**COURSE SECTIONS**

**CONTENTS :**

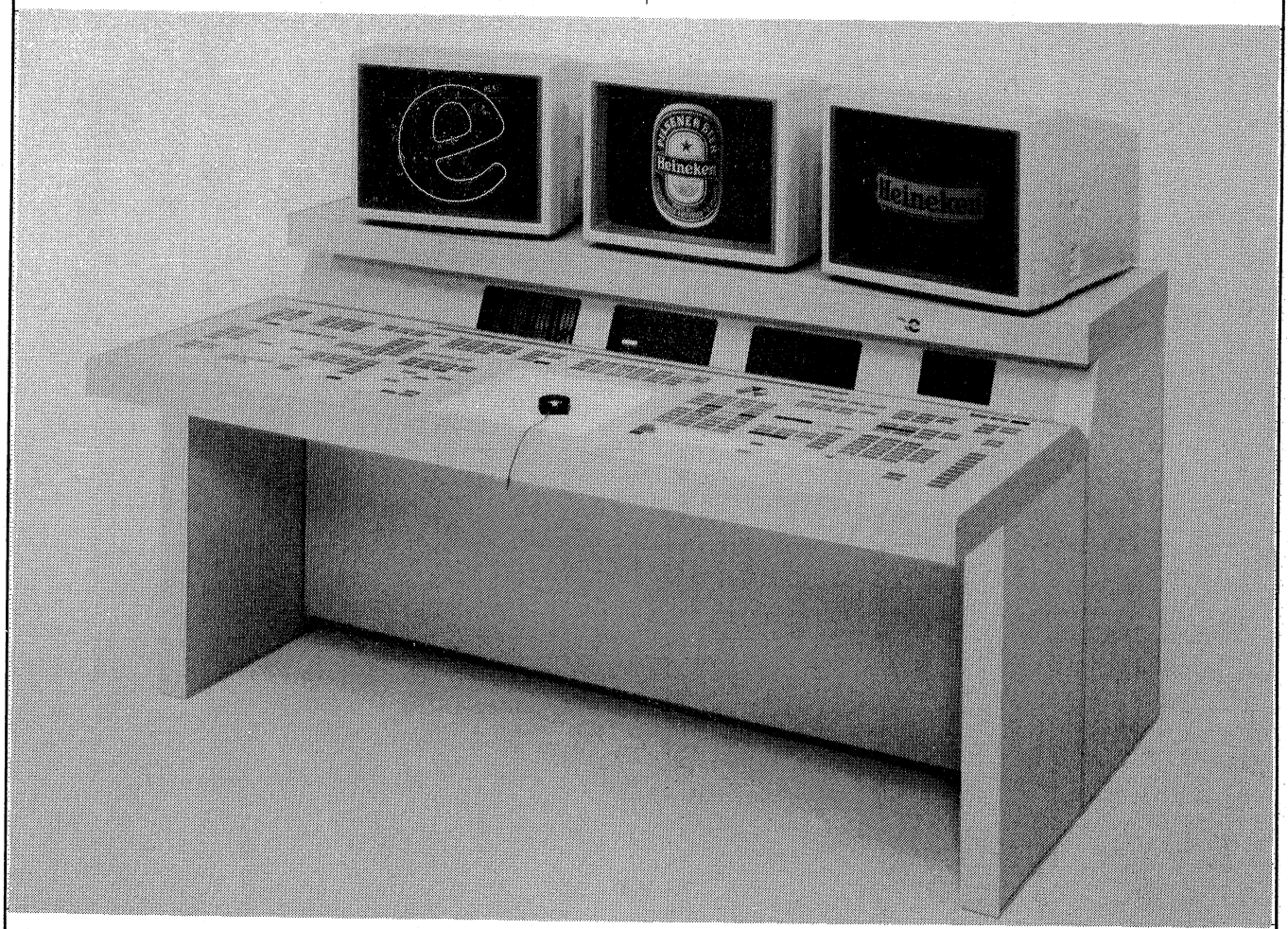
# - INTRODUCTION -

Welcome on the Aesthedes Design Computer and welcome in the Claessens Design Systems training centre.

The Aesthedes is the product of the Dutch firm Claessens Design Systems b.v.
It has been created exclusively for designers use,therefore it looks different from the majority of computer systems and ..... is considerable easier to learn.

The architecture of the system is unique for its keyboard and the six monitors.

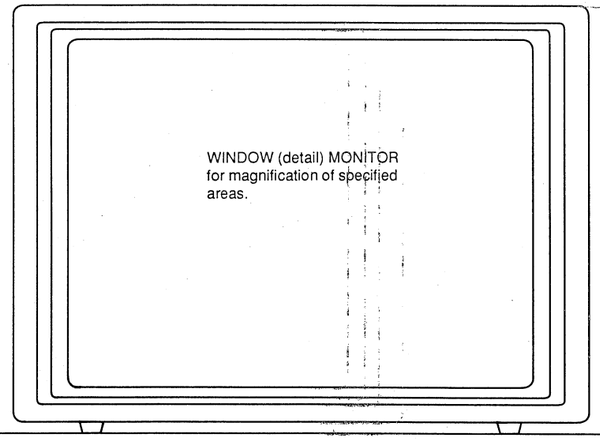
The keyboard is comparable with a designers-desk, with all the tools as single function keys.
All keys are grouped and well organised positioned on the keyboard, which is the direct interface between designer and computer.



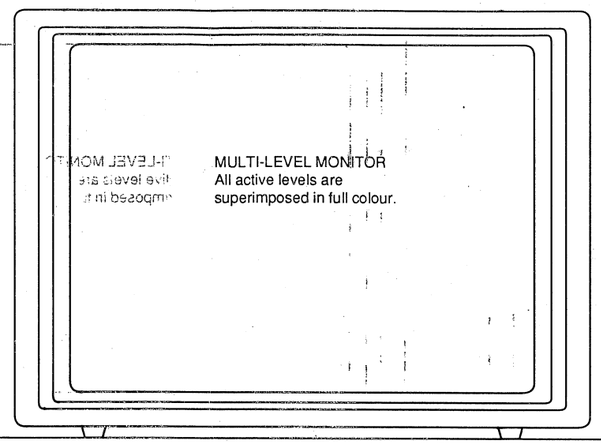

In the next coming two weeks, you will follow a course, which will be a good start to operate the system.
With the help of this book and your instructor, we like to acquaint you with all features off the Aesthedes.

This training manual contains a number of step by step exercises.
Each exercise consists of two parts.

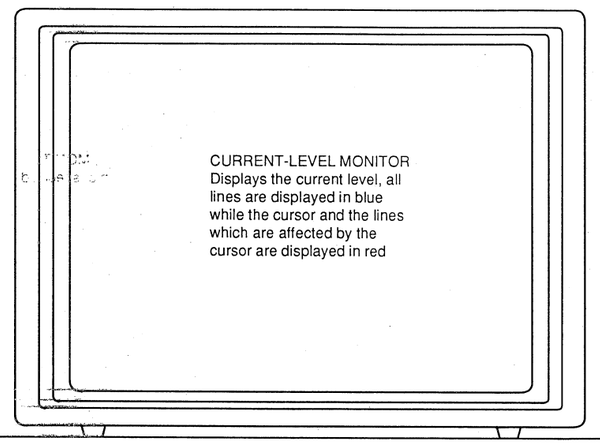
On the left page are three columns: keyblock, keys and an explanation.
Underneath you will find a plan of the key-board with a numbered quide through the different keyblocks relating to the exercise.
On the right page is an illustration of the exercise.
Every chapter is prefaced by a small description about the aim of the lesson, a description of new functions and where to use them in practical situations.



WINDOW (detail) MONITOR
for magnification of specified areas.



MULTI-LEVEL MONITOR
All active levels are superimposed in full colour.



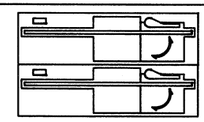
CURRENT-LEVEL MONITOR
Displays the current level, all lines are displayed in blue while the cursor and the lines which are affected by the cursor are displayed in red

aesthedes

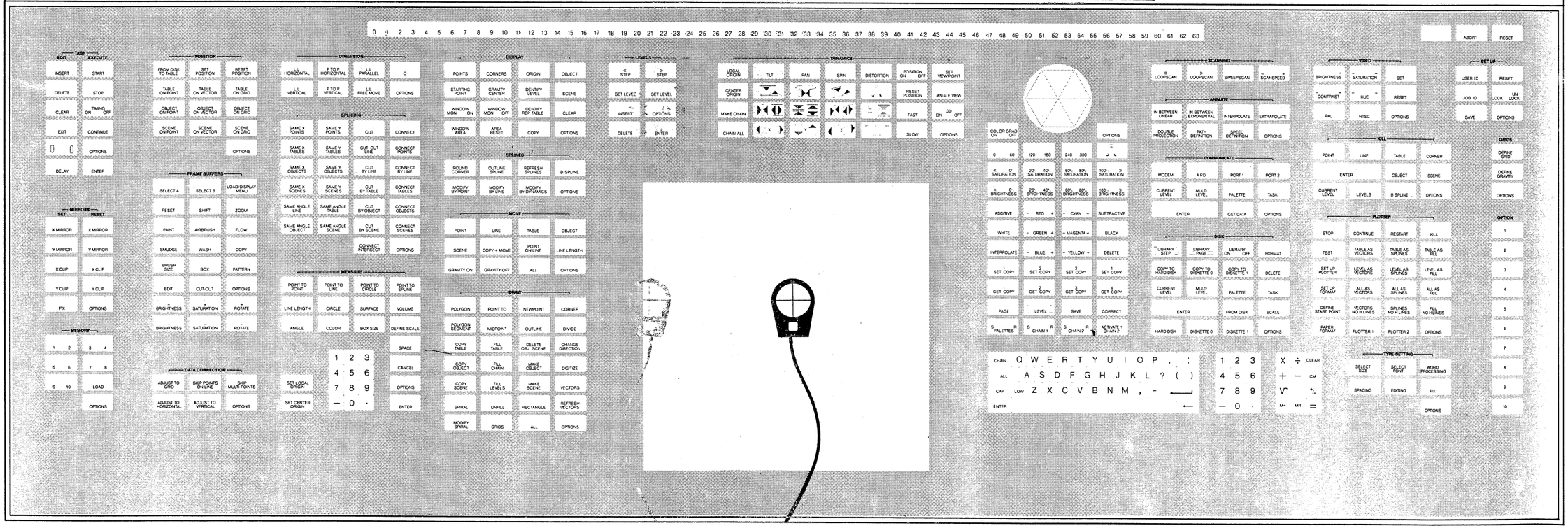
COLOUR CONTROL DISPLAY
Display for the colour system. The numbers 0-63 represent the 64 levels.

SYSTEM CONTROL DISPLAY
Displays graphic commands, measurements and active user information.

DISK CONTROL DISPLAY
Displays information from the disksystem, contents of the library memory.



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



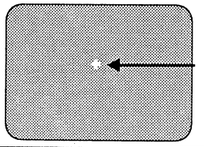

KEYBOARD
The table containing all the controls for the various functions for the machine.

LEDS
Light emitting diode (green or red); indicates which functions have been activated.


GRAPHIC TABLET
or Bitpad that the cursor controller 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 cross 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.

In this lesson the basic drawing functions will be discussed.

The Aesthedes computer allows to start a drawing from scratch, using the functions in the keyblock **DRAW**.
For being a **VECTOR** system this lesson is called: **DRAWING VECTORS**.

A vector is a line between two points (or co-ordinates), which can be created by activating the key **POINT TO** and using the **MOUSE** (or **CURSOR CONTROL**) on the graphic tablet.
The position of the mouse on the tablet controls the position of the **CURSOR** on the monitors.

Each time the **CCB** (=cursor control button) is depressed and released, will generate a point and a connecting line.
Any drawing created by two or more points is called a **TABLE**.

The system will never know when a drawing is complete. It will continue to generate points and connecting lines untill interrupted by another key command, or by re-initiating **POINT TO** to proceed another drawing.

When the last point of a drawing is positioned on the first point the table will be closed.

When creating, a new generated point can still be moved as long as the CCB is depressed.
The color of the point and connecting line is **RED** on the current level monitor. When the CCB is released the point and connecting line will be instantly fixed and turn **BLUE**.

Later on a point, line or table can be moved with the cursor and the respective keys in the keyblock **MOVE**. When the CCB is depressed the active part of the drawing will also turn red.
Consider a proper construction, then use the **MOVE** keys to make optical corrections.

The key **GRAVITY ON** in keyblock **MOVE** will be used to create exact horizontal and vertical lines.
The keys **SAME X POINTS** and **SAME Y POINTS** in the keyblock **SPLICING** will be used to line up points in horizontal and vertical position after all.

**NEW POINT** and **KILL POINT** will be used to add and remove points from a drawing.

The system allows to make copies of a table if desired.
The key **COPY+MOVE** in the keyblock **MOVE** is a double function, by which a table can be copied and moved away, while the CCB is kept depressed.

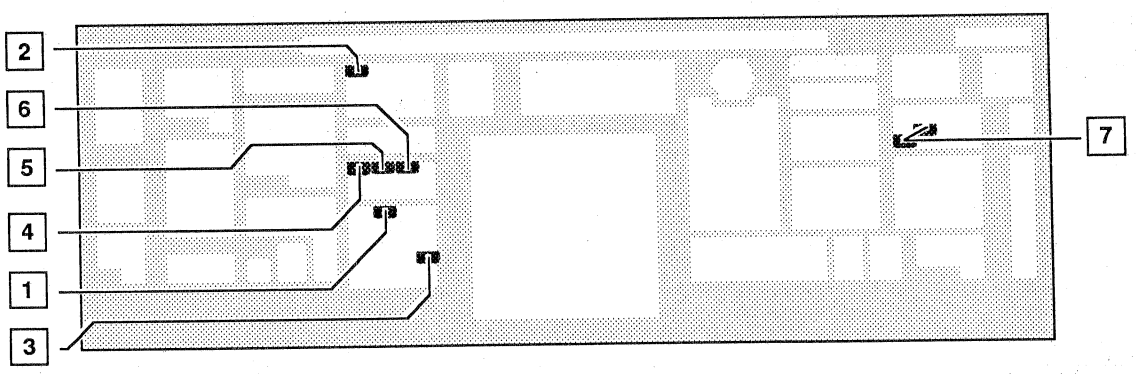
Because of the restricted resolution of the monitors the **WINDOW** can be used to zoom in a drawing. The image will be displayed on the lefthand monitor.

The key **CURRENT LEVEL** in the keyblock **KILL** can be used to clear the screen.

# LESSON 1 - 1

## DRAWING VECTORS (move)

| | KEYBLOCK | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 1 | DRAW | POINT TO | Use the cursor to make points.<br>Press CCB (Cursor Control Button) to make each point.<br>Points are repositionable as long as the CCB is depressed.<br>Points are always connected by lines.<br>Press POINT TO again for a new, separate drawing. |
| 2 | DISPLAY | POINTS | Display points in a drawing. |
| 3 | DRAW | REFRESH VECTORS | Clears the screen and redraws the vectors only. |
| 4 | MOVE | POINT | Points in a drawing can be moved.<br>Use the cursorand select a point to be moved.<br>When the CCB is depressed, the point may be moved. |
| 5 | MOVE | LINE | Lines can be moved.<br>Bring the cursor on the line (not on a point).<br>When CCB is depressed, the line may be moved. |
| 6 | MOVE | TABLE | A table is one group of vectors, connected to each other.<br>This may be moved in the same way as points or lines.<br>Bring the cursor on a point or a line.<br>When CCB is depressed, the table may be moved. |
| 7 | KILL | CURRENT LEVEL ENTER | Everything is cleared from the screen. |



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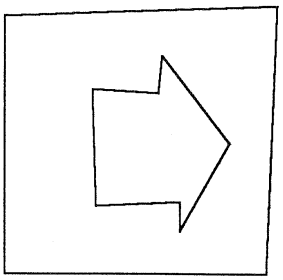

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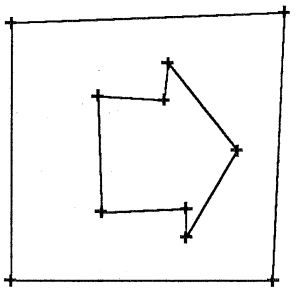

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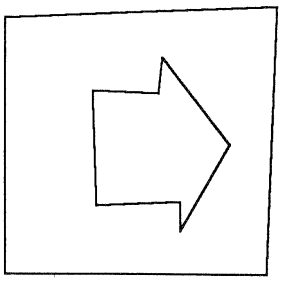

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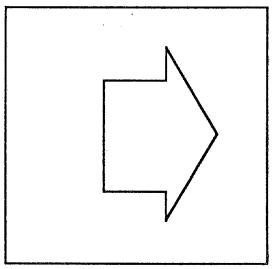

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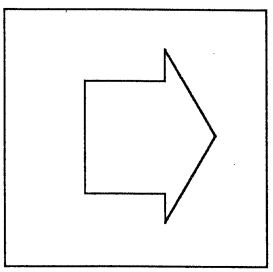

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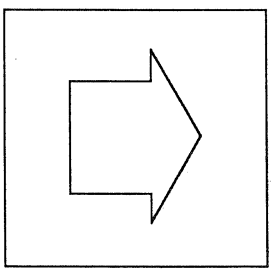
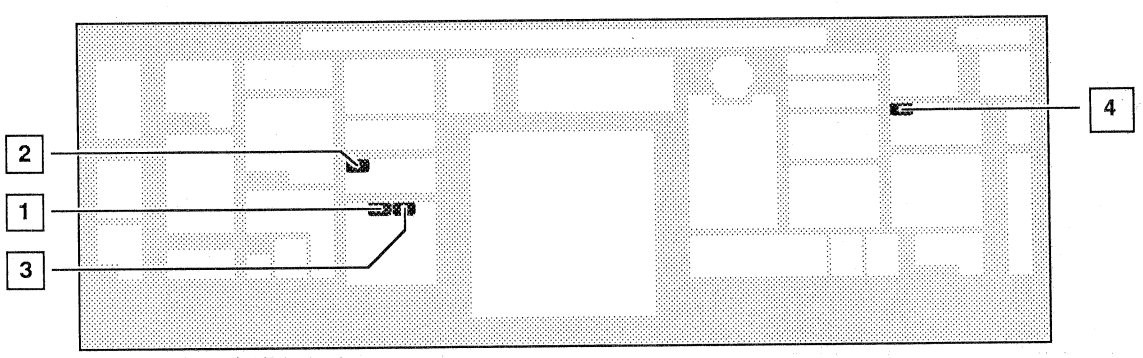


# LESSON 1 - 2

## DRAWING VECTORS (add and remove points)

| KEYBLOCK | | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 1 | DRAW | POINT TO | Start the drawing. |
| 2 | MOVE | POINTS | Move the points. |
| 3 | DRAW | NEWPOINT | Every touch of the CCB on a line, creates a newpoint.<br>If the CCB is kept depressed, the points may be moved immediately. |
| 4 | KILL | POINTS | If necessary, points can be removed. |



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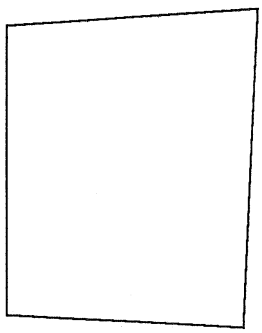

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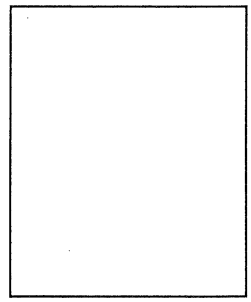

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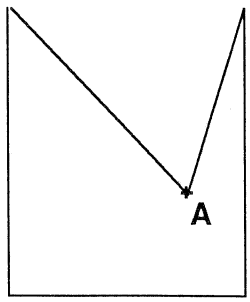
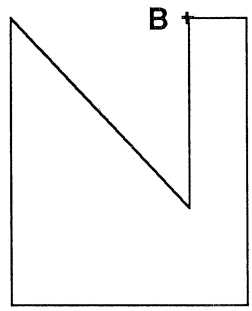
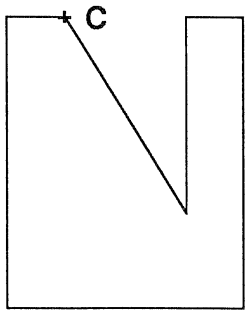
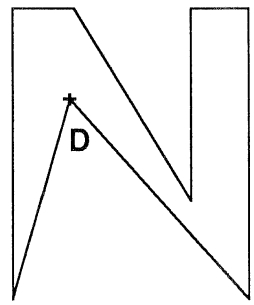
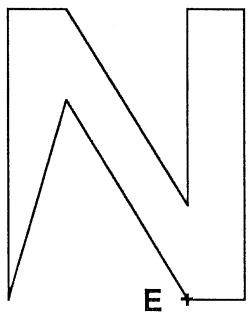
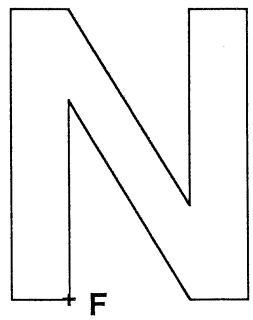


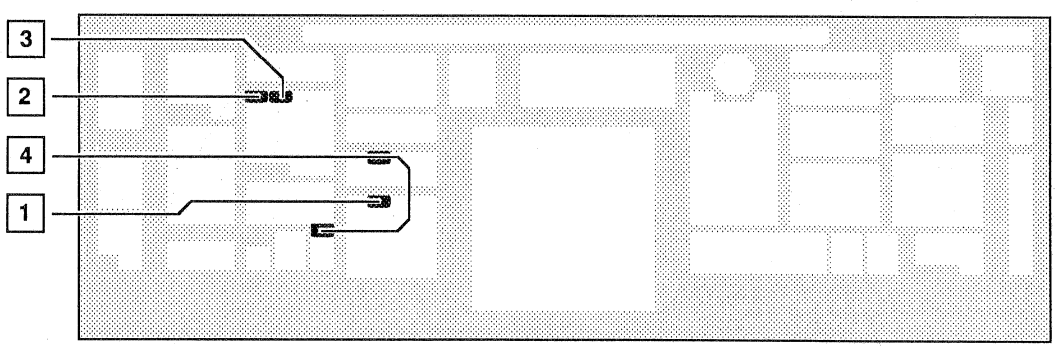



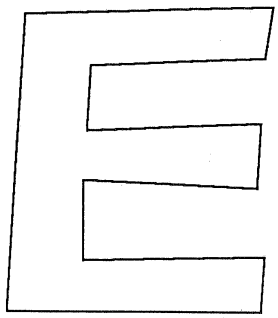



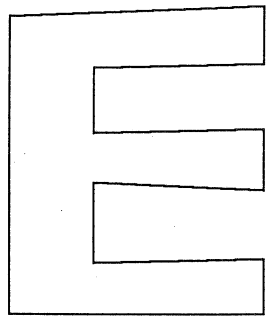



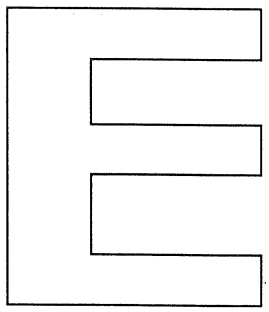



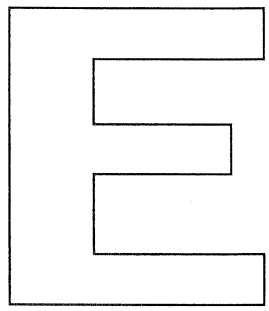
| KEYBLOCK | | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 1 | DRAW | POINT TO | Draw the character -E- roughly. |
| 2 | SPLICING | SAME X POINTS | Use SAME X POINTS to make lines vertical.<br>Touch two points. The first point will stay in position. The second point will chose the same x position, and will make the line vertical. |
| 3 | SPLICING | SAME Y POINTS | The same principle for horizontal lines. |
| 4 | MOVE + MEASURE | LINE<br>SPACE | Using these two functions in sequence allows a line to be moved parallel to its original position. |



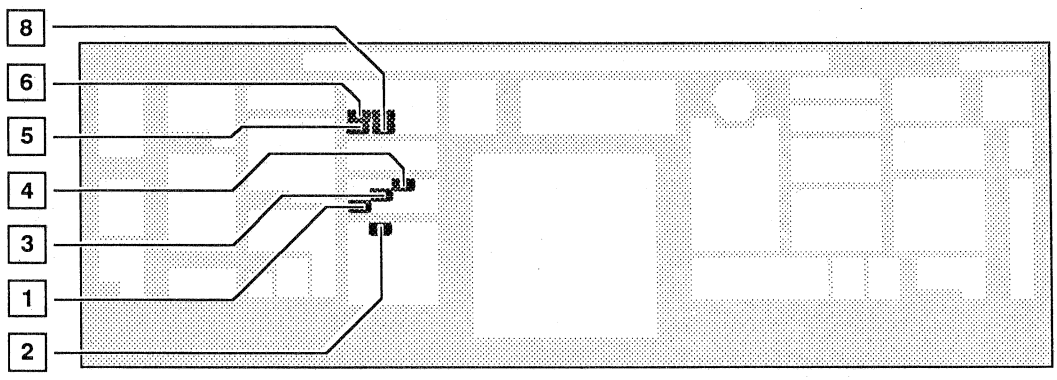
1 

2 

3 

4 

| | KEYBLOCK | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 1 | MOVE | GRAVITY ON | This function gives the possibility to draw absolute horizontal and vertical lines. |
| 2 | DRAW | POINT TO | Start to draw a rectangle.<br>Notice that the line "snaps" into position.<br>While drawing, the gravity area is 10 mm in both directions. |
| 3 | MOVE | COPY + MOVE | This function copies a table and simultaniously moves the copy with the CCB. Repeat this3 times. (see example) |
| 4 | MOVE | TABLE | Reposition the 3 copies. (see example)<br>Notice: While moving, it seems there is no gravity anymore.<br>Well there is, but in a smaller area, 2 mm.<br>This is hard to see, so we are going to use the window. |
| 5 | DISPLAY | WINDOW AREA | Bring the cursor on a line of the window area, press CCB and move inside.<br>Now, bring the cursor inside or outside the area, press CCB and position the window on the middle part of the drawing. |
| 6 | DISPLAY | WINDOW MON. ON | The left monitor displays a magnified view of the area within the window. |
| 7 | MOVE | TABLE | Bring the cursor on the points of the tables (not the lines) and move them around.<br>Now it's possible to position them on equal distance. |
| 8 | DISPLAY | WINDOW MON. OFF, AREA RESET | Switches off the window monitor and resets the window area to his original size and position. |



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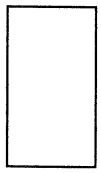

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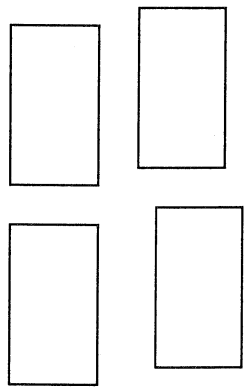

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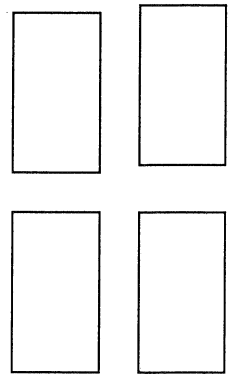

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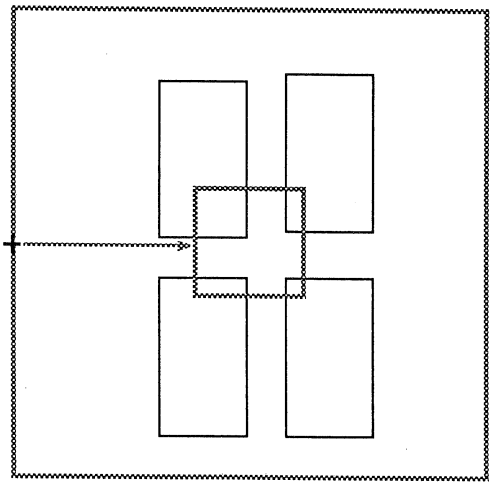

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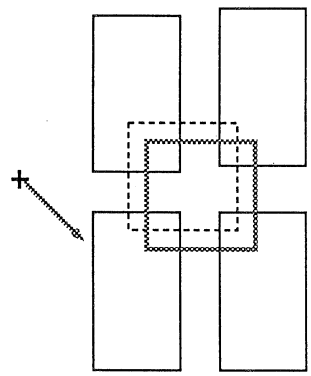

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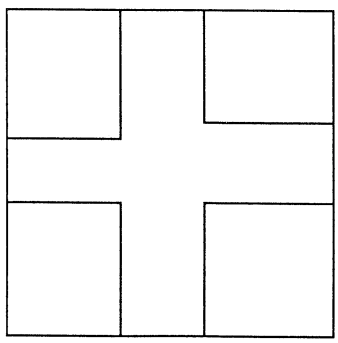

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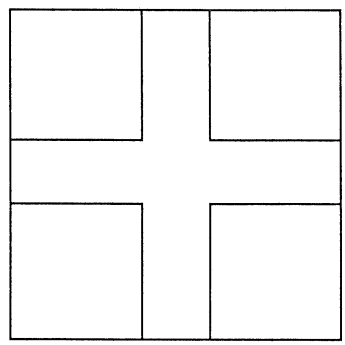


A polygon is a preprogrammed equal - sided figure in which all angles are the same.

The **POLYGON** key in the keyblock **DRAW** plus a numeric input in the keyblock **MEASURE**, will create any polygon between 3 and 1000 sides.

Many times polygons are used as a base for a drawing.

Like **POINT TO** drawings, polygons are composed of points and can be modified by any **MOVE** function.

Instead of using the cursor-controlled move functions, the **DYNAMICS** keyblock can be activated for manipulations. Such as: zoom, x and y scale, rotation, italic and x and y moves.
These manipulations can be carried out by pressing on the **PICTORIAL SYMBOL** labeled keys, or by numeric input on the middle data display.

For some of the dynamic functions the **ORIGIN** (vanishing point) of a table is quite important.
Modifications with zoom, x and y scale, rotation and italic are always related to the origin.

The origin of a polygon or a point to drawing will always be in the centre of the monitor. It can be repositioned on any choosen location with the keys **SET LOCAL ORIGIN** or **SET CENTRE ORIGIN** in the keyblock **MEASURE.**

The functions in the **DISPLAY** keyblock can give all sorts of information. The **ORIGIN** key displays the origin of a table as a small red circle on the current level monitor after designating a table with the cursor.

The key **REFRESH VECTORS** in **DRAW** will clear this information.

Tables can be copied by using **COPY TABLE** in the keyblock **DRAW.**
One copy is made by one press on the CCB while designating the table.
The copy will be exactly on top of the original.
Later on the copy can be moved with **MOVE TABLE.**

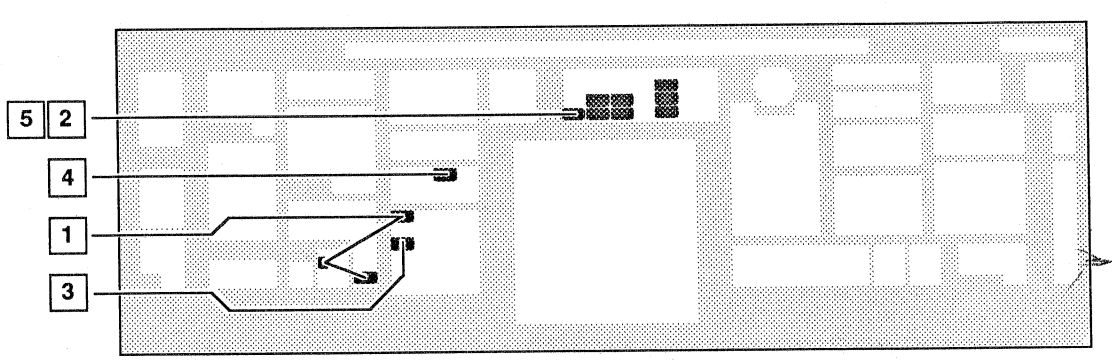
Any drawing stored on disk can be recalled on the screen. The key **FROM DISK** in the keyblock **DISK**, plus a (file)name typed on the alpha-numeric keyboard, will show the drawing.

The disk will be fully explained in **LESSON 20.**

# LESSON 2 - 1

## POLYGONS (dynamics)

| | KEYBLOCK | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 1 | DRAW | POLYGON 4 ENTER | A preprogrammed polygon appears on the screen.<br>The minimum is a polygon 3.<br>The maximum is a polygon 1000. |
| 2 | DYNAMICS | CHAIN ALL | This key activates the dynamics functions for all the tables in the selected level. |
| | | | ZOOM. |
| | | | X SCALE. |
| | | | Y SCALE. |
| | | | ROTATE. |
| | | | ITALIC. |
| | | X | X MOVE. |
| | | Y | Y MOVE. |
| 3 | DRAW | COPY TABLE | To make one copy, touch the table once. |
| 4 | MOVE | TABLE | Move the copy to another position.<br>Repeat copy table / move table. |
| 5 | DYNAMICS | MAKE CHAIN | Select some tables with the cursor.<br>To close the chain, touch the last one twice.<br>The dynamic functions are active for the selected group. |



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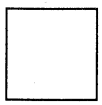

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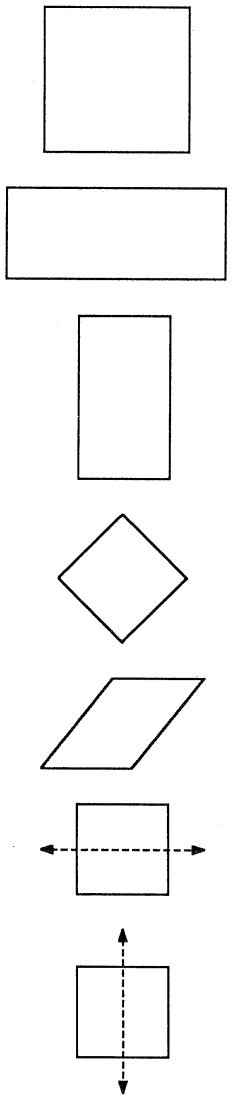

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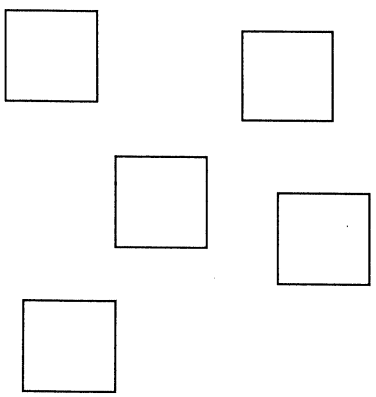

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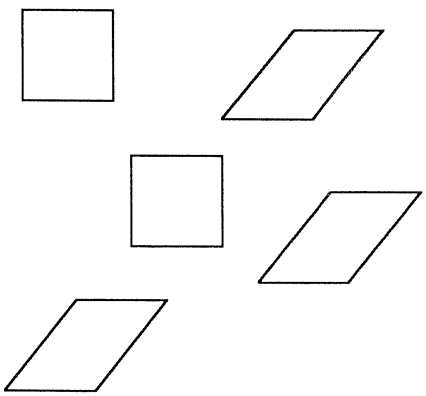
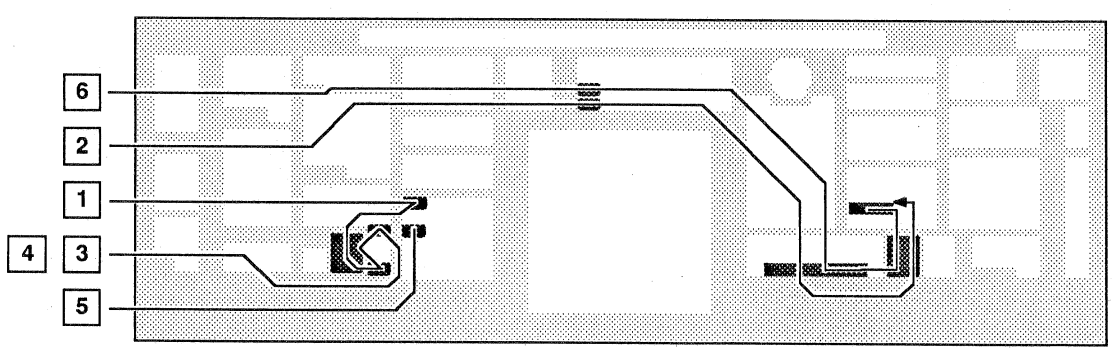


| | KEYBLOCK | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 1 | DRAW | POLYGON 4 ENTER | The polygon appears on the screen. |
| 2 | DYNAMICS | CHAIN ALL SPACE MENU<br>4 ENTER | A list of the dynamic functions appears on the middle data-monitor.<br>zoom<br>x scale<br>y scale<br>rotate<br>italic<br>x move<br>y move<br>distortion<br>Use the cursor while pressing CCB to select the different functions.<br>Select zoom and type in: 4 (means 400%). |
| 3 | DYNAMICS | SPACE MENU<br>4 5 ENTER | Select rotate and type in: 45 (means 45°). |
| 4 | DYNAMICS | SPACE MENU<br>0 . 7 5 ENTER | Select x scale and type in: 0.75 (means 75%). |
| 5 | DRAW | COPY TABLE | Make one copy. |
| 6 | DYNAMICS | MAKE CHAIN<br>SPACE MENU<br>0 . 8 ENTER | Touch the copy twice.<br>Press space, select zoom and type in 0.8 |



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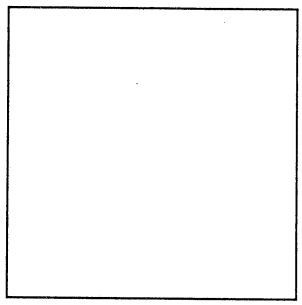

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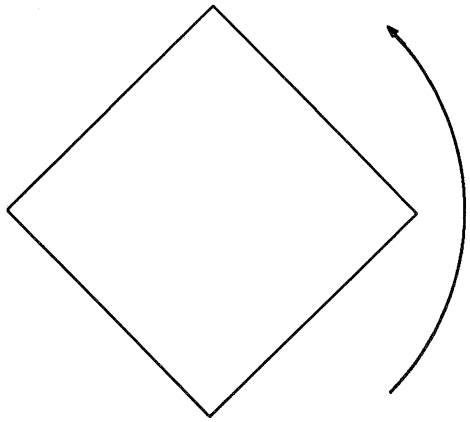

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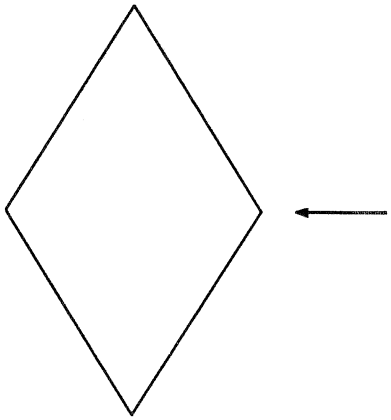

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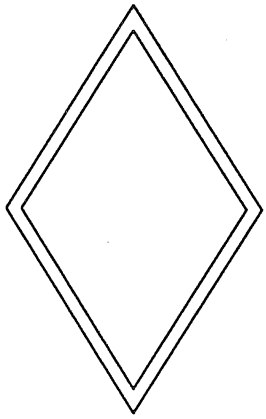
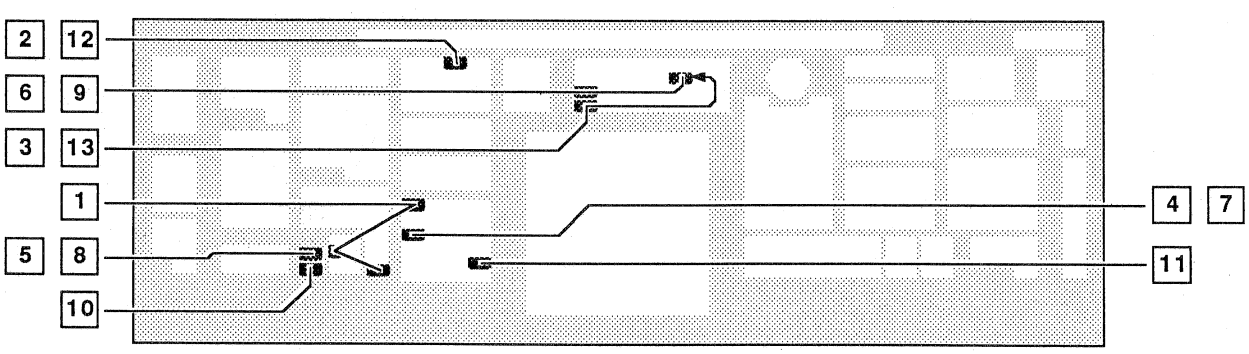


| | KEYBLOCK | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 1 | DRAW | POLYGON 4 ENTER | The polygon appears on the screen. |
| 2 | DISPLAY | ORIGIN | Touch the polygon with the cursor and the origin will be displayed as a small circle. If a drawing is created with one of the drawing functions the origin always will be in the centre of the screen. |
| 3 | DYNAMICS | CHAIN ALL | Count 9 steps on rotate. This equals with 45°. Fast = 5° per step. Slow = 1° per step. |
| 4 | DRAW | COPY TABLE | Make one copy. |
| 5 | MEASURE | SET LOCAL ORIGIN | Touch the copy twice, then (third time) position the new origin of the copy on the left point. |
| 6 | DYNAMICS | MAKE CHAIN | Touch the copy twice and rotate 180°. |
| 7 | DRAW | COPY TABLE | Make one copy of the original again. |
| 8 | MEASURE | SET LOCAL ORIGIN | Position the new origin on the right point. |
| 9 | DYNAMICS | MAKE CHAIN | Rotate the copy 180°. |
| 10 | MEASURE | SET CENTER ORIGIN ALL | This will reset the origin of all tables to the centre of the screen. |
| 11 | DRAW | REFRESH VECTORS | |
| 12 | DISPLAY | ORIGIN | Touch all the tables. |
| 13 | DYNAMICS | CHAIN ALL | Rotate the polygons 90°. |



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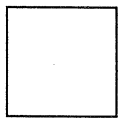

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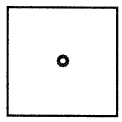

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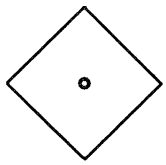

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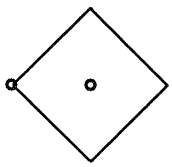

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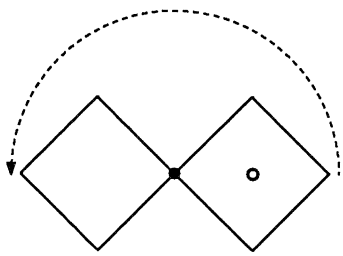

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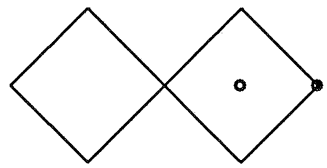

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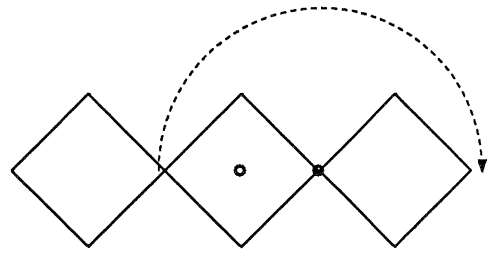

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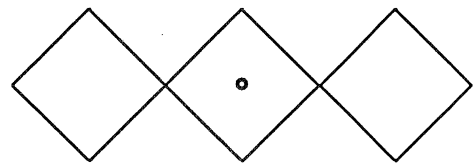

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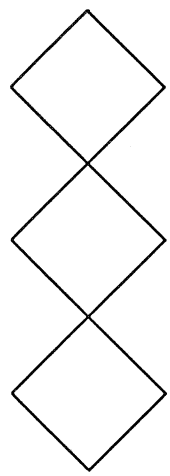
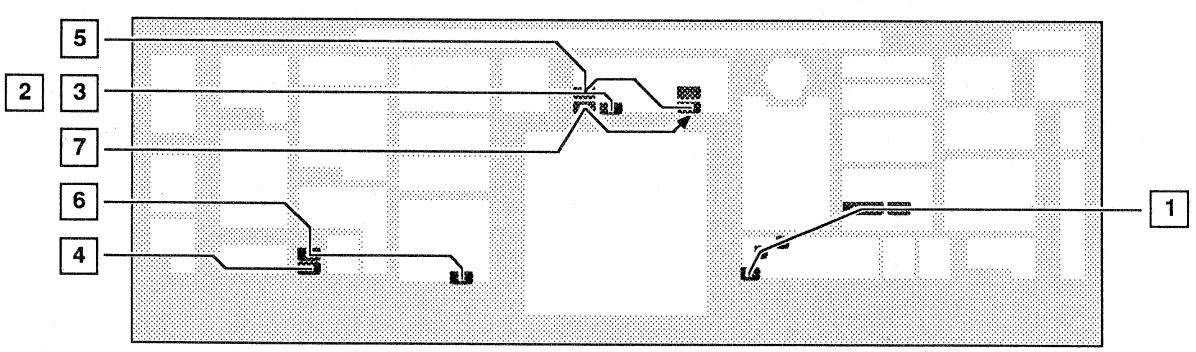


# LESSON 2 - 4 (dynamics / origins)

| | KEYBLOCK | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 1 | DISK | FROM DISK · ENTER · A · ENTER<br>FROM DISK · ENTER · E · ENTER | The -A- appears on the screen.<br>The -E- appears on top of the -A-. |
| 2 | DYNAMICS | MAKE CHAIN | Touch the two tables of the -A- (the last one twice) and move it to the left. |
| 3 | DYNAMICS | MAKE CHAIN | Touch the -E- twice and move it to the right. |
| 4 | MEASURE | SET LOCAL ORIGIN | Touch the two tables of the -A- (the last one twice) and position the origin. (see example) |
| 5 | DYNAMICS | MAKE CHAIN | Make the -A- italic. |
| 6 | MEASURE | SET CENTER ORIGIN · ALL | |
| 7 | DYNAMICS | CHAIN ALL | Make both characters italic to the other side.<br>Enlarge the size with zoom. |



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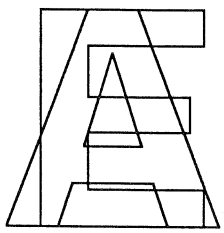

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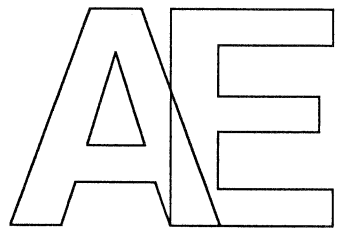

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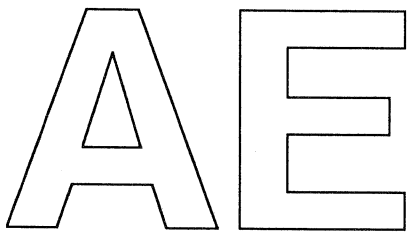

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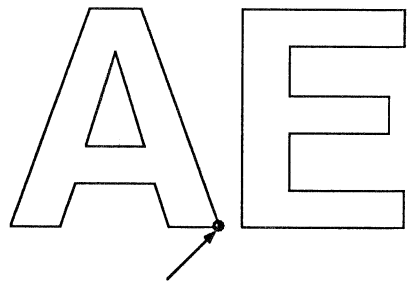

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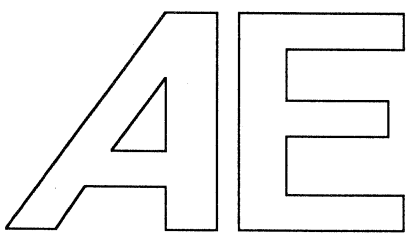

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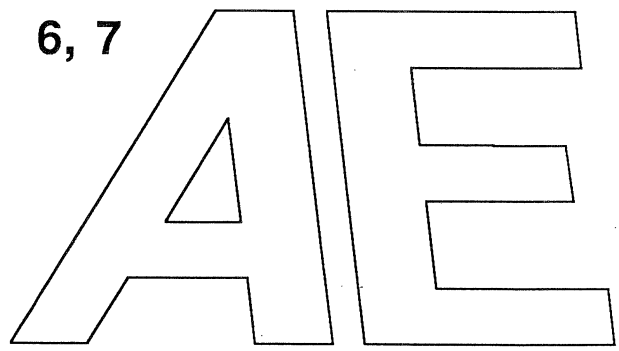


In creating images, the functions in the keyblock **SPLICING** are essential.

The keys **CUT** and **CUT BY LINE** enable to sever points, lines and tables.

The keys **CONNECT**, **CONNECT POINTS**, **CONNECT BY LINE** and **CONNECT TABLES** will join points, lines and tables.

These functions are cursor controlled.

The key **CUT** is used to cut a drawing on a point or line.
As long as te CCB is kept depressed, the cursor can be moved along a line. When it is released the cutting point is fixed and visible on the monitor. This point is really two points and can be moved one at the time with **MOVE POINT**.

The key **CUT BY LINE** is used to cut a drawing by a straight line. The line will act as a knife on any intersection point.

The key **CONNECT** will fuse two points. These points have to stand close to each other.

The key **CONNECT POINTS** will do the same over a longer distance. Both points have to be designated while the first one will be the reference point and the second one will be the match point.

The key **CONNECT BY LINE** will join two open points with a staight line.
It does not work on a point which already connects two lines.

The key **CONNECT TABLES** will join two tables. Designate a reference point on the first table and a matching point on the second one. The second table will shift in such a way that reference and match points are superimposed.

**OUTLINE** in the keyblock **DRAW** is a function which will increase or decrease the size of a table. It will make a parallel line outside or inside the original position of a table. Do not mix up this function with **ZOOM**.

The key **FILL CHAIN** is used to fill any drawing.
A table will not fill when it is not closed or when there is an unnoted copy on top.

**OUTLINE** and **FILL CHAIN** are also cursor controlled functions.

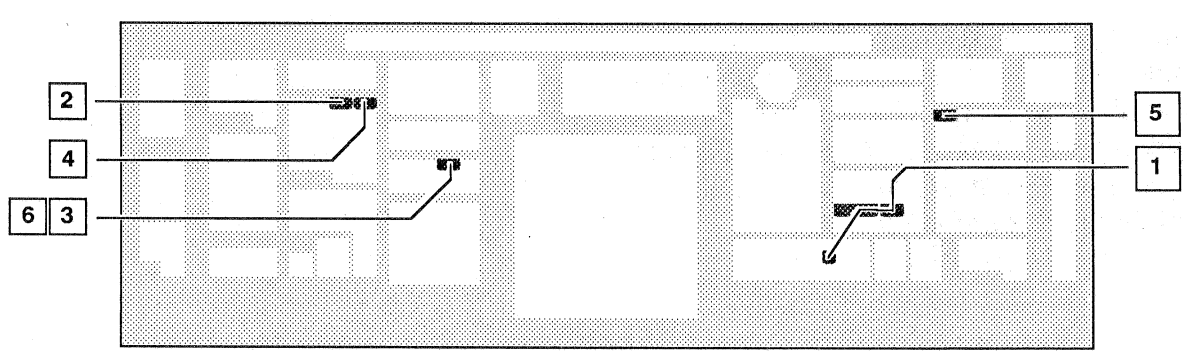
Contrary to **OUTLINE**, **FILL CHAIN** can be used in combination with **ALL**. This will fill all tables in a current level.

The keys **LINE** and **TABLE** in the keyblock **KILL** are used to remove parts of a drawing.
**KILL LINE** will only remove a line between two points.

# LESSON 3 - 1



| | KEYBLOCK | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 1 | DISK | FROM DISK, ENTER, K, ENTER | The character - K - appears on the screen. |
| 2 | SPLICING | CUT | Use the cursor and cut two lines. |
| 3 | MOVE | TABLE | Move seperated part away and reposition it again. |
| 4 | SPLICING | CONNECT | Connect the cutted points. |
| 5 | KILL | POINTS | Remove the points that are redundant. |
| 6 | MOVE | TABLE | Move the -K- around. |



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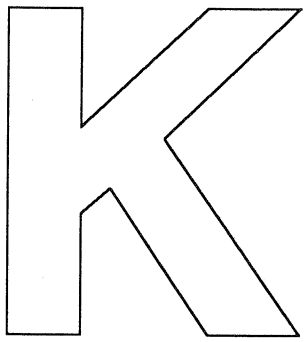

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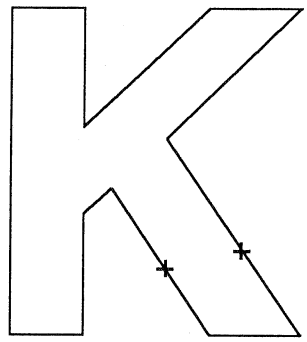

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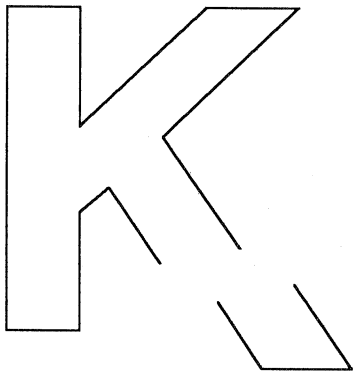

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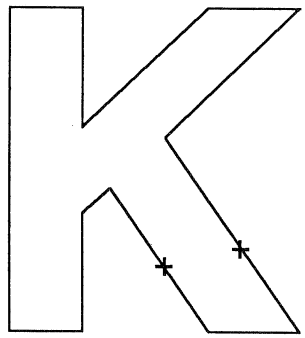

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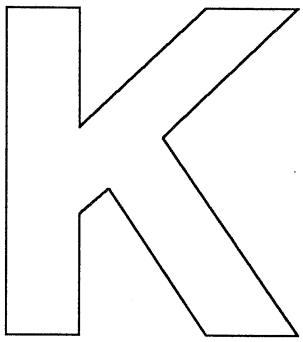

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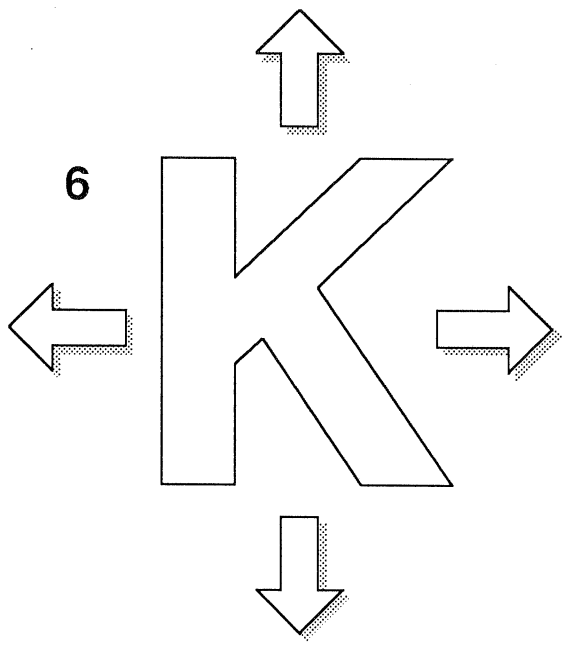
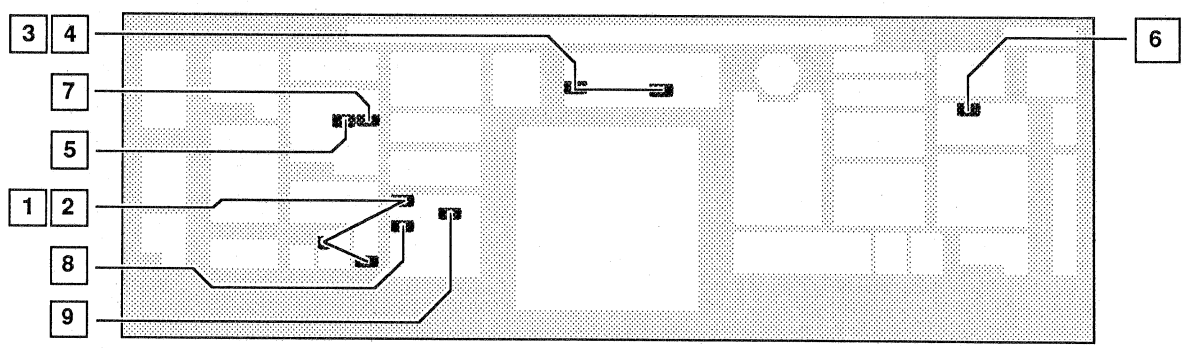


| | KEYBLOCK | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 1 | DRAW | POLYGON 4 ENTER | |
| 2 | DRAW | POLYGON 8 ENTER | |
| 3 | DYNAMICS | MAKE CHAIN | Touch the polygon 4 twice and enlarge it with ZOOM. |
| 4 | DYNAMICS | MAKE CHAIN | Touch the polygon 8 twice and enlarge it with ZOOM. |
| 5 | SPLICING | CUT BY LINE | Touch the angled line of the polygon 8. These lines will cut the polygon 4. |
| 6 | KILL | LINE | Kill the middle cutted lines of the polygon 4 and also the angled lines of the polygon 8. |
| 7 | SPLICING | CONNECT BY LINE | Designate the open points to be connected. |
| 8 | DRAW | COPY TABLE | Touch the drawing and press CCB once. |
| 9 | DRAW | OUTLINE | Use the cursor, bring it to the copy, depress CCB and pull the copy inside.<br><br>Notice that the outline function gives a parallel line. |



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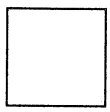

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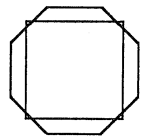

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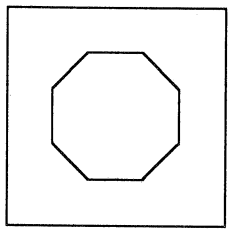

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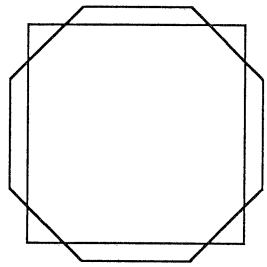

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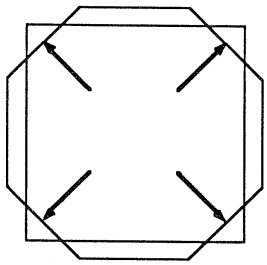

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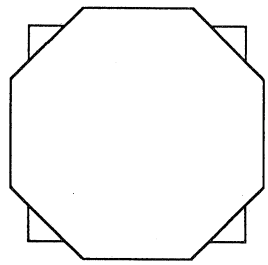

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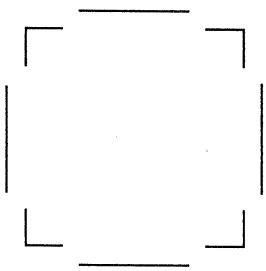

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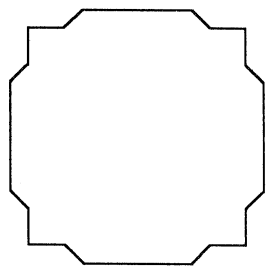

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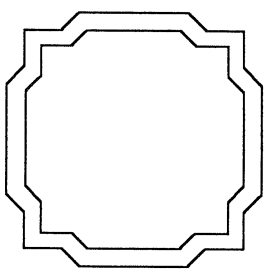
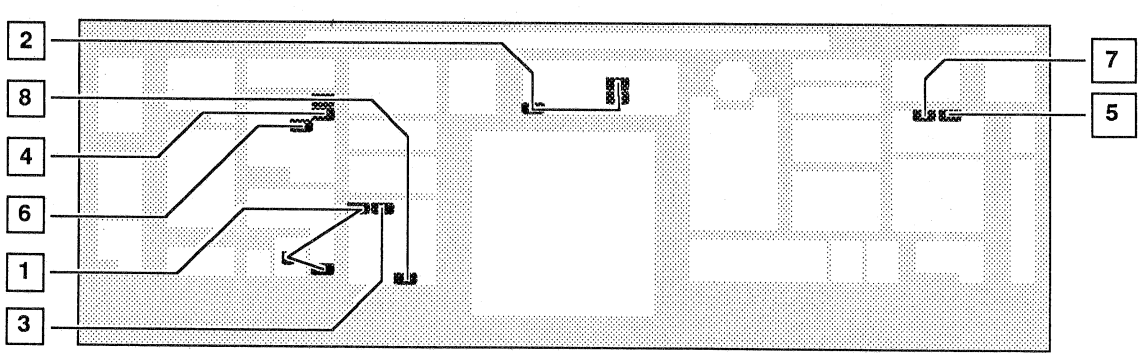
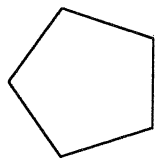


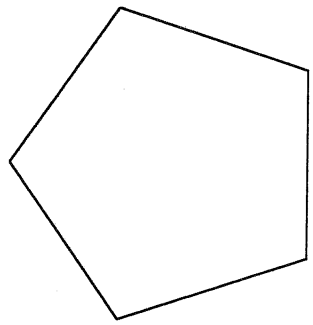
| | KEYBLOCK | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 1 | DRAW | POLYGON 5 ENTER | |
| 2 | DYNAMICS | CHAIN ALL | Activate with CHAIN ALL and use ZOOM to enlarge the polygon. Than ROTATE until the bottom line is horizontal. |
| 3 | DRAW | POINT TO | Draw a 5 point star inside. Use the points of the polygon as a reference. (roughly). Continue the drawing from 1 to 6. |
| 4 | SPLICING | CONNECT POINTS | Designate a point of the polygon first, than a corresponding point of the star. |
| 5 | KILL | TABLE | Kill the polygon 5. |
| 6 | SPLICING | CUT BY LINE | Touch the 5 lines of the star in the middle. |
| 7 | KILL | LINE | Kill the inner parts. |
| 8 | SPLICING | CONNECT ALL | |



1



2A



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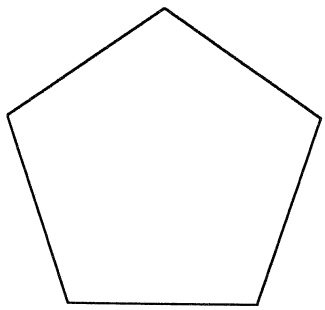

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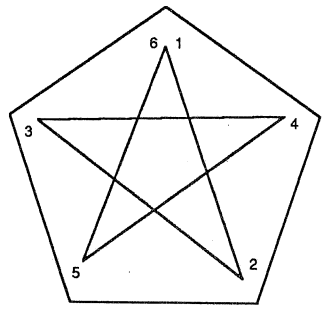


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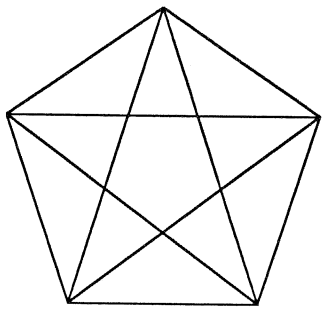

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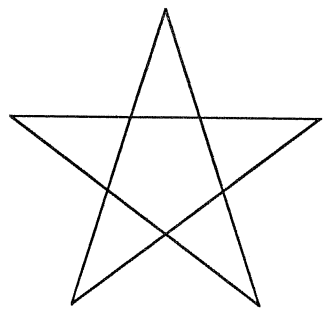

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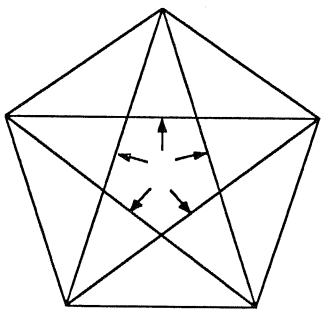

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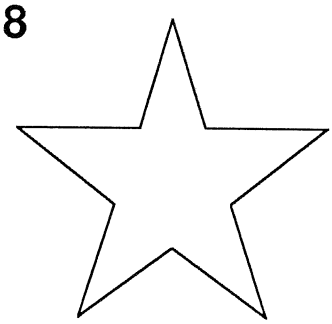
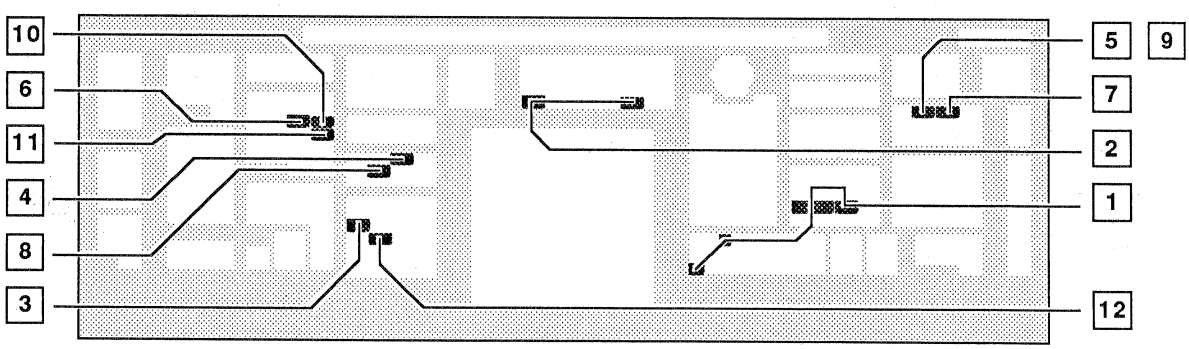


# LESSON 3 - 4

## SPLICING

| | KEYBLOCK | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 1 | DISK | FROM DISK · ENTER · E · ENTER | The -E- appears on the screen. |
| 2 | DYNAMICS | CHAIN ALL · | Make the character italic. |
| 3 | DRAW | COPY TABLE · | Make one copy of the -E-. |
| 4 | MOVE | TABLE · | Move the copy to create the shadow. (see example). |
| 5 | KILL | LINE · | Kill the lines of the shadow. (see example). |
| 6 | SPLICING | CUT BY LINE · | Use the horizontal lines of the -E- to cut the lines of the shadow. (see example). |
| 7 | KILL | TABLE · | Kill the cutted parts. |
| 8 | MOVE | COPY + MOVE · | Make a copy of the -E-. Keep CCB depressed and move the copy away. |
| 9 | KILL | LINE · | Kill the needles lines of the original -E- to create the shadow. |
| 10 | SPLICING | CONNECT BY LINE · | Designate the open points to be connected. |
| 11 | SPLICING | CONNECT TABLES · | Select a reference-point on the shadow. Than select the corresponding point on the -E-. |
| 12 | DRAW | FILL CHAIN · | Touch the 3 parts of the shadow. Press CCB for the last one twice. |



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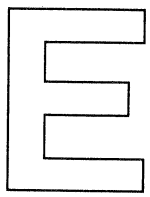

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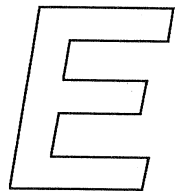

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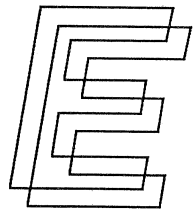

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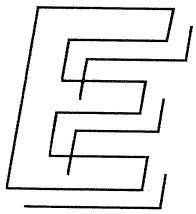

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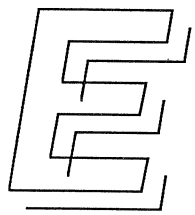

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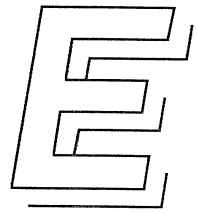

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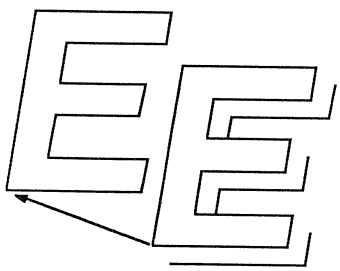

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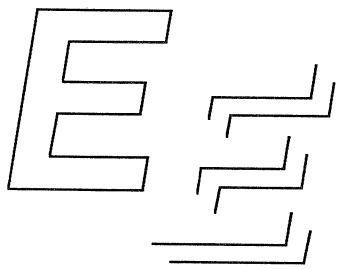

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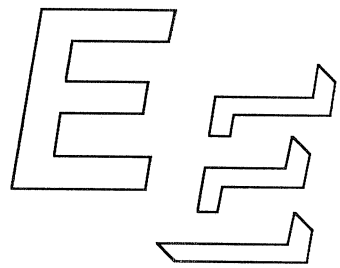

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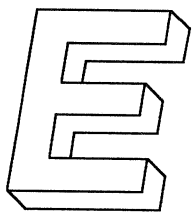

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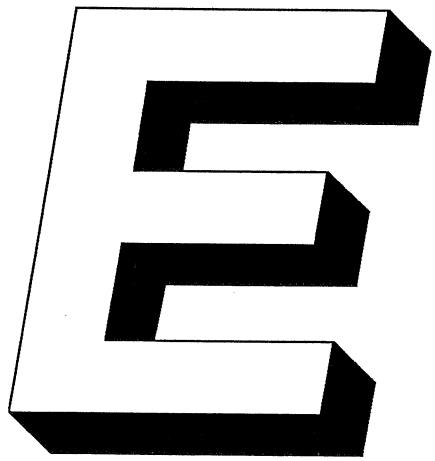


When curves and round shapes are required, the keyblock **SPLINES** can be used.

