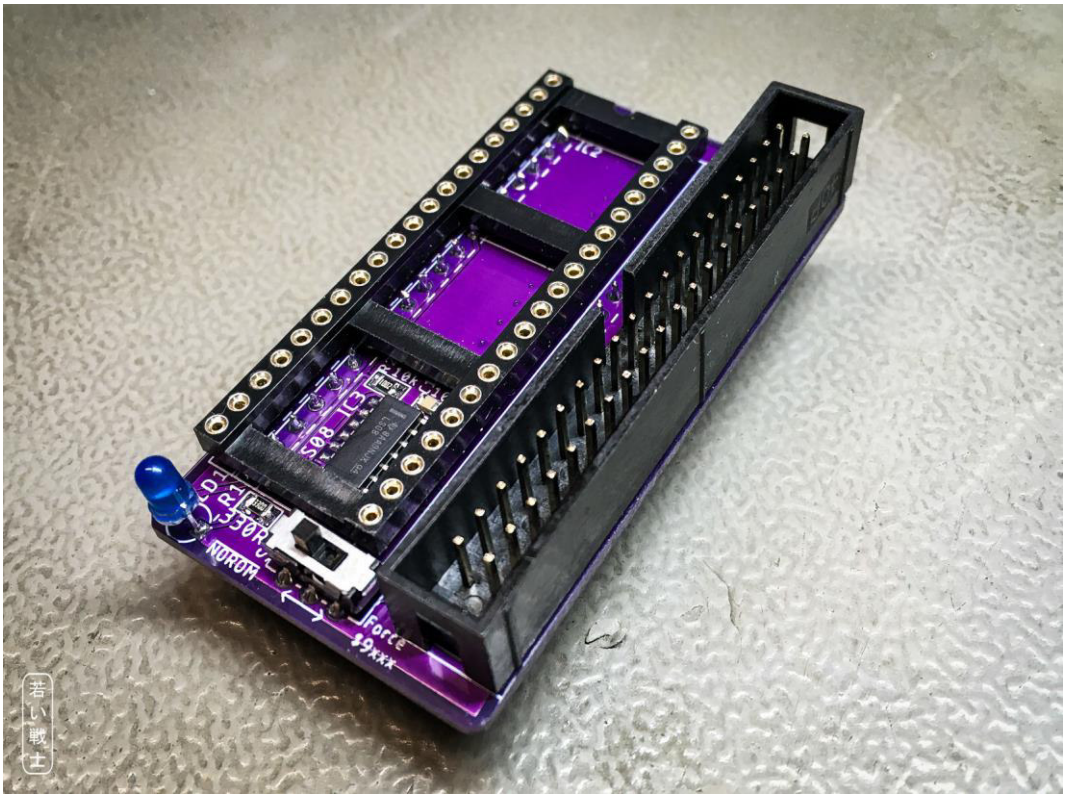
Project Documentation

Commodore PET/CBM 6502 Ribbon Cable Adapter

Project number: 162

Revision: 1

Date: 01.01.2023



Commodore PET/CBM 6502 Ribbon Cable Adapter Rev. 1

Module Description

Introduction

The 6502 Ribbon Cable Adapter is part of the PET Diagnostic Clip assembly. It replaces the actual DIP40 clip, which is available from Mouser etc. for about US$50. It provides a connection of the 6502 µprocessor to a 40 pin box header. The 6502 is inserted into its socket and it is then connected to the socket of the 6502 on the mainboard of the PET.

The Ribbon Cable Adapter (with or without the clip) can remain in the mainboard for normal operation.

