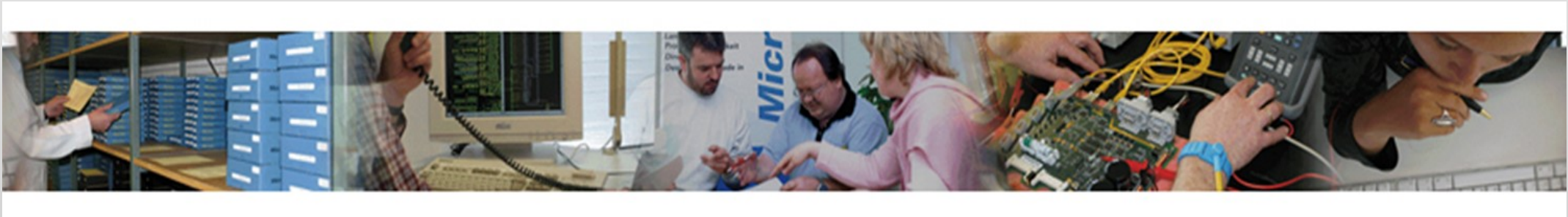




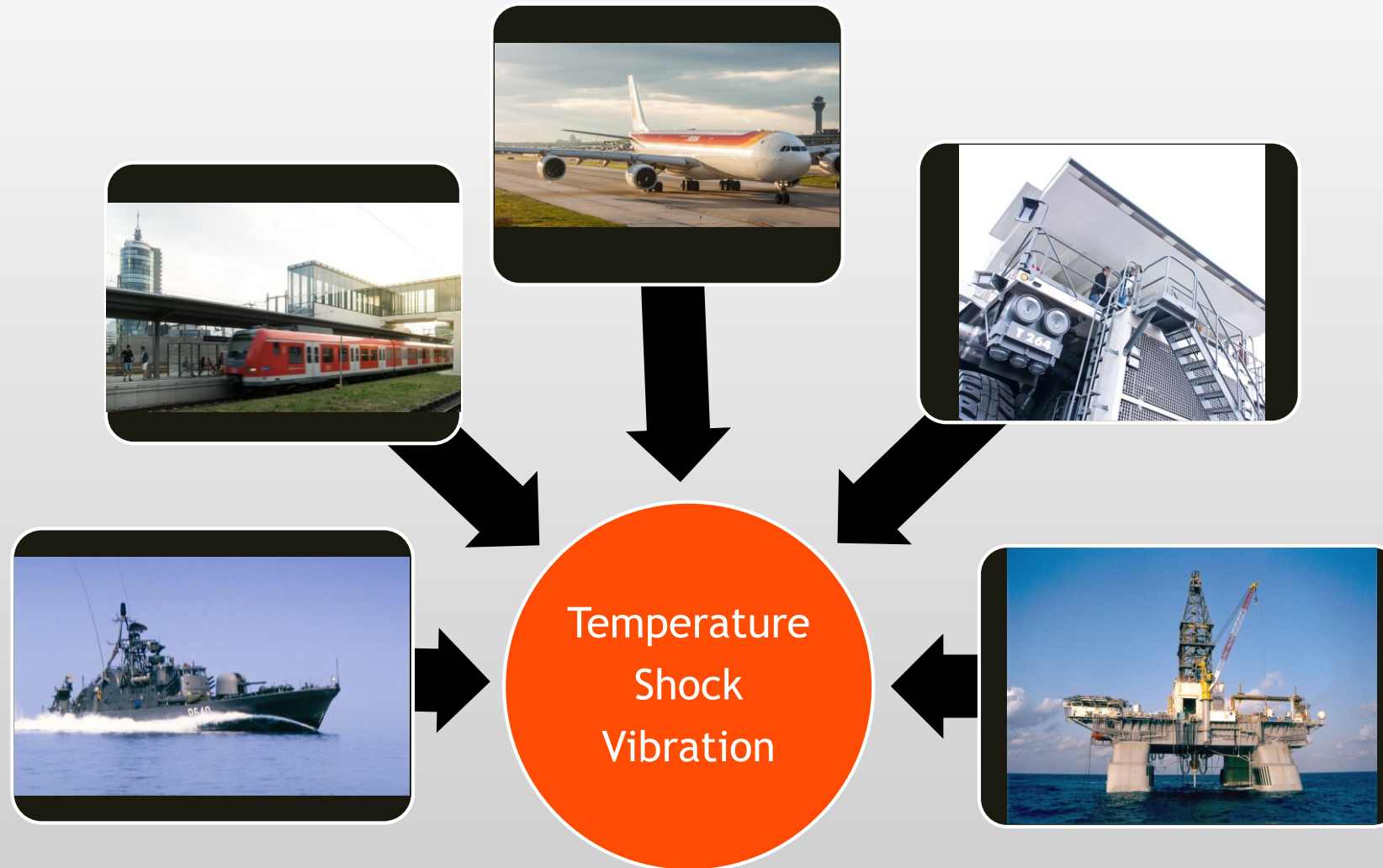
MicroSys

SOM-Robustness on
miriac[®] MPX-
LS1043A LS1046A LS1088A
T1024 T1042



Creating Embedded Systems

Why to manage fitness for harsh environment?



