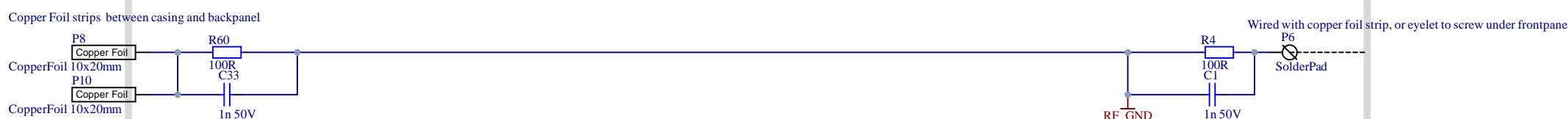


## CASING RF-GROUNDING

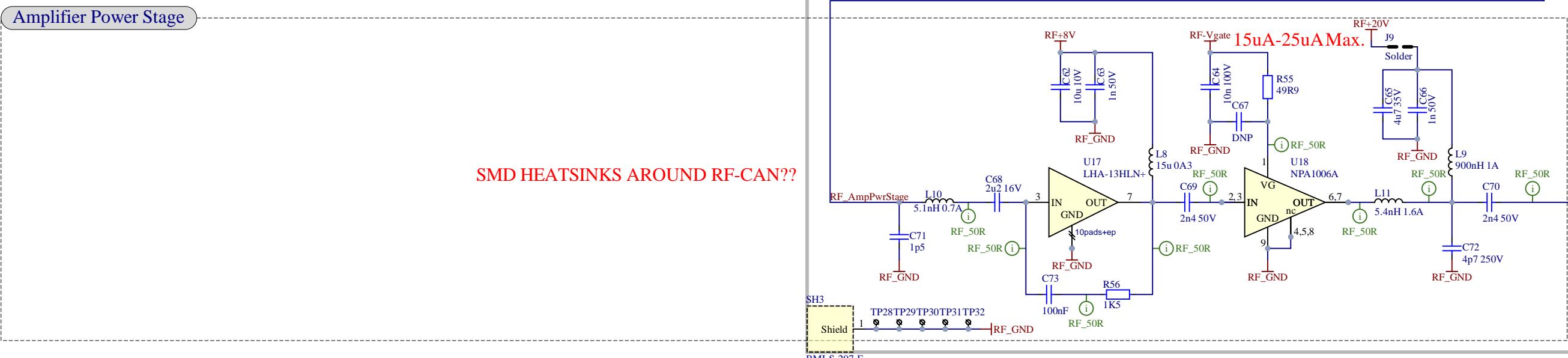
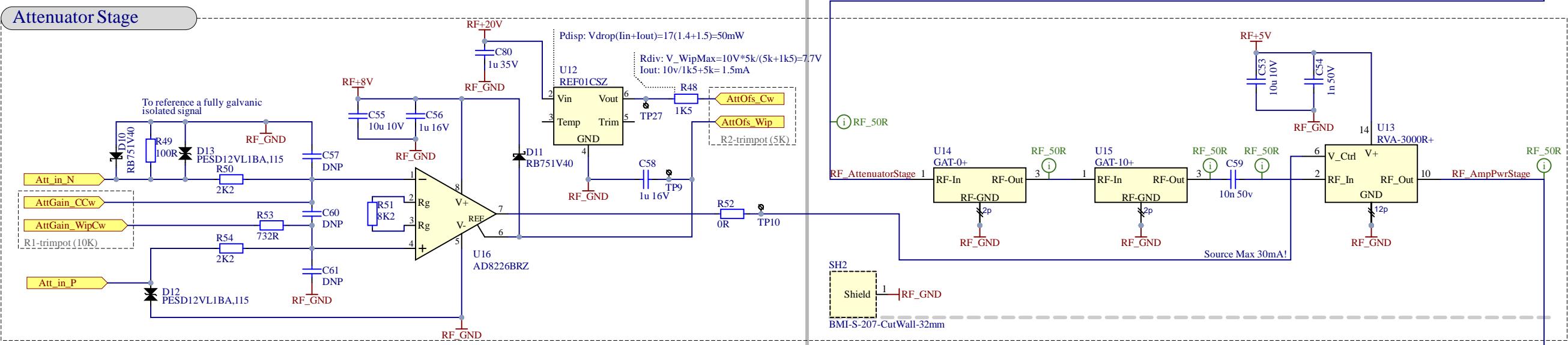
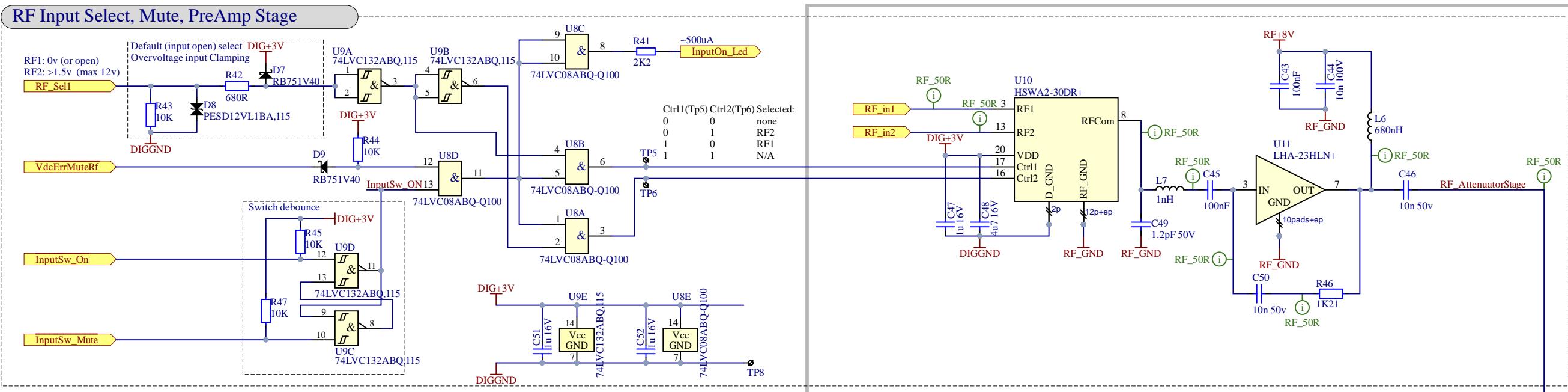


