

# Thomas Henry 555-VCO (Eurorack DIY 10HP v3)



Original documentation (schematics & original BOM):  
<http://electro-music.com/forum/viewtopic.php?t=54623>

## Introduction

Thomas Henry 2012: “A VCO using easy to find parts. If I may be so immodest, this is my best design to date. The waveforms look great and if you check the measurements, you'll see it's the most accurate I've ever come up with.

My favorite VCO of all times is the CEM3340, and I've always wanted to approximate it somehow. After nearly thirty years, I finally have a design which comes the closest. The accuracy on my breadboard was very good.

The sync is a real treat and basically comes along for free. If you're looking for cleverness, then be sure to check out how I did the sync, the ramp, and buffered the sine to keep the chip count down. So there it is. Have fun with it.”

## Features

Inputs: 1V/Oct, Sync, Lin FM, Exp FM, PWM  
 Outputs: Tri, Ramp, Sine, Pulse  
 Now with LFO-mode Switch/LED

## Specifications

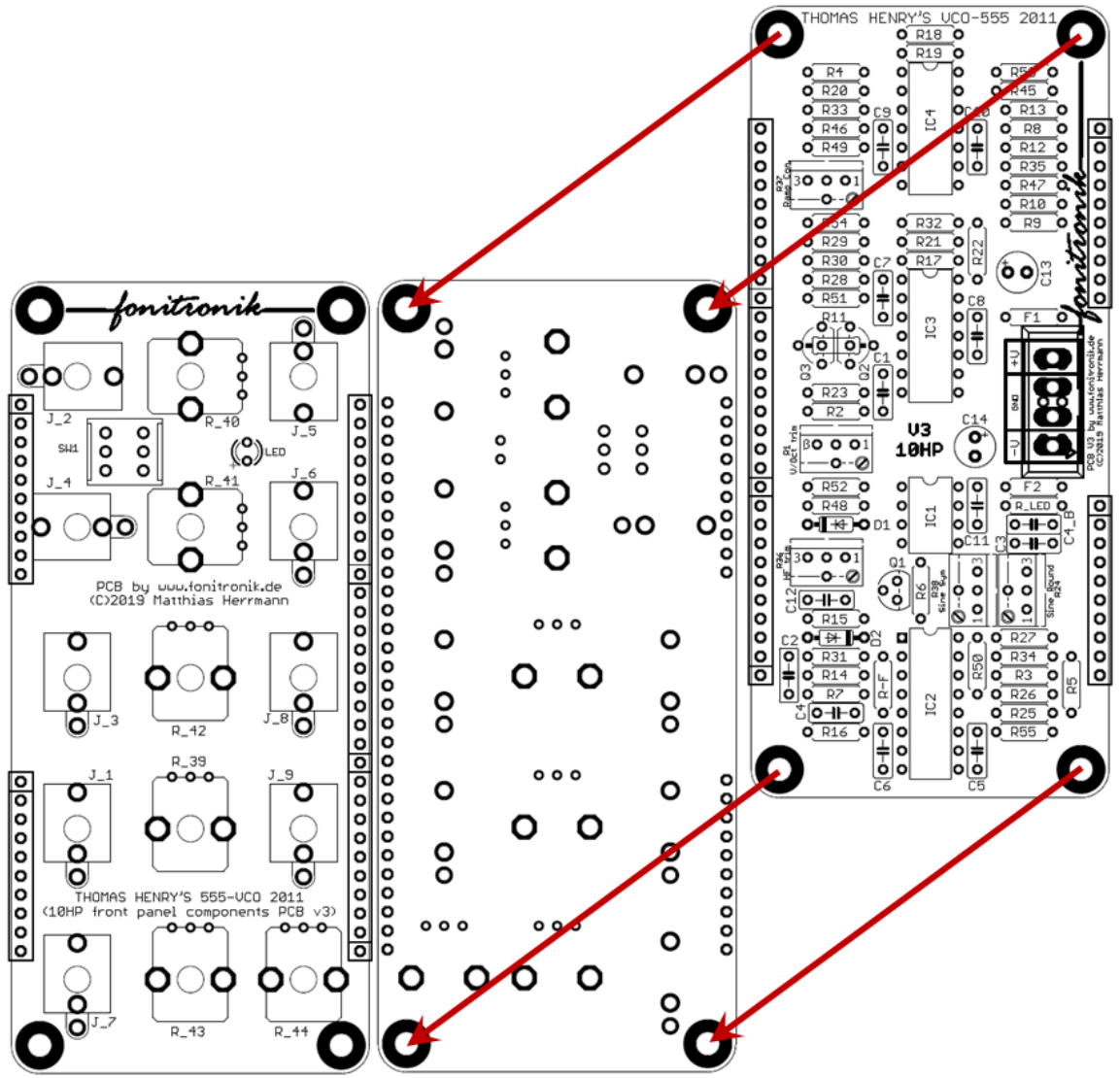
The frontpanel measures: 10HP (Eurorack)  
 Mounting depth behind frontpanel incl. power plug: 40mm  
 Power consumption: +25mA/-20mA

