FF_help

COLLABORATORS			
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FF_help

1.1 FreeForm Help

1.2 author

"About The Author"

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AGE: 25

COMPUTER: 25MHZ A3000

EDUCATION: A. High School Graduate - Computer Science Major
B. C programming - Self taught

C. 3D Graphics - Self taught

WORK STATUS: Currently unemployed

If you like the program, please purchase a copy, so I can
continue to improve on it. I'm sure you will agree that
compared to the price of other 3D software, and what you
get for it, mine is a really good deal. see the Introduction
section for ordering information.

If you intend to review this product for any publication, please take
into account the following information;

1. This is my first major C program.

2. I've only learned how to program in C about a year and a half ago.

3. I've only learned how to program 3D graphics about 2 years ago.

4. I've only learned how to program using the Commodore libraries
   2 years ago;

5. I am not a registered developer. My information is limited
   to what I can read from anywhere else or figure out on my own.

6. Most of the routines in this program are my own creation, many
   of the ones that are in books I either could not understand,
   could not find what I wanted, or they were too slow; so I wrote
   my own better, faster ones".

1.3 introduction

"Introduction"

If you are interested in distributing this product, all dealer inquiries
are welcome.

FreeForm is a Bspline and NURB editor for Real3D2, LightWave, Caligari and
Imagine.

Some example conversions have been done for you to see.

REAL3D2 - spoutbs.rpl
LIGHTWAVE - spoutbs.geo
CALIGARI - spoutbs.geo
IMAGINE - spoutbs.imag

This usable DEMO is provided so you can see some of the functions of the program. Some functions are not accessible, for obvious reasons. Due to the reorganization of functions for the DEMO, you may experience some bugs. Due to the large amount of combinations of button presses and functions, it is impossible to find all of the bugs on my own. If you find any while using the program, please describe them and what you tried to do, and forward the information to my friends BBS address or to me directly at the address below.

This demo contains just part of the abilities of the program. Some prefs and other functions were shortened or left out do to:
1. It's a DEMO
2. Space considerations

There may be some screen shots and a short morphing demo included if time and space allow.

The program includes on_line help through an amiga guide file and phone tech support.

If you wish to order the full program, it is only $59.95. Please include what type of processor you have. You will receive all future upgrades for only $5 for each upgrade.
(Please support an Amiga programmer)

$59.90 + $5 shipping and handling.

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FreeForm has a realtime Perspective and Parallel view interface, with points picking and bones modification in all views.
In the interactive modes, you can choose how your object is displayed on the fly. Choose from

1. Knot- object drawn in realtime by connecting points through the knots. This gives you a more accurate shape and size than Real3D's lines through the control points.

2. Cntrl Pnt- Same as Real3D's lines drawn through the control points.

3. BOUNDING BOX - You can toggle this on and off, on the fly, while in any of the two other modes. It is useful if your machine is slower or the number of points on the object is very large.

The following are just some of the features in the program, that are vast improvements over Real3D2.

1. FreeForm IS 20 TIMES FASTER THAN REAL3D2.(Yes, I said 20 times !) Real3d2 converts your bsplines to polygons, so if you zoom in close to an object and then render it, you'll see poly edges. You have to adjust the subdiv level up to 4 to even come close to FreeForms smoothness.

   FreeForm will render your Bsplines smooth no matter what the resolution or zoom level; and will do it 20 times faster than Real3D2. There is no level to set. It should always be smooth.

   FREEFORM RENDERS CURVES IN CURVE SHADE MODE, FASTER THAN IMAGINE2 RENDERS POLYGONS IN SCANLINE !; AND FREEFORM HAS NO PHONG SHADING POLYGON EDGE ARTIFACTS !

2. Spin open objects at angles of less than 360 degrees, at 1 degree increments.

3. Spun objects match the profile and correct size of the curve that was used to create them; no matter how many sections you use. Real3D2's freeform rotate function generates incorrect objects. They tell you to use more sections to get an object closer to the original curve. This not only uses more memory and slows down redrawing, but it does not solve the problem.
   I have developed a function which corrects this problem. You can spin objects in FreeForm using as little as 4 sections and the objects profile and size will correctly match the curve that was used to create it.

