Status of electrical power supply of OUFTI-1 nanosatellite as of mid-2012: design, implementation, and tests

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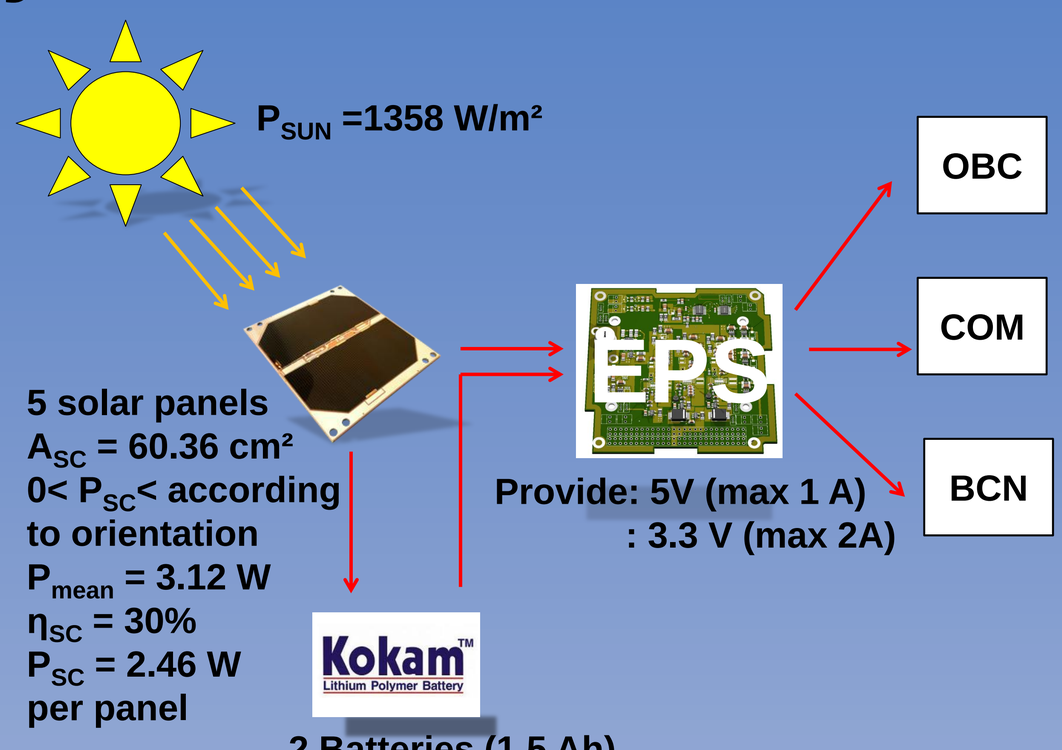
Functions

- Convert solar energy into electrical energy
- Store electrical energy
- Provide energy to subsystems:
  - → 3.3V « low current » (+/- 100 mA)
  - → 3.3V « high current » (+/- 1050 mA)
  - → 5V (+/- 300mA)
- Protect subsystems against overcurrent
- Charge batteries (on ground and in flight)
- Protect batteries (overvoltage, undervoltage, T)
- Dissipate excess power
- Feed antenna deployment subsystem
- Measure different parameters (V, I, T)

