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**HOW CAD 200 WORKS**

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CAD200 allows you to construct a drawing on the screen, edit this drawing to your satisfaction, and finally to store it away on a disc and to plot it.

There are two prime drawing elements - lines and arcs.

Each line comprises 2 points. To draw such a line it is necessary to enter its start and end points. Points are entered by moving the screen cursor to the location of the point, which is then entered automatically by the system. The power of CAD200 lies in the many versatile methods of moving this cursor.

In addition to the above, temporary construction lines and circles may be defined. These are called geometry elements and they can be used to ease the construction of complex shapes.

A drawing created using any or all of the above may be dimensioned, annotated and hatched as required.

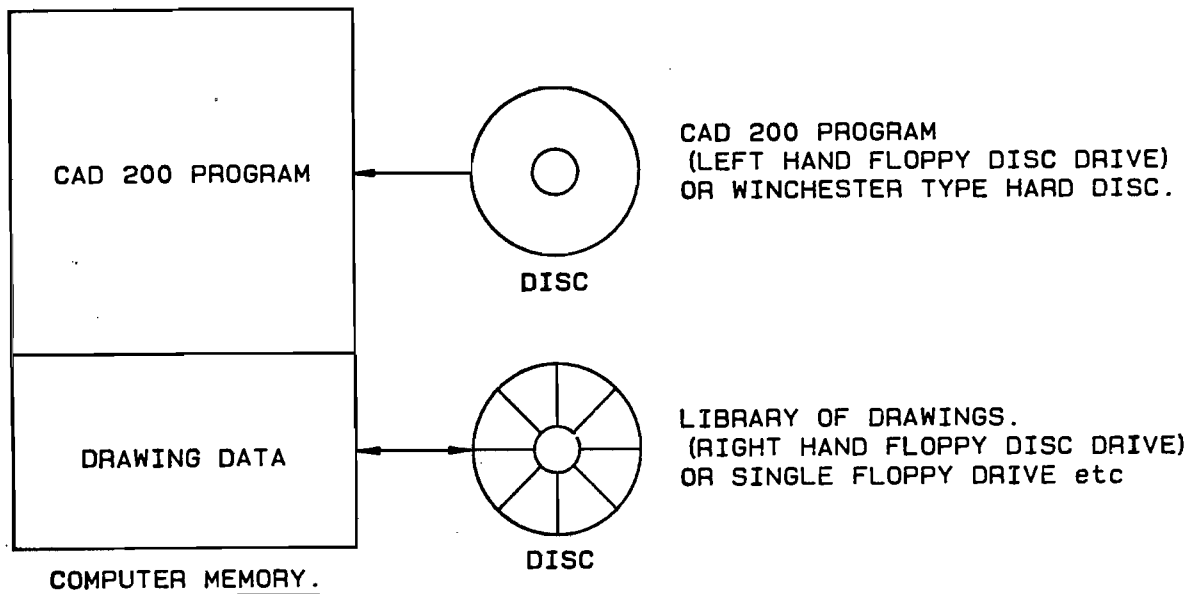
The finished or partially completed drawing is then stored on disc for future reference or plotting.

The purpose of this manual is to list the functions available to the user of a CAD200 system, what they do and how to use them.

---

**OVERVIEW**

---



## NORMAL DEFAULT STORAGE.

YOUR DRAWING IS IN INTERNAL COMPUTER MEMORY WHILE YOU WORK ON IT.  
AT ANY STAGE, YOU MAY STORE IT ONTO A DISC OR RECALL IT AT WILL.

THE GRAPHICS TABLET HAS TWO FUNCTIONS: -

1. MOVING THE CURSOR ON THE SCREEN.
2. SELECTING A FUNCTION.

---

 CURSOR MOVEMENT METHODS & ENTRY POINTS
 

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**CURSOR MOVEMENT METHODS  
AND  
ENTRY OF POINTS  
- OVERVIEW -**

---

The basic function of simple straight line drawing using CAD200 is achieved by moving the cursor to the required location which CAD200 then enters as a line end point. It follows therefore that a MOVE (go there with the pen up) command is necessary to start a new line.

The power and flexibility of the system lies in the many ways in which the cursor placement can be accomplished and the fact that any of these methods is available at all times.

Summarised, the cursor placements methods are :-

1. Freehand tracking by means of the Track area on the Graphics Tablet.
2. Placement by simple numerical entry of X, Y (Cartesian) coordinates; and/or angle and distance (polar) coordinates - measured either relative to the last point entered or to the origin.
3. The end points of a previously drawn line or arc.
4. An intersection of Lines and Circles drawn as a construction aid.
5. Intersection of construction lines and circles and real drawing lines and arcs.
6. Precise placement by freehand tracking using the track area on the Graphics tablet - on a previously determined regular grid. This grid may be defined either on any square, or isometric matrix.
7. Placement by special cursor functions relating to previously drawn elements, e.g. Circle Centre, Mid Point (of any element).
8. Combinations of various of the above. In addition, there are various features which can be combined with some or all of these methods to further enhance cursor control.
  1. Confine cursor to ORTHOGONAL. The cursor can be confined to horizontal and vertical movement.
  2. Confine cursor to ELEMENT. The cursor can be restricted to the locus of a line or circle.
  3. Hold last X or Y - the last X or Y entered can be retained for the next entry.

**IMAGINATIVE USE OF THESE FEATURES CAN GREATLY INCREASE THE USER'S ABILITY TO SOLVE COMPLEX DRAWING PROBLEMS.**

---

**DEFINITION OF TERMS**

---

**Modal.**

A modal button is one which sets the state of CAD200.

The program will remain in that state until the mode is terminated or changed.

e.g. POINT - once this mode has been set, cursor entries will jump to the closest point until a new mode is set.

**Termination.**

The method by which the mode set by this button can be terminated - (relevant only to modal buttons).

**Hierarchy**

The type of interrupt caused by this button - See Chapter 5.

-----  
**BUTTON DEFINITION**  
**ENTRY COMMAND**  
 -----

FREE  
HAND

**Button** : **Menu Position** : L14  
**Name** : Freehand  
**Function Type** : Modal  
**Hierarchy** : Direct Command  
**Termination** : Point; Any int; Geometry Int; Grid.  
**Temporary Termination** : Various buttons which require other entry modes will temporarily terminate this mode. However, if required it can be re-entered by pressing this button at the time of entry.

**Purpose** :

Freehand Sketching and entry of Points and General Placing of Text and Patterns.

**Operation** :

The tracking area is used for freehand entry of points.

The current entry state and the position of the cursor are indicated on the screen as shown in the example below.

Cursor Location

```

MOVE DEF ABCDEFGHIJKLMNO SCOPE:ALL X=0.00 Y=0.00 1.0
AUT: E NEW PAT LAYS: Pen:4 LT:8
LEFT: PEN READ LAYERS: AS DSK FORM: DIN-A4 SCL 1:50
  
```

FREEHAND or GRID mode is Active.

**Example** :

N/A

**Special Considerations.**

May be used with cursor confining commands.



-----  
**BUTTON DEFINITION**  
**ENTRY COMMAND**  
 -----

**GRID**

Menu Position : K14

Button Name : Entry by Grid  
 Function Type : Modal  
 Hierarchy : Direct Command  
 Termination : Freehand; Point; Any Int; Geometry Int; Erase memory.  
 Temporary Termination : Various buttons which require other entry modes will temporarily terminate this mode. However if required it can be re-entered by pressing this button at the time of entry.

**Purpose :**

Placement of the cursor on a predetermined grid (See GRID PARS page 2:24 and GRID ON/OFF Page 2:23). Useful for Electrical, Hydraulic Schematics and some types of building plans.

**Operation :**

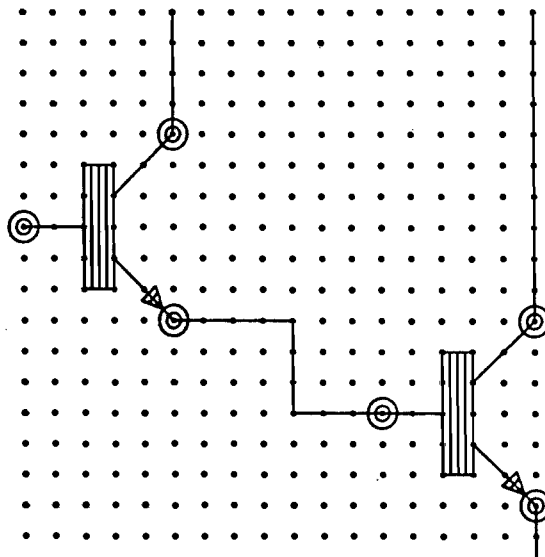
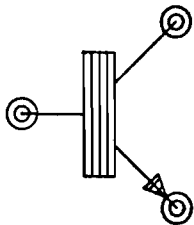
Similar to freehand entry except that the cursor tracks to and enters the nearest grid point. It is normally used with the grid displayed as shown below.

|   |
|---|
| MOVE <b>D</b> FG <b>B</b> BCD <b>E</b> FGHIJKLMNO SCOPE:ALL X=0.00 Y=0.00 1.0 |
| ??  |
| AUTO <b>E</b> NEW PAT LAYS: Pen:4 LT:8  |
| LEFT:3045 READ LAYERS:AS DSK FORM:DIN-A4 SCL 1:50                             |

FREEHAND or GRID mode is Active.

**Example :**

SINCE THE SYMBOL OR PATTERN MAY BE DEFINED BY GRID, PLACING THIS & OTHER SIMILARLY DEFINED PATTERNS ON A SUITABLE GRID ENSURES EASY INTERCONNECTION WHEN USING ENTRY BY GRID.



**Special Considerations.**

A maximum of approximately 200 grid dots across the screen are permitted, the system will not show the grid if the grid spacing is too small. The spacing also depends on the scale and zoom factors.

See GRID PARAMETERS, page 2:24.

See GRID ON/OFF, page 2:23.

N.B. This command functions whether the grid is displayed or not.

-----  
**BUTTON DEFINITION**  
**ENTRY COMMAND**  
 -----

G E O M E T R Y  
I N T

**Button** : Menu Position : J14  
**Name** : Entry by Geometry Int.  
**Function Type** : Modal  
**Hierarchy** : Direct Command  
**Termination** : Point; Any Int; Grid; Freehand; Erase memory.  
**Temporary Termination** : Various buttons which require other entry modes will temporarily terminate this mode. However if required it can be re-entered by pressing this button at the time of entry.

**Purpose :**

Placement of the cursor on an intersection of existing geometry Lines/circles in the current scope.

**Operation :**

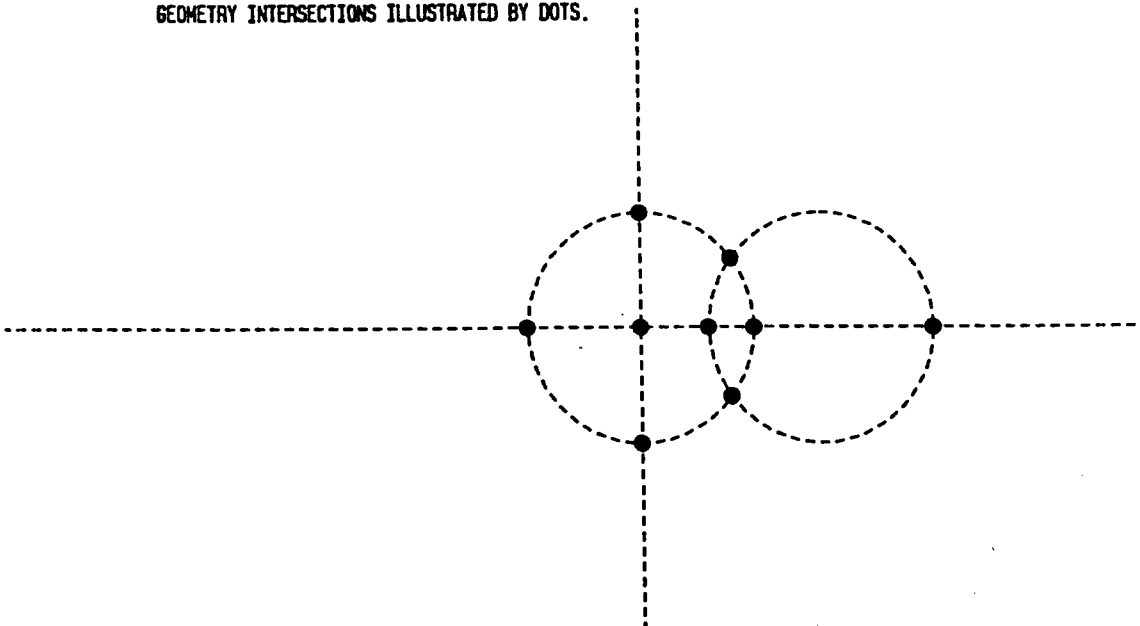
On entry the cursor will "snap" to the closest intersection in the current scope. If too many geometry lines are present, it may be difficult to find the required intersection. Either zoom in or remove some construction lines from the current scope.

|            |                 |                |              |          |        |     |
|------------|-----------------|----------------|--------------|----------|--------|-----|
| MOVE       | ABC             | BCDEFGHIJKLMNO | SCOPE: PUL   | X=0.00   | Y=0.00 | 1.0 |
| ??         |                 |                |              |          |        |     |
| AUTO       | NEW PAT         | LAYS: Pen:4    | LT:8         |          |        |     |
| LEFT: 9045 | READ LAYERS: AS | US4            | FORM: DIN-A4 | SCL 1:50 |        |     |

Entry by GEOMETRY INTERSECTION mode is Active.

**Example :**

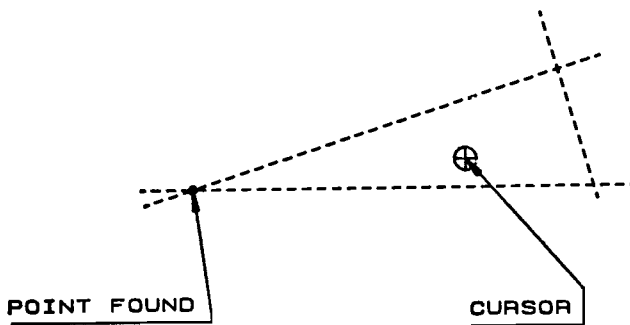
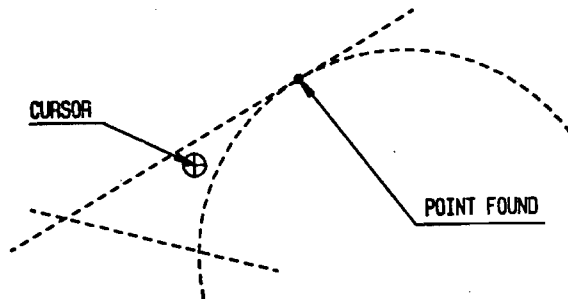
GEOMETRY INTERSECTIONS ILLUSTRATED BY DOTS.



**Special Considerations.**

The intersection found is the closest intersection of the closest 2 elements.

**Example :**



-----  
**BUTTON DEFINITION**  
**ENTRY COMMAND**  
 -----

ANY  
INT

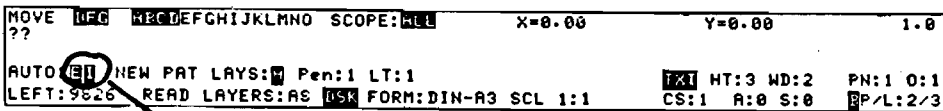
Button Menu Position : I14  
 Name : Entry by Any Int.  
 Function Type : Modal  
 Hierarchy : Direct Command  
 Termination : Point; Grid; Geometry Int; Freehand; Erase memory.  
 Temporary Termination : Various buttons which require other entry modes will temporarily terminate this mode. However if required it can be re-entered by pressing this button at the time of entry.

**Purpose :**

Placement of the cursor on an intersection of existing construction lines and circles and real drawing lines and arcs in the current scope (in any combination).

**Operation :**

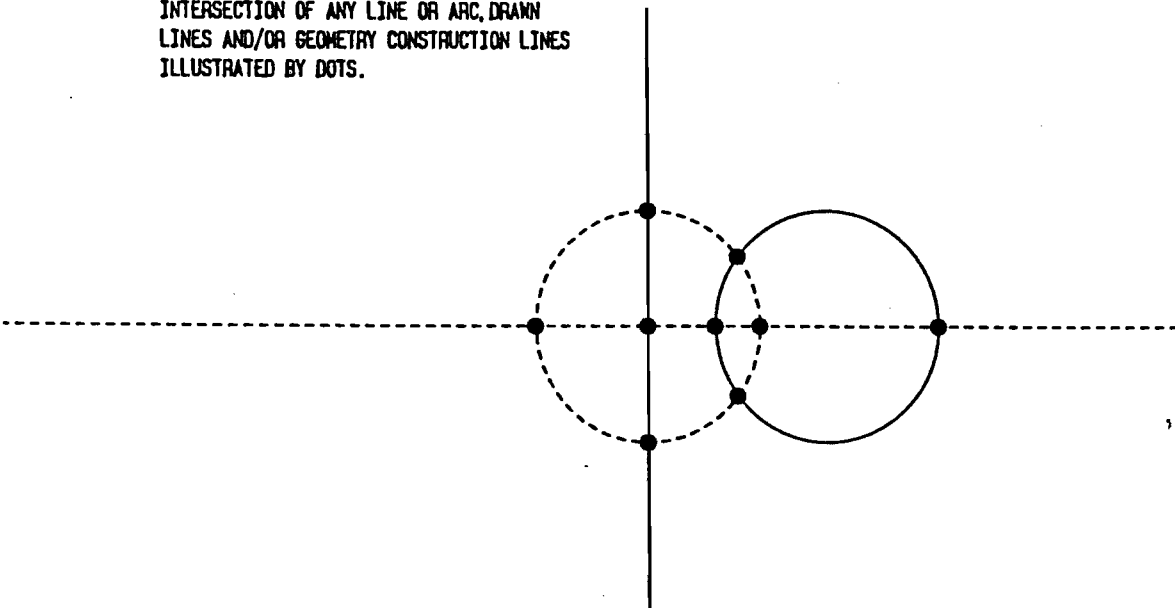
On entry the cursor will "snap" to the nearest intersection.



Entry by ANY INTERSECTION mode is active.

**Example :**

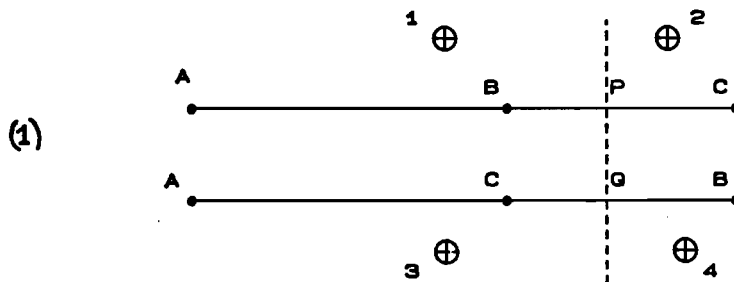
INTERSECTION OF ANY LINE OR ARC, DRAWN  
 LINES AND/OR GEOMETRY CONSTRUCTION LINES  
 ILLUSTRATED BY DOTS.

**Special Considerations.**

This mode of entry is slower than the Geometry Int mode, since the program has to search through more elements.

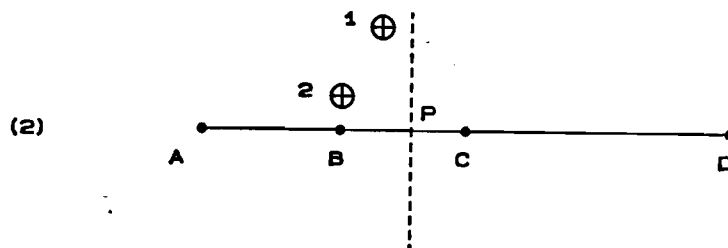
The intersection found is the closest intersection of the two closest elements (diagram as for geometry intersection).

If two drawing lines are collinear (lie "on top" of one another) then if they have a common end point, CAD200 will use this as the point of intersection: if they have no common end point, CAD200 will say "NO INTERSECTION FOUND", e.g.



AB is one drawing line. BC is another drawing line. In ANY INT mode, the results for cursor positions 1 - 4 will be as follows :-

1. Cursor finds point B and warning message appears (using common end point of collinear lines).
2. Cursor finds intersection P.
3. Cursor finds point B and warning message appears.
4. Cursor finds point B and warning message appears.



AD is one drawing line. BC is another drawing line. In ANY INT mode, the results for cursor positions 1 and 2 will be as follows :-

1. Cursor finds intersection P.
2. Cursor remains in place, message appears "NO INTERSECTION FOUND".

---

**BUTTON DEFINITION  
ENTRY COMMAND**

---

|       |
|-------|
| POINT |
|-------|

Button Menu Position : H14  
 Name : Entry by Points  
 Function Type : Modal  
 Hierarchy : Direct Command  
 Termination : Any Int; Geometry Int; Grid; Freehand; Erase memory.  
 Temporary Termination : Various buttons which require other entry modes will temporarily terminate this mode. However, if required it can be re-entered by pressing this button at the time of entry.

Purpose :

Placement of the cursor on an end point of an existing line or arc.

Operation :

On entry the cursor will snap to the nearest point.

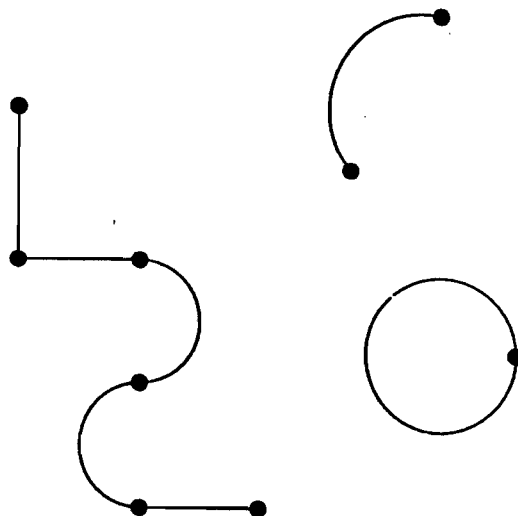
The current entry state is indicated on the screen as shown below.

|   |  |            |  |
|---|--|------------|--|
| MOVE <input type="checkbox"/> <input checked="" type="checkbox"/> ABCDEFGHIJKLMNO SCOPE: <input type="checkbox"/> <input checked="" type="checkbox"/> | X=24788.75   | Y=18710.00 | 1.0  |
| 36.25   |  |            |  |
| AUTO <input type="checkbox"/> <input checked="" type="checkbox"/> NEW PAT LAYS: <input type="checkbox"/> Pen:1 LT:1 -                                 | <input type="checkbox"/> <input checked="" type="checkbox"/> HT:5 WD:3 | PN:2 O:5   |  |
| LEFT:7878 READ LAYERS:AS <input type="checkbox"/> <input checked="" type="checkbox"/> FORM:DIN-A1 SCL 1:50  | CS:1   | A:0        | S:0 <input type="checkbox"/> <input checked="" type="checkbox"/> P/L:2/3 |

Entry by POINTS is active.

Example :

ELEMENT ENDS ILLUSTRATED BY DOTS.



Special Considerations. :

-----  
**BUTTON DEFINITION**  
**MOVE/DRAW**  
 -----

MOVE /  
DRAW

Button Menu Position : M13  
 Name : MOVE/DRAW  
 Function Type : Modal  
 Hierarchy : Direct Command  
 Termination : Press MOVE/DRAW again

Purpose :

To select MOVE or DRAW mode, such that the user can "MOVE", (i.e. lift the pen) or "DRAW" (Pen down) to a new cursor location.

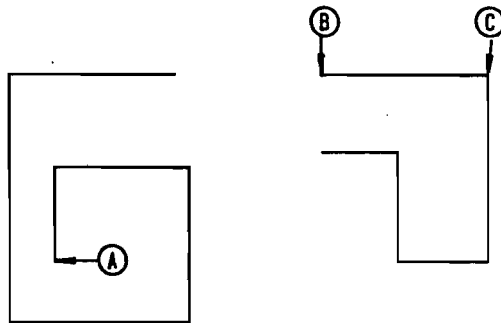
Operation :

Press the button to change the mode. Press again to change it back again.

|   |     |                 |            |        |        |     |
|---|-----|-----------------|------------|--------|--------|-----|
| <b>MOVE</b>   | DEF | ABCDEFGHIJKLMNO | SCOPE: ALL | X=0.00 | Y=0.00 | 1.0 |
| AUTO: [P] NEW PAT LAYS: [P] Pen:1 LT:1              |     |                 |            |        |        |     |
| LEFT: 9822 READ LAYERS: AS [P] FORM: DIN-A3 SCL 1:1 |     |                 |            |        |        |     |
| [TX] HT:3 WD:2 PN:1 0:1                             |     |                 |            |        |        |     |
| CS:1 A:0 S:0 [P/L:2/3                               |     |                 |            |        |        |     |
| <b>DRAW</b>   | DEF | ABCDEFGHIJKLMNO | SCOPE: ALL | X=0.00 | Y=0.00 | 1.0 |
| AUTO: [P] NEW PAT LAYS: [P] Pen:1 LT:1              |     |                 |            |        |        |     |
| LEFT: 9826 READ LAYERS: AS [P] FORM: DIN-A3 SCL 1:1 |     |                 |            |        |        |     |
| [TX] HT:3 WD:2 PN:1 0:1                             |     |                 |            |        |        |     |
| CS:1 A:0 S:0 [P/L:2/3                               |     |                 |            |        |        |     |

Example :

USE MOVE TO GO FROM A TO B.  
 USE DRAW TO GO FROM B TO C.



Special Considerations. :

- A) In the case of successive moves, only the last move prior to a draw is entered.
- B) Starting a new pattern automatically defaults the system to MOVE and the MOVE/DRAW button becomes inoperative until a point is entered.
- C) Pressing MOVE/DRAW when not in drawing mode will terminate any active routine and act like DWG MODE button as well.



-----  
**BUTTON DEFINITION**  
**LINE/ARC BY END POINTS**  
 -----

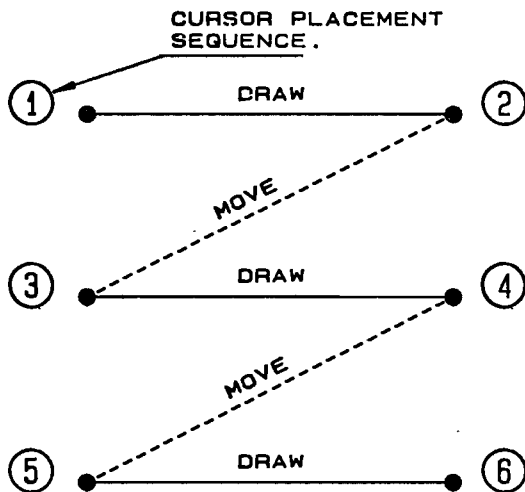
|  |   |                            |
|--|---|----------------------------|
| <b>Button</b><br><b>Name</b><br><b>Function Type</b><br><b>Hierarchy</b><br><b>Termination</b> | <div style="border: 1px solid black; padding: 2px; display: inline-block; text-align: center;">       LINE / ARC<br/>       BY END<br/>       POINTS     </div><br>: Line/Arc by End Points<br>: Modal<br>: Direct Command<br>: DWG.MODE (M14); Erase Memory. | <b>Menu Position : I16</b> |
|--|---|----------------------------|

**Purpose :**

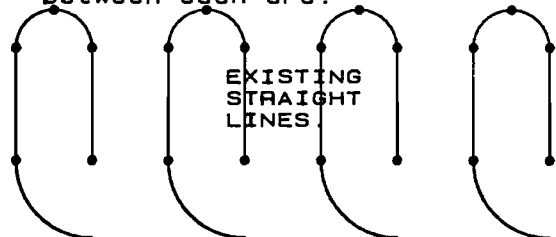
To alternatively MOVE and DRAW to indicated points - without the necessity of pressing the MOVE/DRAW button.

**Operation :**

Press button to enter mode.

**Example :**

ARC BY 3 POINTS was Used in conjunction with LINE/ARC BY END POINTS. System was set to ENTRY BY POINTS mode for the end points, RELATIVE NUMERIC CO-ORDINATE ENTRY was used for the centre point. It was not necessary to press MOVE between each arc.



ARC BY START POINT, ANGLE AND CENTRE POINT was used similarly to above.

**Special Considerations. :**

The first action following the pressing of this button is always a MOVE.

---

**BUTTON DEFINITION**  
**ENTER CENTRE POINT**

---

|                      |                          |                            |
|----------------------|--------------------------|----------------------------|
| <b>Button</b>        | ENTER<br>CENTRE<br>POINT | <b>Menu Position : M11</b> |
| <b>Name</b>          | : Centre Point           |                            |
| <b>Function Type</b> | : Non Modal              |                            |
| <b>Hierarchy</b>     | : Direct Command         |                            |
| <b>Termination</b>   | :                        |                            |

**Purpose :**

To place the cursor on the CENTRE POINT of a CIRCLE or ARC, and entry of that point, without the need for construction geometry.

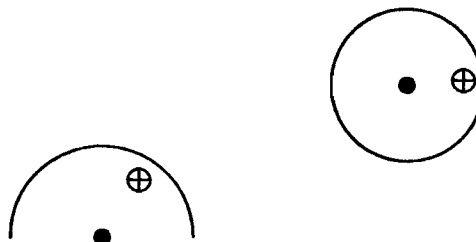
**Operation :**

This command prompts the user to indicate the Centre point of a circle or arc, the cursor "snaps" to the centre point and the point is entered. The circle whose circumference is closest to the cursor will be chosen.

**Example :**

⊕ = APPROXIMATE CURSOR PLACEMENT.

● = ENTRY LOCATION.

**Special Considerations. :**

Centre points of both real and geometry circles may be entered using this function.

-----  
**BUTTON DEFINITION**  
**ENTER MID POINT**  
 -----

**Button**

|                       |
|-----------------------|
| ENTER<br>MID<br>POINT |
|-----------------------|

**Menu Position : M12****Name**

: Mid Point

**Function Type**

: Non Modal

**Hierarchy**

: Direct Command

**Purpose :**

Placement of the cursor on the MID POINT of an arc or line, and entry of that point, without the need for construction geometry.

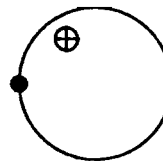
**Operation :**

This command prompts the user to indicate an element (Arc or Line), the cursor then snaps to the Mid Point of that element and the point is entered.

**Example :**

⊕ = APPROXIMATE CURSOR PLACEMENT.

● = ENTRY LOCATION.

**Special Considerations. :**

1. A complete circle has a termination point where the circumference starts and ends - the mid point of a circle is opposite this point.
2. Because geometry elements are unbounded (i.e. they do not have end points) it is not possible to find their mid points.

-----  
**BUTTON DEFINITION**  
**MOVE CURSOR**  
 -----

**Button** MOVE  
CURSOR **Menu Position** : M8  
**Name** : Move Cursor  
**Function Type** : Non Modal  
**Hierarchy** : Direct Command

**Purpose** :

To inhibit the next point entry, allowing the cursor to be located without a new point being entered.

This allows the user to enter a point relative to any location, by first moving the cursor to that position., and re-locating it relative to this with the aid of COORDINATE ENTRY for example.

**Operation** :

Following this command, the cursor may be located without a point being entered, then placed again as described above. The operation can be repeated for successive relative moves.

**Example** :

TO DRAW LINE AB (A IS THE LAST POINT ENTERED)  
 (B IS THE REQUIRED ENTRY LOCATION)

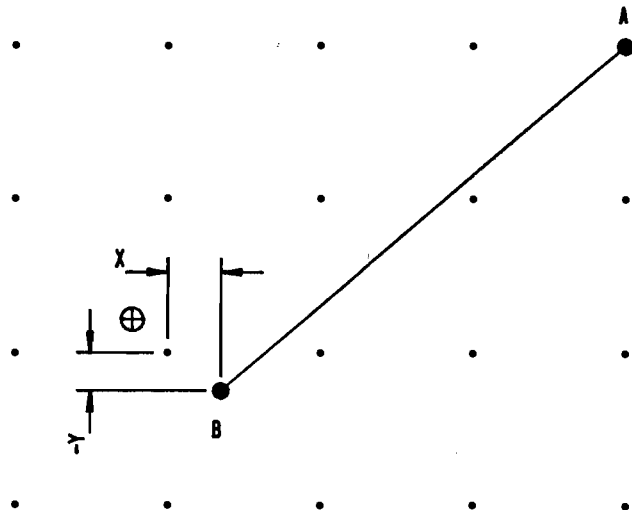
ENTRY BY GRID MODE

1) press



2) indicate the grid point from which the dimensions to B are known

3) then step off this point by an X & Y value using RELATIVE NUMERIC CO-ORDINATE ENTRY.



⊕ = APPROXIMATE CURSOR PLACEMENT (step 2)

M12

**Special Considerations.** :

None

-----  
**BUTTON DEFINITION**  
**MOVE CURSOR TO POINT**  
 -----

**Button** MOVE  
CURSOR  
TO POINT **Menu Position :** M9  
**Name** : Move Cursor to Point  
**Function Type** : Non Modal  
**Hierarchy** : Direct Command

**Purpose :**

Placement of the Cursor on a Point **WITHOUT ENTERING THAT POINT**, and without changing the current Entry Mode. The cursor may then be placed relative to this position by any other entry mode such as NUMERIC CO-ORDINATE ENTRY (See Page 2:25).

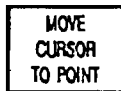
**Operation :**

Following this command the cursor may be located on the end point of a line or arc, then moved relative to this location. The intermediate location will not be entered as a point. The operation can be repeated for successive relative moves as described above.

**Example :**

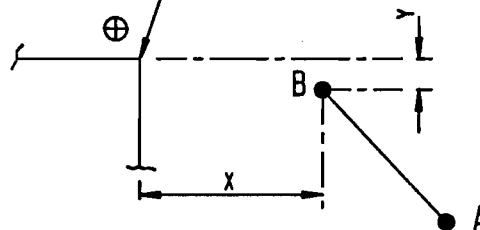
TO DRAW LINE AB (A IS THE LAST POINT ENTERED)  
 (B IS THE REQUIRED ENTRY LOCATION).

1) press



2) move cursor to the existing point.

3) then step off this point by an X &amp; Y value using RELATIVE NUMERIC CO-ORDINATE ENTRY.



⊕ = APPROXIMATE CURSOR PLACEMENT.

**Special Considerations. :**

None

-----  
**BUTTON DEFINITION**  
**MOVE CURSOR TO INT**  
 -----

**Button**

MOVE  
 CURSOR  
 TO INT.

**Menu Position** : M10

**Name** : Move Cursor to Int.  
**Function Type** : Non Modal  
**Hierarchy** : Direct Command

**Purpose** :

Placement of the cursor on an intersection **WITHOUT ENTRY OF THAT INTERSECTION**, and without changing the ENTRY MODE. The cursor may then be placed relative to this position by any other entry mode such as NUMERIC CO-ORDINATE ENTRY (See Page 2:25).

**Operation** :

Following this command, the cursor may be placed on an intersection, then placed again as described above. The second placement will be the point entered.