   TRY THIS TEST IF YOU HAVE REAL3D2, AND YOU WILL SEE WHAT I MEAN

   A. Create a curve edge in Real3D2
   B. Do a freeform rotate on it using only 4 sections or 6 sections.
   C. Compare its shape to that of the original curve. (They don't match)

   A. Run FreeForm and create a curve edge.
   B. Press the spin button and indicate 4 sections. (Leave the degree at 360)
   C. When asked if you wish to delete the original curve edge, say NO. (You need to see it to make the comparison)
   D. Compare the original curve edge with the spun object.
   E. This is a correct freeform rotate.

   NOTE: You may not initially see the original curve edge because the spun objects profile matches it and covers it up. Just press the move button or 'm' key and slide the object over a bit so you can see it.

4. Easy duplication of control points, by setting the point to be a SINGLE, DOUBLE or TRIPLE type. This way of doing it frees you from having to figure out how many points are already there, and takes away the lengthy task of separating the object into curves, then duplicating or deleting points,

(hoping that you didn't add to many or to little), then picking all the right curves in the right orders, and putting the object back together again like Real3D does it. (When I brought a computer I expected it to do most of the work not me !)

5. Give an edge curve a thickness automatically.

6. Set Object On Ground function, positions objects on the editors ground for you.

7. Pick points by dragging, clicking or lassoing. Lasso lets you draw a freehand line encircling points that you want picked. It allows you to weave in and out of spaces that a drag box cannot get to.

8. Adjust object by Control Points or Knot Points.

9. Automatic Bones creation for objects, and modification of objects using Bones.

10. Export objects to Real3D2(Bsplines and Tension NURBS), LightWave, Caligari and Imagine (Bsplines and Tension NURBS converted to polygons adjustable by you).

11. Rail extrusion allows easy creation of complexed shapes (Example teapot spout - spoutbs.FreeForm). Rail extrusion automatically aligns the cross section to be extruded for you. Real3D2 does not.

12. Morph Extrusion allows you to set 2 edge curves, and FreeForm will extrude from one to the other creating the in between sections for you. (Example - a mesh that is a circle at one end, and changes to a square at the other).

13. Screen redraw is 3 times faster.

14. Curves drawn during dragging are complete, and not disconnected from the mesh like Real3Ds' are.

15. Points are highlighted for easy picking; and picked points are shown to you, so you can tell if you have all that you wanted.(Unlike Real3D2)

16. Tension - allows you modify the shape of curve sections without it affecting the knot position. This makes your Bsplines NURB like curves and allows you to create objects which are next to impossible in Real3D2.
(In Real3D2, when you triple a point to create a sharp corner, the knots moves away from its original position, changing the size and shape of the object. (BAD KNOT ! BAD !).

Example- Imagine a bottle whose cross section is a smooth circle from the top to the center of the bottle, and changes to a sharp edged octagon from the middle to the bottom. Much like a bottle of Heinz ketchup.

17. Blend - allows you to pick sections and generate a smooth transition from the first sections shape, to the last sections shape.(Blends Tension)

18. Easy Morphing previews - Just pick an object, set it to source. Pick another object, and set it to target. Then select Morph it. That's it !

19. Multi-pick file requester allows you to load in more than one object
    at one time.

20. Export objects to 9 different workspaces; without any additional memory
    usage.

21. Taper and twist with easy to use deformation functions.

22. Change the render screen mode and resolution with out having to open
    new environments.

1.4 prefs

"Preferences"

There is a file called configfile where you can change the
screen mode if you know the decimal number of it.

1.5 system

"System required"

RAM: 2MB fast
NOTE : FreeForm will run with as little as 1 MB of total ram; but,
       you may not be able to use some rendering modes,
       and the speed may suffer from it.

PROCESSOR : A 68030 or better and a math co-processor for the DEMO.

If you would like to use the program on another processor;
when you order it, specify what processor and if you have a math chip
and I'll compile a version for you.

