

# Loop-R: real-time video interface

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## ABSTRACT

Loop-R is a real-time video performance tool, based in the exploration of low-tech, used technology and human engineering research. With this tool its author is giving a shout to industry, using existing and mistreated technology in innovative ways, combining concepts and interfaces: blending segregated interfaces (GUI and Physical) into one. After graspable interfaces and the “end” of WIMP interfaces, hardware and software blend themselves in a new genre providing free control of video-loops in an expressive hybrid tool.

## Keywords

Real-time; video; interface; live-visuals; loop;

## 1. INTRODUCTION

The main goal of this project was to study the activity of vj'ing in the way of controlling previously created media, small pieces of video (video-loops), in real-time and to use this research results in the conceptualization and construction of an hybrid software and hardware controller. This would reflect the users needs and should try to provide as less psychological and physical distress in this system's operation and to be as much intuitive as possible. This interface can be seen as a toy, trying to escape complex interfaces and systems though easily providing full control of the media.

## 2. WHY?

Direct manipulation and The Wimp interfaces are past, their objective was lost in the increasing amount of graphical interface widgets, continuously *popping* and moving windows, ancient and generalized input interfaces and, so: the lost of the main object of interest in the interaction.

For a long time, VJ softwares have been provided filled with features but many times forgetting the user that would control them and expecting those users to acquire a whole new set of hardware tools such as standard midi-controllers; the users

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would have to adapt themselves to generalized hardware, mostly designed for audio applications, boxes filled with knobs and keyboards, forcing themselves to memorize the locations and attributes of each of these knobs or keys with no relation to the next or previous widget.

Based on different approaches to interface design, this project tends to blend valuable principles from *graspable interfaces* theories[1] but also to *post-wimp interfaces* [2] and bi-manual input interaction. Also performance modes of interaction and Exploratory operation techniques are taken advantage of, allowing the user to explore the interface and different controllers positions and combinations with no risks or dangers and having immediate feedbacks from the system.

The combination and blending of the GUI with the physical interface is done in ways of allowing the user to instinctively know which feature is controlled by which interface device; besides the natural mapping also the physical constraints of the interface devices are taken into account when attributing them to the application features.

Assumed as a DIY project the limits were only the available technology on the market and the builder's budget.

It is also an attitude towards the non-development of specific and dedicated solutions by the industry and its feeble response to the vj's needs.

Both seen as a creative process and the continued study of the activity and its needs, demands and efforts from a user's perspective, this project has grown from a theory/practical essay and conceptualization into a functional prototype, currently used as a tool for vj'ing and real-time video control performances such as theater plays and presentations.

## 3. LOOP-R DESCRIPTION

### 3.1 Vj'ing activity premises

As a performance activity, vj'ing demands ease on the control of multiple parameters simultaneously and on the fly, intuitive and natural gestures reflected as commands, natural mappings and appropriate constraints to the actions. As an instrumental real-time control interface, loop-R provides:

-No fixed ordering in the human-computer dialogue;

-Human controls <-> Computer reacts;

-Continuous and immediate controls rather than menus, sub-menus and intermediate and confirmation widgets and dialogue boxes;

- Overall control by the user with possible automation features;
- Hybrid device (coordinated Physical and graphical interfaces) providing simultaneous multi-parametric control;
- Easily learnable, by practicing the user develops further intimacy with the system;
- Cognitive freedom for the user, providing low cognitive distress while operating the system;
- Matching device structure with perceptual structure of the tasks involved;

### 3.2 System description

Combining both hardware and software forces and taking advantage of their own features, each Loop-R's module has been designed bearing in mind the activity and expression needs and the input and output characteristics of the used hardware and software. Each feature is directly activated and controlled by a correspondent interface control, with no intermediate menus or need for confirmation of the choices/actions.



Figure 1 - Loop-R - topview

#### 3.2.1 Library Module

Extended and user-expandable Library featuring customizable sub-category organization, page navigation plus thumbnail preview and name labeling for each video loop. This way, the user can organize and preview each and any piece of media directly from the interface, the choice and activation of each media piece is direct, just by touching the previewed thumbnail. Directly positioned above the the editing module and its preview screen creates a direct relationship of the controls involve.



Figure 2 - Library Module

#### 3.2.2 Edit Module

Regarding the media's timeline as an horizontal representation, a line in time, its attributes are naturally controlled by two physical horizontal sliders, which provide start and end points for selections. Therefore, and despite having visual feedback from the graphical representation of the timeline placed directly above the physical sliders, the user has also an accurate tactile feedback of the selection. The speed and direction attributes of the media are controllable by a jog dial which incorporates pause, speed and direction features into its actions: when positioned at 0° the media is paused, rotating it to each side provides positive or negative speed of the loop.

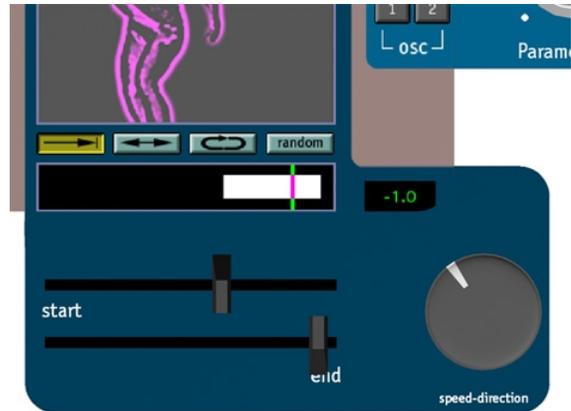


Figure 3 - Edit Module

#### 3.2.3 Effects Module

Choose effects seeing their previews on the video you're using through Effects thumbnails buttons. Providing independent physical controllers / knobs for each effect channels parameter, loop-R lets the user freely control and express each effect through 3 parameters. Effects can also be automated using Oscillators – wave generators and, so, allowing the user to “beat-match” effects and them dedicate himself to other parts of his composition.



