Team 246
Electronics & Programming Manual
This is in order of how it should be needed; electronics first, programming stuff later.

**List of basic components on the electronics board**

1. Breaker
2. Power Distribution Board
3. cRIO
4. Jaguars/Victors
5. Digital Sidecar
6. Solenoids/Pneumatics

**General Notes:**
- The breaker gets wired into the red (+) leg of the battery connection
- The outside (+) connectors on the robot signal get connected to each other, then into the digital sidecar with the middle (-) connector. The signal light doesn’t get screwed into the aluminum. There is a plastic ring that uses the threads.
- The victor fans get connected to the voltage terminals (V+/-) on the victor
- Make sure not to wire Jaguars/Victors backwards. Sounds stupid, but it’s easy to do. Make sure V+/- go to 40A slots on the PD board, and M+/- go to the motors.

**Power Distribution Board**

- With the terminals of the power distribution board on top, the camera power connector is on the bottom right of the board, and the bridge power is on the left
- The nuts for the terminals on the PD board (and breaker) are M6 (10mm socket)
- The wireless adapter connector is a WAGO 734-102
Digital Sidecar

- The power input connector is a WAGO 734-102, going to a 20A slot on the PD board
- The signal light header is a 2-pin Molex P/N 22-23-2021
- Spikes get connected to “Relay Outputs”
- Digital sensors get connected to “GPIO” connections

cRIO Notes:

Yes, that IS correct. I’m sure.

The analog breakout board is necessary for battery voltage tracking. It is NOT optional.
cRIO Module Positions
Slot 1: 9201 (Analog Breakout connected to 20A slot on PD board with WAGO 734-102)
Slot 2: 9201 (optional)
Slot 3: Empty
Slot 4: 9403 (connected to Digital Sidecar connected to 20A slot on PD board)
Slot 5: Empty
Slot 6: 9403 (optional)
Slot 7: Empty
Slot 8: 9472 (Solenoid Breakout connected to 20A slot on PD board) (optional)

Connect the cRIO to the PD board, as shown in above diagram

Severe corruptions of the software or settings on the cRIO result in the device no longer functioning. If the cRIO is corrupted or if the IP Address is set incorrectly, the device boots only in safe mode, regardless of the safe mode switch position. When this occurs, switch the device into safe mode. The cRIO Imaging Tool offers to reformat the disk. After the disk has been reformatted, switch the cRIO out of safe mode, reboot, and run the cRIO Imaging Tool normally.

**Proper LED Status on Electronics**
1. On the Power Distribution Board, three green LEDs should be lit: +5V supply, +24V supply, and +12V supply
2. On the Digital Sidecar, three green LEDs should be lit: “Power Input,” +5V, and +6V
3. On the Analog Breakout, one green LED should be lit.
4. On the Solenoid Breakout, one green LED should be lit
5. The Jaguar LEDs should be flashing yellow.
6. Signal light:
   a. On, blinks every 1.5s: Enabled, teleoperated
   b. Slow Blink: Disabled; caused by watchdog, or disabled by driver’s station
   c. Fast Blink: No communication, cRIO Image, or team ID
   d. Solid on: Enabled, autonomous
   e. Fast-Slow Blink (200ms on / 900ms off): Disabled by low battery, no user code, watchdog, or driver’s station

**Solenoids & Pneumatics**
- Solenoids use 2-pin PWM-like wires. We get them in the kit of parts. They have grey insulation. Polarity doesn’t matter.
- When using teflon tape, just 1 wrap of it is all that is needed.
- A pneumatics circuit needs: a visible pressure gauge, then pressure tanks, with a release valve (with a white diffuser thing) attached to one of the tanks. The other leads to a regular valve set to 60psi, with a visible gauge attached to it. After that are the solenoids.
Programming
10.2.46.1 = Wireless bridge on robot
10.2.46.2 = cRIO
10.2.46.4 = Drivers station wireless router
10.2.46.5 = Drivers station netbook
10.2.46.6 = Programming laptop

Bridge
IP: 10.2.46.1
Username: admin
Password: admin
Wireless:
Network name: 246
802.11 band: 5GHz
10.2.11 mode: 802.11n only
Channel width: 20MHz
Network Settings:
IP address mode: static
Subnet mask: 255.0.0.0
Default gateway: 10.2.46.4

Router
IP: 10.2.46.4
Username: blank
Password: admin
Wireless
Network mode: Wireless-N only
Network name (SSID): 246
Radio band: standard 20MHz channel
SSID broadcast: enabled
Network mode: disabled
Basic Setup
Subnet mask: 255.255.255.0
URL address: http://WRT610N.com
DHCP server: enabled
Start IP address: 10

Computer (under IPv4 NOT v6)
IP: 10.2.46.6
Subnet mask: 255.0.0.0
Gateway: 10.2.46.4

Netbook
IP: 10.2.46.5
Subnet mask: 255.0.0.0
Gateway: 10.2.46.4