 port set to MessageBuilder communication parameters.** See Page 5–3 for an example of how to switch settings.

To upload the HE Stack from a MessageView terminal:

Note: An application file does not have to be open when this command is used.

1. Choose HE Stack Upload from the Application menu.



2. Under **Source**, verify that Operator Terminal is selected. This is the only option available.
3. In the **File Name** box, enter a file name (8 characters maximum) with the .CSV extension in which to save the HE stack information.

   Or select **Browse** to search for an existing file which will be overwritten by the uploaded file.

4. Select **Clear Historical Event Stack after successful upload** if you want the HE Stack file in the terminal to be cleared.

   Note: If the HE Stack file becomes full, a warning message informs the terminal operator that it is full. After this message is acknowledged, the operator may use the Front Panel Editor to clear the file. If the file is not cleared the oldest messages are overwritten as new messages are added.

5. If more than one of the computer COM ports is configured with a DF1 driver, specify which port to use. Select the **Setup** button. The DF1 Setup dialog opens with the available INTERCHANGE ports. Select a port and close the dialog.

6. Select **OK** to start the upload. MessageBuilder displays its progress. The terminal remains in run mode during the upload.

Note: If the HE Stack file in the terminal is empty, the message "Terminal has no file available" appears in the Status bar.

When the upload is complete, you are returned to the Message Editor Table View.

Note: Error messages may appear during this upload. See Appendix E for a list of error messages and how to correct the problems.

Using the MessageView File Transfer Utility

Use the MessageView File Transfer Utility to transfer applications between a terminal and a computer running Windows. This Utility was installed as part of the MessageBuilder software installation. 110

Important: Applications transferred using this utility must be in MVA format; that is, they must have .MVA file extension.

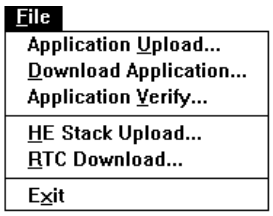
To create an MVA file for downloading, you must download the MBA application to a DOS file from the Application menu of MessageBuilder. See Page 11–8. Applications uploaded from a terminal are already in MVA format.

Before using the MessageView File Transfer Utility:

- DF1 INTERCHANGE communication driver must be loaded and configured on the computer.
- Cable connections must be correct.
- **The MessageView terminal must have its RS-232 port set to MessageBuilder communication parameters.** See Page 5–3 for an example of how to switch settings.

To start the MessageView File Transfer Utility:

- Double-click the MessageView File Transfer Utility icon in the MessageBuilder program group to open the utility workspace.
- Or select WINMFT.EXE in the Windows File Manager.



In the MessageView File Transfer Utility, applications and data may be downloaded/ uploaded either from the Toolbar or from the File menu.

Click:	or Choose:	To:
	Application Upload	Upload an application from a MessageView terminal to an MVA file. The MVA file can be opened as an MBA file in MessageBuilder for editing.
	Application Download	Download an MVA file to a MessageView terminal. To create an MVA file, download the application to a DOS file. See Page 11–8.
	Application Verify	Compare the application in the terminal with the application to be downloaded, to determine if they are the same or different.
	HE Stack Upload	Upload the Historical Event Stack from a MessageView terminal.
	RTC Download	Download the date and time from the computer to the MessageView terminal's Real Time Clock.
	Exit	Exit the MessageView File Transfer Utility.

Note: All Download and Upload dialogs are identical to the dialogs accessed from the Application menu in MessageBuilder software. The only dialog that is different is the Application Verify dialog.

Error messages

Error messages may appear while the File Transfer Utility is downloading or uploading files. See Appendix E for a list of error messages and how to correct the problems.

Verifying an Application when using the File Transfer Utility

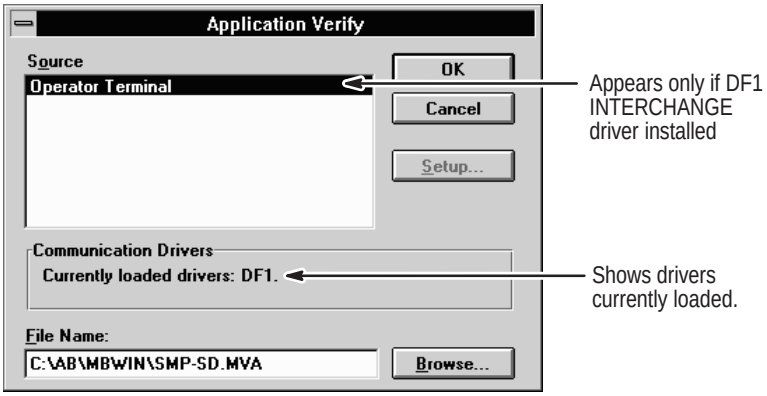
Use the Verify command to compare an application with the application loaded in a specific terminal. You might want to download an application only if it is different from the one installed. The verification process checks whether the applications match.

Note: This Verify command is different from the Validate command which is part of the Application Download from MessageBuilder software. See the Glossary.

To verify an application:

1. Click the Verify tool.

   Or choose Application Verify from the File menu.



2. Under **Source**, Operator Terminal is the only option available.
3. In the **File Name** box, enter the name of an MVA file that you want to verify.

   Or select **Browse** to search for an existing MVA file.
4. Select **OK** to open the Application Verification dialog.

When done, the dialog shows whether the applications match or not.

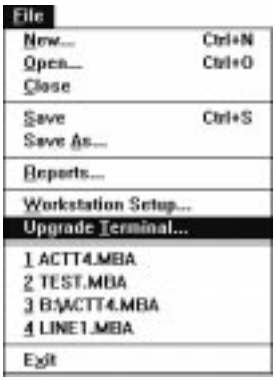
Terminal Upgrade

Allen-Bradley may send a new version of MessageView terminal firmware to registered users. For most efficient terminal operation, upgrade the firmware in each of your terminals as soon as possible.

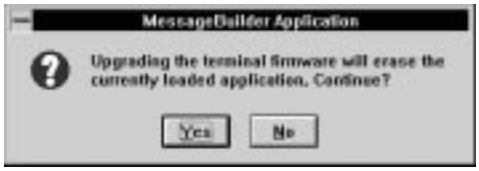
Before upgrading the terminal: 111

- DF1 INTERCHANGE communication driver must be installed and loaded on the computer, see Page 2–3.
- Driver communication parameters must be checked using the Workstation Setup command on the File menu. See Page 2–7.
- Cable connections must be correct. See the MessageView Terminal User Manual (Publication 2706-816) for details.
- **The MessageView terminal must have its RS-232 port set to MessageBuilder communication parameters.** See Page 5–3 for an example of how to switch settings.

To install a firmware upgrade in a MessageView terminal:



1. Choose Upgrade Terminal on the File menu. A dialog warns that the current application will be erased from the terminal.



2. Select **Yes**. Downloading begins. MessageBuilder software displays the progress of the download.

Note: The application resident in the terminal was erased as soon as the Firmware Download started. Even if the download is cancelled, the application is gone. If the terminal is switched to Run mode, its startup self-tests will report that there is no valid application.

3. Download an application, see Page 11–6.

Creating Reports

This chapter covers the following topics:

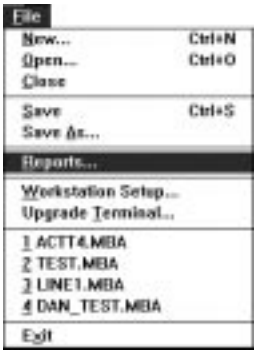
- Types of reports
- Creating and printing a report
- Changing the report setup
- Previewing a report
- Setting up a printer
- Sending a report to a file.

Types of Reports

MessageBuilder lets you specify the types of information to include in a report.

Report Options	Description
Description	Includes the first page of the application description as entered in the Application Description dialog.
Messages	Lists all messages in the application.
Message Attributes	Lists attributes of all messages in the application. Messages are listed in order of their message numbers.
Terminal Setup	Lists runtime communications and setup parameters for MessageView terminals.
Tag Attributes	Lists all tag definitions in the application.
Function Keys	Lists all function keys used in the application and their attributes.
LED Indicators	Lists all function key LEDs used in the application and their attributes.

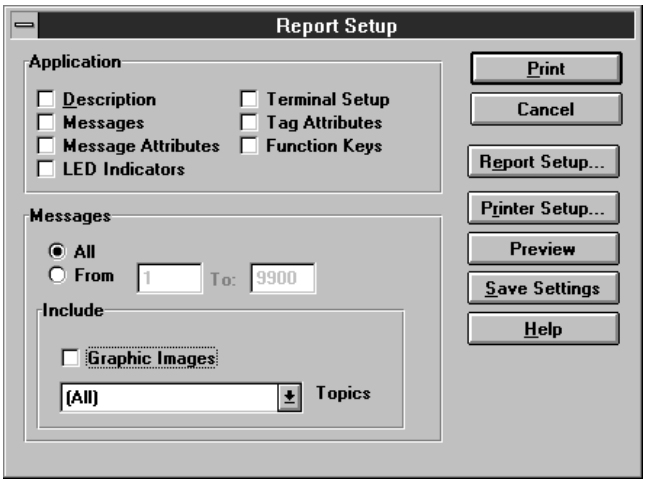
Creating and Printing a Report



Use the Reports command to create a customized report documenting all or specific aspects of an application. Reports are useful for tracking application updates and changes. 112

To set up a report:

1. Choose Reports from the File menu to open the Report Setup dialog.



2. Select the application components to include in the report by selecting the appropriate check boxes under **Application**. To remove a component, clear the box.
3. Indicate which messages will be included in the report.
   - Select **All** to include all messages.
   - Select **From** to include a range of messages. Enter the range of message numbers in the **From** and **To** boxes.
4. Select the **Graphic Images** check box to include ISA graphics embedded in messages in the report. To clear this option, select the box again.
5. From the **Topics** list box, specify whether you want to include messages assigned to a specific topic or all messages. The default is All.

Press this button:	To:
Print	Send report to a printer or file. Select Cancel at any time to abort printing of the report.
Cancel	Exit dialog without printing the report.
Report Setup	Change page headers and title page of the report.
Print Setup	Define printer settings for the report.
Preview	Preview how the report will look.
Save Settings	Save current report settings as the default. Otherwise the dialog reverts to the original settings when closed.

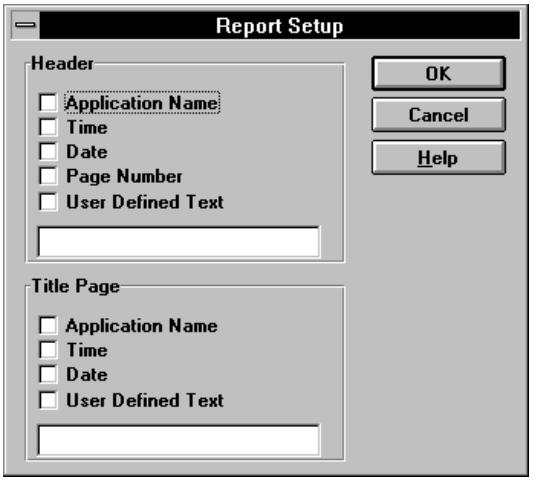
Changing the Report Setup

Specify the page headers and the title page of a report.

To change the page headers and title page:

Report Setup...

1. Select the **Report Setup** button from the Report Setup dialog to open another Report Setup dialog.



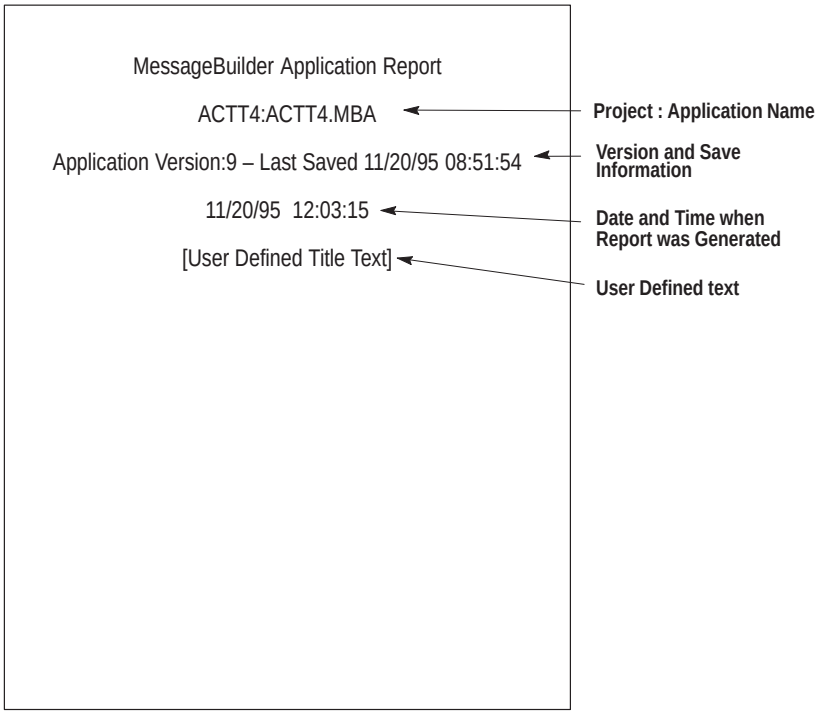
2. By default, all options are selected. If some are not needed, select the appropriate check boxes in each area. To enable an option, select the box again.

Select:	To Print:
Application Name	The name of the application.
Time	Time of printout in 24-hour format: Hour/Minute/Second.
Date	Date of printout: Month/Day/Year.
Page Number	Consecutive page numbers. Title page is 1.
User Defined Text	Up to 80 characters including spaces.

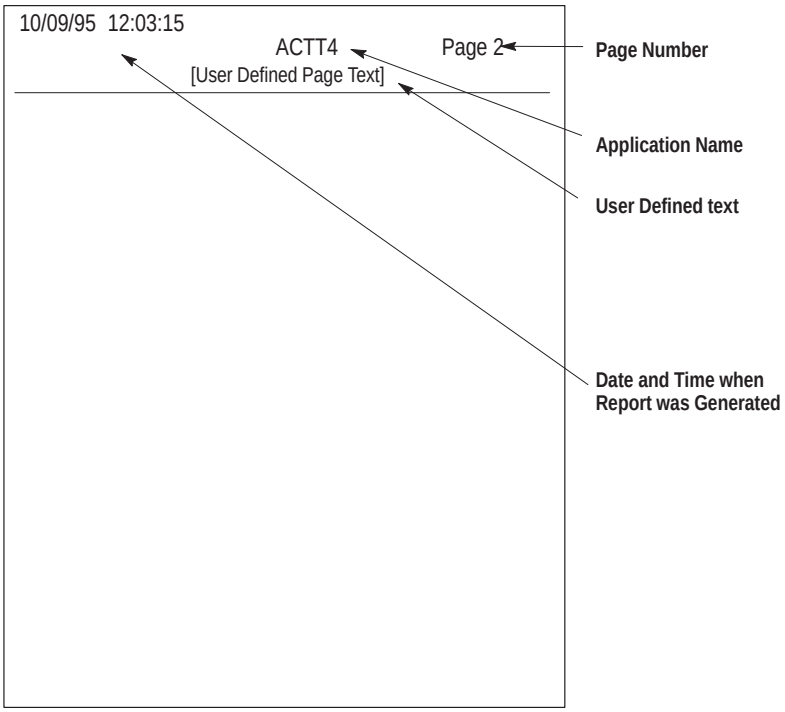
3. When done, select the **OK** button.

The next page shows where each option appears in the page header and title page of a report.

The title page is the first page printed in a report.



Header information appears on every page of a report except the title page.



Previewing a Report

The Preview option lets you view a report before printing it or sending it to a file. You can then make the necessary adjustments before printing it.

