Portfolio of building blocks

Board Type				
Function	Description	Remarks		
Power Conversion	ISODCDC	Multipurpose bidirectional fully digitally controlled ISOlation DC/DC		
	BCDR	Isolated bidirectional fully digitally controlled Battery Charge and Discharge Regulator		
	BRM	\boldsymbol{B} us \boldsymbol{R} egulator \boldsymbol{M} odule: bus and battery quality and control parameters management		
	PDC	Digitally controlled Power Down Conversion from 120V to 28V		
	SUPS	Standard User Power Service: independent power supplies for crew usage: 4 x programmable Low Voltage outputs (3-28V) and 4 x High Voltage outputs (120V)		
	APR	Solar Array Power Regulator: S3R under development, Maximum Power Point Tracker in roadmap		
Control & Auxiliary Supply	CTRL-APS	ConTRoL and Auxilary Power Supply: TM/TC based on Time Triggered Ethernet, and centralized auxiliary power supply		
Power Sitching and Distribution	HC-LCL 120V	High Current LCL: solid state based 20 A to 165 A programmable latching current limiter		
	X-TIE(-)	Cross-straping return side switched link between primary power buses		
	LCL 28V & 120V	Solid state Latching Current Limiter for spacecraft users of power		
	BES 28V & 120V	Bus Enable Switch: cross-straping link between secondary power buses		
	HCM	Heater Control Module: heater drivers upstream protected in groups by latching current limiter		

Contacts products.trescantos@airbus.com

Airbus Crisa designs and produces state-of-the-art electronic products for space applications that range from satellites, deep space probes and orbital infrastructure to space transportation systems. From ensuring proper on-board temperatures, energy management, and providing the delicate control for spacecraft and launchers, Airbus Crisa's innovative solutions build on the company's heritage in almost all types of electronics with the highest precision and performance.

Motivated by a commitment to continuous innovation, and backed by the strategy of investments in research and development, the company's products continually evolve in response to customer's needs.

Airbus Crisa has proven its ability to meet requirements for all types of missions, equipping everything from large telecommunication satellites, new-space constellations and agile Earth observation platforms to scientific and deep space exploration probes.

AIRBUS

Airbus Crisa © Copyright Computadoras, Redes e Ingeniería, SAU (CRISA) Reference 0278_24_18.



GHPS

GHPS (Generic High-Power System) is the Airbus

Crisa standard electronic

and crewed space station

scalable high power control

and distribution solutions

for 120V electrical power

NASA/ESA requirements.

GHPS highlights include

in-flight maintainability,

efficient power conversion,

distribution elements for

equipment. The product

tolerance concept in line

with having humans on

this technology apart.

also provides electrical

vehicles and a failure

crew usage and on-board

interfaces to supply visiting

board. All of these are some

of the key features that set

isolated bidirectional

wide range of power

subsystems compliant with

product for exploration

missions. It provides



- 100-base TTE link with avionics. • Unregulated and regulated
- primary and secondary buses.
- On board battery management. • On ground umbilical interface.
- 120 and 28 V secondary buses for on board equipment.
- High & Low (programmable) voltages for crew usage and on-board experiments.
- Supply to Visiting Vehicles through docking ports.

Applications fields

- Low Earth, Moon and interplanetary crewed space stations.
- Moon and Mars surface permanent bases.
- Moon and Mars landing vehicles.
- Logistics vehicles.
- · Spaceplanes.

Environmental

- Operation in pressurized and
- (70%) and high oxygen content (30%) atmosphere.
- Designed for Low Earth orbit and
- In orbit lifetime > 15 years.

Key Figures

- Dimensions depending on mission specific needs (length x width x height):
- Small unit example single power Portfolio of cards enabling the domain / single bus / 3 kW PCDU: 460 x 360 x 260 mm
- "Big unit" example single power domain / dual bus / 30 kW PCDU: 1150 x 500 x 260 mm
- Power Conversion efficiency higher than 95%

GHPS

GHPS is a state-of-the-art product for Power Conditioning and Distribution Units on-board crewed missions. It is the solution of choice for a wide range of power and mission scenarios thanks to the existing portfolio of building blocks configurable to cover different spacecraft architectures and redundancy schemes of application when having humans on board.

GHPS highlights:

- Supports Primary and Secondary buses reliable management and regulation.
- In orbit maintainability.
- Capability to implement two power domain electrical power subsystems with single or multiple power buses, cross-strapped or not.
- Compatible with unregulated (battery follower) and fully regulated bus architectures.

