



CUBIX
Visualization and HPC Solutions

HostEngine 5URP24 C621 Computer User Guide

Front and Rear View



HostEngine 5URP24 (HE5URP24) computer features Intel® Xeon® Scalable (Skylake FCLGA3647 socket) Series dual processors with the Intel C621 chipset. HE5URP24 supports up to 2TBytes error-correcting code (ECC) 3DS load-reduced, dual in-line memory module (RDIMM) memory or 1TByte ECC registered ECC DIMM memory. It provides 4 x PCI Express (PCIe) Gen 3.0 x16 expansion slots and 2 x PCIe Gen 3.0 x8 slots. Each x16 slot accommodates a full-height, full-length GPU. One x16 slot supports a double-wide GPU if one x8 slot is not populated. It also supports 2 x half-height, half-length, single-wide Cubix Host Interface Controller (HIC) that connects to Cubix Xpander Rackmount 8 and 1 or 2 x RAID controllers that connect to 24 x SAS hard disk drives (HDDs) or solid-state drives (SSDs). Each HIC connects to multiple slots within Xpander and each RAID controller connects to 24 x HDDs or SSDs within HE5URP24.

To support the 24 x Serial-Attached SCSI (SAS with 12Gbits / second or 12Gbps transfer rate) 2.5" or 3.5" hot-plug hard-disk drives (HDDs) requires 1 x 24-port or 2 x 12-port SAS (12Gbps) RAID controller(s) in one or two of the 8 x slots. Each RAID controller port connects to a 4-port SAS backplane with a 1.0meter SFF-8643 mini-SAS to SFF-8643 mini-SAS HD cable, and in turn, each 4-port SAS backplane connects to 4 x SAS HDDs for a total of 24 x HDDs in each HE5URP24 and XPRM8G3-5URP24 chassis. The two chassis form a system with 48 x SAS HDDs. The total storage capacity is 48TBytes to 672TBytes, or 0.672PBytes, of direct-attached storage.

It also provides 6 x rear-panel USB ports – 4 x USB 3.0 and 2 x USB 3.1, a type A and a type C. HE4U also provides 2 x GbE network ports, one of which supports both local and remote management using IPMI 2.0. Each HE5URP24 and XPRM8G3-5URP24 also features a power supply with 3 + 1 hot-plug, redundant power modules and 4 x hot-plug cooling fans. Each is also rack-mountable with a tool-less access top cover.

By connecting HostEngine 5URP24 to Xpander Rackmount 85URP24, you can add up to 8 x double-wide GPUs such as NVIDIA® Quadro P6000 to the HostEngine 4U computer for running Autodesk® 3ds Max with NVIDIA iray or BlackMagic Design® DaVinci Resolve® for Linux or Windows.

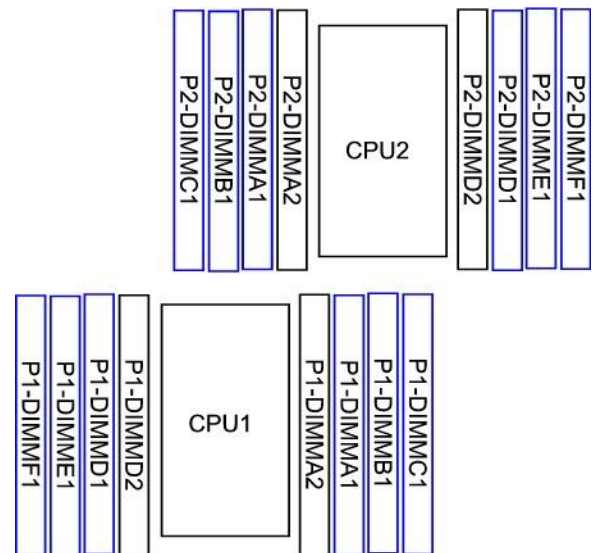
HostEngine 5URP24 Technical Specifications

