AMERICAN SIGNAL COMPANY

33x WebbExpress Series
x32 WebbExpress Series
Portable Changeable Message Signs

331 WX, 332 WX, 333 WX
232 WX, 432 WX, 465 WX

SOFTWARE OPERATIONS MANUAL
(LOCAL and REMOTE Control)

Downloadable Copy, Password Restricted

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I. REVISION INFORMATION

Rev	Date	Author	Description	Page
A	3-15-13	Chris Webb	Initial Release	-
B	6-11-13	Don Goulart	Added Appendix B Graphics	33-36
C	2-3-14	Rodney Wheat	Updated to reflect changes in firmware	All
D	12-3-15	Kyle Jackson	Added Sequences, Graphic Upload, Digibrite, Chromaview, and More Graphics to Appendix B, Added Appendix E	16,47-48,54-55,60-61

1.0 Introduction

Thank you for choosing Amsig WebbExpress, the successor to the AMSIG LEGACY Advantage sign controller (PCB-085-x).

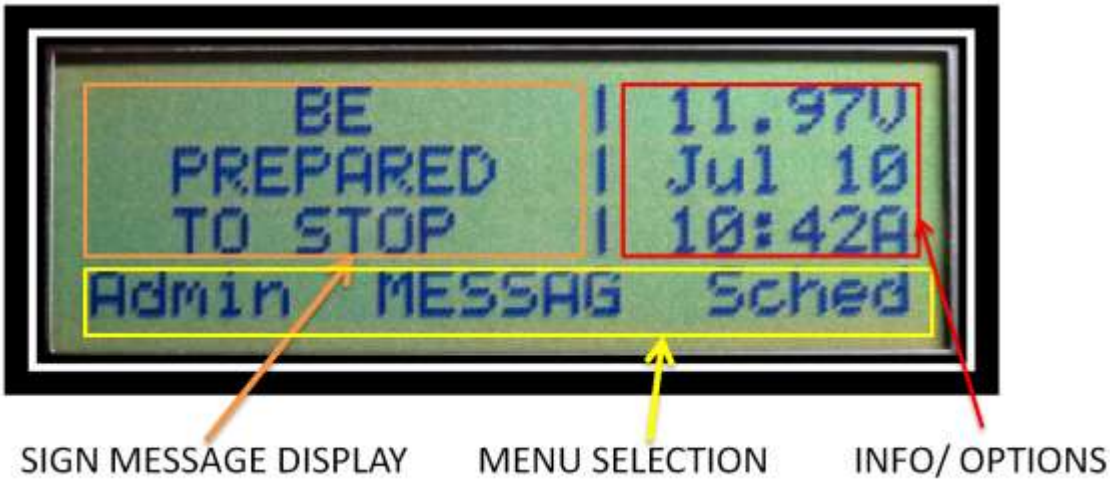
Those of you familiar with our LEGACY range of signs will recognize the Handheld Terminal (TER-105/ HHT). The TER-105 menus have been redesigned (at the controller) so any existing TER-105 can be used on the new WebbExpress.

Careful design and planning has resulted in an easier to use and more intuitive menu structure than ever before as this is due to the flexibility of the modern design tools used in the writing of the software.

This manual covers the use of the Handheld Terminal and the WEB interface portion of the sign. The WEB portion of the sign assumes there is a correctly configured IP modem or WIFI interface plugged into the Ethernet port of the WebbExpress Controller or a computer that is attached via either supplied Ethernet cable in pedestal or directly to the CPU.

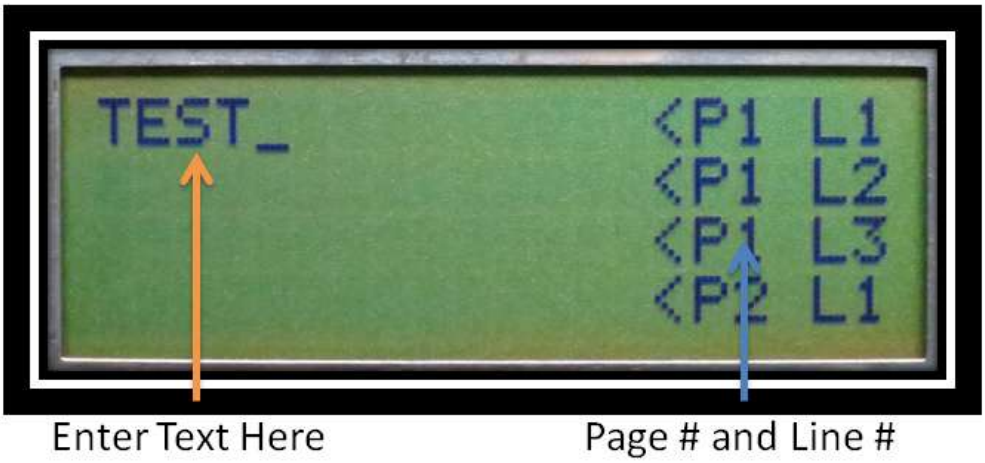
2.0 Hand-Held Terminal

The hand-held terminal enables the user to readily control and configure the sign system. The main hand-held terminal screen is comprised of 3 main areas: Message Display, Information/Options and Menu Selections.



Quick Edit Feature (To quickly put a message on the sign from the handheld)

- Press [Q] (Quick Edit) on the handheld from the Home screen or Message menu
- Type the password if/when asked (contact Amsig Service Department for password information) and press [Enter]
- At the Screen you will see P1 L1, which means, Page 1 Line 1. Type the required text and press [Enter] to go to the next line. A maximum of 3 pages can be entered using quick message
- Once all 3 lines have been entered (press [Enter] for blank lines) the message is automatically saved in the next CHANGEABLE message location, and ACTIVATED on the sign. Note the message will be formatted according to the default sign settings (i.e. Centered, Font 5x7, etc.)



2.1 Menu Navigation

Navigating through the hand-held terminal's menus is fairly straightforward. You will mainly use the arrow and Enter keys.

Moving left and right Highlights the menu Selection

Use the left [←] and right [→] arrow keys to change the menu selection. When navigating through the menu, the current selection is in the middle of the screen and designated by all UPPER CASE letters. Press the [Enter] key to input your selection.

Above is the Admin screen. Note the pointer on the right designating Accounts as the current selection.

Use the up [↑] and down [↓] arrow keys to scroll through the lists. The current selection is the 2nd item in the visible portion of the list and is typically designated by the following character: <

3.0 Message Menu

In the previous section we talked about editing a changeable message with the Quick Edit option. However, if the user requires more customization (such as flashing text, different font size) then the full featured Message menu must be used. From the Main menu select MESSAG and press [Enter].

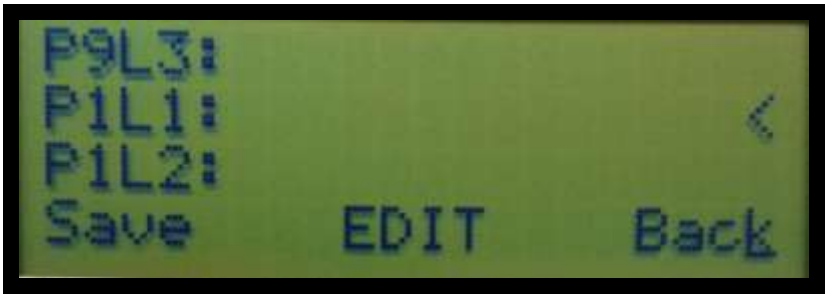
Above is the main Message menu. The following selections can be made:

- Changeable Messages: Create, edit and activate custom messages
- Permanent Messages: Activate pre-programmed system messages that consist of industry standard traffic messages such as, ACCIDENT AHEAD and animations, such as growing chevrons
- Quick Edit: The same as pressing [Q] from the main screen; see Section 2.0
- Radar Settings: Sets the speed thresholds used to activate specific messages (only valid when used with the optional radar hardware)
- Sequences: Allows for multiple existing messages to be displayed concurrently without re-creating them.

3.1 Changeable Messages Screen

The Changeable Messages screen allows you to create and edit messages for specific scenarios (traffic alert, crowd control, emergency notification, etc.). From the Messages menu scroll to Changeable Messages, select ENTER and press [Enter]. Or to add individual graphic messages see Appendix B for list of graphic messages

- When there are no changeable messages loaded, the hand-held displays “No Valid Messages”.
- To create a new message, select NEW on the bottom menu using the arrow keys and press [Enter].



- The hand held controller will automatically take you to the first available message location
- Using the up [↑] and down [↓] arrow keys select the Page/Line that needs to be edited. Select EDIT and press [Enter].

- Enter the desired text (NOTE: the hand held controller can only type upper case letters). Select DONE and press [Enter]. Scroll down to the next line if necessary.
- When the message is complete, select SAVE and press [Enter].

- To display a message, select the desired message location from the changeable message list using the up [↑] and down [↓] arrow keys. Select ACTIVE and press [Enter] (NOTE: The hand-held will only activate messages that are capable of fitting on the sign display).

- To delete a message, select the desired message location from the changeable message list using the up [↑] and down [↓] arrow keys. Select DELETE and press [Enter]. Select YES and press [Enter].

3.2 Permanent Messages Screen

The Permanent Messages screen allows you to activate pre-programmed system messages that consist of industry standard traffic messages. This allows you to rapidly deploy a sign and have it operating in a short amount of time. From the Messages menu scroll to Permanent Messages, select ENTER and press [Enter].

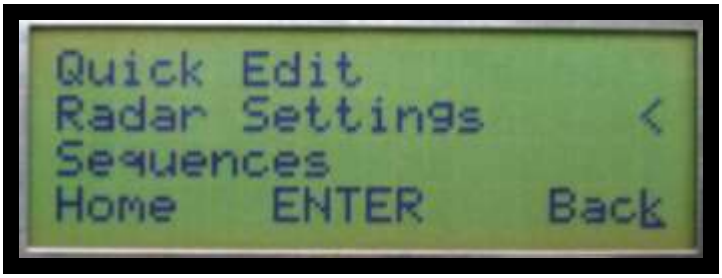
- Using the up [↑] and down [↓] arrow keys scroll through the list of messages and select the message to be displayed (Hold <shift> while pressing up and down to skip 25 messages at a time). Select ACTIVE and press [Enter]. The message has now been activated; press [Enter] to return to the list.

