



PRODUCT DATASHEET | RELEASE V1.0

Edge Computing Flight Controller Pixhawk 6X

FMUv6 flight control, Raspberry Pi CM5 integration, M.2 cellular connectivity and Ethernet on one modular baseboard.



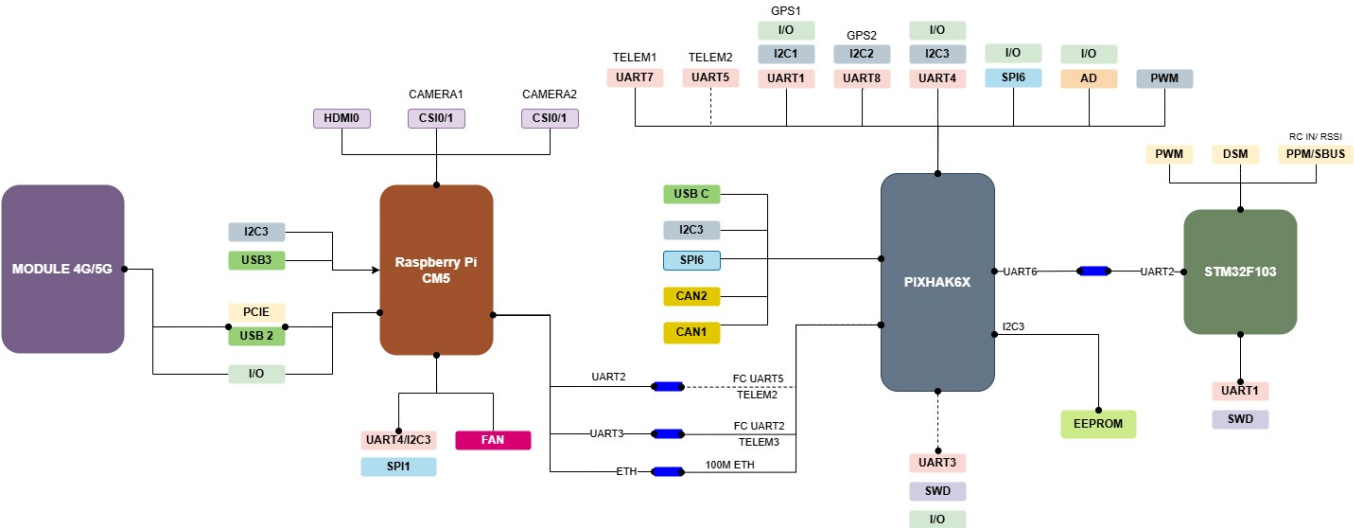
FMUv6	CM5	4G / 5G	16 PWM
Real-time flight domain	Linux edge compute	M.2 modem path	8 MAIN + 8 AUX

A unified control platform for UAV, UGV and marine autonomous systems that need deterministic flight or motion control, onboard Linux compute and network connectivity in one deployable architecture.

SECTION 01

System Architecture

Real-time control remains on the FMUv6 domain while the CM5 handles Linux, vision, AI and higher-level autonomy. Internal UART and Ethernet paths join both domains, and the M.2 path extends the platform to cellular networks.



Functional relationship between the modem, CM5, Pixhawk 6X core and STM32F103 IO coprocessor.

FLIGHT DOMAIN STM32H7xx FMUv6 controller for sensors, safety, navigation interfaces and mission-critical control loops.	COMPUTE DOMAIN Raspberry Pi CM5 for Linux applications, vision pipelines, video processing and autonomy software.
CONNECTIVITY DOMAIN M.2 4G LTE / 5G NR modem path over PCIe Gen 2 and USB 3.0, with Nano SIM and control signals.	FIELD I/O DOMAIN STM32F103 IO coprocessor, 16 PWM outputs, dual GPS, dual CAN, telemetry, SPI, I2C and RC interfaces.

