

iVision-Mac 4.5 Release Notes

Also see the Camera Control, Motion Control and Deconvolution Release Notes for additional features.

What's New in iVision-Mac 4.5.2

The new features since 4.5.0 are marked in the text below with “4.5.1” & “4.5.2”.
Search for that text to jump to each addition.

4.5.2 Bug Fixes:

Fixed Delete File command to honor the “Ignore Missing” flag and show the “Keep” button in the alert.

Fixed Open and Delete File to use variable substitution for the Single File text item.

Fixed a bug that kept the Transfer Frames, Delete Frames, and Reverse Sequence commands dim when they should have been enabled.

Fixed a crash in Frames To Sequence that could occur if the source directory no longer exists.

Improved reading of CSV text files.

Fixed cosmetic issues in menus with ellipses.

Fixed a cosmetic issue with icons in the Device toolbar.

Improved the initial position of the histogram sliders in the Color Join normalization panel.

Fixed a bug in Image Arithmetic that incorrectly gave an “empty name” error when using the option to put the results into the first window.

Fixed a bug that could cause a crash when using the Flip command on drawings with arrow heads.

Fixed a possible crash when manually segmenting Color 48 images.

Fixed a long-standing bug in Segmentation with color images when the color to be segmented fell into certain ranges of red/orange.

Fixed a bug in Measurements that would append two superfluous columns to the results window when the “Perimeter: Line Method” measurement is selected.

Fixed a possible crash if you duplicated a measurement results window and then tried to add more measurements to it. (But to do this now you must duplicate the entire window, not a portion of it.)

Fixed a crash that could occur when trying to open a QuickTime movie file. (iVision does not import QuickTime movie files).

4.5.1 Bug Fixes:

Corrected degree symbol for angle measurement tool.

Corrected the cursor shown for Segment Paintbrush and Eraser tools.

Fixed a bug that could prevent you from pasting text into a window name field, or into the file navigation dialogs.

Fixed a bug in transferring Row and Column names.

Fixed a bug reading Row and Column names from IPLab format files.

Improved resizing of columns in scripts when adding longer comments.

Fixed a bug that could keep you from copying or cutting script comments.

Fixed bug that kept Copy item in Edit menu disabled when it should have been enabled.

The Color Join command no longer leaves a segment layer on an image which did not have one prior to the use of the command.

Fixed a bug that did not clear the measurements window, usually seen when doing column-ordered measurements.

Fixed a bug that could let you drag an ROI past the edge of an image.

During a long Delay step in a script, a progress alert offers a “Cancel” button; a bug was fixed that kept that button from canceling the script.

Fixed a bug that kept the Segmentation dialog from returning to the last tab used.

Fixed a bug that broke the “Before/After” button in the AutoSegmentation dialog.

Fixed the tab order in the Duplicate Window dialog.

Fixed the placement of labels around drawing objects (the preference was being ignored).

Faster Processing on Intel-based Macs

iVision 4.5 is a “universal” application that runs on Intel Macs as well as PowerPC-based Macs.

(4.5.1 All PowerPC Macs which can run OS X 10.5 are now supported, not just G5 models.)

Here are the times for a short script that reads 20 color files (800 x 600), converts them to grayscale, auto-segments them, measures them (mean & area, with area limit), modifies them (despeckle and median filter), and writes the new images to another folder:

	G5 (2.30GHz)	MacPro (2.26GHz)
iVision 4.0	33 seconds	38
iVision 4.5	26	15
speed up	> 1.25x	> 2.5x

Note that camera frame rates are not noticeably improved. The faster processing speeds will speed up scripts that do other processing during the capture loop, though.

PCIe support on Intel-based Macs

Cameras which use PCI-Express (PCIe) boards are now supported on Intel-based machines.

Scripts and non-device preferences are not convertible, yet.

Sorry about that.

New Menus

Some of the menu items have been re-arranged.

The items in the 3D menu have been moved to other menus (mostly Enhance). The optional Deconvolution commands are now appended to the Enhance menu.

A new “Color” menu includes Color Join (previously in FCV) as well as other color-related commands from the old Enhance and Math menus.

The Analyze menu has been renamed “Measure”. The remaining FCV commands, if installed, are appended to the Measure menu.

The Math menu now contains Image Ratios, Calibrate Intensities, 3D Stacked View and the Extract commands. The commands Swap 0 and 255 and Signed<->Unsigned have been combined into the new “Reformat Data” command.

Wider images can be displayed.

While previous versions could create images up to 32767 pixels in width, they would not display grayscale images wider than 16380 pixels or color images wider than 4095 pixels. In 4.5 all image types will display up to the maximum image width of 32767 pixels.

File/Image names: 255 Unicode characters

Unicode allows the use of "international" (non-Roman alphabet) characters.

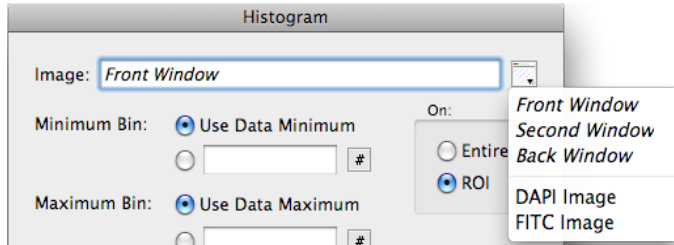
There are some items where Unicode is still not fully supported including:

Row and Column Labels, Drawing Text, Device Position Names

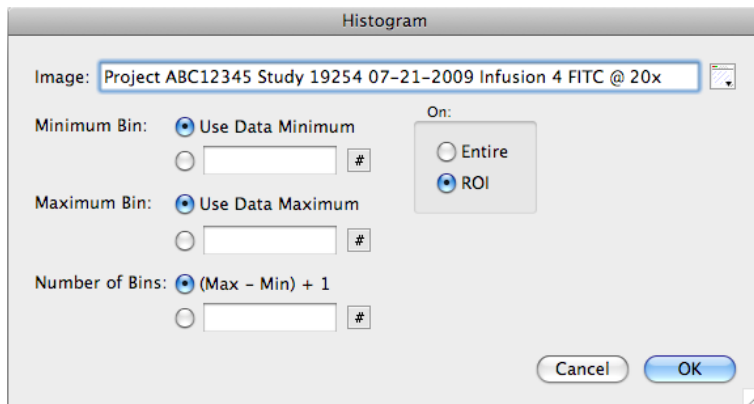
To fully support these a new file format will have to be developed, because the older IPLab format does not store these items in Unicode.

