

VEX Robot Remote Control Set-Up

Note: Before proceeding with the VEXnet joystick setup on the following pages, complete these steps:



- 1) Open the RobotC program
- 2) Select “File > Open Sample Program”
- 3) Select the “Remote Control” folder
- 4) Select and open the program entitled “*Clawbot Single Joystick Control*” – it should be the 2nd one listed.
- 5) Select “File > Save As” rename the file and save it where you keep your other programs (“Q” or “H” network drive).
- 6) Select “Robot > VEX Cortex Communication Mode” - set to “VEXnet or USB”.
- 7) Make sure your robot is connected to your computer with the USB cable, a battery is installed and the Cortex is turned on.
- 8) Download the program “*Clawbot Single Joystick Control*” to your robot.
- 9) Turn the Cortex off. Unplug the USB cable.

Now follow the steps on the next pages to set-up your VEXnet joystick

Once you get the single joystick program working, try reprogramming the remote for dual joystick, tank control style. There are sample programs in the “remote control” folder that will help to guide you. You may need to change motor port names and numbers to match your robot’s configuration!

Setup

VEXnet Joystick Configuration in ROBOTC

The VEXnet Joystick enables more than just the remote control of your robot. It also provides the wireless communication link between your computer and the VEX Cortex, enabling you to wirelessly download firmware, programs and run the ROBOTC debugger. In this document, you will learn how to configure VEXnet Joystick using ROBOTC.

This document is broken into 3 sections:

1. Downloading Firmware to the VEXnet Joystick
2. Creating a Wireless Link Between the VEXnet Joystick and VEX Cortex
3. Calibrating the VEXnet Joystick Values

You will need:

- 1 VEXnet Joystick with 6 AAA Batteries
- 1 Small Phillips Screwdriver
- A computer with ROBOTC for Cortex and PIC installed
- 1 USB A-to-A Cable
- 1 USB-to-Serial Programming Cable

Section 1: Downloading Firmware to the VEXnet Joystick

1. Begin by installing 6 AAA batteries in the VEXnet Joystick. You will need a small Phillips screwdriver to remove the battery cover.



1a. Install 6 AAA Batteries

Remove the battery cover using a small Phillips screwdriver and install 6 AAA batteries, being careful to align them as indicated.



1b. Verify Correct Installation

Turn the VEXnet Joystick ON to verify that you correctly installed the batteries. If any of the LED's on the front turn on, you installed the batteries correctly. Turn the controller OFF and secure the battery cover using the Philips screwdriver.

Setup

VEXnet Joystick Configuration in ROBOTC (cont.)

2. Connect the VEXnet Joystick to your computer using the USB A-to-A cable and turn it ON.



2a. Connect the VEXnet Joystick

Use the USB A-to-A cable to connect your VEXnet Joystick to your computer.

Note: The VEXnet light should turn green.



2b. Turn the VEXnet Joystick ON

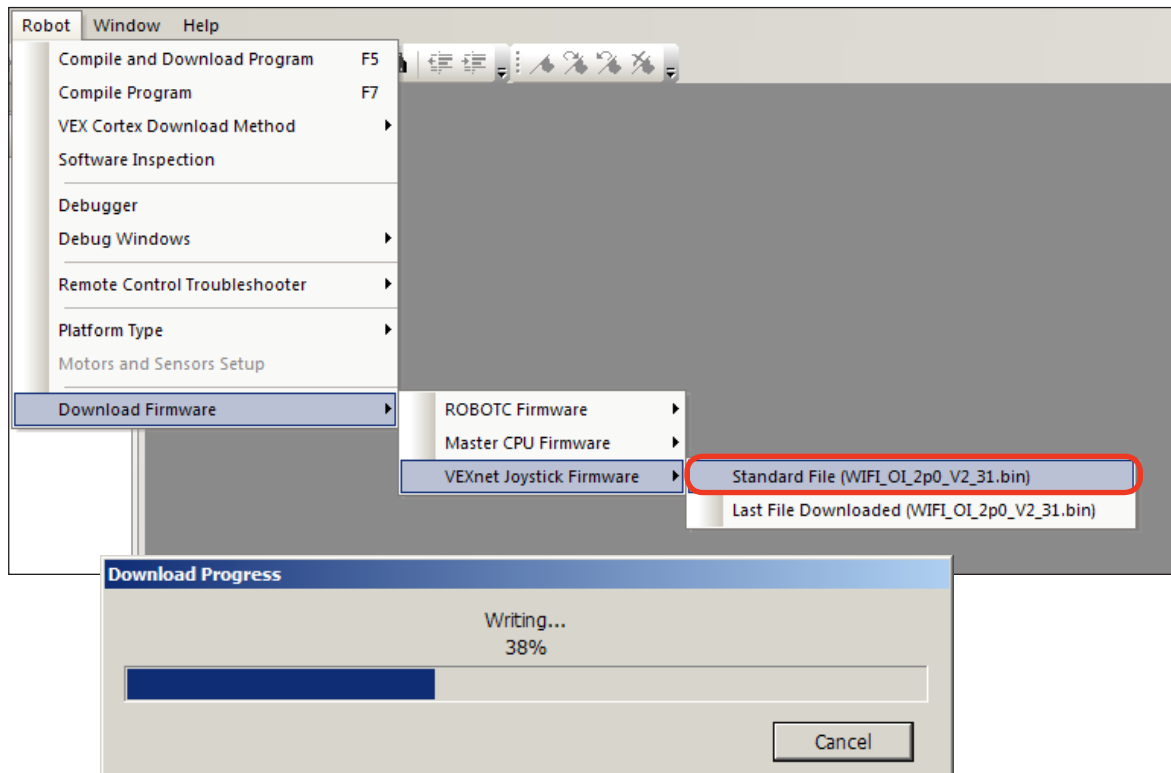
Switch the VEXnet Joystick to the ON position.

