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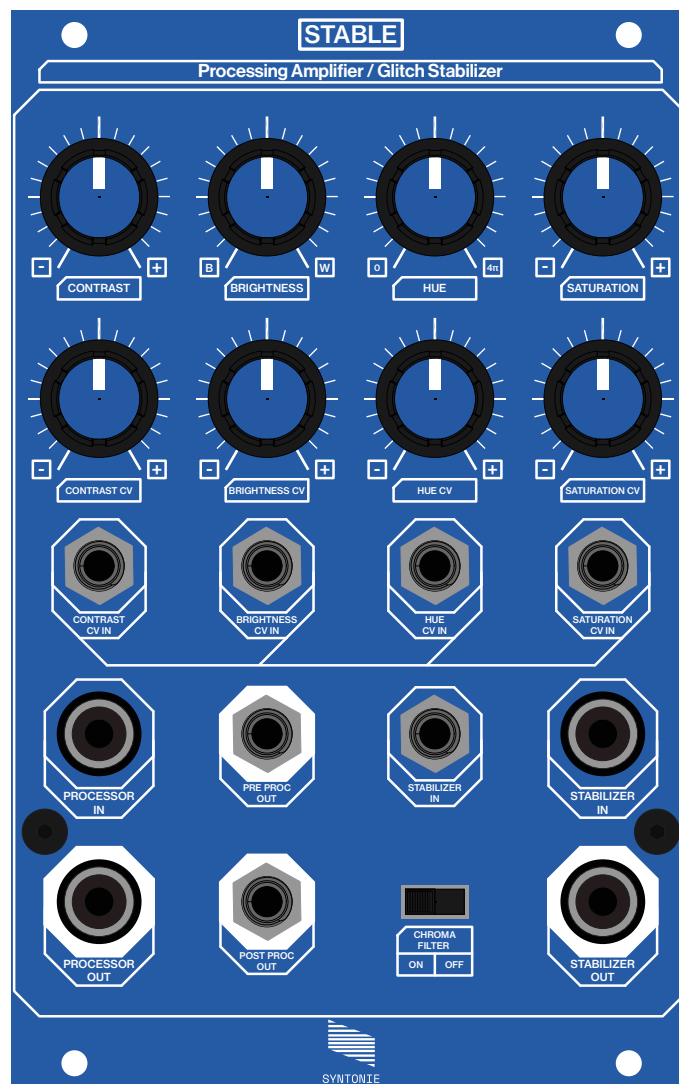
# Stable

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## Processing Amplifier / Glitch Stabilizer - User documentation



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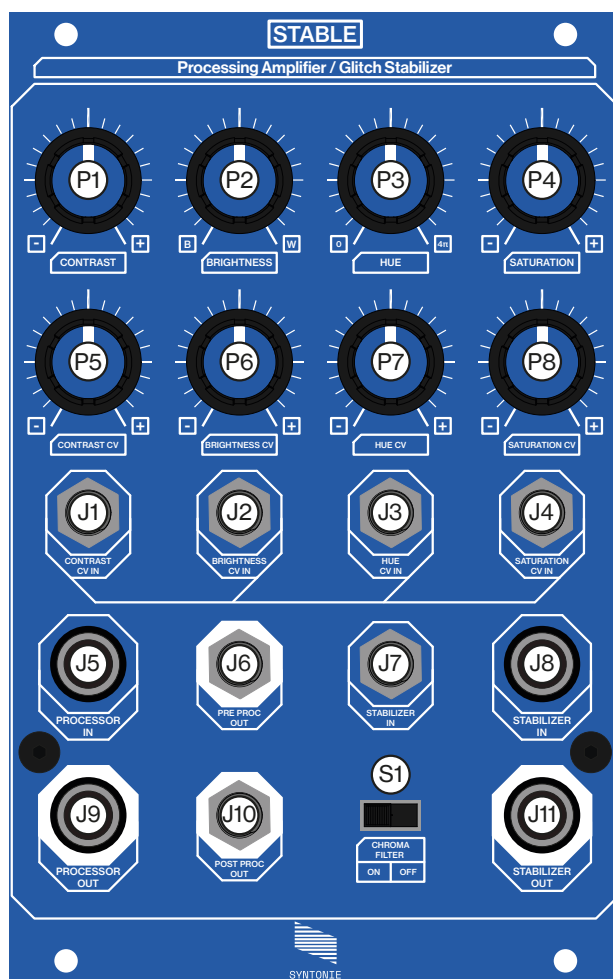
Stable is a processing amplifier with voltage control over contrast, brightness, hue and saturation, and a glitch stabilizer allowing restoration of sync to a video signal, however deteriorated this signal may be, making it a versatile video processor and utility.

