Overview

As requested by Charles a quick Matlab m.file to calculate the correct squarewave center and amplitude voltages and their corresponding binary value.

It might be a little hard to see here, but within the structure called values, each of the 14 parameter values can be changed depending on the machine properties, as well as the wavelengths used for the measurements in EWP.wavelengths.

Running the code then gives the corresponding binary values of the wave center and amplitude.

Additional resources

Need more help?

Check the resources, and then see Ken

Main content

**Part 1: The Matlab m.file**

%% Calculate squarewave center and amplitude

clear all

clc

values     = struct('DACperVolt',     6553.6, ...% This is the factory setting on the 5216a DAP Board, 2^16 / 10 volts (+/-5V)

                    'SLumperDAC',          0, ...% Will be derived from other quantities and set in the constructor, converts DAC counts into SL microns based on ASI HVSL settings

                    'SLminHVSL',         1.0, ...% Minimum SL for USBDAC output from ASI HVSL system settings

                    'SLmaxHVSL',         3.0, ...% Maximum SL for USBDAC output from ASI HVSL system settings

                    'VoltMinHVSL',       0.1, ...% Minimum Voltage output for USBDAC output from ASI HVSL system settings

                    'VoltMaxHVSL',       2.4, ...% Maximum Voltage output for USBDAC output from ASI HVSL system settings

                    'umMaxMonoch',       650, ...% [µm] maximum wavelength from Monochromator (PTI), corresponding to VoltMaxMonoch

                    'VoltMaxMonoch',    -4.8, ...% Monochromator input voltage corresponding to maximum wavelength (nmMaxMonoch)

                    'umMinMonoch',       250, ...% [µm] minimum wavelength from Monochromator (PTI), corresponding to VoltMinMonoch

                    'VoltOffMonoch',     0.1, ...% Voltage offset to be added to Monochromator command voltage. Based on Felix Calibration performed by technician originally (values read off of Tektronix scope in response to Felix 340/380 sequence)

                    'VoltMinMonoch',     4.8, ...% Monochromator input voltage corresponding to minimum wavelength (nmMinMonoch)

                    'MonochDeadtime',  0.002, ...% [s] Time to switch between wavelengths, determined by Monochromator spec

                    'MonochDelayTime', 0.001, ...% [s] Time delay between registering monochromator command update and seeing a change in PMT signal (determined through testing)

                    'umPerVolt',        0);      % Planned converstion between piezos and physical distance (not implemented)

EWP.wavelengths = [340 380];                     % Defaults

% Convert wavelengths to dac counts

waveDACs      = zeros(size(EWP.wavelengths));

    VoltMaxMonoch = values.VoltMaxMonoch;

    VoltMinMonoch = values.VoltMinMonoch;

    umMaxMonoch   = values.umMaxMonoch;

    umMinMonoch   = values.umMinMonoch;

    VoltOffMonoch = values.VoltOffMonoch;

    DACperVolt    = values.DACperVolt;

    for w = 1:length(EWP.wavelengths)

        waveDACs(w) = DACperVolt \* (VoltOffMonoch + (VoltMaxMonoch - VoltMinMonoch) / (umMaxMonoch - umMinMonoch) \* (EWP.wavelengths(w) - umMinMonoch) + VoltMinMonoch);

    end

Wave\_Center    = mean(waveDACs)

Wave\_Amplitude = waveDACs(1)-Wave\_Center