AD-A126 637 BLOCK: INTERACTIVE BLOCK CHART DESIGN(U) HARRY DIAMOND 1/1
LABS ADELPHI MD S J CHOY DEC 82 HDL-TM-82-17

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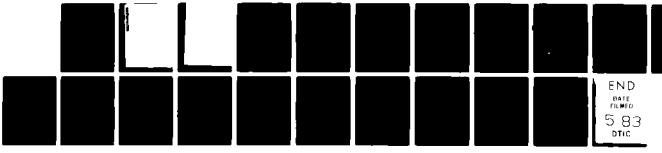

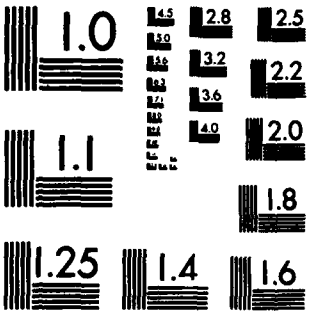

MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

AD A126637

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A program has been developed to interactively create and modify block diagrams and pictures on a computer graphics terminal. The program, called BLOCK, runs on the ~~Harry Diamond Laboratories~~ VAX 11/780 Master Systems Controller (MSC). The program provides for the interactive entry of lines, boxes, circles, arcs, diamonds, arrows, and text using artistically styled character fonts. All entities can be inserted using different colors and varying line textures. Hard copy of the created pictures can be produced on a plotter and on a color copying system, producing both transparencies and prints. The program is accessible to all computer terminals connected to the MSC.

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1. INTRODUCTION

The program BLOCK enables a user to easily create block charts and other arbitrary drawings on a graphics terminal. The charts may be composed of the following entities: lines, rectangles, circles, diamonds, arrows, arcs, color fills, and text. All entities may be drawn with varying line textures and multiple colors. The user indicates the desired position of the elements by using a graphics crosshair cursor on the graphics terminal.

The method for positioning the crosshair cursor depends on the terminal being used. On the Tektronix 401x terminals, the cursor is moved by the rolling of two thumb wheels on the right of the keyboard. On the AED 512 color terminal, the cursor is positioned by moving the "joystick," also on the right of the keyboard. On the Imlac PDS-4, the cursor is moved by depressing the appropriate arrow keys. On the Adage GP430 terminals, the cursor is moved by turning the lower two analog dials labelled "C" and "F." For those terminals not listed, the instruction guide for the individual terminal should be consulted to determine the means for positioning the cursor.

To run the program, type the following command:

RUN PUB:NEWBLOCK

BLOCK operates in two different modes (much like a text editor). BLOCK has an edit mode (the initial mode at startup) and a command mode. When BLOCK is in edit mode, it accepts instructions made up of a combination of cursor positions and single-character keyboard inputs. When BLOCK is in command mode, it accepts input via command words terminated with carriage returns. To enter command mode from edit mode, the keyboard character "C" is pressed. To enter edit mode from command mode, the command EDIT is entered, followed by a carriage return. Figure 1 shows a typical output from BLOCK.

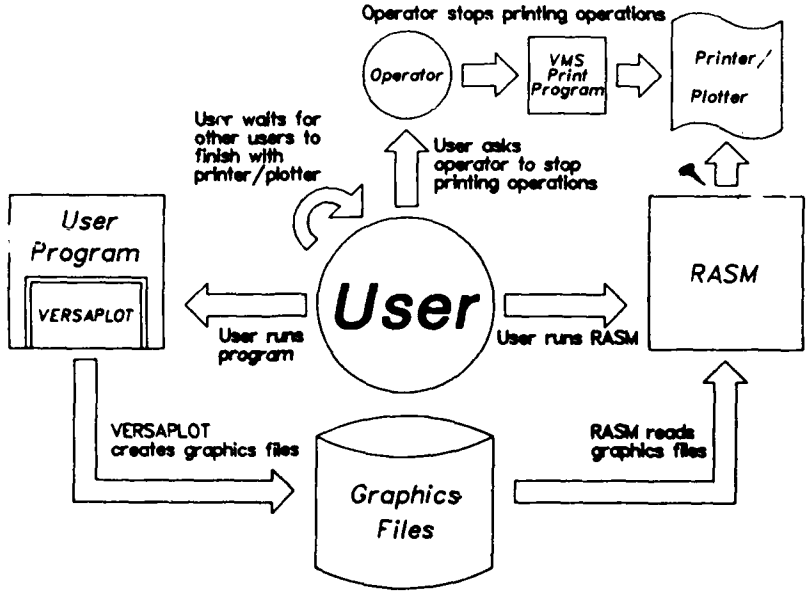

Figure 1. Example of BLOCK output.

