



U S E R S M A N U A L

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10/86

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DESCRIPTION

THE THREE LARGE DISPLAYS

- Left : Window (detail) monitor for magnification of specified areas.
- Middle : Multi-level monitor. All active levels are superimposed in full colour.
- Right : Current level monitor. Displays the current level, all lines are displayed in blue while the cursor and the lines which are affected by the cursor are displayed in red.

THE THREE SMALL MONITORS

- Left (colour control display) : Display for the colour system. The numbers 0-63 represent the 64 levels. The level in which you are working is indicated by an underscore character () to the lower left of the level number. To the right of the level number are three numbers; the first represents the proportion of red in a colour between 0 and 255 (0-100%), the second the proportion of green and the third the proportion of blue. On the bottom line, 4 variables of the colour system are displayed, from left to right they are:
- 1) the colour page number, a memory system for colour combinations;
 - 2) a degree symbol which indicates the degree of the colour in the colourcircle;
 - 3) the brightness or percentage of light in a colour;
 - 4) the saturation of a colour, 0% being grey and 100% being full colour.

Middle : Displays graphic commands, measurements and active
(system user information.
control display)

Right : Information from the disksystem, the contents of
(disk control the library memory.
display)

FLOPPYDISK DRIVE

A memory system with removable diskettes, also called floppydisks; can store up to 1 megabyte of information.

The upper diskette drive is for storage and reading of drawings. The bottom drive is used for copying data.

KEYBOARD TABLE

Graphic tablet
or Bitpad : The white square on the panel that the cursor control moves over. If the cursor is moved out of the boundaries of the bitpad, a warning sound will be heard.

Cursor
Control : The hand control on the bitpad which directly effects the cursormovements on the monitors.

Cursor Control
Button : Abbreviated as c.c.b. throughout the manual. A key used to set and move points and to carry out the functions of the system.

- Cursor : The point on the monitor directly controlled by the cursor control on the bitpad. The movement of the cursor control over the bitpad has a "real time" effect on the movement of the cursor on the screen.
- Keyboard : The table containing all the controls for the various functions for the machine.
- Level Bar : The long bar of numbers from 0-63.
- Colour circle : The circle containing red, yellow, green, cyan, blue and magenta.
- Leds : Light emitting diode (green or red); indicates which functions have been activated.

TERMINOLOGY

- Vector : A line, shortest connection between two points.
- B-Spline : A fluent line which follows the original vector drawing characteristics. The B-spline starts and ends in the same points as the vector drawing. The B-spline goes through the midpoints of all the vectors apart from the first and last vector. When a vector point is changed into a "corner", the corner will behave as a starting and end point in the drawing.
- Chain : A temporary group of tables or objects which can be manipulated as a whole.
- Level : The **AESTHEDES** system uses a multi-level technique. A multi-level drawing consists of several partial drawings on transparent levels placed over each other (comp. overlays). There are 64 levels, 0 being the background colour or lowest and 63 being the highest. One or more parts of a picture can be set in each level, every level can obtain one adjustable colour. If a level is unused, it can be seen through, so that the underlying levels are visible.

- Polygon : A basic figure composed of at least 3 equal length sides wherein all angles are the same. For example an octagon.
- Table : A figure composed of several mutually connected vectors.
- Object : A figure composed of 2 or more tables that can be manipulated as a whole.
- Scene : A number of objects that can be manipulated as a whole. The objects can be made into scenes with the "make scene" key.
- X- and Y-axis : The x-axis is the horizontal axis, the y-axis is the vertical axis.
- Page
coloursyst : A temporary colour memory and recall system in the form of pages where information can be stored without sending the data to the harddisk or a floppydisk. A page can contain up to 64 levels. There are between 70 and 1.000 pages. If every level has a colour, than the maximum number of pages is 15 if only 1 level has colour, other than black, there can be up to 1.000 pages.
- Page
Disk syst : One page from the contents of the harddisk or floppydisk.

DESCRIPTION OF KEY GROUPS from left to right

- TASK : For the automatic executions of pre-programmed functions.
- MIRRORS : Reflects images from one 1/2 of the screen to the other. The X-mirror reflects from top to bottom and vice versa, i.e. it treats the x-axis as a mirror. The y-mirror reflects from right to left and vice versa, i.e. it treats the y-axis as a mirror. The Y-clip makes all lines on the right 1/2 of the screen invisible. The X-clip makes all lines on the upper 1/2 of the screen invisible. The images that are reflected can be fixed to make them identifiable.
- MEMORY : Internal memory storage, the stored information does not go to the Winchester harddisk or to the floppydisk, is a possibility to temporarily store and recall constants.
- POSITION : To set and recall the position of a 3D figure.
- FRAME BUFFERS : For manipulation of the contents of the framebuffer (loading, display etc.)
- DIMENSION : Used to plot line lengths (l.l.). The figures are not drawn on the screen but are plotted on paper and displayed on the system control display.
- SPLICING : To cut figures, to line up figures and to connect them. Can be described as the scissors and glue.
- MEASURE : With these functions values between 2 points can be determined in terms of:
line length, measured in units which are then determined by the scale that has been defined.
X-difference, the distance between 2 points as measured along the x-axis.
Y-difference, the distance between 2 points as measured along the y-axis.
Angles are measured in a counter clockwise fashion, 0 being the x-axis and 90 being the y-axis. The angles are read according to which order the points have been indicated.
Can be used to set line length and angle.

Measures surface area of a figure and the volume of a 3D figure. Also contains the define scale function to set the desired scale.

- DISPLAY : To display specific parts of a drawing.
- SPLINES : Used to create fluid lines or splines from a "drawn" figure composed of vectors.
- MOVE : Used to move points, lines and tables. Also controls the gravity function when on; the points gravitate to each other and when using a grid the points gravitate to the crossing points of the grid. Without GRID, gravity can be activated horizontally and vertically.
- DRAW : To create basic figures. Can draw lines, polygons, new points, can set sharp corners and midpoints and divide lines. Controls the filling, copying and outlining of figures and contains most of the basic functions for drawing.
- LEVELS : To move through the 63 different levels in steps. The higher levels in number are above the lower numbers.
- DYNAMICS : To manipulate the figures. Figures can be moved to right or left, (see figures), up or down, zoomed, rotated, in italics. Move, zoom and rotate can be done in X-direction, Y-direction or 3 dimensionally.

- THE COLOUR SYSTEM : There are 16,777,216 colour possibilities for each level and by using the 64 levels there are more than 1 billion colour choices available. The system works additive or subtractive according to your choice. Also controls the saturation and brightness of the colours on the screen. Saturation is the amount of colour in percentages in a colour and brightness is the amount of light in a colour in percentages.
- SCANNING : To scan through the different levels. Is used for animation.
- ANIMATE : An aid for animation. With this function a uniform series of images can be generated between two drawings as desired.
- COMMUNICATE : Used to send data to or call data from other Aesthedes systems through a telephone modem.
- DISK : To send and retrieve information from the Winchester disk or floppydisk.
- LETTER KEYS : The characters A to Z are used to type in file names. The space bar is used to move through functions shown on the system control display.
- NUMERIC KEYS: Is used for the input of numbers. The information that is typed in with these keys is displayed on the system control display.

- CALCULATOR : To calculate.
- VIDEO : To control the turning on and off of a video camera. A video picture can be projected on the screen.
- KILL : Is used for removing elements from a drawing. To kill points. Is killed at the same time from the screen and from the memory.
- PLOTTER : To send drawings partially or entirely to the plotter. Drawing, scale and the pen sort, colour and thickness are steered through this function.
- TYPE-
SETTING : For the selection of fonts.
- ABORT/
RESET : A system to reset the machine in case of blockage. When the system is reset, all information not stored on disk will be lost. Abort gives less radical correction: all data are saved.
- GRIDS : Background grids for drawing proportionally correct.
- OPTIONS : Keys reserved for features to be added later.

START-UP

To turn the machine on, turn the key in the back of the machine to the right until it clicks.

The 3 small displays will show information after a few seconds.

The left display, or colour data display, will indicate that levels 0-63 are empty of colour and that pages, degree on the colour scale, brightness and saturation are all void of information.

The middle display or system control display will read: system is ready

Note: if plotter is not set, display also shows: "plotter not ready".

There will be a blinking line at the left side of the system control display to indicate that the machine is ready for a graphic command.

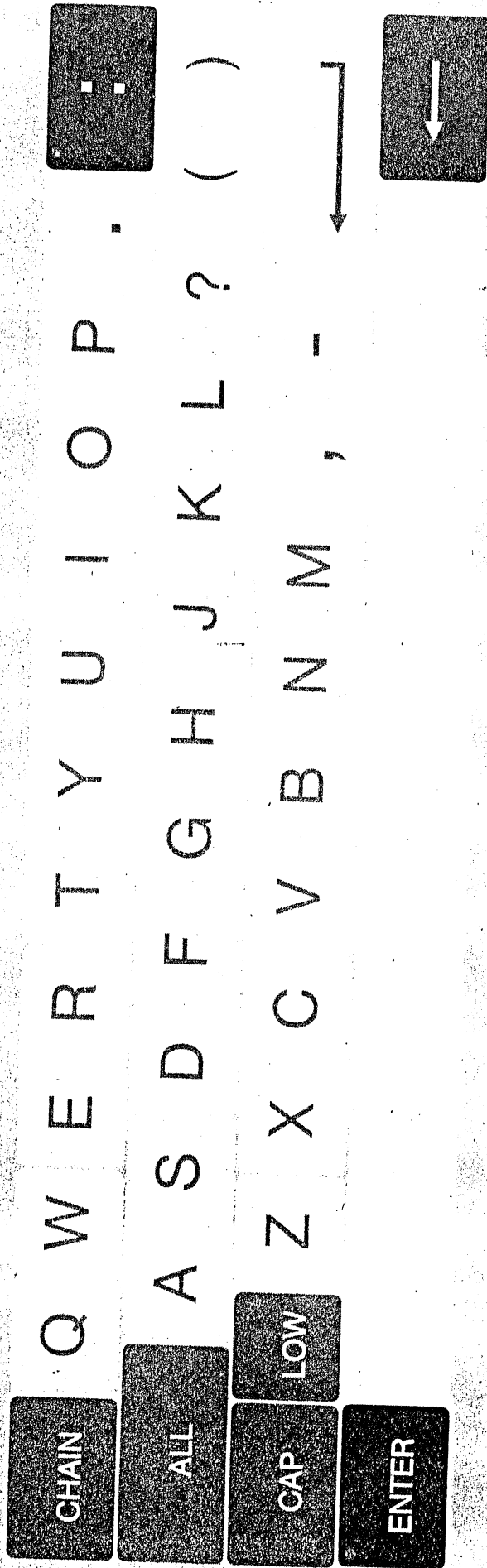
The display on the right or disk monitor will display:

"Harddisk selected"

The following leds will be burning which indicate that the following functions are set:

Level 31 : The standard activated level;
MIRRORS : Under RESET the X-mirror, Y-mirror,
X-clip and Y-clip are off;
DISPLAY : The window monitor is off;
MOVE : The gravity is off;
DYNAMICS : The figures if manipulated by the dynamic
function will move fast;
COLOURSYSTEM: The colour system is working in an additive
manner;
DISK : The system is ready to write on or read from
the harddisk;
LETTERS : The information will be stored and retrieved
in capital and low letters;
PLOTTER : Information will be sent to Plotter 1.

You are now ready to draw.



ANIMATE

**IN BETWEEN
LINEAR**

**IN BETWEEN
EXPONENTIAL**

INTERPOLATE

EXTRAPOLATE

**DOUBLE
PROJECTION**

**PATH
DEFINITION**

**SPEED
DEFINITION**

•
OPTIONS

ANIMATE

The 'animate' functions are meant to create a sequence of images.

IN BETWEEN LINEAR

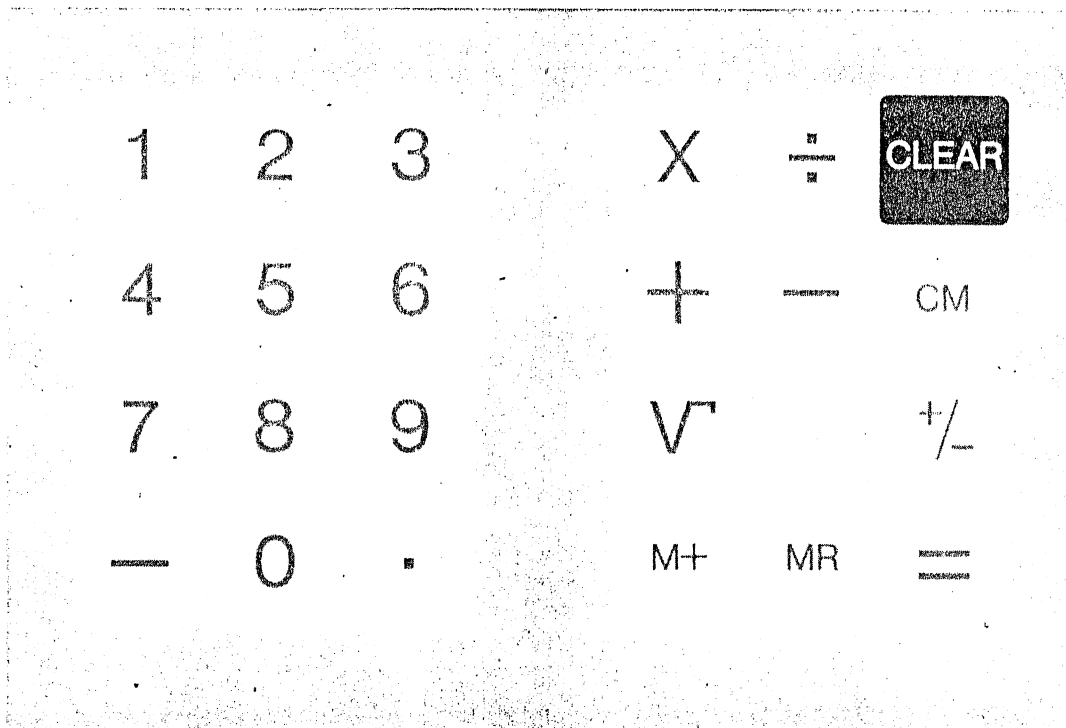
Function : To draw a desired number of copies between two designated tables, the copies will change from the form of the first table to the form of the second in stages, the number of which can be determined.

To use : Draw the two tables to be used. Push in between linear and go to the two tables and press the c.c.b., the system control display will read "give number", type in the desired number of in between spaced and push enter. The two tables that are used and the base for each in between, have to have the same number of points, unless a special effect is wanted, the drawing direction of these two should be the same. When you enter an in between of 0, the computer will generate closed 4-sided figures. Each pair of corresponding points are connected by vectors. Each 4-sided figure is a connected, independent table.

EXTRAPOLATE

Function : To manipulate a chain or a table through repetitions of a numeric dynamics function.

To use : Press the extrapolate key and assemble a chain and manipulate this chain with dynamic function. Enter desired number of repetitions, confirm with enter key and manipulation is performed now.

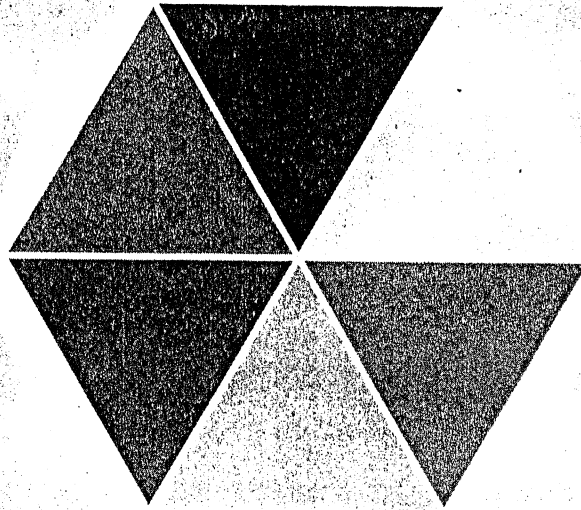


CALCULATOR

- Function : To be used in combination with "measurement"-functions. The calculator enables you to perform arithmetical operations on numerical values that are used in measurement (displayed on system control monitor). Can also be used as an independent calculator, displayed on s.c.m.
- To use : Select function by pressing relevant key in "measurement" section.
Adress relevant spot on current level display and press c.c.b.
the system control display now displays the result of the measurement to manipulate these values through arithmetical operations:
- Press space bar, star appears on bottom line of the system control monitor.
- Use cursor to choose unit to be changed.
- Select arithmetic operation by pressing relevant function and number key on calculator section.
Confirm with "enter" key.
Note that only one operation can be performed at a time.

The number keys

- Function : Used to enter numerical values when needed to carry out a function and can be used as a part of a file name. A file name cannot begin with a number.
- To use : Press the desired numbers, most numerical information needs to be confirmed by pressing enter.



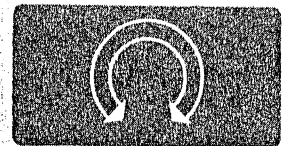
COLOR GRAD.
ON OFF

OPTIONS

0 60

120 180

240 300



« 0%
SATURATION

20% 40%
SATURATION

60% 80%
SATURATION

100% »
SATURATION

« 0%
BRIGHTNESS

20% 40%
BRIGHTNESS

60% 80%
BRIGHTNESS

100% »
BRIGHTNESS

ADDITIVE

- RED +

- CYAN +

SUBTRACTIVE

WHITE

- GREEN +

- MAGENTA +

BLACK

INTERPOLATE

- BLUE +

- YELLOW +

DELETE

COLOUR CIRCLE

Function : To change the colour of a level to one of the colours on the colour circle. When a colour is chosen with the colour circle, the colour comes into the level with a saturation of 100% and a brightness of 74%.

To use : Press on the triangle with the colour of your choice and all points, vectors and filled areas will have the chosen colour.

COLOR CONTROL

1
SET COPY

2
SET COPY

3
SET COPY

4
SET COPY

1
GET COPY

2
GET COPY

3
GET COPY

4
GET COPY

← PAGE →

↓ LEVEL ↑

SAVE

CORRECT

S R
PALETTES

S R
CHAIN 1

S R
CHAIN 2

ACTIVATE 1
CHAIN 2

COLOUR CONTROL

0 - 60

Function : To set the colour of the current level to the colour found at 0° on the colour circle, red, or 60° on the colour circle, yellow. The colour will come into the level at the brightness and saturation that has been set.

To use : Press on the left side of the key for red or 0° and the right side of the key for yellow or 60°.

120 - 180

Function : To set the colour of the current level to the colour found at 120° on the colour circle, green, or 180° on the colour circle, cyan. The colour will come into the level at the brightness and saturation that has been set.

To use : Press on the right side of the key for green or 120° and the left side of the key for cyan or 180°.

240 - 300

Function : To set the colour of the current level to the colour found at 240° on the colour circle, blue, or 300° on the colour circle, magenta. The colour will come into the level at the brightness and saturation that has been set.

To use : Press on the left side of the key for blue or 240° and the right side of the key for magenta or 300°.

Function : To rotate through the colour circle.

To use : To move clockwise through the colour circle press on the right side and to move counterclockwise, press on the left side. The colours will come into the level with the brightness and saturation that has been set. The changing values of the colours can be read on the colour data display.

SATURATION
<< 0%

Function : To move in steps from a higher to a lower percentage of saturation in a colour. 0 - to set the saturation of a colour at 0%, black or white, depending upon the brightness.

To use : By keeping the left side of the key depressed, the saturation of the colour in the current level will gradually decrease to 0% or no colour. By pressing the 0%, the colour saturation will immediately go to 0%, white or black, depending upon how much brightness has been set. The saturation of the colour in the current level can be read on the colour data display.

SATURATION
20% 40%

Function : To step to a colour saturation of either 20% or 40%.

To use : Press on the left side to get a 20% colour saturation and on the right side for a 40% colour saturation. The saturation can be read on the colour data display.

SATURATION
60% 80%

Function : To step to a colour saturation of either 60% or 80%.

To use : Press on the left side to get a 60% colour saturation and on the right side for a 80% colour saturation. The saturation can be read on the colour data display.

SATURATION
100% >>

Function : To give a colour 100% saturation and to gradually give a colour a saturation up to 100%.

To use : To give the colour in the current level 100% saturation, press the 100%. To gradually add saturation to the colour, up to 100%, press and keep depressed the right side of the key. The changing saturation can be read on the colour data display.

BRIGHTNESS
<< 0%

Function : To set the brightness of a colour at 0% or black and to remove brightness from colours in steps.

To use : Press on the 0% to get black. By keeping the left side of the key depressed, the brightness will gradually be taken out of a colour. The percentage of brightness can be read in the colour data display.

BRIGHTNESS
20% 40%

Function : To set the brightness of (a) colour(s) at either 20 or 40%.

To use : Press the left side for 20% brightness and the right side for 40%. The percentage of brightness can be read in the colour data display.

BRIGHTNESS
60% 80%

Function : To set the brightness of (a) colour(s) at either 60 or 80%.

To use : Press the left side for 60% brightness and the right side for 80%. The percentage of brightness can be read in the colour data display.

BRIGHTNESS
100% >>

Function : To set the brightness of a colour at 100% or to gradually add brightness to the colour in the current level up to 100%.

