



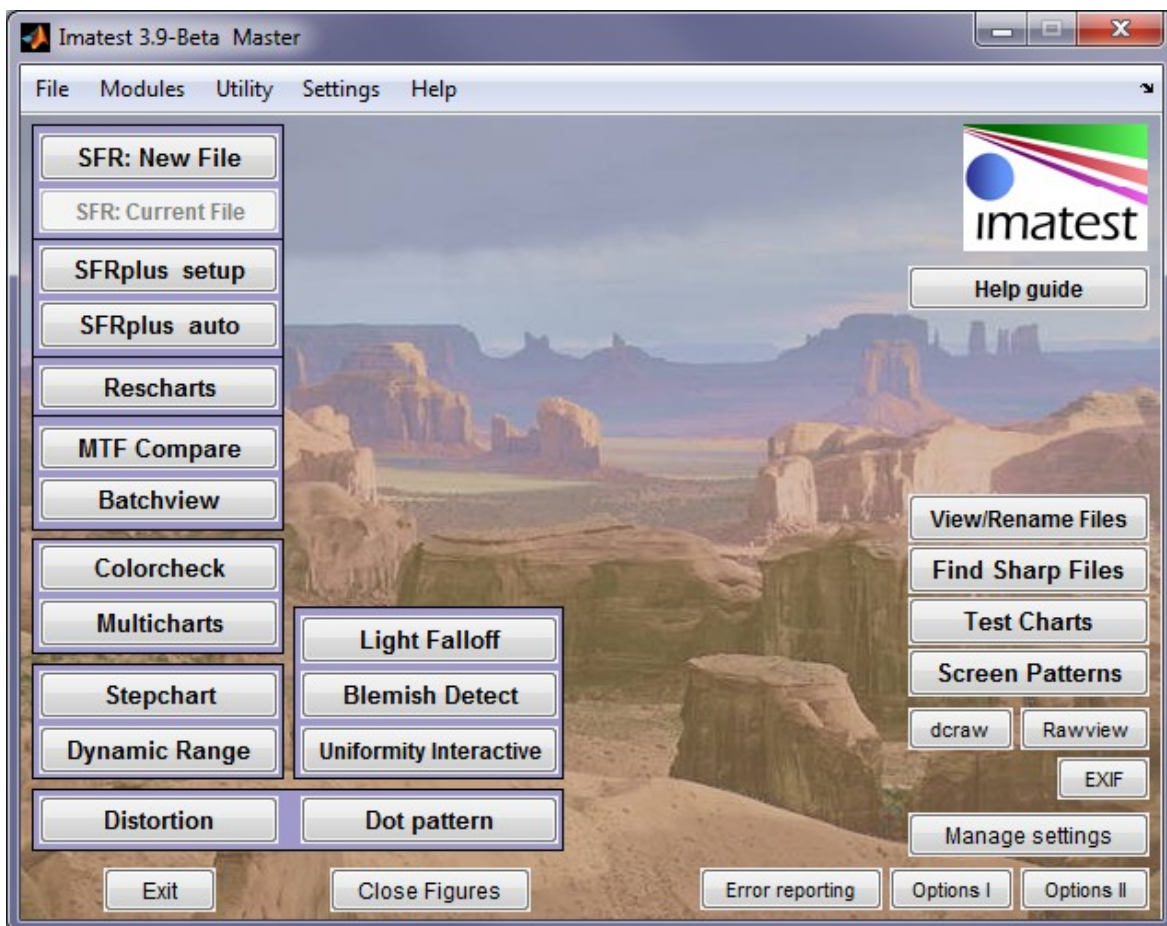
Imatest - ImaTest Instructions

Running ImaTest

Imatest is opened by

- double-clicking the ImaTest icon  on the Desktop,
- from Windows Start menu: → All Programs → ImaTest →  ImaTest (some versions, such as Image sensor, may be in subfolders),
- or from the ImaTest directory (typically C:\Program files\Imatest\Imatest in win32 English language installations).

After several seconds, the ImaTest main window, shown below, opens. ImaTest modules are run by clicking on one of the buttons on the left. Instructions for the individual modules are on their own pages, listed below. Click [here](#) for the documentation [Table of contents](#).



Imatest main window

[Pre-Imatest 3.7]: When you first [install](#) Imatest it operates in evaluation mode, which allows 20 runs and does not allow data to be saved. A welcome page summarizing Imatest's capabilities and operations is displayed when Imatest is started in evaluation mode. To continue using Imatest you must [purchase](#) and [register](#) it.]

Font size/DPI scaling

If DPI scaling is set to Larger scale (120 DPI), buttons at the top and the right of the Imatest main window may be truncated. This problem should be fixed with Imatest 3.2.1. In earlier versions there are two fixes.

1. In the Imatest main window, click Settings (on the top bar), Enlarge screen.
2. (In Vista) Right-click on the wallpaper, click on Personalize, then click on Adjust Font size (DPI) (near the top of the left bar) to open the DPI scaling window. Select Default scale (96 dpi) instead of Larger scale (120 dpi). Reboot for the change to take effect.



The following steps are typical for most Imatest modules.

- **Open the image file.** A dialog box requests the name of the input image file. Imatest supports TIFF (24 or 48-bit), JPEG, PNG (24 or 48-bit), BMP, HDF, PCX, XWD, and PPM (24 or 28-bit) file formats. It also supports [RAW files](#) for a large variety of digital cameras, using [Dave Coffin's dcrw](#) and custom RAW files using [Generalized Read Raw](#). New cameras are typically added to dcrw within a month or two of their introduction. The [dcrw](#) page has the latest list of cameras.

