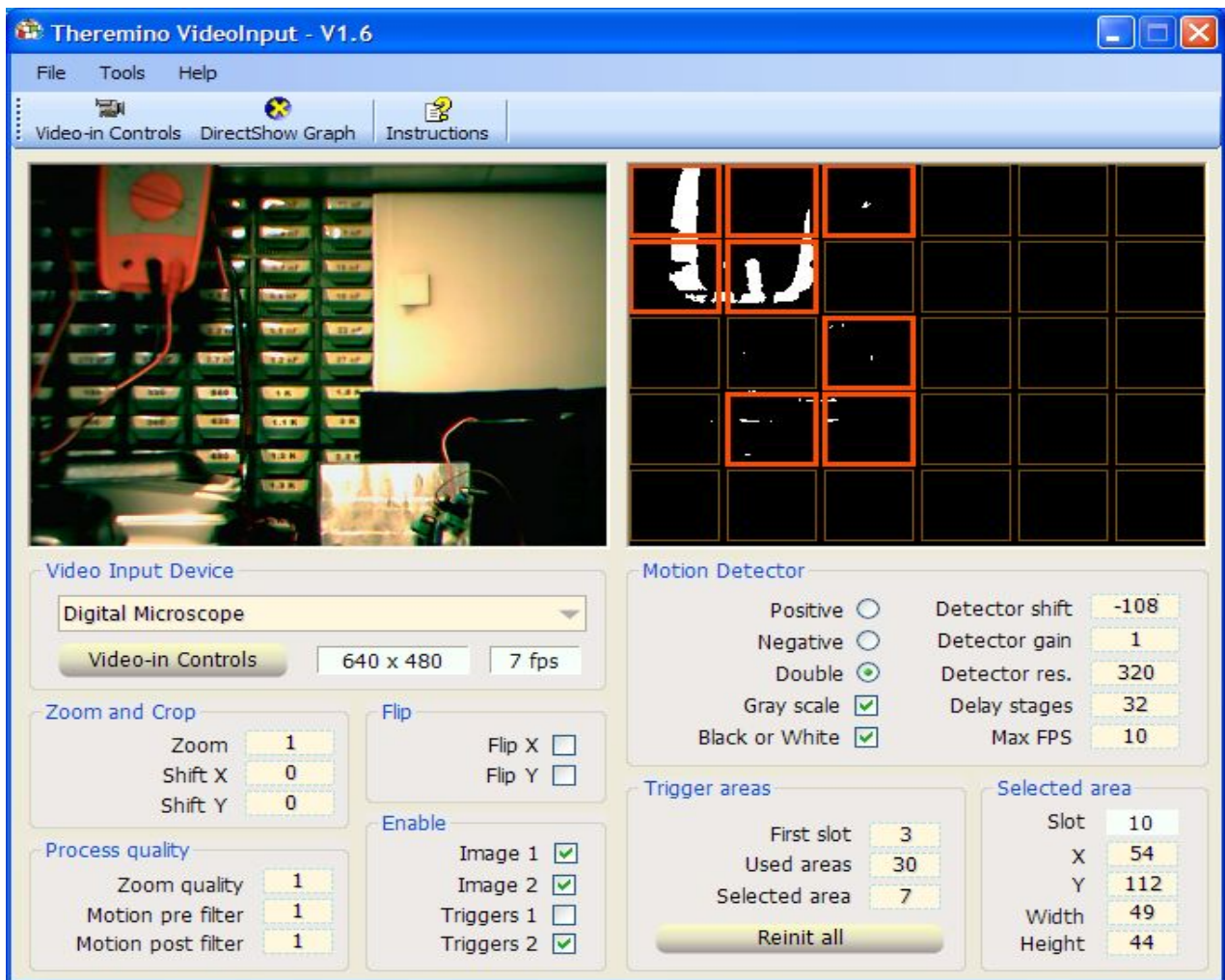


theremino
•the•real•modular•in-out•

System Theremino

Theremino Video Input Instructions

Theremino Video Input



The Video Input is designed to detect changes in the video images (movement detection) from a video camera.

The uses are varied, from the anti-theft perimeter surveillance, the control of access to the revelation of the passage of animals.

The ability to describe areas of interest, even overlapping, allows you to specify different types of alarm and concern for the various areas of the image and to exclude areas that are not significant or "noisy" as the curtains that move the air movements.

