rossum
electro-music

SATELLITE
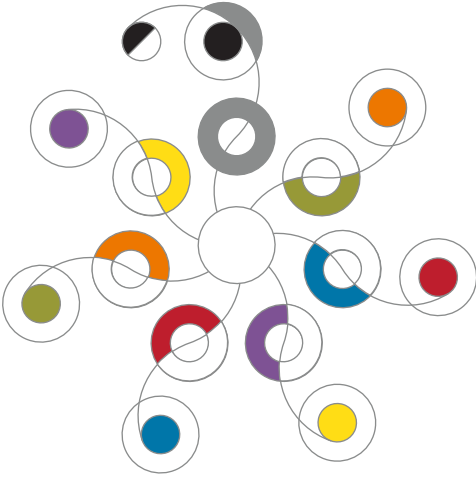## Universal CV Generator

Operation Manual
v2.1_060117

Contents

1. Introduction

Thanks for purchasing (or otherwise acquiring) the Rossum Electro-Music **Satellite Programmable Universal CV Generator**.

This manual will give you the information you need to get the most out of Satellite. However, the manual assumes you already have a basic understanding of synthesis and synthesizers. If you're just starting out, there are a number of good reference and tutorial resources available to get you up to speed. One that we highly recommend is:

Power Tools for Synthesizer Programming (2nd Edition)
By Jim Aikin
Published by Hal Leonard
HL00131064

Support

In the unlikely event that you have a problem with your Satellite, tell us about it here:

http://www.rossum-electro.com/support/support-request-form/

... and we'll get you sorted out.

If you have any questions, comments, or just want to say "Hi!," you can always get in touch here:

http://www.rossum-electro.com/about-2/contact-us/

... and we'll get back to you.

Happy music making!

2. Module Installation

As you will have no doubt noticed, the rear of Satellite, is a circuit board with exposed parts and connections. When handling Satellite, it's best that you hold it by the edges of the front panel or circuit board. It's not particularly easy to blow up, but why take chances?

More specifically, the biggest risk (to the extent that there's a risk), is damage by static electricity. Particularly on dry, cold days (or if you've just shuffled across your shag carpet in fuzzy slippers), make a point of touching the metal panel first, before touching any other part of the module.

While all Rossum Electro-Music modules are protected against reverse polarity damage, both to your module and your system, care should still be taken to connect the power cable correctly. (For more detail on our unique protection method, check out Dave's discussion of Circuit Protection in **Chapter 14**.)

Plug the included 16-pin connector into the header on the rear of the module such that the red stripe on the cable (the -12V side) is on the same end of the header as the "Red Stripe (-12V)" text on the PCB.

Satellite requires, at most, 125mA of +12V and 25mA of -12V.

We have included both M3 and M2.5 (for vector rails) mounting screws. Use what fits your system.

If rack rash is of concern to you, use the included nylon washers when mounting Satellite in your case.

3. Overview

Satellite is a compact 12HP module that can be loaded with all (or a subset) of the presets and preset sequences from a **Rossum Electro-Music Control Forge** or other **Satellite** and then function as a completely stand-alone CV generator. Once the presets and preset sequences are transferred from the other module (via a patch cord connection), **Satellite** no longer requires any connection to the module.

With one or more **Satellites**, you can take advantage of all of your **Control Forge** presets and sequences in multiple cabinets or even different systems.

Multiple **Satellites** can be programmed from the same **Control Forge** and synced together via their Gate inputs to create complex polyphonic sequences and modulation contours.

In addition to direct connection with a **Control Forge** or other **Satellite,** presets and preset sequences can also be loaded via audio file archives that have been saved from a **Control Forge** or **Satellite.** And since those files can be posted online and downloaded, that's a great way to share and exchange presets.

4. How to Use This Manual

For the purpose of this manual, we're going to assume that you are already familiar with the Control Forge Programmable Universal CV Generator and its capabilities and functionality. While it's possible to make use of a Satellite without owning a Control Forge (by loading presets and preset sequences from a friend's Control Forge or downloading audio file archives posted by other Control Forge users), you're still going to have to know how the Control Forge's presets and sequences work to make use of them in your Satellite.

If you're *not* already familiar with the workings of Control Forge, you should check out the Control Forge manual at:

http://www.rossum-electro.com/support/documentation/

With that in mind, the goal of this manual is to describe the various ways of getting content into your Satellite and describing the few differences (largely a result of the Satellite's more compact form factor) between the functioning of the presets and sequences in Control Forge and in Satellite.

Here's what the following chapters offer:

Chapter 5: Basic Functionality

This chapter introduces you to Satellite's basic functional principles, its inputs and outputs, and its controls.

Chapter 6: The Main Display

This chapter describes the elements of Satellite's main operational display.

