

# CamStream Documentation

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# **CamStream Documentation**

by

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## **Abstract**

CamStream is an easy to use webcam tool with GUI.

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# Chapter 1. Introduction

Welcome to CamStream. CamStream is an easy to use webcam tool for Linux users. In stead of having to fiddle with command line parameters and obscure configuration files, CamStream is completely GUI oriented. The main feature is to watch the image of one or more webcams or TV card and take snapshots. These snapshots can then be saved, uploaded to a server or run through a script.

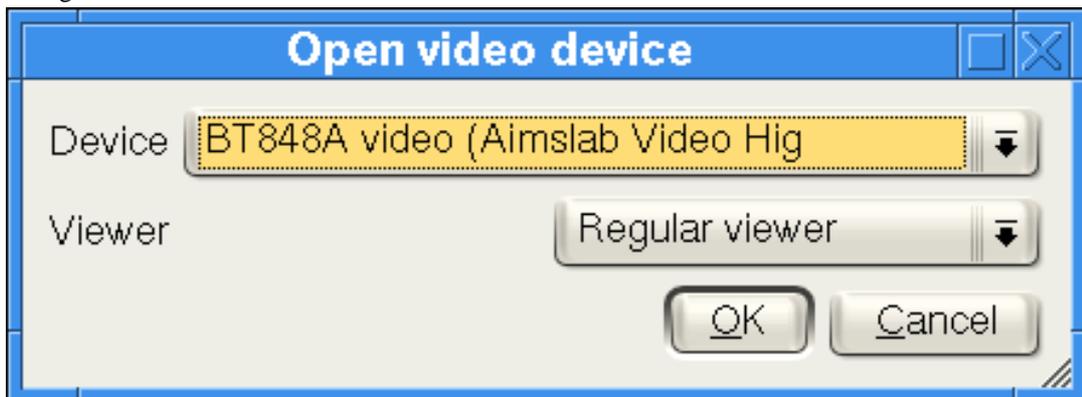
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## Chapter 2. Getting started

First, make sure all the necessary kernel modules for your webcam or TV card are loaded. Most modern Linux distributions do this automatically for you, so chances are just plugging in the webcam will work. Then start CamStream from the command line, menu or “Run Command...” from your desktop.

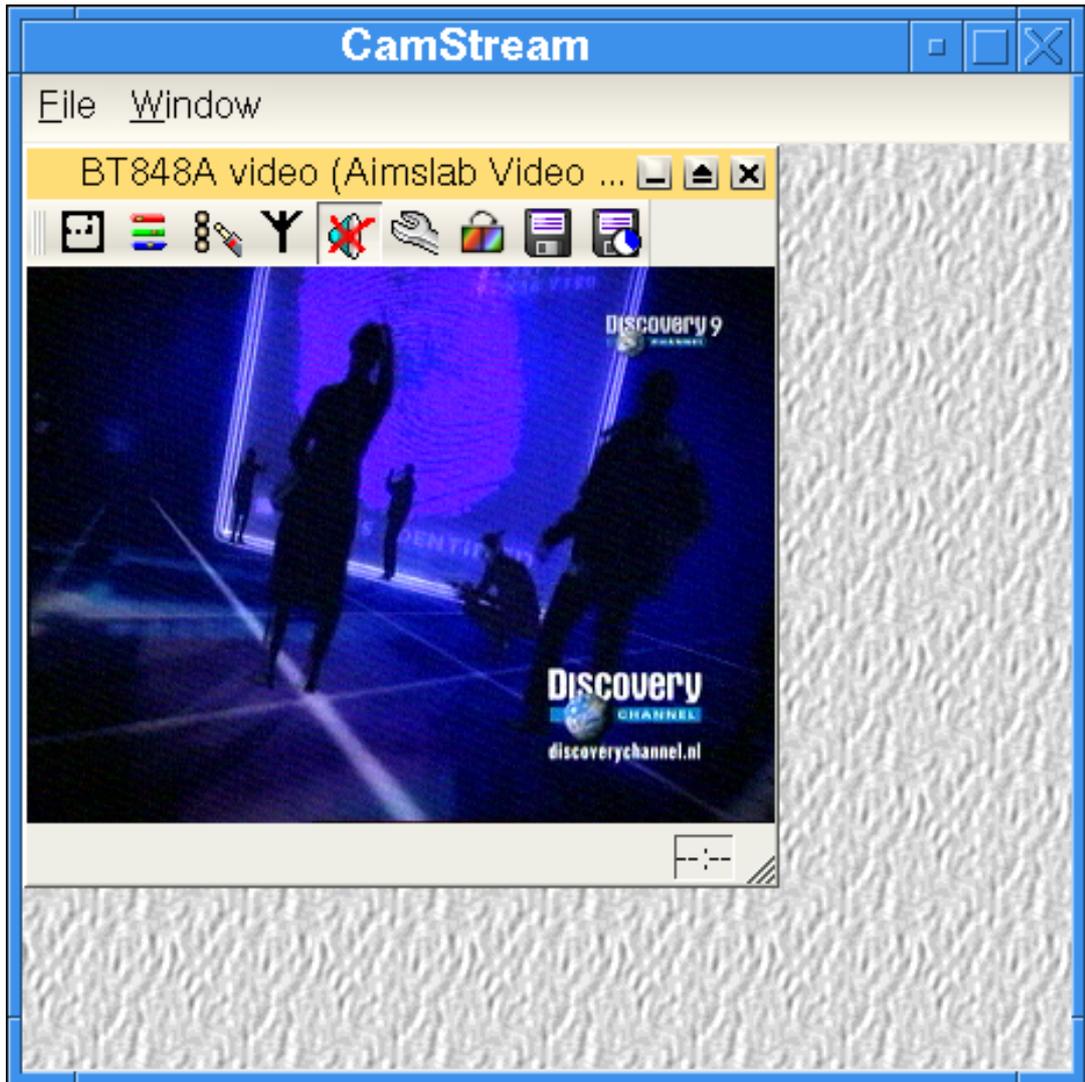
CamStream will start up with a blank window. CamStream has a MDI (Multiple Document Interface): the streams are shown as subwindows of the main window. Initially, no devices are opened.

