Signal-Tech

RedStorm™ 2.0
Parking Guidance System
Installation & Operation Instructions

Version: 2.0.1 Jun 2014

RED STORM™
Parking Guidance System

Product Installation and Operation Instructions

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Product Installation and Operation Instructions

Section 1
Introduction and Preparation

Thank you for purchasing the RedStorm 2.0 System. This section will give you a broad overview of a typical system and its capabilities. This may or may not reflect the specific hardware you have chosen.

1.1 Introduction to the RedStorm™ 2.0 Parking Guidance System

The RedStorm™ System is a stand-alone network of space available signs, Differential Zone Counters (DZ Counters) and the SuperMaster Control Center which integrates with commercially available vehicle detection equipment. The RedStorm 2.0 System is flexible enough to support a small surface lot or a multi-level parking structure. It is not required to be tied-in with the main parking facility network and is the ideal system to integrate with existing loop detection.

Using sensors or loop detectors the DZ Counters keep a running count of the vehicles entering and exiting defined zones or areas of the parking facility. The SuperMaster Control Center takes this information and uses it to display available space counts on the Space Available signs. Each loop detector or pair of sensors is hard-wired to a DZ Counter. ***Refer to Figure 1 for typical network topology.***

We recommend reading through this manual before beginning the system installation and setup configuration.

1.2 Installation Preparation

Before you begin installing the RedStorm 2.0 System, review the following checklist to ensure you have all of the proper components, tools and information to complete the installation.

Installation Checklist

A typical installation requires the following components, tools and information:

Provided by Manufacturer (Make sure all items are included. Verify against packing slip.)

- Installation and Setup Instructions
- RedStorm 2.0 SuperMaster Control Center
- RedStorm 2.0 Differential Zone Counter (DZ Counter)
- Signage and mounting designed for your site
- RedZone Overhead Sensors (If applicable)

Provided by Installer

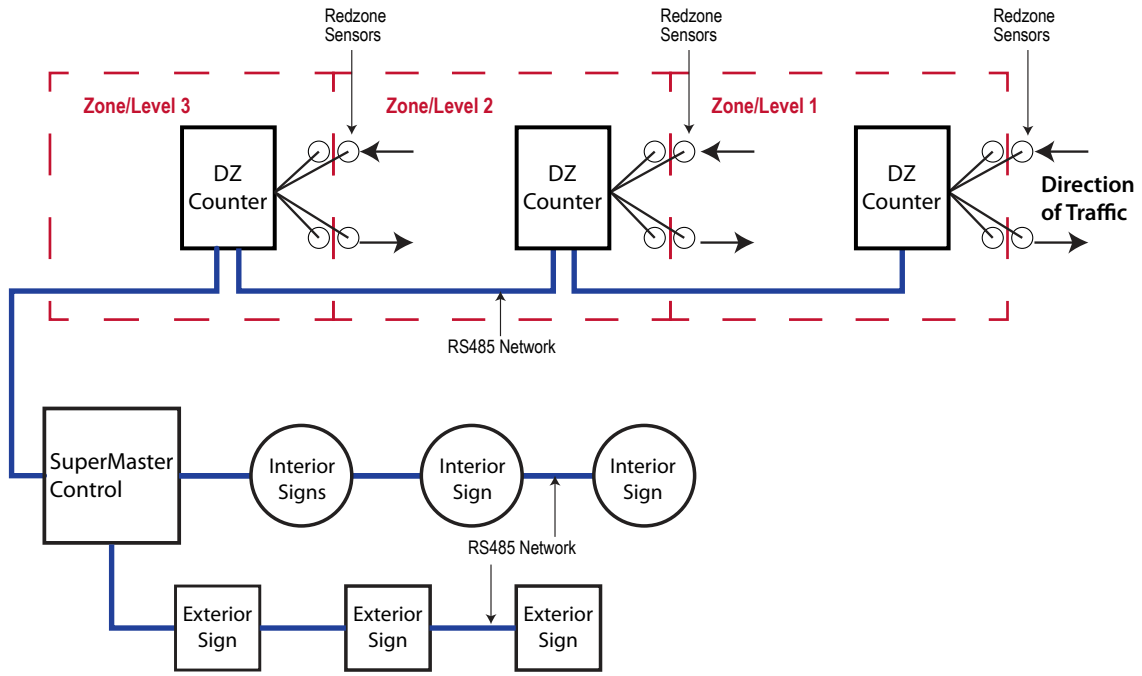
- Digital Multi-meter (DMM)
- Mounting hardware for RedStorm Control Units & Sensors
- Tools required for mounting hardware

Provided by the Owner or Others

- Garage diagram indicating the location of electrical service and desired location of loops, sensors and signs
- Number of parking spaces in the lot or garage
- Number of parking spaces per zone/level
- Lane Delineation
- Uninterruptible Power Supply (UPS)

Typical RedStorm 2.0 Network Topology

Figure 1.

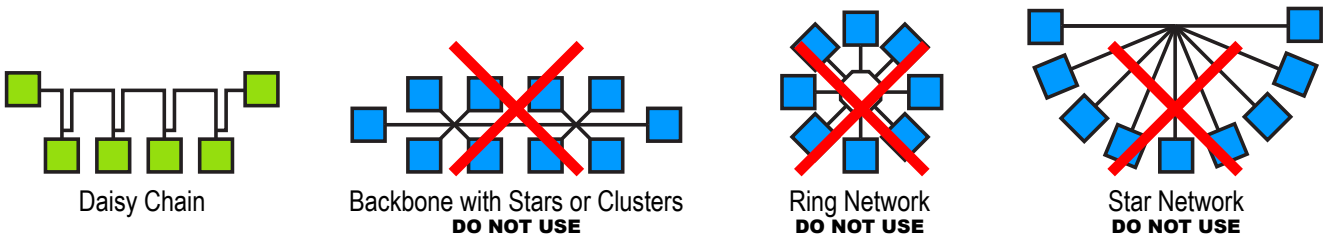


DZ Counter - Differential Zone Counter

RS 485 Network

- Daisy-chain network topology is required.
- Must conform to EIA/TIA-485-A standards.
- Maximum communication cable length NOT to exceed 4,000 feet for each RS-485 Network.
- Each RS-485 Network can support a maximum of 32 devices. DZ Counters and signs are considered individual devices.
- Communication and power wiring MUST be run through separate conduits to avoid cross-over interference. All wiring must be grounded. Additional protection against voltage transients on the network is highly recommended.

Example of the daisy chain network that is **required** for the RedStorm 2.0 System.



Section 2
RedStorm 2.0 SuperMaster Control Center

A SuperMaster Control Center consists of one (1) SuperMaster Controller, multiple Auxiliary Displays and one (1) 120 Volt Power Supply. Components are mounted on a panel and enclosed in a hinged cabinet. ***Refer to Figure 2 on page 6.***

2.1 SuperMaster Controller Specifications

SuperMaster is the central control point for the RedStorm System. It gathers the vehicle count information, controls communication sequencing and communicates the vehicle count information to all system signage in real-time.

