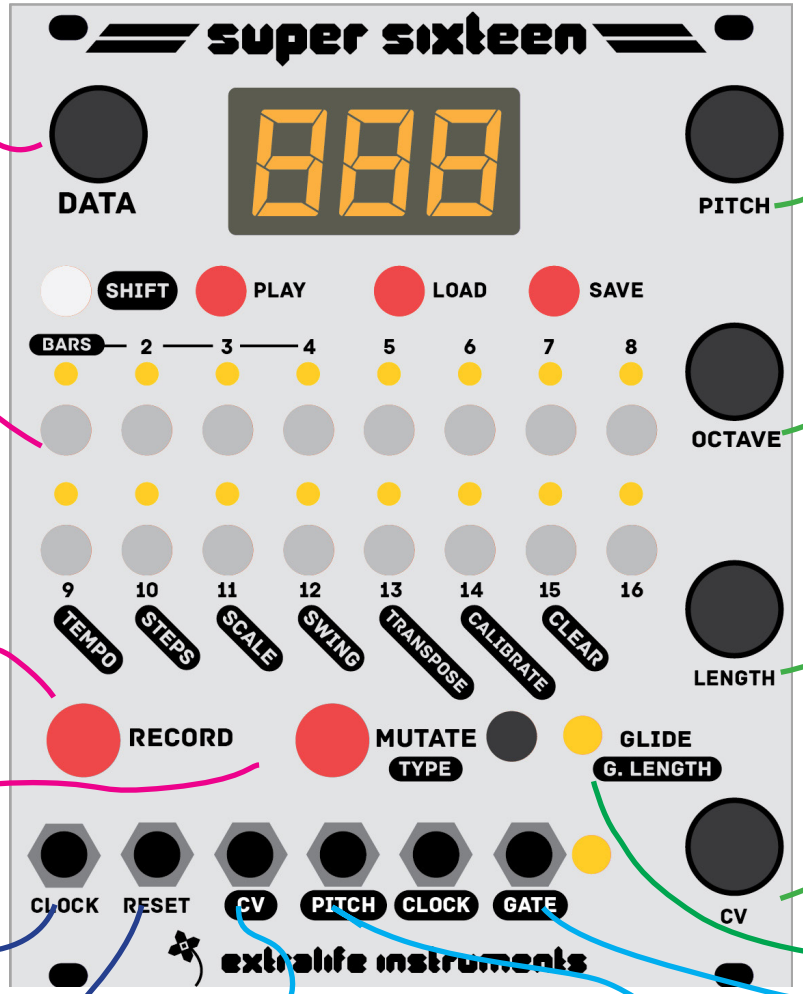
super sixteen

extralife instruments

Quick Start Guide 1.0

Complete manual available at:
http://extralifeinstruments.com/



DATA this stepped encoder adjusts the selected sequence parameter, like patch number or tempo.

STEP BUTTONS select and toggle steps on and off. Press once to select and again to toggle. Inactive steps are activated automatically when selected.

RECORD enables motion recording. Press and hold while adjusting ***PITCH, OCTAVE, LENGTH,*** or ***CV*** to record changes to the currently playing steps in real-time.

MUTATE activates the selected "mutation" or pitch/rhythm effect. Adjust ***DATA*** while holding ***MUTATE*** to change the effect depth.

PITCH Adjusts pitch output for selected step.
Range +/- 12 semitones

OCTAVE Adjusts pitch output for selected step by increments of 12 steps.
Range +/- 4 octaves.

LENGTH Adjusts the duration of the selected step, as a percentage of a single step's length. Range 0-400%.

CV Adjusts the value of the secondary CV output for the selected step. Range 0-100%

GLIDE Activates portamento, or a "slide" to the selected note over its duration.

CLOCK input accepts a 1-pulse-per-step clock signal and advances the sequencer in sync to external gear.

RESET input accepts a pulse to restart the sequence at the beginning, for synchronized looping.