New dialog window name field & resizable dialogs.

The window name field in dialogs is now a single edit field with a menu to the right of it. The menu includes "relative" window names that let you refer to windows based on their position, for use in scripts. The relative names are drawn in italics. To put in a specific name (e.g. "DAPI Image"), pick from the menu, or just type into the field and any italic name will be replaced.



Since window names can potentially be very long now, dialogs that contain window name fields can be resized horizontally to see the full name.



Commands

More commands allow you to specify the image to use.

Almost all commands that reference image windows now include a window name field, rather than only working with the front image. This should make scripting easier, since you don't have to worry as much about which image is at the front.

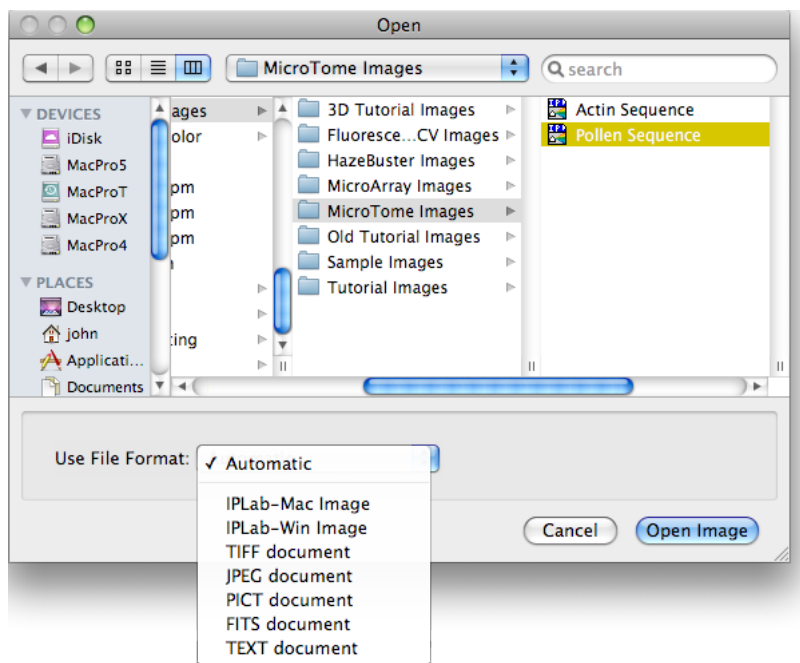
Open As replaced by enhanced Open command.

The "Open As" command let you tell iVision what format a file was (e.g. TIFF or PICT), so if the file had the wrong extension or file type associated with it you could still open the file. Since it was not used much and seemed to confuse people more than it helped them, the "Open As" has been removed. Its functionality has been included in the "Open" command.

To keep "Open" simple to use, the default file format is set to "Automatic". This will figure out the format of the file for you and open the image if it is in any format that iVision knows.

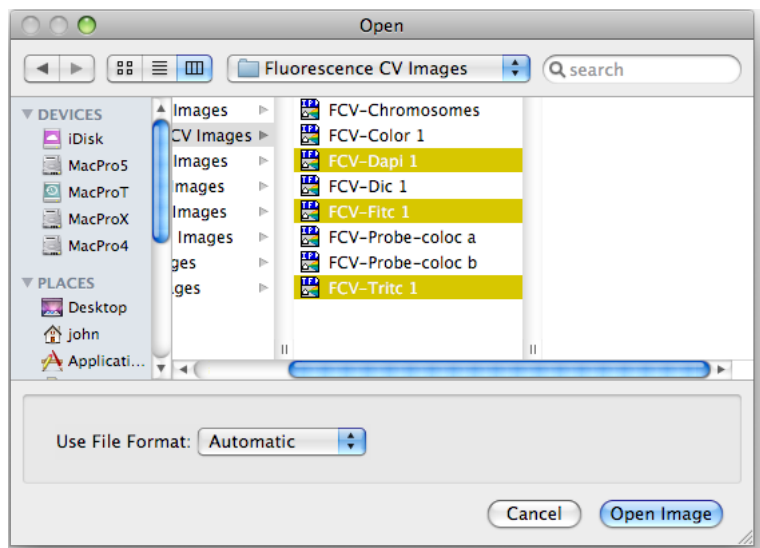
The "Automatic" format should be used in almost all cases.

The best reason to use a specific format is when using a script to open a large number of images that are all the same format but do not have an extension or other file type (e.g. from an old OS 9 CD). In that case telling iVision the format will speed up the file reading.



Open Multiple Files at once, interactively.

The Open command allows you to select more than one file at a time interactively. Multiple selections are not scriptable.



File Sets are just Indexed and Folder (no more List).

Dialogs with File Set menus in them also now have a “Show” button that will open the current File Set’s folder in the Finder.

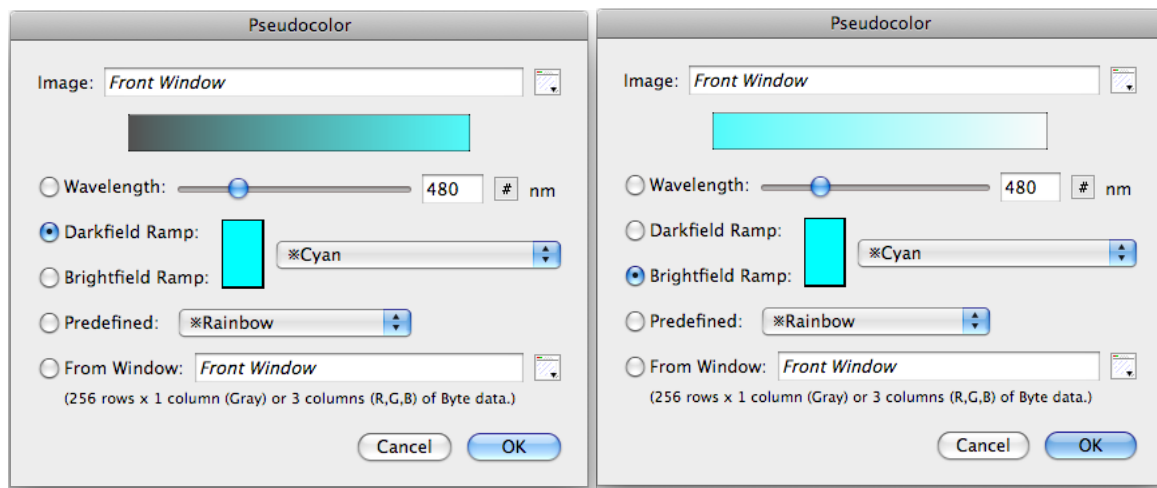
Segmentation sets gone.

