



# **STAR LAKE**

**COM EXPRESS TYPE 6 + GPU EMBEDDED SYSTEM**



- **High-Performance Intel CORE & Xeon in a ruggedized small form factor**
- **COM Express Type 6 CPU Modular**
- **Standard MXM Version 3.1 Support**
- **PCI/104 Express Expansion Slot for Modular Open Structure**
- **Extreme Temperature Support -40~+85 degree**

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## Introduction

COM Express, a computer-on-module (COM) form factor, is a highly integrated and compact PC that can be used in a design application much like an integrated circuit component. The COM Express Module integrates core CPU and memory functionality, the common I/O of a PC/AT, USB, audio, graphics (PEG), and Ethernet.

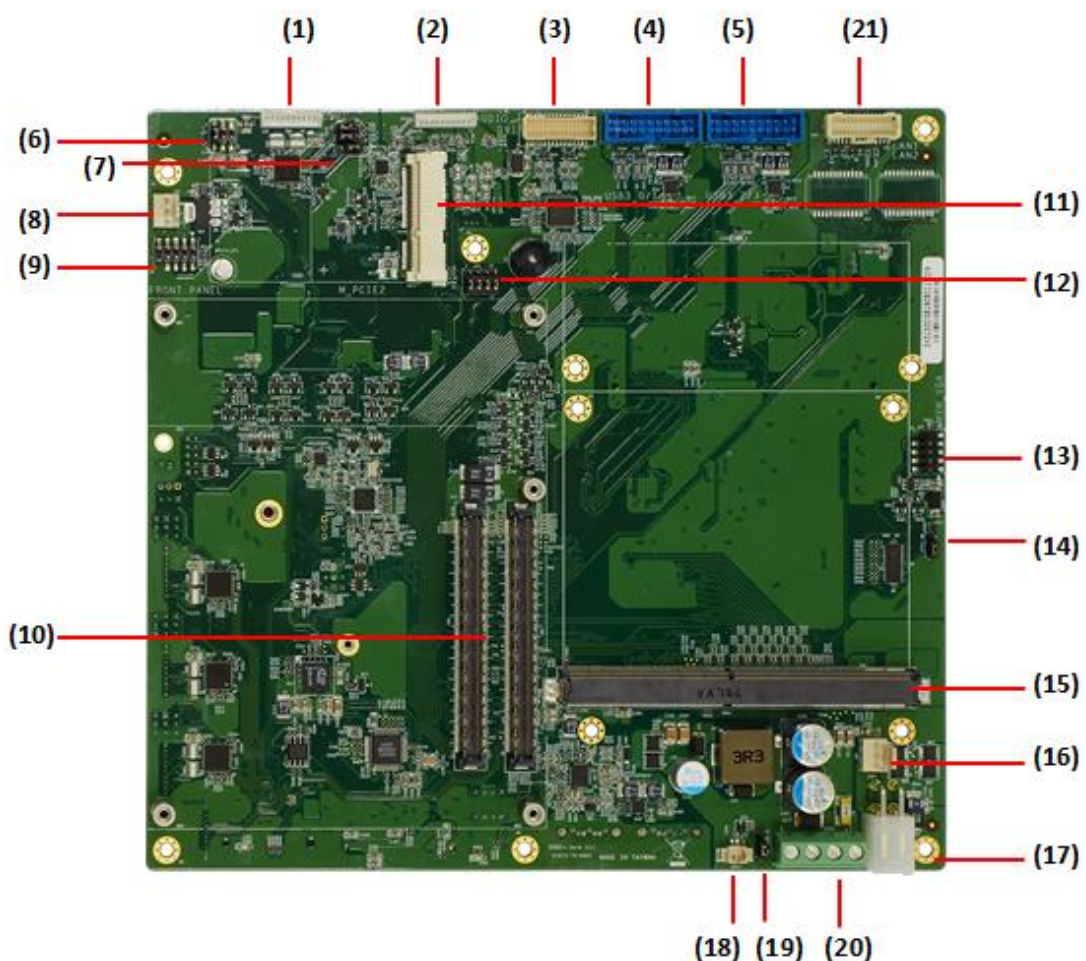
SK515-T6CL features a range of Intel processors, up to the latest Intel Core series. SK515-T6CL are built to operate in harsh environmental conditions, the operating temperatures as low as -40°C to as hot as 85°C. From low power consumption to high performance processing power, SK515-T6CL are built to suit a wide range of computing applications from signal processing to unmanned vehicles and more.

