Cost-Performance of MicroDisplay
Enabling New Applications

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Taunton, MA
HBT Manufacturing

Los Gatos, CA
System Application Center

Westboro, MA
Display Manufacturing

Taunton, MA
Headquarters and HBT Manufacturing
CyberDisplay technology origin:

- MIT nano-semiconductors technology
- Kopin Corporation got US military funding of US$50M in 1992, matched US$50M funding by public listing on Nasdaq
- Then develop CyberDisplay in 5 years.

- Besides Military application, CyberDisplay is used in Video Camera, Digital Camera, Video Eyewear, and 3D-Stereo Game Head Mount Display (HMD).

World’s Densest Transmissive AMLCD: 11.5um pixel size
# CYBERDISPLAY PRODUCTS

## (COLOR)

<table>
<thead>
<tr>
<th>Display</th>
<th>Resolution</th>
<th>Size (inch diag.)</th>
<th>Aspect Ratio</th>
<th>Availability</th>
<th>Driver ASIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>113K</td>
<td>521 x 218</td>
<td>0.16</td>
<td>4 : 3</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>152K</td>
<td>695 x 218</td>
<td>0.20</td>
<td>16 : 9</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>230K</td>
<td>320(3) x 240</td>
<td>0.24</td>
<td>4 : 3</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>WQVGA</td>
<td>432(3) x 240</td>
<td>0.29</td>
<td>16 : 9</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>VGA</td>
<td>640(3) x 480</td>
<td>0.44</td>
<td>4 : 3</td>
<td>Yes*</td>
<td>Yes*</td>
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<tr>
<td>WVGA</td>
<td>854(3) x 480</td>
<td>0.58</td>
<td>16 : 9</td>
<td>Yes</td>
<td>Q2 06</td>
</tr>
<tr>
<td>SVGA</td>
<td>800(3) x 600</td>
<td>0.59</td>
<td>4 : 3</td>
<td>Yes</td>
<td>Q2 06</td>
</tr>
<tr>
<td>SXGA</td>
<td>1280(3) x 1024</td>
<td>0.97</td>
<td>5 : 4</td>
<td>Yes</td>
<td>Q2 06</td>
</tr>
</tbody>
</table>

* Low-voltage version to be available in 2Q 06
Kopin Commercial Display Rolling Chart

Year

Quantity

SVGA
WVGA
VGA
WQVGA
QVGA Color
113K Color
QVGA Mono

EvF: Camcorder
EvF: DSC
EvF: Toy
EvF: RC Model, 3D Game, Movie

Forecast
Cost-Performance Trend

MicroDisplay Cost

- SXGA
- WVGA
- VGA
- QVGA Color
- WQVGA
- 113K Color
- WQVGA
- QVGA Mono

Cost Scale:
- $10,000
- $1,000
- $100
- $10
- $1

Year Scale:
- 2000
- 2001
- 2002
- 2003
- 2004
- 2005
- 2006
- 2007
- 2008
- 2009
- 2010
CyberDisplays & Applications

Kopin CyberDisplay Platforms

- SXGA 3932K
- SVGA 1440K
- WVGA 1230K
- VGA 922K
- WVQVA 308K
- QVGA 230K
- Sub-QVGA 180K
- 153k 113K
- 320 300S
- 290 Mono

Applications

- EVF for Video Camera Toy; Baby Monitor 2006
- EVF for Digital Camera 2001
- WVGA 1230K
- VGA 922K
- Sub-QVGA 180K
- 153k 113K
- 320 300S
- 290 Mono

- Video Eyewear for MDTV; DVD; PMP; 3D Stereo Games 2005
- Eyewear for UMPC; 3D Stereo Games 2007
- EVF Photo Sharing Kaleidoscope 2009
- HMD for Virtual Reality; Military 2000

- Kopin CyberDisplay Platforms 2001
- Kopin CyberDisplay Platforms 2005
- Kopin CyberDisplay Platforms 2007
- Kopin CyberDisplay Platforms 2009
- Kopin CyberDisplay Platforms 2000
Binocular Applications

(for Two Eyes)
The Key Values to User

Value of a set of good Video Eyewear / Personal Display Product:

• Mobile - Portable, Light Weight (large image)
• Personal - Privacy & Courtesy
• Outdoor Under the Sun Display
• Stereoscopic - 3D Stereo
Binocular: Wearable TV Monitor