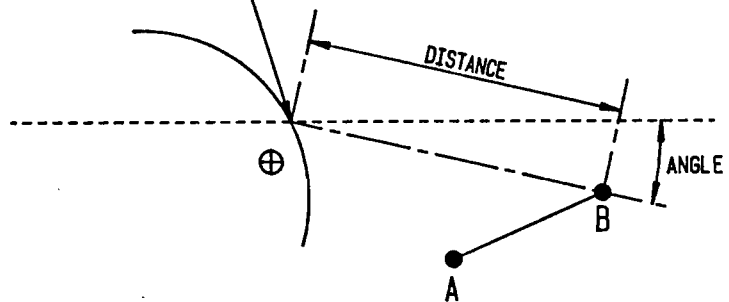
**Example** :

TO DRAW LINE AB (A IS THE LAST POINT ENTERED)  
 (B IS THE REQUIRED ENTRY LOCATION).

1) press

MOVE  
 CURSOR  
 TO INT.

2) move cursor to this existing INTERSECTION

3) then step off the intersection  
by DISTANCE & ANGLE.

⊕ = APPROXIMATE CURSOR PLACEMENT.

**Special Considerations.** :

None

-----  
**BUTTON DEFINITION**  
**CONFINING THE CURSOR**  
 -----

|                      |                        |                            |
|----------------------|------------------------|----------------------------|
| <b>Button</b>        | CURSOR<br>TO<br>ORTHO  | <b>Menu Position : G16</b> |
| <b>Name</b>          | : Cursor to Orthogonal |                            |
| <b>Function Type</b> | : Modal                |                            |
| <b>Hierarchy</b>     | : Direct Command       |                            |
| <b>Termination</b>   | : FREE CURSOR (G15)    |                            |

**Purpose :**

To provide a convenient method of moving the cursor Horizontally or Vertically by free hand methods. Specially useful for underlining, leader arrows, centre lines etc.

**Operation :**

The cursor is confined to horizontal or vertical movement during freehand cursor tracking. The choice of horizontal or vertical tracking depends on which is closest to the current cursor position.

**Example :**

TO UNDERLINE THE WORD TITLE SHOWN BELOW: -

FREEHAND ENTRY ACTIVE

- 1) PRESS MOVE /  
DRAW
- 2) PLACE THE CURSOR AT A
- 3) PRESS CURSOR  
TO  
ORTHO
- 4) PLACE THE CURSOR AT B
- 5) PRESS FREE  
CURSOR

TITLE  
 A ————— B

**Special Considerations. :**

The origin of the orthogonal axes on which the cursor tracks moves to each successive point entered. e.g. in the example above, after step 3 the cursor will move only vertically or horizontally from A : after step 4 the cursor will move only vertically or horizontally at B.

-----  
**BUTTON DEFINITION**  
**CONFINING THE CURSOR**  
 -----

|  |   |                            |
|--|---|----------------------------|
| <b>Button</b><br><b>Name</b><br><b>Function Type</b><br><b>Hierarchy</b><br><b>Termination</b><br><b>Purpose</b> : | <div style="border: 1px solid black; padding: 2px; display: inline-block; text-align: center;">         CURSOR<br/>TO<br/>ELEMENT       </div><br>: Cursor to Element<br>: Modal<br>: Direct Command<br>: FREE CURSOR (G15) | <b>Menu Position</b> : G17 |
|--|---|----------------------------|

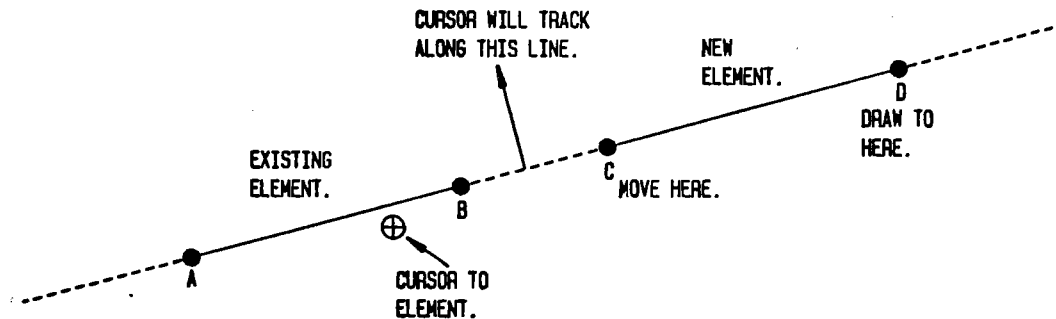
To continue freehand cursor tracking to an existing element (line, circle or arc). If the line or arc is a normal drawing element, then the cursor is permitted to track an unbounded line or circle, co-linear with that element.

**Operation :**

Following this command the User is prompted to indicate the element.

**Example :**

FREE-HAND TRACKING OF AN ELEMENT BASED ON AN ALREADY DRAWN ELEMENT.



**Special Considerations. :**

None



-----  
**BUTTON DEFINITION**  
**CONFINING THE CURSOR**  
 -----

HOLD  
VERTICAL

**Button**

**Name** : Hold Vertical  
**Function Type** : Non Modal  
**Hierarchy** : Direct Command  
**Termination** : Next Entry  
**Purpose** :

**Menu Position** : F16

To place the cursor, using the X value of the last cursor position, as well as the Y value from the point indicated. (Useful for drawing a third projection from two existing views.)

**Operation** :

This function holds the X value of the last cursor position and uses this value as the X co-ordinate of the next cursor entry.

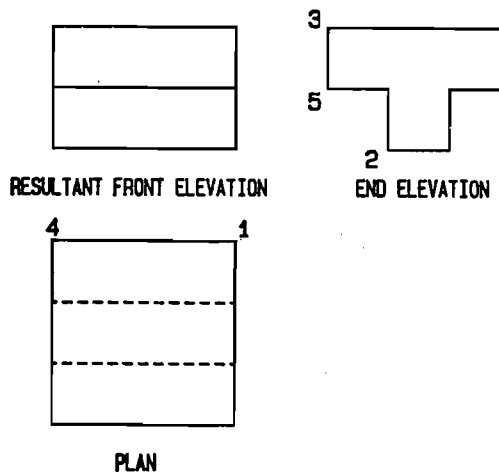
**Example** :

TO DRAW THE FRONT ELEVATION PROJECTED FROM THE OTHER VIEWS.

ENTRY BY POINTS ACTIVE.

- 1) press "MOVE/DRAW"
- 2) indicate point 1
- 3) press "MOVE/DRAW"
- 4) press "HOLD VERTICAL"
- 5) indicate point 2
- 6) press "HOLD VERTICAL"
- 7) indicate point 3
- 8) press "HOLD HORIZONTAL"
- 9) indicate point 4
- 10) press "HOLD VERTICAL"
- 11) indicate point 2
- 12) press "HOLD HORIZONTAL"
- 13) indicate point 1
- 14) press "MOVE"
- 15) press "HOLD VERTICAL"
- 16) indicate point 5
- 17) press "HOLD HORIZONTAL"
- 18) indicate point 4

YOU HAVE DRAWN THE FRONT ELEVATION.

**Special Considerations.** :

None

---

BUTTON DEFINITION  
CONFINING THE CURSOR

---

HOLD  
HORIZONTAL

Button

Menu Position : F17

Name : Hold Horizontal  
Function Type : Non Modal  
Hierarchy : Direct Command  
Termination : Next Entry  
Purpose :

To place the cursor, using the Y value of the last cursor position, as well as the X value from a point indicated. ( Useful for drawing a third projection from two existing views).

Operation :

This function holds the Y value of the last cursor position and uses this value as the Y co-ordinate of the next cursor entry.

Example :

See HOLD VERTICAL

Special Considerations. :

None

---

**BUTTON DEFINITION  
CONFINING THE CURSOR**

---

|                      |  |                            |
|----------------------|--|----------------------------|
| <b>Button</b>        | <div style="border: 1px solid black; padding: 2px; display: inline-block;">FREE<br/>CURSOR</div> | <b>Menu Position : G15</b> |
| <b>Name</b>          | : Free Cursor  |                            |
| <b>Function Type</b> | : Modal  |                            |
| <b>Hierarchy</b>     | : Direct Command   |                            |
| <b>Termination</b>   | : Cursor confining command   |                            |
| <b>Purpose</b>       | :  |                            |

To indicate to the system that the user wants to terminate any previously set cursor confining modes (Cursor to Orthogonal, Cursor to Element, Hold Last X, Y) and to return to normal drawing mode.

**Operation :**

Self Explanatory.

**Example :**

N/A

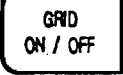
**Special Considerations. :**

None

---

**BUTTON DEFINITION**  
**GRID FUNCTIONS**

---

|                      |   |                            |
|----------------------|---|----------------------------|
| <b>Button</b>        |  | <b>Menu Position : H17</b> |
| <b>Name</b>          | : Display/Don't Display Grid  |                            |
| <b>Function Type</b> | : Modal   |                            |
| <b>Hierarchy</b>     | : Immediate Command   |                            |
| <b>Termination</b>   | : Press button again.   |                            |
| <b>Purpose</b>       | :   |                            |

To allow the user to selectively display or erase the grid on the screen.

**Operation :**

Pressing the button displays the grid, pressing it again erases the grid.

**Example :**

N/A

**Special Considerations. :**

Grid Entry Mode will function normally even if the grid is not displayed.

If the grid spacing is too small to display (i.e. drawing the grid results in an impractically large number of dots), the system will warn the operator of this and not display the grid. Grid entry is not affected however.

-----  
**BUTTON DEFINITION**  
**GRID FUNCTIONS**  
 -----

|  |  |                            |
|--|--|----------------------------|
| <b>Button</b><br><b>Name</b><br><b>Function Type</b><br><b>Hierarchy</b><br><b>Termination</b><br><b>Purpose</b> | <div style="border: 1px solid black; padding: 2px; display: inline-block; margin-bottom: 5px;">GRID<br/>PARS</div> : Grid Parameters<br>: Parameter Entry<br>: Minor Command<br>: Continue | <b>Menu Position</b> : I17 |
|--|--|----------------------------|

To allow the user to specify a Grid Separation and Type, i.e. Rectangular or Isometric.

**Operation :**

The current values are displayed and may be changed as required. Entry is by two values separated by a comma.

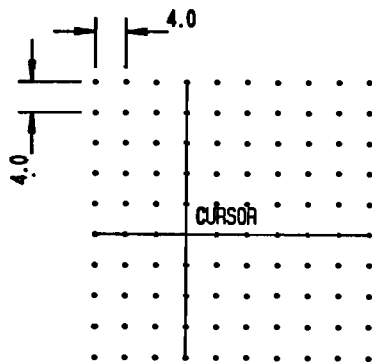
The first value represents the separation of the grid dots. The second value may be a 1 or 0.

A 0 after the comma will set a Rectangular Grid and Cursor Type.

A 1 after the comma will set an Isometric Grid and Cursor Type.

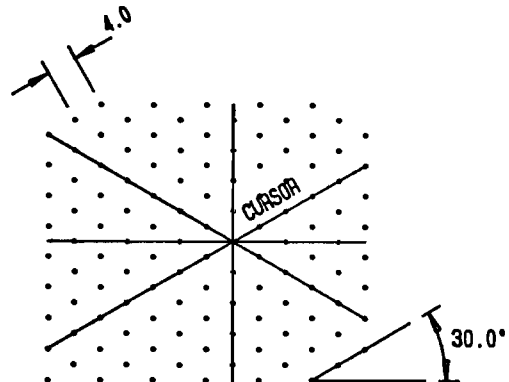
Press CONTINUE to store and activate the new values. The new grid is then redrawn if the grid mode is on.

**Example :**



RECTANGULAR GRID.

GRID PARS 4,0



ISOMETRIC GRID.

GRID PARS 4,1

**Special Considerations. :**

A maximum of +-200 grid dots across the screen are permitted. The system will not display the grid if the spacing is too small. The spacing also depends on the Scale and Zoom factors.

The isometric cursor is not available on the 9845B OPT 100 computer. A manual cursor is provided instead.

---

**NUMERIC CO-ORDINATE ENTRY**

---

Numeric co-ordinate entry is a simple yet powerful method of entering co-ordinates.

The four basic parameters used in entry are :-

X,Y coordinates, distance and angle.

Any two of the above may be used to define the new cursor position.

The parameters are either measured from the current drawing position (Relative Measurement.)

or

They are measured from the drawing origin (Absolute Measurement).

X parameters are specified by preceding the numeric expression by X or x.

Y parameters are specified by preceding the numeric expression by Y or y.

Distance parameters are specified by preceding the numeric expression by D or d.

Angles are specified by preceding the numeric expression by A or a - or by indicating angular units, e.g. 30° 10' 20". (Use Special Function Key K8 for ° sign).

**RELATIVE OR ABSOLUTE ENTRY.**

All the above data, may be referenced to the last point entered. (RELATIVE ENTRY) - or the origin (ABSOLUTE ENTRY).

This may be specified by using an uppercase character, e.g. X to specify the ABSOLUTE ENTRY,

and

a lowercase character e.g. d to specify RELATIVE ENTRY.

All angles are specified according to the Current Angle Mode (See SRV. MODE/NORMAL button, page 2:36).

Angles relative to other lines can only be entered as expressions (see ANGLE FROM LINE, button page 4:25).

Mixtures of Relative and Absolute co-ordinates are both valid and useful.

If no prefix is specified e.g. 50, -20 then these parameters are taken to be Cartesian Coordinates (X, Y) by default.

Whether ABSOLUTE (X,Y) or RELATIVE (x,y) depends on the setting of the RELATIVE ABS. DFLT button, page number 2:34)

**NOTE**

If only X (x) is specified then the other parameter is assumed to be Y(y) by default.

If only Y (y) is specified then the other parameter is assumed to be X (x) by default.

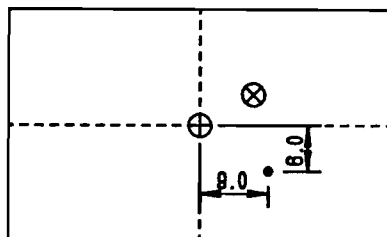
Normally X precedes Y by default. However, in the Surveyors mode (page number 2:33) this is reversed :

| EXAMPLES                 | Normal Default |          | Surveyors Default |          |
|--------------------------|----------------|----------|-------------------|----------|
|                          | Relative       | Absolute | Relative          | Absolute |
| 50, 40 ≡                 | x50,y40        | X50,Y40  | y50,x40           | Y50,X40  |
| X50,40<br>or<br>40,X50 ≡ | X50,y40        | X50,Y40  | y40,X50           | Y40,X50  |

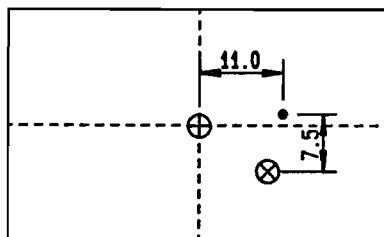
EXAMPLES - CARTESIAN COORDINATES (X,Y)

NOTE :

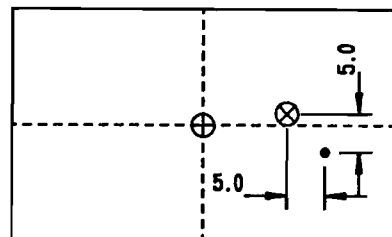
- ⊕ Signifies Origin
- ⊗ Signifies Last Point
- Signifies new cursor position



X9.0, Y-6.0



X11.0, Y7.5



X5.0, Y-5.0

-----  
**POLAR CO-ORDINATES (DISTANCE, ANGLE)**  
**NORMAL ANGLE MODE**  
 -----

Either Distance or Angle **must** be specified to indicate Polar co-ordinates.

Distance Parameters are specified by preceding the numeric expression by a D or d.

Angle Parameters are specified by preceding the numeric expression by an A or a.

The prefix indicates to the system whether distance or angle is related to the origin - or last cursor position

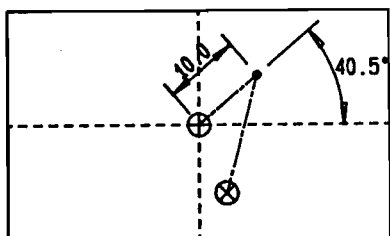
If no prefix D or d, A or a is specified, the current mode set by RELATIVE ABS. DFLT button will be used (Page number 2:34).

| EXAMPLES                | Relative Abs. Default Setting. |                  |
|-------------------------|--------------------------------|------------------|
|                         | Relative                       | Absolute         |
| 50.25,25 <sup>o</sup> ⊕ | d50.25,a25                     | D50.25,A25       |
| D45,19        ⊕         | D45,a19                        | D45,A19          |
| 17 deg15',15,20         | a17deg15',15,d20               | A17deg.15'15,D20 |

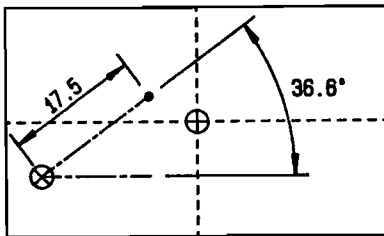
-----  
**EXAMPLES - POLAR COORDINATES (DISTANCE, ANGLE)**  
**NORMAL ANGLE MODE**  
 -----

NOTE :

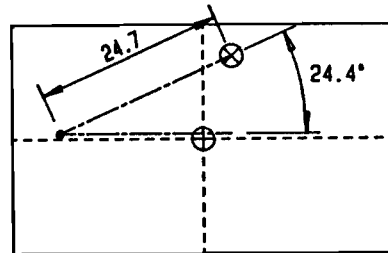
- ⊕ Signifies Origin
- ⊗ Signifies last point
- Signifies new cursor position



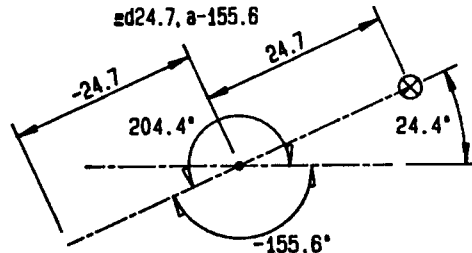
D10, A40°30'0"  
 ⊕D10, A40.5



d17.5, a36.6  
 ⊕d17.5, 36°36'



d-24.7, a24.4 ⊕d24.4, a204.4  
 ⊕d24.7, a-155.6





---

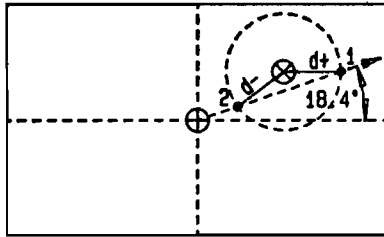
 DISTANCE ANGLE CONTINUES.
 

---

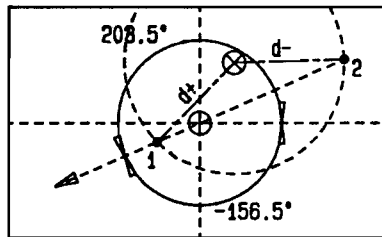
This page illustrates 3 examples where two possibilities of distance occur - the sign for d is used to differentiate the two possibilities - see rule below.

NOTE :

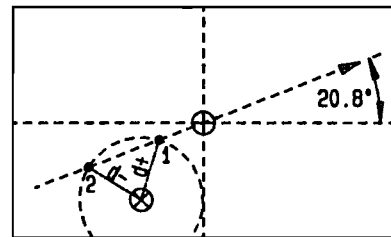
- ⊕ Signifies Origin
- ⊗ Signifies last point
- Signifies possible new cursor positions.



A18.4  
POINT 1 IS d+  
POINT 2 IS d-



A203.5=A-156.5  
POINT 1 IS d+  
POINT 2 IS d-



A20.8  
POINT 1 IS d+  
POINT 2 IS d-

**THE RULE** for establishing the sign of d - is determined by the angular **DIRECTION** specified (See direction arrow head).

The point closest to the **ANGULAR DIRECTION** (arrowhead) specified, will have the + value for d.

---



---

**ANGLE AND X OR Y COMBINATIONS**

---



---

Angles and X - and Angles and Y can be combined in a useful manner.

**NOTE**

Angles and X or Y may be referenced to the last cursor position - or the origin - as indicated by Xx or Yy or Aa.

If no angle prefix is specified the setting of the RELATIVE ABS. DFLT button will be used (Page number 2:34).

---



---

**EXAMPLES - ANGLE and X or Y COMBINATIONS.  
NORMAL ANGLE MODE**

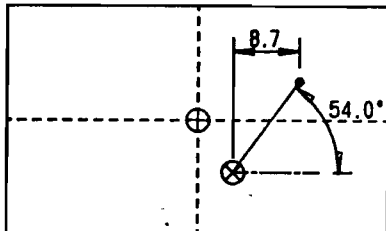
---



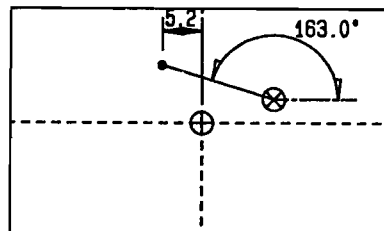
---

**NOTE :**

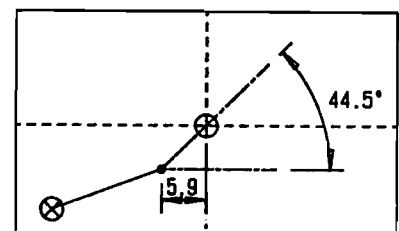
- ⊕ Signifies Origin
- ⊗ Signifies last cursor position
- Signifies new cursor position



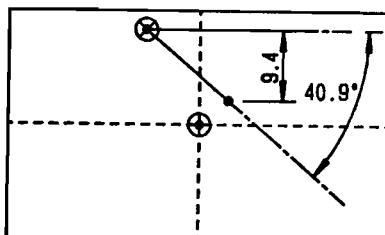
x8.7, a54.0=a54.0, x8.7



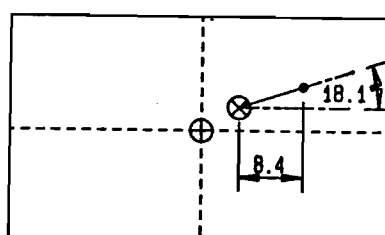
X-5.2, a163.0



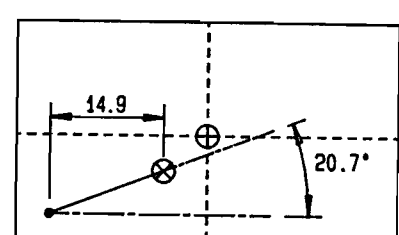
X-5.9, A44.5



y-9.4, a-40.9



x8.4, a18.1



x-14.9, a20.7=x-14.9, a20.7

---

 DISTANCE and X or Y COMBINATIONS
 

---

Distance can be combined with any X or y Co-ordinate.

The distance and the X or Y can be related to the last cursor position or the origin independently, e.g. x40,D50 is valid.

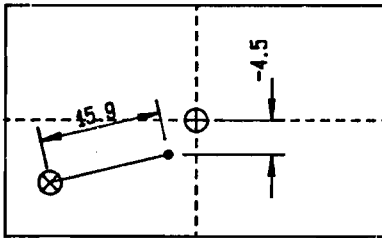
In order to deal with two possibilities resulting from this combination - the sign of the distance indicates the required choice.

---

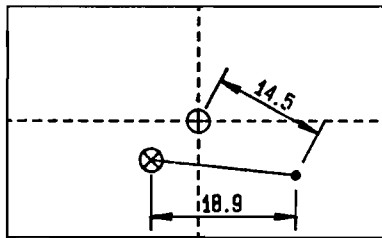
 EXAMPLES - DISTANCE and X or Y COMBINATIONS
 

---

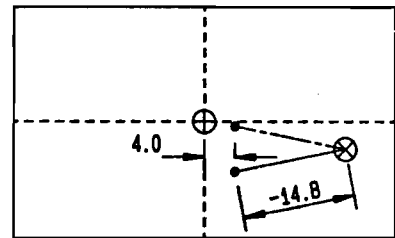
NOTE :    ⊕ Signifies Origin  
          ⊗ Signifies last cursor position  
          • Signifies new cursor position



Y-4.5, d15.8

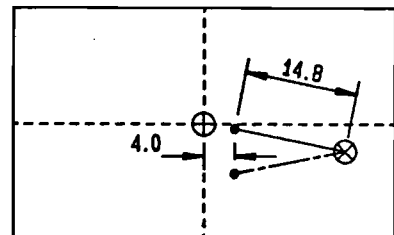


x18.9, D14.5



X4.8, d-14.8

THE LAST TWO EXAMPLES ILLUSTRATE USE OF THE SIGN, (+or-),  
 OF THE DISTANCE VALUE, TO DIFFERENTIATE BETWEEN 2 POSSIBILITIES.



X4.8, d14.8

---

 DISTANCES ONLY
 

---

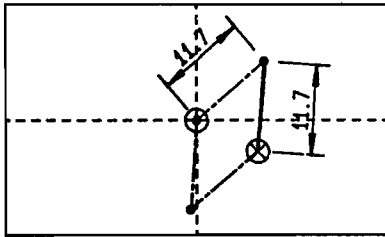
The cursor may be placed by entry of an ABSOLUTE DISTANCE combined with a RELATIVE DISTANCE.

---

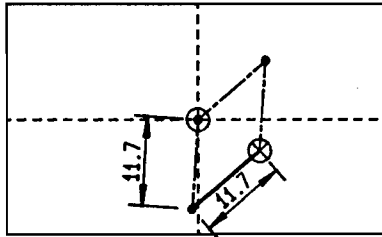
 EXAMPLES - DISTANCE,distance COMBINATIONS.
 

---

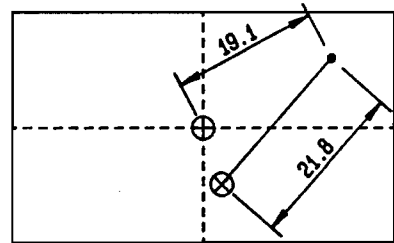
NOTE :    ⊕ Signifies Origin  
          ⊗ Signifies last cursor position  
          • Signifies new cursor position



D11.7, d11.7



D-11.7, d-11.7



D19.1, d21.8=d21.8, D19.1

**NOTE!**

1. There are two possibilities - to differentiate, a minus sign is used for the lower possibility.
2. Invalid Entries will be rejected.

---

 ANGLES ONLY
 

---

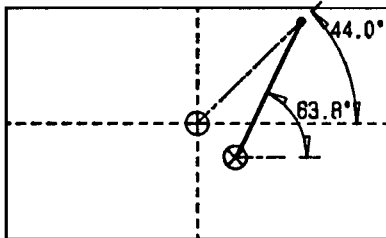
The cursor may be placed by entry of an ABSOLUTE ANGLE combined with a RELATIVE ANGLE.

---

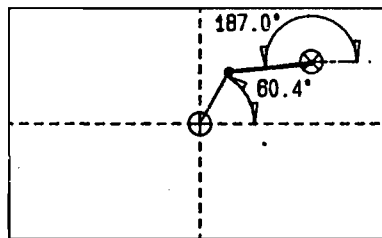
 EXAMPLES ANGLE, angle COMBINATIONS  
 NORMAL ANGLE MODE
 

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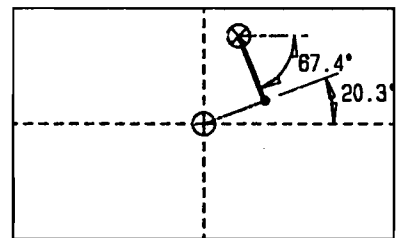
NOTE :  
 ⊕ Signifies Origin  
 ⊗ Signifies last cursor position  
 • Signifies new cursor position



A44.0, a63.8=a63.8, A44.0



A60.4, a187.0=a187, A60.4



A20.3, a-67.4=a-67.4, A20.3

---

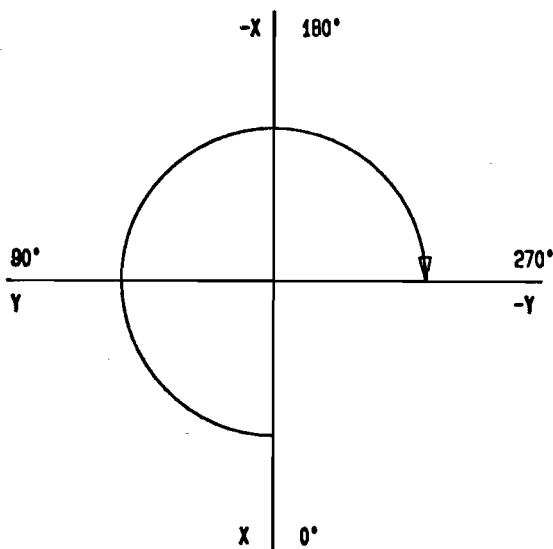
**NUMERIC COORDINATE ENTRY FOR SURVEYORS.**

---

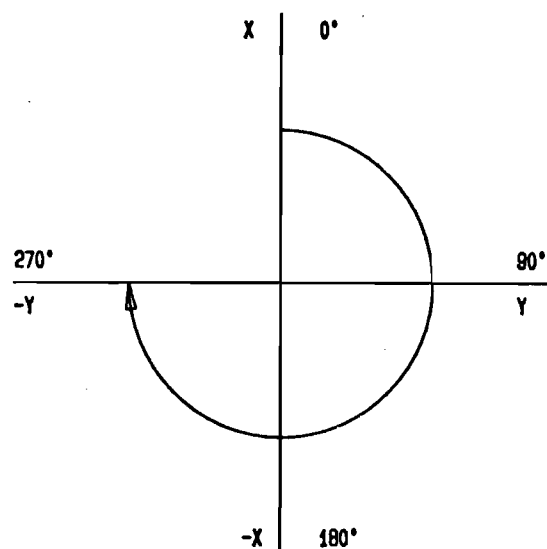
Simply a different convention, Y values will precede X values, as illustrated, and the angles are measured clockwise from the X axis with 0 degrees either pointing North or South depending on the Hemisphere concerned. Otherwise all that was said in the previous section will apply.

To convert to Surveyors Coordinate entry press the key SRV MODE/NORMAL - Successive presses of this key will place the system in :-

1. Surveyor's mode Northern Hemisphere
2. Surveyor's mode Southern Hemisphere
3. Normal mode



SOUTHERN HEMISPHERE



NORTHERN HEMISPHERE

-----  
**BUTTON DEFINITION**  
**NUMERIC CO-ORDINATE ENTRY**  
 -----

|                      |                               |  |
|----------------------|-------------------------------|--|
|                      | RELATIVE/<br>ABS.<br>DEFAULTS |  |
| <b>Button Name</b>   | :                             | Relative or Absolute Numeric Coordinate entry by default (unspecified parameters). |
| <b>Function Type</b> | :                             | Modal  |
| <b>Hierarchy</b>     | :                             | Direct Command   |
| <b>Termination</b>   | :                             | Using the same button to switch over   |
| <b>Purpose</b>       | :                             |  |

**Menu Position : I2**

To place the system into Absolute or Relative mode for numerical coordinate entry.

**Operation :**

This button switches the system to the absolute system of entry, i.e. numeric coordinate entry parameters that are not specified by their prefix - will be measured from the drawing origin. If the button is pressed a second time the system switches to the Relative mode, i.e. unspecified parameters will be measured from the current drawing position.

**Example :**

|                     | DEFAULT  |          |           |          |
|---------------------|----------|----------|-----------|----------|
|                     | NORMAL   |          | SURVEYORS |          |
|                     | RELATIVE | ABSOLUTE | RELATIVE  | ABSOLUTE |
| 50, 40≡             | x50, y40 | X50, Y40 | y50, x40  | Y50, X40 |
| X50, 40 or 40, X50≡ | X50, y40 | X50, Y40 | y40, X50  | Y40, X50 |

MORE EXAMPLES ARE SHOWN IN THE NUMERIC CO-ORDINATE ENTRY SECTION OF THIS MANUAL

**Special Considerations. :**

Any parameter specified by its prefix will override the default set by this command.

---

BUTTON DEFINITION  
NUMERIC CO-ORDINATE ENTRY

---

|                      |  |                           |
|----------------------|--|---------------------------|
| <b>Button</b>        | <div style="border: 1px solid black; padding: 2px; display: inline-block;">DEGREES/<br/>GRADS/<br/>RADIANS</div> | <b>Menu Position : J2</b> |
| <b>Name</b>          | : Degrees or Grads or Radians  |                           |
| <b>Function Type</b> | : Modal  |                           |
| <b>Hierarchy</b>     | : Direct Command   |                           |
| <b>Termination</b>   | :  |                           |
| <b>Purpose :</b>     |  |                           |

To select the type of angular unit for system operation.

**Operation :**

Pressing this button switches the system from Degrees mode to Grads - a further press switches the system to Radians, then back to Degrees if pressed again.

**Example :**

N/A

**Special Considerations. :**

Parameters specified by suffix G or R or D will override the default set by this command.



---

BUTTON DEFINITION  
NUMERIC CO-ORDINATE ENTRY

---

|                      |  |                           |
|----------------------|--|---------------------------|
| <b>Button</b>        | <div style="border: 1px solid black; padding: 2px; display: inline-block;">DEGREES/<br/>GRADS/<br/>RADIANS</div> | <b>Menu Position : J2</b> |
| <b>Name</b>          | : Degrees or Grads or Radians  |                           |
| <b>Function Type</b> | : Modal  |                           |
| <b>Hierarchy</b>     | : Direct Command   |                           |
| <b>Termination</b>   | :  |                           |
| <b>Purpose :</b>     |  |                           |

To select the type of angular unit for system operation.

**Operation :**

Pressing this button switches the system from Degrees mode to Grads - a further press switches the system to Radians, then back to Degrees if pressed again.

**Example :**

N/A

**Special Considerations. :**

Parameters specified by suffix G or R or D will override the default set by this command.

-----  
**BUTTON DEFINITION**  
**NUMERIC CO-ORDINATE ENTRY**  
 -----

SURVEYOR /  
NORMAL

**Button** : SURVEYOR /  
NORMAL **Menu Position** : K2  
**Name** : Surveyors or Normal Co-ordinate entry mode.  
**Function Type** : Modal  
**Hierarchy** : Direct Command  
**Termination** : Using the same button to switch over.  
**Purpose** :

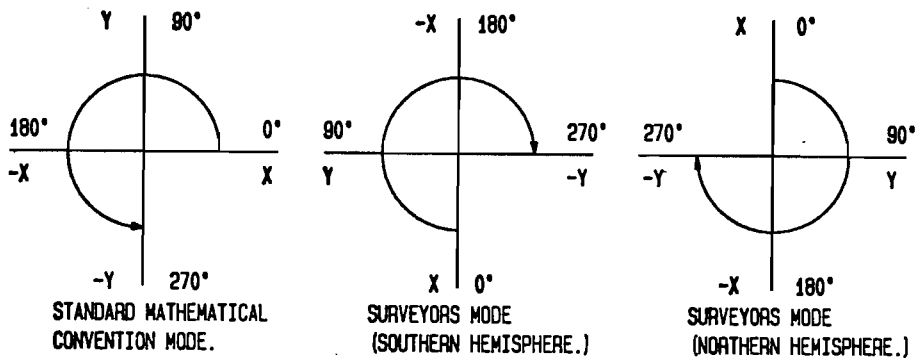
To select Surveyors or Normal convention for Angle and Co-ordinate entry.

