# PSL monitoring fieldbox circuit board documentation

*LIGO-T0900632*

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**Abstract**

This fieldox is used to monitor various signals from the PSL table. The inputs of this fieldbox are lemo connectors. There are 16 inputs, which have a whitening filter in front of the output. These whitening filters can also be switched off, otherwise they have to be assembled. Another four channels are directly connected to the output. The outputs of this fieldbox are female sub-d9 connectors for a direct connection to the Anti-Aliasing filter.

## Contents

## 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).
- The unit does not contain any mechanical drive system. Therefore, the regulations of the *Machinery Directive* (2006/42/EC) do not apply.

## 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 Laborausrüstung 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).
- Das Gerät enthält kein mechanisches Antriebssystem – die Bestimmungen der *Maschinenrichtlinie* (2006/42/EC) sind daher nicht anwendbar.

# Front of the monitoring fieldbox

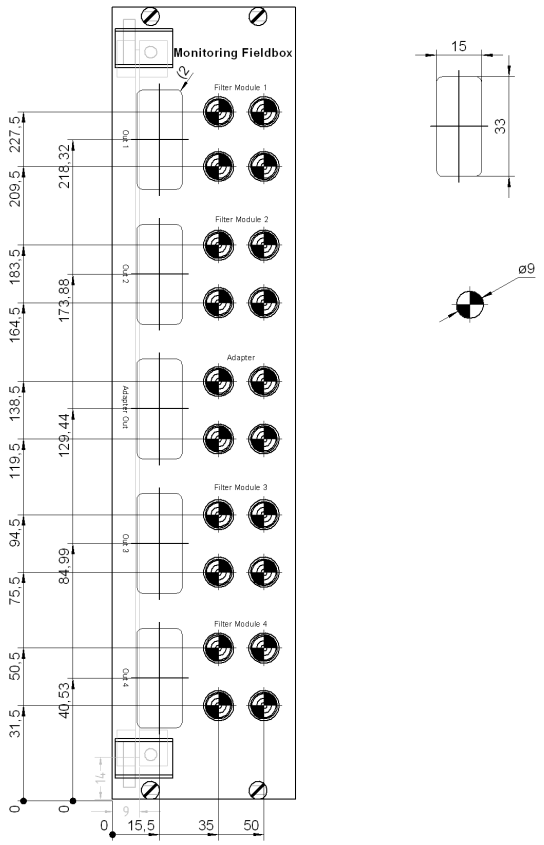


**Figure 1:** *Front*

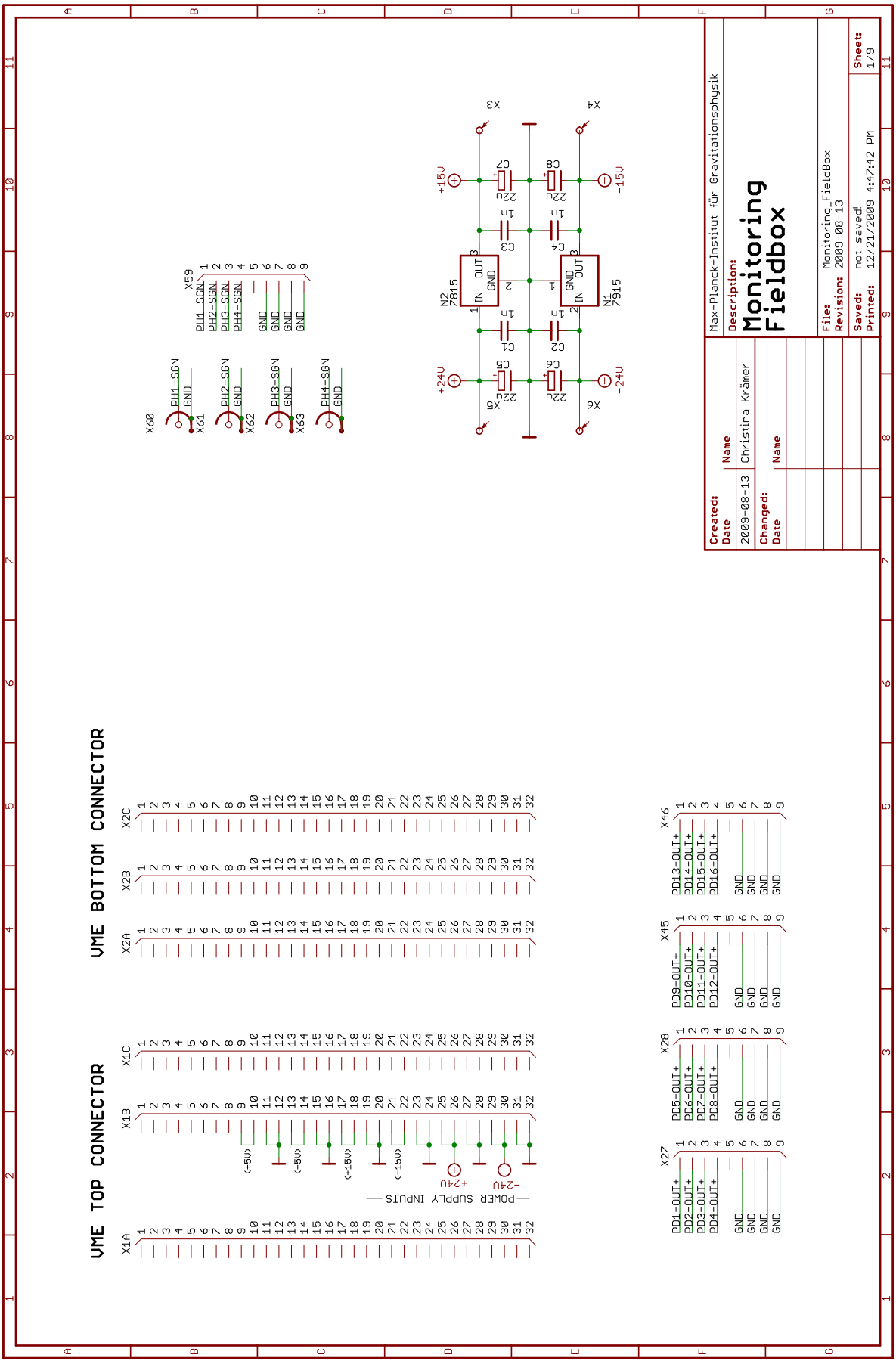


**Figure 2:** *Project schematics (sheet 1)*

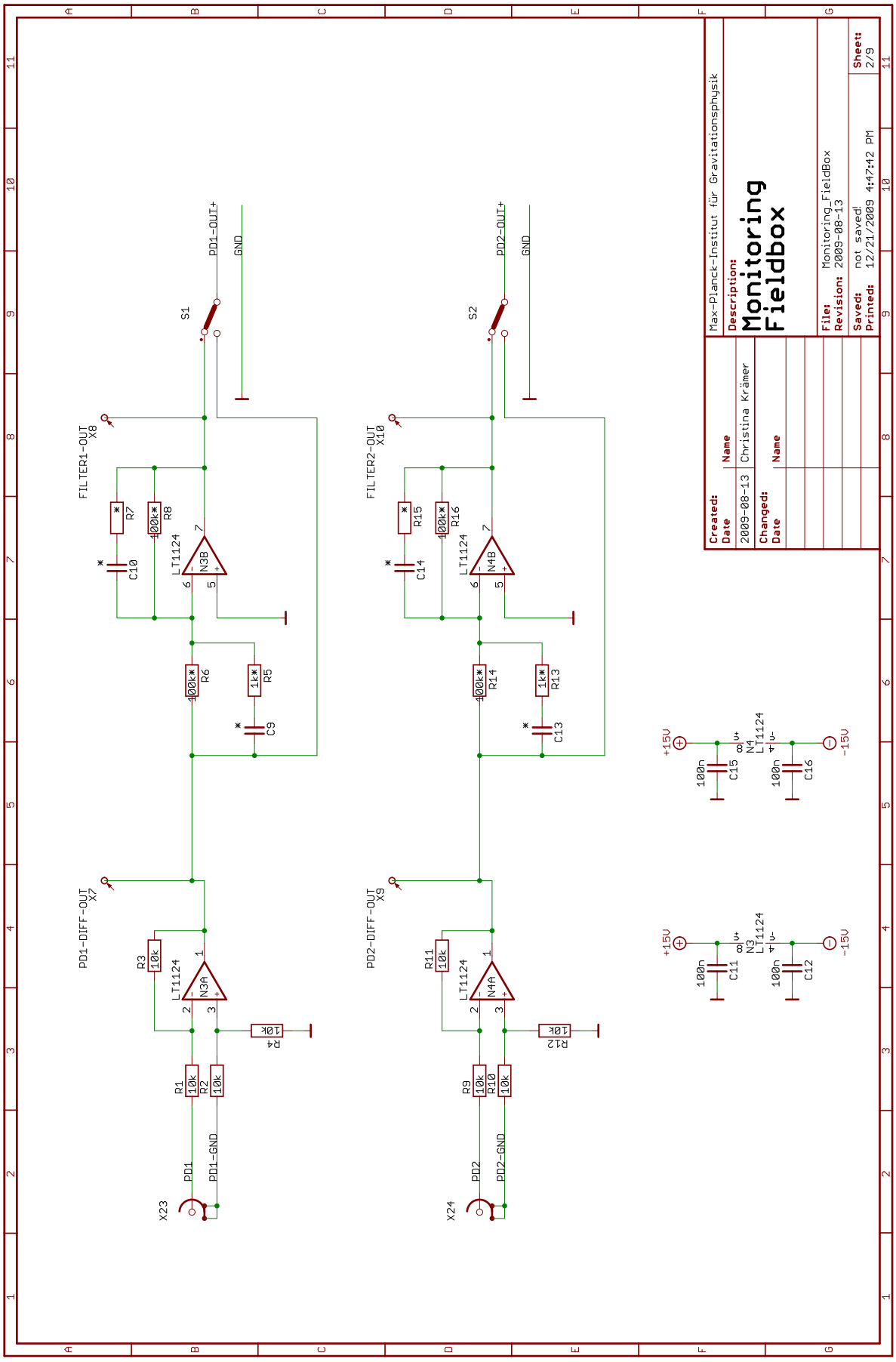


**Figure 3:** *Project schematics (sheet 2)*

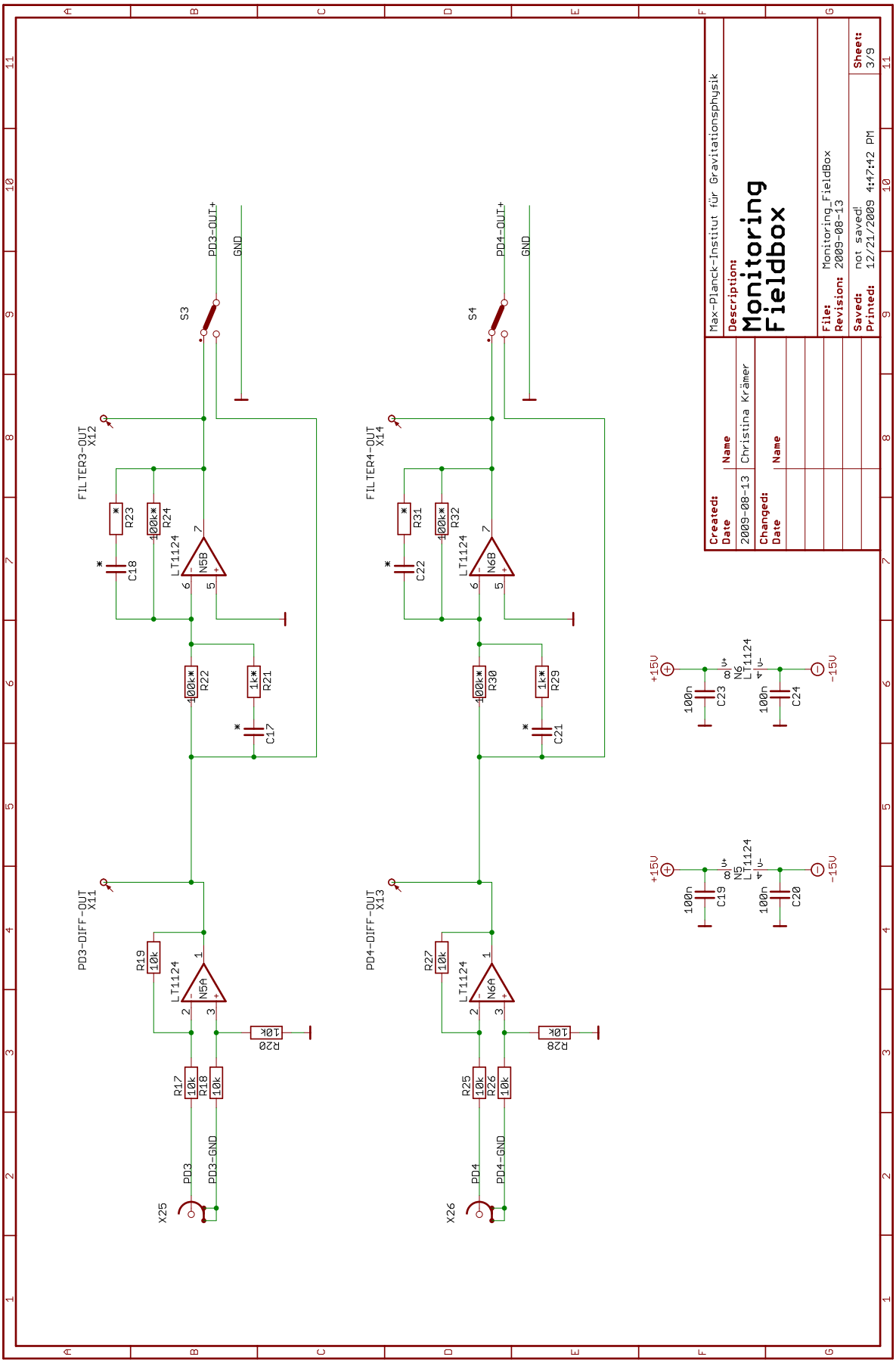


**Figure 4:** *Project schematics (sheet 3)*

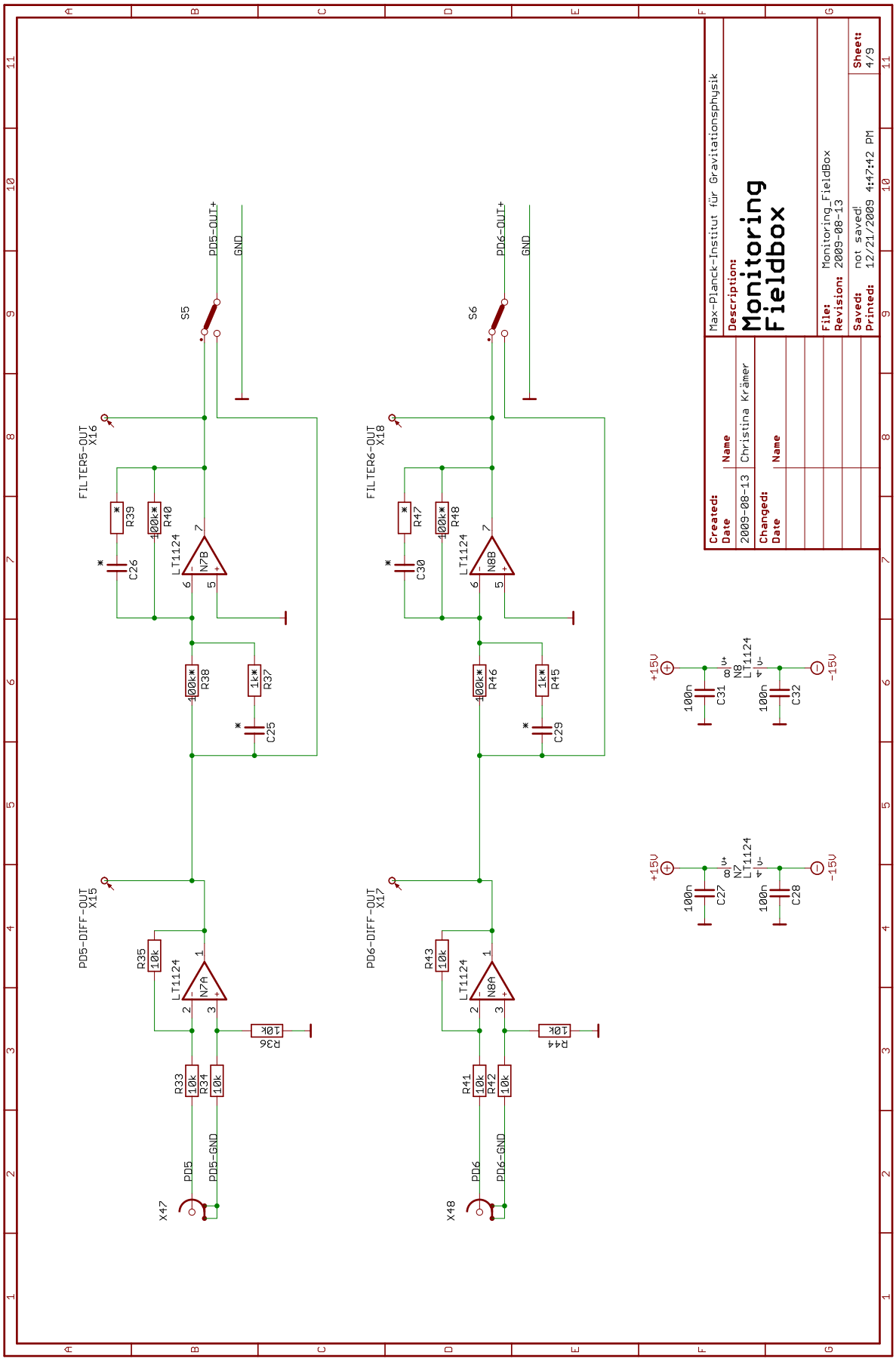


**Figure 5:** *Project schematics (sheet 4)*

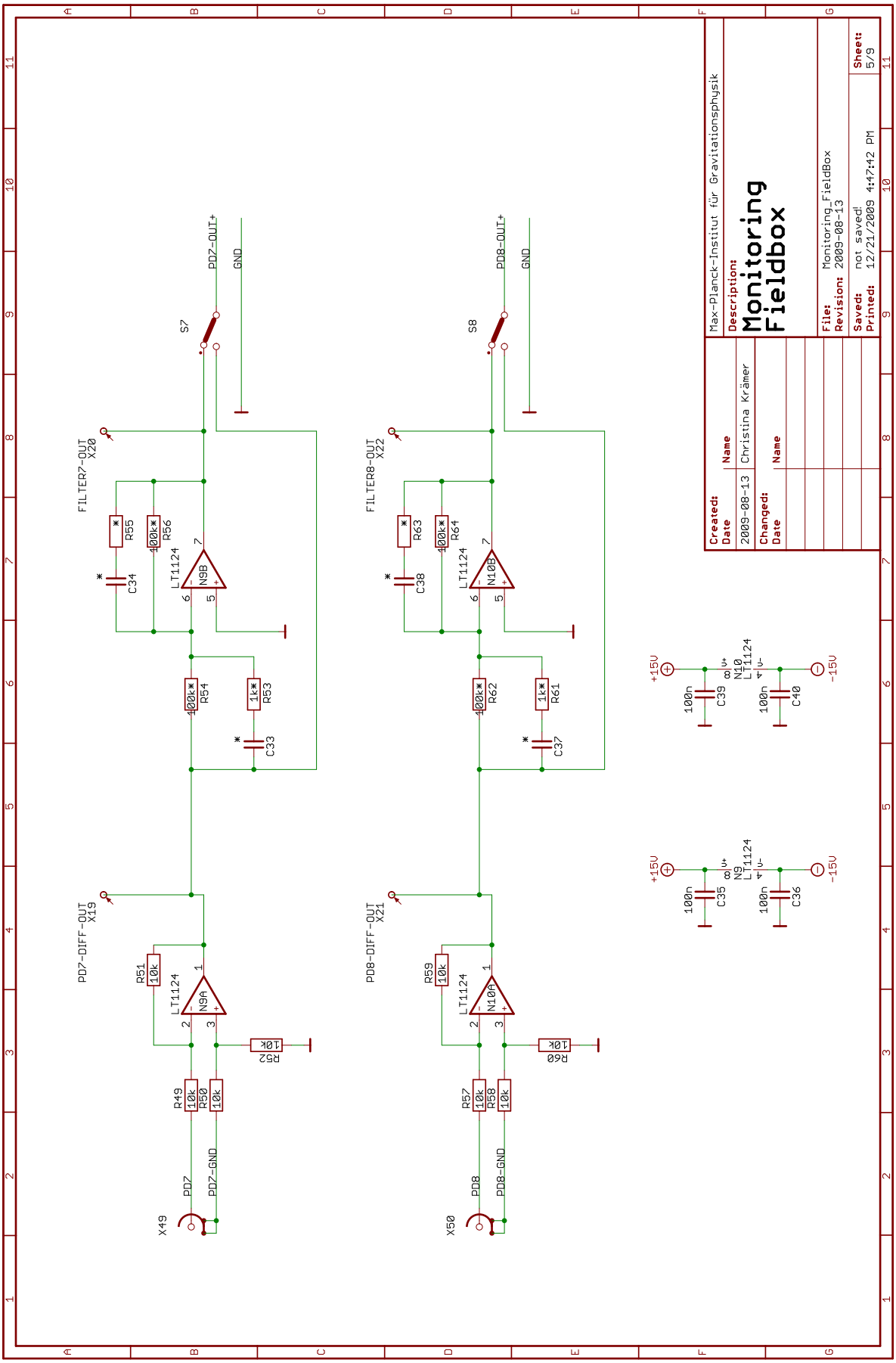


**Figure 6:** *Project schematics (sheet 5)*

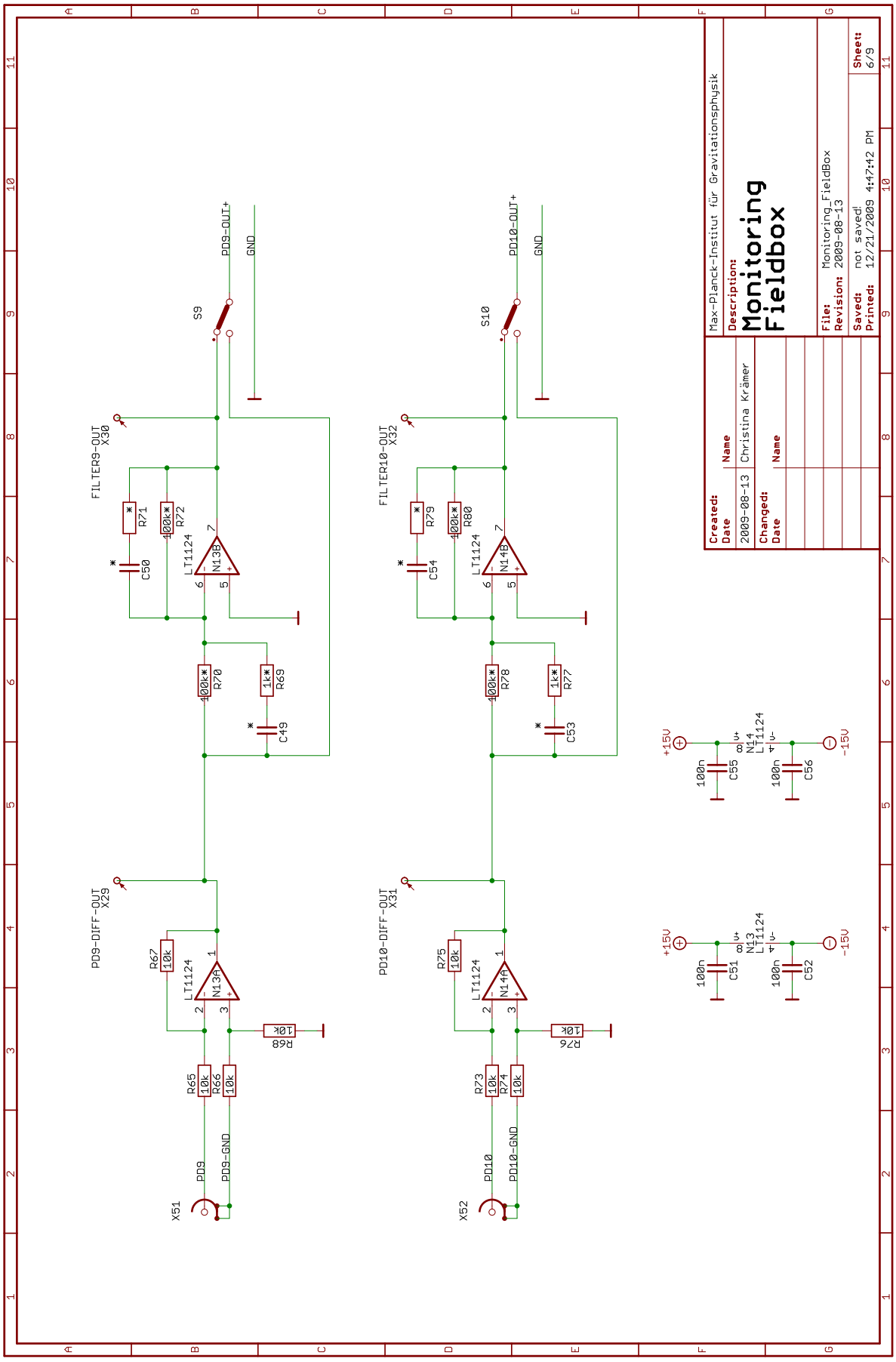


**Figure 7:** *Project schematics (sheet 6)*

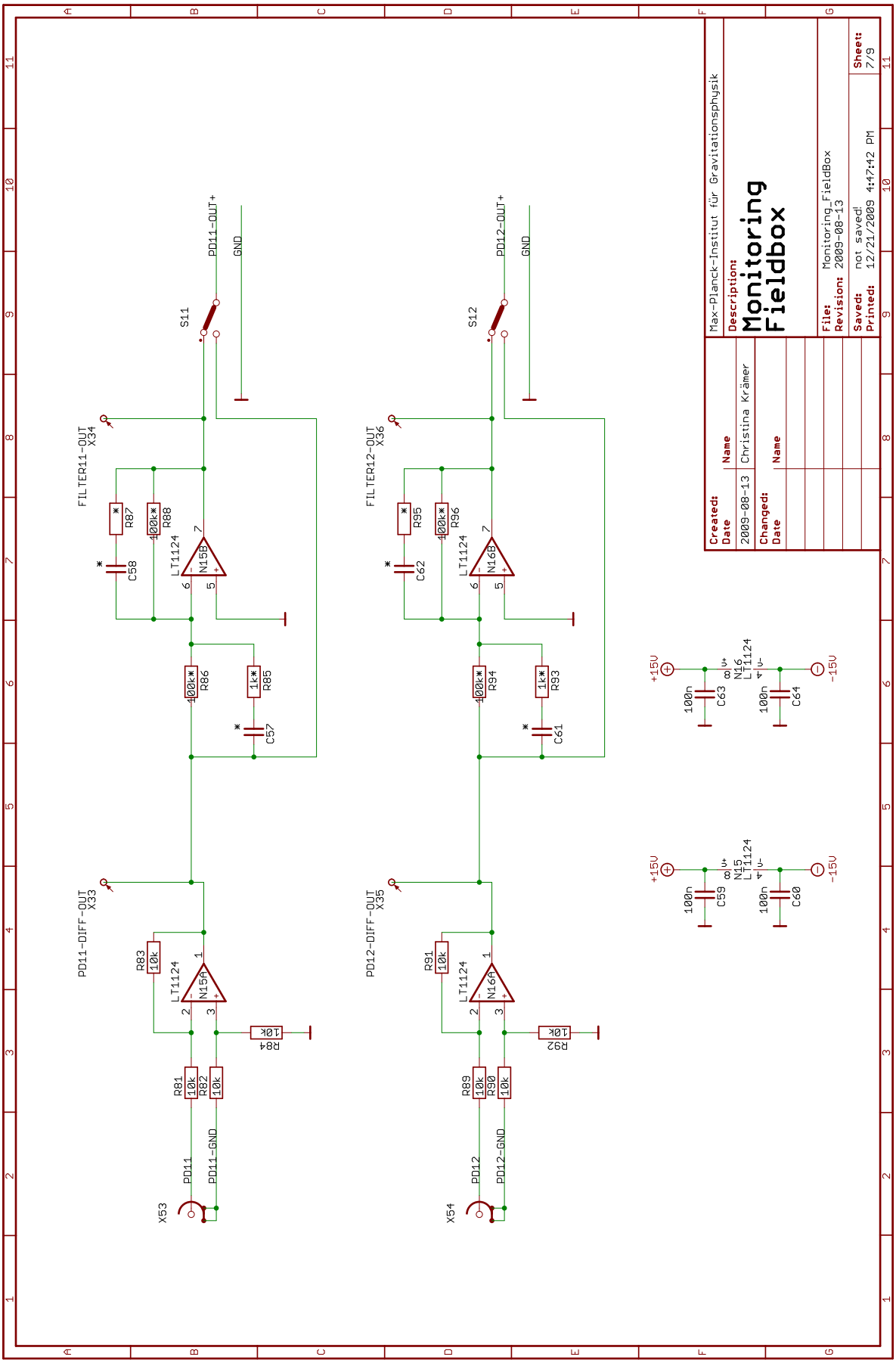


**Figure 8:** *Project schematics (sheet 7)*

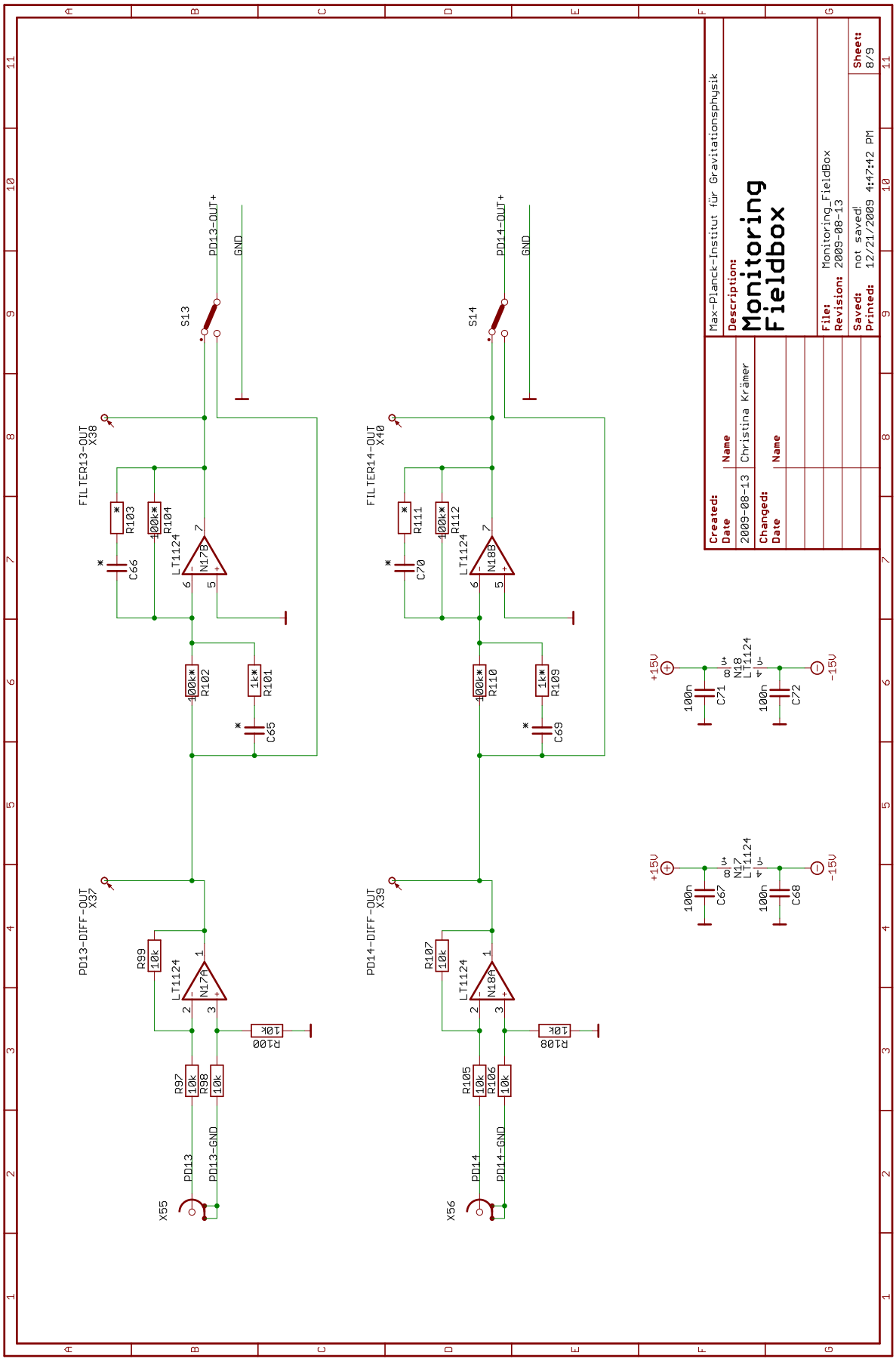


