

High Efficiency (typically 85%) SMPS for Nixie Tubes – 50 mA, 150 V to 220 V Adjustable

Boost converter notes:

Q1 should be selected for low R_{DSon} , Q_g and C_{oss} . Ex.: Vishay IRF644PBF; an IRF740A (note the “A”) will work but is more lossy.

R1, C3, C7 must be rated for >220 V.

D2 must be an ultra-fast (<50nS) recovery – lower if possible. Ex.: Vishay ES2F (Mtrr 35nS)

C2 & C4 must be low ESR types. Ex.: AVX TPS series

C4 & C5 must be located as close as possible to pin 2 of the MAX1771.

C3 must be low ESR (<3 ohms) and rated for >220 V.

RV1 adjusts output between 150 V and 220 V, multi-turn types allow for greater adjustment accuracy.

L1 should be DC rated at 2+ A for 50+ mA output. Ex.: EPCOS B82479

L1 may be rated 1 A for output currents up to 25mA; change Rsense to 0R100 ohms in this case. Ex.: Sumida CDRH125–101

Rsense must be capable of handling 2 A.

The traces between the MAX1771 and the FET must be short and FAT, i.e. be low resistance and inductance.

In the event of stability issues, a 100 pF 250 V ceramic capacitor may be soldered on top of R1.

An RF ferrite bead placed around the gate to the FET may help if the circuit shows a tendency to be sensitive to the presence of a hand/finger/etc. (e.g. when you move your hand near, you hear a whistle from the inductor or the output voltage varies.)

Origin: <https://desmith.net/NMdS/Electronics/NixiePSU.html>

Note: The physical board layout is critical in order to obtain high efficiency!

