Project Documentation

Commodore VIC-20 A/V-Adapter

Project number: 185

Revision: 0

Date: 18.07.2021

Commodore VIC-20 A/V-Adapter Rev. 0

Module Description

Introduction

The VIC-20 A/V-Adapter serves as a breakout module for the 5-pin A/V jack, which allows using off the shelve cables of desired length and quality for connecting the VIC-20 to video/audio equipment.
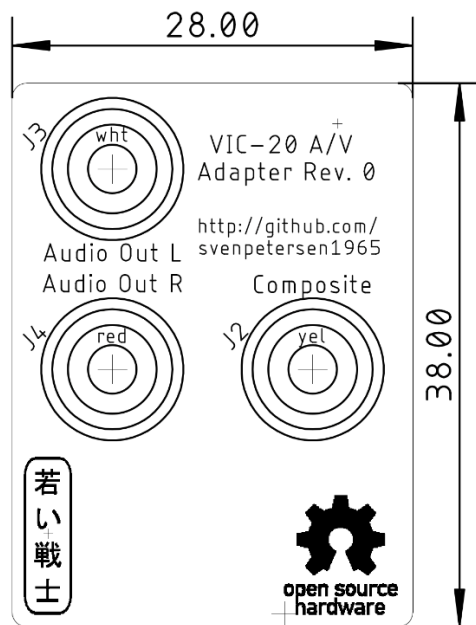

Figure 1: Dimensions of the PCB

The two audio jacks (Audio L and Audio R) are connected to the same signal, the (mono) Audio Out of the VIC-20.

A 3D printable case can be found in the project folder as well as a label for this case.

Figure 2: 3D printed case and assembled PCB

Connectors

A/V-Plug – J1
The A/V-Plug for the VIC-20 is the inner part of a Lumberg SV 50 DIN-Plug (180°).

Pin	Signal
1	n.c.
2	GND
3	Audio Out (mono)
4	Composite Video
5	n.c.

RCA-Jacks – J2, J3, J4

Connector	Signal
J2	Composite Video
J3	Audio Out L (mono!)
J4	Audio Out R (mono!)

The DIN-Plug
The DIN-Plug is an **essential part** of this development. It is the inner part of a Lumberg SV 50 connector, which is not cheap, but it is definitely worth the money, since the flange is taking the forces introduced by the weight of the adapter and the cables. This way, the set-up is not hanging from the contacts, which might even damage those. Do not use a cheap connector without a flange, here.

