

LANforge CLI CT712 DFS / RF Generation, Japan W53 - Functionality

Goal: Show usage of lf_hackrf_dfs.py and lf_pulse_detect3.py for Japan W53 DFS testing.

This document describes the command line interface to generate Japan W53 pulses for DFS (Dynamic Frequency Selection) Testing. The pulses / chirps implemented will be described first then how to execute using the CLI.

Known Issues:

none known

Pulse Detect

Pulse detect may be used with a second hackrf to monitor the signals produced by the first hackrf.

- command line
 - ./lf_pulse__detect3_pw.py --freq <'center frequency' in Mhz> --lf_hackrf <'hackrf serial'>
 - example
 - `./lf_pulse_detect3_pw.py --freq 5320 --lf_hackrf c2b4aa75f`

W53 Radar Test Waveform

In W53 band, there are two fixed pulse radar test waveforms, two variable pulse radar test waveforms and six chirp radar test waveforms.

Fixed Pulse Radar Test Waveform

| Test Signal Fixed Pulses | Pulse Width (us) | Pulse Repetition Frequency (Hz) | Number of Continuous Pulses | Repetition Cycle (s) |
|--------------------------|------------------|---------------------------------|-----------------------------|----------------------|
| Pulse 1 | 1.0 | 840 or 1120 | 18 | 15.0 |
| Pulse 2 | 2.7 | 260 | 18 | 15.0 |

Variable Pulse Radar Test Waveform

| Test_Signal (variable pulse) | Pulse Width (us) | Pulse Repetition Frequency (Hz) | Number of Continuous Pulses | Repetition Cycle (s) |
|------------------------------|------------------|---------------------------------|-----------------------------|----------------------|
| Pulse 3 | 0.5-5.0 | 200-1000 | 10-40 | 12.0 |
| Pulse 4 | 0.5-15.0 | 200-1600 | 15-40 | 12.0 |

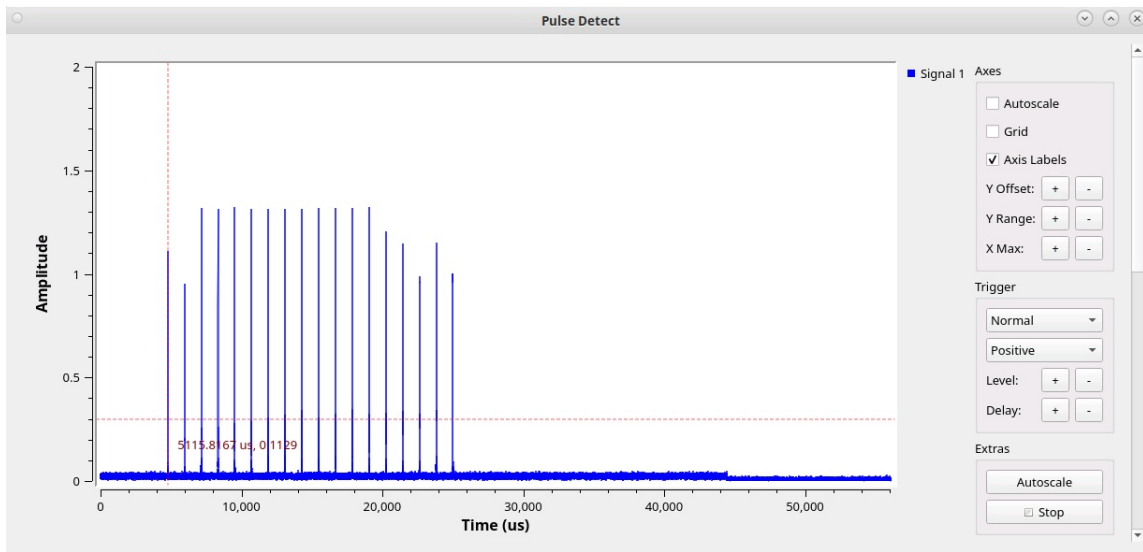
Chirp Radar Test Waveform

| Test_Signal (Chirp) | Pulse_Width (us) | Blank_Time T1 (us) | Long Pulse Width (us) | Chirp_Width (Mhz) | Pulse Repetition Frequency (Hz) | Number of Continuous Pairs of Pulses | Repetition Cycles (s) | Number of Bursts |
|---------------------|------------------|--------------------|-----------------------|-------------------|---------------------------------|--------------------------------------|-----------------------|------------------|
| Chirp 5 | 0.5-5.0 | 70-120 | 20-110 | 1.00-2.00 | 200-1000 | 22-40 | 12.0 | 1 |
| Chirp 6 | 0.5-15.0 | 70-120 | 20-110 | 1.00-2.00 | 200-1600 | 22-40 | 12.0 | 1 |

| | | | | | | | | |
|----------|---------|--------|-------|-----------|-----------|-------|------|---|
| Chirp 7 | 0.5-1.5 | 50-240 | 30-32 | 1.00-2.00 | 1114-1118 | 30-40 | 12.0 | 1 |
| Chirp 8 | 0.5-1.5 | 50-240 | 30-32 | 1.00-2.00 | 928-932 | 25-40 | 12.0 | 1 |
| Chirp 9 | 0.5-1.5 | 50-240 | 30-32 | 1.00-2.00 | 886-890 | 24-40 | 12.0 | 1 |
| Chirp 10 | 0.5-1.5 | 50-240 | 30-32 | 1.00-2.00 | 738-742 | 20-40 | 12.0 | 1 |

