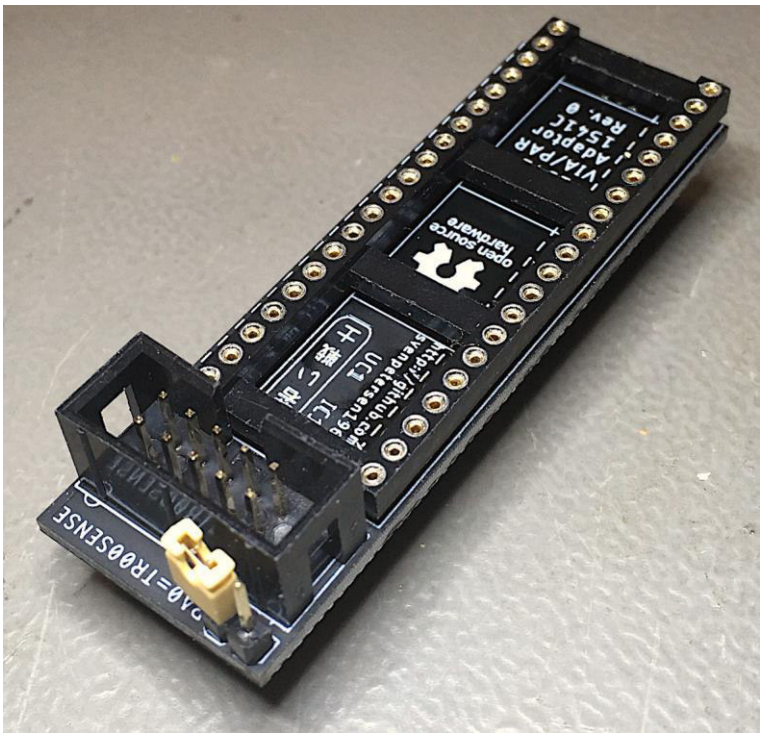
Project Documentation

Commodore 1541 VIA/Parallel-Adapter

Project number: 178

Revision: 0

Date: 10.04.2021



Commodore 1541 VIA/Parallel-Adapter for 1541C Rev. 0

Module Description

Introduction

This adapter board serves as a VIA (6522) adapter for a parallel connection for SpeedDOS in conjunction with a suitable ribbon cable and the User Port Parallel-Adapter (Project 150).

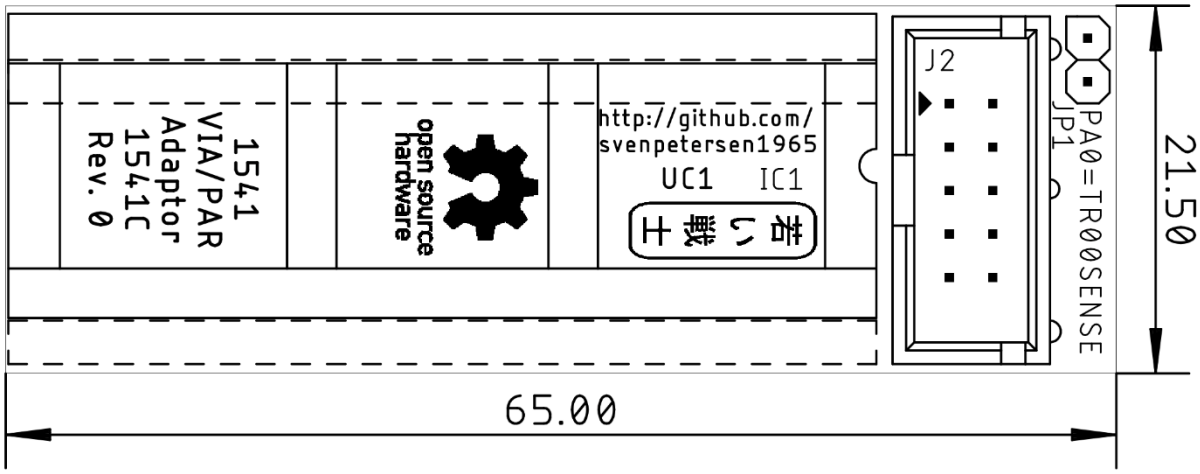


Figure 1: Dimensions

The box connector (2x5 way, 2.54mm pitch) has the following pinout:

VIA (pin)	J2	J2	VIA (pin)
CA2 (39)	1	2	PA0 (2)
PA1 (3)	3	4	PA2 (4)
PA3 (5)	5	6	PA4 (6)
PA5 (7)	7	8	PA6 (8)
PA7 (9)	9	10	CB1 (18)

The via for the parallel data transmission in a 1541C is **UC1**. The Jumper **JP1** connects the signal PA0 to the signal TR00SENSE, which is (probably) required for the original firmware.

