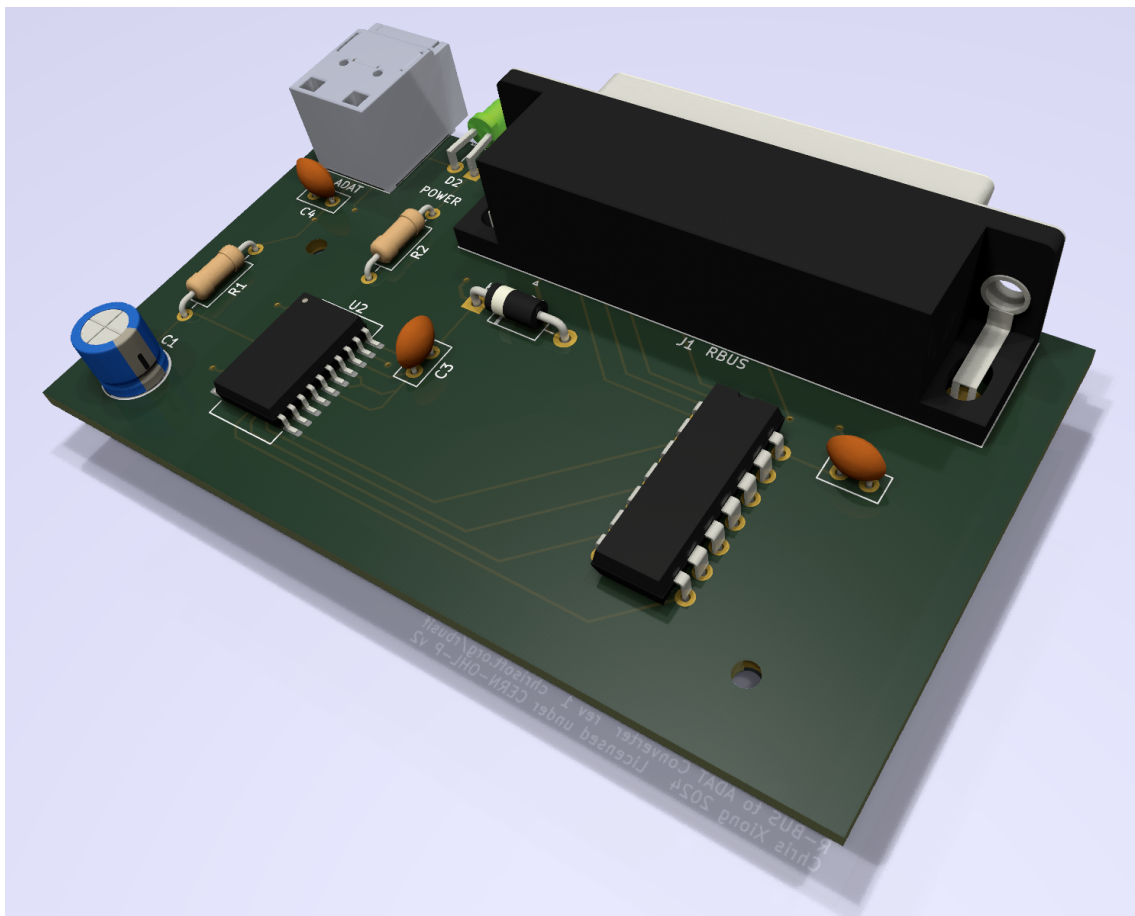


# RBUS-ADAT User Manual



This version of the manual is for **revision 1** of the board.

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## Chapter 1: Preface

If you are reading this, chances are you have become an unfortunate test subject of the RBUS-ADAT conversion board (or have the nerves to think about becoming one). Well, here is (almost) everything you will want to know about the board. If you want to learn about some less useful information about this thing, consider checking out the devlog, which can be found by following the link to the project homepage listed under “Useful links”.

As this manual is written as if it’s a blog post, which is prone to being very rambling, I’ll try to keep the rambling low, at least make an attempt to do so.

Pictures in this manual are renders (computer-generated) and are for illustration purposes only.

**This product is neither affiliated with or endorsed by Roland Corporation. Roland does not approve connecting unofficial accessories to proprietary Roland interfaces.**

Visit [chrisoft.org/rbusif](https://chrisoft.org/rbusif) for any future updates to this manual and the hardware.

