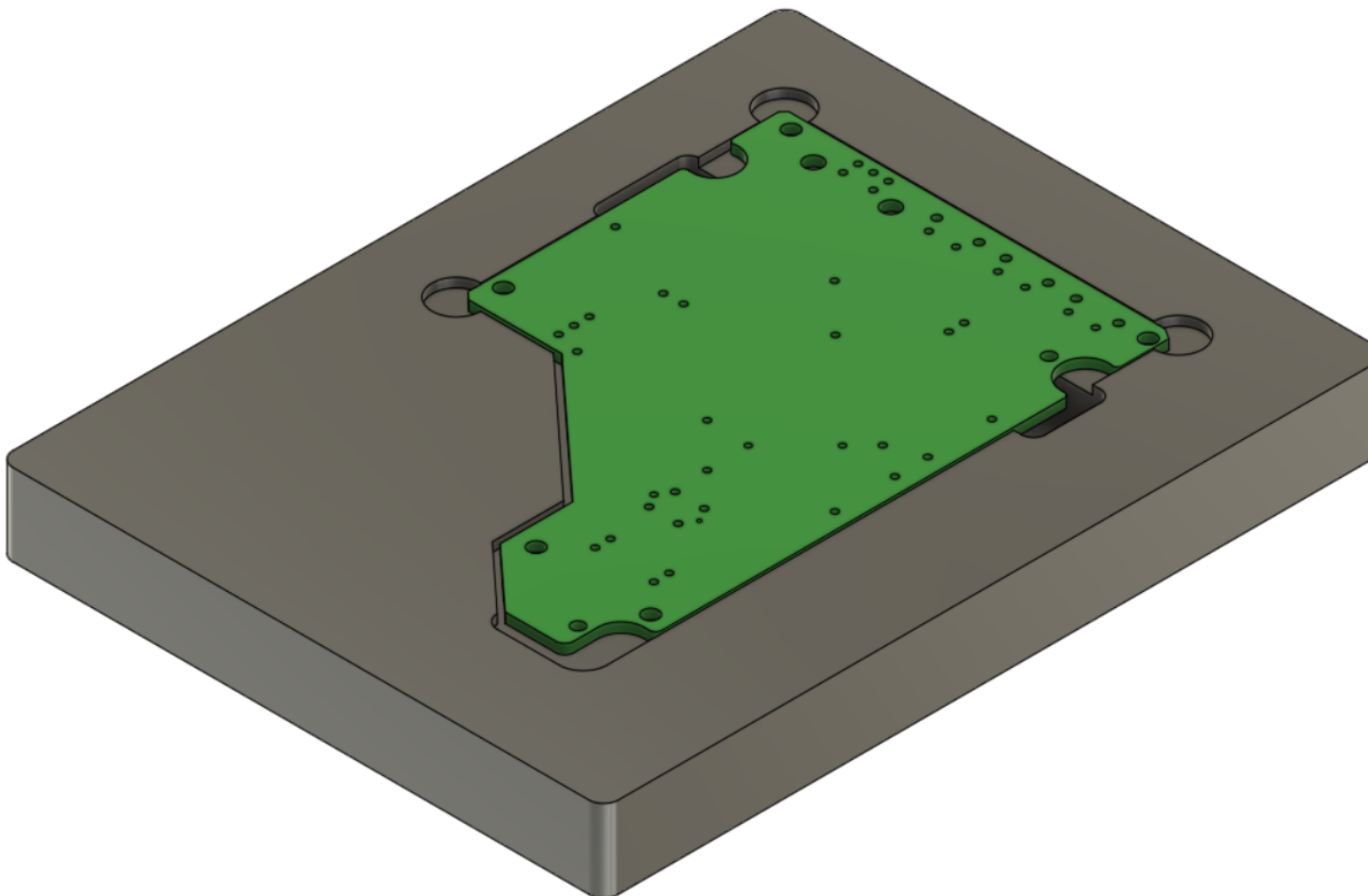
