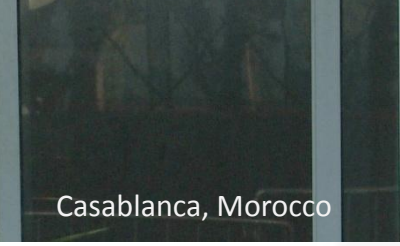




Basic issues of large format outdoor LCD systems

*There is no such thing as bad weather...
... there are only bad outdoor LCD system installations*



Casablanca, Morocco



When choosing outdoor large format LCD systems customer should be aware of number of issues, to be able to differentiate between the offer on market. This short document should point out following as relevant issues worth considering:

» **How systems cope with environmental elements and how well it supports integrated electronics with their PEAK operational requirements**

Natural ambient

- Temperature, temp. fluctuation, rain, snow, dust, dirt, salt, humidity and condensation

Solar radiation

- UV, visible light, IR

Public exposure

- Vandalism, theft, hacking

» **Capability to minimize downtime and critical system failures**

» **Ease of maintenance, system remote control and surveillance**

» **Compliance to digital signage solution elements**



motion quality standard

Optimal and stable inner enclosure environment delivering peak LCD performance and long life of integrated electronics

- Optimal temperature for LCD operation
- Minimal fluctuation of inner temperature
- Immunity to humidity and dust particle intrusion
- Advanced automatic self protection system





Any decent outdoor LCD system will be engineered to limit environmental effects of outdoor environment. Truly well built systems will be capable of supporting optimal environment for integrated electronics, delivering optimal operation of integrated LCD panel enabling best sun readability and life time results.

Environmental issues



Difference between semi-outdoor and full-outdoor LCD systems is in the fact that full-outdoor LCD systems need to handle direct influence of solar radiation with its UV, visible light and IR waves.

IR

- » **Heating up** materials. But sun generated IR waves present minor influence on heating up such systems

Visible light

- » Washing out image colors
- » Generating **heat** as IR radiation after getting absorbed by materials
- » Lower viewing angles
- » Glass sun reflection

UV

- » Degrading materials
- » LCD matrix permanent discoloration
- » Dye discoloration
- » Cracks in dye

Temperature and its fluctuation

- » **Heating up** / cooling down enclosure and integrated components
- » Materials stretching and contracting

Vandalism & Theft

- » Harming glass and enclosure
- » Graffiti
- » Braking cooling system

Electronics and LCD requirements

- » Each LCD panel (matrix/backlight) has narrow optimal performance range
- » High brightness LCD panels generate a lot of **additional heat**
- » Performance of LCD backlight is dropping towards operational extremes



Precipitation

(rain/ snow)

- » Corrosion of metal
- » Short circuiting electronics
- » Might block cooling system

Precipitation

(humidity & condensation)

- » Corrosion of metal
- » Short circuiting electronics

Dirt, dust and pollution particles

- » Particles taint appearance
- » Electronics additional heat
- » Preventing air circulation