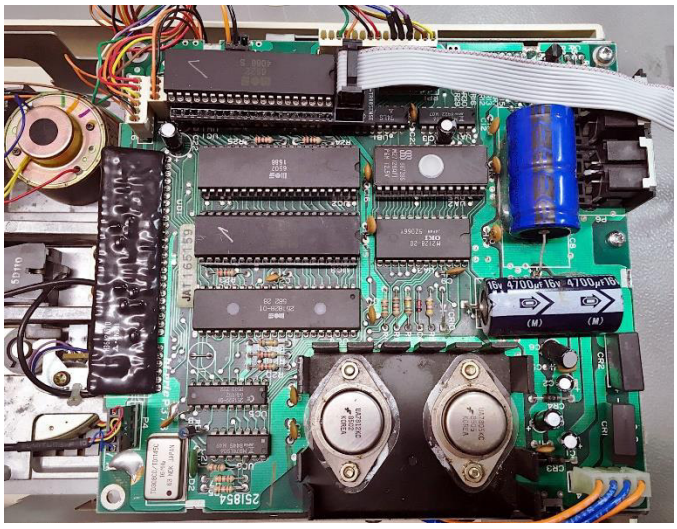


Figure 2: : VIA-Parallel-Adapter installed in a 1541C

Installation

Three issues have to be taken care of, when installing the VIA-Parallel-Adapter:

- The VIA (UC1) should be socketed
- The adapter has to be oriented properly (align the notch of the IC, the adapter and the socket on the 1541C PCB
- The pins of box connector on the solder side must not make contact with any component leads

The latter issue can be caused by the leads of a 100n capacitor, which can be replaced with a smaller, modern capacitor. The adapter has to sit firmly in the socket, though.

The ribbon cable has two 2x5 (ribbon cable) IDC connectors. The one, that goes inside the 1541C is the one without a strain relief. The header connecting to the User Port Adapter does require the strain relief, though.

It is a good idea to secure the ribbon cable with an adhesive cable post and a cable tie for strain relief, after the configuration is fully functional. A ribbon cable exiting the case through the breakout for the fuse is pretty common, I did not experience any problems with it, but one person reported a possible source of problems, here.

An alternative way of exiting the case is the left side of the case. A breakout for the ribbon cable has to be filed into the case, though.

The cable making with IDC connectors does not require any special tools, except a (small) vice for compressing the connector after the ribbon cable was inserted properly. In case you don not feel comfortable with this work, consult this write up about cable making: http://tech.guitarsite.de/cable_making.html#Ribbon%20Cables

Assembly

The Assembly of the VIA-Parallel-Adapter is fairly simple. The precision round pin headers on the solder side need to be aligned to be straight and in the proper distance. For this purpose, the cut strips have to be inserted into the DIP-socket before soldering. Their alignment needs to be checked. They should be fully inserted into the socket and the PCB should be perpendicular. After soldering the pin stripes, the DIP-40 socket can be removed and soldered in on the top side. Some of soldered pins of the pin strips might require to be shortened. The DIP-40 socket should sit straight on the PCB.

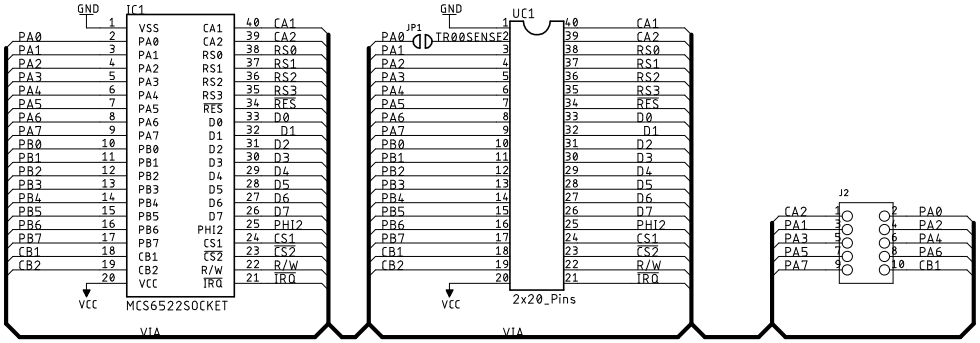
Finally, the box connector can be soldered.

