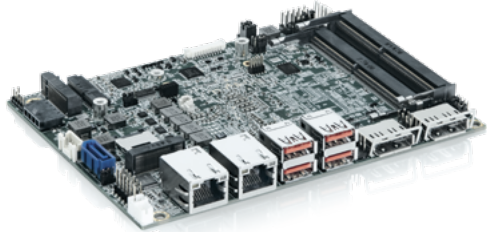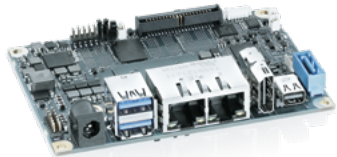# EMBEDDED
SINGLE BOARD COMPUTERS

▼

The longevity Single Board Computers follow international industry size standards with well-defined mounting holes and standard I/O bracket areas. In addition, Kontron offers many value-added services like detailed documentation, display support and complete life-cycle management.

The Core™-i and Atom®-based Single Board Computers offer up to 7 years product availability from the release date, based on embedded key components. In applications where permanence and risk avoidance must be optimized, Kontron's experience in a variety of markets leads customers to the solution that meets their critical programming and cost objectives.

// 3.5"-SBC-WLU

// pITX-APL V2.0

▶ Single Board Computer
High quality longevity Single Board Computers in the formfactors of 2,5" (pITX) and 3,5". These embedded "SBC" are based on latest processors and chipset platforms, and utilize advanced technology components.

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kontron S&T Group

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.

For more information, please visit: **www.kontron.com**

About the Intel® Partner Alliance

From modular components to market-ready systems, Intel and the over 1,000+ global member companies of the Intel® Partner 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.

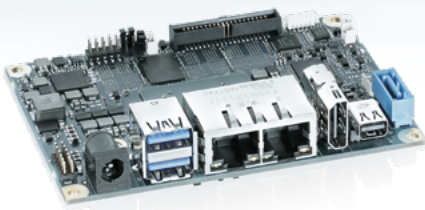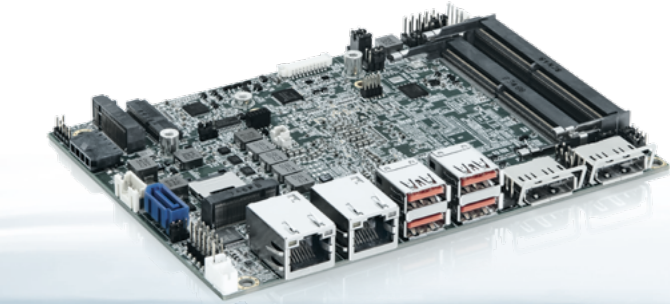Intel and Atom are registered trademarks of Intel Corporation in the U.S. and other countries.

intel partner Titanium

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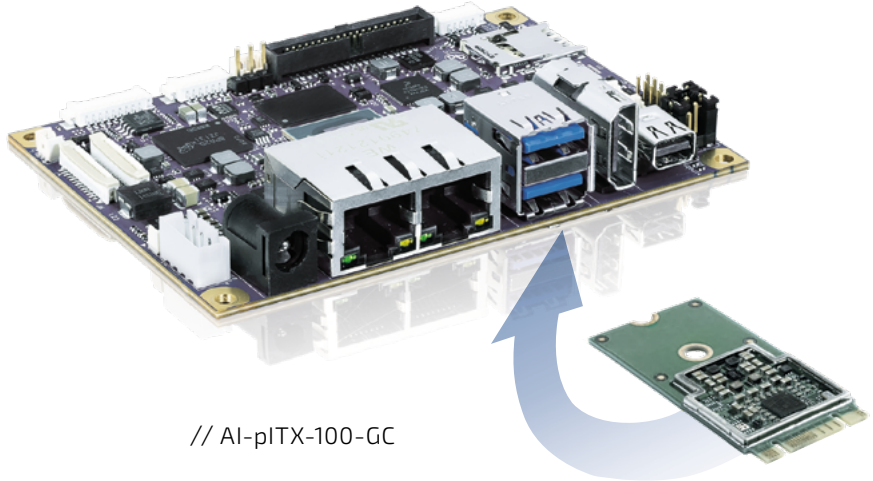info@kontron.com

www.kontron.com

Embedded
SINGLE BOARD COMPUTER

▼

▶ **SMART AUTOMATION**
Industrial IoT applications, edge & fog computing

▶ **SECURITY AND LICENSING SOLUTIONS**
Approtect - Kontron Embedded Hard-/ Software Security Solution

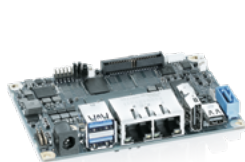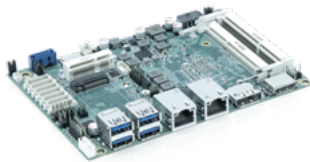▶ **FOREVER YOUNG**
Maximum innovation – minimum investment

