



F1-3004

**INTEL 9TH GEN. XEON,
4 x QUADRO P5000 MXM,
AIRBORNE GPU SERVER**

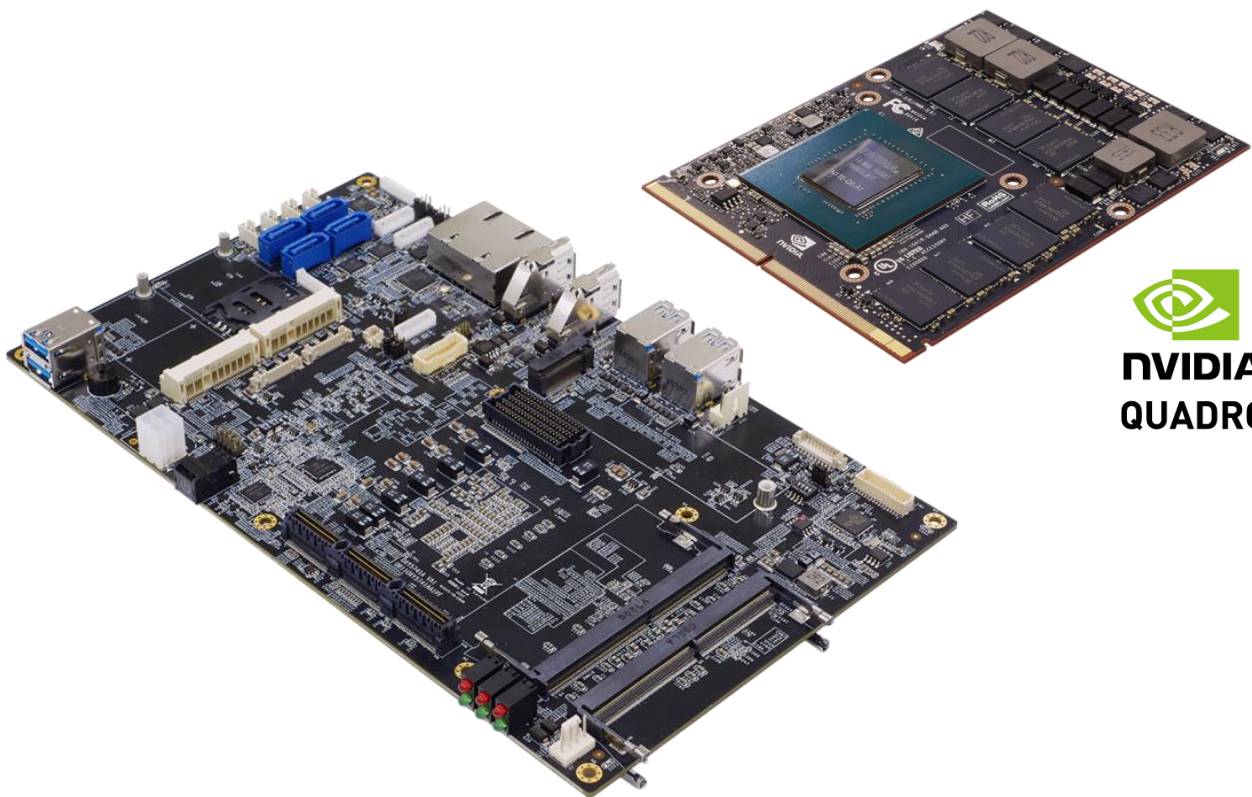


**NVIDIA.
QUADRO®**

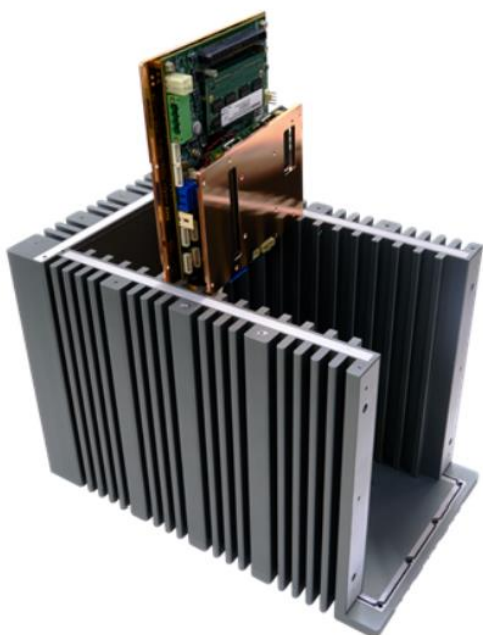


- **SFF Rugged PCIe/104 computer with Intel®9th Gen.® Xeon® E-2276ML CPU**
- **4 x NVIDIA® Quadro Embedded P5000 MXM GPU (2048 CUDA, 16GB GDDR5)**
- **DDR4-2666 Up to 128GB**
- **DC-DC 18V~36V, MIL-STD 461/1275**
- **MIL-STD 810 Shock up to 75Grms**
- **Operating Temp. -40°C~+55°C**

ATR (Air Transport Rack) is a standard that specifies form fit and function of enclosures designed to protect the main internal **critical parts**. This military enclosure not only meets EMI / EMC requirements, but also sustains heavy vibrations up to 10Grms. In addition, with **mezzanine type connectors**, the completed system can support up to 75 G shock. Thus, it can be deployed in unmanned vehicles, fighters, helicopters and battleship as well. Based on **3/4 ATR** size, 7Starlake launches a new Rugged Airborne Mission Computer **F1-30G4**. As a modular mission computer, F1-30G4 features a built in