

Silent Messenger Solar Powered Portable Changeable **Message Boards**

for MB Full Size, MB II, MB III, MB IV,
Double-Sided Message Boards and
Incident Response Trailers

Operation and Maintenance Manual



As Reliable as the Sun

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550-024-100

Revision: 01 January 2011

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SILENT MESSENGER

OPERATION AND MAINTENANCE MANUAL

For Full Matrix Message Board Driver Version 9.5, 1.X.X & 2.X.X

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1. INTRODUCTION

The **SILENT MESSENGER SOL-R-SIGN** Solar-Powered Portable Changeable Message Sign manufactured exclusively by **SOLAR TECHNOLOGY, INC.** provides the absolute ultimate in innovative design and performance. From the heavy duty structural steel trailer and support frame to the user-friendly control console, the **SILENT MESSENGER** is designed and built to provide years of trouble-free service with minimal care and maintenance.

- PRODUCT CONCEPT AND FEATURES -

SOLAR TECH's philosophy of designed-in quality assures that your **SILENT MESSENGER** will perform to your expectations now and into the future. The **SILENT MESSENGER** is designed such that product updates and improvements can be incorporated into existing units as they become available. Your **SILENT MESSENGER** never becomes obsolete!

Your new **SILENT MESSENGER** comes with a very important patented feature - the **SIGN PANEL FAILSAFE FEATURE**. This feature provides the ability to automatically detect problems with the display modules in the sign panel, correct temporary or "soft" errors, and return the sign panel to normal operation within seconds. The **SIGN PANEL FAILSAFE FEATURE** also provides the ability to totally blank the sign panel if a display module failure or "hard" error occurs. This insures that the **SILENT MESSENGER** will never display an incorrect or misleading message, that could confuse motorists, if a problem occurs in the sign panel.

We recommend that you read this entire manual carefully and clarify any misunderstandings you may have prior to operating the equipment. Factory-trained technical personnel are always available to assist you with any questions you may have regarding operation, programming, maintenance, or repair. Remember, safety through knowledge works for everyone! Make sure that your staff is familiar with any tools or equipment before they attempt to use them.

- STANDARD EQUIPMENT -

The **SILENT MESSENGER SOL-R-SIGN** comes with a long list of standard features which are clearly spelled out in detail in the Specifications Section of this manual. In addition, there are several available options which provide additional features as well as increased operational flexibility and convenience.

- OPTIONS -

Standard available options include:

- Various ball and pintle ring coupler sizes and configurations
- Various solar array, battery and battery charger options
- Hardware and software support to permit field upgrades of operating software
- Remote operation via wire line, wireless or cellular, telephone or modem
- Radar speed monitoring, display, and recording

These and other options can be installed at the factory at the time of manufacture or added later in the field. Always consult with factory technical personnel regarding field-added options to make certain that your **SILENT MESSENGER** is equipped with the latest version of operating software. You will be notified of major operating software revisions as they become available. However, feel free to contact the factory at any time to determine what new features may currently be available and we will be happy to assist in updating your units.

2. RULES FOR SAFE OPERATION

The **SILENT MESSENGER SOL-R-SIGN** was designed and manufactured to be as safe and easy to use as possible. However, as with any piece of equipment, it is of paramount importance that operating personnel be completely familiar with the unit and properly trained in safe deployment and operating procedures. Make certain that any persons transporting or operating the **SILENT MESSENGER** have thoroughly read and understand the Operation and Maintenance Procedures as presented in this manual.

- OPERATION & MAINTENANCE CHECKLIST -

The Operation & Maintenance Checklist, contained in the Appendix of this manual, should be used prior to transporting the **SILENT MESSENGER** or putting the unit into service. The checklist helps to insure that proper operating procedures are followed and that certain items pertinent to the safe operation and maintenance of the equipment are not overlooked.

- CAUTIONS & WARNINGS -

WARNING! DO NOT ATTEMPT TO OPERATE THIS EQUIPMENT UNTIL YOU HAVE READ THOROUGHLY AND COMPLETELY UNDERSTAND ALL OPERATING INSTRUCTIONS AND PRECAUTIONS CONTAINED IN THIS MANUAL. FAILURE TO COMPLY CAN RESULT IN PERSONAL INJURY AND/OR PROPERTY DAMAGE.

NOTE: SOLAR TECHNOLOGY, INC. has taken every precaution to insure that the **SILENT MESSENGER SOL-R-SIGN** is a safe and effective piece of traffic safety equipment. **SOLAR TECHNOLOGY, INC.**, however, cannot be held responsible for any injuries, accidents, or other mishaps resulting from the use, misuse, or abuse of the **SILENT MESSENGER**, or any other **SOLAR TECH** product. It is the user's sole responsibility to ensure that the manner in which the **SILENT MESSENGER** is used is consistent with safe operating practices and that the user understand that he/she is the only liable party.

3. SETUP AND OPERATION

Portable changeable message signs are intended to supplement other traffic control devices in diverting or rerouting traffic and generally informing motorists about activities and conditions in and around highway work zones or highway emergency situations. A detailed description of how they are to be placed and utilized in the work zone is presented in the Federal Highway Administration Manual on Uniform Traffic Control Devices (MUTCD) and also in many individual state D.O.T. specifications. These publications include detailed instructions on where to place various traffic control devices, particularly in situations where visibility may be limited due to a curved approach to the work zone or where the work zone is near an on or off ramp or other traffic merging point. If one of these manuals is not available, you should consult with local traffic safety officials before placing message signs or any other traffic control devices in the work zone. Proper placement of traffic control devices is essential to their effectiveness.

- TRANSPORTING & TRAILERING

A safety check should be performed on the message sign before transporting the unit over the road. The Operation & Maintenance Checklist form included in the Appendix of this manual can and should be used as a safety checklist by the operator to make certain that nothing has been overlooked.

Prior to transporting the unit to the work site, make sure that the battery bank is fully charged. This can be accomplished by using the Check System Status function (9.5 & 1.9.X) or viewing the Information Page (2.X.X/3.X.X) of the main control console operating program or looking at the LCD on the Energy Management System. A battery voltage reading of 12.6 Volts or higher indicates a fully charged battery bank. If battery voltage is below 12.6 Volts, the battery bank should be recharged using any automatic-type 12-Volt battery charger with an output current capability of 60 to 75 Amps. Check the Troubleshooting and Repair Section of the manual for additional information on battery charging and testing.

Inspect the entire trailer for structural integrity to ensure no physical damage has occurred that would render the trailer unsafe paying particular attention to all structural welds including checking for any evidence of cracking and/or fatigue failure (note: this should be performed by a qualified individual). Ensure the trailer coupler, safety chains, clevis pins, and all bolts are properly installed and secured. Connect trailer wiring harness to tow vehicle and check for proper operation of stop, turn, and tail lights. All swivel jacks and outriggers must be placed in the appropriate position for transport and securely locked. The sign panel(s) must be completely lowered/retracted/locked/pinned into the transport position. Make certain that the sign supports have been properly adjusted and that the sign panel support frame rests securely against the rubber pads. Close all battery compartment covers and secure with padlocks. Check tires for correct inflation; 28 psi (190 kPa) for 13-inch wheels and tires, 30 psi (200 kPa) for 14-inch wheels and tires, 45 psi (300 kPa) for 15-inch wheels and tires. Finally, if trailer is equipped with brakes, check for proper surge brake function prior to entering main roadways and traffic.

In situations where the work site is a significant distance away, stop periodically and check the integrity of the coupler and safety chains and for any excess heat buildup in the tires and wheel bearings.

- POSITIONING & STABILIZING -

Upon arriving at the work site, first check the immediate area for any overhead power lines or obstructions. Also, check the surrounding area for any tall buildings, trees, or other obstructions nearby that might shade the solar array during part of the day and interfere with the proper operation of the solar electric charging system. Many times, just moving the unit a few yards can make the difference between getting an adequate supply of sunlight to maintain the charge level of the battery bank and being shaded enough that the battery bank will eventually become discharged to the point where the sign panel is automatically switched off.

Once the appropriate site has been selected, the unit can be positioned and set up for operation. Block the trailer wheels before disconnecting the coupler from the tow vehicle hitch. It is best to position the trailer as close to the chosen location as possible with the tow vehicle because of the substantial weight of the unit.

- SILENT MESSENGER & SILENT MESSENGER II/III LIFT & ROTATE -

The trailer should be oriented such that when the sign panel is finally positioned for display, the sign panel will be perpendicular to the tongue of the trailer to achieve maximum stability in high wind conditions. In other words, locate the trailer so that the trailer is parallel to the direction of traffic flow. Now, position and lock the swivel jacks vertically and extend each jack so that the jacks are carrying at least the majority, if not all of the weight of the unit, for maximum stability. If the unit is set up on a relatively soft, unpaved surface, planks or some other form of weight distributing material should be used to prevent the jack foot pads from sinking into the surface.

Open the right front battery compartment (left front for units with two sign panels) and locate the control lever for the hydraulic power unit located on the hydraulic power unit or the toggle switch for the electric linear actuator. Pull the lever or switch to raise the sign panel so that the bottom of the sign panel clears the top of the transport support cradles. Make sure the locking lever is in the unlock position (pointing toward the rear of the sign panel). Rotate the sign panel into the viewing position, using the sight tube to aim the sign panel precisely into the path of oncoming traffic. Push the sign rotation locking lever forward (parallel to the bottom of the sign panel) to lock the rotation of the sign. The sign panel(s) can be locked into any position. For units with two sign panels, retract the two transport locking pins for auxiliary sign panel located on the lower rotator plate. Lift up on the rotator locking lever and aim auxiliary sign panel. Release the rotator locking lever and make certain that the auxiliary sign panel locks into place. Move back and forth slightly to allow locking pins to engage. Now continue to raise the sign panel(s) until the mast is fully extended and the sign panel is at its maximum operating height. Do not continue to operate the hydraulic pump or linear actuator after the mast has reached its fully elevated position. Insert the 1/2-13 x 8 inch bolt into the hole at the top of the lower section of the mast and install the 1/2-13 hex nut to secure the bolt in place to lock the mast in the

elevated position. This will insure that the sign panel will not lower in the event that hydraulic pressure in the mast extension cylinder is reduced.

Simply reverse the above procedure to return the sign panel(s) to the transport position to prepare the unit for traveling. Be sure to remove the security bolt from the top of the lower section of the mast before attempting to lower the sign panel. The sign panel(s) can be lowered by pushing on the lever on the hydraulic power unit or the switch for the linear actuator. Exercise care when lowering the sign panel(s)! Unlock the mast rotation locking lever and rotate the sign panel(s) into the transport position before the sign panel(s) drops below the top of the transport support cradles. Leave the mast rotation locking lever in the unlock position during transport. The transport cradles will hold the main sign panel securely during transport. For units with two sign panels make certain that the auxiliary sign panel is locked in the transport position by the two transport locking pins located on the lower rotator plate.

NOTE: The hydraulic system is equipped with a velocity fuse which will activate if the hydraulic system suddenly loses pressure. The activation of the velocity fuse will prevent rapid, uncontrolled descent of the sign panel in the event of a hydraulic system failure. If the fuse should set, simply repressurize the hydraulic system to reset the velocity fuse. The sign panel can then be safely lowered to the transport position.

- SILENT MESSENGER II, III and IV-

The smaller trailer can be moved rather easily prior to raising the sign panel into the operating position. Locate the trailer so that the trailer is parallel to the direction of traffic flow. Use the sight tubes located on the left side of the trailer frame to position the unit so that the sign panel will be perpendicular to oncoming traffic. If unit is equipped with four (4) swivel-type screw-jacks, simply use the four corner swivel-type screw-jacks to level the unit, ensuring that the majority of the weight is removed from the tires to ensure proper stability. Otherwise, lower the tongue jack all the way, extend the rear jack stands until they just touch the ground and insert and lock the pins. Next, extend the tongue jack while looking through the sight tubes until you are sighting directly into oncoming traffic. Extend and lock the front jack stands to complete the setup. If the unit is set up on a relatively soft, unpaved surface, planks or some other form of weight distributing material should be used to prevent the jack foot pads from sinking into the surface.

Pull and turn the latch pins located just below the pivot point for the sign panel support frame to lock them in the retracted position. Rotate the winch handle clockwise to raise the sign panel and solar array into the operating position. Turn and release the latch pins to secure the sign panel in the operating position.

Simply reverse the above procedure to return the sign panel to the transport position to prepare the unit for traveling. Be sure to pull and turn the two sign support locking pins to secure them in the retracted position before attempting to lower the sign panel. The sign panel can be lowered by rotating the winch handle counterclockwise. The automatic brake built into the winch will control the descent. Lower the sign panel slowly until it is resting on the travel support pads.

For units with two sign panels, position the trailer so that the trailer is perpendicular to the direction of traffic flow (i.e. both sign panels are facing in desired/opposite directions). Lower the tongue jack all the way. Extend the rear jack stands until they just touch the ground and insert and lock the pins. Now extend the tongue jack until front of unit is just above level. Extend, lock and lower unit on to the front jack stands to complete the setup (unit should be level). If the unit is set up on a relatively soft, unpaved surface, planks or some other form of weight distributing material should be used to prevent the jack foot pads from sinking into the surface.

If it is desired to slightly angle sign panels to improve visibility remove both locking pins from either the front or rear telescoping support arms, gently lift as to support sign case weight and move sign case (grasp near both support arms - near top and bottom of sign case) away from trailer to desired position and then reinstall locking pins. Insure both telescoping arms are extended equally. Note - it is not necessary nor desirable to extend both front and rear support tubes on a given sign case - extend only front or rear to aim sign panel as desired.

Simply reverse the above procedure to return the sign panels to the transport position to prepare the unit for traveling. Be sure to install all locking pins to secure the sign panels in the retracted position.

- PREOPERATIONAL CHECK -

Check the battery bank voltage by viewing the LCD screen on the **ENERGY MANAGEMENT SYSTEM CONTROL UNIT**. The **ENERGY MANAGEMENT SYSTEM CONTROL UNIT** is located in the forward battery compartment on the right side of the trailer.

If adequate sunlight is available, the **CHARGING** indicator on the **ENERGY MANAGEMENT SYSTEM CONTROL UNIT** will be on and the LCD screen will be displaying the solar array voltage and current and the battery bank voltage and current. If the battery bank is at or near a full state of charge, the display panel on the **ENERGY MANAGEMENT SYSTEM CONTROL UNIT** will be displaying the solar array voltage and current and the battery bank voltage and current and the **CHARGING** indicator will be flashing. When the battery bank is fully charged the **ENERGY MANAGEMENT SYSTEM CONTROL UNIT** will switch off the current flow from the solar array to prevent overcharging of the batteries. The **ENERGY MANAGEMENT SYSTEM CONTROL UNIT** will automatically switch current flow from the solar array on and off as needed to maintain the charge level of the battery bank.

Make sure that the solar panels are free of dirt and dust. Clean with clear water and a mild detergent. While the unit is in service, periodically check the solar array for dust and dirt buildup and check the fluid level in the batteries. Every 30 days should be adequate except in extreme conditions of dust or low sunlight. Any excess snow accumulation should be removed from the solar panels as soon as possible. It is not necessary or desirable to scrape ice buildup from the upper surface of the solar panels. If the majority of the snow is brushed away the heat effect of the sun will melt any remaining ice or snow accumulation.

Check the battery bank voltage every few days to make sure that the unit is receiving an adequate amount of solar energy to maintain the battery bank at an acceptable level of charge.

In the event that the battery voltage drops below 12 Volts during a sunny day, the battery bank should be recharged by a line-powered auxiliary battery charger as soon as possible. If the battery bank is allowed to discharge to a very low level in extremely cold weather, the electrolyte may freeze resulting in permanent damage to the batteries.

The battery bank may require a few recharge cycles before it reaches its full energy storage capacity. New lead acid batteries generally do not reach their full capacity until they have gone through 10 to 15 charge/discharge cycles. Consult the **MAINTENANCE** section of the manual for additional information on battery maintenance and charging.

- Units with two Sign Panels -

Silent Messenger II & Silent Messenger III units with two sign panels may be configured with a single control console to enable display of identical messages on both sign panels simultaneously or with two (2) control consoles to allow for completely independent control of each sign panel. Additionally only one of the installed Energy Management Control Units is used for regulating charge current from the solar array to the batteries - the Energy Management Control Unit with the solar array power cable connected to the Solar Array connector.

- For units with a **single** control console installed:

The control console may be installed in either battery box; however, the sign panel that is connected to the battery box which contains the control console is considered the "main" sign panel, and will function identically in all respects to a standard Silent Messenger sign panel including regulating brightness via it's photocell input and error detection and correction with SolarTech's exclusive Sign Panel Fail-safe System. The other sign panel is the "auxiliary" sign panel and will display exactly the same messages that appear on the "main" sign panel. The "main" sign panel is energized along with the control console by turning the on/off switch on the Energy Management Control Unit located in the same battery box as the control console. The "auxiliary" sign panel is energized by turning the on/off switch on the Energy Management Control Unit located in the opposite battery box (box without a control console and closest to the "auxiliary" sign panel). The "main" sign panel must be used during all operations; however, the "auxiliary" sign panel may or may not be energized depending on desired operations. You may make either sign panel the "main" by simply installing the control console in the correct battery box. All connections for a control console are provided in both battery boxes. You may operate either just the "main" sign panel or both sign panels.

- For units with **two** control consoles installed:

Each control console controls the sign panel connected to the battery box in which the control console is installed. Each control console will operate the sign panel it is connected to, completely independent of the other sign panel.

NOTE: To switch from single control console operations to dual control console operations simply install a second control console into the battery box which presently does not have a control console and disconnect the data jumper line (black and blue pair of 22 gage wires) that connects the data lines from one Energy Management Control Unit to the other. There are two

disconnects for the data jumper lines - one at each Energy Management Control Unit located at the Sign Panel Power & Control connector - you may disconnect either connection. To return to single control console operations simply remove one of the control consoles and reconnect the data jumper line.

- SOLAR ARRAY CLEANING -

- SILENT MESSENGER & SILENT MESSENGER II/III LIFT & ROTATE -

The solar array can be tilted down for cleaning and snow removal by unlatching the spring locking levers on the rear solar array supports, pushing the supports forward, and pulling down on the back of the solar array to expose the top of the solar panels. The solar array is divided into two halves for cleaning and servicing purposes. When cleaning and servicing is completed, simply reverse the above procedure to return the solar arrays to their operating position. Make certain that the spring locking lever pins are securely inserted into the locking pin holes in the solar array supports. For units with two sign panels pull and release solar array locking pins (located between sign panels on solar array mounting framework) and tilt solar array down in front of main sign panel and clean. When finished cleaning simply push solar array back into position from front side of main sign panel and then release locking pins. Insure that both locking pins fully engage the solar array locking tabs.

- SILENT MESSENGER II, III and IV -

When the sign panel is in the travel position, the entire trailer can be tilted back for cleaning and snow removal. Simply lift up on the tongue until the trailer frame rocks back and rests on the rear jack stands (or lowered swivel-type screw-jacks). The solar panels can be easily cleaned with clear water and a squeegee. When cleaning and servicing is completed, simply pull down on the tongue to return the trailer to the normal traveling position.

NOTE: A comprehensive **Preoperational Checklist** is provided in the Appendix of this manual and may be photocopied for field use.

- PRE-TRANSPORT PROGRAMMING -

The **SILENT MESSENGER SOL-R-SIGN** can be completely programmed prior to transportation to the work site. Simply follow the programming procedures outlined in the **Main Console Operation and Programming** section of the manual, switch off the main power, transport the unit to the job site, and switch the main power back on. This handy features simplifies the installation and setup procedure and minimizes the amount of time service personnel need to spend at the work site.

Install padlocks on the battery compartments when the unit is left unattended to prevent unauthorized access and vandalism.

4. MAIN CONTROL CONSOLE OPERATION AND PROGRAMMING

QWERTY KEYBOARD CONTROL CONSOLE (P/N - MB-22-905)

- GETTING STARTED -

When the main power switch, located on the **ENERGY MANAGEMENT SYSTEM CONTROL UNIT**, is switched on, the system goes through a self check power-up test. This power-up sequence takes approximately one minute during which time the control console display screen will show which functions are being tested and verified and which options are installed. After hardware testing and initialization has been completed, the data files are loaded and the control module screen will display the Message Board Software Driver version number and the software copyright notice. A few seconds later the display will indicate that the data files are being updated. The control console will then display the **MAIN MENU**.

Sequences previously stored in the **SEQUENCE QUEUE LIBRARY** will be displayed on main message display panel as well as on the control console LCD screen. The sequence presently being displayed or the next sequence to be displayed, in the event of pre-programmed start and stop times, will appear on the right hand side of the LCD screen.

All **SILENT MESSENGER** programming activities start from the **MAIN MENU**. Any time control console keyboard activity stops for more than five minutes, the control console will automatically return to the **MAIN MENU** to insure that the password protection features designed into the software are always in effect while the **SILENT MESSENGER** is left unattended.

The **SILENT MESSENGER** employs three levels of password protection to prevent unauthorized use and/or programming of the main control module and the message display. The **MASTER Password**, installed at the factory, grants access to all three of the major sub-menus in the system. The **MASTER** or **SUPER USER Password** should be given only to a select few individuals who can in turn add Supervisors, Users and their associated passwords to the **USER LIBRARY** for others who need access to the various programming features of the system. The **SUPERVISOR Passwords** grant access to the **USER MENU** and the **SUPERVISOR MENU**. Supervisor level access should be limited to individuals who have some technical experience and an understanding of the system operating parameters used in the **SILENT MESSENGER** control system. Supervisors can be added to and deleted from the **USER LIBRARY** only from the **SUPER USER MENU**. The **USER Passwords** grant access only to the **USER MENU**. Users and their passwords can be added to the **USER LIBRARY** only from the **SUPERVISOR MENU**. Users can be deleted from the **USER LIBRARY** from either the **SUPERVISOR MENU** or the **SUPER USER MENU**.

From the **MAIN MENU** you can access any of the three major sub-menus, the **USER MENU**, the **SUPERVISOR MENU**, and the **SUPER USER MENU**, limited of course by the level of access granted by your password. Press the appropriate number key to access the desired menu. You will be asked to enter a password to gain access to the menu. Enter your password followed by the **Enter** key. If your password is valid and entered correctly you will be granted access to the desired menu. The password must be entered exactly as it is stored in the control console memory. Upper case letters, lower case letters, and special characters must be entered correctly!

- DEFINITIONS -

PIXEL - A single display element or dot used to form characters and symbols.

CHARACTER - A letter, numeral, or symbol formed by a group of pixels, usually an array of 5 wide by 7 high pixels.

FONT - The size and configuration of the characters used to make up messages.

MESSAGE - A group of characters, numerals, and symbols or a graphic image used to convey a warning or instruction. Typically one, two or three lines of up to 10 characters each.

GRAPHIC - An array or configuration of pixels that forms an image or symbol for the purpose of conveying information.

SEQUENCE - A group of messages or graphic images displayed one after the other to convey a set of warnings or instructions. A sequence typically consists of a group of three messages with two second display times, but a sequence can vary from one message flashing on and off up to a group of sixteen messages scrolling in secession.

PROGRAM - A sequence or group of sequences with start and stop times and days that will change automatically and display the desired sequence at the appropriate times on the appropriate days.

QUEUE - A file where **SEQUENCES** are placed chronologically, with start and stop times and days, waiting to be displayed. The appropriate message will be displayed when its turn comes up. After the selected stop time is reached, the sequence will be placed back "in line" in the **QUEUE** to be displayed when the correct time and day come up again.

LIBRARY - A file where message signs, messages, sequences, programs, users, etc. are stored.

LUMINOUS INTENSITY - The amount of light produced by a light source, typically a spot or beam type lamp, expressed in candela (cd) or candlepower.

ILLUMINANCE - The amount of light incident on a surface expressed in footcandles (fc), lux, or lumens per square meter.

BRIGHTNESS - The amount of light emitted by a large illuminated surface, typically a lighted sign panel, expressed in candela per square meter (cd/m²).

- KEYBOARD SYMBOL DEFINITIONS -

- Enter** - ENTER (**Enter**) OR RETURN (**CR**) KEY - Press to choose selected function or complete data entry
- Shift** - SHIFT KEY (**Shift**) - Press and hold for upper case & special characters
- _** - CURSOR - Indicates where characters will be placed or changed on display

- SPECIAL KEY FUNCTIONS -

- Up-Arrow** - Scroll **UP** one line or move cursor **UP** one position
- Down-Arrow** - Scroll **DOWN** one line or move cursor **DOWN** one position
- Right-Arrow** - Move cursor **RIGHT** one position
- Left-Arrow** - Move cursor **LEFT** one position
- Enter** - Select item or finish current activity
- Backspace** - Delete character and move cursor left one position
- Esc** - Quit current activity and return to menu

While in the **USER MENU** the **SPECIAL FUNCTION KEYS, F1** through **F10** on the keyboard, provide a shortcut to all of the message and sequence features of the system. Using the special function keys saves time and keystrokes!

