uAvionix.com/Defense

uAvionix

IFF National Security Systems

DEVELOPED IN PARTNERSHIP WITH:

Low SWaP, No Compromise

uAvionix ZPX systems enable secure Mode 5 platform identification for Uncrewed Aircraft Systems (UAS). ZPX transponders, receivers, and Combined Transponder Receiver (CTR) deliver functionality and performance like those on crewed aircraft, but at a Size, Weight, and Power (SWaP) for carriage by tactical UAS, even those weighing only 6 kg (Group 1). Supporting these devices are crypto emulators, also available from uAvionix, that enable Mode 5 development and testing without the security burdens imposed by actual crypto use. ZPX equipment, by possessing Mode S/1090ES ADS-B functionality, complies with civil airspace requirements and simplifies equipage of military aircraft needing to transit civil airspace.

ZPX-A Mode S Transponder

Modes 3/A,C,S,
ADS-B Out

RT-2087/ZPX IFF Transponder

Modes 1,2,3/A,C,S,S,L1,L2,L2-B
ADS-B Out + ADS-B Receiver

ZPX IFF Combined Transponder Receiver

Modes 1,2,3/A,C,S,S,L1,L2,L2-B
ADS-B Out + ADS-B
M5L2 and L2-B Squitter Receiver

ZPR-B Receiver

ADS-B, M5L2 and L2-B
Squitter Receiver

UNRIVALED SWaP

- Available in LRU and surface mount versions to support any aircraft configuration
- Solutions as light as 50 grams
- Power consumption 3.5W Nominal
- 54 dBm transmit power (250W)
- Crypto Ready

NO COMPROMISE

- Mode 5 AIMS certification to Mk XIIB Levels 1/2
- ICAO Annex 10
- DO-181E Class 1, Level 2
- DO-260B Classes A and B
- Environmental Testing: MIL-STD-810H
- RF Testing: MIL-STD-461G

OPTIONS

- Available in LRU or surface mount
- truFYX TSO-C145e GPS/WAAS
- KIV Emulator for rapid integration
- Monopole and Dipole antennas
- National Secure Mode
- AV-30M Control Head and Tactical Traffic Display

DEVELOPED IN PARTNERSHIP WITH

ZPX-A
Mode S Transponder

AIMS Certified

TSO C112e C166b C88b Derived

The ZPX-A is a complete system designed to meet the Transponder and Automatic Dependent Surveillance – Broadcast (ADS-B) surveillance requirements of both civilian and military users wanting to operate an Uncrewed Aircraft (UA) in controlled airspace. It's derived from the successful uAvionix TSO-certified ping200X Mode S transponder with Design Assurance Level C. Enhancements to support military users include control of X-bit in Mode A replies and individual on/off mode control.

Specification	Value
Input Voltage/Power	11-34V (3S-8S LiPo) 1.5W Continuous On/Alt. 4W Peak (8ms maximum)
Size	47 × 54 × 9 mm
Weight	50 grams
Operating Temp	-45° to 70° C

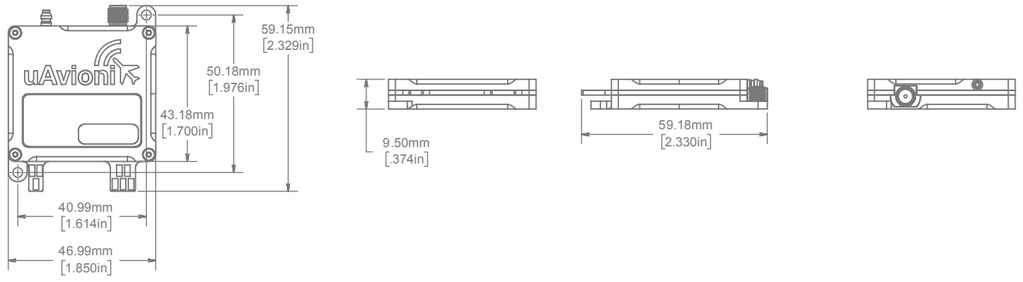
Transponder	
Modes 3/A, C, S 1030 MHz Rx MTL (sensitivity)	-74 dBm ±3 dB
1090 MHz Tx Power	54 dBm (Nominal)