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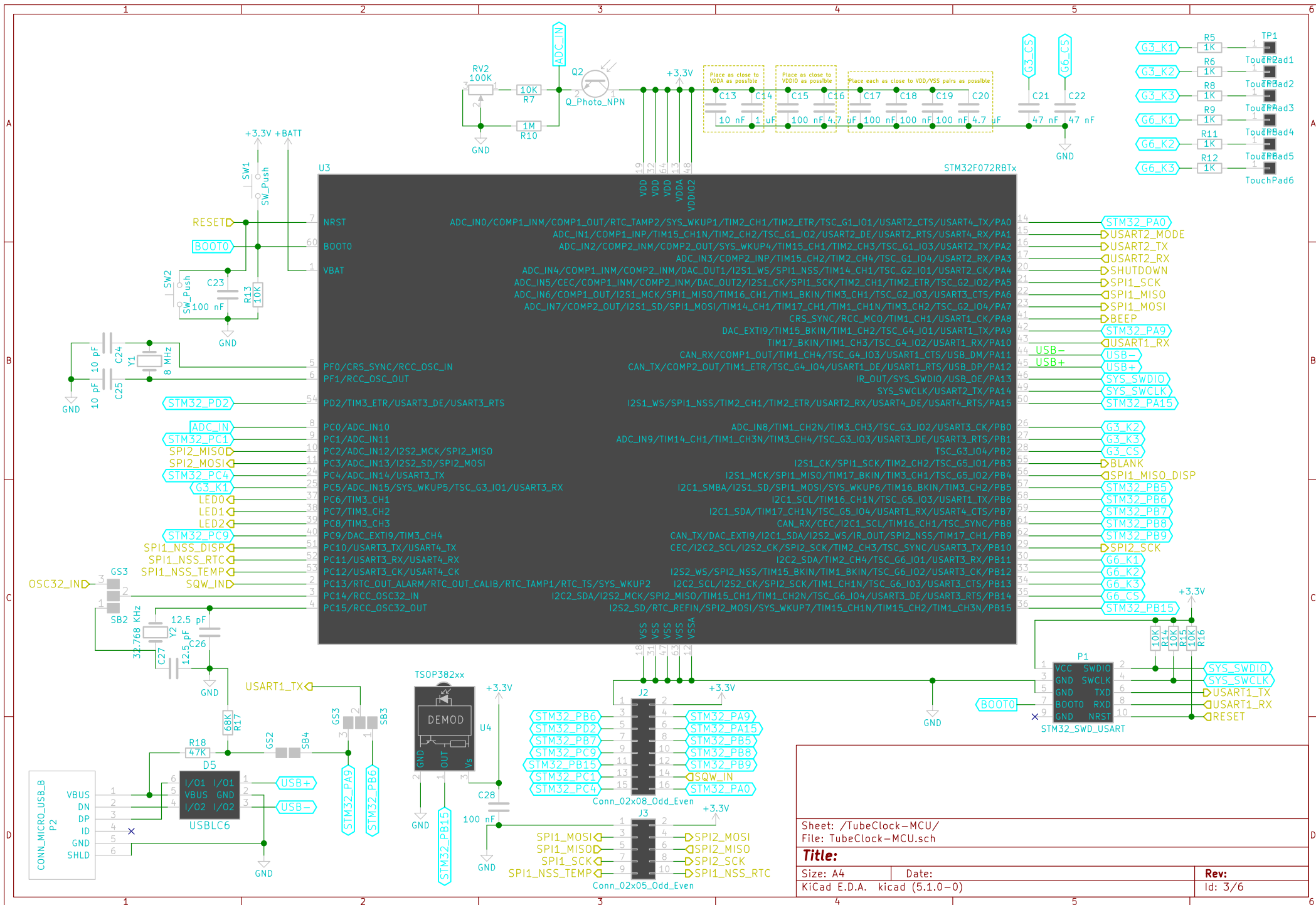
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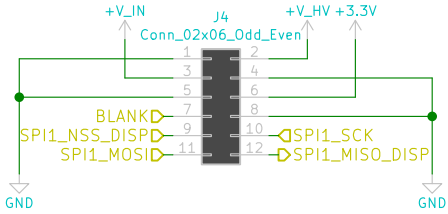
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