

Acer Predator XB272 Testing

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1 Introduction

Here we test a new monitor (Acer Predator XB 272) to replace the 144Hz ASUS 278 that we have been using with the DPI.

Specs:

- See full specs here: <https://www.acer.com/ac/en/GB/content/predator-model/UM.HX2EE.005>
- 1920 × 1080 resolution
- up to 240Hz

The screen size is the same as the ASUS 278 (which goes up to 2560×1440 and 144Hz) so pixel angles should be the same at the same distance.

2 Refresh Rate

The refresh rate is 200 Hz. This was measured by Janis on October 7, 2018 (results on OPUS: Z:\Monitors\ACER_XB272\PhotocellTest_2018-10-07\test_photocell.m).

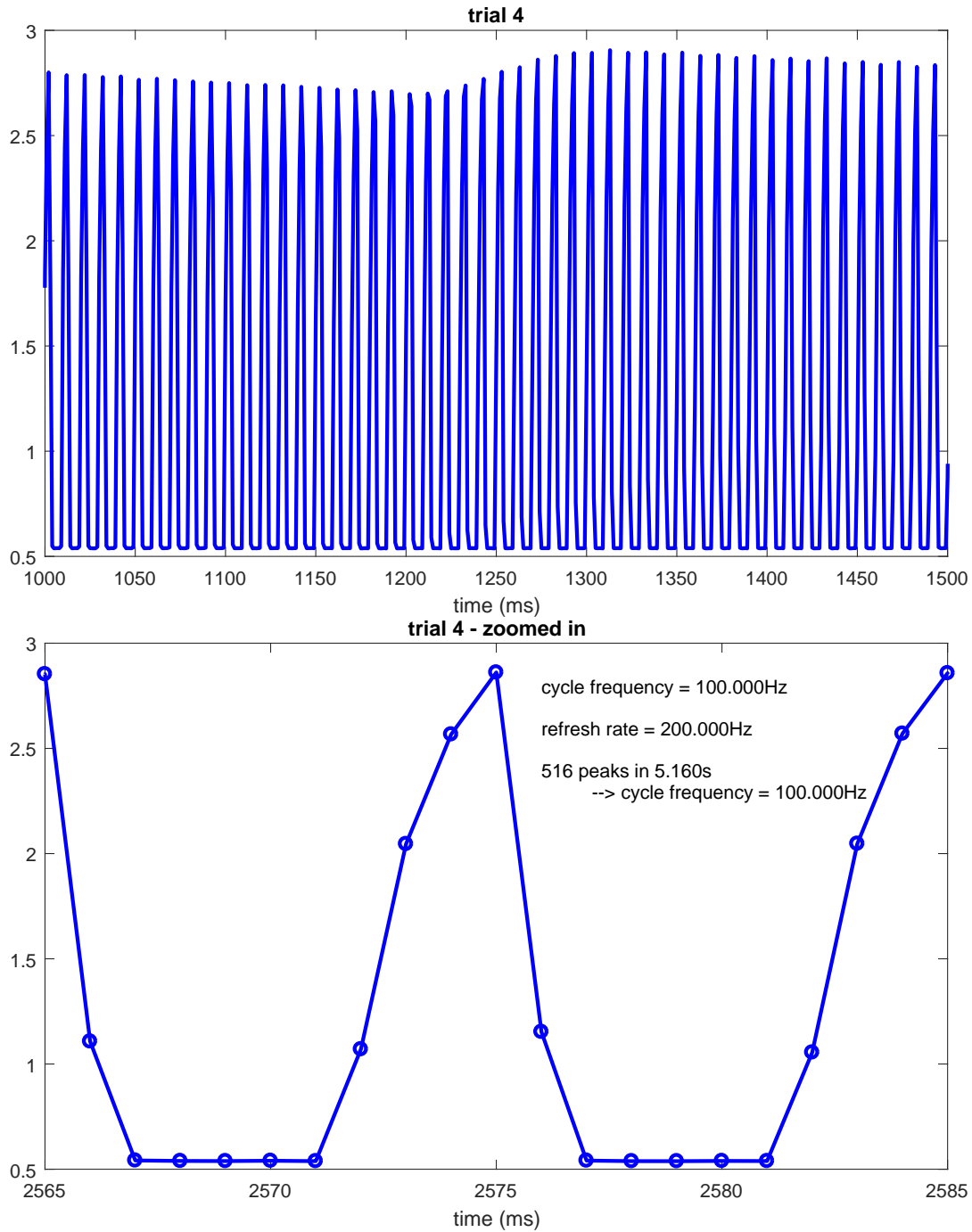


Figure 1: Photocell readings from ACER272 monitor. Y-axis are in arbitrary units. TOP shows a 500ms period. BOTTOM shows two periods of the square wave.

3 Luminance Comparisons

3.1 Non-calibrated: Exogenous Attention & Spatial Attention studies

This section compares luminances to the ASUS with settings used in a couple of experiments. (See results on OPUS: Z:\Monitors\ACER_XB272\PhotocellTest_2018-10-07\compareAsusAcer.m)

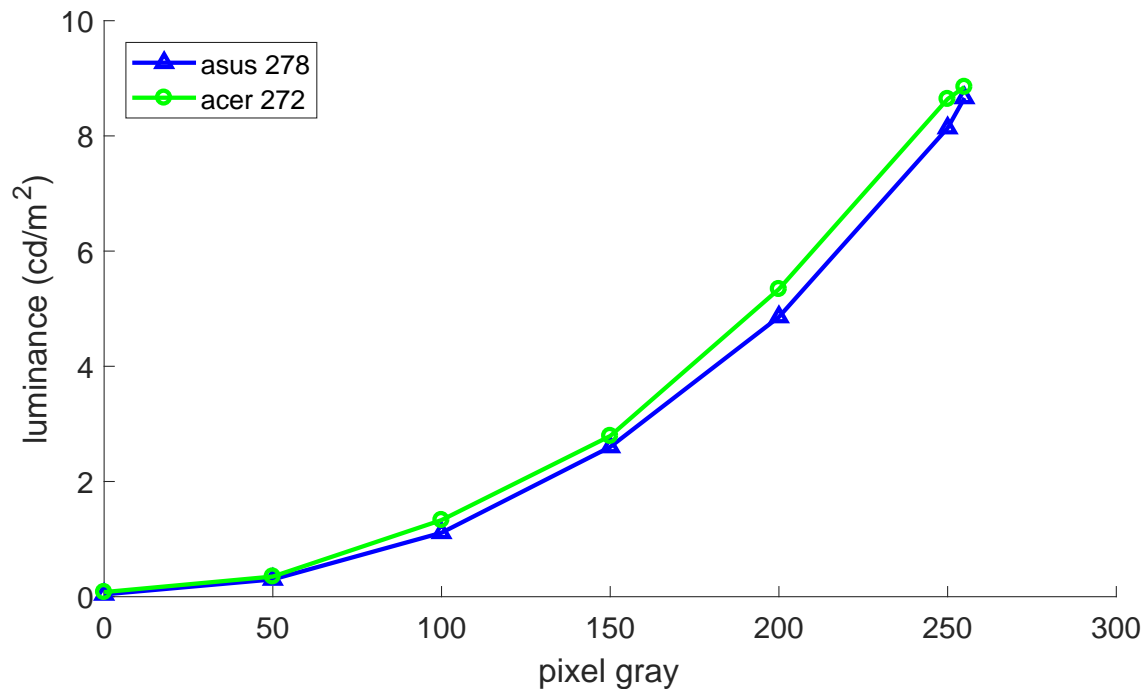


Figure 2: Comparable luminances for the two different monitors. See table below for full settings.

