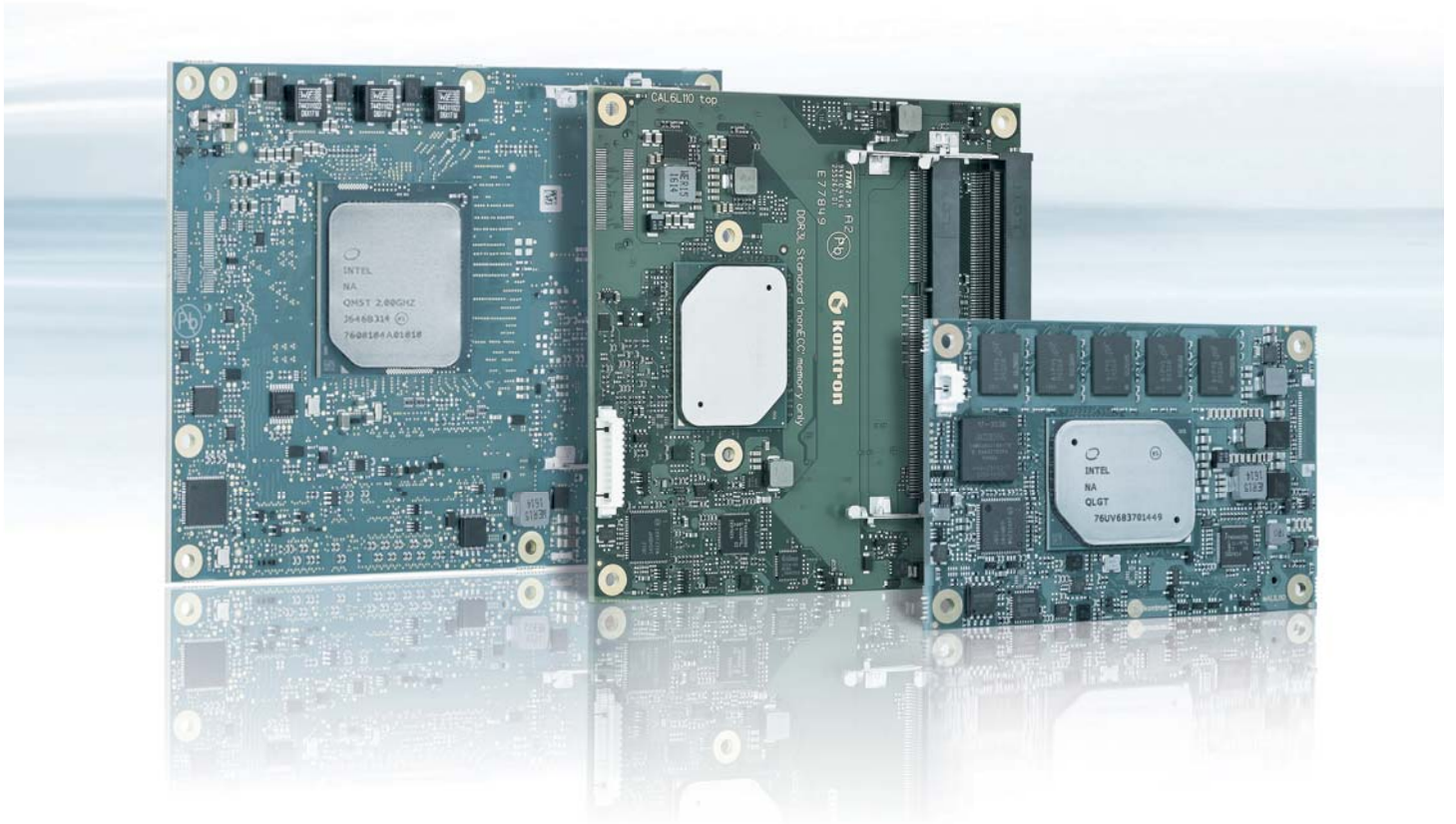


# COM EXPRESS® TYPE 6/7/10 STANDARD COMPUTER-ON-MODULES

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- ▶ COM EXPRESS® BASIC
- ▶ COM EXPRESS® COMPACT
- ▶ COM EXPRESS® MINI
- ▶ COM EXPRESS® CARRIER