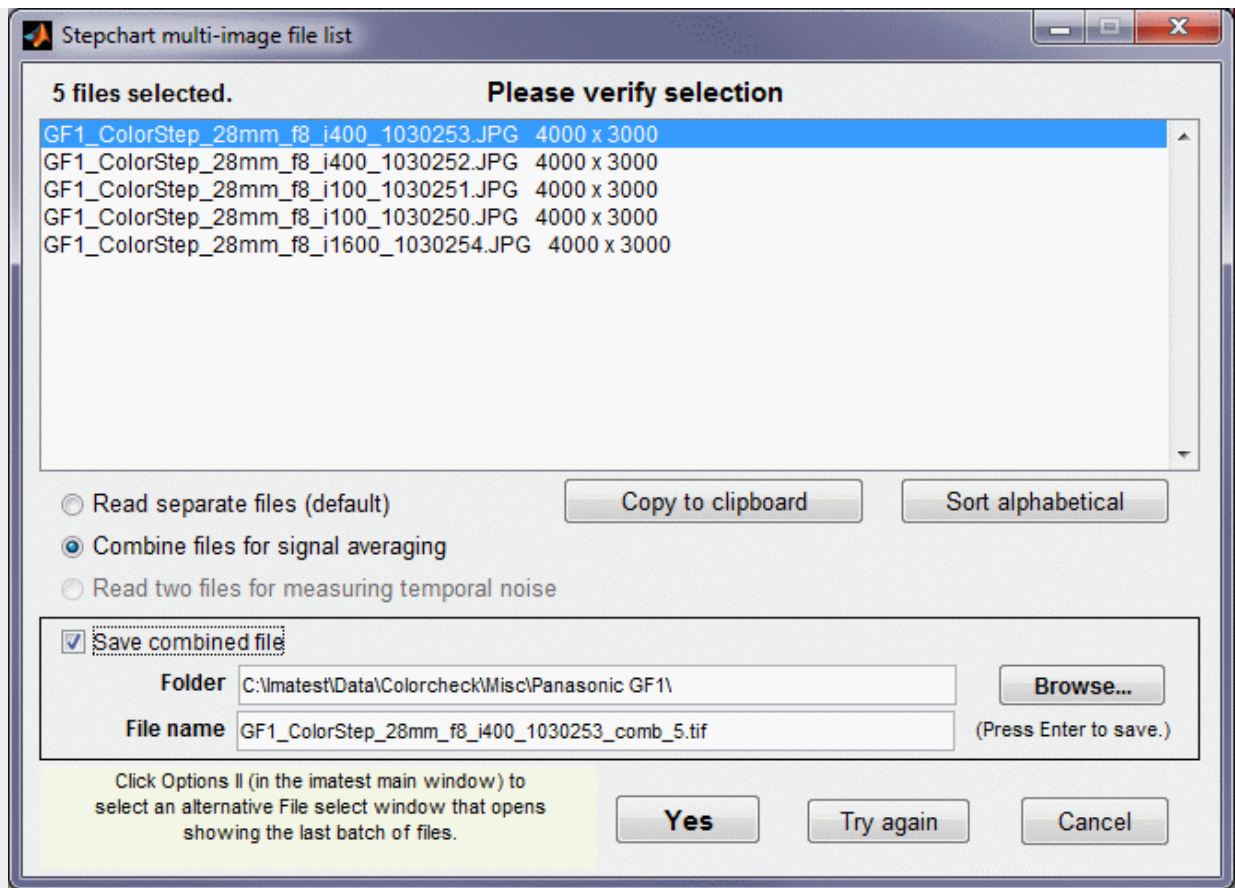
Multiple file read (batch mode)

In Imatest Master you can select several files to read.

Depending on how you respond to the multi-image dialog box (below),

- The files can be analyzed individually in sequence (batch mode), or
- The files can be combined—averaged—and the mean analyzed (it can also be saved). This is useful for measuring sensor fixed pattern noise in [Stepchart](#), [Colorcheck](#), and [Light Falloff](#) and in [SFR](#) for reducing noise or measuring performance of image stabilization.
- For two input files only, with Stepchart or Colorcheck, you can calculate temporal noise.

The files should be in the same folder, have the same pixel dimensions, and be framed identically (except for [SFRplus](#), where they can be any size). If you choose Combine files, you'll have the option of saving the combined file with 16-bit TIFF format as default. **Batch mode is not supported in interactive modules such as Rescharts or Multicharts.**



For combined files, the saved file name is the same as the first selected file name with `_comb_n` appended, where `n` is the number of combined files.

- **Enter additional input data.** Unless **Express mode** has been selected, a dialog box opens that requests the title (which defaults to the file name) and other data, depending on the module. Most additional data is optional (most is saved from previous runs); you only need to pay attention to settings you wish to change. Click to run the program or to terminate the run. Results are in figures and CSV or XML files.
- **Save results?** A dialog box asks if you would like to save the results. Checkboxes in the dialog box enable you to select the Figures, CSV (Excel-readable), and XML files to be saved. You may examine the results before deciding which, if any, to save. (The Save box is omitted in the evaluation version.) [Figures](#) can be saved as PNG (losslessly-compressed) image files or Matlab Fig files (not recommended because of their large size), which can be opened and manipulated with .

