

approximately actual size

# XL- MaxSonar® - EZ4™ (MB1240) XL- MaxSonar® - AE4™ (MB1340) Sonar Range Finder with High Power Output, Noise Rejection, Auto Calibration & Short-Range Narrow Detection Zone (Hardware gain of 250)

The MB1240 & MB1340 have a new high power output along with real-time auto calibration for changing conditions (temperature, voltage or acoustic or electrical noise) that ensure you receive the most reliable (in air) ranging data for every reading taken. The MB1240 & MB1340 low power 3.3V – 5V operation provides very short to long-range detection and ranging, in a tiny and compact form factor. The MB1240 & MB1340 detect objects from 0-cm to 765-cm (25.1 feet) and provide sonar range information from 20-cm out to 765-cm with 1-cm resolution. Objects from 0-cm to 20-cm range as 20-cm. The interface output formats included are pulse width output (MB1240), real-time analog voltage envelope (MB1340), analog voltage output, and serial digital output.

## Features

- High acoustic power output
- Real-time auto calibration and noise rejection for every ranging cycle
- Calibrated beam angle
- Continuously variable gain
- Object detection includes zero range objects
- 3.3V to 5V supply with very low average current draw
- Readings can occur up to every 100mS, (10-Hz rate)
- Free run operation can continually measure and output range information
- Triggered operation provides the range reading as desired
- All interfaces are active simultaneously
  - Serial, 0 to Vcc
    - 9600Baud, 81N
  - Analog, (Vcc/1024) / cm
  - Pulse Width (MB1240)
  - Real-time analog envelope (MB1340)
- Sensor operates at 42KHz

## Benefits

- Acoustic and electrical noise resistance
- Reliable and stable range data
- Sensor dead zone virtually gone
- Low cost
- Quality controlled beam characteristics
- Very low power ranger, excellent for multiple sensor or battery based systems
- Can be triggered externally or internally
- Sensor reports the range reading directly, frees up user processor
- Fast measurement cycle
- User can choose any of the sensor outputs
- No calibration requirement is perfect for when objects may be directly in front of the sensor during power up
- Small size allows for easy mounting

## Applications and Uses

- UAV blimps, micro planes and some helicopters
- Bin level measurement
- Proximity zone detection
- People detection
- Robot ranging sensor
- Autonomous navigation
- Environments with acoustic and electrical noise
- Multi-sensor arrays
- Distance measuring
- Short range object detection
- Users who prefer to process the analog voltage envelope (MB1340)
- Physical drop-in upgrade for LV-MaxSonar product line, part numbers: MB1000, MB1010, MB1020, MB1030, & MB1040 (except for transformer attached to the back of the PCB)



**MB1240 & MB1340 Real-time Noise Rejection**

While the XL-MaxSonar® is designed to operate in the presence of noise, best operation is obtained when noise strength is low and desired signal strength is high. Hence, the user is encouraged to mount the sensor in such a way that minimizes outside acoustic noise pickup. In addition, keep the DC power to the sensor free of noise. This will let the sensor deal with noise issues outside of the users direct control (in general, the sensor will still function well even if these things are ignored). Users are encouraged to test the sensor in their application to verify usability.

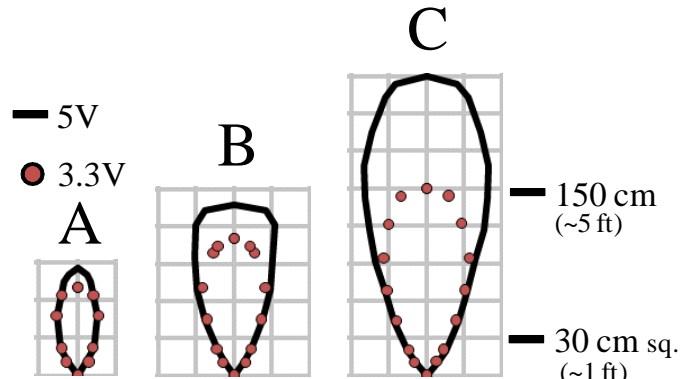
For every ranging cycle, individual filtering for that specific cycle is applied. In general, noise from regularly occurring periodic noise sources such as motors, fans, vibration, etc., will not falsely be detected as an object. This holds true even if the periodic noise increases or decreases (such as might occur in engine throttling or an increase/decrease of wind movement over the sensor). Even so, it is possible for sharp non-periodic noise sources to cause false target detection. In addition, \*(because of dynamic range and signal to noise physics,) as the noise level increases, at first only small targets might be missed, but if noise increases to very high levels, it is likely that even large targets will be missed.