**Operation :**

Pressing this button switches the system to Surveyor's entry mode and the operator is prompted to indicate Northern or Southern Hemisphere.

The system will remain in this mode until this key is pressed again whereby the system will revert to Normal Entry mode.

**Example :**



**Special Considerations. :**

None

---

BUTTON DEFINITION  
NUMERIC CO-ORDINATE ENTRY

---

|               |   |                    |
|---------------|---|--------------------|
| Button        | <div style="border: 1px solid black; padding: 2px; display: inline-block; text-align: center;">CLEAR<br/>USER<br/>VARIABLES</div> | Menu Position : L2 |
| Name          | : Clear User Variables  |                    |
| Function Type | : Non Modal   |                    |
| Hierarchy     | : Direct Command  |                    |
| Termination   | :   |                    |
| Purpose       | :   |                    |

To clear all User Variables currently set from system "memory".

**Operation :**

Self Explanatory.

**Example :**

An example is "Angle" - which may have automatically been set using the function GET ANGLE FROM LINE, (Page 4:25).

**Special Considerations. :**

None

-----  
 NUMERIC CO-ORDINATE ENTRY - USING VARIABLES & CALCULATIONS  
 -----

In addition to numeric entry of co-ordinates as illustrated in the preceding examples - any of the four basic units may be entered as a calculation.

These calculations may, in addition, be done using variables that may be declared by the user.


(See the Hewlett-Packard Basic Programming Manual for more details on Arithmetic Functions and Variables).


e.g. Length = 10.3 + 2.1  
 Height = Length + (3.2/2.35)  
 Diag. = SQR ((Length^2)+(Height^2))




D Diag, A30-3.237 might be the final distance and angle entered after declaring the variables above.

The following variables are automatically set and are available simply by typing in their names :-

1) Angle : Set by "Get Angle from Line" (Page 4:25)

2) Area : Set by "  " G:7

3) Perim : Set by "  " G:7

4) Length: Set by "    " D,E,F:7

5) Axis-angle : Set by " GRID PARAS" I:17

- also -

the system will "sense" a calculation which will obviously be for angular entry even though not specified by its prefix or suffix - e.g. ASN(0.5),50 will automatically be assumed to be angle and distance.

- also -

The result of a calculation followed by EXECUTE - is available for direct input.

---

**EDITING AND ERROR RECOVERY**

---

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---

**BUTTON DEFINITION  
EDITING AND ERROR RECOVERY**

---

|                      |  |                           |
|----------------------|--|---------------------------|
| <b>Button</b>        | <div style="border: 1px solid black; padding: 2px; display: inline-block;">ABORT</div> | <b>Menu Position : M1</b> |
| <b>Name</b>          | : Abort  |                           |
| <b>Function Type</b> | : Non Modal  |                           |
| <b>Hierarchy</b>     | : Immediate Command  |                           |
| <b>Termination</b>   | : N/A  |                           |
| <b>Purpose</b>       | :  |                           |

This function allows the user to ABORT a partially entered function or a process such as Hatching or Plotting.

**Operation :**

Pressing this key will abort any function which may have been active. Two question marks will be displayed in the entry area below the screen frame, signifying that the system is ready for a new command.

**Example :**

N/A

**Special Considerations. :**

**NOTE!**

Entering a new function will also ABORT a current function and replace it. For this reason ABORT is not required for normal use.

-----  
**BUTTON DEFINITION**  
**EDITING AND ERROR RECOVERY**  
 -----

|                      |                           |                            |
|----------------------|---------------------------|----------------------------|
| <b>Button</b>        | DELETE<br>LAST<br>ELEMENT | <b>Menu Position : M15</b> |
| <b>Name</b>          | : Delete Last Element     |                            |
| <b>Function Type</b> | : Non Modal               |                            |
| <b>Hierarchy</b>     | : Direct Command          |                            |
| <b>Termination</b>   | :                         |                            |
| <b>Purpose :</b>     |                           |                            |

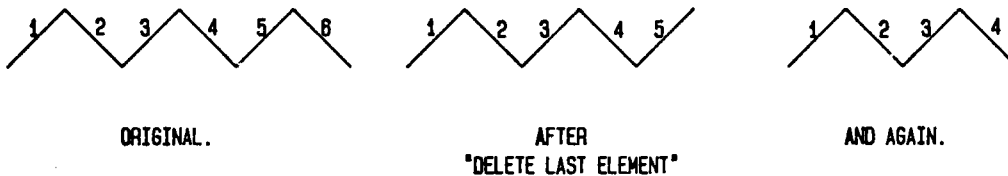
To erase the last element drawn.

**Operation :**

Pressing this button will erase the last element drawn and the cursor will be placed at the previous point. A further press will delete the element drawn prior to the last element, etc, etc.

**Example :**

NUMBERS INDICATE DRAWING SEQUENCE.



**Special Considerations. :**

Because a number of key presses can be "queued" by the system, the user is warned not to repeatedly press this key too quickly as more elements than necessary may be deleted!

"CANCEL DELETE" will replace the last element deleted, but only once! e.g. after the example above, pressing "CANCEL DELETE" will replace element 5, but element 6 is lost forever.

-----  
**BUTTON DEFINITION**  
**EDITING AND RECOVERY**  
 -----

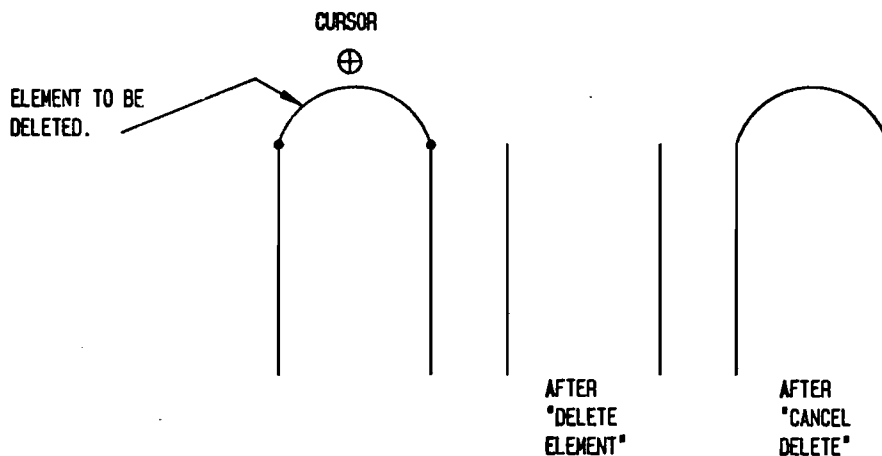
|  |   |                            |
|--|---|----------------------------|
| <b>Button</b><br><b>Name</b><br><b>Function Type</b><br><b>Hierarchy</b><br><b>Termination</b><br><b>Purpose</b> : | <div style="border: 1px solid black; padding: 2px; display: inline-block; text-align: center;">         CANCEL<br/>DELETE       </div><br>: Cancel Delete<br>: Non Modal<br>: Major Command<br>:<br>: | <b>Menu Position</b> : M16 |
|--|---|----------------------------|

To redraw the last element deleted, i.e. the user may recover if the cursor was inadvertently closer to an element other than the one intended.

**Operation** :

Pressing this command will redraw the last element deleted.

**Example** :



**Special Considerations.** :

This function is only available to recover from the one last element accidentally deleted by "DELETE LAST etc", "DELETE (NEXT PREVIOUS) etc", and sometimes "DELETE SEGMENT" (the last **only** when a complete element has been remove, **not** when a segment has been removed).



-----  
**BUTTON DEFINITION**  
**EDITING AND RECOVERY**  
 -----

|                      |  |                            |
|----------------------|--|----------------------------|
| <b>Button</b>        | DELETE<br>ELEMENT  | <b>Menu Position</b> : 015 |
| <b>Name</b>          | : Delete Element   |                            |
| <b>Function Type</b> | : Modal  |                            |
| <b>Hierarchy</b>     | : Major Command  |                            |
| <b>Termination</b>   | : Using the command DWG.MODE (M14) or entry of another command |                            |

**Purpose :**

To selectively delete any element on a drawing.

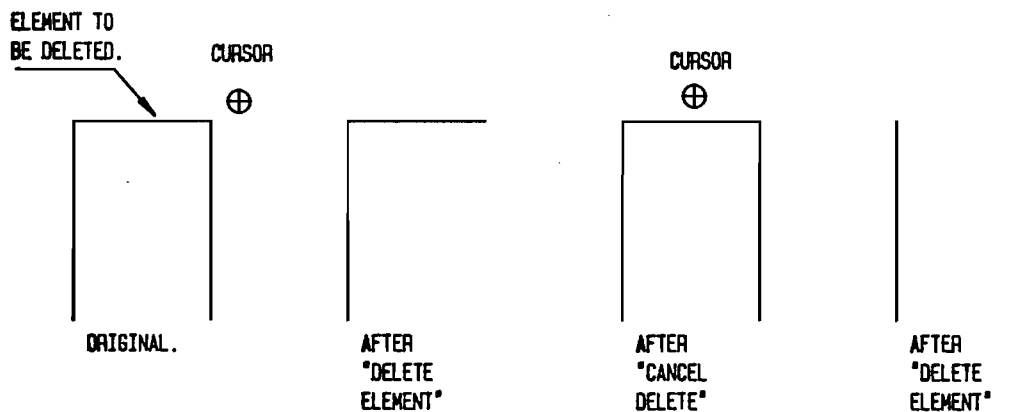
**Operation :**

Indicate the selected element with the cursor - the element indicated will be erased. (Be sure that the cursor is closer to the selected element than any other).

If the wrong element is accidentally deleted, press CANCEL DELETE.

**Example :**

SHOWING RECOVERY FROM ACCIDENTALLY DELETING THE WRONG ELEMENT.

**Special Considerations. :**

The enabled scope and the complexity of the drawing will affect the response time of this function.

-----  
**BUTTON DEFINITION**  
**EDITING AND ERROR RECOVERY**  
 -----

|  |   |                            |
|--|---|----------------------------|
| <b>Button</b><br><b>Name</b><br><b>Function Type</b><br><b>Hierarchy</b><br><b>Termination</b><br><b>Purpose</b> | <div style="border: 1px solid black; padding: 2px; display: inline-block; text-align: center;">       DELETE<br/>       PREVIOUS<br/>       ELEMENT     </div><br>: Delete Previous Element<br>: Non Modal<br>: Major Command<br>:<br>: | <b>Menu Position</b> : N15 |
|--|---|----------------------------|

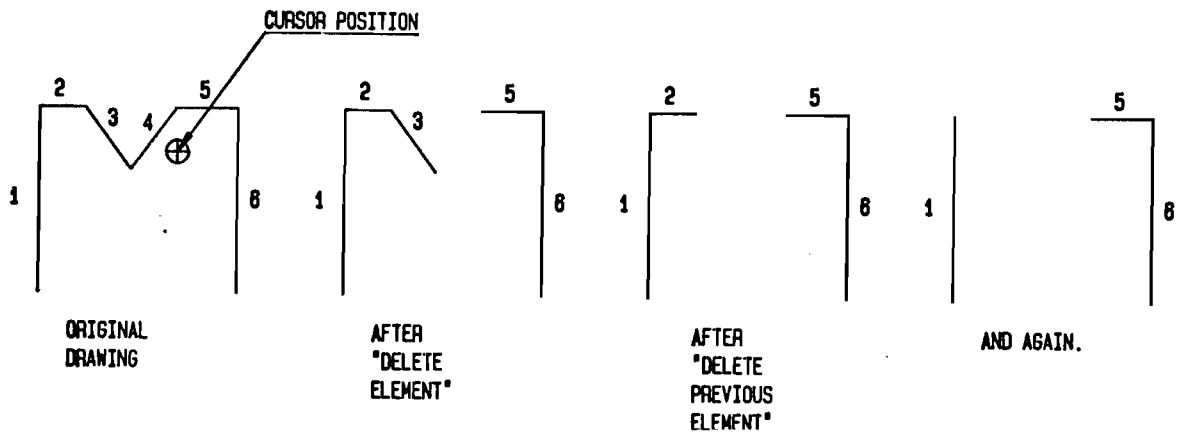
To delete the element drawn prior to the last deleted element. This command also permits the system to delete elements more quickly since it refers to an already found and deleted element and need not search through the whole drawing for that element.

**Operation :**

Pressing this command will delete an element as shown below.

**Example :**

NUMBERS indicate original drawing sequence.



**Special Considerations. :**

Normally used sequentially after DELETE ELEMENT (015)

-----  
**BUTTON DEFINITION**  
**EDITING AND ERROR RECOVERY**  
 -----

|                      |  |                            |
|----------------------|--|----------------------------|
| <b>Button</b>        | DELETE<br>NEXT<br>ELEMENT                                      | <b>Menu Position</b> : P15 |
| <b>Name</b>          | : Delete Next Element  |                            |
| <b>Function Type</b> | : Modal  |                            |
| <b>Hierarchy</b>     | : Major Command  |                            |
| <b>Termination</b>   | : Using the command DWG.MODE(M14) or entry of another command. |                            |
| <b>Purpose</b> :     |  |                            |

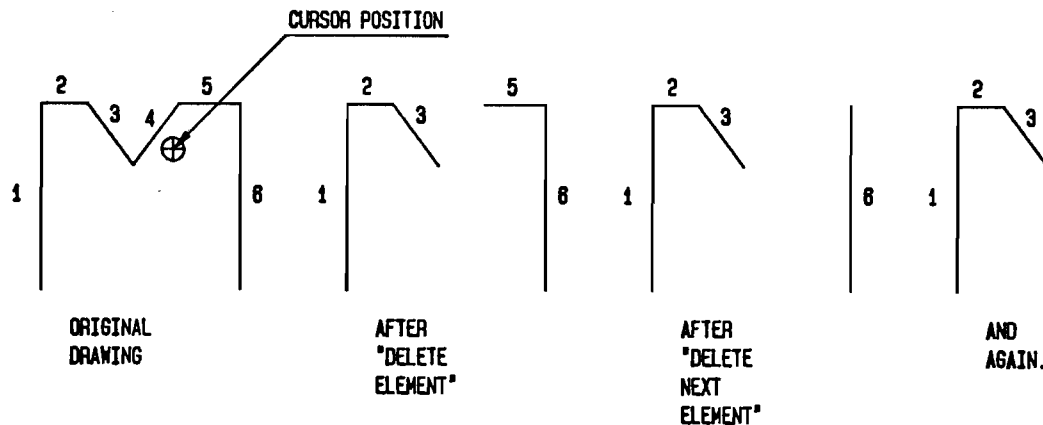
To delete the element which was drawn after the last deleted element. This command also permits the system to delete elements more quickly since it refers to an already found and deleted element and need not search through the whole drawing for that element.

**Operation :**

Pressing this command will delete an element as shown below.

**Example :**

NUMBERS indicate original drawing sequence.

**Special Considerations. :**

Normally used sequentially after DELETE ELEMENT (015).

-----  
**BUTTON DEFINITION**  
**EDITING AND RECOVERY**  
 -----

DELETE  
SEGMENT  
CURR. PAT.

**Button** **Menu Position : N16**  
**Name** : Delete Segment Current pattern  
**Function Type** : Modal  
**Hierarchy** : Major Command  
**Termination** : Using the command DWG.MODE (M14) or entry of another command.

**Purpose :**

To allow the user to delete the segment of an element (line or arc) up to, or between real line intersections in the current pattern being worked on.

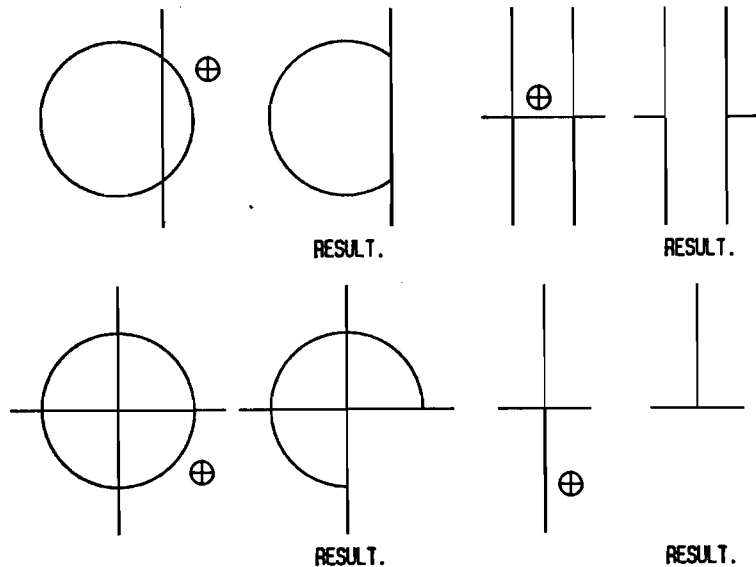
**Operation :**

Indicate the required segment with the cursor - the segment will be erased as shown below.

**Example :**

TO DELETE SEGMENTS AS SHOWN.

- 1) PRESS DELETE  
SEGMENT  
CURR. PAT.  
 2) INDICATE THE APPROXIMATE CURSOR POSITION. ⊕



**Special Considerations. :**

The element containing the segment to be deleted must be part of the current pattern. The intersecting elements need not be in the current pattern. Use HIGHLIGHT PATTERN & EDIT PATTERN to confirm which pattern is desired.

-----  
**BUTTON DEFINITION**  
**EDITING AND ERROR RECOVERY**  
 -----

|                      |  |                            |
|----------------------|--|----------------------------|
| <b>Button</b>        | DIVIDE<br>ELEMENT  | <b>Menu Position</b> : 016 |
| <b>Name</b>          | : Divide Element   |                            |
| <b>Function Type</b> | : Modal  |                            |
| <b>Hierarchy</b>     | : Major Command  |                            |
| <b>Termination</b>   | : Using the command DWG.MODE (M14) or another major command. |                            |
| <b>Purpose</b> :     |  |                            |

To allow the user to divide an element at a specified location.

**Operation :**

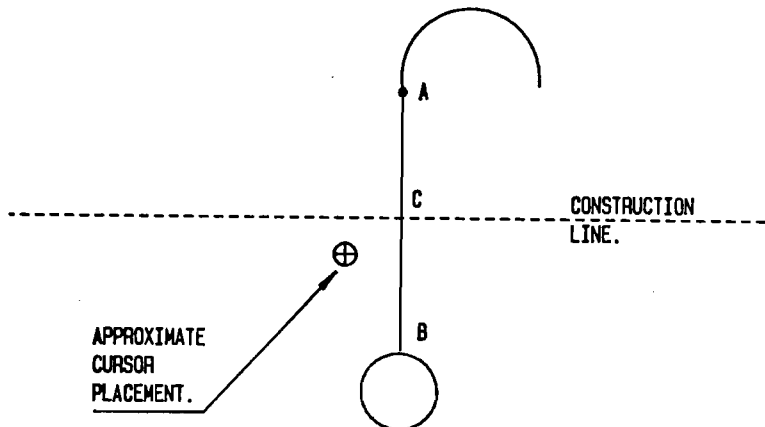
The operator will be prompted to indicate the element to be divided. The division point will be selected according to the current cursor placement method chosen.

**Example :**

TO DIVIDE LINE AB AT INTERSECTION C.

ENTRY BY ANY INT.ACTIVE

- 1) press DIVIDE  
ELEMENT
- 2) indicate line AB with the cursor.
- 3) place the cursor as shown.
- 4) line AB will be divided at C  
& each half may be moved or  
erased separately.



**Special Considerations. :**

If the division point is indicated while in freehand mode, the point on the required element closest to the point indicated will be used as the point of division.

-----  
**BUTTON DEFINITION**  
**EDITING AND ERROR RECOVERY**  
 -----

**Button**

BLOCK  
DELETE

**Menu Position : P16****Name**

: Block Delete

**Function Type**

: Modal

**Hierarchy**

: Major Command

**Termination**

:

**Purpose :**

To selectively delete a number of elements by fully enclosing them in a polygon.

**Operation :**

The above command will prompt the user to enclose the desired elements in a polygon - this is done by tracking the cursor to the first vertex of the polygon and pressing the pen down. Successive vertices are entered in the same way. The function is terminated and the first and last vertex closed by the command CLOSE POLYGON (G13).

**Example :**

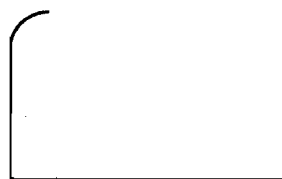
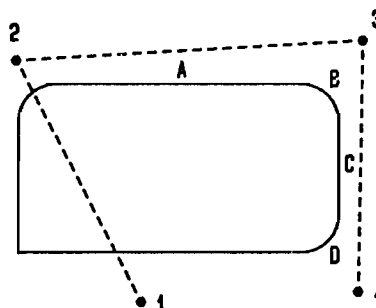
TO DELETE ELEMENTS A, B, C &amp; D.

1) press "BLOCK DELETE"

2) indicate the approximate points 1, 2, 3, 4.

3) press "CLOSE POLYGON"

ELEMENTS A, B, C &amp; D ARE ERASED.

**RESULT.****Special Considerations. :**

A polygon in the form of a rectangle may be entered by indicating two diagonal points and then using the command CLOSE POLYGON.

All elements fully enclosed in this polygon will be deleted, partially enclosed elements will remain.

-----  
**BUTTON DEFINITION**  
**EDITING AND ERROR RECOVERY**  
 -----

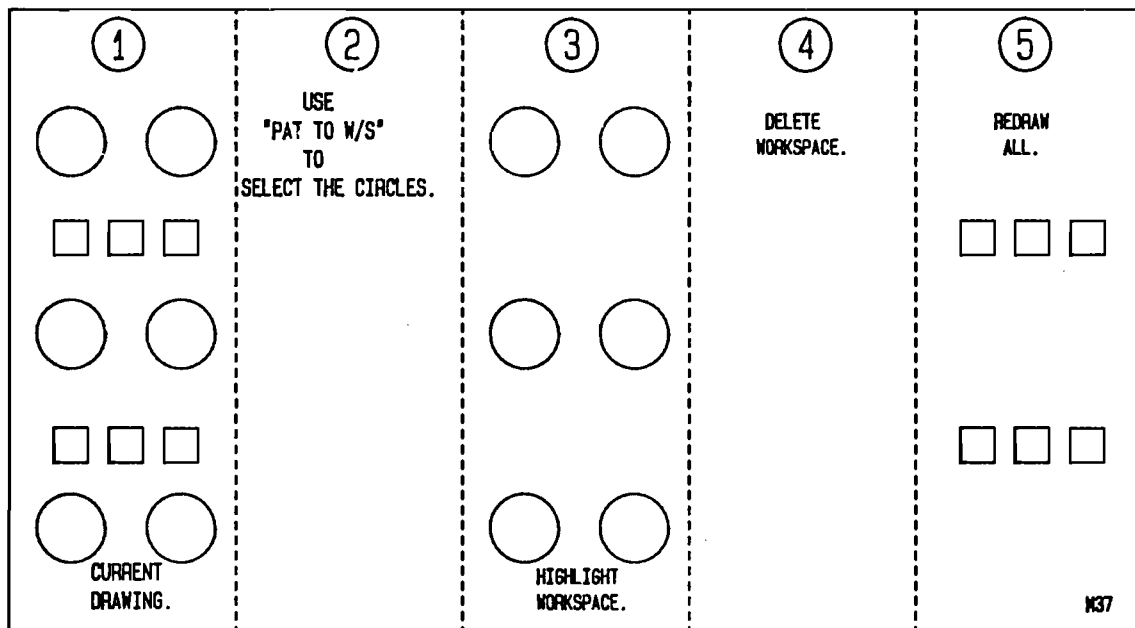
|  |   |                            |
|--|---|----------------------------|
| <b>Button</b><br><b>Name</b><br><b>Function Type</b><br><b>Hierarchy</b><br><b>Termination</b><br><b>Purpose</b> : | <div style="border: 1px solid black; padding: 2px; display: inline-block; text-align: center;">DELETE<br/>W/S</div><br>: Delete Workspace<br>: Non Modal<br>: Major Command<br>:<br>: | <b>Menu Position</b> : Q21 |
|--|---|----------------------------|

To allow the user to assign patterns to the workspace (See PATTERNS & WORKSPACE pages 7:19/34), prior to using this command - following which this command may be used to **ERASE ALL PATTERNS ASSIGNED TO THE WORKSPACE** in a block rather than individually.

**Operation :**

The user will be prompted to press this button a second time (a contingency against accidental erasure). **All patterns assigned to the workspace** will be erased from memory on the second press.

**Example :**



**Special Considerations. :**

Use **HIGHLIGHT WORKSPACE** to ensure that all chosen patterns have indeed been transferred there. There is no recovery from this command. If in doubt, press **ABORT**.

This is much quicker than **BLOCK DELETE** and should be used when whole patterns are to be removed.

---

**BUTTON DEFINITION**  
**EDITING AND ERROR RECOVERY**

---

|                      |  |                           |
|----------------------|--|---------------------------|
| <b>Button</b>        | <div style="border: 1px solid black; border-radius: 10px; padding: 2px; display: inline-block;">ERASE<br/>MEMORY</div> | <b>Menu Position : M2</b> |
| <b>Name</b>          | : Erase Memory   |                           |
| <b>Function Type</b> | : Non Modal  |                           |
| <b>Hierarchy</b>     | : Major Command  |                           |
| <b>Termination</b>   | :  |                           |
| <b>Purpose</b>       | :  |                           |

To erase all drawings currently in computer memory. (not to be confused with drawings stored on a disc).

**Operation :**

The user will be prompted to press this button a second time (a contingency against accidental erasure) - on the second press all drawings will be irrecoverably erased from memory.

**Example :**

N/A

**Special Considerations. :**

Because commands may be "queued" by the system the operator is warned not to press this button twice quickly. If there is any doubt after the first press, use ABORT.



---

**SYSTEM ERROR RECOVERY**  
e.g. Following a System Error.

---

1. Fill in the error report form and return to supplier.

Depending on the extent of the error - various recovery methods are possible.

2. If an error dump occurs - press "CONT". If the system returns to normal and operates normally, continue as normal.
3. If the system "hangs" all commands inoperative - hold the "CONTROL" button and press "STOP" - release "CONTROL" and press "CONT" - try again - normally this cures most problems, unfortunately on occasion the program may become corrupted. If so, please accept our apologies and proceed to the next option.
4. If none of the above helps - switch off and re-load the program. **All drawing data will be lost** - unless it was stored on disc. (See Section 9.)

**NOTE!**

For temporarily using the computer to do calculations, cataloguing or initializing discs etc - use the PAUSE button - once completed use the CONT button.

**IMPORTANT!**

**All reported bugs or system malfunctions receive the highest possible priority.**

---

**CONSTRUCTION GEOMETRY**

---

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---

**CONSTRUCTION GEOMETRY  
OVERVIEW**

---

Temporary lines and circles - the equivalent of the lightly drawn lines a draughtsman would use for construction, before drawing firm profiles and lines - are referred to on the CAD system as construction geometry lines or circles.

The commands for construction geometry are grouped directly above the cursor tracking area.

In many cases these commands make use of existing points, lines and arcs in defining further lines and circles.

Construction geometry lines and circles are unbounded i.e. lines are endless and circles are complete.

When sufficient geometry has been generated to start a drawing, the user returns the system to DRAWING MODE and selects those portions of the geometry elements necessary to the object being drawn. This is a similar process to the draughtsman "inking over" those portions of his light pencil lines he requires for the final drawing.

Construction geometry will not appear on a plotted drawing and is shown on the screen as dotted line or circles to differentiate them from "real" elements.

Construction geometry is a convenient method of drawing complex shapes (with little or no calculation required of the user) by simply indicating on the screen the relationship of points, lines and circles to one another as prompted by the system. e.g. Tangency points, intersections etc.

-----  
**BUTTON DEFINITION**  
**CONSTRUCTION GEOMETRY**  
 -----

**Button****Menu Position : J8****Name**

: Parallel Lines

**Function Type**

: Modal

**Hierarchy**

: Major Command

**Termination**

: Using the command DWG.MODE or entering another command.

**Purpose :**

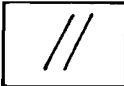
To draw construction lines parallel to an existing line at known distances. Parallel lines at the distances entered may be drawn relative to another line at the completion of each cycle, etc., etc.

**Operation :**

A list of up to 30 values, + and/or -, separated by commas, may be entered. The values are distances measured from any base line to be indicated by placing the cursor on the desired side of that line, when prompted to by the system. If no geometry lines exist - a vertical and horizontal line will be drawn through the origin, allowing parallel lines to be entered in the same way from either of those lines - on completion of a cycle this command returns to the point where the cursor may be placed relative to another base line etc, etc.

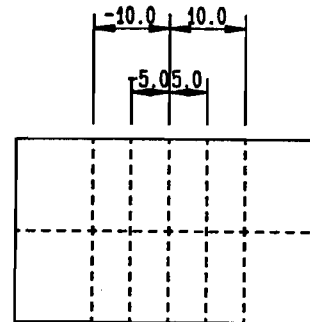
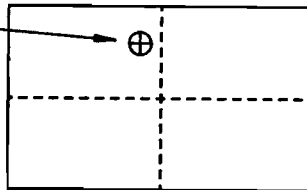
**Example :**

TO DRAW VERTICAL PARALLEL LINES OF DISTANCES 5, -5, 10, -10 FROM THE ORIGIN.

1) press 

2) enter 5, -5, 10, -10  
& press 'CONT'

3) place the cursor here  
(closer to the vertical  
than the horizontal line)



**THIS IS THE RESULT**  
 (the cursor could again be  
 placed using any of these lines  
 as a base line.)

**Special Considerations. :**

The base line may be at any angle and can be a real drawing line or a geometry line.

---

BUTTON DEFINITION  
CONSTRUCTION GEOMETRY

---



**Button** : **Menu Position** : K8  
**Name** : Parallel lines by entry of repetitive distances  
**Function Type** : Modal  
**Hierarchy** : Major Command  
**Termination** : Using the command DWG.MODE or entering any other command.  
**Purpose** :

Identical to parallel lines (Page 4:3).

**Operation** :

Same as Parallel Lines, except that after the specified lines have been drawn, the system no longer "remembers" these values and prompts the operator to enter a new set of distances.

**Example** :

See Parallel Lines.

**Special Considerations.** :

See Parallel Lines.

-----  
**BUTTON DEFINITION**  
**CONSTRUCTION GEOMETRY**  
 -----



**Button** : **Menu Position** : L8  
**Name** : Parallel Lines by Entry of Incremental Distances  
**Function Type** : Modal  
**Hierarchy** : Major Command  
**Termination** : Using the command DWG.MODE or entering another command.  
**Purpose** :

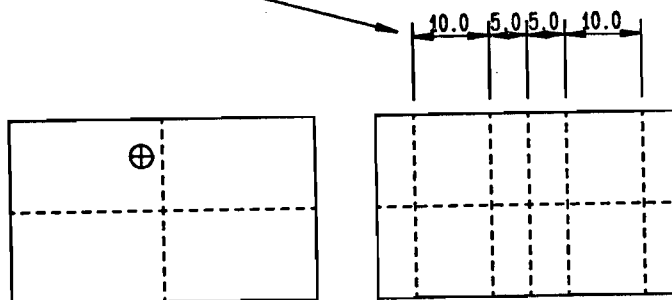
Identical to Parallel Lines (Page 4:3), except that the values entered are incremental distances between the lines - not absolute distances from a base line.

**Operation** :

Identical to Parallel Lines.

**Example** :

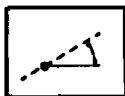
SAME AS PARALLEL LINES PAGE 3, BUT WITH THIS RESULT.



**Special Considerations.** :

Identical to Parallel Lines.

-----  
**BUTTON DEFINITION**  
**CONSTRUCTION GEOMETRY**  
 -----

**Button****Menu Position : H7****Name**

: Line by Point and Angle

**Function Type**

: Modal

**Hierarchy**

: Major Command

**Termination**

: Using the command DWG.MODE or entering another command.

**Purpose :**

To draw Construction Line(s) through an indicated Point - by listing the Angle(s) of the Line(s)

**Operation :**

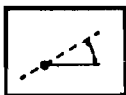
A list of up to 30 values may be entered, separated by commas. The cursor is then placed on a point through which the line will pass using any cursor placement method.

**Example :**

TO DRAW CONSTRUCTION LINES OF ANGLES 45° & -45° THROUGH THE TERMINATION POINT B ON LINE AB.

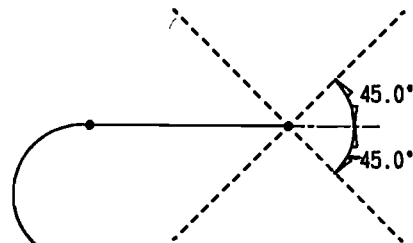
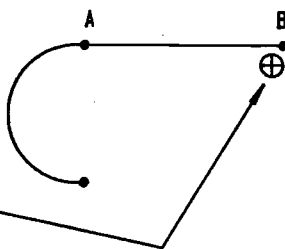
CHECK THAT ENTRY BY POINTS MODE IS ACTIVE.

1) press



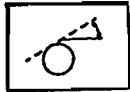
2) enter 45, -45  
& press 'CONT'

3) place the cursor  
approximately here.

**Special Considerations. :**

None

-----  
**BUTTON DEFINITION**  
**CONSTRUCTION GEOMETRY**  
 -----



**Button Name** : Line Tangent to Circle at an Angle  
**Function Type** : Modal  
**Hierarchy** : Major Command  
**Termination** : Using the command DWG.MODE (M14) or entering another command.

**Menu Position** : I7

**Purpose** :

To draw a construction line tangent to an existing circle/arc at an angle.

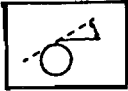
**Operation** :

An Angle value is entered, following which the approximate required tangency point on the circle or arc is indicated. A line will be drawn tangent to the circle, on the side indicated, at the angle entered.

**Example** :

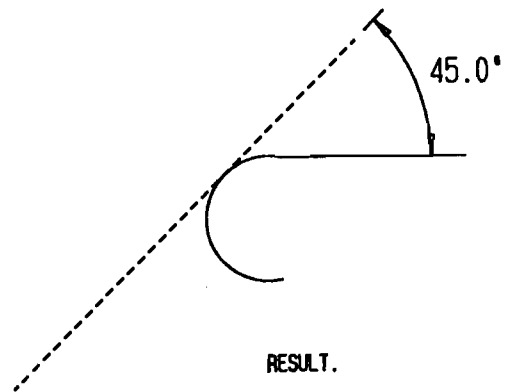
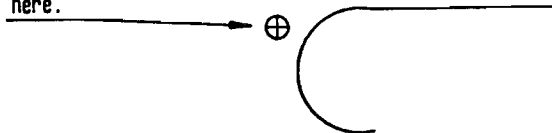
TO DRAW A LINE AT AN ANGLE OF 45° AND TANGENT TO THE ARC AS SHOWN.

1) press



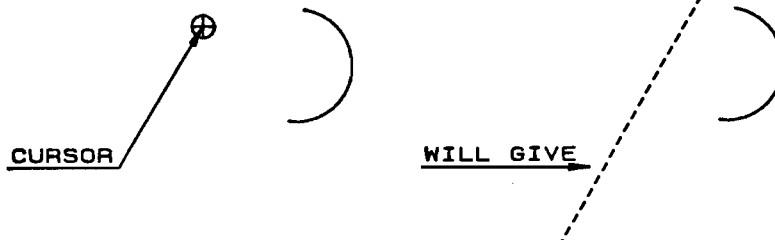
2) enter 45 &  
press 'CONT'

3) place the cursor  
approximately here.



