

Experimental Systems Design - Jack Weallans - Max for Live Patch - Report and Evaluation

Bo's Dr. Video TD-303

Concept and Research

The goal of this project was to create a patch that could create audio reactive audiovisual media that could then be used for online content creation as well as live shows.

To give context, there is a staple within the lo-fi hip-hop community of beatmakers posting videos of them performing on Roland SP-404s and/or Boss SP-303s. The majority of these videos are similar to this - <https://www.youtube.com/watch?v=s69XHdRTNTg>

I wanted to be able to upload content in a similar vein, but to also add a more unique and engaging element. I therefore designed my patch to be able to take in performance visuals through a camera, but then layer them through chroma keying with a second visual that would be manipulated by the audio. The aesthetic of the visual output would be inspired by Captain Murphy's Duality album visuals - <https://www.youtube.com/watch?v=FwV8ySqsYsg>.

As the SP-404 and SP-303 machines are so popular within the generic conventions of the scene for both beat creation and performance, I wanted to model my patch around them in both functionality and interface.



Boss SP-303



Roland SP-404

One of the main draws of these machines is the large selection of effects in the top panel (as annotated above), that can be applied in real-time live, and easily switched in and out, offering

the performer a large amount of creative control. These effects are extremely easy to access and use, they are available as buttons and dials on the front of the interface. Everything is surface level and accessible. As the dials also control all of the effects (21 on the 303, and 24 on the 404), there is no specific labelling of what they control (although some abbreviations do appear on the LCD). This therefore inspires the user to experiment and play with the dials and buttons, which creates a creative performative environment.

In the design of my patch I wanted to emulate the usability of the above hardware, but to create “playable” effects for video. I also wanted to be able to pair these with audio effects to create cohesion between the two, as well as including a legitimate audio reactive element.

Alongside the above research sources used for concept, I utilised various sources to inspire and inform the patching:

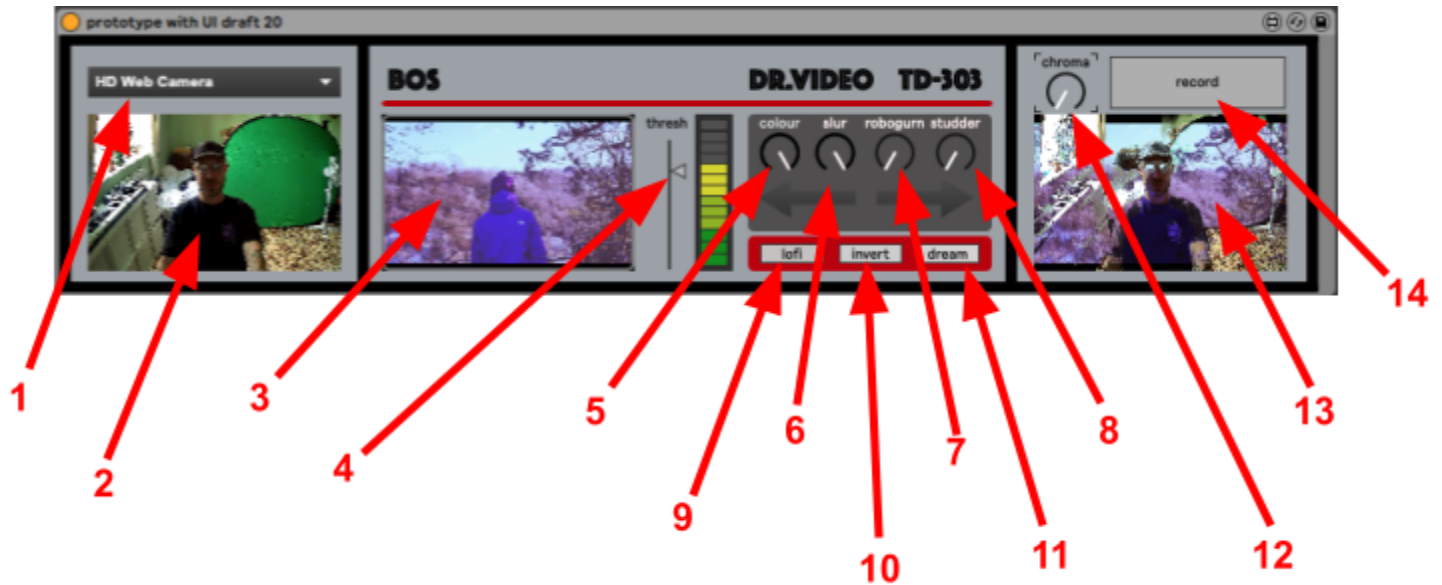
- <https://www.youtube.com/c/AmazingMaxStuff/videos> - Amazing Max Stuff
- <https://www.youtube.com/playlist?list=PLD45EDA6F67827497> - Delicious Max
- <https://www.youtube.com/watch?v=YwFIONF9O2M> - Programming for People
- <https://docs.cycling74.com/max8/tutorials/jitterchapter10> - Jitter Recipes
- https://docs.cycling74.com/max7/vignettes/jitter_functional - Functional list of all Jitter Objects