Integration principle

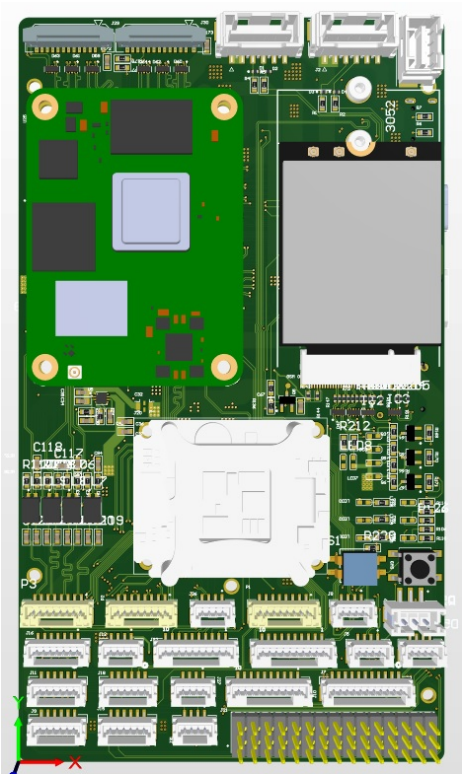
- Separate deterministic control from compute-heavy Linux workloads.
- Reduce external wiring between the autopilot, companion computer and modem.
- Keep external expansion available through standard vehicle and payload interfaces.

SECTION 02

Flight Control and IO

The FMUv6 block provides the primary real-time controller. A dedicated STM32F103 IO coprocessor handles AUX PWM, RC and safety-related service functions separately from the Linux domain.

Flight-control item	Specification
Standard	Pixhawk FMUv6 / Pixhawk 6X class
Main processor	STM32H7xx, Cortex-M7 with FPU, up to 480 MHz
Memory	2 MB flash; 1 MB TCM + 512 KB DTCM
EEPROM	24LC64, 64 Kbit, I2C3 address 0x51
FMU Ethernet	LAN8742A 10/100 Mbps PHY through RMII
USB	USB full-speed through USB-C
Safety / service	Safety switch, buzzer, ARMED LED, version sense, RTC battery and SWD



IO item	Specification
Coprocessor	STM32F103C8T7, Cortex-M3, 72 MHz
PWM	8 AUX channels; 8 MAIN channels from FMU domain
RC	PPM, SBUS, DSM and RSSI input
FMU link	USART6 bidirectional internal link
Safety	Safety switch input and safety LED output
Debug	UART and SWD access
Sensing	Servo-voltage sense

Top-side PCB view for layout orientation. Use the released connector table for harness design.

SECTION 03

Edge Compute and Cellular Connectivity

The CM5 domain provides onboard Linux compute, camera and display interfaces, USB, external Ethernet and the host paths used by the M.2 cellular module.



