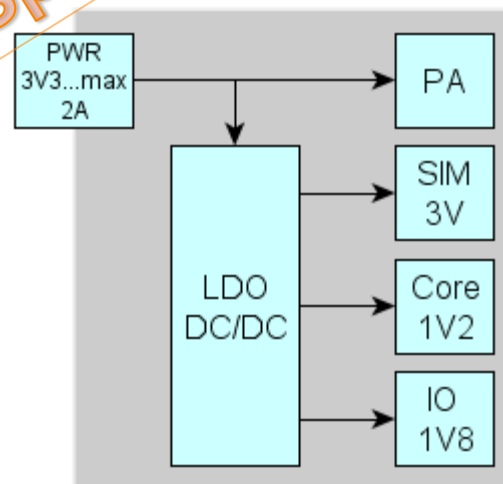


Split Power Supply – Improve the operating range

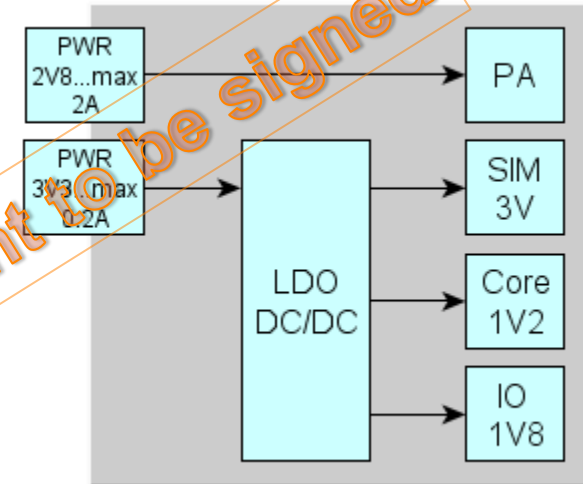


Steffen GRIEHL, Application Engineering
November 2015

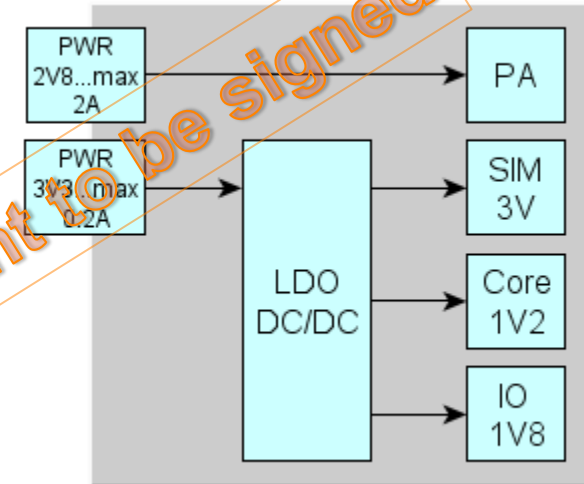
- Legacy mode: Connect one supply => Vbatt
 - Internally all domains powered by Vbatt
 - Different supply ratings for BB, PA, SIM, FE disregarded
 - Limited operating range, usually $V_{battmin} = 3.3V$
- Restricted battery technology, usually single cell, Li+ / Li+polymer
- Expensive DC/DC upconverters needed, $V_{sup} > 3.3V$ / **2A**



- SPS: Two supplies, V_{batt}=PA, 3V3=BB
 - PA path operates down to 2.8V
 - BB path operates as usual V_{min} > 3.3V

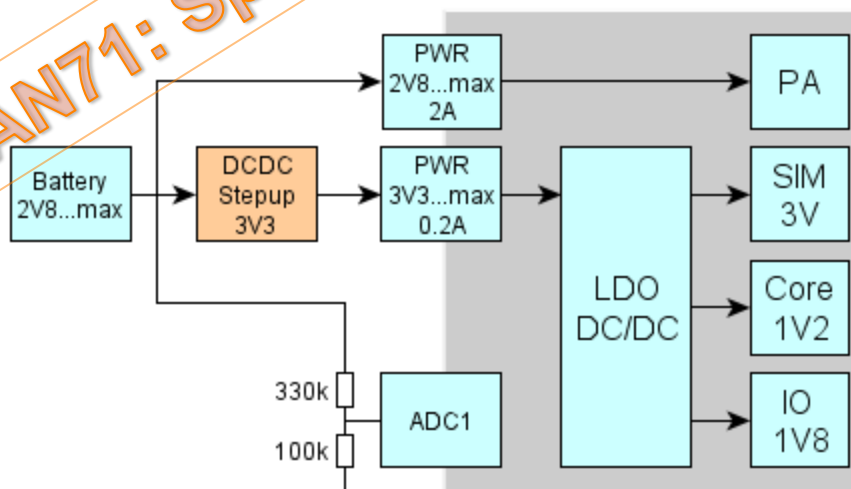


- SPS: Two supplies, $V_{\text{batt}} = \text{PA}$, $3\text{V3} = \text{BB}$
 - PA path operates down to 2.8V
 - BB path operates as usual $V_{\text{min}} > 3.3\text{V}$



- Benefits from different supply ratings
 - Improved operation range, down to 2.8V (module depended)
 - Less cost DC/DC upconverting $V_{\text{batt}} < 3.3\text{V}$ / **0.2A**
 - Marketing argument: operating range 2.8V... V_{max}
 - Other battery technologies like LFP supported
3.2V, 10y life, high power density, http://en.wikipedia.org/wiki/Lithium_iron_phosphate_battery

- DC/DC step-up supplies the BB, ~200mA max (module dependent)
- PA supply from battery can be monitored via ADC1
Automatic shut down; ADC1 not available for App
- Enable monitoring via ADC1 in SPS: `AT+SPCFG="Power/Srv/RF","1"`
Mandatory divider on ADC1, avoids dead lock
- Set undervoltage threshold: `AT+SPCFG="MEShutdown/sVsup/threshold","x"`
-200...+200mV, resulting in $V_{min} = 3.1V$
Runs /wo SPS config as well



Almost battery driven application, e.g.

- POS with printers
Heavy dynamic loads on battery forces module shut down
- LFP battery usage; 3.2V_{nom}; 2.8...3.6V
10 years life time => better choice for industry & automotive
- Emergency cases
Make call below 3.3V, get all out of the battery
- SPS is supported by
 - BGS2-E, BGS2-W, BGS5, BGS8
 - EHS6, EHS8
 - ELS61