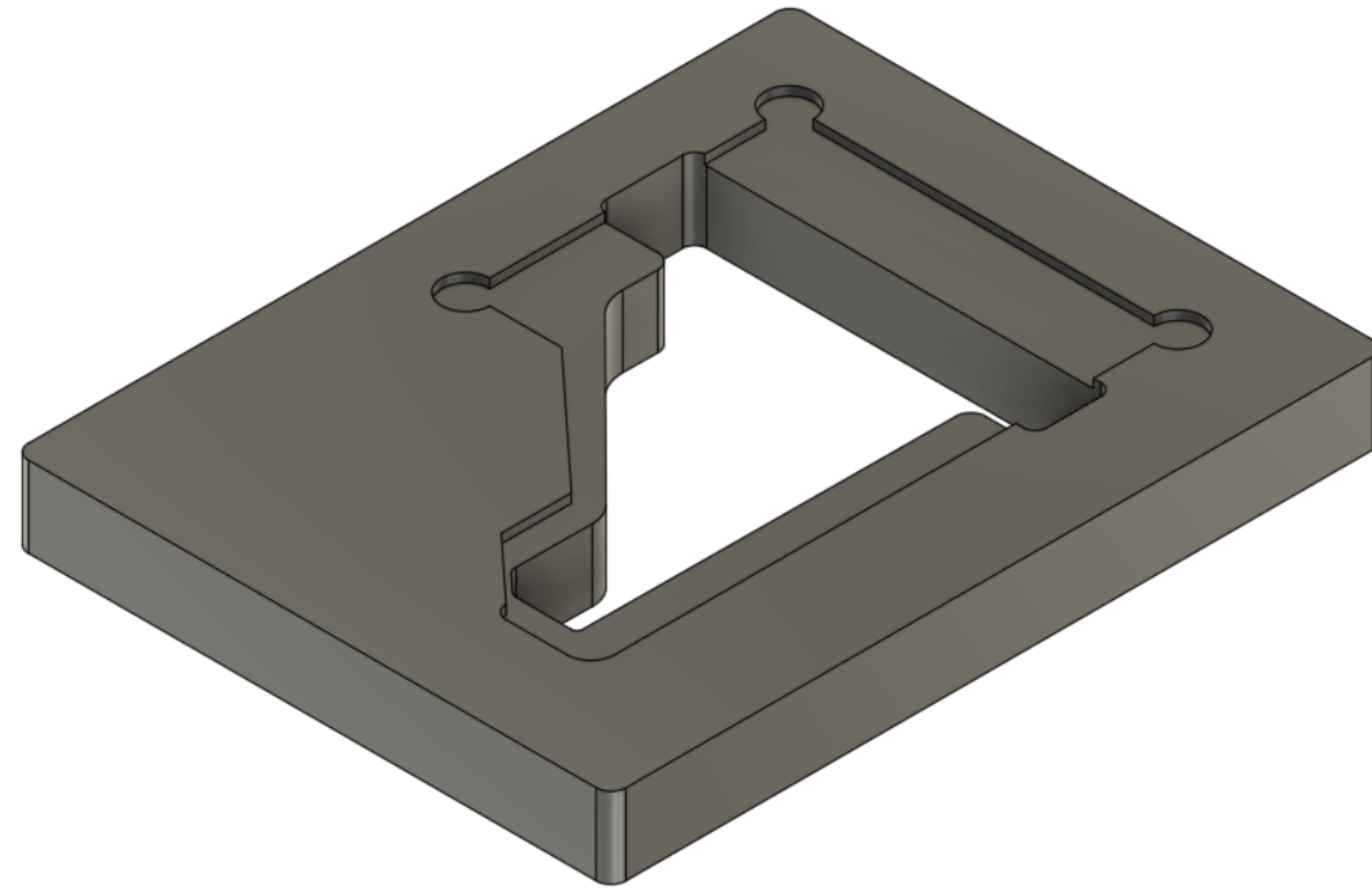