Altimeter	
Range Accuracy	-1000 to 35,000 ft - per AS 8003 35,000 – 60,000 ft, ±1%

Control Interface	
Baud Rate	1200 to 2 Mbps
Protocol	GDL90+

Position Interface	
Baud Rate	115,200 bps
Protocol	uAvionix OEM Protocol

Options
1030/1090 MHz Transponder Antenna
uAvionix truFYX TSO-C145e Position Source
Similar unit available with TSO (vs. AIMS) certification, without X-bit control & Mode selection



DEVELOPED IN PARTNERSHIP WITH

RT-2087/ZPX
Mode 5 Transponder

AIMS Mk XIIB Certified

TSO C112e C166b C88b Derived

The RT-2087/ZPX (ZPX-B) is a complete, low-SWaP Combat ID and Air Traffic Control surveillance system designed to satisfy encrypted Identification Friend or Foe (IFF), unencrypted civil and military transponder, and ADS-B and Mode 5 squitter requirements for UAS operating both in the battlefield and civilian airspaces. When combined with a micro-crypto e.g. KIV-79, small and tactical UAS benefit from interoperability using Mode 5—the latest IFF encryption standard adopted by NATO and its allies. Crypto emulators are available for non-classified development, testing, and NSM operation. ADS-B In is a supported native function providing Detect and Avoid (DAA) functionality. Ethernet control is an available option.

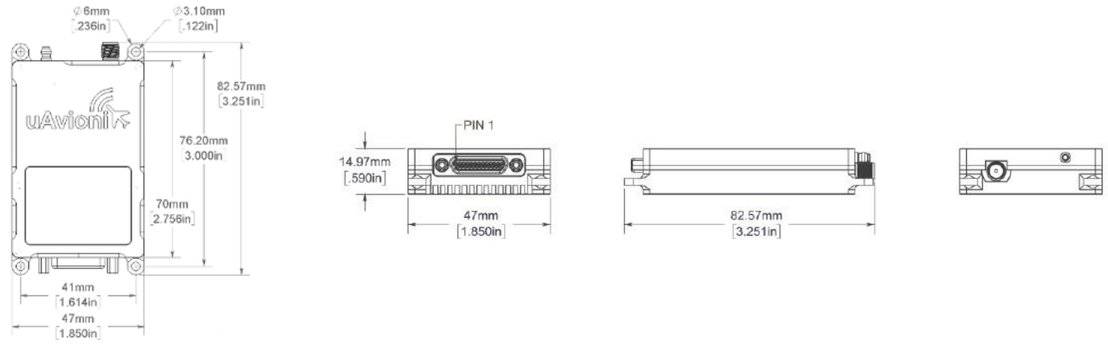
Specification	Value
Input Voltage/Power	11-33VDC 3.5W Continuous (NORMAL) 4W Peak (8ms maximum)
Size	83 × 47 × 15 mm
Weight	68 grams
Operating Temp	-45° to 71° C

Transponder	
Modes 1, 2, 3/A, C, S 1030 MHz MTL (sensitivity)	-76 dBm ±2 dB
Mode 5 MTL (sensitivity)	-80 dBm
1090 MHz Tx Power	250 W (54 dBm)

Altimeter	
Range Accuracy	Up to 35,000 ft - TSO-C88b compliant 35,000 to 60,000 ft, ±1%

Control Interface	
Baud Rate	57,600 bps RS-485/-232
Protocol	GDL90+
Position Interface	
Baud Rate	115,200 bps RS-232
Protocol	uAvionix OEM Protocol
ADS-B Traffic Interface	
Baud Rate	115,200 bps RS-232
Protocol	GDL90
KIV Interface	
AIMS 04-900(A)	Option B (KIV-77 / KIV-79)

Options
1030/1090 MHz Transponder Antenna
uAvionix truFYX TSO-C145e Position Source
NSM programming for crypto emulator
Crypto emulators (KIV-77 and KIV-79) for interrogators, test equipment, and development/ test of transponders