Assembly
First, the DIN connector has to be soldered. The pins should be aligned flush to the top side of the PCB. This can be accomplished by putting the PCB top down on a heat resistant, flat surface. Then solder one pin from the top (the solder pads are shaped in a way, that allows doing so), check, if it is really flush and the connector is perpendicular to the board, then solder the remaining pins.
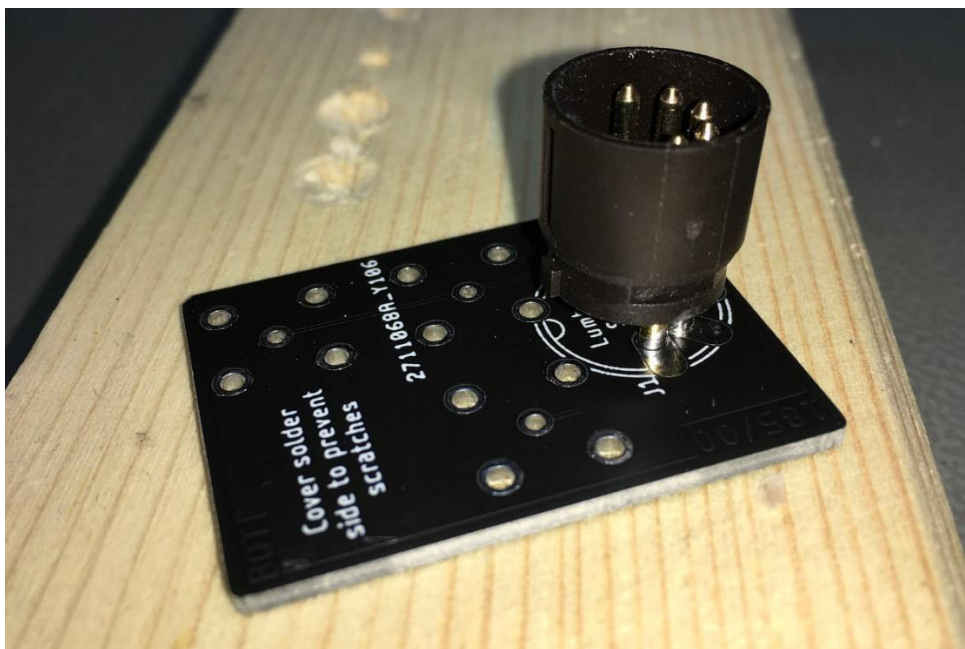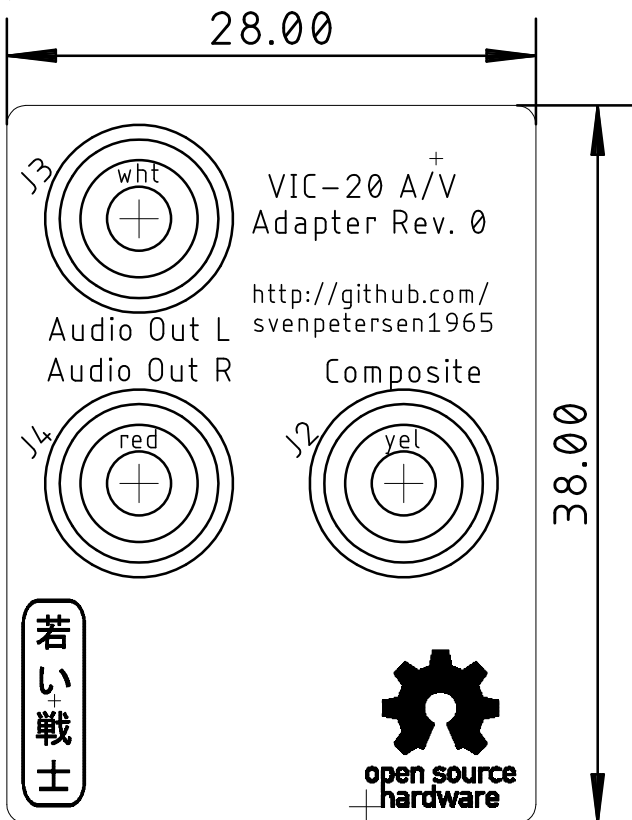

