

KAGRA 3rd External review for Analog Electronics subgroup

2014/4/3(Thu)

@ICRR

Osamu Miyakawa

| Subsystem | Project name | Item name | 種別 | Description | prototype 必要数 | iKAGRA 必要数 | bKAGRA 必要数 | 完了数 | | 開始日 | 終了予定日 | 終了日 | Currrnt Status | 提案者 | 実作業をする人 | 達成率 |
|-----------|-----------------------|-------------------|-------------|----------------|------------------|---------------|---------------|-----|----|------------|------------|------------|--------------------------------------|-----|-----------|------|
| VIS | LVDT driver | | prototype | | 1 | | | 1 | | 2011/9/1 | 2012/1/31 | 2012/1/31 | 使用中。 | 高橋 | NIKHEF | 100% |
| VIS | LVDT driver | | iKAGRA | | | 8 | | | | 2013/2/15 | 2014/11/30 | | 基板待ち。 | 高橋 | NIKHEF | 20% |
| VIS | | Over all design | | | | | | | | 2013/2/15 | | | 箱にどのように入れるか検討 | | | |
| VIS | | LVDT driver board | | HIKHEFデザインの基板 | | | | | 30 | 2013/5/29 | 2014/1/15 | | NIKHEFに基板を30セット頼んでいる。一月半ばに出来上がる。 | | NIKHF | |
| VIS | | LVDT interface | | | | | | | | | | | デザイン検討中、サスペンド | | 上泉 | |
| VIS | | LVDT chassis | | | | | | | | | | | 未定 | | 上泉 | 10% |
| VIS | LVDT driver | | bKAGRA | | | | 11 | | | 2015/3/1 | 2015/5/31 | | | 高橋 | | 0% |
| VIS | LVDT-Coil distributor | | prototype | LVDTとCoilに分岐 | 1 | | | | | 2013/11/18 | 2014/1/31 | 2014/2/4 | 仕様がほぼ決定。 | 関口 | 宮川 | 100% |
| VIS | | 仕様決定 | | | | | | | | 2013/11/18 | 2013/12/18 | 2013/12/27 | 仕様決定。 | 関口 | 宮川 | 100% |
| VIS | | 基板デザイン | | | | | | | | 2013/12/19 | 2013/12/25 | 2014/1/9 | 終了 | | 宮川 | 100% |
| VIS | | board製作 | | | | | | 1 | | 2014/1/1 | 2014/1/15 | 2014/1/29 | 終了 | | 上泉 | 100% |
| VIS | | Front panelデザイン | | | | | | | | 2013/12/19 | 2013/12/25 | 2014/1/20 | 終了 | | 上泉 | 100% |
| VIS | | Front panel製作 | | | | | | 5 | | 2014/1/1 | 2014/1/15 | 2014/1/28 | 終了 | | 上泉 | 100% |
| VIS | | Rear panelデザイン | | | | | | | | 2013/12/19 | 2013/12/25 | 2014/1/20 | 終了 | | 上泉 | 100% |
| VIS | | Rear panel製作 | | | | | | 5 | | 2014/1/1 | 2014/1/15 | 2014/1/28 | 終了 | | 上泉 | 100% |
| VIS | | 組み立て | | | | | | | | 2014/1/15 | 2014/1/31 | 2014/2/4 | 終了 | | 上泉 | 100% |
| VIS | LVDT-Coil distributor | | iKAGRA | LVDTとCoilに分岐 | | 7 | | | | 2014/9/1 | 2014/11/30 | | | 関口 | | 0% |
| VIS | LVDT-Coil distributor | | bKAGRA | LVDTとCoilに分岐 | | | 4 | | | 2015/3/1 | 2015/5/31 | | | 関口 | | 0% |
