DiGi STUDIO

User Manual

Revision 1.2

For Plugin of Adobe Premiere* and VirtualDub*

Microsoft Windows* Version

DiGiStudio Team

Nov. 2000

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1. Introduction

Thank you for choosing DiGiStudio digital video stabilizer, a novel software solution to your shaky videos. Based on breakthrough technologies of video motion estimation and motion filtering, the digital stabilizer can smooth out shakes and vibrations from your footages elegantly.

Shooting smooth video is not a piece of cake even for professionals because cameras cannot always be fixed or mounted on complicated and expensive electro-mechanical stabilized platforms. You may have to shoot again and again to get somewhat steady videos. However there are times you do not have chances to shoot your footages again; and even you can shoot them again, it'll cost time and money and may not be as good. With this digital video stabilizer, your valuable shaky footages can be saved!

1.1 Features

- High performance whole frame video stabilization.
- Support both interlaced and progressive video formats.
- Tolerance of large scene depth changes and independent moving objects.
- Fully adjustable motion filters.
- Advanced edging distortion compensation
- Simple to use interface.
- No user interaction is required.

1.2 System Requirements

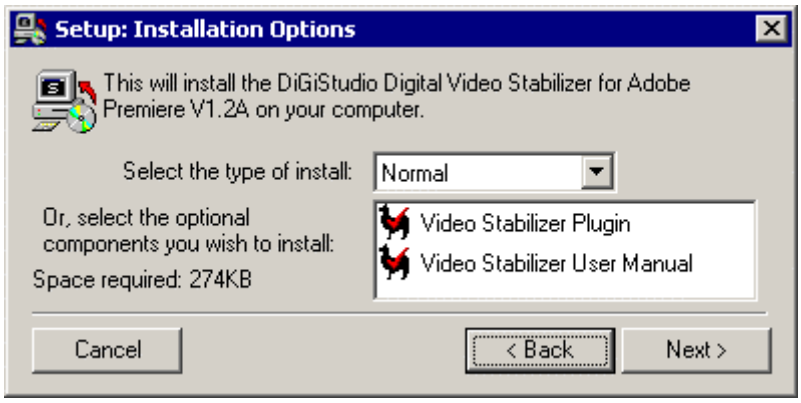
- Operating System
  - ♦ Microsoft Windows 95/98/NT/2000/Me. Mac OS is not supported currently.
- Other Software
  - ♦ Adobe Premiere for Windows 5.0 or above.
  - ♦ VirtualDub 1.3 or later.
- Hardware Requirements
  - ♦ An Intel Pentium MMX compatible CPU or above.
  - ♦ 32M Bytes RAM
  - ♦ 1M Bytes of free hard disk space (for installation).

2. Installation

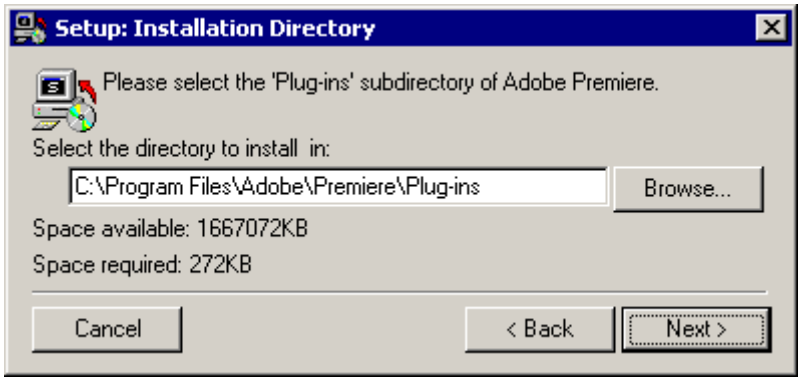
The following sections will give a brief introduction to installation of the plugin for Adobe Premiere and VirtualDub.

