```
      10x0              0x      x10x0x10x0x10x   10x0x10x0x10x0      x0x1         x0x1        10x0        x0x1
    0x10x0            0x0x      x10x0x10x0x10x   10x0x10x0x10x0      x0x1       10x0x10x      10x0x1    10x0x1
  0x0x10            0x0x10 x10x                  10x0               x0x1       10x0x10x      x0x10x   10x0
  0x0x10x0            0x0x10 x10x0x10x0x1         10x0x10x0x10       x0x1     0x10    0x0      x10x0x10
    0x10x0        x10x0x    x10x0x10x0x10x        10x0x10x0x10       x0x1     0x10x0x10x0       x10x0x10
      10x0x1      x0x10x    x10x                  10x0               x0x1     0x10x0x10x0          0x0x
    x0x10x0x10x0x1          x10x                  10x0          x10x   x0x1   0x10x0x10x0x10         0x0x
    x10x0x10x0           x10x0x10x0x10x      10x0x10x0x10x0  x10x  10x0   0x0x         0x10          0x0x
      0x0x10             x10x0x10x0x10x      10x0x10x0x10x0     0x010x0   0x0x         0x10          0x0x
```


Perspective Transform Estimation and Image Masking

VEEJAY 1.0

A visual instrument and realtime video sampler for GNU/Linux

Setting up the Viewport

The viewport provides support for the perspective transform estimation. It allows you to define 4 corners that will form a quadrilateral to which the image wll be mapped.
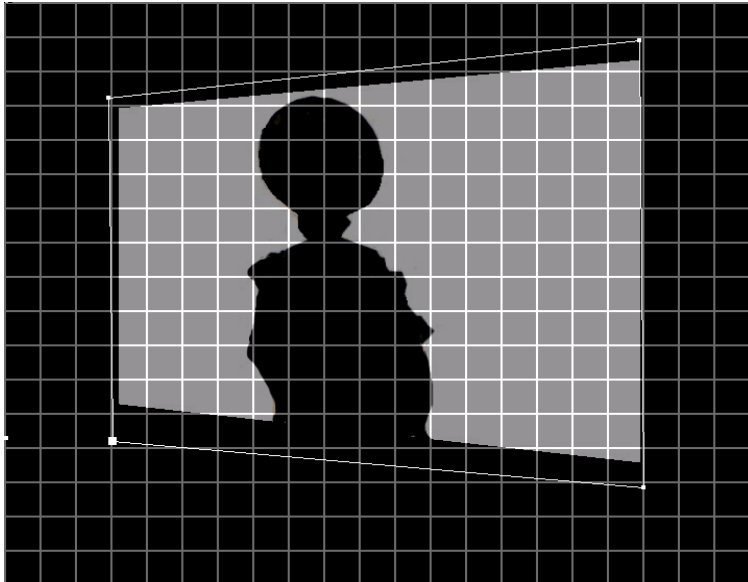
Veejay has two viewports:
> 1: Input viewport (Sample, Stream, Camera ...)
> 2: Output viewport (Projection, Beamer)

You can use viewport 1 to crop (and zoom) a portion of the input video or to apply a forward perspective transform. Select the 4 points that define the region of interest and choose forward as the transformation method. The image within the 4 points will be transformed scaled to full frame size.

You can use viewport 2 to calibrate your projection screen. Select the 4 points that define the corners of your projection. Choose projection as the transformation method.
The image will now be mapped inside the 4 points.

Press **CTRL+v** to enter Viewport 1 setup , or **CTRL+p** to enter Viewport 2 setup.
 You will see 4 points that form a quadrileteral.

Now, **press CTRL+h** to activate the on-screen-display help
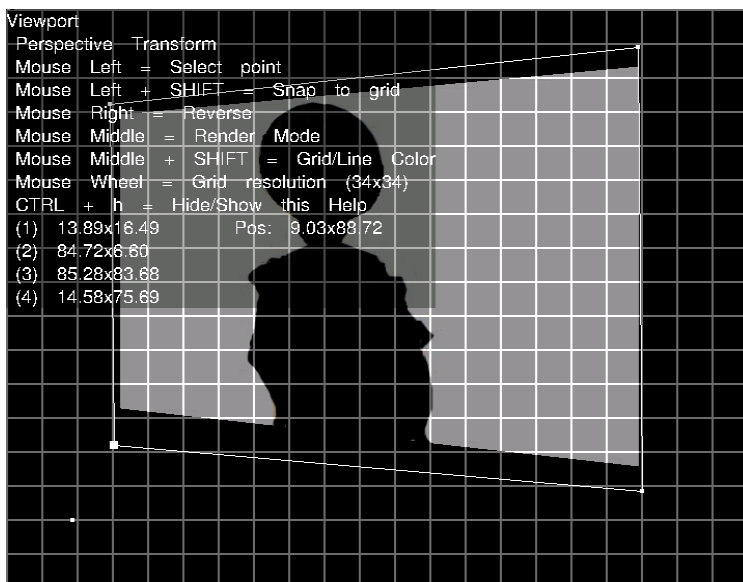

