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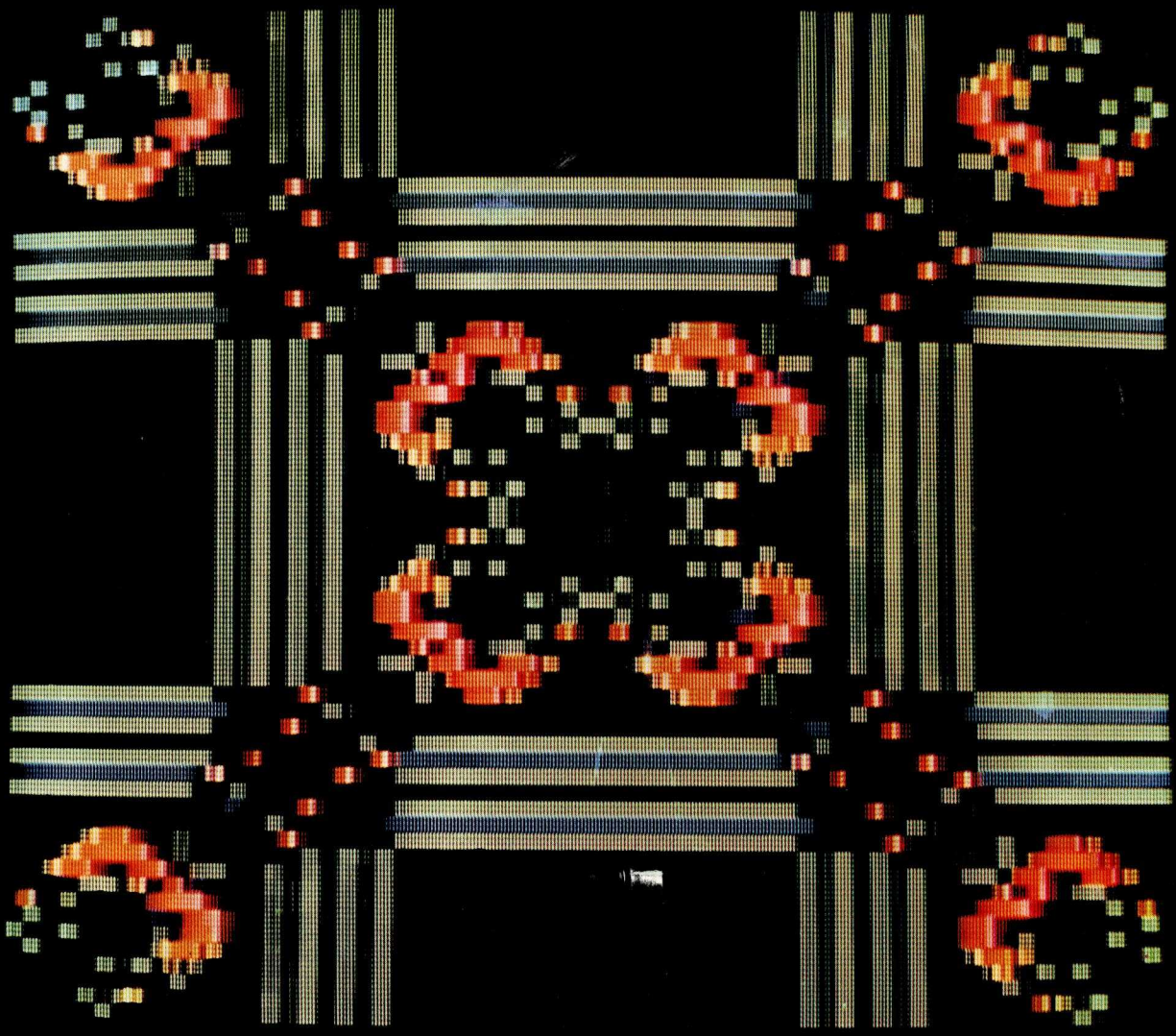

