

MERLIN MANUAL

Version 6.0

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INTRODUCTION

What is MERLIN?

Congratulations on your selection of MERLIN™ Laser Graphics Software.

MERLIN brings all of the elements of 3D color laser graphics into one powerful package. If you're a novice and unfamiliar with laser graphics and multi-media packages, you will quickly learn how to create a laser graphic Image and display it. For a skilled producer, Merlin is both powerful and flexible. Merlin offers comprehensive capabilities so you can incorporate Images in Scenes and then integrate the Scenes into a fully choreographed Show.

With Merlin you can easily create three-dimensional Images, beams, fans, text and more in full color laser light with blanking! Display and interact with your creations in real time, or save them to disk for replay at a later date. A full range of special effects gives added impact.

How MERLIN works

Laser shows are constructed much like a movie. First, the individual *Images* are created. Second, these *Images* are choreographed and grouped into *Scenes*. Finally, the *Scenes* are grouped into a complete *Show*.

Creating Images:

Easily create *Images* of 3D graphics, fans, beams, text and lissajous (geometric) patterns, using a Mouse, Tablet or Keyboard. Merlin allows *Images* up to 2500 points in length and supports blanking (hidden lines) and full RGB color. *Images* are easily edited using Merlin's built-in editing tools.

Choreographing Scenes:

Use the Images in choreograph *Scenes* by choosing any number of digital special effects such as size, zoom, sweep, position, rotation, duration, and animation rate. All parameters are easily manipulated in real time for professional results. *Scenes* may be created using individual *Images* or animation sequences that are hundreds of *Images* in length.

Presenting Shows:

Shows can be many *Scenes* in length. A full complement of special effects and specialized controls such as looping and single stepping allows for easy control of sophisticated Shows.

The flexibility of Merlin allows you to create a Show that plays and stops automatically, or can be overridden manually. A more experienced user may want to make changes on the fly, whereby you can create and edit Images, Scenes or Shows and display them immediately.

This manual will Show how easy it is to tap into the power of Merlin. Learning how to take advantage of all the flexibilities and features of this product will come with a little practice--and your imagination.

If you are installing Merlin on your own computer...

If you bought your computer from us...

If you have purchased a computer with MERLIN installed from Technological Artisans you can skip this section since MERLIN and the MERLIN library of Images come pre-installed.

What you need to use MERLIN

The following is required to use MERLIN:

- **Pentium class processor with a "PCI" slot and a printer port**
- **A minimum of 128 MB of RAM**
- **A VGA monitor**
- **A hard-drive for storing large graphic files**
- **Computer Key (comes with package)**
- **DAC board (comes with package)**
- **Connector cables (come with package)**
- **Output device (e.g. a laser projector, oscilloscope, etc.)**

A mouse or tablet, although not required, is recommended.

To install Merlin on your own computer...

- **Install the DAC board into a PCIslot**
- **Boot the computer to a 'DOS' C:\ prompt**
- **Insert each Merlin disk into the A drive**
- **Type A:\INSTALL and hit ENTER to copy all of the Merlin files into the new MERLIN directory Repeat the process for each of the Merlin disks**
- **Make sure your machine's CONFIG.SYS file loads HIMEM.SYS.**
A sample CONFIG.SYS file is included with the MERLIN software.

The MERLIN application and library files are now installed on your computer.

How this manual is organized

The MERLIN manual is a comprehensive guide for using MERLIN. Information is broken down in the following manner:

Introduction: Provides an overview of MERLIN and what you need to use it.

Shows: Describes all the commands you need to create a new Show, display and/or edit an existing Show, and delete a Show.

Scenes: Describes all the commands/special effects available to create a new Scene, display and/or edit an existing Scene, delete a Scene.

Images: Describes all the commands you need to create a new Image, display and/or edit an existing Image, delete an Image.

Appendix A: The Merlin Imaging Model

Appendix B: Technical Specifications

Getting Merlin Started

Getting your computer ready

- **Insert the Computer Key into the printer port on your computer (your printer cable can plug into the back of the Key; the Key will not interfere with printing)**
- **Connect the cables**

If you bought your computer from us...

If you have purchased with a computer with MERLIN from Technological Artisans, MERLIN will automatically start when the system is powered up. A title screen and MERLIN's main menu bar will appear across the top of the screen.

If you are using your own computer...

If you are using a Windows based machine, boot it into native DOS mode. (Note: not a DOS window).

- **Boot up the computer in native DOS mode**
- **CD into the C:\MERLIN\PROGRAM directory**
- **Type "M"**
- **Press <ENTER>**

What will happen next...

Merlin will start up and the title screen will appear. (See Title screen below)



Note: If a mouse is not plugged into the mouse port, a dialog box will appear stating that mouse support is not available. Press <ENTER> to continue.

If you have a mouse

Select the desired item from the Button Bar.

If you are using the key commands

- **Use the keyboard command for the desired Button Bar item**



Note: Generally, the desired control may be selected either with a mouse, or by typing the key command that appears within the <>.

MERLIN



Button Bar

DJ Show <f1>

The DJ SHOW menu provides all the commands required to create a new Show, edit an existing Show (using a number of digital special effects tools) run a Show or delete a Show.

Shows <f2>

The SHOWS menu provides all the commands required to create a new Show, edit an existing Show (using a number of digital special effects tools) run a Show or delete a Show.

Scenes <f3>

The SCENES menu provides all the commands required to create a new Scene, edit an existing Scene (using a number of digital special effects tools), run a Scene or delete a Scene.

Images <f4>

The IMAGES menu provides all the commands required to create a new Image, edit an existing Image (using a number of digital special effects tools), run an Image or delete an Image.

Quit<esc>

Exits the application and returns to the prompt.

Status Bar

xxxx Available Image Cache Entries

Since disk drives are relatively slow, Merlin tries to cache as many Images as possible. This status entry Shows the number [xxxx] of available Image cache entries for Merlin to load with Image files. The number will vary depending on the amount of XMS memory supported by your system. Approximately 25 Images can be cached per megabyte of memory. In reality, Merlin can never run out of memory since Images not cached will be loaded from the disk as needed during the running of Merlin.

xxxxx PPS

Shows the *Points Per Second* display rate for Merlin. This readout will display the default standard rate of 30k PPS. Normally the DEFAULT rate will never be changed since scanning rates can be adjusted in the *Images: Point Editor* menu.

DJ SHOW <F1>

DJ SHOW



Top Control Bar

EXIT <esc>

Returns to the main Merlin screen.

LASER OFF<enter>

Turns OFF the laser and closes the shutter.

REPEAT<r>

Toggles the Show's *Repeat* action. When depressed it causes the current Show to run indefinitely.

STEP <bar>

Spacebar advances to the next Scene on the list. Moves left to right, top to bottom and then resets.

AUTO STEP <a>

Causes the Scenes to automatically to run one after the other. Moves left to right, top to bottom and then back to the top left.

RANDOMIZE <j>

Similar to Auto Step except it causes the scenes to sequence in a random order.

LOAD SHOW <l>

Bring up the Load Show screen so a Show can be selected and loaded.

F-Key Scene Bank

The screen bank displays up to 4 banks of 12 Scenes, each with a thumbnail of the first Image in the associated Scene. Each bank is accessed by pressing an **F-Key**. Note that some banks will require the pressing of **SHIFT**, **ALT** or **CTRL** at the same time as the **F-KEY** to access the correct Scene in the bank.



Note: An indicator bars over the currently selected Scene lights RED for a stopped Scene or GREEN for running one.

SHOWS <F2>

Scene List

The Scene List status line displays an *Index* of Scenes that are in a Show, (*Total:Current*), the *Start* action, the *End* action, the *Scene* name and the associated *FKey*. Other buttons provide a variety of controls for adding, deleting and editing the Scene list. The currently active Scene is indicated by the line containing the > < braces.

The first 36 Scenes of your Show will have Function Keys associated with them. When you select a Scene's FKey from this list, you automatically trigger it to start and it will run according to the Scene's settings. This allows to instantly bring up a specific. This is quite useful. For example: If you are doing an awards Show, list all the names of the potential winners and hit the corresponding Fkey when the winner's name is called.

Edit <+=>

Edits the current Scene in the Scene Editor also can be used to replace it by loading or creating a new Scene in the Scene Editor. To insert a new Scene or delete the current one on the list use the **Insert** and **Delete** controls described below.

Start <z>

Toggles the Scene's Start action between *Wait* and *Run*. *Wait* cues up the Scene and lets you manually trigger the start by pressing the "q" key (see above). *Run* initiates the start of the Scene immediately.

End <x>

Toggles the Scene's End action between *Stop* and *Loop*. *Stop* causes the display to stop when the Scene comes to its end. When *Loop* is preset, as the Scene comes to the end, it immediately goes back to the beginning of that same Scene and plays it again. (*Loop* will continue to replay until you EXIT via one of the navigation keys below)

Reset <enter>

Resets the current Scene (within the > < brackets).

To edit or replace the current Scene entry

- **Press the <+=> Button**

The Scene Editing Screen appears with the current Scene loaded. You may edit the Scene you see displayed, save the changes, even go in and edit a single Image. See the Edit Scene section of the manual for all editing options. When the Scene is correct, press the **EXIT<ESC>** Button. The Show Editing Screen will reappear --and the new/updated Scene will be included on the Scenes Display List.



Note: Generally you will want to Insert a new entry before going to "edit" a Scene--or the new Scene will overwrite an existing one.

Insert

Inserts a new Scene into the Scene List.



*Note: The new entry will have a duplicate of the preceding Scene. Press **Edit<+=>** in order to fill the entry with the desired Scene.*

Delete

Deletes the current Scene entry.

Home

Returns to the top of the Scene List (the first Scene that will play in the Show).

End

Goes to the end of the Scene List (the last Scene that will play in the Show).

PgUp

Scrolls up the Scene List a page at a time (toward the first Scene that will play in the Show).

PgDn

Scrolls down the Scene List a page at a time (toward the last Scene that will play in the Show).

Up

Scrolls up the Scene List a line at a time (toward the first Scene that will play in your Show).

Down

Scrolls down the Scene List a line at a time (toward the last Scene that will play in the Show).

Merge A Show<m>

Merge a Show from a selected directory. The selected Show's complete Scene List is then added to the current Scene List.

Merge A Dir <d>

Merges all of the Scenes from a selected directory. Each Scene is then added to the Scene List.

Copy <AltC>

Saves a copy of the current Scene line into the copy buffer to be pasted later. (Use Delete to cut).

Paste <AltV>

Pastes a copy of the current Scene line saved in the copy buffer into the current line.

Cache & Save<p>

If a Show is not pre-cached then Scenes are cached when they run. This command pre-loads all Scenes (and their associated Images) into the cache and then saves a cache file for faster performance. Use this command to optimize performance of a Show you will be running frequently or the timing is critical. You will be prompted to load this cache file on future loading.



Note: Disk drive access times can vary resulting in inconsistent Show timing. A pre-cached and saved Show can run from memory minimizing this problem..

Bottom Bar

EXIT <esc>

Returns to the main Merlin screen.

SAVE AS <s>

Launches the *Show Save As* screen to save the current Show under a different name.



Note: SAVE AS will prompt you to ask if you want to save a new complete copy the underlying files (Scenes as well as Images). This is useful if you plan to base a new Show on an existing Show. This way you can work on a copy and not change the original files.

SAVE <spacebar>

Saves the current Show under the current name. Use SAVE AS to save under a new name..

NEW <n>

Creates a new Show. This can also be done from the *Load Show* screen. (See next section).

LOAD <l>

Launches the *Load Show* screen to pick a existing Show to load.

ERASE <backspace>

PERMANENTLY deletes the current Show from the disk. You will be prompted for confirmation BEFORE any permanent action takes place. Note: only the Show will be deleted, The Scenes and Images contained in the Show WILL NOT be affected. To delete them, go to the Scene and Image sections of the Merlin program.

Image Monitor: Y/X

A monitor showing the real-time display of the Scene as it runs.

VIEWPOINT <f9>

Toggles the monitor's viewpoint between X:Y and the X:Z perspectives

VECTORS <f10>

Toggles the monitor's display between vectors and points.

BLANKING<f11>

Toggles the monitor's blanking on or off. When off, blanking lines are displayed as grey points or vectors.

GRID LINE<f12>

Toggles the monitor's grid line overlay between off, large grid, or small grid.

LOAD SHOWS



SET HOME DIR <f8>

Sets the HOME directory to the current directory. Pressing <-HOME-> will always return you to this directory.

SELECTION

The *Selection:* _____ field lets you enter the name of the Show you wish to load. The mouse may also be used to select the Show to display. Simply click in the desired entry.



Entering or selecting a directory will cause the system to navigate to the selected directory and list the Shows available there. Select \. to navigate up the directory tree.

RENAME <f1>

Selecting a file name or directory, edit it, then press this button to rename it to the new text.

DELETE<f4>

Deletes the currently selected file or directory. Directories must be empty to be deleted.

