



**SPECIFICATION**  
**SOLAR MESSAGE CENTER**  
**MODEL SMC4000-MAST MINI**

**1.0 INTRODUCTION**

This specification shall describe a trailer-mounted, portable changeable sign upon which varying electronically generated lamp messages and graphics will be displayed to highway traffic as advisories or for the purposes of warning and/or control.

The equipment described shall be a standard model produced by a manufacturer with experience in the production of trailer-mounted traffic control products. All workmanship, materials, and assembly procedures shall be of quality design. Each component of the unit shall be adequate for and compatible with all structural and performance requirements of the complete unit. The equipment shall remain operational under inclement weather conditions.

**1.1 DESCRIPTION**

The Mast Mini Message Center manufactured by Work Area Protection Corp. is a trailer mounted variable message board consisting of LED lamp matrix panels powered by a bank of batteries in order to convey bright, distinctive messages to the traveling public. The batteries are in turn recharged automatically by a group of solar panels located at the highest point on the unit. The Solar Message Center is designed with sufficient energy backup to operate for a period of 21 days without any sun. The solar panel generator array shall recharge the battery bank at a rate of 2.5 hours sun to one 24 hour period of usage.

**2.0 CONSTRUCTION REQUIREMENTS**

**2.1 GENERAL**

The trailer and all mounted equipment shall be structurally adequate for unlimited, normal operation in wind velocities normally encountered on the roadway. The equipment shall be designed to enable one person to perform all transporting and operation functions easily and effectively without assistance.

## 2.2 Trailer

The 2-wheel trailer shall be structurally adequate to serve both as a carrier and as an operating platform for all components of the complete unit. The open deck design shall be 2 inches by 3 inches 11 gauge steel tubing, providing an adequate foundation for the unit. Welding shall join all tubing and all structural welds shall be continuous bead welds.

The axle shall be rated at 2,000 pounds capacity, and the suspension shall consist of 1400 pound leaf springs. Wheels and tires shall be a minimum of 14 inches and shall be rated for towing at on-highway speeds of 65 miles per hour. A plastic fender shall be installed over each wheel.

The mast pivot tube shall be .250" x 5" round carbon steel tubing.

The battery box shall be constructed from 14 gauge steel. The batteries shall be secured in position, and the enclosure lid shall be lockable using a single-latch/locking device.

The trailer tongue shall be .250 thick x 2 Y2" square tubing x 60" overall length. A 2" ball type trailer hitch with double safety chains in accordance with SAE J684F shall be installed. A 2 Y2" or 3" pintle ring hitch is optional. The tongue shall be removable.

Four crank type, heavy duty, industrial leveling jacks, one at each corner of the trailer deck mounted to the adjustable telespar outriggers shall be installed for maximum stabilization.

A lighting system shall be provided for the trailer, to include tail lights, stop lights, turn signals, license plate light and reflectors. A trailer electrical cable and connector compatible with towing vehicles shall be installed.

## 2.3 MESSAGE SIGN

The sign panel shall be of aluminum construction and so assembled as to prevent dissimilar metal action from occurring. The sign panel frame shall be an assembly made of aluminum alloy channel.

The size of the Mast Mini Message Center sign panel shall not exceed 96 inches wide by 48 inches high. The front face of the sign shall be covered with a UV inhibited polycarbonate to prevent fading.

The Mast Mini Message Center sign panel shall consist of one continuous LED lamp matrix which provides text messages as well as graphic symbols. The sign panel shall be capable of projecting two different size characters, ranging from 12 inches to 18

inches, as are created in the standard software. Double stroke fonts shall be projected in 12 inch letter heights. The full matrix panel shall consist of 25 LED lamp matrix pixels in height and 48 LED lamp pixels in length. Each pixel shall incorporate 4 LED's. Message color shall be approximately 590 nanometers.

In addition, 80 standard preprogrammed graphics symbols can be shown due to the full matrix capability.

The sign shall have the capability to display up to six (6) pages in message, with variable timing in 0.1 second increments under computer control. The entire sign shall completely change all lines of message in not more than 100 milliseconds.

The sign, when projecting 18 inch characters, shall be clearly visible and legible from a distance of 1000 feet under both day and night conditions. Legibility shall increase proportionately to the size of the symbols. Under variable light level conditions, the sign shall automatically adjust its light source so as to meet the 1000 feet legibility requirements without being too dim or too intense.

The Mast Mini Message Center sign panel shall incorporate a lifting mechanism with a 1,500 pound capacity hand-operated braking winch using 1/4" wire cable. The mast shall be fabricated with 3" x 3" square steel tubing. The lifting sleeve shall be .250" formed steel, fully welded to the 2" x 2" square steel tube panel support frame. A locking device to secure the panel in the raised (display) and lowered (travel) position shall be provided. The bottom of the sign shall be at least 84 inches above the ground when in the raised position. In a transport position, the sign shall rest horizontally in a manner that effectively reduces aerodynamic drag during towing.

### 3 POWER AND MISCELLANEOUS REQUIRED EQUIPMENT

The power supply type shall be a battery bank consisting of two size 4-D, deep cycle, lead acid 12 volt DC batteries wired in parallel. The battery bank shall be housed in lockable heavy duty steel weatherproof battery box. The batteries shall be recharged by a solar panel array producing 110 watts of power.

### 4 System Control Requirements

The Mast Mini Message Center shall be controlled in all functions by an on-board dedicated computer that shall:

- a) Be of solid state design and be removable.

