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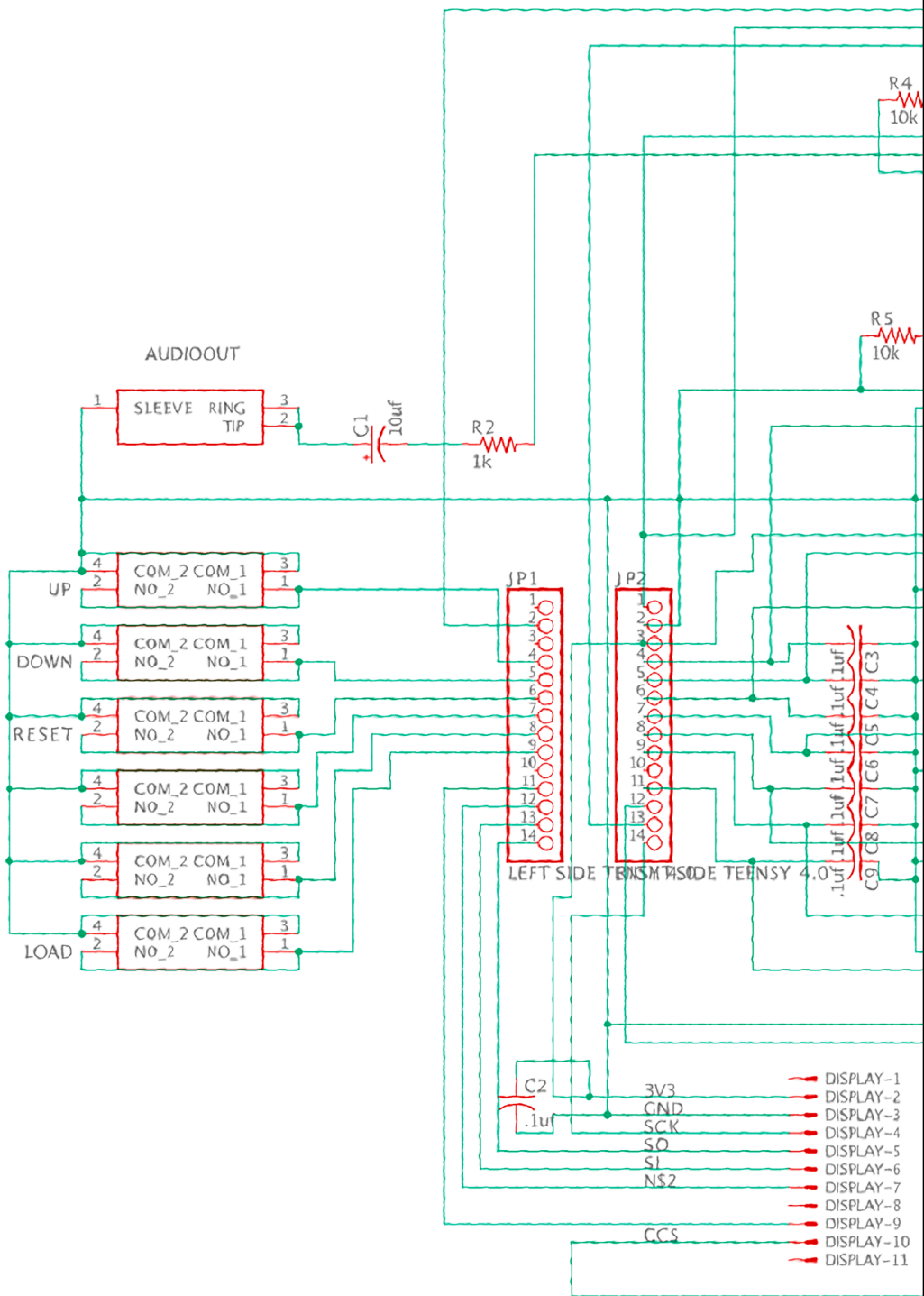
# Bytebeat Synthesizer Prismatic Spray

By Arman Bohn



A mysterious package arrives at your door. Inside, a small device adorned with switches and dials and a few scraps of parchment rambling on about “runes” and “incantations.” Your curiosity compels you to activate the apparatus.

