

Data620 Testing Device - Project Overview

The Data620 computer is a unique and fascinating machine built using analog electronic circuitry. It employs a versal logic signaling scheme where a logical **false** or bit value **0** is represented by **0V**, while a logical **true** or bit value **1** is represented by **-12V**. This unconventional voltage scheme sets it apart from many modern digital systems.

Constructed from basic electronic components such as resistors, capacitors, diodes, and transistors, the Data620's entire system is divided into a large number of printed circuit boards (PCBs). Each PCB contains analog circuitry, and it is known that some of these boards may include faulty or erroneous components.

Currently, there is no dedicated testing device available to verify the functionality of these PCBs. Such a device would be highly valuable to anyone restoring or working with the Data620, as it would allow for systematic troubleshooting and repair.

This project represents the first draft towards developing such a testing device. It includes preliminary hardware design concepts and the necessary SPICE simulations to understand and verify the circuitry. However, at this stage, only the hardware draft exists.

Software development for this testing device is in its early stages and will proceed following the completion of a stable hardware version. It also awaits the reverse engineering efforts of the DATA620 PCBs carried out by third parties.

This project is currently an independent effort (not affiliated with Usagi Electric or other existing Data620 projects). We hold great respect for the significant contributions and extensive work carried out by Usagi Electric and the dedicated volunteers contributing to the Usagi Electric Data620 project. Our development is separate, however, we are more than willing to explore opportunities to collaborate and join forces in the future.

As this is an initial draft, the design undoubtedly contains errors and inaccuracies. We warmly welcome constructive feedback and suggestions from the community to improve and refine the project.

For those interested in learning more about the Data620 itself, the following discussion provides valuable insights and historical context:

- <https://retrocomputingforum.com/t/data-620-transistor-minicomputer/3847>
- <https://github.com/Nakazoto/Data620>
- <https://www.youtube.com/watch?v=YR9E9ZvHkQE>

Thank you to all that participate with **Usagi Electric** for your interest and support in preserving this remarkable piece of computing history.

License Overview

Copyright (c) 2011-2025 Filip Pynckels & Robin Pynckels

This project contains software, hardware designs, and documentation. Each part is licensed under terms appropriate to its nature. You are free to use, modify, and distribute each component under its respective license terms.

Hardware Designs

The schematics, PCB layouts, and other hardware design source files are licensed under the **CERN Open Hardware Licence Version 2 - Strongly Reciprocal (CERN-OHL-S v2.0)**.

See CERN-OHL-S for the full text.

