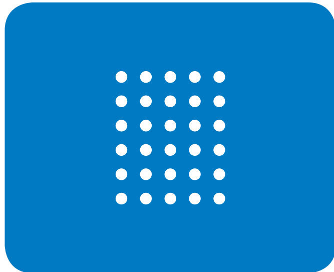
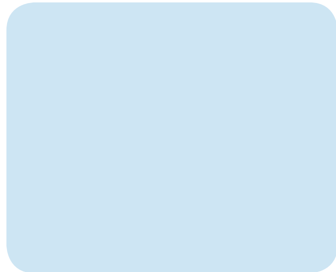
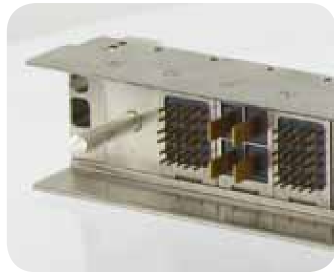
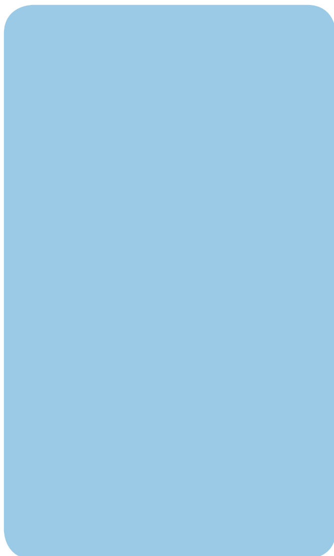
MODUL R ™

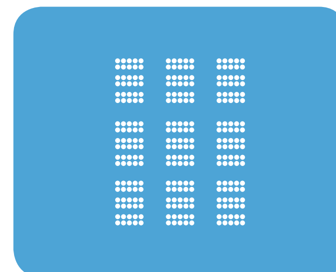
NEW





The **Next Generation** of **Avionics Board Level connector**



www.amphenol-socapex.com

Amphenol Socapex

Why does the commercial avionics market need for *modular architecture* ?

The future generation of avionics will be more modular, robust and higher speed than ever before. Power, inter-changeability, easy maintenance & repair and cost effectiveness are driving the changes of the complete architecture for all onboard systems and all platforms.

Designing Next Gen Integrated Modular Architecture (IMA) requires a new interconnect technology providing the right match between:

- Size and weight reduction
- Thermal management optimization for an improved cooling
- Data transmission excellence (high-speed & high-density)
- Rugged construction for stringent environments

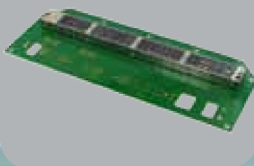
This (r)evolution of integrated modular electronic packaging requires a suitable interconnect solution:

- Compact
- Higher performances
- Rugged and modular
- Evolutive for future improvements and changes

No matter the aircraft size, the application or the nature of the equipment to be designed (power generation, actuators, avionics...), Amphenol remains the one-stop solution provider.

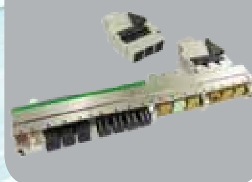
IMA solution provider for each *interconnect level*

From Board



To Board

Thru Harness



TO APPLICATIONS

MODUL R ™ : scalability to infinite adaptability

From airliners stand point

Easier maintenance
Increased reliability
Easier upgrades
Reduced inventory / Obsolescence management

From airframers stand point

Improved installation
Modularity for multi-programs adaptability
Reduced volume and weight
Reduced aircraft assembly duration
Reduced inventory / Obsolescence management
Scability lower P/N count

From OEM & system suppliers stand point

Dual source
Modularity for multi-applications adaptability
Improved thermal management
Higher density & higher performances
Optimized cost
Reduced design phase duration
Reduced inventory / Obsolescence management

BUILDING TODAY THE *NEXT STANDARD CONNECTOR* FOR THE AVIONICS MARKET

The **MODUL R** is actively contributing to define & develop the next generation of IMA connectors.

