FEDERAL SIGNAL
Safety and Security Systems

Installation and Programming Instructions for the Serial Interface Module

2562248 REV H1 0520

Safety Message to Installers and Operators of Warning Lights

⚠ WARNING

People's lives depend on your proper installation and operation of Federal Signal products. It is important to read and follow all instructions shipped with this product and the original product. Listed below are some other important safety instructions and precautions you should follow:

- To properly install a light assembly, you must have a good understanding of automotive electrical procedures and systems, along with proficiency in the installation and use of safety warning equipment.
- When installing equipment or wiring inside airbag equipped vehicles, the installer MUST ensure that the equipment or wiring is installed ONLY in areas recommended by the vehicle manufacturer. Failure to observe this warning will reduce the effectiveness of the airbag, damage the airbag, or potentially damage or dislodge the equipment, causing serious injury or death.
- When drilling into a vehicle structure, ensure that both sides of the surface are clear of anything that could be damaged.
- A light system is a high current device. In order for it to function properly, a separate ground connection must be made. If practical, it should be connected to the negative battery terminal. At a minimum, it may be attached to a solid metal body or chassis part that will provide an effective ground path as long as the light system is to be used.
- Locate the light system controls so the VEHICLE and CONTROLS can be operated safely under all driving conditions.
- If a vehicle seat is temporarily removed, verify with the vehicle manufacturer if the seat needs to be recalibrated for proper airbag deployment.
- This product contains high intensity LED devices. To prevent eye damage, DO NOT stare into the light beam at close range.
- Frequently inspect the light system to ensure that it is operating properly and is securely attached to the vehicle.
- File these instructions in a safe place and refer to them when maintaining and/or reinstalling the product.

Failure to follow all safety precautions and instructions may result in property damage, serious injury, or death.

Product Overview

The Serial Interface Module is a device to communicate with Convergence Network controlled light bars. To minimize the number of discrete wires to the light bar, control lead functions are wired to the Interface Module. The information is converted to a digital format and communicated to the light bar via the serial communication cable. Light bar patterns can be changed through the programming procedure.

Control leads can also activate an Internal SignalMaster™ controller. If preferred, an external Federal Signal SignalMaster controller can link with the Interface Module and directly control SignalMaster operation.

The Serial Interface Module can be identified by part number 8583446 on the nameplate located on the top of the housing. A 3-foot-long, 24-conductor, control-link cable harness is also provided for external connection (J1) to the Interface Module.

Unpacking the Product

After unpacking the product, inspect it for damage that may have occurred in transit. If it has been damaged or is missing a part, do not attempt to install or operate it. File a claim immediately with the carrier, stating the extent of the damage. Carefully check all envelopes, shipping labels and tags before removing or destroying them. If you are missing any parts, contact Customer Support at 1-800-264-3578, 7 a.m. to 5 p.m., Monday through Friday (CT).

Programming the Light Bar

⚠ WARNING

LIGHT HAZARD: To be an effective warning device, this product produces bright light that can be hazardous to your eyesight when viewed at a close range. Do not stare directly into this lighting product at a close range, or permanent damage to your eyesight may occur.

Before permanently installing the Serial Interface Module (described on page 8), test and program the light bar. Each mode patterns is programmed independently. If you want to program the light bar after you connect a progressive slide switch, the programming sequence must be MODE 3, MODE 2, MODE 1, and then INTERSECTION.

A number of different flash patterns are available for the three modes of light bar operation. When you use the SW1 flash pattern button, the light bar momentarily turns off before flashing the next pattern. To cycle up or down through the flash patterns, set SW2 Switch 5 as shown in Table 1 on page 3.

In addition, the FRONT/REAR light heads can be set for +BAT cutoff or enable. The INTERSECTION mode has one of three options: HIGH (+BAT maintained), TAP II (push-on/push-off) or an 8-SECOND TIMEOUT.

