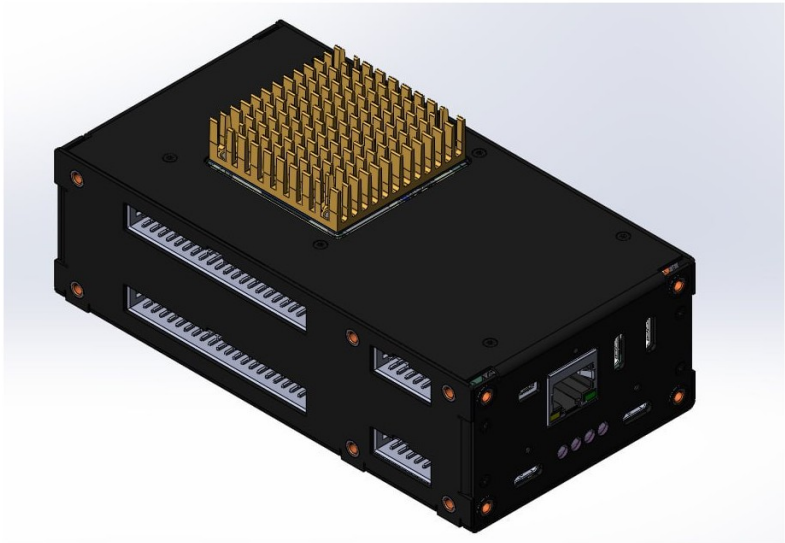


CoreBlock CM5

Open test-system core with Linux computing, programmable DUT power, built-in measurements, and modular expansion.



CM5 + Linux	1.25–32 V	1 μ A–3 A	0–80 V
Run HardPy and the complete test application locally	Programmable DUT supply, up to 3 A / 25 W	Two current-measurement ranges	Low- and high-voltage measurement inputs

CoreBlock CM5 is the central module for automated end-of-line, functional, and hardware-in-the-loop test systems. It combines a Raspberry Pi Compute Module 5 carrier with a dedicated Measurement & Power Board, providing enough functionality to build many production test stations without a separate computer, programmable supply, or basic multimeter.

Development status Preliminary specification based on the current Rev. 0.1 hardware design. Final accuracy, dynamic-performance, mechanical, and certification data will be published after validation.



Product overview

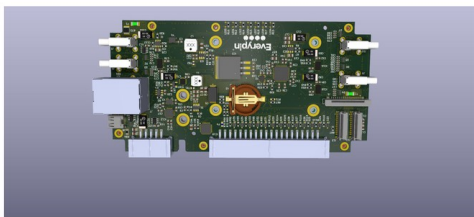
A complete control, power, and measurement foundation for automated electronics testing.

Run the station locally

Raspberry Pi CM5 runs Linux, HardPy, programming tools, machine-vision processing, local databases, and custom Python applications inside the fixture.

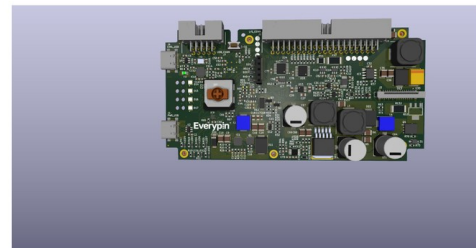
Control electrical tests

A dedicated MCU manages programmable DUT power, electrical measurements, I/O, protection events, and SCPI-compatible control over USB.



CM5 Carrier Board

Linux computing, storage and high-speed interfaces

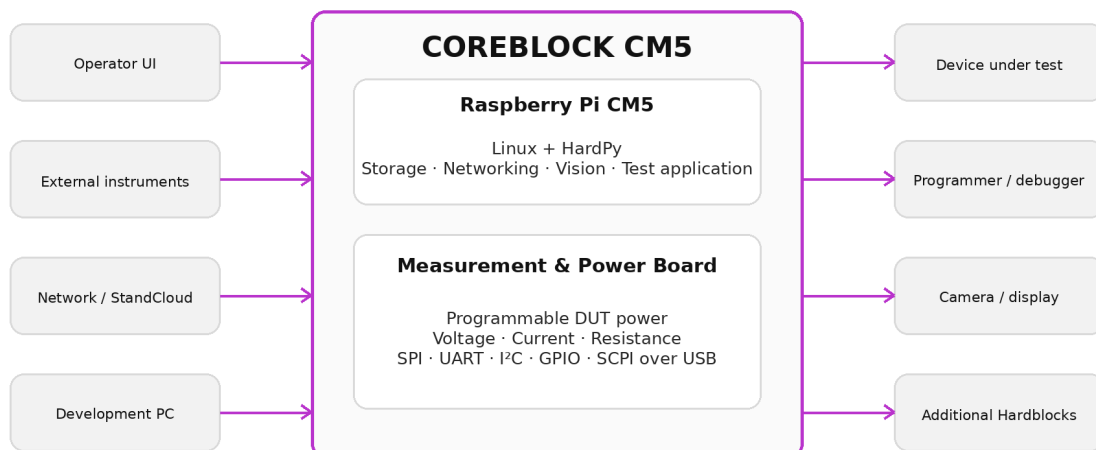


Measurement & Power Board

Programmable power, measurements and real-time control

System architecture

CoreBlock CM5 system architecture



Typical applications

Applications End-of-line testing · Flashing & provisioning · Power-state validation · Calibration · Vision workflows · HIL & reliability

Electrical specifications

Power input, CM5 supply, programmable DUT output, and built-in measurement ranges.