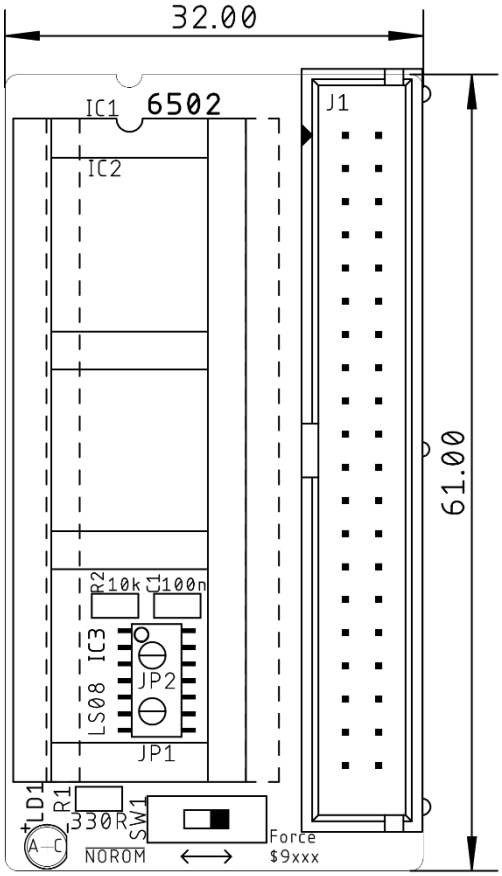


Figure 1: Dimensions of the 6502 Ribbon Cable Adapter

To prevent the need to short circuit the address lines AB13 and AB14 to GND to redirect kernal ROM accesses from $Fxxx to $9xxx (the lower EDIT ROM address space), two AND gates (IC3: 74LS08) are inserted directly after the processor address lines (A13 and A14). This way, the address lines can be set low. This kind of redirection is required for all "non CRTC type PETs, which are not capable to switch off all system ROMs with the /NOROM signal (being low). This feature requires a diagnostic clip rev. 2 (or later).

Switch SW1

The switch has to be set to "Force $9xxx" for these non-CRTC mainboards. The CRTC mainboards make use of the /NOROM signal and do not require the said redirection.

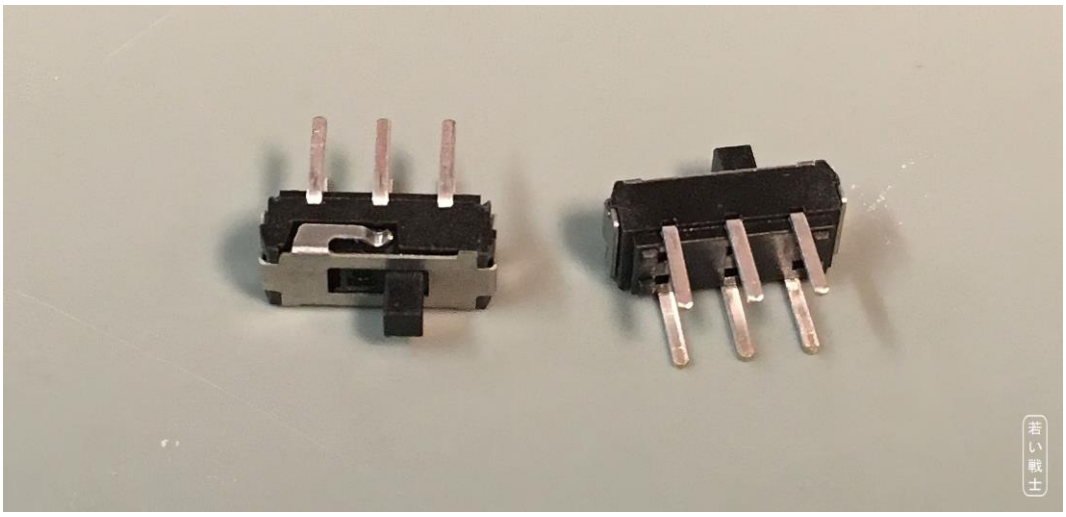


Figure 2: Mini slide switch

These mini slide switches can be found on Amazon, Ebay and AliExpress. A possible search term is “mini slide switch dpdt” or “MSS22D18”, which will not show these switches exclusively, but it should not be too hard to find the right ones.

Assembly

First, the SMD components are soldered.

The precision round pins should be aligned properly. For this purpose, they are inserted into the DIP40 socket, inserted into the solder pads, soldered one pin each, checked, if they are properly aligned and vertical, adjusted if required and finally soldered completely.

