advanced television development at Zenith, comments as follows on the prospects for LCD displays: "Our feeling here—and I think it's widely shared in the industry—is that if indeed the Japanese (or anybody else) are able to come up with flat-panel displays, it's going to be very hard to compete with the entrenched technology of cathode-ray tubes. They're going to come up with displays, but we doubt that they'll have the same brightness, contrast and color fidelity that people have come to expect, and certainly not at a price that is competitive with CRTs."

Computing and chips

The guts of every HDTV system will consist of highly specialized chips that do the gargantuan work of coding and decoding picture information. As Congress's Office of Technology Assessment pointed out last year in the opening paragraphs of its 108-page report on high-definition television, "HDTVs must process huge quantities of information at speeds approaching those of today's supercomputers in order to display a real-time, full-color, high-definition video signal. HDTVs are able to do this at relatively low cost through the use of circuitry dedicated to specialized tasks."

"HDTV is driving the state-of-the-art," the OTA report continues, "in a number of technologies that will be important to future generations of computer and communications equipment. These include certain aspects of digital signal processing for real-time video signals; high-performance displays; fast, high-density magnetic and optical data storage; technologies for packaging and interconnecting these electronics; and, as with all high-volume consumer electronics, processes for manufacturing these sophisticated products at affordable costs."

An anomalous aspect of HDTV, worldwide, is that despite the technology's apparent significance for the semiconductor and computer industries, companies in those industries have been slow to involve themselves directly in advanced-TV development. JESSI, Europe's submicron chip effort, which often is described as an adjunct to the EUREKA-95 television program, suffered a reverse last fall with the withdrawal of Philips from the SRAM project (PHYSICS TODAY, November 1990, page 79). In the US, AT&T, Texas Instruments and Motorola seem to be the only major chip manufacturers entering into important agreements with Japanese and American television developers. (TI has an agreement with NHK, and Motorola has been negotiating with Toshiba.)

Photography and HDTV

Skeptics say that HDTV alone—the wider screen and sharper image—will not be enough to entice consumers to spend much more for television receivers. But added attractions are easy to imagine, and some of them already are on their way, in anticipation of HDTV.

Next year Kodak is scheduled to introduce a system permitting photographers to have images on film transferred electronically to compact disks by a digital process, so that pictures can be viewed on television sets or color computer screens. The disks reportedly will contain 16 times more detail than can be reproduced on current television, and four times more than on HDTV.

The transfer of images would take place at the time film is developed, at a price of about $20 for the first batch of 24 photographs. Disk players (also capable of reading audio CDs) might sell for around $500.

The technology will permit amateur photographers to store photos more economically, to randomly access images and to manipulate images on-screen. Potential commercial applications—for example in publishing, banking and insurance—are legion. John P. White, a vice president of Kodak, has pointed out that the disk technology will permit commercial users to maintain much larger photo archives than is currently feasible, providing readier access and assuring perfect preservation of image quality.

Processing equipment and disks will be sold by Kodak, disk writers and the compact disk players for current television by Philips (which co-invented the audio CD), and a special workstation for photo finishers by Sun Microsystems.

Who's ahead?

From the US point of view, the race to develop an advanced television system is resolving into a contest among three US-based groups, the European EUREKA-95 group and the Japanese group led by NHK. One of the US groups has a very strong European element (Thomson and Philips), and the Japanese group includes several companies, such as Sony, Hitachi, Toshiba and Mitsubishi, that control—like Thomson and Philips—substantial research and manufacturing operations in North America.

Largely because of its early start in HDTV and its impressive general performance in consumer electronics, semiconductors and computers, Japan is conventionally described as the leader in advanced television research, and Japan plainly intends to be the leader. At Sony, still the number-one name in television, HDTV development is at the top of the corporate agenda. The brochure for the company's Corporate Research Laboratories, which were formed in 1988 to bring all corporate research under one umbrella, characterizes HDTV as "the final major developmental project of this century." To realize HDTV, the brochure says, a digital signal decoder, a CRT and a VCR have to be designed. "The basic research on these three units has been done," the brochure says, "and prototypes are now being made."

One measure of Japan's confidence was Sony's 1989 purchase of Columbia Pictures at a cost of $3.4 billion, which was echoed late last year in the decision by Matsushita (known in the US for the Panasonic and Technics brand names) to buy MCA for $6.6 billion. The conventional wisdom is that the driver behind both decisions was HDTV: Sony had concluded that one important reason why the Betamax format lost out to VHS in the VCR market, despite a decisive early lead, was that not enough films were available on Betamax; accordingly, Sony hopes with the purchase of Columbia—and Matsushita with the purchase of MCA—to build up an archive of films that will be immediately available when HDTV receivers and high-definition VCRs come onto the market.

Despite Japan's formidable position, the Europeans also express a great deal of confidence. For one thing, in contrast to their performance in, say, computers or semiconductors, the Europeans already have had a great deal of success in television. As in Japan, but in contrast to the US situation, the European HDTV effort is the product of careful central planning and strong public support. Last May, Philips and Thomson announced an agreement committing the two companies to spend 20 billion francs—about $4 billion—on HDTV development over a five-year period. (Philips is to spend 11 billion francs, Thomson 9 billion.)

While the general position of Philips has slipped badly in the last few years because of company-wide business difficulties, Thomson's position seems stronger than ever. Under the leadership of Alain Gomez, the company has acquired major television