



Born to be perfect ►



ATR **F1**

Core i7 Military COTS Computer

Small Form Factor (SFF) with PCIe/I/O Architecture

Extended
Temperature
+75°C
-40°C

CPU Full Speed



- Rugged COTS computer with Intel® 3rd generation Core- i7 processor
- NVIDIA® GPU GT730M supports CUDA 384 independent displays by 4 x DP
- Modular rugged chassis with stackable PCIe/I/O card expansion.
- 28V DC MIL-STD-1275/704/DO-160 Power supply with Voltage transient protections
- Design for reliability under demanding MIL-STD-810G/DO-160/MIL-461F Thermal Shock, Vibration, Humidity/EMI/EMC conditions
- Rugged IP65 aluminum chassis with military grade M12 or MIL-DTL-38999 connectors
- Operating temperature range : -40°C to 75°C

F1 series products are built on the solid foundation of 7STARLAKE's expertise in thermal design and ruggedized system. Supporting tier-one customers to realize diversified critical missions worldwide. Stackable method provides resilience to comprehensive applications. 7STARLAKE designs ATR with StackPC form factor modules, supporting high speed graphic processing, wide size storage, multi-Ethernet, and wide DC input power module (9-36V).

Applications Overview

Naval/Ground/Aerospace Defense

F1 Rugged COTS system is born to answer the critical demands of defense market. The flexibility of F1 holds a true value. Interface modules like Analog and digital input/output, 128 bit DIO modules, 4 CAN bus modules could be applied to compliment different missions.

Stackable design can achieve tailored skews and provide great advantages and resilience to harsh environment and operations. F1 is capable of withstanding vibration level at 10g peak, 5-2000Hz; shock level at 100g peak. F1 can assure a safe and efficient computing environment.

For modern battlefield scenario, versatility and adaptability are the winning keys. Pairing with SK506 – Ethernet Module, which can support total six independent LAN connections by Intel i350-AM4, can greatly enhance faster data transmission and the linking of remote devices.

Unmanned Systems

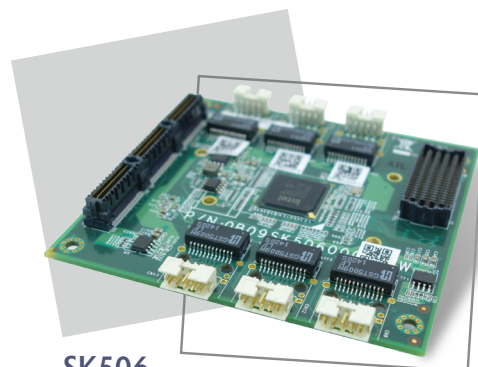
F1's slim size and light weight design completes a compact solution perfect for unmanned deployment. F1 can support wide temperature (suitable for various terrains and environments), high-speed I/O (designed and tested to meet MIL-standard), and optimal size, weight, and power. Unmanned systems must be flexible and configurable to match UAV's critical demands.

SK401 – Storage module is a must for mass storage demands, supporting either 1 x 2.5" SSD or 2 x mSATA/mPCIe slot. Data collected from each missions can be safely stored.

Radar Detection

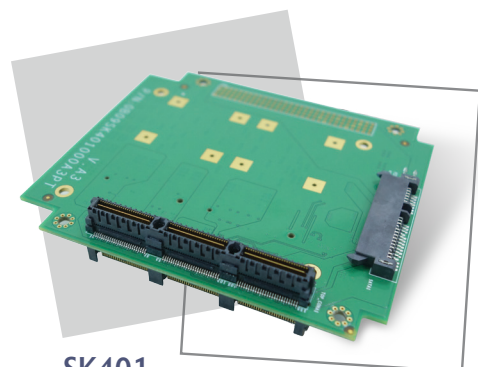
Radar systems rely highly on the reliability and multi-functionality of the computing device. To support automatic target recognition, high speed computing, and high definition display, small form factor PCIe/104 modules can easily expand with "Wave Form modules", dual ~ quad channels frame grabber. Radar systems acquire and secure vital data for timely location of targets.

SK210 – Graphic Module is with NVIDIA GT730M GPU that can support four independent DisplayPort (3 full HD). High resolution, multi-mega pixel image sensors can be attached to ATR and have satisfactory outcome. GPU can also be incorporated as an even more powerful processing unit.



