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Programming Procedures:
SmartArrow Messenger™

Automotive: Serial Communication

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.**
- **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 any 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 owners 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.**
- **If this product uses a remote device to activate or control this product, 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.**
- **If this product contains strobe light(s), halogen light(s) or high-intensity LEDs, 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!**

For warranty information regarding this product, visit **www.whelen.com/warranty**

Form No.13360C (072607)

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Illustrations

Introduction...

This manual will outline the procedures necessary for programming the Whelen Messenger Display (models MGM01, MGM02, MGM13 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 should pay close attention to the procedures outlined herein. It is recommended that this manual is read through carefully. 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

Using the Windows "Add/Remove Software" application, install the software located on the CD-ROM provided.

Understanding the Terms...

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 four different models; Model MGM01 (8-character display), Model MGM02 (16-character display), MGM13 (20-character display) and Model MGM03 (24-character display).

Messenger Controller - The panel used to control the functions of the Messenger. This control head, 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 transferred to the Messenger Display. 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 an unlimited number of messages, but only the first 127 messages can be programmed to the Messenger itself.

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. These sub-directories can be found in a WHELEN\MGP01\MGM*xx* folder created for each of the four different messengers. The messages already stored in these folders are specified for the different character settings on the individual messengers.

A Library File can contain an unlimited number of 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*

The Virtual Display - A display at the top of the Message File Window (directly below the toolbar) which is capable of displaying messages as they would appear on a real Messenger.

Transporter - Device which is capable of storing two Message Files ("Rear" and "Front") as well as the B-LINK programming. It is a necessary component in the communication setup.

Address - Each Messenger and Message File must be configured as either "Rear" or "Front".

Aux Control - Each Messenger can be programmed with the following options for Aux Control: On/Off (default), Remote On/Off, Motor Control, and Remote Motor Control.

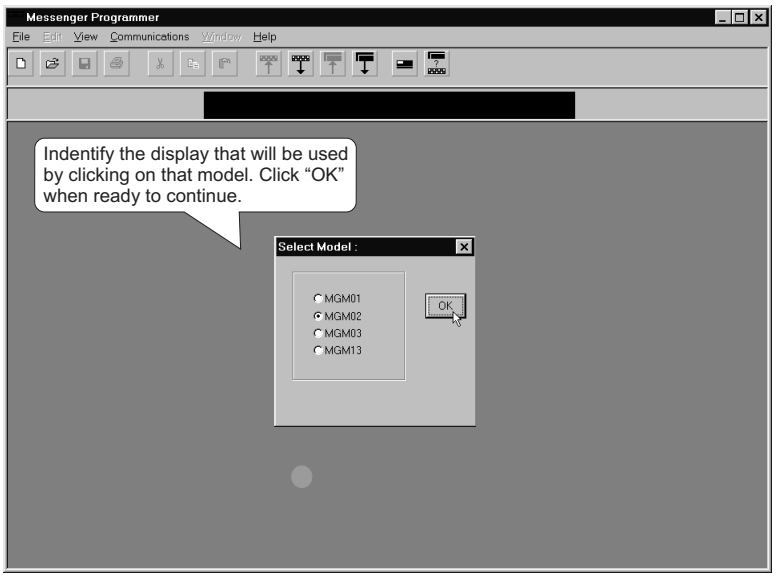
Pursuit Mode - Each Messenger has a message selected which will be displayed during Pursuit Mode.

Selecting the Proper Messenger Display...

There are four different Messenger Displays available; The MGM01 8-character display, the MGM02 16-character display, the MGM03 24-character display and MGM13 20-character display. Before any programming can begin, the operator must first identify which display unit will be used to display the Message. (*See Figure 1 on Page 7*)

IMPORTANT NOTE: Each of the four available models display a different amount of characters (8, 16, 20 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.

Fig. 1

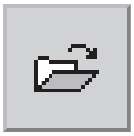


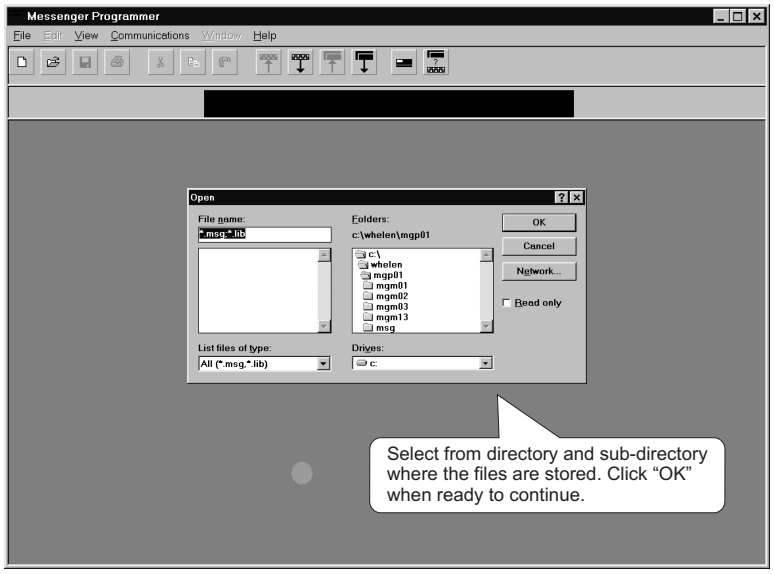
Opening an Existing Message File or Library File...

1. In the Message File Window, click on "File". Now click on "Open" from the list, or click the open button on the toolbar.

Fig. 2

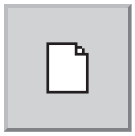
2. This will open the "Open" window (*Figure 2*). From this window, select the directory that corresponds with the display model and choose any of the given messages that are pre-programed.





Creating a Message File or Library File...

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. In the Message File Window, click on "File". Now click on "New" from the list. Or click the NEW button on the toolbar.
2. This will open the "Select Model" window. From this window, choose the model you wish.

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.*

NOTE: *Be sure to save the file when you are done creating messages.*

Saving a Message File or Library File...

To save an existing Message File:

1. Make the desired Message File active by clicking on its Title Bar.
2. In the Message File Window, click on "File". Choose "Save" from the list of options. Or click the Save button on the toolbar.

To save a new unnamed Message File or to save an existing Message File with a new name:

1. Make the desired Message File active by clicking on its title bar.
2. In the Message File Window, click on "File". Choose "Save As" from the list of options.
3. To save the Message File in a different folder, click a different drive in the Save in box, or double-click a different folder in the folder list.
4. In the File name box, type a name for the Message File.

Printing a Message File or Library File...

