

Modification Plan for Common Mode Servo Board

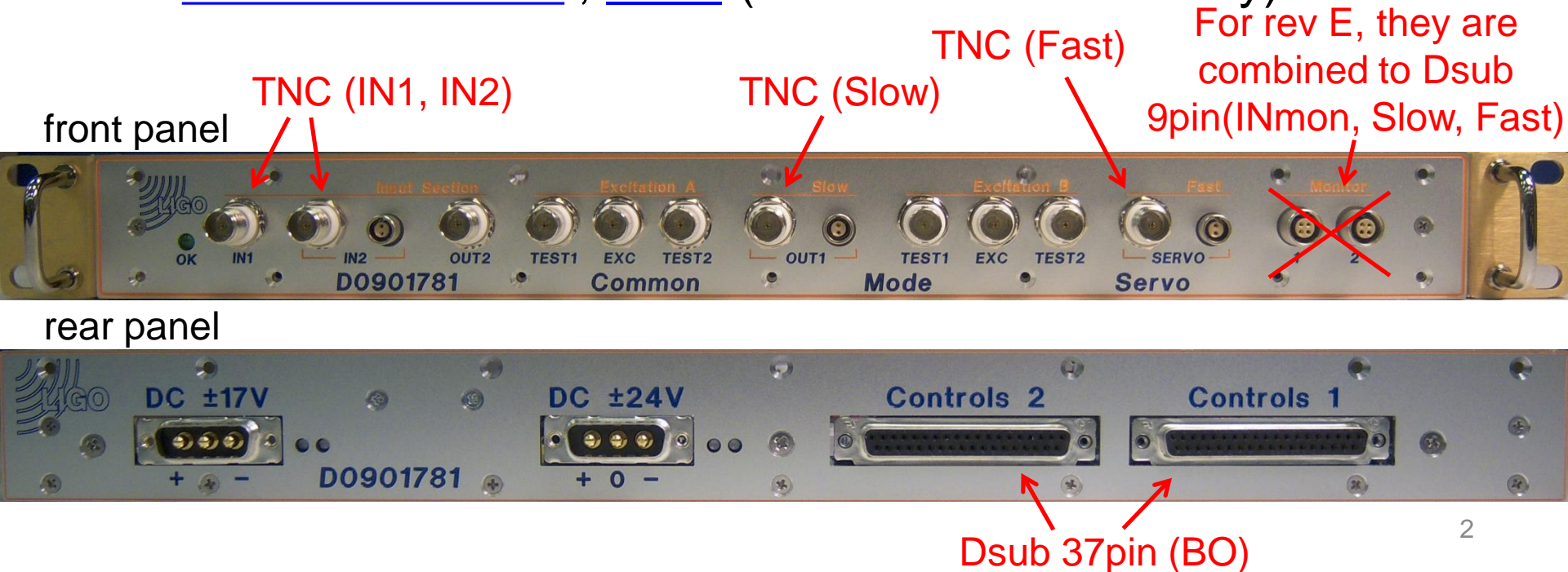