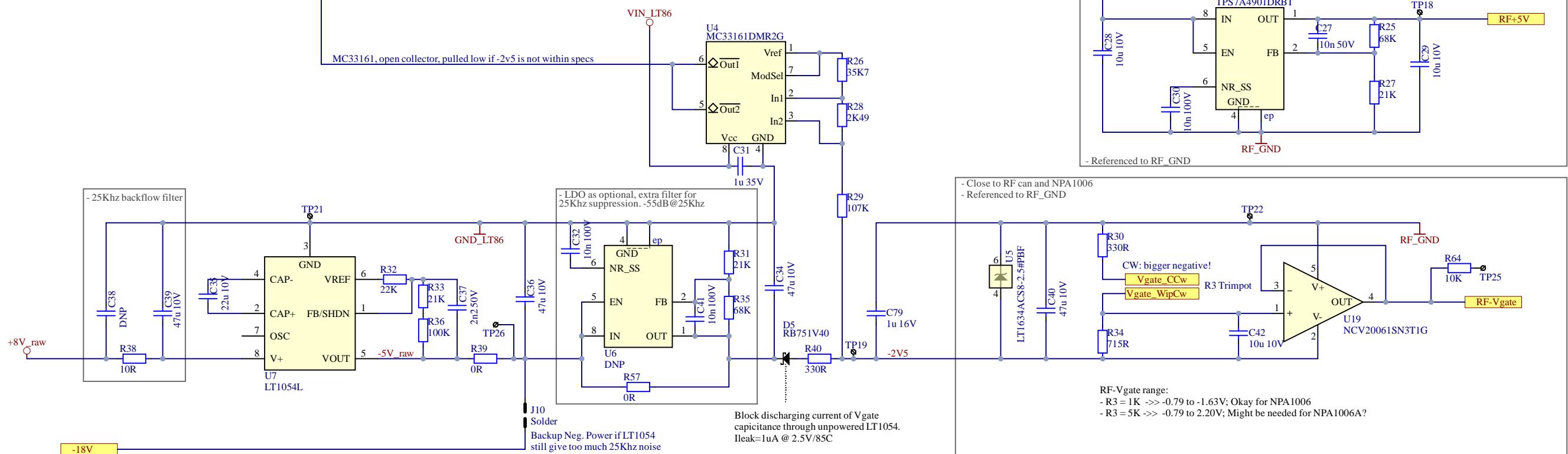
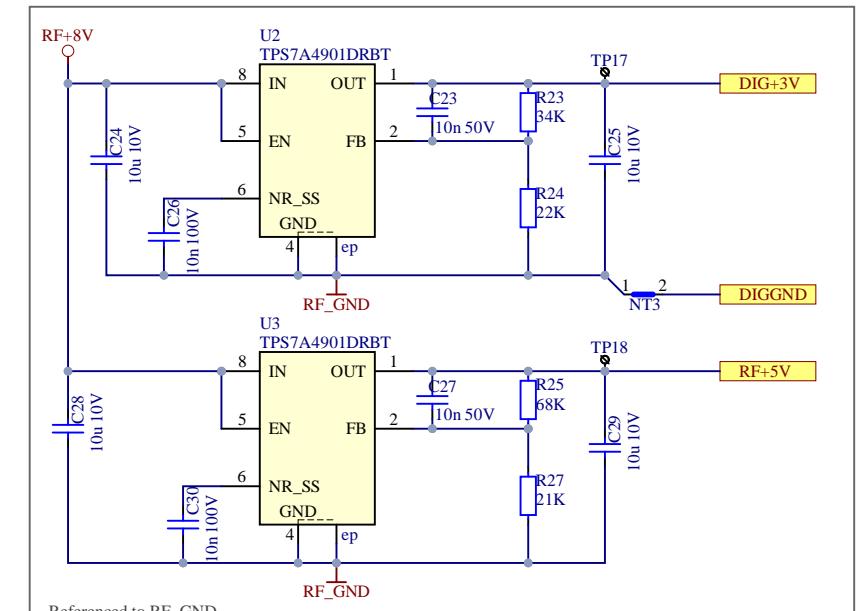
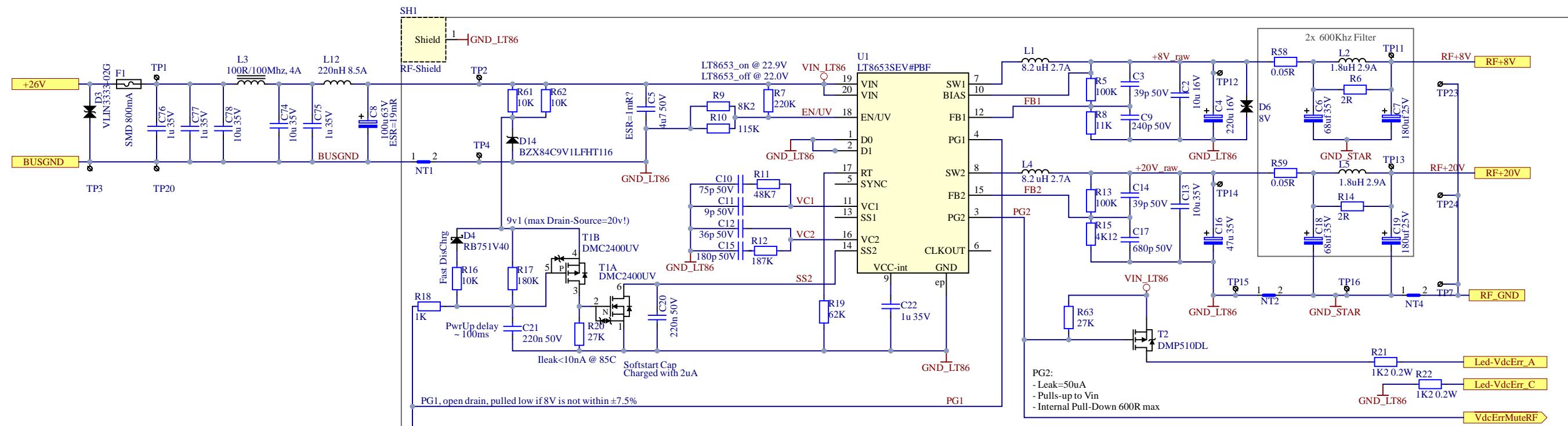
FrontPanel

