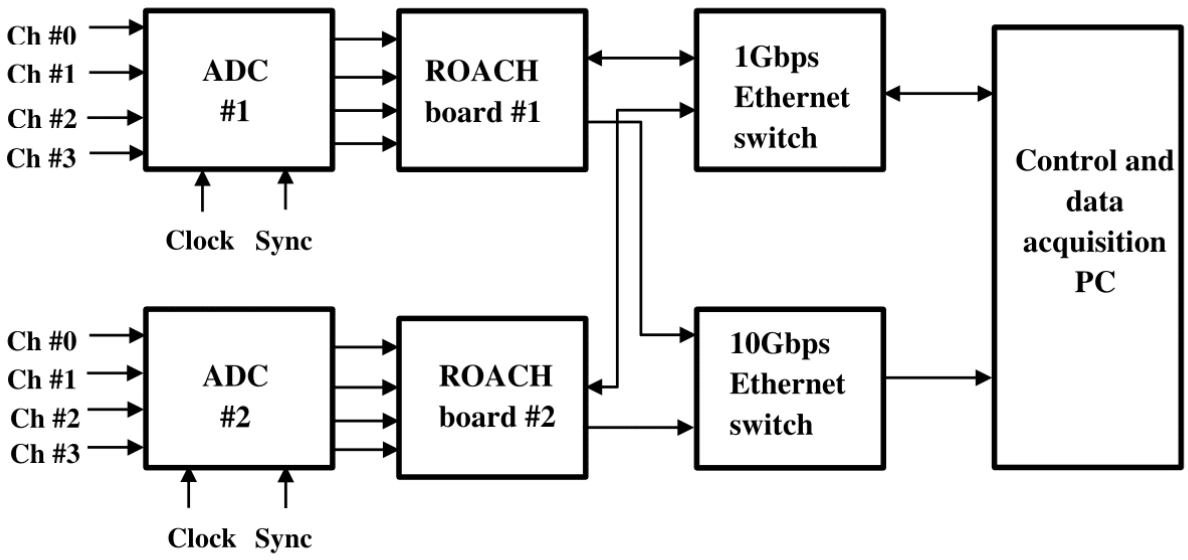
SCALABLE ARCHITECTURE TEST

28th April 2017

model file name: 'off_corr_sync3.mdl'
BOF file name: 'off_corr_sync3_2016_Nov_25_1745.bof'
correlation: Offline
Number of input: 8
Script used:

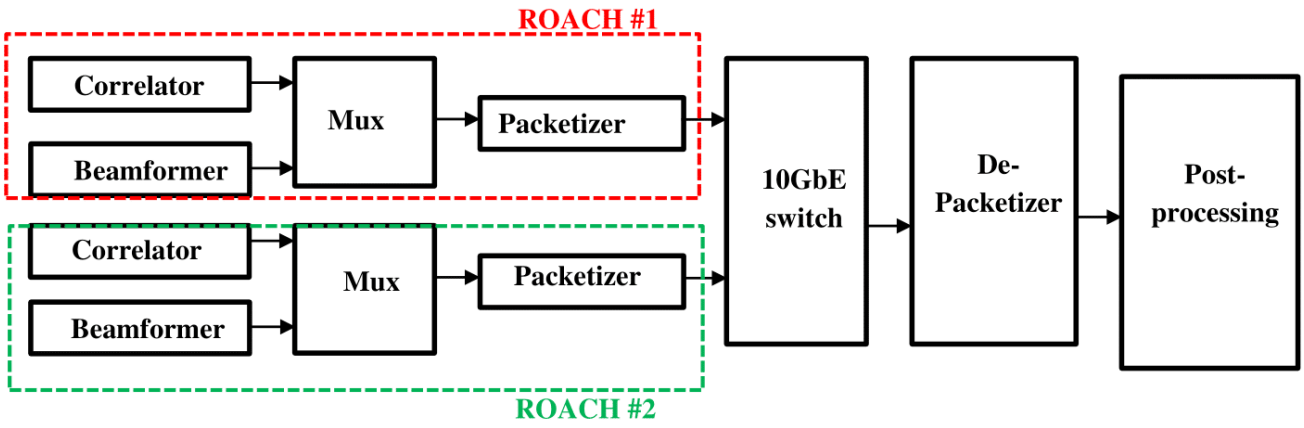
No	Script Name	Description
1	./ini_4ant_2beam12.py	This is initialization scripts, which is used to load .boffiles into ROACH board.
2	./phase_add_four_ant_two_beam_argu.py	It is used for dumping phase value externally.
3	./final_corr_depack_two2 'packet name' 'packet size' 1	For extracting capture packets we use this script.
4	./beam_corr_select.py	This script use to select either correlator or beam data
5	./ final_beam_depack_two2	beam data depacketization object file
6	./ final_corr_depack_two2	Correlator data depacketization object file
7	correlation_scal.m	Offline correlation script
8	beam_process_scal.m	Offline beam processinng script

