

## INSTALLATION AND MAINTENANCE INSTRUCTIONS FOR SERIAL INTERFACE MODULE

### SAFETY MESSAGE TO INSTALLERS OF FEDERAL SIGNAL LIGHT SYSTEMS

#### **▲WARNING**

**People's lives depend on your safe installation of our products. It is important to read, understand and follow all instructions shipped with the products. In addition, 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 air bag 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 air bag, damage the air bag, or potentially damage or dislodge the equipment, causing serious injury or death to you or others.
- When drilling into a vehicle structure, be sure 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 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.
- You should frequently inspect the light system to ensure that it is operating properly and that it 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.**

### I. GENERAL.

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

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

### II. UNPACKING.

The Serial Interface Module can be identified by part number 8583446 on the nameplate located on the top of the unit. The 8583446-INT has been configured for internal SignalMaster operation. This module can be identified by a label stating "FACTORY CONFIGURED FOR INTERNAL SIGNALMASTER." A 3-foot-long, 24-conductor control link cable harness is also provided for external connection (J1) to the module (Figure 1 on page 2).

#### Interface Module Dimensions:

Length: 6.25" (159 mm)

Width: 2.88" (73 mm)

Height: 1.06" (27 mm)

#### **▲WARNING**

**Light system controls must be located so that VEHICLE and CONTROLS can be operated safely under all driving conditions.**

### III. INSTALLATION.

#### A. Mechanical.

#### NOTE

If the internal SignalMaster option will be used, the Interface Module and compatible Federal Signal lightbar must be configured prior to mechanical mounting. See the Paragraph titled *IV. Programming Options* on page 4 and refer to the Installation and Maintenance Instructions included with the lightbar ([www.fedsig.com](http://www.fedsig.com)).

#### **▲CAUTION**

The Interface Module is **NOT** waterproof. It must be mounted in a location which is sheltered from falling rain, snow, standing water, etc. Also, it must be installed in an adequately ventilated area. Never install near heater ducts.

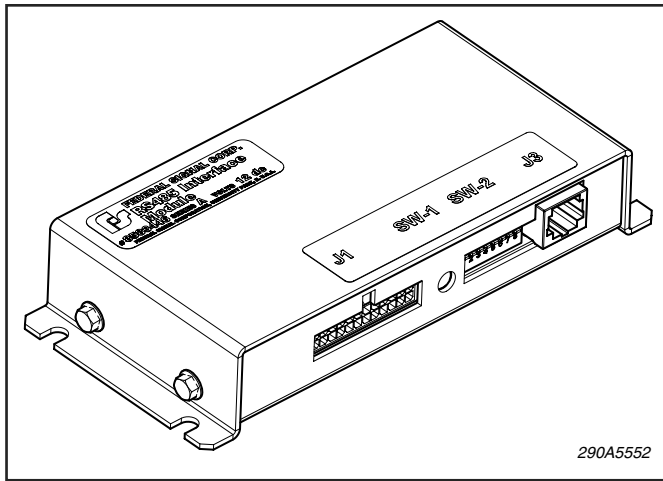


Figure 1.

When selecting a mounting location for the Interface Module, it is necessary to plan all wiring and cable routing before performing any installation.

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

**CAUTION**

Before drilling holes in ANY part of a vehicle, be sure that both sides of the mounting surface are clear of parts that could be damaged, such as brake lines, fuel lines, electrical wiring or other vital parts.

**WARNING**

**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 at the position marks, based upon recommended user supplied #8 mounting hardware.
3. Secure the Interface module to the mounting surface with user supplied #8 mounting hardware.
4. See Figure 1. Install the lightbar's serial cable to noted J3 output jack of the Interface Module.
5. See Figure 1. Install supplied 3-foot-long, 24-conductor cable to noted J1 input connector of the Interface Module.

B. *Electrical.*

**CAUTION**

Insulate all unused wires to prevent short circuits.

**NOTE**

The basic light functions of the lightbar must be controlled by a user-supplied control panel.

1. Function Activation – Excluding SignalMaster™.

**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 lightbar function to remain ON. If necessary, use a relay to isolate devices with large filter capacitors. See Figure 2 for the schematic. All components/wires are user-supplied.

