Project Documentation

Commodore VIC-20 Diagnostic User Port PCB

Project number: 155

Revision: 1

Date: 14.07.2021

Commodore VIC-20 Diagnostic User Port PCB Rev. 1

Module Description

Table of content

The VIC-20 Diagnostics User Port PCB provides most of the required feedbacks for the Commodore Diagnostic Software. Those are the feedbacks for the User Port, the IEC (serial) bus and the Cassette Port. Only the keyboard feedbacks are realized on the Diagnostic Keyboard PCB.

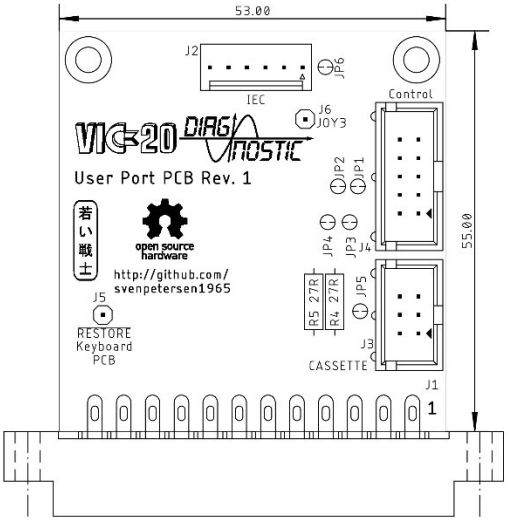


Figure 1: Dimensions of the User Port PCB

Connectors

User Port

J1- Edge Connector (2x12, 3.96mm pitch)

Pin	Signal	Pin	Signal
1	GND	A	GND
2	+5V	B	CB1
3	/RESET	C	PB0
4	JOY0	D	PB1
5	JOY1	E	PB2
6	JOY2	F	PB3
7	LIGHTPEN	H	PB4
8	CASSSW	J	PB5
9	ATN	K	PB6
10	9VAC(1)	L	PB7
11	9VAC(2)	M	CB2
12	GND	N	GND

IEC-Bus

J2 – KF2510, 6pin (compatible to Molex KK 254 series, 6p. - P/N 22272061)

Pin	Signal	DIN 6
1	SQR IN	1
2	GND	2
3	ATN	3
4	CLK	4
5	DATA	5
6	n.c	-

Cassette Port

J3 – 2x3 pin header for a ribbon cable connected to the cassette port PCB (project number 114, from the C64 Diagnostic Harness).

Pin	Signal	Pin	Signal
1	GND	2	n.c.
3	MOTOR	4	READ
5	WRITE	6	SENSE

Control Port

J4 – 2x5 pin header for a ribbon cable which connects via a D-SUB 9 (female) to the control port.

Pin	D-SUB	Signal	Pin	D-SUB	Signal
1	1	JOY0 (up)	2	6	LIGHTPEN
3	2	JOY1 (down)	4	7	+5VCTR1
5	3	JOY2 (left)	6	8	n.c. (GND)
7	4	JOY3 (right)	8	9	POTX
9	5	POTY	10	-	n.c.

Feedbacks

User Port (J1)

Pin	Signal		Signal	Pin
B	CB1	↔	IEC-Data	J2/Pin 5
C	PB0	↔	PB1	D
E	PB2	↔	PB3	F
H	PB4	↔	PB5	J
K	PB6	↔	PB7	L
M	CB2	↔	IEC-Clk	J2/Pin 4
9	ATN	↔	KB $\overline{\text{RESTORE}}$	See J5

IEC-Bus (J2)

Pin	Signal		Signal	Pin
1	SQR_IN	↔	*ATN*	3
4	IEC-Clk	↔	CB2 (User Port)	J1/Pin M
5	IEC-Data	↔	CB1 (User Port)	J1/Pin B

Cassette Port (J3)

Pin	Signal		Signal	Pin
1	GND		n/c	2
3	MOTOR	Volt.div.	SENSE	6
4	READ	↔	WRITE	5

Control Port (J4)

DSub	J4 Pin	Signal		Signal	J4 Pin	DSub
1	1	JOY0	↔	JOY1	3	2
6	2	LIGHTPEN/FIRE	↔	JOY2	5	3
9	8	POTX	↔	+5V (Control Port)	4	7
5	9	POTY	↔	+5V (Control Port)	4	7

The JOY3 signal is not tested by the original harness. It is connected to the solder pad J6 for experimental purposes.