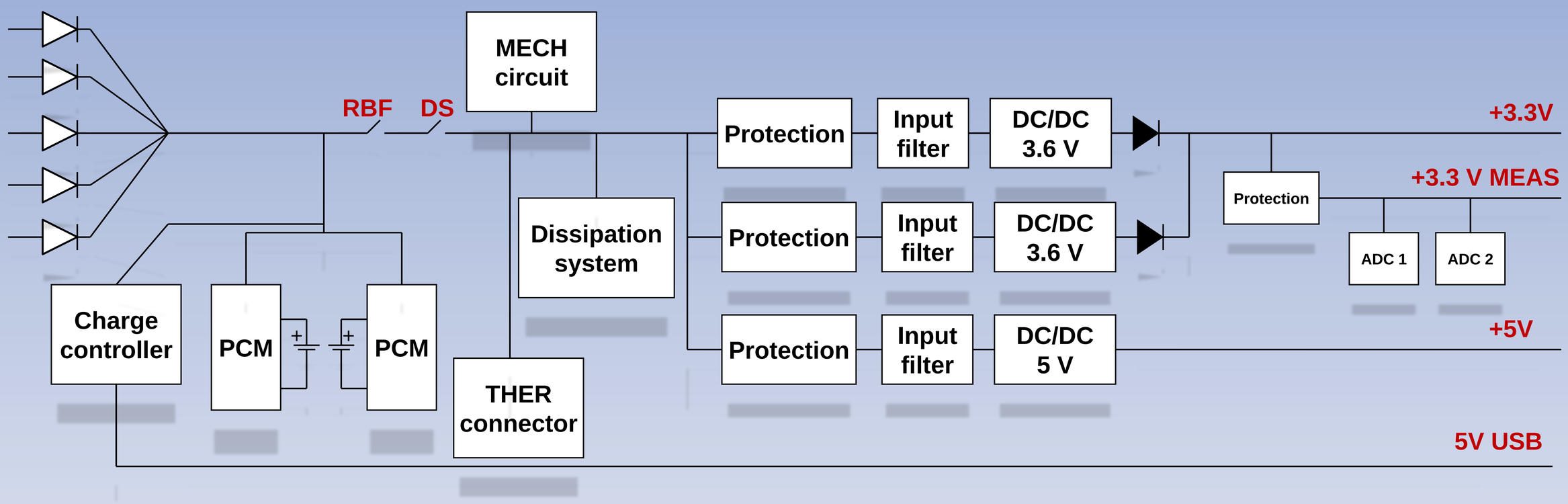
System



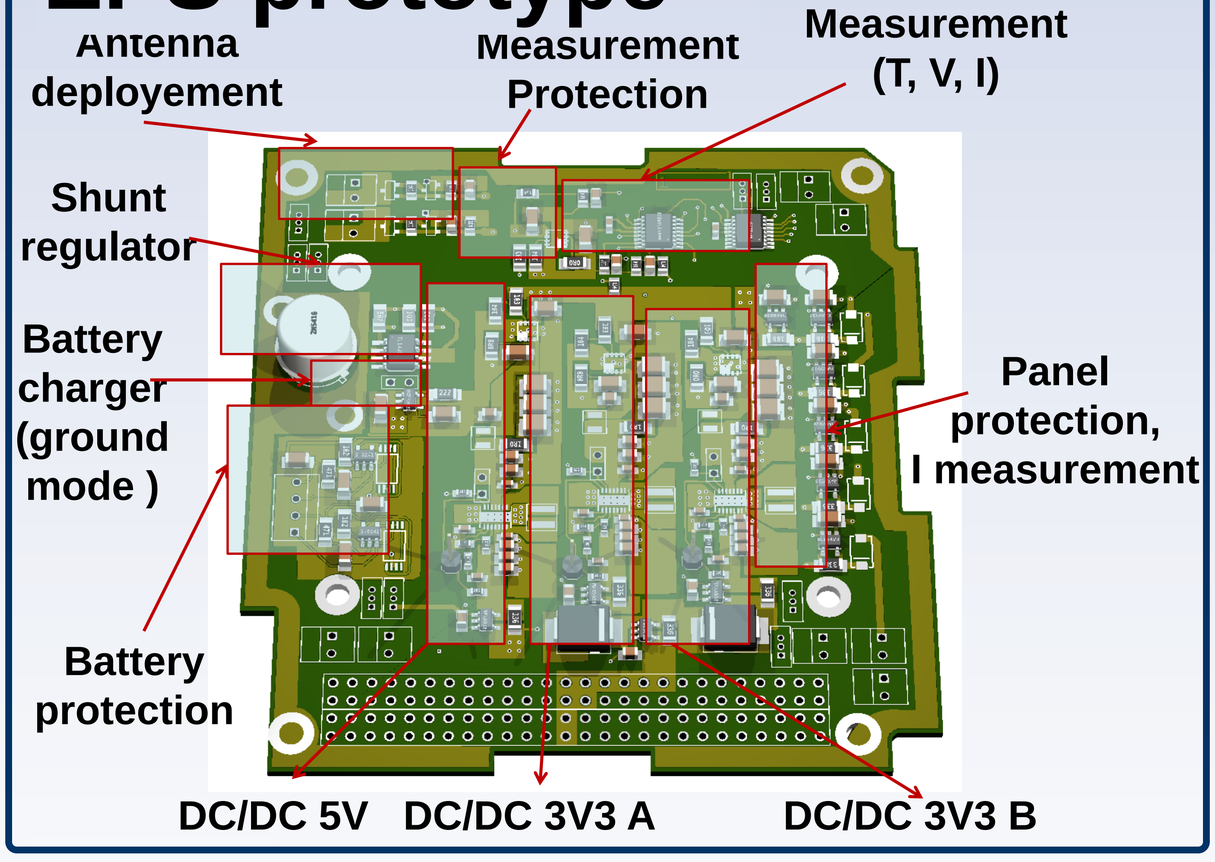
- 5 solar panels
- A_{SC} = 60.36 cm²
- 0< P_{SC}< according to orientation
- P_{mean} = 3.12 W
- η_{SC} = 30%
- P_{SC} = 2.46 W per panel

