



Helio Board – LTpowerPlay Power Manager Changes

Version 2.0

March 20, 2014

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Macnica Americas

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1 Helio Board Modifications Overview

1.1 Introduction and Goals

This document is intended to help you modify the Helio board revision 1.2 in order to use the LTC2978 power monitor's full features. The changes require adding eight 0-ohm resistors, removing four resistors and creating a short between two resistors.

This document refers to the Helio schematic and PWB assembly diagram. The Helio schematic and assembly drawing can be found on www.rocketboards.org. The schematic file is [helio_board_SCH_v1.22.pdf](#). The assembly diagram is "HELIO_BOARD_Rev1-2_Ref-A.pdf" and can be obtained by downloading the [PWD_data_v1.2.zip](#) file. Schematic v1.3 is the latest version and can be found on www.rocketboards.org as well. You may want to find the resistors in question on the actual assembly drawing document in order to zoom in.

1.2 Hardware and Software Requirements

1.3 Assistance

A dedicated e-mail account has been setup to receive support requests for the vWorkshop series. Please identify the course (in this case Helio Power) in addition to details on the question. workshophelp@macnica.com

2 Required Modifications

In order to take advantage of the full functionality of the Linear Technology LTC2978 Power System Manager, a few resistor changes must be made to the Helio board version 1.2. These resistors are in small 0402 and 0603 packages. You will need fine tweezers, some solder, solder flux, a good soldering iron, and very good hands free magnification to make the changes. Some resistors will be removed and other zero ohm resistors will be added.

2.1 Modification Check List

This check list is a summary of all of the modifications to the Helio board and can aid you in purchasing the required parts. It can also be printed and each line item can be checked off as it is completed.

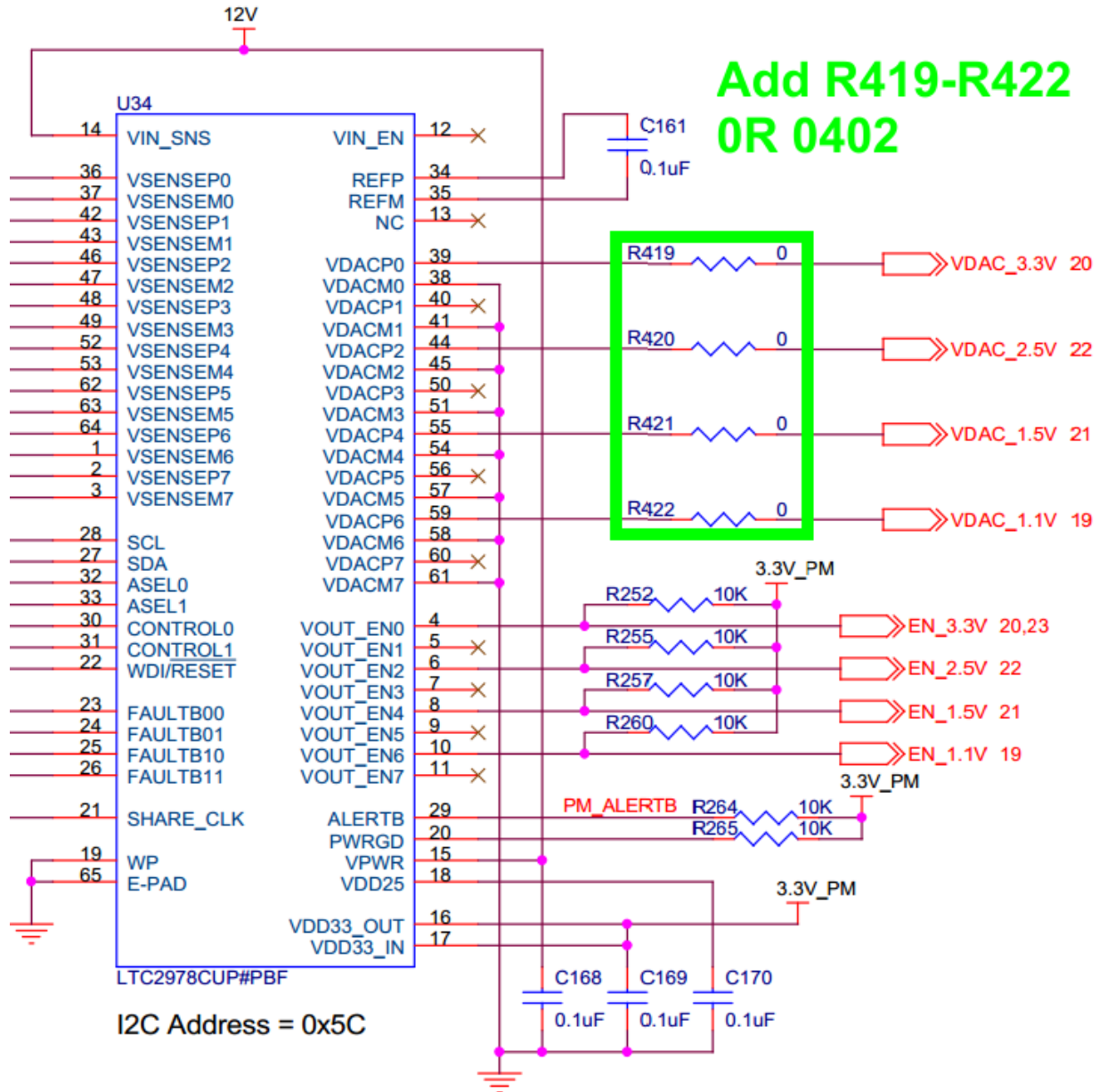
The first column is the reference designator for each part on the board. The next column tells whether the part should be added, removed, swapped, or in one case shorted. The New Value column specifies the value of the part to be added or swapped along with the part's size in the next column. The final column can be used to keep track of whether the part has been purchased and/or populated.

Part	Add/Remove/Swap	New Value	Size	Completed
R419	Add	0R	0402	
R420	Add	0R	0402	
R421	Add	0R	0402	
R422	Add	0R	0402	
R280	Remove	-	-	
R278	Add	0R	0402	
R300	Remove	-	-	
R298	Add	0R	0402	
R312	Remove	-	-	
R311	Add	0R	0402	
R326	Remove	-	-	
R325	Add	0R	0402	
R259/R261	Short	0R (optional)	0402	
R266	Swap	100k	0402	
R274	Swap	75k	0603	
R294	Swap	20k	0603	
R309	Swap	56k	0603	
R323	Swap	36k	0603	