- F1** Create new messages and add them to the Message Library
- F2** Edit and correct messages already in the Message Library
- F3** Delete messages no longer required from the Message Library
- F4** Create new sequences and add them to the Sequence Library
- F5** Edit and correct sequences already in the Sequence Library
- F6** Delete sequences no longer required from the Sequence Library
- F7** Add sequences to the Display (Queue) Library for display on the sign panel
- F8** Check the current contents of the Display (Queue) Library
- F9** Delete sequences from the Display (Queue) Library
- F10** Not currently assigned

- MAIN MENU FUNCTIONS -

Q. QUICK PROGRAMMING (Requires Quick Programming, User, Supervisor, or Master PASSWORD)

Quick display of a sequence of up to eight messages

1. USER MENU (Requires User, Supervisor, or Master PASSWORD)

Add to, Edit, and Delete from the Message Library
Add to, Edit, and Delete from the Sequence Library
Set up Message and Sequence Display Schedules
Add to, and Delete from the Display (Queue) Library
Display individual messages from the Message Library

2. SUPERVISOR MENU (Requires Supervisor or Master PASSWORD)

Review, Add to, and Delete from User Library
Set Time and Date
Set Operating Parameters
Display System Status
Test Display Character Modules
Check Battery Bank Voltage and Ambient Light Level
Check Cellular Modem

2. SUPER USER MENU (Requires Master PASSWORD)

Review, Add to, and Delete from Supervisor Library
Review and Delete from User Library

- MENU STRUCTURE -

MAINMENU

Q. Quick Programming

1. User MENU

1. Message library
 1. Create a new message or graphic image
 2. Edit a message
 3. Delete a message or graphic image
2. Sequence library
 1. Create a new sequence
 2. Edit a sequence
 3. Delete a sequence
3. Display Library (QUEUE)
 1. Add a sequence to QUEUE
 2. Display sequence QUEUE
 3. Delete a sequence from QUEUE
4. Message display check
 1. Select message for display
 2. Clear message from display
 3. Sign panel display - on/off
5. Return to main menu

2. Supervisor MENU

1. User library
 1. Review user list
 2. Add new user
 3. Delete user
 4. Return to Supervisor MENU
2. Change system settings
 1. Set time and date
 2. Change language choice
 3. Set shutdown voltage
 4. Set brightness (high/low) limits
 5. Clear entire queue
 6. Change (low battery) caution message
 7. Change modem settings
 8. Sign panel failsafe status
 9. Return to Supervisor MENU
3. Check system status
 1. Check library & QUEUE status
 2. Test display modules
 3. Check battery voltage
 4. Check ambient light level
 5. Check cellular modem
 6. Display software version
 7. Return to Supervisor MENU
4. System shut down (Full Matrix Models Only)
5. System re-initialization
6. Return to main menu

3. Super User MENU

1. Review supervisor/user list
2. Add new supervisor
3. Delete supervisor or user
4. Check Time Meter
5. Return to main menu

Q. QUICK PROGRAMMING

STEP 1: Select **Q** from the **MAIN MENU** to access the **QUICK PROGRAMMING** feature of the **SILENT MESSENGER**. Access to the **QUICK PROGRAMMING** feature requires a **QUICK PROGRAMMING** level password, a User level password, a Supervisor level password, or the Master Password. **QUICK PROGRAMMING** provides a fast, easy method to display a series of messages by following a few simple steps.

SILENT MESSENGER SOL-R-SIGN		SIGN DISPLAY PANEL
Q. Quick Programming		
1. User Menu		
2. Supervisor Menu		
3. Super User Menu		Day Mon
Press Q,1,2 or 3 to select.		Beg 1000
Valid password is required!		End 1530
SolarTech Inc. Copyright 2000		

STEP 2: Following the entry of a valid password, you will have access to the **QUICK PROGRAMMING Menu**. Press the **1** key to enter a new **QUICK PROGRAM** sequence.

- QUICK PROGRAMMING -	
1. Enter a new sequence	
2. Delete Quick Program sequence	
3. Return to main menu	
<hr/>	
Press number key to select.	
Use up arrow or down arrow to scroll.	
Press Esc for Main Menu.	

STEP 3: The following prompt screen will appear indicating that you can enter **QUICK PROGRAMMING** sequences that include up to **8** messages. Press the **Enter** key to continue or the **Esc** key to quit.

- QUICK SEQUENCE PROGRAMMING -		
You may include up to 8 messages in this sequence.		
Press Enter to create the first message.		
Press Esc to quit.		

STEP 4: Select the desired font for the first message. Three line (normal) will produce the same display appearance as a conventional (non full matrix) 3-line by 8-character message board.

```
Select desired character size:
1. One line
2. Two line
3. Three line (normal)
4. Three line (narrow)
5. Three line (condensed)
6. Three line (bold)
Press Esc to quit.
```

STEP 5: Enter the desired message. Each line will be automatically centered on the display panel. Use the **Space Bar** to position the characters exactly where you want them. Use the **Backspace** key to make corrections. Use the **Down-Arrow** key to move down to the next line. Press the **Enter** key when finished entering the message.

Begin ENTERING message:

3 Line (normal) Line: 1

Space (pixels) remaining: 22

Press down arrow for next line.

NEWLY
CREATED
MESSAGE

Use Bksp or left arrow to make changes.
Use NumLk key to turn flashing on/off.
Press Enter when finished, Esc to quit.

STEP 6: Enter the desired display time for the message. You can accept the default time (in parenthesis) or enter any time from 0.1 seconds to 99.0 seconds in tenth of a second increments. Press the **Enter** key to accept the default or enter the desired display time and press the **Enter** key to continue. Use the **Backspace** key to make corrections.

- QUICK SEQUENCE PROGRAMMING-
Message number: (current)
Enter display time (2):

NEWLY
CREATED
MESSAGE

STEP 7: Press the **Enter** key to add another message to the sequence and repeat the process from **STEP 4** (or **STEP 5** for Standard 3-line only models) or press the **End** key if you are finished adding messages to the sequence.

<p>- QUICK SEQUENCE PROGRAMMING- Message number: (current) Enter display time (2):</p> <p>Press Enter to create message (next). Press End if finished adding messages. Press Del to remove message (current). Press Esc to cancel creating sequence.</p>	<p>NEWLY CREATED MESSAGE</p>
--	--------------------------------------

The sequence will immediately appear on the message display panel. That's all there is to it!

QUICK PROGRAM sequences are retained when **Main Power** is switched off. This feature enables you to use **QUICK PROGRAMMING** to preprogram the message board and switch **Main Power** off to transport the unit to the job site. Then simply switch **Main Power** back on to place the message board into service.

QUICK PROGRAM sequences are deleted by either selecting **2. Delete Quick Program sequence** from the **QUICK PROGRAMMING Menu** or by adding a sequence from the **SEQUENCE LIBRARY** to the **DISPLAY (QUEUE) LIBRARY** from the **User MENU**. The **User MENU** functions are covered in the next section.

1. USER MENU

Select **1** from the **MAIN MENU** to access the **USER MENU**. Access to the **USER MENU** requires a user level password, a supervisor level password, or the Master Password. The **USER MENU** provides access to the **MESSAGE LIBRARY**, the **SEQUENCE LIBRARY**, and the **SEQUENCE/PROGRAM QUEUE (Q)**. Nearly all of the typical daily activities can be performed from within the **USER MENU**.

While in the **USER MENU**, the special function keys, **F1** through **F9**, provide immediate access to the various programming features available. The front-panel overlay on the main control console indicates the purpose of each special function key. Using the special function keys saves keystrokes and time! You must be in the **USER MENU** for the special function keys to work!

- 1. MESSAGE LIBRARY MENU -

To add, edit, and delete messages and graphic images in the **MESSAGE LIBRARY**.

Select **1** from the **USER MENU** to access the **MESSAGE LIBRARY MENU**.

The **MESSAGE LIBRARY MENU** provides the ability to create new messages, edit user-created messages, and delete unwanted user-created messages from the **MESSAGE LIBRARY**. Select the desired function from the **MESSAGE LIBRARY MENU** or press the **Esc** key to return to the **USER MENU** and use the special function keys **F1**, **F2**, and **F3** to access the **MESSAGE LIBRARY**.

1. CREATE A NEW MESSAGE or GRAPHIC IMAGE

To create a new message or graphic image and add it to the **MESSAGE LIBRARY**.

Select **1** from the **MESSAGE LIBRARY MENU** or press **F1** from the **USER MENU** to begin creating a new message or graphic image.

Select the desired character size (font). One line for a one line message, two line for a two line message, and three line for a three line message. Three line messages can be displayed as normal width characters, narrow characters, condensed characters or bold (double strike) characters. Following the selection of the desired character size, the message entry screen will appear. Select graphic if you want to create a new graphic image or modify an existing graphic image.

The message entry screen displays each line of the message on the left side of the LCD screen, with lines separated by double ended vertical arrows, and the complete message

exactly as it will appear on the message display panel on the right side of the LCD screen. Follow the screen prompts and begin entering the new message. The number of pixels remaining on each line are displayed on the LCD screen as the message is being entered. Advance to the next line by pressing the **Down-Arrow** key. Use the **Left-Arrow** and **Right-Arrow** keys to position the cursor. Use the **Backspace** key to delete unwanted or incorrect characters. Press the **Enter** key when you are finished to save the new message in the **MESSAGE LIBRARY**. Press the **Esc** key to cancel saving the new message.

If you selected Graphic for the desired font, press the **1** key to create a new graphic image or the **2** key to modify an existing graphic image. You can save time and effort by modifying an existing graphic image and saving it under a new name! Follow the screen prompts to create a new graphic image or modify an existing graphic image. Use the cursor keys to position the cursor and the space bar to toggle the pixels on and off. A graphic image form in the Appendix enables you to create new graphic images on paper, then key them into the Control Console using the cursor position indicators on the LCD screen. Press the **Enter** key when you are finished. Press the **Esc** key to cancel.

DATE, TIME AND TEMPERATURE MESSAGES

The date, time and temperature can be displayed as part of any message by using the following codes in the message where you would like the date, time or temperature to appear. The codes are configured such that they will take up as much space as the actual date, time and temperature to insure that there is sufficient space on the message display panel to accommodate the entire message.

The codes are as follows:

Date (USA Format): Type: [DATE: MDY]	MM-DD-YYYY (Month-Day-Year) (10 Characters)
Date (European Format): Type: [DATE: DMY]	DD-MM-YYYY (Day-Month-Year) (10 Characters)
Time (12-Hour Format): Type: [TI12]	HH:MM (5 Characters)
Time (24-Hour Format): Type: [TI24]	HH:MM (5 Characters)
Time (12-Hour w/ AM & PM): Type: [TI12:AMPM]	HH:MM PM (8 Characters)
Temperature (Fahrenheit): Type: [TEF]	XXX0 (4 Characters)
Temperature (Centigrade): Type: [TEC]	XXX0 (4 Characters)

For example:

If you want the sign panel to display:

**TODAY'S
DATE IS
12-25-2003**

Create the message:

**TODAY'S
DATE IS
[DATE: MDY**

If you want the sign panel to display:

**CURRENT
TIME IS
10:30 PM**

Create the message:

**CURRENT
TIME IS
[TI12:AMPM**

If you want the sign panel to display:

**TIME IS
10:30**

Create the 2-line message:

**TIME IS
[TI12**

If you want the sign panel to display:

**LOCAL
TEMP IS
72°**

Create the message:

**LOCAL
TEMP IS
[TEF**

If you want the sign panel to display:

**LOCAL
TEMP IS
72° F**

Create the message:

**LOCAL
TEMP IS
[TEF F**

If you want the sign panel to display:

72°

Create the 1-line message:

[TEF

You can display the date, time or temperature in any message. If the appropriate code fits within the space (number of characters) permitted, the date, time or temperature will be correctly displayed on the message display panel. Simply type in the appropriate code in the message exactly where you would like the date, time or temperature to appear.

RADAR SPEED MONITOR MESSAGES

If the message board is equipped with the optional radar speed monitor, messages that will display the speed of oncoming vehicles can be created by substituting "_" (the underline character) where you want the speed to appear in the message.

For example, the message:

YOUR
SPEED IS
_ _ _ MPH

will display up to three digits of the speed of oncoming vehicles on the message board display panel anytime this message is displayed in a sequence.

After entering the last character of the message and checking to see if the message is positioned on the display screen to your satisfaction, press the **Enter** key to complete entering the message. You will then be asked if you want to save the message. Enter **Y** for yes to save the message to the **MESSAGE LIBRARY**. The display screen will indicate that the message has been saved and how many messages are currently in the **MESSAGE LIBRARY**. Press any key to continue. You will then be returned to the menu from which you started, the **MESSAGE LIBRARY MENU** or the **USER MENU**. If you made a mistake or changed your mind and do not want to save the message, press **N** for no. The newly created message will not be saved and you will be returned to the previous menu.

2. EDIT A MESSAGE

To revise or correct a user-created message in the **MESSAGE LIBRARY**.

Select **2** from the **MESSAGE LIBRARY MENU** or press **F2** from the **USER MENU** to access the **MESSAGE LIBRARY** and edit a message.

Locate the desired message by pressing the key that represents the first character of the message, then scroll through the **MESSAGE LIBRARY** by using the **Up-Arrow** key and the **Down-Arrow** key. When the desired message is displayed in the middle row on the left hand side of the screen as well as on the right hand side of the screen, press **Enter** to choose the selected message for editing. Use the **Right-Arrow** and **Left-Arrow** keys to move the cursor forward and backward or simply type over the existing message. Use the **Backspace** key to delete unwanted or incorrect characters. Use the **Down-Arrow** and **Up-Arrow** keys to move the cursor from one line to another. When the corrections are complete, press the **Enter** key. The prompt "Are you sure you want to replace the old message with the one in the display (y/n)?" will appear. Press the **Y** key to accept the changes and save the revised message in the **MESSAGE LIBRARY** or the **N** key to ignore the changes. You will then be returned to the menu from which you started, the **MESSAGE LIBRARY MENU** or the **USER MENU**. To end the search and return to the previous menu without selecting a message for editing, press the **Esc** key.

Messages can be edited or corrected even when they are currently being displayed in a sequence. Simply follow the above procedure to change the selected message. When the **Enter** key is pressed the **MESSAGE LIBRARY** will be updated with the corrected message and it will appear, in its corrected form, the next time it is called up to be displayed on the main display.

NOTE: You can not edit standard factory-installed messages.

3. DELETE A MESSAGE

To delete or remove a message from the **MESSAGE LIBRARY**.

Select **3** from the **MESSAGE LIBRARY MENU** or press **F3** from the **USER MENU** to access the **MESSAGE LIBRARY** and delete a message.

Locate the desired message by pressing the key that represents the first character in the message, then scroll through the **MESSAGE LIBRARY** by using the **Up-Arrow** key and the **Down-Arrow** key. When the desired message is displayed in the middle row on the left hand side of the screen as well as on the right hand side of the screen, press the **Enter** key to remove the selected message from the **MESSAGE LIBRARY**. The display screen will indicate that the message has been deleted and how many messages currently remain in the **MESSAGE LIBRARY**. Press any key to continue. You will then be returned to the menu from which you started, the **MESSAGE LIBRARY MENU** or the **USER MENU**. To end the search without selecting any messages for deletion press the **Esc** key.

If the message selected for deletion is currently used in one or more sequences, the control console display will show the first sequence in which the message is used. You must delete all sequences in which the selected message is used before you can delete the message from the message file. You will be asked if you want to delete the sequence in which the message is used. If you press the **Y** key for yes the sequence will be deleted and you can now select the message again for deletion. If you press the **N** key for no or any other key you will be returned to the **User MENU** and the sequence will not be deleted. If the message is used in more than one sequence you will have to repeat the above process until all sequences in which the message has been used have been deleted.

Use this function to remove special messages from the file that will probably never be used again to avoid filling the file with unnecessary messages.

- 2. SEQUENCE LIBRARY MENU -

To add, edit, and delete sequences in the **SEQUENCE LIBRARY**.

Select **2** from the **USER MENU** to access the **SEQUENCE LIBRARY MENU**.

The **SEQUENCE LIBRARY MENU** provides the ability to create new sequences, edit user-created sequences, and delete unwanted user-created sequences from the **SEQUENCE LIBRARY**. Select the desired function from the **SEQUENCE LIBRARY MENU** or press the **Esc** key to return to the **USER MENU** and use the special function keys **F4**, **F5**, and **F6** to access the **SEQUENCE LIBRARY**.

1. CREATE A NEW SEQUENCE

To select messages from the message file, organize them into a sequence, assign display time intervals and characteristics, and save the sequence in the **SEQUENCE LIBRARY**.

Select **1** from the **SEQUENCE LIBRARY MENU** or press **F4** from the **USER MENU** to create a new sequence and add it to the **SEQUENCE LIBRARY**.

The message "You may add at most 16 messages to a sequence. Press Enter to continue. Press Esc to quit" will appear on the control module display screen. Press the **Enter** key to continue or the **Esc** key to quit and return to the **USER MENU**.

If you pressed the **Enter** key to continue the sequence creation process you will see the message "Press Enter to select message 1. Press Esc to cancel creating sequence." Press the **Enter** key to add the first message to the sequence.

You now have access to the **MESSAGE LIBRARY**. Select the first message to be added to the sequence by scrolling through the **MESSAGE LIBRARY**. You can select the desired message by pressing the key that represents the first character in the message to jump to the appropriate section of the **MESSAGE LIBRARY**, then scroll through the messages by pressing the **Up-Arrow** key and the **Down-Arrow** key.

NOTE: Messages that are required to make up the sequence must already be in the **MESSAGE LIBRARY**. Use the **Create a New Message** function (**F1** from the **USER MENU**) to add the required messages to the **MESSAGE LIBRARY**.

The messages are arranged alphabetically in the **MESSAGE LIBRARY** with messages beginning with numerals or special characters located at or near the top of the file. A blank message, used to create messages that flash or have pauses in between messages, will appear at the beginning of the file. Use the **Up-Arrow** key and the **Down-Arrow** key to step through the **MESSAGE LIBRARY** one message at a time. You can jump directly to any section of the **MESSAGE LIBRARY** by pressing the key representing the first letter of the first word of the desired message. The left hand portion of the control module display will show the

message selected in the center, the one preceding it in the library above and the message following the one selected below it. The right hand side of the display will show the selected message exactly as it will appear on the message sign. When the first or last message in the **MESSAGE LIBRARY** is selected, it will be preceded or followed by a blank indicating the beginning or the end of the file has been reached.

When the desired message has been selected, press the **Enter** key to add it to the sequence.

Now enter the message display time. A default display time will appear in parenthesis. You can accept the default time by pressing the **Enter** key, or you can override the default time by entering the desired display time. Display times from 0.1 to 99 seconds may be entered. Press the **Enter** key after you have entered the desired display time.

You will now be prompted to:

Press Enter to select message {next}.
Press End if finished adding messages.
Press Esc to cancel creating sequence.
Press Del to remove message {previous}.

If you press the **Enter** key you will be returned to the beginning of the **MESSAGE LIBRARY** for selection of the next message in the sequence. If you press the **End** key you will be prompted: "**Want to save this sequence (Y/N).**" Press the **Y** key to save the new sequence to the **SEQUENCE LIBRARY** or the **N** key to quit and return to the **USER MENU**. If you press the **Esc** key you will quit the sequence creation process and return to the **USER MENU**. If you press the **Del** key the preceding message in the sequence will be deleted and you will be prompted to make a new selection for that message in the sequence.

Press the **Enter** key to select the next message. You will now be returned to the beginning of the **MESSAGE LIBRARY** for selection of the next message in the sequence. Remember, you can add up to 16 messages in a sequence. When you have entered the last message in the sequence, press the **End** key to indicate that the sequence has been completed. The control module screen will display the message "**Want to save this sequence (Y/N)?**" If you entered the sequence correctly, press **Y** for yes to add the sequence to the **SEQUENCE LIBRARY**. The display screen will indicate the sequence has been saved and how many sequences are presently in the **SEQUENCE LIBRARY**. Press any key to continue. You will then be returned to the menu from which you started, the **SEQUENCE LIBRARY MENU** or the **USER MENU**. If you made a mistake and would like to try again, press **N** for no. The newly created sequence will not be added to the **SEQUENCE LIBRARY** and you will be returned to the previous menu.

Sequences with flashing messages can also be created by adding blank display messages alternately with the message to be flashed on and off. First create a message of all blank characters by using the space bar. The blank message will be stored at the top of the message file. Now create the sequence. Add the message to be flashed on and off to the sequence at the appropriate location. Enter a very brief display time in the range of 0.3 to 0.6 seconds. Now add the blank message with an equally brief display time. Repeat the process for as many

times as you want the message to flash on and off. Add any other messages that may be required before ending the sequence. The following example demonstrates how this flashing message feature may be used.

<u>MESSAGE</u>	<u>DISPLAY TIME</u>
WORK ZONE AHEAD	2.0 SECONDS
{blank}	0.3 SECONDS
SLOW DOWN	0.6 SECONDS
{blank}	0.3 SECONDS
SLOW DOWN	0.6 SECONDS
{blank}	0.3 SECONDS
SLOW DOWN	0.6 SECONDS
{blank}	0.3 SECONDS
PROCEED WITH CAUTION	2.0 SECONDS

The blank messages count as one message in the sequence the same as the other messages. The limit of 16 messages in a sequence must be observed. In the above example the sequence is comprised of a total of nine messages. The blank message can also be used to create a brief off time between the last and first message in a sequence, if desired.

2. EDIT A SEQUENCE

To revise or correct a sequence in the **SEQUENCE LIBRARY**.

Select **2** from the **SEQUENCE LIBRARY MENU** or press **F5** from the **USER MENU** to access the **SEQUENCE LIBRARY** and edit a sequence.

Locate the desired sequence by pressing the key that represents the first character of the first message of the sequence, then scroll through the **SEQUENCE LIBRARY** by using the **Up-Arrow** key and the **Down-Arrow** key. When the first message of the desired sequence is displayed in the middle row on the left hand side of the screen and the entire sequence is displayed on the right hand side of the screen, press **Enter** to choose the selected sequence for editing. Messages that contain flashing lines will be displayed with the flashing lines shown in lower case letters.

The first component of the selected sequence will be displayed with the current display time. At this point you can enter a revised display time or press the **Enter** key to retain the current display time. The second component of the selected sequence will now be displayed offering the same options. After all of the components of the sequence have been reviewed for editing, you will be returned to the menu from which you started, the **SEQUENCE LIBRARY MENU** or the **USER MENU**.

3. DELETE A SEQUENCE

To delete or remove sequences from the **SEQUENCE LIBRARY**.

Select **3** from the **SEQUENCE LIBRARY MENU** or press **F6** from the **USER MENU** to access the **SEQUENCE LIBRARY** and delete a sequence.

Locate the desired sequence by pressing the key that represents the first character of the first message of the sequence, then scroll through the **SEQUENCE LIBRARY** by using the **Up-Arrow** key and the **Down-Arrow** key. You can examine the contents of the **SEQUENCE LIBRARY** and delete any sequences that are undesirable or no longer needed. The first message of each of the sequences in the file will be displayed on the left hand portion of the control module display. The sequence selected will be in the middle with the sequence preceding above and the sequence following the one selected below. The selected sequence will also be displayed in its entirety on the right hand side of the screen. The display will step through the messages contained in the sequence exactly as they would appear on the message board. Messages that contain flashing lines will be displayed with the flashing lines shown in lower case letters. To delete a sequence from the file, scroll through the file until the desired sequence is displayed on the right hand side of the screen, and press the **Enter** key. You will then be asked if you really want to delete the sequence. Press **Y** for yes to delete the sequence. The display screen will indicate that the sequence has been deleted and how many sequences still remain in the **SEQUENCE LIBRARY**. You will then be returned to the menu from which you started, the **SEQUENCE LIBRARY MENU** or the **USER MENU**. If you press **N** for no or any other key, you will be returned to the previous menu and the selected sequence will not be deleted. If you wish to return to the **SEQUENCE LIBRARY MENU** or the **USER MENU** at any time without deleting any of the sequences in the library, press the **Esc** key.

NOTE: Sequences currently in the **SEQUENCE QUEUE (Q)** should be deleted from the **Q** before they are deleted from the sequence file! If you attempt to delete a sequence that is currently in the **SEQUENCE QUEUE** you will be warned by the message "**This sequence is in the queue. Do you really want to delete this sequence (Y/N)?**" If you respond by pressing the **Y** key the sequence will be deleted from both the **SEQUENCE QUEUE** and the **SEQUENCE LIBRARY**. If you respond by pressing the **N** key, or any other key, the selected sequence will not be deleted. You will then be returned to the **SEQUENCE LIBRARY MENU** or the **USER MENU**.

- 3. DISPLAY QUEUE LIBRARY -

To add sequences to and remove sequences from the **DISPLAY QUEUE LIBRARY** and to display and examine the current contents of the **DISPLAY QUEUE LIBRARY**.