**Special Considerations.** :

If a drawing arc is indicated, it will be treated as if it were a complete circle e.g.





-----  
**BUTTON DEFINITION**  
**CONSTRUCTION GEOMETRY**  
 -----



**Button Name** : Line through a Point & Tangent to a Circle  
**Menu Position** : J7  
**Function Type** : Modal  
**Hierarchy** : Major Command  
**Termination** : Using the command DWG.MODE (M14) or entering another command.  
**Purpose** :

To draw a Construction line tangent to an existing circle/arc and through an indicated point.

**Operation** :

The cursor is placed on a point through which the line will pass, using any cursor placement method - following which the approximate required tangency point on the circle or arc is indicated. A line will be drawn through the point and tangent to the circle or arc on the side indicated.

**Example** :

TO DRAW A LINE THROUGH THE TERMINATION POINT B ON LINE AB, AND TANGENT TO THE CIRCLE AT C.

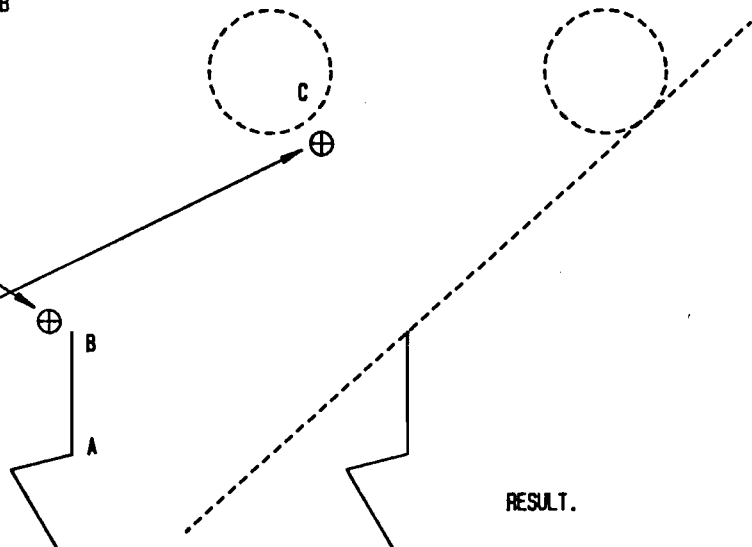
CHECK THAT ENTRY BY POINTS IS ACTIVE.

1) press



2) place the cursor approximately here.

3) place the cursor approximately here.



**Special Considerations.** :

None

-----  
**BUTTON DEFINITION**  
**CONSTRUCTION GEOMETRY**  
 -----



**Button Name** : Line through two Points **Menu Position** : K7  
**Function Type** : Modal  
**Hierarchy** : Major Command  
**Termination** : using the command DWG.MODE (M14) or entering another command.

**Purpose** :

To draw a construction line through two indicated points.

**Operation** :

The cursor is placed on two points, using any placement method for each point.

**Example** :

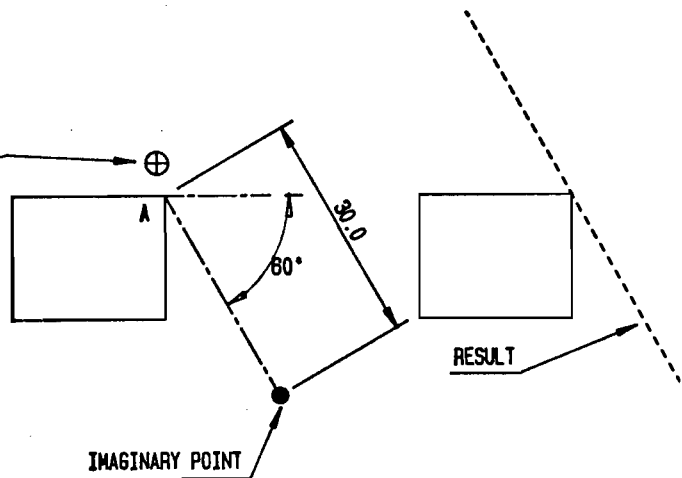
TO DRAW A LINE THROUGH POINT A, AND THROUGH A (NON EXISTENT) POINT AT ADISTANCE OF 30 AND AN ANGLE OF -60° FROM A.

1) press



2) place the cursor approx. here

3) enter d30, a-60 and press 'CONT'



**Special Considerations.** :

The above example is not the best way to draw a construction line through point A - the reason for using this method was to illustrate that ANY METHOD may be used to define either point.

-----  
**BUTTON DEFINITION**  
**CONSTRUCTION GEOMETRY**  
 -----



**Button Name** : Line Tangent to two Circles **Menu Position** : L7  
**Function Type** : Modal  
**Hierarchy** : Major Command  
**Termination** : Using the command DWG.MODE (M14) or entering another command.  
**Purpose** :

To draw a Construction line Tangent to two existing Circles/Arcs.

**Operation** :

The approximate tangency point on each of the two arcs or circles is indicated. A line will be drawn tangent to each, on the side indicated.

**Example** :

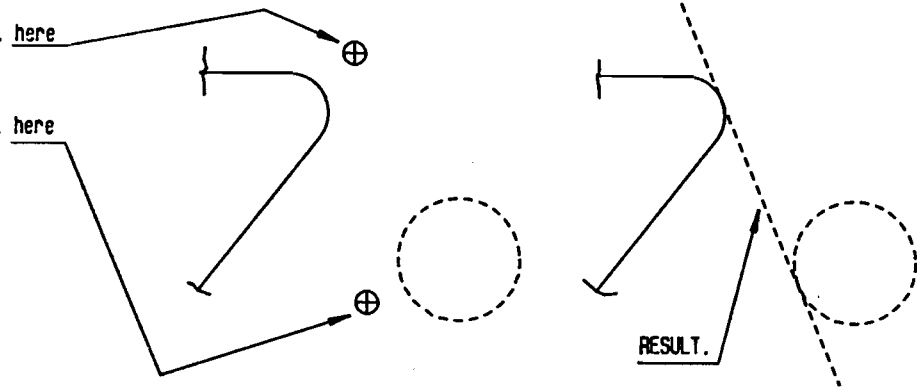
TO DRAW A LINE TANGENT TO THE CIRCLE AND ARC AS SHOWN.

1) press



2) place the cursor approx. here

3) place the cursor approx. here



**Special Considerations.** :

Drawing arcs are treated as if they were complete circles.

-----  
**BUTTON DEFINITION**  
**CONSTRUCTION GEOMETRY**  
 -----



**Button Name** : Circles by Centre and Radius **Menu Position** : H6  
**Function Type** : Modal  
**Hierarchy** : Major Command  
**Termination** : Using the command DWG.MODE (M14) or entering another command.  
**Purpose** :

To draw Construction Circle(s) by entering the radii and indicating a centre point.

**Operation** :

A list of up to 30 radii may be entered, separated by commas. Any of the cursor placement methods may be used to select the centre point. Circles of the specified radii will be drawn about that point.

**Example** :

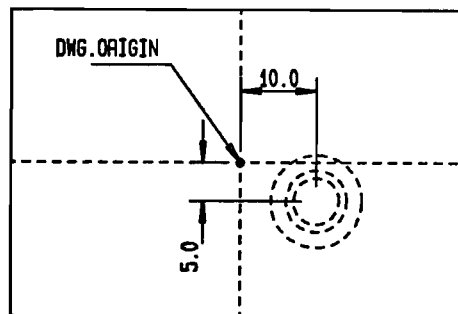
TO DRAW CIRCLES OF RADII 2, 3 & 5 ABOUT A CENTRE POINT OF X10 & Y-5 FROM THE ORIGIN.

1) press



2) enter 2, 3, 5 & press 'CONT'

3) enter X10, Y-5 & press 'CONT'



**Special Considerations.** :

None

-----  
**BUTTON DEFINITION**  
**CONSTRUCTION GEOMETRY**  
 -----



**Button Name** : Circle by Centre Point & a Point on the Circumference  
**Menu Position** : I6  
**Function Type** : Modal  
**Hierarchy** : Major Command  
**Termination** : Using the command DWG.MODE (M14) or entering another command.  
**Purpose** :

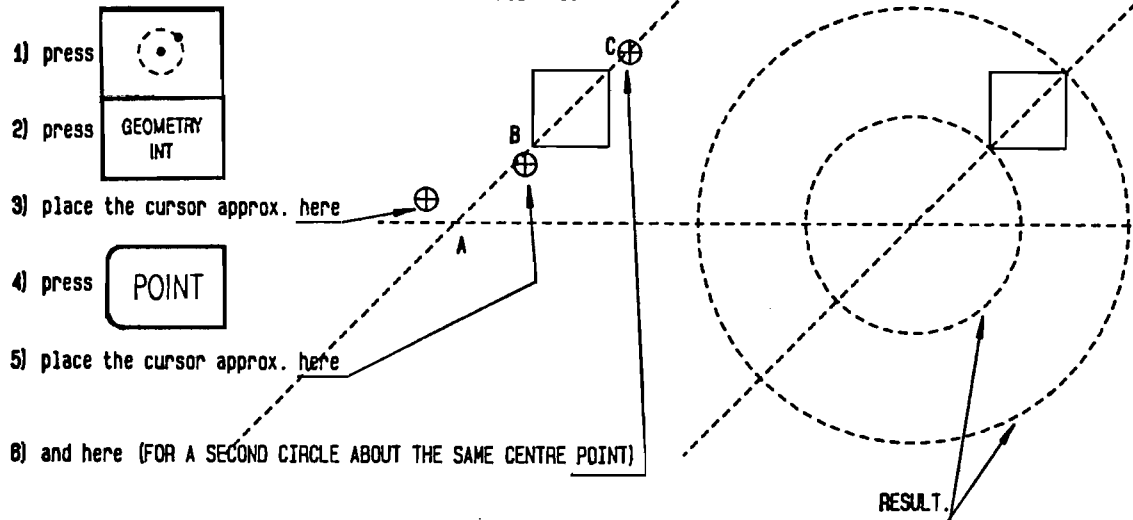
To draw a construction circle by indicating the centre point and a point on the circumference.

**Operation** :

Using any of the Cursor placement methods, indicate the centre point and then a point on the circumference.

**Example** :

TO DRAW 2 CIRCLES CENTRED AT INTERSECTION A, AND WITH THEIR CIRCUMFERENCES PASSING THROUGH POINT B & POINT C.



**Special Considerations.** :

None

-----  
**BUTTON DEFINITION**  
**CONSTRUCTION GEOMETRY**  
 -----



**Button** : **Menu Position** : J6  
**Name** : Circle by Centre Point and Tangent Element  
**Function Type** : Modal  
**Hierarchy** : Major Command  
**Termination** : Using the command DWG.MODE (M14) or entering another command.

**Purpose** :

To draw a construction circle by indicating its centre point and an element tangent to that circle.


**Operation** :

Place the cursor on the required centre point, using any placement method, then indicate an approximate tangency point to the desired element.

**Example** :

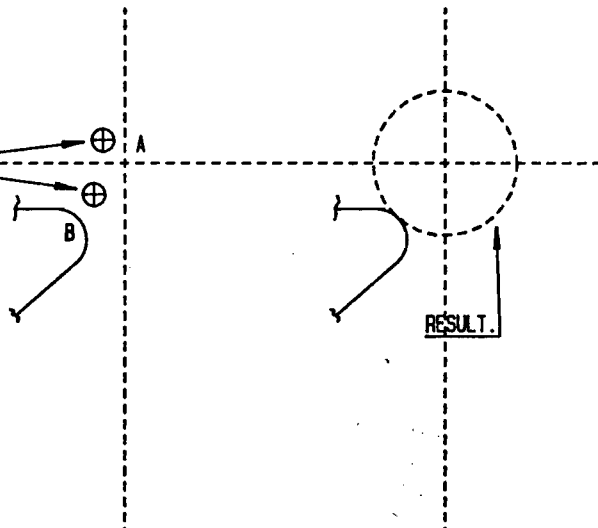
TO DRAW A CIRCLE CENTRED AT INTERSECTION A AND TANGENT TO THE ARC AT B.

CHECK THAT ENTRY BY GEOMETRY INT. IS ACTIVE

1) press 

2) place the cursor approx. here

3) place the cursor approx. here



**Special Considerations.** :

None

-----  
**BUTTON DEFINITION**  
**CONSTRUCTION GEOMETRY**  
 -----



**Button** : **Menu Position** : K6  
**Name** : Circle by Radius Value and two points on the Circumference.  
**Function Type** : Modal  
**Hierarchy** : Major Command  
**Termination** : Using the command DWG.MODE (M14) or entering another command.

**Purpose** :

To draw a Construction circle by entering a radius value and indicating two points through which its circumference must pass.

**Operation** :

A Radius value is entered, followed by 2 points selected by any of the cursor placement methods.

**Example** :

TO DRAW A CIRCLE WITH A RADIUS OF 11.0,  
 AND WITH ITS CIRCUMFERENCE PASSING THROUGH  
 POINTS A & B. (A & B have known co-ordinates from the origin.)

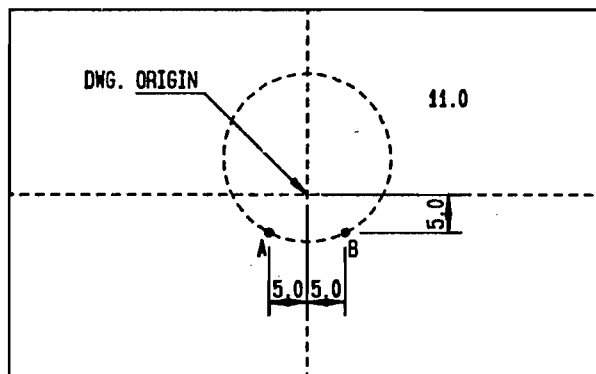
1) press



2) enter 11 & press 'CONT'

3) enter X-5, Y-5 & press 'CONT'

4) enter X5, Y-5 & press 'CONT'

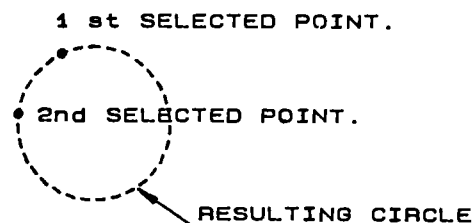
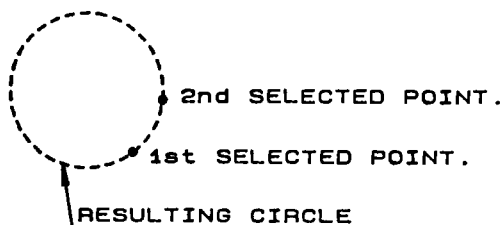


RESULT.

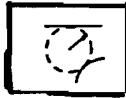
**Special Considerations.** :

To predict which "side" of the 2 points the circle will appear, simply follow this convention :-

Imagine standing on the first selected point looking towards the 2nd point to be selected and the circle will appear on the "left".



-----  
**BUTTON DEFINITION**  
**CONSTRUCTION GEOMETRY**  
 -----



**Button Name** : Circle by Radius and two Tangent elements. **Menu Position** : L6  
**Function Type** : Modal  
**Hierarchy** : Major Command  
**Termination** : Using the command DWG.MODE (M14) or entering another command.

**Purpose** :

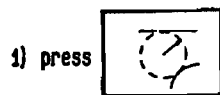
To draw a construction circle by entering its radius and indicating two existing tangent elements.

**Operation** :

A radius value is entered, following which two elements are indicated by placing the cursor at the approximate tangency point of each element.

**Example** :

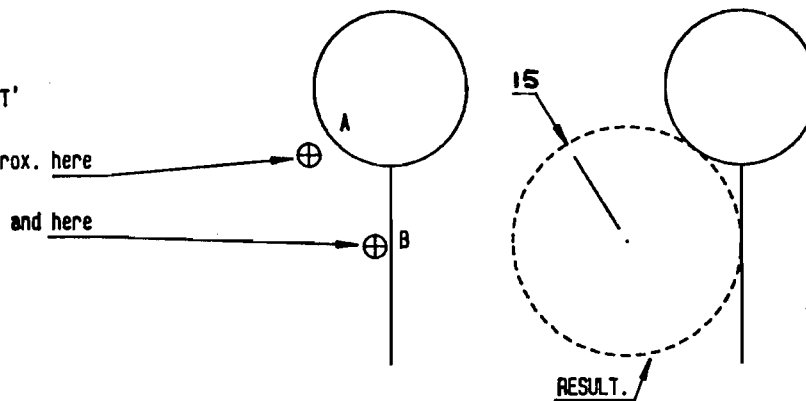
TO DRAW A CIRCLE OF RADIUS 15 TANGENT TO THE TWO ELEMENTS AT A & B.



2) enter 15 & press 'CONT'

3) place the cursor approx. here

4) and here



**Special Considerations.** :

None



-----  
**BUTTON DEFINITION**  
**CONSTRUCTION GEOMETRY**  
 -----



**Button Name** : Circle Tangent to 3 elements. **Menu Position** : H5  
**Function Type** : Modal  
**Hierarchy** : Major Command  
**Termination** : Using the command DWG.MODE (M14) or entering another command.

**Purpose** :

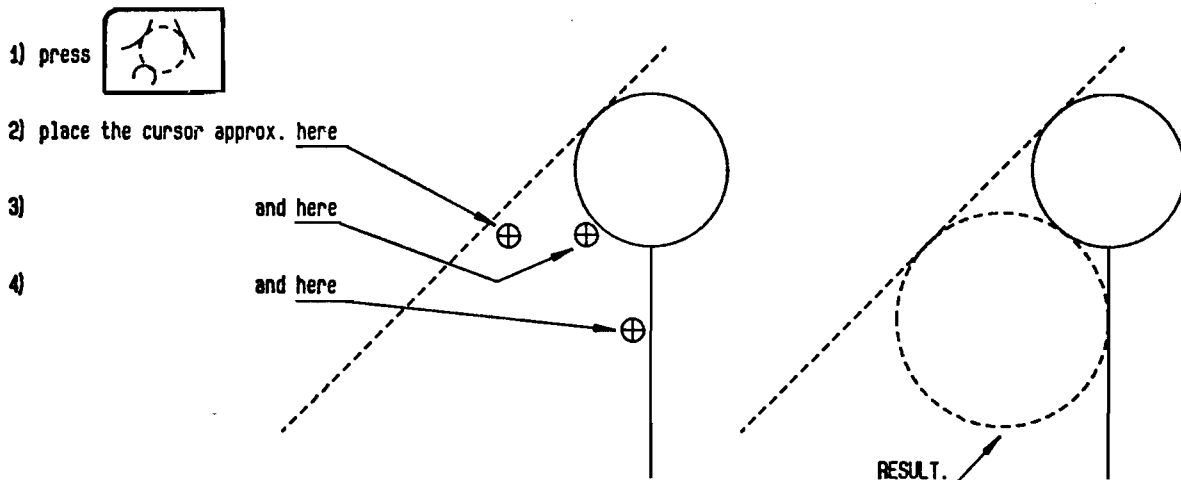
To draw a construction circle by indicating three existing tangent elements.

**Operation** :

Three elements are indicated by placing the cursor at the approximate tangency point of each element.

**Example** :

TO DRAW A CIRCLE TANGENT TO 3 ELEMENTS AS SHOWN.



**Special Considerations.** :

The solution for this type of construction element is very complex and relies on an iterative method. Should no solution be found, you will be prompted to try again by indicating the tangency points more accurately - i.e. the tangency points should be indicated in such a way as to best approximate their position on the circumference of the required construction circle.

-----  
**BUTTON DEFINITION**  
**CONSTRUCTION GEOMETRY**  
 -----



**Button Name** : Circle by Point on circumference and two tangent elements. **Menu Position** : I5  
**Function Type** : Modal  
**Hierarchy** : Major Command  
**Termination** : Using the command DWG.MODE (M14) or entering another command.

**Purpose** :

To draw a construction circle by indicating a point and 2 existing tangent elements through which the circumference must pass.

**Operation** :

A point through which the circumference must pass is indicated by using any cursor placement method. Following which the cursor is placed at the approximate tangency point of each of the two tangent elements.

**Example** :

TO DRAW A CIRCLE WITH THE CIRCUMFERENCE PASSING THROUGH POINT A, & TANGENT TO THE TWO ELEMENTS AS SHOWN.

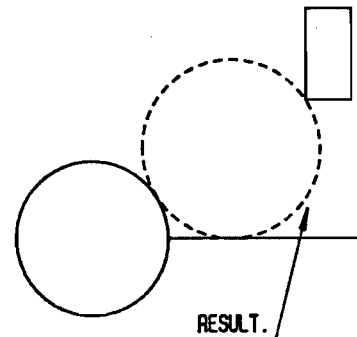
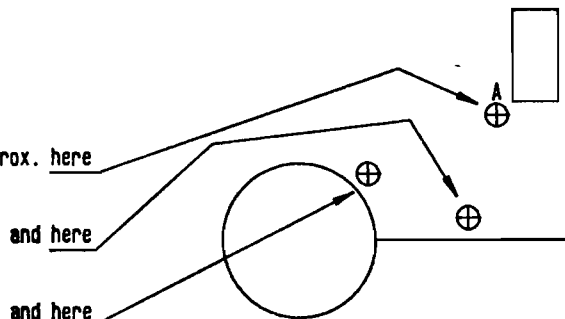
1) press



2) place the cursor approx. here

3) and here

4) and here



**Special Considerations.** :

None

-----  
**BUTTON DEFINITION**  
**CONSTRUCTION GEOMETRY**  
 -----

**Button****Menu Position : J5****Name**

: Circle by two Points on the Circumference and a Tangent element.

**Function Type**

: Modal

**Hierarchy**

: Major Command

**Termination**

: Using the command DWG.MODE (M14) or entering another command.

**Purpose :**

To draw a construction circle by indicating two points and a tangent element through which the circumference must pass.

**Operation :**

Two points through which the circumference must pass are indicated using any cursor placement method. Following which the cursor is placed at the approximate tangency point of the tangent element.

**Example :**

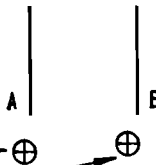
TO DRAW A CIRCLE WITH THE CIRCUMFERENCE  
 PASSING THROUGH POINTS A & B AND  
 TANGENT TO THE ELEMENT AS SHOWN.

WITH ENTRY BY POINTS MODE ACTIVE

1) press



2) place the cursor approx. here

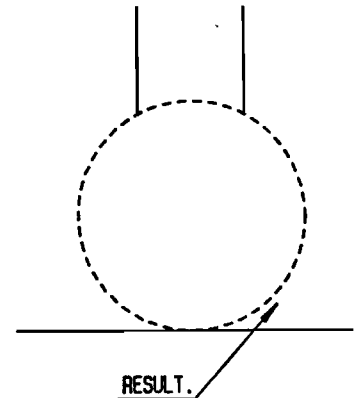
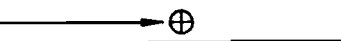


3) and here

and here

4) and here

and here

**Special Considerations. :**

None

-----  
**BUTTON DEFINITION**  
**CONSTRUCTION GEOMETRY**  
 -----



**Button Name** : Circle through three points. **Menu Position** : K5  
**Function Type** : Modal  
**Hierarchy** : Major Command  
**Termination** : Using the command DWG.MODE (M14) or entering another command.  
**Purpose** :

To draw a construction circle by indicating three points through which the circumference must pass.

**Operation** :

Three points are indicated, using any cursor placement method for each of the points.

**Example** :

TO DRAW A CIRCLE WITH THE CIRCUMFERENCE PASSING THROUGH POINTS A, B & C.

ENTRY BY GEOM INT. MODE ACTIVE

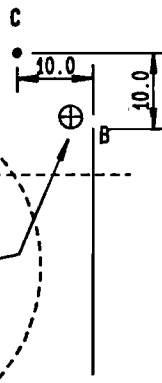


2) place the cursor approx. here



4) place the cursor approx. here

5) enter x-10, y10  
& press 'CONT'



RESULT.

**Special Considerations.** :

None

-----  
**BUTTON DEFINITION**  
**CONSTRUCTION GEOMETRY**  
 -----



**Button Name** : Circle by Radius, Point & Tangent element.  
**Function Type** : Modal  
**Hierarchy** : Major Command  
**Termination** : Using the command DWG.MODE (M14) or entering another command.  
**Menu Position** : L5  
**Purpose** :

To draw a construction circle by entering its radius and indicating a point and a tangent element through which the circumference must pass.

**Operation** :

A radius value is entered, following which a point through which the circumference must pass is indicated using any cursor placement method. Lastly the approximate tangency point of the required element is indicated.

**Example** :

TO DRAW A CIRCLE WITH A RADIUS OF 15, WITH ITS CIRCUMFERENCE PASSING THROUGH POINT A, AND TANGENT TO THE ELEMENT AS SHOWN.

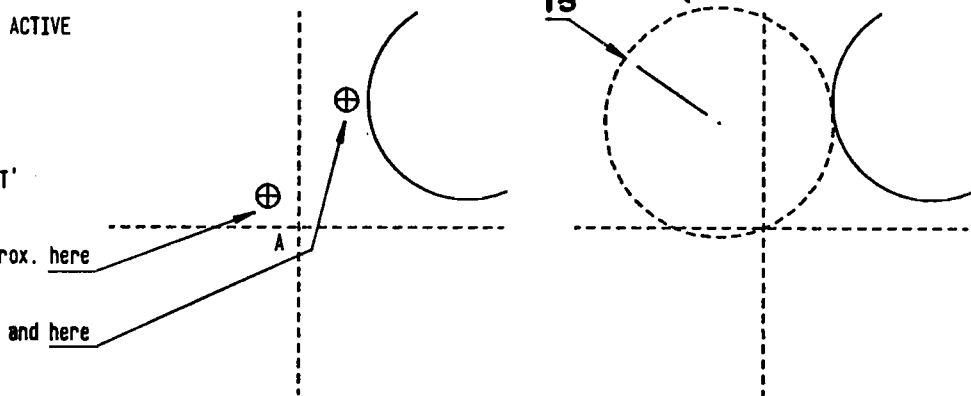
ENTRY BY GEOM INT. MODE ACTIVE

1) press 

2) enter 15 & press 'CONT'

3) place the cursor approx. here

4) and here



**Special Considerations.** :

None

-----  
**BUTTON DEFINITION**  
**CONSTRUCTION GEOMETRY**  
 -----

|                      |                         |                           |
|----------------------|-------------------------|---------------------------|
| <b>Button</b>        | GEOMETRY<br>AT<br>POINT | <b>Menu Position : H8</b> |
| <b>Name</b>          | : Geometry at Point     |                           |
| <b>Function Type</b> | : Non Modal             |                           |
| <b>Hierarchy</b>     | : Major Command         |                           |
| <b>Termination</b>   | :                       |                           |
| <b>Purpose</b>       | :                       |                           |

To automatically reconstitute the geometry at a selected point. This is the geometry which would have had to be specified to construct the elements passing through that point in the first place.

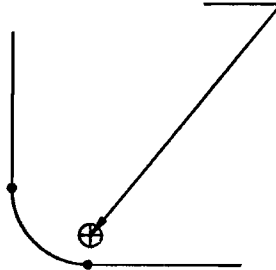
**Operation :**

Place the cursor close to the required point, the geometry elements will be drawn as explained above.

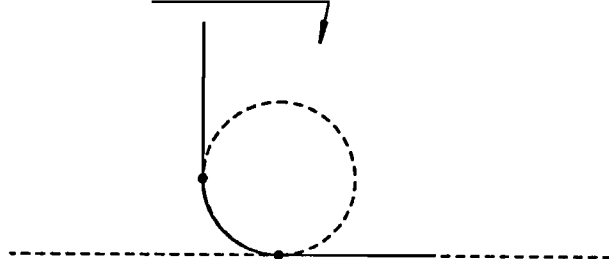
**Example :**

1) press GEOMETRY  
AT  
POINT

2) place the cursor approx. here



RESULTS IN.


**Special Considerations. :**

None

---

**BUTTON DEFINITION  
CONSTRUCTION GEOMETRY**

---

|                      |   |                           |
|----------------------|---|---------------------------|
| <b>Button</b>        |  | <b>Menu Position : M5</b> |
| <b>Name</b>          | : Delete Geometry from Scope  |                           |
| <b>Function Type</b> | : Non Modal   |                           |
| <b>Hierarchy</b>     | : Major Command   |                           |
| <b>Termination</b>   | :   |                           |
| <b>Purpose</b>       | :   |                           |

To erases all visible Geometry elements from memory.

**Operation :**

Set the Scope (See Page 7:3), then press this button.

**Example :**

N/A

**Special Considerations. :**

Deleting geometry is usually required when the number of geometry elements displayed makes the drawing confusing. Geometry elements are powerful but nevertheless temporary tools and it is wrong to think that deleting geometry is either fatal or final.

The selective reconstruction of geometry at any point on the drawing is achieved by the function GEOMETRY AT POINT.

---

**BUTTON DEFINITION  
CONSTRUCTION GEOMETRY**

---

|                      |   |                           |
|----------------------|---|---------------------------|
| <b>Button</b>        | <div style="border: 1px solid black; padding: 2px; display: inline-block;">DELETE<br/>GEOMETRY<br/>CIRCLE</div> | <b>Menu Position : M6</b> |
| <b>Name</b>          | : Delete Geometry Circle  |                           |
| <b>Function Type</b> | : Non Modal   |                           |
| <b>Hierarchy</b>     | : Major Command   |                           |
| <b>Termination</b>   | : Using the command DWG.MODE (M14) or entering another command.   |                           |

**Purpose :**

To Erase Geometry Circles as indicated with the cursor, in order to correct a wrongly specified circle or to remove confusing or obsolete circles.

**Operation :**

Self Explanatory.

**Example :**

N/A

**Special Considerations. :**

The geometry circle whose circumference is closest to the cursor at the time of selection will be deleted.



---

**BUTTON DEFINITION  
CONSTRUCTION GEOMETRY**

---

DELETE  
GEOMETRY  
LINE

**Button** : **Menu Position** : M7  
**Name** : Delete Geometry Line  
**Function Type** : Non Modal  
**Hierarchy** : Major Command  
**Termination** : Using the command DWG.MODE (M14) or entering another command.  
**Purpose** :

To erase Geometry Lines as indicated with the cursor, in order to correct a wrongly specified line or to remove confusing or obsolete lines.

**Operation** :

Self Explanatory.

**Example** :

N/A

**Special Considerations.** :

The construction line closest to the cursor at the time of selection will be deleted.

-----  
**BUTTON DEFINITION**  
**CONSTRUCTION GEOMETRY**  
 -----

|                      |  |                           |
|----------------------|--|---------------------------|
|                      | <div style="border: 1px solid black; padding: 2px; display: inline-block;">GET ANGLE<br/>FROM<br/>LINE</div> | <b>Menu Position : I8</b> |
| <b>Button Name</b>   | : Get Angle From Line.   |                           |
| <b>Function Type</b> | : Non Modal  |                           |
| <b>Hierarchy</b>     | : Direct Command   |                           |
| <b>Termination</b>   | :  |                           |
| <b>Purpose</b>       | :  |                           |

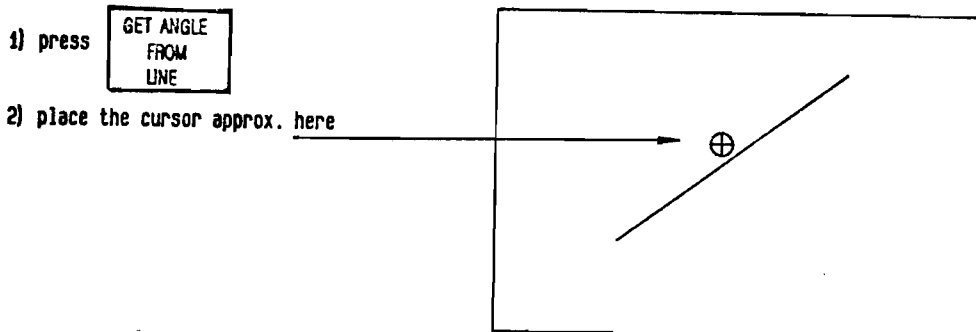
To establish the angle of any line on the screen by indicating that line with the cursor.

**Operation :**

This function prompts the user to indicate the line whose angle is required. This angle is then displayed in the entry area below the screen frame. It may be left alone or modified by an expression and used as an input value to any function requiring numerical entry.

**Example :**

TO ESTABLISH THE ANGLE OF THE LINE INSIDE THE RECTANGLE BELOW.



THE ANGLE VALUE IS DISPLAYED IN THE ENTRY AREA.

DR **DEG** **R** 1:1 19994 R3 X18.47 Y39.01  
 ??  
 44.3013056982

**Special Considerations. :**

A variable named "Angle" is set when this function is used (See Page 2:38) and the units are as specified by DEG, RAD, GRAD.

---



---

**DRAWING SOLID LINE TYPES OVER CONSTRUCTION GEOMETRY**

---



---

To draw over previously constructed geometry lines and circles, terminating at :-

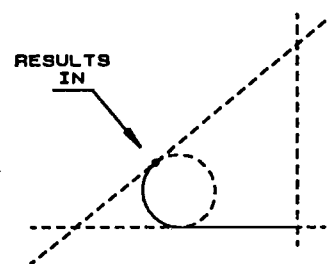
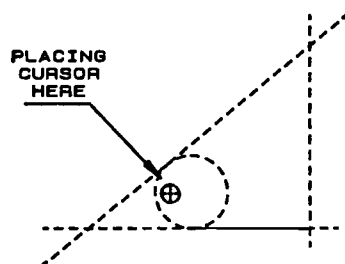
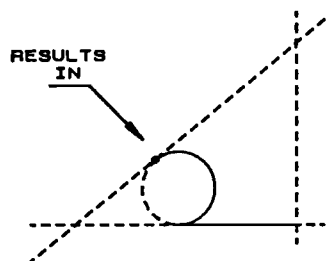
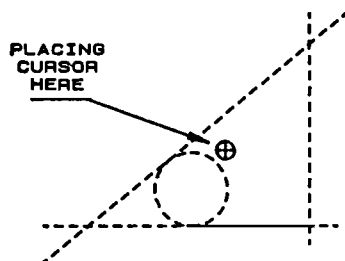
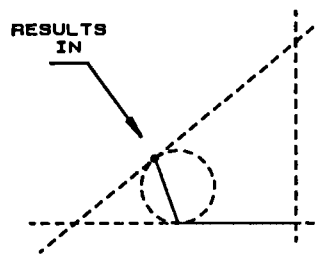
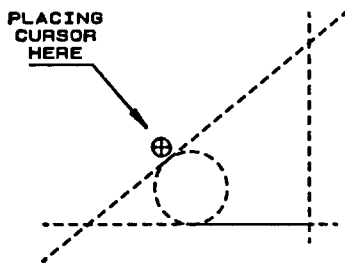
- Geometry intersections or Tangency points
- Real Line intersections, Tangency points or End Points
- A combination of both

simply indicate with the cursor the intersection or point to which you wish to draw (after choosing the appropriate cursor placement method).