EBX OXY5741 SBC powered by Intel 9th XEON E-2276ML (6 Cores, Max Turbo up to 4.2GHz). Fusing 4x NVIDIA QUADRO P5000 MXM with 4x LAN expansions, 4x USB and 2x COM for device connects ability and 600W Military Standard 18V~36V DC-In power module, F1-30G4 is an optimum choice for high performance computing, demanding graphics applications, GPU-accelerated data processing, yet ruggedized enough for harsh environments.



F1-30G4 is driven by Intel 9th generation Xeon® E-2276ML processor soldering onboard which is an extremely compact fanless rugged airborne computer. Coffee Lake-H processor supports outstanding CPU and graphics performance, providing hexa core up to 4.2GHz turbo frequency.



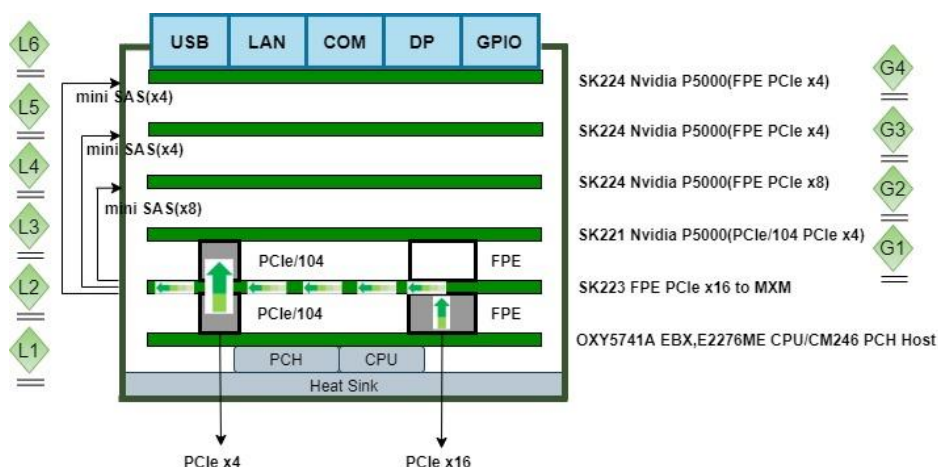
EBX with 4 x Quadro P5000 MXM GPU

F1-30G4 is regarded as a StackPC with rugged stackable PCIe/104 & FPE connectors featuring flexibility and modularity. This combination allows to minimize the numbers of wired connections inside the enclosure while achieving a goal to keep high performance computing and anti-vibration & shock capability.