To use : To set the brightness at 100%, press the left side of the key. To gradually add brightness to a level, keep the right side of the key depressed. The changing brightness can be read on the colour data display.

ADDITIVE

Function : To set the colour system in an additive mode.

To use : Press COLOUR CIRCLE additive and the led will burn continuously. All colour manipulations will be done in an additive manner, meaning that the end result of adding one colour to another will be a colour with a high brightness. White is the result of full red, full green and full blue. The additive colour system is commonly used in video art and based on the red green and blue components of video.

- RED +

Function : To add and subtract red from a colour in the current level.

To use : Keep the right side of the key pressed to add red and the left side to take red out of a colour.
The changing value of red in a colour can be read on the colour data display in the left columns of the three columns that follow the level numbers, 255 being 100%.

- CYAN +

Function : To add and subtract cyan from a colour in the current level.

To use : Keep the right side of the key pressed to add cyan and the left side to take cyan out of a colour. The changing value of cyan in a colour can be read on the colour data display. Green and blue will change at the same time.

SUBTRACTIVE

Function : To set the system to a subtractive mode. All functions used with the colour system will be carried out in a subtractive manner, meaning that when colours are added to one another, the end result will be a dark colour or a colour with little brightness.

To use : Can be compared to the effect of adding colours to each other with oil paints. Starting on a white background, if colours are added on top of each other. The end result will be dark brown or black. As in printing systems, you can work with cyan, magenta and yellow, starting with white: cyan + magenta make blue; magenta + yellow make red; cyan + yellow make green.

WHITE

Function : To give the current level a white colour with a brightness of 74%

To use : Press white and the current level will be given a white colour. It is a visible colour to draw in when using a black background.

- GREEN +

Function : To add and subtract green from a colour in the current level.

To use : Keep the right side of the key depressed to add green to the colour in the current level and on the left side to take green out. The changing values can be read on the colour data display.

- MAGENTA +

Function : To add and subtract magenta from a colour in the current level.

To use : Keep the right side of the key depressed to add magenta to the colour in the current level and on the left side to take magenta out. The changing values can be read on the colour data display while blue and red change at the same time.

BLACK

Function : To give the current level a black colour.

To use : Push black and the current level will turn to black, 0% brightness and 0% saturation.

- BLACK +

Function : To add and subtract blue from a colour in the current level.

To use : Keep the right side of the key depressed to add blue to the colour in the current level and on the left side to take blue out. The changing values can be read on the colour data display.

- YELLOW +

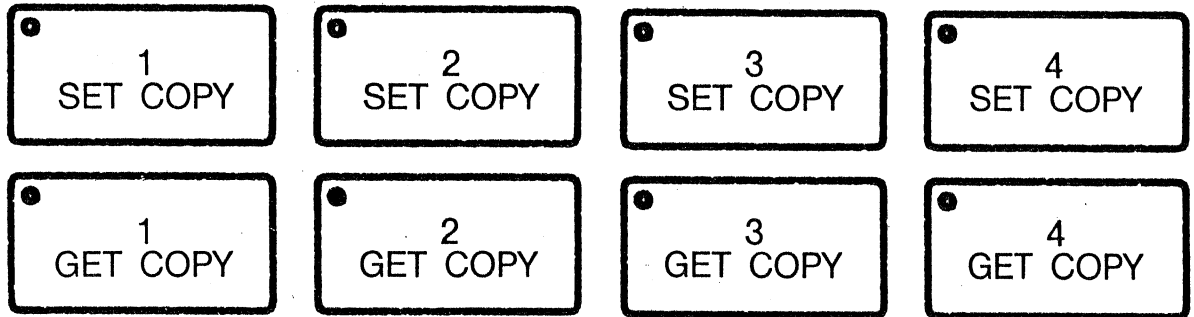
Function : To add and subtract yellow from a colour in the current level.

To use : Keep the right side of the key depressed to add yellow to the colour in the current level and on the left side to take yellow out. The changing values can be read on the colour data display while red and green change at the same time.

DELETE

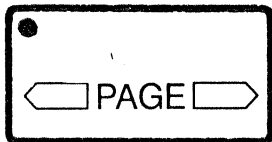
Function : To delete a page of colour information that has been stored with the save key.

To use : Step to the page number to be deleted with the page function and press delete and enter. This page can now be used to store new information.



Function : A temporary memory system for storing and recalling colours. Is convenient for transferring colours from one level to another.

To use : Press set copy and the colour that is in the current level will be stored. To recall the colour, press get copy. The colour can be recalled in levels other than the level that the colour was stored in. Only one colour can be stored per copy number.



Function : To move through the pages in the memory. The page consists of data stored with the save key stored all of the colour information present in all 64 levels. There are between 60 and 1,000 pages available depending upon the amount of information stored upon each page. When the machine is turned off or reset, all information stored on the pages is lost.

To use : When you have a colour combination to be stored, press the save key and all colour data in the 64 levels will become a page, the page number is displayed in the lower left hand corner of the colour system display. If the save key is pressed while on a page that already contains information, the data will immediately be sent to the next available page. When the pages are stepped through, the colour combinations that were stored on the pages will be displayed. To delete a page, go to the page number and press delete enter. The S after the last page number is a memory system that stores the colours that were on the display at the time that you went to another page. colours that you had before leaving the page can be recalled by stepping with the page key to the S number.



Function : To enable a colour to be changed in a level other than the current level. With this function the levels 0-63 can be stepped through and the colours change without actually changing current level.

To use : Press the right or left side to move through the levels, the movement is indicated by the bar to the lower left of the level numbers in the colour data display. Step to the level to be changed and adjust the colour. When you press one of 64 keys on the level bar, the chosen number will be your current level and the colour system will again affect the current level.

SAVE

Function : Used to store colour combinations on pages, the page numbers are displayed in the lower left hand corner of the colour data display.

There are between 60 and 1,000 pages available depending upon how much information is stored on a page.

To use : To store the colour combination of a drawing, press save and notice that the changing page number in the colour display will be displayed. The information will be stored on the next available page. To recall the information, press the page key and move to the desired page. Each page will be displayed when it is passed.

CORRECT

Function : To correct the variations in a colour that has been made since the current level was switched on by giving the original colour.

To use : After having changed the colour of the current level, push correct. You will get the colour back that the level had at the moment you came into to current level.

PALETTES S R

Function : To set and reset the standard palette of the system. The palette has been designed to give each level a different color for the ease of having a visible cursor when a level is entered.

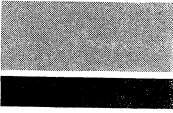
To use : Press on the s for set and enter. Notice the red, green and blue values filling in the 64 levels on the colour monitor.

CHAIN 1 CHAIN 2 ACTIVATE S R S R 1 CHAIN 2

Function : To set the colours of different levels in a chain which can all be affected by the colour variation function. Two chains can be created and one level can belong to both chains. The chains can also be activated together.

To use : With the LEVEL key, or with the keys, of the level bar, move the indicator line to the levels to be put in a chain and while at the level, press the S for set, repeat for each level. A small dot will appear after each level number that has been set in the chain. Press activate chain 1 and the dots will turn into stars indicating that all the levels in the chain are now affected by the colour control function. The same principal applies to chain 2. To deactivate the chain, press on activate chain 1 or 2 again. To erase the display of the dots indicating the levels that are in the chain, press chain 1 - R - reset or chain 2 - R reset.





COMMUNICATE

MODEM

A.P.D.

PORT 1

PORT 2

CURRENT
LEVEL

MULTI
LEVEL

PALETTE

TASK

ENTER

GET DATA

OPTIONS

COMMUNICATE MODEM

Function : To link up with another Aesthedes system (if both are equipped with a telephone modem). Can only be used by qualified AESTHEDES personnel. Used to display on an external monitor what functions are used on the tandem system.

To use : Press on the COMMUNICATE modem key. The indication "tandem on" appears on the system control monitor. Both systems are linked together now and all functions are performed simultaneously on both systems. Note: the control of the cursor can be switched by pressing the c.c.b. of the cursor control to be used.

PORT 1

Function : Datatransmission from disk to the tandemsystem.

To use : Switch to tandemmode by pressing port 1. The SCD now reads "send data", the partner-systems' SCD reads "receive data". Call a file from the memory by pressing the from disk key, entering a filename and confirming with enter. After the confirmation, the file is transmitted to the tandem-system.

PORT 2

Switch to the tandemmode with modem key. Press port 2 and from disk and select hard/floppy disk. Enter the filename as requested on the SCD. By pressing enter. The file is called from the disk of the tandemsystem.

DIMENSION

L.L.
HORIZONTAL

P. TO P.
HORIZONTAL

L.L.
PARALLEL

Ø

L.L.
VERTICAL

P. TO P.
VERTICAL

L.L.
FREE MOVE

OPTIONS

L.L. HORIZONTAL

- Meaning : Line length measured horizontally
- Function : To give the exact length of a line as measured along the x-axis. The horizontal length or length along the x-axis, can be plotted. The distance of the measuring line from the measured line can be determined as well as the position of the numbers on the measuring line.
- To use : Push DIMENSION ll horizontal. Select with the cursor the desired horizontal line of the table, push and hold the c.c.b. On the current level monitor a horizontal measuring line will appear in red which can be moved and set at the desired distance from the line that has been measured. On the multi-level monitor, the line will be displayed in the colour of level one as all measuring lines are immediately sent to level one. To determine the location of the numbers on the measuring line, go to level one and set a midpoint in the line. To move the location of the point and thus the numbers along the measuring line, use MOVE point on line function. The numbers will not be printed unless a point is set, the decimal point of the number will be set by the point.

P. TO P. HORIZONTAL

- Function : The exact distance between two points as measured along the x-axis can be determined and plotted with measuring lines. The measuring line and the numbers representing the distance between the two points can be set at the desired location. All measuring lines and the numbers are immediately sent to level one. To adjust the lines and the position of the numbers, go to level one.

To use : Push DIMENSION p. to p. horizontal. With the cursor, select the two points that you would like to measure. At the second point, keep the c.c.b. depressed and move the measuring line to the desired location. The line will be displayed on the multi-level monitor in the colour of level one. If it is not displayed, go to level one and add colour. The measuring lines are written in level one and will only be displayed on the current level monitor as long as the c.c.b. is depressed and the horizontal or X-difference between the two points will be displayed on the system control display.

To set the location of the numbers on the line, go to level one and the line will be displayed on the current level monitor. Set a midpoint in the line using the DRAW midpoint function. To move the location of the point and thus the position of the numbers on the measuring line, move the point with MOVE point on line, the decimal point of the number on the line will be plotted where the point has been set. The measuring line can be extended with the point on line function.

L.L. PARALLEL

Function : The exact length of an angled line can be measured under every angle and plotted with measuring lines. The measuring line and the location of numbers on the line can be set in the desired location. All measuring lines and measuring values are immediately send to level one. To adjust the lines and position of the numbers on the lines, go to level one.

To use : Push DIMENSION L.L. parallel. With the cursor, go to the line that you would like measured and depress the c.c.b. Keep the c.c.b. depressed and move the measurement line to the desired location. The line will be displayed on the multi-level monitor in the colour of level one. If it is not displayed go to level one and add colour. The measuring lines are written in level one and will only be displayed on the current level monitor as long as the c.c.b. is depressed and the length of the line will be displayed on the system control display. To set the location that the numbers will be printed along the measuring line, go to level one and the lines will be displayed on the current level monitor. Set a midpoint in the line using the DRAW midpoint function. To move the location of the point and thus the position of the numbers on the measuring line, move the point with MOVE point on line, the decimal point of the number on the line will be plotted where the midpoint has been set. The measuring line can be extended with the point on line function.

L.L. VERTICAL

Function : To give the exact length of a vertical line as measured along the y-axis. The vertical length or length along the y-axis, can be plotted. The distance of the measuring line from the measured line can be determined as well as the position of the numbers on the measuring line.

To use : Push DIMENSION ll vertical. Select with the cursor the desired vertical line of the table, push and hold the c.c.b. On the current-level monitor a vertical measuring line will appear in red which can be moved and set at the desired distance from the line that has been measured. On the multi-level monitor, the line will be displayed in the colour of level one as all measuring lines are immediately sent to level one.

To determine the location of the numbers on the measuring line, go to level one and set a midpoint in the line. To move the location of the point and thus the numbers along the measuring line, use MOVE point on line function. The numbers will not be printed unless a point is set, the decimal point of the number will be set at the same level as the midpoint.

P. TO P. VERTICAL

Function : The exact distance between two points as measured along the y-axis can be determined and plotted with measuring lines. The measuring line and the numbers representing the distance between the two points can be set at the desired location. All measuring lines and the numbers are immediately sent to level one. To adjust the lines and the position of the numbers, go to level one.

To use : Push DIMENSION p. to p. vertical. With the cursor, select the two points that you would like to measure. At the second point, keep the c.c.b. depressed and move the measuring line to the desired location. The line will be displayed on the multi-level monitor in the colour of level one. If it is not displayed, go to level one and add colour. The measuring lines are written in level one and will only be displayed on the current level monitor as long as the c.c.b. is depressed and the vertical or Y-difference between the two points will be displayed on the system control display.

To set the location of the numbers on the line, go to level one and the line will be displayed on the current level monitor. Set a midpoint in the line using the DRAW midpoint function. To move the location of the point and thus the position of the numbers on the measuring line, move the point with MOVE point on line, the decimal point of the number on the line will be plotted where the midpoint has been set. The measuring line can be extended with the MOVE point on line function.

DISK

LIBRARY STEP

LIBRARY PAGE

LIBRARY ON OFF

FORMAT

COPY TO HARD DISK

COPY TO DISKETTE 0

COPY TO DISKETTE 1

DELETE

CURRENT LEVEL

MULTI LEVEL

PALETTE

TASK

ENTER

FROM DISK

SCALE

HARD DISK

DISKETTE 0

DISKETTE 1

OPTIONS

LIBRARY

- Function : To turn through the pages of the library.
- To use : After the library has been turned on with the off/on key, press on the right side of the key to move to a page higher in number and on the left side of the key to move to a page lower in number. At the bottom of the page will read the number of entries so far. There are 45 entries per page.

LIBRARY ON OFF

- Function : To turn the library display on and off. When the library is on, the BDOS is not available, meaning you can't call a file from disk.
- To use : Press on the right side to turn the library off and the left side to turn it on. A led will burn when the library is on.

FORMAT

- Function : To prepare the diskettes for use in the Aesthedes system and clear old diskettes.
- To use : Press format, enter. The scd now asks "Do you want to format it", confirm with "Y". SCD asks "ready", confirm with "Y". If the formatting procedure is finished, the SCD will read "done".

COPY TO HARD DISK

- Function : Copying files from diskette to harddisk.
- To use : Select the drive. Press copy to hard disk, enter. SCD now reads "copy from upper/lower floppy to harddisk:" we can now enter the name of the file to be copied. If more files are to be copied, we can use special characters like ? and :
Example: We have files A1, A2, A10 and AB to be copied. If we enter "A:" for filename, every file with the name starting with A will be copied. If we type "A?", only A1, A2 and Ab are copied.

COPY TO DISKETTE 0

Function : Copying files to diskette 0, or "upper diskette".

To use : Press copy to diskette 0, enter. The dcd reads "copy from *** harddisk/floppydisk to upper floppy". Enter the names of the files to be copied.

COPY TO DISKETTE 1

Function : Copying files to diskette 1 or "lower diskette".

To use : Press copy to diskette 1, enter. The dcd reads "copy from *** harddisk/floppy to lower floppy". Enter the names of the files to be copied.

DELETE

Function : To remove files from disk.

To use : Select disk. Press delete, enter. The dcd reads "delete from ...:" enter the name of the file you want to delete. The dcd now reads "delete filename? (y,n,q):"
This gives three possibilities
1. Y (yes), the file will be deleted.
2. N (no), the file will not be deleted.
3. Q (quit), the function is abandoned.

CURRENT LEVEL

Function : To send all tables in the current level to the harddisk or diskette.

To use : Press DISK current level, enter. system control display will ask "give file name", type in file name and enter. Disk display will read create file name, date and time". On the system control display appears "job done".

MULTI-LEVEL

Function : To send all levels to the disk or diskette.

To use : Press DISK multi-level and enter. System control display will ask "give name". Type in the file name and enter. Disk display will read create file name, date and time", system control display will read "job done".

PALETTE

Function : To store (current) color page on disk.

To use : Move to relevant page (as shown on color data display) as using "page" key (bottom right of color control section). Press the DISK palette key and enter key and a request for filename will appear on the system control display. Enter filename on alphabetical keyboard and then press enter key. The page is stored now.

TASK

Function : To store a task.

To use : Press task. The scd shows: "store demo give filename: t.-". Enter the filename and the taskfile is stored on the selected disk.

FROM DISK

Function : To get files from the disk.

To use : Push DISK from disk and on the screen appears "give file name", type in file name and enter. The file will be recalled and appears on the displays.

SCALE

Function : Defines the input scale for files being send to the disk.

To use : Press DISK scale and on the screen appears "give number", type in number and enter.

HARD DISK

Function : To select harddisk to store and recall information.

To use : Press DISK harddisk.

DISKETTE 0

Function : To select diskette 0, to store and recall information.

To use : Press DISK diskette 0.

DISKETTE 1

Function : To select diskette 1, to store and recall information.

To use : Press DISK diskette 1.

OPTION

Function : To start the printer, if it is connected to the main system. (The printer is used to print a listing of the files that are stored on harddisk or diskette).

To use : Select harddisk or diskette from which the listing is to be printed. Switch on the printer (check paperfeed). Now press option key and the list is printed.

DISPLAY

POINTS

CORNERS

ORIGIN

OBJECT

STARTING
POINT

GRAVITY
CENTER

IDENTIFY
LEVEL

SCENE

WINDOW
MON. ON

WINDOW
MON. OFF

IDENTIFY
REP. TABLE

CLEAR

WINDOW
AREA

AREA
RESET

COPY

OPTIONS

POINTS

- Function : To display all present points in the current level.
- To use : Push DISPLAY points, all the points of the current level in the multi-level monitor will be displayed in the colour of the level and the points in the current level monitor will be displayed in red.

CORNER

- Function : To display all present corners in the current level.
- To use : By pushing DISPLAY corner, the corners which have been set with the DRAW corner function are displayed in red in the current level monitor and in the colour of the level in the multi-level monitor. To remove the display, push DRAW refresh vectors or SPLINES refresh splines.

ORIGIN

- Function : With this function, the "local origin", i.e. turning point of a selected table, can be displayed.
- To use : Push DISPLAY origin and select with the cursor the local origin that you would like to see and push the c.c.b. The local origin is displayed as a red circle on the current level monitor, and as a circle (in the colour of the table) in the multi-level monitor. To remove the circles, press DRAW refresh vectors.

OBJECT

- Function : To check whether an object has been defined and if so, to show which element it comprises.
- To use : Press the object key and address table with cursor. If this table is part of an object, the entire object will be displayed in red on the current level monitor.

STARTING POINTS

- Function : The starting points (and end-points) of selected tables are displayed. Half of the starting vector of a table is illuminated to determine the starting point and the direction of a table as well as the end-point.
- To use : Push on DISPLAY starting point. Select the desired table with the cursor and push the c.c.b. The starting point is displayed as a point in the multi-level monitor and as a red line the length of 1/2 of the first vector on the current level monitor as well as the end point. To remove the display, press DRAW refresh vectors or SPLINES refresh splines.

Note: If a table is closed, the starting point and the beginning point are the same and can therefore not be differentiated.

IDENTIFY LEVEL

- Function : To identify the level of a specific table.
- To use : Enter level 63, press DISPLAY identify level and address relevant table with cursor control. Press c.c.b. and the identified level now appears on your system control display.

Objects and scenes:

Please note that in order to work with objects and scenes you should bear in mind the following hierarchy:

scenes > object > table > line > point

Any temporary combination of elements from this hierarchy up from tables, is called a chain.

SCENE

Function : To check whether a scene has been defined and if so, to show which elements it comprises.

To use : Press the DISPLAY scene key and address table with cursor. If this table is part of a scene, the entire scene will be displayed in red on the current level monitor.

WINDOW MONITOR ON

Function : To turn the window monitor on. The window monitor displays selected areas of a drawing that have been enclosed in a box or window. The magnification of the area depends upon the size of the window-area.

To use : By turning the DISPLAY window monitor on, any figures in the current level that are in the standard window area are displayed in the window monitor. Any changes in a figure in the window have a direct effect on the figure in the multi-level monitor. All lines are displayed in blue and the points are displayed in a bright yellow. Areas that are affected by the cursor will be displayed in red.

WINDOW MONITOR OFF

- Function : To turn off the window monitor.
- To use : Press DISPLAY window monitor off. The last set window area will be displayed in the window monitor when turned on again. To adjust the area, go the window area.

DISPLAY CLEAR

- Function : Empty the current level, as displayed on the CLM.
- To see : Press clear and confirm with enter, the current level now disappears from the monitor.
Note: the current level is only removed from the display but remains in the system. If the current level really has to be removed, use the KILL current level function.