DEVELOPED IN PARTNERSHIP WITH R3E

RT-xxxx/ZPX Mode 5 IFF Combined Transponder Receiver

AIMS Mk XIIB Pending

TSO C112e C166b C88b Derived

The RT-xxxx/ZPX (B2) is a complete, low-SWaP Combat ID system designed to satisfy encrypted Identification Friend or Foe (IFF), civil and military transponder, and Automatic Dependent Surveillance –Broadcast (ADS-B) and Mode 5 squitter requirements for Uncrewed Aircraft Systems (UAS) operating both in battlefield and civilian controlled airspace. When combined with a micro-crypto e.g. KIV-79, UAS as small as Group 1 have available the latest IFF encryption standard used by NATO and its allies. Continuing the spirit of low SWaP, the B2 offers AIMS-certified RT-2087/ZPX users an upgrade path that includes Mode S Enhanced Surveillance (EHS), ADS-B IN, and Mode 5 squitter Level 2/2-B IN receive capability for Detect and Avoid.

Specification	Value
Input Voltage/Power	11-33VDC 3.5W Continuous (STBY) 5.5W Continuous (NORMAL) 6W Peak (8ms maximum)
Size	83 × 47 × 21 mm
Weight	91 grams
Operating Temp	-45° to 71° C

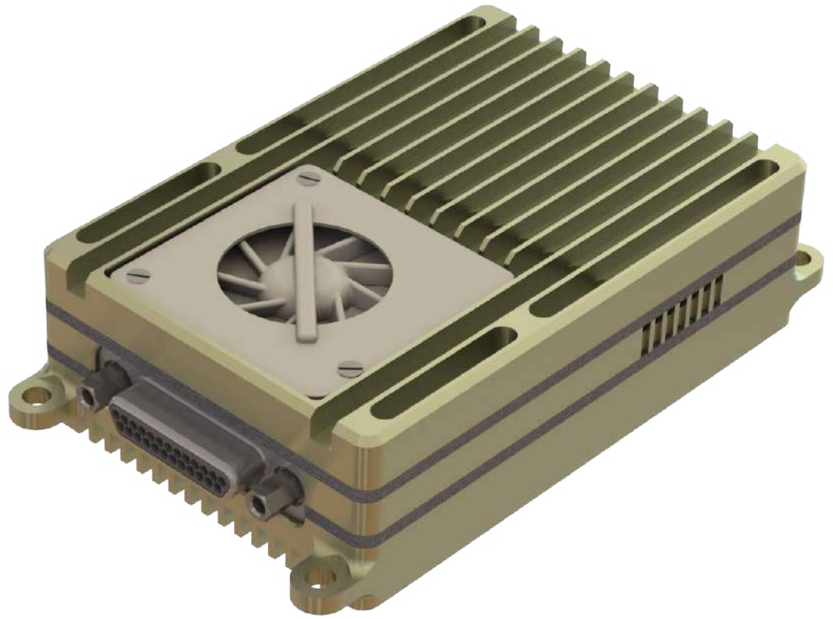
Transponder	
SIF & Mode S MTL @ 1030 MHz MTL (sensitivity)	-76 dBm ±2 dB
Mode 5 MTL (sensitivity)	-80 dBm
1090 MHz Tx Power	250W (54 dBm)

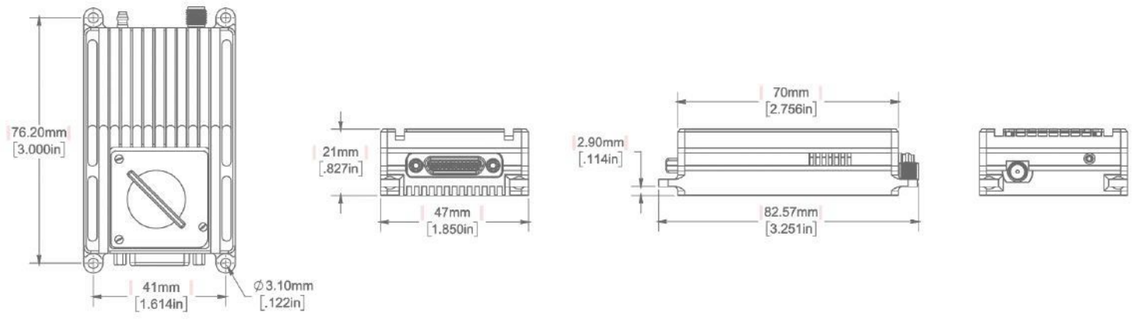
Receiver Sensitivity	
ADS-B Rx MDL	-79 dBm ±2 dB
Mode 5 MDL L2/2-B Rx	-84 dBm