1.6 editor

"Using The Editor"

1.
Menus
2.
Buttons
3.
U and V directions
4.
Picking Points

1.7 uv

" U and V directions"

Real3d2 uses U and V to distinguish between the 2 directions of a spline patch. The letters U and V are inconsequential, any 2 letters could be used, they signify the with and height directions or the row and column directions on the patch.

I have always had a problem with using the letters u and v for this; first, because when printed on the screen among a jumble of lines,they look to much alike; second, because it is still hard to figure out which lines correspond to which letters in Real3d2.

I have decided to opt for a different method in FreeForm. I think it is much clearer and I hope you will agree. The 2 directions of the patch are shown in different line patterns: a SOLID line for one direction and a DOTTED line for the other. If you create a cylinder shape by spinning a line about an axis, you will see that the circle cross sections are DOTTED and the straight lines are SOLID. If you need to close and object or set tension on points in a specific direction, all you need to know is what kind of lines are the direction you whish to perform the action in, made of. This allows you to more easily identify the direction you want.

If this is still not clear enough for you, there are 2 menu items in the "Display" menu, that will allow you to turn on and off drawing of the SOLID and DOTTED lines. If you are concerned with curves in the DOTTED direction, you can shut off drawing of curves in the SOLID direction and vise-versa. This affects the active object only.

You will see some functions which will give you a choice of what direction. You can select one or both depending on what you need to do.

1.8 menus

"Menus"

1. Project
2. Display
3. Object
4. Tension
5. Form
6. Primitives
7. Render Mode
8. Work Spaces

1.9 m_project

"Project"

1. QUIT - Allows you to exit FreeForm. You may also press 'q'.

1.10 m_display

"Display"

1. CLEAN SCREEN - Erases the screen only.

2. VERT SYMMETRY - When you draw a curve edge, you will see a vertical line down the center of the screen. This is the vertical symmetry line, and it is used mainly for creating spun objects. When you draw on one side of the line, the mirror image is drawn on the other to give you an idea about the overall shape and size of the finished object.

3. REDRAW PICKED - Redraws the currently picked object only. All other objects are not visible.

4. REDRAW ALL - Redraws all objects.

5. SET ORIGIN - Returns the world's origin to the center of the screen.

6. GRID - Sets the grid size.

7. ASPECT ADJUST - Allows you to adjust the aspect to your monitors size control settings - This is in addition to the normal aspect which is set for you according to Commodore's library functions.

1.11 m_object

"Object"

1. LOAD - Loads a FreeForm object.

2. SAVE - Saves a FreeForm object.

3. LOAD REAL3D2 - Load a Real3D2 mesh object.

4. CONVERT TO -

   A. Videoscape - Allows you to convert your Spline object to polygons.

   B. R3D2 Bspline - Writes a Real3D2 mesh object as an RPL.

   C. R3D2 NURB - This is for outputting objects to Real3D2 that have tension set. It will output the patches as a group of meshes, as Real3D2 does not

support the single mesh Bezier format.
Your object will look the same in spite of this.

5. HIDE OBJECT - Object's axis is all that will be visible. The object will return to visible when you select it.

6. RE-CALC BOUND BOX - If you have an object that is tilted when loaded in and its bounding box is not, you can align the object straight and re_calc the bounding box to match its alignment; so when you tilt it back the box will be titled as well, and the size of the box will more accurately match the object.

7. SET ON GROUND - Sets your object on the editor's ground.

8. MOVE TO ORIGIN - Moves the object to the origin.

9. MOVE AXIS TO OBJECT CENTER - You got it.

10. MOVE AXIS TO FIRST POINT - This is good for ensuring that spun objects have no openings at the top before you spin.

11. MOVE AXIS TO LAST POINT - This is good for ensuring that spun objects have no openings at the bottom before you spin.

12. MIRROR X COMBINE - Takes a curve edge and creates a new edge, which is the combination of the first edge duplicated, flipped over in the X axis direction and combined into one object edge.

13. MAKE EDGE THICK - Creates a thickness to the edge you have picked.

14.

15. COPY & PASTE - You got it.

16.