WINDOW AREA

- Function : To display and adjust the size and location of the window area to be displayed in the window monitor. Displays the current level.
- To use : Press DISPLAY window area and the standard window size will appear on the multi-level monitor and the current level monitor in red. Turn the window monitor on.
To change the size of the window, put the cursor directly on one of the vectors of the window and depress the c.c.b., the window can now be enlarged or made smaller by moving the cursor control to the outside or the inside of the bitpad. To move the window out of the centre of the screen, bring the cursor to any location outside or inside of the window except for on a vector of the area and "pull" the window to the desired location. To display the selected area, push again DISPLAY window area. The window area will remain on the last setting, unless the window area is reset with DISPLAY area reset at which time the window will return to the standard size and location.

AREA RESET

Function : Reset the window to the standard size in the middle of the screen.

To use : Press DISPLAY area reset key and if a window is already in use and visible on the screen, the window will return to the standard position. If a window size and location has not yet been determined, the standard window will appear on the current level monitor, the window area function can then be used to adjust the size and location of the window. The window monitor must be on to carry out the window function.



DRAW

• POLYGON	• POINT TO	• NEWPOINT	• CORNER
• POLYGON SEGMENT	• MIDPOINT	• OUTLINE	• DIVIDE
• COPY TABLE	• FILL TABLE	• DELETE OBJ./SCENE	• CHANGE DIRECTION
• COPY OBJECT	• FILL CHAIN	• MAKE OBJECT	• DIGITIZE
• COPY SCENE	• FILL LEVELS	• MAKE SCENE	• VECTORS
• SPIRAL	• UNFILL	• RECTANGLE	• REFRESH VECTORS
• MODIFY SPIRAL	• GRIDS	• ALL	• OPTIONS

POLYGON

Function : To call a standard figure up from the memory with at least 3 sides equal in length with the same angle between each vector. All standard polygons have a measurement of 100.00 mm or 10 cm from the middle point to each point in the polygon of measured with the standard scale.

To use : Press DRAW polygon and the system control display will display "give number". Type in the desired number of sides with the number keys and push enter. The polygon will appear in a standard size in the middle of the screen.
You can call up polygons with up to 1,000 sides, larger numbers are not accepted!

POINT TO

Function : To draw connected lines from one point to another. Each time DRAW point to is pushed, a new table is started.

To use : Push DRAW point to. A cursor will appear on the screen; blue on the current level monitor, in the colour of the level on the multi-level monitor, that is in straight connection with the "mouse" on the bitpad. Press the c.c.b. lx. Move the cursor. Press again the c.c.b. and keep it depressed, to be able to choose a position for the line arisen (red on the current level monitor). As soon as you release the c.c.b. the line is fixed. Press DRAW point to again to draw a new table. With the gravity on, the lines drawn with DRAW point to gravitate towards the horizontal and vertical positions on the screen. There is also a "pull" towards the starting point. When a table is closed with the gravity on, the points are connected.

NEW POINT

Function : To create a new point in a table. You can give it a position with the cursor, so that the shape of the table changes.

To use : Make with point to a vector drawing. Push DRAW new point. Select with the cursor a line of the table. Press the c.c.b. and keep it depressed. On the current level monitor the selected line will be red. On the place of the cursor a new point has arisen, which you can move by moving the cursor with the c.c.b. depressed, over the bitpad. The new point will remain connected to the table. As soon as you release the c.c.b., the new point and the two adjoining lines are fixed. It is a repeating function; in this way you can add new points without pressing point to again.

CORNER

Function : To select and set corners in figures that are to be B splined. The B spline will not affect those points that have been set as corners.

To use : Push on DRAW corner. Go to the table to be splined and select the points to be set as corners with the cursor and push the c.c.b. Upon this point will appear a small cross in the colour of the level in the multi current level and in red on the current level monitor. The figure can now be B splined. To erase the crosses from the screen, use refresh spline after the figure has been splined. A corner can taken away with KILL corner.

MIDPOINT

Function : To create a new point exactly in the middle of a vector.

To use : Make a vector drawing with point to, press DRAW midpoint and go to a line with the cursor and press the c.c.b. at which time a new point will be displayed as a cross in the exact centre of the line. Use refresh vectors to remove the displayed midpoints from the screen.

OUTLINE

Function : 1. To make tables larger and smaller while keeping the same shape;
2. A copy of a table can be made and the 0 copy enlarged to outline a figure;
3. The outline can be set numerically.

To use : 1. Push DRAW outline. Go to the selected table with the cursor and push the c.c.b. and keep it depressed. The figure will be displayed in red on the current level monitor. The table can be made larger and smaller by moving the 0 cursor over the bitpad. The outline will be set when the c.c.b is released. To move to another table or to readjust the outline, the outline key must be pushed again.
2. First make a copy of a table, (see DRAW copy table) and then use the copies to outline the original figure by following the same procedure as above.

3. Push DRAW outline and go to the table to be outlined with the cursor and push and release the c.c.b. Now push the space key and the system control display will ask for a number. The number entered represents the distance between the points in the reference table and the points in the outline. This function can also be used with a copied table. Enter the number to represent the offset and push enter. The offset can be entered with either a positive or a negative number, the numbers affecting the outline as follows:

If the drawing was drawn in a clockwise direction, a negative number will make the outline smaller and a positive number will make the figure larger. All polygons are drawn clockwise.

If a figure was drawn in a counterclockwise direction, a negative number will make the outline smaller and a positive number will make the outline larger, so:

If the outline is made smaller, there is a possibility that the points will crowd one another or overlap in which case the shape will be changed.

To determine the drawing direction, press DISPLAY starting points.

DIVIDE

- Function : To divide a selected line of table into any number of equal pieces, while keeping the table closed.
- To use : Press DISPLAY divide. Select one of the lines of the table and press the c.c.b. On the system control display will be displayed "give number". Indicate with a number the number of pieces that you want to divide the line into. Push enter. The pieces are indicated by points (red on the current level monitor). These points are added to the table: the table itself remains closed.

COPY TABLE

- Function : To make a copy or copies of a table.
- To use : Push DRAW copy table and select with the cursor the table to be copied. Push the c.c.b., the amount of times that the c.c.b. is pressed determines the number of copies on top of a table.

FILL TABLE

- Function : To fill a table
- To use : Press DRAW fill table key and address object with cursor and press c.c.b.

DELETE OBJ/SCENE

- Function : To remove an object from a scene, or a table from an object.
- To use : Press the DRAW delete object/scene key and address the table or object you want to be removed from object or scene, press c.c.b. and object/table is removed.

CHANGE DIRECTION

- Function : To change the direction that a figure has been drawn in.
- To use : Press DRAW change direction. Go to the desired table with the cursor and press the c.c.b. To display the drawing direction or starting points, press DISPLAY starting point.

COPY OBJECT

Function : To make a copy in order to use copy in other functions (e.g. move copy, send to other level) while leaving the master in place.

To use : Press DRAW copy object and address object with cursor, press c.c.b. once for each copy you want to make and now select function for which copy is to be used.

FILL CHAIN

Function : To fill closed tables. They will be filled with the color of that level.

To use : Press fill chain and touch a vector of the table with the cursor. Press c.c.b. 2x. The table will now be filled with the color of the level. A chain of tables can be made and be filled by pressing the c.c.b. 1x on each table and press it 2x on the last table. The relevant tables are displayed in pink on the CLM until the chain is finished, when they turn red.
If tables overlap or are connected, the tables in the chain will be filled intermittently. This function can also fill all the closed tables in a level through the fill chain all procedure.

MAKE OBJECT

Function : To assemble an object form several existing tables.

To use : Press make object and point with cursor to the table to be included in the object. Press c.c.b. once at every table and twice at the last table.

COPY SCENE

Function : To make a copy of a scene in order to move the copy around while leaving the original in place.

To use : Press DRAW copy scene and address scene to be copied, press c.c.b. once for each copy you want to make and select function for which you want to use the copy.

MAKE SCENE

Function : To assemble a scene from several existing objects.

To use : Press make scene and select objects to be included in the scene by pressing the c.c.b. once at every object. Finalise by pressing c.c.b. twice at the last object.

VECTORS

Function : Used to display the vectors of a splined drawing.

To use : After a vector drawing has been splined, push DRAW vectors and the vectors will be displayed with the spline. To remove the vectors, push SPLINE refresh spline.

SPIRAL

Function : To draw a spiral.

To use : Press spiral key. The ccd now reads: "set position 1"
"give number"; enter size of first radius
in mm, enter
"give number"; enter size of second radius
in mm, enter
"give number"; enter number of vectors,
enter.

UNFILL

Function : To unfill a closed table that has been filled with fill scene.

To use : Press DRAW unfill and with the cursor on one of the vectors of the table, press the c.c.b. 2x and the table will unfill. If the vectors disappear, recall them with DRAW refresh vectors.

To unfill more than one table, go to each table to be unfilled and press the c.c.b. 1x, the tables indicated will be displayed in pink on the current level monitor until the chain is closed by pressing the c.c.b. 2x on the last table when they will be displayed in red and the tables in the chain will unfill. If a chain is used on a series of closed tables that encircle one another, for example a series of outlined polygon 8's, the tables will unfill intermittently. All the filled tables in the level can be unfilled by using DRAW unfill all, DRAW refresh vectors, or SPLINES refresh splines.

REFRESH VECTORS

Function : To display only the vectors of a drawing. By pushing DRAW refresh vectors, all displays, splines, filled areas and points are removed and only the vectors remain.

To use : Push DRAW refresh vectors.

MODIFY SPIRAL

Function : Changing a spiral.

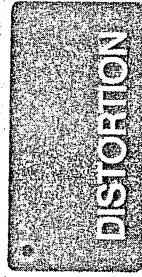
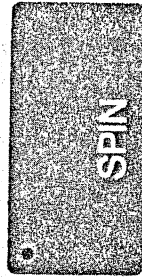
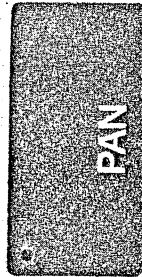
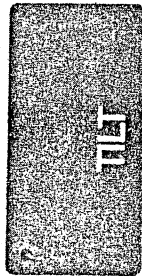
To use : Modify R1 or R2 by picking up one of the ends of the spiral with the cursor and moving it up and down.

Note: Modification of the spiral remains possible after manipulations with "move" or "dynamics" provided that the origin and both ends are kept on one line.

If the shape of the spiral was modified, the original shape will return following the use of the modify spiral function.

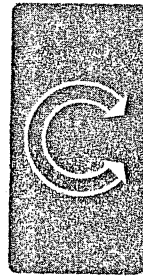
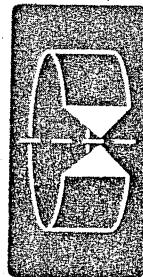
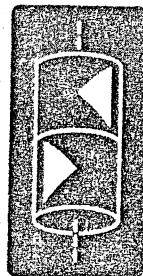
DYNAMICS

LOCAL ORIGIN



SET VIEWPOINT

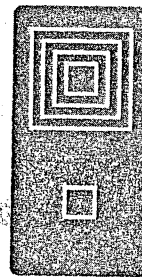
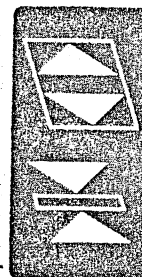
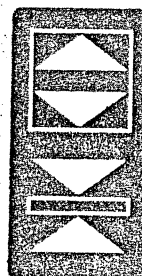
CENTER ORIGIN



POSITION ON OFF

ANGLE VIEW

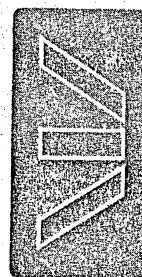
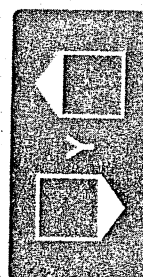
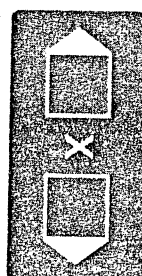
MAKE CHAIN



RESET POSITION

ON 3D OFF

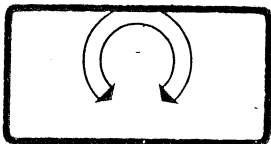
CHAIN ALL



FAST

OPTIONS

SLOW



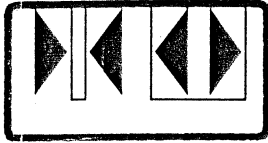
Function : To rotate tables around their local origin. The local origin of tables can be set and reset.

To use : Set the table(s) to be rotated in a chain (by using DYNAMICS make chain). Those tables in the chain will rotate counterclockwise if you push on the left side and clockwise if you push on the right side. The tables can be moved in steps by repeatedly pressing the key or continually by keeping the key depressed. The tables can be rotated either fast or slow by selecting the fast or slow function in dynamics. Rotation can also be carried out numerically. Put the desired tables in a chain, press the space key at which time the system control display will display:
zoom
Y-scale
X-scale
rotate
italic
Y-move
X-move
Distortion
Step with the space key to rotate and enter the desired degree to be rotated and push enter.

MAKE CHAIN

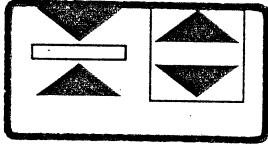
- Function : To make a temporary connection of elements, to be manipulated as a whole with dynamics functions.
- To use : Press make chain and select first table to be included in the chain with the cursor, press c.c.b. once on every table to be included, which will be displayed in pink on the CLM. Press c.c.b. twice on the last table, to close the chain. The tables in the chain are now displayed in red.
Note that dynamics functions can only applied to tables forming a closed chain. The chain can be broken by pressing make chain again or using any other function. If a table is included in a chain and has to be released, point cursor to relevant table and press c.c.b.
To manipulate all tables in the current level simultaneously, use chain all.

X-SCALE



- Function : To increase and decrease the dimension of a table(s) along the X-axis. The scaling can also be carried out numerically, measured by the degree of the magnification of the existing table.
- To use : Place the tables to be affected in a chain. Push the key on the left side to decrease the X-scale measurements and the right side to increase the X-scale measurement. To increase and decrease the scale numerically, put the desired table(s) in a chain and press the space key at which time the system control display will display:
- zoom
 - Y-scale
 - X-scale
 - rotate
 - italic
 - Y-move
 - X-move
 - Distortion
- Step with the space key to the X-scale function and enter the desired number representing the amount of times the X-scale is to be magnified. For instance 2 = 2 times and 0.5 is for half of the existing dimension and push enter.

Y-SCALE



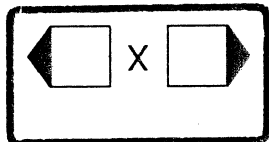
- Function : To increase or decrease the dimension of a table(s) along the Y-axis. The scaling can also be carried out numerically, measured value by the degree of magnification of the existing table.
- To use : Place the tables to be affected in a chain. Push the key on the left side to decrease the Y-scale dimension and on the right side to increase the Y-scale dimension. To increase or decrease the dimensions numerically, place the desired table(s) in a chain and press the space key at which time the system control display will display:
- zoom
 - Y-scale
 - X-scale
 - rotate
 - italic
 - Y-move
 - X-move
 - Distortion
- Step into Y-scale with the space key and enter the desired number representing the magnification factor of the tables in the chain. Example 2 = 2 times as large. 0.5 = half the size and push enter.

FAST

Function : To carry out the dynamic functions fast. The size of the steps in the dynamic functions are made larger.

To use : Press DYNAMICS fast. The led will burn and all dynamic functions will be carried out fast unless the key is turned off by pressing slow.

X-MOVE



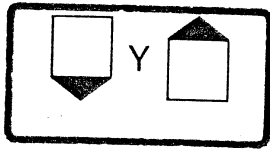
Function : To move selected table(s) along the X-axis.

To use : Place the table(s) in a chain. To move the table(s) to the right, push on the right side of the key. The movement can be performed in steps by repeatedly pushing the key or continuously on the fast or slow settings by keeping the key depressed. Tables can also be moved numerically. Place the table(s) in a chain and push the space key at which time will be displayed on the system control display:

- zoom
- Y-scale
- X-scale
- rotate
- italic
- Y-move
- X-move
- Distortion

With the space key move the blinking line to the X-move variable and enter the desired X-move in millimetres. A positive number will result in a movement to the right and a negative number to the left. Now push enter and the figures will move.

Y-MOVE



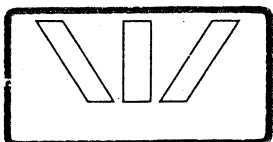
Function : To move selected tables along the Y-axis.

To use : Place the tables in a chain. To move the tables upward, push on the right side of the key and to move them downward push on the left side. The movement can be performed in steps by repeatedly pushing the key or continuously either fast or slow by keeping the key depressed. The tables can also be moved numerically. Place the tables in a chain and press the space key at which time will be displayed on the system control display:

zoom
Y-scale
X-scale
rotate
italic
Y-move
X-move
Distortion

With the space key move the blinking line to the Y-move variable and enter the desired Y-move in millimetres. A positive number will result in an upward movement and a negative number in a downward movement. Now push enter and the figures will move.

ITALICS



- Function : To "lean" tables to the right or to the left in relation to the local origin. The size of the tables as measured along the Y-axis will remain constant.
- To use : Place the selected table(s) in a chain. To lean the table over to the right, push on the right side of the key and to the left, on the left side of the key. The italic function can also be carried out numerically. A negative number is to the right of vertical and a positive figure to the left of vertical.

Set the table in a chain and press space key. Step through the functions to italic with the space bar and type in the desired angle and press enter.

SLOW

- Function : To carry out the dynamic functions slowly. The size of the steps in the dynamic functions are made smaller.
- To use : Press DYNAMICS slow. The led will burn and all dynamic functions will be carried out slowly unless the key is turned off by pressing fast.

FRAME BUFFERS

SELECT A

SELECT B

LOAD/DISPLAY
MENU

RESET

SHIFT

ZOOM

PAINT

AIRBRUSH

FLOW

SMUDGE

WASH

COPY

BRUSH
SIZE

BOX

PATTERN

EDIT

CUT-OUT

OPTIONS

+
BRIGHTNESS

+
SATURATION

+
ROTATE

-
BRIGHTNESS

-
SATURATION

-
ROTATE

SELECT A

Function : Call up the menu to load the frame buffer.

To use : Press select A. The SCD now shows the load menu:

- all level colours
- non black level colours
- black in level colours
- camera
- camera in filled areas
- camera outside filled areas

SELECT B

Function : Call up the menu to load the frame buffer.

To use : Press select B. The SCD now shows the background menu:

- level colour
- camera

Select your choice with the cursor and press c.c.b.

LOAD/DISPLAY MENU

Function : Call up the display menu.

To use : Press Load/Display menu. The menu now appears on the SCD and shows what can be displayed:

- levelcolours
- levelcolours + camera (in filled areas)
- levelcolours + camera (outside filled areas)
- camera
- framebuffer
- framebuffer + levelcolour
- framebuffer + camera (in filled areas)
- framebuffer + camera (outside filled areas)

Select the mode you want to display by moving the cursor and pressing the ccb when the cursor reflects our choice.

MEASURE COLOUR

Function : To measure the colours in the framebuffer.

To use : Press MEASURE colour. The ccd will show the following scheme:

pixels		
x	y	rgb
xxx	xxx	000

The multilevel monitor shows a blinking cursor which should be moved to the area that we want to measure. After pressing the ccb we see

?

RESET

Function : To reset the framebuffer.

To use : Press reset. Framebuffer, shift x and y are now set at 0; zoom x and y are set 1.

ZOOM

Function : Magnify the image (x and y simultaneously, up to 512 times (one pixel will than fill the screen)).

To use : Press zoom. The SCD will show that the zoom frame value is 1.00. By pressing the c.c.b. and moving the cursor control (up and down the bitpad) we can zoom.

PAINT

Function : To select the paint (modify) framebuffer menu.

To use : Press paint. The ccd now shows the menu:

- paint
- wash
- pixel copy
- brush 10
- saturation 10
- brightness 10
- brushsize 20

Choose the requested mode with the cursor and press the c.c.b. Activate the selected mode by pressing the airbrush key.

Paint: choose color with the cursor and press c.c.b. A cursor now appears on the multi-level monitor. We can start painting by pressing the c.c.b. again. The size of the brush can be set with "brush size".

Wash : after selection and activation, the edges between two parts of an image can be softened by washing the colours of the adjoining pixels into each other. To wash, keep ccb pressed and move cursor over the edges.

Brush: after selection and activation, a color can be chosen. When we keep the ccb pressed, the color is sprayed on the image. We use the same effects as real paint: moving fast will give a thin mist of paint, moving slow will give a more solid paint. The number behind "brush" indicates the amount of paing sprayed.

BOX

Function : Blockgenerator for the frame buffer, including a "digital" effect in the image.

To use : Press Box; 5; enter. The cdd now says:

Blockgenerator

blocks horizontal (16 - 256):

blocks vertical (16 - 256):

Fill in the number of blocks requested.

The result is displayed on the multi-level monitor.

EDIT

Function : Send a framebuffer file to disk.

To use : Press edit; the color data display now reads: "geef drempel: -", enter 0. CDD reads "give filename" "-", enter filename (last letter F) During the procedure of writing the file to disk, the bottom of the cdd shows the image line number, from 0 to 511. If this is finished, the file is stored on disk.

OPTION

Function : Using the zoom function independently for x and y.

To use : Press option; the scd shows "zoom frame x:1.00, y:1.00". Press ccb and move cursor and move cursor control in x-direction for x-zoom and in y direction for y-zoom.