The pins of the precision pin strips are pretty delicate and brittle. They should not be bent much, so care must be taken before and while installing them in the socket of the 1541. Square headers must not be used instead, because those might break the sockets and do not sit well in the socket, either.

Revision History

Rev. 0

- Prototypes preliminarily tested in a 1541.



VIA	USER PORT
CA2	B FLAG2
CB1	8 PC2
PA0	C PB0
PA1	D PB1
PA2	E PB2
PA3	F PB3
PA4	H PB4
PA5	J PB5
PA6	K PB6
PA7	L PB7

open source hardware

Title:	VIA Parallel Adapter Commodore 1541C	Doc.-No.:	178-1-01-00
		Draft.:	Sven Petersen
Date:	10.04.2021 16:52	Rev.: 0	Page 1/1
File:	VIA_PAR_Adapter_1541C		
	http://github.com/svenpetersen1965		A3

Sven Petersen 2021	Doc.-No.: 178-2-01-00	
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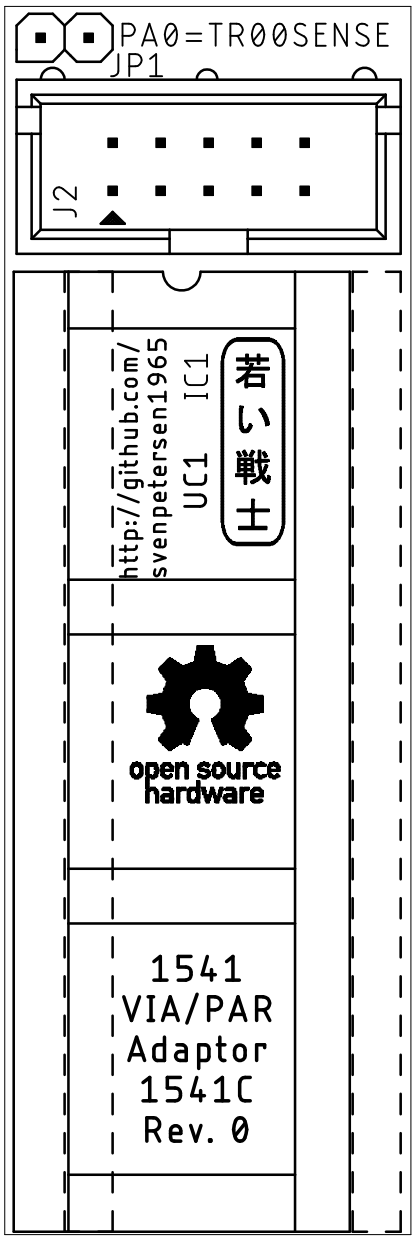
VIA_PAR_Adapter_1541C		
10.04.2021 22:35		Rev.: 0
placement component side		



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VIA_PAR_Adapter_1541C		
10.04.2021 22:35		Rev.: 0
placement solder side		

Sven Petersen 2021	Doc.-No.: 178-2-01-00	
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VIA_PAR_Adapter_1541C		
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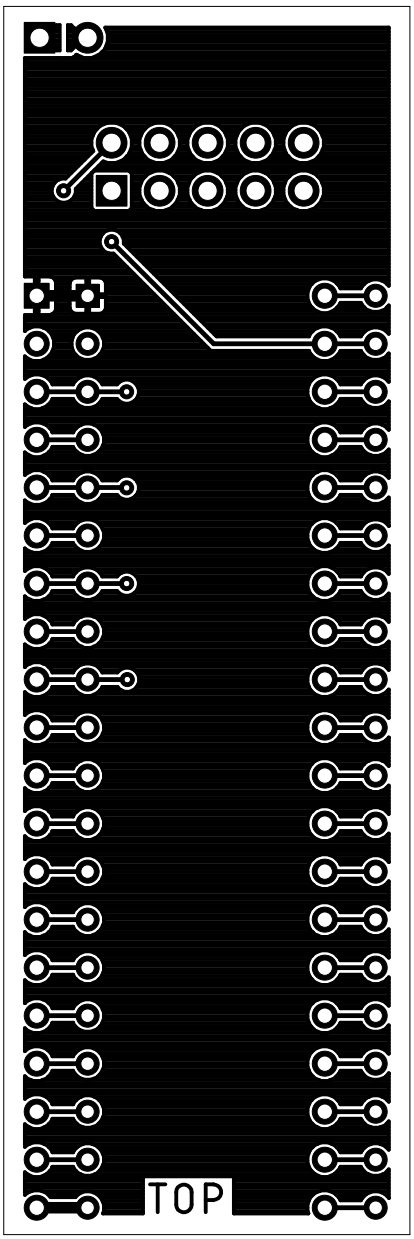