Some simple rules are applicable - especially when indicating intersections :-

- A) The previous move or draw must place the cursor on the line/arc over which you wish to draw.
- B) The cursor must be placed closer to the line or arc over which you wish to draw than the intersecting line/arc/point, when indicating the terminal point - otherwise the result will be a straight line.
- C) In the case of Arcs, the direction is indicated by placing the cursor on the correct side of the intersection or terminal point - in stubborn cases use CLW ARC or CCW ARC to force the issue.

**Example :**



-----  
**BUTTON DEFINITION**  
**CONSTRUCTION GEOMETRY**  
 -----

NORM

**Button** **Menu Position** : E17  
**Name** : Normal (to a line or arc)  
**Function Type** : Non Modal  
**Hierarchy** : Major Command  
**Termination** :  
**Purpose** :

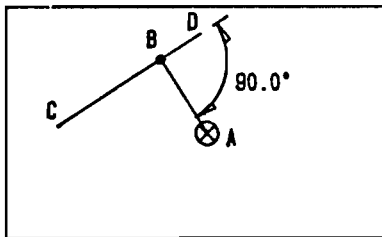
To place the cursor "normal" to a line or arc. i.e. on that line at 90 degrees to the line, or on an arc/circle in the direction of its centre point.

**Operation** :

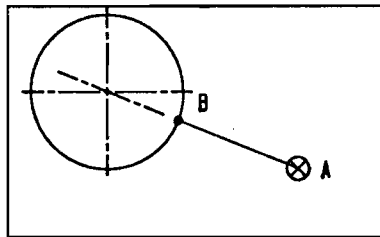
Indicate the line or arc on which you wish to place the cursor.

**Example** :

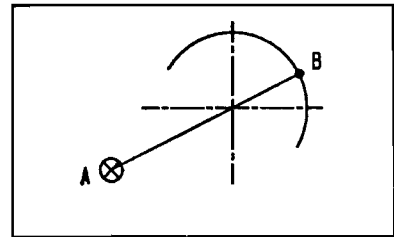
TO DRAW THE LINES AB FROM THE CURRENT CURSOR POSITION  
 NORMAL TO THE ELEMENT AT B IN EACH CASE.



LINE AB DRAWN NORMAL TO LINE CD  
 FROM LAST CURSOR POSITION ⊗



LINE AB DRAWN NORMAL TO CIRCLE  
 FROM LAST CURSOR POSITION ⊗



LINE AB DRAWN NORMAL TO ARC  
 FROM LAST CURSOR POSITION ⊗

**Special Considerations.** :

A move could have been done in each case - instead of drawing a line.

---

**BUTTON DEFINITION  
CONSTRUCTION GEOMETRY**

---

TAN

**Button Name** : Tangent (to an arc or circle) **Menu Position** : D17  
**Function Type** : Non Modal  
**Hierarchy** : Major Command  
**Termination** :  
**Purpose** :

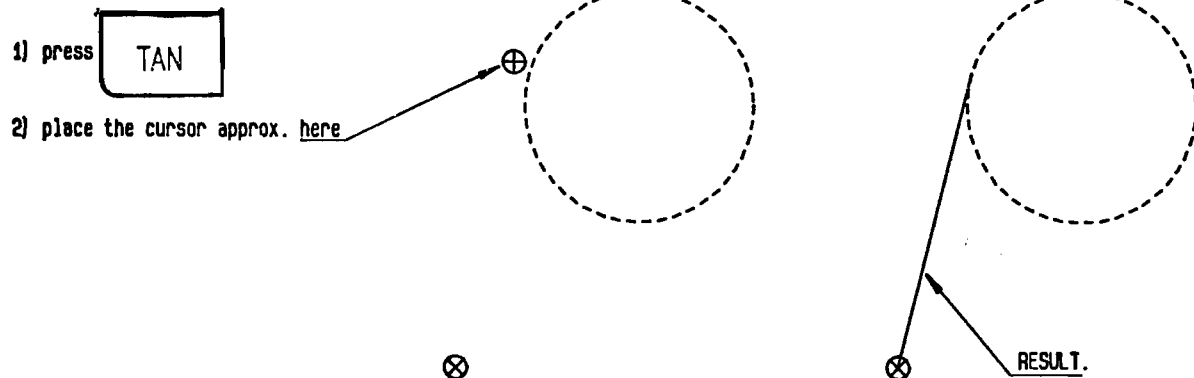
To place the cursor on a line tangent to a circle or arc.

**Operation** :

Place the cursor on the side of the circle or arc desired, at the approximate tangency point. The cursor will "snap" to the exact tangency point on the side indicated.

**Example** :

TO DRAW A LINE FROM THE CURRENT CURSOR POSITION ⊗  
TANGENT TO THE CIRCLE AS SHOWN.




**Special Considerations.** :

A move could have been done to the same position on the circle.

---

**BUTTON DEFINITION  
CONSTRUCTION GEOMETRY**

---

|                      |   |                            |
|----------------------|---|----------------------------|
| <b>Button</b>        |  | <b>Menu Position : E16</b> |
| <b>Name</b>          | : Clockwise Arc   |                            |
| <b>Function Type</b> | : Non Modal   |                            |
| <b>Hierarchy</b>     | : Major Command   |                            |
| <b>Termination</b>   | :   |                            |
| <b>Purpose</b>       | :   |                            |

To force the cursor to move in a clockwise direction around a construction circle when selecting the portion of that circle required by the drawing.

**Operation :**

Self Explanatory

**Example :**

N/A


**Special Considerations. :**

None

---

**BUTTON DEFINITION  
CONSTRUCTION GEOMETRY**

---

|                      |   |                            |
|----------------------|---|----------------------------|
| <b>Button</b>        |  | <b>Menu Position : D16</b> |
| <b>Name</b>          | : Anticlockwise Arc   |                            |
| <b>Function Type</b> | : Non Modal   |                            |
| <b>Hierarchy</b>     | : Major Command   |                            |
| <b>Termination</b>   | :   |                            |
| <b>Purpose</b>       | :   |                            |

To force the cursor to move in a anticlockwise direction around a construction circle when selecting the portion of that circle required by the drawing.

**Operation :**

Self Explanatory.

**Example :**

N/A

**Special Considerations. :**

None

---

**CAD200 INTERRUPT STRUCTURE**

---

CAD200 features a multi-level interrupt structure rather than the tree structure prevalent in most CAD Systems.

The multi-level interrupt (MLI) is discussed in this chapter in detail. Do not be alarmed however - this complex structure is designed to simplify things for you, the user. If you find this chapter starts to confuse you - skip it - you can manage without it altogether. Essentially MLI allows you to press virtually any button at any time without worrying about what you were doing before. Press buttons as you need to and follow the machine prompts and you will not go far wrong.

CAD200 MLI involves five levels of interrupt

These are :

- Entry level
- Immediate level
- Direct level
- Minor level
- Major level

**ENTRY LEVEL**

The **ENTRY** level is the point at which all new inputs are placed into a buffer or queue until the computer has time to deal with them. This buffer can hold up to thirty or more key strokes or button presses, depending on the type of buttons pressed. This is the reason why you can press a button like "REDRAW" while the machine is otherwise engaged. Nothing appears to happen even though you may press it several times. Finally the computer finishes its previous task and starts through the queue of your button presses and surprises you by redrawing several times, one for each press of the "REDRAW" button. The moral is to wait patiently and remember that a computer never forgets. If you overfill the queue or buffer the computer will warn you by a loud BEEP - coming from the computer itself rather than the soft musical one from the digitizer. This tells you the computer is ignoring you until it is ready to resume normal duties again.

**IMMEDIATE LEVEL**

You may have noticed that whilst the computer is busy you can still type into the entry line. Alpha-numeric key entry, whether from the keyboard or from the digitizer together with functions such as "GRID ON/OFF", "ABORT", and others, are **IMMEDIATE** functions and as such they normally operate as soon as they are pressed. Because of this, immediate functions will not normally queue up in the **ENTRY** buffer.

There is an exception to this rule. If you press a non-immediate button then all subsequent button presses - even immediates - are blocked, and have to wait patiently in the queue until the computer has time to deal with the blockage.

**DIRECT LEVEL - MINOR LEVEL - MAJOR LEVEL.**

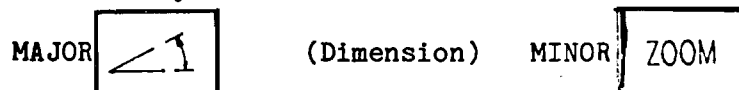
These three levels of interrupt follow the same rules and can therefore be described together. **DIRECT** is the highest priority of interrupt, and **MAJOR** the lowest.



The rule is simple.

Any new interrupt kills any routine which is not lower than its own level and interrupts a lower one.

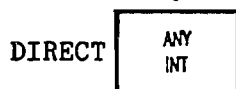
An example will clarify this rule.



You are entering dimensions. That is a MAJOR level routine. You now wish to ZOOM in for a closer look. "ZOOM" is a MINOR routine and after the ZOOM action you would return to the dimension routine as though you had never been parted from it.



However that is not what happens - You enter the bottom left of your ZOOM area. Then after a second look you decide to locate the bottom left on an intersection - so you press "ZOOM" again. Because of the MLI rule the new "ZOOM" command kills the old one and you are now ready to enter bottom left again.



Now you need to press the "ANY INT" button in order to find the intersection. Because "ANY INT" is a Direct level routine it does not kill the ZOOM it merely interrupts it, and you can continue the ZOOM function in the usual manner. When the ZOOM is finally complete the machine prompts you again for your next dimension point as though nothing had happened.

Let us re-emphasize that if this sounds complicated - forget about why or how and just do what comes naturally. The computer is a very forgiving animal and MLI has been written so that you need not worry unduly about the questions "Where am I?" or "How ever did I get here?", freeing you to concentrate on "Where do I go from here?", which is after all the important question in life and CAD200.

---

**ZOOM, PAN, PENS AND LINE TYPES, SCALE, FORMAT, UNITS, ORIGIN.**

---

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-----  
**BUTTON DEFINITION**  
**ZOOM, PAN, PENS & LINE TYPES, SCALE, FORMAT, UNITS, ORIGIN.**  
 -----

|  |  |                            |
|--|--|----------------------------|
| <b>Button</b><br><b>Name</b><br><b>Function Type</b><br><b>Hierarchy</b><br><b>Termination</b><br><b>Purpose</b> | <div style="border: 1px solid black; display: inline-block; padding: 2px 10px;">ZOOM</div><br>: Zoom<br>: Non Modal<br>: Minor Command<br>:<br>: | <b>Menu Position : 013</b> |
|--|--|----------------------------|

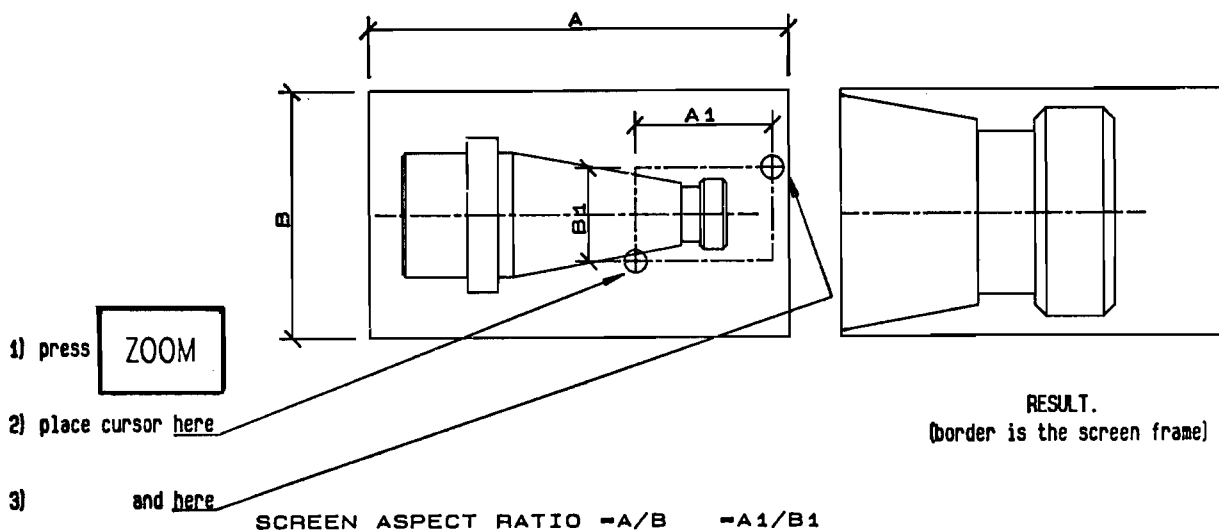
To magnify details on the drawing to full screen size.

**Operation :**

Indicate the bottom left and top right corner of a "frame" around the detail to be viewed. Note that after indicating the bottom left, the cursor "locks" onto an imaginary vector and is not completely free, this is done to maintain the aspect ratio of the screen prior to the top right position being selected.

**Example :**

ZOOM DETAIL ON DRAWING AS SHOWN.



**Special Considerations. :**

"Finishing" elements such as Cross Hatching, Dimensions, Text, Leader arrows etc. are not automatically drawn in zoom mode. The following commands will cause them to appear selectively or in combinations.

|     |                   |                     |
|-----|-------------------|---------------------|
| F21 | Draw Hatch        |                     |
| D21 | Draw Dimension    | See Section 7:15/18 |
| E21 | Draw Text         |                     |
| G21 | Draw other finish |                     |

Bottom left and top right may be selected using any of the cursor placement methods. The system will however maintain the correct aspect ratio for display. Top right may be specified before bottom left.

---

**BUTTON DEFINITION**  
**ZOOM PAN, PENS & LINE TYPFS, SCALE, FORMAT, UNITS, ORIGIN.**

---

|                      |  |                            |
|----------------------|--|----------------------------|
| <b>Button</b>        | <div style="border: 1px solid black; padding: 2px; display: inline-block; text-align: center;">BACK<br/>ZOOM</div> | <b>Menu Position : 011</b> |
| <b>Name</b>          | : Back Zoom  |                            |
| <b>Function Type</b> | : Non Modal  |                            |
| <b>Hierarchy</b>     | : Direct Command   |                            |
| <b>Termination</b>   | :  |                            |
| <b>Purpose</b>       | :  |                            |

To return the screen to its completely unzoomed state.

**Operation :**

Self Explanatory.

**Example :**

Self Explanatory.

**Special Considerations. :**

No finishing elements will be drawn unless requested (See Zoom).

-----  
**BUTTON DEFINITION**  
**ZOOM, PAN, PENS & LINE TYPES, SCALE, FORMAT, UNITS, ORIGIN.**  
 -----

|  |   |                           |
|--|---|---------------------------|
| <b>Button</b><br><b>Name</b><br><b>Function Type</b><br><b>Hierarchy</b><br><b>Termination</b><br><b>Purpose</b> | <div style="border: 1px solid black; display: inline-block; padding: 2px 5px; margin-bottom: 5px;">ZOOM TO<br/>SCALE</div><br>: Zoom to Scale<br>: Non Modal<br>: Minor Command<br>:<br>: | <b>Menu Position : 09</b> |
|--|---|---------------------------|

To Zoom to a specified magnification about an indicated point.

**Operation :**

The user is prompted to enter values in the form :-

Magnification factor for Zoom [, origin]. The current values are displayed and will be used if no entry is made.

The selected origin (See the example), about which the zoom will be effected, may then be indicated using any cursor placement method.

**Example :**

TO ZOOM BY A FACTOR OF 2 IN ALL DIRECTIONS ABOUT AN INDICATED POINT ON THE DWG.

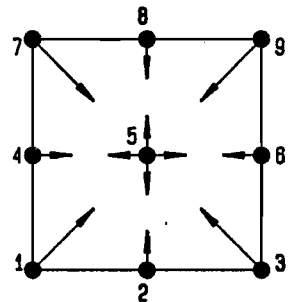
- 1) press 

ZOOM TO  
SCALE
- 2) enter 2,5  
and press 'CONT'
- 3) place the cursor (using any method)  
in the centre of the area to be ZOOMED.

THE DRAWING WILL BE MAGNIFIED BY A FACTOR OF 2  
ABOUT THE POINT INDICATED -IN ALL DIRECTIONS-  
AS SHOWN BY THE ARROWS AT 5



|   |   |   |
|---|---|---|
| 7 | 8 | 9 |
| 4 | 5 | 6 |
| 1 | 2 | 3 |



NUMERIC KEY PAD LAYOUT  
IS USED TO SELECT ORIGIN  
TYPE FOR DIRECTION OF  
MAGNIFICATION ABOUT AN  
INDICATED POINT.

**Special Considerations. :**

See Zoom.

-----  
BUTTON DEFINITION  
ZOOM, PAN, PENS & LINE TYPES, SCALE, FORMAT, UNITS, ORIGIN.  
-----

|                      |   |                            |
|----------------------|---|----------------------------|
| <b>Button</b>        | <div style="border: 1px solid black; padding: 2px; display: inline-block;">STORE<br/>ZOOM</div> | <b>Menu Position : 010</b> |
| <b>Name</b>          | : Store Zoom  |                            |
| <b>Function Type</b> | : Non Modal   |                            |
| <b>Hierarchy</b>     | : Direct Command  |                            |
| <b>Termination</b>   | :   |                            |
| <b>Purpose</b>       | :   |                            |

To allow the user to Store the current Zoom state such that this view may be displayed at will by RECALL ZOOM. Particularly useful when having to work in Zoom mode at either end of a large drawing alternately.

**Operation :**

Self Explanatory.

**Example :**

Self Explanatory.

**Special Considerations. :**

See Zoom.

-----  
BUTTON DEFINITION  
ZOOM, PAN, PENS & LINE TYPES, SCALE, FORMAT, UNITS, ORIGIN.  
-----

|               |  |                     |
|---------------|--|---------------------|
| Button        | <div style="border: 1px solid black; padding: 2px; display: inline-block;">RECALL<br/>ZOOM</div> | Menu Position : P10 |
| Name          | : Recall Zoom  |                     |
| Function Type | : Non Modal  |                     |
| Hierarchy     | : Direct Command   |                     |
| Termination   | :  |                     |
| Purpose       | :  |                     |

To recall the previously "stored" Zoom state..

Operation :

Self Explanatory.

Example :

Self Explanatory.

Special Considerations. :

See Zoom.

## SECTION 6

---

**BUTTON DEFINITION**  
**ZOOM PAN, PENS & LINE TYPES, SCALE, FORMAT, UNITS, ORIGIN.**

---



**Button** : **Menu Position : N9**  
**Name** : Grid Zoom by Number  
**Function Type** : Non Modal  
**Hierarchy** : Minor Command  
**Termination** :

**Purpose :**

To zoom directly to a ninth part by selecting the number on the pad in the corresponding position. (See the nine parts as illustrated on the button itself and the same relative position of the numbers on the number pad).

**Operation :**

Press this button, enter the desired number between one and nine and press "continue"

**Example :**



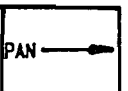

N/A

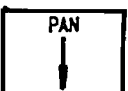

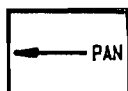

**Special Considerations :**

- A Back Zoom is not necessary prior to using this command.
- B You may Zoom further in the normal way following this command.



-----  
**BUTTON DEFINITIONS**  
**DIRECTIONAL PAN BUTTONS**  
 -----

|                     |   |   |  |   |
|---------------------|---|---|--|---|
| <b>Buttons :</b>    |  |  |  |  |
| <b>Name :</b>       | Pan<br>North  | Pan<br>N/E  | Pan<br>East  | Pan<br>S/E  |
| <b>Menu Posn. :</b> | 012   | P12   | P13  | P14   |

|                   |   |   |  |   |
|-------------------|---|---|--|---|
| <b>Buttons :</b>  |  |  |  |  |
| <b>Name :</b>     | Pan<br>South  | Pan<br>S/W  | Pan<br>West  | Pan<br>N/W  |
| <b>Menu Posn.</b> | 014   | N14   | N13  | N12   |

**Function Type :** Non Modal

**Hierarchy :** Direct Command

**Purpose :**

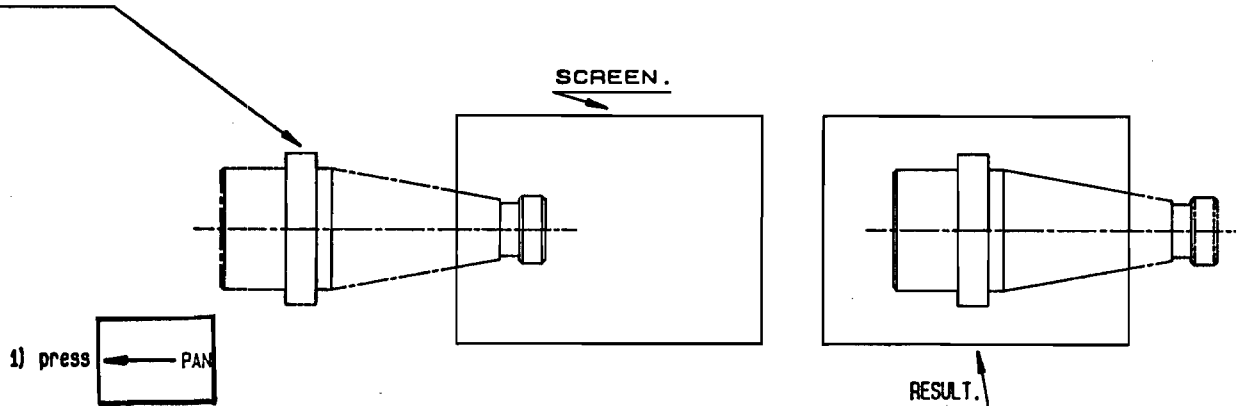
To allow the user to selectively view the drawing area about the current zoomed display (and at the same magnification).

**Operation :**

The screen frame may be regarded as the view finder of a camera which can be moved in any of the above eight directions. The amount of movement is set by using LARGE PAN or SMALL PAN.

**Example :**

TO VIEW THAT PART OF THE DRAWING (NOT VISIBLE)  
ON THE LEFT OF THE CURRENTLY ZOOMED SCREEN.



**Special Considerations :**

See Zoom

-----  
BUTTON DEFINITION  
ZOOM, PAN, PENS & LINE TYPES, SCALE, FORMAT, UNITS, ORIGIN.  
-----

|               |  |                     |
|---------------|--|---------------------|
| Button        | <div style="border: 1px solid black; padding: 2px; display: inline-block;">LARGE<br/>PAN</div> | Menu Position : N11 |
| Name          | : Large Pan  |                     |
| Function Type | : Modal  |                     |
| Hierarchy     | : Direct Command   |                     |
| Termination   | : Using the command SMALL PAN  |                     |
| Purpose       | :  |                     |

To set the amount of PAN to approximately one full screen each time a direction PAN button is pressed.

**Operation :**

Self Explanatory.

**Example :**

Self Explanatory.

**Special Considerations. :**

See Direction Pan (page 6:7).

-----  
BUTTON DEFINITION  
ZOOM, PAN, PENS & LINE TYPES, SCALE, FORMAT, UNITS, ORIGIN.  
-----

|               |  |                     |
|---------------|--|---------------------|
| Button        | <div style="border: 1px solid black; padding: 2px; display: inline-block;">SMALL<br/>PAN</div> | Menu Position : P11 |
| Name          | : Small Pan  |                     |
| Function Type | : Modal  |                     |
| Hierarchy     | : Direct Command   |                     |
| Termination   | :  |                     |
| Purpose       | :  |                     |

To set the amount of PAN to approximately half a screen each time a directional pan button is pressed.

Operation :

Self Explanatory.

Example :

Self Explanatory.

Special Considerations. :

See Directional Pan (Page 6:7)

-----  
**BUTTON DEFINITION**  
**ZOOM, PAN, PENS & LINE TYPES, SCALE, FORMAT, UNITS, ORIGIN.**  
 -----

|  |   |                            |
|--|---|----------------------------|
| <b>Button</b><br><b>Name</b><br><b>Function Type</b><br><b>Hierarchy</b><br><b>Termination</b><br><b>Purpose</b> | <div style="border: 1px solid black; padding: 2px; display: inline-block; text-align: center;">SELECT<br/>PEN</div><br>: Select Pen<br>: Parameter Setting<br>: Minor Command<br>: Alter using this button<br>: | <b>Menu Position : Q14</b> |
|--|---|----------------------------|

To select a Pen number corresponding to the number on the Pen Carousel of the Plotter.

**Operation :**

Enter a value between 1 and 9 for the required Pen number as above (Pen No. 9 is "DRAW ON SCREEN BUT DON'T PLOT"). All elements drawn following a pen change will be in that thickness or colour, on the plotter but not on the screen.

The current pen number is indicated on the screen as shown.

```

MOVE DEF  ABCDEFGHIJKLMNO  SCOPE:ALL  X=0.00  Y=0.00  1.0
??
AUTO:  NEW PAT LAYS:  Pen:4  LT:8
LEFT:9845  READ LAYERS:AS  DSK  FORM:DIN-A4  SCL 1:50
  
```

**Example :**

**Special Considerations. :**

The user is encouraged to decide as soon as possible after getting a system which order pens will be installed in the carousel and not to deviate from this decision.

| For Example : | Carousel Location | Pen Thick. | Colour |
|---------------|-------------------|------------|--------|
|               | 1                 | 0,25 mm    | Black  |
|               | 2                 | 0,35 mm    | Red    |
|               | 3                 | 0,5 mm     | Blue   |
|               | 4                 | 0,7 mm     | Green  |

-----  
**BUTTON DEFINITION**  
**ZOOM, PAN, PENS & LINE TYPES, SCALE, FORMAT, UNITS, ORIGIN.**  
 -----



Button Name : Select Line Type  
 Function Type : Parameter Setting  
 Hierarchy : Minor Command  
 Termination : Alter using this button or one of the line type editing commands.

Menu Position : R14

Purpose :

To select a line type by number.

Operation :

Enter a number between 1 and 9 corresponding to the line type required. All elements drawn following a line type change will be drawn in that Line Style. The appearance of the line type is shown on its corresponding number, on the menu's numeric keypad.

The current Line Type is indicated on the screen as shown.



Example :

LINE TYPES

- LINE TYPE 1 \_\_\_\_\_
- LINE TYPE 2 - - - - -
- LINE TYPE 3 . . . . .
- LINE TYPE 4 - - - - -
- LINE TYPE 5 - - - - -
- LINE TYPE 6 \_\_\_\_\_
- LINE TYPE 7 \_\_\_\_\_
- LINE TYPE 8 - - - - -
- LINE TYPE 9 - - - - -

Special Considerations. :

See also the buttons :-

- Q13 Set Pen & Line type from element.
- R13 Edit element Pen/Line.
- S13 Edit Scope Pen/Line.

-----  
**BUTTON DEFINITION**  
**ZOOM, PAN, PENS & LINE TYPES, SCALE, FORMAT, UNITS, ORIGIN.**  
 -----

|  |   |                            |
|--|---|----------------------------|
| <b>Button</b><br><b>Name</b><br><b>Function Type</b><br><b>Hierarchy</b><br><b>Termination</b><br><b>Purpose</b> | <div style="border: 1px solid black; padding: 2px; display: inline-block; text-align: center;">       PEN &amp;<br/>       LINE TYPE<br/>       FROM ELE.     </div><br>: Set Pen & Line Type from Element<br>: Parameter Setting<br>: Minor Command<br>: Select Line Type or one of the Line Editing Commands. | <b>Menu Position : Q13</b> |
|--|---|----------------------------|

To set the current Pen number and Line type to those of an existing element on the drawing.

**Operation :**

Indicating an element on the drawing will set the current pen number and line as above and the latest status is displayed as shown.

|  |
|--|
| PROME <b>DRG</b> P:DEFGHIJKLMNO SCOPE:ALL X=0.00 Y=0.00 1.0<br>AUTO: <b>01</b> NEW FAT LAYS: <b>Pen:1 LT:1</b> <b>EXT</b> HT:3 WD:2 PN:1 O:1<br>LEFT:9926 READ LAYERS:AS DSK FURN:DIN-A3 SCL 1:1 CS:1 A:0 S:0 EP L:2/3 |
|--|

(An arrow points to the circled text "Pen:1 LT:1" in the status bar.)

**Example :**

N/A

**Special Considerations. :**

None

-----  
BUTTON DEFINITION  
ZOOM, PAN, PENS & LINE TYPES, SCALE, FORMAT, UNITS, ORIGIN.  
-----

|                      |   |                            |
|----------------------|---|----------------------------|
|                      | EDIT<br>ELEMENT<br>PEN / LINE                                   |                            |
| <b>Button</b>        |   | <b>Menu Position : R13</b> |
| <b>Name</b>          | : Edit Element Pen/Line   |                            |
| <b>Function Type</b> | : Modal   |                            |
| <b>Hierarchy</b>     | : Major Command   |                            |
| <b>Termination</b>   | : Using the command DWG.MODE (M14) or entering another command. |                            |

**Purpose :**

To allow the user to change the pen number and line type of already drawn elements.

**Operation :**

A Pen number and Line type is entered. The elements to be changed are then indicated sequentially.

**Example :**

N/A

**Special Considerations. :**

None



-----  
**BUTTON DEFINITION**  
**ZOOM, PAN, PENS & LINE TYPES, SCALE, FORMAT, UNITS, ORIGIN.**  
 -----

|                      |                             |                            |
|----------------------|-----------------------------|----------------------------|
| <b>Button</b>        | EDIT<br>SCOPE<br>PEN / LINE | <b>Menu Position : S13</b> |
| <b>Name</b>          | : Edit Scope Pen/Line       |                            |
| <b>Function Type</b> | : Non Modal                 |                            |
| <b>Hierarchy</b>     | : Major Command             |                            |
| <b>Termination</b>   | :                           |                            |
| <b>Purpose</b>       | :                           |                            |

To allow the user to change the Pen and Line type of all visible elements.

**Operation :**

All elements currently displayed will adopt the newly entered Pen and Line Type attributes.

**Example :**

TO CHANGE THE PEN NUMBERS & LINE TYPE OF 2 PATTERNS ONLY ON THE DRAWING IN MEMORY.

- 1) press 

|                  |
|------------------|
| HIGHLIGHT<br>W/S |
|------------------|
- 2) press 

|              |
|--------------|
| CLEAR<br>W/S |
|--------------|

 (to insure only the required patts. will be changed)
- 3) press 

|                        |
|------------------------|
| PATTERN<br>INTO<br>W/S |
|------------------------|
- 4) indicate the required patts. (they will be highlighted for confirmation)
- 5) press 

|               |
|---------------|
| REDRAW<br>W/S |
|---------------|

 (WORKSPACE becomes the current SCOPE)
- 6) press 

|                             |
|-----------------------------|
| EDIT<br>SCOPE<br>PEN / LINE |
|-----------------------------|

 and follow the prompts.

**Special Considerations. :**

The following redraw commands may be used to change the "scope" prior to using this command.

|                      |                               |
|----------------------|-------------------------------|
| D19 Redraw Workspace |                               |
| E19 Redraw Patterns  | See Patterns/Layers/Workspace |
| F19 Redraw Layers    |                               |
| G19 Redraw All       |                               |

All elements in the current Scope are changed irrespective of the Zoom status.



## SECTION 6

-----  
**BUTTON DEFINITION**  
**ZOOM PAN, PENS & LINE TYPES, SCALE, FORMAT, UNITS, ORIGIN.**  
 -----

|  |   |                           |
|--|---|---------------------------|
| <b>Button</b><br><b>Name</b><br><b>Function Type</b><br><b>Hierarchy</b><br><b>Termination</b> | <div style="border: 1px solid black; padding: 2px; display: inline-block; text-align: center;">       RESCALE<br/>ALL     </div><br>: Rescale all<br>: Parameter Setting<br>: Major Command<br>: Alter using this button. | <b>Menu Position : H1</b> |
|--|---|---------------------------|

**Purpose :**

To alter the scale of a drawing in memory, similarly to 

SET  
SCALE


 (I1) except that the text, dimensions text, and hatching separation are also scaled (As is done by 

INCREASE /  
DECREASE

 (Q8)). The value of dimensions done after the scale change will be the same as before, unlike INCREASE/DECREASE.

**Operation :**

Enter a ratio, (with respect to 1), as required. The new scale will be indicated on the screen as shown.



MV **DEF** **R** 1:1      19996 R1      X0      Y0  
 ??

**Example :**

1/100 or 0.01  
 1/50 or 0.02

**Special Considerations**

Following the use of this command, the result may be edited and dimensioned normally, unlike INCREASE/DECREASE.

Scale values greater than 100 000 or smaller than 0.00001 will be rejected.

-----  
**BUTTON DEFINITION**  
**ZOOM, PAN, PENS & LINE TYPES, SCALE, FORMAT, UNITS, ORIGIN.**  
 -----



Button Menu Position : J1  
 Name : Set Format  
 Function Type : Parameter Setting  
 Hierarchy : Minor Command  
 Termination : Alter using this button  
 Purpose :

To select a Din Standard Paper Size A0 to A6.

**Operation :**

Enter a number 0 to 6. the size of the drawing on the screen will be relative to the screen frame size - as the final plot will be relative to the paper size.

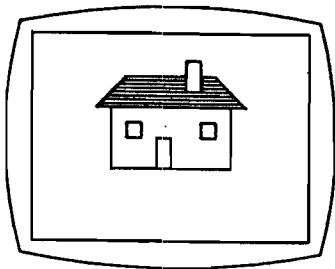
The current format is indicated on the screen as shown.

```

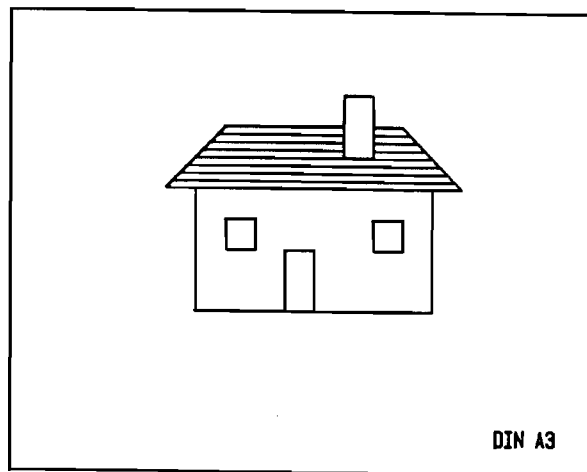
MOVE DEF ABCDEFGHIJKLMNO SCOPE:ALL X=24788.75 Y=18710.00 1.0
??
36.25
AUTO: [ ] NEW PAT LAYS: [ ] Pen:1 LT:1
LEFT:7878 READ LAYERS:AS DSK FORM:DIN-A1 SCL 1:50 HT:5 WD:3 PH:2 0:5
CS:1 A:0 S:0 P/L:2/3
  
```

**Example :**

SHOWING THAT THE SCREEN & PLOT ARE PROPORTIONATE TO THE FRAME SIZE.



SCREEN



PLOT

**Special Considerations. :**

- A). If part way through a drawing it is discovered that a larger paper format would be more expedient, simply enter the next format size.
- B). The screen frame is approximately Din A5.
- C). Selected formats outside the range 0 to 6 will be changed as follows :-  
 Format 8 will be changed to Format 1  
 Format 10 will be changed to Format 3

-----  
**BUTTON DEFINITION**  
**ZOOM, PAN, PENS & LINE TYPES, SCALE, FORMAT, UNITS, ORIGIN.**  
 -----



Button Name : Set Format Menu Position : J1  
 Function Type : Parameter Setting  
 Hierarchy : Minor Command  
 Termination : Alter using this button  
 Purpose :

To select a Din Standard Paper Size A0 to A6.

