NI-VGA01

No-Input VGA Feedback Machine User Guide

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- Jonas Bers for their CHA/V (cheap hacky audio video) designs and inspiration
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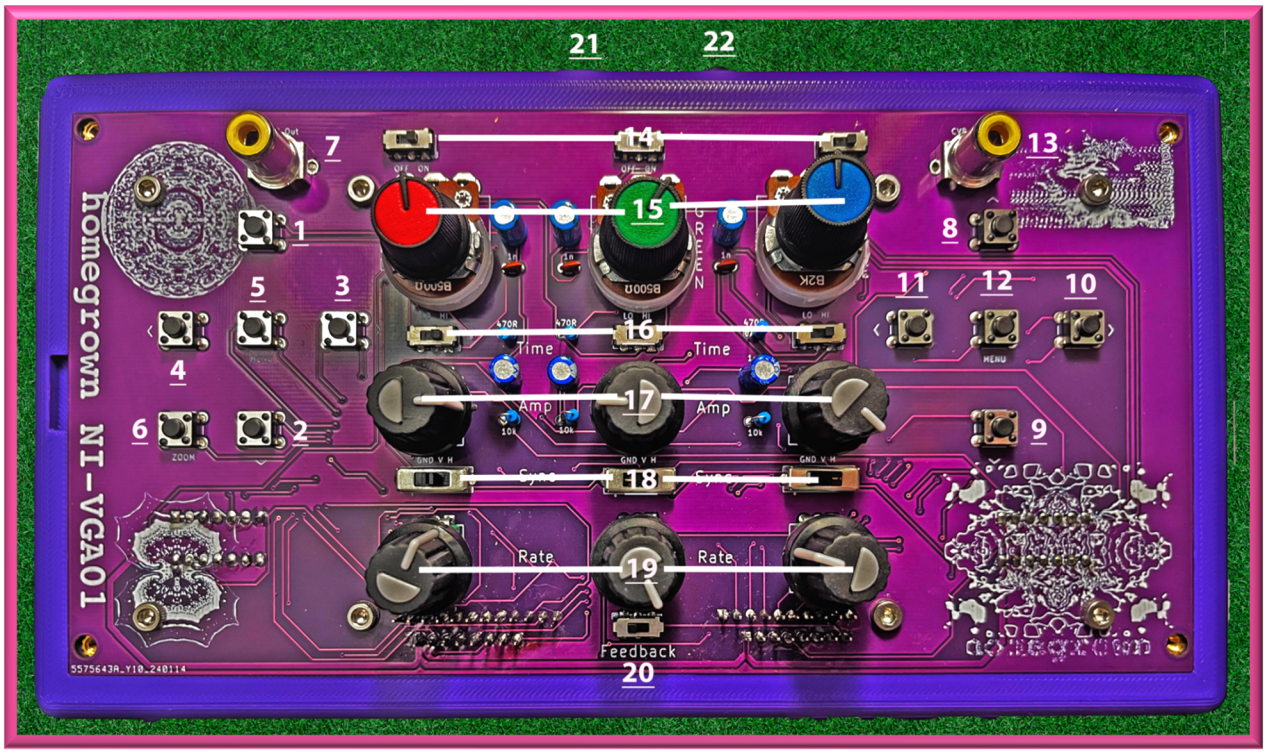

VGA2CVBS		
1	Up	Directional and OSM control
2	Down	Directional and OSM control
3	Right	Directional and OSM control
4	Left	Directional and OSM control
5	Menu	Opens On-Screen Menu
6	Zoom	Scrub through subsequent scalings with each actuation
7	CVBS Out	
CVBS2VGA		
8	Up	OSM control (change resolution when menu is closed)
9	Down	OSM control (change resolution when menu is closed)
10	Right	OSM control (change resolution when menu is closed)
11	Left	OSM control (change resolution when menu is closed)
12	Menu	Opens On-Screen Menu
13	CVBS In	
Color Channels		
14	Oscillator ON/OFF	
15	Attenuator	
16	Oscillator Freq Range	
17	Oscillator Volume	
18	Oscillator Sync	
19	Oscillator Frequency	
Utility		
20	Feedback ON/OFF	Off setting enables CVBS input
21	Power ON/OFF	
22	5V DC Socket	Max 5VDC

Background

The NI-VGA01 uses a CVBS to VGA converter and a VGA to CVBS converter to synthesize video signals. The VGA portions of each of these converters come hardwired to one-another. The CVBS portions of each converter are connected to one-another via the Feedback ON/OFF switch. Switching the Feedback switch to the ON position connects the CVBS output of the VGA to CVBS converter to the input of the CVBS to VGA converter, thus completing the feedback loop.

CVBS is a complex signal consisting of multiple signals' worth of information encoded within it. This makes it difficult to manipulate aspects of the video signal without equally complex circuitry. VGA, on the other hand, splits the complex video signal into multiple discrete signals which makes it much easier for us to tweak parts of the video signal that can withstand the manipulation whilst preserving the parts that can't.