## Chapter 2: NO WARRANTY

THIS BOARD IS HOMEBREW AND EXPERIMENTAL HARDWARE. THERE IS NO WARRANTY FOR THIS HARDWARE, INCLUDING ITS DESIGN AND THE FINISHED PRODUCT, TO THE EXTENT PERMITTED BY APPLICABLE LAW. THE DESIGNER SHALL NOT BE HELD LIABLE FOR ANY DAMAGE CAUSED BY USING THIS HARDWARE, UNLESS REQUIRED BY APPLICABLE LAW.

For the full legalese text on warranty and liability, please refer to the [license text](#).

If this board fried your equipment, don’t try to extract anything from me. That’s what this section is trying to say.

## Chapter 3: Open hardware

This board is open hardware licensed under the [CERN Open Hardware Licence Version 2 - Permissive](#) license. Feel free to make as many of this board as you wish and sell them, as long as you follow the terms.

Contributions welcome and will be appreciated. If you have any suggestions to improve the board, please feel free to contact the author. The author’s contact information can be found on the project homepage.

## Chapter 4: Safety notice

There’s no enclosure for this board. As a result there would be exposed conductors on both sides of the board. You’re advised to take measures to prevent them from shorting out. You may try any combination of the following:

- Placing the board on a non-conductive surface.
- There are two M2 mounting holes in the board. Using two M2 screws and nuts, install a plastic sheet (or cardboard even) under and / or over the board.
- Don’t use the board at all. Don’t even think about it.

Again, if you fried your equipment while using this board, it’s all your fault. I mean not really – I would still want to know what happened. But it’s all your fault.

## Chapter 5: Intended usage and applicable devices

RBUS-ADAT is designed for use with the Roland XV-5080. It converts the 8 digital outputs exposed by XV-5080's R-BUS port to a standard ADAT lightpipe stream which can be recorded with any audio interface with an ADAT input.

The ADAT output from this converter is 20-bit and has the same sampling rate as the input supplied from the R-BUS port.

This converter **cannot**:

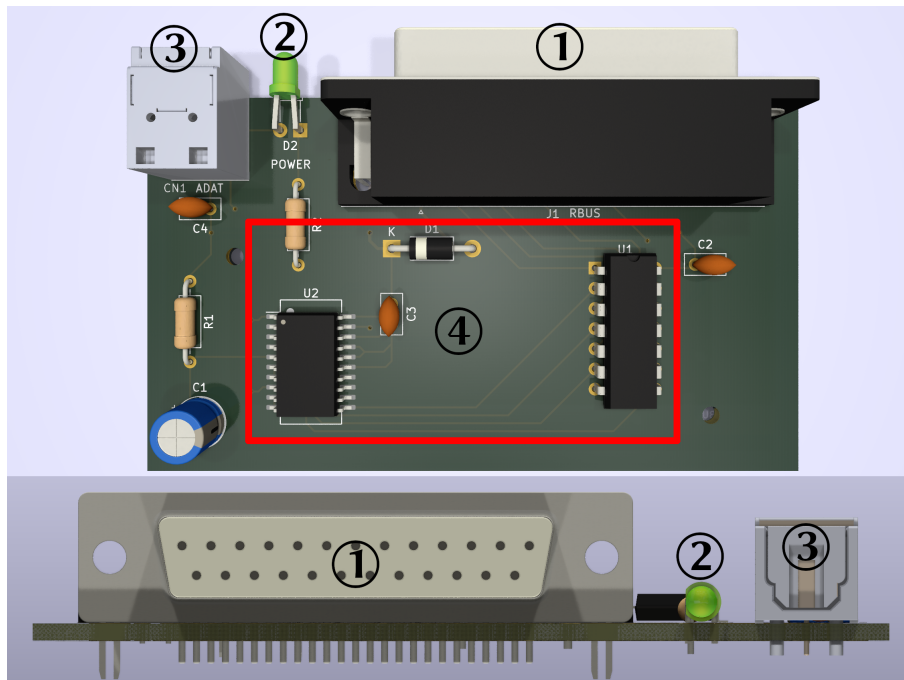
- Convert ADAT back to R-BUS input. i.e. you can't record an ADAT stream on a V-Studio through R-BUS with this converter.
- Serve as a clock source for the connected R-BUS device. You should always select "internal" as the clock source for the connected R-BUS device.
- Expose the MIDI interface on the R-BUS port.

The converter is designed and tested with the XV-5080. In addition, the only audio interface that has been verified to work is Focusrite Scarlett 18i8 3rd gen. I don't have the resources to test other devices.

The converter has not been tested against VM- or VS- devices that feature RMDB 2 / R-BUS ports or MV-8x × × fitted with the MV8-OP1 expansion but may still work as a unidirectional converter as intended. If you decide to try this converter with these devices, reporting the results would be appreciated.