GRIDS

DEFINE
GRID

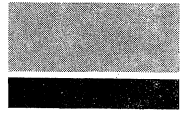
DEFINE
GRAVITY

OPTIONS

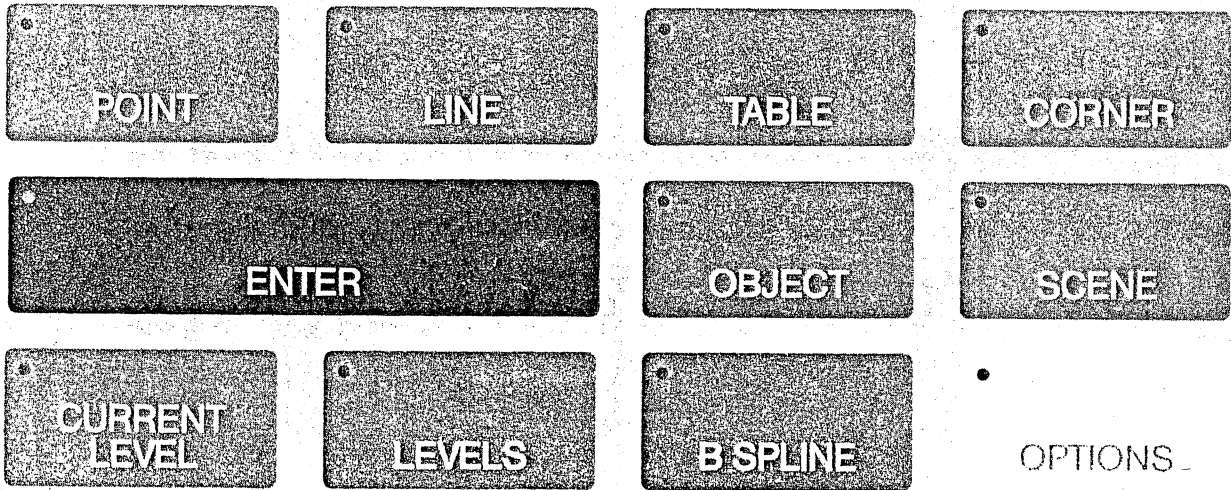
DEFINE GRID

Function : Gives all cursor functions "gravity" to a grid, the size of which can be defined. Works only if the key "gravity on" has been selected.

To use : Push GRIDS define grid, type in desired grid factor and enter. On the hard disk is a collection of standard grids that correspond with the "default scalefactor" and the 512 x 512 pixel structure of the multi-level monitor. When using the "default scale factor", each pixel is 2 mm.
The standard grids on the hard disk are: G8 - G10 - G12 - G14 - G16 - G18 - G20 - G22 - G24 - G26 - G28 - G30 - G40.
For example, a G20 is a grid pattern of 20 mm x 20 mm or 10 x 10 pixels. If you call from hard disk the G20 grid pattern and define the grid with a value of 20, then the grid lines will line up with the gravity lines. The cursor will now gravitate towards the crosspoints of the grid pattern. The grid pattern, when called up from disk, appears in levels 1 and 2. The pattern itself is in level 1 and in level 2 are 2 lines designating the middle of lines of the grid, 10 x 10, use this pattern to define the scale of the grid.



KILL



POINT

Function : To kill an existing point of a table.

To use : Push KILL point. Go to the selected point with the cursor and press the c.c.b.. The point will be killed and in the case where the point is in between 2 other points, a line will be drawn between the two remaining points. If the point is an end-point, the vector that connected the point will disappear. It is helpful to display before you kill points.

LINE

Function : To kill a line of a table.

To use : Push KILL line and with the cursor go to any location on the selected line and push c.c.b.

TABLE

Function : To kill all of the vectors that make up a table.

To use : Push KILL table and with the cursor select the table to be killed and press the c.c.b.

CORNER

Function : To kill a corner that has been previously set with the DRAW corners function.

To use : Push KILL corner and go with the cursor to the corner to be killed and press the c.c.b. A normal point will remain.

OBJECT

Function : To remove a previously assembled object.

To use : Press KILL object and address object to be removed with cursor and press c.c.b. The object will now disappear from the display and is removed from the system.

SCENE

Function : To remove a previously assembled scene.

To use : Press KILL scene and address scene to be killed with cursor and press c.c.b. The scene shall now disappear from the display and is removed from the system.

CURRENT LEVEL

Function : To kill all points, vectors and tables in the current level.

To use : Push KILL current level and then enter.

LEVELS

Function : To kill all the information in all 64 levels.

To use : Press KILL levels and press enter.

B-SPLINE

Function : To kill a spline through selection by the cursor while keeping the base vectors.

To use : Push KILL B-spline and enter. Go with the cursor to one of the points of the vector drawing and press the c.c.b. The vector drawing will again be displayed.

— LEVELS —

«
STEP

»
STEP

GET LEVEL

SET LEVEL

INSERT

•
OPTIONS

DELETE

ENTER

STEP >> OR <<

- Function : To step through the levels quickly. The information in the levels that you pass are displayed on the current level monitor. The leds of the levels in the level bar will light up in the corresponding levels.
- To use : To go from level to level, push and release the key LEVELS step >> or LEVELS step <<. To move continuously through the levels, keep the key depressed on either side. The stepping speed is reduced if the window monitor is on.

SET LEVEL

- Function : To send tables in the current level to another selected level.
- To use : Press LEVELS set level and the system control display will ask for a number. Type in the number of the desired level and push enter at which time a cursor will appear on the multi-level monitor and the current level monitor. Select the table or tables to be set in the other level by pressing the c.c.b. The tables will disappear from the current level monitor and are to be found if you go to the selected level.

ENTER

- Function : To enter functions where a clear verification is necessary.
- To use : When the enter leds are burning, push enter.

MEASURE

POINT TO
POINT

POINT TO
LINE

POINT TO
CIRCLE

POINT TO
SPLINE

LINE LENGTH

CIRCLE

SURFACE

VOLUME

ANGLE

COLOR

BOX SIZE

DEFINE SCALE

SPACE

CANCEL

OPTIONS

ENTER

SET LOCAL
ORIGIN

SET CENTER
ORIGIN

1 2 3
4 5 6
7 8 9
- 0 .

POINT TO POINT

Function : With this function you can measure the following: The vertical distance, the horizontal distance, the direct (shortest) distance between the two measured points and the angle of the shortest distance. The measurements are defined by the sequence in which you set the points. With this function the distance between two points can also be set to the desired distance.

To use : Push MEASURE point to point. There will appear a small 0 in the middle of the screen in the colour of the level in the multi-colour level and in red in the current level monitor. The first measurement will be an absolute measurement. The distance as measured from the middle of the screen. With the cursor, select the second point and push the c.c.b.. The point will be marked by a small 0. On the system control display, the following values will be displayed:
(the first reading gives out the measurements referring to the middle of the screen)

1. the x-axis difference between A and B;
horizontal distance.
2. the y-axis difference between A and B;
vertical distance.
3. the length of the line;
the shortest or direct distance.
4. the angle of the line as measured from
point A to point B.

It is a repeating function, thus you can proceed to the next point and again push the c.c.b. to get the reading.

In order to adjust the difference between two points, push MEASURE point to point and select with the cursor the two points to be set. The first measuringpoint will always be in the middle of the screen. The two points indicated will be marked by small zeros. The second point selected will be adjusted and the first point will remain stationary. Using the space bar or the c.c.b., move through the menu to the desired variable which is identified by a blinking line and press the desired figures and push enter at which time the point will be moved and at the same time the adjusted figure will be displayed on the system control display. As soon as you move your cursor towards the variable that you want to adjust, the affected vectors will be displayed red in the current level monitor.

Note: If you have typed in a new value for one of the variables and you wish to cancel this change, step back with the backspace and type in the original value.

SURFACE

Function : The surface area of a table is displayed in cm² on the system control display.

To use : Push MEASURE surface and go to the closed table(s) that you would like measured. Indicate the table by pushing the c.c.b. while the cursor is on a vector. If you would like only one table measured then push c.c.b. and the area will be displayed in cm² on the system control display. To measure more than one table, push c.c.b. 1x on any table to be measured and 2x on the last table to get a combined surface area. If there is a closed table enclosed by another closed table, by selecting first the outer one and than twice the inner one with the c.c.b., you get the surface of the outer one minus the inner one.

VOLUME

Function : To measure the column of a table that has been rotated round the y-axis 350 degrees in cm³.

To use : In order to make the volume function available, the end points of a table must be on the axis of the Y-mirror. An easy way to set this is to set the Y-clip and fix it. Then push volume and the volume will be displayed in the system control display. The function can be used with or without the X- and Y-mirrors on. The result is the volume of a body that would arise if your measured drawing was cylindered around the y-axis. This function can be used when designing bottles.

DEFINE SCALE

Function : To set the desired scale of a drawing for the purpose of plotting it the proper size or to work in a convenient size. The scale of a drawing can also be adjusted when setting up the plotter.

To use : Push MEASURE define scale and with the cursor indicate the line that you would like defined and press the c.c.b.
The system control display will ask for a number and enter, for example 70 mm. If plotted on a 1 to 1 scale, the line will be plotted at 70 mm or 7 cm.

Note: Be sure there are no midpoints in the selected line for your defined scale will reflect only on the part of the line that you have selected.

SPACE

Function : Used to move one position further on the system control display. Used in conjunction with dynamics, measuring, move line, the plotter and test. Also used to transport certain functions from the manual control to the numerical control. (dynamics, outline, move line).

To use : Dynamics - to move through menu;
Measuring - to move through values;
Line - to keep the angles stationary while moving a line;
Plotter - to move through menu;
Test - to move through menu;
Outline - to prompt the outline in a numerical way.

CANCEL

Function : Cancel has the function of the backspace when typing in data or numbers.

To use : After unintended information has been typed in, use cancel to back out the information letter by letter.

SET LOCAL ORIGIN

Function : With this function, the location of the rotation point can be changed. When a local origin has been set for a table, the local origin will move with the table.

To use : Press MEASURE set local origin. Go to the table(s) to be set and select them by pressing once on the c.c.b. while the cursor is on a vector. The tables will light up in pink on the current level monitor. At the last table to be set, push the c.c.b. 2x while on a vector and the cursor will become a cross, move the cursor to the desired location and set the local origin by pushing the c.c.b.. The origin will not be visible. To make it visible, use DISPLAY origin.

SET CENTER ORIGIN

Function : To set the local origin (or rotation centre) of a table or group of tables in the middle of the screen.

To use : Press set center origin and identify tables with the cursor, press c.c.b. at each table which will be displayed in pink. Press c.c.b. twice at the last table, after which the tables are displayed in blue. Check with DISPLAY origin.

Note: in this function, a line should not be taken up by its end.

┌── MIRRORS ──┐
SET RESET

X MIRROR

X MIRROR

Y MIRROR

Y MIRROR

X CLIP

X CLIP

Y CLIP

Y CLIP

FIX

•
OPTIONS

SET X-MIRROR

Function : To turn on the X-mirror which goes horizontal through the middle of the screen. Everything that is drawn above or below the x-axis is mirrored by the x-axis to the other side. The points and lines that are mirrored cannot be affected by the cursor until they are fixed. When fix is pushed, the mirrored image is fixed.

To use : Push on MIRRORS set and proceed with drawing, can be used with X- or Y-clip. Can draw with the mirrors on, or can first draw a figure above or below the x-axis and then turn on the mirror.

RESET X-MIRROR

Function : To turn off the X-mirror. If the reflected figures are not fixed, they will be removed from the screen.

To use : Push reset X-mirror, immediately resets.

SET Y-MIRROR

Function : Everything you draw on the left or on the right of the y-axis, will be mirrored by the y-axis to the other side.

To use : Push on set Y-mirror and proceed with a point to drawing. Can draw with the mirrors on or a figure can be drawn and then mirrored. To fix the drawings, push fix. Can be used in conjunction with the X- or Y-clip.

RESET Y-MIRROR

Function : To turn off the Y-mirror. If the reflected figures are not fixed, they will be removed from the screen.

To use : Push reset Y-mirror, immediately resets.

SET X-CLIP

Function : To set a blockage or clip along the x-axis. The meaning of the X-clip function is, that you cannot draw through the x-axis with the cursor. You can only draw below the x-axis. The lines, which are drawn from point to point, stop exactly on the x-axis.

To use : To illustrate drawing. Draw a polygon 4 and move to the lower left side of the screen with MOVE table. Turn on the X- and Y-mirrors. With the X clip set, using move table, try to move the original figure above the x-axis. The clip can also be used without the mirrors and the upper half of the screen is clipped.

RESET X-CLIP

Function : To cancel or turn off the blockage of the x-axis. While the mirrors are functioning, the X-clip can be turned off.

To use : Press reset X-clip, immediately resets. You can now draw through the x-axis.

SET Y-CLIP

Function : To set up a clip or blockage of the y-axis.

To use : To illustrate drawing. Draw a polygon 4 and move to the lower left side of the screen with move table. Turn on the X- and Y-mirrors. With the Y clip set, using MOVE table, try to move the original figure to the other side of the y-axis. The clip can also be used without the mirrors and the right side of the screen is clipped.

RESET Y-CLIP

Function : To cancel or turn off the blockage of the y-axis. While the mirrors are functioning, the Y-clip can be turned off.

To use : Press reset Y-clip, immediately resets. You can now draw through the y-axis.

FIX

Function : To fix the reflected images. Until a mirrored figure is fixed, it cannot be identified by the cursor or manipulated or stored as information by the computer.

To use : Push MIRRORS fix and all the mirrors will be reset and the mirrored figures are now fixed "real".



MOVE

POINT

LINE

TABLE

OBJECT

SCENE

COPY + MOVE

POINT
ON LINE

LINE LENGTH

GRAVITY ON

GRAVITY OFF

ALL

•
OPTIONS

POINT

- Function : To move one point of the table independent from the other points.
- To use : Go with the cursor to one of the points of the table. Press the c.c.b. and move the cursor over the bitpad while keeping the c.c.b. depressed. The point will be taken along with the cursor and at the same time remains connected to the table. On the current level monitor the points and the two adjoining lines are colored red. When you release the c.c.b. the point and the two lines are fixed on the place where they are at that moment. The whole table is now again colored blue.

LINE

- Function : 1. The line can be moved and the attached vectors follow. The line stays parallel with its original position.
2. The line can be moved parallel and the angle of the attached vectors remain the same.
- To use : Select with the cursor the line to be moved and push the c.c.b.. The line and the attached vectors that will be effected by the movement of the line will be displayed in red on the current level monitor. While keeping the c.c.b. depressed, move the line by moving the cursor control over the bitpad. To set the line, release the c.c.b. at which time the table will again be displayed in blue on the current level monitor. To move a line without effecting the angels of the connected lines, push MOVE line and then space. Select the line with the cursor and push the c.c.b. The line and the attached vectors will be displayed in red on the current level monitor. Move the line by moving the cursor control over the bitpad. The line will stay parallel with its original position. The line will be set when the c.c.b. is released. The line and the attached vectors will be displayed in red on the current level monitor.

TABLE

Function : To move only one table.

To use : Push MOVE table. Select with the cursor one of the tables and press the c.c.b. while on a vector of the table. Move the cursor over the bitpad, while keeping the c.c.b. depressed. On the current level monitor the table is displayed in red; it can be moved over the screen in any direction. As soon as you release the c.c.b., the table will be fixed. It has now again a blue colour.

Note: The cursor should be on one of the vectors.

OBJECT

Function : To move an entire configuration, previously assembled as an object.

To use : Press the MOVE object key and address object to be moved with cursor and than use cursor control to move object.

SCENE

Function : To move an entire configuration, previously assembled as a scene.

To use : Press the MOVE scene key and address relevant scene with cursor. Use now the cursor control to move the scene.

COPY+MOVE

Function : To copy and move a table without changing the form.

To use : With the cursor, select the table to be copied and moved and push the c.c.b. while the cursor is on one of the vectors. A copy is immediately produced which can be moved by moving the cursor control over the bitpad while the c.c.b. is depressed. The copy will be displayed in red on the current level monitor. To set the copy, release the c.c.b. A copy can again be copied. As it is a repeating function a number of copies can be made without having to repeatedly push on MOVE copy+move.

POINT ON LINE

Function : Allows a point to be moved between two points without disturbing the line. The point cannot be moved off of the line.

To use : Can use an existing point or create a new point on a line by using midpoint. Press MOVE point on line and go to the point with the cursor and press the c.c.b. and move the point along the line by moving the cursor control.

LINE LENGTH

Function : With the dynamics zoom function, the line length can be lengthened or shortened while the midpoint of the line remains in the same location.

To use : Press MOVE line length and select with the cursor the line to be lengthened or shortened and press the c.c.b. at which time the line and the attached vectors will be displayed in red on the current level monitor indicating that the line is in the chain mode. With the DYNAMICS zoom function, the line length will be lengthened or shortened.

GRAVITY ON

Function : To create a gravitational pull towards exact vertical and horizontal when drawing with the DRAW point to and MOVE point(s). When working with draw, point to, the cursor gravitates to the starting point of a table. When a table is closed this way, it will automatically be connected.

To use : Push the MOVE gravity on key. It will remain on until it is turned off.

GRAVITY OFF

Function : To turn off the gravity function.

To use : Push the gravity off key.

ALL

Function : The selection of all elements in a level is used in conjunction with the following functions:

1. splicing connect all: to connect all open end points of tables in a level that have been placed very close to each other (or are overlapping);
2. Move table all: to move all the table in a level at once;
3. Chain all: to put all the tables in one level in a chain mode. There is a separate key for this function in the group dynamics;
4. Set local origin, all: to set the local origin of all of the tables in a level to the desired location;
5. Reset local origin, all: to reset the local origin of all of the tables in a level to the middle of the screen;
6. Fill scene all: to fill all closed tables in a level.

- To use
- : 1. Place the end points of the tables that are to be connected very close to each other and press connect all. Those points that are affected will "jump" to one another.
 2. Press move table all and with the cursor placed wherever you like, press the c.c.b. and move the tables by moving the cursor control over the bitpad.
 3. Push chain all and all the tables in the current level will be set in the chain mode and be displayed in red on the current level monitor. Can also use the chain all key in the dynamics group.
 4. Press set local origin, all and the cursor will immediately become a cross, move the cursor by moving the cursor control over the bitpad and set the local origin for all the tables by pressing the c.c.b. To display the origin, press display origin and select the desired tables.
 5. Press set center origin and the local origin for all tables in the current level will be set to the middle of the screen.
 6. Press fill screen all and all tables in the current level that are closed will be filled.

OPTION

1

2

3

4

5

6

7

8

9

10

OPTION

Function : 1. To set the clock;

To use : 1. Press option key 1, date and time appears on the disk screen. Use library page key to select data and time. Use library step key to update date and time.

PLOTTER

STOP

CONTINUE

RESTART

KILL

TEST

TABLE AS VECTORS

TABLE AS SPLINES

TABLE AS FILL

SETUP PLOTTER

LEVEL AS VECTORS

LEVEL AS SPLINES

LEVEL AS FILL

SETUP FORMAT

ALL AS VECTORS

ALL AS SPLINES

ALL AS FILL

DEFINE START POINT

VECTORS NO H.LINES

SPLINES NO H.LINES

FILL NO H.LINES

PAPER FORMAT

PLOTTER 1

PLOTTER 2

OPTIONS

STOP

Function : To stop the current plot.

To use : Press stop then enter. The plot will stop after a few seconds and the pen returns to the carousel.

CONTINUE

Function : To continue the current plot if it has been stopped using the stop function.

To use : Press continue then enter. The pen will be retrieved from the holder and the plot will continue from the point at which it was stopped.

RESTART

Function : To restart the current plot if it has been stopped using the stop function.

To use : Press restart then enter. The current plot will be restarted from the beginning.

KILL

Function : To kill the current plot.

To use : Press kill then enter. After a few second the pen will be returned to the holder.

TEST

Function : To display a list of variables associated with each fill.

To use : Press test. The following list of variables will be displayed on the data display monitor.

Variable	Value after power on or reset	Description
Offset from start	0	A number greater or equal than/to zero that defines the distance in millimetres from the top of the figure at which the fill begins.
Number of lines	1	A number greater than zero that defines the number of lines in a repeating group of parallel lines which is used to fill.
Line separation	0.7	A number greater than zero that defines the separation of the lines in millimetres within the repeating group.
Skip distance	0.7	A number that must be greater than zero that defines the distance in millimetres between the repeating groups.
Blob factor	0.7	A number greater than 0 that defines the distance in millimetres from the outline at which the fill begins.
Hatching angle	0	A number that defines the angle in degrees at which the groups of lines are drawn. The angle is measured counterclockwise from the positive X-axis.

Variable	Value after power on or reset	description
Outline	yes	<p>For example: to fill horizontally, use 0, to fill vertically, use 90.</p> <p>Defines whether or not the outline is drawn before filling.</p>

If an outline is required, move through the list using the space bar to the appropriate line, which is identified by a blinking line, and type the letter y or Y. If an outline is not required, move through the list using the space bar to the appropriate line, which is identified by a blinking line, and type the letter n or N. To modify any of the other variables, move through the list using the space bar to the desired variable, which is identified by a blinking line. Next type in the desired variable and push enter.

Note: If you have typed in a new value for one of the variables and you wish to cancel this change, step back using the cancel or backspace key and type in the original value.