Sound and light emanate forth, cascading around you. Your senses are overwhelmed. Time is lost. You awaken in a landscape of harmonic and geometric impossibilities. How will you return?



## FOREWORD

Greetings, seeker of the arcane and uncommon implement! Congratulations on acquiring the Prismatic Spray; an apparatus capable of summoning a copious assortment of aural and spectral phenomenon (when wielded by an adept medium). This unusual device derives its power from incantations ( $\Sigma$ ) that have been programmatically inscribed within its material structure. These incantations can be transmuted at will by runes, controlled by the various dials and switches which adorn its face.

It is well within the realm of probabilities that one may become overwhelmed by the unbridled sonic and visual chaos that so easily escapes from the Prismatic Spray. Be strong! This is where the Prismatic Spray desires to be. The following guide will aid you in your quest to understand and utilize the device to its full potential.



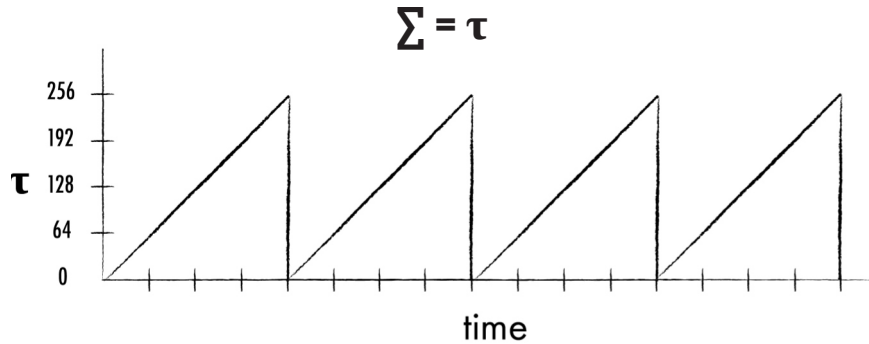
## HISTORY

The origins of the Prismatic Spray date back to the discovery of its primary incantations in 2011 by the wizened enchanter Viznut. Viznut's research into temporally manipulating bytes and transfiguring them into audio has led to a small, but dedicated community of explorers. These curious souls have come to colloquially refer to this sub-genre of conjuration as "bytebeat synthesis" or merely "bytebeat".

Indeed, other devices have been enchanted and imbued with "bytebeat" incantations, but none appear to match the capabilities and scope of the Prismatic Spray. The Glitchstorm, MMXX T-APE and Gamecat are such devices that have been forged in the material world and can be sought out as alternatives or counterpoints to the Prismatic Spray (if one so desires).

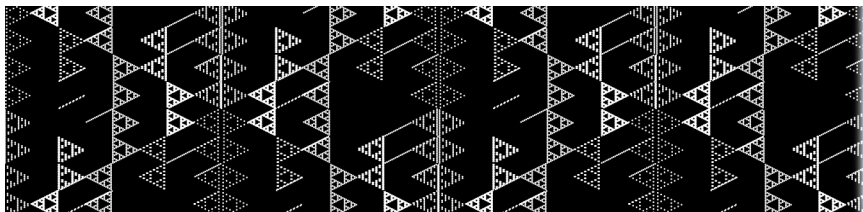
## INCANTATIONS (bytebeats)

The incantations confined within the Prismatic Spray are fundamentally a function of time. The most simple incantation, without any additional runes, would be:



In the incantation above, as time progresses in the forward direction, the value of  $\tau$  increases. If  $\tau$  is encased within the confines of a byte, it must remain within the boundaries of natural integers between 0 and 255. As  $\tau$  marches on in the forward direction (1,2,3,4 ...)  $\tau$  eventually reaches 255 and can proceed not further. Its classification as a byte requires it to loop back to 0 and proceed from there, repeating the sequence infinitely. This most banal of incantations is inscribed in the Prismatic Spray as incantation

"0" and sounds rather unsurprisingly like a common sawtooth wave. The Prismatic Spray contains more than thirty expressive incantations infused with runes for the inquisitive conjurer to alter and explore. Most incantations use additional arithmetic and logical operators (+,-,/,<<, >>, |, etc) in complex arrangements. The complete form of the current incantation is visible when the conjurer is viewing the Runic Display.