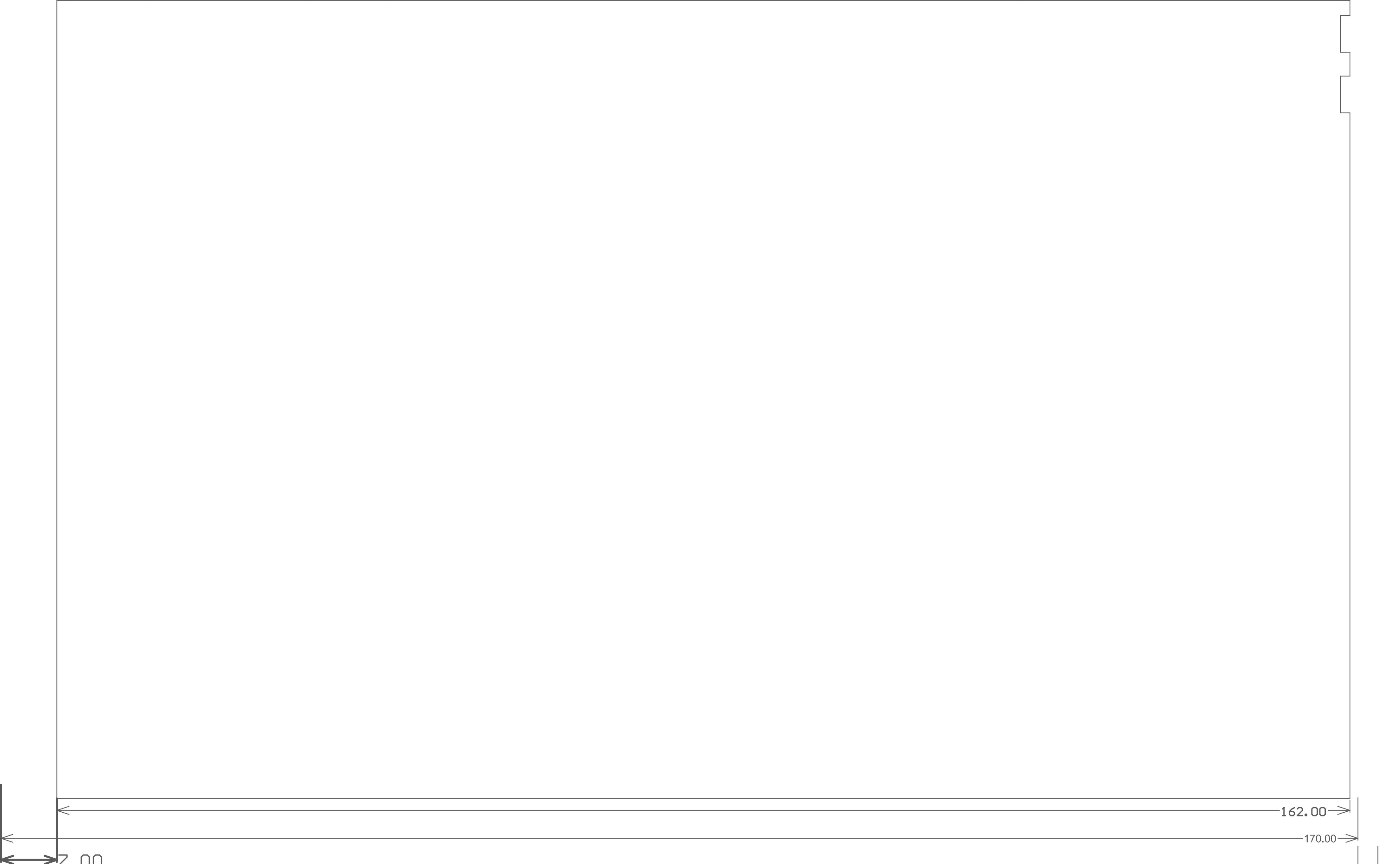


|                              |                         |
|------------------------------|-------------------------|
| Project: RF_PowerAmp_V1.1    | University of Amsterdam |
| Customer: StrontiumBEC Group | Technology Centre       |
| Sheet: RFPA_Main_V12.SchDoc  | E.W.Baaij / T.van Roon  |
| Sheet 1 of 3                 | Revision: 1.1           |