1. Make the desired Message File active by clicking on its Title Bar.
2. In the Message File Window, click on "File". Choose "Print" from the list of options, or click the PRINT button on the toolbar.
3. Choose the desired parameters from the Print Box, then click on OK

Copying and Pasting Messages from one File to Another...

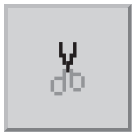
Key Command: Ctrl C

Ctrl V

1. Make the desired source Message File active by clicking on its Title Bar.
2. Highlight the Message(s) that you wish to copy.
3. Select "Copy" from the "Edit" menu in the Message File Window. Or click the COPY button on the toolbar. This copies the Message(s) to the Windows clipboard.
5. Click where you want your messages to appear. This can be in the same Message File or a different one.
6. Select "Paste" from the "Edit" menu in the Message File Window or click the PASTE button on the toolbar. This pastes a copy of the Message(s) from the clipboard into the Message File.

Cutting and Pasting Messages from one File to Another...

1. Make the desired source Message File active by clicking on its Title Bar.
2. Highlight the Message(s) that you wish to cut.



Ctrl X

3. Select “Cut” from the “Edit” menu in the Message File Window, or click the CUT button on the toolbar. This cuts the Message(s) to the Windows clipboard.
5. Click where you want your messages to appear. This can be in the same Message File or a different one.
6. Select “Paste” from the “Edit” menu in the Message File Window or click the PASTE button on the toolbar. This pastes the Message(s) from the clipboard into the Message File.

Copying All and Pasting from one File to Another...

1. Make the desired Message File active by clicking on its Title Bar.
2. Select “Copy All” from the “Edit” menu in the Message File Window, or select “Ctrl A”. This highlights all of the Messages in the Message File Window.
3. Click where you want your messages to appear. This can be in the same Message File or a different one.
4. Select “Paste” from the “Edit” menu in the Message File Window or click the PASTE button on the toolbar. This pastes a copy of the Messages from the clipboard into the Message File.

Deleting Messages...

1. Make the desired Message File active by clicking on its Title Bar.
2. Highlight the Message(s) that you wish to delete.
3. Select “Delete” from the “Edit” menu in the Message File Window. This deletes the Message(s) and is not retrievable.

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

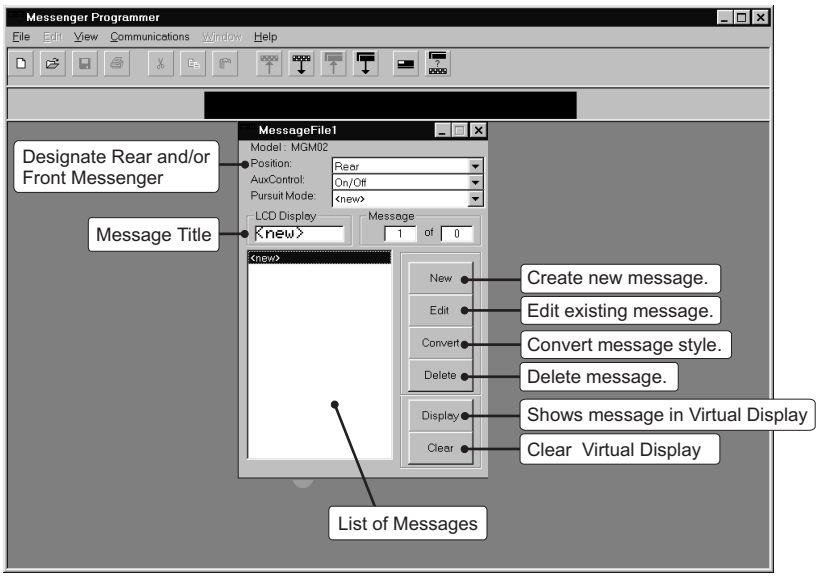
Section II:
Designing a Message...

Working with Messages...

Fig. 3

There are four different styles of messages - Steady, Scroll, Flash and Advanced. Designing your message will be simplified if you chose the appropriate type of message style.

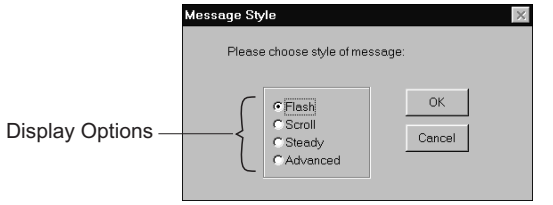
The message designer is able to:
Create a new message
Edit existing messages
Convert the message style of an existing message.
(*Refer to Figure 3*)



Creating a Message

Fig. 4

1. Open an existing Message File or create a new Message File.
2. Double-click on <new> in the Message File window.
3. From the "Select Message Style" window, choose the style of Message you wish to create (Message Styles). (*Refer to Figure 4*) This will open the Message Editor appropriate to the message style that was chosen.



Refer to the "Styles of Messages" section for defining these terms.

4. Enter the 16-character Message ID 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 16 characters in length (including spaces), the display screen on the Messenger Controller will only display the first 8 characters.
5. Proceed to enter the desired text, text formatting, and timing parameters.
6. At any time during the editing process, click on "DISPLAY" to preview the message on the Virtual Display.
7. When done editing, click on "SAVE/EXIT"

Editing a Message

1. Open an existing message file.
2. Click on the message you wish to edit in the Message File window and then click on the EDIT button. Or double click on the message you wish to edit. (*See Figure 4*) This will open the

Message Editor appropriate to the message style that was chosen.

3. Proceed to edit the text, text formatting, and timing parameters.
4. At any time during the editing process, click on "DISPLAY" to preview the message on the Virtual Display.
5. When done editing, click on "SAVE/EXIT"

Converting the Message Style of a Message

1. Open an existing Message File.
2. Click on the message you wish to edit in the Message File window and then click on the "CONVERT" button.
3. From the "Select Message Style" window, choose the style of Message you wish to convert to (Message Styles). This will open the Message Editor appropriate to the message style chosen.
4. Proceed to edit the text, text formatting, and timing parameters.
5. At any time during the editing process, click on "DISPLAY" to preview the message on the Virtual Display.
6. When done editing, click on "SAVE/EXIT". The message will be saved as the new message style.

Styles of Messages...

Steady Messages have one line of text that is displayed continuously. The model of the Message File determines the number of characters allowed. MGM01 Message Files can have up to 8 regular-sized characters or 4 bold characters. The text can be left, center, or right justified. The individual text characters can be bold or regular as well as mirrored or unmirrored. (*See Figure 5 Below*).