Software

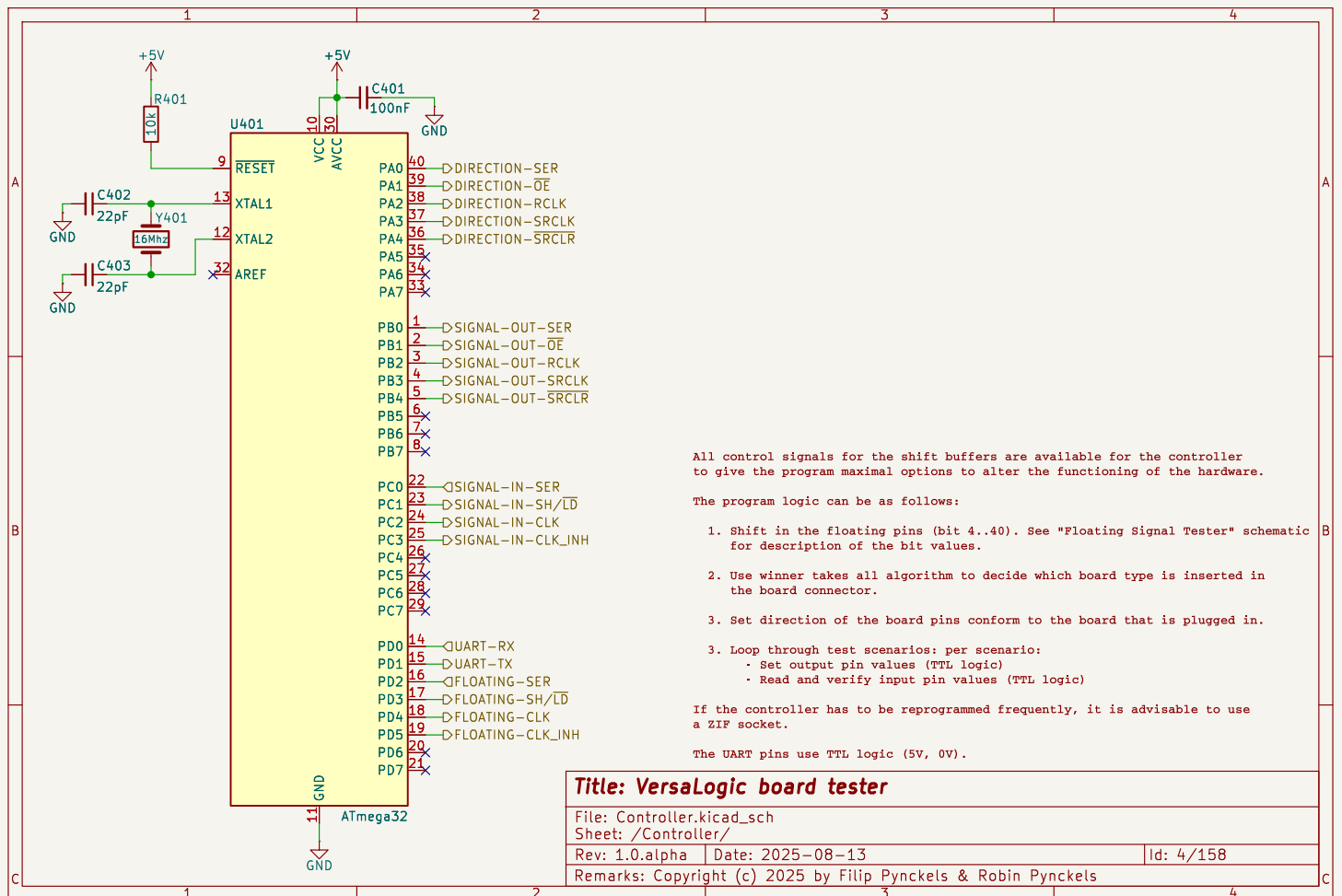
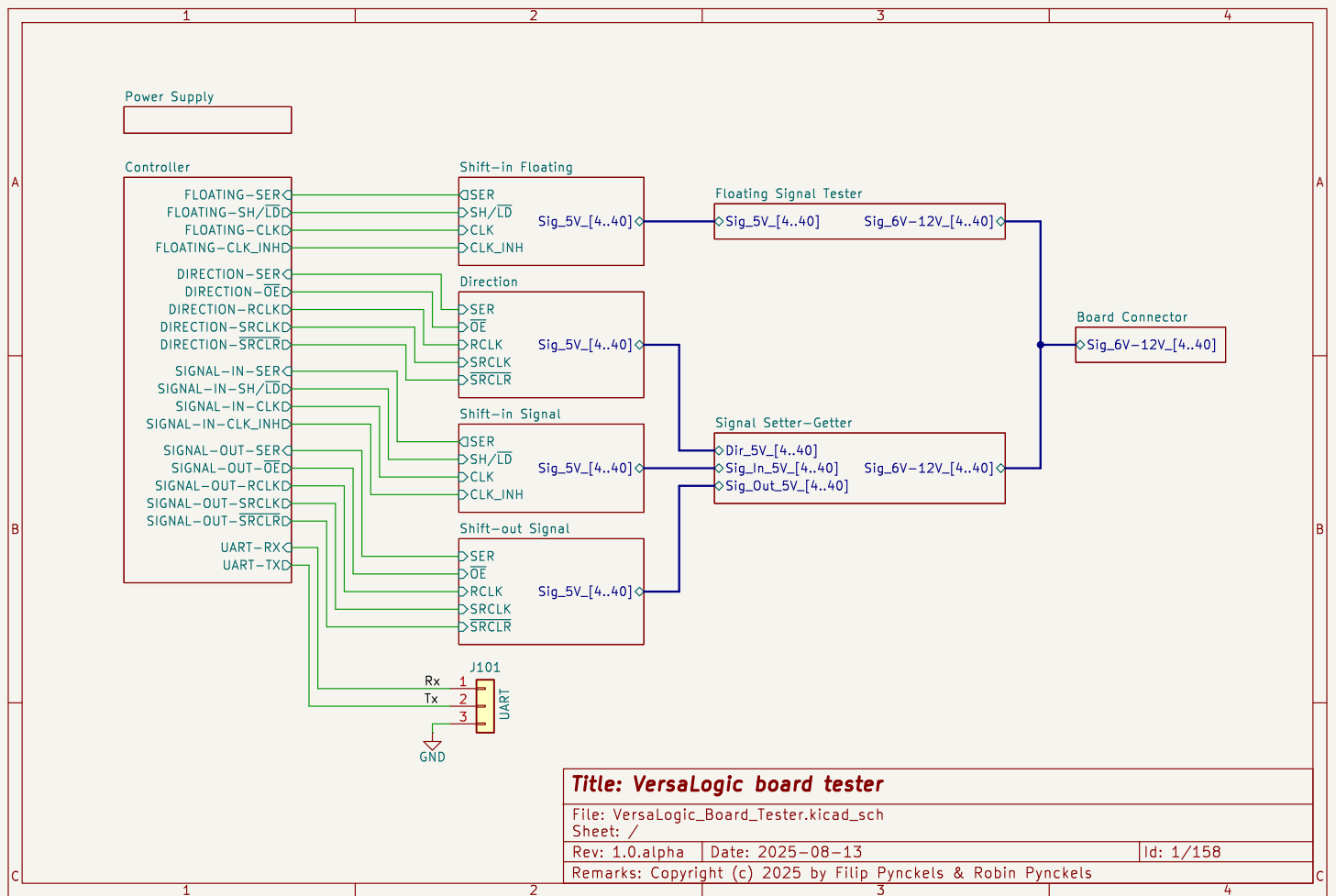
The controller source code, build scripts, and related software files are licensed under the **MIT License**.

