

# WHELEN<sup>®</sup>

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Programming Procedures:  
SmartArrow Messenger™

### Warnings to Installers

Whelen's emergency vehicle warning devices must be properly mounted and wired in order to be effective and safe. Read and follow all of Whelen's written instructions when installing or using this device. Emergency vehicles are often operated under high speed stressful conditions which must be accounted for when installing all emergency warning devices. Controls should be placed within convenient reach of the operator so that they can operate the system without taking their eyes off the roadway. Emergency warning devices can require high electrical voltages and/or currents. Properly protect and use caution around live electrical connections. Grounding or shorting of electrical connections can cause high current arcing, which can cause personal injury and/or vehicle damage, including fire. Many electronic devices used in emergency vehicles can create or be affected by electromagnetic interference. Therefore, after installation of any electronic device it is necessary to test all electronic equipment simultaneously to insure that they operate free of interference from other components within the vehicle. Never power emergency warning equipment from the same circuit or share the same grounding circuit with radio communication equipment. All devices should be mounted in accordance with the manufacturer's instructions and securely fastened to vehicle elements of sufficient strength to withstand the forces applied to the device. Driver and/or passenger air bags (SRS) will affect the way equipment should be mounted. This device should be mounted by permanent installation and within the zones specified by the vehicle manufacturer, if any. Any device mounted in the deployment area of an air bag will damage or reduce the effectiveness of the air bag and may damage or dislodge the device. Installer must be sure that this device, its mounting hardware and electrical supply wiring does not interfere with the air bag or the SRS wiring or sensors. Mounting the unit inside the vehicle by a method other than permanent installation is not recommended as unit may become dislodged during swerving; sudden braking or collision. Failure to follow instructions can result in personal injury. Whelen assumes no liability for any loss resulting from the use of this warning device. **PROPER INSTALLATION COMBINED WITH OPERATOR TRAINING IN THE PROPER USE OF EMERGENCY WARNING DEVICES IS ESSENTIAL TO INSURE THE SAFETY OF EMERGENCY PERSONNEL AND THE PUBLIC.**

### Warnings to Users

Whelen's emergency vehicle warning devices are intended to alert other operators and pedestrians to the presence and operation of emergency vehicles and personnel. However, the use of this or any other Whelen emergency warning device does not guarantee that you will have the right-of-way or that other drivers and pedestrians will properly heed an emergency warning signal. Never assume you have the right-of-way. It is your responsibility to proceed safely before entering an intersection, driving against traffic, responding at a high rate of speed, or walking on or around traffic lanes. Emergency vehicle warning devices should be tested on a daily basis to ensure that they operate properly. When in actual use, the operator must ensure that both visual and audible warnings are not blocked by vehicle components (i.e.: open trunks or compartment doors), people, vehicles, or other obstructions. It is the user's responsibility to understand and obey all laws regarding emergency warning devices. The user should be familiar with all applicable laws and regulations prior to the use of any emergency vehicle warning device. Whelen's audible warning devices are designed to project sound in a forward direction away from the vehicle occupants. However, because sustained periodic exposure to loud sounds can cause hearing loss, all audible warning devices should be installed and operated in accordance with the standards established by the National Fire Protection Association.

### Safety First

This document provides all the necessary information to allow your Whelen product to be properly and safely installed. Before beginning the installation and/or operation of your new product, the installation technician and operator must read this manual completely. Important information is contained herein that could prevent serious injury or damage.

- **Proper installation of this product requires the installer to have a good understanding of automotive electronics, systems and procedures.**
- **Whelen Engineering requires the use of waterproof butt splices and/or connectors if that connector could be exposed to moisture.**
- **Any holes, either created or utilized by this product, should be made both air- and watertight using a sealant recommended by your vehicle manufacturer.**
- **Failure to use specified installation parts and/or hardware will void the product warranty.**
- **If mounting this product requires drilling holes, the installer MUST be sure that no vehicle components or other vital parts could be damaged by the drilling process. Check both sides of the mounting surface before drilling begins. Also de-burr the holes and remove any metal shards or remnants. Install grommets into all wire passage holes.**
- **If this manual states that this product may be mounted with suction cups, magnets, tape or Velcro®, clean the mounting surface with a 50/50 mix of isopropyl alcohol and water and dry thoroughly.**
- **Do not install this product or route any wires in the deployment area of your air bag. Equipment mounted or located in the air bag deployment area will damage or reduce the effectiveness of the air bag, or become a projectile that could cause serious personal injury or death. Refer to your vehicle owner's manual for the air bag deployment area. The User/Installer assumes full responsibility to determine proper mounting location, based on providing ultimate safety to all passengers inside the vehicle.**
- **For this product to operate at optimum efficiency, a good electrical connection to chassis ground must be made. The recommended procedure requires the product ground wire to be connected directly to the NEGATIVE (-) battery post (this does not include products that use cigar power cords).**
- **If this product uses a remote device for activation or control, make sure that this device is located in an area that allows both the vehicle and the device to be operated safely in any driving condition.**
- **Do not attempt to activate or control this device in a hazardous driving situation.**
- **This product contains either strobe light(s), halogen light(s), high-intensity LEDs or a combination of these lights. Do not stare directly into these lights. Momentary blindness and/or eye damage could result.**
- **Use only soap and water to clean the outer lens. Use of other chemicals could result in premature lens cracking (crazing) and discoloration. Lenses in this condition have significantly reduced effectiveness and should be replaced immediately. Inspect and operate this product regularly to confirm its proper operation and mounting condition. Do not use a pressure washer to clean this product.**
- **It is recommended that these instructions be stored in a safe place and referred to when performing maintenance and/or reinstallation of this product.**
- **FAILURE TO FOLLOW THESE SAFETY PRECAUTIONS AND INSTRUCTIONS COULD RESULT IN DAMAGE TO THE PRODUCT OR VEHICLE AND/OR SERIOUS INJURY TO YOU AND YOUR PASSENGERS!**

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## Introduction...

This manual will outline the procedures necessary for programming the Whelen Messenger Display (models MGM01, MGM02 and MGM03), with the Whelen Programming Software. The Messenger is capable of generating messages in a wide variety of styles, however this does not mean that programming the Messenger is overly difficult or complicated. It does mean that the programmer must pay close attention to the procedures outlined herein. Do not “skim” over any portions of this manual. It is important for the programmer to understand the entire manual before attempting to actually program the Messenger.

## Section I:

### **Installing and Operating the Programming Software**

Before using the configuration software, it must first be installed on a PC or notebook computer (hereafter referred to as the “host”) that utilizes either Windows 3.1, Windows 3.11 (collectively referred to as **Windows 3.x** in this manual) or Windows 95 as its operating system. The person operating the host computer will be referred to as the “operator”. The following steps explain how to install the programming software on your host computer. Please note that although this manual has been written in a simple, straight-forward format, it is necessary for the operator to have a basic understanding of the Windows operating system.

#### **Installing the Messenger programming software...**

When the operator installs the Whelen Messenger programming software onto the host computer, a setup program transfers files from the release disk to a directory which the setup process creates on the hard drive. The setup program (setup.exe) is run from a 3.5” floppy disk drive. On most systems this is drive A:. The following steps assume that drive A: is the 3.5” floppy drive.

#### **Windows 3.x Installation**

1. Insert the Messenger software program disk into drive A:.
2. Choose Run from the File menu of the Program Manager window. Enter the following text in the Command Line box:

**a:\setup**

3. When the installation is complete, the operator will have the option of restarting Windows or continuing the current Windows session without restarting. Windows should be restarted before using the Messenger software.

