

Low probability of intercept altimeter (LPIA)

Our design yields next-generation performance for accuracy, jam resistance, and reliability.



Description

The low probability of intercept radar altimeter was developed and tested by the U.S. Navy for tri-service use. The core of the LPIA is a high-speed digital signal processor and RF module operating on a frequency-hopped, spread-spectrum, phase-encoded, low-power signal waveform.

The transmit waveform and receive signal processing allow the LPIA to extend altimeter accuracy, performance envelope (roll, pitch, and altitude), jamming resistance, and low probability of intercept capabilities far beyond existing altimeters. The advanced waveform and signal processing also allows the LPIA to discriminate a slung load from the ground return.

High gain achieved in the receive signal processing allows for very low power output, resulting in a simple RF design without multiple power amplifier circuits. The reduced circuitry and low operating temperature help drive LPIA in-field reliability predictions to greater than 6800 hours MTBF predicted.

The LPIA is 100 percent backward compatible with existing installations of the APN-194, APN-224, APN-232, APN-209 and APN-171, eliminating A-kit costs by use of simple, interchangeable front panels, mounting plates, and analog I/O cards and reuse of existing antennas. High reliability and extensive BIT coverage support a cost-effective "O to D" maintenance concept, with minimal replacement and pipeline spare requirements. Commonality of design reuses five of the seven subassemblies (digital signal processor card, RF module, digital I/O card, power supply cards, and chassis) in multiple configurations allowing users to share cost savings achieved by a broader production base. The waveform and signal processing are software controlled, allowing easy tailoring of performance to the unique challenges of various platforms. The software is field-reprogrammable, keeping new installation and software maintenance costs low.

Features

- Maximum LPI effectiveness
- High-accuracy performance over all altitudes and attitudes
- Superior anti-jam performance
- Ability to discriminate slung loads
- High reliability and low life-cycle cost
- Highly adaptable modular design facilitates form, fit and function compatibility for retrofits and new installations

Common among all variants – DSP card, RF module, digital I/O card and chassis

High commonality among all variants



Shared AC power supply

Shared DC power supply

	LPIA-194, RT-1805		LPIA-171R	LPIA-224R	LPIA-232R		LPIA-209R
Customers	U.S. Navy		U.S. Navy	U.S. Air Force	U.S. Air Force		U.S. Army
Application	F/A-18 AV-8B V-22 F-14 T-45 P-3C JSF	C-2A AH-1W EA-6B SH-60 CH-60 S-3 C-130	CH-53 MH-53 UH-1N CH-46 E-2C	A-10 B-1B B-52	C-130 F-22 F-16 F-15 H-53 JSF CV-22*	C-141 C-5 F-111 T-43 C-17 F-117* H-60	AH-66 AH-64 H-60 UH-1 OH-58
Weight	4.1 lbs.		< 5.0 lbs.	4.4 lbs.	4.5 lbs.		4.1 lbs.
Prime power	115 Vac, 400 Hz, 1Ø		115 Vac, 400 Hz, 1Ø	115 Vac, 400 Hz, 1Ø			28 Vdc
Power usage	32W						
MTBF	Fighter environment > 6,800 hours; UAS, Airlift environment > 11,600 hours						
Power output	< 1W, 4.2 to 4.4 GHz						
Vibration	Fighter, uninhabited, rotary and turboprop						
Accuracy	0-5000 ft: ±2 ft or 2% of altitude; 5000-35000 ft: ±50 ft + 1% of altitude						
Interfaces	Analog outputs: compatible with all existing height indicators. Digital outputs: MIL-STD-1553B, RS-422						
Fault detection	98% BIT coverage						
Weight (lbs.)	4.1 4.4	<5.0 13.4	4.4 4.5	4.5 9.5	4.1 11.0		
Volume (in ³)	87.5 96	237.6 581.3	87.5 140	140 193	87.5 96		
MTBF (h)	6800 400	6800 110	6800 6500	6800 3000	87.5 400		
Bit coverage (%)	98 No requirement	98 No requirement	98 No requirement	98 95	98 No requirement		
Altitude range (ft x 1000)	35 5	35 5	35 5	35 50	35 1.5		
Altitude error (% altitude)	2 4	2 4	2 4	2 2	2 3		
1553B compatible	Yes No	Yes No	Yes No	Yes No	Option	Yes No	

■ LPIA □ Competition

*The U.S. Air Force's F-117 and CV-22 use the RT-1805 version.

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