To preview a report:

1. Select the **Preview** button in the Report Setup dialog .

   The Preview workspace opens showing the title page of the report.

2. Select one of the following buttons at the top of the workspace.

Press this button:	To:
Print	Open a Print dialog allowing you to print all or specific pages of the report.
Next Page	View the next page of the report.
Previous Page	View the previous page of the report.
One Page	View the report one page at a time.
Two Page	View the report two pages at a time, side by side.
Zoom In	Increase the magnification of the view so the report looks larger. You can increase the magnification several times.
Zoom Out	Decrease the magnification of the view so the report looks smaller. You can decrease the magnification several times.
Close	Exit the Preview workspace and return to the Report Setup dialog.

Setting up a Printer

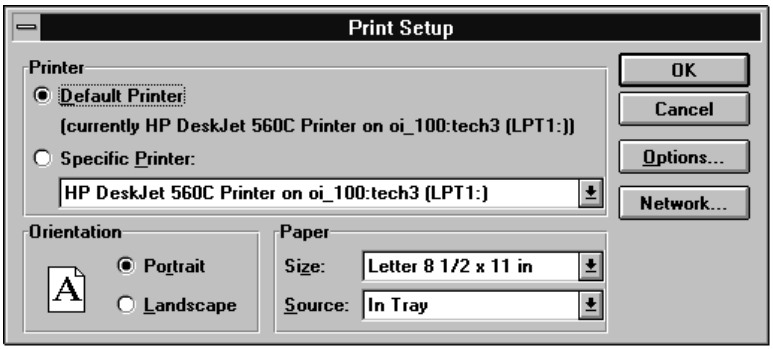
To print a report:

- A printer must be connected to your computer.
- The computer must recognize the printer as a valid printer.

See your Microsoft Windows User's Guide for details on installing printers.

To set up the printer:

1. Select the **Printer Setup** button in the Report Setup dialog to open the standard Windows Print Setup dialog.



2. If the default printer is not the one in use, select a printer from the **Specific Printer** list box.

   If it is not listed, see below.

3. Set appropriate attributes for the printer.

4. Select the **Options** button to fine-tune the printer. The Options dialog is different for each type of printer.

5. When done, select the **OK** button.

6. Select the **Print** button from the Reports Setup dialog to print the report.

7. Select **Close** to return to the Message Editor Table View.

If the printer connected to the computer is not listed:

1. Check for hardware compatibility between the printer and one of the printers listed.

2. Check if your printer has an emulation mode that is compatible with one of the printers listed.

3. It may be necessary to install a printer driver for your printer. Refer to the Windows User's Guide.

Sending a Report to a File

To send a report to a file, is is necessary to:

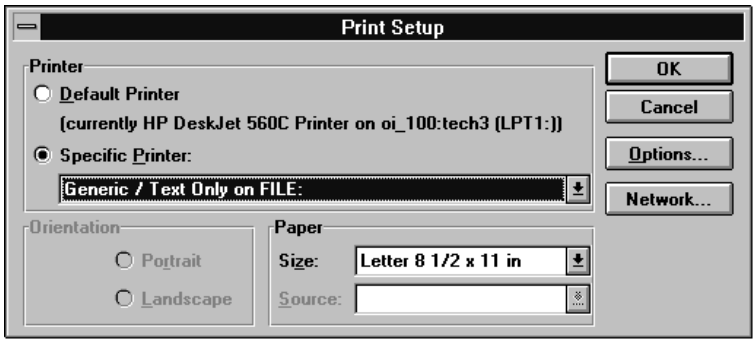
- add the Generic/Text Only printer to the Installed Printers list
- connect the printer to a FILE: port.

For details on how to add **Generic/Text Only on FILE:** to the Installed Printers list on your computer, see the Microsoft Windows User's Guide. This printer driver allows you to print text but not graphics.

To send a report to a file:

Printer Setup...

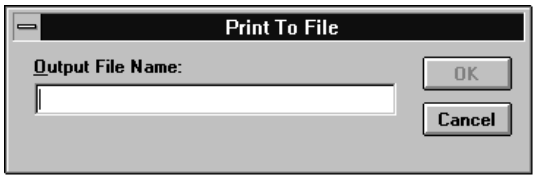
1. Select the **Printer Setup** button in the Report Setup dialog to open the standard Windows Print Setup dialog.



2. Select Generic/Text Only on FILE: from the list of **Specific Printers**. If it is not listed, it must be installed first.
3. Select **OK** to exit the Printer Setup dialog.

Print

4. Select the **Print** button in the Report Setup dialog to open the Print to File dialog.



5. Enter the name of the file in which to save the report.

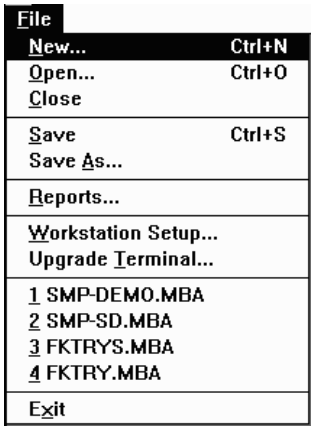
   The default directory is C:\AB\MBWIN\.
6. Select **OK** to print the report to a file.

   If the file name already exists, a dialog gives the option of overwriting it or of entering another file name.

   Select **Cance**l at any time to abort the printing.
7. Select **Close** to return to the Message Editor Table View.

Menus and Commands Summary

File Menu



Use commands on the File menu to handle application files.

New...

Opens a dialog for creating a new application file for a specific MessageView terminal.

Open...

Opens an existing application file and displays a list of all messages in the application.

Close

Closes the current application file.

Save

Saves the application file and replaces the previous version stored on disk.

Save As...

Saves a copy of the application file with all its changes under a new name. The original file remains intact.

Reports...

Opens a dialog to generate a customized report for an application using the default or user defined format. Reports can be printed or saved to a file.

Workstation Setup ...

Accesses the INTERCHANGE Configuration Utility to configure serial communications required for transferring files to and from a MessageView 421 terminal.

Upgrade Terminal...

Opens a dialog to load updated firmware in a MessageView terminal.

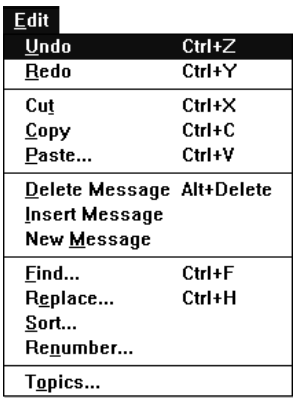
1 XXX.MBA

The four applications opened most recently are listed here for convenient access. 1 is the most recent or current application.

Exit

Quits MessageBuilder and returns to the Windows desktop. If an application is open, a dialog asks if it should be saved first.

Edit Menu



Use commands on the Edit menu to manage messages and their attributes.

Undo

Reverses the most recent edit operation: cut, copy, paste, delete.

Redo

Reverses the previous Undo operation(s).

Cut

Removes a selected text string from the Message Edit box, or removes a selected message from the application. Anything cut is put on the clipboard, where it remains until something else is copied or cut, or until Windows is closed.

Copy

Copies a selected text string from the Message Edit box, or copies a selected message from the application. Anything copied is put on the clipboard, where it remains until something else is copied or cut, or until Windows is closed.

Paste...

Copies a text string from the clipboard to the cursor position in the Message Edit box, or a message to the application. Whatever is on the clipboard may be pasted as often as needed.

Delete Message

Removes selected message(s) from the application.

Insert Message

Creates a new message above the currently selected message.

New Message

Appends a new message after the last message.

Find...

Opens a dialog to locate any message in the application by message number, topic, text, or trigger.

Replace...

Opens a dialog to replace a text string with another text string, in any or all of the messages in which the text string is found.

Sort...

Opens a dialog to sort all messages in the application by message number, topic, text, or trigger.

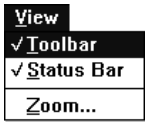
Renumber...

Opens a dialog to set the number of the first message and renumber in sequence all messages that follow.

Topics...

Opens a dialog to define a text string for each topic used in the application.

View Menu



Use commands on the View menu to toggle window bars and the toolbox on or off. Click the menu name to toggle the command. A check mark (✓) next to a command means the command is active.

Tool Bar

Toggles the toolbar on or off.

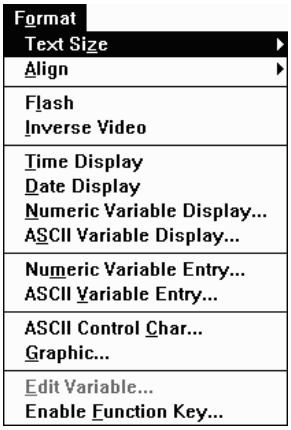
Status Bar

Toggles the status bar on or off.

Zoom

Opens a dialog to enlarge or reduce the size of the Message Editor Terminal View.

Format Menu



Use commands on the Format menu to change the appearance of message text, and to enter display and entry variables.

Text Size ▸ **Quarter**
Half
Full

Sets the size of the text in the message.

Align ▸ **Left**
Center

Toggles between centered and left justified.

Flash

Toggles between flashing and non-flashing for the highlighted text in the Edit Box.

Inverse Video

Toggles between inverse video and normal text for the highlighted text in the Edit Box.

Time Display

Enters a placeholder in the message that will display the current time in the MessageView terminal.

Date Display

Enters a placeholder in the message that will display the current date in the MessageView terminal.

Numeric Variable Display...

Enters a placeholder in the message that will display a numeric variable in the MessageView terminal.

ASCII Variable Display...

Enters a placeholder in the message that will display a variable that contains ASCII characters in the MessageView terminal.

Numeric Variable Entry...

Enters a placeholder in the message that allows the terminal operator to input a numeric value.

ASCII Variable Entry...

Enters a placeholder in the message that allows an ASCII Input device to send alphanumeric characters to the terminal. Valid only in applications designed for terminals with a Remote I/O daughterboard and firmware that supports ASCII Input.

ASCII Control Char...

Enters an ASCII Control Character in the message.

Graphic...

Enters an ISA graphical symbol in the message.

Edit Variable...

When a variable in the message is selected, opens the dialog for that type of variable.

Enable Function Key...

When the application is designed for a MessageView 421F terminal, allows specific function keys to be enabled in the message.

Application Menu

Use commands on the Application menu to validate, download and upload an application, edit function key and special message attributes, and set runtime parameters for the MessageView terminal.

Tag Editor...

Opens the Tag Editor to view, add or edit tag information for an application. Tag information is specific to the communication protocol that the application will use.

Project Management...

Opens the Project Management dialog to manipulate (display, create, copy, rename, delete) projects and to manipulate (create, copy, rename, delete) devices in projects.

Description...

Opens a dialog to enter an application description and change the application name. Also shows when the last version of the application was saved.

Validate..

Checks the entire application for potential problems. This command allows the designer to make necessary corrections before downloading is attempted.

Download...

Downloads an application to a MessageView terminal or a DOS file. Download to a terminal uses DF1 point to point protocol through a connection at the RS-232 COM port.

Upload...

Uploads an application from a MessageView terminal.

RTC Download...

Sends the computer's time and date to the terminal to update its Real Time Clock.

HE Stack Upload...

Uploads the Historical Event Stack file from the terminal to a file in CSV format.

Terminal Setup...

Sets runtime communication and operating parameters for the MessageView terminal.

Special Messages...

Assigns bit triggers or other tags to special messages used in the application.

Function Keys...

If the application is designed for a MessageView 421F terminal, sets the function key attributes.

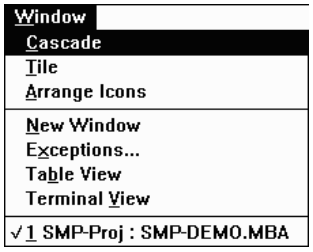
LED Indicators...

If the application is designed for a MessageView 421F terminal, assigns the LED indicator tags.

Preferences...

Allows the user to specify whether messages should be validated individually when they are created or edited, and what colors should be used in the Message Edit box to distinguish Flashing Text and Embedded Text.

Window Menu



Use commands on the Window menu to arrange application message tables and icons to suit, and to toggle between table and terminal view of messages.

The bottom of the Window menu displays a list of open views of the current application file. A check mark (✓) next to a window name means the window is active.

Cascade

Arranges open windows in the workspace so that they overlap each other, with the title bar of each screen remaining visible.

Tile

Arranges open windows in a vertical row in the workspace.

Arrange Icons

When some of the open windows are minimized to icons, spaces them evenly along the bottom of the workspace so they do not overlap.

New Window

Opens a new Message Editor Table View dialog.

Exceptions...

Opens the Exceptions dialog which displays errors detected during application validation. Use this dialog as a reference while correcting errors.

Table View

Brings focus to the Message Editor Table View.

Terminal View

Brings focus to the Message Editor Terminal View with the current message displayed.

1 Project: Application.MBA

A list of all applications and all views currently open in the workspace. The active window is checked.

Help Menu

Use commands on the Help menu to access the MessageBuilder Online Help utility.

Contents...

Displays an index to online Help.

Search for Help On...

Provides a list of Help topics available online.

How To Use Help...

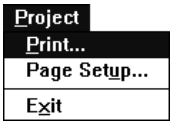
Provides a short tutorial and other information about using MessageBuilder Help.

About MessageBuilder...

Displays copyright and release information about MessageBuilder. Use the version number and serial number on this screen if you need to call Allen-Bradley for help.

Project Menu (Tag Editor)

Use commands on the Project menu to print the Tag Editor or selected parts of it.



Print...

Selects which tags to print and sets up the page and the printer.

Page Setup...

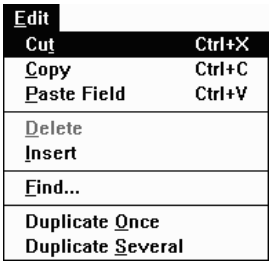
Sets up the format for printing tags.

Exit

Exits the Tag Editor.

Edit Menu (Tag Editor)

Use commands on the Edit menu to edit tags and their attributes (fields).



Cut

Removes a selected field or fields from the tag, or removes a selected tag or tags from the Tag Editor. Anything cut is put on the clipboard.

Copy

Copies a selected field from a tag, or copies a selected tag from the Tag Editor. Anything copied is put on the clipboard.

Paste Row, Paste Field

Places a field from the clipboard at the cursor position, or places a tag at the position above the cursor. Whatever is on the clipboard may be pasted as often as needed.

Delete

Removes the selected tag(s) from the Tag Editor.

Insert

Creates a new blank tag above the currently selected tag.

Find...

Locates a tag or tags with a specified name.

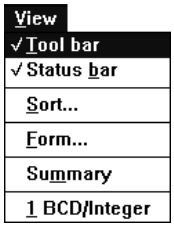
Duplicate Once

Duplicates the selected tag once and places the new tag above the selected tag.

Duplicate Several

Duplicates the selected tag several times and places the new tags above the selected tag. The number of duplicates is set in the Duplications box on the Toolbar or using the Duplication command on the Options menu.

View Menu (Tag Editor)



Use commands on the View menu to rearrange the tags and toggle the tool and status bars.

Tool Bar

Toggles the Tag Editor tool bar on or off.

Status Bar

Toggles the Tag Editor status bar on or off.

Sort...

Sorts tags by any field or fields.

Form...

Opens the Tag Form for the selected tag.

Summary

Opens the Tag Editor Table View.

1 BCD/Integer

Filters the tags to display all tags with value data type.

Options Menu (Tag Editor)

Use commands on the Options menu to set Tag Editor options.

Duplication...

Sets the options for number of duplicates to be created with the Duplicate Several command on the Edit menu, and sets the format for names of duplicated tags.

Address Validation

Toggles address validation on and off.

Tools Menu (Tag Editor)

Use commands on the Tools menu to import or export tags from a file in a different format.

List Editor

Opens a new Tag Editor Table View.