Select **3** from the **USER MENU** to access the **DISPLAY QUEUE LIBRARY**.

The **DISPLAY QUEUE LIBRARY** provides the ability to select sequences from the **SEQUENCE LIBRARY** for display on the message panel, to assign start and stop times and days, to examine the current contents of the **DISPLAY QUEUE LIBRARY**, and to select and remove sequences and programs from the **DISPLAY QUEUE LIBRARY**. Select the desired function from the **DISPLAY QUEUE LIBRARY** or press the **Esc** key to return to the **USER MENU** and use the special function keys **F7**, **F8**, and **F9** to access the **DISPLAY QUEUE LIBRARY**.

1. ADD A SEQUENCE TO THE DISPLAY QUEUE LIBRARY

To select sequences from the **SEQUENCE LIBRARY**, assign start and stop times, add sequences to the **DISPLAY QUEUE LIBRARY**, and display sequences on the message board.

After all of the messages required in the sequence have been added to the **MESSAGE LIBRARY** and the messages have been arranged into a sequences with the appropriate display times, the sequence can be added to the **DISPLAY QUEUE LIBRARY** for presentation on the message board.

Select **1** from the **DISPLAY QUEUE LIBRARY** or press **F7** from the **USER MENU** to access the **SEQUENCE LIBRARY**, select the desired sequence, and add it to the **DISPLAY QUEUE LIBRARY**. The control console LCD will show the sequences in the file, arranged in alphabetical order using the first letter of the first message in the sequence, with the one selected in the middle of the left hand side of the screen, the one preceding it above, and the sequence following the one selected below. Locate the desired sequence by pressing the key that represents the first character of the first message of the sequence, then scroll through the **SEQUENCE LIBRARY** by using the **Up-Arrow** key and the **Down-Arrow** key. If there is only one sequence in the file it will, of course, be located at the top of the file. The sequence selected will be displayed in the right hand side of the control module display screen exactly as it will appear on the main message display. Messages that contain flashing lines will be displayed with the flashing lines shown in lower case letters. Once you have located the desired sequence, press the **Enter** key to add the sequence to the **DISPLAY QUEUE LIBRARY**. Make sure that the desired sequence is displayed on the right hand side of the control console display exactly as you want it to appear on the main message display panel. You can, at any time, press the **Esc** key to exit the **SEQUENCE LIBRARY** and return to the **DISPLAY QUEUE LIBRARY** or the **USER MENU** without selecting any of the sequences for placement in the **QUEUE LIBRARY**.

After the desired sequence has been selected for placement in the **DISPLAY QUEUE LIBRARY**, the system will advance to the "**DISPLAY MODE**" screen.

Press the **1** key if you want the sequence to be displayed continuously. The sequence will be displayed indefinitely until it is either deleted from the **DISPLAY QUEUE LIBRARY** or it is replaced by another continuously displayed sequence. You will then be informed that the sequence has been added to the **DISPLAY QUEUE LIBRARY** and how many sequences are presently in the **DISPLAY QUEUE LIBRARY**. Press any key to continue. You will be returned to the menu from which you started, the **DISPLAY QUEUE LIBRARY** or the **USER MENU**.

Press the **2** key if you want the sequence to be displayed only on certain days of the week and at certain times of the day. You will then be asked to choose the days of the week on which you want the sequence displayed, starting with **1** for Sunday, **2** for Monday, **3** for Tuesday, and so on up to **7** for Saturday. Press the appropriate number keys to select the days on which you want the sequence displayed, then press **Enter**. Now enter the starting time for the days you just selected by first entering the **hour** (24-hour format), then the **minute** for the time you want the sequence display to start. Press the appropriate number keys, then press **Enter**. Now enter the stopping time for the days selected by first entering the **hour**, then the **minute** for the desired time you want the sequence to stop.

If you have assigned start and stop times and days, you will actually add more than one sequence to the **DISPLAY QUEUE LIBRARY**. Each day with associated start and stop times is considered one entry or sequence in the **DISPLAY QUEUE LIBRARY**.

You will now be asked if you want to add the sequence(s) to the **DISPLAY QUEUE LIBRARY**. If everything was entered correctly, press **Y** for yes. The sequence(s), with the selected start and stop times and days will be placed in the **DISPLAY QUEUE LIBRARY** in the appropriate chronological order for display at the proper times and days. The display screen will indicate that one or more sequences have been added to the **DISPLAY QUEUE LIBRARY** and how many sequences are currently in the **DISPLAY QUEUE LIBRARY**. Press any key to continue. You will then be returned to the menu from which you started, the **DISPLAY QUEUE LIBRARY** or the **USER MENU**. If you made a mistake and would like to start over, press **N** for no and you will be returned to the **DISPLAY QUEUE LIBRARY** or the **USER MENU** where you can try again.

If the desired start and stop times for a sequence bridge from one day to the next, that is start on Tuesday evening 6:30 PM and run until Wednesday morning 6:00 AM, simply break the sequence up into two segments. One that runs from Tuesday evening 6:30 PM (hour 18, minute 30) until Tuesday midnight (hour 24, minute 00) and one that runs from Wednesday midnight hour 0, minute 00) until Wednesday morning 6:00 AM (hour 6, minute 00). This will result in continuous display of the sequence for the desired time period.

Press the **3** key if the sequence is to be displayed upon the occurrence of a special event such as radar speed monitor detected speeds above or below a certain threshold or a signal from a traffic queue detector. Anytime the programmed special event is not occurring a default

sequence can be displayed. Default sequences are placed in the **DISPLAY QUEUE LIBRARY** for either continuous display or timed displayed and will be displayed at the appropriate days and times whenever the special event sequence is not being displayed.

If you add a sequence or sequences to the **DISPLAY QUEUE LIBRARY** and they are not displayed on the sign panel as you expected, there is probably a conflict in the **DISPLAY QUEUE LIBRARY**. Proceed to the next section of the manual to display the current contents of the **DISPLAY QUEUE LIBRARY** to see if there is more than one sequence with the same display days and times or overlapping display days and times. If a sequence is currently being displayed continuously and another sequence is selected for continuous display, the currently displayed sequence will automatically be deleted and the new sequence will be displayed. If sequences with automatic display days and times are currently in the **DISPLAY QUEUE LIBRARY** and a sequence is added to the **DISPLAY QUEUE LIBRARY** to be displayed continuously, the newly added sequence will override the timed sequence and display immediately. When that newly added sequence is deleted from the **DISPLAY QUEUE LIBRARY** the timed sequences will resume displaying according the programmed display schedule.

For radar speed monitor equipped units, the special event sequence can be displayed if the speed of the approaching vehicle is above a certain speed, below a certain speed, or within a speed window. At the "**Display sequence if speed is above:**" prompt, enter the speed above which you want the special event sequence to be displayed. Then at the "**Display sequence if speed is below:**" prompt, enter the speed below which the special event sequence will be displayed. If you do not want an upper threshold simply accept the default speed (**200**) which is above the upper limit of the speed monitor. The special event will always be displayed anytime the approaching vehicle's speed is above the lower threshold. For example, if the average speed of approaching traffic is above 55 MPH displaying the sequence:

**YOUR | SPEED IS | _ _ _ MPH
SLOW | DOWN | NOW!**

can be a very effective means of reducing traffic speed prior to entering a work zone. When the speed of approaching traffic is below the lower speed threshold, a default sequence will be displayed. If there is no default sequence in the **DISPLAY QUEUE LIBRARY** to be displayed at the current time, the message display panel will be blank.

To display a special event sequence anytime the approaching vehicle's speed is below a certain threshold, at the "**Display sequence if speed is above:**" prompt, enter **0** (zero), a speed threshold which is below the minimum speed of the radar speed monitor's detection range. Then at the "**Display sequence if speed is below:**" prompt, enter the speed below which you want the sequence to be displayed. For example, if traffic speed dropped below 35 MPH through the work zone displaying the sequence:

**PLEASE | MAINTAIN | SPEED
THRU | WORK | ZONE**

would be appropriate to help keep traffic moving through the area.

You can have different special event sequences display if the speed of approaching vehicles falls into a preset set of speed "windows". For example if the detected speed is greater than 45 mph, but less than 55 mph, display sequence "A". If the detected speed is greater than 55 mph, but less than 65 mph, display sequence "B". And finally, if the detected speed is greater than 75 mph, display sequence "C". Simply input the desired lower and upper limits of the speed window when you are prompted following the selection of the special event mode of sequence display.

2. DISPLAY SEQUENCE QUEUE LIBRARY

To examine the contents of the **DISPLAY QUEUE LIBRARY**, the message sequences, their start and stop times, and which sequence is currently active (being displayed).

Select **2** from the **DISPLAY QUEUE LIBRARY MENU** to display the **DISPLAY QUEUE LIBRARY**. The sequences in the **DISPLAY QUEUE LIBRARY** will be displayed in chronological order with Sunday (day 1), or the first day in the **QUEUE**, at the top of the file. Press the **Up-Arrow** key to scroll up in the file and the **Down-Arrow** key to scroll down. The first message of each sequence in the **DISPLAY QUEUE LIBRARY** will be displayed on the left hand side of the control module screen with the selected sequence in the middle, the one preceding the one selected above, and the sequence following the one selected below. The sequence currently selected will also be displayed on the right hand side of the screen exactly as it will appear on the main display along with the programmed start and stop times shown above the sequence as it is displayed on the screen. The start time is shown as **B: DAY HOUR MINUTE** and the stop time is shown as **E: DAY HOUR MINUTE**. If the sequence selected is currently active (being displayed) or it is the next sequence chronologically to be displayed the start time will be preceded with an * instead of a **B**.

If the sequence in the Queue was programmed to run continuously, the start time will be shown as ******** and the stop time will be displayed as **"forever"**.

When you are finished examining the **DISPLAY QUEUE**, press the **Esc** key to quit and return to the menu from which you started, the **DISPLAY QUEUE LIBRARY MENU** or the **USER MENU**.

3. DELETE A SEQUENCE FROM THE DISPLAY QUEUE LIBRARY

To locate and remove a sequence from the **DISPLAY QUEUE LIBRARY**.

Select **3** from the **DISPLAY QUEUE LIBRARY MENU** to access the **DISPLAY QUEUE LIBRARY**. Use the **Up-Arrow** key and the **Down-Arrow** key to scroll up and down in the **DISPLAY QUEUE LIBRARY** to locate the desired sequence. The sequences will be

arranged in chronological order in the **DISPLAY QUEUE LIBRARY**. The sequence selected will appear on the left hand side of the control module display screen with the one preceding it above and the sequence following the one selected below. The sequence selected will also appear in the right hand side of the display screen exactly as it will appear on the main display with the start and stop times shown above.

When you have selected the sequence you want to delete, press the **Enter** key to delete the sequence from the **DISPLAY QUEUE LIBRARY**. The display screen will indicate that the sequence has been deleted from the **DISPLAY QUEUE LIBRARY** and how many sequences still remain in the **DISPLAY QUEUE LIBRARY**. Press any key to continue. You will then be returned to the menu from which you started, the **DISPLAY QUEUE LIBRARY MENU** or the **USER MENU**. If the sequence you selected for deletion was currently being displayed, it will be removed from the display **QUEUE** and the sign panel display will go blank. If you do not want to delete any of the sequences in the queue, press the **Esc** key to quit. You will be returned to the **DISPLAY QUEUE LIBRARY MENU** or the **USER MENU** and none of the sequences in the **DISPLAY QUEUE LIBRARY** will be removed.

- 4. MESSAGE DISPLAY CHECK Menu -

To select messages from the **MESSAGE LIBRARY**, display the messages on the sign panel, and delete messages from or clear the sign panel.

Select **4** from the **USER MENU** to access the message sign panel display functions.

The **MESSAGE DISPLAY CHECK** menu provides the ability to select messages from the **MESSAGE LIBRARY**, display them on the sign panel to check the appearance of the messages on the actual sign display, and delete messages from the sign panel.

1. SELECT A MESSAGE FOR DISPLAY

To select a message from the **MESSAGE LIBRARY** and display it on the main sign panel display.

NOTE: Feature not implemented at this time.

2. CLEAR A MESSAGE FROM DISPLAY

To remove messages from and blank the main display.

Select **2** from the **MESSAGE DISPLAY CHECK** menu any time a message is being displayed on the main message display. The message will be removed from the display and the display will go blank. If an active sequence in the **QUEUE** is currently being displayed, the main display will momentarily go blank then the sequence will resume immediately and continue to display the active sequence.

After the display goes blank, you will be returned to the **MESSAGE DISPLAY CHECK** menu.

3. SIGN PANEL DISPLAY ON/OFF

To switch the main display panel on or off.

Select **3** from the **MESSAGE DISPLAY CHECK** menu to switch the main display panel on or off. The control console display will indicate whether the main display is currently on or off. Simply press the appropriate key, **Y** for yes to switch the display to the state opposite that indicated on the console display, or **N** (or any other key) for no to let the display its present state.

You can also use the special function key **F10** while in the **USER MENU** to switch the main

display panel on or off. Using this special function allows you to switch off the main display panel and stop displaying messages or sequences without switching off the main power and disrupting normal control computer activities. You can switch the display back on at any time and resume displaying the previously programmed messages and sequences.

If the display is currently operating, when you press the **F10** key, the control module display will display the message "**Display Status. At present, display is ON. Want to turn it OFF?**". If you press the **Y** key for **YES**, the display will turn off and no longer display any messages. If you press the **N** key, or any other key, for **NO** the display will remain on. If the display is currently off, when you press the **F10** key, the control module display will display the message "**Display Status. At present, display is OFF. Want to turn it ON?**". If you press the **Y** key for **YES**, the display will turn back on and resume displaying the appropriate messages. If you press the **N** key, or any other key, for **NO** the display will remain off.

4. RETURN TO USER MENU

To return to the **USER MENU**.

Select **4** from the **MESSAGE DISPLAY CHECK** menu to exit and return to the **USER MENU**. Pressing the **Esc** key will also return you to the **USER MENU** at any time.

5. RETURN TO THE MAIN MENU

To leave the **USER MENU** and return to the **MAIN MENU**.

Select **5** from the **USER MENU** and you will be returned to the **MAIN MENU**. When you are finished with any activities conducted from the **USER MENU**, it is recommended that you return to the **MAIN MENU** to put the password protection back into effect. For anyone to gain access to the **USER MENU** and its associated functions, they must have a valid password.

NOTE: Pressing the **Esc** key anytime while you are using one of the sub-menus will return you to the **MAIN MENU**. Pressing the **Esc** key will always return you to the next highest menu in the menu hierarchy.

NOTE: To help insure that the full force of the **SILENT MESSENGER**'s password protection features are always in effect when the unit is left unattended, any time that there is no keyboard activity for more than five minutes the main control console will automatically return to the **MAIN MENU**.

2. SUPERVISOR MENU

Select **2** from the **MAIN MENU** to access the **SUPERVISOR MENU**. Access to the **SUPERVISOR MENU** requires a supervisor level password or the Master Password. A user level password will not permit access to the **SUPERVISOR MENU**. The **SUPERVISOR MENU** provides access to the **USER LIBRARY**, the **SYSTEM SETTINGS**, and the **SYSTEM STATUS** menus. These menus are used to set up, check, and maintain the message sign control computer.

- 1. USER LIBRARY MENU -

To review, add users to, and delete users from the **USER LIBRARY**.

Select **1** from the **SUPERVISOR MENU** to access the **USER LIBRARY MENU**.

The **USER LIBRARY MENU** provides the capability to add new users and their passwords to the **USER LIBRARY**, review the current list of users and their passwords, and remove inactive or unwanted users from the **USER LIBRARY**.

1. REVIEW USER LIBRARY

To examine the current list of users and supervisors

Select **1** from the **USER MENU** to display the current list of users and supervisors.

Both users and supervisors are included in the list. Supervisor's names are preceded by an asterisk (*) to discriminate supervisors from users. User's assigned passwords are displayed to the right of their names in quotes. For security reasons, supervisor's passwords are not displayed. Supervisor's passwords are only displayed while in the **SUPER USER MENU**. Supervisors and users are listed in the order in which they were entered with the earliest entries listed first and the most recent entry listed last.

Use the **Down-Arrow** key to scroll down through the list and the **Up-Arrow** to scroll up through the list. Press the **Esc** key to quit when you are finished reviewing the supervisor and user list. You will be returned to the **USER LIBRARY MENU**.

2. ADD NEW USER

To add a new user to the **USER LIBRARY**.

Select **2** from the **USER LIBRARY MENU** to add a new user to the **USER LIBRARY**.

The first step in adding a new user to the **USER LIBRARY** is to enter their name. Use the person's last name, first name, or nickname. A total of eight characters is available for the individual's name. Enter the name using upper and lower case letters as desired, then press the **Enter** key.

The next step is to enter a password for the new user. The password may consist of any combination of letters, numerals, and special characters, up to a total of six characters. Select something that will be easy for the person to remember, such as initials, a nickname, company name, etc. Special characters such as \$, %, &, *, etc., can also be used. Enter the password and press the **Enter** key. Notice that the password is not displayed as you type. This provides additional security in the event that someone is watching the display while you are entering a new user and their password. After you enter the password you will be asked to retype it to verify that it was entered correctly. Enter the new user's password again, exactly as you entered it the first time. Again, the password will not be displayed as you type it. If the password matches, the new user and their password will be added to the **USER LIBRARY** and you will be returned to the **USER LIBRARY MENU**. If the password entered to verify the original password entry does not match, you will have to reenter the new user's password and correctly verify it.

Now you must choose access privileges for the new User. Select **1** do allow the new User complete access to both the **QUICK PROGRAMMING MENU** and the **User MENU**. Select **2** to allow the new User access to only the **QUICK PROGRAMMING MENU**.

The new user is now listed in the **USER LIBRARY** and will have access to the **USER MENU**. **Users** do not have access to the **SUPERVISOR MENU** or the **SUPER USER MENU**. Press any key to continue.

3. DELETE USER

To delete or remove a user from the **USER LIBRARY**.

Select **3** from the **USER LIBRARY MENU** to access the **USER LIBRARY** and delete users from the file.

A complete list of current users and supervisors will be displayed. Users and supervisors are listed by name in the order in which they were entered with the most recent additions listed first, at the top of the file. Passwords are not displayed for security reasons. Supervisors will have an asterisk (*) to the left of their names. Use the **Up-Arrow** key and the **Down-Arrow** key to scroll up and down the file. When the name of the user you want to delete is displayed, press the appropriate number key to indicate your choice, then press the **Enter** key to remove that user from the file. You can return to the **USER LIBRARY MENU** at any time without deleting any users by pressing the **Esc** key to quit.

Note that although supervisors are displayed, you cannot delete supervisors from the **USER LIBRARY MENU** from within the **SUPERVISOR MENU**. Supervisors can be added or deleted only from the **SUPER USER MENU** using the Master Password.

- 2. CHANGE SYSTEM SETTINGS MENU -

To examine current system operating parameters and update as required.

Select **2** from the **SUPERVISOR MENU** to access the **CHANGE SYSTEM SETTINGS MENU**.

The **CHANGE SYSTEM SETTINGS MENU** provides the capability to check and update system operating parameters such as time and date, LCD screen prompt language, modem type and telephone numbers (only if system is equipped with a modem), automatic shutdown voltage, and display brightness limits. Improperly changing system operating parameters can lead to unexpected and undesirable system operation. Therefore access to the **SUPERVISOR MENU** should be restricted, through password issuance, to qualified, trained personnel. A precautionary message is displayed warning the operator that "***Changing these settings may adversely affect system behavior!***" to help avert any potential problems.

1. SET TIME AND DATE

To check and/or set the correct time and date in the control computer's real time clock.

Select **1** from the **CHANGE SYSTEMS SETTINGS MENU** to display the current time and date and to change the time and date to a new setting.

Press the **Enter** key to change the time and date. Press the **Esc** key to quit. The current settings will be displayed in parenthesis. Press the **Enter** key to retain the current setting or enter the correct value, then press **Enter**. The value for hours must be in **24-hour format**. Continue in the same manner to complete setting the time and the month, day, and year. The control computer's real time clock will be set to the exact values displayed or entered. Remember the clock must be adjusted at least two times a year when the change from standard time to daylight saving time occurs. The clock setting should also be checked periodically to make sure it is correct. Correct sequence start and stop times depend on precise setting of the real time clock.

2. CHANGE LANGUAGE CHOICE

To select the language in which the LCD screen prompts are displayed

Select **2** from the **CHANGE SYSTEM SETTINGS MENU** to select the desired language.

Presently, English, French and Spanish LCD screen prompts are available. Simply press the associated number key to choose the desired language. The system will immediately begin displaying the screen prompts in that language. The screen prompts will remain in that language until changed by using the **CHANGE LANGUAGE CHOICE** function. Remember, you will need to understand enough about the language chosen, or follow the menu structure

as indicated in the **Operation and Maintenance Manual** precisely to return to the original language!

You can return to the **SUPERVISOR MENU** at any time by pressing the **Esc** key. The **Esc** key will always return you to the next highest menu in the menu hierarchy.

3. SET SHUTDOWN VOLTAGE

To set the low voltage shutdown level; the battery bank voltage level at which the display will be shut off to conserve battery power and prevent over discharge of the battery bank.

Select **3** from the **CHANGE SYSTEM SETTINGS MENU** to examine the current low voltage shutdown point and/or change the low voltage shutdown setting to a new value.

The low voltage shutdown point is factory set at 10.7 Volts. This shutdown point will protect the battery bank from being over-discharged in situations, because of surrounding obstructions, where the battery bank is not receiving sufficient energy input from the solar array. In the unlikely event the battery bank is discharged to a voltage level of 0.2 Volts greater than the auto-shutdown point, a low battery caution message will be displayed on the message display panel. If the battery bank voltage reaches 10.7 Volts or less, the control computer will blank the main sign display to conserve battery energy. The display will remain blank until the battery bank voltage returns to a level of 12.0 Volts or greater, when the sign will resume displaying the appropriate message sequence from the sequence display queue. All messages, sequences, and programs stored in the control computer will remain intact.

The factory setting of 10.7 Volts is appropriate for standard lead acid flooded batteries. If sealed lead acid or gel electrolyte batteries are substituted for the original factory supplied batteries, the low battery cutoff voltage may need to be changed to a higher value to insure that the batteries are not damaged by over-discharging. It is advisable to consult with factory service personnel prior to making any changes in the low battery voltage cutoff point.

NOTE: The auto-shutdown voltage cannot be set to values less than 10.7 Volts.

If you inadvertently select the **Set Shutdown Voltage**, item **(3)** from the **CHANGE SYSTEM SETTINGS MENU**, simply press the **Enter** key once to return to the **CHANGE SYSTEM SETTINGS MENU** without altering the shutdown voltage. The standard factory default setting will remain in effect.

4. SET BRIGHTNESS (High/Low) LEVELS

To change the high and low limits for the automatic brightness control for the main sign display.

Select **4** from the **CHANGE SYSTEM SETTINGS MENU** to change the main display automatic brightness control limits.

The high and low limits for the automatic display brightness control function are preset at the factory to levels that will provide acceptable operation under nearly any operating conditions. The automatic brightness control system takes into account such environmental conditions as ambient lighting, direction or location of the sun, clear versus overcast conditions, and headlights from oncoming vehicles. Under certain unusual operating conditions the high and low brightness limits may need to be changed from the normal factory settings. If you think you have a situation that may require changing these settings, consult factory personnel to discuss your particular application.

The high brightness limit sets the ambient light level at which the display will be at maximum brightness. The low brightness limit sets the ambient light level at which the display will be at minimum brightness. At ambient light levels in between the high and low limits, the display intensity will vary linearly from maximum to minimum, automatically adjusting to current ambient light conditions.

Arbitrarily changing the high and low brightness limits can cause abnormal operation of the display, i.e. setting the high brightness limit lower than the low brightness limit which will cause the display to remain at minimum intensity regardless of ambient lighting conditions. Incorrect settings can also result in erratic display operation.

Factory default settings are **3500** for the limit on high intensity and **500** for the limit on low intensity. Check these and other system settings periodically to insure proper message sign operation.

If you inadvertently select the **Set Brightness Levels** item (4) from the **SYSTEM SETTINGS MENU** simply press the **Esc** key to return to the **SYSTEM SETTINGS MENU** without altering the display brightness settings. The current settings will remain in effect.

5. CLEAR ENTIRE DISPLAY QUEUE LIBRARY

To remove all sequences from the **DISPLAY QUEUE LIBRARY**.

Select **5** from the **CHANGE SYSTEMS SETTINGS MENU** to completely clear the **DISPLAY QUEUE LIBRARY** of all sequences and start and stop times.