Instead of drawing a lot of points, the system can calculate automatically a curve through the imaginary midpoints of the vectors in a table.

The key **B-SPLINE** will instandly curve a table, after designating with the cursor. The vectors still exist and the points are used as controlpoints when modifying the spline with the key **MODIFY BY POINT.**

**MODIFY BY LINE** will do the same over a larger area.

The key **REFRESH SPLINES** works the same as **REFRESH VECTORS.**
It clears the screen and redraws the splines.

On any point a spline can be interrupted. The key **CORNER** in the keyblock **DRAW** can be used to create sharp corners.

Sometimes it is necessary to see vectors as well as splines to judge the right construction. Therefore activiate the key **VECTORS** in the keyblock **DRAW.** It will show the vectors and leave the splines.

An other part in this lesson is the use of the keyblock **MIRROR.**

The system has **X** and **Y MIRRORS** which intersect at the centre of the screen.

**RESET** is the non-active and **SET** is the active position for the keys.

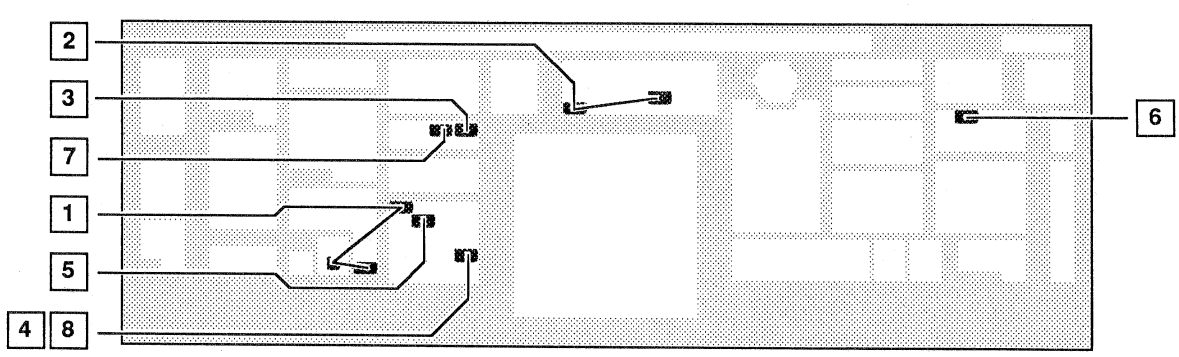
When **X, Y** or both **MIRRORS** are activated, a reflection will be shown. This reflection is not real and cannot be modified until the key **FIX** is pressed.

The **X-** and **Y CLIP** keys will cut of an image on the mirror lines.
Here also, **FIX** will make this permanent.

# LESSON 4 - 1



| | KEYBLOCK | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 1 | DRAW | POLYGON 8 ENTER | The polygon 8 appears on the screen. |
| 2 | DYNAMICS | CHAIN ALL | Enlarge the polygon with ZOOM. |
| 3 | SPLINES | B-SPLINE | Use the cursor and touch the polygon somewhere. |
| 4 | DRAW | VECTORS | This function displays the vectors as well. Notice that the spline curves the polygon on the inside and touches the vectors in the middle. |
| 5 | DRAW | MIDPOINT | Draw midpoints on the righthand angled lines. |
| 6 | KILL | LINE | Kill the 3 lines on the right side. (see example). |
| 7 | SPLINES | REFRESH SPLINES | Refreshes the screen and displays the new spline. |
| 8 | DRAW | VECTORS | Shows the vectors as well. Notice that the curve of the remaining part has not changed. |



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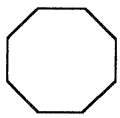

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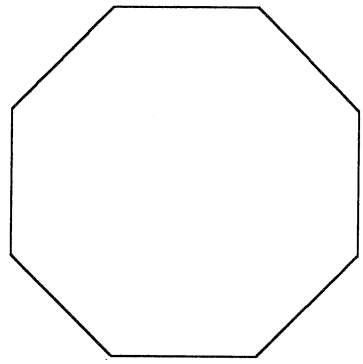

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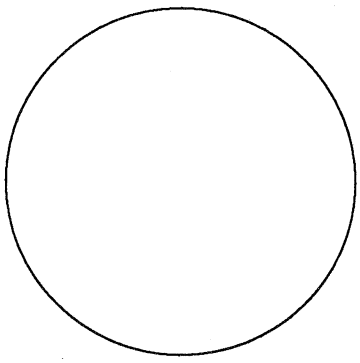

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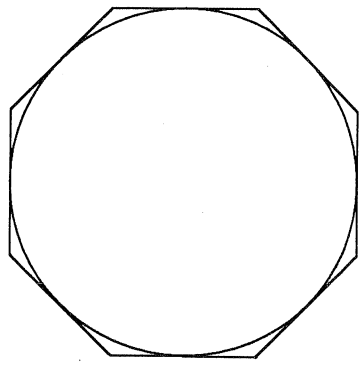

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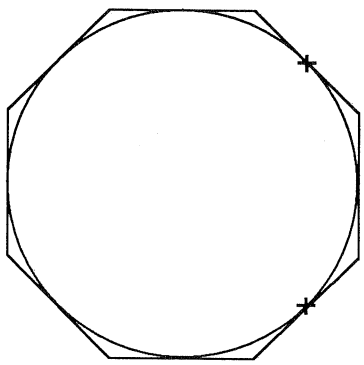

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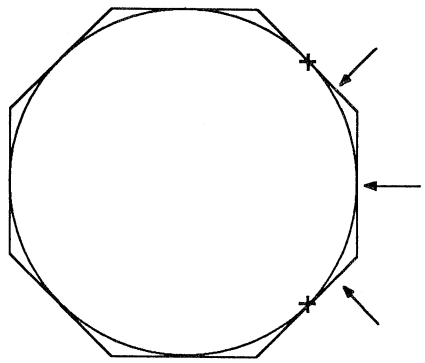

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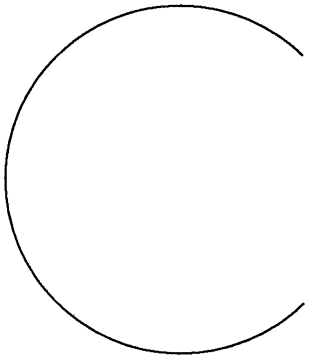

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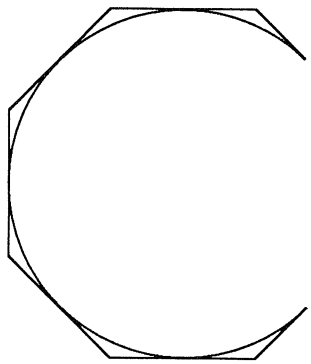
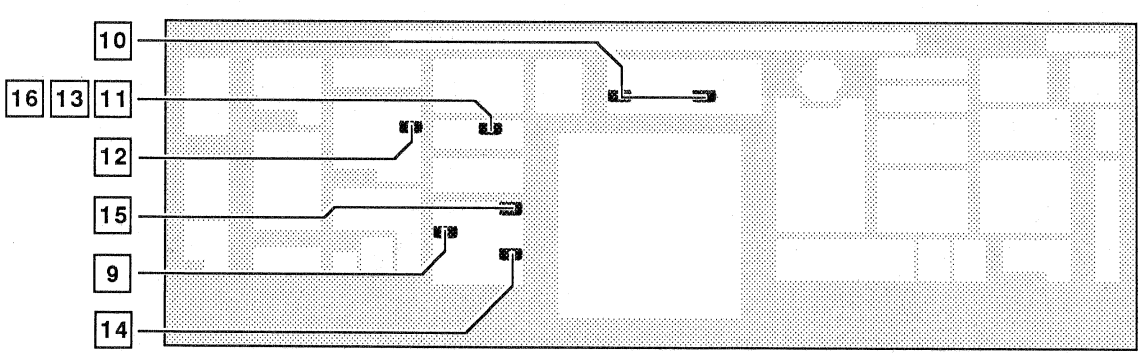


| KEYBLOCK | | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 9 | DRAW | COPY TABLE | Make one copy. |
| 10 | DYNAMICS | MAKE CHAIN | Touch the copy twice and reduce it with ZOOM. |
| 11 | SPLINES | REFRESH SPLINES | Displays the splines of both tables. |
| 12 | SPLICING | CONNECT BY LINE | Connect the end-points by line. |
| 13 | SPLINES | REFRESH SPLINES | The new lines are integrated in the spline as well. |
| 14 | DRAW | VECTORS | |
| 15 | DRAW | CORNER | To create sharp points use the cursor and depress CCB on these points. |
| 16 | SPLINES | REFRESH SPLINES | |



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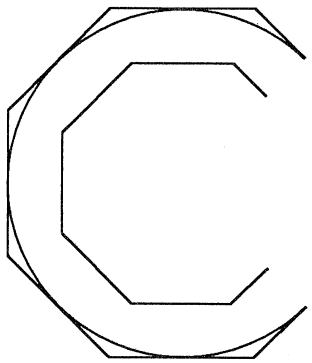

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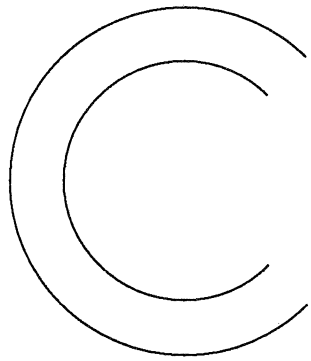

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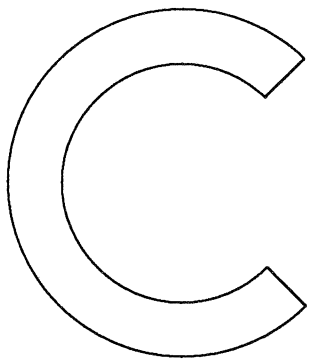

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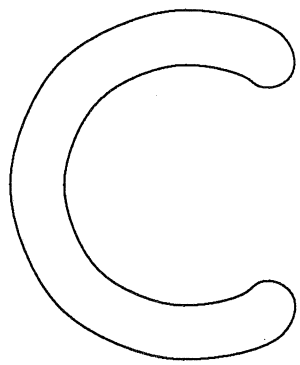

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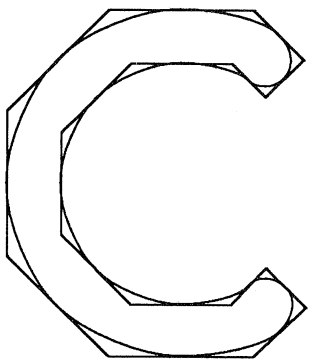

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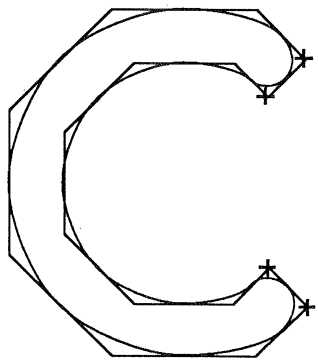

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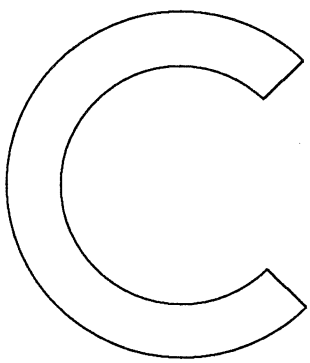
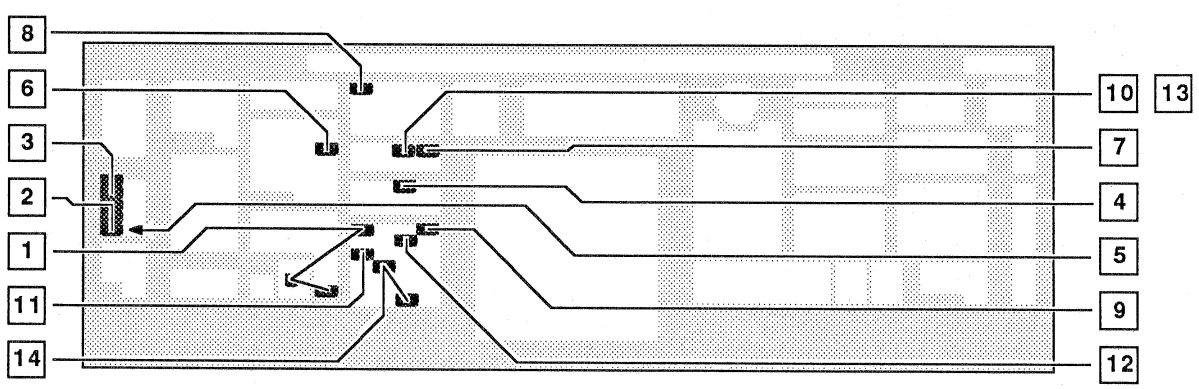
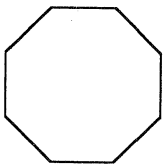
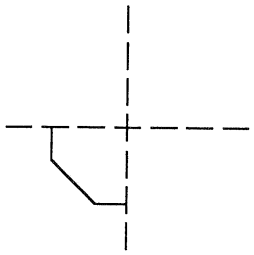
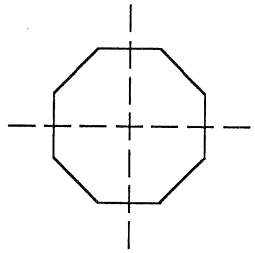


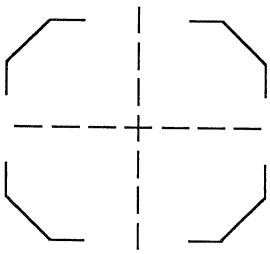
| | KEYBLOCK | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 1 | DRAW | POLYGON 8 ENTER | The polygon 8 or 16 is used for round-corners. |
| 2 | MIRRORS SET | X CLIP Y CLIP FIX | The polygon may be cut off at the mirror-lines by pressing X and Y CLIP in the set position. FIX makes this permanent. |
| 3 | MIRRORS SET | X MIRROR Y MIRROR | X and Y MIRROR in set position gives the reflection of the lower left quadrant. |
| 4 | MOVE | TABLE | Move the lower left part down/left. |
| 5 | MIRRORS | FIX | Will make the images permanent. |
| 6 | SPLICING | CONNECT BY LINE | Connect the open parts. |
| 7 | SPLINES | B-SPLINE | Touch the table. Notice that the round corners are not right yet. |
| 8 | DISPLAY | POINTS | Shows the points. |
| 9 | DRAW | CORNER | Make corners on the points where the spline should start. |
| 10 | SPLINES | REFRESH SPLINES | Shows the better form. |
| 11 | DRAW | COPY TABLE | Make one copy.<br>The copy is displayed as vectors. |
| 12 | DRAW | OUTLINE | Bring the copy inside. |
| 13 | SPLINES | REFRESH SPLINES | Gives the splines of both. |
| 14 | DRAW | FILL CHAIN ALL | Will fill the space between the tables automatically. |

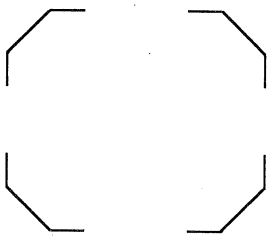


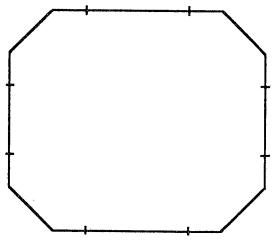
1 

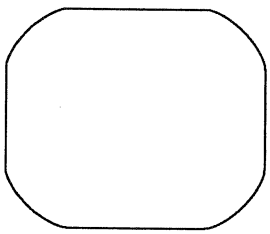
2 

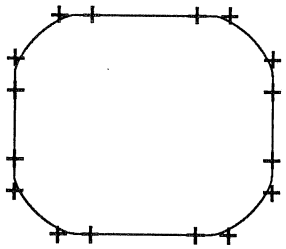
3 

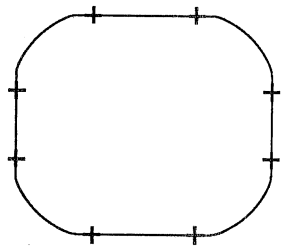
4 

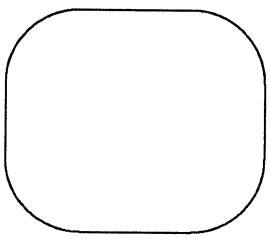
5 

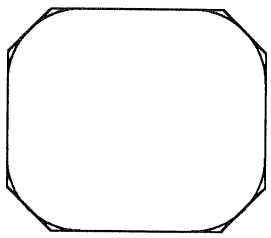
6 

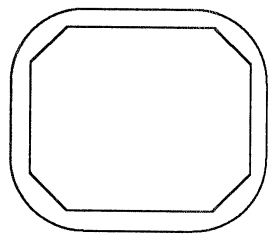
7 

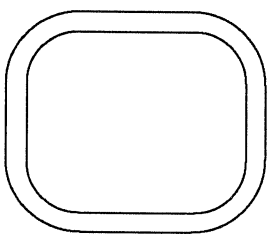
8 

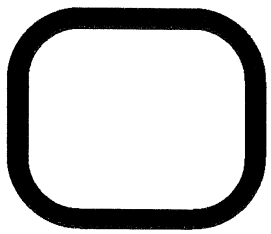
9 

10 

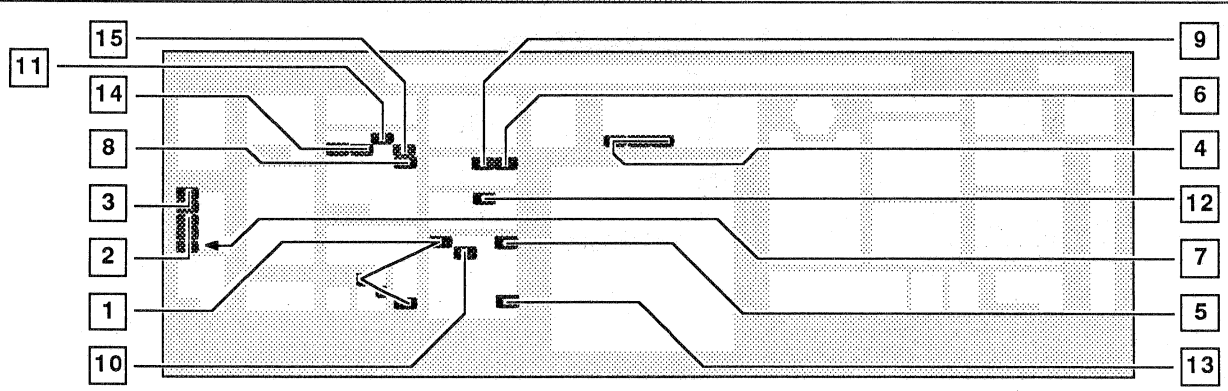
11 

12 

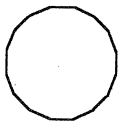
13 

14 

| | KEYBLOCK | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 1 | DRAW | POLYGON 1 6 ENTER | Now the polygon 16 is used to create round corners. |
| 2 | MIRRORS SET | X CLIP Y CLIP FIX | Gives the lower left part of the polygon. |
| 3 | MIRRORS SET | X MIRROR Y MIRROR | Gives the reflection of the lower left part. |
| 4 | DYNAMICS | CHAIN ALL X Y | Count 10 steps to the left with x move and 10 steps down with y move. |
| 5 | DRAW | CORNER | Make corners on the open ends of the lower left table. |
| 6 | SPLINES | B-SPLINE | Spline this table. |
| 7 | MIRRORS | FIX | Makes the reflections real including the corners. |
| 8 | SPLICING | CONNECT BY LINE | Connect the open points. |
| 9 | SPLINES | REFRESH SPLINES | Redraws the spline. |
| 10 | DRAW | MIDPOINT | Draw midpoints on the top and right side. |
| 11 | SPLICING | CUT | Cut the midpoint. |
| 12 | MOVE | TABLE | Move the top right-part to the right. |
| 13 | DRAW | REFRESH VECTORS | Redraws the vectors only. |
| 14 | SPLICING | SAME X TABLES<br>SAME Y TABLES | These functions anables to line up a compleet table (see example). The working procedure is just like same x- and y-points. |
| 15 | SPLICING | CONNECT POINTS | Connect the top line. |



1



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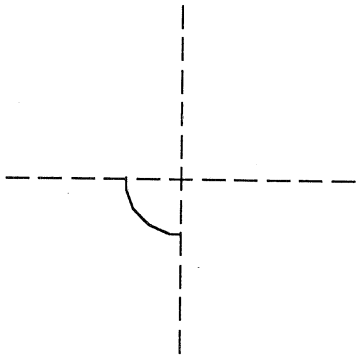

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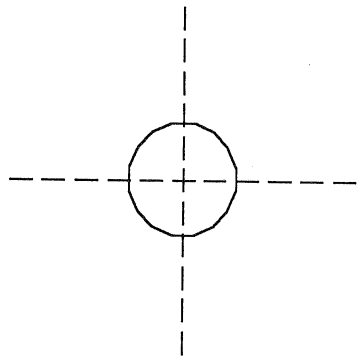
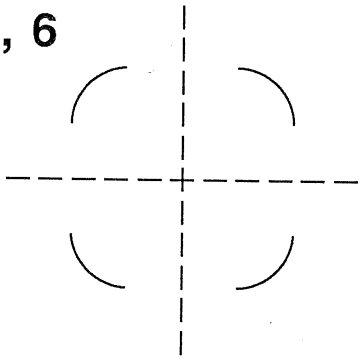


4, 5, 6



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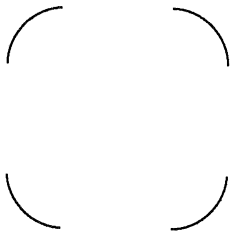
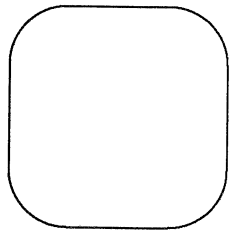
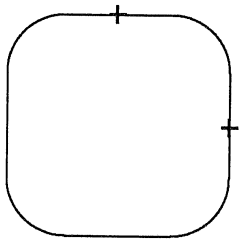


8, 9



10, 11



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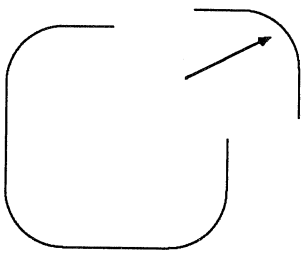

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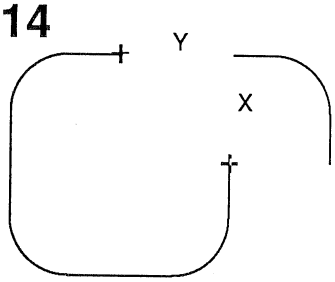
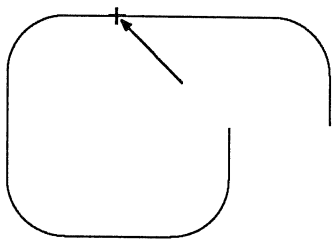
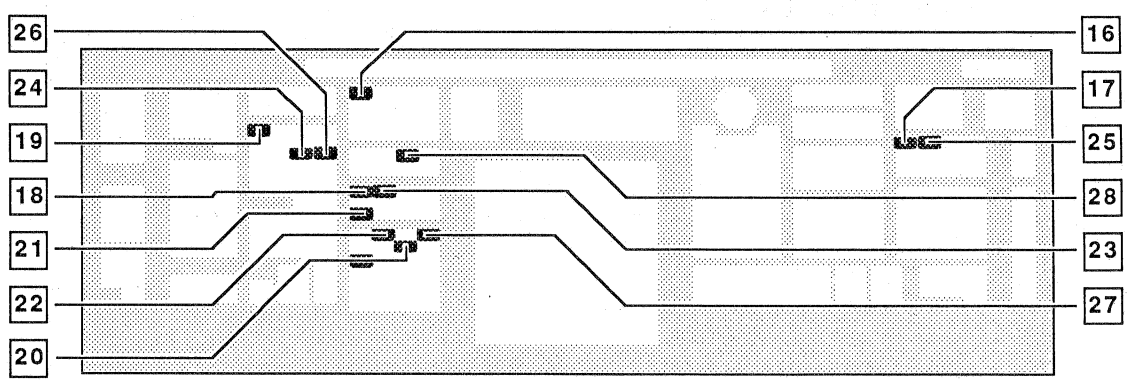


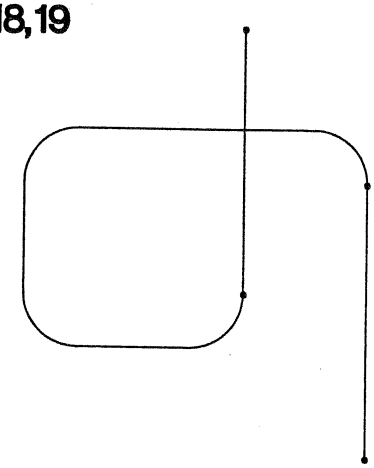

15, 16, 17



| KEYBLOCK | | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 16 | DISPLAY | POINTS | |
| 17 | KILL | POINT | Kill the point on the top-line. |
| 18 | MOVE | POINT | Lengthen the open lines. (see example) |
| 19 | SPLICING | SAME X POINTS | Make these lines vertical. |
| 20 | DRAW | COPY TABLE | Make 3 copies. |
| | | OUTLINE | Pull one copy inside and the other one outside. (see example) |
| 21 | MOVE | GRAVITY ON | |
| 22 | DRAW | POINT TO | Draw two vertical lines. (see example) |
| 23 | MOVE | LINE | Position the vertical line with equal spacing from the vertical part of the drawing. |
| 24 | SPLICING | CUT BY LINE | Use the two line as cutting lines. |
| 25 | KILL | LINE | Kill the cutted lines and the cutting lines. |
| 26 | SPLICING | CONNECT BY LINE | Connect all the open ends. |
| 27 | DRAW | CORNER | Make corners on the end-points. |
| 28 | SPLINES | REFRESH SPLINES | |



18,19



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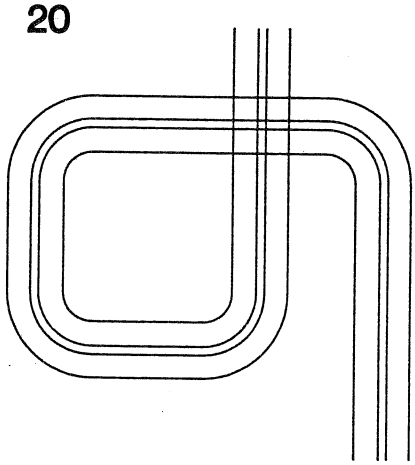
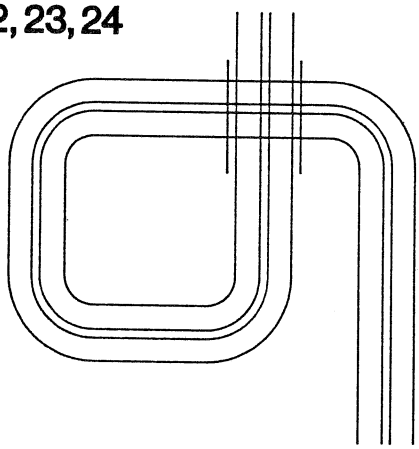
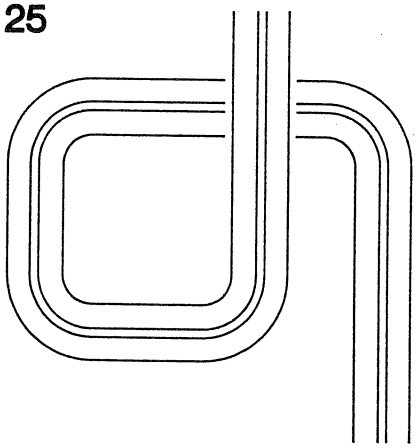


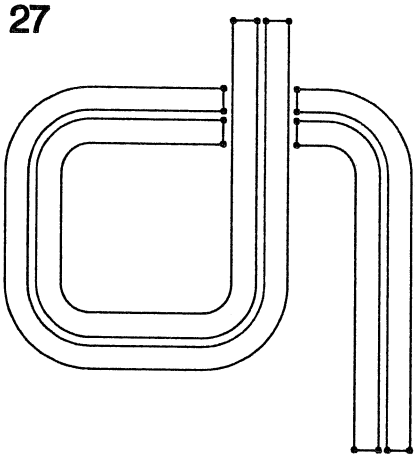
21, 22, 23, 24



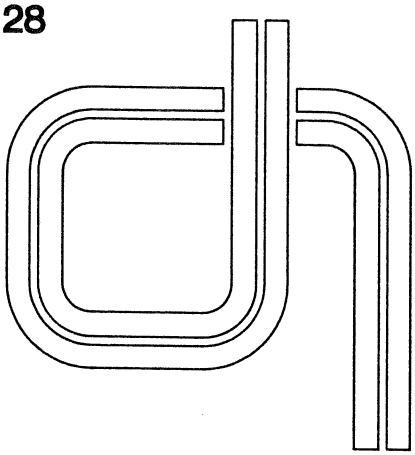
25



26, 27



28



These lessons will discuss the constructions and some modifications of characters.

By having the type-setting facilities, there is not always a need to construct characters yourself.
Only when a logo has to be created on the system and the right type-font is not available.

The best result in constructing characters will be obtained by using as few points as possible.

To start a drawing with a polygon, polygon 4, 8 or 16 can be used.
Otherwise start with **POINT TO**, with or without **GRAVITY.**

In these lessons, examples from disk are used as a reference.
A higher level will be activated in which the drawing can be made.

By entering colours from the colour-circle, both levels are visible on the middle monitor.

The system will always start up in **LEVEL 31.**
Use the key **STEP>>** in the keyblock **LEVELS** to activate a higher level (32), or press **32** on the **LEVEL BAR.**

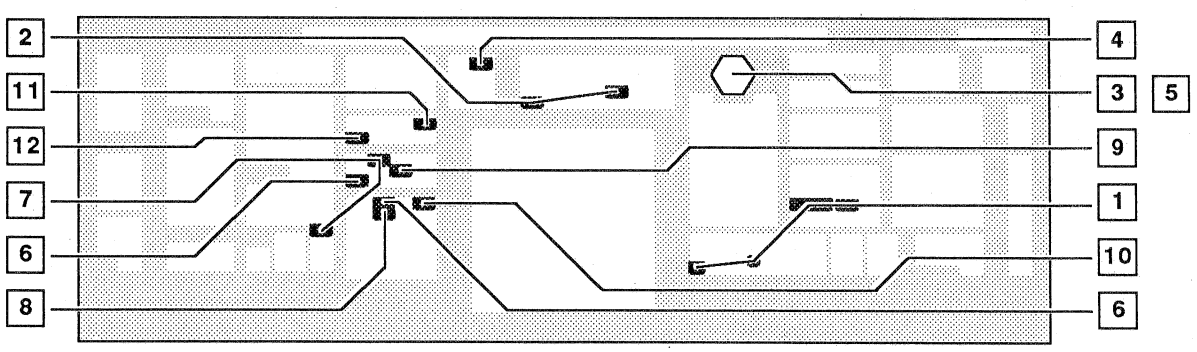
The reference drawing from disk can be recalled in any scale with the key **SCALE** in the keyblock **DISK.** This can be used instead of **ZOOM.**

Sometimes a drawing has to be cut on a spline.
This can have a bad influence. Therefore the function **CUT BY LINE** plus **SPACE** from the keyblock **MEASURE** can be used.
A cutting line is also required.
By designating first the line, and then the spline, the original shape will not be changed by the interruption.

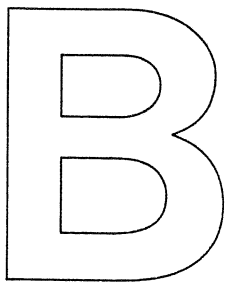
# LESSON 5 - 1



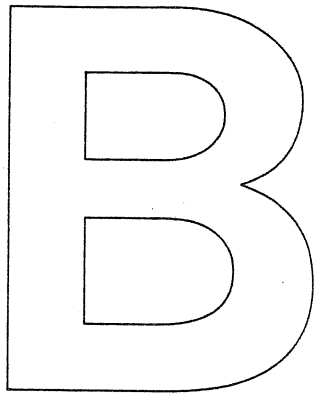
| | KEYBLOCK | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 1 | DISK | FROM DISK · ENTER · B · ENTER | The -B- appears on the screen. |
| 2 | DYNAMICS | CHAIN ALL · | Enlarge the -B-. |
| 3 | COLOUR | | Press red on the colour circle. This will give red on the middle monitor. |
| 4 | LEVEL | >> STEP | Press once to activate the following level. It's also possible to press the next number on the level bar. |
| 5 | COLOUR | | Give yellow for the new level. Now it's possible to see the difference between the drawing to be made and the -B- from disk. |
| 6 | MOVE | GRAVITY ON | |
| | DRAW | POINT TO | Trace around the -B- (see example). Make the angled lines 45°. (compare with a polygon of 8). |
| 7 | MOVE | LINE | |
| | MEASURE | SPACE | Move the line on top of the -B-. |
| 8 | DRAW | MIDPOINT | Make midpoints on the horizontal lines. |
| 9 | MOVE | POINT ON LINE | Enables to move a point along a line. Move the midpoints to the position where the spline should start. |
| 10 | DRAW | CORNER | Designate the points, where the spline should start and stop. |
| 11 | SPLINES | B-SPLINE | Touch all the tables. |
| 12 | SPLINES | MODIFY BY POINT | Enables to modify the spline real time. Keep the horizontal lines horizontal and the vertical lines vertical. Alternate with REFRESH VECTORS. |



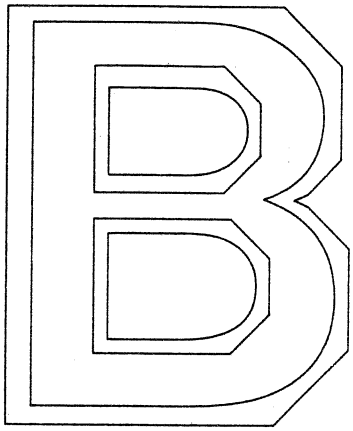
1



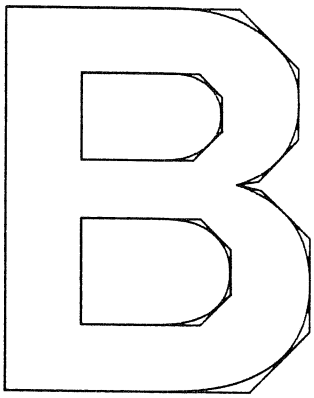
2,3,4,5



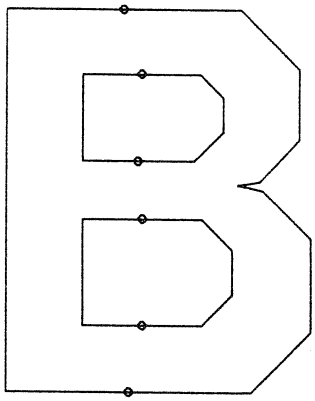
6



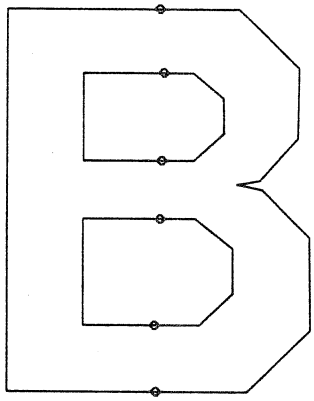
7



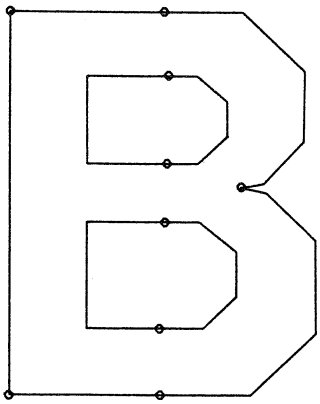
8



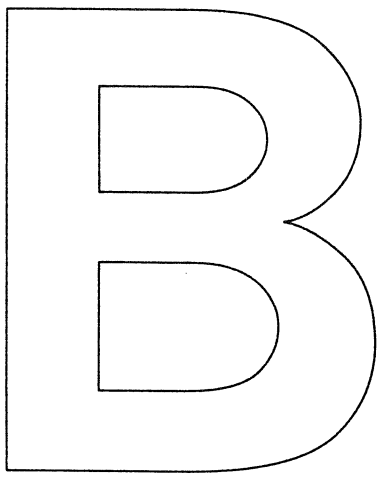
9

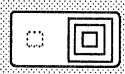
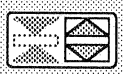


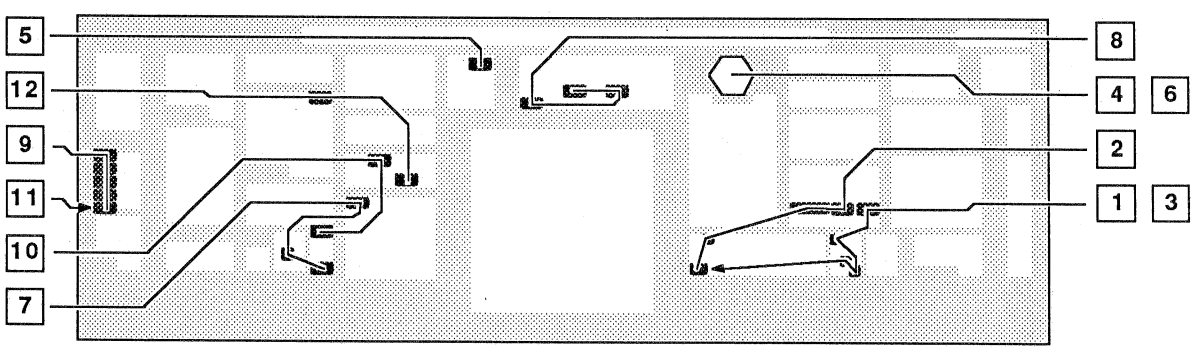
10



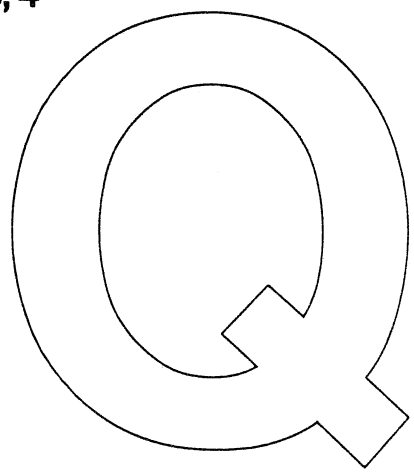
11, 12



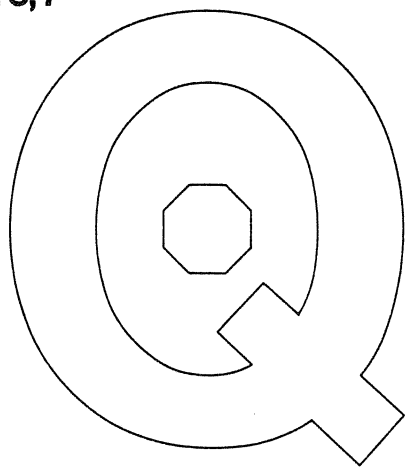
| | KEYBLOCK | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 1 | DISK | SCALE 1 . 8 ENTER | Scale changes the input scale factor. Elements saved on disk appear larger or smaller on the screen. 1 = 100% / 1.8 = 180% / 0.5 = 50% etc. |
| 2 | DISK | FROM DISK ENTER Q ENTER | The character -Q- appears on the screen. |
| 3 | DISK | SCALE 1 ENTER | Return to default scale 100%. |
| 4 | COLOUR |  | Give red for the -Q-. |
| 5 | LEVELS | >> STEP | Step one level higher. |
| 6 | COLOUR |  | Give yellow for the next level. |
| 7 | DRAW | POLYGON 8 ENTER | The polygon 8 appears on the screen. The middle monitor displays the -Q- in red and the polygon in yellow. |
| 8 | DYNAMICS | CHAIN ALL   | Use zoom and y scale untill the horizontal and vertical sides of the polygon overlap the previous example. |
| 9 | MIRRORS | X CLIP Y CLIP FIX X MIRROR Y MIRROR | Gives the lower left part of the polygon and the reflections. |
| 10 | MOVE | LINE | Move the lower left line (see example) so that it also fits on the -Q-. |
| | MEASURE | SPACE  | |
| 11 | MIRRORS | FIX | Makes the reflections real. |
| 12 | SPLICING | CONNECT ALL | Connects the four parts. |



1, 2, 3, 4



5, 6, 7



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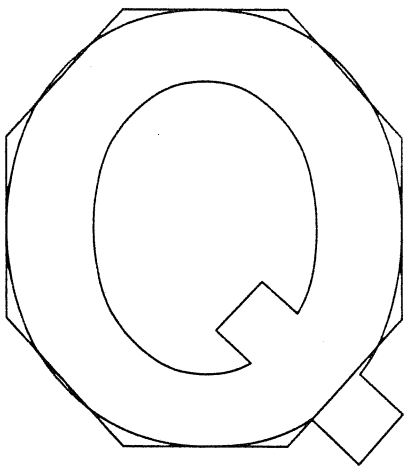
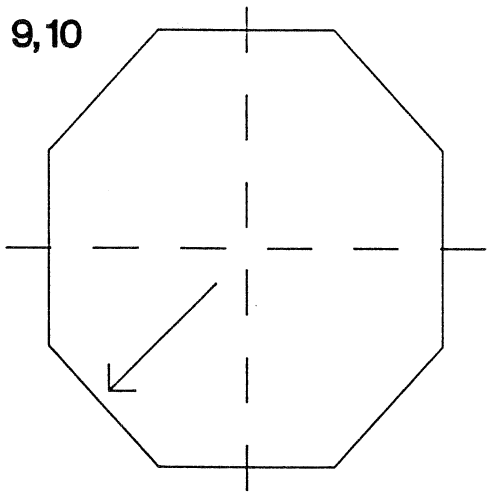
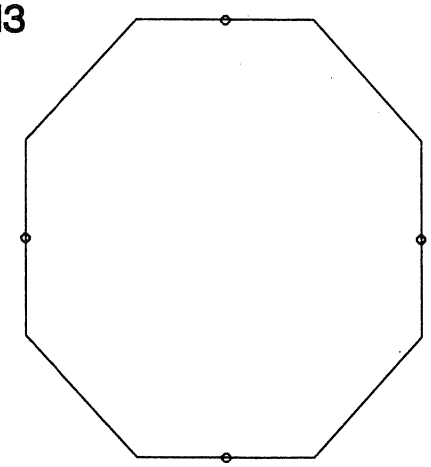


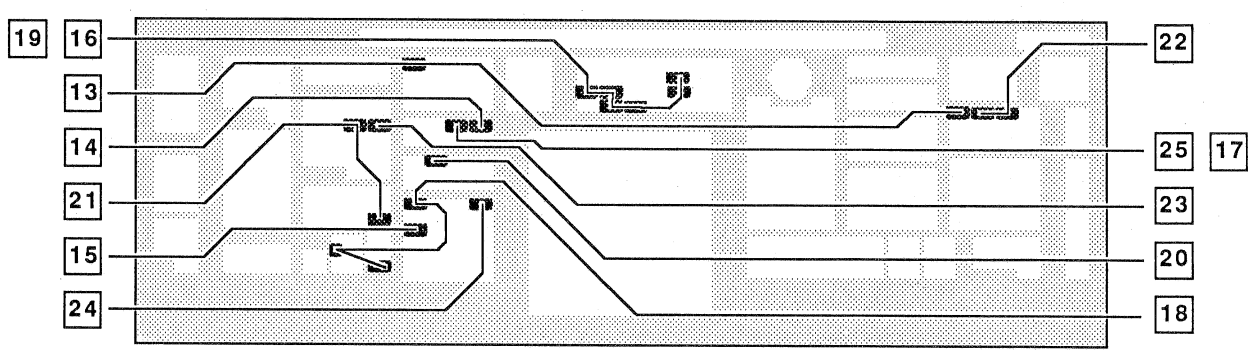
9, 10



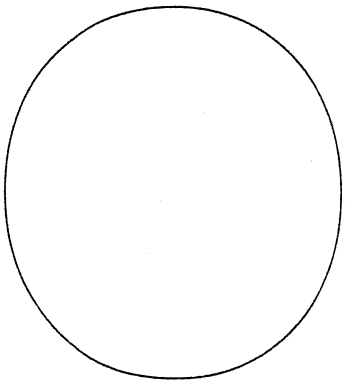
11, 12, 13



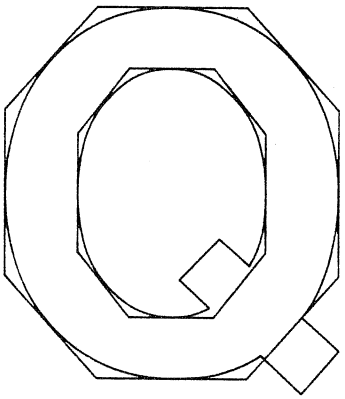
| KEYBLOCK | | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 13 | DISPLAY | POINTS | |
| | KILL | POINT | Kill the points cause of the mirrors. |
| 14 | SPLINES | B-SPLINE | Touch the table. |
| 15 | DRAW | COPY TABLE | Make one copy. |
| 16 | DYNAMICS | MAKE CHAIN | Touch the copy twice, then reduce and scale, until it fits on the inner part of the -Q-. |
| 17 | SPLINES | REFRESH SPLINES | Displays the splines. |
| 18 | DRAW | POLYGON 4 ENTER | Use the polygon 4 to create the rectangle of the -Q-. |
| 19 | DYNAMICS | MAKE CHAIN | Activate the polygon 4 by pressing the CCB twice. Use x move, y move and rotate to position the polygon. |
| 20 | MOVE + MEASURE | LINE SPACE | Move the line on top of the example. |
| 21 | SPLICING + MEASURE | CUT BY LINE SPACE | CUT BY LINE + SPACE gives the posibility to cut a spline by line. First touch the cutting line, then touch one of the points of the spline to be cutted. Points are automatically displayed after pressing SPACE. |
| 22 | KILL | TABLE LINE | Kill the cutted parts and the cutting lines. |
| 23 | SPLICING | CONNECT BY LINE | Connect the open points. |
| 24 | DRAW | CORNER | Give corners for the points where the spline should stop. |
| 25 | SPLINES | REFRESH SPLINES | |



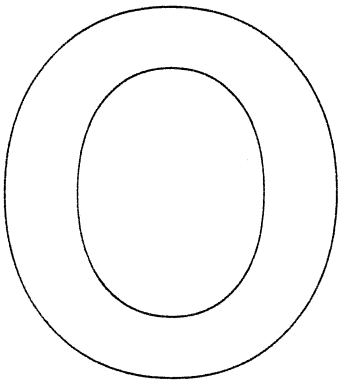
14



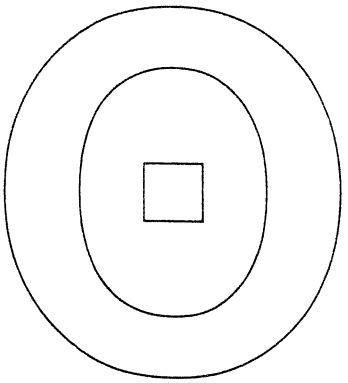
15,16



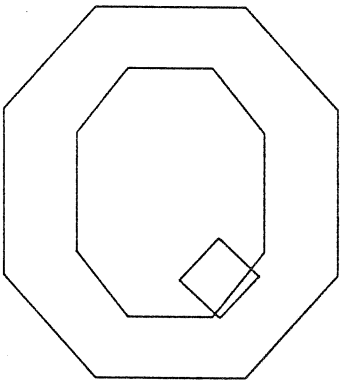
17



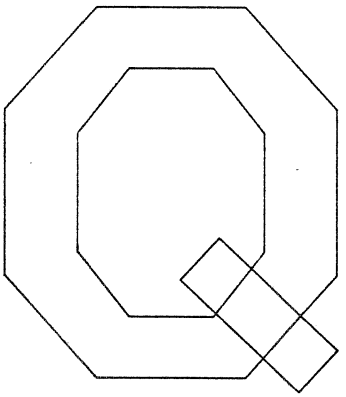
18



19



20



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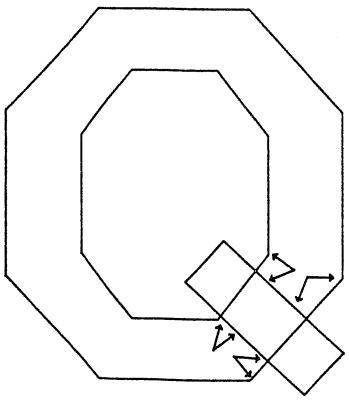

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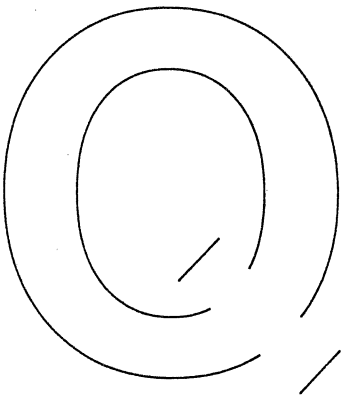
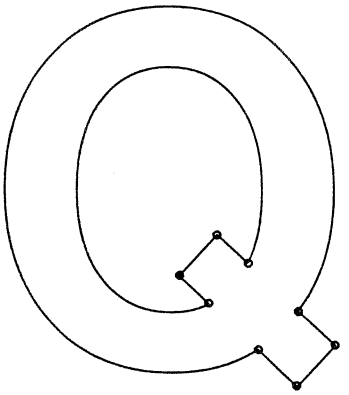
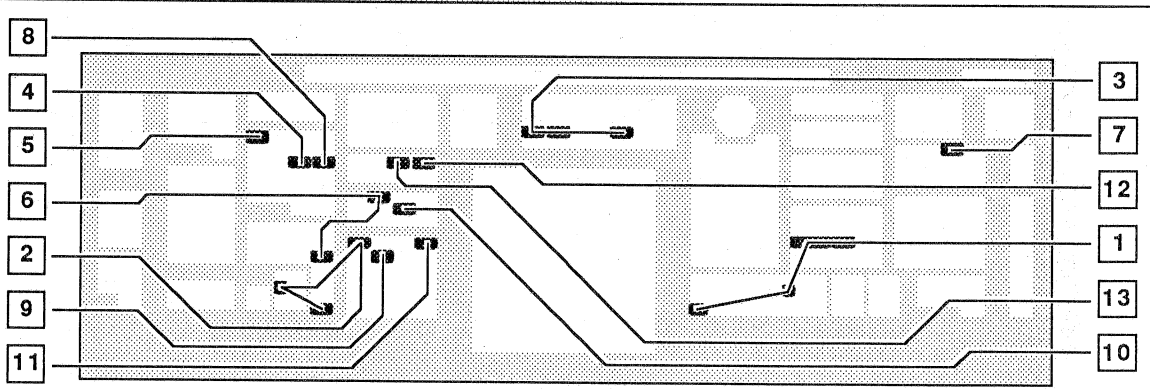


23, 24, 25



| | KEYBLOCK | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 1 | DISK | FROM DISK · ENTER · K · ENTER | The -K- appears on the screen. |
| 2 | DRAW | POLYGON · 4 · ENTER | The polygon appears on the screen. |
| 3 | DYNAMICS | MAKE CHAIN | Touch the polygon twice. Enlarge and scale the polygon to create cutting lines. |
| 4 | SPLICING | CUT BY LINE | Use the horizontal lines of the rectangle as cutting lines. |
| 5 | SPLICING | SAME X POINTS | Make the angled lines of the serifs vertical. |
| 6 | MOVE | LINE | Move the vertical lines of the serifs. |
| | MEASURE | SPACE | |
| 7 | KILL | TABLE | Kill the rectangle. |
| 8 | SPLICING | CONNECT BY LINE | Connect the open points. |
| 9 | DRAW | MIDPOINT | Draw midpoints on the -K- to create round corners. |
| 10 | MOVE | POINT ON LINE | Position them on equal distance. |
| 11 | DRAW | CORNER | On start and end points of the spline. |
| 12 | SPLINES | B-SPLINE | Touch the table. |
| 13 | SPLINES | REFRESH SPLINE | |



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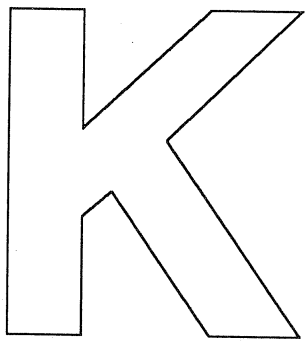

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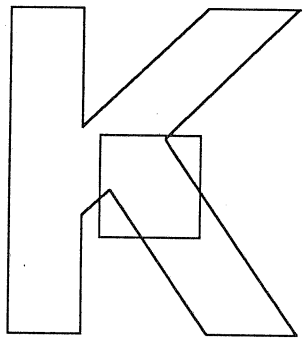

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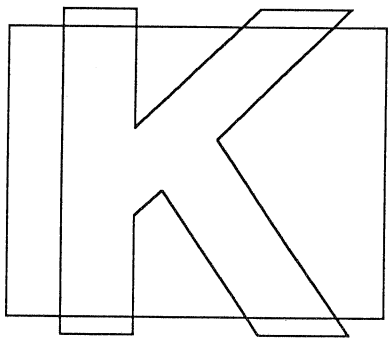

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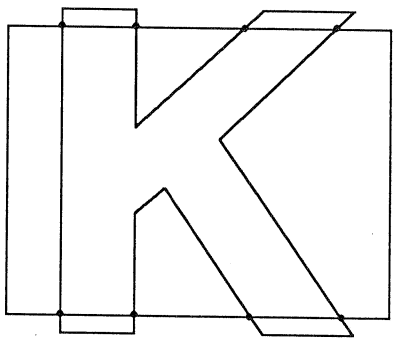

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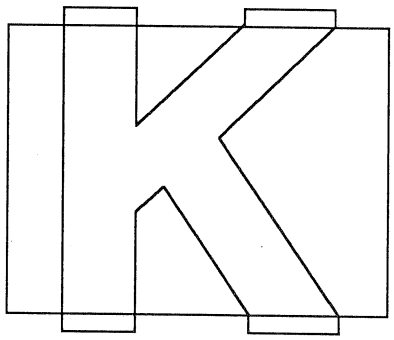

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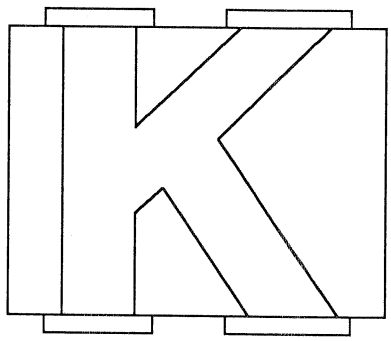

