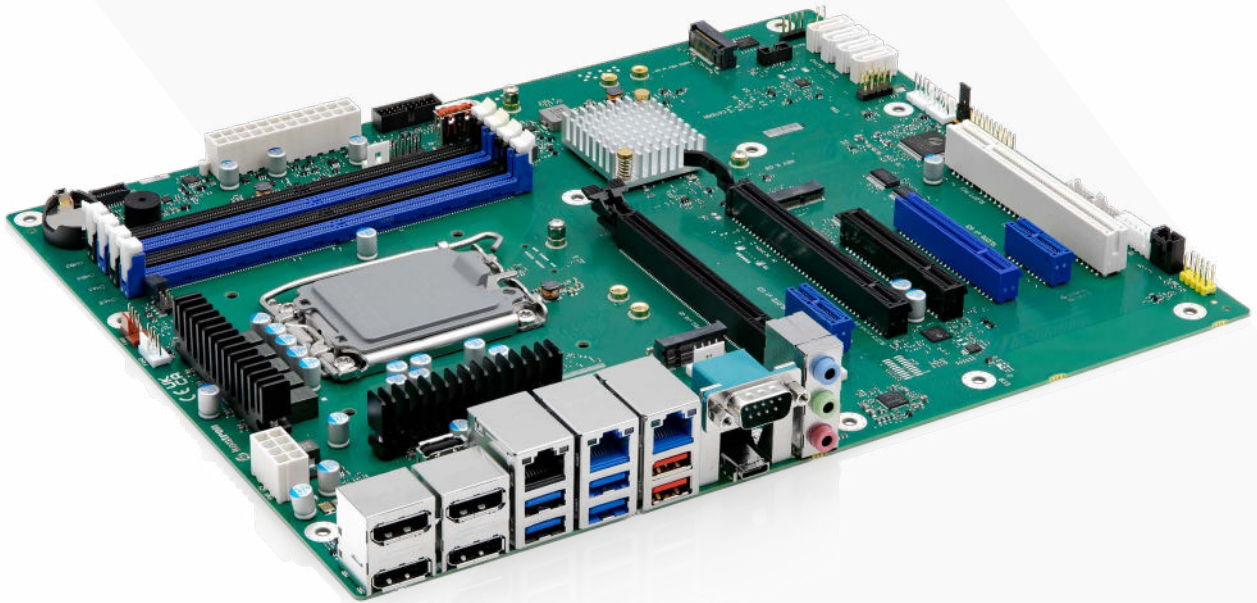


K3851-R ATX

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

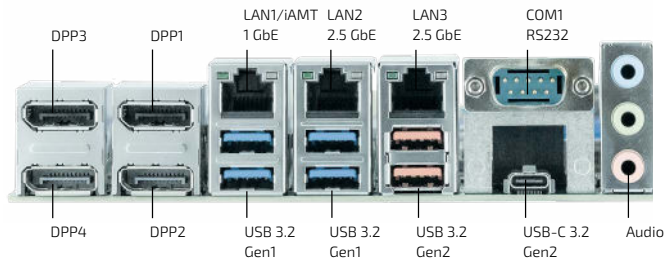
K3851-R ATX Industrial Series

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 X^e 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.

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

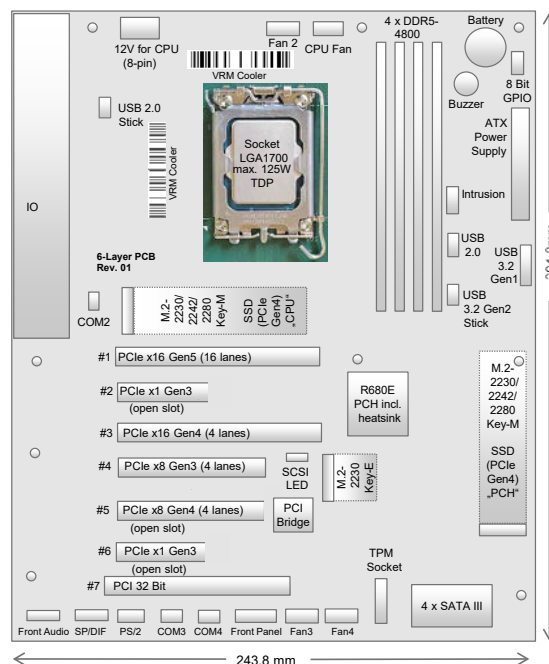
SOURCE	VOLTAGE	MIN. PS LOAD	MAX. VOLTAGE TOLERANCE	MOTHERBOARD CAPACITIVE LOAD	MOTHERBOARD MAX. CURRENT (continuous)*
Main Power Supply	+ 12 V	0 A	± 5 %	2.500 µF	15 A
	- 12 V	n.a.	n.a.	-	-
	+ 5 V	0 A	± 5 %	1.900 µF	6.0 A
	+ 3.3 V	0 A	± 5 %	1.100 µF	0.5 A
Aux	+ 5 Vaux	0 A	± 5 %	1.900 µF	2.5 A

*) 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 loadability.
 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)

FEATURES	Board Size / Chipset 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	ATX / R680E - / - / + / - / - - / + / + + / + + / + / + + / + / + / + + / + / - + / + / + / + + / + / + / + + / + / + / + + / + / -
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 PCI Express® x16: 16lanes-Gen5 / PCI Express® x16: 4lanes-Gen4 PCIe x8 @4 lanes: Gen4-"open" / Gen3-"closed" PCI Express® x1: Gen3-"open" PCI Slots (32 Bit, 33 MHz, Rev. 2.3) / Mini-PCIe SATA-600 / M.2 Key-M (NVME SSD) / M.2 Key-B M.2 2230 (Key-E, PCIe & USB2.0 for WLAN/Bluetooth) S/PDIF (digital Audio) OUT / IN Front Panel Audio (9-Pin, HD Audio) USB 2.0 / USB 3.2 (Gen1) / USB 2.0 Stick / USB 3.2 (Gen2) Stick**** Fan CPU / AUX1 / AUX2 / AUX3 Intrusion (Case Open) / GPIO (8Bit) / SM-Bus (Case Temp.) Serial Port Header (COM, RS-232) / Parallel Port Header / PS2 Header** Front Panel (Power Switch, Reset Switch, LEDs, Intel 10 pin compatible) Multirail PSU (24 pin + 8 pin) / Single 12 V PSU	4 / + 1 / 1 1 / 1 2 1 / - 4 / 2 / - 1 1 / - 1 1 / 1 / 1 / 1 1 / 1 / 1 / 1 1 / 1 / - 3 / - / 1 1 + / -
EXTERNAL CONNECTORS	VGA Sub D* / DVI-I / DVI-D / DisplayPort™ V1.4a Audio Mic. In / Line in / Line out (or driver configuration) LAN (RJ-45) PS/2 Mouse / Keyboard** USB 2.0 / USB 3.2 (Gen1) / USB 3.2 (Gen2) Serial (COM1, RS-232) Parallel (EPP/ECP)	- / - / - / 4 1 / 1 / 1 3 - / - - / 4 / 3 1 -

*) 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



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)

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