\*HINT: In high noise environments, if needed, use 5V power to keep acoustic signal power high.

**MB1240 & MB1340 Beam Characteristics**

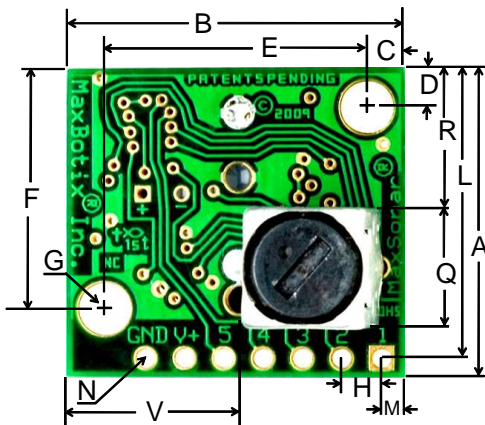
The MB1240 and MB1340 have a wide and long sensitive beam that offers excellent detection of objects and people. The MB1240 and MB1340 balances the detection of objects and people with minimal side-lobes. Sample results for measured beam patterns are shown to the right on a 30-cm grid. The detection pattern is shown for dowels of varying diameters that are place in front of the sensor;

- (A) 6.1-mm (0.25-inch) diameter dowel,
- (B) 2.54-cm (1-inch) diameter dowel,
- (C) 8.89-cm (3.5-inch) diameter dowel,

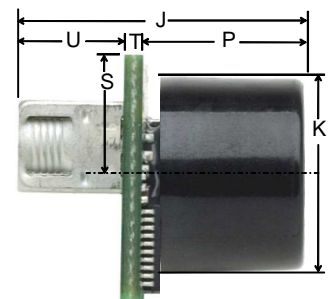


Beam characteristics are approximate

**MB1240 & MB1340 Mechanical Dimensions**

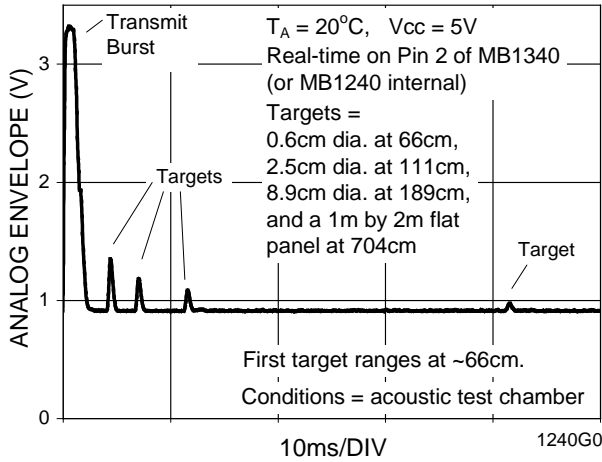


A	0.785"	19.9mm	L	0.735"	18.7mm
B	0.870"	22.1mm	M	0.065"	1.7mm
C	0.100"	2.54mm	N	0.038" dia.	1.0mm dia.
D	0.100"	2.54mm	P	0.537"	13.64mm
E	0.670"	17.0mm	Q	0.304"	7.72mm
F	0.590"	15.0mm	R	0.351"	8.92mm
G	0.124" dia.	3.1mm dia.	S	0.453"	11.5mm
H	0.100"	2.54mm	T	0.063"	1.6mm
J	0.989"	25.11mm	U	0.368"	9.36mm
K	0.610"	15.5mm	V	0.492"	12.5mm
values are nominal			Weight, 5.9 grams		

