21 July 2013

**Team 3061 Programming Survival Guide**

…for all the stuff that everyone thinks is obvious and then forgets about. Usually when it’s really, really inconvenient.

**Connections**

**Connecting to the robot—Ethernet**

1. You have to tell your computer to use a static IP address. Look for something like “TCP/IP settings” under properties for the Local Area Connection. Instead of allowing an IP address to be assigned automatically, tell the computer to use an IP address of **10.30.61.5** and subnet mask of **255.255.255.0**.

2. **Disable the wireless connection.** You probably won’t be able to connect if you forget.

3. Connect your laptop via Ethernet cable to **port 1** on the cRIO.

4. Turn on the robot.

5. Open the driver station to see if a connection has been made.

**Connecting to the robot—wireless**

1. Again, the computer needs a static IP address. Under properties for the wireless connection, set the IP address to **10.30.61.5** and the subnet mask to **255.255.255.0**.

2. Turn on the robot.

3. Look at available wireless connections. You should be able to see the robot’s router (called “3061”). Connect to this.

4. Open the driver station to ensure that a connection has been made.

**Troubleshooting connection issues**

If you have problems connecting, here are some things to try:

1. In the driver station under the setup tab, make sure that the team number is 3061.

2. Check the IP address of the target on the LabVIEW project you’re running. It should be 10.30.61.2.

3. If using a wired connection, make sure that all wireless connections are disabled.

4. If you can’t connect to the router, make sure that no other computers in the area have inadvertently connected to the router.

5. Make sure the router/ethernet cable is plugged into port 1 on the cRIO. **Port 2 will not work.**

6. The modules **must be in this order** (starting from the one closest to the LAN port): analog, DIO, DO (solenoid).

**Deployment**

**Deploying to RAM (i.e. not as startup)**

This kind of deployment is most useful for testing or debugging. You can use probes, breakpoints, and have front panels open to see what is going on with the code.

1. Connect to the robot (wired or wireless).

2. In the project window, right click on the “target” and select Connect. This will abort the current startup application on the cRIO (if there is one) and allow for much faster deployment.

3. Open Robot Main.vi and hit the run button. This will deploy all VI’s in the project to the cRIO. If the conflict resolution dialog opens, click “OK”.

**Deploying as startup**

This kind of deployment is used to put competition code on the cRIO. The code starts running automatically once the cRIO is turned on.

1. In the project window, expand “Build Specifications”. Right-click “FRC Robot Boot-up Deployment” and select “build”.

2. Once the project is done building, right-click “FRC Robot Boot-up Deployment” and select “Set as startup” if necessary (if it’s already set as startup, “Unset as startup” will appear).

3. Connect to the robot.

4. Right-click “FRC Robot Boot-up Deployment” and select “Deploy”.

5. Once the startup application is done deploying, restart the cRIO. After a minute or so, the startup code will be running (there should be a green light next to “Robot Code” in the driver station).

**Building the dashboard**

1. In the dashboard project window, expand “Build Specifications”. Right-click “FRC PC Dashboard” and select “Build”. The dashboard code will be compiled into an .exe file (to find the .exe, hit “explore” in the dialog box that pops up after the build finishes).

2. The new .exe must be copied into Program Files so that the driver station knows to open the new version of the dashboard. Look for the right directory (usually “C:\Program Files\FRC Dashboard”) and replace the .exe in this folder with the new one.

**Troubleshooting deployment issues**

1. If a dialog box pops up and says something like, “the target is already in use by another project or computer,” restart the cRIO.

2. If a message like “Waiting for Real-Time target (RT CompactRIO Target) to respond” appears twice in a row, deployment has failed. This is almost always a connection problem; see “troubleshooting connection issues.”

3. If the deployment process hangs or seems to be taking forever, it’s usually a connection problem. See “troubleshooting connection issues.”

4. If you have no idea what is going on, try restarting the cRIO. That always works, right?

**Operation**

**Testing**

1. Once you have connected to the robot and deployed code, make sure that the driver station and dashboard are open. The robot can be activated by pressing the “enable” button in the driver station and—gasp—deactivated by pressing the “disable” button.

2. Choose the mode you want: autonomous, teleop, or practice (this simulates a match: a 5-second countdown, a 15-second autonomous, and an unlimited teleop).

3. Plug controllers (if needed) into the laptop. **Always** check that they are in the right order (see below). **Just because a controller is physically labeled number one does not mean that the driver station recognizes it as number one.**

* In the driver station, switch over to the setup tab; you should see the two controllers listed.
* While the robot is **disabled**, press a button on each controller to make sure that the driver controller is listed first and the shooter controller is listed second. (The corresponding entry in the list will flash briefly as the button is pressed.)
* The controllers can be reordered by clicking and dragging the list entries around.

4. Make sure that everyone is aware that you intend to enable the robot before you actually enable it. Or be prepared to run from angry mechanical peoples. Fast.

5. Disabling the robot does **not** mean that everything just freezes. When the robot is disabled, all the hardware reverts to a “safe” status—i.e. motors stop running, etc. It also means that any solenoids that are in the “on” position will automatically be moved to the “off” position. So if you leave a solenoid in the “on” position (e.g. raising the climber on Sally), disabling the robot will effectively actuate the solenoid (e.g. lowering the climber on Sally), which is probably unintended. (And if you enable the robot again, the solenoid will go back to the “on” state.)

**Competition**

1. Plug the LAN cable into the laptop. “FMS Connected” should appear in the driver station, and the enable/disable buttons should disappear.

2. Confirm that the controllers are being detected by the driver station and are in the right order using the procedure above.

3. If controller issues occur, try these steps:

* Unplug the controllers and then plug them back in—that actually works sometimes.
* Switch USB ports.
* Press the f1 key; this “refreshes”, forcing the driver station to check for controllers. (Note: if you do this off-field while the robot is disabled, this **will enable the robot**.)