



Future Perfect

The need for mobile imagery is already clear to both technologists and manufacturers. What does this mean for consumers and designers? We offer a glimpse of what technology makes possible today, and what's yet to come.

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The human head has a pair of very good image capture devices built in, but as far as accurate image storage goes, people's memories leave much to be desired—especially since they cannot create viewable output. So for thousands of years people have resorted to reproducing images with the best technologies on hand, from petroglyphs to high-resolution color printers.

Similarly, image transportability has been a hotly pursued goal over the years. This desire to share pictures with others has taken many leaps forward over the last decade via new technologies. The cost of computational horsepower has dropped dramatically, and chips whose performance was considered phenomenally high just a few years ago are finding their way into cheap hand-held devices.

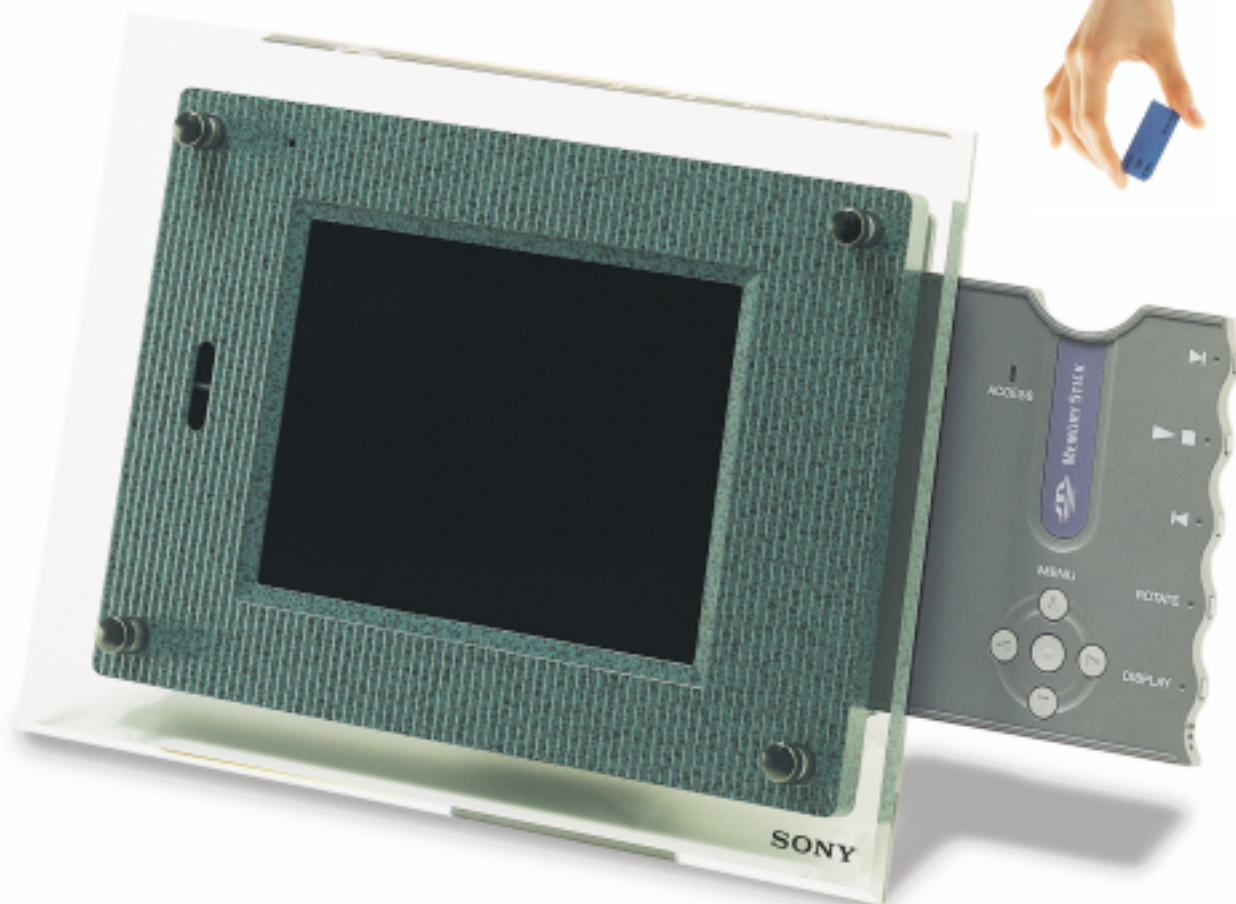
The contribution that technology makes to picture mobility is not just in the realm of image processing. Connectivity technology, the ability to transmit pictures, has progressed rapidly from grainy black-and-white faxes sent across oceans to large color images traveling around the world over the Internet.

Ten to 15 years ago, military and aerospace

needs were the single most powerful driving force in technology evolution. After the Cold War fizzled out, entertainment technology rapidly became worth more consumer dollars (or yen, or marks) than high-tech military gadgetry. As a result, consumer-oriented technology is getting very powerful very quickly.