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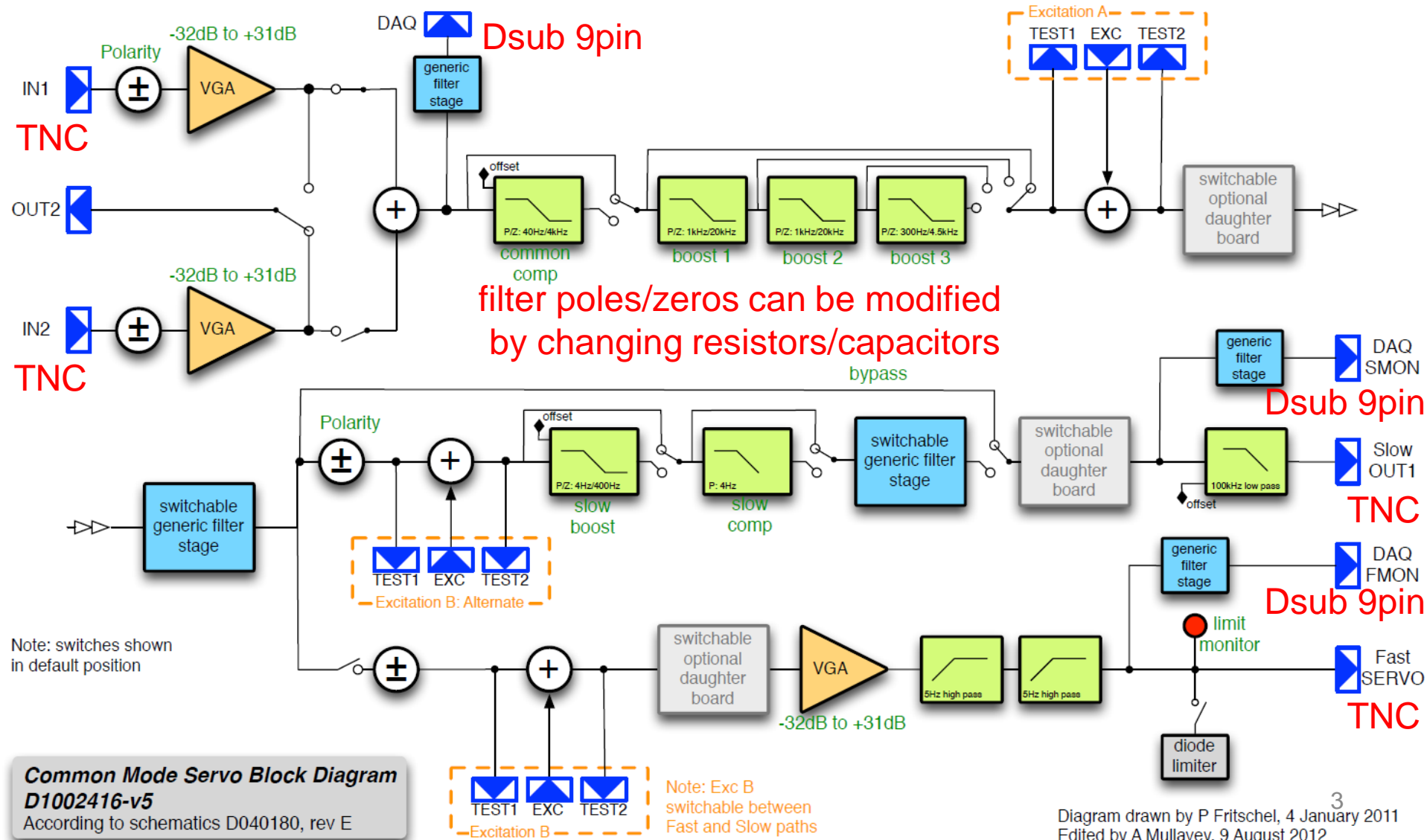
aLIGO One