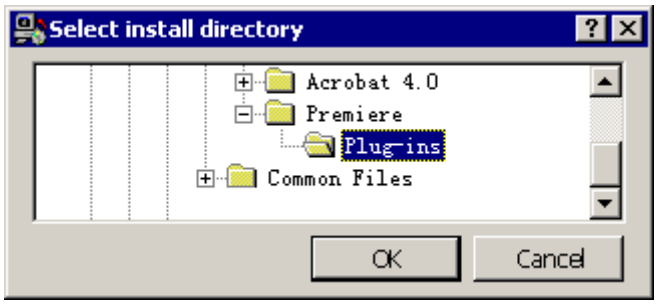
2.1 Adobe Premiere Installation

1. Download the video stabilization plugin for Adobe Premiere (***stabi-premiere.exe***) and save it to your hard disk.
2. From your Windows Explorer window, double click the downloaded file to execute it. Read the license agreement carefully. Then select "Next >" to continue.



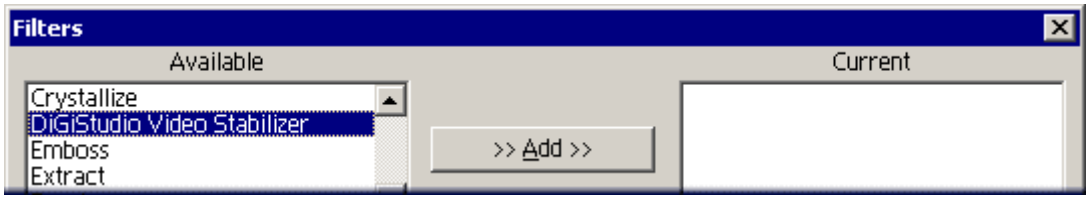
3. Select the components you want to install or just use default settings. In the following dialog box, specify your Adobe Premiere's "***Plug-ins***" directory by clicking "Browse…" button. (The installer will try to detect the directory for you, but do check if it is correct.)





4. Click "Next >" to install the files.

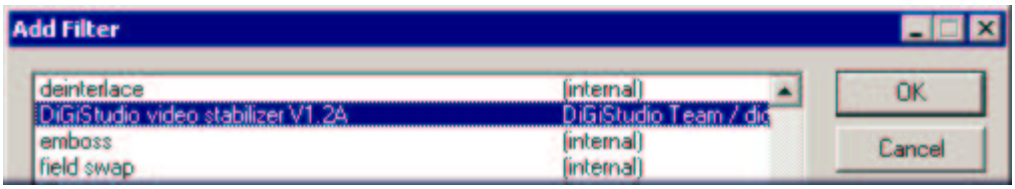
5. Start up Adobe Premiere and the video stabilization plugin should be available as "***DiGiStudio Video Stabilizer***" in the filters selection list. You can now click ">>Add>>" to try it on your shaky video clips.



2.2 VirtualDub Installation

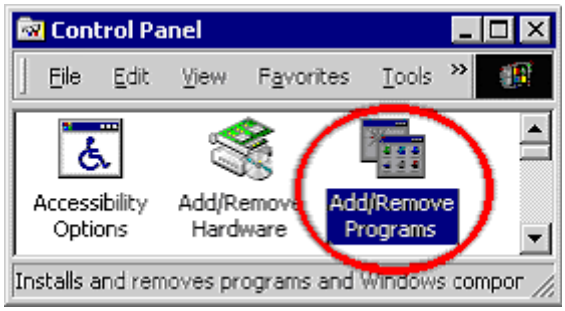
The installation of VirtualDub plugin is similar to that of Adobe Premiere.

1. Download the video stabilization plugin for VirtualDub (***stabi-virtualdub.exe***) and save it to your hard disk.
2. From your Windows Explorer window, double click the downloaded file to execute it. Read the license agreement carefully. Then select "Next >" to continue.
3. Then select the components you want to install or just use default settings. In the following dialog box, specify the "***`plugins`***" subdirectory where VirtualDub is installed. Assume that VirtualDub is installed at "***`C:\Program Files\ VirtualDub`***", then the plugin directory should be "***`C:\Program Files\VirtualDub\plugins`***".
4. Click "Next >" to install the files.
5. Start up VirtualDub and the video stabilization plugin should be available as "***DiGiStudio video stabilizer Vx.xx***" in the filters selection list. You can now click "OK" to add it.