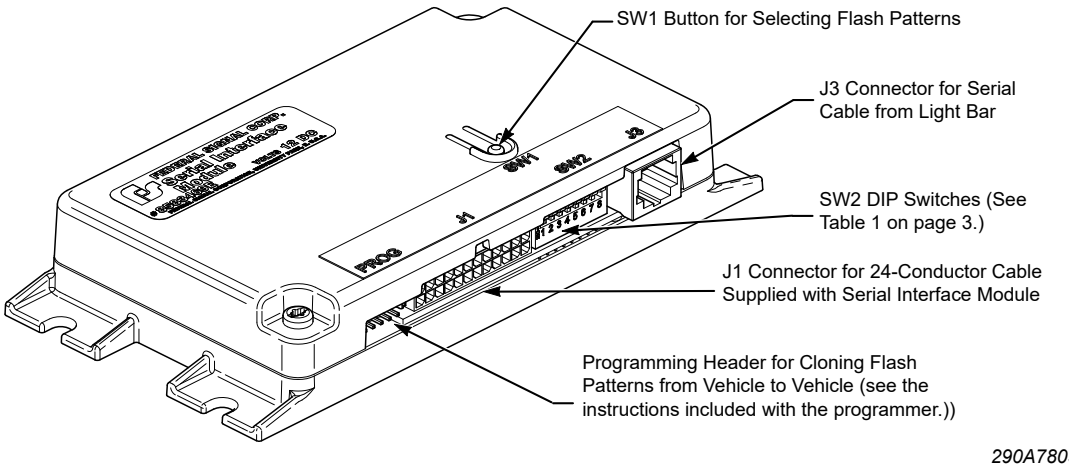
The SignalMaster® can also be set for INTERNAL or EXTERNAL control. See Table 1.

Wiring the Interface Module for Testing and Programming

To wire the Interface Module for programming before permanent installation:

1. Connect the serial cable from the light bar to the J3 output jack of the Interface Module. See Figure 1.

Figure 1 Connectors and switches on the Serial Interface Module



2. Connect the three-foot-long, 24-conductor cable to the J1 input connector of the Interface Module.

3. Connect the white wire from the supplied J1 cable harness on the Interface Module to a 1 A fuse.

4. Connect the fuse end of the white wire from the supplied J1 cable harness as close as possible to switched ignition power. Power should also be present in the cranking start position.

5. Connect the black and black/white wire from the supplied J1 cable harness to battery ground. Use 16 AWG wire to extend cable length.

Quick Testing the Light Bar

Before programming and testing flash patterns, perform the LIGHT BAR TEST to ensure that all LEDs light properly by following these steps:

NOTE: This feature does not test the STEADY BURN LED lightheads.

The SW2 Switch 3 must be in the UP position for the LIGHT BAR TEST (Table 1 below).

Applying 12 Vdc to the LIGHT BAR TEST control wire activates a test pattern that illuminates each head sequentially. At the end of the sequence, the ALLEY and TAKEDOWN lights turn on.

For light bars with SpectraLux® Technology (Valor® and Vision® SLR), refer to the manual shipped with the light bar for the test sequence. SCENE LIGHT is unavailable with this switch setting.

Table 1 SW-2 DIP switch settings in the Interface Module

SW2 Switch Number	Switch Setting		SIgnalMaster® Function and Control Wires (See the wiring harnesses on page 11 and 12.)
	Up (OFF)	Down (ON)	
1	X		FRONT/REAR LEDs cut off (deactivate) when 12 Vdc is applied their control wires.
1		X	FRONT/REAR LEDs enable (activate) when 12 Vdc is applied to their control wires.
2	X		Keep in OFF position
3	X		INTERSECTION is on when 12 Vdc is applied to blue/black wire.
	X		LIGHT BAR TEST is on when 12 Vdc is applied to black/white/red wire.
		X	SCENE LIGHT, LEFT is on when 12 Vdc is applied to blue/black wire.
		X	SCENE LIGHT, RIGHT is on when 12 Vdc is applied to black/white/red wire. **NOTE:** INTERSECTION and LIGHT BAR TEST are unavailable with the SCENE LIGHT ON (down) switch setting. SCENE LIGHT activation is available only in light bars with SpectraLux Technology (Valor and Vision SLR).
4	X		SignalMaster, EXTERNAL control
4		X	SignalMaster, INTERNAL control
5	X		Cycle forward through the selection of flash patterns
5		X	Cycle backward through the selection of flash patterns
6	X		Operation Mode
6		X	Program Mode
7	Switch for INTERSECTION operational settings (Table 2 on page 5)		
8	Switch for INTERSECTION operational settings (Table 2)		

Programming the Flash Patterns

Before programming CUT OFF, program the light bar flash patterns. To access flash patterns, ensure that SW2 Switch 1 is OFF.