3.3 Quick Edit Screen

The Quick Edit screen is the same as pressing [Q] from the main screen. This allows you to quickly create a custom message for a given application. See Section 2.0 for further detail.

3.4 Radar Settings Screen

The Radar Settings screen allows the user to set speed thresholds and associate those thresholds with specific messages. This feature is useful in School zones, Work zones, Residential areas, etc. The radar unit is only powered up when a message requires speed data (this is to save power). If you do not have a radar unit connected to the sign, call American Signal Company to purchase one. From the Messages menu scroll to Radar Settings, select ENTER and press [Enter].



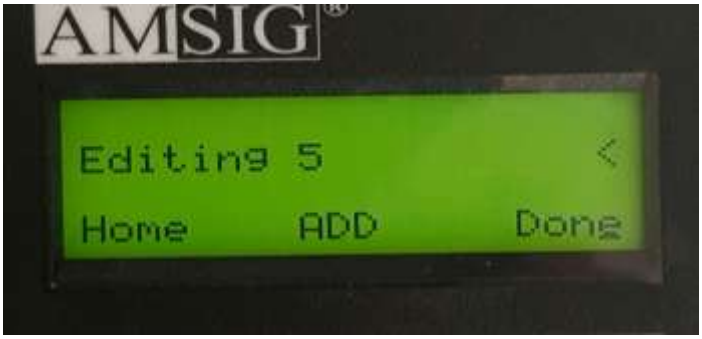
- From the Radar Settings menu use the up [↑] and down [↓] arrow keys to select the threshold to modify.
- Select the SPEED option and press [Enter]. Using the up [↑] and down [↓] arrow keys set the desired trigger speed and press [Enter]. **NOTE:** thresholds should increase in speed with the list number (i.e. threshold speed #1 should be lower than #2 and #2 should be lower than #3).
- Select the MESSAG option and press [Enter]. Using the up [↑] and down [↓] arrow keys scroll through the message list. When the desired message is found, choose the SELECT option and press [Enter].

NOTE: Speed information will not be displayed unless 1) the Radar is enabled (see Section 5.9), 2) one or more thresholds have been setup & activated, and 3) a Message requiring Radar data has been activated (see Section 10).

3.5 Sequences Screen

The sequence screen allows the user to set multiple changeable and/or permanent messages to display in a sequence. This function is useful for the user to choose from the messages already programmed instead of manually entering each message. From the Messages menu scroll to Sequences, select ENTER and press [Enter].

- In the sequences menu select ADD and press [Enter].



- Scroll and select desired message and press [Enter].
- Repeat this step until all desired messages have been selected.
- Added Sequences will be stored as new changeable messages.
- Once completed return to home screen, then select messages and press [Enter].
- Select Changeable Messages and press [Enter].

- Select the Sequence desired then select Active and press [Enter].

4.0 Status Screen

The Status screen provides useful information about the sign's configuration and operating parameters. From the Main menu select STATUS and press [Enter].

Above is the Status screen. The following information is provided here:

- Active Message: This item tells the user which message-is currently active
- Schedule: Indicates whether a schedule is active or not
- Battery: Battery bank voltage reading (voltage below 11.2 will result in default lookout)
- System Amps: Number of DC amperes being drawn by the system
- Charge Amps: Number of DC amperes being supplied by the Solar charging system
- Net Amps: Displays N/A; with Power Manager installed will display charge amperes minus system amperes
- AC Power: indicates whether there is power applied to charger
- Lux: ambient light level reading from the photo sensor
- Brightness: current control mode and brightness output of LED's
- Date: current controller date
- Time: current controller time
- Version: firmware version loaded on controller

5.0 Admin Menu

The Admin menu provides options for the configuration of system parameters. From the Main menu select ADMIN and press [Enter].

Above is the ADMIN menu. The following selections can be made here:
See Appendix A for the user level rights as they apply to making changes in the Admin Menu

- Accounts: Used to create and edit user accounts for the sign
- Brightness: Determines LED display brightness and mode
- Brightness Table : Specify brightness response scale
- Date: Set sign controller's date
- Locale: Set time zone, daylight savings and units
- Message Defaults: Set default fonts, page times, flash rates, justification, etc.
- Network Settings: Set controller IP address
- Radar Test: Used to test radar function
- Settings: Name sign, enable/set beacon sequence, enable radar
- Time: Set sign controller's time

5.1 Accounts

The Accounts screen allows you to see the default user/password combinations, and create up to 15 user accounts for the sign. The hand held terminal requires only a password to gain access. Therefore, it is important to use unique passwords. The user name is required for remote access and is covered in the WEB User Interface portion of the manual. The hand held is NOT case sensitive, so if the passwords are entered from the WEB User Interface in lower case, the password will still work. From the Admin menu select Accounts and press [Enter].

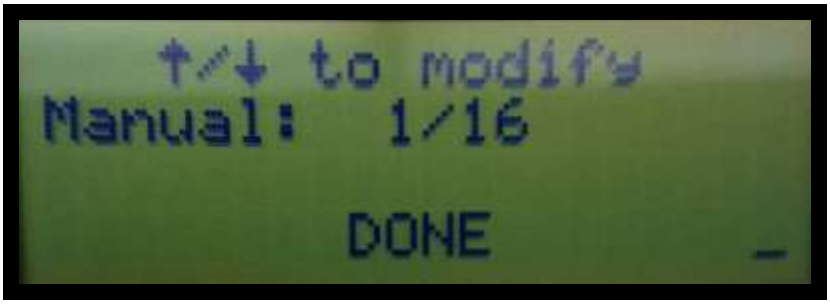
See Appendix A for the user level rights (ex. basic level user can't create a changeable message)

- On the Accounts screen, scroll up/down to access the desired user account/location; select ACCNT and press [Enter]. Type the desired user name and press [Enter].
- Select PASSW and press [Enter]. Type the desired password and press [Enter].
- Select LEVEL; press [Enter] to change the access rights. Continue pressing [Enter] until you have the correct level selected (None, Full, Extended, Basic).
- If you want to delete an account, scroll up/down to access the desired user account. Select CLEAR and press [Enter]. You cannot delete the account you are currently logged in under.
- If the trailer is accessible remotely, then it is important to change the default passwords. **NOTE**: if the default password is lost or forgotten, American Signal Technical Support can reset the defaults remotely. If remote access is unavailable, the sign controller will have to be returned for reprogramming to system defaults.

5.2 Brightness

The Brightness screen allows you to change the LED display's brightness and control mode. From the Admin menu select Brightness and press [Enter].

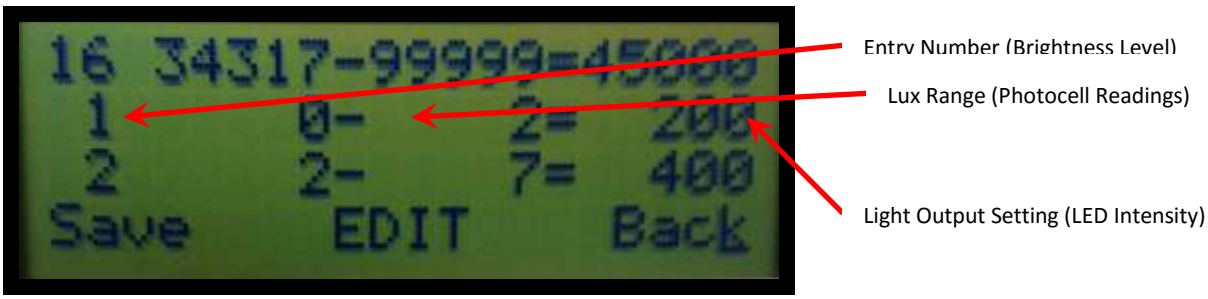
- On the Brightness screen, scroll up or down to the desired option; select EDIT and press [Enter].
- Pressing EDIT in the Mode option will toggle the brightness control mode between Automatic and Manual. In Automatic mode, which is the default mode, the sign brightness is determined by data from the photocell. In Manual mode the sign brightness is determined by the current brightness level setting (typically 1 of 16)



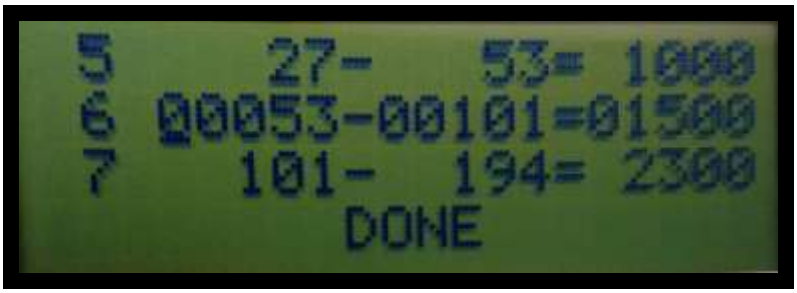
- Pressing EDIT on the Manual option will take you to the brightness level selection screen. Using the up [↑] and down [↓] arrow keys, scroll through the brightness levels (1-16) and press [Enter] on the desired level.
- **WARNING:** Power consumption may be adversely effected if the sign is left in Manual brightness mode for extended periods of time. Visibility and legibility of the sign display during various times of the day or night should also be taken into consideration when using Manual brightness (for example, full brightness at level 16 is unsafe to motorists during night time conditions). It is advised to leave the sign in Automatic mode.

5.3 Brightness Table

The Brightness Table screen allows you to change the controller's brightness curve, which defines the relationship between the photocell reading and the display brightness level (LED output). The sign controller has 16 default brightness levels built into the brightness table. The photocell input is heavily filtered to reject sudden changes in ambient light level readings such as car headlights. From the Admin menu select Brightness Table and press [Enter].