Central Processing Unit (CPU)	Intel® Xeon Scalable Processor Series
Number CPUs	2 with identical revision, core voltage and bus (core) speed
Sockets	2 x Socket P LGA 3647
Speeds / Cores / Threads	1.8 – 3.5GHz / up to 28 cores / up to 56 threads
Intel Smart Cache	Up to 38.5MByte L3 cache
UltraPath Interconnect (UPI)	Up to 10.4 GigaTransfers/second (GT/s) across 2 x UPI links
Chipset	Intel C621
Front Side Bus Speed	2666MHz
System Memory Sizes	RDIMM: 64GByte, 32GByte, 16GByte or 8GByte LRDIMM: 128GByte, 64GByte or 32GByte
Type	Standard ECC Registered DIMMs (RDIMMs) Optional 3DS ECC Load-Reduced DIMMs (LRDIMMs)
Configuration	DDR4-2666MHz, 2400MHz, 2133MHz
Maximum Size	1TByte using 16 x ECC Registered DIMMs (RDIMMs) 2TByte using 16 x 3DS ECC Load-Reduced DIMMs (LRDIMMs)
PCI Express Gen 3.0 Slots	
PCIe Expansion	4 x PCI-E 3.0 x16: Slot 1 / 2 from CPU1; Slot 3 / 5 from CPU 2 2 x PCI-E 3.0 x8: Slot 4 / 6 from CPU 2
M.2 Expansion Sockets	1 x PCIe 3.0 x4 from CPU 1, M-Key 2280 and 22110
U.2 Expansion Sockets	2 x PCIe 3.0 x4 from CPU 1 (each requires 1 x data / power cable kit)
System BIOS	AMI® User Extensible Firmware Interface (UEFI) BIOS
Feature Support	Advanced Configuration and Power Interface (ACPI) 3.0 / 4.0 USB keyboard Plug-n-Play (PnP) Serial Peripheral Interface (SPI) dual / quad speed System Management BIOS (SMBIOS) 2.7 or later
Ethernet ports	2 x Intel RJ-45 ports supported by PCH C621 1 x port shared by Aspeed AST2500 BMC with dedicated IPMI
Support	10 / 100 / 1000Mb/s
Boot device	Non-Volatile Memory Express (NVMe)
Drive Format	Solid-state drive (SSD)
Transfer Rate / Connection	M.2 / PCIe Gen 3 x4
Capacity, Terabytes (TB)	2, 1, 0.5
Solid-state drive (SSD) No.	24
Storage devices	Serial-Attached SCSI (SAS) with 24-port RAID controller
SSD Maximum Devices	24
Drive Format	2.5-inch (63.5mm) SSD 3.5-inch (88.5mm) SSD
Transfer Rate / Connection	12.0Gbit/second (12Gbps) / SAS / 1.0meter mini-SAS HD SFF-8643
Capacity, TB	14, 12, 10, 8, 6, 4, 2, 1, 0.5 Maximum 336TB with all drives operating
RAID configuration	0, 1, 5, 6 or 10 hardware with 24-port RAID controller
DVD Rewriter	8x SATA, access via front panel
Baseboard Mgt Controller (BMC)	Aspeed AST2500 BMC
Graphics	VGA
Feature support	IP Management Interface (IPMI) 2.0
Network	1 x GbE port shares LAN support with IPMI 2.0
Audio Controller	High-Definition (HD) 7.1 with SPDIF-input digital header
Universal Serial Bus (USB)	Version 3.0
Ports	4 x USB 3.0 (5.0Gbits/sec)

	2 x USB 3.1 (Type-A and Type-C 10.0Gbits/sec)
Cooling Fans	4
Maximum air flow each	178 cubic feet / minute (cfm)
Remove / Replace	Hot-plug
AC Power Supply	One single-phase, auto-ranging, 100-240VAC, 45-24Amps, 50/60Hz with 3 + 1 x 1,280Watt redundant modules; total output power is not to exceed 3,840Watts
Operating Environment	0° to 30° Celsius (32° to 86° Fahrenheit) temperature 5% to 80% non-condensing humidity
Altitude	Maximum
Operating	10,000ft (3,050meters)
Storage	50,000ft (15,240meters)
Dimensions	8.75" H x 19.00" W x 28.00" D (22.22cm H x 48.26cm W x 71.12cm D)
Weight	49.00 lbs. (24.50kg)
Warranty / Period	Parts & labor return to manufacturer / 2 year
Ext. Warranty Period	Optional 3 rd year

