# SUPERCELL

User Manual 1.05

Clouds, the granular synthesis module from Mutable Instruments, was discontinued in 2017.  Supercell brings back Clouds in an expansive 34 hp form factor, offering an improved user interface and several additional features.

## Dedicated Blend Controls

Clouds offered four useful parameters – Feedback, Stereo Spread (Panning), Dry/Wet (Mix), and Reverb (Space) – which were all controlled by one "Blend" knob and one CV input. Supercell separates these parameters into individual controls with their own CV inputs and inverting attenuators (attenuverters).

## Louder Output Levels

The output of Clouds could be somewhat quiet with certain parameter settings. Supercell adds an Output control with approximately +6 dB of gain, which also functions as a master volume control on the final output.

## Performance Mutes

The stereo inputs and outputs now have mute switches. When mutes are enabled, the red LED on the associated VU meter will remain on at all times and the meter will otherwise be disabled. Muting the outputs will silence the audio signal path prior to the Space parameter so that reverb tails are not clipped.

## Simplified Time/Quality UI

Tap the TIME switch to cycle between 1, 2, 4, or 8 seconds of sampling time. The LED associated with the chosen time value will blink until the buffer has been filled with new material. Note that the sample rate also changes in relation to the sampling time. Refer to the Clouds manual for details.

## Simplified Load/Save UI

To load saved presets, tap the BANK switch to step through the four memory banks. Note that a brand new module (or a module that has just received a firmware upgrade) will have four empty banks.

A new feature has also been added which reloads the current preset bank without cycling through the other three banks first, which may be useful in live performance settings. Press BANK while pressing TRIG to reload.

To save the current audio buffer, press BANK for one second to begin the save process. Save into the current bank by pressing BANK again for one second. Alternately, you can select a different bank to save into by tapping BANK briefly before saving. The save process will exit after saving is complete. Alternately, the save process will be canceled if nothing is saved within five seconds. The LED of the last-selected bank will blink ten times before saving is canceled.

## Expanded Modulation Options

Each of the nine granular processing parameters has its own CV input with an inverting attenuator (attenuverter) to set the level and polarity of external CVs.

Along with patching external CVs directly to each CV input, you may want one CV to affect multiple parameters without using splitter cables or a multiple module. Patch a CV signal into AUX and it will be distributed to all nine of the parameters. The attenuverters can still be used to control the modulation depth of this distributed CV signal. Patching a different signal directly into one of the nine CV inputs will disconnect the AUX signal from that parameter.

There is also a third option for modulation, which involves a fluctuating random CV that is internally generated by the module itself. Any unpatched parameter inputs will receive this signal automatically (assuming that the AUX input is also

unpatched, because patching into AUX overrides this internal random CV). The attenuverters control the modulation depth here as well. To prevent the internal modulation from changing a parameter, set the attenuator to its center position.

Firmware version 1.01 provides a way to change the frequency of the random CV changes. Press and hold the TRIG switch and then turn the PAN knob until the HOLD LED starts to blink. The randomization frequency will change when the TRIG switch hold is released. Return the Pan knob to its original position if needed. The available range is from 1 Hz to 100 Hz.

To disable the internal random CV, press both of the mute switches for about two seconds. There is no visual feedback to indicate the current state of the modulation, so try setting the Pitch attenuator to its maximum position in order to determine whether the randomization is enabled or disabled.

## Stereo Input/Output VCAs

The inputs and outputs now include stereo VCAs and separate VU meters. The knobs for Input and Output function as DC offsets for their respective VCAs, setting the modulation baseline when the VCA inputs are patched, so turn these knobs to their minima if you want to use unipolar CV sources like envelopes. CV signals affect the left and right channels equally. If you prefer to modulate the left and right channels separately, this can be accomplished with external VCAs.

## Exponential and Linear Pitch Control

The PITCH parameter is now controlled by two separate CV inputs. The V/OCT input is exponential and the Pitch input is linear (with an attenuverter). When both inputs are used, the two voltages are summed. Note that on Clouds, the PITCH input was used for calibration since it was the module's only 1V per octave CV input. On Supercell, the V/OCT input should be used for calibration instead. See the calibration section below for details.