**Figure 9:** *Project schematics (sheet 8)*

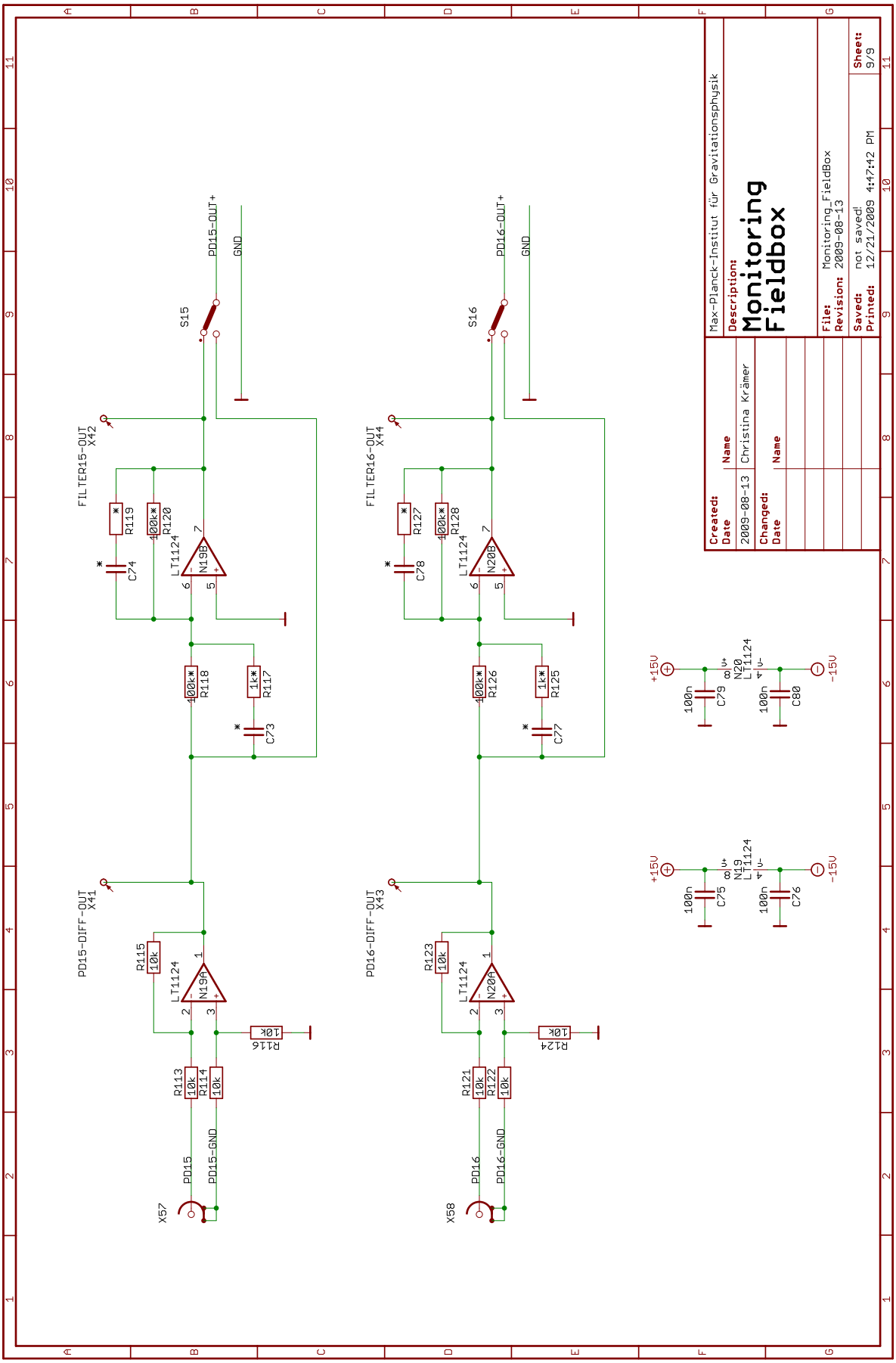


**Figure 10:** *Project schematics (sheet 9)*

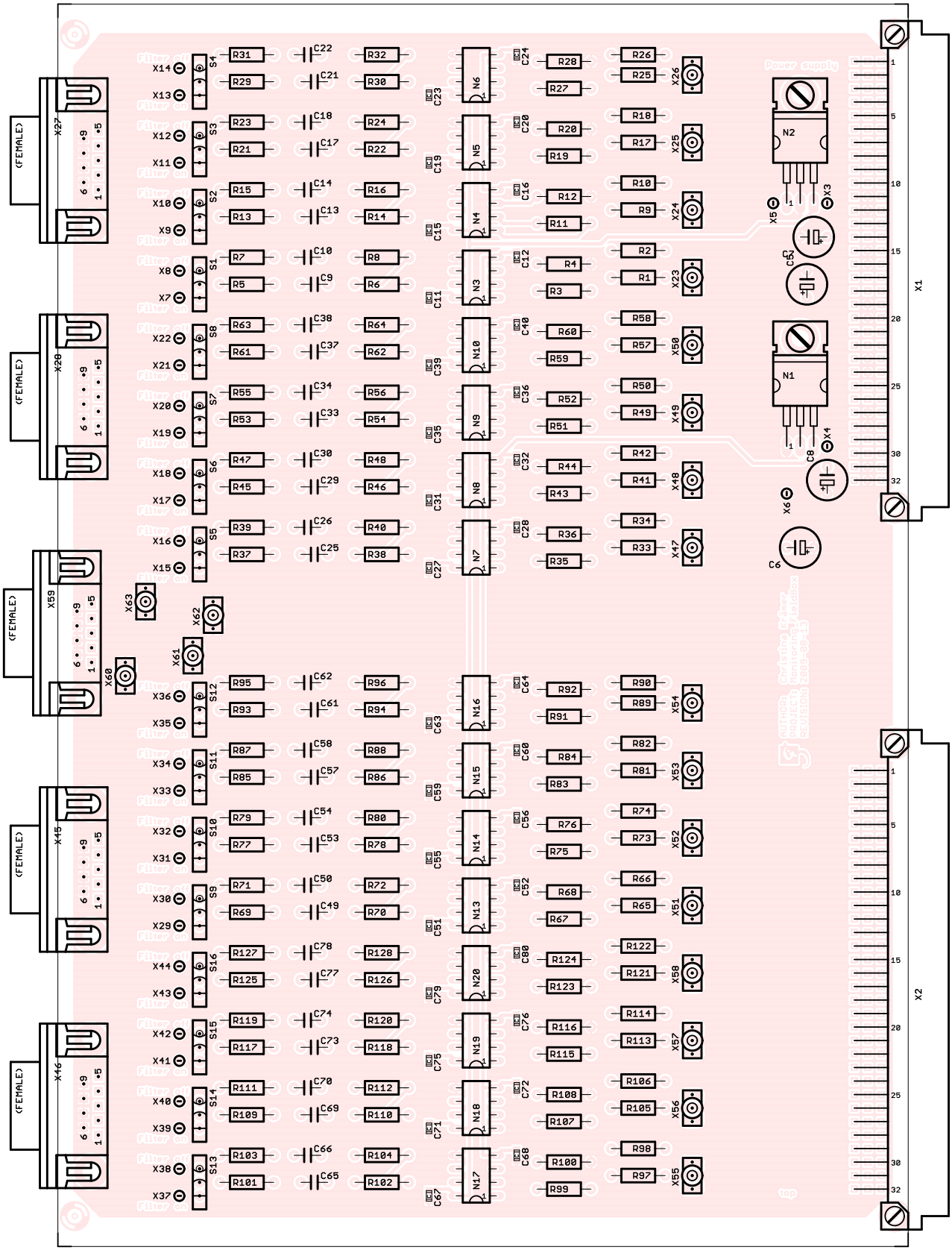

**Figure 11:** *Board top view showing placeplan with component names*

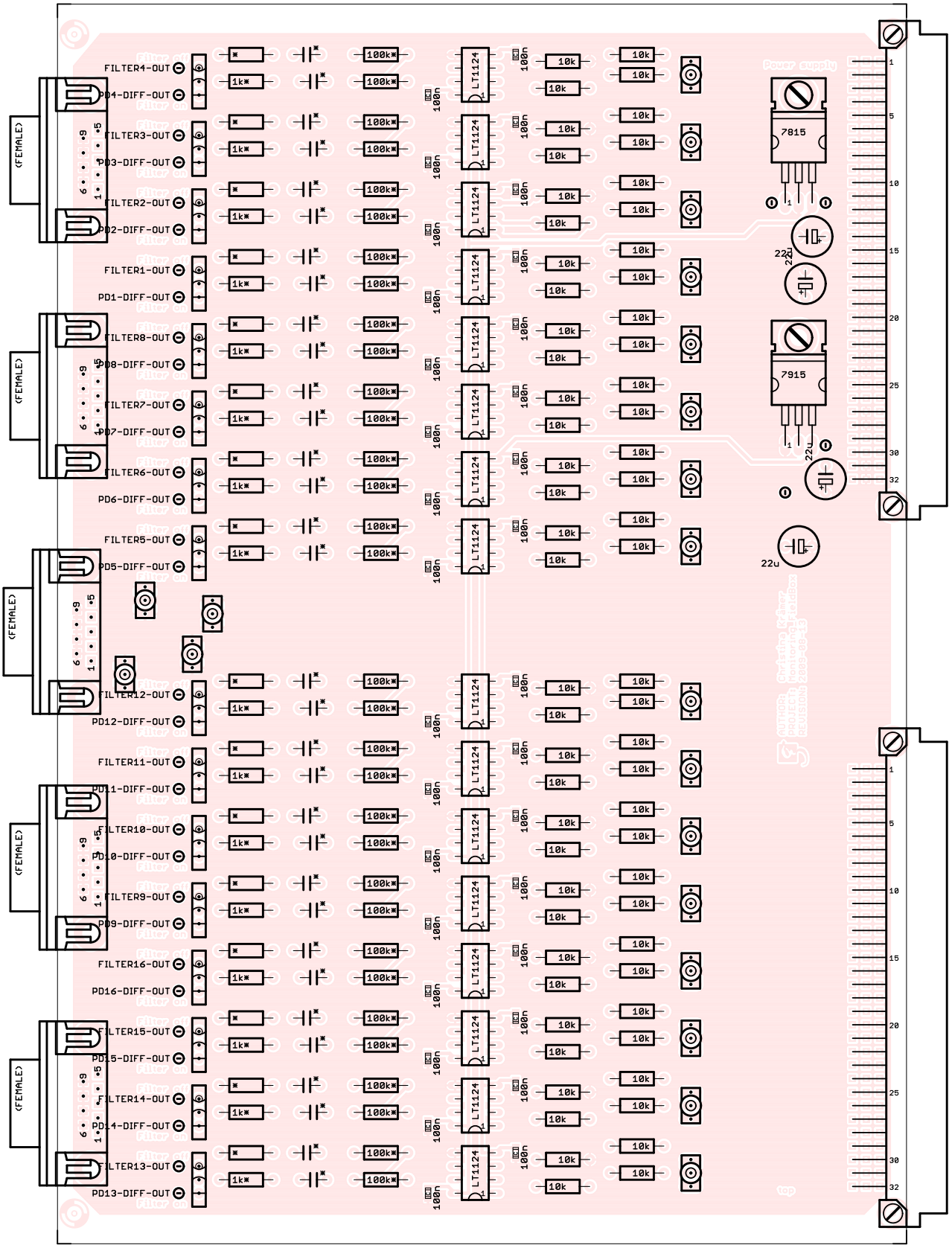


**Figure 12:** *Board top view showing placeplan with component values*

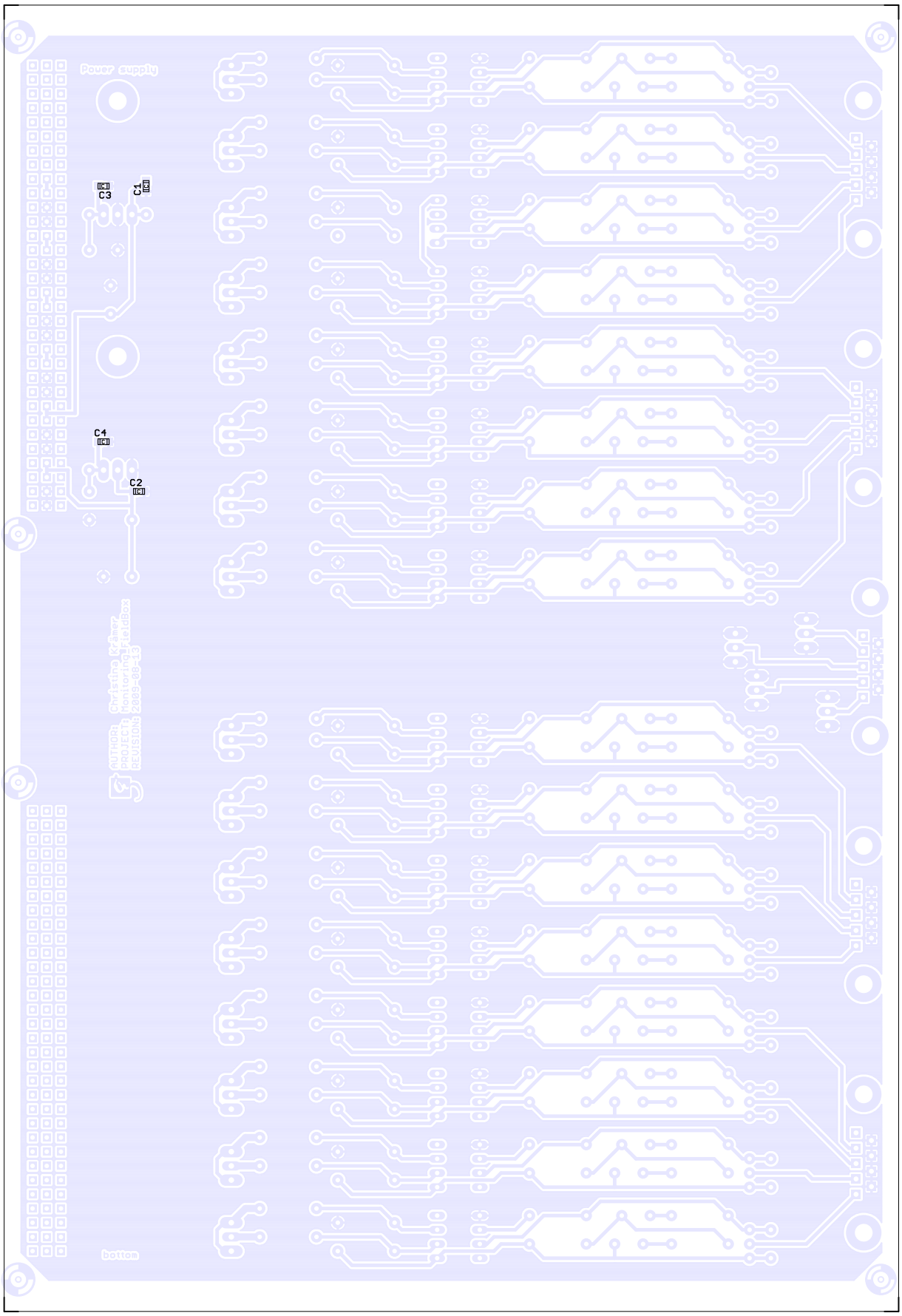


**Figure 13:** *Board bottom view showing placeplan with component names*

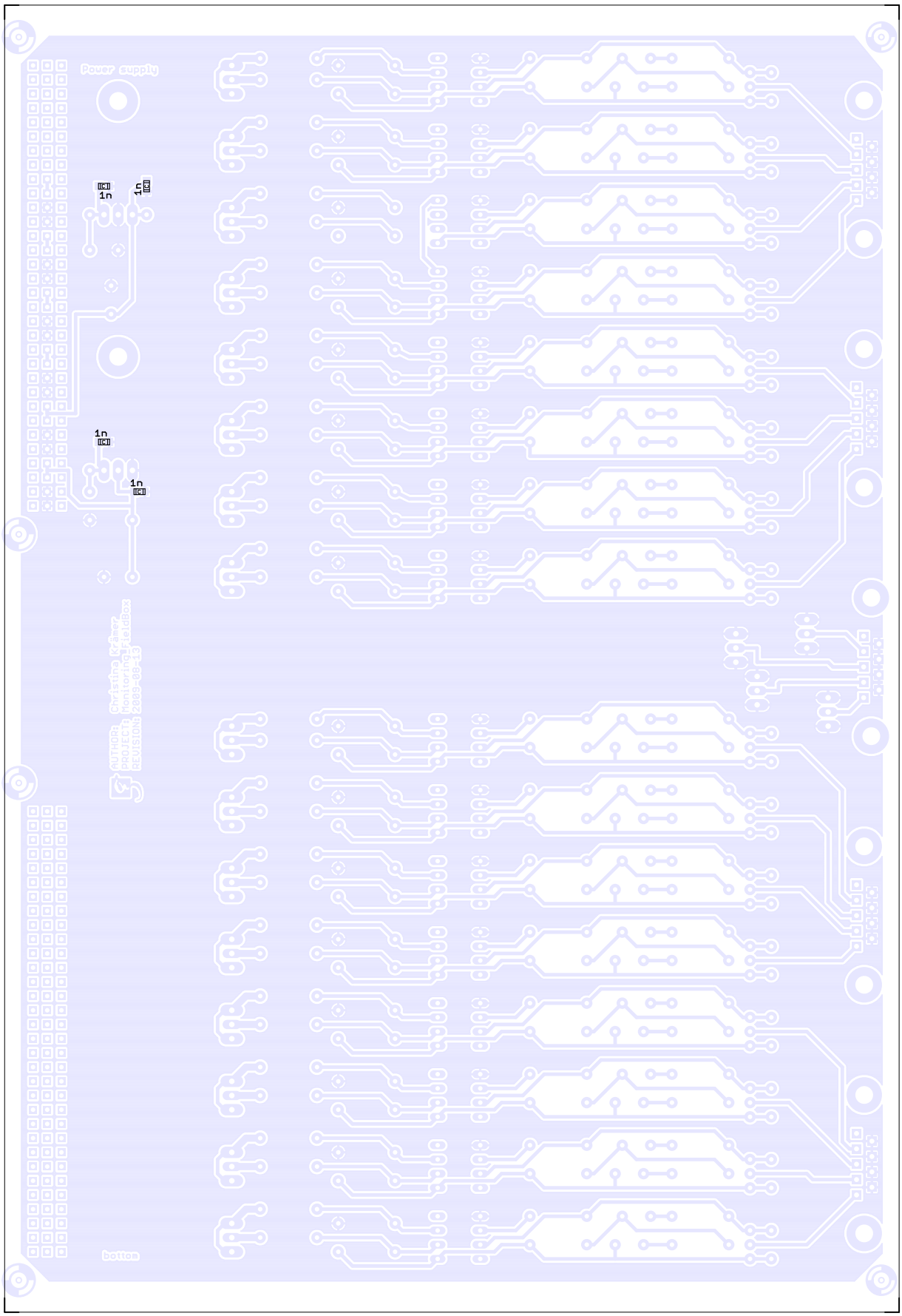


**Figure 14:** *Board bottom view showing placeplan with component values*

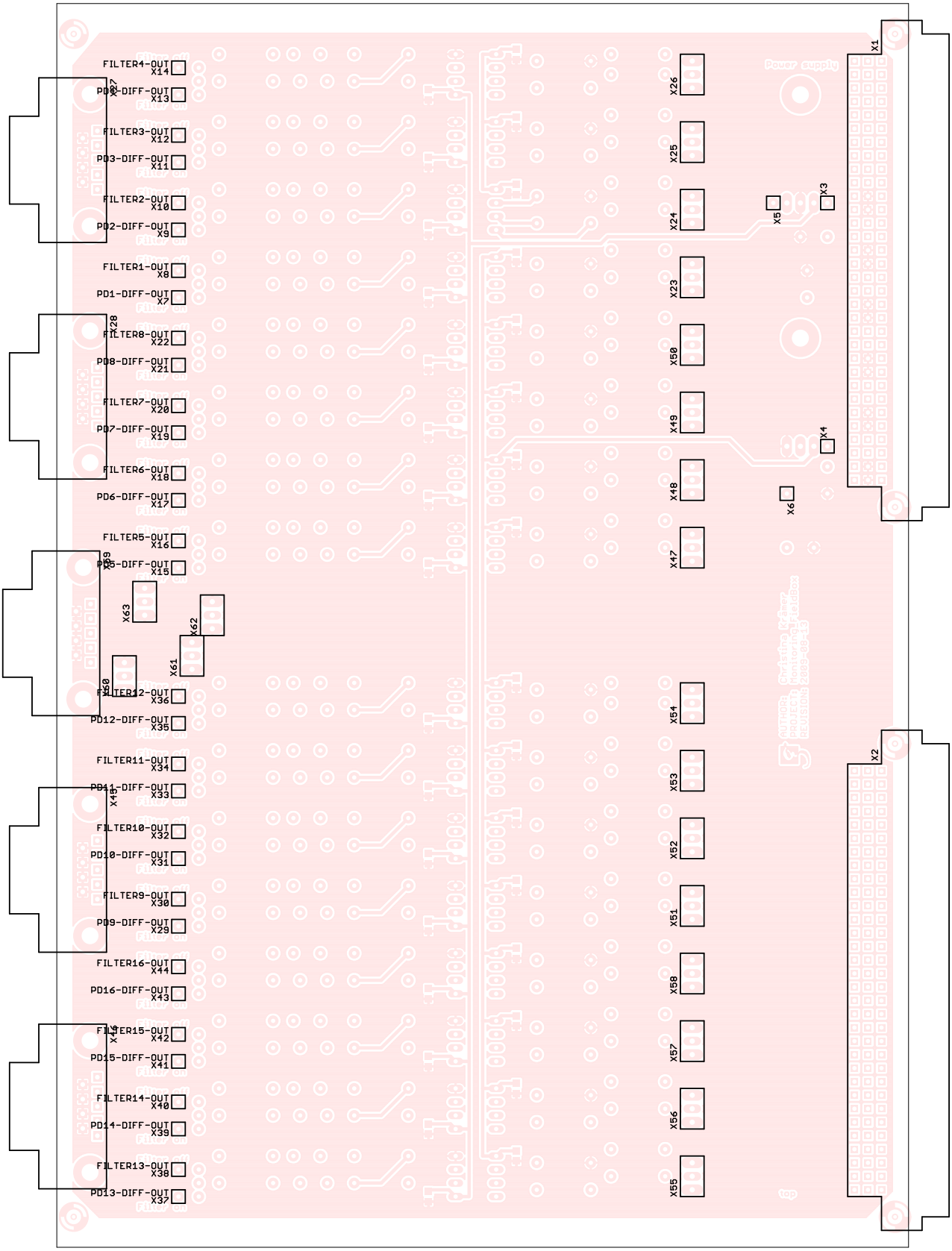


**Figure 15:** *Board top view showing connectors, test points and wired components*

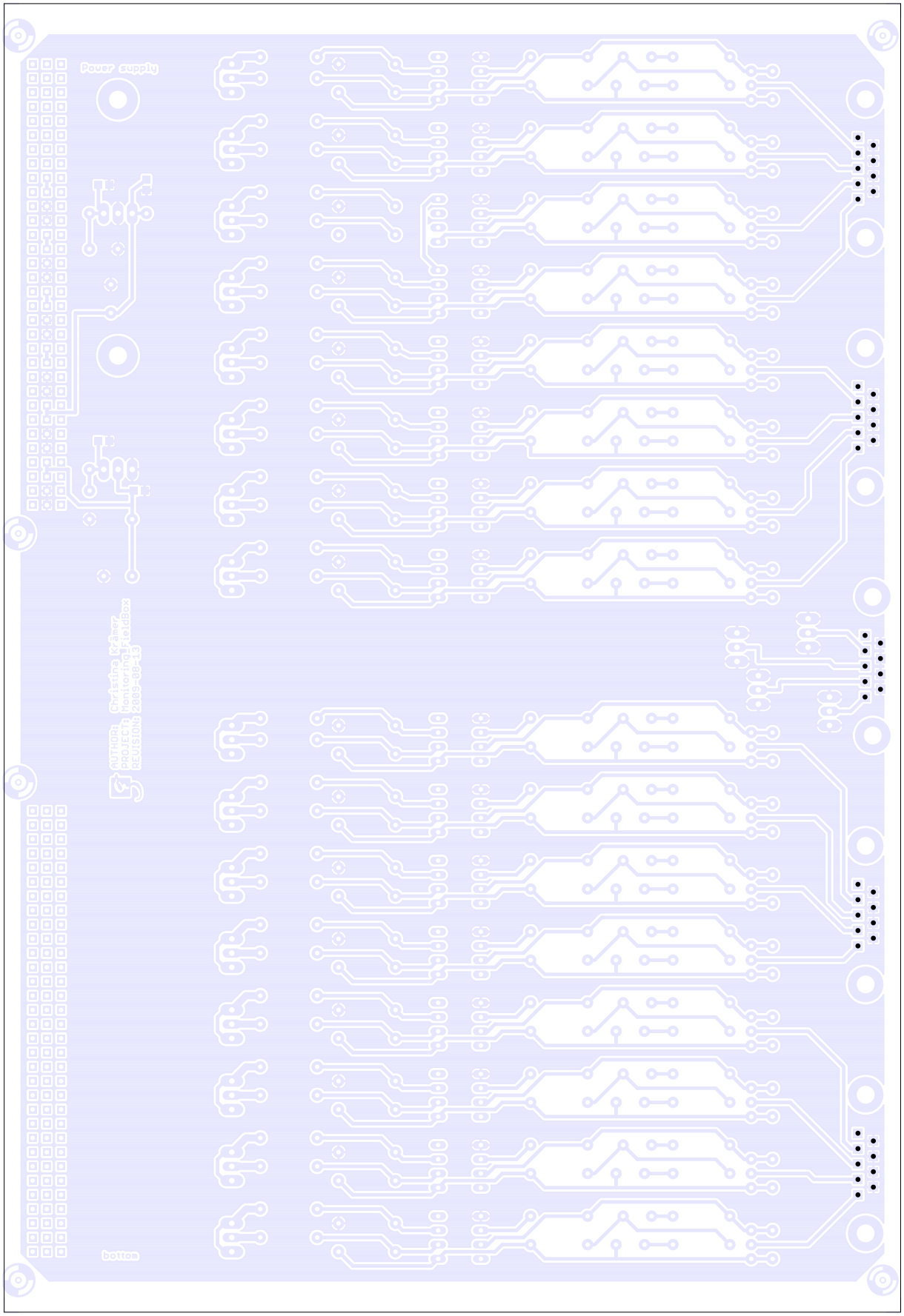


**Figure 16:** *Board bottom view showing drills with 0.9 mm (0.035 in) diameter*

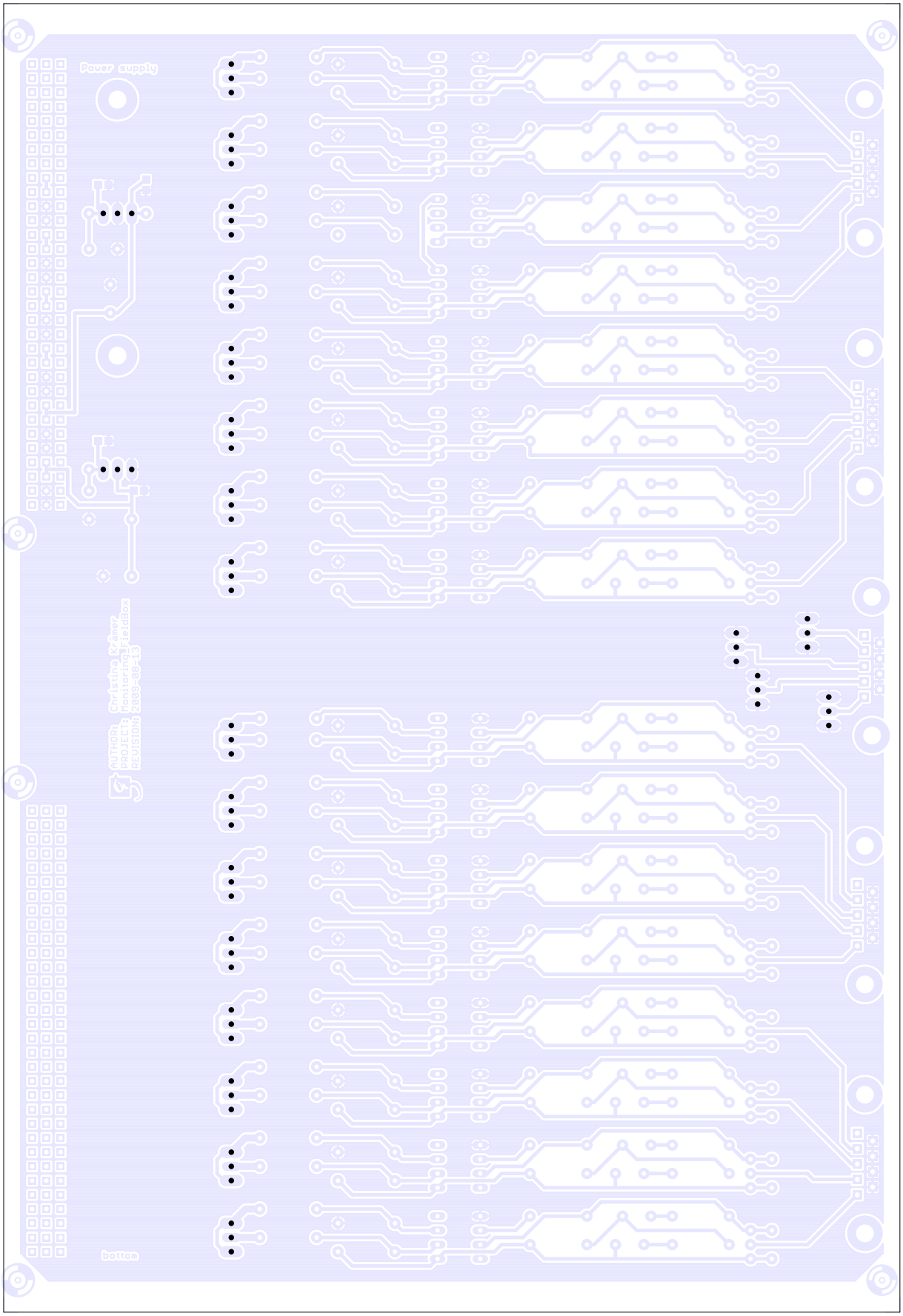


**Figure 17:** *Board bottom view showing drills with 1.0 mm (0.039 in) diameter*

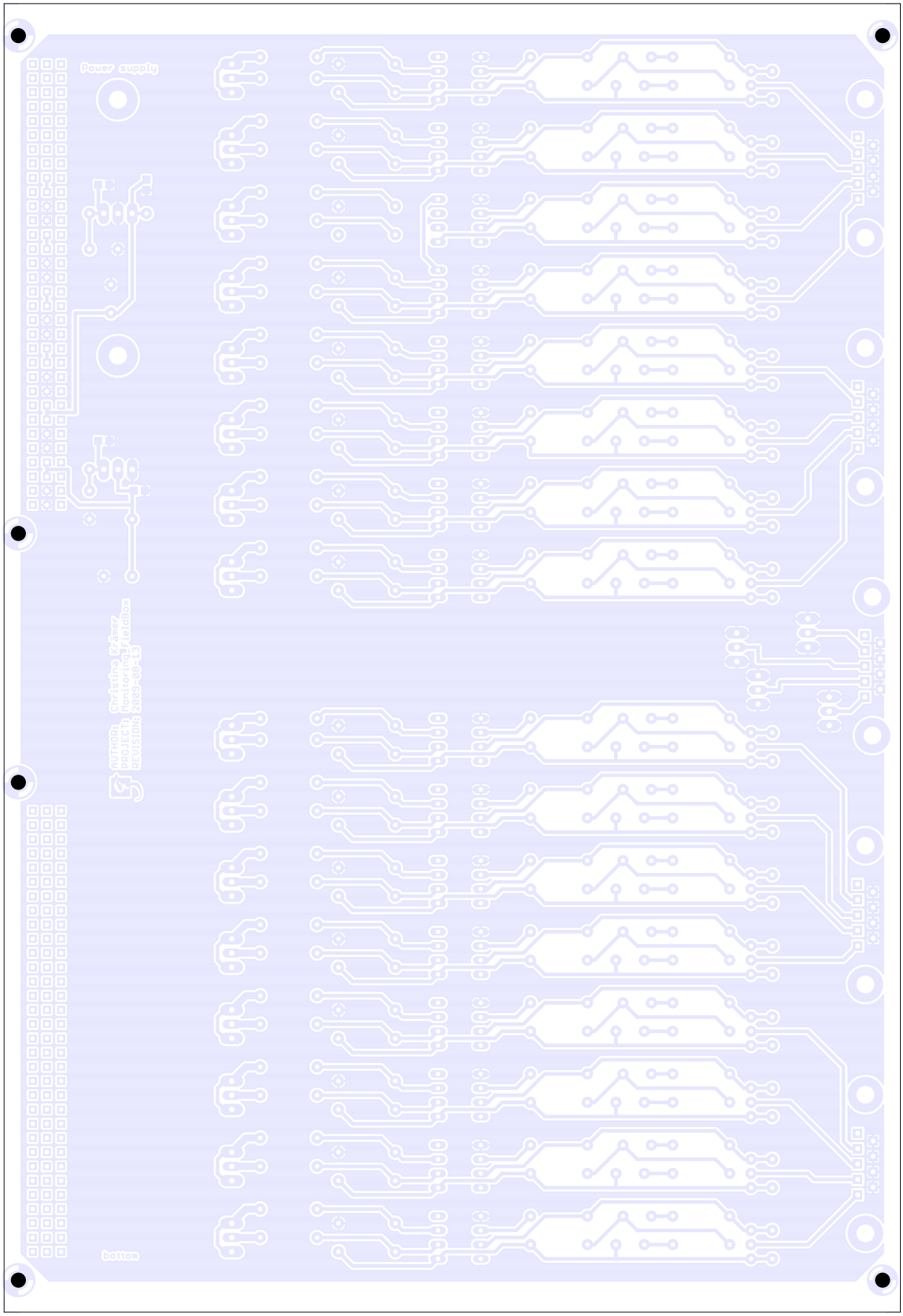