2. EDIT MODE

When the program is first started, BLOCK is in edit mode. A crosshair cursor will appear on the screen to indicate that BLOCK is waiting for a single-character command. All commands can be identified by the first letter of the command to be performed. For example, if help is needed, the single-letter command H may be typed and a list of available edit commands will be displayed.

The following edit mode command functions are available:

Alphabet—enable/disable drawing of fancy text

Boundary color fill—fill in a closed boundary with current color

Command—enter command mode

Erase—erase part or all of the picture

File—save or load a picture file

Grid on—turn on grid

Help—print edit mode command summary

Insert—insert a graphic entity (e.g., line, box, circle, diamond, arrow, arc, or user symbol)

Line type set—set line texture and color for subsequent insertion of graphic entities

Merge—merge individual entities of a subpicture into current picture

No grid—turn off grid and redraw

Pick—pick an object on the screen

Quit—exit the program (and optionally, save picture)

Redraw—redraw the current picture

Set—set grid lock resolution

Text—insert text entity

User—save picture as a user-defined symbol (subpicture)

Xlate—translate the picture position

AED function key 0 "("—set the active entity insertion color

AED function key 1 ")"—set the active text insertion color

2.1 *Insert*

The *insert* command is used to enter a graphic entity into the picture. One positions the cursor crosshairs to the start of the symbol. The cursor is moved to the second position and a command indicating the desired symbol is typed. The symbol will then be drawn between the two indicated cursor positions. The following symbols, in which the one-letter code is capitalized, can be inserted:

Box
Circle
Line
Diamond
Arrow
aRc
Quit (ignore the insert)
User-defined symbols (subpictures)

Note: all cursor positions in insert mode "lock" to the nearest current grid-lock value (initial default is 0.25 in.). However, the grid is only drawn on the screen every 0.5 in. The user can change the "fineness" of the grid lock by the edit mode command *set*.

The *insert* command functions as follows. Positioning the cursor to the first point of the graphic entity and typing an "I" causes a marker to appear at the closest "locked" grid point to the cursor. The meaning of this point (see fig. 2) depends on the entity to be selected, as shown in table 1. The program now waits for a second point and the indication of the entity type to be inserted. There are eight possible responses, as shown in table 2.

TABLE 1. MEANING OF FIRST CURSOR POSITION

Entity	Meaning
Box	One corner of box
Circle	Center of circle
Line	One end point of line
Diamond	One corner of a box that surrounds diamond
Arrow	Tail of arrow
Arc	One end point of arc
User symbol	One corner of a box that surrounds *user-defined symbol*

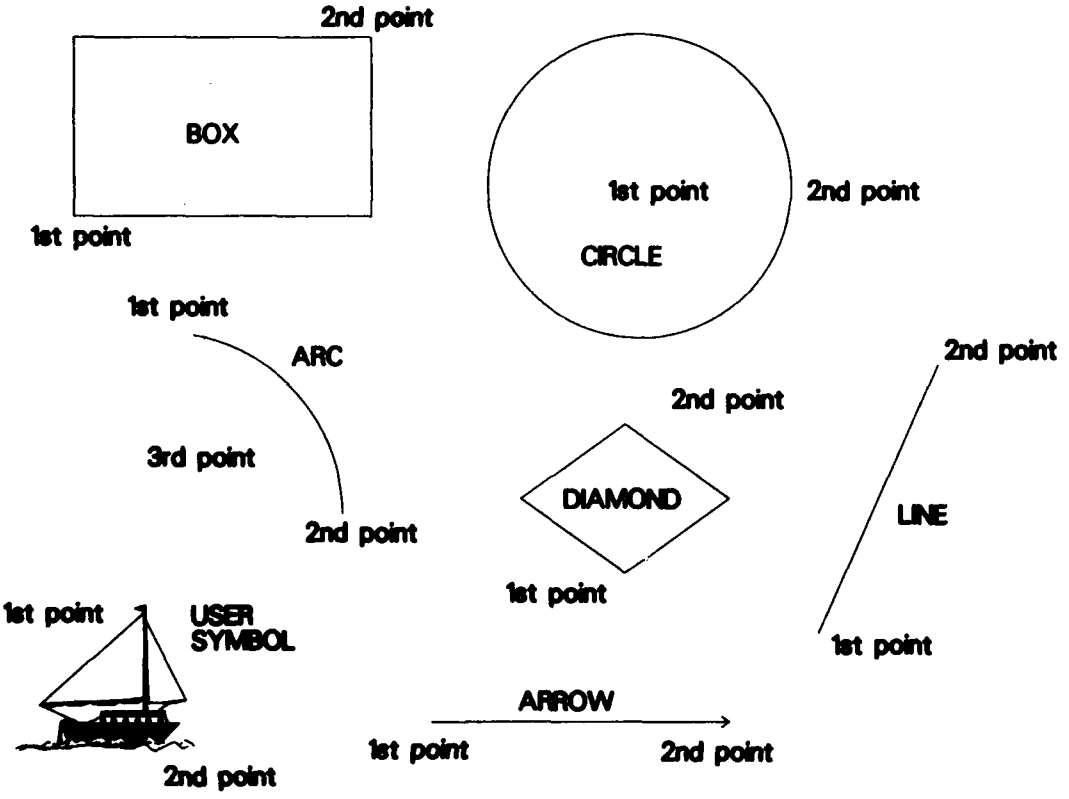

Figure 2. Graphic entities from BLOCK.