- On the Brightness Table screen, scroll up or down to the desired brightness table entry (this will be the middle entry as there is no room for the pointer); select EDIT and press [Enter].



- Enter all fifteen numbers for the brightness table entry as shown in the following:
  Level 2 2- 7= 400
  00002 000007 00400
  Then press [ENTER] to complete the changes for that entry.
- When the required changes to the entry or entries have been made, select SAVE and press [Enter] to save the changes to memory.

WARNING: Changing the Brightness Table factory settings is not recommended.

5.4 Date

The Date screen enables you to set the controller's full calendar to the correct month, date and year. This feature is important for scheduling messages. From the Admin menu, select Date and press [Enter].

- On the Date screen select SET and press [Enter] to change the controller's date.
- Enter the month, date and year as follows: MMDDYYYY; select SET and then press [Enter]. For example March 12 2013 would be entered as 03122013.

5.5 Locale

The Locale screen enables you to set the controller's time zone, enable/disable Daylight Savings, and select English or Metric units. From the Admin menu select Locale and press [Enter].

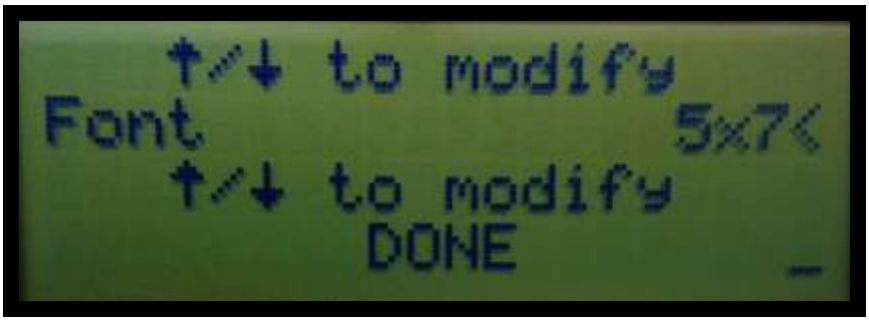
- On the Locale screen, scroll up or down to the desired option; select EDIT and press [Enter].
- Time Zone: select EDIT and press [Enter]. Using the up [↑] and down [↓] arrow keys, scroll through the, Offset/Time Zone (if applicable)/Country list to the desired option; select EDIT and press [Enter] to set. (Default is -5/Eastern/Peru).
- Daylight Savings: select EDIT and press [Enter]. The option will change between USA, Europe and none. (Default is USA).

- Units: select EDIT and press [Enter]. The option will toggle between US/Imperial (i.e. MPH) and Metric (i.e. KPH).

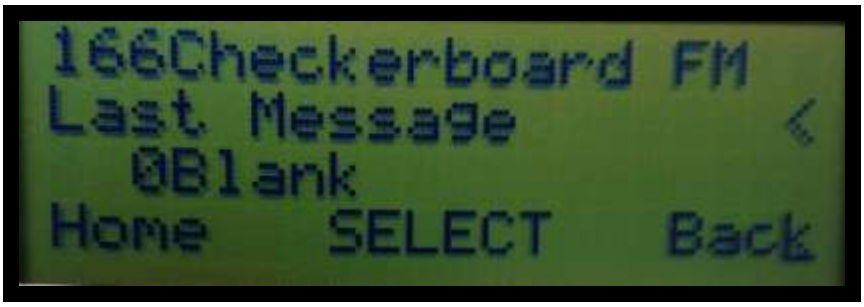
5.6 Message Defaults

The Message Defaults screen allows users to set default parameters that are associated with creating and displaying Changeable messages. The Message Defaults settings apply to all Permanent messages. However, they may be overridden on a message-by-message basis for Changeable messages (see Section 10). From the Admin menu select Message Defaults and press [Enter].

- On the Message Defaults screen, scroll up or down to the desired option; select EDIT and press [Enter].
- Page On Time determines how long each page, in a multiple page message, is displayed on the sign face. Select EDIT and press [Enter]; use the up [↑] and down [↓] arrow keys to set the On Time and press [Enter].
- Page Off Time determines the length of time between each page being displayed on the sign face, in a multiple page message. Select EDIT and press [Enter]; use the up [↑] and down [↓] arrow keys to set the Off Time and press [Enter].
- Flash On Time determines the length of time in which text and/or graphics are displayed on the sign face when flashing is enabled. Select EDIT and press [Enter]; use the up [↑] and down [↓] arrow keys to set the On Time and press [Enter].
- Flash Off Time determines the length of time in which text and/or graphics are NOT displayed on the sign face when flashing is enabled. Select EDIT and press [Enter]; use the up [↑] and down [↓] arrow keys to set the Off Time and press [Enter].
- Arrow Speed determines the rate at which an arrow graphic will scroll across the sign face (i.e. 1 board per 0.1 s). Select EDIT and press [Enter]; use the up [↑] and down [↓] arrow keys to set the time and press [Enter].



- Font allows the user to select different size fonts that are compatible with the sign configuration. Select EDIT and press [Enter]; use the up [↑] and down [↓] arrow keys to scroll through the options. Press [Enter] to select. Font names refer to the LED pixel layout of each character, so the 5x7 font creates a character that is 5 pixels wide and 7 pixels high. Refer to Appendix E for more information on available fonts for your model sign.
- Horizontal Alignment (Horiz Align) is similar to line justification, in that it determines whether text appears in the Center, Left or Right of the display. Select EDIT and press [Enter]; use the up [↑] and down [↓] arrow keys to scroll through the options. Press [Enter] to select.
- Vertical Alignment (Vert Align) is similar to page justification, in that it determines whether text appears in the Middle, Top or Bottom of the display. Select EDIT and press [Enter]; use the up [↑] and down [↓] arrow keys to scroll through the options. Press [Enter] to select.



- Startup Message is the message that will be displayed on the sign face after a controller reset or a power cycle/recovery (i.e. the sign is powered up). Select EDIT and press [Enter]; use the up [↑] and down [↓] arrow keys to scroll through the messages. Highlight SELECT and press [Enter].
- Units determine whether the sign will display MPH or KPH. Select EDIT and press [Enter]. The option will toggle between US/Imperial (i.e. MPH) and Metric (i.e. KPH).
- General Purpose Input/Output (GPIO msg1-3; msg4 not supported at present) is used for the contact closure option. The contact closure option utilizes three terminals (J8) on the controller. A signal from an external sensor (i.e. over-height, temperature, etc.) triggers an override message to be displayed on the sign face. Choose GPIO msg 1-3, select EDIT and press [Enter]; use the up [↑] and down [↓] arrow keys to scroll through the available messages. Highlight SELECT and press [Enter]. Upon a received trigger signal, the associated message will be displayed. For more information regarding this option, please contact American Signal Company.

5.7 Network Settings

The Network Settings screen allows users to configure LAN settings for the controller. These settings are necessary to communicate with the sign via a cellular connection or local network. From the Admin menu select Network Settings and press [Enter].

- On the Network Settings screen you can modify the controller's Gateway (GW) address, IP address and Network Mask (NM). Scroll up or down to the desired option; select EDIT and press [Enter].
- In order to edit an address, select EDIT and press [Enter]. Type the desired number(s) at the cursor and press [Enter]. Select SAVE and press [Enter].
- NOTE: The following are the default Network Settings for the controller:
  GW 192.168.1.1
  IP 192.168.1.199:80
  NM 255.255.255.0
- **NOTE:** It is advisable to change the default incoming port from 80 (which is normal http) to another port (ex. 8080) for added security. In your cellular modem/gateway you will create a port forwarding rule similar to the following: outside port (8080) ==> IP address 192.168.1.199 inside port (80).

5.8 Radar Test

The Radar Test screen is used to test the functional state of the radar unit when the radar option has been installed. The radar is automatically powered up during testing, and the speed information is displayed on the hand-held. From the Admin menu select Radar Test and press [Enter].

- Using the appropriate tuning fork (supplied with radar option) test the radar unit and ensure that the correct speed is displayed on the hand-held (moving the fork away or towards the unit may result in slightly decreased or increased readings, respectively).
- During this testing process the tuning fork's speed will only display on the handheld terminal, not on the sign display itself.
- After testing has been completed press [Enter] to exit the test function.

5.9 Settings

The Settings screen allows users to enable sign accessories (when installed) and name the sign for easy identification, particularly in a fleet-type application. From the Admin menu select Settings and press [Enter].

- On the Settings screen, scroll up or down to the desired option; select EDIT.
- The Radar option enables the radar so that it can be "powered-up" when speed data is required by a message. Press [Enter].
- The Name option allows the user to assign a descriptive name to the sign. This is very helpful if the sign has remote communications ability. The name could be used to describe the sign's location or purpose (i.e. Highway 141 N Exit 10 or Rear Access Control). Press [Enter], type the desired name, and press [Enter] again.
- In addition to enabling the beacon(s) for associated messages, the Beacon option determines the type of flash pattern the beacons will display (Sync, Alt, Strobe, etc.). Press [Enter] until you see the appropriate selection.
- **NOTE:** the associated option must be installed for the option to take effect.

5.10 Time

The Time screen enables you to set the controller's real time clock. From the Admin menu, select Time and press [Enter].

- Enter the time in military format using all six digits. For example, 2:30:00 P.M. would be 143000, and 6:14:30 A.M. would be 061430. Highlight SET and press [Enter].

6.0 Web User Interface

This section of the manual explains the remote control capabilities of the sign controller. No additional software is required, just any device that is capable of browsing the internet. However, only Mozilla Firefox and Google Chrome internet browsers are supported at this time. These browsers provide rich functionality to the rendering of the web pages.

Please see Section 5.7 (Network Settings) to configure your device for network and Internet communications. You may also need to refer to your modem manual for further information.

7.0 Main Web Page

The main web page contains all the pertinent information about the sign (i.e. battery voltage, temperature, message displayed, etc.).