Form Editor

Opens the Tag Form for the selected tag.

Import

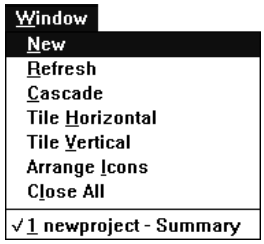
Opens a dialog for importing tags from files in different formats.

Export

Opens a dialog for exporting tags to files in different formats.

Window Menu (Tag Editor)

Use commands on the Window menu to arrange Tag Editor windows and icons to suit, or to close all windows.



The bottom of the Window menu displays a list of open Tag Editor windows. A check mark (✓) next to a window name means the window is active.

New

Opens a new window with the Tag Editor Table View.

Refresh

Updates the Table View to reflect changes made in a Form View.

Cascade

Arranges open Tag Editor views so that they overlap each other, with the title bar of each screen remaining visible.

Tile Horizontal

Arranges open windows in a horizontal row in the workspace.

Tile Vertical

Arranges open windows in a vertical row in the workspace.

Arrange Icons

Spaces icons evenly along the bottom of the workspace so they do not overlap.

Close All

Closes all the Tag Editor windows.

1 Project: View

A list of all views currently open in the Tag Editor. The active view is checked.

Help Menu (Tag Editor)

Use commands on the Help menu to access the Tag Editor Online Help utility.

Contents

Displays an index to online Help.

About...

Displays copyright and release information about the Tag Editor.

Tool Summary

This appendix contains a brief description of all MessageBuilder tools on the Standard Toolbar, Message Edit Toolbar and Tag Editor Toolbar. Certain tools cannot be applied in some fields of the dialog; the icons are greyed out when those fields are selected.

Standard Toolbar

File Tools

New File

Creates a new application file.

Open File

Opens an existing application file.

Save File

Saves an application file to disk.

Edit Text Tools

Cut

Cuts the selected text string or an entire message from the Edit box and places it on the clipboard.

Copy

Copies the selected text string or an entire message from the Edit box to the clipboard.

Paste

Pastes the contents of the clipboard at the cursor position in the Edit box. If text is highlighted, the pasted text replaces it.

Undo

Reverses the last edit operation in a message.

Redo

Reverses an Undo.

Windows Tools

Terminal View

Displays the front face of the MessageView terminal that the application is designed for.

Table View

Displays the main MessageBuilder Table View dialog.

Application Tools

Terminal Setup

Opens the Terminal Setup dialog, to configure the MessageView 421 terminal.

Download

Opens the Download Application dialog.

View Tools

Zoom In

Increases the Terminal View to the next higher magnification. May be repeated twice.

Zoom Out

Reduces the Terminal View to the next lower magnification. May be repeated twice.

Help Tools

Help Contents

Displays an index to Help topics.

Help Question

Changes the cursor arrow to a question mark. Click the question mark on an item to get context-sensitive online help.

Message Editor Toolbar

Message Edit Tools

Insert Message

Inserts a new message with default text before the current highlighted message.

Append Message

Appends a new message with default text after the last message in the list.

Delete Message

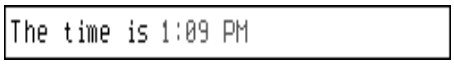
Permanently deletes the highlighted message from the Message List.

Cancel Changes

Removes any changes in the Edit box since the last Store Message.

Store Message

Copies the message in the Edit box to the highlighted row in the Message List.



Message Edit box

Displays the text of the highlighted message so it can be edited.

Formatting Tools

Flash

Sets highlighted text, graphics or variables to flash on/off when the message is displayed by the MessageView terminal.

Inverse Video

Sets highlighted text, graphics or variables in reversed video.

Embedded Variable

Opens a menu to insert a variable, ASCII control character or graphic in a message at the cursor position. If a variable is selected, opens the dialog to edit that type of variable.

Enable Function Key

Opens the Enable Function Key dialog to specify which function keys are enabled for the current message.

Left Justify

Aligns a message at the left side of the display. Toggles with Center.

Center

Centers a message in the display. Toggles with Left Justify.

Tag Editor Toolbar

Many of the Tag Editor tools are the same as in the Message Editor dialog. Certain tools cannot be applied in some fields of the dialog; the icons are greyed out when those fields are selected.

Print

Opens the Print dialog, with Printer and Page Setup dialogs available.

Cut

Cuts the selected field or row and places it on the clipboard.

Copy

Copies the selected field or row to the clipboard.

Paste

Pastes the contents of the clipboard at the cursor position.

Insert Tag

Inserts a blank tag above the cursor position, no matter what field the cursor is in.

Delete Tag

Removes the highlighted tag. If only a field is selected, the icon is greyed out.

Find Tag

Opens a dialog from which each tag of a specified name can be found.

Duplicate Tag Once

Duplicates the selected tag once and places the new tag above the selected tag.

Duplicate Tag Several Times

Duplicates the selected tag several times and places the new tags above the selected tag. The number of duplicates is set using the Duplications box in the tool bar.

Form View

Opens the Form View dialog for the selected tag.

Table View

Opens a copy of the Tag Editor Table View.

Duplications

A text box which displays the number of duplicate tags the Duplicate Several command or icon will create.

ISA Symbols

ISA symbols are a standard set of graphics that illustrate various types of manufacturing tools. They are illustrated and named in the Select Graphics dialog box. 113

Use them to help the operator visualize the operation controlled by specific messages.

1: Horizontal Valve with Actuator

2: Horizontal Valve with Throttling Actuator

3: Horizontal Valve with Manual Actuator

4: Vertical Valve with Actuator

5: Vertical Valve with Throttling Actuator

6: Vertical Valve with Manual Actuator

7: Butterfly Valve

8: Check Valve

9: Relief Valve

10: Liquid Filter

11: Vacuum Filter

12: Motor

13: Transformer

14: Vessel

15: Reactor

16: Storage Bin

17: Distillation Tower

18: Pressure Storage Vessel

19: Weight Hopper

20: Pump

21: Turbine

22: Blower

23: Compressor

24: Agitator

25: Conveyor

26: Screw Conveyor

27: Inline Mixer

28: Rotary Feeder

29: Exchanger

30: Furnace

31: Rotary Kiln

32: Cyclone Separator

Configuration Software Error and Warning Messages

This appendix lists messages that may appear while creating or editing an application. Messages are listed alphabetically.

For messages that may appear during validation, see Appendix D. For messages that may appear during a download, see Appendix E. For messages that may appear during a tag import or export, see Page 8–22.

Message	Meaning	What to do
AB Utilities error creating project	The project could not be created. Cause could be a full disk or a write-protected network partition.	Check available disk space. Verify the computer's write privileges if it is on a network.
AB Utilities failed to initialize	MessageBuilder could not initialize Utilities during startup because SHARE.EXE is not running.	MessageBuilder installation should add SHARE.EXE to the AUTOEXEC.BAT file. See the RELEASE.TXT file in C:\AB for more details.
Cannot delete project associated with current application.	The project belonging to the current application cannot be deleted.	Reassign the current application to another project, then delete the project.
Cannot find desired terminal in Terminal catalog.	The CATALOG.DAT file is missing or corrupted. This file stores the terminal type that is selected when creating a new application or changing the application to fit a different terminal type.	Contact A-B technical support.
Cannot find or cannot load the Application File Transfer Utility.	The WINMFT.EXE executable failed to load.	Verify that WINMFT.EXE is in the same directory as MBWIN.EXE. If it is not there, reload the file from the installation disk.
Cannot initialize print device.	Printer could not be initialized.	Check the Print Setup settings and try again.
Cannot load the data for tag: [tag name].	Internal error.	Check tag information. Contact A-B technical support if error continues.
Cannot locate tag: [tag name].	Internal error.	Check tag information. Contact A-B technical support if error continues.
Cannot parse address for tag: [tag name].	Internal error.	Check tag information. Contact A-B technical support if error continues.
Cannot perform terminal conversion. The following message(s) have function keys enabled: Message(s): [number], [number] ...	The application is being converted to a Terminal that does not have Function Keys. One or more messages has Function Keys Enabled.	Remove all the messages that have Function Keys enabled from the Application.
Cannot perform terminal conversion. The following message(s) have Numeric Variable Entry fields: Message(s): [number], [number] ...	Attempting to convert an application from a 421N or 421F terminal to a 421D terminal.	Remove Numeric Entry variables from all messages listed.
Cannot perform terminal conversion. The following message(s) have ASCII Variable Entry fields: Message(s): [number], [number] ...	Attempting to convert an application from a terminal with a daughterboard to one without a daughterboard.	Remove ASCII Entry variables from all messages listed.

Message	Meaning	What to do
Cannot print line.	Failed to send a text string. This may be a printer error. The printout is terminated.	Check the Print Setup settings, Print Spooler settings and the printer.
Cannot print text string.	Failed to send a text string. This may be a printer error. The printout is terminated.	Check the Print Setup settings, Print Spooler settings and the printer.
Cannot read the Terminal Catalog datafile.	The CATALOG.DAT file is missing or corrupted. This file stores the terminal type that is selected when creating a new application or changing the application to fit a different terminal type.	Call A-B technical support.
Data format unknown for tag: [tag name].	Internal error.	Check tag information. If error persists, call A-B support.
Enter tag name before pressing Edit Tag button.	A tag must be named before it can be edited.	Enter tag name.
Environment variable ABIC_CONFIG not defined.	The DOS environment variable ABIC_CONFIG is required for the INTERCHANGE comm. drivers to work properly. It is not defined.	Edit the AUTOEXEC.BAT FILE to add the ABIC_CONFIG variable to specify the location of the INTERCHANGE comm. drivers and the configuration utility, or reinstall MessageBuilder software.
File Error – Cannot find ISPCORE.DLL.	MessageBuilder software would not start because the default path C:\AB\BIN is missing from AUTOEXEC.BAT file.	Check the AUTOEXEC.BAT file for the path.
Firmware Version is the same - no need to load new.	The firmware in the Terminal is the same as the firmware in the Terminal Upgrade database.	No action is necessary.
Font file name not found in MBWIN.INI - Corrupt or missing INI file.	Essential MessageBuilder startup information cannot be acquired. The MBWIN.INI is corrupt or missing.	Check the \windows\system\ directory for a valid MBWIN.INI file. Reinstall MessageBuilder software.
Incompatible AB Utilities version.	MessageBuilder software detected an incorrect version of the Utilities software on startup.	Reinstall the AB Utilities disk, or call Allen-Bradley for support.
Insufficient available Windows resources to run this application. Try closing some other applications and try again.	Too many applications are running.	Close all running applications and try again.
INTERCHANGE Configuration Utility not found at [DOS path]. Check ABIC_CONFIG environment variable.	The InterChange Configuration Utility can not be found at the DOS path location that is specified by the variable ABIC_CONFIG.	Check that CFGIC.EXE exists at a location that is consistent with the path specified by ABIC_CONFIG. Reinstall MessageBuilder software.
Low resource memory.	Low memory error.	Close other applications and try again. If error persists, exit Windows, reboot the computer, try again.
Low resource memory. Unable to open additional windows.	Low memory error.	Close other applications and try again. If error persists, exit Windows, reboot the computer, try again.
MessageBuilder version [nn.nn] is not compatible with the version of CMSERV.DLL that is currently in memory. MessageBuilder will exit.	Conflict between MessageBuilder and PanelBuilder DLL files.	Exit PanelBuilder to unload the DLL and then restart MessageBuilder before restarting PanelBuilder.
MessageBuilder version [nn.nn] is not compatible with the version of CTKRIO.DLL that is currently in memory. MessageBuilder will exit.	Conflict between MessageBuilder and PanelBuilder DLL files.	Exit PanelBuilder to unload the DLL and then restart MessageBuilder before restarting PanelBuilder.

Message	Meaning	What to do
MessageBuilder version [nn.nn] is not compatible with the version of WPFTDLL.DLL that is currently in memory. MessageBuilder will exit.	Conflict between MessageBuilder and PanelBuilder DLL files.	Exit PanelBuilder to unload the DLL and then restart MessageBuilder before restarting PanelBuilder.
No default printer. Use Control Panel to install and select a default printer.	A default printer has not been configured.	See the Windows user manual for details on how to install and select printers.
Not enough resource memory to open dialog.	Low memory error.	Close other applications and try again. If error persists, exit Windows, reboot, and try again.
Out of memory. Close other applications and try again. Otherwise select Cancel to quit.	Attempt to allocate additional memory has failed.	Close other Windows applications and try again. If this is unsuccessful, MessageBuilder exits.
Print manager failed.	Error received from print manager (spooler).	Check print spooler for possible errors.
Printer setup failed.	Error occurred during printer setup.	Check validity of the print driver. Reload driver is necessary.
Project does not exist.	There is no project of that name.	Select another project name.
Project exists.	Entered a project name that already exists.	Enter another project name, or use the existing project.
The input file is not a MessageBuilder application file. Please select a new data file.	The file is not a MessageBuilder Application file and is not compatible with MessageBuilder.	Enter a different file name and retry. MessageBuilder Application files typically have the extension MBA or MVA.

Validation Error Messages

This appendix lists messages that may appear while validating an application, whether on command or automatically before downloading. Messages are listed alphabetically.

For messages that may appear during creation or editing of an application, see Appendix C.
For messages that may appear during a download, see Appendix E.
For messages that may appear during a tag import or export, see Page 8–22.

Message	Meaning	What to do
[Terminal Setup] Terminal selected in Terminal Setup does not match Application Type.	The selected catalog number does not match that of the application.	Change the catalog number using the Terminal Setup dialog to change the MV Type and Catalog and Version controls to match that of the application, or press OK to the Terminal Setup dialog to convert the application to match the selected terminal type.
Background message [number] doesn't exist.	The assigned Background message is not defined.	Define the Background message or disable background message with the Terminal Setup/Advanced dialog.
Bit Trigger Number [number] duplicated [number] times.	The bit trigger numbers for all messages in an application are not unique.	Use the Bit Trigger control on the Message Editor Table View to change the bit number or delete the offending message to insure that bit trigger numbers are unique.
Bit Trigger Priority mismatch with undefined Bit Triggered Messages.	Bit triggering is assigned priority over Value triggering yet there are no Bit Trigger enabled messages in the Application.	Use the Trigger Priority control on the Terminal Setup/Advanced dialog to change the priority to Value.
Bit Trigger Tag missing or tag not assigned.	The application has one or more messages that has bit triggers enabled; however the Bit Trigger Tag is undefined for the Application.	Change all message to value triggers or use the Terminal Setup/Control Tags dialog to define a Bit Trigger for the Application.
Chain-To-Message number greater than the maximum allowed.	The message is chained to a non-existent message.	Use Chain control on the Message Editor Table View to disable the chain or alter the "To" message number to select a different existing message.
Checking Msg [number] for unsupported features.		
Display variable storage size is greater than 100 characters. Reduce the tag sizes of display variables.	The combined tag array sizes for the embedded ASCII Variable Display variables in the message exceed 100 characters.	Use the tag editor to reduce the array size of the tags assigned to the embedded ASCII Variable Display variables in the message.
Duplicate Message Number within Application.	The message number for all messages in an Application are not unique.	Renumber or delete the offending message to insure that message numbers are unique.
Duplicate RTC Date Variables within message.	The message has more than one embedded Date variable. One is permitted per message.	Remove all but one Date variable.
Duplicate RTC Time Variables within message.	The message has more than one embedded Time variable. One is permitted per message.	Remove all but one Time variable.