| VIS | GEO phone distributor | | prototype | 出力と電源供給 | 1 | | | | | 2013/11/18 | 2014/1/31 | 2014/2/4 | 仕様がほぼ決定。 | 関口 | 宮川 | 100% |
| VIS | | 仕様決定 | | | | | | | | 2013/11/18 | 2013/12/18 | 2013/12/27 | 仕様がほぼ決定。 | 関口 | 宮川 | 100% |
| VIS | | 基板デザイン | | | | | | | | 2013/12/19 | 2013/12/25 | 2014/1/9 | 終了 | | 宮川 | 100% |
| VIS | | board製作 | | | | | | 1 | | 2014/1/1 | 2014/1/15 | 2014/1/28 | 終了 | | 上泉 | 100% |
| VIS | | Front panelデザイン | | | | | | | | 2013/12/19 | 2013/12/25 | 2014/1/20 | 終了 | | 上泉 | 100% |
| VIS | | Front panel製作 | | | | | | 5 | | 2014/1/1 | 2014/1/15 | 2014/1/28 | 終了 | | 上泉 | 100% |
| VIS | | Rear panelデザイン | | | | | | | | 2013/12/19 | 2013/12/25 | 2014/1/20 | 終了 | | 上泉 | 100% |
| VIS | | Rear panel製作 | | | | | | 5 | | 2014/1/1 | 2014/1/15 | 2014/1/28 | 終了 | | 上泉 | 100% |
| VIS | | 組み立て | | | | | | | | 2014/1/15 | 2014/1/31 | 2014/2/4 | 終了 | | 上泉 | 100% |
| VIS | GEO phone distributor | | iKAGRA | 出力と電源供給 | | 1 | | | | 2014/9/1 | 2014/11/30 | | | 関口 | 上泉 | 0% |
| VIS | GEO phone distributor | | bKAGRA | 出力と電源供給 | | | 7 | | | 2015/3/1 | 2015/5/31 | | | 関口 | 上泉 | 0% |
| VIS | Coil driver | | prototype | | 5 | | | | | 2013/5/29 | 2014/1/15 | | EMACにて組み立て中、パネル納品待ち | 高橋 | EMAC, 上泉 | 100% |
| VIS | | Design | | | | | | | | 2013/5/29 | 2013/8/31 | | EMACにて設計済 | | EMAC | 100% |
| VIS | | board | | | | | | 5 | | 2013/9/1 | 2013/11/30 | | EMACにて製作中 | | EMAC | 100% |
| VIS | | Chassis | | | | | | 5 | | 2013/9/9 | 2013/10/1 | | IUのHamilton Metacraft製の物を5箱EMACに配布済。 | 宮川 | 上泉 | 100% |
| VIS | | Front pannel | | | | | | 5 | | 2013/11/12 | 2013/12/13 | | EMACに送付済 | | 上泉 | 100% |
| VIS | | Rear pannel | | | | | | 5 | | 2013/11/12 | 2013/12/13 | | EMACに送付済 | | 上泉 | 100% |
| VIS | | 組み立て | | | | | | | | 2013/12/1 | 2013/1/10 | | 組み立て完了 | | EMAC | 100% |
| VIS | Coil driver | | iKAGRA | | | 29 | | | | 2014/7/1 | 2014/9/30 | | | 高橋 | | 0% |
| VIS | Coil driver | | bKAGRA | | | | 23 | | | 2015/3/1 | 2015/5/31 | | | 高橋 | | 0% |
| VIS | OSEM driver | | prototype 1 | | 3 | | | 3 | | 2013/9/1 | 2013/12/1 | | | 高橋 | | 100% |
| VIS | OSEM driver | | prototype 2 | | 3 | | | | | 2014/4/1 | 2014/8/31 | | | 高橋 | | 0% |
| VIS | OSEM driver | | iKAGRA | | | 18 | | | | 2014/7/1 | 2014/9/30 | | | 高橋 | | 0% |
| VIS | OSEM driver | | bKAGRA | | | | 8 | | | 2015/3/1 | 2015/5/31 | | | 高橋 | | 0% |
| VIS | OSEM distributor | | prototype | SensorとCoilに分岐 | 3 | | | | | 2014/4/1 | 2014/8/31 | | | 関口 | | 0% |