## REQUIRED MATERIAL COMPONENTS

The Prismatic Spray requires some primary material components for operation:

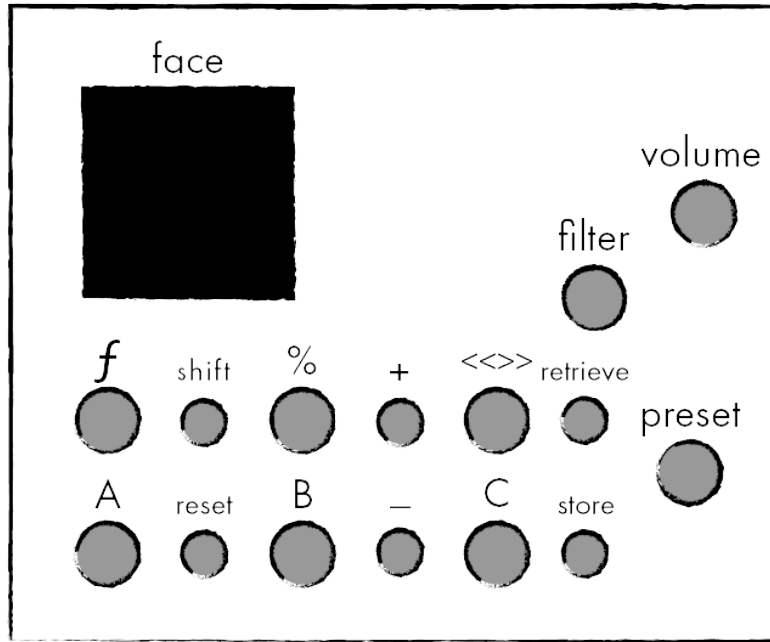
- A MicroUSB cable, a fairly common component usually found in a drawer crowded with household refuse. Go look for one now, as it is required to provide both electrical power (5v) and for the Prismatic Spray to commune via USB MIDI (if so desired). If one is not located amongst your personal wares, simply check again as it is a certainty that every able bodied conjurer has a MicroUSB cable whether they realize it or not. To activate the Prismatic Spray, connect the MicroUSB port located on the rear of the device to a USB power source via a MicroUSB cable. When connected to a USB Host (Mac, PC, etc), the Prismatic Spray will reveal itself by name and can be controlled via MIDI. Full USB MIDI invocation is detailed below.



- A 3.5mm audio device (mixer, headphones, amplifier, etc). In order to hear the auditory magic of the Prismatic Spray, one must plug some form of sound emitting device into the 3.5mm audio port located on the rear of the Prismatic Spray. Warning! The Prismatic Spray produces loud emanations, so it is advisable to reduce the volume before use.
- A 3.5mm TRS MIDI (Type-A) cable (optional). The Prismatic Spray is able to commune with other devices via a 3.5mm TRS MIDI IN jack located on the rear of the device. Full MIDI invocation is detailed below.

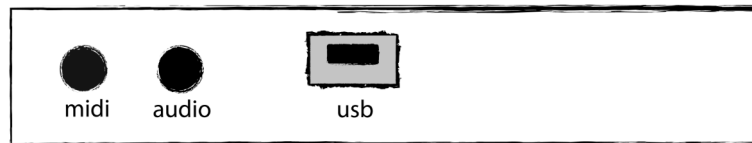


# DEFINING ATTRIBUTES



Prismatic Spray - Top

The top of the Prismatic Spray contains nine dials, six switches, and an illuminated "face" that is able to evoke either arcane visualizations or the Runic Display.