Comparable settings:

	ASUS 278	ACER 272
Monitor Brightness	0	0
Monitor Contrast	0	0
NVIDIA Brightness	50%	10%
NVIDIA Contrast	50%	10%
Gamma Correction (all)	1.0	1.0

3.2 Calibrated for Contrast Sensitivity (Oct 7 attempt)

Here I attempt to duplicated the ASUS 278 luminance values I have been using for experiments. I have not found a comparable setting for the ACER yet but here's the closest I have gotten. See results on OPUS: Z:\Monitors\ACER_XB272\PhotoCellTest_2018-10-07\acer272_rgbttest.m

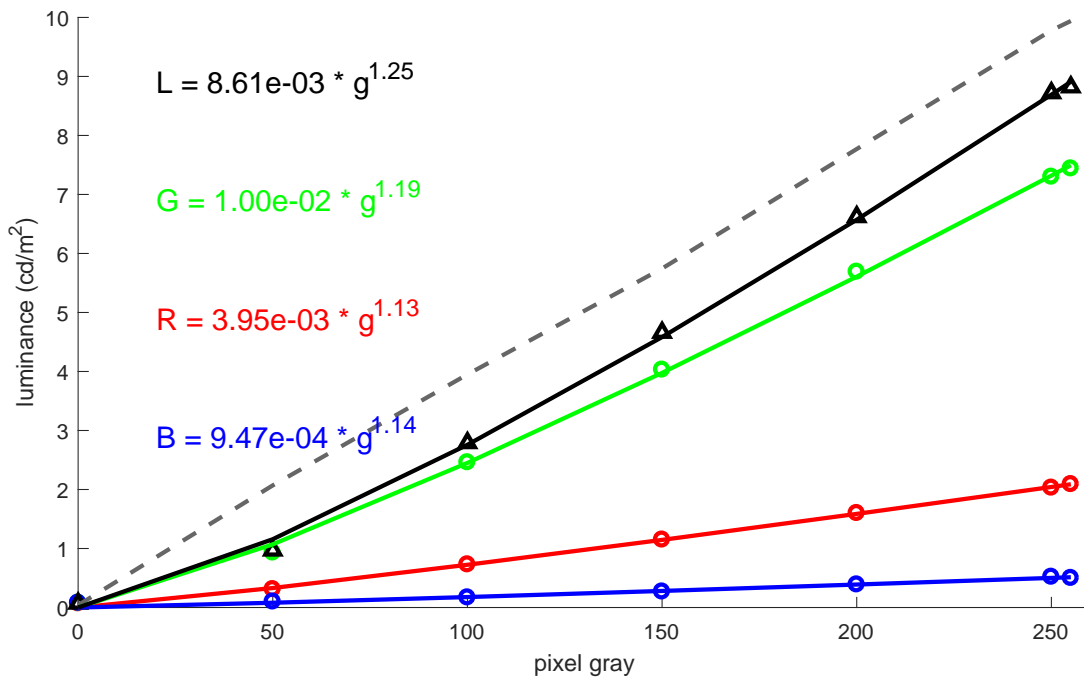


Figure 3: Comparable luminances for the two different calibrated monitors. Solid lines are different channels and total luminance for ACER 272. Dashed gray line is the luminance from the ASUS 278. See table below for full settings.

Comparable settings:

	ASUS 278	ACER 272
Monitor Brightness	0	0
Monitor Contrast	0	0
Red Brightness	50%	10%
Red Contrast	50%	10%
Red Gamma Correction	2.10	1.95
Green Brightness	50%	5%
Green Contrast	50%	5%
Green Gamma Correction	2.17	2.10
Blue Brightness	50%	10%
Blue Contrast	50%	10%
Blue Gamma Correction	2.58	1.45

3.3 Calibrated for Contrast Sensitivity (Oct 8 attempt)

Today's closest results - See results on OPUS: Z:\Monitors\ACER_XB272\PhotoCellTest_2018-10-08\acer272_rgbtest.m

