

Checking PlutoSDR connectivity in MATLAB

Before we start using some applications with PlutoSDR, we need to check to make sure PlutoSDR is connected properly to MATLAB. First, open MATLAB and launch the Add-Ons Manager as shown in Figure 1. This is done by selecting the “HOME” tab, selecting the “Add-on-ONS” dropdown, and selecting “Manage Add-Ons”.

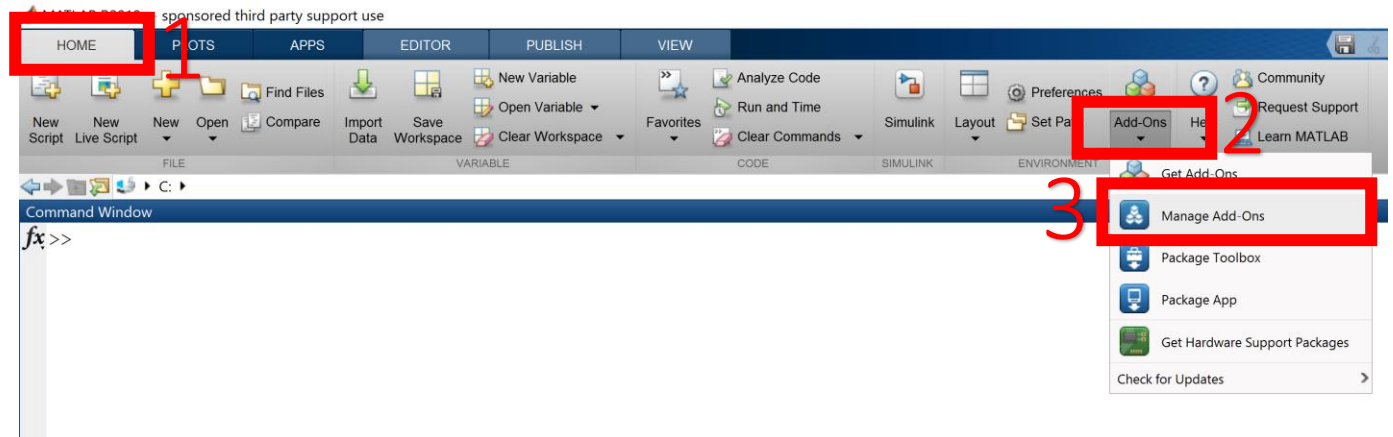


Figure 1

Once launched, select the setup icon for the ADALM-Pluto support package as shown in Figure 2.



Figure 2

Once the setup wizard has been launched, follow all the steps as guided by the wizard. This process will make sure that the PlutoSDR firmware is updated, and you are able to talk to the device. Note, on the first step, which has the same window as shown in Figure 3, the first time you click the “Next” button may take several seconds to initialize the radio. Please be patient and wait for the window to update before proceeding. Do not repeatedly click the next button.

