



RoboJackets
FIRST - IGVC - BATTLEBOTS - ROBOCUP

2008 TE Sessions Supported by
CATERPILLAR[®]



Rockwell
Automation



Kitbot Electrical Jan. 2, 2008

Phillip Marks with some pieces from Ken York, Team 476, Ed Latimer, Team 476, Ron Markum, Team 1750

www.robojackets.org



Overview

- During the next two and a half hours you will assemble and test the control system.
- During the first hour the layout and installation of the components and wiring on to the base plate should be completed.
- You should have the required components of the KOP and RQBS parts with you and ready to assemble.
- After completion, the electrical assembly will be taken to the frame area and mounted onto the robot chassis.



The Goal





The Real Goal



Parts You'll Need

- Crio
- Digital Side Card (DSC)
- Power Distribution Board (PD)
- (2) Jaguars
- Circuit Breaker (CB)
- Wifi Bridge and its wall wart
- CIM Motors
- (2) PWM Cable
- Battery Connectors
- Wiring Terminals and Connectors Kit



Tools

- **Safety Glasses, put them on now.**
- Wire strippers
- Wire cutters
- Wire crimpers
- Phillips screwdriver - #2
- Flat Screwdriver
- Supplied Wago flat screwdriver
- 7/16" combination wrench
- 3/8" combination wrench
- 10mm combination wrench
- Tape measure



Read Instructions

- Peruse sections 1-5 of the 2009 Control System Manual.
- Read section 2 carefully.
- Make all electrical connections and ensure CIM motors are secured and safe to operate before powering any part of the control system.
- Refer to the large 2009 FRC Control System layout included in the control system box.



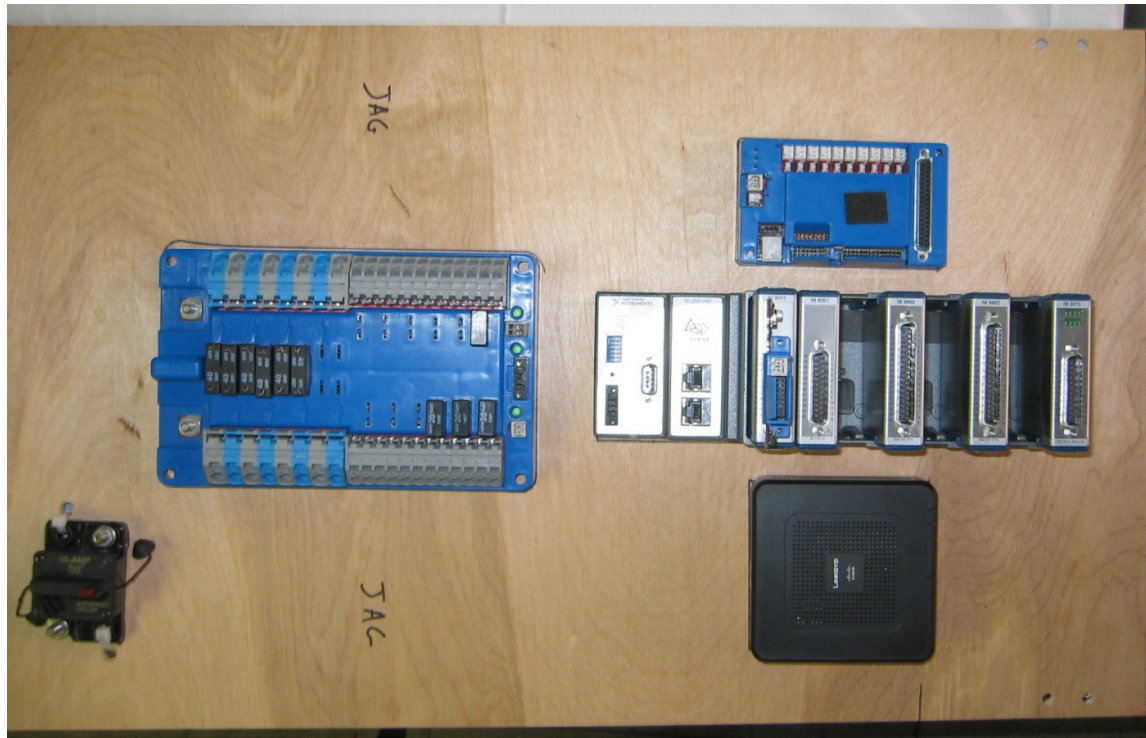
The Plan

- **Mount all the components using the velcro**
- **Connect the battery connector**
- **Connect up the Jaguars**
- **Then the digital side card**
- **Followed by the cRio**
- **The analog card**
- **And finally the wireless bridge**
- **At the same time you will install the software**
- **Driver station and bench test**



