Octovolt

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Recollections: User Manual

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Recollections is a voltage memory module for Eurorack modular synthesizer systems offering 8 output channels across 16 presets, 16 banks and 16 modules for a total of 32,768 recallable voltages. It may be quickly reconfigured to function as a controller, a sequencer, a track-and-hold, a sample-and-hold, a random voltage generator, or all of these at the same time and in conjunction with each other. The data is stored on an SD card for later recall, and the storage files are easy to read and edit.

Recollections uses a color-coded user interface that is intuitive and easy to learn. These colors may be changed according to the musician's needs.

About this Manual

While *Recollections* is easy to use and has an intuitive user interface, an initial explanation of the color scheme and a more in-depth description of some of its deeper functionality is certainly warranted.

We recommend reading through the Overview and the documentation about Inputs and Controls, Sections and Screens, and Navigation before diving into the details of each of the operational *sections*. Within the documentation for each operational section, a *Quick Reference* provides a simplified overview of that section's functionality. Afterward, a detailed *Description* explains the functionality at length.

Additionally, a Glossary is available at the end of the manual. When terms found in the Glossary are first introduced in one of the manual's sections, they are presented as italicized links to their Glossary entries, as may be seen with the term *sections* in the paragraph above. Likewise, whenever the major sections of the manual are referenced, they are also presented as links for quick navigation.

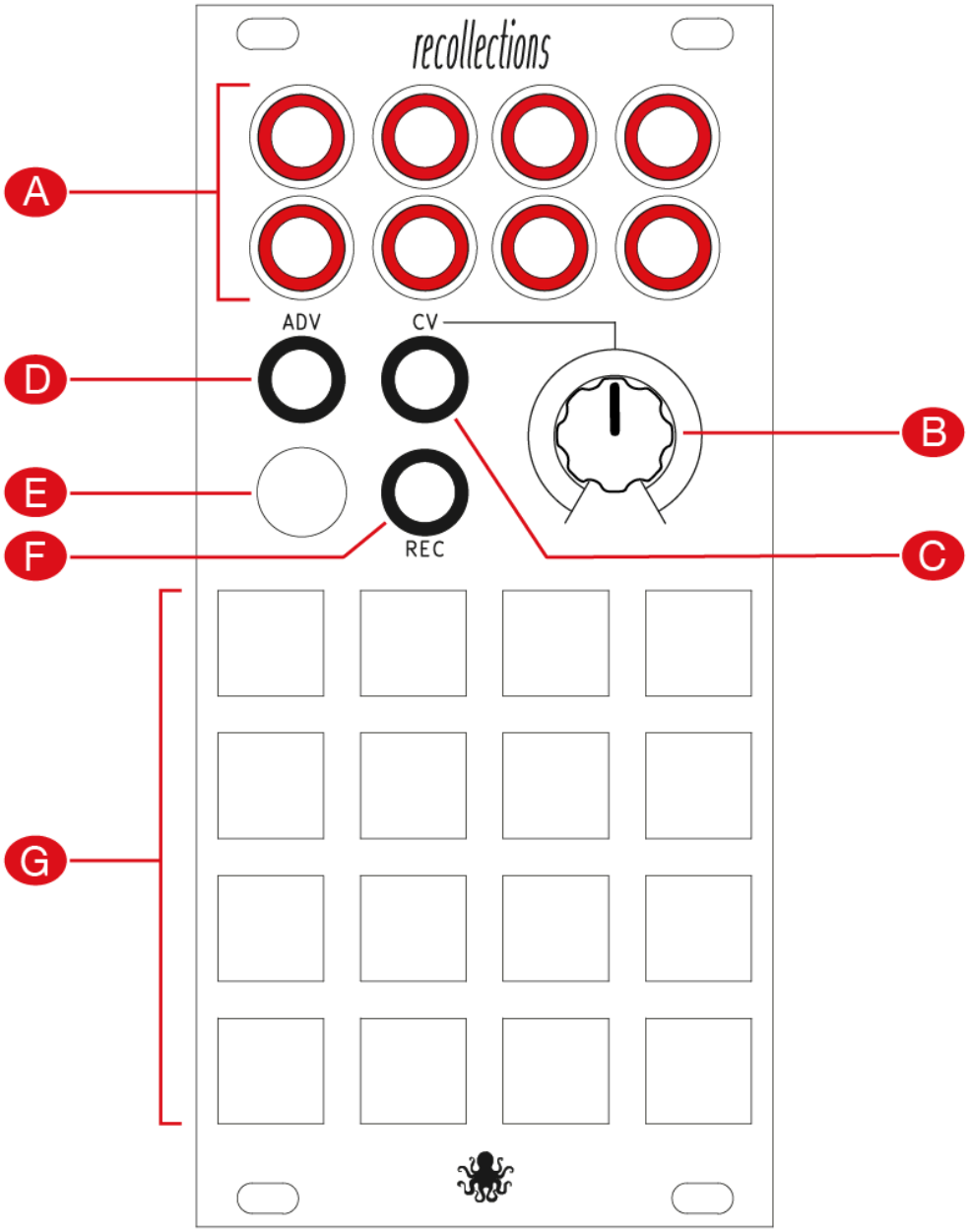
This manual repeats information in different places in an attempt to provide the best reference resource possible.

Much of the material presented in this manual will be available also in a forthcoming series of videos on the Octopus Arts YouTube channel.

