



# mRo Autopilot Family



Specifications	mRo PixRacer R15	mRo Pixracer Pro	mRo Pixhawk (Discontinued)	mRo x2.1 Rev 2	mRo x2.1-777
Main Processor	32-bit STM32F427 Cortex M4 core with FPU rev.3 168 MHz	32-bit STM32H743IILK6 Cortex M7 RISC core with FPU 460 MHz	32-bit STM32F427 Cortex M4 core with FPU rev.3 168 MHz	32-bit STM32F427 Cortex M4 core with FPU rev.3 168 MHz	32-bit STM32F777 Cortex M4 core with FPU 216 MHz
IO Processor	No	No	32-bit STM32F103 failsafe co-processor	32-bit STM32F103 failsafe co-processor	32-bit STM32F103 failsafe co-processor
RAM	256 KB RAM	1024 KB RAM	256 KB RAM	256 KB RAM	512 KB RAM
Flash	2 MB FRAM	2 MB FRAM	2 MB FRAM	2 MB FRAM	2 MB FRAM
Crypto / Hash Processor	No	No	No	No	Yes
Accelerometers / Gyros / Mags	2 / 2 / 2	Accelerometers / Gyros / Mags	2 / 2 / 1	2 / 2 / 1	2 / 2 / 1
Sensors	Invensense/TDK ICM-20602 (6DOF) Invensense/TDK MPU-9250 (9DOF)	Invensense/TDK ICM-20602 (6DOF) Invensense/TDK ICM-20948 (9DOF)	STMicro L3GD20 3-axis 16-bit (gyro) STMicro LSM303D 3-axis 14-bit (accel & mag) Invensense/TDK ICM-20602 (6DOF) Invensense/TDK MPU-9250 (9DOF)	Invensense/TDK ICM-20602 (6DOF) Invensense/TDK MPU-9250 (9DOF)	Invensense/TDK ICM-20602 (6DOF) Invensense/TDK MPU-9250 (9DOF)
Sensors - Damped	None	Bosch BMI088 (6DOF) internally vibration damped)	None	None	None
Internal Magnetometer	AK8963 inside MPU-9250 and ST LIS3MDL	AK09916 inside ICM-20948	ST Micro LISM303D 3-axis 14-bit (accel & mag)	AK8963 inside MPU-9250	AK8963 inside MPU-9250
Barometer	MEAS MS5611	Infinion DPS310 barometer (Very smooth and NO light sensitivity)	MEAS MS5611	MEAS MS5611	MEAS MS5611
Interfaces and Protocols	5x UART (serial ports) one high-power capable, 2x with HW flow control and GPS+I2C®.	6x UART (serial ports) [2x with HW flow control, Purpose & 1x GPS+I2C].	5x UART (serial ports) [one high-power capable, 2x with HW flow control, 2x CAN]	5x UART (serial ports) [2x with HW flow control, 1x CAN].	5x UART (serial ports) [2x with HW flow control, 1x CAN].
	1x PPM sum input signal	1x PPM sum input signal	1x PPM sum signal	1x PPM sum signal	1x PPM sum signal
	6x PWM outputs	8x PWM outputs (all Dshot capable)	14x PWM/servo outputs (8 with failsafe and manual override, 6 auxiliary, high-power compatible)	14x PWM/servo outputs (8 with failsafe and manual override, 6 auxiliary, high-power compatible)	14x PWM/servo outputs (8 with failsafe and manual override, 6 auxiliary, high-power compatible)
	1x RSSI (PWM or voltage) input	1x RSSI (PWM or voltage) input	1x RSSI (PWM or voltage) input	1x RSSI (PWM or voltage) input	1x RSSI (PWM or voltage) input
	1x I2C	1x I2C	1x I2C	1x I2C	1x I2C
	1x SPI	1x SPI	1x SPI	1x SPI	1x SPI
	1x CAN	2x CAN	2x CAN	2x CAN	2x CAN
	1x JTAG (Debugging & programming interface)	1x JTAG (TC2030 Connector)	1x External microUSB port	2x ADC inputs	2x ADC inputs
	8x OneShot PWM output (Configurable)	8x OneShot PWM output (Configurable)	3.3 and 6.6V ADC inputs.		