CV output sends out an unquantized control voltage controlled by the ***CV*** parameter for each step (0-8v)

PITCH output sends out a quantized control voltage set by the ***PITCH*** and ***OCTAVE*** parameters for each step (0-8v)

GATE output sends 5V gate signals for each active step, the duration of which is set by each step's ***LENGTH***

sequence controls

SHIFT Press [SHIFT] plus another button simultaneously to access its secondary or "shift" function (these are outlined in black labels on the panel). Buttons that have shift functions include Steps 9-16, Record, Mutate, Glide, and Play. When you are editing a parameter, press [SHIFT] again to exit back to the main note data display.

PLAY Start or stop the internal sequencer playback. [SHIFT]+Play resets to the start, the same as a pulse to the RESET input. A pulse to the CLOCK input will stop the internal sequencer.

NOTE: Pressing play while the CLOCK input is receiving a signal generally has no effect - if

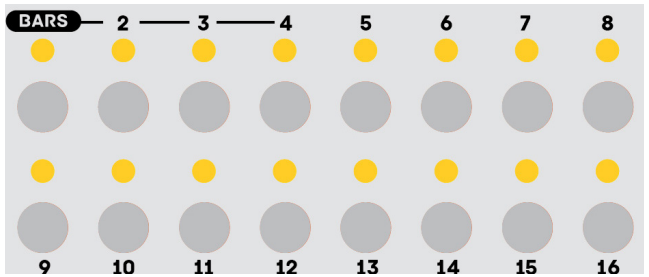
LOAD/SAVE enables you to save the active sequence or load a new one. To save a sequence to memory, press **SAVE** once, and then use the **DATA** knob to choose the **PATCH NUMBER** (1-99) [0-99] where this sequence will be saved. To confirm it, press **SAVE** again. Press [**SHIFT**] to cancel saving. Once saved, the sequence can be recalled at any time. It's a good idea to save your sequences frequently, since it's easy to radically alter the patch memory.

Once you've chosen a PATCH NUMBER to save your sequence, you can double-tap **SAVE** to overwrite it with the active sequence. Get in the habit of doing this whenever you make a change you like! You can likewise double-tap **LOAD** to reload the last-saved sequence if you make a change you dislike.

To load a sequence, press **LOAD** once, and then use the **DATA** knob to choose a **PATCH NUMBER** to load. Press **LOAD** again to confirm it. If there is no sequence in that patch number, the display will flash "ERR" (error). This just means that patch number is empty.

NOTE: When a new sequence is loaded, the sequence will "**pick up**" playback in real-time at the same place in the last bar of the sequence, making synchronized

step editing



Step editing is accomplished by pressing the the 16 step buttons in the center of the panel. The LEDs adjacent to each button indicate whether that step is **active** or **inactive**. This display indicates the 16-step rhythm of the sequence.When selected for editing, its LED will **blink** on and off. If the selective step is active, it will be mostly on and blink off briefly. If it's inactive, it will be mostly off and blink on briefly.

To select a step, press the corresponding button once. If inactive, that step will be automatically activated when selected. To deactivate a step, press it again.

Once a step is selected, you can edit its **PITCH, OCTAVE, DURATION, CV,** and **GLIDE** values with the corresponding knobs and button on the right side of the panel. These values only change when the knobs are moved and the display updates to reflect the new value. When a step is selected, the display will update to show its value for the last edited parameter.

Only active steps will trigger the gate output and change the PITCH/CV outputs. Inactive steps do not have any effect on the seqeuncer, but their values are saved with the sequence.

While the sequencer is playing, the LEDS will blink as each step is played to show a "Running light" indicating the current step.

Tap **once** to activate a step

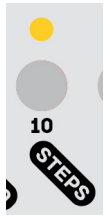
Double-tap a step to deactivate

Press a button to select a step then edit it by turning the **knobs**.

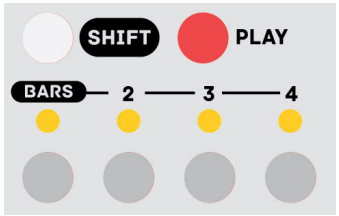
- **PITCH** and **OCTAVE** together control the Pitch output voltage.
- **CV** controls the CV output voltage.
- **DURATION** controls the length of the pulse sent to the GATE output.

multi bar sequences

The default sequence length is 16 steps, but sequences of any length from 1-64 steps can be programmed. To access steps 17-64, make use of the **BARS** buttons (SHIFT+1 thru 4) and the **STEPS** parameter (SHIFT+10). This feature is analogous to "Pages."