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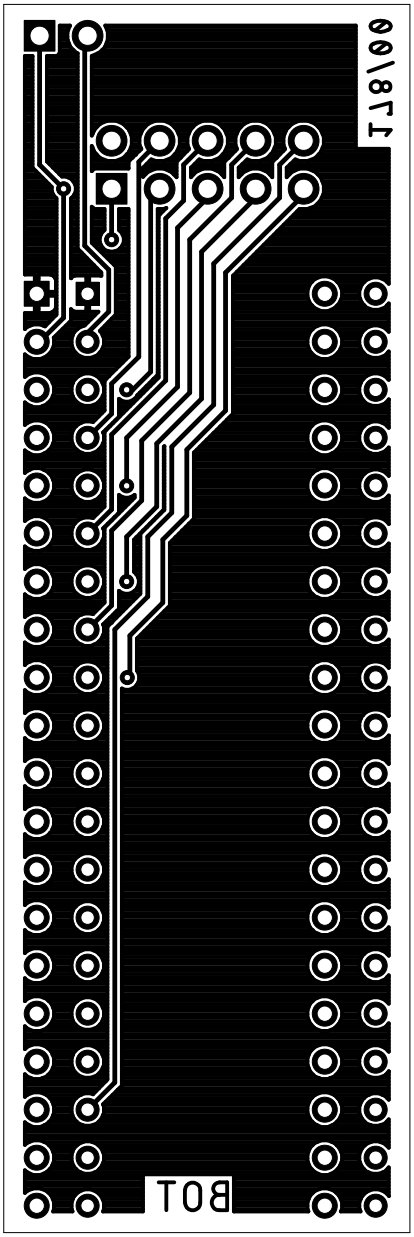

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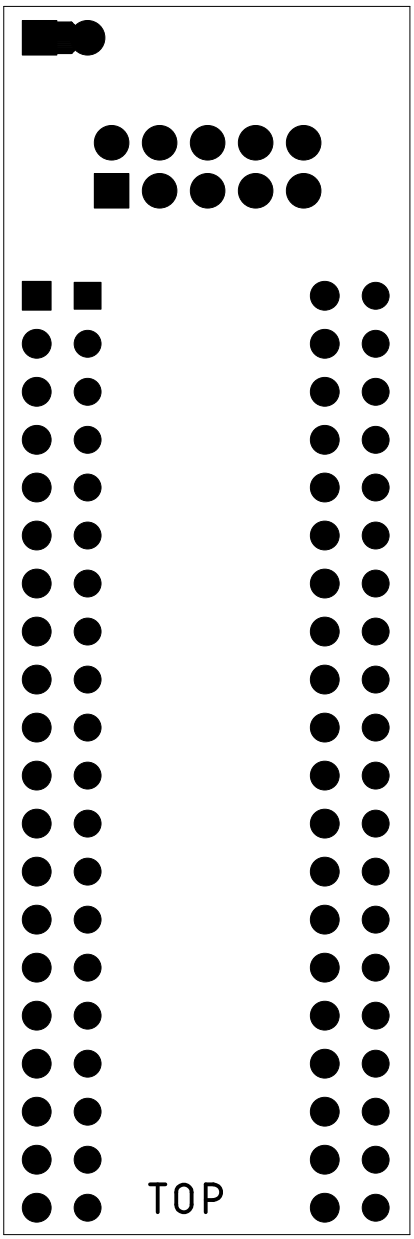
VIA_PAR_Adapter_1541C		
10.04.2021 22:35		Rev.: 0
stopmask component side		