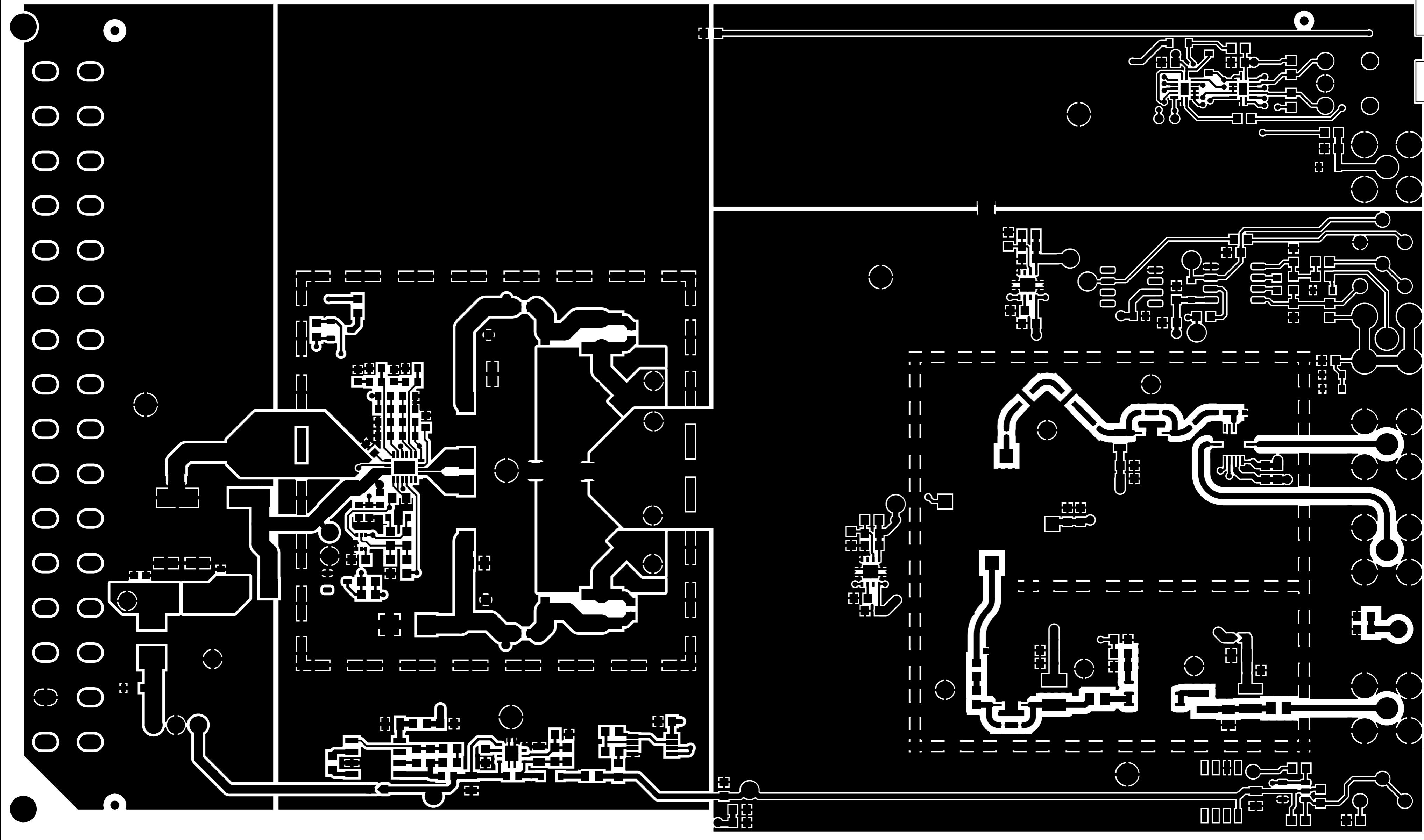


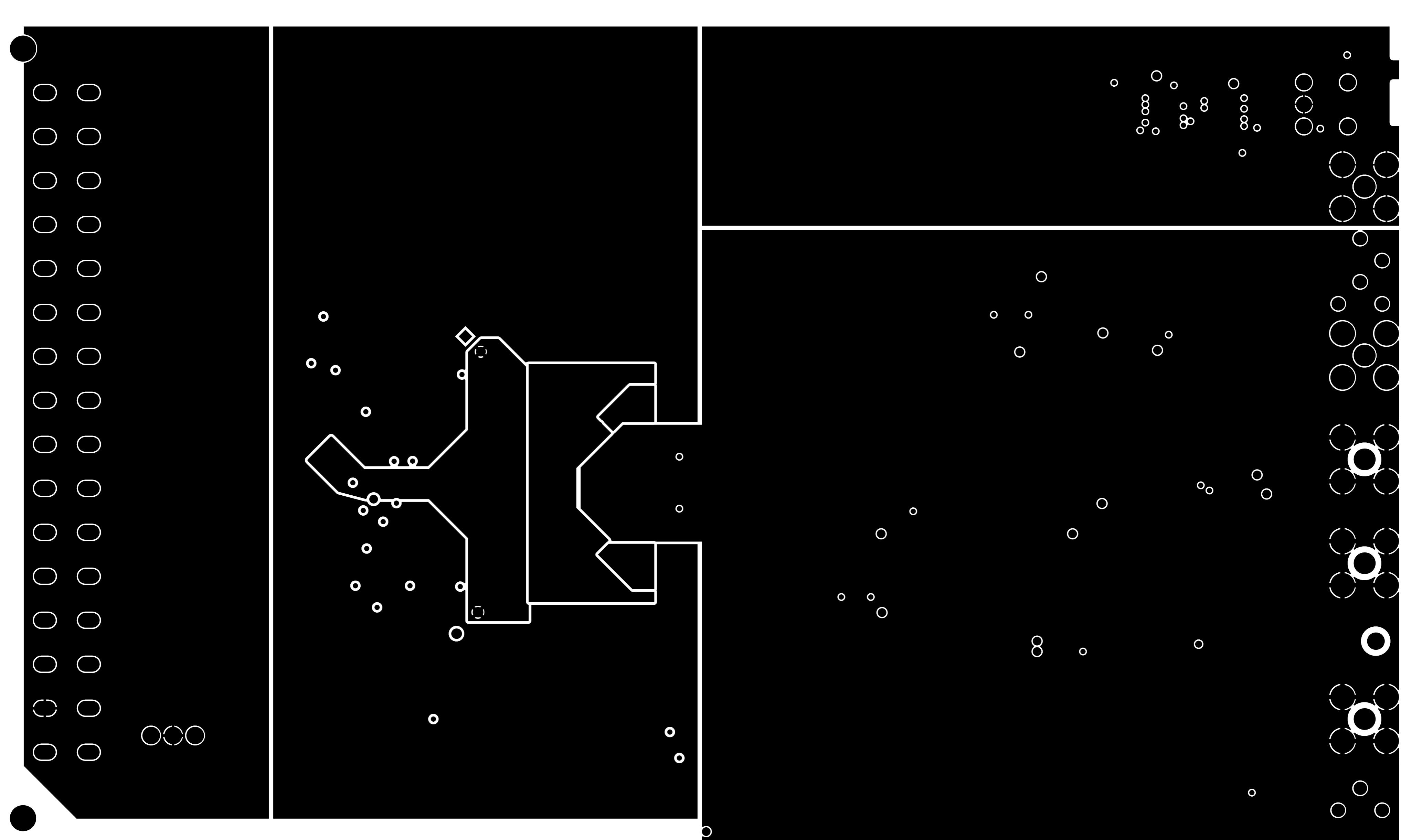


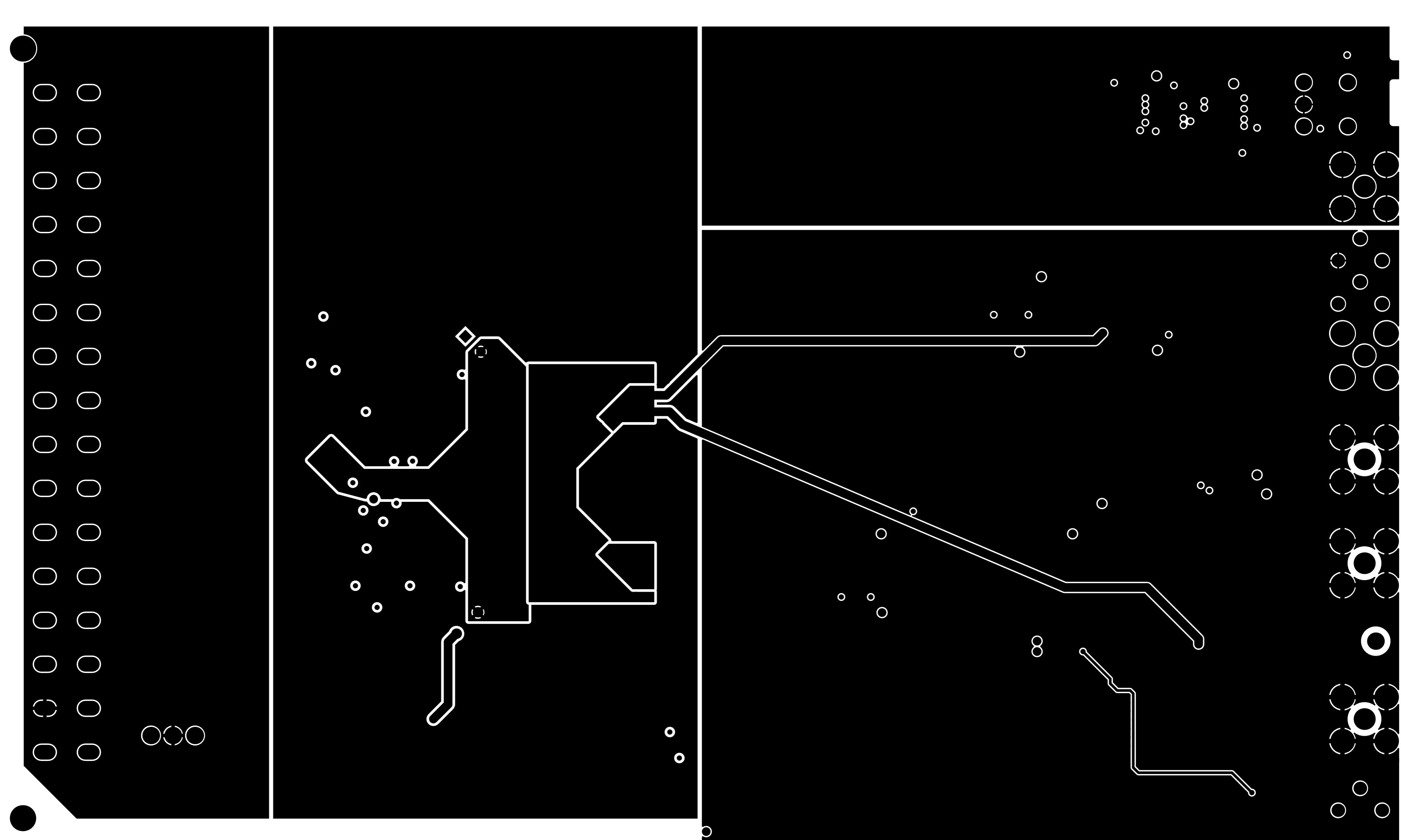


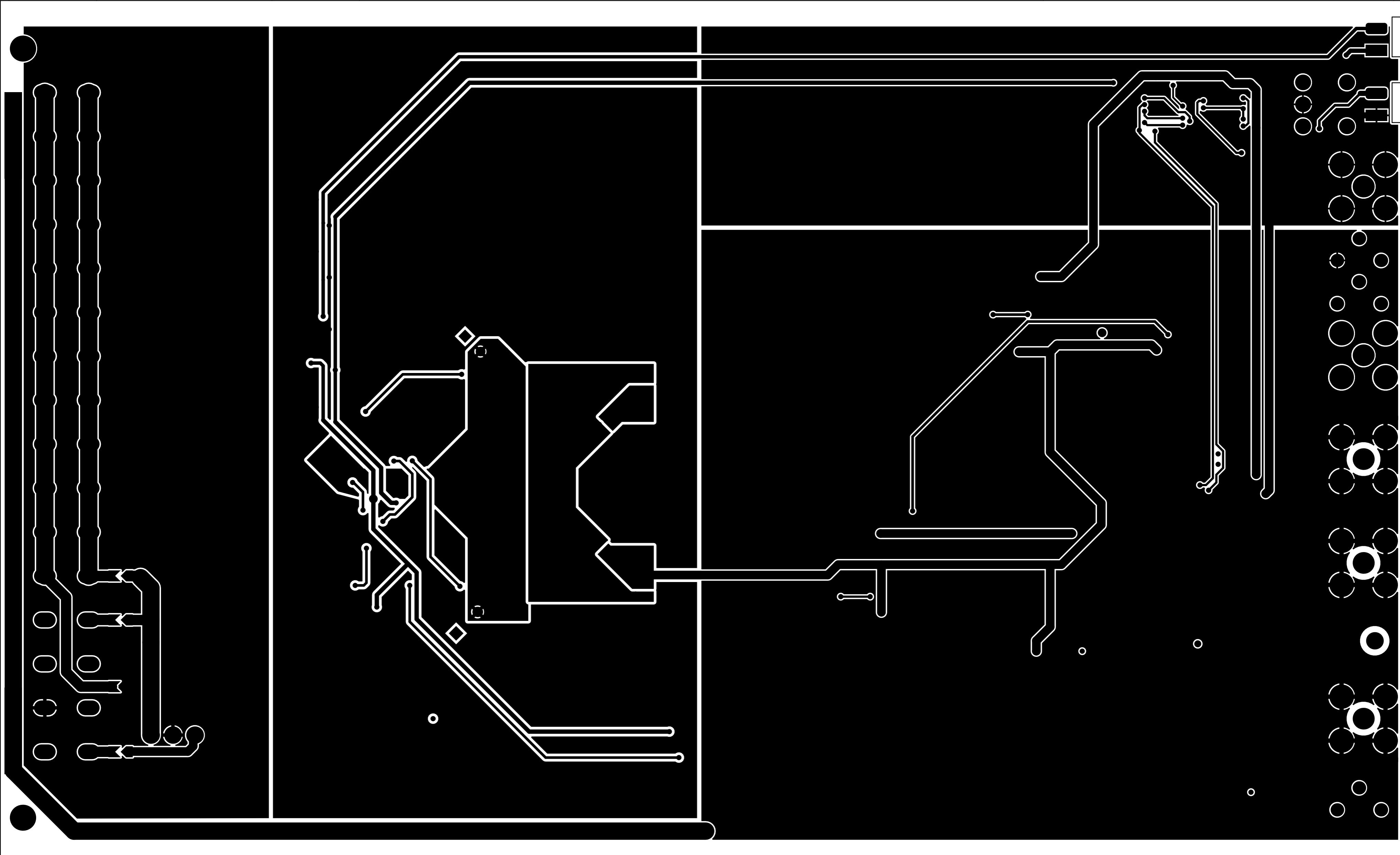


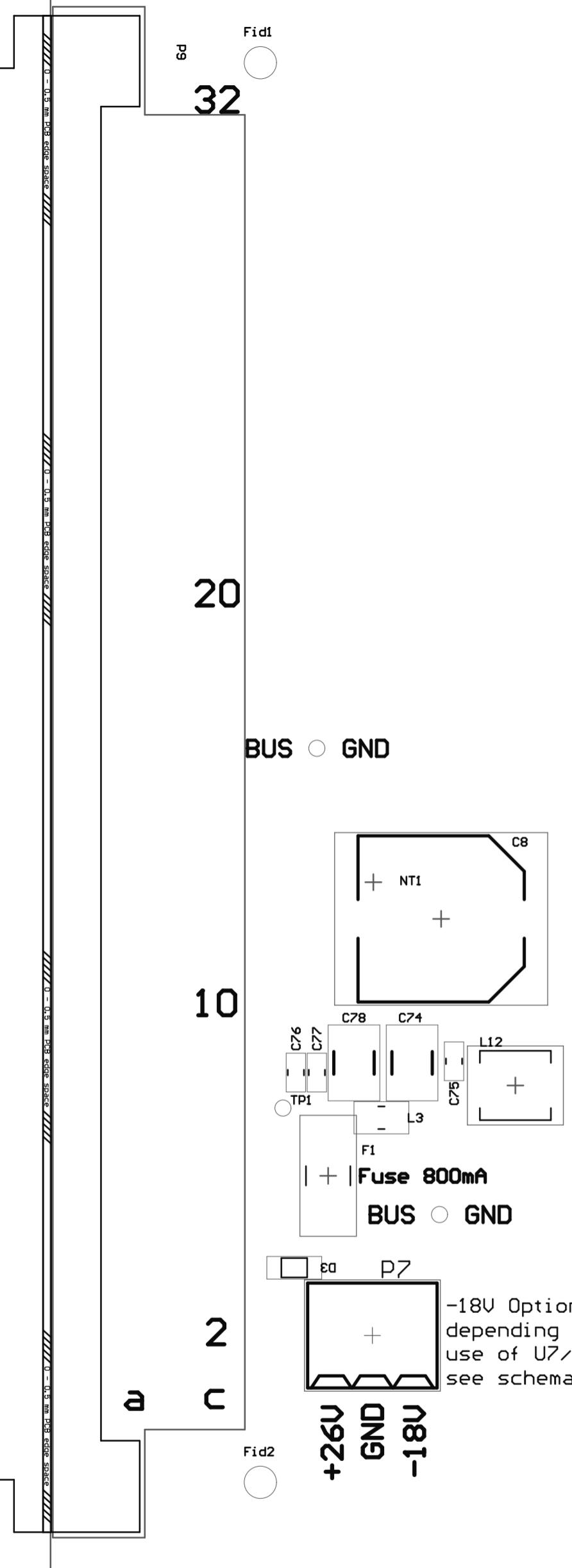
|   |
|---|