You can just place the segmentation command into the script without creating a segmentation set. This required that the number of colors saved for the Color Cube feature be limited to a maximum of 20.

Pseudocolor dialog expanded:

The "Predefined" menu is reduced to the "complex" color ramps, like Rainbow, Classify, and System, as well as the commonly used "Monochrome" and "Reverse Mono".

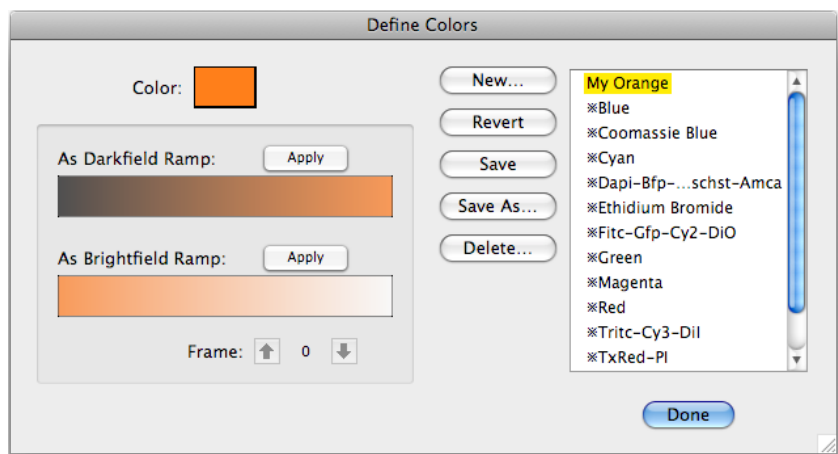
There are also two new options to create simple color ramps:



The menu to the right of the ramp choices lists "single color" color definitions (e.g. Red, Green, Blue, Cyan, etc.). You can add to this list with the new "Define Colors" command.

Edit CLUT replaced with Define Colors:

The Define Colors command lets you specify a single color and give it a name:



The dialog show what a darkfield and brightfield ramp made from this color will look like. If there is an image open when this dialog is open, you can apply either of the ramps to the image to see how they look. You can also step through the frames of the image to preview what the change will look like.

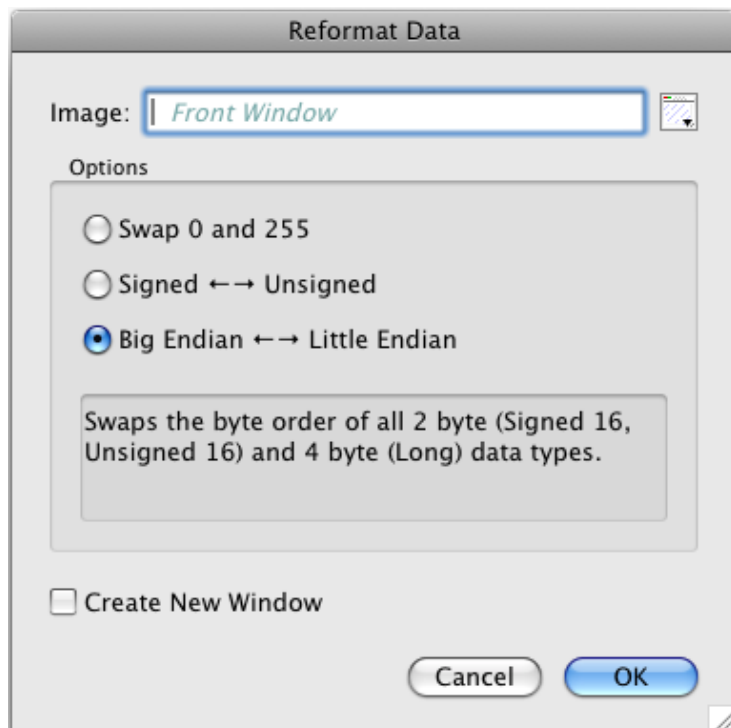
Color Join Command

The Color Join command from the FCV extension has been moved to the main program.

The colors in the Color Join command are shared with the **Define Colors** command.

Reformat Data Command

This command takes two older commands (“Swap 0 and 255” and “Signed <-> Unsigned”) and makes them options for a new command. A new option “Big Endian <-> Little Endian” has also been added. The effect of each option can be reversed by simply applying the change a second time. These options are useful when importing data that has missing or incorrect type information.



4.5.1 AutoSegment

The AutoSegment command now *adds* the segment to any existing segment rather than *replacing* it. This matches the behavior of the Segmentation command.

4.5.2 “Mosaic” renamed to “Join Images”, “3D Mosaic” renamed to “2D Mosaic”.

These names better describe what the commands do. The “Join Images” command only combines images at their edges, and the “2D Mosaic” command uses a 3D stack of images, but builds a 2D mosaic out of them.

4.5.2 Export To Movie

Separated the directory for the output file from the name of the file and added an “Ask” option.

Acquire Information Commands

4.5.1: Edit Image Notes

This command has been renamed from “Edit Image Info”. The two fields in here (Short Description and Notes) are now stored with the other acquisition fields (like exposure, etc.) This will preserve the values when the image is stored to TIFF files as well as IPLab format files. The Cmd-I keyboard short cut has now moved to the “Edit Acquire Info” command.

4.5.1: Capture Times

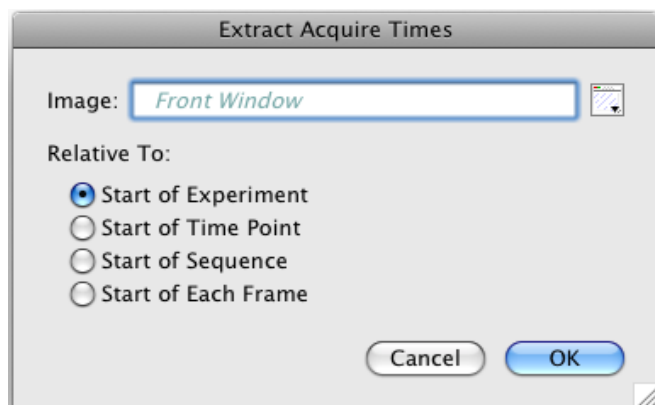
The Timing Window option in the Camera commands has been removed in favor of always storing the capture times with the images.