Overview

Recollections stores and recalls static voltages with a flexible and intuitive control panel. The 8 outputs produce voltages between 0 and +5 volts. All 8 output channel voltages change with every *preset* selected from the 4x4 grid of *keys*.

Front Panel



- **A: 8 output jacks**. The outputs are capable of producing stable voltages between 0 and +5 volts. All 8 outputs may be configured on each *preset*, and all of them will change with every new preset selected.
- **B: CV knob**. This knob will attenuate voltage at the CV input, whether external or internal, prior to it being sampled during *recording* or editing.
- **C: CV input**. This input accepts voltages between 0v and +5v and is normalled to an internal +5v source. Voltage received at this input, whether coming from an external

source or from the internal +5v, will be sampled while recording or editing voltage. Negative voltage received at this input is rectified to be positive and voltage above +5v is clipped.

- **D: ADV input**. A clock or gate provided at this input will *advance* the current preset forward by one step.
- **E: MOD button**. When pressed alone, the MOD button navigates between *screens*. Most often, this navigates backward by one screen. However, on the first screen, Preset Selection, it navigates forward. Further, this button operates as a modifier button, similar to the control key on a computer keyboard, when held down prior to pressing one of the 16 illuminated keys. The resulting change in the behavior of the key is specific to the context of the screen in which this occurs.
- **F: REC input**. While *automatically recording*, a gate received at this input will begin recording while the gate is high and stop recording when the gate is low. When *Recollections* is in *Clocked Mode*, automatic recording will act as a sample-and-hold, preserving the voltage level when recording begins. If not in Clocked Mode, recording will act as a track-and-hold, preserving the voltage level when recording ends.
- **G: 16 illuminated keys**. The keys are arranged in a 4x4 grid and are illuminated in a variety of colors according to their function on any particular screen.

Colors

The user interface is based on colors, and understanding these colors is key to the use of the module.

Section colors:

- White: preset selection, current preset
- Yellow: channel editing (single channel)
- Green: global editing (all channels)
- Blue: bank selection
- Red: channel recording

Additional colors:

- Orange: locked voltages or presets
- Purple: inactive voltages or presets
- Magenta: module selection
- Black (non-illuminated): unused keys or removed presets
- Random: random voltage or random gates

Using Recollections

Some of the possible uses of *Recollections* are:

- **Live performance controller** for recalling stored sets of voltages. In essence, using the module in this way provides the musician with 16 presets at their fingertips. For more details, please see Preset Selection.
- **Gate and/or CV sequencer**. Each of the 8 output channels can be configured to be a gate channel or a CV channel, so exactly how many channels of each are used is entirely the musician's choice. For more details, please see Channel Editing.
- **Sample and hold**. For more details, please see Channel Recording.
- **Random voltage/gate generator**. For more details, please see Random Input and Random Output.
- **Voltage sequence generator/evolver** with the ability to lock voltages. For more information about evolving the voltage on a channel, please see Evolving Sequences and Locked voltages.

To get the most value from *Recollections*, one should pair it with other modules. However, only the first of these is truly required for *Recollections* to provide great value to your modular synthesizer system:

- Modules that produce or process audio, video or CV, with CV control over their parameters.
- A clock generator or sequencer.
- A pitch quantizer.
- A dynamic voltage source such as an LFO or function generator.
- A random or semi-random gate or trigger source.

Inputs and Controls

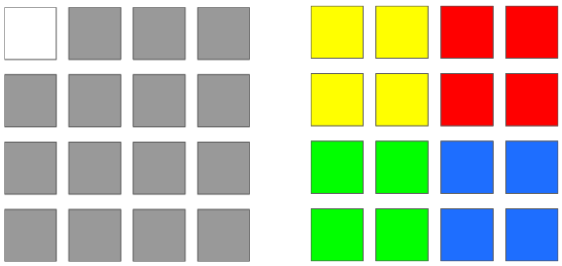
When pressed by itself, the *MOD button* operates as a "back" button to help navigate backwards through the various *sections* and *screens*. However, it also operates as a modifier button, much like the control key on a computer keyboard, when used in conjunction with one of the *keys* in the 4x4 grid. The behavior of these MOD + key combinations is different on each screen and are described in detail in this manual. On some screens, holding the MOD button and then pressing one of the keys repeatedly will cycle through a series of different options.

The color coded 4x4 grid of illuminated keys provide different functions on each screen, but are most often in a 4x4 configuration mapping to the 16 presets, banks or modules, or in a 4x2 configuration mapping to the 8 output channels.

When providing a clock, gate or trigger to the *ADV input*, *Recollections* will automatically advance from one preset to the next. Beyond the recording and recalling of voltages, the ADV input is perhaps where *Recollections* provides the most value. Sending a clock or gate signal into this input while leveraging the rest of the module's functionality can be very rewarding.

External voltage sources may be sampled through the *CV input*, or an internal +5v source may be used instead. The sampling range is unipolar, 0 to +5 volts, and negative voltages received at the CV input are inverted to bring them back into this range. This allows the full range of a noise source or an LFO to be utilized for input voltages. Voltages beyond 5v are clipped. The CV input is normalled to an internal +5v source. Both the internal +5v and the voltage received at the CV input may be attenuated with the associated knob.

While recording new voltages may be done manually, recording may also be automated by providing a gate or trigger to the *REC input*. This process is described in detail in the Channel Recording section of the manual.



