FF_help

COLLABORATORS

	TITLE : FF_help		
ACTION	*NAME*	*DATE*	*SIGNATURE*
WRITTEN BY		June 25, 2022	

REVISION HISTORY

NUMBER	DATE	DESCRIPTION	NAME

Contents

Chapter 1

FF_help

1.1 FreeForm Help

```
        0.
WHATS NEW
   1.
About The Author
   2.
System Required
   3.
Introduction
   4.
Using The Editor
   5.
NURB Tension
   6.
Bones
   7.
Rendering
   8.
Work Spaces
   9.
Keyboard Shortcuts
  10.
Preferences
  11.
Writing your own HELP text
  12.
Animation and Morphing
  13.
Using an IFF as a background for drawing splines
  14.
Inverse Kinematics
```

1.2 changes

```
**** What's changed in this version. ****
```

```
  ** NEW VERSION 1.9 CHANGES **

1. Added real time Inverse Kinematics.

                  Press here for explaination
                  2. Added a set path for saving of animation tween objects.
```

```
** NEW VERSION 1.88 CHANGES **

*** BUG FIXES *******
1. Error in one the corners of a patch when tension
   was set to other than smooth or sharp, in the solid direction.

2. Error when answering yes to the requester, after a build from
   cross sections.

3. More that I may not have remembered.
-----------------------------------------------
***** NEW ADDITIONS *******************

1. Raised the number of multi picked objects in the file requester
   to 50;

2. Added pick cycling through objects with the left and right
   arrow keys;  You can pick objects by pressing the arrow keys.
   This will pick the next object, or previous object to the one
   currently selected.

   TRY THIS:
   Load in 3 or more objects.
   Press the left or right arrow key, and it will jump to the next,or
   previous object, and pick it as the currently active one.

3. The subdivision level in the convert requester, for both the solid
   and dotted direction, is now stored and saved with the object.
   You can set the level, save the object, and when its loaded back
   in, and you go to convert it, the slider controls are already
   set to the values you previously saved with the object.
   When you copy an object, the new object will have the same subdivision
   level as the original.

4. You can call up Amigaguide on-line help with the HELP key on the
   keyboard now.

5. You can use hotkeys to switch displaying of the workspaces.

6. F10 is now hot key for rendering. Just like pressing the render
   button.

7. Added a new menu item in the object/position menu. It's called
   Align to world axis. It will re-align your object back to
   the world axis alignment. Rotate your object on some axises,
   and then pick that menu item.
```

8. Added @{ " keyframe animation " link m_animate} in place of the old morpher. ↵
    The new
    animation function allows morphing and position animation
    with mutiple targets (limited only my your memory).
    You can set options like:
    A. Number of tweens between keys.
    B. The save format for the tween objects.

9. Added a
                 Conform to sphere
                 function. Works two ways.
    1. Pick points, and then conform.
    2. Allow the program to pick the points, based on the radius
       of the sphere, and they'll be conformed.

10 Added CUT and INSERT object functions. They allow you to change
    an objects order in ram (which object comes first, second ....)
    This is useful for the Build and Animate functions, which
    use objects in order of succession, so you don't have to
    constantly pick each one, everytime you want to do something.

11 Added output of objects to Pixar's RenderMan spline format.

12 Added the abilty to load in a 4 color background IFF, to use
    to make spline edges, by drawing over the shapes on screen.

                 Press here to find out how
               ;

****

****
** VERSION 1.7 CHANGES **

This is the third update; version 1.7.

**** BUG FIXES *****

1. Fixed a bug with saving to ram:. Commodore returned the illegal
    volume name "Ram Disk" instead of ram: to the program through
    the file requester.

2. Fixed a bug with the buttons. When you were in points mode, and
    had modified some points, and then swicth to camera; if you
    didn't use the right mouse button to end the interactive mode,
    the buttons would leave themselves on and change orders. If
    you did use the right mouse button to end the mode, it would have
    sent you back to the mode you were in before you pressed the
    camera button, which was what it was designed to do. Now I
    checked for those of you who press the points button or bones

to get back.

