# SKS15-T6KL

## 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**

# INDEX

**7STARLAKE**

# 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-T6KL features a range of Intel processors, up to the latest Intel Core series. SK515-T6KL 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-T6KL are built to suit a wide range of computing applications from signal processing to unmanned vehicles and more.
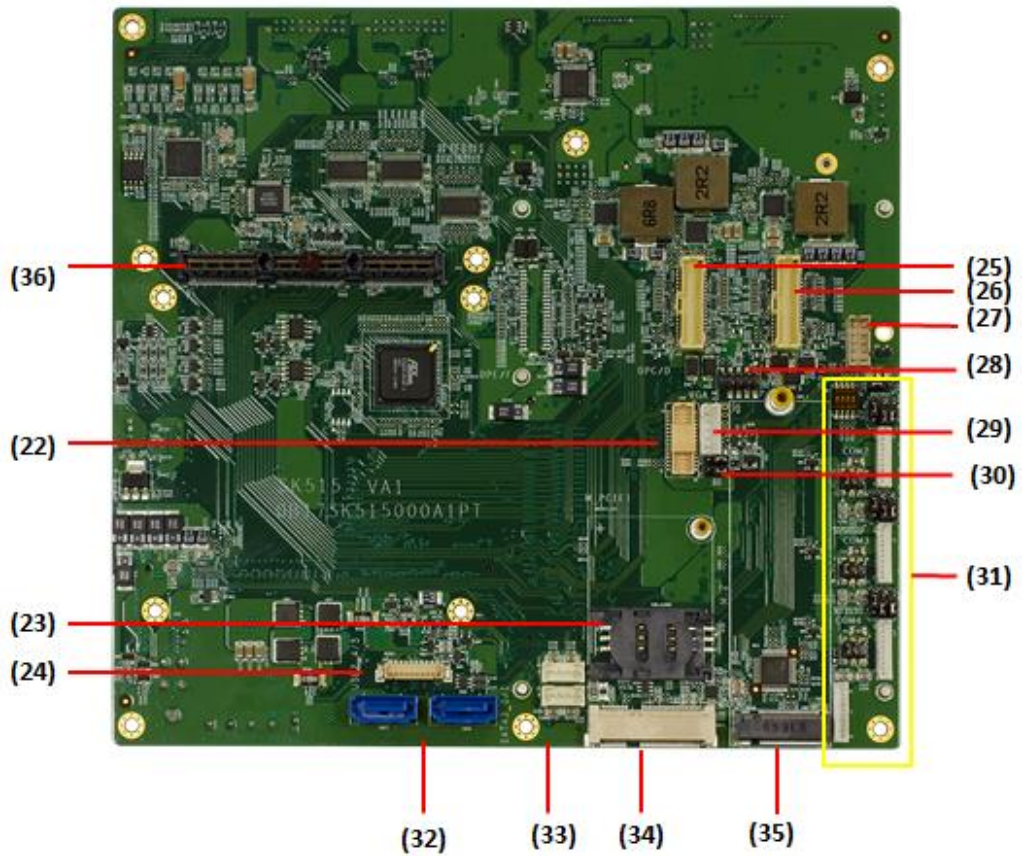
## Key Features of SK515-T6KL