Note: The Joystick light should turn green.

Setup

VEXnet Joystick Configuration in ROBOTC (cont.)

- Go to **Robot > Download Firmware > VEXnet Joystick Firmware** and select **Standard File** to download the latest VEXnet Joystick Firmware to the controller.



3. Download Progress

A *Download Progress* window will appear and begin the download process. When the window closes, the firmware download is complete.

Note: You only need to download the VEXnet Joystick Firmware once, when you first start using a VEX Cortex with ROBOTC, or when you upgrade to a newer version of ROBOTC.

End of Section: Downloading Firmware to the VEXnet Joystick

Once the Download Progress window closes, the VEXnet Joystick Firmware download is complete.

Move on to the next section to learn how to create a wireless link between the VEXnet Joystick and VEX Cortex.

Setup

VEXnet Joystick Configuration in ROBOTC (cont.)

Section 2: Creating a wireless link between the VEXnet Joystick and VEX Cortex

In this section, you will learn how to pair a VEX Cortex Microcontroller to a VEXnet Joystick, allowing them to communicate over VEXnet. This section assumes that you have already updated the master firmware on the VEX Cortex and VEXnet Remote Control.

VEXnet is an 802.11 WiFi communication system between the VEX Cortex and VEXnet Remote Control.

VEXnet features include:

- Easy to connect (No IP addresses, MAC addresses, passwords, or special security modes)
- Multiple layers of security built-in and always on
- No wireless access point needed; each VEXnet pair makes its own private network
- Hundreds of robots can operate at once; every VEXnet robot has a hidden unique ID
- Optional tether for wired communication
- Optional 9V battery backup to maintain wireless link during a main 7.2V power loss
- LED scheme displays the status of the Robot, VEXnet link, and Game (Competition Mode)

1. Begin by verifying that both the Cortex and VEXnet Joystick are connected to charged batteries.



1a. Connect a Battery to the Cortex

Connect a 7.2V robot battery to the Cortex, but do not power it ON.



1b. Install Batteries in the VEXnet Remote Control

Remove the battery cover plate on the remote control. Install 6 AAA batteries, and replace the battery cover plate. Do not power the remote control ON.

Setup

VEXnet Joystick Configuration in ROBOTC (cont.)

2. Tether the USB port on the VEXnet Joystick to the USB port on the Cortex using a USB A-to-A cable.

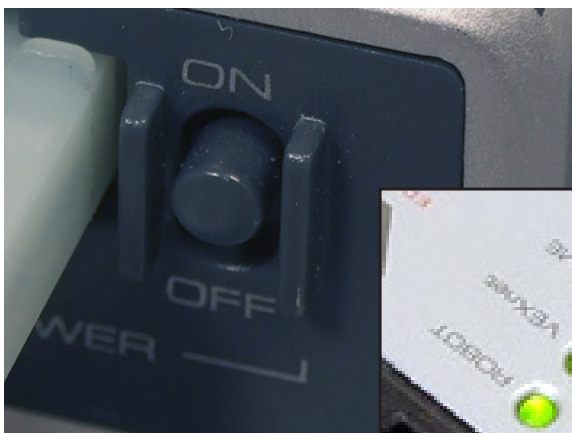
**2a. VEXnet Joystick USB Port**

Plug one end of the USB A-to-A cable into the USB port on the VEXnet Joystick.

**2b. VEX Cortex USB Port**

Plug the other end of the USB A-to-A cable into the USB port on the VEX Cortex.

3. Power the Cortex ON. After a few seconds, ROBOT and VEXnet LEDs will blink green, indicating that the Cortex and VEXnet Joystick have successfully paired.

**3a. Turn the Cortex ON****3b. Status LEDs**

The ROBOT and VEXnet LEDs will blink green once the Cortex and VEXnet Joystick have successfully paired.

Setup

VEXnet Joystick Configuration in ROBOTC (cont.)

4. Turn the Cortex OFF.



5. Remove the USB A-to-A cable from the VEXnet Joystick and Cortex.



6. Insert VEXnet USB Keys into both the VEXnet Joystick and Cortex.



6. **VEXnet USB Keys**
Insert VEXnet USB Keys into the VEXnet Joystick and Cortex.

