# Displaying in Negative or Positive Mode on Graphics Displays

I. Introduction:

Some graphics displays are available only in one mode, either negative or positive. For example, FSTN displays with CCFL backlight are only available in the "Negative" mode with a dark background and light characters or dots. It is quite simple for the user to "change" any graphics display to the opposite mode by manipulating the data before it is sent to the display..
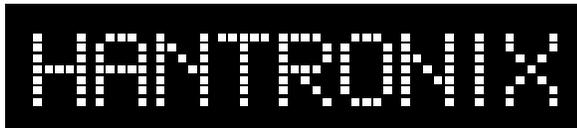
Negative Mode
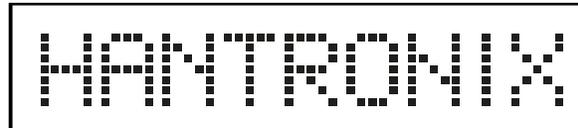
Positive Mode

II. Simple graphics display:

As an example, consider an FSTN display with a CCFL backlight such as the Hantronix HDM64GS24Y-2. This display works in the negative mode. After a reset, the display will be dark or opaque so the light from the backlight is blocked. Writing a logical 1 to a bit will switch it to white or transparent so the backlight shines through. The net effect is to display a bright or white image on a dark background. If the opposite effect is desired the user simply inverts each byte of data just before it is sent to the display. This is usually accomplished by executing a compliment command on the register holding the data to be written to the display.

Many programmers write to only selected portions of the display without updating the entire display. In this case, the user should fill the display memory with all 1's to change the background to white before sending any "complimented" data to the display.

III. Graphic displays with a text/graphic controller.

Many modern displays come with a built in text/graphic controller such as the Toshiba T6963C. "Reversing" the display when in the text mode requires only slightly more effort. The Hantronix display example discussed above is equipped with the T6963C controller and will serve as an example in this case, also.

When text and graphics are mixed on the same display the graphic is sent to the display in complimented form as in **section II** above. The text display mode is set to EXOR and the text is then written to the display in the normal way.

When the display is to be used exclusively in the text mode "reversing" display can accomplished most easily by writing the text with its attribute bit set to "reverse display".

Using these techniques, any display can be used in either display mode. These techniques can also be used to dynamically change the appearance of the display, if desired.