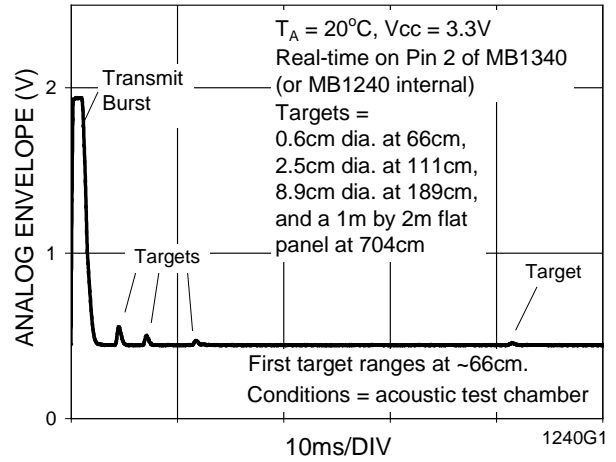


# Typical Performance to Targets

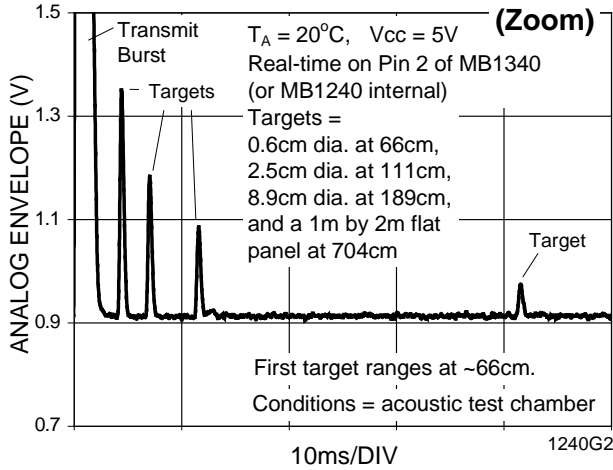
**Analog Envelope Output (Dowels, 5V)**



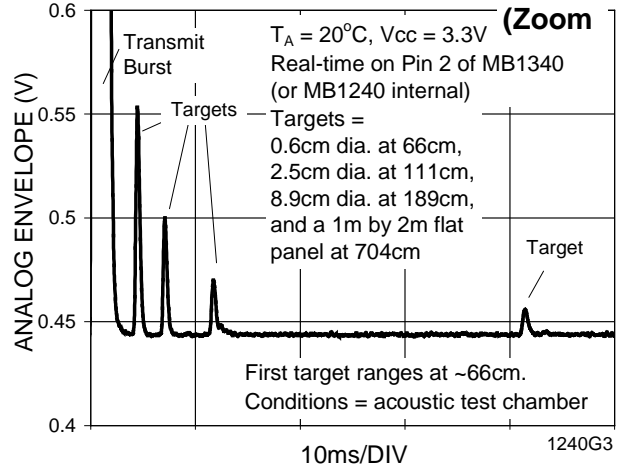
**Analog Envelope Output (Dowels, 3.3V)**



**Analog Envelope Output (Dowels, 5V)**

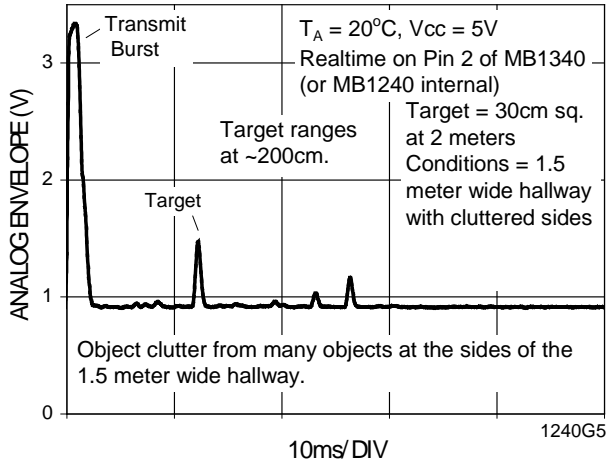


**Analog Envelope Output (Dowels, 3.3V)**



# Typical Performance in Clutter

### Analog Envelope Output (Clutter, 5V)



### Analog Envelope Output (Clutter, 3.3V)

