Raymarine®

2008 Transducer Products
A fishfinder system consists of the sounder and transducer.

Electrical pulses are sent to the ceramic element.

These pulses are converted to acoustic energy—"sound waves"—that travel through the water.
The sound is transmitted through the water and reflects off of objects within the water column, returning the sound back to the face of the transducer.

The air in a fish’s bladder is an excellent reflector, making it an easy target for the transducer to detect.
The fishfinder measures the time between transmitting the sound and receiving the echo. Sound travels at 4800’/second.

Distance to the object is calculated by multiplying the time elapsed between the sound transmission and the received echo by the speed of sound through water.
P66 Transom TRIDUCER Multisensor

Raymarine models:
E66028-PZ, E66054,
(Depth Only E26027-PZ)

- Plastic kick up bracket
- New square blade paddlewheel improves linearity
- Accommodates transom angles between $2^\circ$ - $20^\circ$
- Recessed water flow channel protects paddlewheel
- 600 Watt capable
B45 Bronze Thru-Hull

Raymarine models:
E26019-PZ

- Recommended for planing hull power boats and cruising sailboats
- Good sensitivity in a compact housing
- Fast response temperature sensor provides +/- 0.2º accuracy
- 600 Watt capable
P79 In-hull

Raymarine models:
E26001-PZ, E66008

- Recommended for solid fiberglass hulls
- Recommended for planing hull powerboats, trailered boats, rigid inflatable boats (RIBS) and racing sailboats
- Easily adapts to deadrise angles up to 22º
- No hull protrusions
- 600 Watt capable
B744V/B744VL TRIDUCER Multisensor

Raymarine models:
- E26011-PZ, E66056,
- E66057, E66061, A26043, A66090, A66091

- Depth/Speed/Temp functions
- 600 Watt capable
- Self-closing valve
- Longer stem than B44V
- Removal of wings
- High Performance Fairings included
- Accessories available
High Performance Fairings

- Allows Vertical mounting of transducer for proper beam orientation
- Straightens water flow / reduces turbulence for less chance of prop and water intake cavitation
- Significantly improves the performance of any thru-hull installation
- Significant performance improvement at speeds from 10 knots to over 40 knots
Importance of Vertical Beam
Tilted Element™ Transducers
B60 Tilted Element Bronze Thru-Hull

Raymarine models:
12° - E66086, E66088
20° - E66085, E66087

- 12° tilted version for 8°-16° hull deadrise angles
- 20° tilted version for 16°-24° hull deadrise angles
- Arrow on cap points toward keel when installed
- Includes temperature
- 600 Watt capable
B164 1 kW Tilted Element™

- Engineered for Center console and sport fishing boats
- 50/200kHz: constructed of three dual frequency elements.
- Low-profile design leaves no protrusion below the hull
- No High Performance fairing required
- Built-in temp sensor
B258 1 kW Bronze Thru-Hull

Raymarine model: E66082
(8 pin plug/DSM300)

- Higher receive sensitivity over B256
- Reduced Q to 9 at 50kHz
- Depth & Temperature functions
- 25x’s more sensitive than single element design
- Elliptical Beam 14°x 23°/ 3°x 5°
- High Performance Fairing recommended for best results (fairing part # 33-523-01)
B258 (E66082) Element Array
M258 1 kW Transom Mount

Raymarine model:
E66084 (8 pin connector/DSM300)

- Depth & Temperature functions
- Same internal construction as E66082
- Simple and inexpensive installation
- Adjustable brackets for multiple running positions
- Tool-Free removal for transport or storage
- Works with all hull materials
The Broadband Advantage

- Broadband transducers exhibit minimal ringing.
  - This provides crisper imaging and greater definition.
  - These transducers can also echo-range in very shallow water.