| VIS | OSEM distributor | | iKAGRA | SensorとCoilに分岐 | | 21 | | | | 2014/7/1 | 2014/9/30 | | | 関口 | | 0% |
| VIS | OSEM distributor | | bKAGRA | SensorとCoilに分岐 | | | 8 | | | 2015/3/1 | 2015/5/31 | | | 関口 | | 0% |
| VIS | BO adapter chassis | | prototype | | 1 | | | 1 | | 2012/6/12 | 2013/11/1 | 2013/11/1 | 関口君に配布済。 | 宮川 | 上泉 | 100% |
| VIS | | board | | | | | | | 1 | 2012/6/12 | 2012/6/12 | 2012/6/12 | 関口君に配布済。 | | 上泉 | 100% |
| VIS | | Front pannel | | | | | | | 1 | 2012/10/23 | 2013/11/1 | 2013/11/1 | 関口君に配布済。 | | 上泉 | 100% |
| VIS | | Chassis | | | | | | | 1 | 2013/10/20 | 2013/11/1 | 2013/11/1 | 基板と接続して関口君に配布済。 | 上泉 | 上泉 | 100% |
| VIS | Stepper motor driver | | prototype | TAMA回路改良版 | 1 | | | 1 | | 2012/4/1 | 2012/6/12 | 2012/6/12 | 関口君に配布済。 | 宮川 | 宮川 | 100% |
| | | Design | | | | | | | | 2012/4/1 | 2012/4/9 | | | | | 100% |
| | | 製作 | | | | | | | | 2012/4/10 | 2012/5/7 | | | | | 100% |
| | | test | | | | | | | | 2012/5/8 | 2012/5/24 | | | | | 100% |
| | | Installation | | | | | | | | 2012/6/12 | 2012/6/12 | | | | | 100% |
| VIS | Stepper motor driver | | prototype | | 1 | | | | | 2013/12/20 | 2014/2/28 | | | 高橋 | 高橋 | 5% |
| VIS | | Design | | | | | | | | 2013/12/20 | 2014/2/15 | 2014/2/13 | 基本方針決定済 | 関口 | | 100% |
| VIS | | Front panelデザイン | | | | | | | | | | | | | 上泉 | 0% |
| VIS | | Front panel製作 | | | | | | | | | | | | | 上泉 | 0% |
| VIS | | Rear panelデザイン | | | | | | | | | | | | | 上泉 | 0% |
| VIS | | Rear panel製作 | | | | | | | | | | | | | 上泉 | 0% |
| VIS | | 組み立て | | | | | | | | | | | | | 上泉 | 0% |
| VIS | Stepper motor driver | | iKAGRA | | | 1 | | | | 2014/9/1 | 2014/11/30 | | | 高橋 | 高橋 | 5% |
| VIS | Stepper motor driver | | bKAGRA | | | | 11 | | | 2015/3/1 | 2015/5/31 | | | 高橋 | 高橋 | 0% |
| VIS | Picomotor driver | | iKAGRA | | | 7 | | | | 2014/3/1 | 2014/5/31 | | | 高橋 | 高橋 | 0% |
| VIS | Picomotor driver | | bKAGRA | | | | 8 | | | 2015/3/1 | 2015/5/31 | | | 高橋 | 高橋 | 0% |
| VIS | RMS-DC converter | | prototype | | 1 | | | | | 2013/7/22 | | | 麻生君のデザイン待ち。 | 麻生 | | 5% |
| VIS | OSEM | | iKAGRA | | | | | | | 2014/1/27 | 2014/3/31 | | CADデータ製作中 | 高橋 | | 100% |
| VIS | | 仕様決定 | | | | | | | | 2014/1/27 | 2014/2/10 | | | 高橋 | Fabian | 100% |
| VIS | | 基板デザイン | | | | | | | | 2014/2/11 | 2014/2/28 | | | | Fabian,上泉 | 20% |