Figure 4 - Effects Module

### 3.2.4 Mixing Module

The mixing between the two video decks can be made through a smaller horizontal slider, in which its position is directly connected to the intensity of each video deck, so, positioned to the further left the left deck will have 100% opacity and the right side deck its full transparency. Besides the ability to choose from different mix modes, the keying modes (chroma and luma) can be easily controlled through color maps: allowing the user to directly select the “keyable” saturation and luminosity by choosing the color itself and not dwelling with infinite and abstract parameters.

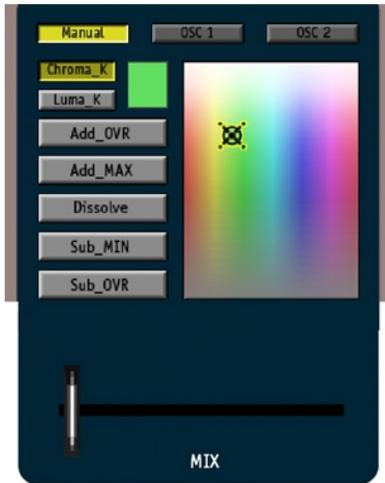


Figure 5 - Mixing Module

### 3.2.5 Automation Module

Some features can be automated using two independent wave generators with four different wave modes (sine, square, sawtooth, random) directly selected from GUI buttons, an extra wave draw-mode is available allowing the user to draw a wave in a GUI surface and thus creating a personalized automation feature. Each wave generator has its knob to control its frequency, allowing the user to freely and directly control its features. The frequency can also be controlled by means of the users body motion; a Tap Tempo surface, placed in the ground, allows the user to match the beat of the music with his beating foot, freeing the user’s hands to control other features and taking advantage of the feet – a rhythmically very important and trustful part of our body.

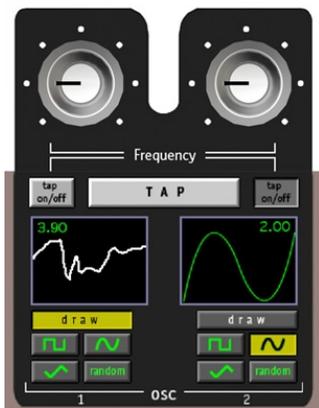


Figure 6 - Automation Module

### 3.2.6 Correction Module

Color correction control is provided through 4 exclusive vertical graphic sliders for Brightness, Contrast, Saturation and Hue. Perspective and Detail browsing are also provided through panning and 3D rotation controls; a 2d surface (X,Y axis) and an extra slider (Z axis) provide natural control and positioning of the image in space.

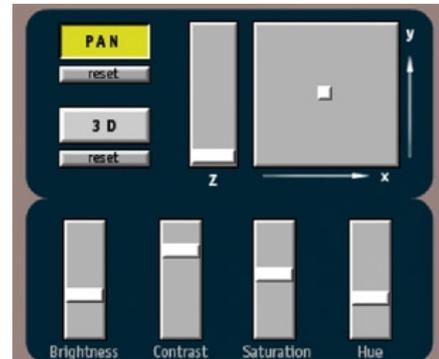


Figure 7 - Correction Module

## 4. CONCLUSIONS

As an integrated visual media instrument, Loop-r denies the use of generalized physical interfaces (mouse, keyboard, standardized midi controllers) providing dedicated interface devices to control each of the media characteristics: each physical controller has a close spatial placement to the correspondent GUI controls and feedbacks, and a natural behavior regarding the features it controls. The nature of the actions and the constraints of the interface widgets was taken into account in the placement and attribution to the controlled features.

Thus this is an hybrid tool, mixing and blending two distinct, and many times segregated, aspects of the interface design such as the GUI and the physical controllers for a more rich and natural control and expression of the media in the context of real-time performance.

## 5. PROJECT STATUS

The Loop-R video interface was built using 2<sup>nd</sup> hand/used electronic parts: 10.4” TFT + touchscreen and a disassembled Doepfer Midi controller. Loop-R software is currently built using Isadora ([www.TroikaTronix.com](http://www.TroikaTronix.com)).

As this is an evolving project some graphic and functional features might not be available as shown in the 3d preview model. This might also be due to limitations of some parts used and/or software GUI elements.

Loop-R is currently on its way to be replaced by Looop-R, a 2<sup>nd</sup> version featuring a whole new hardware and software platform. Among its new features: bigger touch surface, 3 video decks/players/libraries, GUI re-design; longer sliders; 4 dedicated parameter controllers per effect, 3 automation wave generators, wave generator draw mode, media sequencer, color correction and 3d and 2d space positioning of each clip. Features still currently missing:

- color picker for luma and chroma mixing modes only available as a 2 dimensional slider (no color map)

## 6.ACKNOWLEDGMENTS

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