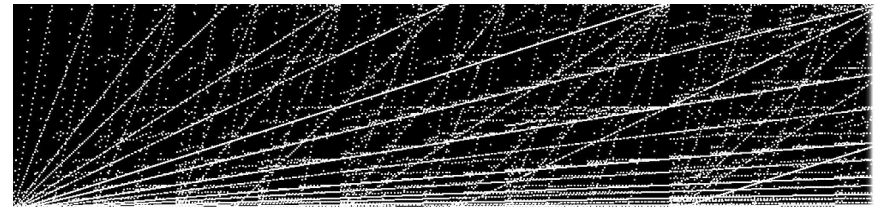
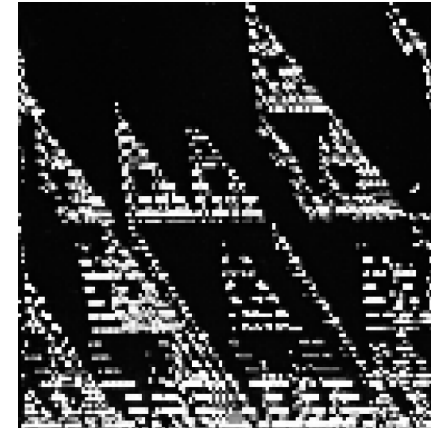


Prismatic Spray - Rear

The rear panel contains the MicroUSB port, 3.5mm audio jack, and the TRS MIDI (type-A) port.

## Visualization

When the conjurer commands the face of the Prismatic Spray to display face visualizations, hypnotic imagery is produced by the current incantation (and all runic variations) in a variety of colors. If the Prismatic Spray needs to convey other information (such as MIDI channel, #, etc) the text will only appear momentarily as the incantation will eventually overpower and destroy any lesser visual constructs.



## Runic Display

In contrast to visualization, the Runic Display reveals the detailed inner workings of the Prismatic Spray. Every rune and alteration to the incantation can be viewed here; many of which are color coded to match their corresponding dials. Of particular note is the Loop Boundary Indicator (located above the A, B, and C runes). When an incantation is encased within a loop, it allows the conjurer to view its temporal progression and current start and end boundaries.



## WIELDING THE APPARATUS

The dials and switches located on the top of the Prismatic Spray offer the conjurer a direct link to the runes inscribed within. By manipulating the controls and setting the runes in various combinations, one can elicit seemingly infinite outcomes in both the visual and auditory spectrums.

The following pages will outline the various functions available through the dials, switches, and combinations of the two, that adorn the face of the apparatus.

### Dials:

## PITCH (*f*)

Color: Dark Blue Dial  
Range: 32Hz - 1975Hz  
Area of Effect: Pitch/Frequency

The *f* dial alters the speed at which the incantation is intoned. Depending on the incantation, the results may be tonal or chaotic. The values conjured by *f* are locked chromatically, but can be accentuated by the <<>> dial. An attentive conjurer will notice that the incantations appear to “slow down” as the *f* dial is rotated counterclockwise and “speed up” as it is rotated clockwise. It is worth noting that the Prismatic Spray is capable of a larger range of *f* when communing with an external MIDI device.

## RATE (%)

Color: Light Blue Dial  
Range: 100% - 0%  
Area of Effect: Temporal

As is abundantly clear to any novice “bytebeat” conjurer, all incantations inscribed within the Prismatic Spray are temporal in nature. At certain times, it may become useful to slow down the progression of time. When % is set fully counterclockwise at 100, time proceeds as normal. As the dial is rotated clockwise, and % is reduced, the progression of the incantation is slowed down. For many incantations, approaching 0% will result in time almost appearing to stand still. For others, varying % can have drastically different effects depending on an incantation’s dependency and relationship with time.



## SKIP (<<>>)

Color: Green Dial  
Range: (-8), 8  
Area of Effect: Temporal

Each incantation derives its power from its position in time. The <<>> dial allows the conjurer to alter the direction and speed at which the Prismatic Spray flows through time. When centered at the “1” position, the incantation proceeds at what we shall refer to as its “normal” rate. “1” is the natural rate at which all incantations were intended to progress and is a useful reference point if one is compelled to return to some level of normalcy when exploration becomes overwhelming. Turning the dial to produce a “2” results in a progression through time at twice the normal rate and so forth. Negative values (-1, -2, -3, ...) send the Prismatic Spray backwards through time. It is worth noting that if a certain segment of an incantation is of interest to the conjurer, one may simply reverse the present direction of time to locate and repeat it. One may also encase a segment of an incantation and loop it infinitely.