17. OPEN - Opens an object that is closed.

18. CLOSE -Closes an object that is open.

19. DELETE - Works on objects.

1.12 m_tension

"Tension"

Tension - allows you modify the shape of curve sections without it affecting the knot position. This makes your Bsplines NURB like curves and allows you to create objects which are next to impossible in Real3D2.

Example- Imagine a bottle whose cross section is a smooth circle from the top to the center of the bottle, and changes to a sharp edged octagon

from the middle to the bottom. Much like a bottle of Heinz ketchup.

(In Real3D2, when you triple a point to create a sharp corner, the knot moves away from its original position, changing the size and shape of the object. (BAD KNOT ! BAD !).

You also have to have the same number of knots per section, barring you from creating shapes with blended and varying cross sections and profiles.

You only have 3 shape choices in Real3D2: a single, double or triple knot.

In FreeForm, With Tension, you can adjust the shape from smooth (single knot) to sharp (triple knot) or any increment in between giving you fine control over the shape with 100 choices.

1. SET TO SHARP - Makes picked sections have sharp points. (Ex. Circle made of 8 points will turn into an octagon).

2. SET TO SMOOTH - Sets the points back to smooth joins - the reverse of the above.

3. BLEND TENSIONS - Creates smooth transitions between the first and last sections of a group of picked sections. (Ex. A can that has a cross section of a circle from the top to the middle then blends to an octagon from the middle to the bottom.

1.13 m_form

"Form"

Form - Creates complexed combinations of cross sections and profiles.

SET CROSS SECTION - Sets the currently picked object to be the cross section.

SET RAIL 1 OR SOURCE - Sets the currently picked object to be Rail 1 (IF your going to rail extrude) or Source (IF your going to morph extrude)

SET RAIL 2 OR TARGET - Sets the currently picked object to be Rail 2 (IF your going to rail extrude) or Target (IF your going to morph extrude)

RAIL EXTRUDE - Creates and object by extruding the cross section along 2 rails and scaling the size of the cross section to try and match the distance between the rails.

MORPH EXTRUDE - Creates an object by extruding from the source edge to the target edge and generating the in between shape changes. (Ex. Object that is a circle at one end a changes to a square at the other.)

```
 SEA SHELL - Creates sea shell shapes by spinning an edge curve around the
             axis. There are more options for this function than are in the
             demo.

             Try these settings in the requester.
             SECTIONS = 56
             DEGREE   = 2520
```

1.14 m_primitives

```
"Primitives"

1. CIRCLE OR ARC - Allows you to create and edge that is a full circle
                   or some part of a circle, at 1 degree increments. The
                   number of sections can be set by you.(Unlike Real3D2
                   which gives you only a whole circle with no choice
                   of the number of sections.)

   You can create the standard polygon shapes(Hexagon, Octagon ...) with this,
   by setting the number of sections to what you want, and when the object
   is generated, pick all the points and set the tension to sharp.
   This generates corners at the points.
2.

3.
```

1.15 m_render

```
"Render Mode"


1. AGA - Changes to 256 shade rendering for AGA machines.

2. FULL SCREEN - You got it.

3. QUARTER SCREEN You got it.


4. WIRE - Wire frame render.

5. DRAFT - Polygonal make shift interpolated shade.

6. CURVE SHADE (QUICK) - Low resolution quick render - shading is smooth with no
                         polygonal artifacts.

                       THIS IS NOT A PHONG or any other type of interpolated
                       shading. The shade is calculated directly from the
                       curve surface, and no polygonal edges will be
                       seen no matter how close you zoom int the object.

7. CURVE SHADE  - High resolution render - shading is smooth with no
                  polygonal artifacts.
```

THIS IS NOT A PHONG or any other type of interpolated
shading. The shade is calculated directly from the
curve surface, and no polygonal edges will be
seen no matter how close you zoom int the object.

1.16 m_morph

"Morph"

1. SET SOURCE OBJECT - You got it.

2. SET TARGET OBJECT - You got it.

3. PREVIEW MORPH - Shows you the morph animation in wireframe
(Not saved to disk).

4. RENDER MORPH - Generates rendered frames to a chosen file based
on the settings in the render mode menu.

1.17 m_work

"Work Spaces"

Work Spaces are different drawing areas that you can send objects to
to reduce clutter or work on a specific group of objects, without
others getting into the way.