MODUL R enables progress towards various research projects such as CORAC or CLEANSKY.

To bring a multi source solution to the market, Amphenol and its partner are working to build the interconnection solution of tomorrow for integrated modular avionics.

A fully adaptable platform covering all the commercial avionics needs :

- High-speed signal transmission
- Power management solutions
- High-density design (size and weight optimization)
- Size adaptability (3U & 6U)
- Thermal management option for better cooling
- Easy-to-use solution
  - Less tools, quick install, blind mate and shock-proof
- Ruggedization and fully protected against
  - Electro Magnetic Interferences (EMI)
  - Short cuts

By design, the use of shared components is optimized, providing a competitive & multisource solution.

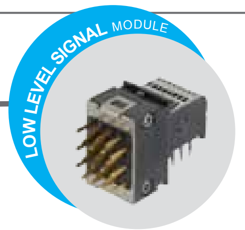
With its unique platform of proven technologies, **MODUL R ™** is an innovative commercial avionics connector covering a wide array of applications including

> Avionics equipments
> Communication (radar, radio,...)
> Flight control systems
> Engines / Power units / FADEC

The MODUL R ™ is available in both 6U and 3U format to address the future avionics market needs with respectively 4 cavities equipped with 4 modules each and 2 cavities equipped with 3 modules each.

The 3A SIGNAL MODULE: ideal for discrete signal or low-power up to 3A

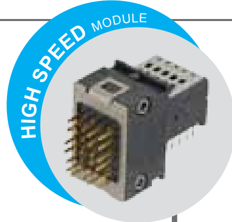
- 3A per contact / 24 signal contacts per module
- Up to 384 signal contacts in a full connector
- Press-fit technology for a cost effective on-board assembly

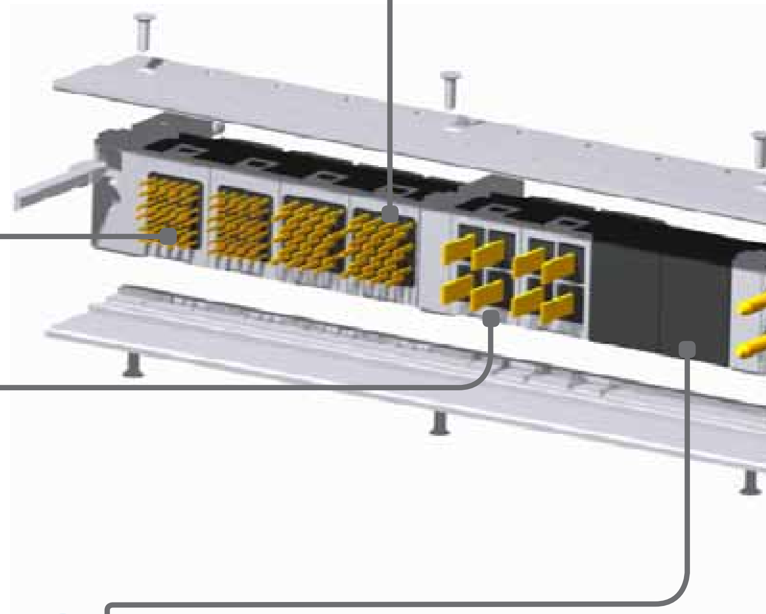


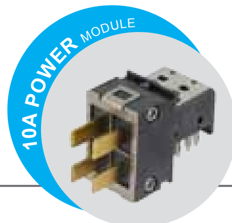
The HIGH-SPEED MODULE: dedicated to 14Gbps+ signal transmission such as XAUI, Ethernet, Infiniband or PCIe

- Up to 14Gbps per differential pair
- 8 differential pairs per module
- Up to 128 differential pairs in a full connector
- Press-fit technology for a cost effective on-board assembly

> Evolutive towards 25Gbits+ to face future protocol demands

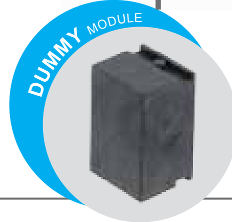






The 10A POWER LEVEL MODULE: dedicated to applications requiring intermediate power