Click on File -> Open...; CamStream scans for the available video devices and then shows this dialog:



The Device dropdown box contains a list with all the names of the devices that were found. The Viewer dropdown box lists the available viewers; these are the ways in way CamStream can handle your video device.

Select the webcam or TV card of your choice, and the “Regular viewer”. Click Ok; a window should appear in the main window with a live image of the device on your screen.



**Note**

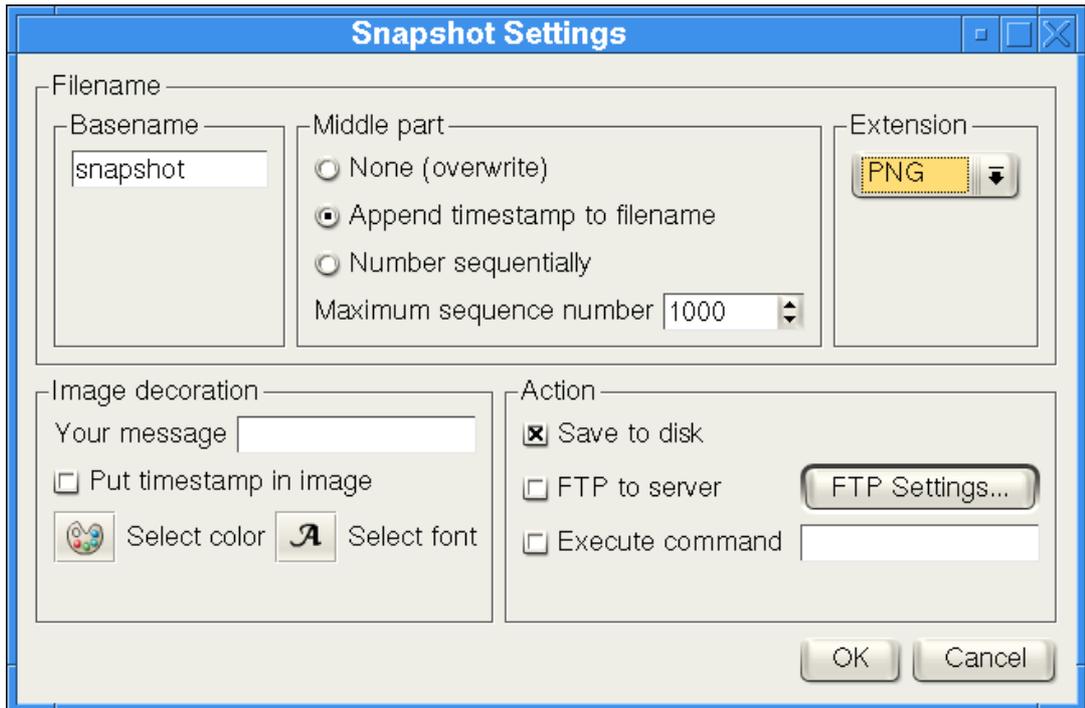
If you selected a TV card and you only see noise, click on the tuner icon  to select a channel. See the paragraph on tuners>

You can change the size of the image, brightness and contrast, input selection and tuning with the first 4 buttons on the toolbar. The input selection and tuning are mostly relevant for TV cards. A TV card usually has multiple inputs (tuner, composite input, S-VHS, etc) and, of course, a tuner.

**Note**

You can not change the size of the image by dragging the corner or sides of the viewer window. The viewer window will resize, but the image will not; you must use the toolbar button for that.

Next, click on the Configure icon . A dialog will open where you can configure what CamStream will do when you take a snapshot.



Select **Append timestamp to filename** and **Save to disk**. Close the dialog, and first click on the  button. Your viewer window will expand, and a black image with the text “Your last saved snapshot appears here” appears on the right.

Now click on the **Save snapshot icon** . The image on the right is replaced with the snapshot of the video stream at the moment you clicked on the button. At the same time, the snapshot is written to disk as a file, which should have a name like `snapshot-20060219-040723.png`.

Congratulations! You have just recorded your first image with CamStream!

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# Chapter 3. Reference manual

## Applets

CamStream works slightly different from other tools. Rather than doing one thing and provide a ton of options to accomplish your task, it uses several applets (here called "Viewers") to perform a specific task. I'll explain using the Open dialog:



Apart from the device selection dropdown box, there is a Viewer selection; in here the available applets are listed. Currently, there is only one viewer fully implemented, the Regular viewer. It implements your basic webcam software functionality and is described in this chapter.

Other viewers will be implemented later; popular requests are a video recorder and a motion detector. One other viewer that is on the TODO-list is a video-conferencing tool. Some viewers will be in beta, or even listed as experimental. Beta viewers may be documented, but experimental viewers never are. All viewers are based on a common framework and share some functionality; it should therefore be easy to develop new viewers.