# COM EXPRESS® basic

## Tech Specs At-a-Glance



COM EXPRESS® basic

COMe-BCL6/-BCL6R E2S

COMe-bKL6/-bKL6R E2S

COMe-bSL6/-bSL6R E2S

COMe-bBD7/-bBD7R E2

COMe-bDV7/-bDV7R E2

COMPLIANCE	COM Express® basic, Pin-out Type 6	COM Express® basic, Pin-out Type 6	COM Express® basic, Pin-out Type 6	COM Express® Basic, Pin-out Type 7	COM Express® Basic, Pin-out Type 7
<b>DIMENSIONS (H X W)</b>	125 x 95 mm	125 x 95 mm	125 x 95 mm	95 x 125 mm	95 x 125 mm
<b>CPU</b>	Intel® Xeon® E-2176M, 6x 2.7 GHz (4.4 GHz), GT2, 45/35 W Intel® Core™ i7-8850H, 6x 2.6 GHz (4.3 GHz), GT2, 45/35 W Intel® Core™ i5-8400H, 4x 2.5 GHz (4.2 GHz), GT2, 45/35 W Intel® Core™ i3-8100H, 4x 3.0 GHz, GT2, 45/35 W	Intel® Xeon® E3-1505M v6, 4x 3.0 GHz (4.0 GHz), GT2, 45/35 W Intel® Xeon® E3-1505L v6, 4x 2.2 GHz (3.0 GHz), GT2, 25 W Intel® i7-7820EQ Core™ i7, 4x 3.0 GHz (3.7 GHz), GT2, 45/35 W Intel® i5-7440EQ Core™ i5, 4x 2.9 GHz (3.6 GHz), GT2, 45/35 W Intel® i5-7442EQ Core™ i5, 4x 2.1 GHz (2.9 GHz), GT2, 25 W Intel® i3-7100E Core™ i3, 2x 2.9 GHz, GT2, 35 W Intel® i3-7102E Core™ i3, 2x 2.1 GHz, GT2, 25 W	Intel® Xeon® E3-1515M v5, 4x 2.8 GHz (3.7 GHz), GT4e, 45/35 W Intel® Xeon® E3-1505M v5, 4x 2.8 GHz (3.7 GHz), GT2, 45/35 W Intel® Xeon® E3-1505L v5, 4x 2.0 GHz (2.8 GHz), GT2, 25 W Intel® Core™ i7-6820EQ, 4x 2.8 GHz (3.5 GHz), GT2, 45 W Intel® Core™ i7-6822EQ, 4x 2.0 GHz (2.8 GHz), GT2, 25 W Intel® Core™ i5-6440EQ, 4x 2.7 GHz (3.4 GHz), GT2, 45/35 W Intel® Core™ i5-6442EQ, 4x 1.9 GHz (2.7 GHz), GT2, 25 W Intel® Core™ i3-6100E, 2x 2.7 GHz, GT2, 35 W Intel® Core™ i3-6102E, 2x 1.9 GHz, GT2, 25 W Intel® Celeron® G3900E, 2x 2.4 GHz (2.7 GHz), GT1, 35 W Intel® Celeron® G3902E, 2x 1.6 GHz, GT1, 25 W	Intel® Xeon® Processor D-1577, 16 C, 1.3 GHz, 24 MByte, 45 W, Intel® Xeon® Processor D-1548, 8 C, 2.0 GHz, 12 MByte, 45 W, Intel® Xeon® Processor D-1537, 8 C, 1.7 GHz, 12 MByte, 35 W, Intel® Xeon® Processor D-1528, 6 C, 1.9 GHz, 9 MByte, 35 W, Intel® Xeon® Processor D-1527, 4 C, 2.2 GHz, 6 MByte, 35 W, Intel® Xeon® Processor D-1517, 4 C, 1.6 GHz, 6 MByte, 25 W, Intel® Pentium® Processor D1508, 2 C, 2.2 GHz, 3 MByte, 25 W, Intel® Xeon® Processor D-1559, 12 C, 1.5 GHz, 18 MByte, 45 W, ind. Temp Intel® Xeon® Processor D-1539, 8 C, 1.6 GHz, 12 MByte, 35 W, ind. Temp Intel® Pentium® Processor D1519, 4 C, 1.5 GHz, 6 MByte, 25 W, ind. Temp	Commercial temperature: Intel® Atom® Processor C3958, 16C, 2.0GHz, 31W TDP Intel® Atom® Processor C3858, 12C, 2.0GHz, 25W TDP Intel® Atom® Processor C3758, 8C, 2.2GHz, 25W TDP Intel® Atom® Processor C3558, 4C, 2.2GHz, 16W TDP  Industrial temperature: Intel® Atom® Processor C3808, 12C, 2.0 GHz, 25 W TDP Intel® Atom® Processor C3708, 8C, 1.7 GHz, 17 W TDP Intel® Atom® Processor C3508, 4C, 1.5 GHz, 11 W TDP Intel® Atom® Processor C3308, 2C, 1.6 GHz, 9 W TDP
<b>CHIPSET</b>	Intel® Mobile CM246 (Xeon®) / Intel® Mobile QM370 (Core™)	Intel® Mobile CM238 / Intel® Mobile QM175 (Core™ i5 & Core™ i7)	Intel® Mobile CM236 / Intel® Mobile QM170 (Core™ i5 & Core™ i7)	-	-
<b>MAIN MEMORY</b>	Up to 4x DDR4-2400 SO-DIMM with up to 64 GByte (non-ECC/ECC) (3rd/4th socket on request)	2x DDR4-2400 SO-DIMM up to 2x 16 GByte (non-ECC/ECC)	2x DDR4-2133 SO-DIMM up to 2x 16 GByte (non-ECC/ECC)	2x DDR4 SODIMM dual channel up to 2 x 32 GByte ECC or non ECC	2x DDR4 SODIMM for up to 32 GByte ECC / non ECC on request: 4x DDR4 SODIMM for up to 64 GByte ECC / non ECC
<b>GRAPHICS CONTROLLER</b>	Intel® HD Graphics P630 for Xeon® processor Intel® HD Graphics 630 for Core™ processors	Intel® HD Graphics P630 for Xeon® processors Intel® HD Graphics 630 for Core™ processors	Intel® Iris™ Pro Graphics P580 (GT4e), Intel® HD Graphics P530 (GT2), Intel® HD Graphics P510 (GT1)	-	-
<b>ETHERNET CONTROLLER</b>	Intel® I219LM	Intel® I219LM	Intel® I219LM	Intel® I210IT (uses one lane of PCIe 2.0) Intel® Dual 10GbE LAN integrated in SoC	Intel® I210IT (uses one lane of PCIe 3.0) Intel® Quad 10GbE LAN integrated in SoC
<b>ETHERNET</b>	10/100/1000 MBit Ethernet	10/100/1000 MBit Ethernet	10/100/1000 MBit Ethernet	1x 10/100/1000 MBit Ethernet Dual 10GbE Interface (KR) and NC-SI	1x 10/100/1000 MBit Ethernet Up to 4x 10GbE Interfaces (KR) – depending on C3000 SKU NC-SI support
<b>HARD DISK</b>	4x SATA 6Gb/s	4x SATA 6Gb/s	4x SATA 6Gb/s	2x SATA3, 6Gb/s	Up to 2x SATA3, 6Gb/s
<b>FLASH ONBOARD</b>	Up to 1 TByte NVMe SSD (on request)	-	-	-	eMMC 5.0 up to 64 GByte SLC or 128GByte MLC (build option)
<b>PCI EXPRESS® / PCI SUPPORT</b>	8x PCIe x1, 1x PEG x16	8x PCIe x1, 1x PEG x16	8x PCIe x1, 1x PEG x16	24x PCIe 3.0 (6 controllers, x16, x8, x4, x1 operation) 8x PCIe 2.0 (8 controllers, x8, x4, x1 configuration), one lane used by onboard 1 GbE LAN controller	Up to 14x PCIe 3.0 lanes – depending on C3000 SKU
<b>PANEL SIGNAL</b>	DDI1: DP++, DDI2: DP++, DDI3: DP++, VGA: -, LVDS: Dual Channel 18/24bit	DDI1: DP++, DDI2: DP++, DDI3: DP++, VGA: -, LVDS: Dual Channel 18/24bit	DDI1: DP++, DDI2: DP++, DDI3: DP++, VGA: -, LVDS: Dual Channel 18/24bit	-	-
<b>USB</b>	4x USB 3.1 (incl. USB 2.0) + 4x USB 2.0	4x USB 3.0 (incl. USB 2.0) + 4x USB 2.0	4x USB 3.0 (incl. USB 2.0) + 4x USB 2.0	4x USB 3.0/2.0 (1x USB used for onboard security chip) 2x serial interface (RX/TX only)	Up to 3x USB3.0 / 4x USB2.0 (3x USB2.0 with WIBU security chip) 2x serial interface (RX/TX only)
<b>SERIAL</b>	2x serial interface (RX/TX only)	2x serial interface (RX/TX only)	2x serial interface (RX/TX only)	-	-
<b>AUDIO</b>	Intel® High Definition Audio	Intel® High Definition Audio	Intel® High Definition Audio	SPI, LPC, SMB, Fast I <sup>2</sup> C, Staged Watchdog, RTC	SPI, LPC, SMB, Fast I <sup>2</sup> C, Staged Watchdog, RTC
<b>COMMON FEATURES</b>	SPI, LPC, SMB, Fast I <sup>2</sup> C, Staged Watchdog, RTC, support of Intel® Optane™ memory technology via PCIe	SPI, LPC, SMB, Fast I <sup>2</sup> C, Staged Watchdog, RTC, support of Intel® Optane™ memory technology via PCIe	SPI, LPC, SMB, Fast I <sup>2</sup> C, Staged Watchdog, RTC	-	-
<b>BIOS</b>	AMI Aptio V	AMI Aptio V	AMI Aptio V	AMI UEFI	AMI UEFI
<b>ON REQUEST</b>	vPRO (AMT/TXT/AES Support), eDP instead of LVDS, VGA, Intel® Mobile HM370 Chipset, 3rd/4th DDR4-2400 SO-DIMM socket, NVMe SSD	vPRO (AMT/TXT/AES Support), eDP instead of LVDS, VGA, Intel® Mobile HM175 Chipset	vPRO (AMT/TXT/AES Support), eDP instead of LVDS, VGA, Intel® Mobile HM170 Chipset	-	eMMC size, additional 2 SODIMM sockets for overall 4 SODIMM sockets
<b>POWER MANAGEMENT</b>	ACPI 6.0	ACPI 6.0	ACPI 6.0, S5 Eco	ACPI 5.0	ACPI 6.0
<b>POWER SUPPLY</b>	8.5 V – 20 V Wide Range, Single Supply Power	8.5 V – 20 V Wide Range, Single Supply Power	8.5 V – 20 V Wide Range, Single Supply Power	ATX, 8.5 V – 20 V Wide Range, Single Supply Power	ATX, 8.5 V – 20 V Wide Range, Single Supply Power
<b>SPECIAL FEATURES</b>	POSCAP capacitors, Trusted Platform Module TPM 2.0, Security Chip, 4k Resolutions, Flexible PEG lane configuration by Setup Option, Rapid shutdown (R E2S variants)	POSCAP capacitors, Trusted Platform Module TPM 2.0, Security Chip, 4k Resolutions, Flexible PEG lane configuration by Setup Option, Rapid Shutdown (R E2S variants)	POSCAP capacitors, Trusted Platform Module TPM 2.0, Security Chip, 4k Resolutions, Flexible PEG lane configuration by Setup Option, Rapid Shutdown (R E2S variants)	Trusted Platform Module TPM 2.0, Security Chip for Kontron security stack (APPROTECT)	Trusted Platform Module TPM 2.0, Security Chip for Kontron security stack (APPROTECT)
<b>TEMPERATURE</b>	Commercial temperature: 0 °C to +60 °C operating, -30 °C to +85 °C non-operating Extended temperature: -25 °C to +75 °C operating, -30 °C to +85 °C non-operating Industrial temperature: -40 °C to +85 °C operating, -40 °C to +85 °C non-operating	COMe-bKL6 - Commercial temperature: 0 °C to +60 °C operating, -30 °C to +85 °C non-operating COMe-bKL6R E2S - Industrial temperature: -40 °C to +85 °C operating, -40 °C to +85 °C non-operating	COMe-bSL6 - Commercial temperature: 0 °C to +60 °C operating, -30 °C to +85 °C non-operating COMe-bSL6R E2S - Industrial temperature: -40 °C to +85 °C operating, -40 °C to +85 °C non-operating	COMe-bBD7 - Commercial temperature: 0 °C to +60 °C operating, -30 °C to +85 °C non-operating COMe-bBD7R E2 - Industrial temperature: -40 °C to +85 °C operating, -40 °C to +85 °C non-operating	Commercial grade Version Temperature 0 °C - 60 °C, Industrial grade Versions -40 °C to +85 °C
<b>OPERATING SYSTEM</b>	Windows® 10, Linux, VxWorks	Windows® 10, Linux, VxWorks	Windows® 10, Windows® 8.1, Windows® 7, WES7, Linux, VxWorks	Linux, Windows® Server 2012 / 2012 R2 / 2016, Windows® 7, Windows® 10, VxWorks 7.x	Linux, Windows® Server 2012 / 2012 R2 / 2016, Windows® 7, VxWorks 7.x