See Figure 3 on page 3 for the block wiring diagram. See Table 1 on page 3 and Figure 8 on page 7 and Figure 9 on page 8 for wiring the controller's functions to the cable harness supplied with the unit. If additional wire is necessary for the harness (except ground), 22 AWG wire is adequate. The ground wires must be extended with 16 AWG or better, wire. All inputs are active HIGH.

- a. MODE Inputs.

To activate a mode, apply 12 VDC to a MODE control lead. There are three prioritized modes of operation available with mode three being the highest priority. Mode 3 will override Mode 2, and Mode 2 will override Mode 1. One of the available flash patterns can be programmed to each mode input. Programming is covered in the *Paragraph titled, IV. Programming Options* on page 4.

- b. STEADY BURN RED.

When the lightbar is equipped with a Steady Burn Red led module, applying 12 VDC to the control lead will cause that module to operate when any mode input is selected.

**NOTE**

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 lightbar's front and rear light heads to cut off. To initiate front and rear light head enable with the application of 12 VDC, refer to the *Paragraph titled, IV. Programming Options* on page 4.

- c. FRONT CUT OFF.

12 VDC applied to the FRONT CUT OFF control lead, will deactivate the selected MODE operation to the front of the lightbar. Only the rear lights will function.

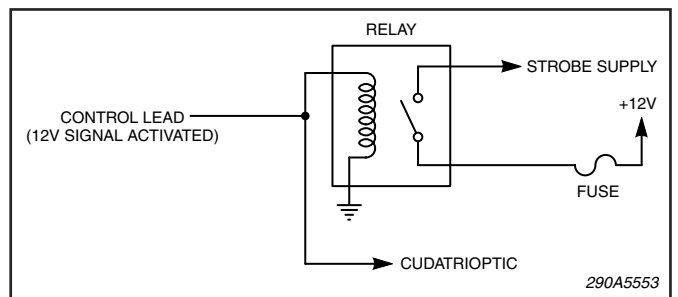


Figure 2.

Table 1.

WIRE COLOR	FUNCTION
BLUE	MODE 1
BLUE/WHITE	MODE 2 — overrides MODE 1
BLACK/RED	MODE 3 — overrides MODES 1 and 2
RED/WHITE	STEADY BURN RED
GREEN/WHITE	FRONT CUTOFF
ORANGE/BLACK	REAR CUTOFF
BLUE/BLACK	INTERSECTION (or SCENE LIGHT, LEFT) see Table 5 on page 6 and pages 7 and 8.
RED/BLACK	FLASH TAKEDOWN/ALLEY
GREEN/BLACK	LEFT ALLEY
ORANGE/RED	RIGHT ALLEY
WHITE/BLACK	TAKEDOWN
WHITE/BLACK/RED	LOW POWER
WHITE	IGNITION POWER: includes power in the cranking position
BLACK/WHITE/RED	LIGHTBAR TEST (or SCENE LIGHT, RIGHT) see Table 5 on page 6 and pages 7 and 8.
BLACK	GROUND 1
BLACK/WHITE	GROUND 2

**NOTE**

The first color is the predominant color; additional colors indicate stripes.

Additionally, with FLASH TAKEDOWN/ALLEY active, only the alley's will flash. Additional Programming, for alternative configurations of this feature, can be found in the Paragraph titled, IV. Programming Options on page 4.

d. REAR CUT OFF.

12 VDC applied to the REAR CUT OFF control lead, will deactivate the selected MODE operation to the rear of the lightbar. Only the front lights will function. Additional Programming, for alternative configurations of this feature, can be found in the Paragraph titled, IV. Programming Options on page 4.

e. INTERSECTION.

**NOTE**

Modes 1, 2, or 3 need to be active to initiate the INTERSECTION feature.

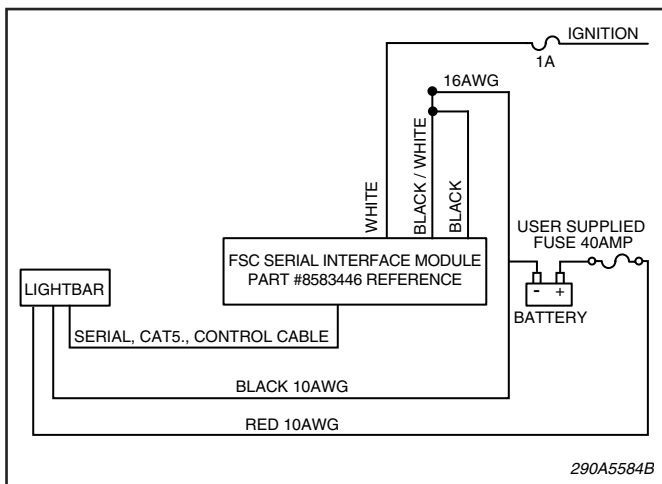


Figure 3.

As supplied from the factory, when 12 VDC is applied to the control lead, it energizes the INTERSECTION Mode. When 12 VDC is removed, the lightbar returns to its original mode of operation. Additional programming, for alternative configurations of this feature, can be found in the Paragraph titled, IV. Programming Options on page 4.

f. FLASH TAKEDOWN/ALLEY

Applying 12 VDC to the FLASH TAKEDOWN/ALLEY control lead yields flashing of the alley lights and takedown lights. Mode 1, 2, or 3 must be in operation for the FLASH TAKEDOWN/ALLEY feature to function.

g. ALLEY LIGHTS.

Applying 12 VDC to the LEFT or RIGHT ALLEY control leads will illuminate the appropriate alley light.

h. TAKEDOWN.

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

i. LOW POWER.



**Enabling the Low Power Mode in the lightbar will cause the light output of the lightbar to fall below current light output standards and guidelines for emergency warning lights. Use extreme caution when using this mode. Ensure that the ambient light conditions are low enough that you are seen, and that the reduction of glare from the lightbar 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.**

**NOTES**

Low power mode is disabled when the lightbar is in Mode 3 or INTERSECTION Mode.

Applying 12 VDC to the LOW POWER Mode control lead activates the low power mode; the LEDs are dimmed to 25 percent of their full level brightness. Low Power mode is only functional in Mode 1 or Mode 2 operation. Low Power is disabled when switching to another mode of operation, including the INTERSECTION mode. To enter Low Power mode again, disconnect 12 VDC from the Low Power mode lead and reapply 12 VDC to the Low Power mode control lead after a mode change occurs.

j. SCENE LIGHT, LEFT

The SCENE LIGHT, LEFT option is available only in lightbars with Spectralux Technology (Valor and Vision SLR). To use the Scene Light, Left with the Serial Interface Module, you must place SW-2 Switch 3 in the module in the down position (ON). INTERSECTION is unavailable with this switch setting.

k. SCENE LIGHT, RIGHT

The SCENE LIGHT, RIGHT option is available only in lightbars with Spectralux Technology (Valor and Vision SLR). To use the Scene Light, Right with the Serial Interface Module, you must place SW-2 Switch 3 in the module in the down position (ON). LIGHTBAR TEST is unavailable with this switch setting.

1. LIGHTBAR TEST.

**NOTES**

If the lightbar has the steady burn option, this feature does not test these LED heads. SW-2 Switch 3 must be in the UP position (Table 5 on page 6.)

Applying 12 VDC to the LIGHTBAR TEST control wire will activate a test pattern that illuminates each head sequentially. After the sequence completes, the alley and takedown lights will illuminate. For lightbars with Spectralux Technology (Valor and Vision SLR), refer to the manual shipped with the lightbar for the test sequence. SCENE LIGHT, RIGHT is unavailable with this switch setting.

1. IGNITION.

Connect the White wire, from the supplied J1 cable harness on the Interface Module, to a 1 A fuse. Connect the fuse end, as close as possible, to switched ignition power. Power should also be present in the cranking start position.

Connect the Black and Black/White wire from the supplied J1 cable harness to battery ground. Use 16 AWG wire to extend cable length.

2. SignalMaster Connections.

**NOTE**

Depending on length, lightbars will have a 4-, 6-, or 8-head SignalMaster. Be certain to use the proper controller to match the SignalMaster heads on the lightbar.

If SignalMaster operation is not initiated by a control head or external controller, the SignalMaster LED heads will flash per the selected Mode (1, 2, or 3) of operation.

a. Internal SignalMaster.

The Interface Module SignalMaster control leads are defined in Table 2. The SignalMaster can be configured for internal operation. +BAT applied to the specified control lead, is used to activate the lightbar's internal SignalMaster controller. Refer to the *Paragraph titled IV. Programming Options.*

b. External SignalMaster.

The Interface Module comes factory preset for the EXTERNAL SignalMaster option. The Interface Module drives each SignalMaster head independently via an external Federal Signal SignalMaster controller or an SS2000SM series siren. See Figures 5 and 6. Either device will provide an independent ground signal to illuminate

Table 2.

WIRE COLOR	Internal SignalMaster Controller
RED	LEFT
GREEN	CENTER
GREEN/BLACK/WHITE	RIGHT
ORANGE/GREEN	WARN 1
ORANGE	WARN 2
BLUE/RED	WARN 3
RED/GREEN	WARN 4
WHITE/RED	FAST

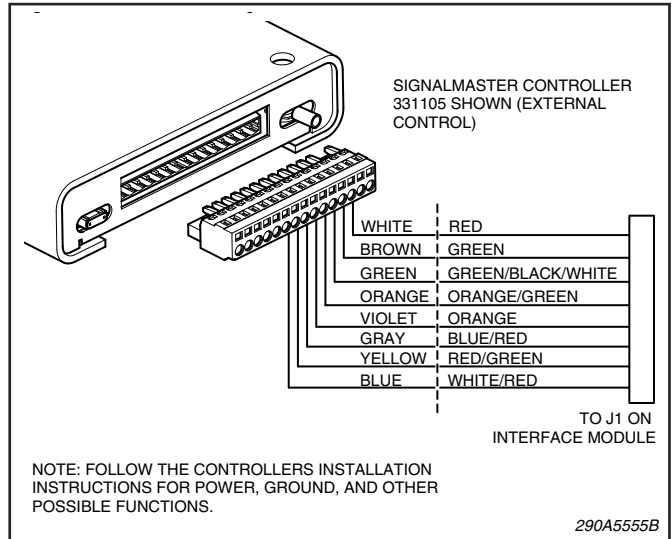


Figure 5.

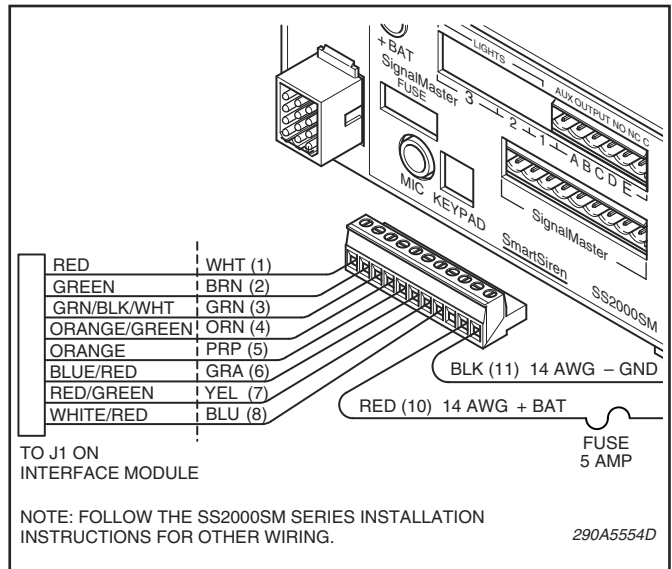


Figure 6.

each head. See Table 4 on page 6 to cross reference external SignalMaster wiring to a Federal Signal controller or the SS2000SM series siren.

**IV. PROGRAMMING OPTIONS.**

**NOTE**

The lightbar should be programmed prior to installation. Programming of each of the Mode patterns is independent. If the lightbar needs to be programmed after a progressive slide switch was connected, the programming sequence must be as follows: Mode 3, Mode 2, Mode 1, and then INTERSECTION.

Several features of the lightbar can be programmed by the installer. A number of different patterns are available for three modes of lightbar operation. 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 lightbar's SignalMaster can be set for INTERNAL or EXTERNAL operation. See Tables 3 and 5 for SW-2 switch summary.

**NOTE**

For the SW-1 pushbutton pattern select, the lightbar momentarily turns off and then displays the next pattern. Switch 5 on SW-2 selects up or down pattern selection. Use this switch to quickly return to a previous pattern.

A. *Mode 1, Mode 2, Mode 3 and INTERSECTION Pattern Select.*

**NOTE**

The lightbar must complete on full pattern cycle before changing to the next pattern. To ensure not missing a pattern choice, push SW-1 once, wait for the lightbar to turn off, and then observe the next pattern. The LIGHTBAR TEST pattern will take approximately one minute to complete its cycle.

**NOTE**

Program patterns before programming CUT OFF. SW-2, position 1, must be off to access pattern programming.

1. Enter Program Mode.

Remove ignition power. Turn "ON" (down position) Switch 6 on SW-2. Apply ignition power.

a. **MODE 3:** Activate Mode 3 with +BAT. Using the momentary pushbutton, SW-1, push and release the switch. Repeat the push and release until the desired pattern is attained. **Remove +BAT from MODE 3.**

b. **MODE 2:** Activate Mode 2 with +BAT. Using the momentary pushbutton, SW-1, push and release the switch until the lightbar pattern changes. Repeat the push and release until the desired pattern is attained. **Remove +BAT from MODE 2.**

c. **MODE 1:** Activate Mode 1 with +BAT. See Figure 1 on page 2. Using the momentary pushbutton, SW-1, push and release the switch. The lightbar will turn off before changing to the next pattern. Repeat the push and release until the desired pattern is attained. **Remove +BAT from MODE 1.**

d. **INTERSECTION:** Activate Mode 1 and INTERSECTION with +BAT. Using the momentary pushbutton, SW-1, push and release the switch until the lightbar pattern changes. Repeat the push and release until the desired pattern is attained. **Remove +BAT from INTERSECTION and Mode 1.**

Table 3.

Operation	SW-2	
	SW7	SW8
High (+BAT maintained)	OFF	OFF
Tap II (Push on/Push off)	ON	OFF
8-second timeout	OFF	ON

2. Exit Program Mode.

Return Switch 6 on SW-2 to the "OFF" (up) position. **Remove ignition power.**

B. *Front / Rear Cut Off.*

**NOTE**

CUT OFF must be programmed after MODE/ INTERSECTION pattern selection. SW-2, position 1, must be off to allow pattern selection programming.

**NOTE**

SS2000 application: If Front Cut off is desired in MODE 1, the active state should be set for enable (apply 12 VDC to activate light heads). The Front Cut Off lead is then connected directly to the MODE 2 lead wire.

The installer can program the active state for cut off. The factory setting for Front and Rear Cut Off is activate (apply 12 VDC); both 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 state for Front and Rear Cut off, remove ignition power to the interface module. Turn 'ON' SW-2 position 1, on the interface module.

C. *Intersection.*

The installer can program the INTERSECTION function 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 the +BAT (maintained). To change the active state for the INTERSECTION Mode, remove ignition power to the interface module. Refer to Table 3 for the DIP switch settings on SW-2. "OFF" is the up position and "ON" is the down position.

D. *SignalMaster: Internal vs. External.*

**NOTE**

A SignalMaster controller is necessary to operate the external operation mode. For the 36" Arjent S2, a 4-head external SignalMaster is required. For the 44" Arjent S2, external SignalMaster controllers must be 6-head. For 53" and longer models and the Valor and Vision SLR models, an 8-head SignalMaster controller is required.

The Interface Module is factory shipped with the External SignalMaster option. An external Federal SignalMaster controller, or an SS2000SM series siren, can be used to control the SignalMaster in all Convergence Network controlled lightbars.

Table 4.

Interface Harness Wire (external control)	FS SignalMaster Wire	SS2000SM Wire
RED	WHITE	WHITE (1)
GREEN	BROWN	BROWN (2)
GRN/BLK/WHT	GREEN	GREEN (3)
ORANGE/GREEN	ORANGE	ORANGE (4)
ORANGE	PURPLE	PURPLE (5)
BLUE/RED	GRAY	GRAY (6)
RED/GREEN	YELLOW	YELLOW (7)
WHITE/RED	BLUE	BLUE (8)

Wire colors as stated in the respective Installation Instructions.

The installer can program the SignalMaster for Internal operation. Internal operation uses the lightbar's on-board controller for SignalMaster operation. Refer to Table 4 for the control lead functions. To program for Internal SignalMaster, remove Ignition Power to the Interface Module. Remove the cover from the Interface Module. Move SW-2 Switch 4 to the 'ON' (down) position. See Figure 7. Move jumper, JP1, to the 'INT' position. Secure the cover back in place.

To return to External SignalMaster Mode, remove ignition power, return JP1 to external configuration per Figure 7, and SW-2 Switch 4 to the up (OFF) position. The lightbar is also to be returned to the external SignalMaster configuration.

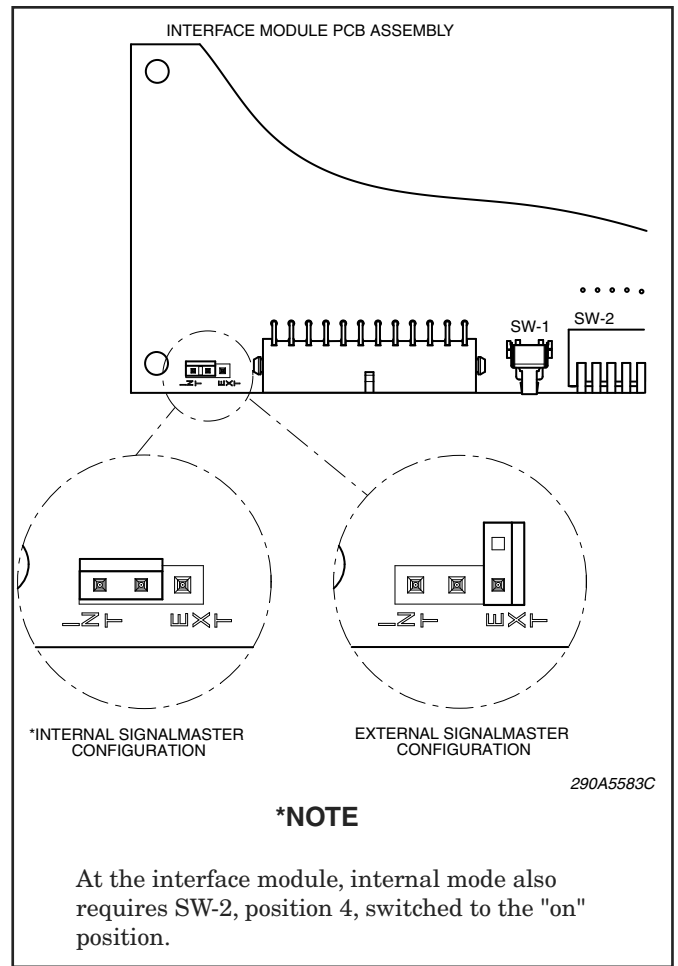
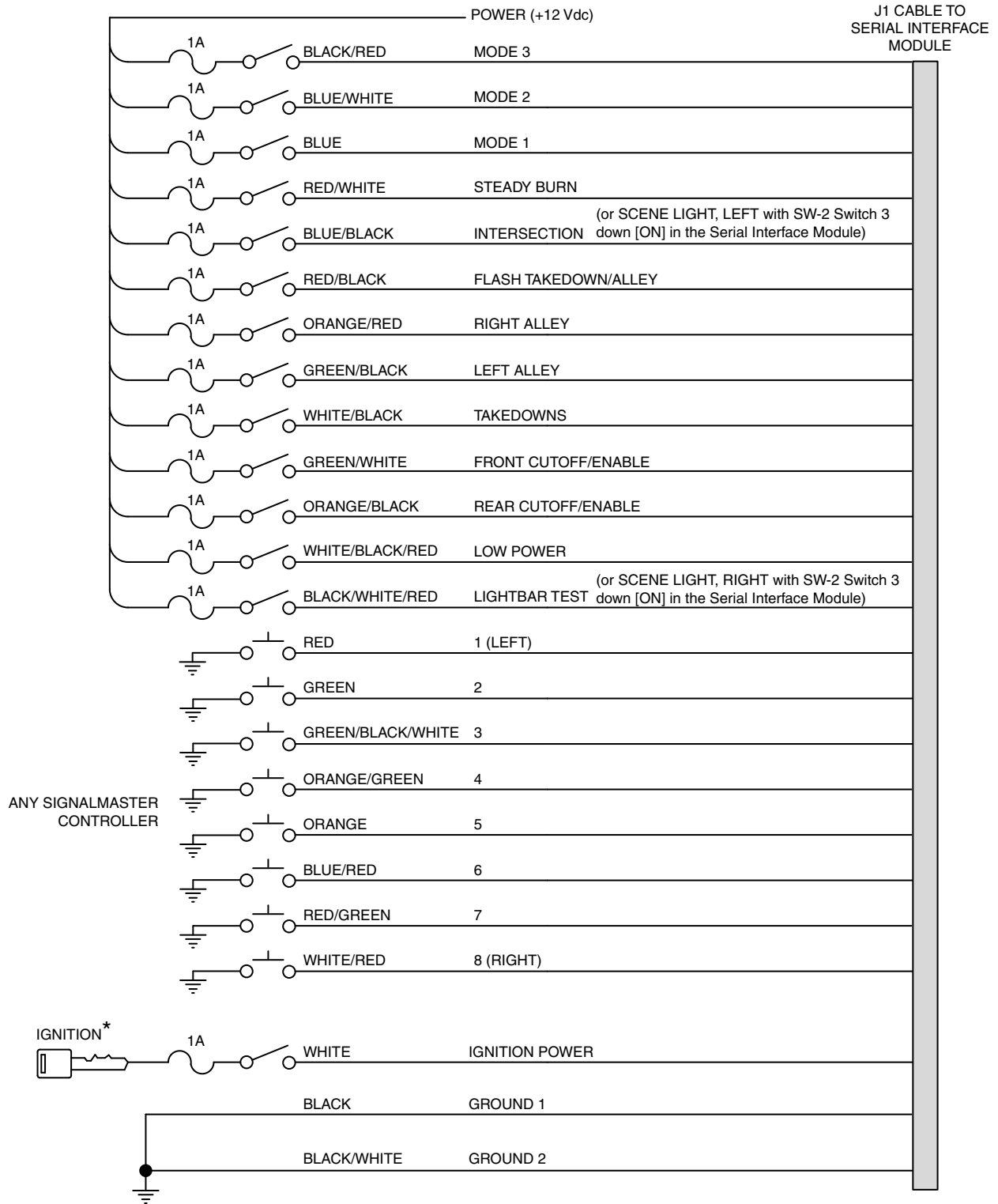


Figure 7.

Table 5.

SW-2 Switch Number	Switch Setting		Function (see wire charts on pages 7 and 8)
	Up (OFF)	Down (ON)	
1	✓		FRONT/REAR LEDs, CUT OFF (turn off) when 12 Vdc is applied their control wires
1		✓	FRONT/REAR LEDs, ENABLE (turn on) when 12 Vdc is applied to their control wires
2	✓		Keep in OFF position
3	✓		INTERSECTION when 12 Vdc is applied to blue/black wire. LIGHTBAR TEST when 12 Vdc is applied to black/white/red wire.
		✓	SCENE LIGHT, LEFT turns on when 12 Vdc is applied to blue/black wire. SCENE LIGHT, RIGHT turns on when 12 Vdc is applied to black/white/red wire. Intersection and Lightbar Test are unavailable. This function applies only to lightbars with Spectralux technology (Valor and Vision SLR).
4	✓		SignalMaster, External controller
4		✓	SignalMaster, Internal controller
5	✓		Cycle forward through the selection of flash patterns
5		✓	Cycle backward through the selection of flash patterns
6	✓		Operation Mode
6		✓	Program Mode
7	Switch for Intersection operational settings		
8	Switch for Intersection operational settings		

# SIGNALMASTER CONTROL FUNCTIONS WIRED TO GROUND FOR EXTERNAL CONTROL

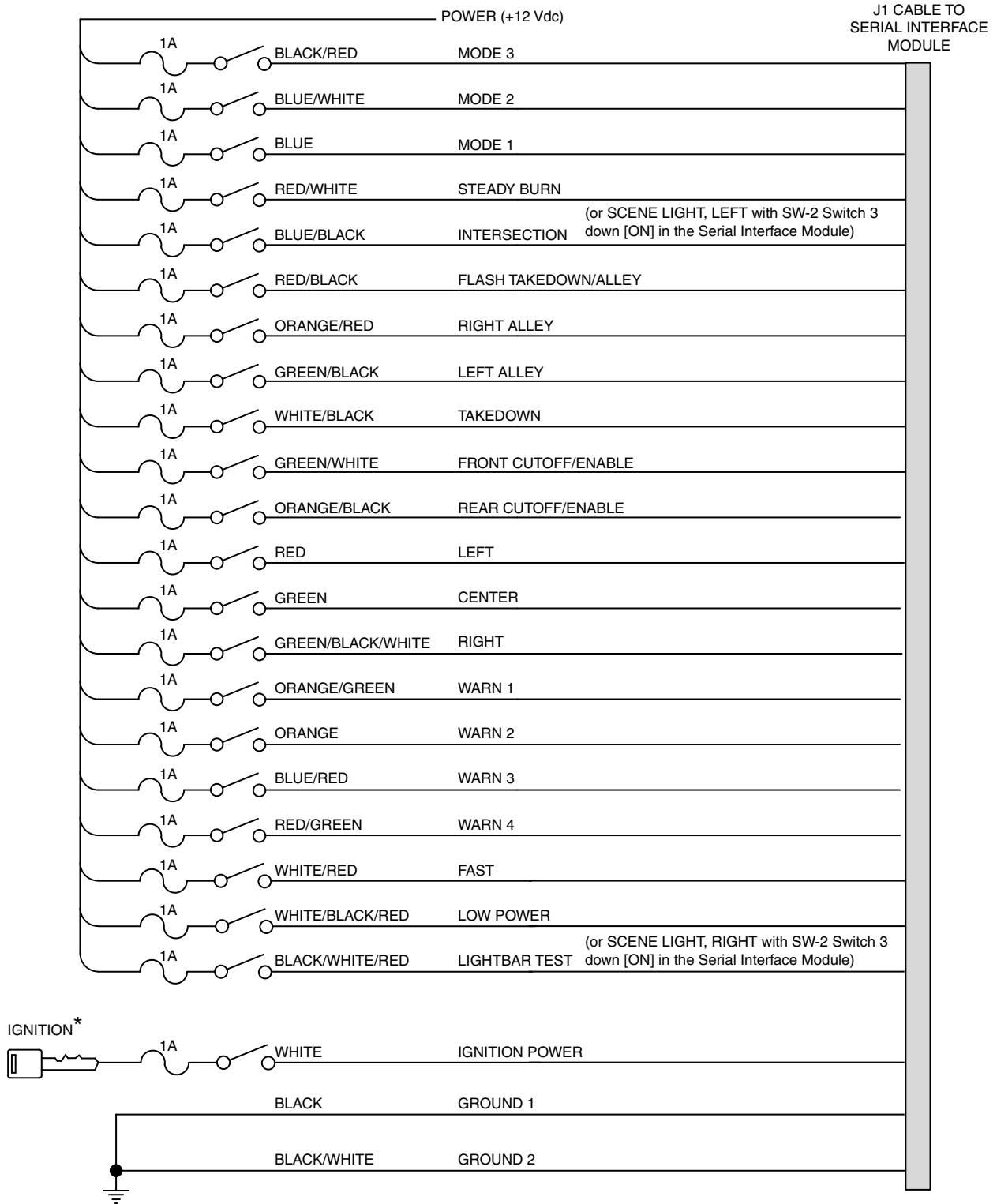


\* IGNITION POWER INCLUDES POWER IN THE CRANKING POSITION

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Figure 8.

SIGNALMASTER CONTROL FUNCTIONS WIRED TO 12 VDC FOR INTERNAL CONTROL



\* IGNITION POWER INCLUDES POWER IN THE CRANKING POSITION

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Figure 9.