One of the nice features of the current design is that it is possible to open a device more than once, even with the same viewer. It should therefore be possible to record a movie from a webcam and at the same time take snapshots using the Regular viewer. There are some restrictions, however: all viewers must use the same image size, and (currently) a viewer can have only one configuration stored per device; it is also easy to overtax your CPU this way.

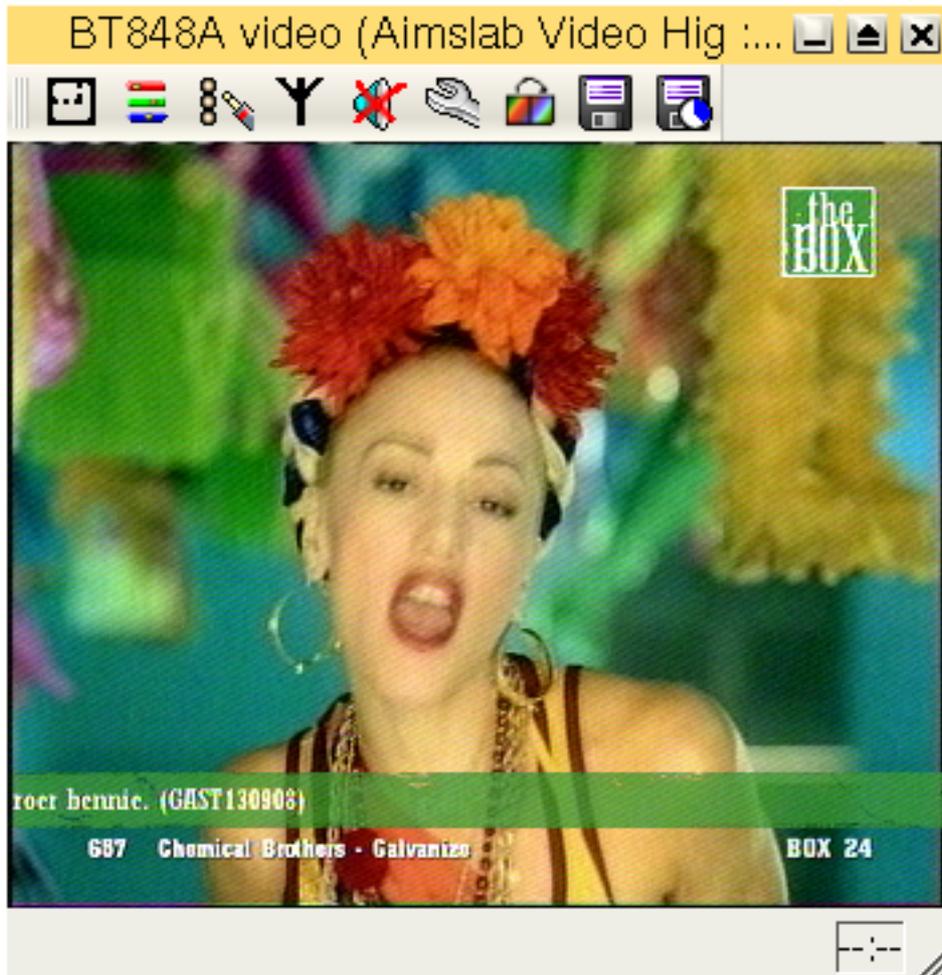
## Regular viewer

The Regular viewer shows a live stream from the selected videodevice and takes snapshots. These snapshots can be

- saved to a file on disk
- FTPed to another computer
- run through a script

You can perform one, two, or all three of these actions on the snapshot, but the filename of the snapshot is the same for all actions.

The window for a Regular Viewer looks like this:



From top to bottom, there's a toolbar, the main viewer area and the statusbar.

## The toolbar



The toolbar contains all the buttons needed for operating the webcam viewer. The first four buttons are used to control the webcam video device itself. The rest performs various settings and toggles.

The buttons are, from left to right:

1. Size/framerate
2. Brightness/contrast/colour
3. Input selection
4. Tuning
5. Muting
6. Settings for snapshots
7. Snapshot view toggle

8. Take snapshot
9. Take snapshot at regular intervals

It is possible that one or more buttons are disabled (grayed out). In that case the device doesn't support that particular function (for example, a webcam does not have tuning capabilities).

## Video control buttons



Clicking on one of the video control buttons will open a dialog with controls.

Under Linux, all dialogs are actually different tabs on a single dialog (except Tuning). The control are described fully in the section Video controls below.

## Tuning



TV cards have one or more tuners on board; these can be used to tune into stations, either from an aerial or cable. It is handy to have a chart ready with the frequencies of your local television stations or cable company.

The controls in the tuning dialog are described below in detail.

## Muting



Some devices (usually TV cards) have an actual mute settings; this should not be confused with muting the soundcard (assuming the sound from the TV card is routed through a soundcard in the system). This button mutes the sound when depressed. It acts like a toggle, so clicking it a second time will unmute the sound.

## Snapshot settings

Clicking this button  will show this dialog:

This dialog is used to set 3 things:

- The filename
- The annotations in the image
- What you want to do with the snapshot: save, FTP, or execute a script

The top half of the dialog has controls for the filename; it consists of 3 parts: the basename, which is simply the first part of the filename. This filename may be augmented with nothing at all (the same filename is user over and over again), a timestamp or a sequence number. The timestamp is of the form `yyymmdd-hhmmss`, in a 24 hour format. This allows for easy sorting and selection of pictures for a particular date or time.