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|---|---------------|------------------|
| <p>Project:</p> <p>HDD Clock V3.0 Driver Board PCB Assembly</p> | | |
| <p>Pg. Description:</p> <p>Bottom Side SMT Polarity and Component Notes</p> | | |
| <p>Author: Kadin Whiting</p> | <p>REV: -</p> | <p>PG 1 of 7</p> |



6. Now that the bottom side of the PCB has been assembled we need to suspend the bottom components while applying solder paste and placing components.

The Driver Board Solder Paste Stencil Jig can be used for both applying solder paste to the top side of the PCB as well as a holder for the PCB while components are being placed.

Print settings for this jig:

1. Layer height of 0.25mm to ensure the PCB pocket is 1.5mm deep.
2. Enable ironing to ensure a smooth top surface
3. 10-15% infill should be sufficient

When using this jig ensure that it is not exposed to high heat.

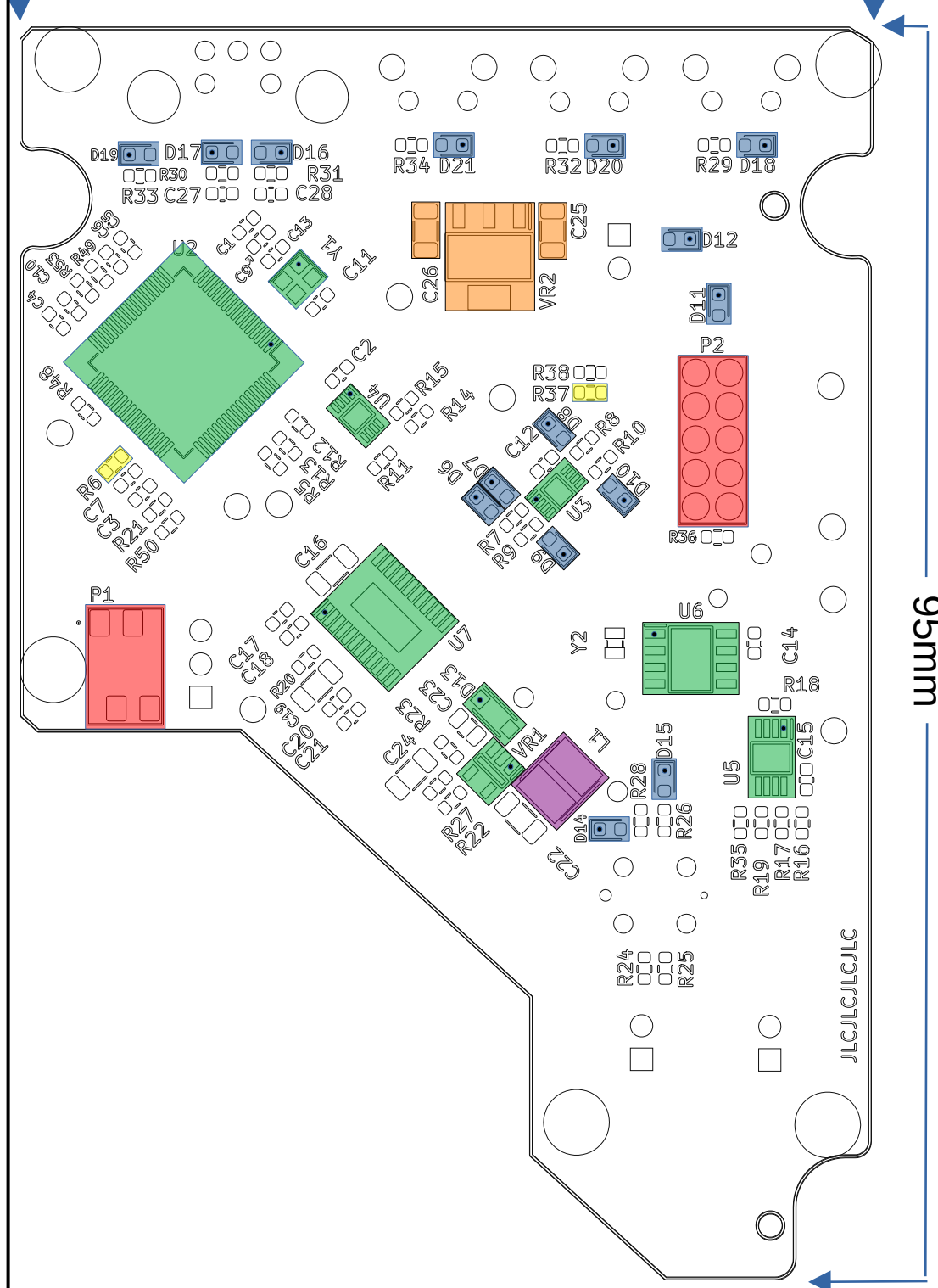
Steps to use this jig:

1. Using double sided tape, secure the jig to the top of a stable surface.
2. Carefully place the Driver Board PCB, placed parts down, into the paste jig.
3. Align the stencil to the jig and secure it using tape. The jig is about the same size as the ordered solder stencil.
4. Using an appropriate tool, apply solder paste to the PCB.
5. Carefully remove the PCB from the jig using tweezers or leave it for parts placement.

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| Project: | | |
| HDD Clock V3.0 Driver Board PCB Assembly | | |
| Pg. Description: | | |
| Top Side Solder Stencil Jig | | |
| Author: | Kadin Whiting | REV: - |
| | | PG 2 of 7 |