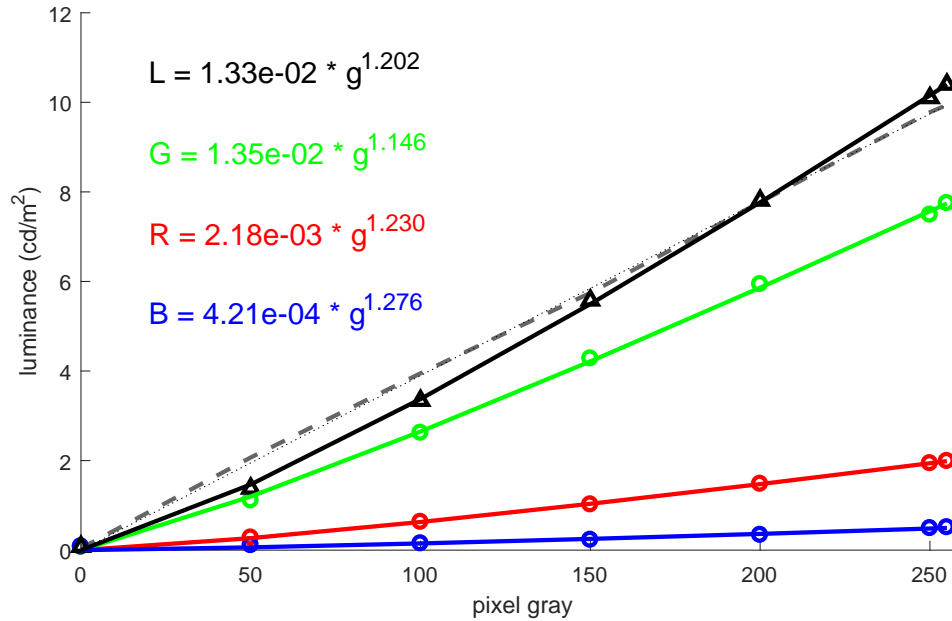


Figure 4: Comparable luminances for the two different calibrated monitors. Solid lines are different channels and total luminance for ACER 272. Dashed gray line is the luminance from the ASUS 278. See table below for full settings.

Comparable settings:

	ASUS 278	ACER 272
Monitor Brightness	0	0
Monitor Contrast	0	0
Red Brightness	50%	20%
Red Contrast	50%	20%
Red Gamma Correction	2.10	1.81
Green Brightness	50%	20%
Green Contrast	50%	20%
Green Gamma Correction	2.17	2.13
Blue Brightness	50%	20%
Blue Contrast	50%	20%
Blue Gamma Correction	2.58	1.17

4 Calibration for luminance (Dec 3 - NK,JI)

JI and NK measured luminances with the CS-100 right up against the Acer 272. See results on OPUS: Z:\Monitors\ACER_XB272\2018-12-03_LuminanceTest\acer272_luminancetest.m

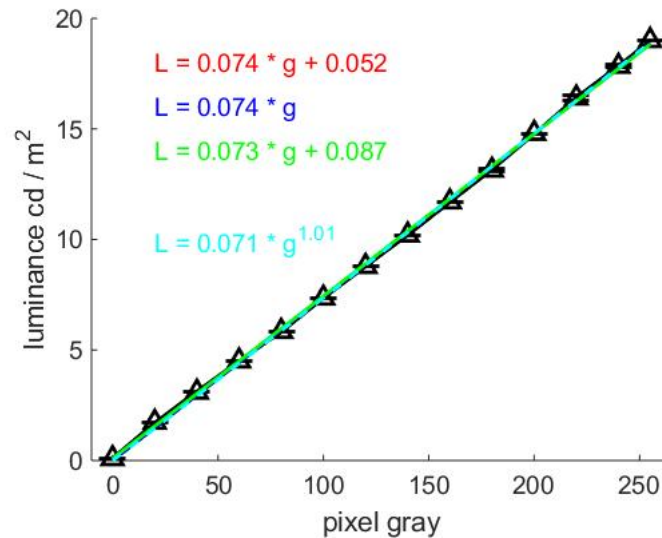


Figure 5: Luminance readings from the ACER272 monitor after gamma correction of 1.83.