You can render a specific object or group of objects by sending
them to another workspace; then change the current workspace
to that one, and render;

SENDING OBJECTS TO WORKSPACES - 1. Pick the object you want to send to a
workspace by clicking on its axis
center. It will become White to
show you that it is picked.

2. Press one of the number keys, and
the object will be sent to the workspace
number of your key choice.

SWITCHING BETWEEN WORKSPACES - Select the number of the work space you
wish to be displayed, from the workspace
menu.

1. Workspace 1 is the one that you start out in when the program is loaded.
2.
3.
4.
5.
6.
7.

8.
9.

10. ALL OBJECTS TO CURRENT SPACE - This takes all the objects in memory and moves them to the workspace your currently in.

1.18 buttons

"Buttons"

IMPORTANT: You can end the interactive modes, (Move,Rotate,Scale,Zoom....), and return to the curve display by clicking the right mouse button. It is a faster alternative than shutting of the actual Move, Rotate ,Scale.... buttons.

1.
Move
2.
Rotate
3.
Scale
4.
Zoom
5.
X
6.
Y
7.
Z
8.
Axis Only
9.
Obj
10.
Cam
11.
Pnts
12.
Bones
13.
Draw Edge
14.
Sketch
15.
Mirror
16.
Grid
17. Front
18. Top
19. Side
20. Persp

```
        21.
                Lasso / Click/ Drag
                        22.
                World / Local
                        23.  Together / Separate
        24.
                Knots / Cntrl Pnts
                        25.
                Spin
                        26.
                Extrude
                        27.  Multiply Points
        28.
                Fit / Unfit
                        29.
                Render
                        30.
                UNDO
```

1.19 move

"Move"

HOW: Hold left mouse button down and move mouse around.

WORKS ON: Objects, points, bones, camera

WORKS IN: All views

ALTERNATE FUNCTION : When the Camera button is on, this will move the Camera.

AFFECTED BY: x,y,z buttons

1.20 rotate

"Rotate"

HOW: Hold left mouse button down, move mouse up and down or left to right
depending on the axis you've selected.

WORKS ON: Objects, points, bones, camera

WORKS IN: All views

ALTERNATE FUNCTION : When the Camera button is on, this will cause you to
encircle the world.

AFFECTED BY: x,y,z buttons

1.21 scale

"Scale"

HOW: Hold left mouse button down, move mouse up and down

WORKS ON: Objects, points, bones

WORKS IN: All views

AFFECTED BY: x,y,z buttons

1.22 zoom

"Zoom"

HOW: Hold left mouse button down, move mouse up and down
If you hold the SHIFT key down and click the mouse, it will move where you clicked on screen, to the center of the screen, before it zooms.

WORKS ON: Camera

WORKS IN: All views

1.23 x

"X"

HOW: Click button or with "x" key

WORKS ON:

WORKS IN: All views

ALTERNATE FUNCTION : Shift and "x" key will turn on the X direction exclusively

1.24 y

"Y"

HOW: Click button or with "y" key

WORKS ON:

WORKS IN: All views

ALTERNATE FUNCTION : Shift and "y" key will turn on the Y direction exclusively

1.25 z

"Z"

HOW: Click button or with "z" key

WORKS ON:

WORKS IN: All views

ALTERNATE FUNCTION : Shift and "z" key will turn on the Z direction exclusively

1.26 axis

"Axis Only"

HOW: Click button - actions are performed on the axis only (Move,Rotate)

WORKS ON: objects

WORKS IN: All views

1.27 object

"Object"

HOW: 1. Click button - actions are performed on the object
2. Pick objects by clicking on their axis center point

WORKS ON: objects

WORKS IN: All views

1.28 camera

"Camera"