**Figure 18:** *Board bottom view showing drills with 2.7 mm (0.106 in) diameter*

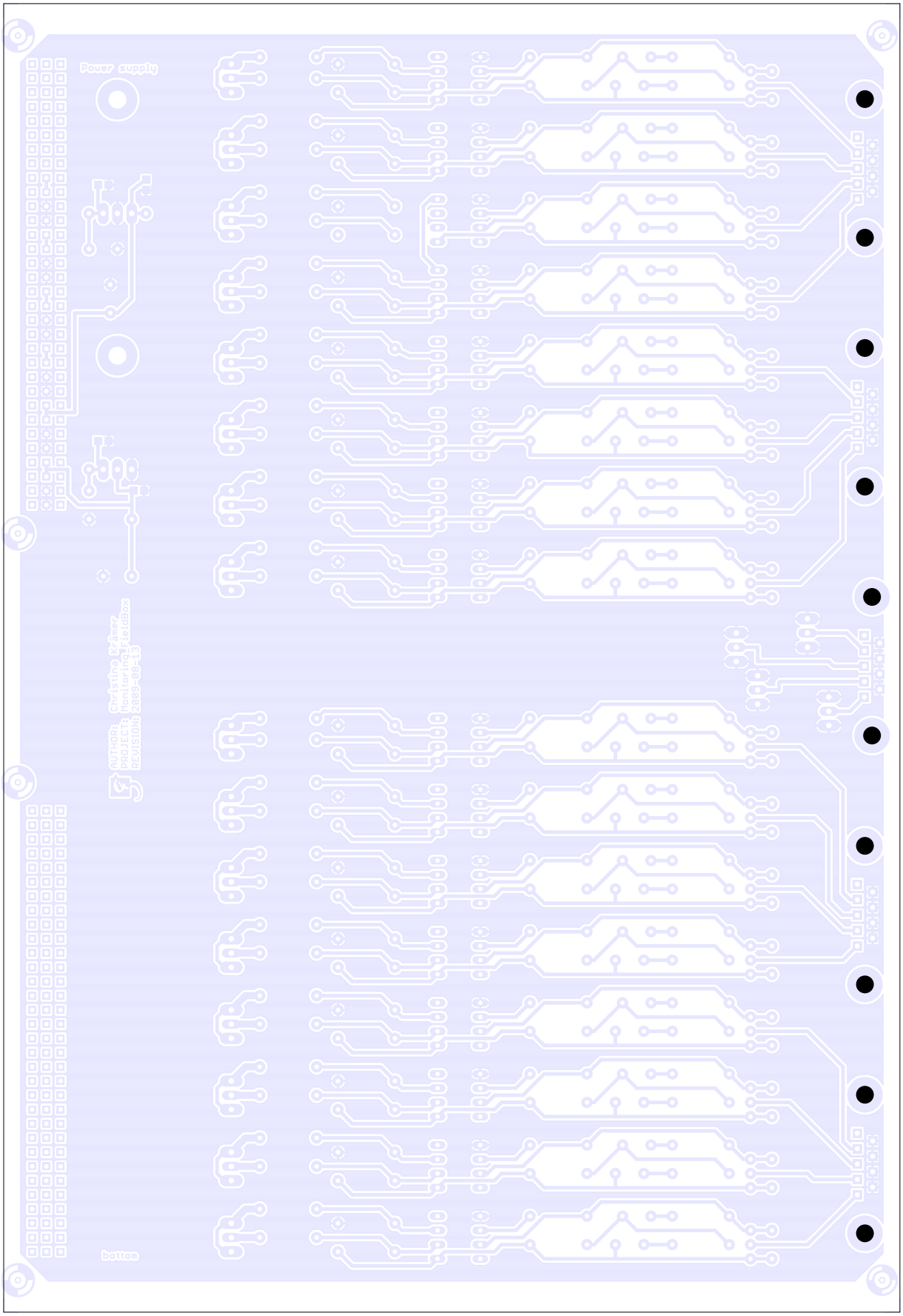


**Figure 19:** *Board bottom view showing drills with 3.2 mm (0.125 in) diameter*

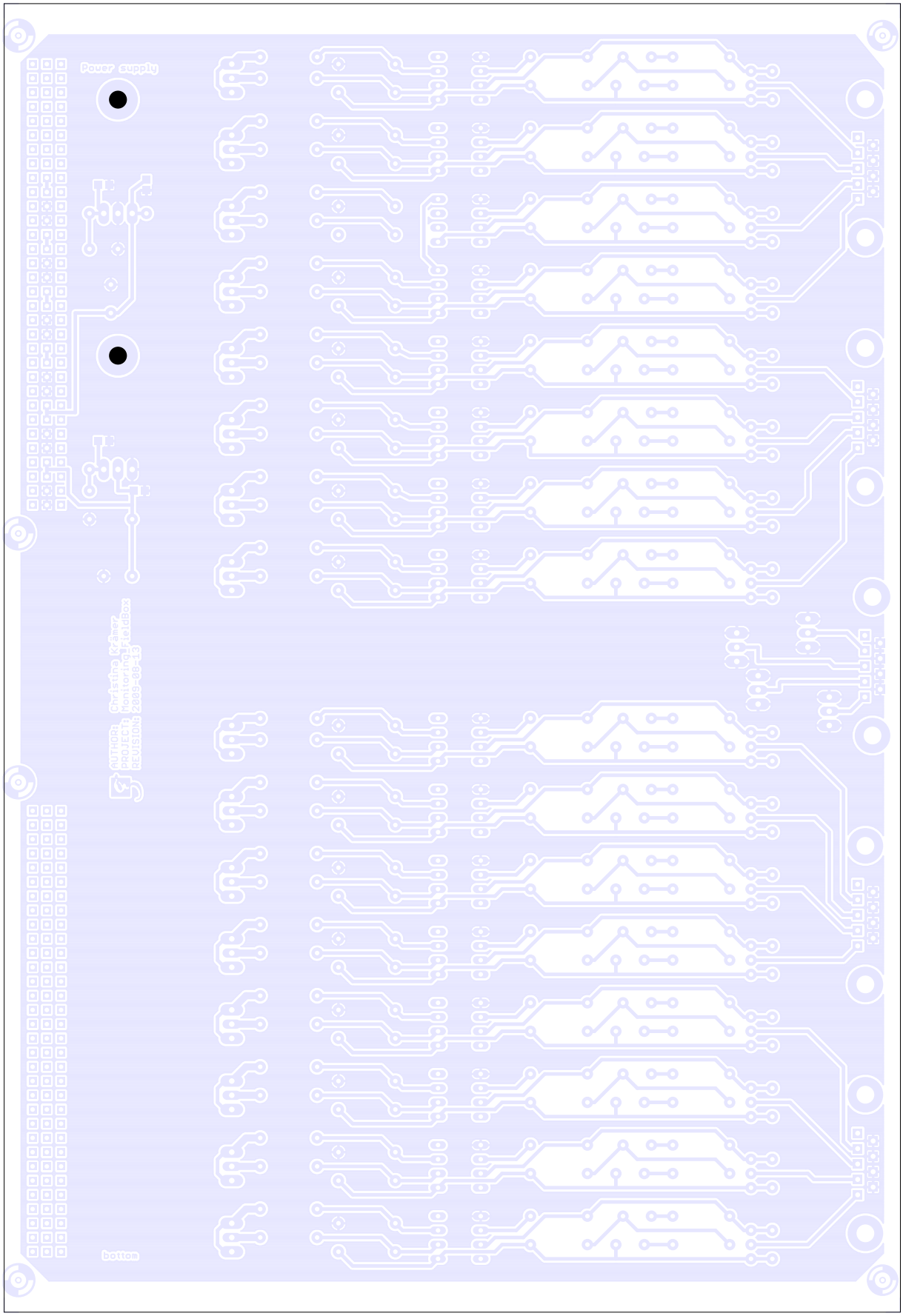


**Figure 20:** *Board bottom view showing drills with 3.2 mm (0.126 in) diameter*

## Circuit Lists

**Drill list:** The following table shows all *final* drill diameters used in the board. When manually drilling the clearance holes, round up to the nearest available drill bit diameter, ensuring that all components fit well. When manufacturing *through-plated* boards, adjust for the additional copper coating by increasing the diameter accordingly.

| ∅ [µm] | ∅ [mm] | ∅ [in] | Count |
|---|---|---|---|
| 812 | 0.8 | 0.032 | 732 |
| 889 | 0.9 | 0.035 | 45 |
| 990 | 1.0 | 0.039 | 66 |
| 2692 | 2.7 | 0.106 | 6 |