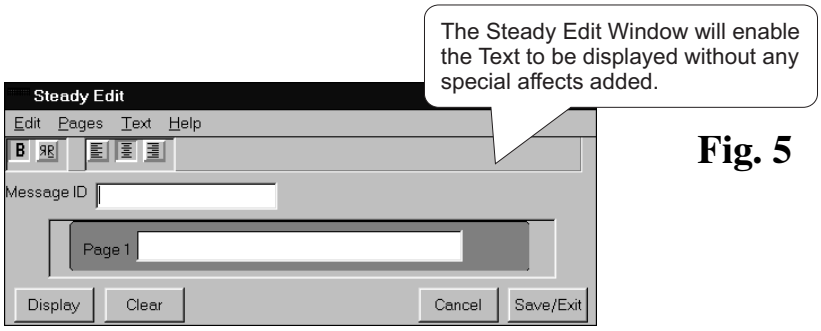


Fig. 5

Scroll Messages have one line of text that is scrolled continuously across the display. The text can be scrolled from right to left (the default) or from left to right. The entire text can be made bold or regular as well as mirrored or unmirrored. The number of text characters allowed is over 600 regular characters or 300 bold characters, regardless of the model type. (*See Figure 6*).

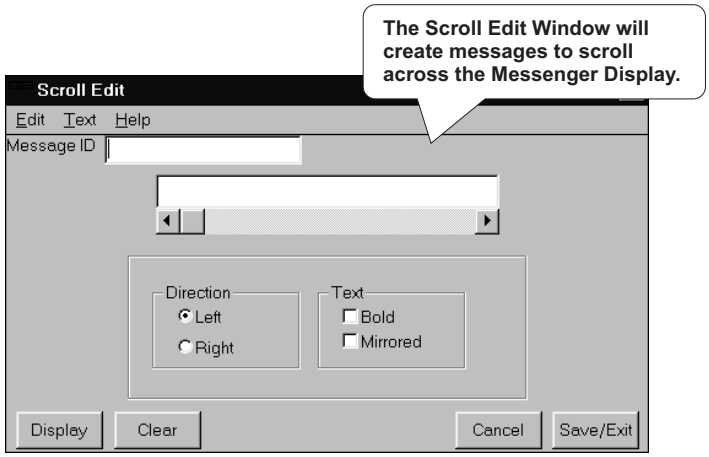


Fig. 6

Flash Messages can contain one or more lines of text. The individual lines are referred to as Pages. Each page of text can be individually formatted as left, center, or right justified. Within each page, text characters can be individually formatted as bold/regular and mirrored/unmirrored. Each Flash Message has 2 timing parameters associated with it, the flash rate and time on. The available flash rates, in flashes per minutes, range from 20 to 300 in increments of 10. The time on selection determines the percentage of time that the page is displayed vs. the time that the display is blank. If the operator, for instance, chooses 60 flashes per minute with a time on of 100, the display will cycle through the pages of the message, displaying each page for 1 second, before moving on to next page. Following the last page, the display will start over with the first page. If the time on were changed to 50%, the first page would be displayed for one half second, then the display would be blanked for one-half second, page 2 would be displayed for one-half second, etc. (*See Figure 7*).

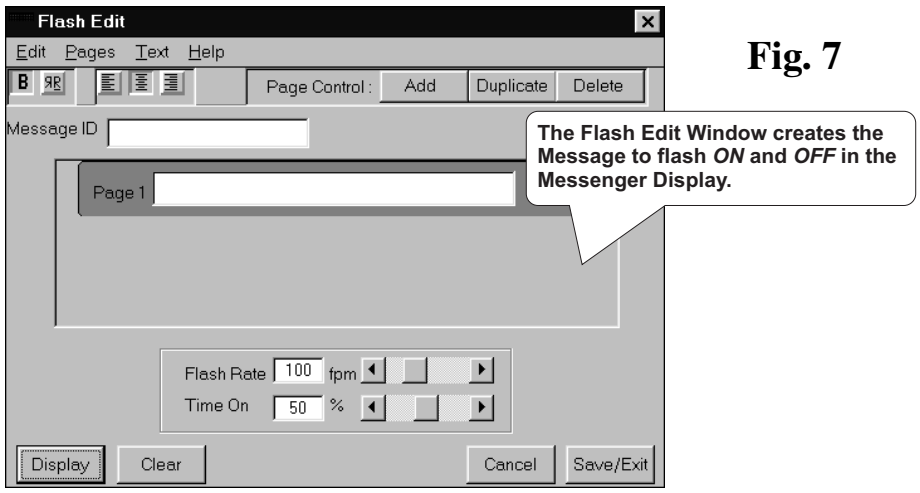


Fig. 7

If a message fails to fall into any of the preceding categories, it becomes designated as an ***Advanced Message***. With an advanced message, the designer is able to use any of the timing and formatting parameters available. In this window the operator can specify the exact timing for the message to remain on the screen and off the screen. It can enable the message to scroll in different direction and at different speeds. Also messages can correspond to other styles. Both flashing and scrolling options can be applied to messages in specific page divisions. (*See Figures 8 & 9 on the next page*).

