
aLIGO PSL monitor PD (D1002164-v1)

Circuit Board Documentation

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Abstract

This circuit provides a photodiode with the following features:

- Advanced LIGO monitor photodiode
- Transimpedance feedback must be added to provide for desired transfer function

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Safety Instructions

In order to operate the circuit properly and safely, review the following guidelines before installing and using the unit. Failure to do so may result in equipment damage or bodily injury:



This circuit was designed as a laboratory equipment to be operated only by trained and qualified technicians in research institutes or development departments. For safety reasons, usage by other persons or in other environments is *not* recommended.



This circuit uses extra-low voltage ($< 50 V_{AC}$ and $< 75 V_{DC}$) and is therefore exempt from the regulations of the *Low Voltage Directive* (2006/95/EC).

Sicherheitshinweise

Nehmen Sie vor Aufbau und Inbetriebnahme des Geräts folgende Empfehlungen zur Kenntnis, um die Schaltung korrekt und sicher zu betreiben sowie Schäden und Verletzungen zu vermeiden:



Diese Schaltung wurde als Laborausüstung entworfen, die nur von qualifizierten und eingewiesenen Technikern in Forschungsinstituten oder Entwicklungsabteilungen benutzt wird. Aus Sicherheitsgründen wird die Verwendung durch andere Personen oder in anderer Umgebung *nicht* empfohlen.



Diese Schaltung verwendet Kleinspannung ($< 50 V_{AC}$ und $< 75 V_{DC}$) und unterliegt daher nicht den Bestimmungen der *Niederspannungsrichtlinie* (2006/95/EC).

