

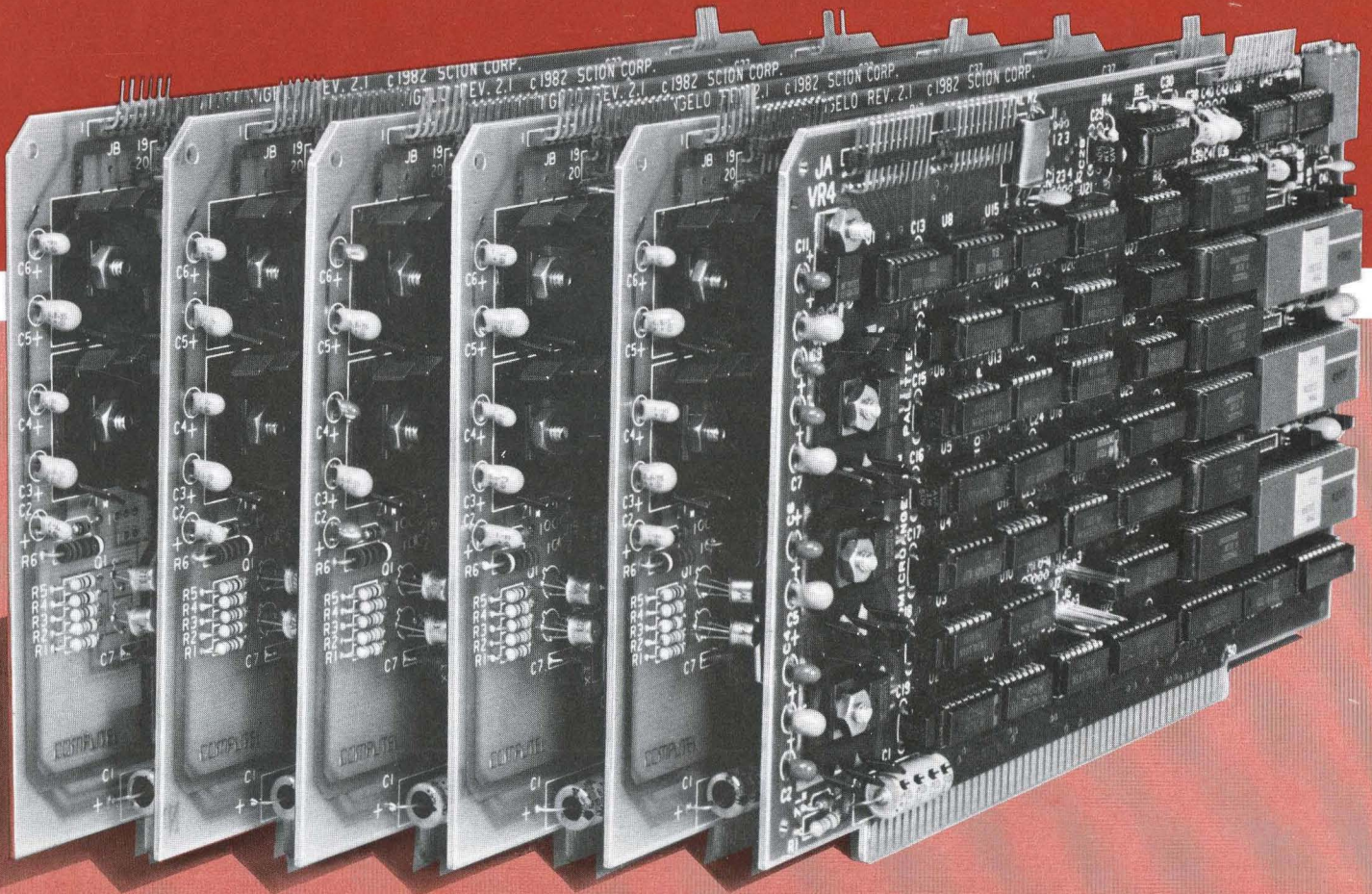
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MICROANGELO® CS5000 COLOR GRAPHICS COMPUTER Technical Data

- Low Cost Board-Level Color Graphics System
- 512 x 480 Resolution
- 2 to 8 Bit Planes
- 4 to 256 Colors from Palette of 16.8 Million
- Color Editor Aids Color Selection
- Interface Software Gives High-Level Access to Graphics and Text Functions
- S-100 and Multibus* Versions, Easy-to-Integrate

*Multibus is a trademark of Intel Corporation.