### Trigger Switch

Clouds had a trigger/gate input for generating individual grains. Supercell adds a manual TRIG switch that performs the same function. It's particularly useful with some of the alternate firmware modes such as Beat Repeat. This switch is also used for the quick reload function and adjustment of the internal random voltage generator's clock rate. See the notes above for details.

### Alternate Modes

The alternate modes from Clouds remain accessible. Hold the TIME switch to see which mode is currently active and tap TIME to select a new mode. If the default Supercell firmware is installed, the 1/2/4/8 LEDs will correspond to the Granular Processor, Pitch Shifter, Looping Delay, and Spectral Madness modes from Clouds, respectively. To exit without changing modes, wait five seconds and the mode selection process will automatically exit. The LED of the selected mode will blink ten times before selection is canceled.

### Firmware Updates

Supercell supports the audio-based WAV file firmware update method used on the original Clouds. First, unpatch all inputs and outputs, then connect your computer or smartphone to the LEFT audio input of Supercell using a standard patch cable. Power on your modular system while pressing the HOLD switch. The red HOLD LED will blink slowly, indicating that the module is waiting for data. Set the INPUT knob to its center position, then play the WAV file from your audio device. The red LED will blink rapidly, indicating that data is being received, with occasional pauses in between. The process takes a bit more than two minutes and the module will reboot once the update is complete.

If the red LED stops blinking for more than a few seconds, and the yellow Time/Bank LEDs are blinking instead, the update has failed. Repeat the steps above but change the INPUT volume on Supercell or the output volume on your audio device so that only the green LEDs on the VU meters are illuminated.

Note that performing firmware updates will clear any saved audio clips stored in the four BANK slots.

## Calibration

Calibration should be performed after making firmware updates. Otherwise certain CV inputs and parameter ranges will not be properly scaled.

1. Power on your modular system while holding the TRIG switch. The input VU meter will start to blink.

2. Patch a cable into the V/OCT input (not the Pitch input) and send a 1V DC offset into the module. Many Eurorack modules can generate DC offsets but you will need some way to measure the voltage. Use a digital multimeter or an oscilloscope module like the Mordax DATA to generate precise values. Once a 1V signal is present at the V/OCT input, tap the TRIG switch.

3. The output VU meter will start to blink. Now change the 1V DC offset to 3V instead, then tap the TRIG switch once more. The calibration process will then be completed and the module will return to normal operation.

If calibration fails, try again (which will require power cycling your modular system) and be sure that your CV source is providing the correct DC offset levels.

**Open Source**

Thanks to Mutable Instruments for making the original Clouds hardware and firmware available under open-source licenses (CC BY-SA 3.0 and the MIT License, respectively). The CC BY-SA 3.0 license grants a broad range of rights related to the Supercell source files but it does not grant any rights to use intellectual property such as trademarks, brand names, and logos. Grayscale, Supercell, Mutable Instruments, and Clouds are trademarks of their respective owners and should not be used on any derivative works without permission.

Note that Grayscale does not offer technical support for DIY builders or repair services for individuals who purchase DIY builds. Builders who are selling DIY modules should clearly indicate to their customers that DIY builds are not official Grayscale products and will not be covered by warranty services.

**Grayscale Supercell:** grayscale.info/supercell
**Supercell source files:** github.com/grayscalemodular
**Clouds manual:** mutable-instruments.net/modules/clouds/manual
**Clouds source files:** github.com/pichenettes/eurorack
**Superparasites code:** github.com/patrickdowling/superparasites/
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**Firmware Credits**

The Supercell "Core" firmware offers the original four DSP modes from Clouds. This code was released by Mutable Instruments under an MIT License.

The "Superparasites" firmware incorporates alternative Clouds firmware code from Matthias Puech (Parasites) and Julius Kammerl (Beat Repeat) which was also released under the MIT License and used with permission. Patrick Dowling (known for his extensive work on the Ornament & Crime firmware) merged these existing alternate firmware libraries into one consolidated firmware that takes full advantage of the Supercell hardware.