### Specifications

- 16HP
- 310 mA +12V (16pin or DC)
- 0 mA -12V
- 0 mA +5V
- 42mm depth

**Special thanks to:** the **LZX team** for the Cadet designs which feature some key elements used to develop this module, **Lo-renzo Ferronato** for the documentation design.

And of course, **everyone who has supported Syntonie until now & those who will support it in the future.**



**(P1)** Contrast manual control

**(P2)** Brightness manual control

**(P3)** Hue manual control

**(P4)** Saturation manual control

**(P5)** Contrast CV attenuverter

**(P6)** Brightness CV attenuverter

**(P7)** Hue CV attenuverter

**(P8)** Saturation CV attenuverter

**(J1)** Contrast CV input (jack, 0V/+1V, 100kΩ)

**(J2)** Brightness CV input (jack, 0V/+1V, 100kΩ)

**(J3)** Hue CV input (jack, 0V/+1V, 100kΩ)

**(J4)** Saturation CV input (jack, 0V/+1V, 100kΩ)

**(J5)** Processor input (RCA, 2Vpp, 75Ω)

**(J6)** Pre-processor output (jack, 0V/+1V, 75Ω)

**(J7)** Stabilizer input (jack, 0V/+1V, 100kΩ)

**(J8)** Stabilizer input (RCA, 2Vpp, 75Ω)

**(J9)** Processor output (RCA, 2Vpp, 75Ω)

**(J10)** Post-processor output (jack, 0V/+1V, 75Ω)

**(J11)** Stabilizer output (RCA, 2Vpp, 75Ω)

**(S1)** Chroma filter bypass switch

Stable can be separated in two sections: the processing amplifier/processor and the glitch stabilizer.

### Processing Amplifier

The processing amplifier part gives control over contrast, brightness, hue and saturation of a Composite video signal, allowing for fine tuning of each of the parameters manually. In addition to manual controls, CV inputs and attenuverters on each of the parameters opens Stable to external modulation, from DC to video rate signals, so it can be easily integrated in the 1V video ecosystem. To make the integration with video generators even easier, a sync output at the back of Stable can be used to sync modules that requires it.

Internal modulation is also possible, thanks to the two 1V jack outputs:

- pre-processor output: unprocessed video input signal, resulting in a solarization effect when used to modulate contrast
- post-processor output: processed video signal, creating feedback loops when patched into the processor parameters, which generate effects typical of analog video glitch

Self modulation makes Stable really powerful on its own, and using other processing modules in the loop extends the possibilities further.

It is also possible to process Y from Component video, however, only the black and white information will be processed (since the color information is contained in the Pb and Pr signals). In this case, the all-pass filter used for hue shift will act as an enhancer type of effect, with the saturation knob controlling the intensity of the enhance.

The chroma filtering switch can be set to off to avoid unwanted filtering, which results in a sharper picture, especially in HD formats.

### Glitch Stabilizer

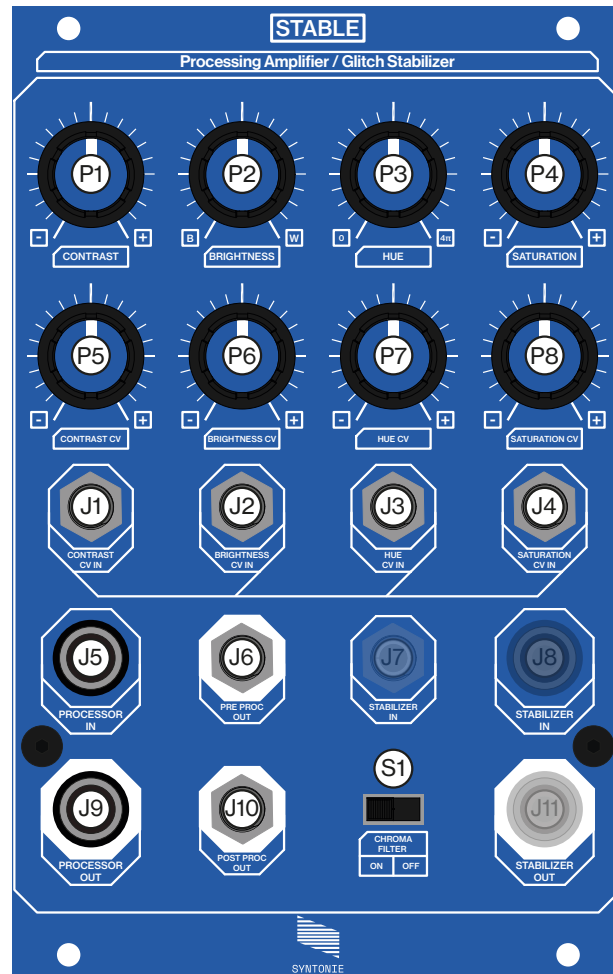
Composite video glitch processors can create very distinct effects, mainly because the black and white (Luma) and colors (Chroma) information are merged into a single video signal, which will affect each other when altered with such devices. However, one issue is that the synchronisation signal is also embedded with Luma and Chroma, meaning that it is also altered, and if sync is too degraded, the receiving device (LCD monitor, video projector, capture card, etc...) may not be able to decode it properly, resulting in drops/blue screen.