Block diagram:



[note:we can apply internal sync]

Data flow diagram:



Step1:initialization and load .boffiles into ROACH board.run following command

"./int_4ant_2beam12.py"

set register "sync_s"1 for internal sync and 0 for external sync

Step2: Initially dump amplitude (value 1) and phase zero run following command ,

"./phase_add_four_ant_two_beam_argu.py zero.txt array.txt zero.txt array.txt zero.txt array.txt zero.txt array.txt zero.txt array.txt zero.txt array.txt zero.txt array.txt"

Step3: Select either correlator or beam data,run following commands

"./beam_corr_select.py"

set register "corr_s"0 for beam output and 1 for correlator output

step4: Record data using gulp run following command

./gulp -i eth1 > <packet_name>

Step5: Depacketization of data

a)Beam data depacketization run following command

"./final_beam_depack_two2 <packet> 2090 1"

b) Correlator data depacketization,run following command

"./final_corr_depack_two2 <packet> 2090 1"

Step6: To obtain Offline correlation run following MATLAB script "correlation_scal.m"

S**tep7:**Create phase file to check phase multiplication part
"./txt_file_creator.py <phase1_value> <phase2_value> <phase3_value> <phase4_value> <phase5_value> <phase6_value> <phase7_value> <phase8_value>"
eg: "/txt_file_creator.py 1.0 180.0 180.0 180.0 180.0 180.0 180.0 180.0"
S**tep7:**Dump phase values to check multiplication part,cancellation in beam one
"./phase_add_four_ant_two_beam_argu.py zero.txt array.txt array1.txt array.txt array1.txt array.txt zero.txt array.txt zero.txt array.txt zero.txt array.txt zero.txt array.txt"

Results:
Single board
check offline correlation and phase correction
1)Before phase correction