Layout

- **Layout the items as shown. Secure each with Velcro**



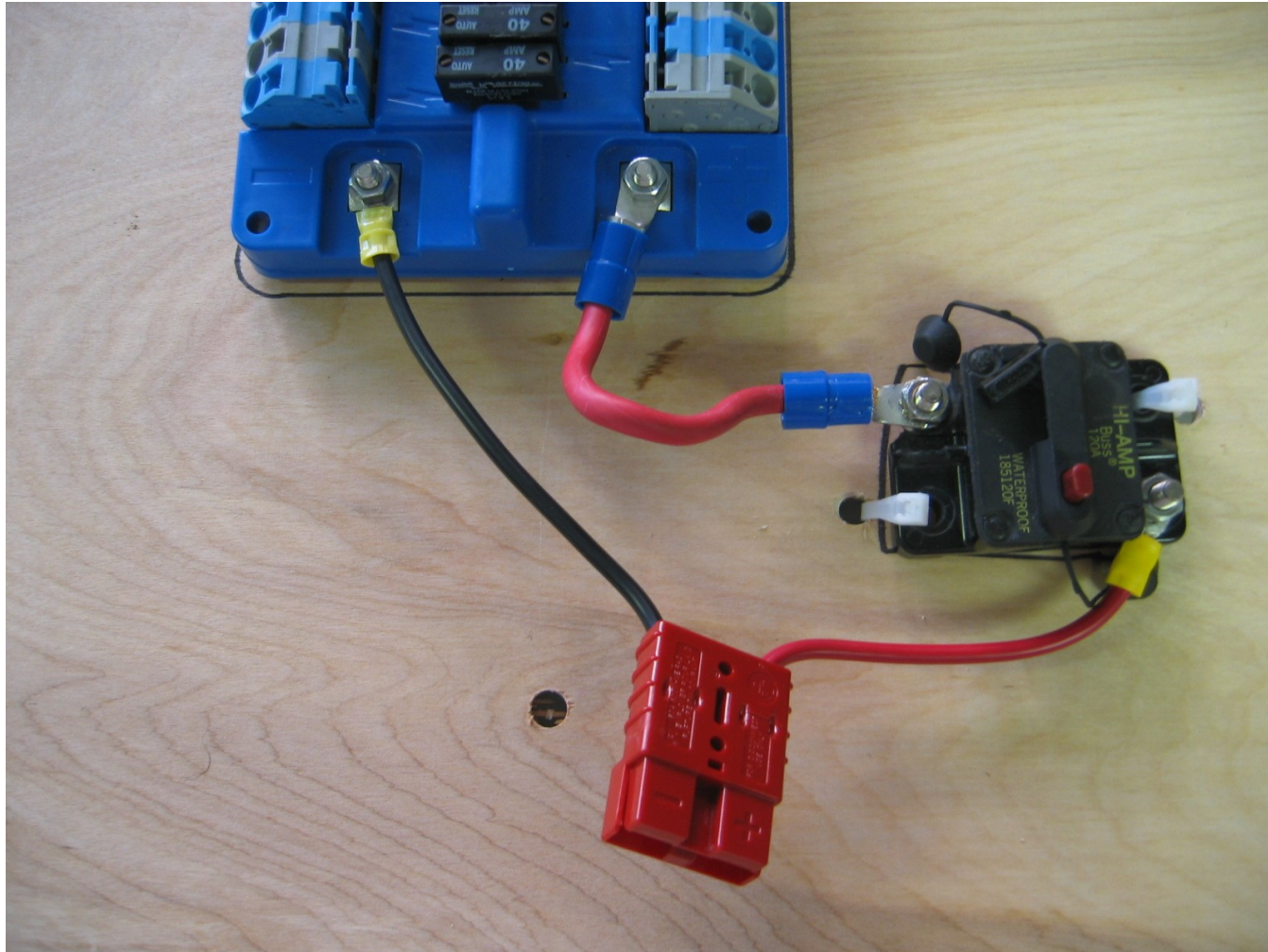


Battery Connector

- **Wire the large battery wires. The black wire is connected directly from the half connector to the PD (power Distribution) board.**
- **The red wire from the half connector is attached to the 120 amp circuit breaker and then on to the PD board.**
- **Note: the 120 amp breaker uses SAE threads while the PD board uses Metric threads. Do not swap the nuts!out the items as shown. Secure each with Velcro**