- [LIGO-D0901781](#) (assembly)
- [LIGO-D040180](#) (schematic)
- [LIGO-D0901784](#) (schematic of interface board)
- [LIGO-D0901846](#) (schematic of low noise power module)
- boards are modified for each servo (IMC, ALS, CARM)
[LIGO-E1200177](#) , [awiki](#) (modification summary)



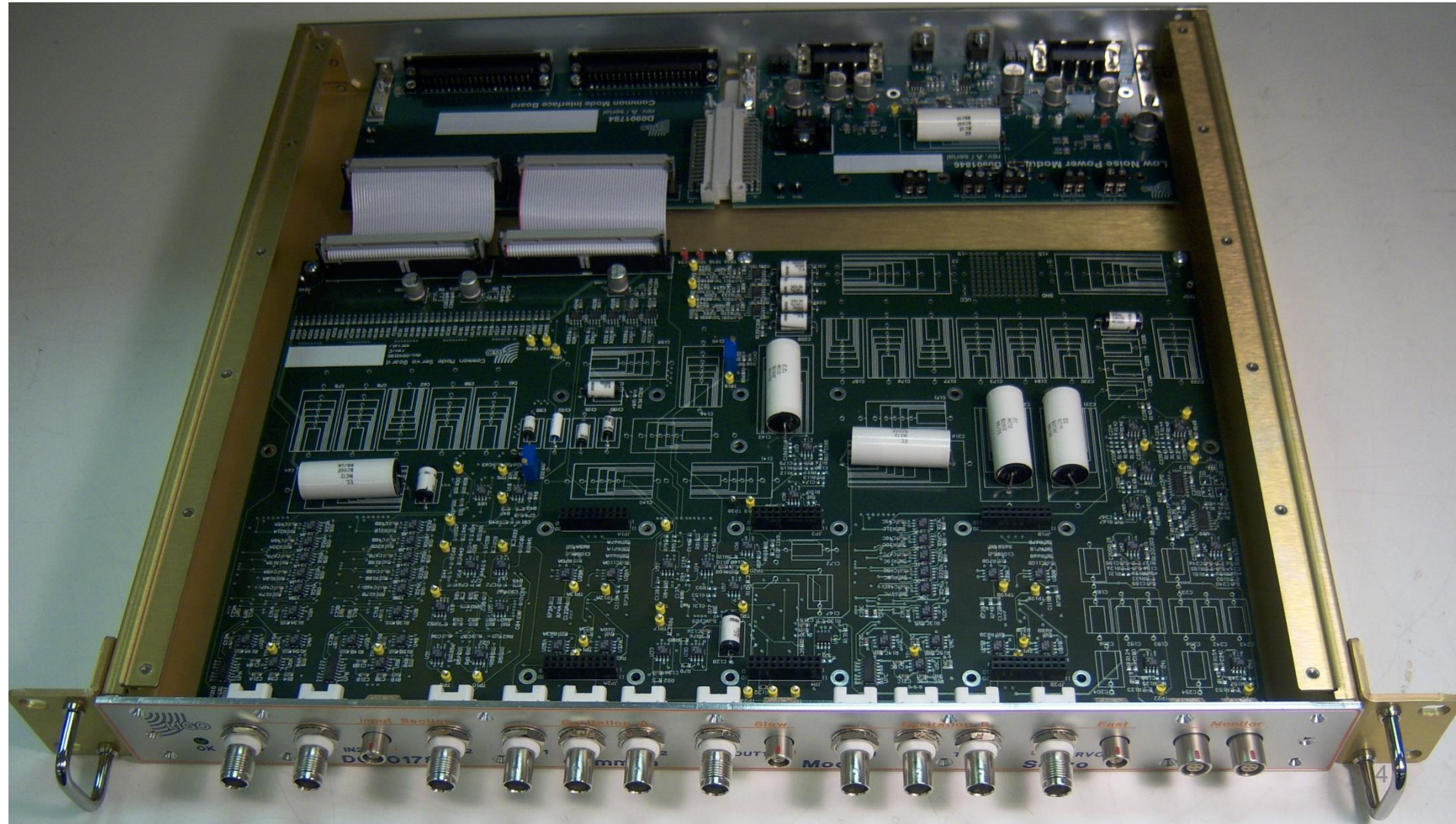
Block Diagram

- [LIGO-D1002416](#) (we also want to make rev E)



