

Resources/Reference

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Resources you can use if needed

- [Resources](#)
- [The Most Important Pieces of Electrical Documentation](#)
- [Commonly Ordered Electrical Parts for Reference](#)
- [FRC Wire Gauge Easy Reference](#)
- [Status Lights](#)

Resources

Resources/References:

<https://www.chiefdelphi.com/t/zebrapower-2-0-the-zebracornss-battery-paper-update/440093> (Team 900's Battery Paper)

<https://docs.wpilib.org/en/stable/docs/hardware/hardware-basics/robot-battery.html>

<https://frcteam3255.github.io/Wiki/Electrical/Wiring%20Cheat%20Sheet/>

[How to Wire an FRC Robot — FIRST Robotics Competition documentation](#)

[2025 FRC Electrical System.pptx](#)

[FRC Pneumatic System Diagram - Control System - Chief Delphi](#)

[Talons FX](#)

[Phoenix Tuner X](#)

[Installing Phoenix 6 \(FRC\)](#)

[LED Status Indications | FIRST FRC Radio](#)

[Robot Power Delivery - Shane Trent - FRC#4561 - Houston 2025](#)

The Most Important Pieces of Electrical Documentation

As new FRC controls system hardware comes out (i.e. Systemcore), these pieces of Electrical Documentation may be subject to minor change.

However, these are pieces of information that I find essential and important for the Electrical Subteam to know.

Hardware Electrical (Drive of Citrus Circuits Electrical Practices)

Managing the FRC Controls System

Status Light Quick Reference — FIRST Robotics Competition documentation

How to wire a robot

And Finally, the most important piece of documentation:

Wiring Pattern language

Commonly Ordered Electrical Parts for Reference

COMMONLY ORDERED PARTS

DESCRIPTION	PART NUMBER
SB50 HOUSING RED	992G1-BK
SB50 CONTACT 6AWG	5900-BK
POWERPOLE HOUSING RED	1327G6
POWERPOLE HOUSING BLACK	1327
POWERPOLE CONTACT 10-14 AWG	261G3 or 261G2-LPBK
POWERPOLE CONTACT 12-16 AWG	1331-BK
POWERPOLE CONTACT 16-20 AWG	262G2 or 1332-BK
POWERPOLE RETENTION CLIP	110G68 or PCLIP
#6 RING TERMINAL WITH INSULATION CRIMP, 10-12 AWG	61424-1
#6 RING TERMINAL 10-12 AWG	2-35476-1
#4 RING TERMINAL WITH INSULATION CRIMP 16-20 AWG (FITS 2X 22AWG)	61386-1
JACKETED CAN	WCP-1153
MOLEX SL TPA	738380002
MOLEX SL FEMALE 2 PIN HOUSING	0050579702
MOLEX SL MALE 2 PIN HOUSING	0701075002
MOLEX SL FEMALE CONTACT GOLD	0016020088
MOLEX SL MALE CONTACT GOLD	0016020116



FRC Wire Gauge Easy Reference

FRC LEGAL WIRE GAUGE	
APPLICATION	MINIMUM AWG
40A BREAKER CIRCUIT	12 AWG
30A BREAKER CIRCUIT	14 AWG
20A BREAKER CIRCUIT	18 AWG
20A FUSE CIRCUIT	
10A FUSE CIRCUIT	22 AWG
5A BREAKER CIRCUIT	
ROBORIO	
VRM IN	
VRM 2A OUT	24 AWG
SIGNAL	28 AWG

Status Lights

Be sure to also look up status lights online and read the specific component documentation.

Pigeon 2.0 CTRR



Red Alternate	No CAN/PWM
Orange Alternate	CAN Detected, Phoenix Not Running on Robot
Orange Blink	Robot Disabled
Green Alternate	Robot Enabled
Red + Orange	Damaged Hardware
Green + Orange	In Bootloader

SPARK MAX + FLEX REV



Red Blink	Motor Running in Reverse
Red	Motor Running in Reverse at Full Power
Red + White	Reverse Limit
Green	Motor Running Forwards
Green	Motor Running Forwards at Full Power
Green + White	Forward Limit
Orange + Blue	Running on USB Power, Motor Will Not Run Without 12V
Orange + Magenta	Sensor Fault - Fix Cable, Plug Cable In, or Repair Sensor
Orange + Cyan	Gate Driver Fault
Orange + Yellow	CAN Fault
Magenta + White	Device Identify
Yellow + White	CAN Bootloader Firmware Updating
Blue + White	CAN Bootloader Firmware Retry
Off	Off: Firmware Update Corrupt Firmware Recovery Mode