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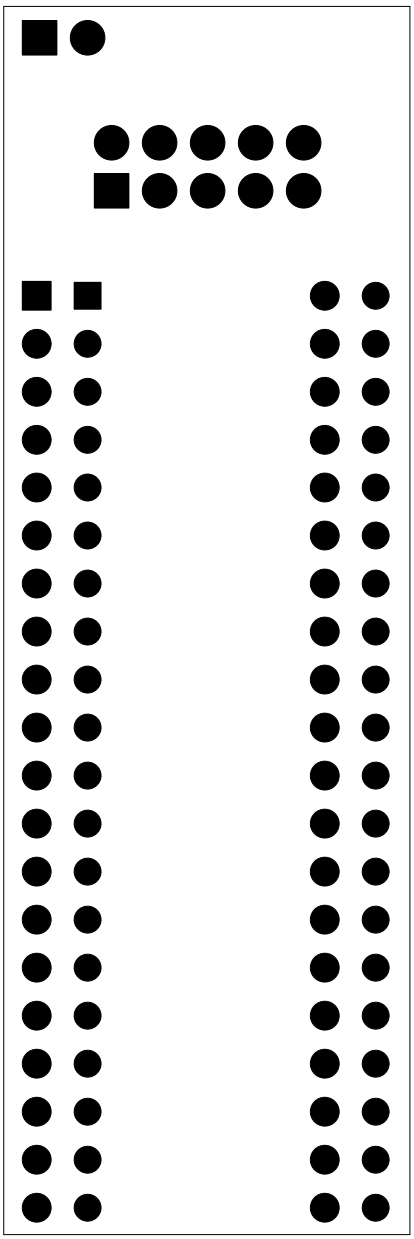
stopmask solder side		



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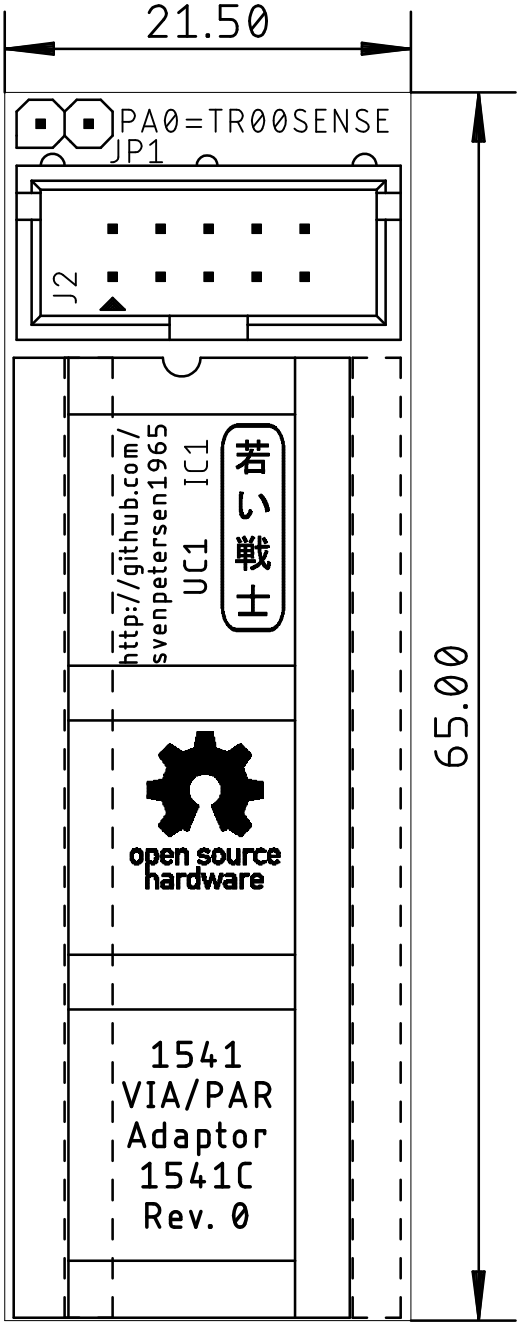
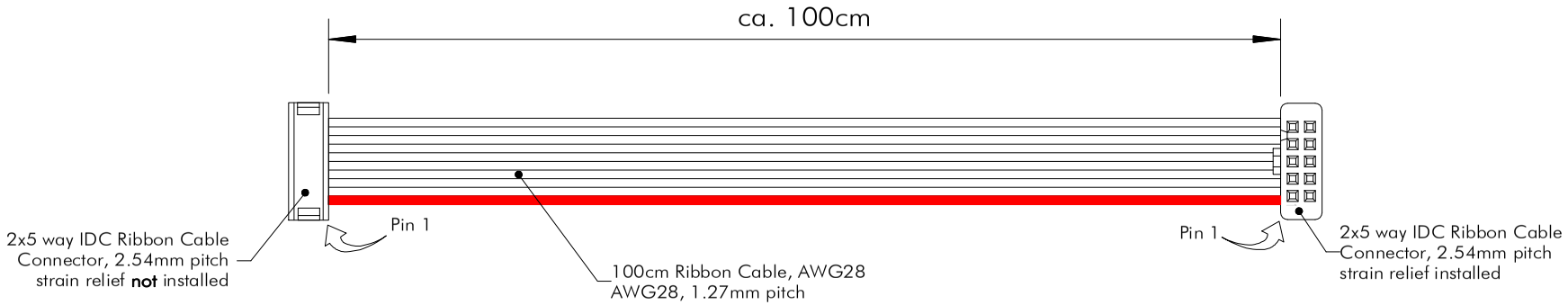
10.04.2021 22:35		Rev.: 0
placement component side measures		