**Operation :**

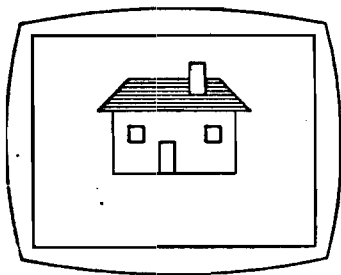
Enter a number 0 to 6. the size of the drawing on the screen will be relative to the screen frame size - as the final plot will be relative to the paper size.

The current format is indicated on the screen as shown.

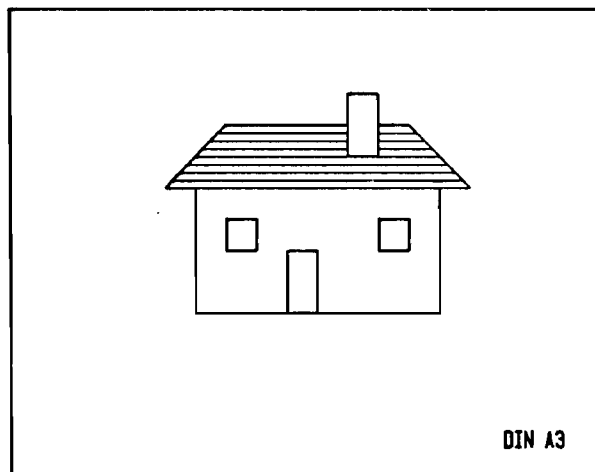
DR **DFG** **R** 1:50 1994 **A3** X923.46 Y1950.71  
 ??

**Example :**

SHOWING THAT THE SCREEN & PLOT ARE PROPORTIONATE TO THE FRAME SIZE.



SCREEN



PLOT

**Special Considerations. :**

- A). If part way through a drawing it is discovered that a larger paper format would be more expedient, simply enter the next format size.
- B) The screen frame is approximately Din A5.
- C) Selected formats outside the range 0 to 6 will be changed as follows :-  
 Format 8 will be changed to Format 1  
 Format 10 will be changed to Format 3

-----  
**BUTTON DEFINITION**  
**ZOOM, PAN, PENS & LINE TYPES, SCALE, FORMAT, UNITS, ORIGIN.**  
 -----

|  |   |                           |
|--|---|---------------------------|
| <b>Button</b><br><b>Name</b><br><b>Function Type</b><br><b>Hierarchy</b><br><b>Termination</b><br><b>Purpose</b> | <div style="border: 1px solid black; display: inline-block; padding: 2px 5px; text-align: center;">           SET<br/>UNITS         </div><br>: Set Units<br>: Parameter setting.<br>: Minor Command<br>: Alter using this button.<br>: | <b>Menu Position : K1</b> |
|--|---|---------------------------|

To allow the user the choice of units of measurement for drawing entry and display.

**Operation :**

Enter a value as prompted by the system. If 20 is selected, the user will be asked to enter the name of the new unit and its length in mm.

**Example :**

Enter a number as follows :-

- 1 to select Plotter Units.
- 2 to select Millimetres.
- 3 to select Metres
- 4 to select Inches
- 5 to select Feet
- 20 to select Other units.

If 20 is selected, enter YDS (Yards) followed by 36 \* 25.4. All subsequent calculations and dimensions will then be in yards.

**Special Considerations. :**

Any option number outside the range 1 to 5 or 20 will be rejected.

-----  
**BUTTON DEFINITION**  
**ZOOM, PAN, PENS & LINE TYPES, SCALE, FORMAT, UNITS, ORIGIN.**  
 -----



Button Menu Position : L1  
 Name : Set Origin  
 Function Type : Parameter Entry  
 Hierarchy : Minor Command  
 Termination : Alter using this button

Purpose :

To allow the user the facility to Set, or Move, the Drawing Origin to a location other than the centre of the screen (Default).

Operation :

Select a new origin using any of the cursor placement methods.

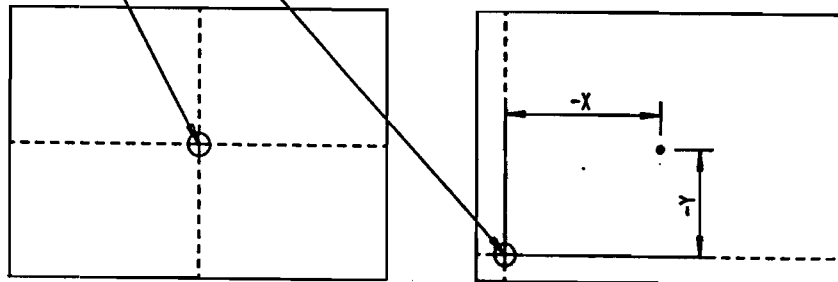
NOTE!

When tracking the cursor, X and Y values relative to the origin will be shown below the screen frame (as shown below).

MOVE **0.76** **1.20** DEF GHIJKL MNO SCOPE: **ALL** X=0.00 Y=0.00 1.0  
 ??  
 AUTO: **0** NEW PAT LAYS: **0** Pen: 1 LT: 1 **1.21** HT: 3 WD: 2 PN: 1 O: 1  
 LEFT: 9822 READ LAYERS: AS **DSK** FORM: DIN-A3 SCL 1:1 CS: 1 A: 0 S: 0 **0** P/L: 2/3

Example :

NORMAL ORIGIN HERE, MOVED HERE FOR CONVENIENCE OF DIMENSIONAL INPUT  
 BY ENTERING X & Y DEPARTURE FROM CURRENT POSITION.



Special Considerations. :

Normal System default origin is the centre of the screen.

---

**SCOPE - REDRAW & HIGHLIGHT, PATTERNS, WORKSPACE,  
MOVING PATTERNS, LAYERING**

---

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## SECTION 7

2

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---

**SCOPE - DRAW REDRAW & HIGHLIGHT**

---

The "SCOPE" is that which is currently visible on the screen following one of the redraw commands.

The exception to the above statement is FINISH - i.e. Dimensions, Text, Hatching, Leader Arrows etc. will not be visible following a redraw unless specifically drawn using their individual draw buttons - but will be included in the "Scope", if the FINISH ON/OFF button is set to "ON".

The main drawing, and geometry elements, may be included or excluded from the scope by the buttons :- DRAWING ON/OFF and GEOMETRY ON/OFF being set prior to the redraw.

Workspace (Page 7:34) or Pattern(s) (Page 7:19) or Layer(s) (Page 7:64) may be redrawn individually

- or -

highlighted by solid line type against dotted line type of all other elements on the drawing.

**IMPORTANT NOTE !**

The current "Scope" is that which will be STORED to a disc

- or -

PLOTTED following the appropriate commands.

Other commands exist that will only affect the current "Scope" (these will be obvious by the command names). Therefore, use a redraw command to change the scope as required prior to using one of these "Scope" addressed commands.

Limiting the "Scope" is also a means of speeding up system operation. e.g. The system will have fewer elements to search through etc. This time factor will become noticeable with a very full and detailed drawing resident in computer memory.

-----  
**BUTTON DEFINITION**  
**SCOPE, REDRAW & HIGHLIGHT**  
 -----



Button Name : Drawing On or Off  
 Function Type : Modal  
 Hierarchy : Direct Command  
 Termination : Alter using this button  
 Purpose :

Menu Position : D18

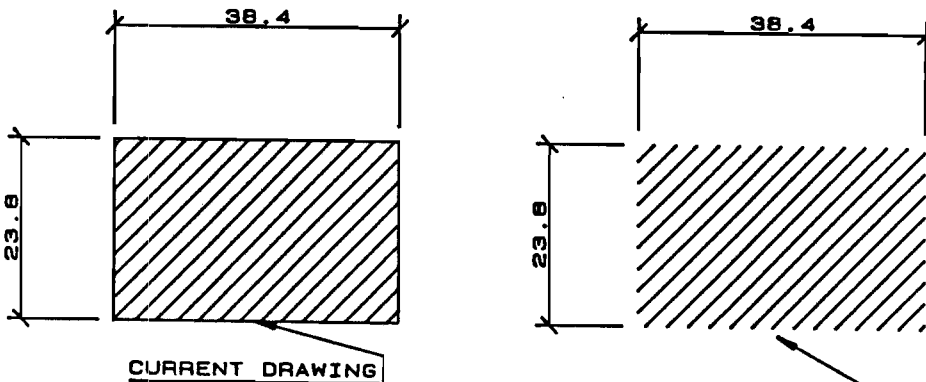
To include or exclude the drawing elements from the current scope.

Operation :

Self Explanatory

Example :

A redraw following a change of this mode will either include or exclude the main drawing (as distinct from Finish and Geometric elements). i.e. The main drawing may be included or excluded from "Scope".



PRESSING ON/OFF, REDRAW, DRAW DIM, DRAW HATCH RESULTS IN.

The current system status is indicated as shown: -

```

MOVE DRG [BCDEFGHIJLMNO] SCOPE: [DRG] X=0.00 Y=0.00 1.0
??
AUTO: [ ] NEW PAT LAYS: [ ] Pen:1 LT:1
LEFT:5145 READ LAYERS:AS [DRG] FGM:DIM-AS SCL 1:1
    
```

**Special Considerations. :**

The above mode may be set on or off at will - the drawing elements are not lost when turned to off - but will be excluded if the current scope is stored to disc or plotted.

-----  
**BUTTON DEFINITION**  
**SCOPE, REDRAW & HIGHLIGHT**  
 -----



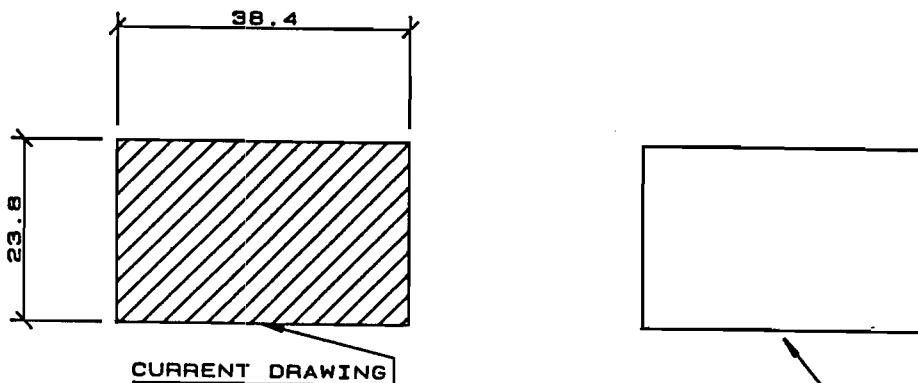
Button Menu Position : E18  
 Name : Finish On or Off  
 Function Type : Modal  
 Hierarchy : Direct Command  
 Termination : Alter using this button  
 Purpose :

To include or exclude the finishing elements (dimensions, text, hatching and leader arrows etc) from the Scope following a redraw.

Operation :

Self Explanatory.

Example :



PRESSING FINISH ON/OFF AND REDRAW RESULTS IN.

The current system status is indicated as shown: -

|            |           |                 |                          |        |        |     |
|------------|-----------|-----------------|--------------------------|--------|--------|-----|
| MOVE       | <b>LF</b> | BCDEFGHIJKLMNO  | SCOPE: ALL               | X=0.00 | Y=0.00 | 1.0 |
| ??         |           |                 |                          |        |        |     |
| AUTO:      |           | NEW PAT LAYS:   | Pen:1 LT:1               |        |        |     |
| LEFT: 5145 |           | READ LAYERS: AS | DSI FORM: DIN-A3 SCL 1:1 |        |        |     |

Special Considerations. :

The above mode may be set on or off at will - the Finishing elements are not lost when turned off - but will be excluded if stored to disc or plotted in that mode.

-----  
**BUTTON DEFINITION**  
**SCOPE, REDRAW & HIGHLIGHT**  
 -----

GEOMETRY  
ON / OFF

Button Menu Position : F18  
 Name : Geometry On or Off  
 Function Type : Modal  
 Hierarchy : Direct Command  
 Termination : Alter using this button.  
 Purpose :

To include or exclude geometry elements from Scope following a redraw. A Redraw following a change of this mode - will either include or exclude the geometry elements, (as distinct from the main drawing and finishing elements).

Operation :

Self Explanatory.

|  |
|--|
| MOVE <b>D</b> FG ABCDEFGHIJKLMNO SCOPE: <b>ALL</b> X=0.00 Y=0.00 1.0 |
| ??   |
| AUTO: <b>0</b> NEW PAT LAYS: <b>0</b> Pen:1 LT:1                     |
| LEFT:9992 READ LAYERS:AS <b>DSK</b> FORM:DIN-A3 SCL 1:1              |

Example :

N/A

Special Considerations. :

The above may be set on or off at will - the geometry elements are not lost when turned off - but will be excluded if stored to disc or plotted in that mode.

---

**BUTTON DEFINITION**  
**SCOPE, REDRAW & HIGHLIGHT**

---

|                      |  |                            |
|----------------------|--|----------------------------|
| <b>Button</b>        | <div style="border: 1px solid black; padding: 2px; display: inline-block; text-align: center;">RE<br/>DRAW</div> | <b>Menu Position : G18</b> |
| <b>Name</b>          | : Redraw   |                            |
| <b>Function Type</b> | : Non Modal  |                            |
| <b>Hierarchy</b>     | : Direct Command   |                            |
| <b>Termination</b>   | :  |                            |
| <b>Purpose</b>       | :  |                            |

To Redraw the Current Scope. (This may be found necessary following deletions that have left partially displayed elements, i.e. where a geometry element was deleted and part of an overlaying element disappeared with it). A redraw will "clean up", such anomalies.

**Operation :**

Self Explanatory.

**Example :**

N/A

**Special Considerations. :**

N/A

---

**BUTTON DEFINITION**  
**SCOPE, REDRAW & HIGHLIGHT**

---

|                      |                    |                            |
|----------------------|--------------------|----------------------------|
| <b>Button</b>        | REDRAW<br>W/S      | <b>Menu Position : D19</b> |
| <b>Name</b>          | : Redraw Workspace |                            |
| <b>Function Type</b> | : Non Modal        |                            |
| <b>Hierarchy</b>     | : Major Command    |                            |
| <b>Termination</b>   | :                  |                            |
| <b>Purpose</b>       | :                  |                            |

To erase the screen and redraw only those patterns assigned to the Workspace (See Page 7:34.)

**Operation :**

Self Explanatory.

**Example :**

N/A

**Special Considerations. :**

Note that the "Scope" following this command will be only those patterns that were assigned to the workspace. It follows therefore that commands addressed to the "Scope" at this point will affect those patterns only.

---

BUTTON DEFINITION  
SCOPE, REDRAW & HIGHLIGHT

---

|               |   |                     |
|---------------|---|---------------------|
| Button        | <div style="border: 1px solid black; padding: 2px; display: inline-block;">REDRAW<br/>PATTERN</div> | Menu Position : E19 |
| Name          | : Redraw Pattern  |                     |
| Function Type | : Non Modal   |                     |
| Hierarchy     | : Major Command   |                     |
| Termination   | :   |                     |
| Purpose       | :   |                     |

To erase the screen, select a pattern as current pattern, and redraw that pattern only (See Page 7:19.)

Operation :

Self Explanatory.

Example :

N/A

Special Considerations. :

Note that the "Scope" following this command will be the current pattern only. Commands addressed to the "Scope" will affect this pattern only.



-----  
**BUTTON DEFINITION**  
**SCOPE, REDRAW & HIGHLIGHT**  
 -----

Button REDRAW  
LAYERS Menu Position : F19  
 Name : Redraw Layers  
 Function Type : Non Modal  
 Hierarchy : Major Command  
 Termination :  
 Purpose :

To erase the screen and redraw only the layer(s) as set by the button SELECT DISPLAYED LAYERS (S10). The layer(s) which will be displayed are indicated below the screen frame as shown.

|           |                |                |             |        |        |     |
|-----------|----------------|----------------|-------------|--------|--------|-----|
| MOVE      | DFG            | ABCDEFGHIJLMNO | SCOPE:ALL   | X=0.00 | Y=0.00 | 1.0 |
| 22        |                |                |             |        |        |     |
| AUTO:     | 27             | NEW PAT LAYS:M | Pen:4       | LT:8   |        |     |
| LEFT:9645 | READ LAYERS:AS | USR            | FORM:DIN-R4 | SCL    | 1:50   |     |

Operation :

Self Explanatory.

Example :

N/A

Special Considerations. :

Note that the "Scope" following this command will be the layer(s) displayed. Commands addressed to the "Scope" will affect these layers only.

---

**BUTTON DEFINITION**  
**SCOPE, REDRAW & HIGHLIGHT**

---

|                      |   |                            |
|----------------------|---|----------------------------|
| <b>Button</b>        | <div style="border: 1px solid black; padding: 2px; display: inline-block; text-align: center;">REDRAW<br/>ALL</div> | <b>Menu Position : G19</b> |
| <b>Name</b>          | : Redraw All  |                            |
| <b>Function Type</b> | : Non Modal   |                            |
| <b>Hierarchy</b>     | : Major Command   |                            |
| <b>Termination</b>   | :   |                            |
| <b>Purpose</b>       | :   |                            |

To redraw all drawing and existing geometry elements in all layers depending on setting of drawing ON/OFF and GEOMETRY ON/OFF flags (excluding finishing elements - which must be drawn with the individual buttons for that purpose).

**Operation :**

Self Explanatory.

**Example :**

N/A

**Special Considerations. :**

"Scope" becomes "all".

---

**BUTTON DEFINITION**  
**SCOPE, REDRAW & HIGHLIGHT**

---

|                      |  |                            |
|----------------------|--|----------------------------|
| <b>Button</b>        | <div style="border: 1px solid black; padding: 2px; display: inline-block;">HIGHLIGHT<br/>W/S</div> | <b>Menu Position : D20</b> |
| <b>Name</b>          | : Highlight Workspace  |                            |
| <b>Function Type</b> | : Modal  |                            |
| <b>Hierarchy</b>     | : Direct Command   |                            |
| <b>Termination</b>   | : Another highlight button   |                            |
| <b>Purpose</b>       | :  |                            |

To draw all patterns assigned to the workspace (Page 7:36) in solid line type - all others will be dotted line type - so that the user may visually confirm which patterns are currently assigned to the workspace.

**Operation :**

Self Explanatory.

**Example :**

N/A

**Special Considerations. :**

None

---

**BUTTON DEFINITION  
SCOPE, REDRAW & HIGHLIGHT**

---

HIGHLIGHT  
PATTERN

**Button** : **Menu Position : E20**  
**Name** : Highlight Pattern  
**Function Type** : Modal  
**Hierarchy** : Direct Command  
**Termination** : Another Highlight button  
**Purpose** :

To draw the current pattern, or pattern being edited in solid line type for visual confirmation by the user. All other patterns will be dotted line type.

**Operation** :

Self Explanatory.

**Example** :

N/A

**Special Considerations.** :

None

---

BUTTON DEFINITION  
SCOPE, REDRAW & HIGHLIGHT

---



**Button** **Menu Position : G20**  
**Name** : Highlight All  
**Function Type** : Modal  
**Hierarchy** : Direct Command  
**Termination** : Another Highlight button  
**Purpose** :

To draw all lines as they were originally specified.

**Operation** :

Self Explanatory

**Example** :

N/A

**Special Considerations.** :

None

---

BUTTON DEFINITION  
SCOPE, REDRAW & HIGHLIGHT

---

|               |  |                     |
|---------------|--|---------------------|
| Button        | <div style="border: 1px solid black; padding: 2px; display: inline-block; text-align: center;">DRAW<br/>DIMENS</div> | Menu Position : D21 |
| Name          | : Draw Dimensions  |                     |
| Function Type | : Non Modal  |                     |
| Hierarchy     | : Direct Command   |                     |
| Termination   | :  |                     |
| Purpose       | :  |                     |

To display all dimension lines and dimension text within the current "Scope".

Operation :

Self Explanatory

Example :

N/A

Special Considerations. :

None

---

**BUTTON DEFINITION**  
**SCOPE, REDRAW & HIGHLIGHT**

---

|                      |  |                            |
|----------------------|--|----------------------------|
| <b>Button</b>        | <div style="border: 1px solid black; padding: 2px; display: inline-block;">DRAW<br/>TEXT</div> | <b>Menu Position : E21</b> |
| <b>Name</b>          | : Draw Text  |                            |
| <b>Function Type</b> | : Non Modal  |                            |
| <b>Hierarchy</b>     | : Direct Command   |                            |
| <b>Termination</b>   | :  |                            |
| <b>Purpose</b>       | :  |                            |

To display all text and leader arrows within the current "Scope".

**Operation :**

Self Explanatory.

**Example :**

N/A

**Special Considerations. :**

None

---

**BUTTON DEFINITION**  
**SCOPE, REDRAW & HIGHLIGHT**

---

|                      |   |                            |
|----------------------|---|----------------------------|
| <b>Button</b>        | <div style="border: 1px solid black; padding: 2px; display: inline-block; text-align: center;">DRAW<br/>HATCH</div> | <b>Menu Position : F21</b> |
| <b>Name</b>          | : Draw Hatch  |                            |
| <b>Function Type</b> | : Non Modal   |                            |
| <b>Hierarchy</b>     | : Direct Command  |                            |
| <b>Termination</b>   | :   |                            |
| <b>Purpose</b>       | :   |                            |

To display all cross hatching within the current "Scope".

**Operation :**

Self Explanatory.

**Example :**

N/A

**Special Considerations. :**

None



---

BUTTON DEFINITION  
SCOPE, REDRAW & HIGHLIGHT

---

DRAW  
OTHER

**Button** : **Menu Position : G21**  
**Name** : Draw Other Finish  
**Function Type** : Non Modal  
**Hierarchy** : Direct Command  
**Termination** :  
**Purpose** :

**Operation** :

Self Explanatory.

**Example** :

N/A

**Special Considerations.** :

None

---

**PATTERN CONCEPTS**

---

A PATTERN may be defined as any group of lines, arcs and finishes which contribute to the definition of an entity or object. This combination of drawing elements may then be assigned a name, stored on disc for future use and manipulated in many ways - just as a tailor's dress pattern may be manipulated on a piece of cloth.

- . An Architect may have a whole series of patterns each one describing a standard window, door, toilet or other fitting.
- . An Electronic Engineer will have patterns called resistor, capacitor, transistor, etc.

A pattern can also be part of an existing drawing. A drawing may consist of one or more patterns arranged to describe a General Assembly.

**NOTE**

There is no such thing as a "drawing" all by itself - there is only an assembly of one or more patterns, the collective name for which is a drawing. Therefore, whatever we draw, is automatically grouped as elements which will constitute a pattern. When the first pattern is finished, pressing INIT PATTERN will automatically terminate the previous group of elements and start a new group or pattern.

Pattern manipulation includes the following :-

1. Patterns may be moved and placed anywhere on the drawing - as many times as desired.
2. A pattern, or group of patterns may be rotated through an angle.
3. Patterns may be mirrored about an axis.
4. They may be increased or decreased in size by a specified amount.
5. The above functions may be combined.
6. In all cases the original pattern may be kept or erased.
7. Individual patterns may be written away to disc storage medium (Pattern library disc) - these patterns may later be read in from the disc and placed precisely on a drawing in memory
8. A collection of patterns (e.g. A complete drawing) - may be written to and read from a disc - without losing the individuality of the patterns on the drawing.
9. Patterns may be viewed or plotted selectively, or in combinations.

---

**BUTTON DEFINITION  
PATTERNS**

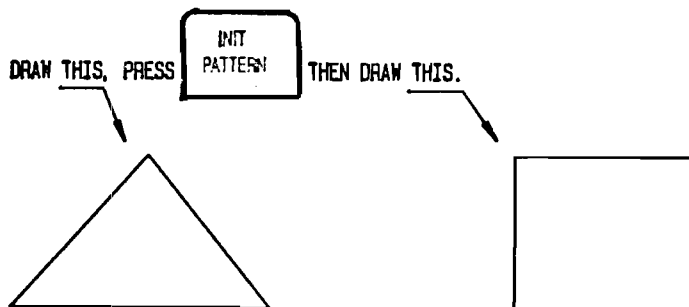
---

|                      |  |                           |
|----------------------|--|---------------------------|
| <b>Button</b>        | <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 0 auto;">INIT<br/>PATTERN</div> | <b>Menu Position : Q9</b> |
| <b>Name</b>          | : Initiate a Pattern   |                           |
| <b>Function Type</b> | : Non Modal  |                           |
| <b>Hierarchy</b>     | : Major Command  |                           |
| <b>Termination</b>   | :  |                           |
| <b>Purpose</b>       | :  |                           |

To initiate a new pattern and end the previous one. The new pattern will automatically be assigned a new number - incrementing by one and ascending from zero. The newly initiated pattern will be referred to as the current pattern.

**Operation :**

Self Explanatory.

**Example :**

The square becomes a separate PATTERN which is the CURRENT PATTERN- (until "INIT PATTERN" is pressed again -then a third pattern will be started.)

**Special Considerations. :**

An existing pattern indicated using the command "EDIT PATTERN" will cause that pattern to become the "CURRENT PATTERN".

---

**BUTTON DEFINITION  
PATTERNS**

---



Menu Position : Q11

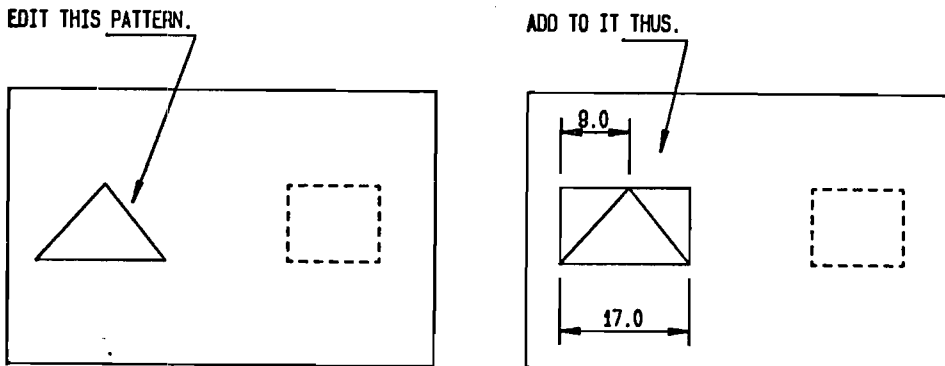
**Button Name** : Edit Pattern  
**Function Type** : Non Modal  
**Hierarchy** : Major Command  
**Termination** :  
**Purpose** :

To allow the user to add extra lines, text or dimensions to an existing pattern in such a way as to make the new features part of the pattern. Also to allow the user to delete or edit text or dimensions on a pattern.

**Operation :**

The user is prompted to indicate a pattern, which then becomes the current pattern.

**Example :**



THE ORIGINAL TRIANGLE, NEW LINES & DIMENSIONS  
WILL ALL BELONG TO THIS PATTERN.

**Special Considerations. :**

Use in conjunction with HIGHLIGHT PATTERN (E20) to confirm that the right pattern was indicated.

---

**BUTTON DEFINITION  
PATTERNS**

---

|                   |
|-------------------|
| DELETE<br>PATTERN |
|-------------------|

**Button** : **Delete Pattern** **Menu Position** : Q12  
**Name** : Delete Pattern  
**Function Type** : Modal  
**Hierarchy** : Major Command  
**Termination** : Using the command DWG MIDE (M14) or entering another command.

**Purpose :**

To delete a pattern from the drawing in memory.

**Operation :**

Erases the pattern indicated after the operator has confirmed that this is indeed the pattern to be deleted.

**Example :**

N/A

**Special Considerations. :**

None.

---

**BUTTON DEFINITION  
PATTERNS**

---



Menu Position : Q10

**Button**  
**Name** : Merge Pattern  
**Function Type** : Modal  
**Hierarchy** : Major Command  
**Termination** : Using the command DWG.MODE (M14) or entering another command.

**Purpose** :

To merge a number of existing patterns into one single pattern.

**Operation** :

The patterns indicated will be **MERGED INTO THE CURRENT PATTERN.**

**Example** :

N/A

**Special Considerations.** :

If inclusion of the current pattern is not desired, first press INIT PATTERN (Q9). The patterns indicated will then be merged into a new pattern.

Use in conjunction with HIGHLIGHT PATTERN (E20) to confirm that the right pattern was indicated.

## SECTION 7

---

**BUTTON DEFINITION  
PATTERNS**

---

**HIGHLIGHT  
PATTERN  
BY NAME**

**Button** **Menu Position : H3**  
**Name** : Highlight Patterns by name  
**Function Type** : Non Modal  
**Hierarchy** : Direct Command  
**Termination** : Cancelled by the following redraw

**Purpose :**

To allow the user to identify patterns on the drawing by entering the pattern names.

**Operation :**

Press this button, type in the pattern name and press "continue". The pattern of the name entered will be highlighted.

**Example :**

N/A


**Special Considerations :**

N/A

---

**BUTTON DEFINITION  
PATTERNS**

---

|                      |   |                           |
|----------------------|---|---------------------------|
| <b>Button</b>        |  | <b>Menu Position : I3</b> |
| <b>Name</b>          | : Name Pattern  |                           |
| <b>Function Type</b> | : Non Modal   |                           |
| <b>Hierarchy</b>     | : Minor Command   |                           |
| <b>Termination</b>   | :   |                           |
| <b>Purpose</b>       | :   |                           |

To assign a name to a pattern.

**Operation :**

The designated name will be assigned to the current pattern.

**Example :**

N/A

**Special Considerations. :**

For the selection of current pattern, see command "EDIT PATTERN".



---

**BUTTON DEFINITION  
PATTERNS**

---

|                      |                          |                           |
|----------------------|--------------------------|---------------------------|
| <b>Button</b>        |                          | <b>Menu Position : J3</b> |
| <b>Name</b>          | : Count Patterns by name |                           |
| <b>Function Type</b> | : Non Modal              |                           |
| <b>Hierarchy</b>     | : Major Command          |                           |
| <b>Termination</b>   | :                        |                           |
| <b>Purpose</b>       | :                        |                           |

|                          |
|--------------------------|
| COUNT<br>PATS<br>BY NAME |
|--------------------------|

To allow the user to ask the system how many patterns of a particular name are on the drawing currently in memory.

**Operation :**

Enter the name of the patterns to be counted.

**Example :**

Enter the name "Transistor". The system will respond by displaying how many patterns of that name are currently on the drawing.

**Special Considerations. :**

None

---

**BUTTON DEFINITION  
PATTERNS**

---

|                      |  |                           |
|----------------------|--|---------------------------|
| <b>Button</b>        | <div style="border: 1px solid black; padding: 2px; display: inline-block;">LIST<br/>PATS<br/>BY NAME</div> | <b>Menu Position : K3</b> |
| <b>Name</b>          | : List Patterns by name  |                           |
| <b>Function Type</b> | : Non Modal  |                           |
| <b>Hierarchy</b>     | : Major Command  |                           |
| <b>Termination</b>   | :  |                           |
| <b>Purpose</b>       | :  |                           |

To allow the user to obtain a "parts List" of the named patterns in the current drawing.

**Operation :**

**Example :**

14 Patterns Named "Window"  
10 Patterns Named "900 mm door" etc.  
etc.

**Special Considerations. :**

None.

---

**BUTTON DEFINITION  
PATTERNS**

---

|                      |  |                           |
|----------------------|--|---------------------------|
| <b>Button</b>        | <div style="border: 1px solid black; padding: 2px; display: inline-block;">DELETE<br/>PATS<br/>BY NAME</div> | <b>Menu Position : L3</b> |
| <b>Name</b>          | : Delete Patterns by Name  |                           |
| <b>Function Type</b> | : Non Modal  |                           |
| <b>Hierarchy</b>     | : Major Command  |                           |
| <b>Termination</b>   | :  |                           |
| <b>Purpose</b>       | :  |                           |

To allow the user to delete all patterns of a particular name from the drawing.

**Operation :**

Enter the name of the patterns to be deleted.

**Example :**

Enter Pattern Name "XXXXXX"

All Patterns of the name "XXXXXX" will be deleted from memory.

**Special Considerations. :**

None

---

**BUTTON DEFINITION  
PATTERNS**

---



**Button** : **Menu Position** : R9  
**Name** : Move Element to Current Pattern  
**Function Type** : Modal  
**Hierarchy** : Major Command  
**Termination** : By using the command DWG.MODE (M14) or entering another command.

**Purpose** :

To allow the user to Move any selected element into the current pattern.

**Operation** :

Indicate the element required.

**Example** :

N/A

**Special Considerations.** :

The element indicated is removed from the pattern in which it originally resided and now "belongs" to the current pattern.

---

**BUTTON DEFINITION  
PATTERNS**

---

|                                  |
|----------------------------------|
| COPY ELE.<br>TO CURR.<br>PATTERN |
|----------------------------------|

**Button** : **Menu Position** : R10  
**Name** : Copy Element to Current Pattern.  
**Function Type** : Modal  
**Hierarchy** : Major Command  
**Termination** : By using the command DWG.MODE (M14) or entering another command.

**Purpose** :

To allow the user to copy any selected element into the current pattern.

**Operation** :

Indicate the element required.

**Example** :

**Special Considerations.** :

The element required will be copied into the current pattern, but will also remain in the original pattern.

-----  
**BUTTON DEFINITION  
 PATTERNS**  
 -----

**Button**

BLOCK  
 POINTS TO  
 CURR. PAT.

**Menu Position :** R11

**Name** : Block Points to Current Pattern  
**Function Type** : Non Modal  
**Hierarchy** : Major Command  
**Termination** :  
**Purpose** :

To move a group of elements into the current pattern.

**Operation :**

All elements **fully enclosed** in a described polygon will become part of the current pattern.

**Example :**

TO MOVE ELEMENTS A, B, C & D INTO THE CURRENT PATTERN.

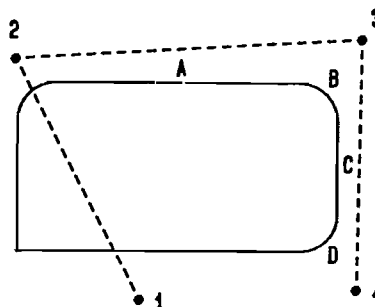
1) press

BLOCK  
 POINTS TO  
 CURR. PAT.

2) indicate the approximate points 1, 2, 3, 4.

3) press "CLOSE POLYGON"

(close polygon will join 4 to 1)



THESE ELEMENTS NOW 'BELONG' TO THE CURRENT PATTERN.

**Special Considerations. :**

The elements now "belong" to the current pattern, (they are not physically moved at all). They no longer "belong" to the original pattern.

Pressing INIT PATTERN prior to using this command will "allocate" the enclosed elements to an entirely new pattern.

