

White Paper

Latency

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1 INTRODUCTION

The delay in time between initiation of an event and visualization of it on the screen is a critical factor in the defense world. Especially in 'man in the loop' applications there is a need to keep that time (latency) as short as possible.

2 DEFINITION OF LATENCY

Latency is the delay between a change at the input of the system and the corresponding output of the system.

In a visualization system for example, this delay will be the total time elapsed between capturing the event by a sensor, processing it, transmitting it and displaying it.

The latency inside a display is the time from arrival of the signal on the connectors until the moment that it is made visible.

It is the addition of:

- De-interlacing
- Frame store buffering and scaling
- Mixing
- Panel delay (technology and supplier dependent)

A part of the latency is the panel delay or response time of the LCD (this topic is discussed in a separate white paper).

Note: In CRT displays the signal is processed in an analog way, this results in very low latency. In LCD panels however, the signal is mostly converted from analog to digital and then processed. De-interlacing and scaling are a few of the processes that can take up to one frame. One frame results in 16,6 msec in the case of a 60 Hz refresh rate.

In the Barco TL display family one can select genlock on the RGB inputs. This feature locks the incoming signal with the output to the LCD. As such, the maximum latency becomes 0.2 frames (3.33 milliseconds at 60 Hz).

3 EXAMPLE OF LATENCY

The practical test below demonstrates latency.

On the left a CRT display, on the right an LCD display, both with the same input signal from the same graphical card. The digital clock's first digit are the seconds, the two remaining are 1/100 of seconds.

We can calculate that there is a latency of 40 milliseconds on the LCD display.



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