

# MPRT – time slices of frames

## Objective

When the grey level transitions are finalized in less than one frame period, it is of special interest to know the luminance variation within the frame period.

An experiment was carried out where the luminance level, due to shift in grey level, has been measured several times during one frame period.

## Set up

A (moving) target of size  $119 \times 39$  pixels with the grey level of 170 on a background grey level of 56 was loaded into a Quantum 881C video generator. The image was shown on a 60 Hz  $1280 \times 1024$  LCD monitor. The velocity used was 10 pixels per frame.

The luminance variation was measured with an ICAM 2D colorimeter and the MPRT application software from DELTA Light & Optics, Denmark.

ICAM is placed in front of the display under investigation and the V-Sync signal from the Quantum 881C is connected to ICAM to ensure synchronization between the display refresh period and the integration timing of ICAM.

The MPRT application controls the measurement timings. With a special ‘trigger hold-off’ it is possible to average over a number of ‘events’ to improve the S/N. An event is here defined as the situation where the moving target is in the exact same pixel position on the display.

## Results

The integration period is, in this test, set to be 1/12 of a LCD frame period corresponding to 1.389 ms (@ 60 Hz). In figure 1 the measurement images are shown for the 12 time slices.

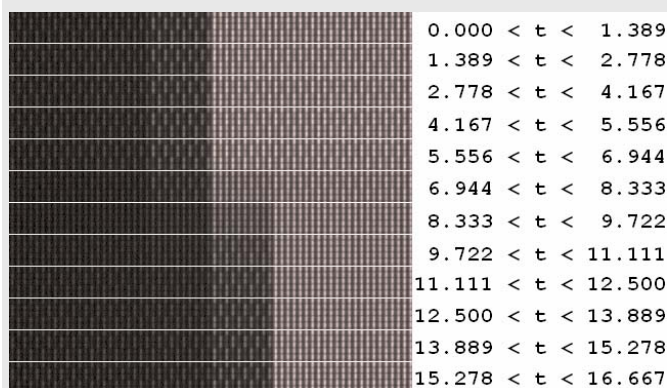


Figure 1. Measurement images as function of time. To the right the timing, in ms, is given for the integration period for the image to the left.

In figure 2 the luminance variation as a function of time is given for the total passage of the target. In figure 2 is also shown the running average, averaged over one frame period, of the luminance.

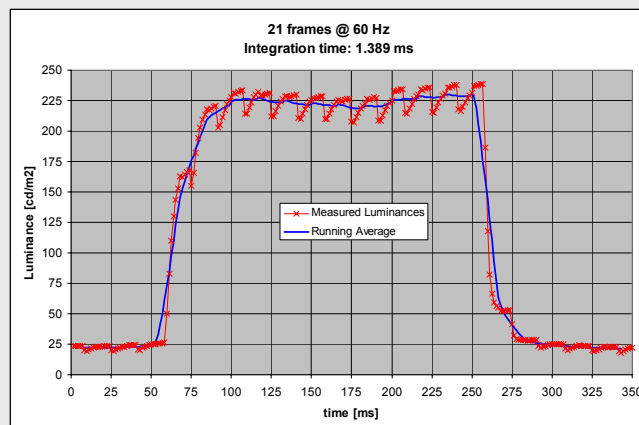


Figure 2. Luminance variation as a function of time is given for the total passage of the target. To the left is seen the luminance raise on the leading edge.

## Conclusion

The possibility to measure the luminance variation, within a frame period is shown.

This also indicates that it will be possible to use ICAM for measuring the luminance variation in a black to white flashing.