- Currently 152 kinds of item, 804 chassis(boxes) are counted!
 - Probably the number may increase x1.5 times if actual drivers or interfaces are considered.
 - Prototype: 95 chassis, iKAGRA: 456 chassis, bKAGRA: 253 chassis
 - 149 boxes have been manufactured.
 - 149 means VIS:13, MIF:2, IOO:2, DGS:132, not much progress except for DGS.

- Kamiizumi
- New engineer?
- Warsaw University of Technology

1. Asking to AEL: each subgroup to AEL
2. Desig diagram: **by each subsystem**
 - Introduces existing diagrams (EX.LIGO DCC)
3. Designing diagram: **by each or each subsystem or AEL**
4. Ordering electronic parts: **by AEL**
5. Making boards: **by AEL**
6. Soldering electronic parts: **by AEL**
7. Design chassis: **by each or each subsystem or AEL**
8. Making chassis: **by AEL**
9. Putting them into chassis: **by AEL**
10. Inspection: **by each subsystem**

Altium

Altium

2 months

Digikey, Mouser, RS, Tip One Stop

P-ban.com

P-ban.com

Front Panel Express

Hamilton Metalcraft, Densie

AEL, Densie

3 more months

Circuit boards we have made

- Timing injection ADC adapter x 20
- Timing injection DAC adapter x 20
- D-SUB – LEMO interface x 10
- D-SUB – BNC interface x 10
- 8ch AA/AI filter x 40
- 32ch Binary Output interface x 10
- RF PD for LSC x 10