	1x External microUSB port				
Connectors	-JST GH series connectors -Servo Header -Onboard MicroUSB -2x5 header (Esp-01)	-JST GH -External USB-C	-DF13 -Servo Header -Onboard MicroUSB	-JST GH series connectors -Servo Header (optional) -External MicroUSB	-JST GH series connectors -Servo Header (optional) -External MicroUSB
Pin Headers	Yes	Yes - 8 Servo	Optional	Optional	Optional
Conformal Coating	Available	No	Available	Available	Available
Custom Carrier Board Support	No	No	No	Yes	Yes
LED	Yes	Yes	Yes (Multicolor)	Yes	Yes
Dimensions	Width: 36mm (1.42") Length: 36mm (1.42")	Width: 36mm (1.42") Length: 36mm (1.42")	Width: 50mm (1.96") Length: 81.5mm (3.21")	Width: 30.7mm (1.21") Length: 51.2mm (2.02")	Width: 30.7mm (1.21") Length: 51.2mm (2.02")
Weight	10.54g (.37 oz)	38g (1.31 oz)	15.14g (0.53 oz)	15.14g (0.53 oz)	15.14g (0.53 oz)
Mounting Holes	30mm x 30mm (1.18"x1.18")	4mm holes at 31.5mm spacing, Silicone grommets for m3 screws	30mm x 30mm (1.18"x1.18")	30mm x 30mm (1.18"x1.18")	30mm x 30mm (1.18"x1.18")
Protector Case	Optional	Optional	Optional	Optional	Optional
[Quality] and Typical Platforms	[High-End] -Multirotor -Rover -Fixed-Wing -Boats -Submarines -VTOL -Automatic Tractors -Others	[High-End] -Multirotor -Rover -Fixed-Wing -Boats -Submarines -VTOL -Automatic Tractors -Others	[High-End] -Multirotor -Rover -Fixed-Wing -Boats -Submarines -VTOL -Automatic Tractors -Others	[High-End] -Multirotor -Rover -Fixed-Wing -Boats -Submarines -VTOL -Automatic Tractors -Others	[High-Middle] -Multirotor -Rover -Fixed-Wing -Boats -Submarines -VTOL -Automatic Tractors -Others
	PX4 and ArduPilot	PX4 and ArduPilot	PX4 and ArduPilot	PX4 and ArduPilot	PX4 and ArduPilot
	AUAV-PXRCR-R15-MR	M10064C	MRO-PIXHAWK1-BB-MR	MRO-X2.1RV2-MR	MRO-X2.1-777-MR
	Board, Cables & SD Card	Board, Cables, Rubber Balls & SD Card	Board	Board	Board
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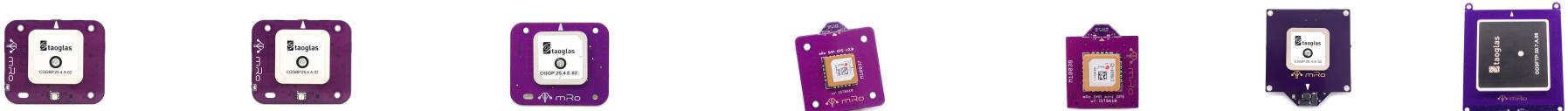


## Description

The mRo Control Zero series of flight controller from mRo is our commitment to continuous improvement. Our goal with this series was to take every lesson learned from our 10+ years of flight controller design and make the best pro-consumer / commercial flight controller on the market. Our journey begins with this Zero, this is a no-compromises triple IMU commercial grade flight controller.

