















## APPLICATION NOTES

### Basic Signal Patterns

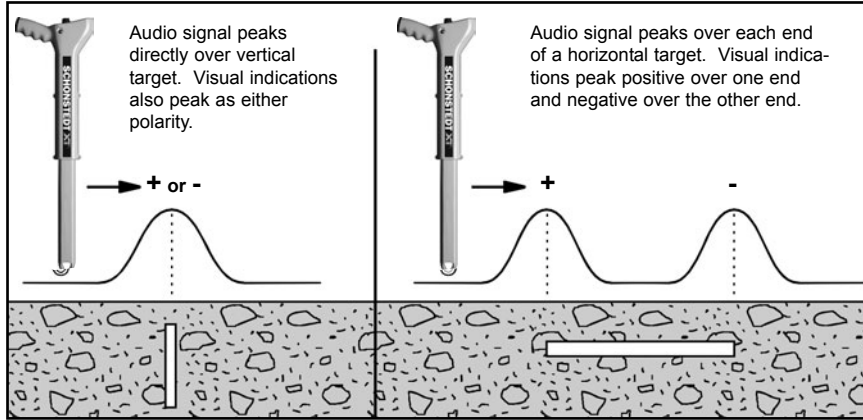
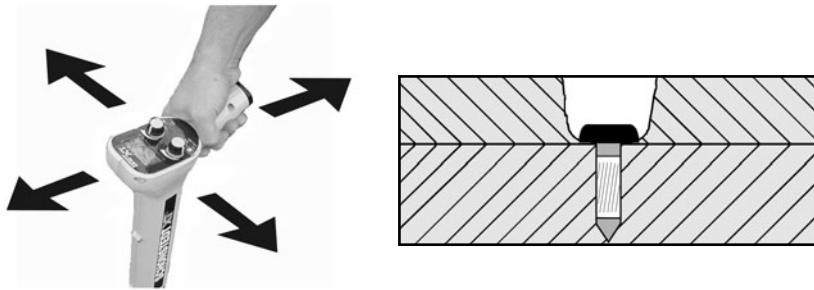


Figure 7. Signals from Vertical and Horizontal Targets

After you have detected the presence of a target, hold the locator vertically and slowly move it back and forth in an "X" pattern while listening to the audio response and observing the bargraph (XTd model only) readout. For a given gain setting the number of bars will be greatest when the locator is directly over a vertical target, and over the ends of a horizontal target. The "X" pattern is ideal for pinpointing small objects. A 1-1/4 inch PK nail buried up to 8 inches can be located so precisely with this technique that it can be uncovered using a 1/2 inch



star drill.

Figure 8. "X" Pattern provides Precision Locating

If you are looking for a corner marker and detect two or three signals in the same general vicinity, decrease the gain setting before you get a shovel. Any signal that disappears when the gain is decreased is probably coming from a shallow target. The signal from a rusty bolt or other small item (see Figure 9.) is much

## MAINTENANCE

The GA-92XT® is designed and built to give trouble-free operation. Normally, maintenance is limited to the occasional replacement of the batteries. In the event a malfunction does occur, refer to the Troubleshooting Guide on page 16 for a few problems that you can correct in the field.

### Replacement of Battery

The GA-92XT® is powered by one 9-volt lithium battery that has a shelf life of ten years, and provides twice the operating life of an alkaline battery. The battery is located in the handle of the instrument and can be accessed by turning the screw counterclockwise by hand or with the use of a screwdriver or coin. To remove the battery, simply tilt the unit so that the handle is pointing down, and the battery will slide out. When replacing the battery, look at the inside of the battery door for the proper battery orientation. (The positive terminal should be on the right on the inside of the unit) As a safety measure the unit has been "Keyed" so that the battery will only make contact when in the correct orientation. **For this reason you should never have to force the battery door closed. If the battery does not seem to be going in all the way, remove, reverse and then replace.**

### CAUTION

**W** **D** **V** **U** **H** **E** **R** **P** **P** **H** **G** **W** **K** **D** **W** **R** **X** **S** **X** **U** **E** **K**  
 batterLHVDGKHRXVHWKHMSDUHMH  
 replace it as soon as possible so that yoX  
 will never be without a spare battery□

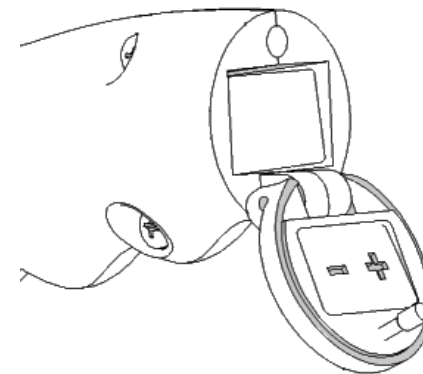
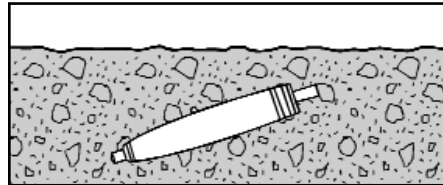
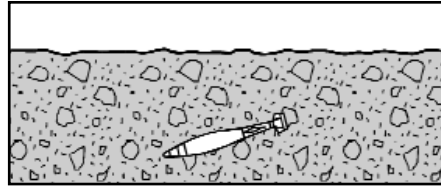


