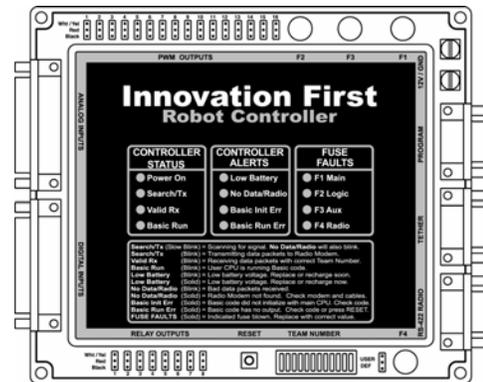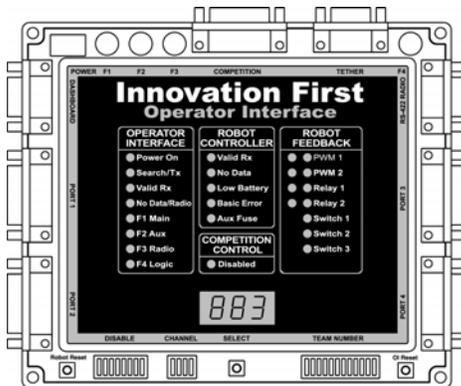# Innovation First, Inc.

Full-Size Control System Quick Start Guide

For the OI and Full-Size RC

Table of Contents

1.   System Overview

The heart of the Innovation First Control System is an Operator Interface and a Full-Size Robot Controller. The Operator Interface takes inputs from the human operator(s) and passes it to the Robot Controller. The Robot Controller takes this information, gathers additional information from sensors on-board the robot, determines how the robot should function, and controls the robot to perform the functions. The Robot Controller also sends data back to the Operator Interface, giving the human operator(s) feedback of critical information.

The Operator Interface used with the Isaac16 EDU Robot Controller is the same as the Operator Interface used with the Full-Size Robot Controller.

The Innovation First control system uses a unique "Team Number" identification to ensure safe and reliable human to robot communication. Users enter their team number via dipswitches on both the Operator Interface and the Robot Controller. Both units use this number as a unique identifier, ensuring that all communications received are actually "theirs".   Section 4 describes how to set the Team Number.
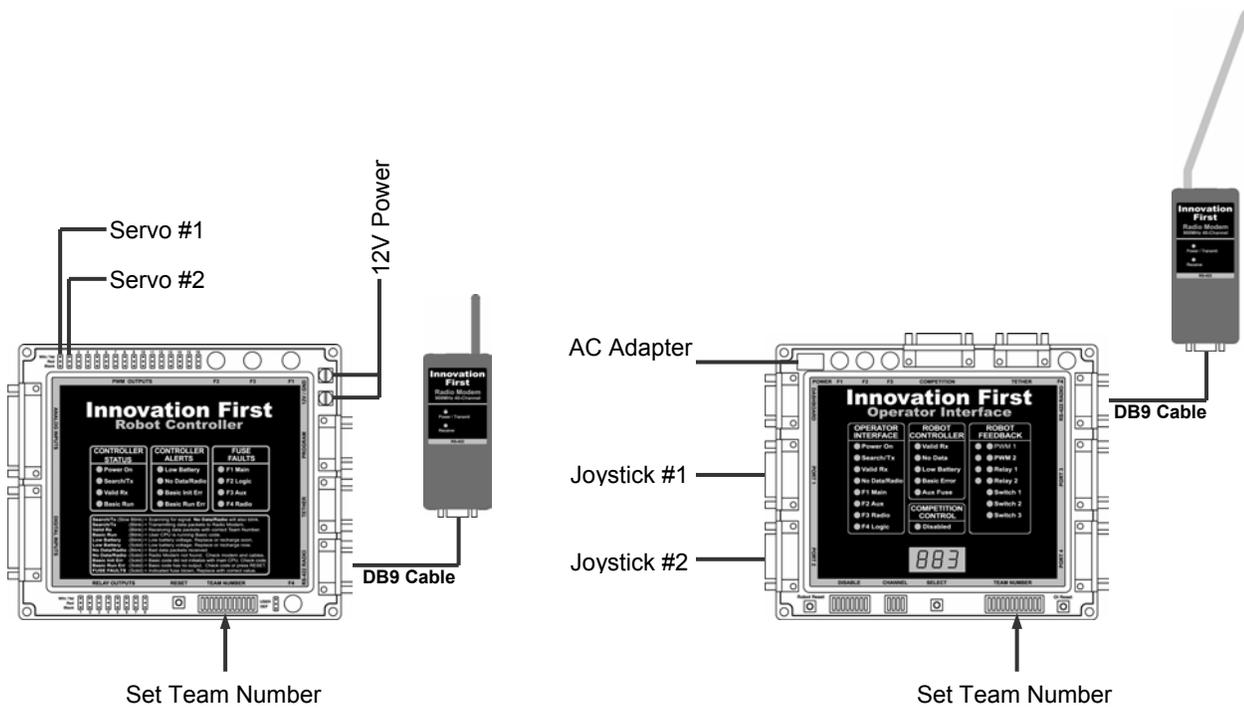
2. Wireless System Setup Guide