#### **Windows 95 Installation**

1. Insert the Messenger software program disk into drive A:.
2. Choose Run from the Start menu and enter the following text in the Command Line box:

**a:\setup**

3. When the installation is complete, the operator will have the option of restarting Windows 95 or continuing the current Windows session without restarting. Windows 95 should be restarted before using the Messenger software.

Now that the software is successfully installed in the host computer, it is easier to understand its functionality and operation by defining some of the terms used herein:

**Messenger** - The LED panel that is used to display Messages. This is available in three different models; Model MGM01 (8-character display), Model MGM02 (16-character display) and Model MGM03 (24-character display).

**Messenger Controller** - The panel used to control the functions of the Messenger. This controller, located within the vehicle, enables the vehicle operator to turn the Messenger on or off, as well as to select the message to be displayed. If multiple Messengers are present on the vehicle, it also allows the operator to choose which Messenger will display a selected Message. For example, Messenger #1 could display one Message, while Messenger #2 displays a completely different Message.

**Message** - a phrase or pattern created for viewing on the Messenger.

**Message File** - a data file comprised of various messages that is uploaded to the Messenger. Using the controller, the Messenger operator can then select a message to be displayed on the Messenger. The Messenger is designed to store one Message File.

The messages in a Message File are usually oriented towards a specific vehicle and are based on the needs and/or function of that vehicle. Message files are identified by the extension **MSG** and are typically given names that reflect the specific use for which the message file was designed. For example, UNIT\_123.MSG would contain messages designed for use on Police Unit 123. UNIT\_047.MSG would contain messages designed for use on Police Unit 47.

A Message File can contain up to 128 messages.

***NOTE:** A Message file must adhere to the 8.3 file name structure. In other words, the name of the Message File (which can not be longer than 8 characters) comes first, followed by a dot (a period) and then the 3-letter extension that identifies the file to the computer. Example: 12345678.MSG*

**Library File** - A data file that contains specific types of messages. Library files are identified by the extension **LIB**. Libraries are usually given a name that describes the type of messages that can be found within that Library. For example, a POLICE.LIB library would contain messages and/or patterns oriented towards the Police Department and their particular message needs. A FIRE.LIB library would contain messages and/or patterns oriented towards the Fire Department and their particular message needs.

A Library File can contain up to 128 messages.

***NOTE:** A Library file must adhere to the 8.3 file name structure. In other words, the name of the Library file (which can not be longer than 8 characters) comes first, followed by a dot (a period) and then the 3-letter extension that identifies the file to the computer. Example: 12345678.LIB*

## **Starting the Messenger Software...**

Since this software is compatible with both Windows 3.X and Windows 95, the process of launching the software on either platform will be outlined. However, once the software is running, its operation and functionality are identical, regardless of what version of Windows is running on the host computer. Please note that the screen shots shown in this manual demonstrate the program on a Windows 3.X platform. On computers with Windows 95, the software will have a slightly different appearance.

### **Windows 3.X**

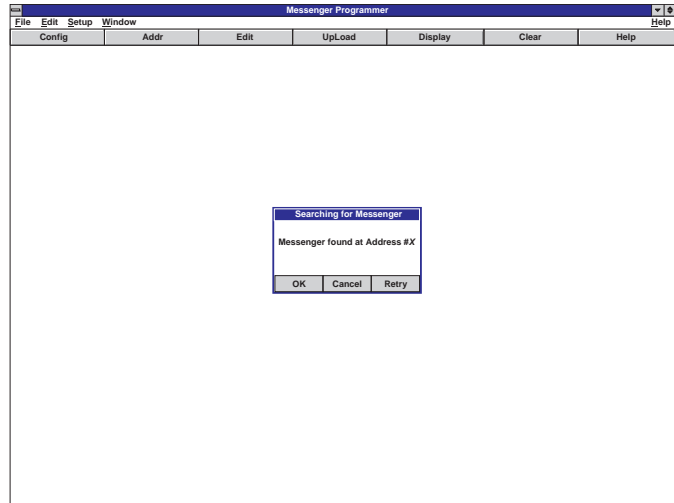
In Windows 3.X, locate the “Messenger Programmer” icon. This can be found in the “Messenger” program group that was created when the programming software was installed on the host computer. Double-clicking this icon will start the Messenger Programming Software.

## Windows 95

In Windows 95, click the “**START**” button and highlight “Programs”. Now highlight “Messenger”. From the fly-out window, click on “Messenger Programmer” to start the Messenger Programming Software.

As the software is launched, it will search to see if a Messenger is connected to the host computer. After it has searched each address, the software will display a window stating the results of its search. If the search was successful, a message box will be displayed that should be similar to the following:

**Fig. 1**



If there is no Messenger connected to the host computer, or if the Messenger is improperly connected to the host computer, the message box will state that there was no Messenger found. It is not necessary for the host computer to be connected to the Messenger in order to create a Message, Message File or Library File. However, in order to preview any message, or to upload a Message File to the Messenger, the host computer does need to be connected to the Messenger.

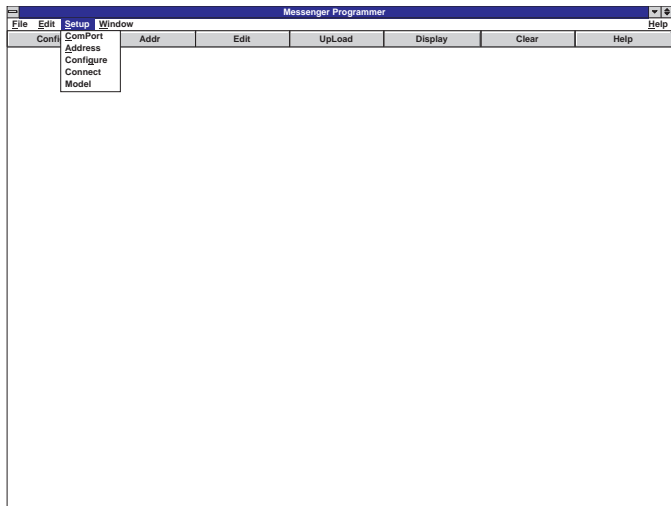
If the host computer is connected to the Messenger and the message box indicates that no Messenger was found, click on the “Retry” button. If a Messenger is still not found, please refer to the troubleshooting section of this manual.

Click “OK” to close the message box.

### Selecting the proper Messenger Display...

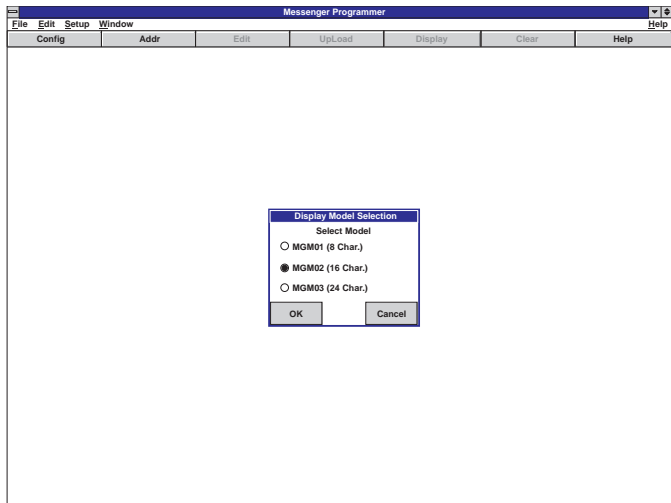
There are three different Messenger Displays available; The MPG01 8-character display, the MPG02 16-character display and the MPG03 24-character display. Before any programming can begin, the operator must first identify which display unit will be used to display the Message.

1. Launch the programming software.
2. In the main programming window, click on “Setup”. Now click on “Model” from the list (see Fig. 2).