NOTE: Cruise lights are also available in MODES 1 and 2.

IMPORTANT: The light bar must turn off before it displays the next flash pattern. To ensure that you do not miss a pattern choice, push SW1 once, wait for the light bar to turn off, and then observe the next pattern.

To program the flash patterns:

1. Enter Program Mode.
    - **a.** Remove ignition power.
    - **b.** Turn ON (down position) Switch 6 on SW2.
    - **c.** Apply ignition power.
2. Program MODE 3.
    - **a.** Activate MODE 3 with +BAT.
    - **b.** Push and release SW1 until the flash pattern you want displays.
    - **c.** Remove +BAT from MODE 3.
3. Program MODE 2.
    - **a.** Activate MODE 2 with +BAT.
    - **b.** Push and release SW1 until the flash pattern you want displays.
    - **c.** Remove +BAT from MODE 2.
4. Program MODE 1.
    - **a.** Activate MODE 1 with +BAT.
    - **b.** Push and release SW1 until the flash pattern you want displays.
    - **c.** Remove +BAT from MODE 1.
5. Program INTERSECTION.
    - **a.** Activate MODE 1 and INTERSECTION with +BAT.
    - **b.** Push and release SW1 until the flash pattern you want displays.
    - **c.** Remove +BAT from MODE 1 and INTERSECTION.
6. Exit Program Mode.
    - **a.** Return Switch 6 on SW2 to the OFF (up) position.
    - **b.** Remove ignition power.

Programming Front/Rear Cut Off

The active state for FRONT CUT OFF and REAR CUT OFF are not independent. As set at the factory, 12 Vdc must be applied for the front and rear light heads of the light bar to cut off. To initiate front and rear light head ENABLE with the application of 12 Vdc, see “Front Cutoff”and “Rear Cutoff” in “Light Bar Functions Activated via the CAT5 Cable (Excluding SignalMaster)” on page 6.

CUT OFF must be programmed after the MODE/INTERSECTION pattern. To enable pattern selection, SW2 Switch 1 must be off (Table 1 on page 3).

With the SS2000 controller, if FRONT CUT OFF is preferred in MODE 1, set the active state for ENABLE. (Apply 12 Vdc to activate the light heads.) The lead wire for FRONT CUT OFF is then connected directly to the MODE 2 lead wire.

The active state for CUT OFF is programmable. The factory setting for FRONT and REAR CUT OFF is to activate when 12 Vdc is applied; FRONT and REAR CUTOFF must share the same active state.

FRONT and REAR CUT OFF can be programmed to activate when 12 Vdc is removed from the respective control leads. To change the active states for FRONT and REAR CUT OFF, remove ignition power to the Serial Interface Module. Refer to Table 1 on page 3 for the DIP switch settings.

Programming the Intersection Function

The INTERSECTION function can be programmed to be activated for HIGH (+ BAT maintained), or TAP II (+BAT, push on/push off), or 8-SECOND TIMEOUT (activated by +BAT). The factory setting for INTERSECTION is HIGH (+BAT maintained).

To change the active state for the INTERSECTION Mode, remove ignition power to the interface module. Refer to Table 2 for the DIP switch settings on SW2. OFF is the up position and ON is the down position.

Table 2 SW2 switch settings for INTERSECTION operation

	SW2	
Operational Settings	**SW7**	**SW8**
HIGH (+BAT maintained)	OFF (up)	OFF (up)
TAP II (+BAT, push on/push off)	ON (down)	OFF (up)
8-SECOND TIMEOUT (activated by +BAT)	OFF (up)	ON (down)

Selecting External SignalMaster Control

The Serial Interface Module is factory-configured for INTERNAL control. (See the next section.) When the Serial Interface Module is configured for EXTERNAL SignalMaster control, an external Federal Signal SignalMaster controller or an SS2000SM Series siren can be used to control the SignalMaster in all Convergence Network controlled light bars.

