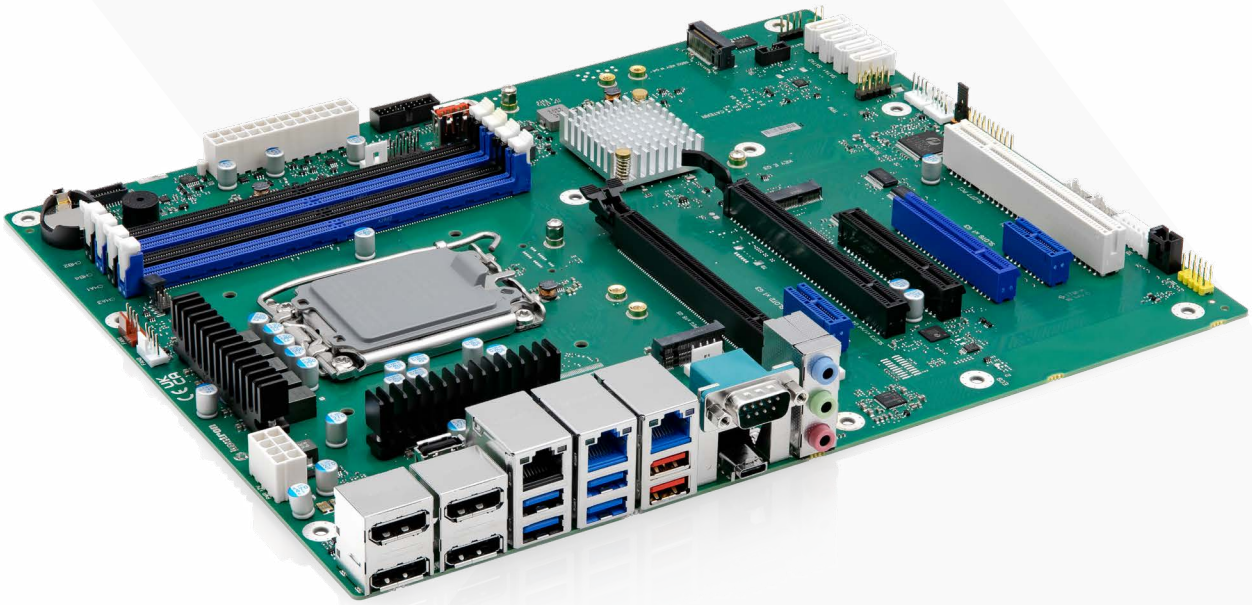
K3851-R ATX

Industrial Series



Intel® R680E Chipset and Intel® Core™ processors (12th/13th/14th Gen)

- Latest DDR5 memory technology for best-in-class system performance
- Intel® UHD Graphics 7xx driven by Xe Architecture
- Triple LAN 1GbE/2.5GbE incl. Teaming and TSN support
- Dual M.2 Key-M SSD & single M.2 Key-E WLAN sockets onboard
- Powerful USB 3.2 Gen 2/Type-C, 4x COM, GPIO

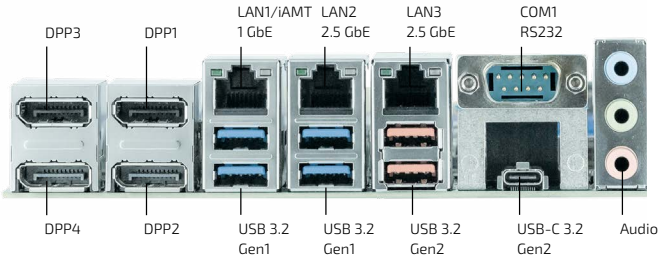
kontron
The Power of IoT

Product Highlights

K3851-R ATX Industrial Series

The Industrial Motherboard K3851-R ATX is equipped with the highly performant Intel® R680E Chipset. It also offers a multitude of supporting processors such as the Intel® Core™ i9/i7/i5/i3 processor (12th/13th/14th Gen) and the Intel® Pentium®/Intel® Celeron® processor series. Designed and approved for 24/7 continuous operation and an enhanced temperature range up to 60 °C the K3851-R ATX provides high functionality and fits perfect with special requirements of certain markets. It offers iAMT-based Out-of-Band Management features. Besides, K3851-R provides TSN and Realtime support (TCC) for specific industrial applications.

