cExpress-KL

COM Express Compact Size Type 6 Module with Mobile 7th Gen Intel® Core™ and Celeron® Processors

Features

- 7th Generation Intel® Core™ and Celeron® Processors
- Up to 32GB Dual Channel DDR4 at 1867/2133MHz
- Supports up to 3 independent displays in combinations of DDI, LVDS, VGA, eDP
- GbE, up to 6 PCIe x1 (build option)
- Three SATA 6 Gb/s, four USB 3.0 and four USB 2.0
- Supports Smart Embedded Management Agent (SEMA) functions
- Extreme Rugged operating temperature: -40°C to +85°C (build option)



Specifications

Core System

CPU

Mobile 7th Generation Intel® Core™ and Celeron® Processors - 14nm (code name "Kaby Lake-U")

Core™ i7-7600U 2.8/3.9GHz (Turbo), 4M, 15W (cTDP) (2C/GT2)
Core™ i5-7300U 2.6/3.5GHz (Turbo), 3M, 15W (cTDP) (2C/GT2)
Core™ i3-7100U 2.4GHz, 3M, 15W (2C/GT2)
Celeron® 3965U 2.2GHz, 2M, 15W (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

Dual channel 1867/2133 MHz DDR4 memory up to 32GB in dual SODIMM sockets

Embedded BIOS

AMI EFI with CMOS backup in 8MB SPI BIOS with Intel® AMT 11.0 support

Cache

4MB for Core™ i7, 3MB for Core™ i5 and i3, 2M for Celeron®

Expansion Busses

Up to 6 PCI Express x1 (AB): Lanes 0-5 (configurable to x2, x4, Lane 5 by build option)

Note: Gen3 for Core™ i7/i5/i3

LPC bus, SMBus (system), I²C (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 I²C, 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

Video

GPU Feature Support

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

Hardware encode/transcode HD content (including HEVC)

DirectX 12, DirectX 11.2, DirectX 11.1, DirectX 11, DirectX 10.1, DirectX 10, DirectX 9 support

OpenGL 5.0, 4.4/4.3 and ES 2.0 support

OpenCL 2.1, 2.0/1.2 support

Digital Display Interface

DDI1/2 supporting DisplayPort/HDMI/DVI

VGA

Build option support through DP-to-VGA IC (in place of DDI2)

LVDS

Single/dual channel 18/24-bit LVDS from eDP-to-LVDS IC

eDP

4 lane support by build option, in place of LVDS

Audio

Chipset

Intel® HD Audio integrated in SoC

Audio Codec

Located on carrier Express-BASE6 (ALC886 standard support)

Ethernet

Intel® MAC/PHY: Intel® I219LM/V

Interface: 10/100/1000 GbE connection

Specifications

I/O Interfaces

USB: 4x USB 1.1/2.0/3.0 (USB 0,1,2,3) and 4x USB 1.1/2.0 (USB 4,5,6,7)
SATA: 3x SATA 6 Gb/s
Serial: 2 UART ports with console redirection
GPIO: 4 GPO and 4 GPI from BMC

Super I/O

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

TPM (option)

Chipset: In ineon SLB 9665 XT2.0
Type: TPM 2.0

Power

Standard Input: ATX = 12V±5%, 5Vsb ±5%; AT = 12V±5%
Wide Input: ATX = 5-20 V, 5Vsb ±5% ; AT = 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

Mechanical and Environmental

Form Factor: PICMG COM.0, Rev 2.1 Type 6
Dimension: Compact size: 95 mm x 95 mm

Operating Temperature

Standard: 0°C to 60°C
Extreme Rugged: -45°C to +85°C (build option)