To adjust the sequence length, select **STEPS** (SHIFT+10), and then select a number of steps using the **DATA** knob. If you continue holding shift, the knob will skip through common sequence lengths divisible by 4 (4, 8, 12, 16, 24, 32, 48, 64). Release SHIFT to adjust 1 step at a time and create odd-length sequences if desired.



To view and edit a bar of 16 steps, press **SHIFT** and **STEP 1, 2, 3, or 4,** indicated by the "BARS" label. This will update the step display LEDs to show the active steps for that bar.

Change sequence length:
-[**SHIFT**] + **10** (**STEPS**)
-Adjust with **DATA** knob

View and edit a bar:
[**SHIFT**] + 1 (Steps 1-16)
[**SHIFT**] + 2 (17-32)
[**SHIFT**] + 3 (33-48)
[**SHIFT**] + 4 (49-64)

Note: A subsequent bar may be edited and have active steps, but it will not *play* unless the STEPS parameter is adjusted so the sequence is long enough to reach it.

Bars may be **COPIED and PASTED** within a sequence to create repetitions. To copy and paste a bar, press **SHIFT**, then press the button for the bar you wish to **copy** (the source), then (**while holding** SHIFT+source) press the button for the bar you want to **paste** it to (the destination). The display will flash "CPY" when a bar is successfully pasted.

Copy/paste a bar:
[**SHIFT**]+ **SOURCE** + **DESTINATION**

For example:
[**SHIFT**] + **1** + **2** = Copy bar 1 to bar 2
[**SHIFT**] + **2** + **4** = Copy bar 2 to bar 4

making recording

Step parameters can also be editing in real-time using the **RECORD** button.

While the sequencer is **playing**, press and hold RECORD and adjust any of the knobs for **PITCH, OCTAVE, DURATION**, or **CV** to record those changes to the sequence as it plays.

Hold **RECORD** while adjusting **PITCH, OCTAVE, DURATION,** or **CV** to make quick changes to the sequence

The changes are only recorded while the button is held down, and **only the first knob** adjusted during recording is recorded. **Only active steps** will be updated. To record another parameter, release the record button and press it again as the sequence loops during playback. It is good to get in the habit of releasing the record button quickly as it is easy to overwrite your sequence with new notes.

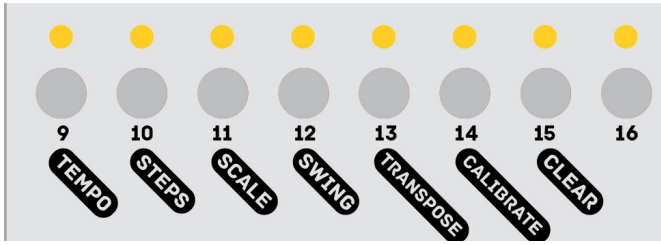
It is also a good idea to **SAVE** your sequence before recording in new data. Double-tap the SAVE button to write it to the last-used patch number. Then record your new part. If you aren't happy with the change, just double-tap **LOAD** to "undo" the changes and reload the previous version.

Note: during a live performance, motion-recording using the **PITCH** parameter can be quite dangerous as it can introduce non-diatonic "wrong notes" into your sequence. These can be avoided by selecting a **SCALE** for the sequence to exclude such notes and allow greater improvisation (see the SCALE section). However, in a typical patch, recording real-time changes to **OCTAVE, DURATION** and usually **CV** is relatively "safe" for live performance, though it is still a good idea to save your patches frequently for reloading.

Real-time rhythm: hold **SHIFT+RECORD** to activate steps during sequence playback.

shift functions

Additional sequence parameters can be edited by pressing and holding [**SHIFT**] and pressing another button, then adjusting that parameter using the **DATA** knob. These values are **saved** with each sequence (except CALIBRATE and CLEAR).



Most buttons which have a secondary function show that function in **outlined text.**

TEMPO (SHIFT+9)

Controls the speed of the sequence, in beats per minute (BPM).

NOTE: When loading a new sequence, the sequencer tempo is **only** adjusted if the sequencer is **PAUSED**. When a new sequence is loaded during playback, it will continue at the same tempo as the previous sequence to avoid sudden jumps.