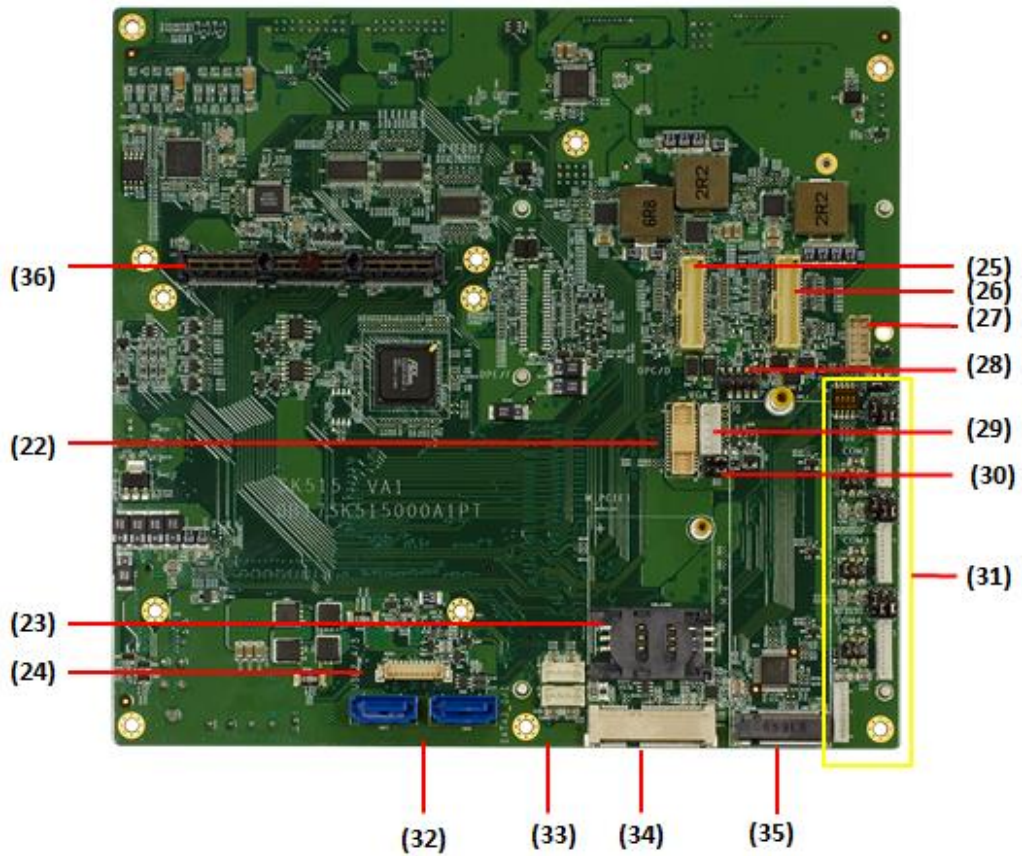
## Key Features of SK515-T6KL

(1) Efficiency product design

(2) Fast system integration

(3) Rich Expansion Slot





1	J26
2	AUDIO (MIC-In/LINE-Out)
3	J27
4	JUSB3_1
5	JUSB3_2
6	JP7
7	JP8,JP9,JP10
8	J22
9	J23
10	CN1, CN2 (COM Express connector)
11	CN15 (miniPCle)
12	JP6
13	J20
14	JP30
15	MXM1
16	J25