## RUNES (A,B,C)

Color: Yellow, Orange & Red Dials  
Range: Varies (based on incantation)  
Area of Effect: Incantation Alteration

Three runes (A,B,C) are at the heart of the Prismatic Spray. Each incantation inscribed within the device can be altered instantaneously by increasing or decreasing the influence of each rune. The limits of influence vary from rune to rune, but generally fall into the range [1 - 10]. It is difficult to state the influence that each rune has over an incantation or indeed, over one another. The power and mystery contained within the Prismatic Spray waits for you amongst these runes. The position of each rune within an incantation is visible when the face of the Prismatic Spray has been commanded to evoke the Runic Display.

## PRESET (#)

Color: Pink Dial  
Range: (0 - 33)  
Area of Effect: Memory

The exploration of incantations via the Prismatic Spray can be complex and exhausting. One may not always have a quill and parchment readily available to record interesting combinations of runes. As a convenience, the Prismatic Spray is capable of retaining and recalling thirty-four different configurations of runic values. Rotating the # dial to a specific value (0-33), readies the device for instantaneous storage or retrieval of runic information in that specific location. Once the location has been selected with #, the conjurer needs only to invoke Store or Retrieve.

## FILTER

Color: Purple Dial  
Range: (20,000Hz - 60Hz)  
Area of Effect: Spectral

Summoning audio through incantations can produce terrifying auditory results. The Filter dial is a simple, but effective tool for sculpting aural energy. As the dial is rotated clockwise, high frequencies are gradually reduced until the Prismatic Spray produces a low, muffled rumble. Unlike the methods which manifest runes and incantations within the binary plane, the Filter resides solely within the analog plane and therefore is not represented on the Runic Display.

## LOOP START POINT

Combo: Blue Switch + Orange Dial  
Range: +/- 50% total loop time  
Area of Effect: Temporal/Loop Start

If one has encased an incantation within the confines of a loop, it is possible to adjust the loop's start point. The conjurer simply needs to invoke the secondary plane of operation by holding Shift for longer than one second. Once engaged, rotate the B dial (while continuing to hold Shift). When the dial is rotated into its central position, the loop start offset will be 0. Rotating the dial counter-clockwise pushes the loop start point further back in time (up to 50% of the total loop time), while rotating clockwise yields the opposite result in the forward temporal direction. The conjurer can see the effects of this offset on the Loop Boundary Indicator when viewing the Runic Display.

## LOOP END POINT

Combo: Blue Switch + Red Dial  
Range: +/- 50% total loop time  
Area of Effect: Temporal/Loop End

Similarly to the method stated above, if one has encased an incantation within the confines of a loop, it is possible to adjust the loop's end point. The conjurer simply needs to invoke the secondary plane of operation by holding Shift for longer than one second. Once engaged, rotate the C dial (while continuing to hold Shift). When the dial is rotated into its central position, the loop end offset will be 0. Rotating the dial counter-clockwise pushes the loop end point further back in time (up to 50% of the total loop time), while rotating clockwise yields the opposite result in the forward temporal direction. The conjurer can see the effects of this offset on the Loop Boundary Indicator when viewing the Runic Display.

## VOLUME

Color: Gray Dial  
Range: Quiet - Loud  
Area of Effect: Amplitude

The Volume dial allows the conjurer to control magnitude of the auditory output of the Prismatic Spray. It would be wise for any conjurer to begin each session with this dial rotated completely counter-clockwise. In this position, the Prismatic Spray produces the quietest output. Slowly rotate the dial clockwise until the desired output is achieved. Be warned - Incantations can produce wildly varying outputs. At its maximum rotation of Volume, the Prismatic Spray can produce sounds that are much louder than traditional audio apparatuses. However, when used in conjunction with Filter, (which reduces the output of the device) it can be useful to have the extra energy that Volume provides at your disposal.