Note

The former 0Ω resistor have been replaced with closed (by default) solder bridges. This is to reduce the part count. They don't serve any purpose, so leave them as is.

3D-printed Case

A 3D-printed case for the User Port PCB is available from this repository. The recommended screws are C2.9 x 9.5mm.

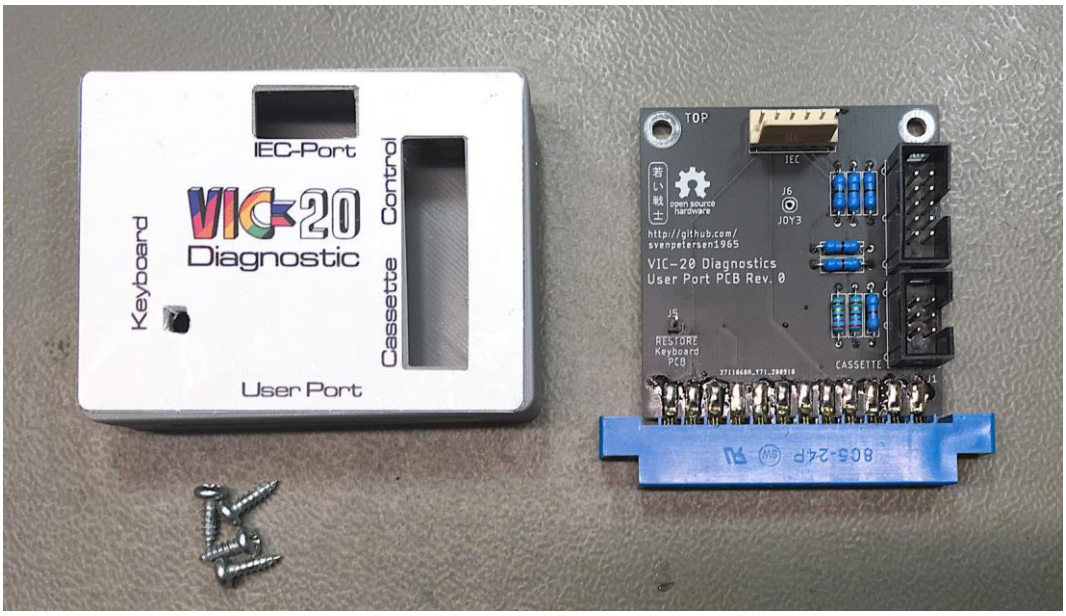


Figure 2: User Port PCB with 3D-printed case

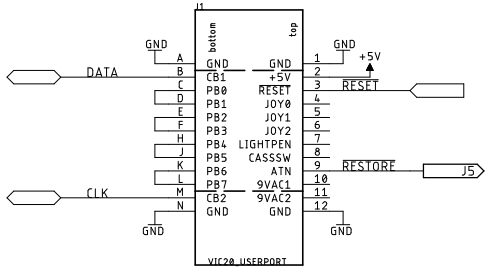
Revision History

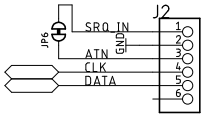
Rev. 0

- Fully working prototype

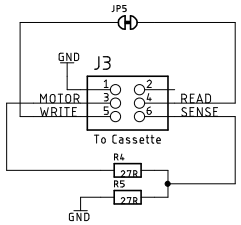
Rev. 1

- 0Ω resistors replaced with closed solder bridges to reduce part count
- Cool new logo
- Not yet tested, but low risk modification. Ready for production.