Design Features

For the design of the interface I was directly inspired by SP-303 in terms of colourway. The title of the patch is also a play on the Boss Dr. Sample SP-303 (the machine’s full name) - *Bo’s Dr. Video TD-303*. The Bo’s comes from my producer name being Bo Bribery (I dropped the apostrophe on the UI to more closely resemble *Boss*). The *TD* was chosen as it is an acronym of the group Team Dreebs which I am a part of.

The inspiration of the SP-303 also follows through into the lack of parameter values on the dials, as well as the choice of names of the effects. This is to inspire experimentation and creativity.





1. Camera Input selection

- jit.qt.grab

2. Camera Input Viewer & Chromakey

This section shows the input from the camera input, and also contains the chroma key element of the patch. By clicking on the area of the screen you wish to use as the 'green screen' component, the patch will then layer the second video onto this.

- jit.pwindow
- suckah
- jit.chromakey

3. Second Video Input and Viewer

In this section the second video can be dropped directly in. This screen also presents the video output before it reaches the third screen, so shows any effects that are being used.

- jit.pwindow
- jit.qt.movie
- dropfile

4. Threshold Slider

The threshold is in relation to the audio reactive element of the patch. I have set up the patch to read and process the dimensions of the incoming visuals from *section 3* through the jitter matrix, and then the level of audio coming in to the patch shuffles those dimensions, with a large level (high threshold) creating little or no shuffle, and low level/threshold creating a large amount of shuffle.

- jit.matrix
- gain~

- meter~
- live.slider

5. *Colour Dial*

This dial controls the saturation of the visuals from *section 3 (all of the effects from 5 - 11 are applied to these visuals)*. When the dial is to the right the colour is fully saturated (normal), when half way it is black and white, and when to the left it is inverted. The direction of the dial is anti-clockwise as I wanted to pair it with a low pass filter's cutoff, which you would generally pull back anti-clockwise. I also chose to have the black and white (0. saturation) be at the mid point, as usually when using a low-pass filter live you would rarely go beyond the 12 o'clock range as it would cut too many frequencies.

- jit.brcosa
- live.dial

6. *Slur Dial*

This dial controls the amount that the visuals get blurred.

- jit.scanslide
- live.dial

7. *Robogurn Dial*

This dial controls the amount that the visuals get "*Robogurned*". This uses the jit.plur object to interpolate and resample incoming matrices, creating some wild and interesting effects.

- jit.plur
- live.dial

8. *Studder Dial*

This dial controls the rows and columns parameters of the jit.eclipse object. This object creates a grid (which here I have set between 1x1 and 10x10, and fills each box in the grid with a scaled down representation of the incoming video. The dial has been scaled so that it's range is 0-40. Therefore bringing the dial up gradually expands the amount of boxes in the grid.