"He's been at it all day."

Switches:

## SHIFT/TOGGLE

Color: Blue Switch  
Range: Varies  
Area of Effect: Alteration

The Shift switch serves two purposes:

1) When the conjurer presses and releases it quickly, the face of the Prismatic Spray toggles between two different primary states (see *Defining Attributes*).

- Visualization: Mesmerizing, hypnotic imagery is produced by the current incantation and runic variations invoked by the conjurer. Some relevant information may appear amongst the patterns briefly until it is destroyed by the visualization. Patterns and images of some significance may emerge. Fortunes may be told. A fleeting glimpse at the origin?

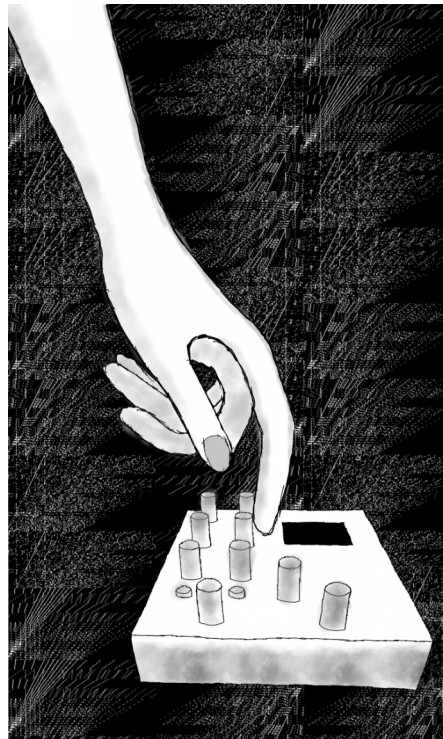
- Runic Display: For the more pragmatically inclined conjurer, the Prismatic Spray is able to display all relevant components of its current state. The selected incantation ( $\Sigma$ ) scrolls across the face slowly. Runes are displayed in colors that correspond to their dials. Of particular note is the Loop Boundary Indicator, which displays the temporal traversal of any incantation that has been encased within a loop. Filter and Volume do not exist in the binary plane, so they are not represented amongst the Runic Display.

2) When the conjurer holds Shift for more than one second, the Prismatic Spray enters its secondary plane of operation. In this plane, a number of dials and switches have additional functions (denoted in this guide by the word "Combo"). The Prismatic Spray will alert the conjurer that they have entered the secondary plane of operation by denoting "↑" on the top center of its face. To exit the secondary plane, the conjurer must simply release Shift and a corresponding "↓" will be displayed on the face of the Prismatic Spray.

## RESET

Color: Yellow Switch  
Range: 0  
Area of Effect: Temporal

As previously noted, incantations traverse and persist through time. By depressing the Reset switch, the conjurer instantly returns the Prismatic Spray to the beginning of time;  $t = 0$ . The incantation will restart its workings from the origin. If the  $\langle\langle\rangle\rangle$  dial has been rotated into negative (-1, -2, 3, etc), time will flow backwards into the negative!



## MIDI NOTE RESET

Combo: Blue Switch + Yellow Switch  
Range: 0  
Area of Effect: Temporal/MIDI

When a conjurer invokes the secondary plane of operation by holding Shift for longer than one second and pressing Reset (while continuing to hold Shift), MIDI Note Incantation Reset is toggled OFF/ON\*. When toggled ON, every incoming MIDI note will cause the current incantation to restart from  $t = 0$  (or the boundary start point if encased in a loop). When toggled OFF, the incantation will proceed through time (as dictated by  $\langle\langle\rangle\rangle$ ). This allows for some degree of control over the incantation when invoking it from an external MIDI device.