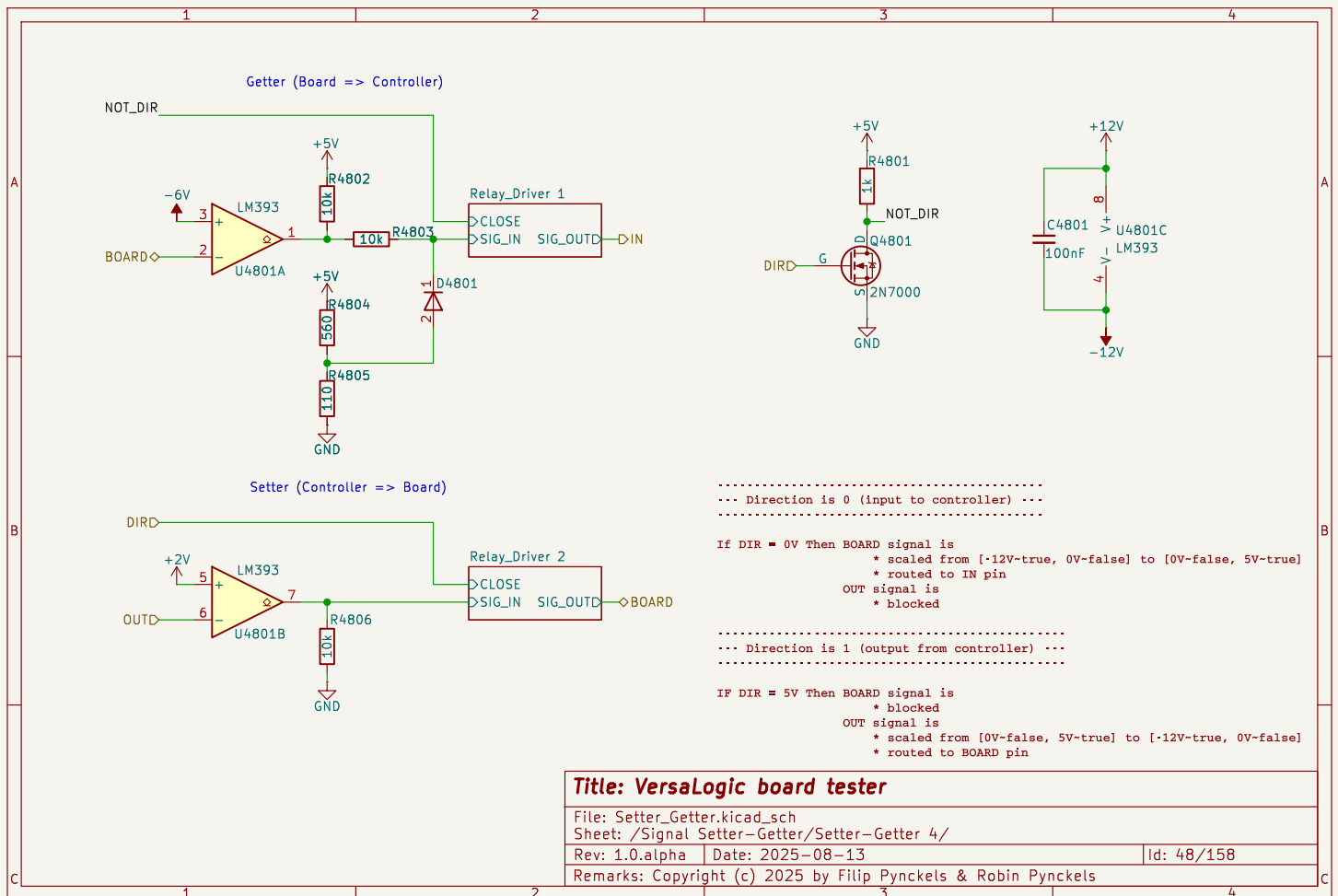
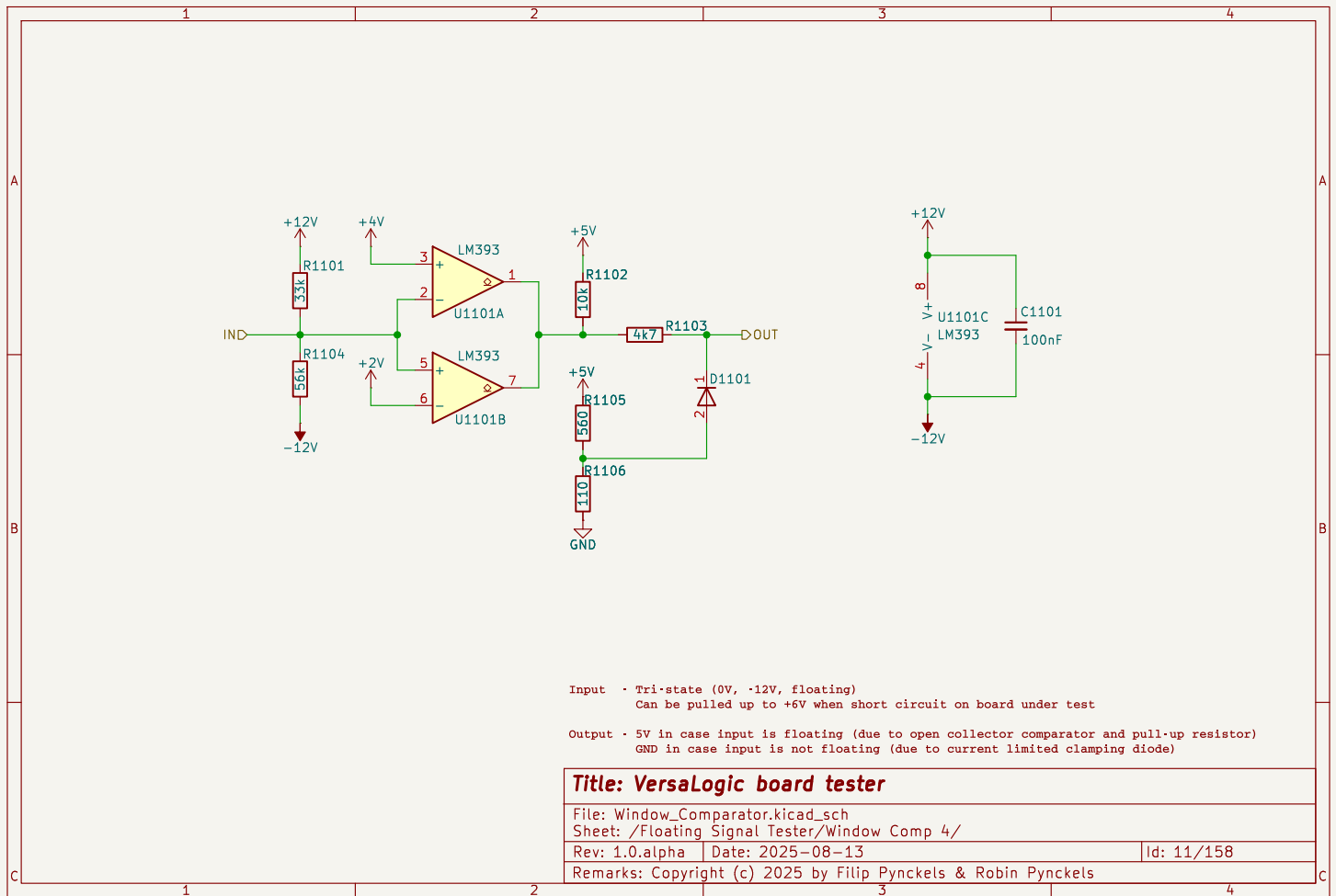
See MIT for the full text.