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

Operating Systems

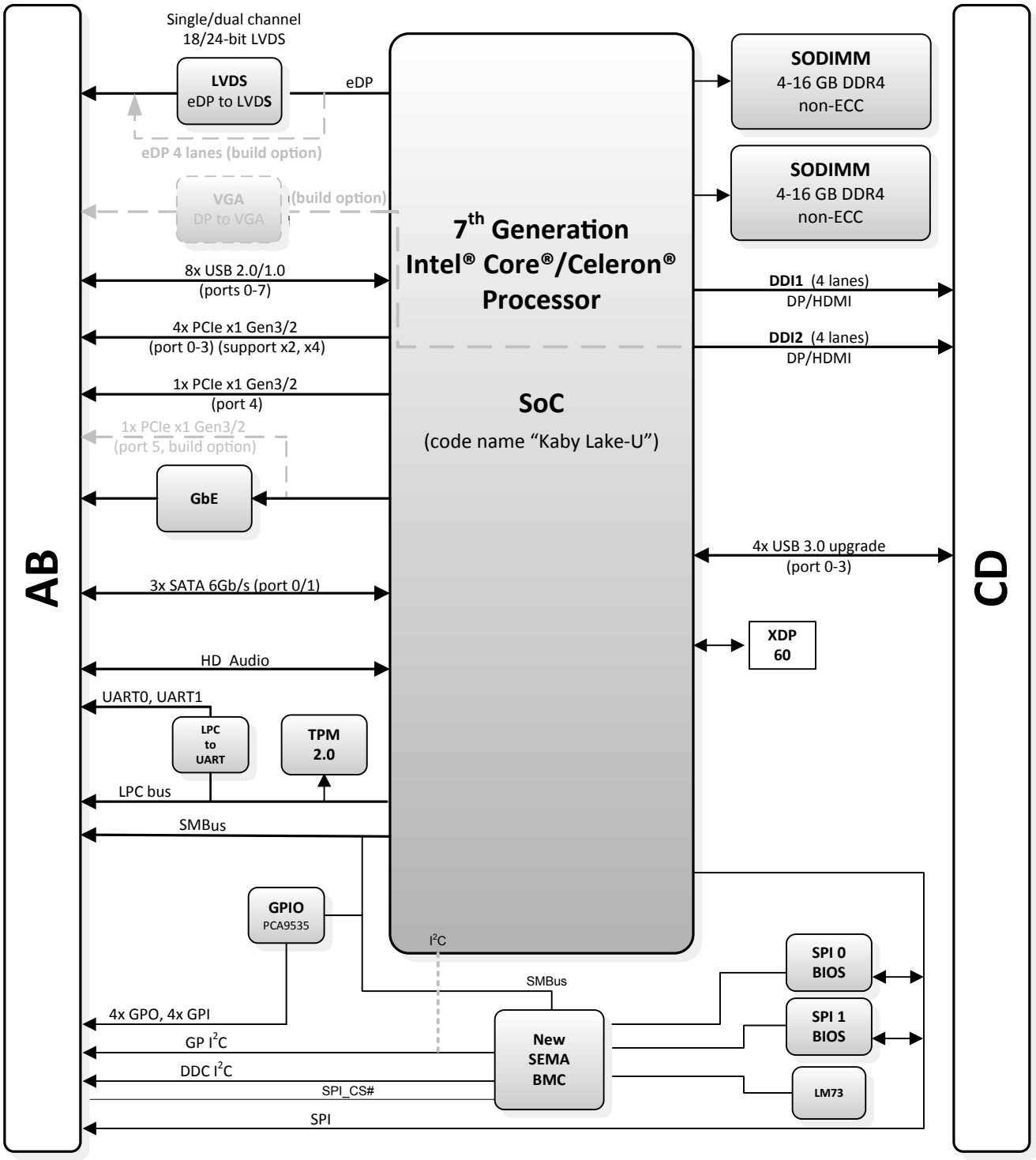
Standard Support

Windows 10 IOT Enterprise 64-bit, Linux 64-bit
VxWorks 7 64-bit (TBD)

Extended Support (BSP)

Linux 64-bit
VxWorks 64-bit (TBD)

Functional Diagram



Ordering Information

- **cExpress-KL-i7-7600U**
  Compact COM Express® Type 6 module with Intel® Core™ i7-7600U and GT2 graphics
- **cExpress-KL-i5-7300U**
  Compact COM Express® Type 6 module with Intel® Core™ i5-7300U and GT2 graphics
- **cExpress-KL-i3-7100U**
  Compact COM Express® Type 6 module with Intel® Core™ i3-7100U and GT2 graphics
- **cExpress-KL-3965U**
  Compact COM Express® Type 6 module with Intel® Celeron® 3965U and GT1 graphics

Starter Kit

- **COM Express Type 6 Starter Kit Plus**
  COM Express formfactor starter kit with Express-BASE6 board, power supply, and accessory kit

Accessories

Heat Spreaders

- **HTS-cKL-B**
  Heatspreader for cExpress-KL with threaded standoffs for bottom mounting
- **HTS-cKL-BT**
  Heatspreader for cExpress-KL with through hole standoffs for top mounting

Passive Heatsinks

- **THS-cKL-B**
  Low profile heatsink for cExpress-KL with threaded standoffs for bottom mounting
- **THS-cKL-BT**
  Low profile heatsink for cExpress-kL with through hole standoffs for top mounting
- **THSH-cKL-B**
  High profile heatsink for cExpress-KL with threaded standoffs for top mounting

Active Heatsink

- **THSF-cKL-B**
  High profile heatsink with Fan for cExpress-KL with threaded standoffs for bottom mounting

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