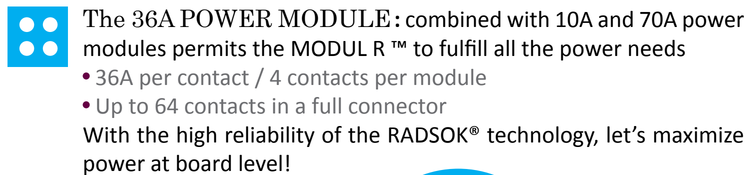
- 10A per contact / 4 power contacts per module
- Up to 64 power contacts in a full connector
- Press-fit technology for a cost effective on-board assembly



The DUMMY MODULE: keeps consistency with the 6U or 3U format in case of unpopulated cavity

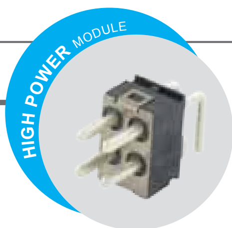
70A POWER MODULE: c
control unit or power distributi
- 70A per contact / 1 contact pe
- Up to 16 power contacts in a f

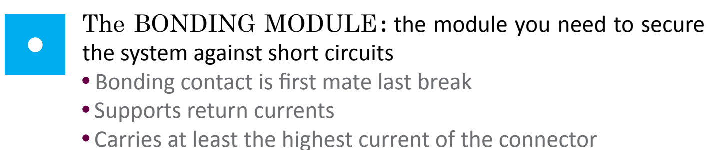
Based on the proven RADSOK ®
Xtra high-power needs while be
attachment on bus bars



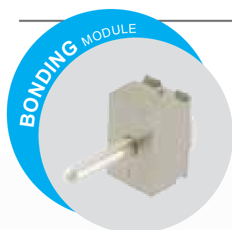
The 36A POWER MODULE: combined with 10A and 70A power modules permits the MODUL R ™ to fulfill all the power needs
- 36A per contact / 4 contacts per module
- Up to 64 contacts in a full connector

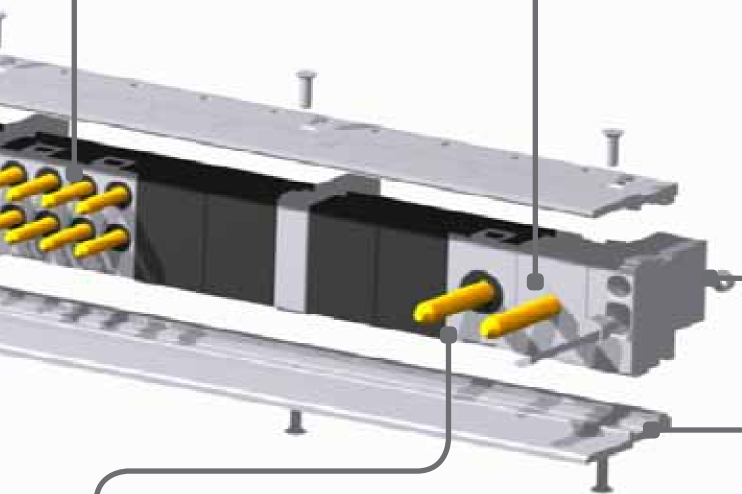
With the high reliability of the RADSOK® technology, let's maximize power at board level!

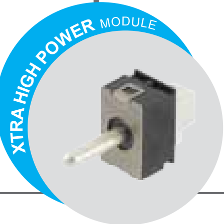




The BONDING MODULE: the module you need to secure the system against short circuits
- Bonding contact is first mate last break
- Supports return currents
- Carries at least the highest current of the connector







overing of applications such as power
on
er module
full connector
® technology, the 70A module addresses
eing compliant with soldering process or

+ TECHNO

- EMI: a metal plate provides a High-frequency filtering of perturbations by acting as high-frequency capacitive filter
- ESD: the connector design permits the redistribution of electrostatic discharges towards the ground through the metallic shell