2.3 Uninstall

The plugin can be uninstalled from Control Panel of Windows. Click "Start", select "Settings" and select "Control Panel" to open Windows Control Panel. Then double click "Add/Remove Programs" and following the steps. Another way to uninstall the plugin is to run the uninstaller by on Windows startup menu. It's "Programs->DiGiStudio->Stabilizer for Adobe Premiere->Uninstall".

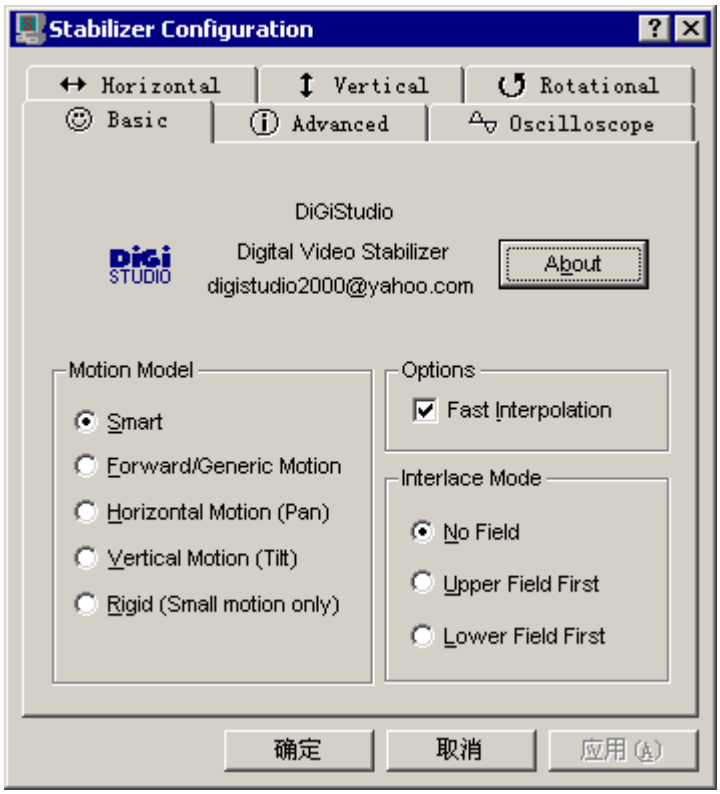


3. Configuration

The video stabilization plugin's configuration interface can be activated by your video editing software's "Configure" or "Edit" command in filter setup dialog. The configuration interface consists six panels. We will introduce their functions in following sections. The configuration interface runs in a separate thread from the main application. So you do not need to close it before closing the filter manager dialog. Thus you can adjust parameters while the filter is running. However, due to technical limitations of Adobe Premiere's plugin management[1], this on-the-fly configuration interface is available with VirtualDub version of the filter only.

3.1 Basic Panel

This is for beginners who want a quick start. There are two adjustable fields on this panel.



- **Motion Model:** This is where you can select a best motion model of your video content.
  - **Smart:** Automatic selection of a model. However for best performance, we suggest you pick the best motion model manually.
  - **Forward/Generic Motion:** Cameras move forward or randomly.
  - **Horizontal Motion:** Cameras pan or move horizontally.
  - **Vertical Motion:** Cameras tilt or move vertically.
  - **Rigid:** Cameras are shooting static sceneries with only small shakes.
- **Options:** Some basic options
  - **Fast Interpolation:** Select this to use Bi-linear interpolation for faster speed. Unselect this to use Bi-cubic interpolation for finer image quality.
- **Interlace Mode:** Specify the interlace mode of your video. *** Important note for Adobe Premiere users: For interlaced video footages, please create your editing project in "No Fields" mode and specify field mode explicitly on stabilizer's configuration interface. In cases when you have to use interlaced mode with your editing project, please choose "No field" with stabilizer. However you may not be able to get the best stabilization results. This inconvenience is due to some technical reasons.**
  - **No Field:** Input video is progressive frame mode.
  - **Upper Field First:** The first displayed field of each frame is upper field (odd field).