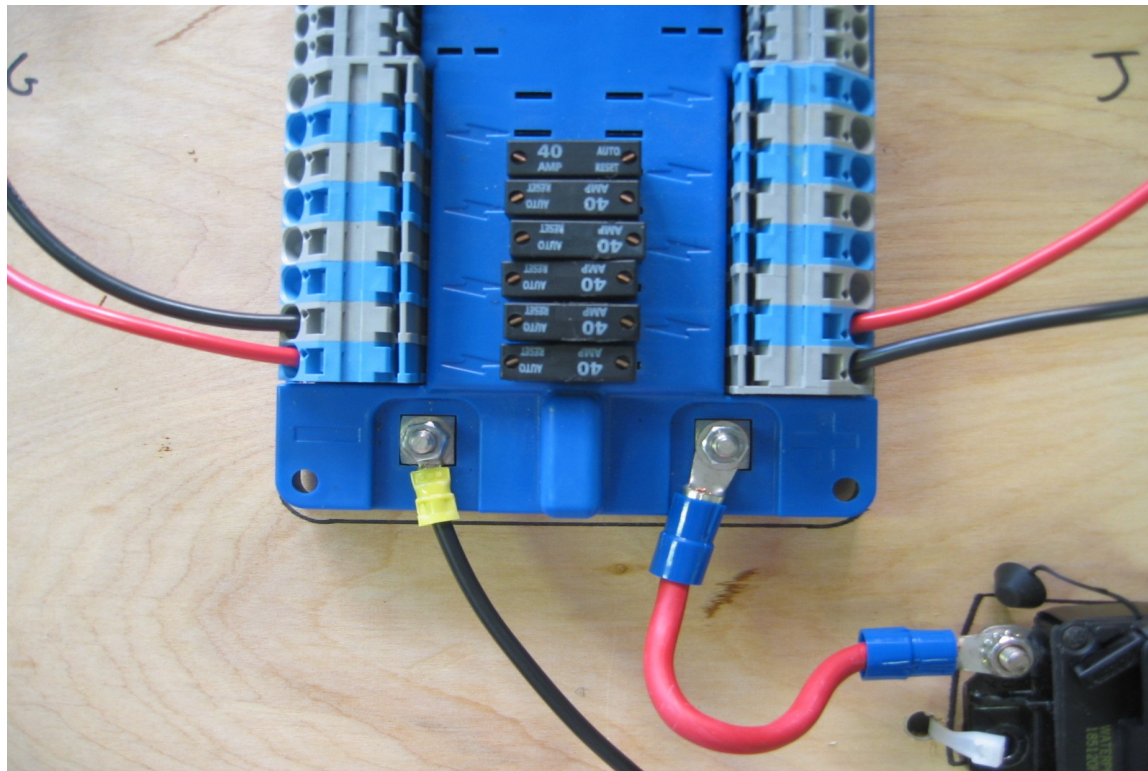
Battery Connector





Jaguars

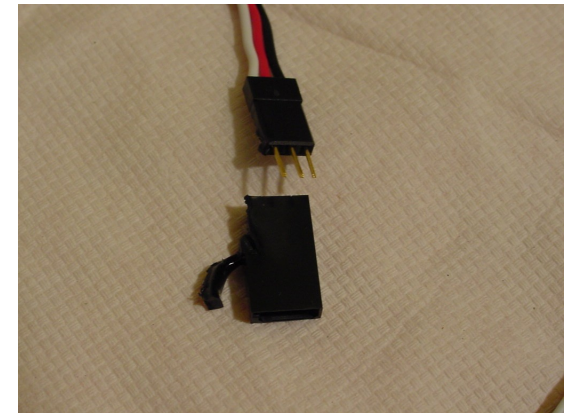
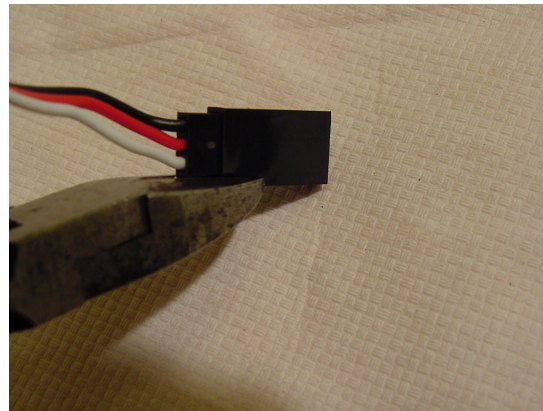
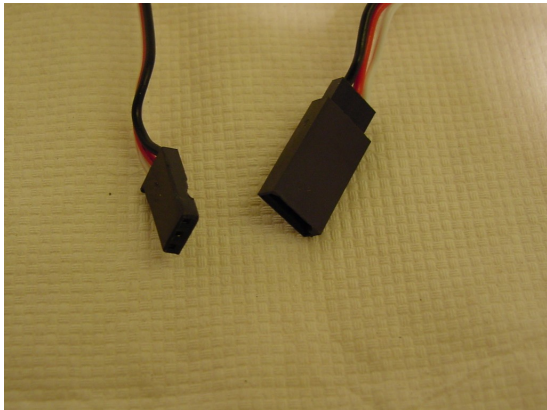
- **Connect the provided power wires to the power distribution block**





