An Introduction to XFIG

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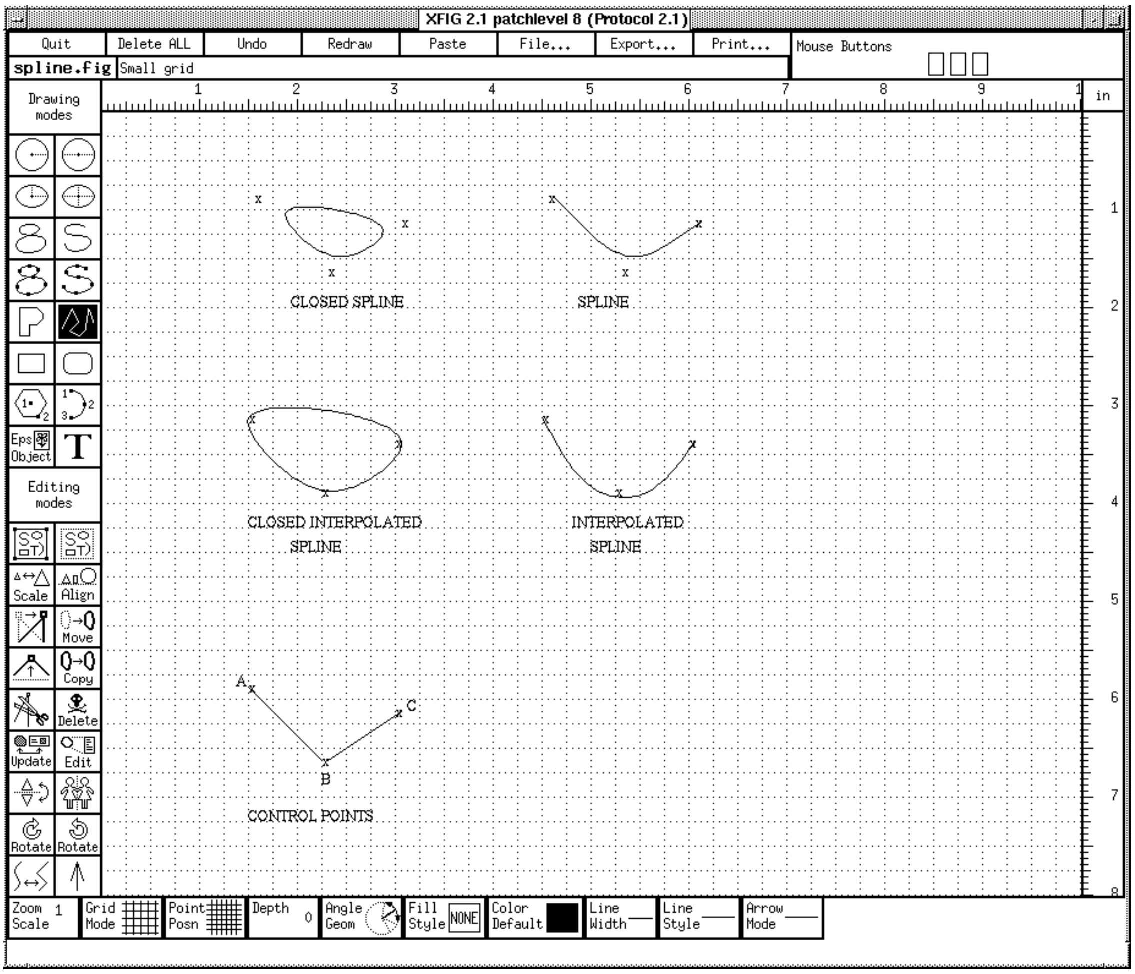
XFIG: Facility for Interactive Generation of figures under an X window.

SYNOPSIS: To begin a figure, type: xfig [filename].fig

MOUSE OPERATION:

Icons in the drawing and editing panel windows, command functions,drawing parameters, and diagram objects,are selected by the cursor,and by "clicking" the appropriate mouse button. [1] In this description the 3 mouse buttons will be referred to as *mb1*(left), *mb2*(middle), and *mb3*(right).

1 X Window Display



[1]Relevant mouse actions for the currently selected mode are also available at the *mouse buttons* box located at the upper right corner of the screen display.

2 COMMAND PANEL FUNCTIONS

Refer to the "print-screen" diagram (pg.1). Select the required function with *mb1*.

Quit Discard or save the figure.

Delete ALL Delete all objects from the "canvas" window. This operation may be undone by the following Undo.

Undo Undo the last object creation, deletion,or modification.

File Several file-related functions, including the Save function.