open source hardware	Titel: VIA-Parallel Adapter 1541/Parallel Cable	Bearb.: Sven Petersen
		Datei: ParCab.SKF
	Dok.-Nr.: 178-3-01-00	Rev.: 0
	Datum: 07.05.2021 16:22	M 1 mm = 1 mm
https://github.com/svenpetersen1965		

Commodore 1541 VIA/Parallel-Adapter for 1541C Rev. 0

Testing

Test Setup

- VIA/Parallel-Adapter for 1541C Rev. 0
- 1541C (not operational) for mechanical testing
- 1541 with SpeedDOS Kernal v2.7
- C64 with SpeedDOS v2.7
- User Port Parallel Adapter for the 1541/1541-II Rev. 0

Test Execution

The Parallel Adapter for the Commodore 1541C was installed in a 1541C. It has fit without a problem and no (mechanical) modifications of the drive have been required.

The strain relief of the (2x5) IDC ribbon cable header has been slightly too high. While closing the case of the 1541C, the adaptor was dislocated. It is required to install the parallel cable without this strain relief.

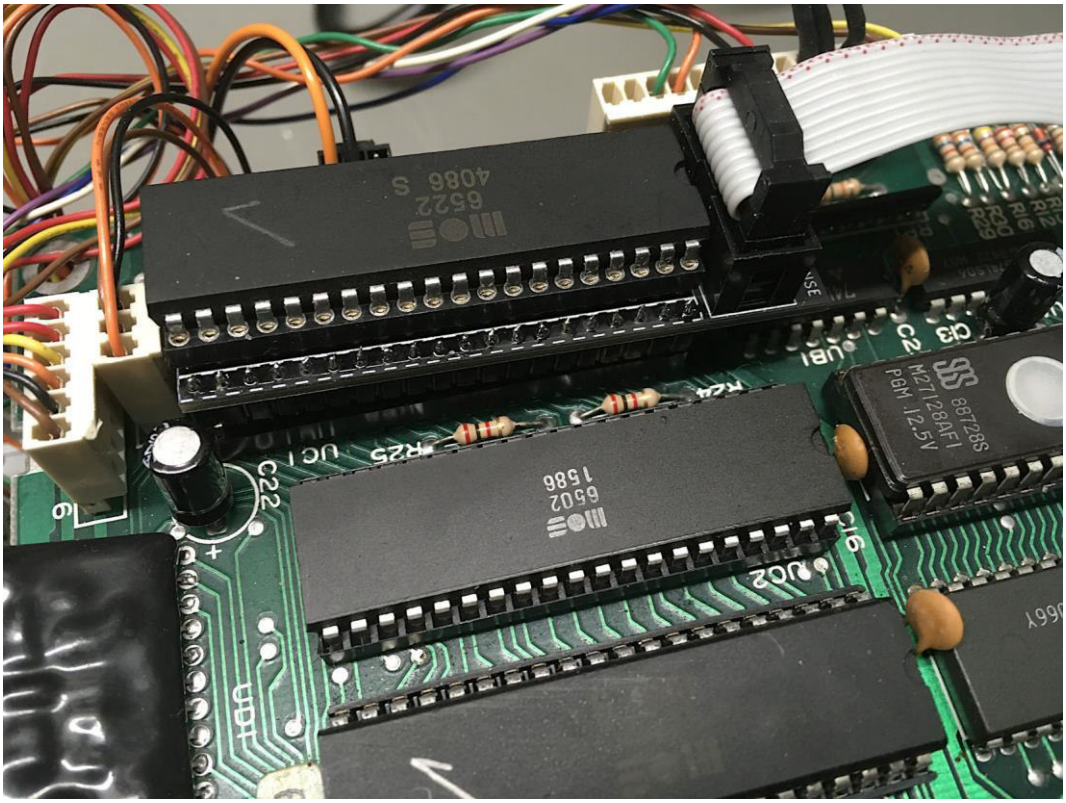


Figure 1: Installation in a 1541C

Due to a lack of a working 1541C, the adapter was installed in a 1541. Since it is not designed to fit into the 1541, a DIP40 socket was required to fit the adapter for the test. Closing the lid of the 1541 was not possible, but this is not withing the scope of this development.

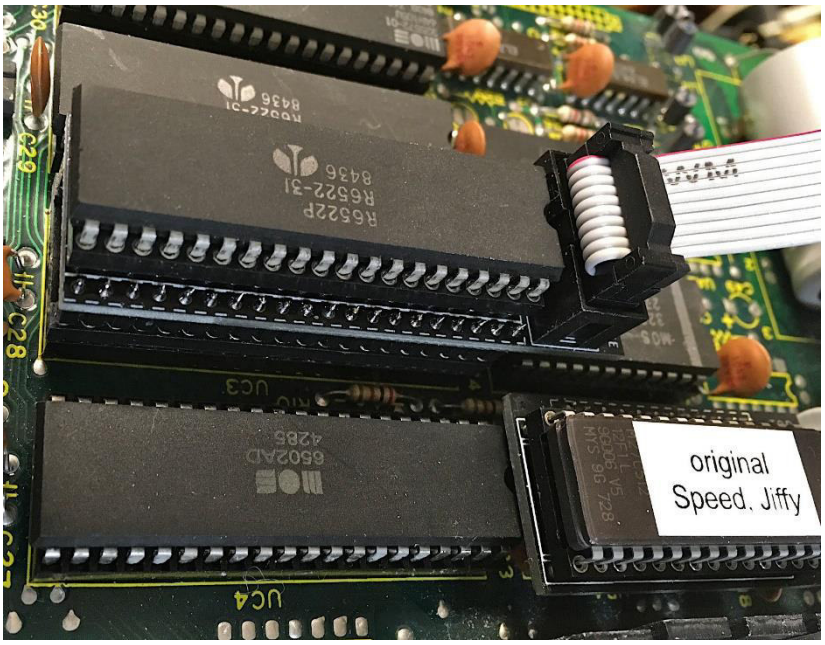


Figure 2: Installation in a 1541 for electrical testing

