

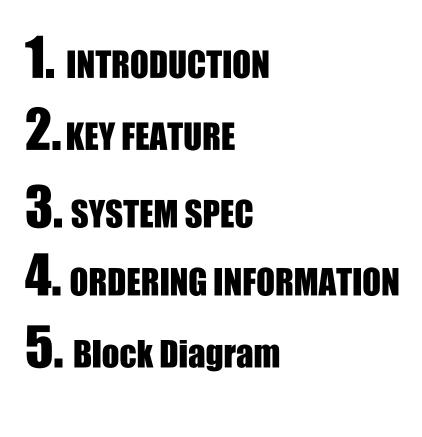
# *513- 1760*

COM EXPRESS TYPE7 + GPU EMBEDDED System



- High-End CPUs with latest generation x86 processors in a ruggedized small form factor
- Up To 6 Display port
- 2 x VGA, 1 x LVDS, 4 x COM, 6 x USB, 2 2 x mini PCIe, 1 x M.2, 2 x SATA
- 9-36V DC-IN

## INDEX

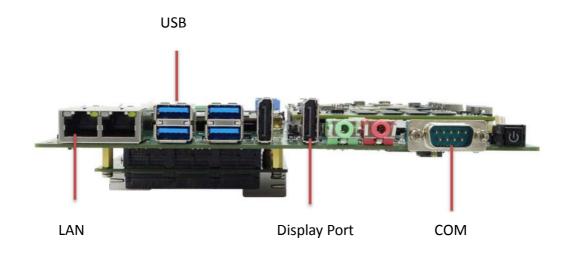




## Instructions

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.

SK513 feature a range of Intel processors, up to the latest Intel Core series. SK513 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, SK513 are built to suit a wide range of computing applications from signal processing to unmanned vehicles and more.



## **Key Features of SK513**

(1)Efficiency product design

(3) Rich Expansion Slot

(2) Fast system integration







#### **GPU Products List**

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. SK513 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



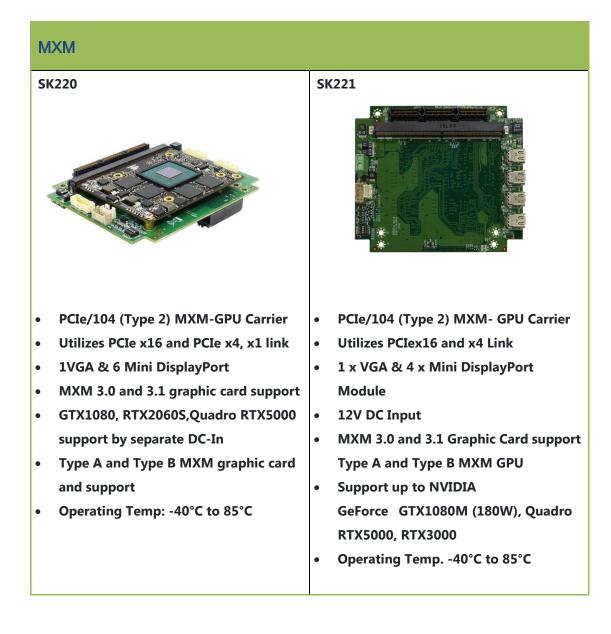
#### (2) Fast system integration

SK513 is the fanless design for pass environment test, ex: IP65, MIL-STDG. No need to find the problem until the end, and confirm the design direction as soon as possible. At the same time, SK513 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

SK-513 provides rich expansion to make the whole solutions easier.