EXIT <esc>

Returns to the main menu.

MORE <spacebar>

Lists Shows (if available).

LOAD/OPEN <enter>

Loads the entry or Opens the directory entered on the *Selection* line.

Note: If entry is blank a *New Show* is assumed

MAKE DIRECTORY <f5>

Creates a new directory entry. Select and use RENAME (see above) to change the directory name.

OPEN A NEW SHOW <f9>

Opens a brand new show.

SAVE SHOW AS



SET HOME DIR <f8>

Sets the HOME directory to the current directory. Pressing <-HOME-> will always return you to this directory.

SELECTION

The *Selection:* _____ field lets you enter the name of the Show you wish to save the Show As. The mouse may also be used to select an existing Show name to save over. Simply click in the desired entry.



Entering or selecting a directory will cause the system to navigate to the selected directory and list the Shows available there. Select \ .. to navigate up the directory tree.

RENAME <f1>

Selecting a file name or directory, edit it, then press this button to rename it to the new text.

DELETE<f4>

Deletes the currently selected file or directory. Directories must be empty to be deleted

EXIT <esc>

Returns to the main menu.

MORE <spacebar>

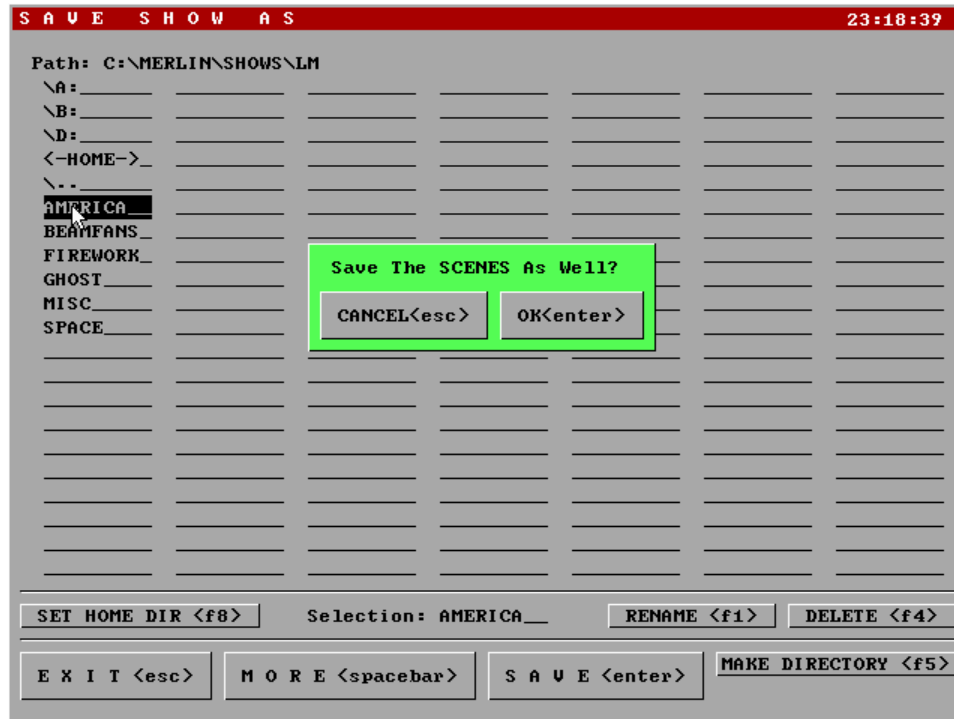
Lists more Shows (if available).

SAVE/OPEN<enter>

Saves the Selection entry or Opens the selected directory as entered on the *Selection* line.

MAKE DIRECTORY <f5>

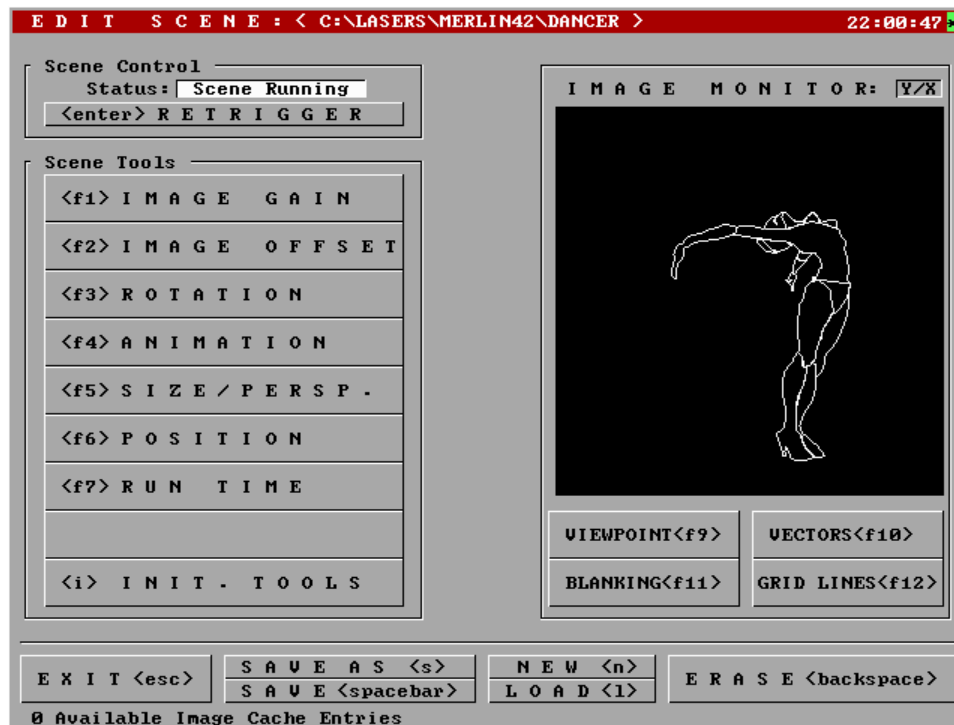
Creates a new directory entry. Select and use RENAME (see above) to change the directory name.



Note: SAVE AS will prompt you to ask if you want to save a new complete copy the underlying files (Scenes as well as Images). This is useful if you plan to base a new Show on an existing Show. This way you can work on a copy and not change the original files.

SCENES <F3>

EDIT SCENES



Scene Control

The Scene Control status line indicates the *Status* of the Scene that is cued.

Retrigger <enter>

Resets the Scene and sets the *Status* back to the beginning state. Has the same effect as reloading the Scene.

Scene Tools

The Scene Tools allow for adjustment of Image Gain, Image Offset, Rotation, Animation, Size/Perspective, Position, Timing/Sync and Initialize Tools.

<f1> Image Gain

Controls to edit the gain for an Image's X, Y and/or Z axis. This gain is applied prior to rotation and is normally used to correct for Image errors and special effects.

<f2> Image Offset

Controls to adjust the relative position of an Image's X, Y and/or Z axis. This offset is applied prior to rotation and is normally used to correct for Image errors and special effects.

<f3> Rotation

Controls to adjust the rotation of the current Scene

<f4> Animation

Controls the rate of delay between Images being animated.

<f5> Size / Perspective

This is a "Master Control" for the size of the Scene. These controls are applied post rotation.

<f6> Position

This is a "Master Control" for positioning of the Scene. These controls are applied post rotation.

<f7> Run Time

Determines the length of time the Scene will run (selectable between clock driven and data driven).

<i> Initialize Tools

Clears all of the parameters that have been set.

Bottom Bar

EXIT <esc>

Returns to the main Merlin screen.

SAVE AS <s>

Launches the *Scene Save As* screen to save the current Scene under a different name.



Note: SAVE AS will prompt you to ask if you want to save a new complete copy the underlying files (Scenes as well as Images). This is useful if you plan to base a new Show on an existing Show. This way you can work on a copy and not change the original files.

SAVE <spacebar>

Saves the current Scene.

NEW <n>

Creates a new Scene. This can also be done from the Scene Load screen.

LOAD <l>

Launches the Scene Load screen to pick a Scene to load.

ERASE <backspace>

PERMANENTLY deletes the currently displaying Scene from the disk. You will be prompted for confirmation BEFORE any permanent action takes place. Note: only the Scene will be deleted, the Images contained in the Scene WILL NOT be affected. To delete them, go to the Image section of the Merlin program.

Image Monitor: Y/X

A monitor showing the real-time display of the Scene as it runs.

VIEWPOINT <f9>

Toggles the monitor's viewpoint between X:Y and the X:Z perspectives

VECTORS <f10>

Toggles the monitor's display between vectors and points.

BLANKING<f11>

Toggles the monitor's blanking on or off. When off, blanking lines are displayed as grey points or vectors.

GRID LINE<f12>

Toggles the monitor's grid line overlay between off, large grid, or small grid.

LOAD SCENES



SET HOME DIR <f8>

Sets the HOME directory to the current directory. Pressing <-HOME-> will always return you to this directory.

SELECTION

The *Selection* _____ field lets you enter the name of the Scene you wish to load. The mouse may also be used to select the Scene to display. Simply click in the desired entry.



Entering or selecting a directory will cause the system to navigate to the selected directory and list the Scenes available there. Select \ .. to navigate up the directory tree.

RENAME <f1>

Selecting a file name or directory, edit it, then press this button to rename it to the new text.

DELETE<f4>

Deletes the currently selected file or directory. Directories must be empty to be deleted

EXIT <esc>

Returns to the main menu.

MORE <spacebar>

Lists more Scenes (if available).

LOAD/OPEN <enter>

Loads the entry or Opens the directory entered on the *Selection* line. Assumes a *New Scene* if entry is blank.

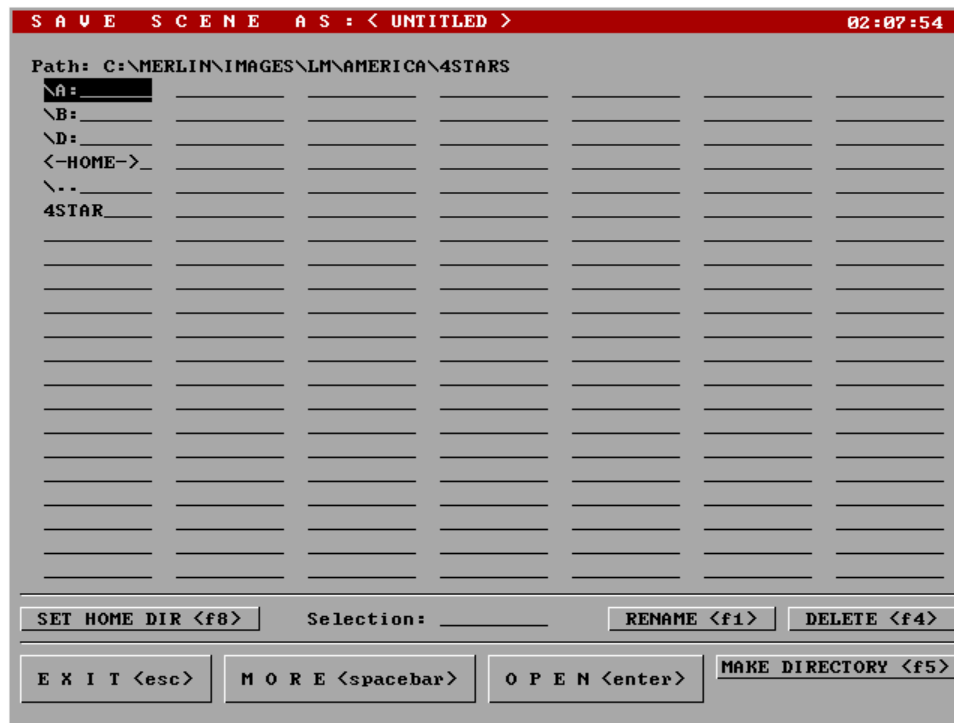
MAKE DIRECTORY <f5>

Creates a new directory entry. Select and use RENAME (see above) to change the directory name.

OPEN A NEW SHOW <f9>

Opens a brand new show.

SAVE SCENE AS



SET HOME DIR <f8>

Sets the HOME directory to the current directory. Pressing <-HOME-> will always return you to this directory.

SELECTION

The *Selection:* _____ field lets you enter the name of the Scene you wish to save the Scene as. The mouse may also be used to select an existing Scene name to save over. Simply click on the desired entry.



Entering or selecting a directory will cause the system to navigate to the selected directory and list the Scene available there. Select \.. to navigate up the directory tree.

RENAME <f1>

Selecting a file name or directory, edit it, then press this button to rename it to the new text.

DELETE<f4>

Deletes the currently selected file or directory. Directories must be empty to be deleted

EXIT <esc>

Returns to the main menu.