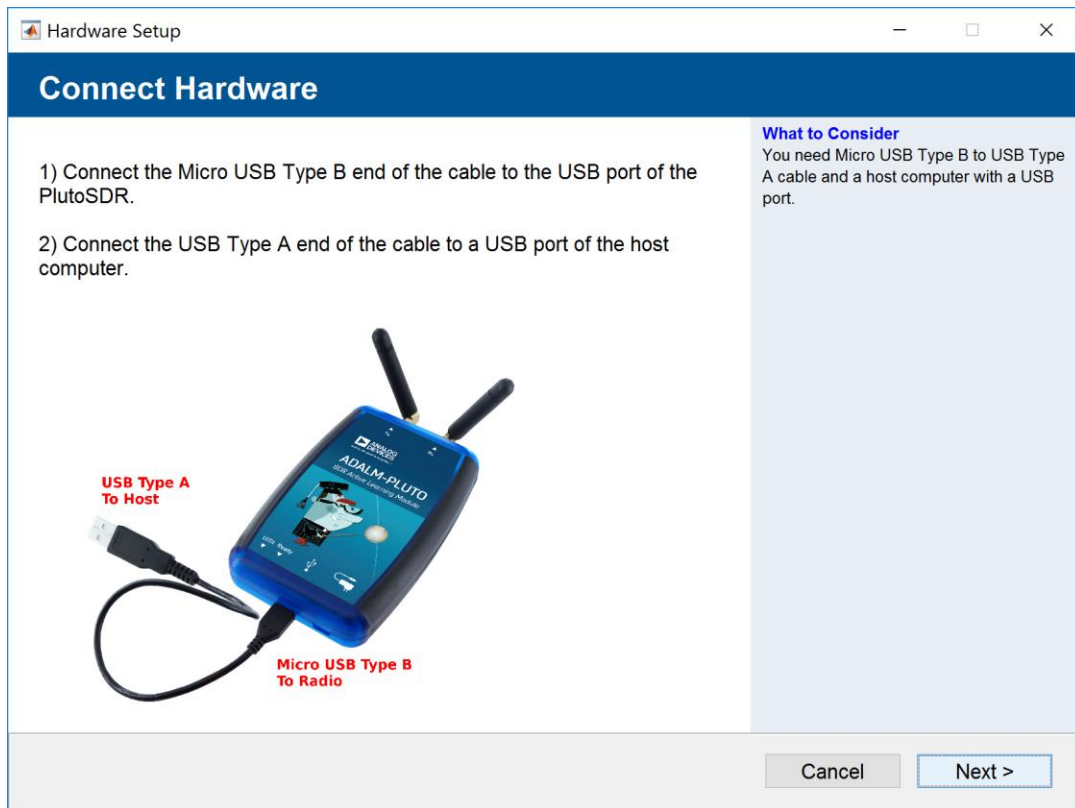


Figure 3

Follow the remaining steps in the wizard to complete verification that connectivity is working between PlutoSDR and MATLAB. If you run into any error, please ask for help from one of the instructors. Once complete, move on to the next section.

Streaming data from PlutoSDR into MATLAB and Simulink

Next in this lab, we will explore using PlutoSDR as a FM receiver with an existing demonstration that ships within MATLAB and Simulink. First, to make sure we can receive FM frequencies we must set a specific configuration in software. From the MATLAB command prompt run the command "configurePlutoRadio('AD9364')" as shown in Figure 4.

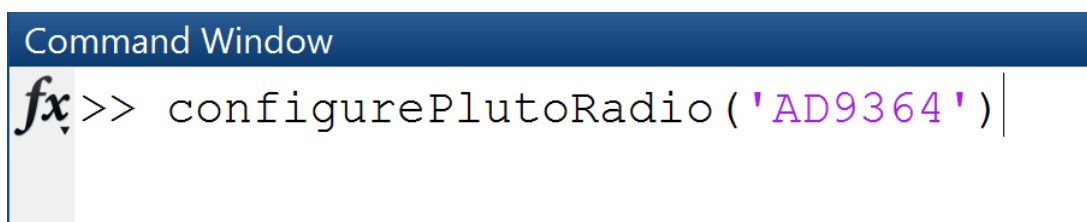


Figure 4

This will launch a progress bar and automatically update the radio with the necessary configuration. We will discuss what this actually did under the hood during the lunch break. Next, we can move on to the FM demo itself in Simulink. To reach this demo first launch the PlutoSDR documentation by typing “doc plutoradio” in the command prompt as in Figure 5.

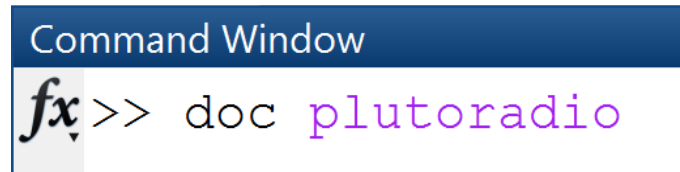


Figure 5

This will launch the MATLAB documentation browser with the PlutoSDR documentation showing. Next click on the “Application-Specific” link half-way down the page as shown in Figure 6.