**Fig. 2**

3. This will open the “Display Model Selection” window (Fig. 3). From this window, the operator will identify which type of Messenger the Message is to be designed around.



**Fig. 3**

4. To select, click on the circle adjacent the desired model. As shown in the above illustration, model MGM02 has been selected. When the desired model has been selected click the “OK” button to close the window.

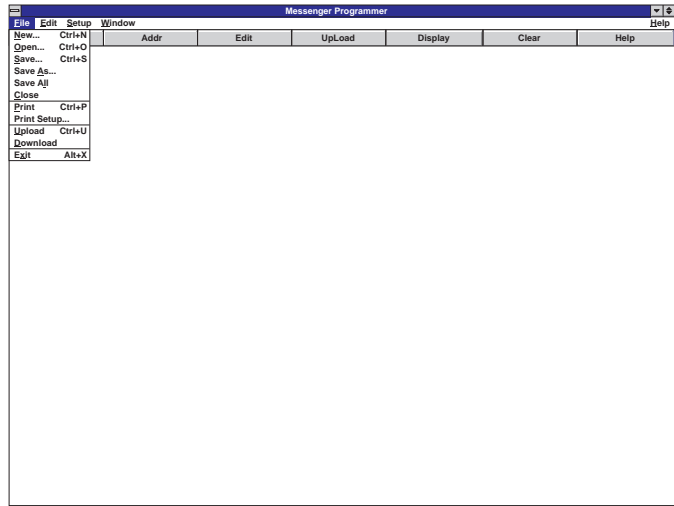
**IMPORTANT NOTE: Each of the three available models display a different amounts of characters (8, 16 or 24). Because of this, a Message designed for use on one display may not function properly on another type of display. For example, a Message designed for use on an MGM02, would have to be redesigned for use on an MGM01 or an MGM03.**

### **Creating a Message File or Library File...**

As explained earlier in this manual, a Message can only exist within a Message File or Library file. Therefore before the operator can create a message, a Message File or Library File must first be created.

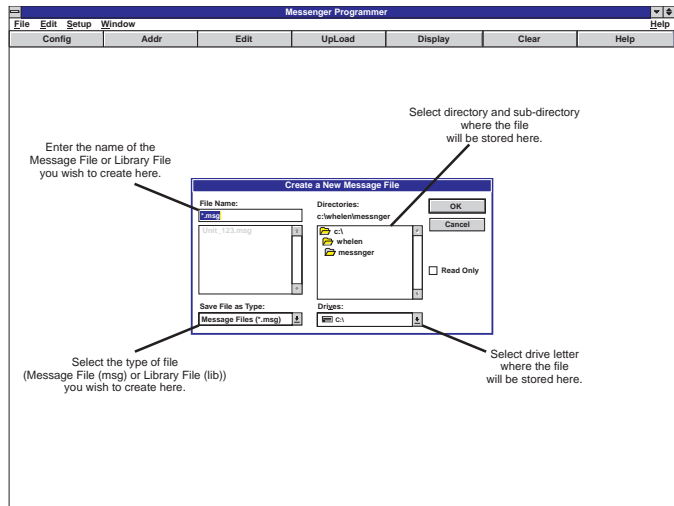
1. Launch the programming software.
2. In the main programming window, click on “File”. Now click on “New” from the list (Fig. 4).

Fig. 4



3. This will open the “Create a New Message File” window (Fig. 5). From this window, the operator will assign a name to the Message File or Library File being created. Refer to Fig. 5 to see where to enter this name.

Fig. 5



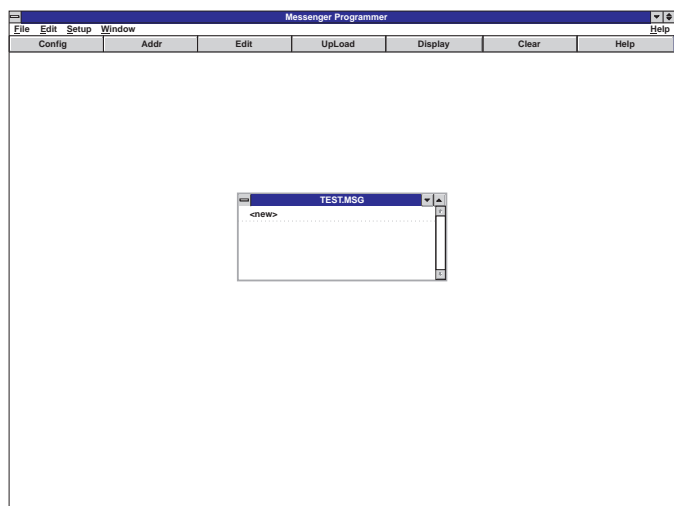
4. The operator must also determine *where* the Message File or Library File is to be placed. See Fig. 3 to specify the file destination. The default directory is **whelen\messngr** on drive **C:**.

5. After the file name and destination have been selected, press “OK” (Figure 6).

Fig. 6

6. In this example, a Message File named TEST.MSG has been created. A Message can now be created within this Message File.

**NOTE:** The process for creating a Library File is identical, except that the operator must select “**Library Files (\*.lib)**” from the “**Save File as Type:**” pull-down menu (see Fig. 5).



## Section II: Designing a Message...

### Message Characteristics...

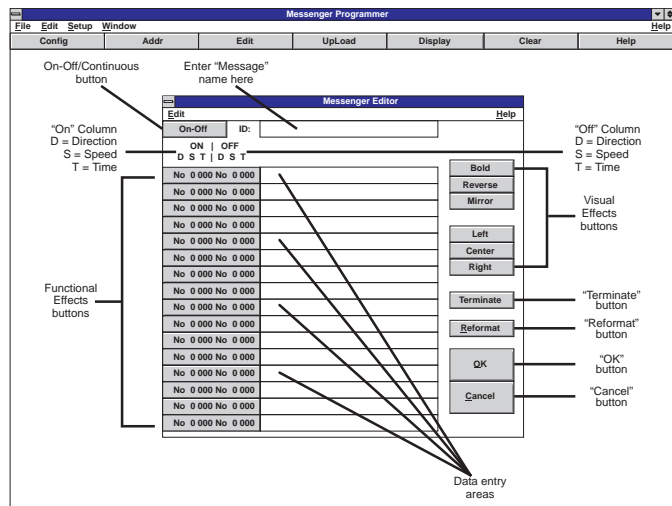
As defined earlier, a Message can consist of text, graphics or a combination of the two. Every Message has two major characteristics that must be defined by the operator: Display and Functional.

**Display characteristics** determine the way the Message looks on the Messenger. Display effects include the following:

- The font size (default or Bold)
- The type of background (default or Reverse)
- The font layout (default or Mirror)
- The font justification (default, Center or Right)

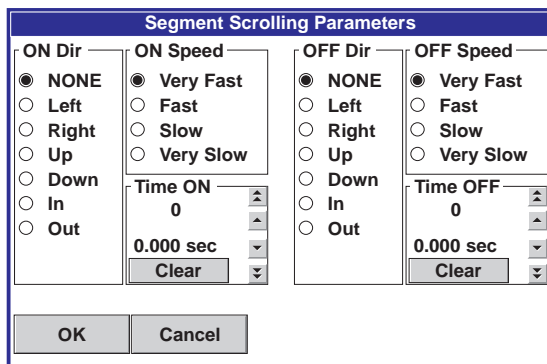
**Functional characteristics** determine the way the Message enters and exits the Messenger. These characteristics are configured in the “Scrolling Parameters” window. This window is opened by clicking on any of the “Functional Effects” buttons in the “Messenger Editor” window. A “Functional Effects” button can only set characteristics for the Data Field to which it is adjacent (Fig. 7).

