

## Digital Sonde Locating - On the Job

Please note: These instructions should be considered guidelines, not gospel. Every locating job presents unique challenges, and although most will yield to "textbook" procedures as described here, many will require a creative approach. We strongly advise that you familiarize yourself with the fundamentals of digital locating. Armed with this knowledge, you will be able to reason your way through most locating challenges.

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Before starting any locating job, please follow these simple steps. An ounce of preparation here can prevent a ton of embarrassment and lost time.

- **Survey the area** - before turning on any transmitter, turn your receiver on, go to the Peak screen, and set the sensitivity to 70. Walk around the area where you will be locating and check for sources of noise or interference. Buried power lines, nearby computers, other electrical sources can all cause the receiver to respond as though there is a transmitter in the area. Mark any of these "hot spots" so you won't be fooled by them when you're locating.
- **Test your equipment** - put the battery in your transmitter and throw it on the ground, then turn on the receiver and turn up the sensitivity. Be sure you are getting full range out of your equipment. You should be able to walk 12 feet away from a -10 transmitter or 25 feet away from a -20 transmitter and get a signal above 15 at 70 db sensitivity. Anything less than this requires fresh batteries and another run through this test.

You'll be glad you took the time!

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Your best locating success will involve moving the transmitter in small increments. Push it 5 to 10 feet, locate it using all the steps, then repeat this process until you have reached your final locate position. It's easy to be fooled about the route of a line when you can't see it, and you can waste a lot of time retracing your steps if you lose track of the transmitter.

The LCD screen's backlight will come on when the surrounding light is low. If you want to keep it on all the time, place your finger over the sensor (lower left of screen border) or put a piece of electrical tape over it. This will, however, drastically shorten the expected battery life. If you choose to tape over the sensor, make sure you turn the unit off when not in use.

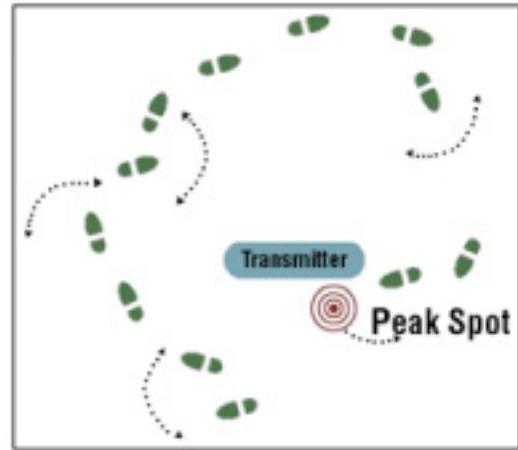
### Step 1. Locate the Peak Signal

The first thing to do is to find the general area of the transmitter. Starting with the Peak screen, set the sensitivity to 70 by pushing the rocker switch away from you until you see "70 dB" on the left side of the screen.



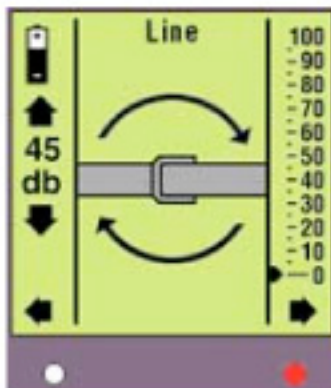
Walk around the general area where you think the transmitter should be. Move the receiver slowly in a 3 foot arc, turning your body as you go.

Walk toward the direction that the clicks get faster and the number in the center of the screen reaches its highest value. When you have reached a point where the clicking is fairly rapid and everywhere else you move makes the clicking slow down and the number in the screen get lower, you have found the "Peak Spot". Now repeat this procedure starting from a different place until you consistently come back to the same spot. Mark it with a rock or other marker.



A note about sensitivity, or "gain": 99 is the highest number you will see for signal strength, and 70 dB is the maximum sensitivity setting. Raise the sensitivity if you're not getting enough signal. Just remember that raising it too high will trigger the receiver to automatically lower it to maintain accuracy.

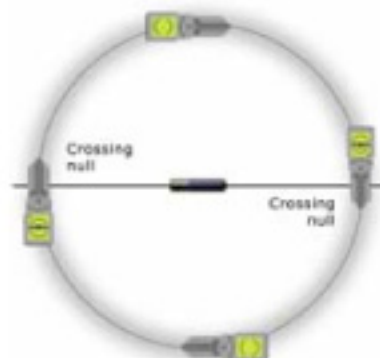
## Step 2. Determine the Direction of the Line



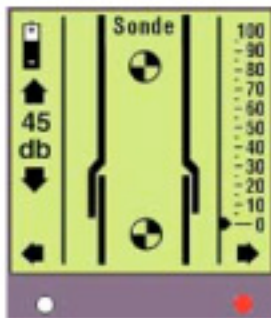
Crossing Null image

Move about 5 feet away from the Peak Spot and switch to the Line screen. Increase the sensitivity until you have a good strong signal. Now walk in an 8 to 10 foot diameter circle, with the Peak Spot as the center of the circle, while you listen and watch the screen carefully. You will encounter a spot where the clicking slows down almost to a stop, and the red LED at the lower right of the screen comes on. At the same time you will see an image of the line appear on the screen, as seen here. *Note that the way the pipe lies on the screen is the way the pipe lies in the ground beneath you.* You may need to raise or lower the sensitivity to "fine tune" the image. This is a "Crossing Null". **Mark this spot** and continue your trip around the circle. You will find another "Crossing Null" on the opposite side of the circle from the first one. **Mark this spot also.**