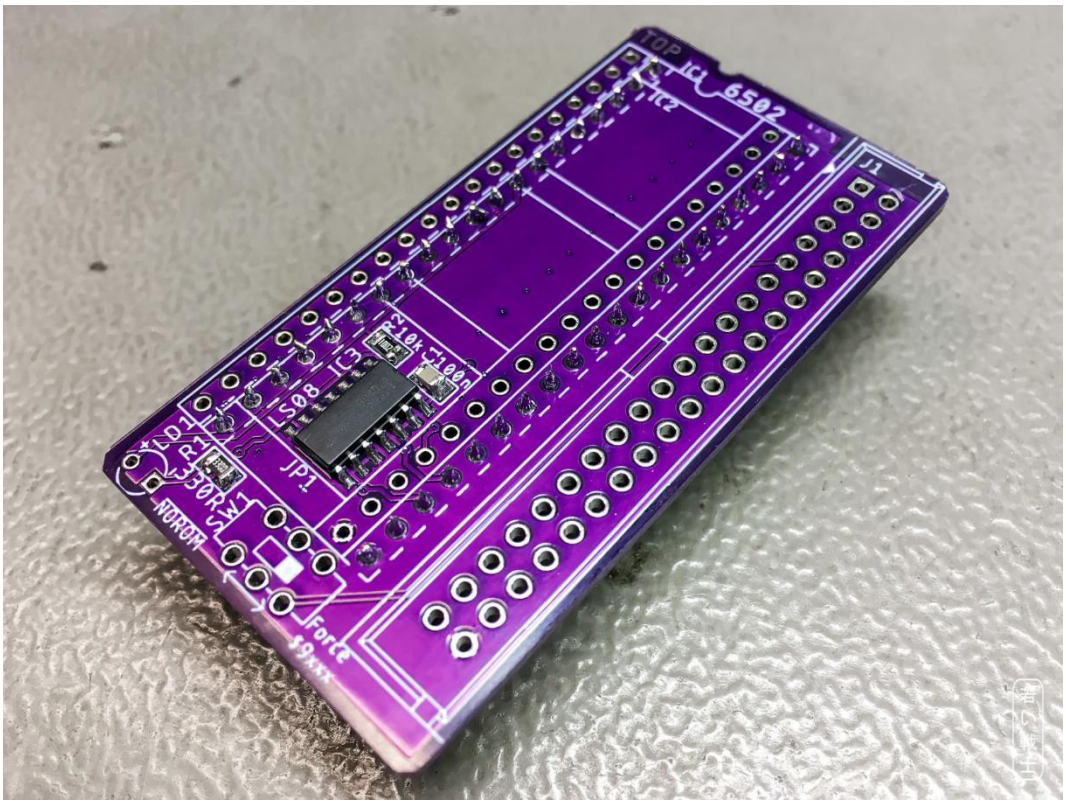


Figure 3: First steps - SMD components and pin strips assembled

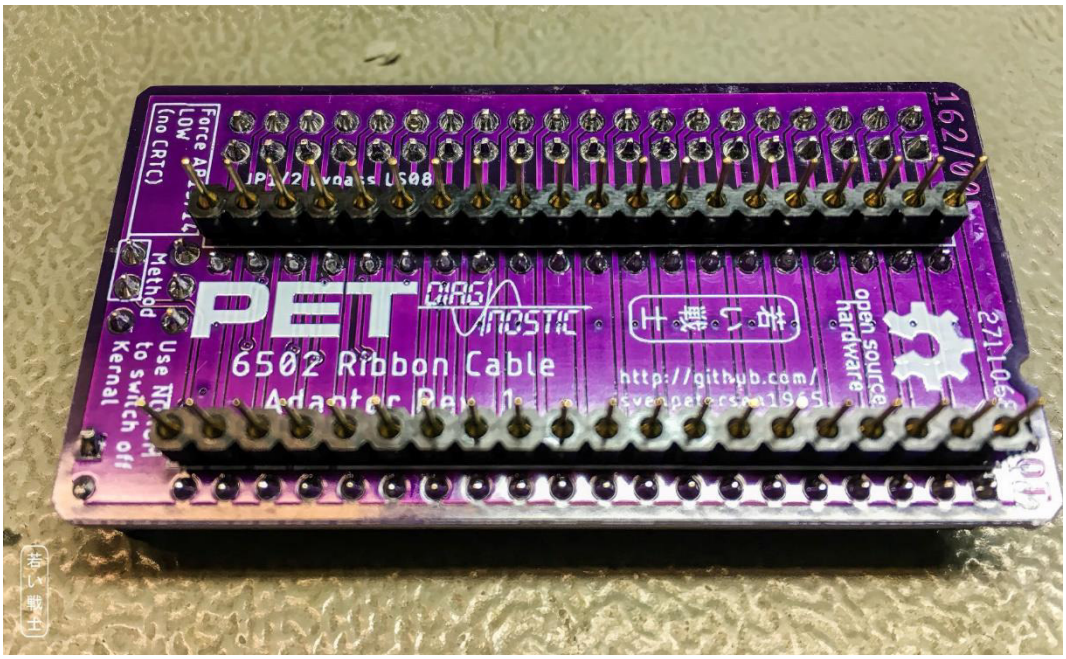


Figure 4: bottom side of the assembled board

Connectors

J1 – Clip Connector

Signal	Pin	Pin	Signal
GND (6502, Pin 1)	1	2	/RES
RDY	3	4	PHI2
PHI	5	6	S.O.
/IRQ	7	8	PHI0
/NOROM	9	10	n.c. (6502, Pin 36)
/NMI	11	12	n.c. (6502, Pin 35)
SYNC	13	14	R//W
5V	15	16	DB0
AB0	17	18	DB1
AB1	19	20	DB2
AB2	21	22	DB3
AB3	23	24	DB4
AB4	25	26	DB5
AB5	27	28	DB6
AB6	29	30	DB7
AB7	31	32	AB15
AB8	33	34	AB14
AB9	35	36	AB13
AB10	37	38	AB12
AB11	39	40	GND (6502, Pin 21)

