AN24-04 DemoRad
Accessing Calibration Data

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1 Accessing Calibration Data

In this application note we show how to read the antenna positions and how to access the calibration data. The antenna positions are stored in the `Adf24Tx2Rx4` class and cannot be altered. The calibration data is stored on the EEPROM of the DemoRad board as each module is calibrated individually.
The aim of the tutorial is to:

- read the antenna positions,
- access calibration data, and
- understand calibration data.

The DemoRad has two transmit and four receive antennas. The receive antennas are arranged as uniform linear array with a spacing of half the free-space wavelength at 24.125 GHz. In Fig. 1 the positions of the patch antennas are plotted for a front view of the radar system. The center of the arbitrarily chosen coordinate system is placed at the second transmit antenna.

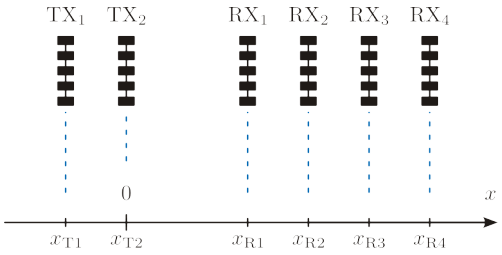

Figure 1: Antenna positions for a front view of the radar system.

In the first step the DemoRad must be powered on and connected to the PC. In addition the required Matlab classes and the `DemoRadUsb` mex file must be added to the Matlab path. After generating a class object

```
Brd = AdfTx2Rx4();
```

the antenna positions as well as the calibration data can be accessed. To read the positions of the transmit antennas

```
TxPosn = Brd.RfGet('TxPosn')
```

the method `RfGet` with argument `'TxPosn'` is called. In case of the `Adf24Tx2Rx4` class an array with two entries $[x_{\mathrm{T1}}, x_{\mathrm{T2}}]$ is returned. To read the receive positions

```
RxPosn = Brd.RfGet('RxPosn')
```

the method must be called with argument `'RxPosn'`. The returned array has four entries

$$\texttt{RxPosn} = [x_{\mathrm{R1}}, x_{\mathrm{R2}}, x_{\mathrm{R3}}, x_{\mathrm{R4}}]$$

holding the x-positions of the receive antennas. In the next step we show how to access the calibration data stored in the EEPROM of the board.

Read Calibration Data

To access the calibration data the method

```
CalDat = Brd.BrdGetCalDat();
```

is called. The method returns an array `CalDat` with eight complex values. These correspond to all possible transmit and receive antenna combinations. The first entry corresponds to TX antenna 1 and RX antenna 1 as shown in Fig. 2.

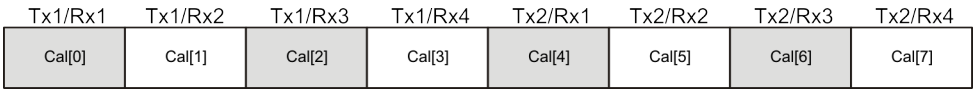

Figure 2: Format of the calibration data stored in the EEPROM.

In the EEPROM also the calibration setup is stored. The method

```
CalDat = Brd.BrdGetCalInf();
```

returns a structure

```
      Type: 1
      Date: 0
         R: 5.1000
       RCS: 1
    TxGain: 100
    IfGain: 11.2000
```

which summarizes the calibration setup. The field `'RCS'` defines the radar cross-section of the corner cube used for calibration and the field `'R'` holds the distance between the corner cube and the radar system during calibration.