Which LCD to choose: It's not as difficult as you think

One of the most important jobs an engineer performs, after making coffee, is to choose the optimum LCD display for new product development.

Unlike other components, the display sets the perceived value of your product. If the display is dull or difficult to read, then your end customer, the one who pays for your coffee, will see a sub-standard product.

So . . . which display technology is best for your current design?

Do you need multi-color, sunlight readable, low-power or a touch panel and if so, what type? No one display offers it all. Each technology possesses its own pros and cons.

Engineers have more important things to do then gather information about LCDs -- Important things like ordering coffee. That's why FocusLCDs.com offers this overview to choose the optimum display technology and so you can impress people at the next office party with your knowledge.

Color or Monochrome?

All displays can be broken down into two categories: Color or Monochrome.

Monochrome has one color background and a different color character or icon as seen in digital watches, gas pumps and scales.

Color modules produce up to 64,000,000 unique colors and are found in cell phones, laptops, heart-monitors and automotive applications.

Let's start with color.

TFT:

TFTs (thin-film transistor) are bright, vibrant, eye catching modules that make any product distinctive which is why they are the single most popular color module for OEMs.

They generate characters, images and video.

Pros:

- Bright and multi-color performance makes your product stand out.
- TFTs are standard stock items, most samples can ship the same day you call.
- Most contain touch panels (Resistive or Capacitive).
- Onboard controller/driver for quick programing.
- Multiple interfaces including HDMI, SPI and Parallel.

Cons:

- Poor performance in direct sunlight
    - Most TFTs perform poorly in direct sunlight, try reading your phone or tablet on a sunny day.
    - New transflective technology has been introduced that makes the display readable in direct sunlight -- but at a higher cost.
- Power hungry
    - They draw more power than monochrome technology since their backlight must be powered all the time. A negative for battery powered products. Cell phones and other portable products turn the display off seconds after the call has connected to extend battery life.

Since most TFTs contain a touch panel, we thought we would offer a quick overview.

Touch Panels:

There are two common types of touch panels: Capacitive and Resistive

Capacitive:

- Capacitive touch panels are multi-touch that allow the user to zoom, scroll and pinch the image.
- They are higher cost then resistive, require more integration resources and are limited to a finger or stylus to activate.

Resistive:

- Resistive panels can be activated by any item from a finger, tip of eraser or gloved hand. They are limited to single touch, but are lower cost, easier to integrate and perform well in harsh environments.

OLEDs:

OLEDs (Organic light emitting diodes) are similar to TFT's.

Pros:

- Thinner profile and require less power.

Cons:

- The downside is their tendency for obsolesce. There are few OLED manufactures compared to several TFT manufacturers. The lack of supply to meet demand produces shortages, unreliable lead times and cost fluctuations.

We do not recommend OLEDs currently for new product designs. If your product needs a consistent supply for three or more years, choose TFTs.

Character LCDs:

Character LCDs are monochrome and display letters, numbers and punctuation marks. They are easy to read from multiple angles.

Pros:

- Sunlight readable
  - Character displays are easy to read in direct sunlight and contain a backlight for nighttime operation.
- Low power
  - Current draw with the backlight off draws less than 1mA.
- Low cost
  - Cost range from $4/each up to $40 depending on the display's size and quantity ordered.
- In stock
  - US based inventory allows shipment of samples the same day you call. Production lead times run six weeks for higher volumes.
- Ease of programing
  - A built-in character table makes programing quick. There are several development boards that have prewritten code.
- Very little chance of obsolesce
  - They've been around for twenty plus years and their popularity hasn't diminished.

Cons:

- Single color
  - You can choose any color background including blue, white, black, red, green, RGB etc.
- They cannot display graphics or videos.

When ordering samples from Hughes Peters, ask for the estimated lifetime for the display.