This function provides a quick, simple method of removing all current entries in the **DISPLAY QUEUE LIBRARY**. This function is particularly useful when the **DISPLAY QUEUE LIBRARY** contains a large number of entries which would otherwise have to be deleted one at a time using the **DELETE A SEQUENCE FROM THE DISPLAY QUEUE LIBRARY** function in the **USER MENU**. Simply respond to the screen prompt with **Y** for **YES** to clear the **DISPLAY QUEUE LIBRARY** or the **N** key for **NO**, or any other key, to continue without clearing the library.

6. CHANGE (Low Battery) CAUTION MESSAGE

To change the message or sequence that is displayed automatically when the battery bank voltage drops to within 0.2 Volts of the automatic shutdown voltage setting.

Select **6** from the **CHANGE SYSTEMS SETTINGS MENU** to change the low battery caution message.

The factory default low battery caution message is the word **CAUTION** on the center line of a three-line normal character size on for one second followed by a blank screen for one second. This message indicates that the battery bank has reached a critically low level and should be recharged as soon as possible. This message continues to indicate that some condition exists along the route ahead that mandates that the driver exercise caution.

The low battery caution message can be changed, if desired, by selecting **6** from the **SYSTEMS SETTINGS MENU** and following the prompts on the screen. The procedure is exactly the same as entering a new **QUICK PROGRAMMING** sequence. Just keep in mind that this message will be displayed whenever the battery bank has dropped to a critically low level. Therefore the message should be configured so as to minimize energy consumption and enhance run time.

7. CHANGE MODEM SETTINGS

To change dial-out numbers and modem type.

Select **7** from the **CHANGE SYSTEMS SETTINGS MENU** to access the **CHANGE MODEM SETTINGS MENU**.

The **CHANGE MODEM SETTINGS MENU** allows you to change the phone numbers that the Control Console dials when certain types of faults are detected, such as low battery condition or display panel problems and to select the type of modem used.

Select **1** from the **CHANGE MODEM SETTINGS MENU** to change the phone numbers. If a modem is installed you will be prompted to key in the phone number for each of up to four numbers that the system will dial in the event of a fault condition. The numbers will be dialed in the order in which they are listed.

NOTE: This function is not currently implemented!

Select **2** from the **CHANGE MODEM SETTINGS MENU** to change the modem type. Select the modem type according to the installed make and model designations on the modem. Connect the modem to the **MODEM** port connector on the rear of the **Control Console** using the standard 9-pin serial cable supplied with the modem. Press the appropriate number key to select the correct modem type.

Following the selection of a modem type, the **Control Console** will initialize the connected modem. The system is then ready for remote control programming.

8. SIGN PANEL FAIL SAFE STATUS

To temporarily disable or re-enable the **SIGN PANEL FAIL SAFE FEATURE**.

Select **8** from the **CHANGE SYSTEM SETTINGS MENU** to access the **SIGN PANEL FAIL SAFE** screen.

The **SIGN PANEL FAIL SAFE** screen displays the current status of the **SIGN PANEL FAIL SAFE FEATURE**, either **ACTIVE** or **DISABLED**. The current status of the **SIGN PANEL FAIL SAFE FEATURE** can be changed by pressing the **y** key. To accept the status setting, simply press the **Esc** key. When the **SIGN PANEL FAIL SAFE FEATURE** is **ACTIVE** (default), anytime that the data signal from the Control Console is not properly returned by the sign panel display modules, the Control Console automatically attempts to correct the detected fault. If the Control Console is able to correct the fault, normal operation of the sign panel will resume and the following message will be displayed on the Control Console display screen:

**- CAUTION -
TEMPORARY LOSS OF DATA SIGNAL
FROM SIGN PANEL HAS OCCURRED!!**

The warning message can be cleared from the screen by making a menu selection, **Q**, **1**, **2**, or **3** and entering a valid password. This type of error is a "soft" error and is not an indication that there is anything wrong with the message board. "Soft" errors can be caused by various forms of electromagnetic interference and are automatically detected and corrected by the Control Console.

If the Control Console is unable to correct the fault after two attempts, the sign panel is shut down and the following message is displayed on the Control Console display screen:

**- WARNING -
LOSS OF DATA SIGNAL FROM
SIGN PANEL HAS OCCURRED!!**

The sign panel will be blanked to prevent the display of an inappropriate message. The Control Console display screen instructs the operator to switch **MAIN POWER OFF**, then **ON** to reset the sign panel, then to use the **Check Display Modules** function in the **Supervisor MENU** to locate the problem display module. At this point the failed display module can be replaced or temporarily moved to position 24 to allow the sign panel to be placed back into service. If a failed display module must be left in the sign panel, the **SIGN PANEL FAIL SAFE FEATURE** must be **DISABLED** to permit the sign panel to continue operating with the defective display module in place.

Following the repair or replacement of the defective display module the **SIGN PANEL FAIL SAFE FEATURE** should be enabled to ensure proper operation of the message board.

NOTE: The Control Console automatically defaults to **SIGN PANEL FAIL SAFE FEATURE ENABLED** when **MAIN POWER** is switched **OFF** and back **ON**.

If the defective display module is temporarily removed from the sign panel for repair or replacement insert the connector that was plugged into display module #24 into the display module bypass plug located behind display module position #24. This will permit the sign panel to operate normally until a display module is returned to position #24.

- 3. SYSTEM STATUS MENU -

To display and check system operating parameters.

Select **3** from the **SUPERVISOR MENU** to access the **SYSTEM STATUS MENU**.

The **SYSTEM STATUS MENU** provides the ability to review the current status of the **MESSAGE LIBRARY**, the **SEQUENCE LIBRARY**, and the **DISPLAY QUEUE LIBRARY** and to test the individual character modules on the message display panel, check the battery bank voltage, current ambient light level, and the cellular modem performance. When system status checks and tests are completed, press the **Esc** key to return to the **SUPERVISOR MENU**.

1. DISPLAY LIBRARY / QUEUE STATUS

To display the current number of entries in the **MESSAGE LIBRARY**, the **SEQUENCE LIBRARY**, and the **DISPLAY (QUEUE) LIBRARY**.

Select **1** from the **SYSTEM STATUS MENU** to access the **LIBRARY** status report.

The report shows the current number of messages in the **MESSAGE LIBRARY** plus the maximum number of messages permitted, the current number of sequences in the **SEQUENCE LIBRARY** plus the maximum number of sequences permitted, and the current number of sequences in the **DISPLAY (QUEUE) LIBRARY** plus the maximum number permitted. Press any key to return to the **SYSTEM STATUS MENU**.

2. TEST DISPLAY MODULES

To test all pixels or dots in the main display panel one character at a time.

Select **2** from the **SYSTEM STATUS MENU** to begin testing the character modules.

The control module display screen will show which module is currently being tested. All pixels or dots should illuminate on the selected character. If all of the pixels are not lighted, there is a problem with that particular character and it should be replaced as soon as possible. Press the **Right-Arrow** key to advance forward one character and the **Left-Arrow** key to move backward one character. When all characters have been tested, press the **Esc** key to quit and return to the **SYSTEM STATUS MENU**.

3. CHECK BATTERY VOLTAGE

To check and display the current battery bank voltage and shutdown voltage setting.

Select **3** from the **SYSTEM STATUS MENU** to display current battery bank voltage.

The current battery bank voltage is displayed along with the message ***low*** or ***ok***. The low voltage shutdown set point and the restart voltage setpoint are also shown. If the current battery voltage is above the low voltage shutdown point (10.7 Volts) the current battery voltage reading will be followed by the message, ***ok***. If the current battery voltage is below the low voltage shutdown point (10.7 Volts), the current battery voltage reading will be followed by the message, ***low***, and the display panel will be shut down. When the battery voltage returns to the automatic restart voltage (12 Volts) the battery condition indicator will switch from ***low*** back to ***ok*** and the display panel will automatically switch back on.

The indication of a low battery bank voltage reading (less than 12 Volts) plus a battery condition indication of ***low*** indicates that the unit went into the automatic shutdown mode and is currently recovering from an low battery voltage condition. The battery bank should be completely recharged from an auxiliary source to insure reliable, long term operation. Typical battery bank voltage readings are 12.8 to 13.8 Volts during daylight hours and 12.2 to 12.5 Volts during hours of darkness. Remember, cleaning the solar panels periodically is essential to reliable operation, particularly during winter months. When the battery voltage check is complete, press any key to exit and return to the **SYSTEM STATUS MENU**.

4. CHECK AMBIENT LIGHT LEVEL

To check and display the current ambient light level and brightness limit settings.

Select **4** from the **SYSTEM STATUS MENU** to display current ambient light level.

The current ambient light level as well as the low brightness limit and high brightness limit set points are displayed on the control module display screen. An ambient light range message is also displayed next to the current ambient light level reading. If the current ambient light level is below the low brightness limit set point, the message ***low*** is displayed indicating that the sign panel display is presently at minimum brightness. If the current ambient light level is in between the low and high brightness limit set points, the message ***ok*** is displayed indicating that the sign panel display brightness is presently somewhere between minimum and maximum brightness. If the current ambient light level is above the high brightness limit, the message ***high*** will be displayed indicating that the sign panel display is at maximum brightness. This ambient light check feature is useful in determining that the display brightness is appropriate for the typical ambient light levels present at the installation site. Press any key to return to the **SYSTEM STATUS MENU**.

5. CHECK CELLULAR MODEM

To check the functions of the cellular modem (if so equipped).

Select **5** from the **SYSTEM STATUS MENU** to activate and check the cellular modem.

Prior to initiating any tests the system warns that activating the cellular modem test sequence may disrupt any ongoing communications. If the system is presently under remote control via the cellular modem, do not proceed with the test! Respond by pressing the **N** key and you will be returned to the **SYSTEM STATUS MENU** without disrupting communications. If the cellular modem is not currently communicating with a remote host you may proceed by pressing the **Y** key.

If the installed modem supports signal quality checking, an automatic test sequence will be initiated which will test and report the quality of the signal currently being received by the cellular modem transceiver. The Control Console display will indicate the current signal quality plus a minimum acceptable value. If the indicated signal quality is below the recommended minimum, check the condition of the antenna and the integrity of the antenna cable and connector. A damaged or corroded antenna whip or connector or a damaged antenna cable will significantly reduce the signal strength. Many times simply moving the location of the antenna, by moving the message board slightly in one direction or the other will dramatically improve cellular transceiver signal quality.

The display will indicate if the installed cellular modem or a wire line modem does not support signal quality checking. Press any key to quit and return to the **SYSTEM STATUS MENU**.

6. DISPLAY SOFTWARE VERSION

To display the current control computer system software version.

Select **6** from the **SYSTEM STATUS MENU** to display the current software version.

The software version number indicates the current status of the control computer software. The current software version is also displayed following the system power-up test routines. Take note of the your current software version when contacting the factory for service or support assistance. The control computer system software can be easily upgraded in the field with an IBM or compatible computer and a **SOLAR TECH** supplied software diskette. Your **SILENT MESSENGER** can always be maintained to the latest and greatest level of performance! Register your **SILENT MESSENGER** with the factory or contact the factory to check on the current software revision level. You can also visit the **SOLAR TECH** web site at www.solartechnology.com to check for current software revisions and updates.

- 4. SYSTEM SHUT DOWN -

NOTE: *Full Matrix Models Only*

To reset the control computer and restart the main program. Used primarily to exit the Message Board control program when updating software in the main control computer.

Select **4** from the **SUPERVISOR MENU** to halt the control computer.

The control computer software will clear the display screen and await further instruction. If you inadvertently select **SYSTEM SHUT DOWN**, simply press the **N** key in response to the message, "Do you really want to quit?". You will be returned to the **SUPERVISOR MENU** and the system will continue to operate normally.

- 5. SYSTEM RE-INITIALIZATION -

To completely clear all user files and re-initialize the system to original factory settings. Used primarily to rid user files of unwanted entries and to insure that the system is set to original factory default settings.

Select **5** from the **SUPERVISOR MENU** to select the System re-initialization function.

Use extreme caution when activating the System re-initialization function!!! All user files will be lost! Follow the prompts on the LCD screen to complete the System re-initialization process or press the **Esc** key to return to the **SUPERVISOR MENU** without activating the System re-initialization process.

- 6. RETURN TO MAIN MENU -

To exit the **SUPERVISOR MENU** and return to the **MAIN MENU**.

Select **6** from the **SUPERVISOR MENU** to return to the **MAIN MENU**.

You can also return to the **MAIN MENU** at any time by pressing the **Esc** key. The **Esc** key will always return you to the next highest menu in the menu hierarchy.

NOTE: To help insure that the full force of the **SILENT MESSENGER**'s password protection features are always in effect when the unit is left unattended, any time that there is no keyboard activity for more than five minutes the main control console will automatically return to the **MAIN MENU**.

3. SUPER USER MENU

Select **3** from the **MAIN MENU** to access the **SUPER USER MENU**. The Master Password is required to access the **SUPER USER MENU**. The **SUPER USER MENU** provides access to the **USER LIBRARY**. The list of supervisors and users can be reviewed, new supervisors can be added to the **USER LIBRARY**, and unwanted supervisors and users can be removed from the **USER LIBRARY**.

- 1. REVIEW USER LIBRARY -

To examine the current list of supervisors and users.

Select **1** from the **SUPERVISOR MENU** to display the current list of supervisors and users.

Both supervisors and users are included in the list. Supervisor's names are preceded by an asterisk (*) to discriminate supervisors from users. Supervisor's and user's passwords are displayed to the right of their names in quotes. Supervisors and users are listed in the order in which they were entered with the earliest entries listed first and the most recent entries listed last.

Use the **Up-Arrow** key and the **Down-Arrow** key to scroll up and down the list. When you are finished reviewing the supervisor and user list press **Esc** to quit and you will be returned to the **SUPER USER MENU**.

- 2. ADD NEW SUPERVISOR -

To add a new supervisor to the supervisor/user file.

Select **2** from the **SUPER USER MENU** to add a new supervisor to the supervisor/user file.

The first step in adding a new supervisor to the supervisor/user file is to enter their name. Use the person's first name, last name, or nickname. A total of eight characters is available for the individual's name. Enter the person's name, using upper and lower case letters as desired, then press the **Enter** or key.

The next step is to enter a password for the new supervisor. The password may consist of any combination of letters, numerals, and special characters, up to a total of six characters. Select something that will be easy for the person to remember such as initials, a nickname, company name, etc. Special characters such as \$, %, &, *, etc., can also be used. Enter the password and press the **Enter** key. Notice that the password is not displayed as you type. This provides additional security in the event that someone is watching the display while you are entering a new supervisor and their password. After you enter the password, you will be asked to retype it to verify that it was entered correctly. Enter the new user's password again, exactly as you

entered it the first time. Again, the password will not be displayed as you enter it. If the password entered matches, the new supervisor and their password will be added to the supervisor/user file and you will be returned to the **SUPER USER MENU**. If the password entered to verify the original password does not match, you will have to reenter the new user's password and correctly verify it.

The new supervisor is now listed in the **USER LIBRARY** and will have access to the **SUPERVISOR MENU** and the **USER MENU**. Supervisors do not have access to the **SUPER USER MENU**.

Note that you can not add users to the supervisor/user file from the **SUPER USER MENU**. Use the **SUPERVISOR MENU** to add users to the supervisor/user file.

- 3. DELETE SUPERVISOR OR USER -

To delete or remove a supervisor or user from the supervisor/user file.

Select **3** from the **SUPER USER MENU** to access the supervisor/user file and delete supervisors or users from the file.

A complete list of current supervisors and users will be displayed. Users and supervisors are listed by name in the order in which they were entered with the most recent additions listed first, at the top of the file. Passwords are not displayed during the delete supervisor/user procedure. Supervisors will have an asterisk (*) to the left of their names. Use the **Up-Arrow** key and the **Down-Arrow** key to scroll up and down through the file. When the name of the supervisor or user you want to delete is displayed, press the appropriate number key to indicate your choice, then press the **Enter** key to remove that supervisor or user from the file. You can return to the **SUPER USER MENU** at any time without deleting any supervisors or users by pressing the **Esc** key to quit.

Note that you can delete both users and supervisors from the **SUPER USER MENU**.

- 4. TIME METER MENU -

To display the current reading on the run time meter and to reset the run time meter to a zero time condition.

Select **4** from the **SUPER USER MENU** to access the **TIME METER MENU**.

The **TIME METER MENU** provides access to the buried run time or hour meter contained within the control computer's real time clock system. The time meter accumulates time in hours and minutes any time that the message sign is actively displaying messages. It provides the added convenience of automatically recording run time for situations where payment for equipment use is based on time used. Simply follow the screen prompts to use the time meter.

1. DISPLAY TIME METER

To display the current contents of the run time meter.

Select **1** from the **TIME METER MENU** to display the current contents of the time meter.

The accumulated time since the last time meter reset will be displayed in hours and minutes. Record the reading and press any key to continue and return to the **TIME METER MENU**.

2. RESET TIME METER

To reset the run time meter to zero.

Select **2** from the **TIME METER MENU** to reset the time meter to a zero time condition.

The screen will display the message "**Do you want to reset the time meter (y/n)?**" Press the **Y** key for **YES** to reset the time meter and return to the **TIME METER MENU**. Press the **N** key for **NO** to return to the **TIME METER MENU** without resetting the time meter.

- 5. RETURN TO MAIN MENU -

To exit the **SUPER USER MENU** and return to the **MAIN MENU**.

Select **4** from the **SUPER USER MENU** to return to the **MAIN MENU**.

You can also return to the **MAIN MENU** at any time by pressing the **Esc** key. Pressing the **Esc** key will always return you to the next highest menu in the menu hierarchy.

MEGA-TECH TOUCH-SCREEN CONTROL CONSOLE (P/N - MB-22-915)

- GETTING STARTED -

When the main power switch, located on the **ENERGY MANAGEMENT SYSTEM CONTROL UNIT (EMS)**, is switched on, the system goes through a self check boot-up procedure. This power-up sequence takes approximately 3-4 minutes during which time the control console display screen will show which functions are being tested and verified and which options are installed. After hardware testing and initialization has been completed, the data files are loaded and the control console screen will display the **SolarTech® Splash Screen** which will contain the Message Board Software Driver version number along with patent and software copyright notices. The unit is now ready for use.

TRAFFIX Menu Structure and Operating Instructions (Version 1.9.17):

SolarTech® Splash Screen – The **SolarTech® Splash Screen** is presented at the completion of system boot-up (power-up & initialization) and whenever an operator logs-out. **Note:** If no touch-screen activity is detected for more than 5 minutes control console will automatically return to the **SolarTech® Splash Screen** and turn the back-light off to conserve power and restore **Password Security** if enabled (unless **Auto-Logout Feature** is disabled – see **Disable Automatic Log Out** in **Supervisor Menu**). To re-activate the **SolarTech® Splash Screen** and turn on the back-light simply touch the touch-screen [**Note:** ensure that the main power switch on the **Energy Management System (EMS)** is in the “On” position!]

Enabling Password Security – Unless specified otherwise at time of order, all **MegaTech®** Control Consoles equipped with the **TRAFFIX®** operating system software are shipped with **Password Security** disabled (no password required for log-in). To enable **Password Security**, log-in to the **Administrator Menu**, select **Add/Remove Administrators** and create at least one **Administrator Password**. **Password Security** is now enabled and multiple passwords may be created for **Quick Picks**, **General Users**, **Supervisors** and other **Administrators**. Additional passwords may be added and/or removed for any operational level at anytime by the appropriate authority. All passwords, and all **Password Security**, may be removed, at any time, by selecting **Reset Controller Settings** from the **Supervisor Menu** – see below for additional details.

Menu Structure and Operating Instructions:

- **? – requires a Quick Picks, User, Supervisor or Administrator Password (if Password Security enabled – see Enabling Password Security)**

- o **Control Console Language Selection** – Enables the operator to select from English, Spanish, French, Portuguese, Dutch or German Console Operating Languages (i.e. Menus, Prompts, Buttons, etc.) – **Note:** Changing the Control Console Operating Language has **no effect** on available Fonts and/or Keyboards – in order to enable various International Keyboards and/or Fonts (such as Arabic, Portuguese, French Canadian etc.) the operator must select the appropriate **Font Set** from the **Change Font Set** option in the **Administrator Menu** – see **Administrator Menu** below.
- **Blank the Sign Panel** – requires a **Quick Picks, User, Supervisor** or **Administrator** Password (if **Password Security** enabled – see **Enabling Password Security**)
 - o Blanks the Sign Panel – follow instructions provided on screen. **Note:** it is recommended that when the Silent Messenger PCMS is not in use the operator select this option to blank the sign panel, place the system in a low-power consumption mode, and leave the Main Power switch on to avoid system to boot up prior to next usage. Only turn the Main Power switch (located on the Energy Management System) off for prolonged periods of non-use or storage.
- **Instant Message** – requires a **User, Supervisor** or **Administrator** Password (if **Password Security** enabled – see **Enabling Password Security**)
 - o Takes the operator directly to the Message Creation and Editing Screen (see Message Creation and Editing Screen below) for Instant Message creation and display on the Sign Panel. Upon completion of Message Creation the newly created Message will be automatically named “Instant Message”, placed in the Message Library and set as the Default Message (unless set as the Override Message – follow instructions provided on screen).
- **Quick Picks** – requires a **Quick Picks, User, Supervisor** or **Administrator** Password (if **Password Security** enabled – see **Enabling Password Security**)
 - o **Up to Six (6) Pre-Programmed Quick Pick Messages for Preview & Display** – User Assigned (see **Set Quick Picks** in **User Menu**). To preview a **Quick Picks Message** touch the desired **Message Window** once (**Message Window** will turn yellow and Message will be displayed in **Message Window**). To select a **Quick Picks Message** as the **Default Message**, and display it on the Sign Panel, touch the desired **Message Window** a second time [**Message Window** will turn from yellow to green indicating that the selected Message is now set as the Default Message (unless set as the Override Message – follow instructions provided on screen) and will be displayed on the Sign Panel].
 - o **Blank** – Blanks the Sign Panel – follow instructions provided.

- o **Done** – Returns to **Main Menu** or directly to **SolarTech® Splash Screen** (Quick Picks operators if **Password Security** is enabled).
- **Main Menu** – requires a **Quick Picks, User, Supervisor or Administrator Password** (if **Password Security** is enabled – see **Enabling Password Security**)
 - o **Quick Picks** – access requires log-in with a **Quick Picks, User, Supervisor or Administrator Password** (if **Password Security** is enabled – see **Enabling Password Security**)
 - **Up to Six (6) Pre-Programmed Quick Pick Messages for Preview & Display** – User Assigned (see **Set Quick Picks** in **User Menu**). To preview a **Quick Picks Message** touch the desired **Message Window** once (**Message Window** will turn yellow and Message will be displayed in **Message Window**). To select a **Quick Picks Message** as the **Default Message**, and display it on the Sign Panel, touch the desired **Message Window** a second time [**Message Window** will turn from yellow to green indicating that the selected Message is now set as the Default Message (unless set as the Override Message – follow instructions provided on screen) and will be displayed on the Sign Panel].
 - **Blank** – Blanks the Sign Panel – follow instructions provided.
 - **Done** – Returns to **Main Menu** or directly to **SolarTech® Splash Screen** (Quick Picks operators if **Password Security** is enabled).
 - o **User Menu** - access requires log-in with a **User, Supervisor or Administrator Password** (if **Password Security** is enabled – see **Enabling Password Security**)
 - **Manage Messages** (Create, Edit, Delete, Preview & Display Messages)
 - **Message Screens:** top left screen (Current Message Screen) displays Message currently being displayed on the Sign Panel (amber), top right screen (Preview Screen) for preview of Messages within Message Library (blue).
 - **Set Default Message (Yellow Check Mark)** – Sets the selected Message from the Message Library as the Default Message and displays the selected Message in the top left screen (Current Message Screen) in amber and on the Sign Panel unless a current Schedule, Event or Override Message is currently taking priority over the Default Message in which case follow instructions provided.

Note: the **Default Message** is that Message which will normally be displayed on the Sign Panel unless superseded by a Schedule or an Event. If there are no Schedules or Events programmed, then the Default Message will be displayed on the Sign Panel at all times; however, if any Schedules or Events are present in the system's Scheduler those Messages will take priority over the **Default Message** as programmed. In this case, when changing the **Default Message**, the operator will be given a warning and the choice of setting the newly selected Message as the **Default Message** or as the **Override Message**. If the newly selected Message is set as the **Override Message** it will not update or change the current **Default Message**, will take priority over all other Schedules and Events and will be displayed on the Sign Panel at all times until changed or cleared. If the newly selected Message is set as the **Default Message**, the system will function normally allowing all Schedules, Events (and the current **Override Message**) to take priority.

To preview a Message from the Message Library touch the desired Message in the list of Messages - the Message will be displayed in blue in the Preview Screen (right). To set a Message from the Message Library as the Default Message and display it on the Sign Panel unless a current Schedule, Event or Override Message is currently taking priority over the Default Message touch the desired Message in the list of Messages and once it is displayed in blue in the Preview Screen (right) touch the **Set Default Message (Yellow Check Mark)** button to set the selected Message as the Default Message, display it in amber in the Default Message Screen (left) and display it on the Sign Panel unless a current Schedule, Event or Override Message is currently taking priority over the Default Message – if any Schedules or Events are present in the system's scheduler follow instructions provided on setting message as Default Message or Override Message – see above explanation.