Figure 3: Aligning the DIN-Connector

Now, place and solder the RCA jacks. They should be well aligned, too. The ground pins might require more energy to be soldered, so the use of a thick solder tip is recommended and may be even a higher temperature (450°C). After soldering, the pins should be trimmed (shorter than 1.5mm), so they fit into the 3D-Printed case. If you do not use a case, cover the pins with something like duct tape or small drops of hot glue to prevent scratching the case of your VIC-20.
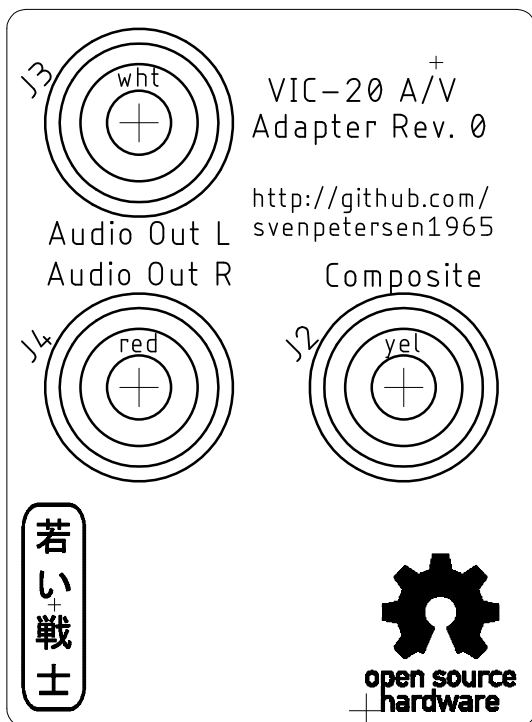
Compatibility
The adapter also fits the C64 (in case S-Video is not required), especially the first C64 model with the 5-pin A/V-jack (this does not have the S-Video outputs). The same is for the C16. The A/V-Adapter does not work for the C128, since it blocks the serial bus. The adapter was successfully tested with an Atari 800XL.
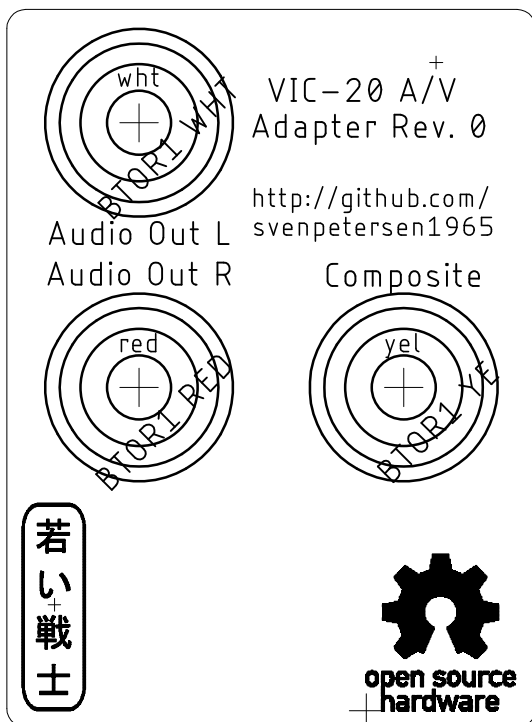
A1
A2
A3
A4
GND
J3
BTOR1 WHT

A1
A2
A3
A4
GND
J4
BTOR1 RED

AUDIOOUT

A1
A2
A3
A4
GND
J2
BTOR1 YE

COMPOSITE

SV50
J1
AUDIOOUT
COMPOSITE
GND

28.00

38.00

J3 wht

Audio Out L

VIC-20 A/V
Adapter Rev. 0

http://github.com/
svenpetersen1965

Audio Out R

J4 red

Composite

J2 yel

若い戦士

open source
hardware

Sven Petersen 2021	Doc.-No.: 185-2-01-01	
	Cu: 35µm	Cu-Layers: 2
VIC-20_AV-Adaptor		
29.06.2021 10:20	Rev.: 1	
placement component side		

J3 wht

Audio Out L

VIC-20 A/V
Adapter Rev. 0

http://github.com/
svenpetersen1965

Audio Out R

Composite

J4 red

J2 yel

若い戦士

open source
hardware

Sven Petersen 2021	Doc.-No.: 185-2-01-01	
	Cu: 35µm	Cu-Layers: 2
VIC-20_AV-Adaptor		
29.06.2021 10:20	Rev.:	1
placement component side		

VIC-20 A/V
Adapter Rev. 0

http://github.com/
svenpetersen1965

wht

Audio Out L
Audio Out R

Composite

red

yel

BTORI_WHT

BTORI_RED

BTORI_YE

若い戦士

open source
hardware

Sven Petersen 2021	Doc.-No.: 185-2-01-01	
	Cu: 35µm	Cu-Layers: 2
VIC-20_AV-Adaptor		
29.06.2021 10:20	Rev.:	1
	placement solder side	

Cover solder
side to prevent
scratches

Lumberg
SV50
3   1
5   4
2
J1

Sven Petersen 2021	Doc.-No.: 185-2-01-01	
	Cu: 35µm	Cu-Layers: 2
VIC-20_AV-Adaptor		
29.06.2021 10:20	Rev.: 1	
top		

