



FPGA-module with iVu-programming version 1.0.0

Integration of the FPGA-module within a display:

The FPGA-module will be mounted into the LVDS-line between video-controller and directly before the display/display-controller. To support that it offers a LVDS-input- as well as an LVDS-output-adaptorboard. Driving is possible by VESA- and also JEIDA-standard.

Requirements regarding the components of the display:

The video-controller should be equipped with the actual and most common input-interfaces. Among others there should be available one HDMI-interface according standard 1.3, for 3D side-by-side-processing at least according standard 1.4, to avoid conflicts with the HDCP copy protection.

The utilized display-panel itself is required to be planar as far as possible, to show a brightness of at least 700 cd/m² and to offer an original full-HD-resolution of 1920 x 1080 pixels. The unit has to be preinstalled for autostereoscopic usage by the application of either best a parallax-barrier or at least a lenticular film. The build in controllers have to ensure a least original, not electronically processed/not improved data flow. The display-controller itself ought to operate totally neutral in respect to signal transmission and control of the display.

Features of the iVu-programming:

- **Realtime-conversion of any 2D-video-input-signal:** Without any interim storage mono pictures will be converted into 3D-spatial-images and emitted to the auditorium in a way, which allows an unlimited number of viewers to perceive the same spatial-image-experience within a viewing angle of up to about 160° to the display.
- **No pseudoscopies or ghostings created by the 2D-3D-conversion:** The natural depth of the single mono image will be restored and any artificial effects or structures, which could distort the original scenery, will be avoided. The spatial-depth is not perceptible as graduated, but is present in a continuous and flowing way. The spectator within the given focal length of the camera is able to focus at its own discretion on every depth-level of the portrayed space.
- **Autostereoscopic processing of original 3D- content:** Any original 3D-content, which is disposable in the most common side-by-side-format, will be edited realtime for autostereoscopic presentation. The result can be watched without the usage of any 3D-glasses within a viewing scope of up to around 160° to the display by every spectator irrespective of his position in the auditorium.
- **Transformation of parallaxes and reduction of disparity for 3D-productions:** Within the scope of the conceded possibilities by the production itself each film made for watching with glasses will be displayed clear, detailed and with great effect. In the process the only originally available positive parallax will be partly converted to negative parallax (= out screen effects) to an extend reconcilable for the spectator. Overdone, unrealistic disparities under observance of the desired illusion/effect will be automatically amended as far as possible (animation film <=> live-action film).
- **Automatic image improvement and up-scaling:** Any provided content during the iVu-processings undergoes an automatic, system immanent improvement of picture noise and effects created by the various compressing methods. In addition any content will be scaled up to full-HD before analysing and calculations start.

- **Versatile possibilities of adjustment:** The perception of depth could be set simply automatically by selecting the usual viewing distance or to the individual preference/perception of the spectator. The adjustment of disparity within original 3D-productions is modifiable pixel per pixel. The way of processing, 2D-3D-conversion or 3D-processing, of iVu will be decided by the selection of the format, mono or side-by-side, of the content to be shown. Obviously iVu could be switched of completely.
- **Latency of roughly 2ms:** Despite a computing power of 6.5 GB per second it is not necessary to do any post-editing regarding the original dubbing due to the not perceivable latency of the whole process.

Fields of application for iVu:

- Television
- Games
- Digital Signage
- Medical Engineering
- Diagnostics and maintenance
- Simulators and trainers
- ...



natural view systems gmbh

spatial-image systems