



Getting Started Guide

mmWave LAB Medium Range Radar Beam Steering

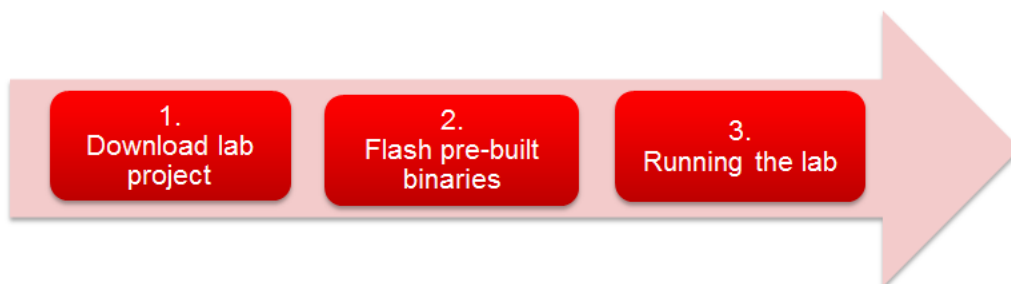
Overview

- This lab exercise demonstrates the use of the 6-bit phase shifter on AWR-1843 mmWave sensor to steer the beam at programmable angles with ranges up to 150m
- The mmWave sensor AWR1843BOOST evaluation module (EVM) is used for lab demonstration
- Multi-mode capability is implemented in the current MRR Lab .


Required Hardware

- AWR1843BOOST EVM RevB (**Note: For EVM RevA** See Appendix – ECO Required for AWR1843BOOST RevA)
- Micro USB cable (included in the EVM package)
- 5V/2.5A Power Supply
 - [Purchase from Digikey](#)
 - <https://www.digikey.com/product-detail/en/cuiinc/SMI36-5-V-P5/102-3589-ND/5415060>

