# LineFinder Transmitter User Manual

## Important!!

**WARNING!** Failure to follow these warnings could result in serious injury or death.

- Only persons qualified and trained to operate cable & pipe locators may operate this equipment.
- Follow appropriate safety procedure, your companies policies and applicable safety codes and/or laws.
- Do not connect to utilities, cables or pipes without authorization and training. Use tool only for intended purpose as described in this manual
- Do not expose tool to rain or moisture.
- Do not expose to hazardous chemicals, hazardous gas or explosive environment.
- **SHOCK HAZARD** - Lethal voltages may be present at the transmitter's output. Turn off transmitter before touching test lead or any un-insulated conductor. Make connection to ground and target conductor before turning on transmitter.
- **SHOCK HAZARD** Do not connect to live voltage or active utility lines. De-energize any circuits in or around the work area.
- This tool is designed to detect electro-magnetic field emitted from cables and buried metallic utilities.
- There are buried cables, pipes, and utilities this instrument CANNOT detect.
- LOCATING is not an exact science. The only certain way to be sure of the existence, location, or depth of buried utilities is to carefully expose (dig up) the utility.

**DISCLAIMER OF LIABILITY**

MYTANA LLC SHALL NOT BE LIABLE TO ANY PERSON FOR ANY INCIDENTAL, INDIRECT, SPECIAL, EXEMPLARY OR CONSEQUENTIAL DAMAGES, OR INJURY OF ANY TYPE WHATSOEVER, CAUSED DIRECTLY OR INDIRECTLY BY PRODUCTS SOLD OR SUPPLIED BY MYTANA LLC.

### Please inspect all parts carefully upon receipt.

Make sure there is no shipping damage and all the parts are included:

- MT LineFinder Transmitter
- Direct connection cable
- Grounding rod
- Battery recharging cable (lithium-ion battery is already installed)
- Carry bag

## Introduction

The MT LineFinder Transmitter is capable of detecting buried power cables, CATV cables, gas and water pipes, sewer lines, telephone cables, fiber optic cables with sheath.

The transmitter emits a signal that is conducted by, or coupled to a conductor (the buried utiltity). A receiver (such as our MT 512+ Locator) detects the signal. You can locate the relative position of the buried conductor by following the tracing signal.

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# Transmitter Interface

## Controls

*All controls are also used in Programming, (see pg 7)*

**Power On / Off**
The ON/OFF turns the unit on and off.

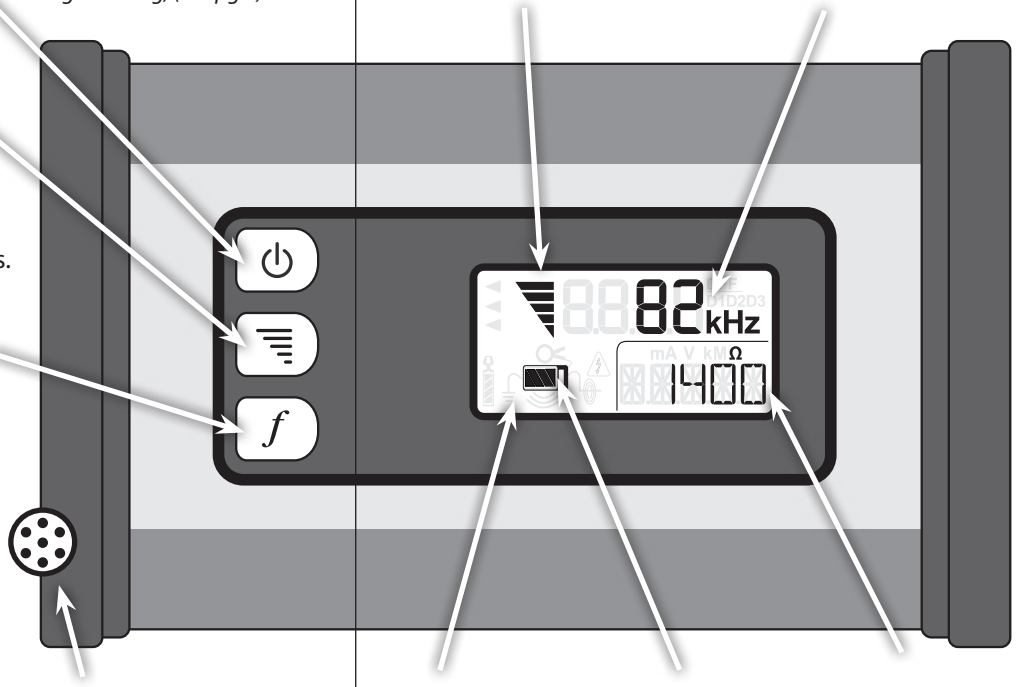
**Output Signal Level**
Will adjust the power output from the transmitter. There are 5 selections on the standard power settings.