Three helpful buttons

Each of these buttons opens a large Help window with lots of explanations and buttons that open a variety of functions. You should familiarize yourself with them and use them whenever the need arises.

opens a window with links to some of the most useful instruction web pages as well as brief

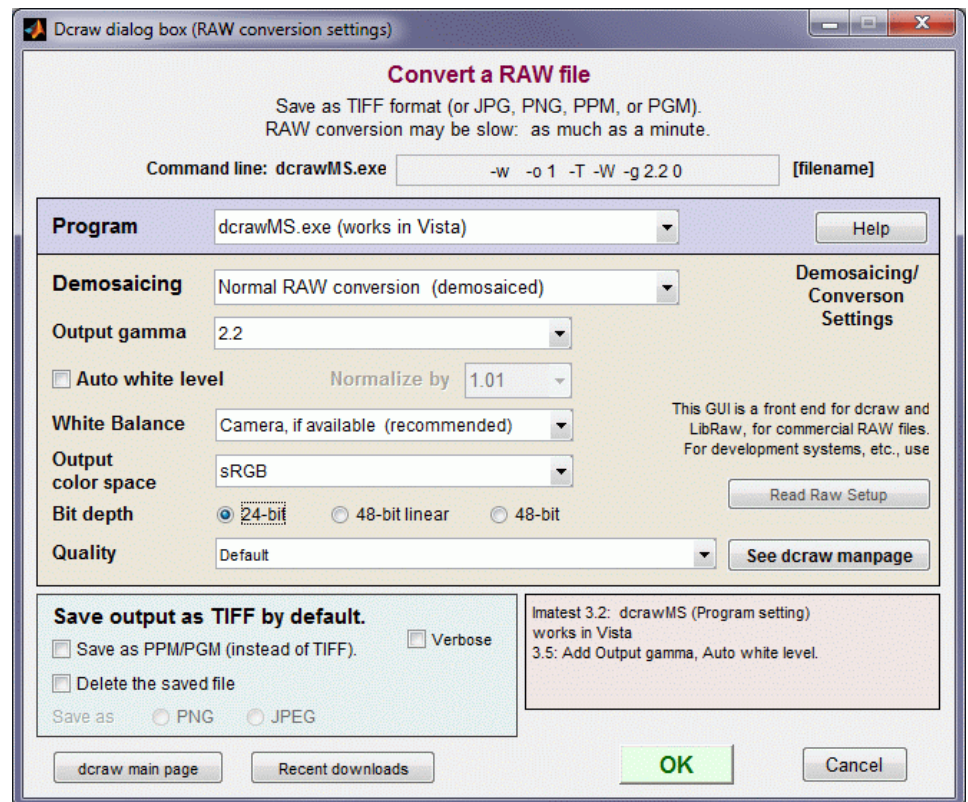
explanations of what they contain, including Registration quickstart | [Imatest instructions](#) | [Image quality factors](#) | [Imatest tour](#) | [Table of Contents \(site map\)](#) | [FAQ](#) | [Change Log](#) | [Testing lenses](#) | [MTF Curves & Appearance](#) | [SFRplus](#) | [Troubleshooting](#).

opens a window that explains some of the key functions for setting and examining the contents of imatest.ini, where settings are stored. It also displays the full path name to imatest.ini and shows how to fix bugs that can arise when imatest.ini is corrupted. Function buttons include **Save settings...**, **Load settings...**, **View/Edit settings (ini file)**, **Copy settings (ini file)**, **Import / Merge settings**, **Edit / Reset Modules**, and **Reset Defaults (all)**.

opens a window that shows what to do if you encounter an error. It includes link to the [Change Log](#) and [Troubleshooting](#) pages, buttons for Copying the current or last session to the clipboard for pasting into emails, and instructions on fixing imatest.ini when it gets corrupted.

RAW files

[RAW files](#) are the unprocessed output of digital image sensors. For [Bayer](#) sensors, each RAW pixel represents a single color in RGRGRG, GBGBGB, ... sequence. To be converted into usable, standard file formats (TIFF, JPEG, etc.), raw files must be processed by a RAW converter. RAW converters perform several functions: [demosaicing](#) (converting the Bayer sequence into full color), applying a [gamma](#) curve, often with an additional tonal response curve, reducing [noise](#), and [sharpening](#) the image. These operations can affect Imatest's measurements, especially [SFR](#).



The best way to be sure an image file faithfully resembles the RAW file—that it has a pure gamma curve, no sharpening, and no noise reduction—is to read a RAW file into Imatest and convert it into a standard format (typically TIFF) using [Dave Coffin's dcraw](#). If you select any of the standard RAW formats (CRW, NEF, etc.) or if a file that contains RAW data (e.g., Phase One TIF) is detected the dialog box on the right appears. It allows you to choose among several RAW conversion options. More

detail can be found in [RAW files](#).