Chapter 7: Selecting Presets

This chapter describes selecting and loading your Satellite presets.

Chapter 8: Triggers

This chapter (briefly) describes Satellite's two programmable triggers, which can be used either to affect Satellite itself (e.g., controlling the **Preset Sequencer** or driving the **Logic** or **Gate/Trig** inputs) or to provide triggers or gates to other modules in your system.

Chapter 9: Real Time Control

This chapter describes the various ways that your CV contours can be modified in real time while they are playing. Options include CV inputs (**CV 1, CV 2, CV 3**, and **CV 4,** and **Time Scale CV**), real time **Quantize,** pausing and restarting presets, **Sequencer Control (Dec, Inc, and Reset)** and external triggers.

Chapter 10: Preset Sequencer

This chapter describes selecting and loading Preset Sequences and navigating sequences under the control of triggers from Satellite itself or from external sources..

Chapter 11: Utilities

This chapter describes various utility functions, including loading presets and sequences from a Control Forge or another Satellite, loading updated firmware or boot software, saving and reloading a backup of all your presets and sequences, calibrating your Satellite, and more.

Chapter 12: Preset Templates and Demo Presets

Satellite comes from the factory with the same Templates and Demo Sequences that were designed for Control Forge. While the templates in particular are not as useful in a Satellite as in a Control Forge, given that you can't modify them for your specific needs, they do still give you a good idea of what various presets can do and give you something to play with until you load your Satellite with your own creations.

Chapter 13: Specifications

Yup, specifications.

Chapter 14: From Dave's Lab

Dave describes our unique approach to circuit protection.

Chapter 14: Acknowledgements

Thanks to the talented folks who contributed in one way or another to the development of Satellite.

5. Basic Functionality

Given that Satellite's entire functional reason for being is to play CV contours created on a Control Forge, its basic functionality is really pretty simple.

Here's how it's organized:

Power Up

When power is applied to the module for the first time, it begins with the lowest numbered existing preset selected and Sequence 000 (i.e., Sequence Off) as the Active Sequence, and the contour stopped.

On subsequent power ups, the Preset and Sequence that were current at power off are restored.

Presets

Presets contain the individual settings for the 8 segments and a variety of **Global** settings that affect the overall preset.

Presets can be manually loaded using the **Load Preset** function, loaded as the result of a **Conditional Jump**, as part of an **AutoChain,** or loaded by the **Preset Sequencer.**

Inputs

Gate/Trigger

This input, as its name so ably suggests, accepts triggers and/or gates, i.e., a digital signal that can be high or low. Analog signals will be converted to high or low at a threshold of 1.65V. In order to be detected, the pulse width, either high or low, must exceed 25 microseconds.

Depending on the preset's settings in the Control Forge's **Preset Globals** menu, signals appearing here can either control a contour's start, reset, and jump to a "release" segment, or can be tested for a conditional jump.

The LED next to the **Gate** pushbutton will light while a gate is active, either as the result of a **Gate/Trigger** input signal or the **Gate** button being pressed.

Logic

The **Logic** input accepts digital logic signals for evaluation for true/false conditional jumps. Analog signals will be converted to high or low at a threshold of 1.65V.

The associated Logic LED will light whenever the Logic input is high.

CV 1, CV 2, CV 3, and CV 4

These inputs accept CVs in the range of -5V to +5V. Voltages outside of that range are clipped to the appropriate limit.

The CVs at these inputs are tested for various conditional jump states.

Additionally, the CVs at these inputs are passed directly through to the output during any segment whose shape is **CV 1, CV 2, CV 3, or CV 4 Passthrough.**

NOTE: *The **CV 3** and **CV 4** inputs perform the functions of the Control Forge's **CV 3** and **CV 4** knobs.*

Time Scale CV

This input accepts CVs in the range of -5V to +5V. Voltages outside of that range are clipped to the appropriate limit.

The value of the CV modifies the **Time** or **Tempo** values of all of a preset's segments such that a 1 volt change increases or decreases the Time Scale or Tempo value by a factor of 2. Therefore, overall range of modification is from 1/32 of the set time or tempo to 32 times the set time or tempo.

When not otherwise selecting items or values in a menu, the **Encoder** also controls time scale or tempo. Its value is multiplied by the Time Scale CV to provide the final time scale or tempo modification value.

Sequencer Dec, Inc, and Reset

Depending on the **Preset Sequencer** state, rising edges at these inputs control the loading of a sequence's programmed presets.

See **Chapter 10** for details.

Outputs

+ Output

Outputs the CV contour in the range of -5V to +5V. Accuracy is approximately +/-1mV.

- Output

Outputs a precisely inverted version of the CV contour in the range of -5V to +5V.