MORE <spacebar>

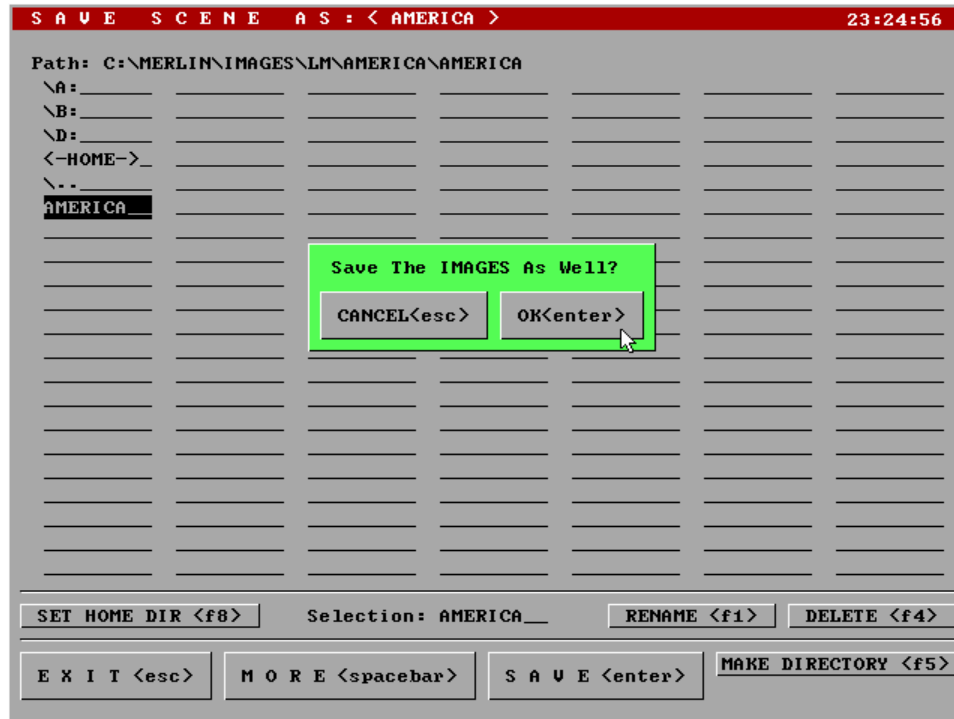
Lists more Scenes (if available).

SAVE/OPEN <enter>

Saves the entry or Opens the directory entered on the *Save Scene As* line.

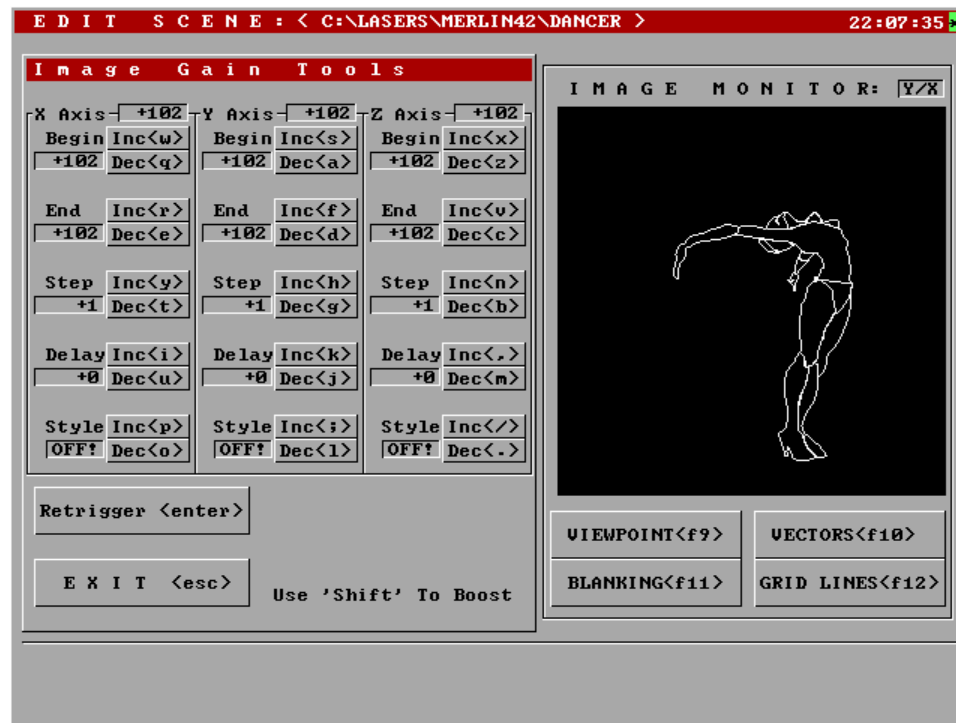
MAKE DIRECTORY <f5>

Creates a new directory entry. Select and use RENAME (see above) to change the directory name.



Note: SAVE AS will prompt you to ask if you want to save a new complete copy the underlying files (Images). This is useful if you plan to base a new Scene on an existing Scene. This way you can work on a copy and not change the original files.

EDIT SCENES: <F1> IMAGE GAIN TOOLS



These controls let you preprocess the Image gain before any of the Scene functionality takes effect. *Inc* increases a value, *Dec* decreases it.

X-Axis, Y-Axis and Z-Axis Controls

The *Begin* field Shows the beginning gain value for each axis of your Image.

The *End* field Shows the ending gain value for each axis of your Image.

The *Step* field Shows how large each step will be moving toward the End value.

The *Delay* field Shows the amount of “time” between each Step.

Note: The duration of delay is dependent upon the clock speed of your computer.

The *Style* field Shows the repeat style for an axis when it has reached the End value. There are three styles:

- Off** No action taken.
- >-: Run the action once, when it hits the ending value, stop.
- >-> Run the action, when it hits the ending value, repeat (loop).

General Controls

RETRIGGER <enter>

Replays the Scene.

EXIT <esc>

Returns to the Editing Screen.

Image Monitor: Y/X

A monitor showing the real-time display of the Scene as it runs.

VIEWPOINT <f9>

Toggles the monitor's viewpoint between X:Y and the X:Z perspectives

VECTORS <f10>

Toggles the monitor's display between vectors and points.

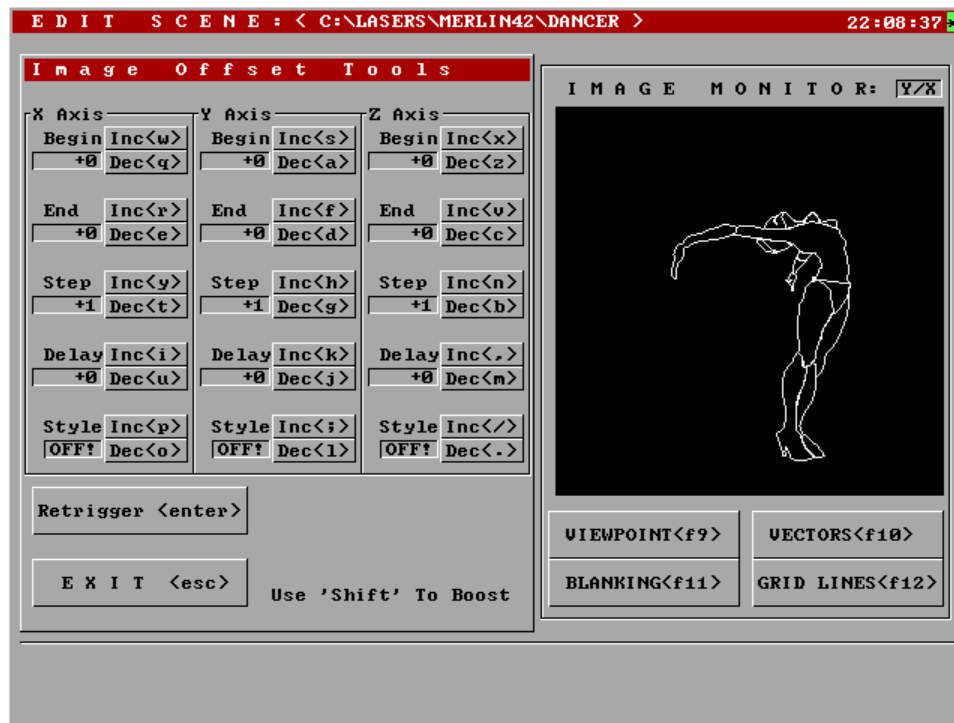
BLANKING<f11>

Toggles the monitor's blanking on or off. When off, blanking lines are displayed as grey points or vectors.

GRID LINE<f12>

Toggles the monitor's grid line overlay between off, large grid, or small grid.

EDIT SCENES: <F2> IMAGE OFFSET TOOLS



These controls let you preprocess the Image offset before any of the Scene functionality takes effect. *Inc* increases a value, *Dec* decreases it.

X-Axis, Y-Axis and Z-Axis Controls

The *Begin* field Shows the beginning offset value for each axis of your Image.

The *End* field Shows the ending offset value for each axis of your Image.

The *Step* field Shows how large each step will be moving toward the End value.

The *Delay* field Shows the amount of “time” between each Step. Note: The duration of delay is dependent upon the clock speed of your computer.

The *Style* field Shows the repeat style for an axis when it has reached the End value. There are three styles:

- Off** No action taken.
- >-: Run the action once, when it hits the ending value, stop.
- >-> Run the action, when it hits the ending value, repeat (loop).

General Controls

RETRIGGER <enter>

Replays the Scene.

EXIT <esc>

Returns to the Editing Screen.

Image Monitor: Y/X

A monitor showing the real-time display of the Scene as it runs.

VIEWPOINT <f9>

Toggles the monitor's viewpoint between X:Y and the X:Z perspectives

VECTORS <f10>

Toggles the monitor's display between vectors and points.

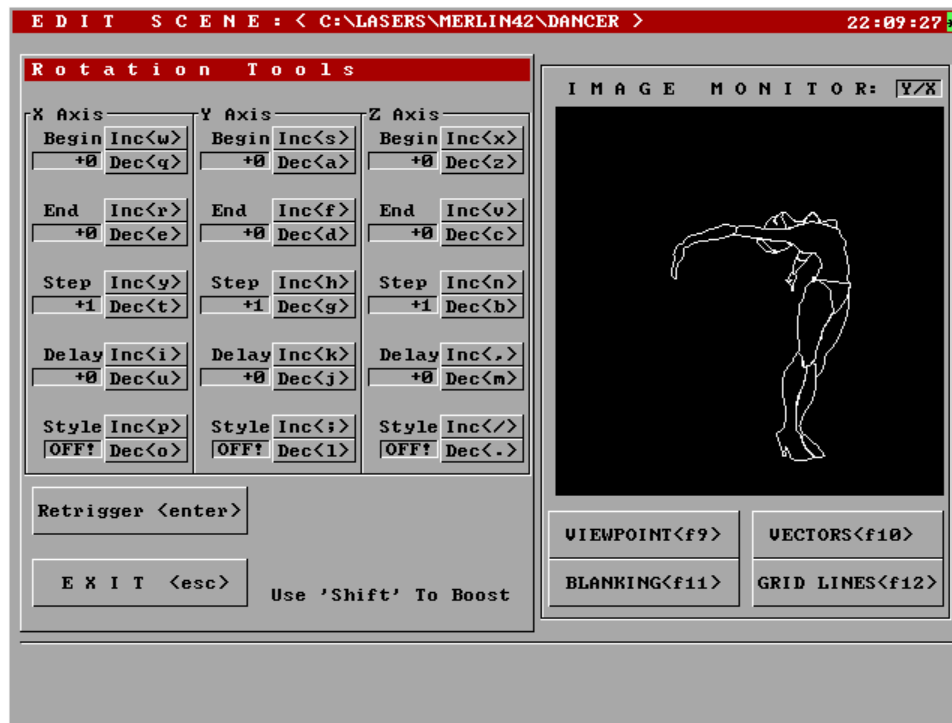
BLANKING<f11>

Toggles the monitor's blanking on or off. When off, blanking lines are displayed as grey points or vectors.

GRID LINE<f12>

Toggles the monitor's grid line overlay between off, large grid, or small grid.

EDIT SCENES: <F3> IMAGE ROTATION TOOLS



These controls let you process the Image rotation before any of the Scene functionality takes effect. *Inc* increases a value, *Dec* decreases it.

X-Axis, Y-Axis and Z-Axis Controls

The *Begin* field Shows the beginning rotation value for each axis of your Image.

The *End* field Shows the ending rotation value for each axis of your Image.

The *Step* field Shows how large each step will be moving toward the End value.

The *Delay* field Shows the amount of “time” between each Step. Note: The duration of delay is dependent upon the clock speed of your computer.

The *Style* field Shows the repeat style for an axis when it has reached the End value. There are three styles:

- Off** No action taken.
- >-: Run the action once, when it hits the ending value, stop.
- >-> Run the action, when it hits the ending value, repeat (loop).

General Controls

RETRIGGER <enter>

Replays the Scene.

EXIT <esc>

Returns to the Editing Screen.

Image Monitor: Y/X

A monitor showing the real-time display of the Scene as it runs.

VIEWPOINT <f9>

Toggles the monitor's viewpoint between X:Y and the X:Z perspectives

VECTORS <f10>

Toggles the monitor's display between vectors and points.