Message	Meaning	What to do
Embedded ASCII Character 13 is not allowed.	The embedded ASCII Character of value 13 is not allowed for slaving messages.	Remove or change the value of the embedded ASCII character 13 by selecting the embedded ASCII character in the message and pressing the Delete key, or selecting the Format/Edit Variable Dialog.
Embedded ASCII Entry Tag array size must be greater than ASCII Entry variable field width.	The assigned tag array size is smaller than the display field width. Operator input cannot be completed without a large character array defined.	Use the tag editor to change the tag array size.
Embedded Carriage-Return not allowed with “Full” size text.	The message with “Full” attribute can not contain embedded Carriage-Return.	Use the Message Editor Table view to change the text size or remove the embedded Carriage-Return from the message.
Embedded Display Variables are not allowed in Chained message [number], chained from message [number].	Applications can not support embedded displayable variables in a chained-to message.	Resolve the conflict by chaining to a different message or removing the embedded display variables in the chained-”To” message.
Embedded Display Variables are not allowed in the Background message.	The Background Message assigned that has embedded display variables is not allowed.	Change or disable the Background Message in the Terminal Setup/Advanced dialog or remove the embedded display variables from the message.
Embedded Display Variables are not allowed in the Startup message.	The Startup Message assigned that has embedded display variables is not allowed.	Change or disable the Startup Message in the Terminal Setup/Advanced dialog or remove the embedded display variables from the message.
Embedded Entry Write Tag used but not defined.	The tag is undefined in the project database.	Use the tag editor to define the tag.
Embedded Graphic 13 is not allowed in slave messages.	The embedded Graphic symbol number 13 is not allowed for slaving messages.	Remove or change the value of the embedded Graphic number 13 by selecting the embedded Graphic in the message and pressing the Delete key or selecting the Format/Edit Variable Dialog.
Embedded-Carriage-Return not allowed without All attribute set.	Embedded Carriage-Return requires “All” attribute enabled.	Use the Message Editor Table view to change the Line attribute to “ALL” or remove the embedded Carriage-Return from the message.
Error: Msg [number] Numeric Variable Entry is not supported by terminal type.	The terminal is a 421D type.	Remove Numeric Entry variables from the messages listed. Or if practical change the application to a different terminal type.
Error: “Return Message Number to PLC” checked in the Advanced dialog requires Msg Tags Return Number, Ack Tags Return Number or FKey Tag Return Number be defined.	An appropriate return message number tag must be defined if Return Message Number to PLC option is selected.	Remove the Return Message Number to PLC option in the Terminal Setup/Advanced dialog or define a return message number tag in the Terminal Setup/Control Tags dialog.
Field width of Entry is larger than the width of the display.	An entry is not allowed to be wider than the displayable area.	Reduce the embedded Variable Entry Field width or increase the display width by making the message Text Size Half or Quarter.
Function Key Write Tag missing or tag not assigned.	The Function Key Write Tag is undefined for one or more Function Keys that are enabled in the Application.	Use the Function Key dialog to define a Write Tag for each Function Key that is enabled in the Application.
Graphic does not display properly on the end of the line.	The defined message cannot be displayed properly.	Reformat the message by deleting characters, or enable the scrolling attribute.

Message	Meaning	What to do
If “Enable Message Queue” is checked Value Trigger Tag must be defined.	The Message Queue option was selected but only Value Triggered messages can utilize the Message Queue.	Disable the Enable Message Queue option in the Terminal Setup/Advanced dialog or define a value trigger tag in the Terminal Setup/ Control Tags dialog.
Invalid Ack attribute for message with Embedded Entry Variables.	Not more than one operator action can be required per message.	Resolve the conflicting attributes. Disable the Ack attribute for a message with entry variables.
Invalid Ack attribute with Hidden Message attribute assignment.	A hidden message can not support any operator actions.	Resolve the conflicting attributes. Disable the Ack attribute for a hidden message.
Invalid Ack Time attribute with Ack attribute assignment.	Ack Time is enabled for a message that is not Ack enabled.	Resolve the conflicting attributes. Disable the Ack Time attribute for a non-Ack message.
Invalid Ack Time attribute with Hidden Message attribute assignment.	Hidden messages can not be acknowledged.	Resolve the conflicting attributes. Disable the Ack Time or Hidden Message attribute for message.
Invalid Any line attribute with hidden and slave attributes.	A message with Line attribute “Any” can not be hidden and slaved.	Resolve the conflicting attributes. Disable the Hidden or Slave message attribute or change the Line message attribute.
Invalid Auto Clear attribute with Wait Time zero and Scroll attribute not assigned.	The message is invisible.	Disable selection of the Auto Clear attribute or increase the Wait Time.
Invalid Block Transfer Table - Block [number] has an invalid direction.	The enabled block transfer block must have a direction.	Use the Communication Setup Block Transfer dialog to define the direction.
Invalid Block Transfer Table - Block [number] has an invalid length.	The block transfer length is illegal.	Use the Communication Setup Block Transfer dialog to define the proper length.
Invalid center attribute with HE stack and hidden attributes and no slave enabled attribute.	Message that are only Historical Event Stacked can not be centered.	Resolve the conflicting attributes. Disable the Center Message attribute for messages that are only Historical Event Stacked.
Invalid embedded ASCII char without slave enable attribute.	Embedded ASCII characters are defined in a message without the Slave Attribute enabled.	Select Slave Enable attribute or delete the Embedded ASCII characters.
Invalid embedded ASCII character with no other displayable characters in message.	The message defined is invisible on the terminal.	Define the message with displayable characters.
Invalid embedded carriage return character with no other displayable characters in message.	The message defined is invisible on the terminal.	Define displayable characters for the message.
Invalid Enable Function keys attribute for message with Embedded Entry Variables.	Not more than one operator action can be required per message.	Resolve the conflicting attributes. Disable the function keys or delete the Embedded entry variables.
Invalid Enable Function keys attribute for message with Acknowledge attribute.	Not more than one operator action can be required per message.	Resolve the conflicting attributes. Disable the Ack attribute for a message with Function Keys enabled.
Invalid Enable Function keys attribute for message with Ack Time attribute.	Not more than one operator action can be required per message.	Resolve the conflicting attributes. Disable the Ack Time attribute for a message with Function Keys enabled.
Invalid Enable Function keys attribute for message with Hidden Message attribute assignment.	A hidden message can not support any operator actions.	Resolve the conflicting attributes. Disable the Hidden Message attribute for a message with Function Keys enabled.
Invalid hidden attribute without slave, or HE stack.	A hidden message must be slaved and/or Historical Event Stacked.	Resolve the conflicting attributes. Enable the HE Stack or Slave Enable message attribute.
Invalid Hidden Message attribute with Embedded Entries.	A hidden message can not support any operator actions.	Resolve the conflicting attributes. Disable the Hidden Message attribute for a message with Embedded Entry variables.

Message	Meaning	What to do
Invalid Line attribute for Full Text Size attribute assignment.	A message with Full Text Size must start on Line 1 since it occupies 4 lines.	Resolve the conflicting attributes to achieve compatibility between Text Size and starting Line.
Invalid Line attribute for Half Text Size attribute assignment.	A message with Half Text Size can not start on line 4 since it occupies 2 lines.	Resolve the conflicting attributes to achieve compatibility between Text Size and starting Line.
Invalid Line attribute for message with Embedded Graphics.	A message with graphical symbols can not start on line 4 since it occupies 2 lines.	Resolve the conflicting attributes to achieve compatibility between Text Size and starting Line.
Invalid message character length.	A message can not exceed 100 characters.	Reduce the number of characters in the message.
Invalid Message length; must be greater than zero.	A message can not be entirely empty. It must have a length.	Delete the empty message or edit the message to make its length non-zero.
Invalid Message Number.	The Message number must be between 1 and 9900 inclusive.	Use the Message control on the Message Editor Table View to change the number to a legal message number between 1 and 9900 inclusive.
Invalid Scroll attribute with ALL Line attribute assignment.	A message that uses all lines can not be scrolled.	Change the Line attribute to not be ALL or disable the Scroll attribute option for the message.
Invalid Scroll attribute with center attribute.	A message that is centered can not be scrolled.	Disable the Scroll attribute option or disable the Center attribute option for the message.
Invalid Scroll attribute with HE stack and Hidden Message attributes.	Messages that are only Historical Event Stacked can not be scrolled.	Resolve the conflicting attributes. Disable the Scroll Message attribute for messages that are only Historical Event Stacked.
Invalid Tag [name] references device [name] as Node Name. This is not the Logic Controller selected in Terminal Setup - Comms. Setup.	The Node Name assigned to this tag does not match the assigned PLC/Scanner Name.	Use the tag editor to change the Node Name for this tag or change the PLC/Scanner Name in Terminal Setup/Comms. Setup dialog.
Invalid Tag - Acknowledge Tag [name] isn't a valid address in the terminal's assigned Discrete Rack or Block Transfer channels.	The Acknowledge Tag in Terminal Setup/ Control Tags address is not in the discrete I/O image of the rack or in the block transfer(s) configured for the Terminal.	Use the tag editor to change the tag address or the Terminal Setup/Comms. Setup/Block Transfer dialog to put the tag into a Block Transfer.
Invalid Tag - Acknowledge Tag [name] must be of type Bit.	The assigned tag is the wrong data type.	Use the tag editor to change the data type of the tag, or use the Terminal Setup Control Tag dialog to select an appropriate tag.
Invalid Tag - Acknowledge Tag [name] must be of type Input or BTR.	The Acknowledge Tag in Terminal Setup/ Control Tags is controlled by the Terminal and is read by the PLC. The tag must be in the Input image or be in a BTR (Block Transfer Read).	Use the tag editor to change the tag address or the Terminal Setup/Comms. Setup/Block Transfer dialog to put the tag into a Block Transfer that has its mode assigned as R.
Invalid Tag - Acknowledge Tag [name] overlaps Discrete I/O Rack Control/Status byte.	The Acknowledge Tag in Terminal Setup/ Control Tags is assigned the same address as the Block Transfer Control/Status Byte (the lowest byte in the discrete I/O rack).	Use the tag editor to change the tag address or the Terminal Setup/Comms. Setup/Block Transfer dialog to disable block transfers if they are not being used.
Invalid Tag - Acknowledge Tag [name].	The tag definition is incorrect.	Use the tag editor to correct the PLC address for the Ack tag.
Invalid Tag - Acknowledge-Handshake Tag [name] must be of type Bit.	The assigned tag is the wrong data type.	Use the tag editor to change the data type of the tag, or use the Terminal Setup Control Tag dialog to select an appropriate tag.

Message	Meaning	What to do
Invalid Tag - Acknowledge-Handshake Tag [name] isn't a valid address in the terminal's assigned Discrete Rack or Block Transfer channels.	The Acknowledge-Handshake Tag in Terminal Setup/Control Tags address is not in the discrete I/O image of the rack or in the block transfer(s) configured for the Terminal.	Use the tag editor to change the tag address or the Terminal Setup/Comms. Setup/Block Transfer dialog to put the tag into a Block Transfer.
Invalid Tag - Acknowledge-Handshake Tag [name] must be of type Output or BTW.	The tag is controlled by the PLC and is read by the Terminal. The tag must be in the Output image or be in a BTW (Block Transfer Write).	Use the tag editor to change the tag address or the Terminal Setup/Comms. Setup/Block Transfer dialog to put the tag into a Block Transfer that has its mode assigned as W.
Invalid Tag - Acknowledge-Handshake Tag [name] overlaps Discrete I/O Rack Control/Status byte.	The Acknowledge-Handshake Tag in Terminal Setup/Control Tags is assigned the same address as the Block Transfer Control/Status Byte (the lowest byte in the discrete I/O rack).	Use the tag editor to change the tag address or the Terminal Setup/Comms. Setup/Block Transfer dialog to disable block transfers if they are not being used.
Invalid Tag - Acknowledge-Handshake Tag [name].	Tag is undefined in the project database.	Use the tag editor to define the tag.
Invalid Tag - Bit Trigger Tag [name].	Tag is undefined in the project database.	Use the tag editor to define the tag.
Invalid Tag - Bit Trigger Tag [name] isn't a valid address in the terminal's assigned Discrete Rack or Block Transfer channels.	The tag address is not in the discrete I/O image of the rack or in the block transfer(s) configured for the Terminal.	Use the tag editor to change the tag address or the Terminal Setup/Comms. Setup/Block Transfer dialog to put the tag into a Block Transfer.
Invalid Tag - Bit Trigger Tag [name] must be of type Output or BTW.	The tag is controlled by the PLC and is read by the Terminal. The tag must be in the Output image or be in a BTW (Block Transfer Write).	Use the tag editor to change the tag address or the Terminal Setup/Comms. Setup/Block Transfer dialog to put the tag into a Block Transfer that has its mode assigned as W.
Invalid Tag - Bit Trigger Tag [name] must be of type Unsigned Integer.	The assigned tag is the wrong data type.	Use the tag editor to change the data type of the tag.
Invalid Tag - Bit Trigger Tag [name] overlaps Discrete I/O Rack Control/Status byte.	The tag is assigned the same address as the Block Transfer Control/Status Byte (the lowest byte in the discrete I/O rack).	Use the tag editor to change the tag address or the Terminal Setup/Comms. Setup/Block Transfer dialog to disable block transfers if they are not being used.
Invalid Tag - Bit Trigger Tag [name] will not fit in the Block Transfer Table (Max Bit Trigger = [number]) or tag is not defined in the Table.	The tag will not fit within the valid range in the discrete I/O image of the rack or in the block transfer(s) configured for the Terminal.	Redefine the block transfer address or reduce the total number of bit triggered messages.
Invalid Tag - Block [number] for Tag [name].	Address defined in the block transfer is incorrect.	Use the Communication Setup Block Transfer dialog to define the proper address.
Invalid Tag - Brightness Level Tag [name] must be of type Output or BTW.	The tag is controlled by the PLC and is read by the Terminal. The tag must be in the Output image or be in a BTW (Block Transfer Write).	Use the tag editor to change the tag address or the Block Transfer dialog to put the tag into a BTW.
Invalid Tag - Brightness Level Tag [name] must be of type Unsigned Integer.	The assigned tag is the wrong data type.	Use the tag editor to change the data type of the tag.
Invalid Tag - Brightness Level Tag [name] isn't a valid address in the terminal's assigned Discrete Rack or Block Transfer channels.	The tag address is not in the discrete I/O image of the rack or in the block transfer(s) configured for the Terminal.	Use the tag editor to change the tag address or the Communication Setup Block Transfer dialog to put the tag into a Block Transfer.
Invalid Tag - Brightness Level Tag [name] overlaps Discrete I/O Rack Control/Status byte.	The tag is assigned the same address as the Block Transfer Control/Status Byte (the lowest byte in the discrete I/O rack).	Use the tag editor to change the tag address or the Terminal Setup/Comms. Setup/Block Transfer dialog to disable block transfers if they are not being used.
Invalid Tag - Day Read Tag [name] must be of type Unsigned Integer.	The assigned tag is the wrong data type.	Use the tag editor to change the data type of the tag, or use the Application/Special Messages/Read Tags dialog to select an appropriate tag.