- Intel® Core™ processors (12th/13th/14th Gen)
- DDR5 4800/5600 UDIMM, max. 192 GByte, ECC support
- cTDP – Easy & flexible reduction of CPU TDP
- Supporting Intel® iAMT features and Intel® Time Coordinated Computing (TCC)
- PCI Express® x16 (Gen5 @ CPU prepared, Gen4 @ PCH)
- 1x Intel® GbE LAN, 2x 2.5GbE incl. Teaming and TSN
- Intel® UHD Graphics 7xx driven by Xe Architecture; 4x DisplayPort™ V1.4a up to 8K
- Intel® High Definition 5.1 Audio; Intel® integrated TPM V2.0
- 8 Bit GPIO; 4 x COM ports
- 3x USB 3.2 Gen 2, 6x USB 3.2 Gen1, 2x USB 2.0, 1x USB 3.2 Gen2 stick socket, 1x USB 2.0 stick socket
- 4x SATA 6G incl. RAID support
- 2x M.2 2230/2242/2280 (Key-M, PCIe/NVME SSD modules), incl. NVME RAID support
- M.2 2230 (Key-E, WLAN/Bluetooth modules, incl. CNVi support)
- PCI Slot (32 Bit)
- BIOS-POST/-Boot & OS – HW Watchdog onboard



Technical Information

SYSTEM	PROCESSOR CHIPSET MEMORY	Intel® Core™ processors (12th/13th/14th Gen) Intel® Pentium®/Intel® Celeron® processor series Socket LGA1700, max. 125 W TDP (For details on supported processors please refer to Kontron FTP Server) Intel® R680E Chipset 4 DIMM Sockets UDIMM DDR5-4800/5600***, max. 192 GByte Dual Channel unbuffered, ECC support Effective memory speed of DDR5 modules according Intel® specification: 1x DIMM per channel = max. DDR5-4400*** 2x DIMM per channel (single rank) = max. DDR5-4000 2x DIMM per channel (dual rank) = max. DDR5-3600
VIDEO	GRAPHICS	Intel® UHD Graphics 7xx (depends on installed processor), 4x DPP V1.4a up to 8K
AUDIO	AUDIO CODEC AUDIO INTERFACE	Tempo Semiconductor 92HD91B 5.1- channel*, High Definition Audio Codec
NETWORK CONNECTION	ETHERNET 1 ETHERNET 2/ETHERNET 3	Intel® i219LM with 10/100/1000 MBit/s, iAMT features, Wake-on-LAN (WoL) by interesting Packets, Link Status Change and Magic Packet™, PXE Support, BIOS MAC Address Display, Teaming Support Intel® i226LM **** with 10/100/1000/2500 MBit/s, TSN Support, Wake-on-LAN (WoL) by interesting Packets, Link Status Change and Magic Packet™, PXE Support, BIOS MAC Address Display, Teaming Support
PERIPHERAL CONNECTION	USB SERIAL PORT OTHER I/Os	2x USB 3.2 Gen 2 (rear I/O, Type-A), 1x USB 3.2 Gen 2 (rear I/O, Type-C with locking option), 4x USB 3.2 Gen1 (rear I/O, Type-A), 2x USB 3.2 Gen1 (by header), 2x USB 2.0 (by header), 1x USB 3.2 Gen2 (internal Type-A stick socket), 1x USB 2.0 (internal Type-A stick socket) 1x RS232 (rear I/O), 3x RS232 (by header)** 1x 8-Bit GPIO

*) 5.1 surround sound is possible via digital output ports like S/PDIF or DisplayPort™
**) Internal ports (COM3/COM4):
***) Modules DDR5-4800/5600 can be installed, but the max. effective speed is limited to DDR5-4400 (Intel design limitation for 12th/13th/14th Gen processors @ 4 DIMM sockets)
****) Updated LAN controller i225LM to i226LM with K3851-R12 Rev. 0106, K3851-R23 or newer.