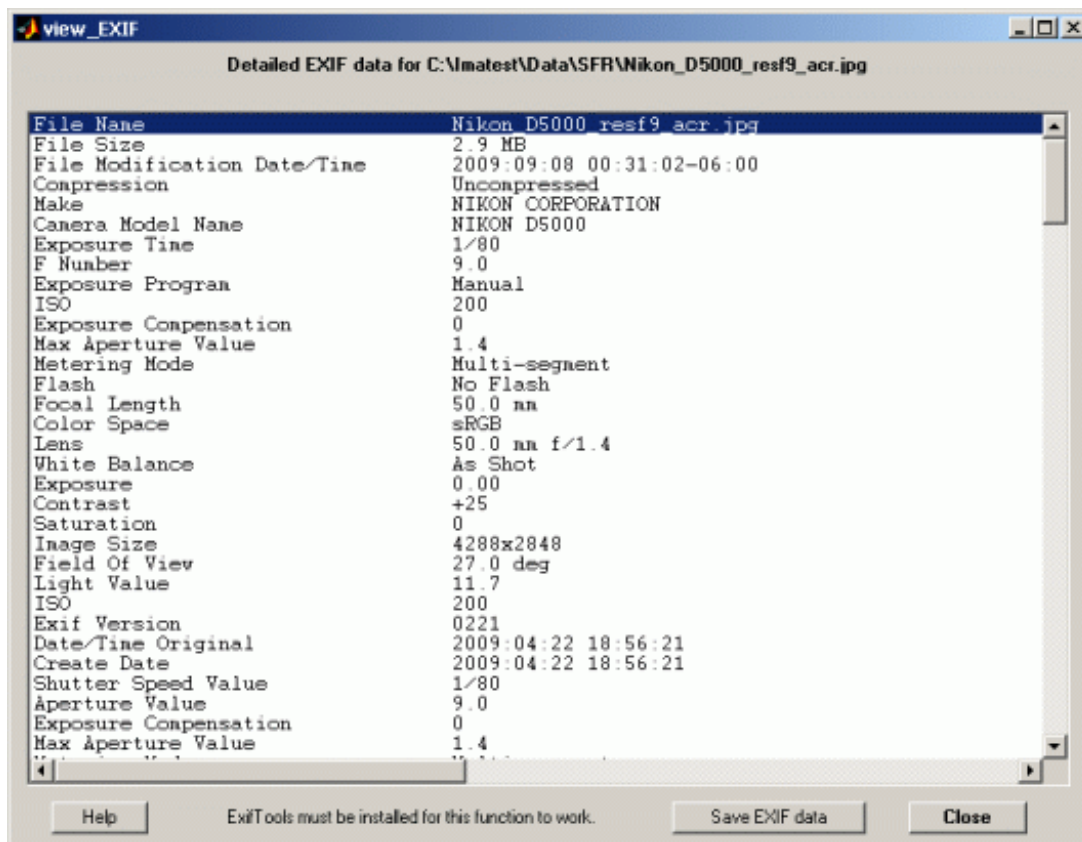
Imatest can also read RAW files from manufacturer's development systems using [Generalized Read Raw](#), which enables you to specify file extensions and parameters for decoding them.

Miscellaneous controls and utilities

closes all figures and terminates Imatest.

closes all figures. Important because the computer will slow down if too many are open. You can close figures individually by the usual Windows methods — clicking the in the upper right or right-clicking on the figure icon on the Taskbar and selecting Close.

displays [EXIF](#) data for an image file. Most file formats supported when [ExifTool](#) is installed (instructions [below](#)). Exif data can be saved in a text file in the same folder as the image for viewing/searching with the button.



Exif viewer

opens a Matlab Fig file saved during an Imatest module run. Unlike image files, Fig files can be manipulated— most importantly, 3D Fig files can be rotated for enhanced visualization. But Fig files are not generally recommended: they should be used sparingly because they can be as large as several megabytes.

Saved settings: Imatest saves a number of settings, including Font size, folders for opening and saving images, calculation parameters, plot selection, and figures to display and save. To view or edit the settings, click the **Settings** menu (in the toolbar on the top of the Imatest window), then click **View settings (ini file)** or **Edit/Reset modules**. To restore these settings to their original defaults, click (in the toolbar on the top of the Imatest window), then click **Reset defaults (all)** in the **Settings** menu. The settings are stored in imatest.ini. Lots of details about saved settings— including how to fix errors that may result from corrupted ini files— can be found by clicking on the lower-right of the Imatest main window.

and (bottom-right of the Imatest main window); also in the Settings dropdown menu) opens the boxes shown below, which allow several options to be specified.

Options I

The screenshot shows the 'Options I' dialog box with the following sections and settings:

- Expert vs. simplified mode (affects the complexity of input dialog boxes)**
 - SFR: ☒ Expert mode, ☐ Simplified
 - SFRplus: ☒ Expert mode, ☐ Simplified
- ROI (Region of Interest) section**
 - SFR ROI filtering: ☐ Normal (safest; default), ☒ Light (for small or noisy ROIs); advanced
 - Stepchart ROI: ☐ Automatic, 20 Patches
 - Colorcheck: Select crop by dragging cursor. Ask to repeat crop for same-sized image. (Dropdown menu)
 - Display patch squares in fine adjustment (similar to Multicharts) (Dropdown menu)
 - Distortion: Select crop by dragging cursor. Ask to repeat crop for same-sized image. (Dropdown menu)
 - Uniformity: Select crop by dragging cursor. Ask to repeat crop for same-sized image. (Dropdown menu)
 - Blemish: Don't ask to crop. (Crop pixels near borders is enabled in Settings box.) (Dropdown menu)
- LARGE FILES (Uniformity, Blemish, Distortion)**: Do not shrink large image files. (Dropdown menu)
- Batch run order**: No change (runs may be in different sequence from selection). (Dropdown menu)
- Buttons: Reset, OK, Cancel

Options I for setting ROI options, Large file processing, and Batch run order.

Expert vs. Basic mode affects the complexity of input dialog boxes. Basic (beginner) mode uses a simplified dialog box and uses defaults for settings that are not displayed. Modules are gradually being added.

ROI (Region of Interest) section controls cropping options.

