FISHFINDERS
THE FACTS

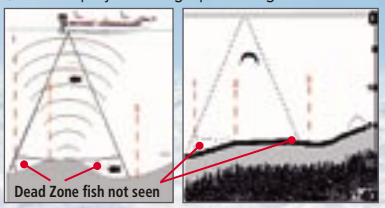
How Fishfinders work

Fishfinders use SONAR sound waves to locate objects and measure distances under water. SONAR stands for SOund NAvigation and Ranging.

Fishfinders transmit a sound pulse by sending short bursts of electrical energy into a transducer. The transducer converts the electrical energy into a cone of sound wave energy. The sound wave travels through the water and reflects off objects such as sand, mud, rocks and fish etc. The transducer is then switched over so that it now acts as a 'microphone' to pick up the sounds of any returning echoes. These returning echoes are amplified and processed by the Fishfinder, then displayed as a graphic image.

The 'Dead Zone'

The Dead Zone is a hidden area that the Fishfinder is unable to display, it is the result of the way Fishfinders process the returning echo. The first strong return sets the bottom level. Weaker secondary returns between the bottom and the boat, show additional detail such as fish. Anything below the first strong return (bottom) is 'lost' in the 'Dead Zone'.

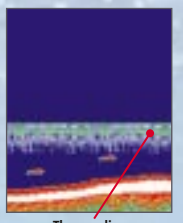


Transmitter Power

Generally, high transmitter power increases the probability that you will get a return echo in deep water or poor water conditions. It also improves fine detail, such as baitfish and structure. Fishfinders designed for inland waterways, lakes, rivers and close in-shore work do not need high power and the economical lower powered Fishfinders are excellent for these applications. However if you prefer to fish well offshore in deeper water, you should select a higher powered unit.

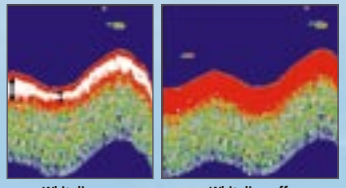
Thermoclines

The temperature in a body of water is seldom the same from the surface to the bottom, often there are warm and cool layers. Where these layers meet is called a thermocline. This layer of different temperature causes a change in the speed of the sound wave which makes the layer visible on the Fishfinder. The greater the temperature differential, the denser the thermocline shows on the screen.



Whiteline

The Whiteline feature helps to determine if the bottom is hard or soft. When Whiteline is enabled, the surface layer of the seabed is displayed as a thin line with a white strip underneath it. The thickness of the white strip is determined by the strength of the returning echo. A hard rocky bottom generates a stronger echo resulting in a thicker white line whereas a soft sandy or muddy bottom displays as a thinner white line.



Bottom Lock

The Bottom lock feature has the unique ability to smooth out the seabed presentation so that the bottom looks flat. The bottom lock mode delivers greater magnification of fish echo returns directly above the seabed, helping you differentiate structure from fish.

How the Fishfinder sees fish

Sound waves are reflected by places where the speed of sound changes. The flesh of a fish is mostly water, but fish have a swim bladder. The difference between the speed of sound in water and in the gas of a swim bladder is large enough that much of the energy that strikes it is reflected back. So it is the swim bladder that you see rather than the fish itself. This drawing shows the typical 'Arc' shape of a single fish as it moves through the centre of the sound wave cone.

You might think that a bigger 'Arc' means a bigger fish, but that isn't always true. If a fish moves through the centre of the cone near the surface, it will only be in the cone for a short period of time and so will produce a short 'Arc'. If that same fish is close to the bottom and passes through the centre of the cone it will be inside the cone for much longer and so will produce a much longer 'Arc'. This means that fish of the same size may appear smaller if they're closer to the surface and larger as the depth increases.

Where are the fish?

The Fishfinder display makes everything appear to be directly under the boat even if it is not. Here's why. The transducer transmits the sound wave pulse in a cone shape. The Fishfinder image simply captures everything that enters the sound wave cone. It doesn't know the position of a fish within the cone, only the time an echo return from that fish was received. The Fishfinder software compresses all the fish found within the cone into a single vertical line beneath the transducer. The resulting display indicates that all the fish are directly under the boat.

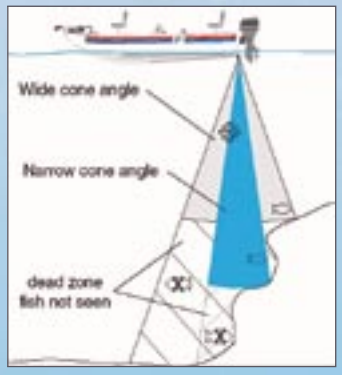
When more than one fish is found at the same range even though they are in different parts of the cone. They will all be measured at the same range, and therefore appear to be only a single fish.

Transducers

A Transducer is a device that converts electrical energy into sound energy and vice versa. Transducers are available in a range of frequencies. Garmin uses 50 kHz and 200 kHz transducers.

Why different frequencies?

The 50 kHz transducer is more efficient than a 200 kHz unit and is therefore better suited for deep water soundings. However the beam angle is typically wider in the 50 kHz transducer, so it provides a larger view of the area underneath the boat which results in less resolution. The 200 kHz transducer is better suited for shallower applications. It typically has a narrower beam angle, providing a smaller diameter but higher resolution view beneath the boat.



A Garmin Fishfinder can transmit both 50 kHz and 200 kHz signals at the same time. This allows the unit to use the narrow cone angle (200 kHz) to display detailed bottom information keeping 'Dead Zones' to a minimum while the wide cone angle (50 kHz) provides a large coverage area.

Digital Vs Analogue

All fishfinders use much the same technology to send and receive SONAR signals. The main difference between analogue and digital sounders is in the processing of the received signal. Where analogue units used fixed receiver parameters to process the incoming signal, digital units make adjustments to the receiver parameters in an attempt to enhance the image. The results are probably subjective and both types provide the same opportunities for measuring depth and locating fish.

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