TABLE 2. MEANING OF SECOND CURSOR POSITION

Character	Meaning
B	Opposite diagonal corner of box
C	Point on circumference of circle
L	Other end point of line
D	Opposite diagonal corner of box containing diamond
A	Position of head of arrow
R	Second clockwise end point of arc; program will then ask for center of arc
Q	Cancel insert
digit from 0 to 9	Determines which user-defined symbol to use; defines opposite diagonal corner of a box surrounding symbol; if digit is 0, program asks for number from 10 to 99.

If the last graphic entity inserted is incorrect (e.g., positioned incorrectly), immediately after it is drawn, the command d (delete) may be given and the message

INSERT CANCELLED

will appear. This command is only valid immediately after an insert operation is completed.

2.2 *Alphabet*

BLOCK can produce artistic character sets. However, since these characters take longer to draw on the screen, they are initially disabled, i.e., they are not drawn when they are used. To enable the drawing of these character sets, the command "A" is typed when the crosshair cursor is on the screen. To disable the drawing of these character sets, type another "A." The "A" command acts like a toggle switch.

A special type of alphabet is available, called a shaded character font. Since the shading operation is time consuming, it is often useful to be able to draw the shaded characters without actually filling in the characters until the final copy is desired. When alphabets are enabled, BLOCK will ask whether shading is to be enabled. If a YES response is entered, BLOCK will ask for the number of shading angles. If one shading angle is requested, then shading is performed with horizontal lines. If two angles are requested, then shading is performed with horizontal and vertical lines. Note that the distance between shaded lines may be changed using the GAP-SIZE command in command mode.

2.3 *Text*

To enter text into the picture, position the cursor to where the text is to begin and type "T."

A marker will appear at the cursor position and the program will wait for text input. Carriage returns may be inserted to start a new line. The default character height is 0.15 in. To terminate the text entry mode, type a line-feed. In text entry mode, several additional text-related commands are available. These commands are used to alter the characteristics of the text to be entered. The commands are entered by holding down the control key and then pressing the letter of the command to be used.

2.3.1 *Text Height*

The character height can be changed at any time, even within a single line. To change the character height, type a control-H (for height). The program will display the current character height in inches and request a new height. The height may be from 0.001 to 999. in. Note that a character smaller than 0.07 in. will be illegible. Note also that the maximum number of characters in any text entity is 4010.

2.3.2 *Alphabets and Type Styles*

The initial default alphabet used is Simplex-Roman. The system can also produce

artistic characters. A detailed description of the characters sets can be found in the DISSPLA manual.* To change the current type style and alphabet, type a control-A (for alphabet). BLOCK will display the current type style, request a new type style name, display the current alphabet name, and then request the new alphabet name. If an empty answer (i.e., carriage return) is given, the setting will not be changed. Only the minimum number of characters to make the name unique are required when responding to the questions. The type styles and alphabets shown in table 3 are supported by BLOCK.

For speed, the alphabetic characters are always drawn using the default, simple, stick-figure character set, no matter what font or style is selected, until alphabets are enabled with the "A" command. Typically, most layout and positioning is done with the alphabets disabled to minimize the time it takes to draw each character. Table 4 (p 10) shows a sample of the different alphabets and type styles.

TABLE 3. STYLES AVAILABLE FROM BLOCK*

Type styles	Alphabet styles
Simplex	Roman
Duplex	Italic
Complex	Script
Gothic	Greek
SComplex†	Math (both uc and lc§)
CArtog	Special (uc) Greek (lc)
Triplex	Hebrew (uc) Greek (lc)
SErif, SSerif†	
FUtura, SFUtura†	
Logo1, SLogo1 †	
FAshon, SFAshon†	
SWISSI, SSWWISSL†	
SWISSM, SSWISSM†	
SWISSB, SSWISSB†	

*Capital letters indicate minimum abbreviation
†Shaded § uc = upper case, lc = lower case

2.3.3 *Text File Input*

Text input can be taken from a standard ASCII file (e.g., one created with the editor) by typing a control-F (for file). The program will ask for a file name. After the file name is entered, the text is appended to the current text entity until either the end of file is reached or the maximum text entity size is reached.