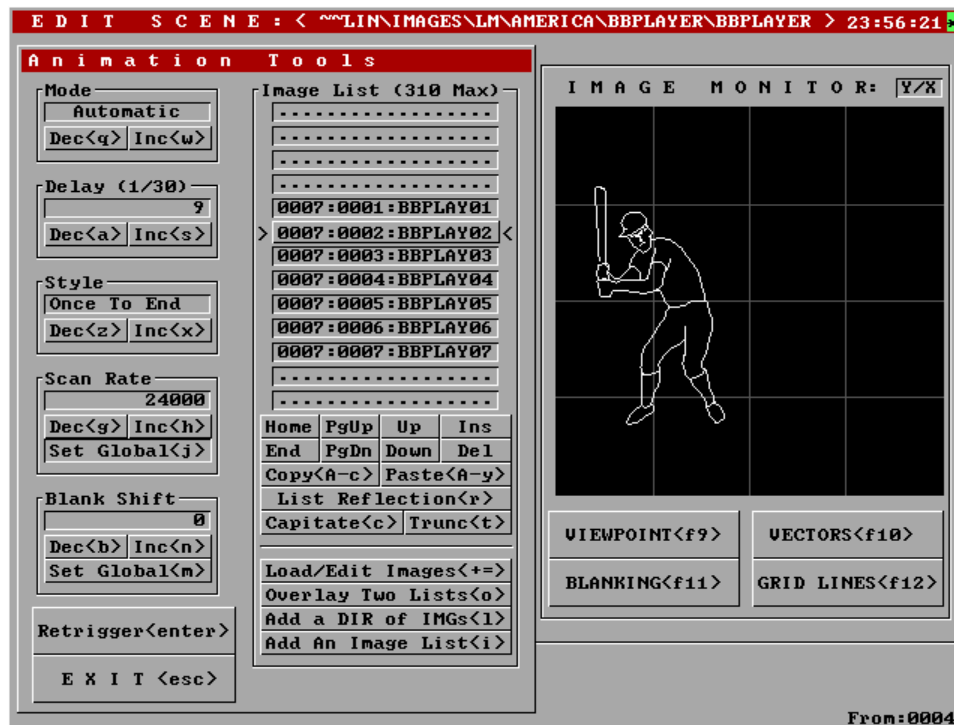
BLANKING<f11>

Toggles the monitor's blanking on or off. When off, blanking lines are displayed as grey points or vectors.

GRID LINE<f12>

Toggles the monitor's grid line overlay between off, large grid, or small grid.

EDIT SCENES: <F4> ANIMATION TOOLS



These controls let you process the Scene's Image animations.
Inc increases a value, *Dec* decreases it.

Mode Controls

The *Mode* field displays how the animation runs. The values are:

- Automatic** The Image animation runs automatically.
- Single Steps** The Image selection is via manual control.

Delay Controls

The *Delay* field displays the amount of "time" between each animation Image.

Note: The duration of delay is measured in 1/30 of a second.

Style Controls

The *Style* field Shows the repeat style for when the animation has reached the end. There are two styles:

- Loop to Start** Start the animation again from the first Image.
- Once to End** Run animation one time and then stop.

Scan Controls

The *Scan Rate* field Shows the current scanning rate. Selecting the *Set Global* control allows for global adjustment of the Image scanning rate for the entire animation sequence. This is useful for adjusting Image flicker.

Blank Shift

Normally done in the Image Editor or Setup Screens for individual Images, selecting the *Set Global* control allows for global adjustment of the Image blanking shift rate for the entire animation sequence, this control allows you to globally adjust the blanking shift for this animation.

Images List Controls

The Image List status line displays an Index of Images that are in a Scene, (*Total:Current*), as well as the Image name. Other controls provide a variety of functions for adding, deleting and editing the Image List. The currently active Image is indicated by the line containing the > < braces.

Home

Returns to the top of the list (the first Image that will play in the Scene).

End

Goes to the end of your list (the last Image that will play in the Scene).

PgUp

Scrolls up the list a page at a time (toward the first Image that will play in the Scene).

PgDn

Scrolls down the list a page at a time (toward the last Image that will play in the Scene).

Up

Scrolls up the list one entry at a time (toward the first Image that will play in the Scene).

Down

Scrolls down the list one entry at a time (toward the last Image that will play in the Scene).

Ins

Inserts a new Image.

Del

Deletes an Image. May be pasted back, see Paste below.

Copy <Alt-c>

Copy the current Image into the copy buffer. May be pasted back, see Paste below.

Paste <Alt-v>

Pastes the Image stored in the copy buffer due to a previous Copy or Del command. See above.

List Reflection<r>

Will reflect the list adding it at the end of the current list. If the list has entries 1,2,3,4 the new list will then be 1,2,3,4,4,3,2,1, Useful for reversing an animation or creating a bounce effect.

Capitate<c>

Deletes all list entries above the current edit point ><.

Truncate<t>

Deletes all list entries below the current edit point ><.

Load/Edit Images <+=>

Edits or changes the indicated (> <) Image entry on the list

Overlay Two List<m>

Loads and overlays an Image List from another Scene of your choosing. Each Image in the other Scene's Image List is combined with the Image at the same index. This has the effect of combining two images into one.

Add a DIR of IMGs<d>

Scans for all the Images in the current directory. Each Image is then added to the Image List.

Add a Image List<i>

Loads an Image List from another Scene of your choosing. Each Image in the other Scene's Image List is then added to the current Image List.

General Controls

RETRIGGER <enter>

Replays the Scene.

EXIT <esc>

Returns to the Editing Screen.

Image Monitor: Y/X

A monitor showing the real-time display of the Scene as it runs.

VIEWPOINT <f9>

Toggles the monitor's viewpoint between X:Y and the X:Z perspectives

VECTORS <f10>

Toggles the monitor's display between vectors and points.

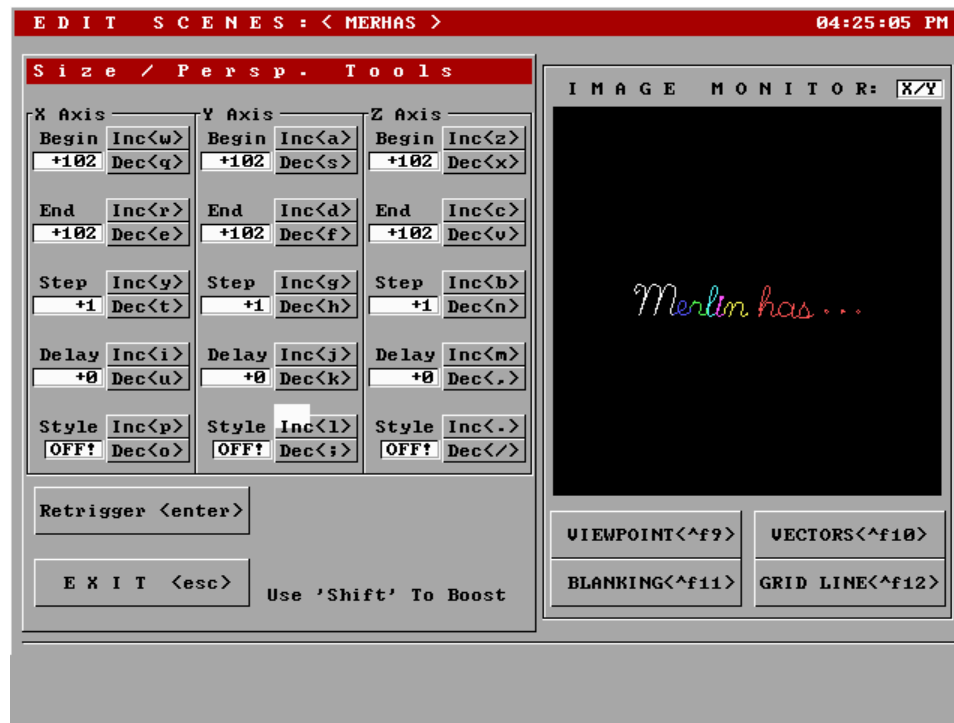
BLANKING<f11>

Toggles the monitor's blanking on or off. When off, blanking lines are displayed as grey points or vectors.

GRID LINE<f12>

Toggles the monitor's grid line overlay between off, large grid, or small grid.

EDIT SCENE: <F5> SIZE / PERSPECTIVE TOOLS



These controls process the Scene size and perspective after the Image gain, offset & rotation have taken effect. *Inc* increases a value, *Dec* decreases it.

X-Axis, Y-Axis and Z-Axis (Perspective) Controls

The *Begin* field Shows the beginning size value for each axis of your Image.

The *End* field Shows the ending size value for each axis of your Image.

The *Step* field Shows how large each step will be moving toward the End value.

The *Delay* field Shows the amount of “time” between each Step. Note: The duration of delay is dependent upon the clock speed of your computer.

The *Style* field Shows the repeat style for an axis when it has reached the End value. There are three styles:

- Off** No action taken.
- >-: Run the action once, when it hits the ending value, stop.
- >-> Run the action, when it hits the ending value, repeat (loop).

General Controls

RETRIGGER <enter>

Replays the Scene.

EXIT <esc>

Returns to the Editing Screen.

Image Monitor: Y/X

A monitor showing the real-time display of the Scene as it runs.

VIEWPOINT <f9>

Toggles the monitor's viewpoint between X:Y and the X:Z perspectives

VECTORS <f10>

Toggles the monitor's display between vectors and points.

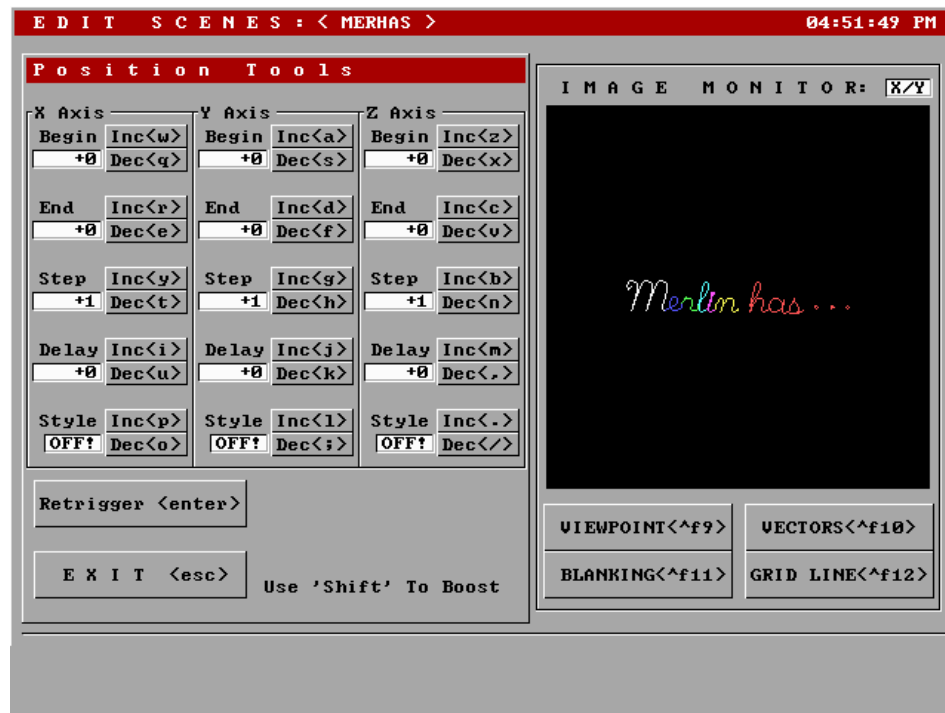
BLANKING<f11>

Toggles the monitor's blanking on or off. When off, blanking lines are displayed as grey points or vectors.

GRID LINE<f12>

Toggles the monitor's grid line overlay between off, large grid, or small grid.

EDIT SCENE: <F6> POSITION TOOLS



These controls process the Scene master position after the Image gain, offset & rotation functionality has taken effect. *Inc* increases a value, *Dec* decreases it.

X-Axis, Y-Axis and Z-Axis n

The *Begin* field Shows the beginning position value for each axis of your Image.

The *End* field Shows the ending position value for each axis of your Image.

The *Step* field Shows how large each step will be moving toward the End value.

The *Delay* field Shows the amount of “time” between each Step. Note: The duration of delay is dependent upon the clock speed of your computer.

The *Style* field Shows the repeat style for an axis when it has reached the End value. There are three styles:

- Off** No action taken.
- >:** Run the action once, when it hits the ending value, stop.
- >>** Run the action, when it hits the ending value, repeat (loop).

General Controls

RETRIGGER <enter>
Replays the Scene.

EXIT <esc>

Returns to the Editing Screen.

Image Monitor: Y/X

A monitor showing the real-time display of the Scene as it runs.

VIEWPOINT <f9>

Toggles the monitor's viewpoint between X:Y and the X:Z perspectives

VECTORS <f10>

Toggles the monitor's display between vectors and points.