The sequence number is handy if you only want to keep the last N pictures; after the final sequence number is used, numbering starts again at 1. The sequence number is padded with leading zeroes to make sorting easier (e.g. '001' is used as the first sequence number if the maximum is between 100 and 1000).

It is possible to print a message at the bottom of the image, together with an optional timestamp. Your message can be entered in edit input box in the bottom-left corner of the dialog. With the two buttons you can select a font and a color.

## Note

The text is printed directly over the image without a background, so be careful which color you select for the font; otherwise the text may disappear against the background (for example, white text in a snapshot of a snowy landscape).

The final part of the dialog, at the bottom-right corner specifies *what* what you want to do with the image. There are 3 options:

1. Save to disk; the image is saved in the directory where the application was started in
2. FTP to a remote server; click on the FTP settings button to specify FTP parameters
3. Execute a script; you can enter the script name in the box next to the option; the filename is supplied as an argument to this script

Using a script offers the greatest flexibility for processing the image, but there are two things to remember: a) the script must be in the PATH, or you must supply the full pathname to the script; and b) the script may not remove the image; CamStream will automatically remove the file after the script has terminated, if necessary.

## Snapshot view toggle



This button toggles the snapshot view on or off. When depressed, the main viewer area is expanded to the right to make room for the actual snapshot. This way it is possible to see which image has been saved or uploaded. Each time a snapshot is taken, the image at the right is updated.

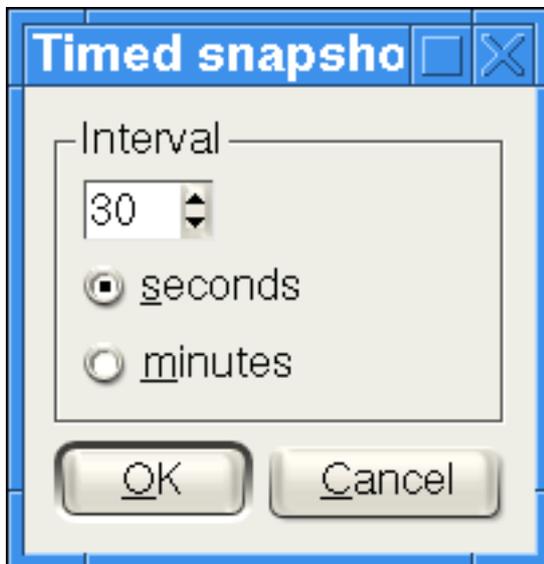


(yes, those are Dutch subtitles)

## Take snapshot/Take regular snapshots



These two buttons control taking a snapshot immediately, or at regular intervals. The left button takes a snapshot immediately. The second button is a toggle button; when clicked, a dialog appears:



You can set the interval in either seconds or minutes; the spinbox has a range of 1-60, so the maximum interval is 1 hour; the minimum 1 second (not recommend, though). The timer starts when you click on Ok; pressing Cancel just closes the dialog.

While the timer is active, the button on the toolbar will remain depressed; clicking on the button again will release it, and the timer stops.

## Main viewer area

This is the area where the actual image is shown. However, when the View snapshot toggle is on,

the area is resized to accommodate both the live view and the last snapshot.

In case you are watching TV and you set up your stations properly, you can use the PageUp and PageDown keys to cycle through your stations. See the Tuning dialog for more information.

## The status bar

The status bar has two fields: a message box and the count-down timer.