Altimeter	
Range	-1000 to 126,750 ft

Control Interface	
Baud Rate	57,600 bps RS-485/-232
Protocol	GDL90+
Position Interface	
Baud Rate	115,200 bps RS-232
Protocol	uAvionix OEM Protocol
Mode 5 Level 2/2B and ADS-B IN Traffic	
Baud Rate	115,200 bps RS-232
Protocol	GDL90+ / DoD AIMS 23-901
KIV Interface	
AIMS 04-900(A)	Option B (KIV-77 / KIV-79)

Options
1030/1090 MHz Transponder Antenna
10/100 Ethernet Adapter
uAvionix truFYX SIL 3 Position Source
NSM programming for crypto emulator





ZPR-B
Mode 5 L2/2-B and ADS-B Receiver

AIMS
Mk XIIB
Pending

TSO
C112e
C166b
C88b
Derived

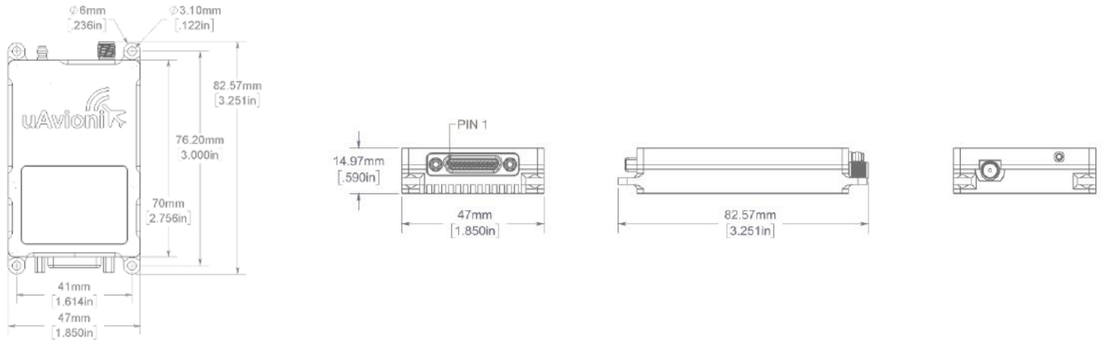
The uAvionix ZPR-B is a passive Mode 5 L2/2-B IFF and civil 1090 MHz ADS-B receiver system which provides situational awareness of civil and military aircraft in national airspaces or on the battlefield. The low Size, Weight, and Power Consumption (SWaP) characteristics make ZPR-B ideal for airborne and shipboard deployments, as well as for temporary or permanent ground-based installation. The system's design is based on hardware and software deployed in the uAvionix AIMS-certified RT-2087/ZPX Mode 5 Micro IFF transponder.

Specification	Value
Input Voltage/Power	8-32VDC 1W Continuous
Size	83 × 47 × 15 mm
Weight	50 grams
Operating Temp	-45° to 71° C

Receiver Sensitivity	
ADS-B Rx MDL	-79 dBm ±2 dB
Mode 5 MDL L2/2-B Rx	-84 dBm

Altimeter	
Range	-1000 to 126,750 ft

Host Interface	
Baud Rate	57,600 bps RS-232
Protocol	uAvionix OEM Protocol
Position Interface	
Baud Rate	115,200 bps RS-232
Protocol	uAvionix OEM Protocol
Traffic Interface	
Baud Rate	115,200 bps RS-232
Protocol	GDL90+ / DoD AIMS 23-901
KIV Interface	
AIMS 04-900(A)	Option B (KIV-77 / KIV-79)
Crypto Emulator	Internal
Options	
uAvionix truFYX SIL 3 Position Source	
NSM programming for crypto emulator	



Micro IFF Accessories

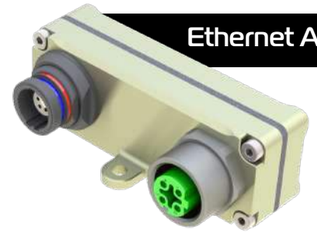
Mode 5 Crypto Emulators, backplanes, adapters, and antennas provide users of the uAvionix ZP(X/R) family of Micro IFF Mode 5 transponders and receivers with the capability to perform ground and airborne Mode 5 functional testing and verification when crypto keys are unavailable or simply not desired. Using an emulator avoids the burden of dealing with COMSEC security protocols, which often streamlines testing and field operations.