It is advised to use a ribbon cable, not longer than 15cm and to install the strain reliefs.

IC1(socket for the 6502, IC2 (6502 pin header)

Signal	Pin	Pin	Signal
To J1 Pin 1(GND)	1	40	/RES
RDY	2	39	PHI2
PHI	3	38	S.O.
/IRQ	4	37	PHI0
/NOROM	5	36	To J1, pin 10
/NMI	6	35	To J1, pin 12
SYNC	7	34	R//W
5V	8	33	DB0
AB0	9	32	DB1
AB1	10	31	DB2
AB2	11	30	DB3
AB3	12	29	DB4
AB4	13	28	DB5
AB5	14	27	DB6
AB6	15	26	DB7
AB7	16	25	AB15
AB8	17	24	AB14
AB9	18	23	AB13
AB10	19	22	AB12
AB11	20	21	GND

The precision round pins are very fragile. It is advised to keep them in a second DIP40 round pin socket.

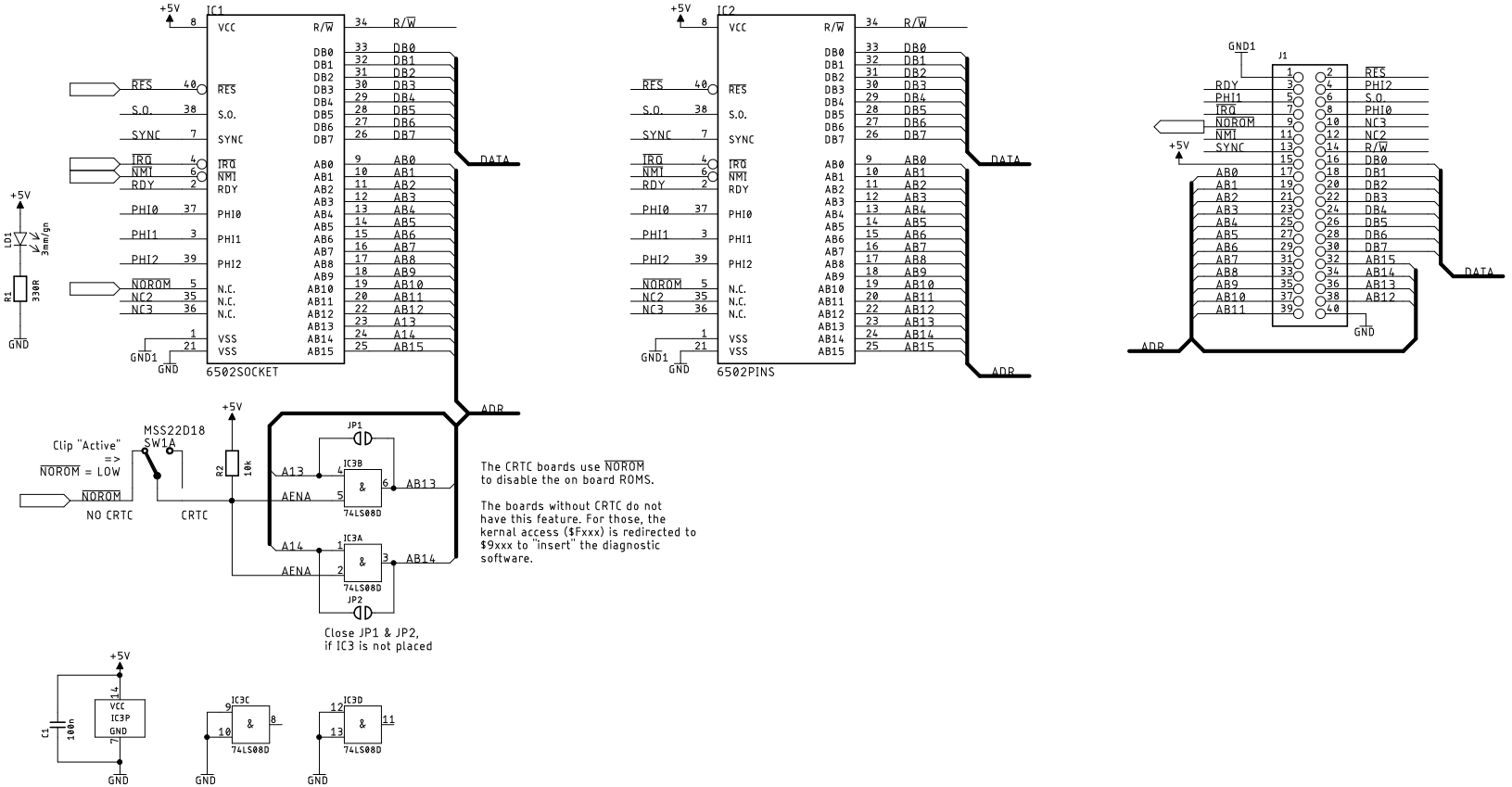
Revision History

Rev. 0

- Working prototype

Rev. 1

- Tested good with Diagnostic Clip Board Rev. 2



open source hardware

Title:	6502 Diagnostic Ribbon Cable Adapter	Doc.-No.:	162-1-01-01
		Draft.:	Sven Petersen
Date:	01.01.2023 22:02	Rev.: 1	Page 1/1
File:	6502_cable_ada		
	http://github.com/svenpetersen1965		A3

Sven Petersen 2023	Doc.-No.: 162-2-01-01	
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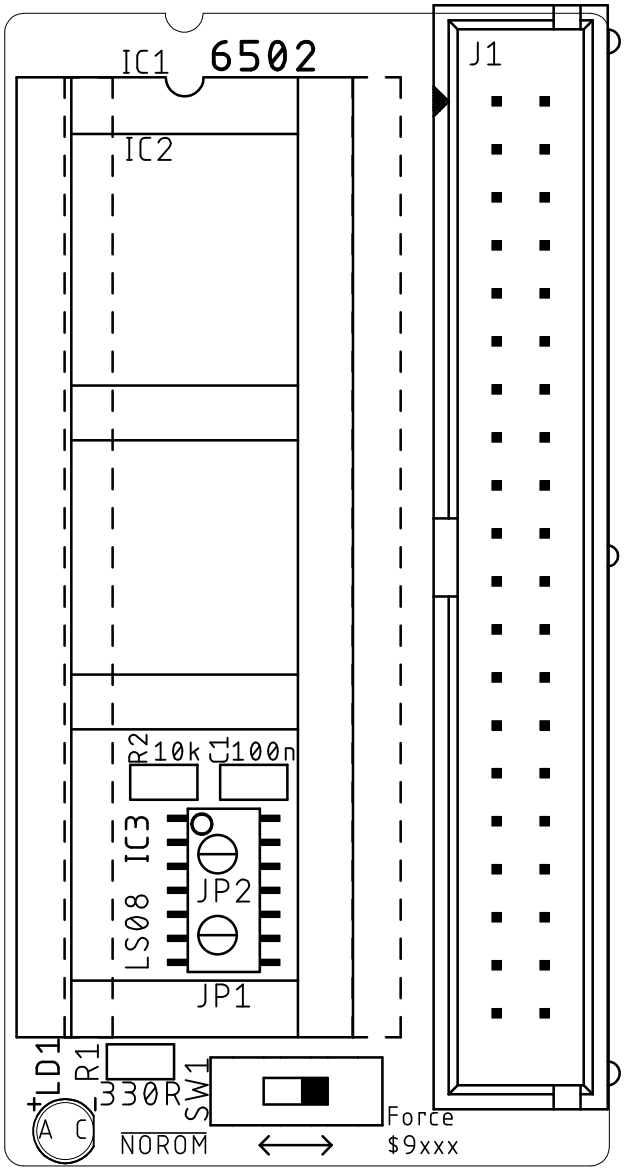
6502_cable_ada		
01.01.2023 22:14		Rev.: 1
placement component side		