#### NIC

#### SK506

SK502

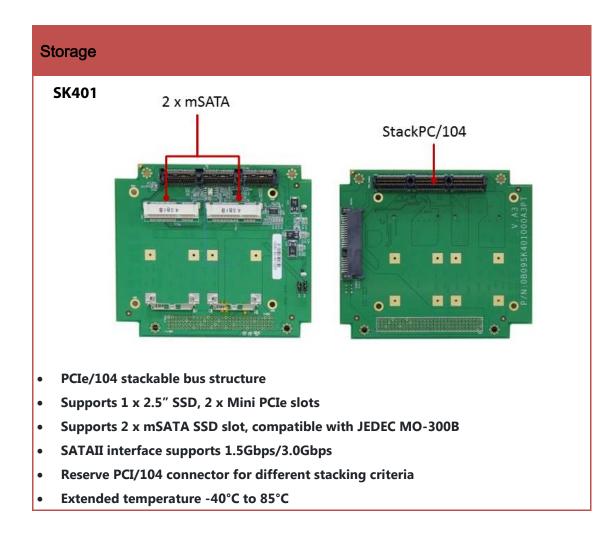


- StackPC-FPE form factor
- PCIe/104 stackable bus structure
- Reliable Ethernet technology from
  Intel i350-AM4 controllers
- total 6 independent LAN connections (2 from host board, 4 from Intel controllers)
- Flexible options for Ethernets through RJ45 or 10 pin-headers
- High-performing bridgeless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



- Intel® X710-BM2 Controller
- 2 10GbE/1GbE SFP+ ports
- PCIe Gen.3 x4 host interface
- Rugged Stackable PCIe/104 form factors
- Supports 10GBASE-SR / 10GBASE-LR / 10GBASE-DAC / 10GBASE –GBIC module
- Supports SR-IOV based virtualization