Fig. 7



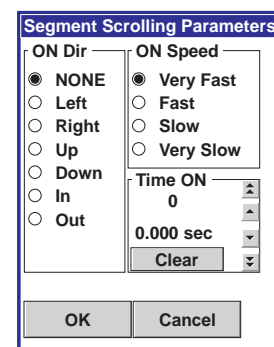
The functions of the “Scrolling Parameters” window are different, depending on whether the On-Off/Continuous button is set to the On-Off setting, or to the Continuous setting. In their respective modes, the windows will look like this:

Fig. 8



On-Off Mode

Fig. 9



Continuous Mode



In ON-Off Mode, there are 6 parameters that the operator can change. **NOTE: These settings only effect the data in the field adjacent to the specific Functional Effects button that opened the “Scrolling Parameters” window.**

**ON Dir** - This determines how the data will first appear on the Messenger Display.

- NONE (default) = The data appears immediately on the display
- Left = The data scrolls onto the display from right to left
- Right = The data scrolls onto the display from left to right
- Up = The data scrolls onto the display from the bottom
- Down = The data scrolls onto the display from the top
- In = The data scrolls onto the display from the end
- Out = The data scrolls onto the display from the center

**ON Speed** - This determines how fast the data will scroll onto the Messenger Display. The available speeds are Very Fast (default), Fast, Slow and Very Slow.

**Time ON** - This determines how long the data will remain on the Display. The duration is increased or decreased with the arrow keys adjacent to the numeric display. The “Clear” button resets the duration to 0.000 seconds. The default Time ON is 0.000.

**OFF Dir** - This determines how the data will exit the Messenger Display.

- NONE (default) = The data disappears immediately from the display
- Left = The data scrolls off to the left
- Right = The data scrolls off to the right
- Up = The data scrolls up and off the display
- Down = The data scrolls down and off the display
- In = The data scrolls inwards from both the left and right until display is blank
- Out = The data scrolls outwards towards both the left and right until display is blank

**OFF Speed**- This determines how fast the data will scroll off the Messenger Display. The available speeds are Very Fast (default), Fast, Slow and Very Slow.

**Time OFF**- This determines how much time will elapse before the next data segment is processed. The duration is increased or decreased with the arrow keys adjacent to the numeric display. The “Clear” button resets the duration to 0.000 seconds. The default Time OFF is 0.000.

In Continuous Mode, the only parameters that can be configured are **ON Dir**, **ON Speed** and **Time ON**. To understand the difference between On-Off mode and Continuous mode, it is necessary to see how the different modes process the data fields.

### **On-Off Mode**

If this parameter is set to **On-Off**, the data fields are processed in this fashion:

- Messenger is blank.
- The data in field 1 appears on the Messenger in a set fashion (as determined by **ON Dir** and **ON Speed**).
- The data remains on the Messenger for a set duration (as determined by **Time ON**).
- The data exits the Messenger Display in a set fashion (as determined by **OFF Dir** and **OFF Speed**).
- The Messenger Display stays blank for a set duration (as determined by **Time OFF**).

The cycle then repeats itself using the data in field 2, then 3, etc., until all of the fields that contain data have been displayed. **NOTE: Fields that do not contain any data are not included in this cycle.**

### **Continuous Mode**

If this parameter is set to Continuous, the fields are processed in this fashion:

- Messenger is blank.
- The data in Field 1 appears on the Messenger in a set fashion (as determined by **ON Dir** and **ON Speed**).
- The data remains on the Messenger for a set duration (as determined by **Time ON**).
- The data in Field 2 appears on the Messenger in a set fashion (as determined by **ON Dir** and **ON Speed**).
- The data remains on for a set duration (as determined by **Time ON**).

This process then repeats itself using the data in Field 3, then 4, etc., until all of the fields that contain data have been displayed. **NOTE: Fields that do not contain any data are not included in this cycle.** After all available data fields have been processed, the entire Message (beginning with Data Field 1) is then repeated. A more detailed explanation is provided in Exercise IV: Message Timing.

It will be easier to understand how a Message is structured by creating a sample Message. In the following exercises, generic Messages will be created, each with different effects and characteristics. These exercises will assume that the host computer is connected to a MGM02 8-Character Messenger Display.

### **EXERCISE I: *Creating a Message***

**NOTE: For these exercises, the MGM02 16-character display will be used to represent a typical Messenger. Keep in mind that the MGM01 can only display 8 characters at a time and the MGM03 can display up to 24 characters at a time.**

In this exercise, the operator will create a Message named “Caution Ahead”.

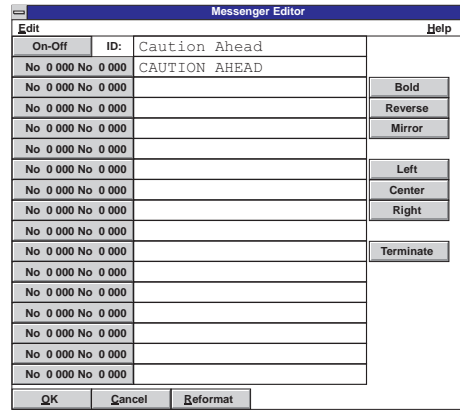
**NOTE: When instructed to enter data in a Data Field, do NOT enter quotation marks.**

1. Start the Messenger Programming Software.
2. Click on **File**, then **Open**. Select the TEST.MSG Message File created earlier. If this file does not exist, create it by following the steps outlined in “Creating a Message File or Library File...” in Section I.
3. Double-click on <new> in the TEST.MSG window. This will open the “Message Editor” screen.
4. Enter the name “Caution Ahead” in the box adjacent to “**ID:**”.

**NOTE: The data entered in the “ID:” field will not only serve as the name of the Message, but will also be displayed on the Messenger Controller’s display screen. Although this name may be from 1 to 24 characters in length (including spaces), the display screen on the Messenger Controller will only display the first 8 characters.**

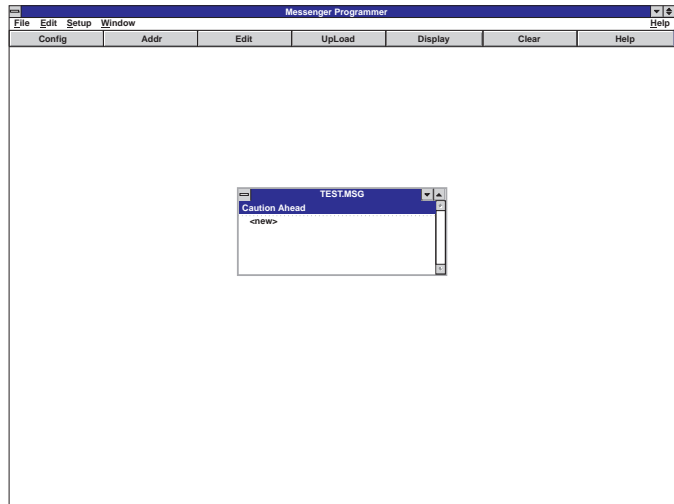
5. Set the mode selection button to “On-Off”.
6. In Data Field 1, enter the words “CAUTION AHEAD”. The Messenger Editor screen should look like this:

Fig. 10

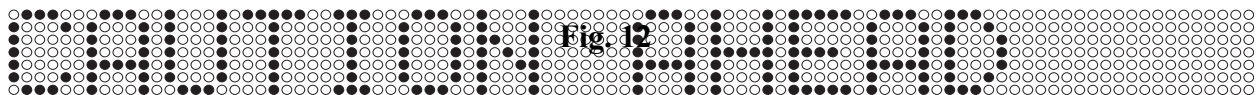


7. Click the “OK” button to close the message editing screen. The host computer’s screen should appear as shown in Fig. 11.

