Abstract.

The invention provides a ferro-electric liquid crystal display (FLCDs) with reduced voltages requirements for driver circuits. This enables standard drivers circuits designed to rms address twisted nematic type of displays, to be used for FLCDs. Displays are formed by cells containing smectic liquid crystal material. The cell walls are surface treated and carry eg. row and column electrodes forming an x,y matrix of addressable display elements. The smectic liquid crystal material switches between two states upon application of a dc pulse of appropriate amplitude, polarity, and time. Addressing waveforms are strobe waveforms, eg two pulses of opposite polarity in successive time slots, applied to each row in turn. Data waveforms are, eg dc pulses of alternate polarity with each pulse lasting one time slot ts. Two data waveforms are needed to switch between the two states; one data waveform is the inverse of the other. Typically a strobe waveform pulse may be 50 volts. In the invention a voltage reduction waveform (VRW) is added to both strobe and data waveforms. This has the effect of reducing the maximum amplitude of voltage needed by the driver circuits, whilst leaving the resultant voltage appearing at a display element at the same value as if VRW were not used. With a reduced voltage requirement, driver circuits previously used for relatively low voltage nematic material type of displays can be used to switch smectic materials.

This Sheet Has Been Replaced