The converter is not compatible with devices with the older RMDB port.

## Chapter 6: What's on the board



1. **R-BUS DB-25 Connector.** See "Choosing a suitable cable" for what you should and shouldn't plug into this connector.
2. **Power indicator.** Illuminates if the board is receiving power.
3. **ADAT Lightpipe output.** Connect to a device capable of recording ADAT data stream with a TOSLINK cable.
4. **Pure hecking magic.**

## Chapter 7: Quick start

1. Using a suitable cable (see the following chapter), connect the R-BUS DB-25 connector on the board to the R-BUS port on your Roland device.
2. Connect the ADAT output on the board to the ADAT input of your recording equipment with a TOSLINK optical fiber cable.
3. Turn on the Roland device, then turn on your recording equipment.
4. If necessary, change the sampling rate of both devices so that they match, or alternatively, configure the recording device so that its clock is synchronized to the ADAT input clock signal.

## Chapter 8: Choosing a suitable cable

**DO NOT USE ROLAND'S OFFICIAL R-BUS CABLE!!!**

Please use a straight through DB-25 male-to-male (pins on both ends) cable to connect the R-BUS port on your device to the port on the converter. These cables connect pin 1 to pin 1, pin 2 to pin 2, pin 3 to pin 3 etc. These cables are usually sold as "DB-25 RS-232 serial cable". Do NOT use any of the following cables:

- Roland's official R-BUS / RMDB 2 cable
- Parallel port cable
- SCSI cable
- LPT port Printer cable
- Null modem cable

These cables all use the same DB-25 connector but are wired differently. Using the wrong cable may damage the converter and / or your device.

Note that many RS-232 serial cables designed for relatively newer computers use the DE-9 connector. You'll need the older style with DB-25 connectors (which conveniently have 25 pins).

**DO NOT USE ROLAND'S OFFICIAL R-BUS CABLE!!!**

## Chapter 9: Notes

- Digital recording made from Scarlett 18i8 of the converted ADAT stream seem to have the full 24-bit resolution. However this might be due to interpolation done by the audio interface or the operating system. I do not have proper equipment to verify the bit depth of the output data stream. As such, only 20 bits out output resolution is guaranteed.
- The optical output port is a tight fit. You have to insert the plug all the way in until you hear a click.

## Chapter 10: Specifications

Signal processing	24-bit internal, 20-bit output
Sampling rate	44.1 kHz, 48 kHz
Connectors	R-BUS (Input only): DB-25 Digital output: ADAT Lightpipe (JIS F05 connector)
Chipset	coolaudio V1401 (Alesis AL1401 equiv.)
Rated current	<8 mA
Rated power	<0.04 W

# Chapter 11: Appendices

## 11.1: Build instructions

This is intended for people who didn't end up with a pre-assembled board. If you already have a fully assembled board, you may ignore this section.

If you have a kit, you may skip to step 3.

### 11.1.1: PCB production

I assume if you have chosen to take this route, you know what you are doing.

You'll find Gerber files in the out directory of the project repository that you can upload to your favorite PCB production service provider. Or alternatively if you want to tweak the board you can open up the KiCad project files, which are also found in the project repository.

Many PCB manufacturers will add a board identifier to each PCB they make and allow customization of where this identifier will be placed. The front side silkscreen text "Production ID" is reserved for this purpose. Please refer to the ordering instructions of your PCB manufacturer for the details. Usually this will involve changing the text to something specific to that manufacturer and selecting an option before submitting your order.

### 11.1.2: Bill of materials

Designator	Part	Qty
C1	16V 100 $\mu$ F electrolytic	1
C2, C3, C4	50V 0.1 $\mu$ F ceramic	3
CN1	Cliff FCR684208T	1
D1	1N4002	1
D2	Red GaAsP / GaP LED 3mm <sup>a</sup>	1
J1	Adam Tech DB25-SL-25 <sup>b</sup>	1
R1	1/4W 1k $\Omega$	1
R2	1/4W 2.2k $\Omega$	1
U1	SN74LS04N	1
U2	coolaudio V1401	1

<sup>a</sup>5mm used in prototypes

<sup>b</sup>Or any right angle DB-25 receptacle with 8.1mm backset spacing

### 11.1.3: Assembling

Again, I assume if you are assembling the board yourself, you possess the appropriate set of skills. It's now time for them to shine. Most components are through hole so it should be easy. If it's not already obvious, solder the only SMD chip first.