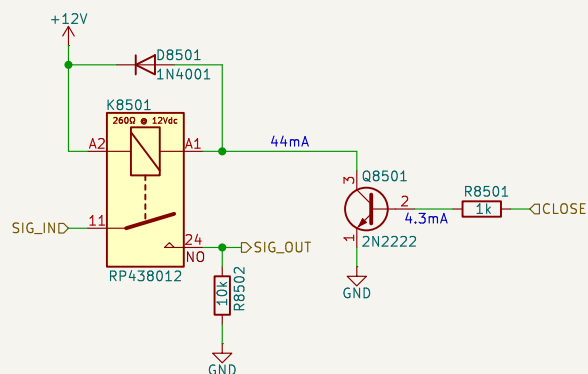
Documentation

The written documentation, guides, and non-code instructional materials are licensed under the **Creative Commons Attribution Non Commercial Share Alike 4.0 International (CC-NC-SA 4.0)** license.

See CC-NC-SA for the full text.







* If ON = 5V then SIG_IN => SIG_OUT
If ON = 0V then SIG_OUT = High-Z (floating)
Else Undefined behaviour (!)

* The two transistor relay driver circuit may be a bit overkill but since it's not known what relay will be used on the production board one is better safe than sorry. The same goes for the decoupling capacitor.

