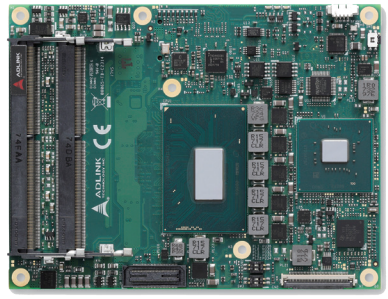
Express-CFR

COM Express® Basic Size Type 6 Module with Hexacore Mobile 9th Gen Intel® Xeon®, Core™, Pentium® and Celeron® Processors

Features

- PICMG COM.0 R3.0 Type 6 module with 45W/25W hexacore and quad-core Intel® processors
- Up to 96GB Dual Channel DDR4 at 2133/2400/2666 in up to three SO-DIMM sockets
- Three DDI channels, one LVDS, supports up to 3 independent displays (VGA, eDP by build option)
- One PCIe x16 Gen3, eight PCIe x1 Gen3 (NVMe SSD & Intel® Optane™ Memory Technology support)
- GbE, four SATA 6 Gb/s, four USB 3.1 and four USB 2.0
- Supports Smart Embedded Management Agent (SEMA) functions
- Extreme Rugged operating temperature: -40°C to +85°C (build option, selected SKUs)



Specifications

Core System

CPU

Mobile 9th Gen Intel® Core™, Intel® Xeon®, Pentium® and Celeron® Processors - 14nm process

- Xeon® E-2276ME 45W (35W cTDP), 6C/GT2
- Xeon® E-2276ML 25W, 6C/GT2
- Xeon® E-2254ME 45W (35W cTDP), 4C/GT2
- Xeon® E-2254ML 25W, 4C/GT2
- Core™ i7-9850HE 45W (35W cTDP), 6C/GT2
- Core™ i7-9850HL 25W, 6C/GT2
- Core™ i3-9100HL 25W, 4C/GT2
- Pentium® G5600E 35W, 2C/GT1
- Celeron® G4930E 35W, 2C/GT1
- Celeron® G4932E 25W, 2C/GT1

Supports: Intel® VT, Intel® TXT, Intel® SSE4.2, Intel® HT Technology, Intel® 64 Architecture, Execute Disable Bit, Intel® Turbo Boost Technology 2.0, Intel® AVX2, Intel® AES-NI, PCLMULQDQ Instruction, Intel® Secure Key and Intel® TSX.

Note: Availability of the features may vary between processor SKUs.

Memory

Up to 96GB 2133/2400 MHz DDR4 in three (superscript) SODIMM sockets (Xeon®, Core™ i3, Pentium®, Celeron® paired with CM246 support both ECC and non-ECC memory)

* Three sockets by build option

Embedded BIOS

AMI EFI with CMOS backup in 32/16MB SPI BIOS with Intel® AMT 12.0 support

Cache

12MB for Xeon® 6C, 8MB for Xeon® 4C, 9MB for Core™ i7, 6MB for Core™ i3, 4MB for Pentium®, 2MB for Celeron®

Chipset

- Mobile Intel® CM246 (supports ECC memory and Intel® AMT)
- Mobile Intel® QM370 (supports Intel® AMT)
- Mobile Intel® HM370 (no support for Intel® AMT)

Note: Chipset is formerly Coffee Lake.

Expansion Busses

- PCIe x16 or 2 PCIe x8 or 1 PCIe x8 with 2 PCIe x4 (Gen3)
- 6 PCI Express x1 (Gen3); AB connector, Lanes 0/1/2/3/4/5
- 2 PCI Express x1 (Gen3); CD connector, Lane 6/7
- LPC bus, SMBus (system), I^2C (user)

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^2C, failsafe BIOS (dual BIOS), watchdog timer and fan control

Debug Headers

- 40-pin multipurpose flat cable connector for use with DB-40 debug module providing BIOS POST code LED, BMC access, SPI BIOS flashing, power testpoints, debug LEDs
- 60-pin XDP header for ICE debug of CPU/chipset (optional)

Note: "build option" indicates an alternative BOM configuration to support additional or alternative functions that are not available on the standard product. Be aware that these "build option" part numbers will need to be newly created and this will result in production lead times.

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Specifications

Video

GPU Feature Support

Intel® Generation 9 LP Graphics Core Architecture, supporting 3 independent and simultaneous display combinations of DisplayPort/HDMI (or VGA), LVDS or eDP outputs

- Hardware encode/transcode HD content (including HEVC 10-bit)
- DirectX 12, DirectX 11.2, DirectX 11.1, DirectX 11, DirectX 10.1, DirectX 10,DirectX 9 support
- OpenGL 4.5 support
- OpenCL 2.1, 2.0/1.2 support

Digital Display Interface

DDI1/2/3 supporting DisplayPort 1.2, HDMI 1.4, DVI

Notes:
DP1.2: max. resolution is 4096x2304 @ 60Hz, 24bpp
HDMI1.4: max. resolution is 4096x2160 @ 24Hz, 24bpp