Stable solves that by extracting the synchronisation from the clean signal present at the processor input, and later re-insert it to the glitched signal in the stabilizer part, along with adequate clipping and blanking, ensuring a stable signal in all instances. A similar technique is used in the processor part, meaning that both RCA outputs will provide a valid signal, regardless of what's happening to the video content.

It is also possible to use the stabilizer part to process Composite/Component Y video with 1V compliant video modules, by connecting one of the processor outputs into such a module, and the output of the module back to the stabilizer jack input. It can also be processed with audio modules, however the bandwidth will probably be too limited, resulting in the color and finer details to be filtered.

Then it's important to note that Stable isn't a TBC, so it needs a stable signal at the processor input, which means that it may not work properly with devices like VCRs, some retro gaming consoles (usually, anything before 6th generation) or if the signal at the processor input is glitched/out of spec.

Furthermore, the stabilizer part will correct hard glitch effects caused by invalid sync (ie: pictures bending horizontally, scrolling up/down/left/right), where a TBC may be able to display some of it. Since Stable signal path is purely analog, it won't "freeze" the picture or part of it as a TBC generally does with really distorted signals.



Here are all the controls related to the processor section of Stable.

First, a Composite or Component Y signal is connected to the processor's RCA input (**J5**). This unprocessed signal is made available at the pre-processor output jack (**J6**). No processing is applied (yet) besides black level restore and scaling/buffering to 1V (meaning that it is the full Composite video signal, colors included.)

When using Stable to process a Composite video signal, the chroma filter switch (**S1**) must be turned on, in order to have the saturation control nulling the colors completely. When using it with a Component Y signal, it must be turned off to avoid unwanted filtering, which is more noticeable with HD formats.

Contrast (**P1, P5, J1**) controls the amplitude of the black and white content, with a gain ranging from 2 to -2 (invert).

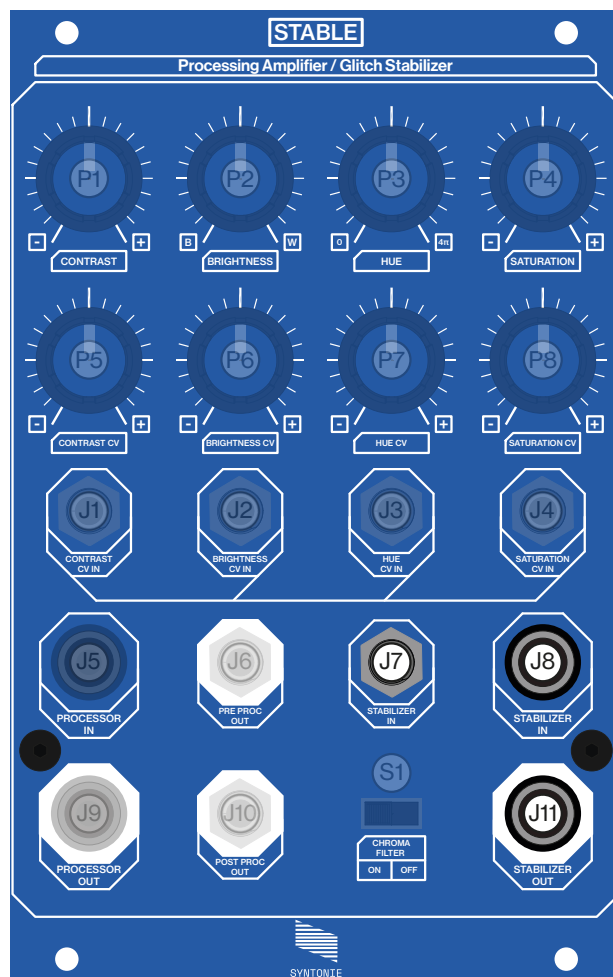
Brightness (**P2, P6, J2**) controls the offset of the black and white content, going from black level to white level.