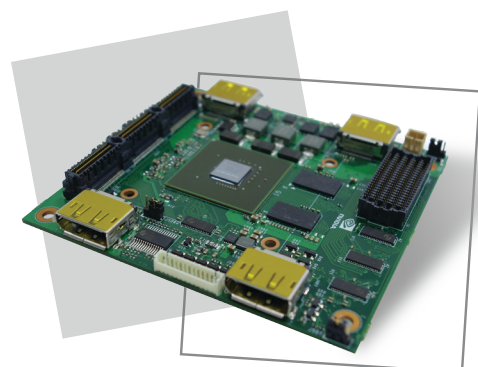
SK506

PCIe/104(StackPC FPE module)
Expand 4 extra 10/100/1000 mbps
Gigabit Ethernet



SK401

PCIe/104 (StackPC)SSD/mSATA
Storage Carrier, Supports 2 x mSATA
/mPCIe slots or 1 x 2.5" SATA SSD



SK210-GT730M

NVIDIA GeForce® GT730M
StackPC/PCIe104 Graphic Module,
Supports Four DP outputs



When StackPC meets ATR Structure...

ATR, which stands for Air Transport Rack, is an universal standard that determines the dimension and function of a rugged system especially dedicated to avionics/aerospace applications.

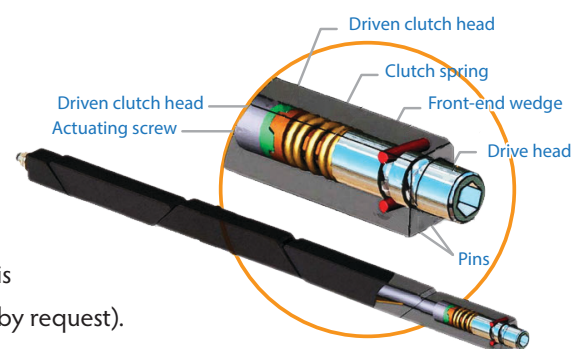
7Starlake's Unique Solution

While usual ATR structure incorporates PCI, VPX, and VME based form factors, 7Starlake's F1-30 Conduction cooled ATR is powered by PCIe104 small form factor modules. PCIe104 – StackPC architecture provides even more flexibility in designing rugged COTS computers.

Also known as ARINC, the concept has been used universally for not only aviation purpose but also vehicles with wheels and tracks.

The Power of Conduction Cooling ►

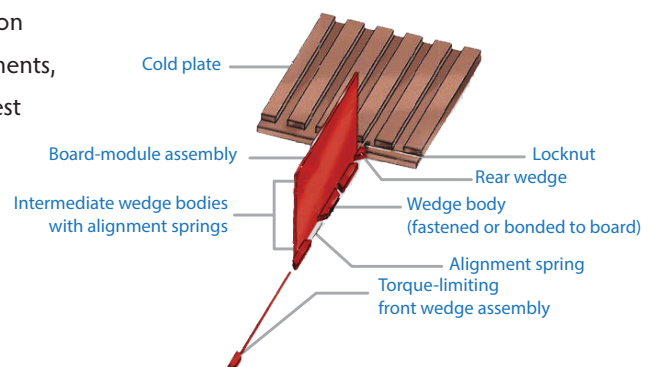
7Starlake, being the master of thermal design, has once again achieved fanless design through conduction cooling method. With each layer comes a heat plate to touch directly the heated parts, the thermal performance is of the highest level. The top side, which is designated as the customized I/O interface, is equipped with water/dust proof MIL-STD M12 connectors (enhanced D38999 by request).



Wedge-Lok

To ensure maximum reliability in rugged, heavy shock, and high vibration terrains, Wedge-Lok can provide equally satisfying results. With 5 segments, shifted design, Wedge-Lok also help to transfer the heat and ensure best conductivity of heat load.

The multi-segment design highlights on its ability to withstand massive vibration and shock, providing even higher sustainability through the torque-limiting design.