5 LCD Dynamics

This section characterizes the temporal profile of the LCD monitor. These recordings were done with high contrast and brightness settings - much higher than we would use for experiments - so that we could get clear readings from the photodiode. Recordings were made at several gray levels including both sustained presentation and flickering between a black and brighter frame. Recordings were made from only the corner of the monitor which was set to flicker.

(See results on OPUS Z:\Monitors\ACER_XB272\PhotocellTest_2018-10-08\test_photocell.m)

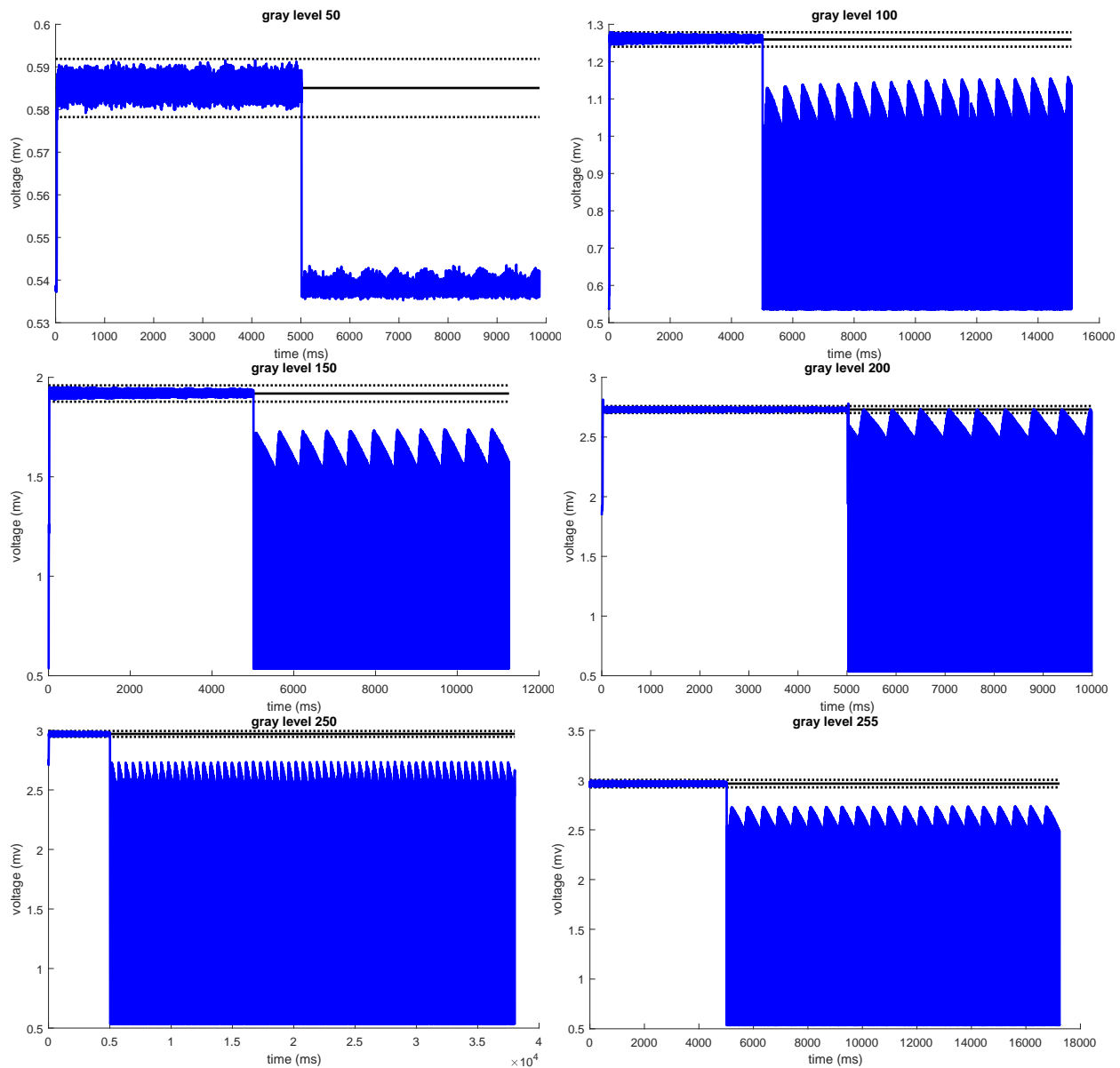


Figure 6: Data were recorded with the photodiode in trials that started with 5 seconds of sustained presentation of some gray level (50-255), followed by a period of alternating between black and the same initial gray level. The black lines show the mean \pm 3SD of the voltage during the sustained period. Not shown: a sustained reading of a completely black screen was also made for comparison.