Specifications	mRo Control Zero F7	mRo Control Zero H7	mRo Control Zero H7 OEM	Reference Design Carrier Board for CZOEM	Prototyping Carrier Board for CZOEM
Main Processor	32-bit STM32F777 Cortex M4 core with FPU Rev. 3 216 MHz	STM32H743 contain the Arm® Cortex®-M7 core (with double-precision floating point unit), 480 MHz fCPU /2424 CoreMark /1027 DMIPS executing from Flash memory, with 0-wait states thanks to its L1 cache.	STM32H743 contain the Arm® Cortex®-M7 core (with double-precision floating point unit), 480 MHz fCPU /2424 CoreMark /1027 DMIPS executing from Flash memory, with 0-wait states thanks to its L1 cache.	N/A	N/A
IO Processor	No	No	No	N/A	N/A
RAM	512 KB RAM	1024 KB RAM	1024 KB RAM	N/A	N/A
Flash	2 MB FRAM	2 MB FRAM	2 MB FRAM	N/A	N/A
Crypto / Hash Processor	Yes	Yes	No	N/A	N/A
Accelerometers / Gyros / Mags	3 / 3 / 1	3 / 3 / 1	3 / 3 / 1	N/A	N/A
Sensors	Invensense/TDK ICM-20602 (6DOF) Invensense/TDK ICM-20948 (9DOF)	Invensense/TDK ICM-20602 (6DOF) Invensense/TDK ICM-20948 (9DOF)	Invensense/TDK ICM-20602 (6DOF) Invensense/TDK ICM-20948 (9DOF)	N/A	N/A
Sensors - Dampened	Bosch BMI088 (6DOF) (internally vibration damped)	Bosch BMI088 (6DOF) (internally vibration damped)	Bosch BMI088 (6DOF) (internally vibration damped)	N/A	N/A
Internal Magnetometer	AK09916 inside ICM-20948	AK09916 inside ICM-20948	AK09916 inside ICM-20948	N/A	N/A
Barometer	Infineon DPS310 barometer (Very smooth and NO light sensitivity)	Infineon DPS310 barometer (Very smooth and NO light sensitivity)	Infineon DPS310 barometer (Very smooth and NO light sensitivity)	N/A	N/A
Interfaces and Protocols	6x UART (serial ports) [3x with HW flow control, 1x FRSky Telemetry (D or X types), 1x Console & 1x GPS+I2C].  1x PPM sum input signal 8x PWM outputs (all DShot capable) 1x RSSI (PWM or voltage) input 1x I2C 1x SPI 1x CAN 1x JTAG (TC2030 Connector) 3x Ultra low noise LDO voltage regulator	6x UART (serial ports) [3x with HW flow control, 1x FRSky Telemetry (D or X types), 1x Console & 1x GPS+I2C].  1x PPM sum input signal 8x PWM outputs (all DShot capable) 1x RSSI (PWM or voltage) input 1x I2C 1x SPI 1x CAN 1x JTAG (TC2030 Connector) 3x Ultra low noise LDO voltage regulator	5x UART (serial ports) [2x with HW flow control, 1x FRSky Telemetry (D or X types), 1x Console & 1x GPS+I2C].  1x PPM sum input signal 8x PWM outputs (all DShot capable) 1x RSSI (PWM or voltage) input 1x I2C 1x SPI 2x CAN 1x JTAG (TC2030 Connector) 3x Ultra low noise LDO voltage regulator	<b>Top:</b> -Telem1 -Telem2 -GPS+I2C -Power -UART6/ SPI -CAN1 -CAN3 -Safety Switch  <b>Bottom:</b> -Optional External Arm Button -PWM CH1~CH8 -RX7 / TX7 -FRSKY_IN / FRSKY_OUT -Optional External PWR Input -SDA3 / SDA4 -SCL3 / SCL4 -RC_ Input -RSSI	<b>Front:</b> -GND/ GND -USB_N/ RTS6_MISO -USB_P/ CTS6_SCK -USB_V/ RX6_CS -GND/ TX6_MOSI -RX4/ 5V_P -TX4_GND -5V_P/ RTS2 -GND/CTS2 -3V_SPK/ RX2 -GND/ TX2 -FRSKY_IN/ 5V_P -FRSKY_OUT/ GND -5V_P/ RTS3 -RSSI_IN/ RX3 -RC_IN/ TX3 -5V_R/ 5V_P <b>Rear:</b> -GND/CH1 -GND/CH2 -BATT_VOLT/CH3 -5V_BRICK/CH5 -5V_BRICK/CH6 -FMU_3V3/CH7 -SFTY_SWITCH/CH8 -5V_P/5V_P -I2C1_CL/ CAN1_H -I2C1_DA/ CAN1_L -GND/GND -5V_P/5V_P -I2C3_CK/ CAN3_H -I2C3_DA/ CAN3_L -GND/GND -5V_P/5V_P -I2C4_CL/ TX7 -I2C4_DA/ RX7 -GND/GND