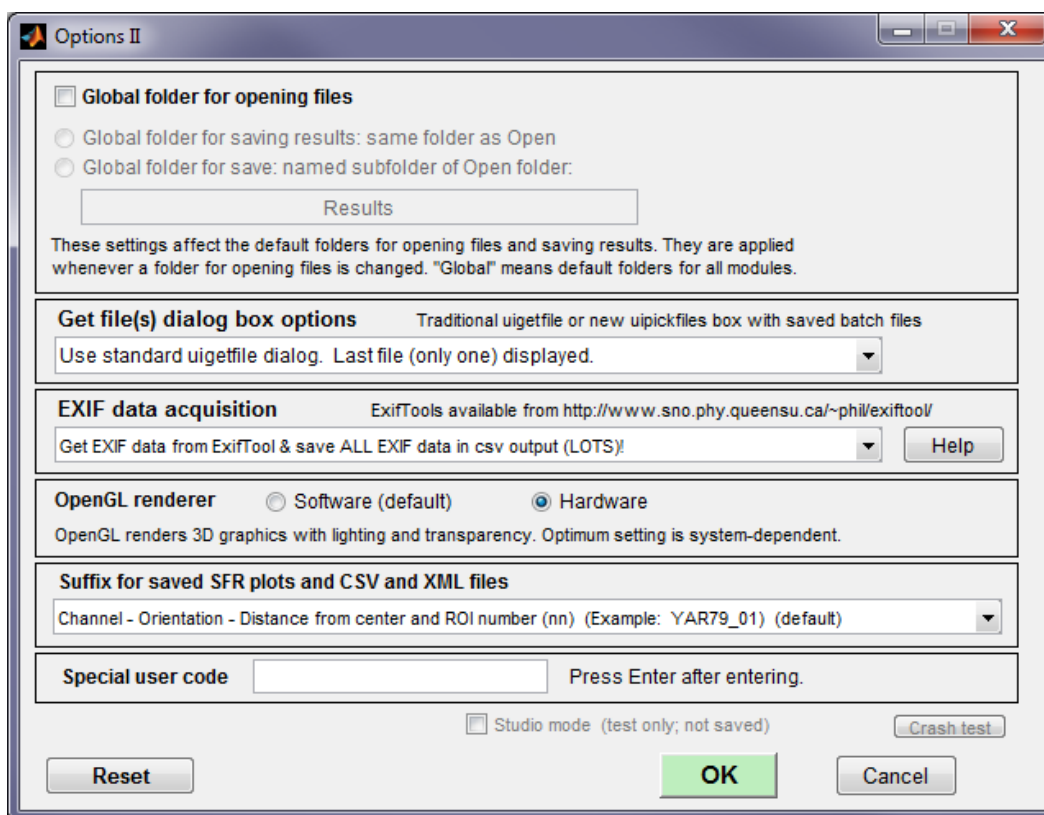
- **SFR ROI filtering** When Light filtering is checked the tests that validate the SFR ROI (region of interest) are relaxed. This can be useful when testing noisy images, rough edges, images of endoscopes or other devices with interfering patterns, but it can lead to errors if regions are selected carelessly. Normal filtering is the default.
- **Stepchart ROI selection** Automatic selection (the default) can be toggled. If it is turned off, a fixed number of patches (6-41) can be selected for Stepchart analysis. This option is useful when high noise in dark regions confuses the automatic ROI detection.
- **Colorcheck, Distortion, Light Falloff** Cropping options. You can select whether to ask for cropping and whether to use the last crop (for same-sized images). For Colorcheck you can also choose between traditional automatic patch detection and Multicharts-like patch detection, where all squares are shown in the fine adjustment window.

LARGE FILES (Light Falloff, Distortion) These two modules typically use little or no cropping. As a result, memory may sometimes overflow. This setting offers the option of cutting the image dimensions in half (1/4x in area and memory) to avoid memory problems.

Batch run order The actual order of batch runs may differ from the order of selection in curious ways that depend on the operating system or other factors. With one of the choices in this popup menu the run and selection orders should be the same.

restores defaults: it sets SFR ROI filtering to Normal, Stepchart ROI selection to Automatic, turns off all global folder settings, and checks Get EXIF data .

Options II



Options II for setting folder options, SFR save file suffix, etc.

Global folders The default folders for opening files and saving results can be set globally using the second group of controls. Normally (with **Global folder for opening files** unchecked), the default folder for opening files is changed only for the Imatest module in use: one module at a time. When it is checked, the default folder for opening files is changed for *all* modules. This can be convenient if project data for several modules is stored in the same file.

When either of the Global folder for saving results... radio buttons is set, the default save folder is changed for all modules whenever the input folders are changed.

EXIF data acquisition This selects the program used to read [EXIF](#) data: image file metadata that contains camera and lens settings. Selected EXIF data (important values such as aperture, exposure time, ISO speed, and focal length) is displayed in several figures and EXIF data is saved in CSV and XML output files. There are four settings:

1	Get EXIF data from jhead.exe (default; JPEG-only, limited)	Default
2	Get EXIF data from Phil harvey's ExifTool (all file types; must download & install)	Recommended
3	Get EXIF data from ExifTool & save ALL EXIF data in csv output (LOTS)!	<i>Detailed!</i>

4	Do not get EXIF data (for rare cases of errors)	EXIF off
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Setting 1, jhead.exe, is the default. Jhead is a compact program with limited capabilities included in the lmatest installation file. It only works with JPEG files, and it captures limited EXIF data. Settings 2 and 3 ([ExifTool](#); introduced with lmatest 3.2.1) work with virtually any file type and capture virtually all available EXIF data. If the setting 3 (save ALL EXIF) is selected, all the EXIF data—a huge amount; some quite obscure—is written to the CSV output files.

The second and third settings require that [ExifTool](#) be downloaded and installed.

- Go to the [ExifTool home page](#) and download the Windows standalone executable (a zip file). This file is not included in the lmatest installation because it is [frequently updated](#).
- In Windows Explorer, double-click on the downloaded zip file.
- Copy the contents (exiftool(-k).exe) to the lmatest installation folder (typically C:\Program files\lmatest\lmatest in win32 English-language installations for lmatest 3.6+).
- **Rename exiftool(-k).exe to exiftool.exe.**

The final selection is for very rare cases (e.g., industrial prototypes with non-standard EXIF data) that cause the EXIF read routine to crash.