- Your Airmar transducer is Broadband Enabled for future advancement.
  - Future Fishfinders may be “tunable” allowing users to “tune” the best frequency for optimum performance.
  - Broadband also allows for advanced chirp transmission technology by extracting information from the chirp echo such as seafloor characteristics, fish type, etc.
B260 1kW Bronze Thru-Hull

Raymarine model: E66079 (8 pin connector/DSM300)

- 50x’s more sensitive @ 50 kHz than single element design
- 19 º beam @ 50 kHz
- 6 º beam @ 200 kHz
- Excellent for bottom fishing and target discrimination
- High Performance Fairing recommended for best results
- Fairing part number E66034
B260 (E66079) Element Array

50kHz Ceramic Array

200kHz Broadband Ceramic
M260 1kW In-hull

Raymarine model: A66089 with in-hull tank

- Depth only
- Innovative tank design allows for bow-stern or port-starboard mounting
- Same internal construction as B260 (E66079)
- Excellent high speed performance
- Solid fiberglass hulls
- Easy to install
Performance Photos
Performance Photos
In-Hull Performance

200SLQ PEAK FREQUENCY vs. HULL THICKNESS

200SLQ BEST TRANSMIT FREQUENCY (RESONANCE OF SYSTEM)

HULL THICKNESS

- 0" FIBERGLASS
- 3/8" FIBERGLASS
- 1/2" FIBERGLASS
- 3/4" FIBERGLASS
- 1" FIBERGLASS
In-Hull Performance

50AF PEAK FREQUENCY vs. HULL THICKNESS

- 0" FIBERGLASS
- 3/8" FIBERGLASS
- 1/2" FIBERGLASS
- 3/4" FIBERGLASS
- 1" FIBERGLASS

50AF BEST TRANSMIT FREQUENCY (RESONANCE OF SYSTEM)
In-Hull Performance

200SLQ TVR vs. HULL THICKNESS

200SLQ TVR, dB

HULL THICKNESS

0" FIBERGLASS  3/8" FIBERGLASS  1/2" FIBERGLASS  3/4" FIBERGLASS  1" FIBERGLASS
In-Hull Performance

50AF TVR vs. HULL THICKNESS

HULL THICKNESS:
- 0" FIBERGLASS
- 3/8" FIBERGLASS
- 1/2" FIBERGLASS
- 3/4" FIBERGLASS
- 1" FIBERGLASS

50AF TVR, dB:
- 155 dB
- 156 dB
- 157 dB
- 158 dB
- 159 dB
- 160 dB
- 161 dB
- 162 dB
- 163 dB
- 164 dB

Graph showing the relationship between 50AF TVR and hull thickness.
2 kW R99 External Mount

RAYMARINE model: E66075 (8 pin connector/DSM300)

- Depth & Temperature functions
- 9 °x 17 ° beam at 50 kHz
  5 ° beam at 200 kHz
- Exposed temperature sensor provides fast response
- High Performance fairing and bronze stuffing tube included
- Recommended for vessels 30’ and up
2 kW R199 In-hull

Raymarine model: E66076 (8 pin connector/DSM300)

- Depth functions only
- Same internal construction as R99
- 400 times more sensitive @ 50kHz than single element design
- 9 °x 17 ° beam at 50 kHz
  5 ° beam at 200 kHz
- Solid fiberglass hulls
Broadband vs. No Broadband

Short Ring- Low Q

Long ring- High Q

Individual fish are separated
Fish 1” above the bottom is still detected by short ring from low Q

Individual fish blend together
Fish 6” above blends into bottom echo by long ring from high Q

Broadband Q = 2, 5° beam

Non-Broadband Q = 25, 5° beam

Individual fish are detected
Fish are detected 1” above the bottom

Shows fish as “blobs”
Fish less than 6” above bottom will blend in
Individual fish below & along side baitfish

Individual fish holding tight to bottom

baitfish

71.1 ft
Broadband Transducer

Non-Broadband Transducer
Low ring = Excellent Shallow-water operation
SS270W Wide Beam

- 25° degree beam at both frequencies
- Provides four times the beam width at 200kHz
- Can retrofit existing B260 installations
- Stainless Steel Housing
- Includes High Performance Fairing
- Built-in Temp sensor
SS270W
Twin 25° beams @ 50 and 200kHz

B260 1 kW transducer
19° at 50 kHz, 6° at 200 kHz

SS270W twin wide-beam transducer
Identical, 25° beamwidths at 50 kHz and 200 kHz
User Benefits