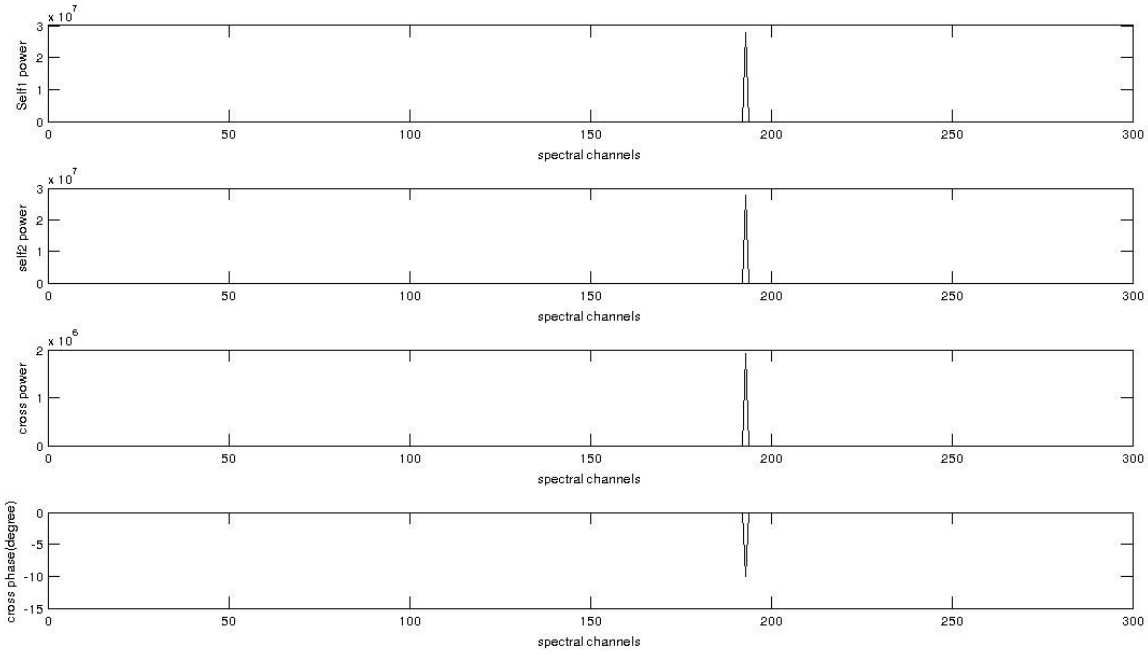


Fig1:offline correlation before phase correction(In this plot sub-plot 1st and 2nd show the self-power of two input elements.3rd sub-plot show cross-power of two input elements, and 4th sub-plot show cross-phase of two input elements)

2)After phase correction

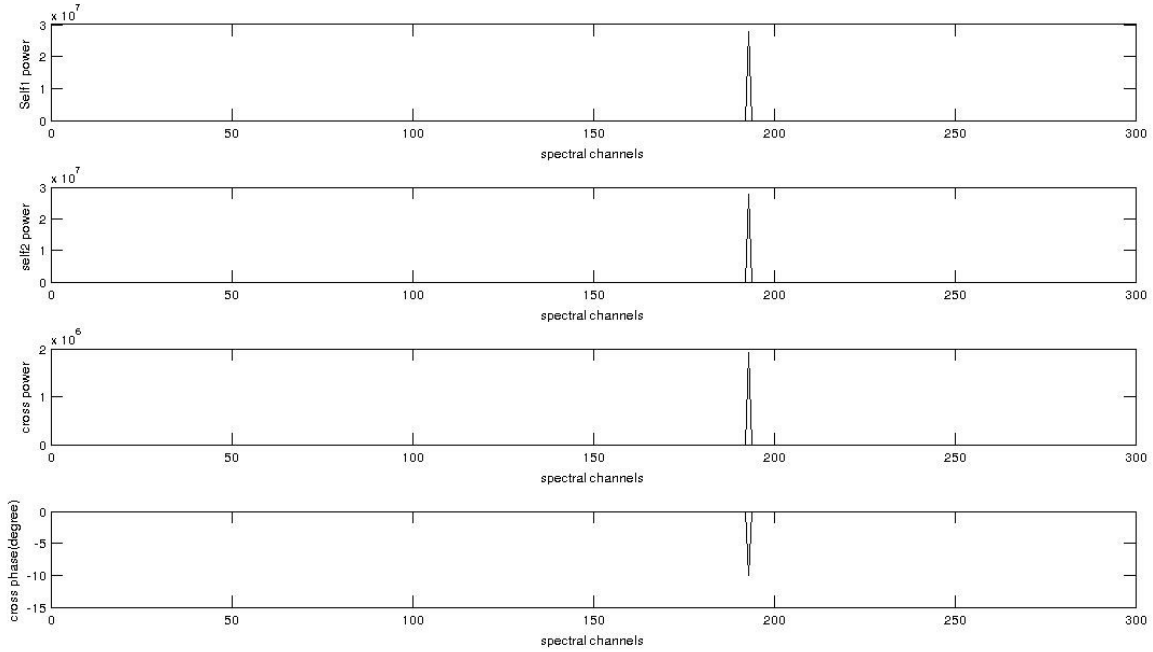


Fig2:offline correlation before phase correction(In this plot sub-plot 1st and 2nd show the self-power of two input elements.3rd sub-plot show cross-power of two input elements, and 4th sub-plot show cross-phase of two input elements)