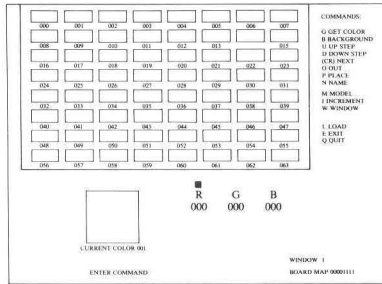


THE COLOR EDITOR/SCREEN EDITOR PROGRAM

Color Editor is an interactive application program to experiment with color and to set up color libraries for later use. With Color Editor you can directly manipulate the red, green and blue guns of your monitor, or you can select hue, lightness and saturation in a "color wheel" format. You can create one color library or several, and you can save your choices.

Screen Editor works with one of your color libraries to build a screen library. At your command it assigns bit planes to one or more transparencies and lets you assign colors from a color library to them. You can create and save as many screen libraries as you need.

The diagram at the right shows the relationship among the color library, the screen library and an application program.

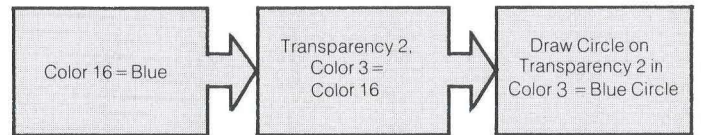


RELATIONSHIP OF COLOR AND SCREEN LIBRARIES



- Defines 4 to 256 colors screen library or RCI can refer to.
- Color Editor permits different color libraries for different users and applications.
- Assigns bit planes to transparencies and designates wink bit plane (if desired).
- Assigns colors from color library to transparencies.
- Screen Editor permits different screen organizations for different applications.
- Selects color library and screen library.
- Works in current color on current transparency.

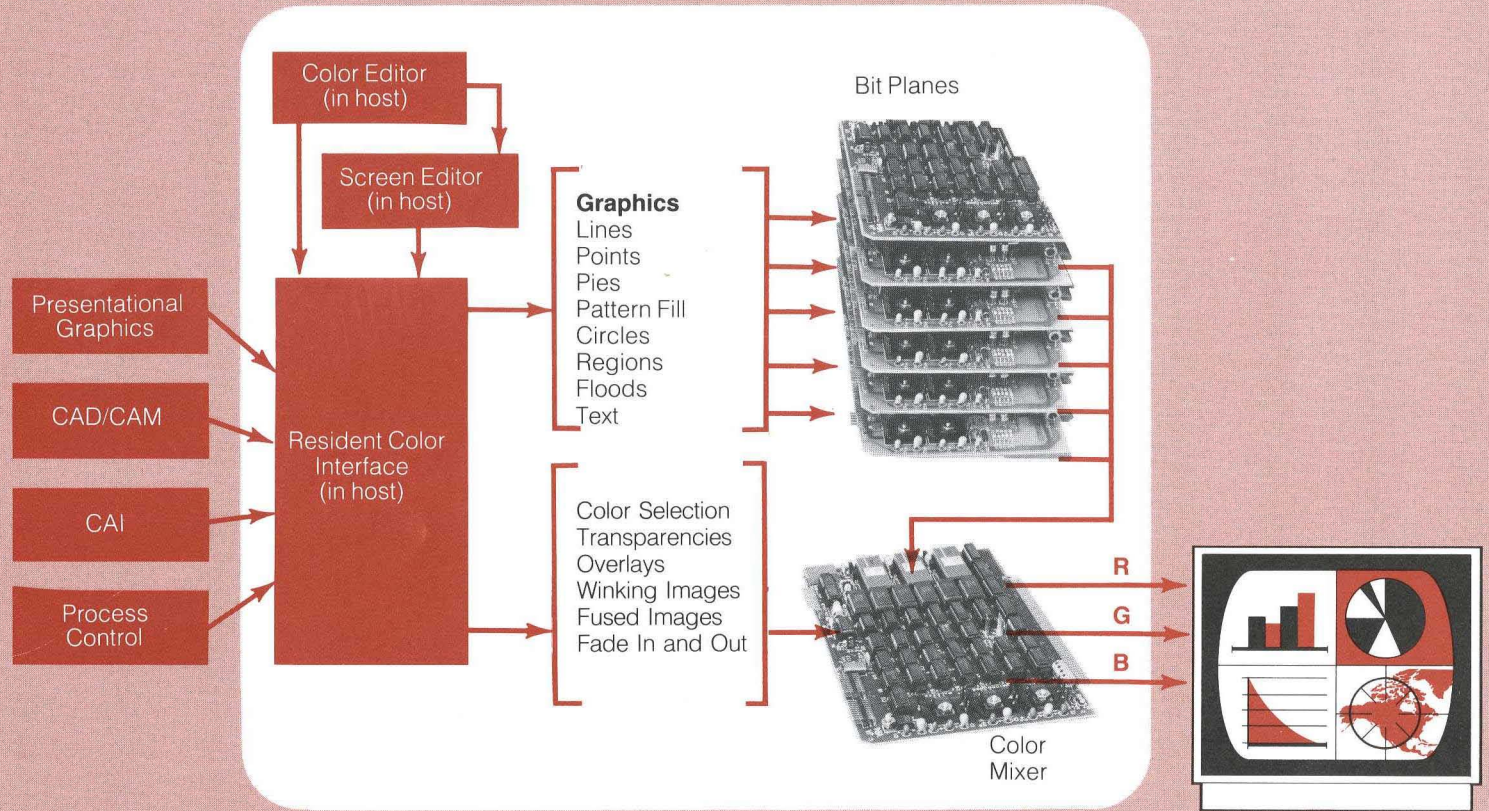
EXAMPLE:



CS5000 FUNCTIONAL OVERVIEW

APPLICATION PROGRAMS

FULL COLOR GRAPHICS DISPLAY

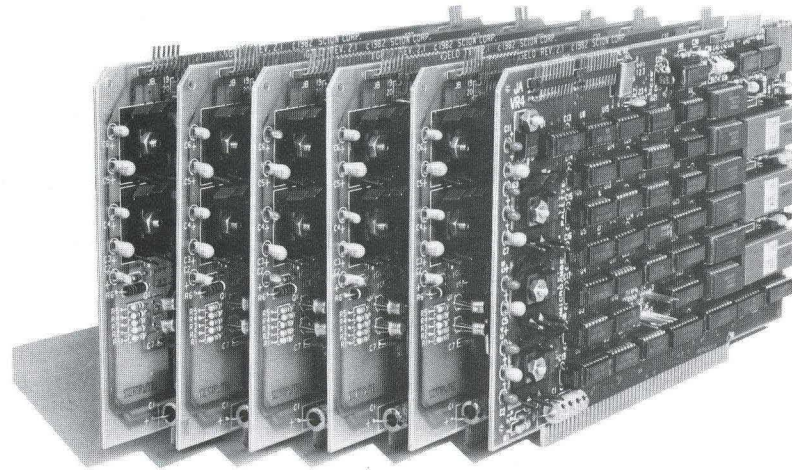


THE RESIDENT COLOR INTERFACE

RCI is the program that works with your application program to provide access to a full range of graphics and text display commands. RCI also lets your application

call previously-created color and screen libraries automatically — and use them or modify them on the fly.

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SYSTEM OVERVIEW

The MicroAngelo Color System CS5000 is a high-resolution, expandable color graphics system for S-100 or Multibus computers. CS5000 combines from two to eight MA520 graphics computer boards, a companion Color Mixer and high-level ColorPak graphics software. Each MA520 acts as a bit plane, using its Z80 microprocessor, display memory and on-board ROM firmware to generate graphics and text data. Synchronized bit plane signals combine in the Color Mixer under software control to produce graphics and text in full color.

CS5000 displays 4 to 256 colors simultaneously, chosen from a palette of 16.8 million colors. A highly interactive Color Editor program called ColorPak lets you experiment with colors by directly manipulating the red, green and blue guns of a color monitor, or by selecting hue, lightness and saturation in a "color wheel" format.

ColorPak software comes on 8" flexible disks in FORTRAN, C and Pascal versions. SCION Corporation includes source code with the version you choose to make it fit the details of your system.

THE TRANSPARENCY CONCEPT

CS5000 produces a video display with layering and non-destructive unlayering of multicolor images, like color transparencies. Images on transparencies can be shifted so that first one then another appears in the front, in the middle or in the back. CS5000 also creates effects not possible with photographic transparencies: partial fades that let transparencies in back "show through";

fusing of transparencies so that overlaps appear in a contrasting color; making color "wink" to a different color for attention.