Trigger 1

Outputs a +10V trigger or gate pulse whenever the condition set in a Preset's **Assign Trigger 1** menu is met.

Trigger 2

Outputs a +10V trigger or gate pulse whenever the condition set in a Preset's **Assign Trigger 2** menu is met.

Controls

Data/Quantize Encoder

When in a menu, the **Encoder** selects and sets the values of the menu's parameters.

When not in a menu, the **Encoder** serves as a real time control over **Time Scale** or **Tempo** (depending on the settings of the current Preset).

The **Encoder** includes an integrated pushbutton that is used to enter the currently selected value in menus and to load Presets or Sequences. When not in a menu or Preset or Sequence selection screen, press and quickly release the encoder switch to toggle on and off the temporary quantization of the CV output.

Additionally, pressing and holding the encoder switch and then releasing it while a preset is running pauses the preset. Pressing, holding and releasing it again resumes playing.

NOTE: *Using the release of the switch to pause or restart the preset allows you to precisely choose the correct moment for each action.*

Manual Gate Button

The **Gate** button functions in the same manner as the Gate/Trigger input, allowing the generating of a gate for test or real-time performance purposes. The button and input are logically ORed together to create the Gate.

The LED next to the **Gate** pushbutton will light while a gate is active, either as the result of a **Gate/Trigger** input signal or the **Gate** button being pressed.

Load Preset Button

Press to select and load a Preset as the Current Preset.

Press and hold this button and then simultaneously press the **Load Sequence** button to enter the **Utilities Menu.**
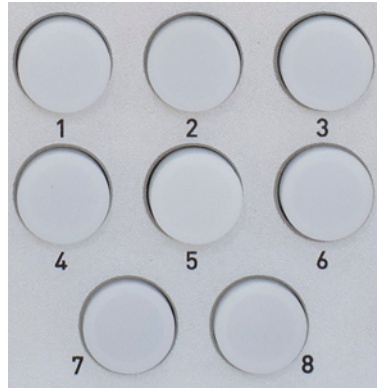
Load Sequence Button

Press to select and load a Preset Sequence as the Current Sequence.

Press and hold this button and then simultaneously press the **Load Preset** button to enter the **Utilities Menu.**

Segment Buttons

While Satellite is running, the buttons' LEDs light to indicate the active segment. No segment LED is lit when the Satellite is stopped.

Pressing one of the Segment Buttons (apart from Segment 1) while Satellite is stopped causes it to immediately jump to that segment and to begin running from 0 Volts. If Segment 1 is pressed while stopped, it is treated as a **Manual Gate**, including activating the global Start/Reset parameters.

Pressing one of the Segment Buttons while Satellite is running is treated as a Jump Immediate from the active segment to the pressed segment.

6. Main Display

Satellite's main display provides information about the currently selected Preset and Sequence and a variety of other information, as described below. When the contour is running, it displays the output CV level, the progress through the individual segments, and any trigger activity.

Additionally, there are dedicated displays for loading and saving Presets and Sequences, and selecting and executing **Utility** functions.

In this chapter, we'll describe the main display. The others will be described in their own chapters.

⬤ **IMPORTANT:** *OLED displays (which is what the Satellite display is) have long lifetimes under normal use, but if you leave your system on 24/7 (or just want to ensure the longest possible life for your display), Satellite provides the ability to adjust the brightness of the display (which is also useful for optimizing it for the ambient lighting level of your work environment) and, optionally, to set a time after which the display enters a screensaver mode. Both of these can help extend the life of your display. They are set in the* **Utilities** *menu. Details for setting them will be found in* **Chapter 11.**

The main display provides the following:

> A real-time graphic representation of the output voltage level with a range of -5V to +5V.

> A display of the time progress through the segments used in the preset (including any conditional jumps).

　⬤ **NOTE:** *This display disappears when Satellite is stopped.*

> The number and name of the currently loaded sequence.

> The current numeric **Time Scale** or **Tempo** multipliers. The first number is the Encoder multiplier and the second is the result of the **Time Scale CV** input.

> The number and name of the currently loaded sequence.

> A display of the current segment's **Transition Shape**

　⬤ **NOTE:** *The* **Transition Shape** *graphic will be inverted if the the segment's* **Target Voltage** *is lower than its starting voltage.*

> Graphical indicators of the real-time values of **CV 1, CV 2, CV 3, CV 4,** and the **Time Scale CV** (top to bottom in that order).

> A sequencer status indicator which displays the current sequence step number (if the step contains a preset) or an indication that the sequence is in a **Halt** or **Pause** state.

This display flashes briefly whenever the Sequencer receives an Inc, Dec, or Reset command via triggers at the sequencer input jacks.

　⬤ **NOTE:** *If* **Sequence Off** *has been selected, this status display is blank.*

> Status indicators:

R: Lights when real-time randomize is active as a result of the **Encoder** being clicked.