Connectors	-Molex PicoClasp -External MicroUSB	-Molex PicoClasp -External MicroUSB	Front: Samtec FTM-118-02-L-DV Rear: Samtec FTM-120-02-L-DV	-JST-GH -MicroUSB -Samtec CLM-120-02-F-D -Samtec CLM-118-02-F-D	JST-GH Ports: -GPS -TELEM1 -CAN1 -CAN3  -JST-GH -MicroUSB -Samtec CLM-120-02-F-D -Samtec CLM-118-02-F-D
Pin Headers	Yes	Yes	Yes	Yes	Yes
Conformal Coating	Yes	Yes	Yes	Yes	Yes
Custom Carrier Board Support	Yes	Yes	Yes	Yes	Yes
LED	Yes (Tricolor)	Yes (Tricolor)	Yes (Tricolor)	No	No
Dimensions	Width: 20mm (0.79") Length: 32mm (1.26")	Width: 20mm (0.79") Length: 32mm (1.26")	Width: 20mm (0.79") Length: 35mm (1.38")	Width: 61.45mm (2.42") Length: 32.50mm (1.28")	Width: 67.25mm (2.65") Length: 53mm (2.09")
Weight	5.3g (.19 oz)	5.3g (.19 oz)	4.14g (.15 oz)	5.80g (.2 oz)	13.58g (.40 oz)
Mounting Holes	N/A	N/A	N/A	Yes	Yes
Protector Case	Aluminum Case	Aluminum Case	N/A	Optional	Optional
[Quality] and Typical Platforms	[High-End] -Multirotor -Rover -Fixed-Wing -Boats -Submarines -VTOL -Automatic Tractors -Others	[High-End] -Multirotor -Rover -Fixed-Wing -Boats -Submarines -VTOL -Automatic Tractors -Others	[High-End] -Multirotor -Rover -Fixed-Wing -Boats -Submarines -VTOL -Automatic Tractors -Others	[High-End] -Multirotor -Rover -Fixed-Wing -Boats -Submarines -VTOL -Automatic Tractors -Others	[High-End] -Multirotor -Rover -Fixed-Wing -Boats -Submarines -VTOL -Automatic Tractors -Others
Compatibility	PX4 and ArduPilot	Ardupilot	Ardupilot	N/A	N/A
Product Code	MRO-CTRL-ZERO-F7	MRO-CTRL-ZERO-H7	M10059	M10066A	M10060B
What is included	Board, Cables, Case & SD Card	Board, Cables, Case & SD Card	Board & Tweezers	Just the board	Just the board
Release Date	April 2019	Coming Soon	June 2020	Coming Soon	Coming Soon

# mRo Professional GPS Family



Specifications	mRo GPS u-Blox Neo-M8N Dual Compass LIS3MDL+ IST8310	mRo GPS u-Blox Neo-M9N Dual Compass LIS3MDL+ IST8310	mRo GPS u-Blox Neo-M8N / 3DR SOLO (New)	mRo SAM GPS + IST8308 Mag (Full Size) MRO10037	mRo SAM GPS + IST8308 Mag (Medium Size) MRO10038	mRo Location ONE W/ Barometer & Compass	mRo ZED F9
Module	u-Blox Neo-M8N 40mm x 47mm	u-Blox Neo-M9N 40mm x 47mm	u-Blox Neo-M8N 40mm x 47mm	SAM 40mm x 40mm	SAM 31mm x 31mm	u-Blox Neo-MSN 50mm x 50mm	ZED F9 70mm x 70mm
Ground Plane							GPS ( L1/L2 ) Glonass ( L1/L2 ) Galileo BeiDou
Constellations	USA (GPS), Russia(GLONASS), Europe (Galileo) & China (BeiDou).	USA (GPS), Russia(GLONASS), Europe (Galileo) & China (BeiDou).	USA (GPS), Russia(GLONASS) and Europe (Galileo). China can be enable (BeiDou).	USA (GPS), Russia(GLONASS) and Europe (Galileo). China can be enable (BeiDou).	USA (GPS), Russia(GLONASS) and Europe (Galileo). China can be enable (BeiDou).	USA (GPS), Russia(GLONASS), Europe (Galileo) & China (BeiDou).	