Message	Meaning	What to do
Invalid Tag - Day Write Tag [name] must be of type Unsigned Integer.	The assigned tag is the wrong data type.	Use the tag editor to change the data type of the tag, or use the Application/Special Messages/Write Tags dialog to select an appropriate tag.
Invalid Tag - Function Key F[number] Handshake Tag [name] must be of type Bit.	The assigned tag is the wrong data type.	Use the tag editor to change the data type of the tag, or use the Function Keys dialog to select or add an appropriate tag.
Invalid Tag - Function Key F[number] Handshake Tag [name] not defined.	Tag is undefined in the project database.	Use the tag editor to define the tag.
Invalid Tag - Function Key F[number] Write Tag [name] must be of type Bit.	The assigned tag is the wrong data type.	Use the tag editor to change the data type of the tag, or use the Function Keys dialog to select or add an appropriate tag.
Invalid Tag - Function Key F[number] Write Tag [name] not defined.	Tag is undefined in the project database.	Use the tag editor to define the tag, or use the Function Keys dialog to select or add an appropriate tag.
Invalid Tag - HE100% Full Tag [name] must be of type Bit.	The assigned tag is the wrong data type.	Use the tag editor to change the data type of the tag, or use the Terminal Setup Status Tags dialog to select an appropriate tag.
Invalid Tag - HE80% Full Tag [name] must be of type Bit.	The assigned tag is the wrong data type.	Use the tag editor to change the data type of the tag, or use the Terminal Setup Status Tags dialog to select an appropriate tag.
Invalid Tag - HE95% Full Tag [name] must be of type Bit.	The assigned tag is the wrong data type.	Use the tag editor to change the data type of the tag, or use the Terminal Setup Status Tags dialog to select an appropriate tag.
Invalid Tag - Hour Read Tag [name] must be of type Unsigned Integer.	The assigned tag is the wrong data type.	Use the tag editor to change the data type of the tag, or use the Application/Special Messages/Read Tags dialog to select an appropriate tag.
Invalid Tag - Hour Write Tag [name] must be of type Unsigned Integer.	The assigned tag is the wrong data type.	Use the tag editor to change the data type of the tag, or use the Application/Special Messages/Write Tags dialog to select an appropriate tag.
Invalid Tag - LED #[number] Tag [name] must be of type Bit.	The assigned tag is the wrong data type.	Use the tag editor to change the data type of the tag, or use the Application/LED Indicators dialog to select an appropriate tag.
Invalid Tag - LED #[number] Tag [name] must be of type Output or BTW.	The tag is controlled by the PLC and is read by the Terminal. The tag must be in the Output image or be in a BTW (Block Transfer Write).	Use the tag editor to change the tag address or the Terminal Setup/Block Transfer dialog to put the tag into a Block Transfer that has its mode assigned as W.
Invalid Tag - LED #[number] Tag [name] overlaps Discrete I/O Rack Control/Status byte.	The tag is assigned the same address as the Block Transfer Control/Status Byte (the lowest byte in the discrete I/O rack).	Use the tag editor to enter a different address for the tag or use the Terminal Setup/Comms. Setup/Block Transfer dialog to disable block transfers if they are not being used.
Invalid Tag - LED #[number] Tag [name]	Tag is undefined in the project database.	Use the tag editor to define the tag.
Invalid Tag - LED #[number] Tag [name] isn't a valid address in the terminal's assigned Discrete Rack or Block Transfer channels.	The tag address is not in the discrete I/O image of the rack or in the block transfer(s) configured for the Terminal.	Use the tag editor to change the tag address or the Terminal Setup/Comms. Setup/Block Transfer dialog to put the tag into a Block Transfer.
Invalid Tag - Message Return Number Tag [name] must be of type Unsigned Integer.	The Message Return Number tag in Terminal Setup/Control Tags is the wrong data type.	Use the tag editor to change the data type of the tag, or use the Terminal Setup Status Tags dialog to select an appropriate tag.

Message	Meaning	What to do
Invalid Tag - Minute Read Tag [name] must be of type Unsigned Integer.	The assigned tag is the wrong data type.	Use the tag editor to change the data type of the tag, or use the Application/Special Messages/Read Tags dialog to select an appropriate tag.
Invalid Tag - Minute Write Tag [name] must be of type Unsigned Integer.	The assigned tag is the wrong data type.	Use the tag editor to change the data type of the tag, or use the Application/Special Messages/Write Tags dialog to select an appropriate tag.
Invalid Tag - Month Read Tag [name] must be of type Unsigned Integer.	The assigned tag is the wrong data type.	Use the tag editor to change the data type of the tag, or use the Application/Special Messages/Read Tags dialog to select an appropriate tag.
Invalid Tag - Month Write Tag [name] must be of type Unsigned Integer.	The assigned tag is the wrong data type.	Use the tag editor to change the data type of the tag, or use the Application/Special Messages/Write Tags dialog to select an appropriate tag.
Invalid Tag - Msg #[number] Embedded Entry Notify Tag [name] must be of type Input or BTR.	The tag is controlled by the Terminal and is read by the PLC. The tag must be in the Input image or be in a BTR (Block Transfer Read).	Use the tag editor to change the tag address or the Terminal Setup/Comms. Setup/Block Transfer dialog to put the tag into a Block Transfer that has its mode assigned as R.
Invalid Tag - Msg #[number] Bit Trigger Number [number] greater than 1023.	The bit trigger number is required to be within the range of 0 to 1023.	Change the bit trigger number.
Invalid Tag - Msg #[number] Embedded ASCII Display Read Tag [name] must be of type Output or BTW.	The tag is controlled by the PLC and is read by the Terminal. The tag must be in the Output image or be in a BTW (Block Transfer Write).	Use the tag editor to change the tag address or the Terminal Setup/Comms. Setup/Block Transfer dialog to put the tag into a Block Transfer that has its mode assigned as W.
Invalid Tag - Msg #[number] Embedded ASCII Display Tag [name] must be of type Character Array.	The assigned tag is the wrong data type.	Use the tag editor to change the data type of the tag, or use the Terminal Setup Control Tag dialog to select an appropriate tag.
Invalid Tag - Msg #[number] Embedded ASCII Display Tag [name].	The tag definition is incorrect.	Use the tag editor to correct the PLC address for the tag.
Invalid Tag - Msg #[number] Embedded ASCII Display Tag used but not defined.	The tag is undefined in the project database.	Use the tag editor to define the tag.
Invalid Tag - Msg #[number] Embedded ASCII Display Tag [name] array size must be between 1 and 32.	The assigned tag must have an array size between the values of 1 and 32.	Use the tag editor to change the tag array size.
Invalid Tag - Msg #[number] Embedded ASCII Display Tag [name] isn't a valid address in the terminal's assigned Discrete Rack or Block Transfer channels.	The tag address is not in the discrete I/O image of the rack or in the block transfer(s) configured for the Terminal.	Use the tag editor to change the tag address or the Communication Setup Block Transfer dialog to put the tag into a Block Transfer.
Invalid Tag - Msg #[number] Embedded ASCII Display Tag [name] overlaps Discrete I/O Rack Control/Status byte.	The tag is assigned the same address as the Block Transfer Control/Status Byte (the lowest byte in the discrete I/O rack).	Use the tag editor to change the tag address or the Terminal Setup/Comms. Setup/Block Transfer dialog to disable block transfers if they are not being used.
Invalid Tag - Msg #[number] Embedded ASCII Entry Tag [name] array size must be between 2 and 33.	The assigned tag array size is outside the valid range.	Use the tag editor to change the tag array size.
Invalid Tag - Msg #[number] Embedded ASCII Entry Tag array size must be greater than ASCII Entry variable field width.	The assigned tag array size is smaller than the display field width. Operator input cannot be completed without a large character array defined.	Use the tag editor to change the tag array size.

Message	Meaning	What to do
Invalid Tag - Msg #[number] Embedded Entry Handshake Tag [name] Bit address specified but tag isn't Bit data type.	The assigned tag is the wrong data type.	Use the tag editor to change the data type of the tag, or use the Numeric Entry dialog to select or add an appropriate tag.
Invalid Tag - Msg #[number] Embedded Entry Handshake Tag [name] must be of type Bit.	The assigned tag is the wrong data type.	Use the tag editor to change the data type of the tag.
Invalid Tag - Msg #[number] Embedded Entry Handshake Tag defined without Embedded Entry Notification Tag.	Tag is undefined in the project database.	Use the tag editor to change the data type of the tag, or use the Numeric Entry dialog to select or add an appropriate tag.
Invalid Tag - Msg #[number] Embedded Entry Handshake Tag [name] must be of type Output or BTW.	The tag is controlled by the PLC and is read by the Terminal. The tag must be in the Output image or be in a BTW (Block Transfer Write).	Use the tag editor to change the tag address or the Terminal Setup/Comms. Setup/Block Transfer dialog to put the tag into a Block Transfer that has its mode assigned as W.
Invalid Tag - Msg #[number] Embedded Entry Handshake Tag [name] isn't a valid address in the terminal's assigned Discrete Rack or Block Transfer channels.	The tag address is not in the discrete I/O image of the rack or in the block transfer(s) configured for the Terminal.	Use the tag editor to change the tag address or the Communication Setup Block Transfer dialog to put the tag into a Block Transfer.
Invalid Tag - Msg #[number] Embedded Entry Handshake Tag [name] overlaps Discrete I/O Rack Control/Status byte.	The tag is assigned the same address as the Block Transfer Control/Status Byte (the lowest byte in the discrete I/O rack).	Use the tag editor to enter a different address for the tag or use the Terminal Setup/Comms. Setup/Block Transfer dialog to disable block transfers if they are not being used.
Invalid Tag - Msg #[number] Embedded Entry Notification Tag defined without Embedded Entry Handshake Tag.	The tag is undefined in the project database.	Use the tag editor to define the tag.
Invalid Tag - Msg #[number] Embedded Entry Notify Tag [name] isn't a valid address in the terminal's assigned Discrete Rack or Block Transfer channels.	The tag address is not in the discrete I/O image of the rack or in the block transfer(s) configured for the Terminal.	Use the tag editor to change the tag address or the Terminal Setup/Comms. Setup/Block Transfer dialog to put the tag into a Block Transfer.
Invalid Tag - Msg #[number] Embedded Entry Notify Tag [name] must be of type Bit.	The assigned tag is the wrong data type.	Use the tag editor to change the data type of the tag, or use the Terminal Setup Status Tags dialog to select an appropriate tag.
Invalid Tag - Msg #[number] Embedded Entry Notify Tag [name] overlaps Discrete I/O Rack Control/Status byte.	The tag is assigned the same address as the Block Transfer Control/Status Byte (the lowest byte in the discrete I/O rack).	Use the tag editor to enter a different address for the tag or use the Terminal Setup/Comms. Setup/Block Transfer dialog to disable block transfers if they are not being used.
Invalid Tag - Msg #[number] Embedded Entry Write Tag [name] Bit address specified but tag isn't Bit data type.	The assigned tag is the wrong data type.	Use the tag editor to change the data type of the tag.
Invalid Tag – Msg #[number] Embedded Entry Write Tag [name] Initial Value exceeds the allowed value for this tag type.	The assigned tag initial value is outside of the valid range.	Use the tag editor to change the tag initial value.
Invalid Tag – Msg #[number] Embedded Entry Write Tag [name] Max Data Entry Limit exceeds the allowed value for this tag type.	The assigned tag maximum Data Entry Limit is invalid.	Use the tag editor to change the Maximum entry value.
Invalid Tag – Msg #[number] Embedded Entry Write Tag [name] Max Entry value must be greater than Min Entry value.	The assigned tag minimum Data Entry Limit is greater than the maximum Data Entry Limit.	Use the tag editor to change the Maximum or Minimum entry values.
Invalid Tag – Msg #[number] Embedded Entry Write Tag [name] Maximum Data Entry exceeds data limits (-2147483647 to +2147483647).	The assigned tag maximum entry is greater than the maximum value allowed.	Use the tag editor to change the Maximum Data Entry value.

Message	Meaning	What to do
Invalid Tag – Msg #[number] Embedded Entry Write Tag [name] Min Data Entry Limit is smaller than the allowed value for this tag type.	The assigned tag minimum Data Entry Limit is invalid.	Use the tag editor to change the Minimum entry value.
Invalid Tag – Msg #[number] Embedded Entry Write Tag [name] Minimum Data Entry exceeds data limits (-2147483647 to +2147483647).	The assigned tag minimum entry is less than the minimum value allowed.	Use the tag editor to change the Minimum Data Entry value.
Invalid Tag - Msg #[number] Embedded Entry Write Tag [name] Scale value of 0 or not in range (± .0001 to ± 9999.0).	The tag scaling factors are outside the valid range.	Use the tag editor to change the tag scale.
Invalid Tag - Msg #[number] Embedded Entry Write Tag [name].	Tag is undefined in the project database.	Use the tag editor to define the tag.
Invalid Tag - Msg #[number] Embedded Entry Write Tag [name] used but not defined.	Tag is undefined in the project database.	Use the tag editor to define the tag.
Invalid Tag - Msg #[number] Embedded Entry Write Tag [name] has wrong type.	The assigned tag is the wrong data type.	Use the tag editor to change the data type of the tag.
Invalid Tag - Msg #[number] Embedded Entry Write Tag [name] initial value must be an integer.	The assigned tag is the wrong data type.	Use the tag editor to change the data type of the tag.
Invalid Tag - Msg #[number] Embedded Entry Write Tag [name] isn't a valid address in the terminal's assigned Discrete Rack or Block Transfer channels.	The tag address is not in the discrete I/O image of the rack or in the block transfer(s) configured for the Terminal.	Use the tag editor to change the tag address or the Communication Setup Block Transfer dialog to put the tag into a Block Transfer.
Invalid Tag - Msg #[number] Embedded Entry Write Tag [name] Max value not valid or not in range.	The assigned tag maximum value is invalid.	Use the tag editor to change the Maximum entry value.
Invalid Tag - Msg #[number] Embedded Entry Write Tag [name] Min value not valid or not in range.	The assigned tag minimum value is invalid.	Use the tag editor to change the Minimum entry value.
Invalid Tag - Msg #[number] Embedded Entry Write Tag [name] must be of type Input or BTR.	The tag is controlled by the Terminal and is read by the PLC. The tag must be in the Input image or be in a BTR (Block Transfer Read).	Use the tag editor to change the tag address or the Terminal Setup/Comms. Setup/Block Transfer dialog to put the tag into a Block Transfer that has its mode assigned as R.
Invalid Tag - Msg #[number] Embedded Entry Write Tag [name] offset not in range.	The tag offset value is outside the range of –32768 and +32767.	Use the tag editor to change the tag offset.
Invalid Tag - Msg #[number] Embedded Entry Write Tag [name] overlaps Discrete I/O Rack Control/Status byte.	The tag is assigned the same address as the Block Transfer Control/Status Byte (the lowest byte in the discrete I/O rack).	Use the tag editor to enter a different address for the tag or use the Terminal Setup/Comms. Setup/Block Transfer dialog to disable block transfers if they are not being used.
Invalid Tag - Msg #[number] Embedded Numeric Display Tag [name].	Tag is undefined in the project database.	Use the tag editor to define the tag.
Invalid Tag - Msg #[number] Embedded Numeric Display Tag [name] has wrong type.	The Embedded Numeric Display Tag must be a signed integer, unsigned integer, or bit data type.	Use the tag editor to change the data type of the tag, or select the embedded variable in the message and select the appropriate tag using the Format/Edit Variable dialog.
Invalid Tag - Msg #[number] Embedded Numeric Display Tag [name] isn't a valid address in the terminal's assigned Discrete Rack or Block Transfer channels.	The tag address is not in the discrete I/O image of the rack or in the block transfer(s) configured for the Terminal.	Use the tag editor to change the tag address or the Terminal Setup/Comms. Setup/Block Transfer dialog to put the tag into a Block Transfer.