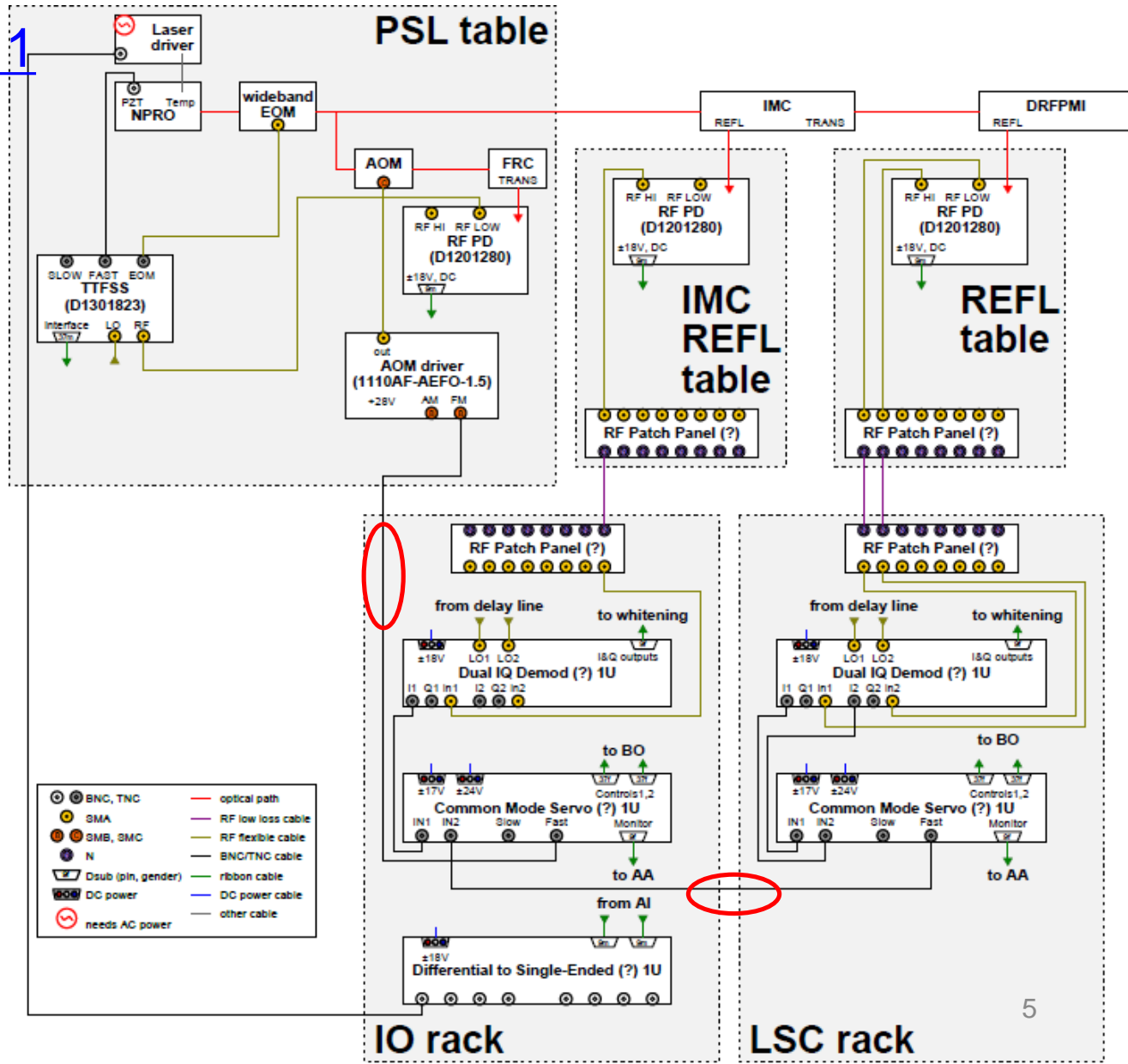
Inside

- consist from main board(bottom), interface board(top left), and low noise power module(top right)