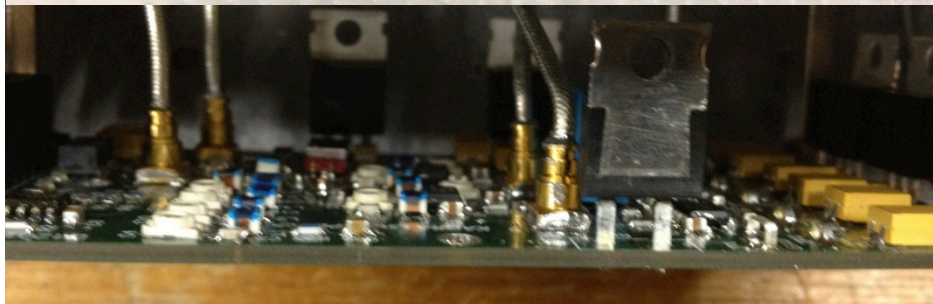
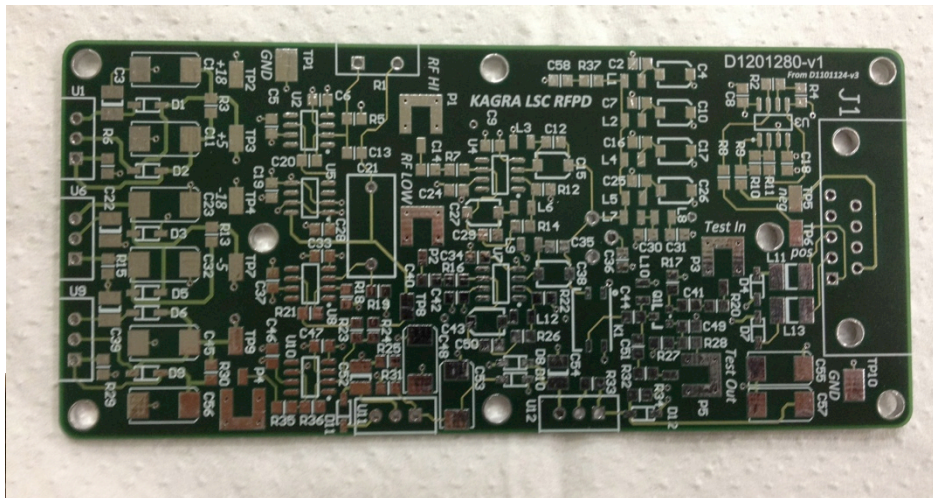
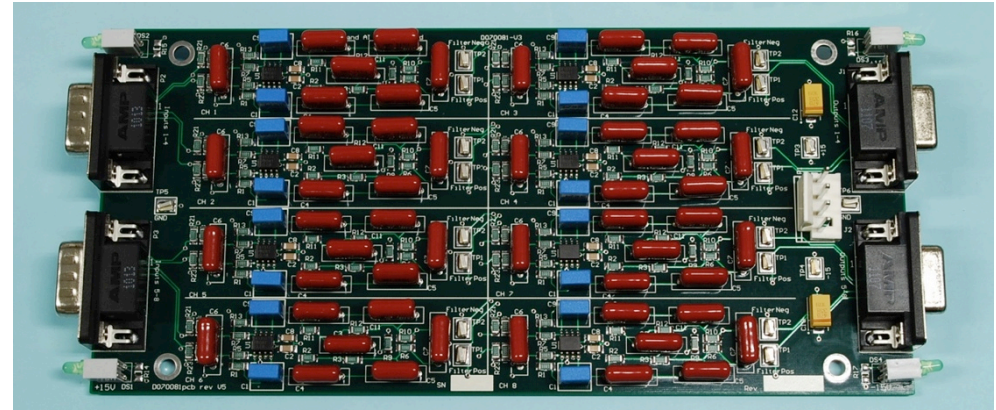
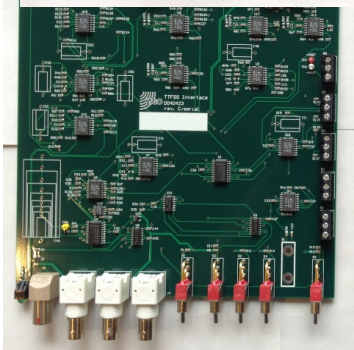
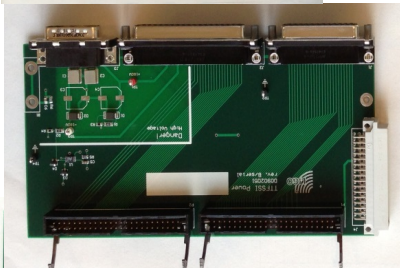