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Sven Petersen 2023	Doc.-No.: 162-2-01-01	
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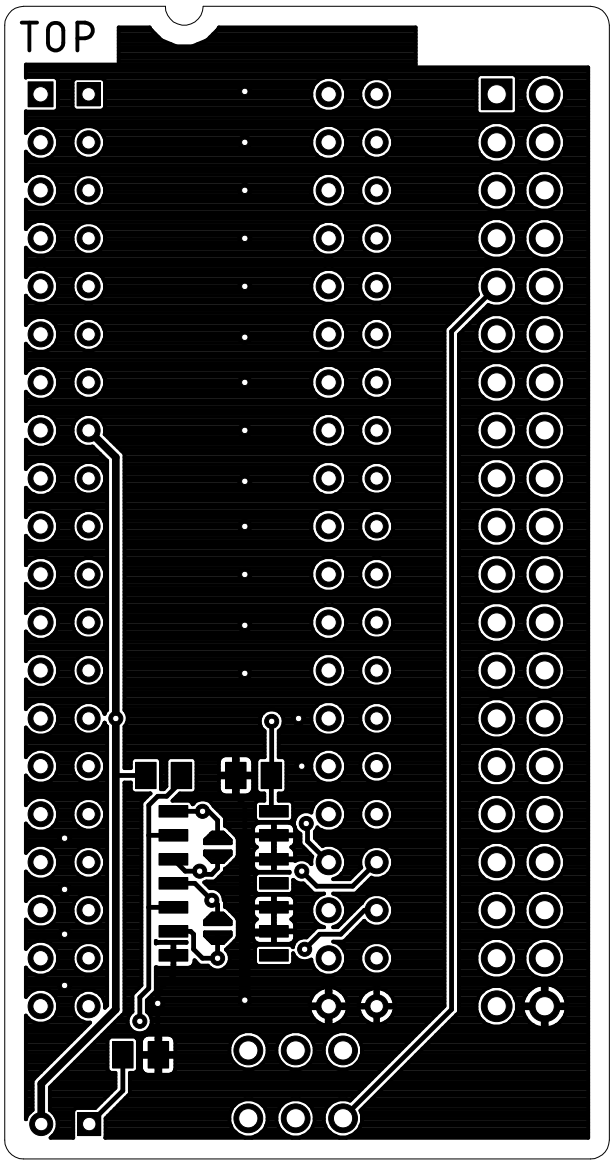
01.01.2023 22:14		Rev.: 1
top		



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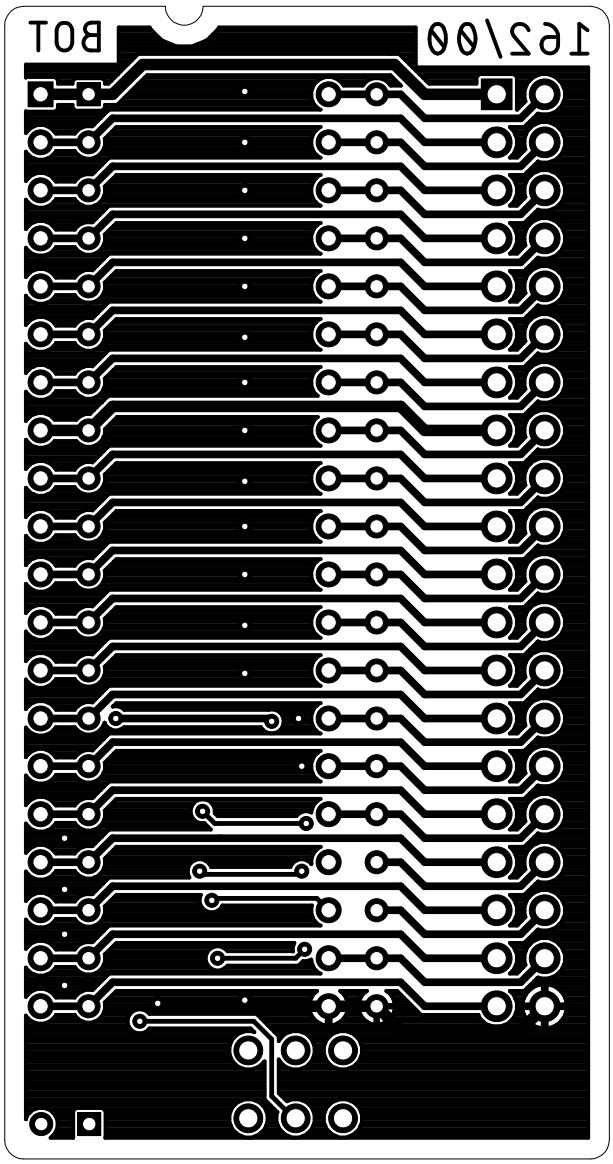
bottom	[redacted]	



