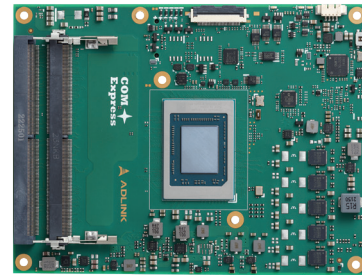# Express-VR7

COM Express Basic Size Type 7 Module
with AMD Embedded Ryzen V3000

**Preliminary**



## Features

- 8 Cores at 15W, 45W — Best Performance per Watt in its class
- Up to 64GB DDR5 SO-DIMM, 4800 MT/s ECC
- 2x 10G Ethernet and 1x 2.5G Ethernet
- 14x PCIe Gen4 lanes
- Extreme Rugged operating temperature: -40°C to 85°C (build option, selected SKU)

## Specifications

| Core System | CPU | AMD Embedded Ryzen V3000 Processor | | |
|---|---|---|---|---|
| | | • V3C48  3.3/3.8GHz | 8 Cores / 16 Threads | 45W |
| | | • V3C44  3.5/3.8GHz | 4 Cores / 8 Threads | 45W |
| | | • V3C18I  1.9/3.8GHz | 8 Cores / 16 Threads | 15W |
| | | • V3C16  2.0/3.8GHz | 6 Cores /12Threads | 15W |
| | | • V3C14  2.3/3.8GHz | 4 Cores / 8 Threads | 15W |
| | | Note: Availability of features may vary between processor SKUs. Note: V3C18I could be used for extreme temperature (TBC) | | |
| | Memory | Dual channel up to 4800 MT/s ECC/non-ECC DDR5 memory up to 64GB (2x 32GB) in two SODIMM sockets<br>Two SO-DIMM on top side | | |
| | Embedded BIOS | AMI UEFI with CMOS backup in 32 or 16MB (TBC) SPI BIOS (dual BIOS by build option) | | |
| | Cache | TBC | | |
| | Expansion Busses | All Gen4 speed<br>• 8 PCI Express Gen4: Lanes 16-23 (configurable to one x8, two x4, two controller)<br>• 4 PCI Express Gen4: Lanes 0-3 (configurable to four x1, two x2, one x4, four controller)<br>• 2 PCI Express Gen4: Lanes 4-5 (configurable to one x1, one x2, one controller)<br>• LPC bus (through an ESPI to LPC bridge IC), SMBus (system) , I$^2$C (user), GP_SPU (user, project basis) | | |
| | SEMA Board Controller | Supports : Voltage/current monitoring, power sequence debug support, AT/ATX mode control, logistics and forensic information, flat panel control, general purpose I$^2$C, watchdog timer, fan control and failsafe BIOS (dual BIOS by build option) | | |
| | Debug Headers | 30-pin multipurpose flat cable connector for use with DB-30 x86 debug module providing BIOS POST code LED, EC access, SPI BIOS flashing, power testpoints, debug LEDs | | |