This guide shows a diagram of the basic cabling required to begin using the control system in a wireless configuration. Also, this guide consists of a list of components required for the Quick Setup based on using the default program.

Robot Control System pieces:
   (1) Robot Controller
   (1) 12V Battery
   (1) RS 422 Radio (RC)
   (1) DB9 M-F Cable
   (2) Servos

Operator Control System pieces:
   (1) Operator Interface
   (1) AC Adapter
   (1) RS-422 Radio (OI)
   (1) DB9 M-F Cable
   (2) Joysticks

3. Tethered System Setup Guide

This guide shows a diagram of the basic cabling required to begin using the control system in a tethered configuration. Also, this guide consists of a list of components required for the Quick Setup based on using the default program.

Robot Control System pieces:
  (1) Robot Controller
  (1) 12V Battery
  (1) RS 422 Radio (RC) <u>Optional</u>
  (1) DB9 M-F Cable (radio) <u>Optional</u>
  (2) Servos
  (1) DB9 M-F Cable (tether)

**Operator Control System pieces:**
  (1) Operator Interface
  (1) AC Adapter <u>Optional</u>
  (1) RS-422 Radio (OI) <u>Optional</u>
  (1) DB9 M-F Cable (radio) <u>Optional</u>
  (2) Joysticks
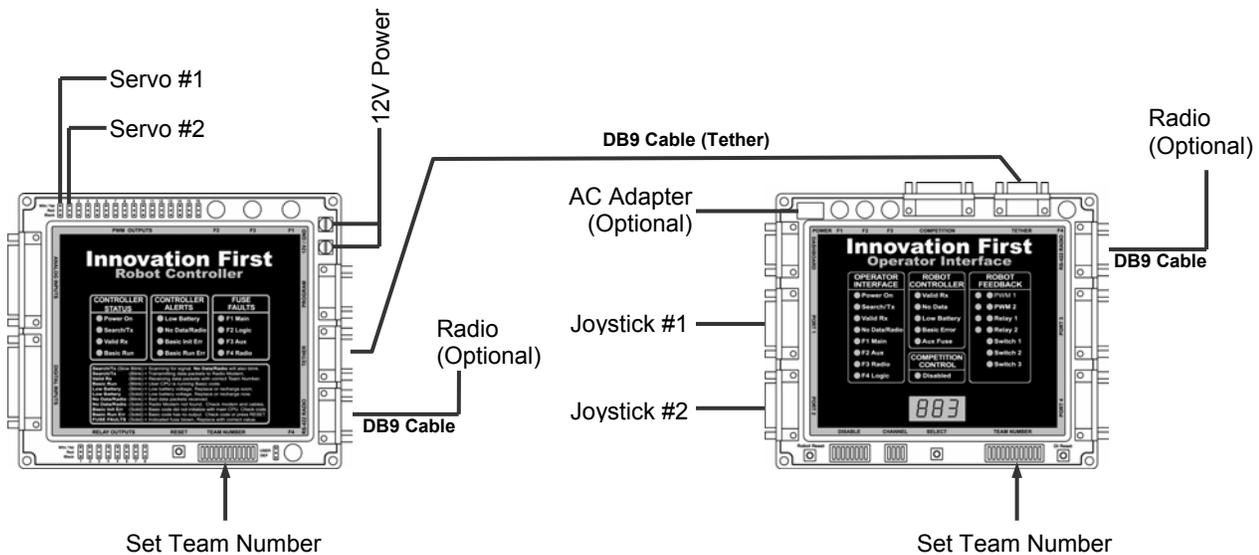
4. Setting Your Team Number

