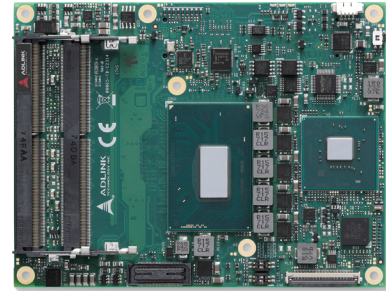


# Express-CFR

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

### Features

- PICMG COM.0 R3.0 Type 6 module with 45W/25W hexacore and quad-core Intel<sup>®</sup> 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<sup>®</sup> Optane<sup>™</sup> 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<sup>®</sup> Core<sup>™</sup>, Intel<sup>®</sup> Xeon<sup>®</sup>, Pentium<sup>®</sup> and Celeron<sup>®</sup> Processors - 14nm process

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

Supports: Intel<sup>®</sup> VT, Intel<sup>®</sup> TXT, Intel<sup>®</sup> SSE4.2, Intel<sup>®</sup> HT Technology, Intel<sup>®</sup> 64 Architecture, Execute Disable Bit, Intel<sup>®</sup> Turbo Boost Technology 2.0, Intel<sup>®</sup> AVX2, Intel<sup>®</sup> AES-NI, PCLMULQDQ Instruction, Intel<sup>®</sup> Secure Key and Intel<sup>®</sup> 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<sup>®</sup>, Core<sup>™</sup> i3, Pentium<sup>®</sup>, Celeron<sup>®</sup> 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<sup>®</sup> AMT 12.0 support

##### Cache

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

#### Chipset

- Mobile Intel<sup>®</sup> CM246 (supports ECC memory and Intel<sup>®</sup> AMT)
- Mobile Intel<sup>®</sup> QM370 (supports Intel<sup>®</sup> AMT)
- Mobile Intel<sup>®</sup> HM370 (no support for Intel<sup>®</sup> 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<sup>2</sup>C (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<sup>2</sup>C, 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)

## 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

Notes:

\* All specifications are subject to change without further notice.

\* For CPU and chipset combinations not listed, please contact your ADLINK representative for availability.

### • 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 = 8.5-20V / 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

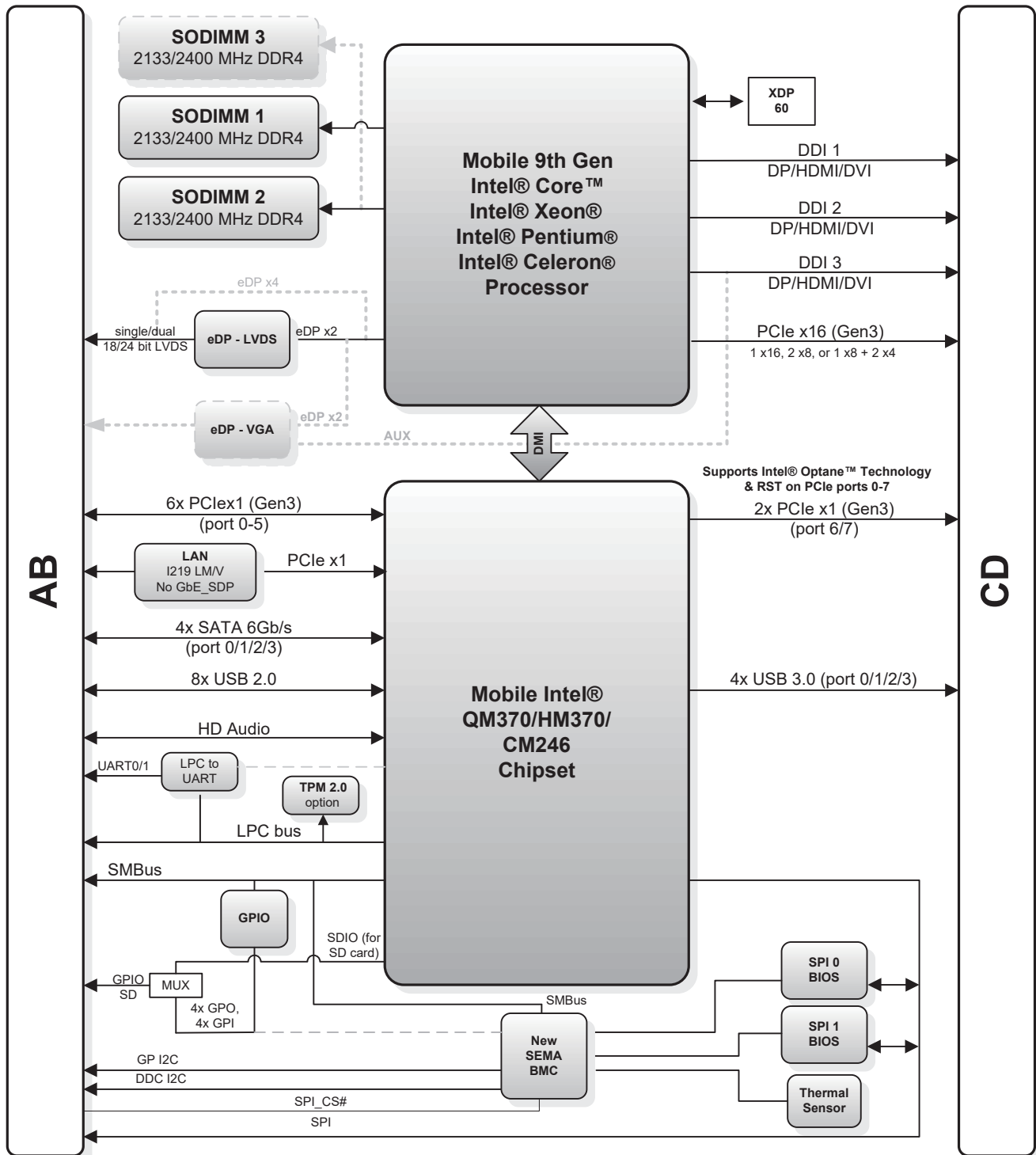
IEC 60068-2-64 and IEC-60068-2-27

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

## 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



Authorized Distributor

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