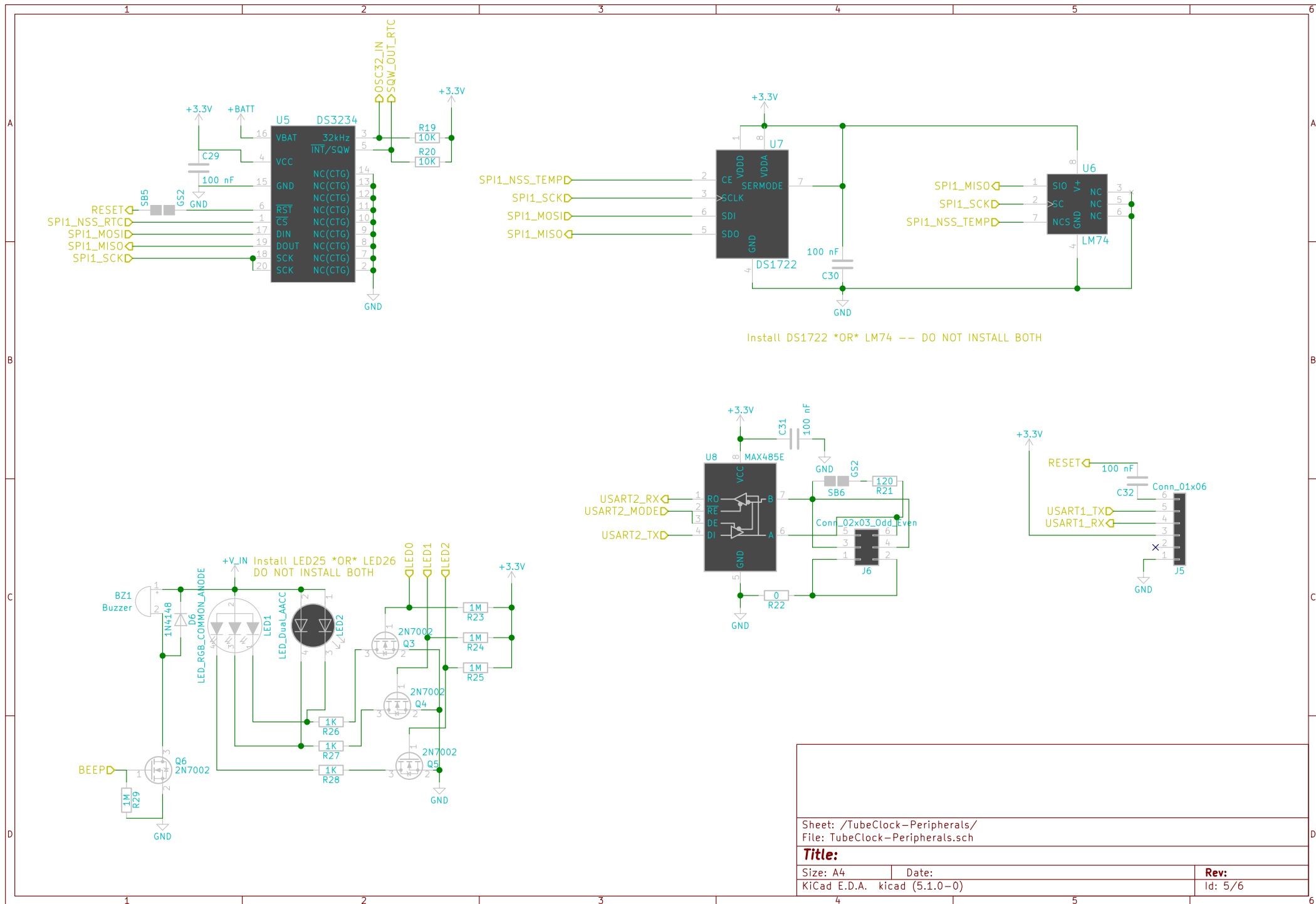
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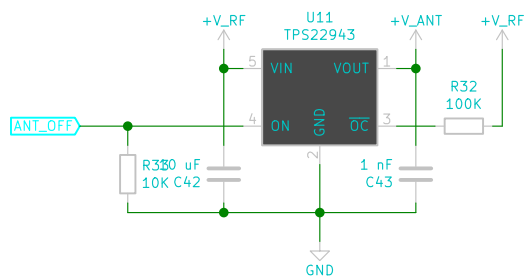
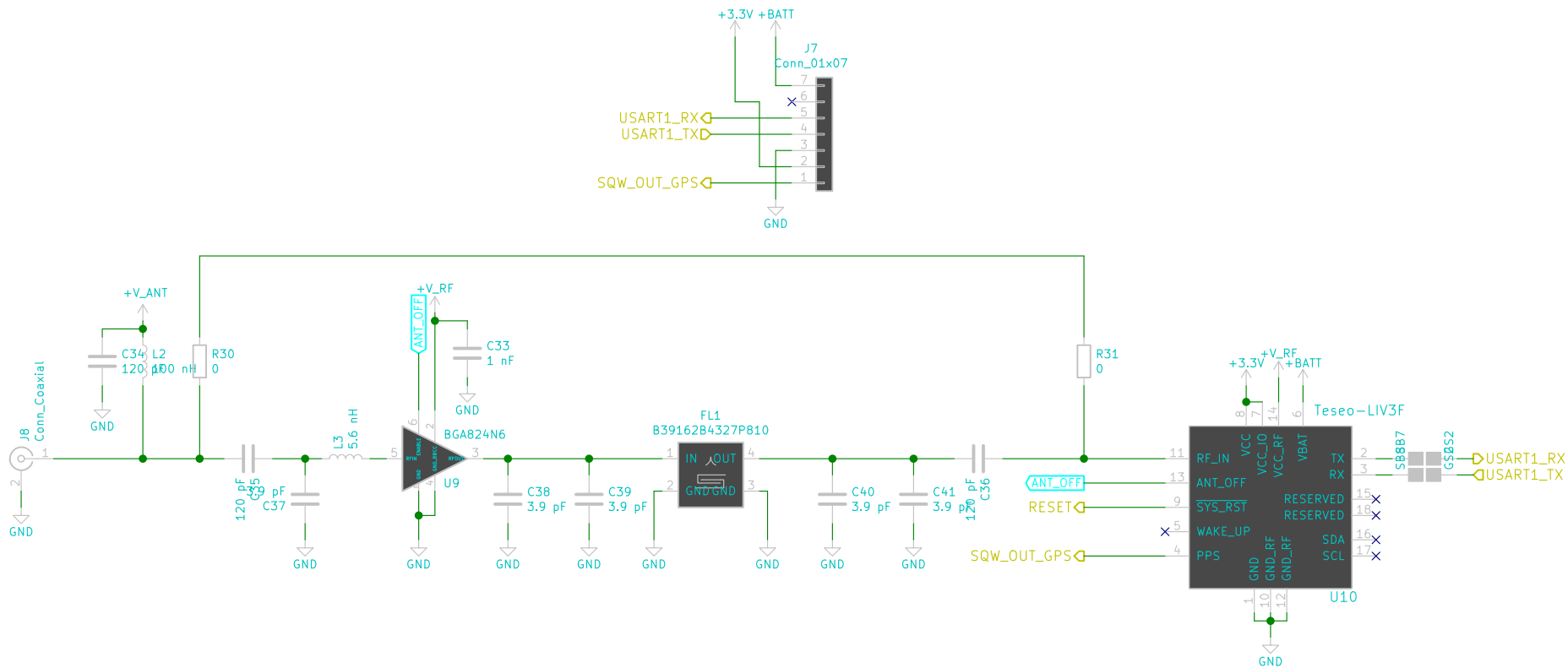
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