

MESA-K-DEV K-Band MESA Radar Developer's Kit

Applications

- ◆ UAS Airborne Detect and Avoid
- ◆ Autonomous Vehicle Radar Vision
- ◆ Industrial & Agricultural Automation
- ◆ Perimeter Security & Surveillance

Features and Benefits

- ◆ Ultra Compact Size and Low Weight
- ◆ Simple Integration with Other Sensors
- ◆ Integrated Radar Processor Delivers Raw or Post Detection Data
- ◆ Plug and Play (No Calibration Required)
- ◆ Serial USB or CAN bus Control
- ◆ Hot Standby —Power Saving Mode
- ◆ Fast frame rates 1-10 fps depending on modes
- ◆ Fast Beam Transition < 1 uSec
- ◆ Up To 1 watt TX Peak RF power
- ◆ IMU stabilization (Custom)
- ◆ FMCW Std. (Custom Modes PSK, FSK)



General Description - An ultra-low C-SWAP electronically scanning radar using Echodyne's MESA™ coupled with a built-in radar transceiver supporting long and short range modes. This radar is an ideal platform for users to explore this disruptive technology in a wide range of applications.

Interfaces	
DC Control I/O:	All through USB Type-C Connection
Sync/Standby	Discrete 3.3V TTL
Primary Control	USB 2.0 and CAN Serial
General SWAP and Environment	
Size	22cm x 7.5cm x 2.5cm (< 415 cm ³)
Weight	< 900 grams
DC Power:	+7 to +28V ~20 watt (Standby <1W)
Op. Temp.	-40 to +75C (Storage -55 to +95C)
Radar Hardware	
Freq.	K-Band Selectable (200MHz BW Sgmts.)
TX Power	Variable +6 to +30dBm (digital cont.)
TX /RX Isolation	>70 dB On/Off (Fast Switching <100ns)
Receiver	High IP3 LNA

Radar Hardware - Continued	
Exciter	FMCW Std. (PSK, FSK, Special Req.)
Waveform Timing	Programmable Sequencing
DSP and Sampling	Built in 14bit ADC/FFT
Beam Control	
EIRP	>50dBm available (Long Range Mode)
Field of View	±60° AZ, ±40° EL
Polarization	Horizontal (Typ. 20 dB Cross Pol Iso.)
Load / Trans Time	<100uSec / <1 uSec
Object Detection	
RCS	+0dBsm @ >500 m, 90% P _D /10 ⁻⁶ P _{FA}
Range MODE(s)	Long(50-750m) / Short (1-110m)
Resolution	<5m (Long), <1m (Short), < 3° AZ/EL
Multi—Modes	Cont. Scan FOV with Object (s) Logging

Echodyne Releases Breakthrough Ultra-Low C-SWAP Electronically Scanning Radar

New technology enables high-performance radar for commercial markets and applications

May 2, 2016, Bellevue, Wash. - [Echodyne Corp](#) today announced availability of MESA-K-DEV, an ultra-low C-SWAP (cost, size, weight, and power), fast electronically scanning radar based on its patented Metamaterials Electronically Scanning Array (MESA™). Released as a developer's kit, MESA-K-DEV is designed to give end customers and integrators the ability to test the breakthrough C-SWAP characteristics and capabilities of MESA-based radar. MESA-K-DEV is evocative of a number of breakthrough future applications, including: Airborne Detect and Avoid radars on small unmanned aircraft systems (UAS), dramatically enhanced autonomous vehicle radars, security radars capable of drone detection, and many others.

"MESA-K-DEV is like no other radar ever produced," said Eben Frankenberg, founder and CEO of Echodyne. "The C-SWAP characteristics are completely unparalleled for a true electronically scanning radar. Phased array radars – long the radar of choice for defense applications – are way too complex, expensive, bulky and heavy for commercial applications and even for many military applications. MESA makes high performance radar practical for commercial applications and platforms never before thought possible."

Specifications of MESA-K-DEV

Echodyne's MESA-K-DEV operates at K-band and has a broad field of view ($\pm 60^\circ$ in azimuth and $\pm 40^\circ$ in elevation), which it can scan rapidly with sub-microsecond beam switching speed. The radar unit is a mere 22 x 7.5 x 2.5 cm, with a total weight of only 820 grams. Completely self-contained, MESA-K-DEV includes the metamaterial array, the array control driver circuitry, the beam steering computer, and a fully integrated transceiver and processors. The aperture is controlled through a simple USB Type C interface and requires only a single +7 to +28V DC source to operate. MESA-K-DEV consumes ~20W in operation and <1W in standby. Convective cooling provided by the aluminum housing allows the unit to operate in temperatures from -40 to +75C.

In a separate release today, Echodyne also announced the development of its next radar specifically designed for Airborne Detect and Avoid for small to medium sized UAS. The Airborne Detect and Avoid radar, scheduled for release at the end of 2016, will be an evolution of MESA-K-DEV and an important technological milestone to support beyond visual line of sight operations for small UAS.

About MESA

Unlike conventional mechanical apertures that steer a radar beam using motorized gimbals, Echodyne's MESA requires no moving parts to steer its beam. And unlike Phased Array radars or Active Electronically Scanning Array radars that require complicated and expensive transmit/receive modules - including phase shifters, amplifiers, circulators, and low noise amplifiers behind every single antenna element - MESA uses a vastly simpler metamaterials architecture. The net effect of this simplified architecture is dramatically lower cost, size, weight and power.

About Echodyne

Echodyne is reinventing the way the world uses radar by creating high performance electronically scanning radars with ultra-low C-SWAP (cost, size, weight, and power). Echodyne's patented Metamaterial Electronically Scanning Array (MESA) offers disruptive capabilities for existing radar applications, and enables new categories of radars never before thought possible such as small, lightweight radars for UAVs, robots, autonomous vehicles, and security that work well even when environmental conditions are less than ideal (e.g., in rain, snow, fog, dust, darkness, etc.). Echodyne is a privately held company backed by Bill Gates, Madrona Venture Group, Vulcan Capital, Lux Capital, and The Kresge Foundation, among others.

* Go to www.Echodyne.com for more information

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