*DISSPLA is a program and trademark of ISSCO.

2.3.4 *Text Rotation*

The rotation angle at which the text is drawn can be changed at any time by typing control-R (for rotation). The program will then ask for the angle (in degrees) of the text to be drawn. Note that carriage returns within a text entity will not work properly for text at angles other than zero degrees. Each line must be entered as a separate entity for rotated text.

2.4 *Pick*

The *pick* command is used to identify a previously entered entity in order to move it, delete it, copy it, or change its color. The cursor is positioned to the entity to be picked (using the lower left corner of the two points used to enter the entity for graphic symbols or the beginning of the text for text entities) and a P is typed.

If an entity is found at that location, a marker will appear, the entity will brighten on the screen, and the message

M-MOVE, D-DELETE, C-COPY, S-SETCOLOR,
N-NEXT, Q-QUIT

will appear on the screen. If no entity is found (i.e., the cursor was positioned incorrectly) then nothing will happen, and the cursor will reappear. To move the entity, reposition the cursor to the desired position and type "M." To make an additional copy on the screen of the same entity, position the cursor to the desired position and type "C." To delete the entity, type "D." To alter the color of the entity, type "S" and then enter the color desired. To do nothing at all, type "Q."

If two entities share the same location and it is desired to pick the second of the two entities, type "N" for next and the next entity at that location will be picked. Note that text entities have higher priority than graphic entities (i.e., if a text and a graphic entity share

TABLE 4. SAMPLE ALPHABET STYLES FROM BLOCK

	ROMAN	ITALIC	SCRIPT	GREEK	SPEC	MATH	HEBREW
CARTOG	AbCd	*AbCd*	𝒜𝒷𝒞𝒹	AβHδ	24ΩΨ	∞∂∇∈	דכבא
SIMPLX	AbCd	*AbCd*	𝒜𝒷𝒞𝒹	AβHδ	24ΩΨ	∞∂∇∈	דכבא
SCMPLX	AbCd	*AbCd*	𝒜𝒷𝒞𝒹	AβHδ	24ΩΨ	∞∂∇∈	דכבא
COMPLX	AbCd	*AbCd*	𝒜𝒷𝒞𝒹	AβHδ	24ΩΨ	∞∂∇∈	דכבא
DUPLX	AbCd	*AbCd*	𝒜𝒷𝒞𝒹	AβHδ	24ΩΨ	∞∂∇∈	דכבא
TRIPLX	AbCd	*AbCd*	𝒜𝒷𝒞𝒹	AβHδ	24ΩΨ	∞∂∇∈	דכבא
GOTHIC	𝔄𝔟ℭ𝔡	𝔄𝔟ℭ𝔡	𝔄𝔟ℭ𝔡	AβHδ	24ΩΨ	∞∂∇∈	דכבא
FUTURA	AbCd	*AbCd*	𝒜𝒷𝒞𝒹	AβHδ	24ΩΨ	∞∂∇∈	דכבא
SERIF	AbCd	*AbCd*	𝒜𝒷𝒞𝒹	AβHδ	24ΩΨ	∞∂∇∈	דכבא
FASHON	AbCd	*AbCd*	𝒜𝒷𝒞𝒹	AβHδ	24ΩΨ	∞∂∇∈	דכבא
LOGO	AbCd	*AbCd*	𝒜𝒷𝒞𝒹	AβHδ	24ΩΨ	∞∂∇∈	דכבא
SWISSL	AbCd	*AbCd*	𝒜𝒷𝒞𝒹	AβHδ	24ΩΨ	∞∂∇∈	דכבא
SWISSM	AbCd	*AbCd*	𝒜𝒷𝒞𝒹	AβHδ	24ΩΨ	∞∂∇∈	דכבא
SWISSB	AbCd	*AbCd*	𝒜𝒷𝒞𝒹	AβHδ	24ΩΨ	∞∂∇∈	דכבא
SFUTURA	AbCd	*AbCd*	𝒜𝒷𝒞𝒹	AβHδ	24ΩΨ	∞∂∇∈	דכבא
SSERIF	AbCd	*AbCd*	𝒜𝒷𝒞𝒹	AβHδ	24ΩΨ	∞∂∇∈	דכבא
SFASHON	AbCd	*AbCd*	𝒜𝒷𝒞𝒹	AβHδ	24ΩΨ	∞∂∇∈	דכבא
SLOGO	AbCd	*AbCd*	𝒜𝒷𝒞𝒹	AβH		∂∇∈	דכבא
SSWISSL	AbCd	*AbCd*	𝒜𝒷𝒞𝒹	AβHδ	24ΩΨ	∞∂∇∈	דכבא
SSWISSM	AbCd	*AbCd*	𝒜𝒷𝒞𝒹	AβHδ	24ΩΨ	∞∂∇∈	דכבא
SSWISSB	AbCd	*AbCd*	𝒜𝒷𝒞𝒹	AβHδ	24ΩΨ	∞∂∇∈	דכבא

the same beginning location, the text entity will be picked). If the deletion is successful, the message "DELETED" will appear after each deletion.