The Game of LIFE Played in Color

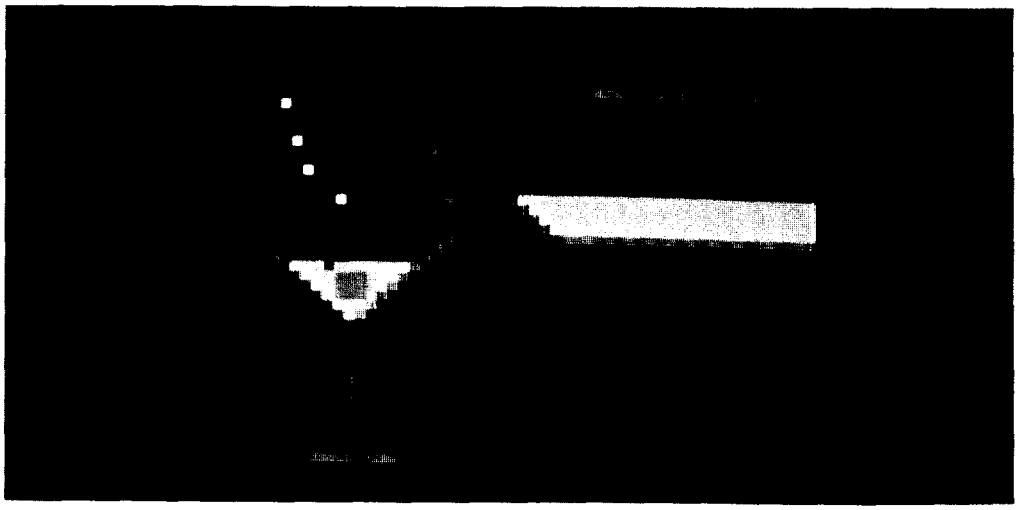

Photo 1: Here is a black and white reproduction of a single frame of a wine pouring animation sequence created by Steve Dompier using his Dazzlemation program. The colors of the original reproduce as shades of grayness in this black and white picture.

About the Cover

Imagine being able to look inside your computer memory, actually being able to see the individual bits. With this sort of X ray vision your computer memory could also serve as your computer display. Messages could be spelled out by lighting some bits and darkening others. Games could be played with clusters of bits forming game pieces and markers. Space War might be played with miniature rocket ship patterns zooming in, out and around the visible region of memory address space. The key element of hardware required to actually achieve this imagined result is a memory module which has provisions to map its contents onto a television screen. This is precisely what Cromemco has done in creating its TV Dazzler product, the results of which were used to create this month's cover.

The TV Dazzler hardware features two modes of operation providing high resolution and low resolution generation of a television picture. Through software selection the TV Dazzler can be programmed either as a 128 x 128 point black and white display, or as a 64 x 64 point colored display. The points of the display grid are tiny square regions on the screen which map into segments of the 2 K byte memory of the TV Dazzler module.

In the high resolution "bit mapped" mode, TV Dazzler uses its 2 K byte memory as a means of storing 2^{14} = 16,382 bits required to generate a unique "on" or "off" value for each location of a 128 x 128 grid. This high resolution black and white mode is very effective for alphanumeric displays and detailed computer controlled images.

In the low resolution "nybble mapped" mode, TV Dazzler uses its 2 K byte memory as a means of storing 2^{12} = 4096 four bit nybbles of data needed to generate a color display on a 64 x 64 grid. Each nybble determines the color and intensity of the corresponding picture element on the grid. The most significant bit sets either high or low intensity, and the next three bits independently select the blue, green and red channels of the color TV signal.

Like a metaphorical beachball, (see January 1976 BYTE editorial), the Dazzler provides the hardware for an incredible variety of applications. This variety is realized through the software for games and other purposes developed by people who buy and use this type of peripheral. One particular application of the peripheral is a program called Dazzlemation which was written by Steve Dompier. The purpose of Dazzlemation is to record an animated sequence of TV frames in color, then play these back. In order to make such a sequence, Dazzlemation is used to color in the appropriate regions of single frames which are stored in memory. Steve's standard demonstration sequence shows a carafe of red wine being poured into a wine glass. One frame of the carafe sequence is illustrated by photo 1. This is just one of an endless variety of computer generated animated displays which is made possible by programs like Dazzlemation.

A second application of the Dazzlemation hardware was used to generate the pattern which forms the main portion of the cover. This is a program called Dazzler-LIFE which was written by Ed Hall. John Conway's

[This short account is based upon materials supplied by Harry Garland of Cromemco. . . . CH]

fascinating game of LIFE gains a new dimension when it is displayed in color. Watching the patterns evolve can be intoxicating in black and white, but becomes truly addictive when color is used to illustrate the game board. In the Dazzler-LIFE program, the game begins in a drawing mode which allows the user to draw an initial colony of cells on the screen using controls from the ASCII keyboard. Then the evolution process is initiated with each succeeding generation being displayed on the screen with colors marking the health of each cell. Cells that are too crowded, or too remote, turn a flaming red color, then wither away. Newborn cells first appear in green, then grow up to a mature blue color. The kaleidoscopic result is fascinating to watch. One frame of a colorful LIFE history was photographed for the cover.

Still another application of the Dazzler is as a hardware game board for sophisticated computer automated games. One example of such an application is the Tic Tac Toe software written by George Tate. Dazzler Tic Tac Toe is written in BASIC, and demonstrates how very well suited the MITS BASIC is for creating colorful creations. George's program is one of a class of "man versus computer" game applications, and is reputed to be extremely competent at Tic Tac Toe. A sample of the output is reproduced here in black and white as photo 2.