---

**BUTTON DEFINITION  
PATTERNS**

---

|  |  |
|--|--|
| <p><b>Button</b></p> <p><b>Name</b> : Block Copy Points to Current Pattern</p> <p><b>Function Type</b> : Non Modal</p> <p><b>Hierarchy</b> : Major Command</p> <p><b>Termination</b> :</p> <p><b>Purpose</b> :</p> | <div style="border: 1px solid black; padding: 2px; width: fit-content; margin-bottom: 10px;">BLOCK COPY<br/>POINTS TO<br/>CURRL PAT.</div> <p><b>Menu Position</b> : R12</p> |
|--|--|

To copy a group of elements into the current pattern.

**Operation :**

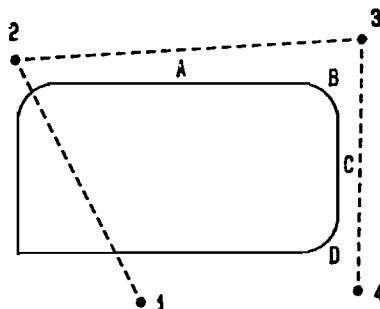
All elements fully enclosed in a described polygon will be copied to the current pattern.

**Example :**

TO COPY ELEMENTS A, B, C & D INTO THE CURRENT PATTERN.

- 1) press 

BLOCK COPY  
POINTS TO  
CURRL PAT.
  - 2) indicate the approximate points 1, 2, 3, 4.
  - 3) press "CLOSE POLYGON"
- (close polygon will join 4 to 1)



THESE ELEMENTS ARE 'DUPLICATED' IN THE CURRENT PATTERN.

**Special Considerations. :**

The elements are copied to the current pattern - but not removed from the original pattern.

Pressing INIT PATTERN prior to using this command will copy the enclosed elements to an entirely new pattern.

---

**BUTTON DEFINITIONS  
PATTERNS**

---

|  |  |                            |
|--|--|----------------------------|
| <b>Button :</b><br><b>Name</b><br><b>Function Type</b><br><b>Hierarchy</b><br><b>Termination</b> | <div style="border: 1px solid black; padding: 2px; display: inline-block; text-align: center;">             BLOCK<br/>             TO PAT.<br/>             WITH INTS           </div><br>: Block to Pattern with intersections<br>: Non Modal<br>: Major Command<br>: | <b>Menu Position : 020</b> |
|--|--|----------------------------|

**Purpose :**

To copy to a new position and form a new pattern from those lines and parts of lines which fall within a defined rectangle.

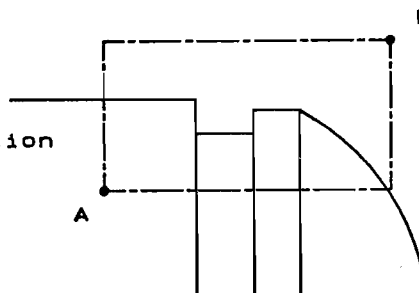
**Operation :**

All elements and parts of elements which fall within a defined rectangle will be copied and re-positioned as a new pattern.

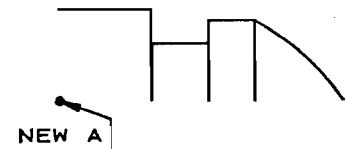
TO PRODUCE THE NEW PATTERN FROM THE ORIGINAL PATTERN AS SHOWN.

- 1) press 

BLOCK  
 TO PAT.  
 WITH INTS
- 2) indicate points  
A and B  
(lower left &  
upper right)
- 3) indicate new position  
for point A  
(lower left)



ORIGINAL PATTERN

RESULTANT  
NEW PATTERN.**Special Considerations :**

None



## SECTION 7

---

 FINDING PATTERNS
 

---

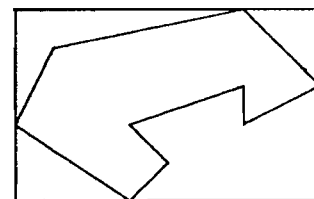
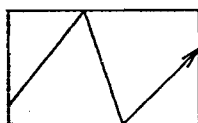
The following rules apply :-

- a) If the drawing flag is on (inverse video "D" in the "DFG" group below the drawing area), then **only** patterns containing drawing elements will be looked at, and the one will be the one with a vertex (not element) closest to the cursor. (In the case of two patterns sharing the same closest vertex, the first defined pattern is arbitrarily chosen.)
- b) If the drawing flag is off and the finishing flag is on, **only** patterns containing finishing will be looked at, and the pattern returned (if any) will be the first one found where the cursor is inside a finishing "block" (See definition below).
- c) If the drawing and finishing flags are both off, and the geometry flag is on, **only** patterns containing geometry will be looked at, and the pattern returned will be the one containing the closest geometry element.

A finishing "block" is defined as follows : it is a rectangle, orthogonal to the (unrotated) X and Y axes, such that it completely contains :

1. All the modes of a leader arrow
2. All the vertices of a hatching polygon
3. All the text for a text block
4. All the text for a dimension N.B. not arrows etc.

Example :



If the cursor is anywhere within such a block, the pattern containing that finishing will be selected.

## SECTION 7

-----  
PATTERNS  
-----

**Button** **Menu Position : M3**  
**Name** : Pattern information  
**Function Type** : Non Modal  
**Hierarchy** : Minor Command

**Purpose :**

To obtain a list of information on the internal printer pertaining to a selected pattern.

**Operation :**

Indicate the required pattern by placing the cursor close to any vertex of the pattern that is well separated from any other pattern, or by entering the pattern number and pressing "CONT".

**Example :**PATTERN INFORMATION:

Pattern No. 1  
In Layer D and in W/S.  
Number of drawing points: 22  
Number of finishing rows: 17  
Number of geometry lines: 0  
Number of geometry circles: 0

**Special Considerations:**

None.

---

 WORKSPACE CONCEPTS
 

---

To isolate a pattern (or patterns) in preparation for special commands that will affect **only those patterns** - the chosen patterns are temporarily placed in an area called the WORKSPACE.

**All Patterns** that have been assigned to WORKSPACE will be affected by any command addressed to the WORKSPACE - without losing pattern individuality.

Those commands that will automatically affect **all patterns** currently assigned to the WORKSPACE are :-

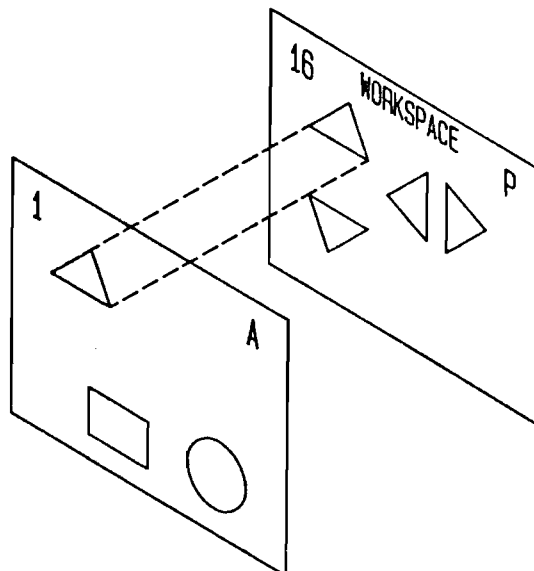
|                         |                                |
|-------------------------|--------------------------------|
| TRANSLATE               | DELETE WORKSPACE               |
| ROTATE                  | BLOCK POINTS TO WORKSPACE      |
| INCREASE/DECREASE       | BLOCK COPY POINTS TO WORKSPACE |
| KEEP                    | SWAP SCOPE & WORKSPACE         |
| DON'T KEEP              | SCOPE TO WORKSPACE             |
| REPEAT                  | PATTERN OUT OF WORKSPACE       |
| NEVER KEEP              | CLEAR WORKSPACE                |
| ROTATE DURING TRANSLATE | HIGHLIGHT WORKSPACE            |
| SET CUMULATIVE ROTATE   | REDRAW WORKSPACE               |
| MIRROR DURING TRANSLATE |                                |
| COPY WORKSPACE          |                                |
| MERGE WORKSPACE         |                                |

**NOTE!**

If no patterns have been assigned to the workspace - the current pattern will be used when using Translate etc, with the **Clear Workspace On/Off** button set to off (See Page 7:35).

PATTERNS & WORKSPACE.

In LAYER A below were drawn 3 individual PATTERNS. The triangular PATTERN was labelled for WORKSPACE in preparation for a COMMAND addressed to the WORKSPACE -



ALL PATTERNS carrying a WORKSPACE label will be effected by commands addressed to the WORKSPACE-WITHOUT LOSING THEIR INDIVIDUALITY.

-----  
**BUTTON DEFINITION**  
**WORKSPACE**  
 -----

|  |  |                           |
|--|--|---------------------------|
| <b>Button</b><br><b>Name</b><br><b>Function Type</b><br><b>Hierarchy</b><br><b>Termination</b><br><b>Purpose</b> | <div style="border: 1px solid black; padding: 2px; display: inline-block; text-align: center;">       CLEAR<br/>       W/S<br/>       ON / OFF     </div><br>: Clear Workspace On or Off<br>: Parameter Setting<br>: Direct Command<br>: Alter using this button | <b>Menu Position : Q7</b> |
|--|--|---------------------------|

To change modes from that in which the workspace is automatically cleared when pattern manipulation commands are actioned to that in which this is not the case, and vice versa.

**Operation :**

Pressing CLEAR W/S ON/OFF will change the mode as indicated in the area below the screen frame.

**Example :**

N/A

**Special Considerations. :**

The sequence of button presses if the command is set to ON would be :

1. Translate (etc.)
2. Patt to Workspace
3. Indicate the required Patterns
4. Return to Previous Routine
5. Follow the Prompts, depending on the command selected.

-----  
**BUTTON DEFINITION**  
**WORKSPACE**  
 -----

PATTERN  
INTO  
W/S

**Button** **Menu Position : R5**  
**Name** : Pattern into Workspace  
**Function Type** : Modal  
**Hierarchy** : Minor Command  
**Termination** : Return to previous routine  
**Purpose** :

To assign selected patterns to the Workspace.

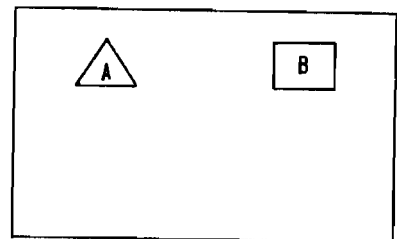
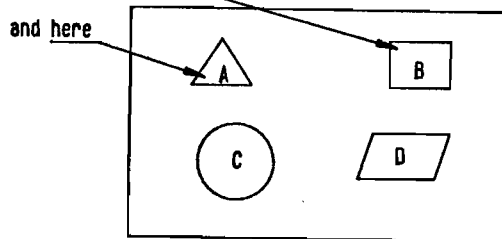
**Operation :**

Patterns indicated are assigned to the workspace.

**Example :**

TO ASSSIGN PATTERNS A & B TO THE WORKSPACE.

- 1) press PATTERN  
INTO  
W/S
- 2) place the cursor approx. here
- 3) and here



RESULT FOLLOWING "REDRAW WORKSPACE"

**Special Considerations. :**

Use in conjunction with HIGHLIGHT WORKSPACE to confirm that the correct patterns were indicated.

-----  
**BUTTON DEFINITION**  
**WORKSPACE**  
 -----

|  |  |                           |
|--|--|---------------------------|
| <b>Button</b><br><b>Name</b><br><b>Function Type</b><br><b>Hierarchy</b><br><b>Termination</b><br><b>Purpose</b> | <div style="border: 1px solid black; padding: 2px; display: inline-block; text-align: center;">       RETURN TO<br/>       PREVIOUS<br/>       ROUTINE     </div><br>: Return to Previous Routine<br>: Non Modal<br>: Direct Command<br>:<br>: | <b>Menu Position : Q6</b> |
|--|--|---------------------------|

To return the system to the pattern manipulation commands after indicating those patterns required in the workspace when the system is in the clear workspace mode controlled by the clear workspace ON/OFF command.

**Operation :**

See Example Below.

**Example :**

CLEAR WORKSPACE set to ON / HIGHLIGHT WORKSPACE ON

- |   |   |  |
|---|---|--|
| <ol style="list-style-type: none"> <li>1. TRANSLATE, (patterns are cleared from Workspace).</li> <li>2. Interrupted by PATTERN INTO WORKSPACE</li> <li>3. Indicate the required patterns.</li> <li>4. Press RETURN TO PREVIOUS ROUTINE</li> <li>5. Follow the translate prompts to a conclusion.</li> </ol> | } | Interruption<br>of Translate<br>Routine. |
|---|---|--|

**Special Considerations. :**

None

---

**BUTTON DEFINITION**  
**WORKSPACE**

---

|              |
|--------------|
| CLEAR<br>W/S |
|--------------|

**Button** :  
**Name** : Clear Workspace  
**Function Type** : Non Modal  
**Hierarchy** : Minor Command  
**Termination** :  
**Purpose** :

**Menu Position** : R8

To Clear the Workspace of all Patterns.

**Operation** :

Clears the Workspace of all Patterns.

**Example** :

N/A

**Special Considerations** . :

None

-----  
**BUTTON DEFINITION**  
**WORKSPACE**  
 -----

|                      |  |                           |
|----------------------|--|---------------------------|
| <b>Button</b>        | <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 0 auto;">         PATTERN<br/>OUT OF<br/>W/S       </div> | <b>Menu Position : S5</b> |
| <b>Name</b>          | : Pattern out of Workspace   |                           |
| <b>Function Type</b> | : Modal  |                           |
| <b>Hierarchy</b>     | : Minor Command  |                           |
| <b>Termination</b>   | : By entering another command, e.g. DWG.MODE   |                           |
| <b>Purpose</b>       | :  |                           |

To selectively remove patterns from the Workspace.

**Operation :**

Patterns indicated are removed from the Workspace.

**Example :**

TO REMOVE PATTERNS A & B FROM THE WORKSPACE.

1) press 

REDRAW  
W/S

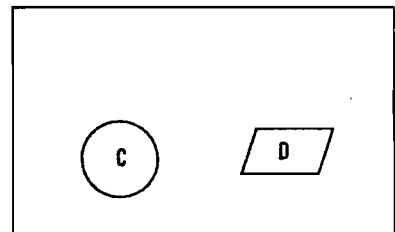
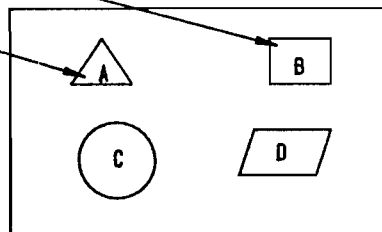
      2) press 

PATTERN  
OUT OF  
W/S

3) place the cursor approx. here

4)

and here



RESULT FOLLOWING "REDRAW WORKSPACE"

**Special Considerations. :**

None



-----  
**BUTTON DEFINITION**  
**WORKSPACE**  
 -----

|                      |                      |                           |
|----------------------|----------------------|---------------------------|
| <b>Button</b>        | SCOPE<br>TO<br>W/S   | <b>Menu Position : R6</b> |
| <b>Name</b>          | : Scope to Workspace |                           |
| <b>Function Type</b> | : Non Modal          |                           |
| <b>Hierarchy</b>     | : Minor Command      |                           |
| <b>Termination</b>   | :                    |                           |
| <b>Purpose</b>       | :                    |                           |

To assign all patterns within the Scope to the Workspace. (See Scope & Redraw Page 7:3)

**Operation :**

All visible patterns within the scope are assigned to the workspace.

**Example :**

To Translate Layer B on the Drawing by a Required amount.

1. With CLEAR W/S set to OFF
2. Press SELECT  
DISPLAYED  
LAYERS (See Page 7:66)
3. Enter B and Press "CONT"
4. Press REDRAW  
LAYERS (Screen is erased and Layer B is displayed.)
5. Press SCOPE  
TO  
W/S (Layer B is assigned to Workspace).
6. Press TRANSLATE
7. Follow the prompts to translate all of Layer B as desired (See MOVING PATTS, Page 7:47).

**Special Considerations. :**

None.

---

 BUTTON DEFINITION  
 WORKSPACE
 

---

|  |   |                           |
|--|---|---------------------------|
| <b>Button</b><br><b>Name</b><br><b>Function Type</b><br><b>Hierarchy</b><br><b>Termination</b><br><b>Purpose</b> | <div style="border: 1px solid black; padding: 2px; display: inline-block; text-align: center;">       SWAP<br/>       SCOPE &amp;<br/>       W/S     </div><br>: Swop Scope and Workspace<br>: Non Modal<br>: Minor Command<br>:<br>: | <b>Menu Position : S6</b> |
|--|---|---------------------------|

To exchange patterns currently assigned to the "Workspace" with the patterns in the current "Scope" .

**Operation :**

All patterns within the Scope are exchanged with those currently assigned to the workspace.

**Example :**

To Translate 25 patterns - assuming there are 30 patterns in the current scope).

1. CLEAR W/S set to OFF

2. Press 

PATTERN  
 INTO  
 W/S

3. Indicate the 5 patterns that will not be translated.

4. Press 

SWAP  
 SCOPE &  
 W/S

 (the 25 patterns are now assigned to the workspace, and the 5 are removed from workspace).

5. Press 

TRANSLATE

 and follow the prompts in the normal way.

The 25 Patterns will be Translated.

**Special Considerations. :**

None

-----  
**BUTTON DEFINITION**  
**WORKSPACE**  
 -----

|                      |                             |                           |
|----------------------|-----------------------------|---------------------------|
| <b>Button</b>        | BLOCK<br>POINTS TO<br>W/S   | <b>Menu Position : R7</b> |
| <b>Name</b>          | : Block Points to Workspace |                           |
| <b>Function Type</b> | : Non Modal                 |                           |
| <b>Hierarchy</b>     | : Major Command             |                           |
| <b>Termination</b>   | :                           |                           |
| <b>Purpose</b>       | :                           |                           |

To assign selected elements to the workspace as a new pattern or patterns, removing the elements from the pattern in which they currently reside.

**Operation :**

All elements fully enclosed in a polygon are removed from the pattern in which they currently reside and are transferred to a new pattern in the workspace. This will include Finish if FINISH ON/OFF is set ON.

**Example :**

TO ASSIGN THE ELEMENTS A, B, C & D TO THE WORKSPACE AS A NEW PATTERN & REMOVE THEM FROM THE EXISTING PATTERN.

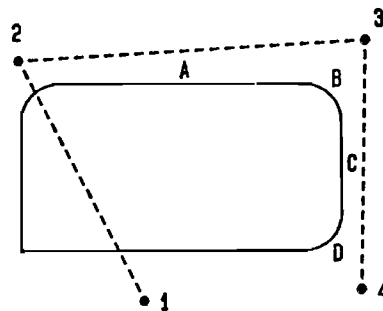
1) press

BLOCK  
POINTS TO  
W/S

2) indicate the approximate points 1, 2, 3, 4.

3) press "CLOSE POLYGON"

(close polygon will join 4 to 1)



THESE ELEMENTS ARE REMOVED FROM THE ORIGINAL PATTERN  
& TRANSFERRED TO THE W/S AS A NEW PATTERN.

**Special Considerations. :**

If an entire pattern including finish and all elements is enclosed in the polygon - the original pattern is deleted and transferred to the workspace as a new pattern, but if FINISH ON/OFF is set to OFF, finishing elements only will remain as the original pattern and not appear in the new pattern.

Elements which were in separate patterns before the "BLOCK PTS TO W/S" command will be placed into new separate patterns in the workspace, i.e. this command retains pattern individuality.

-----  
**BUTTON DEFINITION**  
**WORKSPACE**  
 -----

|  |   |                           |
|--|---|---------------------------|
| <b>Button</b><br><b>Name</b><br><b>Function Type</b><br><b>Hierarchy</b><br><b>Termination</b><br><b>Purpose</b> : | <div style="border: 1px solid black; padding: 2px; display: inline-block; text-align: center;">         BLOCK COPY<br/>         POINTS TO<br/>         W/S       </div><br>: Block Copy Points to Workspace<br>: Non Modal<br>: Major Command<br>:<br>: | <b>Menu Position</b> : S7 |
|--|---|---------------------------|

To COPY elements to the workspace as a new pattern.

**Operation :**

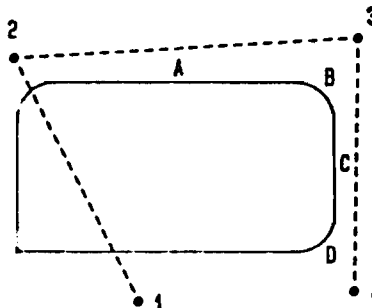
All elements fully enclosed in a polygon are copied to the workspace as a new pattern. These elements will also remain in the pattern in which they currently reside. This will include finish if FINISH ON/OFF is set ON.

**Example :**

TO COPY THE ELEMENTS A, B, C & D TO THE WORKSPACE AS A NEW PATTERN, ALSO LEAVING THEM IN THE ORIGINAL PATTERN.

- 1) press 

BLOCK COPY  
POINTS TO  
W/S
  - 2) indicate the approximate points 1, 2, 3, 4.
  - 3) press "CLOSE POLYGON"
- (close polygon will join 4 to 1)



THESE ELEMENTS ARE COPIED TO THE WORKSPACE,  
 BUT ALSO REMAIN IN THE ORIGINAL PATTERN.

**Special Considerations. :**

See "BLOCK POINTS TO W/S"

---

**BUTTON DEFINITION**  
**WORKSPACE**

---

|               |
|---------------|
| DELETE<br>W/S |
|---------------|

**Button** : **Menu Position : Q21**  
**Name** : Delete Workspace  
**Function Type** : Non Modal  
**Hierarchy** : Major Command  
**Termination** :  
**Purpose** :

To delete all patterns currently assigned to the workspace.

**Operation :**

The user will be prompted to press this button again to confirm that he does indeed wish to delete the patterns currently assigned to the workspace. Following this the patterns will be deleted.

**Example :**

N/A

**Special Considerations. :**

Do not confuse this with CLEAR WORKSPACE!

---

**BUTTON DEFINITION**  
**WORKSPACE**

---

|                      |   |                            |
|----------------------|---|----------------------------|
| <b>Button</b>        | <div style="border: 1px solid black; padding: 2px; display: inline-block;">COPY<br/>W/S</div> | <b>Menu Position : R21</b> |
| <b>Name</b>          | : Copy Workspace  |                            |
| <b>Function Type</b> | : Non Modal   |                            |
| <b>Hierarchy</b>     | : Major Command   |                            |
| <b>Termination</b>   | :   |                            |
| <b>Purpose</b>       | :   |                            |

To copy patterns currently in the workspace into the current pattern, but retain the patterns in the workspace.

**Operation :**

Self Explanatory.

**Example :**

N/A


**Special Considerations. :**

This command should be used with caution - it is possible to superimpose patterns over existing patterns unintentionally - without realising what has occurred.

---

**BUTTON DEFINITION  
WORKSPACE**

---

|                      |   |                            |
|----------------------|---|----------------------------|
| <b>Button</b>        |  | <b>Menu Position : S21</b> |
| <b>Name</b>          | : Merge Workspace   |                            |
| <b>Function Type</b> | : Non Modal   |                            |
| <b>Hierarchy</b>     | : Major Command   |                            |
| <b>Termination</b>   | :   |                            |
| <b>Purpose</b>       | :   |                            |

To merge all patterns currently assigned to the workspace into the current pattern.

**Operation :**

All patterns currently assigned to the workspace will be merged into one pattern and the workspace cleared of all patterns.

**Example :**

N/A

**Special Considerations. :**

None.

---

**MOVING PATTERNS**

---

As illustrated earlier under the heading WORKSPACE CONCEPTS (Page 7:34), ALL patterns that are assigned to the workspace may be moved and relocated on a drawing. e.g. Translate, Rotate, Mirror, etc.

This chapter illustrates some of the relevant buttons - and sequences in which they may be used.



-----  
**BUTTON DEFINITION**  
**MOVING PATTERNS**  
 -----

|  |  |                           |
|--|--|---------------------------|
| <b>Button</b><br><b>Name</b><br><b>Function Type</b><br><b>Hierarchy</b><br><b>Termination</b><br><b>Purpose</b> : | <div style="border: 1px solid black; padding: 2px; width: fit-content; margin-bottom: 5px;">         QUICK<br/>         TRANSLATE<br/>         &amp; KEEP       </div> : Quick Translate and Keep<br>: Modal<br>: Major Command<br>: DWG MODE (M14) or entering another command. | <b>Menu Position</b> : N6 |
|--|--|---------------------------|

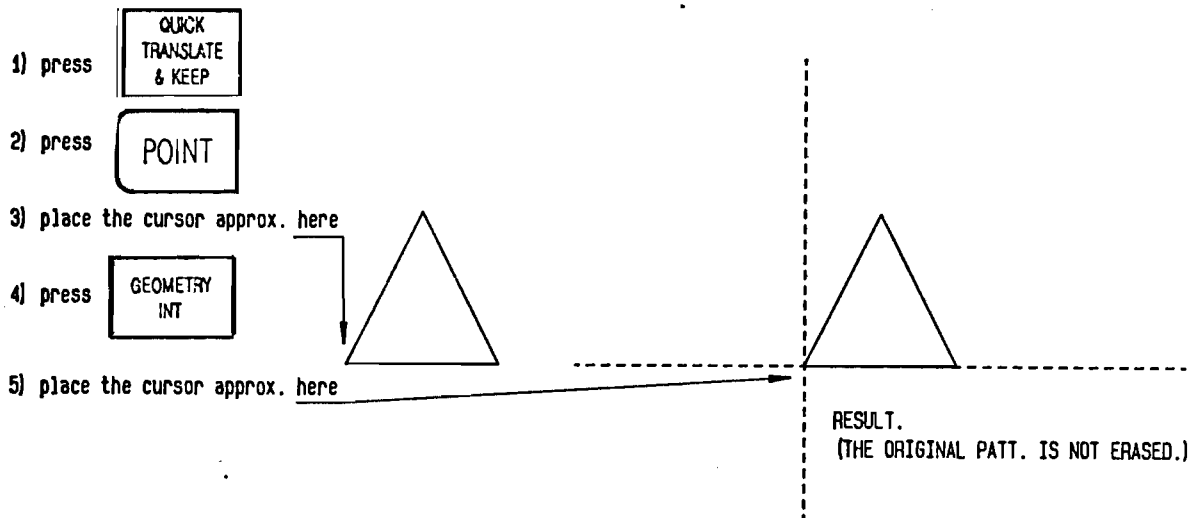
To move one Pattern only, keeping the original pattern.

**Operation :**

The user will be requested to enter the point to be translated and the new location for this point - either of which may be done using any cursor placing method. The pattern indicated will be moved by this amount.

**Example :**

TO TRANSLATE THE PATTERN AS SHOWN, KEEPING THE ORIGINAL PATTERN.



**Special Considerations. :**

|                                   |  |                               |                                  |                               |                                  |                           |
|-----------------------------------|--|-------------------------------|----------------------------------|-------------------------------|----------------------------------|---------------------------|
| The buttons<br>translate command. | <table border="1" style="border-collapse: collapse; text-align: center;"> <tr> <td style="padding: 2px;">ROTATE<br/>DURING<br/>TRANSLATE</td> <td style="padding: 2px;">CUMULATIVE<br/>ROTATE</td> <td style="padding: 2px;">MIRROR<br/>DURING<br/>TRANSLATE</td> <td style="padding: 2px;">INC./DEC.<br/>DURING<br/>TRANSLATE</td> </tr> </table> | ROTATE<br>DURING<br>TRANSLATE | CUMULATIVE<br>ROTATE             | MIRROR<br>DURING<br>TRANSLATE | INC./DEC.<br>DURING<br>TRANSLATE | may be used following the |
| ROTATE<br>DURING<br>TRANSLATE     | CUMULATIVE<br>ROTATE   | MIRROR<br>DURING<br>TRANSLATE | INC./DEC.<br>DURING<br>TRANSLATE |                               |                                  |                           |

As this command uses the point specified in Step 3 not only as the origin point for the translation, but also as an indication of which pattern to select, the point must be closer to a vertex of the desired pattern than to any vertex of another pattern, or the wrong pattern will be used.

---

**BUTTON DEFINITION**  
**MOVING PATTERNS**

---

|                      |   |                           |
|----------------------|---|---------------------------|
| <b>Button</b>        | QUICK<br>TRANSLATE<br>NO KEEP                 | <b>Menu Position : N7</b> |
| <b>Name</b>          | : Quick Translate No Keep                     |                           |
| <b>Function Type</b> | : Modal                                       |                           |
| <b>Hierarchy</b>     | : Major Command                               |                           |
| <b>Termination</b>   | : DWG MODE (M14) or entering another command. |                           |
| <b>Purpose :</b>     |   |                           |

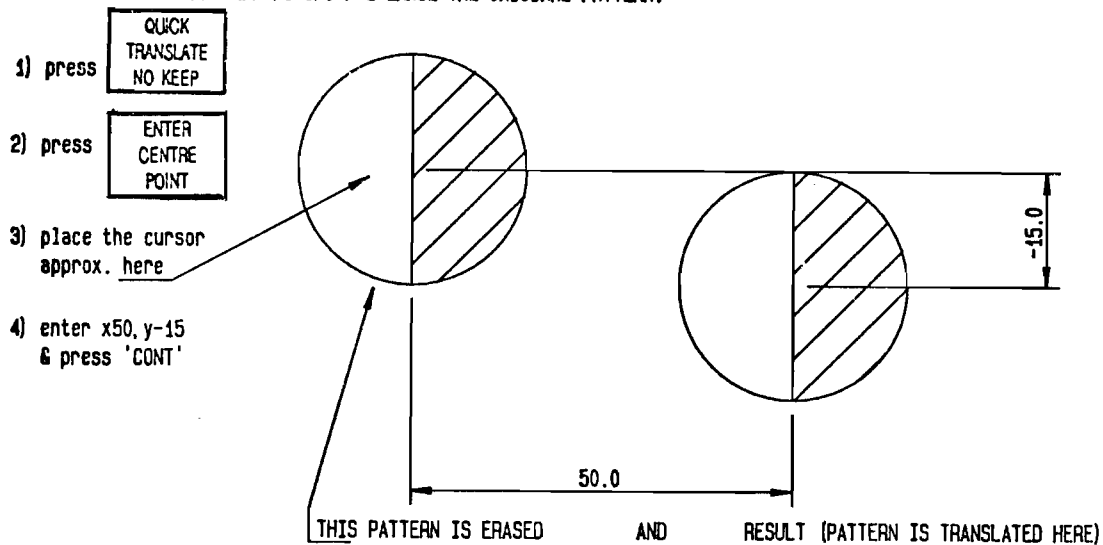
To move one pattern only, erasing the original pattern.

**Operation :**

The user will be requested to enter the point to be translated and the new location for this point - either of which may be done using any cursor placing method. The pattern indicated will be moved by this amount.

**Example :**

TO TRANSLATE THE PATTERN AS SHOWN & ERASE THE ORIGINAL PATTERN.



**Special Considerations. :**

-----  
**BUTTON DEFINITION**  
**MOVING PATTERNS**  
 -----



**Button Name** : Translate **Menu Position** : N8  
**Function Type** : Modal  
**Hierarchy** : Major Command  
**Termination** : Using one of the Execute commands, shown under the heading Operation, below.

**Purpose :**

To move all patterns, currently assigned to the workspace, to a specified new position. The original patterns may be kept or erased - or repeated a specified number of times.

**Operation :**

The user will be requested to enter the point to be translated and the new location for this point - either of which may be done using any cursor placing method. All patterns currently assigned to the workspace will be moved by this amount, after pressing one of the Execute Buttons :

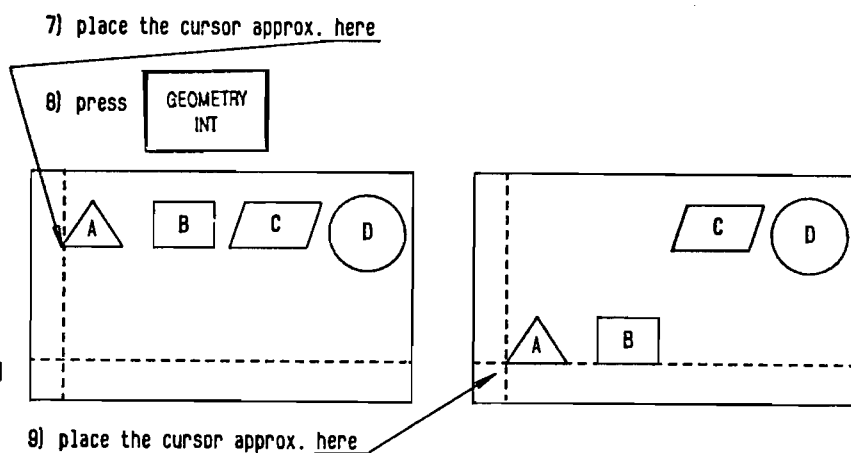
|            |            |
|------------|------------|
| KEEP       | REPEAT     |
| DON'T KEEP | NEVER KEEP |

**Example :**

TO TRANSLATE PATTERNS A & B AS SHOWN.

(WITH CLEAR W/S ON)

- 1) press
- 2) press
- 3) press
- 4) indicate patterns A & B with the cursor (they will be highlighted for confirmation)
- 5) press
- 6) press



9) place the cursor approx. here

**Special Considerations. :**

The buttons 

|           |        |        |                     |
|-----------|--------|--------|---------------------|
| TRANSLATE | ROTATE | MIRROR | INCREASE / DECREASE |
|-----------|--------|--------|---------------------|

 may be used following the

-----  
**BUTTON DEFINITION**  
**MOVING PATTERNS**  
 -----



**Button Name** : Rotate **Menu Position** : 08  
**Function Type** : Modal  
**Hierarchy** : Major Command  
**Termination** : Using one of the Execute buttons shown below, under the heading **Operation**.

**Purpose** :

To rotate all patterns currently assigned to the workspace about an indicated point by a specified angle. The original pattern may be kept or deleted or repeatedly rotated a specified number of times.

**Operation** :

The user will be requested to enter the point of rotation, which may be done using any cursor placing method. An angle of rotation is then entered following which one of the following execute buttons must be pressed :-

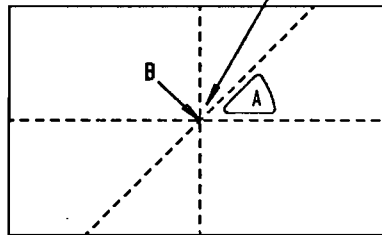
|            |            |
|------------|------------|
| KEEP       | REPEAT     |
| DON'T KEEP | NEVER KEEP |

**Example** :

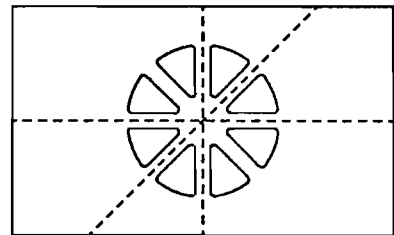
TO ROTATE PATTERN A BY AN ANGLE OF 45°  
 7 TIMES, ABOUT THE GEOMETRY INTERSECTION AT B.  
 (WITH CLEAR W/S OFF)

- 1) press
- 2) press
- 3) press
- 4) indicate pattern A
- 5) press
- 6) press

7) place the cursor approx. here



- 8) press
- 9) enter 7 & press 'CONT'



**RESULT**  
 (Note! all patterns are now in workspace)

**Special Considerations.** :

-----  
**BUTTON DEFINITION**  
**MOVING PATTERNS**  
 -----



Menu Position : P8

**Button Name** : Mirror  
**Function Type** : Modal  
**Hierarchy** : Major Command  
**Termination** : Using one of the Execute buttons shown below under the heading **Operation**.