Getting Started

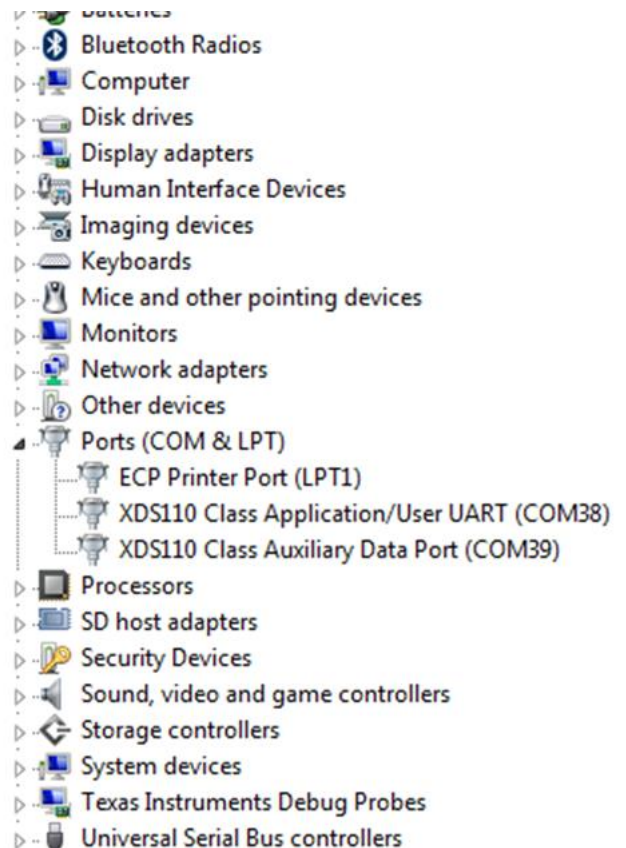


Step 1: Download the Lab Project

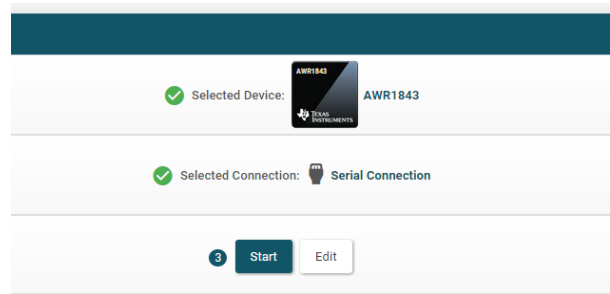
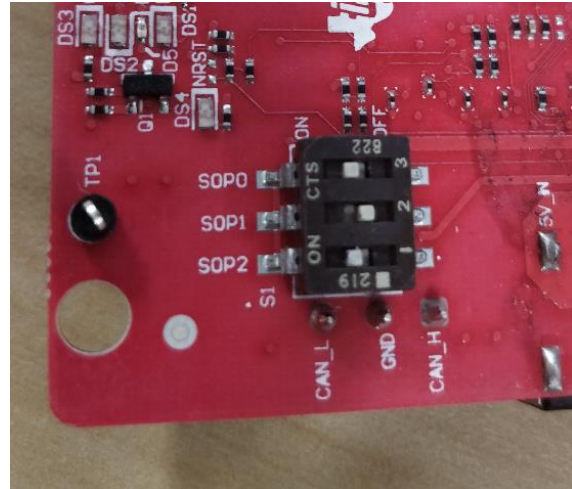
- The mmWave Lab projects are available as part of the TI CLOUD TOOLS under **Resource Explorer**
- Open the following page: <https://dev.ti.com/> and select **Resource Explorer**
- In the Resource Explorer Window, select **Software ► mmWave Sensors ► Automotive Toolbox**
- Click the Download button  in the window that opens on the right side
- Download and install the Automotive Toolbox zip file
- The pre-built binaries are located in the folder:
 - `\labs\lab0011-mrr-beamsteering\prebuilt_binaries\xwr18xx_mrr_demo.bin`

Step 2: Flash Lab Binaries

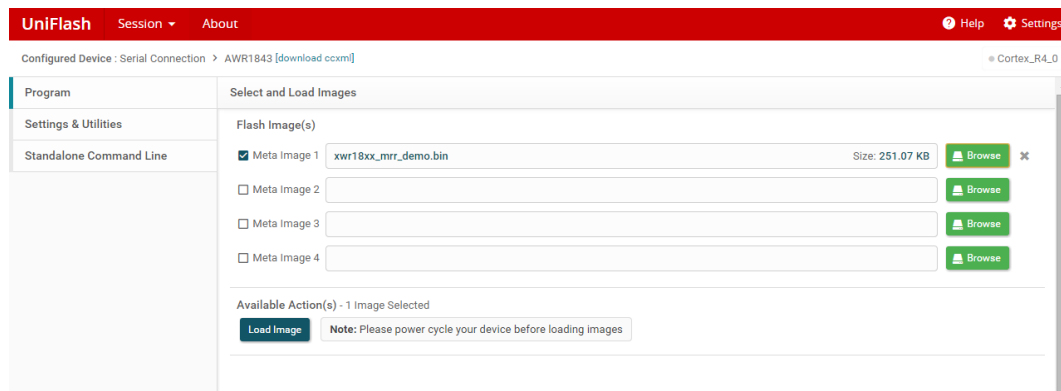
- Install [XDS Emulation Package](http://processors.wiki.ti.com/index.php/XDS_Emulation_Software_Package) on the PC host if needed from the following
 - http://processors.wiki.ti.com/index.php/XDS_Emulation_Software_Package.
 - If CCS is installed on the PC host, the XDS Emulation package has already been installed during the CCS installation process.
 - Power on the EVM using a 5V/2.5A power supply.
 - Connect the EVM to your PC and check the COM ports in Windows Device Manager
 - The EVM exports two virtual COM ports as shown below:
 - XDS110 Class Application/User UART (COM_{UART}):
 - Used for passing configuration data and firmware to the EVM
 - XDS110 Class Auxiliary Data Port (COM_{AUX})
 - Used to send processed radar data output
 - Note the COM_{UART} and COM_{AUX} port numbers, as they will be used later for flashing and running the Lab.
- COM_{UART}: COM38 COM_{AUX}: COM39**
- The actual port numbers on your machine may be different



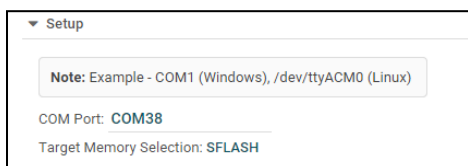
- Set the Dip Switch SOP0=ON; SOP1=OFF; SOP2=ON as shown in the image.
- Open the **UniFlash** tool
- Download from [TI.com/tool/uniflash](http://ti.com/tool/uniflash)
- In the **New Configuration** section, locate and select the appropriate device AWR1843BOOST
- Click **Start** to proceed