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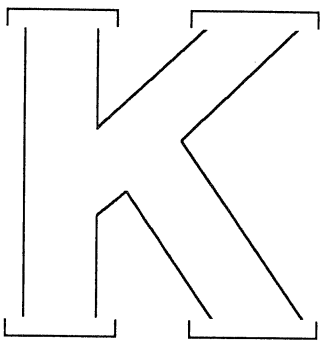

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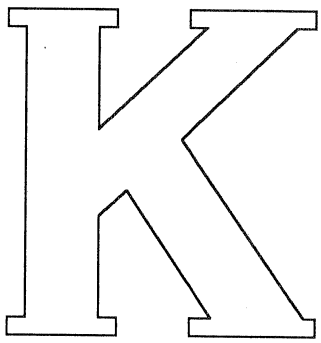

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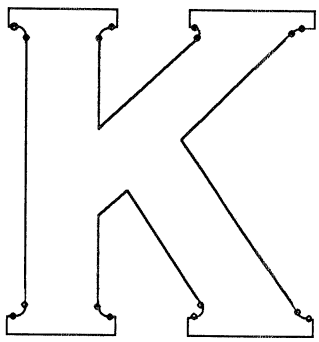
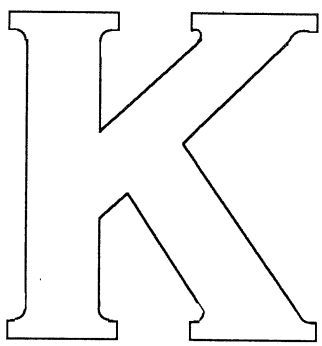
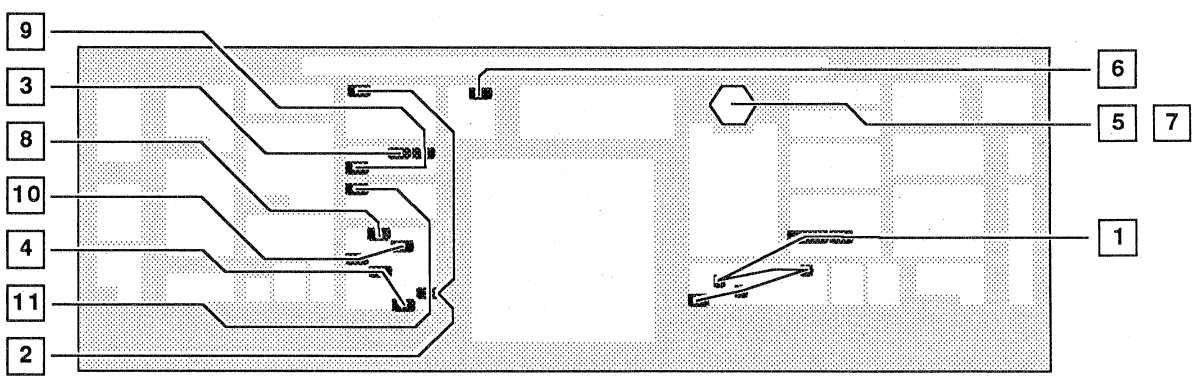


12, 13



| | KEYBLOCK | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 1 | DISK | FROM DISK, ENTER; S, ., C, ENTER | The script appears on the screen. |
| 2 | DRAW + DISPLAY | REFRESH VECTORS, POINTS | Shows the vectors and the points. Have a good look at the construction. |
| 3 | SPLINES | REFRESH SPLINE | Redraws the splines. |
| 4 | DRAW | FILL CHAIN, ALL | Fill the drawing. |
| 5 | COLOUR | | Make the drawing red. |
| 6 | LEVELS | >> STEP | Step one level higher. |
| 7 | COLOUR | | Make the new level yellow. |
| 8 | DRAW | POINT TO | Start to redraw the example. Notice that the lenght of the first vector determines the lenght of the other vectors. These vectors have to touch the spline of the example in the middle. And because of the shape, the drawing needs more vectors for a good curve. |
| 9 | SPLINES | B-SPLINE, MODIFY BY POINT | Touch the drawing and modify the spline. |
| 10 | DRAW | COPY TABLE, OUTLINE | Make one copy and position it with outline on the other side. |
| 11 | DRAW + MOVE | REFRESH VECTORS, POINT | Move the points of the copy to get the thicker part. |



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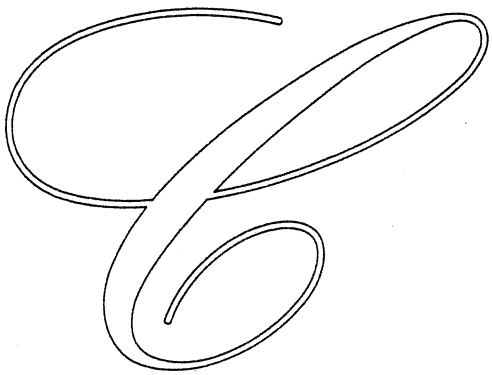

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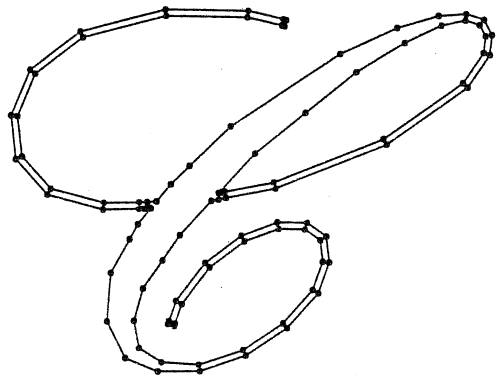
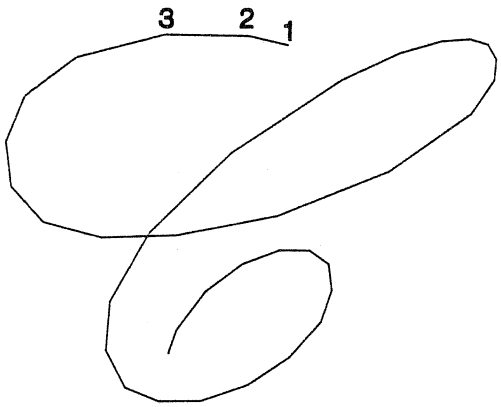
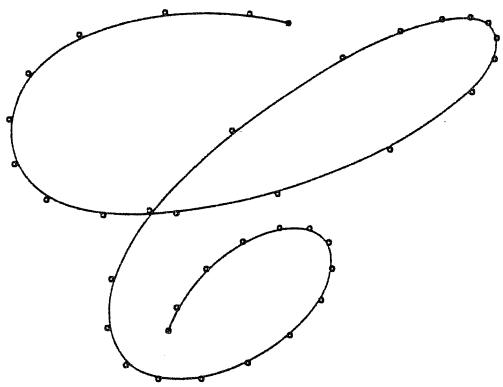


(3, 4, 5, 6, 7,) 8




9



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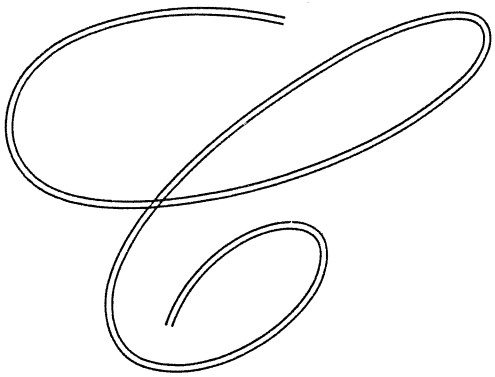

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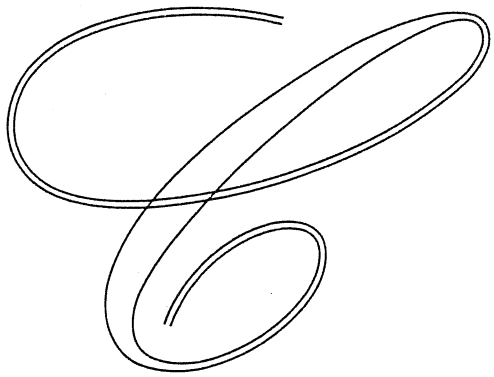
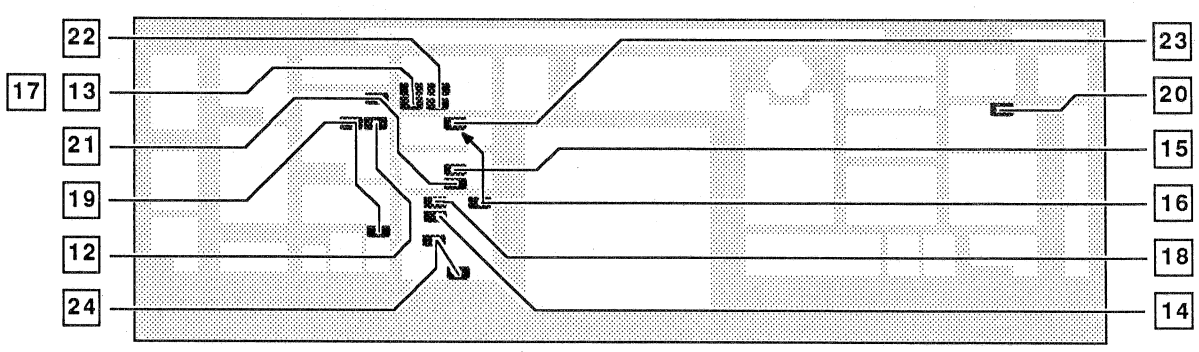


| KEYBLOCK | | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 12 | SPLICING | CONNECT BY LINE | Connect the open points. |
| 13 | DISPLAY | WINDOW AREA, WINDOW MON. ON | Zoom in on the end points. |
| 14 | DRAW | MIDPOINT | Make midpoints on the last vectors. |
| 15 | MOVE | POINT ON LINE | Move the midpoints close to the end of the vectors. |
| 16 | DRAW + SPLINES | CORNER, REFRESH SPLINES | Make corners on these points and refresh splines.<br>Repeat 13 to 16 for the other parts. |
| 17 | DISPLAY | WINDOW AREA, WINDOW MON. ON | Zoom in on the cross section of the drawing. |
| 18 | DRAW | POINT TO | Draw 4 cutting lines.<br>Each line has to cut 2 splines |
| 19 | SPLICING + MEASURE | CUT BY LINE, SPACE | Touch a line and one of the crossing splines. Then again the line and the other spline and repeat also for the other lines. |
| 20 | KILL | TABLE | Kill the cutted part and the cutting lines. |
| 21 | SPLICING + DRAW | CONNECT, ALL, CORNER | Connect all and draw corners on the connected points. |
| 22 | DISPLAY | WINDOW MON. OFF, RESET AREA | |
| 23 | SPLINES | REFRESH SPLINES | |
| 24 | DRAW | FILL CHAIN, ALL | |



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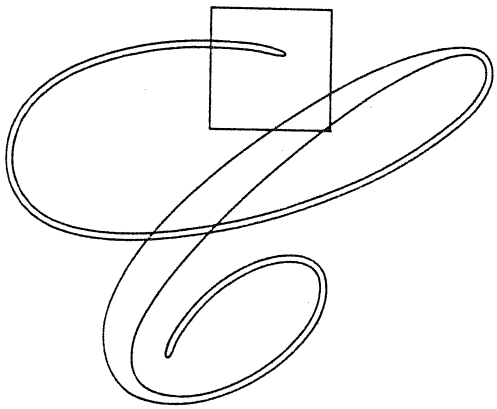
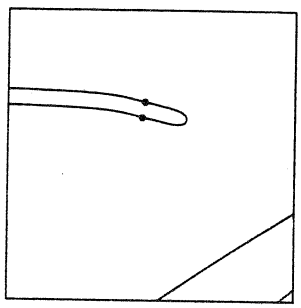


13,14



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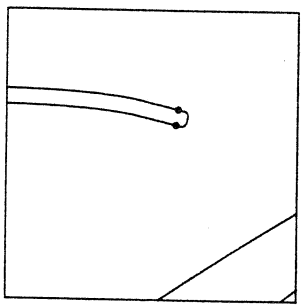

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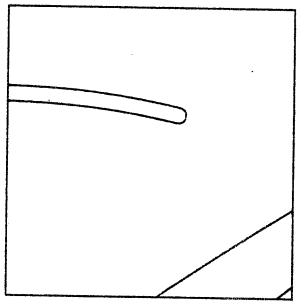
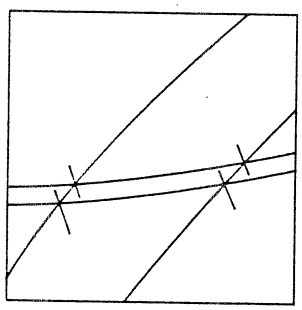


17,18



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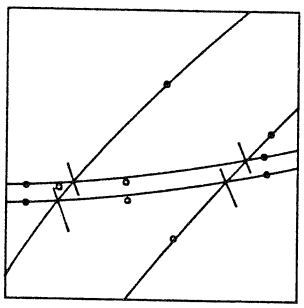
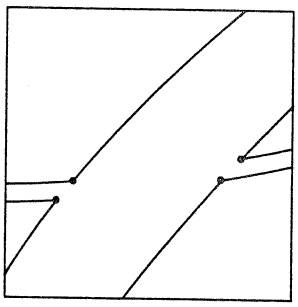


20,21



22,23

In making final artwork the measurements are essential.

The key **POINT TO POINT** in the keyblock **MEASURE** enables to measure values between any two points.
By activating **POINT TO POINT** and designating two points with the cursor, there will be a readout on the middle data-monitor.

X difference (horizontal distance in mm),
Y difference (vertical distance in mm),
Length (absolute distance in mm) and
Angle (in degrees).

The **SPACE** key is used to select one of these values. Then a new number can be typed in, it will be executed by pressing **ENTER.**

The purposes of this function are:
to examine sizes and to make numerical corrections.

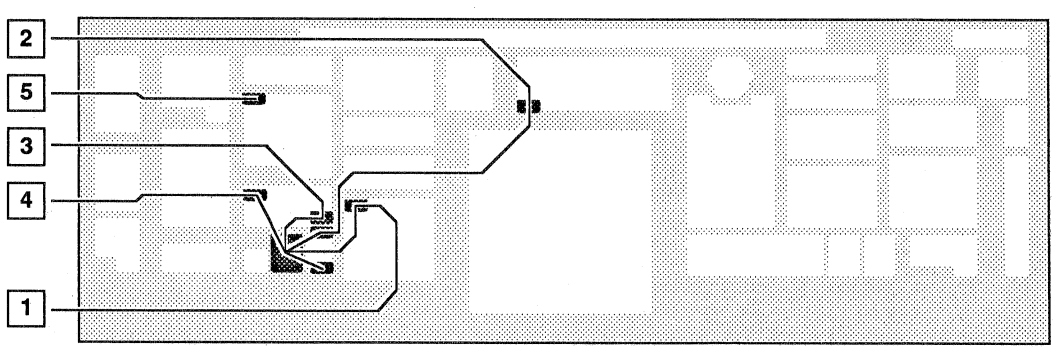
An other function in this keyblock is **DEFINE SCALE**, which can be used to change the standard size of tablet and screen (1000 x 1000 mm) to any other size.

The key **SPACE** can also be used in combination with **OUTLINE.**
The outline will be made numerical.

The key **SURFACE** is used to measure the surface of any closed area in $cm^2$.

The key **VOLUME** is used to measure the volume of any cilindrical form in ml.
Therefore **Y CLIP** plus **FIX** have to be executed.

| | KEYBLOCK | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 1 | DRAW | POLYGON 4 ENTER | The polygon appears on the screen. |
| 2 | DYNAMICS + MEASURE | CHAIN ALL SPACE<br>MENU 6 ENTER | Enlarge the polygon 6x with ZOOM. |
| 3 | MEASURE | DEFINE SCALE 2 9 7<br>ENTER | The maximum standard size of the screen is 1000 x 1000 mm. This can be changed into any other size.<br>Use DEFINE SCALE, select one of the sides of the polygon with the cursor and type in: 297, to get the A4 hight. |
| 4 | MEASURE | POINT TO POINT | Pressing POINT TO POINT will show, the center of the screen, the cursor, and on the middle data monitor X and Y difference, length and angle. |
| | | | Select the top left point of the polygon. The numerical values between the centerpoint and the top left point will be displayed on the middle data monitor. |
| | | SPACE<br>- 1 0 5 ENTER<br>ENTER | Press CCB and select X-diff.<br>Type in -105 to get the half of the A4 width.<br>ENTER will execute the numerical input.<br>By pressing ENTER again the cursor will return on the screen. Select the top right point. The centerpoint will disappear and the top left point will be the starting-point. |
| | | SPACE 2 1 0<br>ENTER | Press CCB and select X diff.<br>Type in 210 to get the total A4 width.<br>ENTER will execute the second numerical input. |
| 5 | SPLICING | SAME X POINTS | Select top left- and below left-point, then the top right- and below right point. |



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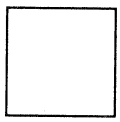
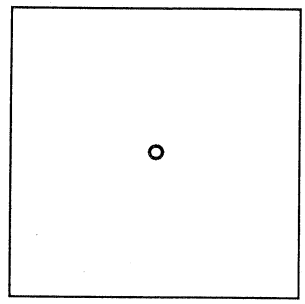


2, 3



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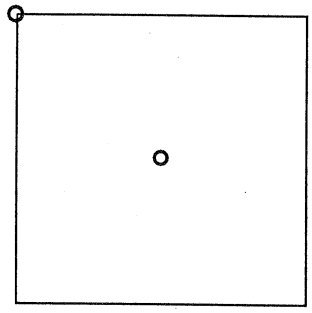

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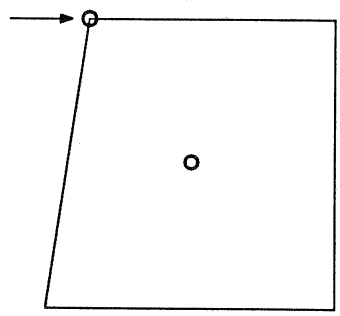

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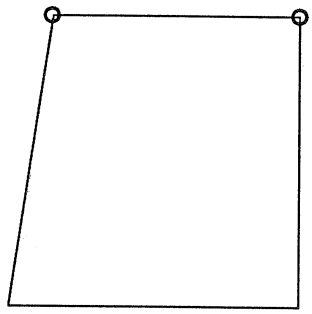

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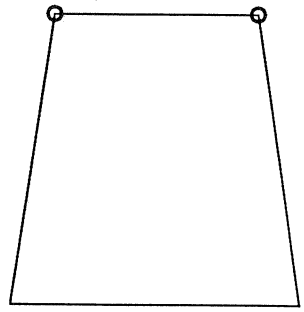

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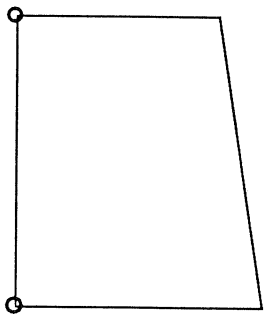

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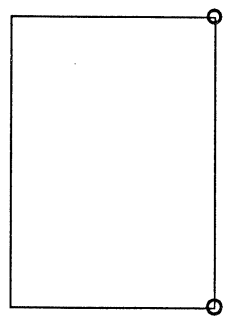
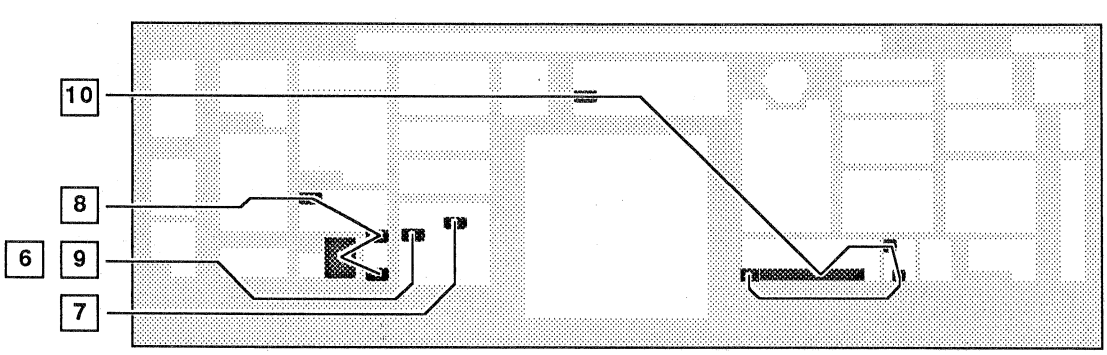


| KEYBLOCK | | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 6 | DRAW | COPY TABLE | Make one copy of the A4. |
| 7 | DRAW + MEASURE | OUTLINE SPACE | Touch the copy with the cursor and press CCB once. Then press space. On the middle data display you will find : -Give number : . |
| | | 1 0 ENTER | Type in 10 and press ENTER. The copy will go inside on a distance of 10 mm. (if you should have typed in: -10, the copy would go outside). |
| 8 | MEASURE | POINT TO POINT | Touch the top left point of the copy first and then the top right point. |
| | | SPACE MENU ENTER | Select LENGHT and type in 90. |
| | | | Touch the lower right point of the copy. (the top right point will be the reference point). |
| | | SPACE MENU 0 ENTER | Press SPACE and select X DIFF. with the cursor. Type in 0, ENTER. |
| 9 | DRAW | COPY TABLE | Make one copy of the small rectangle. |
| 10 | DYNAMICS | MAKE CHAIN SPACE MENU 1 0 0 ENTER | Touch the copy twice. Press SPACE and select X MOVE with the cursor. Type in: 100, ENTER. |



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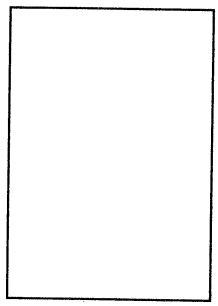

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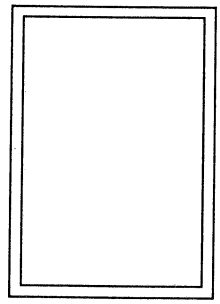

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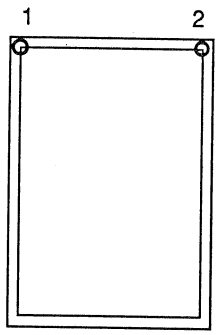


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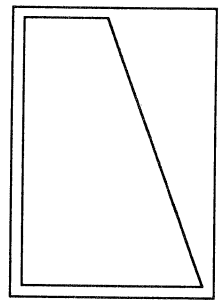

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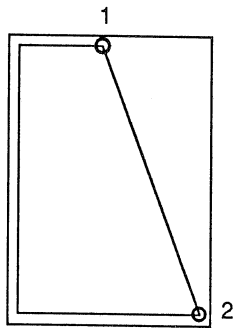


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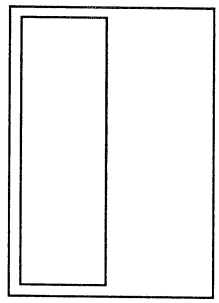

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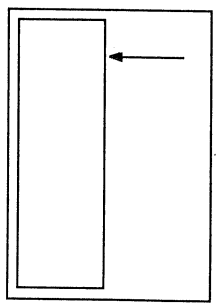

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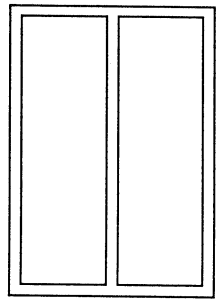
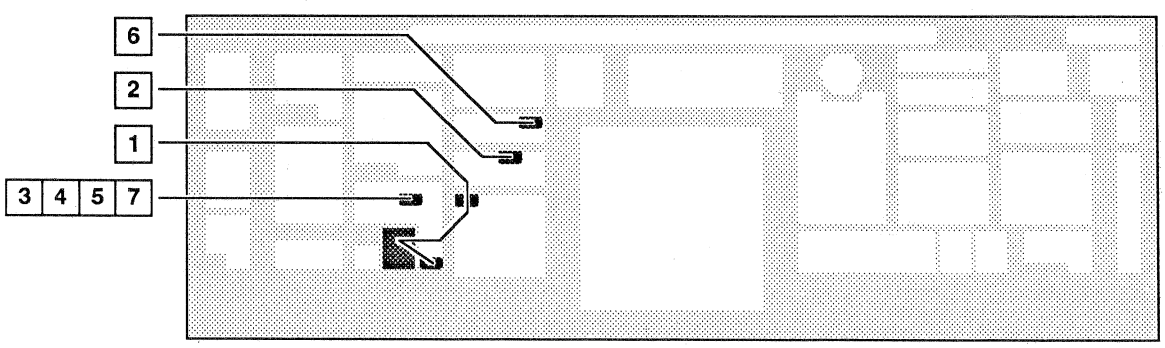


| | KEYBLOCK | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 1 | DRAW | POLYGON 3 ENTER<br>POLYGON 4 ENTER | The polygons 3 and 4 appear on the screen. |
| 2 | MOVE | TABLE | Move the polygon 4. |
| 3 | MEASURE | SURFACE MENU | Select with CCB the polygon 3 and press twice.<br>On the middle data-monitor you will see the surface measured in $cm^2$ |
| 4 | MEASURE | SURFACE MENU | Select with CCB the polygon 4 and press twice.<br>Read the middle data-monitor for the surface measured in $cm^2$ |
| 5 | MEASURE | SURFACE MENU | Select the polygon 3, press twice, select polygon 4 and press twice.<br>Notice on middle data-monitor that<br>Area = polygon 4<br>Total area = surface measured of polygon 3 and 4 together. |
| 6 | SPLINES | B-SPLINE | Spline the polygons. |
| 7 | MEASURE | SURFACE MENU | Repeat step 5 of this lesson.<br>Read the data on the monitor.<br>Notice the difference in surface. |



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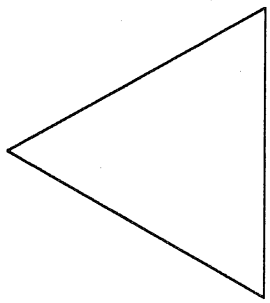

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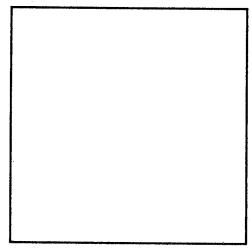

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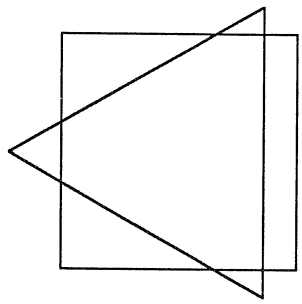

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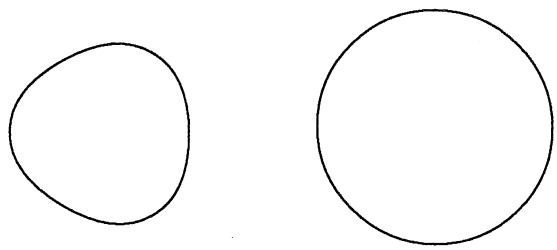
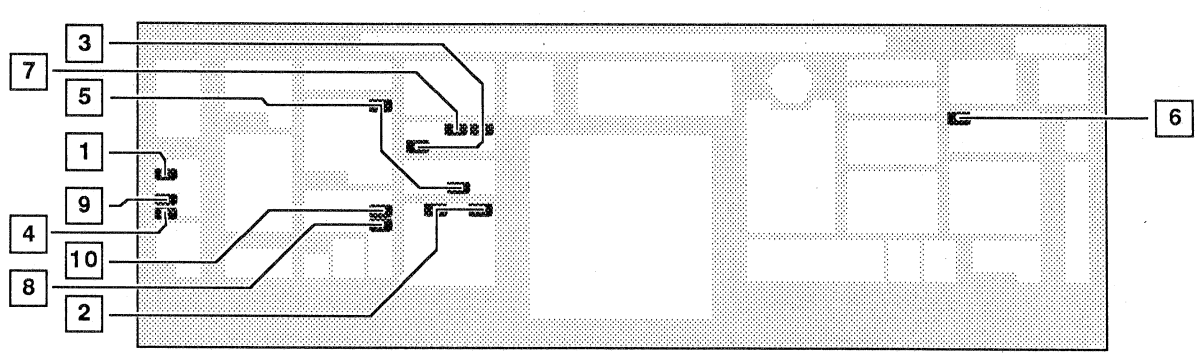


| | KEYBLOCK | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 1 | MIRRORS / SET | Y MIRROR | This function will give you a mirror along the y-axis. |
| 2 | DRAW | POINT TO, CORNER | Make a drawing ( for example a bottle) and place corners where needed. |
| 3 | SPLINES | B-SPLINE, MODIFY BY POINT | Spline the drawing and adapt the shape if you want. |
| 4 | MIRRORS / SET | FIX | Will make the reflected image permanent. |
| 5 | SPLICING | CONNECT, ALL | Will connect the two tables. |
| 6 | KILL | POINT | There where the two tables are connected are points, so kill these points. |
| 7 | SPLINES | REFRESH SPLINES | Refresh the spline. |
| 8 | MEASURE | DEFINE SCALE | Select the bottom-line and give it a scale factor. |
| 9 | MIRRORS / SET | Y CLIP, FIX | Will show you the left part of the drawing, fix will make it permanent. |
| 10 | MEASURE | VOLUME, MENU | The middle data-monitor will show you the volume of your complete drawing in milli-liters. |

*Note* Measuring a volume is only possible using "y-clip" and "fix" because the volume of a table is measured as if the table has been rotated round the y-axis 360° in $cm^3$ You are measuring only a round shape.



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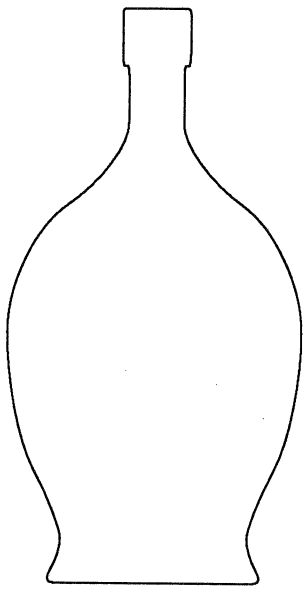

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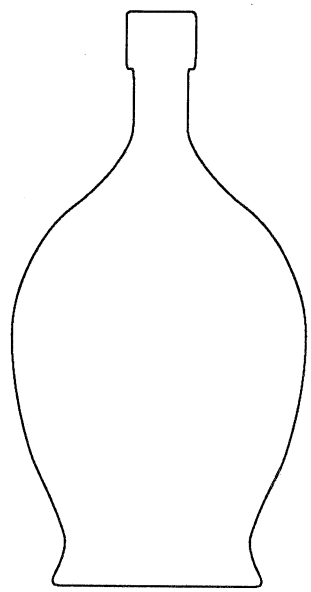

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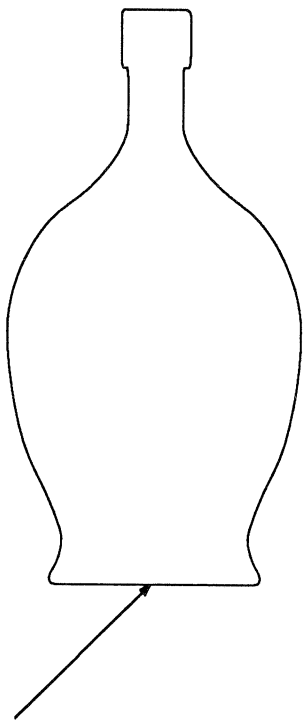

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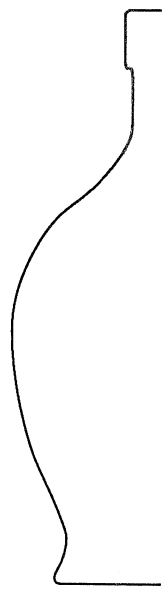


One of the facilities of the system is drawing on gravity grids.

Grid can be compared with graph-paper.
A number of pre-programmed grids can be called from disk as a visualisation.
The grids are stored on disk as multi-level files, named with even-numbered suffixes: G8, G10, G12, G14, G16, G18, G20, G22, G24, G26, G28, G30 and G40.

A fine line grid will appear on level 1, and a crosshair figure with a centred square will appear on level 2.
The square will always correspond with the width of ten vertical and ten horizontal grid spaces.

By starting up, or **RESETTING** the system, the size of the total working area will be 1000 x 1000 mm. This means, when for instance G20 is recalled from **DISK**, the distance between the lines will be 20 mm and the size of the square will be 200 mm.

Beside having the grid on the monitor, the system has to be programmed to have gravity on each intersection.

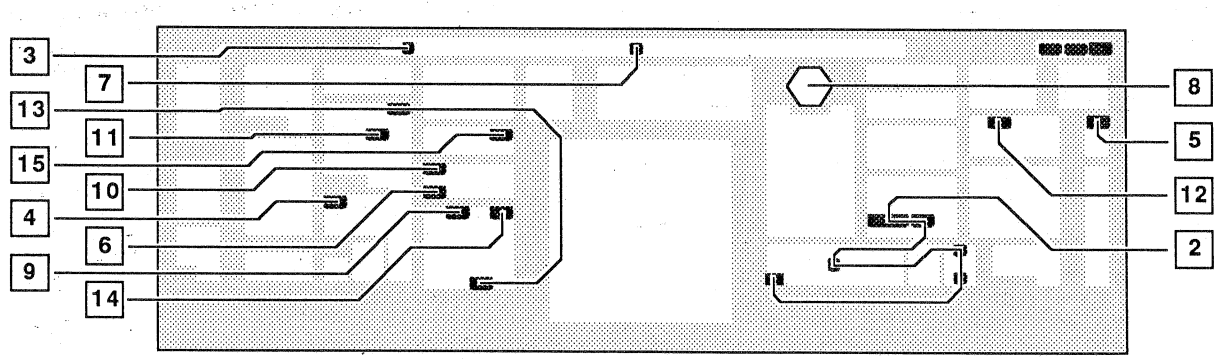
The key **DEFINE GRID** in the keyblock **GRIDS** is used to tell the system the distance between gravity points.

Then, **GRAVITY ON** in the keyblock **MOVE** will activate the gravity on the grid for all cursor controlled functions.

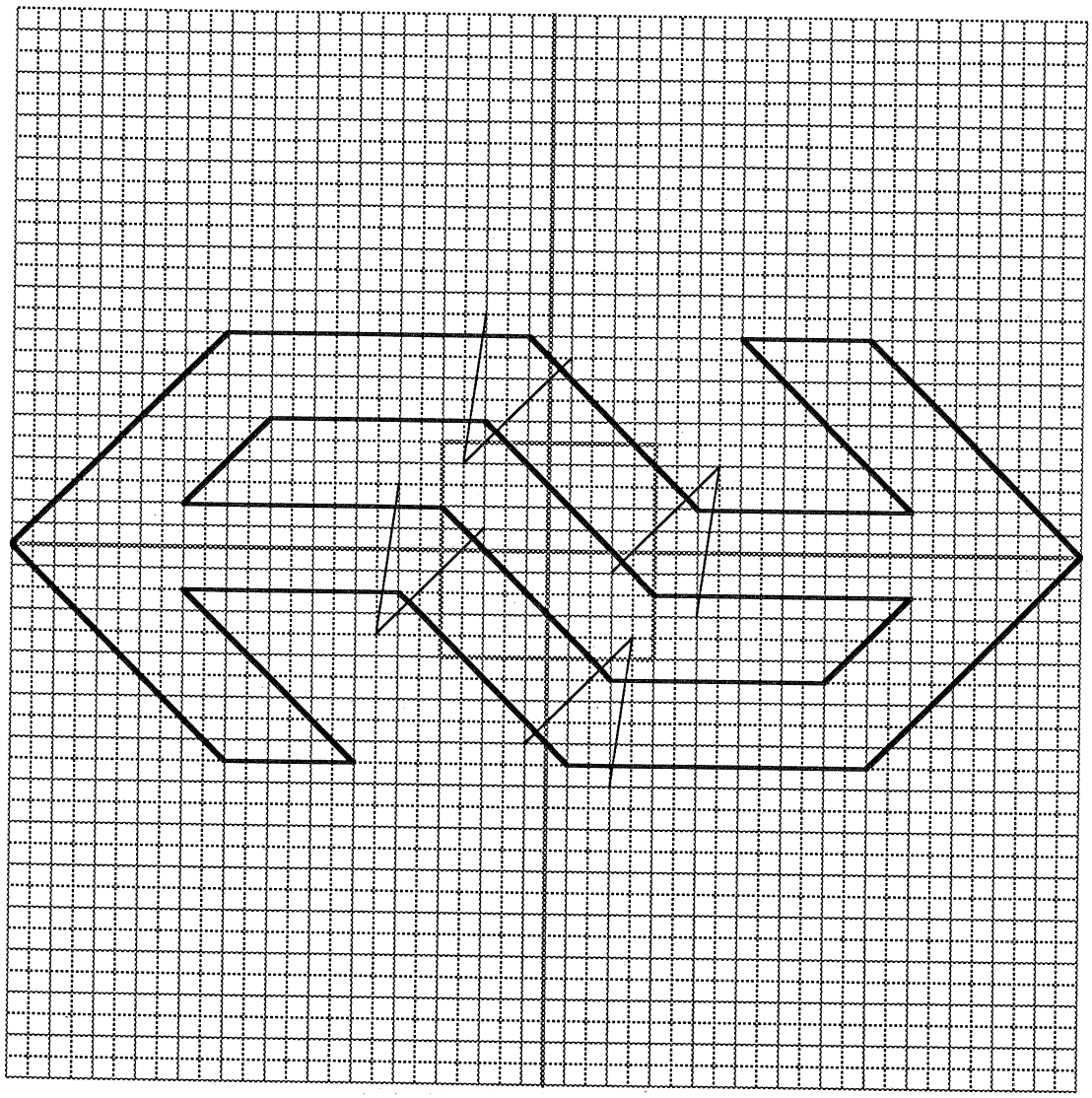
# LESSON 7 - 1



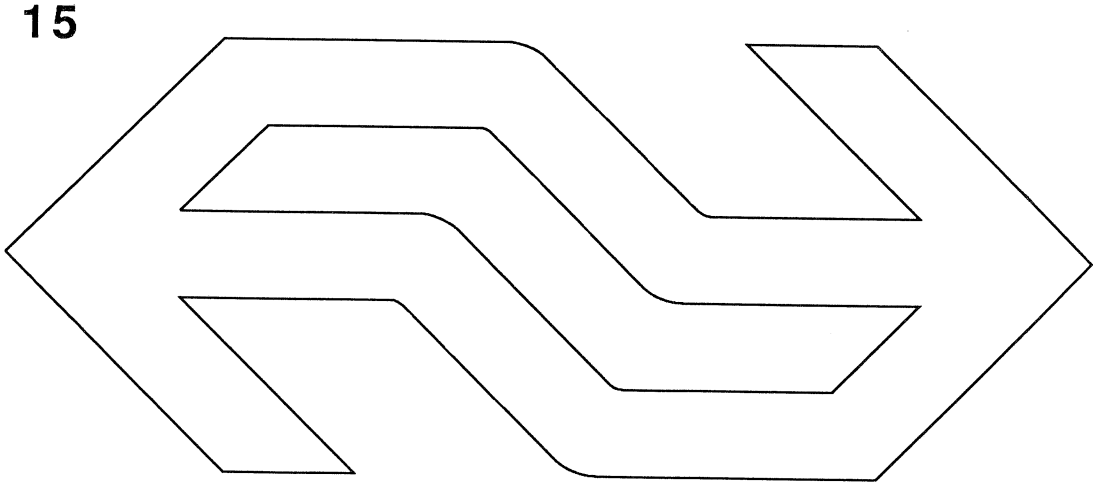
| | KEYBLOCK | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 1 | | [ ] ABORT RESET | Press the reset and the green button at the same time, to reset the system. |
| 2 | DISK | FROM DISK ENTER<br>G 2 0 ENTER | A grid appears on the middle monitor. The levels 1 and 2 are used for the grid. |
| 3 | LEVEL BAR | 1 2 3 | Activate level 2. |
| 4 | MEASURE | POINT TO POINT | Measure the size of the square. It will be 200 mm. This means, the distance between each intersection will be 20 mm. |
| 5 | GRIDS | DEFINE GRID 2 0 ENTER | This will give gravity on each intersection. |
| 6 | MOVE | GRAVITY ON | Activates the gravity. |
| 7 | LEVEL BAR | 30 31 32 | Activate level 31. |
| 8 | COLOUR | | Give yellow on this level. |
| 9 | DRAW | POINT TO | Make the drawing and the cutting lines. (see example). |
| 10 | MOVE | POINT | Make corrections if necessary. |
| 11 | SPLICING | CUT BY LINE | Touch the lines that define the round-corners. |
| 12 | KILL | LINE | Kill the cutting lines. |
| 13 | SPLICING | CONNECT ALL | |
| 14 | DRAW | CORNER | On all necessary points. (see example). |
| 15 | SPLINES | B-SPLINE | Touch the tables. |



## 1 — 14



## 15



Any drawing in more levels can be visibly built up in colour and can be displayed as a multi-coloured image on the middle monitor.
The activated level is always displayed in blue on the current level monitor.

The colour system is based on video colours: red, green and blue.

By mixing these colours, any other colour can be created.
It is based on the additive principle.

| | |
|---|---|
| Red + Green | = Yellow |
| Green + Blue | = Cyan |
| Blue + Red | = Magenta |
| Red + Green + Blue | = White |

The brightness of red, green and blue can be varried in 255 steps, displayed on the lefthand data-monitor.
This will lead up to over sixteen million colours.

The **COLOUR-CIRCLE** on top of the colour keyblock has to be used to enter one of the basic colours.

The top row of the key-controls has to be used to step through the colour-circle in degrees or small steps.

The **SATURATION** and **BRIGHTNESS** keys will affect the colours by percentage or by steps, when the extreme left or right key positions are used.

By pressing + or - on the six colour hue keys, colours can be added or substacted by steps.

The keys **ADDITIVE** and **SUBSTRACTIVE** are used to compare screen-colours to printed-colours.

The keys **SET COPY** and **GET COPY** are used to copy a colour from one to another level.

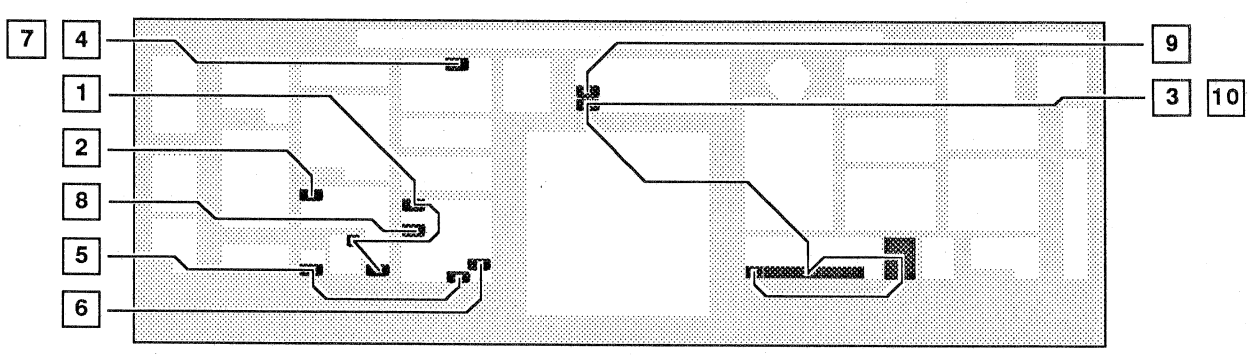
To compare different colour-designs all level-colours can be stored in a non permanent memory, by pressing the key **SAVE**.
This will create a colour-page.
The key **PAGE** is used to step through the different pages.

Any group of assigned level-colours can be tied together into an interactive chain. Colour changes will influence the whole group at once.

# LESSON 8 - 1/1

## COLOUR CIRCLE

| | KEYBLOCK | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 1 | DRAW | POLYGON 3 ENTER | The polygon 3 appears on the screen. |
| 2 | MEASURE | POINT TO POINT | Select the left point and read on the middle data-monitor x diff: 100. |
| 3 | DYNAMICS + MEASURE | CHAIN ALL SPACE MENU 1 0 0 ENTER | Select X MOVE and type in 100. This will move the triangle to the right. The left point will be in the center of the screen. |
| 4 | DISPLAY | ORIGIN | Touch the table and notice that the origin has moved also. |
| 5 | MEASURE | SET CENTER ORIGIN ALL | Now the origin is back in the center again. |
| 6 | DRAW | REFRESH VECTORS | Refreshes the screen. |
| 7 | DISPLAY | ORIGIN | Shows the origin. |
| 8 | DRAW | COPY TABLE | Make one copy of the triangle. |
| 9 | DYNAMICS + MEASURE | MAKE CHAIN SPACE MENU 6 0 ENTER | Select the copy twice, press SPACE, select ROTATE and type in 60(°), ENTER. The copy has rotated around the origin. Repeat step 8 and 9 until there are 6 triangles. |
| 10 | DYNAMICS + MEASURE | CHAIN ALL SPACE MENU 3 0 ENTER | Now rotate all 6 triangles together 30°, so you will have the horizontal position. (see example). |



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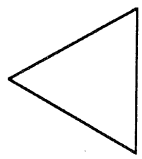

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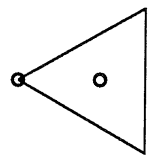

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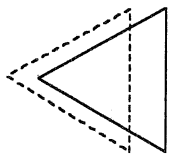

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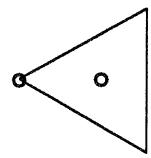

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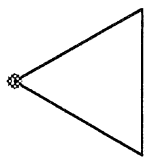

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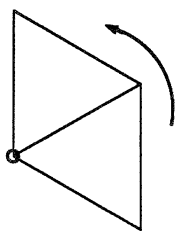

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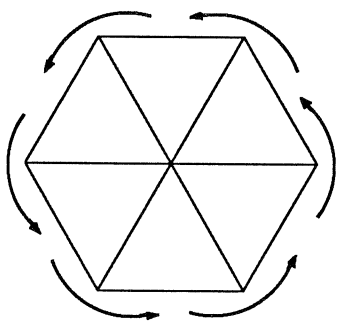

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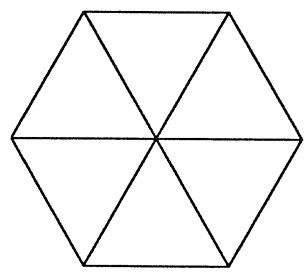
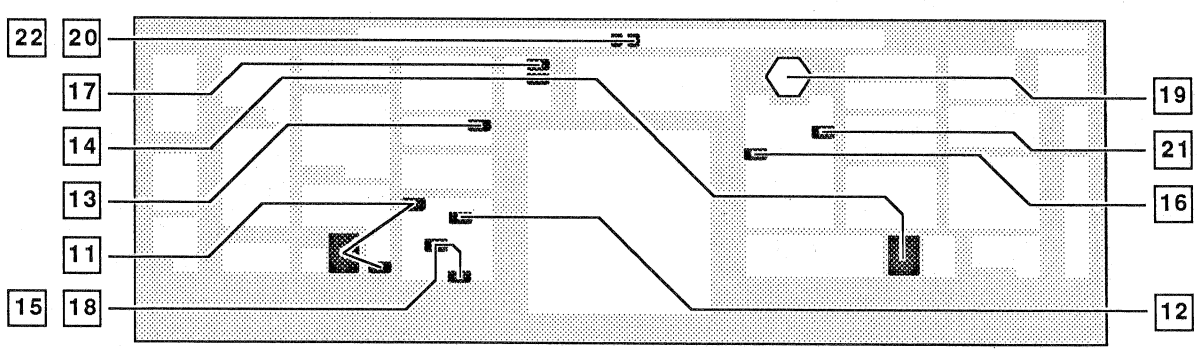


# LESSON 8 - 1/2

## COLOUR CIRCLE

| | KEYBLOCK | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 11 | DRAW | POLYGON 1 6 ENTER | The polygon 16 appears on the drawing. |
| 12 | DRAW | OUTLINE | Enlarge the polygon 16. |
| 13 | SPLINES | B-SPLINE | Spline the polygon16. |
| 14 | LEVELS | SET LEVEL 3 2 | Select the upper triangle twice, than this triangle will go to level 32.<br>Repeat this for the other triangles and set them to the levels 33, 34, 35, 36 and 37. |
| 15 | DRAW | FILL CHAIN ALL | Fill the circle. |
| 16 | COLOUR | WHITE | Make it white. |
| 17 | LEVELS | >> STEP | Step to the following level. |
| 18 | DRAW | FILL CHAIN ALL | Fill the triangle. |
| 19 | COLOUR | | Give it the colour red.<br>Repeat step 17, 18 and 19 for the other triangles. |
| 20 | LEVEL BAR | 30 31 32 | Select level 31 which contains the white circle. |
| 21 | COLOUR | 100% >> BRIGHTNESS | When one of the standard colours is entered, the brightness is 75%. To get the maximum brightness press 100%<br>Repeat this also for the other levels. |
| 22 | LEVEL BAR | 30 31 32 | Activate level 32. |



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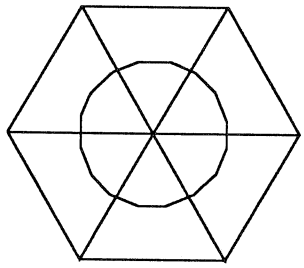

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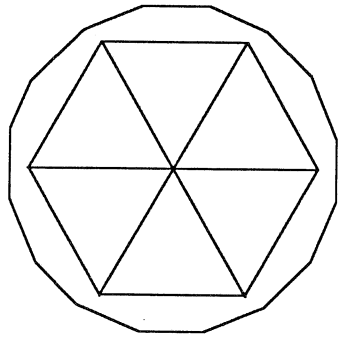

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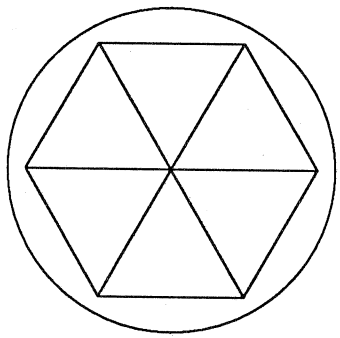

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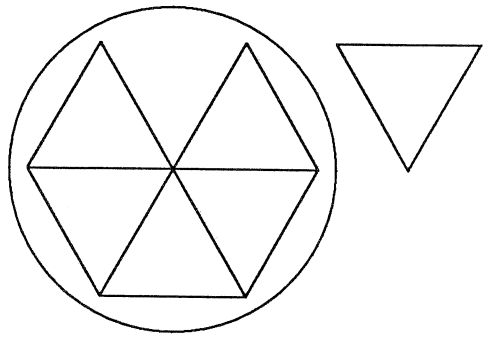

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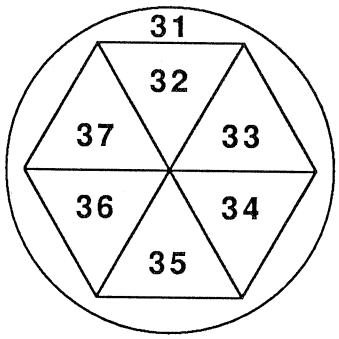


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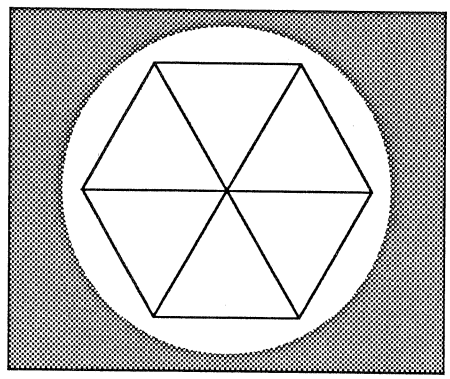

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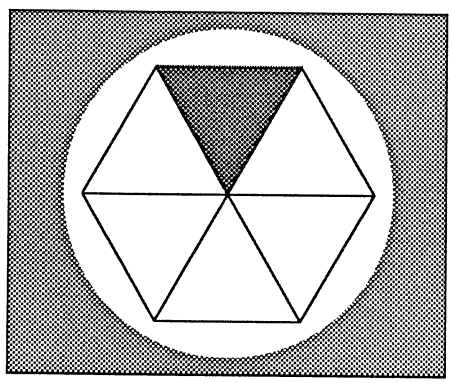

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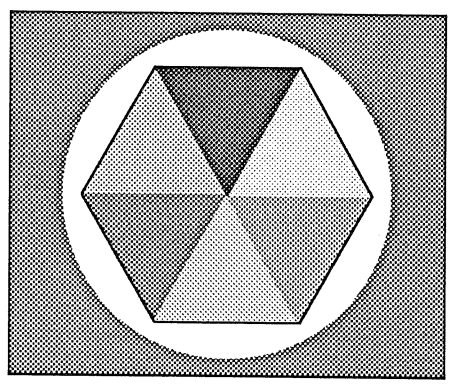
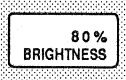
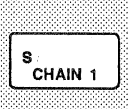
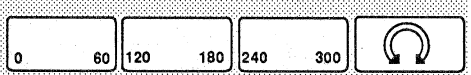
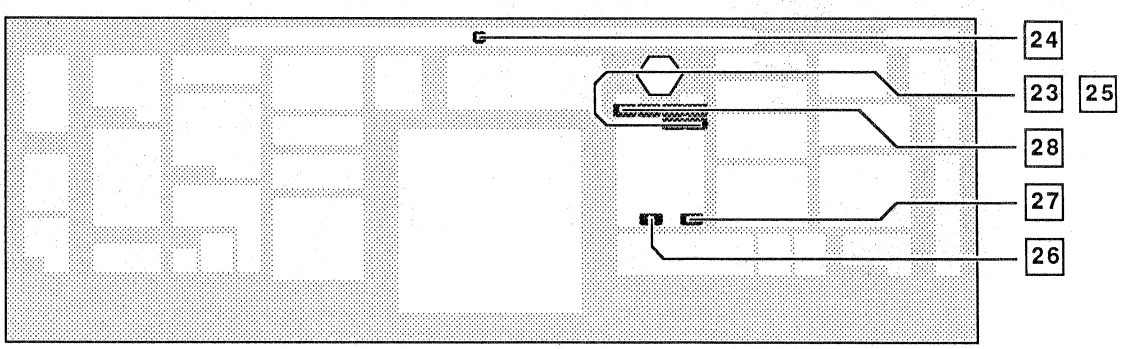
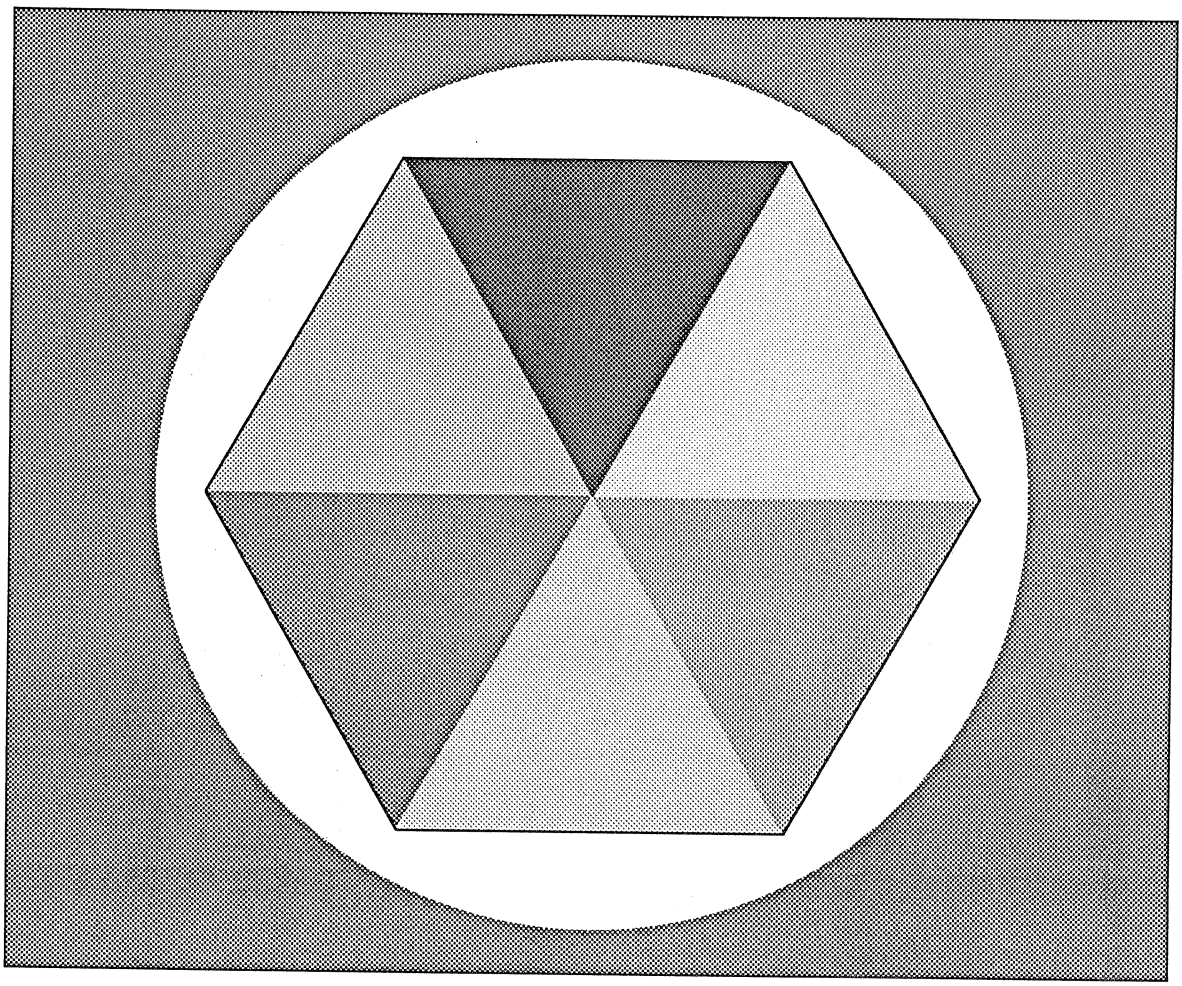
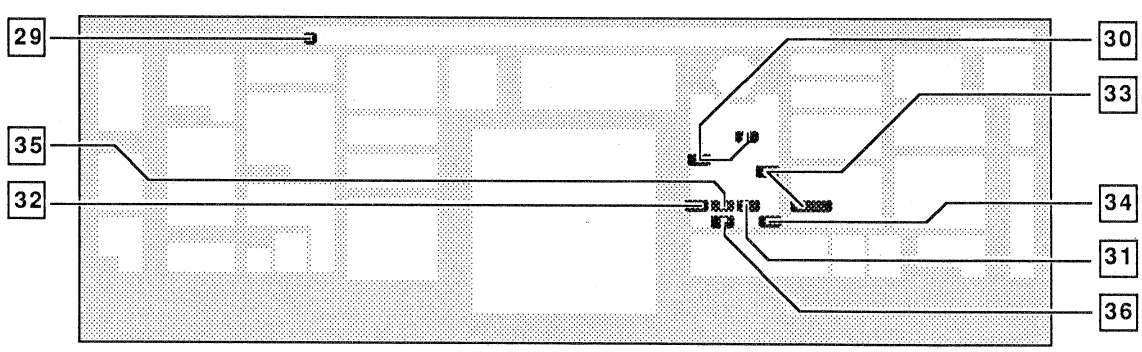


| KEYBLOCK | | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 23 | COLOUR |   | Give the maximum brightness. |
| 24 | LEVEL BAR |   | Activate level 33. |
| 25 | COLOUR |  | Give red also for this level and change brightness to 85%. |
| | |   | The brightness is displayed on the left data-monitor. |
| | |   | 80% is preprogrammed. To get 85%, use the arrows on the right side. |
| | | | Change level 34 into red 70%.<br>Change level 35 into red 55%.<br>Change level 36 into red 40%.<br>Change level 37 into red 25%. |
| 26 | COLOUR |   | This function is used to tie together a number of levels for a colour manipulation.<br>Press S on the CHAIN 1 button.<br>The system will put a small dot behind the chosen level number on the left data-monitor. |
| | | | Repeat this for the levels 32 - 37. |
| 27 | COLOUR |   | Then press on the left side of this key.<br>The dots following the affected level numbers, will turn into asterisks. |
| 28 | COLOUR |   | Use the numbers (degrees) to change the colours into other basic colours, or the rotation button to make smaller steps. |

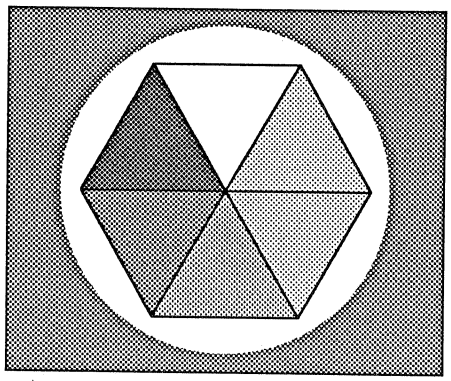




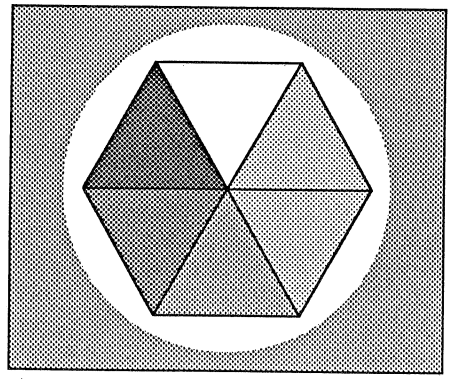
| | KEYBLOCK | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 29 | LEVELBAR | 0 1 2 | Select level 0.<br>This is the background on full screen size. |
| 30 | COLOUR | WHITE, 80% BRIGHTNESS | Give it a 80% white colour. |
| 31 | COLOUR | SAVE | The colour combination of all levels is stored on a page. Every new colour combination will be stored on the next available page.<br>Save some different colour combinations. |
| 32 | COLOUR | PAGE | To step through the different pages.<br>The colour combinations are shown on the left data-monitor. The numbers of the pages are displayed also.<br>The last colour combination, if not "saved" before you went to another page, is stored and indicated by a "S" before the last page number. |
| 33 | COLOUR | DELETE, ENTER | The current page will be deleted.<br>This page can be used to store new information. |
| 34 | COLOUR | ACTIVATE 1 CHAIN 2 | Press on the left side of this key to de-activate the colour-chain.<br>The asterisks following the affected level-numbers will turn into dots again. |
| 35 | COLOUR | LEVEL | Step to a level of the colour-chain / circle.<br>This function makes it possible to step through the levels and change colour-information without changing the current level. The movement is indicated on the left data-monitor by a little bar before the level-number. |
| 36 | COLOUR | R CHAIN 1 | Press the "R" on the "CHAIN 1" key to release this current level from the colour-chain. The small dot behind the chosen level-number on the left data-monitor will disappear.<br>Repeat step 33 and 34 for all levels of the colour-chain. |



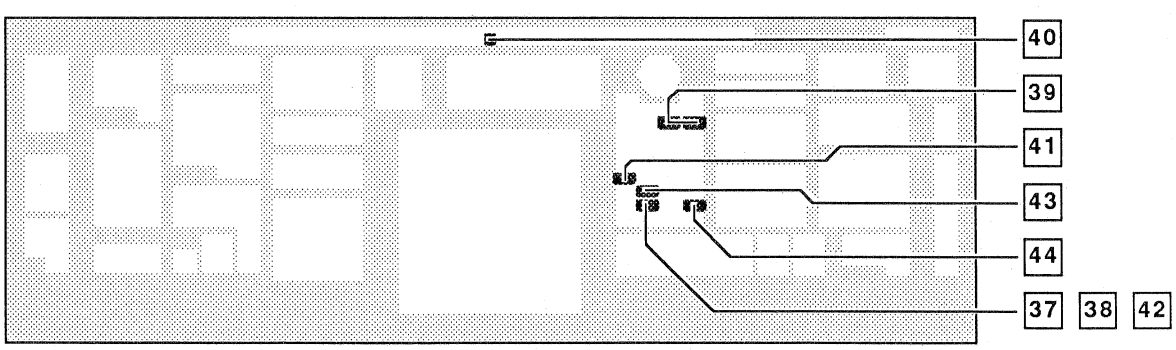
29



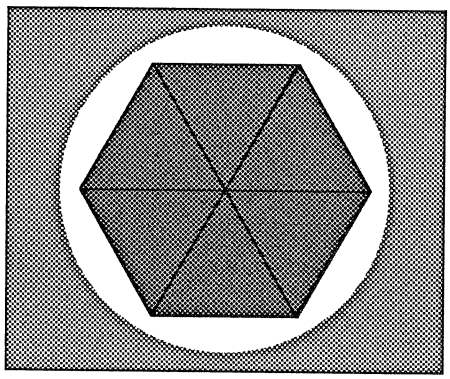
30



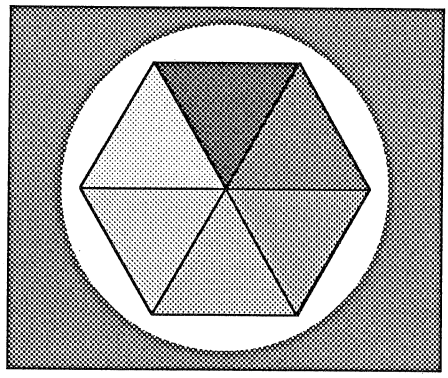
| KEYBLOCK | | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 37 | COLOUR | LEVEL, 100% >> BRIGHTNESS | Give all levels of the colourcircle maximum brightness. |
| 38 | COLOUR | LEVEL | Step to level 33. |
| 39 | COLOUR | 80% SATURATION, >> SATURATION | Change the saturation from 100% of the standard colours to 85%. The number of saturation is displayed on the left data-monitor. |
| | | | Change level 34 into 70% saturation.<br>Change level 35 into 55% saturation.<br>Change level 36 into 40% saturation.<br>Change level 37 into 25% saturation. |
| 40 | LEVELBAR | 31 32 33 | Activate level 32. |
| 41 | COLOUR | 1 SET COPY | The colour that is in the current level will be stored. |
| | | | Repeat step 40 and 41 for:<br>level 34 - set copy 2<br>level 36 - set copy 3<br>level 37 - set copy 4 |
| 42 | COLOUR | LEVEL | Step to level 33. |
| 43 | COLOUR | 1 GET COPY | The copied colour is recalled in the activated level. The original colour of this level will be deleted when we change levels. |
| | | | Repeat this for: level 35 - get copy 2<br>level 37 - get copy 3<br>level 30 - get copy 4 |
| 44 | COLOUR | CORRECT | The original colour of the current level, when it was switched on, is recalled. |



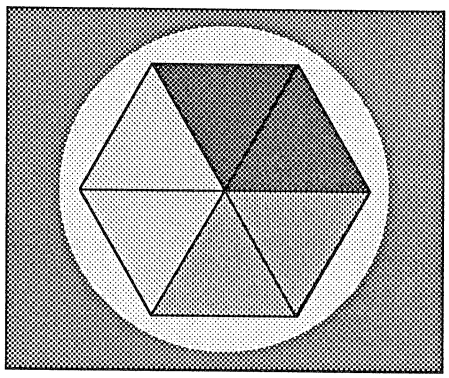
37



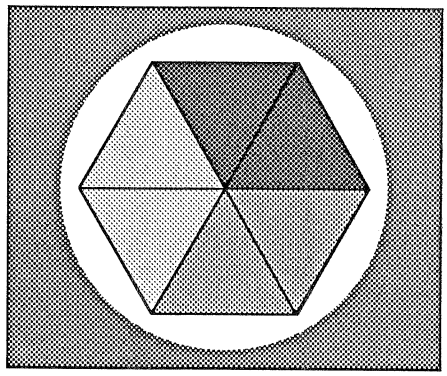
38 - 41



42,43



44



For making patterns and repetitions, the key **IN BETWEEN LINEAR** and **EXTRAPOLATE** in the keyblock **ANIMATE** can be used.