- **Add (Green Plus Sign)** – Activates the **Message Creation & Editing Screen** to enable creation, naming and saving of a new Message to the Message Library (see **Message Creation & Editing Screen**).
- **Add & Set Default Message (Green Plus Sign & Yellow Check Mark)** – Activates **Message Creation & Editing Screen** to enable creation, naming, saving and *automatic display* of a new Message (sets the newly created and saved Message as the Default Message or Override Message (if any

Schedules or Events are present in the system's Scheduler) and displays it in the Current Message Screen in amber and on the Sign Panel unless a current Schedule, Event or Override Message is currently taking priority over the Default Message – see **Set Default Message (Yellow Check Mark)**, **Add (Green Plus Sign)** and **(Message Creation & Editing Screen)** for additional information and explanation.

- **Edit Message (Pencil-Scissors-Glue)** – Activates **Message Creation & Editing Screen** and loads the selected Message from the Message Library for editing and saving. To edit a Message from the Message Library, touch the desired Message and when it is displayed in blue in the Preview Screen (right) touch the **Edit Message (Pencil-Scissors-Glue)** button to activate the **Message Creation & Editing Screen** (see **Message Creation & Editing Screen**).
- **Delete Message (Black X)** – Removes the selected Message from the Message Library. To delete a Message from the Message Library, touch the desired Message and when it is displayed in blue in the Preview Screen (right) touch the **Delete Message (Black X)** button and follow on-screen instructions. **Note:** The Default Message and Messages assigned to Current Quick Picks may not be deleted. To delete a Message from the Message Library ensure that it is not assigned as the Default Message or to Current Quick Picks.
- **User Menu** – Returns operator to the **User Menu**.
- **Message Creation & Editing Screen:**

General Notes:

- The Active Page in a Message during Message creation & editing is outlined in red. To edit an existing Page, touch the Page once to make it the Active Page (outlined in red). Touch the Active Page a second time to edit the Page contents. To place the cursor in a Text Page for editing, touch the desired location for cursor placement and edit as desired using the keyboard. To change the Page Display Time for the Active Page, touch the Page Display Time window (seconds) once and type in desired display time [Note: two (2) seconds is provided automatically as the default display time for all newly added Pages]. To remove a Page from a Message, touch the Page to make it the Active Page and then touch the **Delete (Trash Can)** button to remove the Page from the Message. New Pages added to a Message will always

be added to the right of the current Active Page. When all editing is completed touch the **Finished (Green & Yellow Smile Face)** button to name and save the Message (naming is not required for Message editing as the Message already had a name prior to editing). To exit without saving any changes touch the **Cancel (Red w/Black X)** button.

- To add a Text Page to a Message, touch the **Create Text Page (Te[])** button. Select desired font (an automatic sizing font labeled “Adaptive” is provided as the default font). Select the desired keyboard. (Note: availability of fonts and keyboard activation is dependent upon current controller font selection - see **Change Font Set in Administrator Menu**). Type desired text. To select specific lines within a Page for text creation/editing (such as in a 3-Line Normal font) touch desired line on the Active Text Page to place cursor as desired. To change the display time of the Active Text Page touch the display time window and type in desired display time.
- To add a Graphic Image Page to a Message touch the **Create Graphic Image Page (Mona Lisa Picture)** button and create a Graphic Image as desired by using the tools provided. When finished touch the **Finished** button. To change the display time of the Active Graphic Image Page touch the display time window and type in desired display time.
- To add a Dynamic Data Source (e.g. radar, time, date, etc.) Page, touch the **Create Dynamic Data Source Page (Thermometer & Time)** button and create the Dynamic Data Source Page by using the tools provided. When finished touch the “**OK**” button. To change the display time of the Active Dynamic Data Source Page touch the display time window and type in desired display time.
- To add a Page from the Master Library, touch the **Insert Page from Master Library (Books)** button. Select the desired Page for insertion from the menu provided, and then touch the “**OK**” button. To change the display time of the Active Page touch the display time window and type in desired display time.
- To add a Page by copying an existing Page from within the Message simply select the Page to be copied and touch the **Copy** button (**Two Sheets of Paper**) – a copy of the currently selected Page will be inserted into the Message just to the right of the selected Page. The newly copied Page may now be edited and/or moved about within the Message just like any other Page.

- To move Pages left or right within a Message simply select the Page to be moved and use the **Move Left (Left Arrow)** or **Move Right (Right Arrow)** buttons to move the Page left or right one space at a time.

Menu Selections:

- **Create Text Page (Te][)** – Inserts a new Text Page in a Message
 - o **Keyboard** – standard keyboard input – multiple keyboards are available and may be selected at anytime by use of the keyboard button at lower right – note keyboard activation is dependent upon current controller language setting – see **Set Controller Fonts** in **Administrator Menu**.
 - o **Display Time (Seconds)** – Page Display Time within Message – touch in window to edit display time (2 seconds is provided as the default display time for all newly added Pages).
 - o **Font** – Font Selection – font availability is based upon current controller language setting – An Adaptive font (an automatic sizing font) is provided as the default font in all cases unless changed by the operator. – see **Set Controller Fonts** in **Administrator Menu**.
- **Create Graphic Image Page (Mona Lisa Picture)** – Inserts a new Graphic Image Page in a Message
 - o **Pencil** – Pixel by Pixel Editing – turns pixels on or off based upon pixel on/off selection
 - o **Line** – Draw/Remove Pixels w/Line Editing
 - o **Circle** – Draw/Remove Pixels w/Circle Editing
 - o **Pixels On** – Turn Pixels on while editing
 - o **Pixels Off** – Turn Pixels off while editing
 - o **Undo** – Undo last edit
 - o **Redo** – Redo last edit
 - o **Finished** – save changes and return to Message Creation & Editing Screen

- o **Cancel** – cancel and discard changes and return to Message Creation & Editing Screen
- **Create Dynamic Data Source Page (Thermometer & Time)** – Inserts a Dynamic Data Source Page in a Message
 - o **Insert Text** – adds a text block to a Dynamic Data Source Page
 - o **Insert Source** – adds a Data Source to Dynamic Data Source Page
 - o **Edit** – enables editing of previously created text blocks within the Dynamic Data Source Page (select text block for editing and then select Edit)
 - o **Delete** – deletes selected text block or data source from Dynamic Data Source Page
 - o **Move Up** – moves selected text or data source up in display order on Dynamic Data Source Page
 - o **Move Down** – moves selected text or data source down in display order on page on Dynamic Data Source Page
- **Insert Page from Master Library (Books)** – Inserts a new Page from the Master Library into the Message
- **Delete (Trash Can)** – Deletes the Active Page from the Message – **Note:** a Message must contain at least on Page.
- **Copy (Two Pages)** – Creates and inserts into the Message a Copy of the Active Page.
- **Move Page Left (Left Arrow)** – Moves the Active Page left one position within the Message.
- **Move Page Right (Right Arrow)** – Moves the Active Page right one position within the Message.
- **Cancel (Red w/Black X)** – Cancels Message Creation & Editing without saving any changes to the Message Library
- **Finished (Green & Yellow Smile Face)** – accepts changes and saves them to the Message Library (newly created Messages will require naming prior to saving to Message Library)
- **Keyboard** – standard keyboard function for selected language

- **Keyboard Button** (lower right-hand corner next to space bar)
 - enables selection of available keyboards for supported languages – requires proper selection of controller language (see **Set Controller Fonts** in **Administrator Menu**)
- **Schedule Messages** (Create, Edit, & Delete Message Schedules and Events) – when selected the operator is presented with a standard calendar (one month at a time) which provides a graphical representation of the current Date & Time Based Scheduled Messages. **Note:** to view the list of Schedules for any given day touch the desired day twice. The following controls are provided:
 - **Schedules** – View the List of all Date & Time Based Scheduled Messages
 - o **Add** – Adds a New Scheduled Message to the Scheduler – follow on-screen instructions provided.
 - o **Edit** – Edits Selected Scheduled Message – follow on-screen instructions provided.
 - o **Delete** – Deletes Selected Scheduled Message from Scheduler – follow on-screen instructions provided.
 - o **Finished** – Return to Scheduler Main Screen
 - **Events** – View the List of Event (Data Source) Based Scheduled Messages – Data Driven Events may be created for various Data Sources including: System Battery Voltage, Internal and External Temperature Inputs, System Photocell Readings, Radar Gun Input, and External Switch Closures. The following controls are provided:
 - o **Add** – Adds a New Event Based Scheduled Message to Scheduler – follow on-screen instructions provided.
 - o **Edit** – Edits the Selected Event Based Scheduled Message – follow on-screen instructions provided.
 - o **Delete** – Deletes the Selected Event Based Scheduled Message from Scheduler – follow on-screen instructions provided.
 - o **Finished** – Return to Scheduler Main Screen
 - **Add Schedule/Event** – Adds New Date & Time or Event Based Scheduled Message to the Scheduler – follow on-screen instructions provided.
 - **Finished** – Returns to User Menu

- **Set Quick Picks** (Assign Quick Picks Messages from Message Library)
 - To add a Message to Current Quick Picks from the Message Library, touch the desired Message in the Message Library then touch the **Right Arrow Button (=>)** to move the desired Message to Current Quick Picks. If the desired Message is not in the Message Library follow **Message Creation & Editing** procedures to add the desired Message to the Message Library. [Note: up to six (6) messages may be added to the Current Quick Picks message list.]
 - To remove a Message from Current Quick Picks touch the desired Message in Current Quick Picks and then touch **Left Arrow Button (<=)**.
 - When finished touch the **Finished** button and then touch the **Log Out** button.
 - **View System Status** (Displays Current Time, Date, Photocell Reading, Battery Voltage, Temperature, MAC Address, IP Address, Up-Time, Current Run-Time, Lifetime Run-Time, Serial Modem Type, Signal Strength and Signal Quality).
 - **Blank the Sign Panel** (Blanks the Sign Panel) – follow on-screen instructions provided.
 - **Test Display Modules** (Tests LED Display Modules & Sign Panel operation) – use arrow buttons provided to turn on and test specific LED Display Modules on the Sign Panel – numerical address of current LED Display Module under test is provided to aid in diagnostics – for assistance contact Customer Service.
 - **Help** (Basic operational instructions)
 - **Solar Panel Orientation** (Controls actuator equipped solar arrays) – follow on-screen instructions provided.
 - **Main Menu** (Returns to **Main Menu**)
 - **Log Out** (Logs Out and returns to **SolarTech® Splash Screen**)
- o **Supervisor Menu** - access requires log-in with a **Supervisor** or **Administrator** Password (if **Password Security** is enabled – see **Enabling Password Security**)

- **Manage Quick Pick Users** (Add & Remove Quick Picks Users)
- **Manage General Users** (Add & Remove Users)
- **Set Date & Time** (Setting Date, Time, and Time Zone – for proper DST operation)
- **Set Photocell Limits** (Used to adjust Photocell Light Level Parameters) – Note: factory default settings are 1500 and 3750 – it is not recommended that changes be made to these set-points without consulting with the factory.
- **Disable Automatic Log Out** (Disables the Automatic Log-Out Security Feature) – follow on-screen instructions provided.
- **Reset Controller Settings** (Reset Message Library, Scheduler, Set Points and Passwords, Master Reset)
 - **Reset Run-Time Counter** – Resets the resettable Run-Time Counter viewable from the System Status Screen.
 - **Recalibrate Touch-Screen** – Initiates touch-screen calibration routine upon next system boot-up – only used when replacing touch-screen – not part of Master Reset operation – contact Customer Service for assistance.
 - **Reset Sign Type** – Clears currently saved/stored Sign Panel Configuration and initiates Sign Panel Auto-Detection & Configuration upon next system boot-up – contact Customer Service for assistance.
 - **Reset Message Library** – Deletes all Schedules and Events from the Scheduler, all Messages from the Message Library and all user-assigned Messages from Quick Picks.
 - **Reset Schedules and Events** – Deletes all Schedules and Events from the Scheduler.
 - **Reset Factory Settings** – Restores all controller settings to original factory settings including photocell set-points, and deletion of all passwords.
 - **Master Reset** – Resets Message Library; Resets Schedules and Events; Resets Controller Settings (Deletes all Schedules and Events from the Scheduler, all Messages from the Message Library, all user-assigned Messages from Quick Picks, all passwords and restores all controller set-points to original factory settings).

- **Manage NTCIP/UTMC Settings** (Enables an Operator to Enable or Disable NTCIP & UTMC servers, select between Central and Local control and establish/change the Administrator Password for NTCIP/UTMC access and control) – for more information see NTCIP & UTMC supporting documentation or contact Customer Service for assistance.
 - **Sign Panel Management** (Enables an Operator to describe the sign panel type for NTCIP & UTMC control and, if necessary, manually configure the system's Sign Panel Configuration for certain types of Sign Panels including dual Sign Panel systems – contact Customer Service for additional assistance.
 - **Main Menu** (Returns to **Main Menu**)
 - **Log Out** (Logs Out and returns to **SolarTech® Splash Screen**)
- o **Administrator Menu** - access requires login with an **Administrator** Password (if **Password Security** is enabled – see **Enabling Password Security**)
- **Add/Remove Supervisor** (Add & Remove Supervisors)
 - **Add/Remove Administrators** (Add & Remove Administrators) – Note: at-least one Administrator must be created prior to creation of any other passwords.
 - **View Controller Information** (Software Version, S/N, Secret Key)
 - **Change Font Set** (US DOT Fonts, Canadian Fonts, International Fonts)
 - **US DOT Font Set** – Fonts Provided: Adaptive, One-Line, Two-Line, Three-Line Normal, Three-Line Bold, Three-Line Narrow, Three-Line Condensed, and Four-Line. Keyboards Activated: English.
 - **STD US DOT 3-Line** – Fonts Provided: Adaptive & Three-Line Normal (5x7) only. Keyboards Activated: English.
 - **International Font Set** – Fonts Provided: Language specific. Keyboards Activated: All (English, Arabic, French-Canadian MTO, Portuguese/Spanish)
 - **French Canadian MTO Font Set** – Fonts Provided: French Canadian MTO-2 Three-Line Font. Keyboards Activated: English and French-Canadian.

- **Adaptive Blanking** - When "On" the software will automatically insert blank pages (approximately 0.5 seconds in duration) between all pages of the currently displayed message to conserve power whenever logged or actual battery terminal voltage falls below 12.4VDC.
- **Configure IP Address** (Set up IP Address for Networkability) – select between Dynamic IP Address and Static IP Address – see Control Center 3000 Operating Instructions for additional information on network settings.
- **Configure Serial Modem** (Set up correct settings for current Serial Modem)
- **Set Radar Gun Units** (Selects between MPH and KPH)
- **Set Battery Voltage Offset** (Sets the offset for voltage drop in Control Console power lines to ensure accurate display of actual battery terminal voltage)
- **Main Menu** (Returns to **Main Menu**)
- **Log Out** (Logs Out and returns to **SolarTech® Splash Screen**)

Silent Messenger® MegaTech® Control Console

TRAFIX® Operating System (Ver. 2.x.x) Menu Structure & Operating Instructions:

SolarTech® Splash Screen: The **SolarTech® Splash Screen** is presented at the completion of system boot-up (power-up & initialization) and whenever an operator logs out. **Note:** If no touch-screen activity is detected for more than 15 minutes, control console will automatically return to the **SolarTech® Splash Screen** and turn the backlight off to conserve power and restore **Password Security** if enabled (unless **Auto-Logout Feature** is disabled – see **Disable Automatic Log Out** in **Settings** Main Screen). To reactivate the **SolarTech® Splash Screen** and turn on the backlight, simply touch the touch-screen [**Note:** ensure that the main power switch on the Energy Management System (EMS) is in the “On” position!]

Enabling Password Security: Unless specified otherwise at time of order, all **MegaTech®** control consoles equipped with the **TRAFIX®** operating system software are shipped with **Password Security** disabled (no password required for log-in). To enable **Password Security:** log-in, select the **Settings** Main Screen, select **System Accounts**, select **Administrators**, and create at least one **Administrator Password**. **Password Security** is now enabled and multiple passwords may be created for **Quick Picks Users**, **General Users**, **Supervisors** and other **Administrators**. Additional passwords may be added and/or removed for any operational level at anytime by the appropriate authority. All passwords, and all **Password Security**, may be removed, at any time, by selecting **Restore Initial Configuration** located in **Controller Resets** from the **Tools** Main Screen – see below for additional details.

Menu Structure and Operating Instructions:

Display Main Screen:

- **Blank the Sign Panel:** Requires Log-in with a **User**, **Supervisor** or **Administrator** Password (if **Password Security** enabled – see **Enabling Password Security**).
 - Blanks the Sign Panel – follow instructions provided on screen. **Note:** It is recommended that when the Silent Messenger PCMS is not in use the operator select this option to blank the sign panel, place the system in a low-power consumption mode, and leave the Main Power switch on to avoid system boot up prior to next usage. Only turn the Main Power switch (located on the Energy Management System) off for prolonged periods of non-use or storage.
- **Instant Message:** Requires Log-In with a **User**, **Supervisor** or **Administrator** Password (if **Password Security** enabled – see **Enabling Password Security**).
 - Takes the operator directly to the **Message Creation and Editing Screen** (see **Message Creation and Editing Screen** below) for **Instant Message** creation and display on the Sign Panel. Upon completion of Message Creation the newly created Message will be automatically named “Instant Message”, placed in the

Message Library and set as the Default Message (unless set as the Override Message – follow instructions provided on screen).

- **Quick Picks:** Requires Log-In with a **Quick Picks, User, Supervisor or Administrator** Password (if **Password Security** enabled – see **Enabling Password Security**).
 - **Up to Six (6) Pre-Programmed Quick Pick Messages for Preview & Display** that are user assigned (see **Set Quick Picks in Manage Messages**). To preview a **Quick Picks Message** touch the desired **Message Window** once (**Message Window** will turn yellow and Message will be displayed in **Message Window**). To select a **Quick Picks Message** as the **Default Message**, and display it on the Sign Panel, touch the desired **Message Window** a second time [**Message Window** will turn from yellow to green indicating that the selected Message is now set as the Default Message (unless set as the Override Message – follow instructions provided on screen) and will be displayed on the Sign Panel].
 - **Blank** – Blanks the Sign Panel – follow instructions provided.
 - **Finished** – Returns to **Display Menu** or directly to **SolarTech® Splash Screen** if Logged-In with a **Quick Picks Password**).
- **Manage Messages:** Requires Log-In with a **User, Supervisor or Administrator** Password (if **Password Security** is enabled – see **Enabling Password Security**). Used to Create, Edit, Delete, Preview, Display Messages & Assign Quick-Picks.
 - **Message Screens:** Top left screen (Current Message Screen) displays Message currently being displayed on the Sign Panel (amber). Top right screen (Preview Screen) is for preview of Messages within Message Library (blue).
 - **Set Default Message (Yellow Check Mark):** Sets the selected Message from the Message Library as the Default Message and displays the selected Message in the top left screen (Current Message Screen) in amber and on the Sign Panel unless a current Schedule, Event or Override Message is currently taking priority over the Default Message in which case follow instructions provided.

Note: The **Default Message** is that Message which will normally be displayed on the Sign Panel unless superseded by a Schedule or an Event. If there are no Schedules or Events programmed, then the Default Message will be displayed on the Sign Panel at all times; however, if any Schedules or Events are present in the system's Scheduler those

Messages will take priority over the **Default Message** as programmed. In this case, when changing the **Default Message**, the operator will be given a warning and the choice of setting the newly selected Message as the **Default Message** or as the **Override Message**. If the newly selected Message is set as the **Override Message** it will not update or change the current **Default Message**, will take priority over all other Schedules and Events and will be displayed on the Sign Panel at all times until changed or cleared. If the newly selected Message is set as the **Default Message**, the system will function normally allowing all Schedules, Events (and the current **Override Message**) to take priority.

Note: To preview a Message from the Message Library touch the desired Message in the list of Messages. The Message will be displayed in blue in the Preview Screen (right). To set a Message from the Message Library as the Default Message and display it on the Sign Panel unless a current Schedule, Event or Override Message is currently taking priority over the Default Message touch the desired Message in the list of Messages and once it is displayed in blue in the Preview Screen (right) touch the **Set Default Message (Yellow Check Mark)** button to set the selected Message as the Default Message, display it in amber in the Default Message Screen (left) and display it on the Sign Panel unless a current Schedule, Event or Override Message is currently taking priority over the Default Message – if any Schedules or Events are present in the system’s scheduler follow instructions provided on setting message as Default Message or Override Message – see above explanation.

- **Add Message (Green Plus Sign):** Activates the **Message Creation & Editing Screen** to enable creation, naming and saving of a new Message to the Message Library (see **Message Creation & Editing Screen**).
- **Add & Set Default Message (Green Plus Sign & Yellow Check Mark):** Activates **Message Creation & Editing Screen** to enable creation, naming, saving and *automatic display* of a new Message (sets the newly created and saved Message as the Default Message or Override Message (if any Schedules or Events are present in the system’s Scheduler) and displays it in the Current Message Screen in amber and on the Sign Panel unless a current Schedule, Event or Override Message is currently taking priority over the Default Message – see **Set Default Message (Yellow Check Mark)**, **Add (Green Plus Sign)** and **(Message Creation & Editing Screen)** for additional information and explanation.
- **Edit Message (Pencil-Scissors-Glue):** Activates **Message Creation & Editing Screen** and loads the selected Message from the Message Library for editing and saving. To edit a Message from the Message Library, touch the desired Message and when it is displayed in blue in the

Preview Screen (right) touch the **Edit Message (Pencil-Scissors-Glue)** button to activate the **Message Creation & Editing Screen** (see **Message Creation & Editing Screen**).

- **Delete Message (Black X):** Removes the selected Message from the Message Library. To delete a Message from the Message Library, touch the desired Message and when it is displayed in blue in the Preview Screen (right) touch the **Delete Message (Black X)** button and follow on-screen instructions. **Note:** The Default Message and Messages assigned to Current Quick Picks may not be deleted. To delete a Message from the Message Library ensure that it is not assigned as the Default Message or to Current Quick Picks.
- **Set Quick Picks:** Displays the Quick Picks Set-Up screen in which you can add or remove Messages to or from the Quick Picks Library.
 - To add a Message to the Quick Picks Library from the Message Library, touch the desired Message in the Message Library then touch the **Right Arrow Button (==>)** to move the desired Message to Current Quick Picks. If the desired Message is not in the Message Library touch the Green Plus (+) button and follow **Message Creation & Editing** procedures to automatically create and add the desired Message to the Message and Quick Picks Libraries. [Note: up to six (6) messages may be added to the Quick Picks_Library.]
 - To remove a Message from Current Quick Picks touch the desired Message in Current Quick Picks and then touch **left arrow button (<=)**.
 - When finished touch the **Finished** button and then touch the **Log Out** button.
- **Export:** Exports entire Message Library to a USB memory device for transfer to another controller (using Import) or Control Center 3000.
- **Import:** Imports Messages (exported from another controller or from Control Center 3000) from a USB memory device into the Message Library.
- **Finished:** Returns operator to the **Display Main Screen**.

Message Creation & Editing Screen General Notes:

- The Active Page in a Message during Message Creation & Editing is outlined in red. To edit an existing Page, touch the Page once to make it the Active Page (outlined in red). Touch the Active Page a

second time to edit the Page contents. To place the cursor in a Text Page for editing, touch the desired location for cursor placement and edit as desired using the keyboard. To change the Page Display Time for the Active Page, touch the Page Display Time window (seconds) once and type in desired display time [Note: two (2.0) seconds is provided automatically as the default display time for all newly added Pages]. To remove a Page from a Message, touch the Page to make it the Active Page and then touch the **Delete (Trash Can)** button to remove the Page from the Message. New Pages added to a Message will always be added to the right of the current Active Page. When all editing is completed touch the **Finished (Green & Yellow Smile Face)** button to name and save the Message. To exit without saving any changes touch the **Cancel (Red w/Black X)** button.

- To add a Text Page to a Message, touch the **Create Text Page (Te][)** button. Select desired font (an automatic sizing font labeled “Adaptive” is provided as the default font). Select the desired keyboard. (Note: availability of fonts and keyboard activation is dependent upon current controller font selection - see **Change Font Set in Administrator Menu**). Type desired text. To select specific lines within a Page for text creation/editing (such as in a 3-Line Normal font) touch desired line on the Active Text Page to place cursor as desired. To change the display time of the Active Text Page touch the display time window and type in desired display time.
- To add a Graphic Image Page to a Message touch the **Create Graphic Image Page (Mona Lisa Picture)** button and create a Graphic Image as desired by using the tools provided. When finished touch the **Finished** button. To change the display time of the Active Graphic Image Page touch the display time window and type in desired display time.
- To add a Dynamic Data Source (e.g. radar, time, date, etc.) Page, touch the **Create Dynamic Data Source Page (Thermometer & Time)** button and create the Dynamic Data Source Page by using the tools provided. When finished touch the “OK” button. To change the display time of the Active Dynamic Data Source Page touch the display time window and type in desired display time.
- To add a Page from the Master Library, touch the **Insert Page from Master Library (Books)** button. Select the desired Page for insertion from the menu provided, and then touch the “OK” button. To change the display time of the Active Page touch the display time window and type in desired display time.