# COM EXPRESS® compact

low power mobile



NEW!



## COM EXPRESS® compact

### COMe-cVR6 (E2)

### COMe-cKL6

### COMe-cSL6

<b>COMPLIANCE</b>	COM Express® compact Pin-out Type 6
<b>DIMENSIONS (H X W)</b>	95 x 95 mm
<b>CPU</b>	AMD V1807B, 4x 3.35 GHz (3.75 GHz), 35-54W AMD V1756B, 4x 3.25 GHz (3.6 GHz), 35-54W AMD V1605B, 4x 2.0 GHz (3.6 GHz), 12-25W AMD V1202B, 2x 2.5 GHz (3.4 GHz), 12-25W AMD V1404I, 4x x.x GHz (x.x GHz), 15W
<b>CHIPSET</b>	Integrated SoC
<b>MAIN MEMORY</b>	1x DDR4 SO-DIMM up to 16 GByte, 2nd channel DDR4 memory down up to 8 GByte (non-ECC/ECC)
<b>GRAPHICS CONTROLLER</b>	Integrated AMD Vega Graphics (GFX9)
<b>ETHERNET CONTROLLER</b>	Intel® I210/I211
<b>ETHERNET</b>	10/100/1000 MBit Ethernet
<b>HARD DISK</b>	2x SATA 6Gb/s, SDIO Interface (shared with GPIO)
<b>FLASH ONBOARD</b>	-
<b>PCI EXPRESS® / PCI SUPPORT</b>	5x PCIe 3.0 (On request: 6x without Ethernet) On request: 8x PCIe x1 with 4x PCIe 3.0 + 4x PCIe 2.0 1x PEG x8
<b>PANEL SIGNAL</b>	DDI1: DP++, DDI2: DP++, DDI3: DP, VGA: -, LVDS: Dual Channel 18/24 bit
<b>USB</b>	3x USB 3.x (incl. USB 2.0) + 5x USB 2.0
<b>SERIAL</b>	2x serial interface (RX/TX only)
<b>AUDIO</b>	High Definition Audio interface
<b>COMMON FEATURES</b>	SPI, LPC, SMB, Fast I <sup>2</sup> C, Staged Watchdog, RTC
<b>BIOS</b>	AMI Aptio V
<b>ON REQUEST</b>	eDP instead of LVDS, VGA, 1x PCIe x1 additional w/o onboard LAN, PCIe Switch, Security Chip
<b>POWER MANAGEMENT</b>	ACPI 6.0
<b>POWER SUPPLY</b>	8.5V – 20V Wide Range, Single Supply Power
<b>SPECIAL FEATURES</b>	POSCAP capacitors, Trusted Platform Module TPM 2.0
<b>TEMPERATURE</b>	COMe-cVR6 - commercial temperature: 0 °C to +60 °C operating, -30 °C to +85 °C non-operating COMe-cVR6 E2 - industrial temperature: -40 °C to +85 °C operating, -40 °C to +85 °C non-operating
<b>OPERATING SYSTEM</b>	Windows® 10, Linux