For all captures the “Capture_Date” is the time the image was captured.

For timelapse or multi-wavelength captures the “Experiment_Date” represents the start of the entire capture.

4.5.1: Extract Acquire Times

This command, added to the Extract sub-menu, allows you to recover the capture times from a sequence of Z or T (timelapse) captures. The times can be relative to a variety of starting points.



As an example, imagine a Z stack captured at two wavelengths during a 4 step timelapse with 15 seconds between captures. “Time Point” refers to the start of a timelapse capture. In our example there are 4 time points. The first (#0) is taken at the start of the experiment. There are then 3 more which begin 15, 30, and 45 seconds later.

Start of Experiment: The frame times for a Z stack will be relative to the start of the experiment, so the final Z stack times will begin at least 45 seconds later than the times from the first stack.

Start of Time Point: The first time for the first frame of a Z stack at any time point will be 0. If the Z stack is “multi-pass” then the times for the second wavelength will start after the times for the first. For “single pass” the times for the two wavelengths will be interleaved.

Start of Sequence: The first time for the first frame of a Z stack at any time point will be 0 for any wavelength. Times that are relative to the start of the sequence should be nearly identical for any stack in the experiment, assuming the devices respond at the same speed throughout the experiment.

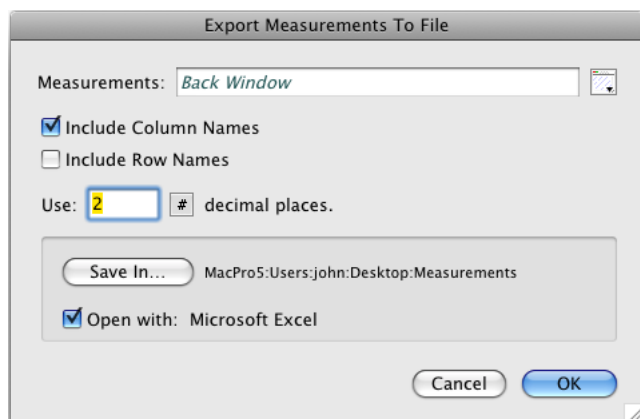
Start of Each Frame: The times for the sequence are reported relative to the previous frame, so any differences indicate a delay in receiving the frame from the camera. The first time is set to match the second to make it easier to graph the arrival times.

Files and Exporting Data

New Text File Format:

The text file format has changed from a proprietary one used in IPLab and iVision to the “Comma Separated Values” (CSV) format which can be imported by spreadsheet programs like Excel™ and Numbers™. The extension for this format is “.csv”. The text file format is usually only used for measurement results windows.

You can export a measurements window (4.5.1: or any other data window) and have it automatically open in a spreadsheet program by using the new “Export Measurements to File” command (File -> Export menu).

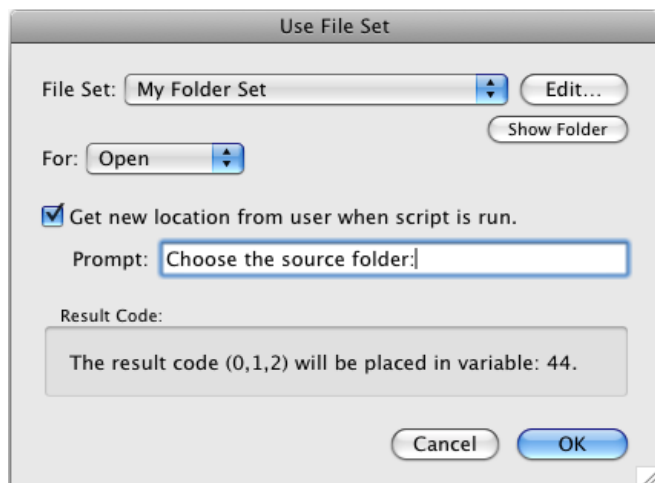


The program with which to open the file is set in the Preferences command (“File” tab). Note that if you change the measurements window (by, for example, adding more measurements to it) and then re-export it, Excel will close the old window and open a new one with the new measurements, while Numbers will keep the old one open and open a second, new, window.

If you have an older IPLab or iVision text file you can still open it in iVision by using the Open command in the File menu, or by dragging the file to the iVision icon in the Dock or in the Finder. If you want iVision 4.5 to open the file by double-clicking on it in the Finder then you must change its extension to “.ivtxt”.

4.5.1 Use File Set

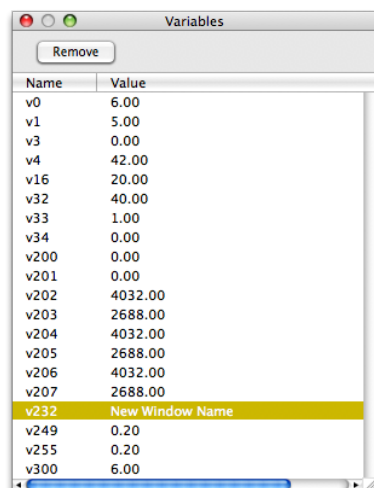
The Use File Set dialog now includes a prompt that will be displayed as the title of the file navigation dialog that is used when the script is run.



Changes to Variables

For the most part variables still work the same as before. You still use a number with the "Var" button in a dialog to specify a variable.

But the Variables window has changed from an image window to a palette:



Name	Value
v0	6.00
v1	5.00
v3	0.00
v4	42.00
v16	20.00
v32	40.00
v33	1.00
v34	0.00
v200	0.00
v201	0.00
v202	4032.00
v203	2688.00
v204	4032.00
v205	2688.00
v206	4032.00
v207	2688.00
v232	New Window Name
v249	0.20
v255	0.20
v300	6.00

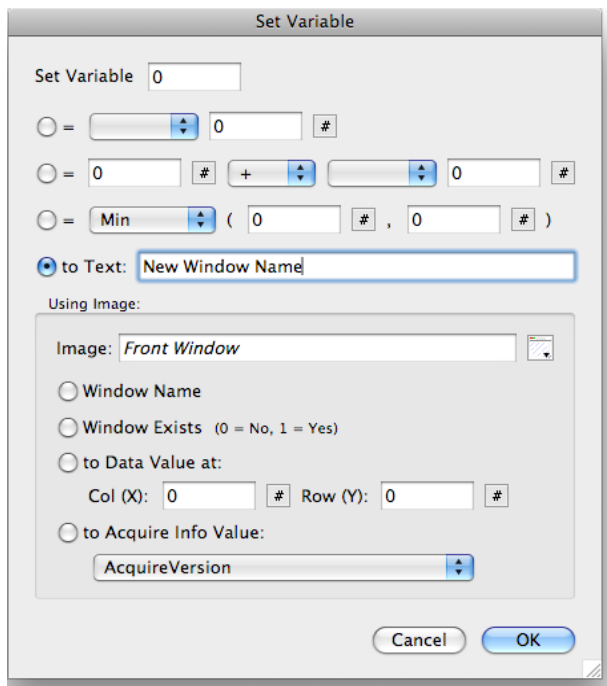
In this window the name of the variable is preceded by a lower case "v".