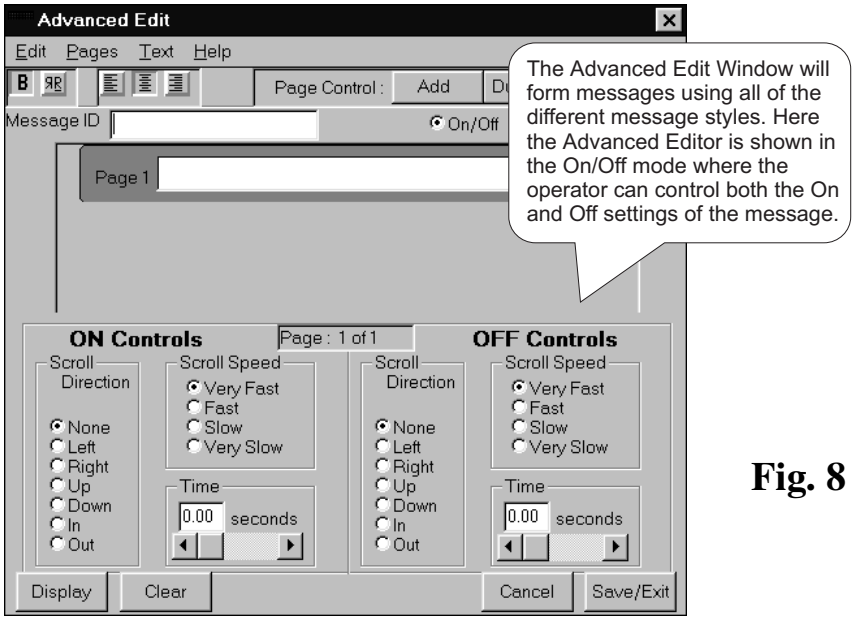


Fig. 8

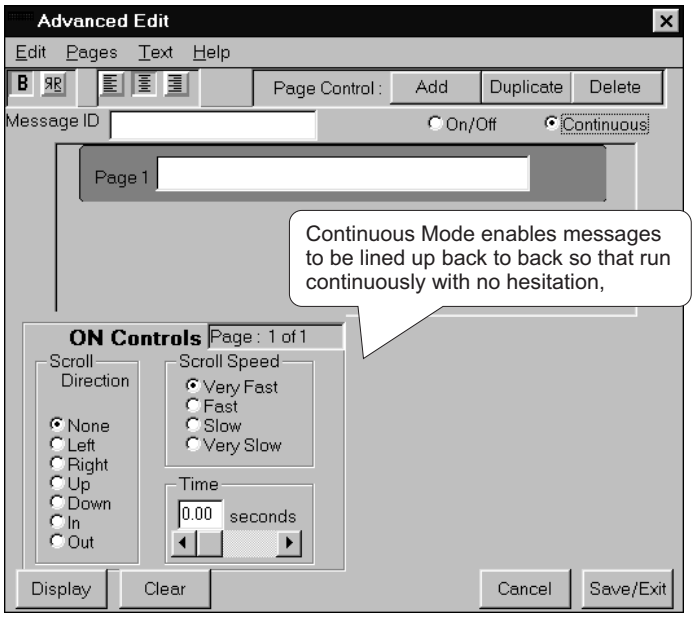


Fig. 9

Advanced Message Characteristics...

As defined earlier, a message can consist of text, special characters 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 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 consist of:

On Controls - *Scroll Direction, Scroll Speed and Time On.*

Off Controls - *Scroll Direction, Scroll Speed and Time Off.*

These "Functional Effects" buttons can only set characteristics for the Page to which they correspond to. Each page must be programmed separately.

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. Once set, the selected mode will apply to the entire message. In the default mode (ON-OFF), the window will look like this: (*See Figure 8)*

In **ON-OFF Mode**, there are 6 parameters that the operator can change. **NOTE:** *These settings only effect the text in the page corresponding to the specific Functional Effects applied to that page. "Scrolling Parameters" must be set individually to each page.*

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 the display is blank.
Out ..... The data scrolls outwards towards both the left and right until the 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 pages.

On-Off Mode

If the mode is set to "**On-Off"**, the Pages are processed in this fashion:

- Messenger is blank.
- The data on page 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 on page 2, then 3, etc., until all of the pages that contain data have been displayed. After all available pages have been processed, the entire Message (beginning with Page 1) is then repeated.

Continuous Mode

If the mode is set to "**Continuous"**, the Pages are processed in this fashion:

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

This process then repeats itself using the data on Page 3, then 4, etc., until all of the fields that contain data have been displayed. After all available Pages have been processed, the entire Message (beginning with Page 1) is then repeated.

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 Steady 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, the MGM13 20-characters and the MGM03 can display up to 24 characters at a time.*

In this exercise, the operator will create a "STEADY" Message named "Caution Ahead".

NOTE: *When instructed to enter data on a Page, do NOT enter quotation marks.*

1. Open an existing Message File or create a new Message File.

2. Click on <**new**> in the Message File window.
3. From the "Select Message Style" window, and choose "**STEADY**" (Message Style).
4. This will open the Message Editor appropriate to the message style that was chosen.
5. 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 16 characters in length (including spaces), the display screen on the Messenger Controller will only display the first 8 characters.*

6. In page 1, enter the word "CAUTION AHEAD". The Messenger Editor screen should look like this: (*Fig. 10*)

Fig. 10

7. Click the "Display" button in the Message File Window. The words "Caution Ahead" will appear on the Messenger in normal size, Left Justified.

Fig. 11

To end the display, click the "CLEAR" button. Now save your Message File by clicking "FILE", and then "SAVE", or click the SAVE/EXIT button on the editor window.

Congratulations! A complete, functional message has been created. In the next few exercises, other message styles will be demonstrated.

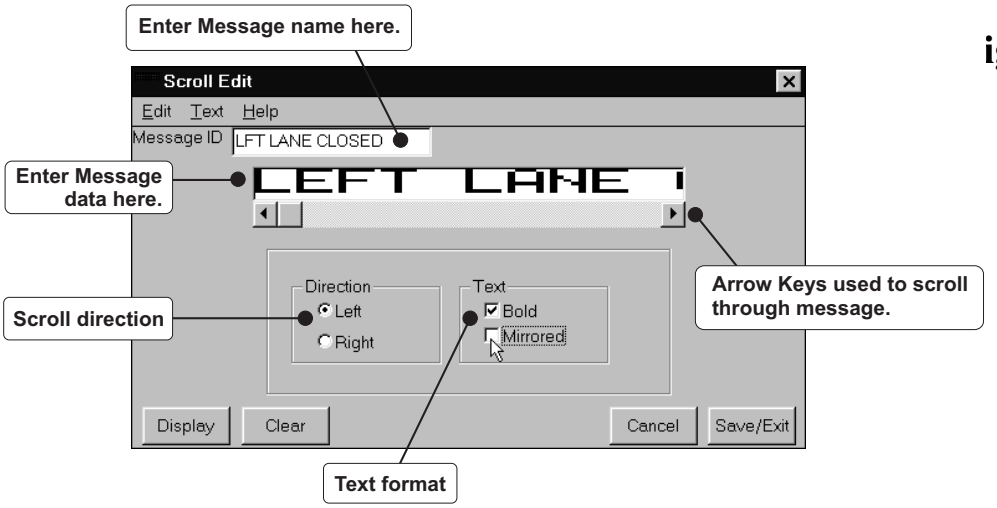
EXERCISE II: ***Creating a Scrolling Message***

In this exercise, the operator will create a "SCROLLING" Message, named "Caution Ahead-2".

1. Open an existing Message File or create a new Message File by clicking on <**new**> in the Message File window.
2. From the "Select Message Style" window, and choose "**SCROLL**" (Message Style).
3. This will open the Message Editor appropriate to the message style that was chosen.
4. Enter the name "Left Lane Closed" 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 16 characters in length (including spaces), the display screen on the Messenger Controller will only display the first 8 characters.*

5. In the data entry field, enter the words “LEFT LANE CLOSED”. The Messenger Editor screen should look like this: (*Fig. 12*)



ig. 12

6. Click the “DISPLAY” button in the Message File Window. The words “Left Lane Closed” will scroll across the Messenger in normal size, Scrolling Left.