T1 & T2: Light when a trigger has fired as a result of its trigger condition being met.

7. Selecting Presets

Loading Presets

To load a Preset, press the **Load Preset** button to bring up the **Load Preset** display. Use the encoder to scroll through all of the existing presets, displaying the number and name of each one. Empty or erased presets are not displayed.

Press the **Encoder** switch to select the desired preset and load it into the Satellite and exit the Load Preset screen.

NOTE: *A long press (in excess of two seconds) of the **Load Preset** button will also load the preset displayed in the **Load Preset** screen. Use whichever method you prefer.*

8. Triggers

Satellite's two independent triggers can fire based on the circumstances programmed in the Current Preset. They can be used to affect other modules in your system or can be routed to Satellite's own inputs.

Off course, you already knew that.

9. Real Time Control

When Satellite is running, there are a variety of ways to influence the progress of a contour, both manually and via signals from other modules in your system (and, in fact, from Satellite itself). This provides a lot of creative flexibility in live performance situations.

Here they are:

Gate/Trig Input

If **Gate Rise** is set to **Start/Reset**, a rising edge at this input, (or a manual push of the Gate button) will cause the contour to reset to Segment 1.

If **Gate Rise** is set to **Off,** a rising or falling edge or high or low signal at this input (or push of the **Gate** button) can be used as a **Conditional Jump** test in any segment.

Logic Input

A rising or falling edge or high or low signal at this input can be used as a **Conditional Jump** test in any segment.

CV 1, CV 2, CV 3, and CV 4 Inputs

The CV levels at these inputs can be tested for a **Conditional Jump** condition in any segment.

If a segment's shape is set to one of the **CV 1, CV 2, CV 3,** or **CV 4 Passthrough** shapes, the CV levels at these inputs will be passed directly through to Satellite's output during that segment.

🔶 NOTE: *The **CV 3** and **CV 4** inputs perform the functions of the Control Forge's CV 3 and CV 4 knobs. If a Preset was designed for manual control via one or both of those knobs, patch a manual CV source (or a static CV source through an attenuverter) from elsewhere in your system into the appropriate input(s).*

Time Scale CV Input

The CV at this input will scale the entire contour while preserving the segment's time relationships. This CV is multiplied by the **Encoder** time scale value (see below) to arrive at the final **Time Scale** or **Tempo** value.

Time Scale (Data Encoder)

The **Encoder** serves as a real time control over time scale. Its value is multiplied by the value of the **Time Scale CV Input** to arrive at the final **Time Scale** or **Tempo** value.

Quantize (Data Encoder)

Clicking and quickly releasing the **Encoder** switch when not in a menu or Preset or Sequence selection screen will cause the contour output to be quantized to the nearest 1/12th volt. A "Q" will appear in the display to indicate that quantization is active.

Click and release the **Encoder** switch again to cancel quantization. Not surprisingly, the "Q" will disappear from the display.

🔶 NOTE: *This quantization selection is independent of quantization that is present due to Segment Levels that are programmed in the Current Preset to one of the quantized modes (i.e, Absolute Quantized or Relative Quantized).*

Pause (Data Encoder)

Pressing and holding the **Encoder** switch and then releasing it while a preset is running pauses the preset. Pressing, holding and releasing it again resumes playing.

🔶 NOTE: *Using the release of the switch to pause or restart the preset allows you to precisely choose the correct moment for each action.*

Segment Buttons

Pressing one of the **Segment Buttons** while Satellite is stopped causes it to immediately jump to that segment and begin playing from 0 Volts. If the **Segment 1** button is pressed while stopped, this is treated the same as a **Manual Gate,** including activating the **Global Start/Reset** parameters.

If a contour is running at the time that a segment button is pressed, it is treated as a **Jump Immediate** from the active segment to the pressed segment.

10. Preset Sequencer

For the purpose of this manual, we'll assume you're already familiar with how **Preset Sequences** work. (If not, check out the Control Forge manual.)

Load Sequence

Sequences are numbered from 000 to 200. Sequence 000 is the special case "Off."

To load a Sequence, press the **Load Sequence** button to bring up the **Load Sequence** display. Use the encoder to scroll through all of the existing sequences, displaying the number and name of each one.

Press the Encoder switch to select the desired sequence and load it into the Satellite and exit the Load Sequence screen.

NOTE: *A long press (in excess of two seconds) of the **Load Sequence** button will also load the sequence displayed in the **Load Sequence** screen. Use whichever method you prefer.*

Sequence 000 (Off) turns off the sequencer. When Sequence 000 is loaded, triggers at the sequence control jacks are ignored.

When loaded, a sequence (other than Sequencer Off) begins at Step 001 and immediately loads the associated preset for that step.