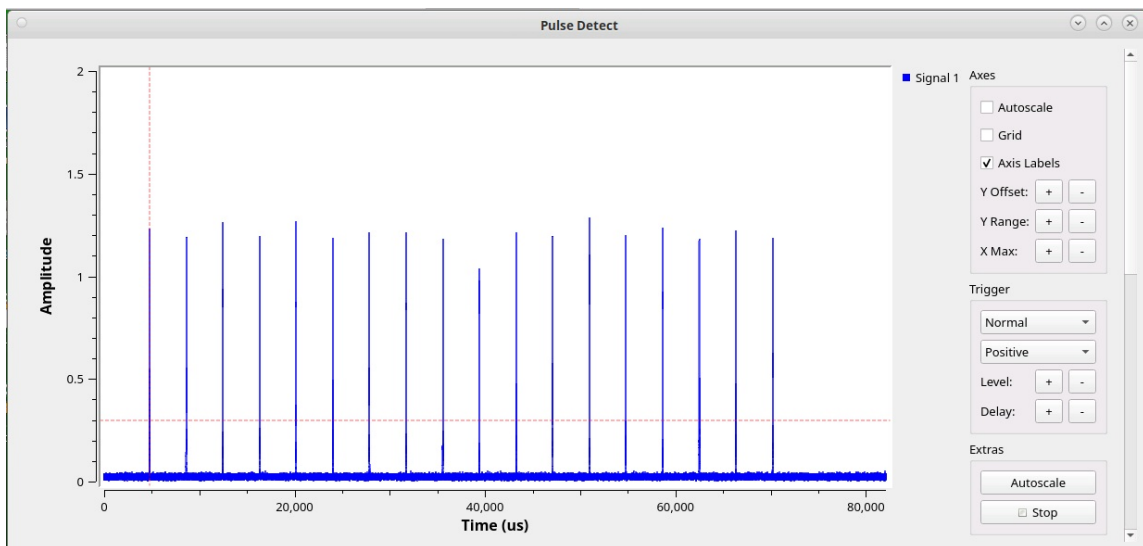
Japan W53 - Fixed Pulse 1

- command line
 - `./lf_hackrf_dfs.py --freq <'center frequency'> --rf_type W53PULSE,,, <tx_sample_rate Mhz> --lf_hackrf`
 - example:
 - `./lf_hackrf_dfs.py --freq 5320000 --rf_type W53PULSE,1.0,840,18,20 --lf_hackrf 22276763`



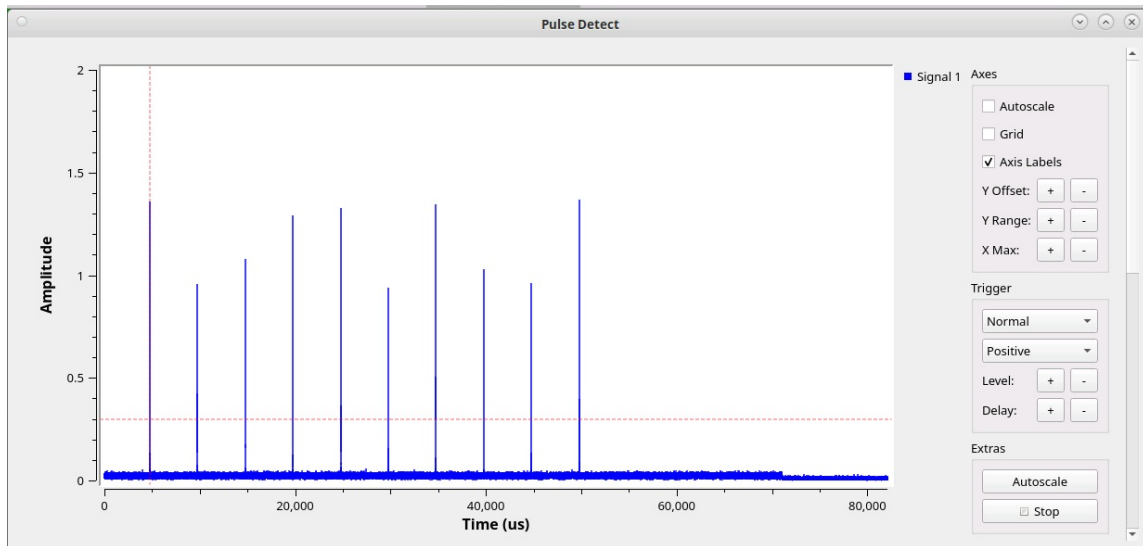
Japan W53 - Fixed Pulse 2

- command line
 - `./lf_hackrf_dfs.py --freq <'center frequency'> --rf_type W53PULSE,,, <tx_sample_rate Mhz> --lf_hackrf`
 - example:
 - `./lf_hackrf_dfs.py --freq 5320000 --rf_type W53PULSE,2.7,260,18,20 --lf_hackrf 22276763`



