

AP04R - The autopilot solution for unmanned aircraft

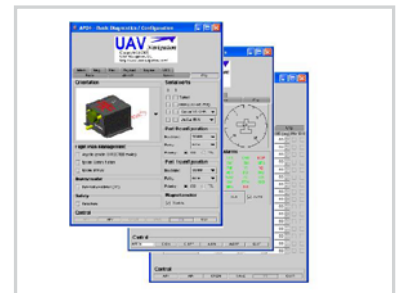
The AP04R is a fully integrated miniaturized autopilot with manual override, radio link, and payload control capabilities.

The AP04R is used in fixed wing UAVs ranging from micro-UAVs of less than 1 meter wingspan to 70Kg target drones capable of 350Kt, as well as in helicopters. It is currently operating on electric, piston, and jet aircraft.

The AP04R is capable of fully automatic takeoff, flight plan following, and landing. It can configure the aircraft for each stage of the flight, adapting flaps, or locking nose wheel steering.

Its integrated radiolink modem allows data communication ranges in excess of 60 miles. Once a flight plan is loaded, no ground communications are needed. This extends the range of operation beyond radio reach.

A manual override mechanism allows the ground operator to have full manual UAV control by means of a joystick similar to the ones used for R/C airplanes, requiring no extra training for external pilots.



The AP04R inherits its design architecture and reliability features from the AP04. Its single processor architecture reduces cost, size and power consumption. Redundancy built into the software allows the AP04R to survive all individual sensor failures while maintaining accurate estimates of attitude and position. Additionally, its ruggedized enclosure is both impact resistant and waterproof.

The AP04R can perform payload control functions, such as activating flares or parachutes for target style UAVs, or gyro-stabilizing cameras or antennas for observation UAVs. In practice, the AP04R can be the sole on-board system (apart from the payload) in most UAVs. Its RS232 port can be used as communication tunnel to the ground station, allowing direct payload communication using the AP04R's radio modem.

The AP04R can control up to 7 servos or peripherals. Its interface signals can also be reconfigured as inputs to develop advanced features such as constant-RPM engine control or payload report signals.

UAV Navigation is a privately owned company that specializes in the design of flight control systems for unmanned and manned aircraft.

AP04R - Autopilot technical specifications

FLIGHT CONTROL

Fully automatic, multi-waypoint, 3D flight-plan following.

Axis	3 (roll,pitch,yaw)
Auto throttle	Yes
Auto takeoff landing	Yes

PAYLOAD MANAGEMENT

Gyro-stabilization	Yes
Flare/parachute	Auto or manual firing

COMMUNICATIONS

Baud rate	115.2 kb/s (full duplex)
Range	100 km
Frequency	902-928 MHz (1.3 GHz option)
Method	Frequency hopping spread spectrum
Simultaneous multiple UAVs	Yes

I/O

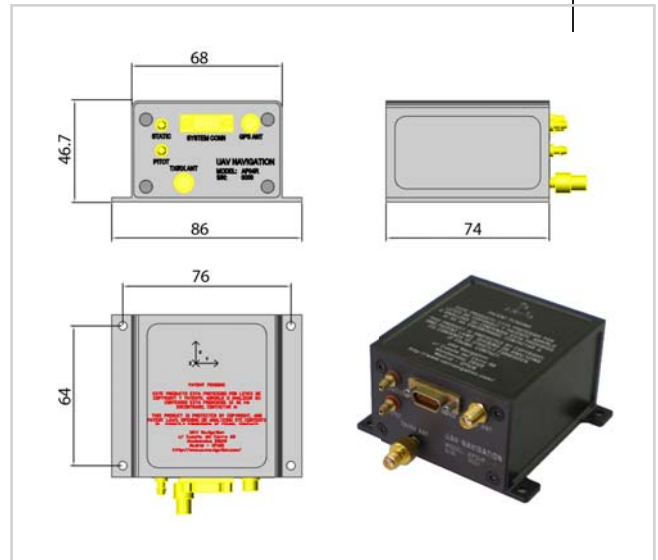
I/O lines	16
PWM rate	50 Hz or 200 Hz
PWM signal	1 ms to 2ms high, 1us steps
RS232 ports baud rate	4.8K, 9.6K, 19.2K, 38.4K

REDUNDANCY & SAFETY

Online sensor diagnostics	Yes
Sensor failure tolerance	All single, several multiple

ADS

Airspeed	LSP	25 Kt-150 Kt
	normal	35 Kt-250 Kt
	HSP	45 Kt-450 Kt
Altimeter		0 to 20,000 ft



AHRS

Accelerometer	3 axis
Max. acceleration	10G (vertical)
Angular rate sensors	3 axis
Max. angular rate	300°/s
Magnetometer	3 axis
Magnetic attitude compensation	Yes

GPS

Channels	12
Differential	Yes

ELECTRICAL

Supply (unregulated)	7 V to 36 V
Power consumption	2.5 W

MECHANICAL/ENVIRONMENTAL

Size (mm, H x W x L)	46.7 x 68.0 x 74.0
Weight	200 g
System connector	CINCH DC0000400E155B0
Pressure connectors diameter	3.0 mm
Radio link RF connector	SMA female
GPS RF connector	SMA female
Temperature range	-40°C to +85°C
Mounting screws	M4

AP04R - Ordering codes



Airspeed range:

N	Normal airspeed (35-250Kt)
L	Low airspeed (25-150Kt)
H	High airspeed (45-450Kt)

Software options:

FW	Standard fixed wing autopilot
AH	Attitude and heading reference system, 20 Hz output (no flight control laws)
AN	Attitude and heading reference system, 20 Hz output (no flight control laws), no radio
FN	Standard fixed wing autopilot, no radio
HC	Helicopter autopilot
TG	Target autopilot
TS	Target autopilot 6DOF
5N	Attitude and heading reference system, 50Hz output (no flight control laws), no radio
A5	Attitude and heading reference system, 50Hz output (no flight control laws)