<b>COMPLIANCE</b>	COM Express compact Pin-out Type 6
<b>DIMENSIONS (H X W)</b>	95 x 95 mm
<b>CPU</b>	Intel® Core™ i7-7600U, 2x 2.8 GHz (3.9 GHz), GT2, 15 W Intel® Core™ i5-7300U, 2x 2.6 GHz (3.5 GHz), GT2, 15 W Intel® Core™ i3-7100U, 2x 2.4 GHz, GT2, 15 W Intel® Celeron® 3965U, 2x 2.2 GHz, GT1, 15 W
<b>CHIPSET</b>	Integrated SoC
<b>MAIN MEMORY</b>	1x DDR4 SO-DIMM up to 16 GByte, 2nd channel DDR4- memory down up to 8 GByte
<b>GRAPHICS CONTROLLER</b>	Intel® HD Graphics 620 (Celeron® 3965U: Intel® HD Graphics 610)
<b>ETHERNET CONTROLLER</b>	Intel® I219LM
<b>ETHERNET</b>	10/100/1000 MBit Ethernet
<b>HARD DISK</b>	2x SATA 6Gb/s
<b>FLASH ONBOARD</b>	up to 32 GByte SLC eMMC (depending on SKU - standard feature or available on request)
<b>PCI EXPRESS® / PCI SUPPORT</b>	5x PCIe3.0 on PCIe lane 0-4 (3.0 only i5/ i7 SKUs) 5 controllers, 5 x1, 1 x4 + 1x 1 Option: 6 Lanes if no LAN 4x PCIe3.0 on PEG Lanes 0-3 (3.0 only i5/ i7 SKUs) 1 Controller, 1 x4 or 1 x2 or 1 x1, (Intel® RST)
<b>PANEL SIGNAL</b>	DDI1: DP++, DDI2: DP++, DDI3: -, VGA: -, LVDS: Dual Channel 18/24 bit
<b>USB</b>	4x USB 3.0 (incl. USB 2.0) + 4x USB 2.0
<b>SERIAL</b>	2x serial interface (RX/TX only)
<b>AUDIO</b>	Intel® High Definition Audio
<b>COMMON FEATURES</b>	SPI, LPC, SMB, Fast I <sup>2</sup> C, Staged Watchdog, RTC, support of Intel® Optane™ memory technology via PCIe
<b>BIOS</b>	AMI Aptio V
<b>ON REQUEST</b>	vPRO (AMT/TXT/AES Support), eDP instead of LVDS, 1x PCIe x1 additional w/o onboard LAN, max. 32 GByte SLC eMMC, industrial grade -40 °C to +85 °C
<b>POWER MANAGEMENT</b>	ACPI 6.0
<b>POWER SUPPLY</b>	8.5 V – 20 V Wide Range ATX, Single Supply Power
<b>SPECIAL FEATURES</b>	POSCAP capacitors, Trusted Platform Module TPM 2.0, Security Chip
<b>TEMPERATURE</b>	Commercial temperature: 0 °C to +60 °C operating, -30 °C to +85 °C non-operating Extended temperature: -25 °C to +75 °C operating, -30 °C to +85 °C non-operating
<b>OPERATING SYSTEM</b>	Windows®10, Linux, VxWorks

<b>COMPLIANCE</b>	COM Express compact Pin-out Type 6
<b>DIMENSIONS (H X W)</b>	95 x 95 mm
<b>CPU</b>	Intel® Core™ i7-6600U, 2x 2.60 GHz, GT3, 15 W Intel® Core™ i5-6300U, 2x 2.40 GHz, GT3, 15 W Intel® Core™ i3-6100U, 2x 2.30 GHz, GT2, 15 W Intel® Celeron® Processor 3955U, 2x 2.0 GHz, GT1, 15 W
<b>CHIPSET</b>	Integrated SoC
<b>MAIN MEMORY</b>	1x DDR4 SO-DIMM up to 16 GByte, 2nd channel DDR4- memory down up to 8 GByte
<b>GRAPHICS CONTROLLER</b>	Intel® HD Graphics 520 (Celeron® 3955U: Intel® HD Graphics 510)
<b>ETHERNET CONTROLLER</b>	Intel® I219LM
<b>ETHERNET</b>	10/100/1000 MBit Ethernet
<b>HARD DISK</b>	2x SATA 6Gb/s
<b>FLASH ONBOARD</b>	up to 32 GByte SLC eMMC (depending on SKU - standard feature or available on request)
<b>PCI EXPRESS® / PCI SUPPORT</b>	5x PCIe3.0 on PCIe lane 0-4 (3.0 only i5/ i7 SKUs) 5 controllers, 5 x1, 1 x4 + 1x 1 Option: 6 Lanes if no LAN 4x PCIe3.0 on PEG Lanes 0-3 (3.0 only i5/ i7 SKUs) 1 Controller, 1 x4 or 1 x2 or 1 x1, (Intel® RST)
<b>PANEL SIGNAL</b>	DDI1: DP++, DDI2: DP++, DDI3: -, VGA: -, LVDS: Dual Channel 18/24 bit
<b>USB</b>	4x USB 3.0 (incl. USB 2.0) + 4x USB 2.0
<b>SERIAL</b>	2x serial interface (RX/TX only)
<b>AUDIO</b>	Intel® High Definition Audio
<b>COMMON FEATURES</b>	SPI, LPC, SMB, Fast I <sup>2</sup> C, Staged Watchdog, RTC, MARS
<b>BIOS</b>	AMI Aptio V
<b>ON REQUEST</b>	vPRO (AMT/TXT/AES Support), eDP instead of LVDS, 1x PCIe x1 additional w/o onboard LAN, max. 32 GByte SLC eMMC, industrial grade -40 °C to +85 °C
<b>POWER MANAGEMENT</b>	ACPI 6.0, S5 Eco
<b>POWER SUPPLY</b>	8.5 V – 20 V Wide Range ATX, Single Supply Power
<b>SPECIAL FEATURES</b>	POSCAP capacitors, Trusted Platform Module TPM 2.0, Security Chip
<b>TEMPERATURE</b>	Commercial temperature: 0 °C to +60 °C operating, -30 °C to +85 °C non-operating Extended temperature: -25 °C to +75 °C operating, -30 °C to +85 °C non-operating
<b>OPERATING SYSTEM</b>	Windows® 10, Windows® 8.1, Windows® 7, WES7, Linux, VxWorks

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# COM EXPRESS® compact

low power value



## COM EXPRESS® compact

### COMe-cAL6 (E2)

### COMe-cBTc6 / cBTi6

### COMe-cBTi6R

### COMe-cBW6

<b>COMPLIANCE</b>	COM Express® compact Pin-out Type 6
<b>DIMENSIONS (H X W X D)</b>	95 x 95 mm
<b>CPU</b>	COMe-cAL6 E2: Intel® Atom™ x7-E3950, 4C, 1.6 / 2.0 GHz, 12 W TDP Intel® Atom™ x5-E3940, 4C, 1.6 / 1.8 GHz, 9.5 W TDP Intel® Atom™ x5-E3930, 2C, 1.3 / 1.8 GHz, 6.5 W TDP  COMe-cAL6: Intel® Pentium® N4200, 4C, 1.1 / 2.5 GHz, 6 W TDP Intel® Celeron® N3350, 2C, 1.1 / 2.4 GHz, 6 W
<b>CHIPSET</b>	Integrated SoC
<b>MAIN MEMORY</b>	2x SODIMM for DDR3L-1600/1867 (non ECC) up to 8 GByte
<b>GRAPHICS CONTROLLER</b>	Intel HD Gfx Gen9: 1x LVDS/eDP (3840 x 2160 @ 60 Hz), 2x DP (++) on DDI1/DDI2 up to 4K
<b>ETHERNET CONTROLLER</b>	Intel® I210IT / I211AT
<b>ETHERNET</b>	10/100/1000 MBit Ethernet
<b>HARD DISK</b>	2x SATA 6Gb/s, SDIO Interface (shared with GPIO)
<b>FLASH ONBOARD</b>	32 GByte eMMC SLC on request: - up to 64 GByte eMMC SLC - up to 128 GByte eMMC MLC
<b>PCI EXPRESS® / PCI SUPPORT</b>	3x PCIe Gen 2.0 on request: - w/ LAN and PCIe hub: 5x PCIe x1 or 1x PCIe x2 + 3x PCIe x1 - w/o LAN and PCIe hub: 2x PCIe x2 or 1x PCIe x4
<b>PANEL SIGNAL</b>	DDI 1/2: DP++, LVDS: Dual Channel up to 48-bit (or eDP on request)
<b>USB</b>	4x USB 3.0/2.0, 4x USB 2.0 (3x USB 2.0 w Security Chip)
<b>SERIAL</b>	2x serial interface (RX/TX only)
<b>AUDIO</b>	Intel® High Definition Audio
<b>COMMON FEATURES</b>	SPI, LPC, SMB, Fast I <sup>2</sup> C, Staged Watchdog, RTC
<b>BIOS</b>	AMI Aptio V
<b>ON REQUEST</b>	PCIe configurations w/ PCI hub and w/o LAN chip eMMC Flash configuration eDP instead of LVDS General Purpose SPI instead of Boot SPI, AES-NI, USB client
<b>POWER MANAGEMENT</b>	ACPI 6.0
<b>POWER SUPPLY</b>	8.5 V – 20 V Wide Range, Single Supply Power
<b>SPECIAL FEATURES</b>	POSCAP capacitors, Trusted Platform Module TPM 2.0, Security Chip (Support of Kontron Approtect), microSD card socket 4k Resolutions, GPIO/SDIO Switch, Industrial grade temperature
<b>TEMPERATURE</b>	COMe-cAL6 - commercial temperature: 0 °C to +60 °C operating, -30 °C to +85 °C non-operating COMe-cAL6 E2 - industrial temperature: -40 °C to +85 °C operating, -40 °C to +85 °C non-operating
<b>OPERATING SYSTEM</b>	Windows® 10 Enterprise, Windows 10 IoT, Linux, VxWorks

<b>COMPLIANCE</b>	COM Express® compact Pin-out Type 6
<b>DIMENSIONS (H X W X D)</b>	95 x 95 mm
<b>CPU</b>	COMe-cBTi6: Intel® Atom™ E3845 (4x 1.91 GHz, 10 W) Intel® Atom™ E3827 (2x 1.75 GHz, 8 W) Intel® Atom™ E3826 (2x 1.46 GHz, 7 W) Intel® Atom™ E3825 (2x 1.33 GHz, 6 W) Intel® Atom™ E3815 (1x 1.46 GHz, 5 W)  COMe-cBTc6: Intel® Celeron® J1900 (4x 2.00 GHz, 10 W) Intel® Celeron® N2930 (4x 1.83 GHz, 7.5 W) Intel® Celeron® N2807 (2x 1.58 GHz, 4.5 W) Intel® Atom™ E3815 (1x 1.46 GHz, 5 W)
<b>CHIPSET</b>	Integrated SoC
<b>MAIN MEMORY</b>	2x DDR3L-1333 SODIMM up to 2x 4 GByte
<b>GRAPHICS CONTROLLER</b>	Intel® HD Graphics (Gen7)
<b>ETHERNET CONTROLLER</b>	COMe-cBTc6 Intel® I211AT COMe-cBTi6 Intel® I210IT
<b>ETHERNET</b>	10/100/1000 MBit Ethernet
<b>HARD DISK</b>	2x SATA 3Gb/s
<b>FLASH ONBOARD</b>	on E3800 CPU only: 2 - 64 GByte eMMC, 1x microSD Socket
<b>PCI EXPRESS® / PCI SUPPORT</b>	3x PCIe Gen 2.0 Option: 4 Lanes if no LAN
<b>PANEL SIGNAL</b>	DDI1: DP++, DDI2: DP++ (shared w/LVDS), DDI3: -, VGA: Yes, LVDS: Dual Channel 18/24bit
<b>USB</b>	1x USB 3.0 (incl. USB 2.0), 3x USB 2.0 from CPU, on COMe-cBTi6 Version only: 4x USB 2.0 from HSIC Hub
<b>SERIAL</b>	2x serial interface (RX/TX only)
<b>AUDIO</b>	Intel® High Definition Audio
<b>COMMON FEATURES</b>	SPI, LPC, SMB, Fast I <sup>2</sup> C, Staged Watchdog, RTC, MARS
<b>BIOS</b>	Phoenix Secure Core UEFI
<b>ON REQUEST</b>	1x PCIe x1 additional w/o onboard LAN, Trusted Platform Module TPM 1.2, on E38xx CPU only: eMMC Flash on board (2 - 32 GByte SLC, 4 - 64 GByte MLC), AES-NI
<b>POWER MANAGEMENT</b>	ACPI 4.0, S5 Eco
<b>POWER SUPPLY</b>	4.75 V – 20 V Wide Range, Single Supply Power
<b>SPECIAL FEATURES</b>	POSCAP capacitors, LVDS/DP Multiplexer
<b>TEMPERATURE</b>	Commercial temperature: 0 °C to +60 °C operating Industrial temperature: -40 °C to +85 °C operating
<b>OPERATING SYSTEM</b>	Windows® 8, Windows® 7, WE8S, WES7, Linux, VxWorks

<b>COMPLIANCE</b>	COM Express® compact Pin-out Type 6
<b>DIMENSIONS (H X W X D)</b>	95 x 95 mm
<b>CPU</b>	Intel® Atom™ E3845 (4x 1.91 GHz, 10 W) Intel® Atom™ E3827 (2x 1.75 GHz, 8 W) Intel® Atom™ E3826 (2x 1.46 GHz, 7 W) Intel® Atom™ E3825 (2x 1.33 GHz, 6 W) Intel® Atom™ E3815 (1x 1.46 GHz, 5 W)
<b>CHIPSET</b>	Integrated SoC
<b>MAIN MEMORY</b>	2x DDR3L-1333 ECC memory down up to 4 GByte or 2x DDR3L-1333 memory down up to 8 GByte
<b>GRAPHICS CONTROLLER</b>	Intel® HD Graphics (Gen7)
<b>ETHERNET CONTROLLER</b>	USB SMSC LAN7500i, PCIe Intel® I210IT optional
<b>ETHERNET</b>	10/100/1000 MBit Ethernet
<b>HARD DISK</b>	2x SATA 3Gb/s
<b>FLASH ONBOARD</b>	2 - 64 GByte eMMC, 1x microSD Socket
<b>PCI EXPRESS® / PCI SUPPORT</b>	4x PCIe Gen 2.0
<b>PANEL SIGNAL</b>	DDI1: DP++, DDI2: DP++ (shared w/LVDS), DDI3: -, VGA: Yes, LVDS: Dual Channel 18/24bit
<b>USB</b>	1x USB 3.0 (incl. USB 2.0), 2x USB 2.0 from CPU, 4x USB 2.0 from HSIC Hub, 1x USB OTG
<b>SERIAL</b>	2x serial interface (RX/TX only)
<b>AUDIO</b>	Intel® High Definition Audio
<b>COMMON FEATURES</b>	SPI, LPC, SMB, Fast I <sup>2</sup> C, Staged Watchdog, RTC, MARS
<b>BIOS</b>	Phoenix Secure Core UEFI
<b>ON REQUEST</b>	ECC or non-ECC memory, eMMC Flash onboard (2 - 32 GByte SLC, 4 - 64 GByte MLC), microSD Socket, PCIe GB Ethernet, AES-NI
<b>POWER MANAGEMENT</b>	ACPI, S5 Eco Kontron Rapid Shutdown
<b>POWER SUPPLY</b>	4.75 V – 20 V Wide Range, Single Supply Power
<b>SPECIAL FEATURES</b>	POSCAP capacitors, GPIO/SDIO Switch, LVDS/DP Multiplexer, 2x MIPI-CSI on PEG interface, memory down, Kontron Rapid Shutdown
<b>TEMPERATURE</b>	Industrial temperature: -40 °C to +85 °C operating
<b>OPERATING SYSTEM</b>	Windows® 8, Windows® 7, WE8S, WES7, Linux, VxWorks

<b>COMPLIANCE</b>	COM Express® compact Pin-out Type 6
<b>DIMENSIONS (H X W X D)</b>	95 x 95 mm
<b>CPU</b>	Intel® Pentium® N3710 (4x 1.60 GHz/2.56 GHz, 6 W) Intel® Celeron® N3160 (4x 1.60 GHz/2.24 GHz, 6 W) Intel® Celeron® N3060 (4x 1.60 GHz/2.48 GHz, 6 W) Intel® Celeron® N3010 (4x 1.04 GHz/2.24 GHz, 4 W) Intel® Atom™ Processor x5-E8000 (4x 1.04 GHz, 5 W)
<b>CHIPSET</b>	Integrated SoC
<b>MAIN MEMORY</b>	2x SODIMM for DDR3L-1333/1600 (non ECC) up to 2x 4 GByte, 8 GByte total
<b>GRAPHICS CONTROLLER</b>	Intel® HD® Graphics
<b>ETHERNET CONTROLLER</b>	Intel® I211AT
<b>ETHERNET</b>	10/100/1000 MBit Ethernet
<b>HARD DISK</b>	2x SATA3 6Gb/s
<b>FLASH ONBOARD</b>	Up to 32 GByte SLC eMMC (option)
<b>PCI EXPRESS® / PCI SUPPORT</b>	3x PCIe2.0 on PCIe lane 0-2 (3 controllers, 3 x1) Option: 4 Lanes if no LAN (4 controllers, 4 x1, 1 x4)
<b>PANEL SIGNAL</b>	3 independent Displays DDI1: DP++, DDI2: DP++, LVDS: Dual Channel 18/24bit, VGA optional on DDI2
<b>USB</b>	4x USB 3.0/2.0, + 4x USB 2.0
<b>SERIAL</b>	2x serial interface (RX/TX only)
<b>AUDIO</b>	Intel® High Definition Audio
<b>COMMON FEATURES</b>	SPI, LPC, SMB, Fast I <sup>2</sup> C, Staged Watchdog, RTC, MARS
<b>BIOS</b>	AMI AptioV UEFI
<b>ON REQUEST</b>	1x PCIe x1 additional w/o onboard LAN, onboard SSD (32 GByte eMMC), eDP instead of LVDS, VGA instead DDI2
<b>POWER MANAGEMENT</b>	ACPI 5.0, S5 Eco
<b>POWER SUPPLY</b>	8.5 V – 20 V Wide Range ATX, Single Supply Power
<b>SPECIAL FEATURES</b>	POSCAP capacitors, LVDS/DP Multiplexer, microSD card socket*
<b>TEMPERATURE</b>	Commercial temperature: 0° C to +60° C operating, -30° C to +85° C non-operating
<b>OPERATING SYSTEM</b>	Win7, Win8.1, WES8, Win 10 (all 64Bit), Linux

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# COM EXPRESS® mini

## Tech Specs At-a-Glance



### COM EXPRESS® mini

### COMe-mAL10 (E2)

### COMe-mBTi10

### COMe-mBTc10

<b>COMPLIANCE</b>	COM Express® mini, Pin-out Type 10
<b>DIMENSIONS (W X D)</b>	84 x 55 mm
<b>CPU</b>	COMe-mAL10: Intel® Pentium® N4200, 4C, 1.1 / 2.5 GHz, 6 W TDP Intel® Celeron® N3350, 2C, 1.1 / 2.4 GHz, 6 W TDP  COMe-mAL10 E2: Intel® Atom™ x7-E3950, 4C, 1.6 / 2.0 GHz, 12 W TDP Intel® Atom™ x5-E3940, 4C, 1.6 / 1.8 GHz, 9.5 W TDP Intel® Atom™ x5-E3930, 2C, 1.3 / 1.8 GHz, 6.5 W TDP
<b>MAIN MEMORY</b>	Up to 8 GByte DDR3-1866 (-1600) memory down (ECC for E2-versions)
<b>GRAPHICS CONTROLLER</b>	COMe-mAL10: Intel® I211AT COMe-mAL10 E2: Intel® I210IT
<b>ETHERNET CONTROLLER</b>	Intel® I210IT
<b>ETHERNET</b>	10/100/1000 MBit Ethernet
<b>HARD DISK</b>	2x SATA 6 Gb/s
<b>FLASH ONBOARD</b>	Up to 64 GByte eMMC SLC build option
<b>PCI EXPRESS® / PCI SUPPORT</b>	4x PCIe x1
<b>PANEL SIGNAL</b>	DDI: DP++, LVDS: Single Channel 18/24 bit or eDP
<b>USB</b>	2x USB 3.0 (incl. USB 2.0) 6x USB 2.0 Port 7 is dual role (Client / Host)
<b>SERIAL</b>	2x serial interface (RX / TX only)
<b>AUDIO</b>	Intel® High Definition Audio
<b>COMMON FEATURES</b>	SPI, LPC, SMB, Fast I <sup>2</sup> C, Staged Watchdog, RTC, MARS
<b>BIOS</b>	AMI Aptio V
<b>ON REQUEST</b>	eMMC Flash onboard (up to 64 GByte SLC, up to 128 GByte MLC), eDP instead of LVDS, General Purpose SPI instead of Boot SPI, AES-NI, USB client
<b>POWER MANAGEMENT</b>	ACPI 6.0
<b>POWER SUPPLY</b>	4.75 V – 20 V Wide Range, Single Supply Power
<b>SPECIAL FEATURES</b>	POSCAP capacitors, Trusted Platform Module TPM 2.0, Security Chip (Support of Kontron Appprotect), 4k Resolutions, GPIO / SDIO Switch, General Purpose SPI optional, Industrial Temperature Grade versions
<b>OPERATING SYSTEM</b>	Windows® 10 Enterprise, Windows 10 IoT, Linux, VxWorks
<b>TEMPERATURE</b>	COMe-mAL10 Commercial temperature: 0 °C to +60 °C operating / -30 °C to +85 °C non-operating  COMe-mAL10 E2 Industrial temperature: -40 °C to +85 °C operating / -40 °C to +85 °C non-operating

<b>COMPLIANCE</b>	COM Express® mini, Pin-out Type 10
<b>DIMENSIONS (W X D)</b>	84 x 55 mm
<b>CPU</b>	Intel® Atom™ E3845, 4C, 1.91 GHz, 10 W TDP Intel® Atom™ E3827, 2C, 1.75 GHz, 8 W TDP Intel® Atom™ E3826, 2C, 1.46 GHz, 7 W TDP Intel® Atom™ E3825, 2C, 1.33 GHz, 6 W TDP Intel® Atom™ E3815, 1C, 1.46 GHz, 5 W TDP
<b>MAIN MEMORY</b>	Up to 8 GByte DDR3L-1333 memory down (ECC on request)
<b>GRAPHICS CONTROLLER</b>	Intel® HD Graphics (Gen7)
<b>ETHERNET CONTROLLER</b>	Intel® I210IT
<b>ETHERNET</b>	10/100/1000 MBit Ethernet
<b>HARD DISK</b>	2x SATA 3Gb/s
<b>FLASH ONBOARD</b>	Up to 64 GByte eMMC SLC build option
<b>PCI EXPRESS® / PCI SUPPORT</b>	3x PCIe x1
<b>PANEL SIGNAL</b>	DDI: DP++, LVDS: Single Channel 18/24 bit or eDP
<b>USB</b>	1x USB 3.0 (incl. USB 2.0), 3x USB 2.0 from CPU, 4x USB 2.0 from HSIC Hub
<b>SERIAL</b>	2x serial interface (RX/TX only)
<b>AUDIO</b>	Intel® High Definition Audio
<b>COMMON FEATURES</b>	SPI, LPC, SMB, Fast I <sup>2</sup> C, Staged Watchdog, RTC, MARS
<b>BIOS</b>	Phoenix Secure Core UEFI
<b>ON REQUEST</b>	1x PCIe x1 additional w/o onboard LAN, Trusted Platform Module TPM 1.2, ECC memory, eMMC Flash onboard (2-32 GByte SLC, 4-64 GByte MLC), eDP instead of LVDS, General Purpose SPI instead of Boot SPI, AES-NI
<b>POWER MANAGEMENT</b>	ACPI, S5 Eco
<b>POWER SUPPLY</b>	4.75 V – 20 V Wide Range, Single Supply Power
<b>SPECIAL FEATURES</b>	POSCAP capacitors, GPIO/SDIO Switch, General Purpose SPI optional
<b>OPERATING SYSTEM</b>	Windows® 8, Windows® 7, WE8S, WES7, WEC7, Linux, VxWorks
<b>TEMPERATURE</b>	Industrial temperature: -40 °C to +85 °C operating

<b>COMPLIANCE</b>	COM Express® mini, Pin-out Type 10
<b>DIMENSIONS (W X D)</b>	84 x 55 mm
<b>CPU</b>	Intel® Atom™ E3815, 1C, 1.46 GHz, 5 W TDP Intel® Celeron® J1900, 4C, 2.0 GHz, 10 W TDP Intel® Celeron® N2920, 4C, 1.86 GHz, 7.5 W TDP Intel® Celeron® N2930, 4C, 1.83 GHz, 7.5 W TDP Intel® Celeron® N2807, 2C, 1.58 GHz, 4.3 W TDP
<b>MAIN MEMORY</b>	Up to 8 GByte DDR3L-1333/1066 memory down (E3815: ECC on request)
<b>GRAPHICS CONTROLLER</b>	Intel® HD Graphics (Gen7)
<b>ETHERNET CONTROLLER</b>	Intel® I211AT
<b>ETHERNET</b>	10/100/1000 MBit Ethernet
<b>HARD DISK</b>	2x SATA 3Gb/s
<b>FLASH ONBOARD</b>	E3815 only: Up to 64 GByte eMMC SLC build option
<b>PCI EXPRESS® / PCI SUPPORT</b>	3x PCIe x1
<b>PANEL SIGNAL</b>	DDI: DP++, LVDS: Single Channel 18/24 bit or eDP
<b>USB</b>	1x USB 3.0 (incl. USB 2.0), 3x USB 2.0 from CPU
<b>SERIAL</b>	2x serial interface (RX/TX only)
<b>AUDIO</b>	Intel® High Definition Audio
<b>COMMON FEATURES</b>	SPI, LPC, SMB, Fast I <sup>2</sup> C, Staged Watchdog, RTC, MARS
<b>BIOS</b>	Phoenix Secure Core UEFI
<b>ON REQUEST</b>	1x PCIe x1 additional w/o onboard LAN, Trusted Platform Module TPM 1.2, ECC memory, E3815 variant only: eMMC Flash onboard (2-32 GByte SLC, 4-64 GByte MLC), eDP instead of LVDS, General Purpose SPI instead of Boot SPI, AES-NI
<b>POWER MANAGEMENT</b>	ACPI, S5 Eco
<b>POWER SUPPLY</b>	4.75 V – 20 V Wide Range, Single Supply Power
<b>SPECIAL FEATURES</b>	POSCAP capacitors, GPIO/SDIO Switch, General Purpose SPI optional
<b>OPERATING SYSTEM</b>	Windows® 8, Windows® 7, WE8S, WES7, WEC7, Linux, VxWorks
<b>TEMPERATURE</b>	Commercial temperature: 0 °C to +60 °C operating

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## COM EXPRESS® carrier and Evaluation Boards



### COM EVALUATION BOARDS

minimize installation requirements and reduce dramatically design time. They help to control and cut-back pre-market costs. Evaluation boards are recommended for testing in every design-in.