*BTW this is not meant as a beginners project. I do not provide step-by-step building instructions. I just assume that you already build quite a few projects and know how to read the BOM and schematics.*

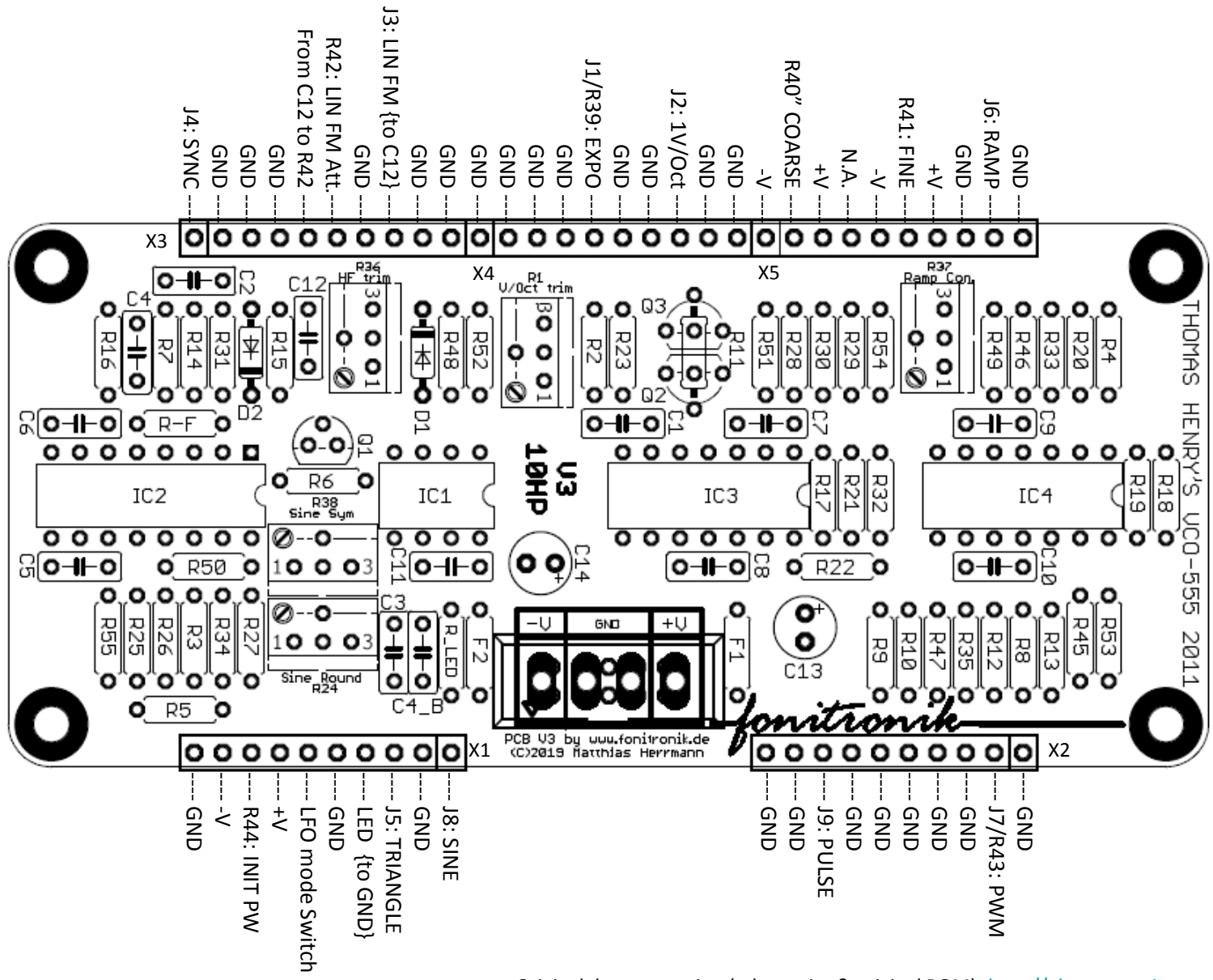
## General mounting instructions

This project uses two PCBs, one board with the actual circuitry and an additional adapter PCB carrying the front panel components. The adapter PCB is used to mount the PCBs to the front panel.

The PCBs are connected using five 1x10 headers/receptables with 2,54mm pitch (.1in). Look out for something like this:



# Overlay for Reference & Manual Wiring Guide



Please, also refer to the original schematic published by Thomas Henry.

To activate the LFO mode you need a DPDT switch connecting X1-pin4 via a bi-color LED to GND and X1-pin6 to GND.

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Qty	Value	Parts
<b>Resistors</b>		
2	10R	F1, F2
2	390R	R2, R3
4	1k	R-F, R4, R5, R9
2	1.5k	R6, R7
1	1.8k	R8
1	2k	R10