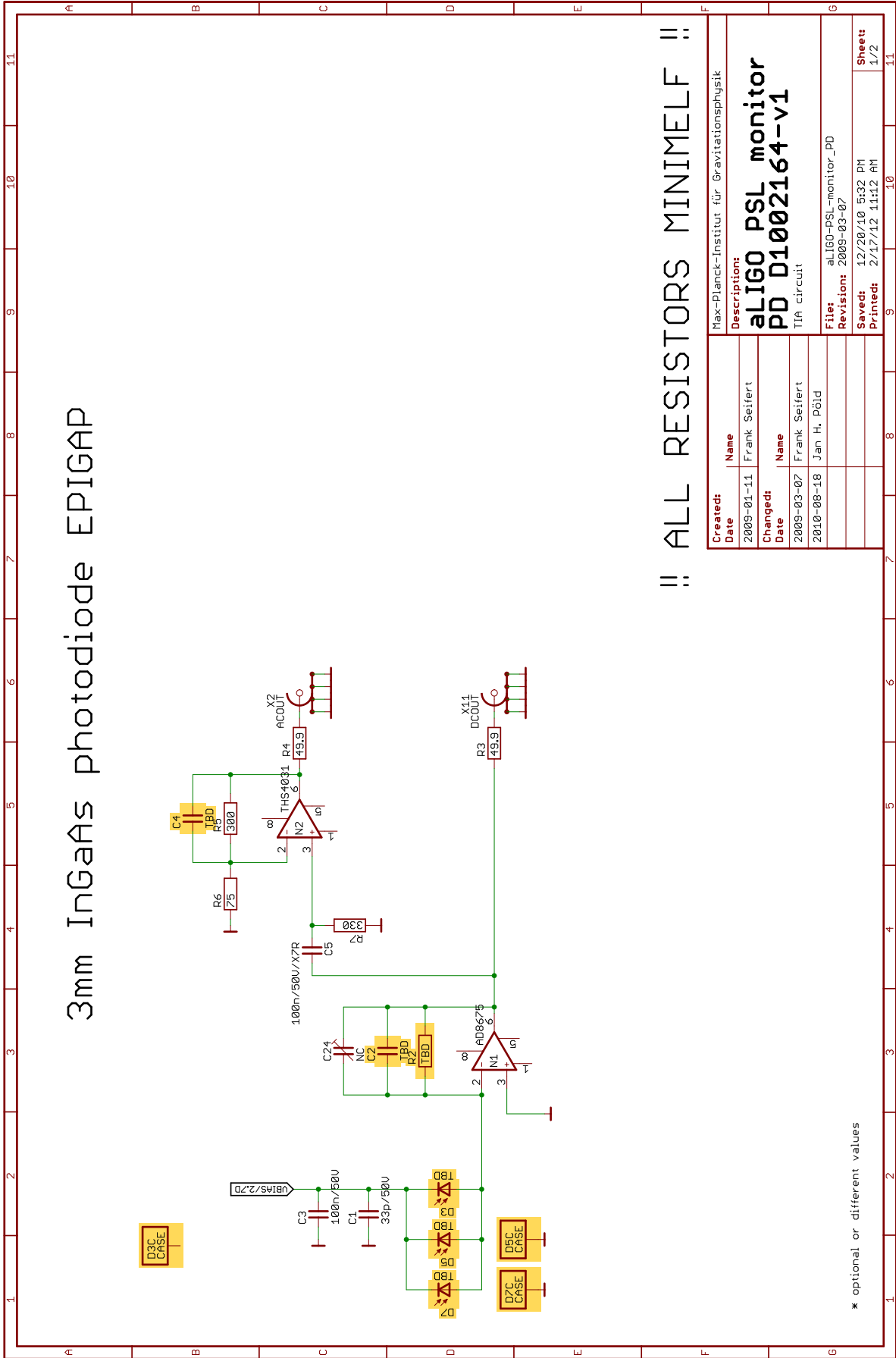
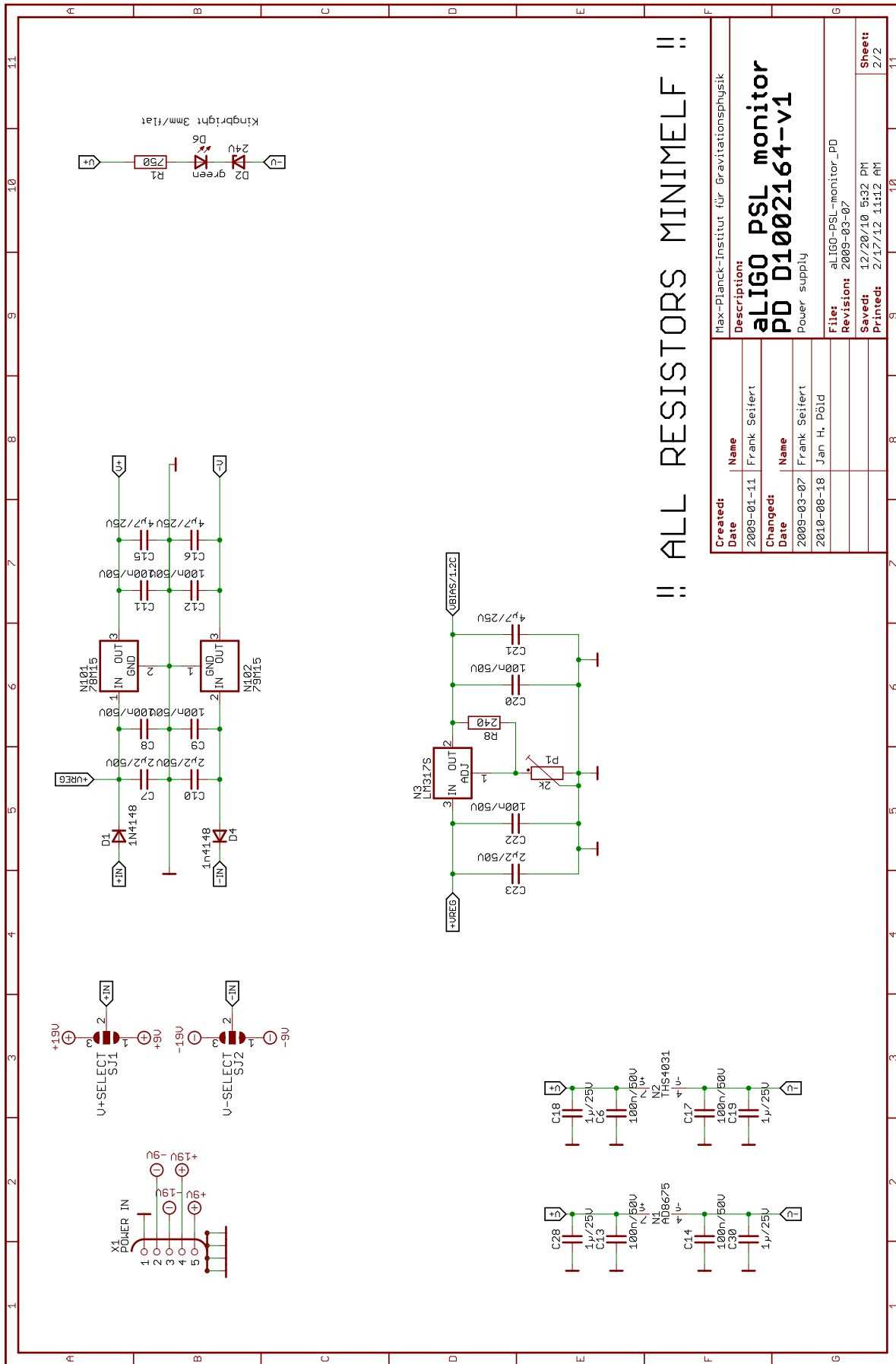


Figure 1: Project schematics (sheet 1)
 Parts with undefined values are highlighted in orange



!! ALL RESISTORS MINIMELF !!