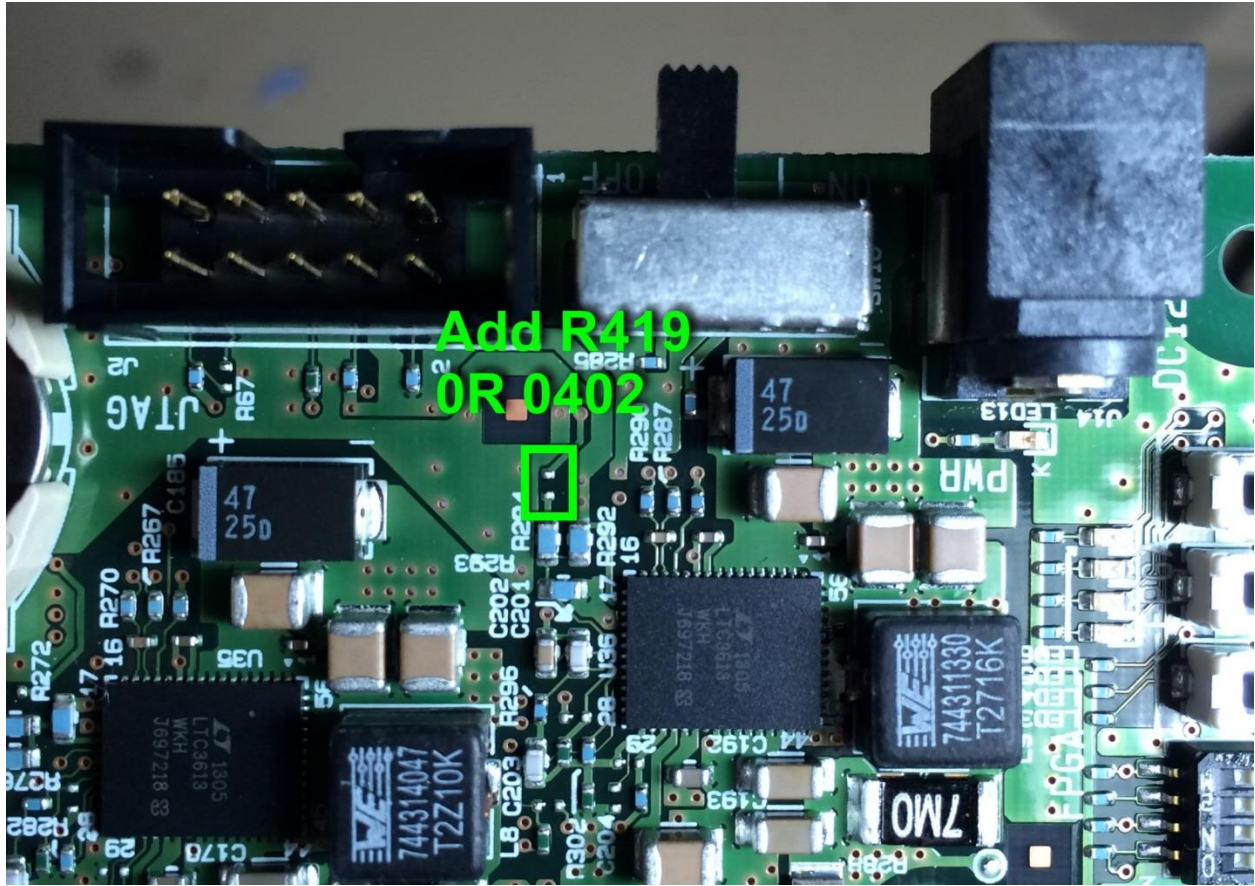
2.2 VDAC Changes

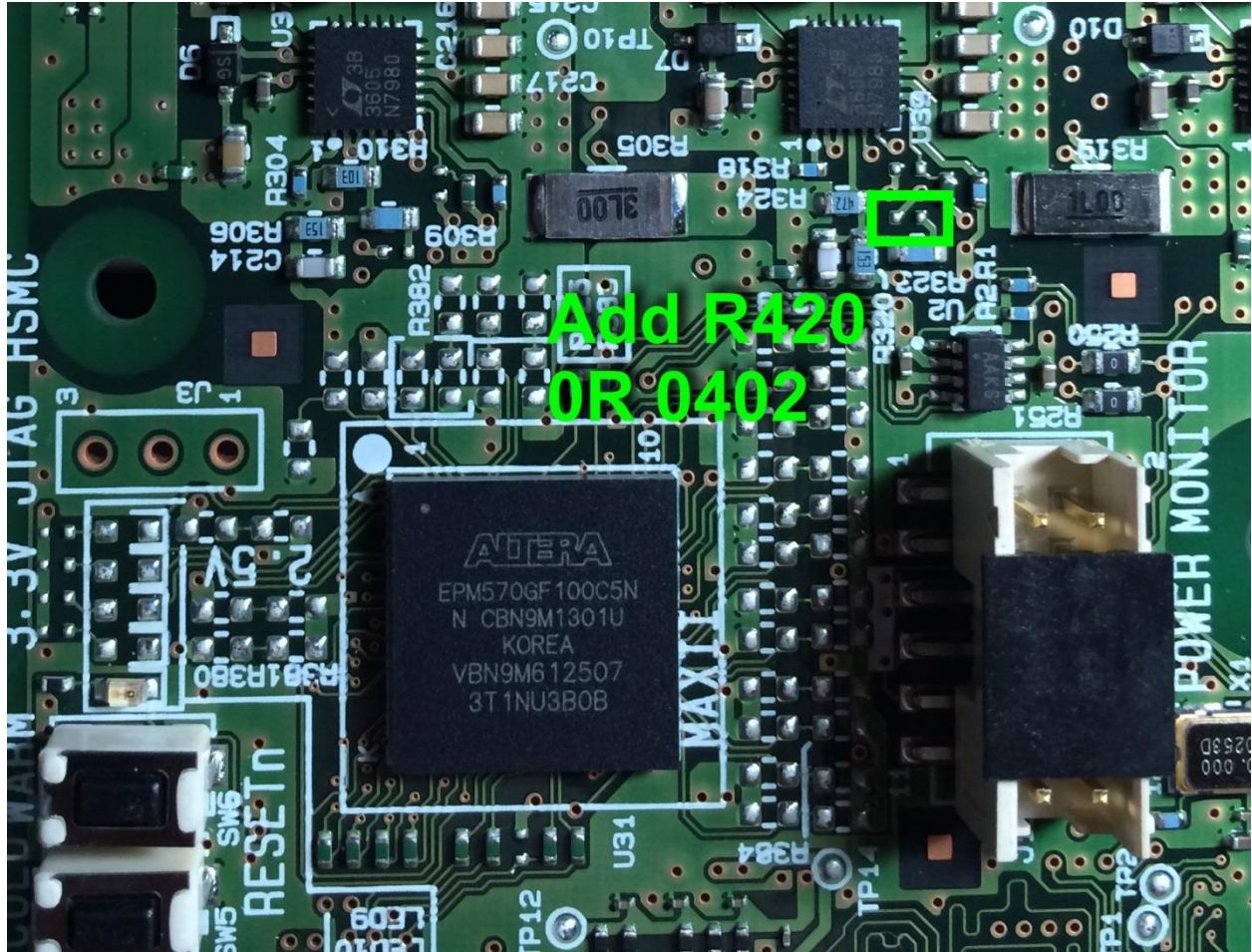
The first four resistor changes are on page 18 (power monitor) of the Helio schematic.

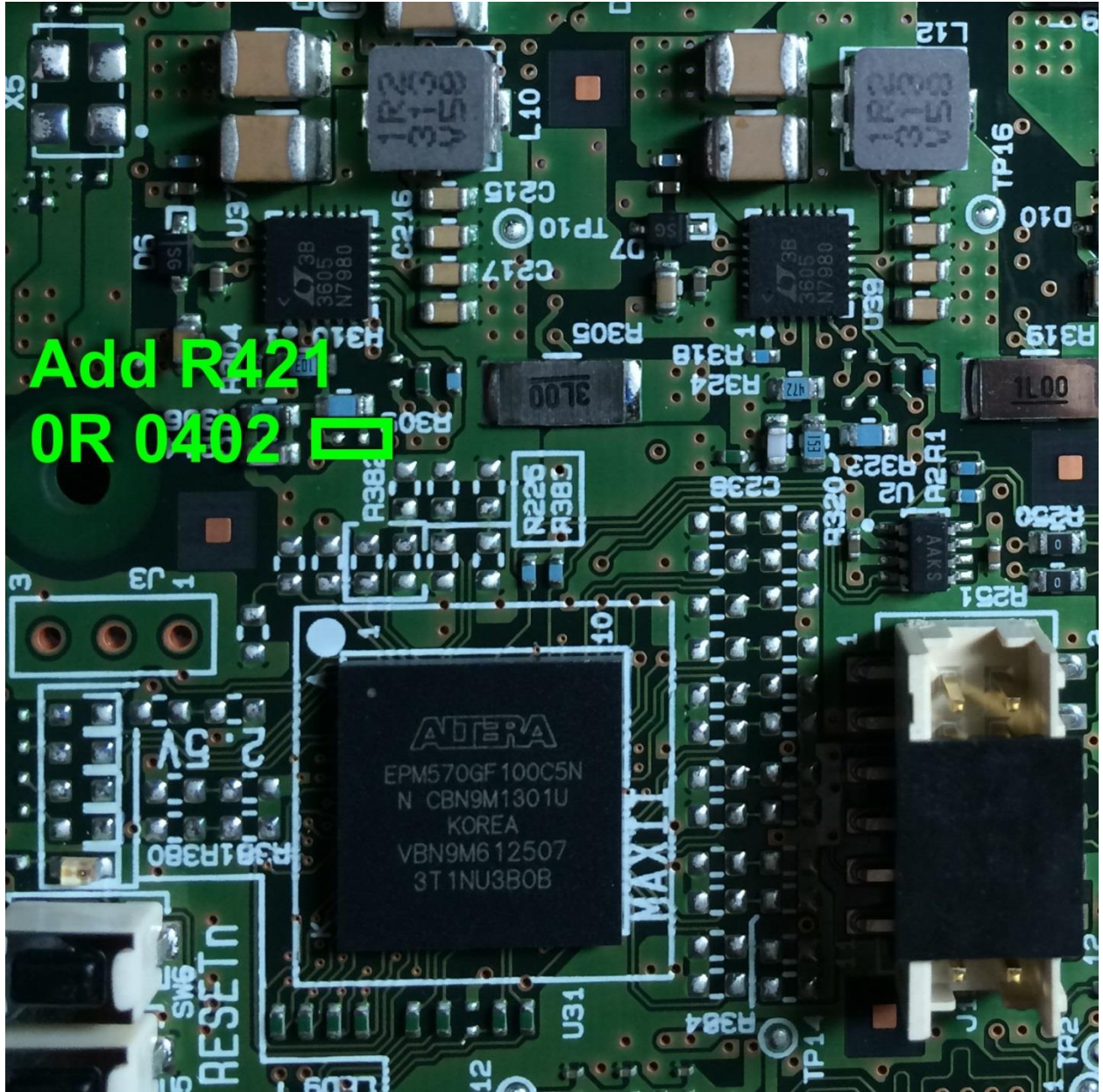
- **ADD** zero ohm resistors R419, R420, R421 and R422.