POSSIBILITIES START HERE **kontron** S&T Group

INDUSTRIAL PLATFORM FOR
AI APPLICATIONS

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The new compact Kontron Industrial AI platform AI-pITX-100-GC consists of an M.2 module with the Google Coral accelerator chip for the software ecosystem TensorFlow Lite on a 2.5" pITX single board computer from Kontron with an NXP i.MX8M processor. The Google Coral TPU (Tensor Processing Acceleration Unit) supports small and low power applications and provides up to 4TOPS (trillion operations per second) for higher speed image and video data processing. Compared to an application with simple USB-cameras without TPU at approx. 6 frames/s, the TPU accelerates to a speed of 30 frames/s, therefore five times faster. All Google TensorFlow Lite applications and pre-trained models can be downloaded free of charge from Google and enable rapid development of own neural networks with Artificial Intelligence/Machine Learning and Deep Learning applications - and significantly reduce time-to-market. The platform is suitable for use in harsh environments with extended temperatures ranging from -40 °C to + 85 °C and supports Yocto Linux with the latest kernel.

// AI-pITX-100-GC

SINGLE BOARD COMPUTER

	3.5"-SBC-WLU	3.5"-SBC-VR1000	3.5"-SBC-SKL	3.5"-SBC-KBL	3.5"-SBC-APL V2.0	pITX-APL V2.0	pITX-iMX8M
PROCESSOR	Intel® Core™ i7-8665UE (Quad Core, 8M Cache, up to 4.4 GHz, FCBGA1528, 15 W TDP) Intel® Core™ i5-8365UE (Quad Core, 6M Cache, up to 4.1 GHz, FCBGA1528, 15 W TDP) Intel® Core™ i3-8145UE (Dual Core, 4M Cache, up to 3.9 GHz, FCBGA1528, 15 W TDP) Intel® Celeron® 4305UE (Dual Core, 2M Cache, 2.00 GHz, FCBGA1528, 15 W TDP)	AMD Ryzen™ V1000/R1000 Series Processors V1605B/V1202B/R1606G/R1505G	Intel® Core™ i7-6600U (Dual Core, 4M Cache, up to 3.40 GHz, FCBGA1356, 15 W TDP) Intel® Core™ i5-6300U (Dual Core, 3M Cache, up to 3.00 GHz, FCBGA1356, 15 W TDP) Intel® Celeron® 3955U (Dual Core, 2M Cache, 2.00 GHz, FCBGA1356, 15 W TDP)	Intel® Core™ i7-7600U (Dual Core, 4M Cache, up to 3.90 GHz, FCBGA1356, 15 W TDP) Intel® Core™ i5-7300U (Dual Core, 3M Cache, up to 3.50 GHz, FCBGA1356, 15 W TDP) Intel® Core™ i3-7100U (Dual Core, 3M Cache, 2.40 GHz, FCBGA1356, 15 W TDP) Intel® Celeron® 3965U (Dual Core, 2M Cache, 2.20 GHz, FCBGA1356, 15 W TDP)	Atom® x7-E3950 (4 Core, 2M Cache, up to 2.00 GHz, FCBGA1296, 12 W TDP) Atom® x5-E3940 (4 Core, 2M Cache, up to 1.80 GHz, FCBGA1296, 9.5 W TDP) Atom® x5-E3930 (2 Core, 2M Cache, up to 1.80 GHz, FCBGA1296, 6.5 W TDP) Pentium® N4200 (4 Core, 2M Cache, up to 2.50 GHz, FCBGA1296, 6 W TDP) Celeron® J3455 (4 Core, 2M Cache, up to 2.30 GHz, FCBGA1296, 10 W TDP) Celeron® J3355 (2 Core, 2M Cache, up to 2.50 GHz, FCBGA1296, 10 W TDP) Celeron® N3350 (2 Core, 2M Cache, up to 2.40 GHz, FCBGA1296, 6 W TDP)	Onboard CPU variants Intel® Processor line, 14 nm SoC Intel Atom® x7 E3950 4C 2.0 GHz, 13 W Intel Atom® x5 E3940 4C 1.8 GHz, 9.5 W Intel Atom® x5 E3930 2C 1.8 GHz, 6.5 W Intel® Mobile Celeron® N3350 2C 2.3 GHz, 6 W Intel® Pentium® N4200, 4 Core, 2.3 GHz, 6 W Intel® Celeron® J3455 4C 2.3 GHz, 10 W	Onboard CPU variants NXP's processors 8M QuadLite (1.3 GHz/Industry) 8M QuadLite (1.5 GHz/Consumer) 8M Dual (1.3 GHz/Industry) 8M Dual (1.5 GHz/Consumer)
