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ARX RevH Testing
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1) Setting up for testing.

- Make sure power to the board is off
- Connect the serial command lines. (see Figure 1)
- Connect all the outputs to the ARX board
- Connect the input to channel 1 on the ARX board
- Connect and turn on power to the ARX board (black wire will be closest to the power supply and red wire will be closest to you with the board having input-side up).

2) Set up two windows on LWAlab2 and get the left window into the LWA-NA/testing directory and the right window into the LWA-NA directory.

- left window:

`./fshScan2.py`

to check if the control software is happy and communicating with the device controller. There are no inputs and if all is well it will complete in a few seconds. If there are problems with the device then it might hang.

- right window:

`./lwaARXserial` to grab data from the spectrum analyzer

- left window:

`./sendSwarmASP.py NNNN FIL 00000`

where NNNN is the ARX board number

3) Start testing

- In left window run `./testSwarmARXChannel.sh` you will be prompted for the serial number of the ARX board to test then the channel number to test
- Make sure that the spectrum analyzer shows a reasonable looking signal (not just noise; see Figure 2). It's ok if it goes off screen.

4) Check results

New window in LWA-NA/testing directory:

- run `./buildFilterTemplates.py` to create master filter template
- run `./analyzeARXChannel.py board_NNNN_channel_#_*`
for each channel# (1 – 16) and check that the results look normal