PWM Mod

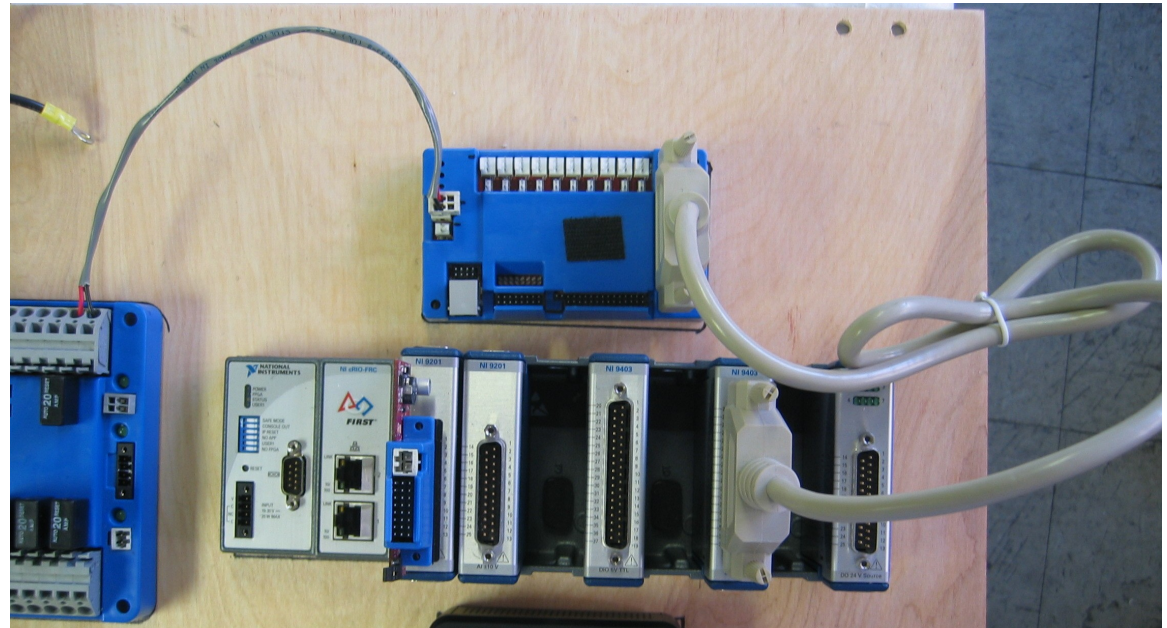
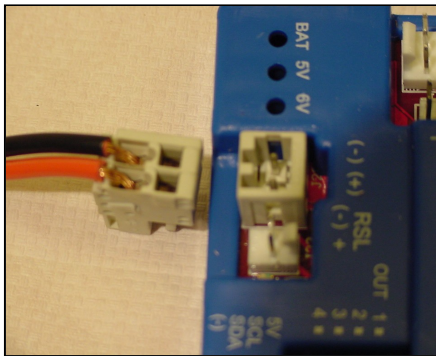
- **Prepare 2 PWM Wires.** The protective casing must be removed from one end.
- Refer to official PWM cable modification document.