**Frequency Selector**
This button toggles through the available frequencies which are displayed on the LCD. When dual frequency transmission options are selected, indicated by the D1 & D2 icons to the right large numeric segments, the frequencies will flash from one to another.

## Indicators

**Output Signal Level**
*see below*

**Frequency Indicator**




**Output Method Indicator**

**Battery Condition Indicator**

**Relative Resistance** (ohms)

**Output Jack**
The Red/Black Cord, Coupler or Flexicoupler connect here to create the circuit on the utility.

## Operation

**To turn unit On / Off**
Short press on/off button

**To engage transmitter from "off" idle**

*f* Short press frequency button
– or –
Short press power-output

*f* **To change frequencies**
Short press frequency button

**To change output power**
Short press power-output button

### Output Signal Level Indicator
(visual & audible)

The Signal Indicator symbol flashes to indicate signal output.

- When the indicator blinks 4 times per second, it is indicating a nearly short circuit.
- When the indicator blinks 1 time every 10 seconds, it is indicating a nearly open circuit.

A quick triple beep audible tone indicates the circuit is open and no signal is being transmitted. A steady continuous beep indicates a closed circuit and signal is transmitted .

**CAUTION** ⚠ **Always turn transmitter OFF before connecting and disconnecting test leads**

# Transmitter Connection Methods

The method of signal application may dictate the frequencies used. While direct connection can be performed on any frequencies, coupler induction will only work with medium and high frequencies and transmitter induction will only work on the highest of the medium frequencies (33kHz) and high frequencies.

## Direct Connection

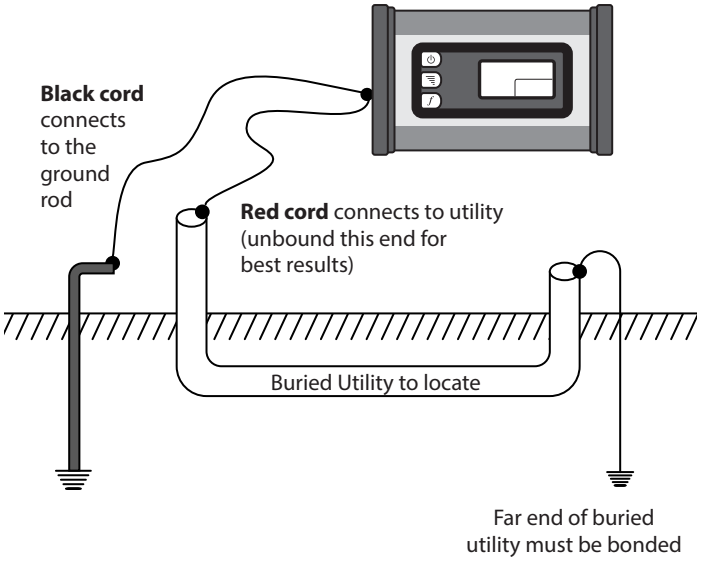
**DO NOT CONNECT TO LIVE OR ENERGIZED POWER CABLES**

- The most reliable method of signal application.
- This method is relatively free of interference.
- Achieves the greatest amount of signal strength
- Low, mid, and high frequency may be used.
- The far end of the utility must be grounded.

