Philips Multiview 3D Display Solutions

Cees van Berkel
Autostereoscopic 3D Displays

- Autostereoscopic
- Any size LCD
- High Brightness
- Compact
- Cost effective

Why LCD?
- Thin Face Plate
- Accurate Pixels
- Uniform Pixel Intensities
- High Pixel Density

- 2D/3D switch-able
- 2D/3D conversion
Why 3D?

- The gaming community is consistently seeking the best possible experience. 3D can offer an additional dimension.
- User Interfaces are becoming 3D as differentiator and as means to simplify access to complex functions.
- (Mobile) operators can increase service revenues via (3D) picture/video downloading & sharing, games, etc.
- TV/Movies in 3D can offer a better experience than in 2D.
- Professional applications seek enhanced visualization.
Lenticular Lens Screens

To make LCDs into 3D displays you need lenticular screens. Philips has this technology.
3D-LCD Technology

Diagram showing top plate, subpixel, pixel, and Lens Screen.
Overlapping Viewing Zones
Slanted lenticulars
Slanted Lenticular Resolution (9 View)

Horizontal Pixel Count
\[
\frac{1600 \times 3}{4.5 \times 2} = 533 \times \frac{1}{3}
\]

Vertical Pixel Count
\[
\frac{1200}{3} = 400 \times \frac{1}{3}
\]

Note:
\[
\frac{533 \times 400 \times 9}{1600 \times 1200} = 1
\]
Slanted Lenticular Resolution (7 View)

Horizontal Pixel Count
\[
\frac{1024 \times 3}{3.5 \times 2} = 686 \quad \frac{1}{2.3}
\]

Vertical Pixel Count
\[
\frac{1200}{3} = 400 \quad \frac{1}{3}
\]

Note:
\[
\frac{686 \times 400 \times 7}{1600 \times 400} = 1
\]
Colour Stripe Pitch

- Slanted Lenticulars
- $\sim N$
- $\sim \sqrt{N}$

Number of Views

RGB Pitch (Pixels)
Philips Key Patents

US6,064,424 (May 2000)

US6,118,584 (Sept 2000)

US6,069650 (May 2004)
3D Solution

Is Content available?  
Does 3D fit mainstream silicon?  
Does 3D fit mainstream Displays/Devices?

Content Creation & Distribution
Processing
Displays
Many 3D displays for many applications
Content Chain

2D Video → 2D+Z → 3D display

Depth estimation → Z-Mapping

“Championing an optimal 3D content chain for a wide spectrum of applications”

• Mobile
• Monitor
• TV
Conclusions

• Philips has excellent 3D display solution
  • Multi user
  • Flexible in viewing angle and distance
  • 2D/3D Switchable
  • Low cost

• Philips has high quality 2D/3D conversion
  • Expertise in signal/display processing
  • Real time depth estimation
  • Image Quality & Resolution

• Philips is active in 3D opportunity
  • Discussions with partners
  • Focus on Mobile, TV & Monitors

• Pluralistic 3D future
  • A universal family of interfaces. Objects, z maps & views