To access the main webpage, open up the web browser and type the IP address of the sign. The internal IP address of the WebbExpress is preconfigured to, http://192.168.1.199:80.

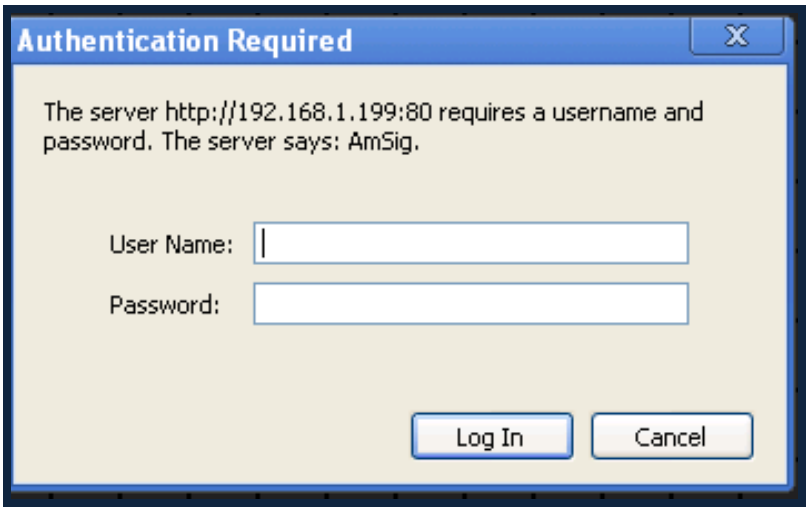
To set up port forwarding please consult the service manual for your cellular modem. It is advised that the internet web page be placed on a port other than port 80 (for example http://192.168.1.199:8080) for security reasons (i.e. hackers scanning for commonly open ports).

8.0 Displaying Messages

From the Main page click on the Messages button (you may need to log in if you haven't already). The default user names and passwords are as follow (contact Amsig Service Department for password information):

USER NAME	PASSWORD	LEVEL OF ACCESS
		BASIC (lowest)
		EXTENDED (most common)
		FULL (highest)

The default user names and passwords are not case-sensitive. It's recommended that these be changed for security purposes if your device is on a public network. For security purposes it is recommended that you don't allow browser to save login info.



- Click on the Messages button at the bottom left of the page.
- Click on the drop down menu to see the list of available messages; Permanent messages are listed first, then any available Changeable messages.
- Click on the desired message to preview it on the web page's WYSIWYG (What You See Is What You Get). The message is **NOT** displayed on the sign yet.
- To display the message on the sign face you must activate the message. Click on the Activate button at the bottom left of the page.
- If the message has been successfully activated, you will see a green confirmation message in the status pane on the right side of the web page.

9.0 Creating Simple Messages

To create a message click on the Messages button from the Main page and select a Changeable message location (1-200) from the drop-down menu. Click on the Edit button at the lower left side of the screen. The following window will appear:

To create and edit content for the selected message location, click on the Pages button, which will take you the window shown below. Select the line where you would like to enter text and start typing your message.

NOTE: The WebbExpress' default formatting options are:

- Center Text on Line (Horizontal Alignment)
- Center Text in middle of Page (Vertical Alignment)
- Default Font is 5X7

- If a second page (or more) is required, select the New >> tab and enter the text.

- If you need to return to previous pages, press the << Prev button and make the necessary changes.
- If you no longer want to edit or finish the message, press the Cancel button.
- Once complete click on the Save button and this will take you back to the previous window (Edit Changeable #).
- Click on the Save button which will take you back to the Messages window.
- **NOTE:** If you don't see a rendered message on the WYSIWYG (too many letters on a line, etc.), make changes until you can save the message and see a rendered preview. You will get an invalid message warning in the status column on the left if the message is incorrectly formatted.
- If you want to display the message on the sign you must click the Activate button.

10.0 Advanced Message Editing & Formatting

If a Font or Justification other than the default is required, the Advanced button, on the Edit pop-up window, should be selected when creating the message.

NTCIP-compliant signs use mark-up tags (case insensitive) between square brackets; for example **[NL]** and **[nl]** both mean new line.

The mark-up tags are not easy to remember, however, you will become familiar with them as you use the editor. The use of mark-up tags has been made easier by providing drop down menus to create the tags for you.

- For example, [FL]HELLO[/FL] would flash the message HELLO at the defualt flash rate. To create this message, simply click Flash on the Advanced edit pop-up and then type HELLO between the tags.
- When you specify a font, that font will be applied to the whole message including subsequently created pages. If you need to change the font during a message simply click on the font drop down and select the appropriate font. To display the above example, HELLO, in font number 6 (to do this click on the 7x7W font) you will see that the browser creates a [F06] tag. Then if you click on flash it puts the cursor between **[FL] [/FL]** the /FL tells the sign to stop flashing after the text you entered.
- **STOPPED[NL][FO2]EMERGENCY** would create a message with the default font (5x7) in this case , then after the word stopped we clicked on New Line, which creates the tag, [NL]. Then we would need to fit the word **EMERGENCY** on the next line, so we would imediately change the font to a smaller type such as 4X7. Cick on the drop down menu and select 4x7 which creates the tag [F02] which is font 2.
- In the case of a formatting error the sign will not allow you to activate the message, and it will indicate the error location by giving a cursor possition #.

The user can refer to WWW.NTCIP.ORG to learn more about formatting messages using markup language for transportation information (MULTI), SECTION 1203 for object definitons of dynamic message signs.

11.0 Message Defaults

- The System Defaults formatting options affect all messages, including permanent messages. To access this menu click on Admin from the main page, then click the System Defaults button.

- Above is the system defaults screen
- Default Page On / Off times can be set
- Flashing rates for Text
- Arrow scroll rates for moving chevrons.
- Default Font (reference Appendix E for more information on available fonts)
- Default Alignment
- Units of measure
- Power-Up message you can choose any message you want the sign to display upon being powered on, such as LAST displayed, blank or any other message)
- GPIO- see Section 11.1

After you change the desired option using the associated drop-down list, you must hit the Save button to retain your modifications.

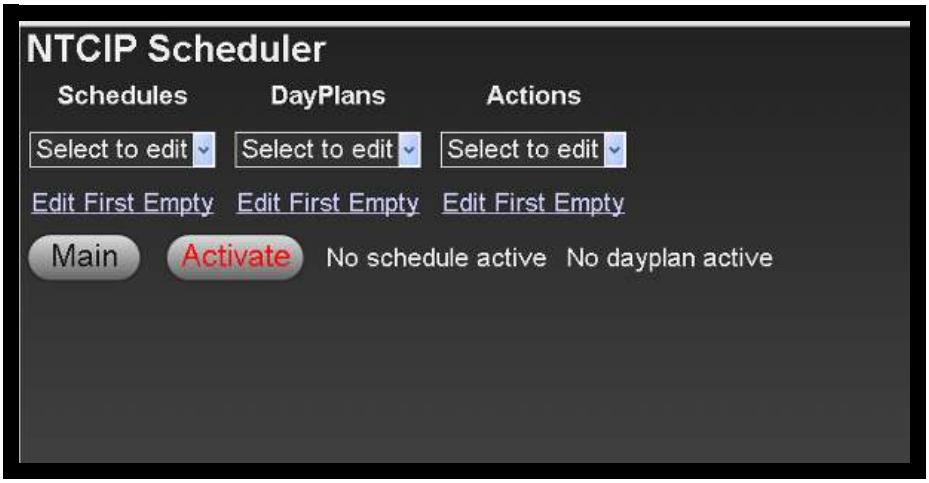
11.1 GPIO (General Purpose Input/Output)

The WebbExpress is equipped with 3 inputs and 4 outputs. The 3 inputs can be triggered to activate any properly configured message, based on the status of the corresponding input. The inputs MUST be tied to a DRY contact closure (0V) and are Active Low (Ground). There is a maximum input voltage of 5V on these terminals, which is provided through internal pull-up resistors. Failure to adhere to this will result in permanent damage to the CPU. The outputs are reserved for future use.

- From the example above you can see that Input 1 would trigger permanent message #2. The message will be activated for the entire time the input is held low.
- Input 1 has the highest priority. Therefore, if Input 2 was held low at the same time as Input 1, permanent message #2 (from example above) would be active. If Input 1 was then cleared (opened), message #3 (from example above) would be active. The same rule applies for Input 3.
- When all the Inputs are cleared, the sign will display the last message before the Inputs were triggered.

12.0 Scheduling Messages

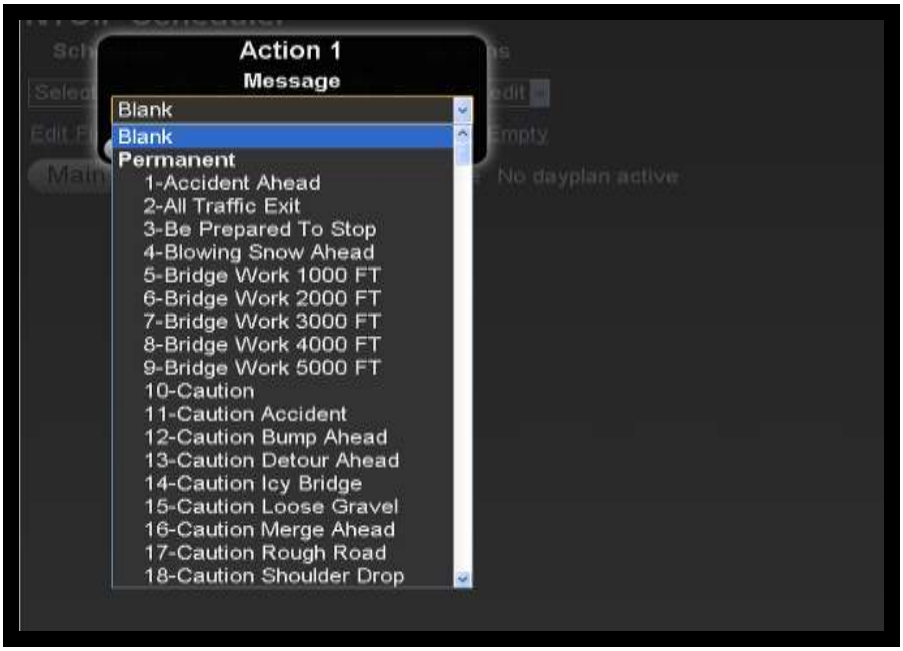
The sign comes with the ability to create custom message display schedules to account for various activities throughout the day, week, month or year. This schedule can be used to accommodate Holidays, Special Events, Weekends and other changes to standard work schedules. To access the scheduler, from the Main page press the Scheduler button.



