Configuring static IP addresses for robots using the FRCVISION RPi co-processor.

Use of computer names such as roborio-4237-frc.local and wpilibpi.local works great at home but there appears to be no end of trouble at the match arena using the FRC FMS. Lack of connection between devices and sudden disconnects are prevalent.

The use of static IP addressing is recommended by all the providers of co-processor camera vision systems such as the frcvision on the Raspberry Pi that we use and has proven to be necessary for our match play.

**Raspberry Pi**

The frc vision image provides a quick and easy way to assign a static IP address.

On the wpilibpi “dashboard” (Open laptop browser to wpilibpi.local/ or use the RPi assigned IP address which you can see through a monitor connected to the RPi HDMI port or guess):

Click Writable at the top of the screen

Select the Network Settings tab on the left of the screen

In the drop down selection field on the right side select Static

Enter the IPv4 address say 10.42.37.11

Subnet Mask 255.255.255.0

Gateway 10.42.37.1 (the radio’s IP address)

DNS Server 10.42.37.1 (the radio’s IP address)

Click Save at the bottom of the screen

Restart the system if it doesn’t automatically

The above process edits the RPi /etc/dhcpcd.conf file by adding the lines below to the end of the file. That is the standard way to set static IP for any RPi and could be done with a text editor on the RPi.

[Note the change in nomenclature for the Subnet Mask; 255.255.255.0 has the first 24 bits turned on and that is designated as /24 in the IP address in dhcpcd.conf (Classless Inter-Domain Routing (CIDR) notation).

###### BELOW THIS LINE EDITED BY RPICONFIGSERVER ######

interface eth0

static ip\_address=10.42.37.11/24

static routers=10.42.37.1

static domain\_name\_servers=10.42.37.1

**roboRIO**

on the roboRIO “dashboard” (Open browser to roboRIO-4237-frc.local/ or use the IP address usually 10.42.37.2/ for the RJ45 connector)

Click Network Configuration

Login user admin no password

For Ethernet Adapter eth0 (the RJ45 connector)

Configure IPv4 Address select Static

IPv4 Address 10.42.37.2

Subnet Mask 255.255.255.0

Gateway 10.42.37.1

DNS Server 10.42.37.1

Current Link Speed 100Mbit/Full Duplex

Preferred Link Speed Autonegotiate

Other Ethernet adaptors that could be in service are:

eth1 if using the USB type A to Ethernet RJ45 connection adapter

usb0 is the type B connector

**DriverStation Laptop**

There are multiple ways to get to the Network settings:

1. At the bottom of the Wi-Fi list

or

1. Windows Icon or Windows Key click on settings gear

or

1. Control Panel\Network and Internet\Network and Sharing Center

Select Network & Internet Settings

Ethernet

Related settings

Change adapter settings

Internet Protocol Version 4 (TCP/IPv4)

Double click or select Properties

Record AS FOUND settings in case you want to restore them (likely both of the Obtain Automatically are selected)

Select Use the following IP address:

IP Address: 10.42.37.5

Subnet mask: 255.0.0.0

Default Gateway may be left blank but if a FTA insists and you have access to the password then use: 10.42.37.1

DNS may be left blank or use 10.42.37.1

**Shuffleboard**

The Shuffleboard has a setting for the address of the NT server - normally the roboRIO.

Use 10.42.37.2 as the static address of the roboRIO.

File

Preferences

Plugins

NetworkTables

Server

Click on the entry field to the right of the word “Server” to highlight the field. (Yet another great example of how to remove all clues of what to do to make this painful to use (it’s what NOT to do).

Type 10.42.37.2

Click OK

**Vision Code**

Our current Java vision program sends targeting data through UDP messages to the roboRIO. Within the Java program use 10.42.37.2 as the static address of the roboRIO that is to receive that data. (0.0.0.0 wild card addressing used to work but now a specific address of the UDP receiver is required.)

Compile and send the program to the RPi.