3. Fixed the saving to Real3D, gave an error message on workbench
   bu it was nothing bad. Just left some extra code line in by
   accident. Saving to RPL NURB format now saves the object to Real3D
   with the tension modifications, as they look in FreeForm.

4. Fixed the close object bug.
****

***** New Additions ********

1. Added a Build from cross sections function. Its in the Forms menu.
   See the "explain" drawer on the disk.

2. Added adjustable tension. You can now get tensions in between smooth
   and sharp, at 0.1 increments. See the Tension menu/Adjustable tension.

3. There's a new function that works in conjunction with the "Only these"
   function. It's the HIDE (all unpickable sections) function.
   It won't draw curve sections that contain points that were not
   set to PICKABLE with the "Only These" function.
   It's in the "object/POINT functions" menu.

   PLEASE REMEMBER TO TURN THESE MODES OFF WHEN YOUR DONE WITH THEM.
   IF YOU FIND YOU CAN NOT PICK A POINT FOR SOME REASON, CHECK TO
   SEE THAT THESE FUNCTIONS ARE NOT CHECK MARKED.

4.

****

   ** OLD VERSION 1.6 CHANGES **

1. Changed the drag points function, to a much more accurate, much
   prettier, and in some cases, faster version.

2. Added some more explanation on using rail extrude properly.
   See the help system (forms menu item button);

3. Added a tween by tween step through of the morphing of an object.
   A requester comes up letting you access any of the tween objects
   so you can save them to disk; allowing you to load them in later
   for conversion or modification or use as a source or target
   for another morph.

4. Added an "Only these" function. This allows you to pick points
   an specify that you are only going to work on these points,
   and they are the only ones that can be dragged when you switch

to that mode. This allows you to pick points that you want to
work on in one view, and then drag them in that or another view,
without accedentally picking other points you didn't want.

5. You can now switch the direction of the Bones, back and forth between
   the two directions. (solid line direction & dotted line direction)

6. Added a recalculate Bones function. Recalculates the Bones whenever
   you should need to; after alot of point pulling into different
   directions and so on.

7. Added a 90 degree snap rotate function. Just choose an axis and hold
   down the shift key when you press the rotate button. Your object
   will be rotated 90 degrees on the axis you chose.

8. Added a drag bones functions. If you switch on bones and then turn
   the drag button on(lasso-click/drag cycle button),you can pick
   a bones point and pivot on the joint before it, according to what
   view your in.
   The rotation is as follows: if you were to bend an arm at the
   elbow, you would grab the arm at the wrist. This is how it responds.
   It may work backwards depending on the order of your points(first
   to last) when you created the object. If it seems to be working
   backwards, use the "swap bone points order" menu item in the
   object/BONE functions menu. This function will automatically
   figure out the appropriate direction to use(SOLID or DOTTED).
   This can also be done manually, with the "change point order" menu
   items, in the object/reparameterize menu.

   1. Load in the spout object
   2. Turn on bones
   3. Change the lasso/click cycle gadget to drag
   4. Pick bone point around the middle of the object
      and while still holding the mouse button down, move
      the mouse up and down.
   5. Select the swap bone points order menu item,in the
      object/BONE functions menu
   6. Use that same point again and notice the difference.

 To switch the order back, just pick the menu item again(It's a toggle)

1.3 m_ik

"Inverse Kinematics"

  Inverse kinematics allows you to do posing snaking and bending
  of objects using there bones, by pulling on as little as one point.

  FreeForm's inverse kinematics are interactive, real time. Meaning that
  as you drag a point you will see not only the bones, but the bones and
  the whole object, update in realtime.

The controls are as follows.

'i' key toggles on and off inverse kinematics mode.
SHIFT + 'i' key toggles on and off the endpoint constraint
or anchor point.

