

2013 MultiRotorForums.com Flight Control Assessment

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[Please note errors or omissions here \(CLICK\)](#)

**=see manufacturer specific notes below

Manufacturer	Model	Complete System Cost	SOD	QOM	Ease of Set-Up	Open Source?	Max # of Motor Outputs	PWM or I2C??	Flight Modes		Altitude Hold	IOC or Carefree	Onboard OSD?	Onboard Failsafe?	Wind Tolerance	GPS					Follow Me	
									Attitude	A/L						PH	RTH	IRTH	Waypoints?	Max WP's?		
3D Robotics	APM 2.5+		3,	5,	4	Yes	8**	PWM or I2C	Y	Y	Y	Y,**	N	Y	3	ArduCopter	Y	Y,**	Y	Y	100+	
	AutoQuad																					
	DJI		5,	5,	4	No	6**	PWM		4,**	4,	Y	N	Y	3,	DJI NAZA	4,		4,		N	N/A
	DJI		4,	5,		No	6**	PWM			4,	Y	Y	Y	4,	DJI WKM	Y		Y			
	Hoverfly		5,	5,	4	No	8	PWM	Y	N		N	N	N		HF Sport	N	N	N	N	N	
	Hoverfly		4,	5,	4	No	8	PWM	5,	5,	3,	Y	Y	N	4,	HF PRO	3,	3,	N	N	N	
	Kaptain Keuk		5,	3,**		Yes	8	PWM				N				KK2	N	N	N	N	N	
	Mikrokopter		5,	3	3	No	12**	I2C **	**	5,	4,	Y	Y	N	5,	MF FC 2.1	4,	4,	N	Y	Y**	Y
	OpenPilot		2,	4		Yes	8	PWM								OP CC3D	N	N	N	N	N	
	XAircraft		???	???		No		PWM								XA FC-1212	???	???	???	???	???	
	Zero UAV		3,		3	No		PWM								XY-Y6	X,					

**=see manufacturer specific notes below

Notes:

- For the purposes of this assessment, Attitude flight mode is defined as flight unassisted by advanced stabilization features, Auto-Level (A/L) is the mode whereby the flight control will continuously seek to establish level flight unless directed otherwise. Individual manufacturers may refer to these modes differently although they are fundamentally the same.
- System cost does not include motor controllers or power distribution .
- All hardware is available via multiple outlets, visit MultiRotorForums.com for more info or reference online search tools.
- Failsafe feature must be specific part of FC system to be considered. Failsafe modes set solely with radio Tx/Rx features are not considered part of FC package.
- Ease of set-up reflects effort for 1st time user.
- PWM or I2C, these are both ways to control the motors, with PWM using standard brushless motor ESC's and I2C using motor controllers that are individually addressed and controlled by a single two wire loop and streamed motor commands from the flight control

** Notes:

ArduCopter Attitude mode is called "Rate" mode, Carefree mode is called "Simple Flight" mode, return-to-home function is called "Return to Launch" (RTL), unlimited # of motors using I2c control
DJI-NAZA 8 motor control available with Futaba SBUS receiver only, A/L combined with GPS PH if GPS enabled
DJI WKM 8 motor control available with Futaba SBUS receiver only

Hoverfly Sport

Hoverfly PRO

KK2 QOM score as sold by HobbyKing.com,

MK FC 2.1 Attitude mode available via firmware tuning, standard PWM ESC's (8 motor maximum) w/ 3rd party converter, max waypoints require user fee

OP CC3D

XA FC-1212S

XY-Y6

Acronyms:

- N/A** Not Available, to the best of our knowledge at the time the current assessment was first published
SOD State of Development (1=Beta, 2=Competent for advanced users, 3=Competent and improving, 4=Mature with ongoing features improvement, 5=Mature with slow to no additional growth)
QOM Quality of Manufacture (Scale 1 to 5, 1 worst, 5 best)
I2C
PWM Pulse Width Modulation (Command format for servos and ESC's), http://en.wikipedia.org/wiki/Pulse-width_modulation
ESC Electronic Speed Controller, device used to control speed of brushless motors, Mikrokopter uses the abbreviation "BL"
A/L Auto/Level, see Note 1
OSD On-Screen Display, provides flight info, electrical system status, navigation info, etc. on monitor or via video goggles
PH Position Hold, GPS required
RTH Return to Home, GPS required, helicopter automatically returns to position where power was first applied before flight
RTL Return to Launch, ArduCopter term, same as RTH with other FC's
IRTH Intelligent RTH, combines vertical and lateral navigation in RTH feature
IOC Intelligent Orientation Control (DJI specific)
GPS Global Positioning System
WP Waypoint (A point on the ground used by the FC for navigation along a route)
FC Flight Controller