## **Specifications**

COM ExpressIntel® Xeon® D-1577 (Broadwell-D D1577, 16 Cores/32 Threads, 24M Cache, up to 2.10 GH2), 45W(Type 7)Intel® Xeon® D-1559 (Broadwell-D D1559, 12 Cores/24 Threads, 18M Cache, up to 2.10 GH2), 45WIntel® Xeon® D-1539 (Broadwell-D D1559, 8 Cores/16 Threads, 12M Cache, up to 2.20 GH2), 35WGPUQuadroP5000 (1280 CUDA Cores, 75W)RTX5000 (1920 CUDA Cores, 100W)RTX5000 (1920 CUDA Cores, 100W)GFOCRTX000 (1020 CUDA Cores, 100W)GFINOWRTX000 (1020 CUDA Cores, 100W)GFINOW (XXX CUDA Cores, 100W)GTX1080 (XXX CUDA Cores, 175W)GTX1080 (XXX CUDA Cores, 175W)CTX1080 (XXX CUDA Cores, 75W)ETHERNETLANDual Gigabit (10/100/1000) Ports 1 x Intel 2101T, 1x from COM ExpressREAR I/OUSB4 x USB 3.0LAN1 x RS232/422/485Audio1 x RS232/422/485Audio1 (Socket)STAP Power2 (Up to GOb/s)(Pin header)MXM1 (Socket)STAP Power2 (Up to GOb/s)(Pin header)MXM DCIN1 (Pin header)MXM DCIN1	PROCESSOR &	System
(Type 7)Intel® Xeon® D-1559 (Broadwell-D D1559, 12 Cores/24 Threads, 18M Cache, up to 2.10 GHz), 45WIntel® Xeon® D-1539 (Broadwell-D D1559, 8 Cores/16 Threads, 12M Cache, up to 2.20 GHz), 35WGPUQuadroP3000 (1280 CUDA Cores, 75W) P5000 (2560 CUDA Cores, 100W) RTX5000 (1920 CUDA Cores, 100W) RTX5000 (3072 CUDA Cores, 10W) GFX1080 (XXX CUDA Cores, 175W) GTX1660S (1048 CUDA Cores, 175W) GTX1060S (1048 CUDA Cores, 75W) GTX1050Ti (768 CUDA Cores, 75W) GTX1050Ti (768 CUDA Cores, 75W) TX1050Ti (768 CUDA Cores, 75W)ETHERNET LANLANDual Gigabit (10/100/1000) Ports 1x Intel i210T, 1 x from COM ExpressREAR I/OUSB4 x USB 3.0LAN2 x R145Serial Port1 x R5232/422/485Audio1 x 3.5mm Audio Jacks (1 x MIC-IN, 1 x LINE-OUT)Display2 x DPINTERNAL I/OMXM1 (Socket)SATA Port2 (up to 6Gb/s)(Pin header)MXM DC IN1 (Pin header)USB 2.02 (Pin header)UVDS Backlight1 (Pin header)USB 2.02 (Pin header)UND8 Bit (4D1/4DO) (Pin header)<	COM Express	Intel® Xeon® D-1577 (Broadwell-D D1577, 16 Cores/32 Threads, 24M Cache, up
to 2.10 GHz), 45W Intel® Xeon® D-1539 (Broadwell-D D1559, 8 Cores/16 Threads, 12M Cache, up to 2.20 GHz), 35W GPU Quadro P3000 (1280 CUDA Cores, 75W) P5000 (2560 CUDA Cores, 100W) RTX3000 (1920 CUDA Cores, 100W) RTX3000 (1920 CUDA Cores, 110W) GeForce RTX0500 (2176 CUDA Cores, 175W) GTX10600 (2176 CUDA Cores, 175W) GTX10600 (1042 CUDA Cores, 175W) GTX10600 (1042 CUDA Cores, 15W) GTX10600 (1042 CUDA Cores, 95W) GTX1050Ti (768 CUDA Cores, 75W) ETHERNET LAN Dual Gigabit (10/100/1000) Ports 1x Intel i210IT, 1 x from COM Express REAR I/O USB 4 x USB 3.0 LAN 2 x RJ45 Serial Port 1 x R5232/422/485 Audio 1 x 3.5mm Audio Jacks (1 x MIC-IN, 1 x LINE-OUT) Display 2 x DP INTERNAL I/O MXM 1 (Socket) SATA Port 2 (up to 6Gb/s)(Pin header) SATA Power 2 (Pin header) MXM GA 1 (Pin header) MXM DC IN 1 (Pin header) MXM DDC IN 1 (Pin header) MXM DC IN 1 (Pin header) UVDS 3 (1X10Pin, 2.0Pitch)(Pin header) (RS232/422/485 USB 2.0 2 (Pin header) LVDS Backlight 1 (Pin header) MSD CIN 1 (Pin header) MXD DC 2 (Pin header	CPU Module	to 2.10 GHz), 45W
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2.20 GHz), 35W           GPU           Quadro         P3000 (1280 CUDA Cores, 75W)           P5000 (2560 CUDA Cores, 100W)           RTX3000 (1920 CUDA Cores, 100W)           RTX5000 (3072 CUDA Cores, 110W)           GeForce         RTX2060 (2176 CUDA Cores, 110W)           GeForce         RTX2060 (2176 CUDA Cores, 180W)           GTX1080 (XXX CUDA Cores, 180W)         GTX1050Ti (768 CUDA Cores, 55W)           ETHERNET         Ital Gigabit (10/100/1000) Ports           Ix Intel i210T, 1 x from COM Express         Ital i210T, 1 x from COM Express           REAR I/O         Ital Siz 3.0           LAN         2 x RJ45           Serial Port         1 x RS232/422/485           Audio         1 x S232/422/485           Audio         1 (Socket)           SATA Port         2 (up to 6Gb/s)(Pin header)           SATA Port         2 (up to 6Gb/s)(Pin header)           SATA Port         2 (up to 6Gb/s)(Pin header)           MXM DC IN         1 (Pin header)           MXM DC IN         1 (Pin header)           MXM DC IN         1 (Pin header)           MXM DD IN         1 (Pin header)           MXM DD IN         1 (Pin header)           MXM DD I         1 (Pin header)           UVDS		to 2.10 GHz), 45W