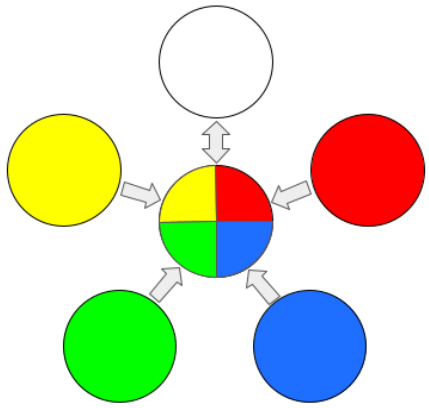
Sections and Screens

Recollections has 5 operational *sections* corresponding to 5 colors, in addition to the **Section Selection** *screen* that acts as a central navigational pivot point between the sections. The colors and their corresponding sections are:

- White: Preset Selection
- Yellow: Channel Editing
- Red: Recording
- Green: Global Editing

- Blue: Bank Selection

The section initially displayed after the module boots up is Preset Selection, and the initial screen of this section is likewise called Preset Selection. On this screen, pressing the *MOD button* briefly will cause *Recollections* to navigate forward to the **Section Selection** screen instead of navigating backward, as there is no previous screen to which we can return. Below is a simplified flow diagram of the MOD button's behavior:



Pressing one of the four colors presented on the **Section Selection** screen will navigate to the section corresponding to that color. Within each section there may be one or two screens. A more detailed flow diagram of all the screens is provided below in the Navigation section.

Navigation

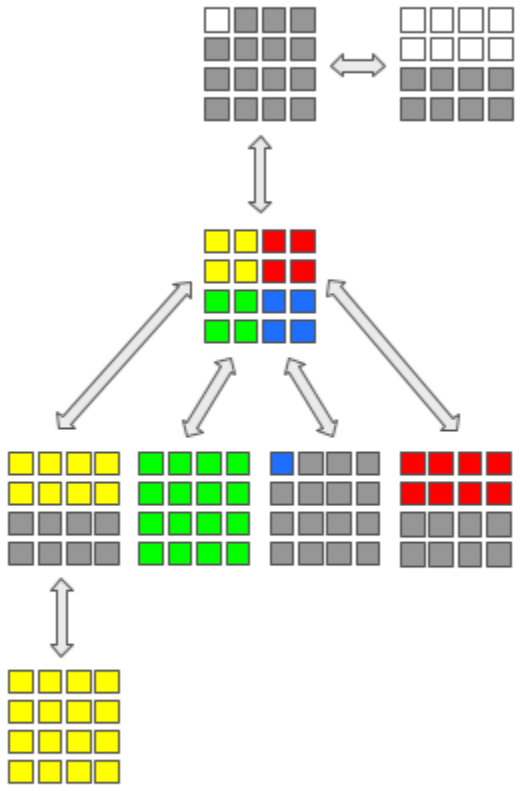
Briefly pressing the *MOD button* by itself, without also pressing one of the 16 *keys*, always navigates one *screen* backward in the flow diagram below. However, one notable exception exists to the MOD button's behavior: the Preset Selection screen. On this screen, pressing the MOD button briefly will navigate forward to the Section Selection screen. Additionally, while on the Preset Selection screen, holding the button down for two seconds will navigate laterally to the **Preset Selection** section's **Channel Selection** screen.

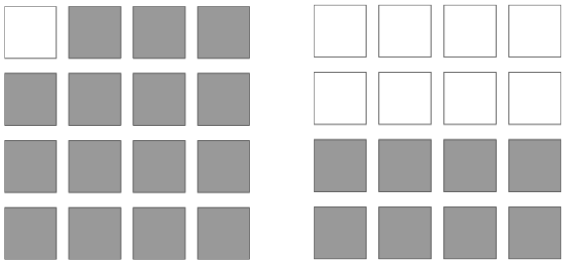
The only other secondary screen in any of the sections is the **Channel Voltage Editing** screen, which may be reached by selecting one of the 8 channels displayed on the initial screen of the Channel Editing section.

Quick Reference

- Preset Selection (white)
    - Channel Selection
- Section Selection
    - Channel Editing (yellow)
        - Channel Voltage Editing
    - Global Editing (green)
    - Bank Selection (blue)
    - Channel Recording (red)

Flow Diagram





Preset Selection (White)