The Variable window only shows those variables that have been used at some point (and have not been removed). You can change the value of a variable in this window by clicking on the Value column and typing a new value. In addition, variables can contain text as well as numbers.

Updated Set Variables dialog.

The Set Variables dialog includes several ways to place text into variables:

- A new "Text" option to set any arbitrary text string.
- A "Window Name" option to place the name of an existing window into a variable.
- The "Acquire Info" menu now includes non-numeric fields such as Filter Names and dates, which will be placed into the variable as a text string.
- 4.5.1 A “negate” (multiply by -1) option was added to the first two assignment options.



Set Variable

Set Variable: 0

= #

= 0 # + #

= Min # , #)

to Text:

Using Image:

Image:

Window Name

Window Exists (0 = No, 1 = Yes)

to Data Value at:

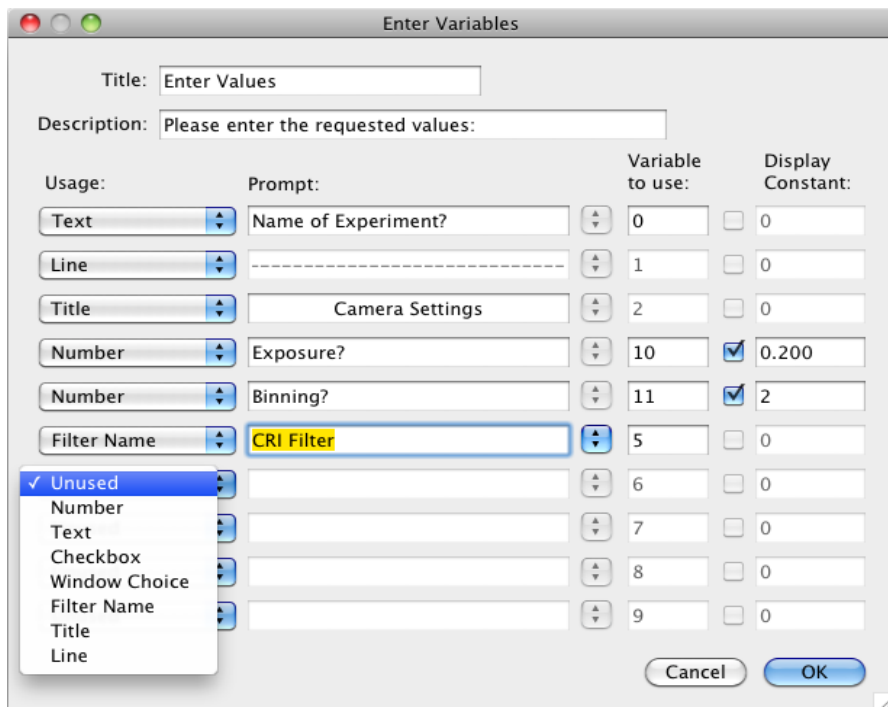
Col (X): # Row (Y): #

to Acquire Info Value:

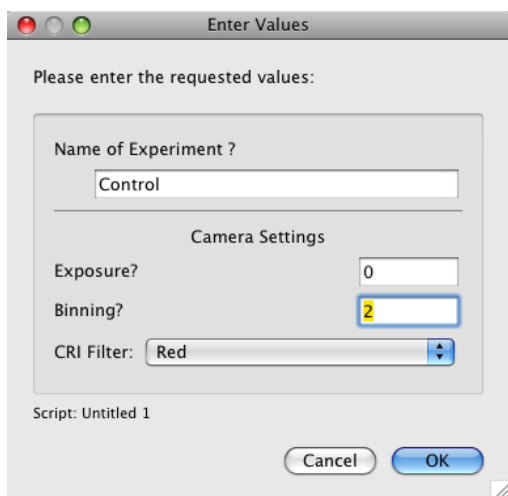
Cancel OK

Updated Enter Variables dialog.

The Enter Variables dialog has been updated to add some formatting features, and to allow text to be entered into variables:

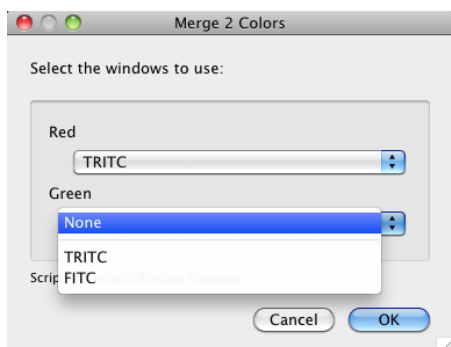


When the script is run, the result looks like this:



If the Help Tags are on, holding the mouse over each field will show which variable the value will go into (as a reminder when you are working on the script).

4.5.2 Added a “Window Choice” option that presents a popup of existing window names.



Using Variables in Text Fields

To use any variable (numeric or text) in a text field, you use a special formatting rule that lets you insert the value of the variable into the text.

Place the name of the variable inside braces: {v123}.

You can optionally use one of two formatting options for numbers: zero fill, or decimal places.

For zero fill you can specify a total length of 2 to 6 digits.

For decimal places you can specify 0 through 6 digits after the decimal place.

You specify the option by following the variable name with a comma and then a 'z' or a 'd', followed by the number.

Example:

if v42 = 12.547000000

{v42}	=> 12	(truncate)
{v42,z2}	=> 12	(truncate)
{v42,z3}	=> 012	(truncate)
{v42,z4}	=> 0012	(truncate)
{v42,z5}	=> 00012	(truncate)
{v42,z6}	=> 000012	(truncate)
{v42,d0}	=> 13	(round)
{v42,d1}	=> 12.5	(round)
{v42,d2}	=> 12.55	(round)
{v42,d3}	=> 12.547	(round)
{v42,d4}	=> 12.5470	(round)
{v42,d5}	=> 12.54700	(round)
{v42,d6}	=> 12.547000	(round)

You can put more than one variable substitution in a text field.