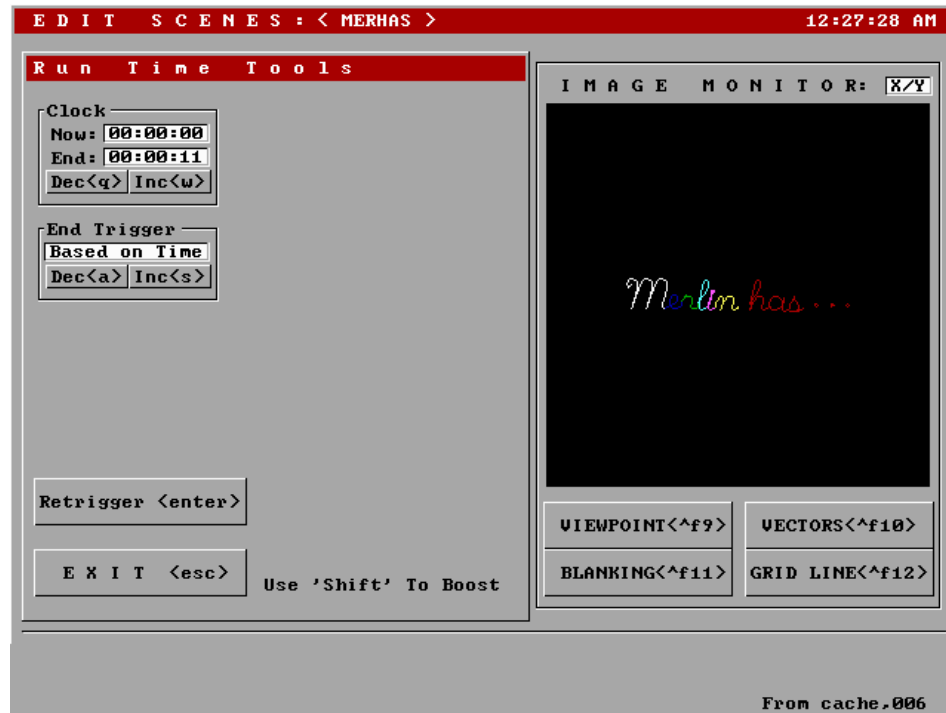
BLANKING<f11>

Toggles the monitor's blanking on or off. When off, blanking lines are displayed as grey points or vectors.

GRID LINE<f12>

Toggles the monitor's grid line overlay between off, large grid, or small grid.

EDIT SCENE: <F7> RUN TIME TOOLS



These controls process the Scene run time. *Inc* increases a value, *Dec* decreases it.

Clock Controls

The *Now* field displays how long the Scene has been running.

The *End* field value is the time when the Scene will end.

All times are in the format: *hours:minutes:seconds*.

End Trigger Controls

The *End Trigger* field displays what will trigger an end of Scene. The values are:

Disabled! Scene runs continuously.

Based on Time Scene ends when the clock *End* field value is reached.

Based on Data Scene ends when effects and animations are complete.

General Controls

RETRIGGER <enter>

Replays the Scene.

EXIT <esc>

Returns to the Editing Screen.

Image Monitor: Y/X

A monitor showing the real-time display of the Scene as it runs.

VIEWPOINT <f9>

Toggles the monitor's viewpoint between X:Y and the X:Z perspectives

VECTORS <f10>

Toggles the monitor's display between vectors and points.

BLANKING<f11>

Toggles the monitor's blanking on or off. When off, blanking lines are displayed as grey points or vectors.

GRID LINE<f12>

Toggles the monitor's grid line overlay between off, large grid, or small grid.

IMAGES <F4>

EDIT IMAGES

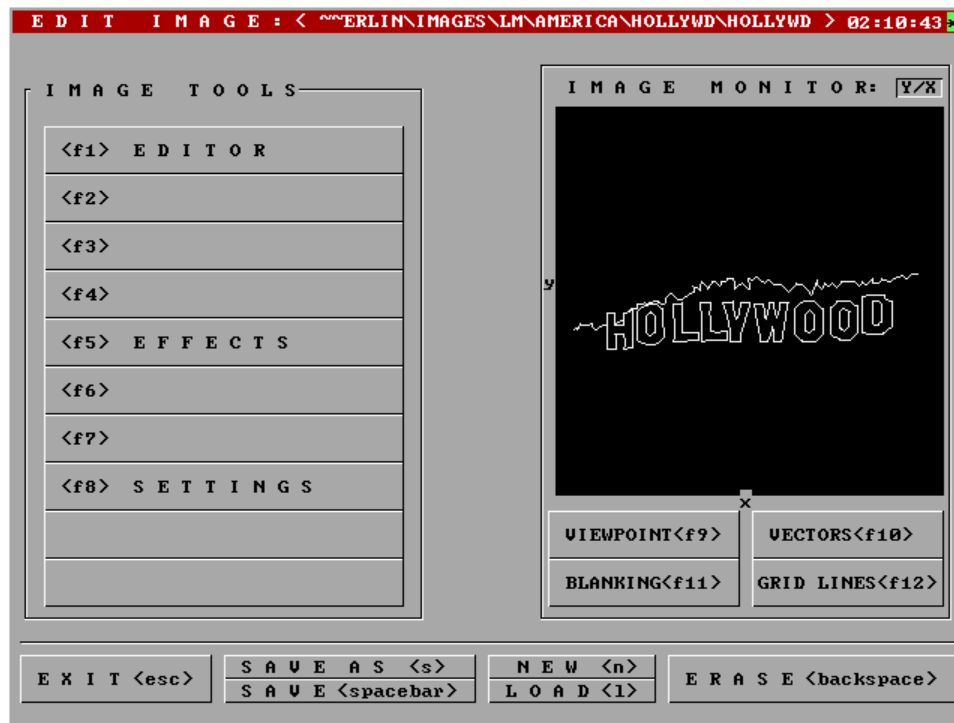


Image Tools

The Image Tools allow for adjustment of Points, Size/Position, Effects, Shapes, Lissajous, Text & Fonts, and Clear All. The desired tool may be selected either with a mouse, or by choose the key command that appears within the <>.

<f1> EDITOR

Controls the editing of an Image with a complete set of editing tools..

<f5> Effects

Controls several special effects which can be applied to an Image

<f8> Settings

Controls system settings.

Bottom Bar

EXIT <esc>

Returns to the main Merlin screen.

SAVE AS <s>

Launches the *Save Image As* screen to save this Image under a different name.

SAVE <spacebar>

Saves the current Image.

NEW <n>

Creates a new Image. This can also be done from the Load Image screen.

LOAD <l>

Launches *Load Image* screen to pick an Image to load

ERASE <backspace>

PERMANENTLY deletes the currently displaying Image from the disk. You will be prompted for confirmation BEFORE any permanent action takes place.

Image Monitor

A monitor Showing the real-time display of the Image as it runs.

VIEWPOINT <f9>

Toggles the monitor's viewpoint between X:Y and the X:Z perspectives.

VECTORS <f10>

Toggles the monitor's display between vectors and points.

BLANKING<f11>

Toggles the monitor's blanking on or off. When off, blanking lines are displayed as grey points or vectors.

GRID LINE<f12>

Toggles the monitor's grid line overlay between off, large grid, or small grid.

LOAD IMAGES



SET HOME DIR <f8>

Sets the HOME directory to the current directory. Pressing <-HOME-> will always return you to this directory.

SELECTION

The *Selection:* _____ field lets you enter the name of the Image you wish to load. The mouse may also be used to select the Image to display. Simply click on the desired entry.



Entering or selecting a directory will cause the system to navigate to the selected directory and list the Images available there. Select \.. to navigate up the directory tree.

RENAME <f1>

Selecting a file name or directory, edit it, then press this button to rename it to the new text.

DELETE<f4>

Deletes the currently selected file or directory. Directories must be empty to be deleted.

EXIT <esc>

Returns to the main menu.

MORE <spacebar>

Lists more Images (if available).

LOAD/OPEN <enter>

Loads the entry or Opens the directory entered on the *Load Image* line. If this entry is blank a *New Image* is assumed.

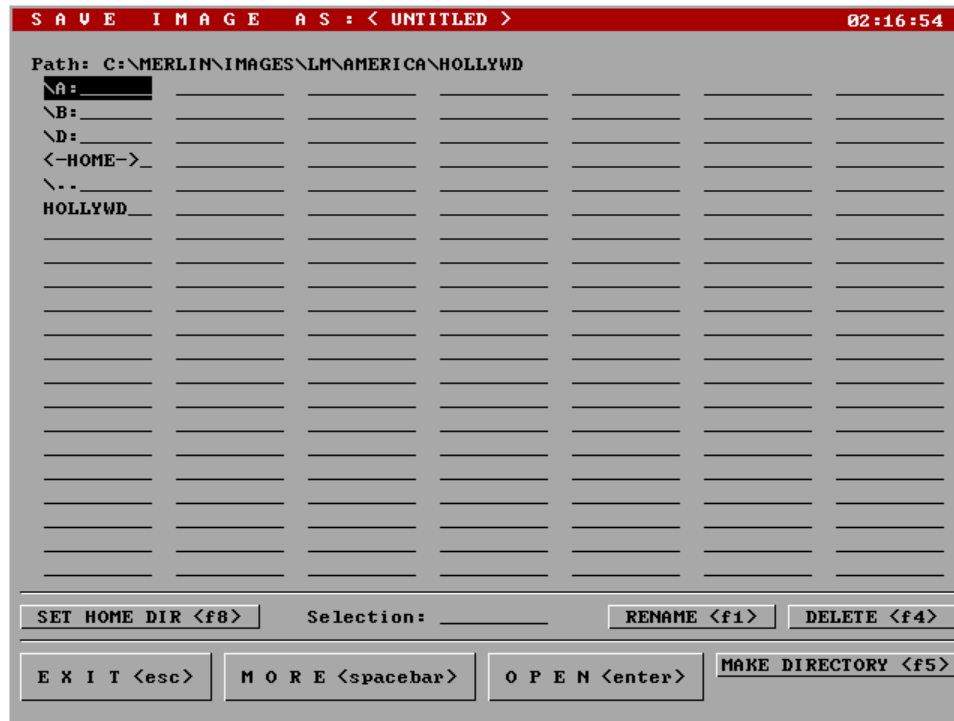
MAKE DIRECTORY <f5>

Creates a new directory entry. Select and use RENAME (see above) to change the directory name.

OPEN A NEW IMAGE <f9>

Opens a brand new show.

SAVE IMAGE AS



SET HOME DIR <f8>

Sets the HOME directory to the current directory. Pressing <-HOME-> will always return you to this directory.

SELECTION

The *Selection:* _____ field lets you enter the name of the Image you wish to save the Image As. The mouse may also be used to select an existing Image name to save over. Simply click in the desired entry.



Entering or selecting a directory will cause the system to navigate to the selected directory and list the Images available there. Select \ .. to navigate up the directory tree.

RENAME <f1>

Selecting a file name or directory, edit it, then press this button to rename it to the new text.

DELETE<f4>

Deletes the currently selected file or directory. Directories must be empty to be deleted.

EXIT <esc>

Returns to the main menu.

MORE <spacebar>

Lists more Images (if available).

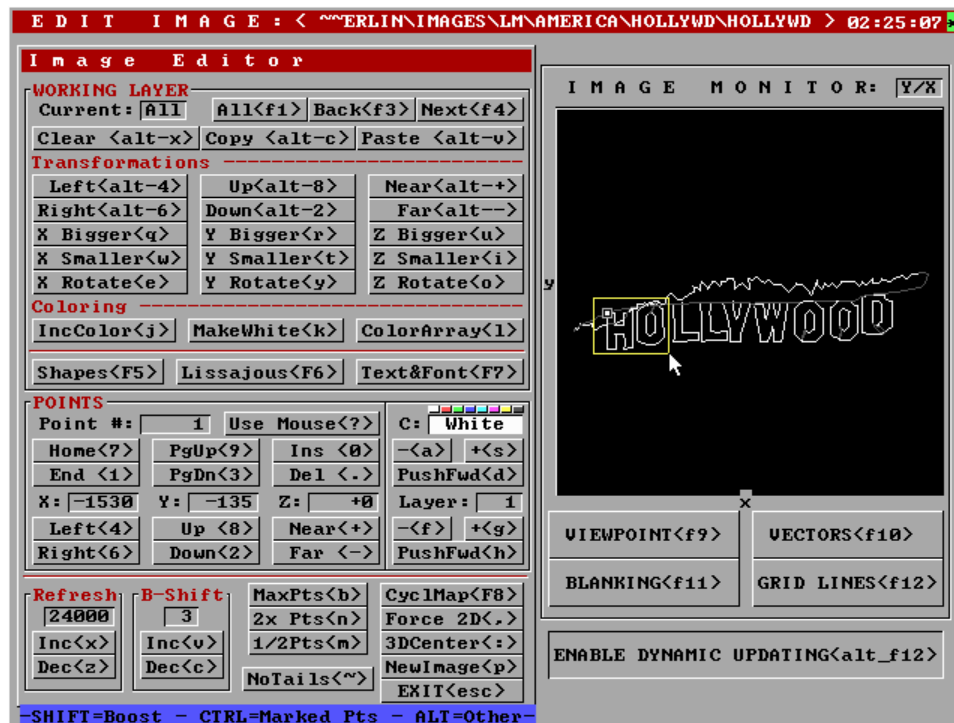
SAVE/OPEN <enter>

Saves the entry or Opens the directory entered on the *Save Image As* line. If this entry is blank a *New Image* is assumed.