VGA consists of 5 signals of interest – 3 analog signals for the respective red, green, and blue color channels and two digital signals for the horizontal and vertical sync information. Leaving the sync signals of each converter hardwired to one another, we are able to attenuate each of the individual color channels whilst preserving the video sync.

Having discrete signals for our active video information also allows us to send our own visual information into the signal path. Each color channel is equipped with its own 40106 Schmitt Trigger relaxation oscillator. Sending oscillators to each of the color channels gives us some rudimentary patterns and allows us to perturb the feedback, leading to more hue shifting, colors, goops, swirls, ya..

Priming the Synth

While I'm a firm believer in stretching the capabilities of gear and pushing the limits of what's possible, obviously when you're first starting you want to be able to goop out the box. There are a few things you can do to set yourself up for success.

Setting CVBS2VGA Resolution

Press the right MENU key to pull up the CVBS2VGA on-screen menu. Use the UP key to select the resolution setting and use the RIGHT key to scrub through the different resolutions. In my experience, 800x600 60 Hz works the best, but sometimes different TVs work better with other resolutions. For NTSC sets though, stick to the 60 Hz resolutions.

Setting CVBS2VGA Proc Amp Parameters

Press the right MENU key to pull up the CVBS2VGA on-screen menu. Use the DOWN key to select the brightness setting and use the LEFT key to set the parameter to a value of 35. Next, select the contrast setting and set the parameter to a value of 35. Next, select the saturation setting and set the parameter to a value of 93. Finally, select hue setting and set the parameter to a value of 100.

Setting the VGA2CVBS Proc Amp Parameters

Press the left MENU key to pull the VGA2CVBS on-screen menu. Use the DOWN key to select the brightness setting and use the LEFT key to set the parameter to a value of the 40. Next, select the contrast setting and set the parameter to a value of 35. Next, select the saturation setting and set the parameter to a value of 95. Finally, select the hue setting and set the parameter to a value of 100.

[OPTIONAL] Bump the sharpness for more defined black edges between hue cycles.

Homing the Frames

Think of the two converters as two mirrors facing one-another. To see the most feedback, you'll obviously want to be centered between those mirrors. The CVBS2VGA converter is a static frame. You can only change its scale by adjusting resolution settings. The VGA2CVBS converter, however, can be shifted in

vertical and horizontal directions with the left UP, DOWN, RIGHT, and LEFT keys. Additionally, the frame can be scaled sequentially from higher to lower resolutions relative to the CVBS2VGA frame with subsequent actuations of the ZOOM key.

For optimal goops, you'll want to align the two frames by first pressing the ZOOM key sequentially until the VGA2CVBS frame is fully zoomed out. Then, use the VGA2CVBS directional keys to center its frame around the CVBS2VGA frame. With the two centered, press the ZOOM key sequentially just until the two frames are perfectly scaled with one-another and no further.

While these are the settings that have worked the best for me across many devices and many TVs, the funny thing about analog video and especially composite video is that there is always room for variation. That is, you may have to tweak any or many of these settings to get the most desirable picture on your setup – experimentation is the name of the game. YMMV.

Internal Oscillators

Each color channel of the synth comes equipped with its own 40106 Schmitt Trigger relaxation oscillator. Toggle on the Oscillator ON/OFF switch to enable a color channel's oscillator. Use the Oscillator Freq Range switch to select between the low and high frequency range of the oscillator. The low frequency range is mostly audio rate, consisting of horizontal and vertical bars. The high frequency range ventures slightly into video rate, consisting of some vertical bars up to diagonal stripes and noisier patterns. The Oscillator Volume knob ranges from 0 at fully CCW to 100 at fully CW. The Oscillator sync switch allows you to either allow the oscillators to be free scrolling on the GROUND setting, synced to H, or synced to V. The Oscillator Frequency knob ranges from the low end of the frequency range at fully CCW up to the high end of the frequency range at fully CW.

When getting familiar with the oscillators, it is recommended that you first use the ZOOM key to maximize the resolution of the VGA2CVBS frame. The oscillators show up in the signal in this frame and thus you'll see the truest representation of the patterns they generate with this frame fully expanded. If you want to see the most prevalence of the specific pattern generated by the oscillator, use the green channel as it is the most heavily weighted of the three. If you want to see the most hue cycling and strobing introduced by the oscillators, use the red channel. If you want randomness and unpredictability, use the blue channel. Experiment.

[NOTE] Due to the different weighting of the color channels as they sum to the final active picture, you'll find you may have to tweak the attenuators to see certain oscillations on certain color channels at certain proc amp settings if you catch my drift.

Using the CVBS Input

Switching the Feedback switch to the CVBS position will isolate the CVBS input of the synth, stopping the internal feedback loop and allowing you to input your own external video signals.

Bigger the loop, bigger the goop

Expand the internal feedback loop to an external feedback loop by inputting another device's video signal into the CVBS input of the NI-VGA01. Then, connect your NI-VGA01 CVBS output back to the auxiliary device. Examples of possible expansions include, but are not limited to, a camera pointed at a TV, a video mixer, proc amp/enhancer.

[NOTE] Non-standard setups like this may require adjustment of different parameters on each of the converters' on-screen menus. Experiment.