Message	Meaning	What to do
Invalid Tag - Msg #[number] Embedded Numeric Display Tag [name] Scale value of 0 is not valid.	Scale value of zero is not allowed.	Use the tag editor to change the tag Scale to be non-zero.
Invalid Tag - Msg #[number] Embedded Numeric Display Tag [name] must be of type Output or BTW.	The tag is controlled by the PLC and is read by the Terminal. The tag must be in the Output image or be in a BTW (Block Transfer Write).	Use the tag editor to change the tag address or the Terminal Setup/Comms. Setup/Block Transfer dialog to put the tag into a Block Transfer that has its mode assigned as W.
Invalid Tag - Msg #[number] Embedded Numeric Display Tag [name] isn't a valid address in the terminal's assigned Discrete Rack or Block Transfer channels.	The tag address is not in the discrete I/O image of the rack or in the block transfer(s) configured for the Terminal.	Use the tag editor to change the tag address or the Terminal Setup/Comms. Setup/Block Transfer dialog to put the tag into a Block Transfer.
Invalid Tag - Msg #[number] Embedded Numeric Display Tag [name] overlaps Discrete I/O Rack Control/Status byte.	The tag is assigned the same address as the Block Transfer Control/Status Byte (the lowest byte in the discrete I/O rack).	Use the tag editor to enter a different address for the tag or use the Terminal Setup/Comms. Setup/Block Transfer dialog to disable block transfers if they are not being used.
Invalid Tag - Msg #[number] Embedded Numeric Entry Write Tag [name] Tag minimum absolute value is too large for Numeric Entry field width.	The Minimum Data Entry Limit assigned to the tag will not fit within the Numeric Variable Entry Field Width.	Use the tag editor to change the Minimum Data Entry or select the embedded variable in the message and change the Field Width using the Format/Edit Variable dialog.
Invalid Tag - Msg #[number] Embedded Numeric Display Tag [name] Bit address specified but tag isn't Bit data type.	The assigned tag is the wrong data type.	Use the tag editor to change the data type of the tag.
Invalid Tag - Msg #[number] Tag [name] references device [name] as Node Name. This is not the Logic Controller selected in Terminal Setup - Comms. Setup.	The Node Name assigned to this tag used in this message does not match the assigned PLC/Scanner Name.	Use the tag editor to change the Node name for this tag or change the PLC/Scanner Name in the Terminal Setup/Comms. Setup dialog.
Invalid Tag - Msg #[number] Tag [name] references no device. Tag Node Name must match the Logic Controller selected in Terminal Setup - Comms. Setup.	There is no Node Name assigned to the tag used in this message.	Use the tag editor to change the Node Name for this tag.
Invalid Tag - Msg #[number] Undefined Embedded Numeric Display Tag.	Tag is undefined in the project database.	Use the tag editor to define the tag.
Invalid Tag - Msg #[number] with Embedded Entry Handshake Tag [name].	Tag is undefined in the project database.	Use the tag editor to change the data type of the tag, or use the Numeric Entry dialog to select or add an appropriate tag.
Invalid Tag - Msg #[number] with Embedded Entry Notify Tag [name].	Tag is undefined in the project database.	Use the tag editor to define the tag.
Invalid Tag - Return Number for Ack Tag [name] must be of type Unsigned Integer.	The Acknowledge Return Number tag in Terminal Setup/Control Tags is the wrong data type.	Use the tag editor to change the data type of the tag, or use the Terminal Setup Status Tags dialog to select an appropriate tag.
Invalid Tag - Return Number for FKey Tag [name] must be of type Unsigned Integer.	The Function Key Return Number tag in Terminal Setup/Control Tags is the wrong data type.	Use the tag editor to change the data type of the tag, or use the Terminal Setup Status Tags dialog to select an appropriate tag.
Invalid Tag - Second Read Tag [name] must be of type Unsigned Integer.	The assigned tag is the wrong data type.	Use the tag editor to change the data type of the tag, or use the Application/Special Messages/Read Tags dialog to select an appropriate tag.
Invalid Tag - Second Write Tag [name] must be of type Unsigned Integer.	The assigned tag is the wrong data type.	Use the tag editor to change the data type of the tag, or use the Application/Special Messages/Write Tags dialog to select an appropriate tag.
Invalid Tag - Tag [name] Bit address specified but tag isn't Bit data type.	The assigned tag is the wrong data type.	Use the tag editor to change the data type of the tag.

Message	Meaning	What to do
Invalid Tag - Value Trigger Tag [name] isn't a valid address in the terminal's assigned Discrete Rack or Block Transfer channels.	The tag address is not in the discrete I/O image of the rack or in the block transfer(s) configured for the Terminal.	Use the tag editor to change the tag address or the Terminal Setup/Comms. Setup/Block Transfer dialog to put the tag into a Block Transfer.
Invalid Tag - Value Trigger Tag [name] must be of type Output or BTW.	The tag is controlled by the PLC and is read by the Terminal. The tag must be in the Output image or be in a BTW (Block Transfer Write).	Use the tag editor to change the tag address or the Terminal Setup/Comms. Setup/Block Transfer dialog to put the tag into a Block Transfer that has its mode assigned as W.
Invalid Tag - Value Trigger Tag [name] must be of type Unsigned Integer.	The assigned tag is the wrong data type.	Use the tag editor to change the data type of the tag, or use the Terminal Setup/Control Tags dialog to select an appropriate tag.
Invalid Tag - Value Trigger Tag [name] overlaps Discrete I/O Rack Control/Status byte.	The tag is assigned the same address as the Block Transfer Control/Status Byte (the lowest byte in the discrete I/O rack).	Use the tag editor to enter a different address for the tag or use the Terminal Setup/Comms. Setup/Block Transfer dialog to disable block transfers if they are not being used.
Invalid Tag - Value Trigger Tag [name].	Tag is undefined in the project database.	Use the tag editor to define the tag.
Invalid Tag - Year Read Tag [name] must be of type Unsigned Integer.	The assigned tag is the wrong data type.	Use the tag editor to change the data type of the tag, or use the Application/Special Messages/Read Tags dialog to select an appropriate tag.
Invalid Tag - Year Write Tag [name] must be of type Unsigned Integer.	The assigned tag is the wrong data type.	Use the tag editor to change the data type of the tag, or use the Application/Special Messages/Write Tags dialog to select an appropriate tag.
Invalid Tag - Bit Trigger Tag not defined.	Tag is undefined in the project database.	Use the tag editor to define the tag.
Invalid Tag - Tag [name] references no device. Tag Node Name must match the Logic Controller selected in Terminal Setup - Comms. Setup.	The tag node name is not assigned.	Use the tag editor to define the tag node name.
Invalid Tag - [tag description] Tag [name] overlaps Discrete I/O Rack Control/Status byte.	The tag is assigned the same address as the Block Transfer Control/Status Byte (the lowest byte in the discrete I/O rack).	Use the tag editor to enter a different address for the tag or use the Terminal Setup/Comms. Setup/Block Transfer dialog to disable block transfers if they are not being used.
Invalid Tag - [tag description] Tag [name] isn't a valid address in the terminal's assigned Discrete Rack or Block Transfer channels.	The tag address is not in the discrete I/O image of the rack or in the block transfer(s) configured for the Terminal.	Use the tag editor to change the tag address or the Terminal Setup/Comms. Setup/Block Transfer dialog to put the tag into a Block Transfer.
Invalid Tag - [tag description] Tag [name] must be of type Input or BTR.	The tag is controlled by the Terminal and is read by the PLC. The tag must be in the Input image or be in a BTR (Block Transfer Read).	Use the tag editor to change the tag address or the Terminal Setup/Comms. Setup/Block Transfer dialog to put the tag into a Block Transfer that has its mode assigned as R.
Invalid Tag - [tag description] Tag [name] must be of type Output or BTW.	The tag is controlled by the PLC and is read by the Terminal. The tag must be in the Output image or be in a BTW (Block Transfer Write).	Use the tag editor to change the tag address or the Terminal Setup/Comms. Setup/Block Transfer dialog to put the tag into a Block Transfer that has its mode assigned as W.
Invalid Tag - [tag description] Tag [name] references no device. Tag Node Name must match the Logic Controller selected in Terminal Setup - Comms. Setup.	There is no Node Name assigned to the tag.	Use the tag editor to define the Node Name for this tag.
Invalid Text Size attribute assignment for message with Embedded Graphics.	The Text Size of a message with embedded graphical symbols must be Half; i.e. the size of a graphic is fixed at 2 display lines.	Use Half Text Size to display graphical symbols.

Message	Meaning	What to do
Maximum allowable Embedded Entry Variables per message exceeded.	The message has more than ten embedded variables.	Reduce the total number of embedded variables to 10 or less.
Message [number] Chain-to message number cannot be 0.	The message is chained to a non-existent message.	Use Chain control on the Message Editor Table view to disable the chain or alter the “To” message number to select a different existing message.
Message number [number] chained to invalid message number.	The message is chained to a non-existent message.	Use Chain control on the Message Editor Table view to disable the chain or alter the “To” message number to select a different existing message.
Message number [number] circular chain.	The message is chained to itself.	Use Chain control on the Message Editor Table view to disable the chain or alter the “To” message number to select a different existing message.
Message number [number] doesn’t have a valid trigger source or isn’t chained to from another message.	The message can not be triggered with the defined application.	Define a Value Trigger tag in the Terminal Setup/Control Tags dialog, select Bit Trigger Enable for this message, or select Chain Enable in another message to this message.
Message number [number] duplicated [number] times.	The message numbers for all messages in an application are not unique.	Renumber or delete the offending message to insure that message numbers are unique.
Msg #[number] Slave message enabled without Slave Device selected in Aux. Port terminal setup.	The message has the Slave Enable attribute set when Slave Device is not selected.	Disable the Slave Enable attribute for the message or select Slave Device as the Aux. Port Device in the Terminal Setup/Aux. Port dialog.
Msg #[number] ASCII Variable Entry is not supported by terminal type.	Embedded ASCII Entry variables are not allowed for ASCII trigger application.	Use the Terminal Setup/Comms. Setup dialog to convert the terminal type, or delete the embedded ASCII entry variables in the message.
Msg #[number] Numeric Variable Entry is not supported by terminal type.	Applications can not support embedded Numeric Entry in the message.	Resolve the conflict by removing the embedded Numeric Entry Variable(s).
PLC/Scanner not assigned.	The PLC/Scanner with which the terminal communicates is not defined.	Use the Terminal Setup Communication Setup dialog to configure the PLC/Scanner type and name.
RIO rack information not defined.	The Remote I/O rack information is not defined.	Use the Terminal Setup Communication Setup dialog to configure the Remote I/O rack information.
Slave message address is greater than the maximum allowed address.	The Slave Address can not be greater than 127.	Change the value of the Slave Address between 1 and 127 inclusive.
Slave message address is less than the minimum allowed address.	The Slave Address can not be less than 1.	Change the value of the Slave Address between 1 and 127 inclusive.
Slave message address of 13 is not allowed.	The Slave Address of 13 assigned to the message is not allowed.	Change the value of the Slave Address to some other value than 13.
Startup Message [number] doesn’t exist.	The Startup Message is assigned to an undefined message number.	Change or disable the Startup Message in the Terminal Setup/Advanced dialog or create a message with the assigned message number.
Tag not assigned or data type mismatch.	Tag is undefined in the project database.	Use the tag editor to define the tag.
Unable to create RIO Block Array.	The RIO communication port setup is incomplete.	Use the Terminal Setup/Comms. Setup dialog or the Communication Setup Block Transfer dialog to define the RIO port information.
Validation Tags: Device not found in project database.	The PLC or Terminal device name is not in the project database.	Use the Terminal Setup/Comms. Setup dialog or the Terminal Setup dialog to define the device.

Message	Meaning	What to do
Validation Tags: PLC/Scanner communications port not defined.	The PLC/Scanner with which the terminal communicates is not defined.	Use the Terminal Setup Communication Setup dialog to configure the PLC/Scanner type and name.
Value Trigger Priority mismatch with undefined Value Triggered Messages.	There is no Value Trigger tag defined for the application; however the Trigger Priority is set to Value.	Use the Trigger Priority control on the Terminal Setup/Advanced dialog to change the priority to Bit, or use the Terminal Setup/Control Tags dialog to define a Value Trigger tag.
With line attribute “All” message won’t fit on display.	The All Line message contains more displayable characters than the display can show.	Reformat the message with fewer characters or change the text size.

Upload/Download Error Messages

This appendix lists error messages that may appear during a download or upload operation. Messages are listed alphabetically.

For messages that may appear during creation or editing of an application, see Appendix C.
For messages that may appear during validation, see Appendix D.
For messages that may appear during a tag import or export, see Page 8–22.

Error Message	Meaning	What to do
Address overlaps Block Transfer Control Byte.	A tag is assigned the same address as the Block Transfer Control Byte, the lowest accessible byte in the discrete I/O rack.	Enter a different address for the tag in the Tag Editor. Or if BTs are not used, disable block transfers in the Block Transfer dialog.
Application (Data) file CRC is incorrect.	The computed CRC of the MVA file does not match the CRC stored in the program.	The file is corrupted. Specify a valid MVA file.
Application file length does not match file header record.	The MVA file has a different file length recorded than the length of the file. This typically occurs when a file is being downloaded which was truncated by an aborted upload.	Specify a valid MVA file.
Application matches file in terminal, no download is necessary.	The CRC of the MVA file is identical to the CRC or the application in the terminal.	No action is necessary.
Application type does not match terminal type. Re-configure in Terminal Setup.	The application is configured for a communication protocol that does not match the terminal port.	From the Setup tab in Terminal Setup, select a terminal type that matches the application. Or convert the application to match the terminal type, then update the tags appropriately.
Block Transfer Channel Number: [Num] – Length is invalid.	The block transfer length is defined as 0 or exceeds the maximum of 64.	In the Block Transfer dialog, correct the invalid length of a block transfer.
Cannot continue, terminal is BUSY. – – – – – – – – OR – – – – – – – – Cannot continue, terminal is not in RUN mode.	The terminal is in a mode that will not support file transfers.	Wait until the terminal is in RUN mode, then retry the file transfer.
Cannot continue, terminal is in PROGRAM mode.	The terminal is transferring a file to or from another computer.	Wait until the terminal completes the other transfer, then retry the operation.
Cannot perform file transfer operation, no INTERCHANGE communication drivers are currently running.	INTERCHANGE drivers are not loaded on the computer.	Exit Windows. Configure the appropriate INTERCHANGE drivers and load them as described in Chapter 2.
Data file CRC is incorrect.	The CRC of the historical event data file did not match the CRC sent by the MessageView terminal.	Retry the historical event stack upload operation.
Data file length is incorrect.	The historical event data file did not match the length sent by the MessageView terminal.	Retry the historical event stack upload operation.
Error while scanning for application file CRC	MessageBuilder software could not read the MVA file to verify the CRC.	Specify a valid MVA file.

Note: CRC is Cyclic Redundancy Check, a check for errors in files.

Error Message	Meaning	What to do
Error while scanning for data file CRC.	The historical event data file could not be read to verify its data.	Retry the historical event stack upload operation.
INTERCHANGE command failure. Remote station did not acknowledge command.	MessageBuilder software aborted the transfer because it did not receive a response to a command.	Verify that the MessageView terminal is connected to the computer and startup self tests are normal. Retry operation.
RNA: Error $COOA placing device #n online	INTERCHANGE could not start the driver associated with port #n of the computer.	Check the driver configuration in CFG-KT.INI. It may be set for a different baud rate than the physical network.
Terminal Aborted File Transfer: File is NOT compatible with terminal.	The type of MessageView application file that is being downloaded is not compatible with the selected terminal device.	Generate a new application file specifying the correct terminal type.
Terminal Aborted File Transfer: File is too large for terminal.	The application file that is being downloaded will not fit in the terminal's memory.	Reduce the size of the application.
Terminal Aborted File Transfer: Terminal has no file available.	An upload attempt failed because the terminal did not have an application loaded in memory.	Download an application to the terminal.
Terminal has no file available.	The requested file for upload does not exist. This typically occurs when the HE Stack is empty, that is, it is cleared.	Do not attempt to upload an empty HE Stack file.

Note: CRC is Cyclic Redundancy Check, a check for errors in files.

Global Configuration Parameters

In this table, a dot in the MessageView 421 Terminals column means that the attribute may be changed by the terminal operator using the Front Panel Editor.

A dot in the MessageBuilder Software column means that the attribute may be changed by the application designer in the Terminal Setup dialogs.