**IN BETWEEN LINEAR** will make copies in between two tables. These tables can be called "key"-tables, which may either be identical or totally different from one another.

After activating the **IN BETWEEN LINEAR** key and designating both "key"-tables, a number has to be typed in.
The system will start to generate copies, corresponding with that number, including the originals.

When both "key"-tables have a different number of points and a different starting point and drawing direction, the copies will be distorted.
The key **STARTING POINT** in the keyblock **DISPLAY**, shows the starting point and drawing direction.
The key **CHANGE DIRECTION** in the keyblock **DRAW** enables to change the drawing direction, by designating the table one time with the cursor.

By counting also the "key"-tables, the numerical input has to be at least 3.
With an input of 0 it will connect the corresponding points with four-sided tables.

The key **EXTRAPOLATE** can make copies from one "key"-table.

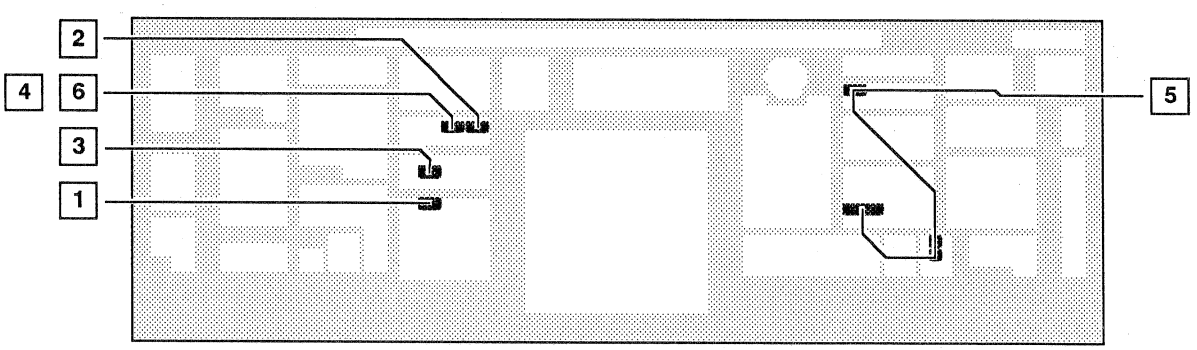
Designate the table twice with the cursor, then use the **DYNAMIC** keys to create the first step.
After typing in the number of steps, the system will generate the following steps.

When these functions are used to create an animation, the scan facilities can be used to simulate a motion.
Therefore the different tables have to be send to different levels. The keys **LOOPSCAN** and **SWEEPSCAN** in the keyblock **SCANNING** can be used to see an animation sequence.
The sequence may be speeded up or slowed down by using the key **SCANSPEED**.

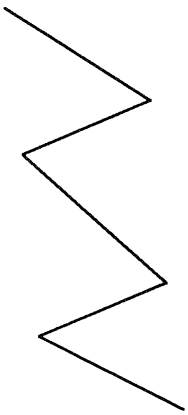
# LESSON 9 - 1

## ANIMATE (in between linear)

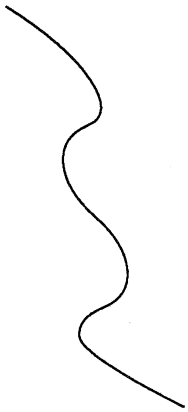
| | KEYBLOCK | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 1 | DRAW | POINT TO | Draw the vectors.<br>(see example) |
| 2 | SPLINES | B-SPLINE | Touch the table. |
| 3 | MOVE | COPY + MOVE | Make one copy and move it in a different position. |
| 4 | SPLINES | REFRESH SPLINES | |
| 5 | ANIMATE | INBETWEEN LINEAR<br>2 5 ENTER | Designate the two tables.<br>The middle data-monitor will display :<br>give number :<br>Type in for example 25 and press ENTER.<br>The number 25 is including the originals. |
| 6 | SPLINES | REFRESH SPLINES | |



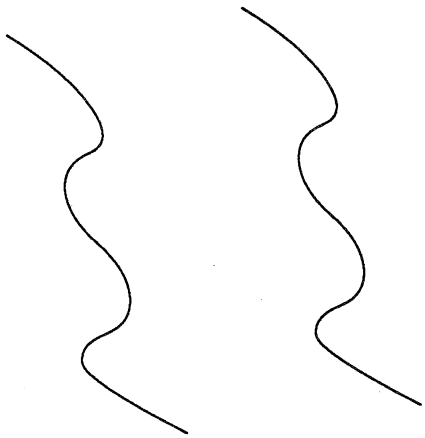
1



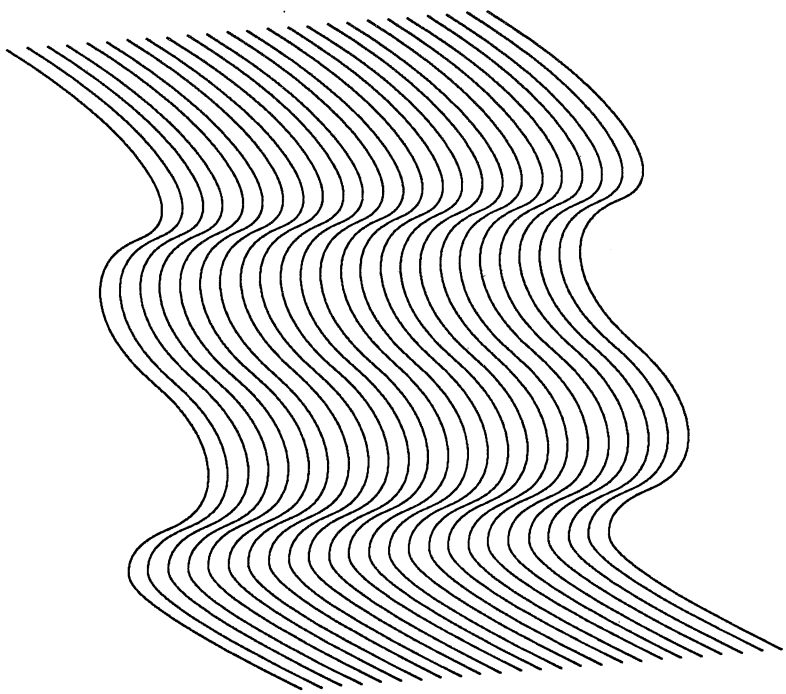
2



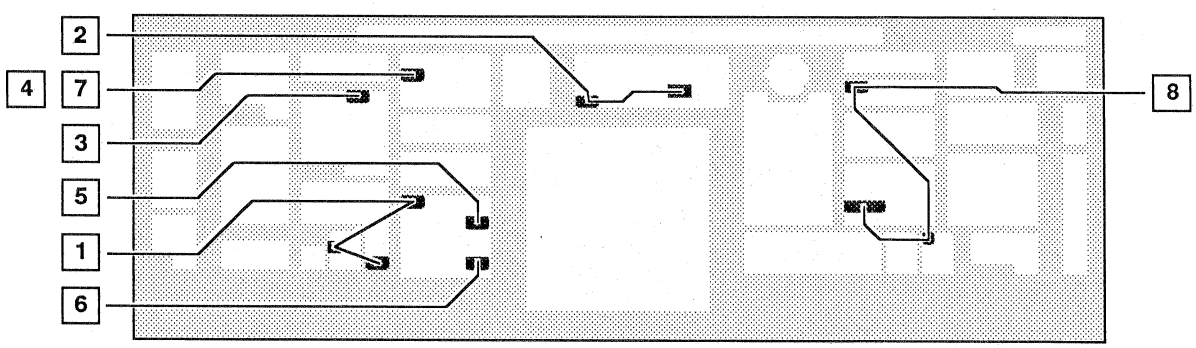
3, 4



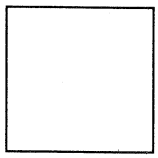
5, 6



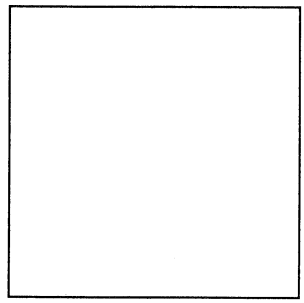
| | KEYBLOCK | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 1 | DRAW | POLYGON 4 ENTER | The polygon is used to create a grid. |
| 2 | DYNAMICS | CHAIN ALL | Enlarge the polygon. |
| 3 | SPLICING | CUT | Cut the 4 corners exactly by sliding the cursor along the lines, releasing the CCB past the corner |
| 4 | DISPLAY | STARTING POINT | This function shows the drawing-direction of a table. Touch the 4 lines. |
| 5 | DRAW | CHANGE DIRECTION | To create the interpolation, the starting-points of two corresponding lines must be in the same direction. Touch one horizontal and one vertical line to change the direction. |
| 6 | DRAW | REFRESH VECTORS | |
| 7 | DISPLAY | STARTING POINT | Check the drawing direction again. |
| 8 | ANIMATE | INBETWEEN LINEAR 1 1 ENTER | Touch the vertical lines and type in 11. Repeat the same for the horizontal lines. The uneven number gives a center-line which is important, if the grid is used as a reference for a drawing. |



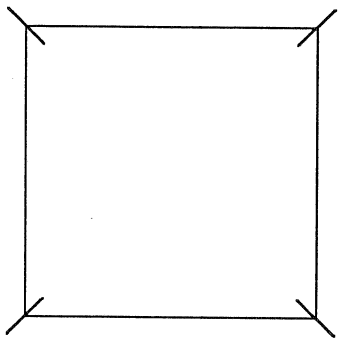
2



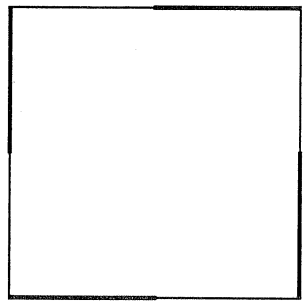
2



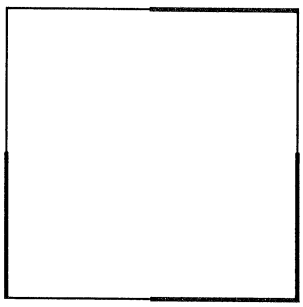
3



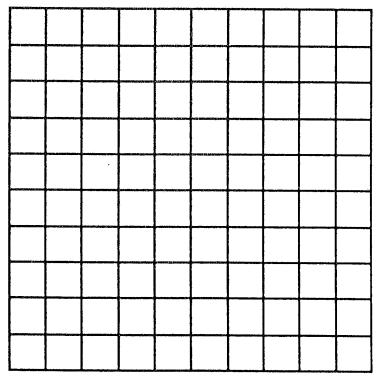
4



5,6,7



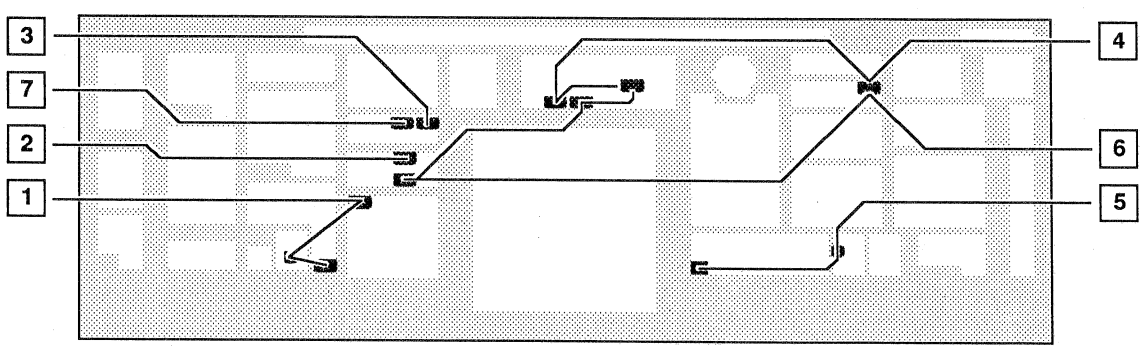
8



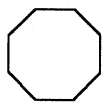
# LESSON 9 - 3

## ANIMATE (extrapolate)

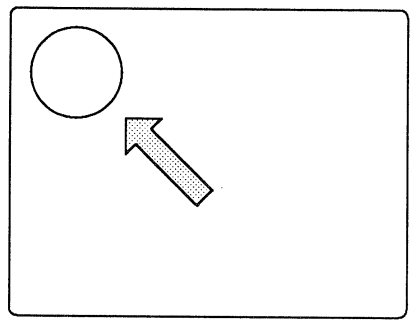
| | KEYBLOCK | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 1 | DRAW | POLYGON 8 ENTER | The polygon appears on the screen. |
| 2 | MOVE | TABLE | Move the polygon to the top left part of the screen. |
| 3 | SPLINES | B-SPLINE | Touch the table. |
| 4 | ANIMATE + DYNAMICS | EXTRAPOLATE<br>X | Touch the polygon twice.<br>Now the dynamic keys are available.<br>Use X-MOVE and ZOOM to move and reduce the next step |
| 5 | MEASURE | 4 ENTER | Then type in 4 and ENTER.<br>The system will generate 4 copies.<br>(see example) |
| 6 | ANIMATE + DYNAMICS | EXTRAPOLATE ALL<br>Y | Activates the 5 tables at once.<br>Make approximately the same steps for Y-MOVE and ZOOM, as preceding steps. |
| | MEASURE | 4 ENTER | |
| 7 | DRAW | REFRESH SPLINES | |



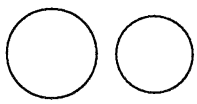
1



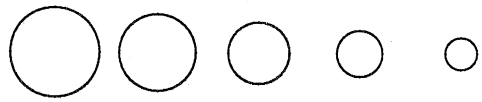
2



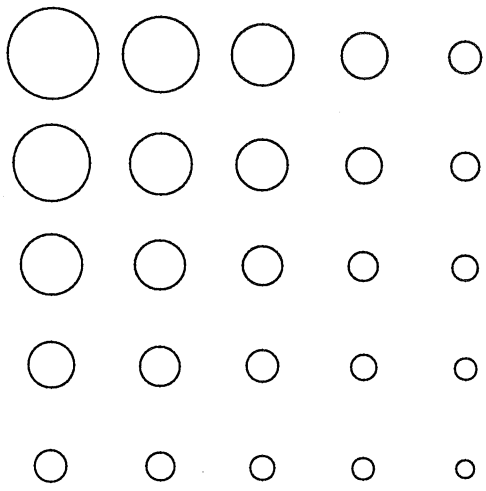
4



5



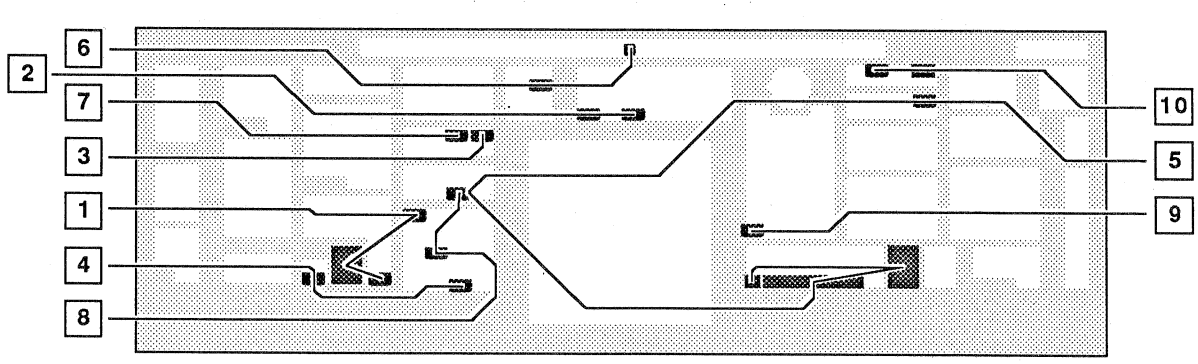
6,7



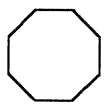
# LESSON 9 - 4

## ANIMATE (extrapolate / scanning)

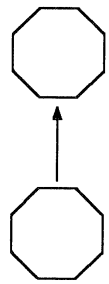
| | KEYBLOCK | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 1 | DRAW | POLYGON 8 ENTER | The polygon appears on the screen. |
| 2 | DYNAMICS | CHAIN ALL Y | Use Y-MOVE to position the polygon in the top middle of the screen. |
| 3 | SPLINES | B-SPLINE | Touch the polygon. |
| 4 | MEASURE | SET CENTER ORIGIN ALL | Brings the origin on the centre of the screen. |
| 5 | ANIMATE + MEASURE | EXTRAPOLATE ALL SPACE | Activate the polygon and make a numerical rotation of 30 degrees. |
| | | MENU 3 0 ENTER | |
| | | 1 1 ENTER | Then type in 11 and ENTER. The system will complete the circle of polygons. |
| 6 | LEVELS | SET LEVEL 31 32 33 | Touch the first copy twice. Set the other copies to the following levels. |
| 7 | SPLINES | REFRESH SPLINES | Repeat step 7 and 8 for each level. |
| 8 | DRAW | FILL CHAIN ALL | |
| 9 | COLOUR | S R PALETTES ENTER | Press SET palettes to have a standard colour in each level. |
| 10 | SCANNING | LOOPSCAN | Activate level 31 first, than level 42. |
| | | - + SCANSPEED | Change the scanspeed by pressing + or -. |



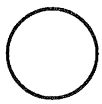
1



2

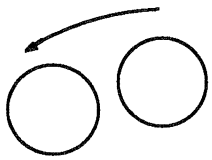


3

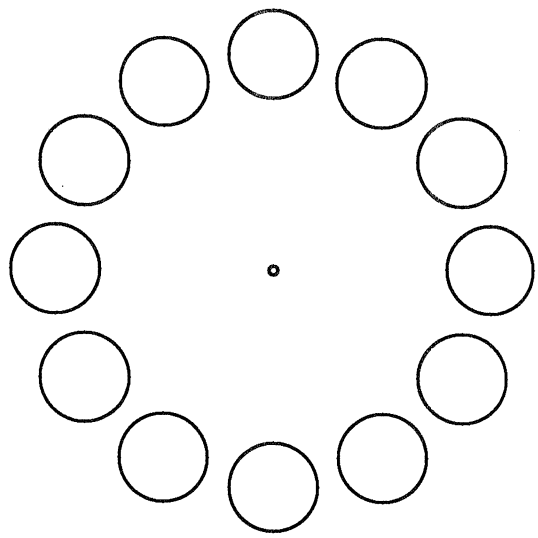


4

5



5-10



A file from disk will always appear on screen in the same way as it was stored. When desired to appear in fixed position, the key **FROM DISK TO TABLE** in the keyblock **POSITION** has to be used. To determine this position, a line has to be drawn.
After activating **FROM DISK TO TABLE** and designating the line, the middle data-monitor will ask for a filename.

In the first lesson of this chapter a horizontal line is drawn and divided into 8 segments. The division is made by using the key **DIVIDE** in the keyblock **DRAW**.
The function **FROM DISK TO TABLE** is used to get a number of characters on the segments.

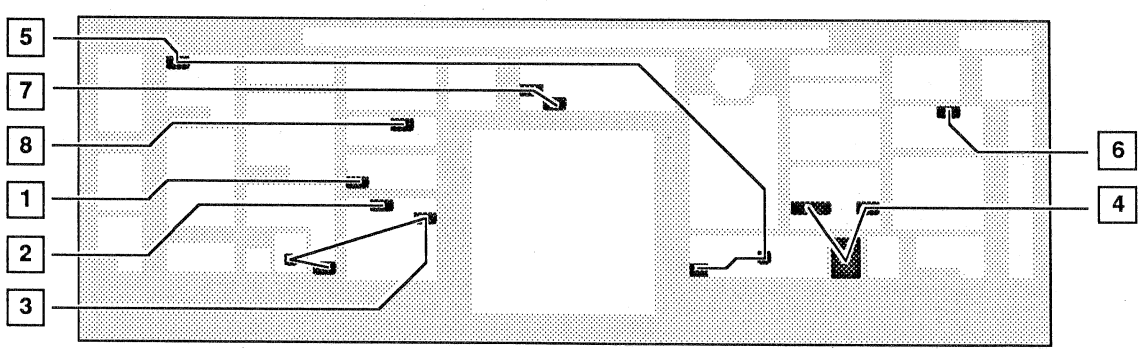
This exercise shows how to create a logo or a small headline, without using the type-setting facilities. It can only be done when the characters are filed on disk.

A number of tables, for instance the word headline in this exercise, can be clustered to an object.
This is done with the key **MAKE OBJECT** in the keyblock **DRAW**.
An object can be manipulated as a whole. Subsequently, a number of objects can be clustered to a scene, by using the key **MAKE SCENE** in the keyblock **DRAW**.
A scene can also be manipulated as a whole.

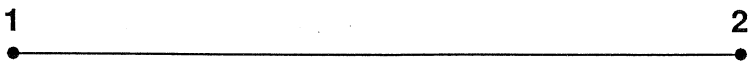
# LESSON 10 - 1

POSITION (text)

| KEYBLOCK | | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 1 | MOVE | GRAVITY ON | Activate the gravity function. |
| 2 | DRAW | POINT TO | Draw a horizontal line from the left to the right. |
| 3 | DRAW | DIVIDE, 8, ENTER | The DIVIDE function will sub-divide a line into any number of segments. Type in : 8, ENTER. |
| 4 | DISK | SCALE<br>0 . 2 ENTER | Change the input scale-factor to 20%. |
| 5 | POSITION | FROM DISK TO TABLE<br>H ENTER<br>E ENTER<br>A ENTER | Touch the line.<br>- Give filename : - will be showed on the middle data-monitor.<br>Type in the character, then ENTER. After ENTER, - Give filename : - will be displayed again, so you can type in the next character. |
| 6 | KILL | TABLE | Kill the divided line. |
| 7 | DYNAMICS | MAKE CHAIN, X | Use X-MOVE in dynamics to bring the characters in the right position. |
| 8 | SPLINES | REFRESH SPLINE | |



**1, 2**




**3**

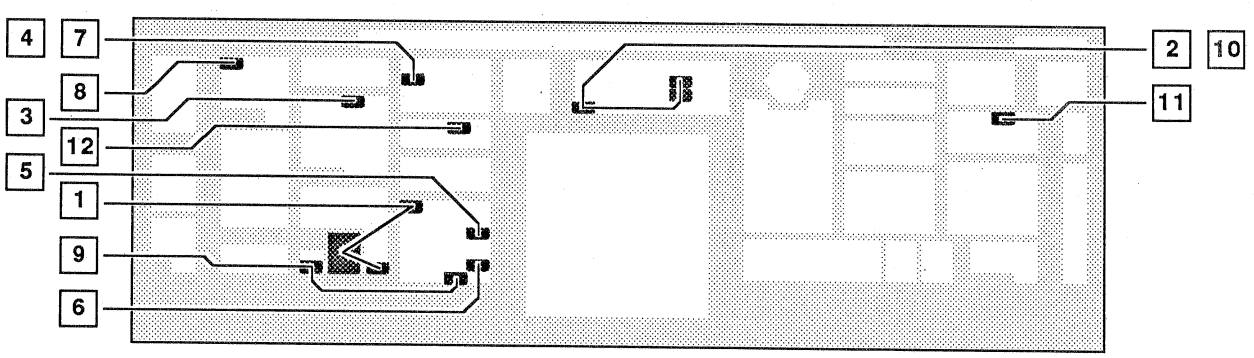
**4, 5**

HEADL INE

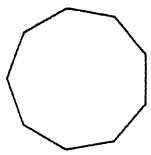
**6, 7, 8**

HEADLINE

| | KEYBLOCK | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 1 | DRAW | POLYGON 9 ENTER | The polygon 9 appears on the screen. |
| 2 | DYNAMICS | CHAIN ALL | Enlarge the polygon and rotate it 90° counter clockwise. |
| 3 | SPLICING | CUT | Using CUT it's possible to create a new starting point on the polygon. Cut exactly on two points. (see example) |
| 4 | DISPLAY | STARTING POINTS | Touch the top and the lower part of the polygon. |
| 5 | DRAW | CHANGE DIRECTION | Touch the lower part. |
| 6 | DRAW | REFRESH VECTORS | |
| 7 | DISPLAY | STARTING POINTS | Check if the starting points of the lower part has been changed to the other side. |
| 8 | POSITION | FROM DISK TO TABLE | Touch the top part and type in :R-O-U-N-D. Then touch the lower part and type in : T-E-X-T. |
| 9 | MEASURE | SET CENTER ORIGIN ALL | Set the origin of all characters on the middle of the screen. |
| 10 | DYNAMICS | MAKE CHAIN | By using ROTATE it is possible to make corrections in the spacing. |
| 11 | KILL | TABLE | Kill the two parts of the polygon. |
| 12 | SPLINES | REFRESH SPLINES | |



1



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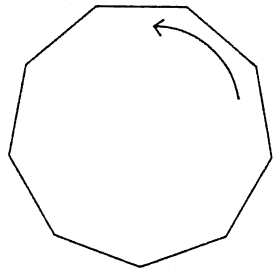

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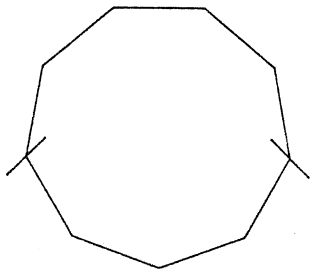

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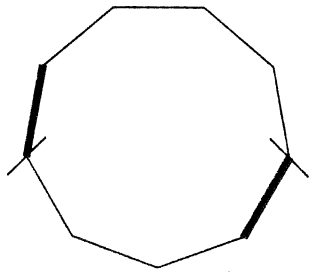

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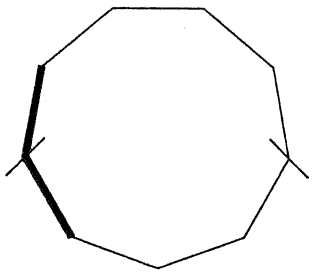
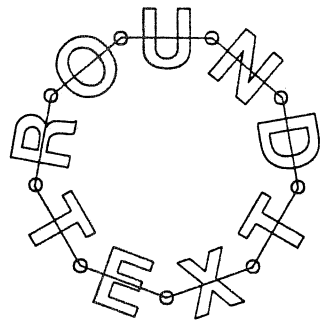
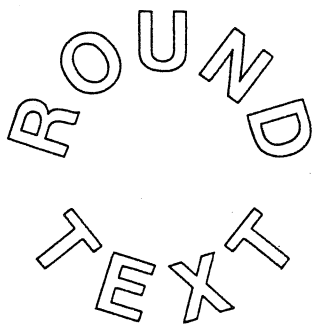


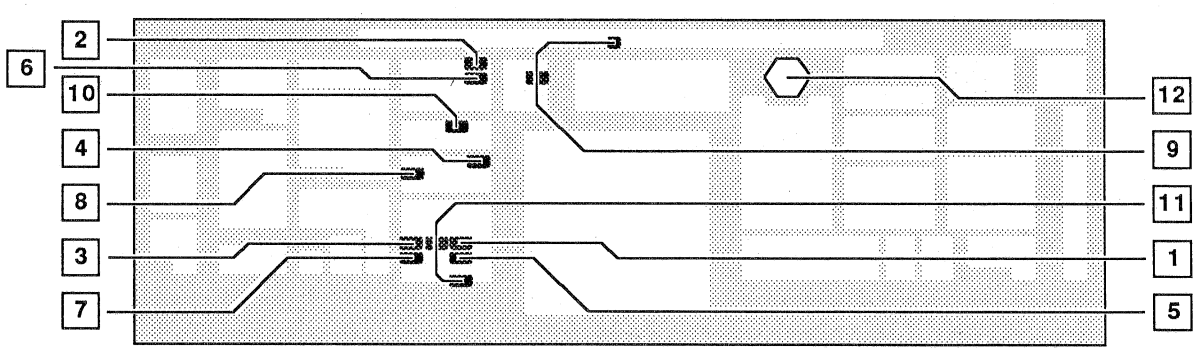
8




9–12



| | KEYBLOCK | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 1 | DRAW | MAKE OBJECT | Use the word HEADLINE to create the OBJECT.<br>Touch all tables that should be one group and touch the last one twice. |
| 2 | DISPLAY | OBJECT | Touch one of the tables.<br>The object will be displayed on the right monitor, by changing from blue to red. |
| 3 | DRAW | COPY OBJECT | Touch one of the tables.<br>All tables in the object will be copied at once. |
| 4 | MOVE | OBJECT | Move the copy below the original. |
| 5 | DRAW | MAKE SCENE | Touch the objects.<br>The last one twice. |
| 6 | DISPLAY | SCENE | The scene will be displayed in the same way as objects. |
| 7 | DRAW | COPY SCENE | Make one copy of the scene by touching one of the tables. |
| 8 | MOVE | SCENE | Move the copy to create a drop-shadow. (see example). |
| 9 | LEVELS | SET LEVEL 29 30 31 | Select the copy. |
| 10 | SPLINES | REFRESH SPLINES | Refresh the screen. |
| 11 | DRAW | FILL CHAIN ALL | Fill the text. |
| 12 | COLOUR | | Give a colour.<br>Repeat step 10, 11 and 12 for level 30 and reduce the colour with BRIGHTNESS. |



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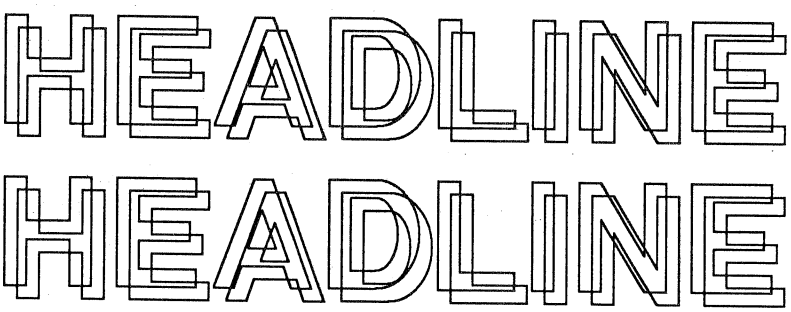
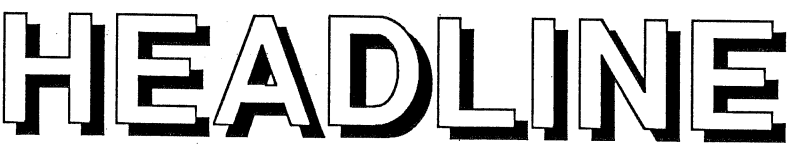
8,9,10




11,12



Another key in the keyblock **POSITION** is **SET POSITION**.

The use of this function is making a quick repetition of one existing table, along the points of another table, without creating a lot of data (computer information).

In some way this function is comparable with **IN BETWEEN LINEAR** or **EXTRAPOLATE**. It is in this way different that **SET POSITION** makes reflections from the "key"-table instead of copying the original tables.

The reflections cannot be modified individually. They will only react on modifications on the "key"-table.

When a modification on the original table has been made, a **REFRESH VECTORS** or **REFRESH SPLINES** will execute this on the whole image. Therefore the key **POSITION ON** in the keyblock **DYNAMICS** has to be activated.

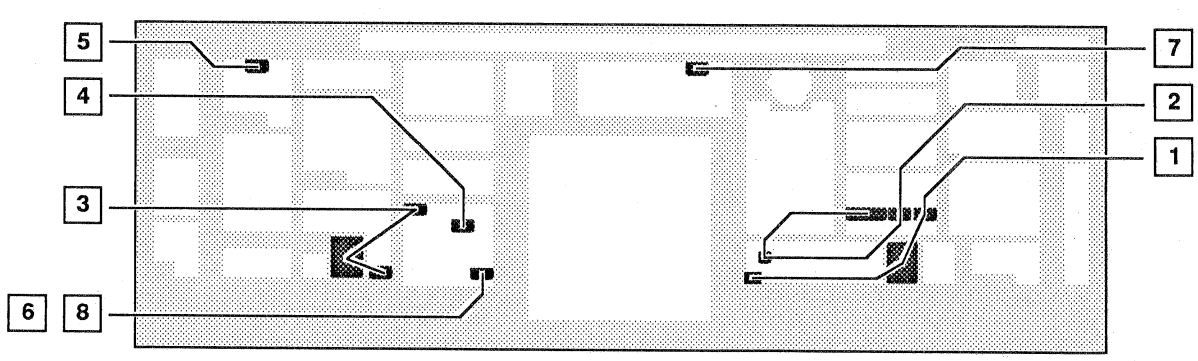
The advantage of this function is a quick view on the repeat motiv-design and its modifications.

The image can be stored on disk, when **MULTILEVEL** is used and the key **POSITION ON** in the keyblock **DYNAMICS** is activated

# LESSON 11 - 1

## POSITION (repeat motif)

| | KEYBLOCK | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 1 | DISK | SCALE 0 . 2 ENTER | Change the input scale-factor to 20%. |
| 2 | DISK | FROM DISK ENTER A ENTER | Call an -A- from disk. |
| 3 | DRAW | POLYGON 1 6 ENTER | The polygon 16 appears on the screen around the -A-. |
| 4 | DRAW | OUTLINE | Select the polygon and use the ouline-function to enlarge it.<br>Notice: it is not allowed for a-symmetrical shapes. |
| 5 | POSITION | SET POSITION | The middle data-monitor will display:<br>**Set flight position 2.**<br><br>Select the table to be repeated.<br>Touch one part of the -A- first.<br>The middle data-monitor will display:<br>**Select place to be positioned.**<br><br>Now, touch the polygon.<br>The system will continue asking:<br>**Select table to be repeated**<br>**Select table to be repeated**<br>Touch the other partt of the -A- and than the polygon again. |
| 6 | DRAW | REFRESH VECTORS | Now the original -A- and the polygon are displayed only. |
| 7 | DYNAMICS | POSITION ON . | This will activate the repetition again which will be displayed after pressing |
| 8 | DRAW | REFRESH VECTORS | REFRESH VECTORS. |



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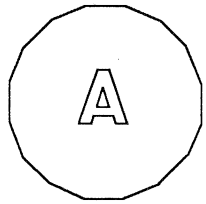

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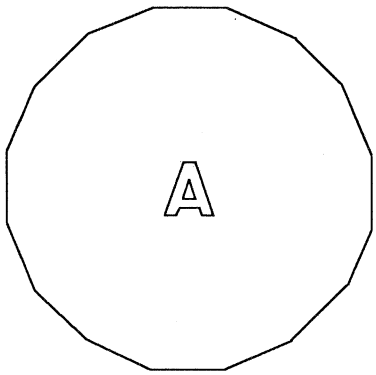

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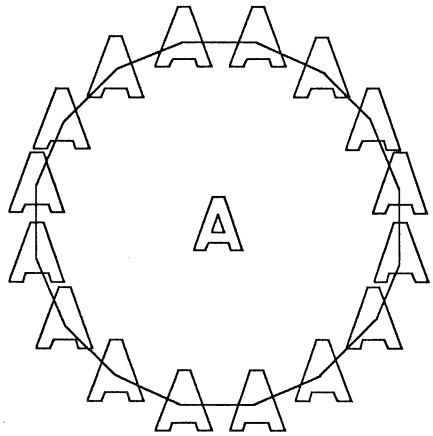

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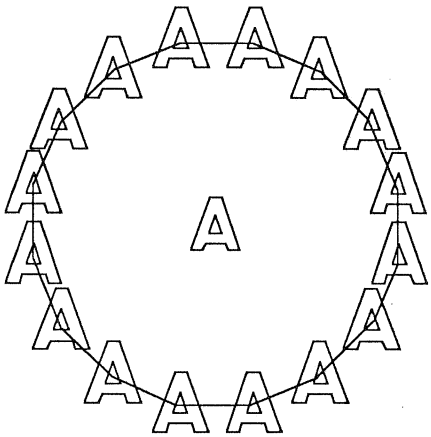

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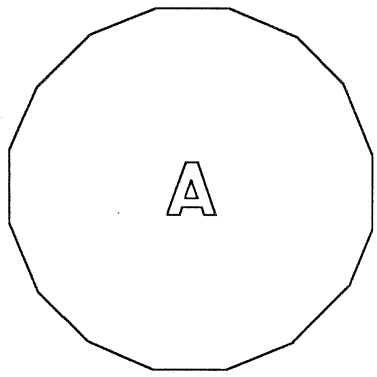
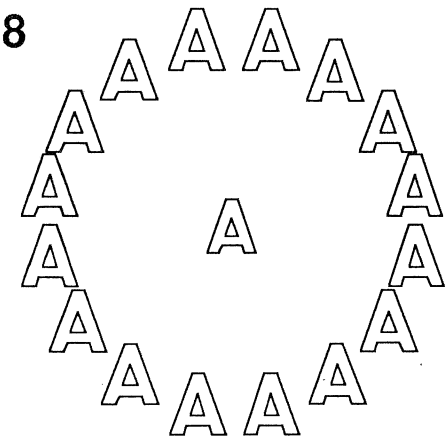
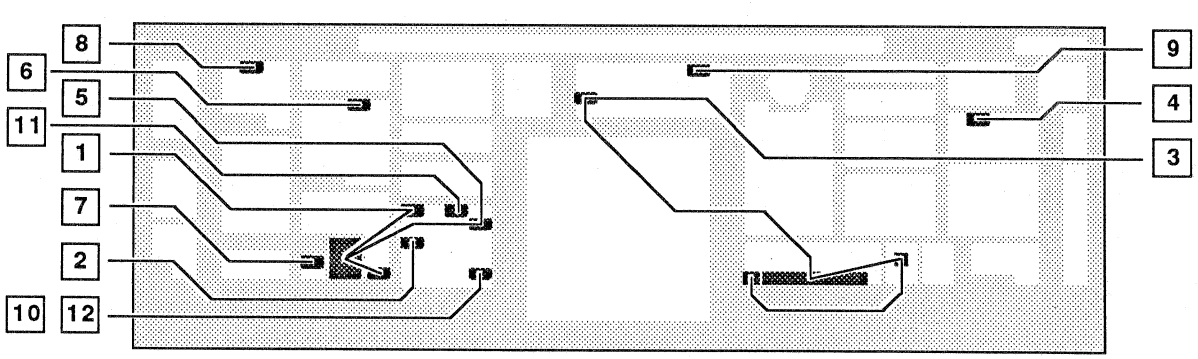


7, 8



| | KEYBLOCK | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 1 | DRAW | POLYGON 4 ENTER | The polygon appears on the screen. |
| 2 | DRAW | COPY TABLE | Make one copy. |
| 3 | DYNAMICS | MAKE CHAIN SPACE<br>MENU 5 ENTER | Select the copy, touch it twice, press SPACE, select ZOOM and type in 5. |
| 4 | KILL | LINE | Kill the top and right line of the enlarged polygon. |
| 5 | DRAW | DIVIDE 4 ENTER | Select the remaining lines and divide them into 4 parts. |
| 6 | SPLICING | CUT | Cut the divided lines exactly in the corner. |
| 7 | MEASURE | SET LOCAL ORIGIN | Select the divided vertical line and set the origin on the corner. |
| 8 | POSITION | SET POSITION | Select first the polygon and then the vertical line.<br>Select the vertical line again and then the horizontal line. |
| 9 | DYNAMICS | POSITION ON . | |
| 10 | DRAW | REFRESH VECTORS | |
| 11 | DRAW | NEWPOINT | Add a newpoint to the original polygon in the middle of the right side and pull it inside. |
| 12 | DRAW | REFRESH VECTORS | Shows the repetition. |



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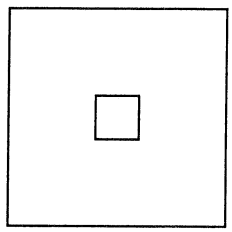

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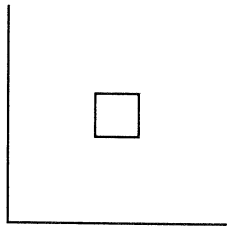
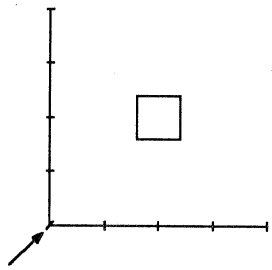
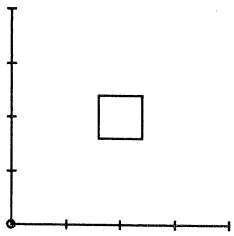


5, 6



7



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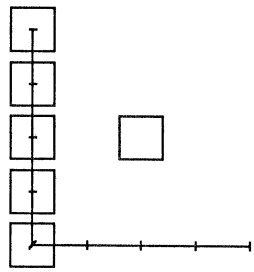

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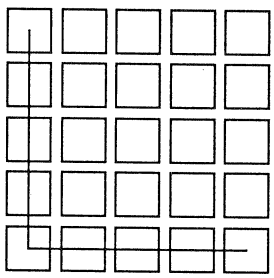

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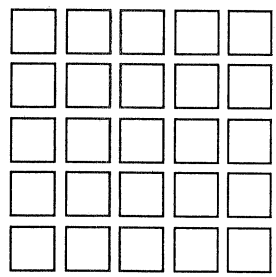

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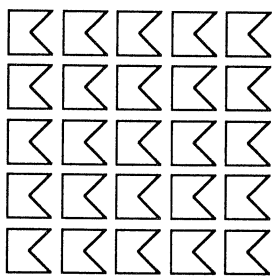
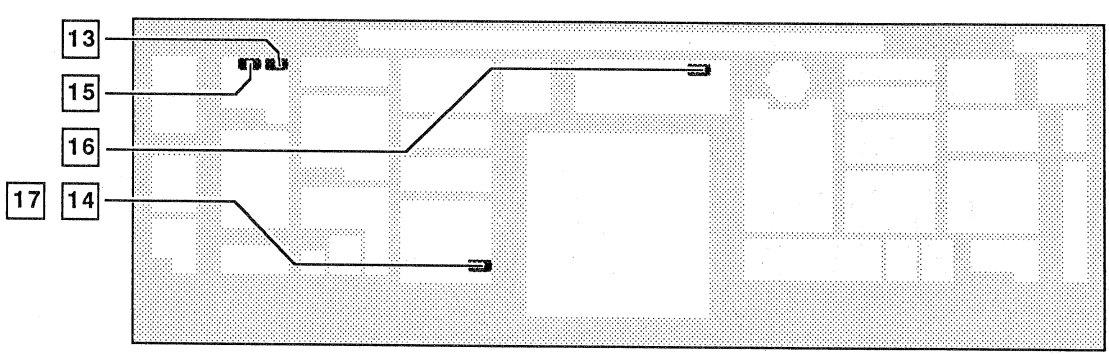
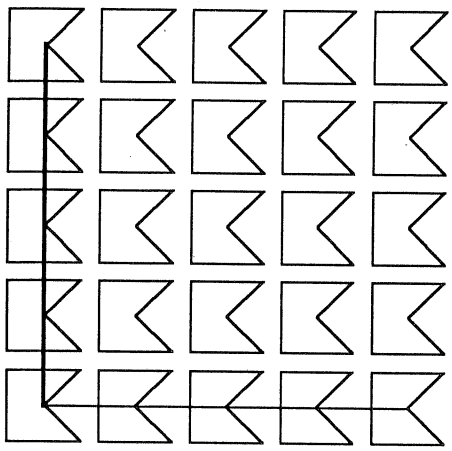


| KEYBLOCK | | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 13 | POSITION | RESET POSITION | Using this key will kill the information you previously gave to you drawing, meaning you are back in step 7 of this lesson. Select with the CCB the vertical line first and then the polygon 4. |
| 14 | DRAW | REFRESH VECTORS | This removes your "copies" leaving only your x- and y-axis and the polygon 4. |
| 15 | POSITION | SET POSITION | To repeat the motif again select first the polygon and then the vertical line. |
| 16 | DYNAMICS | POSITION ON . | |
| 17 | DRAW | REFRESH VECTORS | |



13



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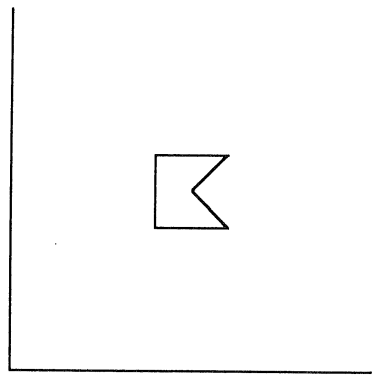

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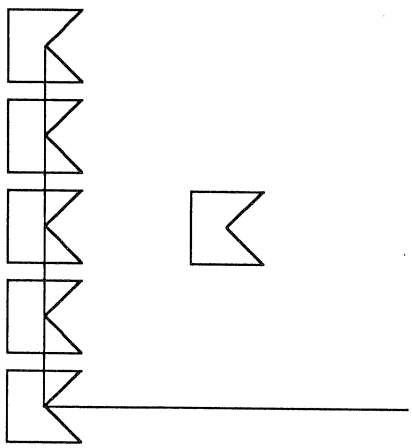

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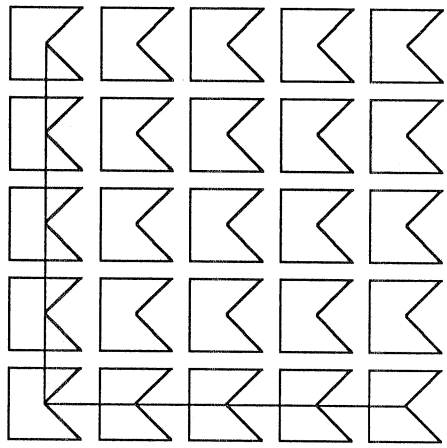

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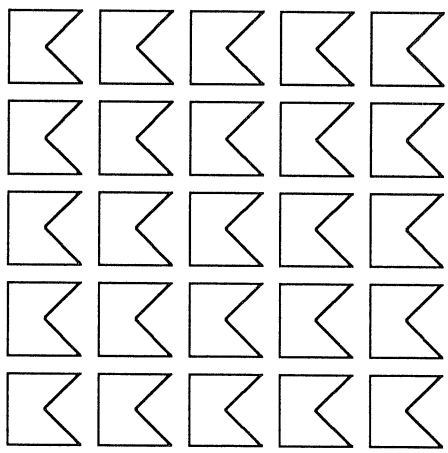


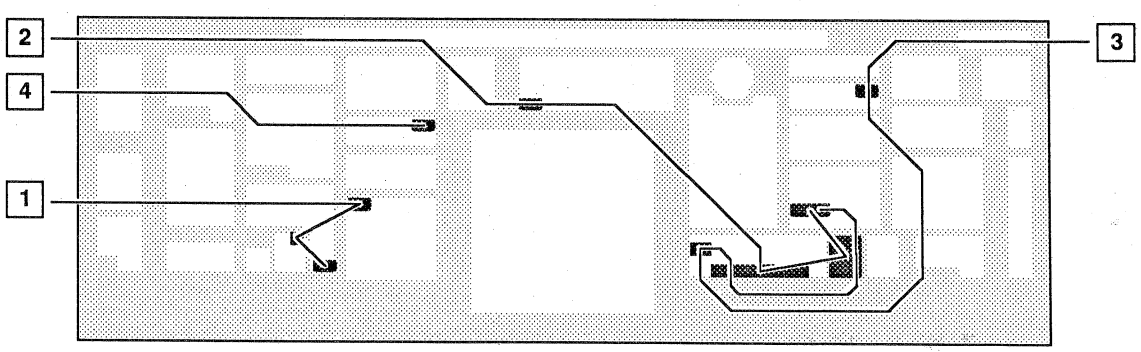
The general use of the **OUTLINE** function is to get a parallel line outside or inside a drawing.

For some splined drawings, the key **OUTLINE** in the keyblock **DRAW** can give some distortion.
Especially when the angles between the vectors are small.

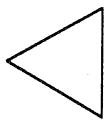
For these drawings the key **OUTLINE SPLINE** in the keyblock **SPLINES** has to be used.

After designating a table the **OUTLINE SPLINE** function will automatically make a copy; the system will ask to give a resolution.
A smaller number, for instance 10, will give a higher resolution or precision.
Finally, the distance between original and outline has to be typed in.

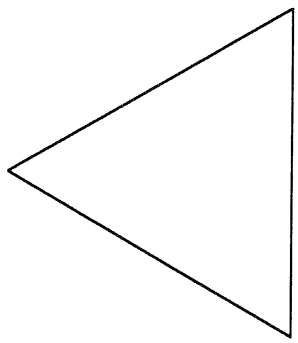
| KEYBLOCK | | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 1 | DRAW | POLYGON 3 ENTER | The polygon appears on the screen. |
| 2 | DYNAMICS | CHAIN ALL | Activates the polygon. |
| | | SPACE MENU<br>5 ENTER | Enlarge the polygon 5x. |
| | | SPACE MENU<br>9 0 ENTER | Rotate it 90°. |
| | | SPACE MENU<br>0 . 2 5 ENTER | Reduce the hight to 25%. |
| | | SPACE MENU<br>2 0 0 ENTER | Move the polygon 200 mm upwards. |
| 3 | ANIMATE | EXTRAPOLATE ALL<br>SPACE MENU<br>- 4 0 0 ENTER<br>1 ENTER | Use EXTRAPOLATE to create a copy, which is positioned 400 mm below the original. |
| 4 | SPLINES | B-SPLINE | Touch both tables. |



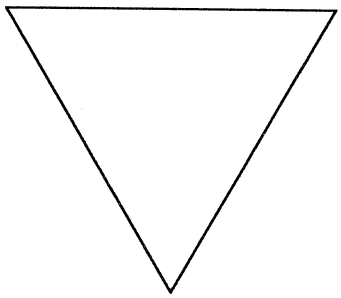
1



2



2



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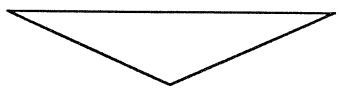

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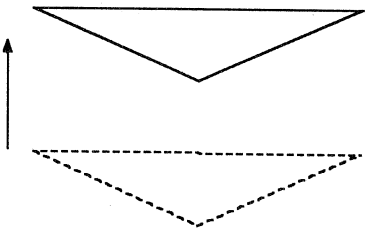

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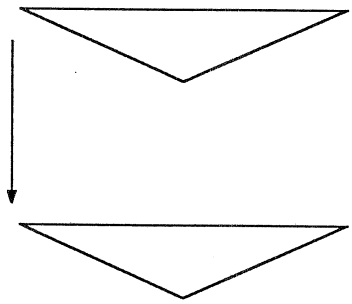

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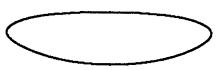
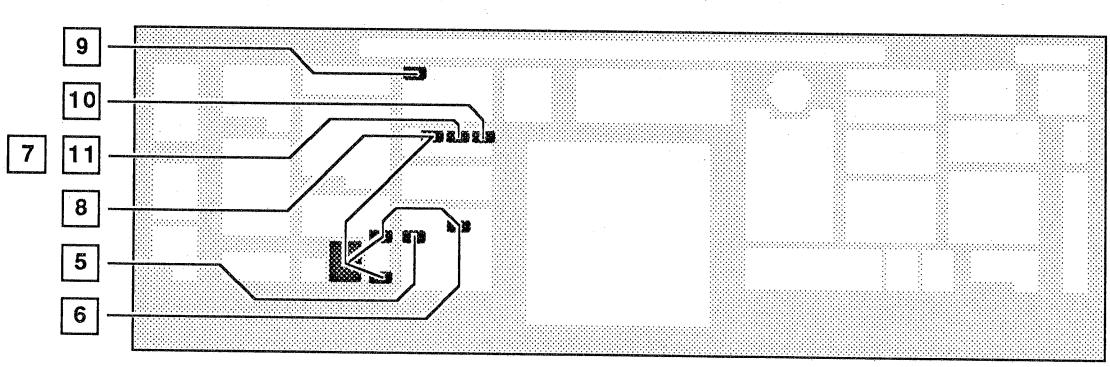
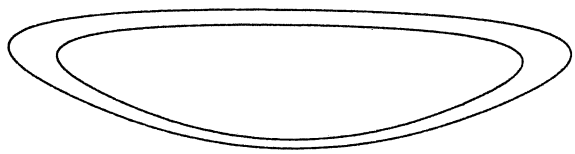
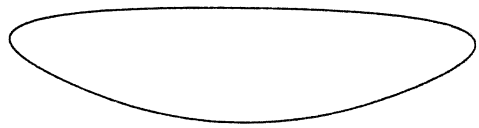


| KEYBLOCK | | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 5 | DRAW | COPY TABLE | Make one copy of the upper table. |
| 6 | DRAW | OUTLINE, SPACE, - 1 0 ENTER | Select the copy, press SPACE and type in: -10 ENTER. |
| 7 | SPLINES | REFRESH SPLINES | Notice that the splines are not parallel. |
| 8 | SPLINES | OUTLINE SPLINE, 1 0 0 ENTER, - 1 0 ENTER | This function creates automaticaly a copy, with a large number of points, which will be parallel with the original.<br><br>Touch the lower table.<br>The middle data-monitor will display:<br>**Give resolution** type in: 100<br>**Give outline in mm** type in: -10.<br><br>A smaller number of resolution will give more points on the OUTLINE SPLINE. |
| 9 | DISPLAY | POINTS | |
| 10 | SPLINES | B-SPLINE | The OUTLINE SPLINE needs to get the B_SPLINE command as well. |
| 11 | SPLINES | REFRESH SPLINES | |

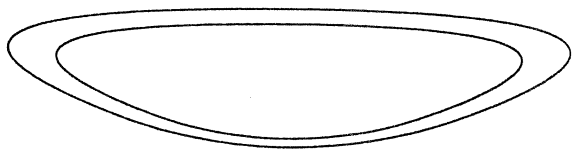


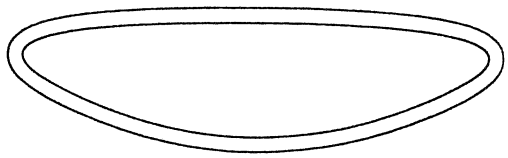
5,6,7





8,9,10,11





If any accelerating curve is required, the **SPIRAL** function in the keyblock **DRAW** can be used.

It is a pre-programmed way of drawing, the same as with the polygons.

When this function is activated, the system will ask three times to type in a number.

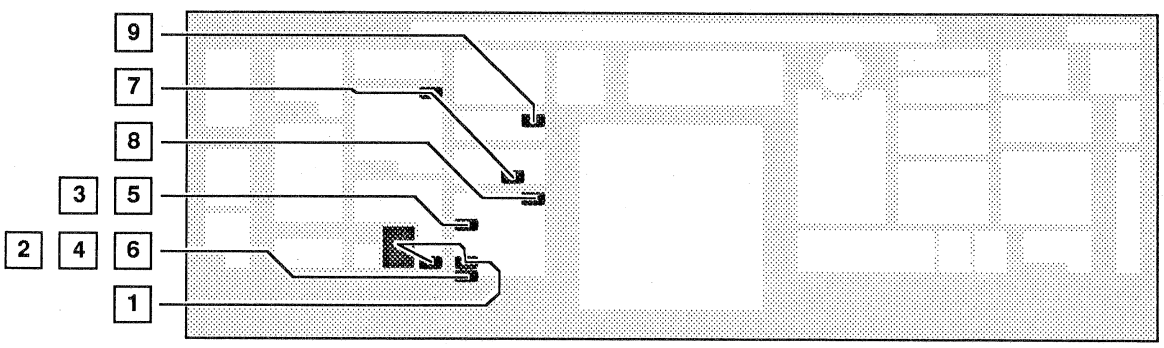
- The horizontal distance between starting point and screen centre.
- The horizontal distance between ending point and screen centre.
- The number of vectors.

The key **MODIFY SPIRAL** in the keyblock **DRAW** is used to change the progress in the spiral. Only starting or ending points can be moved
The moving direction is horizontal.