For example, if v10 = 4, and v12 = 32.4112:

"Experiment {v10,z3} temperature: {v12,d1} F" would produce:

"Experiment 004 temperature: 32.4 F".

Variable substitution is available in:

Window Names

Draw Text: text

Enter Variables: title, description, prompt(s) [for Enter Var and Title uses]

Script Query: title, message, button titles

Script Alert: title, message

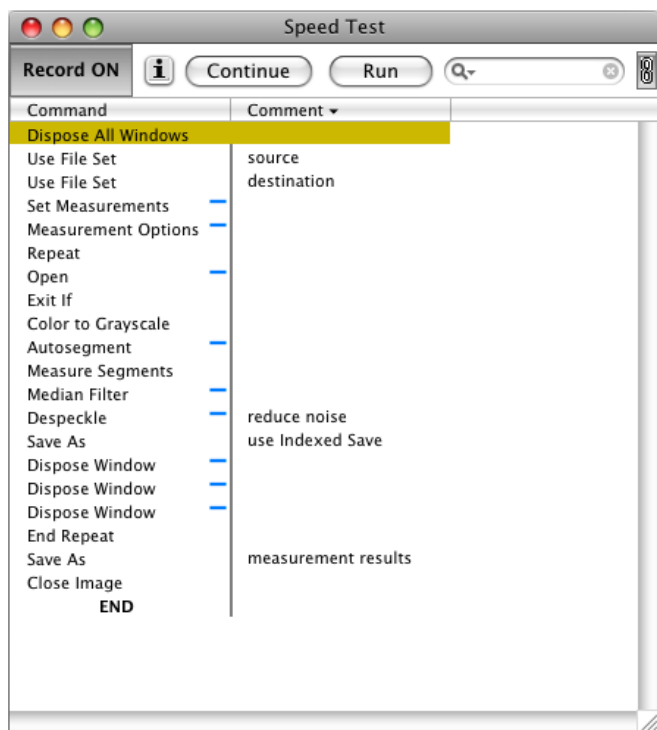
Predefined Variables Reserved by *iVision*

Some variables have changed from iVision 4.0. Their old name is listed in the last column:

<u>Variable</u>	<u>Information Stored in This Variable</u>	<u>By Command</u>	<u>4.0 Var</u>
200	ROI left, by Extract: Image Sizes and Camera	Extract Image Sizes,, Camera Capture commands	
201	ROI top	“	
202	ROI right	“	
203	ROI bottom	“	
204	ROI width	“	
205	ROI height	“	
206	Image width	“	
207	Image height	“	
208	Current Z (Current frame)	Extract Image Sizes	
209	Z depth (Total frames)	“	
210-211	<i>undefined</i>		
212	Data Type	“	
213	XY Unit Factor	“	
214	Camera Binning, X direction	Camera Capture commands	
215	Camera Binning: Y direction	“	
216-218	<i>undefined</i>		
219	Red Color Balance factor used by color cameras	Camera Capture commands	220
220	Green Color Balance factor used by color cameras	“	221
221	Blue Color Balance factor used by color cameras	“	222
222	Segmentation Min (1)	Segmentation (Simple/Histogram)	new
223	Segmentation Max (1)	“	new
224	Segmentation Min (2)	“	new
225	Segmentation Max (2)	“	new
226	Segmentation Min (3)	“	new
227	Segmentation Max (3)	“	new
228	Segmentation Min (4)	“	new
229	Segmentation Max (4)	“	new
230	Frame number of best focused frame (Best Frame option).	3D Extended Focus	
231	<i>undefined</i>		
232	Threshold gray value calculated by AutoSegmentation.	AutoSegment command	
233..234	<i>undefined</i>		
235	Current index used by the Iterate tab in StageScan .	StageScan: Move/Iterate	232
236	Number of positions moved by the Iterate tab in StageScan .	“	233
237	<i>undefined</i>		234
238	Current row position within the array as set by Move/Iterate .	“	235
239	Current column position within the array	“	236
240	Current row position within the super-array	“	237
241	Current column position within the super-array	“	238
242 - 245	<i>undefined</i>		
246	Z Start position for Multi-D Acquire .	Multi-D Acquire	
247	Z End position for Multi-D Acquire .	Multi-D Acquire	
248	Z Step size for Multi-D Acquire .	Multi-D Acquire	
249 - 254	<i>undefined</i>		
255	Exposure time last used by Acquire commands. Exposure time for filter 1 used by Multi-D Acquire . Exposure time last used for Red channel in RGB Acquire .	Camera Capture commands	249 (MultiD 252 (RGB))
256	Exposure time for filter 2 used by Multi-D Acquire . Exposure time last used for Green channel in RGB Acquire .	RGB & Multi-D Acquire	250 (MultiD) 253 (RGB)
257	Exposure time for filter 3 used by Multi-D Acquire . Exposure time last used for Blue channel in RGB Acquire .	RGB & Multi-D Acquire	251 (MultiD) 254 (RGB)
258	Exposure time for filter 4 used by Multi-D Acquire .	Multi-D Acquire	252
259	Exposure time for filter 5 used by Multi-D Acquire .	Multi-D Acquire	253
260	Exposure time for filter 6 used by Multi-D Acquire .	Multi-D Acquire	254
261	Exposure time for filter 7 used by Multi-D Acquire .	Multi-D Acquire	255

Scripts

The Script window has been updated. It is resizable horizontally as well vertically.