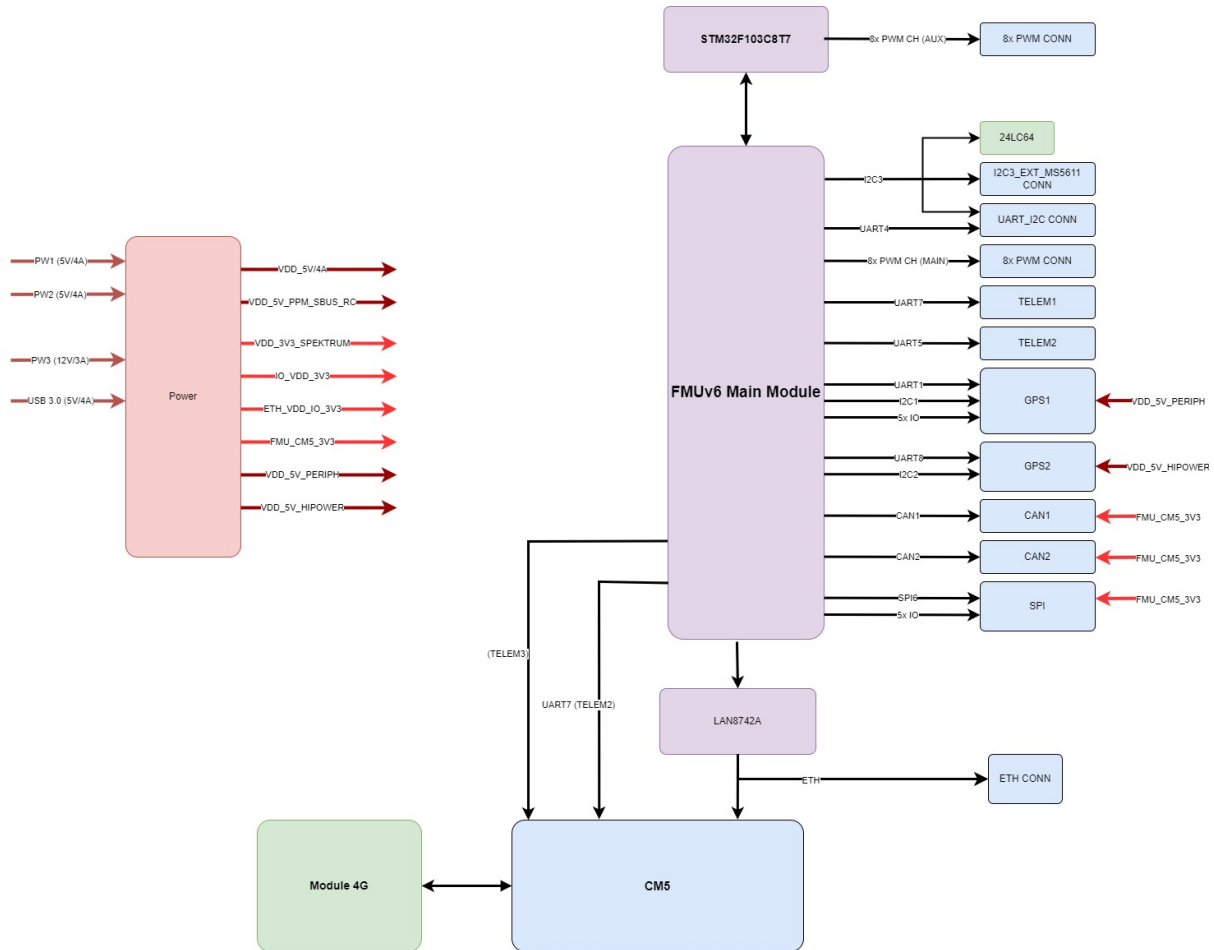
Modular enclosure, compute layer and flight-control baseboard.

Compute item	Specification	Cellular item	Specification
Module	Raspberry Pi Compute Module 5	Form factor	M.2 modem connector
CPU	Quad-core Arm Cortex-A76 at 2.4 GHz	Network class	4G LTE / 5G NR, module dependent
RAM	2 GB / 4 GB / 8 GB LPDDR4X, configuration dependent	Host links	PCIe Gen 2 + USB 3.0
Storage	eMMC or NVMe through PCIe, configuration dependent	SIM	Nano SIM slot
Vision	2 MIPI CSI-2 camera interfaces	Control	ON/OFF, reset, power gate and full-card power-off signals
Display	1 HDMI output	Power	Dedicated 3.8 V modem rail
USB	USB 3.0 host and USB-C boot/service path	Deployment	Module, antenna, carrier and firmware dependent
FMU links	Internal Ethernet plus UART2 and UART3		
Thermal	PWM fan control with tachometer input		

SECTION 04

Power Architecture

A centralized source selector and dedicated rails distribute power to the FMU, IO, Ethernet, CM5, peripherals and cellular modem domains.



Baseboard-level relationship between power inputs, FMUv6, IO, CM5, modem and field connectors.