NOTE: If you want to display a custom message during the schedule, be sure to create that changeable message first before proceeding.

- Decide which messages (changeable and/or permanent) you would like to utilize in your Day Plan (you can view the list on the Messages Page).
- Click on the Actions drop down list and select a number.

- Click on the Action # drop down list and select a message.

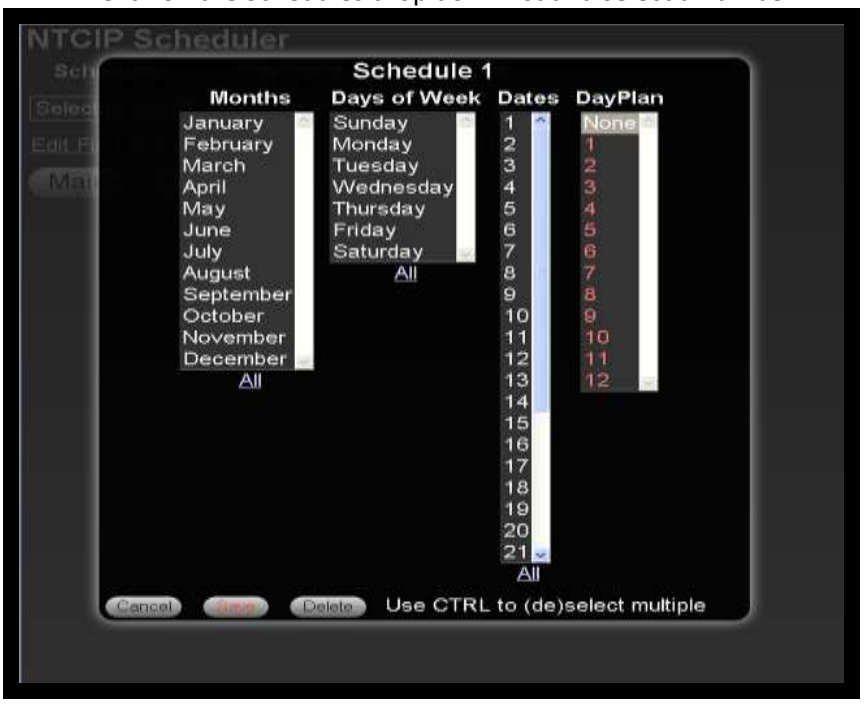


- When you have selected the message to be used, click on the Save button to store the message in this location.
- Repeat the previous three steps as many times as necessary (max. is 100).
- Click on the Day Plans drop down list and select a number.

- When you have selected the Day Plan number, use the drop down lists to select the start times for each Action (message activation) you would like performed. **NOTE:** If you would like to clear the display at a set time, your last Action must be a Blank message. It is recommended you use a BLANK action between each message you want to activate, especially if the messages contain potentially confusing or contradictory information. For example, if you are displaying "RIGHT LANE CLOSED" for a certain time, and then want to display "LEFT LANE CLOSED", you will want

to have the sign be blank for a short time so approaching motorists do not see conflicting information.

- When your Day Plan is complete, click on the  button to store the plan.
- Repeat the previous three steps as many times as necessary (max. is 12).
- Click on the Schedules drop down list and select a number.

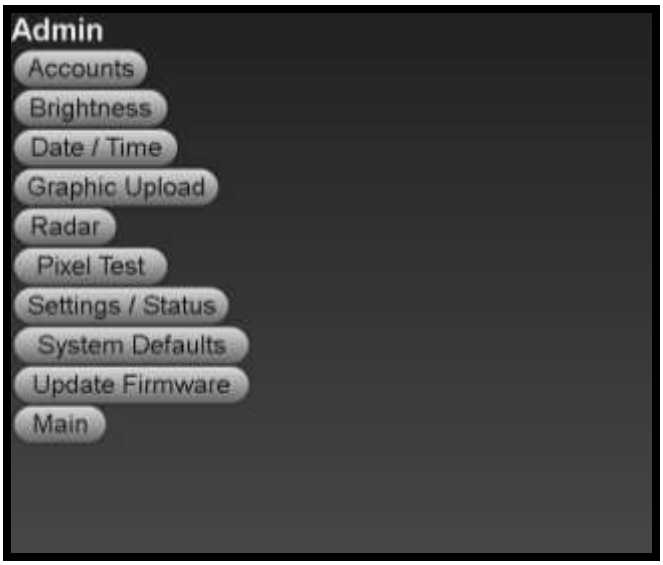


- Select the Months, Days of the Week and Dates you would like the Day Plan to run. If you would like the entire year, click on All under each list.
- Select the Day Plan you would like to use for this schedule.
- Click on the Save button to store the Schedule.
- Repeat the previous four steps as many times as necessary (max. is 32).
- When the Schedule(s) have been completed, you must click on the button (which should be Green) on the Scheduler page. All saved Schedules will now be activated. Any Schedule with true conditions (based on Calendar & Clock settings) will run. If more than one Schedule has true conditions, then the Schedule with the highest priority will take precedence. Precedence is determined by list position, therefore, Schedule 1 has the highest priority and Schedule 32 has the lowest.

NOTE: Any manual message activation will stop the Scheduler automatically. In order for the scheduler to run you must re-activate it by going to the Scheduler page and clicking on the button.

13.0 Admin Page

The Admin page provides options for the configuration of system parameters. From the Main web page press the Admin button. Main



Above is the Admin page. The following selections can be made from here:

- Accounts: Manage user accounts
- Brightness: Set brightness levels and modes
- Date / Time: Set sign controller's date & time
- Graphic Upload: Upload custom graphics files
- Radar: Used to trigger speeds
- Pixel Test: Test pixel operation
- Settings / Status: Name sign, enable beacon / radar, view system parameters
- System Defaults: Set default message parameters & GPIO
- Update Firmware: Load new firmware

13.1 Accounts – Users, Passwords & Levels

The WebbExpress allows you to create and manage 15 unique user Accounts. A user name and password is required for access through the WEB User Interface. As mentioned previously, the hand-held terminal requires only a password to gain access. Therefore, it is important to use unique passwords. Usernames and passwords are NOT case sensitive. From the Admin page select the Accounts button.

- **FULL** account rights is the top level, this allows the editing and creating of password and all other sign functions.
- **EXTENDED** account allows all other sign functions with the exception of assigning passwords.
- **Basic** account will only let the user activate a message.

If the trailer is accessible remotely, then it is important to change the default passwords for added security.

See Appendix A for the user level rights (ex. basic level user can't create a changeable message)

WARNING: Caution should be taken while editing passwords as it is possible to edit FULL account settings. Ensure care is taken to type the password correctly as it is possible to be locked out of the sign. If the default password is lost or forgotten, American Signal Technical Support can reset the defaults remotely. If remote access is unavailable, the sign controller will have to be returned for reprogramming to system defaults.

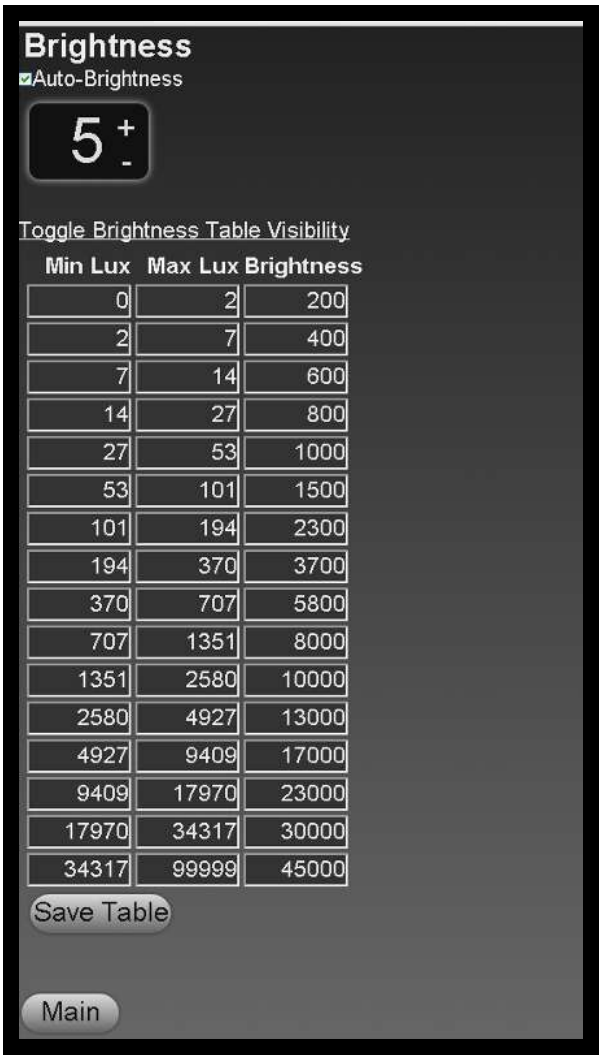
13.2 Brightness Settings

The Brightness page allows the user to change the brightness control mode and make adjustments to the brightness curve. From the Admin page select the Brightness button.