Reset, Dec, and Inc Inputs

If the Sequencer is **Off,** these inputs are ignored. If the Sequencer is on (I.e., any sequence except **#000** is loaded), each of these inputs responds to a rising edge as follows:

Reset: If the Sequencer is in the **normal** or **Halt** state, it immediately jumps to **Step 001** of the current sequence, loading the associated preset or command. The rules for running the loaded preset are followed.

If the sequence is in the **Pause** state, the sequencer will exit that state and return to the normal state, taking no other action until it receives another **Dec, Inc** or **Reset.**

Inc: If the sequencer is in the normal state, it immediately attempts to advance to the next higher (circular) step. If that step is a **Bumper,** it does not advance, but stays at the current step. Otherwise, it succeeds in advancing to the next step. If that step is a **Halt** or **Pause** Command, it enters the corresponding state. If that step is a valid preset, that preset is immediately loaded, and the rules for running the loaded preset are followed.

If the sequence is in the **Pause** or **Halt** state, the sequencer will take no action.

Dec: If the sequencer is in the normal state, it immediately attempts to decrement to the next lower (circular) step. If that step is a **Bumper,** it does not decrement, but stays at the current step. Otherwise, it succeeds in decrementing to the previous step. If that step is a **Halt** or **Pause** Command, it enters the corresponding state. If that step is a valid preset, that preset is immediately loaded, and the rules for running the loaded preset are followed.

If the Sequence is in the **Pause** or **Halt** state, the sequencer will take no action.

11. Utilities

The **Utilities** menu is where you'll find Satellite's various housekeeping and maintenance functions, including, most importantly, the functions for importing presets and sequences from Control Forges or other Satellites.

To access the **Utilities** menu, simultaneously press and hold the **Load Preset** and **Load Sequence** buttons. Turn the encoder to scroll through the available function list. Click the encoder to choose the desired function.

The menu is dismissed by pressing either of the Load buttons again.

Here are the available **Utility** functions:

Send to Module

This function lets you send all of the presets and sequences in your Satellite to a Control Forge module or another Satellite.

To send the data:

1. Connect the **Trigger 2** output from your Satellite to the **Logic** input of the receiving module

2. Select **Utilities > Send to Module** on your Satellite.

3. Select **Utilities > Receive From Module** on the receiving module, then click the encoder again. The display will indicate that it is waiting for data.

4. Click the encoder on your Satellite. The display will show the progress of the transfer.
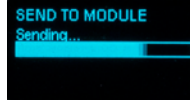
5. If an error is detected on the receiving module during reception or on completion of reception, an error message will be displayed there. Repeat the process to try again.
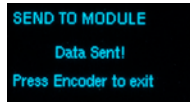
Once transfer is complete, click the encoder to return to the Utility menu.

Receive from Module

This function lets you load the presets and sequences from a Control Forge or another Satellite into your Satellite.

🟡 **IMPORTANT!:** *This function will overwrite (i.e., delete) all of the presets and sequences in your module.* ***Be careful.***

To receive the data:

1. Connect the **Trigger 2** output from the Control Forge or Satellite sending the data to the **Logic** input of your Satellite.

2. Select **Utilities > Receive from Module** on your Satellite and then click the encoder again. The display will indicate that it is waiting for data.

3. Select **Utilities > Send to Module** on the module sending the data, then click that module's encoder to send the data.

4. When the transfer begins, a progress bar on your Satellite's display will show its progress.

5. If an error is detected on your Satellite during reception or on completion of reception, an error message will be displayed there. Repeat the process to try again.
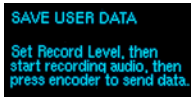
Once transfer is complete, click the encoder to return to the Utility menu.

Save User Data

This function lets you save all your presets and sequences to an audio .wav file for backup or transfer purposes.

To save your data to a .wav file:

1. Connect the Satellite's **+ Output** to the input of your recording device.

🔶 **NOTE:** *The recording device must record uncompressed WAV data. Do not use an MP3 recorder.*

2. Select **Utilities > Save User Data** on your Satellite.
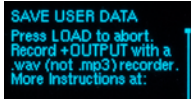
3. Upon selecting **Save User Data**, Satellite will begin sending a test tone for the purpose of setting your record level. Using this tone, set the record level on your recording device to -6dBFS.

4. Start recording on your recording device.

5. Click the encoder on your Satellite to send the data.
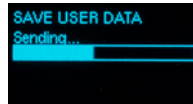
Once transfer is complete, stop recording on your recording device and click the encoder to return to the **Utility** menu.

Load User Data

This function let's you play a previously recorded (using the Save User Data function) backup into your Satellite to load that data into your module's memory.