Top Side

64.7mm



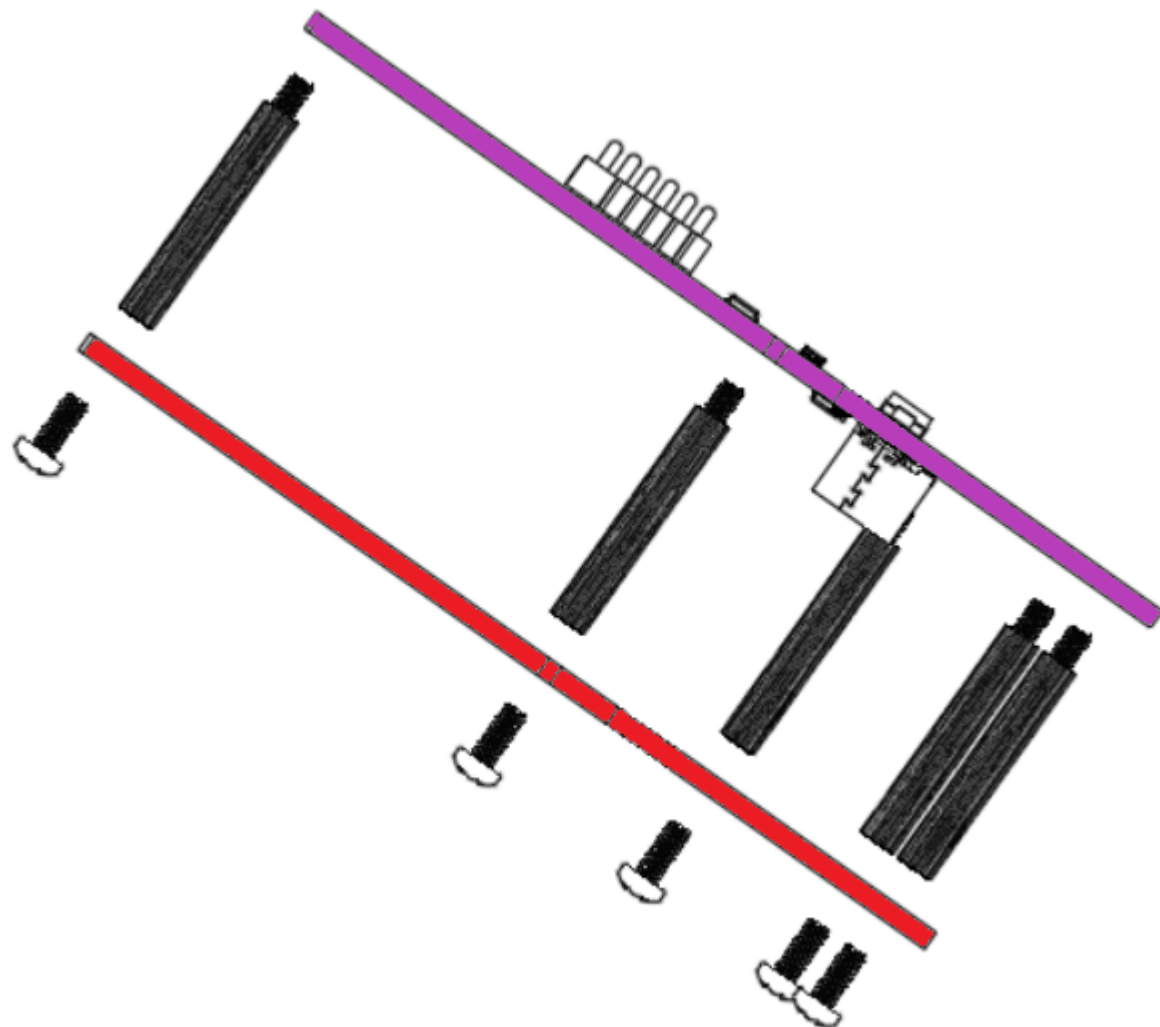
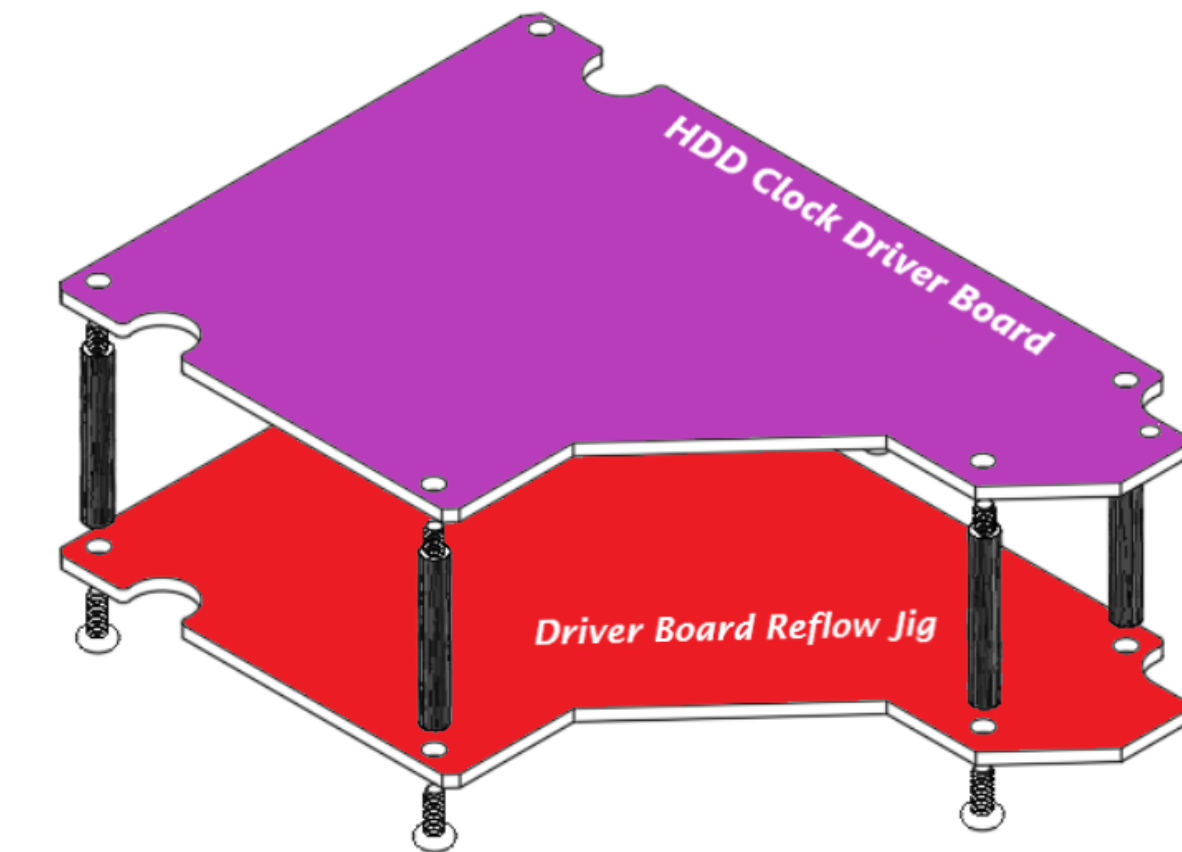
95mm