RedStorm 2.0 SuperMaster Specifications	
Electrical	Voltage 100-240VAC 1 Amp at 120VAC Internal, Real-Time Clock
Communications	Supports 8 daisy chained RS-485 networks. Each network supports 32 devices with maximum length of 4,000 linear feet per network. 9600bps, 8-N-1
Display	Backlit LCD Screen; 4 lines, 20 characters
Permanent Memory	Custom formatted; factory provided SD Multi Media Card. Counts prior to power interruption stored in permanent memory.

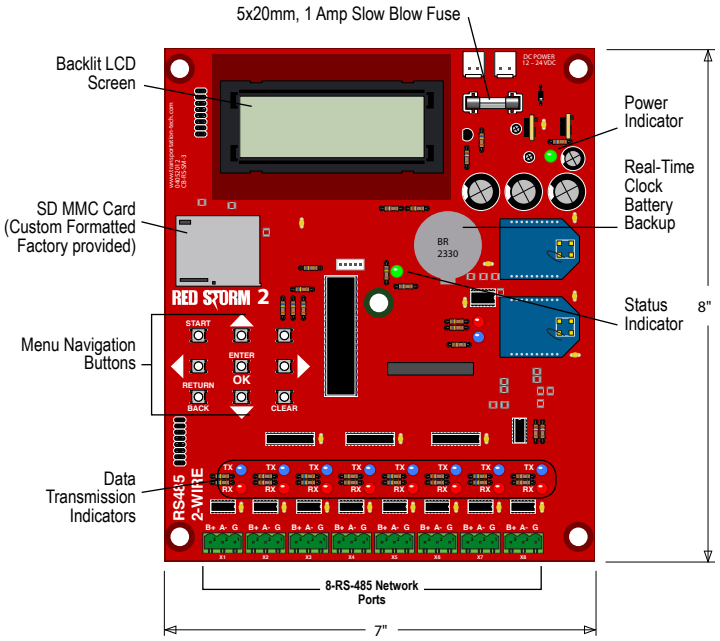


Figure 3.
SuperMaster Controller

2.1.1 SuperMaster Board Functions *(Refer to Figure 3)*

RS-485 Network Ports - Supports up to eight (8) individual RS-485 network connections.

Power Indicator - Illuminates Green when power is on.

Status Indicator - Green LED slowly pulses when running normally. Steady illumination or completely off indicates processing problem.

Data Transmission Indicator - Use to view network activity. Red LED illuminates when receiving (RX) data from one of the RS-485 Networks. Blue LED illuminates when transmitting (TX) data to one of the RS-485 Networks.

Menu Navigation Buttons - Use to select and navigate through SuperMaster menu screens.

ENTER/OK - Push to start or confirm selection.

Directional Arrows - ↑/↓ arrows scroll up and down through menu selections. ←/→ arrows page forward and backward through menu screens.

BACK/RETURN - Returns to previous screen.

CLEAR - Returns count values to zero (Ø) when editing.

SD MMC Card - Holds the RedStorm 2.0 System configuration. Card is custom formatted, factory provided.

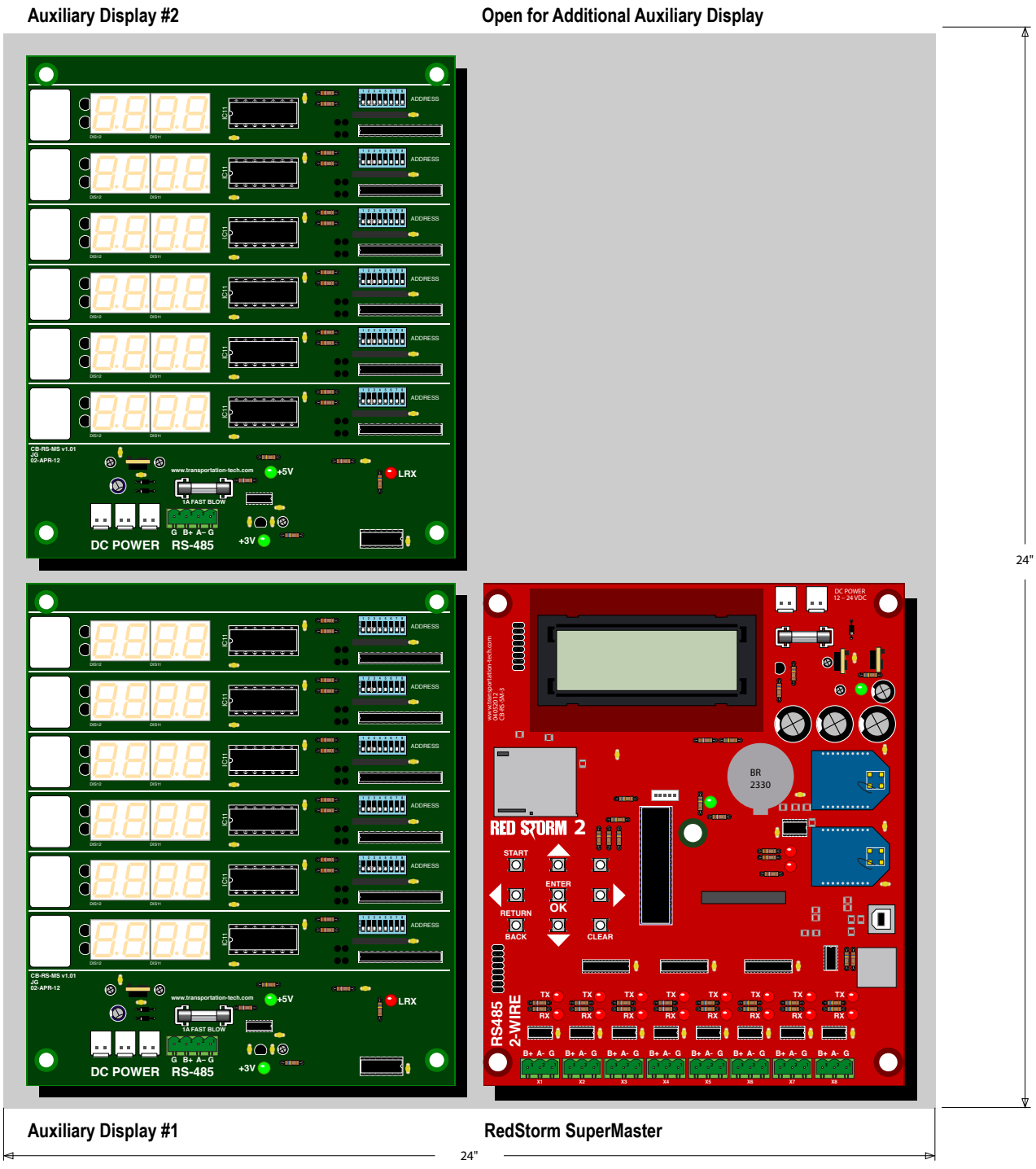


Figure 2.
SuperMaster Control Center Typical Component Configuration
24"h x 24"w x 6"d *(Actual placement may vary)*

2.2. RedStorm 2.0 Auxiliary Display Specification

The Auxiliary Display uses Signal-Tech's standard 7-segment protocol to remotely view space available sign counts in real-time. Each LED 7-Segment Display on the Auxiliary Display board is capable of replicating the vehicle count displays from a remote sign. It is addressable for single or aggregate zone/level counts and is capable of functioning as a secondary stand-alone display within a RedStorm 2.0 System. Using binary code logic set the dip switch to the right of each display with the corresponding sign address.