Fig. 11



8. Click the “Display” button in the Main Programming Window. The words “Caution Ahead” will appear on the Messenger in normal size, Left Justified.



To end the display, click the “Clear” button. Now save your Message File by clicking “File”, and then “Save”.

Congratulations! A complete, functional message has been created. In the next exercise, font justification procedures will be demonstrated.

### EXERCISE II: *Font Justification*

It is important for the operator to understand that configuring the justification properties for a specific data field will not only determine the justification settings for that field, but for all of the subsequent, used fields as well. For example, if a message contains 7 used fields, and the justification for field 1 is center, then fields 1 through 7 will be center justified.

In the same message, with Field 1 still center justified, configuring Field 4 to Right justification will result in the message being processed as follows:

- Fields 1 through 3 are displayed with Center justification
- Fields 4 through 7 are displayed with Right justification

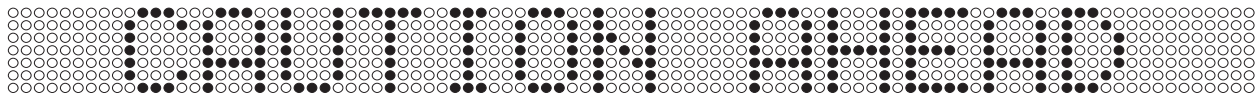
**NOTE: Although each data field within a message can have its own style of justification, a single field can not have multiple justifications.**

In this exercise, the operator will change the justification properties of the “Caution Ahead” message created in Exercise I.

**NOTE: When instructed to enter data in a Data Field, do NOT enter quotation marks.**

1. Open TEST.MSG and highlight the “Caution Ahead” message. Click the “Edit” button in the Main Programming Window to open the Message Editing screen.
2. Click in Data Field 1 and position the cursor so that it precedes the data in that field.
3. Click the “Center” button. This will add “/C” ahead of the data in Field 1.
4. Click the “OK” button to close the message editing screen.
5. Click the “Display” button in the Main Programming Window. The words “Caution Ahead” will appear on the Messenger in normal size, Center Justified.

**Fig. 13**

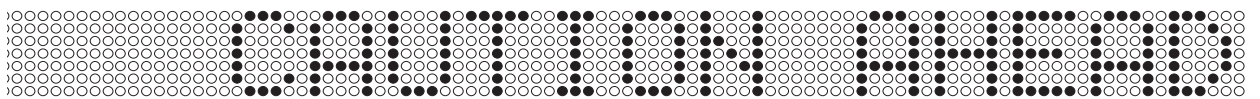


6. Click the “Clear” button to end the display.

In the next procedure, the justification will be changed from Center to Right.

1. Highlight the “Caution Ahead” message. Click the “Edit” button in the Main Programming Window to open the Message Editing screen.
2. Click in Data Field 1, highlight the “/C” and delete those characters.
3. Position the cursor so that it precedes the data in that field.
4. Click the “Right” button. This will add “/R” ahead of the data in Field 1.
5. Click the “OK” button to close the message editing screen.
6. Click the “Display” button in the Main Programming Window. The words “Caution Ahead” will appear on the Messenger in normal size, Right Justified.

**Fig. 14**



7. Click the “Clear” button to end the display.

### EXERCISE III: *Font Effects*

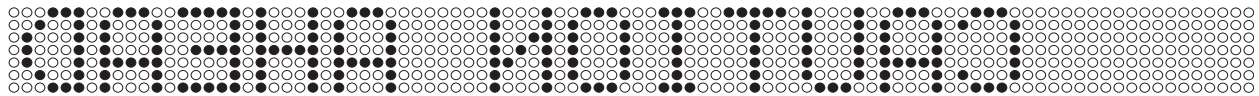
In addition to the various justifications that can be applied to data, there are 3 visual effects that can be implemented to effect a message's appearance. In this exercise, not only will these effects be applied to the "Caution Ahead" message, but the operator will begin to learn how to handle data that spans multiple data fields.

#### **Mirror...**

The Mirror effect configures data so that it appears backwards on the Messenger. This allows drivers to read these mirrored messages in their rear view mirrors. Applying the Mirror effect to data also can require other settings to be changed. Read this section carefully before attempting to create a Mirrored message for actual use.

1. Highlight the "Caution Ahead" message in TEST.MSG. Click the "Edit" button in the Main Programming Window to open the Message Editing screen.
2. Click in Data Field 1, highlight the "/R" and delete those characters.
3. Highlight "CAUTION AHEAD" in the field.
4. Click the "Mirror" button. This will add a "/M" ahead of the data in Field 1 and a "/m" at the end of the data in Field 1.
5. Click the "OK" button to close the message editing screen.
6. Click the "Display" button in the Main Programming Window. The words "Caution Ahead" will appear on the Messenger normal size, Left Justified, but mirrored.

**Fig. 15**



7. Click the "Clear" button to end the display.

In step 4, a "/M" was placed at the beginning of Field 1. This configured the message to mirror all data in all fields, including any used fields subsequent to its location in Field 1. However, the "/m" placed at the end of Field 1 returns the remainder of the data to normal display. Think of "/M" and "/m" as switches that turn the Mirror effect on and off.

**NOTE: If a message that would normally scroll left is also configured to be mirrored, make sure that the direction choice is set to right.**

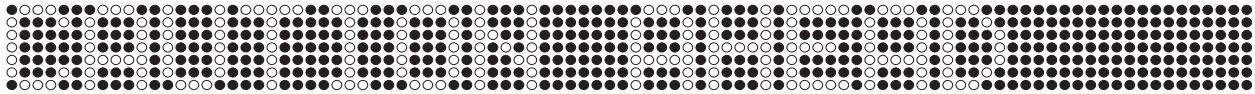
#### **Reverse...**

By default, the Messenger displays illuminated characters against a non-illuminated background. The Reverse effect reverses that arrangement so that non-illuminated characters are displayed against an illuminated background.

1. Highlight the "Caution Ahead" message in TEST.MSG. Click the "Edit" button in the Main Programming Window to open the Message Editing screen.
2. Click in Data Field 1, highlight the "/R" and delete those characters.
3. Highlight "CAUTION AHEAD" in the field

4. Click the “Reverse” button. This will add a “/I” ahead of the data in Field 1 and a “/i” at the end of the data in Field 1.
5. Click the “OK” button to close the message editing screen.
6. Click the “Display” button in the Main Programming Window. The words “Caution Ahead” will appear on the Messenger normal size, Left Justified, but reversed.

Fig. 16

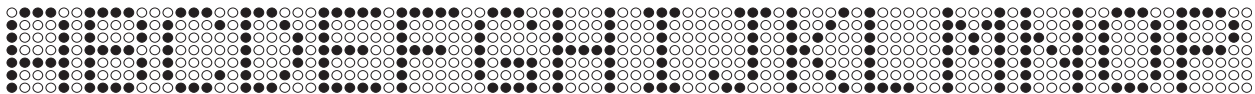


7. Click the “Clear” button to end the display.

**Bold...**

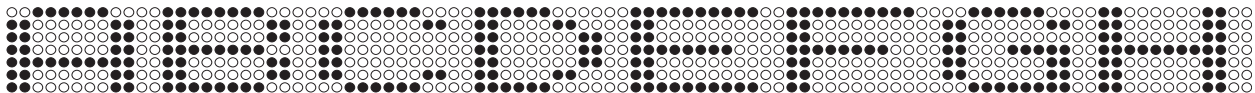
The Messenger display unit is comprised of Light Emitting Diodes (LED’s). In its default configuration, a single character (text, symbol or space) is 7 H x 6 W. This allows the MGM01 to display up to 8 characters, the MGM02 to display 16 characters and the MGM03 to display 24 characters at any given time.