Figure 2: Project schematics (sheet 2)

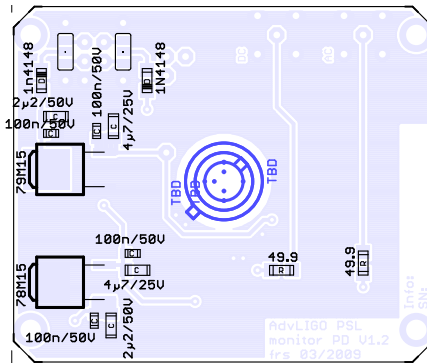


Figure 6: Board bottom view showing placeplan with component values
 Components with undefined values are shown in blue

Circuit Lists

Standard properties: If not explicitly stated otherwise in the schematics or value and part lists, the circuit components have the following standard properties. Parts with 'better' properties can be easily substituted, but care should be taken if the specifications are *not* met.

- Wired resistors: Metal film 0.6 W, 1%, 200 V, TK 100
- SMD resistors: 1%, 150 V, TK 50, MiniMELF in thin film, other packages in thick film technology

Value list: The following list shows all components available on the board (sorted by part *values*) and can be used to quickly gather components. Names of components with undefined values are shown in **red**. Additional information can possibly be found directly on the board (or in the schematics).

```
1 EAGLE Version 5.12.0 Copyright (c) 1988-2011 CadSoft
2 Board value list of 'aLIGO-PSL-monitor_PD.brd'
3 Exported at 2012-02-17 11:13
4 Created with macro 'plot.ulp' (c) Andreas Weidner
5 Shown are: Value/Type,Package,Number,Names (Library)
6
7 ---C---
8 33p/50V C-SMD:0805 (1*) C1 (DIVERS)
9 100n/50V C-SMD:0805 (11*) C3,C6,C8,C9,C11,C12,C13,C14,C17,C20,C22
10 (DIVERS)
11 100n/50V/X7R C-SMD:1210 (1*) C5 (DIVERS)
12 1u/25V C-SMD:0805 (4*) C18,C19,C28,C30 (DIVERS)
13 2u2/50V C-SMD:1206 (3*) C7,C10,C23 (DIVERS)
14 4u7/25V C-SMD:1206 (3*) C15,C16,C21 (DIVERS)
15 [undefined] C-SMD:0805 (1*) C4 (DIVERS)
16 C-SMD:1206 (1*) C2 (DIVERS)
17
18 ---D---
19 1N4148 D-SMD:MiniMELF (1*) D1 (DIVERS)
20 1n4148 D-SMD:MiniMELF (1*) D4 (DIVERS)
21 24V DZ-0.4" (1*) D2 (DIVERS)
22 [undefined] T0-5 (2*) D3,D5 (opto)
23 T0-18 (1*) D7 (opto)
24 green DL2N (1*) D6 (opto)
25
26 ---N---
27 78M15 T0-252 (1*) N101 (IC)
28 79M15 T0-252 (1*) N102 (IC)
29 AD8675 S0-8 (1*) N1 (opamps)
30 LM317S T0-252 (1*) N3 (IC)
31 THS4031 S0-8 (1*) N2 (opamps)
32
33 ---P---
34 2k PT10S (1*) P1 (DIVERS)
35
36 ---R---
37 49.9 R-SMD:MiniMELF (2*) R3,R4 (DIVERS)
38 75 R-SMD:MiniMELF (1*) R6 (DIVERS)
39 240 R-SMD:MiniMELF (1*) R8 (DIVERS)
40 300 R-SMD:MiniMELF (1*) R5 (DIVERS)
41 330 R-SMD:MiniMELF (1*) R7 (DIVERS)
42 750 R-SMD:MiniMELF (1*) R1 (DIVERS)
43 [undefined] R-SMD:MiniMELF (1*) R2 (DIVERS)
44
45 ---SJ---
46 V+SELECT SJ_2 (1*) SJ1 (jumper)
47 V-SELECT SJ_2 (1*) SJ2 (jumper)
```

```

48
49 ---X---
50 ACOUT      LEMO:1-pin/horz. (1*)  X2 (connectors)
51 DCOUT      LEMO:1-pin/horz. (1*)  X11 (connectors)
52 POWER IN   XLEMO05N          (1*)  X1 (connectors)
53
54 ---[unpopulated]---
55 [undefined]                                C24 (DIVERS)