Memory Configuration

DIMM Configurations for CPU1 Only		
# DIMMs	Location	Memory Scheme
4	P1-DIMMF1 P1-DIMMC1 P1-DIMME1 P1-DIMMB1	Interleaved DIMMs must be identical type and speed
8	P1-DIMMF1 P1-DIMMC1 P1-DIMME1 P1-DIMMB1 P1-DIMMA1 P1-DIMMA2 P1-DIMMD1 P1-DIMMD2	
DIMM Configurations for CPU1 and CPU2		
16	P1-DIMMF1 P1-DIMMC1 P1-DIMME1 P1-DIMMB1 P1-DIMMA1 P1-DIMMA2 P1-DIMMD1 P1-DIMMD2 P2-DIMMC1 P2-DIMMF1 P2-DIMMB1 P2-DIMME1 P2-DIMMA1 P2-DIMMD1 P2-DIMMA2 P1-DIMMD2	Interleaved DIMMs must be identical type and speed



Memory Population Guidelines
Use DDR4 DIMMs only.
Do not mix LRDIMMs and RDIMMs.
Do not mix 3DS and non-3DS LRDIMMs.
If only one DIMM is populated in a channel, use the slot furthest from the CPU.

Boot Device

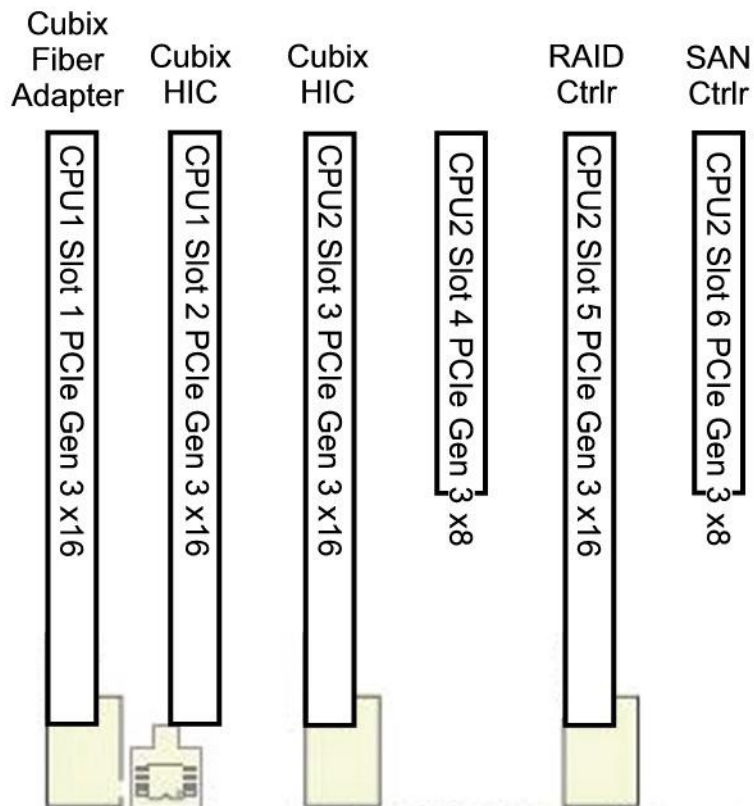
HostEngine provides one M.2 slot in 2280 and 22110 form factor such as the 80mm, 2TByte Samsung 960 Pro (see image at right). It also provides two U.2 slots for NVMe SSDs such as Intel SSD 750 Series. Both the M.2 and U.2 slots are PCIe Gen 3.0 x4.



PCIe Gen 3 Slots

When installing a HIC in HE4U, make sure you seat it in one of the PCIe Gen 3 x16 slots, which are numbered CPU1 Slot1, CPU1 Slot 2, CPU2 Slot4 and CPU2 Slot5. See the illustration at the right for the optimal configuration for BlackMagic Design DaVinci Resolve, for example.

For double-wide accelerators like NVIDIA Quadro Series or AMD Firepro W Series, use slots 1, 3 and 5. If you add a single-wide display controller like AMD Firepro W2100 / W4100 or NVIDIA Quadro P4000 for connecting one or more 4K / UHD displays, use a PCIe x16 slot. For SAN controllers, which usually provide PCIe Gen 3 x8 connectivity, use CPU2 Slot 4 or Slot 6.