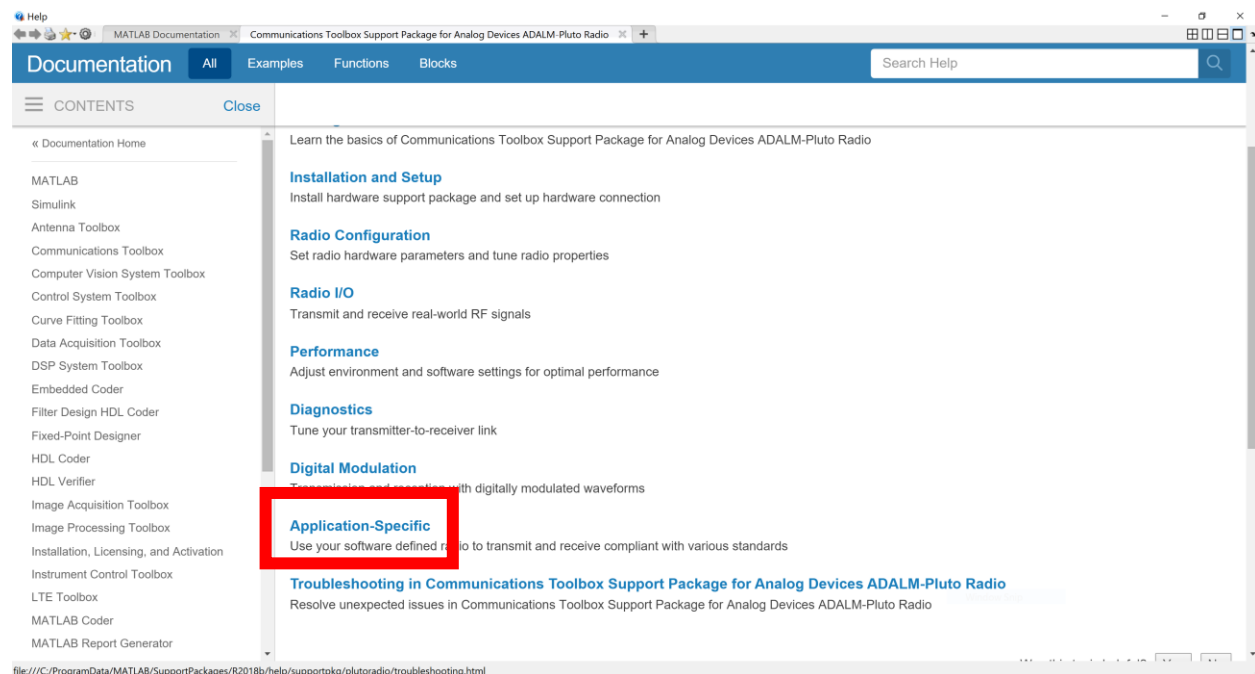


Figure 6

In the next page select “FM Broadcast Receiver”. Then click the “Open Model” link as shown in Figure 7.

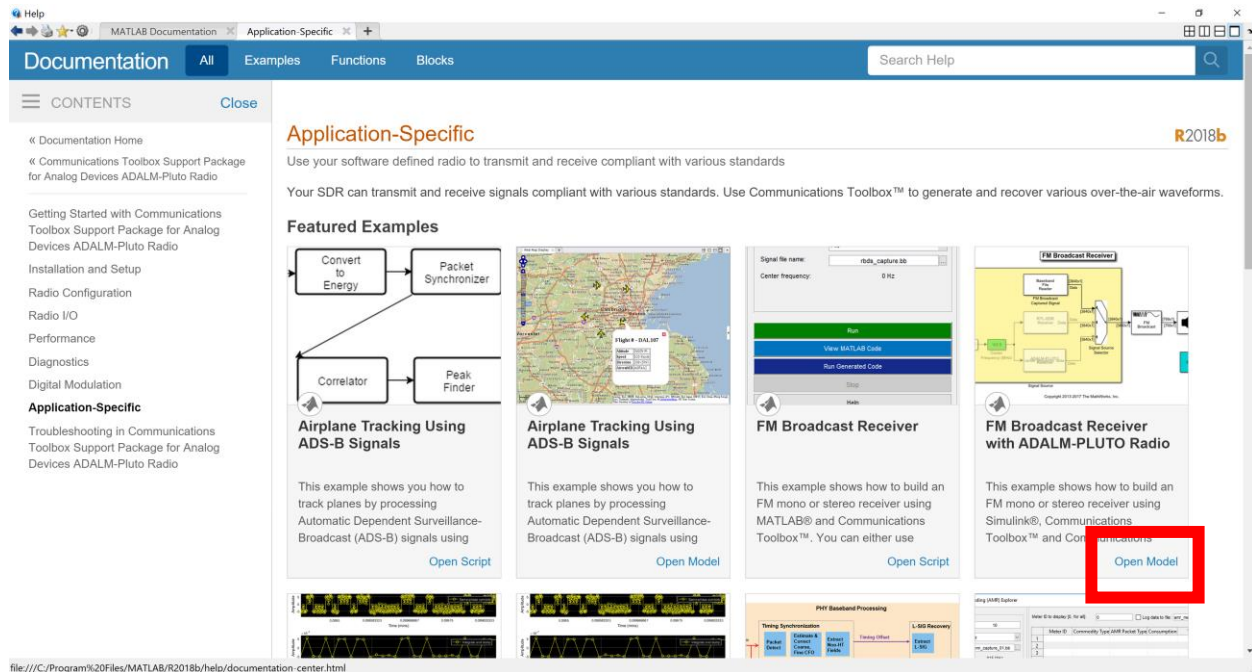


Figure 7

This will launch Simulink and the model of the FM Receiver with PlutoSDR. Since Simulink is opening for the first time it may take a minute for the model to open. Once open it should appear like Figure 8. Before we can run this model, we need to select PlutoSDR as our data source into the FM Receiver. To do so, double click twice on the “Signal Source Selector” block, which will move the source from the “Baseband File Reader” to “ADALM-PLUTO Receiver”, as shown in Figure 8.

