

Communication

**Robot Signal Light**  
855PB-B12ME522 shown

RSL Wire 18 AWG Typical  
22 AWG Minimum

**Robot Radio**  
VH-109

**Downstream Power over Ethernet (PoE)**

Disabled by default. Please check DIP Switches 1 and 2 to verify unless you want to have them on.

If enabled. Devices must support PoE at the supply voltage provided to the radio.

Otherwise damage will occur to them.

Radio Power Minimum 22 AWG

Ethernet Cable

Connection to the RoboRIO connected to the port labeled "RIO"

Please refer to the latest Game Manual for specific rules on how to power this radio.

**Spark MAX**  
Brushless/Brushed, CAN/PWM

**Talon SRX**  
Brushed Only, CAN/PWM

Motor and Motor Controller Wires on 31-40A Breakers must be 12 AWG or larger

**Koors 40**  
Brushed Only, PWM Only

**Discrete Motor Controllers**  
(CAN/PWM Controlled)

The CTRE System was the original complement to the new, RoboRIO-based control system debuted in 2015. It was superseded by the newer REV System in 2022.

The original CTRE complement however are still legal and available for use in FRC, and how it is wired against other FRC components is shown in this diagram.

**Power Distribution Panel**

This CAN Bus is configured to end on the PDP (TERM RES set to "ON").

**120A Breaker**  
CB285-120 shown

**12V Battery**  
Refer to latest Game Manual for specific rules and examples

**Main Power**

**Neo Vortex (Spark FLEX)**  
Modular Brushless, CAN/PWM

**Kraken X44 (Talon FX)**  
Integrated Brushless, CAN/PWM

**Kraken X60 (Talon FX)**  
Integrated Brushless, CAN/PWM

**Integrated/Modular Motor Controllers**  
(CAN/PWM Controlled)

CAN wires should be a twisted pair with a twist per 1 inch or denser.

18 AWG Typical, must be 22 AWG or larger on a 10A Fuse

The main robot CAN loop must start with the RoboRIO.

The use of the discrete I2C/PC port may induce system lockups. Please refer to WPILib docs for possible workarounds.

DIO Wiring Minimum 28 AWG Typical 22 AWG

**USB Camera**  
C270 Shown

**Servo**  
Generic shown

**LED Strip**  
Generic WS2812B shown

**PWM Control**

**Solenoid Valve**  
SMC SY3240-6LZ shown

**Pressure Sensor**  
am-2006 shown

**On-board Compressor**  
Refer to latest Game Manual for specific rules

**Pneumatics Control Module**

**Limit Switch**  
Generic Switch shown

**IR Break**  
2168 Sensor shown

**Analog Encoder**  
TTB-0040 shown

**Potentiometer**  
Generic shown

**Digital Input/Output**

**Analog Input**

**Pneumatic Systems**

**FRC CONTROL SYSTEM - CTRE**

V3.21.CR

TEAM 3161



**Power**

12V DC Main



**PWM**

26 AWG Minimum



**CAN**

28 AWG Minimum



**Wires**

American Wire Gauge (AWG)

Minimum Gauge per connection type shown.



Always practice proper safety precautions and practices when working with electrical systems.

More Information about the FRC Control System can be found at <https://docs.wpilib.org>

**KEEP IN MIND**