VGA

VGA support, in place of DDI3 channel (build option, max. resolution 1920x1200@60Hz)

LVDS

Single/dual channel 18/24-bit LVDS from eDP-to-LVDS IC (max. resolution 1920x1200@60Hz in dual mode)

eDP

4 lane support optional, in place of LVDS (build option, max. resolution 4096x2304 @60Hz, 24bpp)

Audio

Chipset: Intel® HD Audio integrated in chipset
Audio Codec:located on carrier Express-BASE6 (ALC886 standard supported)

Ethernet

Intel® I219LM/V with AMT 12.0 support (only LM version support AMT)
Interface: 10/100/1000 GbE connection

Multi I/O and Storage

USB: 4x USB 3.1 (USB 0, 1, 2, 3) and 4x USB 2.0 (USB 4, 5, 6, 7)
SATA: Four ports SATA 6Gb/s (SATA0,1,2,3)
Serial: 2 UART ports with console redirection
GPIO/SD: 4 GPO and 4 GPI (GPI with interrupt)
SD/GPIO muxed design, switched by BIOS setting
SD functions as storage device only

Note: USB 3.1 Gen2 support dependent on carrier design

Super I/O

Supported on carrier if needed (standard support for W83627DHG-P)

TPM (option)

Chipset: Infineon
Type: TPM 2.0

Power

Standard Input: ATX = 12V ±5% / 5Vsb ±5% or AT = 12V ±5%
Wide Input: ATX = 8.5-20 V / 5Vsb ±5% or AT = 8.5-20V
Management: ACPI 5.0 compliant, Smart Battery support
Power States: C1-C6, S0, S1, S3, S4, S5 , S5 ECO mode (Wake-on-USB S3/S4, WOL S3/S4/S5)
ECO mode: Supports deep S5 mode for power saving

Operating Systems

Standard Support

Windows® 10 64-bit, Linux 64-bit

Extended Support (BSP)

Linux 64-bit

Mechanical and Environmental

Form Factor: PICMG COM.0, Rev 3.0 Type 6
Dimension: Basic size: 125 mm x 95 mm

Operating Temperature

Standard:0°C to 60°C (storage: -20°C to 80°C)
Extreme Rugged: -40°C to +85°C (build option for selected SKUs; storage: -40°C to +85°C)

Humidity

5-90% RH operating, non-condensing
5-95% RH storage (and operating with conformal coating)

Shock and Vibration

IEC 60068-2-64 and IEC-60068-2-27
MIL-STD-202F, Method 213B, Table 213-I, Condition A and Method 214A, Table 214-I, Condition D

HALT

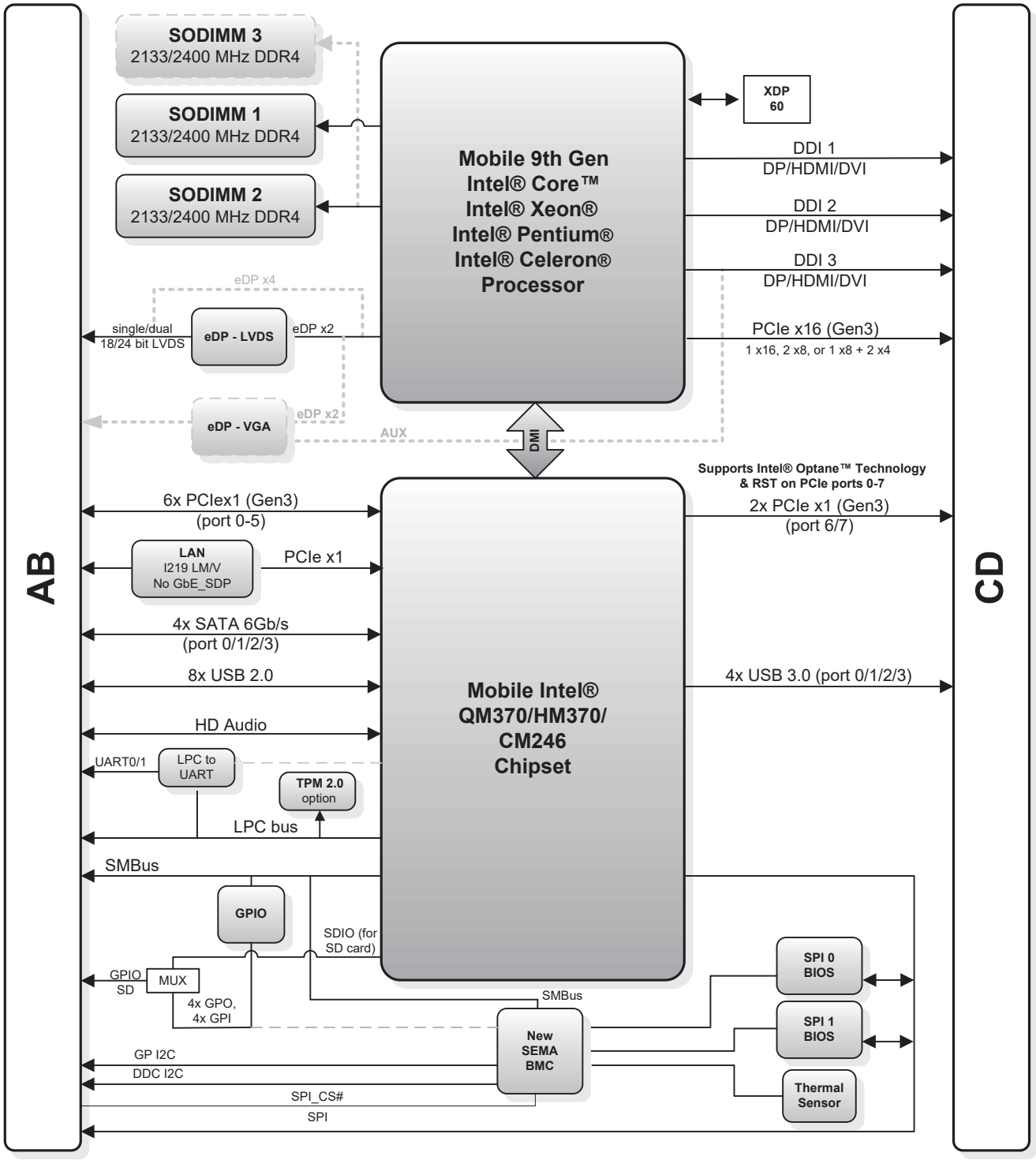
Thermal Stress, Vibration Stress, Thermal Shock and Combined Test