Following PCIe/104 type II and FPE expansion standard , F1-30G4 is able to build a stackable architecture with dense GPU for mission computing, demanding graphics generation applications, this platform can be extended up to 4 GPU in one CPU host module.

How to extend dense GPU?

- PCIe/104 type II (G1)
Powered by PCH-CM246, PCIe/104 type II bring PCIe x4 bus to GPU, such as SK221 carrier module to extend the first Quadro P5000 GPU .
- FPE (G2~G4)
Xeon E-2276ML processor belonging to Coffee-Lake (H) platform, which can provide FPE up to PCIe x16 signal upstream supporting three more Quadro P5000 MXM (G2~G4) via SK223 (FPE to Mini SAS riser card) and SK224 (Mini SAS to MXM riser card).



MIL-STD-1275/704 Power Supply

F1-30G4 is designed with MIL-STD-1275/704, protecting against vehicle/aircrafts voltage surges, spikes and transients, and even electromagnetic interference. This characteristic is well suited for the strictest military requirement and delivers optimal performance in harsh conditions.

MIL-STD-461E	<ul style="list-style-type: none"> ● CE102 basic, curve, 10kHz-30MHz ● RE102-4, (1.5MHz)-30MHz-5GHz ● RS103, 80MHz-GHz
EN55011 EN55032 CISPR32	Class A <ul style="list-style-type: none"> ● Contact Discharge Level 4(8Kv) ● Air Discharge Level 4(15Kv)
IEC61000-4-2	<ul style="list-style-type: none"> ● Contact Discharge Level 4(8Kv) ● Air Discharge Level 4(15Kv)
IEC61000-4-3	<ul style="list-style-type: none"> ● 12V/m: (80 MHz~1.0 GHz) ● 36V/m: (1.4~2.0GHz) ● 1.2V/m: (2.0~2.7GHz) ● 80% Amplitude modulated
IEC61000-4-4	<ul style="list-style-type: none"> ● Level 4(4 KV) ● Repetition Rate: 5KHz and 100 KHz
IEC61000-4-5	<ul style="list-style-type: none"> ● Line to Line : Level 4(2KV) ● Line to Earth : Level 4(4KV)



SK711, the power board adopted by F1-30G4, supports input range from 18V to 36V. Compliant with MIL-STD 1275/461, SK711 performs as an ideal converter module for severe environment. The Cosel Hi-Rel DC/DC CONVERTER also provides, Output Over Current Protection (OCP), Output Overvoltage Protection (OVP) and Over Temperature Protection (OTP) to made stability and safety. Module Compliance with MIL-STD-461C/D/E Standards. Furthermore, with parallel design, two SK711 combining can generate double power of 300W, supporting prominent system performance.

COSEL

EMI/EMS Test Result

Jun 25, 2018
Cosel Co., Ltd.
OS Design Dept.

Model Name : CHS400 series

The EUT is operated with following condition during EMI/EMS test.
Input Voltage : Rated Voltage
Output Current : Rated Current
Ambient Temperature : 25°C ± 10°C