BPU           Quadro         P3000 (1280 CUDA Cores, 75W) P5000 (2560 CUDA Cores, 100W) RTX3000 (1920 CUDA Cores, 100W) RTX5000 (3072 CUDA Cores, 10W)           GeForce         RTX2060 (2176 CUDA Cores, 110W) GTX1080 (XXX CUDA Cores, 180W) GTX1060S (1048 CUDA Cores, 180W) GTX1050Ti (768 CUDA Cores, 180W)           ETHERNET         LAN           LAN         Dual Gigabit (10/100/1000) Ports 1x Intel i210Ti, 1 x from COM Express           REAR I/O         USB           4 x USB 3.0           LAN         2 x RJ45           Serial Port         1 x RS232/422/485           Audio         1 x 3.5mm Audio Jacks (1 x MIC-IN, 1 x LINE-OUT)           Display         2 x DP           INTERNAL I/O         MXM           MXM         1 (Socket)           SATA Power         2 (Pin header)           MXM DC IN         1 (Pin header)           MXM DD         1 (Pin header)           MXM DD         1 (Pin header)           LVDS         1 (Pin header)           LVDS         1 (Pin header)           LVDS         1 (Pin header)           LVDS         2 (Pin header)           USB 2.0         2 (Pin header)           USD 3 (1X10Pin, 2.0Pitch)(Pin header)         (RS232/422/485)           USB 2.0         2 (Pin header) <td></td> <td>Intel® Xeon® D-1539 (Broadwell-D D1559, 8 Cores/16 Threads, 12M Cache, up to</td>		Intel® Xeon® D-1539 (Broadwell-D D1559, 8 Cores/16 Threads, 12M Cache, up to
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REAR I/O           USB         4 x USB 3.0           LAN         2 x RJ45           Serial Port         1 x RS232/422/485           Audio         1 x 3.5mm Audio Jacks (1 x MIC-IN, 1 x LINE-OUT)           Display         2 x DP           INTERNAL I/O         V           MXM         1 (Socket)           SATA Port         2 (up to 6Gb/s)(Pin header)           SATA Port         2 (up to 6Gb/s)(Pin header)           MXM VGA         1 (Pin header)           MXM DC IN         1 (Pin header)           MXM DP         2 (Pin header)           MXD DIN         1 (Pin header)           LVDS         1 (Pin header)           LVDS         1 (Pin header)           LVDS         1 (Pin header)           LVDS         2 (IX10Pin, 2.0Pitch)(Pin header)           (RS232/422/48)         V           USB 2.0         2 (Pin header)           DIO         8 Bit (4DI/4DO) (Pin header)           Battery Header         1 (Pin header)	LAN	Dual Gigabit (10/100/1000) Ports
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LAN2 x RJ45Serial Port1 x RS232/422/485Audio1 x 3.5mm Audio Jacks (1 x MIC-IN, 1 x LINE-OUT)Display2 x DPINTERNAL I/O2 (x DPMXM1 (Socket)SATA Port2 (up to 6Gb/s)(Pin header)SATA Power2 (up to 6Gb/s)(Pin header)MXM VGA1 (Pin header)MXM DC IN1 (Pin header)MXM DP2 (Pin header)MXM DP2 (Pin header)MZM DP1 (Pin header)LVDS1 (Pin header)LVDS3 (1X10Pin, 2.0Pitch)(Pin header)(RS232/422/485)2 (Pin header)DIO8 Bit (4D1/4DO) (Pin header)Battery Header1 (Pin header)	REAR I/O	
Serial Port1 x RS232/422/485Audio1 x 3.5mm Audio Jacks (1 x MIC-IN, 1 x LINE-OUT)Display2 x DPINTERNAL I/OMXM1 (Socket)SATA Port2 (up to 6Gb/s)(Pin header)SATA Power2 (up to 6Gb/s)(Pin header)MXM VGA1 (Pin header)MXM DC IN1 (Pin header)MXM DP2 (Pin header)MXD D1N1 (Pin header)MXD D21 (Pin header)LVDS1 (Pin header)LVDS3 (1X10Pin, 2.0Pitch)(Pin header)(RS232/422/485)USB 2.0DIO8 Bit (4DI/4DO) (Pin header)Battery Header1 (Pin header)	USB	4 x USB 3.0
