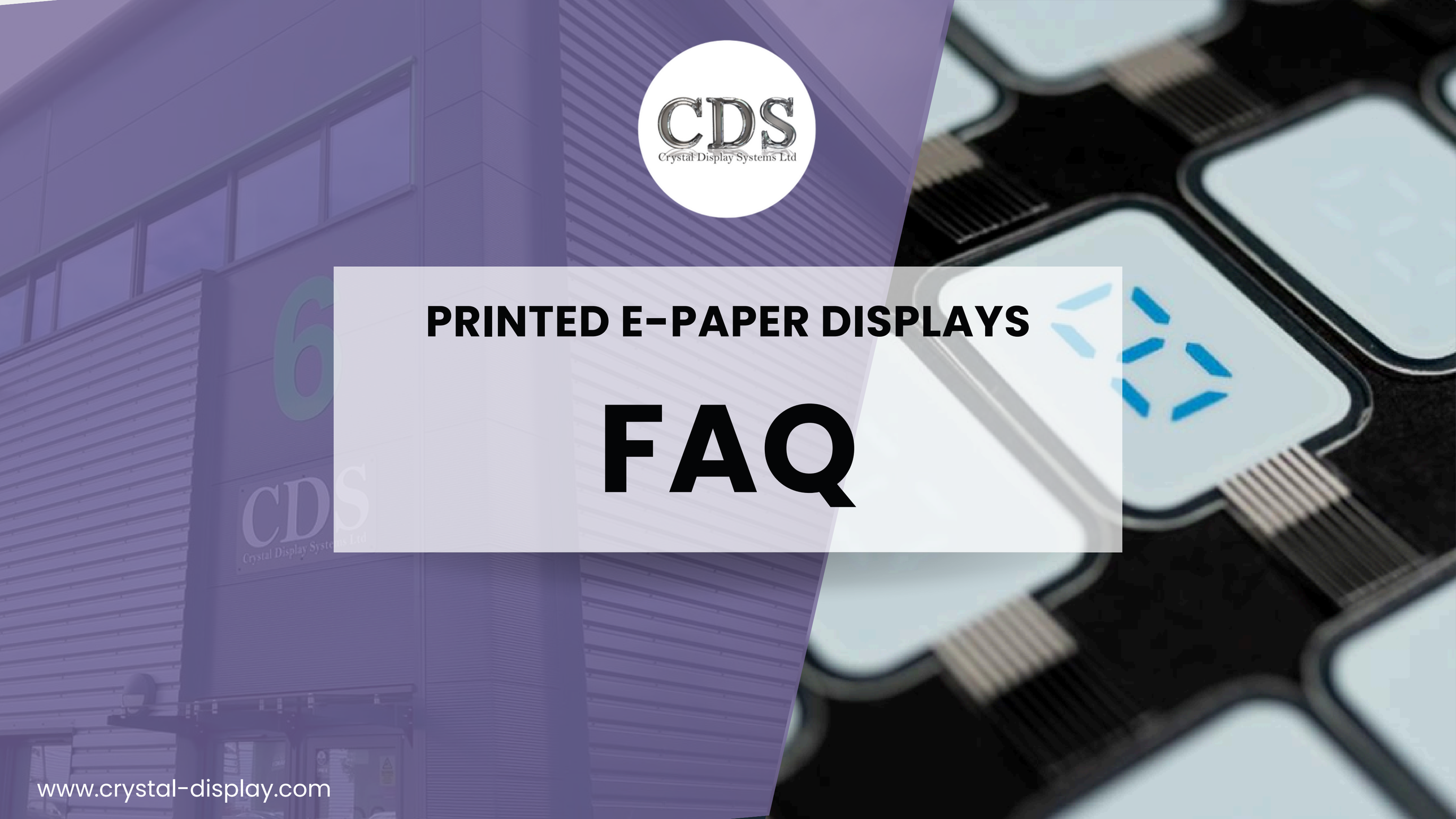
CDS
Crystal Display Systems Ltd

PRINTED E-PAPER DISPLAYS

FAQ



www.crystal-display.com

What is the power consumption?

CDS's displays have the lowest power consumption on the market for many use-cases. For static usage (when the display maintains the same image), the display consumes a maximum of 1.73 µW per cm² segment area. For dynamic usage, the power consumption depends on the number of display updates per day according to the formula:

P=1.67+0.01×n µW/cm2P=1.67+0.01×n µW/cm2

where nn is the number of full display updates per day.
Additionally, one square centimeter of active display area requires approximately 1 mJ to activate.

What is the operating voltage?

The recommended operating voltage for standard e-paper displays is ±1.5V.

How to drive the displays?

CDS's technology is designed to be easily driven, distinguishing it from other e-paper technologies. Most MCUs' GPIOs can directly control CDS displays with minimal additional components.

Can you do high resolution pixel displays?

Our primary focus is on segmented displays tailored for digits, icons, symbols, and other basic human-machine interfaces. These displays are designed to provide intuitive visual feedback, making them ideal for a wide range of applications where clear, straightforward information presentation is key.

What is the refresh speed?

The refresh speed, or update speed, varies depending on the size of the display segment. Larger display segments refresh more slowly compared to smaller ones. For example, it takes approximately 250 milliseconds to activate a 4mm² display segment using a 1.5V drive protocol. This means that the time required for activation increases with larger display segments due to the greater area that needs to be refreshed.

Can you do color displays and what are the standard colors?

Our displays are offered in multiple colors, although they are monochrome since the colors are predefined. We do not produce full-color displays like RGB or CMYK displays, but we can arrange multiple colors side by side within the same display.
We provide displays in a variety of colors and can customize tones to align with your brand. Our standard color options include Grey, Red, Green, Magenta, and Yellow. Among these, grey offers the best readability for display content.

Can you do bistable displays?

Our displays are not fully bistable; instead, we refer to them as semi-bistable.
The standard displays typically have a retention time of approximately 1 minute to 15 minutes before requiring a small refresh pulse. However, we can optimize the displays for shorter or longer image retention times by making slight modifications to the devices. This allows us to achieve retention times ranging from a few seconds up to several days, depending on the specific requirements and configurations of the display.

Can you do passive and active matrix displays?

Yes, however, these devices are not yet ready for mass production. CDS's primary focus remains on direct-driven segmented displays.

What connectors do you recommend?

We recommend either FPC/FFC connectors, Anisotropic Conductive Films (ACF), or conductive glue.

What is the Contrast Ratio or Color Difference?

CDS displays are classified as semi-bistable, offering an intermediate level of stability.
Standard CDS displays typically maintain their image for approximately 1 minute to 15 minutes before requiring a small refresh pulse. However, we have the flexibility to optimize the displays for shorter or longer image retention times through minor modifications to the devices. This allows us to achieve retention times ranging from a few seconds up to several days, catering to various application needs and preferences.

What is Electrochromism and electrochromic displays?

CDS's electrochromic displays are based on screen-printable electrochromic polymers. The term ‘Electrochromism’ refers to the phenomenon where a material changes color in response to an electrical stimulus. CDS produces electrochromic displays by printing thin layers of these materials with high-performance electrolytes into a flexible ‘electrochromic stack’.

When a voltage is applied to the electrochromic material in the presence of the electrolyte, it undergoes chemical oxidation and reduction, resulting in a color change that can be finely tuned. The final displays are as thin as 200 µm and flexible enough to bend around objects like a pencil. This technology offers versatile and visually striking display solutions in a remarkably thin and flexible format.

NEED MORE INFORMATION?

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