Approved : Takayuki Fukuda
Prepared : Eisui Ushitani
Eisui Ushitani

#	Subject	Reference standard	Test Condition	Criteria *1	Result
1	Conducted Emission		EN55011, EN55032 Class A CISPR 32 Class A FCC Part15 Class A VCCI Class A Testing circuitry Fig. 1	-	Pass
2	Radiated Emission		EN55011, EN55032 Class A CISPR 32 Class A FCC Part15 Class A VCCI Class A Testing circuitry Fig. 1	-	Pass
3	Electrostatic discharge immunity test	IEC61000-4-2	Contact Discharge : Level 4 (8kV) Air Discharge : Level 4 (15kV) Testing circuitry Fig. 1	A	Pass
4	Radiated, radio-frequency, electromagnetic field immunity test	IEC61000-4-3	12V/m : (80MHz~1.0GHz) 3.6V/m : (1.4~2.0GHz) 1.2V/m : (2.0~2.7GHz) 80% Amplitude modulated Testing circuitry Fig. 1	A	Pass
5	Electrical fast transient / Burst immunity test	IEC61000-4-4	Level 4 (4kV) Repetition Rate : 5kHz and 100kHz Testing circuitry Fig. 1	A	Pass
6	Surge immunity test	IEC61000-4-5	Line to Line : Level 4 (2kV) Line to Earth : Level 4 (4kV) Testing circuitry Fig. 2	A	Pass

*1 Definition of Criteria

Criteria A : (1) No output voltage drop with control circuit failure.
(2) No protection circuit and other circuit malfunction.

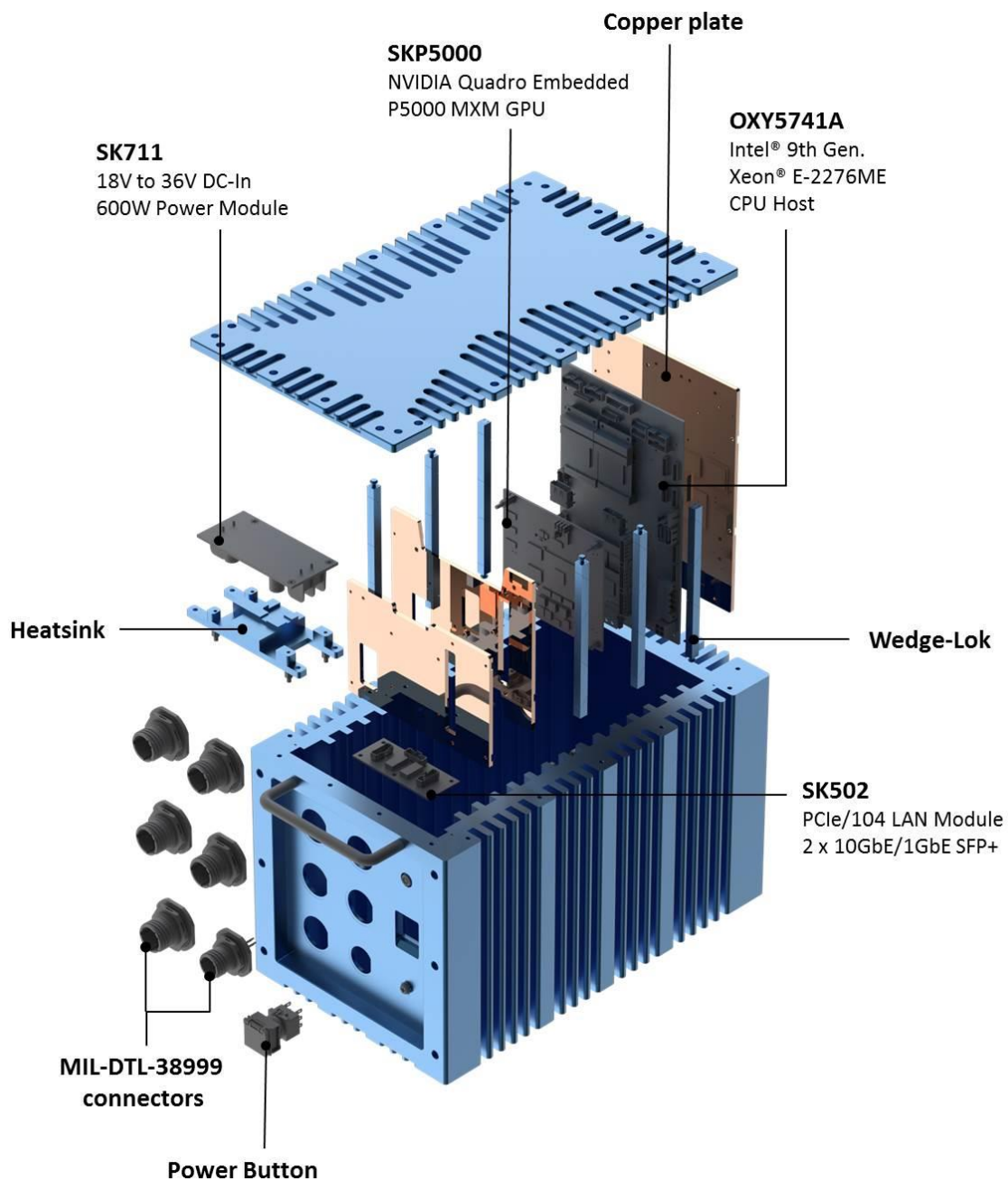
Criteria B : (1) The output voltage is temporary degradation of performance. It recovers its normal performance without operator intervention.
(2) No protection circuit and other circuit failure.

