Modular Avionics Electronics

Applications

Stand-alone electronics equipment for space based avionics applications such as antenna pointing mechanisms (APME), solar array drives (SADE) and lithium-ion battery management (LMU).

Main features

- Full space qualification to ESA standards
- 20Vdc to 105Vdc input range
- 1553B, ML16/DS16 and other data-bus interfaces available
- Modular concept for easy adaptability to different applications
- SADE Module user interfaces:
  - 2 x 2ϕ motor driving
  - Sine/cosine micro-step
  - Full step DC to 20Hz
  - 2 coarse + 2 fine potentiometers
  - 2 rotational optical encoders + 4 optical switches
  - Programmable phase, speed, motor current, sensor type
- APME Module user interfaces:
  - 6 x 2ϕ or 3ϕ motor driving, one at a time
  - Full-step, rate 1 to 20Hz, duty cycle 50% to 95%
  - 6 coarse + 6 fine potentiometers
  - 6 rotational optical encoders + 6 optical switches
- Li-ion battery user interfaces:
  - Up to 24 cell measurements
  - Up to 4 cell group measurements
  - Up to 24 balancing switches
  - Programmable over-voltage protection

Production

- Capacity : 24 per year
- Heritage : 6 models delivered with a further 4 in production

Technical description

- Developed as a modular equipment this electronic unit can be adapted to a wide range of input voltage (28V, 50V , 100V), regulated or unregulated, as well as a wide range of motor drive applications, in full-step and/or micro-step modes, and different avionic applications such as Li-ion battery management.
- Separate modules are available for the DC-DC conversion necessary inside the equipment, the data-bus user interface (e.g. 1553B, ML16/DS16, etc), as well as the application modules themselves: e.g. 8 axis APME module, 2 axis SADE module, 20 cell Li-ion monitoring, etc.
- The use of standard functions, flexible control ASIC's, as well as a modular mechanical and electrical concept allows us to provide an up-to-date and competitive product that can be easily adapted, when required, to the particular user requirements.
- A full internal redundancy is foreseen.

Background

- SADE : YAMAL 401, AMOS 4, SATCOM BW, Star One
- SADE + APME : EDRS, SmallGeo DCU
- Other : CFOSAT, JWST, ICE MIRI

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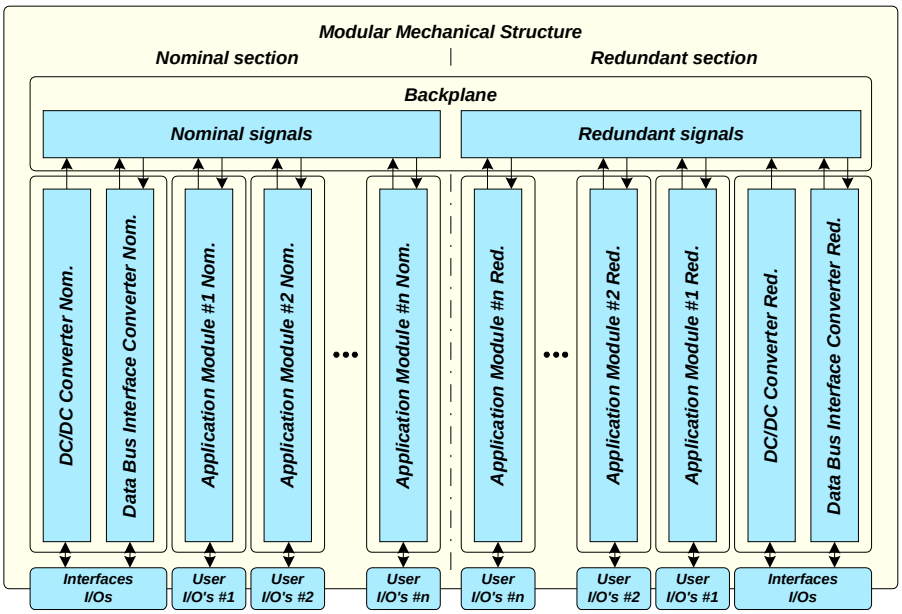

Typical performances

Input voltage		20V to 50V or 55V to 105V
SADE	◆ Motors	2 x 2ϕ, up to 300mA programmable by step of 1mA @ 40V
	◆ Motors type	60Ω to 120Ω / 240mH, 25Ω to 50Ω / 240mH
	◆ Motor mode	Programmable speed from 0.01 to 20 steps/s, accuracy = 10^{-4}
	◆ Motor protection	Bi-directional (550mA)
APME	◆ Motors	6 x 2ϕ or 3ϕ, up to 700mA @ 26V, one at a time
	◆ Motor mode	Stepping rate from 1 to 20 steps/s and duty cycle 50% to 95%
	◆ Motor protection	Active load disconnection by over-current protection (850mA)
Motor Monitoring Interfaces	◆ Potentiometer	Coarse & fine, 12 bits, no missing code, 0.1% accuracy, 2 per motor
	◆ Optical encoder	Serial protocol, 12 to 24 bits, 1 per motor
	◆ Optical switch	Edge or level, 2 per motor (absolute reference counter)
Lithium Battery Management	◆ Cell Measurement	0 to 4.5V, relative accuracy <10mV (0.25% fs)
	◆ Over-voltage prot.	Range 0 to 104.5V, resolution 0.41V, 0.43% accuracy fs
	◆ Balancing switch	Current capability : 500mA
Operating temperature		-30°C to +65°C baseplate
Volume	◆ 2 axis SADE	227 x 162 x 142 mm³
	◆ 6 axis APME	195 x 162 x 142 mm³
Mass	◆ 2 axis SADE	< 3 kg
	◆ 6 axis APME	< 3 kg

This datasheet is not contractual and can be changed without any notice.

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