**Purpose** :

To mirror all patterns currently assigned to the workspace about an indicated line, or at an angle of 0 or 90 degrees about an indicated point on the axis of symmetry.

**Operation** :

The user will be requested to indicate whether he wishes to mirror with respect to an angle of 0 or 90 degrees or with respect to an existing line by entering 1 or 2 or 3. Following which a point on the axis of symmetry may be indicated using any cursor placement method - or, if number 3 was chosen, simply indicate the existing line about which to mirror, finally select one of the execute buttons :

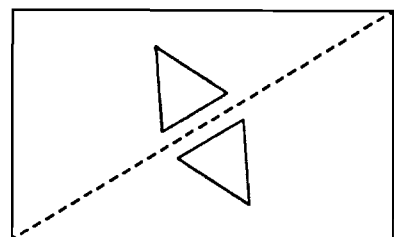
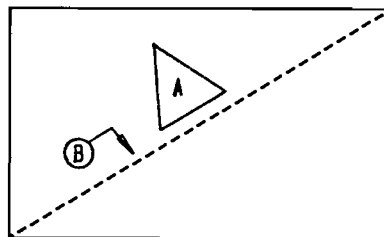
|            |            |
|------------|------------|
| KEEP       |            |
| DON'T KEEP | NEVER KEEP |

**Example** :

TO MIRROR TRIANGLE A ABOUT LINE B

(WITH CLEAR W/S ON)

- 1) press
- 2) press
- 3) press
- 4) indicate pattern A
- 5) press



6) indicate line B

7) press

RESULT.

**Special Considerations** . :

Beware of mirroring text and dimensions; because mirrored text (upside down/back to front) is not terribly useful, all text which is mirrored has only its **location** changed : its angle and direction remain unaltered. This means that the results of mirroring on text are largely dependant on the origin of the text and the angle about which it is mirrored.

e.g

TEXT



mirrored about  
the vertical  
gives

TEXT



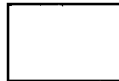
if the origin is 2, 5 or 8.

TEXT



if the origin is 1, 4 or 7.

TEXT



if the origin is 3, 6 or 9.

mirrored about  
the horizontal  
gives



TEXT

if the origin  
is 4, 5 or 6.



TEXT

if the origin  
is 1, 2 or 3



TEXT

if the origin  
is 7, 8 or 9.

---

**BUTTON DEFINITION**  
**MOVING PATTERNS**

---

INCREASE /  
DECREASE

Menu Position : Q8

**Button Name** : Increase or Decrease  
**Function Type** : Modal  
**Hierarchy** : Major Command  
**Termination** : Using one of the Execute buttons shown below under the heading **Operation**.

**Purpose :**

To increase or decrease the size of all patterns currently assigned to the workspace. The original pattern may be kept or deleted.

**Operation :**

The user will be requested to indicate a point about which the patterns will be scaled - which may be done using any cursor placing method. A ratio is then entered, finally one of the Execute buttons must be selected :

|               |               |
|---------------|---------------|
| KEEP          | REPEAT        |
| DON'T<br>KEEP | NEVER<br>KEEP |

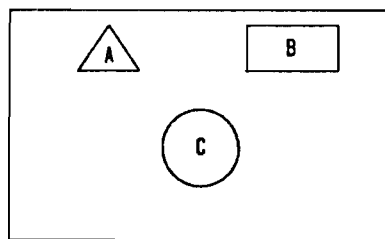
**Example :**

TO INCREASE PATTERN C BY A RATIO OF 1.75, KEEPING ITS CENTRE ON THE SAME POINT.

(WITH CLEAR W/S OFF)

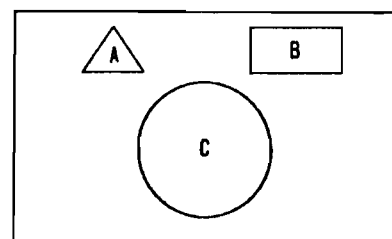
- 1) press CLEAR  
W/S
- 2) press HIGHLIGHT  
W/S
- 3) press PATTERN  
INTO  
W/S
- 4) press INCREASE /  
DECREASE
- 5) press ENTER  
CENTRE  
POINT
- 6) indicate pattern C

7) enter 1.75 and press 'CONT'



8) press

DON'T  
KEEP



RESULT.

To decrease enter the appropriate ratio :

e.g. 0.5 = 1/2 = half size.

0.75 = 3/4 = three quarter of original size.

**Special Considerations. :**

This command will also increase text size and hatching separation in proportion in any finishing which is included in the workspace.

-----  
**BUTTON DEFINITION**  
**MOVING PATTERNS**  
 -----

|                      |                                     |                           |
|----------------------|-------------------------------------|---------------------------|
| <b>Button</b>        | ROTATE<br>DURING<br>TRANSLATE       | <b>Menu Position : N5</b> |
| <b>Name</b>          | : Rotate during Translate           |                           |
| <b>Function Type</b> | : Modal                             |                           |
| <b>Hierarchy</b>     | : Minor Command                     |                           |
| <b>Termination</b>   | : Using one of the execute buttons. |                           |
| <b>Purpose</b>       | :                                   |                           |

To rotate a pattern or patterns during the execution of the translate command.

**Operation :**

This button is pressed following the translate button at any time before the new position point is indicated. The required rotation angle is then entered when prompted by the system.

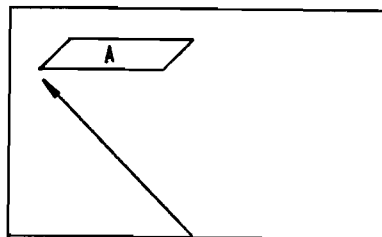
**Example :**

TO TRANSLATE & ROTATE PATTERN A AS SHOWN

(WITH CLEAR W/S OFF)

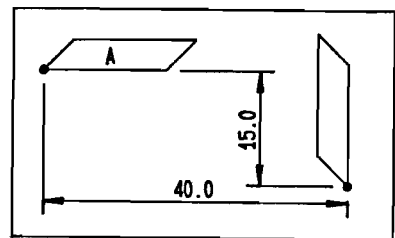
- 1) press CLEAR  
W/S
- 2) press HIGHLIGHT  
W/S
- 3) press PATTERN  
INTO  
W/S
- 4) indicate pattern A
- 5) press TRANSLATE
- 6) press ROTATE  
DURING  
TRANSLATE

7) enter 90 and press 'CONT'



8) press POINT

9) place cursor approx. here



RESULT.

10) enter x40,y-15 & press 'CONT'

**Special Considerations. :**

The Rotation Angle could be obtained by using the command "GET ANGLE FROM LINE".



-----  
**BUTTON DEFINITION**  
**MOVING PATTERNS**  
 -----

|  |   |                           |
|--|---|---------------------------|
| <b>Button</b><br><b>Name</b><br><b>Function Type</b><br><b>Hierarchy</b><br><b>Termination</b><br><b>Purpose</b> : | <div style="border: 1px solid black; padding: 2px; display: inline-block; text-align: center;">MIRROR<br/>DURING<br/>TRANSLATE</div><br>: Mirror During Translate<br>: Non Modal<br>: Minor Command<br>:<br>: | <b>Menu Position</b> : P5 |
|--|---|---------------------------|

To mirror a pattern or patterns during the execution of the translate command.

**Operation :**

This button is pressed following the translate button at any time before the new position point is indicated. The user will be prompted to enter a point and angle about which to mirror, similarly to the normal mirror command (Page 7:52).

**Example :**

TO TRANSLATE & MIRROR PATTERN A AS SHOWN

(WITH CLEAR W/S OFF)

- 1) press 

CLEAR  
W/S
- 2) press 

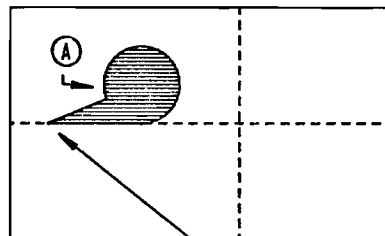
HIGHLIGHT  
W/S
- 3) press 

PATTERN  
INTO  
W/S
- 4) indicate pattern A
- 5) press 

TRANSLATE
- 6) press 

MIRROR  
DURING  
TRANSLATE

7) enter 1 (for 0°) & press 'CONT'



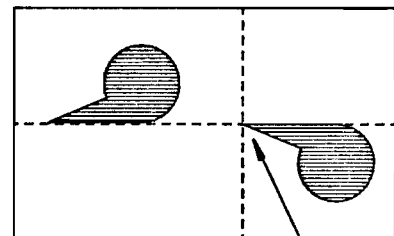
8) press 

POINT

9) place the cursor approx. here

10) press 

GEOMETRY  
INT



RESULT.

11) place the cursor approx. here

**Special Considerations. :**

The mirror angle could be obtained by using "GET ANGLE FROM LINE".

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**BUTTON DEFINITION  
MOVING PATTERNS**

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|                      |   |                           |
|----------------------|---|---------------------------|
| <b>Button</b>        |   | <b>Menu Position : Q5</b> |
| <b>Name</b>          | : Increase or Decrease during Translate |                           |
| <b>Function Type</b> | : Non Modal                             |                           |
| <b>Hierarchy</b>     | : Minor Command                         |                           |
| <b>Termination</b>   | :                                       |                           |
| <b>Purpose</b>       | :                                       |                           |

INC./DEC.  
DURING  
TRANSLATE

To increase or decrease a pattern or patterns in size during the execution of a translate command.

**Operation :**

This button is pressed following the Translate button at any time before the new position point is indicated. The Required ratio is then entered when prompted by the system.

**Example :**

TO TRANSLATE PATTERN A BY THE DIMENSIONS SHOWN  
& SIMULTANEOUSLY DECREASE IT TO HALF SIZE.

WITH CLEAR W/S OFF

- 1) press 

CLEAR  
W/S
- 2) press 

HIGHLIGHT  
W/S
- 3) press 

PATTERN  
INTO  
W/S
- 4) press 

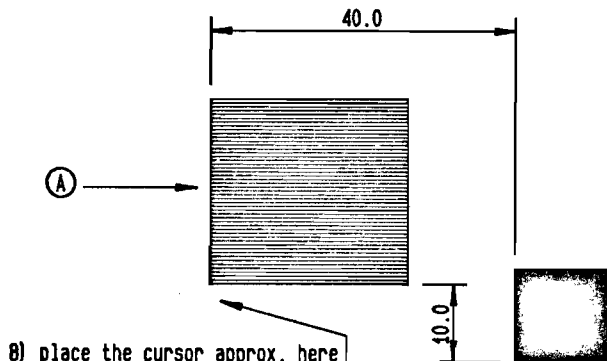
TRANSLATE
- 5) press 

INC./DEC.  
DURING  
TRANSLATE

6) enter 0.5 & press 'CONT'

7) press 

POINT



8) place the cursor approx. here

9) enter x40, y-10 & press 'CONT'

10) press 

KEEP

**Special Considerations. :**

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**BUTTON DEFINITION**  
**MOVING PATTERNS**  
 -----

-CUMULATIVE  
ROTATE

Menu Position : 05

**Button Name** : Cumulative Rotate  
**Function Type** : Modal  
**Hierarchy** : Direct Command  
**Termination** : Terminates when translate sequence terminates.  
**Purpose** :

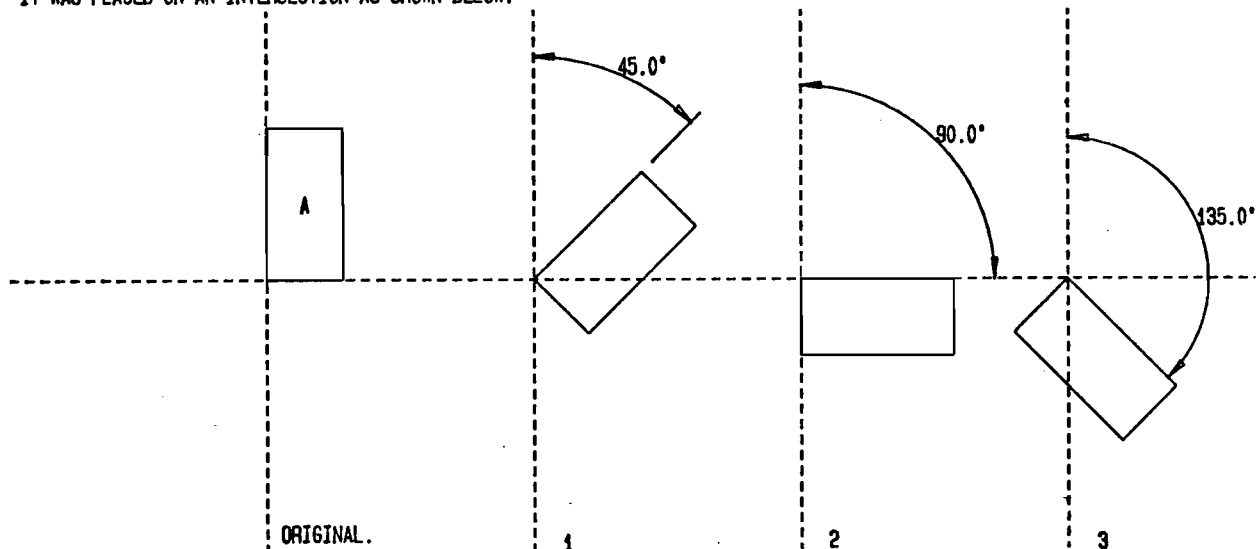
To incrementally rotate a pattern or patterns through a specific angle whilst repetitively re positioning using the translate with keep command.

**Operation :**

This button is pressed following TRANSLATE & ROTATE DURING TRANSLATE.

**Example :**

TO INCREMENTALLY ROTATE PATTERN A BY -45° EACH TIME  
 IT WAS PLACED ON AN INTERSECTION AS SHOWN BELOW.



M84

**Special Considerations. :**

This mode remains active for a single translation sequence **only**. Next time you press "TRANSLATE" it is automatically de-activated and you have to select it again if required.

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**BUTTON DEFINITION**  
**MOVING PATTERNS**

---

|      |
|------|
| KEEP |
|------|

**Button** **Menu Position : 06**  
**Name** : Execute with Keep  
**Function Type** : Non Modal  
**Hierarchy** : Major Command  
**Termination** :  
**Purpose** :

To Execute a Translate, Rotate, Mirror etc. type command and specifying the original pattern is to be "kept" resulting in a duplication.

**Operation :**

Self Explanatory.

**Example :**

N/A

**Special Considerations. :**

N/A

---

**BUTTON DEFINITION**  
**MOVING PATTERNS**

---

**Button**

|              |
|--------------|
| DONT<br>KEEP |
|--------------|

**Menu Position : 07**

**Name** : Execute Without Keep  
**Function Type** : Non Modal  
**Hierarchy** : Major Command  
**Termination** :  
**Purpose** :

To Execute a Translate, Rotate, Mirror etc. type command and specify that the original pattern is to be erased (not kept).

**Operation :**

Self Explanatory.

**Example :**

N/A

**Special Considerations. :**

After transform with no keep instead of redrawing everything only what has been translated, rotated or mirrored will be redrawn. However, if a line from a translated pattern was on top of a line from an untranslated pattern, the line, which is rubbed out by the erasure of the pattern to be translated, is now no longer redrawn until the user redraws.

---

**BUTTON DEFINITION**  
**MOVING PATTERNS**

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|                      |   |                           |
|----------------------|---|---------------------------|
| <b>Button</b>        | <div style="border: 1px solid black; padding: 2px; display: inline-block;">REPEAT</div> | <b>Menu Position : P6</b> |
| <b>Name</b>          | : Repeat Execute  |                           |
| <b>Function Type</b> | : Non Modal   |                           |
| <b>Hierarchy</b>     | : Major Command   |                           |
| <b>Termination</b>   | :   |                           |
| <b>Purpose</b>       | :   |                           |

To Execute a Translate, Rotate etc. type of command - Repeating and Incrementing the command a specified number of times.

**Operation :**

Self Explanatory.

**Example :**

N/A

**Special Considerations. :**

N/A

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**BUTTON DEFINITION**  
**MOVING PATTERNS**

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|               |
|---------------|
| NEVER<br>KEEP |
|---------------|

**Button****Menu Position : P7**

**Name** : Execute and Never Keep  
**Function Type** : Non Modal  
**Hierarchy** : Major Command  
**Termination** :  
**Purpose** :

To Execute a Translate etc. type command - erasing the previous pattern(s) each time they are placed in a new position. (Convenient for experimentally placing pattern(s) for viewing purposes).

**Operation :**

Self Explanatory.





**Example :**

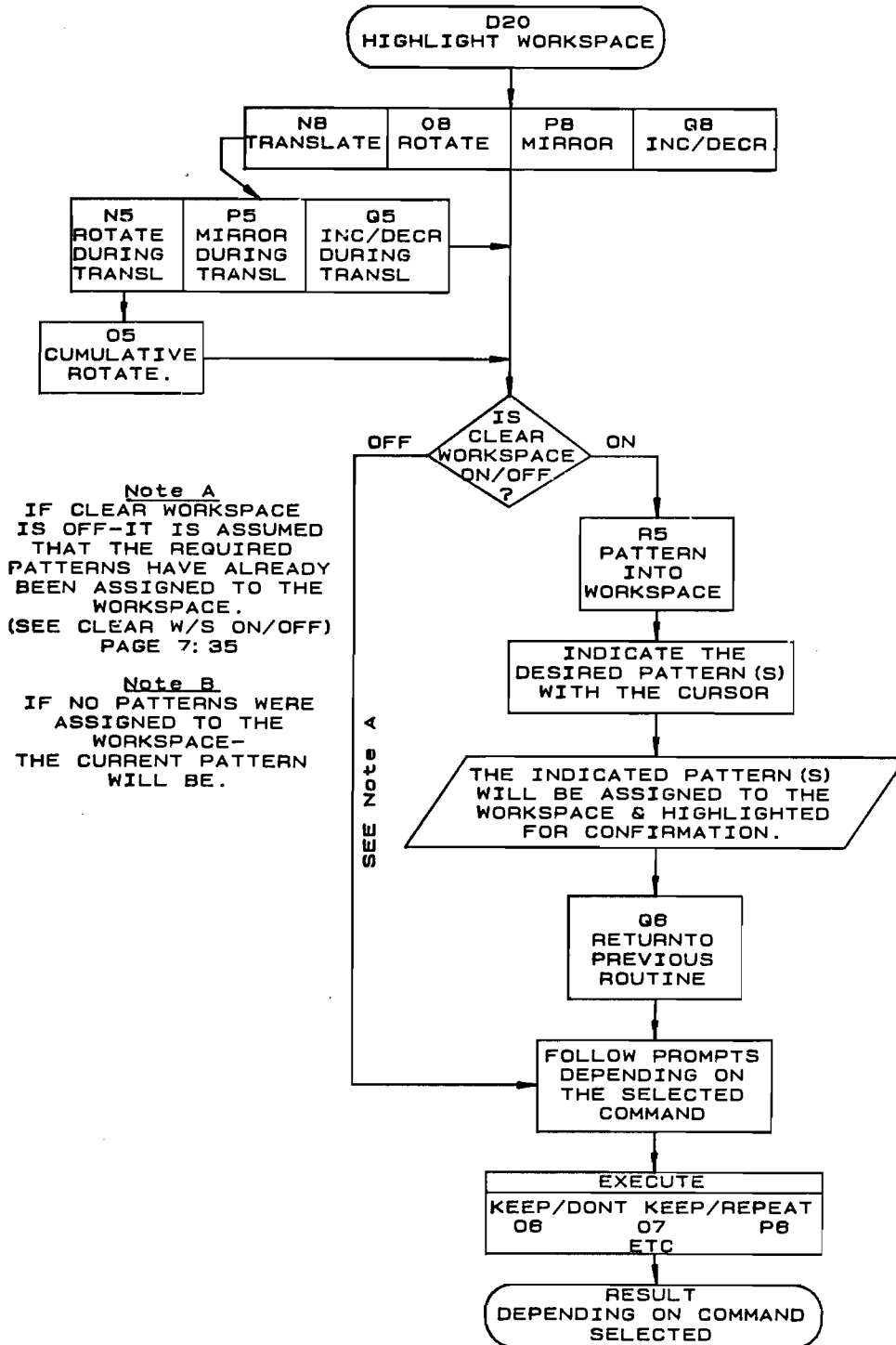
N/A

**Special Considerations. :**

After transform with no keep instead of redrawing everything, only what has been translated, rotated or mirrored will be redrawn. However, if a line from a translated pattern was on top of a line from an untranslated pattern, the line which is rubbed out by the erasure of the pattern to be translated, is now no longer redrawn until the user redraws.

-----  
**BUTTON SEQUENCE**  
**TO TRANSLATE/ROTATE/MIRROR/INCREASE-DECREASE ETC.**  
 -----

Note  -START OR END OF SEQUENCE  -CONDITIONAL SYMBOL  
 - SYSTEM  - USER ACTIVITY



**Note A**  
 IF CLEAR WORKSPACE IS OFF-IT IS ASSUMED THAT THE REQUIRED PATTERNS HAVE ALREADY BEEN ASSIGNED TO THE WORKSPACE. (SEE CLEAR W/S ON/OFF) PAGE 7: 35

**Note B**  
 IF NO PATTERNS WERE ASSIGNED TO THE WORKSPACE- THE CURRENT PATTERN WILL BE.

SEE Note A



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LAYERING CONCEPTS

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The system has been designed to allow the user the facility of splitting a drawing into 15 separate layers.

e.g.

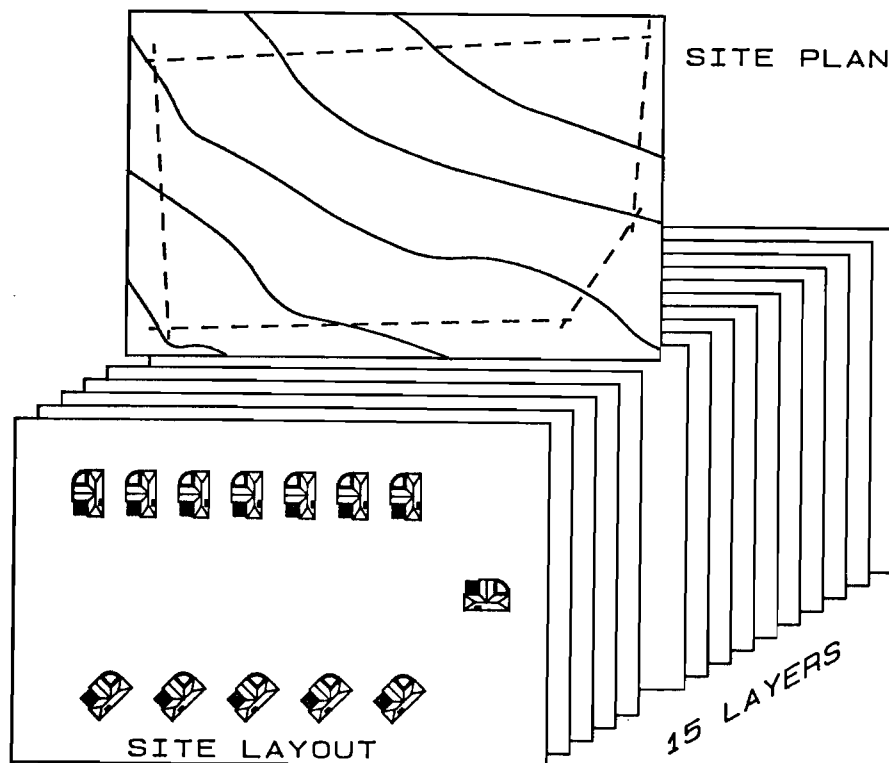
- Layer 1 - Building Plan
- Layer 2 - Electrical Reticulations
- Layer 3 - Plumbing
- Layer 4 - Air conditioning
- Layer 5 - Furniture
- Layer 6 - Lighting.

etc, etc.

Any combination of these layers may be displayed or plotted or stored on disc.

Any Point, Element, Pattern, Text Finishing or Drawing can be assigned to one of the 15 layers.

Any layer or combination of layers can be stored on disc (which means there is no practical limit to the number of layers.)



-----  
**BUTTON DEFINITION**  
**LAYERS**  
 -----

|  |   |                    |
|--|---|--------------------|
| Button<br>Name<br>Function Type<br>Hierarchy<br>Termination<br>Purpose : | <div style="border: 1px solid black; padding: 2px; display: inline-block; text-align: center;">           SELECT<br/>           NEW<br/>           LAYER         </div><br>: Select New Layer<br>: Modal<br>: Major Command<br>:<br>: | Menu Position : S9 |
|--|---|--------------------|

To set a layer into which new patterns will be drawn.

**Operation :**

The user is prompted to enter a layer into which newly drawn patterns will appear.

The current layer into which new patterns will be drawn is indicated on the screen under NEW PAT LAYS.

|                                   |  |   |   |            |                 |
|-----------------------------------|--|---|---|------------|-----------------|
| MOVE <input type="checkbox"/> 0:0 | ABCDEFGHIJKLMNO                          | SCOPE: <input type="checkbox"/> 1       | X=24788.75                                | Y=18710.00 | 1.0             |
| 36.25                             | NEW PAT LAYS: <input type="checkbox"/> 1 | Pen: 1 LT: 1                            | <input checked="" type="checkbox"/> HT: 5 | WD: 3      | PN: 2 0: 5      |
| AUTO: <input type="checkbox"/> 0  | LEFT: 7878                               | REHD LAYERS: <input type="checkbox"/> 0 | FORM: DIN-A1                              | SCL 1: 50  | CS: 1 A: 0 S: 0 |
|                                   |  |   |   |            | P/L: 2/3        |

**Example :**

N/A

**Special Considerations. :**

This command automatically initiates a new pattern : it cannot be used to set the layer of the current pattern.

-----  
**BUTTON DEFINITION**  
**LAYERS**  
 -----

|                      |                               |                            |
|----------------------|-------------------------------|----------------------------|
|                      | SELECT<br>DISPLAYED<br>LAYERS |                            |
| <b>Button</b>        |                               | <b>Menu Position : S10</b> |
| <b>Name</b>          | : Select Displayed Layers     |                            |
| <b>Function Type</b> | : Modal                       |                            |
| <b>Hierarchy</b>     | : Minor Command               |                            |
| <b>Termination</b>   | :                             |                            |
| <b>Purpose</b>       | :                             |                            |

To select the layer(s) that will be displayed following the command REDRAW LAYERS. (This becomes the current "Scope" which may be viewed, plotted, stored on disc etc. - It only becomes the scope AFTER Redraw Layers, not immediately!)

**Operation :**

The user is prompted to enter the Layer(s) A to O. (Do not separate with commas).

The Layer(s) that will be displayed following the command REDRAW LAYERS are indicated on the screen as shown.

|            |                               |                  |          |            |           |
|------------|-------------------------------|------------------|----------|------------|-----------|
| MOVE DEF   | H R E D E F O H I J K L M N O | SCOPE: R L L     | X=0.00   | Y=0.00     | 1.0       |
| ??         |                               |                  |          |            |           |
| AUTO: [I]  | NEW PAT LAYS: [0]             | Pen: 1           | LT: 1    | [XT] HT: 3 | WD: 2     |
| LEFT: 9822 | READ LAYERS: AS               | [S] FORM: DIN-A3 | SCL 1: 1 | CS: 1      | A: 0 S: 0 |
|            |                               |                  |          | [P/L: 2/3] |           |

**Example :**

N/A

**Special Considerations. :**

N/A

---

**BUTTON DEFINITION  
LAYERS**

---

|                      |  |                            |
|----------------------|--|----------------------------|
| <b>Button</b>        | <div style="border: 1px solid black; padding: 2px; display: inline-block;">CHANGE<br/>LAYER OF<br/>PATTERN</div> | <b>Menu Position : S11</b> |
| <b>Name</b>          | : Change Layer of Pattern  |                            |
| <b>Function Type</b> | : Modal  |                            |
| <b>Hierarchy</b>     | : Minor Command  |                            |
| <b>Termination</b>   | :  |                            |
| <b>Purpose :</b>     |  |                            |

To Transfer Pattern(s) to another layer.

**Operation :**

The user is prompted to enter the required layer and then indicate the pattern(s) to be assigned to that layer.

**Example :**

N/A

**Special Considerations. :**

A pattern cannot be assigned to more than one layer.

It may be duplicated in another layer, but is then another separate pattern.

---

**BUTTON DEFINITION  
LAYERS**

---

|                      |  |                            |
|----------------------|--|----------------------------|
| <b>Button</b>        | <div style="border: 1px solid black; padding: 2px; display: inline-block;">CHANGE<br/>LAYER OF<br/>SCOPE</div> | <b>Menu Position : S12</b> |
| <b>Name</b>          | : Change Layer of Scope  |                            |
| <b>Function Type</b> | : Non Modal  |                            |
| <b>Hierarchy</b>     | : Minor Command  |                            |
| <b>Termination</b>   | :  |                            |
| <b>Purpose</b>       | :  |                            |

To Change the Layer of the current "Scope".

**Operation :**

The user is prompted to enter a layer, and then all patterns in the current scope are assigned to the layer entered (See Scope, Page 7:3).

**Example :**

N/A

**Special Considerations. :**

N/A

-----  
**BUTTON DEFINITION**  
**LAYERS**  
 -----

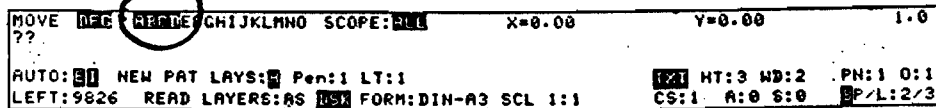
|  |   |                            |
|--|---|----------------------------|
| <b>Button</b><br><b>Name</b><br><b>Function Type</b><br><b>Hierarchy</b><br><b>Termination</b><br><b>Purpose</b> : | <div style="border: 1px solid black; padding: 2px; display: inline-block; text-align: center;">         REDRAW<br/>LAYERS       </div><br>: Redraw Layers<br>: Non Modal<br>: Major Command<br>:<br>: | <b>Menu Position</b> : F19 |
|--|---|----------------------------|

To redraw only those patterns assigned to the layers set by the command SELECT DISPLAYED LAYERS

**Operation** :

Self Explanatory.

The Layers which will be displayed are indicated on the screen as shown.



MOVE DEF REDRAW GHIJKLNNO SCOPE:RUL X=0.00 Y=0.00 1.0  
 ??  
 AUTO: [ ] NEW PAT LAYS: [ ] Pen:1 LT:1 [X] HT:3 WD:2 .PN:1 O:1  
 LEFT:9826 READ LAYERS:AS [ ] FORM:DIN-A3 SCL 1:1 CS:1 A:0 S:0 SP/L:2/3

**Example** :

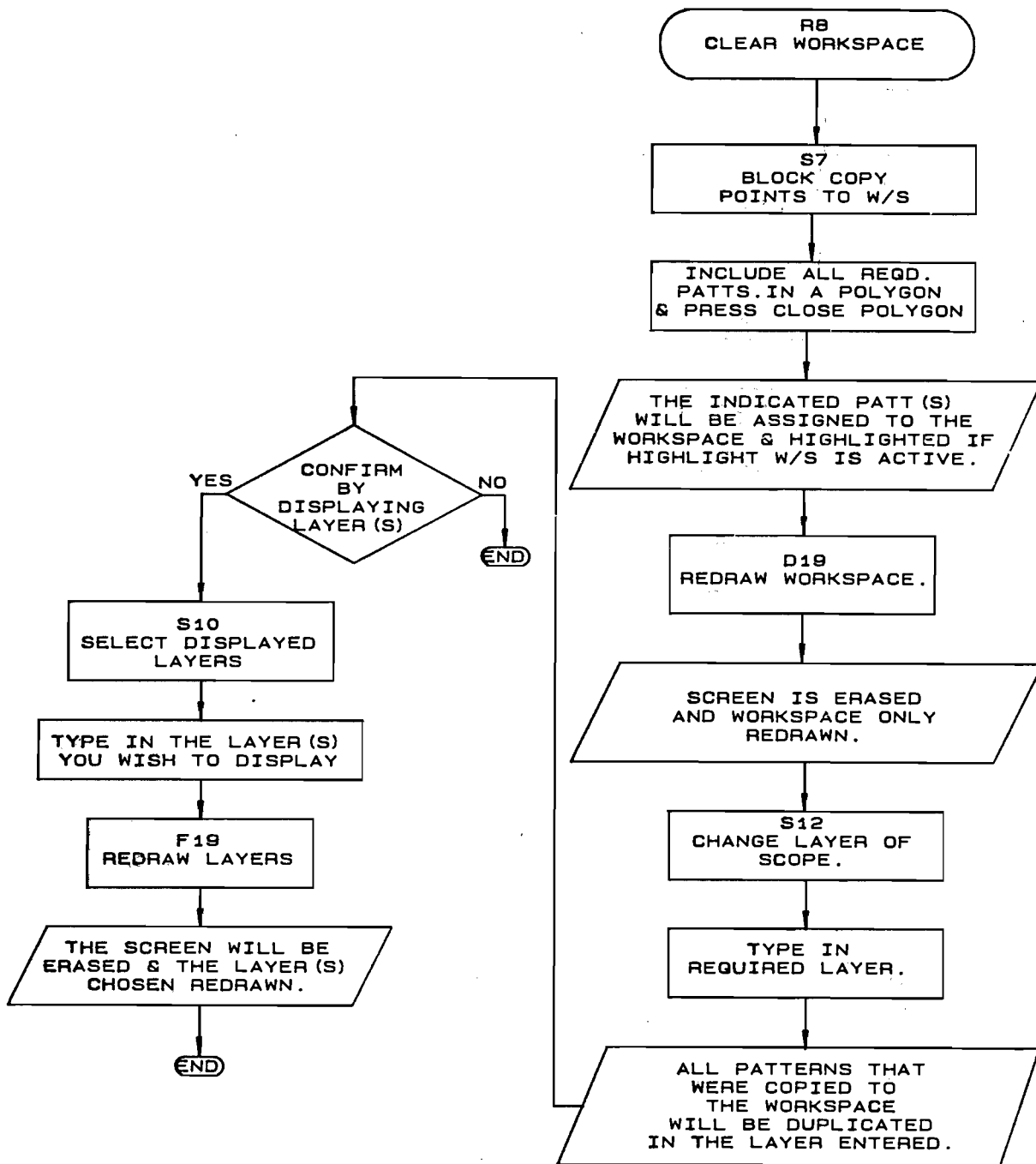
N/A

**Special Considerations.** :

N/A

-----  
**BUTTON SEQUENCE**  
**TO DUPLICATE PATTERN(S) IN ANOTHER LAYER.**  
 -----

Note      ◯ - START OR END OF SEQUENCE      ◇ - CONDITIONAL SYMBOL  
           ▭ - SYSTEM                                      ▭ - USER ACTIVITY



-----  
**BUTTON SEQUENCE**  
**TO PLOT OR DISPLAY OR WRITE TO DISC LAYERS IN ANY COMBINATION**  
 -----

Note  -START OR END OF SEQUENCE  -CONDITIONAL SYMBOL  
 - SYSTEM  - USER ACTIVITY