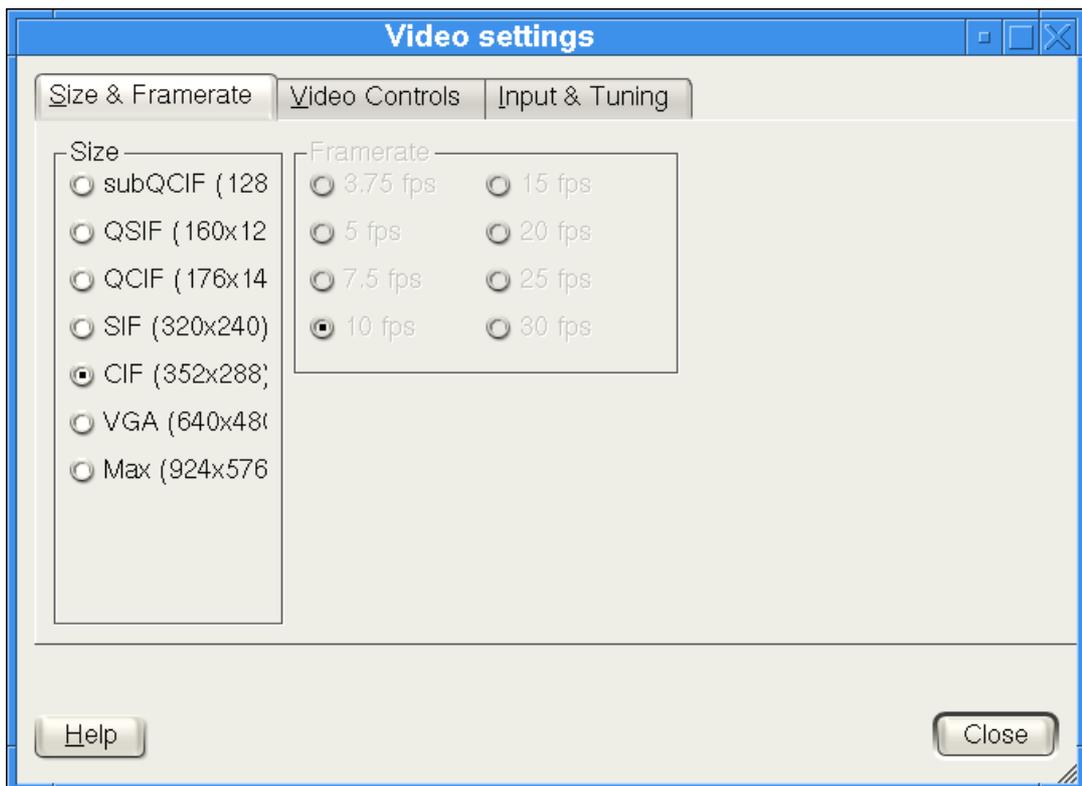


When uploading images, the message box shows information about the FTP transfer. The timer shows the time until the next snapshot; it is therefore counting down when the timer is on. When the timer is off, it will show "--:--".

## Video control dialogs

This section describes all the panels in the video control dialog(s). For Linux, these are panels in a single dialog.

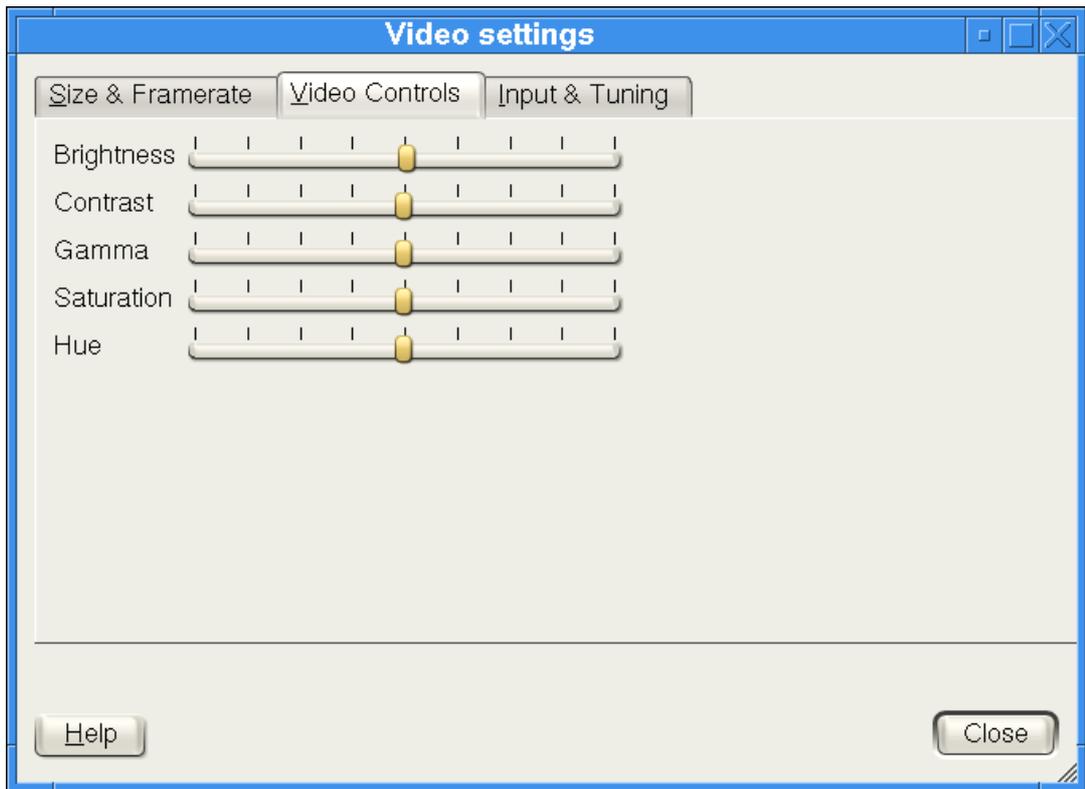
### Size/framerate



In here you can select the desired *image size*, ranging from a stamp-sized 128x96 subQCIF to 640x480 VGA or even more, provided the video device supports this resolution. If a size from the list is not supported by the device, its radiobutton is disabled (grayed out).

The *framerate* only applies to webcams that have such a setting (like the Philips cams). With other webcams and TV cards this setting has no effect; frames from the device are then fetched as quickly as possible.