Connect the Red Cord to an existing ground point or an exposed metallic section of the utility.

Place the Ground Rod approximately 10' from this point, at an angle of 90º to the buried cable or pipe. Push the rod 8"-10" into the ground. Connect the Black Cord to the Ground Rod.

Plug the Red/Black Cord into the Output Jack. Select the desired frequency. The Signal Output Indicator will flash once signal is established.



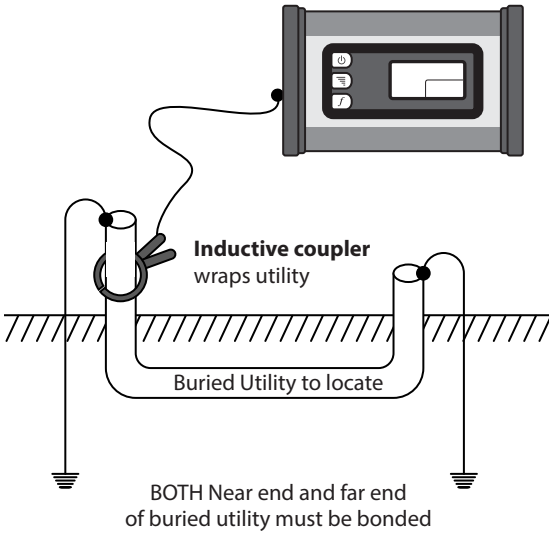

## Coupler and Flexicoupler Connection

- Uses an optional, easy to use Flexicoupler or hard coupler
- Services do not have to be interrupted.
- Shorter operation range than Direct Connection method
- Tracing signal can be affected by nearby cables or pipes
- Requires an insulated conductor that is grounded on both near and far ends

Couplers need to be attached to the cable needing to be traced:

- Loop the Flexicoupler around the cable and connect the two ends or clamp the Hard Coupler around the cable
- For strongest signal, connect around the wire closer to the outgoing cable not near the system ground. Connecting near the grounding will shorten the range, and difficulty may arise determining one cable from another.

Plug the Coupler into the output jack. Some couplers are frequency specific, others can operate on medium and high frequencies.



# Selecting the Frequency

Frequencies are classified into three major categories, each with advantages and disadvantages:

- Low Frequencies < 1 kHz (1000 Hz)
- Medium Frequencies 1 kHz to 44 kHz
- High Frequencies 44 kHz to 480 kHz

The connection method may dictate the frequencies used:

- direct connection can be performed on any frequency
- coupler induction works only with medium and high frequencies
- transmitter induction works only with the highest medium (33kHz) and high frequencies

It is generally accepted that lower frequencies provide a more accurate locate and are less likely to bleed onto adjacent non-target lines, but they are less effective on higher-resistant conductors. Begin by using a low frequency, and continue as long as you are confident in the results. If the signal is very weak try to adjust the connection or grounding. If there is no improvement in signal then try mid-range frequencies. Again, if there is weak or absent signal, repeat adjustments of the grounding and connection point before switching to a high frequency.

Low Frequencies are usually preferred to the mid-range and high frequencies because they are less susceptible to locating errors caused by coupling of signal to adjacent conductors, cables or pipes. The low frequency locating range is also much longer than the medium and high frequencies. Low frequencies will not travel well on highly resistive lines or conductors that have interruptions in their continuity (e.g. disconnected shield bonds or insulated pipe bushing).

- Low frequencies may only be applied via direct connection.

Medium Frequencies take the best of both high and low frequencies. They are not as susceptible to bleed off or coupling as the high frequencies, and medium frequencies can jump minor breaks in continuity and conduct on higher resistant lines better than low frequencies. It is still best to use low frequencies whenever effective, but 8 kHz and 33kHz are of the most common frequencies used in locating.