Note: To fill completely, use the following variables:

```

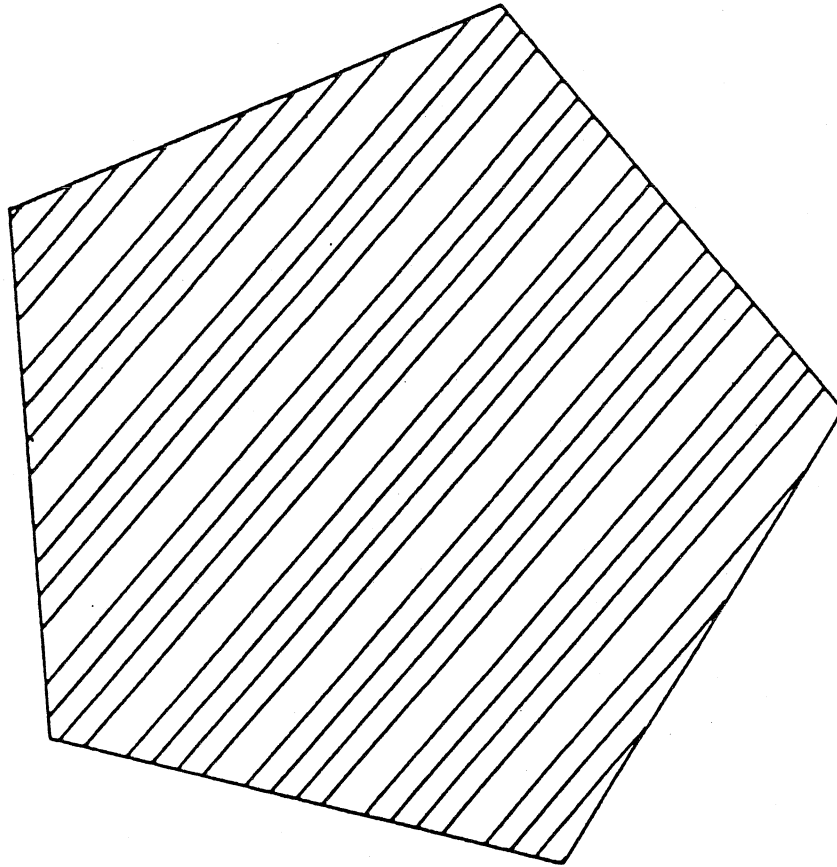
Offset from start: 0
Number of lines   : 1
Line separation   : the current pen width
Skip distance     : the current pen width
Bob factor        : the current pen width
Hatching angle   : 0
Outline           : yes.
```

To exit this function, press another function key.



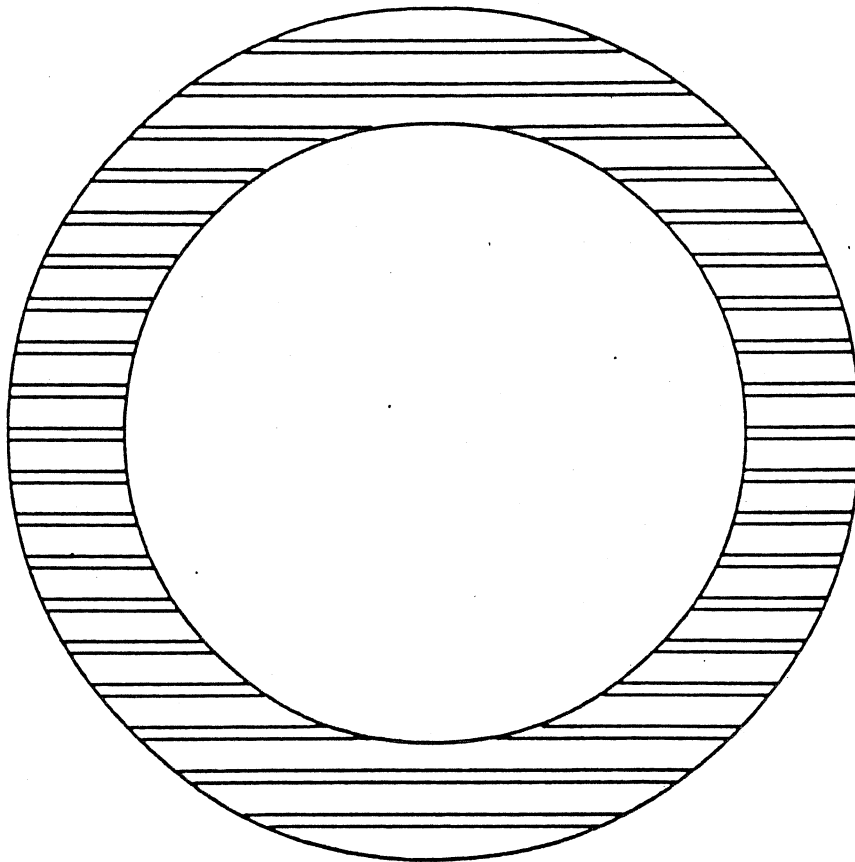
In the following example, the variables were as follows:

Offset from start: 0.00
Number of lines : 4
Line separation : 3.00
Skip distance : 5.00
Blob factor : 0.3
Hatching angle : 45
Outline : yes.



In the following example the variables are as follows.

Offset from start: 4.00
Number of lines : 2
Line separation : 1.50
Skip distance : 4.00
Blob factor : 0.30
Hatching : 0
Outline : yes.



In the following example the variables are as follows:

Offset from start: 0.00
Number of lines : 1
Line separation : 0.30
Skip distance : 0.30
Blob factor : 0.30
Hatching angle : 0
Outline : yes.

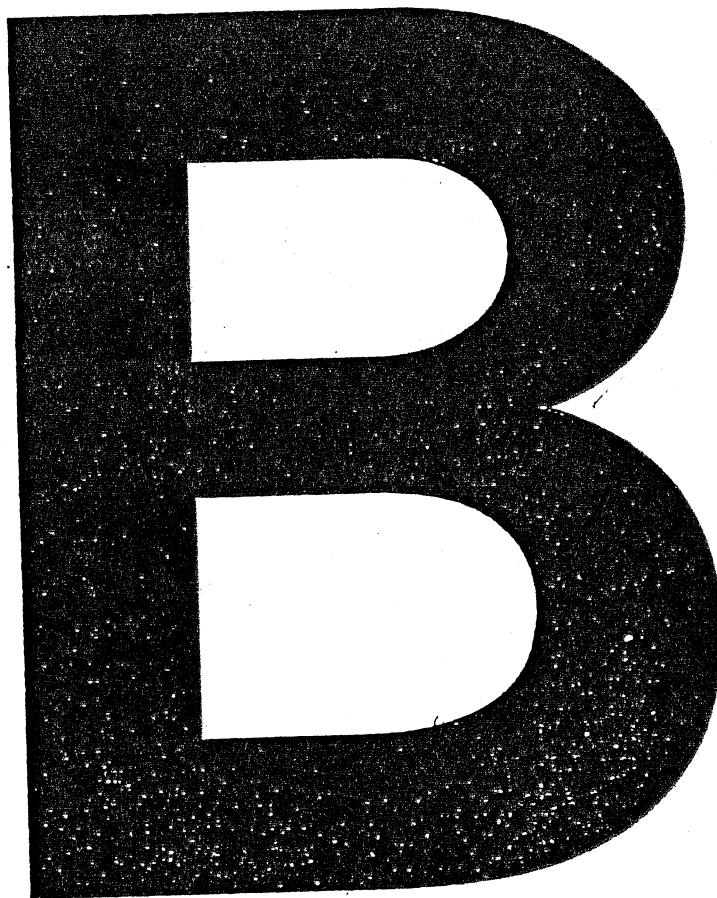


TABLE AS VECTORS

Function : To plot one or more tables from the current level as vectors.

To use : Press table as vectors. Select one table with the cursor, press the c.c.b. 2x or make a chain by pressing the c.c.b. 1x while on a vector of each table and twice on a vector of the last. The list of variables defined by the set up plotter function will then appear on the system control display. If these variables are O.K., press enter key: the system then tries to send the data to the plotter. If the system is not ready to plot, the message "system not ready to plot - job aborted, done" appears on the system control display and the data is not sent. If the plotter is not ready, the message: "plotter not ready - job aborted, done" appears on the system control display and the data is not sent. Otherwise the message "done" appears on the system control display and the data is sent to the plotter. If these variables are not O.K., press another function key.

TABLE AS SPLINES

Function : To plot one or more tables from the current level as splines.

To use : Press table as splines. Select one table with the cursor, press the c.c.b. 2x or make a chain by pressing the c.c.b. 1x while on a vector of each table and 2x on a vector of the last. The list of variables defined by the set up plotter function will then appear on the system control display. If these variables are O.K., press enter: the system then tries to send the data to the plotter. If the system is not ready to plot, the message "system not ready to plot - job aborted, done" appears on the system control display and the data is not sent. If the plotter is not ready, the message "plotter not ready - job aborted, done" appears on the system control display. The data is not sent. Otherwise the message "done" appears on the system control display and the data is sent to the plotter. If these variables are not O.K., press another function key.

TABLE AS FILL

- Function : To plot one or more tables from the current level as filled in the multi-level monitor.
- To use : Press table as fill. Select one table with the cursor, press the c.c.b. 2x or make a chain by pressing the c.c.b. 1x while on a vector of each table and 2x on a vector of the last. The list of variables defined by the set up plotter function, followed by the list of variables defined by the test function will then appear on the system control display. If these variables are O.K., press enter: the system then tries to send the data to the plotter. If the system is not ready to plot, the message "system not ready to plot - job aborted, done" appears on the system control display and the data is not sent. If the plotter is not ready, the message "plotter not ready - job aborted, done" appears on the system control display and the data is not sent. Otherwise the message "done" appears on the system control display and the data is sent to the plotter. If these variables are not O.K., press another function key.

SET UP PLOTTER

- Function : To display a list of variables associated with each plot.
- To use : Press set up plotter. The following list of variables will be displayed on the system control display .

Variable	Value after power on or reset	Description
Plot scale factor 1	1	A number defining the ratio to full size at which the data is plotted. For example: if this number is 2 the data is plotted at half size. If this number is 3 the data is plotted at one third size.
Plot x origin	0	This number defines the horizontal distance in millimetres from the centre of the paper which is used as the origin for the plot. Numbers greater than zero are to the right of the centre of the paper. Numbers less than zero are to the left of the centre of the paper.
Plot y origin	0	This number defines the vertical distance in millimetres from the centre of the paper which is used as the origin for the plot. Numbers greater than zero are above the centre of the paper. Numbers less than zero are below the centre of the paper.
Pen number	1	A number from 0 to 8 that selects the pen from the pen holder.
Pen speed	60	A number greater than 0 that defines the speed of the pen in centimetres per second. If this number is greater than the maximum speed for the current pen type, the maximum speed is used without affecting this value. For each pen type the maximum speeds are: Fibre tip : 50 cm/s Roller-ball: 60 cm/s Drafting : 15 cm/s

To modify any of these variables, move through the list using the space bar to the desired variable, which is identified by a blinking line. Type in the desired variable and push enter.

Note: If you have typed in a new value for one of the variables and you wish to cancel this change, step back using the cancel or backspace key and type in the original value. To exit this function, press another function key.

LEVEL AS VECTORS

Function : To plot the current level as vectors.

To use : Press level as vectors. The list of variables defined by the set up plotter function will then appear on the system control display. If these variables are O.K., press an enter key: the system then tries to send the data to the plotter. If the system is not ready to plot, the message "system is not ready to plot - job aborted, done" appears on the system control display and the data is not sent. If the plotter is not ready, the message "plotter not ready - job aborted, done" appears on the system control display and the data is not sent. Otherwise the message "done" appears on the system control display and the data is sent to the plotter. If these variables are not O.K., press another function key.

LEVEL AS SPLINES

Function : To plot the current level as splines.

To use : Press level as splines. The list of variables defined by the set up plotter function will then appear on the system control display. If these variables are O.K., press enter: the system then tries to send the data to the plotter. If the system is not ready to plot, the message "system not ready to plot - job aborted, done" appears on the system control display and the data is not sent. If the plotter is not ready, the message "plotter not ready - job aborted, done" appears on the system control display and the data is not sent. Otherwise the message "done" appears on the system control display and the data is sent to the plotter. If these variables are not O.K., press another function key.

LEVEL AS FILL

Function : To plot the current level as filled on the multi-level monitor.

To use : Press level as fill. The list of variables defined by the set up plotter function, followed by the list of variables defined by the hatching function will then appear on the system control display. If these variables are O.K., press enter: the system then tries to send the data to the plotter. If the system is not ready to plot, the message "system not ready to plot - job aborted, done" appears on the system control display and the data is not sent. If the plotter is not ready, the message "plotter not ready - job aborted, done" appears on the system control display and the data is not sent. Otherwise the message "done" appears on the system control display and the data is sent to the plotter. If these variables are not O.K., press another function key.

ALL AS VECTORS

Function : To plot all the levels as vectors.

To use : Press all as vectors. The list of variables defined by the set up plotter function will then appear on the system control display. If these variables are O.K., press enter. The system then tries to send the data to the plotter. If the system is not ready to plot, the message "system not ready to plot - job aborted, done" appears on the system control display and the data is not sent. If the plotter is not ready, the message "plotter not ready - job aborted, done" appears on the system control display and the data is not sent. Otherwise the message "done" appears on the system control display and the data is sent to the plotter. If these variables are not O.K., press another function key.

ALL AS SPLINES

Function : To plot all the levels as splines.

To use : Press all as splines. The list of variables defined by the set up plotter function will then appear on the system control display. If these variables are O.K., press enter: the system then tries to send the data to the plotter. If the system is not ready to plot, the message "system not ready to plot - job aborted, done" appears on the system control display and the data is not sent. If the plotter is not ready, the message "plotter not ready - job aborted, done" appears on the system control display and the data is not sent. Otherwise the message "done" appears on the system control display and the data is sent to the plotter. If these variables are not O.K., press another function key.

ALL AS FILL

Function : To plot all the levels as filled on the multi-level monitor.

To use : Press all as fill. The list of variables defined by the set up plotter function, followed by the list of variables defined by the test function will then appear on the system control display. If these variables are O.K., press enter: the system then tries to send the data to the plotter. If the system is not ready to plot, the message "system not ready to plot - job aborted, done" appears on the system control display and the data is not sent. If the plotter is not ready, the message "plotter not ready - job aborted, done" appears on the system control display and the data is not sent. Otherwise the message "done" appears on the system control display and the data is sent to the plotter. If these variables are not O.K., press another function key.

PLOTTER 1

Function : To select plotter 1.

To use : Press plotter 1.

PLOTTER 2

Function : To select plotter 2.

To use : Press plotter 2.

POSITION

FROM DISK TO TABLE	SET POSITION	RESET POSITION
TABLE ON POINT	TABLE ON VECTOR	TABLE ON GRID
OBJECT ON POINT	OBJECT ON VECTOR	OBJECT ON GRID
SCENE ON POINT	SCENE ON VECTOR	SCENE ON GRID

OPTIONS

FROM DISK TO TABLE

Function : To identify a table, on each line of which you can then position a file which is automatically based on the middle of the segment.

To use : Press from disk to table.
: Adress table with cursor.
: s.c.m. now requests filename to be entered.
: Enter file name, file is now positioned first line of table and s.c.m. requests file name to be entered for second regiment

SET POSITION

Function : To identify a table (master), which can be copied or "cloned" on every coordinate of another identified table (position table).

To use : Press set position.
: s.c.m. requests to identify to be cloned.
: Adress table to be cloned with cursor.
: Select position table for clone, press c.c.b. and clones appear.
: If you want to repeat cloning on another position table, address master to be cloned again and select new position table.

RESET POSITION

Function : To remove "the clones" as established under set position.

To use : Press reset position and address master with cursor control. Press the c.c.b. and clones will disappear from the display.

SPLICING

SAME X POINTS	SAME Y POINTS	CUT	CONNECT
SAME X TABLES	SAME Y TABLES	CUT-OUT LINE	CONNECT POINTS
SAME X OBJECTS	SAME Y OBJECTS	CUT BY LINE	CONNECT BY LINE
SAME X SCENES	SAME Y SCENES	CUT BY TABLE	CONNECT TABLES
SAME ANGLE LINE	SAME ANGLE TABLE	CUT BY OBJECT	CONNECT OBJECTS
SAME ANGLE OBJECT	SAME ANGLE SCENE	CUT BY SCENE	CONNECT SCENES
		CONNECT INTERSECT	OPTIONS

SAME X POINTS

Function : To give two points the same X-value as measured on the X-axis. The lines attached to the points will move along. The points will be displayed one on top of the other.

To use : Go to a reference point with the cursor and select it by pressing the c.c.b.

A small zero will mark the point. Go to the point to be moved and press the c.c.b. at which time the point will move to the same point along the x-axis. The zero will disappear once the function is carried out. Same x points is a repeating function. If the function is used on two points that already have the same value along the X-scale, there will be no visible change. However, the function has been carried out and thus same x points must be pushed again to set the following reference point.

SAME Y POINTS

Function : To give two points the same as measured on the Y-axis. The lines attached to the points will move along. The points will be displayed next to each other.

To use : Go to a reference point with the cursor and select it by pressing the c.c.b.

A small zero will mark the point. Go to the point to be moved and press the c.c.b. at which time the point will move to the same point along the y-axis. The zero will disappear once the function is carried out. Same y points is a repeating function. If the function is used on two points that already have the same value along the Y-scale, there will be no visible change. However, the function has been carried out and thus same y points must be pushed again to set the following reference point.

CUT

Function : To cut or break a line with the cursor in any selected place.

To use : Push cut and place the cursor upon a vector of a table and push the c.c.b. At this point a small cross will be displayed red on the current level monitor and in the color of the level on the multi-level monitor. The cross can be moved over the line by keeping the c.c.b. depressed. When the cutting location has been selected, release the c.c.b., the line is now broken. To remove the cutting crosses from the screen, push refresh vectors. As it is a repeating function, you can go from one place to another without having to push the cut key repeatedly. note: Cut only works on vectors, therefore a spline can not be cut.

CONNECT

Function : To connect two open end points that are located close to each other to make one point.

To use : Move the two end points of the vectors that you want to be connected close to each other (use MOVE points, line, table, eventually in combination with window). Press connect. Bring the cursor to the place that has to be connected and touch the sector close to the connection point. The end point of the vector will jump to the vector that has been touched and the two vectors are connected. To check if the two points have connected, use the chain function. Press MOVE chain and with the cursor go to the table wherein the points have been connected and press the c.c.b.. The table will be shown in pink as a whole on the current level monitor. To cancel the chain function, push again on chain. It is a repeating function, you can move directly to the next point to be connected with pushing again on connect. To check if a closed table is connected all around, you can use fill scene.

SAME X TABLES

Function : To give a table in a selected point the same x-value as a reference point.

To use : Go to the point to be used as a reference or stationary point and designate the desired reference point on the table by pressing the c.c.b. A small zero will encircle the point. Now with the cursor go to the table to be moved to the same position and select the point that you would like to be in line with the point that was marked and press the c.c.b.. The point and table will jump to the position indicated by the first point. Same x table is a repeating function.

SAME Y TABLES

Function : To give a table in a selected point the same y-value as a reference point.

To use : Go to the point to be used as a reference or stationary point and designate the desired reference point on the table by pressing the c.c.b. A small zero will encircle the point. Now with the cursor go to the table to be moved to the same position as measured along the y-axis and select the point that you would like to be in line with the point that was marked and press the c.c.b.. The point and table will jump to the position indicated by the first point. Same y table is a repeating function.

CONNECT POINTS

Function : Brings one point to the other.

To use : Push CONNECT points. Go first to the reference point or the point to remain stationary with the cursor and select it with the c.c.b.. The point will be marked by a small zero in the multi-level monitor in the color of the level and by a red zero in the current level monitor. Go to the point to be connected to the selected point and push the c.c.b. at which time the second point will jump to the first. Unless the two points connected were open end points of a table or tables, the points are not connected to form one table. Connect points is a repeating function.

CUT BY LINE

Function : To cut a table with a line. The table is cut where the selected line(s) cross over the lines of the table(s).

To use : Draw with DRAW point to a line and place it where you want to make your cut. Push SPLICING cut by line and go to this line with the cursor and press the c.c.b.. Any vectors that the line crosses will be cut at the crossing point and will be marked by a red cross on the current level monitor and by crosses in the color of the level in the multi-level monitor. To remove the display, press refresh vectors. As it is a repeating function, you can go to another line and select it as a cutting line without having to push cut by line again.

CONNECT BY LINE

Function : To connect two open end points with a line.

To use : Push connect by line. Go to the endpoint and press c.c.b.: a small zero will encircle the point. Go to the point to be connected and push again on the c.c.b. and a line will be drawn in between. Connect by line is a repeating function.

CONNECT TABLES

Function : To join two separate tables by moving one table to the other.

To use : Press connect tables and select a reference point in the stationary table and press the c.c.b. The point will be marked by a small zero. Go to the table to be joined to the first and choose the point where the two tables are to be joined and press the c.c.b., at which time the second table will jump to the reference table. The two tables are now connected if the two open endpoints are brought together.