Metal fixtures, combined with suitable guiding and keying devices ensure:

- Lateral displacement: by design, the connector accepts a ± 0.4mm lateral displacement
- 36 keying positions
- Optimized realignment between the blades and the backplane

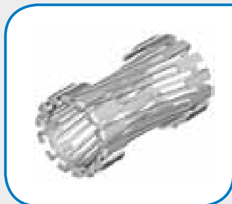
Mechanical characteristics

MODUL R ™ : a ruggedized mechanical interface
- Real blind mate and Rackable connector for harsh environments rack and panel for harsh environments
- Lateral rails maintaining the modules altogether
- Male contacts protected by the metal rails
- Female contacts protected by design

MODUL R ™

- Rackable interface
- 6U or 3U chassis format
- Extensive modularity
- Mechanical floatment
- High Speed diffy pairs
- High Power to the board
- ElectroStatic Discharge protection (ESD)
- Electromagnetic interference protection (EMI)

Amphenol RADSOK® Technology…



… for the most demanding power applications

> The RADSOK® (RADial SOcKet) technology is based upon a stamped and formed flat grid, uniquely twisted into a hyperbolic geometry

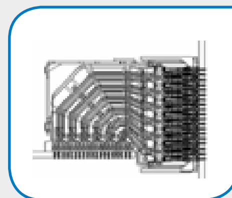
> This geometry offers many advantages, such as contact coverage of up to 65%, absorption of vibration as well as superior durability of the contact element

> RADSOK ® is a well-known and field-proven technology, used in a wide array of markets including automotive, industrial and military & aerospace

Advantages

- Absorption of vibrations and shock
- Robust & high-density of contacts
- High-mating cycle durability
- High-current carrying capacity
- Lower contact resistance
- Low milli-volt drop
- Low temperature rise performance
- Low insertion forces

Amphenol HIGH-SPEED TECHNOLOGY



Achieve your critical speed & rugedization requirements

> Amphenol's MODUL R ™ high-speed module is designed to enable future data requirements of commercial avionics & airframe equipment: XAUI, Ethernet, PCI Excpress, SONET/SDH, InfiniBand, SATA, …

> The 14 Gbps+ high-speed module is based upon a brand new technology of differential pairs, allowing great performances across a wide frequency spectrum while being compatible with thermal devices

> Thanks to the MODUL R ™ strong & ruggedized mechanic, the module meets the harsh environment requirements

Advantages

- High-data rates up to 14Gbps per differential pair
- ± 0.4[.015] lateral displacement compatibility allowing the use of thermal clamps
- Exceptional ruggedization to fulfill the market needs
- 100 ohm differential impedance
- 3.7 differential pairs per cm^2 (24 differential pairs per inch)
- Proven reliability of press-fit attachment for a cost effective on-board assembly
- Propagation delay skew within each differential pair inferior to 5ps

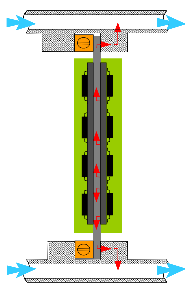
Amphenol thermal management mastering

Amphenol's MODUL R ™ floatability compliance

> As power increases and package size decreases, the need to dissipate excessive heat becomes a challenge in aeronautical applications

> MODUL R ™ is designed to accept the lateral displacement caused by the use of thermal clamps without stressing neither the solder joints nor the active contact area

> The heat dissipation is optimized by the thermal coupling between the heatsink of the printed circuit board and the cold wall of the box



Optimized heat dissipation by conduction cooling

- ± 0.4[.015] lateral displacement compatibility
- Adaptable to all types of heatsink
- Adaptable to all types of thermal clamps
- No stress on the solder joints
- No stress on the active contact area
- Maximized and uniform thermal transfer

The information contained in this document should be used **as a guideline only**.
We reserve the right to **modify our products** in any way we deem necessary.
Any duplication is **prohibited**, unless approved in writing.
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For more information, you can contact us on our website www.amphenol-socapex.com or by calling on **+33 (0)4 50 89 28 00.**