Technical Information

STORAGE & EXPANSION	SATA M.2 PCIe/NVME M.2 WIRELESS PCIe/PCI SLOTS GPIO	4x Serial ATA III 600 Interface (up to 6GBit/s), NCQ, AHCI, RAID 0/1/5/10 2x M.2 2230/2242/2280 (Key-M, PCIe/NVME SSD modules), incl. NVME RAID support 1x M.2 2230 (Key-E, WLAN/Bluetooth modules, incl. CNVi support) PCIe x16: 1x 16 lanes, Gen5* / 1x 4 lanes, Gen4 PCIe x8: 1x 4 lanes, Gen4 ("open slot") / 1x 4 lanes, Gen3 ("closed slot") PCIe x1: 2x Gen3 ("open slots") PCI: 1x 32Bit slot 8 Bit GPIO (Input/Output); WLAN LED support, WLAN enable/disable support 3.3 V/5 V/12 V supply voltage output; SMBus controller PCA9554A
POWER	CONNECTOR INPUT VOLTAGE	ATX (Multirail) plus 8-pin socket (12 V for CPU)
FIRMWARE	BIOS WATCHDOG REAL TIME CLOCK TPM	AMI Aptio 5.x (UEFI) BIOS modified and adapted by Kontron; Recovery BIOS, SMBIOS (DMI), BIOS and CPU Microcode Update, Quick Boot, Logo Boot, Quiet Boot, Plug & Play, Automatic DRAM and PCIe Configuration, BIOS Support for S.M.A.R.T., Advanced Power Management, ACPI S3/S4, Wake on time from S5. No legacy OS support, no MBR installation (UEFI only) BIOS POST-/BIOS BOOT-/OS-HW Watchdog Integrated TPM V2.0 (Intel® integrated); socket for optional TPM module
SYSTEM CONTROL	FP HEADER SECURITY	1x Header for Reset button, HDD LED & External Speaker, Power button, Power LED Recovery BIOS, System and BIOS Password, Boot Sequence Control, Serial/USB- Port Access Protection, Write Protection for Flash BIOS, EraseDisk (BIOS Feature), Trusted Platform Module (TPM)
SOFTWARE	OS SUPPORT	MS Windows® 10, MS Windows® 10 IoT (LTSC), MS Windows® 11, MS Windows® 11 IoT (LTSC), Linux 64 No legacy OS support, no MBR installation (UEFI only)
MECHANICAL	DIMENSIONS (L x W)	ATX: 9.6" x 12" (243.8 x 304.8 mm)
ENVIRONMENTAL	OPERATION TEMPERATURE	0 °C - 60 °C
CERTIFICATION	EMC & SAFETY	cTÜVus acc. IEC62368-1, CE Class B incl. Industrial Immunity, UKCA, FCC-B verified

*) PCIe x16 (PEG) slot: Gen5 ready; Support for lane split (x16 or x8+x8)

Power Supply Requirements

SOURCE	VOLTAGE	MIN. PS LOAD	MAX. VOLTAGE TOLERANCE	MOTHERBOARD CAPACITIVE LOAD	MOTHERBOARD MAX. CURRENT (continous)*
Main Power Supply	+ 12 V	0 A	± 5 %	2.500 µF	15 A
	- 12 V	n.a.	n.a.	-	-
	+ 5 V	0 A	± 5 %	1.900 µF	6.0 A
	+ 3.3 V	0 A	± 5 %	1.100 µF	0.5 A
Aux	+ 5 Vaux	0 A	± 5 %	1.900 µF	2.5 A

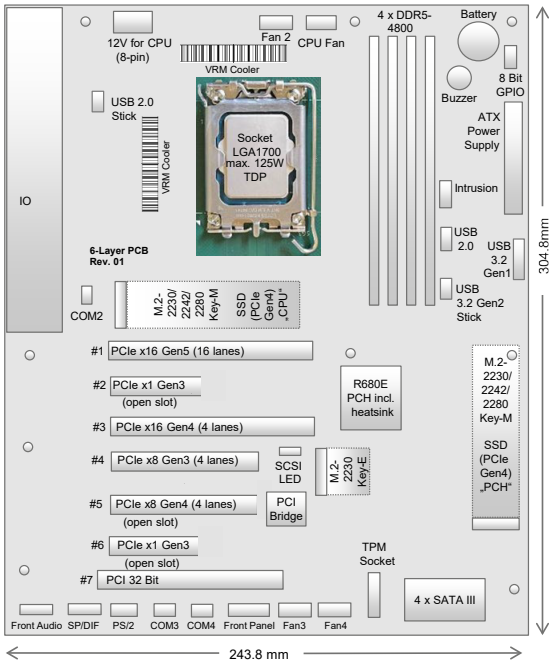
*) Max. motherboard input current incl. processor and DRAM memory. Additional power for drives, USB devices, PCIe cards etc. is not included! Note: BIOS provides option to reduce CPU TDP/Turbo power in order to use PSU with limited loadabilty.
Processor 125 W TDP: Max. Cont. Current < 15 A; max. Surge Current = 30 A (full Turbo Mode)
Processor 65 W TDP: Max. Cont. Current < 8 A; max. Surge Current = 26 A (full Turbo Mode)
Processor 35 W TDP: Max. Cont. Current < 5 A; max. Surge Current = 13 A (full Turbo Mode)