## INCANTATION +/-

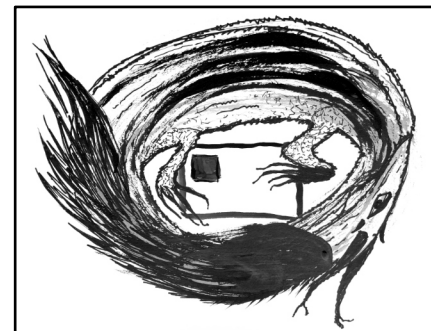
Color: White Button, Black Button  
Range: 1, -1  
Area of Effect: Incantation Selection

The + and - switches allow the conjurer to roam freely through the forty incantations (represented by  $\Sigma$  when viewing the Runic Display). The white switch increments by +1, while the black switch decrements by -1.

## STORE/RETRIEVE

Color: Red Button, Green Button  
Range: 0-33  
Area of Effect: Memory

When the conjurer discovers a particular incantation of note, they may wish to preserve a record of their findings. By selecting a preset with the corresponding dial, and pressing the red switch, one can store an incantation with all of the associated runic variations. Similarly, one can retrieve a stored incantation by selecting a preset and pressing the green switch.



## MIDI CH

Combo: Blue Button + White Button  
Range: +1  
Area of Effect: MIDI

The Prismatic Spray is able to commune with other MIDI capable devices. When a conjurer invokes the secondary plane of operation by holding Shift for longer than one second and presses +, the MIDI channel that the Prismatic Spray communes through is incremented by 1. This number cycles upwards until it reaches 16. Incrementing the MIDI channel above 16 will result in the Prismatic Spray responding to channel "A" or all MIDI channels. Incrementing from channel "A" will loop back to MIDI channel 1. Once the conjurer has selected the desired MIDI channel, the Prismatic Spray will store that selection.

## LOOPING

Combo: Blue Button + Black Button  
Range: Loop Start - Loop End  
Area of Effect: Temporal/Looping

While exploring the vast realms of sonic and visual terrain contained within the Prismatic Spray, one may find themselves enamored with certain "scenes" or "segments" worthy of repetition. It is possible for a conjurer to encase an incantation within certain boundaries, using the methods described below. It is easy to capture and repeat (loop) through these areas if so desired. A conjurer needs only to hold down Shift for longer than one second and press "-" (while continuing to hold Shift), unlocking the following sequence of commands as outlined on the following page:

- First press of "-" clears any existing loop that encases the incantation and captures the loop START point.
- Second press of "-" captures the loop END point and initiates looping the incantation between the START and END points.
- One can remain in the secondary plane of operation (holding down Shift), and continuously encase incantations within loops in this fashion until the conjurer exits the secondary plane of operation (releasing Shift). To release an incantation from the boundaries of a loop, the conjurer simply needs to press RESET. At this point, boundaries are destroyed, and  $t = 0$ .