SPLINES

ROUND
CORNER

OUTLINE
SPLINE

REFRESH
SPLINES

B-SPLINE

MODIFY
BY POINT

MODIFY
BY LINE

MODIFY
BY DYNAMICS

OPTIONS

OUTLINE SPLINE

Function : To outline a splined figure, keeping the same shape with the desired resolution, or number of points in the outline at the desired offset or distance from the original figure as measured in mm. A splined figure can be outlined smaller, however problems can arise with points crowding one another and distorting the outline.

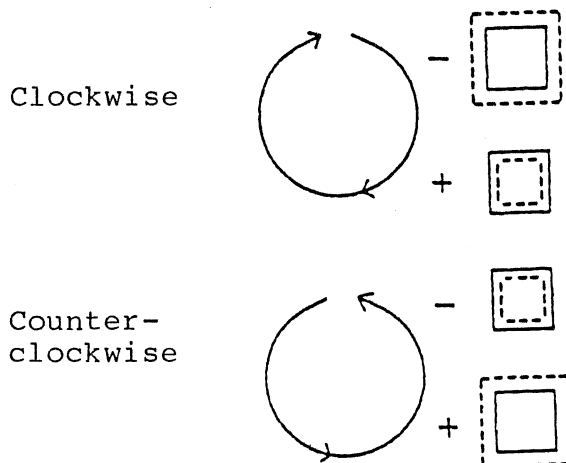
To use : Before outlining a splined figure, there are several variables that have to be determined:

1. Do you want the outline larger or smaller than the splined figure. If smaller, will the outline be distorted due to the overlapping of points.

f

2. Was the figure drawn clockwise or counterclockwise. In order to determine the drawing direction, press DISPLAY starting points and 1/2 of the first vector will be displayed on the current level monitor as are all polygons, then with a negative figure entered into the offset, the outline will be larger; with a positive figure the outline will be smaller. If the figure has been drawn counterclockwise, then a positive number will designate a smaller outline.

Diagram



3. At what resolution or how many points do you want in the outline. The resolution is defined by the numbers 5-500, 5 being a very high resolution or a very large number of points and 500 being a low resolution or low number of points. A normal resolution is 120.
4. At what distance in mm do you want the points in the outline to be set from the points in the original splined figure.

With the cursor go to the splined figure and push the c.c.b.. On the system control display will be displayed "give tolerance" representing the resolution of the outline, enter between 5 and 500 and push enter. The system control display will now display "give outline in mm" for the offset, enter the number and push enter at which time the outline will be drawn. The outline is drawn in vectors and will have to be splined by SPLINES B-spline. It is not necessary to make a copy before you make the outline.

REFRESH SPLINES

Function : To refresh splined figures that have been B-splined but have been returned to vectors. The screen is cleared of the vectors and only the splined figures are displayed. All non-splined figures remain vectors.

To use : Push refresh splines.

B-SPLINE

Function : To draw a fluent curving line through the already made vectordrawing. The spline starts at the end point of the vectordrawing and then goes through the midpoints of the subsequent vectors and ends at the endpoint of the last vector. The spline follows the same direction as the vectordrawing has been drawn.

To use : Press B-spline. Go to the table to be splined with the cursor and push the c.c.b. The basic vector figure will disappear and only the spline will be displayed. To see both the vectors and the spline, push DRAW vectors, to erase vectors, push SPLINES draw spline, to get the original vector drawing back, push refresh vectors. Once a figure has been splined, it can be recalled with DRAW spline. To set sharp corners in a spline, press DRAW corner and press the c.c.b. while the cursor is on a desired point of the vector drawing. A spline can be killed with the KILL B-spline function.


MODIFY BY POINT

Function : To modify a B splined figure by moving the displayed points of the original vector drawing. Is an equivalent to the MOVE point function.

To use : After a figure has been splines, push modify by point and the points of the vector drawing will appear. Select a point with the cursor and depress the c.c.b.. With the c.c.b. depressed move the points of the vectors which will directly modify the shape of the spline.
To see both the vectors and splines, push DRAW vectors. To see only the vectors, refresh vectors. To see only the splined figure without points, push DRAW spline.

MODIFY BY LINE



Function : To modify specific parts of a splined figure by moving a line of the vector drawing, which is the base of the spline. Only the midpoints of the vector drawing are displayed. Can also be used with the space function in which case only one vector of a drawing can be moved parallel, keeping the angles of connected lines constant. Is an equivalent of the MOVE line function.



To use : Push modify by line and the midpoints of the vector drawing will be displayed in the splined figure in the color of the level on the multi-level monitor and in red on the current level monitor. Go to the points with cursor, depress the c.c.b. and move the points. When the c.c.b. is released, the points will be set. The line of the vector drawing can be picked up anywhere, however, only the midpoints are displayed. To see the vectors and the splines, push DRAW vectors. To see only the vector, push refresh vectors. To return to the B splined figures, push DRAW spline.



TASK

EDIT	EXECUTE
INSERT	START
DELETE	STOP
CLEAR	TIMING ON OFF
EXIT	CONTINUE
 	OPTIONS
DELAY	ENTER

INSERT

Function : The assembly of a task. With this function, a series of manipulations can be stored and used as a whole later on.

To use : Press insert. Every function used after this will be stored until insert key is used again or the start key is used.

Note: the START function is selfrepeating if used to end the assembly of a task.

START

Main function : Execute a task, previously stored in the internal memory

side function : - interrupt the execution of a task
- finish the assembly of task with INSERT

To use : Press start. The stored task will now start to run.

DELETE

Function : To delete a task from the diskmemory.

To use : Press delete. The scd now asks for a filename. Enter the filename and confirm with enter. The scd now refers to the memory control display which asks for a confirmation (Y/N). Confirm with Y followed by enter. The task is now deleted from the memory.

TIMING ON/OFF

Function : To activate or disactivate the choice of the speed with which a task runs under start.

To use : Timing on will run the task on the same speed at which it was assembled.
Timing off will run the task on maximum speed.
Note: always choose timing mode first, then use the start key. The timing mode is indicated with the led on the key: the led burns when the timingmode is activated.

DELAY

Function : To reset the task by erasing the internal memory used to store the task.

To use : Press delay and confirm with enter.

EXAMPLES

The following examples are an excerpt from the training course. You can refer to these lessons for the basic principles of working with the AESTHEDES. The examples go from simple to more complicated drawings.

Before you start drawing, it is advisable to read the description of the monitors and their functions. When the system is turned on, the levels are without colour. To give each level a colour, press on the left side of the palette key or S for set and enter, watch the colour monitor. This is a standard palette of colours intended to give each level a different colour in order to have a visible cursor wherever another level is entered. The background colour - or level 0 - is black in the colour palette. The system always starts up in level 31, the middle level.

For ease of visibility, press on the WHITE key under the colour circle to change level 31 to white, notice the numbers change in level 31 on the colour monitor.

Now you are ready to draw.

EXAMPLE 1 Subject: drawing (lines)

	FUNCTION GROUP	FUNCTION	EXPLANATION
A	MOVE	GRAVITY ON	Using gravity on you can draw perfectly horizontal + vertical lines.
	DRAW MOVE MEASURE	POINT TO LINE SPACE	Using these two functions together, enables you to move a line (two points) on a parallel. With cursor on line + white button depressed, move line.
B	MOVE	LINE	(without space) Pick up line with cursor and move line as desired, by keeping white button depressed.

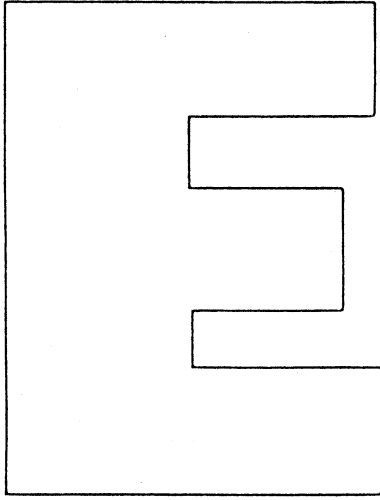
n.b. Move line without space, makes it possible to move that line on a parallel in all directions.

Exercises

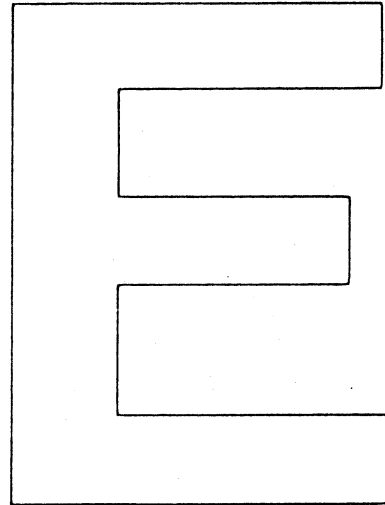
EXAMPLE 1



A

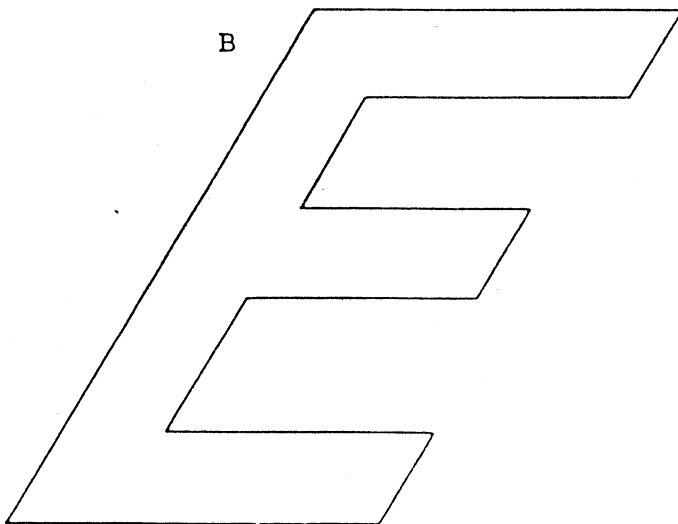


POINT TO



MOVE LINE/SPACE

B



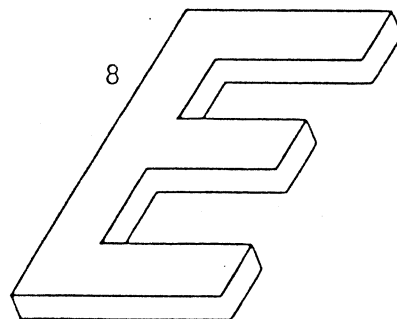
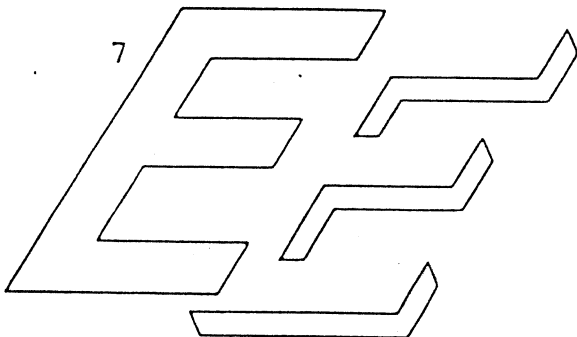
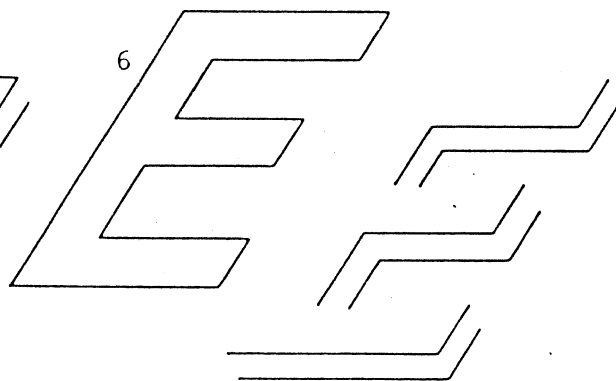
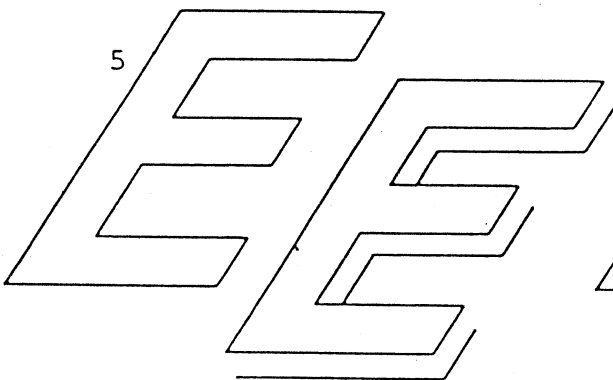
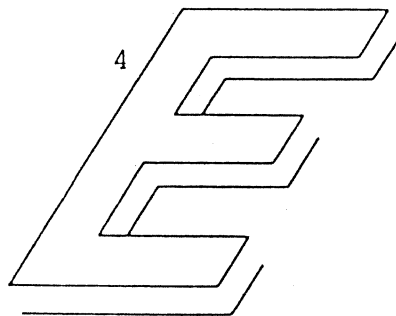
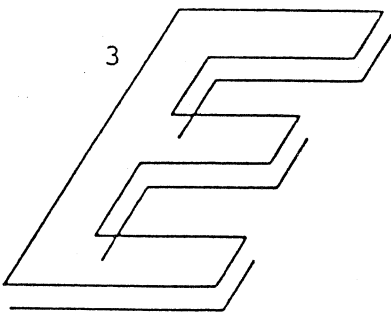
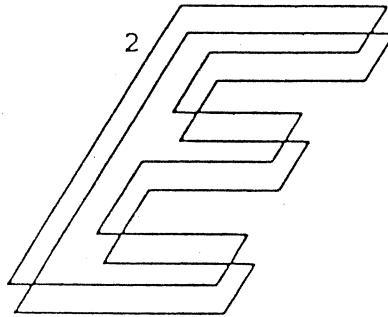
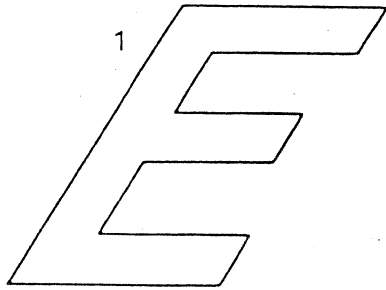
MOVE LINE

EXAMPLE 2 Subject: drawing (lines)

	FUNCTION GROUP	FUNCTION	EXPLANATION
2	DRAW	COPY TABLE	To make a copy of an original, press white button of cursor (once for every copy) on a line of original.
	MOVE	TABLE	Place cursor on the table to be moved. Whilst keeping white button depressed, the table is repositionable.
3	KILL	LINE	To remove (kill) a line, place cursor on that line (not a point) and press white button once.
4	SPLICING	CUT BY LINE	The line you touch with cursor acts as a knife to cut other lines crossing it. <i>KILL TABLE</i>
5	MOVE	COPY + MOVE	Place cursor on table to be copied, press white button once, whilst keeping it depressed, move copy.
6	KILL	LINE	
7	SPLICING	CONNECT BY/ LINE	Touch both points to be connected with cursor, pressing white button once for each point.
8	SPLICING	<i>CONNECT</i> TABLES	Touch the point of the line you want to use as glue point, then the point of the other table that is also the glue point.

n.b.

Exercises



EXAMPLE 3 Subject: the B-spline

FUNCTION GROUP	FUNCTION	EXPLANATION
DRAW	POLYGON	4
MOVE	COPY + MOVE	x5.
MOVE	TABLE	Position the polygons in a row underneath each other.
KILL	LINE	See example.
DRAW	MIDPOINT	Press white button once to get the midpoint of any line, whilst touching that line anywhere with the cursor.
SPLICING	CUT	Whilst keeping white button on cursor depressed, the cut point is freely positionable on any line. See eg. 4th polygon.
DRAW	CORNER	On the midpoint of the 6th polygon.
SPLINES	B-SPLINE	Touch the line/table with the cursor, pressing white button, to make a splined figure.
DRAW	VECTORS	splines + vectors can be seen simultaneously.

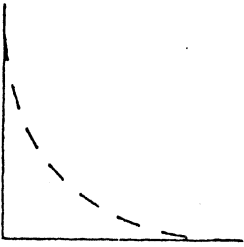
n.b. A spline is a curved line formed between the midpoints of consecutive vectors.
 With open vectors, the spline continues to the end point.
 If a corner is made from a point, that point draws the spline to it, as the end point or midpoint.

Exercises See examples .

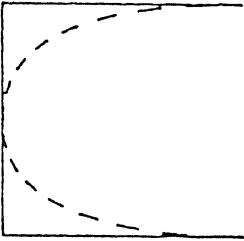
EXAMPLE 3



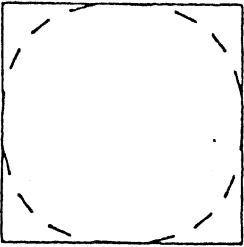
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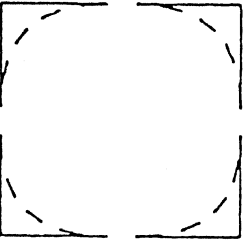
2



3

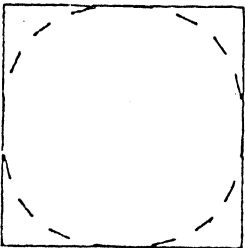


4



MIDPOINTS

6



MIDPOINTS WORDEN CORNERS

EXAMPLE 4 Subject: Drawing (round corners)

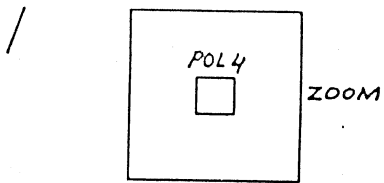
	FUNCTION GROUP	FUNCTION	EXPLANATION
A	DRAW	POLYGON/4/ ENTER	4
	DYNAMICS MIRRORS SET	CHAIN ALL Y MIRROR	Press enlarging zoom.
	DYNAMICS MIRRORS	CHAIN ALL FIX	Press left X move.
	SPLINES	B-SPLINE	Touch all tables.
	DRAW	VECTORS	
	DRAW	MIDPOINTS	On all sides.
	SPLINES	DRAW SPLINES	Watch for the change.
	DRAW	VECTORS	
	DISPLAY	POINTS	Between existing midpoints + corners.
	DRAW	MIDPOINT	Righthand table.
	KILL	POINT	The midpoints of righthand table.
B	DRAW	COPY TABLE	Touch each table 2x,
	DRAW	OUTLINE	so there are 2 copies of each table on top of one another.
	DRAW	OUTLINE	Pick up one copy at a time and make a larger of smaller outline of the original. Keep the spacing regular.

n.b. It is apparent that using corners offers more possibilities than using just points alone. We see the curves are regular when we use corners.

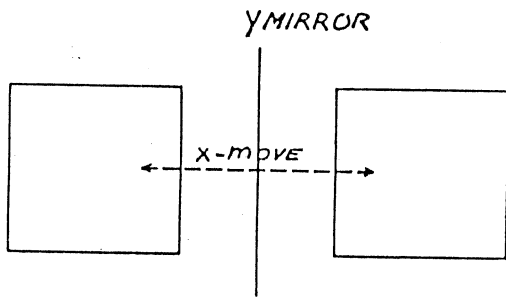
Exercises See examples.