HOW: Click button - actions are performed on the camera

WORKS ON: camera

WORKS IN: All views

1.29 points

```
"Points"

HOW: PICKING POINTS
     1. Use the mouse to click drag or lasso the points you want to use.
        A. You can pick points by lasso, click or by drag box.
           Hold down the ALT key for drag box else you'll be lassoing.

     MANIPULATING points
     1. After you have picked the points you want to manipulate,
        select an action to perform on them (Move, Rotate, Scale...)

     2. If you have the drag button on, the only action you can do on
        points is move. You can also lock an axis direction to drag on
        by turning on and of the x,y,z buttons.


WORKS ON: points - allows picking points and actions on points

WORKS IN: All views

AFFECTED BY: 1. Lasso/Click button - Sets the pick method
             2. Knots/Cntrl point button - Sets what type of point to use
             3. x,y,z buttons
```

1.30 bones

```
"Bones"

 Bones in freeform can be thought of as local center points for each section
 of an object which you can use to move rotate or scale a particular
 section or sections.

 If you take a simple cylinder with 2 circle sections, one at the top and one
 at the bottom, and you wish to modify the whole circle section; you would
 normally have to go and pick every single point. With the bones, all
 you have to do is pick the joint that corresponds to that section. You
 can bend, expand and displace a section or sections, in almost any
 way that you like.

 If you are not in BOUNDING BOX display mode, you will be able to see the
 object being modified in real time along with the bones.
 In BOUNDING BOX mode, you just see the bones moving or rotating.


HOW:

     PICKING BONES
     1. The first point you pick will act as an axis if you plan to rotate or
        scale using bones.

     2. Multiple points are picked by holding the shift key down

     3. IF YOU PLAN TO ROTATE OR SCALE USING THE BONES, THE FIRST POINT YOU PICK
        WILL BE YOUR AXIS AND IT SHOULD BE PICKED WITHOUT THE SHIFT
```

KEY. ANY POINTS YOU WISH TO BE PICKED ALONG WITH THIS SHOULD BE PICKED BY HOLDING DOWN THE SHIFT KEY. THIS IS FOR CLICK PICKING AS WELL AS LASSO PICKING.

MANIPULATING BONES

1. After you have picked the bones you want to manipulate, select an action to perform on them (Move, Rotate, Scale...). Use the right mouse button to return to the curve display mode.

2. When moving bones, the objects sections which are attached to the bones can also be seen moving. This gives you a true sense of what is going on when you change the bones. If this becomes to slow, because of your machine's speed or the number of points on the object, you can use the "Knots/Cntrl Pnts" button to switch to a faster display object; or you can press the 'b' key and switch to BOUNDING BOX mode, where only the bones will be shown moving.

WORKS ON: bones - allows picking bones and actions on bones

WORKS IN: All views

AFFECTED BY: 1. Lasso/Click button - Pick method
2. Knots/Cntrl point button - What type of point to use

1.31 draw

"Draw Edge"

HOW: 1. Left mouse button lays down points

2. Right mouse button lays down the last point and ends the rubber line.

3. FIRST AND LAST POINTS ARE AUTOMATICALLY TRIPLED FOR YOU, there is no need to lay down three points for these or any other points. Use the "Multipl Pnt" button to set double and triple points, after you have turned your edge curve into an edge object(See #4 below)

4. When you are done moving points around, shut this button off and you will be asked if you want to make your drawing into an actual edge object.

IMPORTANT NOTE:

1. When moving points around, you can lock the X or Y direction by turning of whatever button you don't want. This allows you to move a point in one direction, without effecting the other.

2. You can snap to grid by holding down the shift key while you move or click a point.

3. You can add a point by picking one with the left mouse button, and while still holding it down, click the right mouse button. Don't release the left mouse button after you have clicked the right, unless you want that point to stay there; because the point you added can now be moved to a position you want. THE POINT IS ADDED RIGHT AFTER THE ONE YOU PICKED.

```
WORKS IN: front view

AFFECTED BY: 1. Grid - snaps to grid points
             2. Shift - you can move points around with the mouse after
                    you have laid them down. If you hold the shift key down,
                    the point will snap to a grid point as you move, or you
                    can click on a point with the shift key down and it
                    will snap to a grid point.
```

1.32 sketch

```
"Sketch"

HOW: 1. Left mouse button
     2. Allows you to sketch on the screen

WORKS IN: All views
```