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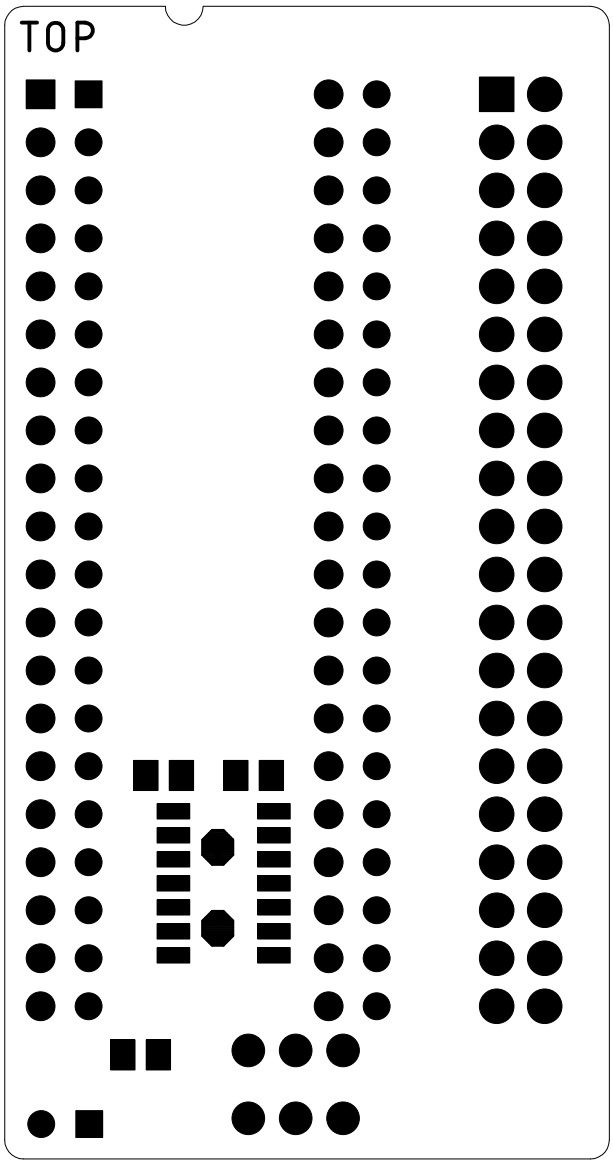
01.01.2023 22:14		Rev.: 1
stopmask component side		



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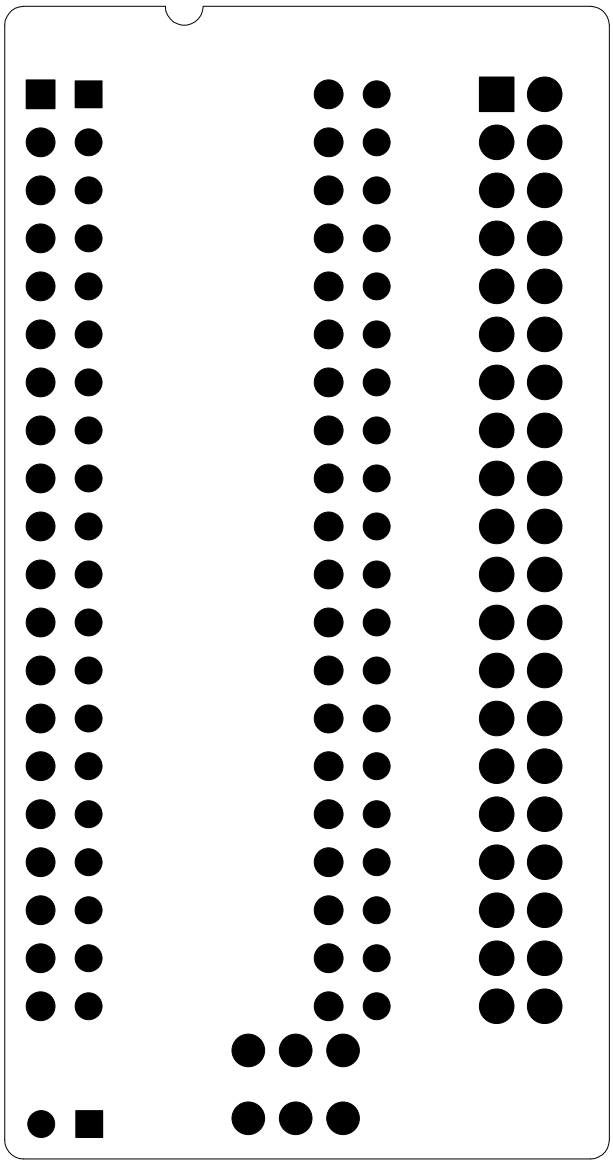
01.01.2023 22:14		Rev.: 1
stopmask solder side		