Great for Travel!
iPod Video Kicked Start the Mobile Video Market in 2005/2006
Personal DTV Grow in 2007 / 2008

Freedom to enjoy mobile video (TV, PMP, Game......) Anytime, anywhere

DVB-T: Europe, Taiwan
DMB-TH: China
ATSC: USA
PSP with Video-Out in Sept 2007

Released in Sept 2007

Composite AV YCbCr component
iPod Generation 6 – Sept 2007

Driving the Made-for-iPod Market Further
MP5 in China – RMVB 2008

• Large movie database in China
• Real Media licensed RMVB decoding software to DSP makers in Sep 2007
• RMVB player solutions available in 2008
Cell Phone TV

• Live TV Video thru 3G network or DMB/DAB
• Network & Services mature in Korea & Japan
• Starting in Taiwan, Europe, China (CMMB)
Outdoor Personal Theater

- Hook-up to DVD Player, iPod, PMP
- Watch Movie Under the Sun
- With Eye-Mask
Watching TV with Lying Down Posture

**Comic Text:**

**Panel 1:** Have you ever seen anyone work so hard at being so lazy?

**Panel 2:** And you say I never do anything around here.

**Panel 3:** 你見過任何懶得如此賣力的人嗎？

**Panel 4:** 你還說我在家啥事也不做呢。

**Source:** Digital Vision
3D-Stereo Movie will see Big Growth 2008 / 2009

- Disney / RealD
  - Digital 3D Projector with Circular Polarizer
  - 1,000 3D Theaters now
  - 3,000 Theaters by 2009
- Dreamworks
- Lucas Art (Starwar)
- More movie titles coming
- Sensio 3D DVD format
3D Stereoscopic Game on PC

- Over 3,000 games available
- Nvidia 3D-Stereo Driver Software support
- Ready for use in VGA Resolution
Virtual Reality at Home

Wireless 3D Stereo Monitor
Monocular Applications
(for Single Eye)
Monocular:
Personal Monitor
PDA Phone / UMPC

- Email & Websurfing thru:
  - WiFi; & 3.5G HSDPA

Sony VAIO

Dopod U1000

Nokia N95
GPS Wearable Display

• Watching GPS screen while driving
Wearable Baby Monitor

The New Hands Free Monitor

Baby always in front of Mom’s Eye while she is doing housework

The old way
Remote Control Toy Monitor

Spy Video Car by Spy Gear
Remote Control Planes & Helicopters

First Person Driving Experience

Tilting
Pan & Tilt Camera
Panning
Radio Control

Head-Trackered HMD
ALL these are possible because Kopin

Digital iVision Technology is HERE
Kopin Product Line
Binocular Display Module (BDM)

The Plug-and-play Solution for Video Eyewear

BDM-230K
QVGA 320 x 240

BDM-922K
VGA 640 x 480

DIGITAL VISION™
# BDM PRODUCT ROADMAP

<table>
<thead>
<tr>
<th>BDM-230K</th>
<th>BDM-922K</th>
<th>BDM-308K*</th>
<th>BDM-1230K*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution</td>
<td>320 x 240 QVGA Color</td>
<td>640 x 480 VGA Color</td>
<td>428 x 240 WQVGA Color</td>
</tr>
<tr>
<td>Image Size @ 2m</td>
<td>35”</td>
<td>48”</td>
<td>42”</td>
</tr>
<tr>
<td>FOV</td>
<td>24 deg</td>
<td>32 deg</td>
<td>28 deg</td>
</tr>
<tr>
<td>Aspect Ratio</td>
<td>4:3</td>
<td>4:3</td>
<td>16:9</td>
</tr>
<tr>
<td>Interface</td>
<td>NTSC/PAL</td>
<td>NTSC/PAL</td>
<td>NTSC/PAL</td>
</tr>
<tr>
<td>Voltage</td>
<td>3.3V</td>
<td>3.3V</td>
<td>3.3V</td>
</tr>
<tr>
<td>Weight</td>
<td>26 g</td>
<td>27 g</td>
<td>~30 g</td>
</tr>
<tr>
<td>Production Time</td>
<td>Q3 2005</td>
<td>Q3 2006</td>
<td>Q2 2008</td>
</tr>
</tbody>
</table>

* Preliminary spec.
Health for the Eyes: Natural Image