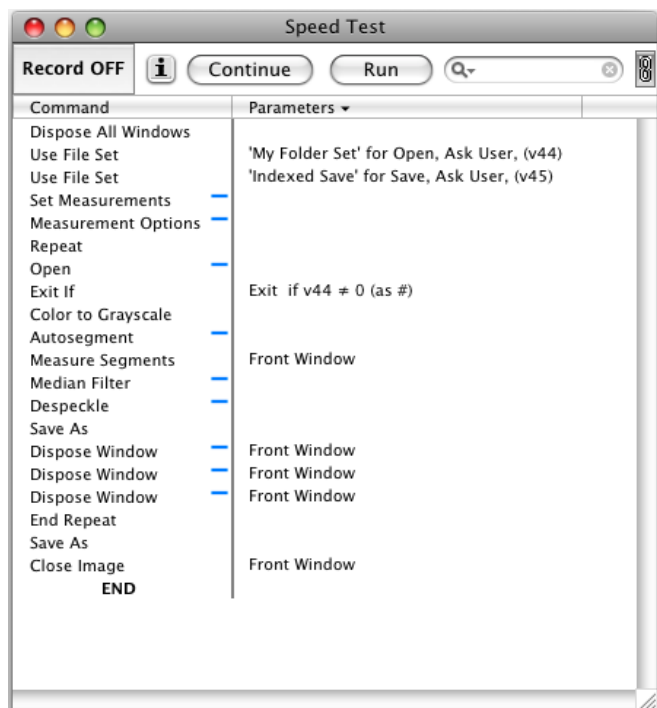


The END symbol now acts like a label,; you can jump to END without adding a label just above it.

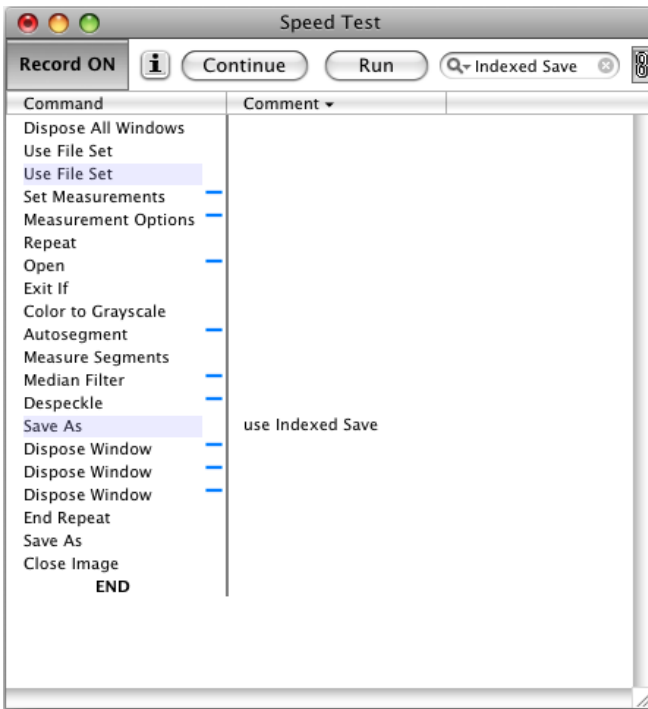
4.5.1 Length of labels expanded to 31 characters.

You can start or finish editing a Comment by pressing the Return or Enter key.

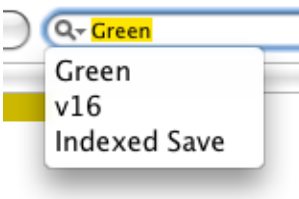
The Comment column can be toggled to show the parameters in the command:



Not all commands have parameter descriptions yet. More will be added in the future.



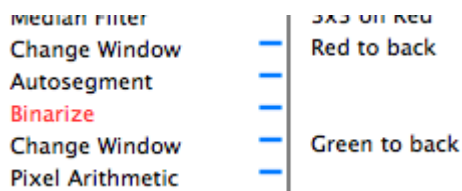
The search field at the top of the window will highlight any commands that contain the given text. In this example the File Set named "Indexed Save" is used by two commands "Use File Set" and "Save As". The command name, the user comment, and the parameters are all searched for the given text. The search field remembers the last 10 searches:



The script commands palette includes two new commands: **Enable** and **Disable**.



These commands allow you to disable commands in a script, which causes them to be skipped over, as if they weren't in the script at all. Disabled commands are displayed in red:



Shared Scripts Folder

There is now a “Scripts” folder within the “iVision 4.5 Shared User Folder”. This acts as a convenient place to store scripts that are shared among all the users on one computer.

Sub-Folders

Scripts that call other scripts can now be stored together in a sub-folder within either the Scripts or Shared Scripts folder. This makes it easier to keep related scripts organized.

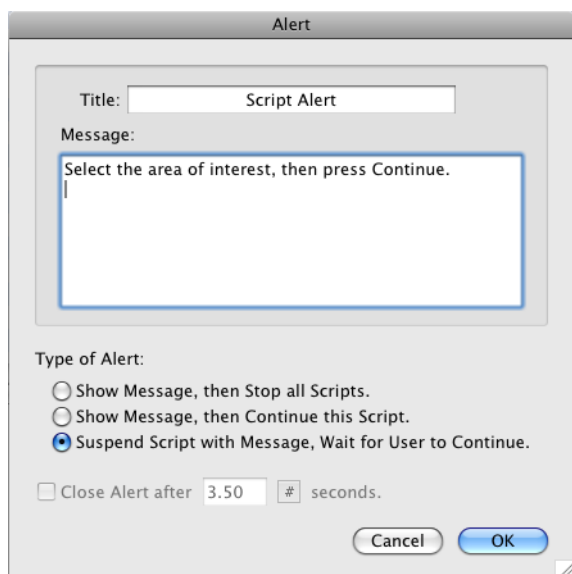
Scripts remember different size/placement than interactive dialogs.

If you are scripting a command where you want the dialog to be opened while the script is running (with the "+"), the size and position of the dialog used when the script is run will be saved independently from the size and position used when not running a script. So you can reliably place the dialog at a specific place on screen.

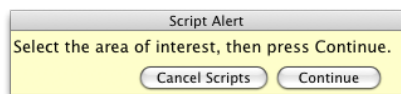
Scripts remember File Sets used by the script.

So if you move the script to another machine, it will automatically take the file set with it.

The Script Alert command has an improved run-time message option.