17	CN21
18	JBAT1
19	JP28
20	DCIN
21	LAN1 (LAN1/LAN2)
22	J10
23	SIM_CARD1
24	J15
25	J18 (DPC/D)
26	J17 (DPA/B)
27	J9
28	J8
29	J11
30	JP23, JP24
31	See page 8~9
32	CN26, CN27
33	J2, J3
34	CN14
35	CN3
36	STACKPC1

## GPU Table

GPU	CUDA Cores
Quadro	P3000 (1280 CUDA Cores, 75W) P5000 (2560 CUDA Cores, 100W) RTX3000 (1920 CUDA Cores, 80W) RTX5000 (3072 CUDA Cores, 110W)
GeForce	RTX2060 (2176 CUDA Cores, 175W) GTX1080 (XXX CUDA Cores, 180W) GTX1660S (1048 CUDA Cores, 95W) GTX1050Ti (768 CUDA Cores, 75W)

## Description of Key Features

### (1) Efficiency product design

In order to design all kinds of products in the shortest time, the COM Express provide a better way to improvement the process. SK515-T6CL does not only provide the COM Express carrier board, but also MXM, PCIe, M.2 and mimi PCI slot, will make the preliminary verification work more efficient. The solutions include:

- Mimi PCIe Expansion: 2x full size mimi PCIe (1 with mSATA support)
- M.2 Expansion: 1x 2280 M key (SATA only)
- PCIe/104 Expansion: 4x PCI x1, 1x PCIe x4, 5 xUSB, 1 LPC, 1X SPI

### (2) Fast system integration

SK515-T6CL is the fanless design for pass environment test, ex: IP65, MIL-STD810. No need to find the problem until the end, and confirm the design direction as soon as possible.

At the same time, SK515-T6CL use the mezzanine standard, mainly is used in industrial computers. Being mezzanines, they are always plugged on a carrier PCB that supports this format. The modules communicate with their carrier over a dedicated bus, and can have all kinds of special functions.

All I/O signals are mapped to two high densities, low profile connectors on the bottom side of the module. COM Express employs a mezzanine-based approach. The COM modules plug into a baseboard that is typically customized to the application. Over time, the COM Express mezzanine modules can be upgraded to newer, backwards-compatible versions. COM Express is commonly used in Industrial, Military/Aerospace, Gaming, Medical, Transportation, IoT, and Computing embedded applications.

### (3) Rich Expansion Slot

SK515-T6CL provides rich expansion to make the whole solutions easier. We could use PCIe 104 related product SK506, SK303, SK1050 and SK1660S

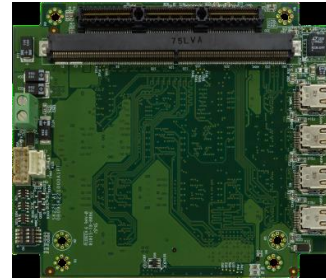
## MXM

### SK220



- PCIe/104 FPE form factor
- Utilizes PCIe x16 and PCIe x4, x1 link
- 1VGA & 6 Mini DisplayPort
- MXM 3.0 and 3.1 graphic card support
- Type A and Type B MXM graphic card and support
- Operating Temp: -40°C to 85°C

### SK221



- StackPC and PCIe/104 Complaint
- Utilizes PCIe x16 and x4 Link
- 1 x VGA & 4 x Mini DisplayPort Module
- 12V DC Input
- MXM 3.0 and 3.1 Graphic card support
- Type A and Type B MXM Graphic card support
- Support up to NVIDIA GeForce 1050Ti/1650/1660S , RTX2060
- Operating Temp. -40°C to 85°C

## NIC

SK506



- StackPC-FPE form factor
- PCIe/104 stackable bus structure
- Reliable Ethernet technology from Intel i350-AM4 controllers
- total 6 independent LAN connections (2 from host board, 4 from Intel controllers)
- Flexible options for Ethernets through RJ45 or 10 pin-headers
- High-performing bridgeless design supporting PCI Express Gen 2.1 5GT/s
- Extended temperature -40°C to 85°C