- Medium frequencies may be applied via direct connection and via coupler induction [Note: 33kHz may be applied via transmitter induction].

High frequencies are sometimes better than the low frequencies for locating highly resistant lines as well as conductors that have breaks in their continuity (e.g. disconnected shield bonds or insulated pipe bushing). The locating range is quite short for the high frequencies so the Transmitter must be repositioned more often during the tracing operation.

- High frequencies may be applied via direct connection, coupler induction and transmitter induction.

# Using the LineFinder with the MT 512+ Locator

To trace the signal the LineFinder transmits along a utility, you need a receiver such as our MT 512+ Locator to detect the signal and guide you along it. Information specific to using the MT 512+ Locator with the Transmitter follows.

## Locating Modes

The MT 512+ Locator offers 2 main operational modes:

### Sonde 

***Information about sonde locating is in the 512+ Locator manual***

- Highest signal strength directly over sonde with gradual decline side to side and front to back. Receiver must be oriented parallel with sonde.
- Passive Line locating available
- Sonde mode has 2 antenna modes available:
  - L/R guidance On
  - L/R Guidance Off

### Line 

- For use with the LineFinder Transmitter
- Multiple antenna modes available
- Line mode has 7 antenna modes available:

- **Peak** Highest signal strength directly over conductor with gradual decline side to side.
  - Locator must be oriented perpendicular to conductor.
  - Available with and without left/rt guidance.

- **Pinpoint Peak** Highest signal strength directly over conductor with sharp decline side to side.
  - Locator must be oriented perpendicular to conductor.
  - Available with and without left/rt guidance.

- **Null** Lowest signal strength directly over conductor with sharp increase side to side.
  - Locator orientation not required.
  - Available with and without left/rt guidance.



- **Auto Left/Right Guidance** Broken tone to left side of conductor with solid tone to right side of conductor.
  - Locator must be oriented perpendicular to conductor.

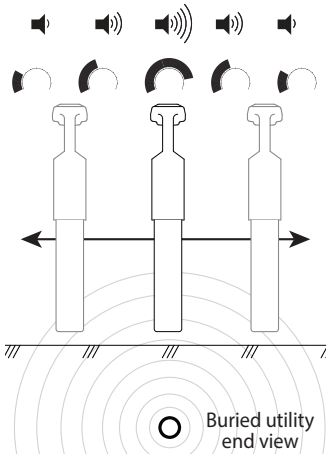
More about these Line modes follows on next page.

## Peak Mode Locating

- **Peak** and **Pin Point Peak** modes have less error rates than the null locating mode in most circumstances.
- The peak mode location indication should be verified by the null to ensure locating accuracy.

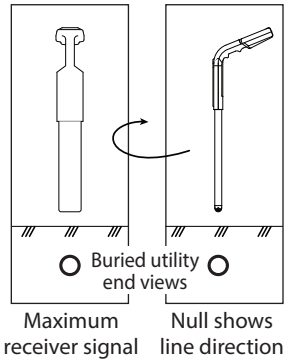
With the Locator in a vertical position. Move left to right across the path. When the Locator is directly above the cable or pipe, rotate the Locator for a maximum signal.

As you move the Locator away from the cable path, the meter reading (and audio frequency response) will drop off.




The Left/Right arrows operate off of the NULL reading. By utilizing the Left/Right arrows while in PEAK mode the user can simultaneously locate in both modes thus quickly identifying the match or discrepancy between the PEAK and the NULL reading.

If you rotate the Locator while over the cable, a sharp NULL will identify the cable's direction which is aligned with the flat side of the receiver.




Trace the path by walking away from the Transmitter at a moderate pace. Move the Locator to the left and right while walking, following the PEAK indications.