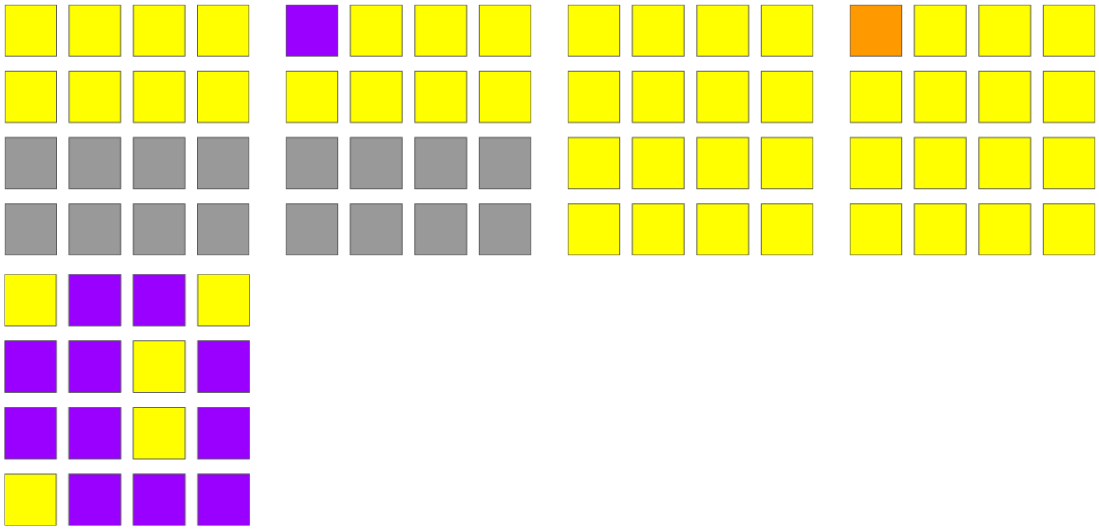
Quick Reference

- Preset Selection
    - Key: select preset
    - MOD + key: record preset
    - MOD: enter Section Selection
    - Hold MOD: enter Channel Selection
- Channel Selection
    - Key: select channel and return to Preset Selection

Description

Pressing any of the *keys* in the 4x4 grid will recall the 8 voltages stored at that *preset*. Holding down the *MOD button* and then pressing one of the keys will *record* voltage at that preset on the currently selected *channel*. While recording in this *section*, voltages are “live” rather than immediately sampled to allow for fine tuning during the recording process. Holding down the MOD button by itself for two seconds will enter a **Channel Selection** screen, where the currently selected output channel may be viewed and changed.

One could easily get a lot of value out of *Recollections* in this first section and never need to explore the others. This section is the “controller” interface for the module, but it also allows for the recording and editing of voltage. Much of the core functionality is readily at hand within this section. However, *Recollections* has a lot more to offer in the sections below.



Channel Editing (Yellow)

Quick Reference

- Channel Selection, Duplication and Configuration
    - Key: Select channel and enter Channel Voltage Editing
    - MOD + key:
        - (1) Copy/paste channel
        - (2) Toggle channel between CV and gate configurations
        - (3) Random output
- Channel Voltage Editing: CV Channels
    - Key: record voltage at preset
    - MOD + key:
        - (1) Copy/paste preset
        - (2) Lock preset
        - (3) Toggle active/inactive preset
        - (4) Random output
- Channel Voltage Editing: Gate Channels
    - Key: toggle preset on or off
    - MOD + key: random gate output

Description

The **Channel Editing** *section* begins with a **Channel Selection** *screen*. Pressing any *key* will select the corresponding *channel* for editing and enter the **Channel Voltage Editing** screen.

Channel Selection, Duplication and Configuration

All 16 voltages stored on a channel may be copied and pasted to one or more additional channels by holding down the *MOD button* and then pressing the key corresponding to the channel to be copied. The copied channel will begin to flash on and off. While still holding the MOD button down, one may then select the destination channels for the copy/paste action. All selected channels will flash and the paste action will occur on all the selected channels once the MOD button is released.

Alternatively, one can press the MOD button and then press a channel key twice. This toggles the channel's configuration between a *CV channel* with a full range of voltage values and a *gate channel* with binary values of 0 and +5 volts.

While holding the MOD button, pressing a channel key multiple times will cycle through the copy/paste mode, the CV/gate channel configuration and random output. Release the MOD button to finalize the change desired.

Channel Voltage Editing: CV Channels

After entering the **Channel Voltage Editing** screen for a CV channel, one may *record* voltage on any *preset* by pressing the key for that preset. Similar to recording in the Preset Selection section, the voltages are "live" during the recording process to allow for fine tuning.

Pressing the MOD button and one of the preset keys will cycle through four different outcomes:

1. Pressing a key once will result in entering a copy/paste flow, just like copying and pasting a channel on the previous screen.
2. Pressing a key twice will *lock* the voltage to prevent recording on the *current channel* on that preset. Locked voltages are illuminated with an *orange* color. This is very useful when using *automatic recording* to record random voltages, but specific voltages should remain consistent. When recording or generating a bass line, for example, it can be more musical to lock the first voltage to the root note of the scale.
3. Pressing a key three times will toggle the voltage as *active* or *inactive*. Active voltages are ***yellow*** and behave normally. Inactive voltages are ***purple*** and become extensions of the last active voltage. That is, no change in voltage occurs on an inactive voltage. They behave as if one had copied and pasted the previous voltage level onto that preset.

4. Pressing a key four times will configure the voltage to be random, which is indicated by the key cycling through random colors.

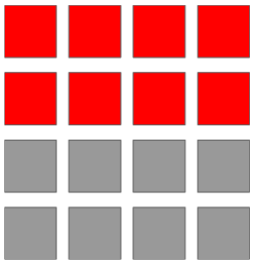
Channel Voltage Editing: Gate Channels

Pressing any key while editing a gate channel in the **Channel Voltage Editing** screen will toggle a gate on or off for that preset on the *current channel*. Presets with gates are *yellow* and those without gates are *purple* – that is, they are "inactive" and become rest notes when advancing from one preset to the next.

Holding the MOD button and pressing a key will toggle random gate generation for that preset on the current channel. The probability that a gate will appear on a random gate preset is 50%.

Random Output

An individual voltage or an entire channel may be configured to produce random voltages or random gates. Within the **Channel Selection** screen, one may configure a channel for random output by holding the MOD button and pressing a channel key three times, moving through the other modes to reach random output. When a channel is producing random voltage, random colors will be displayed by the channel key. Similarly, within a CV channel, a single preset can be configured for random output on the **Channel Voltage Editing** screen. Again, hold the MOD button and press the preset key four times to reach random voltage output. Random colors will be displayed on the preset key. Within a gate channel, an individual preset may be configured for random gates by holding the MOD button and pressing one of the presets. Random gates are always at a 50% probability of occurring.