MAKE DIRECTORY <f5>

Creates a new directory entry. Select and use RENAME (see above) to change the directory name.

EDIT IMAGES: < F1> IMAGE EDITOR



An Image is created by drawing a series of points - much like the child's game "connect the dots". The laser will then retrace the points in the order that they were drawn. When the laser reaches the last point it will loop back to the first point. If the laser is programmed to refresh fast enough, then this stream of points of light will blur giving the illusion of a solid line. On the other hand, if you want to create distinct beams of light, you may deliberately want the laser to redraw (refresh) the points slowly in a staccato fashion--as if points of light were streaking across the sky.

When you use the Point Editor you are drawing your Image point by point.

Remember that laser scanners are mechanical systems with relatively high mass. Often the scanners will not be able to track an Image as initially drawn--it will require adjustment of the number of Points or the Refresh speed to achieve a professional result.

Initially all of the points in a Images are drawn on one Layer. However an Image can have multiple Layers. This is useful for drawing different parts of an Image that you desire to manipulate individually on each layer. Points may be drawn directly or pasted into the other Layers. Use the Layer controls to change the active Layer. There is one special layer called the LIS Layer. This Layer is where the Lissajous points live so they may be adjusted dynamically. Do not place any other points in this Layer.

WORKING LAYER

These controls are used to select one of the individual Layers of the Image for point editing. The ALL setting display all Layers at once. The LIS layer is a special Layer which is actively updated by the Analog Lissajous Generator if used.

All <f1>

Sets the active Layer to All.

Back <f3>

Sets the active Layer to the previous Layer. It will cycle around if necessary.

Next <f4>

Sets the active Layer to the previous Layer. It will cycle around if necessary.

Clear <alt-x>

Clears out any current layer stored in the copy buffer.

Copy <alt-c>

Copies the current layer or ALL layers into the copy buffer.

Paste <alt-v>

Pastes the copy buffer into the current layer. Note ALL will default to Layer 1.

Transformations

These controls are used to Transform the entire Image (ALL) or Image Layer

Left <alt-4>

Moves the Layer Points to the left.

Right <alt-6>

Moves the Layer Points to the right.

X-Bigger <q>

Makes the Layer Points larger in the X axis.

X-Smaller <w>

Makes the Layer Points smaller in the X axis.

X-Rotate <e>

Rotates the Layer Points around the X axis.

Up <alt-8>

Moves the Layer Points up.

Down <alt-2>

Moves the Layer Points down.

Y-Bigger <r>

Makes the Layer Points larger in the Y axis.

Y-Smaller <t>

Makes the Layer Points smaller in the Y axis.

Y-Rotate <y>

Rotates the Layer Points around the Y axis.

Near <alt-+>

Moves the Layer Points nearer.

Far <alt-->

Moves the Layer Points farther.

Z-Bigger <u>

Makes the Layer Points larger in the Z axis.

Z-Smaller <i>

Makes the Layer Points smaller in the Z axis.

Z-Rotate <o>

Rotates the Layer Points around the Z axis.

Coloring

These controls affect the Coloring of the entire Image (ALL) or Image Layer

IncColor<j>

Cycles the current Layers through the available colors except black.

MakeWhite<k>

Makes the current Layer WHITE.

ColorArray<j>

Cycles the current Layer through three possible RAINBOW colorations.

OBJECTS (----)

These controls create specialized objects including Shapes, Lissajous and Text.

Shapes<F5>

Brings up the Shapes editor for shape creation.

Lissajous <F6>

Brings up the Lissajous editor for lissajous creation.

Text&Font<F7>

Brings up the Text&Font editor for text creation.

POINTS

These controls are used to edit individual Points. Groups of points may also be manipulated if they are selected with the Mouse. As you create or edit a Point, the *Point #:*_____ field displays the Point you are currently working on. It starts on Point 1 by default but may be moved to any Point within an Image.

Use the following controls:

Home <7>

Moves the editor to the first Point in the Image.

End <1>

Moves the editor to the last Point in an Image.

PgUp <9>

Moves the editor forward one Point in an Image.

PgDn <3>

Moves the editor backward one Point in the Image.

Ins <0>

Inserts a new point at the current Point.

Del <.>

Deletes the current Point.

Use Mouse <?>

Pressing this button toggles Mouse (if used) drawing on and off. When on, the current Point's Horizontal (X) and Vertical (Y) position is determined by the mouse. Moving the mouse moves the current Point in the Image Monitor.



Note: Pressing mouse button one (left) inserts a point at the current position. Pressing mouse button two (right) inserts a continuous stream of points as long as the button is pressed. In addition, the regular mouse selection of the other controls is disabled until mouse drawing mode is exited <ESC>.

X,Y & Z (Horizontal, Vertical and Depth) Fields

The X,Y & Z (Horizontal, Vertical and Depth) fields Show the position values for the current Point (refer to **Point #:** above). Any change of position of the Point will be reflected in these readouts and in the Image Monitor.

Left <4>

Moves the Point left.

Right <6>

Moves the Point right.

Up<8>

Moves the Point up.

Down<2>

Moves the Point down.

Near<+>

Moves the Point toward the user.

Far<->

Moves the Point away from the user.



Note: +/- Depth (Z) changes cannot be seen on the monitor unless the Viewpoint <f9>is changed.

Color Field

The C: field Shows the color value for the current Point (refer to **Point #:** above). Any change of color of the Point will be reflected in these readouts and in the Image Monitor.

- <a>

Decrements the color value which changes the Point's color.

+ <s>

Increments the color value which changes the Point's color.

PushFwd <d>

Pushes the current Point's color onto the next Point.

Layer Field

The **Layer:** field Shows the layer value for the current Point (refer to **Point #:** above). Any change to the layer of the Point will be reflected in these readouts and in the Image Monitor.

- <f>

Decrements the layer value which changes the Point's layer.

+ <g>

Increments the layer value which changes the Point's layer.

PushFwd <h>

Pushes the current Point's layer onto the next Point.

Refresh Controls

The **Refresh** field displays the relative speed that the Image is refreshed. Remember that there is a tradeoff between the total number of Points and the refresh speed.

Inc <x>

Makes the Image display faster.

Dec <z>

Makes the Image display slower.

Blanking Shift Controls

The **B-Shift** field displays the relative delay that the Image Blanking is offset. This is used to compensate for differences in systems with galvo or high speed AO blanking. Generally this is set globally in the main Setting screen

Inc <v>

Makes the Image display faster.

Dec <c>

Makes the Image display slower.

Sampling Controls

Max Pts

The Image is re-sampled to maximum Merlin Point resolution -smoothing out the Image. This is useful for cleaning up unevenly drawn Images as well as vector drawn Images.

2x Pts <n>

The Image is re-sampled to twice its original Point count. This is useful for increasing under-drawn Images. This is often useful instead jumping right to **Max Pts**.

1/2Pts <m>

The Image is re-sampled so it is reduced to ½ of its original point count. This is useful for shrinking over-drawn Images. This is often useful following a **Max Pts**.

NoTails Control

NoTails <~>

Sometimes there are visible "tails" between objects. This control eliminates them by inserting extra blanking points to "tack down" the offending ends.

Cycle Color Map Control

CyclMap<F8.>

Sometimes the Images was imported fro a system with a different color map. This control allows you to cycle the color map.

Force 2D Control**Force 2D<>**

Forces the images to be a flat 2D representation. Normally, Images drawn in Merlin are 3D in nature. Sometimes, such as in the case of an imported Image, it is desirable to normalize the Z dimension. This process reduces a 3D Image to 2D one.

3D Center Control**3DCenter<:>**

Forces the images to be a centered within all 3 axis.

Miscellaneous Controls**NewImage<p>**

Creates a new Image.

EXIT <esc>

Returns to the main menu.

Image Monitor: Y/X

A monitor Showing the real-time display of the Scene as it runs.

VIEWPOINT <f9>

Toggles the monitor's viewpoint between X:Y and the X:Z perspectives

VECTORS <f10>

Toggles the monitor's display between vectors and points.

BLANKING<f11>

Toggles the monitor's blanking on or off. When off, blanking lines are displayed as grey points or vectors.

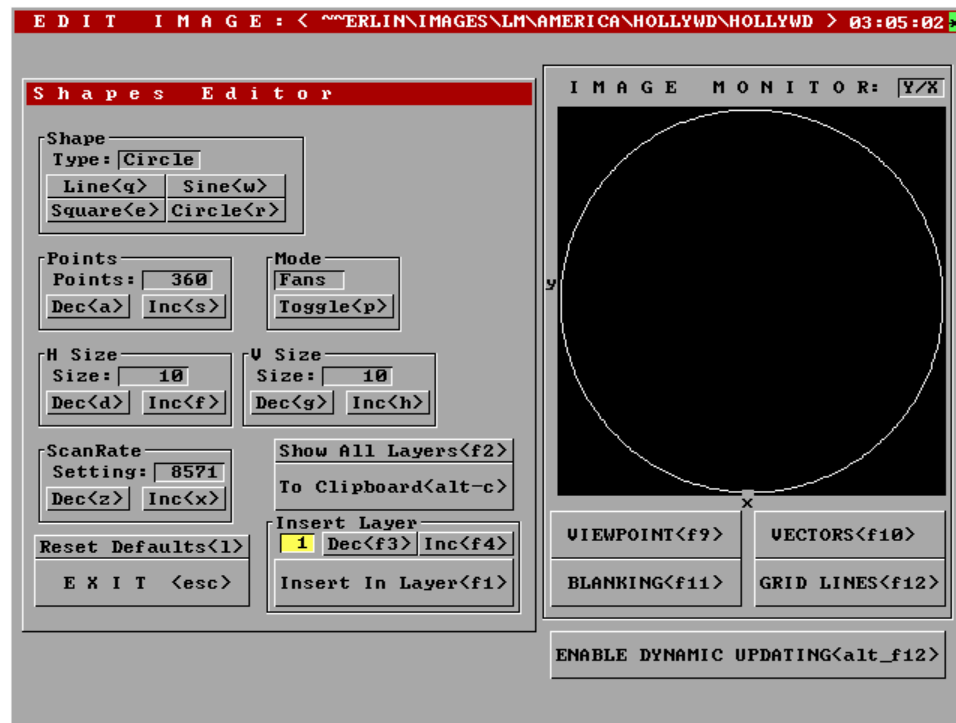
GRID LINE<f12>

Toggles the monitor's grid line overlay between off, large grid, or small grid.

ENABLE DYNAMIC UPDATING <alt_f12>

Toggles real-time viewing mode on/off, useful for freezing dynamic images such as Lissajous patterns.

EDIT IMAGES:IMAGE EDITOR < F5> SHAPE EDITOR



The Shape Editor allows for the creation of standard geometric Shapes.

Shape Controls

Selects the desired geometric shape.

Line <q>

Selects a Line.

Sine <w>

Selects a Sine.

Square <e>

Selects a Square.

Circle <r>

Selects a Circle.

Points Controls

Controls the number of Points contained within the Shape.

Dec <a>

Decrements the number of Points within the Shape.

Inc <s>

Increments the number of Points within the Shape.

Mode Controls

Toggle <p>

Toggles the Shape sides between FAN (solid) mode and BEAM mode

Size Controls

Controls the horizontal and vertical size of the Shape.

Dec <g>

Decrements the Shape's horizontal size.

Inc <h>

Increments the Shape's horizontal size.

Dec <g>

Decrements the Shape's vertical size.

Inc <h>

Increments the Shape's vertical size.

ScanRate Controls

Controls the scanning rate of the Shape.

Dec <z>

Decrements the Shape's scan rate.

Inc <x>

Increments the Shape's scan rate.

Insert Layer Controls

The readout window shows the current insert Layer. Green indicates empty. Yellow indicated the presence of Points in that layer.

Dec<f3>

Decrements the insert Layer. It will wrap back to the top when appropriate.

Inc<f4>

Increments the insert Layer. It will wrap back to the top when appropriate.

Insert In Layer<f1>

Writes the current Shape Image into the current Insert Layer.

General Controls

Show All Layers <f2>

Toggles visibility of other Layers on or off.

To Clipboard<alt-c>

Copies the Base Image to the Clipboard.

Reset Defaults<l>

Resets the Shape Editor to it's initial settings

EXIT <esc>

Returns to the main menu.