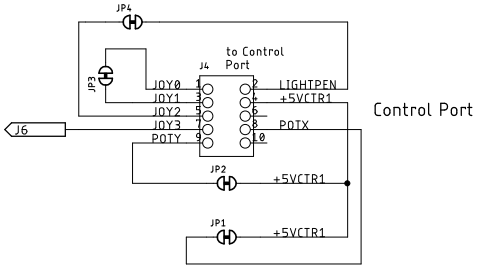




IEC-Bus



Cassette PCB

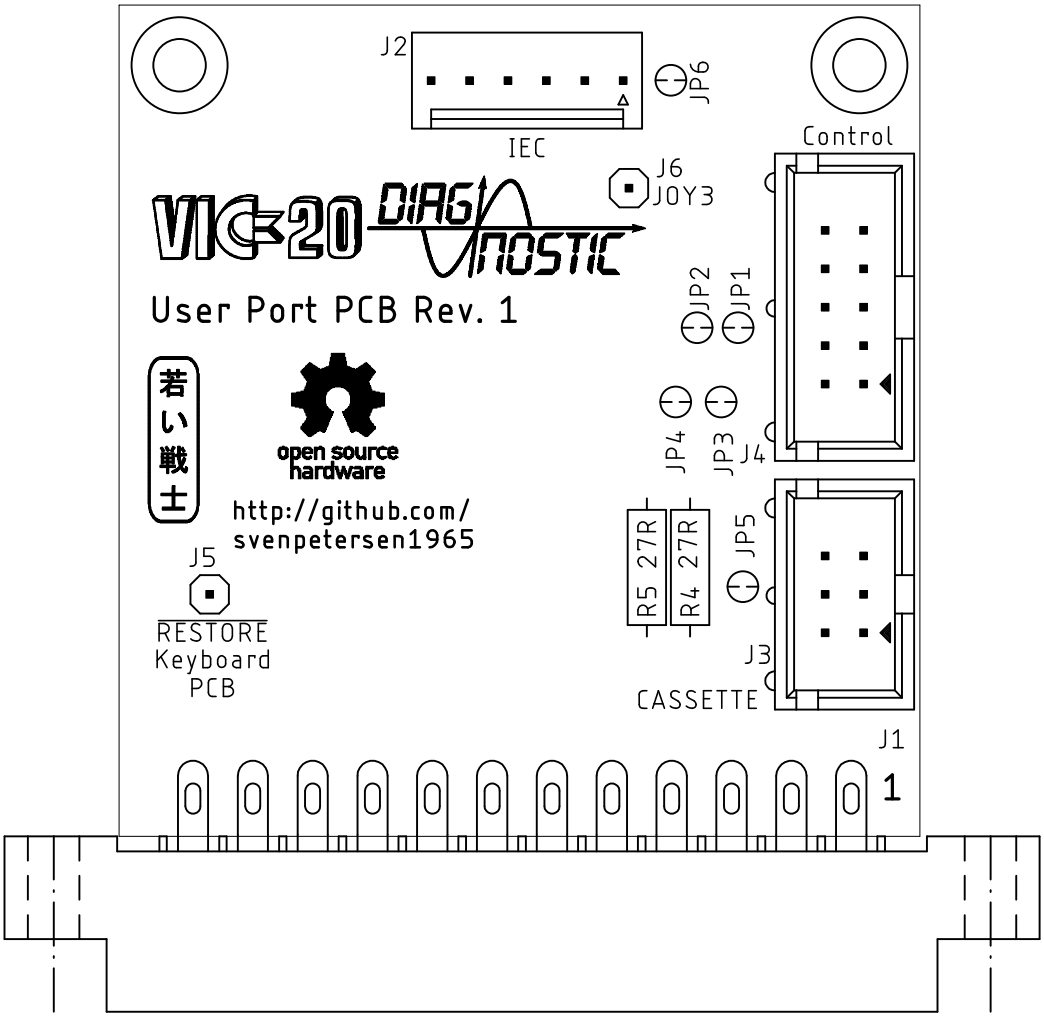


Control Port

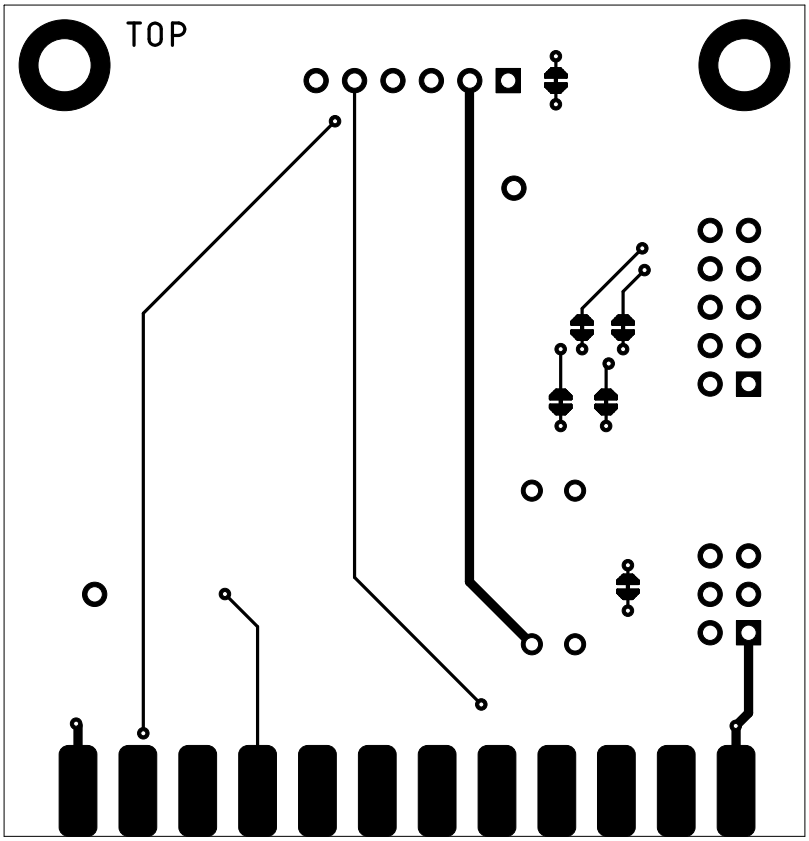
open source hardware

Title:	VIC-20 Diagnostic Harness Userport PCB	Doc.-No.:	155-1-01-01
		Draft.:	Sven Petersen
Date:	14.07.2021 14:01	Rev.: 1	Page 1/1
File:	VIC20_Diag_UP		
	http://github.com/svenpetersen1965		A3

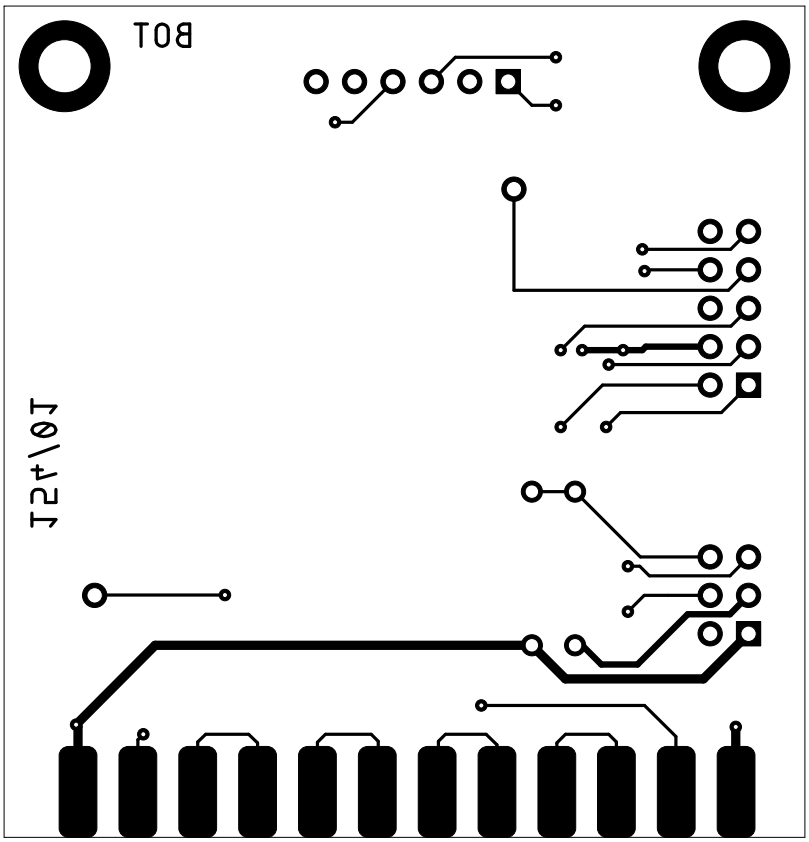
Sven Petersen 2021	Doc.-No.: 154-2-01-01	
	Cu: 35µm	Cu-Layers: 2
VIC20_Diag_UP		
15.07.2021 17:52		Rev.: 1
placement component side		



Sven Petersen 2021	Doc.-No.: 154-2-01-01	
	Cu: 35µm	Cu-Layers: 2
VIC20_Diag_UP		
14.07.2021 17:47		Rev.: 1
top		



Sven Petersen 2021	Doc.-No.: 154-2-01-01	
	Cu: 35µm	Cu-Layers: 2
VIC20_Diag_UP		
14.07.2021 17:47		Rev.: 1
bottom		



Sven Petersen 2021	Doc.-No.: 154-2-01-01	
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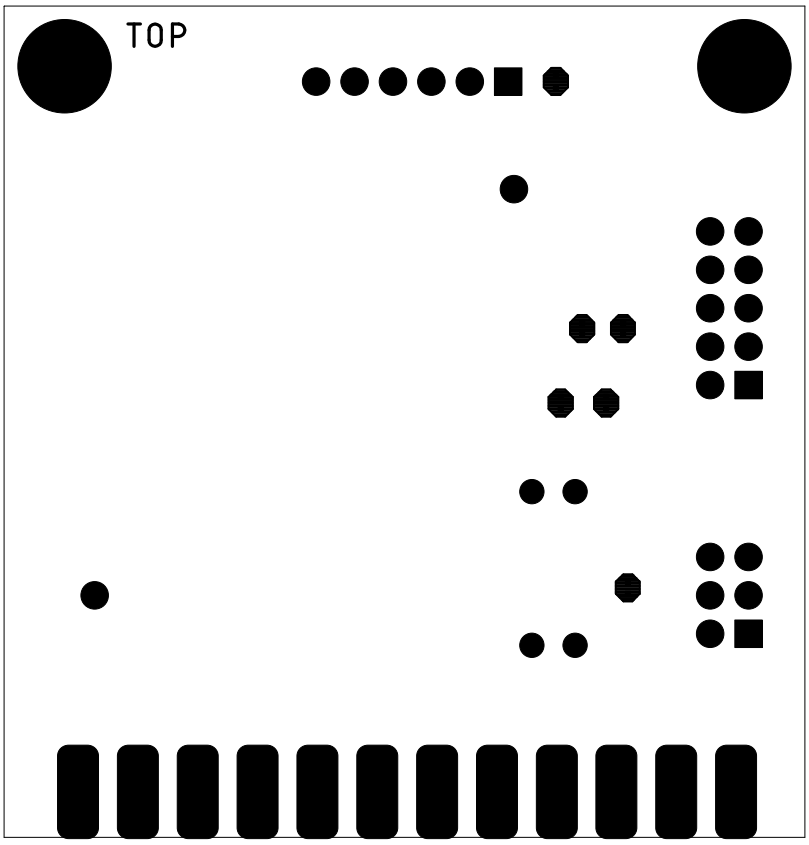
VIC20_Diag_UP		
14.07.2021 17:47		Rev.: 1
stopmask component side		



Sven Petersen 2021	Doc.-No.: 154-2-01-01	
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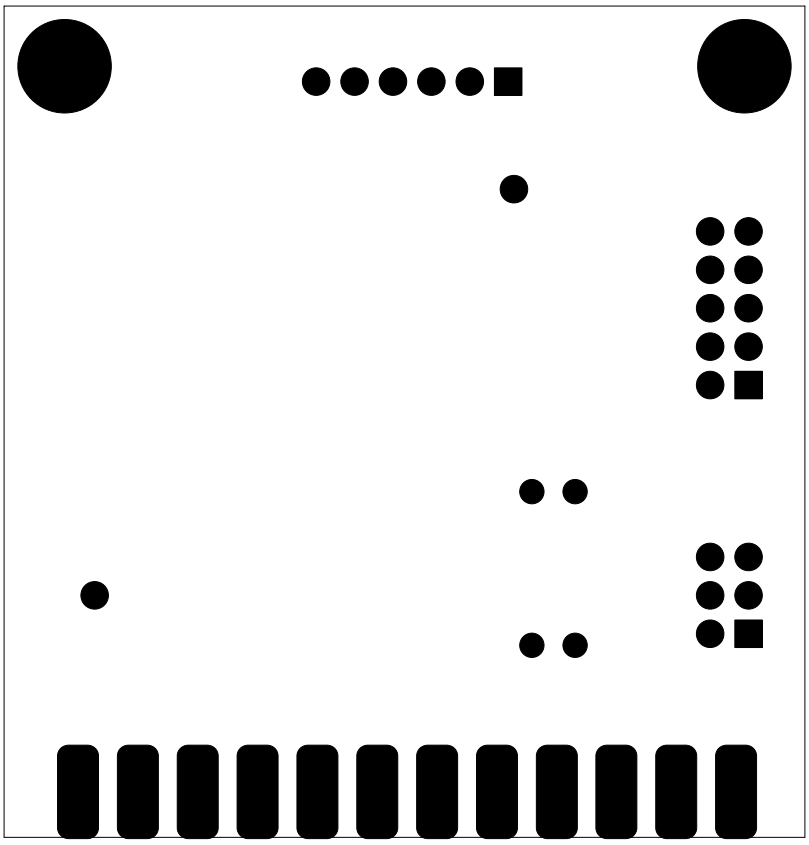
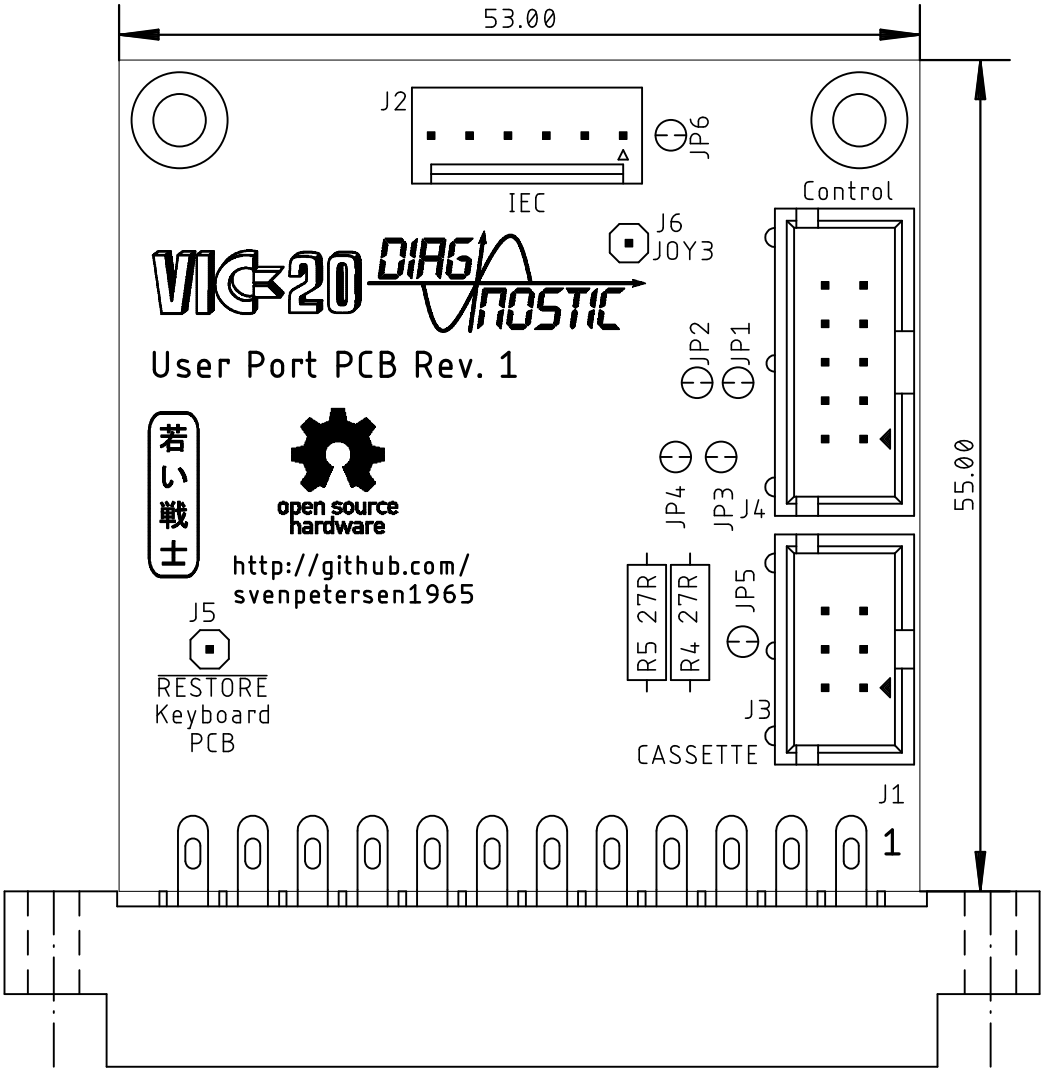
VIC20_Diag_UP		
14.07.2021 17:47		Rev.: 1
stopmask solder side		



Sven Petersen 2021	Doc.-No.: 154-2-01-01	
	Cu: 35µm	Cu-Layers: 2
VIC20_Diag_UP		
15.07.2021 17:52		Rev.: 1
placement component side measures		



VIC-20 Diagnostic User Port PCB Rev. 1
Bill of Material Rev. 1.0

Pos.	Qty	Value	Footprint	Ref.-No.	Comment
1	1	155-2-01-01	2 Layer	PCB Rev. 1	2 layer, Cu 35μ, HASL, 55.0mm x 53.0mm, 1.6mm FR4
2	1	2x3 box connector	2X03WV	J3	e.g. Reichelt WSL 6G
3	1	2x5 box connector	2X05WV	J4	e.g. Reichelt WSL 10G
4	1	KF2510-6P	6410-6P	J2	Reichelt (RND 205-00675), AliExpress or Molex 6410/22-27-2061 (Reichelt MOLEX 22272061)
5	1	Pin header, 1 pin	1X01	J5	Pin Header, e.g. Reichelt RND 205-00622
6	0	do not place	1X01	J6	do not place
7	2	27R	R-10	R4, R5	Metal film resistor, 1/2 W, 5% or better
8	1	2x12, 3.96mm pitch	USERPORT	J1	edge connector, VIC-20 user port