Suffix for saved SFR plots and CSV and XML files Normally the root name (input or selected file name) is followed by the channel, ROI orientation (AL = above left (relative to the center), etc.) and distance from the center in percentage of distance to the corner. Example: *rootname_YAL79_MTF.png* for the Edge/MTF plot. An alternative can be selected where *_ROI_* followed by the ROI number *nn* is used in place of the orientation and distance. Example: *rootname_ROI_03_MTF.png*

Special user code enables custom features for specific users. Normally blank.

restores defaults: it sets SFR ROI filtering to Normal, Stepchart ROI selection to Automatic, turns off all global folder settings, and checks Get EXIF data .

opens a relevant web page on computers connected to the Internet.

Dropdown menus

Dropdown menus are located at the top of the lmatest main window. Most items duplicate the controls elsewhere in the window, but some are unique.

File contains **System command**, **View or Copy the Current or Previous Session** for reporting errors, **Clear Memory**, **Close Figures**, and **Exit**. **System command** lets you execute a DOS call on

Windows computers through Imatest. The session commands are useful for debugging, as described in [Troubleshooting](#) and in the window. **Clear Memory** removes the image data stored after running [SFR](#). This may release enough memory to speed up memory-intensive modules, such as [Light Falloff](#).

Modules opens Imatest analysis modules. The entries duplicate the buttons on the left of the Imatest main window.

Utility opens Imatest utility modules. The entries duplicate many of the buttons on the right of the Imatest main window.

Settings contains functions that control various aspects of Imatest operation. Many can be accessed from the window.

- **IT options** sets several options for controlling [IT](#) (Industrial Testing) runs.
- **Small / Normal / Large fonts** alters the font size in output figures and GUI windows. The default is Normal. The setting is saved between runs. This address problems with tiny fonts in high resolution screens (1600x1200 pixels and above) or larger than expected fonts which appear when the video card DPI setting is Large size (120 DPI) instead of Normal. The video card setting can be accessed by right-clicking on the Windows background, then clicking Properties, Settings, Advanced, General (tab). Large fonts are displayed if DPI is set to Large size (120 DPI). 96 DPI is normal. Windows may need to be rebooted before new settings take effect.
- **Options I and II** contain settings that affect SFR ROI (region of interest) error checking, Stepchart ROI selection, and folder names for storing results, and more.
- **DOS command** allows you to enter a DOS command while Imatest is running. Useful for troubleshooting, for example, for diagnosing path issues.
- When checked, **Fixed sharpening radius** keeps the [SFR](#) standardized sharpening radius fixed, even for edges with poor MTF where it would otherwise automatically increase.
- **Enlarge hi res figs** applies only to high resolution screens (1600x1200 pixels and above). When this box is checked (by default), images are enlarged so they don't look tiny on the screen. Unchecking the box turns this feature off. Images are smaller but better suited for website presentation. The setting is saved.

INI File Settings contains operations that affect stored Imatest settings (the contents of imatest.ini and other INI files). Many can be accessed from the window.

- **Manage Settings** opens the window.
- **Save Settings** copies settings from imatest.ini (which stored the current, active settings) to a named file (with extension ini). Particularly useful for saving regions of interest (ROIs) for [SFR](#)

runs and for controlling [Imatest API](#) modules. The most recent folder used to save or retrieve settings is displayed in the file selection dialog box, but any folder may be selected.

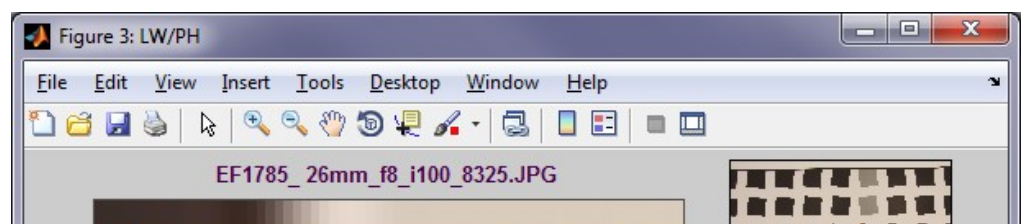
- **Load Settings** retrieves settings from a named file (with extension ini) and stores them in imatest.ini. It is useful for restoring ROIs or for restoring settings after they have been reset. The most recent folder used to save or retrieve settings is displayed in the file selection dialog box, but any folder may be selected.
- **View/Edit Settings** displays the settings— the contents of imatest.ini— in the Notepad viewer. You can edit this file (with care!) and save it as a named file if desired. You can [send us](#) the contents of imatest.ini for help with [troubleshooting](#). ***The Notepad window should be closed when you are finished viewing it: it may interfere with some Imatest operations.***
- **INI File Editor** (formerly Edit/reset module(s)) opens a special editor that allows ini file values to be examined and entire sections to be deleted if the corresponding module crashes. Described in [Troubleshooting](#).
- **Scan & repair INI file** Scans the INI file for errors that may be introduced when there are non-Latin characters (Chinese, Hebrew, etc.) in path names.
- **Reset Defaults (All)** restores settings to their default values by resetting imatest.ini. This sometimes clears bugs. See [Troubleshooting](#). Use only as a last resort. It is a good idea to save settings prior to resetting them.

Help contains Online Help, Register, Register Upgrade, and About, and Welcome window. Most are included with brief explanations in the window.

- **Online Help** corresponds to the button; it opens a browser window.
- **Register** and **Register Upgrade** are used to register Imatest.
- **About** displays the Imatest version and user registration information.
- **Check for updates** opens a web page that shows the latest version.
- **Welcome window** displays the window that normally appears when Imatest is started in evaluation model.
- **Several additional web pages**, including this one, are included.