CS5000 uses complex loading of the color look-up table to create transparencies and other effects. ColorPak software handles the details.

RCI SUBROUTINES REALIZE YOUR GRAPHICS APPLICATIONS

These subroutines in the Resident Color Interface call on individual bit planes in CS5000 to execute graphics and text in any color you choose. You can change colors and screen organization in a program with "Setting Up Color" and "Working With Color" subroutines.

GRAPHICS COMMANDS

CIRCLE	Draw a circle at a specific point
RELCIR	Draw a circle relative to graphics cursor
REGION	Paint a rectangular region between specific corner points
RELREG	Paint a rectangular region relative to the graphics current color
RELFLO	Fill an area relative to the graphics cursor
VECTOR	Draw a line between specific points
RELVEC	Draw a line relative to the graphics cursor
POINT	Draw a point at a specific location
RELPOI	Draw a point relative to the graphics cursor
CHAR	Write text (up to 85 characters) at graphics cursor
CHRMOD	Set size, orientation, font and figure/ground of characters in the graphics mode
MUNCH	Start "munching squares" diagnostic display

TEXT COMMANDS

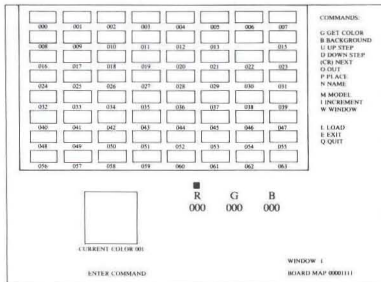
ALPHAM	Set text characteristics: standard/alternate font, erase/overstrike, underlining, figure/ground
ALPSCR	Set text scroll parameter for end of page
SPLITS	Split screen to separate text and graphics

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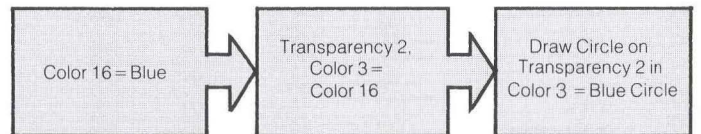


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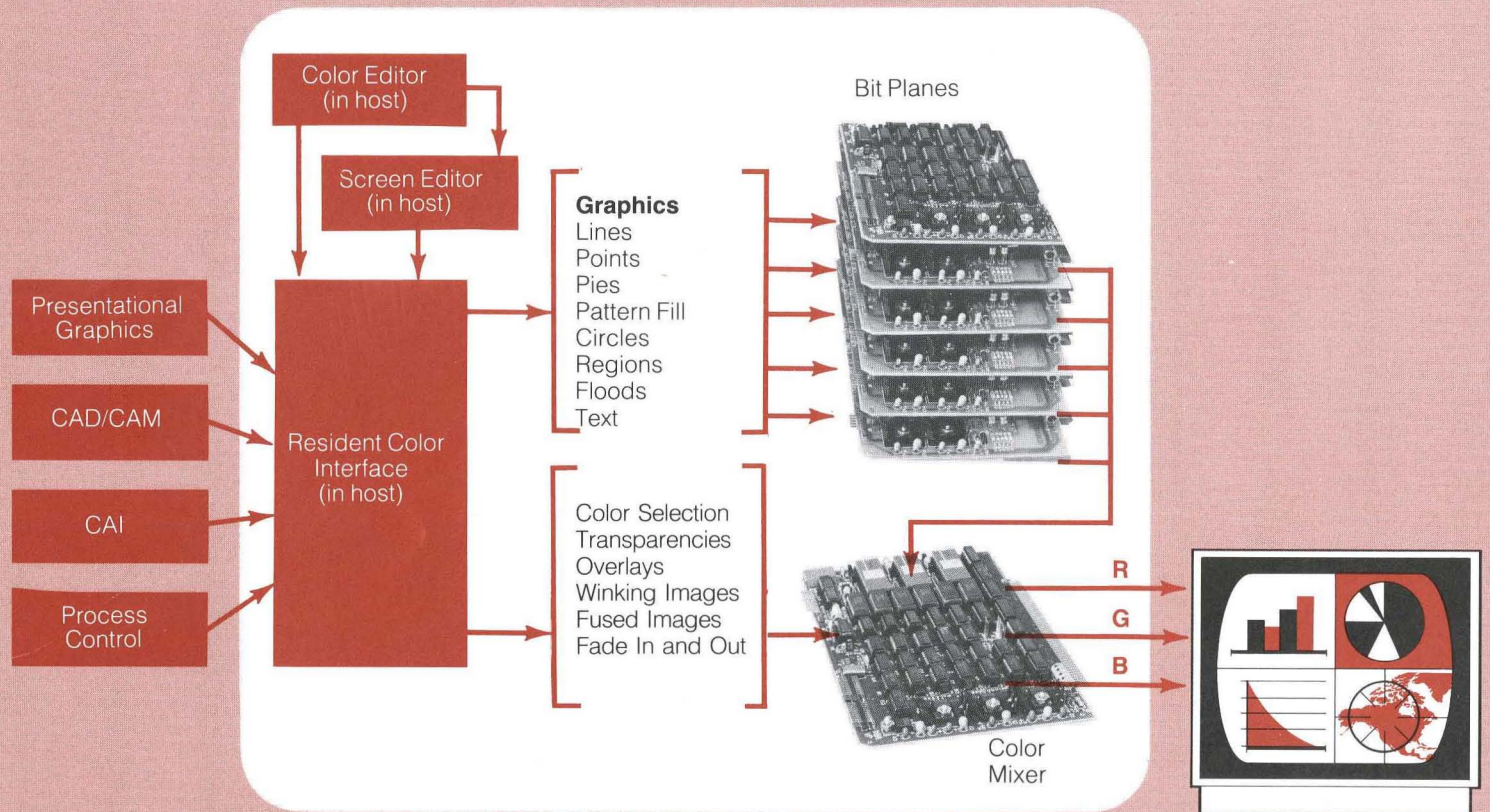
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FULL COLOR GRAPHICS DISPLAY