- In the **Program** tab, browse and locate demo binary file shown in Step 1



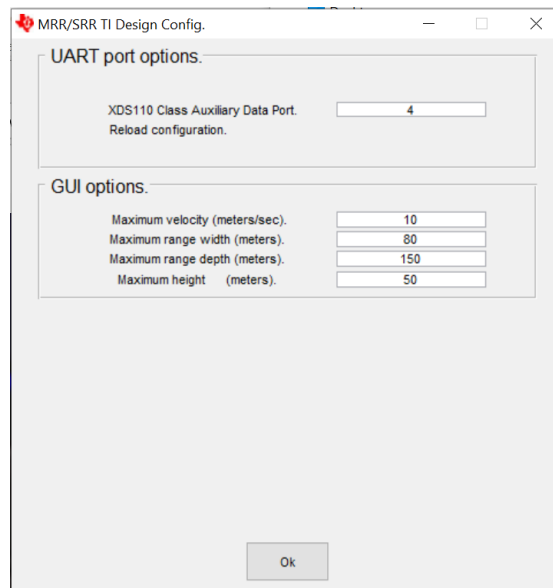
- In the **Settings & Utilities** tab, fill the **COM Port** text box with the Application/User UART COM port number (**COM_{UART}**) noted earlier



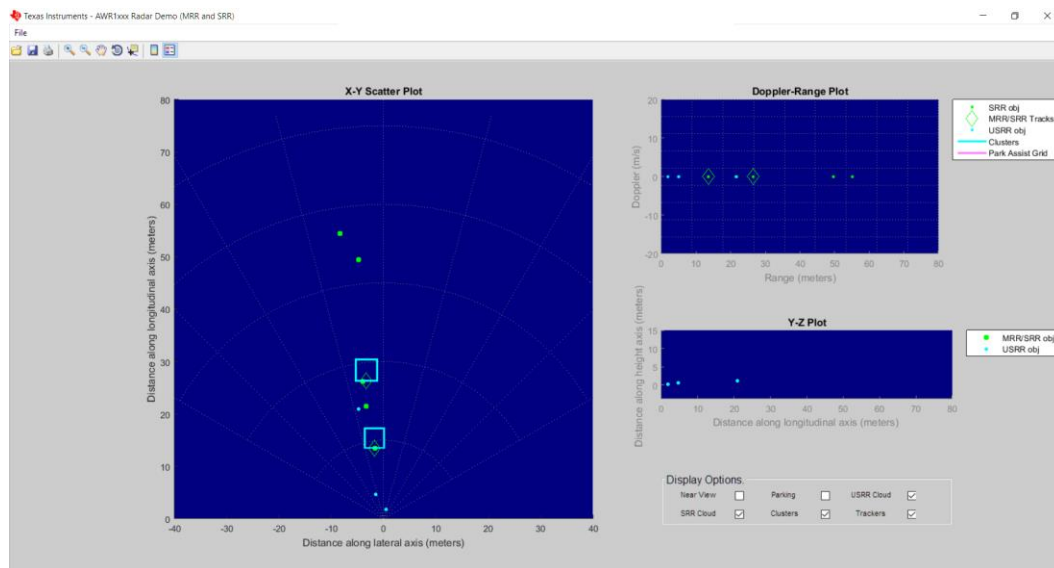
- Return to the **Program** tab, power cycle the device and click on **Load Images**
- When the flash procedure completes, UniFlash's console should indicate: [SUCCESS] Program Load completed successfully
- Power off the board and set the Dip Switch SOP2=OFF (this puts the board back in functional mode).

Step 3: Run the Lab

- Execute the Demo GUI located in:
 - `\labs\lab0011-mrr-beamsteering \ gui\MRRvisualization\mRR_Viz_1_4.exe`
 - [As such, the GUI requires a specific Matlab runtime engine \(v8.5.1 32-bit\) to properly install.](#)
 - [The executable provided only works in a Windows operating system](#)



- In the GUI, select “UART port options”. Provide the **COM Port** with the Auxiliary Data COM port number (**COM_{AUX}**) noted earlier.
- Check that EVM is powered on and the USB cable connected to the PC host running the GUI. In the GUI, select “Ok”.
- A snapshot of the PC-GUI showing the measured MRR visualization is shown below



- In the prebuild binaries, the beam steering is configured as follows
 - Max Angle = 60 deg
 - Min Angle = -60 deg
 - Angle Step Size = 20 deg
 - The beams are alternating as follows:
 - -60deg; -40deg; -20deg; 0deg; 20deg; 40deg; 60deg; -60deg; -40deg....
- In the prebuild binaries, the frame duration is 60ms, so the beam steering cycling time is 7 x 60ms

Appendix – ECO Required for AWR1843BOOST RevA

MRR TIREX Lab enables the Tx beamforming by enabling all the 3 Tx simultaneously and this would require to use the 1V supply.

On the AWR1843BOOST EVM RevA the 1V supply does not by default go to the VOUT PA pin, there is a zero ohms resistor (R137) that needs to be mounted. The resistor is on the bottom of the board, just below the AWR device, near the VOUT PA pin.

Below are the schematic and the placement details:

