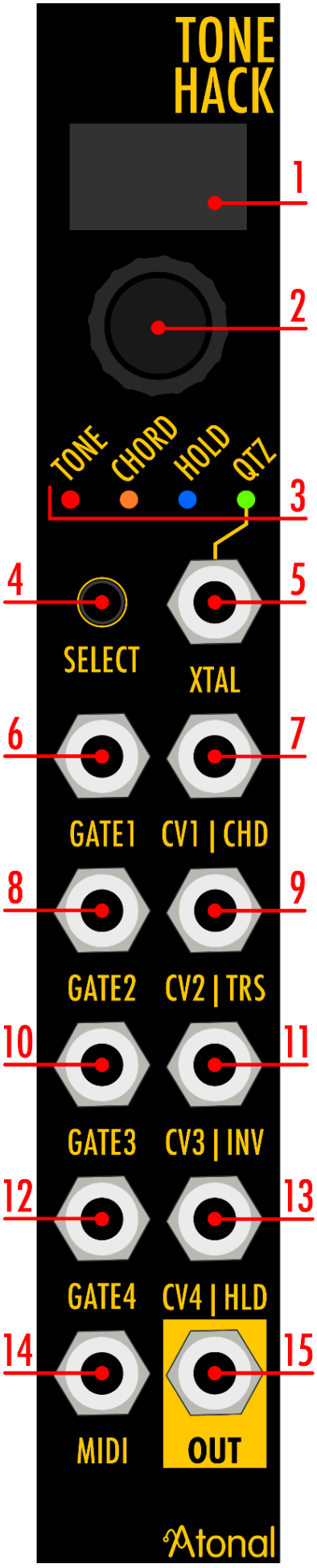


A09 - TONE HACK - USER MANUAL

- **Function selection**

Press “SELECT” button (4) to cycle through the functions (3).
Slow led flashing means the function is selected. A steady light means that the function is active (CHORD mode is on, HOLD mode is on, XTAL input is quantized). Rapid flashing means the function is active and selected. Very rapid flashing means you are in the configuration menu.

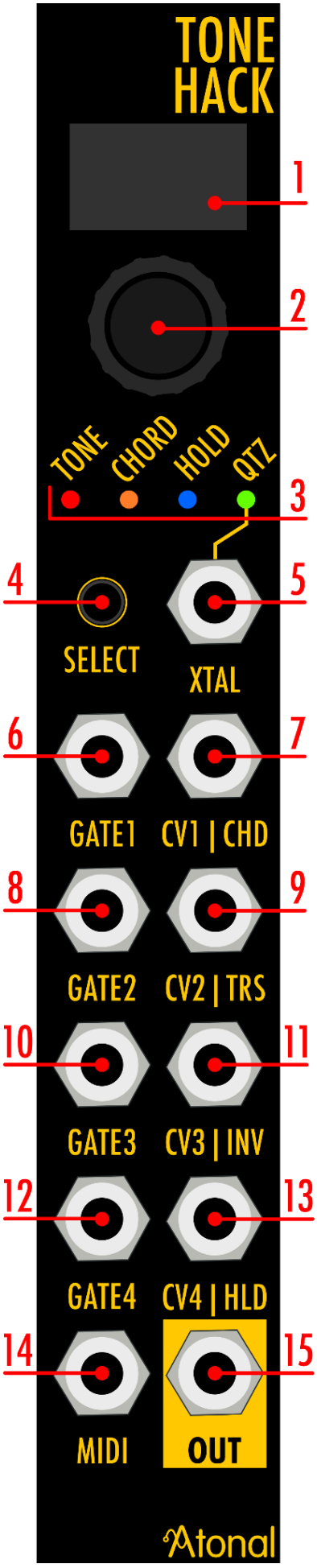
- **TONE selection**

Push (4) to select “TONE”. Turn the rotary encoder (2) to dial the tone number (0 to 99). Press the encoder (2) to load sound. Below 00, you can access 32 rhythms (dots appear on the display) then press the encoder to start or stop the rhythm. Once started, adjust the tempo by turning the encoder up or down.
Feed GATE (6, 8, 10, 12) and CV (7, 9, 11, 13) signals to play notes, or use the MIDI input (14).

- **CHORD mode**

Push (4) to select “CHORD”. Dial the memory number you want to edit. An empty memory is marked by a dot. Press and hold encoder (2) for 1 second to enter chord editing. The first red led is flashing. Turn the encoder (2) to select the first note of your chord. Push SELECT (2), the orange led is flashing. Dial the desired note. Press SELECT (2) again to set the 3rd and 4th notes. If you only want 2 or 3 notes in your chord, turn the encoder to the left until you reach "--" on the display (1), which corresponds to silence. Notes can also be entered one by one using GATE1 and CV1 or MIDI.
At any time, you can briefly press encoder (2) to play the chord. If you press the encoder any longer, you will exit editing mode. When you are not in chord editing mode (the orange LED flashes slowly), briefly press encoder (2) to activate or deactivate chord mode. Rapid flashing means chord mode is activated and the function is selected. If you select another function using (2), the orange LED will remain permanently lit, meaning chord mode is active. A chord contains at least 2 notes.
When chord mode is active, GATE1 (6) and CV1 (7) are used to play and select one of the 60 chord memories (1 to 32 = user, 33 to 60 = factory chords). Other gate inputs (8, 10, 12) are not used. Chords can be selected using the encoder too.
CHD (7) selects chord number when GATE1 (6) receives a gate signal.
TRS (9) transposes chord when GATE1 (6) receives a gate signal.
INV (11) inverts chord when GATE1 (6) receives a gate signal.
HLD (13) activates or deactivates HOLD mode.

circuits Atonal



- **HOLD mode**

Press (4) to select "HOLD". Press encoder (2) to activate or deactivate HOLD mode. When Hold mode is active, the notes played are sustained. When maximum polyphony is reached (4 notes), the oldest note stops to make way for a new one (unless the note is already playing). Turning the encoder (2) up or down while hold mode is active stops the notes played and resets the note counter to zero.

- **QTZ (quantize) mode**

Push (4) to select “QTZ”. Push the encoder (2) to activate or deactivate QTZ mode. The XTAL input (5) modulates the synthesizer CPU clock. This affects the synth's overall pitch. When activated, QTZ quantizes the incoming CV in semitones. Dial the encoder to set the transposition from -22 to +7 semitones (negative values are marked with a dot on the display). Incoming CV is added to the dialed value. When the QTZ is deactivated, the encoder allows you to set the CV modulation depth from 0 to 100.

- **CONFIG menu**

To enter the configuration menu, press the select button (4) and push the encoder while holding down the select button. Press the encoder (2) again to exit the configuration menu. There are 7 options which you can scroll through using the selection knob (2):

1) red led is blinking very fast: this is the CRASH mode (display shows “rS” = reset or “Cr” = crash). Every time you turn the encoder to the right (or send a gate signal to input GATE4 (12)), the synthesizer's CPU is stressed and jams deeper and deeper. You'll hear strange looping noises. Turning the encoder (2 steps) to the left resets the CPU back to normal operation mode and the display shows “rS”.

2) orange led is blinking very fast: this is the MIDI channel input selection. 0 stands for omni mode (any midi channel).

3) blue led is blinking very fast: this sets the CV sampling delay, in milliseconds and tenth of milliseconds (after the dot). If you encounter incorrect notes from the CV values, increase this number.
If you want to reduce latency, decrease this number. Adjust this parameter to match the swing speed with the hardware which produces gate/cv signals.

4) green led is blinking very fast: sets the total range of the XTAL input (5) in semitones.

5) green led is blinking very fast and display shows " t r ". A dot in the display indicates that the transpose input is scaled to 60 semitones. This mode is suitable if you feed quantized voltages corresponding to semitones. When no dot is present in the display, the transpose input is not scaled to 60 semitones but 0v to 2,5v => 16 semitones down and 2,5v to 5v => 16 semitones up. This scaling gives a better range when feeding LFO or manually generated CV.