TOP
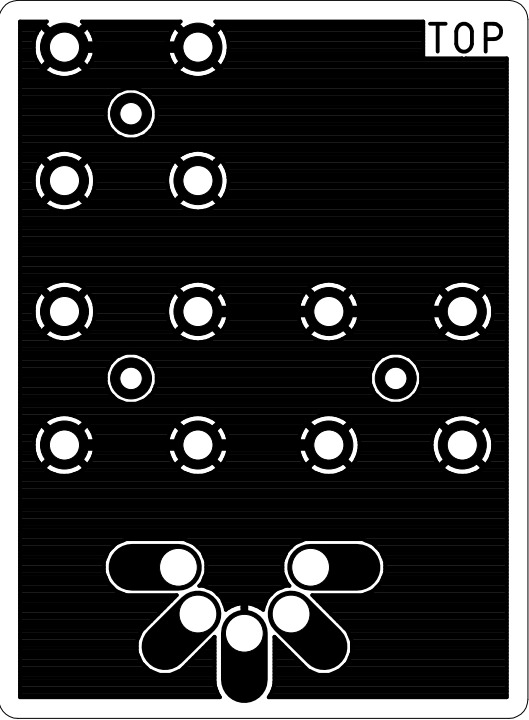
Sven Petersen	Doc.-No.: 185-2-01-01	
2021	Cu: 35µm	Cu-Layers: 2
VIC-20_AV-Adaptor		
29.06.2021 10:20	Rev.:	1
bottom		
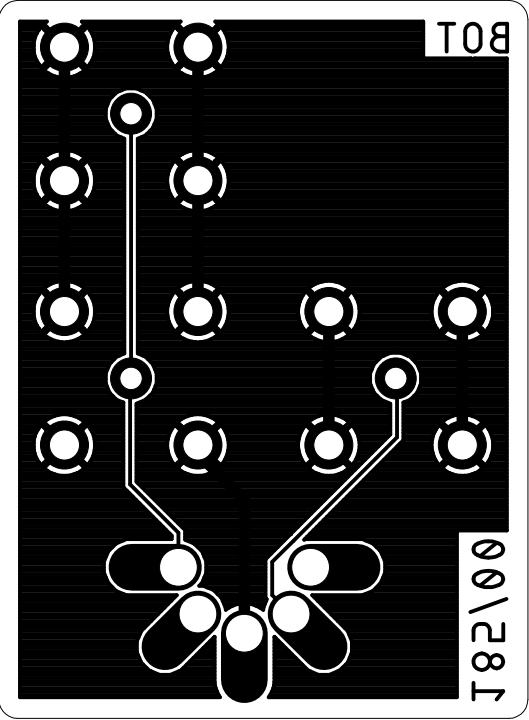
Sven Petersen 2021	Doc.-No.: 185-2-01-01	
	Cu: 35µm	Cu-Layers: 2
VIC-20_AV-Adaptor		
29.06.2021 10:20	Rev.: 1	
stopmask component side		
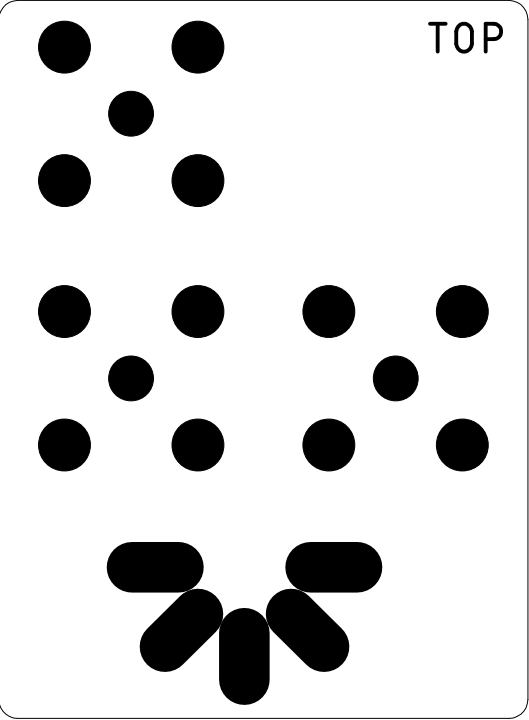
TOP