Compatibility	LIS3MDL supports: both PX4 and Ardupilot IST8310 supports: both PX4 and Ardupilot	LIS3MDL supports: both PX4 and Ardupilot IST8310 supports: both PX4 and Ardupilot	Designed to for 3DR SOLO drone No Compass	IST8308 supports: Ardupilot	IST8308 supports: Ardupilot	RM-3100 supports: both PX4 and Ardupilot	No Compass
Compass	LIS3MDL & IST8310	LIS3MDL & IST8310	No	IST8308	IST8308	RM3100	No
Barometer	No	No	No	No	No	DPS310	No
RTK ready	No	No	No	No	No	No	Yes
USB Port	Yes	Yes	Yes	No	No	Yes ( Type C )	Yes ( Type C )
CAN ready	No	No	No	No	No	Yes	No
Minimum and Maximum Operating Temperature	-20 ~ 80 °C	-20 ~ 80 °C	-20 ~ 80 °C	-20 ~ 80 °C	-20 ~ 80 °C	-20 ~ 80 °C	-20 ~ 80 °C
LED	Yes	Yes	No	Yes	Yes	Yes	Yes
Dimensions			40mm x 47mm x 9.9mm	40mm x 40mm x 11.5mm	31mm x 31mm x 11.5mm	50mm x 50mm x 7mm	70mm x 70mm x 14mm
Weight	16.60 grams (.586 oz)	16.60 grams (.586 oz)	16.60 grams (.586 oz)	9 grams (.32 oz)	7.86 grams (.28 oz)	20.26 grams (.71 oz)	59.6 grams (2.1 oz)
Mounting Holes	2.5mm and 5.4mm	2.5mm and 5.4mm	2.5mm and 5.4mm	3.2mm	No	3.2mm	3mm
Case	Optional	Optional	Not required	Optional	Optional	Optional	Optional
Connectors	-6-Pins JST-GH -Auxiliary Port I2c	-6-Pins JST-GH -Auxiliary Port I2c	-Molex Click-Mate	-6-Pins JST-GH -Auxiliary Port I2c	-6-Pins JST-GH -Auxiliary Port I2c	-2x, 4-Pins JST-GH ( CAN ) -1x, 6-Pins JST-GH ( I2C ) -1x, 6-Pins JST-GH ( Ublox UART )	-6-Pins JST-GH ( Ublox UART + I2C ) -6-Pins JST-GH ( Ublox UART2 )
Includes	1x 6-Pins JST-GH cable	1x 6-Pins JST-GH cable		1x mRo uGPS ublox Sam M8Q. 1x 6-Pins JST-GH to 6-Pins JST-GH - MRC0206 1x 6-Pins JST-GH to 6 Separate 2.54mm Females - MRC0202 (For project versatility)	1x mRo uGPS ublox Sam M8Q. 1x 6-Pins JST-GH to 6-Pins JST-GH - MRC0206 1x 6-Pins JST-GH to 6 Separate 2.54mm Females - MRC0202 (For project versatility)	1x mRo Location One 1x 6-Pins JST-GH 1x USB -C cable	1x mRo ZED F9 2x 6-Pins JST-GH to 6
[Quality] and Typical Platforms	<b>[High-Middle]</b> -Multirotor -Rover -Fixed-Wing -Boats -VTOL -Automatic Tractors -Others	<b>[High-Middle]</b> -Multirotor -Rover -Fixed-Wing -Boats -VTOL -Automatic Tractors -Others	<b>[High]</b> Drone 3DR SOLO	<b>[High]</b> -Multirotor -Rover -Fixed-Wing -Boats -VTOL -Automatic Tractors -Others	<b>[High]</b> -Multirotor -Rover -Fixed-Wing -Boats -VTOL -Automatic Tractors -Others	<b>[High-End]</b> -Multirotor -Rover -Fixed-Wing -Boats -VTOL -Automatic Tractors -Others	<b>[High-End]</b> -Multirotor -Rover -Fixed-Wing -Boats -VTOL -Automatic Tractors -Others