2.5 *Set Grid Lock*

The *set grid lock* command may be used to query and change the grid-lock value. The grid-lock value defines the size of the grid used by the program to define legal beginning and end points for entities. For example, if the grid-lock value is 1.0 in., no two entities can start at separate points closer than 1 in. apart. The user can either make the grid coarser or finer by a factor of two. To change the grid lock, enter the "S" command to the crosshair cursor. BLOCK will display the current grid-lock value (default = 0.25) in inches. It will then display the message

ENTER FINER, COARSER OR QUIT

If FINER (or F) is typed, the grid lock is divided by two, and if COARSER (or C) is entered, the grid lock will be doubled. In either case, the message above will repeat until QUIT (or Q) is typed. This allows successive factoring of the grid lock. Note that the physical grid drawn on the screen with the GRID command is always drawn at 0.5 unit spacing no matter what the grid-lock value is changed to by the user.

2.6 *Translate*

The *translate* command provides users with the facility to create diagrams larger than the screen space. This is done by picking any point on the screen and typing an "X" command. The program will request a second point. When the second point is selected, the first point is moved to the second point and everything in the picture is translated relative to the move. If the first and second points are the same, then the original translation of zero displacement occurs (i.e., the original viewing space at program initialization time is returned).

2.7 *File*

Pictures that are created can be saved and reused. The *file* command allows the user to save a newly created or modified picture and to load in a previously created or modified picture. To save or load a new picture file, type the command "F" to enter the file system.

The program then asks for a file name. Enter the name desired. It is recommended that all pictures have the file type PIC. The program will ask for the operation to be performed. The possible answers are

S—save the picture in a file,
L—load the picture from a file, and
N—no operation (i.e., ignore the file command).

Each of these commands must be followed by a carriage return. Note that all pictures are saved with the current translation and scaling in effect.

2.8 *User*

A picture can be saved as a user-defined symbol or subpicture. This is often done when the same symbol is to be used in several places in a picture. The "U" command is used to save a user-defined symbol. After the "U" is typed, the program will request a user number. This number is used as the name of the symbol for later reference. The number represents the position of the subpicture in a local directory of user-defined symbols (subpictures). Enter the desired number (from 1 to 99), followed by a carriage return.

After the number is entered, a file name is requested by BLOCK. BLOCK will offer a default file name to be used. If a carriage return with no file name is entered, then BLOCK will use the default file name to store the picture data; otherwise the typed file name

is used. After the file name is entered, a box will be drawn on the screen indicating the "frame" that will be used for the subpicture symbol. This frame indicates the reference box that the program will use for later insertions of the user-defined symbol. The program will ask if the frame is satisfactory. If the response is "NO," then the crosshair will be displayed to allow the user to enter two points of a box to indicate a new frame. When the frame is satisfactorily selected, BLOCK will create a file containing the user-defined symbol as a special entity and the file name will be entered in the appropriate slot of the local directory. All graphic information stored on the screen, except the screen grid if being drawn, will be placed in this file. When the user picture is inserted later, only the information within the confines of the box will be displayed.

This special entity may be inserted later onto the screen at any arbitrary position using the *insert* command described above. The size of the entity depends on the two points selected when using the *insert* command. User-defined symbols can be composed of two levels of user-defined symbols. That is, one user-defined symbol can call a second user-defined symbol, but the second user-defined symbol cannot call another user-defined symbol. If more levels are attempted, the lowest level defined symbols will not appear on the screen when the insert is made.

2.9 *Line Type Set*

It is often desired to draw graphic entities with varying line textures and different colors. This may be accomplished by using the *line type* command. To invoke this edit mode command, the letter "L" is entered. BLOCK will request the line texture (i.e., solid, dot, dash, etc), display the current active color, and ask for a new active color.

The active color is defined as the color that will be used for all subsequent insertions of graphic entities. The active color does not affect the color of the text that is entered. The active text color may be altered in command mode using the TEXT command. Note that users of the AED terminal can set the active entity color by striking function key 0. The active text color may be altered by striking function key 1.

2.10 *Boundary Fill*

For users of the color terminal (AED 512), BLOCK will allow shading in of an arbitrary closed boundary (polygonal fill). Boundary lines must consist of solid line segments and not dot or dash lines. The color used to fill with is the color entered by the last line type command entered.