How to manage fitness for harsh environment?

Temperature

- use components with extended temperature specification, minimum $-40^{\circ}\text{C}..+85^{\circ}\text{C}$
heat producing components are often specified much higher
- use components with good electrical margin, e.g. Capacitors with higher specifications for ripple, voltage, ...
- place all heat producing components on the topside for easy adaption with heat-spreader
- provide easy method to mount a heat-spreader e.g. by mounting holes
- enable temperature measurement with appropriate sensors
- Power down whatever is not required for operation

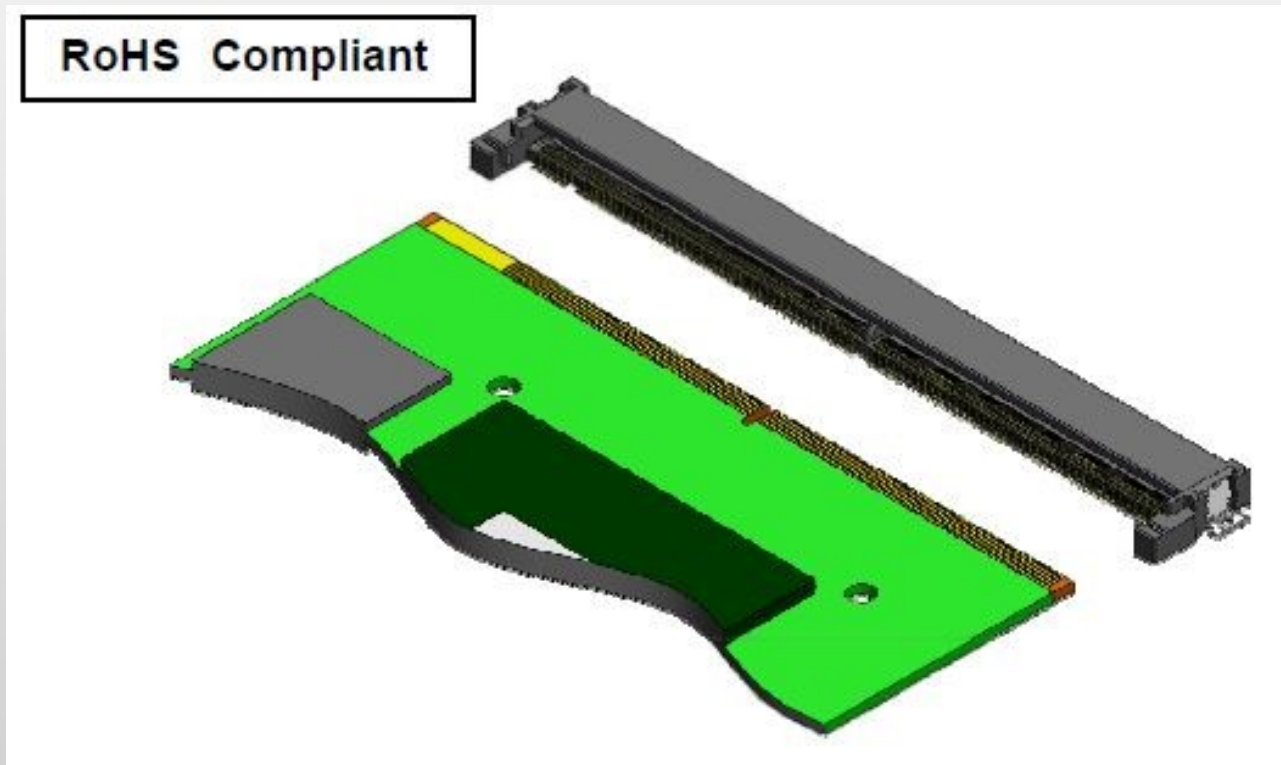
How to manage fitness for harsh environment?