- To add a Page by copying an existing Page from within the Message simply select the Page to be copied and touch the **Copy** button (**Two Sheets of Paper**) – a copy of the currently selected Page will be inserted into the Message just to the right of the selected Page. The newly copied Page may now be edited and/or moved about within the Message just like any other Page.
- To move Pages left or right within a Message simply select the Page to be moved and use the **Move Left (Left Arrow)** or **Move Right (Right Arrow)** buttons to move the Page left or right one space at a time.
- To add Special Effects (Annotations) to a Page, select the Page to which Special Effects (Annotations) are to be added, touch the **Fx** button and select the desired Special Effects (Annotations) to be added to the Page.
- To create a Page with Scrolling Text, touch the "Scr " button and follow instructions provided. Note: Because scrolling text is generally not allowed (i.e. forbidden) on Portable Changeable Message Signs used for traffic control, all units are shipped with Scrolling disabled. In order to create Messages with Scrolling Text Pages, Scrolling must first be Enabled - see "Settings Main Screen" section below for information on Enabling Scrolling.

Menu Selections:

- **Create Text Page (Te)[]**: Inserts a new Text Page in a Message
 - **Keyboard** – standard keyboard input – multiple keyboards are available and may be selected at anytime by use of the keyboard button at lower right – note keyboard activation is dependent upon current controller language setting – see **Set Controller Fonts** in **Administrator Menu**.
 - **Display Time** (Seconds) – Page Display Time within Message – touch in window to edit display time (2 seconds is provided as the default display time for all newly added Pages).
 - **Font** – Font Selection – font availability is based upon current controller language setting – An Adaptive font (an automatic sizing font) is provided as the default font in all cases unless changed by the operator. – see **Set Controller Fonts** in **Administrator Menu**.

- **Create Graphic Image Page (Mona Lisa Picture):** Inserts a new Graphic Image Page in a Message
 - **Pencil** – Pixel by Pixel Editing – turns pixels on or off based upon pixel on/off selection.
 - **Line** – Draw/Remove Pixels w/Line Editing.
 - **Circle** – Draw/Remove Pixels w/Circle Editing.
 - **Pixels On** – Turn Pixels on while editing.
 - **Pixels Off** – Turn Pixels off while editing.
 - **Undo** – Undo last edit.
 - **Redo** – Redo last edit.
 - **Finished** – save changes and return to Message Creation & Editing Screen.
 - **Cancel** – cancel and discard changes and return to Message Creation & Editing Screen.
- **Create Dynamic Data Source Page (Thermometer & Time):** Inserts a Dynamic Data Source Page in a Message.
 - **Insert Text** – adds a text block to a Dynamic Data Source Page.
 - **Insert Source** – adds a Data Source to Dynamic Data Source Page.
 - **Edit** – enables editing of previously created text blocks within the Dynamic Data Source Page (select text block for editing and then select Edit).
 - **Delete** – deletes selected text block or data source from Dynamic Data Source Page.
 - **Move Up** – moves selected text or data source up in display order on Dynamic Data Source Page.
 - **Move Down** – moves selected text or data source down in display order on page on Dynamic Data Source Page.

- **Insert Page from Master Library (Books):** Inserts a new Page from the Master Library into the Message.
- **Delete (Trash Can):** Deletes the Active Page from the Message – **Note:** a Message must contain at least one Page.
- **Copy (Two Pages):** Creates and inserts into the Message a Copy of the Active Page.
- **Move Page Left (Left Arrow):** Moves the Active Page left one position within the Message.
- **Move Page Right (Right Arrow):** Moves the Active Page right one position within the Message.
- **Page Special Effects / Page Annotations (Fx):** Used to add Special Effects to a Page (a.k.a. Page Annotations) within a Message such as flashing an entire Page, flashing specific line(s) on a Page, adding static or dynamic (moving) arrows or chevrons to a Page or adding Signal Lamps to (all Pages in) a Message.
- **Scrolling (Scr):** Used to add a Page containing scrolling text to a Message. **Note:** Because scrolling text is generally not allowed (i.e. forbidden) on Portable Changeable Message Signs used for traffic control, all units are shipped with Scrolling disabled. In order to create Messages with Scrolling Text Pages, Scrolling must first be Enabled - see "Settings Main Screen" section below for information on Enabling Scrolling.
- **Cancel (Red w/Black X):** Cancels Message Creation & Editing without saving any changes to the Message Library.
- **Finished (Green & Yellow Smile Face):** accepts changes and saves them to the Message Library (newly created Messages will require naming prior to saving to Message Library).
- **Keyboard:** Standard keyboard function for selected language.
- **Keyboard Button** (lower right-hand corner next to space bar): Enables selection of available keyboards for supported languages. Requires proper selection of controller language (see **Set Controller Fonts** in **Administrator Menu**).

- **Schedule Messages:** Requires Log-In with a **User, Supervisor or Administrator** Password (if **Password Security** is enabled – see **Enabling Password Security**). When selected the operator is presented with a standard calendar (one month at a time) which provides a graphical representation of the current Date & Time Based Scheduled Messages. **Note:** to view the list of Schedules for any given day touch the desired day twice. The following controls are provided:
 - **Schedules:** View the List of all Date & Time Based Scheduled Messages.
 - **Add** – Adds a New Scheduled Message to the Scheduler – follow on-screen instructions provided.
 - **Edit** – Edits Selected Scheduled Message – follow on-screen instructions provided.
 - **Delete** – Deletes Selected Scheduled Message from Scheduler – follow on-screen instructions provided.
 - **Finished** – Return to Scheduler Main Screen.
 - **Events:** View the List of Event (Data Source) Based Scheduled Messages – Data Driven Events may be created for various Data Sources including: System Battery Voltage, Internal and External Temperature Inputs, System Photocell Readings, Radar Gun Input, and External Switch Closures. The following controls are provided:
 - **Add** – Adds a New Event Based Scheduled Message to Scheduler – follow on-screen instructions provided.
 - **Edit** – Edits the Selected Event Based Scheduled Message – follow on-screen instructions provided.
 - **Delete** – Deletes the Selected Event Based Scheduled Message from Scheduler – follow on-screen instructions provided.
 - **Finished** – Return to Scheduler Main Screen.
 - **Export:** Exports all Schedules & Events to a USB memory device for transfer to another controller (using Import) or Control Center 3000.
 - **Import:** Imports Schedules & Events (exported from another controller or from Control Center 3000) from a USB memory device into Schedules & Events on controller.
 - **Finished:** Returns to **Display Main Screen**.

- **Signal Lamps:** Enables operator to set (optional) Sign Panel Signal Lamps to: **On** (Signal Lamps ON at all times); **Off** (Signal Lamps OFF at all times); **Automatic** (Signal Lamps turned ON / OFF AUTOMATICALLY as determined by current Message displayed on sign panel - see Page Special Effects).
- **Log Out:** Logs Out to Main Splash Screen.

Information Main Screen: Displays: Software Version, Time, Date, Photocell Reading & Set Points, Battery Voltage, Battery Current, Solar Array Voltage, Solar Array Current & Power Source (Solar / Battery / AC-Line & AC Voltage - if equipped with optional AC Line Voltage Sensor), Temperature, IP Address, MAC Address, Up-Time, Current Run-Time, Lifetime Run-Time, Serial Modem Type, Serial Modem Signal Strength, Serial Modem Signal Quality, GPS Position and Sign Panel Compass Heading - if equipped with optional Sign Panel Compass.

- **Refresh:** Requires Log-In with a **User, Supervisor or Administrator** Password (if **Password Security** is enabled – see **Enabling Password Security**). Updates all Data on the Information Screen.
- **Help:** Requires Log-In with a **User, Supervisor or Administrator** Password (if **Password Security** is enabled – see **Enabling Password Security**). Displays Help File (Basic Operational Instructions).
- **Comm. Passwords:** Requires Log-In with a **Supervisor or Administrator** Password (if **Password Security** is enabled – see **Enabling Password Security**). Displays Controllers Remote Communications Security Passwords.
- **Log Out:** Logs Out to Main Splash Screen.

Tools Main Screen: Troubleshooting, Configuration and Reset Tools.

- **Test Display Modules** (Tests LED Display Modules & Sign Panel operation): Requires Log-In with a **User, Supervisor or Administrator** Password (if **Password Security** is enabled – see **Enabling Password Security**). Use arrow buttons provided to turn on and test specific LED Display Modules on the Sign Panel. The numerical address of current LED Display Module under test is provided to aid in diagnostics. For assistance contact Customer Service.
- **Test Entire Sign Panel** (Tests All LED Display Modules): Requires Log-In with a **User, Supervisor or Administrator** Password (if **Password Security** is enabled – see **Enabling Password Security**). This test sends a test pattern to all LED Display Modules in the sign panel to enable an operator to easily and rapidly determine failures and make repairs. For assistance contact Customer Service.

- **Provision Unit:** Requires Log-In with a **Supervisor** or **Administrator** Password (if **Password Security** is enabled – see **Enabling Password Security**). This utility uses a special file from a USB memory device (provided by the factory) to configure a controller to specific agency requirements, etc. For assistance contact Customer Service.
- **Controller Resets:** Requires Log-In with a **Supervisor** or **Administrator** Password (if **Password Security** is enabled – see **Enabling Password Security**).
 - **Reset Run-Time Counter** – Resets the re-settable Run-Time Counter viewable from the **Information Main Screen**.
 - **Reset Schedules and Events** – Deletes all Schedules and Events from the Scheduler.
 - **Reset Message Library** – Deletes all Schedules and Events from the Scheduler, all Messages from the Message Library and all user-assigned Messages from Quick Picks.
 - **Restore Initial Configuration** – Restores all user configurable settings to factory defaults.
 - **Reset Sign Panel Configuration** – Clears currently saved/stored Sign Panel Configuration and initiates Sign Panel Auto-Detection & Configuration upon next system boot-up. Contact Customer Service for assistance.
 - **Recalibrate Touch-Screen** – Initiates a touch-screen calibration routine upon next system boot-up. Only used when replacing a damaged touch-screen. Not included as part of a standard Master Reset operation. Contact Customer Service for assistance.
 - **User Master Reset** – Restores all controller settings to original factory settings including photocell set-points, and deletion of all passwords.
 - **Factory Master Reset** – Resets Message Library; Resets Schedules and Events; Resets Controller Settings (Deletes all Schedules and Events from the Scheduler, all Messages from the Message Library, all user-assigned Messages from Quick Picks, all passwords and restores all controller set-points to original factory settings).
- **Solar Panel Orientation:** Requires Log-In with a **User**, **Supervisor** or **Administrator** Password (if **Password Security** is enabled – see **Enabling Password Security**). Controls actuator equipped solar arrays (follow on-screen instructions provided).
- **Log Out:** Logs Out and returns to **SolarTech® Splash Screen**.

Settings Main Screen:

- **System Accounts: Used to setup Administrator, Supervisor, User & Quick Picks Users Passwords:**
 - **Administrators:** Add & Remove Administrators.
 - **Supervisors:** Add & Remove Supervisors.
 - **Users:** Add & Remove General Users.
 - **Quick Picks Users:** Add & Remove Quick Picks Users.
 - **Back to Settings:** Returns to Settings Main Page.
 - **Log Out:** Logs Out and returns to **SolarTech® Splash Screen**.
- **Date & Time:** Set Date, Time & Time Zone (for proper DST operation).
- **Font Set, Blanking & PFD:** Select among US DOT Fonts, Canadian Fonts, International Fonts, etc. and control settings for Adaptive Blanking and Pixel Failure Detection (PFD)
 - **US DOT Font Set** – Fonts Provided: Adaptive, One-Line, Two-Line, Three-Line Normal, Three-Line Bold, Three-Line Narrow, Three-Line Condensed, and Four-Line. Keyboards Activated: English.
 - **STD US DOT 3-Line** – Fonts Provided: Adaptive & Three-Line Normal (5x7) only. Keyboards Activated: English.
 - **International Font Set** – Fonts Provided: Language specific. Keyboards Activated: All (English, Arabic, French-Canadian MTO, Portuguese/Spanish).
 - **French Canadian MTO Font Set** – Fonts Provided: French Canadian MTO-2 Three-Line Font. Keyboards Activated: English and French-Canadian.
 - **Adaptive Blanking:**
 - **Automatic:** The software will automatically insert blank pages (approximately 0.5 seconds in duration) between all pages of the currently displayed message to conserve power whenever logged or actual battery terminal voltage drops below 12.4VDC.
 - **On:** Blank pages (approximately 0.5 seconds in duration) will be inserted between all pages of the currently displayed message to conserve power at all times regardless of logged or actual battery terminal voltage.

- **Off:** No blank pages will be inserted between the pages of the currently displayed message regardless of logged or actual battery terminal voltage.
- **Dynamic PFD (Pixel Failure Detection):**
 - **On:** If supported by system hardware, system will automatically and continuously test one pixel per LED Display Module approximately every two (2) seconds regardless of ambient light level / sign panel intensity. System will automatically and continuously scan all pixels on all LED Display Modules and report failures dynamically by indicating failed pixels as outlined in red on all Message Preview Screens. Note: this setting may cause pixel testing to be noticeable/detectable in extremely low ambient light conditions.
 - **Automatic:** If supported by system hardware, system will automatically test one pixel per LED Display Module approximately every two (2) seconds for all sign panel intensity levels above minimum intensity and will automatically test one pixel per LED Display Module approximately every thirty (30) seconds when sign panel intensity is at the minimum level. System will automatically and continuously scan all pixels on all LED Display Modules and report failures dynamically.
 - **Off:** Pixels are not tested dynamically during normal sign panel operation.
 - **NOTE: Regardless of Dynamic PFD Setting selected, if supported by hardware, system will automatically scan, test and report status of all pixels** each time sign panel is powered up (i.e. initial power/boot up and/or assigning a message to a blanked sign panel). All non-operational/failed pixels are indicated on all Message Preview Screens by a red outline and will not indicate as operational when displaying/rendering a Message. Additionally, total number of failed pixels will be reported for each LED Display Module when testing LED Display Modules (See Tools Section).
- **Radar & Compass:** Select between MPH and KPH for Radar. Place Radar Gun in Tuning Fork Test Mode. Set Sign Panel Compass Heading Correction Factor.
- **IP Address:** Set up IP Address for Networkability (Select between Dynamic IP Address and Static IP Address – see Control Center 3000 Operating Instructions for additional information on network settings).

- **Interface Language:** Change Control Console GUI (Graphical User Interface) language. Available languages are English, Spanish, French, Dutch, German, and Portuguese.
- **Serial Modem:** Set up Serial Modem Port for desired device.
- **Sign Panel:** Enables an Operator to describe the sign panel type for NTCIP & UTMC control and, if necessary, manually configure the system's Sign Panel Configuration for certain types of Sign Panels including dual Sign Panel systems. Contact Customer Service for additional assistance.
- **NTCIP/UTMC:** Enables an Operator to Enable or Disable NTCIP & UTMC servers, select between Central and Local control and establish/change the Administrator Password (Community String) for NTCIP/UTMC access and control. For more information see NTCIP & UTMC supporting documentation or contact Customer Service for assistance.
- **Photocell Limits:** Used to adjust Photocell Light Level Parameters. Note: factory default settings are 1500 and 3750 – it is highly recommended that changes not be made to these set-points without consulting with the factory.
- **Battery Voltage Offset:** Set the offset for voltage drop in Control Console power lines to ensure accurate display of actual battery terminal voltage in vehicle mount installations.
- **Photocell Override:** Enables an operator to set Sign Panel Intensity manually.
- **Automatic Log Out:** Enables an operator to disable or enable the Automatic Log-Out Security Feature. Follow on-screen instructions provided.
- **Log Out:** Logs Out and returns to SolarTech® Splash Screen.

Radar Statistical Data Collection Operation:

All SolarTech Silent Messenger and Silent Advisor Products equipped with a MegaTech controller operating TRAFIX 2.0.1 or later and the optional Houston Radar radar gun will automatically log and record (to a standard USB memory stick) all raw data provided by the radar gun along with basic statistical and histogram information about the collected data in 15 minute intervals. The data are stored in four (4) CSV (Comma Separated Value) files which may be opened in Microsoft Excel or any other similar spreadsheet type application for viewing, manipulation and analysis. The hr_analyzer.csv file may be analyzed with the Houston Stats Analyzer Software included on the USB memory device shipped with the unit or available at www.solartechtechnology.com. Additionally, the most recent 30 days worth of Radar Statistics and Histogram Data (statistical and histogram radar data logged every 15 minutes) is maintained in the control consoles non-volatile memory and may be retrieved remotely via Control Center 3000 or via the Web Interface - see Control Center 3000 manual for further details. Three (3) files are available remotely: radar_histogram.csv, radar_statistics.csv and hr_analyzer.csv.

Data Provided is as follows:

Raw Data File: (radar_data.csv file) - (Year, Month, Day, Time, Reading) - every detection/reading - readings recorded every 250ms while tracking a target

Statistical Data File: (radar_statistics.csv file) - (Year, Month, Day, Time, # of Detections/Readings, Mean, Median, Mode, Standard Deviation, Lowest Reading, Highest Reading) - based on all detections/readings - readings are taken every 250ms while tracking a target

Histogram Data File: (radar_histogram.csv file) - (Year, Month, Day, Time, Total # Vehicles Detected and # Vehicles Detected within Each Speed Bin in 5 MPH intervals)

Houston Stats Analyzer File: (hr_analyzer.csv file) - (Year, Month, Day, Time, Total # Vehicles Detected and # Vehicles Detected within Each Speed Bin in 5 MPH intervals in a format suitable for analysis using the Houston Stats Analyzer Software)

To use the TRAFIX Radar Statistical Data Collection feature:

1. Insert a USB Memory Device into the USB Port on the back of the MegaTech Control Console. **NOTE:** the most recent 30 days worth of Radar Statistics and Histogram Data (statistical and histogram radar data logged every 15 minutes) is maintained in the control consoles non-volatile memory even if a USB Memory Device is not used and may be retrieved remotely using Control Center 3000 or the Web-Interface at any time.
2. Setup and program the unit as desired. Data logging and recording is now taking place automatically. **NOTE:** a small USB Memory Stick Icon will be displayed in the lower right-hand corner of the Control Console LCD Screen in the Manage Messages Page (Silent Messenger PCMS) or the Main Control Page (Silent Advisor RST) indicating that the radar data collection feature is active if a USB device is used.
3. Remove the USB Memory Device from the USB Port on the Control Console and insert into the USB Port on any standard PC or, if the unit is equipped with a cellular modem for remote communication, access the unit and download the desired files using either Control Center 3000 or the Web-Interface.
4. Either cut and paste or copy the four (4) CSV files to desired location on the PC and use Microsoft Excel (or any other similar spreadsheet type application) to view, manipulate and analyze the data. The Houston Stats Analyzer Software may be used to analyze the data contained within the hr_analyzer.csv file. **Note:** If the files are removed from the USB Memory Device, the Control Console will create new files upon reinsertion; however, if the files are left on the USB Memory Device, the Control Console will simply append new data to the existing files.

5. MAINTENANCE

The **SILENT MESSENGER SOL-R-SIGN** is designed and manufactured to provide years of trouble free service, while demanding a minimum amount of care and maintenance. Aside from keeping the display panel and the solar array clean and free from debris, the **SILENT MESSENGER** will consume very little of your equipment maintenance resources.

- CLEANING -

The sign panel should be cleaned periodically as required to maintain optimum visibility of the display. Use plenty of water to minimize scratching of the surface by abrasive dust and debris that may have accumulated on the door panel. A mild detergent can be used to remove any accumulated oil or grease deposits. Rinse the surface thoroughly to completely remove the dirt and detergent residue. Avoid using strong alkali detergents or petroleum-based solvents. Certain solvents will cause severe damage to the polycarbonate surface and are not necessary for effective cleaning. Periodic application of a cleaning and polishing product such as Novus Plastic Polish or KleenMaster Brilliance will dramatically improve the service life of the polycarbonate panel as well as help to reduce dirt accumulation in the field.

The solar panels used in the solar array have a tempered glass upper surface and can be cleaned using the same techniques as those employed in cleaning the door panel. In the event that the solar array becomes covered with snow, the excess snow should be removed as soon as possible. It is not necessary, nor desirable, to aggressively scrape frozen snow or ice accumulation from the panels. If the majority of the snow is removed, sunlight will usually melt any remaining accumulation within a few days and the solar array will be back to full energy production.

- SILENT MESSENGER & SILENT MESSENGER II/III LIFT & ROTATE -

The solar arrays can be tilted for cleaning by releasing the spring locking tabs from the support arms and gently pushing the arms toward the back of the sign panel to unlock them. Pull down on the back edge of the solar array and it will continue to swing down to a near vertical position for easy inspection and cleaning. Simply reverse the procedure to return the solar arrays to their normal operation position. Make certain that the spring locking tabs are fully engaged when the support arms are returned to their upright and locked position.

- SILENT MESSENGER II, III and IV -

When the sign panel is in the transport position, the trailer can be tilted back onto the rear jack stands (or lowered swivel-type screw-jacks) to facilitate cleaning the solar array. Simply retract the rear jack stands fully and lift up on the tongue until the trailer tilts toward the rear and rests on the rear jack stands. Pull down on the tongue to return the trailer to the transport position.

General overall cleaning of the entire unit is recommended as a part of the routine maintenance schedule to optimize the performance and life expectancy of the message sign. Urethane coatings are among the most durable and corrosion resistant finishes available today. However, regular cleaning to remove dirt and corrosive compound accumulation will go a long way toward maximizing the appearance and life expectancy of the finish. A mild detergent and plenty of water is all that should be required to remove accumulated dust and road film. Avoid using strong alkali or abrasive cleaning compounds. They are not necessary and may damage the finish.

- LUBRICATION -

Although, under typical operating conditions, very little lubrication service is required, it is still an important aspect of maintaining trouble free operation and minimizing rust and corrosion problems.

- SILENT MESSENGER -

The sign panel mast mechanism employs nylatron wear pads at the top of the lower mast section and at the bottom of the upper mast section to ensure that the mast will raise, lower, and rotate with minimum effort and no need for lubrication. It is, however, recommended that a small amount of lithium grease or chain lubricant be applied to the rotor plate and dual cam locking mechanism pivot points located at the bottom of the upper mast section. This will help prevent rust and corrosion from forming inside and around the locking mechanism and restricting the free rotation of the sign panel.

The swivel jacks, located at each corner of the trailer should also be lubricated regularly. Apply a small amount of chain lube at the swivel bearing between the jack and the mounting plate as well as at the hole located at the top of the swivel jack outer tube to lubricate the internal screw mechanism. Lubricating these and other pivot points not only ensures that these mechanisms remain free and easy to operate, but also that rust and corrosion are kept to a minimum.

Check the brake fluid level in the hydraulic surge brake actuator located at the front end of the trailer tongue at least once a month. Refill as required with clean brake fluid rated for DOT 3 applications. Periodically lubricate the surge brake actuator to ensure that the brake mechanism will continue to operate freely. Use a lithium-based lubricant applied with a grease gun to the zerk fittings on the side of the actuator.

The trailer axle wheel bearings should be cleaned and repacked with a good grade of lithium-based bearing grease at least once a year, more frequently if the trailer is used heavily, particularly in excessively dusty environments or if the axle has been submerged in water. Remove the dust cap from the axle hub, remove and discard the cotter key, and remove the castle head nut. Remove the wheel and hub from the axle spindle, being careful to prevent the bearings from falling and becoming contaminated with dirt and grit. While the hub and brake drum are removed, inspect the condition of the lining on the brake shoes and inside surface of the brake drum. Replace the brake shoes if the lining is worn to within 1/16 inch or less and recondition the brake drums, if required. Clean the old grease from the bearings, hub, and spindle. Repack with clean wheel bearing grease and reassemble. Always replace the cotter key with a new one to ensure secure retention of the spindle nut.

The hydraulic system used to raise and lower the sign panel mast does not require any regularly scheduled maintenance. The hydraulic fluid reservoir should be checked periodically to make certain that the fluid is at the level indicated on the side of the reservoir. Add Dexron II ATF hydraulic fluid as required to maintain the appropriate level. Make certain that the reservoir fill cap is replaced securely to prevent hydraulic fluid loss or contamination.

- SILENT MESSENGER II, III and IV -

The sign panel lifting mechanism employs a winch and cable mechanism with a pair of sheaves on the sign panel support frame lower crossmember. Apply a small amount of chain lube at each sheave bearing sleeve and at the lube points on the winch.