Figures

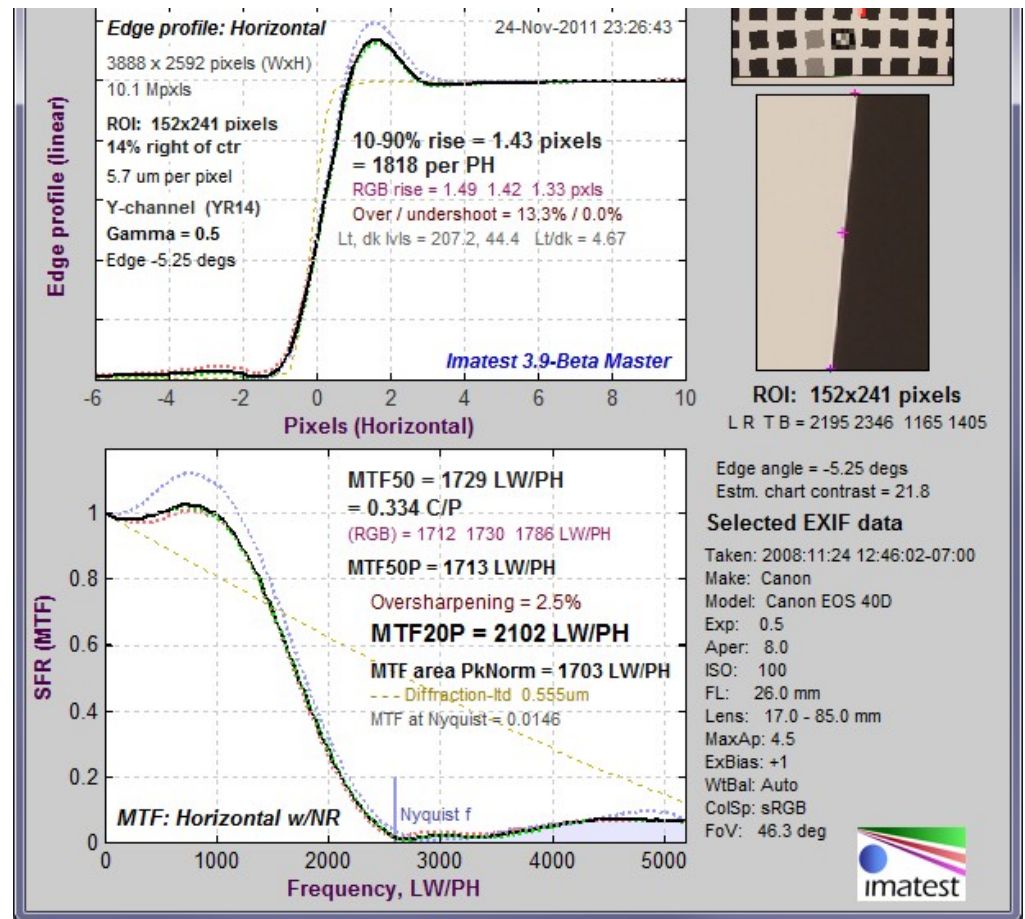
Imatest figure: You can resize it or zoom in on individual plots. The toolbar, which includes Data cursor , is



shown.

Imatest results are displayed in individual windows called Figures. A typical figure—a result of running SFR for a Canon EOS-40D—is shown on the right.

Figures may be resized, minimized, maximized, or closed using standard Windows operations. In addition, several Windows and Matlab-specific operations can be found in the toolbar at the top of the image.

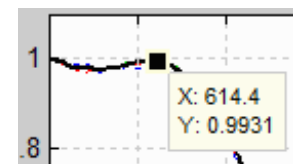


The first four icons in the toolbar are standard Windows icons: **New file**, **Open**, **Save**, and **Print**. **Open** and **Save** refer to Matlab .fig figures. Imatest allows you to save figures as PNG files—an excellent format with lossless compression—or as Matlab fig files, which can be manipulated, but which require much more storage (not recommended).

Of the remaining icons, Zoom in: is particularly useful. Clicking on it highlights it and enables you to zoom in on regions of the plots. You can click and drag to create a zoom rectangle or you can click on any point to zoom in on that point. Double-clicking anywhere inside the image restores the full unzoomed image.

Data cursor example

Imatest 3.6+ includes an extremely useful function called [Data Cursor](#), selected on by the toolbar icon. When selected, you can click on a curve and display its coordinates in a small box called a **Datatip**. Right-clicking on the Datatip lets you can delete it or choose additional options.



In most modules, figures can be saved as either PNG files (a standard losslessly-compressed image file format) or as Matlab FIG files, which can be opened by the button in the Imatest main window. Fig

files can be manipulated (zoomed and rotated), but they tend to require more storage than PNG files, especially for 3D files, which can be generated by [SFRplus](#) and [Light Falloff](#). In general, PNG files are preferred unless significant manipulation will be required at a later time— for example if you wish to rotate 3D files (which can be several megabytes).

Too many open Figures

*Figures can proliferate if you do a number of runs, especially SFR runs with multiple regions, and **system performance suffers if too many Figures are open**. You will need to manage them. Figures can be closed individually by clicking on the upper right of the Figure or by any of the usual Windows techniques. You can close them all by clicking in the Imatest main window.*

To see Figure resource use, open the Windows Task Manager. In Windows XP, click Control-Alt-Del or right-click in the Taskbar, usually at the bottom of the screen. Click on the Processes tab, then click CPU twice so the tasks with the most CPU usage appear at the top. Imatest can be a real CPU hog when several Figures are open; CPU use appears to increase with the square of the open Figures. With Imatest 3.5.1 or earlier on my dual 1 GHz Pentium Windows XP machine, 8 open Figures use 6% of the CPU; 16 open Figures use 33%. Over 20 would seriously slow the computations.

