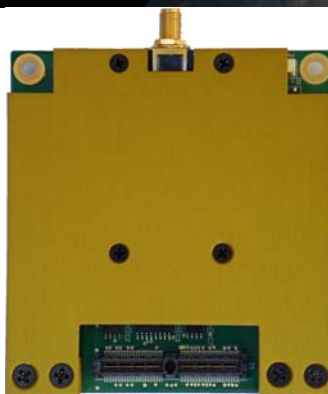




Black Magic Missile Works



CPU (Base) Module (\$850), Optional 5 fps GPS (\$300)



900 MHz Narrow Band Telemetry (\$825)



2.4GHz Wide Band Digital Data Link (\$3,000)



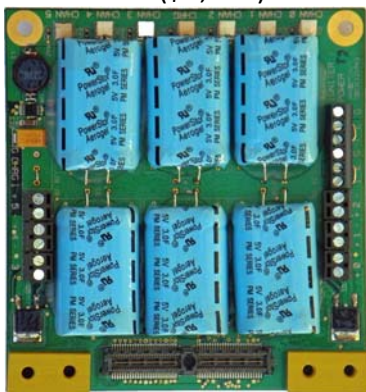
20 fps GPS with External Antenna (\$2,500)



UFC-3-FMS Flight Management System (\$700-\$2,800)



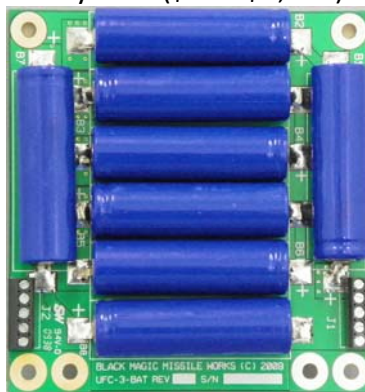
8 Input 16-bit ADC (\$425)



6 Port Pyro (\$300-\$525)



Power (\$225-\$450)



Battery (\$125)

Highest performance, most flexible modular Flight Computers for Class III HPR

Prices subject to change without notice – 10% Discount on System Packages – Two week lead time

Specifications (cont)

2.4GHz Wide Band Digital Data Link Module UFC-3-DDL

RF Modem	MicroHard MHS11610/MHS116150
Frequency	ISM 2.4GHz. frequency band
Output Power	1 Watt maximum (lower power selectable)
Data Rate	4/8MHz. Ethernet (921,600 baud serial channel)
Range (line of sight, high gain antenna)	>32 km (20 miles)
Available addresses	Network ID, 32 bit address
License requirements	None
Indicator LEDs	Status, Receive, Transmit
External Power Output	5V, 12V or Battery Power with Program Enable (POE or Connector)
Module Weight (grams/ounces)	89/3.1 (not including antenna, cables or ground modem)

GPS Module UFC-3-GPS

Option (-1/-2)	Garmin GPS-18 5Hz.	NovAtel OEM615V
Type	External Receiver/Antenna Module (RS-232)	Internal Receiver External Antenna
Fixes per Second	5	20
Position Accuracy	15m Standard, 3m WAAS	1.5m Standard, 0.6m WAAS
Velocity Accuracy	0.12m/s	0.03m/s
Maximum Altitude	60,000' (18,288m)	60,000' (18,288m)
Maximum Velocity	1,150 mph (514m/s)	1,150 mph (514m/s)
Reacquisition Time	< 2 sec.	0.5 sec.
Removal of COCOM limits available	No	Yes
Indicator LEDs	Power, GPS Lock	
Module Weight (grams/ounces)	42/1.5	82/2.9
External Element Weight (grams/ounces)	70/2.5	113/4.0
External Element Size	61mm dia., 19.5mm high	66mm dia., 18mm high