In Automatic mode, which is the default mode, the sign brightness is determined by data from the photocell. In Manual mode the sign brightness is determined by the current brightness level setting (typically 1 of 16). When the box next to Auto-Brightness is checked, that means the display brightness is being controlled automatically. When the box is unchecked, the display will operate at whatever brightness level is selected. To change the selection, click on the + or -, which will increase or decrease the brightness level, respectively.

WARNING: Power consumption may be adversely effected if the sign is left in Manual brightness mode for extended periods of time. Visibility and legibility of the sign display during various times of the day or night should also be taken into consideration when using Manual brightness (for example, full brightness at level 16 is unsafe to motorists during night time conditions). It is advised to leave the sign in Automatic mode.

To view or edit the Brightness table, click on Toggle Brightness Table Visibility. The Brightness Table screen allows you to change the controller's brightness curve, which defines the relationship between the photocell reading and the display brightness level (LED output).



- Click in the cell you would like to edit and enter the appropriate value.
- When your changes have been completed, click on the Save Table button.

13.3 Date & Time Settings

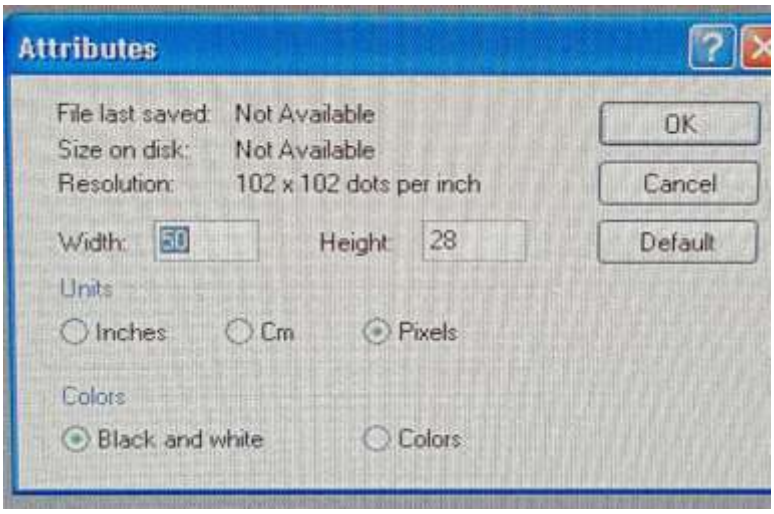
The Date / Time page is where you can set time, date and daylight savings information for the sign. From the Admin page select the Date / Time button.

- Use the drop down lists to select the correct options. Click the Save button when finished.
- Click the Sync and Save button to sync the controller's time & date with the computers. You will still need to set the Time Zone and Daylight savings.

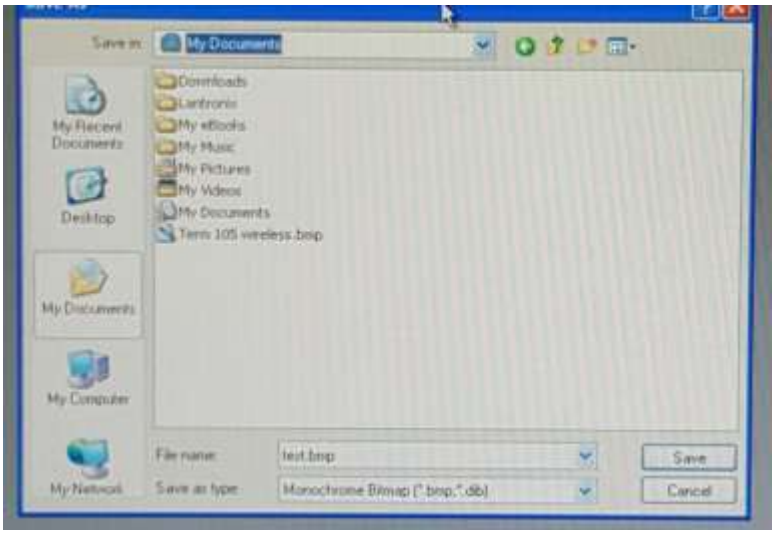
13.4 Graphics Upload

Full-matrix signs (i.e. 333, 232, 465, and 432) have the ability to display custom graphics. This function is not supported on the handheld. It must be done from the webpage. Graphics must be created in an outside program. For this example the graphic will be created in MS Paint (suggested method).

- Open paint and click the <Image> tab at the top
- Select <Attributes>
    - Change width and height to the pixel dimensions of the sign you will be uploading to.
    - Change units to <Pixels>
    - Change colors to <Black and White>
    - Click ok



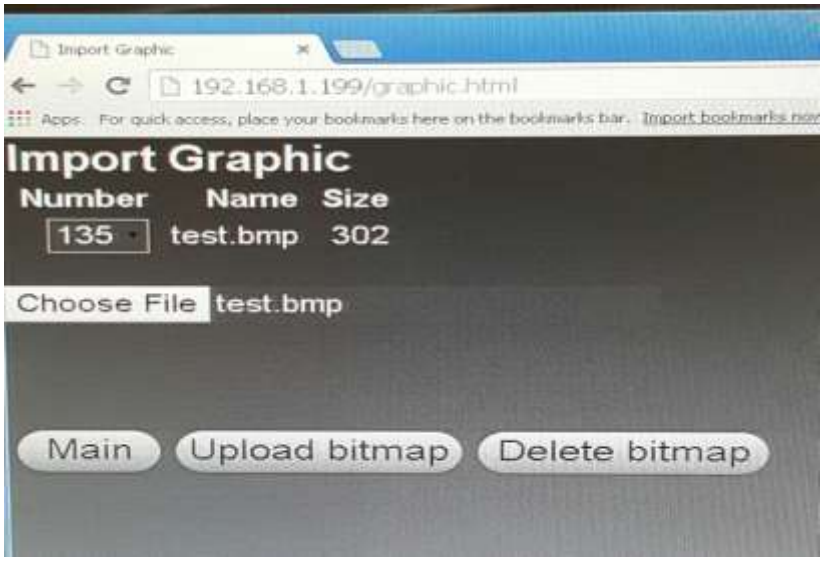
- Create image by clicking pixels to highlight them (zoom in if necessary)
- Once the graphic is finished select <File> then select <Save>.
- The file must be saved as a .BMP. Select monochrome BMP if not already selected.



IMPORT IMAGE

In order to upload a graphic it must be done from the WebbEx webpage

- Select <Admin>
- Select <Graphic Uploader>
- Use the drop down list to select the graphic storage location.
- Select <Choose File> and select a properly formatted bitmap file. **NOTE:** the bitmap file must be Monochrome and no larger than 500 bytes.
- When you have selected an appropriate file, click on the Upload Bitmap button.



- To display your graphic, you will have to add it to a changeable message and then activate that message.
- User generated graphics will not appear in the Graphics drop down list. You must use a Markup tag to add the graphic to the changeable message. The tag will have the following format:

[G###], where ### is the number of the graphic storage location. So a tag for a graphic stored in message location 135 would be [G135].

13.5 Radar Settings

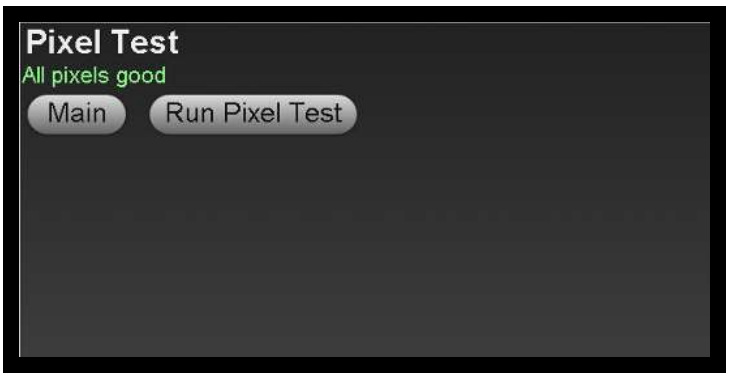
The Radar page lets the user set speed thresholds and associate those thresholds with specific messages. If you do not have a radar unit connected to the sign, call American Signal Company to purchase one. From the Admin page select the Radar button.

- Use the drop down list to select the desired trigger speed. **NOTE:** thresholds should increase in speed with the list number (i.e. threshold speed #1 should be lower than #2 and #2 should be lower than #3).
- Select the message you would like to have associated with the trigger speed.
- When you have completed your changes click the Save button.

NOTE: Speed information will not be displayed unless 1) the Radar is enabled (see Section 13.7), 2) one or more thresholds have been setup & activated, and 3) a Message requiring Radar data has been activated (see Section 10).

13.6 Pixel Test

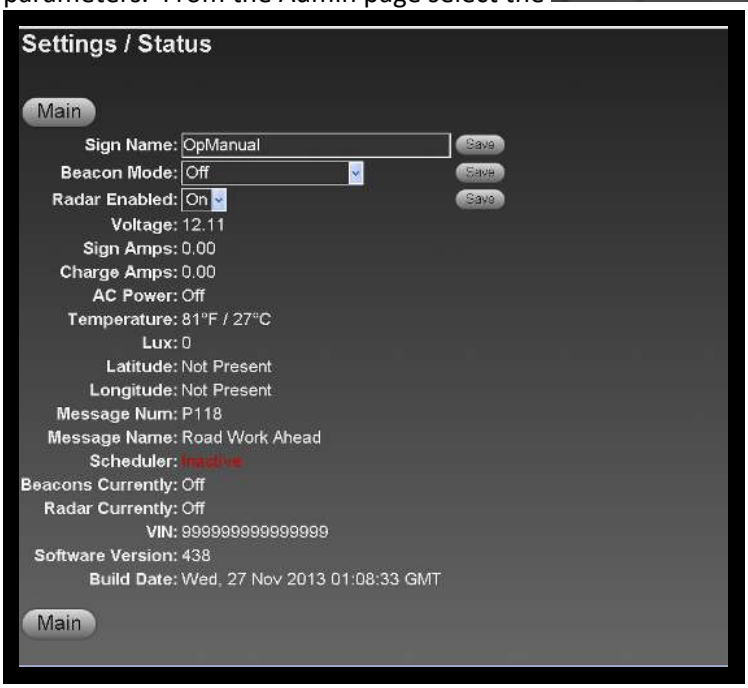
The Pixel Test page enables the user to do a functionality test on all of the display pixels and see visual results on the Main web page. From the Admin page select the Pixel Test button.