The swivel jacks, located on the tongue and/or the four corners of the trailer should also be lubricated regularly. Apply a small amount of chain lube at the swivel bearing between the jack and the mounting plate as well as at the hole located at the top of the swivel jack outer tube to lubricate the internal screw mechanism. Lubricating these and other pivot points not only ensures that these mechanisms remain free and easy to operate, but also that rust and corrosion are kept to a minimum.

The trailer axle wheel bearings should be cleaned and repacked with a good grade of lithium-based bearing grease at least once a year, more frequently if the trailer is used heavily, particularly in excessively dusty environments or if the axle has been submerged in water. Remove the dust cap from the axle hub, remove and discard the cotter key, and remove the castle head nut. Remove the wheel and hub from the axle spindle, being careful to prevent the bearings from falling and becoming contaminated with dirt and grit. Clean the old grease from the bearings, hub, and spindle. Repack with clean wheel bearing grease and reassemble. Always replace the cotter key with a new one to ensure secure retention of the spindle nut.

- ADJUSTMENTS -

Because of the unique design of the telescoping mast assembly used on the **SILENT MESSENGER**, maintenance has been kept to an absolute minimum. As mentioned above, no lubrication of the telescoping mast sections is required. From time to time, however, the nylatron wear pads, located at the top of the lower mast section and at the bottom of the upper mast section, may require adjustment. Raise the sign panel approximately two feet above the transport position and check for play at the bottom of the upper mast section by placing the locking lever in the locked position and attempting to rotate the sign panel assembly about the lower mast section. If there is more than a slight amount of play, the bottom wear pads may need to be adjusted.

To adjust the bottom wear pads, located on the indexing plate at the bottom of the upper mast section, you will need a 5/32 inch hex key. The objective is to have the nylatron pads snug against the lower mast. The set screws have been secured at the factory with a thread locking compound which may need to be broken loose prior to adjusting the lower wear pads. After the set screws have been loosened, gently turn each screw in until it stops. Back the set screw out 1/4 to 1/2 turn and re-secure with a suitable thread locking compound. Repeat procedure for all eight set screws at the bottom of the upper mast section.

The upper wear pads should not require adjustment under normal operating conditions, unless the hydraulic cylinder needs to be removed for service. If the upper wear pads should require adjustment, the hydraulic cylinder cover plate, located on the top of the upper mast section must be removed and the hydraulic cylinder must be partially extended. The solar arrays must be unlocked and pivoted into the inspection and cleaning position to gain clear access to the cover plate. See the repair section of the manual for additional information.

The sign panel support cradles should also be inspected periodically to ensure that they are providing proper support for the mast and sign panel assembly during transport. The bottom of the sign panel does not need to be in direct contact with the rubber pads when it is fully lowered. There may be some clearance to allow for normal movement of the mast and sign panel assembly during transport. The purpose of the round rubber pad is to support the sign panel when the mast assembly comes under excessive stress during transport to prevent any damage to the mast and sign panel assembly.

The vertical face of the sign support cradle should fit snugly against the sign panel when the sign panel is lowered into the transport position. The sign support cradles position can be adjusted by loosening the four screws that secure the cradle to the trailer frame, and sliding the cradle toward the rear of the sign panel until it is snug, then tighten the four screws to hold the cradle in position. Adjust both cradles so that each cradle is in approximately the same position to ensure that the sign panel is in line with the trailer tongue during transport. This will minimize wind loading on the sign panel during transport.

The hydraulic surge brake system installed on the **SILENT MESSENGER SOL-R-SIGN** trailer incorporates an automatic adjustment feature which, under normal operating

circumstances, should not require any manual adjustment of the brakes. The brake shoes are automatically adjusted for lining wear whenever the trailer is moving rearward up an incline. Activating the brakes while the trailer is backing uphill causes the brake adjuster to activate and compensate for brake shoe lining wear. The brakes can also be adjusted manually using a brake adjustment tool via the access port in the inside surface of the brake mechanism backing plate. The hydraulic surge brake system can be checked very easily by raising the trailer with the four outrigger swivel jacks until the wheels are off the road surface and using a tow vehicle coupled to the trailer to apply and release pressure to the brake actuator. Both wheels should lock up when pressure is applied to the actuator and release when the rearward pressure is released. The brakes can be checked for proper adjustment at this time as well. The wheels should rotate freely with the brake shoes just slightly rubbing the brake drums with no force applied to the brake actuator. Adjust the brake shoe position if necessary.

- INSPECTIONS-

Annually inspect the entire trailer for structural integrity to ensure no physical damage has occurred that would render the trailer unsafe paying particular attention to all structural welds including checking for any evidence of cracking and/or fatigue failure (note: this should be performed by a qualified individual).

- BATTERIES -

When servicing the batteries, as with any lead acid type battery, there are a few precautions that should be observed:

1.) Never expose the area over and around an open battery compartment to a spark or open flame. Lead acid type batteries produce hydrogen gas during a recharge cycle and an accumulation of the gas exposed to a spark or flame could result in an explosion! Since hydrogen gas is much lighter than air and dissipates very quickly, the only area of concern is immediately above and around the battery compartment.

2.) Always exercise extreme care when using metal tools around the battery terminals. The batteries used in the **SILENT MESSENGER** have an extremely large energy storage capacity and can generate several thousand Amperes of current if the terminals are shorted out by a metal tool. This high current will cause the tool to heat up very quickly and possibly spray molten metal at the point of contact. The battery bank operates at a very low voltage level, specifically 12 Volts, which is not high enough to present any danger of electrical shock. However, the battery bank's ability to generate very high current necessitates the exercising of extreme caution when working around the battery terminals.

3.) The electrolyte used in lead acid batteries, whether liquid or gel, is highly corrosive and can cause skin irritation and burns. Use caution, whenever batteries are being serviced or replaced, to avoid spillage or case damage. If any of the electrolyte comes into contact with skin or clothing, remove it immediately by flushing with plenty of clean water.

Gloves and safety goggles should be worn anytime service or repair work is being performed on the batteries or electrical terminals!

The batteries, in general, require very little care and maintenance. The most important aspect of optimizing the service life of the batteries is fluid level maintenance. The electrolyte level must always be maintained at a level above the plates inside the battery. If the electrolyte level drops below the tops of the plates, the portion of the plates that have been exposed will be permanently damaged. The electrolyte level is very easily maintained by simply adding distilled water as needed.

Simply remove the vent caps from each cell of the battery, check the level of the fluid, and add distilled water, if necessary, to bring the electrolyte level up to the indicator ring located in the opening. A battery water dispenser, available at most auto parts supply stores, will expedite and simplify the process.

Battery fluid level should be checked every three to four months in temperate climates and every 30 days in very warm climates. Remember, if the fluid level is not maintained, the useful life of the batteries will be dramatically shortened!

The only other maintenance items that should be performed on the batteries can be completed at the same time that the electrolyte level is being checked. Make sure that the fasteners

holding the cables on the battery terminals are tight and that any fluid or residue buildup on the tops of the batteries is removed. Use a damp cloth or sponge to wipe off any buildup. This will help prevent corrosion of the terminals and the battery compartment and minimize breakdowns due to loose or corroded electrical terminals.

From time to time, the battery bank may require a maintenance recharge using an auxiliary line-powered battery charger to optimize the energy storage capacity of the battery bank. If the **SILENT MESSENGER** is operating in extremely low temperatures with limited sunlight availability, the battery bank may become discharged to the point where the system is shut down to conserve power and prevent over-discharging the battery bank. If this should happen, the battery bank should be recharged by an auxiliary battery charger as soon as possible. If the batteries are allowed to remain in a discharged state in low temperatures, the electrolyte may freeze and permanently damage the batteries.

The **SILENT MESSENGER** uses a very high energy storage capacity battery bank. Recharging this battery bank is not like recharging an automobile battery. The charging process requires a large amount of energy which means that a typical household auto battery charger is not going to do the job! The battery bank consists of six-volt batteries wired in a series and parallel combination to create a 12-volt battery bank with appropriate energy storage capacity. The battery charger must be for 12-Volt batteries and must have a suitable output current rating.

SILENT MESSENGER: A 60-Amp battery charger will fully recharge a depleted battery bank in 24 to 36 hours. A 120-Amp charger in about 12 to 18 hours.

SILENT MESSENGER II AND III: A 40-Amp battery charger will fully recharge a depleted battery bank in 20 to 24 hours. A 60-Amp charger in about 12 to 15 hours.

So as you can see, it takes a high capacity battery charger and a substantial amount of time to fully recharge the high capacity battery bank used in the **SILENT MESSENGER**.

To charge the battery bank simply connect the positive (**RED**) lead from the battery charger to the positive (**POS**) terminal of one of the batteries in the battery bank with a **RED** jumper wire attached. Then connect the negative (**BLACK**) lead from the charger to the negative (**NEG**) terminal of one of the batteries in the battery bank with a **BLACK** jumper wire attached.

NOTE: *Do not connect the charger leads to the battery terminals that have jumper wires connecting the negative (**NEG**) terminal of one battery to the positive (**POS**) terminal of another battery in the battery bank!!! These wire connect two 6-Volt batteries in series to produce the 12-Volt power required by the **SILENT MESSENGER's** electrical system.*

Plug in the charger, switch it on and let it run to completion. As always, observe correct voltage and polarity!

Do not attempt to charge the battery bank by connecting the battery bank to a running automobile! This will not cause harm to either the car or the message sign. However, since the alternator in the vehicle is connected through a charge regulation system to an already

charged battery (the vehicle's), the voltage generated will not be sufficient to produce an adequate flow of energy into the message sign's battery bank. You must use a line-powered auxiliary battery charger with sufficient capacity to do the job right.

Properly maintained batteries will provide long service life. Protect your investment! Take care of your batteries!

- QUERTY KEYBOARD CONTROL CONSOLE (P/N - MB-22-905) -

The Main **CONTROL CONSOLE** for the Message Board includes a Central Processing Unit (CPU) Board that contains a battery to provide backup power for the nonvolatile memory. The nonvolatile memory contains all user files and records. The backup battery should be replaced once a year to insure that none of the user files are lost or corrupted when main power is switched off. Use a suitable high-energy lithium battery as a replacement. The following batteries are acceptable substitutes:

Duracell	DL2032
Eveready	ECR2032
Ray-O-Vac	BR2032
Panasonic	BR2032
Radio Shack	CR2032

Carefully replace the battery while the Main Power switch is in the **ON** position. This will insure that any user created messages and sequences are retained in memory while the backup battery is out of service. Do not allow the metal battery case to come into contact with any components on the circuit boards! Possible damage to the CPU Board or the Power Supply and Interface Board that would not be covered by the warranty could occur.

6. TROUBLESHOOTING & REPAIR

Even with the finest quality equipment, things do occasionally go wrong. That's when the true quality begins to show through. Quality in design! Designed in conveniences that optimize service and repair, and get the equipment back on the job as quickly and efficiently as possible. The **SILENT MESSENGER** has been designed precisely that way! Modular construction that simplifies repairs and minimizes costs. Easy servicing to minimize downtime. And finally, the ability to upgrade and maximize the service life of your investment. Designed-in quality that protects your investment now and into the future!

- MAIN CONTROL CONSOLE -

The **MAIN CONTROL CONSOLE** provides several built-in troubleshooting aids as part of the basic operating programs. The ability to check battery voltage, ambient light levels, display character modules, automatic shutdown voltage set points, library file status, and more, right there in the field, allows much of the service and many of the repairs to be completed at the work site without the need to transport the unit to a service center.

Many test and troubleshooting functions are available in the **MAIN CONTROL CONSOLE** operating software. Refer to section 5 of this manual for instructions on how to use these built-in test and troubleshooting functions. This section of the manual also lists the factory defaults for various system operating parameters. Compare the current settings with the factory defaults to check for any discrepancies that could effect system operation. If any operating parameter settings are different from the factory defaults and you wish to correct them, refer to section 5 of this manual for instructions.

QWERTY KEYBOARD MAIN CONTROL CONSOLE (P/N - MB-22-905):

If at any time the display panel on the control console remains completely blank after **MAIN POWER** is switched on, check the **CONTRAST** control located on the front left-hand corner of the Power Supply and Interface Circuit Board in the Control Console. Remove the eight (8) #8 phillips head screws securing the top cover of the Control Console and remove the top. Exercise care since the top of the Control Console has several cables connected to the Power Supply and Interface Circuit Board. Locate the **CONTRAST** adjustment control on the circuit board and rotate the control while watching the display panel on the Control Console front panel. It may be necessary to turn the control several revolutions before observing any effect on the display. Adjust the **CONTRAST** control for the best quality display. Under average ambient temperature conditions the **CONTRAST** control should never require any adjustment, however under relatively low ambient temperature conditions, typically 20 degrees Fahrenheit (-8 degrees Celsius), the **CONTRAST** control may require minor adjustment to improve the visibility of the display. (Note: there is no contrast adjustment on the **Mega-Tech** Touch-Screen Control Console.)

Control Console will not power up!

In the event that the unit fails to power up when **MAIN POWER** is switched **ON**, check the **MAIN POWER SWITCH / CIRCUIT BREAKER** to make certain that it has not tripped. The **MAIN POWER SWITCH** includes an automatic electrical circuit protection device to protect the electrical system in the event of an over-current condition. If the **MAIN POWER SWITCH** is tripped, switch it **OFF** and back **ON**. It trips again, contact technical support at the factory for assistance. Check the display on the **ENERGY MANAGEMENT SYSTEM CONTROL UNIT** to determine if the **BATTERY BANK** voltage is greater than 12.0 Volts. If the **BATTERY BANK** voltage is zero, check the wiring between the batteries and the **ENERGY MANAGEMENT SYSTEM CONTROL UNIT**. If the **BATTERY BANK** voltage is less than 12.0 Volts, recharge the **BATTERY BANK** using a line-powered auxiliary battery charger.

Check all **CONTROL CONSOLE** and **ENERGY MANAGEMENT SYSTEM CONTROL UNIT** electrical connections. If all cables and connectors are in place and the control console still fails to power up, contact the technical support group at the **SOLAR TECH** factory for further assistance.

- SIGN DISPLAY PANEL -

When the **MAIN POWER** is switched **ON**, the system goes through several hardware check and initialization routines before the data files are updated and sequences are displayed. The main message display panel momentarily flashes all of the pixels on shortly after **MAIN POWER** is switched **ON**. This indicates that power has been applied to the main display panel and all character modules are active. If one or more of the display modules fails to flash or display the programmed messages correctly, it means that a display module(s) is either defective or is not receiving power. The sign display panel needs to be checked!

Display Modules are not working properly!

Messages are sent to the main display panel by the control console in much the same way that a host computer sends information to workstations in a computer network. The messages are sent to display module #1 first, then on to display module #2, then to #3, and so on. If one or more of the display modules is not correctly displaying the messages, the problem is usually with the first display module that is not working. It is important to remember that the display modules are completely interchangeable and are not position dependent. That is, any display module will function in any position without the need to set any switches or install any jumpers on the circuit board. Therefore, if a display module is not working properly, simply interchange the module with the last one in the bottom row, #24, to verify if the suspected display module is indeed bad or if it is the next one in line that is faulty. The display modules can be swapped in and out while the message sign is powered and operating. This feature dramatically reduces the amount of time required to troubleshoot and repair the display panel. When "hot swapping" display modules, that is, interchanging display modules with power on, exercise caution to avoid contacting any exposed terminals on the back of the display module with the metal mounting frame.

NOTE: Electrostatic discharge can damage the circuitry on the display module circuit board. If a display module must be returned to the factory for service, immediately upon removing it from the sign panel frame, place the module in an antistatic bag or wrap the module in antistatic material for safe transport. If antistatic material is not available, wrapping the display module circuit board in aluminum foil will provide adequate protection.

To access the interior of the sign panel, unlock the sign panel door latches by gently lifting up at the end of the latch toward the rear of the sign panel and unhooking the latch from the door frame. Make sure that all of the door latches have been disengaged before attempting to open the door. Firmly grasp the center of the door at the bottom edge and pull forward and up until the door supports reach the end of their travel and stop any further upward movement of the door. Now gently allow the door to lower until the door supports engage and hold the door in the open position. You will now have access to the entire sign panel for service and repair. Each display module is held in place by 1/4-turn wing head fasteners. Simply turn each fastener 1/4 turn counterclockwise to unlock the fastener, then gently lift the display from the mounting rails. The power and control signal connector is a locking-type connector and must be unlocked before it can be removed. Press the tabs on the ends of the power connector and pull straight out to remove it. You may have to rock the connector from side to side to loosen it from the mating receptacle on the circuit board.

If you remove display module #17 you will be able to see the Sign Panel Interconnect Circuit Board. This board provides for distribution of power and control signals to the entire sign panel. The Sign Panel Interconnect Board also includes LEDs to indicate that power is available to the sign panel and that data is being sent to the sign panel from the Control Console and that the sign panel is returning data to the Control Console so the Control Console can verify that the sign panel is working.

If one or more of the display modules is not working properly, the **SIGN PANEL FAILSAFE FEATURE** will disconnect power to the display modules. If this condition exists, the **POWER IN** indicator on the Sign Panel Interconnect Board will be **ON** but the **POWER OUT** indicator will be **OFF**. If this is the case, follow the instructions in the Sign Panel Failsafe Status section of the Check System Status Menu to temporarily disable the **SIGN PANEL FAILSAFE FEATURE** so you can locate the problem display module in the sign panel.

After exchanging the suspect display module, check the connector along the bottom edge of the display module circuit board to make sure that the plug and cables are all present and seated completely into the connector and the locking tabs are engaged. Carefully position the display module in the center of the opening, taking care to make sure that the fasteners slip into the mating receptacles, then gently but firmly press on the module and rotate each fastener clockwise until it locks into place. The wing heads should be oriented vertically when the fasteners are locked. Check for proper display function prior to closing the sign panel door. When everything is working properly on the main display panel, grasp the door frame in the center of the bottom edge, lift up until the door supports again hit their stops, and lower the door into the closed position. Make sure that the bottom of the door frame rides up and over the protective lip at the bottom edge of the sign case frame. Secure the door in the closed position by hooking and latching all of the door panel latches located around the perimeter of the sign panel case. The weather-strip seal will compress as the door latches are secured.

(Note: For Mega-Tech Touch-Screen Control Consoles follow instructions provided on Control Console Display.)

Sequence is not displayed as anticipated!

There are several reasons why a sequence you just added to the **SEQUENCE QUEUE** is not displayed as expected. The most likely situation is that another sequence was previously placed in the **QUEUE**, to be displayed forever (continuously) and will be displayed indefinitely until it is removed from the **QUEUE**. In order to more fully understand how the **SEQUENCE QUEUE** works, think of adding a sequence to the **QUEUE** in the same way as getting in line at a service counter. The first person in line is waited on first and remains at the counter until they are finished being served. When the first person is finished, the second person in line moves up to the counter. When the second person is finished, the third person moves up to the counter to be waited on, and so on and so on. If the first person in line takes forever, as it so frequently seems, then the second person will never be waited on. And so it is with the **SEQUENCE QUEUE**. Once a sequence has been added to the **QUEUE**, to be displayed forever, it will literally remain there forever. In order for another sequence added to the **QUEUE** to be displayed, the first sequence must be removed (deleted) from the **QUEUE**.

Use the **CHECK QUEUE LIBRARY** special function key (**F8**) while in the **USER MENU** or the **CHECK CONTENTS OF QUEUE** function in the **SEQUENCE QUEUE LIBRARY MENU** to examine the current contents of the **SEQUENCE QUEUE** to determine if there are any conflicting entries. Remember, even if the sequences entered into the **QUEUE** were not specified "to be displayed forever", but were assigned start and stop times, it is still important to check for conflicts or overlapping start and stop times. This can also cause unexpected sequences to be displayed on the message sign. Remove any unnecessary entries in the **QUEUE** and check for any remaining conflicts. If in doubt, simply remove all current entries from the **QUEUE** and add the desired sequences with the appropriate display time parameters.

If sequences have been added to the **SEQUENCE QUEUE** with start and stop times and the sequences are not coming on and off as expected, check to make sure that you entered the start and stop times using 24-hour format for the hour setting and check the clock/calender setting to make sure that the time and date are correct. Use the **CHECK SYSTEM SETTINGS MENU** in the **SUPERVISOR MENU** to check the current time and date settings and to make any necessary adjustments.

Finally, if the display comes on in the morning and goes off in the evening, the automatic low voltage shutdown set point may be incorrect. The low voltage shutdown feature protects the battery bank from becoming over discharged in the event that the solar electric generator is not producing sufficient energy output to recharge the batteries. The factory default setting for low voltage shutdown is 10.7 Volts. If this set point is inadvertently changed to an excessively high voltage, such as 12.8 Volts, the display will shut off at night when the battery voltage drops below 12.8 Volts and automatically switch back on in the morning when output from the solar array boosts the battery voltage back up over 12.8 Volts. The low voltage shutdown setpoint should not be changed from the factory default setting of 10.7 Volts without first consulting with factory technical personnel to discuss the particular situation to determine if altering the setpoint will improve reliability and operation or indeed make matters worse!

If all of the above checks have been performed and you are still unable to get the desired sequence to display, it may be time to call for help. Make certain that you have:

1. Added the required messages to the **MESSAGE LIBRARY**
2. Added the desired sequence to the **SEQUENCE LIBRARY**
3. Added the sequence to the **SEQUENCE DISPLAY QUEUE**
4. Checked that the Sign Panel Display is set to **ON**

prior to contacting the factory.

(Note: For Mega-Tech Touch-Screen Control Consoles follow instructions provided on Control Console Display.)

If all else fails, call for help! **SOLAR TECH** technical support personnel are always available to assist you.

- SOLAR ENERGY MANAGEMENT SYSTEM -

The **SILENT MESSENGER's SOLAR ENERGY MANAGEMENT SYSTEM** consists of a multi-panel solar array, an **ENERGY MANAGEMENT SYSTEM CONTROL UNIT**, and a battery bank. The solar array, consisting of multiple photo voltaic panels, generates electricity whenever the array is exposed to sunlight. The **ENERGY MANAGEMENT SYSTEM CONTROL UNIT** monitors the solar array output, ambient temperature, the battery bank condition and regulates the flow of power generated by the solar array into the battery bank. Together the system components provide an economical, renewable source of energy for the **SILENT MESSENGER's** display panel and control console.

When everything is working properly the solar power system will provide more than enough energy to operate the **SILENT MESSENGER** continuously, in all kinds of weather, in any geographical location. If the battery bank voltage is not being properly maintained by the solar power system, it is time to perform some preventive and possibly some corrective maintenance to alleviate the problem.

The first step in correcting a low battery voltage situation is to make certain that the upper surface of the solar panels is clean. Dirty solar panels may work fine in the summer time when plenty of sunlight is available. However as Fall approaches and the days become shorter, the reduced amount of available sunlight is unable to penetrate the dust and dirt buildup and generate enough energy to completely recharge the battery bank. Clean the surface with water and a mild detergent or with a window cleaning product.

The next step is to check the output from the solar array and the power currently being consumed by the message board. The **ENERGY MANAGEMENT SYSTEM CONTROL UNIT**, in addition to regulating the flow of power into the battery bank, also monitors the power output of the solar array, the power supplied by the battery bank, and the overall condition of the battery bank.

During daylight hours, when adequate sunlight is available, the **ENERGY MANAGEMENT SYSTEM CONTROL UNIT** will display the solar array voltage and current supplied to the battery bank as well as the present battery bank voltage and current being used by the message display panel and control console. At noon on a bright sunny day, while the **SILENT MESSENGER** is displaying a typical sequence of messages, the current supplied by the solar array should be approximately 1 1/2 to 3 times the current used from the battery bank to operate the unit. This will insure continuous, uninterrupted operation. If the current supplied by the solar array is not adequate, the battery bank will eventually discharge and the unit will automatically shut down.

During the night, the **ENERGY MANAGEMENT SYSTEM CONTROL UNIT** continues to monitor the solar array and the battery bank. The output from the solar array will, of course, be zero during the night, however the output voltage of the battery bank will be displayed along with the current being consumed by the unit from the battery bank. The **CHARGING** indicator will flash and the LCD screen will also display the message "**SOLAR TECH**" and the **ENERGY MANAGEMENT SYSTEM CONTROL UNIT's** current firmware version, indicating that the charging circuit is inactive.

If the battery bank voltage drops below 10.7 Volts, the **ENERGY MANAGEMENT SYSTEM CONTROL UNIT** will automatically switch power to the message board off. Main power will remain off until the battery bank is recharged to a voltage of 12.0 Volts or greater. The solar array, when it receives adequate sunlight, will provide the necessary energy to recharge the battery bank. However, if the battery bank is discharged to the point where the automatic low battery voltage shutdown feature disconnects main power, the battery bank should be recharged by an auxiliary battery charger capable of providing at least 15 Amps per pair of six-volt batteries in the battery bank. This will insure that the batteries have completely recovered and will help insure maximum service life.