1. With No "Power" applied, connect the system together for either a wireless or tether configuration.

2. Power up the Operator Interface. For a wireless configuration, connect the AC Adaptor to 115V 60Hz power. Plug the AC Adaptor cable into the POWER connector on the Operator Interface (turning it ON). For a tether configuration, connect a battery to the Robot Controller. This will also power up the Operator Interface in a tether configuration.

3. Set Team Number:

   TEAM NUMBER
   1 2 3 4 5 6 7 8 9 10 11 12 ← Push Here = (Closed)
                            ← Push Here = (Open)
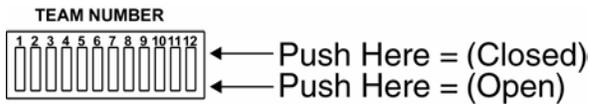
   a. Set each of the twelve TEAM NUMBER switches to the Switch Closed position.
      The Operator Interface display should show "000" on a 3-digit display and "0000" on a 4-digit display.

   CAUTION: You <u>cannot</u> use a team number of zero. A team number of zero is reserved for Autonomous Mode. The Robot Controller set to a team number of zero will begin executing PBASIC code and could start moving if you have modified the default code.

   b. Set switch 3 Down on a 3-digit display and switch 1 Down on a 4-digit display and look at the display.

      If the number displayed is <u>greater than</u> your team number, return the switch to Closed.

      If the number displayed is <u>less than</u> your team number, leave the switch Open.

      If the number displayed is <u>your</u> team number, go to step 4.

   c. Repeat step b. using the next switch (4, 5, 6 . . .) on a 3-digit display unit or (2, 3, 4 …) on a 4-digit display unit.

4. Copy the "Team Number" switch settings from the Operator Interface to the Robot Controller.

5. Connect a battery to the Robot Controller to power-up the unit if it is not already "ON".

6. After a few seconds, the "Search/TX" and "Valid RX" lights should be flashing on both units, indicating each is transmitting and receiving valid data with the correct team number.

7. The display on the Operator Interface will change to the channel number (c40).

5. Testing the System

System Feature Overview

The system should be working correctly now. Try the following to see how it works. Connect a servo to PWM1.

1. Ensure the jumper on the Robot Controller is set to DEF (not USER).

2. You should center the Y axis on Port 1 using the trim tab on the Port 1 Joystick. With the joystick centered, move the trim tab until both "PWM1 Red" and "PWM1 Green" LEDs on the Operator interface are both ON. Both LEDs "ON" at once indicate that the joystick is centered. Repeat this process for the "Y" axis on Port 2 using the PWM2 lights.

3. Pressing the ROBOT RESET button on the Operator Interface should cause the "Basic Init Err" light on the Robot Controller to flash, indicating the PBASIC processor is resetting.

4. Moving the PORT 1 joystick forward and back should move the servo connected to PWM1 output on the Robot Controller.

5. When the PORT 1 "Y" axis joystick is all the way forward, the "PWM1 Green" LED on the Operator interface should be ON, indicating full forward.

6. When the PORT 1 "Y" axis joystick is all the way back, the "PWM1 Red" LED on the Operator interface should be ON, indicating full reverse.

7. When pressing trigger or thumb buttons on the Port 1 joystick, the RELAY 1 Green or Red LEDs on the Operator Interface will be ON, respectively.

8. Pressing the SELECT button on the Operator Interface will change the display between Robot Battery Voltage, User Mode, Team Number, and Channel Number. Leave the User Mode selected. User mode us identified by a small "u" on a 4-digit Operator Interface display or by two decimal places on a 3-digit Operator Interface display.

   Note: All feedback LEDs on the Operator Interface are disabled while in User Mode.

9. Move the PORT 1 "Y" joystick forward and back. The digit display on the OI will display the corresponding Port 1 "Y" axis software value that is sent from the Robot Controller.