Fig. 17



Bold characters are larger than normal characters, having a 7 H x 12 W size. As a result, only 8 bold characters can be displayed at any given time.

Fig. 18



1. Highlight the “Caution Ahead” message in TEST.MSG. Click the “Edit” button in the Main Programming Window to open the Message Editing screen.
2. Click in Data Field 1, highlight the “/I” and delete those characters.
3. Highlight “CAUTION AHEAD” in the field
4. Click the “Bold” button. This will not only add a “/B” ahead of the data in Field 1, but also moves all of the data after the 8th character from Field 1 and places it in Field 2, followed by “/b”. This is because, as stated earlier, the Messenger in question can not display more than 8 bold characters at one time. In the case of our test message, the data is broken after the space between “CAUTION” and “AHEAD” (7 characters in the word “CAUTION” plus the space character). **NOTE:**Be aware of the fact that although in our case the message was broken between words, other messages may split a word in half.
5. Click the “OK” button to close the message editing screen.
6. Click the “Display” button in the Main Programming Window. The display now shows a series of rapidly flashing characters. This is a result of the data in Field 1 (“CAUTION”) and Field 2 (“AHEAD”) being alternately displayed at a very high rate. As

discussed earlier, the default duration for Time ON and (in On/Off mode) Time OFF is 0.000 seconds. This means that as soon as the data in Field 1 is displayed, it is immediately replaced with the data from the next available field, which in this message is Field 2. As soon as the data in Field 2 is displayed, it also is immediately replaced with data from the next available field. As no subsequent fields contain data, the data from Field 1 is displayed and the cycle begins again. With these default settings, the message is useless. Therefore the operator must alter the duration times, a process covered in the next exercise.

#### **EXERCISE IV: *Message Timing***

##### **Continuous Mode...**

As demonstrated in Exercise III, when certain effects are applied to data, other default settings must be changed in order to make the message legible. In the case of the test message, applying the Bold effect has necessitated a change in the default duration setting.

1. Open the TEST.MSG Message File.
2. Highlight the “Caution Ahead” message and click on the “Edit” button. This will open the message editing screen.
3. Set the mode selection button to “Continuous”.
4. Click on the Functional Effects button in front of Data Field 1. This will open the Segment Scrolling Parameters window for Field 1.
5. In the “Time ON” section, increase the setting from 0.000 seconds to 0.693 seconds by using either of the two “increase” or “up” arrows. The single arrow increases duration in increments of approximately 0.017 seconds. The double arrow increases duration in increments of approximately 0.173; roughly the equivalent of 10 clicks on the single arrow.
6. After setting the “Time ON” duration to 0.693 seconds, click “OK” to close this window.
7. Click the “OK” button to close the message editing screen.
8. Click the “Display” button in the Main Programming Window.

As you will see, the word “CAUTION” is displayed for 0.693 seconds, but the word “AHEAD” is flashed on the display for such a brief period, it is perceived as just a flash of characters. This situation is remedied by increasing the duration for Data Field 2 in the exact same manner as applied to Data Field 1. Follow steps 4 through 8 as outlined above, only apply them to Data Field 2. After step 8, the message should appear as follows:

“CAUTION” is displayed for 0.693 seconds

“AHEAD” replaces “CAUTION” and is displayed for 0.693 seconds

At this point the display goes blank for a brief period and the cycle begins again with Data Field 1. The blank period between the last used Data Field and Data Field 1, is equal in length to the “Time ON” setting for the last used Data Field. In this case, 0.693 seconds. This only applies when the message display is in “Continuous” mode. The following section will outline timing characteristics in “On-Off” mode.

##### **On-Off Mode...**

In the previous section, the impact that “Continuous” mode has on timing events was outlined.

Now, the effects of “On-Off” mode will be examined.

1. Open the TEST.MSG Message File.
2. Highlight the “Caution Ahead” message and click on the “Edit” button. This will open the message editing screen.
3. Set the mode selection button to “On-Off”.
4. Click on the Functional Effects button in front of Data Field 1. This will open the Segment Scrolling Parameters window for Field 1.
5. In the “Time ON” section, increase the setting from 0.000 seconds to 0.693 seconds.
6. After setting the “Time ON” duration to 0.693 seconds, click “OK” to close this window.
7. Click the “OK” button to close the message editing screen.
8. Click the “Display” button in the Main Programming Window.

As you will see, the word “CAUTION” is displayed for 0.693 seconds, but the word “AHEAD” is flashed on the display for such a brief period, it is perceived as just a flash of characters, as with “Continuous” mode. This situation is remedied by increasing the duration for Data Field 2 in the exact same manner as applied to Data Field 1. Follow steps 4 through 8 as outlined above, only for Data Field 2. After step 8, the message should appear as follows:

“CAUTION” is displayed for 0.693 seconds (Time ON), after which a blank screen is displayed for 0.000 seconds (Time OFF)

“AHEAD” is displayed for 0.693 seconds (Time ON), after which a blank screen is displayed for 0.000 seconds (Time OFF)

At this point the cycle begins again with Data Field 1. Unlike “Continuous” mode, the display does not have a blank period following the last used Data Field. In “On-Off” mode, the cycle repeats itself immediately after the last, used, Data Field’s “Time OFF” instruction has been executed. To gain further understanding of the “On-Off” mode and how different ON and OFF durations effect message displays, enter different times into these fields and observe the results. Remember, the ON and OFF times do not have to be alike. In fact, varying the ON time from the OFF time, can have a dramatic effect on the overall message.

### **EXERCISE V: *Scrolling***

Earlier in this manual, the “ON Dir” and “OFF Dir” parameters were discussed. As outlined, the default setting for all messages is “NONE”, meaning that data appears on the display instantaneously. In this exercise, the basic “CAUTION AHEAD” message will be reconfigured in several different ways, so that the operator will see how a message looks when different ON and OFF directions and effects are applied. The operator will also gain a more practical understanding of the differences between “On-Off” mode and “Continuous” mode, and which is the best choice for a given message.

#### **On-Off Mode...**

1. Open the TEST.MSG Message File.
2. Highlight the “Caution Ahead” message and click on the “Edit” button. This will open the message editing screen.
3. Set the mode selection button to “On-Off”.



4. Click on the Functional Effects button in front of Data Field 1. This will open the Segment Scrolling Parameters window for Field 1.
5. Set the “ON Dir” to “Left”.
6. Set the “ON Speed” to “Very Fast”.
7. Set the “Time ON” to 0.693 seconds.
8. Set the “OFF Dir” to “NONE”.
9. Set the “OFF Speed” to “Very Fast”.
10. Set the “Time OFF” to 0.000 seconds.
11. Set the same parameters for Data Field 2 and press “Reformat”.
12. Click the “OK” button to close the message editing screen.
13. Click the “Display” button in the Main Programming Window.

As a result of this configuration, the following events transpire:

- The data in Data Field 1 (the word “CAUTION”) scrolls onto the display from right to left (“ON Dir”= Left)
- The data scrolls at its fastest rate (“ON Speed” = Very Fast)
- The data scrolls to the left end of the display and stops (The default font justification = Left)
- The data is displayed for a brief period (“Time ON” = 0.693)
- The data disappears from the display without scrolling in any direction (“OFF Dir” = NONE)
- The display is blank for 0.000 seconds (“OFF Time” = 0.000)
- The data from Data Field 2 (the word “AHEAD”) scrolls onto the display from right to left (“ON Dir” = Left)
- The data scrolls at its fastest rate (“ON Speed” = Very Fast)
- The data scrolls to the left end of the display and stops (The default font justification = Left)
- The data is displayed for a brief period (“Time ON” = 0.693)
- The data disappears from the display without scrolling in any direction (“OFF Dir” = NONE)
- The display is blank for 0.000 seconds (“OFF Time” = 0.000)

At this point the next available Data Field is processed, in this case that is Data Field 1, and the cycle begins again.