For the 36-inch Arjent S2, a four-head external SignalMaster is required. For the 44-inch Arjent S2, external SignalMaster controllers must be six-head. For 53-inch and longer models and the Valor and Vision SLR models, an eight-head SignalMaster controller is required.

To select external SignalMaster control, remove ignition power and return SW2 Switch 4 to the OFF (up) position. To wire the SignalMaster for external control, see page 9.

Selecting Internal SignalMaster Control (Factory Default)

Internal control uses the on-board SignalMaster controller in the light bar to generate directional warning patterns. With internal operation, an external SignalMaster controller is not needed. A standard low-current switch box can activate the internal SignalMaster controller. To wire the SignalMaster for internal control, see page 9.

To select internal SignalMaster control:

1. Remove ignition power to the Serial Interface Module.
2. Move SW2 Switch 4 to the ON (down) position. See Table 1 on page 3.

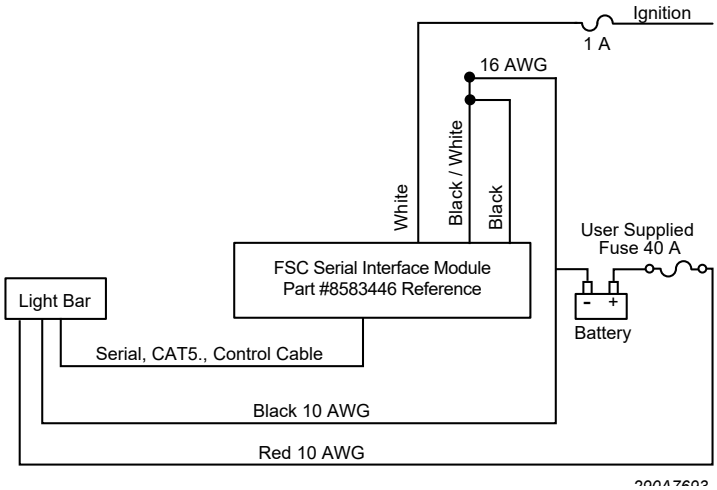
Light Bar Functions Activated via the CAT5 Cable (Excluding SignalMaster)

⚠ WARNING

LIGHT HAZARD: To be an effective warning device, this product produces bright light that can be hazardous to your eyesight when viewed at a close range. Do not stare directly into this lighting product at a close range, or permanent damage to your eyesight may occur.

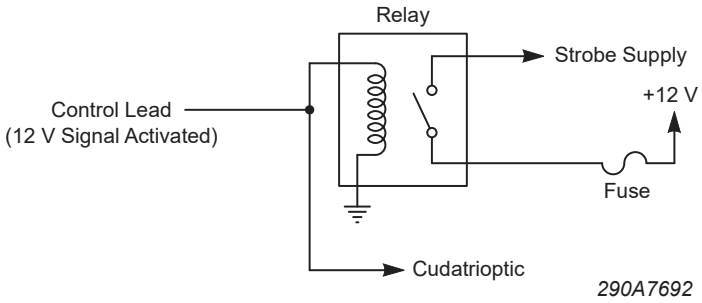
For a block wiring diagram, see Figure 2. For wiring schematics of the controller's functions to the cable harness supplied with the Interface Module, see Figure 4 (internal control) on page 10 and Figure 5 (external control) on page 11. If additional wire is necessary for the harness (except ground), 22 AWG wire is adequate. The ground wires must be extended with wire that is 16 AWG or better. All inputs are active HIGH.

Figure 2 Wiring block diagram



NOTE: Powering multiple devices with a common control lead may cause one or more units to briefly remain functional after signal power is removed. For example, due to the high input filter capacitance, a strobe supply can briefly supply the current required to signal a light bar function to remain ON. If necessary, use a relay to isolate devices with large filter capacitors. See Figure 3 for the schematic.