Power input

Parameter	Specification
Input connector	USB Type-C Power Delivery
Supported source profile	PD 3.0, 20 V / 5 A, 100 W source
Accepted input-voltage range	9–24 V
Maximum CoreBlock input current	3 A
Maximum CoreBlock input power	60 W

Input-power note The external adapter may support a 100 W PD profile. Maximum CoreBlock input power is 60 W.

CM5 power supply

Parameter	Specification
Output voltage	5 V
Maximum current	5 A
Maximum power	25 W

Programmable DUT power

Parameter	Specification
Output range	1.25–32 V
Maximum current	3 A
Maximum power	25 W
Voltage setting step	20 mV
Current setting step	10 mA
Output ripple	Up to 60 mV
Output control	Software + physical button

Power envelope Voltage, current, and power limits apply simultaneously. The full 3 A output is available only while total DUT output remains within 25 W.

Measurement inputs

Function	Channels	Range	ADC
Low-voltage measurement	6, multiplexed	0–27.5 V	12 bit
High-voltage measurement	1	0–80 V	20 bit
Microcurrent measurement	1	1 μ A–2 mA	20 bit
Standard current measurement	1	2 mA–3 A	20 bit
Resistance measurement	1	1 Ω –2 M Ω	12 bit

Measurement note Backplane multiplexing is supported. ADC resolution is not absolute accuracy.

Computing, interfaces, and control

Computing & storage

Compute module: Raspberry Pi Compute Module 5
Operating system: Linux
Test framework: HardPy
Application environment: Python and Linux applications
Security: TPM 2.0
Primary storage: CM5 eMMC, configuration-dependent
Removable storage: microSD with compatible non-eMMC CM5
SSD expansion: PCIe M.2 M-key, 2230 / 2242 NVMe
Wireless: Wi-Fi and Bluetooth with compatible CM5 and external antenna

Digital interfaces

SPI: Master or slave, up to 32 Mbit/s
UART: Up to 8 Mbaud
I²C: 100 kbit/s, 400 kbit/s, or 1 Mbit/s
GPIO: 2 × 3.3 V channels
Measurement-board control: USB
Command protocol: SCPI, IEEE 488.2 compatible
Expansion: Functional-interface multiplexing supported

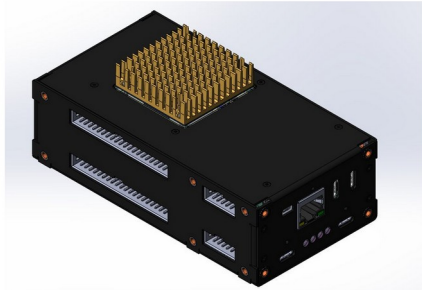
External connectivity

Interface	Quantity / function
Gigabit Ethernet	1 × RJ45
USB 3	3 × USB Type-C host ports
CM5 USB 2	1 × USB Type-C host/device, including USB boot
Additional USB 2 host	1 × USB Type-C
Power and MCU service	1 × USB Type-C PD/device
HDMI	1 × display output
MIPI DSI/CSI-2	2 × FFC camera/display connectors
microSD	1 × slot
SSD	1 × PCIe M.2 M-key slot
Wireless antenna	External antenna connection
Hardblocks control	2 × IDC10 USB-based connectors
Functional expansion	2 × IDC40 functional connectors

Software control and logging

Linux control plane	Real-time control plane
The CM5 runs the test sequence, operator interface, programming tools, network services, local storage, and integrations with external instruments.	The dedicated MCU controls power and measurements, exposes SCPI commands over USB, and logs input-power events, DUT-output switching, faults, and CC-mode transitions.

Mechanical, environmental, and project status



Hardblocks 2U construction

CoreBlock is designed as a modular 2U unit for integration into a production fixture or standalone use on a workbench. The two-board architecture allows the compute carrier and the Measurement & Power Board to evolve independently.

- Stackable modular enclosure
- Fixture-ready connectors and mounting
- External heatsink for the CM5
- Replaceable compute and measurement subassemblies
- Expandable through Hardblocks control and functional interfaces

Environmental conditions

Parameter	Specification
Installation	Indoor, heated, and ventilated spaces
Operating temperature	+1 to +35 °C
Operating humidity	Up to 80% at +25 °C
Storage temperature	−60 to +35 °C
Storage humidity	Up to 95% at +25 °C
Dimensions	To be confirmed
Weight	To be confirmed

Open design

CoreBlock is being developed around open hardware and open software principles. The planned project release includes electronic schematics, PCB sources, mechanical design files, embedded firmware, Linux integration software, manufacturing test scripts, and practical HardPy examples.

Design targets

- EN 61010-1 safety requirements for measurement, control, and laboratory equipment
- EU EMC Directive 2014/30/EU
- RoHS 2 Directive 2011/65/EU
- WEEE Directive 2012/19/EU
- Open Source Hardware Association certification target

Compliance status The listed standards and certifications are design targets, not current certification claims. Final declarations will be published after testing and conformity assessment.

Specification status

Still to be validated Absolute measurement accuracy, temperature drift, bandwidth, and measurement update rate. Mechanical dimensions and weight remain to be confirmed; conformity assessment is planned.

Revision note. This preliminary datasheet describes the current CoreBlock CM5 Rev. 0.1 design and may change before production. “ADC resolution” and “setting step” must not be interpreted as absolute accuracy.