To end the display, click the “CLEAR” button. Now save your Message File by clicking “FILE”, and then “SAVE”, or the SAVE/EXIT button on the editor window.

EXERCISE III: ***Creating a Flashing Message***

In this exercise, the operator will create a “FLASHING” Message, named “Danger Keep Away”.

1. Open an existing Message File or create a new Message File.
2. Click on <**new**> in the Message File window.
3. From the “Select Message Style” window, and choose “**FLASH**” (Message Style).
4. This will open the Message Editor appropriate to the message style that was chosen.
5. Enter the name “Danger Keep Away” 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 16 characters in length (including spaces), the display screen on the Messenger Controller will only display the first 8 characters.*

6. In Page 1, enter the word “DANGER”. Using the Arrow Keys below the page entry field, set the flashes per minute to your desired rate along with the time for the page to be displayed on the Messenger. (*In figure 13 the Flash Rate has been set at 50 fpm, and the Time On at 90%*).

NOTE: *The Flash Edit Window is set at 100 FPM (default) and a Time On period of 50% (default). This enables a small gap displayed in between the text pages. The default duration for the Time Off period is set at 0.00, therefore as soon as the data in Page 1 is displayed, it is immediately replaced with the data from the following page, and that page is replaced with the next available page. As no subsequent pages contain data, the data from Page 1 is displayed and the cycle begins again. If the Flash Rate and Time On options are set at 0 FPM and 0%, the display would show a series of rapidly flashing characters.*

7. Now click on the “ADD” button in the Page Control toolbar which is adjacent to the Font Justifications on the Editor screen. This will create a Page 2.

8. In Page 2, enter the word “KEEP”, and adjust the flash rate and time on options to match the previous page. Once this is done, click the “ADD” button to create a third page.
9. In Page 3, enter the word “AWAY”, and adjust the flash rate and time on options to match those of the previous pages. The Messenger Editor screen should look like this: (*Fig. 13*)

Fig. 13

10. Click the “DISPLAY” button in the Message File Window. The words “DANGER, KEEP and AWAY” will flash consecutively on Messenger in bold size, center justification.

To end the display, click the “CLEAR” button. Now save your Message File by clicking “FILE”, and then “SAVE”, or the SAVE/EXIT button on the editor window.

EXERCISE IV: ***Creating an Advanced Message***

In this exercise, the operator will create an “ADVANCED” Message, named “Split Traffic”.

1. Open an existing Message File or create a new Message File.
2. Click on <**new**> in the Message File window.
3. From the “Select Message Style” window, and choose “**ADVANCED**” (Message Style).
4. This will open the Message Editor appropriate to the message style that was chosen.
5. Enter the name “Split Traffic” 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 16 characters in length (including spaces), the display screen on the Messenger Controller will only display the first 8 characters.*

6. In Page 1, enter the word “SPLIT”, then click on the Continuous Mode option located just under the Page Control toolbar. In the On Controls Box, under the Time option, enter a 1 second display time.
7. Now click on the “ADD” button in the Page Control toolbar which is adjacent to the Font Justifications on the Editor screen. This will create a Page 2.
8. In Page 2, enter the word “TRAFFIC”, and adjust the Page options to match those of the previous page. Once this is done, click the “ADD” button to create a third page.
9. In Page 3, press the Space Key, but do not enter any text. This will add a slight pause to balance out the message before moving on to the next entry. Be sure to adjust the Page options to match

those of the previous pages. The Messenger Editor screen should look like this: (*Fig. 14)*

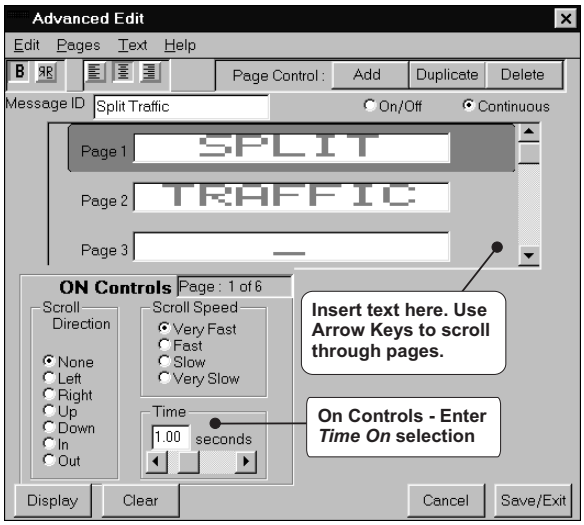


Fig. 14

10. Now click on the "ADD" button in the Page Control toolbar which is adjacent to the Font Justifications on the Editor screen. This will create a Page 4.

11. Click on "Text" and select "Show Special Characters". This will display the Special Characteristics in the Editor Window. Select the Arrow "RIGHT" symbol at the operator's discretion, then press the space key four times and select the Arrow "LEFT" symbol. Be sure, that for this page, the Font Justification is set to Plain, not Bold, so that these characters will fit on the page. Set the On Controls box to show the message will scroll "OUT" and the Time On is at "0.00" seconds.