Image Monitor: Y/X

A monitor Showing the real-time display of the Scene as it runs.

VIEWPOINT <f9>

Toggles the monitor's viewpoint between X:Y and the X:Z perspectives

VECTORS <f10>

Toggles the monitor's display between vectors and points.

BLANKING<f11>

Toggles the monitor's blanking on or off. When off, blanking lines are displayed as grey points or vectors.

GRID LINE<f12>

Toggles the monitor's grid line overlay between off, large grid, or small grid.

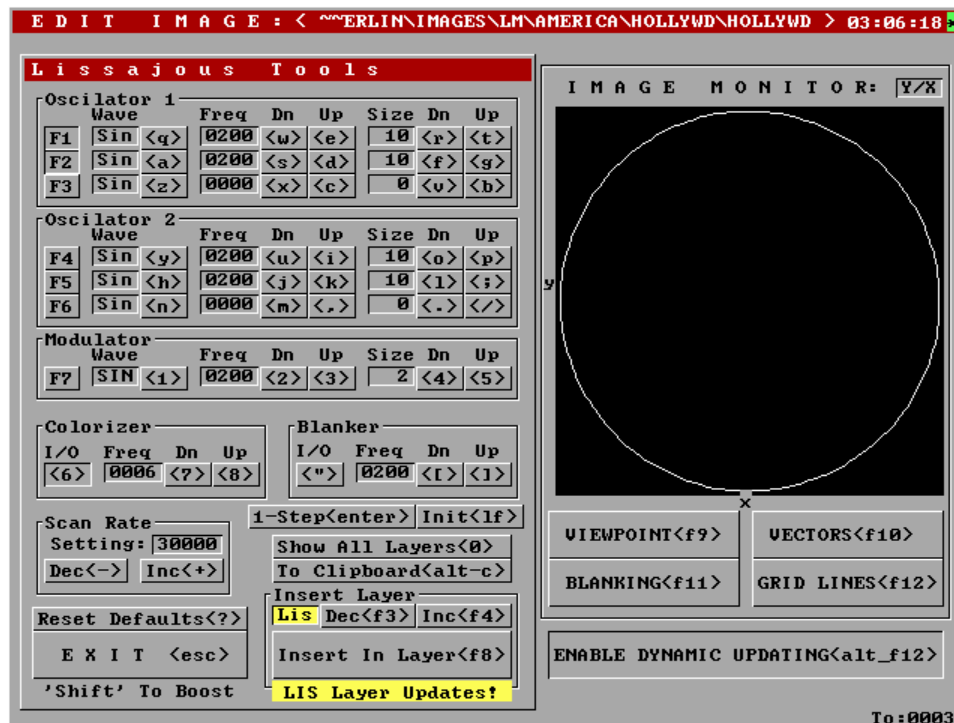
ENABLE DYNAMIC UPDATING <alt_f12>

Toggles real-time viewing mode on/off, useful for freezing dynamic images such as Lissajous patterns.



Note: Pressing SHIFT will boost values between high & low settings, CTRL causes the application to only mark points, and ALT activates any alternate functions.

EDIT IMAGES:IMAGE EDITOR: < F6> LISSAJOUS EDITOR



The Lissajous Editor allows for the creation of various real-time, dynamic, moving “spirographic” shapes.

Oscillator 1 Controls

Controls the parameters of Oscillator 1.

Power

F1, F2, F3

Selects power to the associated oscillator channel.

Wave

<q>, Wave <a>, Wave <z>

Selects the associated oscillator channel’s waveform.

Frequency

Dn <w>, Dn <s>, Dn <x>

Decrements the associated oscillator channel’s frequency.

Up <e>, Up <d>, Up <c>

Increments the associated oscillator channel’s frequency

Size**Dn <t>, Dn <f>, Dn <v>**

Decrements the associated oscillator channel's size.

**Up <t>, Up <g>, Up **

Increments the associated oscillator channel's size.

Oscillator 2 Controls

Controls the parameters of Oscillator 2.

Power**F1, F2, F3**

Selects power to the associated oscillator channel.

Wave**<y>, <h>, <n>**

Selects the associated oscillator channel's waveform.

Frequency**Dn <u>, <j>, <m>**

Decrements the associated oscillator channel's frequency.

Up <i>, Up <k>, Up <v>

Increments the associated oscillator channel's frequency

Size**Dn <o>, Dn <l>, Dn <v>**

Decrements the associated oscillator channel's size.

Up <p>, Up <g>, Up <v>

Increments the associated oscillator channel's size.

*Note: Z Axis- changes may not be seen on the monitor unless the view is changed.****Modulator Controls***

Controls the parameters of Modulator for Oscillator 1

Power**F7**

Selects power to the associated oscillator channel.

Waveform**Wave <1>**

Selects the modulator oscillator's waveform.

Frequency**Dn <2>**

Decrements the modulator oscillator's frequency.

Up <3>

Increments the modulator oscillator's frequency.

Size**Dn <4>**

Decrements the modulator oscillator's size.

Up <5>

Increments the modulator oscillator's size.

Colorizer Controls

Controls the parameters of Color Oscillator

I/O**<6>**

Selects power to the associated oscillator channel.

Frequency**Dn <7>**

Decrements the color oscillator frequency.

Up <8>

Increments the color oscillator frequency.

Blanker Controls**I/O****<">**

Selects power to the associated oscillator channel.

Frequency**Dn <|>**

Decrements the blanker oscillator frequency.

Up <|>

Increments the blanker oscillator frequency.

ScanRate Controls

Controls the scanning rate of the Shape.

Dec <->

Decrements the Shape's scan rate.

Inc <+>

Increments the Shape's scan rate.

Insert Layer Controls

The readout window

The readout window shows the current insert Layer. Green indicates empty layer. Yellow indicated the presence of Points in that layer.

Dec<f3>

Decrements the insert Layer. It will wrap back to the top when appropriate.

Inc<f4>

Increments the insert Layer. It will wrap back to the top when appropriate.

Insert In Layer<f8>

Writes the current Shape Image into the current Insert Layer.

General Controls

1-Step<enter>

Steps the Lissajous sequence generator along a tick at a time when it is not Dynamically Updating.

Init<lf>

Resets the Lissajous generator's sequence to Start.

Show All Layers <0>

Toggles visibility of other Layers on or off.

To Clipboard<alt-c>

Copies the Lissajous Image to the Clipboard.

Reset Defaults<?>

Resets the Shape Editor values to their initial settings

EXIT <esc>

Returns to the main menu.

Image Monitor: Y/X

A monitor Showing the real-time display of the Scene as it runs.

VIEWPOINT <f9>

Toggles the monitor's viewpoint between X:Y and the X:Z perspectives

VECTORS <f10>

Toggles the monitor's display between vectors and points.

BLANKING<f11>

Toggles the monitor's blanking on or off. When off, blanking lines are displayed as grey points or vectors.

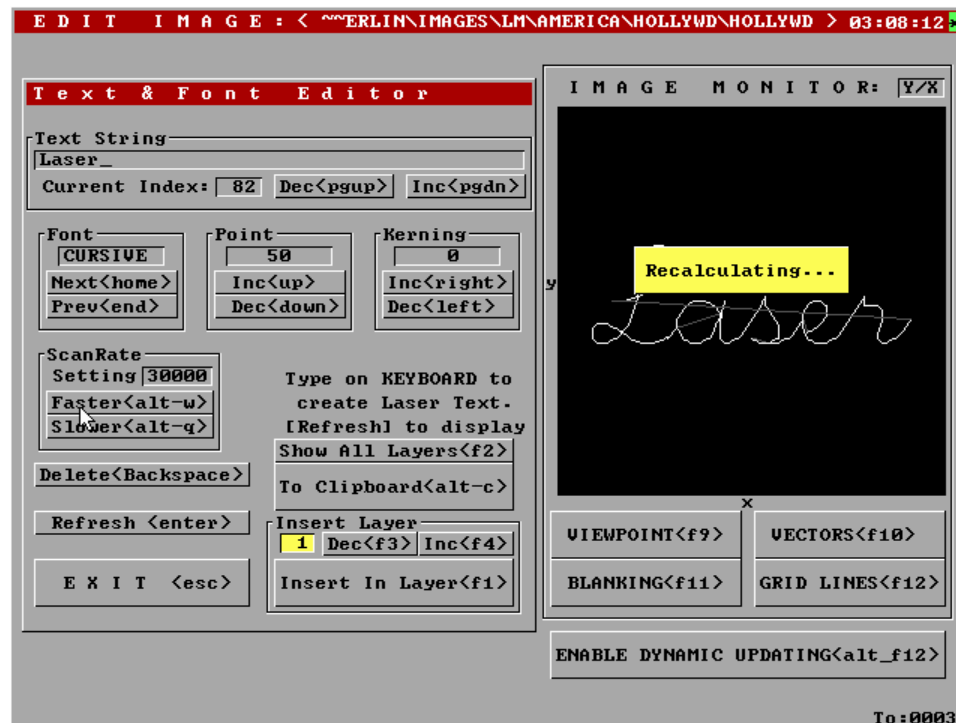
GRID LINE<f12>

Toggles the monitor's grid line overlay between off, large grid, or small grid.

ENABLE DYNAMIC UPDATING <alt_f12>

Toggles real-time viewing mode on/off, useful for freezing dynamic images such as Lissajous patterns.

EDIT IMAGES:IMAGE EDITOR: < F7> TEXT & FONT EDITOR



The Text & font Editor allows for the creation of Text Images.

Text Controls

The **Text String** field Shows the current text string. Up to 16 characters may be entered.

Index Controls

The **Current Index** control helps to select “unprintable” but legal character from the font or that are hard to generate from the keyboard. The value Shown is the current font index in the ASCII table.

Dec <pgup>

Selects the previously available character.

Inc <pgdn>

Selects the next available character.

Font Controls

The **Font** field Shows the current font family.

Next <home>

Selects the next available font.

Prev <end>

Selects the previously available font.

Point Controls

The **Size** field Shows the current font size.

Inc <up>

Increments the fonts Point size.

Dec <down>

Decrements the fonts Point size.

Kerning Controls

The **Kerning** field displays the relative letter spacing between the letters.

Inc <right>

Makes the font spacing wider.

Dec <left>

Makes the font spacing narrower.

ScanRate Controls

The **Setting** field displays the relative speed that the Image is refreshed.

Faster <alt-w>

Makes the font display faster.

Slower <alt-q>

Makes the font display slower.

Insert Layer Controls

The readout window shows the current insert Layer. Green indicates empty. Yellow indicated the presence of Points in that layer.

Dec<f3>

Decrements the insert Layer. It will wrap back to the top when appropriate.

Inc<f4>

Increments the insert Layer. It will wrap back to the top when appropriate.

Insert In Layer<f1>

Writes the current Shape Image into the current Insert Layer.

General Controls

Delete<backspace>

Deletes the current Letter.

Refresh<enter>

Refreshes the display with the current text string.

Show All Layers <f2>

Toggles visibility of other Layers on or off.

To Clipboard<alt-c>

Copies the Lissajous Image to the Clipboard.

Reset Defaults<l>

Resets the Shape Editor values to their initial settings

EXIT <esc>

Returns to the main menu.

Image Monitor: Y/X

A monitor Showing the real-time display of the Scene as it runs.

VIEWPOINT <f9>

Toggles the monitor's viewpoint between X:Y and the X:Z perspectives

VECTORS <f10>

Toggles the monitor's display between vectors and points.

BLANKING<f11>

Toggles the monitor's blanking on or off. When off, blanking lines are displayed as grey points or vectors.

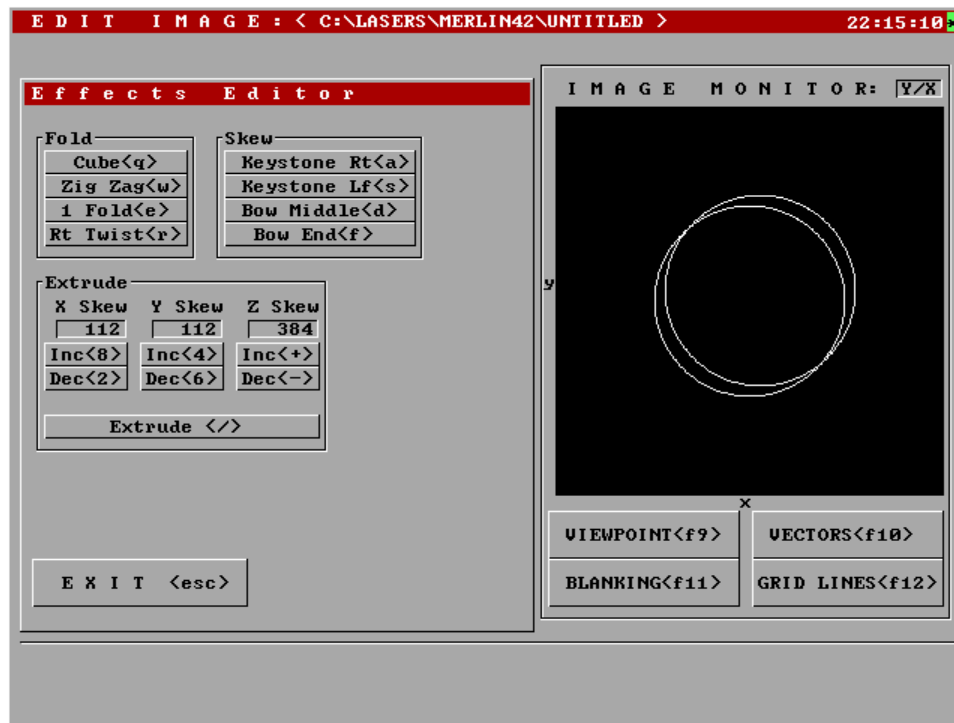
GRID LINE<f12>

Toggles the monitor's grid line overlay between off, large grid, or small grid.