1.33 mirror

```
"Mirror"

HOW: 1. Click button after setting X,Y,Z buttons to directions you
        want to mirror on.

     2. To flip left to right in the front view, use X axis. The X
        direction is from left to right in the front and top view.

     3. To flip top to bottom in the front view, use Y axis. The Y
        direction is from top to bottom in the front and side
        view. (Get it ?)

WORKS IN: All views

WORKS ON: objects, points ,bones

AFFECTED BY: 1. X,Y and Z buttons
```

1.34 grid

```
"Grid"

HOW: 1. Click button

WORKS IN: All views- but your curve edge be be in the front view after
          creation.

WORKS ON: Drawing curve edges
```

```
ALTERNATE FUNCTIONS: Right amiga 'g' will bring up a requester to change the
                     grid size;
```

1.35 lasso

```
"Lasso/Click/Drag"

HOW: 1. Click button
     2. Sets the pick method to be used
     3. Lasso picks points by drawing a freehand line around them
        while holding the left mouse button down. This allows you
        to weave in and out of spaces that are not easily gotten to by
        a drag box.
     4. If you click and release the left mouse button, when lasso click
        is on this is just a click pick.

WORKS IN: All views

WORKS ON: points, bones

AFFECTED BY: together/separate button
             1. If together is on, all points at the mouse position will be
                picked.
             2. If separate is on, only one point, the first one it finds,
                that meets the criteria will be picked.
```

1.36 world

```
"World/Local"

HOW: 1. Click button
     2. This is for rotation, and will cause rotation to occur based on the
        objects axis instead of the world axis.

WORKS IN: All views

WORKS ON: objects, points, bones
```

1.37 unnamed.1

```
"Together/Separate"

HOW: 1. Click button
     2. This controls weather all points at this position should be picked or
        only one point.

WORKS IN: All views

WORKS ON: points, bones
```

1.38 knots

"Knots/Cntrl Pnts"

HOW: 1. Click button
2. This controls the look as well as the point type for picking.

A. Knots - Draws object by connecting lines through the knot points. (More accurate shape than control points)

B. Cntrl Pnts - Draws object by connecting lines through the control points.(faster than knots but less accurate in look)

C. BOUNDING BOX - This is a toggle by pressing the 'b' key.

It is used if the interactive frame rate is to slow on your machine to use the other two modes above; Due either to the speed of your machine or the number of points on the object.

Its nice to have a choice that's up to you any easily changed at any moment.

WORKS IN: All views

WORKS ON: objects,points, bones

1.39 spin

"Spin"

HOW: 1. Click button

2. A requester will ask you for the numbers of sections and to what degree to spin (also known as lathe or freeform rotate).

3. Yes, you can spin open objects at less than 360 degrees, in 1 degree increments.

NOTE: Real3d2 does not spin correctly, the object created does not match the profile of the edge curve from which it was made. They tell you to use more sections, but this will not solve the problem; all it does is force you to use more sections, more memory, and a slower drawing time.

It will never match the profile no matter how many sections you use the way that they do it.

I have developed a formula that corrects this problem in my program; so you do not have to use a large amount of sections to get your objects to look right. Any number you use should correctly match the profile.

(If you have Real3D2 try this and you will see what I mean.)
Spin a curve in real3d2 4 sections and check its profile against the original curve. Not only does it not match, but the object is not

```
      the right size you wanted it to be.

      Then, do the same in my program and note the difference.

WORKS IN: front view - spins around the Y axis

WORKS ON: objects (Whole objects and edge curves)
          If you choose an object the has already been made, either by spin or
          extrude or whatever, pressing the spin button will use the first
          curve edge on the object as it looks in the front view, as a profile
          to create the spun object.
```

1.40 extrude

```
"Extrude"

HOW: 1. Click button
     2. A requester will ask you for the numbers of sections

WORKS IN: front view - extrudes in the z direction

WORKS ON: objects (Whole objects and edge curves)
          If you choose an object the has already been made, either by spin or
          extrude or whatever, pressing the extrude button will use the first
          curve edge on the object as it looks in the front view, as a profile
          to create the extruded object.
```