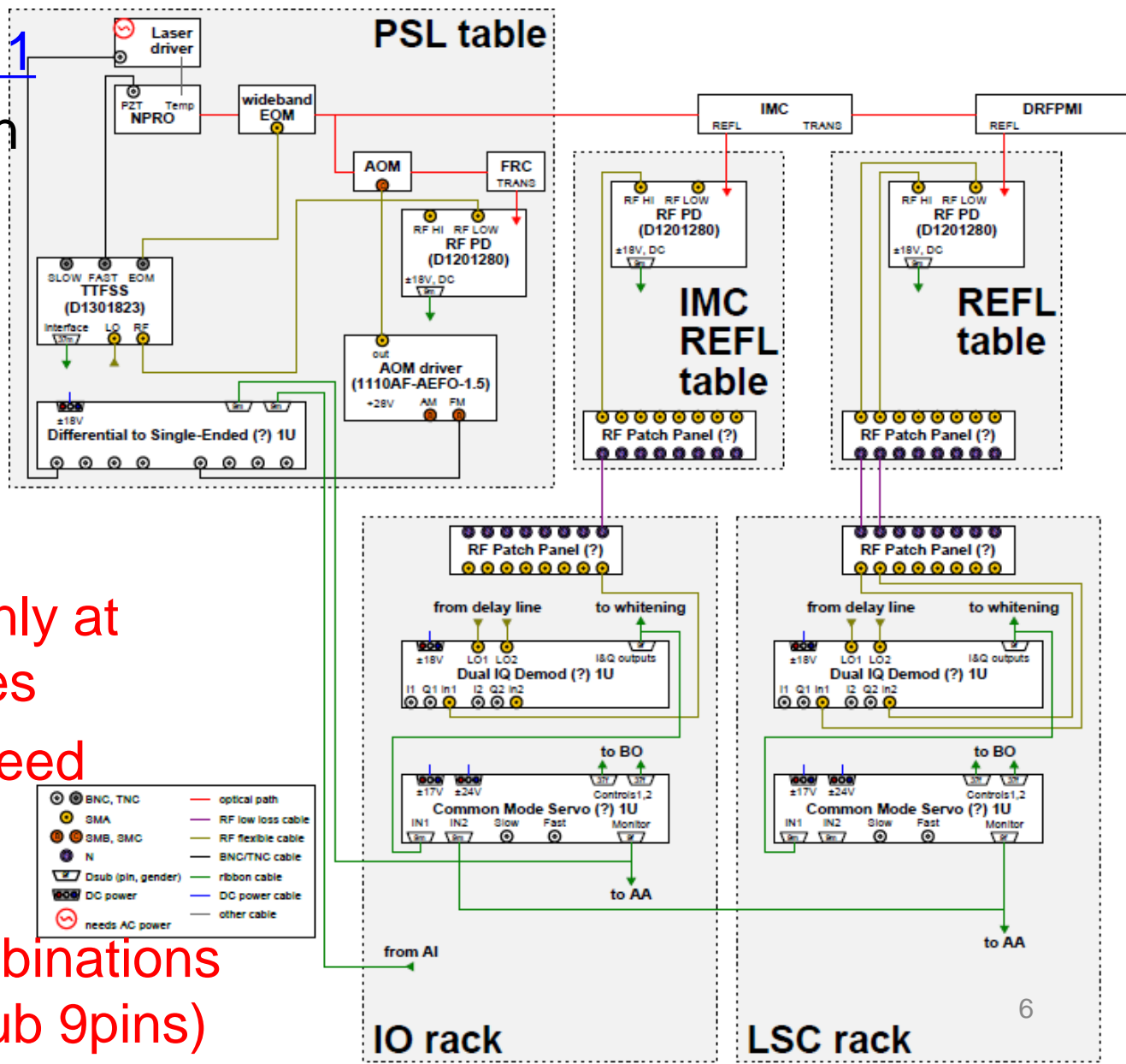
aLIGO Usage Example

- [JGW-D1403111](#)
- long line single-ended cables
- maybe we want to avoid these for eliminating ground loops



KAGRA Case

- [JGW-D1403111](#)
- use D-sub 9pin cables instead
- to do this, we have to modify CM board from that of LIGO
- modification only at the input stages
- note that we need Dsub 9pin splitters (and maybe re-combinations of multiple Dsub 9pins)



Inputs and Outputs

- Inputs

- CM Board for IMC

- IN1: IMC REFL (from Dual IQ Demod Dsub 9pin)