**(1) Efficiency product design**          **(2) Fast system integration**

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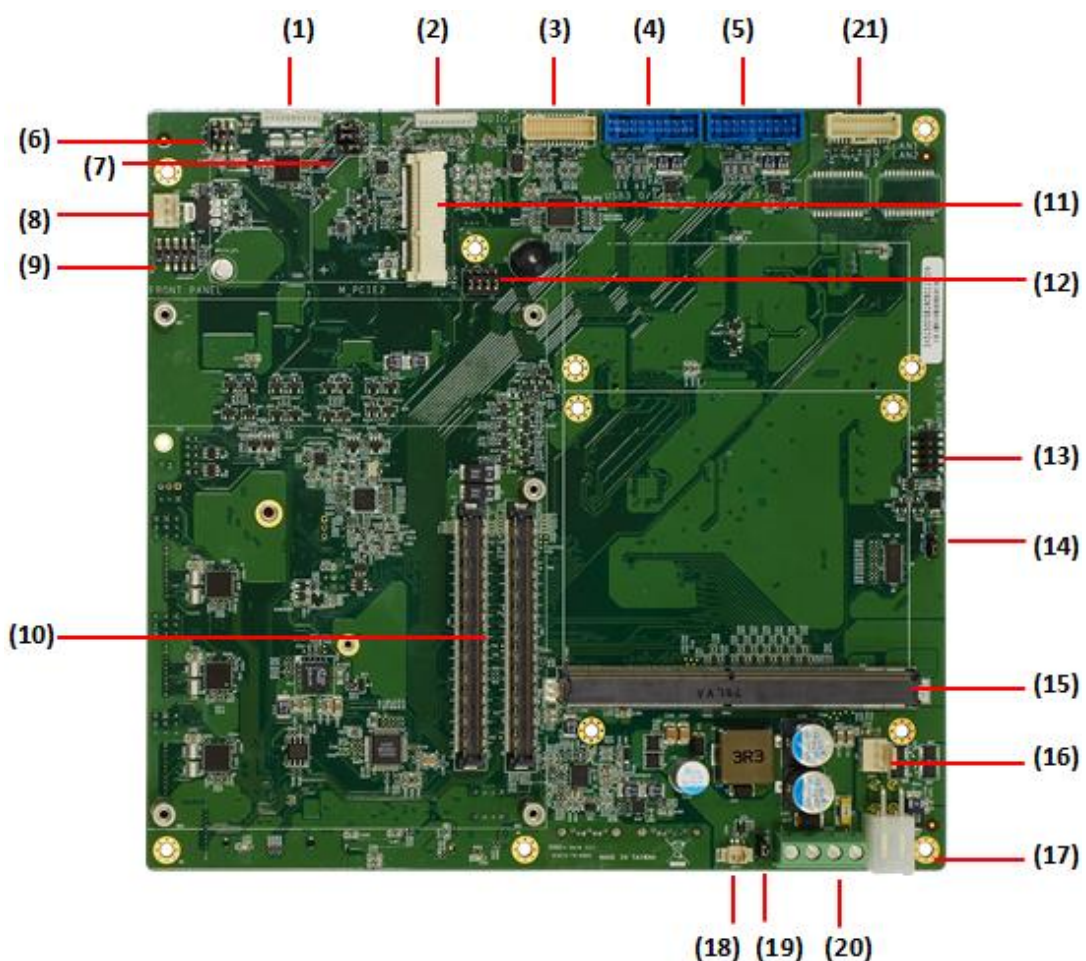
| 1 | J26 |
|---|---|
| 2 | AUDIO (MIC-In/LINE-Out) |
| 3 | J27 |
| 4 | JUSB3_1 |
| 5 | JUSB3_2 |
| 6 | JP7 |
| 7 | JP8,JP9,JP10 |
| 8 | J22 |
| 9 | J23 |
| 10 | CN1, CN2 (COM Express connector) |
| 11 | CN15 (miniPCIe) |
| 12 | JP6 |
| 13 | J20 |
| 14 | JP30 |
| 15 | MXM1 |
| 16 | J25 |

| 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) <br> P5000 (2560 CUDA Cores, 100W) <br> RTX3000 (1920 CUDA Cores, 80W) <br> RTX5000 (3072 CUDA Cores, 110W) |
| GeForce | RTX2060 (2176 CUDA Cores, 175W) <br> GTX1080 (XXX CUDA Cores, 180W) <br> GTX1660S (1048 CUDA Cores, 95W) <br> 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-T6KL 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-T6KL 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-T6KL 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-T6KL provides rich expansion to make the whole solutions easier. We could use PCIe 104 related product SK506, SK303, SK1050 and SK1660S
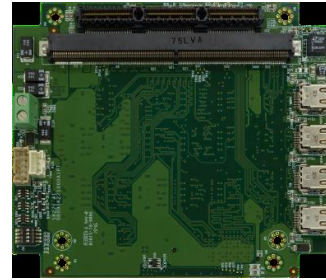
| MXM | |
| --- | --- |
| SK220 | SK221 |
|  <ul><li>PCIe/104 FPE form factor</li><li>Utilizes PCIe x16 and PCIe x4, x1 link</li><li>1VGA & 6 Mini DisplayPort</li><li>MXM 3.0 and 3.1 graphic card support</li><li>Type A and Type B MXM graphic card and support</li><li>Operating Temp: -40℃ to 85℃</li></ul> |  <ul><li>StackPC and PCIe/104 Complaint</li><li>Utilizes PCIex16 and x4 Link</li><li>1 x VGA & 4 x Mini DisplayPort Module</li><li>12V DC Input</li><li>MXM 3.0 and 3.1 Graphic card support Type A and Type B MXM Graphic card support</li><li>Support up to NVIDIA GeForce 1050Ti/1650/1660S , RTX2060</li><li>Operating Temp. -40℃ to 85℃</li></ul> |