Main Features

- Scalable power solutions for 120V platforms compliant with NASA/ESA standards for crewed missions.
- Efficient, isolated, bidirectional power conversion.
- Reliable power management.
- Protected power distribution at 120V and 28V.
- Secondary 120 V and 28 V buses generation.
- Programmable digitally controlled Power Converters, parallel operation for increased power capability.
- Modular approach based on inflight replaceable cards.
- Designed to be compatible with complex grounding schemes.
- Flexible architecture enabling power subsystems from a few kW to tens of kW.
- construction of power architectures implementing one or several power rails.
- Autonomous or on-board computer slave power rails regulation modes.
- 100-base TTE link with avionics.

Performances

	Function	Parameter	Performances
		Architecture	Unidirectional or bidirect
		Power capability	3 kW
	ISODCDC	Control	Full digital control
	and BCDR	Redundancy scheme	Hot (preferred) or cold
	BODIT	Protections	Input & output undervolt
		Telemetries	Input & output current & Converter and protection
		Architecture	Unidirectional 120 V → 2
		Power capability	1 kW
	DD0	Control	Full digital control
	PDC	Redundancy scheme	Hot (preferred) or cold
		Protections	Input & output undervolt
		Telemetries	Input & output current & Converter and protection
	BBM &	Regulation capabilities (autonomous mode)	Bus voltage • Battery ch majority voted
	bus capacitor	Operation capabilities (slave mode)	Constant current
		Configurations	28 & 120 V versions
		Telemetries	Battery current and volta
		Architecture	Generic supply voltages 4 x Low voltage outputs
	SUPS	Capabilities	Low voltage outputs: Pre High voltage outputs: 12
		Protections	Low voltage outputs: Ou High voltage outputs: Ou
		Telemetries	Low voltage outputs cur
		Architecture	AC-bus based auxiliary
	CTRL-APS	Capabilities	Designed for complex gir Time triggered or rate co
		Protections	AC-bus input overcurrer
		lelemetries	Auxiliary supply input cu
		Architecture	to start-up power bus ra
	HC-LCL 120V	Capabilities	Start-up of big capacit
		Protections	Load overcurrent / short
		Telemetries	Distributed current and k
		Architecture	2 x High current return li
	X-TIE(-)	Capabilities	100A (single bus) • 80A
		Protections	Excess of current throug
		Telemetries	Return current • Digital s
	LCL 28V & 120V	Architecture	18 x 5A LCL cores
		Capabilities	Setting to 2.5A, 5A and short requirements • Sta
		Protections	Output overload/short ci
		lelemetries	LCL core distributed cur
		Architecture	Forward, Transmit and F
	BES 28V & 120V	Capabilities	Current of 40A (28V cas
		Protections	Current limitation in Tran
			Current through every no
		Architecture	9 x LCL protected group
	НСМ	Protoctions	Hoator group querourse
		Telemetrice	Heater group & individual
			LIGOTOK OKOLIN V INGINI

- & Lifetime unpressurized environments. • Compatible with high humidity

- Moon orbit radiation environments.
- Tolerance to spilled liquids.

ional

age and overcurrent

voltage ns digital status

8 V

age and overcurrent

voltage ns digital status

arge current + EOC taper voltage • All regulators triple redundant

ige • Bus voltage

for crew usage:

with remote sensing + 4 x High voltage outputs

ogrammable 3V to 28V, 7.14 A max. 20V 10 A LCLs

utput current and overvoltage utput current limit & safe-off switch

rent and voltage • High voltage outputs current • Digital status

supply • 100-base TTE links with avionics

rounding schemes • Start up from primary bus or battery onstrain TTE traffic for TM/TC, best effort for network management

t and output overvoltage

rrent • TM/TC Interface health status

urrent LCL + "Dead Bus Recovery" functionality

mit from 20 to 165A • Trip time proportional to current limit setting ive loads in excess of 4 mF • Enable/disable hardlines

circuit • Excess of current through body diodes

ous voltage • Status and consistency flag

ne solid state switch

(two buses simultaneously

h body diodes

status

2.5A →5 A transition • Up to 500 μ F load per core • Compliant to smart nd alone or parallel operation

rcuit

rent • Status and consistency flag

Receive switching nodes • Switches at active and return line

e) / 55A (120V case)

smit and Receive nodes • Excess of current through body diodes

ode • Status and consistency flag

os of 4 heaters

er switches in the return line

heater current • LCL Status and consistency flag • Heater status