- IN2: additive offset (from CARM CM Board Dsub 9pin)

- CM Board for CARM

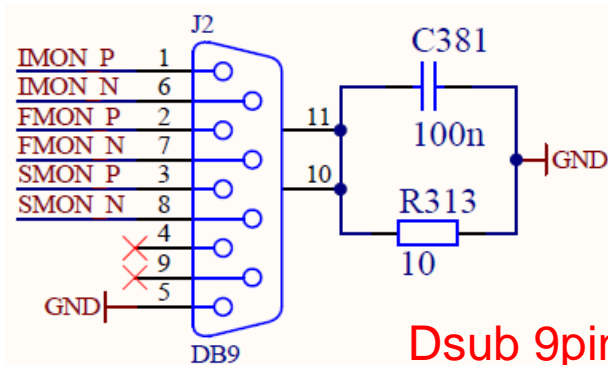
- IN1: REFL/ALS common (from Dual IQ Demod Dsub 9pin)

- IN2: REFLVAC (from Dual IQ Demod Dsub 9pin)

may be we want to mix these signals

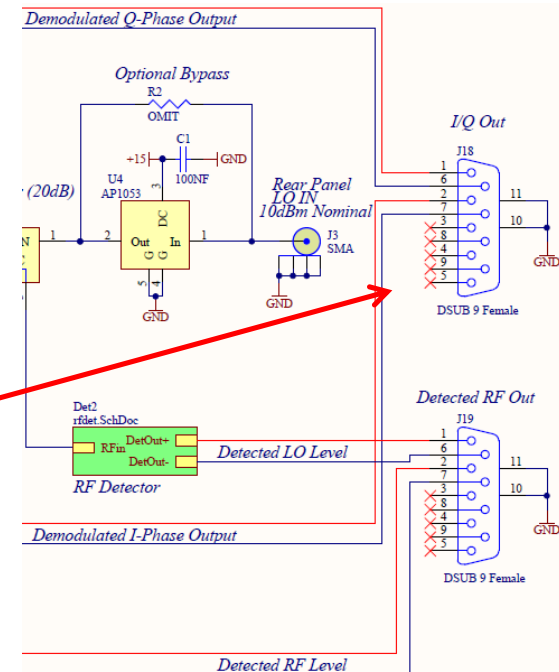
- Outputs

INmon, Fast, Slow in Dsub 9pin



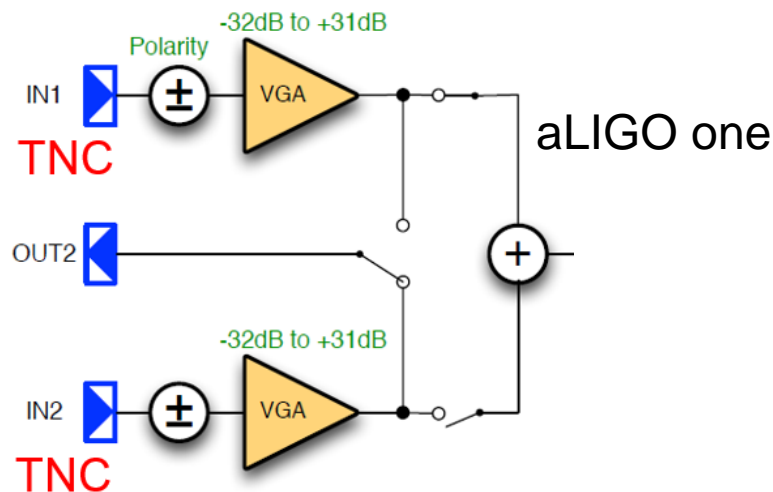
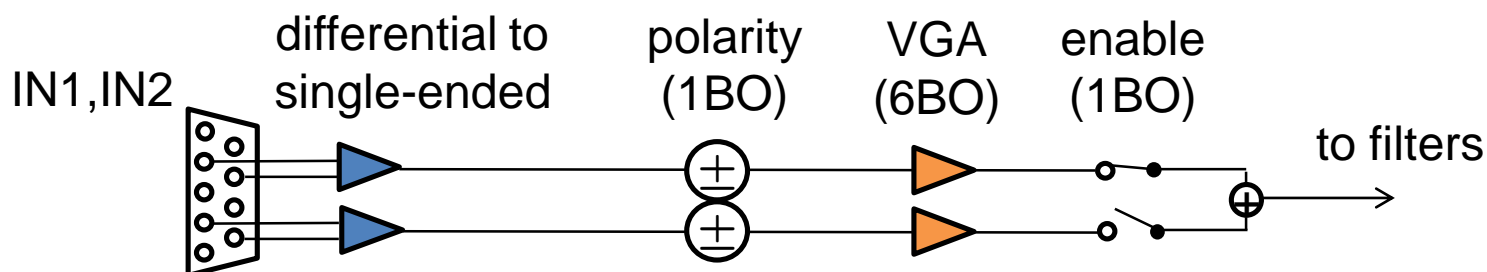
Dsub 9pin from CM Servo Board