As you trace the path, the PEAK meter reading may slowly fade as you move away from the Transmitter. Press and release the Gain buttons as needed to compensate for changes in level (higher or lower). One of the following may occur:

- a junction where the signal divides and goes several directions
- a break in the cable or shield
- a change in the depth of the cable or pipe
- an insulated pipe fitting
- a slack loop of cable

If you can no longer trace the path, even with the Gain set to maximum, connect the Transmitter to the far end of the path and trace back to the point where you lost the signal.

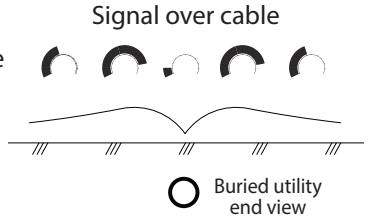
Mark the straight sections of the path every few feet. Mark sharp curves, loops, and cable bundles every few inches. Sharp changes in the path cause the Locator PEAK and NULL indications to behave differently than when tracing a straight path. Practice on the path that you know has turns and laterals in it. This will help you to recognize the conditions within the field.

## Null Mode Locating

Move the Locator left to right across the cable path. When the Locator is directly above the cable or pipe, a NULL (lowest meter reading and lowest audio tone) will occur. When moving the Locator to left or right of the NULL point, the meter reading will rise to a maximum point (PEAK). The audio tone will also be at its highest pitch. When the Locator is moved beyond the PEAK, the meter reading will begin to fade.

Trace the path by walking away from the Transmitter at a moderate pace. Move the Locator to the left and right when walking, following the NULL indications.

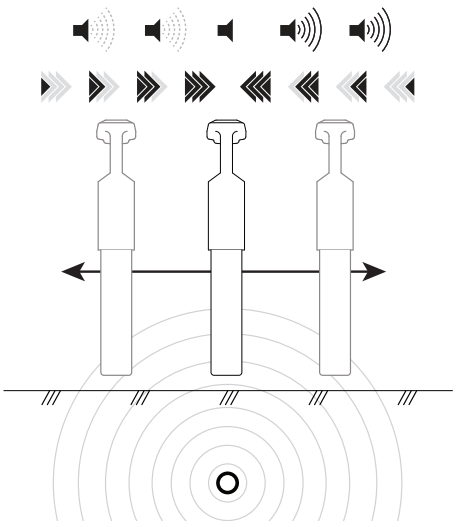
It is expected that in areas of distortion and interference the NULL locating mode will have a greater error rate than the Peak locating mode.




## Left/Right Auto Gain Directional Locating

The Left/Right arrows operate off of the NULL reading and will have the same error rate as the NULL locating mode. By utilizing the Left/Right arrows with the absolute signal strength reading, the user can simultaneously locate with both PEAK and NULL modes, thus quickly identifying the match or discrepancy between the PEAK and the NULL reading.

In this mode the Locator will display directional arrows to the conductor. The audio indicator will provide a solid tone on one side of the conductor and a pulsed tone on the opposite side of the conductor. When the unit is centered in the electromagnetic field the tone will null and the depth will briefly display at the top of the LCD. This mode is gain independent.

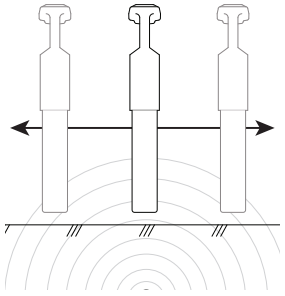


# Depth Measurement

**The only way to be sure of the depth of a utility is to exposes the utility. At any given time, the depth readout may be inaccurate.**

Depth is determined by reading the electromagnetic field radiating from the conductor. The field must be even and circular for the most accurate reading.

Interference of this field may be caused by bends in the cable, faults on the target conductor and signals radiating from adjacent non-target conductors. Interference will warp the field and skew the depth reading.



Peak & Null readings match

From the Peak/Null location take several readings across cable.