Parameter name	Description	(Default) Range	MessageView 421 Terminals	MessageBuilder Software
Ack Bit Hold Time	After a message is acknowledged, the Acknowledge bit is set high for 50 msec. This time cannot be changed	50 msec		
BackGround Message	When no message is triggered, this message displays	(none) 1 to 9900	●	●
Center	Whether the message should be centered in the display			●
Debug Mode Operation	Messages are displayed in the terminal but not active	(Disable) Enable	●	●
Display Brightness	How bright the display should be	(75%) 12, 25, 38, 50,60, 87, 100%	●	●
Flash	Whether characters should be flashing			●
Flash Rate	What the flash rate should be		●	●
Handshake Time-Out	How long the terminal should wait for a response from the logic controller before notifying the operator that the logic controller is not responding. A timeout of 0 means that no response is required	(4 sec.) 0 to 3, 5 to 60 sec.		●
Inverse	Whether characters should be in inverse video			●
Language	Which language the terminal should use	(English) German, French, Italian, Spanish	●	●
Message Queue Enabled	Should there be a Message Queue to store value triggered messages until they can be displayed	(1) 64		●
Password – Entry	Enter a password	(none) any four digits	●	●
Password – Modify	Create or change a password	(none) any four digits		●
Port Powerup	To power communication parameters for the computer with MessageBuilder software (OLP)	(Aux) OLP	●	●

Parameter name	Description	(Default) Range	MessageView 421 Terminals	MessageBuilder Software
Return Msg Num	When a message is displayed, whether its message number should be sent to the controller	(No) Yes		●
RIO Baud Rate	Setting up Remote I/O communications port	(57.6K) 115.2K, 230.4K	View Only	●
RIO Block Transfer	Whether block transfer (default) or discrete I/O should be used	(Disabled) Enabled	View Only	●
RIO Last Chassis	Is this the last chassis on the logic controller?	(No) Yes	View Only	●
RIO Module	The starting module for MessageView addresses	(0) 1 to 3	View Only	●
RIO Pass-Through	Whether the controller should pass data/applications through to the computer on another network	(Disabled) Enabled	View Only	n/a
RIO Rack Number	Setting up Remote I/O communications port	(4_{octal}) 0 to 3, 5 to 76_{octal}	View Only	●
RIO Rack Size	Setting up Remote I/O communications port	$^1/_4$, $^1/_2$, $^3/_4$, Full	View Only	●
RS-232 Data Bits	Setting up the motherboard communications port	(8) 7	●	●
RS-232 Hardware Handshake	Setting up the motherboard communications port	(Enable) Disable	●	●
RS-232 Parity	Setting up the motherboard communications port	(None) Odd, Even	●	●
RS-232 Stop Bits	Setting up the motherboard communications port	(1) 2	●	●
RS-232 Baud Rate	Setting up the motherboard communications port	(19200) 300, 1200, 2400, 9600, 38,400	●	●
Send Values at Power-Up	Whether to send data to PLC following loss of communications and at powerup; RIO has this always enabled	(Disable) Enable	●	●
Simulate Mode	Allow a demonstration using a MessageView terminal not connected to a logic controller or any devices	(Disable) Enable	●	●
Startup Msg	The message to be displayed at powerup	(none) 1 to 9900	●	●
Trigger Priority	Whether a bit trigger or a value trigger has higher priority	(bit) value		●
Values at Power-Up	Send data type as Preset or as in the Last active communications state	(Preset) Last	●	●

The time and date are also set globally.

Parameter name	Description	(Default) Range	MessageView 421 Terminals	MessageBuilder Software
Date Day	The current day of the month	(1) 2 to 31	●	●
Date Format Order	Setting the order of items in the date	(M/D/Y) D/M/Y, Y/M/D		●
Date Format Year Display	How to display the year	(1995) 95		●
Date Format Lead Zero	Whether February 2 should be 2/2 (default) or 02/02	(Disable) Enable		●
Date Format Separators	The symbol to separate day, month and year	(/) any single character		●
Date Month	The current month of the year	(1) 2 to 12	●	●
Date Year	The current year	(1995) 1996 to 2094	●	●
Time Format	Format separators for time display	(:) any single character		●
Time Format Lead Zero	Whether 9:03 (default) is displayed as 09:03	(Disable) Enable		●
Time Format Seconds Included	Whether seconds should be displayed (default)	(Enable) Disable		●
Time Hour	The current hour	(0) 1 to 12/0 to 24	●	●
Time Hour Format	12-hour or 24-hour format	(12) 24		●
Time Hour Notation – Selection	The suffix to be displayed after the time, e.g. PM CST; this is only selection, not entry of 10 characters	(AM) PM, any 10 characters		●
Time Minutes	The current minutes after the hour	(0) 1 to 59	●	●
Time Seconds	The current seconds after the minute	(0) 1 to 59	●	●

Tags and Data Types

Read tags are controlled by the PLC. For Remote I/O, read tags are Output or BTW.

Tag	Type	Purpose	Range
Acknowledge Handshake	Bit	A bit that when set informs the terminal that the Acknowledge bit and Acknowledge Return Number have been acquired by the controller. Use of the Acknowledge Handshake is optional.+	0, 1
ASCII Display	Character Array	A string of ASCII characters that is scanned whenever a message with an embedded ASCII Variable Display is triggered. An ASCII Display tag is required for every embedded ASCII Variable Display in the application.	An array of characters.
ASCII Entry Handshake	Bit	A bit that when set informs the terminal that the ASCII Variable Entry and Message Return Number have been acquired by the controller. Use of the Numeric Entry Handshake is optional.	0, 1
Bit trigger	Unsigned Integer	The first word of a bit sequence for triggering messages by their bit number. The bit sequence is up to 64 words long. The terminal continuously scans the bit sequence whenever one or more bit-triggered messages exist in the application.	Bit position 0-1023
(Latched) Function Key Handshake	Bit	A bit that when set returns a Latched Function Key to the de-energized state. Every Latched Function Key in the application requires a corresponding Handshake tag.	0, 1
LED Indicator	Bit	A bit that controls an LED indicator on the 2706-M1F1 terminal. One bit is optionally assigned to each LED indicator in the application. The terminal continuously scans the LED indicator tags whenever they are assigned.	0, 1
Numeric Display	Signed Integer, Unsigned Integer, or BCD	A numeric value that is scanned, formatted and displayed whenever a message with an embedded Numeric Variable Display is triggered. A Numeric Display tag is required for every embedded Numeric Variable Display in the application.	Depends on the type.
Numeric Entry Handshake	Bit	A bit that when set informs the terminal that the Numeric Variable Entry and Message Return Number have been acquired by the controller. Use of the Numeric Entry Handshake is optional.	0, 1
Special Message 9905: Year	Unsigned Integer	A value for setting the year of the Real-Time Clock in the terminal. The value is acquired when Special Message 9905 (Set Time/Date) is triggered.	0-2035
Special Message 9905: Month	Unsigned Integer	A value for setting the month of the Real-Time Clock in the terminal. The value is acquired when Special Message 9905 (Set Time/Date) is triggered.	0-1**2**
Special Message 9905: Day	Unsigned Integer	A value for setting the day of the Real-Time Clock in the terminal. The value is acquired when Special Message 9905 (Set Time/Date) is triggered.	0-31
Special Message 9905: Hour	Unsigned Integer	A value for setting the hour of the Real-Time Clock in the terminal. The value is acquired when Special Message 9905 (Set Time/Date) is triggered.	0-23
Special Message 9905: Minute	Unsigned Integer	A value for setting the minute of the Real-Time Clock in the terminal. The value is acquired when Special Message 9905 (Set Time/Date) is triggered.	0-59

Tag	Type	Purpose	Range
Special Message 9905: Second	Unsigned Integer	A value for setting the second of the Real-Time Clock in the terminal. The value is acquired when Special Message 9905 (Set Time/Date) is triggered.	0-59
Special Message 9908: Set Brightness	Unsigned Integer	A value for setting the level of brightness of the terminal display. Bit 0 Brightness 12%; Bit 1 Brightness 25%; Bit 2 Brightness 38%; Bit 3 Brightness 50%; Bit 4 Brightness 60%; Bit 5 Brightness 75%; Bit 6 Brightness 87%; Bit 7 Brightness 100%	0–7
Value trigger	Unsigned Integer	A value for triggering messages by their message number. The terminal continuously scans for a new (changed) trigger value.	1-9900

Write tags are controlled by the terminal. For Remote I/O, write tags are Input or BTR.

Tag	Type	Purpose	Range
Message Return number	Unsigned Integer	A value that indicates the message number of the last-triggered message on display when the message does not require Acknowledge nor have Function Keys enabled.	1-9900
Acknowledge	Bit	A bit that when set informs the logic controller that the Ack key is pressed for a message that requires Acknowledgement by the operator.	0, 1
Acknowledge Return Number	Unsigned Integer	A value that indicates the message number of the last–triggered message on display when the message requires Acknowledgement by the operator.	1-9900
Function Key	Bit	A bit that when set indicates that a Function Key has been pressed. The behavior of this bit is determined by the type of Function Key and how it is configured.	0, 1
Function Key Return Number	Unsigned Integer	A value that indicates the message Number of the last-triggered message on display when the message has one or more Function Keys enabled.	1-9900
Numeric Entry	Signed Integer, Unsigned Integer, or BCD	A numeric value that indicates the operator entered value whenever a message with an embedded Numeric Variable Entry is on display. A Numeric Entry tag is required for every embedded Numeric Variable Entry in the application.	Depends on the type.
Numeric Entry Notification	Bit	A bit that when set informs the controller that the Numeric Variable Entry is changed and ready to be acquired by the controller.	0, 1
ASCII Entry	Character Array	Alphanumeric characters entered by an ASCII Input device. An ASCII Entry tag is required for every embedded ASCII Variable Entry in the application.	Depends on the ASCII Input device
ASCII Entry Notification	Bit	A bit that when set informs the controller that the ASCII Variable Entry is changed and ready to be acquired by the controller.	0, 1
HE Stack Status 85%	Bit	A bit that when set indicates that the HE Stack is 85% full.	0, 1
HE Stack Status 95%	Bit	A bit that when set indicates that the HE Stack is 95% full.	0, 1
HE Stack Status 100%	Bit	A bit that when set indicates that the HE Stack is 100% full.	0, 1
Special Message 9906: Year	Unsigned Integer	A value that indicates the year of the Real-Time Clock in the terminal. The value is available when Special Message 9906 (Get Time/Date) is triggered.	0-65535

Tag	Type	Purpose	Range
Special Message 9906: Month	Unsigned Integer	A value that indicates the month of the Real-Time Clock in the terminal. The value is available when Special Message 9906 (Get Time/Date) is triggered.	0-12
Special Message 9906: Day	Unsigned Integer	A value that indicates the day of the Real-Time Clock in the terminal. The value is available when Special Message 9906 (Get Time/Date) is triggered.	0-31
Special Message 9906: Hour	Unsigned Integer	A value that indicates the hour of the Real-Time Clock in the terminal. The value is available when Special Message 9906 (Get Time/Date) is triggered.	0-23
Special Message 9906: Minute	Unsigned Integer	A value that indicates the minute of the Real-Time Clock in the terminal. The value is available when Special Message 9906 (Get Time/Date) is triggered.	0-59
Special Message 9906: Second	Unsigned Integer	A value that indicates the second of the Real-Time Clock in the terminal. The value is available when Special Message 9906 (Get Time/Date) is triggered.	0-59
Special Message 9907: Battery Test	Bit	A bit that when set indicates that the battery is functional. 0 = Fails, 1 = Pass	0, 1

Tag Address Worksheet

This appendix contains a worksheet to help in planning an application. Variables cannot be assigned to memory addresses that overlap, and the only way to make sure they do not overlap is to write them all down.

Make copies as needed and use them to enter addresses for each tag in the application. Depending on what your application requires, you may need one or more worksheets for each of the following:

- RS-232
- Discrete I/O
- Block Transfer Read
- Block Transfer Write

Or you may prefer to have a separate worksheet for each block transfer (maximum of 10).

Note: If the application requires block transfer, be sure to mark off the Status and Control bytes on the Discrete I/O worksheet(s). See Page5–17.

In the Worksheet:

Each row represents one word of memory.

A signed or unsigned integer or a BCD type variable must be assigned to one word.

Bits may be assigned to any available bit address.

Word Address→ Tag Name ↓	Decimal Octal	15 17	14 16	13 15	12 14	11 13	10 12	9 11	8 10	7 7	6 6	5 5	4 4	3 3	2 2	1 1	0 0

Word Address→ Tag Name ↓	Decimal Octal	15 17	14 16	13 15	12 14	11 13	10 12	9 11	8 10	7 7	6 6	5 5	4 4	3 3	2 2	1 1	0 0

Word Address→ Tag Name ↓	Decimal Octal	15 17	14 16	13 15	12 14	11 13	10 12	9 11	8 10	7 7	6 6	5 5	4 4	3 3	2 2	1 1	0 0

Word Address→ Tag Name ↓	Decimal Octal	15 17	14 16	13 15	12 14	11 13	10 12	9 11	8 10	7 7	6 6	5 5	4 4	3 3	2 2	1 1	0 0

ASCII and Extended ASCII Characters

This appendix includes all the ASCII and Extended ASCII characters you can enter in a message.

- The first 31 characters are used as ASCII Control Code characters. They are used to embed control codes in messages sent to slaves.
- Characters numbered 032 to 0127 are usually typed in from the computer keyboard.
- Characters numbered 0128 to 0255 are Extended ASCII characters. The 850 version of the Extended ASCII character list is designed for use with European languages.

To enter an ASCII character in a message:

1. Place the insertion bar in the Edit Box where the ASCII character is to go.
2. Hold down the **ALT** key while entering the number in the keypad.

The corresponding character appears at the insertion point.

To enter an ASCII Control Character in a message to be sent to a slave device:

1. Place the insertion bar in the Edit Box where the ASCII Control Code should be embedded.
2. Click the Embedded Variable icon, or open the Format menu.
3. Select ASCII Control Char to open the ASCII Control Character dialog.
4. Use the scroll bar to locate the number you want.
5. Highlight it and select OK.

A placeholder ~ for the character appears in the Edit Box at the insertion point. A Control Code character determines how the message is displayed by the slave device(s).