Figure 3 Relay for isolating devices with large filter capacitors



To activate a mode, apply 12 Vdc to a MODE control lead. There are three prioritized modes of operation available, with MODE 3 as the highest priority. MODE 3 overrides MODE 2, and MODE 2 overrides MODE 1. One of the available flash patterns can be programmed to each mode input. To program a flash pattern, see "Programming the Flash Patterns" on page 4.

Steady Burn Red

When the light bar is equipped with a STEADY BURN RED LED module, applying 12 Vdc to the control lead causes that module to operate when any mode input is selected.

Front Cutoff

12 Vdc applied to the FRONT CUT OFF control lead deactivates the selected MODE operation to the front of the light bar. Only the rear lights will function. Additionally, with FLASH TAKEDOWN/ALLEY active, only the alley lights flash. See “Programming Front/Rear Cut Off” on page 4.

Rear Cutoff

12 Vdc applied to the REAR CUT OFF control lead deactivates the selected MODE operation on the rear of the light bar. Only the front lights function. See “Programming Front/Rear Cut Off” on page 4.

Intersection

Mode 1, 2, or 3 needs to be active to initiate the INTERSECTION feature. The factory setting activates the INTERSECTION Mode when 12 Vdc is applied to the control lead for INTERSECTION. When 12 Vdc is removed, the light bar returns to the original mode of operation. Additional programming for alternative configurations of this feature are described in the sections “Programming the Intersection Function” on page 5.

Flash Takedown Alley

Applying 12 Vdc to the FLASH TAKEDOWN/ALLEY control lead flashes the ALLEY lights and TAKEDOWN lights. MODE 1, 2, or 3 must be in operation for the FLASH TAKEDOWN/ALLEY feature to function.

Alley Lights

Applying 12 Vdc to the LEFT or RIGHT ALLEY control leads activates the corresponding alley light.

Takedown

Applying 12 Vdc to the Takedown control lead illuminates the TAKEDOWN lights. TAKEDOWN overrides the FLASH TAKEDOWN/ALLEY and FRONT CUTOFF modes of operation.

Low Power

⚠ WARNING

LOW LIGHT HAZARD: Enabling the Low Power function in the light bar may cause the light output to fall below certain current light output standards and guidelines for emergency warning lights. Use extreme caution when using this function. Ensure that the ambient light conditions are low enough that you are seen and that the reduction of glare from the light bar is safer than full light output in the situation. Failure to heed this warning may result in serious injury or death to you or others in your vicinity.

LOW POWER mode is disabled when the light bar is in MODE 3 or INTERSECTION Mode.

Applying 12 Vdc to the control lead for LOW POWER mode dims the LEDs to 25 percent of their full brightness. LOW POWER mode is functional only in MODE 1 or MODE 2 operation. LOW POWER is disabled when switching to another mode of operation, including INTERSECTION mode.

To enter LOW POWER mode again, disconnect 12 Vdc from the lead for LOW POWER Mode and reapply 12 Vdc to the lead for LOW POWER Mode after a mode change occurs.

Under dark conditions, a light bar with an ambient light sensor automatically dims. Under bright conditions, the light bar returns to full brightness. If MODE 3 or INTERSECTION is activated, the light bar returns to full brightness in the dark and dims when MODE 3 or INTERSECTION is deactactivated.

To override autodimming, toggle the LOW POWER wire ON and then OFF.

Scene Light, Left

The SCENE LIGHT, LEFT option is available only in light bars with SpectraLux® Technology (Valor and Vision SLR).

To use SCENE LIGHT, LEFT with the Serial Interface Module, you must place SW2 Switch 3 in the down position (ON). INTERSECTION is unavailable with this switch setting.

Scene Light, Right

The SCENE LIGHT, RIGHT option is available only in light bars with SpectraLux Technology (Valor and Vision SLR).

To use the SCENE LIGHT, RIGHT with the Serial Interface Module, you must place SW2 Switch 3 in the down position (ON). The LIGHT BAR TEST is unavailable with this switch setting.

Light Bar Test

See “Quick Testing the Light Bar” on page 3.

Installing the Serial Interface Module

NOTICE

INSTALLATION PRECAUTIONS: Do not install the Interface Module in an area where it cannot dissipate heat into the air. Do not mount the unit near a heater duct. The Interface Module also is not waterproof. It must be mounted in a location which is sheltered from falling rain, snow, standing water, etc.