🟡 **IMPORTANT!:** *This function will also overwrite (i.e., delete) all of the presets and sequences in your module. So again, **be careful**. We highly recommend using the **Verify User Data** function described below to confirm that your file is good before actually loading it.*

🔶 **NOTE:** *If you are accessing the .wav file from the internet (as opposed to having recorded it yourself), perhaps because you are loading presets that someone else developed and shared online, see the **Hints for Playing Back WAV Files** section below for advice on successful playback.*

To load your saved data:

1. Connect the output from your playback device to your Satellite's **CV 1** input. We've found that a regular Eurorack patch cord works fine.

2. Select **Utilities > Load User Data** on your Satellite.
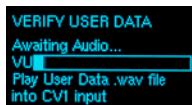
3. Click the encoder as instructed.

4. Start playback of the .wav file. A progress bar on your Satellite's display will show its progress.

5. If an error is detected during reception or on completion of reception, an error message will be displayed and you can try again or click the **Encoder** to exit.

Once transfer is complete, click the encoder to return to the Utility menu.

Verify User Data

This function let's you play a previously recorded (using the **Save User Data** function) backup into your Satellite to ensure that it is intact and being played back at sufficient level.

This does **not** actually load the data into your Satellite. Its purpose is to confirm that the backup file is valid, so that you can avoid loading an invalid file and deleting your existing data.

● **NOTE:** *If you are accessing the .wav file from the internet (as opposed to having recorded it yourself), perhaps because you are loading presets that someone else developed and shared online, see the **Hints for Playing Back WAV Files** section below for advice on successful playback.*

To verify your saved data:

1. Connect the output from your playback device to your Satellite's CV 1 input. We've found that a regular Eurorack patch cord works fine.

2. Select **Utilities > Verify User Data** on your Satellite.

3. Click the encoder as instructed.

4. Start playback of the .wav file. A progress bar on your Satellite's display will show its progress.

5. If an error is detected during reception or on completion of reception, an error message will be displayed and you can try again or click the **Encoder** to exit.

6. If you don't receive an error, you can proceed to load the data into your Satellite using the **Load User Data** function described above.

Once the process is complete, click the encoder to return to the Utility menu.

Merge User Data

This function lets you read in a data file (Presets and Preset Sequences) and copy any preset or sequence in that file to your module, **as long as its number is not already taken up with a saved preset or sequence already in your module.**

So, if you have Presets 303 and 306 in your Satellite, and you load in a file that has Presets 301–309, you'll end up with the following:
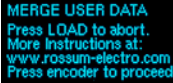
301 and 302 from the merge file
303: your existing preset
304 and 305 from the merge file
306: your existing preset
307, 308, and 309 from the merge file

● **NOTE:** *Presets 303 and 306 from the merge file will **not** be transferred.*

Sequences work the same, with the exception that it would theoretically be possible to exceed the 20,000 step limit. In that case, any sequences that exceed the limit would not be transferred.

To merge your saved data:

1. Connect the output from your playback device to your Satellite's CV 1 input. We've found that a regular Eurorack patch cord works fine.

2. Select **Utilities > Merge User Data** on your Satellite.

3. Click the encoder as instructed.

4. Start playback of the .wav file. A progress bar on your Satellite's display will show its progress.

5. If an error is detected during reception or on completion of reception, an error message will be displayed and you can try again or click the **Encoder** to exit.

Once transfer is complete, click the encoder to return to the **Utility** menu.

OLED Control

As mentioned back in **Chapter 6,** OLED displays have long lifetimes under normal use, but if you leave your system on 24/7 (or just want to ensure the longest possible life for your display), you can adjust the brightness of the display (which is also useful for optimizing it for the ambient lighting level of your work environment) and, optionally, you can set a time after which the display enters a screensaver mode. Both of these can help extend the life of your display.

🔵 **NOTE:** *Once the screen saver has appeared, any button press or a turn of the encoder will dismiss it and return to the regular display. Such encoder turns or button presses are not registered as control inputs.*

🔵 **ANOTHER NOTE:** *The screen saver will not appear when you are executing a **Utilities Menu** function. However, it will appear if the **Utilities Menu** is displayed (but no function selected).*
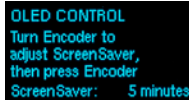
Here's how it works:

1. Select **Utilities > OLED Control** on your Satellite.

2. Turn the encoder to select a brightness level of 1–11. You'll see the display change in brightness as you scroll through the values.

3. Click the encoder to move to the **ScreenSaver** setting.

4. Turn the encoder to select the time after which the screen saver will appear. Choices range from 2 minutes to 60 minutes and "Never." If you consistently leave your system on long periods of time, "Never" is probably not a good choice.
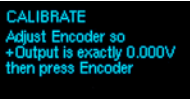
🔵 **NOTE:** *The screen saver is a small version of the current Transition Shape that moves randomly around the display. Note that this plot is actually functional, responding in real time to segment changes.*

Calibrate

Your Satellite is calibrated at the factory to precisely 1V/oct. So, in normal circumstances, you shouldn't have a need to recalibrate it. However should abnormal circumstances present themselves, this function allows you to recalibrate your Satellite.