In the late 1980s, toy manufacturer Fisher-Price created a camera called the PXL-2000, known in filmmaking circles as the Pixelvision. This \$100 device used ordinary audiocassettes as a video medium and could record about five minutes of low-resolution, soundless black-and-white video on one side of a 90-minute tape. But the Pixelvision was ahead of its time and didn't sell well. Only a small number were produced.

The idea, however, was sound—as Nintendo has discovered. Its Game Boy and Color Game Boy devices, which cost \$60 to \$80, can be combined with a \$50 Game Boy Camera attachment to create a low-resolution black-and-white digital still camera. The captured images can even be edited on the Game Boy's screen via software built into the camera module. Admittedly, the Game Boys' current computer tech-



nology is nearly a decade out of date, but that's also what makes them so cheap to produce. For those with an additional \$60, Nintendo even makes a printer that can be plugged in to the Game Boy's Game Port to print out the captured and edited images.

Nintendo recently announced the Game Boy Advance, with a powerful 32-bit processor. The successor to the Game Boy can connect to a cellular phone, access the Internet, and transmit images. Release is slated for late 2000.

In using the Game Boy as the hub to connect all these related gadgets, Nintendo heralds an increasing independence from conventional personal computers. Given the availability of inexpensive processing power, developing increasingly specialized devices to perform a few functions—or even just one—makes financial sense to manufacturers. The user benefits as well, since there are fewer options, configurations, and preferences to comprehend. This reduces confusion, increases acceptance, and ultimately fosters greater familiarity with the various devices.

But it's not just mature and cheap hardware that's allowing inexpensive image capture and manipulation. Sega has announced that its next-

generation Dreamcast game console will include imaging technology from Digital Intelligence. Both companies are deliberately vague about exactly what form this partnership will take and what its fruits will be, but Digital Intelligence is in the business of selling software for specialized devices to capture, manipulate, archive, and render digital images. The fact that Sega found this partnership worthy of announcement indicates the importance the company attaches to Dreamcast's image manipulation capabilities.

But sometimes images are just too large for wireless transfer. When high-resolution digital cameras become as cheap as low-end film cameras are today—which will happen sooner rather than later—the laws of physics will still prevent us from creating larger and larger wireless data transfer schemes.

However, just because physical cabling is involved in transferring images from one device to another doesn't mean that it has to be hostile to the user, or even particularly cumbersome. Take FireWire—one of the most convenient cables imaginable.

Originally developed by Apple Computer, FireWire—also known as IEEE 1394—com-

The Digital Photo Frame.



Sony introduced two products that let users show off their digital family snapshots in a surprisingly traditional way. The Digital Photo Frame PHD-A55, can display photographs and films that have been stored on a Memory Stick. The frame consists of a 5.5-inch TFT screen with two interchangeable frames and a built-in speaker. The Memory Stick is about the size of a stick of chewing gum and can also be used with the Cyber-shot DSC-F55 camera and various Sony digital camcorders.

Soon it will be possible to send images to a Memory stick via phone. The Nokia 9110 Communicator can already send and display black and white images from digital cameras with the IP-TranP protocol. The latest digital cameras, such as the programmable Kodak DC 265, can also transmit images via an infrared link (IrDA) to a cellular phone.

combines a fast data connection with the electricity supply. This allows a number of devices to function with a single FireWire cable delivering connectivity as well as power. The standard FireWire connector was modeled on the simplicity of Nintendo's Game Port plug. There's no need to carefully align pins, no issues about whether a device must be the first or last in a FireWire chain, or any other concern that would befuddle an ordinary consumer. You just plug the de-

a new wireless standard for consumer devices called Bluetooth.

Bluetooth uses radio rather than infra-red as its conduit, but it operates on a frequency that is open worldwide. Users of mobile telephones know all too well that while most of the world uses the GSM (Global System for Mobile telecommunication) standard, the United States uses many different, incompatible standards. Such nation-specific issues not only drive up the prices of devices, but also detract considerably from their usability. As connectivity becomes more widespread, consumer tolerance for this sort of limitation decreases.

"Entertainment technology rapidly became worth more dollars than high-tech military gadgetry"

vices together and, if they include the necessary software to communicate with each other, it all just works. With the increasing acceptance of FireWire in the computer and so-called prosumer business, its entry into the cost-sensitive consumer market is here.

But the future is not just about convenient cables. There is an easy-to-use wireless future as well. A consortium of companies has developed

The desire to make electronic images mobile is growing, and the technologies for making it easier to get images from one device to another are maturing. While many of the technological underpinnings of this evolution stem from the notoriously user-hostile world of personal computing, the requirement that new developments be useful to non-techies is so strong that technology designers are embracing usability as a core feature rather than an afterthought—a relatively novel approach coming from the previously user-ignorant technology community. ☺

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Social Perspectives

"It's the Tittle-tattle of Life that Makes the World Go Round"

Robin Dunbar

Family life has its inside jokes and hidden habits. It's a complex system of concealed messages and informal communication, influencing everything from the poses we assume for photos to how children use mobile phones. In this section, we sketch a portrait of the family by inviting five experts to give their views on different aspects of family life.