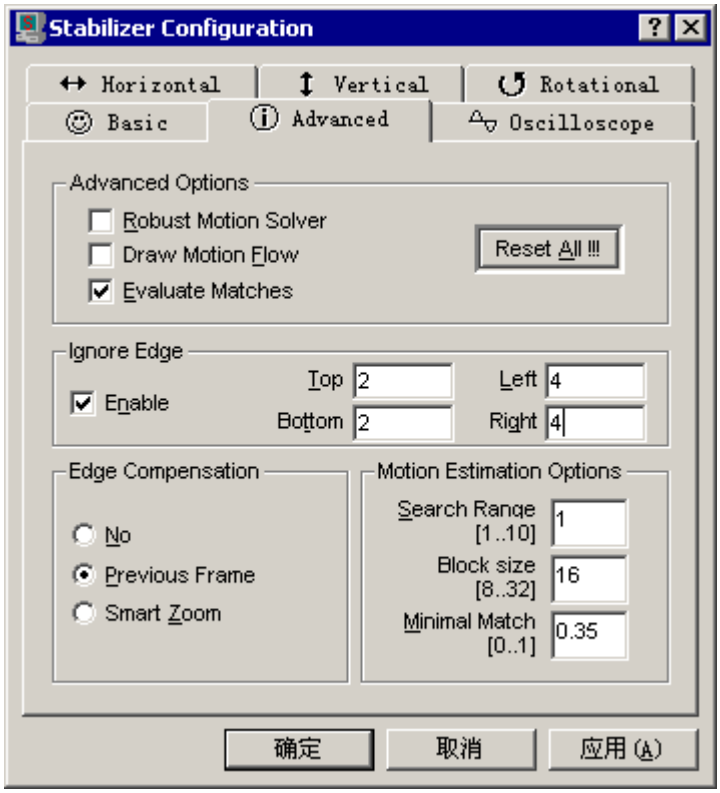
[1] The Adobe Premiere will unload plugins without any notice if it thinks that they are not running.

- **Lower Field First:** The first displayed field of each frame is lower field (even field).

- **About:** To bring up the about dialog box.

3.2 Advanced Panel

This is for advanced users who want to get more control over the stabilizer.



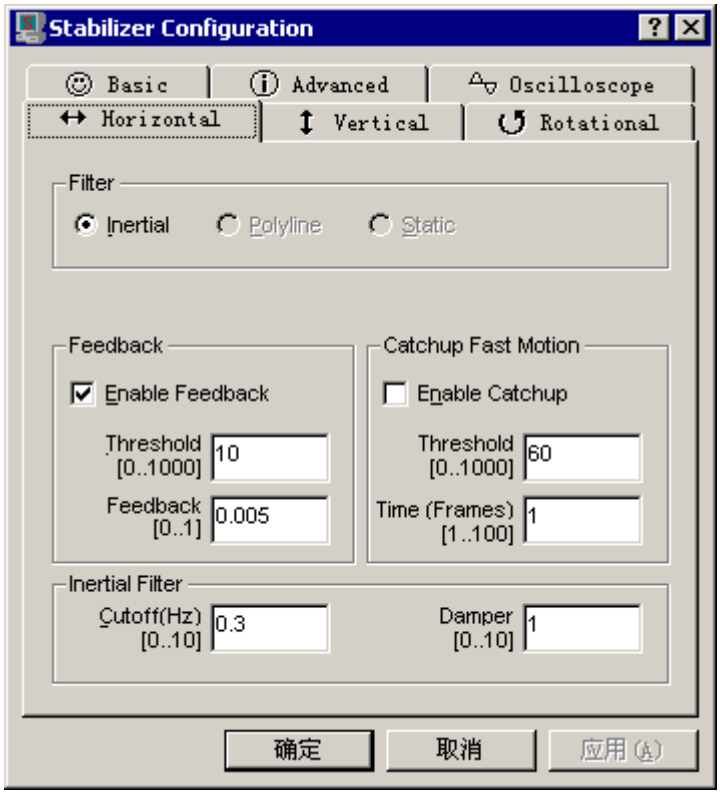
- **Advanced Options:** More options you can select from.
  - **Robust Motion Solver:** Use M-Estimation for motion solution. Only effective when motion model is **rigid**.
  - **Draw Motion Flow:** Draw motion vectors of each image block on output.
  - **Evaluation Matches:** Evaluate the reliability of motion search results.
  - **Reset All!!!:** Click it will reset all parameters to default status.
- **Ignore Edge:** This is used to deal with blank areas around video frames. These blank areas may cause artefacts when edge compensation is used. Edge area defined by Top / Bottom / Left / Right will be ignored by the stabilizer if this option is enabled. See section 5.3 for an illustration of these parameters.
- **Edge Compensation:** Different methods of edge distortion compensation.
  - **No:** Leave it with blank area.
  - **Previous Frame:** Use contents from previous frames as compensation.
  - **Smart Zoom:** Zoom the results and clip blank areas.
- **Motion Estimation Options:** Adjustable parameters of motion estimation procedure.
  - **Search Range:** How far it will look (Caution: further may not be better and will be much slow). Valid range is from 1 to 10.
  - **Block Size:** The image block size used for motion estimation. Valid range is from 8 to 32.
  - **Minimal Match:** The least reliable matching results that are used for motion estimation. Valid range is from 0 to 1.0