If the current output from the solar array is inadequate the solar array must be checked further. The solar array should generate a minimum current of 2 to 3 Amps per solar panel in good sunlight. Make certain that the upper surface of the solar panels is completely cleaned prior to checking output current. Dirt and dust accumulation on the upper surface of the solar panels will significantly reduce the output current. If the current reading is lower than expected, each solar panel should be evaluated individually. Open the junction boxes on the bottom of the solar panels and remove the red wire from the terminal block to isolate the solar panels. Check each panel for proper output voltage and current. If one solar panel is not operating properly, the power output for the entire array can be adversely affected. When all testing is complete and the problem solar panel has been located and replaced, reconnect the leads to the solar panels and reconnect the solar array power output leads to the charge controller, observing correct polarity. Make certain that all connections are secure and that all wire terminals are properly tightened. Install the junction box covers and tighten screws to insure a weather-tight seal.

To check message board energy consumption, using Quick Programming or standard programming in the User Menu if you would like to save the sequence permanently, to create a single-message sequence as follows:

CAUTION
CAUTION
CAUTION

using three-line normal character size (font).

For the **SILENT MESSENGER** current consumption during daylight hours, with the display at full intensity, should be approximately 8.5 Amps. The current consumed by the message board during night time operation should be significantly less than the current consumed during daylight hours. During the night the battery bank current should be approximately 1.2 Amps.

For the **SILENT MESSENGER II** current consumption during daylight hours, with the display at full intensity, should be approximately 6.5 Amps. The current consumed by the message board during night time operation should be significantly less than the current consumed during daylight hours. During the night the battery bank current should be approximately 1.2 Amps.

For the **SILENT MESSENGER III** current consumption during daylight hours, with the display at full intensity, should be approximately 4.5 Amps. The current consumed by the message

board during nighttime operation should be significantly less than the current consumed during daylight hours. During the night the battery bank current should be approximately 1.2 Amps.

Use the **CHECK AMBIENT LIGHT LEVEL** feature in the **CHECK SYSTEM STATUS** Menu to verify that the sign panel display brightness is at high for daylight current consumption measurements and at low for night time measurements.

SolarTech factory service technicians are available for assistance in selecting the proper test equipment and performing solar panel power output checks.

- SILENT MESSENGER HYDRAULIC SYSTEM -

The electrohydraulic power system for raising and lowering the sign panel consists of a power unit, a connecting line, a velocity fuse, and a single acting ram cylinder. The system provides power to lift the sign panel into the operating position and hold it there safely during normal operation. The velocity fuse provides a safeguard against unexpected rapid decent of the sign panel in the event of a power unit failure or hydraulic line rupture.

To raise the sign panel, simply pull on the lever to apply power to the hydraulic pump and pressure to the cylinder. To lower the sign panel, push on the lever. The sign panel rate of decent is controlled by a flow control valve located in the power unit. The velocity fuse should not activate under normal operating conditions! If the fuse should set, check the hydraulic system thoroughly for ruptured hoses or leaking fittings. The velocity fuse can be reset by applying pressure to the system until the pressure on the line side of the fuse exceeds the pressure on the load side. If the system will not pressurize, the cause of the problem must be resolved and the velocity fuse must be reset. The sign panel can then be safely lowered.

The power unit reservoir may require additional hydraulic fluid from time to time. Raise the sign panel to its full height operating position and check the fluid level in the reservoir. There should be about 1 to 1 1/2 inches of oil in the reservoir with the cylinder fully extended. If fluid is required use Dexron II ATF (Automatic Transmission Fluid) only. Do not overfill!

- SILENT MESSENGER II & III WINCH AND CABLE SYSTEM -

If the automatic brake mechanism on the winch fails to properly control the descent of the sign panel, the entire winch should be replaced. Replace the wire rope if it should become kinked or frayed. Keep equipment safe by keeping it properly maintained!

- APPENDIX -

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GRAPHIC IMAGE

LAYOUT FORM

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Mark squares where pixels should be on with an 'x' or blacken them in with a marker to form the graphic image. This form can be copied onto drafting film or velum so that the form can be placed over a printed image and traced to simplify layout. After the form has been completed, use the ADD New Message function on the Message Sign Control Console and select 7. Graphic from the Character Size list. Then press 1 to create the new graphic image. Use the cursor (arrow) keys to move the cursor (blinking bar) around in the sign display field and the space bar to turn the pixels on and off. The cursor position is indicated on the LCD screen on the control console. Simply match the cursor position to that indicated on the layout form and set the appropriate pixels to on. Remember that existing graphic images can be modified to create variations of existing graphic images and saved under a new name.

STANDARD ABBREVIATIONS

Common, easily understood abbreviations:

<u>WORD</u>	<u>ABBREVIATION</u>	<u>WORD</u>	<u>ABBREVIATION</u>
BOULEVARD	BLVD	NORMAL	NORM
CENTER	CNTR	PARKING	PKING
EMERGENCY	EMER	ROAD	RD
ENTER, ENTRANCE	ENT	SERVICE	SERV
EXPRESSWAY	EXPWY	SHOULDER	SHLDR
FREEWAY	FRWY, FWY	SLIPPERY	SLIP
HIGHWAY	HWY	SPEED	SPD
INFORMATION	INFO	TRAFFIC	TRAF
LEFT	LFT	TRAVELERS	TRVLRS
MAINTENANCE	MAINT	WARNING	WARN

Some other abbreviations easily understood when used in conjunction with another word commonly associated with the abbreviated word:

<u>WORD</u>	<u>ABBREVIATION</u>	<u>PROMPT WORD</u>
ACCESS	ACCS	ROAD
AHEAD	AHD	FOG *
BLOCKED	BLKD	LANE *
BRIDGE	BRDG	[NAME] *
CHEMICAL	CHEM	SPILL
CONSTRUCTION	CONST	AHEAD
DIRECTIONS (cardinal)	N, S, E, & W	[NUMBER]
EXIT	EX, EXT	NEXT *
EXPRESS	EXP	LANE(S)
HAZARDOUS	HAZ	DRIVING
INTERSTATE	I	[NUMBER]
LOWER	LWR	LEVEL
MAJOR	MAJ	ACCIDENT
MILE	MI	[NUMBER] *
MINOR	MNR	ACCIDENT
MINUTE(S)	MIN	[NUMBER] *
OVERSIZED	OVRSZ	LOAD
PREPARE	PREP	TO STOP
PAVEMENT	PVMT	WET *
QUALITY	QLTY	AIR *
ROUTE	RT	BEST *
TURNPIKE	TPK, TRNPK	[NAME] *
UPPER	UPR	LEVEL
VEHICLE	VEH	STALLED *

* Prompt word presented first.

Caution should be exercised when using the above abbreviations with other prompt words. Understanding is of paramount importance when using portable changeable message signs for highway safety applications. Avoid using abbreviations whenever possible!

Additional abbreviations understood by most drivers when used in conjunction with another word frequently used with the abbreviated word:

<u>WORD</u>	<u>ABBREVIATION</u>	<u>PROMPT WORD</u>
CONDITION	COND	TRAFFIC *
CONGESTED	CONG	TRAFFIC
DOWNTOWN	DWNTN	TRAFFIC
FRONTAGE	FRNTG	ROAD
LOCAL	LOC	TRAFFIC
NORTHBOUND	N-BND	TRAFFIC
ROADWORK	RDWK	AHEAD [DISTANCE]
SOUTHBOUND	S-BND	TRAFFIC
TEMPORARY	TEMP	ROUTE
TOWNSHIP	TWNSHP	LIMITS

* Prompt word presented first.

Extreme caution should be exercised when using the above abbreviations. Understanding is of paramount importance when using changeable message signs for highway safety applications. Avoid using any abbreviations whenever possible.

Abbreviations prone to confusion:

<u>ABBREVIATION</u>	<u>WORD INTENDED</u>	<u>WORD MISTAKEN</u>
WRNG	WARNING	WRONG
ACC	ACCIDENT	ACCESS
DLY	DELAY	DAILY
LT	LIGHT	LEFT
STAD	STADIUM	STANDARD
L	LEFT	LANE
PARK	PARKING	PARK
RED	REDUCE	RED
POLL	POLLUTION	POLL
FDR	FEEDER	FEDERAL
LOC	LOCAL	LOCATION
TEMP	TEMPORARY	TEMPERATURE
CLRS	CLEAR	COLORS

The above abbreviations are certain to result in misinterpretation and confusion. Avoid using these abbreviations under all circumstances!



SILENT MESSENGER

Solar Powered Portable Dynamic Message Sign

Safe Operating Procedures

Safety Check Before Transporting

1. Check battery bank voltage and solar array current. Clean solar panels if necessary.
2. Check battery fluid level. Add distilled water to indicator ring if necessary.
3. Switch control console on and check for proper operation of sign panel.
4. Switch control console off.
5. Close & secure battery compartment covers.
6. Lower sign panel completely to travel position.
7. Secure all locking pins in appropriate positions.
8. Inspect trailer for structural integrity to ensure no physical damage has occurred that would render unsafe paying particular attention to all structural welds including checking for any evidence of cracking and/or fatigue failure.
9. Connect and lock coupler onto tow vehicle.
10. Secure jack stands in retracted position.
11. Retract and lock tongue jack, if so equipped, in horizontal position.
12. Install safety chains, crisscrossed under tongue.
13. Connect stop and tail lights and check function.
14. Periodically check tire pressure and coupler integrity.

Safety Check Before Operating

1. Position unit properly on jack stands before raising sign panel.
2. Check for overhead wires or obstructions before raising sign panel (15 ft. clear).
3. Do not stand under sign panel while raising and lowering.
4. Keep hands clear of lifting mechanism when raising or lowering sign panel.
5. Secure sign panel in operating position with locking lever.
6. Do not smoke or use open flame around open battery compartment.
7. Open battery compartment lid fully when accessing the compartment.
8. Check battery fluid level periodically. If necessary, add distilled water until fluid reaches the indicator rings.
USE DISTILLED WATER ONLY!
9. Do not get battery fluid on skin or clothing. Should contact occur, flush the area thoroughly with water and seek medical attention.
10. Make sure the sign panel is displaying the appropriate messages and fully visible to drivers approaching the work zone.
11. Always lock battery compartments to prevent unauthorized operation.

I have read and understand the above procedures for the safe and effective operation of the **SILENT MESSENGER** Solar Powered Portable Dynamic Message Sign.

Company Name: _____

Representative: _____

Signature: _____ Date: _____



SOLAR TECHNOLOGY, INC

7620 Cetronia Road, Allentown, PA 18106

Phone: 610-391-8600 Fax: 610-391-8601

Internet: www.solartechnology.com

Procedure for changing the default settings of Solar Technology wireless router:

The defaults settings from the SolarTech factory for the router are as follows:

- Router Access password: **solartech**
- Wireless Network SSID: STI – Serial number of the unit (**STI-XXXXXX**)
- WEP Key: Customer fax number (**XXX-XXX-XXXX**) – unless otherwise specified at time of order.

For extra security you can customize your router settings using the following procedure:

What is required:

- Ethernet cable (provided with unit in product support package)
- Computer with Ethernet port.
- Internet Browser: (Internet Explorer, Mozilla/Firefox, Opera, or Maxton).
- Insert the Ethernet cable to the LAN port 4, the port closest to the power plug.
- Insert the other end of the cable to the Ethernet port on the computer.

Changing the router Access password:

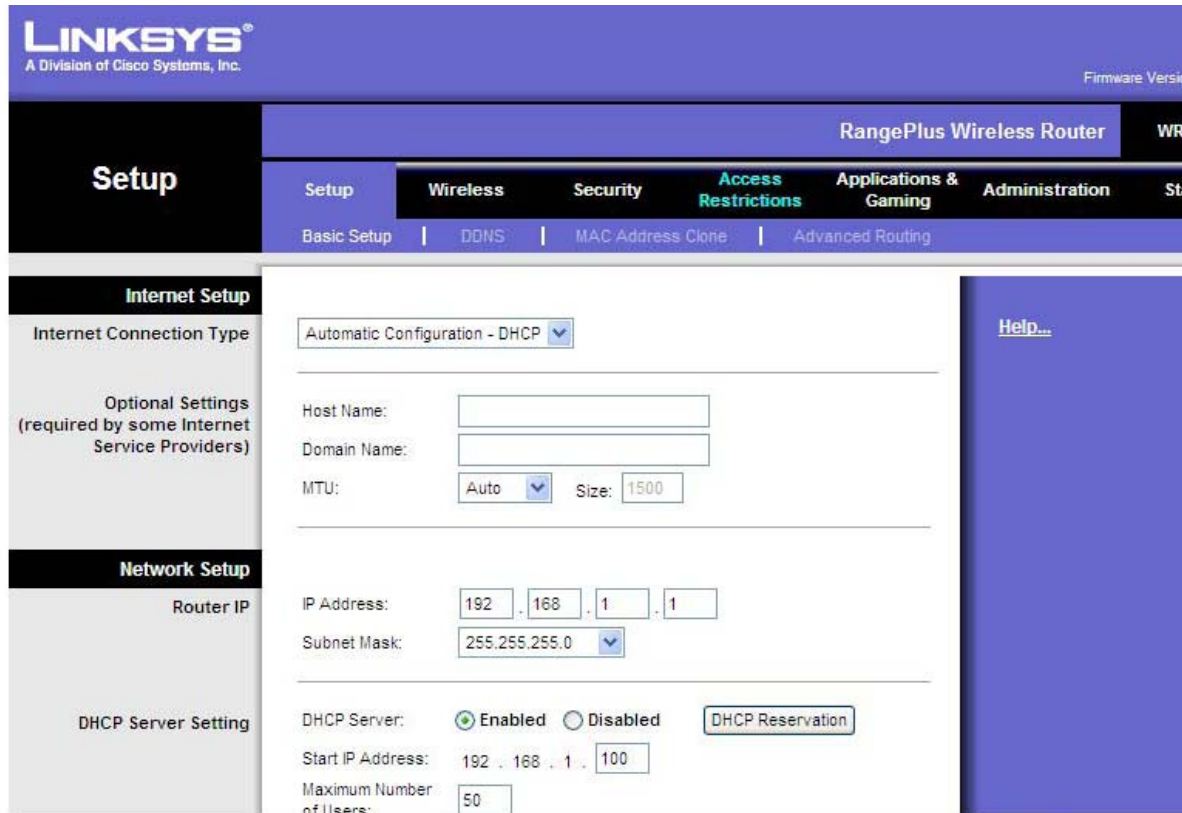
1.) Launch your browser and type <http://192.168.1.1> into the URL address box and press the **Enter** or **Return** key.

The router logon pop-up screen will appear (see below):

Leave the username field **Blank** and type **solartech** (all lower case) in the password field and click on **OK**.

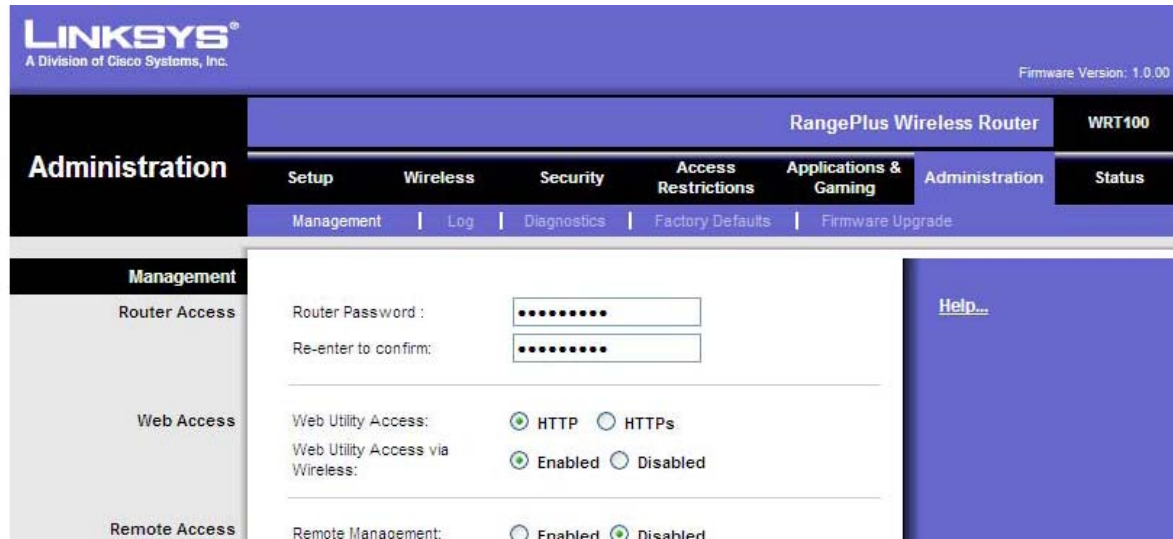


2.) The window below will pop-up: Click on the **Administration** tab.



The screenshot shows the Linksys RangePlus Wireless Router setup interface. The top navigation bar includes 'Setup', 'Wireless', 'Security', 'Access Restrictions', 'Applications & Gaming', and 'Administration'. The 'Setup' tab is active, and the 'Internet Setup' section is selected. The 'Internet Connection Type' is set to 'Automatic Configuration - DHCP'. Below this, there are fields for 'Host Name', 'Domain Name', and 'MTU' (set to 'Auto' with a size of '1500'). The 'Network Setup' section is also visible, showing 'Router IP' settings with an IP address of '192.168.1.1' and a subnet mask of '255.255.255.0'. The 'DHCP Server' is set to 'Enabled', and the 'Start IP Address' is '192.168.1.100' with a 'Maximum Number of Users' of '50'. A 'DHCP Reservation' button is also present.

3.) The window below will pop up: Enter the new password in the **Router Password** and **Re-enter to confirm** fields under the **Router Access** section, scroll down to the bottom of the window and click on “**Save Settings**”.



LINKSYS®
A Division of Cisco Systems, Inc.

Firmware Version: 1.0.00

RangePlus Wireless Router WRT100

Administration

Setup | Wireless | Security | Access Restrictions | Applications & Gaming | Administration | Status

Management | Log | Diagnostics | Factory Defaults | Firmware Upgrade

Management

Router Access

Router Password :

Re-enter to confirm:

Web Access

Web Utility Access: ☒ HTTP ☐ HTTPS

Web Utility Access via Wireless: ☒ Enabled ☐ Disabled

Remote Access

Remote Management: ☐ Enabled ☒ Disabled

[Help...](#)

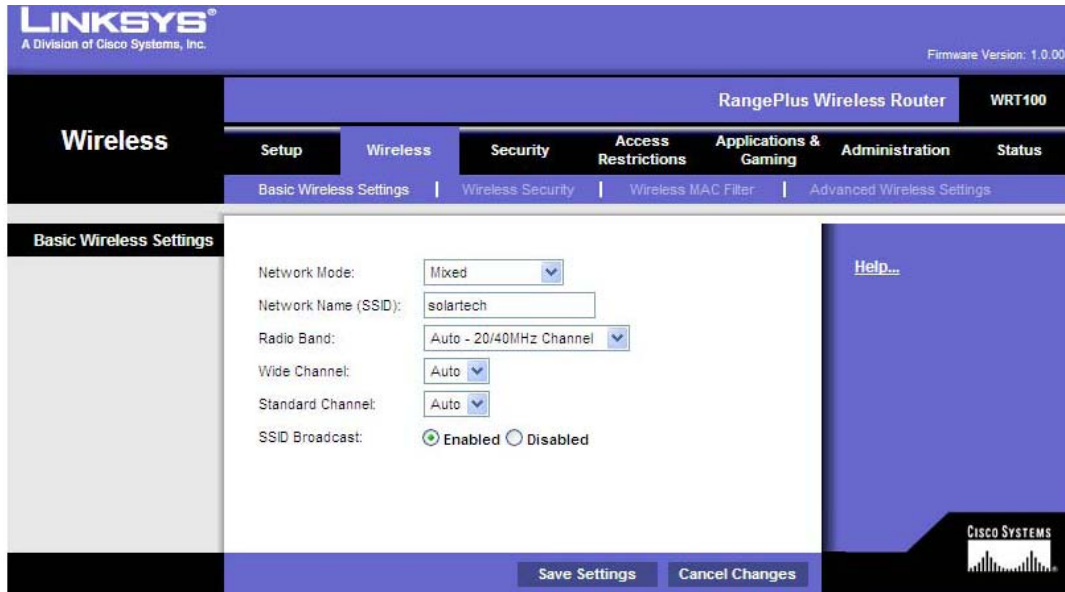
4.) The window will close automatically followed by this message “**Setting are successful - you will be returned to the previous page in 25 seconds.**”

Changing the wireless setting (Network SSID and WEP Key):

Network SSID:

Follow step #1 from above and click on the **Wireless** tab instead of the **Administration** tab.

The screen below will appear: Enter the new Name under **Network Name (SSID)** then click on “**Save Settings**” at the bottom of the window.

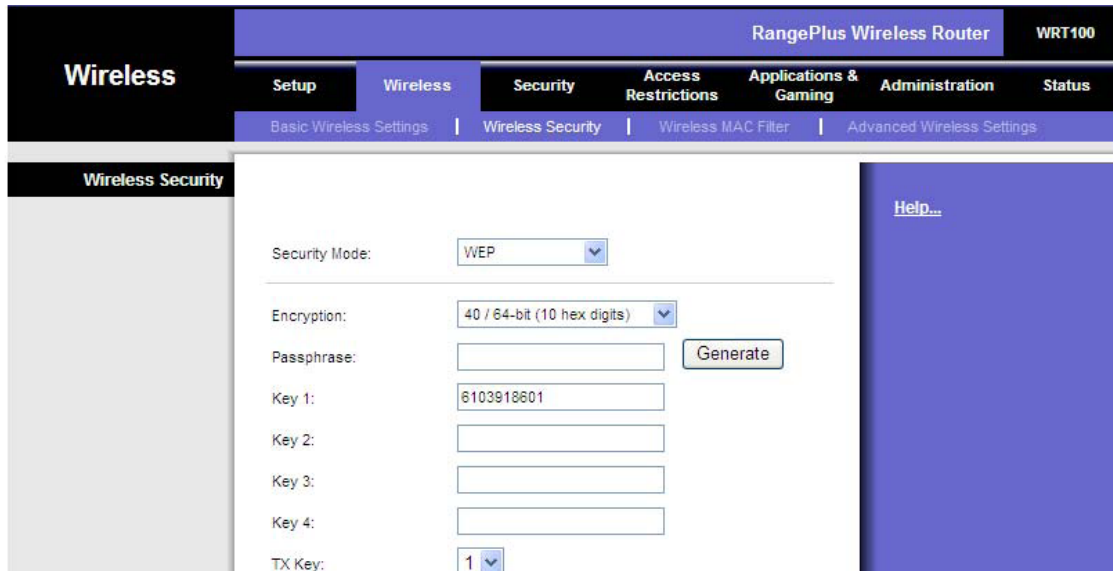
The image shows the web interface of a Linksys RangePlus Wireless Router (WRT100). The top header is purple with the Linksys logo and 'A Division of Cisco Systems, Inc.' on the left, and 'Firmware Version: 1.0.00' on the right. Below this is a black navigation bar with 'Wireless' highlighted. Under 'Wireless', there are tabs for 'Setup', 'Wireless', 'Security', 'Access Restrictions', 'Applications & Gaming', 'Administration', and 'Status'. The 'Wireless' tab is active, showing sub-tabs: 'Basic Wireless Settings', 'Wireless Security', 'Wireless MAC Filter', and 'Advanced Wireless Settings'. The 'Basic Wireless Settings' sub-tab is selected. The main content area has a left sidebar with 'Basic Wireless Settings' and a right sidebar with a 'Help...' link. The central area contains settings for Network Mode (Mixed), Network Name (SSID) (solartech), Radio Band (Auto - 20/40MHz Channel), Wide Channel (Auto), Standard Channel (Auto), and SSID Broadcast (Enabled). At the bottom are 'Save Settings' and 'Cancel Changes' buttons. The Cisco Systems logo is in the bottom right corner.

The window will close automatically followed by this message **“Settings are successful – you will be returned to the previous page in 15 seconds.”**

WEP Key:

On the same window above click on the **Wireless Security** tab:

This following window will appear:



Wireless RangePlus Wireless Router WRT100

Setup Wireless Security Access Restrictions Applications & Gaming Administration Status

Basic Wireless Settings Wireless Security Wireless MAC Filter Advanced Wireless Settings

Wireless Security

Security Mode: WEP

Encryption: 40 / 64-bit (10 hex digits)

Passphrase:

Key 1: 6103918601

Key 2:

Key 3:

Key 4:

TX Key: 1

[Help...](#)

Delete the current key enter the new key. When done click on “**Save Settings**” on the bottom of the window.

The window will close automatically followed by this message “**Settings are successful – you will be returned to the previous page in 15 seconds.**”

When finished close out of the browser and disconnect the Ethernet cable from the wireless router.