Channel Recording (Red)

Quick Reference

- Key: record voltage at the currently selected preset on the selected channel
- MOD + key: Toggle Automatic Recording on or off

Description

The **Channel Recording** section allows for *recording* on a *channel* rather than a specific *preset*. This is particularly useful while providing a signal to the *ADV input*, as this will record voltage across a number of presets.

Recording occurs when one of the *keys* are pressed that correspond to the output channels, and the level of voltage is reflected in the brightness of the illuminated key. Under normal operation, the voltages will be "live" while recording to allow the voltages to be adjusted to one's liking. However, when a gate or trigger has been recently received at the ADV input, Recollections enters Advancing Mode. While in this mode, the new voltage will be sampled whenever the gate at the ADV input goes high.

Automatic Recording

The Channel Recording section also provides the opportunity to do *automatic recording*. To configure *Recollections* for automatic recording, press the *MOD button* and one of the channel keys. The channel key will flash to indicate that the module is ready for automatic recording. When a gate or trigger is received at the *REC input*, the value at the *CV input* will be stored on the current preset. To toggle automatic recording off, press the MOD button and the flashing channel again.

While *Recollections* is configured for automatic recording, sending a gate into the REC input will operate as a track-and-hold: the voltage will follow the input signal while the gate is high and become a static, consistent voltage when the gate is low. However, if a trigger or gate has been recently received on the *ADV input*, *Recollections* will enter *Advancing Mode*. While in this mode, sending a trigger or gate into the REC Input will operate as a sample-and-hold: the new voltage is immediately sampled as soon as the gate or trigger goes high. Unlike most sample-and-hold modules, however, this will be one with stored history. That is, the recording action overwrites the values that were present on the presets where recording took place. Stop the signal into the REC input and the history of sampled voltages will then repeat themselves when triggers or gates arrive at the ADV input.

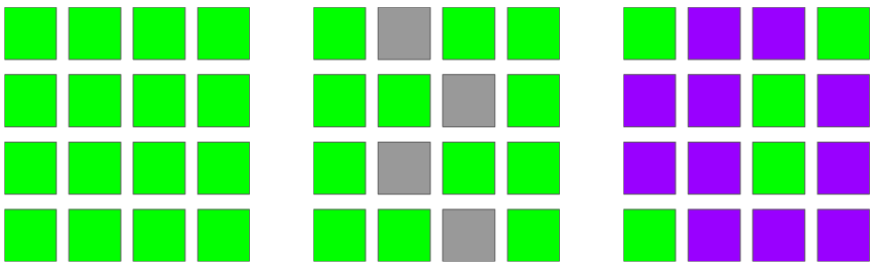
Evolving Sequences and Locked Voltages

A slowly evolving CV sequence generator can be created with automatic recording, but in this case we need a trigger or gate to occur only occasionally on the REC input. The more often the gate appears, the faster the sequence will evolve. This can be achieved with an external random trigger or gate generator, with an external LFO or envelope, or even by self-patching *Recollections* between a random output channel and the REC input.

Automatic recording will also respect *locked voltages* and never overwrite them with a new voltage value. Using locked voltages along with automatic recording can produce very musical results. For example, we might want to create a bass line that evolves over time, but we need it to stay consistent on specific beats, such as the first beat of the measure. We can lock the first preset to ensure that it will never change and then use automatic recording to evolve the other presets.

Random Input

Within the Channel Recording section, a channel may also be configured to do automatic recording of an internally generated random voltage. To do this, press the MOD button and then press one of the channel keys twice. While holding the MOD button, pressing a key multiple times will cycle between normal automatic recording and automatic recording with the internally generated random voltage. When the random input is present, the key will flash with random colors rather than red.



Global Editing (Green)

Quick Reference

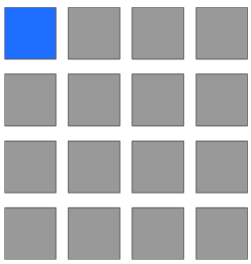
- Key: Remove/restore preset
- MOD + key:
    - (1) Copy/paste presets across all channels
    - (2) Lock preset across all channels
    - (3) Toggle active/inactive preset across all channels

Description

Changes made during **Global Editing** affect all channels.

Press any *key* to remove that *preset* from those that may be reached by *advancing* the current preset with a trigger or gate at the *ADV input*. *Removed presets* are not illuminated. Press the key again to restore it. Voltages recorded prior to removing the preset will be preserved and restored along with the preset. By removing presets, we can create a sequence of an arbitrary number of steps instead of a 16-step sequence, allowing for shorter phrases and odd meters.

Pressing the *MOD button* and any key has behavior similar to Channel Voltage Editing, in that it will cycle through three different outcomes. (1) Pressing a key once will result in entering a copy/paste flow. (2) Pressing a key twice will *lock* the preset to prevent *automatic recording* on that preset. *Locked voltages* are illuminated with an *orange* color. (3) Pressing a key three times will toggle the preset as *active* or *inactive*. Inactive voltages are *purple*. On *gate channels*, inactive voltages will become rests without a gate on that preset. On *CV channels*, inactive voltages continue to produce the same voltage level as the last active voltage.