7. Assembly contains MLCC capacitors. MLCC capacitors are sensitive to heat. Temperatures shall be controlled when hand and reflow soldering.
8. Components highlighted YELLOW are not installed.
9. Components highlighted GREEN should be inspected for polarity prior to reflow or powering on the PCB. Pin 1 is indicated with a black dot.
 1. Components highlighted BLUE are TVS diodes. The part number in the BOM does NOT have polarity. If a different TVS diode is used then polarity inspection may be needed on these components. A black dot has been placed on the cathode side of the footprint.
10. Components highlighted RED are spring connectors. Placement of these components is **critical**. Ensure the connectors are as centered as possible.
11. L1, highlighted PURPLE, is the inductor for the boost converter circuit. If the chosen inductor will not fit in the HDD case due to height or footprint placement an alternate footprint (L2) is available on the bottom side of the PCB.
12. Components highlighted ORANGE are parts for the 3.3V LDO regulator circuit. the part number in the schematic sold out before it could be ordered. Ensure proper capacitor values are installed for the substitute LDO.
13. This side of the board will require the Driver Board Reflow Jig PCB to suspend the PCB during second reflow. See page 3 for instructions.
 1. These steps are necessary for reflow in a toaster oven. The solder jig raises the PCB so the bottom parts do not make contact with the the oven rack. Disregard this note if not using a toaster reflow oven.

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| Project: | | |
| HDD Clock V3.0 Driver Board PCB Assembly | | |
| Pg. Description: | | |
| Top Side SMT Polarity and Component Notes | | |
| Author: | Kadin Whiting | REV: - |
| | | PG 3 of 7 |

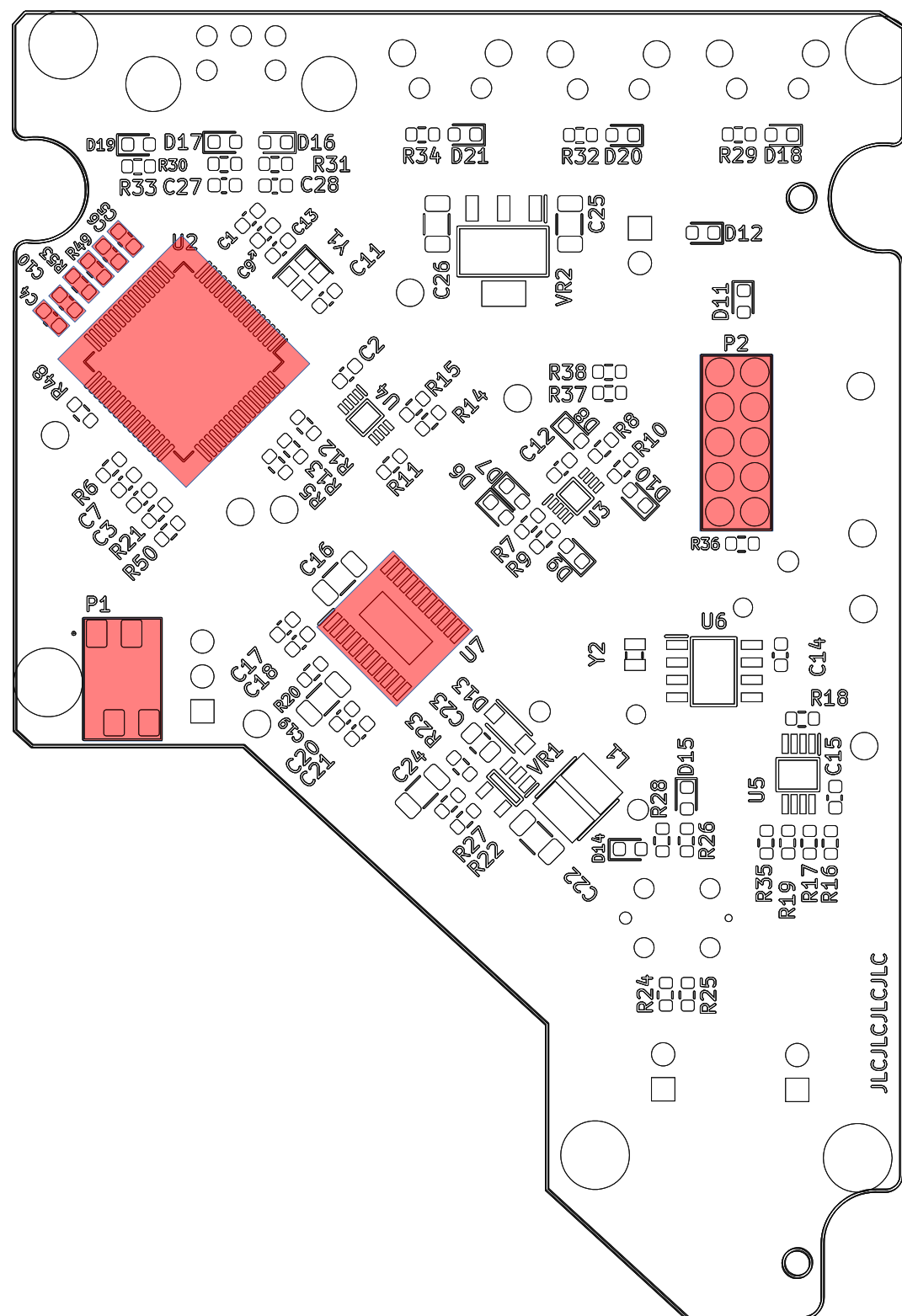
14. The HDD Clock V3.0 Driver Board PCB has components on both sides of the PCB that require a reflow soldering process. The reflow oven I have does not suspend the PCBs by the board edge. This makes reflowing 2 sides of a PCB difficult due to the parts on the bottom side. The Driver Board Reflow Jig PCB has been designed to suspend the PCB during second reflow. The following instructions outline how to use is jig.

