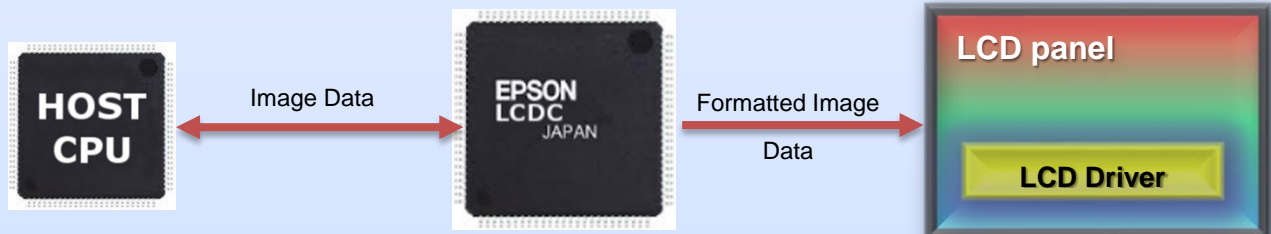


Why Use an LCDC?

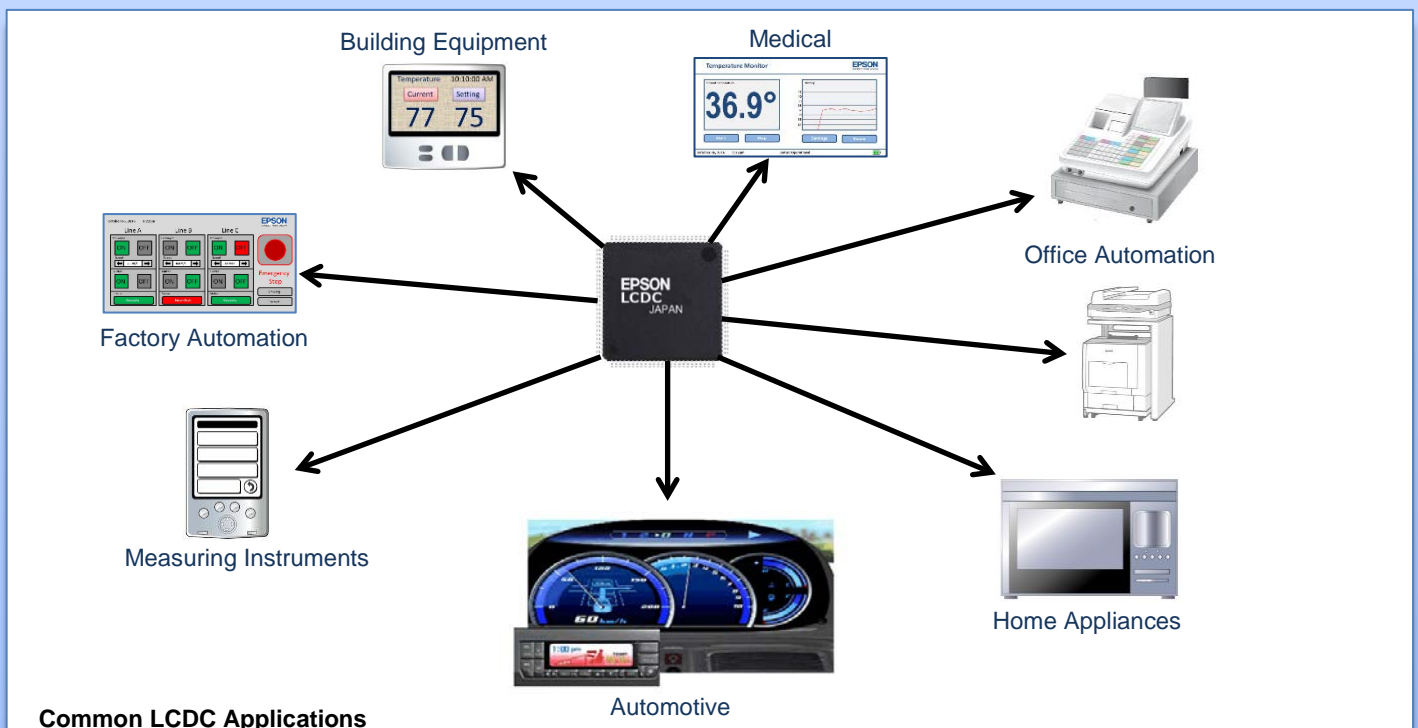
What is an LCDC?

Often referred to as a Display Controller, an LCDC, or LCD Controller, is an IC that receives image data to be displayed on an LCD panel. The image data is managed by the LCDC and then output with the required timing and format to the LCD panel.



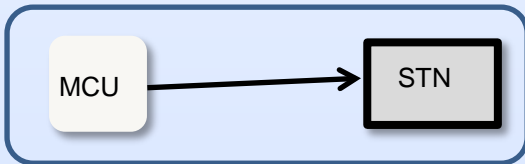
LCDC Application Examples

We are surrounded by products that have displays to provide us with information. LCDCs are found in a wide variety of products found in home, office, industrial and special use applications. They are often used in cases where low power and/or high performance displays are essential.