Hue (**P3, P7, J3**) controls the color shift, up to  $4\pi/360^\circ$ , resulting in a full hue cycle in NTSC and around half a hue cycle in PAL.

Saturation (**P4, P8, J4**) controls the amount of color, with a gain ranging from 5 to -5 (invert).

The resulting signal is available at the processor output RCA (**J9**), as well as the post-processor output jack (**J10**).

**Note:** J4 is normalized to J3, J3 is normalized to J2, and J2 is normalized to J1, meaning that the signal plugged into J1 will be distributed to J2, J3 and J4, until another signal is plugged into them, which breaks the normalization.



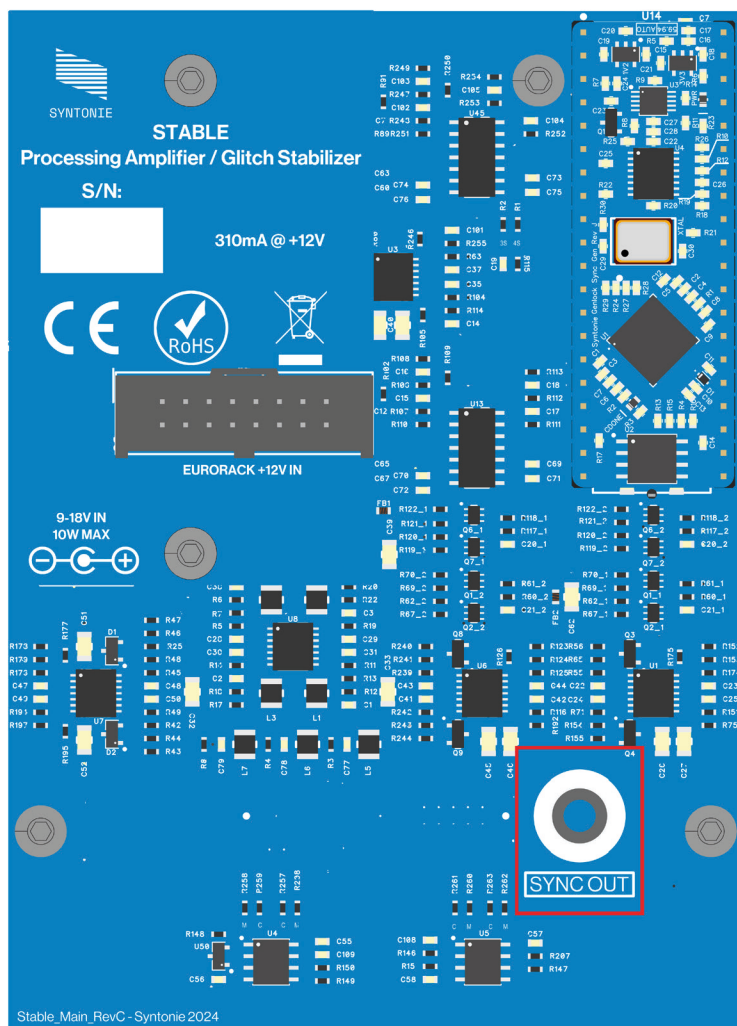
Here are the controls related to the stabilizer section of Stable.

For the stabilizer to work, a clean and stable video signal needs to be connected to the processor's RCA input first (**J5**).

Then the processor's RCA output (**J9**) is connected to a glitch device input (ie: **CBV001**), and the output of the glitch device is connected back to the stabilizer's RCA input (**J8**). A stable, in-spec signal is now available at the stabilizer's RCA output (**J11**).

It is also possible to use any eurorack video module to process the signal over jack. To do so, either the pre-processor output jack (**J6**) or the post-processor output jack (**J10**) is connected to the processing module input (ie: **Isoh  lie**), and the output of the processing module is connected back to the stabilizer input jack (**J7**). Once again, a stable, in-spec signal is now available at the stabilizer output RCA (**J11**), allowing to process Composite over jack with a great variety of modules.

**Note:** the stabilizer's RCA input (**J8**) is normalized to the stabilizer input jack (**J7**), meaning that the RCA input will be disconnected once a jack is inserted in J7.