Remove and replace PCIe devices

PCIe devices can be removed and replaced from the top once you power down HostEngine, disconnect power and remove the top cover. See the image at the right for the features of each PCIe slot. Generally, install x16 devices like GPUs or Cubix HICs in x16 slots.

- Power down gracefully using the OS.
- Remove the power cord and wait for standby power to turn off.
- Loosen the two retention screws on the HostEngine front panel.
- Gently tug the HostEngine handles toward you.
- Remove the screws holding the top cover and set it aside.

- Disconnect auxiliary power cables from the PCIe devices such as accelerators, if needed.
- Remove / replace the PCIe devices and re-connect the drive power and data cables.
- Replace the top cover and its retaining screws.
- Slide HostEngine into the cabinet.
- Replace and tighten the retention screws.
- Power up HostEngine.

Remove and replace a SATA drive

SATA drives are removable from the front one by one after removal of the front panel.

- Remove the front panel, which is held in place with magnetic contacts. No tools needed.
- Remove / replace the drive.
- Replace the front panel.

Remove / Replace HostEngine

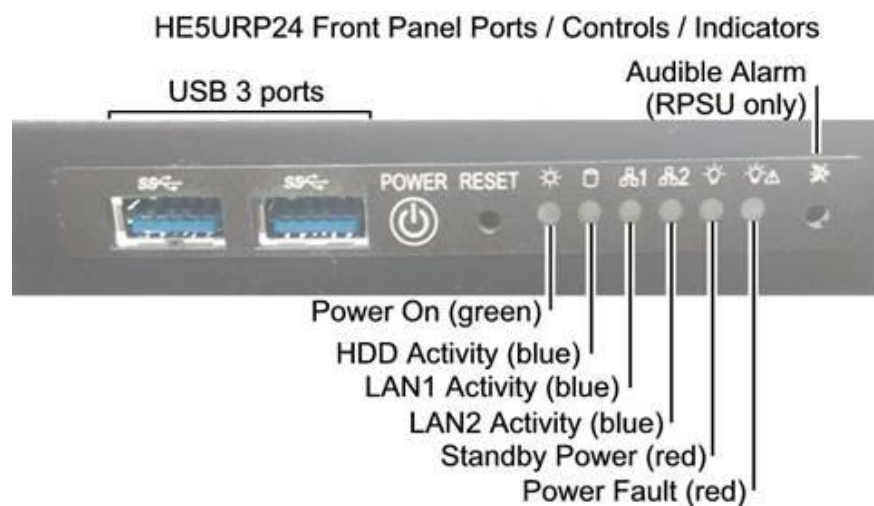
HostEngine can be removed and replaced from the front once you remove power.

- Power down gracefully using the OS or the front-panel on / off switch.
- Wait for the power to shut off.
- Disconnect power and all other cables from HostEngine.
- Loosen the two retention screws on the HostEngine front panel.
- Gently tug the HostEngine handles toward you.
- Extract the HostEngine while supporting its weight.
- Slide the replacement HostEngine into the rack mount slide mounts.
- Slide HostEngine into the cabinet.
- Replace and tighten the retention screws.
- Connect power and all other cables to HostEngine.
- Power up HostEngine.