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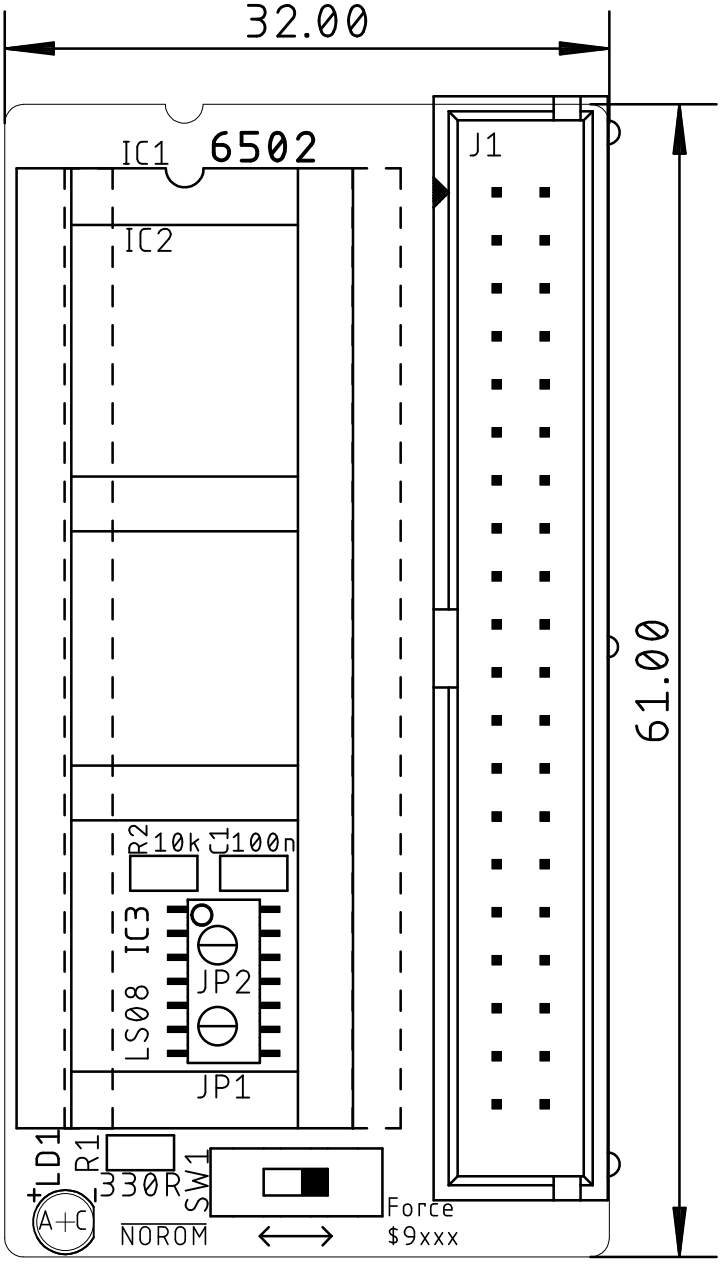
01.01.2023 22:14		Rev.: 1
placement component side measures		



Commodore PET Diagnostic Clip: 6502 Ribbon Cable Adapter Rev. 1
Bill of Material Rev. 1.0

Pos.	Qty	Value	Footprint	Ref.-No.	Comment
1	1	162-2-01-01	2 Layer	PCB Rev. 1	2 layer, Cu 35µ, HASL, 61.0mm x 32.0mm, 1.6mm FR4
2	1	2x20 box header, 2.54mm pitch	2X20WV	J1	2x20, box pin header or standard pin header, e.g. reichelt.de WSL 40G
3	1	330R	0805	R1	SMD, 1/8W, 5%
4	1	3mm/gn	3MM	LD1	standard LED 3mm/green
5	1	6502PINS	DIL40_PINS_SS	IC2	Precision round pin header, e.G. bkl-electronic.de Art.-Nr. 10120540, Reichelt BKL 10120540
6	1	DIP40 socket	GS40P	IC1	Socket for 6502
7	1	10k	0805	R2	SMD, 1/8W, 5%
8	1	100n	0805	C1	SMD
9	1	74LS08D	SO-14	IC3	SMD IC, e.g. TI
10	1	mini slide switch, 2.54mm, DPDT, through hole		SW1	Ali Express, ebay, Amazon, search term "MSS22D18", see module description

Rev. History

Rev. 1

Pos	3	now 0805
Pos	7	new
Pos	8	new
Pos	9	new
Pos	10	new