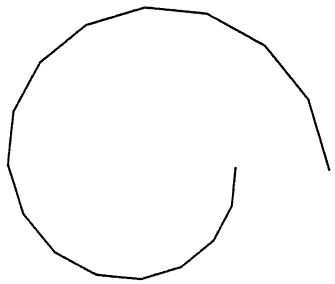
# LESSON 13 - 1



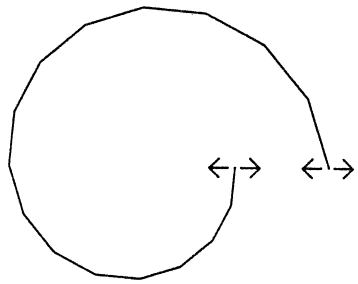
| | KEYBLOCK | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 1 | DRAW | SPIRAL<br>1 0 0 ENTER<br>2 0 0 ENTER<br>1 6 ENTER | This function will generate a spiral by typing in 3 numbers.<br>- The x-diff. between starting-point and centre.<br>- The x-diff. between end-point and centre.<br>- Number of vectors. |
| 2 | DRAW | MODIFY SPIRAL | Select the starting- or end-point and move it along the x-axis while keeping the CCB depressed. |
| 3 | DRAW | COPY TABLE | Make one copy. |
| 4 | DRAW | MODIFY SPIRAL | Move the starting-point of the copy inside, to the starting-point of the original. |
| 5 | DRAW | COPY TABLE | Make a copy of the inner spiral. |
| 6 | DRAW | MODIFY SPIRAL | Move the end-point of the copy inside, to the starting-point of the original. |
| 7 | SPLICING | CONNECT ALL | Connect all tables. |
| 8 | DRAW | CORNER | Give corners where needed. |
| 9 | SPLINES | B-SPLINE | Spline the drawing. |



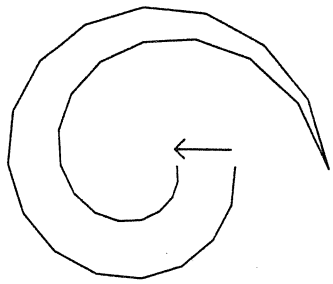
1



2,3



4,5



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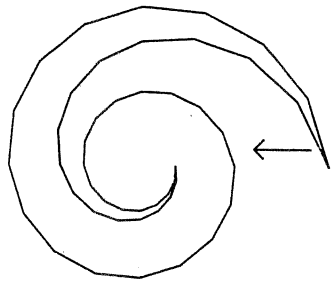
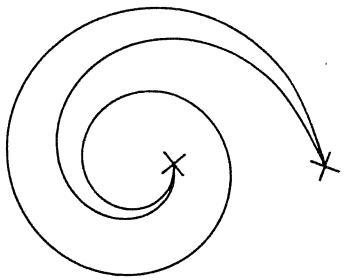


7,8,9



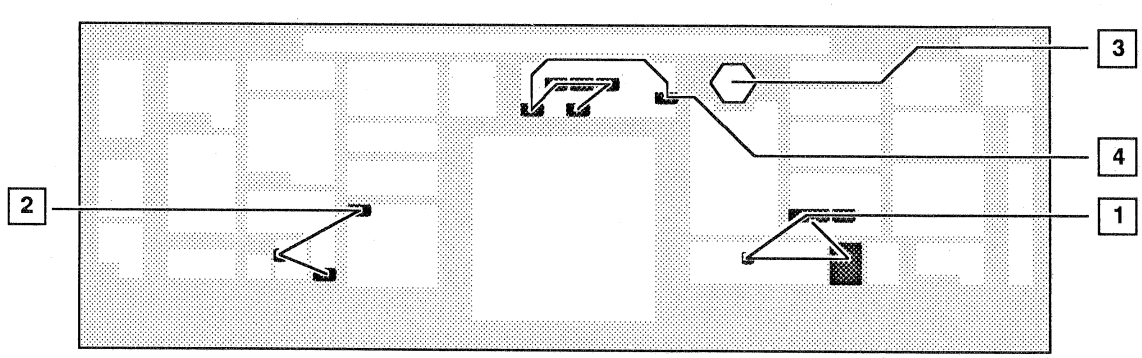
Any drawing can be manipulated in 3 dimensional space, by using the 3D functions in the keyblock **DYNAMICS**.

It is very useful for creating special treatments and effects for lettering, illustration and graphic design.

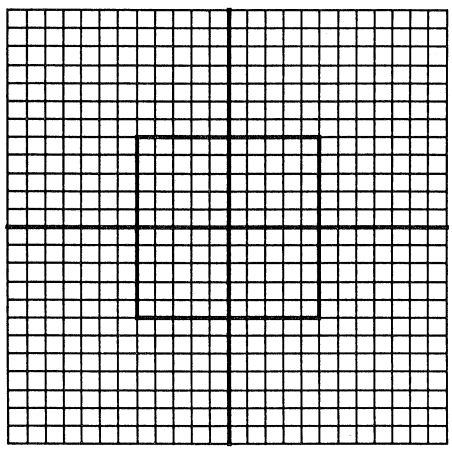
For instance, when folding a box, a two point or three point perspective can be introduced, which will be discussed in this chapter.
The size of the drawing on the screen will determine the perspective distortion.
A full size drawing gives a stronger perspective.

As long as the drawing is kept in the **CHAIN** mode, the system will remember its original 2D shape.
When the **CHAIN** mode is overridden, 3D images become fixed on the 2D picture plane and cannot return to the form they had before.

| | KEYBLOCK | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 1 | DISK | FROM DISK ENTER<br>G 4 0 ENTER | Call grid-40 as a reference for 3D manipulations. |
| 2 | DRAW | POLYGON 4 ENTER | The polygon is used to show the 3D manipulations. |
| 3 | COLOUR | | Give a colour to show the polygon on the middle monitor. |
| 4 | DYNAMICS | 3D ON . | Activate the 3D Dynamics. |
| | | CHAIN ALL | Activate the polygon. |
| | | | Use X-ROTATION to rotate around the X-axis. Continue untill the polygon is rotated 90°.<br>The system will show only one line. |
| | | Y | Move the polygon down.<br>The system will show the shape of the polygon again, because it is below the -HORIZON-.<br>Notice: There is only one vanishing-point. |
| | | | Use Y- ROTATION to rotate around the Y-axis.<br>Notice: By doing Y-Rotation there are two vanishing-points. |
| | | | Use Z-ROTATION to rotate around the Z-axis. |
| | | | Notice: All rotations are around the origin of the polygon. |



1



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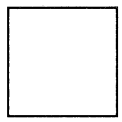
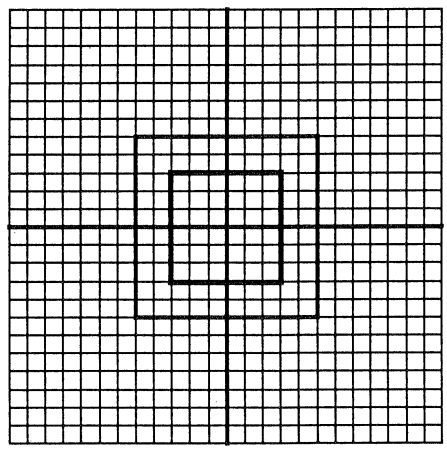


3



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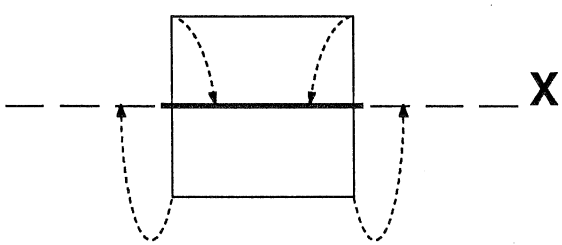
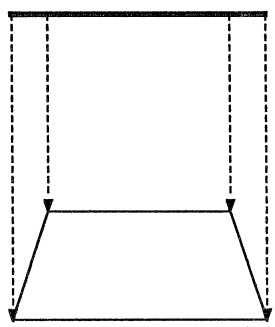
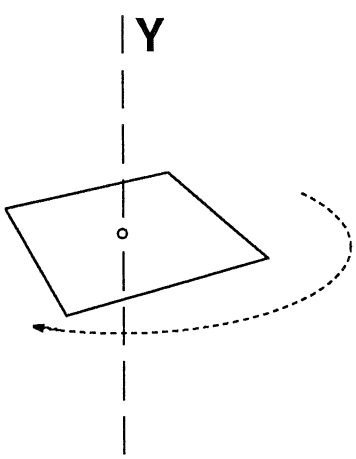
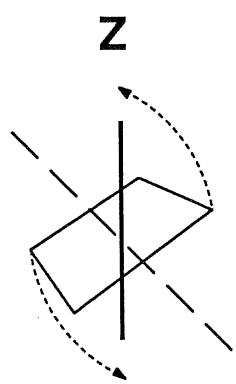
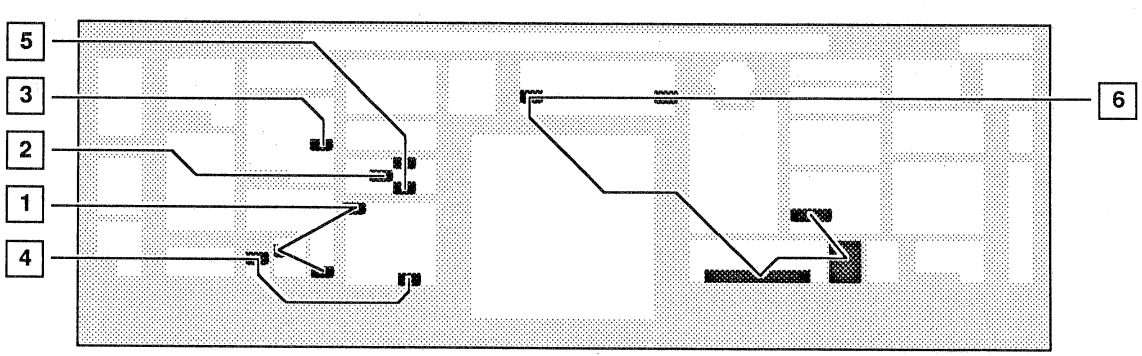


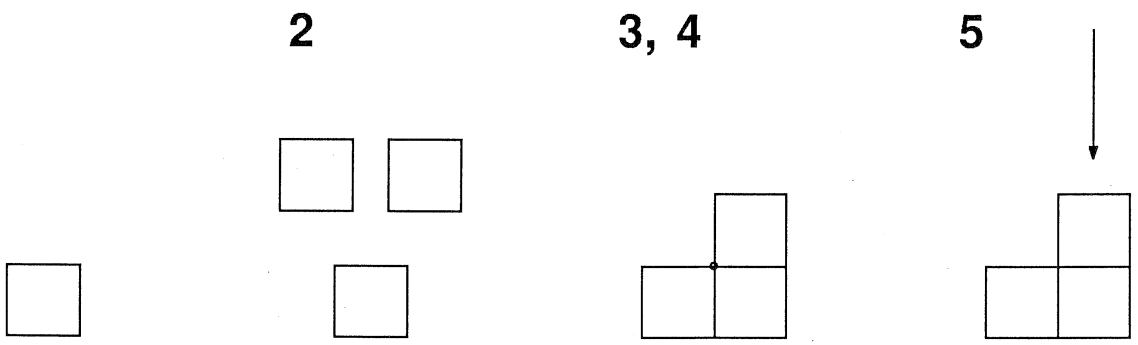





| | KEYBLOCK | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 1 | DRAW | POLYGON 4 ENTER | The polygon appears on the screen. |
| 2 | MOVE | COPY + MOVE | Make two copies. |
| 3 | SPLICING | CONNECT TABLE | Designate the corresponding points to connect the tables (see example). |
| 4 | MEASURE | SET LOCAL ORIGIN ALL | Set the origin on the corresponding point of the tables. |
| 5 | MOVE | TABLE ALL | Depress the CCB somewhere on the screen and move all tables down. |
| 6 | DYNAMICS | 3D ON . | Activate the 3D dynamics. |
| | | MAKE CHAIN SPACE<br>MENU 3 0 ENTER | Select table A.<br>Select Y-ROTATE<br>and type in: 30°, ENTER. |
| | | MAKE CHAIN SPACE<br>MENU - 6 0 ENTER | Select table B.<br>Select Y-ROTATE<br>and type in: - 60°, ENTER. |
| | | MAKE CHAIN SPACE<br>MENU - 9 0 ENTER | Select table C.<br>Select X-ROTATE<br>and type in: - 90°, ENTER. |
| | | SPACE MENU<br>- 6 0 ENTER | Select Y-ROTATE<br>and type in: - 60°, ENTER. |

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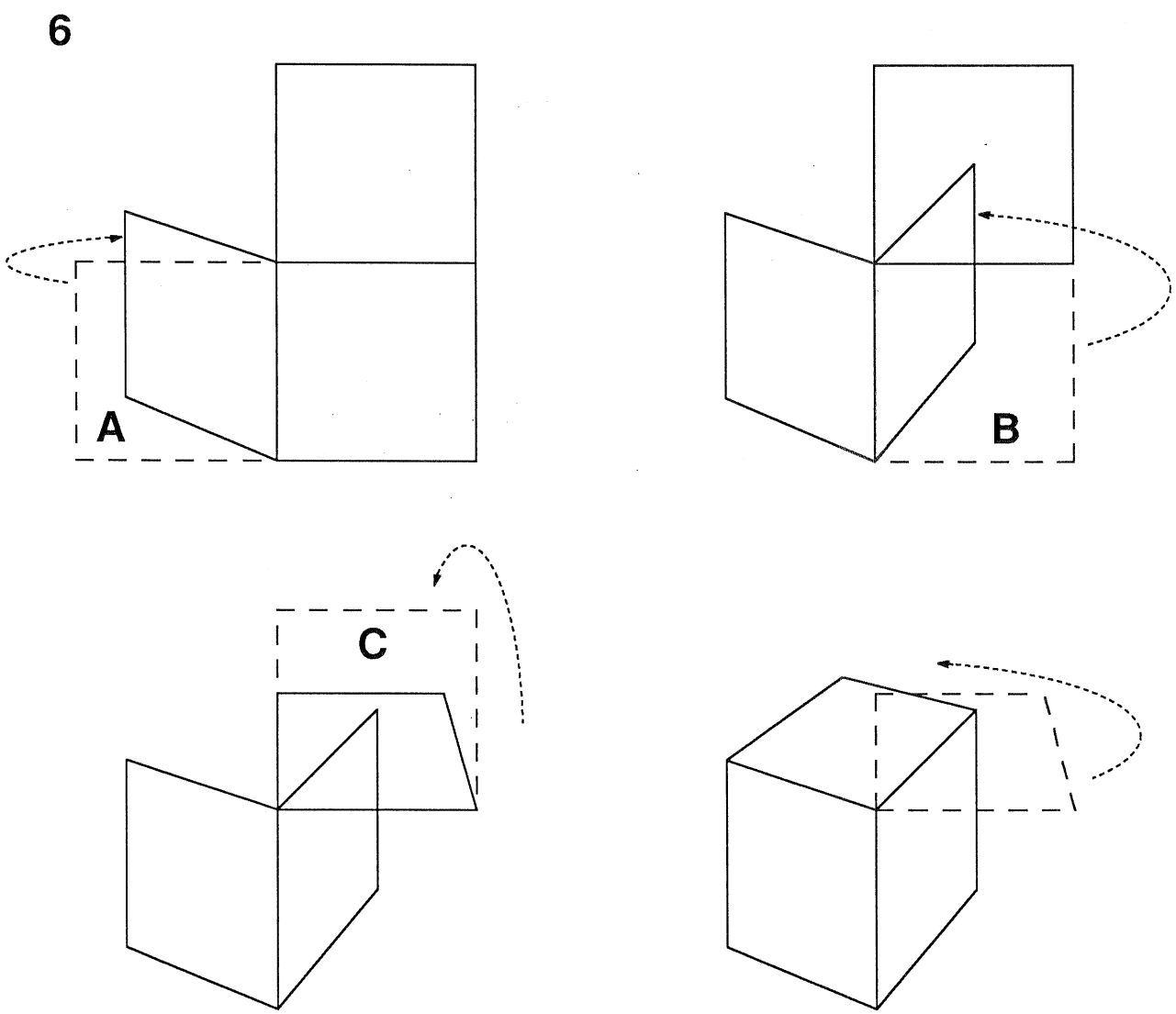
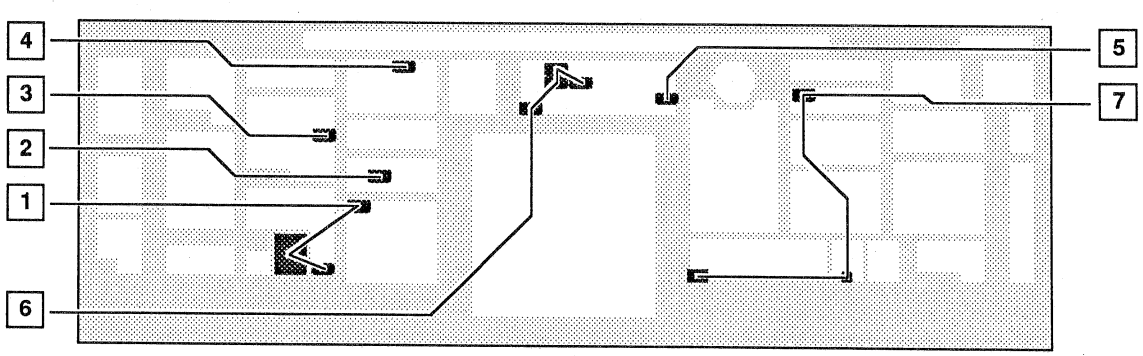
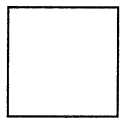
2
3, 4
5


6
A
B
C

| | KEYBLOCK | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 1 | DRAW | POLYGON 4 ENTER | The polygon appears on the screen. |
| 2 | MOVE | COPY + MOVE | Make one copy and move it below the original. |
| 3 | SPLICING | CONNECT TABLES | Connect the copy to the original. |
| 4 | DISPLAY | ORIGIN | Touch both tables and see that they have both their own origin. |
| 5 | DYNAMICS | 3D ON | Activate the 3D functions. |
| 6 | DYNAMICS | CHAIN ALL | Activate both tables. |
| | | | Use the key X-ROTATION to rotate around the X-axis.<br>Count 18 steps. (fast 1 step = 5°).<br>While doing this, notice that both tables are rotating around their own origin. |
| | | TILT | Use TILT now, to rotate the axis system, which means that the Y-axis changes into Z-axis and Z-axis into Y-axis. |
| | | | Use the Y-ROTATION key to introduce another point of view and a three-point perspective.<br>**Remark :** In this example it is not possible to use PAN in combination with TILT, or use X- or Z-rotation to change the angle. |
| 7 | ANIMATE | INBETWEEN LINEAR 0 ENTER | Touch both tables and press 0, ENTER. This will automatically give the 4 sides inbetween. It will better show the three-point perspective. |



1



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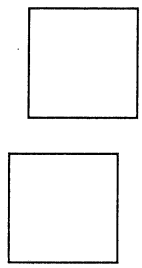
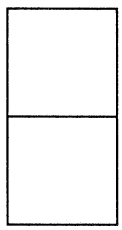
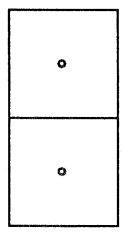


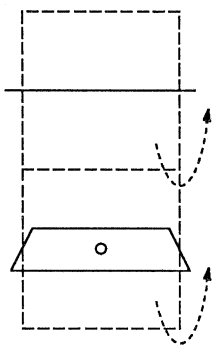
3



4, 5



6



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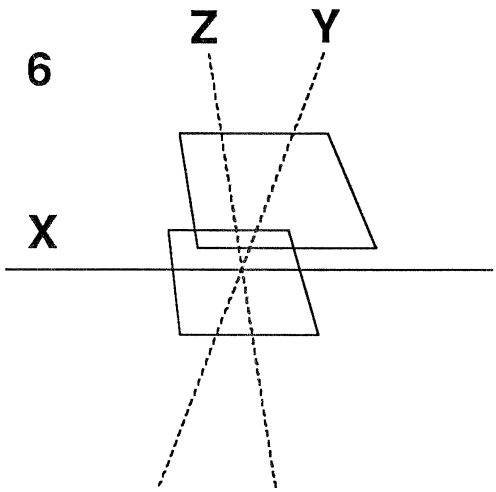
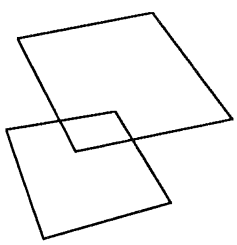
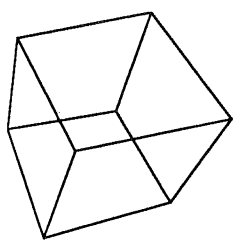


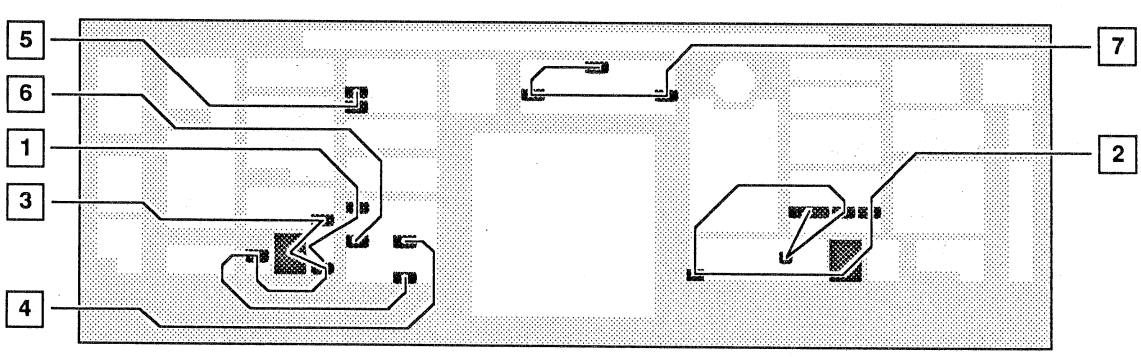

6

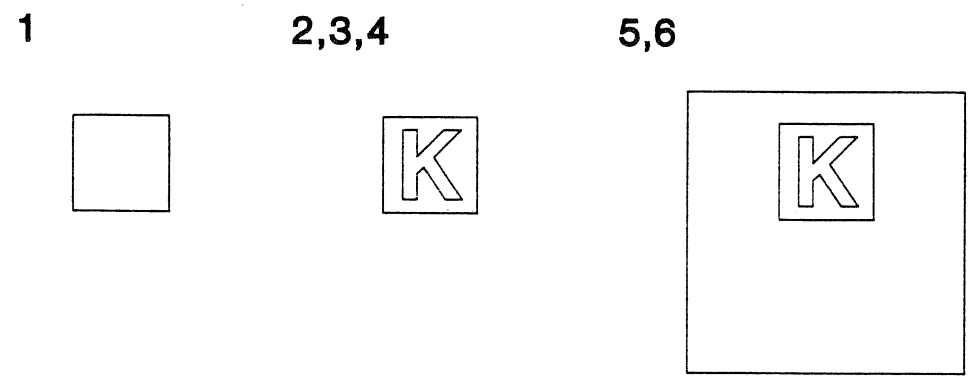


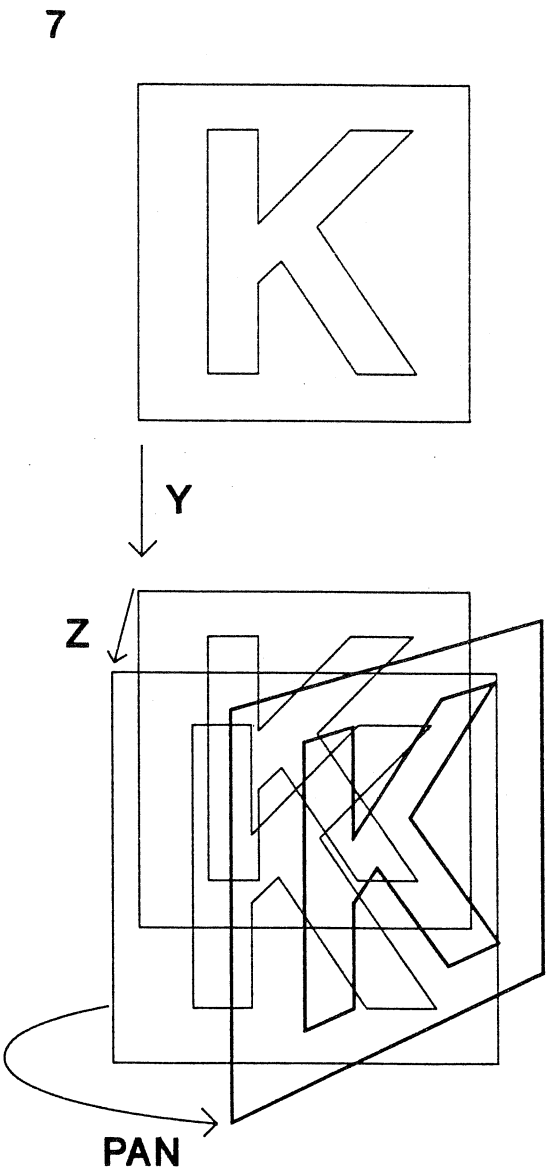
7



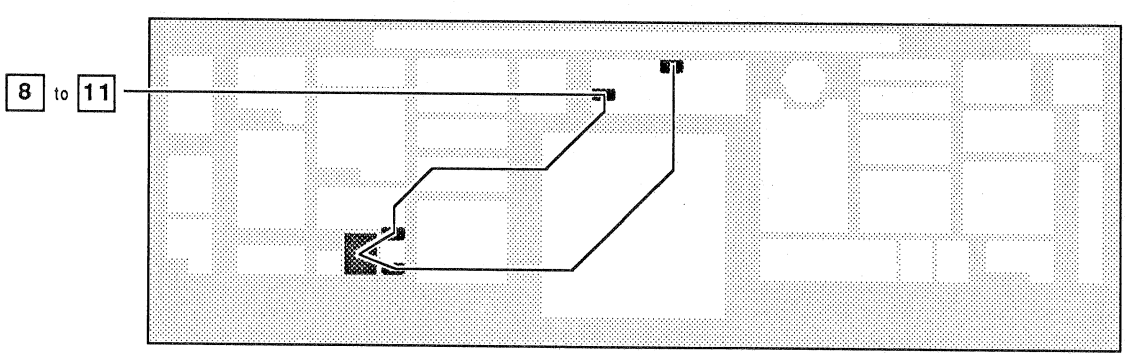
| | KEYBLOCK | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 1 | DRAW | POLYGON 4 ENTER | The polygon appears on the screen. |
| 2 | DISK | SCALE 0 . 2 5 ENTER | Change the input scale factor to 0.25. (is 25%). |
| | | FROM DISK ENTER K ENTER | Call a -K- from disk. |
| 3 | MEASURE | DEFINE SCALE 1 0 0 ENTER SET CENTER ORIGIN ALL | Touch a line of the polygon and type in: 100 (mm), ENTER and set the origin of both tables in the center of the screen. |
| 4 | DRAW | MAKE OBJECT | Touch both tables and the last one twice. |
| 5 | DISPLAY | WINDOW AREA WINDOW MON. ON | Move the window area down so that the drawing will be shown on the higher part of the window monitor. |
| 6 | DRAW | COPY OBJECT | Make 5 copies of the drawing. |
| 7 | DYNAMICS | 3D ON | Activate the 3D functions. |
| | | MAKE CHAIN SPACE MENU | Activate the first copy, press SPACE, select Y-SHIFT and type in : -200, ENTER. |
| | | - 2 0 0 ENTER | |
| | | SPACE MENU 5 0 | Press SPACE, select Z-SHIFT and type in: 50, ENTER. |
| | | ENTER PAN | Use PAN, press on the right side of the key and count 6 steps, which is 30°. |



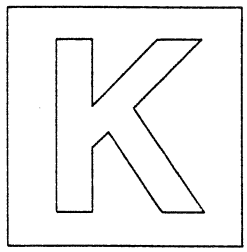

1
2,3,4
5,6
K
K

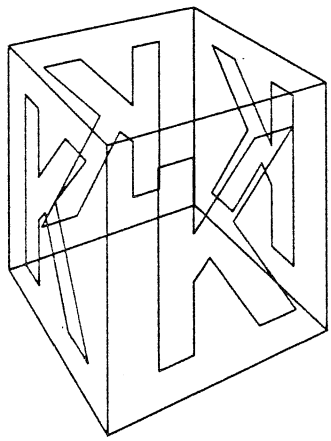

7
K
Y
Z
PAN

| | KEYBLOCK | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 8 | DYNAMICS | MAKE CHAIN, SPACE, MENU, - 2 0 0 ENTER, SPACE, MENU, 5 0, ENTER | Activate the second copy and repeat the manipulations. |
| | | PAN | Use PAN, press on the left side of the key and count 12 steps. |
| 9 | | | Repeat the same for the rear. Count 24 steps on the right and 30 steps on the left side of the PAN key. |
| 10 | DYNAMICS | MAKE CHAIN, SPACE, MENU, - 1 5 0 ENTER, SPACE, MENU, - 9 0 ENTER, SPACE, MENU, 6 0 ENTER | Activate the next copy. To create the upper part, type in -150 for the Y-shift, -90° for X-rotate and 60° for Y-rotate. |
| 11 | | | Do the same for the bottom part. Type in -250 for Y-shift and -120° for Y-rotate. |

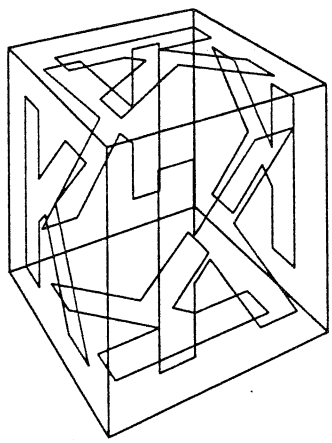


**8,9**

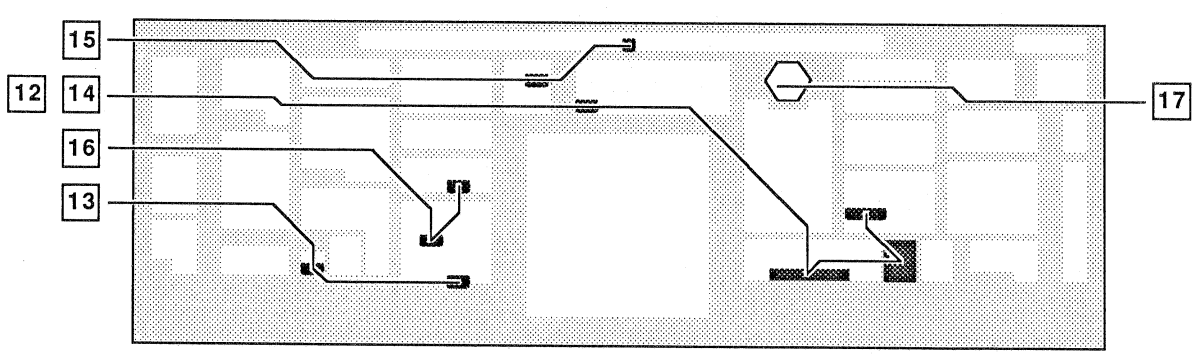




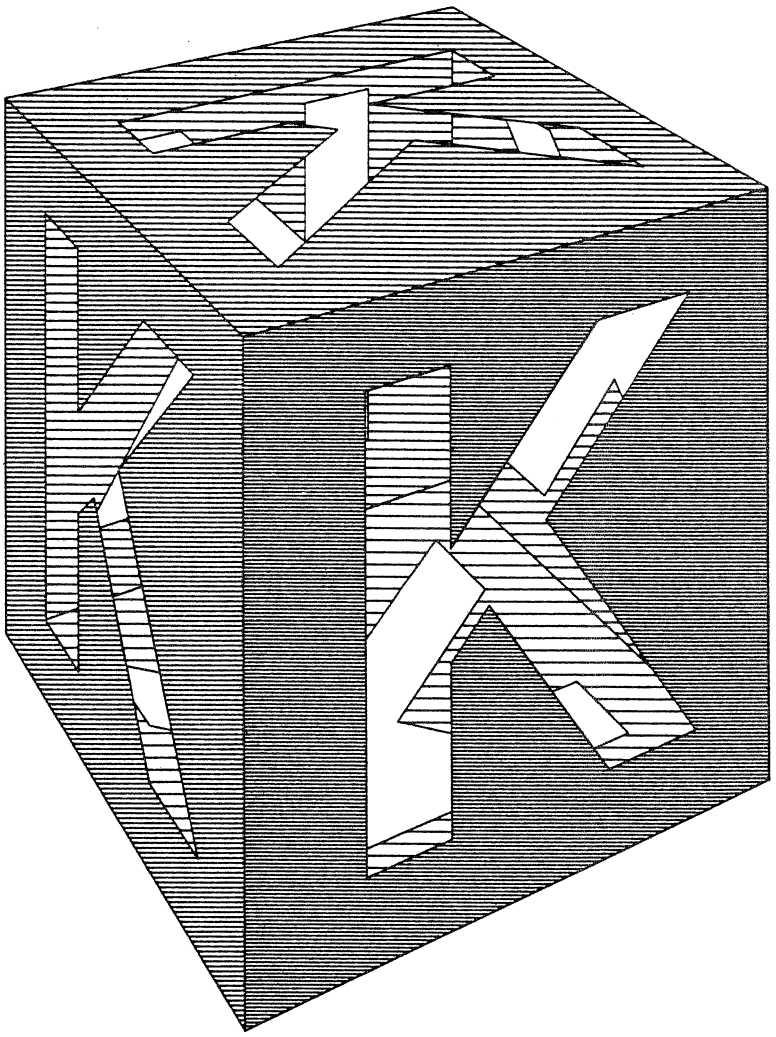
**10,11**



| | KEYBLOCK | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 12 | DYNAMICS | CHAIN ALL · SPACE · MENU · 2 0 0 · ENTER | Activate all and use Y-MOVE to bring it back to the middle of the screen. |
| 13 | MEASURE | SET CENTER ORIGIN · ALL | Reset the origin to the center of the screen. |
| 14 | DYNAMICS | CHAIN ALL · SPACE · MENU · 3 · ENTER | Enlarge the shape 3x. |
| 15 | LEVELS | SET LEVEL · 31 32 33 | Bring the different sides to other levels, which is easy because they are all objects. |
| 16 | DRAW | FILL CHAIN · ALL | Fill the levels. |
| 17 | COLOUR | | Give a different colour in each level. |



12 – 17

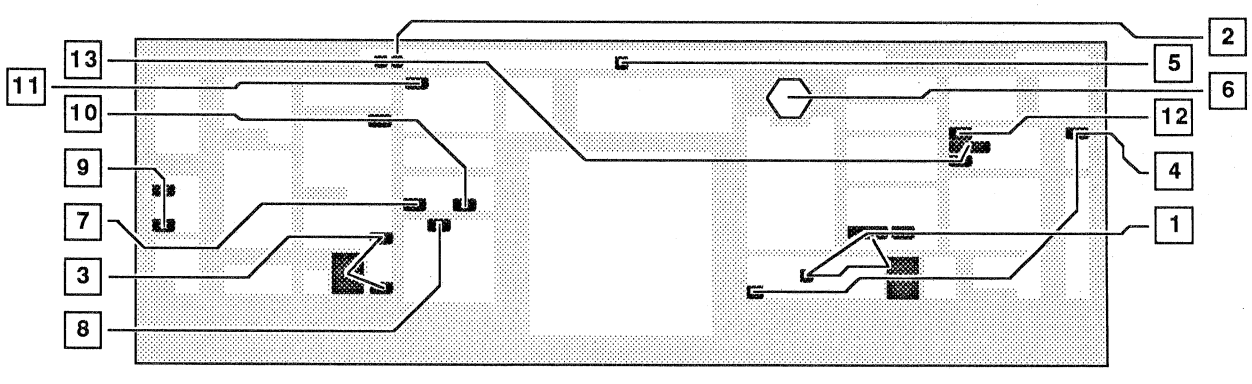


The functions in the keyblock **DIMENSION** enables to visualize the sizes of a drawing, when it is plotted on paper.

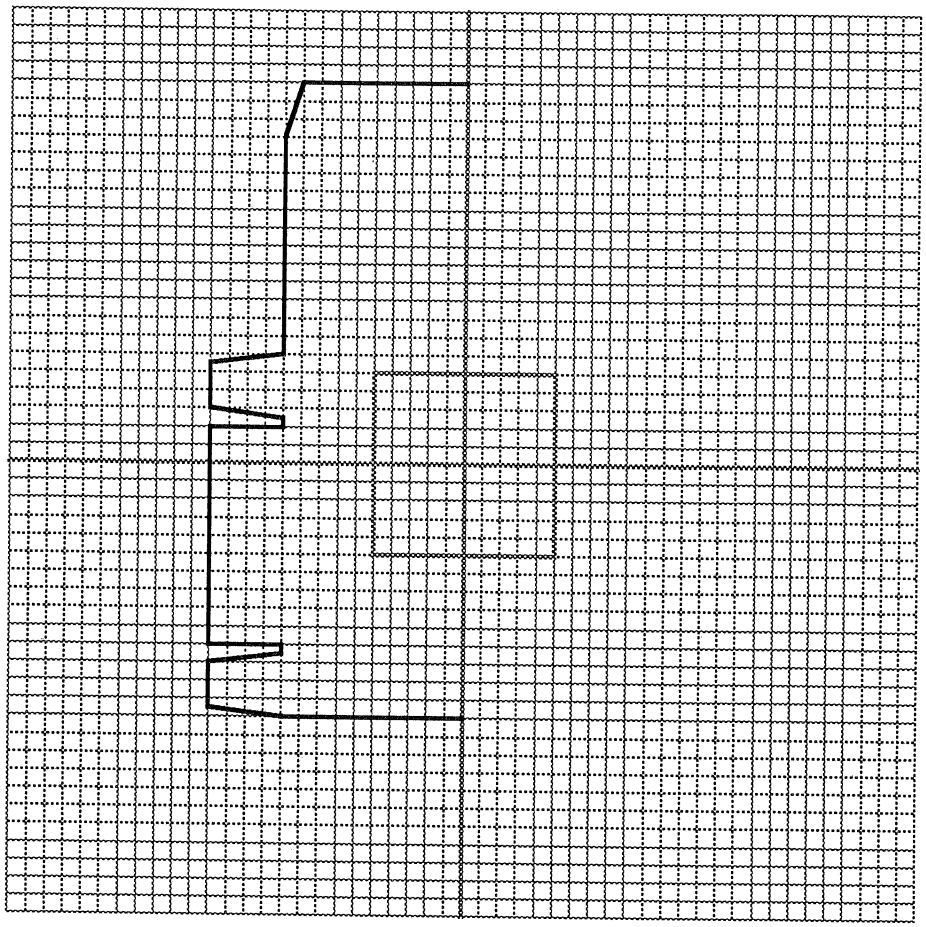
The keys: **LINE LENGTH HORIZONTAL**
**LINE LENGTH VERTICAL**
**POINT TO POINT HORIZONTAL**
**POINT TO POINT VERTICAL** and
**LINE LENGTH PARALLEL**
are used to make three-sided brackets in level one.
These brackets represent the measurement lines in the drawing.

Numerals and arrowheads are not displayed on the monitors.
They will be drawn by the plotter, when a **MIDPOINT** has been set on the brackets.

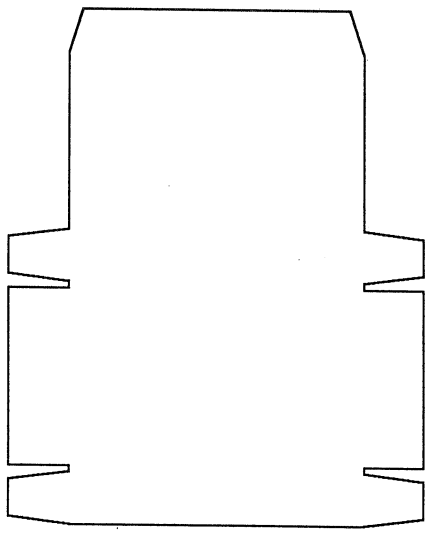
| | KEYBLOCK | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 1 | DISK | FROM DISK · ENTER<br>G · 2 · 0 · ENTER | The grid appears on the middle monitor. |
| 2 | LEVELS | 1 · 2 · 3 | Select level 2 on the levelbar. |
| 3 | MEASURE | DEFINE SCALE · 5 · 0 · ENTER | Select one of the lines of the polygon and type in : 50, ENTER. |
| 4 | GRIDS | DEFINE GRID · 2 · . · 5 · ENTER | Define the gravity of the grid on 2,5 mm. |
| 5 | LEVELS | 30 · 31 · 32 | Select level 31. |
| 6 | COLOUR | | Give level 31 the colour yellow. |
| 7 | MOVE | GRAVITY ON | Activate the gravity. |
| 8 | DRAW | POINT TO | Draw the half of the key-line drawing on the grid. |
| 9 | MIRRORS | Y-MIRROR · FIX | Mirror the drawing and fix it. |
| 10 | SPLICING | CONNECT · ALL | Connect the mirror image to the original. |
| 11 | DISPLAY | POINTS | Notice the points on the Y-axis. |
| 12 | KILL | POINTS | Kill these points. |
| 13 | LEVELS + KILL | 0 · 1 · 2 · CURRENT LEVEL · ENTER | Select level 1 and kill this level. |
| | | 0 · 1 · 2 · CURRENT LEVEL · ENTER | Select level 2 and kill this level also. |



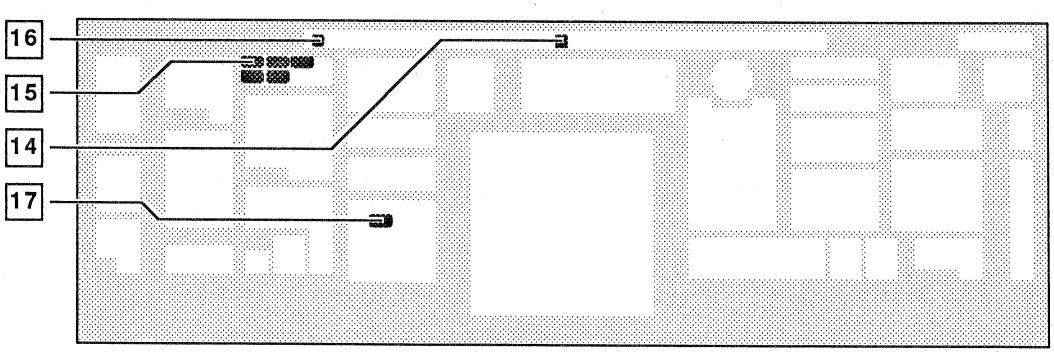
1-8



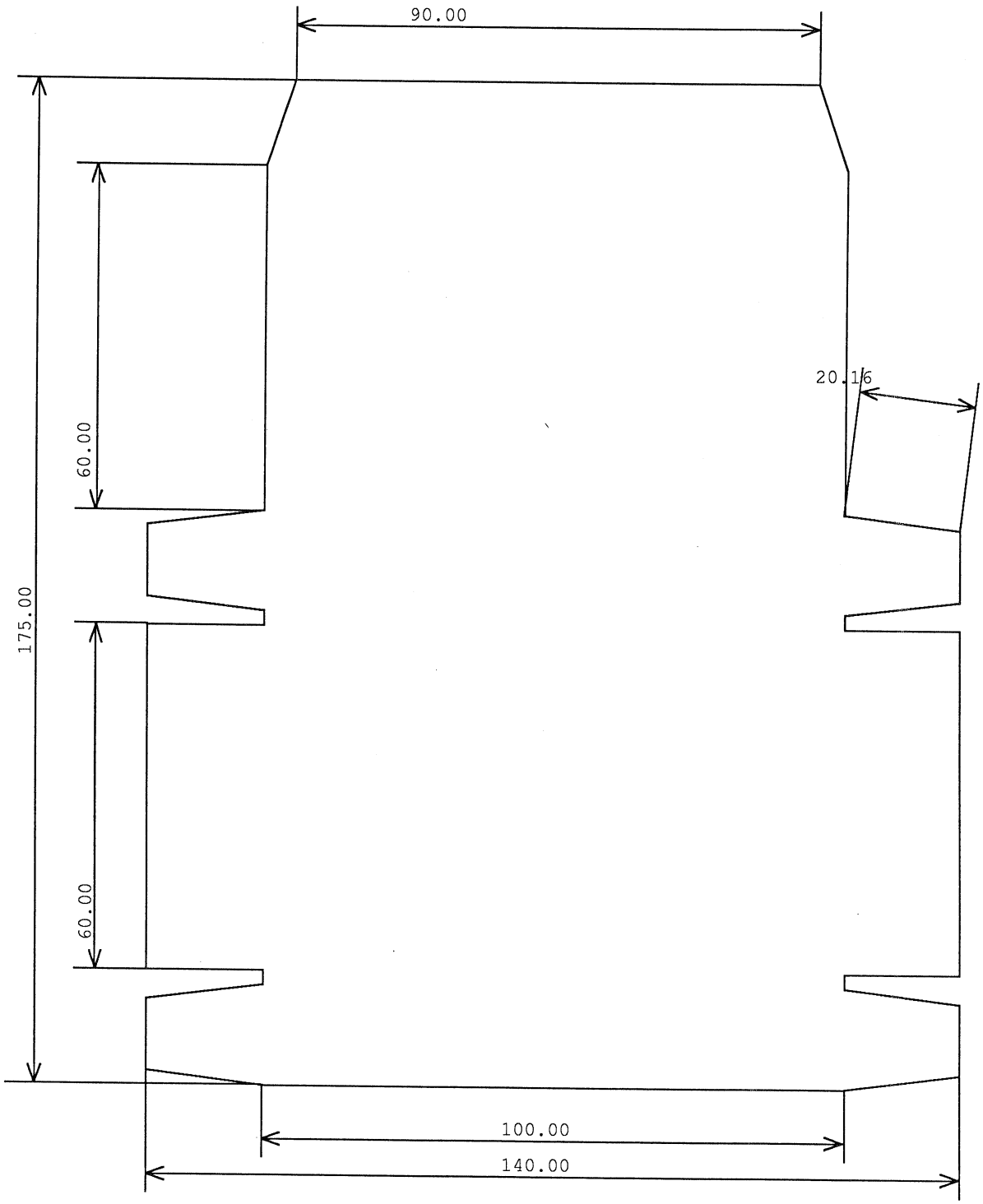
9-14



| KEYBLOCK | | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 14 | LEVELS | 30 31 32 | Select level 31 which contains the drawing. |
| 15 | DIMENSION | LL HORIZONTAL | Select the top line of the drawing, keep CCB depressed.<br>The system switches over to level 1 automatically.<br>Move the cursor upwards while keeping CCB depressed.<br>As soon as the CCB is released, the lenght of the line is displayed in mm. on the middle data-monitor.<br>Repeat the same for the bottom line. (see example). |
| | | LL VERTICAL | Repeat the same procedure for the vertical lines. (see example). |
| | | P. TO P. HORIZONTAL | To give the total horizontal dimension, use POINT TO POINT HORIZONTAL.<br>Select an outmost left point first, then an outmost right point.<br>Keep the CCB depressed while moving the line. (see example). |
| | | P. TO P. VERTICAL. | Repeat the same procedure for the total vertical dimension. (see example). |
| | | LL PARALLEL | LINE LENGHT PARALLEL gives the absolute lenght of an angled line. |
| 16 | LEVELS | 0 1 2 | Activate level 1. |
| 17 | DRAW | MIDPOINT | The plotter will draw numbers on the dimension lines when midpoints have been drawn on these lines. |



## 15, 16, 17



A special feature is the function **COLOUR GRADATION** in the **COLOUR** keyblock.
It is used to get a quick colour vignetting.

**COLOUR GRADATION** is a cursor controlled function, which operates totally different from the other colour keys.

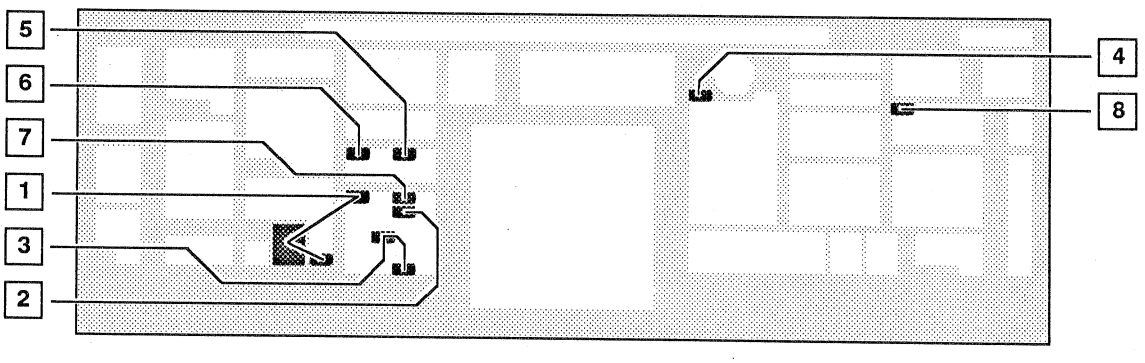
Four colour-graphs are displayed on the window monitor: **RED**, **GREEN** and **BLUE** and the **COMBINATION** of these three.
These graphs can be modified by using:
**DRAW NEWPOINT**
**MOVE POINT / TABLE**
**KILL POINT / TABLE / LEVEL.**

When the key **COLOUR GRADATION** is activated, all other keys are non-active.

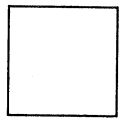
# LESSON 16 - 1

## COLOUR GRADATION

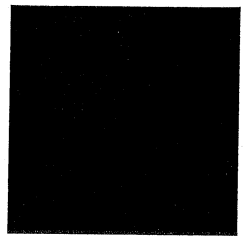
| | KEYBLOCK | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 1 | DRAW | POLYGON 4 ENTER | The polygon appears on the screen. |
| 2 | DRAW | OUTLINE | Enlarge the polygon to the maximum size of the screen. |
| 3 | DRAW | FILL CHAIN ALL | Fill the polygon |
| 4 | COLOUR | COLOR GRAD ON OFF | By pressing this key the lefthand monitor will display four graphics.<br>RED - GREEN - BLUE + the combination. |
| 5 | MOVE | TABLE | Now we have a few keys available.<br>MOVE TABLE, for instance, can be used to move the horizontal or vertical lines of the graphics.<br><br>Designate the RED vertical line and move it to the right.<br>The result will be simular to the normal colour system.<br>Move the line back to its original position. |
| 6 | MOVE | POINT | Designate the lower point of the red vertical graphic and move it to the right.<br>This will introduce a vignetting from top to bottom from 0% to 100% brightness.<br>Move the point back to the original position. |
| 7 | DRAW | NEWPOINT | Using NEWPOINT a partial vignetting can be introduced.<br>Create a newpoint in the same way as normal on the vertical red line and pull it to the right. |
| 8 | KILL | POINT | KILL POINT can be used to take away the vignetting, by touching the extra point. |



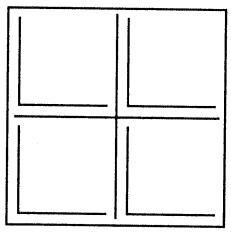
1

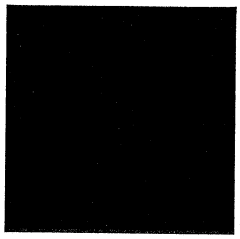


2,3

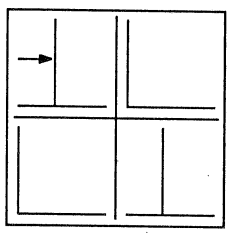


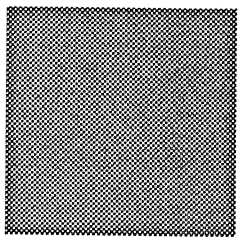
4



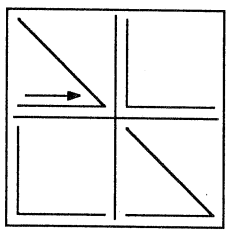


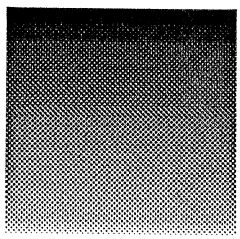
5



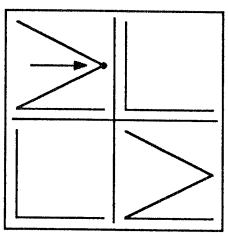


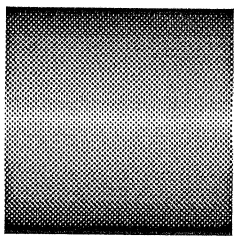
6



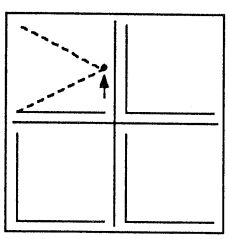


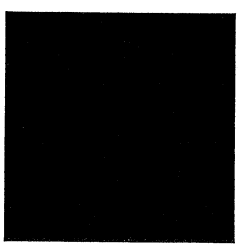
7





8

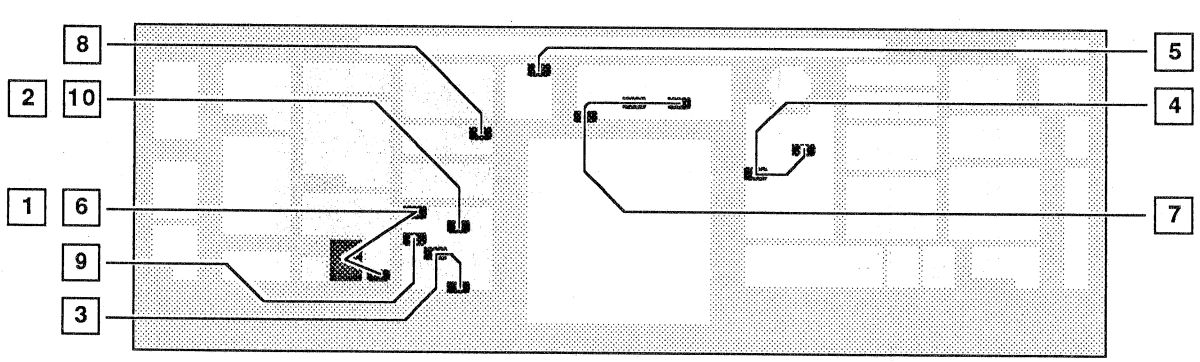




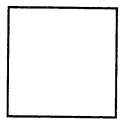
# LESSON 16 - 2/1

## COLOUR GRADATION

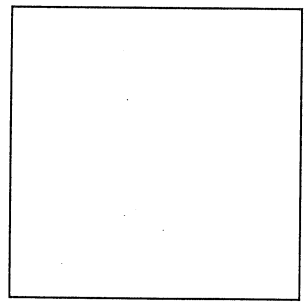
| | KEYBLOCK | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 1 | DRAW | POLYGON 4 ENTER | The polygon appears on the screen. |
| 2 | DRAW | OUTLINE | Enlarge the polygon to allmost the maximum size of the screen. |
| 3 | DRAW | FILL CHAIN ALL | Fill the polygon. |
| 4 | COLOUR | WHITE 60% BRIGHTNESS | Make the polygon white-60%. |
| 5 | LEVELS | >> STEP | Step one level higher. |
| 6 | DRAW | POLYGON 1 6 ENTER | Call a polygon of 16 |
| 7 | DYNAMICS | CHAIN ALL | Enlarge the polygon and reduce the height to make an oval. |
| 8 | SPLINES | B-SPLINE | Touch the polygon. |
| 9 | DRAW | COPY TABLE | Make two copies. |
| 10 | DRAW | OUTLINE | Reduce the size of the copies to get the parallel lines inside. |



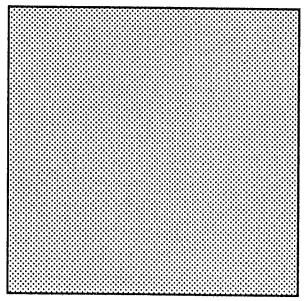
1



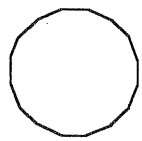
2



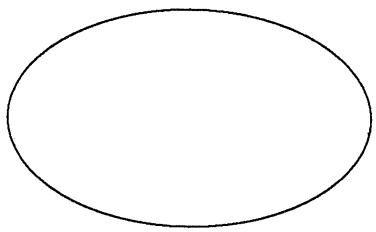
3, 4



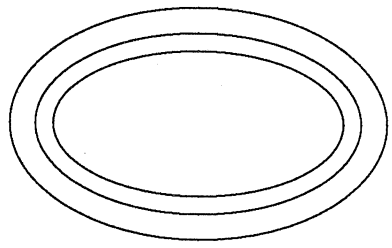
5, 6



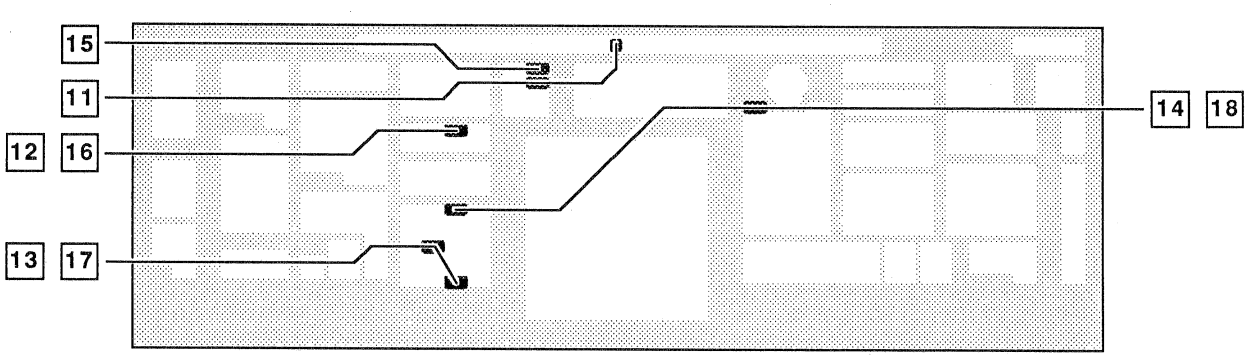
7, 8



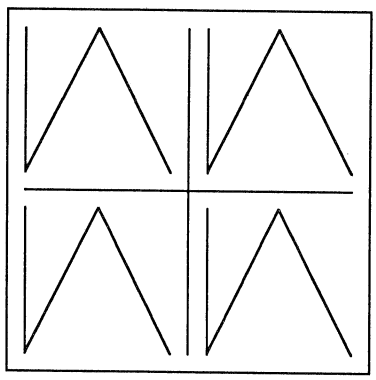
9, 10, 11

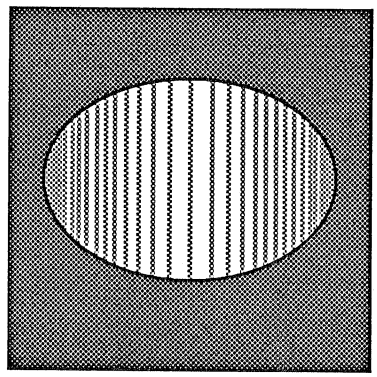


| | KEYBLOCK | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 11 | LEVELS | SET LEVEL · 31 32 33 | Send the inner lines to a higher level. |
| 12 | SPLINES | REFRESH SPLINES | Refresh the splines. |
| 13 | DRAW | FILL CHAIN · ALL | Fill the oval. |
| 14 | COLOUR | COLOR GRAD ON . · NEW POINT · COLOR GRAD . OFF | Use NEWPOINT for each horizontal line, to create a grey vignetting in the middle. |
| 15 | LEVELS | >> STEP | Step one level higher. |
| 16 | SPLINES | REFRESH SPLINES | Refresh the splines. |
| 17 | DRAW | FILL CHAIN · ALL | Fill the ovals. |
| 18 | COLOUR | COLOR GRAD ON . · NEW POINT · COLOR GRAD . OFF | Use NEWPOINT for each horizontal line, to create a silver simulation. |

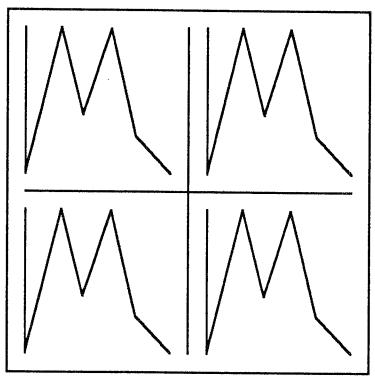


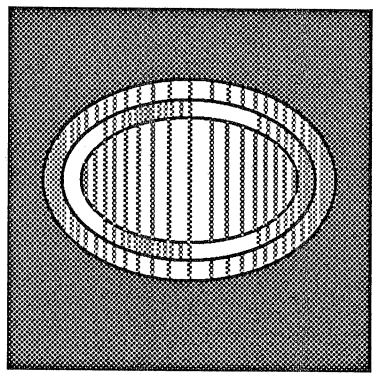
## 12,13,14





## 15,16,17,18





The **TASK** function enables to store and -replay- a sequence of keyboard actions. In other words, a complete exercise can be repeated automatically.

**TASK** can be a good help when, for instance, the same job has to be done in several levels.

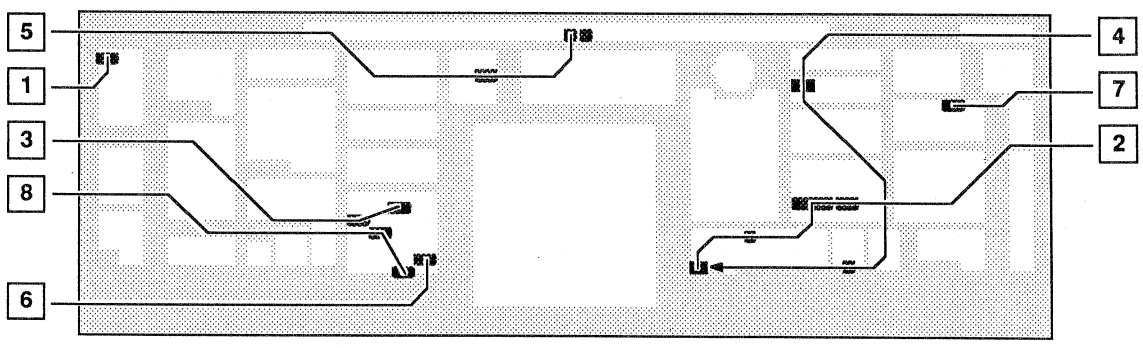
The key **INSERT** will start and stop -recording-.
The key **START** will start and stop -replaying-.

The key **TIMING ON / OFF** is used to select a real time replay, or a computer time replay, which is much faster.
It has to be done before pressing **START.**

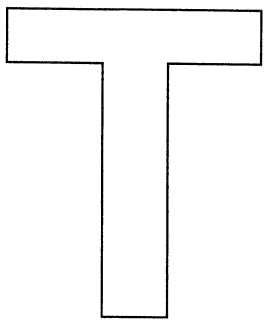
When a -task- has to be stored permanent, the key **TASK** in the keyblock **DISK** has to be used.

Before starting a new -task-, the one before has to be cleared from the task memory by using the keys **CLEAR / ENTER.**

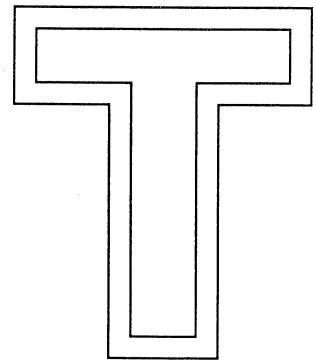
| | KEYBLOCK | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 1 | TASK | INSERT | The task functions enables to fix a number of keys. For instance, to use for repetition of a job.<br>INSERT is used to start or stop recording.<br>So press INSERT and start the following exercise. |
| 2 | DISK | FROM DISK, ENTER, T, ENTER | Call a -T- from disk. |
| 3 | DRAW | COPY TABLE, OUTLINE | Make one copy and one outline around the -T-. |
| 4 | ANIMATE | INBETWEEN LINEAR, 0, ENTER | Touch both tables and type in 0, ENTER. This will result in having tables between the points of the original and the outline |
| 5 | LEVELS | SET LEVEL, 31 32 33 | Touch a group of tables which belong together and touch the last one twice. (see example). |
| | | SET LEVEL, 31 32 33 | Repeat these steps for the other tables, until you will have each group in a different level from 32 to 35. |
| 6 | DRAW | REFRESH VECTORS | This will show again the original shapes. |
| 7 | KILL | TABLE | Kill the outline. |
| 8 | DRAW | FILL CHAIN, ALL | Fill the -T-. |



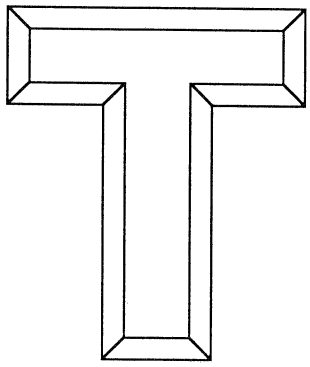
1,2



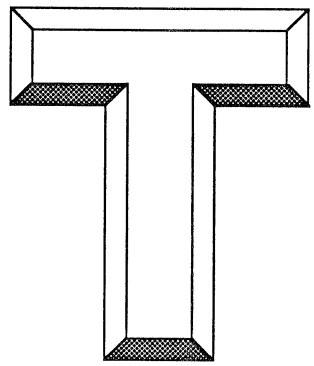
3



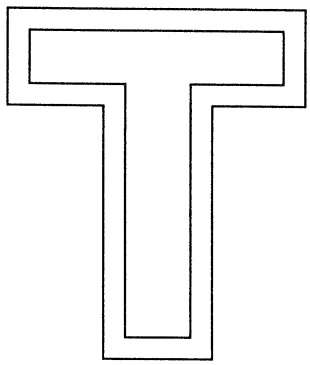
4



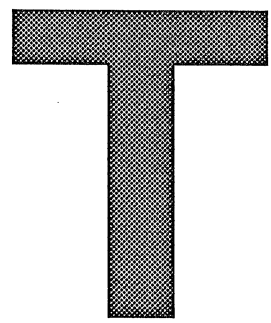
5



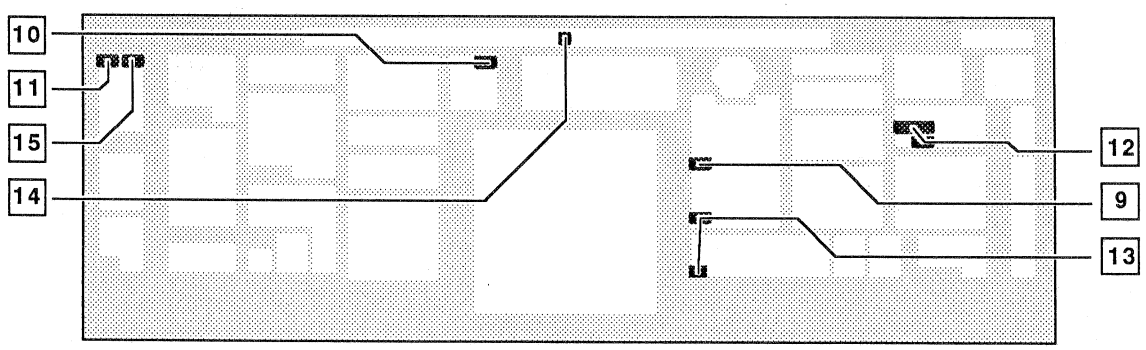
6



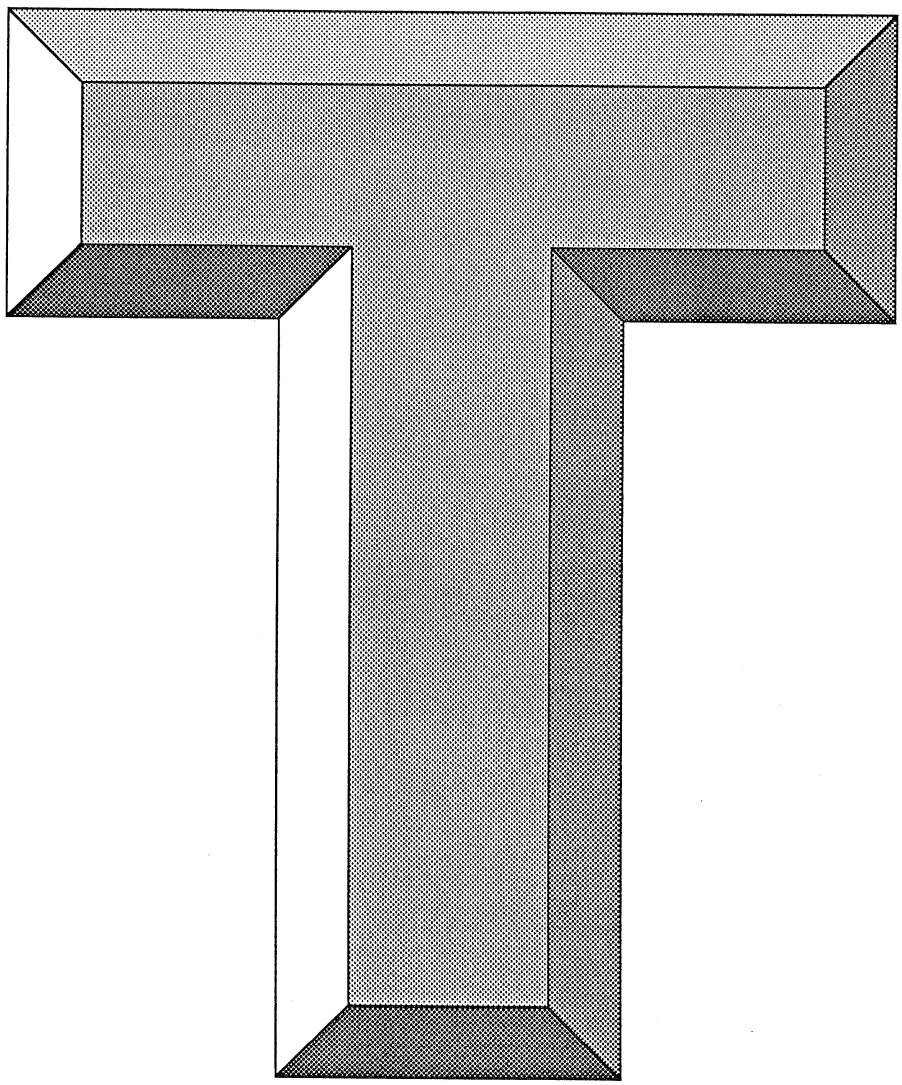
7,8



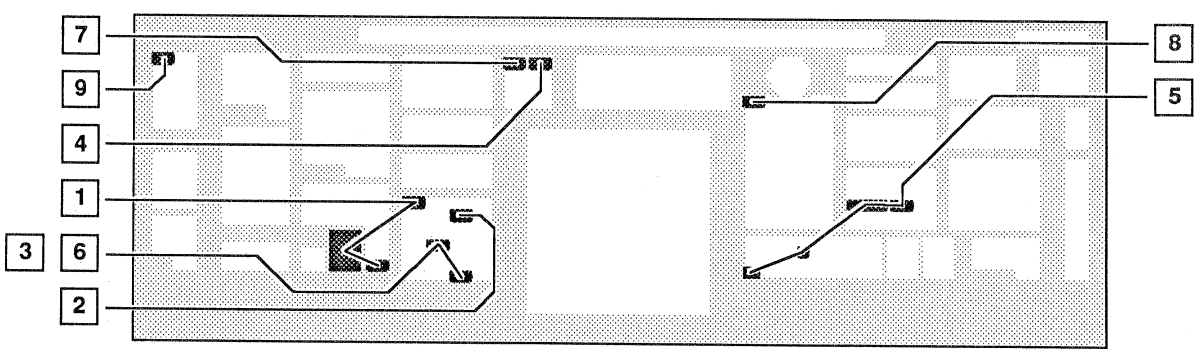
| | KEYBLOCK | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 9 | COLOUR | WHITE | Give white which will be 75% automatically. |
| 10 | LEVELS | >> STEP | Step to the next level and repeat FILL CHAIN, ALL. Give white 40%, 60%, 80% and 100% for the levels 32, 33, 34 and 35. |
| 11 | TASK | INSERT | Press INSERT again to stop recording. |
| 12 | KILL | LEVELS ENTER | Kill all levels. |
| 13 | COLOUR | . R PALETTES ENTER | This will delete all colour information. |
| 14 | LEVELS | 30 31 32 | Step back to level 31. |
| 15 | TASK | START | Press start to see this exercise again. |



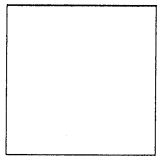
9 - 15



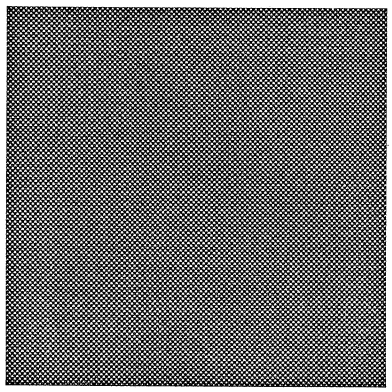
| | KEYBLOCK | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 1 | DRAW | POLYGON 4 ENTER | The polygon appears on the screen. |
| 2 | DRAW | OUTLINE | Enlarge the polygon. |
| 3 | DRAW | FILL CHAIN ALL | Fill the polygon. |
| 4 | LEVELS | >> STEP | Step to a higher level. |
| 5 | DISK | FROM DISK ENTER G ENTER | Call the -G- from disk. |
| 6 | DRAW | FILL CHAIN ALL | Fill the character. |
| 7 | LEVELS | << STEP | Step back to the level with the polygon. |
| 8 | COLOUR | COLOR GRAD ON . | Switch on the colour gradation. |
| 9 | TASK | INSERT | Press INSERT to start recording. |



1



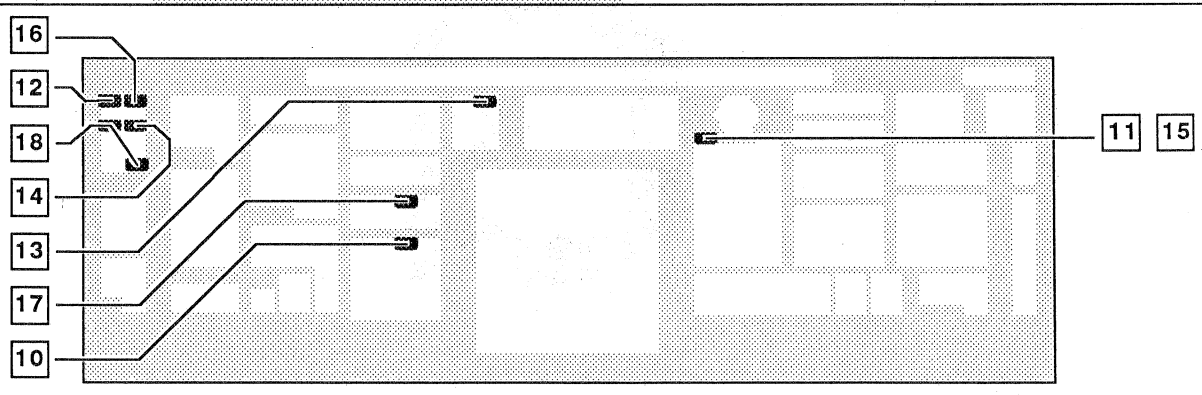
2, 3, 4



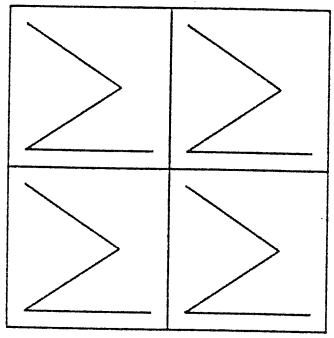
5, 9

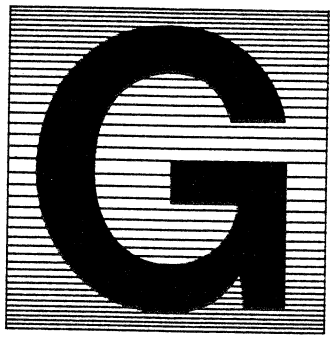
G

| | KEYBLOCK | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 10 | DRAW | NEWPOINT | Use NEWPOINT to create a gradation in the filled polygon as background. Make a grey vignetting by using red, green and blue together, with a highlight in the middle. |
| 11 | COLOUR | COLOR GRAD . OFF | Stop the COLOUR GRADATION. |
| 12 | TASK | INSERT | Press INSERT again to stop recording. |
| 13 | LEVELS | >> STEP | Step to the higher level with the -G-. |
| 14 | TASK | TIMING . OFF | Go to TASK and press TIMING OFF. This will speed up replaying the task. |
| 15 | COLOUR | COLOR GRAD ON . | Activate colour gradation. |
| 16 | TASK | START | Start replaying the task. |
| 17 | MOVE | TABLE | After replaying the task in the higher level, the -G- seems to disappear in the background. By using MOVE TABLE you can give for instance more red, by moving up the red graphic. This will show the -G- again. |
| 18 | TASK | CLEAR ENTER | This will reset the recorded information. |

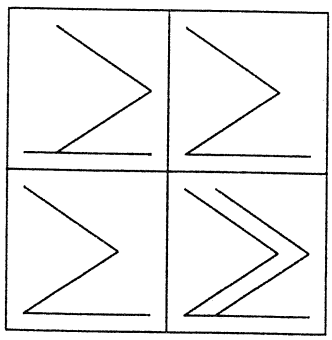


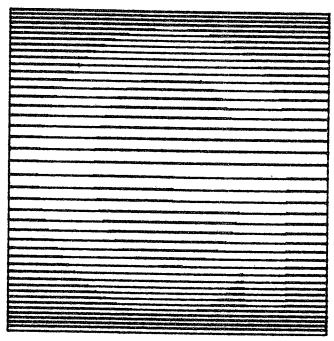
10 – 16






17,18





Another way of drawing with the system is given by **OPTIONS** in the keyblock **DRAW**, which is a sketch-facility.

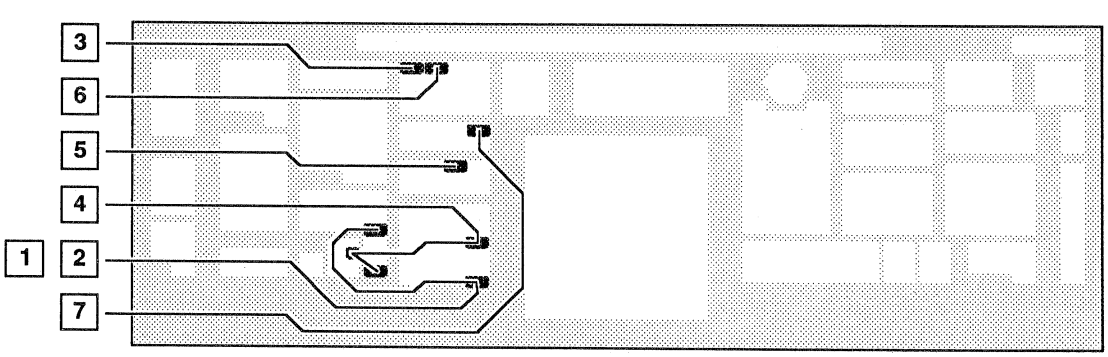
While moving the cursor and depressing the CCB, the system generates pixels (=picture elements) on the screen.
This function can be used to get the effect of a charcoal-drawing.

When using **OPTIONS + SPACE** the pixels will instandly be translated to vectors when the CCB is released.
The key **DIGITIZE** in the keyblock **DRAW** can be used to reduce the number of points, which will be necessary, because **OPTIONS + SPACE** gives as many points as pixels.

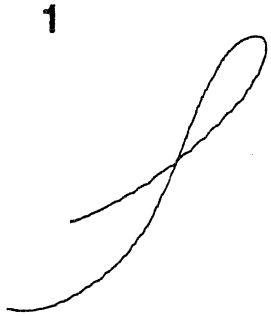
# LESSON 18 - 1

## FREEHAND DRAWING

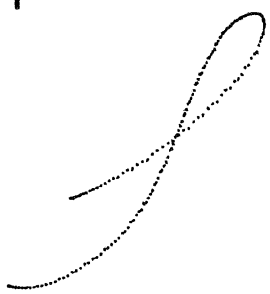
| KEYBLOCK | | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 1 | DRAW | OPTIONS | By using OPTIONS in DRAW it is possible to make a freehand drawing or a sketch.<br><br>While depressing the CCB the cursor starts to generate pixels on the screen.<br>A slow move will give a continious line.<br>A quick move gives an open distance between the pixels. |
| 2 | DRAW + MEASURE | OPTIONS SPACE | Now the system will transform the pixel drawing in vector automatically.<br>It depents of the speed of drawing how many points the system will generate.<br><br>Keep the CCB depressed while drawing, after releasing the CCB the system will transform from pixel to vector. |
| 3 | DISPLAY | POINTS | Touch the drawing and see the points. |
| 4 | DRAW | DIGITIZE 6 ENTER | With this function it is possible to reduce the number of points afterwards.<br>Touch the drawing and type in 6, ENTER.<br><br>When -give resolution- is given on the middle data-monitor, you can type in from 1 up to 6. |
| 5 | MOVE | TABLE | Move the digitized version away and, |
| 6 | DISPLAY | CORNERS POINTS | activate DISPLAY CORNERS first then DISPLAY POINTS. |
| 7 | SPLINES | B-SPLINE | Touch the drawing to spline it. |



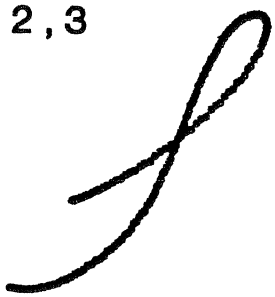
1



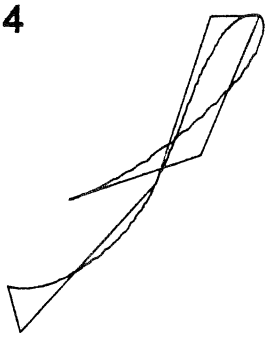
1



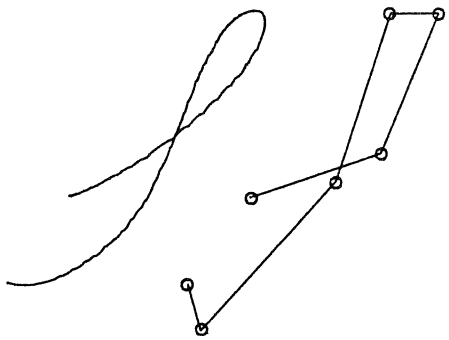
2, 3



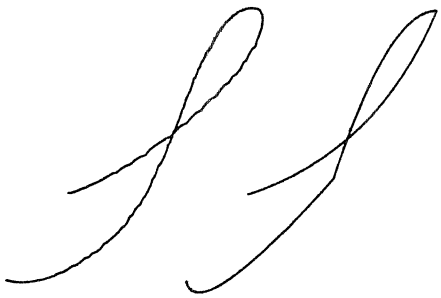
4



5, 6



7



The functions in the keyblock **TYPESETTING** are used to get all sorts of text on the screen.

Nowadays there are lots of typefonts available which can be loaded in the system.

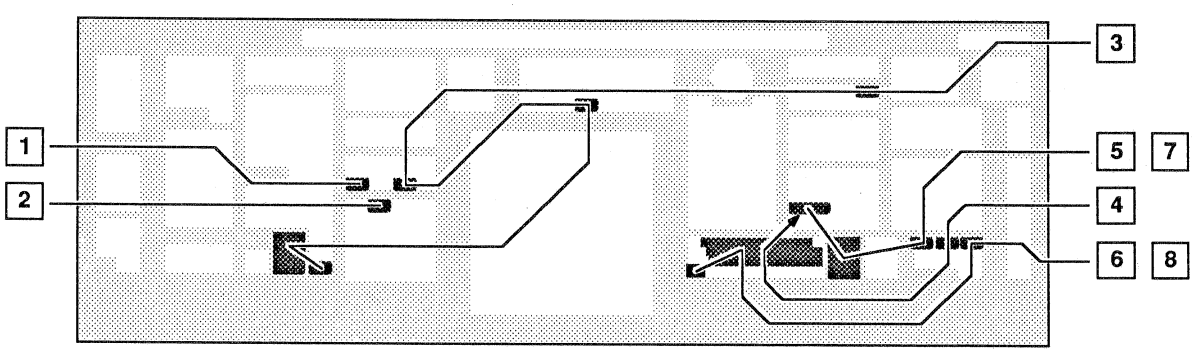
The keys **SELECT SIZE** and **SPACING** enable to set up the different justifications, sizes and spacings.
**WORDPROCESSING** allows to set text on the data-display, while **ENTER** will execute this on the monitors.

A given size is always related to a 1000 x 1000 mm working area and represents mm or didot points (**OPTION 7**).

# LESSON 19 - 1

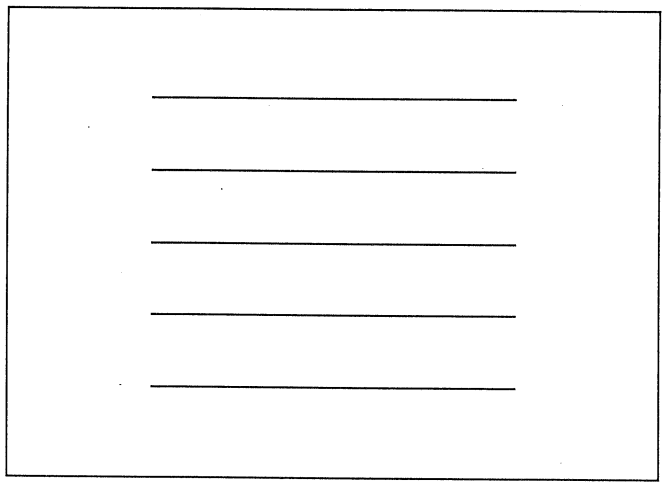


| | KEYBLOCK | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 1 | MOVE | GRAVITY ON | Activate the gravity function. |
| 2 | DRAW | POINT TO | Draw a horizontal line on top of the screen. |
| 3 | ANIMATE | EXTRAPOLATE, ALL, Y, 4, ENTER | Use EXTRAPOLATE to make 4 copies under each other. |
| 4 | TYPESETTING | SELECT FONT, H 0 0 7 0 0 3, ENTER | With this function it is possible to call a type-font from disk. On the right data-monitor is shown: Enter font name: Type in: H007003, ENTER. |
| 5 | TYPESETTING | SELECT SIZE, 1, ENTER | This function displays 5 different types of spacing on the right data-monitor. Select 1, ENTER. |
| 6 | TYPESETTING | WORD PROCESSING, T Y P E, S E T T I N G | Activate WORD PROCESSING and touch the first line. Now the middle data-monitor shows: text: Type in: TYPE SETTING on the alphanumeric keyboard and then ENTER. Now the text will be generated on the screen. Notice that the size of the characters are related to the lenght of the line and the number of characters. |
| 7 | TYPESETTING | SELECT SIZE, 2, ENTER, 2 5, ENTER | Above mode 2,3,4 and 5 there is displayed fixed size. This means; when you type in 2, ENTER, the system will ask for a font-size |
| 8 | TYPESETTING | WORD PROCESSING, T Y P E, S E T T I N G | Select the next line and type in the same text. The characters will be generated on the second line. Left justified and the size will be 25 mm. Try also mode 3,4 and 5 with different sizes. |



1, 2

3,4,5



6, 7

TYPE SETTING

TYPE SETTING

8

TYPE SETTING

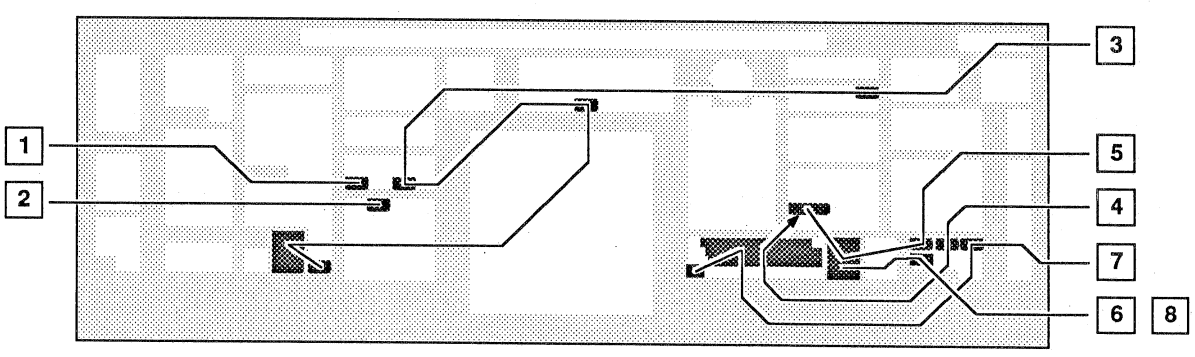
TYPE SETTING

TYPE SETTING

TYPE SETTING

TYPE SETTING

| | KEYBLOCK | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 1 | MOVE | GRAVITY ON | Activate the gravity function. |
| 2 | DRAW | POINT TO | Draw a horizontal line on top of the screen. |
| 3 | ANIMATE | EXTRAPOLATE ALL<br>Y 2 ENTER | Use EXTRAPOLATE and Y MOVE to make 2 copies.<br>(see example) |
| 4 | TYPESETTING | SELECT FONT T 0 0 6<br>0 1 6 ENTER | Enter a font-name first, for instance TIMES. |
| 5 | TYPESETTING | SELECT SIZE 2 ENTER<br>6 0 ENTER | Enter mode: 2 (left justified), and font-size: 60 (mm). |
| 6 | TYPESETTING | SPACING 1 ENTER | Press SPACING. Now the different types of spacing will be displayed on the right data-monitor. Type in 1, for -tight- spacing. |
| 7 | TYPESETTING | WORD PROCESSING<br>T I M E S ENTER | Now activate WORD PROCESSING and type in your characters<br>(for instance: TIMES).<br>Repeat step 6 and 7 to try -normal- and -wide- spacing. |
| 8 | TYPESETTING | SPACING 1 ENTER<br>SPACING 4 ENTER<br>2 ENTER 4 ENTER | It is possible to change the spacing value between characters and words.<br>The method is:<br>Activate SPACING, select for instance 1 (tight spacing). Then activate SPACING again and select 4 (change default values). The system will ask letter-spacing and word-spacing. Type in a number for both (for instance 2 and 4). Repeat the same step for -normal- and -wide- spacing.<br>(for instance: normal: 4,8 and wide: 8,16)<br>Notice: The system will always remember these values, untill you change them.<br>The first time you use the spacing program, the values will be 0,00 - 0,00 for all types of spacing. |



1 - 6

7 - 9

TIMES

TIMES

TIMES

It is possible to store a drawing on disk. For that purpose there are 4 keys in this group:
- CURRENT LEVEL
- MULTI LEVEL
- PALETTE
- TASK

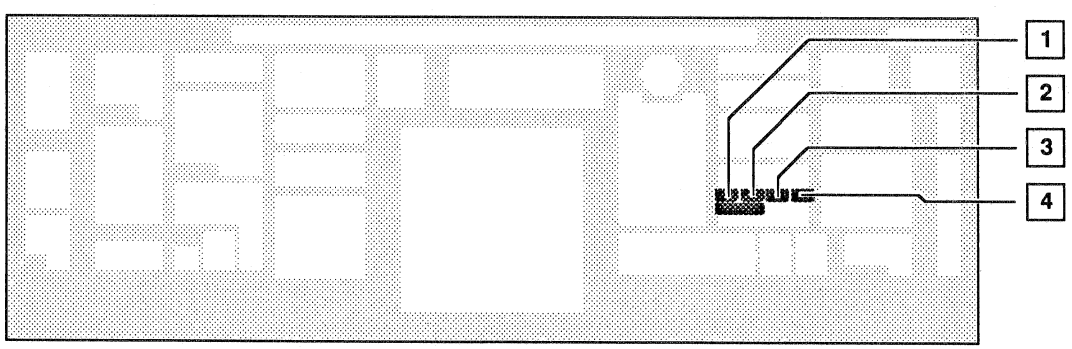
Before using one of these keys, it is important, to ask yourself what sort of drawing has to be stored.

This lesson will discuss how to use these functions.

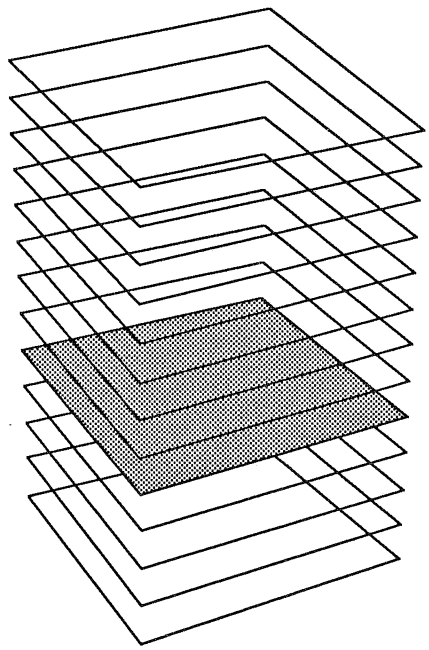
# LESSON 20 - 1

DISK (storing files)

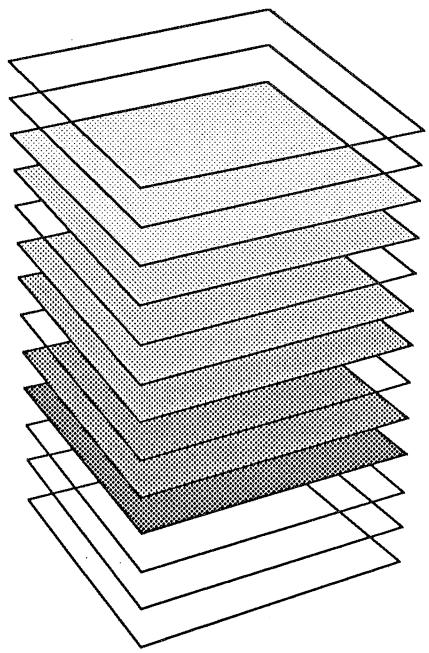
| KEYBLOCK | | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 1 | DISK | CURRENT LEVEL, ENTER<br>N A M E, ENTER | CURRENT LEVEL is used to store a single level drawing. The system will only store the activated level on the levelbar. The activated level is always shown on the right monitor<br><br>Press CURRENT LEVEL, ENTER. On the middle data-monitor wil be displayed: Give filename:_. Now type in the filename. (the maximum number of characters is 8)<br><br>Pay attention to have your drawing on the right monitor otherwise the system will create a file consisting of nothing. Current level files have no colour memory and they can be called back in any level. |
| 2 | DISK | MULTI LEVEL, ENTER<br>N A M E, ENTER | This is the same procedure as CURRENT LEVEL. The system will store all levels including the colours. |
| 3 | DISK | PALETTE, ENTER<br>N A M E, ENTER | PALETTE is also the same procedure. It is used to store the colours of all levels. It will NOT store the vectors. |
| 4 | DISK | TASK<br>N A M E, ENTER | TASK is used to send a task sequence to disk. After pressing TASK there is no need to press ENTER. The system wil display: Give filename: t._ Now a maximum of 6 characters is allowed. |



1



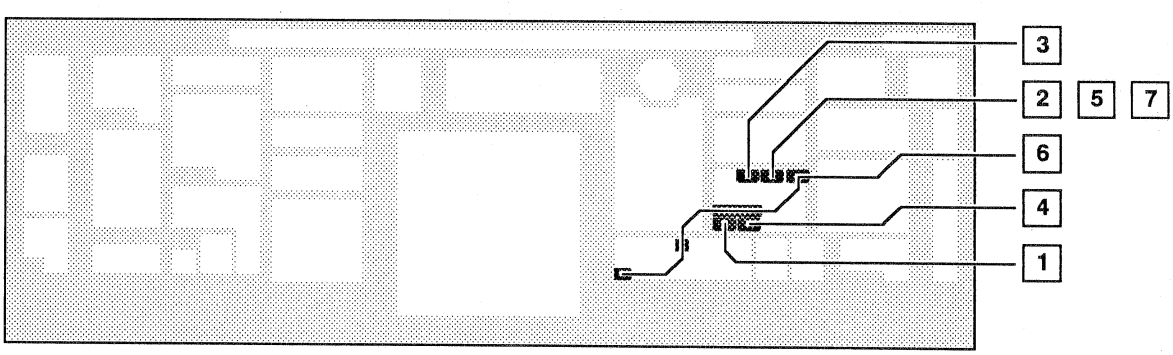
2



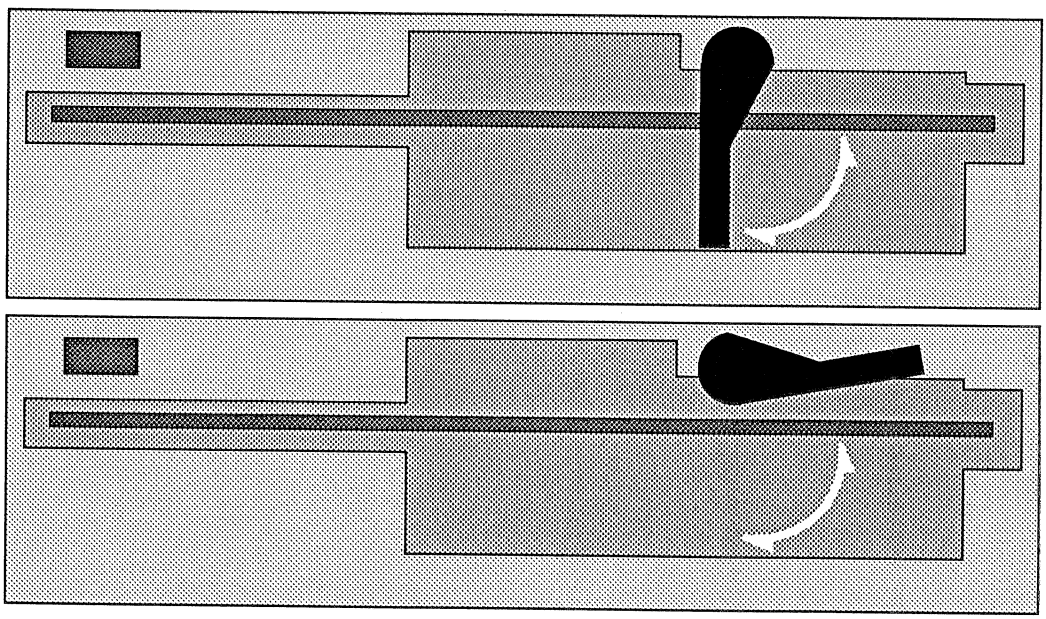
# LESSON 20 - 2

## DISK (library/page/harddisk/diskette/format)

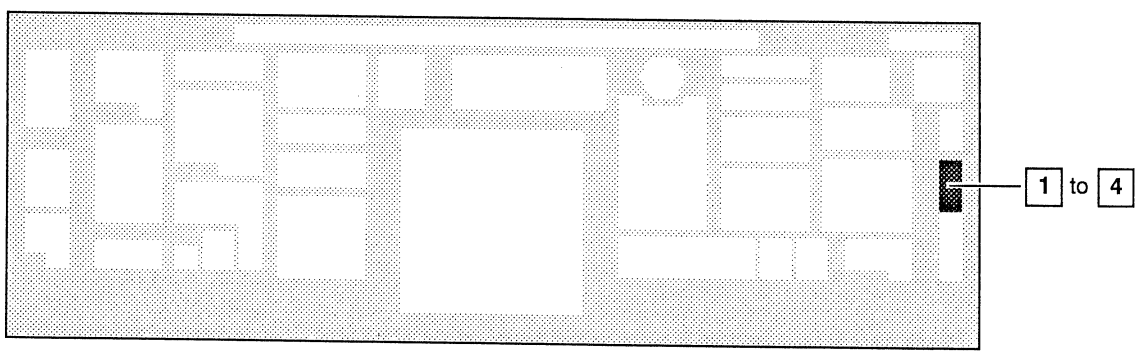
| | KEYBLOCK | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 1 | DISK | HARD DISK | Press HARD DISK to select the hard disk. Usually the hard disk will be selected after switching on, or resetting the system. |
| 2 | DISK | LIBRARY ON . | Activate the LIBRARY to see which files are on the disk. You will find a maximum of 45 files, including date and time on the righthand data-monitor. They are in alphabetic sequence.<br><br>If there are more files, it will be displayed underneath the name -total is ...- |
| 3 | DISK | LIBRARY ◁PAGE▷ | Then LIBRARY PAGE is used to go to the next page. You can step in both directions.<br><br>On the bottom of the screen you will find also the size of the disk-space and how many percent is still free. |
| 4 | DISK | DISKETTE 0 | Press DISKETTE 0 and the upper diskette (drive) will be selected. (see also the right data-monitor). Enter your floppy (label up) and turn the switch down. |
| 5 | DISK | LIBRARY ON . | Press LIBRARY ON to see if there are any files on the floppy. If this is new the system will display: -Bad disk, seek error-. |
| 6 | DISK | FORMAT ENTER<br>Y ENTER | Now press FORMAT to format the upper floppy. After pressing ENTER the system will ask: Are you sure you want to format upper floppy? Press Y (Yes), ENTER. The formatting will be started and will take about three minutes. |
| 7 | DISK | LIBRARY ON . | When the formatting is ready, (displayed on the right data-monitor) press LIBRARY ON again and see: - total is 0-, size of the floppy and how many is free. The floppy is ready to use now. |



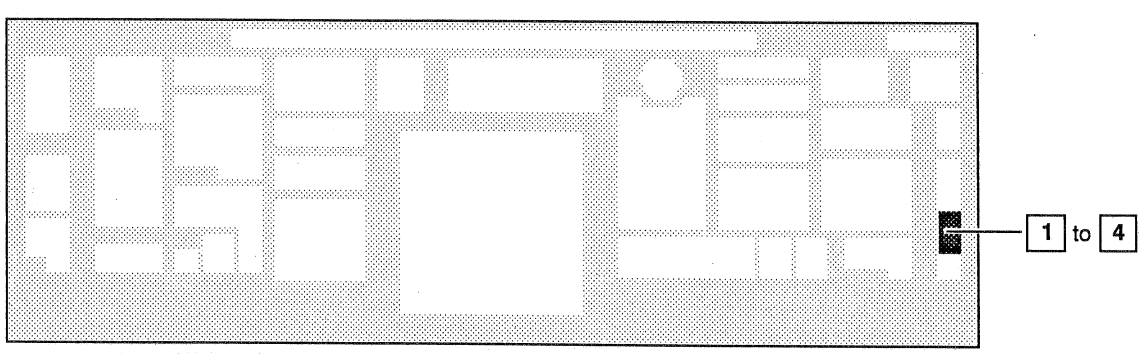
4



| KEYBLOCK | | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 1 | OPTION | 1 | OPTION 1 gives the date and time on the right data-monitor, with the possibility to update. |
| | DISK | LIBRARY PAGE | Use LIBRARY PAGE to select: year - month - day - hour - minute. |
| | | LIBRARY STEP | Use LIBRARY STEP to change the values. |
| | | | For LIBRARY PAGE and LIBRARY STEP, you can step in both directions. |
| | | LIBRARY . OFF | Press LIBRARY OFF to enter the new values. |
| 2 | OPTION | 2 ENTER | Before moving the system it is nessecary to use OPTION 2. It will fix the hard disk in a position, so there will be no damage while moving around. |
| | | | On the right data-monitor will be displayed: DISK IN PARKING-ZONE do not leave in this state unless at power-off! |
| | |  | Switch off the system. |
| | DISK | LIBRARY ON . | or: Press LIBRARY ON to activate the hard disk again. |
| 3 | OPTION | 3 | This will display on the right data-monitor: illegal command. |
| | | | or if different software is installed a menu for plotter output. |
| 4 | OPTION | 4 | This will also display: illegal command, |
| | | | or Plot emulator menu. |

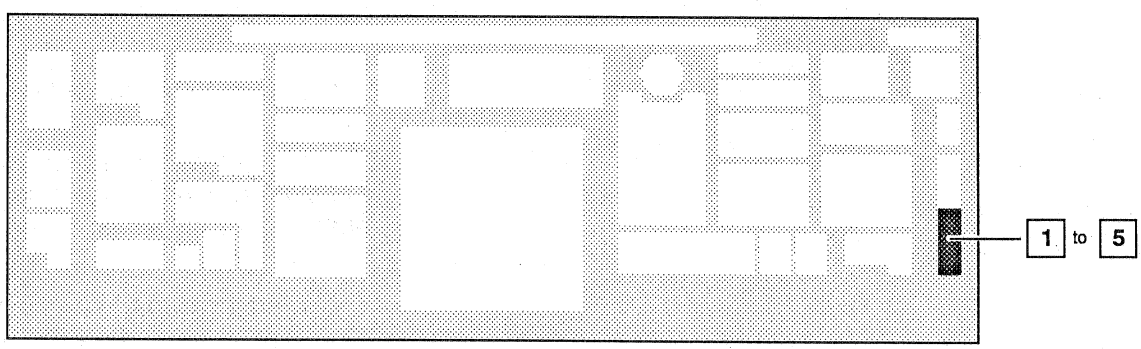


| | KEYBLOCK | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 1 | OPTION | 5 | This function is used to make output on a VERSATEC Colour Printer, or a Q.C.R./P.C.R. slide recorder.<br><br>The procedure is, follow the menu, displayed on the right data-monitor step by step. By pressing OPTION 5, first the main-menu will be displayed. |
| | | 9 9 ENTER | If you want to quit, press: 99, ENTER<br>Now we will discuss how to make a versatec colour print of a vector-file. |
| 2 | DISK | MULTI LEVEL ENTER<br>N A M E ENTER | First store the drawing on hard disk as multi-level. Do not use more than 6 characters. |
| 3 | OPTION | 5 | Then, press OPTION 5 to get the main-menu<br>Select: Taskfile menu.<br>Select: Edit taskfile. |
| | | 5 ENTER 1 ENTER<br>B . N A M E<br>ENTER | Give taskfile name. A taskfile name always start with -B.-<br>For that reason there is a maximum of six characters for the filename. |
| | | 4 ENTER 1 ENTER<br>N A M E ENTER<br>N ENTER | Select: Insert before<br>Select: Rasterize*<br><br>Type in the filename of your drawing.<br><br>The rasterfile is not for the PCR so type in: N(o), ENTER. |
| | | 1 ENTER 6 ENTER | Select: Magnification factor.<br>Type in: 6, ENTER. Because the versatec resolution is 6x the screen resolution, the magnification factor 6, gives a full size print. |
| | | Y ENTER | A checklist is displayed. If the list is correctly specified, answer Y(es), ENTER. |



| KEYBLOCK | | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| | | 4 ENTER 2 ENTER<br>5 ENTER | Select: Insert before.<br>Select: Output to device.<br>Select: Versatec A3 - 4 colours. |
| | | R . N A M E<br>ENTER | Type in the name of the raster-file, ENTER. |
| | | ENTER | Press ENTER to continue, if there is no framebuffer-file. |
| | | 1 6 ENTER 1<br>ENTER 6 0 ENTER<br>1 ENTER | Type in 16 for Dither-size and select: Matrix 0 (this is the smaller raster-point).<br>Type in 60 for minimum black value and type in 1 for having one copy. |
| | | Y ENTER 6 ENTER<br>ENTER | A second checklist will be displayed. If this is correctly specified, type in Y(es), ENTER and select: Save taskfile.<br>Press any key to continue, so press ENTER. |
| | | 4 ENTER 6 ENTER<br>B . N A M E<br>ENTER | Select: Return to main menu.<br>Select: Start task-file.<br>Type in the task-file name. |
| | | ENTER | Press any key to continue, so press ENTER. |
| | | 9 9 ENTER | Select: Quit to go out this menu.<br>This will speed up the whole process. |
| 4 | OPTION | 5 | Select OPTION 5 again to get the main menu.<br>Select: Status to check if the process is running. |
| | | 4 ENTER<br>ENTER | Press ENTER to return to the main menu. |
| | | 9 9 ENTER | Select: Quit to go out the menu. |
| | | | Now the system is free to use for a new job, while the process is running in background. After a few minutes the versatec will start to print.<br>* Rasterize means: The system translate the vector-file into raster. |

| KEYBLOCK | | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 1 | OPTION | 6<br>N ENTER | This function is intended to check the hard disk for bad sectors.<br>You can type in: Y(es) or N(o), ENTER.<br>This will be displayed on the right data-monitor. |
| 2 | OPTION | 7 | This function selects:<br>Metric or Didot point size units.<br>By just one press on OPTION 7 it will change. |
| 3 | OPTION | 8 | Illegal command. |
| 4 | OPTION | 9 | Illegal command. |
| 5 | OPTION | 10 | Illegal command. |

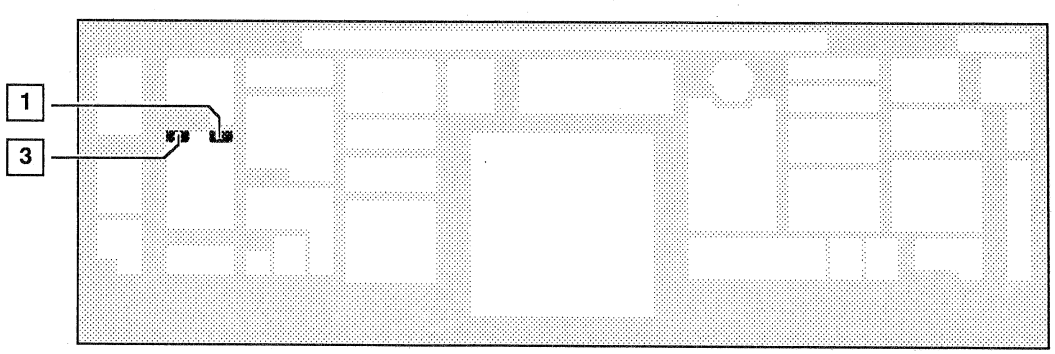


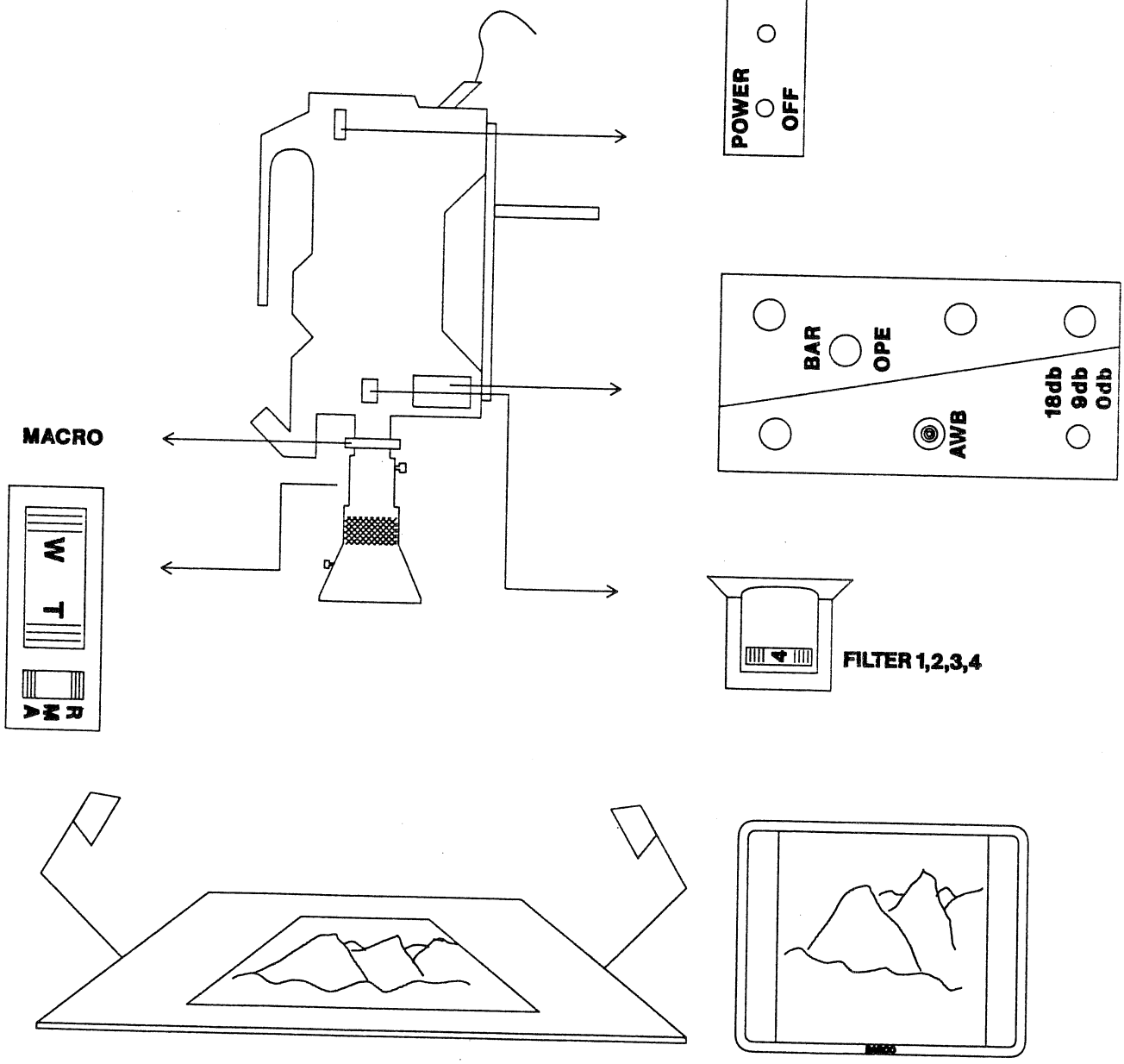
For design purpose, it is possible to use the **FRAME BUFFER** functions, for a quick visualization.
Using a video camera, it is possible to load a video image (FRAME) in the memory (BUFFER).
Then a number ofdifferent halftone images (C.T.'s) can be combinated and manipulated, by using the **PAINT** functions.
A FRAME BUFFER image is build up from pixels. Pixels are the smallest elements of the screen. There are 512 x 512 pixels on the screen.

Another feature of the system is **"PAINT"**. **PAINT** is pixel manipulation. It is used to retouch a frame buffer image.
With this function it is possible to change the colours of pixels in different ways. We will discuss three of them.

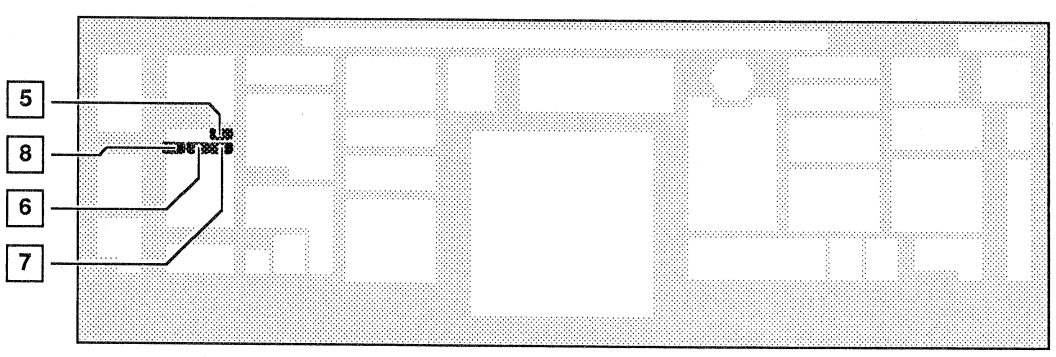
Please use the frame buffer image of lesson 22 - 2.

| | KEYBLOCK | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 1 | FRAME BUFFERS | LOAD/DISPLAY MENU · MENU · ⊕ | First press LOAD DISPLAY MENU (forget LOAD). The display menu is on the middle data-monitor. Use the cursor to select -CAMERA-. Don't press the CCB while moving, only when you have selected the -camera-. |
| 2 | CAMERA(setup) | POWER ON | Switch on the electricity. |
| | | CAMERA FILTER | Turn the wheel to position 1,2 or 3: 4 is closing the camera. |
| | | LIGHT SOURCES | Switch on the light sources. |
| | | BAR / OPE | To open the lens, switch over to operate. |
| | | A.W.B. | First put a white sheet of paper on the base board. Then press the A.W.B. (Automatic White Balance). Put the model / photo on the base board. The position is visible on the middle colour monitor. |
| | | W T | Use the -wide angle / tele- button to zoom in or out. |
| | | LENS | Turn the lower part of the lens to change the definition. Or use the macro ring. |
| 3 | FRAME BUFFERS | SELECT A · MENU · ⊕ | By pressing -select A- the load menu is displayed on the middle data-monitor. Select -camera-, and press CCB, While moving do not press CCB. Now the video image is loaded in the system. |
| 4 | CAMERA | BAR / OPE | Switch over to BAR to close the lens. This is important, because of damaging the tubes of the camera. |

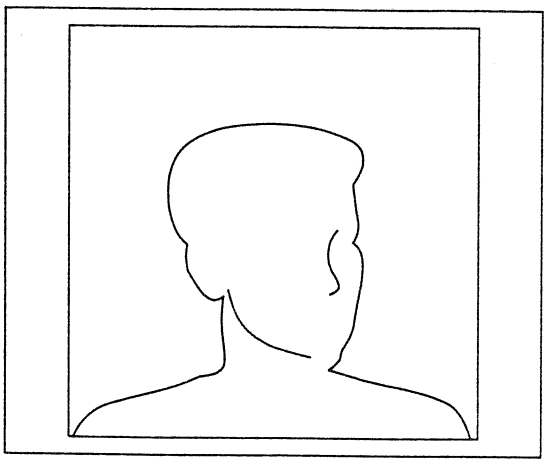


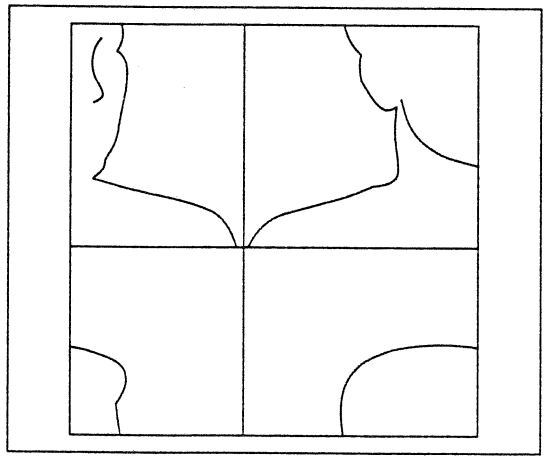

POWER
OFF
BAR
OPE
AWB
18db
9db
0db
MACRO
W
T
MF
FILTER 1,2,3,4

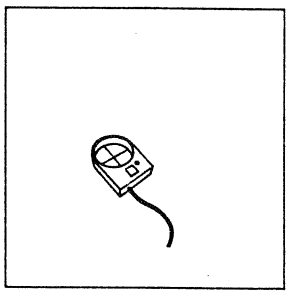
| | KEYBLOCK | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 5 | FRAME BUFFERS | LOAD/DISPLAY MENU, MENU | Press LOAD DISPLAY MENU.<br>The menu is shown on the middle data-monitor.<br>Select: Framebuffer. Now, the image will be displayed on the middle monitor. |
| 6 | FRAME BUFFERS | SHIFT, MONITOR | Press SHIFT.<br>Now, move the cursor while pressing CCB.<br>While moving the cursor, the image is moving as well.<br>There is a - x- and y-move - read out on the middle data-monitor, in pixels. |
| 7 | FRAME BUFFERS | ZOOM, MONITOR | For this function you have to use the cursor in the same way.<br>There is a - x- and y-zoom - read out on the middle data-monitor, in pixels.<br>The maximum is up to 512x. This means, one pixel is fitting the whole screen. |
| 8 | FRAME BUFFERS | RESET | Press RESET.<br>The image will automatically jump into original position. |

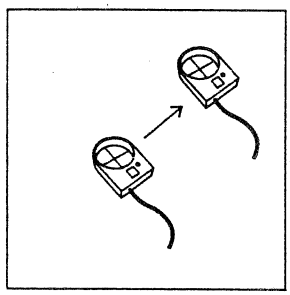


6

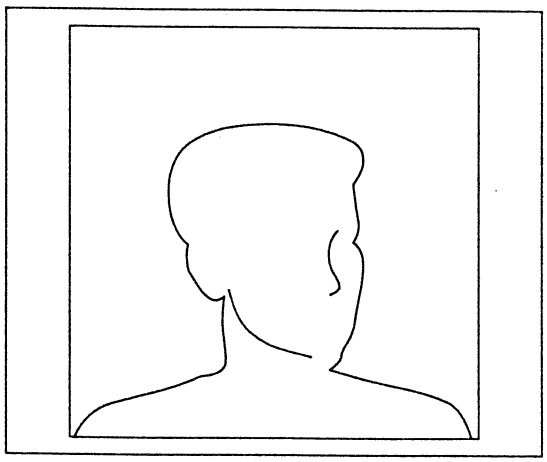


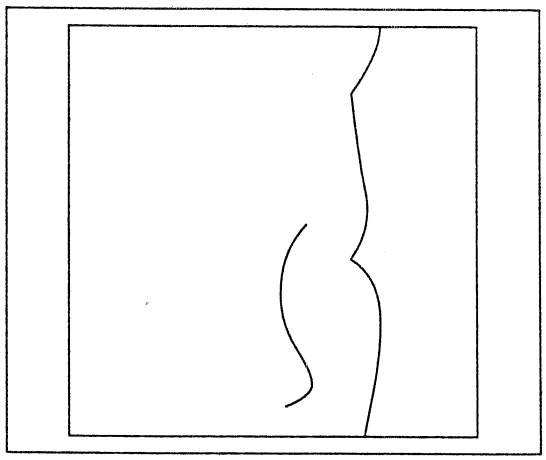


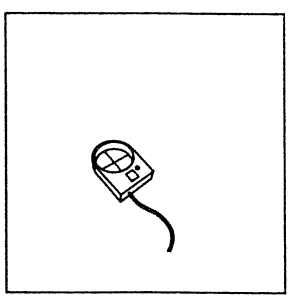


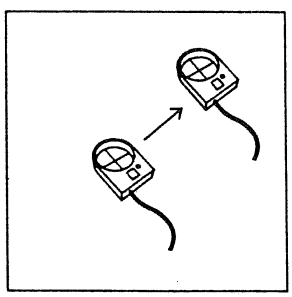


7

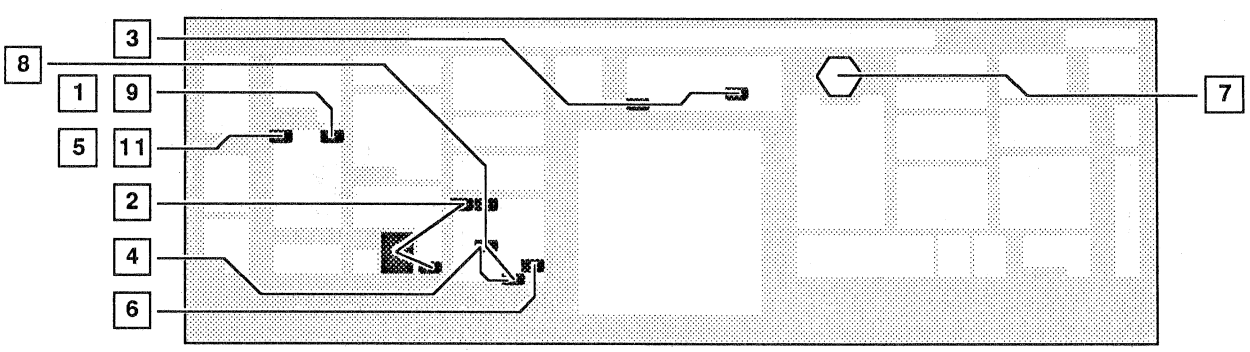




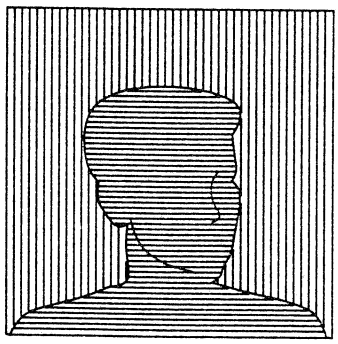




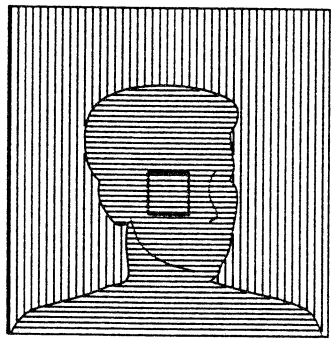
| | KEYBLOCK | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| | | | The following part will discuss how to make a mask and how to use it to enter a second image. |
| 1 | FRAME BUFFERS | LOAD/DISPLAY MENU · MENU | Activate the display-menu and select "frame buffer + level colours". Now you can see a combination of the frame buffer and linework on the middle monitor. |
| 2 | DRAW | POLYGON · 4 · ENTER | The polygon 4 appears on top of the image. |
| 3 | DYNAMICS | CHAIN ALL | Enlarge the polygon to define an area which will be cutted off. |
| 4 | DRAW | FILL CHAIN · ALL | Fill the polygon. This will cover a part of the frame buffer image. |
| 5 | FRAME BUFFERS | SELECT A · MENU | Activate the load-menu and select "outside level areas. Then press CCB. The area outside the polygon will disappear. |
| 6 | DRAW | REFRESH VECTORS | Now, the remaining part of the image will be showed again. |
| 7 | COLOUR | | Give the level a colour, because it will be easier to see, when making a cut-out. |
| 8 | DRAW | POINT TO · FILL CHAIN · ALL | Draw a mask around the part you want to keep and press "fill chain / all". The line-drawing will fill the area you want to use for a new background. |
| 9 | FRAME BUFFERS | LOAD/DISPLAY MENU · MENU | Select: "frame buffer + camera (level areas)" |
| 10 | CAMERA | BAR / OPE | Switch over to operate. Put another picture on the camera base board. On the middle monitor you can see the frame buffer image and the camera image. |
| 11 | FRAME BUFFERS | SELECT A · MENU | Select: "camera (in filled area)". |
| | | LOAD/DISPLAY MENU · MENU | Select: "frame buffer" |
| 12 | CAMERA | BAR / OPE | Switch over to "BAR" to close the camera. |



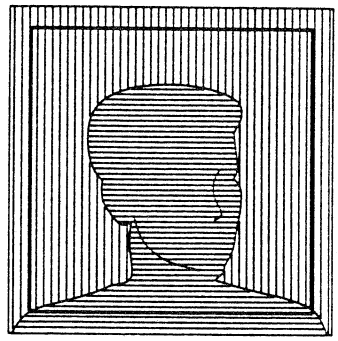
1



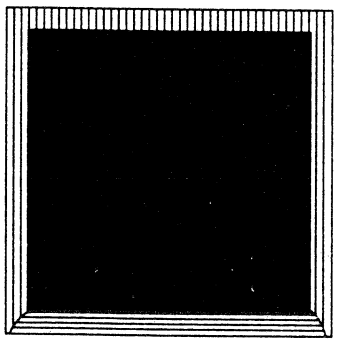
2



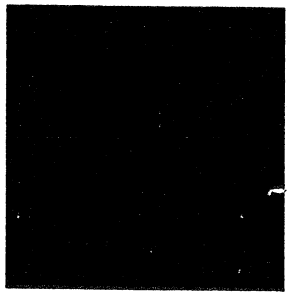
3



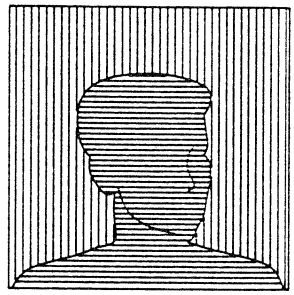
4



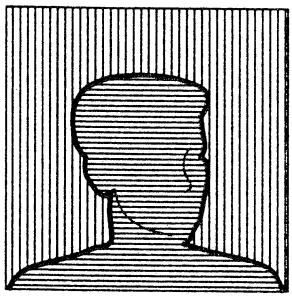
5



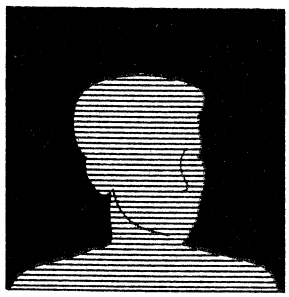
6



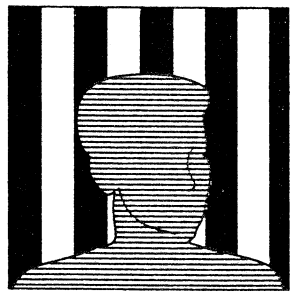
7,8



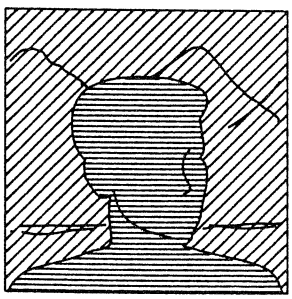
9



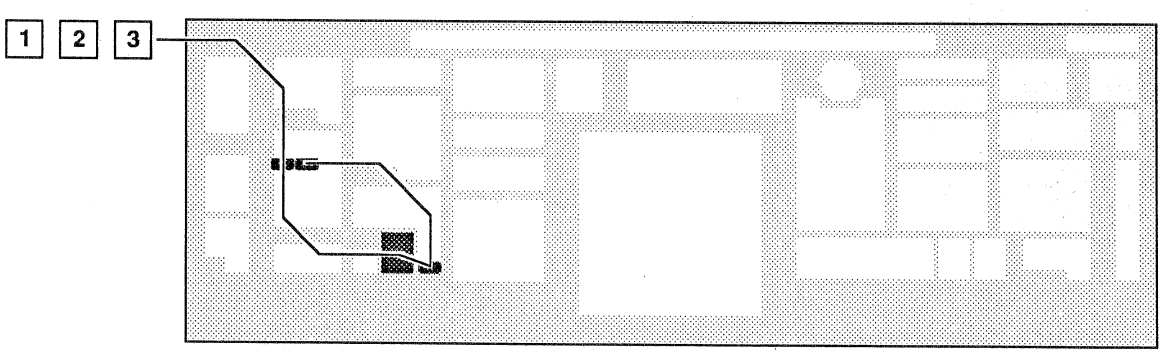
10



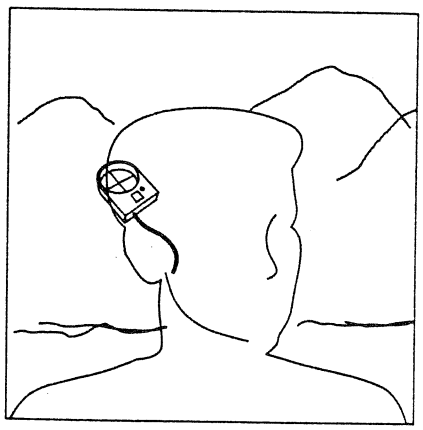
11,12

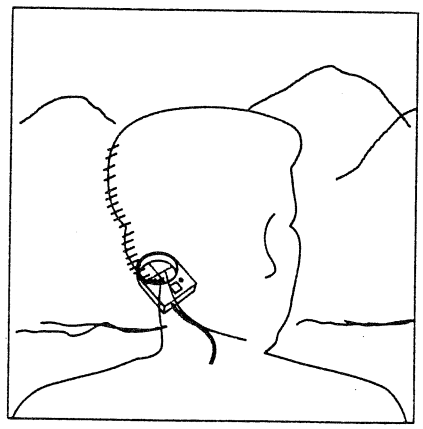


| | KEYBLOCK | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 1 | FRAME BUFFERS | PAINT MENU<br>MENU 3 ENTER<br>AIRBRUSH | Press "PAINT". This will give a menu on the left data-monitor. Select with the cursor -wash- and press the CCB (now -wash- will be active).<br>Select -brush-size-, press CCB, type in 3, ENTER. The minimum brush-size is 1 and the maximum is 29 pixels in diameter.<br>This function activates the selected paint-function and gives a cursor on the screen as a blinker (black/white).<br>Move the cursor, while pressing the CCB, along the edges of the image to blend them in. Notice that the colours are mixing. |
| 2 | FRAME BUFFERS | PAINT MENU<br>MENU 1 5 ENTER<br>AIRBRUSH | Press "PAINT". Select -pixel-copy-. With this function you can copy a number of pixels at once, to an other position.<br>Select -brushsize-, press CCB, type in 15, ENTER.<br>Activate "pixel-copy" by pressing airbrush. Now designate the area which you want to copy, then designate the new position. Now you can start to copy, by pressing CCB continiously.<br>The brushsize is displayed as a circle. |
| 3 | FRAME BUFFERS | PAINT MENU<br>MENU 2 9 ENTER<br>AIRBRUSH | Select -brush 2-. This is a real airbrush-function. At first it will be transparently, later on opaque. This can be adjusted by changing the number behind -brush 2-, from 1 to 128.<br>Select brushsize and type in 29, ENTER.<br>Activate the airbrush and you will see the cursor on the screen. Designate a colour of the image to be loaded in the airbrush. Wait for a few seconds, untill the cursor appears again and start airbrushing, while keeping CCB depressed. |

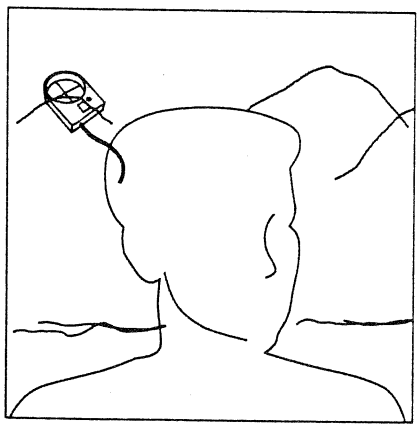


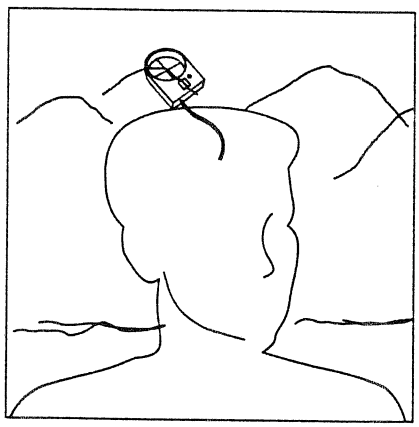
1



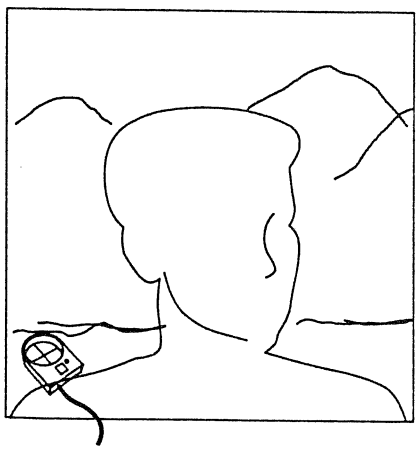


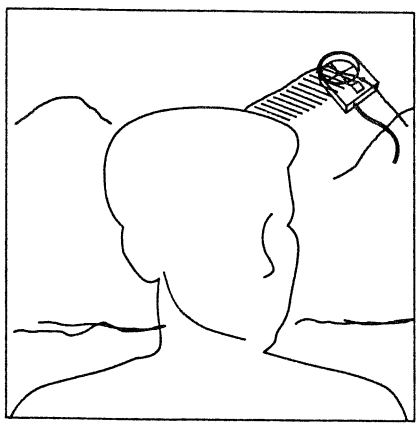
2





3





Any drawing made on Aesthedes can be plotted on paper by using a drafting plotter.

The plotter can be loaded with different media sheets, like polyester, register paper, lay-out paper etc.
Three different pen types can be used:
- fiber pens
- rollerballs
- drafting pens.

The keys **SET UP PLOTTER** and **TEST** in the keyblock **PLOTTER** are used to give the right plotting instructions.

The keys: **TABLE AS VECTORS**
**TABLE AS SPLINES**
**TABLE AS FILL**

**LEVEL AS VECTORS**
**LEVEL AS SPLINES**
**LEVEL AS FILL**

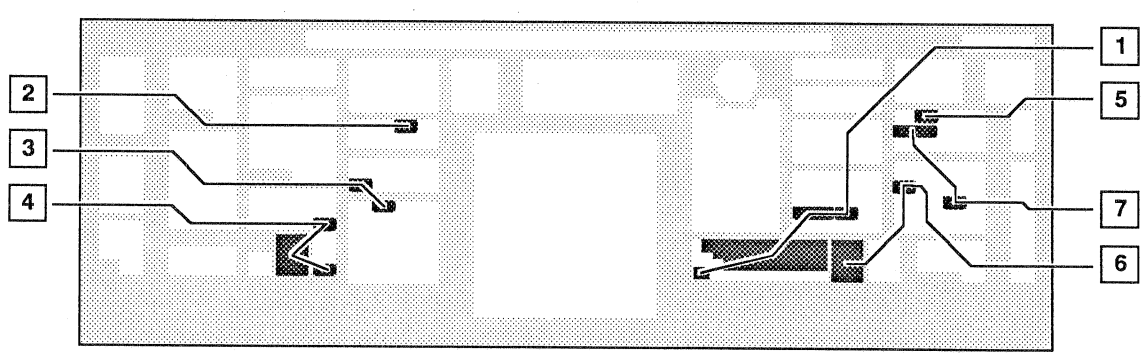
**ALL AS VECTORS**
**ALL AS SPLINES**
**ALL AS FILL**
are used to send the information to the plotter.

In this lesson, the drawing of lesson 7 is used to practice the different plotting instructions.

# LESSON 23 - 1

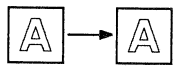
PLOTTER (set up)

| | KEYBLOCK | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 1 | DISK | FROM DISK · ENTER · N · S<br>L · O · G · O · ENTER | The N.S.Logo appears on the screen. |
| 2 | SPLINES | REFRESH SPLINES | Refreshes the splines. |
| 3 | MOVE + DRAW | GRAVITY ON · POINT TO | Press GRAVITY ON and draw with POINT TO a line that will cover the lenght of the logo. |
| 4 | MEASURE | DEFINE SCALE<br>2 · 0 · 0 · ENTER | Touch the line with the cursor and press 200, ENTER.<br>The lenght of the logo will now be defined as 200mm. |
| 5 | KILL | LINE | Kill the line you have used to define the scale. |
| 6 | PLOTTER | SET UP PLOTTER · MENU | Press SET UP PLOTTER.<br>On the middle data-monitor will be displayed the plotter menu:<br>- plot scale factor<br>- plot x origin<br>- plot y origin<br>- pen number<br>- pen speed |
| | | 1 · ENTER | Select: pen number and type in: 1, ENTER. |
| | | 1 · 5 · ENTER | Select: pen speed and type in: 15, ENTER. |
| 7 | PLOTTER | LEVEL AS SPLINES · ENTER | Press LEVEL AS SPLINES, ENTER.<br>This will send the information to the plotter.<br>The plotter will than exucute your drawing. |

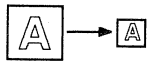


**6 and 7**

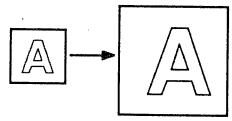
Plot scale factor 1 : 1



Plot scale factor 1 : 2



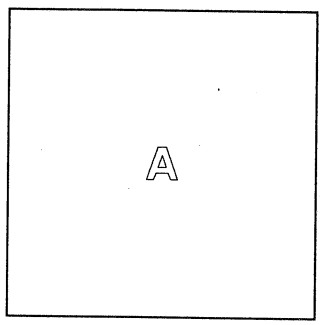
Plot scale factor 1 : 0.5

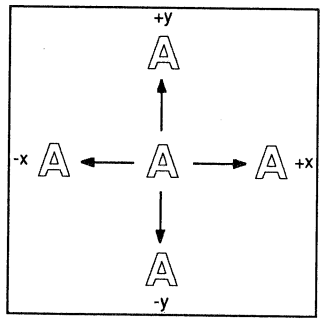


Plot x origin:

plot y origin:

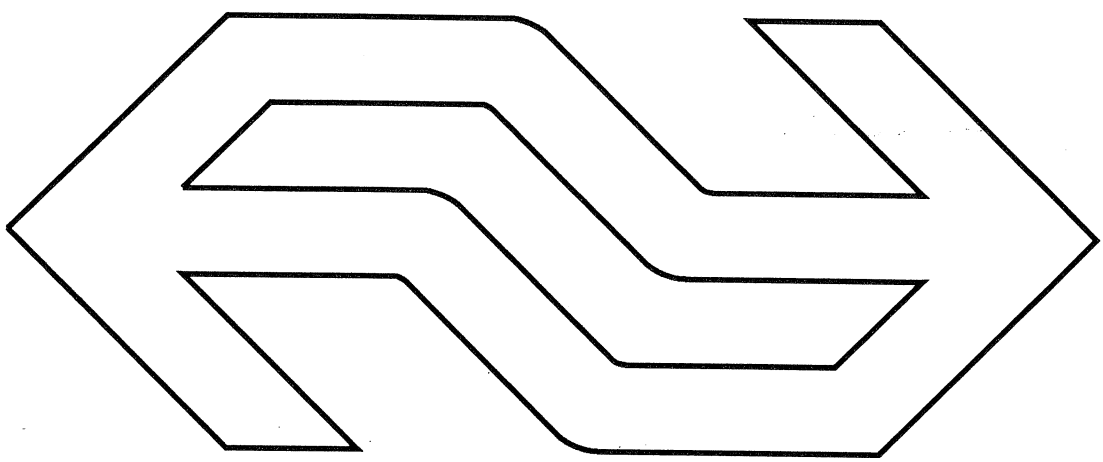
(in mm.)



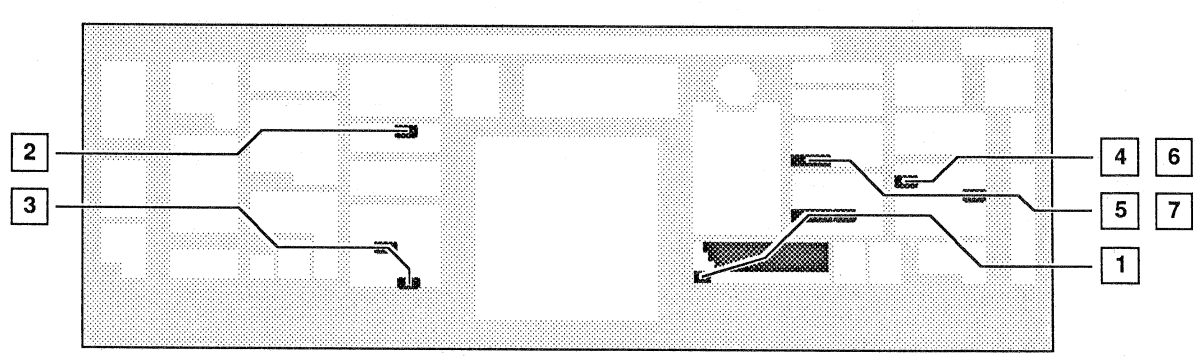



Pen number: Using the H.P. Plotter we have the choice out of 1 up to 8.

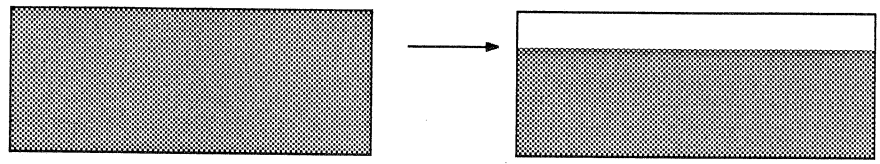
Pen speed: Pen speed will go up from 1 to 60 cm/sec.
This only counts for vectors. Splines are drawn with a slower pen speed



| | KEYBLOCK | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 1 | DISK | FROM DISK · ENTER · N · S · L · O · G · O · ENTER | We will use this file again given the same scale factor used previously. |
| 2 | SPLINES | REFRESH SPLINES | Spline the logo. |
| 3 | DRAW | FILL CHAIN · ALL | Fill the logo and give it a colour. |
| 4 | PLOTTER | TEST · MENU | The Hatching menu will appear on the middle data-monitor.<br>Use the cursor while pressing the CCB to select the different functions.<br>Offset from start : 0<br>Number of lines : 1 ENTER<br>Line separation : 1 ENTER<br>Skip distance : 1 ENTER<br>Blob factor : 0,15 ENTER<br>Hatching angle : 45 ENTER<br>Outline : Yes |
| 5 | PLOTTER | LEVEL AS FILL · ENTER | To send the information (drawing) on the current level to the plotter.<br>Using LEVEL AS FILL will give the plotter instructions to also fill inside the drawing. |
| 6 | PLOTTER | TEST · MENU | Use the cursor to select other values.<br>Offset from start : 0<br>Number of lines : 1 ENTER<br>Line separation : 0,15 ENTER<br>Skip distance : 0,15 ENTER<br>Blob factor : 0,10 ENTER<br>Hatching angle : 0 ENTER<br>Outline : Yes |
| 7 | PLOTTER | LEVEL AS FILL · ENTER | Will send the information (drawing) on the current level to the plotter. |



4 Offset from start. →

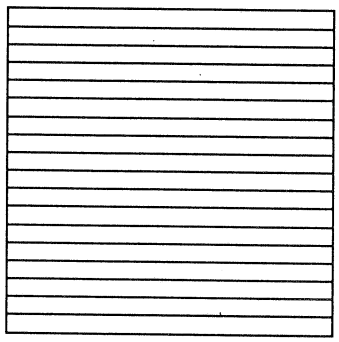


0 mm. 10 mm.

I. Number of lines : number of lines per group.
II. Line separation : distance between the lines.
III. Skip distance : Distance between the groups.

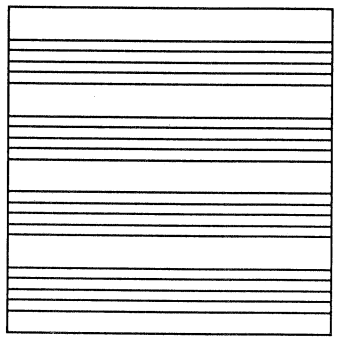
Example A.

I. - 1
II. - 2 mm.
III. - 2 mm.



Example B.

I. - 5
II. - 1 mm.
III. - 3 mm.



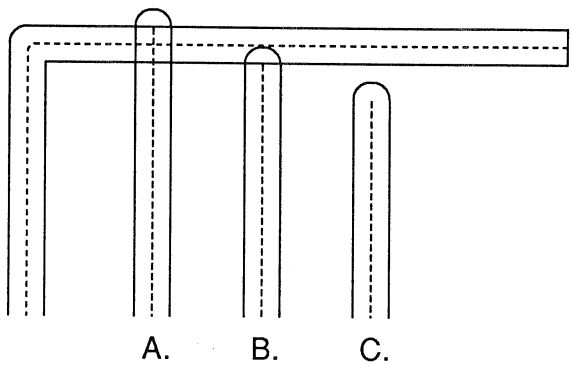
NOTE: The three functions are always functioning as one group.

Blob factor : Distance between the contour-line and startingpoint of the connecting line.

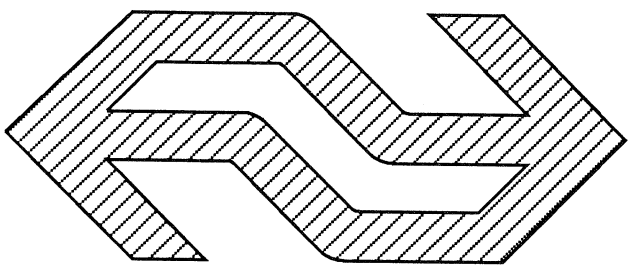
A. - Factor 0 (0 mm) isn't possible.

B. - We usualy use half the thickness of a pen (in mm).

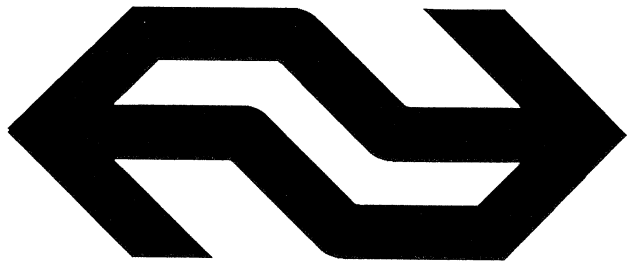
C. - More than half the thickness of a pen will show a gap between the lines.




5.



7.



An other feature in the system is the Colour Matching function.
This is used to compare screen colours with printed colours.

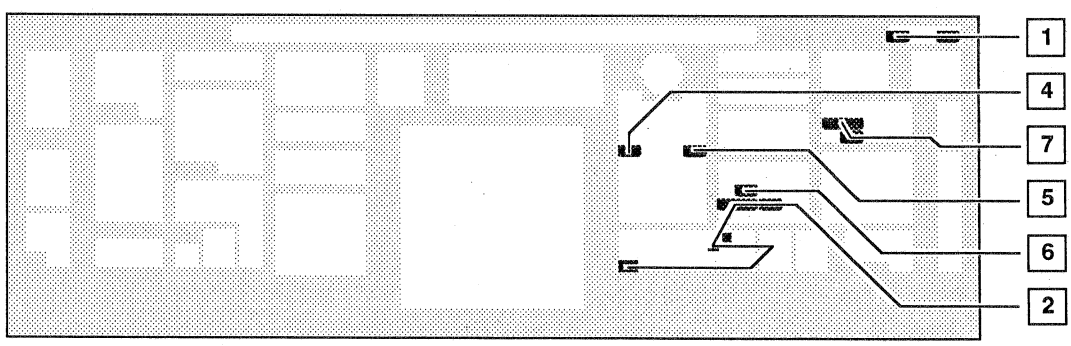
A filter, stored on hard disk and loaded each time when needed, will show up screen colours like printed colours.
So it is possible to make previous colour corrections

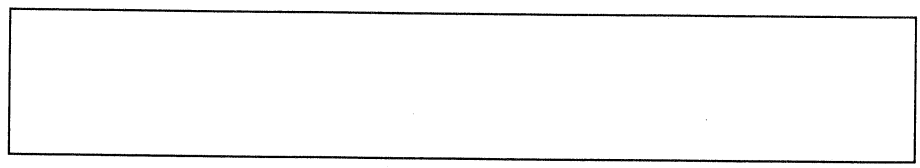
This lesson will discuss how to make the filter and how to use it.

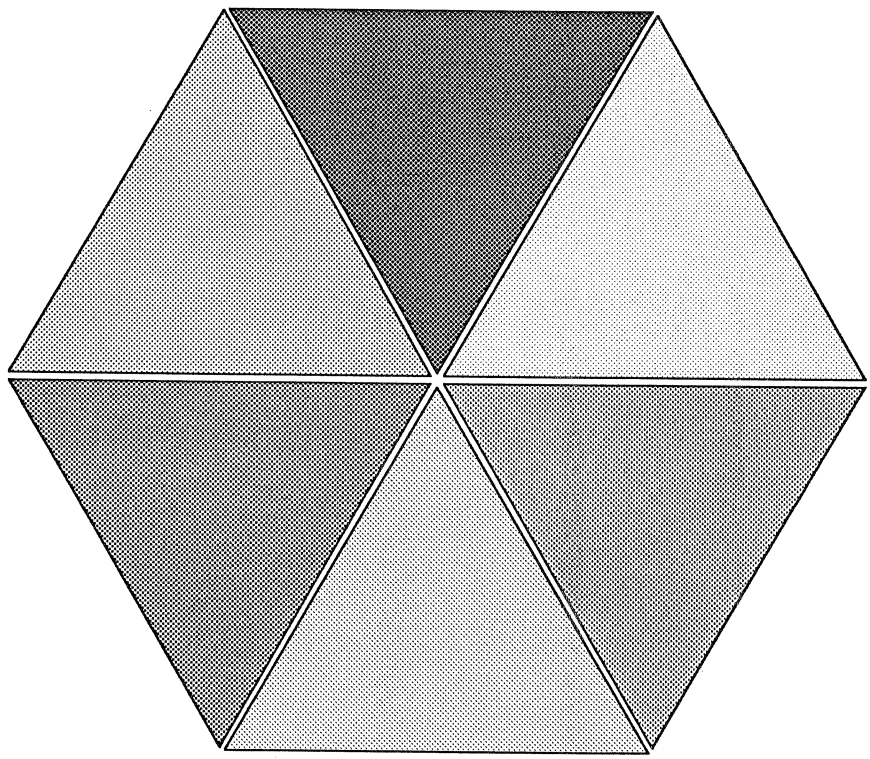
# LESSON 24 - 1

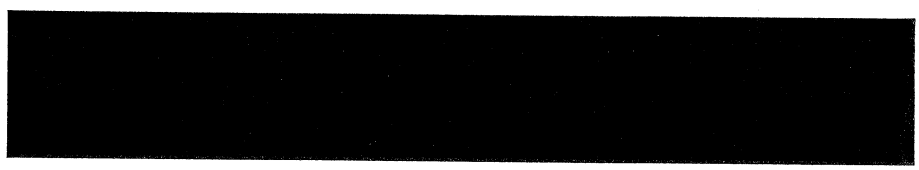
## COLOUR MATCHING (versatec)

| | KEYBLOCK | KEYS / CCB | EXPLANATION |
|---|---|---|---|
| 1 | | [ ] [ABORT] [RESET] | Press the RESET and the GREEN key at the same time to reset the system. |
| 2 | DISK | [FROM DISK] [ENTER] [K] [P]<br>[1] [0] [0] [ENTER] | The KP.100 file will appear on the middle monitor. (stored in levels 1-8).<br>Level 0 is a 75% bright background.<br>Level 1 - 6 show the colour-circle in 100% primary colours, additive and substractive.<br>Level 7 represents the colour of the paper.<br>Level 8 is black, created by the 3 primary colours printed together. |
| 3 | | | Compare your colours on the screen with the colour proof. This proof is an output of the KP100 file from the versatec thermo printer, but could also be a proof of any other system or printer. |
| 4 | COLOUR | [ADDITIVE] | Adapt the colours on the screen by stepping through levels 0-8 adding and subtracting red, green, blue and brightness. Your finished colour combination on the screen which is alike the proof is called a look up table. |
| 5 | COLOUR | [SUBTRACTIVE] [MENU]<br>[ENTER] | On the left data-monitor is shown the menu.<br>Select: Load from levels 1-8.<br>Press CCB and ENTER to execute.<br>Now the look up table has been loaded as the new "filter".<br>NOTE: Keep the colours of your monitor unchanged from now on. |
| 6 | DISK | [MULTI LEVEL] [ENTER]<br>[N] [A] [M] [E] [ENTER] | Store the look up table, because the colour-information of the filter referts to its default values when resetting or switching on/off. |
| 7 | KILL | [LEVELS] [ENTER] | Kill all the levels. |









The A.P.D. (Aesthedes Peripheral Driver) is used as an intermediate between Aesthedes and output devices.

A file , made on Aesthedes and stored on floppy disk, can be loaded in the A.P.D. and used to make a versatec colour print for instance.

Instead of function keys, all instructions are given on the alphanumerical keyboard and displayed on the monitor on top.

In this lesson the pre-programmed -F-keys (function-keys) on top of the keyboard are used to execute a colour print on the versatec.

After switching on the A.P.D., press **RETURN** twice to enter in the A.P.D. menu.

Then press the **MENU** button twice to get the function keys displayed on the bottom of the monitorscreen.

Now, the file on diskette can be copied to the hard-disk of the A.P.D. using the **F7** key.

**F1** is used to rasterize the file which is necessary to translate it from vector to raster.

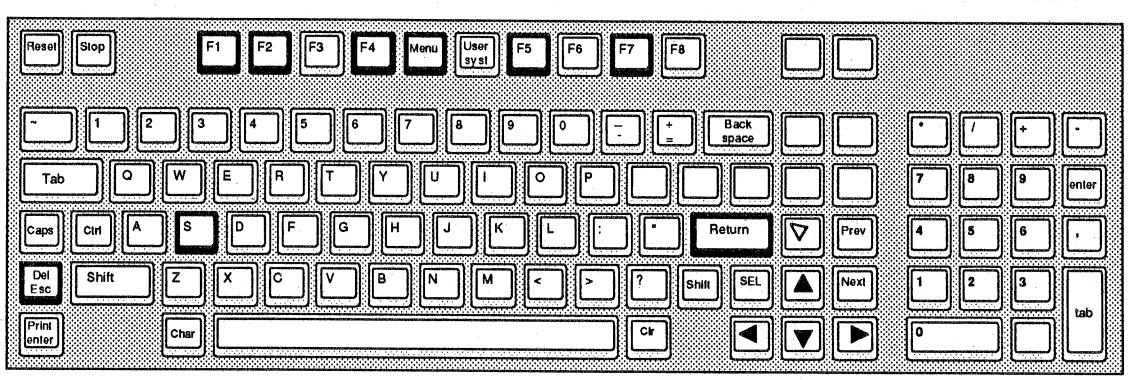
**F2** is used to program the versatec.

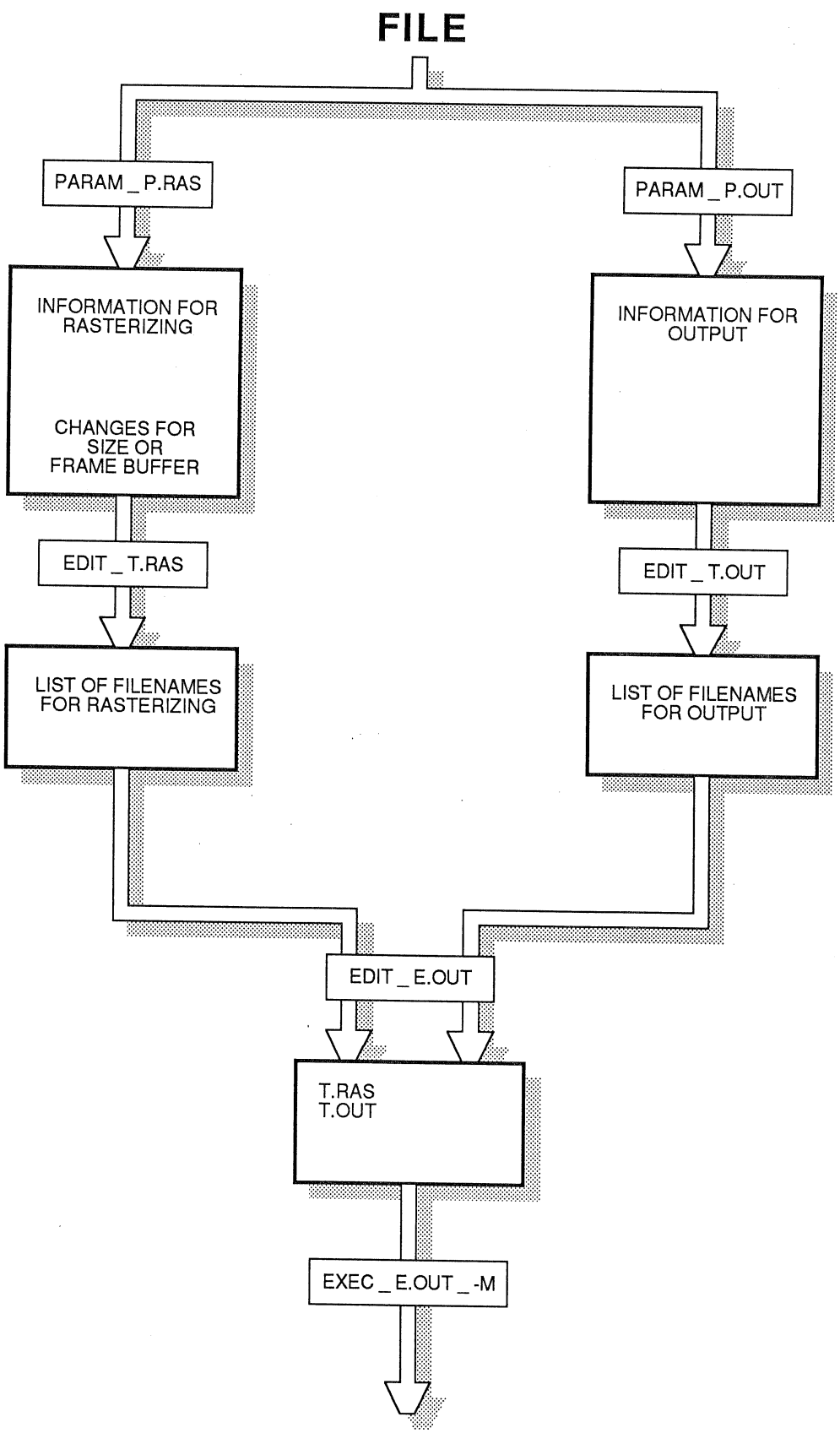
**F3** is used to make a list of file-names for rasterizing.

**F4** is used to make a list of file-names for printing.

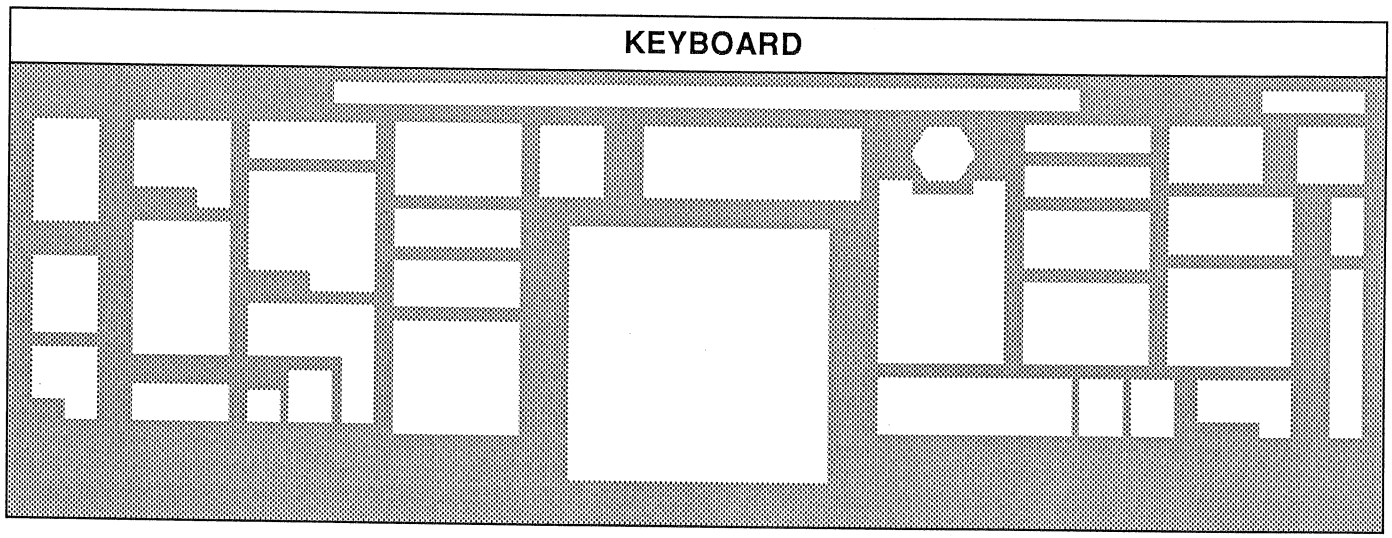
**F5** is used to start rasterizing and printing.

| | KEY | SCREEN | EXPLANATION |
|---|---|---|---|
| 1 | | | Enter the diskette with the file to be printed in the upper floppy disk drive of the A.P.D. |
| 2 | F7 | Copy / D0 / anonymous / ..... | Type in the filename.<br>This will be copied from the upper floppy to the hard disk of the A.P.D. |
| 3 | F1 | Param _ P.RAS | Give a menu where you can give information for rasterizing. |
| | S | Done<br>Command: | SAVING |
| 4 | F2 | Param _ P.OUT | Gives a menu for printing. |
| | S | Done<br>Command: | SAVING |
| 5 | F3 | Edit _ T.RAS<br>P.RAS | |
| | Return | Type in filename(s) _ | List of filenames for rasterizing. |
| | Del Esc | | |
| | S | Saving into file T.RAS<br>Command:_ | |
| 6 | F4 | Edit _ T.OUT<br>P.OUT | |
| | Return | Type in filename(s) | List of filenames for printing. |
| | Del Esc | | |
| | S | Saving into file T.OUT<br>Command:_ | |
| 7 | F5 | Exec _ E.OUT _ -M | Starts rasterising and after that it will start to print. On the screen you can see in percentages how far it is. |

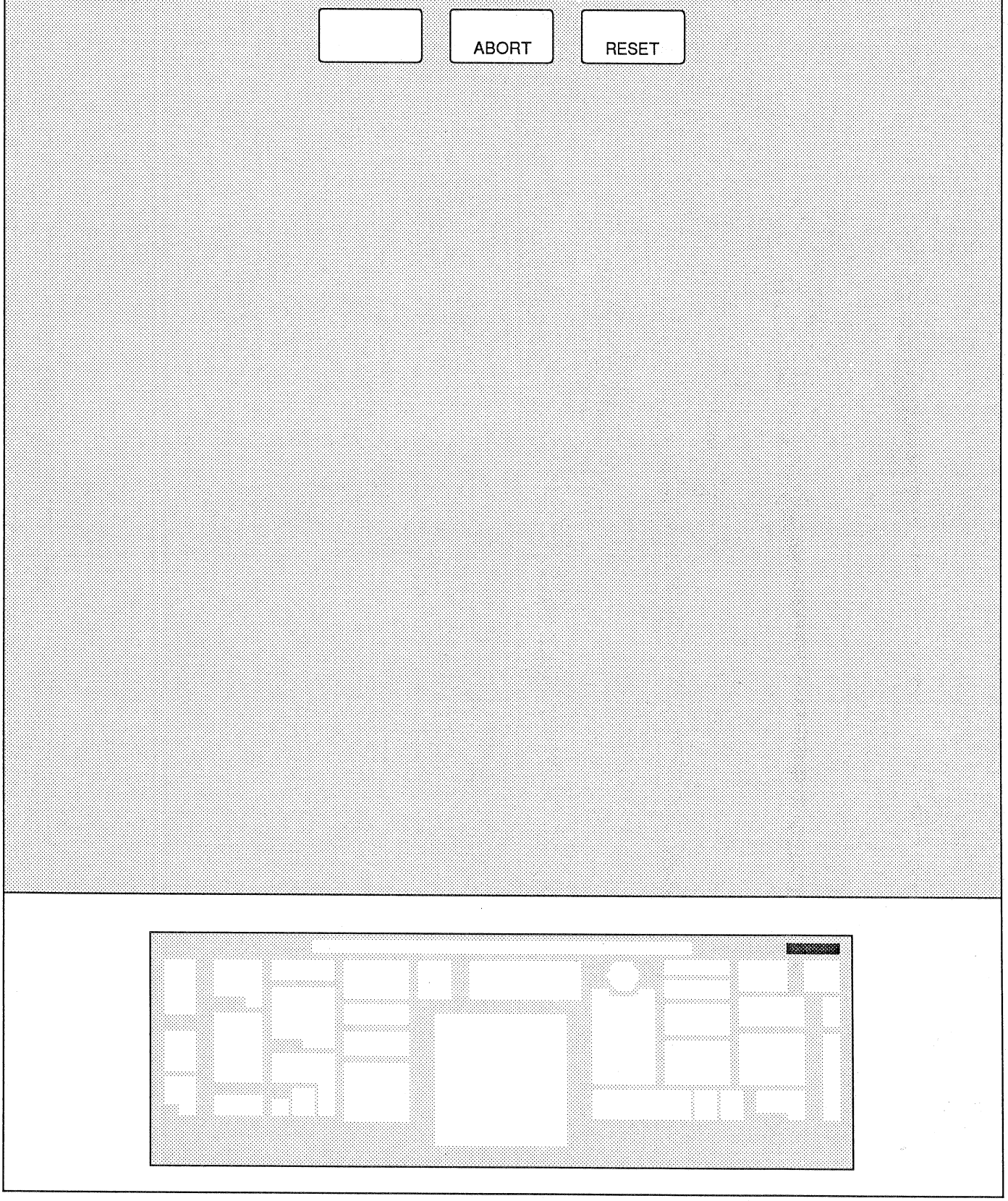



FILE
PARAM _ P.RAS
PARAM _ P.OUT
INFORMATION FOR RASTERIZING
CHANGES FOR SIZE OR FRAME BUFFER
INFORMATION FOR OUTPUT
EDIT _ T.RAS
EDIT _ T.OUT
LIST OF FILENAMES FOR RASTERIZING
LIST OF FILENAMES FOR OUTPUT
EDIT _ E.OUT
T.RAS
T.OUT
EXEC _ E.OUT _ -M
STARTS PRINTING.

# SUMMARY ACTIVE KEYS



KEYBLOCK

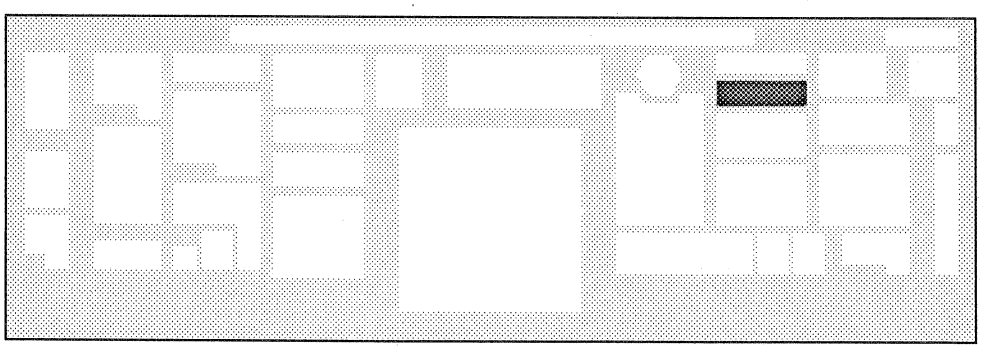


| KEYS | EXPLANATION |
| --- | --- |
| GREEN | A "combination" key that must be pressed concurrently with either ABORT or RESET. |
| ABORT | Clears the system without destroying information in the buffer. |
| RESET | Clears the system entirely; resynchronizes systems and wipes out the buffer memory. |

## KEYBLOCK

ANIMATE

- INBETWEEN LINEAR
- INBETWEEN EXPONENTIAL
- INTERPOLATE
- EXTRAPOLATE
- DOUBLE PROJECTION
- PATH DEFINITION
- SPEED DEFINITION
- OPTIONS

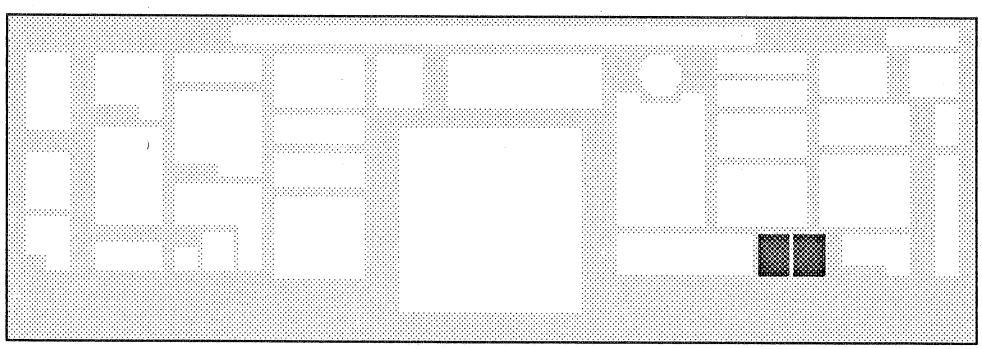


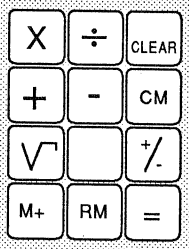
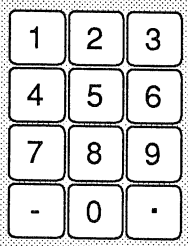
| KEYS | EXPLANATION |
|---|---|
| INBETWEEN LINEAR | To draw a desired number of copies between two designated tables, the copie will change from the form of the first table to the form of the second in stages, the number of which can be determined. |
| INBETWEEN EXPONENTIAL | Not active. |
| INTERPOLATE | Not active. |
| EXTRAPOLATE | To manipulate a chain or a table throught repetitions of a numeric dynamics function. |
| DOUBLE PROJECTION | Not active. |
| PATH DEFINITION | Not active. |
| SPEED DEFINITION | Not active. |
| OPTIONS | Not active. |

## KEYBLOCK

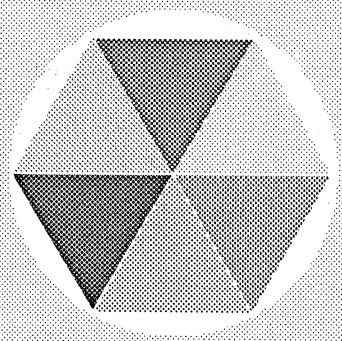
CALCULATOR

| | | | | | |
|---|---|---|---|---|---|
| 1 | 2 | 3 | X | ÷ | CLEAR |
| 4 | 5 | 6 | + | - | CM |
| 7 | 8 | 9 | √ | | +/- |
| - | 0 | . | M+ | MR | = |

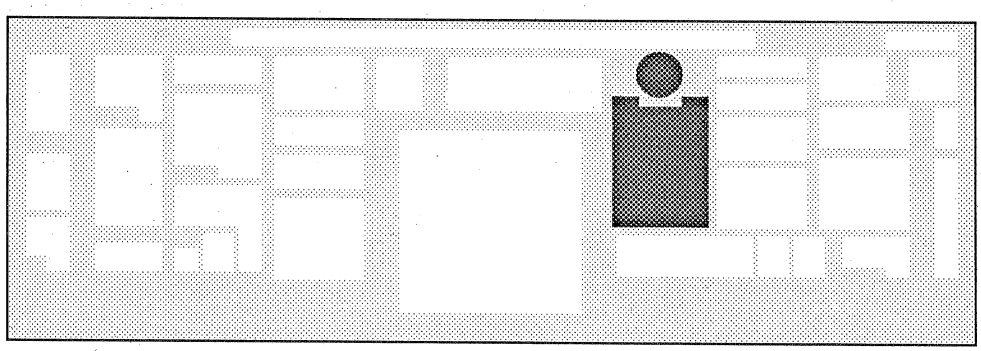


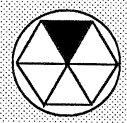
| KEYS | EXPLANATION |
|---|---|
|  | To be used in combination with "measurement" functions.<br>The calculator enables you to perform arithmetical operations on numerical values that are used in measurements (displayed on System Control Monitor).<br>Can also be used as an indipendent calculator displayed on S.C.M. |
|  | Used to enter numerical values when needed to carry out a function and can be used as a part of a filename.<br>A filename cannot begin with a number. |

## KEYBLOCK



| | | | |
|---|---|---|---|
| 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 |
| 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 |



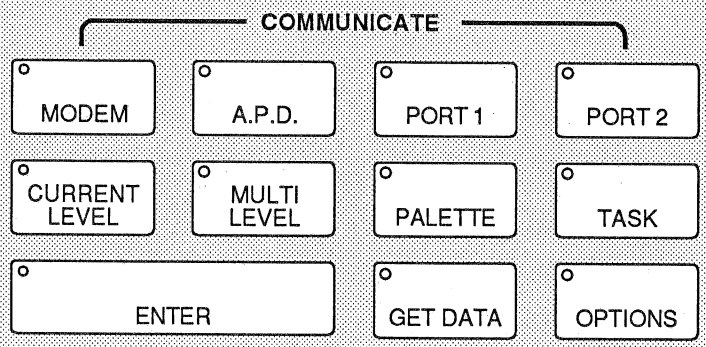
| KEYS | EXPLANATION |
|---|---|
|  | To change a colour of a level to one of the colours of the colour-circle. When a colour is chosen with the colour-circle, it comes into the level with a saturation of 100% and a brightness of 75%. |
| COLOR GRAD ON OFF | To create colour graduation in a current level or in the background. (level0) |
| OPTION | Not active. |
| 0 60 | 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. |
| 120 180 | 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. |
| 240 300 | 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 rotate through the colour-circle. |
| << 0% SATURATION | 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 of the brightness. |
| 20% 40% SATURATION | Using either 20%, 40%, 60% or 80% saturation will give a change in colour in steps. |
| 60% 80% SATURATION | |
| 100% >> SATURATION | To give a colour 100% saturation and to gradually give a colour a saturation up to 100%. |

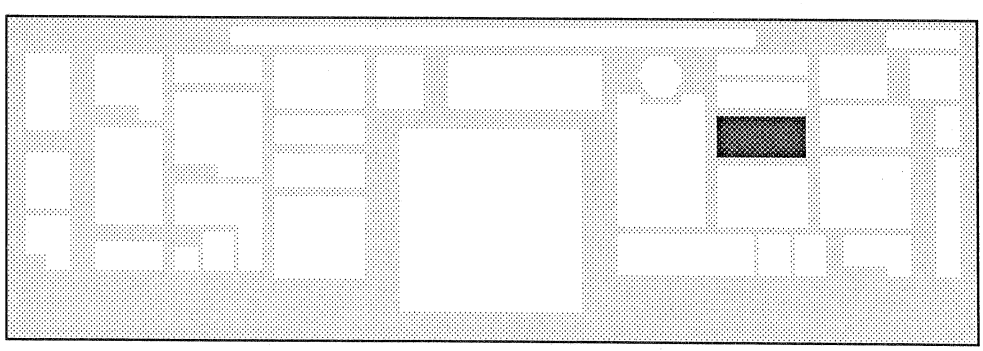
| KEYS | EXPLANATION |
|---|---|
| << 0% BRIGHTNESS | To set the brightness of a colour at 0% or black and remove brightness from colours in steps. |
| 20% 40% BRIGHTNESS | Using either 20%, 40%, 60% or 80% brightness will give a change in colour brightness in steps. |
| 60% 80% BRIGHTNESS | |
| 100% >> BRIGHTNESS | To set brightness of a colour at 100% or to gradually add brightness to the colour in the current level up to 100%. |
| ADDITIVE | To set the colour system in an additive mode. |
| SUBTRACTIVE | 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. |
| WHITE | To give the current level a white colour with a brightness of 75%. |
| - RED + | To add and subtract red from a colour in the current level. |
| - CYAN + | To add and subtract cyan from a colour in the current level. |
| - GREEN + | To add and subtract green from a colour in the current level. |
| - MAGENTA + | To add and subtract magenta from a colour in the current level. |

| KEYS | EXPLANATION |
|---|---|
| - BLUE + | To add and subtract blue from a colour in the current level. |
| - YELLOW + | To add and subtract yellow from a colour in the current level. |
| BLACK | To give the current level a black colour. |
| INTERPOLATE | Not active. |
| DELETE | To delete a page of colour information that has been stored with the save key. |
| ! SET COPY<br>! GET COPY | The set copy and get copy keys are a temporary memory system for storing and recalling colours. Is convenient for transferring colours from one level to another. |
| ◁ PAGE ▷ | To move through the page in the memory.<br>The page consists of data stored with the save key 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 in each page. When the system is turned off or reset, all information stored on the pages is lost. |
| ▽ LEVEL △ | 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 colour changed, without actually changing the current level. |
| SAVE | 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. |
| CORRECT | To correct the variations in a colour that has been made since the current level was switched on by giving the original colour. |

| KEYS | EXPLANATION |
|---|---|
| S R PALETTES | To set and reset the standard palette of the system. The palette has been designed to give each level a different colour for the ease of having a visible cursor when a level is entered. |
| S R CHAIN 1 | To set the colours of different levels in a chain which can all be affected by the colour variation functions. |
| S R CHAIN 2 | Two chains can be created and a level can belong to both chains. |
| ACTIVATE 1 CHAIN2 | The chains can also be activated together. |

## KEYBLOCK


COMMUNICATE
MODEM
A.P.D.
PORT 1
PORT 2
CURRENT LEVEL
MULTI LEVEL
PALETTE
TASK
ENTER
GET DATA
OPTIONS

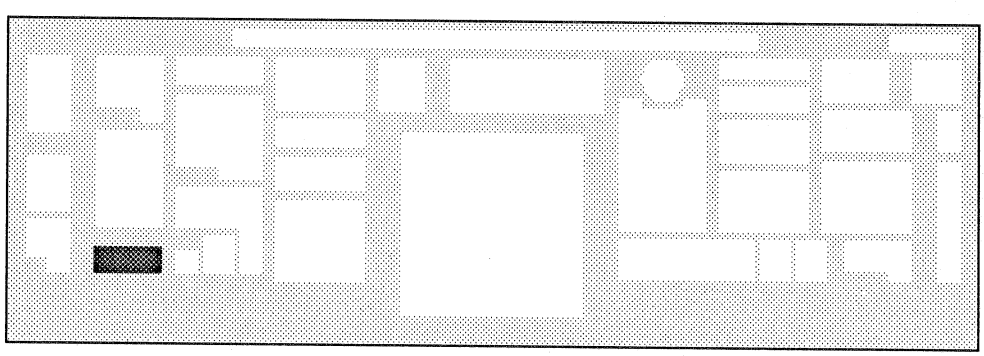


| KEYS | EXPLANATION |
|---|---|
| MODEM | To link up with another Aesthedes system (if both are equipped with a telephone modem).<br>Also used to display on an external monitor what functions are used on the tandem system. |
| A.P.D. | Not active. |
| PORT 1 | Data-transmission from disk to the tandem system. |
| PORT 2 | Receiving of data information from disk of a tandem system. |
| CURRENT LEVEL | Not active. |
| MULTI LEVEL | Not active. |
| PALETTE | Not active. |
| TASK | Not active. |
| GET DATA | Not active. |
| OPTIONS | Not active. |

## KEYBLOCK

DATA CORRECTION

| | | |
|---|---|---|
| ADJUST TO GRID | SKIP POINTS ON LINE | SKIP MULTI-POINTS |
| ADJUST TO HORIZONTAL | ADJUST TO VERTICAL | OPTIONS |

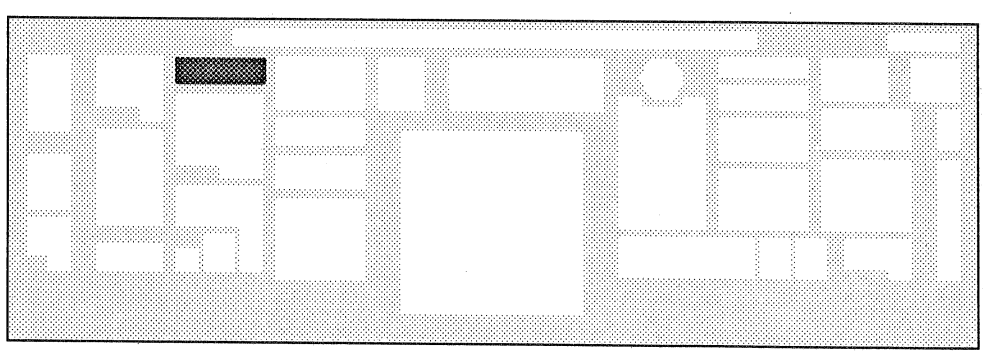


| KEYS | EXPLANATION |
|---|---|
| ADJUST TO GRID | Not active. |
| SKIP POINTS ON LINE | Not active. |
| SKIP MULTI-POINTS | Not active. |
| ADJUST TO HORIZONTAL | Not active. |
| ADJUST TO VERTICAL | Not active. |
| OPTIONS | Not active. |

## KEYBLOCK

DIMENSION

| | | | |
|---|---|---|---|
| L.L. HORIZONTAL | P. TO P. HORIZONTAL | L.L. PARALLEL | Ø |
| L.L. VERTICAL | P. TO P. VERTICAL | L.L. FREE MOVE | OPTIONS |

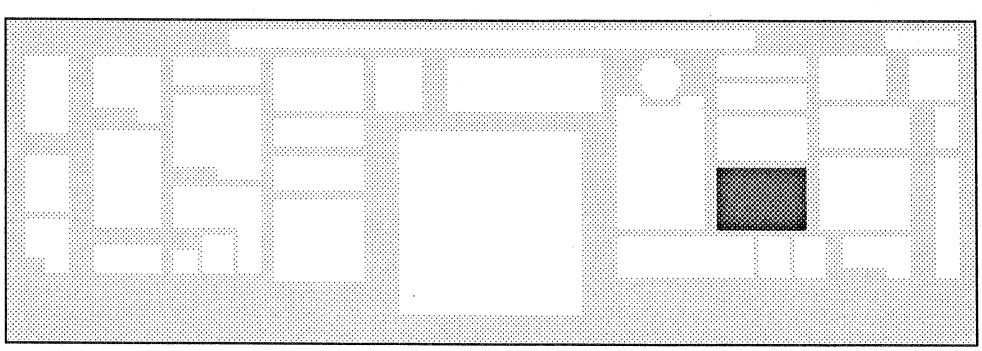


| KEYS | EXPLANATION |
|---|---|
| L.L. HORIZONTAL | To give the exact lenght of a line as measured along the x-axis. The horizontal lenght or lenght along the x-axis, can be plotted. The distance of the measuring line from the measured line can be determined as well as the position of the numbers on the measuring line. |
| P. TO P. HORIZONTAL | 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. |
| L.L. PARALLEL | The exact lenght 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. |
| Ø | Not active. |
| L.L. VERTICAL | To give the exact lenght of a vertical line as measured along the y-axis. The vertical lenght or lenght 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. |
| P.TO P. VERTICAL | 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. |
| L.L. FREE MOVE | Not active. |
| OPTIONS | Not active. |