| University of Amsterdam / Technology Centre |
| E.W Baaij / T. van Roon                     |
| RF_PowerAmp_V1.1                            |
| PCB Template: Eurocircuits 6C 4Layer        |



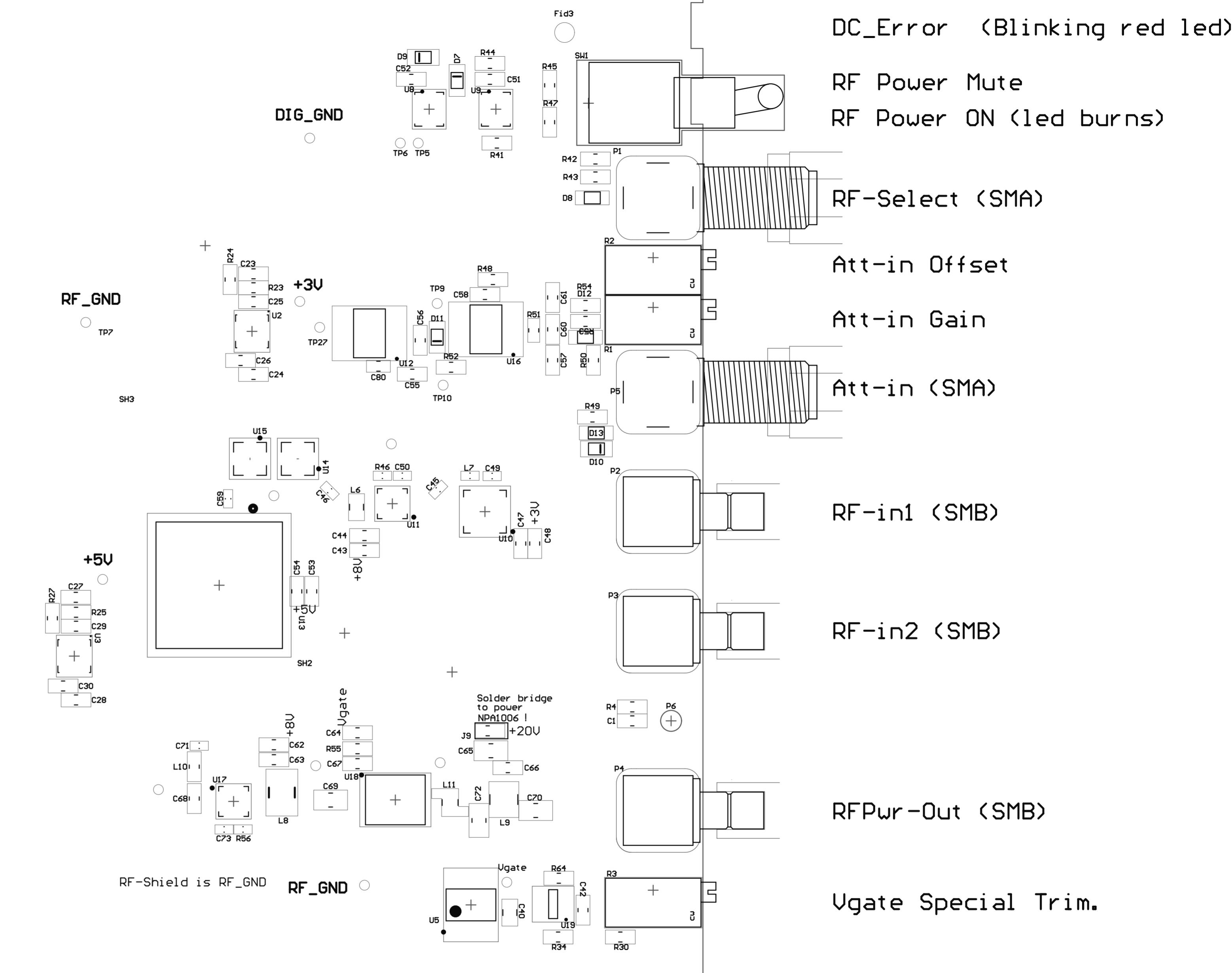


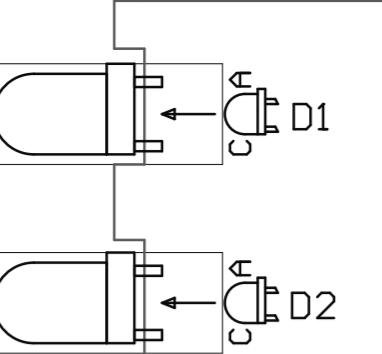






RF-Amplifier UvaTC v1.2<sup>R22</sup>  
University Of Amsterdam  
Strontium BEC Group  
FNWI Technology Centre  
T.v.Roon / E.W.Baaij  
Revision 1.2, Oct. 2023





