



## DESCRIPTION

The UgCS SkyHub solution is a hardware and software set designed to enhance commercial-off-the-shelf UAVs capabilities for industrial purposes and to support integration of diverse sensors.

## **Applications**

- Custom payload integration with drone
- Advanced UAV flight control scenarios

## Features

- Fully isolated and ESD-protected external interfaces
- Reliable and convenient connectors with lock, ideal for airborne applications
- Selectable power output (9 V / 12 V / 15 V / 18 V) with switch-off function for payload connecting
- Drone power pass-through to external payloads

- Using drones in an adverse environment
- 3× UART / 1x RS-232 / 1x UART/RS-232 combined / 2× USB / Ethernet / Wi-Fi / Bluetooth interfaces
- 4x GPIO pin pairs for general purpose input/output
- Protection against input power's inverse polarity
- Extended operating temperature range from -25°C to +50°C



## Interfaces

The UgCS SkyHub 3 device provides a connection to different payloads via several interfaces:

- 3× UART interfaces
- 1× UART / RS-232 interface
- 1× RS-232 interface
- 4× GPIO pin pairs
- Ethernet interface
- Bluetooth interface
- 2× USB 2.0

## **Power outputs**

UgCS SkyHub 3 eliminates the need to have a separate battery or power circuit for the sensors. Every connector with communication ports has pins with +5V and +12V covering 99% of power requirements for the sensors. One additional power connector is configurable and may output 9, 12, 15, 18V with 5A load maximum. Other possibility to power sensors is from a drone power pass-through connector.

## **Specifications**

GENERAL	
Compatible drones	<ul> <li>DJI M210 / M210 V2</li> <li>DJI M600 / M600 Pro</li> <li>DJI M300 RTK</li> <li>Custom frames based on DJI A3 flight controller</li> <li>Pixhawk with ArduCopter / PX4</li> </ul>
Temperature range	-25°C to +50°C
Power input	12 V to 60 V, UgCS SkyHub itself works from 9+ V
Power output	selectable 9 V / 12 V / 15 V / 18 V, up to 5 A



COMPUTATIONAL CORE	
System-on-Module	Raspberry Pi Compute Module 4
CPU	Cortex-A72 (ARM v8) 64-bit
CPU frequency	up to 1.5 GHz
RAM	8 GB
Flash, eMMC	32 GB
OS	Ubuntu Server 21.04
INTERFACES	
UART	up to 4
RS-232	up to 2
GPIO	up to 4
USB	up to 2
Wi-Fi	Dual-band 802.11 b/g/n/ac
Bluetooth	5.0 with BLE support
Ethernet	10/100 Mbit
MECHANICAL	
Dimensions (L $\times$ W $\times$ H)	112 × 84 × 34mm
Weight	195 g
Weight with mountings	215 g for DJI M300 220 g for DJI M600



## **Overview**

The main device elements are illustrated below.



UgCS SkyHub 3 overview. Side 2





UgCS SkyHub 3 elements outline

## Connector 1

By default for communicating with the altimeter (see UART / RS-232 / GPIO)

#### 2 Connector 2

By default for communicating with the flight controller (see UART / RS-232 / GPIO)

#### Connector 3

Communicates with UART-based payloads (see UART / RS-232 / GPIO)

#### 4 Connector 4

By default for communicating with any UART-based or RS-232-based sensors (see UART / RS-232 / GPIO)

### 5 Connector 5

Communicates with RS-232-based payloads (see UART / RS-232 / GPIO)

#### 6 Power input

Power input, two ports to enable drone power pass-through (see Power Input)

#### Power output

Feeds the payload (see Power Output)

#### B Power output LED (Red)

Indicates the presence of power output



#### 9 Power Output Selector

Defines power output for payloads (see Power Output Selector)

#### 10 **Ethernet connector**

Communicates with Ethernet-based payloads (see Ethernet)

**USB** ports

> Double USB-port to communicate with USB-based payloads or through USB-UART adapter (see USB ports)

## Connectors

## **Power Input**

- Mating connector on the cable side: Amass XT30U-F
- Voltage range: 12 V to 60 V.
- The UgCS SkyHub device itself works from 9+ V
- Protected against reverse polarity
- One port to power the UgCS SkyHub device, another can be used to enable drone power pass-through to external payloads



PIN	NAME	DESCRIPTION
1	+V	Power supply voltage
2	GND	Power supply ground

### 2 Payloads LED

Indicates the connection to payloads (support coming soon)

#### **1**3 Autopilot LED (Green / Red)

Indicates the connection of an autopilot. Green when autopilot works well. Red when autopilot isn't connected. Turned off when support for autopilot turns off

#### **14** Core power LED (Yellow)

Indicates the presence of core power

Pinout (device side)



## **Power Output**

- Mating connector on the cable side: Amass XT30U-M
- Voltage: Nominal ± 1%
- Output nominal voltage defines by Power Output Selector
- Current: up to 5 A

Pinout (device side)

PIN	NAME	DESCRIPTION
1	+V	Power output voltage
2	GND	Power output ground

## **Power Output Selector**

- Switcher: C&K RTE16
- Available voltages: 9 V, 12 V, 15 V, 18 V

Positions



POSITION	DESCRIPTION
1	18 V output voltage
2	15 V output voltage
4	12 V output voltage
8	9 V output voltage



## UART / RS-232 / GPIO

UgCS SkyHub 3 has five identical connectors to be dedicated to communicating with the flight controller, payloads equipped with the UART or RS-232 interface.



- One of the connectors is the combined UART / RS-232 interface.
- Four connectors provide support for GPIO line. GPIO pin pairs have no fixed reserved usage, depending on the payload they can be used for payload power switching, PPS input/output or other tasks.
- Mating connector on the cable side: Switchcraft W16982-7SG-P-518
- Logic level: 3.3 V
- Isolated from the CPU
- ESD-protected

CONNECTORS PIN 5 2 З 4 1 GND GND GND GND GND 2 +5 V +5 V +5 V +5 V +5 V 3 +12 V +12 V +12 V +12 V +12 V UART TX UART TX GP019 4 UART TX UART\_TX 5 UART\_RX UART\_RX UART\_RX UART\_RX GPI6 6 GP018 GP07 GP017 **RS232\_TX** RS232\_TX 7 GPI11 GPI23 GPI27 RS232\_RX RS232\_RX

Pinout (device side)



Pins description

PIN NAME	DESCRIPTION
GND	Ground
+5 V	5 V output voltage up to 1 A
+12 V	12 V output voltage up to 1 A
UART_TX	UART transmit line
UART_RX	UART receive line
RS232_TX	RS-232 transmit line
RS232_RX	RS-232 receive line
GPO	GPIO output line
GPI	GPIO input line

Serial device paths

CONNECTOR NUMBER	SERIAL DEVICE PATHS
Connector 1	/dev/ttyAMA1
Connector 2	/dev/ttyS0
Connector 3	/dev/ttyAMA2
Connector 4	/dev/ttyAMA3
Connector 5	/dev/ttyAMA4



## **USB ports**

Double USB-port to communicate with USB-based payloads or through USB-UART adapter. Where possible, UART has to be used instead of USB to avoid the time lag introduced by USB communications overhead.

- Mating connector on the cable side: USB A
- Total current: **up to 3 A**

## Ethernet

Dedicated to communicating with the payload equipped with the Ethernet interface.

- Mating connector on the cable side: RJ-45
- Bitrate: 10/100 Mbit