CSV and XML output files

Individual Imatest modules can optionally write two types of output file, which contain most of the results. They may, if desired, be entered into other programs. .CSV files are most often displayed with Microsoft Excel. XML files can be used as input to database programs and for additional applications yet to be developed. They can be displayed in somewhat readable form with any web browser. Please [contact us](#) if you have requests or suggestions about Imatest output. *Note: These files are not saved in evaluation mode.*

CSV files— Excel-readable **Comma-Separated Variable** format. Here is an example of typical output.

Module, Colorcheck

File, Canon_EOS10d_ColorCheck_It_small.jpg

Run date, 31-Dec-2005 18:11:00

Zone, Gray, Pixel, Pixel/255, Px/255 ideal, Log(exp), Log(px/255), WB Err Deg, WB Err Mired


```

19, 1, 241.6, 0.9475, 0.9569, -0.050, -0.023, 163, -3.8
20, 2, 215.8, 0.8464, 0.7922, -0.230, -0.072, 491, -10.8
21, 3, 179.0, 0.7020, 0.6353, -0.440, -0.154, 450, -10.0

```

The same data displayed in Excel looks like this.

	A	B	C	D	E	F	G	
1	Module	Colorcheck						
2	File	Canon_EOS10d_ColorCheck_It_small.jpg						
3	Run date	12/31/2005 18:11						
4								
5	Zone	Gray	Pixel	Pixel/255	Px/255 ideal	Log(exp)	Log(px/255)	WB E
6	19	1	241.6	0.9475	0.9569	-0.05	-0.023	
7	20	2	215.8	0.8464	0.7922	-0.23	-0.072	
8	21	3	179	0.702	0.6353	-0.44	-0.154	

XML files– Similar output to the .CSV data above is shown below, displayed in the [Firefox](#) browser, which formats the results slightly (adds indentation and colors). XML output was introduced with Imatest 1.6.4. It will be refined in succeeding releases.

```

- <Colorcheck>
  <!-- Geometric and general input variables -->
  <Imatest_Version>Pro 1.6.4</Imatest_Version>
  <Title>Canon_EOS10d_ColorCheck_It_small.jpg</Title>
  <Date_Run>31-Dec-2005 18:11:00</Date_Run>
  <!-- Gray patch (bottom row) analysis -->
  <Zone_Number>19,20,21,22,23,24</Zone_Number>
  <Zone_Number_Row4>1,2,3,4,5,6</Zone_Number_Row4>
  <Pixel_Level_Row4>241.62,215.843,179.012,135.006,84.154,34.5011</Pixel_Level_Row4>
- <Pixel_Level_Normalized_Row4>
  0.947528,0.846445,0.702006,0.529436,0.330016,0.135298
  </Pixel_Level_Normalized_Row4>
- <Ideal_Pixel_Level_Normalized_Row4>
  0.956863,0.792157,0.635294,0.482353,0.333333,0.196078
  </Ideal_Pixel_Level_Normalized_Row4>

```

Use of Imatest

The Imatest license for Master and Studio allows an individual user to Install and use the Software on a single workstation used non-simultaneously by one or more people. This is not a concurrent use license.

License holders are encouraged to publish test results in printed publications, websites, and discussion forums, provided they include links to www.imatest.com. The use of the Imatest Logo is encouraged. However you may not use Imatest for advertising or product promotion without explicit

permission from Imatest LLC. [Contact us](#) if you have questions. The full text of the license can be found [here](#).

Imatest LLC assumes no legal liability for the contents of published reviews. If you plan to publish test results, especially for MTF, you should take care to use good technique. Considerations include,

Sturdy camera support	Use a sturdy tripod, cable release, and, if possible, mirror-lock.
Target mounting	If you are working outdoors, be sure the target doesn't shake in the wind.
Target distance	Be sure you're far enough from the target so the printed edge quality doesn't affect the measurements. Target distance considerations are given here .
Focus	Be sure the camera is focused accurately on the target. Note whether you used manual or automatic focus.
Target alignment	Make sure the corners, as well as the center, are in focus.
Illumination	Should be as even as possible.
Exposure	Take care not to clip shadows or highlights. This will reduce accuracy of the results.
Raw conversion and settings	The choice of RAW converter (in or out of the camera) and settings, particularly Sharpening, can make a huge difference. Contrast and White balance are also important. Settings that affect contrast and transfer curve can also have a strong effect. If possible a "Linear" setting (meaning a straight gamma curve with no additional tonal response adjustments) should be used.
Gamma	SFR sharpness results are moderately sensitive to the Gamma setting: A 10% gamma error changes MTF50 by 2.5%. For best results gamma should be measured by running Colorcheck or Stepchart . Ideally a Q-14 target (similar to the Q-13, but larger) should be mounted close to the slanted edge images.
Cleanliness and filters	Lens surfaces should be clean. You should note whether you have a protective (UV or Skylight) filter. It can make a difference— more likely reduced contrast than reduced sharpness. With Imatest you can find out.
File	Use RAW, TIFF, or the highest JPEG quality. Never use less than the maximum

formats	resolution or JPEG quality unless you are specifically testing the effects of these settings.
Lens settings	Lens performance is a strong function of the aperture (f-stop) and focal length (for zooms). Be sure to record these settings (easy because they're saved with the EXIF data) and include them in your writeup. The optimum (sharpest) aperture is of particular interest. Lens performance is also somewhat affected by the distance to the target.
White balance	Should be close as possible to neutral, particularly in Colorcheck.

This may seem like a lot of fuss, but the technique you develop in testing cameras and lenses will spill over to your daily photography. Alfred Stieglitz tested film and developers extensively when he discovered photography as a student in Berlin. Ansel Adams performed extensive tests in the development of his zone system. Although nobody would claim that testing is responsible for their unique vision, it certainly contributed to the skill that transformed their vision into prints of transcendent beauty.