Bank Selection (Blue)

Quick Reference

- Key: select bank

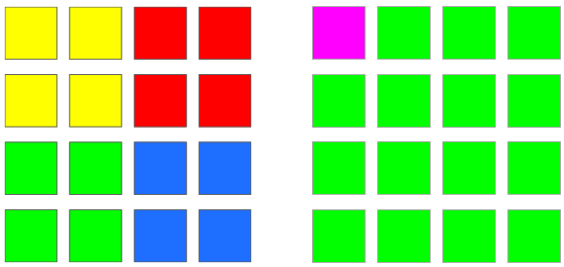
- MOD + key: copy/paste bank

Description

A *bank* is the entire set of 16 *presets*. *Recollections* offers the ability to store and recall 16 banks.

Pressing any *key* in the **Bank Selection** section will load that bank without changing the current preset. That is, if the current preset is 7, it will still be on preset 7 when the bank is changed. However, since the stored voltages at preset 7 are different in the new bank, all of the voltages at the outputs will immediately change when the bank is changed.

Pressing the *MOD button* and any key will enter a copy/paste flow, allowing an entire 16-preset bank to be copied to a different bank. This flow is nearly identical to the other copy/paste flows described above in other sections: the bank to be copied will flash, along with any destination banks. Pressing a destination bank twice will remove it from the set of destinations. The paste action is executed when the MOD button is released.



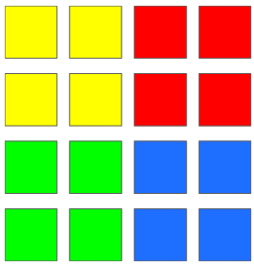
Loading a New Module

We refer to the entire set of 16 banks of 16 presets as a *module*. Recollections is capable of loading 16 different modules for a total of 32,768 recallable voltages. Unlike bank data, which is held in RAM and loaded instantly, modules are loaded from the SD card.

To load a new module, navigate to the Section Selection screen. Hold the MOD button and press one of the green keys. This will navigate to the Module Selection screen. The current module will be illuminated in *magenta*. Press any key to load that module. If this is an entirely new module, the required directories and files will be written to the SD card.

The other keys on this are dimly lit in green merely to help in remembering where this screen is located. Please note that this screen is not included in the navigational flow diagram in the

Navigation section of this document. Pressing the MOD button will navigate back to the Section Selection screen.



Saving a Bank to the SD Card

To save, first navigate to the Section Selection screen. Then hold the *MOD button* while also pressing one of the blue *keys*, as the *blue* color corresponds to *bank* functionality. The blue quadrant of keys will begin to flash. Release the MOD button and press one of the flashing blue keys to confirm the save. All of the keys will flash briefly to indicate the data has been saved successfully. Press any other key or the MOD button to cancel the save operation. The save operation will save all the data for the current *bank*, along with any global data for the *module* such as *removed presets* and the current bank/preset/channel.

An *SD card* is required for *Recollections* to operate correctly. If no SD card is found or the card cannot be read or written to, *Recollections* will go into an error state where all 16 keys will flash red.

All global data for a module across all channels is stored in a *Module.txt* file, located at */Recollections/Module_n/Module.txt*, where *Module_n* is the directory for the current *module*, such as Module_6.

All bank data related to voltages, gates, etc is stored in the *Bank_n.txt* files, located at */Recollections/Module_n/Bank_n.txt*, where *Module_n* is the directory for the current *module*, such as Module_6, and Bank_n.txt is the file for the current bank, such as Bank_7.txt.

These files are human-readable and editable. However, please note that this data must be valid JSON. A misplaced comma, curly brace or quotation mark will make *Recollections* unusable until it is corrected.

If a Module_n.txt or Bank_n.txt file cannot be found, an empty file will be created and the default values will be loaded into RAM.

Example Module_n.txt and Bank_n.txt files are available in the GitHub repository. Please see these example files to more fully understand how the data should be formatted.

Customized Configurations

Recollections may be configured in customized ways to meet a musician's needs. All the customized configuration data, such as customized colors, is stored on the SD card within the *Config.txt* file in the root of the *Recollections* directory at */Recollections/Config.txt*. If the file is empty, the default values will be used instead. Likewise, if one of the configuration values is missing from the file, the default value will be used.

Please note that this data must be valid JSON. A misplaced comma, curly brace or quotation mark will make *Recollections* unusable until it is corrected.

If a Config.txt file cannot be found when *Recollections* boots up, an empty file will be created and the default values will be loaded into RAM.

An example Config.txt file with all the default values is available in the GitHub repository. Please see this file to more fully understand the various options and how the data should be formatted.

Colors are represented by red, green and blue values between 0 and 255. Online color pickers such as Mozilla's Color Picker will certainly help to get close to the desired values, but the LEDs that illuminate the keys do not act exactly like a computer screen, so you will likely need to experiment a bit.

If you are having trouble seeing distinctions between the colors, you may want to try another color palette. Professor David Nichols of the University of Connecticut has some resources on his website that could serve as a good starting point.

In addition to the **colors**, the following configuration options are available:

- **brightness**: the brightness of the illuminated keys, 0-255. Brighter keys consume more power. Default: 100.