RedStorm 2.0 Auxiliary Display Specifications	
Electrical	DC Power 12-24VDC
Communications	RS-485 Network Port
Display	Six (6) 4-digit LED Counters

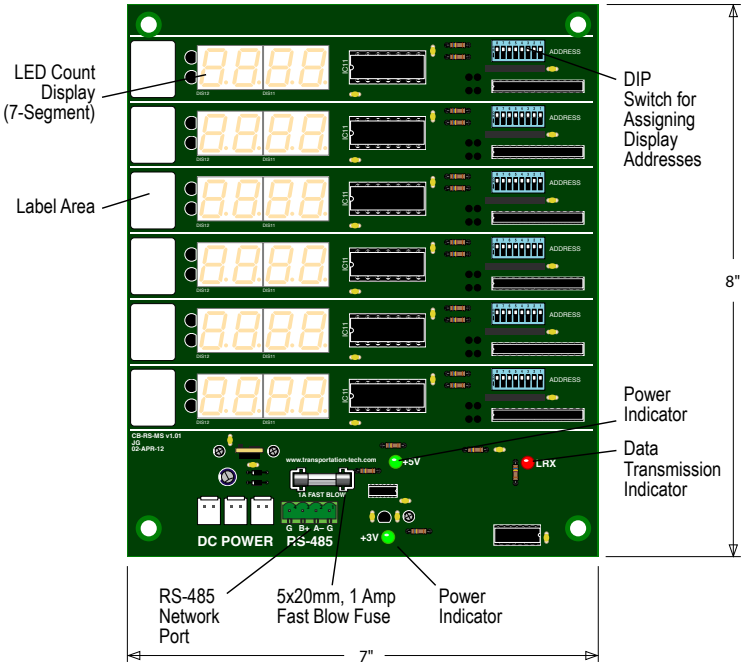


Figure 4.
Auxiliary Display

2.2.1 Auxiliary Board Functions *(Refer to Figure 4)*

RS-485 Network Ports - RedStorm 2.0 network connection.

Power Indicator - Illuminates Green when power is on.

LED Count Display - Displays replicated vehicle counts from a remote sign.

Dip Switch - Used to enter sign address for remote count viewing.

Data Transmission Indicator - Red LED illuminates when receiving (RX) data from SuperMaster Controller.

Binary Code Logic - ***Refer to Figure 6 on page 10 for setting the Dip Switch addresses on the Auxiliary Display.***

2.3 Installation and Wiring of the RedStorm 2.0 SuperMaster Control Center

2.3.1 Mounting the Control Center

The SuperMaster Control Center enclosure should be located in a controlled area to prevent unlawful access to the system controls. Area should also be protected from environmental elements.

All electrical connections should be made through the bottom of enclosure and sealed to prevent moisture from entering enclosure. 120VAC is recommended to power Control Center. Wire in accordance with local electrical codes and weatherproof all connections made through the enclosure.

Critical: To reduce risk of water damage, all conduit connections MUST be made on the bottom of the enclosure. Holes made elsewhere will void the warranty.

2.3.2 Wiring the RedStorm 2.0 SuperMaster Control Center

The RedStorm 2.0 System **MUST** be installed in a daisy-chain topology. Reference typical Network Topology Diagram (Figure 1) and site-specific network topology drawings previously provided. We recommend running a separate RS-485 network for each of the following: the Differential Zone Counters *(DZ Counters)* and sensors; exterior signs and/ interior signs. CAT5 cable or better should be used to wire networks. Each daisy-chained network can be a maximum of 4,000 lineal feet and will support up to 32 devices. If a stub connection is used between device and RS-485 network, maximum length for stub is 10 feet. Proper terminating and bias resistors must be used. Refer to the TIA/EIA-485-A guidelines for additional requirements. ***Refer to Figure BB on the Master Wiring Diagram on pages 18 - 19 for specific wiring detail.***

Critical: Star and parallel network patterns WILL lead to interference and insufficient communication signal strength which WILL result in lost vehicle counts and incorrect or missing sign updates.

The RedStorm 2.0 System MUST be connected to an uninterruptible power supply (UPS) to prevent vehicle count interruption during a power disruption. The UPS is not part of the RedStorm System and should be provided by others.

We recommend having a knowledgeable telecom professional make the communication connections.

2.4 Operating the SuperMaster Controller

The SuperMaster is the main control for the RedStorm 2.0 System. From this control the user is able to:

- View and reset configuration settings
- View settings for counted zones within the parking facility. Clear Total In/Out counts.
- View Zone Controller configuration by address. Clear Total Counts; reset Total Counts, enable/disable Zone Controller; reboot Controller; reset Transmit ID
- View 7-segment display configuration by ID#. View buffer count and select alternate 'FULL' message display.

2.4.1 RedStorm 2.0 SuperMaster Menu Screens and Functions

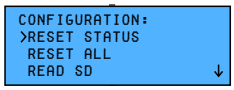
Note: On the menu screens, Controllers refers to DZ Counters.

SuperMaster Menu *(Also refer to Figure 5)*

Title Screen: Title, date and time, software version, and garage name **<Press Enter>** to begin.

Stop: **<Press Enter>** to Pause Communications **<Press Enter>** again to resume.

Configuration:



Reset Status <Press Enter> to reset

Reset All <Press Enter> to reset

Read SD <Press Enter> to read

Read SD Reset All <Press Enter> to read and reset

Display Override <Press Enter> to select Display Override Message

Date and Time <Press Enter> to adjust

Dump to SD <Press Enter> to dump

Reconfigure Cntrls <Press Enter> to reconfigure

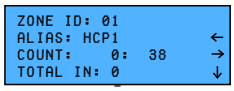
Disable All Cntrls <Press Enter> to disable

Enable All Cntrls <Press Enter> to enable

View:

Zones - <Press Enter>

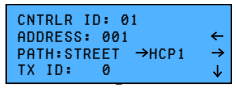
Display ID# - scroll ←/→ to view individual Zone ID#s



On a specific Zone **<Press Enter>** to

Adjust Count <Press Enter> to change

Reset Total Count <Press Enter> to reset



Controllers - <Press Enter>

Controller ID# - scroll ←/→ to view individual Zone ID#s

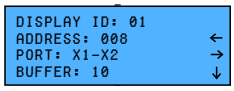
On a specific Controller **<Press Enter>** to