## Brightness/contrast/colour

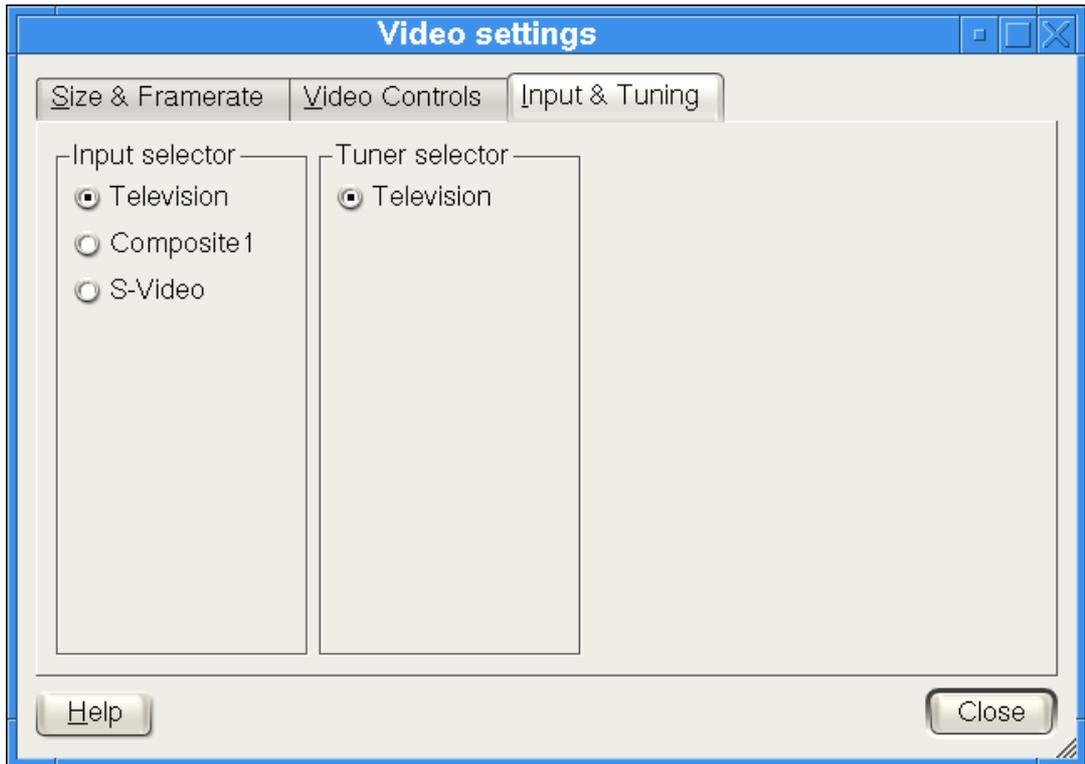


The second page of the dialog contains sliders that affect the colour and brightness of the image. Not all devices support all settings, so some sliders may be disabled.

Nearly all devices have *brightness* and *contrast*, but the *gamma*, *saturation* and *hue* settings are not always present or behave as expected. Originally, the V4L API defined a *whiteness* settings for black-and-white cameras only; but this doesn't really make sense so it has been used as *gamma* for Philips webcams, that really do have a *gamma* setting.

*Colour* and *hue* are for colour saturation resp. hue. The latter is sometimes useful for tuners with a PAL/NTSC decoder if the colours are "wrong". Colour saturation determines how strong the colours should look: moving the slider to the left will produce black-and-white images, and to the right sickly-saturated images.

## Input selection



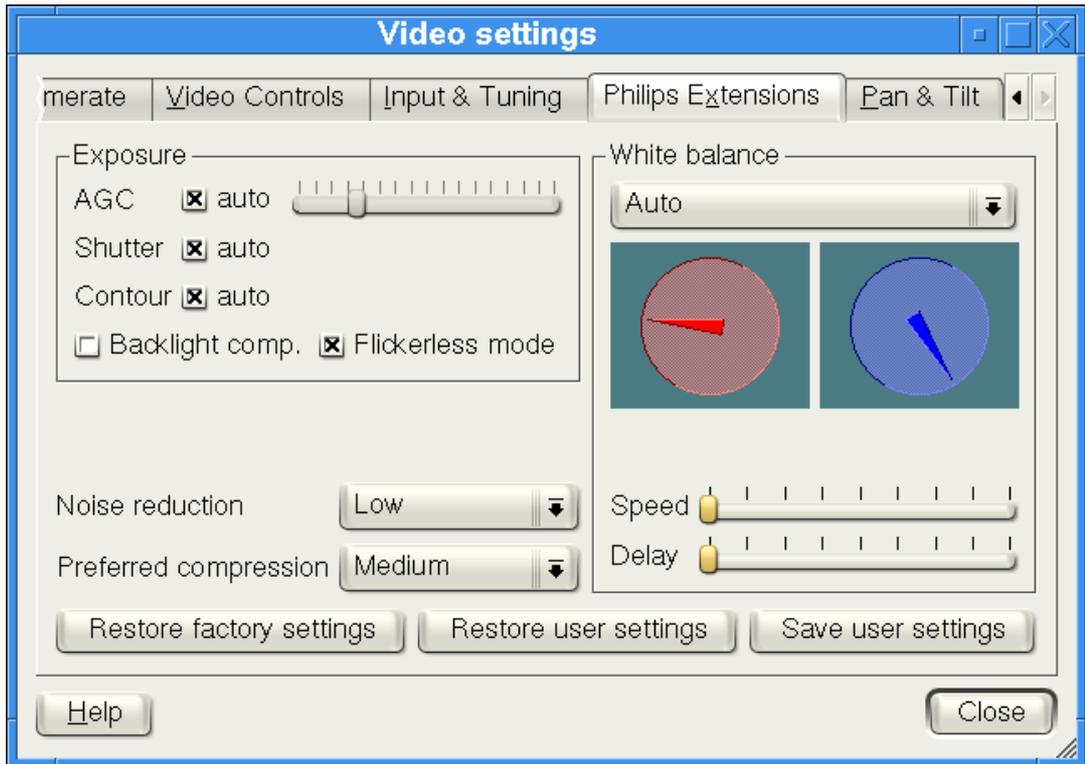
This page contains the selection for input and tuners; usually TV cards have multiple inputs, and may have more than one tuner (though this is rare). Webcams, on the other hand, have only one "input" and no tuners.

This screenshot shows a typical TV card setup: a Television input (e.g. the tuner), a composite input (also known as CVBS) and S-Video. The latter two are usually available as external inputs where a camera or VCR can be connected to.

### Note

It is possible none of the radiobuttons are selected if you open this dialog for the first time; that is because it is not always possible to determine the current input at startup.