EXAMPLE 4

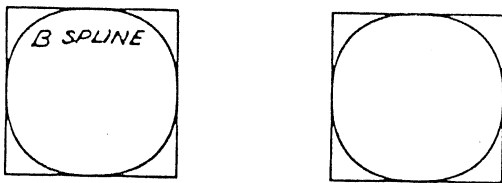
1



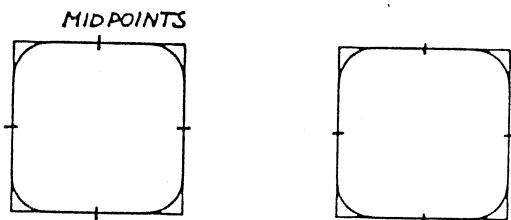
2



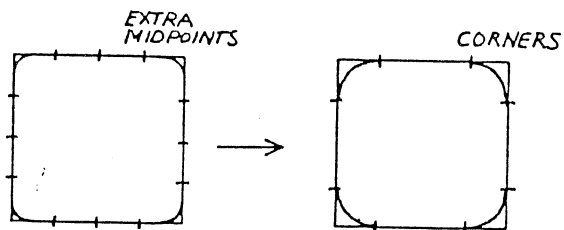
3



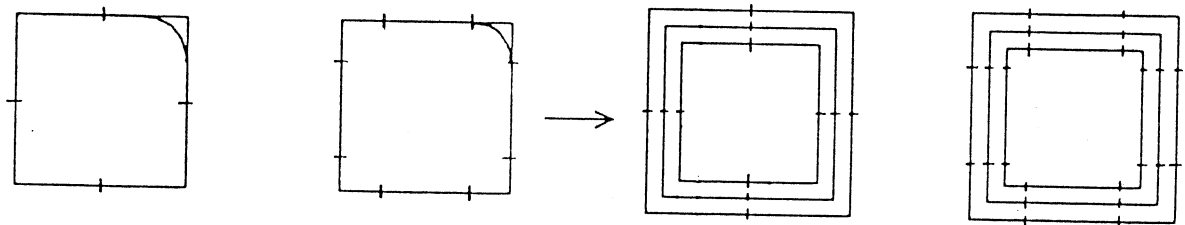
4



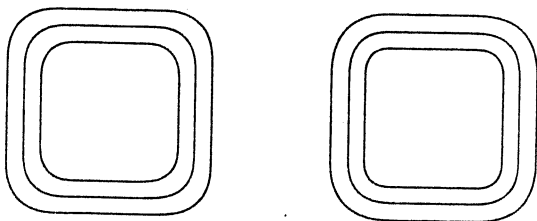
5



6



7

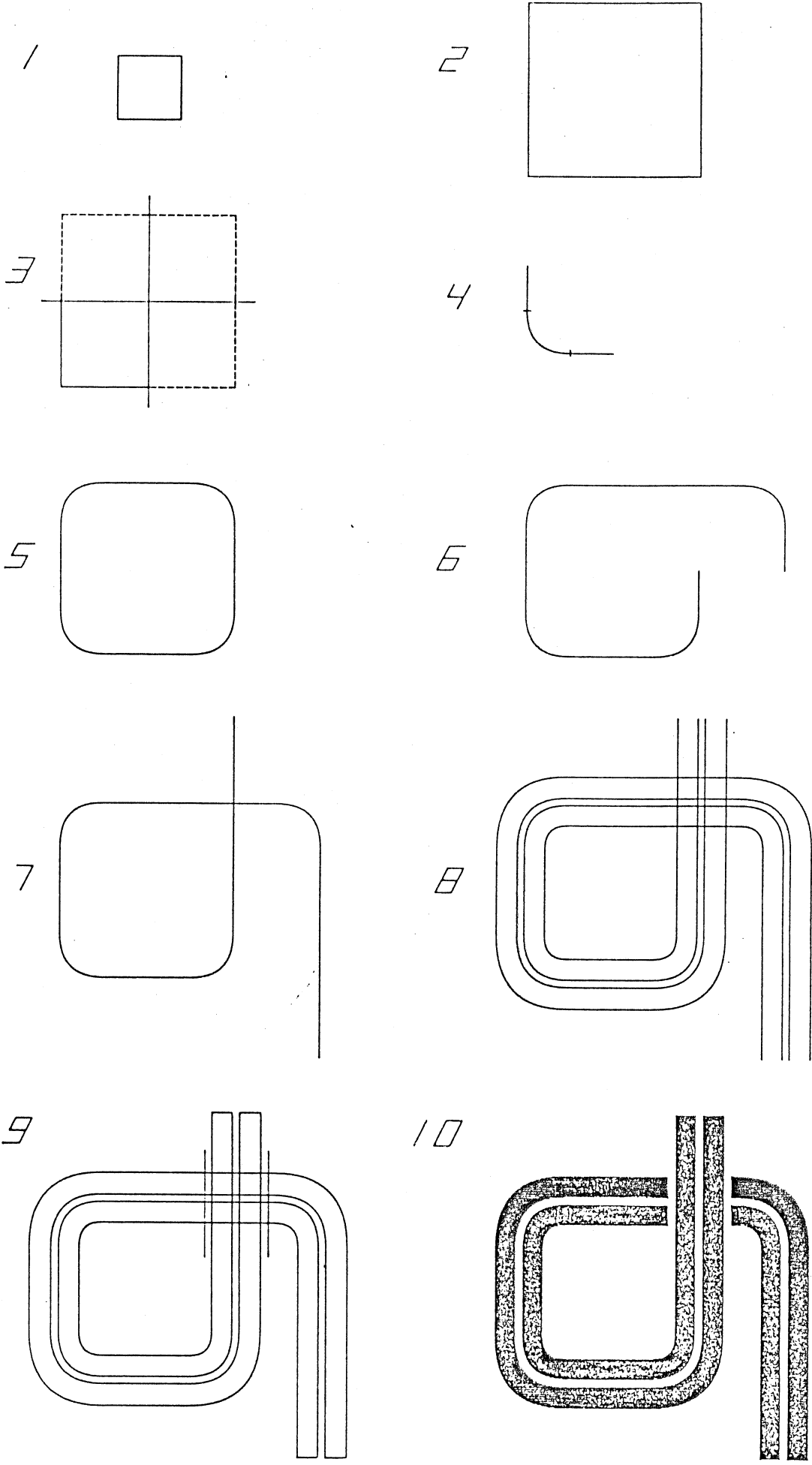


EXAMPLE 5 Subject: drawing rounding alterations

FUNCTION GROUP	FUNCTION	EXPLANATION
1 DRAW	POLYGON/4/ ENTER	
2 DYNAMICS	CHAIN ALL	Zoom enlarge.
3 MIRRORS SET	X CLIP Y CLIP FIX	
4 DRAW	MIDPOINT	On remaining two side.
DRAW	CORNERS	On both midpoints.
5 MIRRORS SET	X MIRROR/ Y MIRROR FIX	Top righthand table touch white button 2x.
6 MOVE	CHAIN	
DYNAMICS	X MOVE	Move this table to the right.
SPLICING	CONNECT POINTS	Join the free standing table to the others.
7 MOVE	POINTS	Lengthen the two free ends.
SPLICING	CONNECT ALL	
KILL	POINT	Kill all extra points.
8 DRAW	COPY TABLE	3X
DRAW	OUTLINE	1 inside, 2 outside.
9 SPLICING	CONNECT BY / LINE	Connect two point at a time on the free ends to make two enclosed figures, one smaller than the other.
DRAW	CORNER	On the end points.
MOVE	GRAVITY ON	
DRAW	POINT TO	Draw 2 vertical outlines.
MOVE	LINE/SPACE	Position cut lines with regular spacing.
10 SPLICING	{ CUT BY LINE CONNECT BY/ LINE	
DRAW	CORNERS	
SPLINES	B-SPLINE DRAW SPLINE. REFRESH	

n.b.

Exercises See examples.

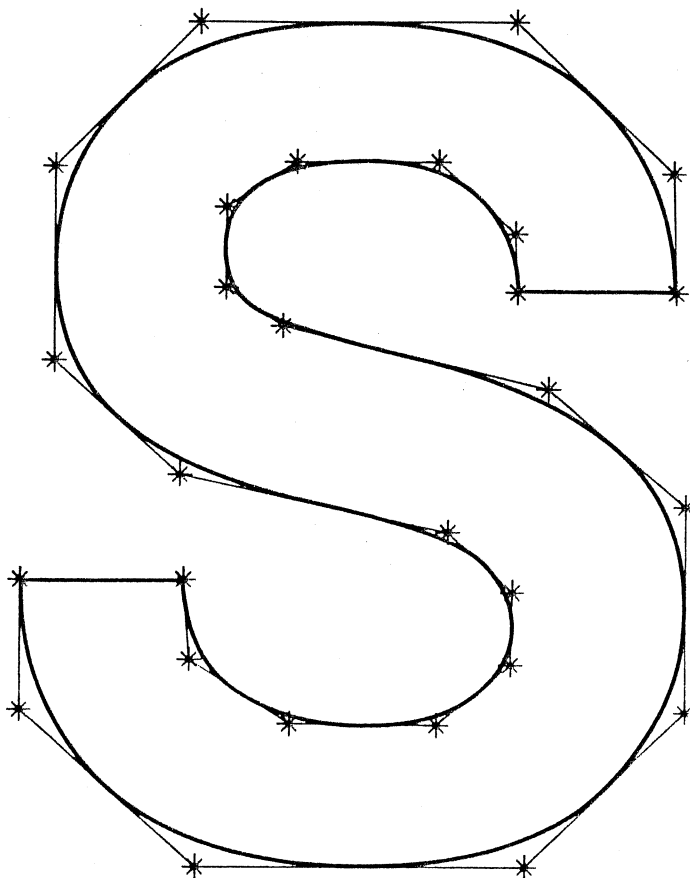
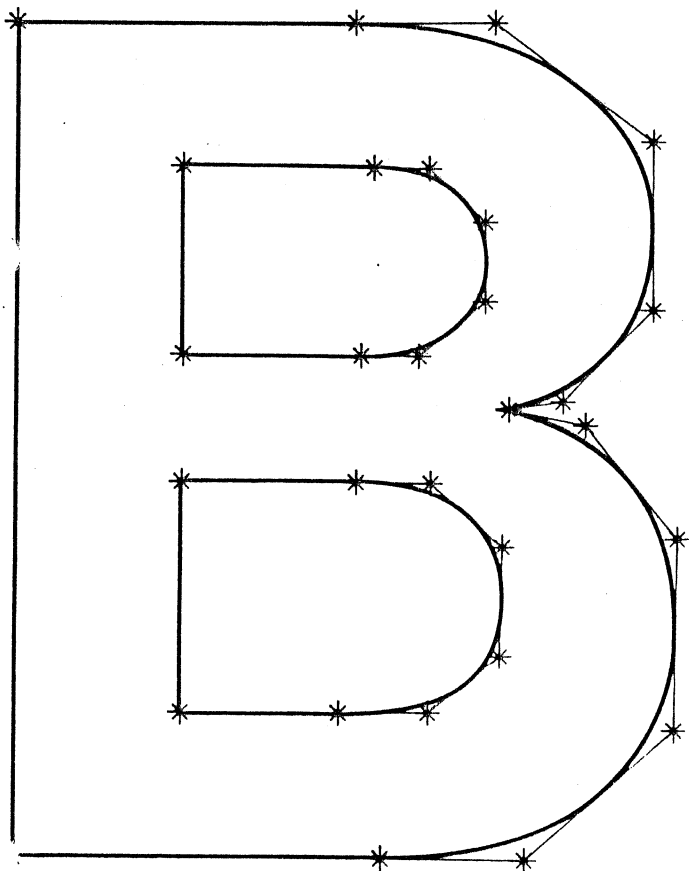
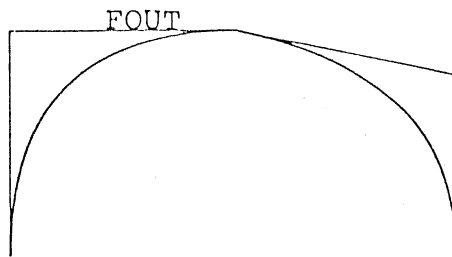
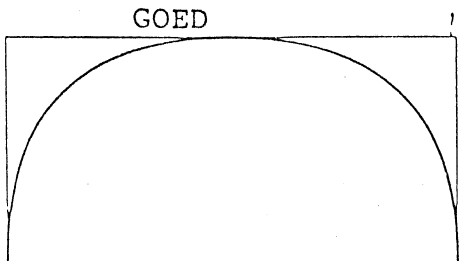
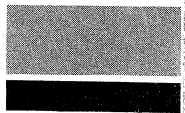


EXAMPLE 6 Subject: letter construction with splines

FUNCTION GROUP	FUNCTION	EXPLANATION
MOVE	GRAVITY ON	
DRAW	POINT TO	
MOVE	LINE/SPACE	
DRAW	MIDPOINTS	
DRAW	CORNER	Draw corners on midpoints and corners that should be sharp.
SPLINES	B-SPLINE	
MODIFY SPLINES	POINT	Make alterations/corrections to figure.

n.b. To copy a letter from a photo example, stick eg. on bitpad.
Trace around letter using many points.
Using move line, move lines to correct position.
Locate midpoints, using move point on line - move midpoint to the middle of a curve.
Vectors with a corner on a line, before a corner cannot be crooked eg.

Exercises

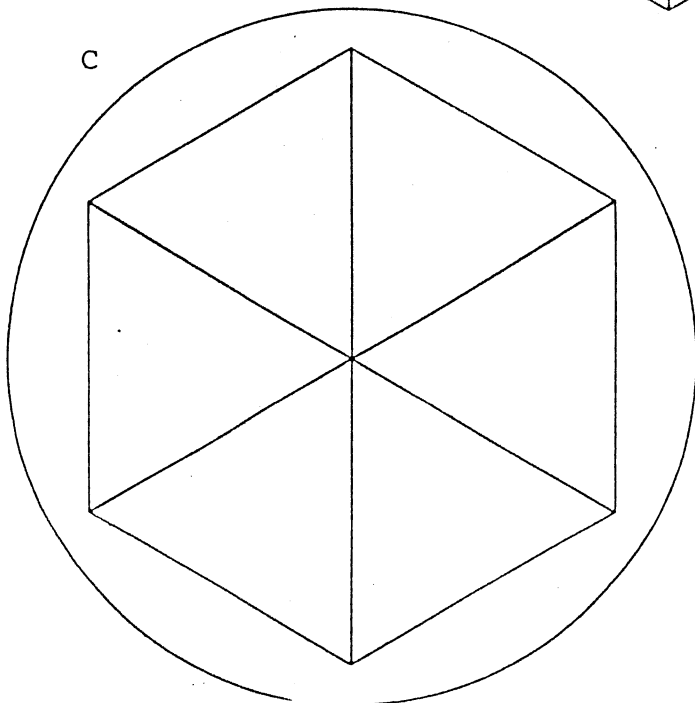
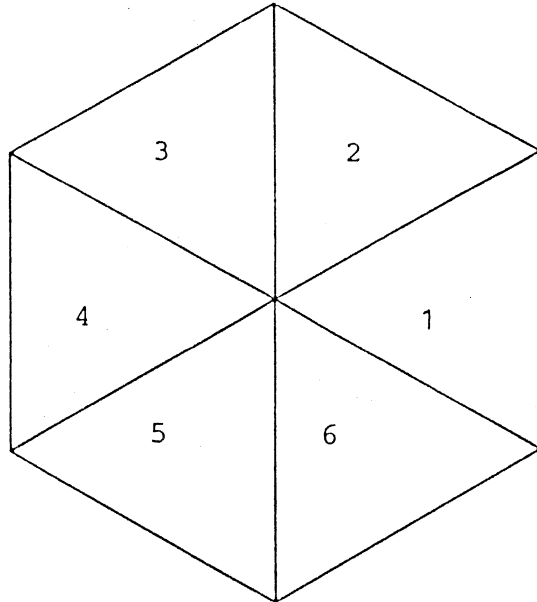
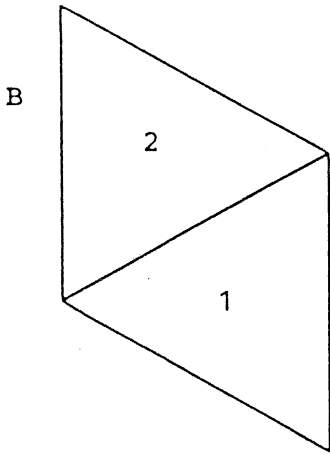
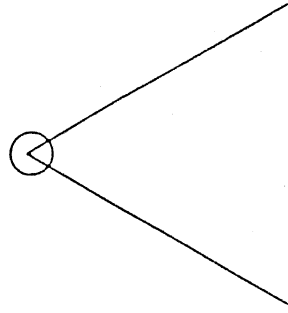
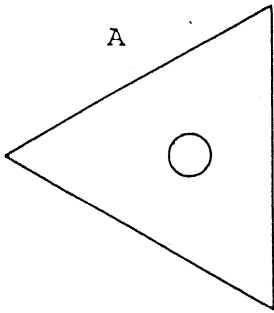
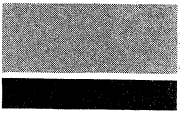


EXAMPLE 7 Subject: color

	FUNCTION GROUP	FUNCTION	EXPLANATION
A	DRAW	POLYGON	3
	MEASURE	POINT TO POINT	Measure left point (X diff. = 100).
	DYNAMICS	CHAIN ALL	
	MEASURE	SPACE	X-move (shift): + 100 (the + symbol doesn't need to be typed in). Point of origin of the rectangle has moved.
	DISPLAY	ORIGIN	
	MEASURE	SET LOCAL/ ORIGIN	Touch with white button the rectangle 2x, the third time on the lefthand corner, the new origin is now on this corner.
B	DRAW	COPY TABLE	Make a copy.
	MOVE <i>DYNAMICS</i>	MAKE CHAIN	Touch with white button copy 2x.
	MEASURE	SPACE	Rotate 60 degrees. Make a copy of the new rectangle and rotate it 60 degrees aswell. Continue, until there are 6 rectangles.
C	MEASURE	RESET <i>CENTER</i> LOCAL/ ORIGIN	
	MOVE	ALL	
	DYNAMICS	CHAIN ALL	
	MEASURE	SPACE	Rotate 60 degrees.
	DRAW	POLYGON	8
	MOVE <i>DYNAMICS</i>	MAKE CHAIN	Zoom, enlarge to fit exactly around the hexogram.
	SPLINES	B-SPLINES	Polygon 8 - circle.

n.b.

Exercises See examples.



EXAMPLE 8 Subject: color

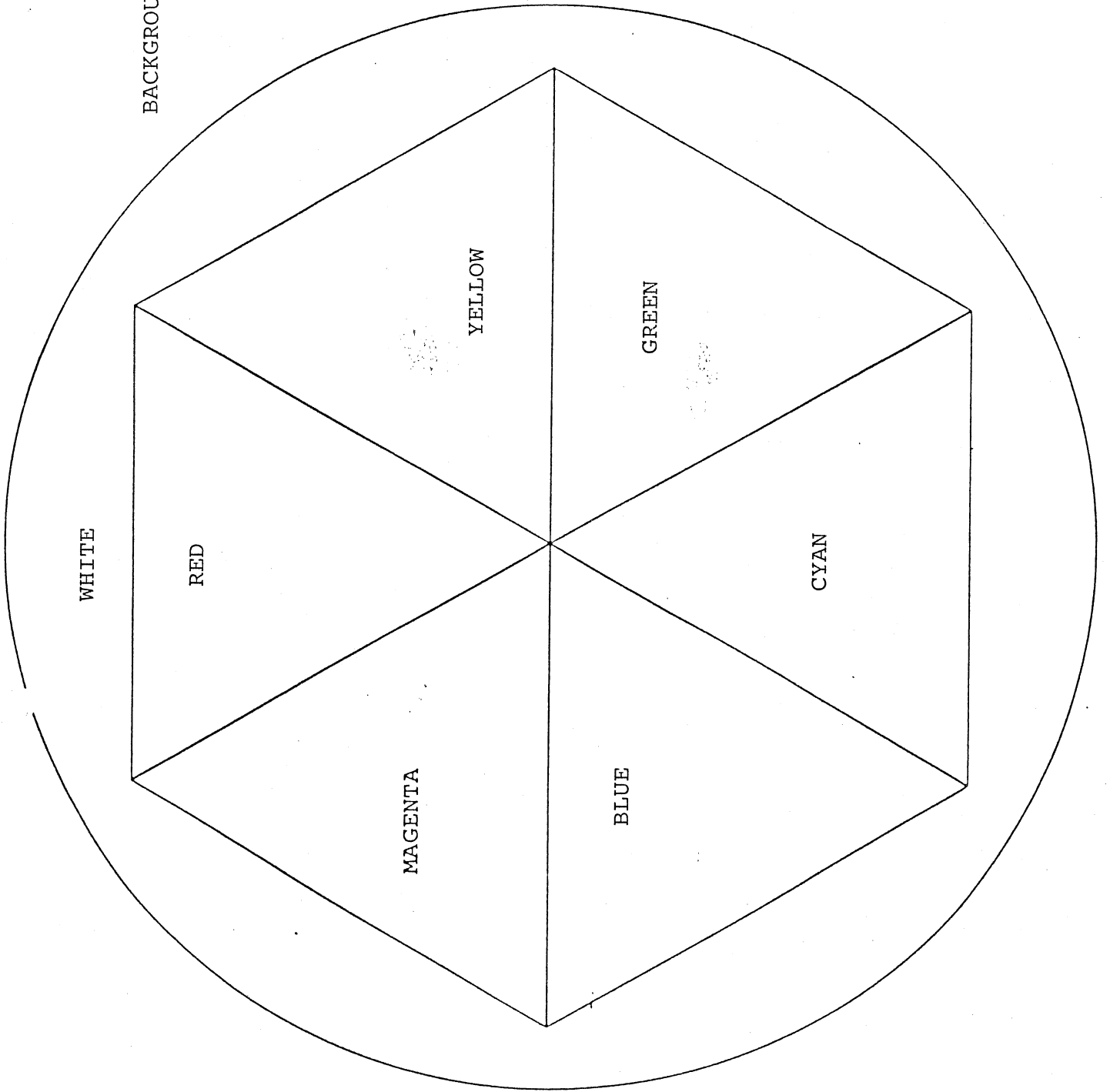
FUNCTION GROUP	FUNCTION	EXPLANATION
LEVELS	SET LEVEL	To get different color, the figure must be divided and sent to different level. Every level gives one color.
MEASURE	32/ENTER	Touch first rectangel 2x.
LEVELS MEASURE LEVEL BAR	SET LEVEL 33/ENTER	The next rectangel. Select the levels to be used. Fill the tables. Give the suitable/desired color to each level.

n.b. The higher (numerical) levels cover the lower levels. The white background circle, should be in the lowest level.
The overall screen background is level 0.

Exercises See examples.