Audio1 x 3.5mm Audio Jacks (1 x MIC-IN, 1 x LINE-OUT)Display2 x DPINTERNAL I/OInternal I/OMXM1 (Socket)SATA Port2 (up to 6Gb/s)(Pin header)SATA Power2 (up to 6Gb/s)(Pin header)MXM VGA1 (Pin header)MXM DC IN1 (Pin header)MXM DP2 (Pin header)MXM DP2 (Pin header)LVDS1 (Pin header)LVDS1 (Pin header)LVDS3 (1X10Pin, 2.0Pitch)(Pin header)(RS232/422/485)VUSB 2.02 (Pin header)Battery Header1 (Pin header)	LAN	2 x RJ45
Display2 x DPINTERNAL I/OMXM1 (Socket)SATA Port2 (up to 6Gb/s)(Pin header)SATA Power2 (Pin header)MXM VGA1 (Pin header)MXM DC IN1 (Pin header)MXM DP2 (Pin header)MB DC IN1 (Pin header)LVDS1 (Pin header)LVDS3 (1X10Pin, 2.0Pitch)(Pin header)(RS232/422/485)USB 2.02 (Pin header)DIO8 Bit (4DI/4DO) (Pin header)Battery Header1 (Pin header)	Serial Port	1 x RS232/422/485
INTERNAL I/DMXM1 (Socket)SATA Port2 (up to 6Gb/s)(Pin header)SATA Power2 (Pin header)MXM VGA1 (Pin header)MXM DC IN1 (Pin header)MXM DP2 (Pin header)MXM DP2 (Pin header)MB DC IN1 (Pin header)LVDS1 (Pin header)LVDS1 (Pin header)COM3 (1X10Pin, 2.0Pitch)(Pin header)(RS232/422/485)USB 2.02 (Pin header)DIO8 Bit (4DI/4DO) (Pin header)Battery Header1 (Pin header)	Audio	1 x 3.5mm Audio Jacks (1 x MIC-IN, 1 x LINE-OUT)
MXM1 (Socket)SATA Port2 (up to 6Gb/s)(Pin header)SATA Power2 (Pin header)SATA Power2 (Pin header)MXM VGA1 (Pin header)MXM DC IN1 (Pin header)MXM DP2 (Pin header)MB DC IN1 (Pin header)LVDS1 (Pin header)LVDS3 (1X10Pin, 2.0Pitch)(Pin header)(RS232/422/485)USB 2.02 (Pin header)DIO8 Bit (4DI/4DO) (Pin header)Battery Header1 (Pin header)	Display	2 x DP
SATA Port2 (up to 6Gb/s)(Pin header)SATA Power2 (Pin header)MXM VGA1 (Pin header)MXM DC IN1 (Pin header)MXM DP2 (Pin header)MB DC IN1 (Pin header)LVDS1 (Pin header)LVDS1 (Pin header)COM3 (1X10Pin, 2.0Pitch)(Pin header)(RS232/422/485)USB 2.02 (Pin header)DIO8 Bit (4DI/4DO) (Pin header)Battery Header1 (Pin header)	INTERNAL I/O	
SATA Power2 (Pin header)MXM VGA1 (Pin header)MXM DC IN1 (Pin header)MXM DP2 (Pin header)MB DC IN1 (Pin header)LVDS1 (Pin header)LVDS Backlight1 (Pin header)COM3 (1X10Pin, 2.0Pitch)(Pin header)(RS232/422/485)2USB 2.02 (Pin header)DIO8 Bit (4DI/4DO) (Pin header)Battery Header1 (Pin header)	MXM	1 (Socket)
MXM VGA1 (Pin header)MXM DC IN1 (Pin header)MXM DP2 (Pin header)MB DC IN1 (Pin header)LVDS1 (Pin header)LVDS Backlight1 (Pin header)COM3 (1X10Pin, 2.0Pitch)(Pin header)(RS232/422/485)VISB 2.0USB 2.02 (Pin header)DIO8 Bit (4DI/4DO) (Pin header)Battery Header1 (Pin header)	SATA Port	2 (up to 6Gb/s)(Pin header)
MXM DC IN1 (Pin header)MXM DP2 (Pin header)MB DC IN1 (Pin header)LVDS1 (Pin header)LVDS Backlight1 (Pin header)COM3 (1X10Pin, 2.0Pitch)(Pin header)(RS232/422/485)VISB 2.0DIO8 Bit (4DI/4DO) (Pin header)Battery Header1 (Pin header)	SATA Power	2 (Pin header)
MXM DP2 (Pin header)MB DC IN1 (Pin header)LVDS1 (Pin header)LVDS Backlight1 (Pin header)COM3 (1X10Pin, 2.0Pitch)(Pin header)(RS232/422/485)2USB 2.02 (Pin header)DIO8 Bit (4DI/4DO) (Pin header)Battery Header1 (Pin header)	MXM VGA	1 (Pin header)
MB DC IN1 (Pin header)LVDS1 (Pin header)LVDS Backlight1 (Pin header)COM3 (1X10Pin, 2.0Pitch)(Pin header)(RS232/422/485)	MXM DC IN	1 (Pin header)
LVDS1 (Pin header)LVDS Backlight1 (Pin header)COM3 (1X10Pin, 2.0Pitch)(Pin header)(RS232/422/485)	MXM DP	2 (Pin header)
LVDS Backlight1 (Pin header)COM3 (1X10Pin, 2.0Pitch)(Pin header)(RS232/422/485)USB 2.02 (Pin header)DIO8 Bit (4DI/4DO) (Pin header)Battery Header1 (Pin header)	MB DC IN	1 (Pin header)
COM3 (1X10Pin, 2.0Pitch)(Pin header)(RS232/422/485)USB 2.02 (Pin header)DIO8 Bit (4DI/4DO) (Pin header)Battery Header1 (Pin header)	LVDS	1 (Pin header)
(RS232/422/485)USB 2.02 (Pin header)DIO8 Bit (4DI/4DO) (Pin header)Battery Header1 (Pin header)	LVDS Backlight	1 (Pin header)
(RS232/422/485)USB 2.02 (Pin header)DIO8 Bit (4DI/4DO) (Pin header)Battery Header1 (Pin header)	0	
USB 2.02 (Pin header)DIO8 Bit (4DI/4DO) (Pin header)Battery Header1 (Pin header)	(RS232/422/485)	
DIO8 Bit (4DI/4DO) (Pin header)Battery Header1 (Pin header)		2 (Pin header)
Battery Header 1 (Pin header)	DIO	
	eSPI/LPC	1 (Pin header)