1.41 fit

```
"Fit/Unfit"

HOW: 1. Click button - toggles between fit and unfit

     2. Centers the object and zooms in as close as possible, while
        keeping the object within the bounds of the screen;

     3. If you haven't switched views or picked a new object, you
        can set things back to the way they looked before you
        did the fit, by pressing the button again.

WORKS IN: All views

WORKS ON: the view
```

1.42 render

```
"Render"

HOW: 1. Click button
```

```
WORKS IN: perspective view

WORKS ON: all objects

AFFECTED BY: render mode menu settings;
```

1.43 usingrender

```
"Using the renderer"

 1. This is a greyscale preview render like in Real3d2, it is designed
    to be a marriage between quality and speed.

 2. IT IS 20 TIMES FASTER THAN REAL3D2.(Yes, I said 20 times !)
    Real3d2 converts your bsplines to polygons, so if you zoom
    in close to an object and then render it, you'll see poly
    edges. You have to adjust the subdiv level up to 4 to
    come close to FreeForms smoothness.

    FreeForm will render your Bsplines smooth no matter what the
    resolution or zoom level; and will do it 20 times faster
    than Real3D2.


 3. You can switch between render modes and sizes using the menu.

 4. If you have an AGA capable machine, you can use 256 color grey scale
    by selecting AGA from the menu.

 5. The time that the render took will be displayed when it is done.


 If you have Real3d2 you may test my speed claims using the object called
 SPOUTBS.FREEFORM in the objects draw. It was created in FreeForm using
 the Rail Extrude and converted to a Real3D2 RPL file called SPOUTBS.RPL

 Zoom it up in Real3D2 to fit the screen, and render it.
 Get out your clock and wait and wait.

 My test was done on a 25Mhz A3000.
 1. Enter FreeForm and load in the spoutbs.FreeForm object using the
    object menu.
 2. Press the persp button and then the fit/unfit button.
 3. Choose Curve Shade (NOT curve shade(quick)).
 4. Press Render button.
```

1.44 undo

```
"Undo"

HOW: 1. Click button
```

WORKS IN: All views

WORKS ON: objects,points,bones

AFFECTED BY: The last action performed before you pressed undo

1.45 multiple

"Mutiply Points"

HOW: 1. Select a point or points

2. Click button

3. A requester will appear asking you what type of point do you want it to be (single, double, triple) it also tells you what action it will have on the way the curve looks.
Doing it this way frees you from having to know how many points are already there to begin with, as in real3d2. You are only concerned with how many do you want to be there, and the program will take care of the rest.

NOTE: SEE INFORMATION ON SETTING TENSIONS AS AN ALTERNATIVE, AND MORE POWERFUL METHOD OF MODIFYING CURVES AT POINTS.

WORKS IN: All views

WORKS ON: points

AFFECTED BY: Being in points mode and having some points picked

1.46 Keyboard shortcuts

a.

b. Toggles bounding box display mode on and off.

c. Creates an object out of the curve you drew.

d.

e.

f.

g.

h. Help - If your reading this you probably figured that out.

i.

j.

k.

l.

m. Move.

n. Toggles display of object names on/off;

o.

p.

q. Quits the program.

r. Rotate.

s. Scale.

t. Sets points picked on an edge curve to sharp.

If in drawcurve mode, toggles between sharp and smooth for the picked point;

T. Sets points picked on an edge curve to smooth.

u.

v. Toggles vertical symmetry line that appears in draw curve mode, on and off. Turns mirror image off and on.

W.

x. Turn on X button.

y. Turn on Y button.

z. Turn on Z button.

X. Turn on X button ONLY !

Y. Turn on Y button ONLY !

Z. Turn on Z button ONLY !

Space Bar. Hide and show button screen toggle.

1. Send picked object to workspace 1.
2. Send picked object to workspace 2.
3. Send picked object to workspace 3.
4. Send picked object to workspace 4.
5. Send picked object to workspace 5.
6. Send picked object to workspace 6.
7. Send picked object to workspace 7.
8. Send picked object to workspace 8.
9. Send picked object to workspace 9.