3.3 Motion Filter Panel

This is for advanced users who want to adjust the motion filter parameters. There are three separate panels for each motion parameter.

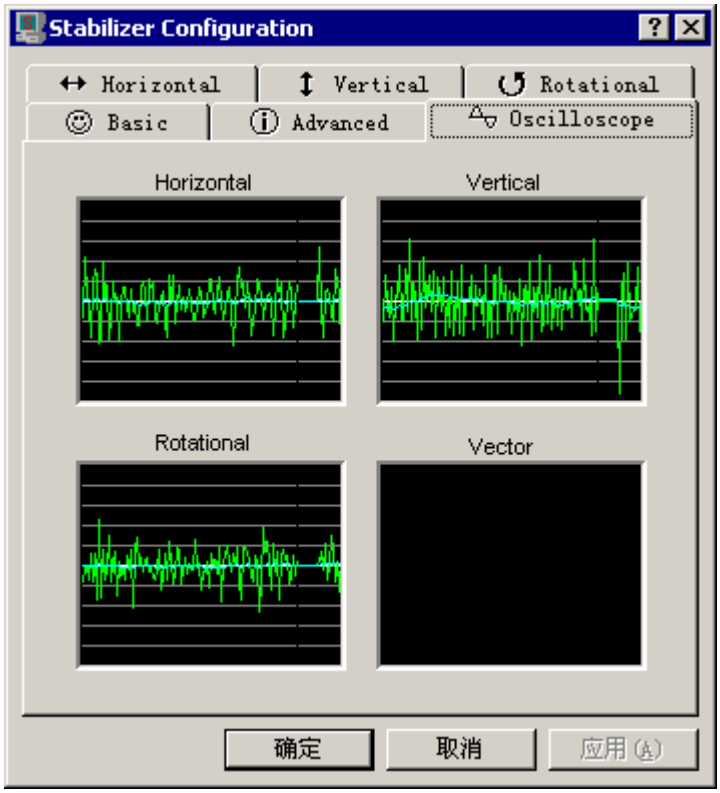
- **Filter:** To choose from different filter models. Currently only inertial model is available.
  - **Inertial:** The filter model is based on common physical regulation of motion.

- **Feedback:** To compensate for filter lags by threshold controlled negative feedback.
  - **Threshold:** Set the minimal threshold of lag that enables feedback. Valid range is from 0 to 1000.0
  - **Feedback:** The amount of feedback. Valid range is from 0 to 1.0
- **Catch up Fast Motion:** To compensate for very fast motions that cause large lags.
  - **Threshold:** The minimal lag that enables the catch up. Valid range is from 0 to 1000.0
  - **Time:** Number of frames used to catch up the pace. Valid range is from 0 to 100
- **Inertial Filter:** Adjustable parameters of the inertial filter.
  - **Cutoff:** The cutoff frequency of the filter. Valid range is from 0 to 10.0
  - **Damper:** Relative damper ratio of the filter. Valid range is from 0 to 10.0



3.4 Oscilloscope

These are plots of three inter-frame motion vectors before and after motion filtering. For the same reason, this will only be available with VirtualDub version of the filter.



