Hardware Change Log

*[P80 PDU]*

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| Document Revision: |  | Date: | *14-03-2018* |
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| Action | Name | Function | Signature | Date |
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# Changelog

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| --- | --- | --- | --- |
| Date | Revision | Author | Description |
|  |  |  |  |
| 14-12-2018 | 1 |  | Initial release first prototype - EDA build no. 17.1.9.592 |
| 17-04-2020 |  |  | Updated with revision 3 changes |

# Purpose and Scope

This document describes the changes for each revision of the P80 PDU.

Raw PCB Number: 100696-x

# Changes to be implemented (Pending)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| No. | Description | BOM | Schematic | Layout | Who | Status |
|  | All Harwin Gecko Connector, J1, J8, J9, J12, J13, is difficult to solder. Add thermal relief to GND and power planes. |  |  | X | JKRI |  |
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# Revision 3.1 changes implemented

Changes implemented to generate PCB revision 3. (new layout)

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| No. | Description | BOM | Schematic | Layout | Who | Status |
| 1 | The ADC opamp buffer circuit for HV load switch current measurements must be modified. The current circuit cannot drive the output signal fast enough.  Modifications needed:  U4 = OPA192  R4 = 4k7  R5 = 1k0  R95 = 100 | X | X |  | JKRI |  |
| 2 | The Vcc switch, change the Fast trip current from 3A to 1A by changing R48 to 68mohm. This will reduce the 3V3 voltage drop as the Fast trip current limit will react faster. To have the same current limit, change R60 to 1,6k (R\_imon, I\_limit=316mA)  Modification:  R48 to 68mohm (ERJ3BWFR068V)  R60 to 1,6kohm | X | X |  | JKRI |  |
| 3 | Low voltage switch, the fast trip current threshold is 12A. Reduce this current limit to 6A with these modifications: (Master sch). Also the datasheet recommended current sourcing out of IMON is lowered to be in the range 0mA to 1mA.  R53 change to 10mohm (KRL2012E-M-R010-F-T5)  R54 change to 51ohm  R132 change to 1kohm  Must be changed on all Low voltage switches. | X | X |  | JKRI |  |
| 4 | Thermal relief on Gecko connectors |  |  | X |  |  |
| 5 | Change R164 to not mounted (Master sch R17) | X |  |  | JKRI |  |
| 6 | Change D3 (Master sch.) from MBRAF260T3G to MBRAF360T3G in HV output circuit. This will reduce Output voltage drops down to -2,75V when output short circuit. | X | X |  | JKRI |  |
| 7 | Change D7 (Master sch.) from MBRAF260T3G to MBRAF360T3G in special HV output circuit. This will reduce Output voltage drops down to -2,75V when output short circuit. | X | X |  | JKRI |  |
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# Revision 3.0 changes implemented

Changes implemented on PCB revision 2 to upgrade its function to reflect all modification going to be made on PCB revision 3. With this it is possible to use the stock of PCB revision 2.

All the details are listed in the excel sheet: **PDU BOM changes Rev 2.xlsx** located in this folder:

\\file01\Projects\SSG-Pearls Constellation\Work Packages\wp30 - platform engineering\WP32 Power design and battery cycling\P80\PDU\verification\2. Pilot.

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| --- | --- | --- | --- | --- | --- | --- |
| No. | Description | BOM | Schematic | Layout | Who | Status |

# Revision 2 changes implemented

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| No. | Description | BOM | Schematic | Layout | Who | Status |
| 1 | FRAM write protect pin connect to CPU IO pin |  | X | X | TTH | DONE |
| 2 | Change all GanFet to Normal N-FET |  | X | X | TTH | DONE |
| 3 | Change low voltage load switch to new type |  | X | X | TTH | DONE |
| 4 | Diode D6 and D7 missing, Set as not mounted. But there might be a problem with running these two outputs in parallel. An other solution is to only use one FET and then use one Keystone resistor to connect the two outputs together | X |  |  | JOKR | DONE |
| 5 | On sheet “PDU\_HV – Main” the remark at SYNC oscillator U4 state “51k=3,9MHz”. This is the master frequency. The output frequency depends on the PH setting, which is 4, thus output frequency is 980KHz. |  | X |  | JOKR | DONE |
| 7 | The Buck converter efficiency can be improved by lowering the switching frequency. Change external clock frequency from 971kHz to e.g. 667kHz by changing R19 from 51k to 75kohm. Verify LT8612 RT setting. | X |  |  | JOKR | DONE |
| 8 | Small stacked capacitors are a problem in production  Small stacked caps removed from design |  | X | X | TTH | DONE |
| 10 | Change inductor to new type |  | X | X | TTH | DONE |
| 12 | Change high voltage gate driver to LTC7000-1 |  | X | X | TTH | DONE |
| 13 | Current measuring point after the switch  Low voltage measured on the *same* measurement resistor,  High voltage is using an IMON output from LTC7000 |  | X | X | TTH | NOT DONE |
| 14 | ADC datasheet recommend more decoupling at ADC’s Vref pin:  “The REFP pin requires a 10-μF ceramic capacitor to meet performance specifications. Place the capacitor directly next to the device. This capacitor ground pin must be routed to the REFM pin by a very short t” |  | X |  | JOKR | DONE |
| 15 | Low voltage output ADC current measurement input to ADC is above the Vref voltage. ADC input voltage is adjusted down with the following changes:  R134 (Master sch.) from 100ohm to 50ohm.  R45 (master sch.) from 10kohm to 2,4kohm    **Note** the current amplifier, LT6106 output voltage high cannot go higher than app. V+ (power supply) minus 1,2V. So with 3V3 powered outputs the maximum ADC input is app. 2V. | X |  |  | JOKR | N/A |
| 18 | R279, R280, R281, R282, R283, R284, R285, R286, R287 and R299 should be changed to 240k | X |  |  | CAF | Done |
| 19 | R290, R291, R292, R293, R294, R295, R296, R297, R298, R313 should be changed to 10k | X |  |  | CAF | Done |
| 9 | CPU must be placed on top 🡪 CPU placed on Bottom |  | X | X | TTH | N/A |
| 16 | U8 and U15 (Master sch) should have V+ (pin 5) connected to Vbat. |  | X | X | CAF | N/A |
| 17 | R55 and R131 (Master Sch) should be changed to 1M | X |  |  | CAF | N/A |
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