



# *Research and Development*

### Environment-Friendly Offices

Minolta has undertaken numerous programs for helping protect the global environment and has placed special emphasis on digital technologies for enhancing the environment friendliness of offices.

For example, the Company has developed reflective color display elements that retain the displayed image without power input and is working to create reusable digital media by applying such elements to flexible plastic substrates.

### Making 3-D Easy and Fun

Minolta is creating combinations of hardware and software technologies that make 3-D information easy to capture, process, edit, display, and output. In 1997, Minolta began marketing its VIVID 700 noncontact 3-D shape inputting device and announced the development of the High-Speed 3-D Digitizer Modeling System, which uses 3-D data from the VIVID 700 to quickly create wooden or metal prototypes as well as statues. In May 1999, the Company announced its development of the MINOLTA 3D 1500 portable and integrated 3-D image capturing and editing system, which handles 3-D image inputting, editing, production, and outputting and is particularly appropriate for creating Internet home page contents.



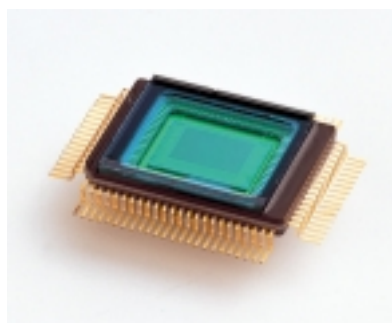
The VIVID 700 is a noncontact 3-D shape digitizer that is portable and easy to operate.

### Artificial Vision

By equipping advanced image capturing devices with sophisticated technologies, Minolta is creating highly intelligent artificial vision systems. The Company's LOG Sensor logarithmically transforms light signals and has a dynamic range more than 1,000 times larger than that of conventional image sensors. This device makes it feasible to construct high-performance artificial eyes. Linking such artificial eyes with improved image processing technologies is expected to allow substantial progress in image-based interactive communication between people and machines.

### Collaboration and Incentives

In line with its tightened focus on highly promising fields, Minolta is proactively seeking to obtain software and other strategic business development resources through various collaborations with other companies, including cross-licensing and exchanges on an OEM basis. To overcome the daunting challenges of initiating a growing number of basic R&D programs involving leading-edge technologies, Minolta is augmenting the scope of its cooperative research with universities and research institutions as well as its participation in national projects.



The LOG Sensor, a logarithmic converting CMOS area image sensor with a dynamic range 1,000 times larger than that of conventional charge-coupled devices (CCDs)



*Featuring greater speed, resolution, and networking capabilities, new generations of digital imaging products are requiring improved materials, devices, and units. Minolta is strengthening its capabilities for the nano- and micro-order precision processing and assembly methods and other technologies needed to meet these hardware requirements. Moreover, to further increase the added value of its digital imaging products, the Company is emphasizing the development and licensing of software for system controls, drivers, and interfaces. The Company is also working to strengthen its image processing technologies.*



Having developed reflective color display elements that retain images without power input, Minolta is working to create such reusable digital media as the chiral nematic full-color LCD.