A different view

How P-OLEDs are enabling the next generation of video display devices. By ***Professor Ian Underwood.***

Video glasses, or personal displays, are set to be the next big thing. The market for the delivery of information and entertainment on the move is predicted to follow personal audio as one of the fastest growing sectors of the electronics industry.

Just as MP3 players – and, before them, the portable cd player – have made music a 'go anywhere' experience, so personal video players are becoming available, allowing the user to play games, watch movies and view sport on the move.

Already, portable multimedia players are successes. Apple has sold more than 100million iPods worldwide – a growing fraction of them video enabled – and, in its wake, have come hundreds of competitors. The latest update of Sony's PSP, meanwhile, has a tv out socket.

Yet there are millions more potential consumers who will be attracted by improvements in image quality, screen size and battery life – all of which would provide an enhanced viewing experience.

There is also substantial demand for the delivery of multimedia content over mobile phones. Worldwide sales of video enabled mobiles are expected to more than double by 2010 compared with sales today, according to a report from Infonetics Research (**http://tinyurl.com/32chhq**). Sales of video phones with powerful capabilities are predicted grow to about $125billion by 2010 from nearly $58bn in 2006, and the number of subscribers to mobile tv and video is expected to increase to 58.6m in 2010.

Mobile tv can be viewed anytime, anywhere and users expect the same level of service for video quality and accessibility of mobile tv on the train and indoors as they do for making and receiving calls.

Consumer expectations are high and products such as the Apple iPhone are meeting them. Nevertheless, accessory enhancements such as video glasses are set to raise the standard and drive a major shift in the way in which we experience digital information and entertainment.

As prices begin to drop below $200, video glasses have become a realistic alternative to hand held devices. A tv or video screen is typically viewed at a distance; whether it is the 3.5in display of an iPhone or a 50in flat screen tv. By contrast, video glasses produce a virtual image from a near eye display; this virtual image 'floats' at a fixed distance in front of the eye and appears equivalent in size to a large tv screen. Video glasses usually provide 'see around' or 'see through' capability but, for gaming applications, they can be totally immersive, blocking out all extraneous vision.

Video glasses currently on the market do not deliver all the features consumers

want. In particular, they suffer the drawbacks of current display technology – predominantly lcd based. What consumers demand of video glasses is clear: comfort, portability and privacy, as well as good video image quality and battery life. It should be hands free, so users can interact with the media player and then view the video content without having to hold the display up towards the face. It should provide freedom of movement, be able to be carried easily from place to place, and used when standing or sitting, stationary or moving. A further requirement is to provide viewing that is much more private than a conventional screen.

Above all, video glasses need to deliver a substantial improvement in the visual experience if they are to meet these demands successfully.

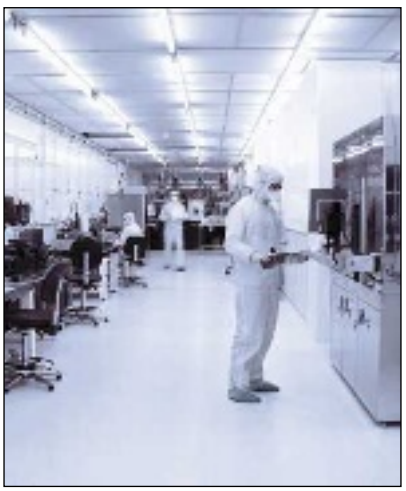
The eyescreen solution developed by MicroEmissive Displays (MED) combines the advantages of polymer organic light emitting diode (P-OLED) technology with the display driver electronics on a cmos substrate, allowing extra functionality such as image resizing to be incorporated onto the chip.

MED believes the eyescreen's image quality and low power consumption are its 'killer' benefits. P-OLEDs emit light when an electric current is passed through the polymer layer. Thin layers of polymer can be used to produce full spectrum colour displays, requiring a relatively small amount of power for the light produced. P-OLEDs produce an emissive display, in contrast to the transmissive or reflective technology of lcds, which means that there is no requirement for a backlight.

The result is a display with a non emissive black, so a black pixel is truly black: it really is an absence of light. With vivid colours and really black blacks, the high contrast of P-OLED microdisplays enhances the visual experience by producing an illusion of depth.

High pixel fill factor – the area of the pixel that lights up – is an important factor in creating a further improvement in perceived image quality and the emissive nature of P-OLEDs ensures that pixel fill factor is high, In addition, the gaps between adjacent pixels in a P-OLED microdisplay are smaller and the light emitting elements occupy a larger proportion of the display area than, say, the light transmitting elements of an lcd. The fill factor of OLEDs is around 80%, leading to much less pronounced pixilation than with lcds, where the fill factor is often less than 25%.

"P-OLED microdisplays operate at lower voltage and are more power efficient than other technologies." ***Professor Ian Underwood,*** *MicroEmissive Displays*



Fast moving video brings the benefits of P-OLED microdisplays to the fore. Conventional displays often suffer blurring caused by display pixels switching on and off too slowly. Moving objects frequently lag or leave a trail of slower dots. P-OLEDs exhibit superior characteristics, switching on and off in microseconds and enabling video frame rates of up to 120frame/s.

Low power, weight and size

P-OLED microdisplays operate at lower voltage and are more power efficient than other technologies. As a result, the eyescreen dissipates around a tenth of the power of a traditional lcd and a quarter of the power of a typical lcd microdisplay. Not only is there no need for a power hungry backlight, its digital interface is more energy efficient than the d/a conversions required with other microdisplays.

The eyescreen's integrated design eliminates the need for additional driver components. Its BT.656 and serial RGB digital video interfaces makes possible a completely digital signal path, removing the need for a/d conversion and eliminating the reduced dynamic range associated with the transmission of analogue composite video signals.

This reduction in the component count means the bill of materials is lower and designers have greater freedom to create innovative products that look good and perform well. For example, the eyescreen's digital interface and digital display driver ics will make it an excellent match for wireless technology and this – along with its low power consumption – brings the possibility of wireless video glasses as an option in the next generations. ■

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