Conductive Cooling Modules for Extreme Power

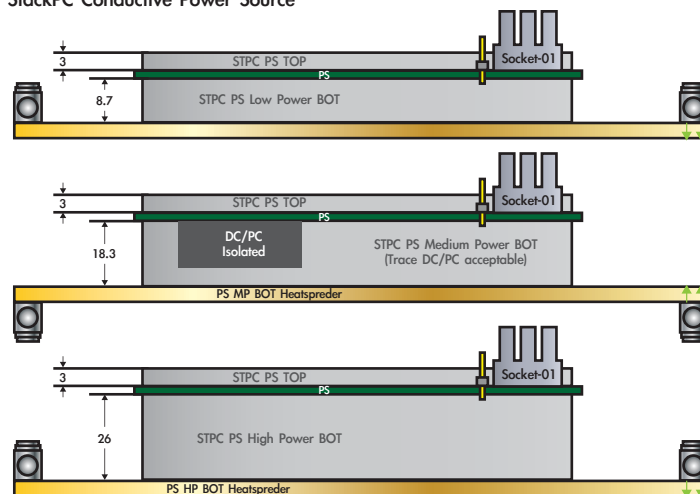
A solid material that can effectively conduct the heat is used to move the heat to the system enclosure and dissipated to the external surroundings. The machined copper cooling plates matching the component layout are placed between each layer; heat is carried away to the edges where a Wedge-Lok mechanism secures inside the chassis, coming up with a thermal interface.



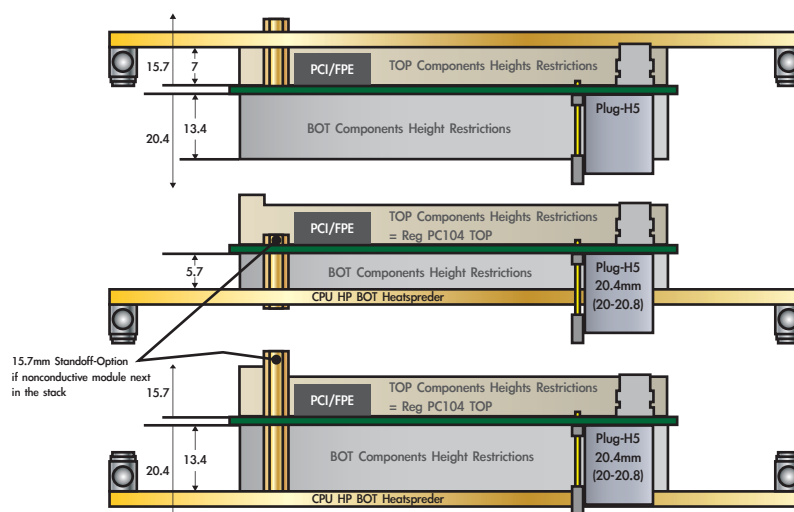
Flexibility in Nature – Configurative Thermal Design

Following the rigid tradition of 7Starlake's thermal concept, F1 is designed with layered heat plates that are in direct touch with the heated areas. Heat dissipation for components that gather a considerable amount of heat is the key in the overall thermal performance. For different modules, we've designed a matched heat plate that fits perfectly into the body for effective conductive cooling.