🔵 **NOTE:** *This calibration procedure assumes you have access to an accurate voltmeter. The result will only be as accurate as your meter.*

Select **Utilities > Calibrate** on your Satellite. The procedure is self-guiding. Simply follow the instructions on each screen.

```
CALIBRATE
Adjust Encoder so
+Output is exactly 0.000V
then press Encoder
```

The first 3 steps require you to measure the voltage at the **+ Output** with your meter and then adjust it if necessary. The remaining steps use that output to calibrate the CV inputs.

When the encoder is pressed after the last step, the screen will briefly display **"New Calibration Data Saved"** then return to normal operation.
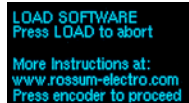
Pressing any other button during the calibration process will briefly display **"Calibration Aborted"** then return to normal operation.

◑ **IMPORTANT NOTE:** *If you don't actually have a need to recalibrate, it's best to leave this function alone. Playing around with it could completely mess up your calibration. You don't want that to happen.*

Load Software

This function lets you load updated operating software into your Satellite. The process is pretty much identical to the **Load User Data** process described above.
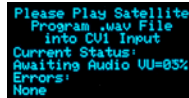
1. Connect the output from your playback device to your Satellite's CV 1 input.
2. Select **Utilities > Load Software** on your Satellite.

```
LOAD SOFTWARE
Press LOAD to abort

More Instructions at:
www.rossum-electro.com
Press encoder to proceed
```

3. Click the encoder as instructed.
4. Start playback of the .wav file. You should see a percentage progress message in the display. Again, see the **Hints for Playing Back WAV Files** section below if you're having any problems.

```
Please Play Satellite
   Program .wav File
     into CV1 Input
Current Status:
Awaiting Audio VU=05%
Errors:
None
```
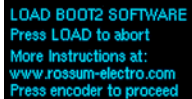
5. f an error is detected during reception or on completion of reception, an error message will be displayed and you can try again or click the **Encoder** to exit.

Once transfer is complete, click the encoder to reboot your Satellite and use your new software.

Load Boot Software

This function loads an updated version of the special software that's responsible for booting up your Satellite.

The process is identical to the **Load Software** function above, except, of course, that you select **Utilities > Load Boot Software** on your Satellite and load an appropriate Boot Software file.
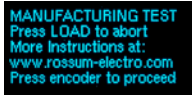
```
LOAD BOOT2 SOFTWARE
Press LOAD to abort
More Instructions at:
www.rossum-electro.com
Press encoder to proceed
```

```
LOAD BOOT2 SOFTWARE
Awaiting Audio...
VU
Play Satellite Boot 2
.wav file into CV1 input
```

Manufacturing Test

This function provides a suite of tests to be used during manufacturing to ensure that everything on your Satellite is working correctly. Unless something goes horribly wrong, there shouldn't be a reason that you ever need to worry about it.

```
MANUFACTURING TEST
Press LOAD to abort
More Instructions at:
www.rossum-electro.com
Press encoder to proceed
```

However, like **Calibrate,** it's self-guiding, so if you're just curious, you're welcome to play with it, since, unlike **Calibrate,** it can't do any harm.

About This Satellite

```
ABOUT THIS SATELLITE
SW Rev: Feb 24 2017
© 2017
Rossum Electro-Music LLC
```

Select this function to display the current software version of your Satellite. This is primarily useful to see if you need to update to a newer version of software.

Hints for Playing Back WAV Files

The basic requirements for successful WAV file playback for software updates and data transfer is that the file should be played back at the **highest possible level without distortion**. As long as it doesn't distort, the hotter the better.

We've had good luck playing WAV files directly from a computer (but see the warnings below) as well as smartphones and tablets.

In theory, any device that will play a WAV file without distorting the data should work. However, here are some caveats:

> If you are streaming the file directly from the web, be sure that your data rate is sufficient to keep up. If necessary, wait until the file has been completely buffered before starting playback.

> If you are playing the file from a computer or phone, quit Facebook, your email client, and any other software that produces audio. Any other audio injected into the stream will cause the transfer to fail.

> If you're using a smartphone, temporarily placing it in Airplane Mode will prevent any incoming call or message notifications from interfering with playback.

> We have found that **Safari** on the **Mac** plays the file in a way that often keeps it from being successfully recognized and decoded. If you are using **Safari,** we recommend downloading the WAV file to your computer and playing the file from the local copy using **Quicktime Player.**

> In fact, if you are having *any* problem streaming the file, downloading the file locally and playing it from there is a good alternative.