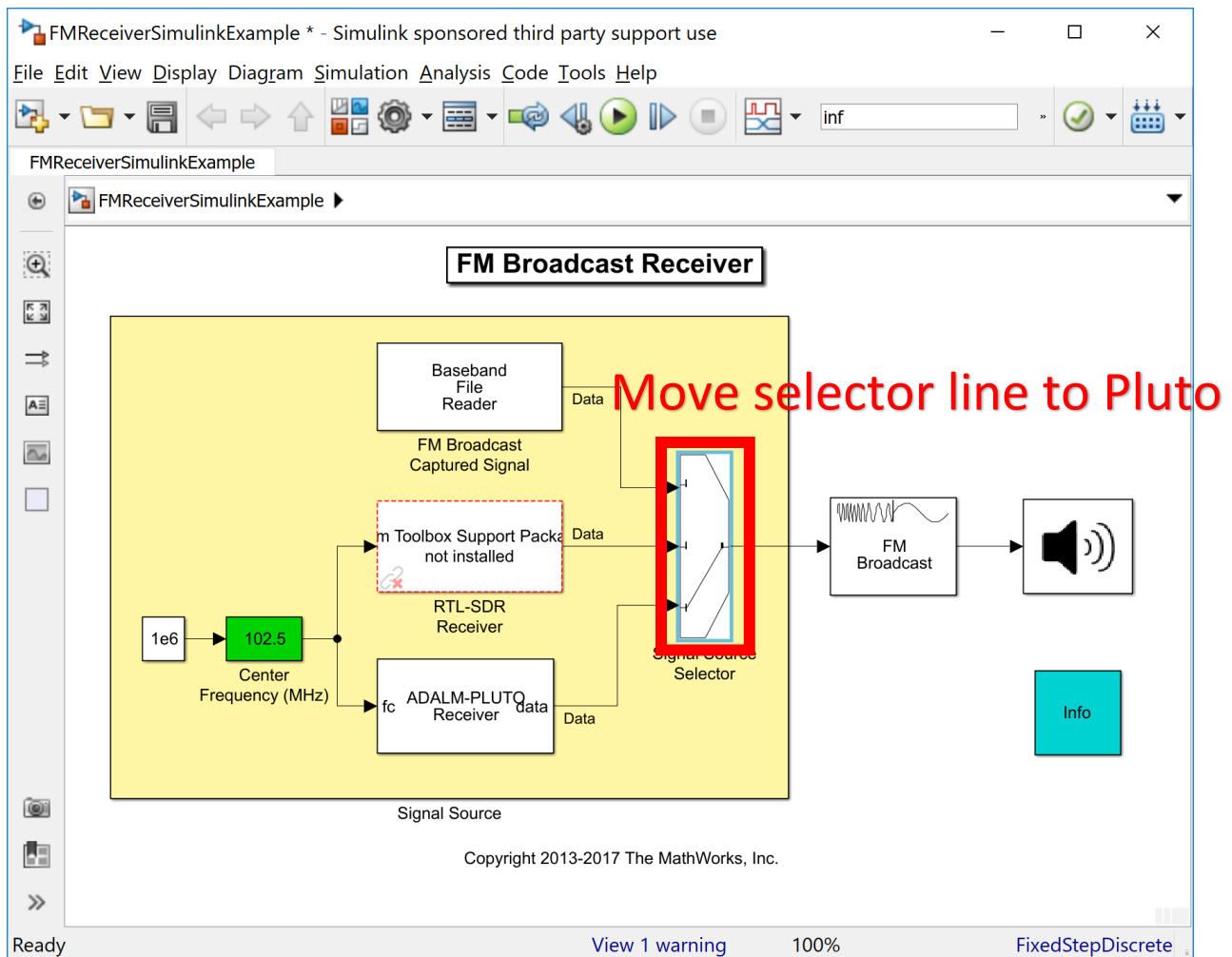


Figure 8

Before we run the model, launch the frequency selection slider, which is the green box highlighted in