## Specifications

| | | |
|---|---|---|
| 10G Ethernet | Intel® MAC/Controller | AMD 10G Ethernet controller integrated in CPU |
| | Interface | 2x 10GBASE-KR and its sideband signals<br>Note: SGMII and additional 1x MDIO/MDC supported by project basis |
| Ethernet | Intel® MAC/Controller | Intel Ethernet controller i226 series |
| | Interface | 2.5GbE and 1000/100/10 Mbit/s Ethernet connection |
| Multi I/O and Storage | USB | 4x USB 3.x/2.0/1.1 (USB 0,1,2,3) |
| | SATA | 2x SATA 6Gb/s (SATA 0,1) |
| | Serial | 2x UART ports with console redirection |
| | GPIO/SD | 4x GPO and 4x GPI (GPI with interrupt TBC) |
| Module Management Controller | Supports: IPMB (in conjunction with carrier BMC for remote management Controller applications) by build option (TBC) | |
| Super I/O | Supported on carrier if needed (standard support for W83627DHG-P, other Super I/O supported by project basis) | |
| TPM | Chipset | Infineon |
| | Type | TPM 2.0 (SPI based) |
| Power | Standard Input | ATX: 12V±5% / 5Vsb ±5%; or AT: 12V±5% |
| | Management | ACPI 5.0 compliant |
| | Power States | C1-C6, S0, S1, S3, S4, S5 , S5 ECO mode (Wake on USB S3/S4, WOL S3/S4/S5) |
| Mechanical and Environmental | Form Factor | PICMG COM.0:  Rev 3.1  Type 7 |
| | Dimension | Basic size: 125 mm x 95 mm |
| | Operating Temperature | Standard: 0°C to 60°C (Storage: -20°C to 80°C)<br>Extreme Rugged: -45°C to 85°C (build option, selected SKUs)<br>(Storage: -40°C to 85°C) (TBC) |
| | Humidity | 5-90% RH operating, non-condensing<br>5-95% RH storage (and operating with conformal coating) |
| | Shock and Vibration | IEC 60068-2-64 and IEC-60068-2-27<br>MIL-STD-202F, Method 213B, Table 213-I, Condition A and Method 214A, Table 214-I, Condition D |
| | HALT | Thermal Stress, Vibration Stress, Thermal Shock and Combined Test |
| Operating Systems | Standard Support | Yocto Linux, Ubuntu 20.04.3 LTS (TBC) |
| | Extended Support (BSP) | Yocto project based Linux |

# Ordering Information

### Module

| | |
|---|---|
| Express-VR7-V3C18I | Basic COM Express Type 7 module with AMD Embedded Ryzen V3C18I, 8-core at 15W |

*For processor SKUs not listed, please contact your ADLINK representative for availability.