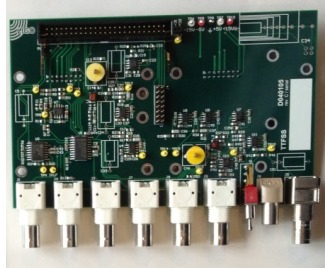
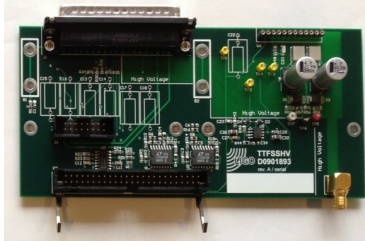
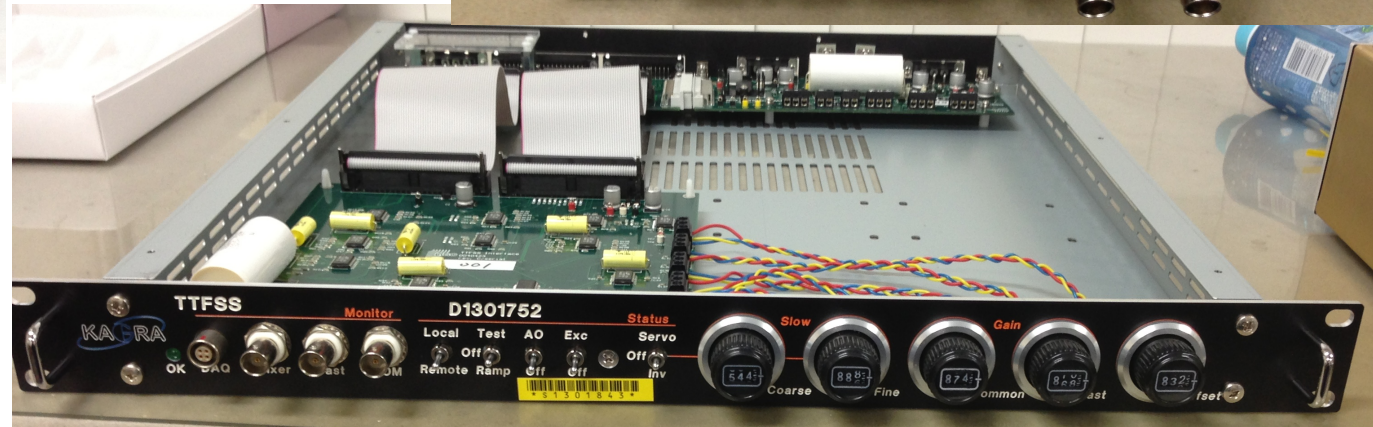
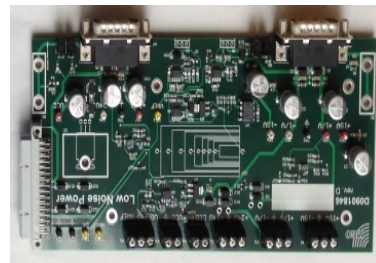
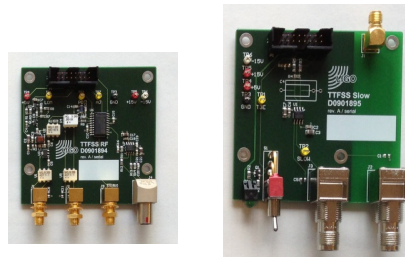