Notes:
* All specifications are subject to change without further notice.
* For CPU and chipset combinations not listed, please contact your ADLINK representative for availability.

Note: "build option" indicates an alternative BOM configuration to support additional or alternative functions that are not available on the standard product. Be aware that these "build option" part numbers will need to be newly created and this will result in production lead times.

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Functional Diagram



Express-CFR

Ordering Information

- **Express-CFR-i7-9850HE**
  Basic size COM Express Type 6 module with 9th Gen Intel® Core™ i7-9850HE hexa-core processor at 2.7/4.4GHz with QM370 Chipset, 3 SO-DIMM
- **Express-CFR-i7-9850HL**
  Basic size COM Express Type 6 module with 9th Gen Intel® Core™ i7-9850HL hexa-core processor at 1.9/4.1GHz with QM370 Chipset, 3 SO-DIMM
- **Express-CFR-i3-9100HL**
  Basic size COM Express Type 6 module with 9th Gen Intel® Core™ i3-9100HL quad-core processor at 1.6/2.9GHz with HM370 Chipset, 2 SO-DIMM
- **Express-CFR-E-2276ME**
  Basic size COM Express Type 6 module with Intel® Xeon® E-2276ME hexa-core processor at 2.8/4.5GHz with CM246 Chipset, 3 SO-DIMM with ECC/non-ECC support
- **Express-CFR-E-2254ME**
  Basic size COM Express Type 6 module with Intel® Xeon® E-2254ME quad core processor at 2.6/3.8GHz with CM246 Chipset, 3 SO-DIMM with ECC/non-ECC support
- **Express-CFR-E-2276ML**
  Basic size COM Express Type 6 module with Intel® Xeon® E-2276ML hexa-core processor at 2.0/4.2GHz with CM246 Chipset, 3 SO-DIMM with ECC/non-ECC support
- **Express-CFR-E-2254ML**
  Basic size COM Express Type 6 module with Intel® Xeon® E-2254ML quad-core processor at 1.7/3.5GHz with CM246 Chipset, 3 SO-DIMM with ECC/non-ECC support
- **Express-CFR-G5600E**
  Basic size COM Express Type 6 module with Intel® Pentium® G5600E dual-core processor at 2.6/3.1GHz with HM370 Chipset, 2 SO-DIMM
- **Express-CFR-G4930E**
  Basic size COM Express Type 6 module with Intel® Celeron® G4930E dual-core processor at 2.4GHz with HM370 Chipset, 2 SO-DIMM

SKUs not listed above can be supported by project basis. Please contact your local ADLINK representative.

Accessories

* Express-CF and Express-CFR share the same thermal solution

Heat Spreaders

- **HTS-CF-B**
  Heatspreader for Express-CF/CFE with threaded standoffs for bottom mounting
- **HTS-CF-BT**
  Heatspreader for Express-CF/CFE with through hole standoffs for top mounting

Passive Heatsinks

- **THS-CF-BL**
  Low profile heatsink for Express-CF/CFE with threaded standoffs for bottom mounting
- **THS-CF-BT**
  Low profile heatsink for Express-CF/CFE with through hole standoffs for top mounting
- **THSH-CF-BL**
  High profile heatsink for Express-CF/CFE with threaded standoffs for top mounting

Active Heatsink

- **THSF-CF-BL**
  High profile heatsink with Fan for Express-CF/CFE with threaded standoffs for bottom mounting

Starter Kit

- **COM Express Type 6 Starter Kit Plus**
  Starter kit for COM Express Type 6

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