LIQUID-CRYSTAL SHUTTER GIVES CRT 3-D CAPABILITY

Tektronix uses polarizing glasses and alternating scan fields to provide low color distortion

Orlando, Fla.

The need to get more graphic information onto a cathode-ray tube has driven Tektronix Inc.'s efforts to create a three-dimensional display using liquid-crystal technology. At the Society for Information Display meeting held here last week, the Beaverton, Ore., firm announced its efforts are about to pay off.

No date has been set for a product introduction, but the firm expects to be the first to market with this technology. Tektronix marketing manager Kathryn Middo claims that "the product is ready to be sold; the only thing we still have to do is get the word to our potential customers—which should happen before the end of the year."

There's still no name for the passive 3-d product, but it is based on Tektronix's proprietary liquid-crystal shutter, a variably sized LCD panel that fits over a monochrome CRT and gives it 2-d three-color capability [*Electronics Week*, Feb. 25, 1985, p. 73].

"Our technique is to time-multiplex two slightly different images displayed on a monochrome or color CRT," explains Phil Johnson, senior engineer of the Color Shutter Program Technology Group. "The difference between the two images represents the parallax information distinguishing the view to each eye of the observer. This approximates the stereoscopic depth cues perceived in normal vision."

A little flicker. This approach takes advantage of a CRT's 2:1 field-to-frame ratio to send the left and right components of a stereo image to each eye, which sees its part of the image for 1/30 s (half the 60-Hz scan rate of a standard television monitor), resulting in a perceptible but not-too-distracting flicker. The two images are displayed sequentially on alternate scan fields while the LCS determines which eye will see a particular field.

As a product, the LCS will consist of a linear polarizer and a proprietary "pi-cell" that selectively rotates light 90° under control of an external voltage. When a voltage is applied, light passing through the cell exits polarized in one direction. When the voltage is removed, the polarization is reversed. The user must wear glasses with separate linear polarizers that pass light of the correct transmission state to each eye.

An important difference between this and other approaches for 3-d display is that the Tektronix glasses are entirely passive, like those for a 3-d movie, "but with much better color fidelity," according to Richard de Hoff, a staff physicist at Tektronix. "In addition, we avoid the hassle and expense of actively switched glasses that have to be electrically connected to a display controller," he says.

The system's cost is expected to be in the $10,000 to $20,000 range, and it can be used with either raster or vector computer graphics. De Hoff points out that the computational cost for generating a stereo image with this system is only twice that for 2-d images: one for each eye. At the cost that Tektronix envisions for the 3-d LCS, customers will be sought among those involved in molecular modeling, medical imaging, cartography, electron microscopy, air-traffic control, and solids modeling.

David Peters, senior researcher at Singer Co.'s Link Flight Division in Binghamton, N.Y., may have put his finger on yet another application: real-time 3-d flight simulation. "What we need now is the holographic equivalent of the cathode-ray tube to trigger a whole new round upon our senses and solve some of simulation's visual tasks," says Peters. Such performance will probably require substantial refinements of the initial 3-d system that Tektronix plans to announce.

–David M. Weber

PERSONAL COMPUTERS

COMPAQ STANDS OUT IN SLUMPING MARKET

Houston

Reminiscent of better days celebrated only months ago by the personal computer business, Compaq Computer Corp. here hosted a big show of strength for the fickle industry, featuring pop music stars, flashing lights, a Hollywood-styled annual stockholders meeting, a global broadcast, and two speedy new units aimed at IBM Corp.'s Personal Computer AT.

For dealers and analysts weary of an

FAST CPU CHIPS BOG DOWN IN GLUE LOGIC

Although faster central-host microprocessors are making their way on the market, cost-conscious personal computer designers cannot always enjoy the speed of these chips. For now at least, the 8-MHz 80286—such as the one being used inside Compaq's newly announced units—could represent a processing-speed ceiling for popularly priced units, suggests Gary Stimac, director of engineering and leader of the development project.

Software considerations for critical time loops are often nestled in programs, which are handled by the Deskpro 286's and Portable 286's dynamically switching bus. But high-speed logic is also needed to handle the speeding logic signals. "There is kind of a logical break on available devices to control the bus," Stimac says. "At 10 MHz, you are going to have real problems getting buffers, drivers, and other discrete logic that approaches the performance levels of ECL [emitter-coupled logic]." He adds that hotter-running bipolar technology presents packaging problems. In the near future, however, Compaq believes it can achieve another 25% speed improvement by swapping the system memory for faster no-wait-state RAM, Stimac says.

Also, Stimac adds, 80286 peripherals supporting higher bus speeds are not yet widely available, though they soon may be. Advanced Micro Devices Inc.—Intel's second source for the 80286—plans to introduce in mid-1985 an 82284 clock driver and a CMOS 82C288 bus controller for its new 10-MHz processors [*Electronics Week*, April 29, 1985, p. 13].

–J. Robert Lineback