To fill in a closed area with a color, position the crosshair cursor to any point within the desired boundary and type a "B" (for boundary fill). If the terminal being used is not the AED 512, then a small letter "f" will appear at the spot to indicate for editing purposes where the boundary fill interior point is located.

3. COMMAND MODE

The user enters the command mode from edit mode by typing the letter "C." When command mode is entered, the crosshair cursor disappears from the screen and the prompt

ENTER COMMAND:

appears on the screen. At this point several commands may be entered by the keyboard. Each command consists of textual input followed by a carriage return. These commands may be abbreviated by entering the least number of characters necessary to distinguish the command uniquely. There are 17 commands available in BLOCK.

CLIP—set picture clipping limits in grid units

DIRECTORY—get a subpicture directory listing

EDIT—return to edit mode

EXIT or QUIT—terminate block

ENTER—make new entries into subpicture directory

FILLCOLOR—alter fill-color parameters

GAPSIZE—set text shading gap size

HELP—command name

NEWCOLOR file name—load new color table file

PLOT (file name)—plot picture on a plotter

PROP ON or PROP OFF—turn on or off proportional spacing in text

REVIEW file name—reviews a sequence of pictures listed in file name

SCALE—set picture scale

STATUS—give status of current picture

TEXT—alter text input default parameters

VERSATEC (ROTATE)—select Versatec as default plotter

XYNETICS—select Xynetics as default plotter

$—operating system command

3.1 *HELP*

The HELP command is used to get more information about command mode. The word HELP may be followed by any of the command names. For example, HELP DIR would give information about the DIR command.

To get a current list of available character fonts, type

HELP FONTS

To get list of BLOCK default colors, type

HELP COLORS

3.2 *$*

The dollar sign command is used to enter any arbitrary operating system command. The dollar sign must be followed by at least one space and then followed by the operating system command. For example, the command $ WHO would tell BLOCK to execute an operating system command that displays a list of all the current users on the computer system.

3.3 *CLIP*

The CLIP command may be used to alter boundary points at which the current picture is clipped on the screen. Block will display the current clipping limits and then ask for a new set of values. All values are expressed in terms of grid units. Grid unit sizes may be changed by using the SCALE command. See the discussion of the SCALE command (sect. 3.13) for more information.

3.4 *DIRECTORY*

The DIRECTORY command allows the user to get a directory listing of current subpictures (user-defined symbols) available for the current picture file. The ENTER command may be used to add more entries to the directory. The edit mode command *user* can also be used to place new entries into the directory. Note that when BLOCK is initially activated, the directory is empty. If a picture is loaded using the edit mode command *file*, then the directory for the picture file loaded is placed into the local directory. If the same

directory is needed for several different pictures, a common practice is to enter the file names into the local directory of an empty picture with the ENTER command and then save the picture using the *file* command. Now the empty picture with the filled directory can be loaded to create new pictures using the same directory.

3.5 *EDIT*

The command EDIT will put BLOCK into picture edit mode.

3.6 *ENTER*

The command ENTER allows the user to change old entries in the subpicture directory and add or delete old ones. After the command is entered, BLOCK will ask for a directory entry number. Enter a number from 1 to 99. BLOCK will then ask for the file name. Enter the file name for the entry.

3.7 *FILLCOLOR*

The command FILLCOLOR is used to alter the display of color fills. The default state on the AED terminal is to draw all color fills with color. On all other terminals, the fills are drawn as an X followed by the letter "f." If color is disabled, the X with the "f" will appear on the AED. This allows easy editing of the fills when the *pick* command is used. If fills are disabled, no display at all is drawn to show the fills. This final state is the default for the Xynetics plotter.

To use this command, enter the command FILL and answer the questions.

3.8 *GAPSIZE*

The command GAPSIZE is used to change the distance between shading lines used in the drawing of shaded character fonts. For example, the command

```
GAP .1
```

would place shading lines 0.1 in. apart.

3.9 *NEWCOLOR*

The command NEWCOLOR is used to load a new color table into BLOCK. The default color table is PUB:COLOR.TAB. To load a different table, type NEWCOLOR file name. The format of each line of a color table file is as follows:

rrr,ggg,bbb,x,mnemonic,

where

rrr is red intensity,
ggg is green intensity,
bbb is blue intensity,
x is Xynetics pen ID, and
mnemonic is the color name, up to 7 characters.

Up to 255 colors can be specified in a file. The following is a listing of the default color table used by BLOCK.

```
255,000,000,4,RED
000,255,000,3,GREEN
255,255,000,1,YELLOW
000,000,255,2,BLUE
255,000,255,2,MAGENTA
000,255,255,3,CYAN
255,255,255,1,WHITE
000,000,000,1,BLACK
112,018,216,4,PURPLE
228,120,066,4,ORANGE
170,165,178,1,OFFWHITE
170,044,111,4,BROWN
```

3.10 *PLOT*

The PLOT command is used to transfer pictures to a plotter. If the plotter is a Xynetics, then the transfer is made via magnetic tape.

