



Imagesetting is the process of creating visible images that include type, line art, and halftones. Imagesetting emerged with the development of cathode-ray tube (CRT) technology. However, the technological breakthrough that made full imagesetting possible was the use of the laser to form controlled images on photosensitive paper, film, and printing plates. CRT technology has been categorized as third generation, and laser technology as fourth generation. Both are discussed in this unit.

Electron-image generation has become an important method of creating visual images. Various types of computer hardware (machine) and software (program) configurations have been developed. These permit electronic imagesetting to be easily accomplished. Such imagesetting can be done with desktop composition systems and with dedicated imagesetting input hardware. The key element in electronic imagesetting is the variety of software programs available for use with computer front-end hardware.

THIRD GENERATION EQUIPMENT

Electromechanical equipment used for regular photo-

typesetting reached its maximum speed in the late 1960s. Ultra-high-speed typesetting was needed to deal with the millions of words being generated in an information explosion. Engineers and technicians found the solution in a third generation of machines that used the *cathode ray tube* (CRT) to create letter images.

Images are drawn on the face of the CRT by the scanning of an electronic beam. Standard home television screens in North America are made up of 525 horizontal lines, regardless of screen size. CRT screens in typesetters have many more lines for greater detail—typically 1,000 lines per inch. The lines are formed by a raster scan—a pattern of electrons which are swept from side to side on the back of a phosphor coated tube—the CRT.

Lasers, (Light Amplification by Stimulated Emission of Radiation) are also make raster scans, they are not only faster, but provide even higher scanning densities. A laser creates a single sharp narrow beam of light in one color wavelength that can be precisely controlled. Type characters, artwork, and halftones are generated dot-by dot. The laser beam scans the full width of the image area and makes the exposures dot-by dot and line-by-line.

Each square inch of a page is divided into *pixels* of space. These pixels are created by the laser light beam, which is used to form a series of horizontal and vertical lines (also called dots). A typical plain-paper laser printer is designed to print at 300 lines per inch (lpi), [or dots per inch (dpi)]. An imagesetter, however, prints over 2,500 lpi (or dpi) to make the visible images. The relative quality of these images can easily be compared. A 300 dpi laser printer creates 90,000 pixels per inch. Because imagesetters form images with more pixels, the image edges are much smoother and more complete.

Equipment manufacturers have originally used the laser only in very high-level equipment. Today, all imagesetters are based on the Laser principle.

Laser equipment having Adobe PostScript level 2 or greater software can produce sizes from 2 point to 999 point and offer hundreds of kinds of type at one time on a single machine.

Such systems can be used to imageset difficult material like the Chinese language. Ideographic languages have been hard to typeset in years past, but they are now being set speedily and effectively in sev-

eral places in China. Japanese Kanji characters are also now set via this technology.

Laser imagesetting systems do not look radically different from second generation phototypesetting systems. The true differences are in the software and electronics. The workings of these machines draw on years of research and engineering by many companies.

ELECTRONIC PUBLISHING

Totally automated prepress preparation both line art (type and pen and ink artwork) and halftones (photographs) became a reality early in the 1980s.

By digitizing, it became possible to merge and convert the three kinds of copy into electronic signals. Original material can now be taken electronically through various stages to platemaking (CTP) and even completely to the press in a process called direct imaging (DI).

In the platemaking operation, the plates are made in a laser imager similar to a normal photoimager and put on the press where thousands of copies can be produced.

In the other case, a system pioneered by Heidelberg Drukmaschinen, who made a specially modified model of one of their mid-range presses. In it, normal plates are not made at all, but an electronic signal drives diode lasers and images plating material which is housed in a special plate cylinder to

create a dry offset printing plate. The plates are Teflon coated and the laser cuts through the nonstick coating to expose an Oleophilic surface. No water or dampening is required due to the nonstick nature of the non-image areas.

The press runs images very similarly to a normal offset printing press.

Often times, total systems need other pieces of equipment, including finishing and binding. Typical publications created with such equipment include technical manuals, magazines, catalogs, and directories.

These publications include hundreds of type styles and sizes, a variety of page formats, and several kinds of halftones, line art, and logos. People involved in electronic publishing must be able to handle a large volume of revisions and tight deadlines. This sophisticated equipment gives them the tools to complete their work with a high level of quality.