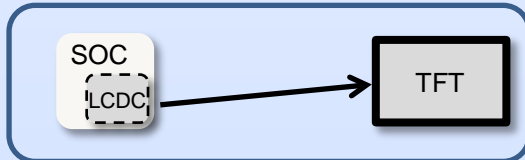


How Can I Drive An LCD Panel?

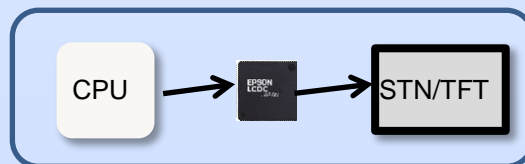
There are several methods of driving an LCD panel. For example:



Some MCUs (i.e. Epson C17 series) may be able to drive small STN panels directly



Some SOC's have a built-in LCDC that can drive TFT panels, but may have possible power consumption concerns



EPSON LCDCs can drive STN/TFT panels, **offload work** from the CPU, offer **many display features**, and may provide **power consumption savings**

When Should I Use an LCDC?

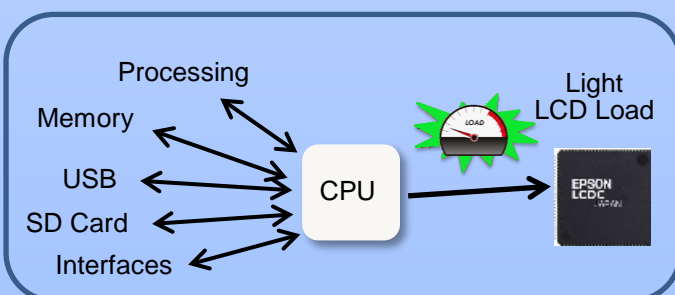
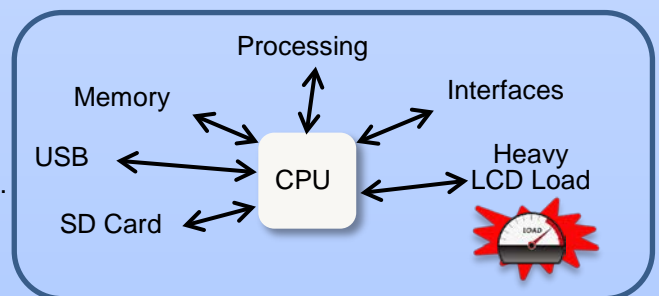
With so many possible methods to drive an LCD panel, which is best for your project. Consider the following examples:

<u>Problem</u>	<u>Solution</u>
• SOC Built-in LCDC uses too much resources (i.e. bandwidth, memory)	- Need LCDC!
• Update existing design to TFT	- Need LCDC!!
• Power consumption too high because managing LCD panel	- Need LCDC!!!
• Specific Display Feature required for customer project (i.e. Rotation)	- Need LCDC!!!!
• Cost of High-end CPU/SOC with Built-in LCDC	-- Need LCDC!!!!

For many applications a separate **EPSON LCDC** is the **best option**.

Use Case 1 - Separate LCDC Frees CPU Load Results in Better System Performance

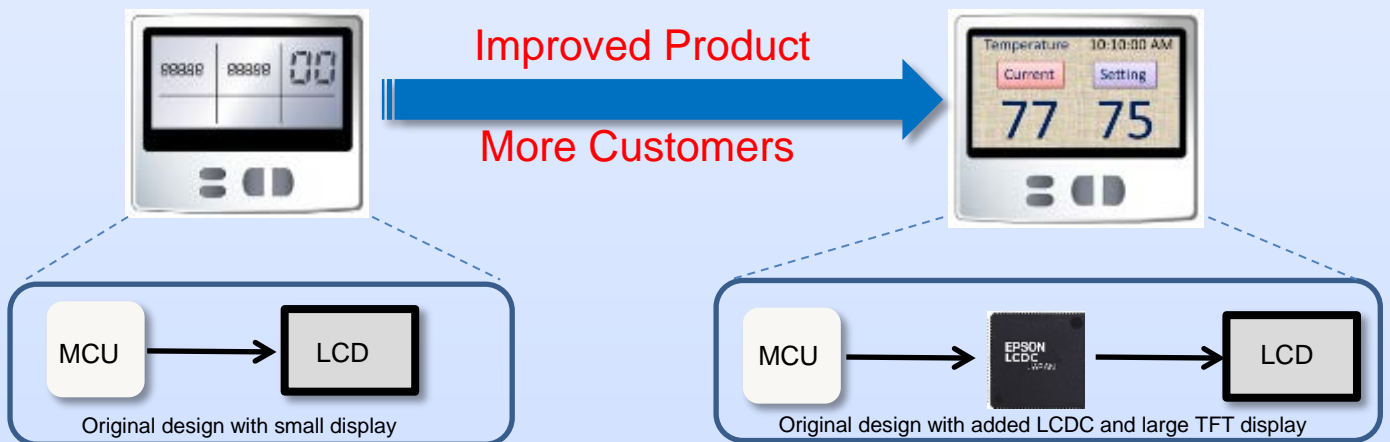
Problem: Low Performance from a CPU that has the capability to drive an LCD panel because it is dedicating too much resources to the LCD (i.e. bandwidth, memory, etc).