Table Top Frequency Stabilization Servo



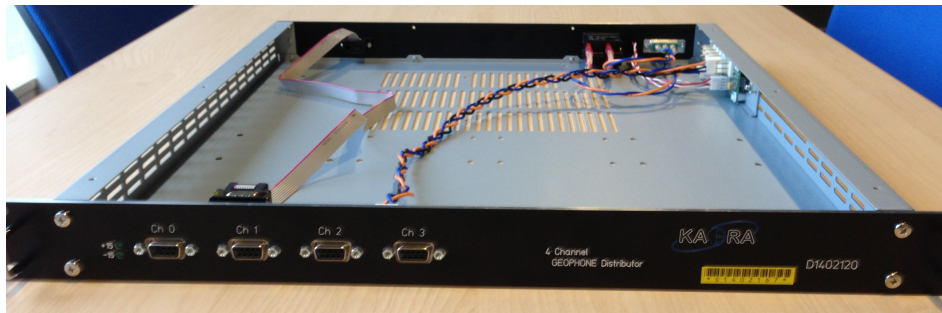
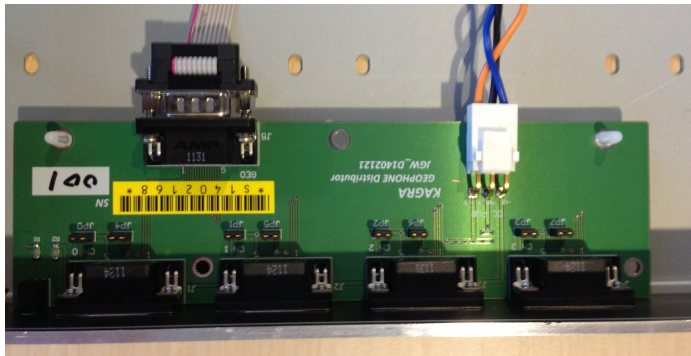
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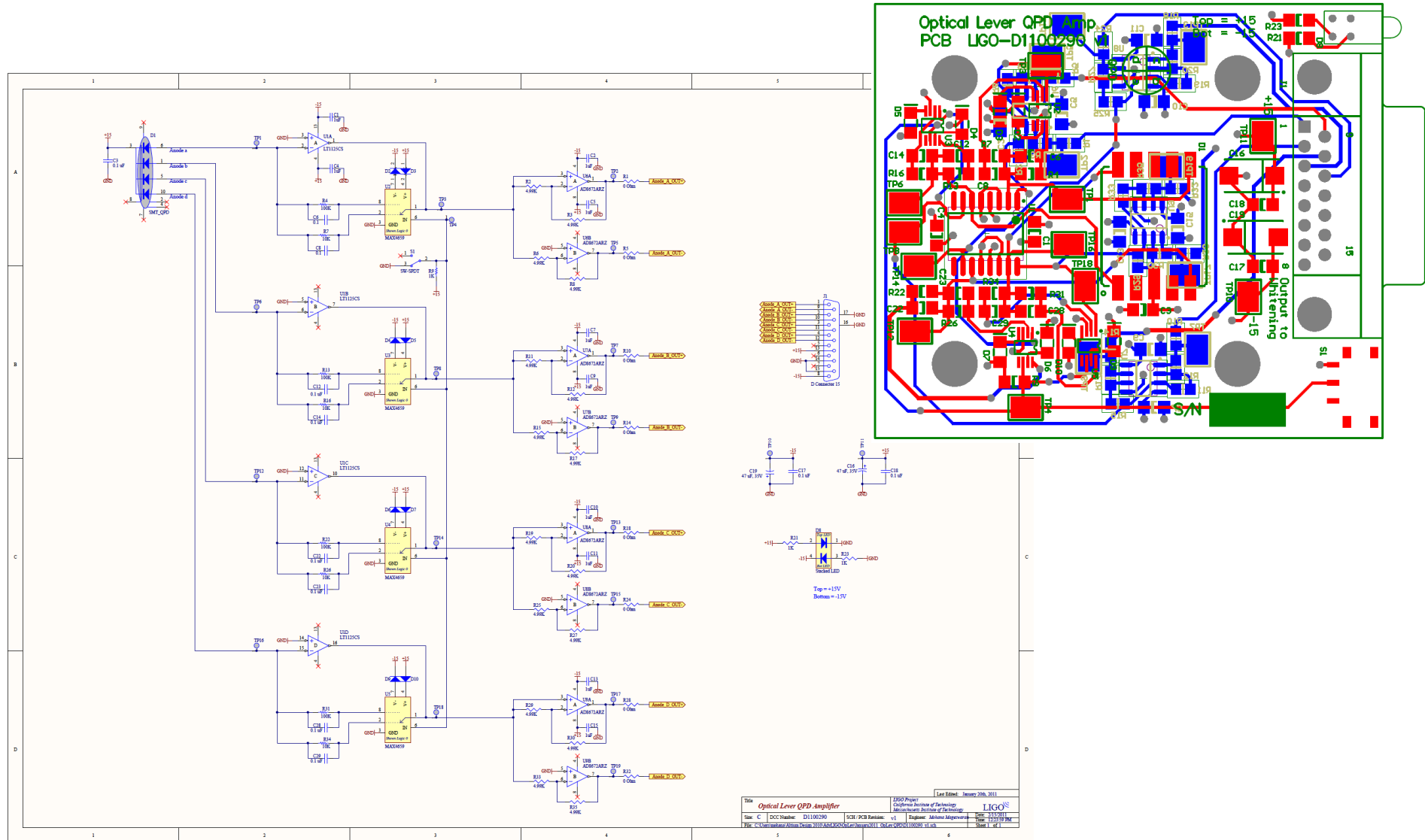
Circuits for VIS



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- MIF: RF PD; **done**
:I&Q demodulators; **being discussed**
- IOO: Frequency stabilized servo; **done**
- VIS : coil drivers, LVDT distributor, Geophone distributor, OSEM boards; **done**
:LVDT drivers; **being designed**
- DGS: Anti alias/Anti image filter; **done**
: whitening filters (for GIF, AOS, MIF); **waiting for order**
- AOS: optical levers; **being discussed**

Circuit diagram reference at LIGO DCC, for example optical lever head



- Design and fabrication for DC power supply network
 - KEPCO ATE series:
 - 50 x 36V:30A, 15 x 25V:10A, 15 x 15V:6A, 15 x 6V:5A were ordered and stored at Kamioka building, and will be installed into the mine by October(?).
 - How to establish DC distribution to each circuits, using tap?
- Design for wiring, purchasing cables and actual cabling in mine
 - For DC signal
 - For RF signal