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THE HARDWARE INTERFACE

I/O

The host communicates with each bit plane and the Color Mixer over the S-100 bus or Multibus. The bit planes send signals to the Color Mixer over twenty conductor ribbon cables (included with CS5000). The Color Mixer drives a standard RGB monitor via a 4-conductor coaxial cable with BNC connectors (included). For a monitor with sync-on-green, the fourth conductor may be left unconnected.

As shipped, the bit planes have two ports that respond to host addresses as follows:

	DATA/COMMAND PORT ADDRESS (IN HEX)	CONTROL/HAND- SHAKING PORT AD- DRESS (IN HEX)
Bit Plane 0	F0	F1
Bit Plane 1	F2	F3
Bit Plane 2	F4	F5
Bit Plane 3	F6	F7
Bit Plane 4	F8	F9
Bit Plane 5	FA	FB
Bit Plane 6	FC	FD
Bit Plane 7	FE	FF

The Color Mixer responds to 8-port addresses as follows:

OUTPUT FROM HOST	INPUT TO HOST
70 Set red gun value	Read red gun value
71 Set green gun value	Read green gun value
72 Set blue gun value	Read blue gun value
73	
74 Set look-up table	Read status byte
75 Set bit plane select	
76 Set video enable	
77 Set wink enable	

Simple hardware changes can map the addresses for the MA520 and CM520 S-100 versions to any 16-bit boundary you choose.

The MA520 Multibus version can be I/O or memory mapped (jumperable) to any 2-port boundary of 256 ports for 8080 or Z80, to any 2-port boundary of 64K ports for 8086 or to any 2-byte boundary of 1 meg address space.

The CM520 Multibus version can be I/O mapped or memory mapped (jumperable) to any 8-port boundary of 256 ports for 8080 or Z80, to any 8-port boundary of 64K ports for 8086 or to any 8-byte boundary of 1 meg address space.

VIDEO OUTPUT

RGB, RS-170 standard video signals appear on 14 pins on the Color Mixer

1	GROUND
2	-COMP SYNC (for monitors without sync-on-green)
3	GROUND
4	RED GUN
5	GROUND
6	GREEN GUN WITH -COMP SYNC
7	GROUND
8	BLUE GUN
9	+COMP SYNC (not ordinarily used)
10	HDRIVE
11	VDRIVE
12	-EXTCSYNC (do not connect)
13	EXT 20 MHz (do not connect)
14	GROUND

SPECIFICATIONS

Boards: S-100 (Model S) or Multibus (Model M). 2 to 8 MA520 boards plus CM520 Color Mixer board.

Power:	CM520S	CM520M
	1200ma at +8V	1200ma at +5V
	100ma at +18V	100ma at +12V
	350ma at -18V	350ma at -12V

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