Many Video Input applications can coexist on the same computer, each one with his briefcase its parameters and its camera completely independent.

The functions of this program are:

- Reading of the video signal
- Signal Conditioning
- Extraction of movements
- Writing the difference values in the Theremino System "Slots"

Interaction with the Theremino System

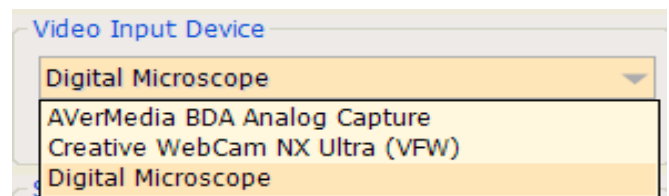
The Video Input is a Theremino modular component (1) and interacts with the other components of the system through the slot (2)

(1) Theremino is a modular system consisting of software and hardware components connected via USB.

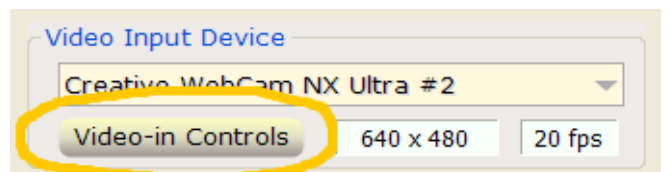
(2) The slot cells are in the "Memory Mapped File" named "Theremino1" named with a number from 0 to 999. Each "slot" contains a "Float" number (4 bytes) and can be written or read by every program on the system, in a very short time (a few microseconds). With slots you can keep a fast communication of data and information between different service processes, making possible the true hardware and software modularity.

Selecting the video input device

Clicking on the name you choose the input device.



The "Video controls" button opens the panel of the video input parameters (See next page)



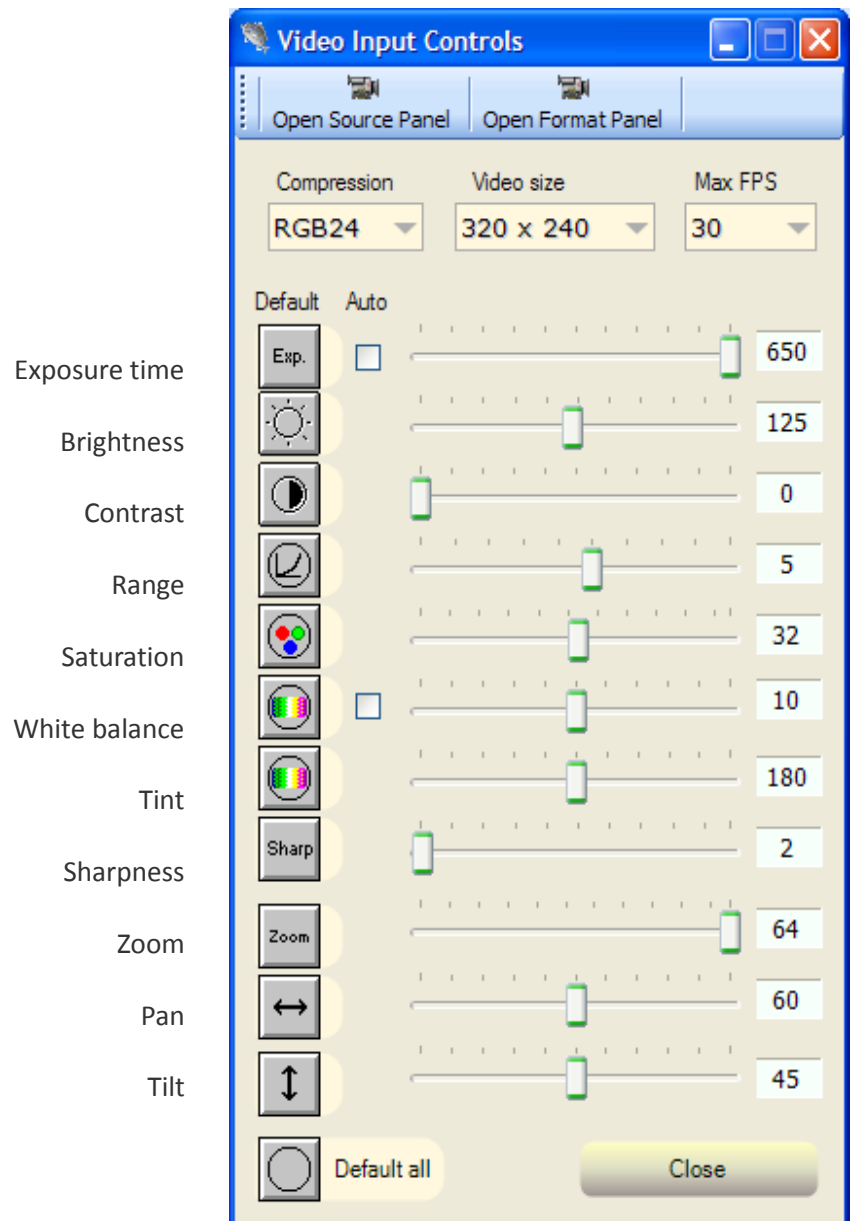
When you buy a device, make sure it is at least 720p HD (1280 x 720) or better yet, Full-HD 1080p (1920 x 1080) And be careful not to be fooled by the many mega-pixels that are often declared.