| NIC | |
|---|---|
| SK506 | SK502 |
|  |  |
| • StackPC-FPE form factor<br>• PCIe/104 stackable bus structure<br>• Reliable Ethernet technology from Intel i350-AM4 controllers<br>• total 6 independent LAN connections (2 from host board, 4 from Intel controllers)<br>• Flexible options for Ethernets through RJ45 or 10 pin-headers<br>• High-performing bridgeless design supporting PCI Express Gen 2.1 5GT/s<br>• Extended temperature -40°C to 85°C | • StackPC-FPE form factor<br>• PCIe/104 stackable bus structure<br>• Reliable Ethernet technology from Intel i350-AM4 controllers<br>• total 6 independent LAN connections (2 from host board, 4 from Intel controllers)<br>• Flexible options for Ethernets through RJ45 or 10 pin-headers<br>• High-performing bridgeless design supporting PCI Express Gen 2.1 5GT/s<br>• 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
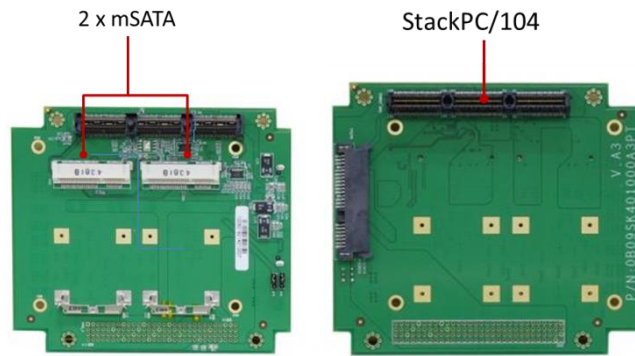


- PCIe/104 stackable bus structure
- Supports 1 x 2.5" SSD, 2 x Mini PCIe slots
- Supports 2 x mSATA SSD slot, compatible with JEDEC MO-300B
- SATAII interface supports 1.5Gbps/3.0Gbps
- Reserve PCI/104 connector for different stacking criteria
- Extended temperature -40°C to 85°C

# Specifications

## Processor & System

| COM Express CPU Module (Type 6) | Intel® Core™ i7-7820EQ (KabyLake 7th Gen, 4 Cores/8 Threads, 8M Cache, up 4.00 GHz), 45W |
|---|---|

## 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 |

## 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℃ ~ 85℃ |
| Storage Temperature | - 40℃ ~ 85℃ |
| Relative humidity | 10% to 90%, non-condensing |

## Accessories

| | |
|---|---|
| SINK+ FAN　Kit | CPU(SINK)+MXM(SINK+FAN) |

## Standard Compliance

| | |
|---|---|
| Standard Compliance | CE/FCC |

## Ordering Information

| Model Name | Description |
|---|---|
| SK515-T604Q01 | CPU Board : i7-6820EQ / MXM GPU : Quadro P3000 |
| SK515-T604Q02 | CPU Board : i7-6820EQ / MXM GPU : Quadro P5000 |
| SK515-T604Q03 | CPU Board : i7-6820EQ / MXM GPU : Quadro RTX3000 |
| SK515-T604Q04 | CPU Board : i7-6820EQ / MXM GPU : Quadro RTX5000 |
| SK515-T604G01 | CPU Board : i7-6820EQ / MXM GPU : RTX2060S |
| SK515-T604G02 | CPU Board : i7-6820EQ / MXM GPU : GTX1080 |
| SK515-T604G03 | CPU Board : i7-6820EQ / MXM GPU : GTX1660S |
| SK515-T604G04 | CPU Board : i7-6820EQ / MXM GPU : GTX1050Ti |

# Block Diagram