To generate a Xynetics plot tape, a tape must have been previously mounted and the command

MOUNT/DENSITY=1600/FOREIGN MT:

must already have been issued. If this is not done, then the picture should be saved, and a return to the operating system should be made in order to perform this function.

This command may be used to transfer pictures to a plotter in one of three ways.

1. If PLOT is entered with no file name, then the current active picture is plotted.

2. If PLOT is entered followed by a file name, then the file is loaded and then plotted onto tape. The picture is not drawn on the graphics terminal.

3. If "@" precedes the file name, this indicates that the file name is a command file. The contents of the command file should be a list of all files to be plotted. The pictures are not drawn on the graphics terminal.

The plotter output device may be selected by issuing the XYNETICS command or the VERSATEC command. The initial default plotter selected is the Versatec.

For example,

PLOT (plot current picture)
PLOT PICTURE.PIC (load and plot)
PLOT @PICTURES.COM (read command file and plot)

When BLOCK is terminated, the drawing statistics for the tape will be written on the terminal screen. Be sure to jot down the important drawing numbers.

3.11 *PROPORTIONAL ON/OFF*

The PROPORTIONAL ON/OFF command is used to turn on or off proportional spacing in the text displays. If the commmand PROP ON is given, it is turned on. If the command PROP OFF is given, it is turned off. BLOCK sets proportional spacing on when first initiated.

3.12 *REVIEW*

The REVIEW command is used to review a sequence of pictures whose file names are listed in a command file. After the next picture in the command file is displayed, BLOCK pauses and waits for a keyboard command to be entered before moving to the next or previous picture. The review mode keyboard commands are as follows.

(1) Space bar—go to the next picture

(2) Backspace—go to the previous picture

(3) Q—Quit this review mode and return to command mode

(4) R—Recycle to the first picture in the command file

(5) Fn—go forward n pictures in the command file

(6) Bn—Back up n pictures in the command file

(7) L—List names of pictures in command file

(8) H—Get help list of review commands

A typical command file would look as follows:

FILE1.PIC
FILE2.PIC
FILE3.PIC
etc.

To invoke the command, type

REVIEW [file name] <cr>

or

REVIEW <cr>

and BLOCK will ask for the file name.

3.13 *SCALE*

The SCALE command is used to change the size of the current picture scale. The default picture size is 1.0, 1.0 (or 1 unit is equal to 1 in.). Grid lines are drawn every half scale unit. Therefore, the initial grid lines are drawn two per inch. To reduce the picture by 10 percent, the values 0.9, 0.9 would be entered into the SCALE command and grid lines would now be drawn two per every 0.9 in.

3.14 *STATUS*

The STATUS command will display miscellaneous information about the state of the current picture. Information displayed includes the number of entities inserted, scaling and clipping limits, active colors, and other pertinent information. This same information is often available via other commands that are related directly to the particular piece of information involved.

3.15 *TEXT*

The TEXT command is used to alter the input attributes of text being inserted in edit mode. After the command is entered, a series of prompts will occur asking for the attributes. These attributes include color, size, and type style.

3.16 *VERSATEC*

The VERSATEC command is used to select the Versatec printer for the PLOT command. If the word ROTATE follows the command, then the picture will be rotated 90 degrees before the picture is plotted.

3.17 *XYNETICS*

The XYNETICS command is used to select the Xynetics plotter for the PLOT command.

4. SUMMARY

BLOCK currently runs on all graphics devices supported by GRAPHELP, an HDL-developed graphics support package. These terminals include the Tektronix 401x storage display terminals, the Imlac-PDS4, the Adage GP430, the AED 512, the RETRO-graphics display terminal, the Versatec printer plotter, and the Xynetics flat bed plotter.

BLOCK may be used for producing graphic documentation for both oral and written presentations. The output may be generated either in black and white or a color format. It is envisioned that as time permits, the capabilities of BLOCK will expand providing more functions, easier use, and greater interaction with other system programs.

APPENDIX A.—FORMAT OF USER-DEFINED SYMBOL FILES FOR BLOCK PROGRAM

The user-defined symbols in the BLOCK graphics program, called subpictures, are stored in ASCII-coded files (editor-readable form).

Up to 99 user-defined symbols can be used at ony one time. A user symbol can call only one additional level of user symbols. User symbols can be composed of any of the standard BLOCK symbols (i.e., lines, boxes, circles, arrows, diamonds, text, etc). To create a user-defined symbol file, the USER command may be used, or the editor may be used to create the file using the following format.