Reset Total Counts <Press Enter> to change

Reset TX ID <Press Enter> to reset

Disable/Enable Cntrlr <Press Enter> to disable/enable

Reboot Cntrlr <Press Enter> to reboot



Displays - <Press Enter>

Display ID# - scroll ←/→ to view individual Displays

On a specific Display **<Press Enter>** to change message displayed

Count <Press Enter> Use ←/→ to choose COUNT, FULL, OPEN, CLSd, BLANK

FULL <Press Enter> Use ←/→ to choose FULL, OPEN, CLSd, BLANK, COUNT

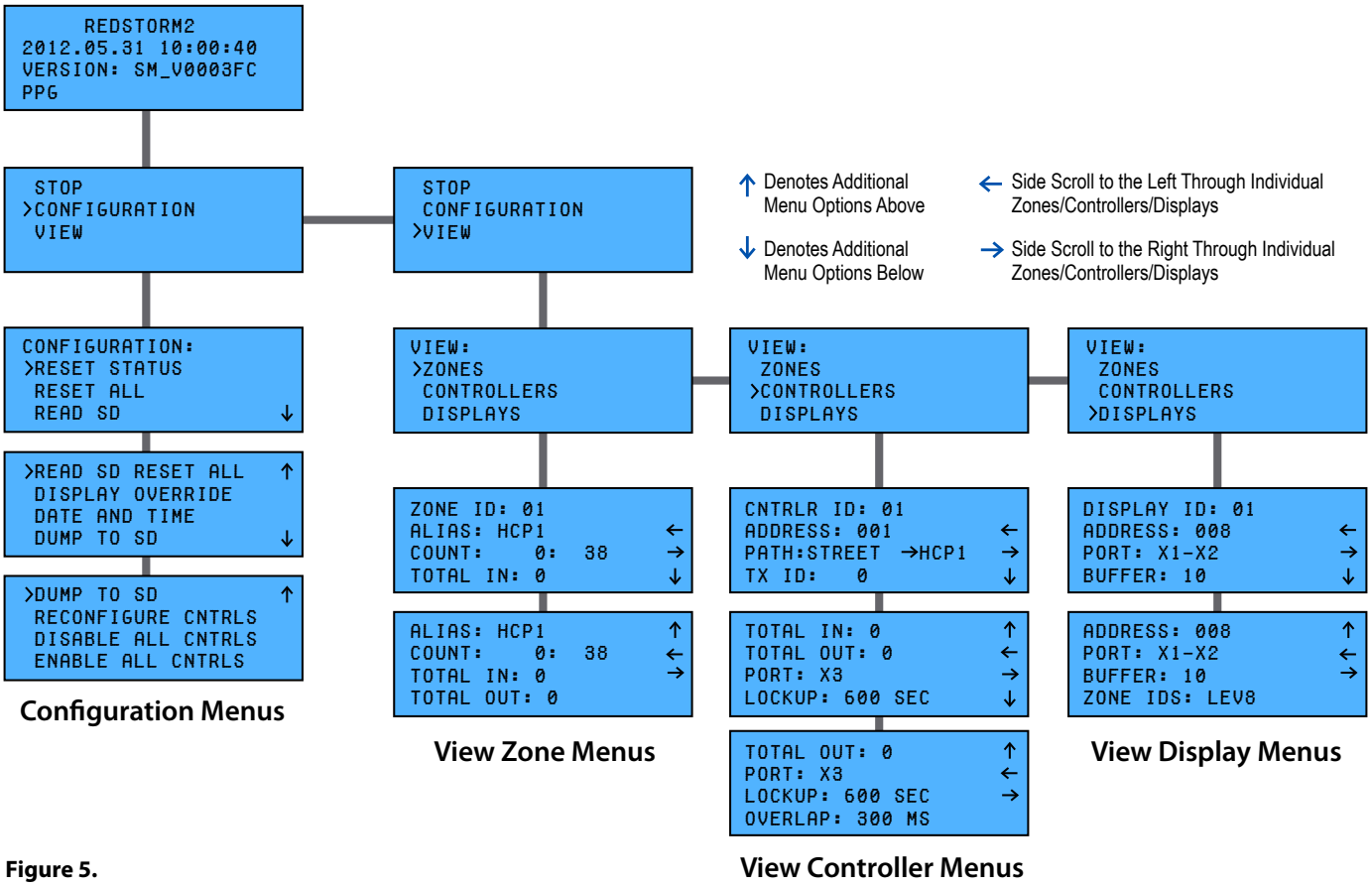


Figure 5.
SuperMaster Menu Display Tree

2.4.2 Description of SuperMaster Menu Functions

Stop:

Functions like a PLAY and PAUSE button. **<Press Enter>** to halt all communication with the Zone Controllers and signs. Menu selection will change to Start. **<Press Enter>** again to resume communication.

Configuration:

Reset Status: Resets all statistical data except for counts and returns to the first screen.

Reset All: Resets all counts and returns to the first screen.

Read SD: Re-reads the configuration files off of the SD card. This will retain all existing counts.
Note: If the garage configuration stored on the card has been significantly altered, this may cause unusual vehicle counts to appear.

Read SD Reset All: Re-reads the configuration files off of the SD card, resets all counts, and returns the SuperMaster board to the main screen.

Display Override: Opens a new menu, with options FULL, OPEN, CLOSED, BLANK, SIGN ADDRESS. Selecting one of these will cause that message to be displayed on all displays which are part of the system setup. The LCD will return to the splash screen. The Stop/Start option is now Cancel <selected message>. **<Press Enter>** will cancel the display override mode.

Date and time: Shows the date and time. YEAR.MONTH.DAY. HH:MM:SS. Press Enter to adjust the date and time.

Dump to SD: Immediately writes a time-stamped log file of all current counts, and other running information.

Reconfigure Cntrls: This function is used at factory request.

Disable All Cntrls: Primarily for debugging. This will disable communication to all Zone Controller boards. Zone Controllers can then be re-enabled either individually in the Zone Controllers menu, or with the Enable All Cntrls function.

Enable All Cntrls: Primarily for debugging. This will enable communication to all Zone Controller boards.

View:

Zone: Displays the following information about the counted Zones in the parking facility.

Zone ID: ## Internal ID# of the counted Zones in the configuration file.

Alias: Common name for the Zone

Count: Vehicles: Spaces: First number is the current vehicle count, second number is the total space count for the zone.

Total In: ### Total vehicles that have entered the zone since the last reset.

Total Out: ### Total vehicles that have exited the zone since the last reset.

Controllers: View information about the Zone Controllers in the system.

DZC ID: ## (DS) Internal ID# of the Zone Controller board within the configuration file. "DS" displays only when communications to Controller have been disabled.

Address: ## Address of the Zone Controller board, as set by the rotary switches on the circuit board.

Path: Source → Destination Indicates the two zones that the Zone Controller is connecting, as well as the direction.

TX ID: ### Internal ID# of the data packet being sent between the SuperMaster controller and the Zone Controller. This number will normally be between 1 and 255. Ø indicates a communication timeout, typically from a disconnected or disabled Zone Controller.

Total In: Total number of vehicles IN counted by this specific controller since last reset.

Total Out: Total number of vehicles OUT counted by this specific controller since last reset.

Port: X# RS-485 port to which the Zone Controller is connected. Set by the configuration file on the SD card.

Lockup: ## Sets the amount of time a sensor can remain stuck until it is automatically reset. Sensor lockups can occur due to events such as a foreign object being placed in the sensor's field of vision.

Overlap: ## Sets the amount of time that both sensors must be tripped together in order to count a vehicle. This is to help filter out unwanted detection events from pedestrians walking through the detection fields of a sensor pair.

Display: View information about the LED 7-segment sign displays in the system.

Display ID: ## Internal ID# of the 7-segment display.

Address: ### Address of the display, as determined by the DIP switch settings on the display circuit board.

Port: X# RS-485 port to which the display is connected.

Count: Message that displays when available space count is above Buffer. Default: COUNT.