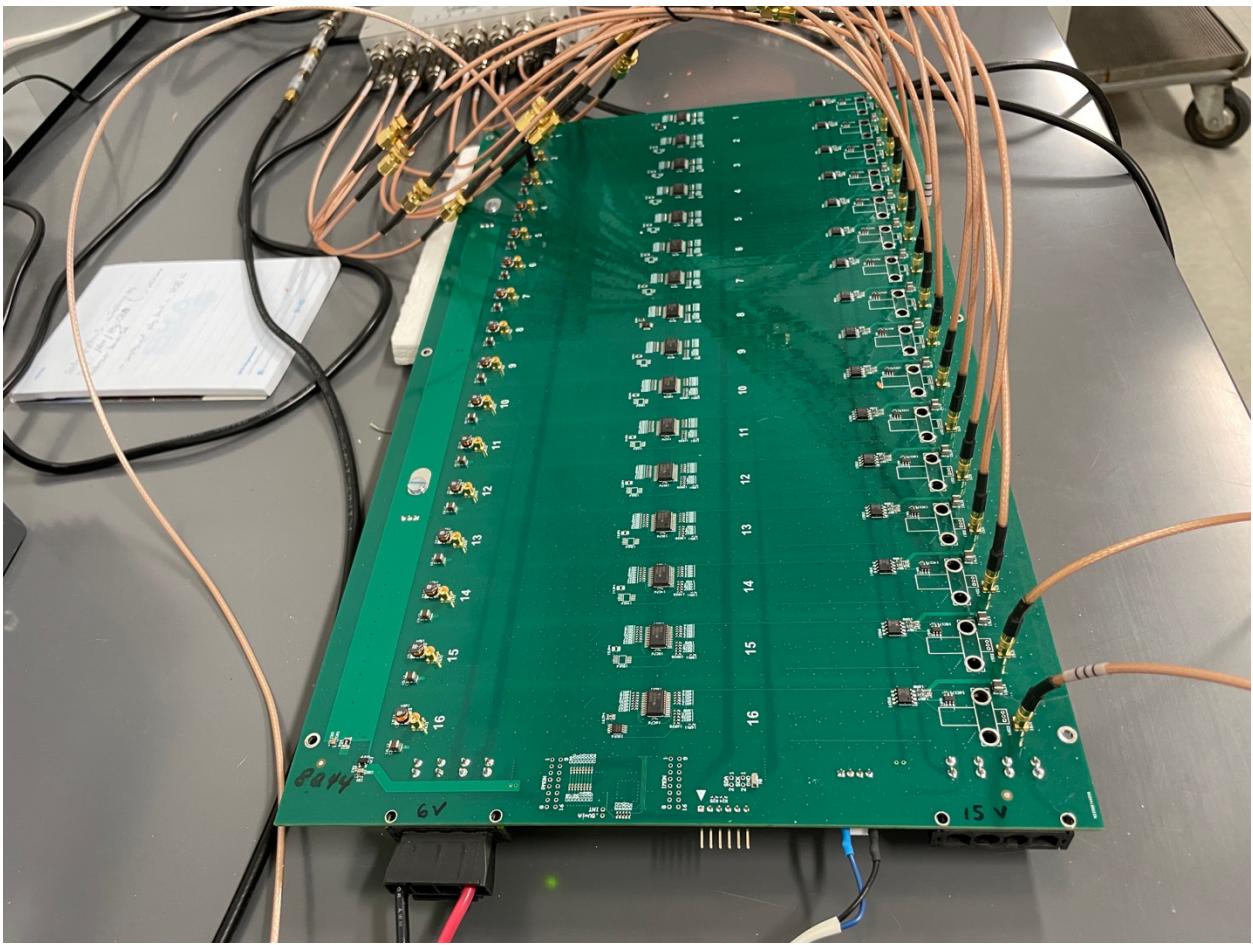


Figure 1. The ARX Rev H board set up for testing. Note serial command lines on the outer pins and the configuration of the power.



Figure 2. Sample spectrum

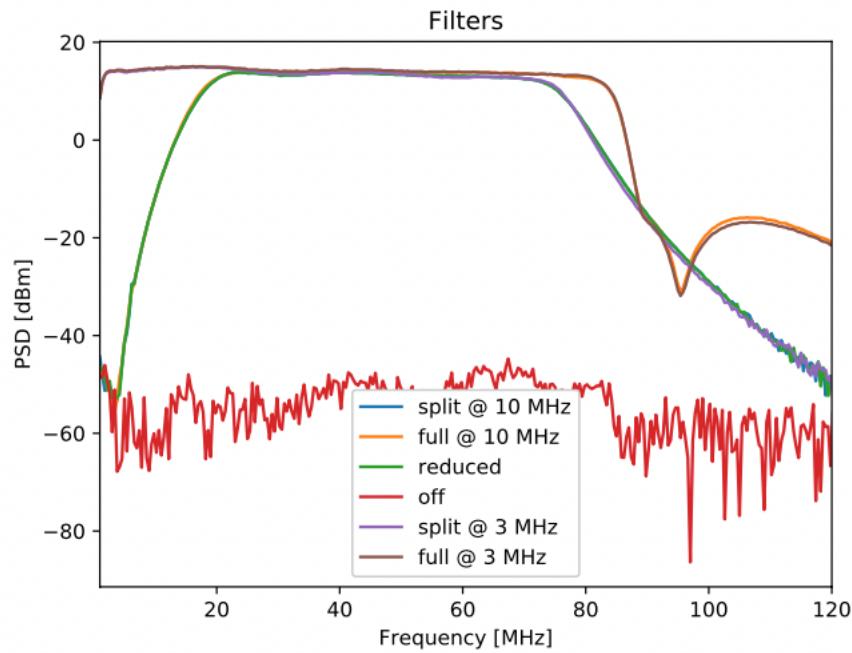


Figure 3. Plot of all the various filters for a good channel on a Rev H board.