Locate the resistors on the board using the photos. Resistors R419, R420, R421, and R422 are highlighted in the photos below:

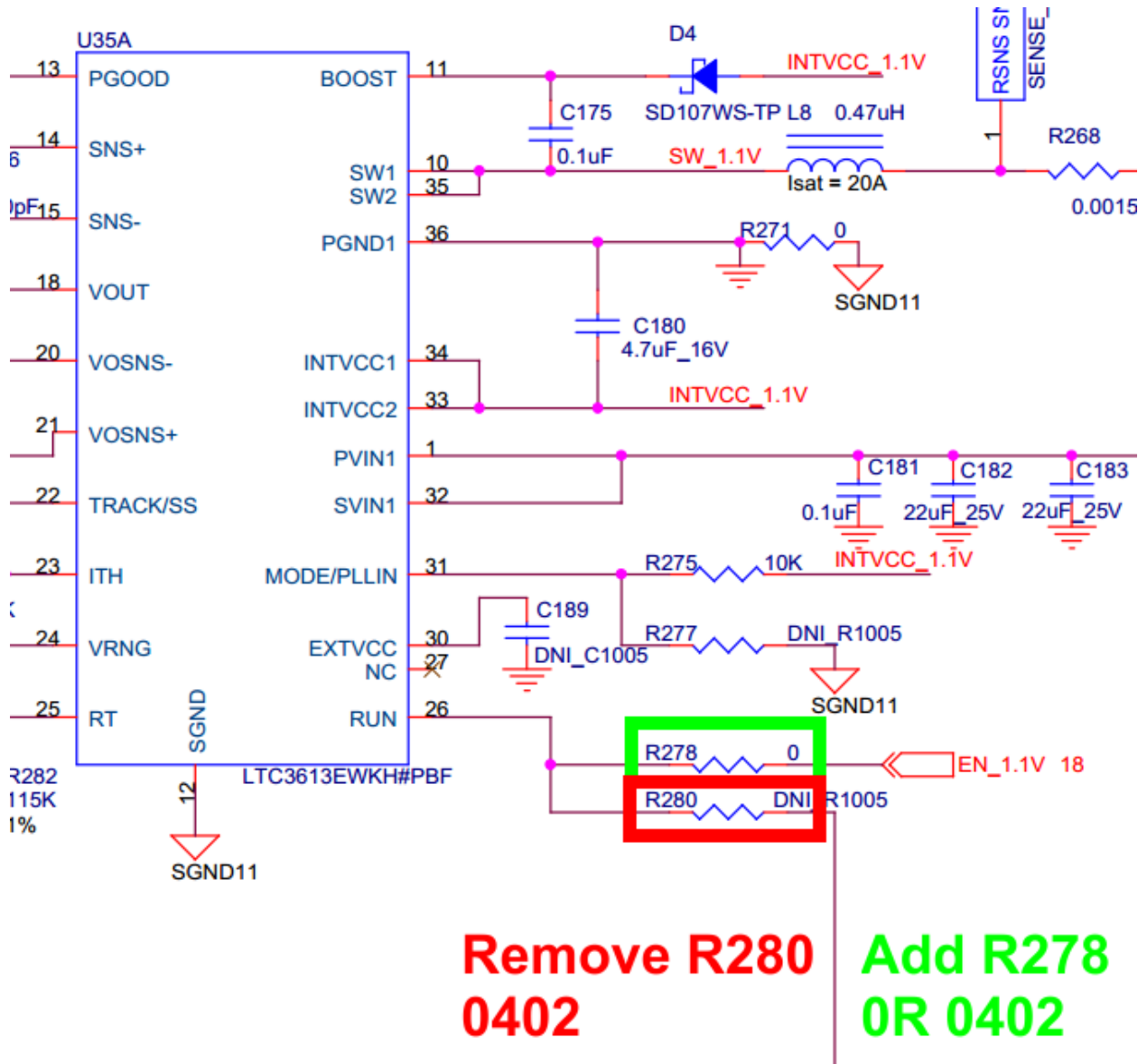




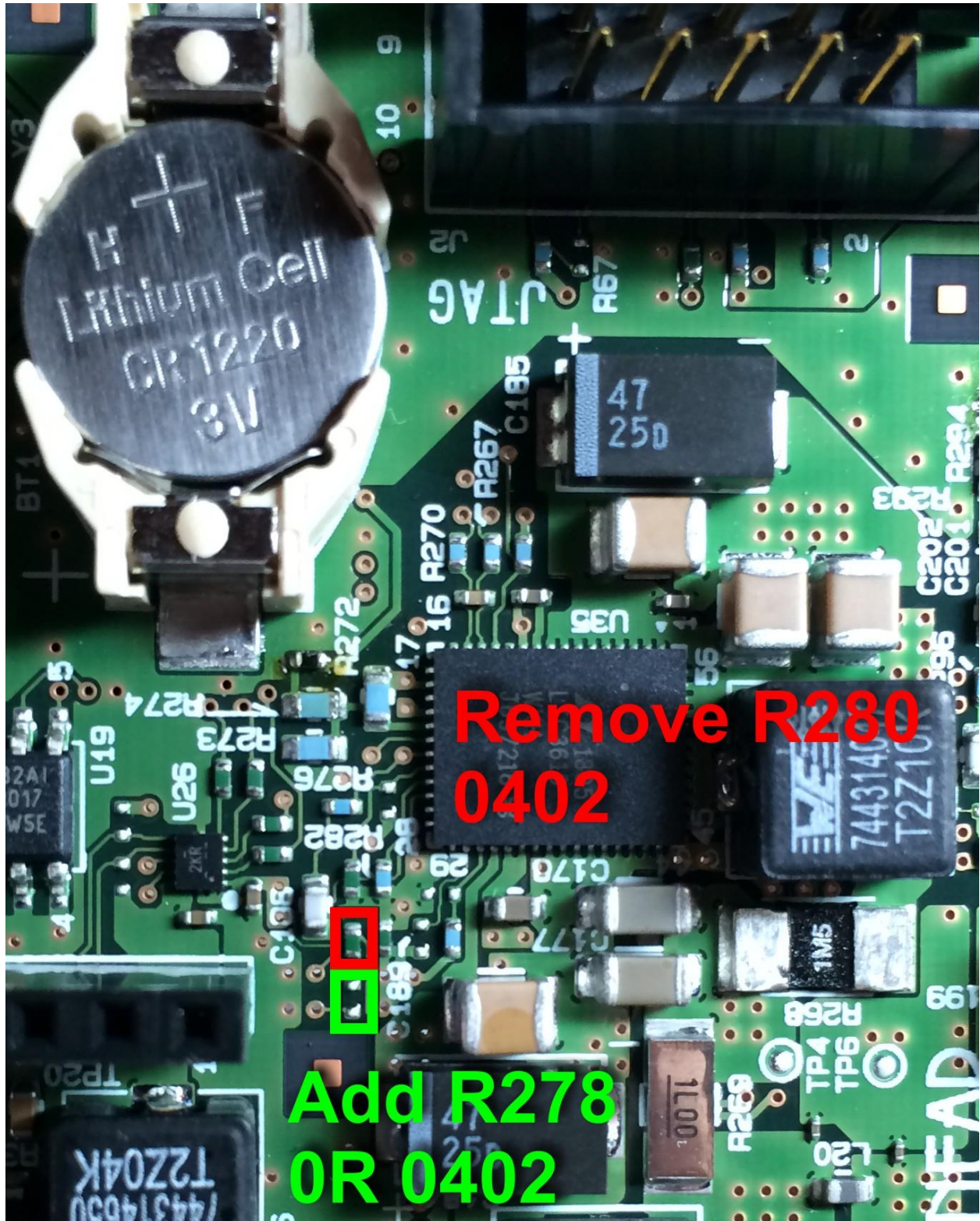


2.3 Voltage output enable (1.1 V)

- ❑ **REMOVE** resistor R280 and **ADD** zero ohm resistor R278 located on schematic page 19.