Title: VersaLogic board tester

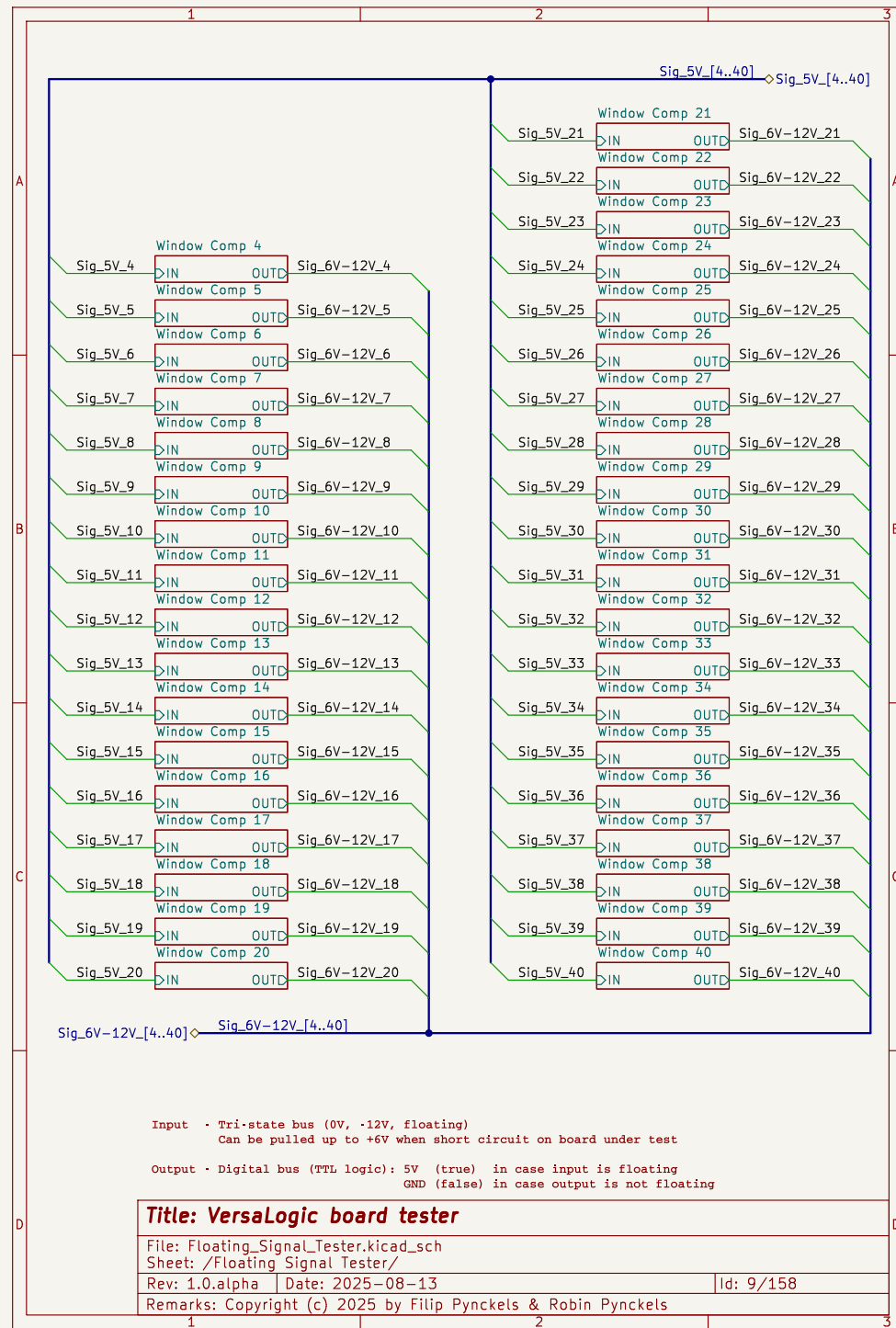
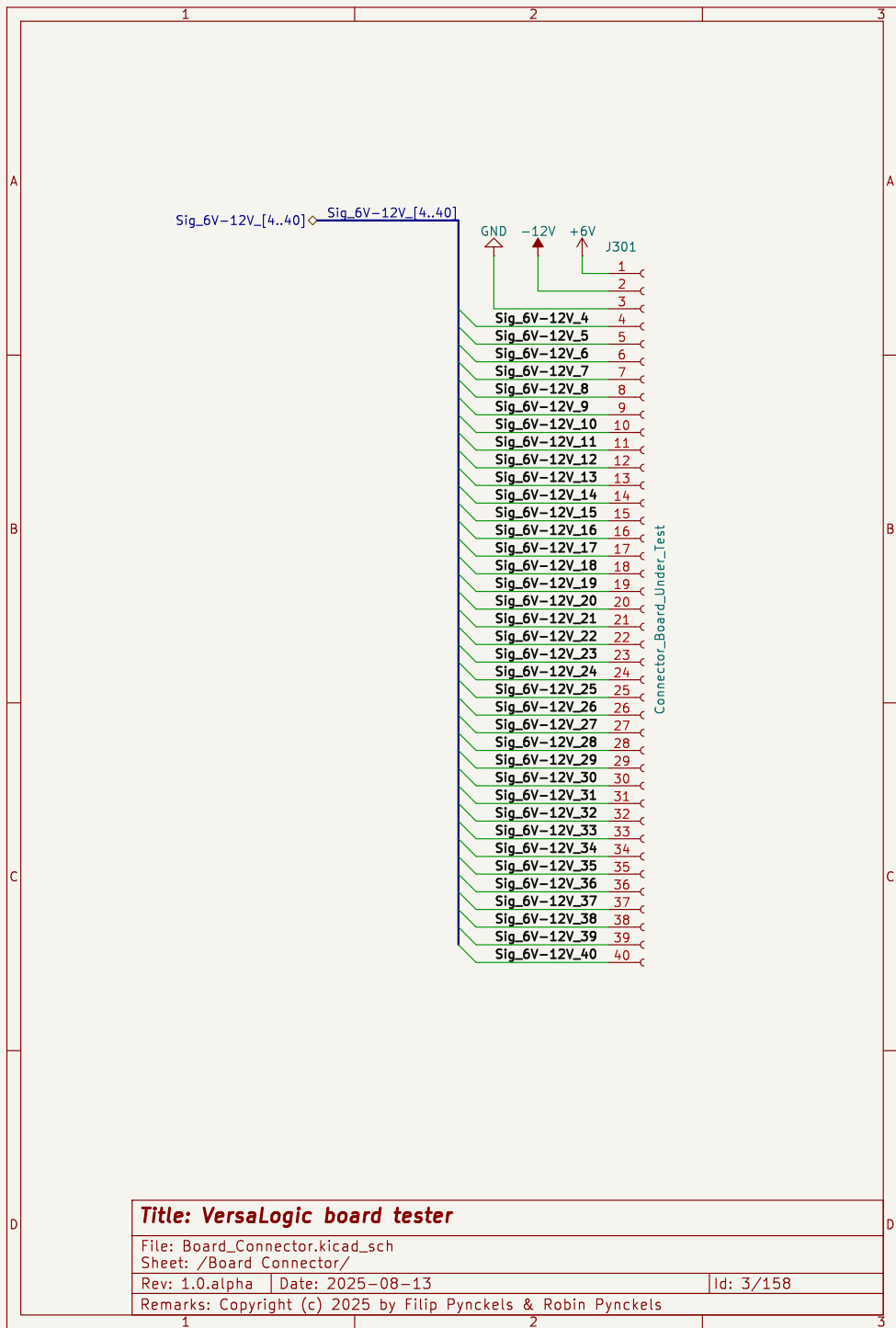
File: Relay_Driver.kicad_sch