12. Repeat this step for Pages 5 & 6. The Messenger Editor screen should look like this: (*Fig. 15*)

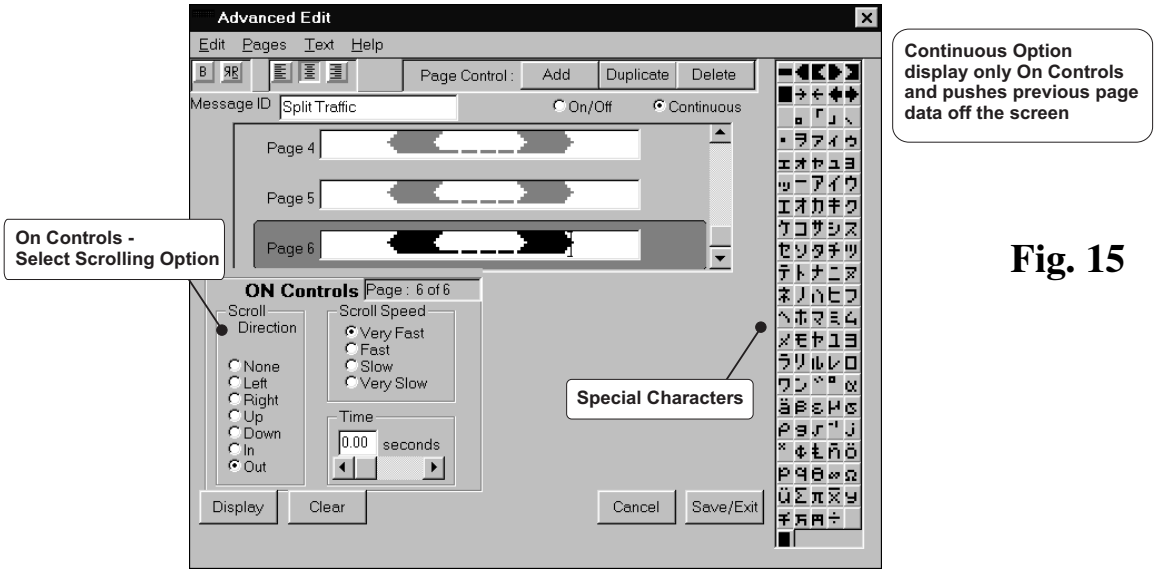


Fig. 15

10. Click the "DISPLAY" button in the Message File Window. The words "SPLIT and TRAFFIC" will flash consecutively followed by a progression of Arrows dividing in the center of the display moving out (Right & Left) to the ends of the page.

To end the display, click the "CLEAR" button. Now save your Message File by clicking "FILE" and then "SAVE", or the SAVE/EXIT button on the editor window.

In the next exercise, font justification and effect procedures will be demonstrated.

EXERCISE V: ***Font Justification***

NOTE: *Although each Page within a message can have its own style of justification, a single page 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 Page, Do NOT enter quotation marks.*

1. Highlight the "Caution Ahead" message. Click the "EDIT" button in the Message File Window to open the Message Editing screen.

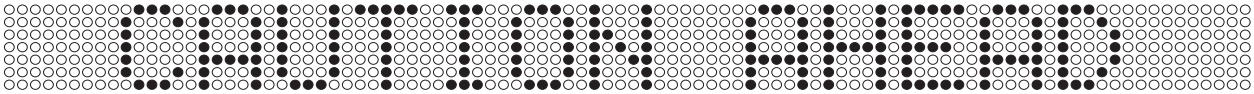
2. Click in Page 1 and position the cursor so that it precedes the text in that page.

3. Click the "CENTER" justification button. This will justify the text in Page 1 to the center.

4. Click the "OK" button to close the message editing screen.

5. Click the "DISPLAY" button in the Message File Window. The words "CAUTION AHEAD" will appear on the Messenger in normal size, Center Justified.

Fig. 16



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 Message File Window to open the Message Editing screen.

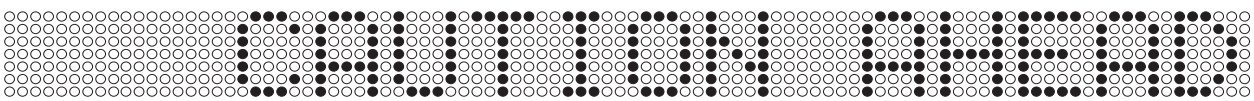
2. Click on Page 1 and position the cursor so that it precedes the data in that page.

3. Click the "RIGHT" justification button. This will justify the text in Page 1 to the right.

4. Click the "OK" button to close the message editing screen.

5. Click the "DISPLAY" button in the Message File Window. The words "CAUTION AHEAD" will appear on the Messenger in normal size, Right Justified.

Fig. 17



6. Click the "CLEAR" button to end the display.

EXERCISE VI: ***Font Effects***

In addition to the various justifications that can be applied to data, there are 2 visual effects that can be implemented to affect 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 Pages.

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.

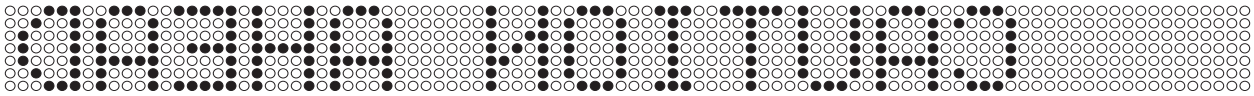
1. Highlight the "Caution Ahead" message. Click the "EDIT" button in the Message File Window to open the Message Editing screen.

2. Click in Page 1, highlight the text "Caution Ahead" in the field.

3. Click the "MIRROR" button and Click the "OK" button to close the message editing screen.

4. Click the "DISPLAY" button in the Message File Window. The words "CAUTION AHEAD" will appear on the Messenger normal size, Left Justified, but mirrored.

Fig. 18



5. Click the "CLEAR" button to end the display.

In step 3, the text was highlighted in Page 1 and the "MIRROR" button was clicked. This configured the message to mirror all highlighted text in Page 1. However, each page is treated individually, all subsequent pages have to be marked to the operator's discretion. If there are multiple pages, be sure to check their justifications so they all correspond with each other. By clicking the "MIRROR" button again when text is highlighted, it will return the text to the normal display.

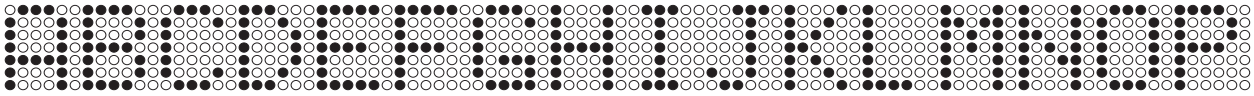
NOTE: *When using the mirror justification option; in the Message Editing Screen, text will appear in italics to show that it is mirrored text. This is so the operator can easily type in the data without the confusion of reverse lettering.*

NOTE: *If a message that would normally scroll left is also configured to be mirrored, make sure to change the direction to scroll right. Otherwise, the last word of the sentence will appear first.*

Bold...

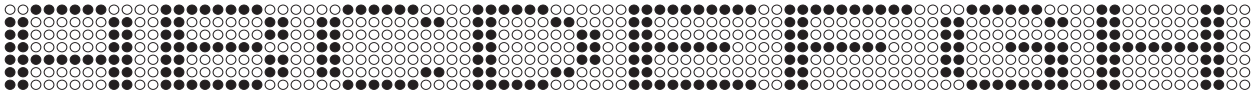
The Messenger display unit is comprised of Light Emitting Diodes (LED's). In its default configuration, a single character (text, symbol or space) is 7 H x 6 W. This allows the MGM01 to display up to 8 characters, the MGM02 to display 16 characters, the MGM13 to display 20 characters and the MGM03 to display 24 characters at any given time.

Fig. 19



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. (on a MGM02)

Fig. 20



1. Highlight the "Caution Ahead" message. Click the "EDIT" button in the Message File Window to open the Message Editing screen.