SK502



- StackPC-FPE form factor
- PCIe/104 stackable bus structure
- Reliable Ethernet technology from Intel i350-AM4 controllers
- total 6 independent LAN connections (2 from host board, 4 from Intel controllers)
- Flexible options for Ethernets through RJ45 or 10 pin-headers
- High-performing bridgeless design supporting PCI Express Gen 2.1 5GT/s
- Extended temperature -40°C to 85°C



## COM

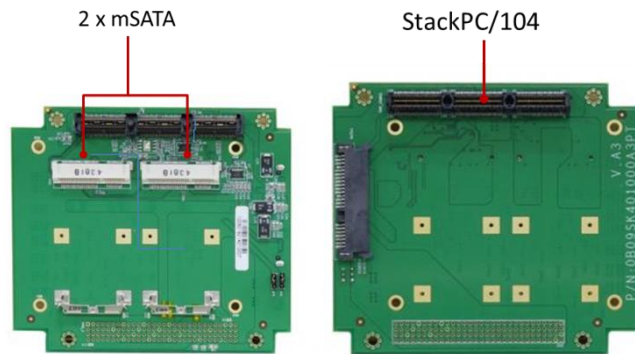
### SK303



- PCI/104-Express, PCI & PCIe connectors (w/StackPC design)
- PCIe/104 stackable bus structure
- PCIe to PCI adapter function
- COM: 4 x RS232/422/485 with 5V/12V selectable and isolation function
- Extended Temp.: -40°C to 85°C

## Storage

### SK401



- PCIe/104 stackable bus structure
- Supports 1 x 2.5" SSD, 2 x Mini PCIe slots
- Supports 2 x mSATA SSD slot, compatible with JEDEC MO-300B
- SATAII interface supports 1.5Gbps/3.0Gbps
- Reserve PCI/104 connector for different stacking criteria
- Extended temperature -40°C to 85°C

# Specifications

## PROCESSOR & SYSTEM

COM Express CPU Module (Type 6)	Intel® Xeon® E-2276ME (CoffeeLake 9th , 6 Cores/12 Threads, 12M Cache, up to 4.50 GHz), 45W
	Intel® Xeon® E-2276ML (CoffeeLake 9th , 6 Cores/12 Threads, 12M Cache, up to 4.20 GHz), 25W
	Intel® Core™ i7-9850HE (CoffeeLake 9th , 6 Cores/12 Threads, 9M Cache up to 4.40 GHz), 45W
	Intel® Core™ i7-9850HL (CoffeeLake 9th , 6 Cores/12 Threads, 9M Cache up to 4.10 GHz), 25W

## GPU

Quadro	P3000 (1280 CUDA Cores, 75W)
	P5000 (2560 CUDA Cores, 100W)
	RTX3000 (1920 CUDA Cores, 80W)
	RTX5000 (3072 CUDA Cores, 110W)
GeForce	RTX2060 (2176 CUDA Cores, 175W)
	GTX1080 (XXX CUDA Cores, 180W)
	GTX1660S (1048 CUDA Cores, 95W)
	GTX1050Ti (768 CUDA Cores, 75W)

## ETHERNET

LAN	Dual Gigabit (10/100/1000) Ports 1x Intel i210IT, 1 x from COM Express
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## INTERNAL I/O

MXM	1 (Socket)
LAN	2 (Pin header)
USB3.0	2 (Pin header)
SATA Port	2 (up to 6Gb/s)(Pin header)
SATA Power	2 (Pin header)
DVI	1 (Pin header)
MXM VGA	1 (Pin header)
MXM DC IN	1 (Pin header)
MXM DP	2 (Pin header)
MB DC IN	1 (Pin header)

LVDS	1 (Pin header)
LVDS Backlight	1 (Pin header)
AUDIO	1 (Pin header)
COM (RS232/422/485)	4 (Pin header)
USB 2.0	2 (Pin header)
DIO	8 Bit (4DI/4DO) (Pin header)
Battery Header	1 (Pin header)
eSPI/LPC Header	1 (Pin header)

### **EXPANSION SLOT**

MXM	1 (MXM3.1 Type B)
PCIe/104	1
mPCIe	2 x Full-size mini PCIe (USB+PCIe) ; 1 x with mSATA supported
SIM Slot	1
M.2	1XM.2 2280 M-Key Slot (SATA only)