4. Using the stabilizer

4.1 Applying the Filter to Video Sequences

The filter is provided as a filter of Adobe Premiere and VirtualDub. And should be applied the same as other filters that comes with your video editing applications. Hosting application controls the scope and order of applying the filter. The major difference between other frame-based visual effect filters is that the stabilizer does not supports gradual change of parameters between editing key frames. Also note that for best performance the filter should be applied to raw footages before other visual effects are applied. Because most visual effects will potentially distort video contents and thus mess up important features the stabilizer depends on.

4.2 Adjusting Customizable Parameters

When the filter is used the first time, the configuration interface is filled with default parameters. These parameters are intended as references and may not present the best ones with your special cases. To get most out of the stabilizer, the best way is to try different parameters. Do not worry that you will mess it up. You can always get every thing back to initial status by clicking the "Reset All" button on "Advanced" panel. Here we'll give some suggestions on choosing proper parameters. However this does not mean that your imagination will be bounded. Just try it and see what happens.

- **Motion Model:** Select the one that most fit your cases (camera motion) should be better.
- **Interlace Mode:** To get proper result for interlaced video, you must specify the interlace mode correctly. *** Important note for Adobe Premiere users: Please refer to section 3.1 of this manual on choosing interlaced modes.**
- **Fast Interpolation:** Select this during preview processes for faster speed and unselect it during rendering final results for better quality.
- **Advanced Options:** Most of these are default to best settings and should not be changed during normal usage.
  - **Edge Compensation:** Just select what you think the best. The default is previous frame.
  - **Motion Estimation Options:**
    - Search range between 1 and 4 should be a better choice for trade-off performance and quality.
    - For very large or a bit blurred video frames, bigger block size should provide better results. Smaller block size may provide more information but will be less reliable.
    - The value of minimal match should be between 0.2 and 0.5 for normal cases.
- **Filters:**
  - Cut-off frequency decides how fast your camera motion will be followed.
  - Feedback is for slow catching up of filter phase lags and should be small enough to avoid oscillation (Eg. Cut-off = 0.3, feedback <0.005; Cut-off = 0.03, feedback<0.0005).
  - If large lags are still unavoidable with feedback turned on, try to turn on "catch up fast motion" also.

- Set cut-off frequency to zero can simulate a still camera. And in this case you should disable feedback and you may also need to enable “catch up fast motion” in some cases.

Also note that you can visit our website for more examples on how to use.

5. Limitations of Current Release

5.1 Shot Boundaries

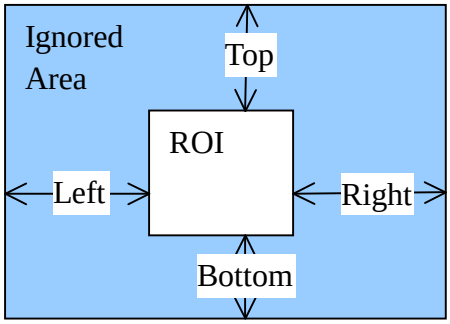
Currently the filter does not handle shot boundaries. There will possibly be jerks at shot boundaries when video contents change dramatically. For best performance, please apply the filter to single shots only.

5.2 Very Fast Motions

In some rare cases, the filter may not get proper results with video that shake very fast and with large motions. Some percent of overlapping between adjacent video frames is required for the filter to work.

5.3 Region of Interest

Tracking of region of interest is not supported yet in this release. The stabilizer will always try to stabilize full frames. However you can simulate a limited version of region of interest, if you set “Ignore Edge” to ignore not interested surrounding areas as illustrated by following figure.



6. Registration Information

Remember this software is a shareware and your support will help us to make it even better. Information about online registration is available at our web site. Contact us at digistudio2000@yahoo.com or visit our site for more information on registration. Also feedbacks are always welcomed. Your supports will make it even better!

http://www.dv99.com

7. Acknowledgement

Many people give us great suggestions and useful feedbacks during our work. Thank you all!