Analog to Digital Converter Module(s) UFC-3-ADC

Number of Channels	8 per Module (up to four modules per node)
Digital Resolution	16-bit
Standard D.C. Input Range	0-5 Volts (up to 50 Volts as an option)
D.C. Accuracy (est.)	0.1% max./0.05% typical
Options (per channel)	Custom Input Scale, Programmable Gain Amplifier (PGA), Thermocouple Input (Type K)
PGA Accuracy (est.)	0.5% max./ 0.25% typical
PGA Gain (1mV max. full scale)	1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024, 2048, 4096
Thermocouple Range (Type K)	-180°C to +1,200°C
Internal Excitation Supply	8V @ 100 ma. on each ADC Module
Module Weight (grams/ounces)	56/2.0

6 Channel Pyro Module(s) UFC-3-PYR

Number of Channels	6 per Module (up to three modules per node)	
Energy Source Option (-1/-2)	External Battery	Internal using Super Capacitors (10 VDC Min. Input, 1.3 Amp maximum charge current)
Current per Channel (constant current)	4 Amps. (channels fired simultaneously limited by battery)	4 Amps. (all channels may be fired simultaneously for 24 Amps. total)
Indicator LEDs	Six Continuity (individual), Charged (-2 only)	
Module Weight (grams/ounces)	54/1.9	100/3.5

Inertial Module (Roll, Pitch, Yaw) UFC-3-3XS

Sensor	Analog Devices ADIS16365 (Internal)
Resolution	14-bits
Range	±300 degree/second, ±17g
Bandwidth	350 Hz., 819.2 samples per second maximum
Temperature Range	-40°C to +105°C
Indicator LEDs	Power
Module Weight (grams/ounces)	66/2.3

Specifications (cont)

Battery Module(s) UFC-3-BAT		
Option	-1	-2
Capacity (nominal), Type	9.6 Volts @ 2 Ah NiMH	2 x 14.4 Volts @ .75Ah Lithium
Temperature Range (discharge)	-10°C to +65°C	-20°C to +60°C
Surge Current (1 second)	4 Amps	2 x 1.9 Amps
Connection Options	Single, Series or Parallel (Redundant Power)	
Module Weight (grams/ounces)	274/9.6	
Power Module(s) UFC-3-PWR		
Option (-1/-2)	Standard	Aerospace
Capacity (nominal), Type	21.6 Volts @ 750mAh, Lithium Ion	21.6 Volts @ 330mAh, Lithium Ion
Temperature Range (discharge)	-20°C to +60°C	-40°C to +85°C
Surge Current (1 second)	1.9 Amps	2 Amps (5 Amps pulsed)
Connection Options	Single or Parallel (Redundant Power)	
Module Weight (grams/ounces)	182/6.4	

**Note: Refer to Flight Management System (FMS)
Brochure for information on this module**

User Configurable System and Fully User Programmable Flight Control

Any sensor can be automatically checked for function or input value (and some may be automatically calibrated) as a part of pre-flight preparations. Any failure of a system check will abort the launch sequence. User defined complex events can cause any action(s) the system is capable of with optional time delays during flight.

Preflight		Flight	
Preparation	Checks	Events	Actions
Calibrate Altimeter	Analog Inputs	Ready (to launch)	Set Analog Recording
Calibrate Accelerometer	Digital Inputs	Stage (by occurrence)	Set Digital Recording
Calibrate Inertial Sensor	Pyro Continuity	Ascent Altitude	Set Altimeter Recording
Use GPS	Altimeter Self-Test	Apogee	Set Accelerometer Recording
	Attitude	Descent Altitude	Set Inertial Sensor Recording
	Inertial Self-Test	Landed (end of Descent)	Set GPS Recording
	Accelerometer Self-Test	Remote (Telemetry uplink)	Set Temperature Recording
	Temperature	Remote (Network message)	Set OSD Recording
	GPS Lock	Analog Inputs	Set/Clear Digital Output
	Battery Check	Digital Inputs	Change Telemetry Config.
	OSD	Roll (rate), Pitch, Yaw	Activate Pyro Channel
	FMS	Temperature Input	Remote (network message)
		Vertical Speed (fps)	Simulate Acceleration*
		Horizontal Speed (knots)	Simulate Velocity*
		Flag Set/Clear	End (shutdown)
		FMS	Set/Clear Flag
			FMS Command
			DDL Power Enable

* Simulation Actions only recognized during Simulated Launch, no effect during flight operations (allows complete test of user script and hardware functions)