> If you do get an error message during a transfer (e.g., the level was too low, your computer generated extraneous audio, etc.), you can just correct the problem and try again. However, we've found that rather than just playing the file again from the beginning, it's usually advisable to close the file, reopen it, and then start playback.

12. Templates and Demo Sequences

Satellite comes from the factory with the same Templates and Demo Sequences that were designed for Control Forge. While the templates in particular are not as useful in a Satellite as in a Control Forge, given that you can't modify them for your specific needs, they do still give you a good idea of what various presets can do and give you something to play with until you load your Satellite with your own creations.

Refer to the **Control Forge Manual** for detailed descriptions of each template or demo.

Here's where they are:

Presets 300−315: Basic templates for envelopes, LFOs, sequences, random voltage sources and more.

Presets 400−481: Presets demonstrating a wide variety of creative Control Forge applications.

And thanks again to our generous developers:

310−315: **Jim Aikin**

440−446: **Kurt Kurasaki**

450−462: **David Phipps**

470−481: **Richard Devine**

13. Specifications

PRESETS
500

PRESET SEQUENCES
200

SEQUENCE STEPS
20,000 Dynamically Allocated

INPUTS
GATE/TRIG
1x 3.5mm mono socket
100kΩ Input Impedance
1.6V threshold

LOGIC
1x 3.5mm mono socket
100kΩ Input Impedance
1.6V threshold

CV 1
1x 3.5mm mono socket
100kΩ Input Impedance
-5V to +5V

CV 2
1x 3.5mm mono socket
100kΩ Input Impedance
-5V to +5V

CV 3
1x 3.5mm mono socket
100kΩ Input Impedance
-5V to +5V

CV 4
1x 3.5mm mono socket
100kΩ Input Impedance
-5V to +5V

TIME SCALE CV
1x 3.5mm mono socket
100kΩ Input Impedance
-5V to +5V

PRESET SEQUENCER DEC
1x 3.5mm mono socket
100kΩ Input Impedance
1.6V threshold

PRESET SEQUENCER INC
1x 3.5mm mono socket
100kΩ Input Impedance
1.6V threshold

PRESET SEQUENCER RESET
1x 3.5mm mono socket
100kΩ Input Impedance
1.6V threshold

OUTPUTS
+ OUTPUT
1x 3.5mm mono socket
<1Ω Output Impedance
-5V to +5V

- (INVERTED) OUTPUT
1x 3.5mm mono socket
<1Ω Output Impedance
-5V to +5V

TRIGGER 1
1x 3.5mm mono socket
1kΩ Output Impedance
10V
Selectable Width

TRIGGER 2
1x 3.5mm mono socket
1kΩ Output Impedance
10V
Selectable Width

POWER REQUIREMENTS
+/-12V via 16-pin, Doepfer-style connector

CURRENT DRAW
125mA +12V, 25mA -12V (maximum)

DIMENSIONS
12HP (W); Panel to power connector (with connector plugged in) 25mm (D)

SUPPLIED ACCESSORIES
1x 16-pin, Doepfer-style cable
4x M3 screws
4x M2.5 screws
4x Nylon washers
1x Quickstart Guide

14. From Dave's Lab: Circuit Protection

Eurorack suffers from the problem of power connector reversal. When 10 pin connectors are used, mis-insertion results in a swap of +12V and -12 V, and protection is easily accomplished using various techniques such as series diodes.

But more systems are providing the +5V supply and thus use the full 16 pin connector. When this is reversed, a diode-protected module is still safe, but the six connected ground pins in the module will short together the system's +5V and +12V supplies, potentially damaging the power supply and any modules that use +5V.

To prevent this, Rossum Electro-Music modules deviate from the standard Eurorack power connector by leaving power connector pins 9 and 10 open, rather than connecting them to ground. When plugged in backwards, this leaves the system +12V supply disconnected. Since ground is still supplied by four pins as well the chassis and any patch cords connected to the module, the dropping of these two pins has no measurable effect on circuit performance, but it means that if a Rossum Electro module is accidentally plugged in backwards, no stress is placed on the +5V supply or modules that use it.

15. Acknowledgements

A number of wonderful people generously provided help, advice, encouragement, and inspiration during the development of Satellite.

Many thanks from the Rossum Electro-Music team to:

Jim Aikin

Bob Bliss

Josh Cliffe

Richard Devine

Nancy Enge

Mihai Ionescu

Kurt Kurasaki

William Mathewson

Gur Milstein

David Phipps

Bill Putnum

Kirk Southwell

Tyler Thompson

And, as always, it goes without saying — but we'll say it anyway — our families for understanding all the late nights and weekends spent not having fun (or doing chores) with them.