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	1 x M.2 2280 M-Key Slot (SATA only)	
Power Mana	GEMENT	
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	- 40°C ~ 85°C	
Temperature	- 40 C ~ 83 C	
Storage	- 40°C ~ 85°C	
Temperature		
Relative	10% to 90%, non-condensing	
humidity		
Accessories		
SINK+ FAN Kit	CPU(SINK)+MXM(SINK+FAN)	
STANDARD C	IMPLIANCE	
Standard	CE/FCC	
Compliance		

<b>Ordering Information</b>	
SK513-T709Q01	CPU Board : D-1577 / MXM GPU : Quadro P3000
SK513-T709Q02	CPU Board : D-1577 / MXM GPU : Quadro P5000
SK513-T709Q03	CPU Board : D-1577 / MXM GPU : Quadro RTX3000
SK513-T709Q04	CPU Board : D-1577 / MXM GPU : Quadro RTX5000
SK513-T709G01	CPU Board : D-1577 / MXM GPU : RTX2060S
SK513-T709G02	CPU Board : D-1577 / MXM GPU : GTX1080
SK513-T709G03	CPU Board : D-1577 / MXM GPU : GTX1660S
SK513-T709G04	CPU Board : D-1577 / MXM GPU : GTX1050Ti
SK513-T710Q01	CPU Board : D-1559 / MXM GPU : Quadro P3000
SK513-T710Q02	CPU Board : D-1559 / MXM GPU : Quadro P5000
SK513-T710Q03	CPU Board : D-1559 / MXM GPU : Quadro RTX3000
SK513-T710Q04	CPU Board : D-1559 / MXM GPU : Quadro RTX5000
SK513-T710G01	CPU Board : D-1559 / MXM GPU : RTX2060S
SK513-T710G02	CPU Board : D-1559 / MXM GPU : GTX1080
SK513-T710G03	CPU Board : D-1559 / MXM GPU : GTX1660S
SK513-T710G04	CPU Board : D-1559 / MXM GPU : GTX1050Ti
SK513-T711Q01	CPU Board : D-1539 / MXM GPU : Quadro P3000
SK513-T711Q02	CPU Board : D-1539 / MXM GPU : Quadro P5000
SK513-T711Q03	CPU Board : D-1539 / MXM GPU : Quadro RTX3000
SK513-T711Q04	CPU Board : D-1577 / MXM GPU : Quadro RTX5000
SK513-T711G01	CPU Board : D-1577 / MXM GPU : RTX2060S
SK513-T711G02	CPU Board : D-1577 / MXM GPU : GTX1080
SK513-T711G03	CPU Board : D-1577 / MXM GPU : GTX1660S
SK513-T711G04	CPU Board : D-1577 / MXM GPU : GTX1050Ti

## **Block Diagram**