## MIDI INVOCATION CHART

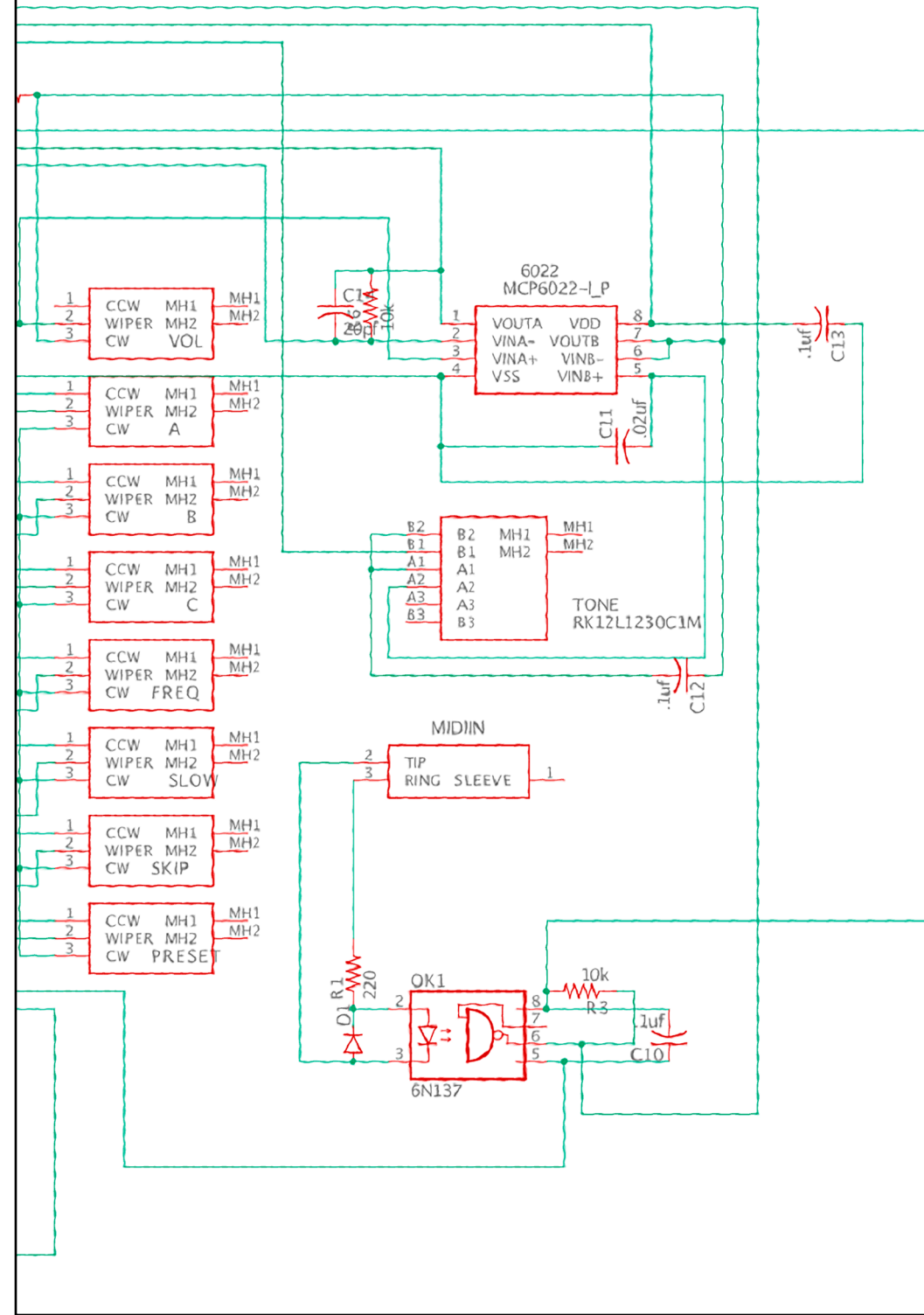
If one so desires, the Prismatic Spray is able to commune all of its internal workings through the language of MIDI. Selecting the MIDI channel on which the Prismatic Spray communes is described in detail above. The following list describes which functions respond to which MIDI CC rune. In general, the Prismatic Spray will respond chromatically to MIDI NOTE messages. You can toggle resetting  $t = 0$  on MIDI note as described above (see MIDI Note Reset)\*.

\* Resetting  $t = 0$  on MIDI note is set to OFF by default.

CC #	CC Value	Rune	Rune Value
30	0-127	A	varies
31	0-127	B	varies
32	0-127	C	varies
33	>63	reset	$t = 0$
34	0-127	<<>>	(-8) - 8
35	0-127	%	100% - 0%
36	0-127	$\Sigma$	0-40
37	>63	looping	cycle loop state
38	0-127	loop start offset	+/- 50% loop time
39	0-127	loop end offset	+/- 50% loop time
program change	0-33	load preset	0-33

## PERTINENT INFORMATION

If one finds themselves in need of further guidance and assistance, an electronic mail may be dispatched to [info@armanbohn.com](mailto:info@armanbohn.com). Please allow 4-6 weeks for delivery. Responses are not implied or guaranteed.







## PRISMATIC SPRAY

A bytebeat adventure synthesizer for at least one player

- 8-Bit sound output
- chromatically playable via an external MIDI keyboard (not required)
- bytebeat looper with adjustable in/out points
- analog audio filter
- 40 bytebeat incantations
- 34 save slots
- full color 1.44" 128x128 pixel display
- 9 dials
- 6 switches
- microUSB power
- USB/TRS-A MIDI
- fully controllable over MIDI CC