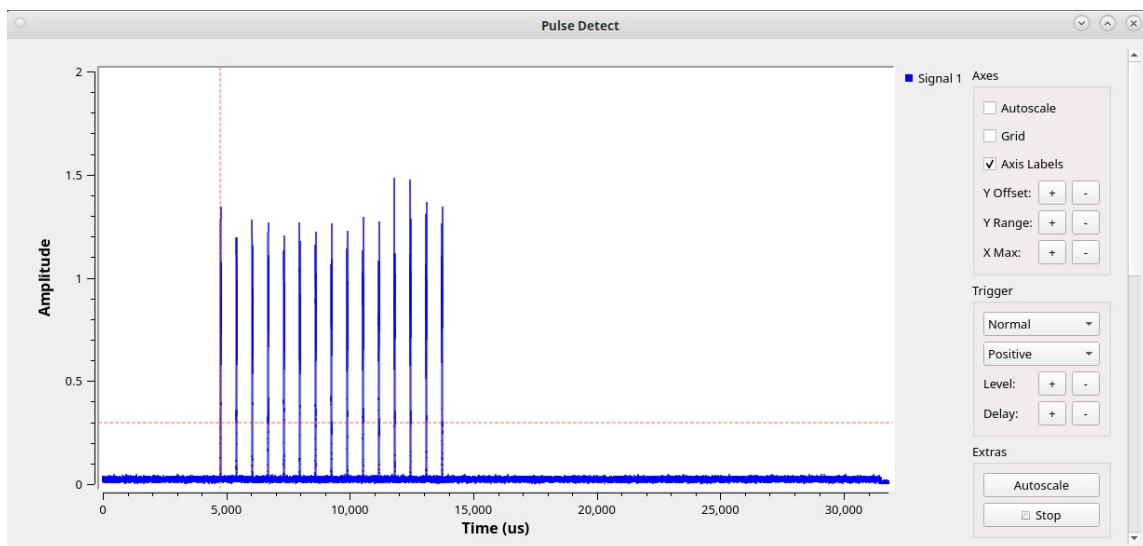
Japan W53 - Variable Pulse 3

- command line
 - `./lf_hackrf_dfs.py --freq <'center frequency'> --rf_type W53PULSE,,, ,<tx_sample_rate Mhz> --lf_hackrf`
 - example:
 - `./lf_hackrf_dfs.py --freq 5320000 --rf_type W53PULSE,.5,200,10,20 --lf_hackrf 22276763`



Japan W53 - Variable Pulse 4

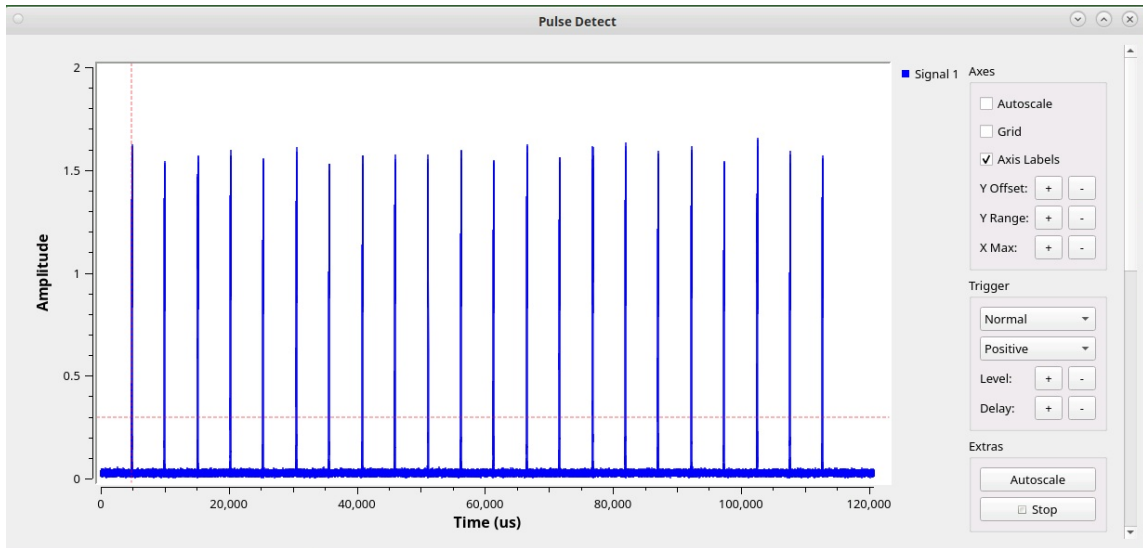
- command line
 - `./lf_hackrf_dfs.py --freq <'center frequency'> --rf_type W53PULSE,,, ,<tx_sample_rate Mhz> --lf_hackrf`
 - example:
 - `./lf_hackrf_dfs.py --freq 5320000 --rf_type W53PULSE,15.0,1600,15,20 --lf_hackrf 22276763`