Technical Details

FEATURES	Board Size / Chipset	ATX / R680E
	VGA* / DVI / DPP / LVDS / eDP	- / - / + / - / -
	Stereo Audio / 5.1 Multichannel Audio / Front Panel Audio	- / + / +
	Buzzer / int. Speaker Support (mono)	+ / +
	GbE LAN / 2.5GbE LAN / Dual 2.5GbE LAN	+ / + / +
	WoL / LAN Boot / Teaming / TSN	+ / + / + / +
	Intel® Standard Manageability / iAMT / vPro	+ / + / -
	SATA / SATA RAID / M.2 SSD (NVME) / NVME RAID	+ / + / + / +
	USB 2.0 / USB 3.2 Gen1 / USB 3.2 Gen2 / USB 3.2 Type-C	+ / + / + / +
	FAN controlled & monitored / CPU / AUX1 / AUX2 / AUX3	+ / + / + / +
	TEMP monitored CPU / Onboard Sensors / External Sensor	+ / + / -
SPECIAL FEATURES	Silent Fan / System Guard / cTDP	+ / + / +
	Recovery BIOS / Flash Update / Multi Boot	+ / + / +
	HDD Password / EraseDisk / TPM V2.0	+ / + / +
	BIOS POST Watchdog / BIOS Boot Watchdog / OS HW Watchdog	+ / + / +
	Logo Boot Option	+
	High Efficiency Core Voltage Regulator Design	+
	Operating Mode 24-7 / 8-5 (hrs per day - days per week)	+ / -
	Motherboard operating temperature range (chassis inside)***	0 °C – 60 °C
INTERNAL CONNECTORS	DIMM Sockets (DDR5-4800) / ECC-Support	4 / +
	PCI Express® x16: 16lanes-Gen5 / PCI Express® x16: 4lanes-Gen4	1 / 1
	PCIe x8 @4 lanes: Gen4-"open" / Gen3-"closed"	1 / 1
	PCI Express® x1: Gen3-"open"	2
	PCI Slots (32 Bit, 33 MHz, Rev. 2.3) / Mini-PCIe	1 / -
	SATA-600 / M.2 Key-M (NVME SSD) / M.2 Key-B	4 / 2 / -
	M.2 2230 (Key-E, PCIe & USB2.0 for WLAN/Bluetooth)	1
	S/PDIF (digital Audio) OUT / IN	1 / -
	Front Panel Audio (9-Pin, HD Audio)	1
	USB 2.0 / USB 3.2 (Gen1) / USB 2.0 Stick / USB 3.2 (Gen2) Stick****	1 / 1 / 1 / 1
	Fan CPU / AUX1 / AUX2 / AUX3	1 / 1 / 1 / 1
	Intrusion (Case Open) / GPIO (8Bit) / SM-Bus (Case Temp.)	1 / 1 / -
	Serial Port Header (COM, RS-232) / Parallel Port Header / PS2 Header**	3 / - / 1
	Front Panel (Power Switch, Reset Switch, LEDs, Intel 10 pin compatible)	1
	Multirail PSU (24 pin + 8 pin) / Single 12 V PSU	+ / -
EXTERNAL CONNECTORS	VGA Sub D* / DVI-I / DVI-D / DisplayPort™ V1.4a	- / - / - / 4
	Audio Mic. In / Line in / Line out (or driver configuration)	1 / 1 / 1
	LAN (RJ-45)	3
	PS/2 Mouse / Keyboard**	- / -
	USB 2.0 / USB 3.2 (Gen1) / USB 3.2 (Gen2)	- / 4 / 3
	Serial (COM1, RS-232)	1
	Parallel (EPP/ECP)	-

*) VGA possible via DP-VGA-converter (dongle)
**) Internal PS/2 header available
***) Forced cooling required, see technical documentation for details
****) Each internal USB connector (pin header) provides two USB ports (except for USB stick socket)

Connector/Socket Diagram



Ordering Information

ARTICLE	PART NO.	DESCRIPTION
K3851-R1 ATX	F5110-V194	Intel® Core™ processors (12th/13th/14th Gen), Intel® R680E Chipset For existing designs and projects only. Not recommend for new designs.
K3851-R2 ATX	F5110-V220	Intel® Core™ processors (12th/13th/14th Gen), Intel® R680E Chipset Updated PCB - Recommended for new designs

Accessories

SERIAL PORT CABLE	S26361-F5000-K010	400 mm, fullsize slot bracket
M.2 CARRIER BOARD	S26361-F5000-M001	D3352-A1
M.2 KEY-E/A SATA ADDON	F5000-M004	AddOn for M.2 Key-E/A slot to provide two SATA 6G ports Kit contains 40 x adapter K1201-A
SLIM HEATSINK LGA1700 65W	F5000-C030	Box contains 40x cooler plus 40x backplate
TPM-MODULE	S26361-F5000-R012	Infineon SLB9670, TPM V2.0 (TCG compliant)

Global Headquarters

Kontron Europe GmbH

Gutenbergstraße 2
85737 Ismaning, Germany
Tel.: + 49 821 4086-0
info@kontron.com

www.kontron.com

The Power of IoT

Copyright © 2025 Kontron. All rights reserved. All data is for information purposes only and not guaranteed for legal purposes. Information has been carefully checked and is believed to be accurate;however, no responsibility is assumed for inaccuracies. Kontron and the Kontron logo and all other trademarks or registered trademarks are the property of their respective owners and are recognized.Specifications are subject to change without notice. K3851-R ATX-20250610- bmy