1. Assemble, hand-tight, m2 screws and standoffs to each hole of the Driver Board Reflow Jig. Standoffs need to be at least 10mm long. Reference images to the left show, at scale, 20mm standoffs and 5mm screws. 10mm standoffs recommended.
2. Carefully place the HDD Clock Driver Board PCB with components placed onto the standoffs previously mounted to the Driver Board Reflow Jig.
 1. This fixture should be tested before any parts are assembled. If this assembly is difficult then consider pasting the board, mounting it to the jig then place top-side SMT components. Spring connector placement on this side of the PCB is critical.
 2. Do not use nuts to secure the HDD Clock Driver Board to the standoffs.
3. See page 4 for critical pre-second-reflow component inspections and reflow instructions.

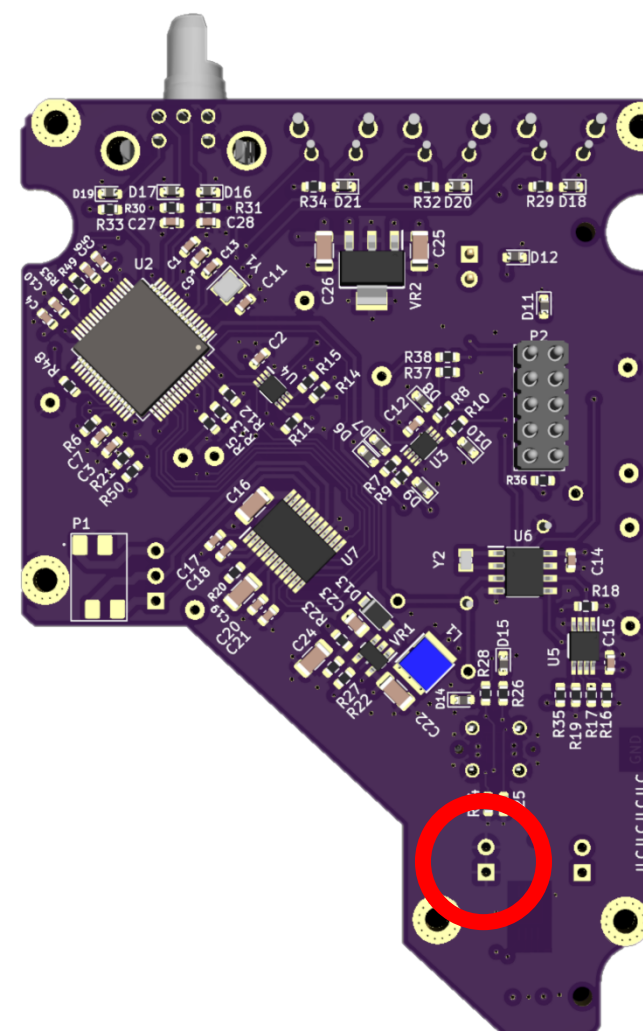


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| Project: | | |
| HDD Clock V3.0 Driver Board PCB Assembly | | |
| Pg. Description: | | |
| Driver Board Reflow Jig Instructions | | |
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Top Side



15. Refer to page 2 for polarity inspection. Components highlighted RED have critical placement. Inspect these parts closely prior to reflow.
16. Reflow the assembly for the second time using the following instructions:
 1. See the Reference Image below for the recommended through-hole location to place the reflow oven thermocouple. Secure the thermocouple with Kapton tape ensuring the thermocouple is making contact with the copper of the PCB.
 2. Place the assembly on the middle of the reflow oven rack and carefully slide the rack into the oven taking care not to disturb any components.
 3. Reflow the PCB using the oven profile for the chosen solder paste.