The anchor point keeps the object from moving past a certain
point. Default is constraint ON.

TRYING IT OUT

1. Load in the gord.FreeForm object.

2. Click on the bones button;

3. Change the lasso/click/drag cycle button, to "Drag".

4. Press the 'i' key to turn on inverse kinematics.

5. Grab the top bones point and drag it around to make the object bend
   over, left or right.

6. Press shift + 'i' key and grab that point again
   and drag around the screen.
   You can use any of the bones points, to pull and switch views
   to pull in other directions.

7. You can try this on the tube.FreeForm object as well.

The constraint point is the last bones point(last meaning in order
of how the objects points were made first to last)

To change the constraint point to the other end of the object,
use the change bone point direction menu item in the

object/bone functions menu.

That's basically it. After you play around with it for awhile,
you begin to see what you can do with it.

1.4 rail_tutor

Rail extrude tutorial.

create a simple airplane wing.

1. Load in the objects in the rail_objects drawer.
   You can pick all three and then say load; the file

requester is multi-pickable;

2. The objects are labeled as to what they represent.
   Pick the cross_sec object, and go to the forms menu
   and set it to be the cross section.
   Do the same with the other objects, set them by their
   appropriate names. (rail1, rail2)

3. Choose rail extrude from the forms menu. DON'T delete
   the rail and cross section curves when ask.

Your object should be created.

4. Notice that the parts are all flat in the front view. This
   is the way you should keep your parts. The only rotation
   that you may want to do, is on the world Z.

5. Orientation of the cross section affects the final result of
   your object. To see this:

   A. Delete the object you just created.
   B. Pick the cross sec object.
   C. Turn on the Z button.
   D. Hold down the shift key and click the rotate button once.
      This does a 90 degree rotate for every press.
   E. Select rail extrude from the menu.

   F. Look at you object in the Persp view.
   G. It looks like a sail boat hull now.

   This is because your cross section is scaled according
   to its height. Top of the cross section to the bottom of
   the cross section; this will try to be scaled to fit
   in between the rails.

6. A morph rail extrude is the same, execpt you have a target
   cross section, that the source cross section will change
   it's shape to while being extruded along the rails.
   The source and target must have the same number of points.
   The target should be scaled up to be near the same size(in area)
   as the source (If is is not already).

BE SURE TO CHECK AND SEE IF THE OBJECT THAT IS CREATED IS ROUGHLY
WHAT YOU WANT BEFORE YOU DELETE YOUR PARTS. IF YOU ARE HAVING
TROUBLE GETTING WHAT YOU WANT TRY THESE CHANGES AND RE-EXTRUDE
THE OBJECT.

1. FOR RAIL EXTRUDE

        A. ROTATE YOUR CROSS SECTION 90 DEGREES ON WORLD Z

2. FOR MORPH & RAIL EXTRUDE ONLY

        A. ROTATE YOUR CROSS SECTION 90 DEGREES ON WORLD Z
             ROTAE YOUR TARGET ALSO OR YOUR OBJECT WILL
             TWIST AS IT'S EXTRUDED; (YOU MAY WANT TO

        USE THIS SIDE EFFECT TO MAKE SOMETHING IN THE
        FUTURE)

    B. SWAP THE SOURCE AND TARGET

ONCE YOU START USING IT AND EXPERIMENTING WITH IT,YOU'LL
BEGIN TO SEE HOW TO SET THINGS UP AND THE COMPLICATED
AND TRULLY WIERD OBJECTS YOU CAN CREATE. YOU MAY NOT
ALWAYS GET EXACTLY THE SHAPE YOU WANTED EVERY TIME; BUT IT
IS A GOOD WAY TO GET A STARTING SHAPE FOR AN OBJECT
THAT YOU CAN MODIFY WITH POINT PULLING AND BONES LATER.

