Name of students: Lam Chun Kit
Liu Kwong Mei

Name of Supervisor: Dr. Huang Ho Chi
Nowadays the most popular display resources are PCs and TVs. The resolution of a PC is mostly XGA (1024x768). As for TVs, there is a trend to make the 16:9 HDTV-720p format (1280x720). In order to accommodate both the PC and TV resolutions, the WXGA (1280x768) resolution is needed. In our project, two high resolution projectors were built with the WXGA resolution using PanelLink as inputs. There are three main components in the project, a PanelLink receiver SiI861, two drivers (one with three panels, and one with two panels), and projection optics.

The PanelLink receiver SiI861 can be programmed to generate any display resolution signals. We configured the PanelLink receiver SiI861 so that WXGA resolution signals are given out.

The PanelLink receiver SiI861:

The drivers connect the PanelLink receiver SiI861 and the microdisplay panels. The two drivers convert the output signals from the SiI861 to the signals needed for the microdisplay panels in the three panel projector and the two panel projector respectively.

Involved in the projections are a 120W arc lamp parabolic reflector, an IR filter, a condense lens and a projection lens. In the three panel projection, a TPA is used to merge the red image, green image and blue image from each microdisplay panel to give a bright full-colour image. In the two panel projection, a PBS is used to merge the full-colour image from each microdisplay panel to provide a brighter full-colour image.

Figure 1 Configuration of the SiI861

Figure 2 WXGA signals from the SiI861
(The test pattern was a screen with horizontal stripes of three colours (green/red/blue). The three different colour data bits are asserted alternatively.)
Three panel driver:

In the three panel driver, discrete logic gates are used to generate the required signals for the microdisplay panels. Using the RC delay, which is generated by the implemented RC circuits, the delay signals and pulse narrowed signals are generated.

In order to accommodate the shape of the TPA, the panel headers are arranged at an angle of 26°.

Two panel driver:

In the two panel driver, the panel headers are arranged in an L-shape in order to accommodate the shape of the PBS. An FPGA is used to generate the required signals. A multiplexing technique and counters are included in the design. Short data paths are introduced to reduce noise.
Conclusion:

Because the SiI861 was correctly configured, the drivers successfully made, the projection optics carefully set up, the system is able to project clear and stable images.