

Dead-Bug Hive

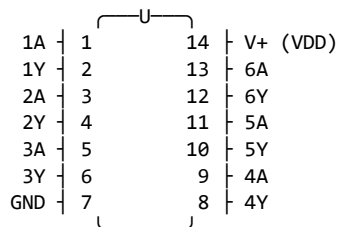
A SIX-OSCILLATOR CD40106 DRONE BOX, POINT-TO-POINT // DEAD-BUG BUILD WORKSHEET // MESS O' PEDALS

Turn a CD40106 hex Schmitt-trigger inverter into a six-voice drone / noise box, built dead-bug with no breadboard and no PCB. Full parts list, pinout, a pin-by-pin netlist, and how to cross-modulate the voices.

Parts

1×	CD40106 (a.k.a. CD40106B / MC14106) hex Schmitt inverter, 14-pin DIP - spot it: CD40106 printed on top; a notch marks pin 1
6×	1M pots for playable pitch, one per voice. Spot it: pots are marked B = linear taper (use these), value after - so B1M is the one you want
6×	1K resistors - one per pot, in series with it, and not optional (Step 1 explains why). Spot it: bands read brown-black-red-gold = 1, 0, ×100, so 1000 ohms ±5%
6×	Ceramic capacitors , one value per voice - I run the whole ladder: 101 (100pF, highest whistle), 102 , 103 , 104 , 105 , 106 (10 µF, slow LFO clicks). Six voices, six values, and the spread is what stops it sounding like one fat buzz. Spot it: the printed code is the value - and they don't have to match each other to work . My 101 is a big blue disc marked 101J 3KV simply because that's the only 100pF I had; it sits next to little yellow ones and behaves identically. Read the number, ignore the packaging.
1×	0.1 µF ceramic - supply decoupling (printed 104)
6×	Mixing resistors , ~ 10K , one per voice you use - bands brown-black-orange, or meter them; non-polar
6×	Mixing capacitors , one per voice - 1 µF non-polarised (NP / bipolar) is the one to reach for. Audio swings both ways, so a cap that doesn't care about direction is the safe choice here. Spot it: NP caps are usually printed NP or BP on the body
1×	10 µF electrolytic - output DC-blocker. Spot it: a little can; the stripe marks the minus leg , longer leg is +
1×	Output: a small speaker + an LM386 amp (an 8-pin DIP printed LM386) for real volume - that's the Dead-Bug Hornet - OR a jack to an amplifier - see Step 7
1×	SPST toggle for on/off - a 2-lug switch
1×	Power source - at least two vape cells in series (7.4V; three gives you 11.1V), or a 9V battery
1×	LED + a series resistor (~ 1K-10K) as a power indicator. Spot it: the longer leg is + (anode), and the flat spot on the rim marks the negative side
1×	Enclosure preferably grounded, if not, then copper tape for grounding
	Solid-core hookup wire, soldering iron, cutters, multimeter

The chip, from above



"A" = input, "Y" = output. Notch marks pin 1. Keep the chip label-up and this map reads exactly as you see it - no mirroring, no mental flipping.

Build

STEP 1 - PRESOLDER EVERYTHING, THEN POPULATE THE PANEL

Do this before the chip ever comes out of its bag.

One pitch pot - three joints, times six

CONNECT	TO	PART
---------	----	------

	Pot outer lug	1K resistor	Tin both, join in one touch
	1K far end	Wire out	Green on mine
	Pot wiper (middle lug)	Wire out	Blue on mine
	Pot third lug	nothing	Left empty - do not bridge it

STEP 2 - FLATTEN THE LEGS - AND LEAVE IT LABEL-UP

Bend all fourteen legs out flat, so they splay sideways instead of pointing down.

STEP 3 - POWER - AND THE CMOS RULE

Hook up the two power pins - a red V+ lead and a black ground lead , soldered straight to the legs - and drop the decoupling cap across the chip.

Power & housekeeping

	CONNECT	TO	WHY
	Pin 14	V+	Supply positive (VDD)
	Pin 7	Ground	Supply negative (VSS)
	0.1 μ F	Pin 14 -> Pin 7	Decoupling, right at the chip
	Every unused input	Ground	No floating CMOS inputs - ever

STEP 4 - BUILD ONE VOICE

Here's the whole oscillator, on inverter 1.

Voice 1 (inverter 1) - one row per joint

	CONNECT	TO	PART
	Pin 2 (out)	Pot wiper (middle lug)	Wiper wire - blue on mine
	Pot outer lug	1K resistor	Already joined in Step 1
	1K far end	Pin 1 (in)	Resistor wire - green on mine
	Pot third lug	nothing	Left empty
	Pin 1 (in)	Ground	Range cap (100pF for voice 1, code 101)
	Pin 2 (out)	-> to mixer (Step 5)	Signal tap

STEP 5 - ADD THE REST OF THE HIVE

Every voice is the same three connections - just on a different inverter.

All six inverters - out -> R -> in, and in -> C -> ground

	VOICE	INPUT (A)	OUTPUT (Y)	SUGGESTED CAP
	1	Pin 1	Pin 2	100pF (101) - the highest whistle
	2	Pin 3	Pin 4	1nF (102)
	3	Pin 5	Pin 6	10nF (103) - mid
	4	Pin 9	Pin 8	0.1 μ F (104) - low growl
	5	Pin 11	Pin 10	1 μ F (105) - sub-bass throb
	6	Pin 13	Pin 12	10 μ F (106) - slow LFO / clicks

STEP 6 - MIX THEM DOWN

You can't just tie the outputs together - they'd fight.

Resistor mixer

	CONNECT	TO	PART
	Each voice output	10K resistor	then the cap - resistor first
	10K resistor	Mix bus	via a 1 μ F NP cap
	Mix bus	Output stage (Step 7)	no volume pot on this build

STEP 7 - GET IT OUT OF THE BOX

Unlike the 555, the 40106's little logic outputs can't shove a speaker around on their own - straight into 8 ohms you'll get a whisper.

Two ways out

	OPTION	HOW	RESULT
	LM386 amp	10 μ F -> LM386 input -> speaker	Actually loud - it's the next chip in your pile (the Dead-Bug Hornet)
	Line / jack out	10 μ F -> 1K series -> jack tip; sleeve to ground	Into an amp or pedal - let them do the work

STEP 8 - POWER UP

Wire your SPST toggle in the V+ line, flip it, and start sweeping pitch knobs.

STEP 9 - IF IT WON'T SING

- A voice is dead silent? Double-check its feedback resistor really goes output->input, and the cap goes input->ground. Easy to swap A and Y on the right-hand side (pins 8-13), where the output is the lower pin number.
- Whole chip buzzy or hot? A floating input. Hunt down any unused inverter input and tie it to ground.
- No sound at all? Confirm pin 14 at V+ and pin 7 at ground, and that you didn't skip the 0.1 μ F decoupling cap.
- Barely audible? That's the raw output into a speaker - expected. Add the LM386, or go into an amp (Step 6).
- A pot does nothing at one end? That is the 1K doing its job - it stops the range there on purpose. Nothing at all , anywhere in the sweep? You are on the wrong two lugs: it wants the wiper and one outer lug , not the two outer lugs.
- One voice dies as you turn it down, and comes back as you turn it up? That voice is missing its 1K, or the 1K is bridged past. At 0 ohms the inverter's output is tied straight to its input and the oscillator has nothing left to charge the cap through. Check that voice's outer lug.