Your rail objects don't have to be mirror images of each other;
only if the profiles of the object your trying to make are
symetrical. The rail curves can look completely different
from each other. The only requirements are that they have
the same number of points, and that they are not rotated
out of the x,y plane. You can rotate them on the Z,or move
them any distance apart on the X and Y only.

1.5 author

"About The Author"

     NAME: Mr. Fori Owurowa

  RESIDES: Brooklyn, NY USA

      AGE: 26

 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 2 years 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".

1.6 introduction

"Introduction"

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

 Please ignore the use of the word DEMO if you have ordered the full version.
 The files are duplicated as a time saver.

 No liability from the use or misuse of this program is expressed
 or implied. All products mentioned are the trade marks of their
 respective companies and have no affiliation with FreeForm at
 this time.

 All code of the program is the property of Fori Owurowa and may not
 be used any other purposes This program may not be copied for sale or
 free distribution, or any other activity that the author feels would
 jepordize it's sale. Each disk has it's own unique code which is matched
 to your name. This code will be accessed by the author on any unauthorized
 copies, and the person/s responsible will be held accountable in accordance
 with the law. I have kept the price of the program low, because I understand
 that not everyone can spend from $400 to $7000 on these programs.
 Please respect my kindness.

FreeForm is a Bspline and NURB editor for Real3D2, Aladdin, 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 $80. 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)

$80 includes shipping and handling.

Fori Owurowa
1873-75 Cropsey Ave
Brooklyn, NY 11214
U.S.A

718-996-1842 (12:30 pm to 7:30 pm Eastern time) For registered users only

enigma@dorsai.dorsai.org

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 other Bspline
        programs lines through the control points.

2. Cntrl Pnt- Same as Real3D2'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 I feel are
improvements over other Bspline modeling programs portions.

1. FreeForm is the fastest grayscale, preview, true curve renderer.

    The curves in the editor, also maintain their smoothness at any
    resolution and zoom, without having to set any subdivision levels.
    FREEFORM CAN RENDER CURVES IN CURVE SHADE MODE, FASTER THAN SOME PROGRAMS
    RENDER POLYGONS IN SCANLINE !;

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

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 in other programs.(When I brought a computer I wanted 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. Some Other programs
    do 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 than other Bspline programs.

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

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.

16. Tension – allows you to 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 other Bspline modelers.

    (In some programs, 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. A result wich you may not always want.

    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 – 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.

1.7 prefs

"Preferences"

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

1.8 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.

1.9 editor

                    "Using The Editor"

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

1.10 uv

" U and V directions"

 Other programs use 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.

1.11 menus

"Menus"

1.

Project
2.
Display
3.
Object
4.
Tension
5.
Deform
6.
Form
7.
Primitives
8.
Render Mode
9.
Animate/morph
10.
Work Spaces

1.12 m_biff

"Background IFF"

Two menu items, in the display menu, let you use an IFF as a background
to draw over, for making spline edges.

1. STEAL FRONT SCREENS IFF – To use this, run a paint program, and
   either load in an IFF or make one yourself.

   Make sure the IFF is the same size(if not close to) FreeForms'
   modeler screen.

   The detail of the picture should use color 1.
   The background of the picture, should use color 3.

   This will keep FreeForm from erasing the picture
   while you are drawing curves over it; and while in
   the interactive modes.

   Then, go back to the FreeForm screen and execute this menu item.
   (STEAL FRONT SCREENS IFF)
   I would recommend pulling the screens down, instead of flipping
   through them.

   FreeForm has the screens IFF stored now; and you can exit the
   paint program.

   *** The front screen does not have to be a paint program.

FreeForm will steal any front screen(Ex. IFF loader program etc.)
The only requirments are.
A. Screen size must be close to FreeForm modelers' screen size.
B. Screen must be 4 colors or more. ONLY THE FIRST 4 COLORS
   WILL MATTER.
C. The detail of the picture(stuff you don't want to
   be erased, while drawing) , must use color #1.
D. The background of the picture, must use color #3.