2. Click in Page 1, and highlight "CAUTION AHEAD".

3. Click the "BOLD" button. This will not only justify all the text in Page 1, but also removes all of the data after the 8th character from Page. 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. The "Steady" (Message Style) will not be able to display this entire message in bold print.*

4. To correct this message, Click the "CONVERT" button in the Message File Window to convert the "Style Type" of the Message. Select the "Advanced" Message Style.

5. Now, in the message editing screen, Click the "ADD" button to add a second page to the "Caution Ahead" message. Type "AHEAD" in the space provided in Page 2.

6. Click the "DISPLAY" button in the Message File Window.

The display now shows a series of rapidly flashing characters. This is a result of the data in Page 1 ("CAUTION") and Page 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 Page 1 is displayed, it is immediately replaced with the data from the next available page, which in this message is Page 2. As soon as the data in Page 2 is displayed, it also is immediately replaced with data from the next available page. As no subsequent pages contain data, the data from Page 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.

Section III:
Communication with Transporter and Messenger

Setting up Communications...

The Host Computer is capable of communicating with the Transporter or with the Messenger Display through the Transporter. The three switches on the Transporter determine the mode of communication. The Transporter must be connected to a +12 VDC power source and to the Host Computer through the serial port. The serial port is chosen and initialized by selecting "Comm Port" from the COMMUNICATIONS menu. In order for the Host computer to communicate with the Transporter or Messenger Display, the MGC01/02 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.

To test the connection and switch settings, click on the COMMUNICATIONS menu and select "Connection Information". Or click the button on the toolbar. If Communication Failures persist, see the Trouble Shooting Help.

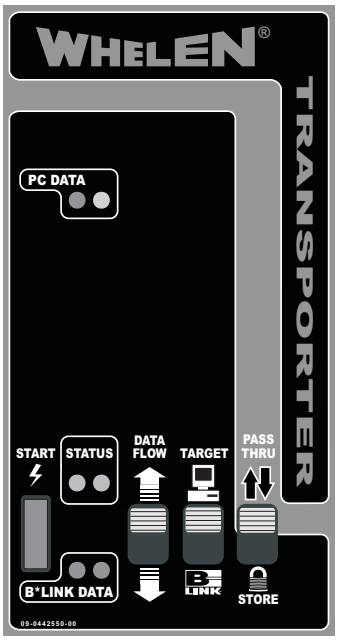


Fig. 21

Transporter Communications...

Transferring a Message File to the Transporter

1. Set the switches on the Transporter to PC transfer Mode.
2. Press the Start Switch on the Transporter.
3. Click on "FILE". From the menu, select "OPEN". This will open the "Open Message File" window.

4. 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.
5. Click on "COMMUNICATIONS". From the menu, select "TRANS-PORTER", then "TRANSFER". Or click the button on the toolbar.

6. A window will now appear confirming the transfer of the Message File. Pressing "TRANSFER" begins the transfer process. As the Message File is transferred, the progress will be displayed in a window. By pressing "CANCEL", the operator can abort the transfer process at any time during the transfer.

Extracting a Message File from the Transporter

1. Click on "COMMUNICATIONS". From the menu, select "TRANSPORTER", then "EXTRACT". Or click the button on the toolbar.

2. Set the switches on the Transporter to PC extract Mode as shown, press the Start Switch, and Continue.
3. Select to Extract from either the Front address or the Rear address.
4. The "Extracting" window will open. Pressing "EXTRACT" begins the extraction process. As the Message File is extracted, the progress will be displayed in a window. By pressing "CANCEL", the operator can abort the extraction process at any time during the extraction.

5. At the end of the extraction, the Communications Information window will be displayed as confirmation.

Clearing the Transporter

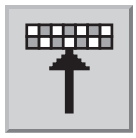
1. Set the switches on the Transporter to PC transfer Mode.
2. Press the Start Switch on the Transporter
3. Click on "COMMUNICATIONS". From the menu, select "TRANSPORTER", then "CLEAR".
4. You are given the option of clearing the Front, Rear and B-LINK programming from the Transporter.

***NOTE**: Clearing the Transporter will delete all Messenger programs stored within. Once the Transporter has been cleared, the message files cannot be retrieved from the transporter.*

Messenger Communications...

Transferring a Message File to the Messenger Display

1. Select the Message File which will be transferred to the Messenger.

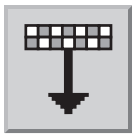


2. Click on "COMMUNICATIONS". From the menu, select "MESSENGER". Then "TRANSFER", or click the button on the toolbar.
3. Set the switches on the Transporter to Transparent Mode as shown, press the Start Switch, and Continue.
4. The "Transferring..." window will open. Pressing "TRANSFER" begins the transfer process. As the Message File is transferred, the progress will be displayed in a window. By pressing "CANCEL", the operator can abort the transfer process at any time during the transfer.

5. At the end of the transfer, the Communications Information window will be displayed as confirmation.

Extracting a Message File from the Messenger Display

1. Click on "COMMUNICATIONS". From the menu, select "MESSENGER", then "EXTRACT". Or click the button on the toolbar.
2. Set the switches on the Transporter to Transparent Mode as shown, press the Start Switch, and Continue.
3. If both a Rear and Front Messenger are connected, select to extract from either the Front address or the Rear address.



4. The “Extracting...” window will open. Pressing “EXTRACT” begins the extraction process. As the Message File is extracted, the progress will be displayed in a window. By pressing “CANCEL”, the operator can abort the extraction process at any time during the extraction.
5. At the end of the extraction, the communications information window will be displayed as confirmation.

Configuring the Messenger

1. Connect the communication cable of the Messenger to the Transporter.
2. Set the switches on the Transporter to Transparent Mode.
3. Press the Start Switch on the Transporter
4. Click on “COMMUNICATIONS”. From the menu, click on ‘MESSENGER”, then on “CONFIGURE”.
5. If you are certain that you wish to change the address of the Messenger, click on “OK”.

Messenger Control Head Simulator

1. Connect the communication cable of the Messenger to the Transporter.
2. Set the switches on the Transporter to Transparent Mode.