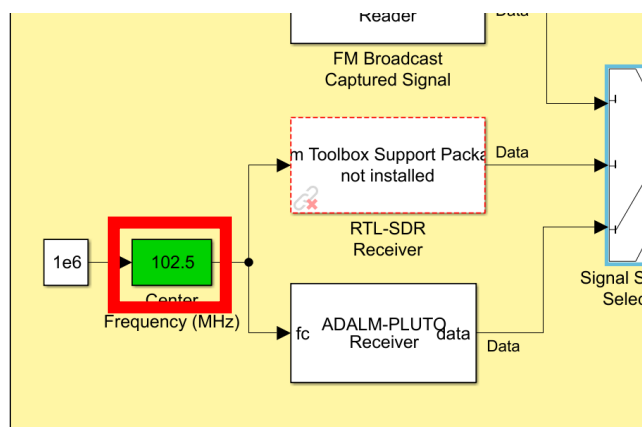


Figure 9

This will open a window like Figure 10, which will allow you to change the center frequency of PlutoSDR while the model is running.

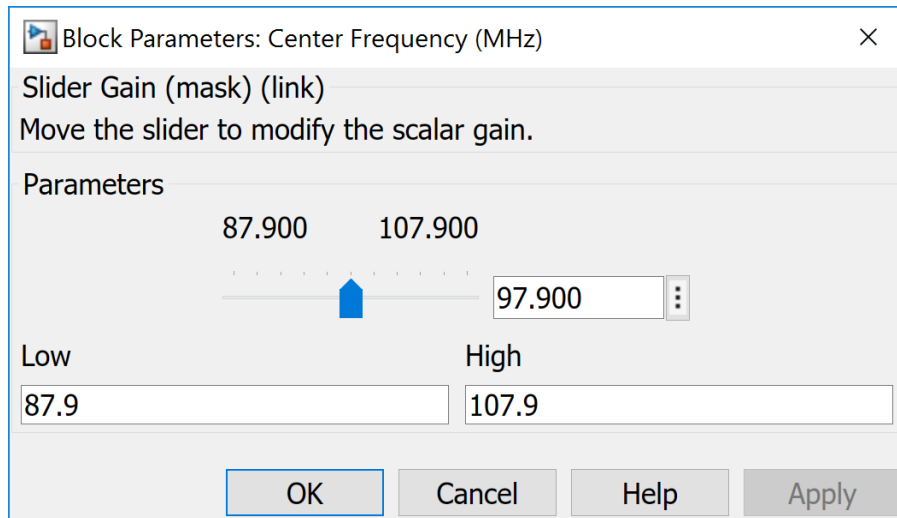
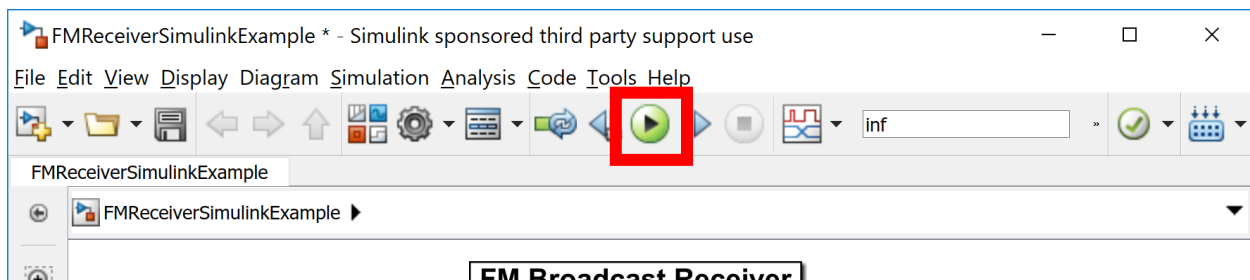


Figure 10

Back in the model window, press the green play button to run the model. Once running, change the slider to find a nearby FM station (The instructors will likely have found one you can tune to).



(With Time Remaining) MATLAB FM Receiver

If you have time remaining you can try out the MATLAB version of the FM Receiver. To do so run “FMReceiverExample” in the command prompt as shown in Figure 11.

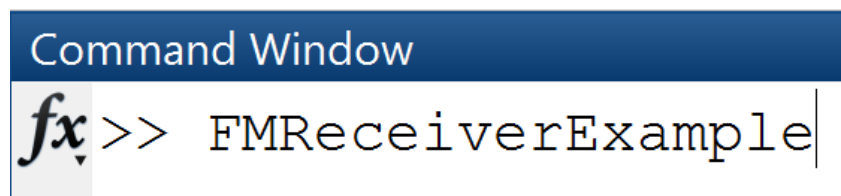


Figure 11

If you want to inspect the code of this example run the command “edit FMReceiverExample” as shown in Figure 12, which will launch the MATLAB editor with the source code available for the example. Feel free to inspect the functions and scripts used in this example.

Command Window

```
fx>> edit FMReceiverExample
```

Figure 12