The mega pixels interpolated by the software are always much higher resolution of the real hardware but you have to identify the true resolution, which unfortunately is often the usual 640 x 480.

Adjusting the video input parameters

Depending on the device selected video some of these properties can be disabled. For example, if you use a OVT Scanner the settings "Zoom", "Pan" and "Tilt" are not enabled.

It can easily happen to accidentally leave active the box "Auto", so the box "Auto" is always disabled at the start of the program even if they were active in the previous session.



These properties are only accessible if you use video devices with drivers such as "WMV". If you only have drivers "VFW" it will be necessary to use "Open source panel" and "Open format panel" as shown on the next page.

Adjusting properties for devices VFW

Some properties of the video devices may be accessible only with "Open source panel" and "Open format panel"

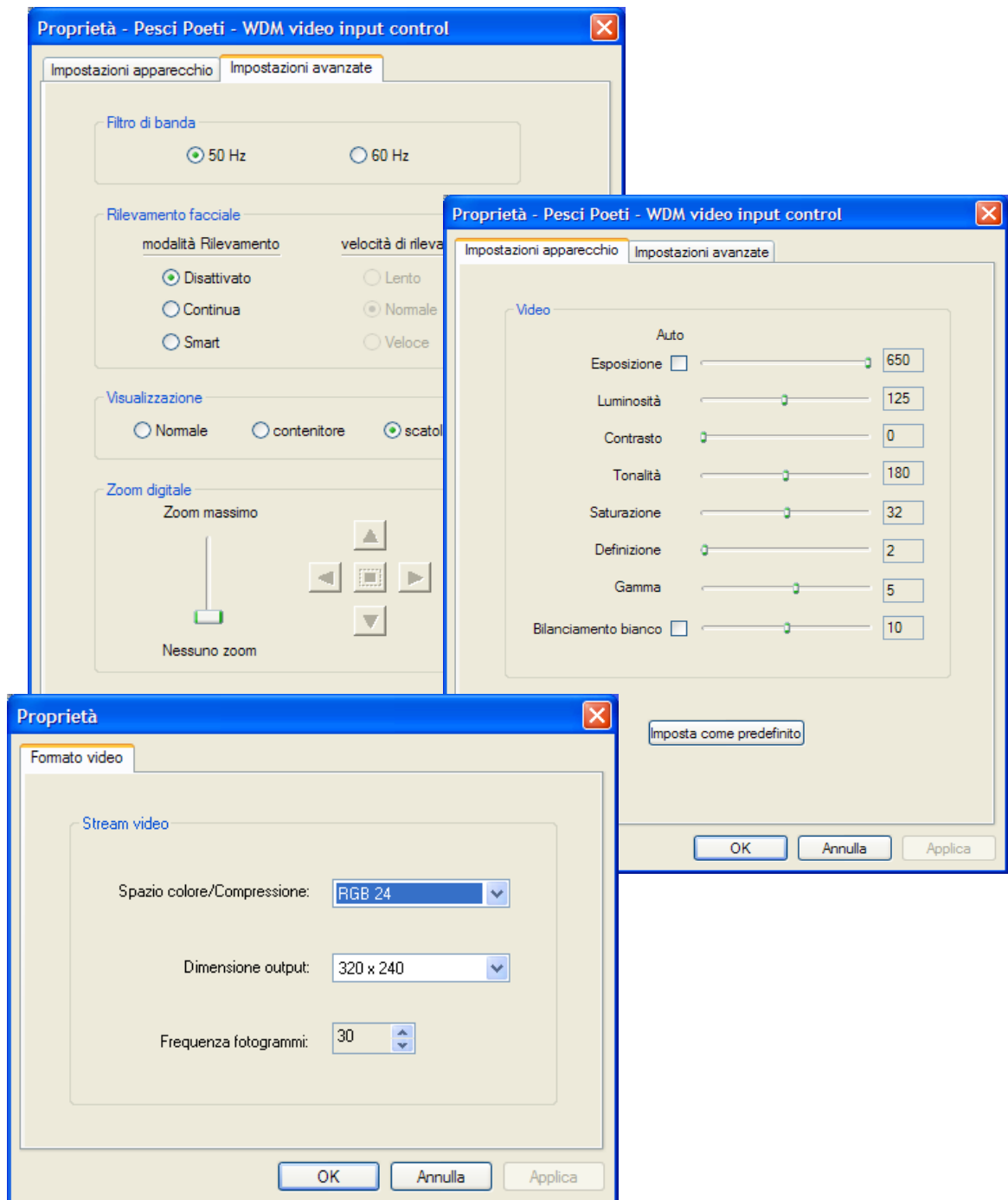
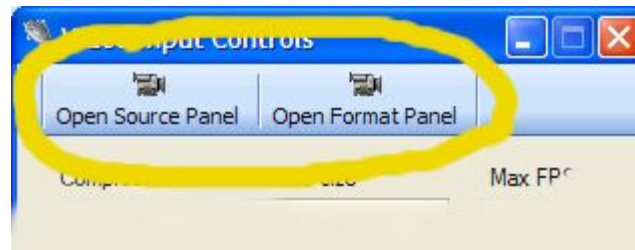
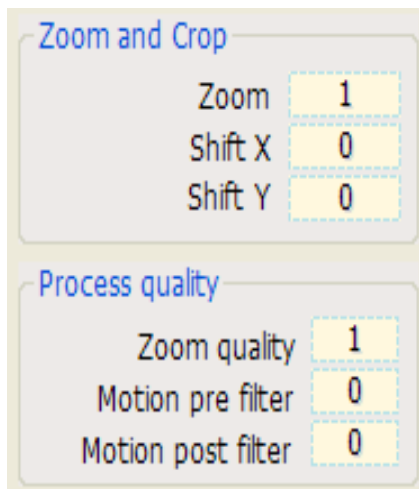


Image adjustments