- **controllerOrientation**: whether Recollections is in its default, controller orientation with the output jacks at the top or in a more standard Eurorack orientation with jacks at the bottom. Default: true.
- **currentModule**: the module that first loads when *Recollections* boots up. Please note that it is possible to use this to load a module other than the 16 available from the keys on the Module Selection screen. Default: 0.
- **isAdvancingMaxInterval**: the number of milliseconds that can elapse without a trigger or gate on the ADV input before Recollections is no longer in Advancing Mode. Default 10000 (10 seconds).
- **isClockedTolerance**: the percentage of tolerance, expressed as a decimal between 0 and 1, that the triggers or gates on the ADV input can vary from each other before Recollections is no longer in Clocked Mode. For example, if isClockedTolerance is 0.1, gates at 1000, 1000 and 900 millisecond intervals are considered to be regular clock signals, while another gate arriving after 1200 milliseconds would not. The most recent interval is compared with the average of the previous two intervals. Default: 0.1 (10%).
- **randomOutputOverwrites**: whether random output, set in the Channel Editing section, should overwrite the stored voltage values in memory. When this is true, the newly created random values are retained in memory as the value for that preset, overwriting the old value. When this is false, the new random values are ephemeral and the original values in the module's memory will be restored when random output is turned off. Default: true.

Glossary

- **Active voltages**: On an individual channel, active voltages are the *presets* which will produce their own voltages when selected. Please compare with *inactive voltages*.
- **ADV input**: Providing a gate or trigger to this input jack will immediately *advance* the current preset to the next preset.
- **Advance**: We call the process of moving through the *presets* in response to a trigger or gate at the ADV input *advancing* rather than *sequencing*, as the latter term tends to imply moving through the presets at a regular interval. While sequencing is possible by providing a regular clock at the *ADV input*, an irregular or rhythmic set of gates may be provided instead.

- **Advancing Mode**: *Recollections* is in Advancing Mode whenever a trigger or gate has been received at the *ADV input* within the last 10 seconds. This time window may be configured on the SD card to be longer or shorter with the isAdvancingMaxInterval field in Config.txt. Advancing Mode affects the behavior of recording in the Channel Recording section and the behavior of *locked voltages*.
- **Automatic recording**: The process of turning *recording* on and off by providing a gate or trigger to the *REC input* jack. Configuring which channels will record new voltage is done in the Channel Recording section. Automatic recording is particularly useful when *advancing* through presets, and can provide functionality that is similar to the groundbreaking Turing Machine module from Music Thing Modular. Additionally, please note that *locked voltages* will ignore all recording, including automatic recording. This is a key feature of Recollections that is very musical.
- **Bank**: A set of 16 *presets*. There are 16 banks available for each *module*.
- **Bank_n.txt**: The files on the *SD card* named for each *bank*, i.e. Bank_0.txt, Bank__1.txt, etc. Each of these files stores the voltages and other bank-specific information for all *presets* on all *channels*. These files are found within a *Module_n* directory. Please see Saving a Bank to the SD Card.
- **Black, or non-illuminated**: This color indicates an unused *key* or *preset*. Notably, within the Global Editing section, it indicates a *removed preset*.
- **Blue**: This color represents the *Bank Selection section* of *Recollections*. Within this section, a blue *key* represents a *bank*.
- **Channel**: One of the eight outputs capable of producing voltage between 0v and 5v.
- **Clocked Mode**: *Recollections* is in Clocked Mode whenever the time between the last four triggers or gates on the *ADV input* are equivalent, while allowing for a small margin of variance. This margin is 95% by default but may be configured on the *SD card* in *Config.txt*. Clocked Mode affects the length of gates produced by *gate channels*.
- **Config.txt**: The file on the *SD card* where all customized configurations may be added and edited. For example, this is where one can change the colors. This file is found at the root of the *Recollections* directory. Please see Customized Configurations.
- **Current channel**: One of the 8 channels will have the status of being currently selected for editing or recording. That is, there is always one channel that has this status, depending on what channel was selected last. By default when *Recollections* powers up, the current channel is channel 1. The currently selected channel may be edited on the Preset Selection screen or the Channel Voltage Editing screen, and may record new voltage values directly on the Recording screen or through the process of automatic

recording. The current channel changes when a key is pressed on the Channel Selection screens in the Preset Selection (white), the Channel Editing (yellow), or the Recording (red) sections. The current channel is displayed brighter than the others on the Channel Selection screen within the Preset Selection section.

- **CV channel**: An output channel that produces control voltage, rather than gates, ranging from 0v to +5v. Control voltage values captured from the *CV Input* or the internal +5v source are captured at 10-bit resolution. This provides over 200 digital values per volt. Random voltage, on the other hand, is produced at 12-bit resolution, which provides over 800 digital values per volt.
- **CV input**: The input jack where an external control voltage source may be provided to *Recollections*. This jack is normalled to an internal source of +5v, and may be attenuated with the associated knob. This jack is used for *recording* voltages at 10-bit resolution.
- **Gate channel**: An output *channel* that produces gates rather than control voltage. Gates are +5v when high, and 0v when low.
- **Green**: This color indicates the default behavior for a *preset* within the Global Editing section. Please compare with *removed presets*, *locked voltages*, and *inactive voltages*.
- **Inactive voltages**: On an individual *channel*, inactive voltages are the *presets* that ignore their own stored voltage level and instead produce the voltage of the most recent *active preset*. Inactive voltages may be used to produce longer notes when *advancing* through the presets. For example, if the voltage at preset 1 is active and the voltages at presets 2, 3 and 4 are inactive, the voltage output will maintain the level it was at preset 1 until we reach preset 5. On *gate channels*, inactive voltages are rest notes that do not produce a gate.
- **Key**: One of the 16 elastomer buttons in the 4x4 grid. Each key is capable of illumination by an RGB LED. Keys typically represent *presets* or *channels*, though they may occasionally represent *sections* or other functions on some *screens*.
- **Locked voltages**: The *voltages* where *recording* is disabled while *Recollections* is in *Advancing Mode*. Locking voltages can provide very musical results, as it maintains a consistent voltage on the selected presets while voltages on other presets are allowed to change. A good example of this is a bass line where the root note of the scale needs to be played consistently on the first beat of the measure. Locking the first voltage in this case would fulfill this need, while the other notes of the bass line would be free to change with newly recorded voltage. Please note that locked voltages only prevent recording while in Advancing Mode.
- **Magenta**: This color indicates the current module.