STEPS (SHIFT+10)

Controls the number of steps in the sequence (Range: 1-64). See the section on *MULTI-BAR SEQUENCING* (p 11).

SCALE (SHIFT+11)

Selects a musical scale to constrain the values for the PITCH parameter. See *SCALES* (page 10).

SWING (SHIFT+12)

Adjusts the timing of even-numbered steps to create a “swing” or “shuffle” rhythm. A default value of 50 produces a “straight” rhythm, while higher values produce more swing. The sequencer can accept a straight **Clock input** signal and still play swung notes, but will produce a “swung” **Clock output** when the swing parameter is adjusted.

TRANSPOSE (SHIFT+13)

Adjusts the pitch output of the entire sequence up and down in increments of 1 semitone. This enables different sequences to be played in different “keys” without adjusting oscillator tuning or step editing. Range +/- 36.

CALIBRATE (SHIFT+14

Enters calibration mode to tune the voltage scaling. See *CALIBRATION* (pg. 13)

CLEAR (SHIFT+15)

Deactivates all steps and resets all note values to their default (zero for PITCH, OCTAVE, and CV, and 80 for DURATION).

FACTORY RESET (SHIFT + 15 5x)

To reset the module to factory settings and **erase all stored sequences**, hold SHIFT and then the 15 button five times in a row. The screen will show “CLR” then “E - R - S” (one letter each press), then blink “ERS.” Press 15 a fifth time to erase all sequences.

RESET (CLOCK) (SHIFT+PLAY)

To reset the sequence clock to Step 1, hold shift and press play. When the play button is pressed or the next clock pulse is received, the sequence will restart. The same thing can be achieved by sending a pulse to the RESET input jack.

mutations

Pressing and holding the **MUTATE** button activates the selected mutation effect while the button is held. While **MUTATE** is held, you can turn the **DATA** knob to adjust its **effect depth**. This does different things depending on the selected mutation - see the table below.

Pressing **SHIFT+MUTATE** will enter the mutation selection menu. Use the **DATA** knob to select a mutation. Press SHIFT or another button to exit the menu. The available mutations are shown in the table.

To RECORD a mutation sequence, you can press and hold **RECORD,** then tap the **MUTATE** button on each step that you want the mutation to be active, just as you would when using it in real-time, then release the RECORD button.

To ERASE a mutation sequence, you must simply *record over it*. So, press and hold RECORD, then tap MUTATE once to initate recording of mutation data, then release the MUTATE button and continue holding record to "erase" mutation data for as long as you like (one complete loop of the sequence will erase it all).

Suggested uses:

Mutations can be used creatively to add real-time variation to recorded sequence. Try "playing" the mutate button rhythmically to introduce varied repetitions or "fills" in your sequences. While holding the mutate button, adjust the effect depth step-by-step to create variations of increasing intensity (this works especially well with REPEAT, TRANSPOSE, OCTAVE SHIFT, and ROLL modes).

Recording mutation data can be especially fun with the RANDOMIZE mode, because you can create semi-random sequences in which certain sections vary each time it's played. Use it in combination with a particular SCALE mode to create a generative sequence that varies over time.

Display	Mutation	Adjustment	Description
rEP	Repeat	Number of steps	Repeats a short section of the sequence
rEU	Reverse	N/A	Reverses playback while held
oct	Octave shift	Num. of octaves up/down	Transposes pitch up/down by 12 steps
trS	Transpose	Num. of steps up/down	Transposes pitch by steps (within scale)
GLd	Auto-glide	Glide duration	Activates glide for every step while held
Fr2	Freeze	N/A	Holds the current pitch and activates the gate
StP	Stop	Duration	Pitch slowly ramps down to 0V
rnd	Randomize	Randomness	Transposes pitch by random amount (w/in scale)
Stt	Stutter	Stutter-step duration	Adds short repeated steps on inactive notes
roL	Roll	Step subdivision	Subdivides clock and doubles, triples, etc notes

glide

Glide (aka “portamento” or “slide”) may be activated for any active step by selecting a step and then pressing the glide button. When active, the pitch output will slowly ramp up or down to that step’s pitch over its duration. The ramp time begins at the beginning of the step.