### **Continuous Mode...**

Now configure this message to “Continuous” mode and observe the results. You will note that just by changing the mode, the message behaves in a distinctly different manner. By changing to

“Continuous” mode, the message is now processed as follows:

- The data in Data Field 1 (the word “CAUTION”) scrolls onto the display from right to left (“ON Dir”= Left)
- The data scrolls at its fastest rate (“ON Speed” = Very Fast)
- The data scrolls to the left end of the display and stops (The default font justification = Left)
- The data is displayed for a brief period (“Time ON” = 0.693)
- The data from Data Field 2 (the word “AHEAD”) scrolls onto the display from right to left (“ON Dir” = Left), forcing the previous data to scroll off the display in the same direction
- The new data scrolls at its fastest rate (“ON Speed” = Very Fast)
- This data scrolls to the left end of the display and stops (The default font justification = Left)
- The data is displayed for a brief period (“Time ON” = 0.693)
- The data scrolls off the display to the left, the same direction configured in the “ON Dir” parameter.
- The display is blank for 0.693 seconds.

In Continuous mode, the display remains blank for a time equal to the “ON Time” of the last Data Field used. In this example, the last Data Field used is Data Field 2, so the display remains blank for 0.693 seconds. This demonstrates one of the significant differences between “On-Off” and “Continuous” mode. To further understand these differences, try changing the scrolling parameters and observe how the message is displayed in the various modes.

## **Section III:**

### **Additional Features**

At this point, the operator should have a firm understanding of a Message's creation and design process, including:

- † What a Message File is and how to create one.
- † What a Library File is and how to create one.
- † What a Message is.
- † What font characteristics are and how they can effect a Message.
- † What the difference is between On-Off and Continuous mode.
- † How the Scrolling parameter works.

In this section we will examine some of the additional features of the software. These features do not directly relate to creating a new Message, but are extremely helpful in building Message Files and Library Files.

#### **Exercise VI: Copying and pasting a Message from one file to another**

In this exercise, the operator will create a new Message File and copy a Message from a Library File into this new Message File.

1. Create a new Message File named "Test2.MSG".
2. Open the Library File "POLICE.LIB" located in C:\whelen\messnger.
3. Highlight the Message named "FL CAUTION".
4. Select "Copy" from the "Edit" menu in the Main Programming Window. This copies the Message to the Windows clipboard.
5. Now open the "Test2.MSG" Message File created in step 1 and highlight "<New>".
6. Select "Paste" from the "Edit" menu in the Main Programming Window. This pastes a copy of the Message from the clipboard into "Test2.MSG".

#### **Exercise VII: Copying and pasting multiple Messages from one file to another**

In this exercise, the operator will copy multiple Messages from a Library File into "Test2.MSG".

1. Open the Library File "POLICE.LIB" located in C:\whelen\messnger.
2. While holding down the "Ctrl" button on your keyboard, click on the Messages "SLOW", "KEEP IN LANE" and "ACC AHEAD".
3. Select "Copy" from the "Edit" menu in the Main Programming Window. This copies the Message to the Windows clipboard.
4. Open "Test2.MSG".
5. Select "Paste" from the "Edit" menu in the Main Programming Window. This pastes the Messages selected in step 2 from the clipboard into "Test2.MSG".

#### **Exercise VIII: Deleting Messages**

In this exercise, the operator will delete or "Cut" Messages from "Test2.MSG". In this instance, assume that the Message "KEEP IN LANE" was mistakenly placed in "Test2.MSG" and must now be removed.

1. Open the Message File "Test2.MSG".

2. Highlight the Message “KEEP IN LANE”.
3. Select “Cut” from the “Edit” menu in the Main Programming Window. This cuts, or deletes, the Message and is not retrievable.

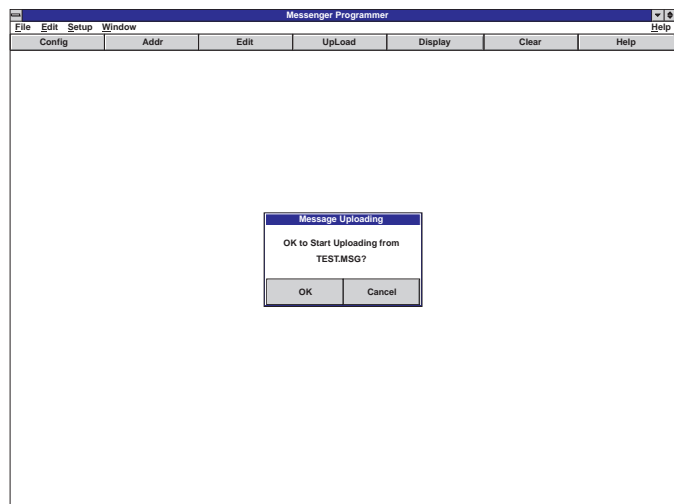
**IMPORTANT NOTE: A deleted Message is irretrievable. Do not delete a Message unless you are sure that it is no longer needed.**

### Exercise IX: Uploading a Message File to the Messenger Display

This is the final exercise. At this point, the operator has learned all of the skills needed to create and edit Messages. This section will outline the procedure for uploading a Message File from its location on the host computer to the storage area on the Messenger display.

1. Disconnect the communication cable plug that connects the Messenger Display to the Messenger controller. The communication cable is identified by its 2-conductor (Blue & Grey), twisted-pair configuration.
2. Connect the end of the communication cable coming from the Messenger, to the communication plug coming from the RS24C adapter connected to the serial port on the host computer.
3. Start the messenger software on the host computer. As the software starts, it will search for the Messenger. When it has located the bar, it will display a window stating “Messenger found at Address #X”, where X represents the address where the bar was found.
4. Click on FILE. From the menu, click on OPEN. This will open the “Open Message File” window.
5. Go to the directory where the Message Files are stored on the host computer and highlight the desired Message File. Click OK to open the file.
6. Click the UPLOAD button located on the button bar.

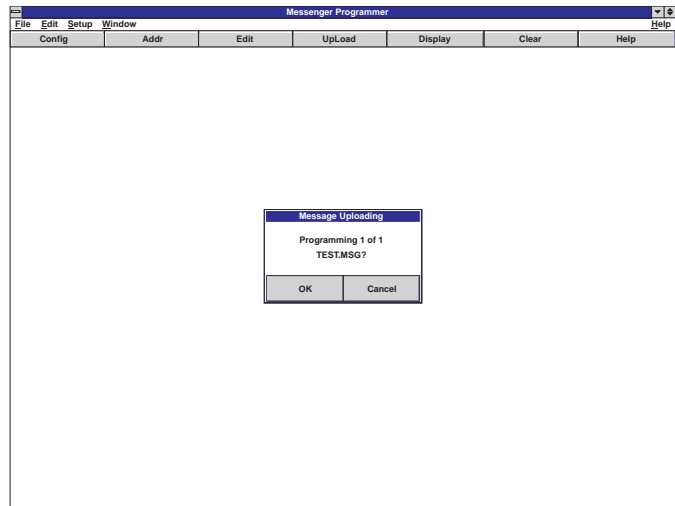
A window will now appear confirming the upload of the Message File.



**Fig. 19**

By pressing “Cancel”, the operator can abort the upload process before any changes are made to the Message File currently loaded in the Messenger display. Pressing “OK” begins the upload process. As the Message File is uploaded, the progress will be displayed in a window, as shown in Fig. 20.