Project:

HDD Clock V3.0 Driver Board PCB Assembly

Pg. Description:

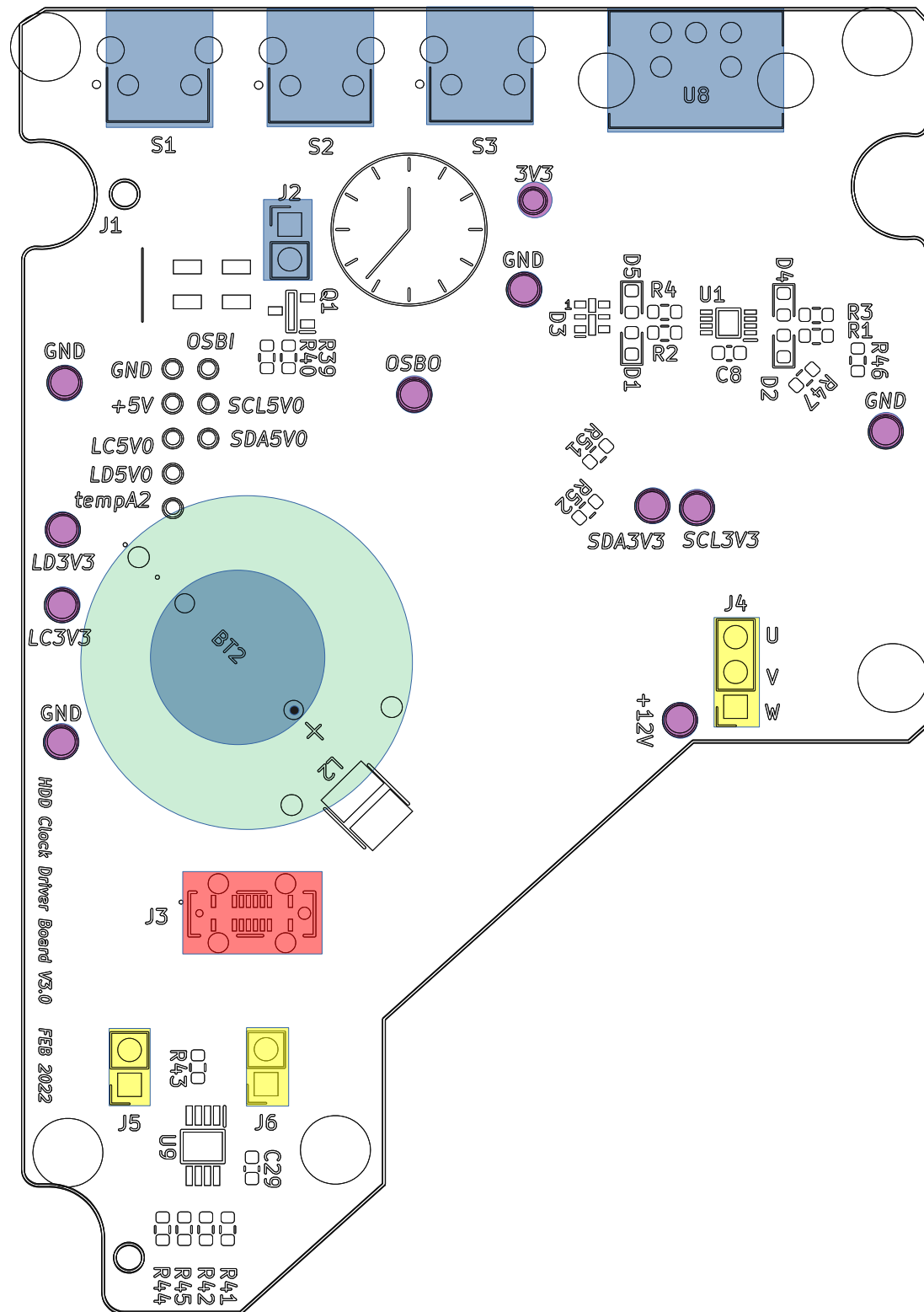
Second Reflow Instructions

Author: Kadin Whiting

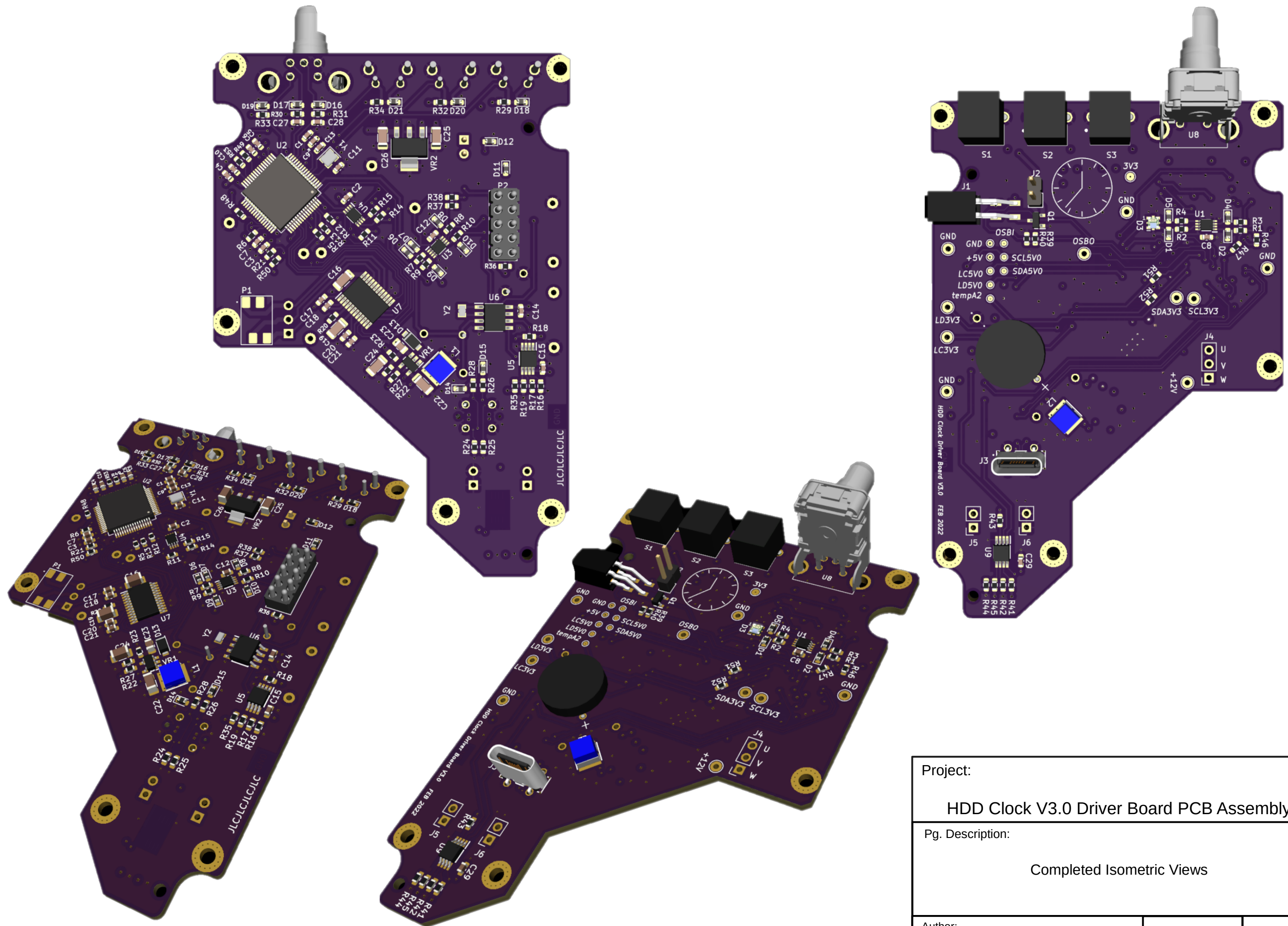
REV: -

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17. Components highlighted BLUE are installed through-hole components.
ensure leads are short enough to fit in HDD case
-BT2 has polarity. Positive pin is shown with a black dot.
18. Components highlighted YELLOW are not installed.
 1. These components may be installed later if an oscilloscope is to be connected to the motor (J6), or if +5V is to be injected into the PCB as a power source (J5 & J6).
19. Highlighted GREEN is an alternate footprint for BT2 (BT1).
 1. This footprint cannot be used if L2 is populated.
20. J3, highlighted RED, should have either had it's through-hole pins soldered or been staked prior to second reflow. If the through-hole pins are not soldered, solder them now.
21. Components highlighted PURPLE are optional through-hole test points. If desired, probe test points or wires can be soldered at these locations for testing.



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| Project: | | |
| HDD Clock V3.0 Driver Board PCB Assembly | | |
| Pg. Description: | | |
| Through-Hole Assembly | | |
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| | | PG 6 of 7 |



Project:

HDD Clock V3.0 Driver Board PCB Assembly

Pg. Description:

Completed Isometric Views

Author: Kadin Whiting

REV: -

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