- **MOD button**: The single button immediately adjacent to the 4x4 grid of *keys* and the input jacks. This button will always operate as a “back” button when pressed by itself. It often acts as a modifier button, similar to the control button on a computer keyboard, when used in conjunction with one of the 16 keys.
- **Module**: The entire state of all *banks*, *presets* and other aspects of *Recollections'* functionality, which may be saved to the *SD card* and recalled at a later time. While 16 modules may be loaded from the front panel of *Recollections*, additional modules may be configured to load when booting up or be accessed through advanced means, such as the i2c data bus. For more information about modules or the i2c data bus, please see the Github repository.
- **Module.txt**: The file on the *SD card* where the global state (across all *banks*) of a *module* is stored. This file is found within a *Module_n* directory. Please see Saving a Bank to the SD Card.
- **Module_n**: The directories where all state for a module is stored, i.e. Module_0, Module_1, etc. These directories are found in the root of the *Recollections* directory. Please see Saving a Bank to the SD Card.
- **Orange**: This color indicates a *locked preset*. Please see *Channel Editing* and *Global Editing*.
- **Preset**: One of the 16 memory slots, per *bank*, containing 8 *voltages* across the 8 *channels*. As there are 16 banks, there are 256 presets available per *module*. Providing a clock, gate or trigger to the *ADV input* will *advance* from one preset to the next.. On the Preset Selectionand Global Editing screens, all of the 16 presets are represented by the 16 illuminated keys. However, on the Channel Voltage Editing screen, the 16 keys represent only one of the 8 *voltages* associated with each of the 16 presets.
- **Purple**: This color indicates either a *removed preset* or an *inactive preset*. Please see *Channel Editing* and *Global Editing*.
- **Random color**: When a key is displaying a series of random colors, this means that the channel or preset is configured to use the internally generated random voltage values. Please see Random Input and Random Output.
- **REC input**: The input jack that can control turning *automatic recording* on or off. After a channel has been configured for automatic recording in the Channel Recording Section, providing a trigger, gate, clock or any voltage over +2.2v to this jack will trigger the recording of a new voltage.
- **Recording**: The process of capturing new voltage, whether from the *CV input* jack, the internal 5v input, or the internally generated random voltage values. Recording behaves

differently within different sections. In Preset Selection (white) and Channel Editing (yellow), the functionality is somewhat similar to a classic track-and-hold: during recording, the voltage is "live" and only becomes a static value when recording ends. This allows for fine tuning of the voltage before it becomes a static value. However, in the Channel Recording (red) section, the recording behavior varies based on whether *Recollections* is in *Advancing Mode*. While in Advancing Mode, the behavior in the Recording section is more similar to a classic sample-and-hold, where the new voltage is established as soon as recording on the current *preset* begins.

- **Red**: This color indicates *recording*. Please also see the Channel Recording section. Additionally, when the module is in an error state, all of the *keys* will flash red.
- **Removed presets**: The *presets* which have been removed from the *advanceable* series of presets. They appear as non-illuminated *keys* in the Global Editing section.
- **Restored presets**: The presets which have been added back to the advanceable series of presets. They appear as green *keys* in the Global Editing section.
- **Screen**: One of the user interface configurations of the 4x4 grid of illuminated *keys*. Each screen's functionality is different, and will have a different display of color to indicate the functionality available. Pressing the *MOD button* will always navigate backward to the previous screen. Forward navigation is performed from the Section Selection screen, or in the case of Channel Editing, by selecting one of the 8 channels. Please see Navigation and Sections and Screens.
- **SD card**: The Secure Digital memory card where all of the data used by *Recollections* is stored. With Recollections version 0.3.1, this card is found on the back of the module as part of the Teensy 4.1 microcontroller board. Please see Saving a Bank to the SD Card and Customized Configurations.
- **Section**: One of the major areas of *Recollections* which is indicated by its own specific color: Preset Selection (white), Channel Editing (yellow), Recording (red), Bank Selection (blue) and Global Editing (green). Some sections only have a single *screen*, while others may have two. Please see Sections and Screens.
- **Voltage**: We refer to one of the 16 individual memory slots on a *single channel* as a *voltage*. Each memory slot has a specific voltage value it will produce on its channel when its *preset* is selected. A preset is all 8 voltages associated with a *key*. A voltage is a single voltage value within a preset, corresponding to a channel. Voltages are more easily viewed across all keys on the Channel Voltage Editing screen, but voltages on the *current channel* may be edited also on the Preset Selection screen and across all 8 channels for the current preset on the Recording screen.

- **White**: This color indicates Preset Selection.
- **Yellow**: This color indicates Channel Editing.