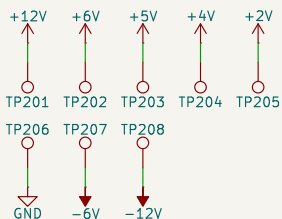
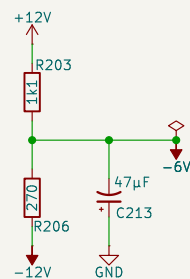
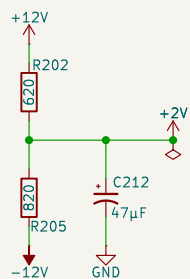
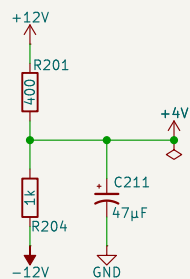
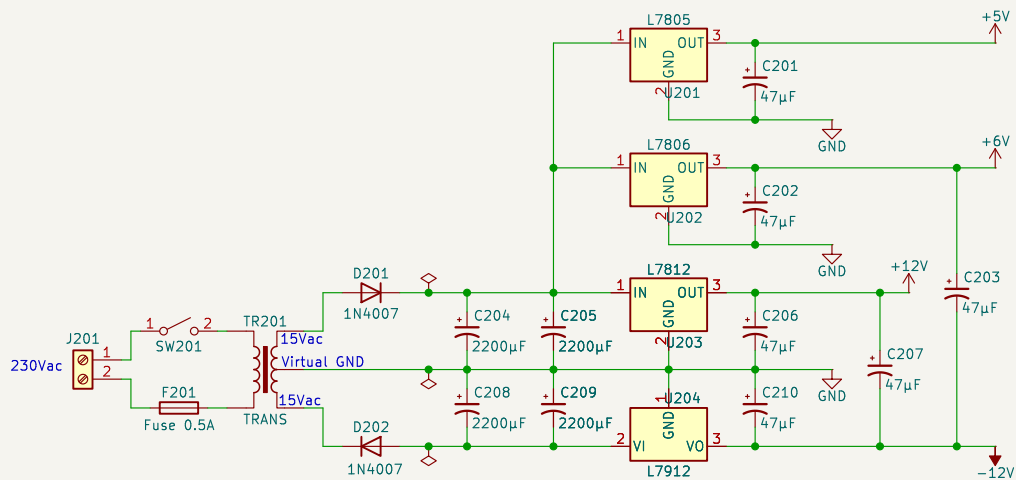
Sheet: /Signal Setter-Getter/Setter-Getter 4/Relay_Driver 1/

Rev: 1.0.alpha | Date: 2025-08-13

Id: 85/158

Remarks: Copyright (c) 2025 by Filip Pynckels & Robin Pynckels





+12V - Supply for operational amplifiers => min 1A available
 +6V - Supply for board under test => min 1A available
 +5V - Supply for controller and logic signals => min 1A available
 +4V - Voltage to test for floating signals => max 10mA needed
 +2V - Voltage to test for floating signals => max 10mA needed
 -6V - Voltage to test for board inverse logic => max 10mA needed
 -12V - Supply for board under test => min 1A available

Alternative power supply: PC power supply can provide +12V +5V -12V.
 +6V can be generated with an L7806
 +4V, +2V, -6V can be generated with voltage divider

