



LCD and CRT TECHNOLOGY: Frequently Asked Questions

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1. WHAT IS A FLAT PANEL LCD DISPLAY?

A flat panel LCD (Liquid Crystal Display) is a display device that uses solid-state technology (i.e. applying voltage to modify the reflective characteristics of special type of crystals), as opposed to a CRT (Cathode Ray Tube), that displays information on a phosphor screen driven by an electron beam (much like a TV set).

2. WHY USE AN LCD DISPLAY INSTEAD OF A CRT ?

Although CRTs are still cheaper than an LCD, they are heavier, generate much more heat (hence requiring costly heat dissipating solutions), require more power and bulkier enclosures than an LCD. CRTs are also less rugged.

Electromagnetic emissions are also greatly reduced when using an LCD.

3. LCD DISPLAYS COST MORE THAN A CRT. WHY IS THAT?

Volume and yield are the primary reasons. World-wide CRT volume is measured by the ton (of glass), and have been in high-volume production for decades. LCD display volume is only recently approaching cost-effective volumes and production yields. But today, thanks to:

- increasing volumes and yields (especially in the fast-going office, home and laptop market)
- decreasing costs of LCD electronics

the price premium paid for an LCD is continuously dropping. Consider you are already saving money, in terms of reduced power consumption and maintenance costs in respect to a traditional CRT: hence a lower cost of ownership over time.

4. CAN AN LCD DISPLAY SUBSTITUTE COMPLETELY A CRT?

An LCD display can be used in any environment that a CRT will operate in. But, without specific CRT industrialization, the reverse is not true. Examples of applications where a commercial CRT (or an improperly protected one) will have difficulty operating are:

- High magnetic fields found around furnaces for melting metals, where the magnetic fields from the furnace will render the CRT image useless.
- Dusty environments where the dust will enter the CRT housing heat vents.
- Clean rooms (yes!), due to the electrostatic charge generated by a CRT attracting dust inside the unit.

LCD screens may often work in these environments without special modifications.

5. THE LCD SCREEN SIZE IS SMALLER THAN MY PRESENT CRT. WHY SHOULD I USE IT ?

A 12.1" LCD is not equivalent to a 12" CRT. In fact, an LCD screen size equates to a bigger CRT ! For example:

- a 12.1" LCD is roughly equivalent to a 14" CRT
- a 15" LCD is roughly equivalent to a 17" CRT

This is because the active area of say, a 12.1" LCD is basically equivalent to its view area (because the screen isflat, by definition). On the other hand, a CRT active area is smaller than its' nominal screen size, due to the tube's curvature.

6. WHAT IS A TOUCH SCREEN ?

A touch screen is a transparent device applied to the display, allowing the operator to interface with the computer by touching the screen. When the operator touches the screen a signal is generated that identifies the location of the touch relative to the screen image. This information can then be interpreted and processed by the application software.

7. CAN I USE A TOUCH SCREEN AND A MOUSE AT THE SAME TIME ?

Yes. In Microsoft® Windows® environments, the touch screen actually emulates a mouse. Not only can they be used together, the touch screen also allows standard drag & drop mouse functions without modifying your application program.

8. HOW OFTEN IS IT NECESSARY TO RECALIBRATE A TOUCHSCREEN ?

Except for Capacitive types, never. Marposs E9066™ systems does not use capacitive type touch screens, only 5-wire analog-resistive types that can be triggered with a finger, a gloved hand or any alternative stylus (even when the screen is dirty!).

9. HOW DO I CLEAN A TOUCHSCREEN ?

Any standard glass cleaner can be used. Spray the glass cleaner on a cloth and then clean the screen.

10. WHAT IS A NIT ?

The luminance of an LCD is measured in candelas per square meter (cd/m²) or equivalently in nits (symbol: **nt**).

1 nt is the luminance of a 1 square meter surface emitting 1 cd of luminous intensity, in a direction perpendicular to the surface itself. Therefore:

$$1 \text{ nt} = 1 \text{ cd/m}^2$$

11. BACKLIGHTS: HOW LONG WILL THEY LAST ?

The lamp life is sometimes defined as the time when either of the following conditions occur in continuous operation:

- the brightness is reduced to 50% of its original value
- the kick-off voltage exceeds the maximum admitted value

Another way of defining lamp life is using MTBF (Mean Time Between Failure). A typical (conservative) value of the LCD backlight MTBF used for the E9066™ Industrial Computers, as stated by its present manufacturer, now exceed 50,000 hours (from the initial 24,000 declared 6-7 years ago).

12. HOW DO I CONTROL THE SCREEN BRIGHTNESS ?

In the E9066™ family of Industrial Computers, the screen brightness can be adjusted via system BIOS. The factory default is set at 50%, allowing ample room for adjustment when the backlight starts decaying.

13. WHERE HAVE MY PIXELS GONE ?

Inherently to the manufacturing process, LCD manufacturers will specify how many defective pixels (always ON or always OFF) are to be accepted in any one production batch. In the past, up to 40 defects per panel were 'accepted', provided no more than 5 were grouped together.

In fact, most active matrix LCD panels will have fewer than 5 defective pixels out of over 300,000. Today, production yields are such that many screens have no defects at all.

As an example from the E9066™ LCD manufacturers' data sheet:

- Maximum number of admitted pixels always ON: 6
- Maximum number of admitted pixels always OFF: 7
- Maximum number of admitted defective pixels (ON+OFF): 10

Notwithstanding the above, Marposs in-coming inspection methods and quality control assure a near-zero defect on all its range of E9066™ Industrial Computers.