- Excellent at detecting mid to shallow water fish (bait, tuna, marlin etc.)
- Split screen 50/200kHz fishfinder display is more intuitive for novice users
- Same targets appear in both beams
- Advanced users can identify fish species
SS270W Clam Shells

<table>
<thead>
<tr>
<th>Ves Pos</th>
<th>Sea Temp</th>
<th>Log</th>
<th>Trip</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>179.8 °F</td>
<td>0.000 nm</td>
<td>0.000 nm</td>
</tr>
</tbody>
</table>

200 kHz: Man
Gain: Man

185 ft
Benefits of Tunable Fishfinders with Broadband Transducers

- Frequency agility allows the user to adjust the frequency if the connected echosounder is "tunable".
- No loss of sensitivity across the frequency range
- Adjusting the frequency will change the beam width and depth capabilities.
- Certain fish are more detectable at specific frequencies so the fishfinder & transducer can be tuned to get the best echo return for the species being targeted (tuna, marlin, ground fish, bait).

[Diagram of Broadband Transducer]
R209 External Mount / R299 In-Hull

- Broadband on both low and high frequencies.
- 24 low-frequency ceramics that can operate anywhere between 33kHz to 60kHz and can handle up to 3 kW of input power.
- High-frequency 3.5" single-ceramic can operate between 130kHz to 210 kHz and can handle up to 2 kW of input power.
- R309 and R399 units operate between 25kHz to 45kHz and 130kHz to 210 kHz.
Broadband and the future: CHIRP
-Frequency Modulated Transmissions

- Improved signal-to-noise ratio
- Very good performance from shallow to deep
- Better target definition
- Better performance at speed
- Variable beamwidths
- Better rejection of noise sources
SS264W Wide Beam Tilted Element™ Pair

- SS270W split up into 2 transducers
- Same ceramics and performance as the SS270W
- Separate transducers for 50 kHz and 200 kHz
- Top of the line 1kW tilted element™
- Engineered for Center console and trailered boats
- Transducers can be sold separately
- No High Performance Fairing needed
- Built-in temp sensor
Tilted Element™ Pair Wiring

- 50/200 kHz
  - 10 m cable
  - 200 kHz cable only
  - 1 m pigtail for 200 kHz

Mating OEM connectors
(Furuno, Raymarine, Garmin)
SB264 200kHz Wide / Narrow-beam Switchbox

- Allows SS264W 200kHz Tilted Element to work with existing B260, M260, B258, and B256 installations.
- User now has a switchable 200kHz wide or narrow beam for the specific type of fishing.
SS264N Narrow Beam Tilted Element™ Pair

- B260 split up into 2 transducers
- Same ceramics and performance as the B260
- Separate transducers for 50 kHz and 200 kHz
- Top of the line 1kW tilted element™
- Engineered for Center console and trailered boats
- Transducers can be sold separately
- No High Performance Fairing needed
- Built-in temp sensor
NMEA 0183 and 2000® Smart Transducers

- All processing is done inside the transducer
- Operates at 235kHz
- No interference with on-board sounder
- Perfect for displaying digital depth/speed/temperature
- DT800- Retractable Tilted Element™ Thru-Hull Depth / Temperature
- DST800- Retractable Thru-Hull Depth / Speed /Temperature
- P39- Transom Mount Depth / Speed /Temperature
- P79- In-Hull Depth only
- T42- High performance Temperature
M260 and R199 In-Hull Tanks

- Now shipped with flat 90° tank bottom which can be easily cut for bow-stern or port-starboard mounting.
- To fill the new tank, we recommend using non-toxic propylene glycol (RV / Marine anti-freeze).
- To mount the tank to the hull, we recommend using fiberglass resin, Marine Tex® or Fusor® 100EZ / T10.
PB200
WeatherStation™ Instrument

- NMEA 0183 & NMEA 2000® OUTPUT
- True and Apparent Wind Speed and Direction
- 3 axis compass with yaw rate gyro
  - +/- 1° for pitch and roll angles ≤ 5°
  - +/- 2° for pitch and roll angles ≤ 30°
  - +/- 3° for pitch and roll angles ≥ 30°-45°
  - Output: 10 Hz
  - User calibration not required
- Three axis accelerometer
- WAAS Enabled GPS
- Barometric pressure
- Air Temperature
- Dew Point Temperature
GH2183 Solid State Compass with GPS