Rail / input	Voltage	Primary role
POWER1	5 V / 4 A	Highest-priority documented input
POWER2	5 V / 4 A	Secondary documented input
POWER3	12 V / 3 A	Fallback documented input path
VDD_5V_IN	5 V	Main platform bus after source selection
FMU_VDD_3V3	3.3 V	FMU main domain
IO_VDD_3V3	3.3 V	IO MCU and support logic
VDD_5V_PERIPH	5 V	GPS1, TELEM2, SPI and I2C peripherals
VDD_5V_HIPOWER	5 V	GPS2 and TELEM1
VIN_CM5	5 V	Compute Module 5
3V8_DIO	3.8 V	4G / 5G modem domain

SECTION 05

Communication Interfaces and Connectors

The connector set covers navigation, telemetry, vehicle networking, RC, PWM, payload interfaces and service access.

Connector	Ref.	Pins	Primary function
GPS1	J10	10	UART1, I2C1, GPIO and VDD_5V_PERIPH
GPS2	J15	6	UART8, I2C2 and VDD_5V_HIPOWER
TELEM1	J9	6	UART7 TX/RX/RTS/CTS and power
TELEM2	J11	6	UART5 TX/RX/RTS/CTS and power
CAN1 / CAN2	J5 / J8	4	Dual CAN peripheral buses
SPI External	J7	11	SPI6, power, CS, sync and data-ready signals
I2C External	J12	4	I2C3 and peripheral power
UART / I2C	J16	7	UART4 and general I2C
USB-C	J3	-	FMU USB data and power sensing
CM5 HDMI	J32	-	HDMI output
CM5 CAM0 / CAM1	J30 / J29	22	MIPI CSI-2 camera inputs
CM5 ETH0 / ETH1	P2 / P3	8	External Ethernet paths
Fan	J31	4	5 V, PWM and tachometer
Power 1 / 2 / 3	J1 / J2 / J4	6 / 6 / 4	Priority-selected power inputs

Interface group	Implementation
CAN	2 buses; documented 120 ohm termination
UART	GPS1, GPS2, TELEM1, TELEM2, TELEM3, debug and internal CM5 links
I2C	I2C1, I2C2 and I2C3
SPI	SPI6 external sensor bus
Ethernet	FMU 10/100 Mbps; external CM5 Gigabit Ethernet
PWM / RC	8 MAIN + 8 AUX; PPM, SBUS, DSM and RSSI

SECTION 06

Software, Applications and Ordering

The platform combines mainstream Pixhawk flight software with Linux robotics and edge-computing tools on the CM5 domain.

SOFTWARE COMPATIBILITY	TARGET APPLICATIONS
- PX4 Autopilot v1.14+ - ArduPilot 4.4+ - QGroundControl and Mission Planner - Raspberry Pi OS and Ubuntu 22.04 LTS - ROS 2 Humble / Iron - TensorFlow Lite, PyTorch Mobile and OpenCV - MAVSDK and GStreamer	- UAV mapping, inspection and connected operations - Autonomous ground vehicles and mobile robotics - ASV / USV platforms with onboard perception - Object detection and obstacle-avoidance pipelines - Fleet telemetry and remote diagnostics - Video analytics and connected payload systems

Ordering information

Model	Description	Availability
HBQ Edge Computing Flight Controller Pixhawk 6X	Modular FMUv6 flight controller with CM5 and M.2 cellular integration paths	Contact HBQ

Deployment notes

- CM5 memory, storage and wireless configuration depend on the selected module.
- Modem, antenna, carrier and firmware compatibility depend on the selected deployment configuration.
- BVLOS operation is subject to applicable regulations and network-link availability.
- Product appearance and populated options may vary by hardware revision.

HBQ TECHNOLOGY CO., LTD.	web.hbqsolution.com contact@hbqsolution.com +84 357 191 643	GitHub github.com/hbqtechnologycompany/ Edge-Computing-Flight-Controller-Pixhawk-6x
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