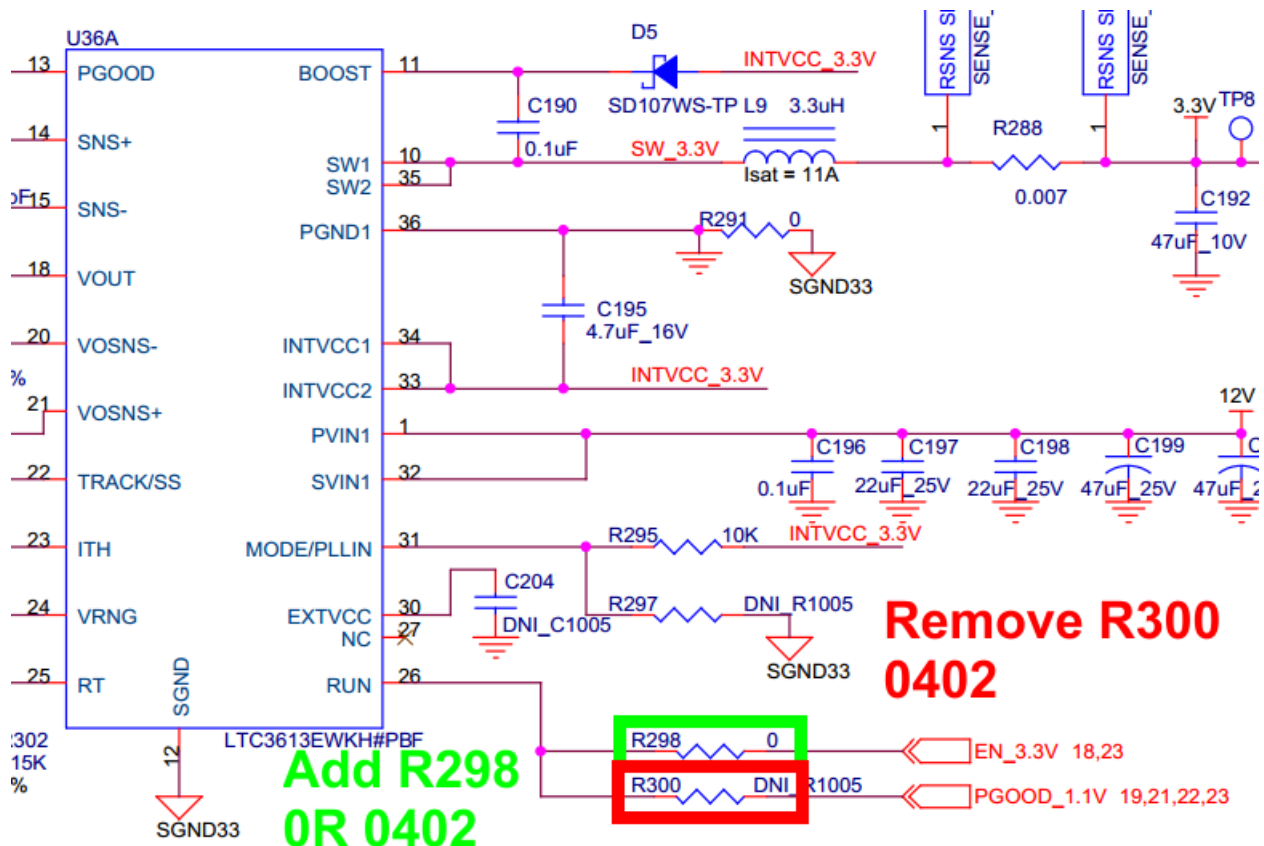


R280 and R278 are next to each other on the board. They are highlighted in the photo below:



2.4 Voltage output enable (3.3 V)

- REMOVE resistor R300 and ADD zero ohm resistor R298 located on schematic page 20.

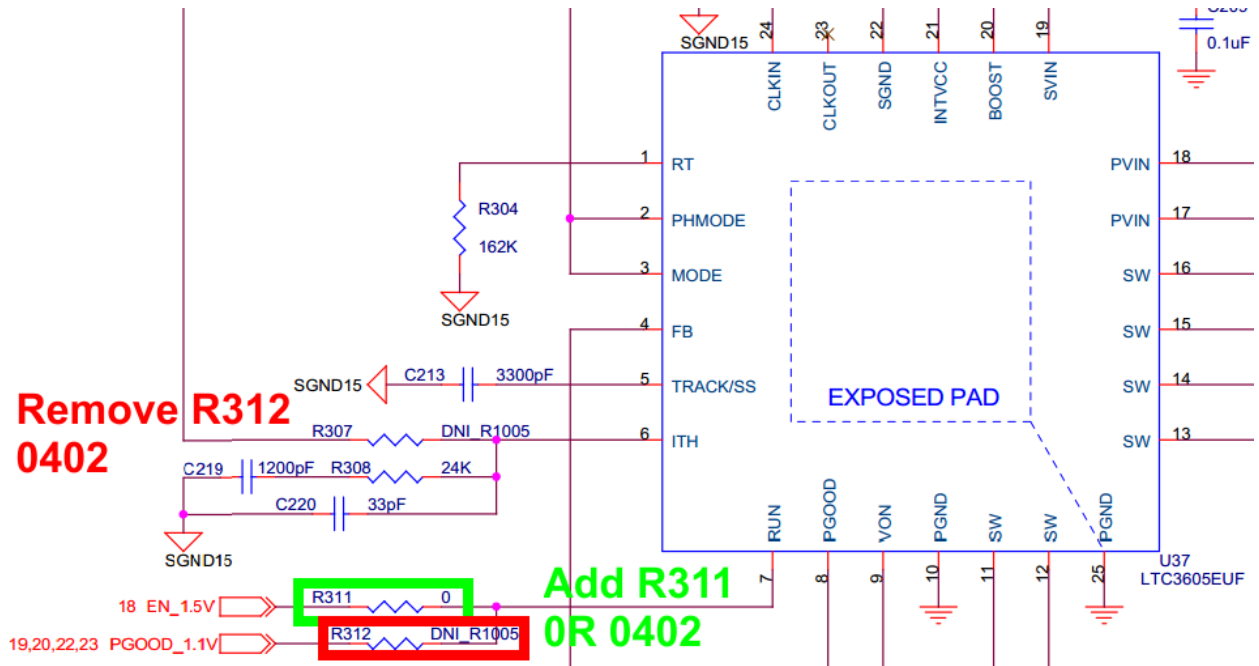


Resistors R300 and R298 are next to each other on the board. They are highlighted in the photo below:

