

NEW PRODUCTS

A SINGLE NCR CHIP SUPPORTS THREE IBM PC GRAPHICS FORMATS

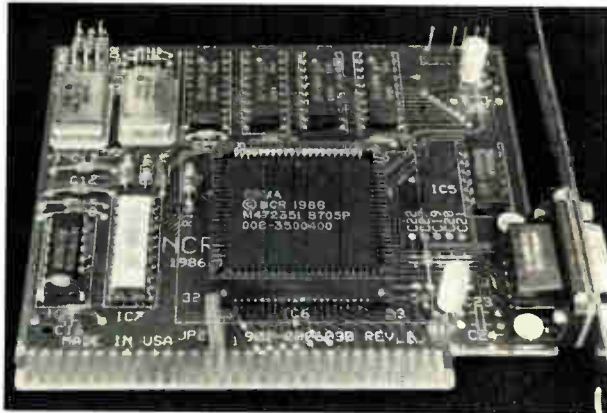
THE 7280 ALSO INTEGRATES A CRT CONTROLLER

Graphics-board designers can now use a single display-adaptor chip to implement three of the most commonly used IBM Corp. Personal Computer graphics formats: MDA (Monochrome Display Adapter), HGA (Hercules Graphics Adapter), and CGA (Color Graphics Adapter). NCR Corp.'s CMOS 7280 Color Graphics Monochrome Adapter chip also features a 6845 cathode-ray-tube controller and a high-definition CGA mode that doubles the number of scan lines for sharper graphics and higher-quality text while maintaining CGA compatibility.

The 7280 was developed by NCR's Microelectronics Division. Brian Herbert, the division's graphics and PC support product manager, says the 7280 is the first chip of its kind. At least one other vendor offers a circuit that provides MDA, HGA, and CGA compatibility on the same device and also conforms to a fourth standard, Plantronics Plus. But that chip—the Spectrum, from Genoa Systems Corp., San Jose, Calif.—requires a separate 6845 CRT controller. **AFFORDABLE COLOR.** The 7280 is aimed at low- to medium-priced graphics applications. NCR expects to see continuing demand for the chip, despite the likely emergence of a new high-end graphics standard based on the VGA (Video Graphics Array) format used in IBM's Personal System/2 [*Electronics*, April 16, 1987, p. 46].

VGA's 640-by-480-pixel resolution will require a \$600 monitor, says Herbert. Monochrome monitors that can handle MDA or HGA sell for \$100 or less, while CGA-compatible monitor prices average around \$340. Monitors that support EGA (Enhanced Graphics Adapter), IBM's previous high-end format, also cost more, Herbert says—\$435 to \$550. "Right now, CGA is the most affordable way to get into color," he says.

EGA is superior to standard CGA when used in text mode, but the 7280's high-definition CGA mode gives performance comparable to EGA. Compared with standard CGA's 8-by-8-pixel text



CHIPS. Using NCR's 7280, a three-mode graphics board requires only a frame-buffer memory and clock circuitry.

character cells, the 7280's high-definition mode uses an 8-by-14 cell, producing text quality equal to EGA, Herbert says. Since the NCR high-definition mode doubles the number of scan lines, the 7280 produces two additional inter-row spacing lines not found in EGA, he notes. In graphics mode, the scan doubling produces 640-by-400-pixel resolution, compared with EGA's 640-by-350 graphics.

The 7280 features direct interfacing to the PC bus, display monitor, and frame buffer, eliminating the need for glue logic. A 16-bit-wide interface to the frame buffer allows for interleaved memory access, since the 7280 can read 2 bytes per cycle from the frame buffer, compared with a 1-byte read with standard CGA. This interleaved approach provides for "flashless updates" without

the snow seen on standard CGA displays, Herbert says. "We read a word twice as wide as normal, so this gives us an extra cycle in which we can write data to the memory without having a conflict between writing to the memory and refreshing the screen," he explains.

NCR expects the 7280 to be used with four 64-Kbit-by-4-bit dynamic random-access memories acting as the frame buffer to provide the 16-bit-wide interface. For a full-blown system, two additional clock oscillators are also required. A 16.257-MHz clock is needed for the monochrome MDA and HGA formats.

The high-definition CGA format requires a 20-MHz clock. (The 14.318-MHz signal needed for standard CGA is available on the PC bus.)

Built with NCR's 3- μ m CMOS standard-cell technology, the 7280 provides 35-mA power dissipation, typical, and less than 100-mA maximum. Available now in an 84-pin plastic leaded chip carrier, the chip costs \$28.50 each in 1,000-unit quantities and \$23.50 in 10,000-unit quantities. During the second half of this year NCR plans to convert production on the device to a 2- μ m CMOS process and reduce 10,000-unit pricing to \$17.85 per chip.

—Wesley R. Iversen

NCR Microelectronics Division, 1635 Aero-plaza Dr., Colorado Springs, Colo. 80916. Phone (303) 596-5612 [Circle 360]

5-V OP AMPS SPAN MILITARY TEMPERATURE RANGE

GE/RCA Solid State Division's upgraded line of BiMOS operational amplifiers have guaranteed specifications for 5-V power supplies over the full military temperature range of -55° to $+125^{\circ}$ C. The new CA5000 line includes three single op amps—the 5420, 5130, and 5160—and the 5422, a dual op amp introduced earlier this year.

What makes the devices special is that the company is able to guarantee performance under specific operating conditions, says Carmine Salerno, product manager for op amps at Solid State headquarters in Somerville, N.J. "If you're looking at op amps and you're using 5-V characteristics, you'd choose these," he says. "I haven't seen other op