3. Press the Start Switch on the Transporter
4. Click on “COMMUNICATIONS”. From the menu, click on “MESSENGER”, then on “CONTROL HEAD” or Click on the “CONTROL HEAD” button on the toolbar:

Exercise X: Transferring 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 transferring 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 Transporter connected to the serial port on the host computer.
3. Click on the “COMMUNICATIONS” button to test the connection. If the connection is good a window will appear and read as follows:

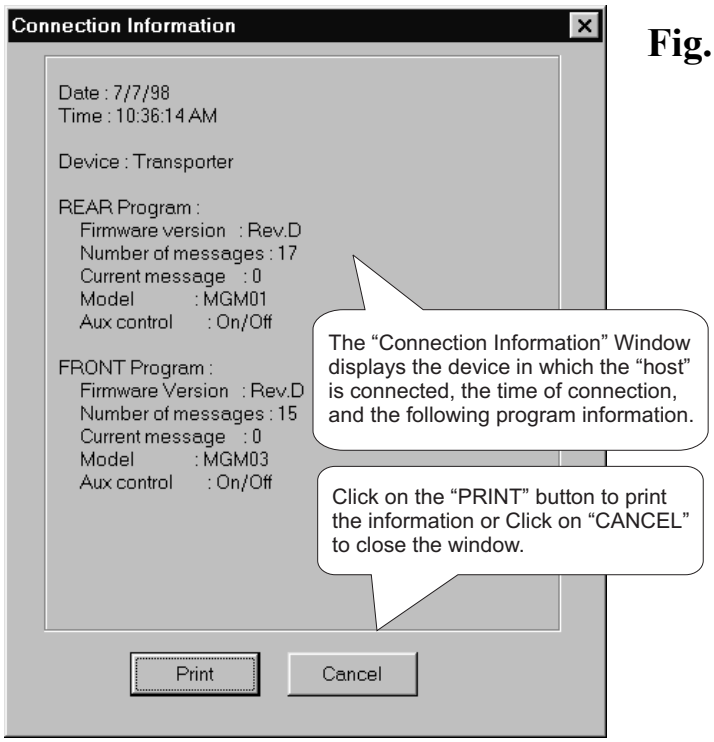


Fig. 22

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 "TRANSFER" button located on the button bar.
A window will now appear confirming the transfer of the Message File.

By pressing "CANCEL", the operator can abort the transfer process before any changes are made to the Message File currently loaded in the Messenger display. Pressing "OK" begins the transfer process. As the Message File is transferred, the progress will be displayed in a window.

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

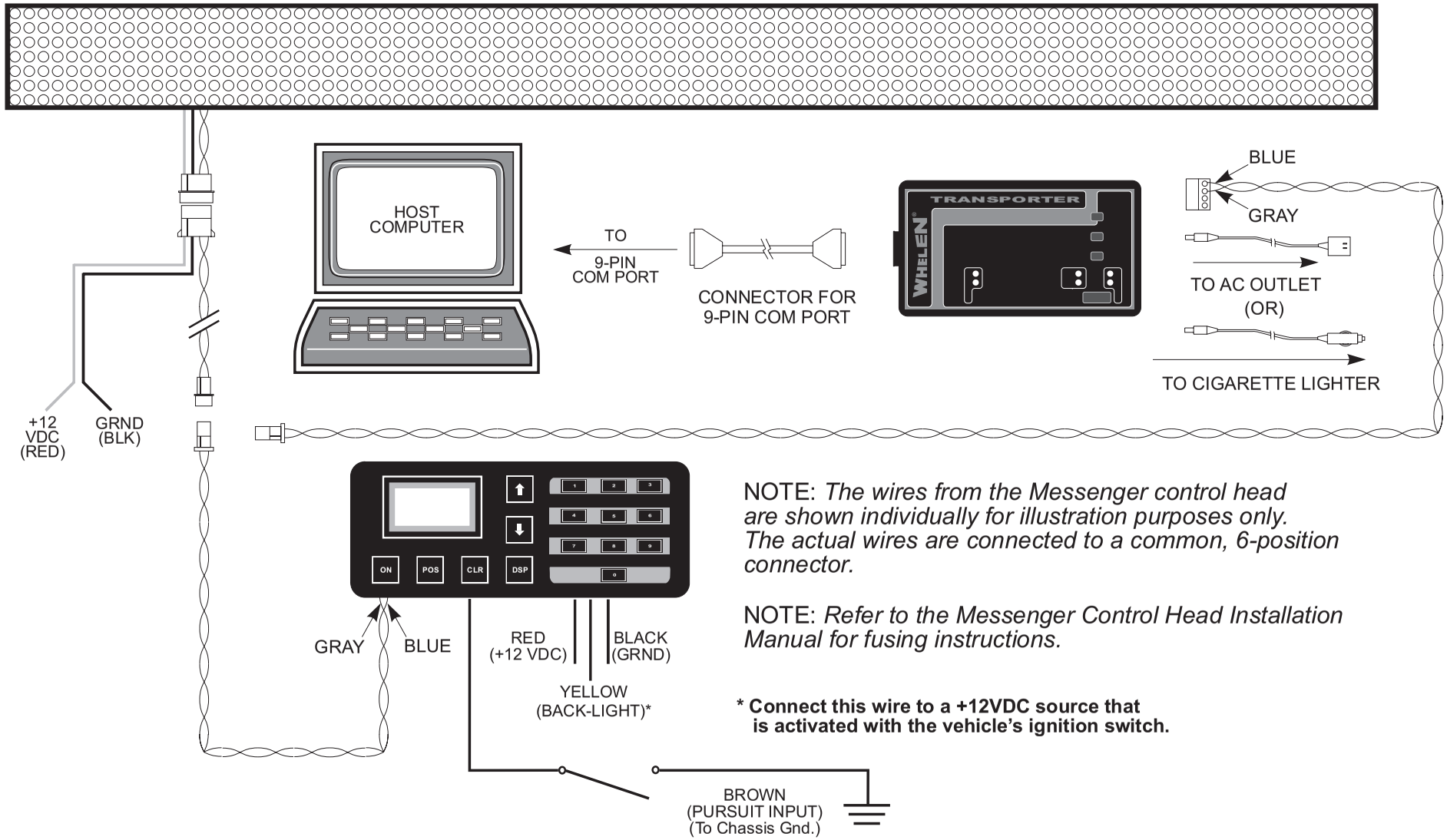
"I started the programming software and a window appeared telling me, "No Messenger Found". What's the problem?"

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 Transporter. Select "*Communications*" from the Setup menu. Select the proper Serial Port from the Serial Port Selection dialog.
- **Transporter is not powered -** The Transporter 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 Transporter. Tighten any loose connections.
- **Blue & Grey communication wires are reversed -** A common problem is that the communication wires are reversed somewhere between the Transporter and the Messenger Display. Refer to the Overview diagram on page 24 for proper communication wire connections.
- **MGC01/02 is still operating -** In order for the Host computer to communicate with the Messenger Display, the MGC01/02 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.

"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.*

NOTE: *Refer to the Messenger Control Head Installation Manual for fusing instructions.*

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