Print Displays the print panel. Select the required magnification, orientation (landscape or portrait), and justification. Enter the name of printer (ps225 or ps229) and select FIGURE/BATCH to printer.

Export Displays the menu to export a file in *encapsulated PostScript form* eps.

3 INDICATOR PANEL

Press *mb1* on an indicator "button" for a pop-up menu in which the value of a drawing parameter (eg. line thickness, canvas grid, rotation angle, text font & size) can be set.

- *mb1* - Press on an indicator to type or select a value (line thickness, grid style,or font name).
- *mb2* - Decrements the parameter value or cycles through the options in one direction.
- *mb3* - Increments the value or cycles through the options in the other direction.

Zoom Scale Select the "canvas" zoom scale. Ruler,grid,and linewidth are included. A selected object can be scaled with the Scale icon in the Editing Mode Panel.

Grid Mode Select no grid, 1/4"(5 mm in metric mode[2]), or 1/2"(10 mm) grid. The use of a grid makes it easier to line up an object.

Text Size Set the text size. The default is 12 points.

Text Step Set the interline spacing of text.The default is 1.2 times the current font size.

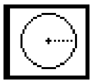
Text Font Selection of 35 fonts and includes Postscript and Latex fonts. The name of the font & its appearance is displayed in the Text Font indicator button.

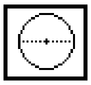
4 DRAWING MODES

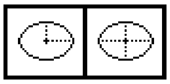
The desired drawing function or object is selected by positioning the cursor and clicking *mb1*.

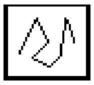
- *mb1* - Move the cursor to the point on the "canvas" where the selected object is to be placed. Press & release *mb1*. For objects with more than 1 point (eg. line), press *mb1* for each successive point.
- *mb2* - Click to finish certain objects (polyline,polygon, text,and the 4 spline variations).
- *mb3* - Click at any time to cancel the creation of the object.

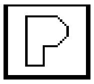
[2] To change from imperial to metric units, click *mb3* in the units box where the top & side rulers meet.

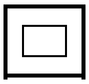
 **CIRCLE:** To draw a circle with reference to the centre,select the icon showing a radius. Click *mb1* on the centre point, and move until the desired radius is attained. Click *mb1* to finish.

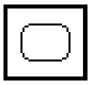
 To draw a circle with reference to an edge, select the icon showing a diameter. Click *mb1* on the desired edge position, and move until the desired size is attained. This feature is useful for drawing "active-low bubbles" on IC symbols.

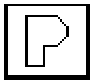
 **ELLIPSE:** Create an ellipse using the same procedure outlined for "circle".

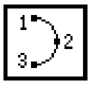
 **POLYLINE:** Create polylines (line segments connecting a sequence of points). Click *mb1* on the start of each line segment and *mb2* to finish. Note that *mb3* will cancel the creation of a line segment. Polyline can be used to create a resistor symbol.

 **POLYGON:** Same as "polyline" above,except that a line segment is automatically drawn to connect the first and last points entered.

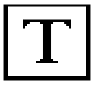
 **BOX:** Create rectangular boxes. Start with *mb1* on any corner of the desired box and finish with *mb1* on the diagonally opposite corner of the box.

 **ARC-BOX:** Create rectangular boxes with rounded corners. Procedure as in "box" above. The radius of the corners can be varied by the Box Curve button in the Indicator Panel.

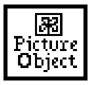
 **REGULAR POLYGON:** The number of sides is selected with the NUM SIDES button in the Indicator Panel. Click *mb1* on the center and move to the desired size. Click *mb1* to finish. The object may be rotated as it is being created by moving the mouse up or down relative to the starting position.



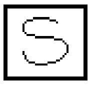
ARC: Create an arc. Specify 3 points using *mb1*. The 1st and 3rd points form the endpoints of the arc,and the 2nd any point on the arc.

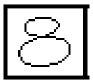


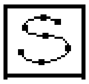
TEXT: Creates text strings. Click *mb1* at the desired position on the canvas window. Enter text from the keyboard. Text is drawn using the current font, font size & justification as set in the Indicator Panel. To finish text fully,click *mb2*. To edit text, click on an existing text string with *mb1*,or use the popup EDIT mode to modify the text.

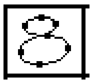


ENCAPSULATED POSTSCRIPT OBJECT (EPS): Click *mb1* on any corner for the EPS object & finish with *mb1* on the diagonally opposite corner. For details regarding the EDIT popup menu, EPS file,preview bitmap,and size of the EPS object, refer to "User Commands" in the on-line XFIG manual.