## Philips extensions



## Note

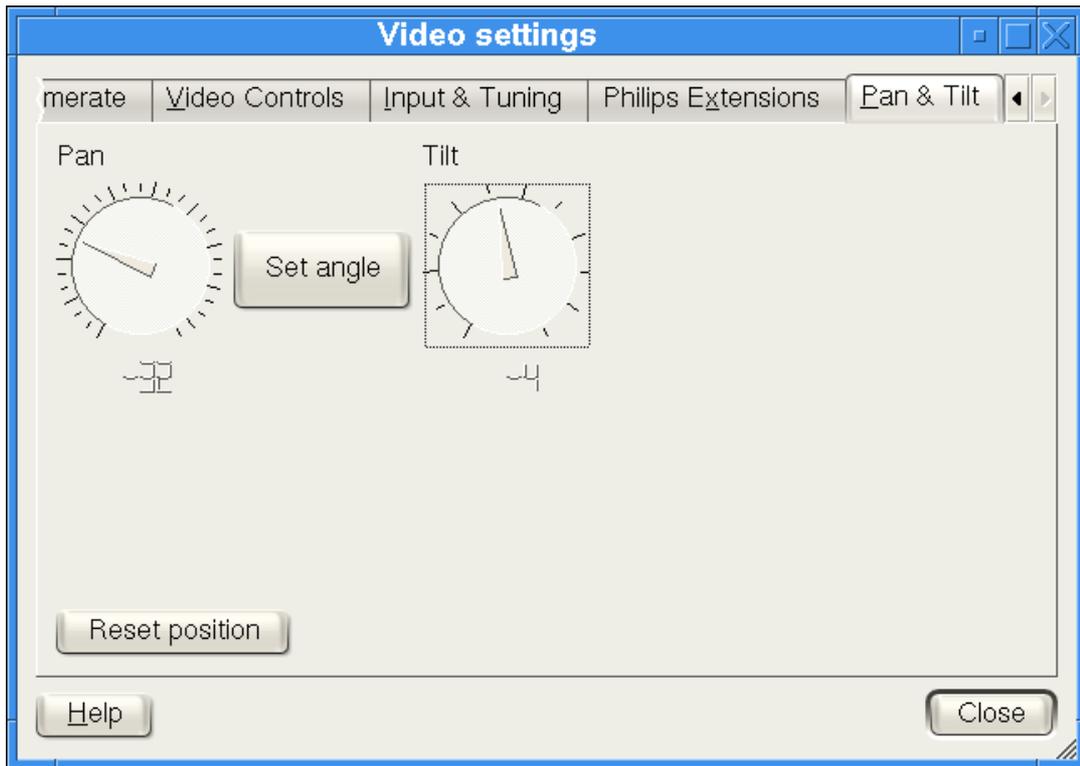
This paragraph applies only to some Philips and OEM webcams on Linux that use the 'pwc' driver. If your webcam does not support these functions, this tab is not shown.

This tab contains a lot of controls that affect the image from certain Philips webcams. They are described here shortly:

AGC	Automatic Gain Control; controls sensor amplification. When auto is on, the slider shows the current AGC value. When auto is off, the AGC can be set manually with the slider.
Shutter	Shutter speed; controls exposure timing. When auto is off, a slider appears by which the shutter speed can be set; however, the slider is not calibrated in any way. It just goes from 'short' to 'long' exposure time, where the maximum exposure time is dictated by the framerate (see description of first tab).
Contour	Contour; defines sharpening. When auto is off, a slider appears which can be used to set the contour value. This affects edges in the image, which are enhanced for higher values of Contour and softened for lower values.
Backlight comp	Backlight compensation. By turning this option on, dark objects in front of a bright surface (i.e. a window at a sunny day) are brightened so they do not appear as a dark blob in the image.
Flickerless mode	When taking pictures under fluorescent lights, the image can appear to flicker due to the 50 or 60 Hz of the mains voltage. This option compensates for that effect.
Noise reduction	The camera's firmware has built in algorithms to reduce noise in the image; this dropdown box sets the noise reduction level.

Preferred compression	The images from the webcam are compressed before they are sent over the USB cable. This dropdown box selects the preferred compression level. Preferred here means that if would not be possible to send the image over the USB bus, a higher compression level is still used. Higher compression saves bandwidth and may allow more cameras to work simultaneously, but it may introduce artefacts in the image.
White balance	White balance controls the colour temper of the image; there are a few presets available in the dropdown box, including "Auto" en "Manual". With the "Auto" option, the webcam tries to automatically adjust whitebalance; In "Manual" mode the colour balance can be set manually using the red and blue dials. The speed and delay sliders affect how quickly the camera reacts to changing lighting conditions in "auto" mode.
Restore factory/Restore user/Save user	These three buttons are used to reset, restore or save all the settings in this dialog. They are stored internally in an EEPROM in the webcam and are used automatically the next time the webcam is used.

## Pan & Tilt



### Note

This paragraph only applies to the Logitech Sphere/Orbit webcams.

The Logitech Sphere and Orbit webcams have motor control; the controls on this tab set the angle for pan (horizontal) and tilt (vertical). To move the camera, move the dials to the desired angle and click on Set angle. The camera will move accordingly.