Sven Petersen	Doc.-No.: 185-2-01-01	
2021	Cu: 35µm	Cu-Layers: 2
VIC-20_AV-Adaptor		
29.06.2021 10:20	Rev.:	1
stopmask solder side		
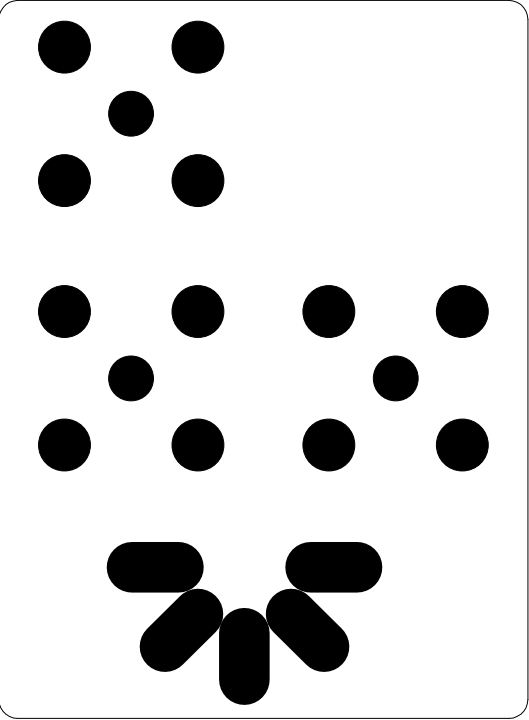
Commodore VIC-20 A/V-Adapter Rev. 0

Test

Test Setup

The tests were executed with a VIC-20 A/V-Adapter Rev. 0. These computers were used for testing:

1. A VickyTwenty (clone of the VIC-20CR) in a plexilaser.de case
2. A two-prong VIC-20 (ASSY No. 324003)
3. A VIC-20CR (ASSY No. ASSY250403)
4. C64 ASSY No. 250469
5. Atari 800XL

None of the computers had a modified video circuitry.

The retroTINK 2x and a Samsung smart TV served as video equipment. A 1.5m RCA A/V cable connected the computer to the video equipment.

Functional Test

The A/V adapter was connected to the computers and the video was displayed properly, the audio could be heard.
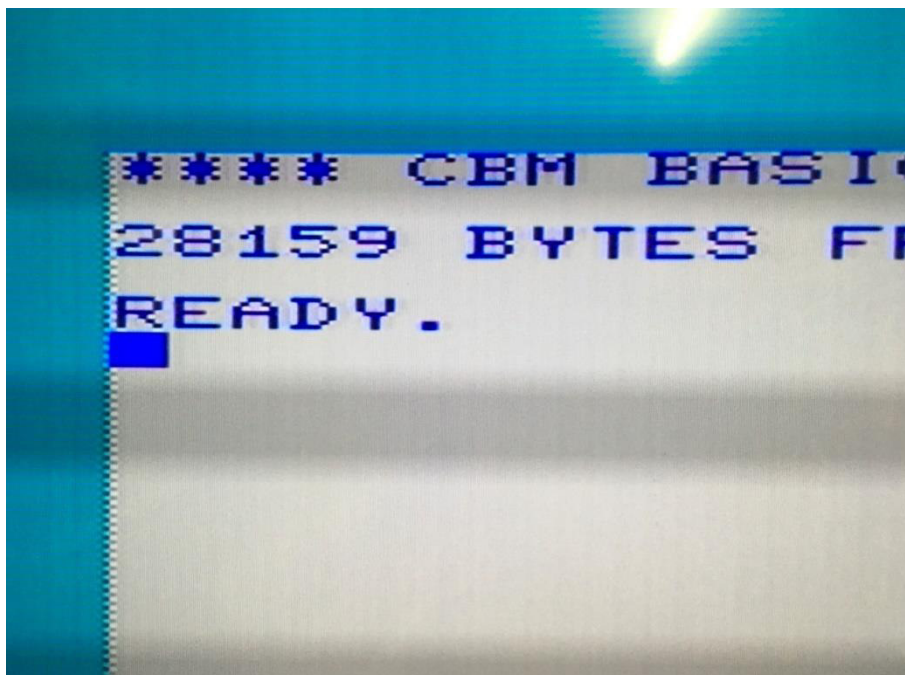