ENABLE DYNAMIC UPDATING <alt_f12>

Toggles real-time viewing mode on/off, useful for freezing dynamic images such as Lissajous patterns.

EDIT IMAGES: < F5>: EFFECTS EDITOR



Use these commands to create several effects in the existing Image including folds, skews and extrusions.

Folds Controls

Controls the folding of the Image in 3D space.

Cube <q>

Folds the Image around a cube.

Zig Zag <w>

Folds the Image in a zig zag pattern.

1 Fold <e>

Folds the right side of the Image back.

Rt Twist <r>

Twists the right side back.



Note: Z Axis- changes may not be seen on the monitor unless the view is changed.

Skews Controls

Controls the skewing of the Image in 3D space.

Keystone Rt <a>

Keystone the Image: left smaller & right larger.

Keystone Lf <s>

Keystone the Image: left larger & right smaller.

Bow Middle <d>

Bows Image: middle larger & ends smaller.

Bow Ends <f>

Bows Image: middle smaller & ends larger.



Note: Z Axis- changes may not be seen on the monitor unless the view is changed.

Extrude Controls

Controls the extruding of the Image in 3D space. The **X, Y & Z** fields Show the extrusion amounts expressed in point sizes.

Inc <8>

Increases the extrusion on the x axis.

Dec <2>

Decreases the extrusion on the x axis.

Inc <4>

Increases the extrusion on the y axis.

Dec <6>

Decreases the extrusion on the y axis.

Inc <+>

Increases the extrusion on the z axis.

Dec <->

Decreases the extrusion on the z axis.

Extrude </>

Applies the desired extrusion settings.



Note: Z Axis- changes may not be seen on the monitor unless the view is changed.

General Controls

EXIT <esc>

Returns to the main menu.

Image Monitor: Y/X

A monitor Showing the real-time display of the Scene as it runs.

VIEWPOINT <f9>

Toggles the monitor's viewpoint between X:Y and the X:Z perspectives

VECTORS <f10>

Toggles the monitor's display between vectors and points.

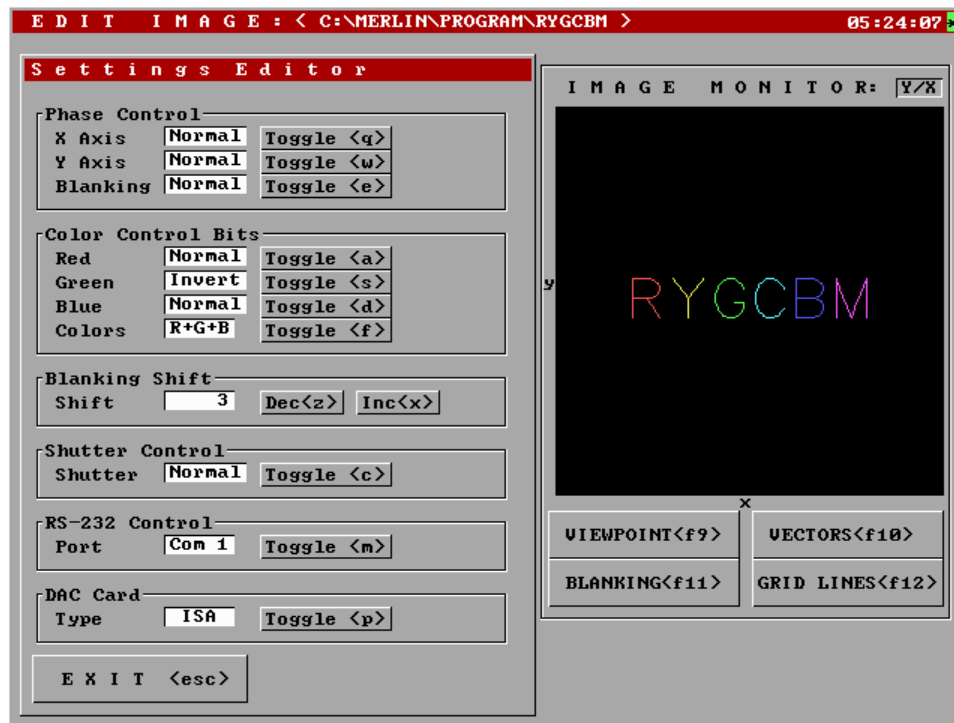
BLANKING<f11>

Toggles the monitor's blanking on or off. When off, blanking lines are displayed as grey points or vectors.

GRID LINE<f12>

Toggles the monitor's grid line overlay between off, large grid, or small grid.

EDIT IMAGES: < F8>: SETTINGS EDITOR



Use these commands to create several effects in the existing Image including folds, skews and extrusions.

Phase Controls

Controls the phase of the Image X,Y & Blanking axis to accommodate different projectors and rear screen installation.

X Axis Toggle <q>

Toggles the phase of the Image's X axis.

Y Axis Toggle <w>

Toggles the phase of the Image's Y axis.

Blanking Toggle <e>

Toggles the phase of the Image's Blanking

Color Control Bits Controls

Controls the phase of the Image's Color Control Bit lines to accommodate different laser setups.

Red Toggle <a>

Toggle the phase of the Image's Red bit line.

Green Toggle <s>

Toggle the phase of the Image's Green bit line.

Blue Toggle <d>

Toggle the phase of the Image's Blue bit.

Colors Toggle <f>

Toggle the color pallet according to the number of lasers in the projectors.

Blanking Shift Controls

Controls the default amount of the Image's Blanking Shift. This setting causes a shift in the Image's Blanking, to compensate for faster (AO) and slower (galvo) blanking technology setups.

Shift Inc <z>

Increase the blanking shift for the Image.

Shift Dec <x>

Decrease the blanking shift for the Image.



Note: Z Axis- changes may not be seen on the monitor unless the view is changed.

Shutter Controls

Controls the phase of the Image's Shutter Control Bit line to accommodate different laser setups.

Shutter Toggle <c>

Toggle the phase of the Image's Shutter bit line.

RS-232 Controls

Controls the default communication port to use for RS-232 control.

Toggle <m>

Toggle the source port of the Image's RS-232 control.

DAC Card Controls

Controls the default DAC card setting.

Toggle <p>

Toggle the DAC card settings.

General Controls

EXIT <esc>

Returns to the main menu.

Image Monitor: Y/X

A monitor Showing the real-time display of the Scene as it runs.

VIEWPOINT <f9>

Toggles the monitor's viewpoint between X:Y and the X:Z perspectives

VECTORS <f10>

Toggles the monitor's display between vectors and points.

BLANKING<f11>

Toggles the monitor's blanking on or off. When off, blanking lines are displayed as grey points or vectors.

GRID LINE<f12>

Toggles the monitor's grid line overlay between off, large grid, or small grid.

APPENDIX A

The MERLIN Imaging Model

Base Images (Images)

Merlin Images are three dimensional in nature with a resolution of 12 Bits (± 2047) along each axis (X, Y, Z). This is the Image resolution displayed in the Image Editor.

$X = \pm 2047$

$Y = \pm 2047$

$Z = \pm 2047$

Images Gain and Offset (Scenes)

Images Gain and Offset can be adjusted with these controls. The Normal value for Gain is 100% and for Offset is 0%. If the gain is adjusted too high the Image will wrap around. Likewise, if the Offset is set to the extreme the Image will also wrap around. These controls are normally used to correct for Images, which are initially drawn too small or off center. However, since these controls are applied prior to Rotation they can also be used to generate a variety of special effects such as orbits and others.

For example, to orbit an Image, reduce the gain to avoid clipping and add offset to the Image, and then apply rotation. Experiment for the desired effect.

$(X * \text{Gain}) + \text{Offset} \rightarrow \text{Limited to } \pm 2047 \rightarrow X$

$(Y * \text{Gain}) + \text{Offset} \rightarrow \text{Limited to } \pm 2047 \rightarrow Y$

$(Z * \text{Gain}) + \text{Offset} \rightarrow \text{Limited to } \pm 2047 \rightarrow Z$

Rotation (Scenes)

Images can be rotated along any of the three axes (X, Y, Z). Rotations are calculated using the standard SIN/COS transformation matrices. Remember that any Offset in an Image will change the center point of the Rotation.

$X * \text{Rotation} \rightarrow X$

$Y * \text{Rotation} \rightarrow Y$

$Z * \text{Rotation} \rightarrow Z$

Size / Perspective (Scenes)

Size and Perspective are calculated after an Image is rotated and determine the Size and Offset for the Scene. The Normal value for Size is 100% and for Offset is 0%. As Size is increased the Image will enlarge. Unlike the Image Gain above, increasing Size will *not* cause the Image to wrap. Rather, the Size can be increased and the Image will expand past the limits of the "frame". This because the Scene Size can be ± 4095 with only the Images ± 2047 visible. This means an Image can be expanded larger than the visible part of the Scene or moved "off frame" in any direction.

$((X * \text{Gain}) + \text{Offset}) * \text{Perspective} \rightarrow \text{Limited to } \pm 4095 \rightarrow \text{Display to } \pm 2047 \rightarrow \text{OUT}$

$((Y * \text{Gain}) + \text{Offset}) * \text{Perspective} \rightarrow \text{Limited to } \pm 4095 \rightarrow \text{Display to } \pm 2047 \rightarrow \text{OUT}$

$((Z * \text{Gain}) + \text{Offset}) * \text{Perspective} \rightarrow \text{Limited to } \pm 4095 \rightarrow \text{Display to } \pm 2047 \rightarrow \text{OUT}$

APPENDIX B

The MERLIN Interface Connections

Interface Specifications:

Resolution	Professional 12-Bit resolution.
Output levels	X, Y @ ± 5 Volts Full Scale.
Blanking	TTL, 0V=Off, +5V = Beam On.
RGB Color	TTL, 0V=Off, +5V = Color On.
Shutter	TTL, 0V=Off, +5V = Shutter Open.
Connector	37-pin D connector, 25-pin male D connector.

DB-37 Female PCI DAC Connector Specifications

		--	
		\	
Gnd X	19	• •	37
Dac X	18	• •	36
Gnd Y	17	• •	35
Dac Y	16	• •	34
	15	• •	33
	14	• •	32
	13	• •	31
	12	• •	30
	11	• •	29
B0 Blank	10	• •	27
B1 Red	9	• •	27
B2 Green	8	• •	26
B3 Blue	7	• •	25
B4	6	• •	24
B5	5	• •	23
B6	4	• •	22
B7 Shutter	3	• •	21
	2	• •	20
	1	• /	
		--	

CABLE COLORS

X = Dark Brown, Y = Red, Blank = Orange,

R = Pink, G = Yellow, B = Green,

Shutter = Black, Ground = Purple/White (watch out for similar coloring)

DB-37 Female ISA DAC Connector Specifications

```

--
| \
Gnd X 19 | • • | 37
Dac X 18 | • • | 36
Gnd Y 17 | • • | 35
Dac Y 16 | • • | 34
Gnd B 15 | • • | 33
Dac B 14 | • • | 32
Gnd R 13 | • • | 31
Dac R 12 | • • | 30
DGD Bl 11 | • • | 29
TTL Bl 10 | • • | 28
      9 | • • | 27
      8 | • • | 26
      7 | • • | 25
      6 | • • | 24
      5 | • • | 23
      4 | • • | 22
      3 | • • | 21   Gnd G
Dac G 2 | • • | 20   Gnd B
Dac B 1 | • / |
--

```

DB-25 Male Connector Specifications

```

--
| \
X      1 | • • | 14
Y      2 | • • | 15
Blank  3 | • • | 16
Interlock 4 | • • | 17   Interlock (pins 4 and 17 are shorted)
Red     5 | • • | 18
Green   6 | • • | 19
Blue    7 | • • | 20
Violet  8 | • • | 21
Yellow  9 | • • | 22
Cyan   10 | • • | 23
Z Depth 11 | • • | 24
DigGnd 12 | • • | 25   Ground
Shutter 13 | • / |
--

```