MEMORY	2x DDR4 2400 1.2 V SO-DIMM up to 64 GByte (Core™ i models) 2x DDR4 2133 1.2 V SO-DIMM up to 64 GByte (Celeron® models)	2x DDR4 SO-DIMM memory socket up to 32 GByte	2x DDR4 2133 SO-DIMM up to 32 Gbyte	2x DDR4 2133 SO-DIMM up to 32 GByte	2x DDR3L 1867 1.35 V SO-DIMM	Up to 8 GByte LPDDR4 3200 MTps Memory Down	Up to 4 GByte LPDDR4 3200 MTps Memory Down
GRAPHICS INTERFACE	Intel® UHD Graphics 620 (Core™ i models) Intel® UHD Graphics 610 (Celeron® models) 1x LVDS (24-bit, 2-ch, 1920 x 1200 @ 60 Hz) 2x DP (4096 x 2160 @ 60 Hz, on rear)	AMD Radeon™ Vega 8 (V1605B) AMD Radeon™ Vega 3 (V1202B, R1606G & R1505G) 1x LVDS (24-bit, 2-ch, 1920 x 1200 @ 60 Hz) 1x DP (4096 x 2160 @ 60 Hz, on rear) 1x HDMI 2.0 (3840 x 2160 @ 60 Hz, on rear) Triple Display Support	Intel® HD Graphics 510 (Celeron® CPU) Intel® HD Graphics 520 (Core™ i CPU) 1x LVDS (24-bit, 2-ch) 1x HDMI 2.0 (on rear, 3840 x 2160 @ 60 Hz) 1x DP (on rear, 4096 x 2304 @ 60 Hz) Triple Display Support	Intel® HD Graphics 620 (Core™ i processor) Intel® HD Graphics 610 (Celeron® processor) 1x LVDS (24-bit, 2-ch) 1x HDMI 2.0 (on rear, 3840 x 2160 @ 60 Hz) 1x DP (on rear, 4096 x 2304 @ 60 Hz) Triple display support	Intel® HD Graphics 505 (for models w/Atom® x7, Pentium®) Intel® HD Graphics 500 (for models w/Atom® x5, Celeron®) 1x LVDS (18/24-bit, 1/2-ch, 1920 x 1200 @ 60 Hz) 1x DP 1.2 (4096 x 2160 @ 60 Hz, on rear) 1x HDMI 1.4 (3840 x 2160 @ 30 Hz, on rear) Triple display support	2x Independent Graphic Output (HDMI 2.0 & mDP/LVDS)	2x Independent Graphic Output (HDMI 2.0 & mDP/LVDS)
SPECIAL	3x M.2 Slot's (Key M/E/B)	TPM 2.0/System Control via several FP Header Pins	-	-	-	TPM 2.0, Kontron Approtect (Optional), eMMC NAND Flash Built-In (Optional)	TPM, Hardware Security (Optional), eMMC NAND Flash Built-In (Optional)
SATA PORTS	1x SATA 3.0	2x SATA Gen 3.0 (1x shared with M.2 Key M)	2x SATA 3.0	2x SATA 3.0	1x SATA 3.0	1x M.2 M-Key (PCIe Rev 2.0) / micro-SIM Interface	M.2 B-key (PCIe x1, USB 3.0)
mPCIe SLOT	-	1x (half size)	1x (full size)	1x (full size)	1x (full size)	-	-
SERIAL PORTS	2x RS232/422/485 (by header)	2x RS232/422/485 (by header) 2x RS232 (by header)	2x RS232/422/485 (by header, w/auto flow control for RS485)	2x RS232/422/485 (by header, w/auto flow control for RS485)	2x RS232/422/485 (by wafer, auto flow control function for RS485) 4x RS232 (by wafer)	1x RS232 (Internal)	1x RS232 (Internal)
LAN PORTS	2x GbE LAN (RJ45 on rear, Intel® I219-LM, Intel® I210-AT)	2x GbE LAN RJ45 on rear, Intel® I219-LM, Intel® I210-AT)	2x GbE LAN (RJ45 on rear, 1x Intel® I219-LM, 1x Intel® I210-AT)	2x GbE LAN (RJ45 on rear, 1x Intel® I219-LM, 1x Intel® I210-AT)	2x GbE LAN (RJ45 on rear, Intel® I210-AT)	2x RJ45 LAN Port (with Transformer and 2 LED Indicators)	2x RJ-45 LAN Port (with Transformer and 2 LED Indicators)