Plan all wiring and cable routing before the installation.

User-supplied #8 mounting hardware is required.

Dimensions:
Length:6.25 inches (159 mm)
Width: 3.16 inches (80 mm)
Height:1.06 inches (27 mm)

To install the Interface Module:

1. Use the Interface Module as a template and scribe four drill position marks at the selected mounting location. Mounting centers are 2 by 5.95 inches (51 by 151 mm).

⚠ WARNING

DRILLING PRECAUTION: DO NOT drill holes in ANY part of the Interface Module. Damage to the unit, serious injury, or death to you or others may result.

2. Drill four mounting holes sized for #8 mounting hardware at the position marks.

3. Secure the Interface Module to the mounting surface.

Wiring the Serial Interface Module to Power and Ground

⚠ WARNING

AIRBAG DEPLOYMENT: Do not install equipment or route wiring in the deployment path of an airbag. Failure to observe this warning will reduce the effectiveness of the airbag or potentially dislodge the equipment, causing serious injury or death.

⚠ WARNING

SEAT REMOVAL PRECAUTION: If a vehicle seat is temporarily removed, verify with the vehicle manufacturer if the seat needs to be recalibrated for proper airbag deployment. Failure to follow this warning cause serious injury or death.

To wire the Serial Interface Module to power and ground:

1. Connect the white wire from the supplied J1 cable harness on the Interface Module to a 1 A fuse.
2. Connect the fuse end of the white wire as close as possible to switched ignition power. Power should also be present in the cranking start position.
3. Connect the black and black/white wire from the supplied J1 cable harness to battery ground. Use 16 AWG wire to extend cable length.
4. Insulate spliced leads with twist-on wire connectors. Fold and seal unused leads. Use wire ties and hold-downs for strain relief.

Wiring the SignalMaster

⚠ WARNING

LIGHT HAZARD: To be an effective warning device, this product produces bright light that can be hazardous to your eyesight when viewed at a close range. Do not stare directly into this lighting product at a close range, or permanent damage to your eyesight may occur.

Depending on length, light bars have a four-, six-, or eight-head SignalMaster. Be sure to use the proper controller to match the number of SignalMaster heads in the light bar.

If SignalMaster® operation is not initiated by a control head or external controller, the SignalMaster LED heads flash according to the selected mode (1, 2, or 3) of operation.

External SignalMaster

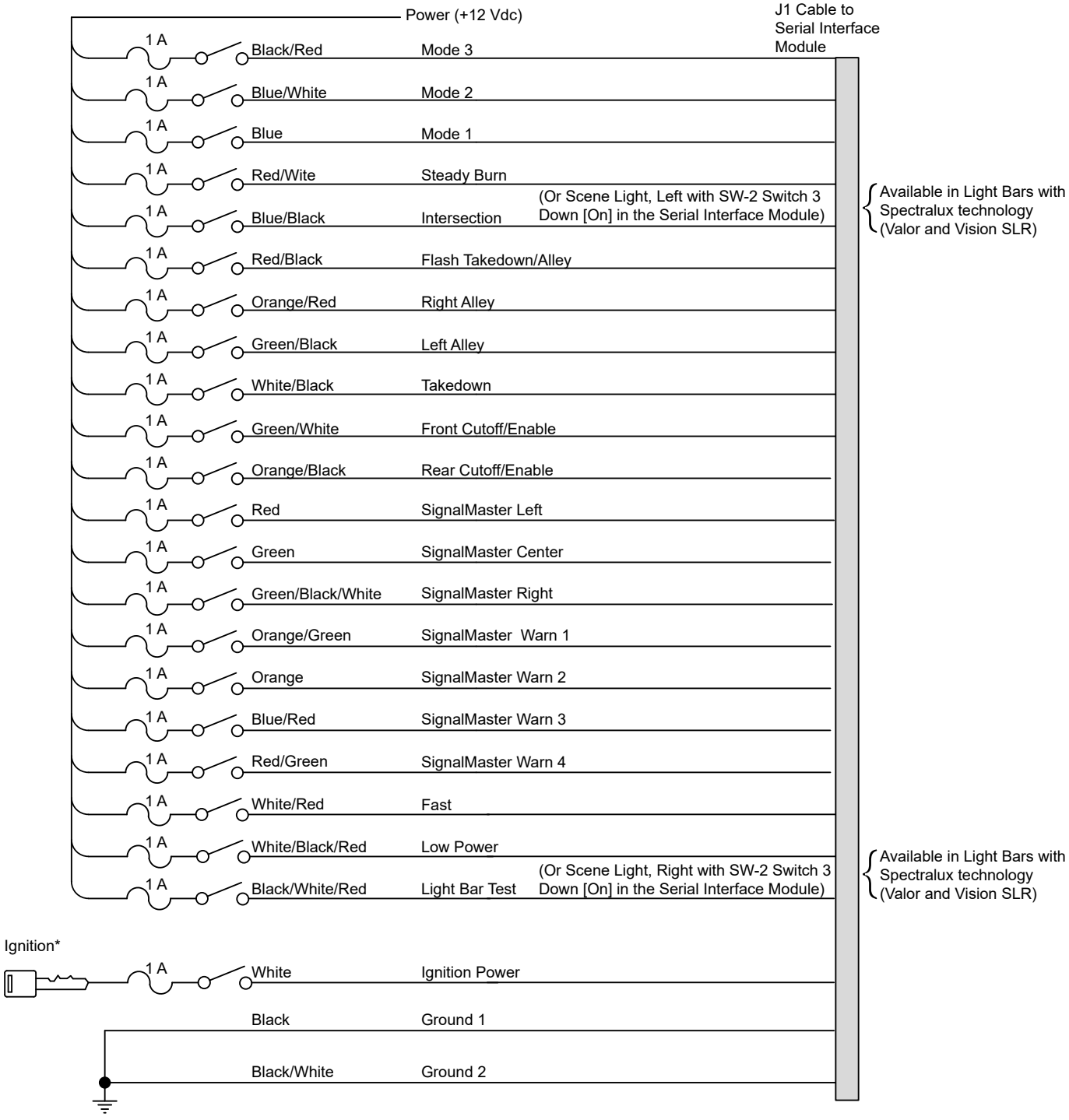
The Interface Module can be configured from the factory default of Internal operation (see the next section) to External operation. The Interface Module drives each SignalMaster head independently via an external Federal Signal SignalMaster controller or an SS2000SM series siren. Either device will provide an independent ground signal to illuminate each head.

For SignalMaster control functions wired to 12 Vdc for External Control, see Figure 5 on page 11.

Internal SignalMaster (Factory Default)

The Interface Module SignalMaster control leads are defined in Table 3. The SignalMaster can be configured from External to Internal operation. +BAT applied to the specified control lead activates the internal SignalMaster controller in the light bar. See Figure 4.

Figure 4 SignalMaster control functions wired to 12 Vdc for Internal Control (factory default)



* Ignition power includes power in the cranking position

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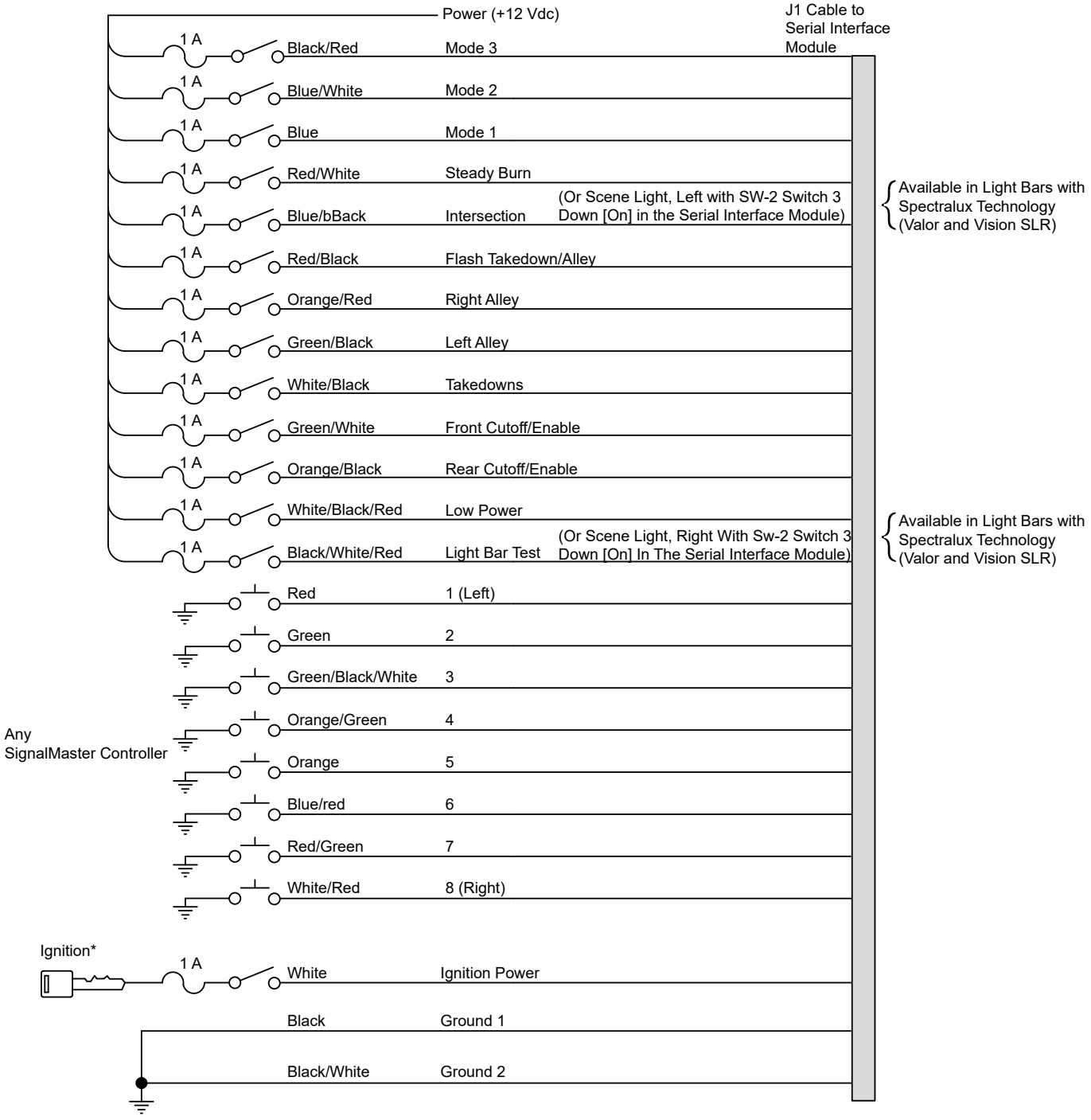
Figure 5 SignalMaster control functions wired to 12 Vdc for External Control



* Ignition power includes power in the cranking position

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Getting Technical Support

For technical support, please contact:

Federal Signal Corporation
Service Department
Phone: 1-800-433-9132
Email: empserviceinfo@fedsig.com

Getting Repair Service

The Federal Signal factory provides technical assistance with any problems that cannot be handled locally. Any product returned to Federal Signal for service, inspection, or repair must be accompanied by a Return Material Authorization (RMA). Obtain a RMA from a local Distributor or Manufacturer's Representative. Provide a brief explanation of the service requested, or the nature of the malfunction.

Address all communications and shipments to the following:

Federal Signal Corporation
Service Department
2645 Federal Signal Dr.
University Park, IL 60484-3167

Limited Warranty

This product is subject to and covered by a limited warranty, a copy of which can be found at www.fedsig.com/SSG-Warranty. A copy of this limited warranty can also be obtained by written request to Federal Signal Corporation, 2645 Federal Signal Drive, University Park, IL 60484, email to info@fedsig.com or call +1 708-534-3400.

This limited warranty is in lieu of all other warranties, express or implied, contractual or statutory, including, but not limited to the warranty of merchantability, warranty of fitness for a particular purpose and any warranty against failure of its essential purpose.

FEDERAL SIGNAL
Safety and Security Systems

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