

LIGO HANFORD OBSERVATORY

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# MEMORANDUM

DATE: August 27, 2015

|  |  |
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| TO: | ISC team |
| FROM: | Daniel Sigg, Koji Arai |
| SUBJECT: | EOM/AOM Diver Modifications |
| Refer to: | LIGO-E1500353-v2 |

This modifications apply to [D0900761-B](https://dcc.ligo.org/LIGO-D0900761), [D0900847-B](https://dcc.ligo.org/LIGO-D0900847), [D0900848-C](https://dcc.ligo.org/LIGO-D0900848) and [D1000216-B](https://dcc.ligo.org/LIGO-D1000216) to bring them to revisions C, C, D and C, respectively.

The affected serial numbers are S1500117 to S1500128.

**Power Board** [**D0900848-C**](https://dcc.ligo.org/LIGO-D0900848)

Change 1:

Capacitors need to be added to prevent the AD829 driving the pass transistor from oscillating.

C20, C35, C36, C37, C50, C51, C52, and C63 → 1nF

C91 → add a 100pF between U6 op27 (PIN6) and VREFP (PIN7)   
 should fit between the pads of C22 and R32

W1 → remove solder jumper

Change 2:

Remove the protection diodes which are no longer needed with the use of the power sequencing relays

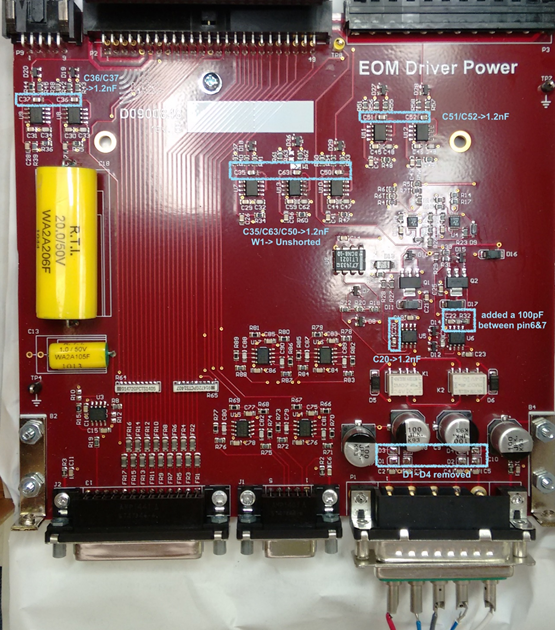
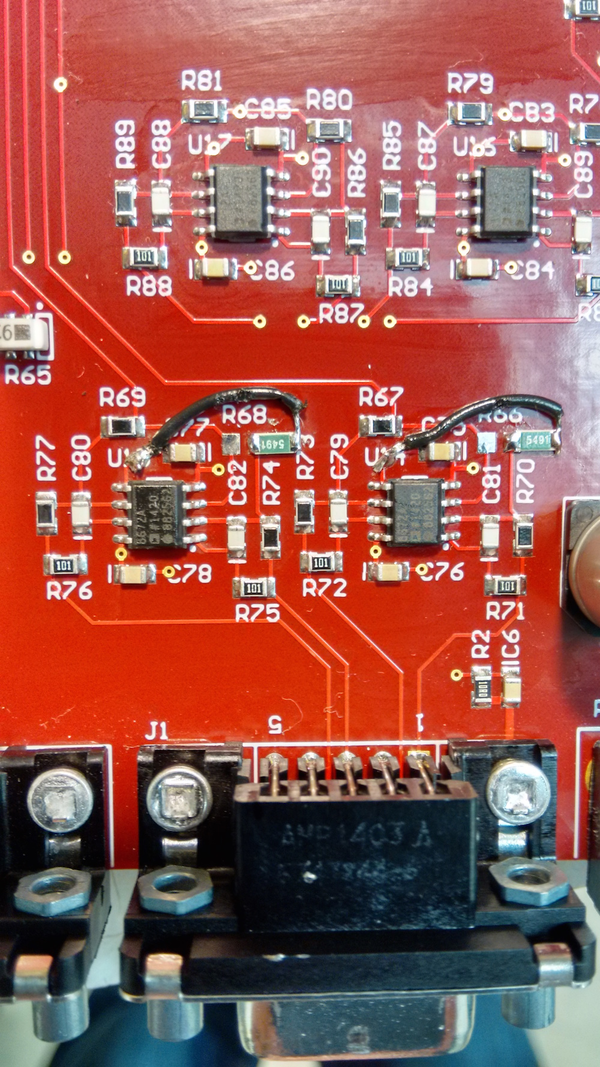
D1, D2, D3, D4 → remove

Change 3:

Fix the gain in the differential output stages.