- NMEA 0183 & NMEA 2000® OUTPUT
- 3 axis solid state compass
  - User calibration not required
- Three axis accelerometer
- Three axis rate gyro
- WAAS / EGNOS Enabled GPS
- Available as GPS only- G2183
H2183 Solid State Compass

- NMEA 0183 & NMEA 2000® OUTPUT
- 3 axis solid state compass
  - User calibration not required
- Three axis accelerometer
- Three axis rate gyro
Installations
Good Installation

This is an excellent installation of a B744V. There are no hull protrusions in front or alongside the transducer. The transducer is also installed away from the keel so that the beam is not shaded.

An installation like this will give clear bottom readings up and above 30 knots.

See the video on the next slide.
Good Mounting Location vs. bad @ 30 kts
This installation of a B164 looks good, however notice the strake 6 feet directly in front of the transducer. This causes turbulence and air bubbles making the transducer stop reading bottom at 12 knots. See the video on the next slide.
Bad Installation = This performance @ 10-15 knots
Bad Installation

This intake shown in the photos above will cause turbulence and send air bubbles over the transducer face as vessel speed increases. The transducer will work great when the vessel is drifting, but will not work well at speed.
This transducer is mounted too far aft and will be affected by the turbulent water that the starboard propeller will create at any speed.
Videos
Bad Installs

DT800

• Inserts must be flush with the thru-hull fitting
• This applies to both retractable depth transducers and speed sensors
Bad Installs
Electrical noise
Testing Transducer Functions
Testing for *Depth* Function

Using an EDI transducer test box you can determine the resonant frequency of a transducer and confirm that it is operating properly.

[www.dsts.com](http://www.dsts.com)
Testing for depth function

Black lead from transducer tester attaches here

Red lead from transducer tester attaches here
Testing for Temperature Function

One lead from OHM meter attaches here

Second lead from OHM meter attaches here
Testing for *Temperature* Function

With meter set to OHMS the reading should be in the 10,000 Ω range at 77° F. The resistance increases as the temp decreases. The sensor will read correctly in or out of water.
Testing for *Speed* Function

**2 Wire Speed**

**3 Wire Speed**

[Images of wiring diagrams for 2 Wire Speed and 3 Wire Speed connections]
Testing for Speed Function (2 Wire Speed)

Attach red lead from volt meter (install a 470Ω resistor between the pin and the battery connection)

Apply positive battery voltage

Apply Negative battery voltage and attach black lead from volt meter

Attach red lead from volt meter (install a 470Ω resistor between the pin and the battery connection)

Apply positive battery voltage
Testing for *Speed* Function (3 Wire Speed)

- Attach red lead from volt meter
- Apply positive battery voltage

- Apply negative battery voltage and attach black lead from volt meter
- Attach red lead from volt meter
Testing for *Speed* Function

Turn the paddlewheel slowly by hand.

The volt meter should toggle between zero volts (5.6V on 2 wire speed) and the input voltage with each ¼ turn.
Identifying and Troubleshooting Interference Issues
Identifying Interference

If the screen interference increases proportional to vessel speed this usually indicates that the transducer face is exposed to aerated water.

If the interference appears at a specific rpm this could be a sign of electrical interference on the sounder’s power line. Try powering the sounder directly from a stand-alone battery.
Identifying Flow Noise

If experiencing interference with a transom mounted transducer, test drive the vessel to determine the speed at which the image is lost. Move the transducer lower in small 1/8\textsuperscript{th} inch increments and retest.

If the screen image improves, repeat until you are satisfied with the results. If the screen image gets worse, move the transducer up and re-test until improvement is seen.
...Identifying Flow Noise

Perform a slow but constant turn to the side of the hull that the transom transducer is mounted. Gradually increase rate of turn. If screen image improves the transducer needs to be mounted lower in the water.

If screen image is worse when turning to the same side as the transducer try turning the opposite direction. This would indicate the transducer needs to be mounted higher in the water.
Questions ?