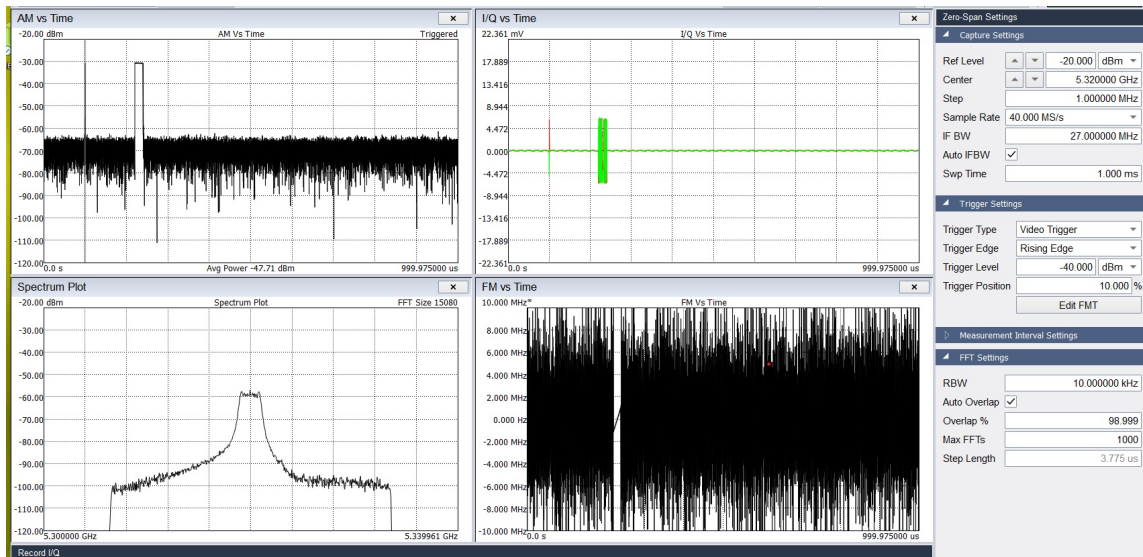
Japan W53 - Chirp 5

- command line
 - `./lf_hackrf_dfs.py --rf_type W53CHIRP,,, ,,,, <'center frequency'>, --lf_hackrf`
 - Note the frequency is in Mhz 5320 is 5.32 Ghz
 - example:
 - `./lf_hackrf_dfs.py --freq 5320000 --rf_type W53CHIRP,.5,120,20,2,200,22,5320,20 --lf_hackrf 22276763`

Japan W53 - Chirp 5 Showing all pairs



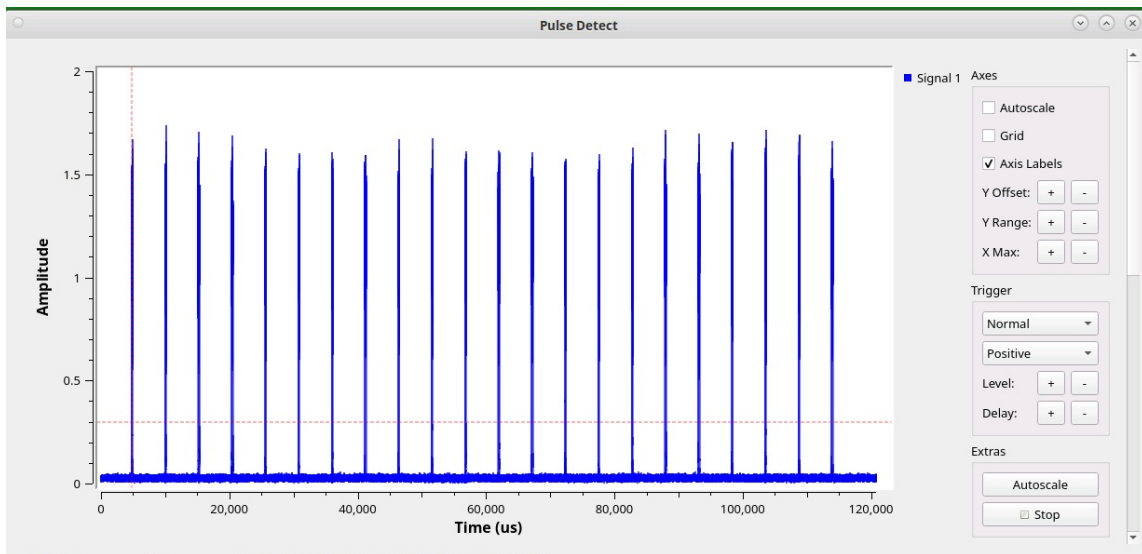
Japan W53 - Chirp 5 Showing individual pulse pair



