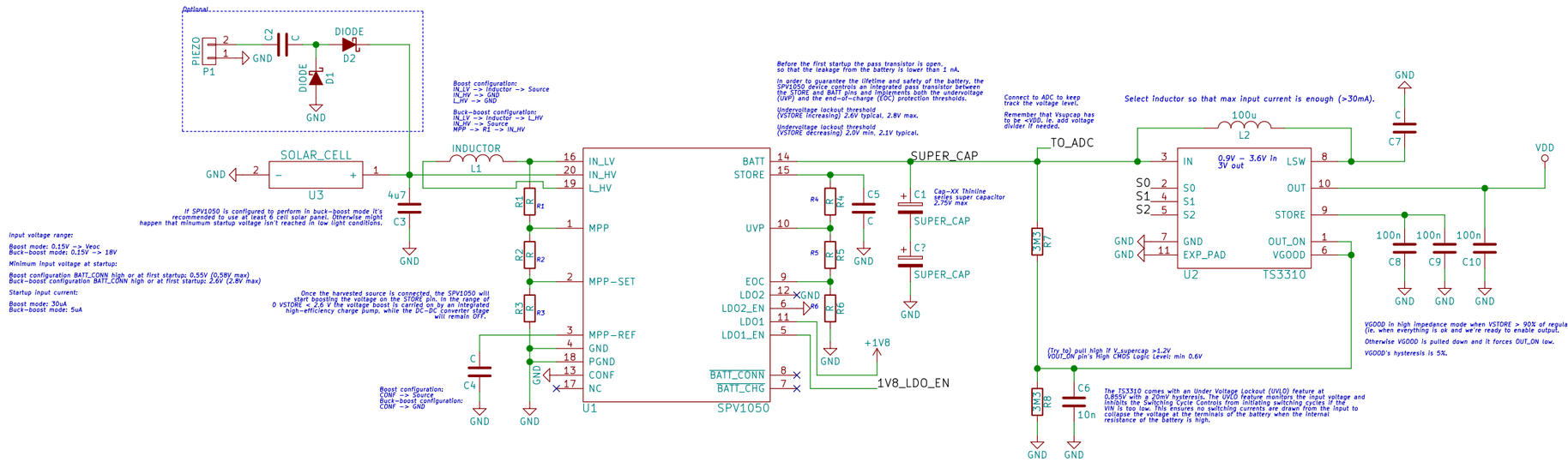
RuuviHarvester



Possible capacitor choices:

Cap-XX HA114T: 19.5mm x 20.0mm x 0.7mm / 2.75V max / 120mF
Cap-XX HS103T: 39.0mm x 20.2mm x 0.9mm / 2.75V max / 540mF

Let's assume TS3310 draws constant power (not current) from super cap.

If the start voltage is 2.75V and stop voltage 1V, we're able to use 87% of its energy:

($\frac{1}{2}$*C*2.75^2-$\frac{1}{2}$*C*1.0^2)/($\frac{1}{2}$*C*2.75^2) = 87%

TS3310's efficiency is typically 80-90%. Let's use 80% in our calculations. Quiescent current consumption of the chip is really low (almost nothing, 150nA).

Calculations:

Ecap = 1/2 * C * V^2
Eusable = Estart - Eend
= 1/2 * C * 2.75^2 - 1/2 * C * 1^2
= 3.28 * C (J)

Ton = (Eusable * η) / P
P = 30uW (average power consumption of target, RuuviTag for example)
η = 0.8 (efficiency of TS3310)

Ton = (3.28 * η * C) / 30μW
= 87500 * C (s)
= 24.3 * C (h)

Tha111t (120mF) = 24.3 * C
= 24.3 * 0.12
≈ 3 (h)

Tha103t (540mF) = 24.3 * C
= 24.3 * 0.540
≈ 13 (h)

A few of the possible combinations:

* 1-3 cell solar panel and SPV1050 in boost mode
* 6-18 cell solar panel and SPV1050 in buck-boost mode
* Piezo element(s) and SPV1050 in boost mode
* TEG element and SPV1050 in boost mode
* Wideband antenna for RF energy scavenging and SPV1050 in boost mode

+

* Cap-XX Thinline and TS3310 @ 3V
* Cap-XX Thinline + SPV1050 1.8V LDO
* 2x Cap-XX Thinline + SPV1050 1.8V LDO
* STM EnFilm battery + SPV1050 LDOs
* Li-Ion or LiPo battery + SPV1050 LDOs
* 4x NiMH batteries + SPV1050 LDOs

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