Getting Started with the 2011 FRC Control System
2011 FRC – *LogoMotion*

WELCOME!

Welcome to the 2011 FRC season! We strongly suggest teams complete the steps below to perform an out of the box (OTB) benchtop test before using any of the components to build a robot. To complete the OTB Testing, you'll need the following documents, which can all be found on the FRC Kit of Parts Website (www.usfirst.org/frc/kitofparts):

- Getting Started with the 2011 FRC Control System (this document)
- How to Set Up Your 2011 Driver Station
- How to Configure Your cRIO
- How to Set Up Your Robot Control System
- How to Build and Load Programming in LabVIEW, C/C++, and Java
- Basic Operator Control
- How to Configure Your Radio
- How to Configure the I/O Module
- How to Configure the Camera

The OTB Test is a way to

- determine your Driver Station system is functional at a basic level
- assure that devices weren't damaged in shipping
- ensure the Classmate and cRIO are imaged correctly
- verify Classmate operation with the Robot Controller.

If you have feedback on the system or this document please post your comments on the FIRST Control System Forum at http://forums.usfirst.org/forumdisplay.php?f=23

STEP 1 – ACQUIRE NEEDED DOCUMENTATION

In addition to the documents listed above, you will also need the following documents as you assemble your control system. Before you even open the Kit of Parts, we suggest you print out the documentation listed below and assemble it in a binder ready for immediate reference by your team. These documents can all be found on the FRC Kit of Parts Website (http://www.usfirst.org/frc/kitofparts).

- Getting Started with the 2011 FRC Control System (this document)
- FRC Control System Control System Component Datasheets (Power Distribution Board, Digital Sidecar, Analog Breakout, Pneumatic Breakout)
- Kit of Parts Checklist
- 2011 Robot Power Distribution Diagram
- 2011 Robot Data Connectivity Diagram

STEP 2 – IDENTIFY AND INVENTORY CONTROL SYSTEM COMPONENTS

Identify each of the components in your kit using the descriptions and photos provided in the Kit of Parts Checklist. Record the quantities you received on your printed checklist. Report any inconsistencies within 3 days of receiving your kit to TIMS as directed in the 2011 Competition Manual.

Veteran teams will need to gather the following items from the 2009 or 2010 Kit of Parts:

- cRIO
- 1 analog breakout
- 1 digital side car
- joysticks
- panel signal device
- robot radio & driver station radio
- solenoid breakout
- 2 standoffs
- 1 DB37 extension cable
- 4 Wago power connectors
- 1 spike relay
- 2 Jaguar motor controllers

STEP 3 - INSTALL SOFTWARE ON THE COMPUTER YOU PLAN TO USE FOR DEVELOPMENT

The 2011 FRC Control System can be programmed in LabVIEW, Java or C/C++. Teams should choose their programming language at this point. The Classmate is a likely candidate for your Driver Station hardware, but you are also invited to use it for development, if that's appropriate for your team. Teams may choose National Instruments LabVIEW, which supports a graphical programming language; Wind River Workbench, which supports C and C++ languages; or Net-Beans which supports Java. After compiling, executables are transferred to the cRIO.

Regardless of the programming language you plan to use, you must install the FRC Tools from the National Instruments DVD included in the 2011 Kit of Parts.

If you would like to use LabVIEW, you can install it from the same National Instruments DVD.

If you would like to use C/C++, you can install Wind River Workbench 3.0 from the Wind River disc included in the Kit of Parts.

If you would like to use Java, you can download Netbeans 6.7 IDE from ?.

Comment [FIRST1]: Insert link.

After you've installed your programming language base software, all teams must install the language specific updates.

- LabVIEW (http://joule.ni.com/nidu/cds/view/p/id/2261)
- Java (insert link)
- C/C++ (http://firstforge.wpi.edu/sf/go/projects.wpilib/frs.wpilib_c_version_11_0_for_2011_f)

Comment [MSOffice2]: Need link

Next, all languages are required to install the Utilities update (http://joule.ni.com/nidu/cds/view/p/id/2262).

If you plan to use the Driver Station application on your development machine, you must also install the Driver Station Update (http://joule.ni.com/nidu/cds/view/p/id/2263).

Licensing
The National Instruments LabVIEW license and WindRiver are active until Jan 15, 2012. Java has no expiration date.

The National Instruments serial number is L13R02200.

The Wind River Workbench License Authorization Code (LAC) is pre-populated in the installer.

Teams are permitted to install the software on as many team computers as needed, subject to the restrictions and license terms that accompany the applicable software, and provided that only team members or mentors use the software, and solely for the FRC. Rights to use LabVIEW and Workbench are governed solely by the terms of the license agreements that are shown during the installation of the applicable software.

Installation Requirements
The installation has been tested on Windows 7 operating system.

To install, you must be logged on as an administrator or as a user with administrator privileges. You will need Internet access to activate the Wind River and NI Licenses.

Requirements for the LabVIEW Programming Environment
Installation of the "LabVIEW Package" from the FRC DVD requires 3.6 GB total disk space. This package takes an average of 1.5 hours to install. Installation on a Vista operating system sometimes takes longer. If you currently have National Instruments software on your PC, it will not interfere with that installation. However it will install over another version of LabView 8.6.

Requirements for the C/C++ Programming Environment
Installation of the "Wind River Package" from the FRC DVD requires 2.4 GB total disk space. Note that even the C/C++ programming environment will require installation of many portions of the NI software to support the cRIO. On a Windows XP platform the Wind River software takes an average of ½ hour to install. The FRC installation must be installed in the directory "c:\WindRiver". A different version of Workbench on your PC can remain installed, but it must be in a different directory.

Users of the software must read the license agreements that are shown during installation of the software carefully and completely.

Requirements for the Java Programming Environment
Installation of the "Java package" from the FRC DVDs requires a minimum of 350 MB disk space and 512 RAM. Note that even the Java programming environment will require installation of many portions of the NI software to support the cRIO. On a Windows XP platform the Java software takes an average ½ hour to install. Users of the software must read the license agreements that are shown during installation of the software carefully and completely.

Before Installing

Deactivate / Uninstall software

1. Disable any automatic virus detection programs before you install. Some virus detection programs interfere with installation. (NOTE: Some of the beta test teams that did not disable virus detection before installation needed to re-install their programming environments again to remedy problems encountered in installation.)
2. If you have another version of the Wind River Workbench installed, make sure it is not in the C:\WindRiver directory because that is the preferred location for the FRC installation (some of the tools expect that location).

Install LabVIEW 8.6.1 and Associated Components

1. Insert the NI LabVIEW 8.6.1 for FRC 2011 and FRC 2011 Tools & CompactRIO Drivers DVD.
2. If you're programming in LabVIEW, click the **Install LabVIEW and the FRC Tools** link and follow the instructions that appear on the screen. If you're programming in C/C++ or Java, click the **Install only the FRC Tools** link and follow the instructions that appear on the screen.
3. When prompted, enter the serial number in the **Serial Number** text box.
4. On the **Installation Summary** page, choose to **Run License Manager to activate the product(s)** and click the **Next** button to display the NI Activation Wizard.
5. Select the **Automatically activate through a secure Internet connection** option and click the **Next** button.
6. Enter the serial number, L13R02200, in the **LabVIEW 8.6.1 FIRST Robotics Competition** text box.
7. Follow the instructions that appear on the screen to complete activation.
8. Install updates, see above.

Install Wind River Workbench

Installation Procedure

NOTE: If you have just installed the previous DVD the National Instruments Activation Wizard may start while Workbench is being installed. Internet access is needed to complete the install for Workbench.

Put the DVD into the reader. After a few minutes the Installer-Welcome screen will appear. Follow instructions on your screen.

At the Installer-Choose Activation Type screen, select Permanent activation and click Browse.
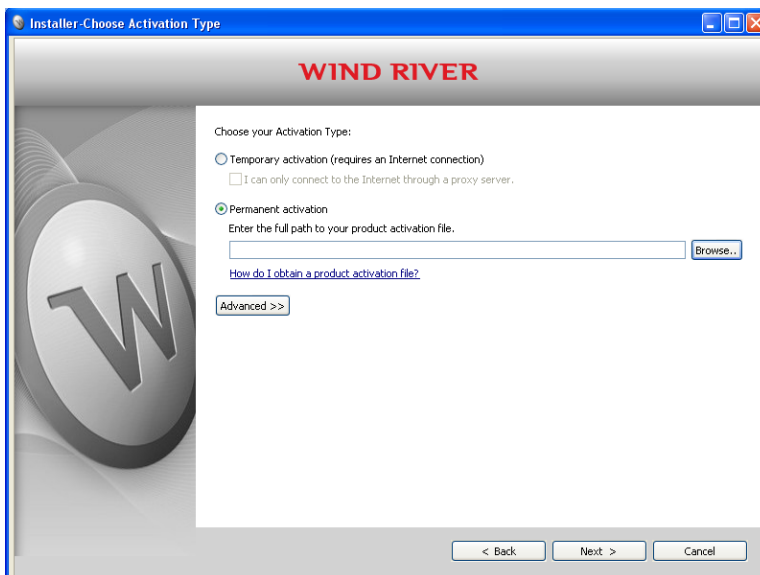
Browse to the DVD-R138732.1-1 directory and select FirstRobotics_2011_install.txt file. Click Open. No internet connectivity is required to obtain your product activation file (FirstRobotics_2011_install.txt).

The FirstRobotics_2011_install.txt file contains the installation keys and licensing needed to install and activate Wind River products. Once the path to the FirstRobotics_2011_install.txt (product activation file) is displayed under Permanent activation, click Next.

At the Installer-Choose Installation Filters screen, make no changes. Click Next. Follow the instructions until the process is complete.

Installing Java and Tools

Installation Procedure

This is an overview on to install the Java SDK for FRC. For complete details please read the "Java Getting Started Guide" found in the "Documents" section of the WPILib project at http://firstforge.wpi.edu/sf/projects/wpilib.

Required Software

In order to setup your machine to program in Java, the following software components are required:

- Java SE Development Kit (JDK) version 6.
- NetBeans IDE version 6.7 or later.

You can use other IDEs if desired but the focus for this document is NetBeans.

- SunSPOT Java SDK for FRC which includes WPILib.

All these components can be installed on Windows, Mac OSX, or linux. Each platform requires slightly different installation procedures.

Install the Java tools in three steps, downloading the components from the Internet for each step:

1. Install the Java SE Development Kit (JDK) version 6 available from http://java.sun.com. Note: Your development system may already have the JDK installed, for example on Mac OS X. Note: On 64-bit Windows the SunSPOT tools still need a 32-bit JDK so download a JDK for platform "Windows" not "Windows x64." You can install the JDK in C:\Java\32-bit\ even if you also have a 64-bit JDK in, say, C:\Java\. Give this SDK location to the NetBeans installer wizard.
2. Install NetBeans version 6.7 or later. This is available from http://netbeans.org/downloads.
3. Add the FRC plugins to NetBeans. These plugins can be downloaded from the WPILib project on http://firstforge.wpi.edu/sf/projects/wpilib or installed via the NetBeans built in downloader as described in the following sections of this document.

Note: The details of each step vary by operating system and browser.

Besides the tools for Java programming you'll also need:

- The FRC cRIO Imaging Tool to format/initialize your cRIO for Java programming. This tool is currently only released and supported for Windows.
- Optionally the FRC Driver Station software to control your robot, also only supported on Windows.

These tools are available online as an update to the installed LabVIEW platform installer DVD that is included with the kit of parts. You can find these updates on the FIRST web site team updates page: http://usfirst.org/roboticsprograms/frc/content.aspx?id=450.

Installing the NetBeans Plugins: Sun SPOT Java SDK for FRC and WPILib

The FRC Plugins add the FRC specific components to your standard NetBeans installation. The NetBeans plugins contain everything needed to extend your Java development environment to program your cRIO. The FRC plugins enable NetBeans to directly download and debug code on the NI cRIO controller. The plugins include project templates and sample programs to help you get started developing robot programs. Please read the "Java Getting Started Guide" for details on how to install the plugins offline or using the online update site.