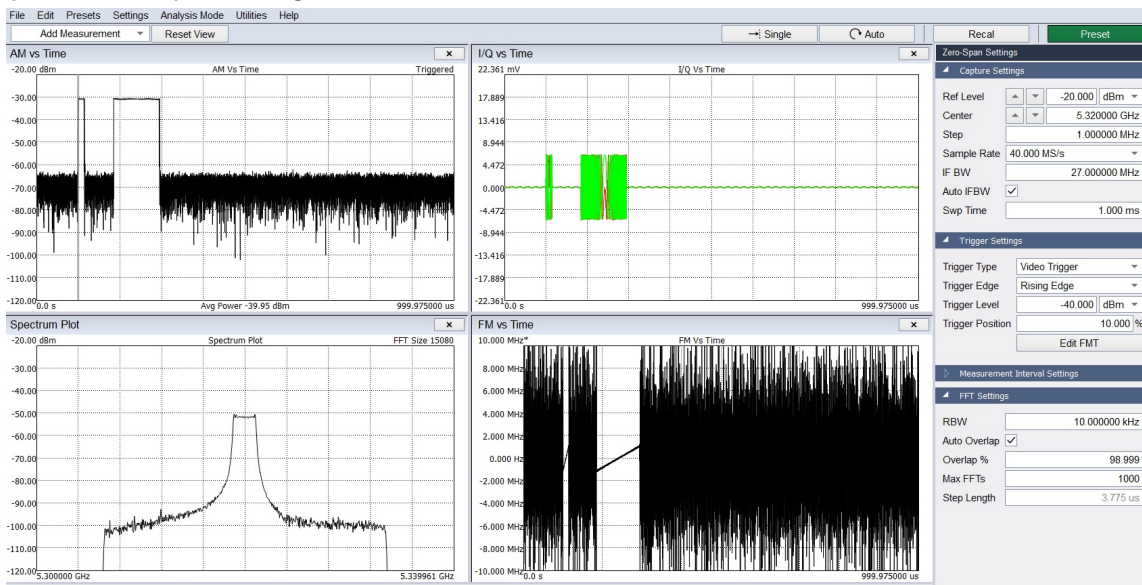
Japan W53 - Chirp 6

- command line
 - `./lf_hackrf_dfs.py --rf_type W53CHIRP, , , , , <center frequency>, --lf_hackrf`
 - Note the frequency is in Mhz 5320 is 5.32 GHz
 - example:
 - `./lf_hackrf_dfs.py --freq 5320000 --rf_type W53CHIRP,15,70,110,2,200,22,5320,20 --lf_hackrf 2227676`

Japan W53 - Chirp 6 Showing all pairs



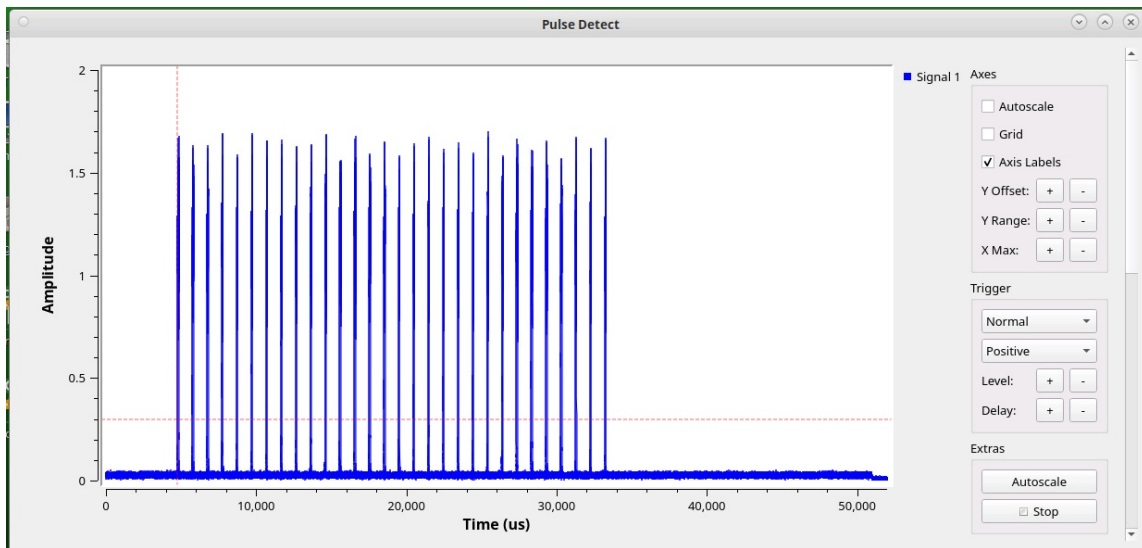
Japan W53 - Chirp 6 Showing individual Pulse Pair