Solution: **EPSON LCDC** handles all display tasks so the **CPU can focus on other tasks** – Improving System Performance.

Use Case 2 – Update Existing Design to TFT

An existing product is successful and well received, but new customers will be attracted to an updated product with a better display.

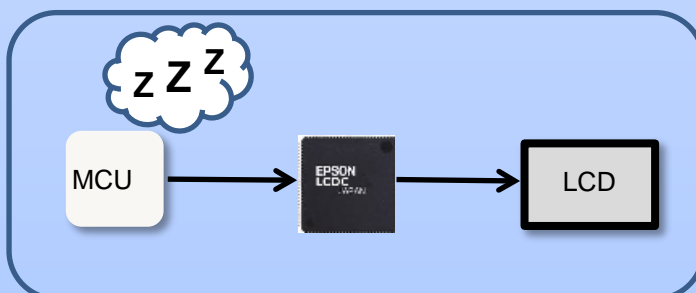
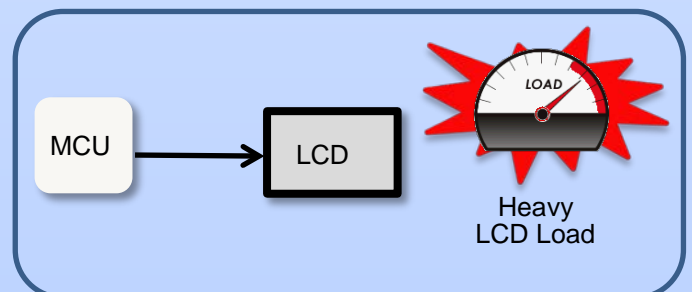


Key Benefits:

- Limited design changes to achieve improved product
- Minimal software changes when using current platform
- Display functions off-loaded from MCU – Increasing Performance

Use Case 3 – Power Consumption Sensitive Design

Problem: Power consumption of a new or existing design is high because the CPU is always servicing the display output.



Solution: Add low power LCDC to control display output while main CPU sleeps.

Key Benefits:

- **EPSON LCDC** allows the MCU/CPU to enter Deep Sleep mode resulting in potential power savings

Use Case 4 – Design Requiring Specific Display Feature

Some projects require a specific display feature that is not available on a “built-in” LCDC, or may overburden an MCU trying to drive an LCD panel directly. Many **Epson LCDCs** offer display features that simplify or enhance designs:

Multiple Window (Picture in Picture): Shows a landscape image with a smaller inset image of flowers overlaid on it.

Scaling: Shows an image of a bridge being scaled down ('Shrink') and then scaled up ('Expand').

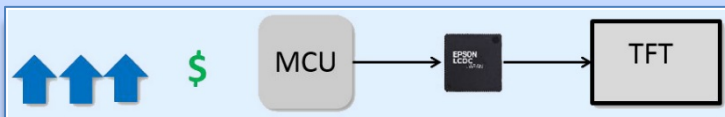
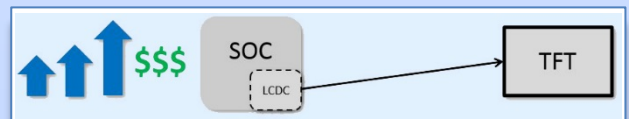
Rotation: Shows an image of a building being rotated 90 degrees clockwise and then counter-clockwise.

Alpha Blending: Shows a 'Main Window' (landscape) and a '2nd Window' (blue square) being combined with 'Alpha Blend 50%' to create a semi-transparent overlay.

Gamma LUT: Shows a color image of trees with a graph of Gamma Correction curves. It compares 'Without gamma correction' (darker colors) with 'Through LUT' and 'With gamma correction' (brighter, more accurate colors).

Use Case 5 – Cost of Using Expensive CPU/SOC

Problem: Project requires high-quality TFT panel, but not performance of high-end CPU. One option may be to consider a high-end CPU/SOC solution with built-in LCDC. However, this may increase the cost of the project.



Solution: Consider: Low Cost MCU + EPSON LCDC. **EPSON LCD controller allows even a Low Cost MCU to support high-quality displays supporting up to XGA resolution.**

Why Use Epson?

EPSON provides a wide range of LCDC solutions that meet the diverse requirements of today’s complex markets. EPSON LCD Controllers are ideal for products targeting WQVGA to XGA size LCD Panels.

EPSON produces the LCDC series of products in its own FAB allowing Epson to achieve a good reputation with many customers for quality control and stable supply.



For more information on EPSON Display Controllers visit:
https://global.epson.com/products_and_drivers/semicon/products/display_controllers



For technical resources, such as Specifications, Software, and Videos visit:
https://global.epson.com/products_and_drivers/semicon/information/support.html