Most paint programs have the ability to change this,
if you have a picture that is not this way.
   ***

 2. USE BACKGROUND IFF - This toggles on and off the display
    of the background IFF, that you grabbed from the paint
    program.

1.13   m_project

"Project"

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

1.14   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. Hold down left mouse button and
                   make the rectangle square if it does not already appear

```
                           to be.
```

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       Most paint programs have the ability to change this,
       if you have a picture that is not this way.
   ***

9. USE BACKGROUND IFF – This toggles on and off the display
              of the background IFF, that you grabbed from the paint
              program.

1.15 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 tension format.
                  Your object will look the same in spite of this.
D. Imagine – Allows you to convert your Spline object
                  to polygons.

****** FOR VIDEOSCAPE AND IMAGINE ******
The object will be output as separate polygons, each containing
there own 4 points. The only thing you will have to do is
merge the points how you wish in the program you are outputting to.
This is neccessary because your object could contain patches with
edges that are curved and straight; and in order to get them
to shade right (phong or flat) in the programs your outputting
to, they require that flat polygons have there own points, and
smooth(phong) polygons share points with there neihboring
polygons.

**** NEW ******
Auto-merge has been added in version 1.8, and will merge
points for you, so you don't have to do it in Lightwave's
modeler, for those objects you wish to be this way.
It is a toggle check box, in the Videoscape conversion
requester.

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.

*** POSITION FUNCTIONS ***

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

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

   ALIGN TO WORLD AXIS – Re-aligns object back back to world 0,0,0.

*** AXIS FUNCTIONS ***

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.
****

*** EDGE FUNCTIONS ***

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.
                      (Make sure your edge is flat in the fron view).
****
14.

15. COPY & PASTE – You got it.

16.

**** Rearange *******

  CUT and STORE – Removes and object from the list and stores it
                  temporarily, to be inserted back in later.

  INSERT – Inserts the CUT object back into the listed; either before
            or after the currently picked object.
            Only its pick-order is changed, not its location on screen.
****

17. OPEN – Opens an object that is closed.

18. CLOSE –Closes an object that is open.

19. DELETE – Works on objects.

1.16   m_deform

"Deform"

 Conform to sphere –
   USE PICKED POINTS – The ceneter of the sphere is the objects
                       axis center. The points you picked, will be
                       moved to conform to a sphere shape.
                       You will be asked to input a radius for the sphere
                       in real world inches. DEFAULT =1.0.

   SET SPHERE RADIUS – Allows to set the radius of the conformation sphere
                       to be used eith the next function below.

   USE POINTS WITHIN RADIUS – This will pick all points contained
                              inside the sphere, defind by the radius

```
                                        size you set.
                                        All points that it finds, will then be conformed
                                        to the sphere shape.


     ******
             Load in the tube.FreeForm object, and select
             conform to sphere/ Use Points within radius.

             Then move the axis to a different position on the object,
             and try it again.
     *****
```

1.17   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 would be far more difficult
     in other Bspline programs.

     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 other Bspline programs, 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 other bspline
     programs: 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 20 increments.