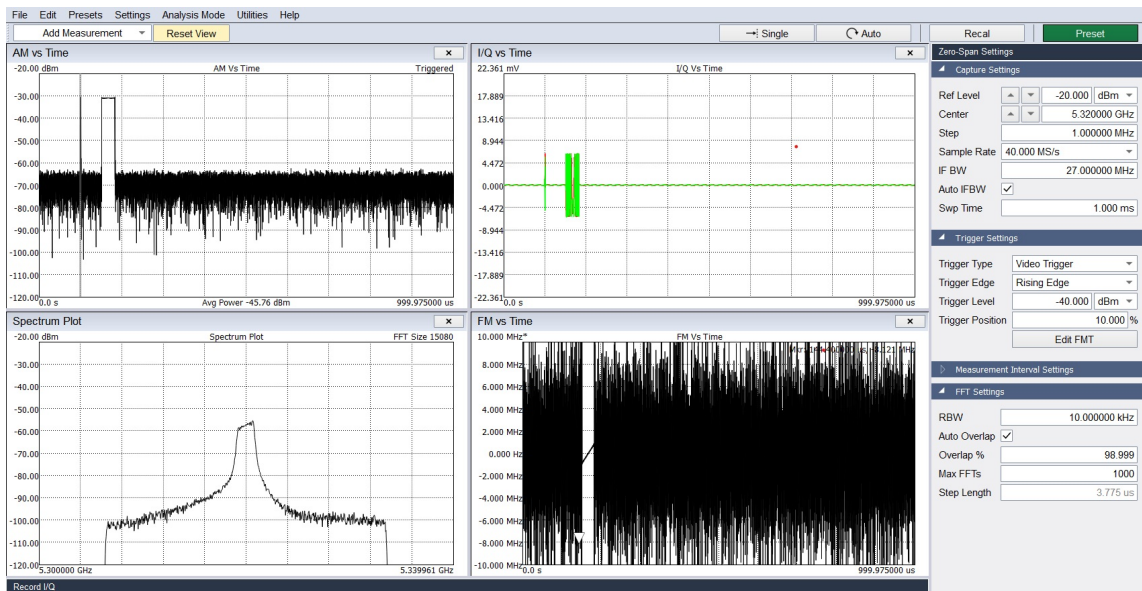
Japan W53 - Chirp 7

- command line
 - `./lf_hackrf_dfs.py --rf_type W53CHIRP, , , , , <center frequency>, --lf_hackrf`
 - Note the frequency is in Mhz 5320 is 5.32 GHz
 - example:
 - `./lf_hackrf_dfs.py --freq 5320000 --rf_type W53CHIRP,1.5,50,32,1.5,1114,30,5320,20 --lf_hackrf 222`

Japan W53 - Chirp 7 Showing all pairs



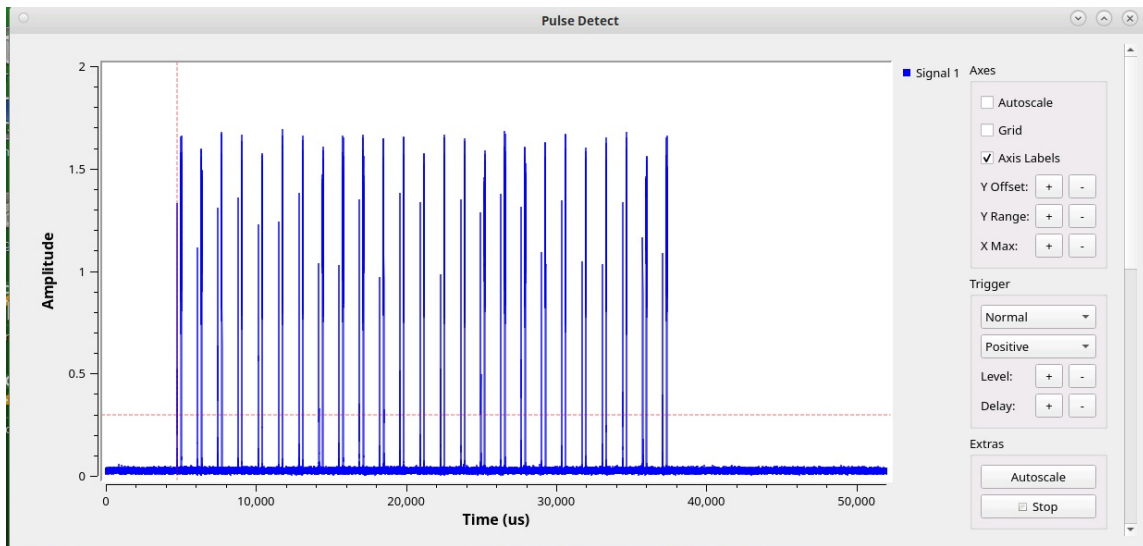
Japan W53 - Chirp 7 Showing individual Pulse Pair



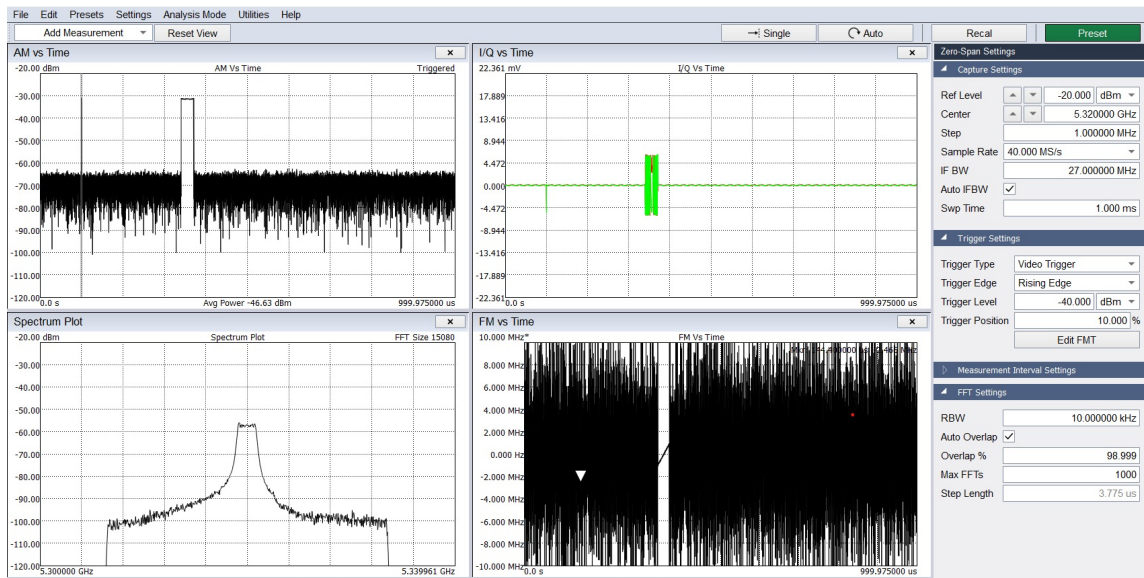
Japan W53 - Chirp 8

- command line
 - `./lf_hackrf_dfs.py --rf_type W53CHIRP, , , , , <center frequency>, --lf_hackrf`
 - Note the frequency is in Mhz 5320 is 5.32 GHz
 - example:
 - `./lf_hackrf_dfs.py --freq 5320000 --rf_type W53CHIRP, .5,240,30,1.7,928,25,5320,20 --lf_hackrf 22276`