Illustration 2: Viewport Setup help

When the mouse is moved across the video screen, the point in the quadrilateral that is nearest will be selected automatically. The point in the quadrilateral that is nearest will be highlighted and enlarged. In illustration 2, the bottom right point is currenlty selected.

By pressing SHIFT + Left Mouse button, you can select a new point that is aligned to the grid and by pressing just the left mouse button, you can select points freely.

By pressing the Right Mouse button, you can switch between traditional and forward perspective mode. By default, the traditional mode is selected (see illustration 5). This will project the image into the quadrilateral you have set up. If you choose the Forward transform, the selected quadrilateral forms the new full screen image (see illustration 4).

For convenience, you can press SHIFT + Middle mouse button to reverse the grid and point colors and with the Mouse Wheel you can change the resolution of the grid.

Once you are happy with the results of the transformation, simply press the middle mouse button to enter the viewport render mode. Your current configuration will be saved in ~/.veejay/viewport.cfg and loaded automatically the next time you start veejay with the -V (viewport) commandline option.

Illustration 4: Forward Transform

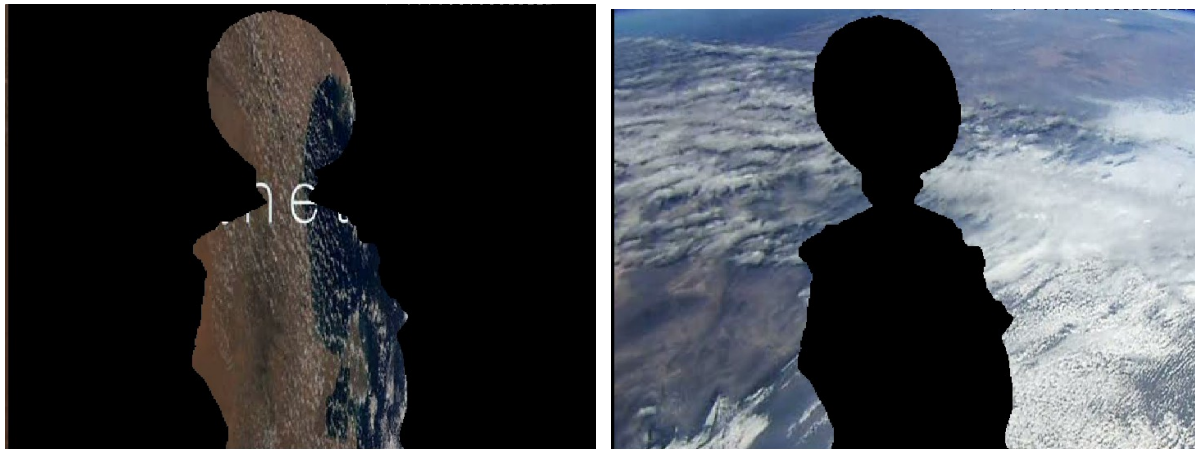*Illustration 3: Traditional transform*

Controllers:

Name	Description
Left Mouse button	Select a point (Freehand)
Left Mouse button + Shift	Select a point (snap to grid)
Right Mouse button	Switch between traditional and forward transform
Middle Mouse button	Switch between viewport setup and viewport render mode
Middle Mouse button + Shift	Invert the grid/line colors
Mouse Wheel up/down	Increase/Decrease the grid resolution
CTRL + v	Enter/leave viewport 1
CTRL + p	Enter/leave viewport 2
CTRL + h	Display on-screen-help on viewport setup

Applying the Image Mask filter

The Image Mask specifies which region of the image is replaced for another image. This filter transforms the current image into a black and white image, where white pixels represent the pixels of the image whose sample value is above the treshold range, and black pixels represent pixels with the sample value below the current threshold. You can either replace the black or the white pixels with another image. The pixels that fall outside the selected range will then be painted black. This is shown in illustrations 6 and 7

Controllers:

Name	Description
Parameter 0	Threshold
Parameter 1	Switch between background/foreground replacement
Key 'Plus'	Use next sample or stream to mix in
Key 'Minus'	Use previous sample or stream to mix in
Key '/'	Switch between sample and stream