Other Features	*RGB LED driver (NCP5623) integrated. *PPS pad for easy access. *On-board safety switch.	*RGB LED driver (NCP5623) integrated. *PPS pad for easy access. *On-board safety switch.		*PPS/GND signal pads *Rechargeable battery *Status LED *Standard JST-GH (GPS and I2C) *Standard 30.5mm x 30.5mm mounting holes (1.2" x 1.2")	*Lightest GPS version , 7.86 grams (.28 oz) *PPS/GND signal pads *Rechargeable battery *Status LED *Standard JST-GH (GPS and I2C)	*mRo GPS version that has the best compass system available at the moment for light weight platforms *RGB LED driver (NCP5623) *PPS pad for easy access *On-board safety switch	*Multi-Band: supporting both L1 and L2 bands *Improved frequency selectivity and signal conditioning provided by the on-board LNA's + SAW's for both bands *Onboard Multi-band antenna which makes the integration lightest and easy rather than using external long corded active antennas. *RTK capability for either Rover or Base configuration
Product Code	MRO-GPS003-MR	M10034-M9N	GPS001-MR	MRO10037	MRO10038	MRO10070B	MR-M10020-A
Release Date	---	12/9/2020	---	---	---	---	---

# mRo Power Module Family



Specifications	mRo Classic Power Module (BEC) 4S LIPOs	AUAV Power Module (ACSP4) 10S- LIPO 5V&12V Output	AUAV Power Module (ACSP5) 10S- LIPO	mRo Hall Sens Power Module ACSP7 (Next Gen)	mRo Power Zero
Dimensions		36mm x 36mm (1.37"x1.37")	17mmx17mm (.67"x.67")	17mmx17mm (.67"x.67")	18mm x 18mm (.70"x.70") Height: 7.30 mm (0.28")
Weight (Board)				2.9g (0.07 oz)	2.50g (0.08 oz)
Maximum input voltage	18v 4s lipo	42v	42v 10s lipo	42v 10s lipo	50.4v 12s lipo
Max Current Sensing	60 Amps	90 Amps	80 Amps	90 Amps	90 Amps
Max Current from 5.3V Power Supply	2.25Amp	3 Amps *3 Amps (Max Current from 12V Power Supply)	2 Amps	2 Amps	2 Amps
Compatibility	<b>Ardupilot &amp; PX4</b>	<b>Ardupilot &amp; PX4</b>	<b>Ardupilot &amp; PX4</b>	<b>Ardupilot &amp; PX4</b>	<b>Ardupilot &amp; PX4</b>
Product Code	CLASSIC-BEC10-MR	AUAV-ACSP4-MR	AUAV-ACSP5-MR	MRO-ACSP7V10-MR	MRO-PWRZERO-MR
Release Date	--	--	--	--	06/30/2020

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