### **POWER MANAGEMENT**

ACPI	ACPI 3.0
Sleep State	S0, S1, S4, S5

### **MECHANICAL AND ENVIRONMENTAL**

Form Factor	Proprietary
Power Type	9~36V DC IN(For System, 4P Terminal Block) ; 12V DC IN(For MXM, ATX 4P)
Dimension	190 mm x 185 mm (Plan)
Operating Temperature	- 40°C ~ 85°C
Storage Temperature	- 40°C ~ 85°C
Relative humidity	10% to 90%, non-condensing

### **ACCESSORIES**

SINK+ FAN Kit	CPU(SINK)+MXM(SINK+FAN)
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### **STANDARD COMPLIANCE**

Standard Compliance	CE/FCC
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## Ordering Information

MODEL NAME	DESCRIPTION
SK515-T605Q01	CPU Board : i7-9850HL / MXM GPU : Quadro P3000
SK515-T605Q02	CPU Board : i7-9850HL / MXM GPU : Quadro P5000
SK515-T605Q03	CPU Board : i7-9850HL / MXM GPU : Quadro RTX3000
SK515-T605Q04	CPU Board : i7-9850HL / MXM GPU : Quadro RTX5000
SK515-T605G01	CPU Board : i7-9850HL / MXM GPU : RTX2060S
SK515-T605G02	CPU Board : i7-9850HL / MXM GPU : GTX1080
SK515-T605G03	CPU Board : i7-9850HL / MXM GPU : GTX1660S
SK515-T605G04	CPU Board : i7-9850HL / MXM GPU : GTX1050Ti
SK515-T606Q01	CPU Board : i7-9850HE / MXM GPU : Quadro P3000
SK515-T606Q02	CPU Board : i7-9850HE / MXM GPU : Quadro P5000
SK515-T606Q03	CPU Board : i7-9850HE / MXM GPU : Quadro RTX3000
SK515-T606Q04	CPU Board : i7-9850HE / MXM GPU : Quadro RTX5000
SK515-T606G01	CPU Board : i7-9850HE / MXM GPU : RTX2060S
SK515-T606G02	CPU Board : i7-9850HE / MXM GPU : GTX1080
SK515-T606G03	CPU Board : i7-9850HE / MXM GPU : GTX1660S
SK515-T606G04	CPU Board : E3-1505L / MXM GPU : GTX1050Ti
SK515-T607Q01	CPU Board : E-2276ML / MXM GPU : Quadro P3000
SK515-T607Q02	CPU Board : E-2276ML / MXM GPU : Quadro P5000
SK515-T607Q03	CPU Board : E-2276ML / MXM GPU : Quadro RTX3000
SK515-T607Q04	CPU Board : E-2276ML / MXM GPU : Quadro RTX5000
SK515-T607G01	CPU Board : E-2276ML / MXM GPU : RTX2060S
SK515-T607G02	CPU Board : E-2276ML / MXM GPU : GTX1080
SK515-T607G03	CPU Board : E-2276ML / MXM GPU : GTX1660S
SK515-T607G04	CPU Board : E-2276ML / MXM GPU : GTX1050Ti
SK515-T608Q01	CPU Board : E-2276ME / MXM GPU : Quadro P3000
SK515-T608Q02	CPU Board : E-2276ME / MXM GPU : Quadro P5000
SK515-T608Q03	CPU Board : E-2276ME / MXM GPU : Quadro RTX3000
SK515-T608Q04	CPU Board : E-2276ME / MXM GPU : Quadro RTX5000
SK515-T608G01	CPU Board : E-2276ME / MXM GPU : RTX2060S
SK515-T608G02	CPU Board : E-2276ME / MXM GPU : GTX1080
SK515-T608G03	CPU Board : E-2276ME / MXM GPU : GTX1660S
SK515-T608G04	CPU Board : E-2276ME / MXM GPU : GTX1050Ti

# Block Diagram