ASCII Character Set With Control Codes

Dec.	Oct.	Hex.	Char	Control Code	Dec.	Oct.	Hex.	Char	Dec.	Oct.	Hex.	Char	Dec.	Oct.	Hex.	Char
0	0	0	NUL	Ctrl-@	032	40	20		064	100	40	@	096	140	60	‘
1	1	1	SOH	Ctrl-A	033	41	21	!	065	101	41	A	097	141	61	a
2	2	2	STX	Ctrl-B	034	42	22	“	066	102	42	B	098	142	62	b
3	3	3	ETX	Ctrl-C	035	43	23	#	067	103	43	C	099	143	63	c
4	4	4	EOT	Ctrl-D	036	44	24	$	068	104	44	D	0100	144	64	d
5	5	5	ENQ	Ctrl-E	037	45	25	%	069	105	45	E	0101	145	65	e
6	6	6	ACK	Ctrl-F	038	46	26	&	070	106	46	F	0102	146	66	f
7	7	7	BEL	Ctrl-G	039	47	27	’	071	107	47	G	0103	147	67	g
8	10	8	BS	Ctrl-H	040	50	28	(	072	110	48	H	0104	150	68	h
9	11	9	HT	Ctrl-I	041	51	29	)	073	111	49	I	0105	151	69	i
10	12	A	LF	Ctrl-J	042	52	2A	*	074	112	4A	J	0106	152	6A	j
11	13	B	VT	Ctrl-K	043	53	2B	+	075	113	4B	K	0107	153	6B	k
12	14	C	FF	Ctrl-L	044	54	2C	,	076	114	4C	L	0108	154	6C	l
13	15	D	CR	Ctrl-M	045	55	2D	–	077	115	4D	M	0109	155	6D	m
14	16	E	SO	Ctrl-N	046	56	2E	.	078	116	4E	N	0110	156	6E	n
15	17	F	SI	Ctrl-O	047	57	2F	/	079	117	4F	O	0111	157	6F	o
16	20	10	DLE	Ctrl-P	048	60	30	0	080	120	50	P	0112	160	70	p
17	21	11	DC1	Ctrl-Q	049	61	31	1	081	121	51	Q	0113	161	71	q
18	22	12	DC2	Ctrl-R	050	62	32	2	082	122	52	R	0114	162	72	r
19	23	13	DC3	Ctrl-S	051	63	33	3	083	123	53	S	0115	163	73	s
20	24	14	DC4	Ctrl-T	052	64	34	4	084	124	54	T	0116	164	74	t
21	25	15	NAK	Ctrl-U	053	65	35	5	085	125	55	U	0117	165	75	u
22	26	16	SYN	Ctrl-V	054	66	36	6	086	126	56	V	0118	166	76	v
23	27	17	ETB	Ctrl-W	055	67	37	7	087	127	57	W	0119	167	77	w
24	30	18	CAN	Ctrl-X	056	70	38	8	088	130	58	X	0120	170	78	x
25	31	19	EM	Ctrl-Y	057	71	39	9	089	131	59	Y	0121	171	79	y
26	32	1A	SUB	Ctrl-Z	058	72	3A	:	090	132	5A	Z	0122	172	7A	z
27	33	1B	ESC	Ctrl-[	059	73	3B	;	091	133	5B	[	0123	173	7B	{
28	34	1C	FS	Ctrl-\	060	74	3C	<	092	134	5C	\	0124	174	7C	¦
29	35	1D	GS	Ctrl–]	061	75	3D	=	093	135	5D	]	0125	175	7D	}
30	36	1E	RS	Ctrl-^	062	76	3E	>	094	136	5E	^	0126	176	7E	~
31	37	1F	US	Ctrl-_	063	77	3F	?	095	137	5F	_	0127	177	7F	▵

Extended ASCII Character Set (850, Multilingual Latin I)

Dec.	Oct.	Hex.	Char	Dec.	Oct.	Hex.	Char	Dec.	Oct.	Hex.	Char	Dec.	Oct.	Hex.	Char
0128	200	80	Ç	0160	240	A0	á	0192	300	C0	└	0224	340	E0	Ó
0129	201	81	ü	0161	241	A1	í	0193	301	C1	┴	0225	341	E1	ß
0130	202	82	é	0162	242	A2	ó	0194	302	C2	┬	0226	342	E2	Ô
0131	203	83	â	0163	243	A3	ú	0195	303	C3	├	0227	343	E3	Ò
0132	204	84	ä	0164	244	A4	ñ	0196	304	C4	─	0228	344	E4	õ
0133	205	85	à	0165	245	A5	Ñ	0197	305	C5	┼	0229	345	E5	Õ
0134	206	86	å	0166	246	A6	ª	0198	306	C6	ã	0230	346	E6	µ
0135	207	87	ç	0167	247	A7	º	0199	307	C7	Ã	0231	347	E7	þ
0136	210	88	ê	0168	250	A8	¿	0200	310	C8	╚	0232	350	E8	Þ
0137	211	89	ë	0169	251	A9	®	0201	311	C9	╔	0233	351	E9	Ú
0138	212	8A	è	0170	252	AA	¬	0202	312	CA	╩	0234	352	EA	Û
0139	213	8B	ï	0171	253	AB	½	0203	313	CB	╦	0235	353	EB	Ù
0140	214	8C	î	0172	254	AC	¼	0204	314	CC	╠	0236	354	EC	ý
0141	215	8D	ì	0173	255	AD	¡	0205	315	CD	═	0237	355	ED	Ý
0142	216	8E	Ä	0174	256	AE	«	0206	316	CE	╬	0238	356	EE	¯
0143	217	8F	Å	0175	257	AF	»	0207	317	CF	¤	0239	357	EF	´
0144	220	90	É	0176	260	B0	▒	0208	320	D0	δ	0240	360	F0	
0145	221	91	æ	0177	261	B1	▒	0209	321	D1	Ð	0241	361	F1	±
0146	222	92	Æ	0178	262	B2	▓	0210	322	D2	Ê	0242	362	F2	=
0147	223	93	ô	0179	263	B3	│	0211	323	D3	Ë	0243	363	F3	¾
0148	224	94	ö	0180	264	B4	┤	0212	324	D4	È	0244	364	F4	¶
0149	225	95	ò	0181	265	B5	Á	0213	325	D5	ı	0245	365	F5	§
0150	226	96	û	0182	266	B6	Â	0214	326	D6	Í	0246	366	F6	÷
0151	227	97	ù	0183	267	B7	À	0215	327	D7	Î	0247	367	F7	¸
0152	230	98	ÿ	0184	270	B8	©	0216	330	D8	Ï	0248	370	F8	°
0153	231	99	Ö	0185	271	B9	╣	0217	331	D9	┘	0249	371	F9	¨
0154	232	9A	Ü	0186	272	BA	║	0218	332	DA	┌	0250	372	FA	·
0155	233	9B	ø	0187	273	BB	╗	0219	333	DB	█	0251	373	FB	¹
0156	234	9C	£	0188	274	BC	╝	0220	334	DC	▄	0252	374	FC	³
0157	235	9D	Ø	0189	275	BD	¢	0221	335	DD	¦	0253	375	FD	²
0158	236	9E	×	0190	276	BE	¥	0222	336	DE	Ì	0254	376	FE	■
0159	237	9F	ƒ	0191	277	BF	┐	0223	337	DF	▀	0255	377	FF	

Glossary

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

A –

Active Window – The window that is currently selected. Only one window can be active at a time, though a number of **Table Views** of one or several **Applications** may be open. The title bar of the active window is highlighted to differentiate it from other open windows, and its name is checked in the Window menu. All **Tools**, **Menus**, **Attributes** and the **Edit Box** apply only to the active window. Any open **Dialog**s must be closed before another window can be activated.

Address – A label identifying a memory location in the **Controller**. The link between the address and the **Variable** or other item that uses that address is specified by a **Tag**. See also **Node Address**.

AI Software – The WINtelligent series version of **CSV** format software.

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**. The application runs in a MessageView terminal to control a specific process.

Application File – The form in which an application is stored in the computer or used by a MessageView terminal. Files created and saved by **MessageBuilder** are in an MBA format (*.MBA file type). They are changed to MVA format (*.MVA file type) before being downloaded to a **MessageView** terminal.

APS Software – Acronym for Advanced Programming Software. The APS Import/Export Utility uses this software, which works with the **SLC** logic controller only.

ASCII – A code defining all the alphanumeric characters, including punctuation, so they may be used by a computer. A number of Enhanced ASCII codes are available, which have accented characters, mathematical and graphical symbols, and so forth.

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. Data input by such a device is stored as alphanumeric characters in an ASCII entry or display variable.

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

Attribute – In **MessageBuilder** software, information that determines how a **Message** will appear on the **MessageView** terminal (e.g., text size), how it interacts with other messages (e.g. chained), and how it is used by the terminal (e.g. logged in the **HE Stack**).

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.

Bit – The smallest unit of information in the binary numbering system. A bit contains either 0 or 1.

Bitmap – A **Graphic** image stored as a pattern of dots (or pixels).

Bit Trigger – A **Bit** location that may be assigned to a **Message**. When the **Logic Controller** sets its bit to 1, the corresponding message is triggered. An **ASCII Triggering** application does not support bit triggers. See also **Value Trigger.**

Block Transfer – One of the two methods of data transfer used by a **Remote I/O port** on a **MessageView** terminal. See also **Direct I/O**.

Byte – A sequence of 8 consecutive **Bits** that are treated as a single value.

C –

Cascade – A way of arranging open windows in the workspace so that they overlap each other, with the title bar of each visible. See also **Tile**.

Choose – Highlight an item by using the mouse or a key combination. A command (such as the OK button in a dialog) can then select or invoke that item. Tools, menu items and certain commands may be selected and chosen in a single mouse click. See also **Select**.

Click – Press and release the left mouse button quickly.

Command – An item in a **Menu** that that carries out an action when it is selected.

Command Button – A labelled rectangle in a dialog that carries out an action when selected. Its label that describes the action to carry out (Close, Cancel). Choosing a command button followed by ellipsis (Options...) opens another dialog.

Control Tag – A tag that specifies the **Controlle**r's memory address for a specific **Global** attribute.

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

Copy – To put a duplicate of the selected item onto the clipboard so that you can transfer it to another location.

CSV Format – This format is used by Excel and some other software packages. The **HE Stack** is uploaded in CSV format.

Cursor Point – The flashing vertical line in the Edit Box where text, graphics or variables are added to the message.

Cut – To move the selected item onto the clipboard, from which it can be placed somewhere else. See also **Delete**.

D –

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

Delete – To remove the selected item permanently. See also **Cut**.

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 a **MessageView** terminal's **RS-232** port.

Dialog – A window that opens to request information. Dialogs have options you must choose before **MessageBuilder** software can carry out a command.

Direct I/O – One of the two methods of data transfer used by a **Remote I/O** port on a **MessageView** terminal. See also **Block Transfer**.

Double-Click – Press and release the left mouse button twice quickly, without moving the mouse.

Drag – Highlight text by pressing and holding down the left mouse button while moving the mouse.

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

Driver – A personal computer's ports are configured by a set of communication parameters collectively called a driver, installed by INTERCHANGE software. A **MessageView** terminal's **Ports** are configured as part of its application.

E –

Edit Box – The place where the active **Message** highlighted in the **Message List** is edited. Only one message is edited at a time. The message in the Edit Box may have its text entered and edited, its **Attributes** assigned, **Variables** and **Graphics** embedded, and (in **Applications** designed for **MessageView** 421F terminals) **Function Keys** enabled.

Exceptions Dialog – A list of all the warning and error messages generated during a **Validate** operation.

Export – The process of changing **Tags** automatically from **MessageBuilder** format to a different format.

F –

File Transfer Utility – Software that supports transfer of an MVA file between a computer that does not have **MessageBuilder** running, and a **MessageView** terminal. It can also download the **RTC** clock and upload the **HE Stack** file. In Microsoft Windows it appears as an icon in the MessageBuilder group.

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. Firmware can be upgraded using software disks from Allen-Bradley and the MessageBuilder **Download** command.

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

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 –

Global – An **Attribute** or **Parameter** that is defined once, and may then be used as often as needed in the application.

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

Greyed – A command that is unavailable or disabled at the moment is represented by a greyed icon, menu item or button. For instance, most of the commands on the Format menu can be used only when the cursor point is in the Edit Box. When it is elsewhere in MessageBuilder, these commands are greyed out.

H –

Handshake – Acknowledgement that data has been received by another device, such as a **Logic Controller**.

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. It may be viewed by the terminal operator, or uploaded into a computer for analysis.

I –

Import – The process of changing **Tags** automatically from a different format into **MessageBuilder** format.

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 enabled. If the jog feature is disabled, the message is terminated after one of its function keys is pressed. If the jog feature is enabled, the message remains active until the terminal display is cleared or the terminal is reset.

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. 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. 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.

MBA Format – See **Application File**.

Menu – A list of related commands in **MessageBuilder** software. Menu names appear in a menu bar under the title bar at the top of the Message Editor **Table View**.

Message – The basic unit of a MessageBuilder **Application**. It contains any or all of the following: text, embedded **Variables, Graphics** and, enabled **Function Keys**. Each message has **Attributes** and a **Value Trigge**r, and it may also have a **Bit Trigger**. It is edited in the **Edit Box**.

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

Message Editor – The main window for **Application** design. See also **Table View**; **Terminal View**.

Message List – Messages are entered in the Message List at the bottom of the Message Editor **Table View** as they are created. They may be returned to the **Edit Box** for editing. Messages in the Message List may be rearranged in a number of ways as needed.

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. Terminals differ in their **Keypad** options and their **Firmware**. Thus an Application must be designed for the capabilities of one type of terminal.

MFT – Acronym for the MessageBuilder **File Transfer Utility**.

MVA Format – See **Application File**.

N –

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 be set up as part of the **Application** so it can communicate with the specific type of **Logic Controller** the system will use.

Paste – To copy the contents of the clipboard to a specified location. To paste attributes or variables of a message, see the procedure in the manual.

Placeholder– Each type of variable has its own placeholder, which represents it in the Edit Box and Terminal View.

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

Pointer – The arrow-shaped cursor on the computer screen that follows the movement of the mouse and indicates which area of the screen will be affected when you press the mouse button. The pointer changes shape during certain tasks. Also called mouse pointer.

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.

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

Project – A database of **Tag** definitions and device information associated with an **Application**. A project may be assigned to more than one application.

Q –

Queue – A memory location in the **MessageView** terminal where a **Value-triggered** message may be stored if it cannot be displayed immediately when it is triggered.

R –

Real Time Clock – The **MessageView** terminal has its own battery-operated clock, also referred to as RTC. It provides values for time or date variables in displayed messages. The terminal's clock may be set using the RTC Download command from **MessageBuilder** software, or the terminal operator may set it.

RS-232 – A serial link for transmitting data to and from the RS-232 port of a **MessageView** terminal. 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. Also supports **Block Transfer** of data that is moved using block transfer ladder instructions.

S –

Save – The process of transferring data stored in RAM memory to a disk file.

Scaling – Mathematically manipulating data so it may be stored in one form in a **Controller** and displayed in another form in the **MessageView** terminal**.**

Select – Select an action to activate a chosen (highlighted) item. In some cases a mouse click can **Choose** and select an item in one step.

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**.

Special Messages – Messages that affect the **MessageView** terminal. They are not displayed or sent to the **HE Stack**, but may be triggered as part of the application.

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

Status Bar – The horizontal bar at the bottom of the **Message Editor** window that tells you what **MessageBuilder** software is doing at the moment.

T –

Table View – A window in which **Messages** or **Tags** are created and their attributes assigned.

Tag – The collective name for a group of **Parameters** that define a controller address and how it interacts with a **MessageBuilder** variable.

Tag Editor – A section of **MessageBuilder** software in which **Tags** may be created, edited, and imported.

Terminal View – A window that looks like the face of the **MessageView** terminal for which the current **Application** is designed. It shows what the **Message** being edited will look like in the terminal display.

Tile – A way of arranging open windows in the workspace so that they do not overlap. Each window occupies a horizontal segment of the workspace. See also **Cascade**.

Tool – An icon that can be used to **Select** frequently used commands. Some tools complete the action immediately; others open a **Dialog** for further input.

Trigger – A unique value or bit assigned to a message, used by the **Controller** to call up the message. See also **Bit Trigger**; **Value Trigger**.

U –

Upload – The process of transferring an **Application** or a **HE Stack** file from a **MessageView** terminal to a computer running **MessageBuilder** software or the **File Transfer Utility**. An uploaded application exists in both **MBA** and **MVA** formats. An uploaded HE Stack file exists in **CSV** format.

V –

Validate – The process of checking an **Application** for mistakes that will cause problems when it is run. **MessageBuilder** software notifies the application designer of any validation errors, since they must be corrected before the application can be downloaded to a **MessageView** terminal. Applications are automatically validated as part of the **Download** process, and they may also be validated while they are being created.

Value Trigger – A message's number. The **Controller** may specify a message number to call up the corresponding message.

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**. In **MessageBuilder** software a variable is represented by a **Placeholder**.

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.

W –

Workspace – The area of the computer display in which the MessageBuilder **Application** is created and edited.

Z –

Zoom – A procedure for enlarging the **Terminal View** so that it is larger than the default size.

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