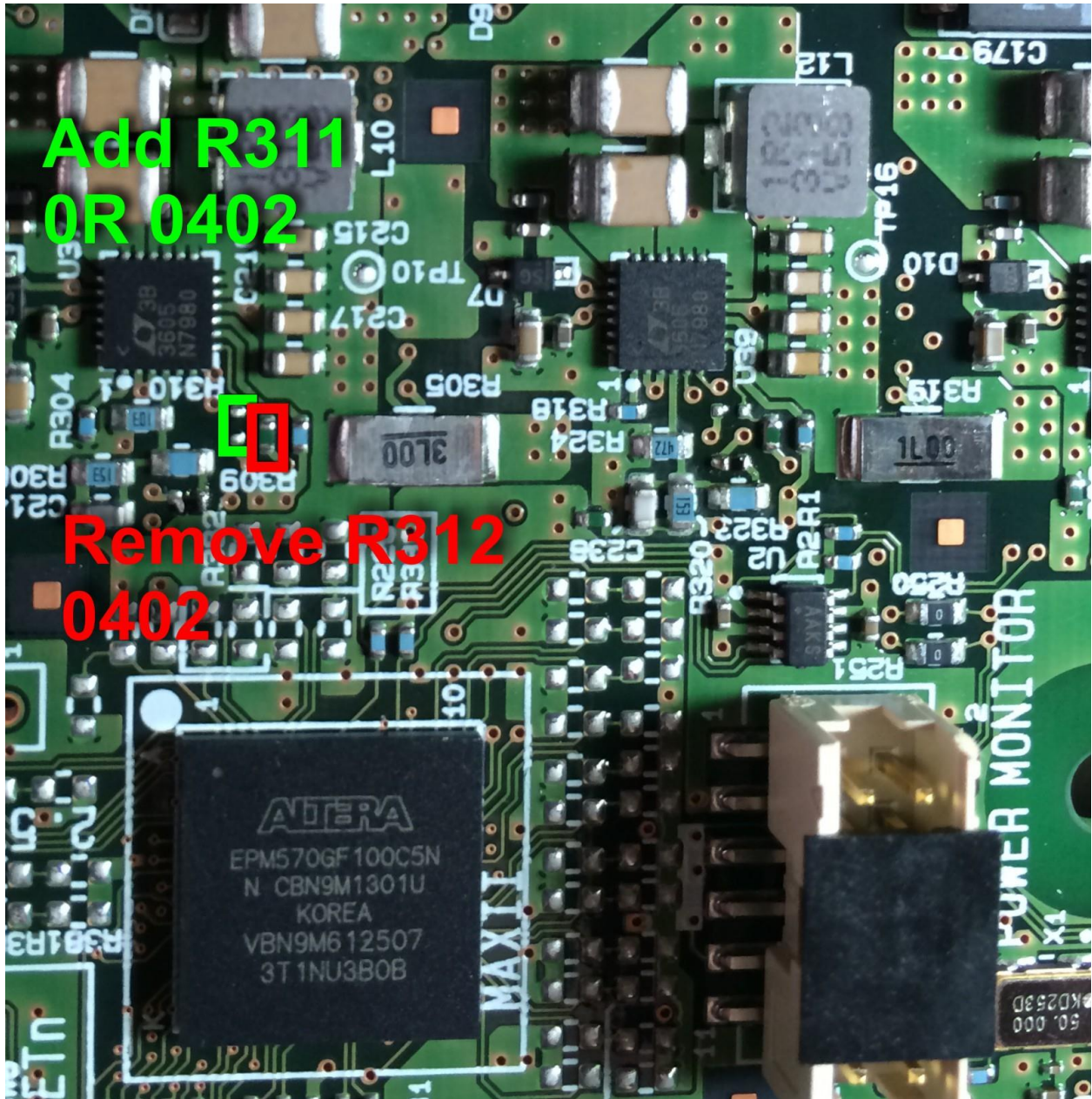


2.5 Voltage output enable (1.5 V)

- ❑ REMOVE resistor R312 and ADD zero ohm resistor R311 located on schematic page 21.

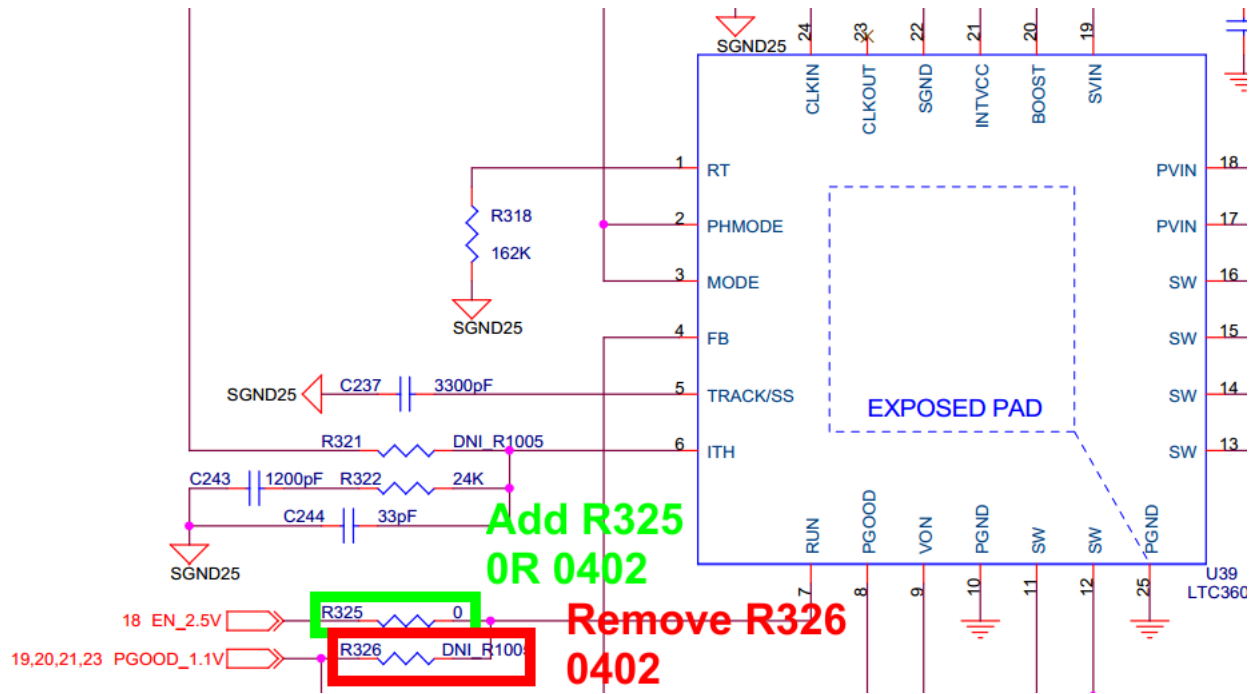


Resistors R311 and R312 are next to each other on the board. They are highlighted in the photo below:

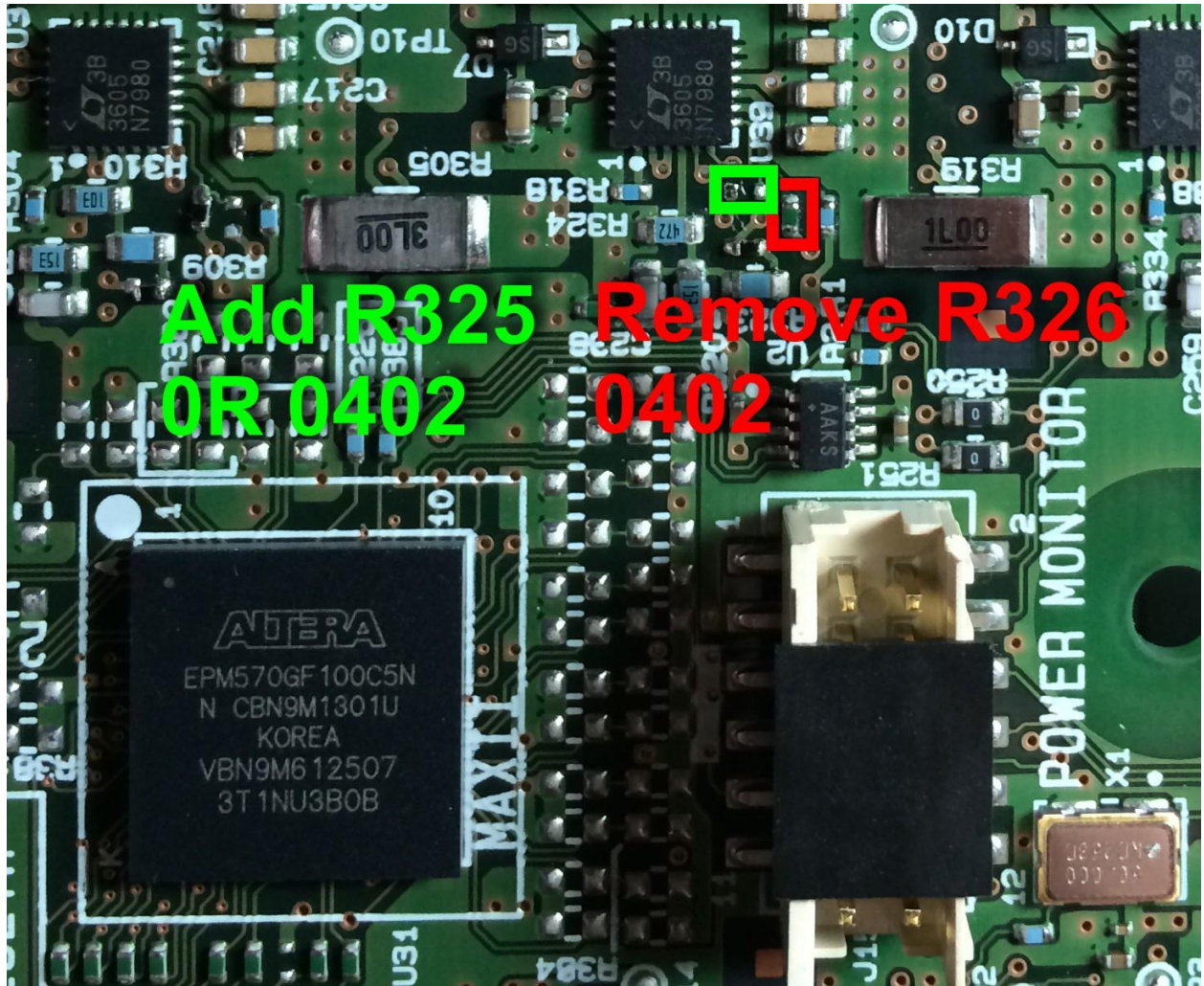


2.6 Voltage output enable (2.5 V)

- ❑ **REMOVE** resistor R326 and **ADD** zero ohm resistor R325 located on schematic page 22.

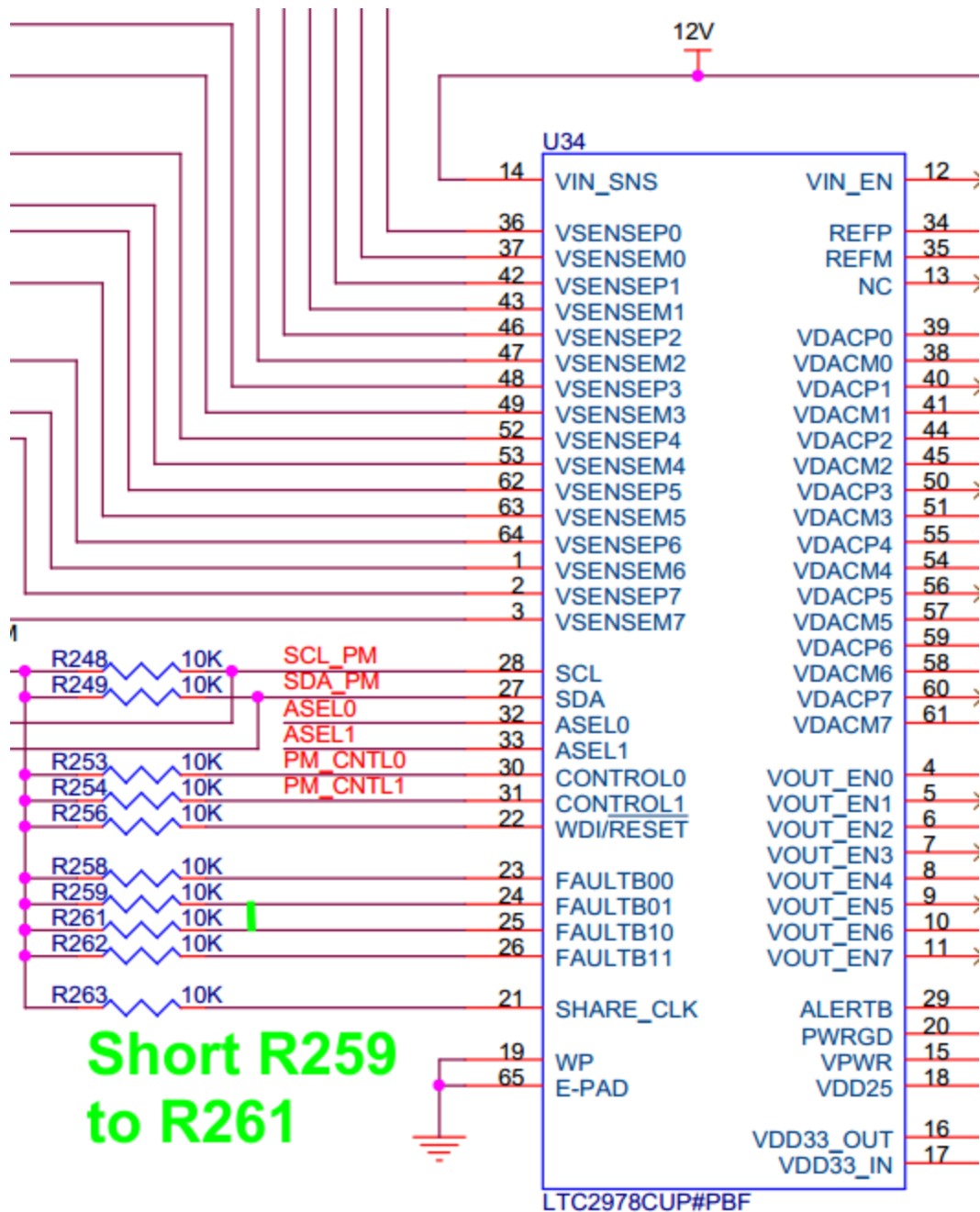


Resistors R325 and R326 are next to each other on the board. They are highlighted in the photo below:

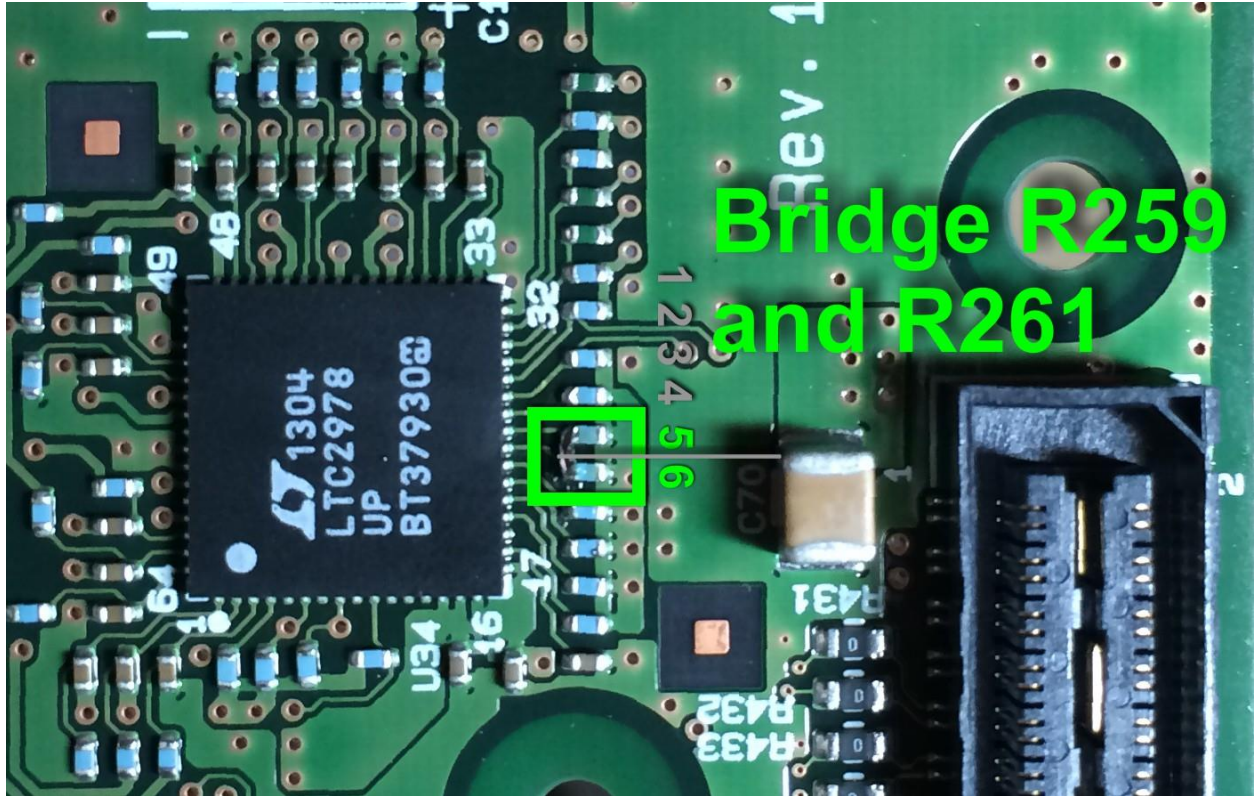


2.7 Fault handling Connection

- Next, a **SHORT** needs to be created between resistors R259 and R261 as highlighted in the schematic below. This fix is from version 1.3 of the schematic.



Notice that the resistors are shorted on the side nearest to the LTC2978. The short can be a solder bridge, wire bridge (better), or 0402 0 ohm resistor (best).



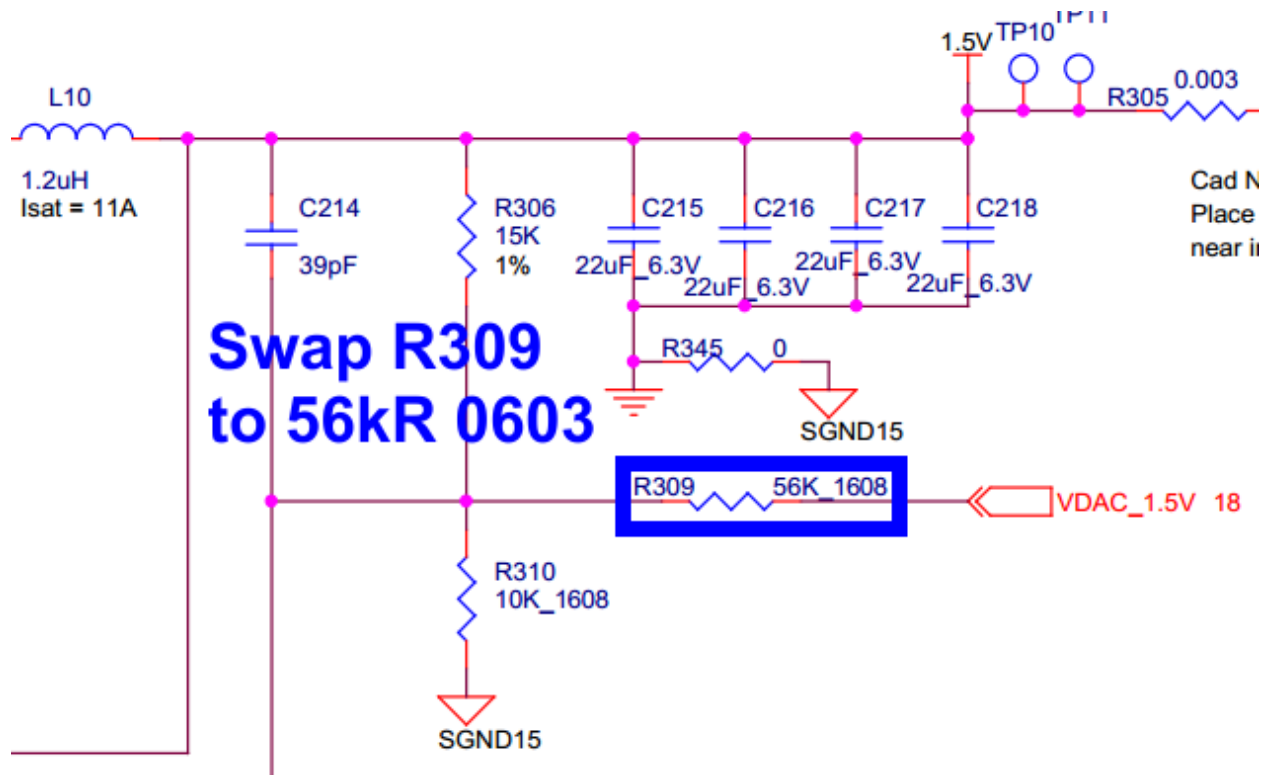
2.8 Other schematic 1.3 changes

There are additional changes from the 1.2 to the 1.3 rev boards. These changes make improvements to the power control circuits and are required to demonstrate the LTC2978 features. The rest of the document discusses these changes.

The resistor changes are:

- R266 is changed from 1K to 100K ohms (size 0402)
- R274 is changed from 215K to 75K ohms (size 0603)
- R294 is changed from 66.5K to 20K ohms (size 0603)
- R309 is changed from 215K to 56K ohms (size 0603)
- R323 is changed from 175K to 36K ohms (size 0603)

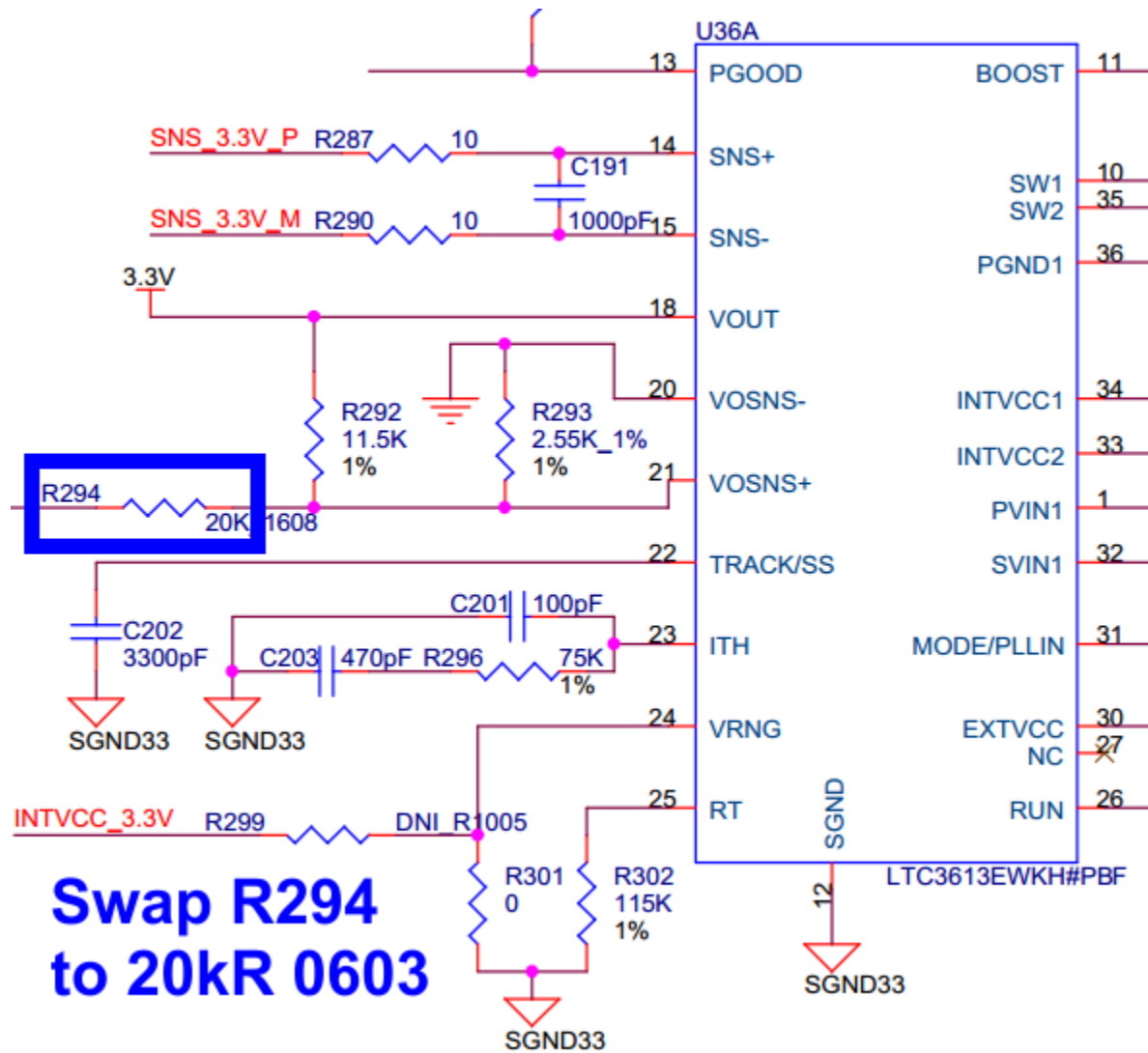
- **Change** R309 to a 56K ohm resistor from schematic page 21.



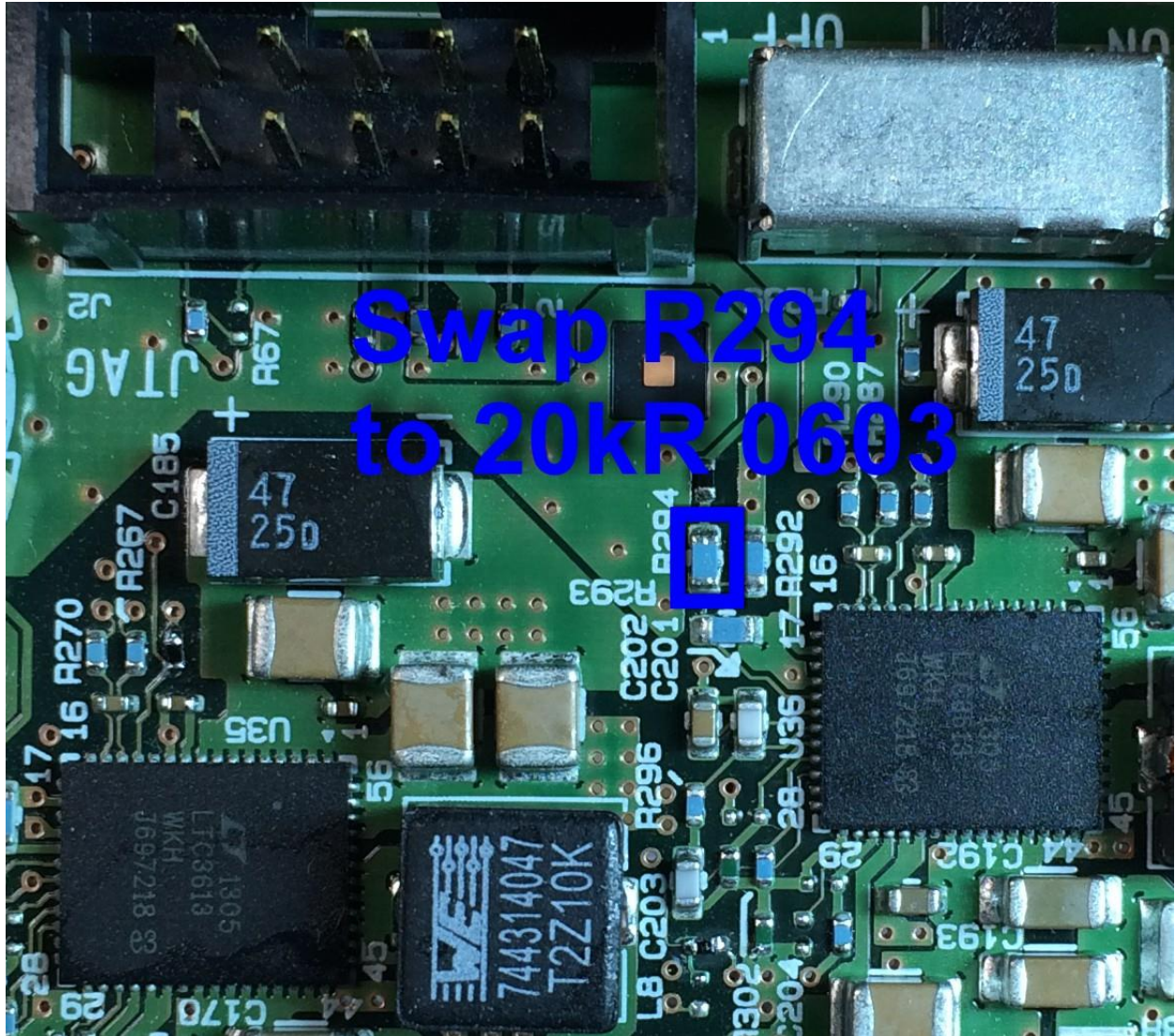
Resistor R309 is highlighted in the photo below:



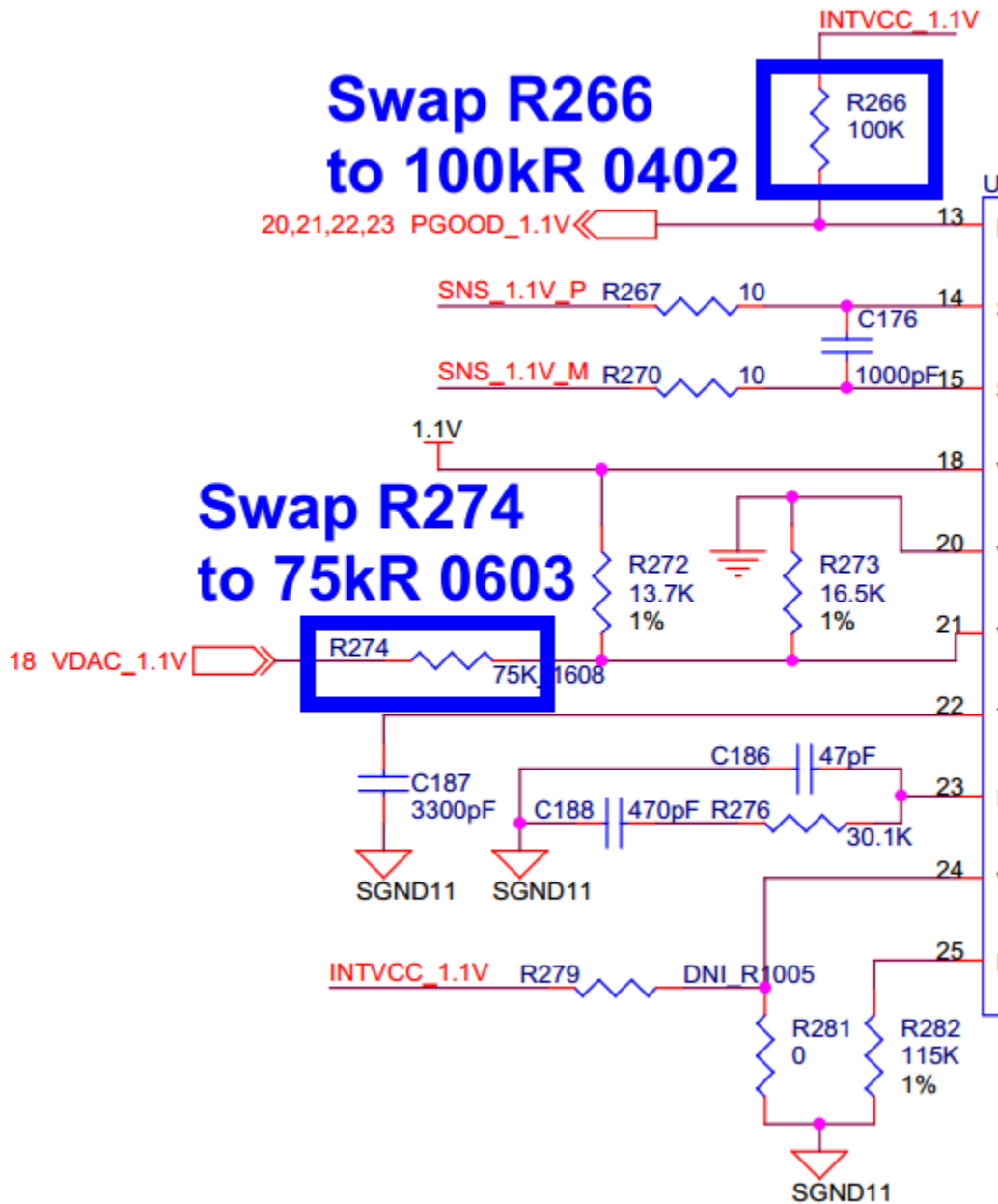
- Change R294 to a 20K ohm resistor from schematic page 20.



Resistor R294 is highlighted in the photo below:



- **Change** R274 to 75K ohm resistor and change R266 to a 100K ohm resistor from schematic page 19.

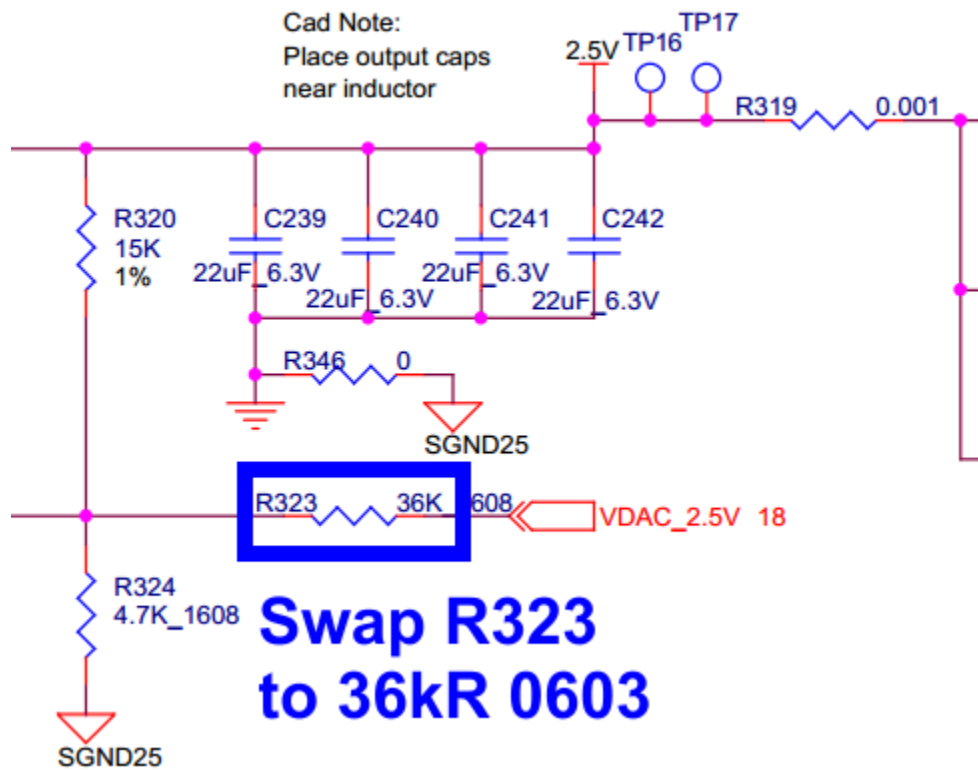


Resistors R274 and R266 are highlighted in the photos below:





- **Change** R323 to a 36K ohm resistor from schematic page 22.



Resistor R323 is highlighted in the photo below:



3 Notes

Document Revision History

Revision	Date	Comments
0.1		Initial Draft
0.2		Internal Review
1.0		Customer Release
2.0	March 21, 2014	Updated to v2.0, Added board shots
		Updated photos, schematics, added modification check list, clean up