| 3175 | 3.2 | 0.125 | 10 |
| 3200 | 3.2 | 0.126 | 2 |
| | | Total | 861 |

**Table 1:** *Drill diameters used in the board*

**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. Additional information can possibly be found directly on the board (or in the schematics).

```
EAGLE Version 5.6.0 Copyright (c) 1988-2009 CadSoft
Board value list of 'Monitoring_FieldBox.brd'
Exported at 2009-12-21 16:48
Created with macro 'plot.ulp' (c) Andreas Weidner
Shown are: Value/Type,Package,Number,Names (Library)

---C---
1n              C-SMD:0805      (4*)    C1,C2,C3,C4 (divers)
100n            C-SMD:0805      (32*)   C11,C12,C15,C16,C19,C20,C23,C24,C27,C28,C31,
                                        C32,C35,C36,C39,C40,C51,C52,C55,C56,C59,C60,
                                        C63,C64,C67,C68,C71,C72,C75,C76,C79,C80
                                        (divers)
22u             CE02D           (4*)    C5,C6,C7,C8 (divers)
*               C-0.2"          (32*)   C9,C10,C13,C14,C17,C18,C21,C22,C25,C26,C29,C30,
                                        C33,C34,C37,C38,C49,C50,C53,C54,C57,C58,C61,
                                        C62,C65,C66,C69,C70,C73,C74,C77,C78 (divers)

---N---
7815            TO220L          (1*)    N2 (ic)
7915            TO220L          (1*)    N1 (ic)
LT1124          DIP-8           (16*)   N3,N4,N5,N6,N7,N8,N9,N10,N13,N14,N15,N16,N17,
                                        N18,N19,N20 (opamps)

---R---
1k*             R-0.4"          (16*)   R5,R13,R21,R29,R37,R45,R53,R61,R69,R77,R85,R93,
                                        R101,R109,R117,R125 (divers)
10k             R-0.4"          (64*)   R1,R2,R3,R4,R9,R10,R11,R12,R17,R18,R19,R20,R25,
                                        R26,R27,R28,R33,R34,R35,R36,R41,R42,R43,R44,
                                        R49,R50,R51,R52,R57,R58,R59,R60,R65,R66,R67,
```