Title: VersaLogic board tester

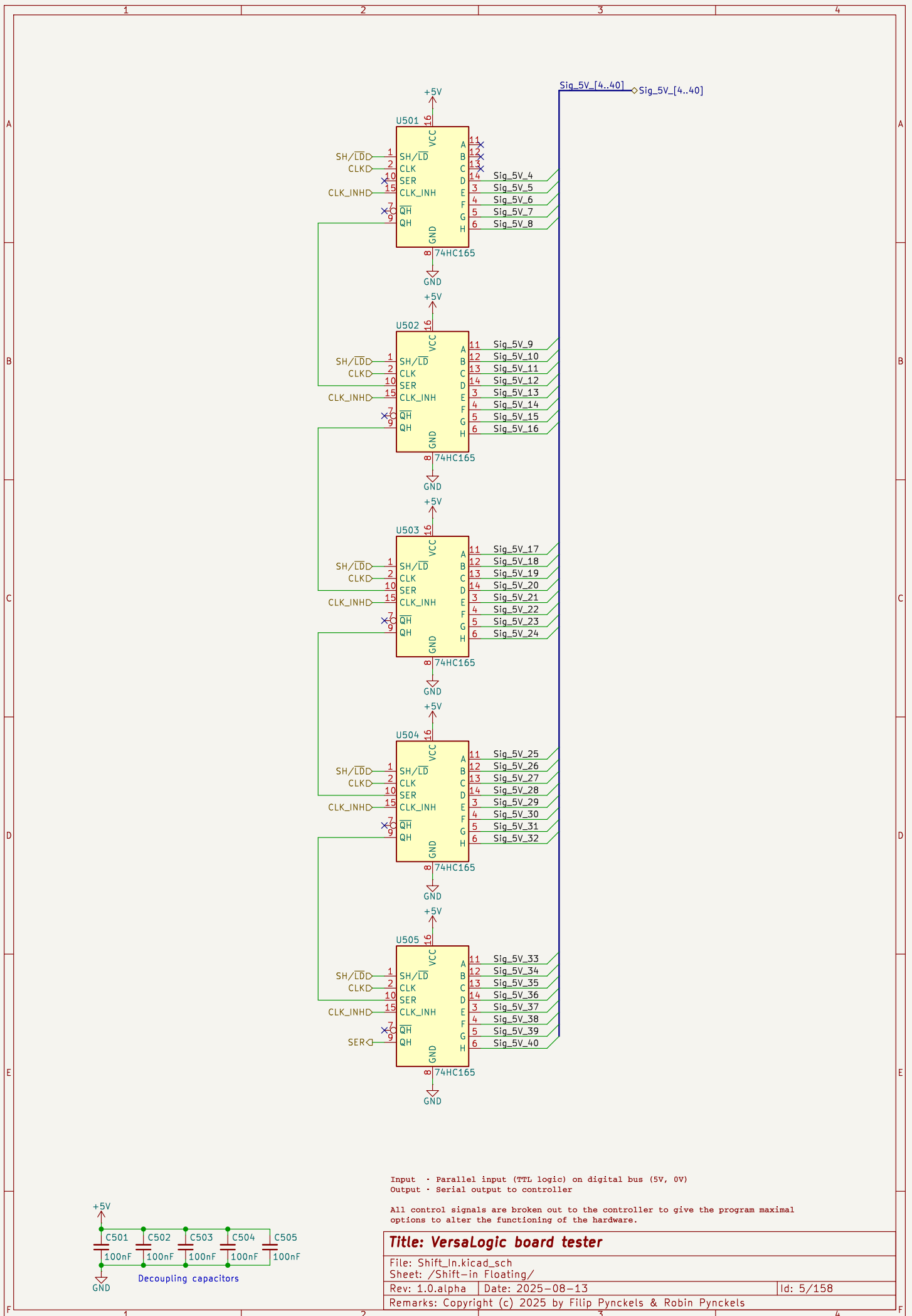
File: Power_Supply.kicad_sch

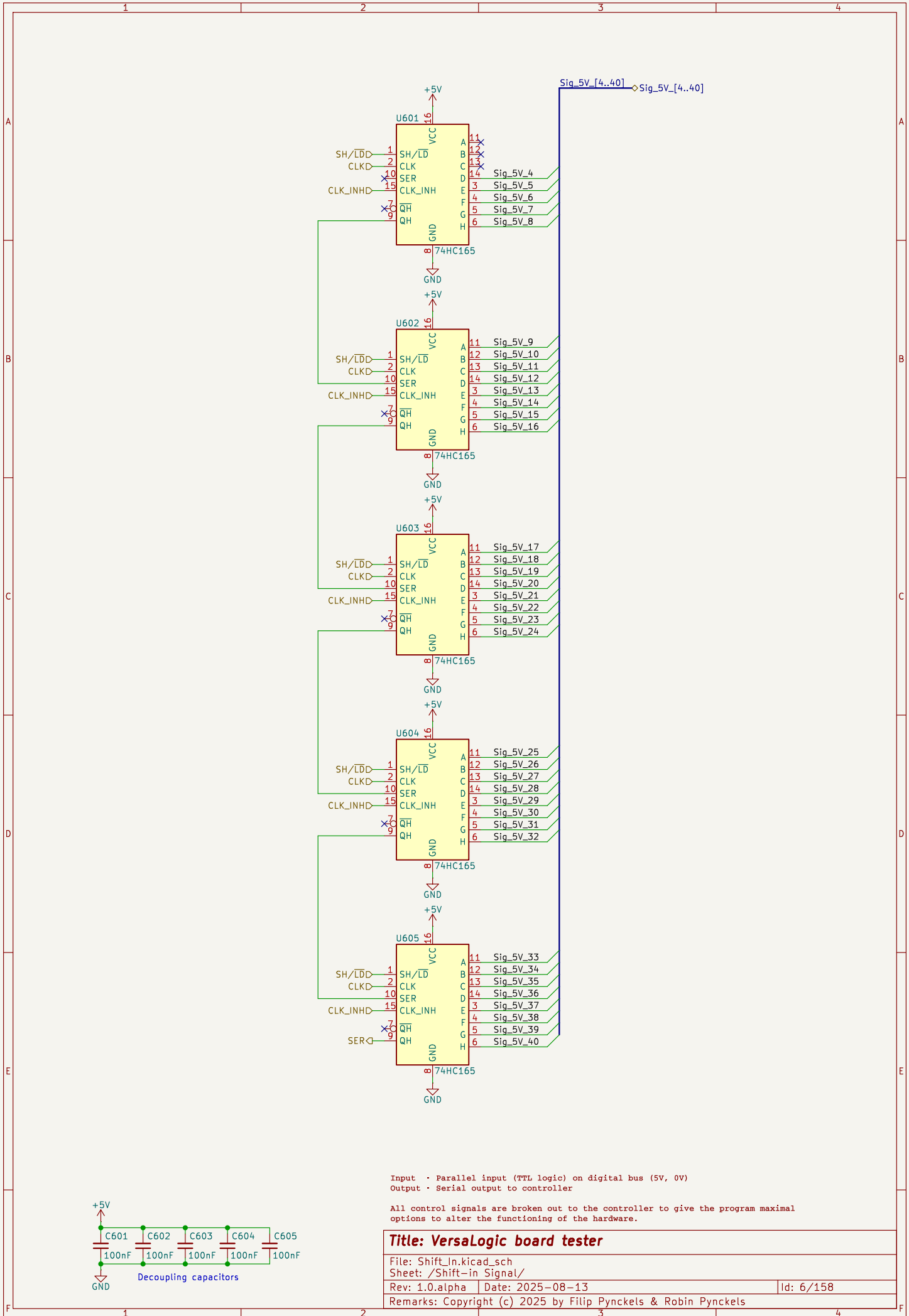
Sheet: /Power Supply/

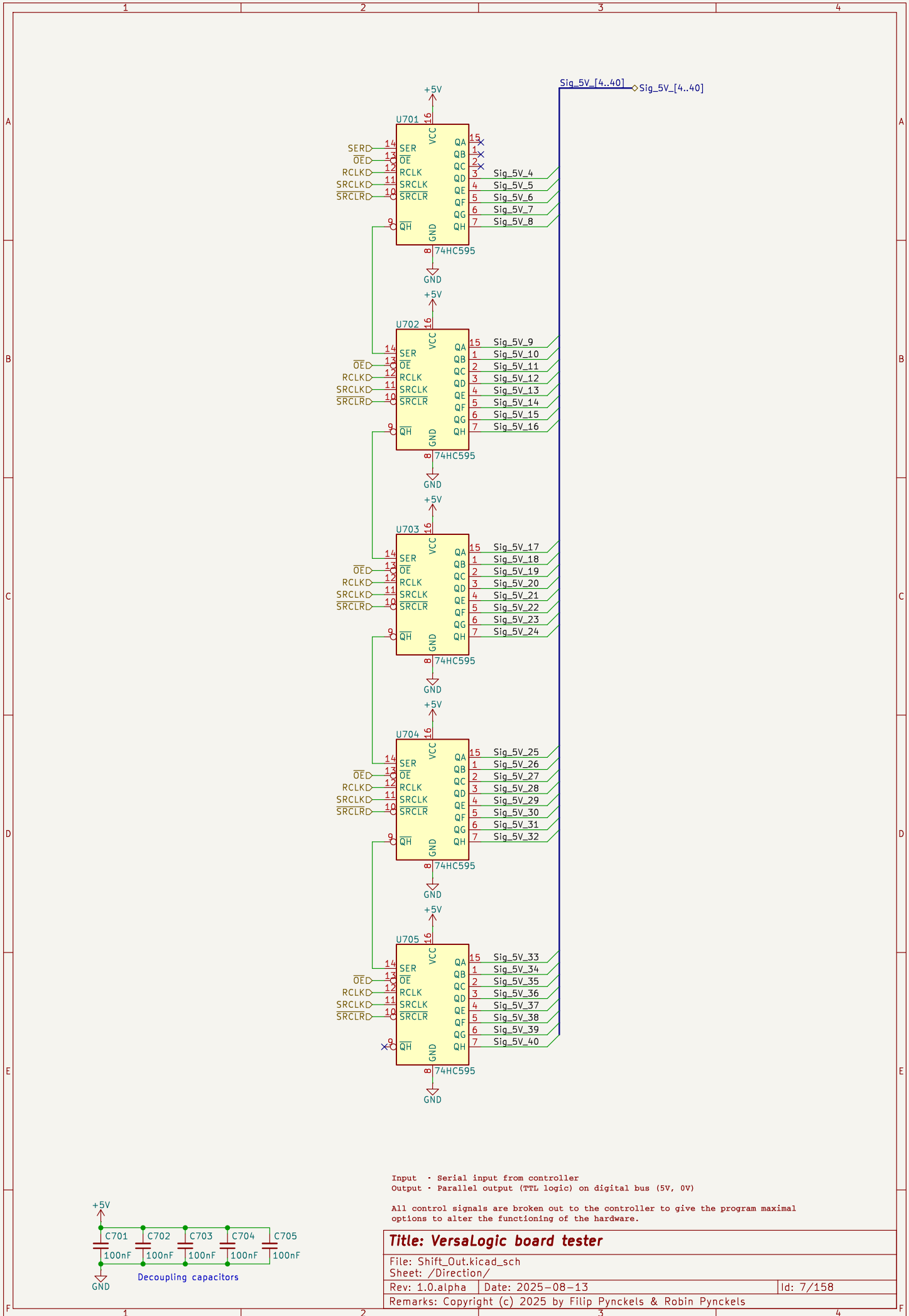
Rev: 1.0.alpha Date: 2025-08-13

Id: 2/158

Remarks: Copyright (c) 2025 by Filip Pynckels & Robin Pynckels







Input - Serial input from controller
Output - Parallel output (TTL logic) on digital bus (5V, 0V)

All control signals are broken out to the controller to give the program maximal options to alter the functioning of the hardware.

Title: VersaLogic board tester

File: Shift_Out.kicad_sch

Sheet: /Direction/

Rev: 1.0.alpha

Date: 2025-08-13

Id: 7/158

Remarks: Copyright (c) 2025 by Filip Pynckels & Robin Pynckels