Digital Side Card

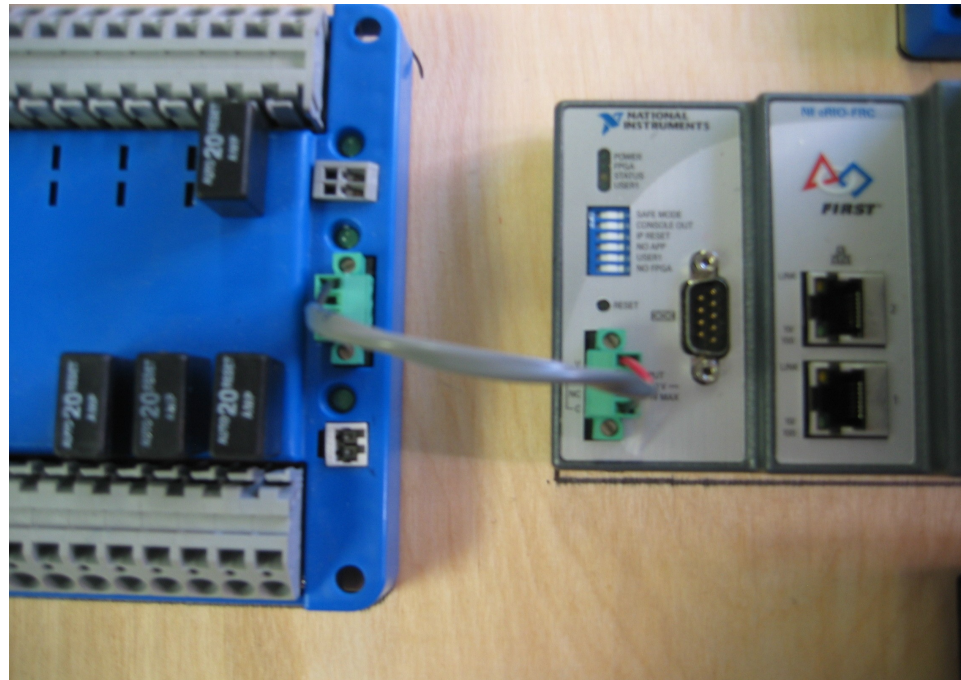
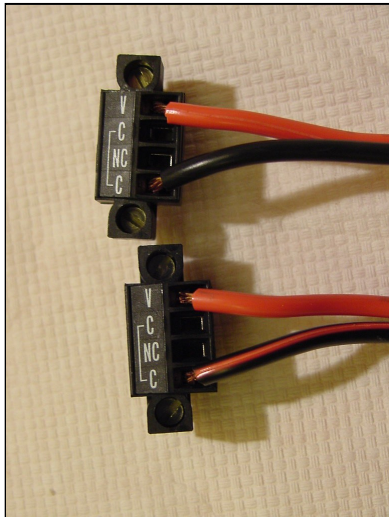
- Take the 18 AWG 2 conductor cable and attach a connector to one side
- Connect the other side to the PD





cRio

- **Wire up the other 18 AWG 2 conductor cable to both green 4-pos connectors and install**