Japan W53 - Chirp 8 Showing all pairs



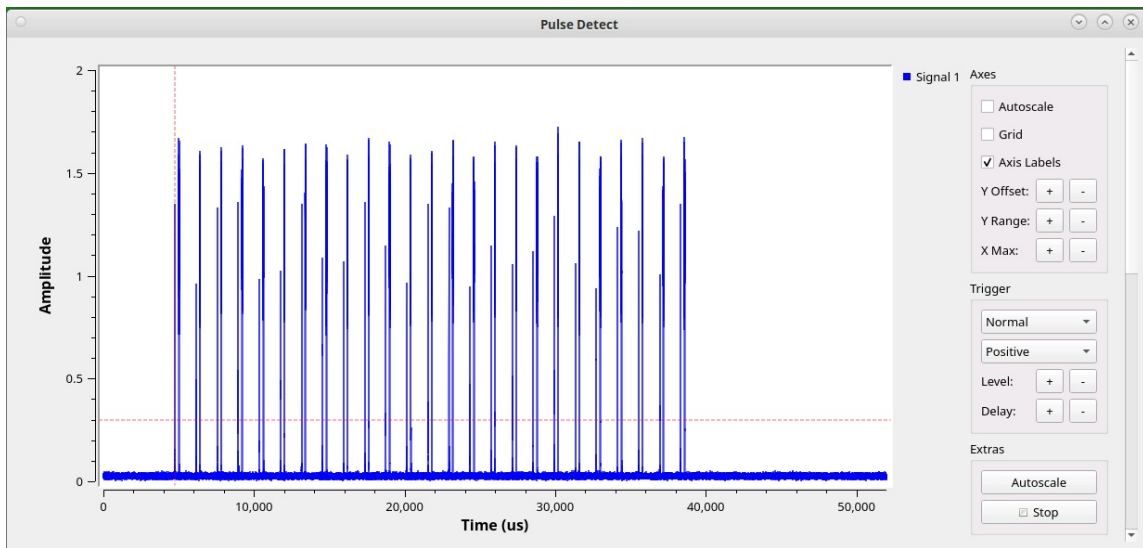
Japan W53 - Chirp 8 Showing individual Pulse Pair



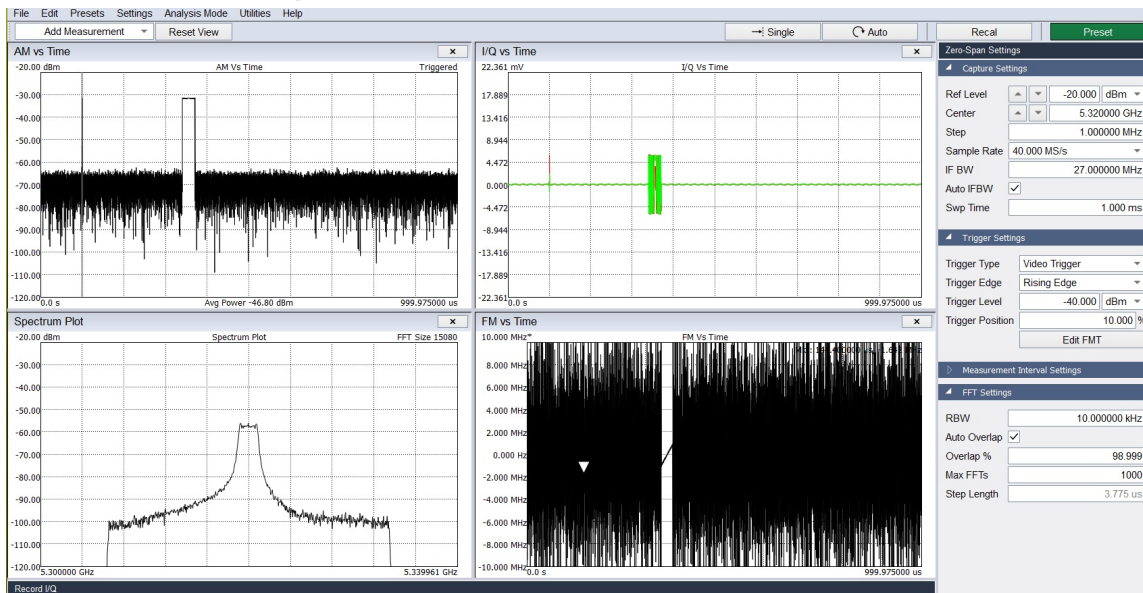
Japan W53 - Chirp 9

- command line
 - `./lf_hackrf_dfs.py --rf_type W53CHIRP, , , , , <center frequency>, --lf_hackrf`
 - Note the frequency is in Mhz 5320 is 5.32 Ghz
 - example:
 - `./lf_hackrf_dfs.py --freq 5320000 --rf_type W53CHIRP, .5,240,30,1.7,886,25,5320,20 --lf_hackrf 22276`