# Accessories

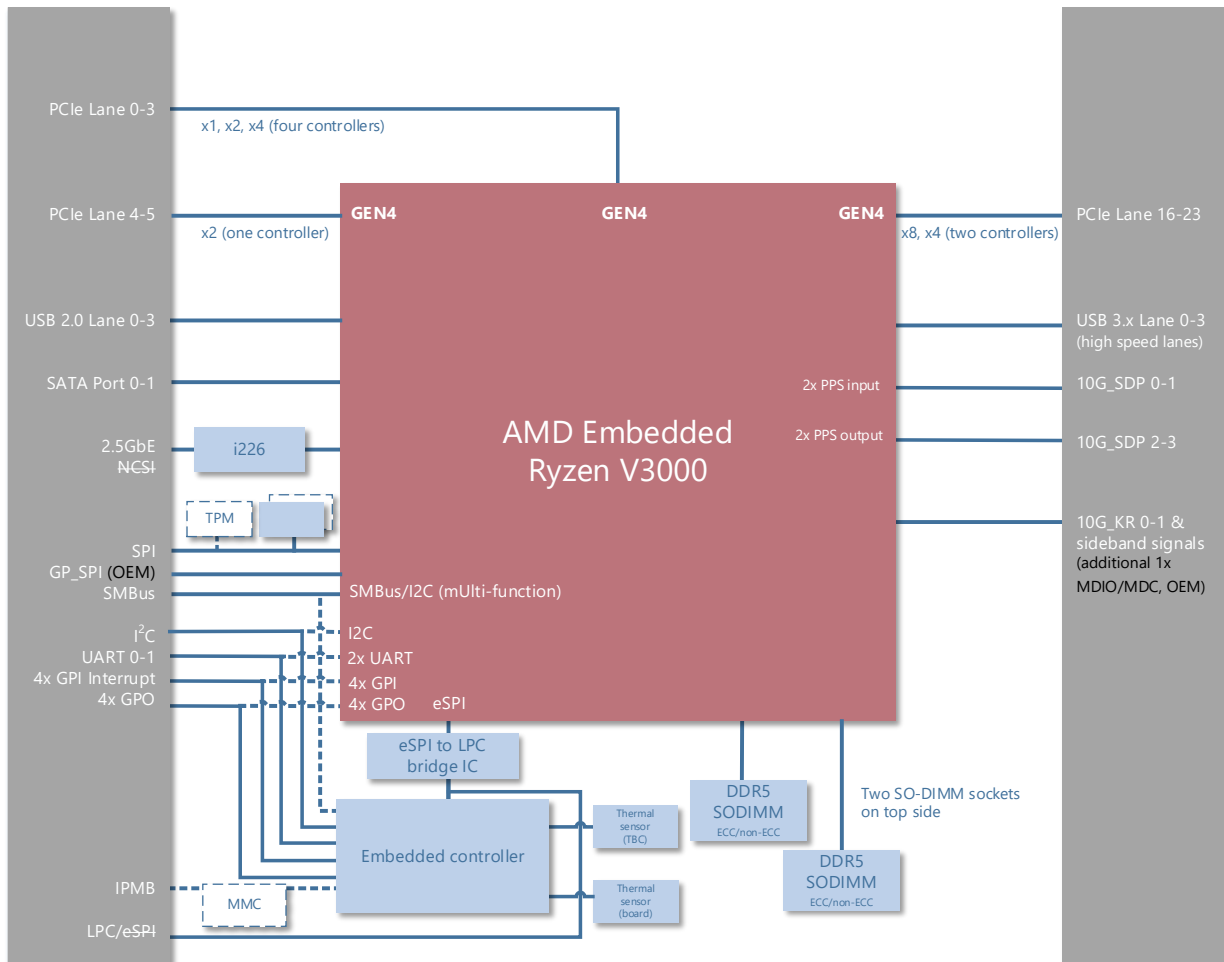| Heat Spreaders | |
|---|---|
| HTS-VR7-B | Heatspreader for Express-VR7 with threaded standoffs for bottom mounting |
| HTS-VR7-BT | Heatspreader for Express-VR7 with through hole standoffs for top mounting |
| **Passive Heatsinks** | |
| THS-VR7-B | Low profile heatsink for Express-VR7 with threaded standoffs for bottom mounting |
| THS-VR7-BT | Low profile heatsink for Express-VR7 with through hole standoffs for top mounting |
| THSH-VR7-B | High profile heatsink for Express-VR7 with threaded standoffs for bottom mounting |
| **Active Heatsinks** | |
| THSF-VR7-B | High profile heatsink with Fan for Express-VR7 with threaded standoffs for bottom mounting |

# Starter Kit

| | |
|---|---|
| VR7 COM Express Type 7 Starter Kit | TBC |

# Block diagram



| | | |
|---|---|---|
| PCIe Lane 0-3 | x1, x2, x4 (four controllers) | |
| PCIe Lane 4-5 | x2 (one controller) | GEN4 GEN4 GEN4 |
| | | x8, x4 (two controllers) PCIe Lane 16-23 |

PCIe Lane 0-3 — x1, x2, x4 (four controllers)

GEN4          GEN4          GEN4

PCIe Lane 4-5 — x2 (one controller) — x8, x4 (two controllers) — PCIe Lane 16-23

USB 2.0 Lane 0-3

SATA Port 0-1

2.5GbE NCSI — i226

TPM

SPI
GP_SPI (OEM)
SMBus — SMBus/I2C (mUlti-function)

I²C — I2C
UART 0-1 — 2x UART
4x GPI Interrupt — 4x GPI
4x GPO — 4x GPO — eSPI

**AMD Embedded Ryzen V3000**

2x PPS input
2x PPS output

USB 3.x Lane 0-3 (high speed lanes)

10G_SDP 0-1

10G_SDP 2-3

10G_KR 0-1 & sideband signals (additional 1x MDIO/MDC, OEM)

eSPI to LPC bridge IC

Embedded controller

Thermal sensor (TBC)

Thermal sensor (board)

DDR5 SODIMM ECC/non-ECC

DDR5 SODIMM ECC/non-ECC

Two SO-DIMM sockets on top side

IPMB

MMC

LPC/eSPI

I2C, SMBus, UART, GPIO source from EC or CPU. It can be configured based on project basis