R66, R68 → 5.49K, shift and use only the pad above R70 and R74

J1, J2 → add a jumper wire from the free end to ground (see pic)



**Servo Board** [**D0900847-B**](https://dcc.ligo.org/LIGO-D0900847)

Change 1:

Reduce the high frequency gain of the servo to allow for better phase margin.

R69 → 200

C49 → 1nF

R71 → 3.3K

R67 → 3.3K

Change 2:

Add capacitor at the output drive to ground to reduce the backfeed of RF from the attenuator board.

C58 → 1nF, add between signal and ground pin of SMA connector J5

**Attenuator Board** [**D1000216-B**](https://dcc.ligo.org/LIGO-D1000216)

Change 1:

Add capacitor at the control input to ground to reduce the backfeed of RF to the servo board.

C2 → 1nF, add between signal and ground pin of SMA connector J3

**Controller Board** [**D0900761-B**](https://dcc.ligo.org/LIGO-D0900761)

Change 1:

Double the gain of the monitor points.

R27A, R27B → 6.65K

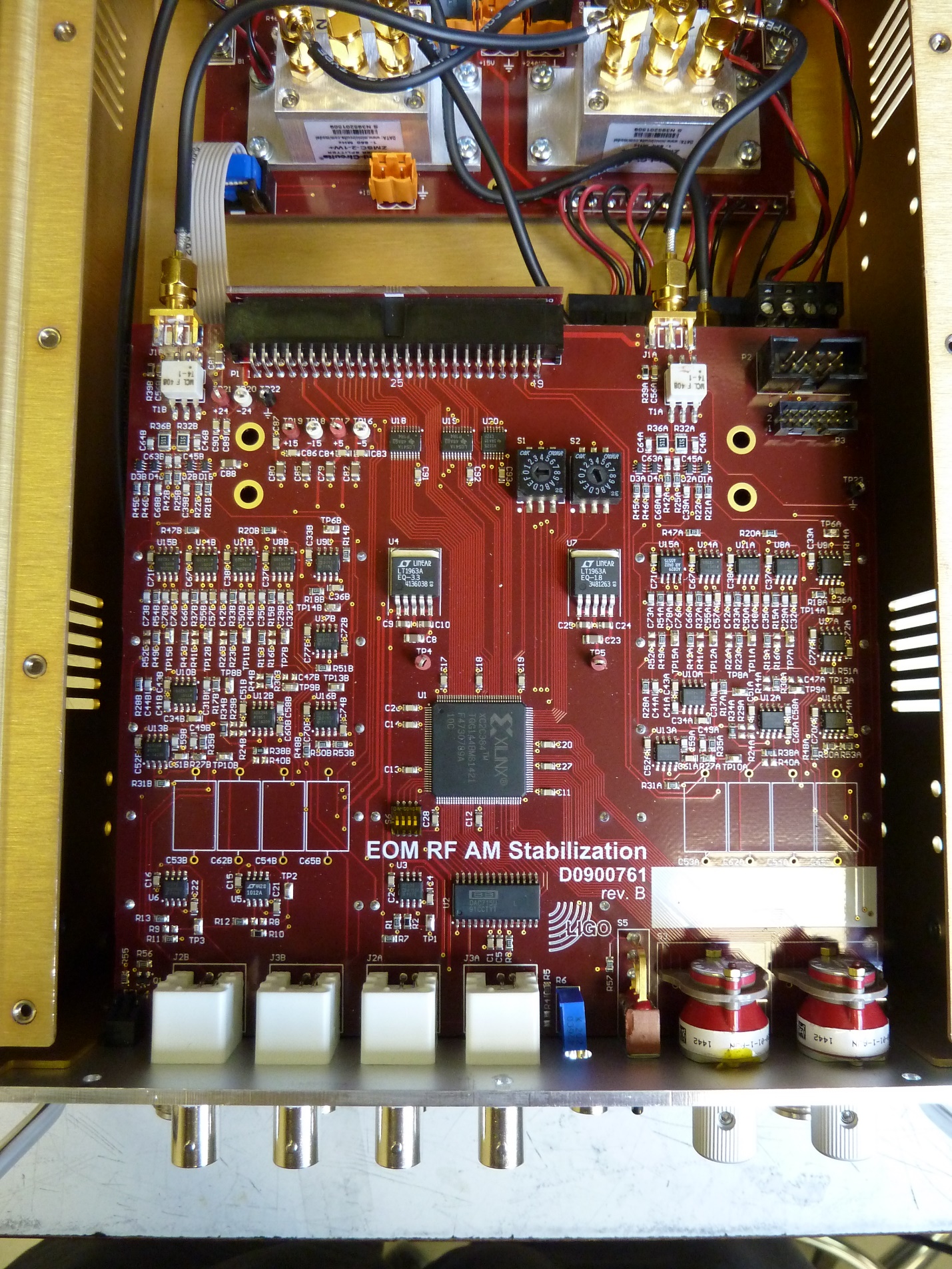
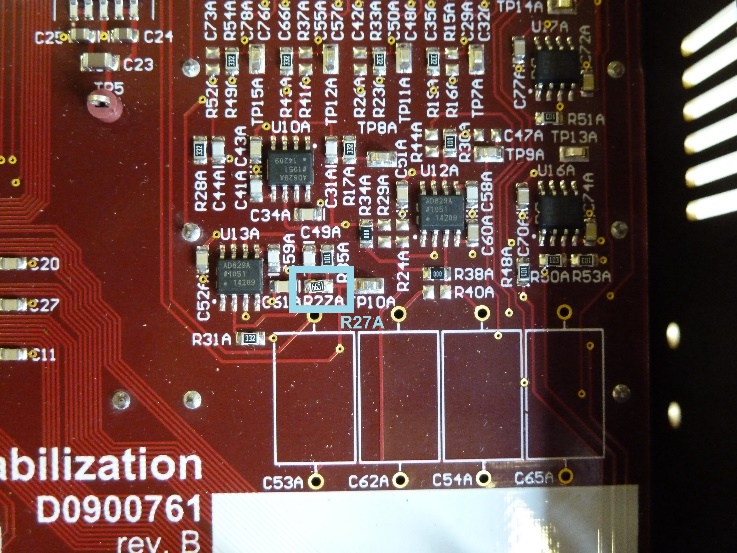
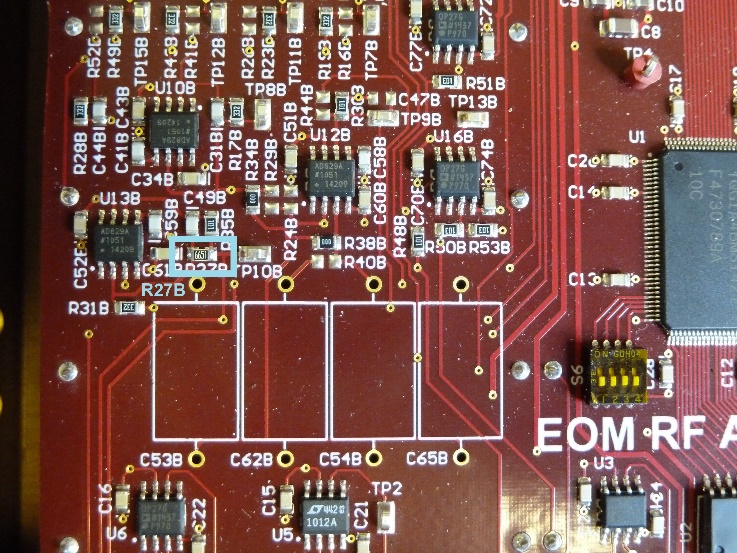
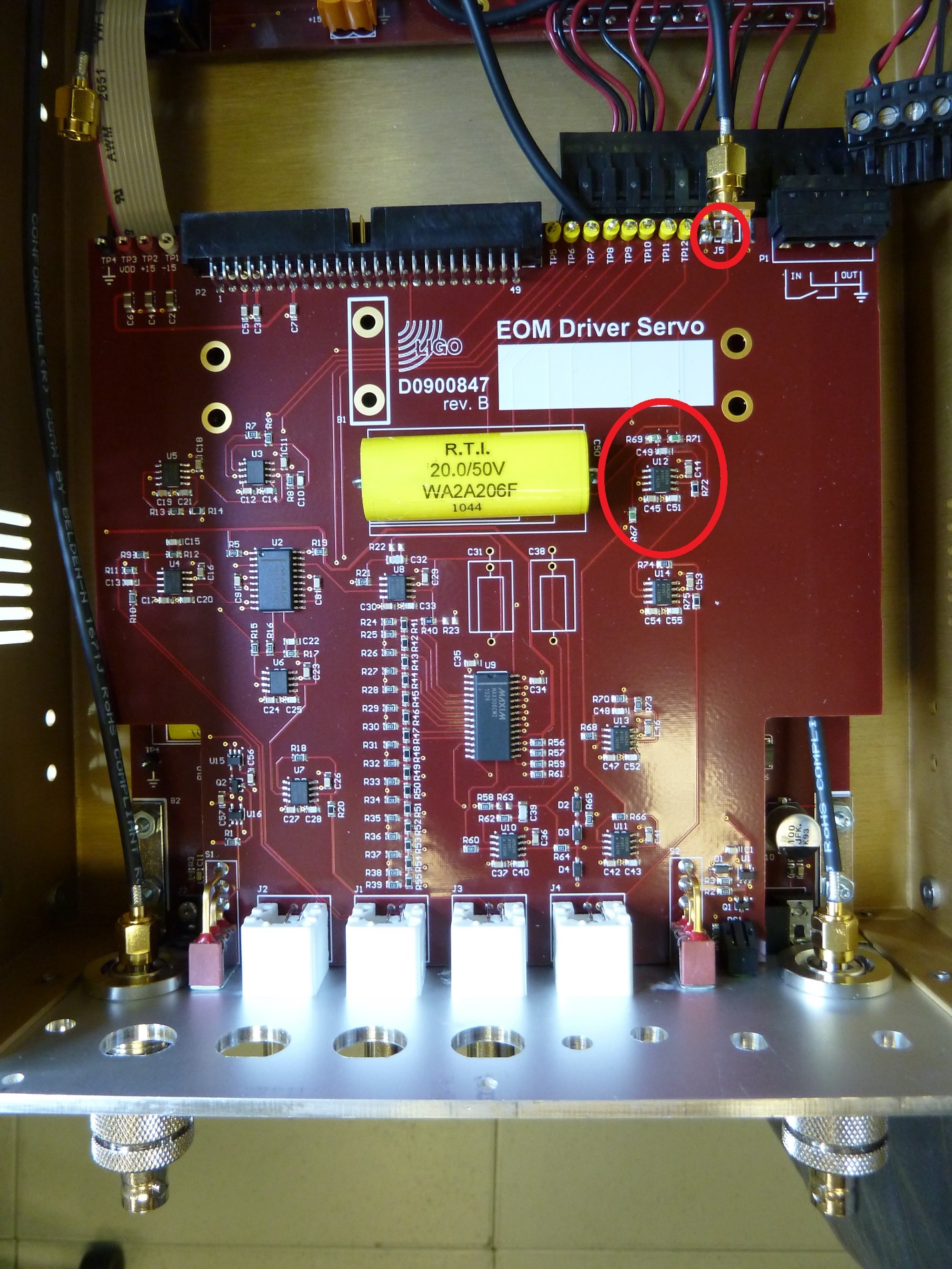
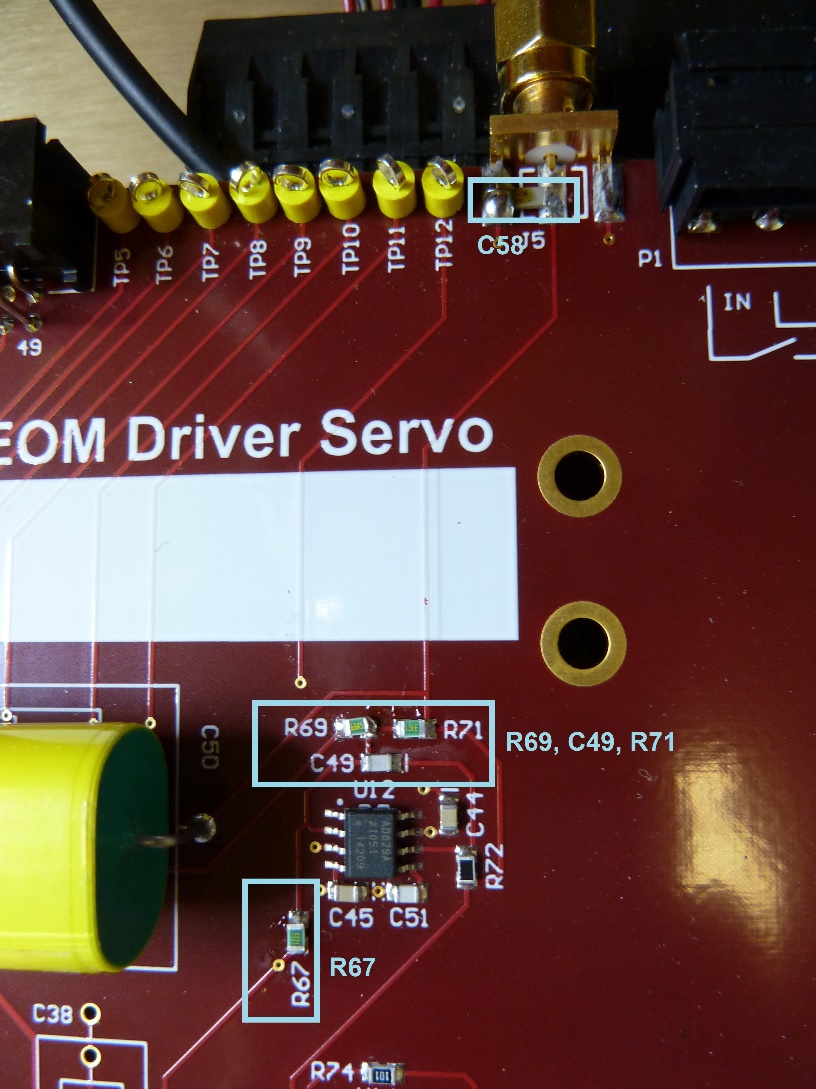
**Final Checks:**