## KEYBLOCK

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 |



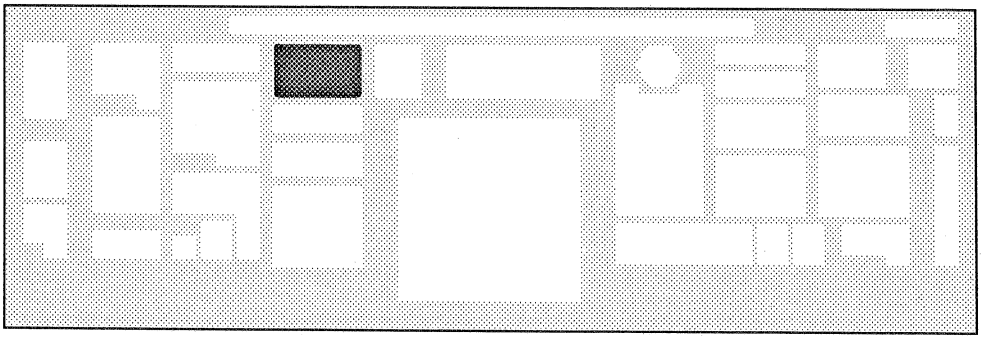
| KEYS | EXPLANATION |
|---|---|
| LIBRARY ON OFF | To turn the library display ON and OFF.<br>When the LIBRARY is on, the DOS (Disk Operation System) is not available, meaning you can't call a file from disk. |
| LIBRARY STEP | ??. |
| LIBRARY PAGE | To turn through the pages of the library. |
| FORMAT | To prepare the diskette for use in the Aesthedes System and clear old diskettes. |
| COPY TO HARD DISK | Copying file from diskette to hard disk. |
| COPY TO DISKETTE 0 | Copying file to diskette 0, or "upper diskette drive". |
| COPY TO DISKETTE 1 | Copying file to diskette 1, or "lower diskette drive". |
| DELETE | To remove files from the selected disk. |
| CURRENT LEVEL | To store all tables in the current level to hard disk or diskette. |
| MULTI LEVEL | To store the compleet drawing of all levels to hard disk or diskette. |
| PALETTE | To store (current) colour page on disk. |

| KEYS | EXPLANATION |
|---|---|
| TASK | To store a task-file. |
| FROM DISK | To get files from the disk. |
| SCALE | Defines the input scale for files being called from disk. |
| HARD DISK | To select the hard disk to store and recall information. |
| DISKETTE 0 | To select the diskette 0 to store and recall information. |
| DISKETTE 1 | To select the diskette 1 to store and recall information. |
| OPTIONS | To start the printer, if it is connected with the main system. (The printer is used to print a listing of the files that are stored on hard disk or diskette). |

## KEYBLOCK

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 |



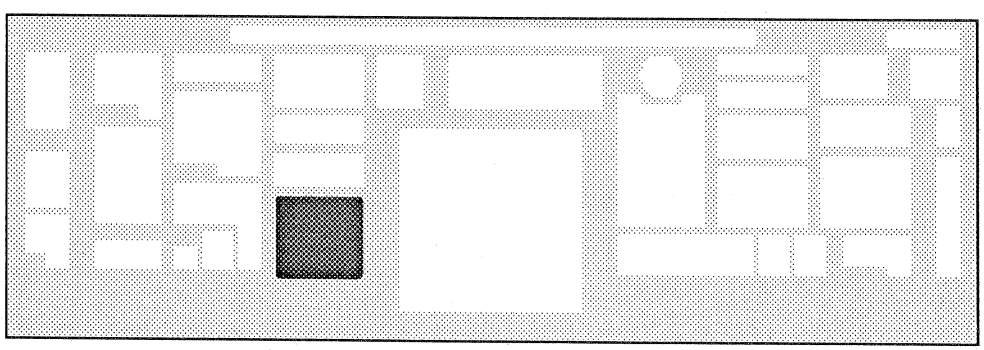
| KEYS | EXPLANATION |
|---|---|
| POINTS | To display all present points in the current level. |
| CORNERS | To display all present corners in the current level. |
| ORIGIN | With this function, the "local origin" of a selected table can be displayed. |
| OBJECT | To check whether an object has been defined and if so, to show which element it compromises. |
| STARTING POINT | 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. |
| GRAVITY CENTER | Not active. |
| IDENTIFY LEVEL | To identify the level of a specific table. |
| SCENE | To check whether a scene has been defined and if so, to show which elements it compromises. |
| WINDOW MON. ON | To turn the window monitor on. The window monitor displays selected areas of a drawing that have been enclosed in a box or window.<br>The magnification of the area depens upon the size of the window area. |
| WINDOW MON. OFF | To turn off the window monitor. |

| KEYS | EXPLANATION |
|---|---|
| IDENTIFY REP. TABLE | Not active. |
| CLEAR | Empty the current level, as displayed on the C.L.M. (Current Level Monitor). |
| WINDOW AREA | To display and adjust the size and location of the window area to be displayed in the window monitor. Displays the current level. |
| AREA RESET | Reset the window to the standard size in the middle of the screen. |
| COPY | Not active. |
| OPTIONS | Character (3D) H will appear on the screen. Stored not on hard disk but within the software to show you 3D. |

## KEYBLOCK

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 |



| KEYS | EXPLANATION |
|---|---|
| POLYGON | To call a standard figure up from the memory with at least 3 sides equal in lenght 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 measured with the standard scale. |
| POINT TO | To draw connected lines from one point to another.<br>Each time POINT TO is pressed, a new table is started. |
| NEWPOINT | To create a newpoint in a table. You can give it a position with the cursor, so that the shape of the table changes. |
| CORNER | 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 corner. |
| POLYGON SEGMENT | Not active. |
| MIDPOINT | To create a newpoint exactly in the middle of a vector. |
| OUTLINE | 1. To make tables larger and smaller while keeping the same shape.<br>2. A copy of a table can be made and the 0-copy enlarged to outline a figure.<br>3. The outline can be set numerically |
| DIVIDE | To divide a selected line of a table into any number of equal pieces, while keeping the table closed. |
| COPY TABLE | To make a copy or copies of a table. |
| FILL TABLE | To fill a table. |
| DELETE OBJ/SCENE | To remove an object from a scene, or a table from an object. |

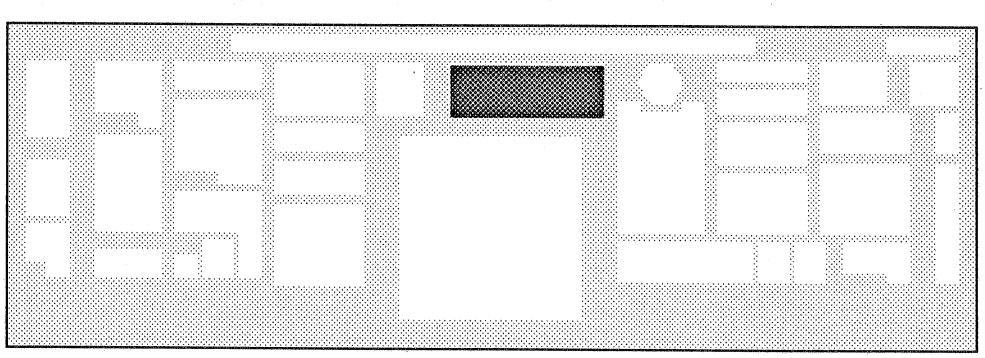
| KEYS | EXPLANATION |
|---|---|
| CHANGE DIRECTION | To change the direction that a figure has been drawn in. |
| COPY OBJECT | To make a copy in order to use the copy in other functions(e.g. move copy, send to other level) while leaving the master in place. |
| FILL CHAIN | To fill closed tables. They will be filled with the colour of that level. |
| MAKE OBJECT | To assemble an object from several existing tables. |
| DIGITIZE | Makes it possible to reduce the number of points afterwards. (in combination with option - space). |
| COPY SCENE | To make a copy of a scene in order to move the copy around while leaving the original in place. |
| FILL LEVELS | Not active. |
| MAKE SCENE | To assemble a scene from several existing objects. |
| VECTORS | Used to display the vectors of a splined drawing. |
| SPIRAL | To draw a spiral. |
| UNFILL | To unfill a closed table that has been filled with fill scene. |

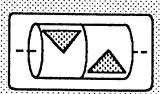
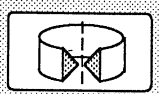
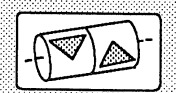
| KEYS | EXPLANATION |
|---|---|
| RECTANGLE | Not active. |
| REFRESH VECTORS | To display only the vectors of a drawing.<br>By pressing REFRESH VECTORS all displayed splines, filled areas and points are removed and only the vectors remain. |
| MODIFY SPIRAL | To change a spiral. |
| GRIDS | Not active. |
| ALL | The selection of all elements in a level is used in conjunction with the following functions:<br>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).<br>2. move table all: to move all the tables in a level at once.<br>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.<br>4. set local origin, all: to set the local origin of all of the tables in a level to the desired location.<br>5. reset local origin, all: to reset the local origin of all the tables in a level to the middle of the screen.<br>6. fill scene all: to fill all closed tables in a level. |
| OPTIONS | By using OPTIONS it is possible to make a freehand drawing or a sketch. |

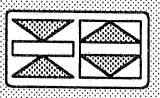
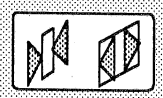
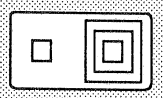
## KEYBLOCK

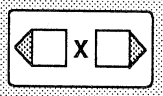
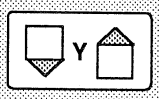
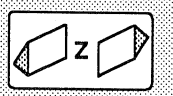
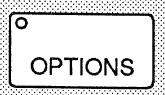
DYNAMICS

| | | | | | | |
|---|---|---|---|---|---|---|
| LOCAL ORIGIN | TILT | PAN | SPIN | DISTORTION | POSITION ON OFF | SET VIEW POINT |
| CENTER ORIGIN | | | | | RESET POSITION | ANGLE VIEW |
| MAKE CHAIN | | | | | FAST | 3D ON OFF |
| CHAIN ALL | X | Y | Z | | SLOW | OPTIONS |



| KEYS | EXPLANATION |
|---|---|
| LOCAL ORIGIN | Not active. |
| TILT | To rotate the axis-system.<br>Meaning the y-axis changes into z-axis and z-axis into y-axis. |
| PAN | To rotate the axis-system.<br>Meaning the x-axis changes into z-axis and z-axis into x-axis. |
| SPIN | Not active. |
| DISTORTION | With distortion you will decrease the top of your table and increase the bottom of your table at the same time. |
| POSITION ON OFF | This key will activate the repetition made by using the function key SET POSITION.<br>(the function position on/off only works in combination with set position). |
| SET VIEW POINT | Not active. |
| CENTER ORIGIN | Not active. |
|  | To use for rotation around the x-axis. |
|  | To use for rotation around the y-axis. |
|  | To use for rotation around the z-axis. |

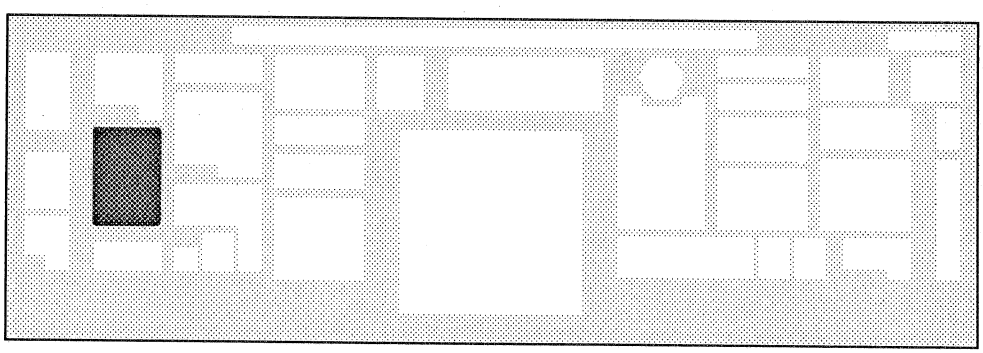
| KEYS | EXPLANATION |
|---|---|
|  | To rotate tables around their local origin.<br>The local origin of tables can be set and reset. |
| RESET POSITION | Not active. |
| ANGLE VIEW | Not active. |
| MAKE CHAIN | To make a temporary connection of elements, to be manipulated as a whole with dynamics function. |
|  | To increase and decrease the dimension of a table(s) along the x-axis.<br>The scaling can also be carried out numerically, measured by the degree of the magnification of the existing table. |
|  | To increase and decrease the dimension of a table(s) along the y-axis.<br>The scaling can also be carried out numerically, measured by the degree of the magnification of the existing table. |
|  | To increase and decrease the dimension of a table(s) along the z-axis.<br>The scaling can also be carried out numerically, measured by the degree of the magnification of the existing table. |
|  | This key is used to increase and decrease a table(s).<br>The zoom factor can also be carried out numerically, measured by the degree of the magnification of the existing table. |
| FAST | To carry out the dynamic functions fast.<br>The size of the steps in the dynamic functions are made larger. |
| SLOW | To carry out the dynamic functions slowly.<br>The size of the steps in the dynamic functions are made smaller. |
| 3D ON OFF | To switch the 3D function on or off. |

| KEYS | EXPLANATION |
|---|---|
|   | To manipulate all tables in the current level simultaneously with dynamic functions. |
|   | To move selected table(s) along the x-axis. |
|   | To move selected table(s) along the y-axis. |
|   | To move selected table(s) along the z-axis. |
|  | To "lean" table(s) to the right or to the left in relation to the local origin. The size of the table as measured along the y-axis will remain constant. |
|   | Not active. |

## KEYBLOCK

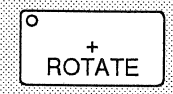
FRAME BUFFERS

| | | |
|---|---|---|
| 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 |



| KEYS | EXPLANATION |
|---|---|
| SELECT A | Call up the menu to load the frame buffer. |
| SELECT B | Call up the menu to load the frame buffer. |
| LOAD/DISPLAY MENU | Call up the display-menu. |
| RESET | To reset the frame buffer. |
| SHIFT | Shift makes it possible to move our frame buffer image along the x- and y-axis on our monitor |
| ZOOM | To magnify the image (x and y simultaneously) up to 512 times. (one pixel will than fill the total screen). |
| PAINT | To select the paint (modify) frame buffer-menu. |
| AIRBRUSH | To activate "paint". By pressing the airbrush key the paint mode is activated. |
| FLOW | Not active. |
| SMUDGE | Not active. |
| WASH | Not active. |

| KEYS | EXPLANATION |
|---|---|
| COPY | Not active. |
| BRUSH SIZE | Not active. |
| BOX | To manipulate frame buffer images. |
| PATTERN | Not active. |
| EDIT | Send a frame buffer-file to disk. |
| CUT-OUT | Not active. |
| OPTIONS | Using the zoom function independently for x and y. |
| + BRIGHTNESS | Not active. |
| - BRIGHTNESS | Not active. |
| + SATURATION | Not active. |
| - SATURATION | Not active. |

| KEYS | EXPLANATION |
| --- | --- |
|  | Not active. |
|  | Not active. |

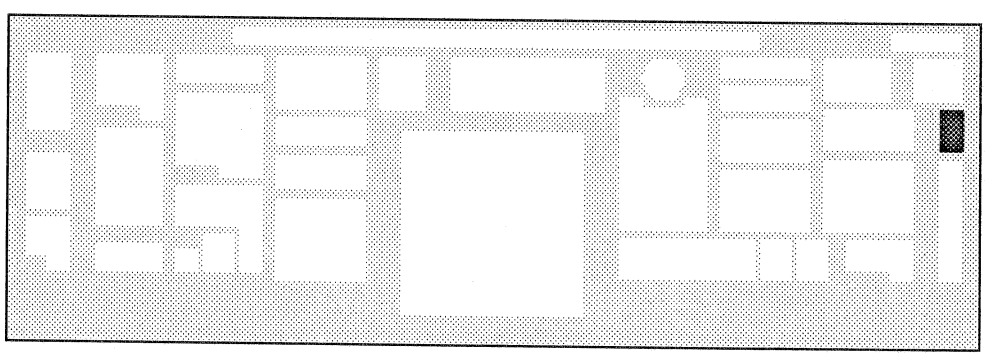
## KEYBLOCK

GRIDS

DEFINE GRID

DEFINE GRAVITY

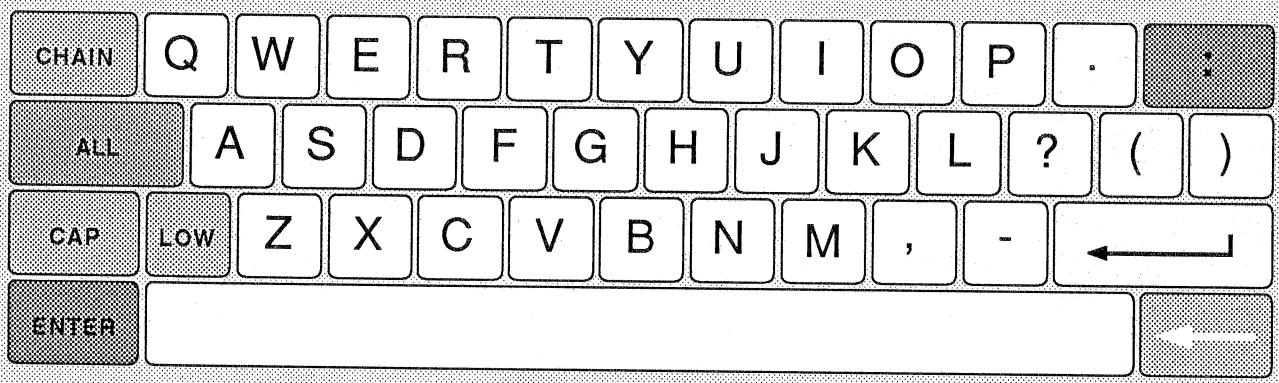
OPTIONS

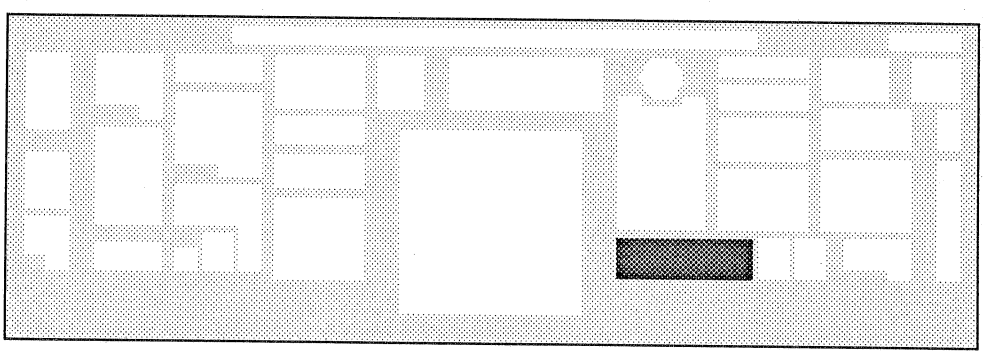


| KEYS | EXPLANATION |
| --- | --- |
| DEFINE GRID | Gives all cursor functions "gravity" to a grid the size of which can be defined. Works only if the key "gravity on" has been selected. |
| DEFINE GRAVITY | Not active. |
| OPTIONS | Not active. |

## KEYBLOCK

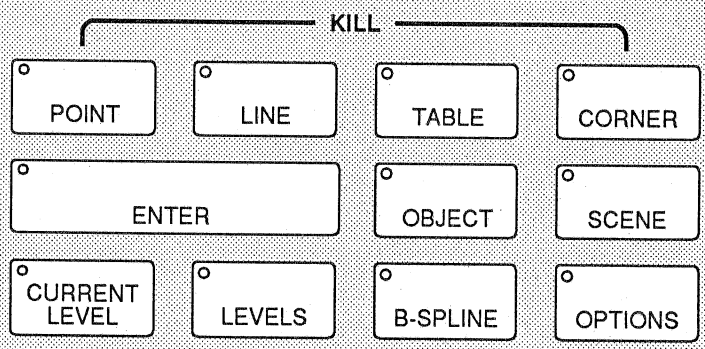
KEYBOARD

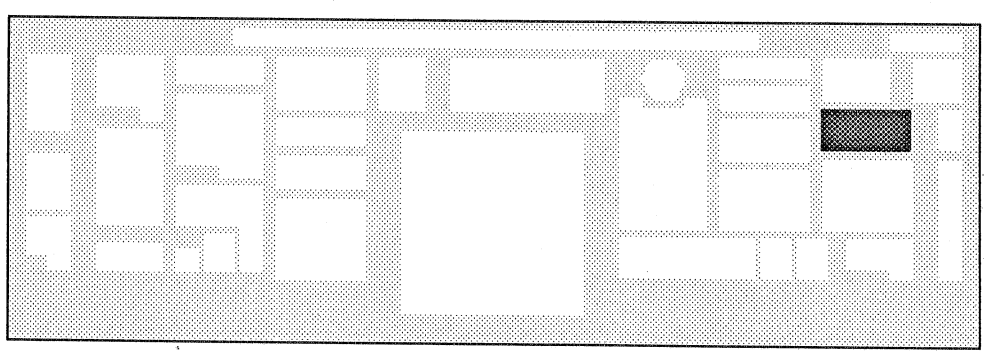


| KEYS | EXPLANATION |
| --- | --- |
| | The keyboard is used to give in text like filenames etc. |

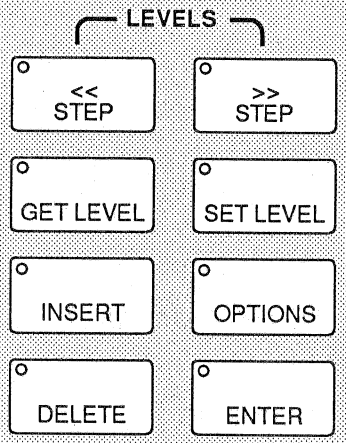
## KEYBLOCK

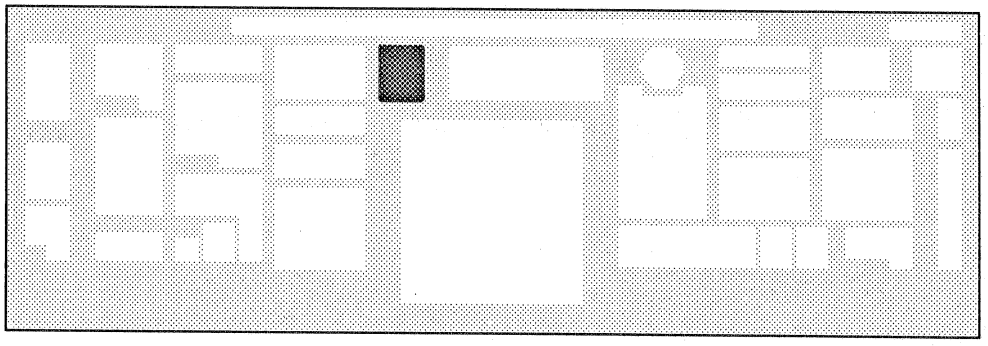

KILL
POINT
LINE
TABLE
CORNER
ENTER
OBJECT
SCENE
CURRENT LEVEL
LEVELS
B-SPLINE
OPTIONS



| KEYS | EXPLANATION |
|---|---|
| POINT | To kill an existing point of a table. |
| LINE | To kill a line of a table. |
| TABLE | To kill all the vectors that make up a table. |
| CORNER | To kill a corner that has been previously set with the draw corner function. |
| ENTER | To confirm the functionkeys "current level" and "levels". |
| OBJECT | To remove a previously assembled object. |
| SCENE | To remove a previously assembled scene. |
| CURRENT LEVEL | To kill all points, vectors and tables in the current level. (confirm with "enter") |
| LEVELS | To kill all the information in all 64 levels. (confirm with "enter") |
| B-SPLINE | To kill a spline through selection by the cursor while keeping the base vectors. |
| OPTIONS | Not active. |

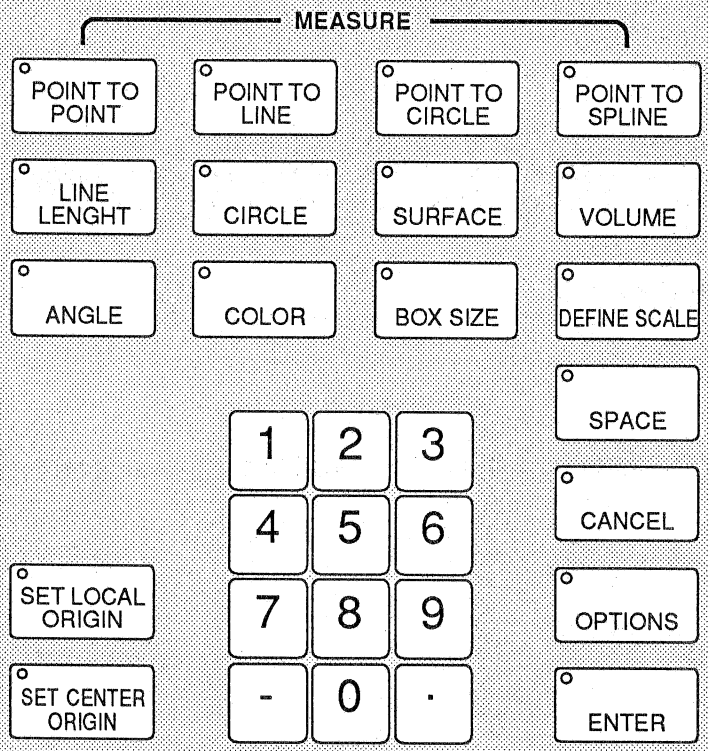
## KEYBLOCK

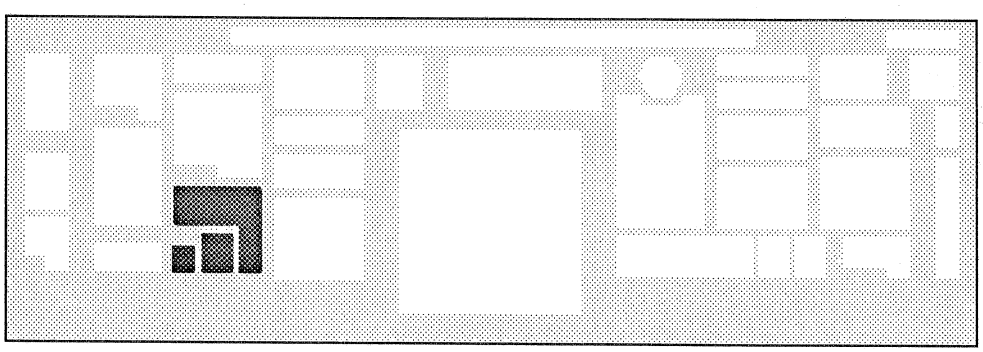

LEVELS
<< STEP
>> STEP
GET LEVEL
SET LEVEL
INSERT
OPTIONS
DELETE
ENTER



| KEYS | EXPLANATION |
|---|---|
| << STEP | To step through the levels quickly downwards.<br>The information in the levels that you pass are displayed on the current level monitor. The leds of the levels in the levelbar will light up in the corresponding levels |
| >> STEP | To step through the levels quickly upwards.<br>The information in the levels that you pass are displayed on the current level monitor. The leds of the levels in the levelbar will light up in the corresponding levels |
| GET LEVEL | Not active. |
| SET LEVEL | To send tables in the current level to another selected level. |
| INSERT | Not active. |
| OPTIONS | Not active. |
| DELETE | Not active. |
| ENTER | To enter functions where a clear verification is necessary. |

## KEYBLOCK

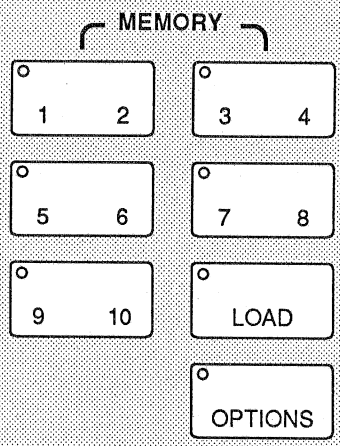

MEASURE
POINT TO POINT
POINT TO LINE
POINT TO CIRCLE
POINT TO SPLINE
LINE LENGHT
CIRCLE
SURFACE
VOLUME
ANGLE
COLOR
BOX SIZE
DEFINE SCALE
SPACE
1 2 3
4 5 6
7 8 9
- 0 .
CANCEL
SET LOCAL ORIGIN
OPTIONS
SET CENTER ORIGIN
ENTER

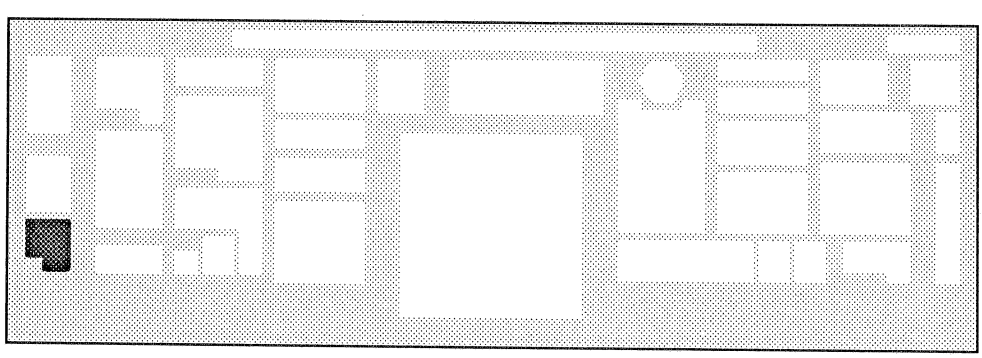


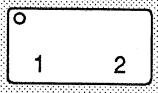
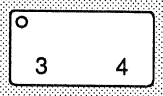
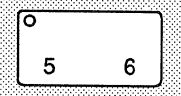
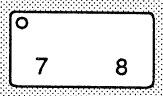
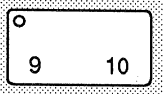
| KEYS | EXPLANATION |
|---|---|
| POINT TO POINT | With this function you can measure the following: The vertical distance, the horizontal distance, the direct (shortest) distance between two measured points and the angle of the shortest distance. The measurements are defined by the sequence in which you set the points. With this function the distance between two points can also be set to the desired distance. |
| POINT TO LINE | Not active. |
| POINT TO CIRCLE | Not active. |
| POINT TO SPLINE | Not active. |
| LINE LENGHT | Not active. |
| CIRCLE | Not active. |
| SURFACE | The surface area of a table is displayed in $cm^2$ on the system control display. (middle data-display) |
| VOLUME | To measure the column of a table that has been rotated round the y-axis 360 degrees in $cm^3$. |
| ANGLE | Not active. |
| COLOR | To measured the colours in the frame buffer. (works only in combination with pixel images) |
| BOX SIZE | Not active. |

| KEYS | EXPLANATION |
|---|---|
| DEFINE SCALE | To set the desired scale of a drawing for the purpose of plotting it the proper size or to work in a convenient size.<br>The scale of a drawing can also be adjusted when setting up the plotter. |
| SPACE | Used to move one position futher on the system control display.<br>Used in conjunction with dynamics, measuring, move line, the plotter and test.<br>Also used to transport certain functions from the manual control to the numerical control. (dynamics, outline, move line) |
| CANCEL | Cancel has the function of the backspace when typing in data or numbers. |
| OPTIONS | Not active. |
| ENTER | To confirm functions. |
| SET LOCAL ORIGIN | With this function, the location of the rotation-point can be changed.<br>When a local origin has been set for a table, the local origin will move with the table. |
| SET CENTER ORIGIN | To set the local origin (or rotationcentre) of a table or group of tables in the middle of the screen. |
| 1 2 3<br>4 5 6<br>7 8 9<br>- 0 . | Used to enter numerical values.<br>When needed to carry out functions. |

## KEYBLOCK



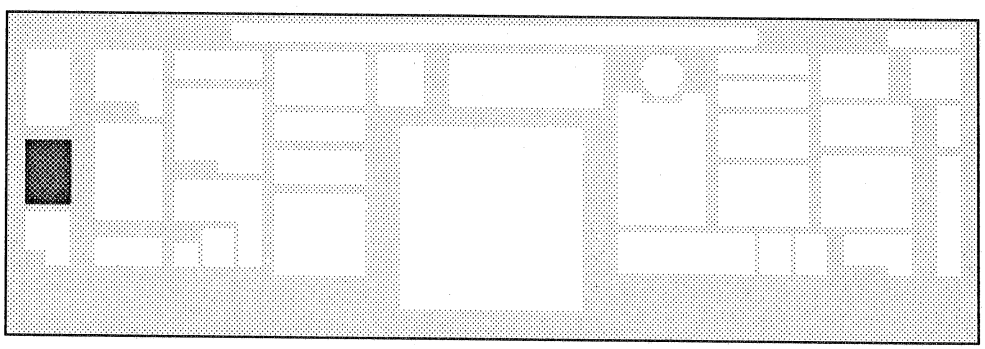



| KEYS | EXPLANATION |
|---|---|
|  | Not active. |
|  | Not active. |
|  | Not active. |
|  | Not active. |
|  | Not active. |
|  | Not active. |
|  | Not active. |

## KEYBLOCK

MIRRORS

| SET | RESET |
| --- | --- |
| X-MIRROR | X-MIRROR |
| Y-MIRROR | Y-MIRROR |
| X-CLIP | X-CLIP |
| Y-CLIP | Y-CLIP |
| FIX | OPTIONS |

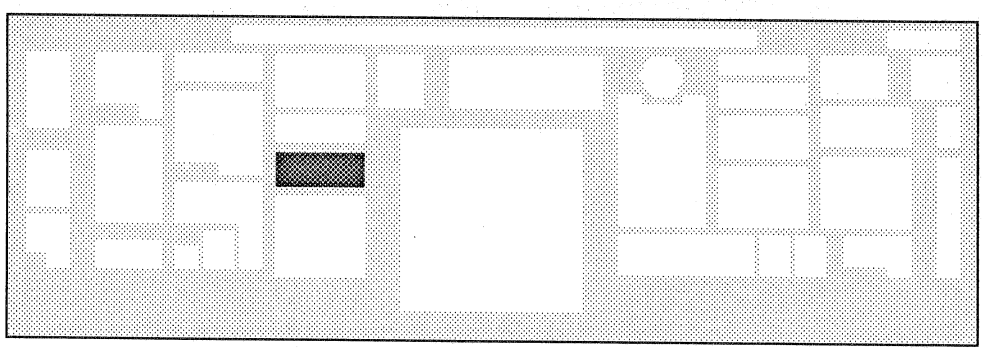


| KEYS | EXPLANATION |
|---|---|
| SET<br>X-MIRROR | To turn on the x-mirror which goes horizontal through the middle of the screen. Everything that is drawn above or below the x-axis is mirrored by the x-axis to the other side. The points and lines that are mirrored cannot be affected by the cursor untill they are fixed.<br>When fix is pushed, the mirrored image is fixed. |
| RESET<br>X-MIRROR | To turn off the x-mirror.<br>If the reflected figures are not fixed, they will be removed from the screen. |
| SET<br>Y-MIRROR | 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. |
| RESET<br>Y-MIRROR | To turn off the y-mirror.<br>If the reflected figures are not fixed, they will be removed from the screen. |
| SET<br>X-CLIP | To set a blockage or clip along the x-axis.<br>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.<br>The lines, which are drawn from point to point, stop exactly on the x-axis |
| RESET<br>X-CLIP | To cancel or turn off the blockage of the x-axis.<br>While the mirrors are functioning, the x-clip can be turned off. |
| SET<br>Y-CLIP | To set a blockage or clip along the y-axis. |
| RESET<br>Y-CLIP | To cancel or turn off the blockage of the y-axis.<br>While the mirrors are functioning, the Y-clip can be turned off. |
| FIX | To fix the reflected images.<br>Untill a mirrored figure is fixed, it cannot be identified or manipulated by the cursor, or stored as information by the computer. |
| OPTIONS | Not active. |

## KEYBLOCK

MOVE

| | | | |
|---|---|---|---|
| POINT | LINE | TABLE | OBJECT |
| SCENE | COPY+MOVE | POINT ON LINE | LINE LENGHT |
| GRAVITY ON | GRAVITY OFF | ALL | OPTIONS |



| KEYS | EXPLANATION |
|---|---|
| POINT | To move one point of a table independent from the other points. |
| LINE | 1. The line can be moved and the attached vectors follow. The line stays parallel with its origin position<br>2. The line can be moved parallel and the angle of the attached vectors remain the same. (in combination with "space") |
| TABLE | To move only one table. |
| OBJECT | To move an entire configuration previously assembled as an object. |
| SCENE | To move an entire configuration previously assembled as an scene. |
| COPY+MOVE | To make one copy of a table and then move it the same time without changing the form. |
| POINT ON LINE | Allows a point to be moved between two points without disturbing the line. The point cannot be moved off of the line. |
| LINE LENGHT | With the dynamics "zoom" function, the line lenght can be lenghtened or shortened while the midpoint of the line remains at the same location. |
| GRAVITY ON | To create a gravitational pull towards exact vertical and horizontal when drawing with draw, "point to" and move, "point". 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. |
| GRAVITY OFF | To turn off the gravity function. |

| KEYS | EXPLANATION |
|---|---|
| ALL | The selection of all elements in a level is used in conjunction with the following functions:<br>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).<br>2. move table all: to move all the tables in a level at once.<br>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.<br>4. set local origin, all: to set the local origin of all of the tables in a level to the desired location.<br>5. reset local origin, all: to reset the local origin of all the tables in a level to the middle of the screen.<br>6. fill scene all: to fill all closed tables in a level. |
| OPTIONS | Not active. |

## KEYBLOCK

OPTION

1

2

3

4

5

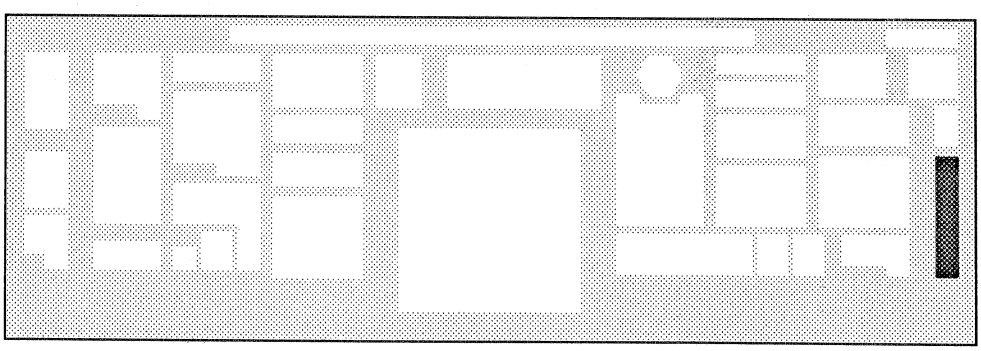
6

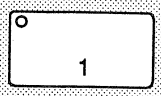
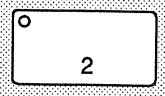
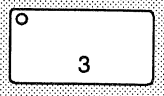
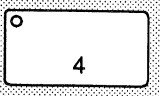
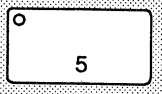
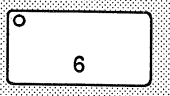
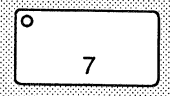
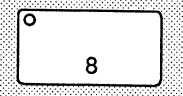
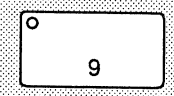
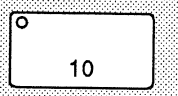
7

8

9

10

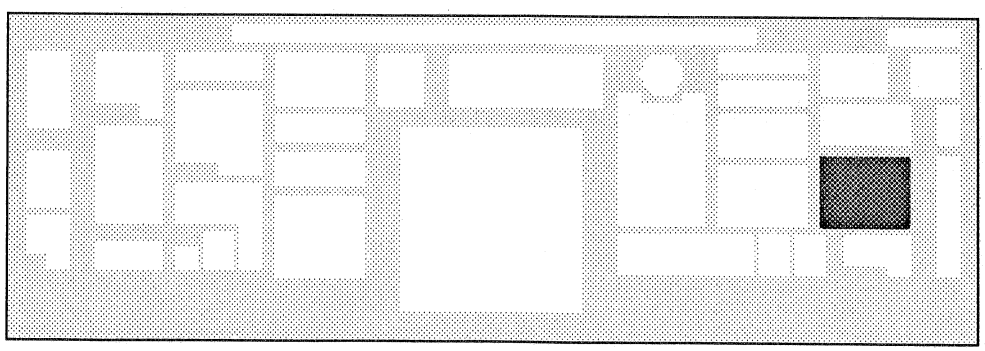


| KEYS | EXPLANATION |
|---|---|
|  | To set the clock.<br>(use the "library page" key for selecting data and time, "library step" to update data and time). |
|  | To be used for transporting the Aesthedes System.<br>Will give when pressed: Disk in parking-zone; and switch off the system. |
|  | Will give a plot menu to select the various means of plotter output. |
|  | Plot emulation menu. |
|  | Will give a menu for output to the versatec thermal transfer printer or a Q.C.R./P.C.R. slide recorder. |
|  | Will give you a menu to check the hard disk for bad sectors. |
|  | Selecting didot pointsize units or metric units. |
|  | Illegal command found (not active). |
|  | Illegal command found (not active). |
|  | Illegal command found (not active). |

## KEYBLOCK

PLOTTER

| | | | |
|---|---|---|---|
| STOP | CONTINUE | RESTART | KILL |
| TEST | TABLE AS VECTORS | TABLE AS SPLINES | TABLE AS FILL |
| SET UP PLOTTER | LEVEL AS VECTORS | LEVEL AS SPLINES | LEVEL AS FILL |
| SET UP FORMAT | ALL AS VECTOR | 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 |



| KEYS | EXPLANATION |
|---|---|
| STOP | To stop the current plot. |
| CONTINUE | To continue the current plot if it has been stopped by using the "stop" function. |
| RESTART | To restart the current plot if it has been stopped by using the "stop" function. |
| KILL | To kill the current plot. |
| TEST | To display a list of variables associated with each fill.<br>(use to fill a table or hatching) |
| TABLE AS VECTORS | To plot one or more tables from the current level as vectors. |
| TABLE AS SPLINES | To plot one or more tables from the current level as splines. |
| TABLE AS FILL | To plot one or more tables from the current level as filled on the multi-level monitor. |
| SET UP PLOTTER | To display a list of variables associated with each plot. |
| LEVEL AS VECTORS | To plot the current level as vectors. |
| LEVEL AS SPLINES | To plot the current level as splines. |

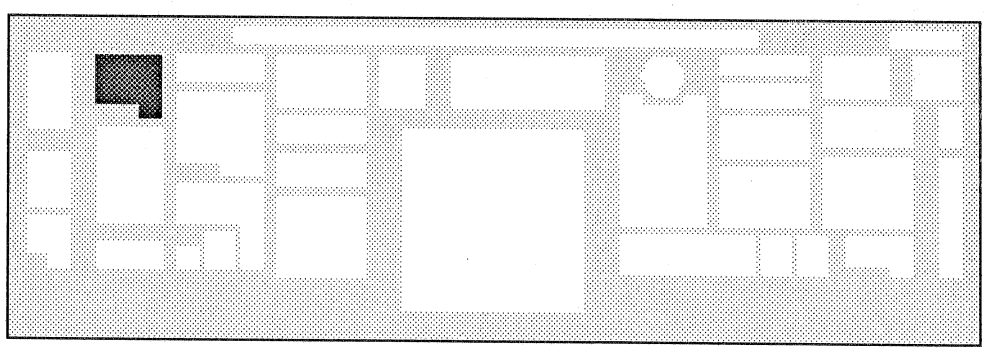
| KEYS | EXPLANATION |
|---|---|
| LEVEL AS FILL | To plot the current level as filled on the multi-level monitor. |
| SET UP FORMAT | Not active. |
| ALL AS VECTORS | To plot all the levels as vectors. |
| ALL AS SPLINES | To plot all the levels as splines. |
| ALL AS FILL | To plot all the levels as filled on the multi-level monitor. |
| DEFINE START.POINT | Not active. |
| VECTORS NO H.LINES | Not active. |
| SPLINES NO H.LINES | Not active. |
| ALL NO H.LINES | Not active. |
| PAPER FORMAT | Not active. |

| KEYS | EXPLANATION |
| --- | --- |
|   | To select plotter 1. |
|   | To select plotter 2. |
|   | Not active. |

## KEYBLOCK

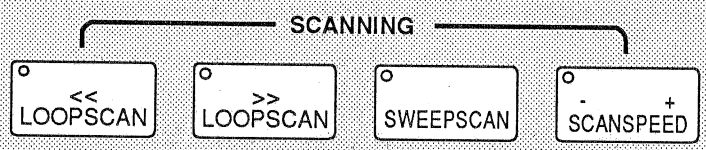
POSITION

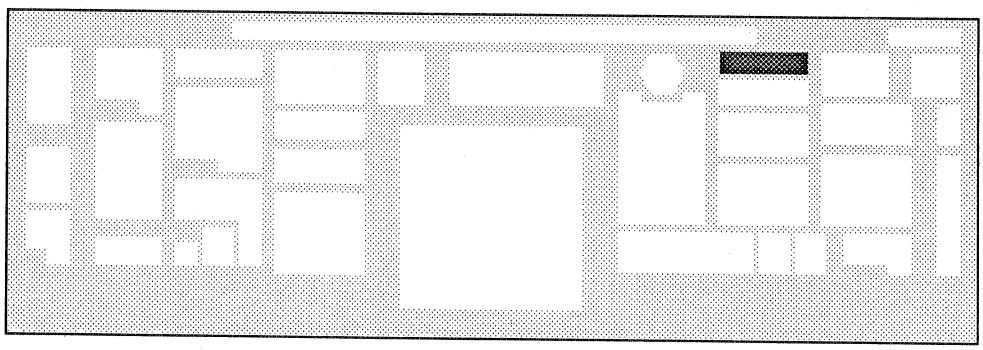
| | | |
|---|---|---|
| FROM DISK TO TABLE | SET POSITION | RESET POSITION |
| TABLE ON POINT | TABLE ON VECTOR | TABLE ON GRID |
| OBJECT ON POINT | OBJECT ON VECTOR | OBJECT ON GRID |
| SCENE ON POINT | SCENE ON VECTOR | SCENE ON GRID |
| | | OPTIONS |

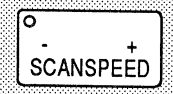


| KEYS | EXPLANATION |
|---|---|
| FROM DISK TO TABLE | To identify a table on each line of which you can than position a file, which is autamatically based on the middle of the segment. |
| SET POSITION | To identify a table (master) which can be copied or "cloned" on every coordinate of another identified table (position table). |
| RESET POSITION | To remove the "clones" or copies as established under set position. |
| TABLE ON POINT | Not active. |
| TABLE ON VECTOR | Not active. |
| TABLE ON GRID | Not active. |
| OBJECT ON POINT | Not active. |
| OBJECT ON VECTOR | Not active. |
| OBJECT ON GRID | Not active. |
| SCENE ON POINT | Not active. |
| SCENE ON VECTOR | Not active. |
| SCENE ON GRID | Not active. |
| OPTIONS | Not active. |

## KEYBLOCK



| KEYS | EXPLANATION |
|---|---|
|  | To scan through the levels at a desired scanspeed. The scanning makes a loop, for example, it begins at level 10 and goes through to level 20 and than starts again at level 10. |
|  | To scan through the levels at a desired scanspeed. The scanning makes a loop, for example, it begins at level 20 and goes through to level 10 and than starts again at level 20. |
|  | To scan through identified levels as under loopscan. The difference is that the sweepscan goes back and forth. If you want to scan levels 10 - 20, the sweepscan goes from 10 to 20 and than backwards to 10 again. |
|  | To raise or to lower the scanspeed of the loopscan. |

## KEYBLOCK

SET UP

USER I.D.

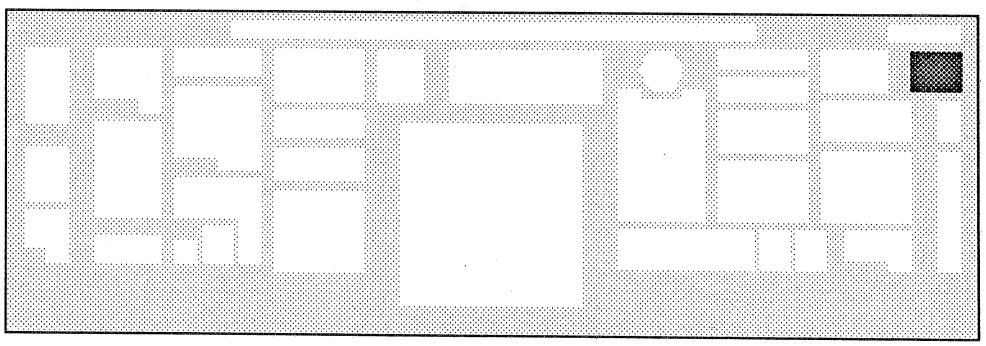
RESET

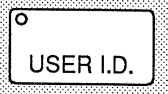
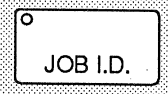
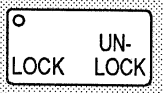
JOB I.D.

LOCK UN-LOCK

SAVE

OPTIONS

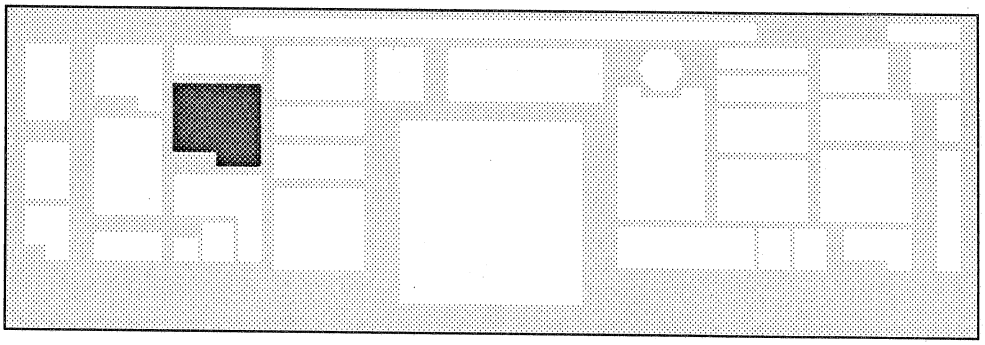


| KEYS | EXPLANATION |
|---|---|
|  | Not active. |
|  | Not active. |
|  | Not active. |
|  | Not active. |
|  | Not active. |
|  | Not active. |

## KEYBLOCK

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 BY OBJECTS |
| SAME ANGLE OBJECT | SAME ANGLE SCENE | CUT BY SCENE | CONNECT BY SCENES |
| | | CONNECT INTERSECT. | OPTIONS |



| KEYS | EXPLANATION |
|---|---|
| SAME X POINTS | 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 on top of each other. |
| SAME Y POINTS | To give two points the same y-value as measured on the y-axis. The lines attached to the points will move along. The points will be displayed next to each other. |
| CUT | To cut or break a line with the cursor in any selected place. |
| CONNECT | To connect two open end-points that are located close to each other to make it one point. |
| SAME X TABLES | To give a table in a selected point the same x-value as a reference point. |
| SAME Y TABLES | To give a table in a selected point the same y-value as a reference point. |
| CUT-OUT LINE | Not active. |
| CONNECT POINTS | Brings one point to the other. (the first point to be touched with the cursor will be the reference point). |
| SAME X OBJECTS | Not active. |
| SAME Y OBJECTS | Not active. |
| CUT BY LINE | To cut a table with a line. The table is cut where the selected line(s) cross over the lines of the table(s). |

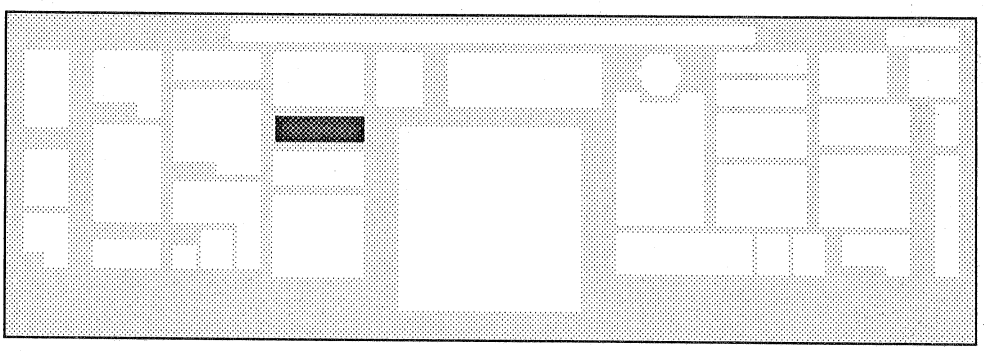
| KEYS | EXPLANATION |
|---|---|
| CONNECT BY LINE | To connect two open end points with a line. |
| SAME X SCENES | Not active. |
| SAME Y SCENES | Not active. |
| CUT BY TABLE | Not active. |
| CONNECT TABLES | To join two separate tables by moving one table to the other. |
| SAME ANGLE LINE | Not active. |
| SAME ANGLE TABLE | Not active. |
| CUT BY OBJECT | Not active. |
| CONNECT OBJECTS | Not active. |
| SAME ANGLE OBJECT | Not active. |
| SAME ANGLE SCENE | Not active. |

| KEYS | EXPLANATION |
|---|---|
| CUT BY SCENE | Not active. |
| CONNECT SCENES | Not active. |
| CONNECT INTERSECT. | Not active. |
| OPTIONS | Not active. |

## KEYBLOCK

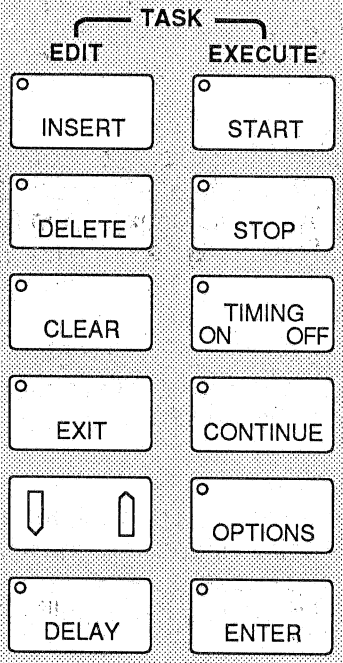
SPLINES

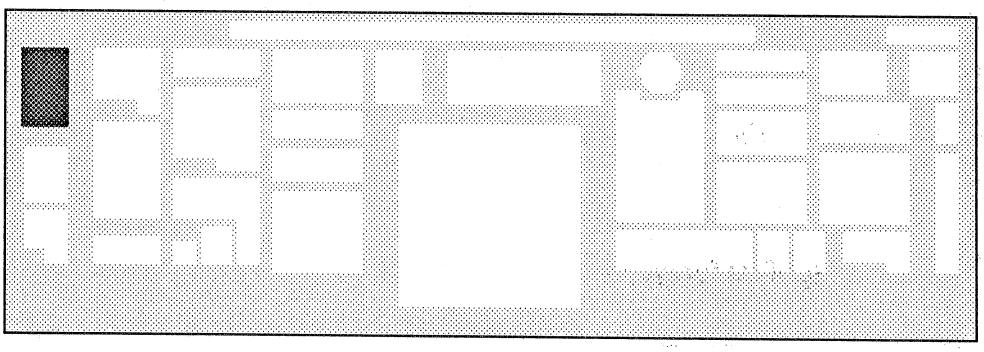
| | | | |
|---|---|---|---|
| ROUND CORNER | OUTLINE SPLINE | REFRESH SPLINES | B-SPLINE |
| MODIFY BY POINT | MODIFY BY LINE | MODIFY BY DYNAMICS | OPTIONS |



| KEYS | EXPLANATION |
|---|---|
| ROUND CORNER | Not active. |
| OUTLINE SPLINE | 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 disstorting the outline. |
| REFRESH SPLINE | 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. |
| B-SPLINE | To draw a fluent curving line through the already made vector-drawing.<br>The spline starts at the endpoint of the vector-drawing and then goes through the midpoints of the subsequent vectors and ends at the endpoint of the last vector.<br>The spline follows the same direction as the vector-drawing has been drawn. |
| MODIFY BY POINT | To modify a B-splined figure by moving the displayed points of the original vector-drawing.<br>Is an equivalent to the MOVE POINT function. |
| MODIFY BY LINE | 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. |
| MODIFY BY DYNAMICS | Not active. |
| OPTIONS | Not active. |

## KEYBLOCK


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

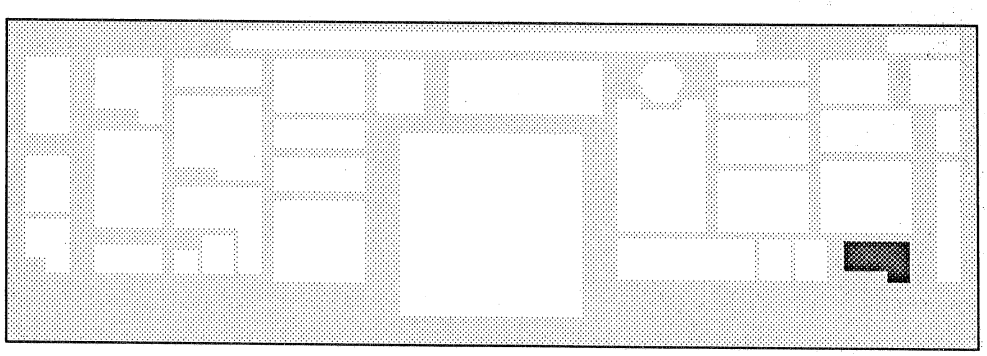


| KEYS | EXPLANATION |
|---|---|
| INSERT | The assembly of a task. With this function a series of manipulations can be stored and used as a whole later on.<br>Also used to cancel our assembly by pressing "insert" again. |
| START | Main function: Execute a task, previously stored in the internal memory.<br>Side function: - interrupt the execution of a task<br>- finisch the assembly of task with "insert". |
| DELETE | Not active. |
| STOP | Not active. |
| CLEAR | To remove all the information stored in the internal memory.<br>(use "enter" to execute the function "clear"). |
| TIMING ON OFF | To activate or disactivate the choice of the speed with which a task runs under "start". |
| EXIT | Not active. |
| CONTINUE | Not active. |
|  | Not active. |
| OPTIONS | Not active. |
| DELAY | Not active. |
| ENTER | To confirm functions. |

## KEYBLOCK

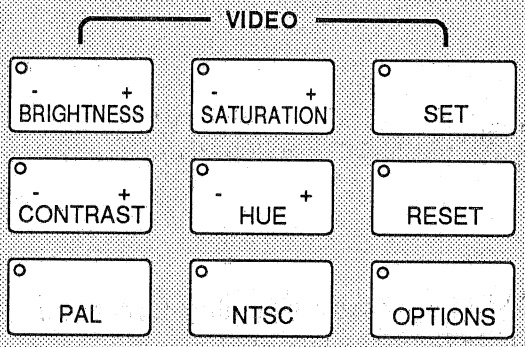
TYPE-SETTING

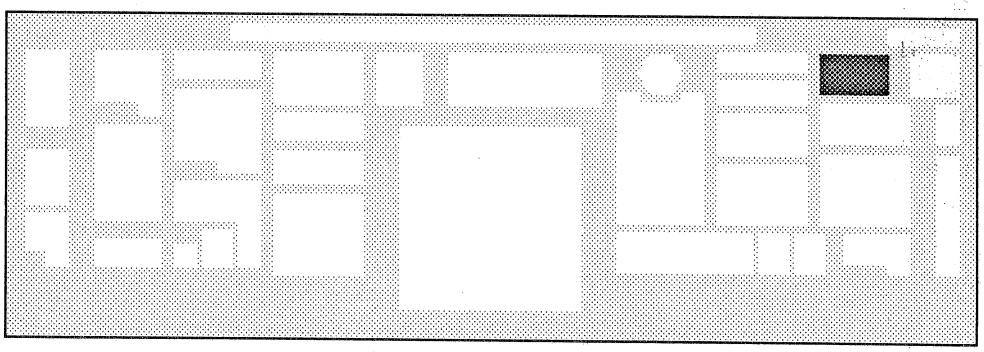
| | | |
|---|---|---|
| SELECT SIZE | SELECT FONT | WORD PROCESSING |
| SPACING | EDITING | FIX |
| | | OPTIONS |



| KEYS | EXPLANATION |
|---|---|
| SELECT SIZE | This function displayes 5 different types of spacing on the right data-display. |
| SELECT FONT | To call a type-font from the hard disk. |
| WORD PROCESSING | To enter text from hard disk (select font) to the current level with the use of the alpha-numerical keyboard. |
| SPACING | To call from hard disk different types of spacing.<br>Menu is shown on the left data-display. |
| EDITING | Not active. |
| FIX | Not active. |
| OPTIONS | Not active. |

## KEYBLOCK


VIDEO
- + BRIGHTNESS
- + SATURATION
SET
- + CONTRAST
- + HUE
RESET
PAL
NTSC
OPTIONS



| KEYS | EXPLANATION |
|---|---|
| - BRIGHTNESS + | Not active. |
| - SATURATION + | Not active. |
| SET | Not active. |
| - CONTRAST + | Not active. |
| - HUE + | Not active. |
| RESET | Not active. |
| PAL | Not active. |
| NTSC | Not active. |
| OPTIONS | Not active. |