| | | | | |
|---|---|---|---|---|
| | | | | R68,R73,R74,R75,R76,R81,R82,R83,R84,R89,R90, |
| | | | | R91,R92,R97,R98,R99,R100,R105,R106,R107,R108, |
| | | | | R113,R114,R115,R116,R121,R122,R123,R124 |
| | | | | (divers) |
| | 100k* | R-0.4" | (32*) | R6,R8,R14,R16,R22,R24,R30,R32,R38,R40,R46,R48, |
| | | | | R54,R56,R62,R64,R70,R72,R78,R80,R86,R88,R94, |
| | | | | R96,R102,R104,R110,R112,R118,R120,R126,R128 |
| | | | | (divers) |
| | * | R-0.4" | (16*) | R7,R15,R23,R31,R39,R47,R55,R63,R71,R79,R87,R95, |
| | | | | R103,R111,R119,R127 (divers) |
| | | | | |
| | ---S--- | | | |
| | | S1X2S01N | (16*) | S1,S2,S3,S4,S5,S6,S7,S8,S9,S10,S11,S12,S13,S14, |
| | | | | S15,S16 (divers) |
| | | | | |
| | ---X--- | | | |
| | | X09-DSUBFEMALE1 | (5*) | X27,X28,X45,X46,X59 (connectors) |
| | | XB96 | (2*) | X1,X2 (connectors) |
| | | XC174N | (20*) | X23,X24,X25,X26,X47,X48,X49,X50,X51,X52,X53, |
| | | | | X54,X55,X56,X57,X58,X60,X61,X62,X63 |
| | | | | (connectors) |
| | | XTN | (4*) | X3,X4,X5,X6 (connectors) |
| | FILTER1-OUT | XTN | (1*) | X8 (connectors) |
| | FILTER2-OUT | XTN | (1*) | X10 (connectors) |
| | FILTER3-OUT | XTN | (1*) | X12 (connectors) |
| | FILTER4-OUT | XTN | (1*) | X14 (connectors) |
| | FILTER5-OUT | XTN | (1*) | X16 (connectors) |
| | FILTER6-OUT | XTN | (1*) | X18 (connectors) |
| | FILTER7-OUT | XTN | (1*) | X20 (connectors) |
| | FILTER8-OUT | XTN | (1*) | X22 (connectors) |
| | FILTER9-OUT | XTN | (1*) | X30 (connectors) |
| | FILTER10-OUT | XTN | (1*) | X32 (connectors) |
| | FILTER11-OUT | XTN | (1*) | X34 (connectors) |
| | FILTER12-OUT | XTN | (1*) | X36 (connectors) |
| | FILTER13-OUT | XTN | (1*) | X38 (connectors) |
| | FILTER14-OUT | XTN | (1*) | X40 (connectors) |
| | FILTER15-OUT | XTN | (1*) | X42 (connectors) |
| | FILTER16-OUT | XTN | (1*) | X44 (connectors) |
| | PD1-DIFF-OUT | XTN | (1*) | X7 (connectors) |
| | PD2-DIFF-OUT | XTN | (1*) | X9 (connectors) |
| | PD3-DIFF-OUT | XTN | (1*) | X11 (connectors) |
| | PD4-DIFF-OUT | XTN | (1*) | X13 (connectors) |
| | PD5-DIFF-OUT | XTN | (1*) | X15 (connectors) |
| | PD6-DIFF-OUT | XTN | (1*) | X17 (connectors) |
| | PD7-DIFF-OUT | XTN | (1*) | X19 (connectors) |
| | PD8-DIFF-OUT | XTN | (1*) | X21 (connectors) |
| | PD9-DIFF-OUT | XTN | (1*) | X29 (connectors) |
| | PD10-DIFF-OUT | XTN | (1*) | X31 (connectors) |
| | PD11-DIFF-OUT | XTN | (1*) | X33 (connectors) |
| | PD12-DIFF-OUT | XTN | (1*) | X35 (connectors) |
| | PD13-DIFF-OUT | XTN | (1*) | X37 (connectors) |
| | PD14-DIFF-OUT | XTN | (1*) | X39 (connectors) |
| | PD15-DIFF-OUT | XTN | (1*) | X41 (connectors) |
| | PD16-DIFF-OUT | XTN | (1*) | X43 (connectors) |

**Part list:** The following list shows all components available in the schematics (sorted by part *names*) and can be used to quickly get component information. The column *Layer/Cell* shows the position of the part on the board: *T* for top layer and *B* for bottom layer, followed by the cell of the sur-

