APPLIED
NEURODIAGNOSTICS

Application-specific LCD Driver Board for Applied Neurodiagnostics Ltd

timestar
developments limited

Background

As part of the development of a new diagnostic instrument for the eyecare industry, Applied Neurodiagnostics Limited identified the requirement for a custom driver board for off the shelf VGA and quarter VGA display devices.

The board was required to display one of a library of preset shape pairs (upper and lower) with adjustable parameters for the brightness of the shape, the brightness of the background, the left-right orientation of the shape and the upper/lower selection state (meaning that, at any given time, either the upper member of the shape pair would be illuminated with a programmable brightness whilst the lower member would be black, or vice versa).

The shape and background were required to be shown in a 6 bit greyscale, but each shape pair also had associated with it a marker, consisting of a red cross, on which the patient was asked to focus.

The board was required to contain drive electronics for backlighting and to support a serial interface with a simple message protocol for communication with a host computer, so that the parameters could be set up, the patterns downloaded, and the current pattern selection made.

Project details

Timestar successfully bid, on a fixed price basis, to design and supply both the board and a Windows application for test and demonstration purposes.

The essential functionality was implemented by using a highly compressed format (requiring only 2 bits per pixel) to store the patterns in Flash memory and a Xilinx CPLD to manage the decompression of the data in real time and the synthesis of the VGA/QVGA timing and control signals.
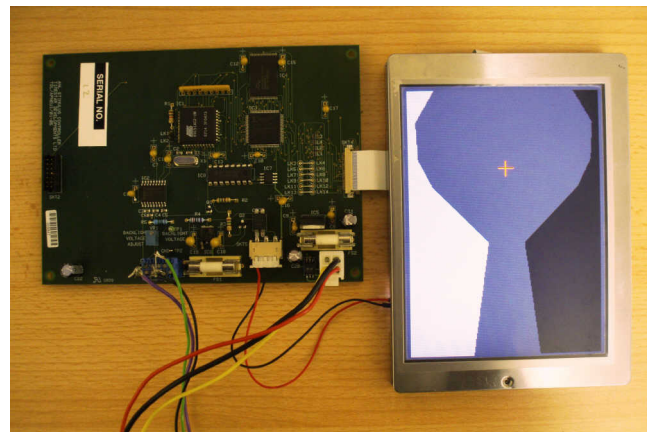

Figure 1: Display control board and display

Subsequent development

A subsequent order, for pre-production quantities, also included the development of a test rig based on a modified version of the same board and an enhanced version of the PC software. The test rig allowed the board under test to be connected back to back with the test rig board, so that the display signal outputs from the board under test were inputs to the test rig board, and a special test pattern, automatically loaded by the test software into the Flash memory of the board under test, permitted verification that every greyscale value was being correctly generated.