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. ADJUSTABLE TENSION - Allows you to change the tension of picked points
                        at 0.1 increments, between smooth and sharp.
                        1. Load in an object.
                        2. Turn on points mode.
                        3. Hold alt key down, and drag a box
```

                                      around the whole object. This picks
                                      all the points.
                                 4. Go to the tension menu, and choose
                                      set to sharp/dotted.
                                 5. Then choose adjustable tension from the same menu.
                                 6. Make the dotted lines the only ones that are
                                      checked in the requester.
                                 7. keep pressing the smoother button, and whatch
                                      your object change.

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.

1.18   m_form

"Form"

 ** IMPORTANT **
FOR RAIL EXTRUDE AND MORPH RAIL EXTRUDE, THE OBJECT WILL BE CREATED USING
THE WAY YOUR PARTS LOOK IN THE FRONT VIEW. THE CROSS SECTION AND SOURCE
OBJECT THAT WILL BE EXTRUDED MUST FACE THE FRONT VIEW. THERE IS NO NEED
TO ALIGN THE CROSS SECTION WITH THE RAILS; THE PROGRAM WILL TAKE CARE OF
ALL OF THAT FOR YOU. IF YOU CREATE YOUR PARTS IN THE FRONT VIEW YOU SHOULD
HAVE NO PROBLEM WITH THIS.

IF YOU DO JUST A MORPH EXTRUDE, YOU CAN HAVE YOUR SOURCE AND TARGET ALIGNED
IN ANY WAY YOU WANT.

 **** newly added ***********
You must forget what you know about other programs that may use
the same or a similar function as this. There is no need to do
any exact aligning of the cross section with the rails; FreeForm
will do virtualy all the work for you.
         Think of it as a 2D program where you design your parts
in the front view. Your rails, and cross section/s should be
in the front view, flat like you drew them on a piece of paper.
If you notice whenever you go to draw a curve edge, and make it
into an object; its always in the front view; even if you were
in another view when you turned on the draw curve button. It
was done that way to keep your parts flat in the front view
for Rail extrusion. The only rotating that you may need to do is
on the Z axis. Just like in a 2D drawing program you can only
rotate your curves clockwise and counter clockwise.

The only thing you have concern yourself with is; are the rails
aligned with each other how you want them to be. They can be
any distance apart (MOVEMENT ON THE X and Y ONLY) and at
any rotation angle to each other. (ROTATION ON THE Z ONLY).

The cross section/s don't even need to be anywhere near the ends
of the rails; FreeForm will take care of all of that for you.

Once you understand what FreeForm will do to your cross section
you will understand if you have to rotate on the Z or not.
FreeForm will do the same thing that you would do, if you were
going to do all of the alignment work yourself.

FreeForm will take your cross section and rotate it on the Y
so that your cross section is now facing in the proprer direction
to be extruded along the direction of the rails. Then FreeForm
will make copies of your cross section and align each one
with the matching points on both rails (THAT'S WHY YOUR RAILS NEED
TO HAVE THE SAME NUMBER OF POINTS AS EACH OTHER). If you notice when
your object is complete, that the number of cross sections matches
the number of points on any one rail.

Once you study this and practice with it a couple of times you will
start to understand what to do, and some of the truly bizzare things
that you can create with it. It is one of the most powerful
features for creating certain types of objects, as well as giving
you a good starting shape for more complexed ones.

@{ " Press here for Rail tutorial example " link rail_tutor }

****

Form – Creates complexed combinations of cross sections and profiles.

SET Source or CROSS SECTION – Sets the currently picked object to be
                              the cross section that will be extruded.

SET RAIL 1 – Sets the currently picked object to be Rail 1

SET RAIL 2 – Sets the currently picked object to be Rail 2

SET TARGET   – Sets the currently picked object to be target. This is
            for morph extrude and morphed rail extrusion.

SWAP SOURCE & TARGET – Swaps the source and the target objects for.
                       The object is always extruded in the (first point
                       to last point) direction of the rail curves.
                       The source will start at the first point and end
                       at the last point. If you think about this you will
                       understand the need for it.

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.)

```
MORPH & RAIL EXTRUDE - Just like rail extrusion, except the shape of
                       the object is changed as it is extruded along
                       the rails from, what the source looks like, to
                       what the target looks like.
                       RAILS must have the same number of points.
                       SOURCE and TARGET  must have the same number of
                       points.

SET STARTING BUILD OBJECT - Sets the currently picked object, to the
                            starting point for a build.

BUIL FROM CROSS SECTIONS - Creates an object by skining, from the
                           build start object to the last object
                           that was made.