Note:

It does not matter which VEXnet USB Key you insert into the Cortex versus the VEXnet Joystick. Pairing the Cortex and VEXnet Joystick establishes the link; the VEXnet USB Keys simply act as antennas for the link.

Setup

VEXnet Joystick Configuration in ROBOTC (cont.)

7. Power the Cortex and Joystick ON. After roughly 15 seconds, the ROBOT and VEXnet LED's will blink green, indicating that the VEXnet communication link has been established.



7a. Turn the Cortex ON



7b. Turn the VEXnet Joystick ON

**7c. Status LEDs**

After roughly 15 seconds, the ROBOT and VEXnet status LEDs will start quickly blinking green. With the VEXnet link established, you should power OFF your Cortex and VEXnet Joystick to preserve battery.

End of Section: Creating a Wireless Link between the VEXnet Joystick and VEX Cortex

Your VEXnet Joystick and VEX Cortex can now communicate over the VEXnet USB Keys. Move on to the next section to calibrate the values your VEXnet Joystick sends out.

Setup

VEXnet Joystick Configuration in ROBOTC (cont.)

Section 3: Calibrating the VEXnet Joystick Values

This section contains the procedure for calibrating the VEXnet Remote Control joysticks. Some steps are time-sensitive, so it's recommended that you read through the instructions once before following along.

The VEXnet Remote Control includes two joysticks (each having an X and Y-axis), 8 buttons on the front, and 4 additional trigger buttons on the top. Inside, there is also 3-Axis accelerometer, capable of providing X-Y-Z acceleration values. Values from the joysticks, buttons, and accelerometer are sent as a constant stream of information over VEXnet to the robot, enabling a user to control the robot in real-time.

To ensure that the VEXnet Joystick sends out accurate joystick values, the joysticks must be calibrated before their first use, and after any firmware updates are applied.

You will need:

- A VEXnet Joystick with batteries
- A VEX Cortex with robot battery
- A small Allen wrench (1/16" or smaller) or paper clip

1. Power on the VEXnet Joystick and VEX Cortex. Allow them to sync over VEXnet.



Setup

VEXnet Joystick Configuration in ROBOTC (cont.)

2. Press and hold the **6U** trigger button.



2. Press and hold the **6U** trigger button

3. While keeping the **6U** trigger button pressed in, use your Allen wrench or paper clip to press in the internal **CONFIG** button until the **JOYSTICK** LED blinks red and green.



- 3a. Press and the **CONFIG** button

While still pressing in the 6U trigger button, use an Allen wrench or paper clip to press in the CONFIG button.



- 3b. **JOYSTICK LED**

Once the JOYSTICK LED begins to blink red and green, release both the 6U and CONFIG buttons.

Setup

VEXnet Joystick Configuration in ROBOTC (cont.)



Important - Time Sensitive Instructions

There is a 10 second time limit to complete steps 4 and 5. If they are not completed in time, the calibration process will timeout and the **VEXnet** LED will blink red briefly.

4. Move both joysticks through their full ranges of motion. When the remote control detects that the joysticks have been fully rotated, the **JOYSTICK** LED stops blinking red and green, and switches to a solid green.



4a. Move the Joysticks

Move the joysticks through their full ranges of motion - Up, Down, Left, Right, and in a circle.



4b. JOYSTICK LED

Once the remote control detects that the joysticks have been fully rotated, the JOYSTICK LED switches to solid green, indicating that you can stop moving the joysticks.

Setup

VEXnet Joystick Configuration in ROBOTC (cont.)

5. Press the **8U** button to save the new calibration.



5. Save

Press the 8U button to save the joystick calibration on your remote control. The JOYSTICK LED will blink green for a few seconds.



Additional Information

- If the calibration is not saved, the process will timeout after 10 seconds and the **VEXnet** LED will blink red.
- To cancel a calibration, press the **7U** button. The calibration process will be discontinued and the **VEXnet** LED will blink red.
- Once the calibration is discontinued or saved, all of the remote control LEDs will resume their normal function.
- The joysticks must be calibrated any time the firmware on the remote control is downloaded.

End of Section: Calibrating the VEXnet Joystick Values

The joysticks on your VEXnet Joystick are now properly calibrated and ready to be used to remote control your robot. If you had any issues during the process, troubleshooting tips can be found on the following page.

Setup

VEXnet Joystick Configuration in ROBOTC (cont.)



Troubleshooting

Issue: Slow blinking green ROBOT light on the Cortex

Solution: Download the Cortex Master Firmware using ROBOTC.

Issue: Slow blinking ROBOT green light on the VEXnet Joystick

Solution: Push and hold CONFIG button for about 5 seconds, until the status LEDs starts blinking green. Release it, wait for another 5 seconds, and then turn the VEXnet Joystick OFF and then back ON. If that fails, download the VEXnet Joystick Firmware using ROBOTC.

Issue: Yellow or red ROBOT light on the Cortex

Solution: Make sure you are using fully charged Robot battery.

Issue: Yellow or red ROBOT light on the VEXnet Joystick, even though they are both green on the Cortex.

Solution: Power cycle both the VEXnet Joystick and CORTEX.