```

Part list: The following list shows all components available in the schematics (sorted by part *names*) and can be used to quickly locate components. Additional information can possibly be found directly in the schematics.

```

1 EAGLE Version 5.12.0 Copyright (c) 1988-2011 CadSoft
2 Schematics part list of 'aLIGO-PSL-monitor_PD.sch'
3 Exported at 2012-02-17 11:13
4 Created with macro 'plot.ulp' (c) Andreas Weidner
5 Shown are: Name,Value/Type,Package,Device,Layer/Cell,Sheets/Cells
6
7 ---C---
8 C1  33p/50V      C-SMD:0805      C0805      T 1-C2
9 C2  [undefined]  C-SMD:1206      C1206      T 1-D3
10 C3  100n/50V     C-SMD:0805      C0805      T 1-C2
11 C4  [undefined]  C-SMD:0805      C0805      T 1-B5
12 C5  100n/50V/X7R C-SMD:1210      C1210      T 1-C4
13 C6  100n/50V     C-SMD:0805      C0805      T 2-E3
14 C7  2u2/50V     C-SMD:1206      C1206      B 2-B5
15 C8  100n/50V     C-SMD:0805      C0805      B 2-B6
16 C9  100n/50V     C-SMD:0805      C0805      B 2-B6
17 C10 2u2/50V     C-SMD:1206      C1206      B 2-B5
18 C11 100n/50V     C-SMD:0805      C0805      B 2-B7
19 C12 100n/50V     C-SMD:0805      C0805      B 2-B7
20 C13 100n/50V     C-SMD:0805      C0805      T 2-E2
21 C14 100n/50V     C-SMD:0805      C0805      T 2-F2
22 C15 4u7/25V     C-SMD:1206      C1206      B 2-B7
23 C16 4u7/25V     C-SMD:1206      C1206      B 2-B7
24 C17 100n/50V     C-SMD:0805      C0805      T 2-F3
25 C18 1u/25V      C-SMD:0805      C0805      T 2-E3
26 C19 1u/25V      C-SMD:0805      C0805      T 2-F3
27 C20 100n/50V     C-SMD:0805      C0805      T 2-D6
28 C21 4u7/25V     C-SMD:1206      C1206      T 2-D6
29 C22 100n/50V     C-SMD:0805      C0805      T 2-D5
30 C23 2u2/50V     C-SMD:1206      C1206      T 2-D4
31 C24 [unpopulated]                T 1-C3
32 C28 1u/25V      C-SMD:0805      C0805      T 2-E2
33 C30 1u/25V      C-SMD:0805      C0805      T 2-F2
34
35 ---D---
36 D1  1N4148      D-SMD:MiniMELF  DMINIMELF  B 2-A5
37 D2  24V         DZ-0.4"         DZ04N      T 2-B10
38 D3  [undefined]  T0-5           DP-C-C30642B B 1-B1,1-D2
39 D4  1n4148      D-SMD:MiniMELF  DMINIMELF  B 2-B5
40 D5  [undefined]  T0-5           DP-C-G8370-02B B 1-D1
41 D6  green       DL2N           DL2        T 2-B10
42 D7  [undefined]  T0-18         DP-C-G8370-01B B 1-D1
43
44 ---N---
45 N1  AD8675       S0-8           AD7975     T 1-D3,2-F2
46 N2  THS4031     S0-8           AD7975     T 1-C5,2-F3

```


47	N3	LM317S	T0-252	LM317S	T	2-D5
48	N101	78M15	T0-252	78XXS2	B	2-A6
49	N102	79M15	T0-252	79XXS2	B	2-B6
50						
51	---P---					
52	P1	2k	PT10S	PT10S	T	2-E5
53						
54	---R---					
55	R1	750	R-SMD:MinimELF	RMINIMELF	T	2-B10
56	R2	[undefined]	R-SMD:MinimELF	RMINIMELF	T	1-D3
57	R3	49.9	R-SMD:MinimELF	RMINIMELF	B	1-D5
58	R4	49.9	R-SMD:MinimELF	RMINIMELF	B	1-C5
59	R5	300	R-SMD:MinimELF	RMINIMELF	T	1-B5
60	R6	75	R-SMD:MinimELF	RMINIMELF	T	1-B4
61	R7	330	R-SMD:MinimELF	RMINIMELF	T	1-C4
62	R8	240	R-SMD:MinimELF	RMINIMELF	T	2-D6
63						
64	---SJ---					
65	SJ1	V+SELECT	SJ_2	SJ2W	B	2-A3
66	SJ2	V-SELECT	SJ_2	SJ2W	B	2-B3
67						
68	---X---					
69	X1	POWER IN	XLEM005N	XS05-4S	T	2-B1
70	X2	ACOUT	LEM0:1-pin/horz.	XS-4S-LEM000HL	T	1-C6
71	X11	DCOUT	LEM0:1-pin/horz.	XS-4S-LEM000HL	T	1-D6