- b) Include a keyboard which user originated messages may be entered for display or storage.
- c) Include an LCD screen upon which messages can be reviewed before/during display on the message sign.
- d) Store 250 preprogrammed messages for display when called upon by the operator through the keyboard.
- e) Store 80 preprogrammed graphic messages/
- f) Store 100 user created multi-page messages.
- g) Maintain stored message list.
- h) Provide password protection.
- i) Provide control programming to display stored messages by operator control through keyboard entry.
- j) Provide control for moving arrow display.
- k) Provide automatic word centering without separate programming.
- l) Provide programming capability while message is being displayed.
- m) Include a scheduling (calendar) program to automatically start and stop the display of messages at predetermined times.
- n) Provide character board and battery diagnostics.

The computer and charge controller shall be modular to allow for ease of replacement. The computer and charge controller shall be housed in a separate, lockable, weather resistant enclosure, and shall be able to be removed and/or replaced with a standard Phillips screwdriver. Battery voltage and amperage generated from the solar array to the battery bank shall be monitored and displayed at the system's computer.

The charge controller shall incorporate a PV regulator with thermal compensation for variances in ambient temperature to regulate the charge rate to the battery bank.

The Mast Mini Message Center shall incorporate an automatic intensity control feature to keep the LED intensity constant and not vary due to battery bank voltage. This allows the message center to maintain a constant legibility distance any time the unit is operational. The Solar Message Center also incorporates a photocell to reduce lamp intensity at night to reduce glare.

**MAST MINI MESSAGE CENTER  
-GENERAL SPECIFICATION-**

**TRAILER SPECIFICATIONS:**

**TRAILER HEIGHT - TRAVEL POSITION..... 102”**  
**TRAILER HEIGHT – ERECTED POSITION ..... 134”**  
**TRAVEL WIDTH ..... 68”**  
**TRAILER LENGTH WITH TONGUE ..... 107”**  
**TRAILER LENGTH WITHOUT TONGUE ..... 55”**  
**TRAILER WEIGHT ..... 850 LBS.**

**MAIN FRAME: 2 X 3 X 11 GA. FORMED CHANNEL**  
**TONGUE : 2 1/2 X 2 1/2 X .250 SQUARE STEEL TUBING**  
**SOLAR PANEL ARRAY FRAME: .125” ALUMINUM ANGLE**

**MESSAGE CABINET: WIDTH ..... 96”**  
**HEIGHT ..... 48”**  
**DEPTH – INCLUDING SOLAR PANEL**  
**ARRAY ..... 40.25”**  
**DEPTH – TOP-WITHOUT SOLAR PANEL**  
**ARRAY ..... 5.0”**  
**DEPTH – BOTTOM..... 5.0”**  
**POLYCARBONATE WINDOW THICKNESS - .125”**  
**CABINET DELTA - TYP ..... 20° F**

**AXLE CAPACITY ..... 2000 LBS.**  
**LEAF SPRING CAPACITY ..... 1400 LBS.**  
**FENDERS: FORMED PLASTIC**  
**BATTERY ENCLOSURE – ONE: 14 GAUGE STEEL**  
**SWING JACK CAPACITY ..... 2000 LBS.**  
**SWING JACK TRAVEL..... 10”**

**SMC CENTRAL PROCESSING UNIT**  
**– CPU SPECIFICATIONS:**

**PROCESSOR ..... PC-104 386 33 MHz**  
**POWER REQUIREMENTS ..... 500 mA @ 12V DC**  
**MEMORY TYPE & SIZE ..... 4 MB STATIC RAM**

**MEMORY BACK – UP: SRAM/3 YEAR LIFE**  
**TEMPERATURE..... -25° TO +50° C**  
**HUMIDITY .....95% NON-CONDENSING**

**DISPLAY TYPE: LIQUID CRYSTAL DISPLAY-LCD**  
**SCREEN SIZE .....320 X 240 DOT PIXELS**  
**INTERFACES: RS232, ETHERNET OPTIONAL**

**LED LAMP MATRIX SPECIFICATION:**

**PIXEL SIZE ..... 0.75” X 0.75”**  
**OPERATING TEMPERATURE..... -55° C TO 100° C**

**CONTRAST ENHANCEMENT FEATURES:**

**\* BLACK BACKGROUND                      \* LED FULL LAMP MATRIX**

**ELECTRICAL CONTROL:**

**\* COMPUTER CONTROLLED/AUTOMATIC INTENSITY CONTROL-  
ADJUSTS LED OUTPUT WITH VARIANCES OF AMBIENT LIGHT  
AND TEMPERATURE / PHOTOCCELL CONTROLLED**

**\* OVERCURRENT PROTECTION: PREVENTS WAVELENGTH SHIFT  
OVER TEMPERATURE AND CURRENT VARIATIO**

**SOLAR GENERATOR SPECIFICATIONS:**

**SOLAR PANEL ARRAY ..... 110 WATT MINIMUM**  
**OPERATING VOLTAGE..... 12 VDC**  
**BATTERY BANK: TWO 4D DEEP CYCLE 12 VOLT BATTERIES 468**

**AMP HOURS TOTAL**  
**CHARGE CONTROLLER: SERIES REGULATOR WITH THERMAL  
COMPENSATION**  
**LOW VOLTAGE DISCONNECT ..... 11.2 VDC**  
**AC/DC BATTERY CHARGER..... 25 AMP**

**SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE**