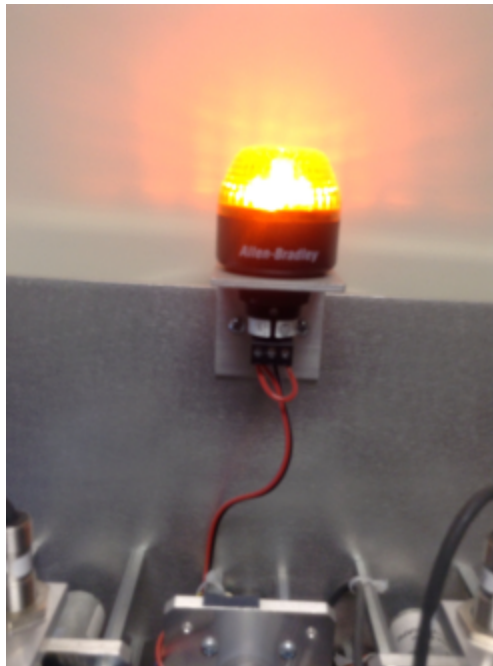


Status Light Quick Reference

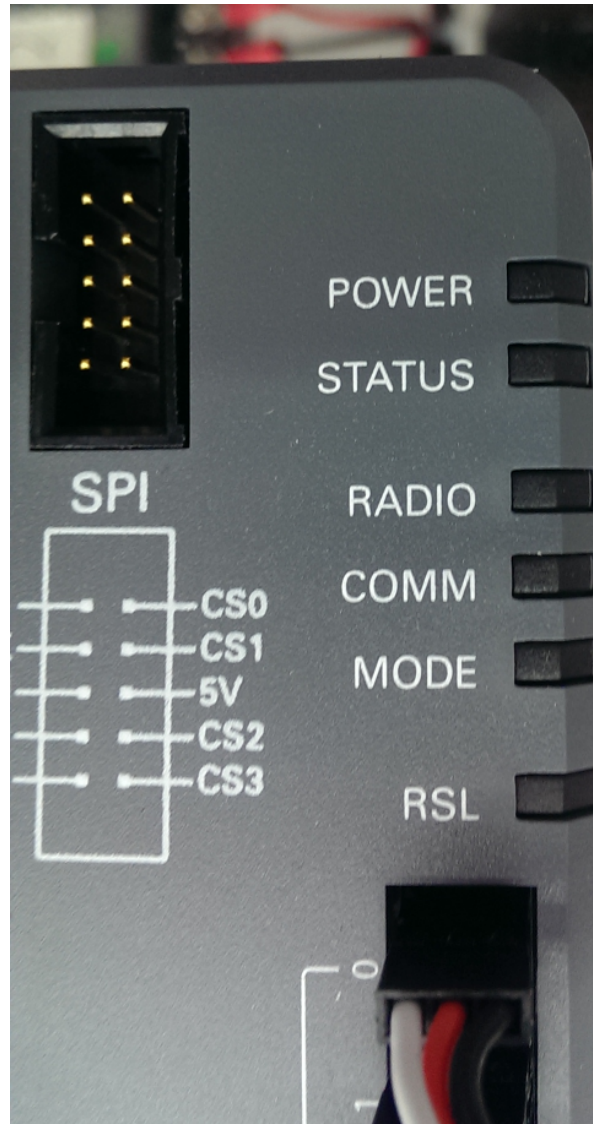
Many of the components of the FRC Control System have indicator lights that can be used to quickly diagnose problems with your robot. This guide shows each of the hardware components and describes the meaning of the indicators. Photos and information from Innovation FIRST and Cross the Road Electronics.

Robot Signal Light (RSL)



- Solid ON - Robot On and Disabled
- Blinking - Robot On and Enabled
- Off - Robot Off, roboRIO not powered or RSL not wired properly.

RoboRIO



Power

- Green - Power is good
- Amber - Brownout protection tripped, outputs disabled
- Red - Power fault, check user rails for short circuit

Status

- On while the controller is booting, then should turn off
- 2 blinks - Software error, reimage roboRIO
- 3 blinks - Safe Mode, restart roboRIO, reimage if not resolved
- 4 blinks - Software crashed twice without rebooting, reboot roboRIO, reimage if not resolved
- Constant flash or stays solid on - Unrecoverable error

Radio

Not currently implemented

Comm

- Off - No Communication
- Red Solid - Communication with DS, but no user code
- Red Blinking - E-stop
- Green Solid - Good communication with DS

Mode

- Off - Outputs disabled (robot in Disabled, brown-out, etc.)
- Amber/Orange - Autonomous Enabled
- Green - Teleop Enabled
- Red - Test Enabled

RSL

See above

Power Distribution Panel



LED Fault Table

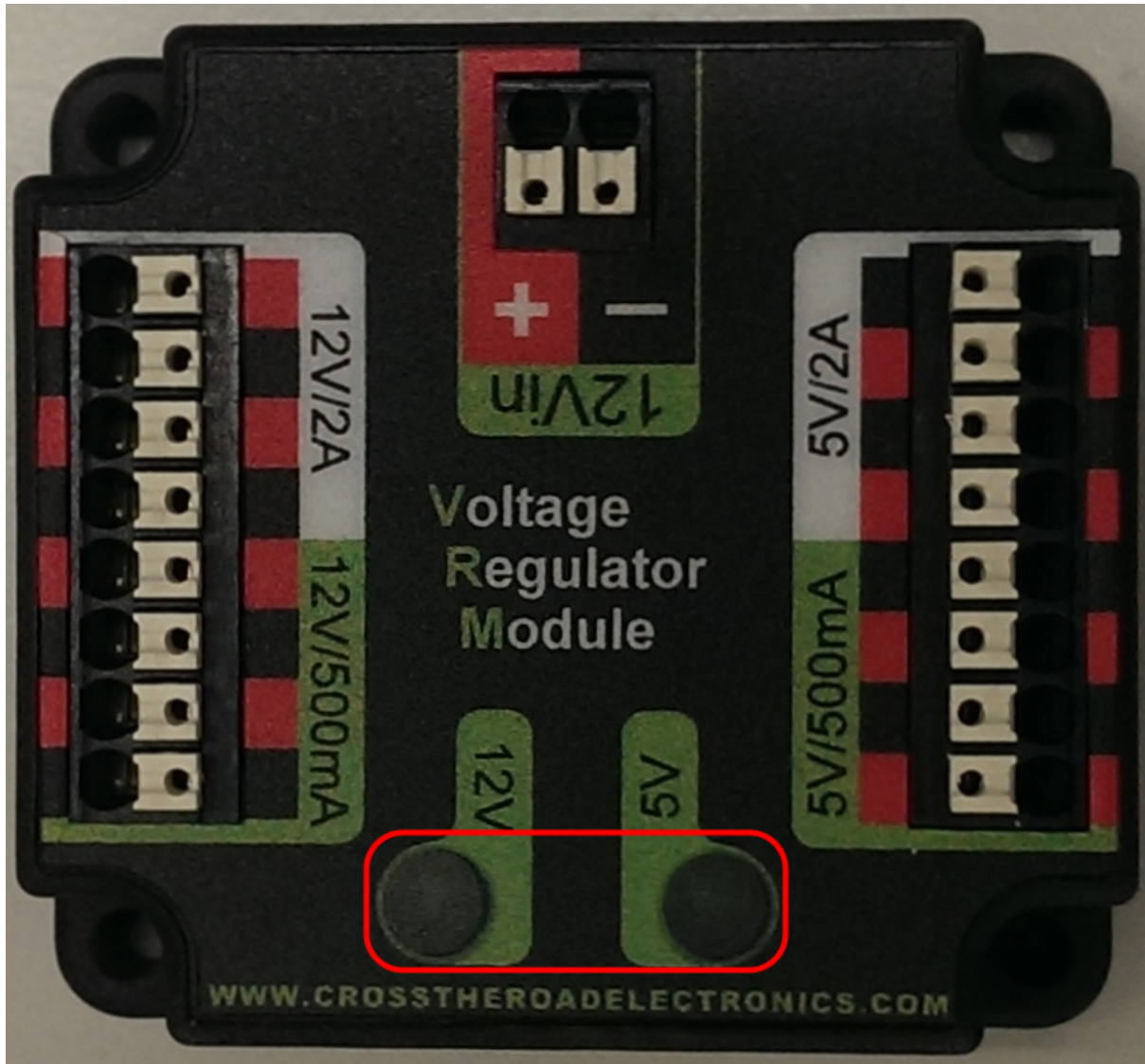
| LED | Strobe | Slow | Long |
|--------|--------------------------|---------------------------|------|
| Green | No Fault - Robot Enabled | No Fault - Robot Disabled | NA |
| Orange | NA | Sticky Fault | NA |
| Red | NA | No CAN Comm | NA |

*If PCM LED contains more than one color, see LED Special States Table

LED Special States Table

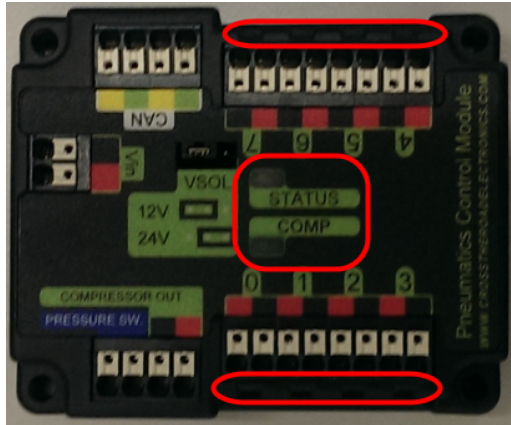
| LED Colors | Problem |
|------------------|-------------------------------|
| Red/ Orange | Damaged Hardware |
| Green/ Orange | In Bootloader |
| No LED | No Power / Incorrect Polarity |

Voltage Regulator Module



The status LEDs on the VRM indicate the state of the two power supplies. If the supply is functioning properly the LED should be lit bright green. If the LED is not lit or is dim, the output may be shorted or drawing too much current.

Pneumatics Control Module



LED Fault Table

| LED | Strobe | Slow | Long |
|--------|--------------------------|--|------------------|
| Green | No Fault - Robot Enabled | No Fault - Robot Disabled | NA |
| Orange | NA | Sticky Fault | NA |
| Red | NA | No CAN Comm OR Solenoid Fault (Blinks Solenoid Index) | Compressor Fault |

*If PCM LED contains more than one color, see LED Special States Table

LED Special States Table

| LED Colors | Problem |
|------------------|-------------------------------|
| Red/ Orange | Damaged Hardware |
| Green/ Orange | In Bootloader |
| No LED | No Power / Incorrect Polarity |

Solenoid Channel LEDs - These LEDs are lit red if the Solenoid channel is enabled and not lit if it is disabled.

Comp - This is the Compressor LED. This LED is green when the compressor output is active (compressor is currently on) and off when the compressor output is not active.

Status - The status LED indicates device status as indicated by the two tables above. For more information on resolving PCM faults see the PCM User Manual. Note that the No CAN Comm fault will

not occur only if the device cannot see communicate with any other device, if the PCM and PDP can communicate with each other, but not the roboRIO you will NOT see a No Can Comm fault.

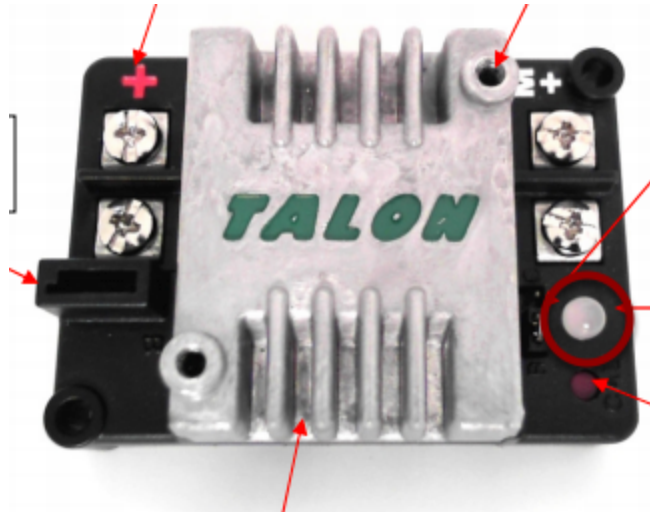
Jaguar speed controllers



| LED State | Module Status |
|------------------------------------|---|
| Normal Operating Conditions | |
| Solid Yellow | Neutral (speed set to 0) |
| Fast Flashing Green | Forward |
| Fast Flashing Red | Reverse |
| Solid Green | Full-speed forward |
| Solid Red | Full-speed reverse |
| Fault Conditions | |
| Slow Flashing Yellow | Loss of servo or Network link |
| Fast Flashing Yellow | Invalid CAN ID |
| Slow Flashing Red | Voltage, Temperature, or Limit Switch fault condition |
| Slow Flashing Red and Yellow | Current fault condition |

| LED State | Module Status |
|--------------------------------|--|
| Calibration Conditions | |
| Fast Flashing Red and Green | Calibration mode active |
| Fast Flashing Red and Yellow | Calibration mode failure |
| Slow Flashing Green and Yellow | Calibration mode success |
| Slow Flashing Red and Green | Calibration mode reset to factory default settings success |
| Other Conditions | |
| Slow Flashing Green | Waiting in CAN Assignment mode |

Talon speed controllers



The LED is used to indicate the direction and percentage of throttle and state of calibration. The LED may be one of three colors; red, orange or green. A solid green LED indicates positive output voltage equal to the input voltage of the Talon. A solid Red LED indicates an output voltage that is equal to the input voltage multiplied by -1(input voltage = 12 volts, output equals -12 volts). The LED will blink it's corresponding color for any throttle less than 100% (red indicates negative polarity, green indicates positive). The rate at which the led blinks is proportional to the percent throttle. The faster the LED blinks the closer the output is to 100% in either polarity.

The LED will blink orange any time the Talon is in the disabled state. This will happen if the PWM input signal is lost, or in FRC, when the robot is disabled. If the Talon is in the enabled state and the throttle is within the 4% dead band, the LED will remain solid orange.

Flashing Red/Green indicate ready for calibration. Several green flashes indicates successful calibration, and red several times indicates unsuccessful calibration.

Victor speed controllers



LED Indicator Status:

Green - full forward

Orange - neutral / brake

Red - full reverse

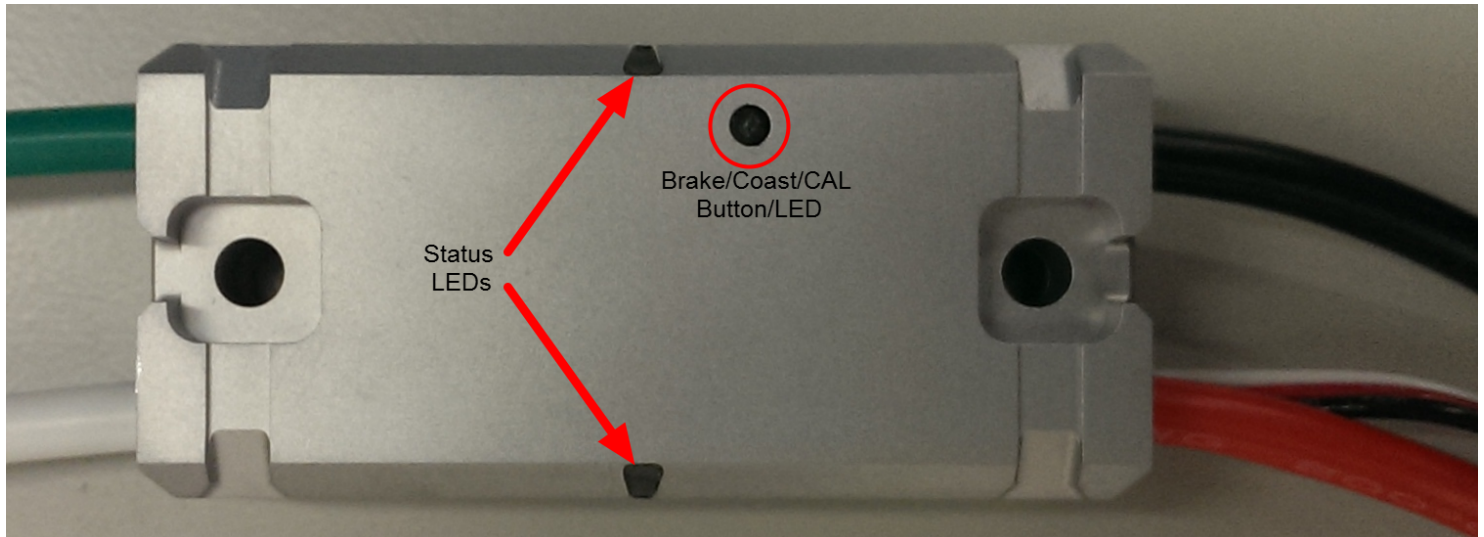
Flashing orange - no PWM signal

Flashing red/green - calibration mode

Flashing green - successful calibration

Flashing red - unsuccessful calibration

Victor-SP speed controllers



Brake/Coast/Cal Button/LED - Red if the controller is in brake mode, off if the controller is in coast mode

Status

The Status LEDs are used to indicate the direction and percentage of throttle and state of calibration. The LEDs may be one of three colors; red, orange or green. Solid green LEDs indicate positive output voltage equal to the input voltage of the Victor-SP. Solid Red LEDs indicate an output voltage that is equal to the input voltage multiplied by -1(input voltage = 12 volts, output equals -12 volts). The LEDs will blink in the corresponding color for any throttle less than 100% (red indicates negative polarity, green indicates positive). The rate at which the LEDs blink is proportional to the percent throttle. The faster the LEDs blink the closer the output is to 100% in either polarity.

The LEDs will blink orange any time the Victor-SP is in the disabled state. This will happen if the PWM input signal is lost, or in FRC, when the robot is disabled. If the Victor-SP is in the enabled state and the throttle is within the 4% dead band, the LED will remain solid orange.

Flashing Red/Green indicate ready for calibration. Several green flashes indicates successful calibration, and red several times indicates unsuccessful calibration.

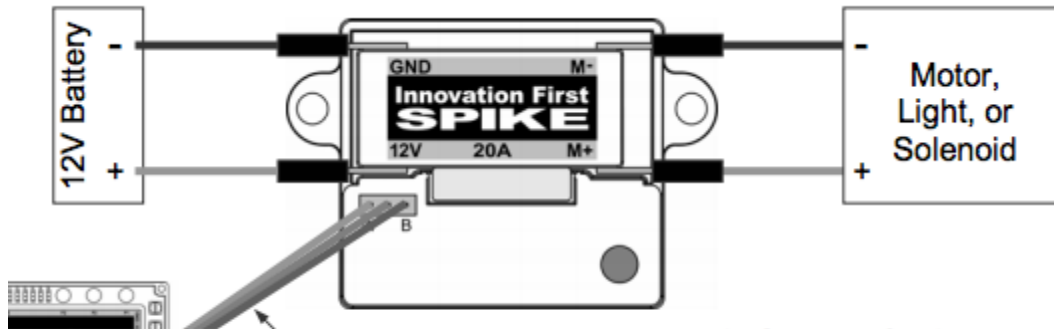
Talon-SRX speed controllers

| Blink Codes During Calibration | |
|--------------------------------|------------------------|
| Status LEDs Blink Code | Talon SRX State |
| Flashing Red/Green | Calibration Mode |
| Blinking Green | Successful Calibration |
| Blinking Red | Failed Calibration |

| Blink Codes During Normal Operation | | |
|--|----------------|--|
| LEDs | Colors | Talon SRX State |
| Both | Blinking Green | Forward throttle is applied. Blink rate is proportional to Duty Cycle |
| Both | Blinking Red | Reverse throttle is applied. Blink rate is proportional to Duty Cycle |
| None | None | No Power is being applied to Talon SRX |
| LEDs Alternate ¹ | Off/Orange | CAN bus detected, robot disabled |
| LEDs Alternate ¹ | Off/Slow Red | CAN bus/PWM is not detected |
| LEDs Alternate ¹ | Off/Fast Red | Fault Detected |
| LEDs Alternate ¹ | Red/Orange | Damaged Hardware |
| LEDs Strobe "towards" (M+) ² | Off/Red | Forward Limit Switch or Forward Soft Limit |
| LEDs Strobe "towards" (M-) ² | Off/Red | Reverse Limit Switch or Reverse Soft Limit |
| LED1 Only "closest" to M+/V+ | Green/Orange | In Boot-loader |

| B/C CAL Blink Codes | |
|----------------------|-----------------|
| B/C CAL Button Color | Talon SRX State |
| Solid Red | Brake Mode |
| Off | Coast Mode |

Spike relay configured as a motor, light, or solenoid switch

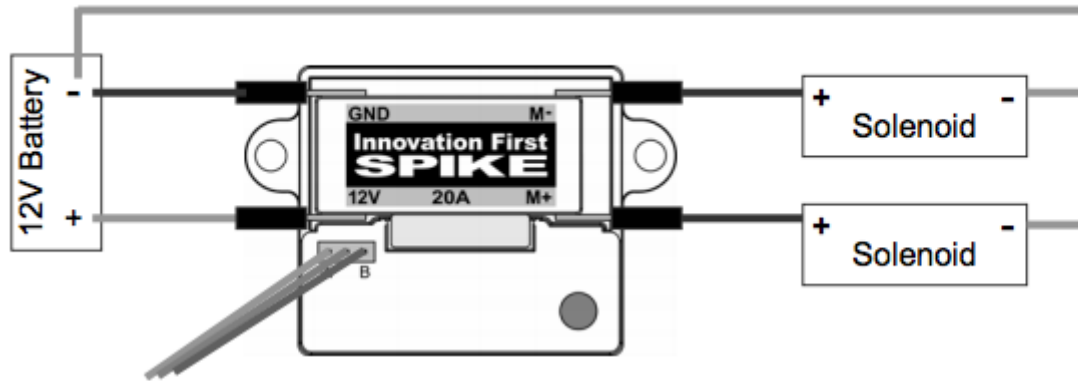


| INPUTS | | OUTPUTS | | Indicator | Motor Function |
|---------|----------|---------|------|-----------|-------------------------------------|
| Fwd(Wh) | Rev(Red) | M+ | M- | | |
| 0 | 0 | GND | GND | Orange | OFF / Brake Condition (default) |
| 1 | 0 | +12v | GND | Green | Motor rotates in one direction |
| 0 | 1 | GND | +12v | Red | Motor rotates in opposite direction |
| 1 | 1 | +12v | +12v | Off | OFF / Brake Condition |

Notes:

1. 'Brake' refers to the dynamic stopping of the motor due to the shorting of the motor inputs. This condition is not optional when going to an off state.
2. The INPUT Fwd and Rev are defined as follows: 0 (Off) and 1 (On).

Spike relay configured as for one or two solenoids



| INPUT | | OUTPUTS | | | |
|---------|----------|---------|------|-----------|--------------------------------|
| Fwd(Wh) | Rev(Red) | M+ | M- | Indicator | Solenoid Function |
| 0 | 0 | GND | GND | Orange | Both Solenoids OFF (default) |
| 1 | 0 | +12v | GND | Green | Solenoid connected to M+ is ON |
| 0 | 1 | GND | +12v | Red | Solenoid connected to M- is ON |
| 1 | 1 | +12v | +12v | Off | Both Solenoids ON |

Note:

1. The INPUT Fwd and Rev are defined as follows: 0 (Off) and 1 (On).