- Please note that a pixel test typically takes approximately 5 minutes. The sign will not be capable of displaying a message during the test.
- Click on the Run Pixel Test button to begin the test. **NOTE:** a pixel test can only be performed when the photocell is reading an ambient light level of 500 Lux or greater to prevent visual impairment of motorist.
- If you receive a message indicating failed pixels, return to the Main page to see a visual representation of the failed pixel locations (highlighted in magenta).

13.7 Sign Settings & Status

The Settings & Status page is where you will find useful information about the sign's operating parameters. From the Admin page select the Settings / Status button.



The following information and settings are provided here:

- Sign Name: Select area and give a descriptive name to the sign. Click Save to retain.
- Beacon Mode: Use drop down list to select flash type. Click Save to retain changes.
- Radar Enabled: Use drop down list to enable the Radar. Click Save to retain.
- Voltage: Current battery bank voltage reading. (Voltage below 11.2 will result in default lookout)
- Sign Amps: Number of DC amperes being drawn by the system
- Charge Amps: Number of DC amperes being stored by the battery bank
- AC Power: indicates if sign is connected to 120Vac
- Temperature: Controller's temperature sensor reading
- Lux: Ambient light level reading from the photo sensor
- Latitude: Current position of sign (if GPS installed)
- Longitude: Current position of sign (if GPS installed)
- Message Num: Number of current active message
- Message Name: Name of current active message
- Scheduler: Indicates whether a schedule is active or not.
- Beacons Currently: Indicates if Beacons are currently active
- Radar Currently: Indicates if Radar is currently active
- VIN: Trailers vehicle identification number

- Software Version: Firmware version loaded on controller
- Build Date: Date firmware file was compiled

13.8 System Defaults

The System Defaults page allows you to select universal message formatting options. To access this menu from the Admin page, select the System Defaults button. See Section 11.0 for details.

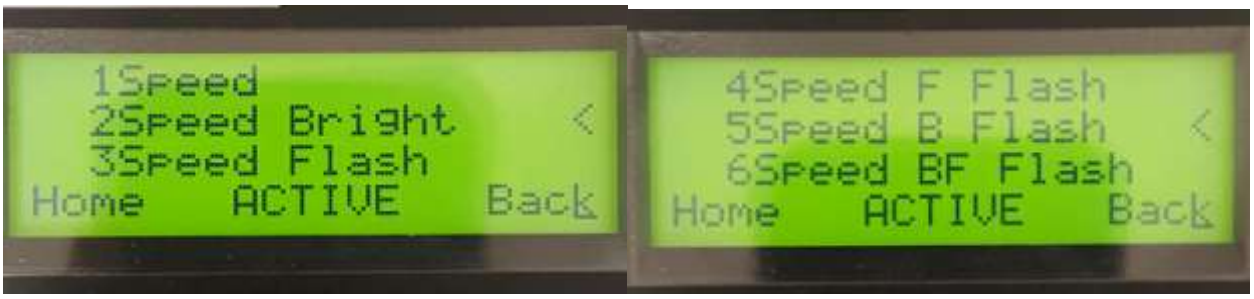
13.9 Firmware Updates

The Update Firmware page can be used to load periodic firmware updates to the controller. From the Admin page select the Update Firmware button.

- Click on Choose File and select the appropriate BIN file.
- When you have selected the file, click on the Start Update button.
- A status bar will appear and after the file has been saved the system will reboot and you will get a Success message.
- If you believe you need a new firmware version please contact American Signal's Service Department (Appendix D).

14.0 CMS-131 DIGIBRITE (SPEED SIGN)

The speed sign offers 6 different message options. At the main menu use the left [←] and right [→] arrows to select [Messages] and press [Enter]. Once inside the Messages menu use the up [↑] and down [↓] arrows to select [Permanent Messages] and select [Enter] using the left [←] and right [→] arrows. Inside the Permanent Messages menu you will see the six available options.



Options are as follows.

1. **Speed** is a continuous display either showing [0] if the radar does not detect anything or a speed reading for whatever the radar detects (This option uses the photocell for determining brightness).
2. **Speed Bright** is a continuous display either showing [0] if the radar does not detect anything or a speed reading for whatever the radar detects (This option is always displayed at max brightness).
3. **Speed Flash** is a speed display that is flashing with a 2 second off cycle (This option uses the photocell for determining brightness).
4. **Speed F Flash** is a speed display that is flashing with a 1 second off cycle (This option uses the photocell for determining brightness).
5. **Speed B Flash** is a speed display that is flashing with a 2 second off cycle (This option is always displayed at max brightness).
6. **Speed BF Flash** is a speed display that is flashing with a 1 second off cycle (This option is always displayed at max brightness).

Use the up [↑] and down [↓] arrows to select the desired message option. Once selected use the left [←] and right [→] arrows to select [Activate] and press Enter.

15.0 CHROMAVIEW

The Chromaview allows the user to choose from three different colors (red, white, amber) for text and graphic displays. In order to change the colors it must be done from the webpage. Once you have logged into your sign click on [Messages]. Then click on the drop down box in the upper left hand corner and scroll until you get to the changeable messages section and select which changeable message you would like to edit. Once selected click [Edit]. Then click [Advanced] on the task bar that pops up.

Now your changeable message screen will appear. To change colors you must first select the color before entering your text. If you would like to have multiple lines with multiple colors you must select the color then enter your text. For the next line click [New Line], select your color and enter your text. You must click [Save] and then [Activate] to display your message.

APPENDIX A USER ACCESS RIGHTS

	Activate Message	Edit/Create Changeable Message	Scheduler Functions	User account settings	Bright Settings	Time and Date	Radar Settings	Settings Menu	UPDATE FIRMWARE
FULL	YES	YES	YES	YES	YES	Yes	YES	YES	Yes
EXT	YES	YES	YES	NO	YES	Yes	YES	YES	YES
BASIC	YES	NO	NO	NO	NO	NO	NO	NO	NO

APPENDIX B GRAPHICS

Below is the list of Graphics that are stored in the memory of the Webb Express. The number beside the graphic is the corresponding number that is used to identify and used to display the graphic.

Graphics for 333 and 432

1. 50LCurves,
2. 50LEFTCURVE
3. 50RCurves
4. 50TTLTURN1
5. 50TTLTURN2
6. 50TTLTURN3
7. 50TTLTURN4
8. 50TTRTURN1
9. 50TTRTURN2
10. 50TTRTURN3
11. 50TTRTURN4
12. 60LCurves
13. 60RCurves
14. Add Right Lane
15. All On
16. American Signal Logo
17. Arrow Double
18. Arrow Left 1
19. Arrow Left 2
20. Arrow Left3
21. Arrow Left 4
22. Arrow Left 5
23. Arrow Left 6
24. Arrow Left 7
25. Arrow Right 1
26. Arrow Right 2
27. Arrow Right 3
28. Arrow Right 4
29. Arrow Right 5
30. Arrow Right 6
31. Arrow Right 7
32. Arrow Left Big
33. Arrow Right Big
34. Blank Image
35. Bump
36. Caution Bar
37. Chevron 123 Left
38. Chevron 12 Left
39. Chevron 1 Left
40. Chevron 2 Left
41. Chevron 3 Left
42. Chevron 123 Right
43. Chevron 12 Right
44. Chevron 1 Right
45. Chevron 2 Right
46. Chevron 3 Right
47. Chevron123 Right Big
48. Chevron12 Right Big
49. Chevron1 Right Big
50. Chevron2 Right Big
51. Chevron3 Right Big
52. Chevron Left Arrow
53. Chevron Left Big
54. Chevron Right Arrow
55. Chevron Right Big
56. Detour Left
57. Detour Right
58. Diamond Blank
59. Diamond Inverted
60. Diamond Left
61. Diamond Middle
62. Diamond Right
63. Diamond With Border
64. Dip
65. Divided Hwy Begins
66. Divided Hwy Ends
67. Firework 1
68. Firework 2
69. Firework 3
70. Firework 4
71. Firework 5
72. Firework 6

73. Firework 7
74. Firework 8
75. Firework 9
76. Firework 10
77. Firework 11
78. Firework 12
79. Firework 13
80. Flag 1
81. Flag 2
82. Flag 3
83. Flag 4
84. Flag 5
85. Flag 6
86. Flag 7
87. Flag 8
88. Flag 9
89. Flag 10
90. Flag 11
91. Flag 12
92. Flag 13
93. Flag 14
94. Flag 15
95. Flag 16
96. Flagman
97. Flag Stars
98. Lane Ends Left,
99. Lane Ends Right
100. LCurves
101. Merging Traffic
102. Motorcycle Warning
103. Narrow Road
104. Pavement Ends
105. Radar Speed Reading
106. RCurves
107. Roadwork
108. Seat Belt 1
109. Seat Belt 2
110. Seat Belt 3
111. Seat Belt 4
112. Seat Belt 5
113. Seat Belt 6
114. Seat Belt 7
115. Seat Belt 8
116. Seat Belt 9
117. Seat Belt 10
118. Seat Belt 11
119. Seatbelt Left
120. Seatbelt Right
121. Sharp Left
122. Sharp Right
123. Sharp Shift Left
124. Sharp Shift Right
125. Shift 1 Left
126. Shift 2 Left
127. Shift 3 Left
128. Shift 1 Right
129. Shift 2 Right
130. Shift 3 Right
131. Sign Image
132. Signs By
133. Single Truck Tipping Left 1
134. Single Truck Tipping Left 2
135. Single Truck Tipping Left 3
136. Single Truck Tipping Right 1
137. Single Truck Tipping Right 2
138. Single Truck Tipping Right 3
139. Slippery Road
140. Slow Down
141. Steep Grade
142. test1 333
143. test2 333
144. Test Columns
145. Test Matrix
146. Test Rows
147. Turn Left
148. Turn Right
149. Two Way Traffic
150. Uneven Pavement
151. Your Speed Is