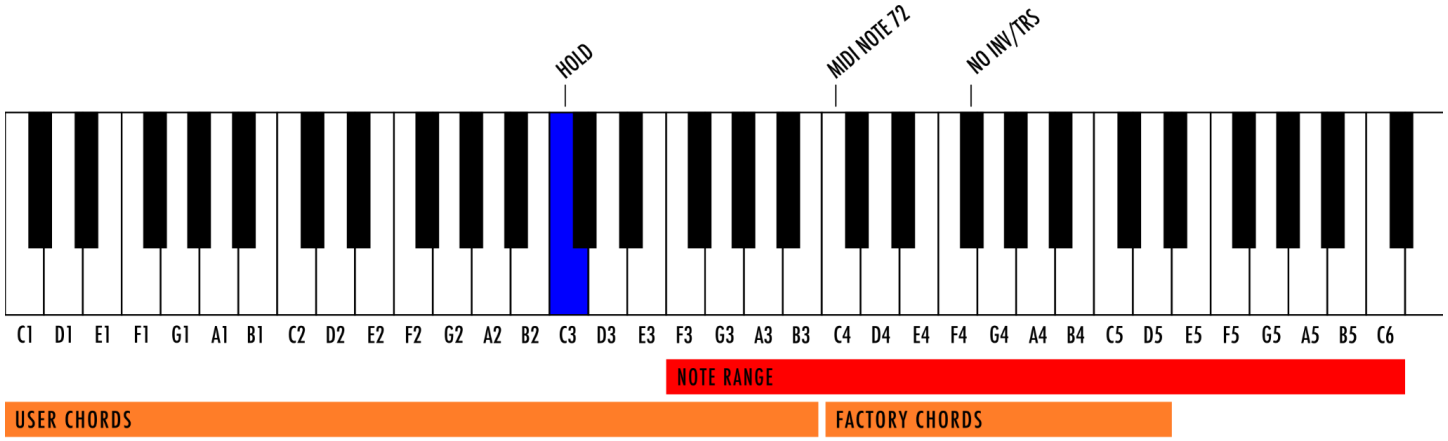
6) green led is blinking very fast and display shows " i n ". A dot in the display indicates that the inversion input is scaled to 60 semitones. This mode is suitable if you feed quantized voltages corresponding to semitones. When no dot is present in the display, the inversion input is not scaled to 60 semitones but 0v to 2,5v => 9 inversions down and 2,5v to 5v => 9 inversions up. This scaling gives a better range when feeding LFO or manually generated CV.

7) all leds are off: master pitch tuning menu. Range is +/- 24 cents. Display shows values ranging from -100 (2 dots indicates negative value) to +100. I recommend using tone number 7, which has no tremolo.

MIDI IMPLEMENTATION

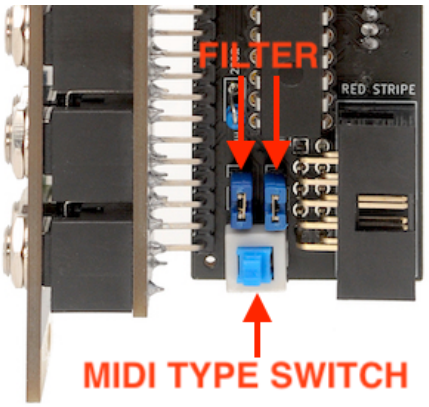
- Control Change 14 controls the transposition value in chord mode. The value dialed with CC14 is added to CV2 (9). Value 64 is the central value (no change).
  e.g. 62 = -2 semitones, 66 = +1 semitone).
- Control Change 15 controls the inversion value in chord mode. The value dialed with CC15 is added to CV3 (11). Value 64 is the central value (no change).
  e.g. 62 = second inversion down, 66 = first inversion up.
- Control Change 64 (Sustain) controls HOLD mode.
- Pitch Bend covers the same range as the XTAL CV input (the value is added).
- The key C2 (midi note # 48) will control HOLD mode.
- The note range is F3 to C6 (32 semitones).

CC values are resetted when sounds are loaded.
The TRS MIDI socket type (A = switch up, B = switch down) can be changed using the small blue switch next to the IDC power connector on the printed circuit board..



OUTPUT FILTER

Two jumpers are located on the PCB near the IDC power connector. Their purpose is to tame high frequencies and reduce the aliasing noise produced by the synthesizer chip. One is labeled "HF -" and produces moderate attenuation, the other is labeled "HF - -" and produces more pronounced attenuation. You can use both at the same time for maximum attenuation.



!! IMPORTANT NOTES - LIMITATIONS !!

The synthesis chip inside the module has been designed for a hand-played keyboard, not MIDI or gates... There is some "timing" limitations due to the original keyboard scanning:

- incoming gates (or midi notes) must have a minimum duration to trigger the note consistently
- when a note ends, there must be a short pause before restarting the same note
- minimum latency is 7 milliseconds (CV sampling delay must be added)
- when the CPU clock is low (XTAL input, 5) all timing issues are de facto greater

When transposing and inverting chords, remember that the total range of the synth is only 32 semitones (the notes outside the range are not played).