Zoom and Crop

Zoom	1
Shift X	0
Shift Y	0

Process quality

Zoom quality	1
Motion pre filter	0
Motion post filter	0

Zoom

Digital magnification of the image. You can also magnify with the mouse wheel.

ShiftX / Shifty

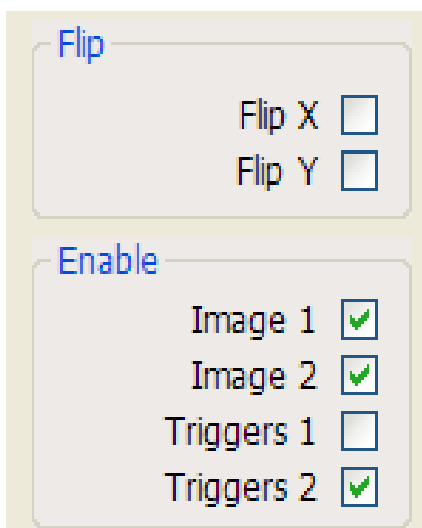
You can make the image move with these boxes or by pressing the left mouse button on the image and dragging it. Shifting is only valid if the image is enlarged.

Zoom quality

Adjust quality for the digital on-screen magnification.

Motion pre filter first acts of the algorithm for the detection of differences, if you set it to zero disables and the resolution used for the filter of the differences becomes the same as the original image of the camera. We use "Motion pre filter" and "Detector res." to save computation time or to decrease the resolution of the detector in some cases. Try what conditions provide the best results.

Motion post filter acts on the output of the algorithm of detection of differences, in some cases it can decrease the noise and eliminate tiny dots. Try what conditions provide the best results.