Japan W53 - Chirp 9 Showing all pairs



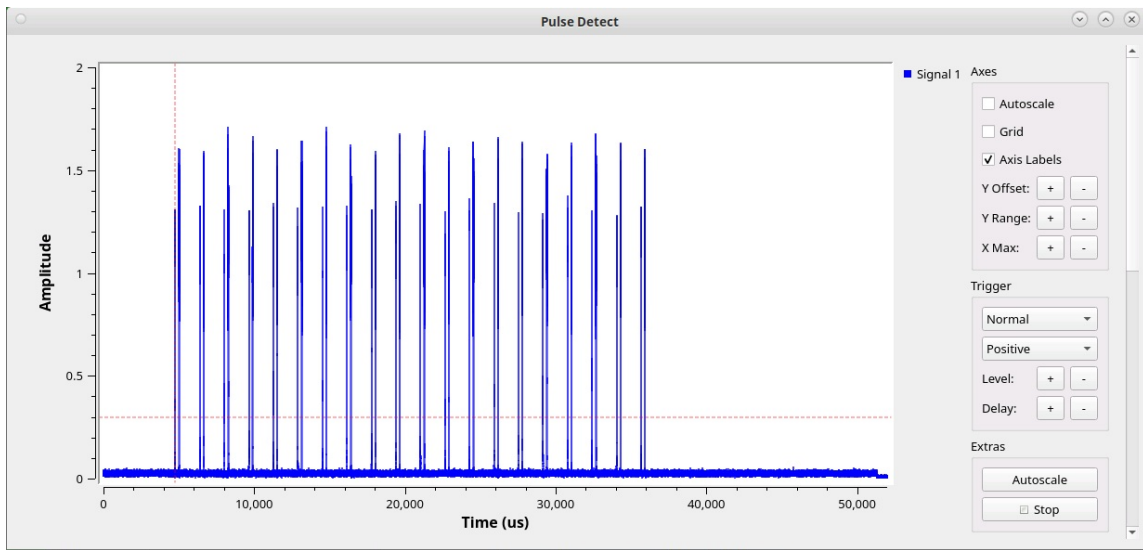
Japan W53 - Chirp 9 Showing individual Pulse Pair



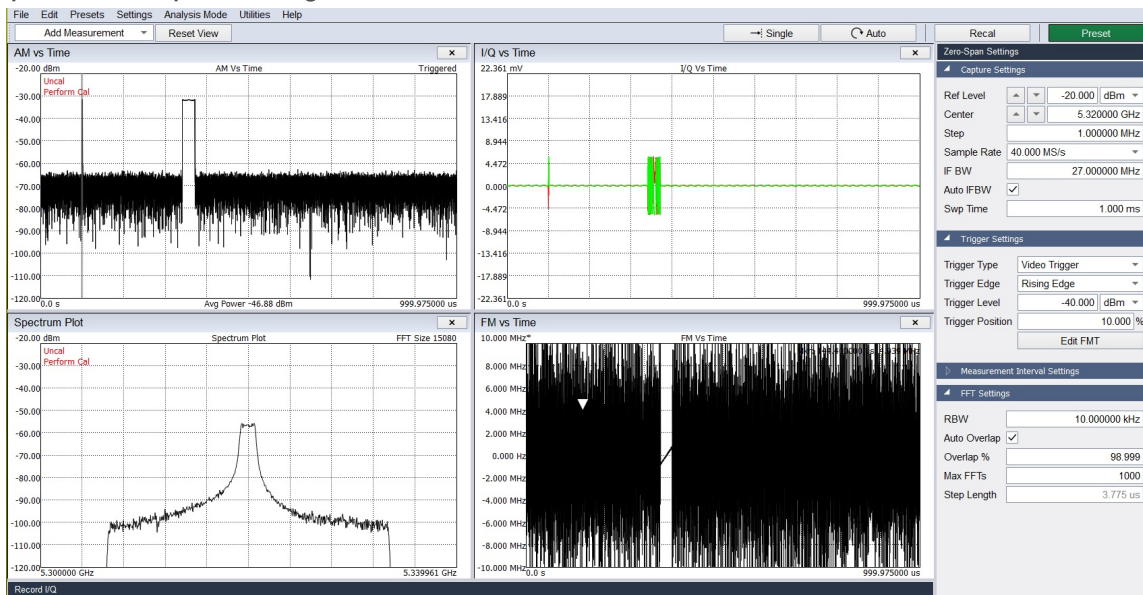
Japan W53 - Chirp 10

- command line
 - `./lf_hackrf_dfs.py --rf_type W53CHIRP, ..., <center frequency>, --lf_hackrf`
 - Note the frequency is in Mhz 5320 is 5.32 GHz
 - example:
 - `./lf_hackrf_dfs.py --freq 5320000 --rf_type W53CHIRP,1.5,240,30,1.3,738,20,5320,20 --lf_hackrf 222`

Japan W53 - Chirp 10 Showing all pairs



Japan W53 - Chirp 10 Showing individual Pulse Pair



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