BACKGROUND = GREY



FUNCTION GROUP	FUNCTION	EXPLANATION
LEVEL BAR	LEVEL 32-37	Red. The lower lefthand monitor shows R-255 for levels 32-37. Bottom part of screen, brightness 100% saturation 100%.
LEVEL BAR	32 SATURATION	100% Press 80% then << till you get 75%.
	33	75%
	34	60%
	35	40%
	36	20%
	37	15%, (20% to 15% using <<)
LEVEL BAR	LEVEL 32	Set levels 32-37 in the color chain.
	SET CHAIN 1 TILL 37	Using color chain, its possible to run through the color changes (for all levels at the same time) without changing brightness + saturation. Will appear next to the levels put in color chain on lower lefthand monitor.
	ACTIVATE CHAIN Color rotation	Dashes become asterisks. Using this function, the principle color changes, with in between steps.
COLOR CIRCLE	RED	Press Red, all levels in color chain will become red.
	ACTIVATE CHAIN 1	By pressing this function again the chain is no longer in function, the dashes return. Change the brightness in the same way as saturation.
	ACTIVATE CHAIN 1	Dashes will become asterisks again.
	COLOR ROTATION	

EXAMPLE 9 Subject: color

FUNCTION GROUP	FUNCTION	EXPLANATION
LEVEL BAR	LEVER 32-37 RESET CHAIN 1	Dashes disappear.

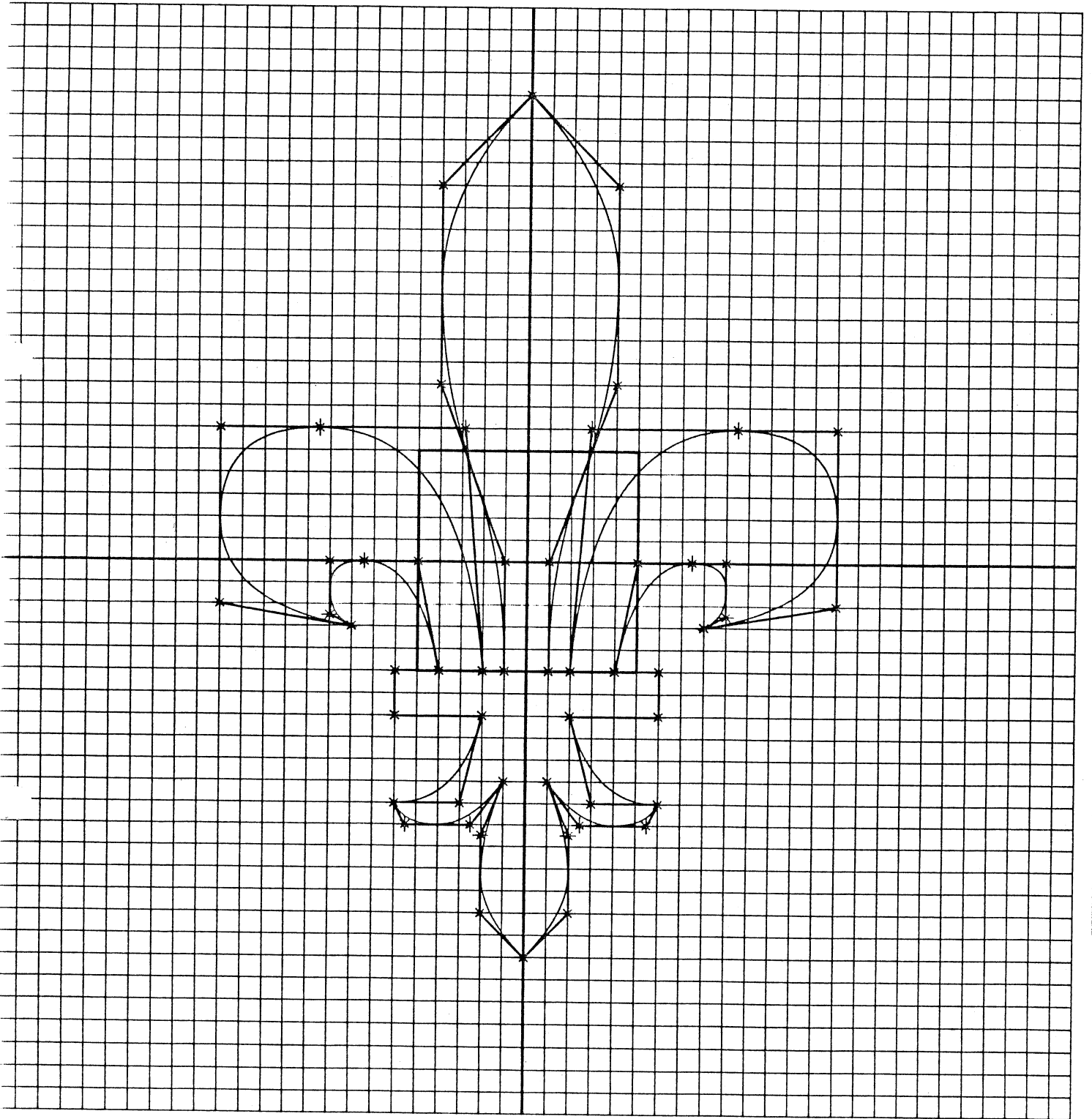
n.b.

Exercises See examples.

FUNCTION GROUP	FUNCTION	EXPLANATION
TO /FROM DISK	FROM DISK	F 20. The grid is in level 1. The axes and a central square are in level 2. The square are the 10 x 10 inside squares of the grid. Every square is 20 mm, unless square is defined in another scale.
MEASURE	POINT TO POINT	Measure the square in level 2.
GRIDS	DEFINE GRID	20, hereby there is a magnetism to the points on the grid.
MOVE DRAW	GRAVITY ON POINT TO	Draw the left side of the drawing. A few points maybe repositioned later if need be.
	MIDPOINT CORNER	Where needed. Make corners of these midpoints.
GRIDS MOVE	DEFINE GRID POINT	10 The difficult to place points can now be more accurately positioned.
DRAW SPLINES MIRRORS	CORNERS B-SPLINE SET Y MIRROR FIX	Where needed.
SPLICING DRAW SPLINES	CONNECT ALL CORNERS DRAW SPLINE REFRESH	Above + below.

n.b.

Exercises See examples.

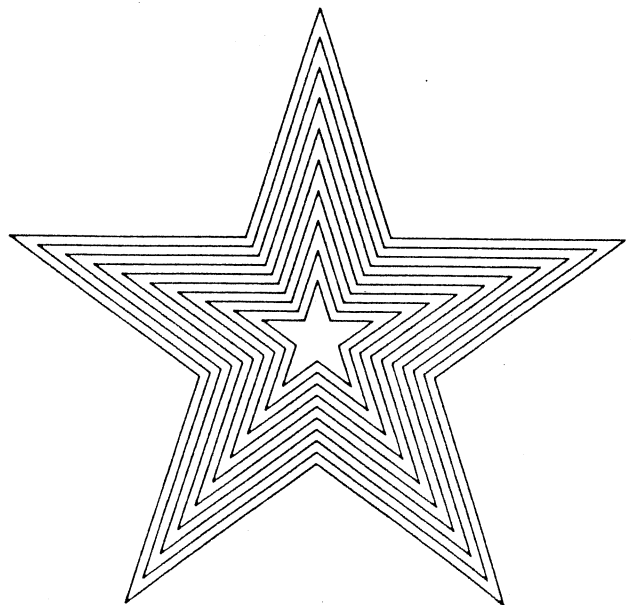
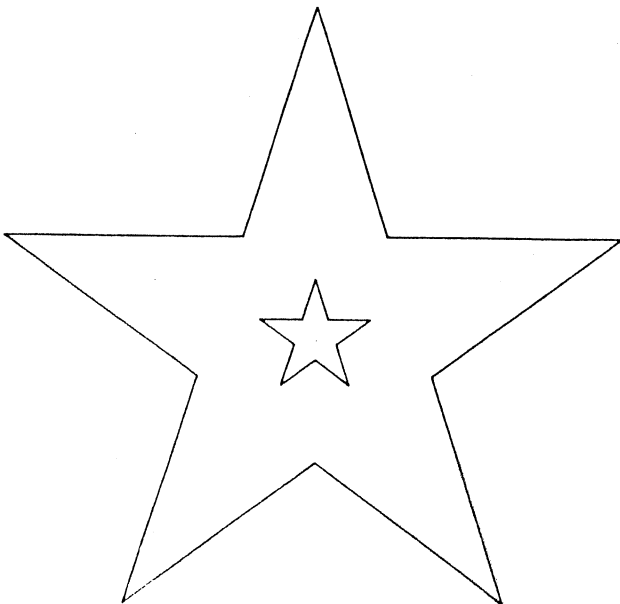
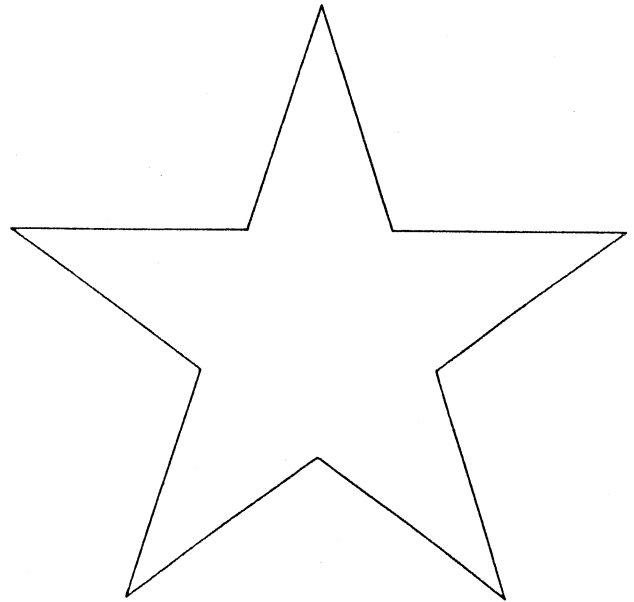
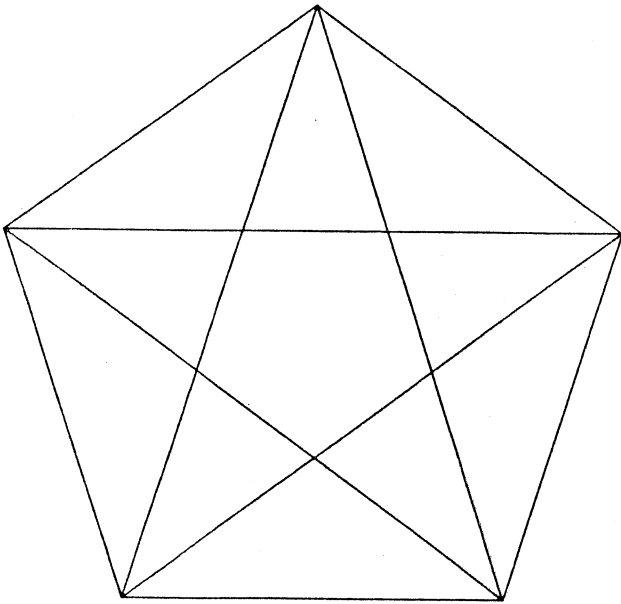
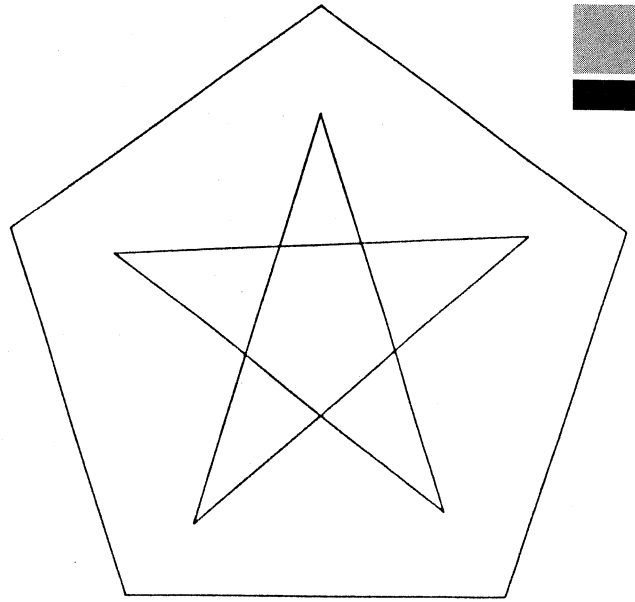
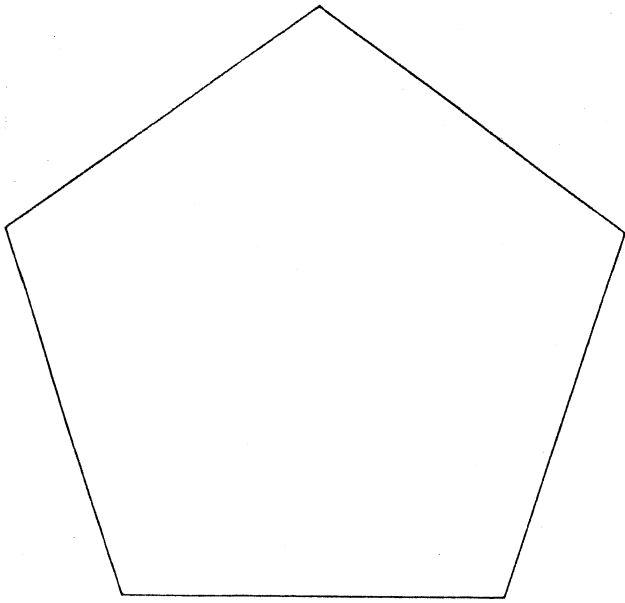
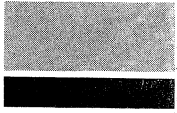


EXAMPLE 11 Subject: interpolation

FUNCTION GROUP	FUNCTION	EXPLANATION
DRAW	POLYGON	5
DYNAMICS	CHAIN ALL	Zoom enlarge. Rotate till bottom is horizontal.
DRAW	POINT TO	5 lines.
SPLICING	CONNECT POINTS	Connect lines with the points of the polygon.
SPLICING	CUT BY LINE	Touch all lines.
KILL	TABLE/OFF LINE	Kill extra lines.
SPLICING	CONNECT ALL	
DRAW	COPY TABLE	1x.
MOVE	CHAIN	Copy.
DYNAMICS	ZOOM	Smaller.
ANIMATE	IN BETWEEN	5 10
	LINIAIR.	

n.b.

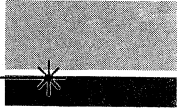
Exercises See examples.



EXAMPLE
12

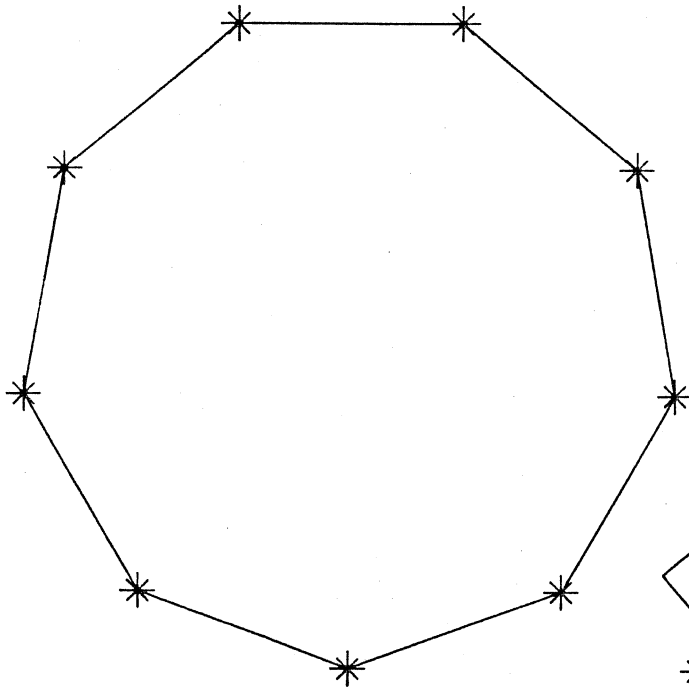
Subject Setting Type

Function Group	Function	Explanation
MOVE DRAW	GRAVITY POINT TO DIVIDE	- Draw a horizontal line - Give number e.g. 11 One for each letter + space
TO/FROM DISK	SCALE	- Type in scale factor if letters need to be smaller.
DISPLAY	STARTING POINTS	- To check direction + starting point of table.
DRAW	CHANGE DIRECTION	- If starting point direc- tion is wrong, touch the table with the cursor once.
POSITION	FROM DISK TO TABLE	- Touch the line with the cursor. - Give filename : of desired letters to be placed
KILL	TABLE	- Kill the line.
SPLICING	MAKE OBJECT	- Make an object of each letter. Can be compared with CHAIN.
DYNAMICS	MAKE CHAIN	- Space the letters, by using X-MOVE
DRAW	MAKE SCENE COPY SCENE	- Touch all objects. - As many copies as needed.
DYNAMICS	MAKE CHAIN	- Arrange the copies where desired, using 3D if needed.



HEADLINE

HEADLINE





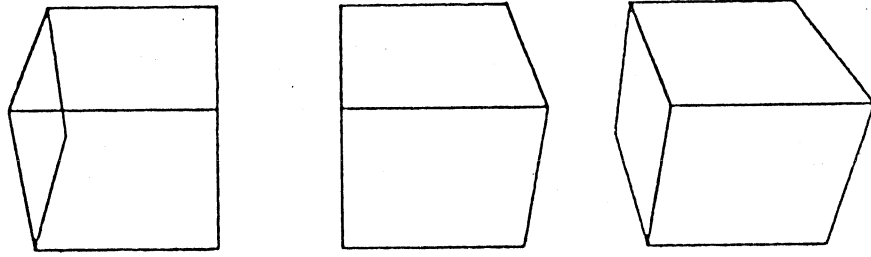
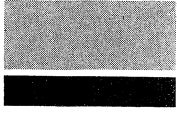
ROUND
TEXTS

WOOD
TEXTS

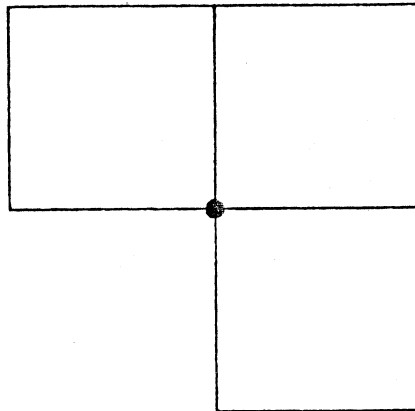
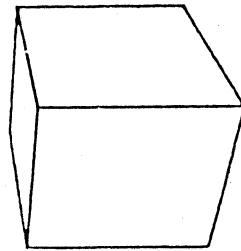
EXAMPLE
13

Subject 3D CUBE

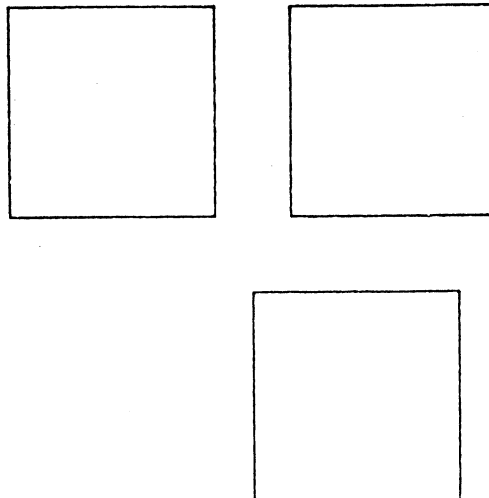
	Function Group	Function	Explanation
A	DRAW	POLYGON 4	
	MOVE	COPY + MOVE	- Twice
	SPLICING	CONNECT TABLES	- See example
	MEASURE	SET LOCAL ORIGIN / ALL	- See example Touch the one common point to the 3 squares.
	DYNAMICS	CHAIN ALL	- Y-move 
B	DYNAMICS	3D ON	
	DYNAMICS	MAKE/ CHAIN	- Table 1 (Left)
		SPACE	- Y-rotation : 30°
		MAKE/ CHAIN	- Table 2 (Right)
		SPACE	- Y-rotation : -60°
		MAKE/ CHAIN	- Table 3 (Top)
		SPACE	- X-rotation : -90° - Y-rotation : -60°
	DYNAMICS	3D OFF	
	CHAIN ALL	- ENLARGE with zoom - Y move 	



B



A



EXAMPLE
14

Subject Repeat Motif Function

Function Group	Function	Explanation
DRAW	POLYGON 4	
MOVE	COPY TABLE	
MEASURE	CHAIN	- The copy
DRAW	SPACE	- Zoom 6
SPLICING	DIVIDE	- The left + lower side of the larger square into 5
KILL	CUT	- Cut the left lower corner of the larger square open
MEASURE	LINE	- The upper + right sides of the larger square
	SET LOCAL ORIGIN	- Of the lower line, in the left corner of that line.
* POSITION	SET POSITION	- Touch the smaller square - Then the lower line - Then the lower line again - Then the left line
DYNAMICS	POSITION ON	
DRAW	REFRESH VECTORS	
* Remarks		<p>The middle lower screen shows :</p> <p>Select table to be repeated</p> <ul style="list-style-type: none"> - Touch according table. <p>Select place to be positioned - Touch line to take table repeats.</p> <p>Select table to be repeated</p> <ul style="list-style-type: none"> - Touch line to take line repeats. <ul style="list-style-type: none"> - To store on disk always use multilevel with FLIGHT ON - Send original table to be repeated to another level, if it disturbs. - The table to be repeated, will be repeated at every point on the table. <p>Example 1 has one point removed.</p>