The glide duration may be adjusted by pressing **SHIFT+GLIDE** and adjusting the value with the encoder. The value goes from 0-400, and like the “duration” knob represents a percentage fo the current step length. (A value greater than 100 will take longer than one step to complete, and the pitch output may not reach the final value before the next step activates.) The glide duration is saved along with the other sequence data.

scales

Pressing SHIFT+11 will enter the scale selection menu, where you can use the DATA knob to select a scale to quantize the sequence to and restrict pitch selection. Any previously entered sequence data will remain unedited, but will be quantized in real-time to the selected scale.

RANDOMIZE and TRANSPOSE mutations will also obey the selected scale quantization and produce variations which remain in-key with the sequence.

When a scale type besides Chromatic is selected, non-diatonic pitch values will be skipped when adjusting the PITCH knob for any step.

Display	Scale
chr	Chromatic
MAJ	Major
M in	Minor
PEn	Pentatonic
PEM	Minor pentatonic
bLu	Blues
bLM	Minor blues
Phr	Phrygian
dor	Dorian
Hho	Whole tone

calibration

To get accurate tuning of the analog 1v/octave pitch output, it must be calibrated using **digital multimeter**, or an **electronic tuner and well calibrated oscillator**.

Multimeter

Connect a 3.5mm TS cable to the PITCH output of the Super Sixteen. Set your multimeter to read DC volts (10V range minimum). Connect the negative/ground/common (black) input of the multimeter to the SLEEVE of the TS cable using an alligator clip. Connect the positive/red input of the multimeter to the TIP of the cable.

Electronic tuner

Connect the PITCH output to the 1V/OCT input of a well-calibrated oscillator. Using a simple waveform (like a sine or triangle wave), connect the output of the oscillator to a digital tuner. (Make sure to attenuate the output if necessary, as eurorack level signals can damage equipment made for instrument or line level inputs).

Enter calibrate mode on the Super Sixteen and select the lowest output voltage (button 1). Turn on the tuner and use the COARSE tune of the oscillator to set the pitch to the lowest note that the tuner can easily pick up. Use the FINE tune of the oscillator to set it to an exact concert pitch (typically C1 or A1).

Press **SHIFT+14** to enter calibration mode. In this mode buttons 1-9 let you choose different octaves, which will set the PITCH output to exact voltages, from 0v, 1v, 2v, 3v up to 8v.

Press 1 and use the encoder to set the calibration of the lowest step to zero (0). The lowest possible output of the DAC is not very accurate at 0v, and cannot be made to go lower (this will cause it to "wrap around" to 8V, so avoid this at all costs! Because of this limitiation, this lowest octave is the least accurate range.

Press 2 and use the encoder to set the calibration to exactly 1 volt, or 1 octave above your tuned pitch at 0V. It is common to have to adjust by 5-20 "units" of correction. Each unit represents about 0.002 volts, or about 3 cents of concert pitch.

Press 3 and repeat the tuning at 2 volts. Continue all the way up to 9 (8 volts). You may have to tune your oscillator lower than initially in order to use your tuner at the top of the pitch range.

IMPORTANT: When you are satisfied that all octaves are playing in tune, press **SAVE** to store the calibration values to memory. These values are saved to EEPROM and will persist even after a factory reset. If you have made and error and want to discard the new calibration values, press SHIFT to return to sequence mode.

specifications

Dimensions:

Height **129.5mm**
Width **102mm** / **20 HP** (horizontal pitch)
Rear Depth **38mm**
Front Depth **16mm** (aka knob height)
Total Depth **55mm**

Electrical characteristics:

Max current draw: **90mA** (+12v) / **5mA** (-12v)
Pitch output voltage: **0-8** volts
CV output voltage: **0-8** volts
Gate output voltage: **0-5** volts
Clock output voltage: **0-5** volts

Clock input voltage: **10v** maximum
Reset input voltage: **10v** maximum

Power connector:

Super Sixteen requires a standard “Eurorack” -12V / +12V power supply (2x5 pin connector). The red stripe of the ribbon cable (-12V side) must be oriented on the same side as the “Red stripe” marking on the circuit board.

The complete manual can be found online at:
http://extralifeinstruments.com/docs/super-sixteen/manual.pdf