- jit.eclipse
- live.dial

9. *Lofi Button*

This button is directly inspired by the *lo-fi* button present on both the SP-303 and SP-404sx. On those machines you press the lo-fi button in and it "dirties up" the input (reducing bit depth and adding saturation). I wanted to emulate this with my patch, so the lofi button here adds saturation to the visuals. I judged it against the sound of the machines to create what I thought was a similar range of saturation. It is most effective when the threshold is around mid/mid-high. The on/off button was created using a jit.xfade and a live.text object (scaled).

- jit.brcosa

- jit.xfade
- live.text

10. *Invert Button*

Another button directly inspired by the aforementioned machines - both of these have a *reverse* button that immediately flips the sample playback. I attempted to do a similar thing with the video, but when linking this with the audio (which was a key concept for the patch), I found that it had to render the two, and could not be done immediately. As this was a live performance patch, I changed the concept of reversing to inverting the video image. This was done through using an on/off switch to change the contrast parameters of the video.

- jit.brcosa
- live.text

11. *Dream Button*

A button that toggles a dreamlike effect on and off. It adds blur (differently than in 6.) and brightness using the jit.wake object.

- jit.wake
- jit.xfade
- live.text

12. *Chromakey Dial*

This dial chooses the amount of the top image (camera) visible with the background video. When all the way to the left it is fully visible, and when to the right only the background is shown. This allows the patch to be used to export only the visual manipulation and forgo the performance aspect, which may also be preferable for live shows. I chose not to include an option just for the performance shot, as this would be better recorded outside of a max for live patch in a standalone program.

- jit.xfade
- live.dial

13. *Video Output*

Outputs the combined result of the 2 videos and effects.

- jit.pwindow

14. *Record*

Records the outputted video and audio and saves onto computer (location is chosen by user on first use of patch).

- jit.vcr

The above listed effects, sliders and dials (specifically 4-12), can be mapped to corresponding audio effects for maximum creativity and cohesion. An example of this is included in the Quick Start Guide, and in the attached Ableton Live session file.

Other Problems and Solutions

- The video input of section 3 was producing audio (if the video file had audio), which was problematic as it bypassed the audio reactive elements of the patch and clashed with the incoming audio. This was solved by inputting `@vol. 0.` into the formula to ensure the outputted video from the section had volume turned off.
- Using very large video files (150mb+) causes the patch to lag when there is a high threshold being used (though is okay with lower thresholds). It is therefore advised to use smaller video clips to avoid this.

Known Issues

- When dragging and dropping a video into the second screen, it often does not load on the first attempt, and has to be done a second time. Sporadically, the first drop also results in a flashing light that disappears once the video is dropped in a second time.
- When lowering the threshold, some videos go straight to black, whereas others result in a continuation of the audio reactive effect (bars of colour). Although both can be useful in a live set, the latter is the more desirable. Though I have tested with different video formats and resolutions, the cause of this remains unknown at this point.

Further Notes

My original plan of progression after the prototype was to add further audio reactivity. However upon experimentation with different patching and techniques I found I preferred controllability and user reactivity. This resulted in me taking the path outlined above through my research and design choices.

I am happy with the result of my current patch, and the parameters of the various effects. There is definitely room for expansion, and possible tweaking. The main effects panel could contain another 4 mappable effects dials. I stopped where I was as the amount of processing was periodically causing lag issues that I could not fully troubleshoot. However the current effects still give a generous amount of playability, whether they be utilised individually or combined together. The mapping of the visual effects with audio effects boosts this even further, and works as I had imagined it would.

With the threshold, I have experimented with different ranges and scales, and am pretty happy with where it currently lies. It is dependent on the audio signal going in, but the current range gives a good canvas of creativity across various video/sound source combinations.