StackPC Conductive Power Source



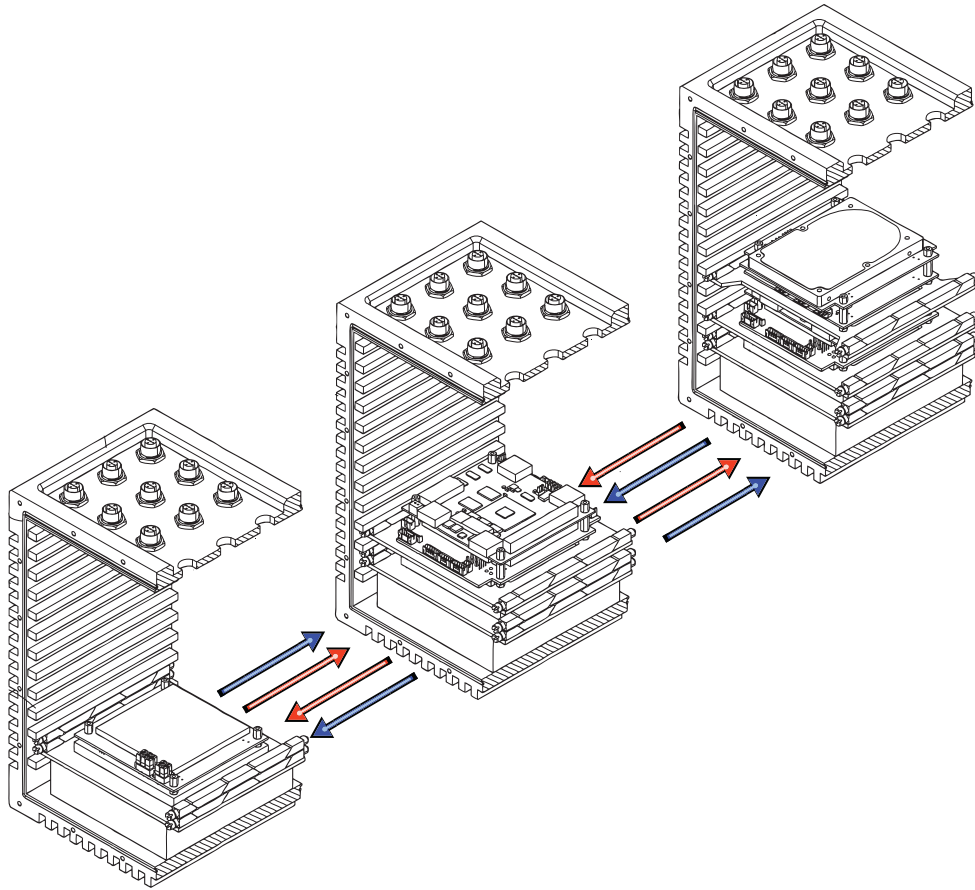
StackPC Conductive HOST



Conduction Cooled Chassis Platform up to 10 Slots

7Starlake's ATR solution comes with an all-in-one design enclosure; each slot can securely fit a Wedge-Lok, and each layer comes with a firmly attached, directly touched copper heat plate to complete a effectively cooled interior.

What makes conduction cooling method so practical is that it is without moving parts, therefore suitable for high altitude and underwater applications.



Technical Specifications

CPU Type

- Intel® 3rd generation Core™ i7 Processor

System Chipset

- Intel® QM77

Memory type

- 1 x DDR3 1333/1600MHz XR-DIMM 8 GB

HDD/SDD support

- 1 x 2.5" SSD or 2 x mSATA
- Onboard 64 GB (MLC) SATA NAND Drive

I/O Connectors

- Phoenix Contact X-Code 8 pin or 12/17 pin connectors for LAN, Display, COM, DIO or other customization requirements
- MIL-DTL-38999 connectors by request

Housing

- Aluminum

Weight

- 9Kg (19.84 lb)

Dimension (W x H x D)

- 147 x 172 x 268 mm

Input Voltage

- 9 to 36 VDC (Optional with MIL-STD-1275/704/DO-160 at 28 VDC transient protections)

Operating temperature

- -40 to 75°C (-40 to 158°F)

Storage temperature

- -40 to 85°C (-40 to 185°F) *without HDD installed

Relative Humidity

- Up to 95%RH @40°C, non-condensing

Ingress Protection

- Designed for compliance to IP65, MIL-STD-810G

EMI/EMC

- Designed to meet MIL-STD-461F & RTCA/DO-160G

Military

- Designed to meet MIL-STD-810G and RTCA/DO-160G

Vibration & Shock

- Designed to meet MIL-STD-810G

Ordering Information

Complete System

F1-30

Intel® QM77, IP65 MIL-STD Fanless Rugged System with Intel® i7-3517UE Ivy Bridge Processor, 9V to 36V DC-in, Extended Temperature -40 to 75°C

Modules

OXY5535B-UT

Intel® 3rd generation Core™ i7 StackPC with QM77 Chipset, Extended temp. -40 to 85°C

SK210-GT730M

NVIDIA GeForce® GT730M StackPC/PCIe104 Graphic Module, Supports Four DP outputs, Extended temp. -40°C to 85°C

SK401

PCIe/104 (StackPC) SSD/mSATA Storage Carrier, Extended temp. -40°C to 85°C

SK506

PCIe/104 (StackPC) expend 4 x GbE with Intel i350-AM4, supports up to 6 x GbE, Extended temp. -40°C to 85°C

SK704

PCIe/104(StackPC) 105 watt DC/DC PSU Module, Extended temp. -40 to 85°C