Figure 1: Boot screen of the VIC-20 CR (Hyper Expander RAM expansion installed)

The video quality was as good as it can get with the unmodified VIC-20. The video quality of ASSY No. 324003 is best, next is the Vicky Twenty. The horizontal dark strips are matter of taking a picture of a monitor (=not synchronized). They are not present in the perception of the user.
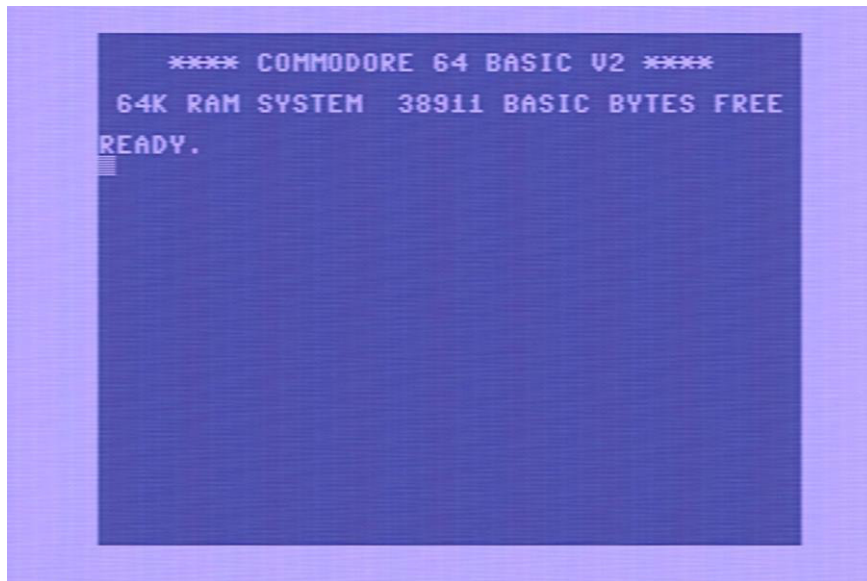
Figure 2: C64 boot screen captured with a (cheap) USB2.0 video grabber

Figure 3: Display of the Atari 800XL

Mechanical Testing

The VIC-20 A/V adapter did not block any port of the said computers.

Figure 4: Testing the adapter with the VickyTwenty (plexilaser.de case)

The A/V-adapter can be inserted far enough in the plexilaser.de case, the connection is stable.

Figure 5: Testing the A/V adapter with a two-prong VIC-20

Again, the connection is stable and no ports are blocked with the ASSY No. 324003 two-prong VIC-20.