Brushless

Magenta	Coast Mode, Valid Signal	Yellow	Coast Mode, Valid Signal
Magenta Blink	Coast Mode, No Signal	Yellow Blink	Coast Mode, No Signal
Cyan	Brake Mode, Valid Signal	Blue	Brake Mode, Valid Signal
Cyan Blink	Brake Mode, No Signal	Blue Blink	Brake Mode, No Signal

Radio VH-109



Use VH Network Assistant tool for remote connection

2.4GHz Connection is very unstable. Use 6GHz

Red Light Blink on Connection

Green	Powered
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System Status

Green	Able to Ping the Field
Green Slow Blink	Unable to Ping the Field
Green Blink	Firmware being flashed
Green Strobe	Performing First Boot

2.4 GHZ

Green	Wifi Available
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6 GHZ

Blue	6GHZ Connection Mode
Blue Blink	Battery Detected, Wireless Disabled

CANcoder CTRR



Red Blink	No CAN
Red Strobe (dim)	No CAN, Magnet Out of Range
Orange Strobe (dim)	No CAN, Magnet in Reduced Accuracy Range
Green Strobe (dim)	No CAN, Magnet in Range
Red Strobe	CAN Detected, Magnet Out of Range
Orange Strobe	CAN Detected, Magnet in Reduced Accuracy Range
Green Strobe	CAN Detected, Magnet in Range
Red + Orange	Damaged Hardware
Green + Orange	In Bootloader

Robot Signal Light



Orange	Robot Disabled
Orange Blink	Robot Enabled

RoboRio 2.0 NI



Green	Powered
Orange	Brownout Protection
Red	Power Fault: Check Rails for Short Circuit

Mode

Green	"sleep" Enabled
Orange	Autonomous Enabled
Red	Test Enabled
Off	Robot Disabled

Comm

Green	Communicating
Red Blink	Emergency Stopped
Red	Communicating, No User Code
Off	No Communications

Status (on during boot)

2 Blinks	Software Error, Reimage Ric
3 Blinks	Safe Mode, Restart R's, Reimage if not Resolved
4 Blinks	Software Crashed Twice, Reboot, Reimage if not Fixed
Blink / Solid	Troubleshoot, Unrecoverable Error

PDP + PCM CTRR



Green Strobe	Robot Enabled
Green Blink	Robot Disabled
Orange Blink	Sticky Fault
Red Blink	No CAN or Solenoid Fault
Red + Orange	Damaged Hardware
Green + Orange	In Bootloader
Red Slow Blink	Compressor Fault

CANivore CTRR



Stat

Red Double Blink	12V Powered, No Lsb
Red Strobe	12V Powered, No Lsb
Orange Strobe	12V Powered, CAN Streaming is Disabled
Green Strobe	12V Powered, No CAN Streaming is Enabled
Green + Orange	In Bootloader
Red + Orange	Hardware Fault

CAN

Red	Not enough voltage for CAN network
Red Strobe	No CAN Communication, Terminations enabled
Orange Strobe	Legacy CAN 2.0B Mode, Terminations enabled
Green Strobe	CAN FD Active, Terminations enabled

PDR + PH REV



Blue	No Communication
Green	Communication Established
Cyan	Connected to REV Hardware Client
Magenta Blink	Keep Alive Timeout
Orange + Yellow	CAN Fault
Orange + Magenta	Device Over Current
Orange + Cyan	Hardware Fault
PH Orange + Green	Compressor Over Current
PDH Orange + Blue	Low Battery

PDH Switched Channels

Off	Channel has NO Voltage and is Operating as Expected
Red	Channel has NO Voltage and has an Active Fault
Red Blink	Sticky Fault, Check for Tripped Breaker

Status Lights Reference

A reference table for common led codes on common frc devices.

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NOVA Thrifty



Red Alternate	Fatal Fault
Blue Strobe	Encoder not Connected or Trapped
Yellow Alternate	Enabled, Idle
Yellow Blink	No CAN Data detected
Yellow	CAN Detected but No Control Frames
Green Blink	Motor Running Forwards
Red Blink	Motor Running in Reverse
Orange Strobe	Approaching Thermal Limit
Orange Blink	Motor Reached Thermal Limit

Talen FX / FXS CTRR



Red Alternate	No CAN/PWM
Orange Alternate	CAN Detected, Phoenix Not Running on Robot
Orange Blink	Robot Disabled
Orange	Idle
Red Blink	Motor Running in Reverse
Green Blink	Motor Running Forwards
Red Offset	Limited Operation Determined Forward Or Reverse
Orange Offset	Thermal Cutoff
Red + Green	Pro feature enabled on unlicensed hardware
Red + Orange	Damaged Hardware
Green + Orange	In Bootloader