All coordinate values are relative to zero.

line 1:
maximum x, maximum y values

line 2 through line n:
opcode,linetype,x1,y1,x2,y2,x3,y3,color

where

opcodes are as follows:

1—box
2—line
3—circle
4—diamond
5—arrow
6—arc
(If the opcode >10, then opcode minus 10 is the user symbol call number.)

linetypes are as follows:

0—solid
3—dotted
4—dashed
5—dot-dashed

x1,x2,y1,y2 are the coordinates for the entity
x3,x4 are the coordinates of an arc's center

If text is to be entered, precede the very first text entity in column 1 with a minus 2. Then for each text entry, there is a line identifying the text:

x,y NCHAR
followed by the text

where NCHAR is the number of characters.

A backslash (\) in the text indicates an extra forced carriage return.

A grave (`) in the text followed by a special set of opcodes may be used for special commands within the text.

An opcode of "S" followed by a 4-digit real number is a size change command. An opcode of "A" followed by two integer values indicates an alphabet change. An opcode of "R" followed by a 5-digit real number indicates a rotation of the text.

Text style coding is stored as follows.

Style Code	Type Styles
1	SImplex
3	Duplex
2	COmplex
4	Gothic
9	SComplex
:	CArtog
;	Triplex
5,7	SErif, SSerif (shaded)
6,8	FUtura, SFUtura (shaded)
<,A	Logo1, SLogo1 (shaded)
=,B	FAshon, SFAshon (shaded)
>,C	SWISSL, SSWISSL (shaded)
?,D	SWISSM, SSWISSM (shaded)
@,E	SWISSB, SSWISSB (shaded)

Alphabet Code	Alphabet
1	Roman
2	Italic
3	Script
4	Greek
5	Russian
6	Special
7	Math
8	Hebrew

APPENDIX B.—INCLUDING EXTERNAL XY PLOTS IN BLOCK

Sometimes it is desired to include an XY plot or other diagram generated by another user FORTRAN program into a picture generated by BLOCK. This is possible, if the FORTRAN program uses either GRAPHELP or DISSPLA calling GRAPHELP to generate the XY plot or other diagram.

Assuming the above to be true, then the user can relink the application FORTRAN program, rerun the application program and instead of producing a picture on the terminal, a pair of data files will be produced that are equivalent to subpicture user files that can be read by BLOCK. The user can then enter the subpictures into the local BLOCK directory and then insert the pictures. This entire procedure requires a clear understanding of how user-defined pictures are used in BLOCK. The following is a step-by-step description of how the procedure would be performed.

1. First there must be a FORTRAN program that generates a picture using GRAPHELP. For this example, it will be called MYPIC.FOR. After compiling the program and seeing that it draws the appropriate picture on one of the CRT terminals, it is now desired to move this picture to BLOCK.

2. Relink the program as follows. The old link statement looked like this

LINK MYPIC,GH/LIB

The new link statement should look like this

LINK MYPIC,PUB:PREGH,GH/LIB

3. Rerun the program and two files will appear at termination of the program. The first file is a vector file and called VEC.SUB. The second file is a symbol file and called SYM.SUB. The symbol file is optional and contains the information from all calls to SYMBOQ in GRAPHELP.

4. Append to the end of VEC.SUB the following line

-2

and then append SYM.SUB to the end of this if it is desired to have the text displays. Then resave the file under a new name, for example, MYPIC.SUB.

5. Run the BLOCK program and go to command mode. Using the ENTER command, enter MYPIC.SUB into the local directory under the desired entry number, for example, number 1.

6. Go to edit picture mode and use the INSERT command to enter subpicture number 1. Note that if the picture does not have too many vectors, then the *merge* command in edit mode may be used to bring in the individual elements on the picture for picture editing.

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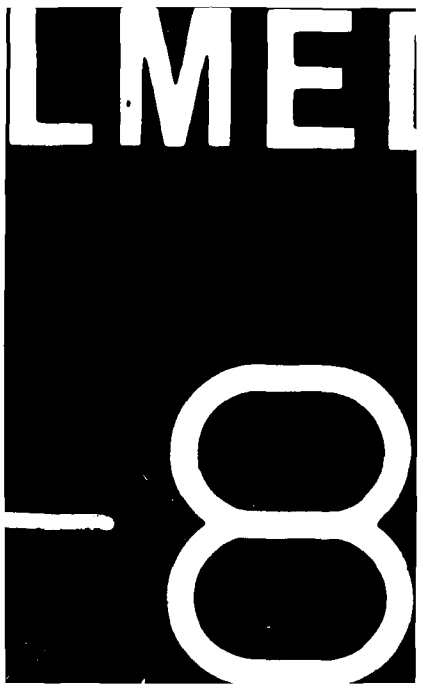
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