USB PORTS	4x USB 3.1 (Type A on rear) 4x USB 2.0 (by header)	4x USB 3.1 (Type A on rear, for V1000 models) 2x USB 3.1 (Type A on rear, for R1000 models) 4x USB 2.0 (by header, for V1000 models) 6x USB 2.0 (2x Type A on rear, 4x by header, for R1000 models)	4x USB 3.0 (Type A on rear) 2x USB 2.0 (by header)	4x USB 3.0 (Type A on rear) 2x USB 2.0 (by header)	4x USB 3.0 (Type A on rear) 2x USB 2.0 (by header, default) 3x USB 2.0 (by header, optional)	2x USB 3.0	2x USB 3.0 on Rear-IO 2x USB 2.0 (Internal Header) (USB OTG Supported)
AUDIO	HD Analog audio interface (Line-In/Line-Out/SPK-Out)	Realtek ALC662 2x Speaker-out (3 W, by header) 1x Line-in (by header) 1x Line-out (by header) 1x Mic-in (by header)	Realtek ALC662 2x Speaker-out (3 W) 1x Line-in (by header) 1x Line-out (by header) 1x Mic-in (by header)	Realtek ALC662 2x Speaker-out (3 W) 1x Line-in (by header) 1x Line-out (by header) 1x Mic-in (by header)	Realtek ALC662 2x Speaker-out (3 W) 1x Line-in (by header, extreme temperature model excluded) 1x Line-out (by header, extreme temperature model excluded) 1x Mic-in (by header, extreme temperature model excluded)	1x SPDIF internal headers	1x SPDIF internal headers, 1x Line-In, Line-Out and Microphone-In headers at rear I/O
POWER SUPPLY	DC 12 V + 4 pin	1x 4-pin pitch 3.0 mm Wafer DC 12 V	DC 12 V + 4 pin	DC 12 V + 4 pin	DC 12 V + 4 pin	12 V DC In, 1x Locking barrel-type DC Power Jack 1x Internal 4-Pin Power Connector	12 V DC input connector (lockable) Surge Protection Reverse Polarity Protection
MTBF	-	-	-	-	-	1,571,585 hours	5 years x 365 days x 24 hours, The MTBF value according to Telcordia standard
SAFETY	CE, FCC Class B	CE, FCC Class A	CE Class B, FCC Class B	CE Class B, FCC Class B	CE Class B, FCC Class B	EN 62368-1	EN 62368-1
COOLING SOLUTIONS	1x Wafer for Smart Fan	1x Wafer for CPU Smart Fan	1x Header for System Fan	1x Header for System Fan	1x Wafer for System Smart Fan	Passive and active cooling solution	Passive and active cooling solution
OPERATING TEMPERATURE	0 °C to 60 °C	0 °C to 60 °C	0 °C ~ 60 °C (Standard) -20 °C ~ 70 °C (Extended)	0 °C ~ 60 °C (Standard) -20 °C~ 70 °C (Extended)	0 °C ~ 60 °C (Standard) -20 °C ~ 70 °C (Extended) -40 °C ~ 85 °C (Extreme)	-25 °C to 75 °C - Operation Temp.	-25 °C to 75 °C - Operation Temp. -40 °C to 85 °C - Non Operation Temp.
REGULATORY	-	-	-	-	-	-	Comply with Emission: EN55022
DIMENSIONS	3.5" (146 x 105 mm)	3.5" (146 x 105 mm)	3.5" (146 x 105 mm)	3.5" (146 x 105 mm)	3.5" (146 x 105 mm)	2.5" (100 x 72 mm)	2.5" (100 x 72 mm)
OPERATING SYSTEMS	Windows 10	Windows 10	Windows 7, Windows 8, Windows 10, Linux	Windows 10	Windows 10; Linux	Win10 IOT Enterprise x64Win10 IOT Core x64, eMMC Boot Linux Yocto 64bit Kontron KEAPI Linux Ubuntu	Linux Yocto, Android on Request, Win10 IOT Core on NXP Website
BIOS	AMI uEFI BIOS w/ 256 Mb SPI Flash	AMI Aption V, UEFI	AMI uEFI BIOS w/ 128 Mb SPI Flash	AMI uEFI BIOS w/ 128 Mb SPI Flash	AMI uEFI BIOS w/ 128 Mb SPI Flash	AMI Aption V, UEFI	U-Boot Bootloader
TDP	15 W	15 W	15 W	15 W	6 - 12 W	6 - 12 W	-
TPM	TPM 2.0 supported (Infineon SLB 9665)	TPM 2.0 support (Infineon SLB 9665)	TPM 1.2 (Infineon SLB 9660)	TPM 2.0 (Infineon SLB 9665)	Optional TPM 2.0 (Infineon SLB 9665)	TPM 2.0 (Infineon SLB9665XQ)	TPM 2.0 (Infineon SLB9670XQ)

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https://www.kontron.com/products/boards-and-standard-form-factors/single-board-computer/