 **SPLINE:** (see pg.1) Enter at least 3 points (*mb1*) as described in the POLYLINE mode. The spline will only pass through the two end points. Click *mb2* to finish a spline object.

 **CLOSED SPLINE:** (see pg.1) Create closed or periodic spline objects. The spline will not pass through any of the entered control points.

 **INTERPOLATED SPLINE:** (see pg.1) Create (cubic spline) objects. At least 3 points must be entered, using *mb1*. The spline will pass through these points.

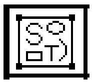
 **CLOSED INTERPOLATED SPLINE:** (see pg.1) Create closed or periodic spline objects. The spline will pass through the control points (knots).

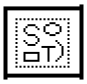
5 EDITING MODE PANEL

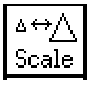
When a "button" (i.e. icon) in the Editing Mode panel is selected with *mb1*, any objects that can be affected by that operation are indicated by "corner markers".

If multiple objects have points in common (eg. 2 boxes touching at a corner), only 1 object can be selected by clicking on that point. Hold down the "shift key" and press *mb1*: the markers of 1 object will be temporarily highlighted. By repeating this operation, it is possible to cycle through all objects common to that point.

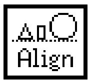
To perform the selected action, click on the highlighted point without holding down the "shift key".

 **GLUE COMPOUND:** Single (primitive) objects are "tagged" to create "compound" objects. Use *mb2* to define the upper-left and the lower-right corners of a region enclosing the objects to be tagged. Press *mb3* to group the tagged objects into a compound object. A compound object can be moved, rotated, flipped, scaled, copied or erased (similar to a primitive object).

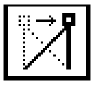
 **BREAK COMPOUND:** Break a compound object to allow manipulation of its component parts. Click *mb1* on one of the compound corner markers or along one of the imaginary lines defining the compound box.



SCALE OBJECT: If *mb1* is clicked on a BOX or ARC-BOX object corner marker, that object can be scaled proportionally to its aspect ratio. Move the mouse & then click *mb1* again. If mb2 is clicked on any object,that object will be scaled up or down about its center as the mouse is moved. Click *mb2* to finish.

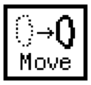


ALIGN: Align objects. Click *mb1* to align objects inside a compound object or *mb2* to align all objects on canvas according to the setting in the Vertical Align and Horizontal Align indicators.

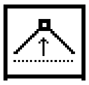
 **MOVE POINT:** Modify the position of a point of any object except *TEXT* and *COMPOUND* objects.

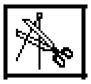
Unrestrained movement: Click *mb1* on the desired point. Reposition the point and click *mb1* again.

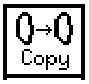
H/V constrained movement: Click *mb2* on the desired point. Move either horizontally or vertically to the desired position and click *mb2* again.



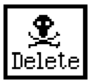
MOVE: Moves object (similar to MOVE POINT above). Click *mb1* (unconstrained) or *mb2* (constrained) on any corner marker of the object to be moved.

 **ADD POINTS:** Adds points to POLYLINE,POLYGON, SPLINE,or CLOSED SPLINE. Click *mb1* on the selected object. Move the mouse and click *mb1* again to finish.

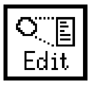
 **DELETE POINTS:** Similar to above,but points are deleted. Note that points of a BOX or ARC-BOX cannot be added or deleted.



COPY/CUT TO CUT BUFFER: Copies object to canvas or cut buffer. Click *mb1* (unconstrained) or *mb2* (constrained) on any corner marker of the object to be copied. The object will be duplicated and then can be moved as described in MOVE above. If *mb3* is clicked, the object is copied to the "cut buffer" for pasting into this or another figure.



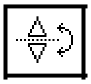
DELETE: Click *mb1* on any object to delete the object. Delete a region of the canvas by clicking *mb2* & moving the mouse to define an area of objects to delete. Click *mb2* to finish. Only complete objects included in the area will be deleted. Undo in the Command Panel will restore a deleted object.

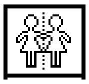


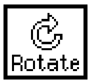
EDIT OBJECT: Edit settings for an existing object.Click *mb1* on the object to display a pop-up menu showing existing settings for the object. When the menu entries are changed, press the done button to apply the changes to the object. Press the apply button to apply the changes but keep the menu up for further changes. Press the cancel button to cancel the changes and the pop-up menu.

UPDATE: By clicking *mb1* on an object, the current settings for the indicator buttons (line width, text size,etc.) selected for update are copied into that object.

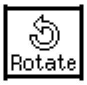
If *mb2* is clicked on an object, the settings in the object are copied into the indicator button settings .Thus selected attributes of one object can be copied to another object. This feature can be used to standardize text size, fonts, and line widths, etc., used throughout a drawing.