Shock & Vibration



- avoid usage of high and heavy components on the PCB
- provide mounting holes for proper fixation
- choose an appropriate connector system

Often a bit nebulous, the Module-Connector



Module-Connector, shock & vibration test at IABG:

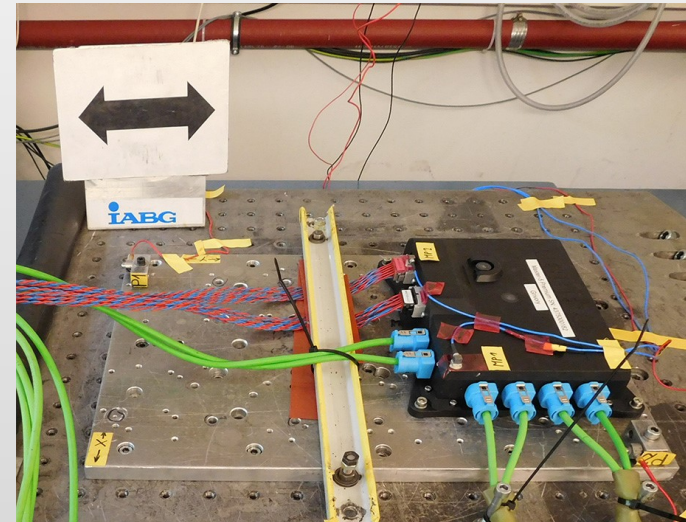
Vibration: noise

Random vibration 3-Axis

Frequency range: 10-2000 Hz: 4,12gRMS

Shock Saw-tooth pos/neg, 3 Axis

Acceleration 6g



Module-Connector, Shock&Vibration Test:

- Tested at IABG with MicroSys SOM CRX-05 and Baseboard MPX-LS1046A
- Test criteria according to DO160F, Electronic Bay, Fixed wings, test category B3 and C
- Linux Software running data transfers across 4x Ethernet and 1x serial interface. No packet loss detected during test time.



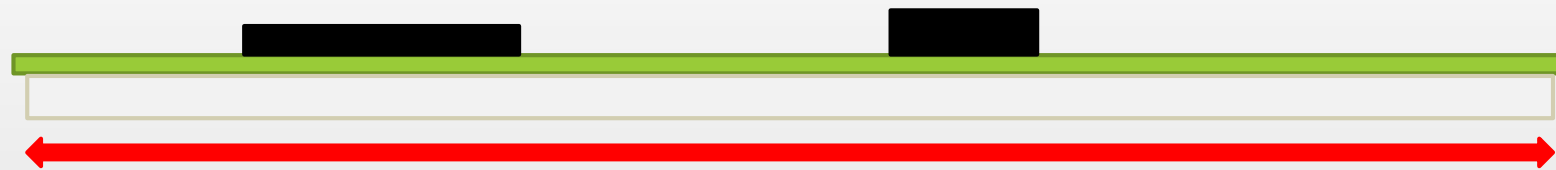
Module-Connector, technical data:

- Manufacturer JAE Japan Aviation Electronics (www.jae.com)
- Type MM70-314-310-B1-1-R300, compatible with MXM3.0 standard
- Number of contacts 310 pos.
- Contact resistance 80mΩ max.
- Rated current 0,5 A per pin
- Durability 30 times
- Spacing two layer, 0,5mm pitch
- Reverse protection by coded PCB-notch
- Operating temperature -40..+85° C
- Contact 0,1μm Au plating over Ni (version with 0,3μm available)

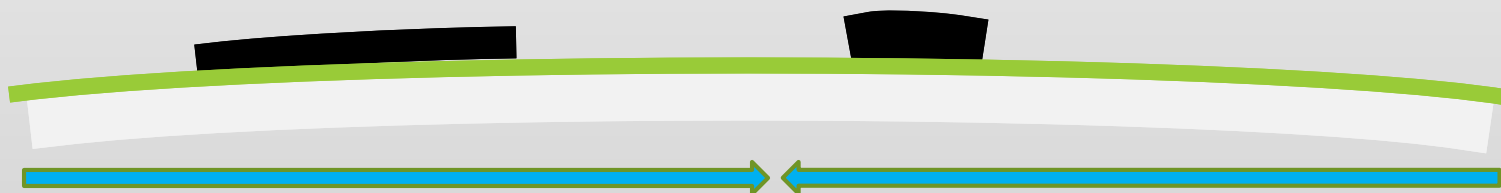
Module-Connector, technical data:

- Insertion force 70N max.
- Extraction force 50N max.
- Vibration tested according to EIA-364-28 condition VII, letter D
Frequency range: 20 to 500 Hz
15 minutes each of 3 axis
3.10 G's rms
- Shock EIA-364-27 Test condition A
Acceleration 490m/s²
Duration of impact 11ms
Three shocks in three axes

Module-Connector, advantage against soldered versions



Connector Liquid Crystal Polymer-Material expands more than PCB, when heated during soldering process



Connector shrinks more than PCB, when cooling down after soldering process...while solder is solid already