Controls, Indicators and Connections

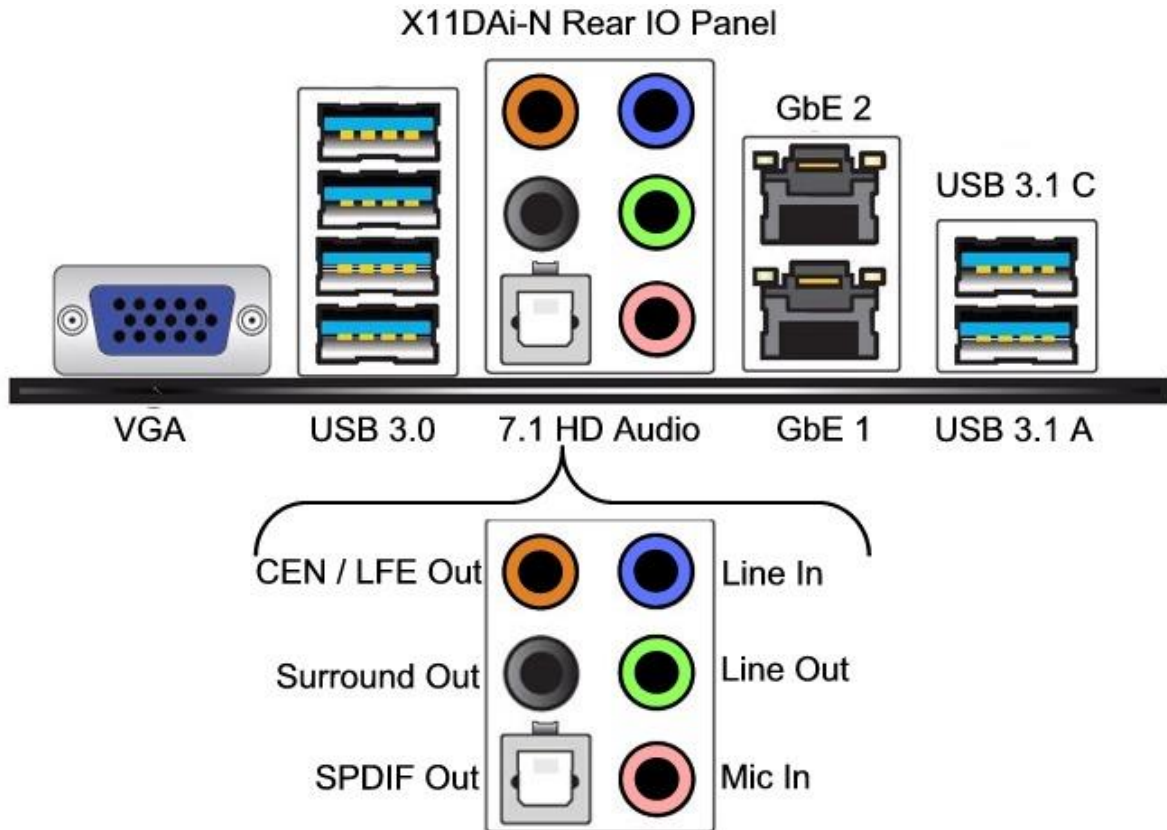
HE5URP24 front panel:

- 2 x USB 3 ports
- Press Power button to power up / down the OS – Windows or Linux.
- Press and hold Power button 4 seconds to force power down.
- Press Reset button (recessed) to recycle power or reset OS



Connections

On the rear panel, HostEngine provides USB 3 ports, Gbps Ethernet ports, a VGA port and HD audio ports. The AC power receptacle is also on the rear panel.



HostEngine also provides access for Cubix HICs that connect to GPU-Xpander Rackmount 8 or other Xpander enclosures using external PCIe x16 cables, if needed. With these connections, you can mount HostEngine immediately above or below GPU-Xpander Rackmount 8. You can also install PCIe cards inside HostEngine 4U. For example, install 4 x full-length, full-height, double-wide GPUs inside HostEngine 4U.

On the front panel, HostEngine provides 2 x local USB ports.

Troubleshooting Procedure

Issue: The Cubix HIC in HostEngine is linking at x8 or x4, or at Gen 2, with Cubix Xpander, and not linking at the specified PCIE Gen 3 x16 transfer rate.

Resolution: Confirm that the Cubix HIC is installed in HostEngine slot 1, 2, 3 or 5.

Issue: The Cubix HICs in HostEngine are installed in PCIE Gen 3 x16 slots 1 & 3 or 2 & 5, but not all 8 x GPUs in Xpander Rackmount 8 show up in the operating system (ls pci in Linux or Windows Device Manager > Display adapters).

Resolution: Confirm the following setting in HostEngine system BIOS > Advanced > PCI Plug-n-Play > Above 4G Decoding > Enabled.

Issue: How can I tell whether each GPU in Xpander connected to HostEngine is running at optimal bandwidth?

Resolution: Download Cubix GPU Manager for either Linux or Microsoft Windows (<http://www.cubix.com/gpumanager/>) and install it. Documentation is on-line [here](#).

Issue:

Resolution: