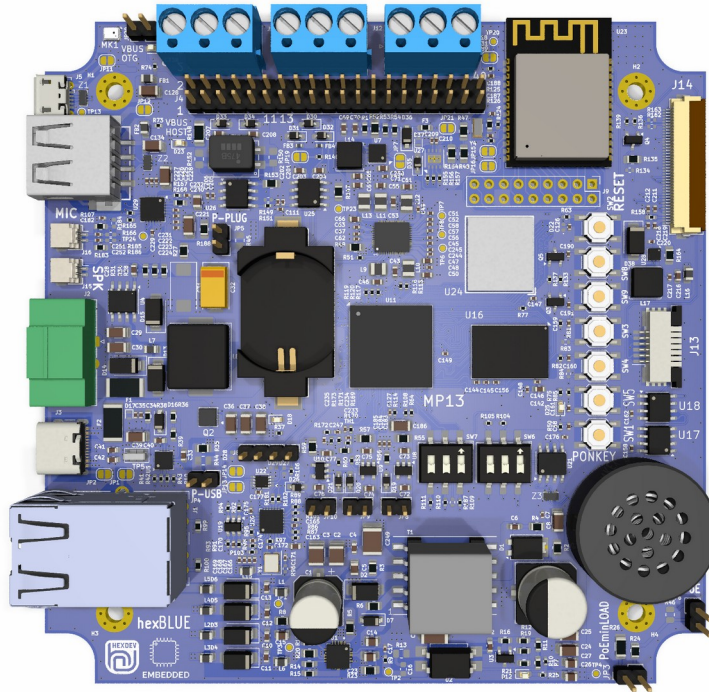


hexBlue embedded Systems Single Board Computer



Introduction

hexBlue is a fully-featured, low-power industrial Linux single board computer (SBC) created by **hexDEV GmbH**. It pairs a gigahertz-class Arm® Cortex-A7 with a real-time RISC-V core, state-of-the-art wireless, and a rich set of field bus and multimedia interfaces. A secure-boot chain with a Trusted Execution Environment (OP-TEE) and a non-secure OS as the Rich Execution Environment (REE) which is a OE/Yocto based Linux OS. This makes the hexBlue SBC an excellent platform for **payment terminals, access-control nodes and any application that requires a hardware-anchored root of trust.**



1 Key Features

- **Application Processor** – STM32MP13, Arm® Cortex-A7 @ up to 1 GHz, NEON™ & VFPv4
- **Co-Processor** – ESP32-C6, 32-bit **RISC-V** single-core @ 160 MHz, 512 kB SRAM, 8 MB QSPI flash
- **System Memory** – 512 MiB DDR3L @ 533 MHz (x16)
- **Storage**
 - 16 GB eMMC 5.1
 - 8 MB QSPI flash
 - 64 kbit I²C EEPROM
 - 4 kbit FRAM (KNX)
- **Connectivity**
 - Wi-Fi 6 (802.11ax, 2.4 GHz)
 - Bluetooth 5 LE, IEEE 802.15.4 (Zigbee & Thread)
 - NFC reader (ISO/IEC 14443 A/B, 15693, 18092)
 - 10/100 Mbit/s Ethernet (LAN8742AI) with 802.3af PoE
- **Industrial Interfaces**
 - **CAN 2.0B, LIN, RS-485, UART×4, SPI×2, I²C×3, GPIO×36, 12-bit ADC×2**
- **Expansion Header** – 40-pin **RaspberryPi™ compatible** pinout
- **Multimedia** – 24-bit RGB LCD (800 × 480 @ 60 Hz), I²C capacitive-touch controller (wake-up source for suspend-to-RAM), on-board mono amplifier + MEMS microphone and speaker
- **Security** – Secure-Boot (Arm TrustZone®), **OP-TEE** TEE, hardware TRNG, optional Fleetwarden® cloud provisioning
- **Real-Time Clock** – CR2032-backed; wake-up source for suspend-to-RAM
- **Power Options**
 - 6–32 V via Phoenix Contact MC 1.5/2-GF-3.81
 - USB-C (5 V)
 - 802.3af PoE over RJ-45



- **Typical Power** – Run $\approx 0.3\text{ W}$ • Suspend-to-RAM $\approx 0.05\text{ W}$; no heatsink required
- **Operating Temperature** – $-25\text{ }^{\circ}\text{C} \dots +85\text{ }^{\circ}\text{C}$ (industrial)
- **Compliance** – RoHS, **Wi-Fi Alliance® certified (802.11ax)**

2 Typical Applications

- Secure payment terminals & smart point-of-sale systems (OP-TEE)
- Industrial protocol gateways (CAN-to-Ethernet, LIN bridges)
- KNX-enabled building-automation controllers
- Smart-home hubs with Zigbee/Thread & voice interface
- Edge AI sensor nodes with audio / vibration capture

3 Specifications

3.1 Absolute Maximum Ratings

Parameter	Min	Max
DC VIN	-0.3	32V
USB-C VBUS	-0.3	5.5V
Storage temperature	-40	70

3.2 Recommended Operating Conditions

Parameter	Min	Typ	Max	Unit
VIN (Phoenix)	6	24	32	V
PoE input	37	48	57	V
Ambient T	-25	25	85	$^{\circ}\text{C}$



3.3 Power Consumption

Mode	A7 Clk	Radios	LCD	Typ. Power
Normal run	650 MHz	Idle	Off	0.2 W
High perf	1 GHz	Active Wi-Fi + ETH	On	0.65 W
Suspend-to-RAM	—	Off	Off	0.05 W



4 Interfaces – Summary & Details

Group	Interface	Qty	Notes
Networking	10/100 Ethernet	1	LAN8742, supports PoE (802.3af class 1)
	Wi-Fi 6 / BT5	1	Integrated 2.4 GHz radio, u.FL antenna port
	802.15.4	1	Zigbee & Thread
Field Bus	CAN 2.0B	1	Up to 1 Mbit/s, on TX/RX pair
	LIN	1	20 kbit/s slave / master
	RS-485	1	Half-duplex, programmable terminator
Serial	UART	4	Up to 4 Mbps; one debug console (3-pin)
Digital	SPI	2	Up to 50 MHz, mode 0/3
	I ² C	3	Multi-master, 400 kHz (Fast-mode)
	GPIO	36	Interrupt capable; PWM on 8 pins
Analog	ADC	2 ch	12-bit, 2 Msps total
Audio	Speaker out	1	2 W mono Class-D amp
	Microphone in	1	Digital MEMS (PDM) + analog header
Display	RGB888	1	5" TFT 800 × 480 @ 60 Hz
	Touch	1	I ² C capacitive controller
Expansion	RPi-compatible header	1	5 V, 3 V3, above buses
Debug	JTAG/SWD	1	3-pin 1.27-mm connector



5 Mechanical Characteristics

Parameter	Value
PCB outline	113 mm × 113 mm
Height (max)	12 mm (including connectors)
Mounting holes	4 × Ø 3.2 mm (M3), spaced 100 mm × 100 mm

A full STEP file is available on request.



6 Wi-Fi Compliance

hexBlue's integrated radio module is **Wi-Fi Alliance™ certified for IEEE 802.11ax 2.4 GHz** interoperability and has passed EU RED & FCC Part 15 modular approvals.

7 Revision History

Rev	Date	Changes
A1	Previous	Initial release
A2	12.2025	Update Picture and Key Features

8 Contact Information

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9 Legal Notice

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