

This document explains step by step programming for 16 RX NCO switching mode of AFE79xx. The steps involved are updating AFE configuration to enable 16 NCOs, Programming NCO frequencies and switching between the NCOs.

1. AFE configuration script updates

Update AFE configuration parameter script by adding below highlighted lines to configure 16 RX NCOs:

```
##### GPIO #####
sysParams.gpioMapping = {
'H8': 'ADC_SYNC0',
'H7': 'ADC_SYNC1',
'N8': 'ADC_SYNC2',
'N7': 'ADC_SYNC3',
'H9': 'DAC_SYNC0',
'G9': 'DAC_SYNC1',
'N9': 'DAC_SYNC2',
'P9': 'DAC_SYNC3',
'P14': 'GLOBAL_PDN',
'K14': 'FBABTDD',
'R6': 'FBCDTDD',
'H15': ['TXATDD', 'TXBTDD'],
'V5': ['TXCTDD', 'TXDTDD'],
'E7': ['RXATDD', 'RXBTDD'],
'R15': ['RXCTDD', 'RXDTDD'],
'G6': 'RX_NCOSEL_0',
'G7': 'RX_NCOSEL_1',
'G8': 'RX_NCOSEL_2',
'R5': 'RX_NCOSEL_3'}

##### 16 RX NCOs #####
sysParams.ncoFreqMode = "FCW"

sysParams.ncoRxMode = [6,6]
sysParams.broadcastRxNcoSel = 1
sysParams.numRxNCO = 2

##### LMK Params #####
lmkParams.pllEn = True
lmkParams.inputClk = 983.04 # Valid only when lmkParams.pllEn =
False
lmkParams.lmkFrefClk = True
setupParams.fpgaRefClk = 245.76 # Should be equal to LaneRate/40
for TSW14J56
```

Note that RX_NCOSEL_0-3 GPIO functions can be assigned to AFE79xx GPIO balls by updating 'gpioMapping' parameter. In the above example script, these are assigned to GPIO balls: G6, G7, G8 and R5.

2. Programming RX NCO frequencies

After configuration is complete, “AFE.updateRxNcoMultiNcoMode” function can be used to program 16 RX NCO frequencies.

updateRxNcoMultiNcoMode Function definition:

AFE.updateRxNcoMultiNcoMode(Rx_ch_num, NCO_freq_in_MHz, NCO_num)

Rx_ch_num – RX channel number: 0 = RX_A; 1 = RX_B, 2 = RX_C, 3 = RX_D,

NCO_freq_in_MHz – NCO frequency to be programmed in MHz

NCO_num – NCO number of NCO to be programmed: Value from 0 to 15

Examples:

1. Program NCO_0 of RX_A to 2600MHz: AFE.updateRxNcoMultiNcoMode(0,2600,0)
2. Program NCO_4 of RX_C to 3500MHz: AFE.updateRxNcoMultiNcoMode(2,3500,4)
3. Program NCO_15 of RX_D to 2605MHz: AFE.updateRxNcoMultiNcoMode(3,2605,15)

3. Switching NCOs:

The RX_NCOSEL_x inputs can be set to ‘Logic High =1’ or ‘Logic Low =0’ to switch between NCOs. Below table shows values of RX_NCOSEL_x inputs and corresponding NCO selected for all RX channels.

RX_NCOSEL_3	RX_NCOSEL_2	RX_NCOSEL_1	RX_NCOSEL_0	NCO selected
0	0	0	0	NCO_0
0	0	0	1	NCO_1
0	0	1	0	NCO_2
0	0	1	1	NCO_3
0	1	0	0	NCO_4
0	1	0	1	NCO_5
0	1	1	0	NCO_6
0	1	1	1	NCO_7
1	0	0	0	NCO_8
1	0	0	1	NCO_9
1	0	1	0	NCO_10
1	0	1	1	NCO_11
1	1	0	0	NCO_12
1	1	0	1	NCO_13
1	1	1	0	NCO_14
1	1	1	1	NCO_15

To configure NCO selection programming through SPI instead of GPIO inputs, these inputs can be overridden through SPI. “AFE.IOWRAP.overrideFunction” function can be used for this.

AFE.IOWRAP.overrideFunction function definition:

AFE.IOWRAP.overrideFunction('RX_NCOSEL_x', override_enable, override_value)

Examples:

1. Override RX_NCOSEL_0 to Logic High:
AFE.IOWRAP.overrideFunction("RX_NCOSEL_0",1,1)
2. Disable override RX_NCOSEL_0:
AFE.IOWRAP.overrideFunction("RX_NCOSEL_0",0,0)