A useful utility program for the Dazzler, which demonstrates the bit mapped mode of operation is the Dazzlewriter software created by Ed Hall. This program turns your ASCII keyboard/computer/Dazzler combination into a TV typewriter by generating the 5 x 7 dot matrix display for each keyboard character. A sample of Dazzlewriter activity is shown in photo 3. Since the main memory of the computer is used to store the character generation information, there is no need for any additional hardware beyond the memory requirements of Dazzlewriter.

Another delightful application of the display is an "idling" program you'll probably want to leave in the computer system when you're not using it for another purpose. This program is Li-Chen Wang's colorful Kaleidoscope program. The program is surprisingly short, just 127 bytes long, yet it generates an unending sequence of captivating patterns.

These programs were created by some of the first individuals who had access to the Dazzler hardware. They are written for the 8080 instruction set (except George Tate's BASIC Tic Tac Toe) and are available in paper tape form from Cromemco at $15 each.■

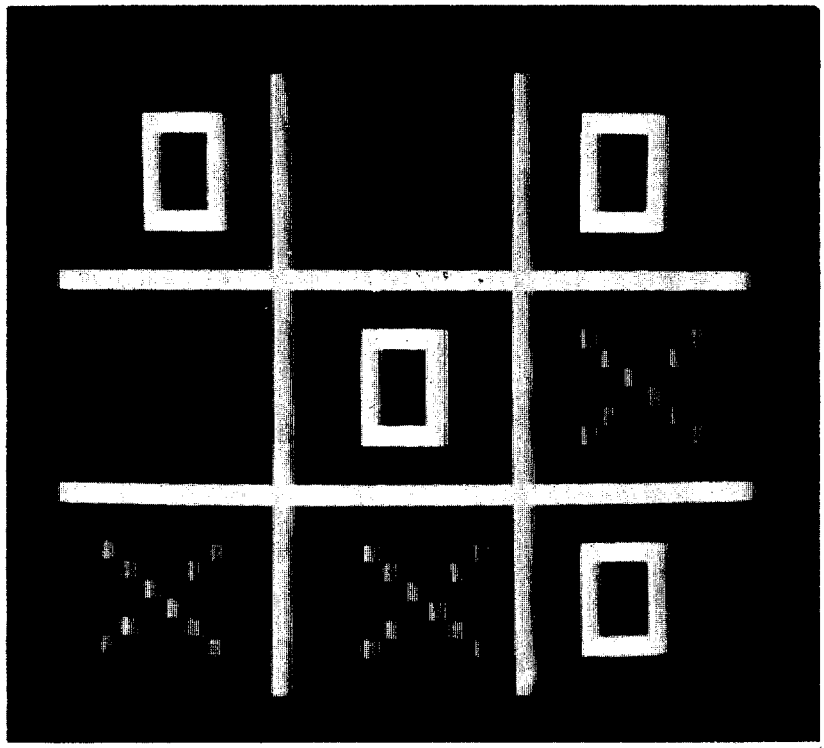

Photo 2: Here is the game board of George Tate's Tic Tac Toe application, written in MITS Altair BASIC with the TV Dazzler as its display peripheral.

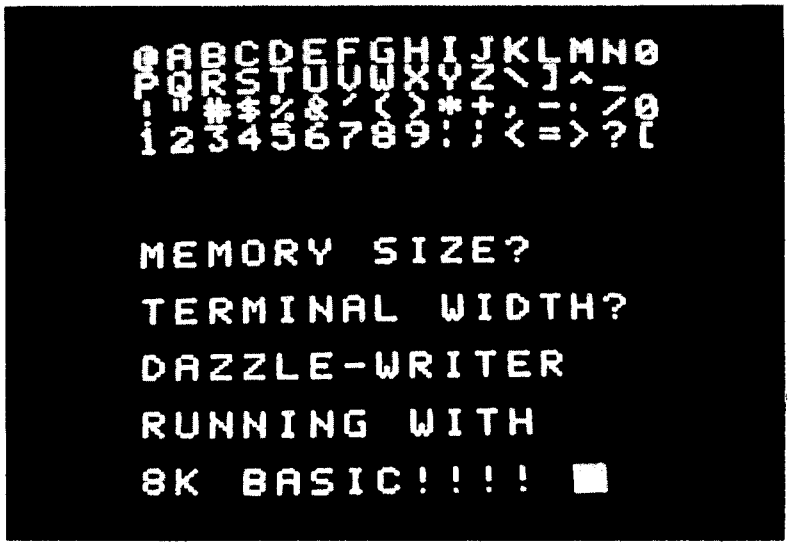

Photo 3: Here is a sampling of outputs generated using Ed Hall's Dazzlewriter program to turn the TV Dazzler/computer/keyboard combination into the logical equivalent of a TV typewriter style display.