The first two options still put the message in a modal alert which can be closed after a given time period. The third option puts the message in the yellow “Cancel or Continue” floating window, so the user doesn’t have to dismiss the alert before doing whatever they are supposed to do:

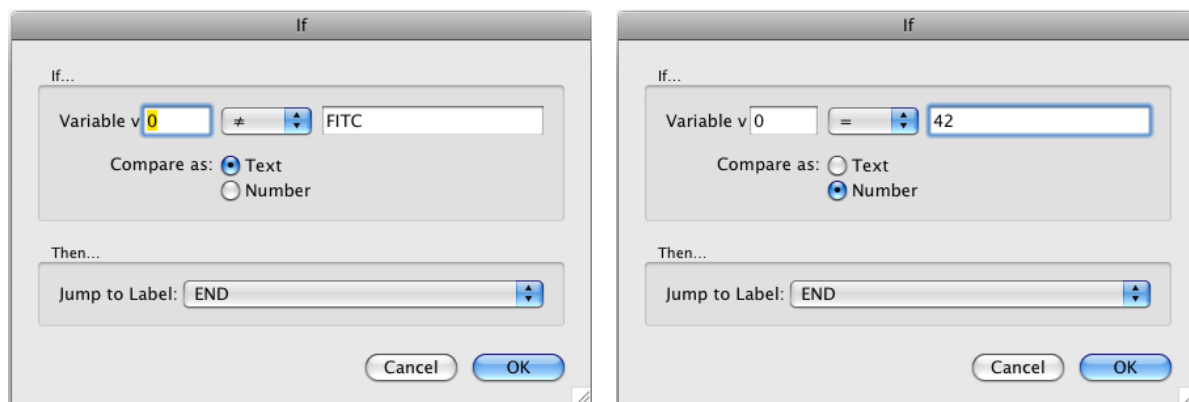


4.5.1 Direct Assignment of Script to FKey

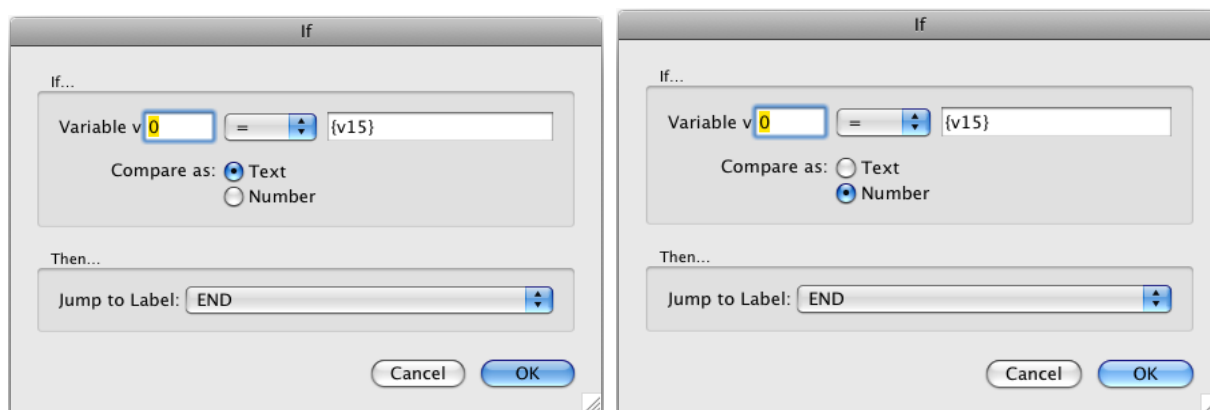
When a script is frontmost you can assign it directly to an unassigned FKey by pressing Option-FKey (e.g. option-F5). A dialog will verify that you want to make the assignment. If the FKey is already assigned, the script for that FKey will be opened

The “If” and “Exit If” commands have changed.

These commands have changed to allow text comparisons. The first field is a variable, the second is a text string.



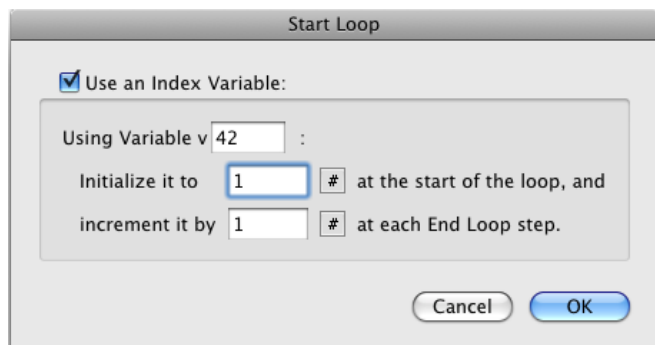
To compare against another variable, use variable substitution:



You should avoid comparing numbers as text because the text representation of numbers can include decimal places or rounding that you did not expect when the script was first written.

4.5.1 Start Loop Command

An optional feature has been added to the Start Loop command. It is common to keep a variable that increments within the loop as the loop runs. This can now be done as part of Start Loop/End Loop without adding extra Set Variable commands to your script.



This will initialize v42 to 1 when Start Loop is first run, and then increments v42 each time the matching End Loop step is reached. Note that End Loop will not allow you to use the same variable for the loop count as the one you are using in Start Loop.

Miscellaneous

New File Extensions for iVision files:

iVision Scripts	.ivsc
iVision Preferences	.ivpr
iVision Extensions	.ivex
iVision Device Modules	.ivdm

4.5.2 Shared Preference Files

iVision now stores most user-defined data in preference files within the “iVision 4.5 Shared User Folder”. This allows them to be used from scripts on machines with multiple user accounts. The 4.5.2 version will automatically move preference files from the user's folder to the shared folder at startup.

Separate FKey Preference File

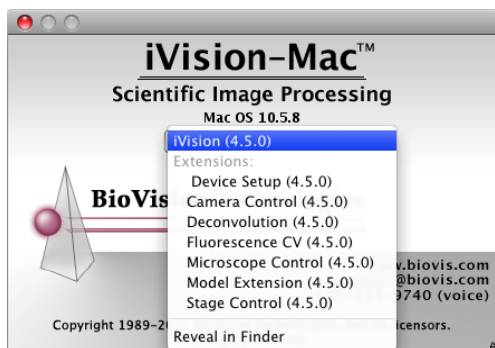
The current FKey assignments are now written to a separate preference file “Command Data.FKeys” in the user’s iVision Preferences folder each time the program quits. This file is read after the main “Command Data” file and takes precedence over it. If the “Command Data.FKeys” file is placed in the Preferences folder within the Shared User Folder, then that file takes precedence over any in the user’s local Preferences folder. Since only the user’s copy is written to by iVision, a file in the Shared folder will not be affected by any changes the user makes to the FKey settings.

4.5.2 Number of FKeys expanded to 38

Added FKeys 16 through 19, shifted and unshifted.

About Box:

The About Box contains a popup menu which shows the name and version of all Extensions in use. This does not include device modules, which are listed in the Device Setup dialog. If you select “Reveal in Finder” a Finder window for the folder which contains iVision will open. This helps verify which copy of iVision is running (if there is more than one on the machine).



Similarly, the Device Setup dialog has an **Open Folder** button to show the current Device Modules folder.