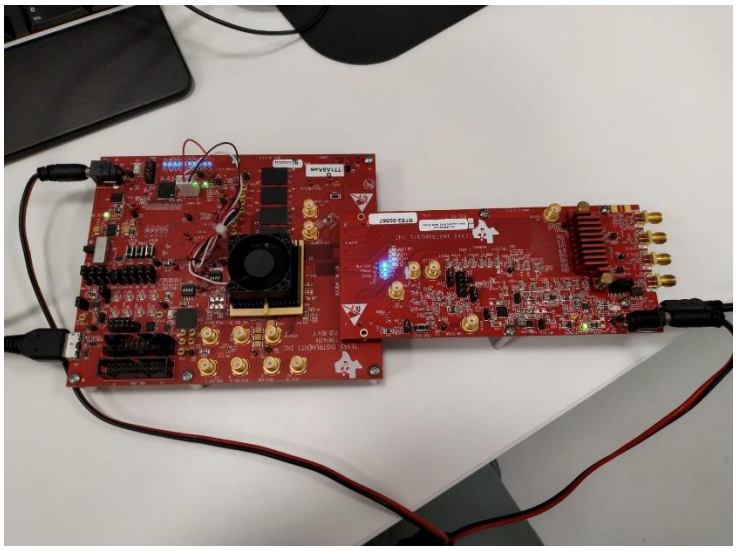
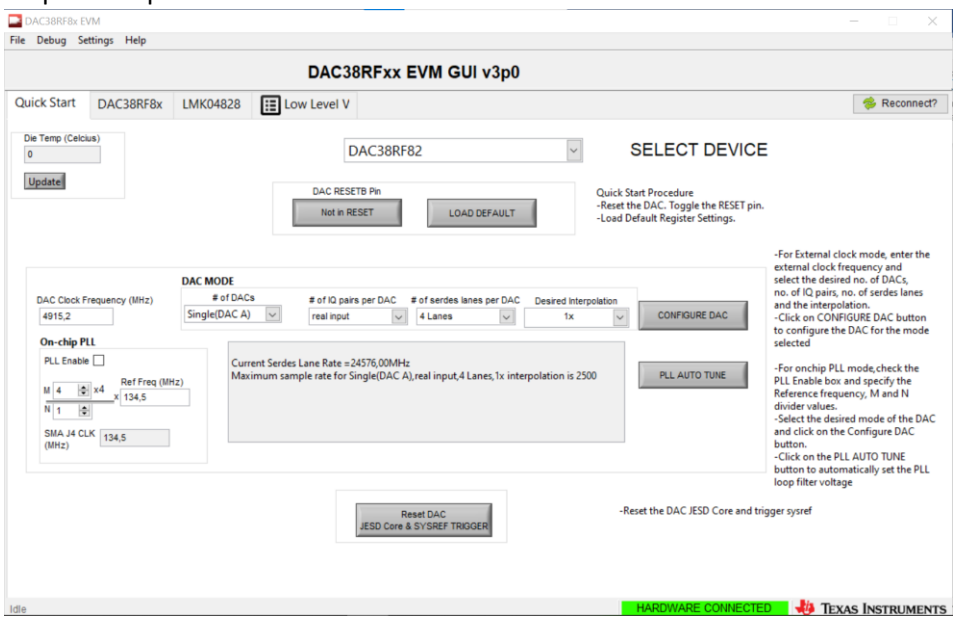
Setup

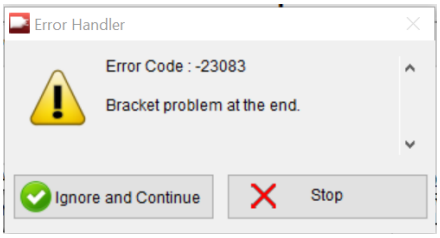
- Step 1: Connect the DAC and AWG via USB and power them on with the external power. Once connected it should look like this:



- Step 2: Open up HSDC pro and DAC38RF8x EVM software
- Step 3: Setup the DAC with the DAC38RF8xEVM software:



  - The software is quite bad, so if it gives any warnings, it can most likely be ignored. There is one exception to this, if you get this specific error on startup:



it means that you do not have the correct decimal separator selected on your Windows machine. It should be '.', which is not the default for Western Europe. Once you changed this, the error should go away.

  - First, click 'Not in RESET` and deselect it again. Then, click 'LOAD DEFAULT'.

    - Then, go to ‘Low Level Vi‘ and click ‘Open Configuration’.
    - For the configuration, select the ‘DAC_config_file.cfg’ file, located in the `config_files` directory.
    - Once the file is loaded, go back to ‘Quick start’ and click ‘PLL AUTO TUNE’.
    - After the PLL autotune is done, check whether the PLL is locked, under ‘DAC38RF8x‘ -> ‘Clocking’. Here, click ‘Check Loop Filter Voltage’ and then ‘Check Clock Alarms’. The PLL LF voltage should be 4 or 5, otherwise it is not locked. If the out of lock LEDs in the software turn grey, the DAC is ready to go.
- Step 4: Setup the AWG with the HSDC (High Speed Data Converter) Pro software.
    - On startup, it will prompt you to select a board. Select the `T71A9Aws-TSW14J56`.
    - Then go to ‘DAC’ and click ‘Select DAC’ in the top left. There, select ‘DAC38RF8x_LMF_811’. Fill in the data rate, in our case ‘8.82091G’ (Don’t forget the G!).
    - Run the script `generate_awg_pattern.py` to generate the AWG pattern file (.csv file)
    - Load the AWG pattern and click ‘Load External Pattern File’.
- Step 5: Now that you have a pattern loaded, you can check on the oscilloscope whether the AWG outputs anything. The output should be on connector ‘IOUTA’. When the output is correct (*no strange artefacts and a Vpp of ~100 mV. This of course depends on the laser diode, so always check the documentation to see what the operational current is*), connect the SMA to the laser diode modulation input.
- Step 6: The last, but most important step before starting the experiment, is to connect a waveform generator to the external clock of the DAC, so that it is synchronized to a stable source. Use a frequency of 80.02833 MHz.

Performing the experiment

- Connect the Swabian time tagger (TT) ultra to your computer. It’s recommended to connect it directly to your computer. If you don’t have enough ports, try to connect your other USB devices to a USB hub. To ensure proper operation, the TT needs a full bandwidth USB 3 port.
- Run the script `acquire_from_time_tagger.py`, this will put the time tag files in the `time tagger files` directory.
- If all went well, you can simply run the file `decode_from_time_tagger.py` and you should see your image appear on the screen.