The ZPK line of emulators supports all essential AIMS 04-900(A) Option B functional interface requirements for Mode 5 Interrogator, Transponder, Combined Interrogator-Transponder (CIT), and Combined Transponder Receiver (CTR) applications. Additionally, use of an emulator makes for a convenient path to AIMS 1102 and 1202 unclassified platform testing, enabling dry-runs of test plans in which operational KIVs or keys aren't readily available.

The ZPK emulators are designed for autonomous operation. No external computer or power is required since it's controlled and powered by the transponder with which it's paired. An internal key-fill sequence is initiated after Time-of-Day (TOD) is loaded into the emulator.

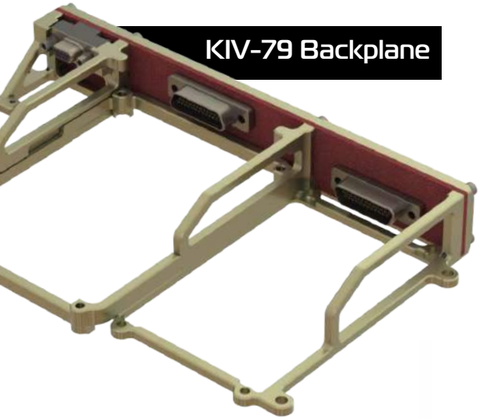
In practice, ZPK emulators can be used with Mode 5 Interrogators in unclassified UAS combat or target training. This is easily accomplished by first substituting in each Interrogator a ZPK for the operational KIV normally used, then equipping target platforms with uAvionix ZPX Mode 5 transponders paired with a ZPK emulator.

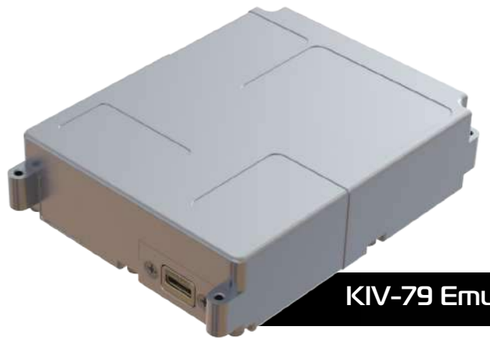
Backplane, ethernet and antenna accessories are available off-the-shelf to support the myriad installation possibilities encountered when equipping UAS. These include backplanes for securely coupling the ZP(X/R) with its paired KIV or ZPK, antennas offering a choice of patterns and gains, and an Ethernet Adapter for alternative control methods. Custom wire harnesses to support unique UAS platform installations may be sourced through uAvionix.

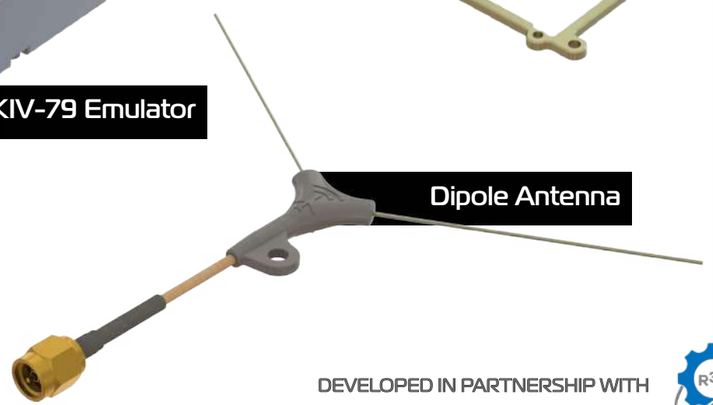

Ethernet Adapter


KIV-77 Backplane


KIV-77 Emulator


KIV-79 Backplane


KIV-79 Emulator


Dipole Antenna

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