Dsub 9pin from IQ Demod Board



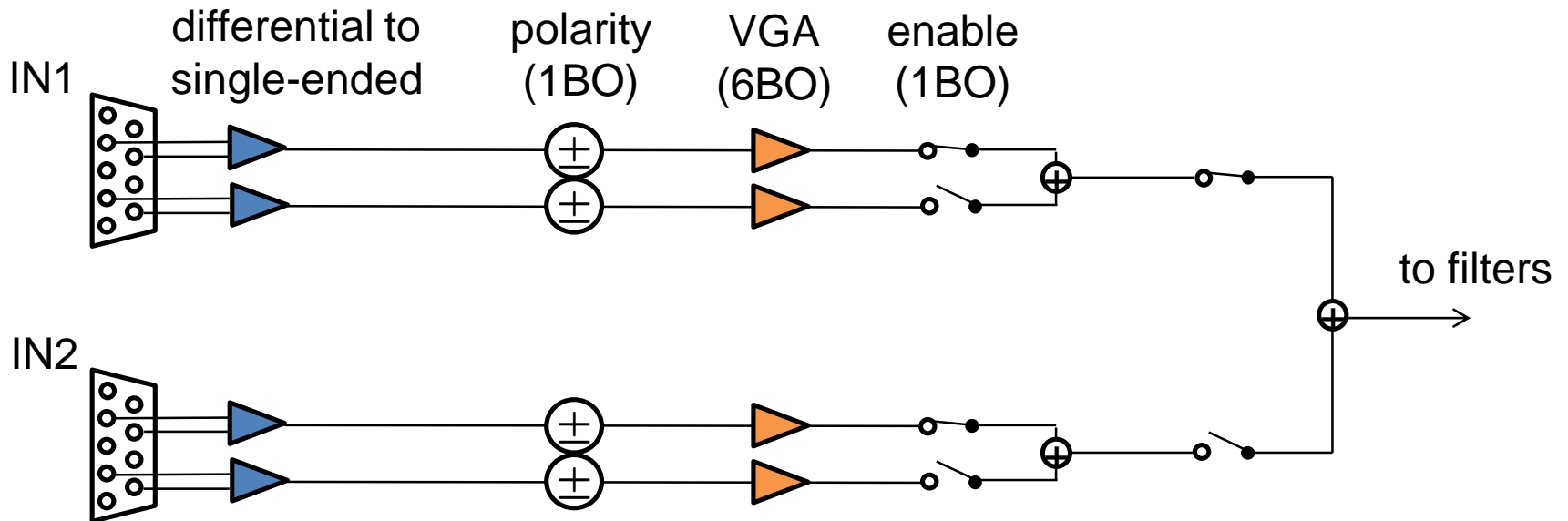
Possible Modification 1

- 1 Dsub 9pin inputs, gain for each
- many Dsub re-combinations
- possibly sum board with VGA is needed besides CM board (aLIGO has CM Sum Board [LIGO-D1200148](#))