All CV inputs are quantized (unless disabled in the configuration) to 60 semitones (5 octaves from 0 to 5v). When no jack is inserted, a 2.5V reference is provided internally, corresponding to note F#4 (no transposition, no inversion).

DIMENSIONS:
4HP - 46 mm deep (including inserted IDC power connector)

CURRENT DRAW:

115 mA	+12V
8 mA	-12V
0 mA	+5V

AUDIO OUTPUT:
max 10 volts peak to peak.
(depending on the number of notes played and the loudness of the tone selected)

Built-in chords list:

All built-in chords are in the key of F, use the transpose input to set another root note.

37	Major Triad	F-A-C	49	Dim. 7th	F-Ab-Cb-D
38	Minor Triad	F-Ab-C	50	Auf. 7th	F-A-C#-Eb
39	Aug. Triad	F-A-C#	51	Aug-maj. 7th	F-A-C#-E
40	Dim. Triad	F-Ab-Cb	52	G9sus4\F	F-G-A-C
41	Suspended 2nd	F-G-C	53	Gm7\F	F-G-Bb
42	Suspended 4th	F-Bb-C	54	F9sus4	F-G-Bb-C
43	Dom. 7th, Sus. 4th	F-Bb-C-Eb	55	Abmaj13\F	F-G-Ab-C
44	Dom. 7th	F-A-C-Eb	56	G11\F	F-G-B-C
45	Major 7th	F-A-C-E	57	Gbm(maj7)\F	F-Gb-A
46	Minor 7th	F-Ab-C-Eb	58	B5 add(b5)\F	F-Gb-B
47	Min-maj. 7th	F-Ab-C-E	59	Gbmaj7\F	F-Gb-Bb
48	Half-dim. 7th	F-Ab-Cb-Eb	60	Gbmaj7b5\F	F-Gb-Bb-C

Voice list:

00 Piano	25 Ocarina	50 Synth-Piano	75 Cosmic Sound
01 Elec. Piano	26 Bagpipe	51 Synth-Celesta	76 Telephone
02 Honky-Tonk Piano	27 Harmonica	52 Synth-Clavi	77 Car Horn
03 Harpsichord	28 Chorus	53 Synth-Accordion	78 Computer Sound
04 Jazz Organ	29 Brass-Strings	54 Synth-Brass	79 Typewriter
05 Elec. Organ	30 Strings	55 Synth-Reed	80 Vibraphone
06 Pipe Organ	31 Warm Strings	56 Synth Lead	81 Marimba
07 Church Organ	32 Violin	57 Synth-Strings	82 Church Bells
08 Street Organ	33 Violin-Piano	58 Synth-Guitar	83 Bells
09 Accordion	34 Cello	59 Synth-Bass	84 Gamelan
10 Brass Ens.	35 Elec. Guitar	60 Glass Harmonica	85 Afro Percussion
11 Warm Brass	36 Jazz Guitar	61 Fantasy	86 Ethnic Percussion
12 Trumpet	37 Mute Guitar	62 Waw Voice	87 Sample Percussion
13 Tuba	38 Metal Guitar	63 Twinkle Echo	88 Matsuri
14 Brass Hit	39 Slap Bass	64 Metal Lead	89 Wadaiko
15 Wind Ens	40 Elec. Bass	65 Cathedral	90 Triangle
16 English horn	41 Wood Bass	66 Cosmic Dance	91 Conga/Agogo
17 Oboe	42 Snare Bass	67 Plunk Extend	92 Cowbell/Clave
18 Basson	43 Ukelele	68 Pop Lead	93 Tom
19 Clarinet	44 Banjo	69 Pearl Drop	94 Rock Drum
20 Samba Whistle	45 Sitar	70 Airplane	95 Swing Drum
21 Whistle	46 Mandolin	71 Ambulance	96 Bass/Piano
22 Quena	47 Harp	72 Insect	97 Bass/Trumpet
23 Flute	48 Taishokoto	73 Emergency Alarm	98 Piano/Flute
24 Flute-Vib	49 Shamisen	74 Laser Beam	99 Strings/Oboe