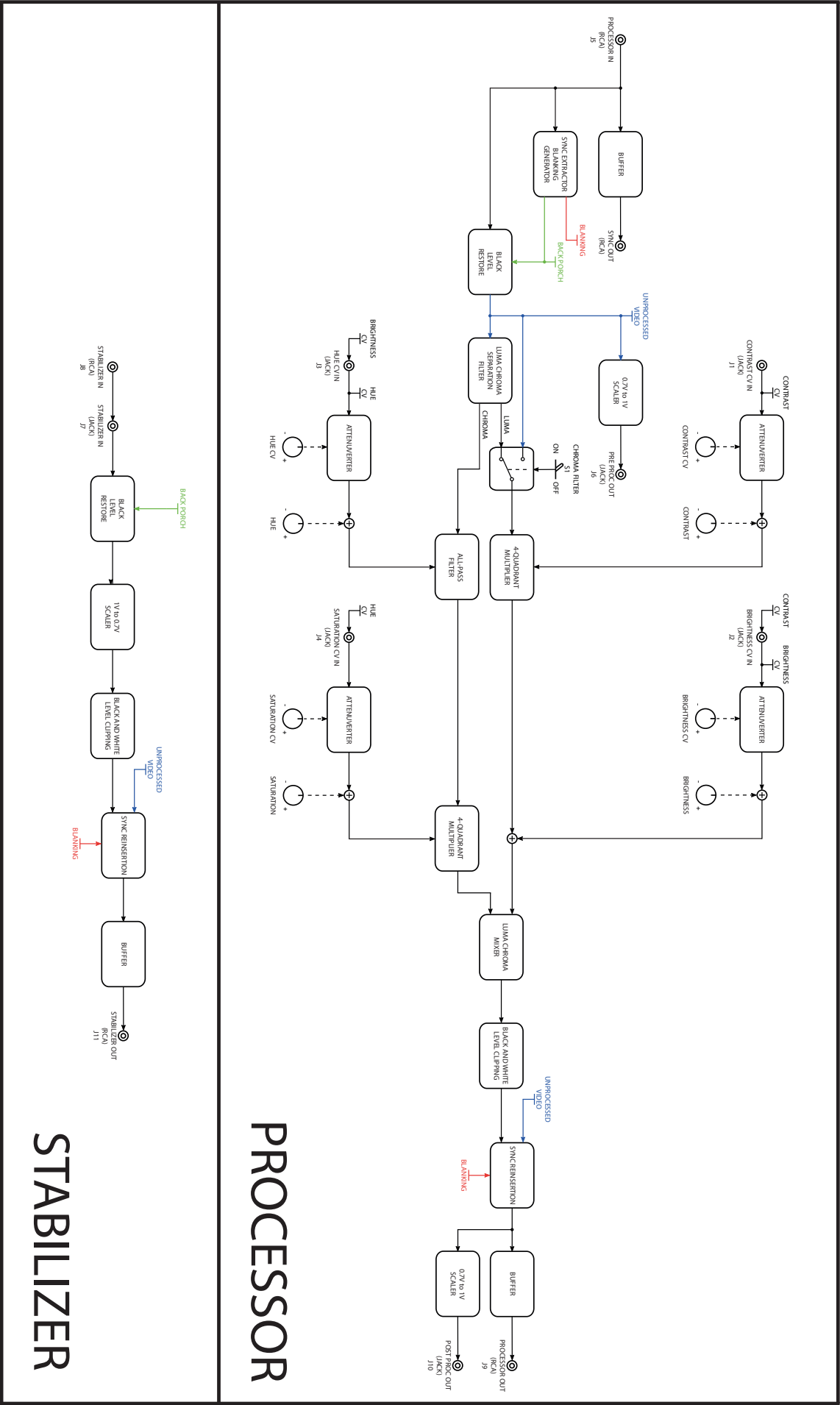
Stable features a sync output at the back of the module, in order to synchronize signal generators (ie: **Rampes**). To do so, simply connect the sync output from Stable to the sync input of the generator module with an RCA cable.

In the case where Stable is used as a video input decoder, the sync output of Stable is connected to the sync input of the RGB encoder/sync generator (ie: **VU007B**).

Stable detects the format of the external video and automatically switches to it, here are the supported formats:

- 288p50	- 720p50	- 1080p23.98
- 240p59.94	- 720p59.94	- 1080p24
- 576i50 (PAL)	- 720p60	- 1080p25
- 480i59.94 (NTSC)	- 1080i50	- 1080p29.97
- 576p50	- 1080i59.94	- 1080p30
- 480p59.94	- 1080i60	

**Note:** Component supports all the formats listed above, Composite only supports PAL and NTSC (and eventually 288p50/240p59.94 depending on the receiving device).





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