Check weight multiplication part by applying 180 phase

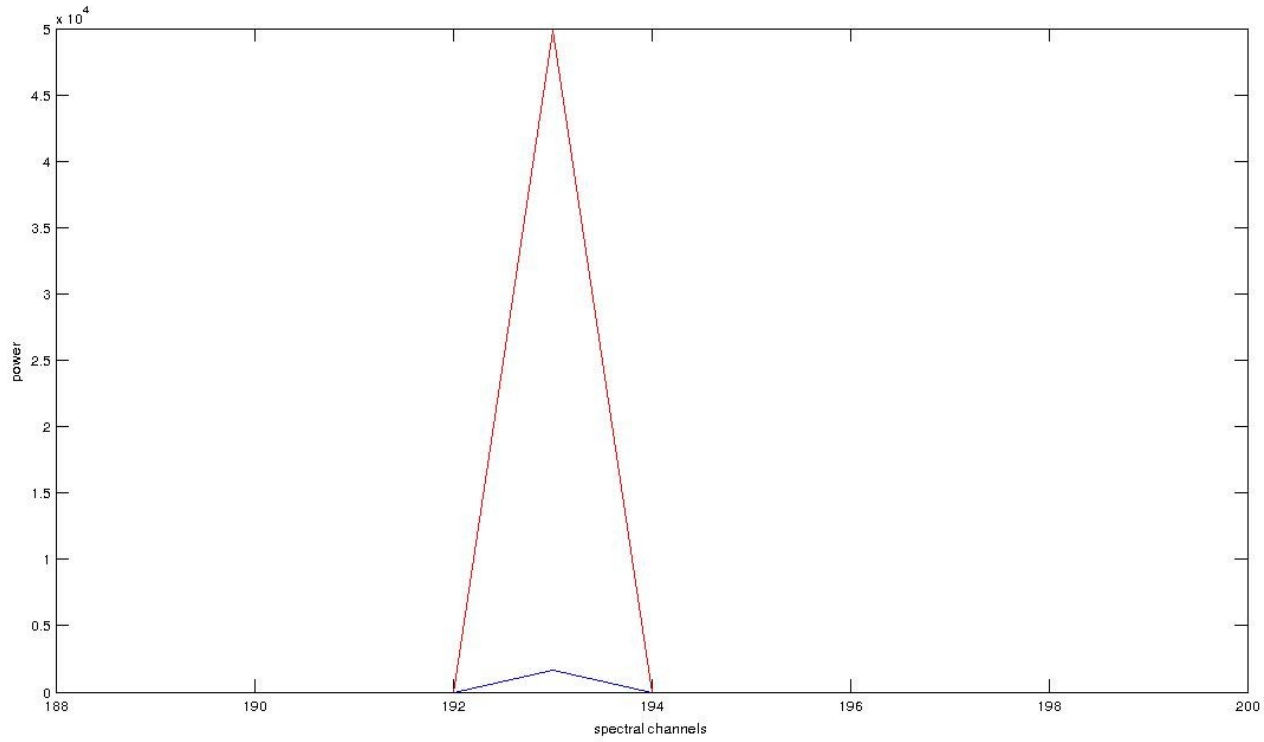


Fig3:sine wave cancellation beam output (spectral channel vs power) ,red plot is in-phase addition and black is out-off phase addition

Status of testing:
1) Beam part for single board working
2)Offline correlation part up to depacketization working
3)offline correlation phase computation related issu
4)two board testing issue with sync part .