#### COMe Ref.Carrier-i T10 TNI

COM Express® Reference Carrier Type 10 for industrial temperature Specifications

- ▶ COM Express® Rev. 2.1, Pin-out Type 10
- ▶ nano-ITX Form Factor (120 mm x 120 mm)
- ▶ Comprehensive connectivity
- ▶ Industrial temperature grade



#### COMe Ref.Carrier-i T6 TMI

COM Express® Reference Carrier Type 6 for industrial temperature Specifications

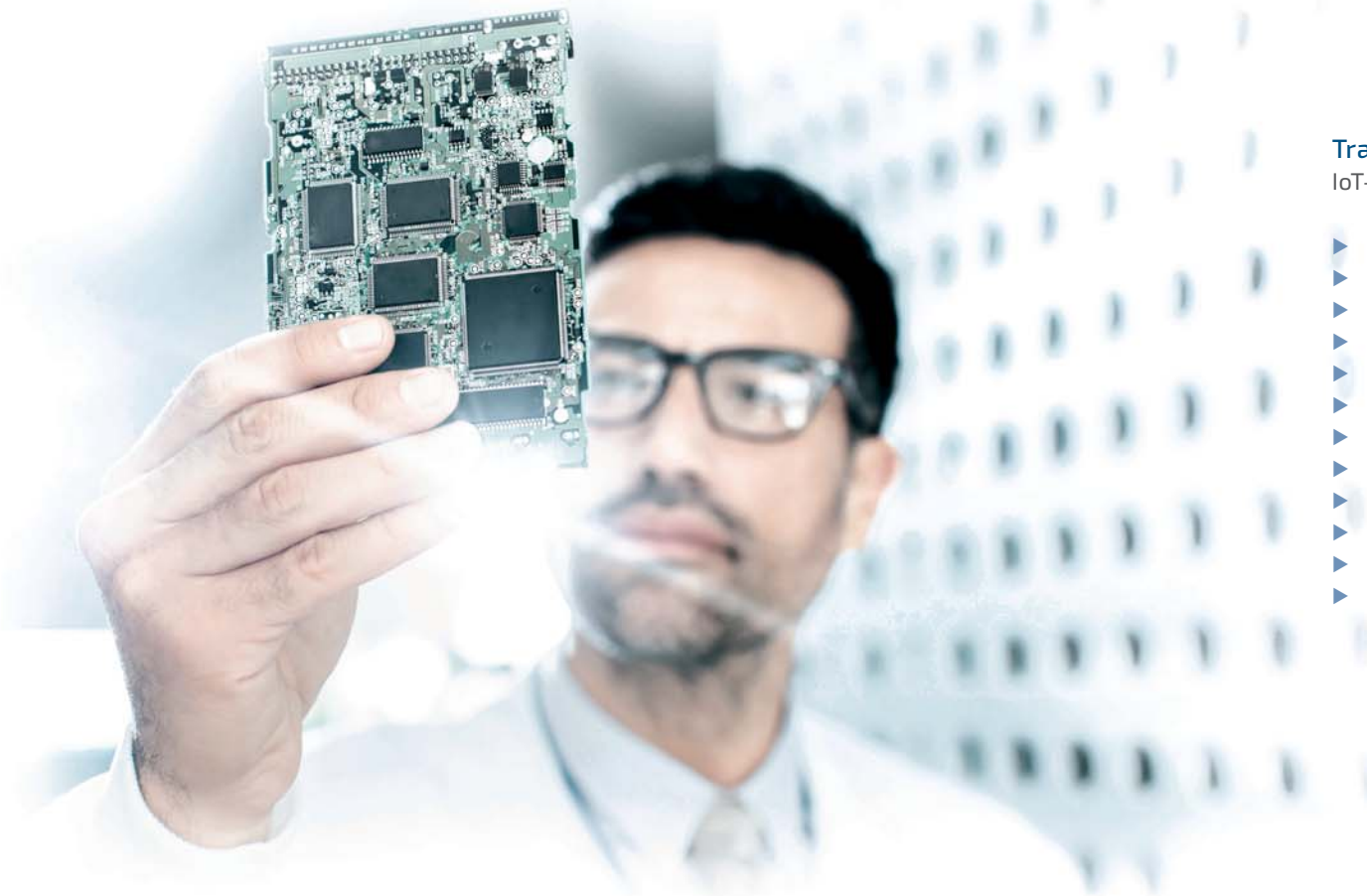
- ▶ COM Express® Rev. 2.1, Pin-out Type 6
- ▶ mini-ITX Form Factor (170 mm x 170 mm)
- ▶ Comprehensive connectivity
- ▶ Industrial temperature grade



#### COMe Eval.Carrier T7

COM Express® Evaluation Carrier Type 7

- ▶ COM Express® Rev. 3.0 Pin-out Type 7
- ▶ ATX Form Factor (305 mm x 244 mm)
- ▶ 4x 10GbE support
- ▶ 32x PCI lanes: 1x PCIe x16, 1x PCIe x8, 1x PCIe x4, 4x PCIe x1
- ▶ 4x USB 3.0, 2x SATA, 2x RS232, GPIO
- ▶ BMC via adapter card



## COM BASEBOARD DESIGN TRAINING

Kontron Academy Workshop



### COM BASEBOARD DESIGN TRAINING

This training is recommended for development engineers, product managers and others involved in the design, verification and validation of COM baseboards. This training is highly recommended as the knowledge gained will assist with avoid-

ing expensive corrective actions during the run of your project. Kontron experts with field experience will provide instruction to ensure you will understand how to avoid common mistakes.

#### Training Agenda:

IoT-ready Industrial Computer Platform

- ▶ Introduction COM concept with product highlights
- ▶ Documentation, specification, support
- ▶ COM Express® COM.0 Rev. 2: Types 6 and 10
- ▶ ETX® / COM Express® migration paths
- ▶ COM Express® Rev. 2: Type 6 and Type 10 Pin-outs
- ▶ General layout rules
- ▶ Design guide lines
- ▶ PCI / PCI Express design
- ▶ LCD solution: "JILI" cable concept
- ▶ Module mounting
- ▶ Thermal design & management
- ▶ Q&A session

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## About Kontron | Member of the S&T Group

Kontron is a global leader in IoT/embedded computing technology (ECT). As a part of technology group S&T, Kontron offers a combined portfolio of secure hardware, middleware and services for Internet of Things (IoT) and Industry 4.0 applications. With its standard products and tailor-made solutions based on highly reliable state-of-the-art embedded technologies, Kontron provides secure and innovative applications for a variety of industries. As a result, customers benefit from accelerated time-to-market, reduced total cost of ownership, product longevity and the best fully integrated applications overall.

## About the Intel® Internet of Things Solutions Alliance

From modular components to market-ready systems, Intel and the 400+ global member companies of the Intel® Internet of Things Solutions Alliance provide scalable, interoperable solutions that accelerate deployment of intelligent devices and end-to-end analytics. Close collaboration with Intel and each other enables Alliance members to innovate with the latest IoT technologies, helping developers deliver first-in-market solutions.



## GLOBAL HEADQUARTERS

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