FULL: Message that displays when available space count reaches Buffer number or below. Default: FULL.

Buffer: A capacity buffer count for the Zone. Default value of 5% of available spaces. When the space available capacity reaches this number or less, the FULL message setting selected under the Display program will be shown. The FULL message setting will display until the number of spaces available is more than the Buffer number.

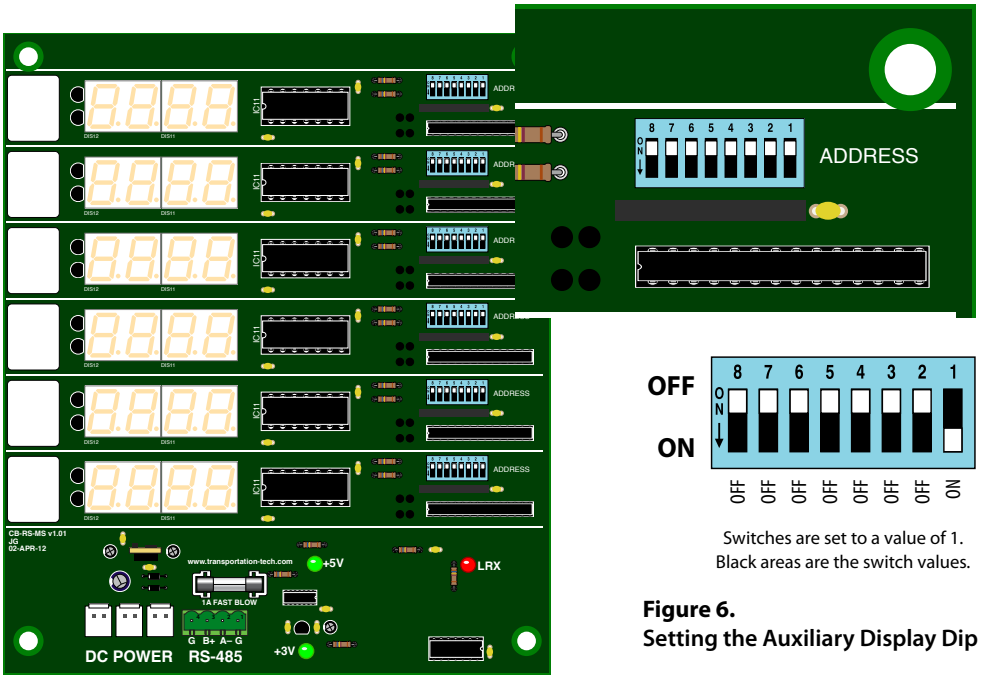
Zone IDs: A listing of the aggregated Zone IDs shown on this display. For example, if it is necessary to display the cumulative count of all available parking spaces above the current level, multiple zones may be added together to produce a total count to be shown on a specific display. All of these zones' aliases will be shown on this line.

2.5. Using the Auxiliary Display

The LED Counter Display will replicate the counts being displayed on up to 6 different 7-segment signs at any given time. Enter the 7-segment sign address for the display you wish to replicate using the dip-switches to the right of the Auxiliary LED Count Display. ***Refer to Figure 6 below for the binary code logic to set the address.***

For convenience, 50 patterns are included below. Each value is represented both in binary form (1 's and 0's), then with the corresponding actual value that is the Sign Number. The binary values relate directly to the way the individual switches should be set. A 1 indicates that the switch for that corresponding position should be ON. A 0 indicates that the switch for its corresponding position should be OFF. When all the switches are OFF, then the value is zero. When all the switches are ON, the value is 255. When switches 1 and 2 and 3 and 5 and 8 are all OFF, and switches 4 and 6 and 7 are ON, then the value is 22 as in our example below.

Remember black areas represent the switch positions, NOT the white switches themselves: a switch is up (ON) when the black area is up, and a switch is down (OFF) when the black area is down. To set the eight switches to a particular value, first choose the value from the chart below. Then set the eight switches to match the binary pattern to the left of the corresponding Sign Number. 1 means UP and ON; 0 means DOWN and OFF.



Sign Number
1

Binary Code
00000001
0's are OFF / 1's are ON

Switches are set to a value of 1.
Black areas are the switch values.

Figure 6.
Setting the Auxiliary Display Dip Switches

Figure 7.
50 Sign Number | Binary Code Values

Sign Number	Binary Code Value	Sign Number	Binary Code Value	Sign Number	Binary Code Value	Sign Number	Binary Code Value	Sign Number	Binary Code Value
1	00000001	**11**	00001011	**21**	00010101	**31**	00011111	**41**	00101001
2	00000010	**12**	00001100	**22**	00010110	**32**	00100000	**42**	00101010
3	00000011	**13**	00001101	**23**	00010111	**33**	00100001	**43**	00101011
4	00000100	**14**	00001110	**24**	00011000	**34**	00100010	**44**	00101100
5	00000101	**15**	00001111	**25**	00011001	**35**	00100011	**45**	00101101
6	00000110	**16**	00010000	**26**	00011010	**36**	00100100	**46**	00101110
7	00000111	**17**	00010001	**27**	00011011	**37**	00100101	**47**	00101111
8	00001000	**18**	00010010	**28**	00011100	**38**	00100110	**48**	00110000
9	00001001	**19**	00010011	**29**	00011101	**39**	00100111	**49**	00110001
10	00001010	**20**	00010100	**30**	00011110	**40**	00101000	**50**	00110010

0's are OFF / 1's are ON

Section 3
Differential Zone Counter (DZ Counters) and RedZone™ Overhead Sensors

3.1 Differential Zone Counter (DZ Counter) Specifications

The DZ Counter monitors in/out vehicle counts and communicates them upon request to the SuperMaster Controller. Each DZ Counter can use up to two (2) sensor pairs or four (4) loop detection units to monitor the counts. The DZ Counter is housed in a NEMA rated enclosure supplied by others.

Differential Zone Counter Specifications	
Electrical	120VAC
Communications	RS-485 Network Port
Sensor Inputs	Four (4) Sensor Connections

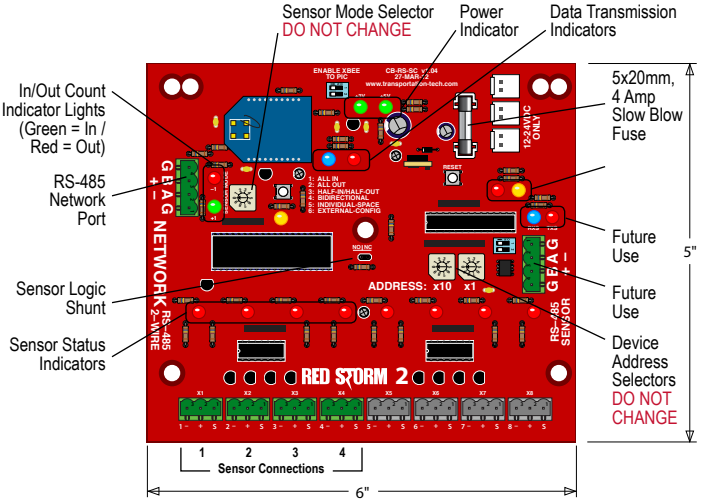


Figure 8.
DZ Counter

3.1.1 DZ Counter Board Functions *(Refer to Figure 8)*

Device Address Selectors - Factory pre-set. **DO NOT CHANGE!**

RS-485 Network Ports - RedStorm 2.0 network connection.

Status Indicator - Amber LED slowly pulses when running normally. Steady illumination or completely off indicates processing problem.

Sensor Mode Selector - Factory pre-set. **DO NOT CHANGE!** 1 = All In; 2 = All Out; 3 = Half-in/Half-out; 4 = Bidirectional; 5 = Individual Space; 6 = External Configuration

Power Indicator - Green LED illuminates when power is on.

In/Out Count Indicators - LEDs blink each time a vehicle is counted as entering or exiting a zone or level. Green as entering (+1) and Red as exiting (-1).

Data Transmission Indicator - Red LED illuminates when receiving (RX) data from SuperMaster Controller. Blue LED illuminates when transmitting (TX) data back to SuperMaster Controller.

Sensor Connections - Wiring ports for two (2) pair of RedZone Overhead Sensors.

Sensor Logic Shunt - Indicates sensor status. NC = 'Normally-Closed' (Factory Default); NO = 'Normally-Open'.

Sensor Status Indicator - Red LED indicates current status of corresponding sensor. Factory Default setting is 'Normally-Closed'. When sensors are set to 'Normally-Closed' LED is off when tripped and illuminates when not-tripped. When sensors are set to 'Normally-Open' LED illuminates when tripped and off when not tripped.

3.2 RedZone™ Overhead Sensor Specifcations

Sensors are installed in pairs to detect vehicles and their travel direction. Sensors are capable of unidirectional and bidirectional vehicle counting. ***Refer to Figure 9.***

RedZone™ Overhead Sensor Specifications	
Electrical	DC Power 12-24VDC, 100mA maximum consumption
Communications	Each sensor includes a 16 foot long cable for connecting the sensor to its corresponding DZ Counter. Cable may be lengthened (in the field by others) to a maximum of 350 feet using 4 conductor, 18 gauge cable.
Temperature Range	Designed for temperatures from -4º to 140º Fahrenheit.

Figure 9.
RedZone™ Overhead Sensor

3.3 Installing & Operating Loop Detectors, RedZone Overhead Sensors & Differential Zone Counters

The DZ Counters require an input signal from ***either*** an installed Loop Detector or a pair of RedZone Overhead Sensors. The choice of which vehicle detection method to use usually comes down to whether the installation is in a new facility or an upgrade to an existing facility with Loop Detectors already installed.

3.3.1 Installing Loop Detectors

RedStorm 2.0 takes the output from a loop detector and uses it to sense a vehicle's presence. The loop detector output **MUST** stay closed for as long a vehicle is over the loop. Follow the manufacturer's installation instructions and return to these instructions once complete. ***Refer to Figure II on the Master Wiring Diagram on pages 18 - 19 for specific wiring detail.***

3.3.2 Installing the RedZone Overhead Sensors

Signal-Tech's RedZone Overhead Scanning Sensors require 12-24VDC and consume 100mA (.1Amp). Power for the sensor is drawn from the RedStorm DZ Counter. The sensors are designed to operate in a temperature range between -4° to 140° Fahrenheit. Each RedZone Sensor comes with an attached, 16 foot long cable used to connect the sensor to the RedStorm Control Unit. This cable can be lengthened to a maximum of 350 feet using 4-conductor, 18 gauge cable. ***Refer to Figure HH on the Master Wiring Diagram on pages 18 - 19 for specific wiring detail.***

The RedZone Sensor is pre-configured at the factory as a 'Normally closed' contact. An LED indicator light on the face of the senor will illuminate when the sensor is tripped.

A pair of RedZone Scanning Sensors **MUST** be installed at each vehicle scanning (counting) transition location. To ensure accurate vehicle counts, place sensor pairs on the straightest part of an entrance, exit and or level/zone transition. A pair of sensors is capable of handling both unidirectional and bidirectional vehicle counting. In bidirectional mode, the sensors scan in an AB/BA sequence and communicate that information to the DZ Counter. The DZ Counter translates the scanning sequence to AB/BA logic, adds and deducts and waits for the SuperMaster Controller to request count data. When data is transferred to SuperMaster, the SuperMaster Controller updates the signage counts.

3.3.2.1 Bidirectional Sensor Logic

Bidirectional functionality is provided by the DZ Counter monitoring of the sensor inputs for a specific trip sequence. This functionality is used when the DZ Counter is set to the following bidirectional sensor logic ***(Refer to Figure 10):***

1. One of the sensors in a pair trips while the other is untripped. This will help determine the direction of travel.
2. The second sensor trips while the first sensor is still tripped.
3. The first sensor that tripped is released, while the second sensor is still tripped.
4. The second sensor is released.
5. A count is registered at this time.

If the first sensor tripped was an A terminal block, the vehicle is counted as entering the Level or Zone.

If the first sensor tripped was a B terminal block, the vehicle is counted as exiting the Level or Zone.

Indicated with letters, the Level entry sequence is : none, A, A & B, B, none.

The Level exit sequence is : none, B, B & A, A, none.

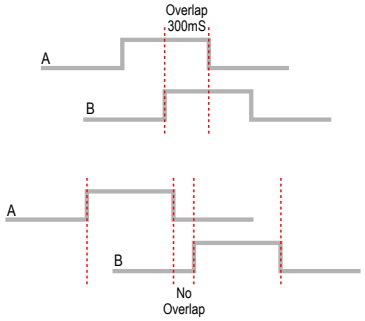


Figure 10.
Bidirectional Sensor Logic

3.3.3 Mounting the RedZone Overhead Sensors

When placing sensors, be sure the sensing field does not overshoot the lane it is meant to scan (count) and keep the sensor scanning field away from pedestrian walkways as this may interfere with accurate vehicle counts. The sensors **MUST** be mounted in a location that is protected from rainfall or water exposure.

Each sensor has a scanning field approximately 7'-0" wide and 3" deep. Recommended installation height is 7'-6" above finished floor. ***Refer to Figure 11.***

To ensure optimal vehicle detection performance, mount sensors level and parallel with the flow of traffic. Mount each pair of sensors on a horizontal surface over the center of the target traffic lane a minimum of 4'-0" to a maximum of 5'-0" apart and no more than 9'-0" above the finished floor (Recommended installation height is 7'-6" above finished floor.). ***Refer to Figure 12.*** If the sensors are too close, a person or object other than a vehicle may be able to produce the trip sequence necessary to generate a vehicle count. Spacing the sensors more that 5'-0" apart may prevent smaller vehicles from properly tripping sensors.

Sensors should not be located adjacent to parking spaces. When sensors must be placed next to parking spaces, the adjacent spaces should be removed from use through permanent delineation to maintain count accuracy. Avoid placing sensors in close proximity to fluorescent lighting fixtures. Reflected light and flickering from fixtures may cause sensor to trip which will affect vehicle count accuracy.

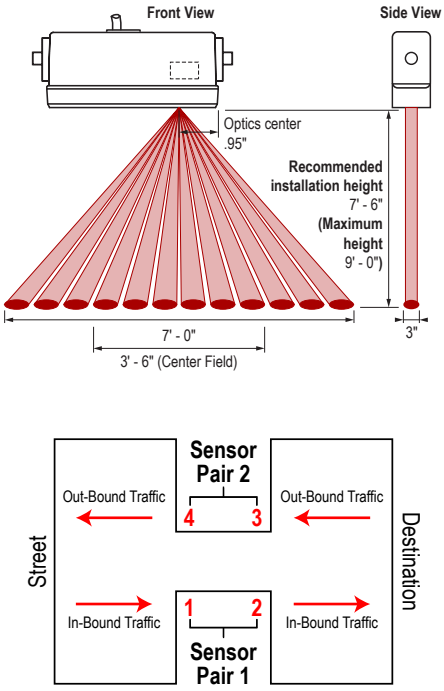


Figure 11.
RedZone Sensor Placement

Critical: The sensors MUST be installed on a SOLID surface, a minimum of 48" to a maximum of 60" apart and height than 9' above the finished floor.

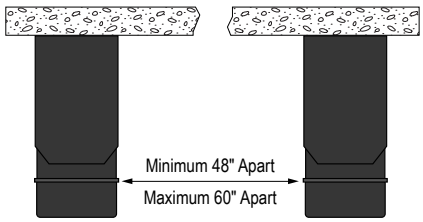


Figure 12.
RedZone Senor Distance

Cautionary: AVOID locating RedZone Sensors on turns, tight bidirectional traffic situations, or near heavy pedestrian traffic.

Critical: Vehicular lane delineation MUST be well defined to achieve accurate vehicle counts.

3.3.4 Installing the DZ Counter and Enclosure

The DZ Counter should be located in a place protected from environmental elements. One (1) DZ Counter is required at each transition point and is capable of monitoring up to two (2) pairs of RedZone Overhead Sensors or 4 loop detector inputs.

We recommend mounting the enclosure with DZ Counter at eye level for ease of use during system maintenance. A 120VAC power source is required at each DZ Counter location.

The RedZone Overhead Sensors draw their power from the DZ Counter. For optimal performance locate the sensors and their associated DZ Counter within 50 feet of each other. This may be extended, by the installer, up to 350 feet using 4-conductor, 18 gauge cable.

Network DZ Counters and SuperMaster together using a RS-485, daisy-chained configuration. CAT5 cable or better should be used to wire the network. Each daisy-chained network can be a maximum of 4,000 lineal feet and will support up to 32 devices. Proper terminating and bias resistors must be used. Wire in accordance with local electrical codes and weatherproof all electrical connections made to the DZ Counter and enclosure. Refer to the **TIA/EIA-485-A Guidelines** for additional requirements. ***Refer to Figure GG on the Master Wiring Diagram on pages 18 - 19 for specific wiring detail.***

Critical: Star and parallel network patterns WILL lead to interference and insufficient communication signal strength which WILL result in lost vehicle counts and incorrect or missing sign updates.

120VAC and low voltage should NOT be run in the same conduit.

We recommend having a knowledgeable telecom professional make the communication connections.

Section 4
Space Available Signs

Space Available Signage

4.1 Space Available Signage Specifications

These are custom designed signs with LED 7-segment boards for displaying counts. Signage is sized to display counts for a single level or entire garage. Custom sizes, finishes and graphics available.

Space Available Signage Specifications	
Construction	Corrosion resistant, mitered, extruded aluminum cabinet with factory applied anti-condensation coating
Finish	Fade resistant, automotive grade paint. Graphics in high performance, commercial grade vinyl; computer cut, factory applied.
Mounting	Wall, ceiling, direct burial post mount or base plate post mount

4.2 Installing Signage

To mount and power your signage, follow the installation and wiring instruction that shipped with them. If additional copies are required, please contact Signal-Tech by phone.

4.2.1 Wiring Signage to the RedStorm Network

RedStorm 2.0 communicates to each sign using a 2-wire RS-485 network. Note: There are two (2) "G" (ground) connections at the RS-485 plug; either one or both may be used as they are electrically tied together on the circuit board. Using one of the "G" (ground) connections is necessary to ensure proper data transfer. Observe proper daisy-chain guidelines when wiring the RedStorm sign network. ***Refer to Figure 1 on page 2 for details.*** Network connection for signs with multiple 7-segment displays within a sign will be made at the factory.

For specific wiring details on connecting the signage to the RedStorm 2.0 System refer to the RS-485 Repeater wiring, Figure CC on the Master Wiring Diagram on page 18 - 19.

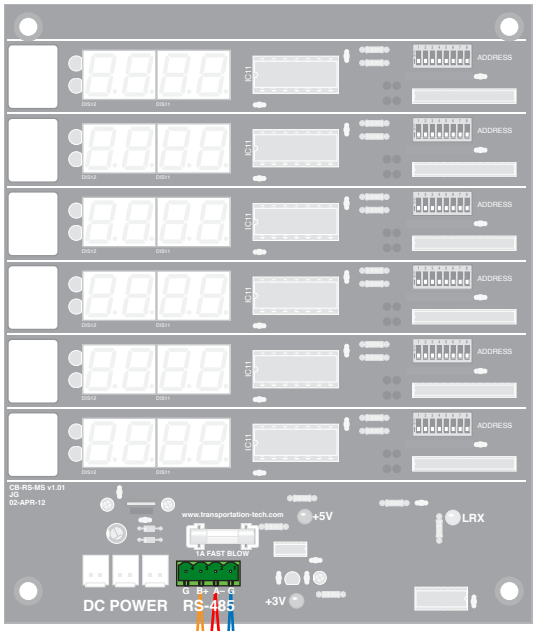
Critical: Communication and power wiring MUST be run through separate conduits to avoid cross-over interference. ALL installations must be grounded. Additional protection against voltage transients on the network is highly recommended.

4.2.2 Addressing Your Signs

Your Signal-Tech Space Available signage is designed to communicate with the RedStorm 2.0 SuperMaster Control via a 2-wire RS-485 network. The CC-Series 7-Segment Display Boards within each sign receives information from the RedStorm SuperMaster Controller. Terminal blocks are present on the 7-Segment Display Boards, which are to be wired into the RS-485 sign network. View the binary code dip switch configuration on the back of the board to determine the factory pre-set address for the display or cycle power to the display and the display will briefly illuminate its address on power up.

Critical: **DO NOT CHANGE THE PRE-SET ADDRESS.** Doing so will cause the system to fail and it will not recognize the proper inputs or display accurate vehicle counts.