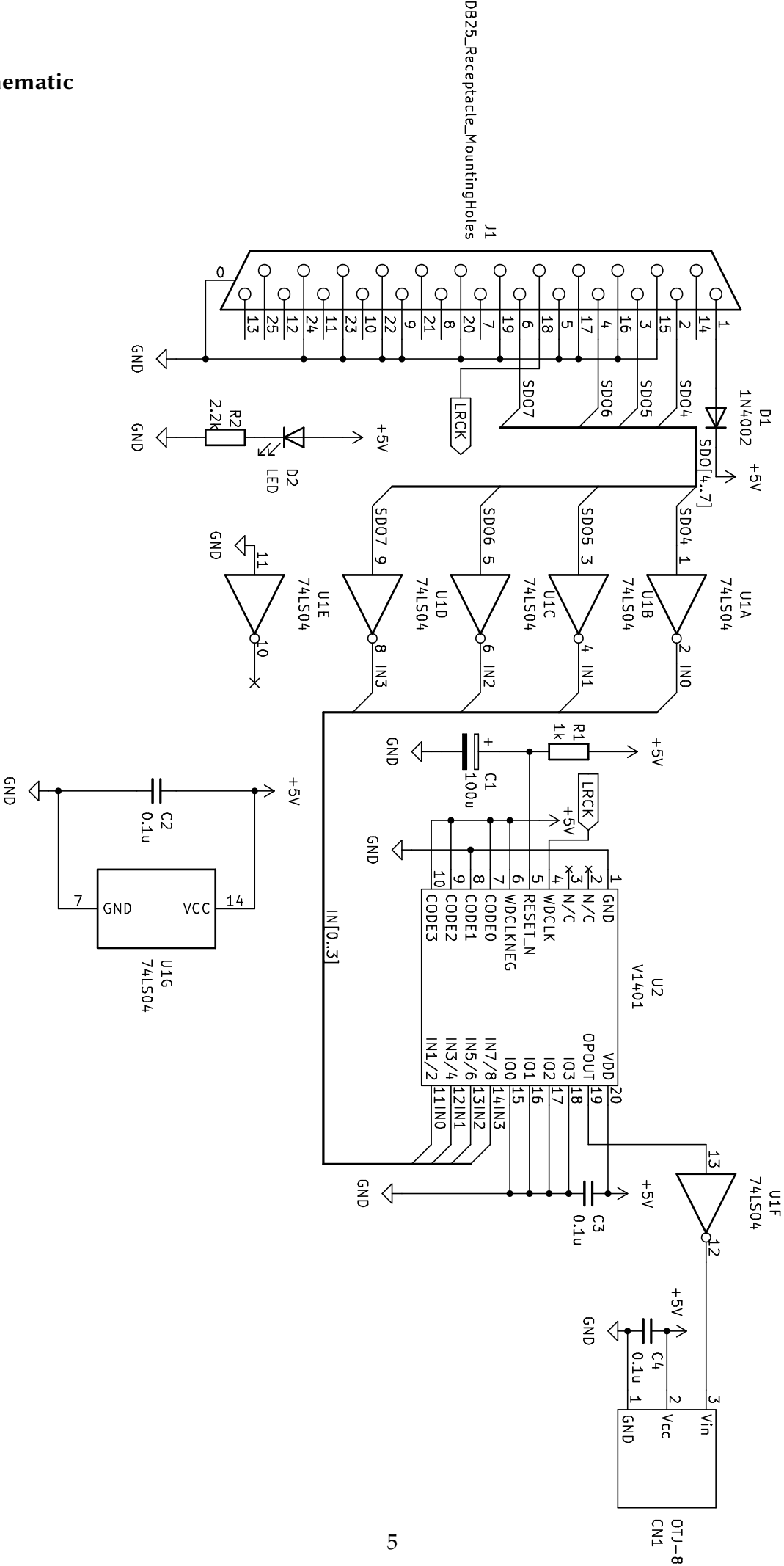
### 11.1.4: Testing

If you have a 5V power source, it is suggested to test your assembled board first. Supply 5V between the anode of the D1 and the metal shell of the DB-25 connector (GND). Check if anything pops.

## 11.2: Useful links

- R-BUS project homepage: <https://chrisoft.org/rbusif>
- Project repository for this board: <https://cgit.chrisoft.org/rbus-adat.git>
- Online version of this manual:  
<https://chrisoft.org/blog/post/rbus-adat-m.html> (html version)  
[https://filestorage.chrisoft.org/blog/data/rbus\\_adat\\_m.pdf](https://filestorage.chrisoft.org/blog/data/rbus_adat_m.pdf) (pdf version)

11.3: Schematic



11.4: Circuit board

Front side