Flip

Flip X	<input type="checkbox"/>
Flip Y	<input type="checkbox"/>

Enable

Image 1	<input checked="" type="checkbox"/>
Image 2	<input checked="" type="checkbox"/>
Triggers 1	<input type="checkbox"/>
Triggers 2	<input checked="" type="checkbox"/>

FlipX / Flipy

Flip Horizontal and vertical image.

Image1 - Enabling the image on the left.

Image2 - Enabling the image on the left.

Triggers1 - Enabling the areas of the trigger in the first image.

Triggers2 - Enabling trigger areas in the second image.

Extraction of movements

Motion Detector	
Positive <input type="radio"/>	Detector shift <input type="text" value="0"/>
Negative <input checked="" type="radio"/>	Detector gain <input type="text" value="5"/>
Double <input type="radio"/>	Detector res. <input type="text" value="160"/>
Gray scale <input checked="" type="checkbox"/>	Delay stages <input type="text" value="10"/>
Black or White <input checked="" type="checkbox"/>	Max FPS <input type="text" value="30"/>

Positive - Is used to isolate the differences from dark to lighter.

Negative - Is used to isolate the differences from lighter to darker.

Double - Used to identify all the variations.

Gray scales - Mix all the colors in a gray scale.

Black or White - Make a threshold function and turns to black or white.

Detector shift - Adjusts the difference detector zero level (brightness)

Detector gain - Adjusts the difference detector gain (contrast)

Detector res. - Adjusts the difference detector horizontal resolution **(1)**

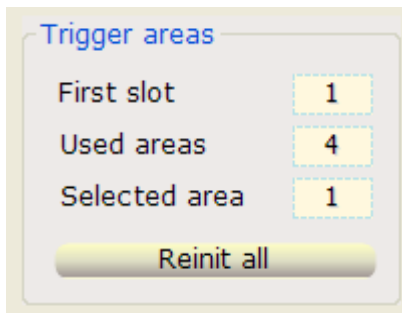
Delay stages - Adjusts the length in frames of the delay line **(2)**

Max FPS - Reduction of the working frequency of the difference detector (to save CPU time)

(1) "Detector res." acts only if "Motion pre filter" is non-zero, otherwise the resolution is always that of the original image in the camera's arrival. Using "Detector res." to save computation time or to decrease the resolution of the detector in some cases. Try as a condition provides the best results.

(2) "Delay stages" adjusts the number of frames of the video delay. This number multiplied by the time of each frame (adjustable with Max fps) determines the total time of detection of movements. Use a low value to reveal only the fast movements.

Trigger areas



Trigger areas	
First slot	1
Used areas	4
Selected area	1
<button>Reinit all</button>	

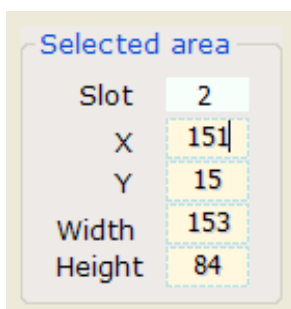
Number of the slot for the first area, the other using consecutive slots.

Number of areas.

Selected area (can be changed with the commands in the next panel)

Button to reset the areas to the initial condition.

You select an area by changing the number in the "Selected area" or by clicking on an area in the windows of the video. The selected area can be moved and resized with the following panel.



Selected area	
Slot	2
X	151
Y	15
Width	153
Height	84

The "Slot" indicate to which slot is sent to the output value of this area. The areas use consecutive slots starting with "First slot" for which this value is only indicative and not editable.

The X and Y change the position of the area.

The Width and Height values change the size of the area.

The output values

Someone may be disappointed by finding that this application, having extracted with great care motion data, do not use them to issue directions or alarm sounds.

It would have been easy to add these features but we preferred to go only up to write data into the slots, to allow maximum flexibility in the use of the same.

The philosophy of the system Theremino provides software modularity, each application must therefore play only part of the job he can do well and leave to other applications tasks of different types. This makes it possible to develop complex systems simply by combining hardware and software modules such as Lego bricks.

The data can then also be used in ways not foreseen at the time of writing of this application.

Alarm functions can be implemented with the Theremino_Script application or other more complex languages such as C + +, CSharp, VBnet, VB6 and Pascal.