Graphic List for 465

1. All On
2. Checkerboard 1
3. Checkerboard 2
4. Add Left Lane 5
5. Add Right Lane
6. Arrow Double
7. Arrow Left 1
8. Arrow Left 2
9. Arrow Left 3
10. Arrow Right 1
11. Arrow Right 2
12. Arrow Right 3
13. Chevron123 Left Big
14. Chevron12 Left Big
15. Chevron1 Left Big
16. Chevron2 Left Big
17. Chevron3 Left Big
18. Chevron123 Right Big
19. Chevron12 Right Big
20. Chevron1 Right Big
21. Chevron2 Right Big
22. Chevron3 Right Big
23. Diamond Blank
24. Diamond Left
25. Diamond Middle
26. Diamond Right
27. Flagman
28. Lane Ends Left
29. Lane Ends Right
30. Lane Shift Left
31. Lane Shift Right
32. Merging Traffic Left
33. Merging Traffic Right
34. Narrow Road
35. Roadwork
36. Sharp Turn Left
37. Sharp Turn Right
38. Steep Grade
39. Shift 2 Left
40. Shift 2 Right 465,
41. Turn Left 465
42. Turn Right

Graphics List for 3260 and 3260L

1. Bike
2. Bike Think
3. Bus Lane
4. Crossroads Minor
5. Double Bend 1
6. Double Bend 2
7. Flood
8. Give Way
9. Give Way Oncoming
10. Ice
11. Men At Work
12. No Entry
13. Queue
14. Road Closed
15. Road Narrows
16. Side Road Emerge Right
17. Speed 10mph
18. Speed 20mph
19. Speed 30mph
20. Speed 40mph
21. Speed Camera
22. Speed Camera Average
23. Stop
24. All Amber
25. All Red
26. All White

Graphics for 232 coming soon.

APPENDIX C PERMANENT MESSAGE LIST

Below is the list of Permanent Messages that are stored in the memory of the WebbExpress. The number beside the message is the corresponding number that is used to identify and used to display the message. Custom message lists will be provided in separate documents.

1. Accident Ahead
2. All Traffic Exit
3. Be Prepared To Stop
4. Blowing Snow Ahead
5. Bridge Work 1000 FT
6. Bridge Work 2000 FT
7. Bridge Work 3000 FT
8. Bridge Work 4000 FT
9. Bridge Work 5000 FT
10. Caution
11. Caution Accident Ahead
12. Caution Bump Ahead
13. Caution Detour Ahead
14. Caution Icy Ahead
15. Caution Loose Gravel
16. Caution Merge Ahead
17. Caution Rough Road
18. Caution Shoulder Drop Off
19. Caution Slow Traffic
20. Caution Soft Shoulder
21. Caution Two Way Traffic
22. Caution Vehicles Crossing
23. Center
24. Center Lane Closed
25. Center Lane Closed Ahead
26. Crews Working in Road
27. Dense Fog Ahead
28. Detour Ahead
29. Detour Next Exit
30. Detour Next 2 Exits
31. Do not Pass
32. Dust Storm
33. Dust Storm Ahead
34. End Shoulder Use
35. Exit Here
36. Expect Delays
37. Expect Delays Ahead
38. Flagger Ahead
39. Form One Line Left
40. Form One Line Right
41. Form 2 Lines Left
42. Form 2 Lines Right
43. Freeway Closed Ahead
44. Fresh Oil
45. Fresh Oil On Road
46. Gusty Winds
47. Gusty Winds Ahead
48. Heavy Traffic Ahead
49. Icy Bridge Ahead
50. Icy Road Ahead
51. Keep Left
52. Keep Left ←------
53. Keep Right
54. Keep Right-----→

55. Lane Closed
56. Lane Closed Ahead
57. Left
58. Left Lane Closed
59. Left Lane Exit
60. Left Lane Closed Ahead
61. Left 2 Lanes Closed
62. Left 3 Lanes Closed
63. Loose Gravel
64. Maximum Speed 25 MPH
65. Maximum Speed 30 MPH
66. Maximum Speed 35 MPH
67. Maximum Speed 40 MPH
68. Maximum Speed 45 MPH
69. Maximum Speed 50 MPH
70. Merge
71. Merge Left
72. Merge ←-----
73. Merge Right
74. Merge Right ----→
75. Merging Traffic Ahead
76. Minimum Speed 25
77. Minimum Speed 30
78. Minimum Speed 35
79. Minimum Speed 40
80. Next 1 Mile
81. Next 2 Miles
82. Next 3 Miles
83. Next 4 Miles
84. Next 5 Miles
85. Next 6 Miles
86. Next 7 Miles
87. Next 8 Miles
88. Next 9 Miles
89. Next 10 Miles
90. No Shoulder
91. One Lane Bridge
92. One Lane Bridge Ahead
93. Paint Crew Ahead
94. Pilot Car Ahead
95. Prepare to Merge
96. Ramp Closed
97. Ramp Closed Ahead
98. Reduce Speed
99. Reduce Speed Ahead
100. Reduce Speed 25 MPH
101. Reduce Speed 30 MPH
102. Reduce Speed 35 MPH
103. Reduce Speed 40 MPH
104. Reduce Speed 45 MPH
105. Reduce Speed 50 MPH
106. Right
107. Right Lane Closed
108. Right Lane Exit
109. Right Lane Closed Ahead
110. Right 2 Lanes Closed
111. Right 3 Lanes Closed
112. Road Closed Ahead
113. Road Narrows Ahead
114. Road Repairs Ahead
115. Road Work Ahead
116. Roadway Narrows
117. Roadwork Next 1 Mile
118. Roadwork Next 2 Miles
119. Roadwork Next 3 Miles
120. Roadwork Next 4 Miles
121. Roadwork Next 5 Miles
122. Roadwork Next 6 Miles
123. Roadwork Next 7 Miles
124. Roadwork Next 8 Miles
125. Roadwork Next 9 Miles
126. Roadwork Next 10 Miles
127. Rough Road Ahead
128. Shoulder Drop Off
129. Shoulder Use Ok
130. Shoulder Work Ahead
131. Signal Not Working
132. Slow
133. Slow Road Flooded
134. Speed Limit 25 MPH
135. Speed Limit 30 MPH
136. Speed Limit 35 MPH
137. Speed Limit 40 MPH
138. Speed Limit 45 MPH
139. Speed Limit 50 MPH
140. Speed Limit 55 MPH
141. Stay In Lane
142. Stop Ahead

143. Stopped Traffic
144. Survey Party Ahead
145. Traffic Control Ahead
146. Traffic Must Exit
147. Trucks Crossing Ahead
148. Trucks
149. Trucks In/Out Highway
150. Two Way Traffic
151. Two Way Traffic Ahead
152. Use Detour Route
153. Use Extreme Caution
154. Vehicles Crossing Ahead
155. Watch For
156. Workers In Road
157. Workers In Tunnel
158. Yield Ahead
159. Buckle Up
160. Drive Safely
161. ABCDEFGHIJKLMNOPQRSTUVWXYZ
162. Checkerboard
163. All On

AMERICAN SIGNAL COMPANY
2755 Bankers Industrial Dr.
Atlanta, GA 30360
Phone: 770-448-6650
Fax: 770-448-8970

APPENDIX D SERVICE AND TECHNICAL SUPPORT

In the case a problem occurs that is not addressed in the manual; please contact our Service department.

- **Dial our main number 770-448-6650**
- **Press <3> for Parts and Service**
- **Parts and Service menu options**
  - **Press <1> for PARTS**
  - **Press <2> for SERVICE**

Or you may email us at service@amsig.com

AMERICAN SIGNAL COMPANY
2755 Bankers Industrial Dr.
Atlanta, GA 30360
Phone: 770-448-6650
Fax: 770-448-8970

APPENDIX E Font Tables

331 CHARACTER FONTS

Pixel Matrix	Normal Height	Characters Per Line	Lines Per Page
4 x 7	18"	8	3
5 x 7	18"	8	3

332 CHARACTER FONTS

Pixel Matrix	Normal Height	Characters Per Line	Lines Per Page
3 x 7	18"	12	3
4 x 7	18"	10	3
5 x 7	18"	8	3
5 x 7	18"	6	3

333 CHARACTER FONTS

Pixel Matrix	Normal Height	Characters Per Line	Lines Per Page
3 x 7	18”	12	3
4 x 7	18”	10	3
5 x 7	18”	8	3
5 x 7w	18”	7	3
7 x 7	18”	6	3
7 x 7w	18”	5	3
6 x 11	28”	7	2
7 x 20	53”	6	1

432 CHARACTER FONTS

Pixel Matrix	Normal Height	Characters Per Line	Lines Per Page
3 x 7	9”	12	3
4 x 7	9”	10	3
5 x 7	9”	8	3
5 x 7w	9”	7	3
7 x 7	9”	6	3
7 x 7w	9”	5	3
6 x 11	15”	7	2
7 x 20	28”	6	1

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Phone: 770-448-6650
Fax: 770-448-8970

465 CHARACTER FONTS

Pixel Matrix	Normal Height	Characters Per Line	Lines Per Page
3 x 7	12"	12	3
4 x 7	12"	9	3
5 x 7	12"	8	3
5 x 7W	12"	7	3
7 x 7	12"	6	3
7 x 7W	12"	5	3
6 x 11	18"	7	2
7 x 20	33"	3	1
9 x 20	33"	3	1

232 CHARACTER FONTS

Pixel Matrix	Normal Height	Characters Per Line	Lines Per Page
5 x 7	6”	10	3
7 x 7	6”	9	3
7 x 7w	6”	8	3
6 x 11	9”	9	2
7 x 20	18”	7	1
9 x 20	18”	6	1