**Fig. 20**



In the case of "TEST.MSG", there is only one Message in the file, so "Programming 1 of 1" is displayed. If there were, for example, 35 Messages in this file, the progress would indicate "1 of 35" then "2 of 35", and so on, up to "35 of 35".

## Section IV: Trouble-Shooting...

*“I started the programming software and a window appeared telling me, “No Messenger Found”. What’s the problem?”*

There are a number of things that could account for this situation:

- **Messenger Display is not powered** - The display unit requires +12 VDC in order to function. Connect the display to +12 VDC power supply or a +12V automotive battery.
- **Wrong Serial Port is selected** - Consult the Host computer’s documentation to verify the designation of the Serial Port connected to the RS24C. Select “*ComPort*” from the Setup menu. Select the proper Serial Port from the Serial Port Selection dialog.
- **RS24C is not powered** - The RS24C must be connected to a +12 VDC power source to operate.
- **Serial Port cables are not connected** - Verify that the proper serial cables are properly connected between the computer and the RS24C. Tighten any loose connections.
- **Blue & Grey communication wires are reversed** - A common problem is that the communication wires are reversed somewhere between the RS24C and the Messenger Display. Refer to the Overview diagram on page 24 for proper communication wire connections.
- **MCG01 is still operating** - In order for the Host computer to communicate with the Messenger Display, the MCG01 control head must be removed from the bus or turned off. If other B-LINK control heads are connected to the communication bus, they must also be turned off.

*“When I try to display a Message it flickers. What am I doing wrong?”*

A flickering Message is symptomatic of a scroll time that is set too short. If scroll times are not set or if they are set too short, the Message segments will be displayed far too quickly to be read. Increase the duration of the “Scroll ON” and “Scroll OFF” times to eliminate the flicker.

*“The Message I’ve created is displayed properly but the time between when the Message ends and when it begins again is longer than the time I specified. How can I fix this?”*

There are two possible explanations for this type of situation:

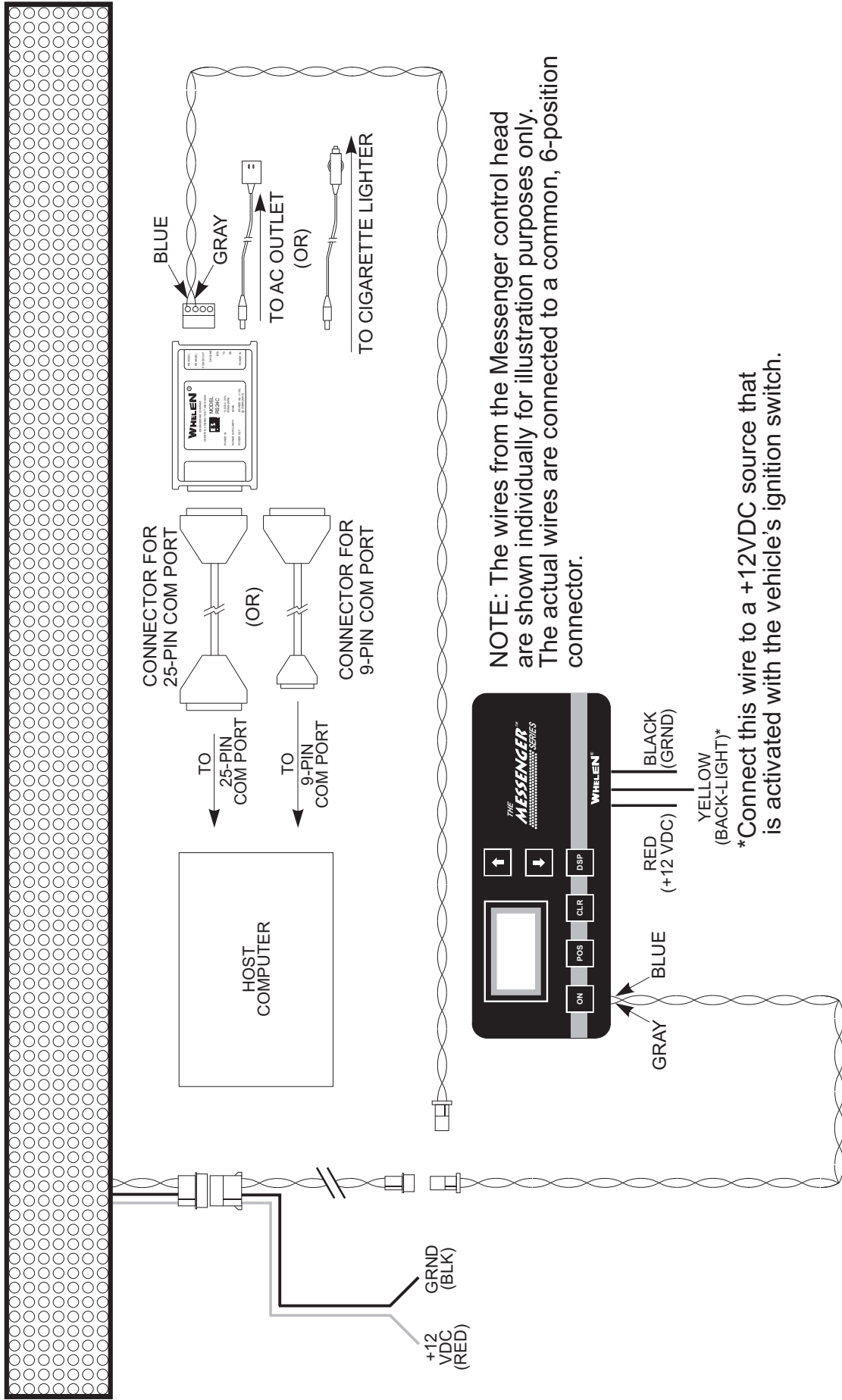
- **The last segment is full** - If the last used data field is filled to capacity, an additional blank field is automatically added. This capacity is determined by the Display model being used. For example, if the Message is being designed for an MGM01 8-character display, the Data Field capacity is 8 characters. For the MGM02 16-character display, it would be 16 characters. For the MGM03 24-character display, it would be 24 characters. Shorten the data in the last Data Field to correct the problem.
- **You have placed a Terminator in the last Data Field** - A Terminator in the last Data Field will cause an additional blank screen to be added to the Message, thus producing the condition being encountered. Removing the Terminator will correct this problem.

***“How can I stop the Messenger from breaking the words in my Message?”***

- **Your Message was designed for a longer Display unit** - If you program an MGM01 8-character display with Messages designed for an MGM02 16-character display, the words within the Message may be broken to fit the 8-character format. The same condition will occur if an MGM02 is programmed with Messages designed for the MGM03 24-character display. Re-program the Display with the correct Message File.
- **On-Off mode has been selected when Continuous should have been used** - If your Message is meant to scroll across the display, and On-Off mode is selected, words at the ends of Data Fields may be broken. Select the Continuous mode to rectify the problem.
- **Mirrored text is left justified** - On Mirrored messages that scroll from right to left, a short message segment (typically the last one) gets the default *Left* justification. This causes the data to appear some distance away from the rest of the Message. This can be corrected by setting the Message to *Right* justification.

***“I created a Message using the “Mirror” configuration and it scrolls the wrong direction.”***

The scroll setting is set to Left. The Mirror attribute works on characters only. Scroll directions are not converted. To correct the problem, change the scroll direction to Right.



NOTE: The wires from the Messenger control head are shown individually for illustration purposes only. The actual wires are connected to a common, 6-position connector.

\*Connect this wire to a +12VDC source that is activated with the vehicle's ignition switch.