P8 +



P10 +

Optional: J1: -18V from NewBP -

Modification needed, see schematics J1

| Designator                             | Quantity | Comment                     | Description   | Manufacturer      | Supplier I    | Supplier Part Number 1 |
|--|----------|-----------------------------|---|-------------------|---------------|------------------------|
| C1, C33, C54, C63, C66                 | 5        | In 50V                      | MLCC 1000pF, 50 V, 0603 [1608 Metric], ±5%, COG / NPO, GRM Series                           | Murata            | Farnell       | 8819920                |
| C2                                     | 1        | In 10u 16V                  | MLCC, 10uF, 16V, 0805, ±10%, X7R, GRM Series  | Samsung           | Farnell       | 8013485                |
| C3, C14                                | 2        | 39p 50V                     | MLCC, 39 pF, 50V, 0603, ±5%, COG / NPO, MC  | Panasonic         | Farnell       | 1759060                |
| C4                                     | 1        | 120n 50V                    | Cap Alu hybrid, SMD 120nF, 50V, 20%, d=20mm, 16v, 13mm, TH                                  | Panasonic         | Mouser        | 167-1653PC220MD        |
| C5                                     | 1        | 100p 50V                    | Cap Alu hybrid, SMD 100pF, 50V, 20%, d=17mm, TH   | Kemicon           | Mouser        | 160-100475SR           |
| C6, C10                                | 2        | 80u 35V                     | Cap Alu hybrid, SMD 180uF, 35V, 20%, d=35.8   | Panasonic         | Farnell       | 2095310                |
| C7, C19                                | 3        | 180u 25V                    | Cap Alu hybrid, SMD, 180uF, 25V, 20%, d=37.7  | Panasonic         | Farnell       | 2227527                |
| C8                                     | 1        | 100u 63V                    | Cap Alu hybrid 100uF/63V, 19mH, ±20%, SMD d10h12.5mm  | Panasonic         | Mouser        | 167-EHH-FS1U101P       |
| C9                                     | 1        | 240u 50V                    | MLCC, 240pF, 50V, 0603, ±5%, COG / NPO  | Farnell           | 2821134       |                        |
| C10                                    | 1        | 75p 50V                     | MLCC, 75 pF, 50V, 0603, ±1%, COG / NPO  | Yageo             | Farnell       | 3872416                |
| C11                                    | 1        | 9p 50V                      | MLCC, 9 pF, 50V, 0603, ±0.5pF, COG / NPO  | Multicomp         | Farnell       | 1759052                |
| C12                                    | 1        | 34p 50V                     | MLCC, 36 pF, 50V, 0603, ±5%, COG / NPO, CC Series   | Yageo             | Farnell       | 3764472                |
| C13, C74, C78                          | 3        | 10u 35V                     | MLCC 10uF, 35V, X7R, 1210 10%   | Taiyo Yuden       | Farnell       | 2309034                |
| C15                                    | 1        | 180u 50V                    | MLCC, 180uF, 50 V, 0603, ±2%, COG / NPO   | VWSIN             | Farnell       | 3881033                |
| C16                                    | 1        | 147u 35V                    | Cap Alu Organic polymer 47u, 35V, 27mH, TH 6.3x6mm, ±20%                                    | Panasonic         | Mouser        | 167-35EK47M            |
| C17                                    | 1        | 680p 50V                    |   | Farnell           | 1759084       |                        |
| C20, C21                               | 2        | 220n 50V                    |   | Farnell           | 2688525       |                        |
| C22, C57, C76, C77, C80                | 5        | 1u 35V                      | MLCC 1uF, 35 V, 0603 [1608 Metric], ±10%, X7R, C  | TDK               | Mouser        | B10-CGA3E1X7R1V105KC   |
| C23, C24                               | 2        | 10n 50V                     |   | Farnell           | 2496828       |                        |
| C24, C25, C28, C29, C42, C55, C56, C62 | 8        | 10u 10V                     | MLCC 10uF 10V DDC 10% 0603 X7R  | Murata            | Mouser        | B1-GRM188Z71A10KA3D    |
| C26, C30, C32, C41, C44, C64           | 6        | 10n 100V                    | MLCC, 10000pF, 100 V, 0603 [1608 Metric], ±5%, X7R, AVX                                     | AVX               | Farnell       | 1833874                |
| C31                                    | 1        | 1u 35V                      | MLCC 1uF, 35 V, 0603 [1608 Metric], ±10%, X7R, C  | TDK               | Mouser        | B10-CGA3E1X7R1V105KC   |
| C34, C36, C39, C40                     | 4        | 47u 10V                     | (BD) MLCC, 47uF, 10V, 0805, ±20%, X5R   | Murata            | Farnell       | 2611939                |
| C35                                    | 1        | 122u 10V                    |   | Farnell           | 2426957       |                        |
| C37                                    | 1        | 2n2 50V                     |   | Farnell           | 2497024       |                        |
| C38, C57, C60, C61, C67                | 5        | DNP                         |   | Farnell           | 1907343       |                        |
| C43                                    | 1        | 100nF                       | MLCC 100nF, 16 V, 0603 [1005 Metric], ±10%, X7R   | Walsin            | Farnell       | 3881081                |
| C45, C73                               | 2        | 100nF                       | MLCC 100nF, 16 V, 0402 [1005 Metric], ±10%, X7R, GCM  | Murata            | Mouser        | B1-GCM15R71C104KA550   |
| C46, C50, C59                          | 1        | 10n 50V                     | MLCC, 10nF, 50V, 0402, ±5%, X7R   | Multicomp pro     | Farnell       | 2627338                |
| C47, C51, C52, C56, C58, C79           | 6        | 1u 16V                      | MLCC 1uF, 16 V, 0603 [1608 Metric], ±10%, X7R, C  | TDK               | Farnell       | 1907343                |
| C48                                    | 1        | 6.7u 10V                    | MLCC, 6.7 uF, 10V, 0603 [1608 Metric], ±10%, X7R, GRM Series                                | Murata            | Farnell       | 2784445                |
| C49                                    | 1        | 1.2e 50V                    | MLCC, 1.2eF, 50V, 0402 [1005 Metric], ±0.5eF, COG / NPO                                     | Murata            | Farnell       | 2781453                |
| C55                                    | 1        | 6.7u 35V                    | MLCC, 6.7 uF, 35V, 0603 [1608 Metric], ±10%, X7R, GRM Series                                | Murata            | Farnell       | 2581169                |
| C48, C68                               | 1        | 2e 16V                      | MLCC, 2eF, 16 V, 0603 [1608 Metric], ±10%, X7R, GRM Series                                  | Murata            | Farnell       | 2581183                |
| C49, C70                               | 2        | 2e 50V                      | Special RF Cap, expensive   | Knowles           | Farnell       | 2088242X5UNX0T         |
| C71                                    | 1        | 1.65                        | MLCC, 1.5 pF, 50V, 0402 [1005 Metric], ±0.25pF, COG / NPO, G/M                              | Murata            | Mouser        | B1-GM1555C1H1B5C801D   |
| C72                                    | 1        | 4.67 250V                   | MLCC, 4.7 pF, 250 VDC, 0.1 pF 0805 COG (NPO)  | Murata            | Mouser        | B1-GM2155C2E4R7B82D    |
| D1                                     | 1        | Red-blk-3mm                 | TH-3mm Red Blinking led, 10mA   | Kingbright        | Mouser        | 604-WP368ID            |
| D2                                     | 1        | 3mm                         | General 3mm LED Footprint PCB Edge SMD Pads   | Wurth             | Mouser        | 710-150131SS0400       |
| D3                                     | 1        | ULN3333D-02G                | ULN3333D Bidirectional 33V SO8-323, 2 pins  | Diodes            | Farnell       | 3779448                |
| D4, D5, D7, D9, D10, D11               | 6        | R8751V140                   | 40 V, Iav=120mA, Vf=370mV, Ipk=200 mA, 150°C, low leak                                      | Nexperia          | Farnell       | 1907691                |
| D6                                     | 1        | 18V                         | TVS Diode, Bi-Directional, 18 V, 13.6 V   | Farnell           | 2777267       |                        |
| D8, D12, D13                           | 3        | PESD12VL1BA,115             | TVS Diode, Bi-directional, 12V, SO8-323, 2 pins   | Nexperia          | Farnell       | 8737363                |
| D14                                    | 1        | 18ZB4C9V1LH1116             | Zener 9V, 1250mW, SOT-23  | Rohm              | Farnell       | 2772440                |
| F1                                     | 1        | SMD 800mA                   | SMD Fuse, 800mA, Very Fast Acting, 125 V, 125 V, 2410                                       | Littlefuse        | Farnell       | 1596412                |
| Fid1, Fid2, Fid3                       | 3        | Fiducial                    |   | Farnell           | 1907691       |                        |
| Graph                                  | 1        | UVA Logo                    | University of Amsterdam Logo  | -no part-         |               |                        |
| L1, L4                                 | 2        | 2.62uH 2.7A                 | Power Inductor, 8.2uH±20%, 2.7A/3A(sat), 53mH, Shielded, SMD, 7.3-7.4-5.5mm                 | Wurth             | Farnell       | 2211566                |
| L2, L5                                 | 2        | 1.8uH 2.9A                  | Power Inductor, SMD, 1.8uH, 2.9A, 4.4A, 42mR, 20%, Unshld                                   | Roems             | Farnell       | 2328799                |
| L3                                     | 1        | 100nR/100nHz, 4A            | 100n, 100MHz, 4A, 20mR, Dc  | TDK               | Mouser        | B10-MP230125101AT000   |
| L6                                     | 1        | 1680nH                      | Coil, 680nH, 0.46 ohm, 400 MHz, 590 mAh, 0805 [2012 Metric], 0805LS Series                  | Coilcraft         | Farnell       | 2286524                |
| L7                                     | 1        | 1nH                         | Coil HF SMD, 1nH, 0.045 ohm, 12.7 GHz, 1.36 A, 0402, 0402CS Series                          | Coilcraft         | Farnell       | 2285697                |
| L8                                     | 1        | 115u 0A3                    | RF Inductors, SMD 15 LH 10%   | Murata            | Mouser        | B1-LH32DN150K53L       |
| L9                                     | 1        | 1900nH 1A                   | Wirewound Inductor, 900nH, 1.0 ohm, 415MHz, 1.3A, 1008 [2520 Metric], 1008AF                | Coilcraft         | Farnell       | 2286629                |
| L10                                    | 1        | 1.5nH 0.7A                  | Wirewound Inductor, 5.1nH, 2%, 0.14 ohm, 5.7 GHz, 700 mA, 0603 [1608 Metric], 0603CS Series | Coilcraft         | Farnell       | 2285923                |
| L11                                    | 1        | 1.54nH 1.6A                 | Air Core Inductor, 5.4 nH, 1.6 A, Micro Spring, ±5%, 0.008 ohm, 7 GHz                       | Coilcraft         | Mouser        | 994-0906-5JLC          |
| L12                                    | 1        | 122nH 8.5A                  | Power Inductor (SMD), 220nH, 8.5 A, Shielded, 20 A, IHP-1616AB-01                           | Vishay            | Farnell       | 1741282                |
| P1, P5                                 | 2        | SMA                         | SMA Coaxial, 19.5mm, 50.0nm, Right Angle Jack, Through Hole                                 | Taoglas           | Mouser        | 960-PCB-115MAFRA-YC    |
| P2, P3, P4                             | 3        | SMB                         | SMB125B1-3GT30G-SMB right angle Jack, through hole, 50 Ohm, center pin 5.5mm above PCB      | Amphenol          | Farnell       | 1111351                |
| P6                                     | 1        | SolderPad                   | SolderPad_PT_<0.01mm  | Farnell           | 1907691       |                        |