<Notes>

Power supply can't determine the final equipment performance against EMS test. Therefore we confirmed the output voltage performance only. EMS test should be performed as a final product.

Thermal Solution—Conductive Cooling

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-Lock mechanism secures inside the chassis, coming up with a thermal interface.



Specifications

SYSTEM

Model	F1-30G4
CPU Type	Intel® Xeon® E-2276ML (12M Cache, up to 2.0/4.2 GHz)
Memory type	4 x DDR4 2666MHz up to 128GB
GPU Type	4 x NVIDIA Quadro Embedded P5000 MXM (2048 CUDA cores, 16GB GDDR5 each GPU)

STORAGE

Storage(1)	1 x M.2 (M-key, type:2280, SATA/PCIe 3.0x4 NVMe)
Storage(2)	Support up to 4x SATAIII (RAID 0,1,5) SSD backup storage

I/O

COM	2
Ethernet	4
USB	2
DVI	1
DC-in	1
Power Button	1 x Waterproof Button with Backlight
Connectors	Amphenol D38999 Connectors or M12 Connectors by request

MECHANICAL

Housing	Aluminum
Weight	16 Kg (35.24 lb)
Ingress Protection	IP65
Dimension (W x H x D)	125 x 250 x325mm

POWER

Input Voltage	DC-IN 18V~36V, 600W Military Standard Power Module with Cosel Solution
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ENVIRONMENTAL

Operating Temp.	-40°C to +55°C
Storage Temp.	-40°C to +85°C
Relative Humidity	Up to 95%RH @40°C, non-condensing
Ingress Protection	Designed for compliance with IP65, MIL-STD-810G

TEST STANDARD

EMI/EMC	Designed to meet MIL-STD-461
Temperature	Designed to meet MIL-STD-810
Vibration & Shock	Designed to meet MIL-STD-810

STACKABLE MODULE

SK506	PCIe/104(FPE module) Expand 4 extra 10/100/1000 mbps Gigabit Ethernet
SK502	PCIe/104(FPE) Dual 10GbE SFP+ module
SK509	PCIe/104(FPE) I/O module
SK220	PCIe/104(FPE) MXM Graphics Card for 4 DisplayPort Module Support NVIDIA® GTX1080M/QUADRO P5000 Graphics Card
SK401	Storage carrier with one 2.5" HDD/SSD socket and two mSATA socket PCIe/104 SSD/mSATA/Mini PCIe Carrier, support 1x 2.5" SSD + 2x mini PCIe LAN module (MT321/MT321R)

Ordering Information

F1-30G4

SFF Rugged PCIe/104 computer with Intel®9th Gen.® Xeon® E-2276ML processor, 4 x NVIDIA Quadro Embedded P5000 MXM, DC-IN 18V~36V, Operating Temp. -40°C to +55°C

Dimension



APPEARANCE