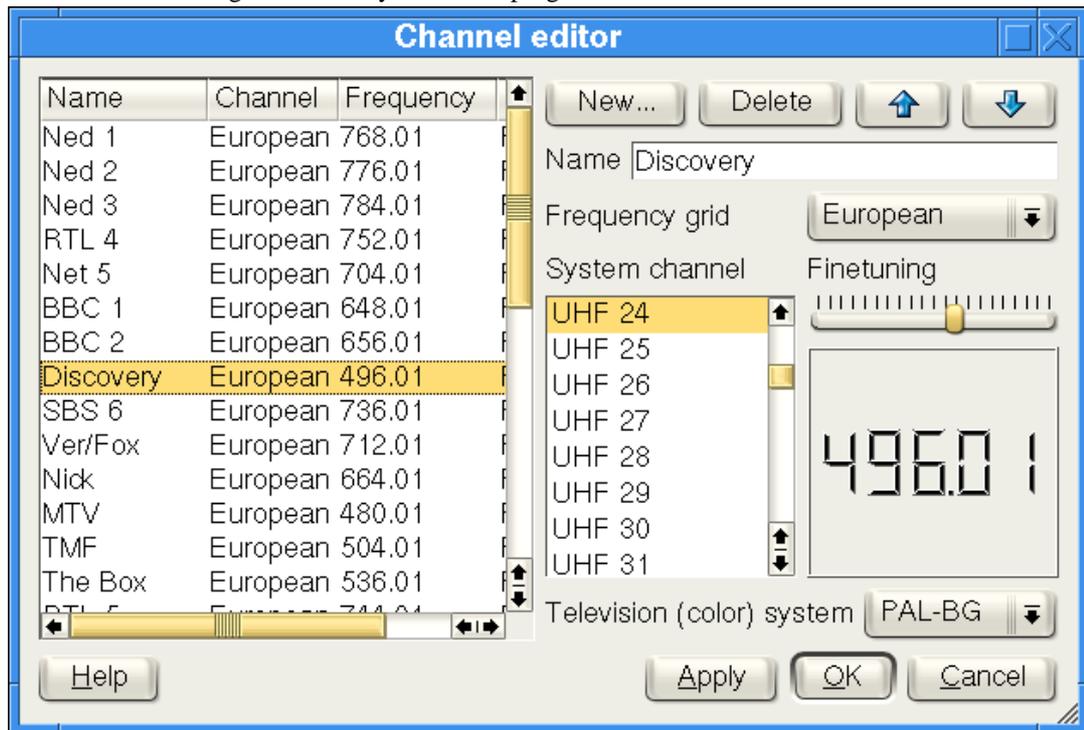
Note that the angles are not absolute; in particular, making a lot of small changes back and forth may result in the camera pointing somewhere else than before with the same angle values. This is due to accumulation errors in the positioning mechanism. However, it is possible to reset the camera's position to one that is halfway between its maximum left- and right angle, looking straight

ahead. To do so, click on Reset position. The camera will move about for a second and then be at its starting position.

The camera's maximum pan and tilt angles have been determined experimentally; it may be possible your camera can move further, but to prevent the positioning mechanism hitting the stops and possibly jam, these safe angles have been chosen by the driver. The Sphere/Orbit camera can pan 70 degrees to the left and right; together with the camera's this allows for a full 180 degree panorama. The vertical tilt ranges from 30 degrees down to 25 degrees up (Other drivers may support different angles).

## Tuning dialog

This rather full dialog contains all you need to program TV stations in CamStream.



At the left is a scrollview that contains all the stations already programmed. At the right are controls to create and remove stations, change the order and set the frequency of the station.

### Note

To avoid confusion, a small explanation is in order. Some people refer to a station as a "channel". However, in this manual "channel" refers to a frequency channel (named System channel in the dialog), which is the technical definition. To indicate a broadcasting station, the term "station" is used.

To create a new station, click on New.... If a station was already selected, a copy is made and the name set to "New". The name of the station can be entered in the Name box.

Now comes the difficult part: setting the right frequency. Most frequency tables for TV station listings put a station in a frequency band and a channel, optionally with a finetuning marker; for example, "UHF 48+". However, the bands and channels are not the same for all countries; there are 3 main systems in use (so called frequency grids): European, American and Japanese. You have to select the proper Frequency grid in order to match the channels in CamStream to your table.

### Note

CamStream currently only has channel tables for the European frequency grid. Input for the correct bands, channel names and frequencies in other grids is welcome!

For North America, Europe and Japan the choice is therefor clear; for other continents/countries,

you may have to test which grid works best. Next comes the channel; just select the correct one from the System channel list. Apart from the terrestrial VHF and UHF frequency bands, there are also channels in the so-called cable band; these are labelled "CATV" in the list.

When you select a channel, the frequency display in the dialog changes accordingly; it shows the current frequency in MHz. In case there is an image but it is not quite optimal, you may need to adjust the frequency with the Finetuning slider until you get a clear picture.

Last, do not forget to select the proper television/color system for the station; again, there has been little consensus worldwide as to the best system (Those of you who think that the digital revolution/analog switchoff will solve all that: forget it...). Again, there are 3 main systems in use: NTSC, PAL and SECAM. NTSC is used mainly in North America and Japan, PAL and SECAM in Europe, with SECAM almost exclusively in France. There are a few variations of all these systems, you may have to test which system works best in your country.

You can browse through your station by clicking on them in the list; you can also use the PageUp and PageDown keys in the main viewer to cycle through the stations.

To remove a station, select it in the list and click on Delete. To change the order of the stations, select a station and use the Arrow up and Arrow down to move the station up and down in the list.

To modify a station, select it in the list and use the controls at the right hand side to change the name, frequency or color system. Click on Apply to save your changes.