FLIP VERTICALLY: Click *mb1* on part of the selected object to flip the object vertically (up/down). Click *mb2* to copy and flip the object.

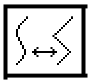

FLIP HORIZONTALLY: Click *mb1* on the object to flip the object horizontally (left/right). Click *mb2* to copy and flip the object.

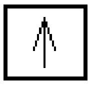


ROTATE CLOCKWISE: Rotate the object (*mb1*) or copy and rotate the object (*mb2*) N degrees as set in the rotation indicator button. Not all objects can be rotated,and not all can be rotated at arbitrary angles. Text objects may be rotated to any angle.



ROTATE COUNTER-CLOCKWISE: Rotate the object counter-clockwise (similar to above).


SPLINE $\Longleftrightarrow$ POLYLINE: Turn a polygon into a closed interpolated spline object, or a polyline into an interpolated spline object. For example: a hexagon− >circle; triangular wave− >approx. sinewave.


ADD/DELETE ARROWS: Add or delete arrowheads of arc, polyline,or spline objects. Add an arrow by clicking *mb1* on the endpoint of the object. Delete an arrow by clicking *mb2*.

Also an arrow mode button on the Indicator Panel selects the auto-arrow mode for automatically drawing arrowheads in arc, polyline, or spline objects.

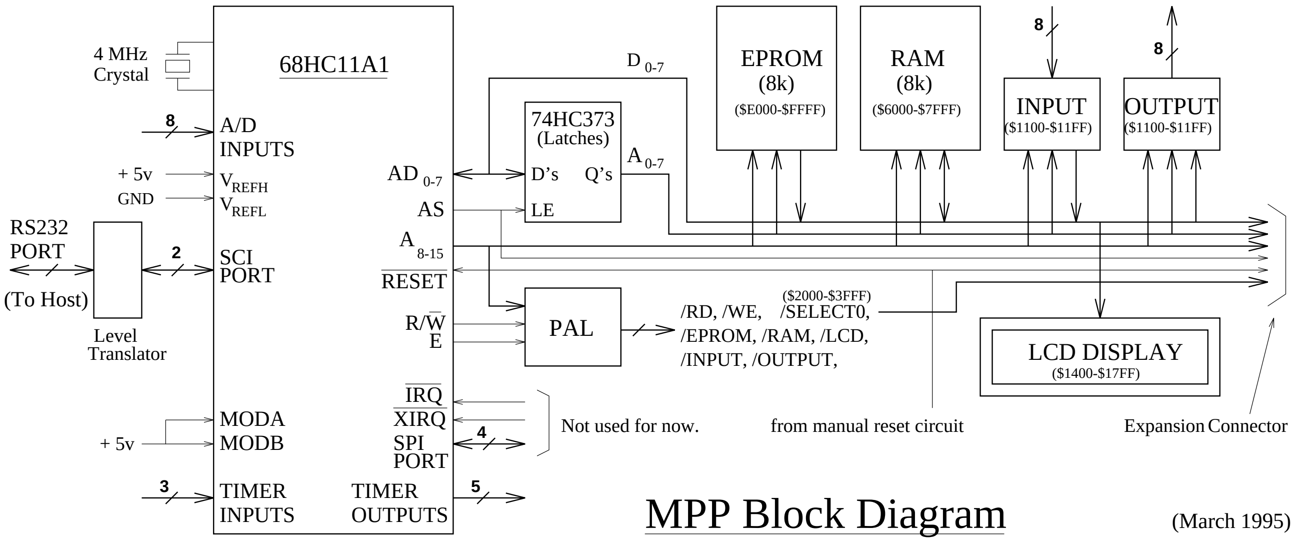
6 PANNING

The drawing may be panned by clicking the mouse buttons in the top and side rulers. The displacement is adjusted for zoom factor.

- *mb1* - Top ruler: to the left by 1/2" (1cm in metric mode).
- *mb3* - Top ruler: to the right by 1/2" (1cm).
- *mb2* - Top ruler: press and hold to drag by the amount desired.

The drawing is panned up/down in a similar manner by using the ruler on the right of the canvas.

7 Sample XFIG drawing



8 Customizing the XFIG Display

The standard (i.e. default) options can be altered to create custom or personalized display features. Refer to *User Command* in the on-line XFIG manual.

For example, the following command line will call up an xfig panel that fills up most of the screen area (of a 17 inches monitor).

```
xfig -geom 1130x840+5+5 -butt 7x13bold -sh -ph 8.7 -pw 12.7 -P
```