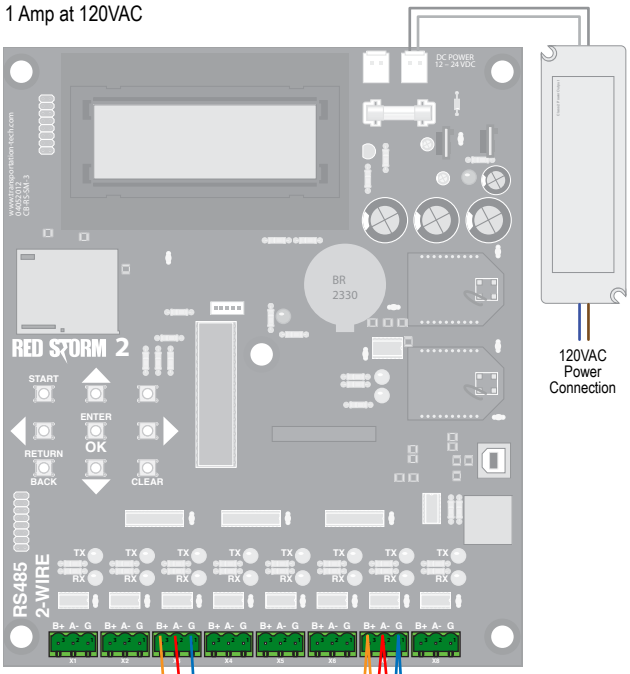
Auxiliary Display
Voltage 12-24VDC
RS-485 Communications Port

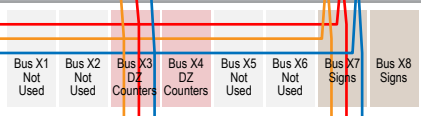


Daisy to Next Auxiliary Display (if used)
A-
B+
G

Figure AA
Auxiliary Display Wiring

RedStorm 2.0 SuperMaster
Voltage 100-240VAC
1 Amp at 120VAC





Typical RedStorm SuperMaster Bus Assignments

B+ A- G
Out to DZ Counter

B+ A- G
Out to RS-485 Repeater in Sign

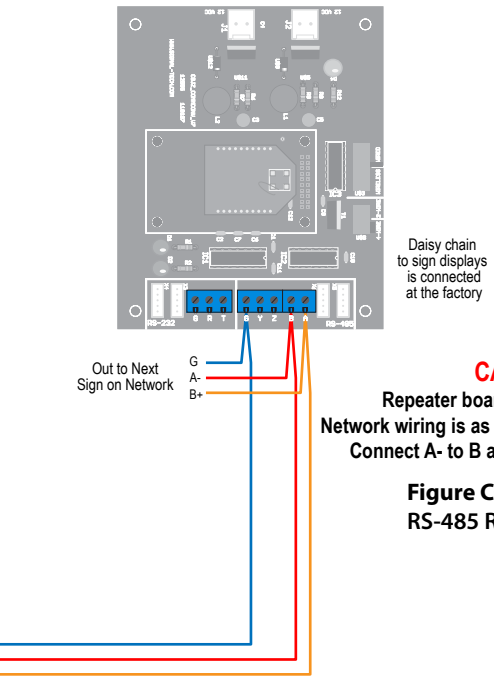
Maximum per network run of 4,000 feet of Cat5 or Cat6 Network wire MUST follow 485 network guidlines

Figure BB
SuperMaster Wiring

RedStorm™ 2.0
Parking Guidance System
Installation & Operation Instructions

Version: 2.0.1 Jun 2014

RS-485 Repeater
(Located within Each Sign Cabinet)



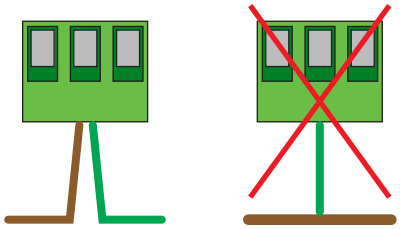
CAUTION
Repeater board is labeled GYZBA.
Network wiring is as shown and is not a mistake.
Connect A- to B and B+ to A on the board.

Figure CC
RS-485 Repeater Wiring

Important Notes

- Daisy chain network topology is required.
- Each RS-485 network cable run **MUST NOT** exceed 4,000 feet.
- Refer to the RS-485 guidelines TIA/EIA-485-A guidelines for additional requirements.
- Communication and Sensor wiring **MUST NOT** be run in same conduit as power.
- Communication network **MUST** be protected with transient voltage suppression and UPS to prevent vehicle count interruption.
- All wiring **MUST** be grounded.

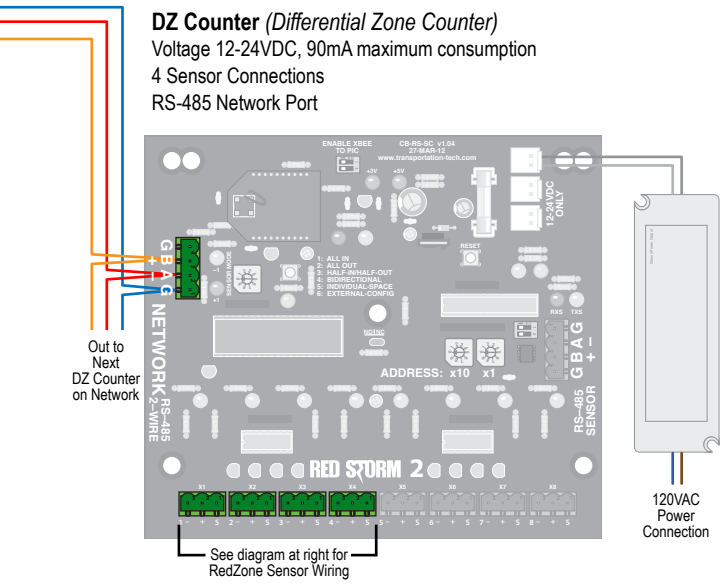
Preferred Style of Wiring Connection



Connecting multiple wires is preferred over using stubs to limit signal loss or degredation.

Figure DD
Preferred Style of Wiring

DZ Counter *(Differential Zone Counter)*
Voltage 12-24VDC, 90mA maximum consumption
4 Sensor Connections
RS-485 Network Port



Sensor leads can be lengthened to a **Maximum** of 350 feet per run
4 Conductor 18ga twisted shielded wire **MUST** be used when lengthening sensor leads

Figure EE
DZ Counter Wiring

RedZone™ Sensor Wiring

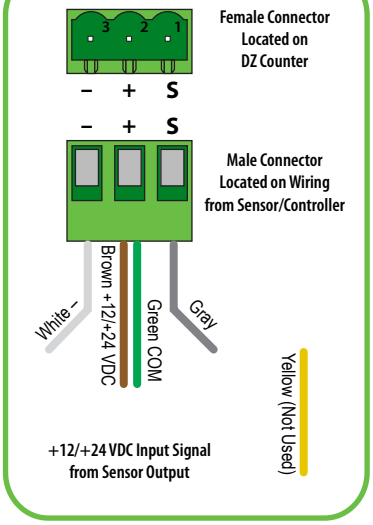


Figure FF
RedZone™ Sensor Wiring

Loop Detector Controller Wiring

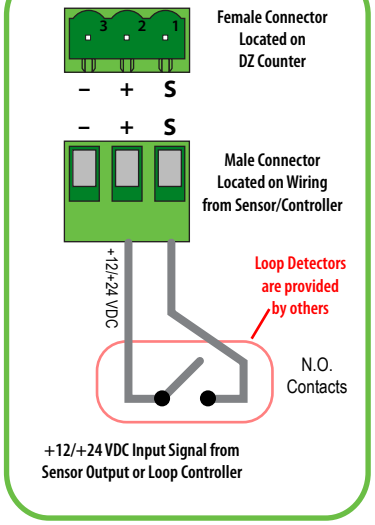


Figure GG
Typical Loop Detector Wiring

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