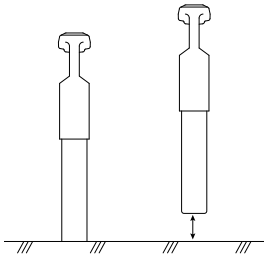
Mark position indicated by lowest depth reading.

While stationary take multiple depth readings.

Reading should be consistent

The following are methods and procedures that will aid in increasing the reliability and testing the accuracy of the depth reading:

- Take depth readings at least 5 yards from cable bends or depth changes. Follow the cable both forward 5 yards and backward 5 yards, ensuring the line is straight and there is a consistent signal strength reading.
- Check for non-target conductors within 5 yards of the target cable. Sweep the area looking for coupled signals into both the tracks and adjacent cables. Adjacent conductors carrying the locate signal can result in a 50% error rate of the depth reading.
- Test for interference in the magnetic field by comparing the PEAK location to the Null location. The determined cable position by these methods should be within 3 inches of each other. A greater disparity will indicate interference resulting in inaccurate depth.
- Place the Locator vertically over the conductor and perpendicular to the conductor. Rest the foot of the Locator on the ground. Take several depth readings moving slightly across the perpendicular plane to the conductor looking for the lowest depth reading.
- Once the lowest depth reading is found, take several readings. Each reading should be within one inch of the other reading. Wider variation will indicate interference resulting in inaccurate depth.
- Lift the Locator up 12 inches and take a depth reading. The reading should reflect the change in distance accordingly. If not, interference is present resulting in inaccurate depth.



Lift 12"

# Current Measurement

**Only works on jacketed and grounded cables.**

The MT 512+ Locator contains a feature that is very useful in identifying a desired cable in a field of various conductors and/or utilities. It is not unusual for the target conductor (the conductor connected to the transmitter) to induce a signal into nearby conductors in a crowded field.

In these instances, the radiated signal on the conductors close to the surface of the earth, may be stronger than the Transmitter signal on the target conductor buried deep in the ground. The operator will find two or more paths and must determine which is the target conductor.

By using the current measurement feature of the MT 512+ Locator, the operator can determine the amount of 815 Hz, 8 kHz, 33kHz or 82 kHz current flowing on the conductors, regardless of the depth. The highest current flow indicates the target conductor.

# Changing preset functions, modes and frequency sets

The LineFinder Transmitter's programming menu lets you preset the frequencies you use most often so they will be available every time you power up the transmitter.

To program the desired frequency set for software versions 3.43 and greater:

⏻ **Press and hold depressed** the Power On Button.

ƒ **Short press** the Frequency button to toggle through available configurations until 'U5' is displayed in the LCD

**Release** the Power On button — 'PRO' will be displayed on the LCD

ƒ **Short press** the Frequency button to toggle through the available frequencies.

ƒ To select and store a desired frequency **press and hold** the Frequency button for 2 seconds. *The preset count of the selected frequency will be displayed on the LCD*

Continue to toggle through and select the desired frequencies

⏻ **Press** the Power On button to shut the unit off. This will save the selected frequencies for availability during normal operation.

# Specifications

| | |
|---|---|
| Operating Frequency | 131 Khz, 82.315 kHz, 65.536 kHz, 32.768 kHz, 8.192 kHz, 4.010 kHz, 815 Hz, 797 Hz, 640 Hz & 512 Hz |
| Operating Temperature | -4°F to 133° |
| Hook-up Method | Direct Connection, Inductive Coupling (with optional coupler), |
| Load Matching | automatic from 5 Ω to 25,000 Ω |
| Battery Type | Rechargeable Lithium Ion |
| Dimensions | 8.2" x 5.4" x 2.1" |
| Weight | 2 lbs |

# Factory Service

If your equipment is not working properly, call MyTana Support at 651-222-1738 for assistance. If the transmitter is in need of repair, MyTana will provide instructions for returning it for service.

- Note: There is a minimum charge for repair and handling.