rounding frame (if available). The column *Sheets/Cells* shows the position of *all* the part's gates in the schematics: Sheet number followed by the cell of the surrounding frame (if available). Additional information can possibly be found directly in the schematics.

```
EAGLE Version 5.6.0 Copyright (c) 1988-2009 CadSoft
Schematics part list of 'Monitoring_FieldBox.sch'
Exported at 2009-12-21 16:48
Created with macro 'plot.ulp' (c) Andreas Weidner
Shown are: Name,Value/Type,Device,Package,Layer/Cell,Sheets/Cells

---C---
C1    1n              C0805     C-SMD:0805       B  1-D9
C2    1n              C0805     C-SMD:0805       B  1-E9
C3    1n              C0805     C-SMD:0805       B  1-D10
C4    1n              C0805     C-SMD:0805       B  1-E10
C5    22u             CE02D     CE02D            T  1-D8
C6    22u             CE02D     CE02D            T  1-E8
C7    22u             CE02D     CE02D            T  1-D10
C8    22u             CE02D     CE02D            T  1-E10
C9    *               C02N      C-0.2"           T  2-B6
C10   *               C02N      C-0.2"           T  2-A7
C11   100n            C0805     C-SMD:0805       T  2-F4
C12   100n            C0805     C-SMD:0805       T  2-G4
C13   *               C02N      C-0.2"           T  2-E6
C14   *               C02N      C-0.2"           T  2-D7
C15   100n            C0805     C-SMD:0805       T  2-F5
C16   100n            C0805     C-SMD:0805       T  2-G5
C17   *               C02N      C-0.2"           T  3-B6
C18   *               C02N      C-0.2"           T  3-A7
C19   100n            C0805     C-SMD:0805       T  3-F4
C20   100n            C0805     C-SMD:0805       T  3-G4
C21   *               C02N      C-0.2"           T  3-E6
C22   *               C02N      C-0.2"           T  3-D7
C23   100n            C0805     C-SMD:0805       T  3-F6
C24   100n            C0805     C-SMD:0805       T  3-G6
C25   *               C02N      C-0.2"           T  4-B6
C26   *               C02N      C-0.2"           T  4-A7
C27   100n            C0805     C-SMD:0805       T  4-F4
C28   100n            C0805     C-SMD:0805       T  4-G4
C29   *               C02N      C-0.2"           T  4-E6
C30   *               C02N      C-0.2"           T  4-D7
C31   100n            C0805     C-SMD:0805       T  4-F6
C32   100n            C0805     C-SMD:0805       T  4-G6
C33   *               C02N      C-0.2"           T  5-B5
C34   *               C02N      C-0.2"           T  5-A7
C35   100n            C0805     C-SMD:0805       T  5-F4
C36   100n            C0805     C-SMD:0805       T  5-G4
C37   *               C02N      C-0.2"           T  5-E5
C38   *               C02N      C-0.2"           T  5-D7
C39   100n            C0805     C-SMD:0805       T  5-F6
C40   100n            C0805     C-SMD:0805       T  5-G6
C49   *               C02N      C-0.2"           T  6-C6
C50   *               C02N      C-0.2"           T  6-A7
C51   100n            C0805     C-SMD:0805       T  6-F4
C52   100n            C0805     C-SMD:0805       T  6-G4
C53   *               C02N      C-0.2"           T  6-E6
C54   *               C02N      C-0.2"           T  6-D7
C55   100n            C0805     C-SMD:0805       T  6-F5
C56   100n            C0805     C-SMD:0805       T  6-G5
C57   *               C02N      C-0.2"           T  7-B6
```

```
C58   *           C02N     C-0.2"          T  7-A7
C59   100n        C0805    C-SMD:0805      T  7-F4
C60   100n        C0805    C-SMD:0805      T  7-G4
C61   *           C02N     C-0.2"          T  7-E6
C62   *           C02N     C-0.2"          T  7-D7
C63   100n        C0805    C-SMD:0805      T  7-F6
C64   100n        C0805    C-SMD:0805      T  7-G6
C65   *           C02N     C-0.2"          T  8-B6
C66   *           C02N     C-0.2"          T  8-A7
C67   100n        C0805    C-SMD:0805      T  8-F4
C68   100n        C0805    C-SMD:0805      T  8-G4
C69   *           C02N     C-0.2"          T  8-E6
C70   *           C02N     C-0.2"          T  8-D7
C71   100n        C0805    C-SMD:0805      T  8-F6
C72   100n        C0805    C-SMD:0805      T  8-G6
C73   *           C02N     C-0.2"          T  9-B6
C74   *           C02N     C-0.2"          T  9-A7
C75   100n        C0805    C-SMD:0805      T  9-F4
C76   100n        C0805    C-SMD:0805      T  9-G4
C77   *           C02N     C-0.2"          T  9-E6
C78   *           C02N     C-0.2"          T  9-D7
C79   100n        C0805    C-SMD:0805      T  9-F6
C80   100n        C0805    C-SMD:0805      T  9-G6

---N---
N1    7915        79XXL    TO220L          T  1-E9
N2    7815        78XXL    TO220L          T  1-D9
N3    LT1124      LT1124   DIP-8           T  2-B4,2-B7,2-F4
N4    LT1124      LT1124   DIP-8           T  2-D4,2-D7,2-F5
N5    LT1124      LT1124   DIP-8           T  3-B4,3-B7,3-F4
N6    LT1124      LT1124   DIP-8           T  3-D4,3-D7,3-F6
N7    LT1124      LT1124   DIP-8           T  4-B4,4-B7,4-F4
N8    LT1124      LT1124   DIP-8           T  4-D4,4-D7,4-F6
N9    LT1124      LT1124   DIP-8           T  5-B3,5-B7,5-F4
N10   LT1124      LT1124   DIP-8           T  5-D3,5-D7,5-F6
N13   LT1124      LT1124   DIP-8           T  6-B4,6-B7,6-F4
N14   LT1124      LT1124   DIP-8           T  6-D4,6-D7,6-F5
N15   LT1124      LT1124   DIP-8           T  7-B4,7-B7,7-F4
N16   LT1124      LT1124   DIP-8           T  7-D4,7-D7,7-F6
N17   LT1124      LT1124   DIP-8           T  8-B4,8-B7,8-F4
N18   LT1124      LT1124   DIP-8           T  8-D4,8-D7,8-F6
N19   LT1124      LT1124   DIP-8           T  9-B4,9-B7,9-F4
N20   LT1124      LT1124   DIP-8           T  9-D4,9-D7,9-F6

---R---
R1    10k         R04N     R-0.4"          T  2-B3
R2    10k         R04N     R-0.4"          T  2-B3
R3    10k         R04N     R-0.4"          T  2-B4
R4    10k         R04N     R-0.4"          T  2-C3
R5    1k*         R04N     R-0.4"          T  2-B6
R6    100k*       R04N     R-0.4"          T  2-B6
R7    *           R04N     R-0.4"          T  2-A7
R8    100k*       R04N     R-0.4"          T  2-B7
R9    10k         R04N     R-0.4"          T  2-D3
R10   10k         R04N     R-0.4"          T  2-D3
R11   10k         R04N     R-0.4"          T  2-D4
R12   10k         R04N     R-0.4"          T  2-E3
R13   1k*         R04N     R-0.4"          T  2-E6
R14   100k*       R04N     R-0.4"          T  2-D6
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|---|---|---|---|---|---|---|
| 116 | R15 | * | R04N | R-0.4" | T | 2-D7 |
| 117 | R16 | 100k* | R04N | R-0.4" | T | 2-D7 |
| 118 | R17 | 10k | R04N | R-0.4" | T | 3-B3 |
| 119 | R18 | 10k | R04N | R-0.4" | T | 3-B3 |
| 120 | R19 | 10k | R04N | R-0.4" | T | 3-B4 |
| 121 | R20 | 10k | R04N | R-0.4" | T | 3-C3 |
| 122 | R21 | 1k* | R04N | R-0.4" | T | 3-B6 |
| 123 | R22 | 100k* | R04N | R-0.4" | T | 3-B6 |
| 124 | R23 | * | R04N | R-0.4" | T | 3-A7 |
| 125 | R24 | 100k* | R04N | R-0.4" | T | 3-B7 |
| 126 | R25 | 10k | R04N | R-0.4" | T | 3-D3 |
| 127 | R26 | 10k | R04N | R-0.4" | T | 3-D3 |
| 128 | R27 | 10k | R04N | R-0.4" | T | 3-D4 |
| 129 | R28 | 10k | R04N | R-0.4" | T | 3-E3 |
| 130 | R29 | 1k* | R04N | R-0.4" | T | 3-E6 |
| 131 | R30 | 100k* | R04N | R-0.4" | T | 3-D6 |
| 132 | R31 | * | R04N | R-0.4" | T | 3-D7 |
| 133 | R32 | 100k* | R04N | R-0.4" | T | 3-D7 |
| 134 | R33 | 10k | R04N | R-0.4" | T | 4-B3 |
| 135 | R34 | 10k | R04N | R-0.4" | T | 4-B3 |
| 136 | R35 | 10k | R04N | R-0.4" | T | 4-B4 |
| 137 | R36 | 10k | R04N | R-0.4" | T | 4-C3 |
| 138 | R37 | 1k* | R04N | R-0.4" | T | 4-B6 |
| 139 | R38 | 100k* | R04N | R-0.4" | T | 4-B6 |
| 140 | R39 | * | R04N | R-0.4" | T | 4-A7 |
| 141 | R40 | 100k* | R04N | R-0.4" | T | 4-B7 |
| 142 | R41 | 10k | R04N | R-0.4" | T | 4-D3 |
| 143 | R42 | 10k | R04N | R-0.4" | T | 4-D3 |
| 144 | R43 | 10k | R04N | R-0.4" | T | 4-D4 |
| 145 | R44 | 10k | R04N | R-0.4" | T | 4-E3 |
| 146 | R45 | 1k* | R04N | R-0.4" | T | 4-E6 |
| 147 | R46 | 100k* | R04N | R-0.4" | T | 4-D6 |
| 148 | R47 | * | R04N | R-0.4" | T | 4-D7 |
| 149 | R48 | 100k* | R04N | R-0.4" | T | 4-D7 |
| 150 | R49 | 10k | R04N | R-0.4" | T | 5-B3 |
| 151 | R50 | 10k | R04N | R-0.4" | T | 5-B3 |
| 152 | R51 | 10k | R04N | R-0.4" | T | 5-B4 |
| 153 | R52 | 10k | R04N | R-0.4" | T | 5-C3 |
| 154 | R53 | 1k* | R04N | R-0.4" | T | 5-B6 |
| 155 | R54 | 100k* | R04N | R-0.4" | T | 5-B6 |
| 156 | R55 | * | R04N | R-0.4" | T | 5-A7 |
| 157 | R56 | 100k* | R04N | R-0.4" | T | 5-B7 |
| 158 | R57 | 10k | R04N | R-0.4" | T | 5-D3 |
| 159 | R58 | 10k | R04N | R-0.4" | T | 5-D3 |
| 160 | R59 | 10k | R04N | R-0.4" | T | 5-D4 |
| 161 | R60 | 10k | R04N | R-0.4" | T | 5-E3 |
| 162 | R61 | 1k* | R04N | R-0.4" | T | 5-E6 |
| 163 | R62 | 100k* | R04N | R-0.4" | T | 5-D6 |
| 164 | R63 | * | R04N | R-0.4" | T | 5-D7 |
| 165 | R64 | 100k* | R04N | R-0.4" | T | 5-D7 |
| 166 | R65 | 10k | R04N | R-0.4" | T | 6-B3 |
| 167 | R66 | 10k | R04N | R-0.4" | T | 6-B3 |
| 168 | R67 | 10k | R04N | R-0.4" | T | 6-B4 |
| 169 | R68 | 10k | R04N | R-0.4" | T | 6-C3 |
| 170 | R69 | 1k* | R04N | R-0.4" | T | 6-C6 |
| 171 | R70 | 100k* | R04N | R-0.4" | T | 6-B6 |
| 172 | R71 | * | R04N | R-0.4" | T | 6-A7 |
| 173 | R72 | 100k* | R04N | R-0.4" | T | 6-B7 |
| 174 | R73 | 10k | R04N | R-0.4" | T | 6-D3 |

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|---|---|---|---|---|---|
| R74 | 10k | R04N | R-0.4" | T | 6-E3 |
| R75 | 10k | R04N | R-0.4" | T | 6-D4 |
| R76 | 10k | R04N | R-0.4" | T | 6-E3 |
| R77 | 1k* | R04N | R-0.4" | T | 6-E6 |
| R78 | 100k* | R04N | R-0.4" | T | 6-D6 |
| R79 | * | R04N | R-0.4" | T | 6-D7 |
| R80 | 100k* | R04N | R-0.4" | T | 6-D7 |
| R81 | 10k | R04N | R-0.4" | T | 7-B3 |
| R82 | 10k | R04N | R-0.4" | T | 7-B3 |
| R83 | 10k | R04N | R-0.4" | T | 7-B4 |
| R84 | 10k | R04N | R-0.4" | T | 7-C3 |
| R85 | 1k* | R04N | R-0.4" | T | 7-B6 |
| R86 | 100k* | R04N | R-0.4" | T | 7-B6 |
| R87 | * | R04N | R-0.4" | T | 7-A7 |
| R88 | 100k* | R04N | R-0.4" | T | 7-B7 |
| R89 | 10k | R04N | R-0.4" | T | 7-D3 |
| R90 | 10k | R04N | R-0.4" | T | 7-D3 |
| R91 | 10k | R04N | R-0.4" | T | 7-D4 |
| R92 | 10k | R04N | R-0.4" | T | 7-E3 |
| R93 | 1k* | R04N | R-0.4" | T | 7-E6 |
| R94 | 100k* | R04N | R-0.4" | T | 7-D6 |
| R95 | * | R04N | R-0.4" | T | 7-D7 |
| R96 | 100k* | R04N | R-0.4" | T | 7-D7 |
| R97 | 10k | R04N | R-0.4" | T | 8-B3 |
| R98 | 10k | R04N | R-0.4" | T | 8-B3 |
| R99 | 10k | R04N | R-0.4" | T | 8-B4 |
| R100 | 10k | R04N | R-0.4" | T | 8-C3 |
| R101 | 1k* | R04N | R-0.4" | T | 8-B6 |
| R102 | 100k* | R04N | R-0.4" | T | 8-B6 |
| R103 | * | R04N | R-0.4" | T | 8-A7 |
| R104 | 100k* | R04N | R-0.4" | T | 8-B7 |
| R105 | 10k | R04N | R-0.4" | T | 8-D3 |
| R106 | 10k | R04N | R-0.4" | T | 8-D3 |
| R107 | 10k | R04N | R-0.4" | T | 8-D4 |
| R108 | 10k | R04N | R-0.4" | T | 8-E3 |
| R109 | 1k* | R04N | R-0.4" | T | 8-E6 |
| R110 | 100k* | R04N | R-0.4" | T | 8-D6 |
| R111 | * | R04N | R-0.4" | T | 8-D7 |
| R112 | 100k* | R04N | R-0.4" | T | 8-D7 |
| R113 | 10k | R04N | R-0.4" | T | 9-B3 |
| R114 | 10k | R04N | R-0.4" | T | 9-B3 |
| R115 | 10k | R04N | R-0.4" | T | 9-B4 |
| R116 | 10k | R04N | R-0.4" | T | 9-C3 |
| R117 | 1k* | R04N | R-0.4" | T | 9-B6 |
| R118 | 100k* | R04N | R-0.4" | T | 9-B6 |
| R119 | * | R04N | R-0.4" | T | 9-A7 |
| R120 | 100k* | R04N | R-0.4" | T | 9-B7 |
| R121 | 10k | R04N | R-0.4" | T | 9-D3 |
| R122 | 10k | R04N | R-0.4" | T | 9-D3 |
| R123 | 10k | R04N | R-0.4" | T | 9-D4 |
| R124 | 10k | R04N | R-0.4" | T | 9-E3 |
| R125 | 1k* | R04N | R-0.4" | T | 9-E6 |
| R126 | 100k* | R04N | R-0.4" | T | 9-D6 |
| R127 | * | R04N | R-0.4" | T | 9-D7 |
| R128 | 100k* | R04N | R-0.4" | T | 9-D7 |
| | | | | | |
| ---S--- | | | | | |
| S1 | | S1X2S01N | S1X2S01N | T | 2-B9 |
| S2 | | S1X2S01N | S1X2S01N | T | 2-D9 |

| | | | | | | |
|---|---|---|---|---|---|---|
| S3 | | S1X2S01N | S1X2S01N | T | 3-B9 |
| S4 | | S1X2S01N | S1X2S01N | T | 3-D9 |
| S5 | | S1X2S01N | S1X2S01N | T | 4-B9 |
| S6 | | S1X2S01N | S1X2S01N | T | 4-D9 |
| S7 | | S1X2S01N | S1X2S01N | T | 5-B9 |
| S8 | | S1X2S01N | S1X2S01N | T | 5-D9 |
| S9 | | S1X2S01N | S1X2S01N | T | 6-B9 |
| S10 | | S1X2S01N | S1X2S01N | T | 6-E9 |
| S11 | | S1X2S01N | S1X2S01N | T | 7-B9 |
| S12 | | S1X2S01N | S1X2S01N | T | 7-D9 |
| S13 | | S1X2S01N | S1X2S01N | T | 8-B9 |
| S14 | | S1X2S01N | S1X2S01N | T | 8-D9 |
| S15 | | S1X2S01N | S1X2S01N | T | 9-B9 |
| S16 | | S1X2S01N | S1X2S01N | T | 9-D9 |
| | | | | | |
| ---X--- | | | | | |
| X1 | | XB96 | XB96 | T | 1-C1,1-C2,1-C3 |
| X2 | | XB96 | XB96 | T | 1-C4,1-C5 |
| X3 | | XTN | XTN | T | 1-D10 |
| X4 | | XTN | XTN | T | 1-E10 |
| X5 | | XTN | XTN | T | 1-D8 |
| X6 | | XTN | XTN | T | 1-E8 |
| X7 | PD1-DIFF-OUT | XT | XTN | T | 2-A4 |
| X8 | FILTER1-OUT | XT | XTN | T | 2-A8 |
| X9 | PD2-DIFF-OUT | XT | XTN | T | 2-D4 |
| X10 | FILTER2-OUT | XT | XTN | T | 2-D8 |
| X11 | PD3-DIFF-OUT | XT | XTN | T | 3-A4 |
| X12 | FILTER3-OUT | XT | XTN | T | 3-A8 |
| X13 | PD4-DIFF-OUT | XT | XTN | T | 3-D4 |
| X14 | FILTER4-OUT | XT | XTN | T | 3-D8 |
| X15 | PD5-DIFF-OUT | XT | XTN | T | 4-A4 |
| X16 | FILTER5-OUT | XT | XTN | T | 4-A8 |
| X17 | PD6-DIFF-OUT | XT | XTN | T | 4-D4 |
| X18 | FILTER6-OUT | XT | XTN | T | 4-D8 |
| X19 | PD7-DIFF-OUT | XT | XTN | T | 5-A4 |
| X20 | FILTER7-OUT | XT | XTN | T | 5-A8 |
| X21 | PD8-DIFF-OUT | XT | XTN | T | 5-D4 |
| X22 | FILTER8-OUT | XT | XTN | T | 5-D8 |
| X23 | | XC | XC174N | T | 2-B2 |
| X24 | | XC | XC174N | T | 2-D2 |
| X25 | | XC | XC174N | T | 3-B2 |
| X26 | | XC | XC174N | T | 3-D2 |
| X27 | | X09-DFEM | X09-DSUBFEMALE1 | T | 1-F2 |
| X28 | | X09-DFEM | X09-DSUBFEMALE1 | T | 1-F3 |
| X29 | PD9-DIFF-OUT | XT | XTN | T | 6-A4 |
| X30 | FILTER9-OUT | XT | XTN | T | 6-A8 |
| X31 | PD10-DIFF-OUT | XT | XTN | T | 6-D4 |
| X32 | FILTER10-OUT | XT | XTN | T | 6-D8 |
| X33 | PD11-DIFF-OUT | XT | XTN | T | 7-A4 |
| X34 | FILTER11-OUT | XT | XTN | T | 7-A8 |
| X35 | PD12-DIFF-OUT | XT | XTN | T | 7-D4 |
| X36 | FILTER12-OUT | XT | XTN | T | 7-D8 |
| X37 | PD13-DIFF-OUT | XT | XTN | T | 8-A4 |
| X38 | FILTER13-OUT | XT | XTN | T | 8-A8 |
| X39 | PD14-DIFF-OUT | XT | XTN | T | 8-D4 |
| X40 | FILTER14-OUT | XT | XTN | T | 8-D8 |
| X41 | PD15-DIFF-OUT | XT | XTN | T | 9-A4 |
| X42 | FILTER15-OUT | XT | XTN | T | 9-A8 |
| X43 | PD16-DIFF-OUT | XT | XTN | T | 9-D4 |

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|---|---|---|---|---|---|---|
| 293 | X44 | FILTER16-OUT | XT | XTN | T | 9-D8 |
| 294 | X45 | | X09-DFEM | X09-DSUBFEMALE1 | T | 1-F4 |
| 295 | X46 | | X09-DFEM | X09-DSUBFEMALE1 | T | 1-F5 |
| 296 | X47 | | XC | XC174N | T | 4-B2 |
| 297 | X48 | | XC | XC174N | T | 4-D2 |
| 298 | X49 | | XC | XC174N | T | 5-B2 |
| 299 | X50 | | XC | XC174N | T | 5-D2 |
| 300 | X51 | | XC | XC174N | T | 6-B2 |
| 301 | X52 | | XC | XC174N | T | 6-D2 |
| 302 | X53 | | XC | XC174N | T | 7-B2 |
| 303 | X54 | | XC | XC174N | T | 7-D2 |
| 304 | X55 | | XC | XC174N | T | 8-B2 |
| 305 | X56 | | XC | XC174N | T | 8-D2 |
| 306 | X57 | | XC | XC174N | T | 9-B2 |
| 307 | X58 | | XC | XC174N | T | 9-D2 |
| 308 | X59 | | X09-DFEM | X09-DSUBFEMALE1 | T | 1-B9 |
| 309 | X60 | | XC | XC174N | T | 1-B8 |
| 310 | X61 | | XC | XC174N | T | 1-B8 |
| 311 | X62 | | XC | XC174N | T | 1-C8 |
| 312 | X63 | | XC | XC174N | T | 1-C8 |