SEA SHELL - Creates sea shell shapes by spinning an edge curve around the
            axis. The size of the curve and how far away it is from the
            axis determines the results.

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

1.19 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.(Other Bspline programs
                   only give you 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. FLAT PLANE - Creates a flat sheet divided into the number of sections you
                specify in the solid and dotted line directions.

                A. Select from the menu.
                B. Drag out a box with left button held down.
                C. Answer the requesters questions.
```

1.20 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.

8. PICASSO TEST – This is only a test function, and will open up a 24bit
                  PICASSO screen and render your object to it, giving each
                  patch a ramdom color; provding that you have a PICASSO board.

1.21 m_animate

The key frame animator generates tweens between key objects.

You set the starting object, for the animation, and it will use
every object from that one to the last object in the list to tween between.
This is why you should create your key objects in the order that you want
them to be tweened. (first to last). Thats the reason for new cut and
insert commands, so you can switch around the object order.

1. Load in the objects in the anim drawer. Spout1 – Spout6.
   (You can multi pick them to load in all at once)

2. Press the left arrow key. This will step you through the objects
   in order. You can go in the opposite direction with the right arrow key.

3. Press until spout1 is the active object (Highlighted in white).

4. Select : Set Starting object from the animate menu.
   This will set spout1 to the start or first key.
   You don't have to set a target, because every object that
   comes after spout1, to the end of the list, will be the targets.

YOU CAN PLAY THE ANIMATION FROM ANY VIEW (FRONT, TOP, SIDE OR PERSP)

```
***** PLAY ANIMATION (PREVIEW) *****
```

5. Choose: Play Animation (preview);
   This will show you the animation;

```
***** PLAY ANIMATION (TWEEN BY TWEEN)   *******
```

6. You can step through the animation a frame at a time, by
   choosing : Play Animation (tween by tween);
   The left and write arrow keys, let go forward and backward through
   the animation frames.
   If you press SHIFT and the arrow keys, you jump forward and backward
   between the frames that match the key objects.

   The defaults are.

   Save Format = Videoscape;
   Number of tweens between each key = 8;

   You can change these by choosing: Set Anim Options, in the menu.

7. You can save a converted tween object ,in the format specified
   by the options, by pressing the 's' key, while in tween by tween
   mode.

   You can stop the mode by pressing 'q';

```
***** PLAY ANIMATION (SAVE TWEENS WHILE PLAYING) ******
```

This menu item will play the animation, and save all the tween
objects ,straight through to the end.

It uses the options you set in : Set anim options, menu item

```
********** RENDER ANIMATION ***********
```

This will paly the animation straight through, and render and save
each screen shot, according to the render setting, in the render
mode menu.

```
*********************************************
```

```
*****   MORPHING  ******
```

You can morph the same way.
Just change the points position on each key the way you want them.

Because it is tweening the object.

The size, shape position and tension settings of the object, are all
tweened with.

```
*** IMPORTANT ****

You will notice that there are duplicates of the first and last object.

If your not looping the animation in a circle, and your using 4 or more
key objects, the first and last object should be duplicated in the
same position.
The first 2 objs should look the same.
The last 2 objs should look the same.

If you don't, the tweens will start from the second object, and end
at the next to the last object. Which is what is needed
when doing a looping animation.

NON LOOPING

****************
2 OBJECTS

 1->2

****************

****************
3 objects

 1->2->3

****************

****************
4 or more OBJECTS

In other words, it should look like this:

   1->1->2->3->4->5->6->6

     ^               ^
   dups            dups

***************



LOOPING

If your going to loop the animation back around in a circle:
it should look like this.