Figure 6: Fitting of the A/V-Adapter with a VIC-20CR

Figure 7: Testing the VIC-20 A/V-Adapter with a C64G

The A/V-adapter is not blocking any port on a C64 (C64G with an ASSY No. 250469 short board).
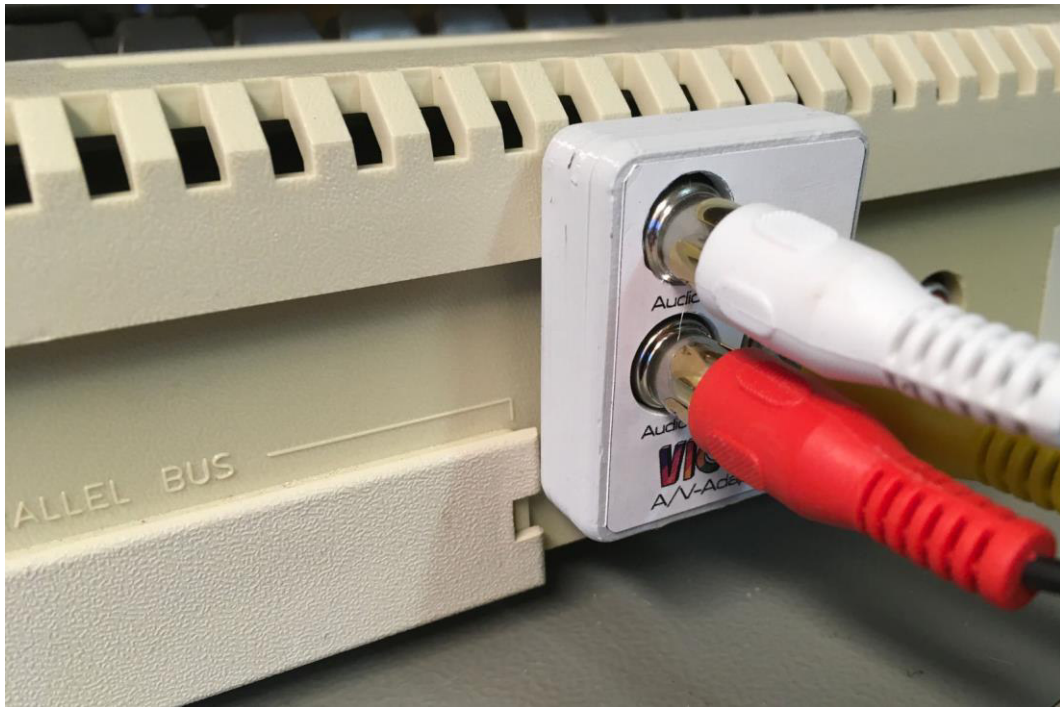
Figure 8: Testing the VIC-20 A/V-Adapter with an Atari 800XL

The A/V-adapter fits the Atari 800XL, not perfectly due to the step in the case above the ports, but it still provides a stable connection and it does not block the ports. Since no parallel port equipment was available, this was not tested.

Conclusion

The VIC-20 A/V-Adapter works well with different equipment. The video quality depends very much on the used video equipment. The video adapter will not improve the picture of the computers, since it is passive only, but since it allows to use good, off the shelve cables, it is superior to most hand-made custom cables.

The VIC-20 A/V-Adaptor Rev. 0 is fully functional.

VIC-20 A/V-Adaptor Rev. 0
Bill of Material Rev. 0.0

Pos.	Qty	Value	Footprint	Ref.-No.	Comment
1	1	185-2-01-00	2 Layer	PCB Rev. 0	2 layer, Cu 35µ, HASL, 38.0mm x 28.0mm, 1.6mm FR4
2	1	BTOR1 RED	BTOR1	J4	Lumberg, RCA jack, vertical, red. E.G. Reichelt LUM BTOR1 RT, Farnell: 1368644, Newark: 53M6863, TME.eu: BTOR1R
3	1	BTOR1 WHITE	BTOR1	J3	Lumberg, RCA jack, vertical, white. E.G. Reichelt LUM BTOR1 WS, Farnell: 1368645, Newark: 53M6864, TME.eu: BTOR1W
4	1	BTOR1 YELLOW	BTOR1	J2	Lumberg, RCA jack, vertical, yellow. E.G. Reichelt LUM BTOR1 GE, Farnell: 1368642, Newark: 53M6865, TME.eu: BTOR1Y
5	1	SV50	SV50_INNER	J1	Inner part of Lumberg SV 50 (SV 50-8), e.G. Reichelt: LUM SV 50, Newark: 82AH3339 , Farnell: 3549652, TME.eu: SV50, alliedelec.com: 70151556