1	2k tempco (+3500ppm/°C)	R11
1	2.2k	R12
1	<b>2k</b>	R13
2	4.7k	R14, R15
1	5.6k	R55
5	10k	R16-R20
2	20k	R21, R22
2	22k	R23, <b>R27</b>
1	39k	R26
7	100k	R28-R32, R34, R35
1	120k	R45
1	<b>137k</b>	<b>R33</b>
1	150k	R46
1	300k	R25
1	330k	R47
4	1M	R48-R51
1	1.5M	R52
1	2.2M	R53
1	3.3M	R54
1	value depends on LED used	R_LED
1	100R Trimmer	R1
1	20k Trimmer	R24
3	100k Trimmer	R36-R38

Qty	Value	Parts
<b>Capacitors</b>		
1	100pF (COG/NPO)	C1
1	470pF (COG/NPO)	C2
1	1n (film)	C3
1	2.2n (COG/NPO)	C4
1	22n (film)	C4_B
7	100n (decoupling)	C5- C11
1	220n (film)	C12
2	10uF/35V	C13, C14
<b>Semi's</b>		
2	1N4148	D1, D2
1	2N3904	Q1
2	2N3906	Q2, Q3
1	TLC555	IC1
1	LM13700	IC2
2	TL074	IC3, IC4
<b>Misc'</b>		
6	Potentiometer 9mm vertical B100k (R39-R44)	
9	Jack Sockets type Thonkicon (J1-J9)	
5	1x 10 SIL socket/header (female/male, 2.54pitch)	
1	two-pin bicolor LED	
1	Sub-Miniature Switch DPDT on-on	
4	Standoffs (M3)	
1	2x5 pole boxed Eurorack power-header, or MTA-156	

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