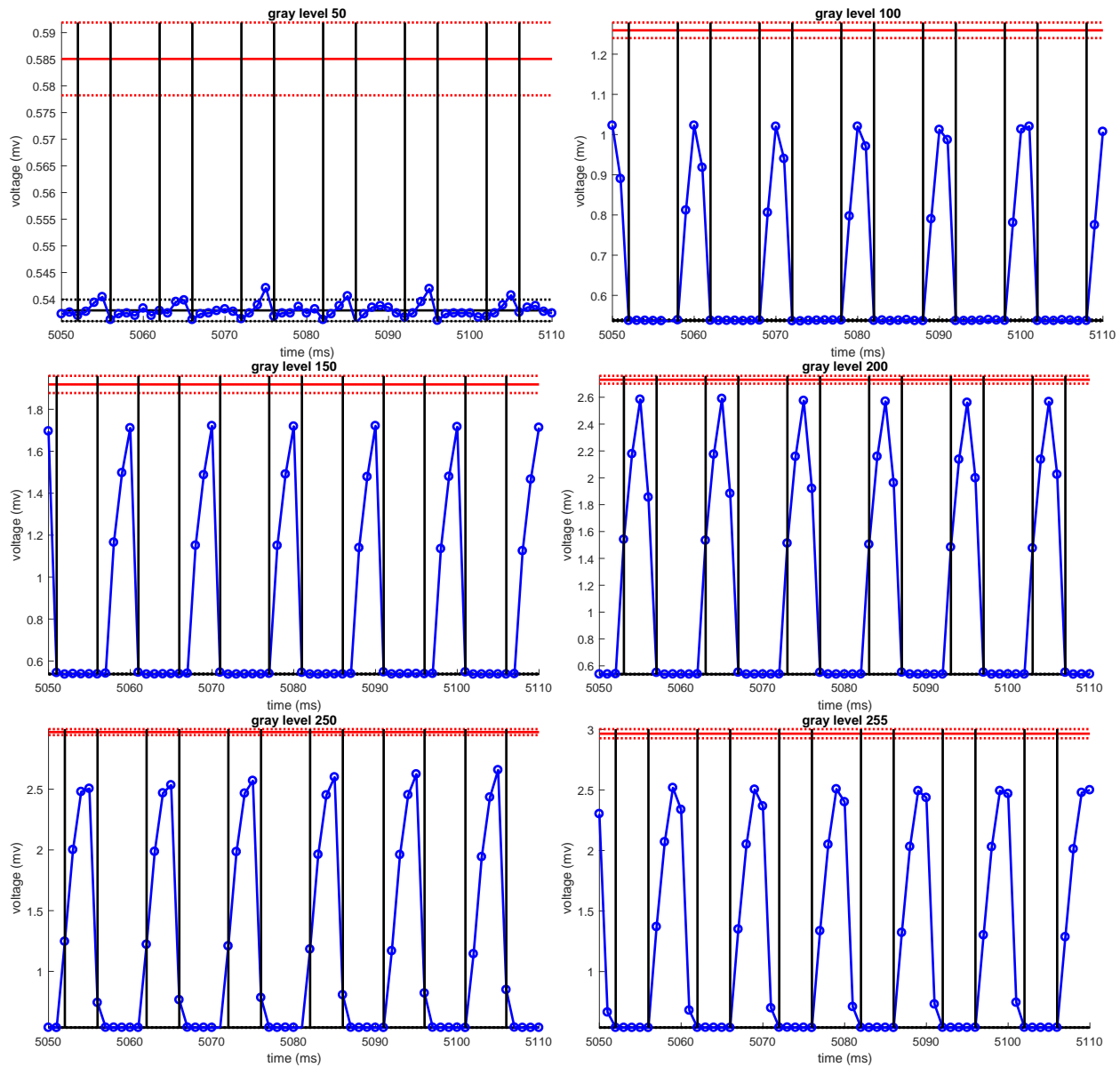


Figure 7: Here are the voltage changes during the alternating period for several frames as the corner of the monitor flickered between black (graylevel = 0) and the gray levels shown. The red lines show the mean \pm 3SD of the corresponding sustained period. The black lines show the mean \pm 3SD of the sustained black presentation. Note that the voltage never reaches the level measured during sustained presentation.