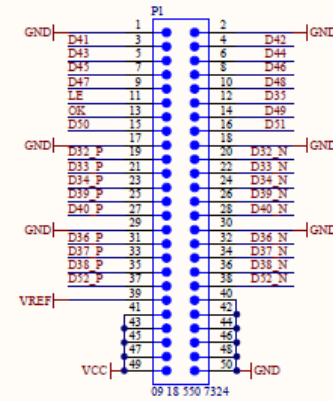
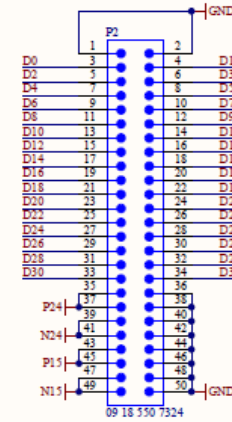
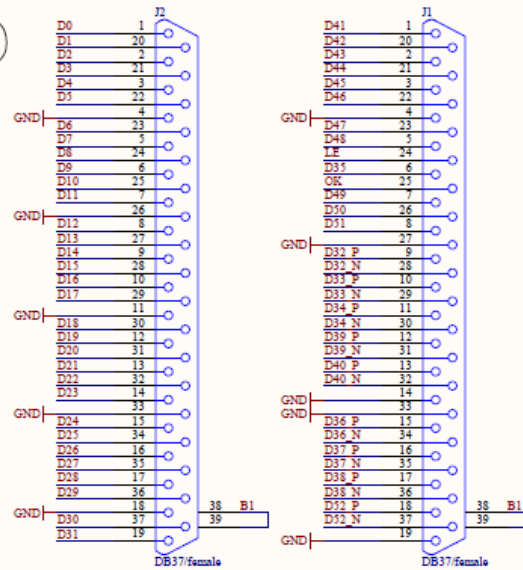
Possible Modification 2

- 2 Dsub 9pin inputs, gain for each
- less Dsub re-combinations outside the CM board
- we need extra 16 BO channels
→ extra Dsub 37pin needed



Binary Outputs

- [LIGO-D0901784](#)
- basically, already full



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Digital Inputs:
D[ 5.. 0]: Gain slider input 1
D[11.. 6]: Gain slider input 2
D[12]    : Input 1 enable
D[13]    : Input 2 enable
D[14]    : Output 1 switch
D[16..15]: Number of boost stages
D[17]    : Compensation enable
D[18]    : Excitation A enable
D[19]    : Option A enable
D[20]    : Polarity slow path
D[21]    : Common filter enable
D[22]    : Fast path enable
D[23]    : Fast path polarity
D[24]    : Slow path option enable
D[25]    : Bypass enable
D[26]    : Slow output offset +5V fixed
D[27]    : Slow output offset enable
D[28]    : Slow path compensation enable
D[29]    : Slow path boost enable
D[30]    : Slow path filter enable
D[31]    : Fast path limiter enable
D[46..41]: Gain slider fast path
D[47]    : Excitation B enable
D[48]    : Option B enable
D[49]    : Excitation slow path
D[50]    : Polarity input 1
D[51]    : Polarity input 2
LE       : Latch enable
    
```

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Digital Outputs:
D[35]    : Fast path limits reached
OK       : Voltages are within range

Analog Inputs:
D[36]    : Common path offset adjust
D[37]    : Slow path offset adjust
D[38]    : Slow path output offset

Analog Outputs:
D[32]    : Input monitor
D[33]    : Monitor at split
D[34]    : Fast monitor
D[39]    : Slow path feedback monitor
D[40]    : Slow monitor

Spares:
D52     : Not used
    
```

Possible Modification 3

- 2 Dsub 9pin inputs, gain for each
- signal selection done by pin selection at Dsub 9pin
- possibly sum board with VGA is needed besides CM board
- number of BO channels is the same as aLIGO one