| P7                                     | 1        | Screw Terminal 2.54         | 2.54 MM TERMINAL BLOCK 18-30Awg   | Wurth             | Digi-Key      | 732-691210910003-ND    |
| P8, P10                                | 2        | CopperFoil 10x20mm          | CopperFoil strip 10x20mm to ground PCB to module casing                                     | Farnell           | 1907691       |                        |
| P9                                     | 1        | DIN1612_2x16_Male_AC_angled | DIN41612_2x16_Male_AC_angled  | EPT               | Farnell       | 1665177                |
| R1                                     | 1        | 10K, 25T                    | 10K, 25 Turn, Side adjust thruhole trimpot Bourns 100pm                                     | Bourns            | Farnell       | 11463545               |
| R2                                     | 1        | 5K, 25T                     | 5K, 25 Turn, Side adjust thruhole trimpot Bourns 100pm                                      | Bourns            | Farnell       | 2321825                |
| R3                                     | 1        | 1K, 25T                     | 1K, 25 Turn, Side adjust thruhole trimpot Bourns 100pm                                      | Bourns            | Mouser        | 652-32962-1-102LF      |
| R4, R40, R60                           | 3        | 100K                        |   | Farnell           | 1576263       |                        |
| R5, R12                                | 2        | 2.2K                        |   | Farnell           | 2141353       |                        |
| R6, R14                                | 2        | 2.2K                        |   | Farnell           | 2447327       |                        |
| R7                                     | 1        | 220K                        |   | Farnell           | 9338286       |                        |
| R8                                     | 1        | 11K                         |   | Farnell           | 9334533       |                        |
| R9, R51                                | 2        | 2K2                         |   | Farnell           | 9331563       |                        |
| R10                                    | 1        | 115K                        |   | Farnell           | 2447236       |                        |
| R11                                    | 1        | 148K7                       | 48.7 kohm, ±1%, 100mW, 0603, Thick Film   | Yageo             | Farnell       | 3950899                |
| R12                                    | 1        | 1187K                       | SMD Chip Resistor, 187 kohm, ±1%, 100mW, 0603 [1608 Metric], Thick Film, General Purpose    | Multicomp         | Farnell       | 2447268                |
| R15                                    | 1        | 1K12                        |   | Farnell           | 2670797       |                        |
| R16, R43, R44, R45, R47, R61, R62, R64 | 8        | 10K                         |   | Farnell           | 2446547       |                        |
| R17                                    | 1        | 1180K                       |   | Farnell           | 9330739       |                        |
| R18                                    | 1        | 1K                          |   | Farnell           | 2447224       |                        |
| R19                                    | 1        | 2K2K                        |   | Farnell           | 9331417       |                        |
| R20, R63                               | 2        | 2.7K                        |   | Farnell           | 9330933       |                        |
| R21, R22                               | 2        | 1K2 0.2W                    | SMD Chip Resistor, 1K2 ohm, ±1%, 200mW, 0603 [1608 Metric], Thick Film                      | TE                | Farnell       | 2332004                |
| R23                                    | 1        | 1.34K                       |   | Farnell           | 2670764       |                        |
| R24, R32                               | 2        | 2.2K                        |   | Farnell           | 9330828       |                        |
| R25, R35                               | 2        | 2.68K                       |   | Farnell           | 9331468       |                        |
| R26                                    | 1        | 1.95K7                      | 35.7K, 0603, ±1%, 100mW, Thick Film   | Walsin            | Farnell       | 2670771                |
| R27, R31, R33                          | 3        | 21K4                        |   | Farnell           | 2561868       |                        |
| R28                                    | 1        | 2.1K49                      | 24K9, 0603, ±1%, 100mW, Thick Film  | Yageo             | Farnell       | 3495795                |
| R29                                    | 1        | 1.107K                      | 107K, 0603, ±1%, 100mW, Thick Film  | Multicomp         | Farnell       | 2694694                |
| R30, R40                               | 2        | 2330R                       |   | Farnell           | 9331016       |                        |
| R34                                    | 1        | 1715R                       |   | Farnell           | 2141357       |                        |
| R36                                    | 1        | 100K                        |   | Farnell           | 2446543       |                        |
| R38                                    | 1        | 1.10K                       |   | Farnell           | 2446543       |                        |
| R39, R57                               | 2        | 2.6K                        |   | Farnell           | 2447743       |                        |
| R41, R50, R54                          | 3        | 3K2                         |   | Farnell           | 2303810       |                        |
| R42                                    | 1        | 1.680R                      |   | Farnell           | 2331441       |                        |
| R46                                    | 1        | 1K21                        | Thick Film Resistors - SMD 0.1watt 1.5Kohms, 1%   | KOA Speer         | Mouser        | 660-RK73H1ETTP1211F    |
| R48                                    | 1        | 1K5                         |   | Farnell           | 9330607       |                        |
| R52                                    | 1        | 1QR                         | [NULL]  | Farnell           | 2447743       |                        |
| R53                                    | 1        | 1732R                       |   | Farnell           | 2694935       |                        |
| R55                                    | 1        | 14999                       |   | Farnell           | 2073520       |                        |
| R56                                    | 1        | 1K5                         | Thick Film Resistors - SMD 0.1watt 1.5Kohms, 1%   | KOA Speer         | Mouser        | 660-RK73H1ETTP1501F    |
| R56, R59                               | 2        | 20.05R                      | Cur-Sense, 50mR, ±1%, 100ppm, 250mW, 0603, Metal Film                                       | Eaton             | Farnell       | 4070827                |
| S11                                    | 1        | RF-Shield                   | RF-Shield 444449.975mm, Two Piece   | Laird             | Mouser        | 739-BM-207-F           |
| SH2                                    | 1        | BM-5-207-CutWall-32mm       | RF-Shield CutWall 32x9.75mm   | Laird             | Mouser        | 739-BM-207-F           |
| SH3                                    | 1        | BM-5-207-F                  | RF-Shield 444449.975mm, Two Piece   | Laird             | Mouser        | 739-BM-207-F           |
| SW1                                    | 1        | 1101M9A9BE                  | SD10, sub-miniature 8.2 x 5.7, small lever, 2A 28Vdc/120Vac                                 | C&K               | Farnell       | 9575885                |
| T1                                     | 1        | 1DMC2400UV                  | Dual Channel Fet, NP-channel  | DIODES            | Farnell       | 2545523                |
| T2                                     | 1        | 1DM/P510D                   | P-Channel, MOSFET, Vgs=>3.0V, Vds=>50V, 130mA, RonMax=10R, SOT-23                           | DIODES            | Farnell       | 3127371                |
| U1                                     | 1        | L18653SEV#PBF               | Two Channel, 2A, 42V, Sync Step-Down, Ig=2.2A   | Linear Technology | Mouser        | 584-L18653SEV#PBF      |
| U2, U3                                 | 2        | 1TP57A4901DRBT              | 1DQ, Pos, UltraLow Noise, 150mA, +3 to +36V, 1.2 to +33Vout, Vdrop<0.26                     | Texas Instruments | Mouser        | 995-1TP57A4901DRBT     |
| U4                                     | 1        | MC33161DMR2G                | 2-40V Window Comparator, internal ref (2.54/1.27V), open collector out                      | OnSemi            | Farnell       | 2774746                |
| U5                                     | 1        | LT1634ACSB-2.5#PBF          | Hi precision Shunt reference, 2.5V, 0.05%, 10ppm  | Linear Technology | Farnell       | 1031317                |
| U6                                     | 1        | 1DNP                        | LDO, Neg UltraLow Noise, 200mA, -3 to -35V, 1.2 to -33Vout, Vdrop<0.26                      | Texas Instruments | Mouser        | 595-TP57A3001DRBT      |
| U7                                     | 1        | LT1054L                     | Switched-Capacitor Voltage Converter with Regulator   | Analog Devices    | Mouser        | 584-LT1054LCS#PBF      |
| U8                                     | 1        | 174V039A9BQ-0100            | Quad 2-Input AND  | Nexperia          | Mouser        | 771-74V039A9BQ01001    |
| U9                                     | 1        | 174V132ABQ-0115             | Quad 2-Input NAND Gate with Schmitt trigger inputs  | Nexperia          | Mouser        | 771-V132ABQ115         |
| U10                                    | 1        | 1HWA2-300R-0.25V            | Alcove RF Switch, 50MHz-3GHz, loss<+1.2db, RfIn(fP)=5dBm, Min-Circuits                      | Mouser            | 139-HWA2-300R |                        |
| U11                                    | 1        | 1HWA-23HLN+0.25V            | 4.7Amp-200mA, 2.7nA, -28.2dBm, N.F. 1.2dB, IP3=44.7dBm, Min-Circuits                        | Mouser            | 139-HWA-23HLN |                        |
| U12                                    | 1        | REF01C52                    | Voltage Reference, 10.0V, ±0.2%, 20ppm, 12.36V, Imax=10mA                                   | Analog Devices    | Farnell       | 4031499                |
| U13                                    | 1        | 1RVA-3000R+                 | Voltage controlled Attenuator 20MHz-30ghz, 50R, att.2.5-5dB, D-17V/10.3mV                   | Min-Circuits      | Farnell       | 139-RVA-3000R+         |
| U14                                    | 1        | GAT1-0+                     | Fixed Attenuator, DC-5GHz, 0dB, 50R, 0.5W   | Min-Circuits      | Mouser        | 139-GAT1-0+            |
| U15                                    | 1        | GAT1-10+                    | Fixed Attenuator, DC-5GHz, 10dB, 50R, 0.5W  | Min-Circuits      | Mouser        | 139-GAT1-10+           |
| U16                                    | 1        | AD8226BRZ                   | Wide supply range, rail-to-rail, Instrumentation Amplifier                                  | Analog Devices    | Mouser        | 584-AD8226BRZ          |
| U17                                    | 1        | 1LHA-13HLN+                 | RF/Amp 1MHz-1GHz, +28dBm, N.F. 1.2dB, IP3=43.3dBm   | Min-Circuits      | Mouser        | 139-LHA-13HLN          |
| U18                                    | 1        | 1NPA1006A                   | GaN Amplifier 2.8V, 12.5W 20 - 1000 MHz   | Macom             | Mouser        | 139-NPA1006A           |
| U19                                    | 1        | 1NCV200615N3T1G             | DyOpAmp, 3MHz, 1.8-5.5V Supply, rail-to-rail, Ig=125uA, UnityGain stable, SoI25-5           | ON semiconductor  | Farnell       | 3265457                |