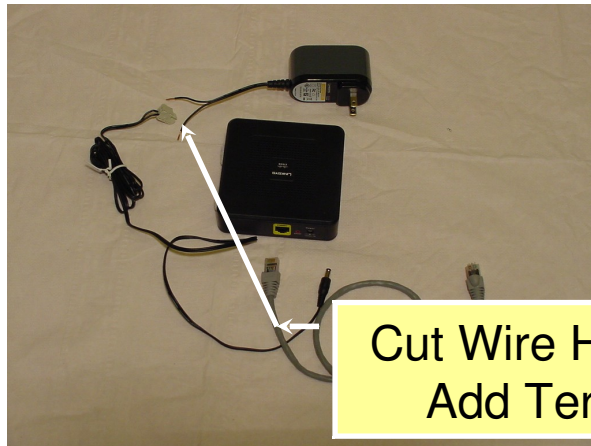
Analog Card

- **Wire up the 22 AWG 2 conductor cable to analog card**
- **Be sure to add the jumper or you can't read battery voltage**

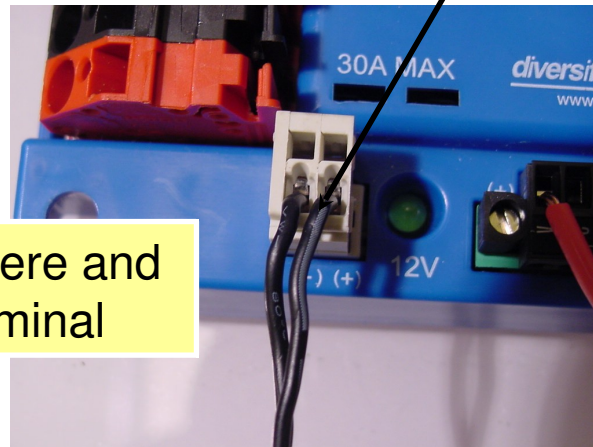


Wireless Bridge

- **Modify the wall wart by cutting its wire**
- **Then connect to power distribution block**



Cut Wire Here and Add Terminal



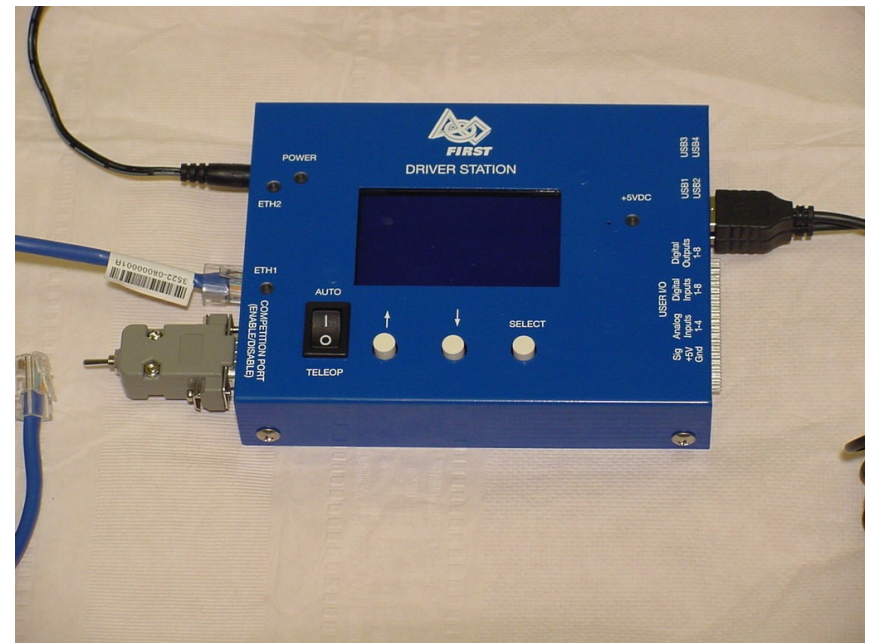
Black w/ white stripe





Driver Station

- **Connect the DS as shown below. Joysticks plug into USB 1 & 2.**





Bench Test

- **You are now ready to proceed with section 2.2.4 of the 2009 FRC control system manual.**
- Test the DS as per section 2.2.4
- Test tethered operation as per section 2.3. You will not have motors at this point but can watch the lights on the Jaguar controllers to verify operation.
- **You should be joined at this point by members of the programming team with the laptop.**
- After successful tethered test ready to install on mechanical base



DON'T PANIC!