The game “Vengeance” was loaded from floppy disk with the parallel cable connected to the C64 via the User Port parallel adapter. This required 22.8 seconds.

Figure 3: Loading Vengeance

Now, the parallel cable was disconnected and both SpeedDOS Kernals (1541 and C64) were replaced by the original Commodore Kernals.

Loading “Vengeance” required 160.2 seconds (7 times as long).

Conclusion

The final test in a 1541C has still to be conducted, but the likelihood is close to 100%, that this will work. Probably, the jumper JP1 has to be opened.

Commodore 1541 VIA/Parallel-Adapter for 1541C Rev. 0
Bill of Material Rev. 0.0

Pos.	Qty	Value	Footprint	Ref.-No.	Comment
1	1	178-2-01-00	2 Layer	PCB Rev. 0	2 layer, Cu 35µ, HASL, 65.0mm x 21.5mm, 1.6mm FR4
2	1	2x5 box connector	2X05WV	J2	e.g. Reichelt WSL 10G
3	1	two Pinstrip, precision round pins, cut to 20 pins length	DIL40_PINS_SS	J1	Precision Round pins **mandatory**! E.g. Reichelt BKL 10120540 or
4					10PCS Single Row 40Pin 2.54mm Round Male Pin Header machined
5	1	40p DIP Socket	GS40P	IC1	Dual In Line Socket, e.g. Reichelt: GS40P
6	1	Pinheader 2.54mm		JP1	optional for original firmaware
7	1	Jumper 2.54mm		(JP1)	optional for original firmaware
8	2	10p IDC receptable, 2,54mm		(J2)	e.g. Reichelt RND 205-00682
9	1m	10p/AWG28/1,27mm			Ribbon cable. See drawing 148-3-01-**