

## Digital Line Tracing - 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.

We're available to help!  
Don't hesitate to call us at **800-541-9123** if you get stuck.

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Prototek's Line Tracing equipment is intended to be used as an aid to avoid disturbing buried utilities when doing work with underground pipes and tanks, within the property lines of the job.  
*Prototek is not liable for any damage or loss incurred while using this equipment due to, but not limited to, false indications, equipment failure or misinterpretation of results.*

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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 FAR. 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 FAR 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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### 1. Which Mode?

The first decision you must make when starting a line tracing job is whether to use Inductive or Conductive mode. Generally, the conditions you are working under will dictate. Here are some considerations.

**Conductive mode** is always preferred if you have the choice, but you must be able to make a direct, metallic connection to the line you wish to trace. This mode is typically used for underground metallic pipes, metallic cables pushed into pipes, tracer wires accompanying nonmetallic gas lines, etc. ***Do not use Conductive mode for energized power lines or telephone lines!***

- The signal will be stronger and will travel further than Inductive mode.
- There is less tendency for the signal you have injected into the line you are tracing to "bleed into" adjacent lines.

**Inductive mode** is used when you can't connect directly to the end of the line you wish to trace. This mode is typically used for power and telephone lines, and other metallic lines that you cannot gain direct access to.

- Maximum depth of an Inductive trace is about 6 feet.

## 2. Which Frequency?

The Blue BuzzBox and the LF2200 (as well as the LF2100) can operate at any of 4 industry standard frequencies: 8 kHz, 16 kHz, 32 kHz and 64 kHz. The latter two frequencies are sometimes called "33 kHz" and "65 kHz" by other manufacturers, but they are the same frequencies. If you are using one of these Prototek tools with another manufacturer's equipment, the frequency choice will be dictated by which frequencies you have in common. Other than that, the best frequency to use will be determined by your tracing conditions. Feel free to change frequencies as you work to find the one that gives you the best results (making sure that whichever you choose is set on both the BuzzBox and LineFinder).

## 3. How Much Power?

The BuzzBox offers two power ranges for each frequency. Generally, you will work most efficiently in "Hi" power. However, if you are working near the BuzzBox, there is danger of picking up the signal directly from the BuzzBox rather than from the line it is exciting, particularly in Inductive mode. In this case you will want to turn the power level to "Lo".

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## Application Note

If you have access to a pipe for inserting a cable, your best locating method is to use a sonde on the end of the cable and locate using the sonde procedures. If finding the exact end point of a line is important, you can put a sonde on the end as well as using the Conductive procedures, allowing you to trace the line and also pinpoint the end of the cable.

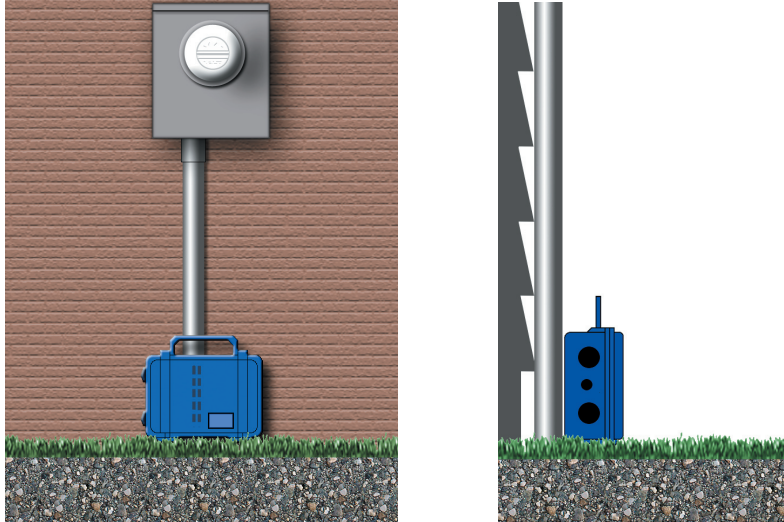
## Setting Up for Line Tracing

You will need to have access to one end of the line you want to trace, so that you can excite it with your BuzzBox. For Conductive mode you must be able to make a direct metallic connection to the line or a tracer that accompanies it. For Inductive locating, you only need to be able to get near the line where it is out of the ground. In some cases, a line can be inductively excited even when it is fully buried, if you know where it runs at that point.

Note: The metallic part of the line you wish to trace must be continuous - insulating couplers or gaps in the line will end the signal at that point. This applies to both Inductive and Conductive tracing.

For a **Conductive** locate, plug the cable connector into the BuzzBox and connect the Red clamp to the line or tracer wire. Connect the Black clamp to a good ground connection. This can be the ground rod that is supplied with the BuzzBox, or a cold water pipe or electrical service ground rod. If you are using the ground rod supplied with the BuzzBox, push it into the ground as far from the excited line as possible (the cables will allow 12 feet of separation) and at right angles to the excited line (that is, not off the end). The Ground Quality meter needle should point at half scale or higher to indicate an adequate ground connection. Wet the area around the ground rod or move it to another spot if necessary to improve the ground quality.

For **Inductive** mode, the aim is to place the BuzzBox as close as possible to the line you wish to induce signal into. It doesn't matter if the line is in metallic or nonmetallic conduit at this point; the signal will be induced into the wire inside the conduit. The other requirement is that the "tracks" on the BuzzBox label be parallel to the run of the line at that point.



How to set the BuzzBox for Inductive mode on a power line riser.  
The signal will follow the line when it turns to run horizontally underground

## Performing the Trace

When using the Inductive mode, avoid attempting to trace the line within 15 feet of the BuzzBox. The signal in this proximity to the Box can be very misleading, even absent, due to competition between the signal the Box is radiating into the air and the signal you are picking up from the line. This should not be as much of a problem in Conductive mode. Any time you are working in proximity to the Box, the power setting should be "Lo".

When tracing a long line, the strength of the signal will decrease as you move further from the exciter, until it is no longer strong enough to complete the trace. This can be overcome by "leapfrogging". Select a point on the line that still has a clear signal and the direction of the line is well defined. Move back up the line (toward where you started) about 20 feet. Place the BuzzBox over this spot, with the "tracks" set parallel to the direction of the line, and use Inductive mode (regardless of the mode you originally used to get this far). Now continue the trace further along the line; you should find good signal for a good distance. If you run out of signal, do another "leapfrog".

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When in doubt, give us a call! **1-800-541-9123**

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