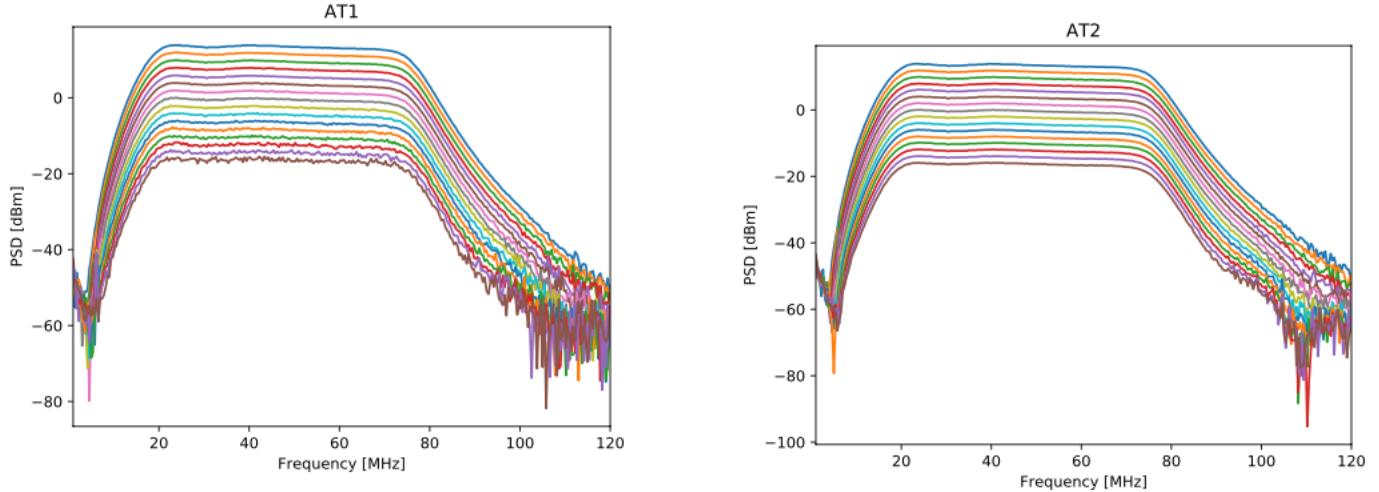


Figure 4. Plots of AT1 (left) and AT2 (right) attenuator settings.

4) Results of testing

Sample plots generated from the tests can be seen in Figures 3 and 4.

ARX boards testing notes

Numbers in parenthesis show approximate difference (in dB) or range of differences (# -> #) between model and measurement.

Board 8243

- channel 1, AT1@12,13,14,15 (0.5 dB difference (approx.))
- channel 2, AT2@12,13,14,15 (0.5)
- channel 4, AT2@12,13,14,15 (0.5)
- channel 14, AT2@12,13,14,15 (0.5)
- channel 15, AT2@12,13,14,15 (0.5)

Board 8244

- channel 2, AT1@15 (0.5)
- channel 5, AT2@12,13,14,15 (0.6)
- channel 7, AT2@12,13,14,15 (0.5)
- channel 10, AT2@8,9,10,11,12,13,14,15 (0.5 -> 0.8)

Board 8245

- channel 8, AT2@12,13,14,15 (0.5 -> 0.6)
- channel 9, AT2@15 (0.5)

Board 8246

- channel 1, AT2@12,13,14,15 (0.5->0.6)
- channel 4 looks a bit weird compared to others
- channel 5, AT1@15, AT2@12,14,15 (0.5)

channel 8, AT1@15 (0.5)
channel 12, AT2@12,13,14,15 (0.5)

Board 8247

channel 2, AT1@15 (0.5)
channel 5, AT1@15 (0.5)
channel 6, AT2@15 (0.5)
channel 8, AT1@13,15 (0.5)
channel 12, AT1@13,15 (0.5)
channel 14, AT2@12,13,14,15 (0.5 -> 0.6)

Board 8248

channel 3, AT2@10,11,12,13,14,15 (0.5 -> 0.7)
channel 11, AT1@12,13,14,15 (0.5 -> 0.7)
channel 12, AT2@15 (0.5)

Board 8249

channel 1, AT2@12,13,14,15 (0.6 -> 0.7)
channel 3, AT2@15 (0.5)
channel 5, AT2@12,13,14,14 (0.5)
channel 7, AT1@13,14,15 (0.5 -> 0.6)
channel 8, AT1@12,13,14,15 (0.5 -> 0.7)
channel 11, AT1@14,15 (0.5, 0.6)
channel 12, AT1@11,12,13,14,15 (0.5 -> 0.7)
channel 13, AT1@13,15 (0.5, 0.6)

Board 8250

channel 1, AT1@14,15 (0.5)
channel 5, AT2@8,9,10,11,12,13,14,15 (0.5 -> 0.8)
channel 8, AT2@12,13,14,15 (0.6 -> 0.7)
channel 9, AT1@15, AT2@12,13,14,15 (0.5)
channel 11, AT2@12,13,14,15 (0.6)
channel 13, AT2@12,13,14,15 (0.5)
channel 15, weird bump in higher frequencies
channel 16, AT1@11,12,13,14,15 (0.5 -> 0.6)

Board 8251

channel 11, AT1@12,13,14,15 (0.5 -> 0.7)
channel 15, weird bump in higher frequencies

Board 8252

channel 5 AT2@12,13,14,15 (0.5 -> 0.6)
channel 7 AT2@12,14,15 (0.5)
channel 10 AT1@15 (0.5)

channel 11 AT1@15 (0.5)

channel 12 AT1@15 (0.5)

channel 14 AT2@12,14,15 (0.5)

channel 16 AT1@8,9,10,11,12,13,14,15 (2.4 -> 2.7 dB) !!!