After re–assembling the chassis the following checks should be performed:

Check 1: Test the tabs of Q3 to Q9 on the power board for shorts with the rear panel.

(Powering up the chassis with a short will damage the transistor.)

Check 2: Make sure the backplane board is inserted center into the rear connectors.   
 (It is possible to offset the backplane by one row and damage Q1 or Q2 on the  
 power board.)



BOM (for 12 units):

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| **Qty** | **Item** | **Distributor** | **Description** |
| 108 | 311-1122-1-ND | Digi-Key | 1nF, 0805, NPO  Power board: C20, C35, C36, C37, C50, C51, C52, and C63  Servo board: C49 |
| 12 | 311-1111-1-ND | Digi-Key | 100pF, 0805, NPO  Power board: C91 |
| 24 | P5.49KDACT-ND | Digi-Key | 5.49K, 0805, 0.1%  Power board: R66, R68 |
| 12 | P200DACT-ND | Digi-Key | 200, 0805, 0.1%  Servo board: R69 |
| 24 | P3.3KDACT-ND | Digi-Key | 3.3K, 0805, 0.1%  Servo board: R67, R71 |
| 24 | 478-1492-1-ND | Digi-Key | 1nF, 1206, NPO  Servo board:C58  Attenuator board: C2 |
| 24 | *P6.65KDACT-ND* | Digi-Key | 6.65K, 0805, 0.1%  Controller board: R27A, R27B |
| 1 | 6710 BK005-ND | Digi-Key | Hook-up wire |
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