2 Batteries (1.5 Ah)
Discharge depth allowed : 13% : 1.638 Wh

Architecture

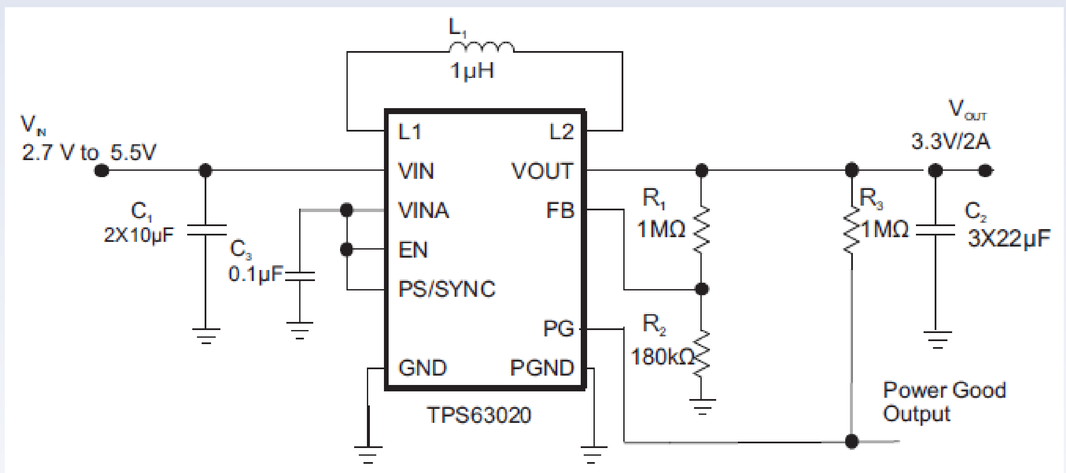


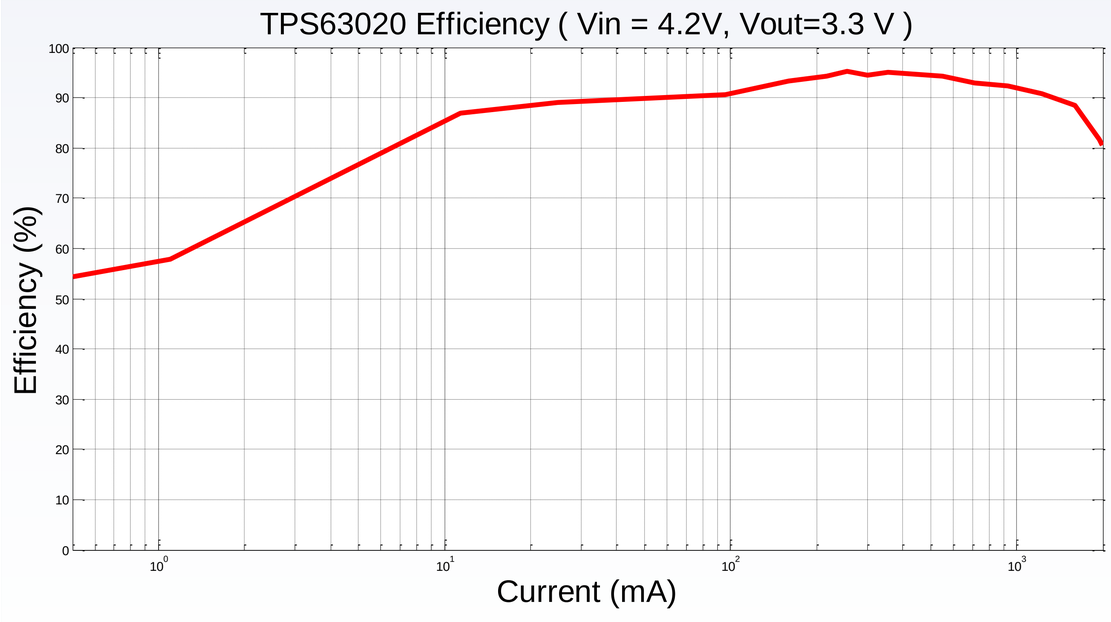
EPS prototype



DC/DC converter

Texas Instruments Buck/boost converter





EMC

DC/DC 3V3 A - 1.05 A - Conducted mode
(CISPR-22 measurement [150KHz – 30 MHz])