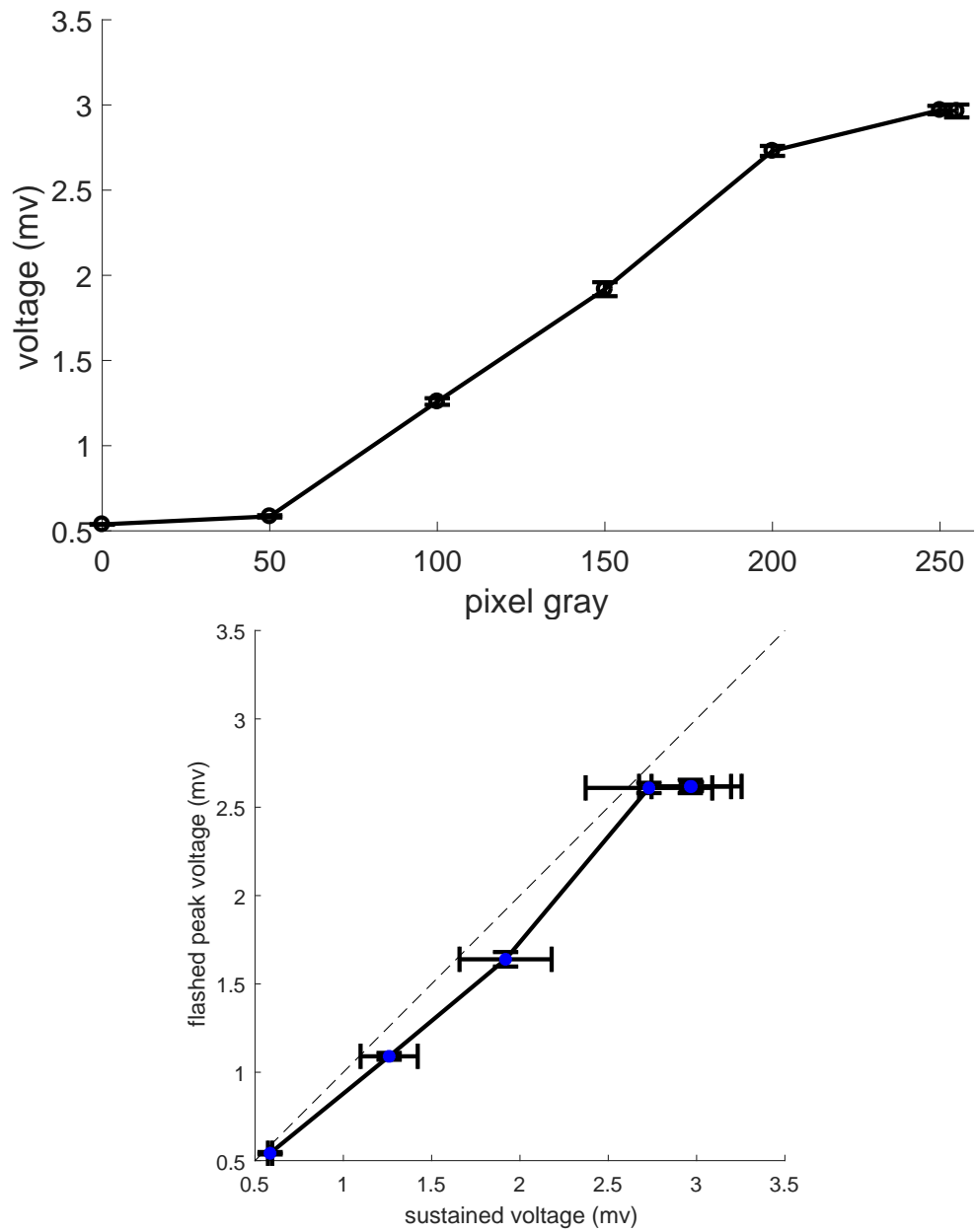


Figure 8: TOP: mean $\pm 3SD$ of the sustained periods for each gray level. BOTTOM: mean $\pm 3SD$ of peak values during alternating period versus mean $\pm 3SD$ during sustained period. Below the unity line means that the peaks during the alternating period are less than the voltage during sustained presentation.

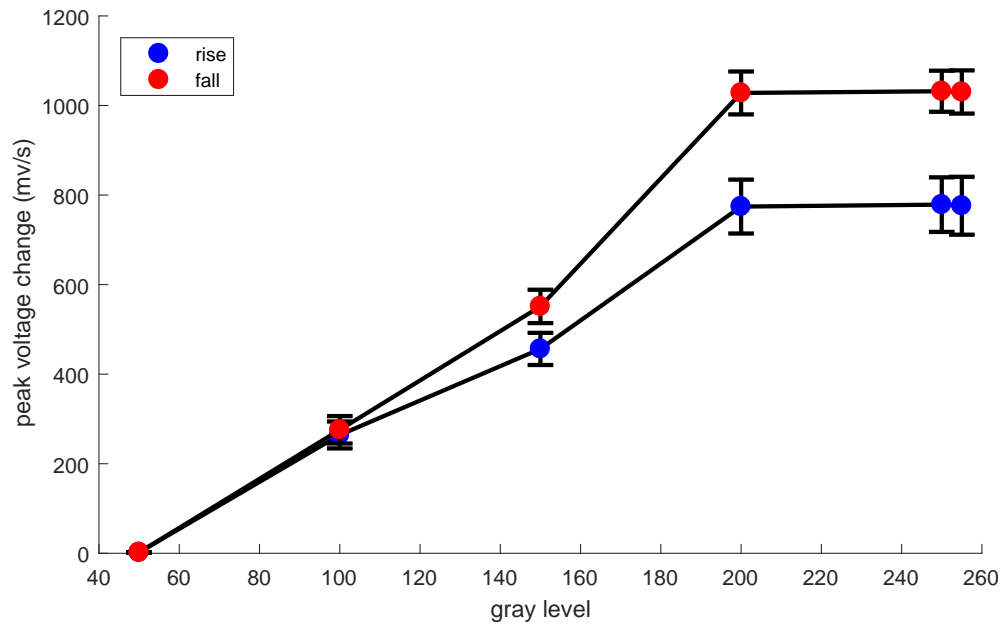


Figure 9: Averages of peak rising and falling speeds at each gray level during the alternating period. Speeds were estimated using an sgolay filter with a window size of 3 (using the difference between neighboring times gave similar results). Note that the falling speed (red) is higher than the rising speed (blue) as expected, and the changes in either are faster with increasing gray level - though it seems to saturate at higher contrasts.