1->2->3->4->5->6->1->2->3


When you loop, the last three key objects should look
just like the first three.
```

You can make keys by pressing the 'k' key. This will, in effect,
make a copy of the currently picked object.
This works nice in drag bones mode, for fast positioning and key making.

0. Delete any objects that may be present.
1. Load in the spout1.FreeForm object.
2. Turn on the bones button.
3. Switch the lasso/clck button, to drag;

4. Now press 'k' key. Drag a bone point(bends object):
   press 'k'. Drag a bone, press 'k' and so on. Creating
   key after key.

****

1.22 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.

1.23 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
```

1.24 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

1.25 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

1.26 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

1.27 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

1.28 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

1.29 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

1.30   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

1.31   axis

"Axis Only"

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

WORKS ON: objects

WORKS IN: All views

1.32   object

"Object"

HOW: 1. Click button – actions are performed on the object
     2. Pick objects by clicking on their axis center point
        or by pressing left arrow key or right arrow key.

WORKS ON: objects

WORKS IN: All views

1.33   camera

"Camera"

HOW: Click button – actions are performed on the camera

WORKS ON: camera

WORKS IN: All views

1.34   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
```

1.35   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

1.36   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:

     If you haven't shut it off, you will notice a vertical line down
     the center of the screen. This is for when you create edges that
     you are going to spin or mirror & merge. It shows you the mirror
     image of your drawing. IT CAN BE TURNED OFF AND ON BY PRESSING THE
     "v" KEY.

     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. ADDING and DELETING POINTS

       ADDING - Click on the point with the mouse and press the 'a' key
                while still holding the mouse button down.
       THE POINT IS ADDED RIGHT AFTER THE ONE YOU PICKED the added point
       becomes the currently picked one, can be moved at this time by
       moving the mouse.

    4. DELETING - Click on the point with the mouse and press the 'd' key
                    while still holding the mouse button down.

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.

1.37   sketch

"Sketch"

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

WORKS IN: All views

1.38   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

1.39   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;

1.40   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.

1.41   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

1.42   together

"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

1.43   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

1.44   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: Some programs doe not spin Bsplines correctly, the object created does
      not match the profile of the edge curve from which it was made.

They may 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.

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.

1.45 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.

1.46 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

1.47   render

"Render"

HOW: 1. Click button or press F10.

WORKS IN: perspective view

WORKS ON: all objects

AFFECTED BY: render mode menu settings;

1.48   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 THE FASTEST BSPLINE RENDERER ON THE AMIGA
    If you zoom in close to an object in other Bspline programs, and then
    render it, you'll see poly edges.
    You have to adjust the subdiv level in other Bspline programs
    up to 4 to even come close to FreeForms smoothness.

    FreeForm will render your Bsplines smooth no matter what the
    resolution or zoom level, there's no need to adjust subdivison
    levels;

 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.

1.49   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

1.50   multiply

"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. 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

1.51   Keyboard shortcuts

        a.   Add a point in drawcurve mode.

        b.   Toggles bounding box display mode on and off.

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

        d.   Delete a point, when in drawcurve mode.
                Delete an object, otherwise.

        e.

        f.

        g.   Grab any front screens IFF, and store it for use as
                a background picture.

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

        i.

        j.

        k.   Creates a key frame object. (Duplicates the picked object)

        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.

Enter key.      Redraw

        .       Smooth tension in draw curve mode.(incremental)
```

```
            ,        Sharpen tension in draw curve mode.(incremental)

           F10       Render

Cursor Left        Pick previous object in the list.

Cursor right       Pick next object in the list.

    HELP Key        calls up this help file.
```

1.52 write_help

```
WRITING YOUR OWN HELP TEXT
```

```
If you examine this help file in an editor, you will see that it is in ACSII.
You can write your own help text or change anything written here to what is
more understandable to you. To create the actual text you only have to
write it and enclose it in a @node – @endnode structure.
```

```
 node  name you want to call it


     text in here

 endnode
```

```
To create a button to access this text, stick this inside of one of the nodes:

 { " text for the button here " link the name you put after the node}
```

```
Look at mine and you'll get it. I had to leave the "at" symbol at the begining
off so the system didn't try to access my example.
```