

This document explains step by step programming for 16 TX 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 TX 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'],
'E6': 'TX_NCOSEL_0',
'C5': 'TX_NCOSEL_1',
'P16': 'TX_NCOSEL_2',
'C6': 'TX_NCOSEL_3'}

##### 16 TX NCOs #####
sysParams.ncoFreqMode = "FCW"
sysParams.txChainDirectCtrl=True
sysParams.ncoTxMode = [3,3]
sysParams.broadcastTxNcoSel = 1
sysParams.numTxNCO = 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 TX_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: E6, C5, P16 and C6.

2. Programming TX NCO frequencies

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

updateTxNcoMultiNcoMode Function definition:

AFE.updateTxNcoMultiNcoMode(Tx_ch_num, NCO_freq_in_MHz, NCO_num)

Tx_ch_num – TX channel number: 0 = TX_A; 1 = TX_B, 2 = TX_C, 3 = TX_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 TX_A to 2600MHz: AFE.updateTxNcoMultiNcoMode(0,2600,0)
2. Program NCO_4 of TX_C to 3500MHz: AFE.updateTxNcoMultiNcoMode(2,3500,4)
3. Program NCO_15 of TX_D to 2605MHz: AFE.updateTxNcoMultiNcoMode(3,2605,15)

3. Switching NCOs:

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

TX_NCOSEL_3	TX_NCOSEL_2	TX_NCOSEL_1	TX_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('TX_NCOSEL_x', override_enable, override_value)

Examples:

1. Override TX_NCOSEL_0 to Logic High:
AFE.IOWRAP.overrideFunction("TX_NCOSEL_0",1,1)
2. Disable override TX_NCOSEL_0:
AFE.IOWRAP.overrideFunction("TX_NCOSEL_0",0,0)