A line drawn between these points will pass directly over the center of the transmitter, and is parallel to the transmitter. It also describes the lay of the line the transmitter is in. This is very valuable information, and sets the stage for determining the precise location and depth of the transmitter. *Many people skip this step, thinking it unnecessary, but it is the key to successful locating.*



### Step 3. Find the Exact Location of the Transmitter

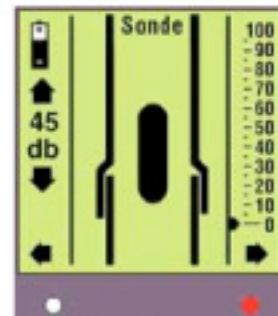


Front or Back Null image

Switch to the Sonde screen ("sonde" is another word for transmitter). Walk about 10 feet away from the Peak Spot along the line described by the markers you placed on the two Crossing Nulls. Increase the sensitivity until you have a good signal. Walk slowly toward the Peak Spot, with the receiver held in front of you about an inch off the ground, while you listen and watch the screen carefully. You are first going to be looking for the "front null" that will be indicated by a slowing down of the clicking to almost nothing, lighting of the red LED, and appearance of the symbols shown here.

**Note:** if the transmitter is deeper than about 15 feet, you may not see these nulls at this point. That's not important now; we will return to them later.

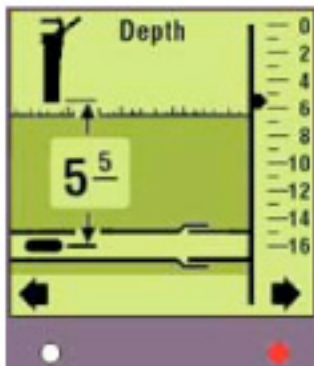
Continue walking along the line while you listen and watch the screen carefully. You will hear the clicking slow down and the red LED light up again, but this time the screen will look like this. Turn up the sensitivity and move slowly back and forth along the line to make the sonde symbol as clear as possible. Mark this spot. The transmitter is directly below it **IF** you completed the previous steps using the Line screen. If you didn't, you cannot be certain of this location and should start over.



Sonde image

Place the bottom of the receiver squarely on the ground with the sonde image still solidly on the screen. If you have performed all of the preceding steps correctly, you are ready to determine depth.

### Step 4. Determine the Depth



Click to the Depth screen and hold the receiver still. While it is averaging its data, the red LED will flash and the screen will display changing numbers. When the red LED glows steadily, the data acquisition is finished and the depth will be displayed in feet and inches. This depth is accurate to 10% of the actual depth, meaning that for a depth reading of 10 feet (for example) the actual depth may be one foot deeper or shallower than that.

*And now for the depth disclaimers!*

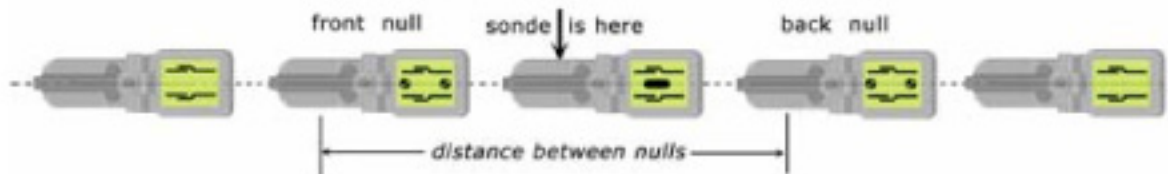
The best accuracy for depth determination will be found when the transmitter is no deeper than half of its maximum rated range. For example, use an FV-10 down to 5 or 6 feet in cast iron, 8 to 10 feet in non-metallic. That doesn't mean you can't use these transmitters down to their maximum rated depth, it just means that the digital receiver's automatic depth reading becomes less reliable at these depths.

A reading of 21 feet on the Depth screen is a false reading and indicates that the transmitter is too deep for automatic depth determination, even though the transmitter signal may be strong enough. The depth screen will never read higher than 21 feet.

All is not lost! Manual depth determination can often be accomplished in situations where automatic depth is unreliable, and it's always a good idea to confirm automatic depth using this method anyway.

## Determining Depth Manually

The front and back nulls you found earlier (using the Sonde screen) are your landmarks for determining depth manually. Revisit them by switching to the Sonde screen and walking about 20 feet away from the Peak Spot along the Crossing Null line you determined using the Line screen. Turn the sensitivity all the way up. Walk the Crossing Null line toward the Peak Spot, with the bottom of the receiver about an inch off the ground, while listening and watching carefully. Watch for the Front or Back Null image on the screen at the same time the clicking slows down and the red LED comes on.



The first one you reach is the Front Null, and you should mark it clearly. Continue on this line toward the Peak Spot, where you should again encounter reduced clicking, a red LED, and the Sonde image on the screen. Continue walking in the same direction until you reach the Back Null and mark it well. Measure the distance between the Front Null and Back Null and multiply by 0.7. This is the depth of the transmitter, right below the Sonde location.