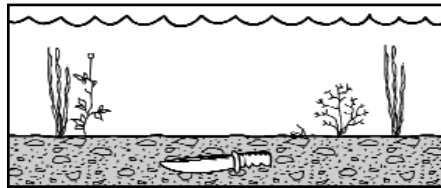
Figure 22. View of Battery Door and Compartment



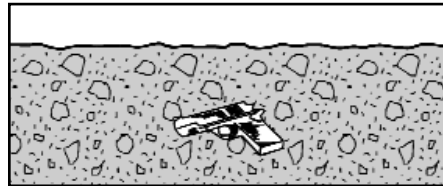
An 81mm mortar can be located up to 12 inches deep.



MK81 Low drag bombs can be located up to 7 feet deep.



A hunting knife under water can be located in up to 14 inches of silt.



A discarded hand gun can be located up to 12 inches deep.

### Other Notes

1. A burbling sound indicates the presence of an energized power line. This will not influence the meter indication unless associated with a magnetic structure.
2. The instrument will not respond to non-ferrous metals such as gold, silver, copper, brass and aluminum.

weaker than the signal from a larger target such as a 18-inch length of 3/4 rebar which can be located at depths up to 7 feet.

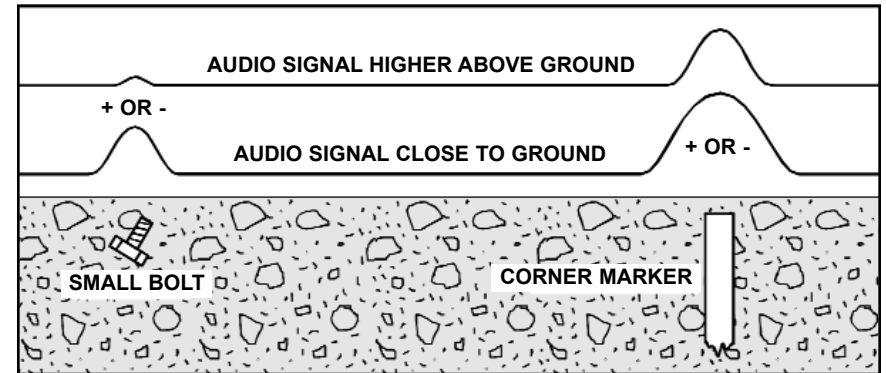


Figure 9. Decreasing gain Eliminates Unwanted Signals

### Strongly Magnetized Markers

A strongly magnetized marker at or near the surface provides a weaker indication on both sides of the marker that could be mistaken for the marker.

The heavy line in Figure 10 represents the increase and decrease in the audio and bargraph (XTd model only) indications as you move the locator over a marker. Between points **A** and **B** the signals increase slightly and then decrease. Just beyond **B** the signals increase rapidly, peaks directly over the marker and then decreases at point **C**. From **C** to **D** the signals increase and decrease again. So if you do not move the locator completely across the marker you might assume that the weaker indication on either side of the marker is its location.

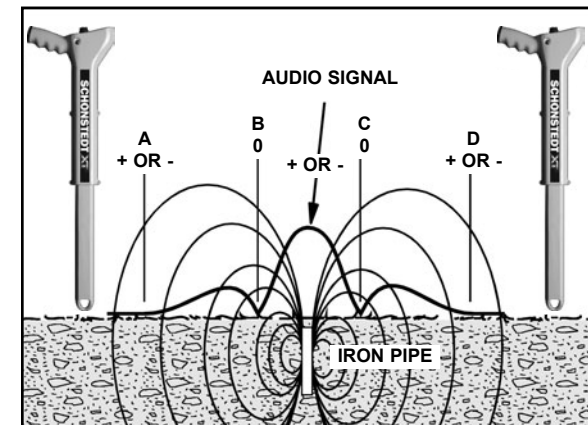


Figure 10. Signal Pattern from a Strongly Magnetized Marker

The two weaker indications occur because the locator is extremely sensitive to the magnetic field components parallel to its long axis. At point **B** and **C** the field is perpendicular to the locator so no peak audio or bargraph (XTd model only) indications are produced at these points.

### Correct Stake Orientation

#### *When Placing Stakes, Correct orientation is Important*

For checking purposes, the orientation of the pin relative to the locator is shown in Figure 11. Check the pin with one orientation. Then rotate the pin 180°. The orientation which gives the largest reading is the one that should be used. This reading should be positive in the Northern Hemisphere, and negative in the Southern Hemisphere.



Figure 11. Checking a Stake's Orientation

An iron pin has two types of magnetization. One is the magnetization induced by the Earth's magnetic field. The induced magnetization is always downward in the Northern Magnetic Hemisphere and produces a positive output no matter which end of the stake is driven into the ground. The other type of field is the permanent magnetization which is fixed to the pin. For maximum detection, the stake should be driven into the ground such that the permanent magnetization is in the same direction as the induced magnetization.

### Locating Manholes, Septic Tanks and Well Casings

The magnetic field is strongest at the edge of a shallow manhole cover. You can

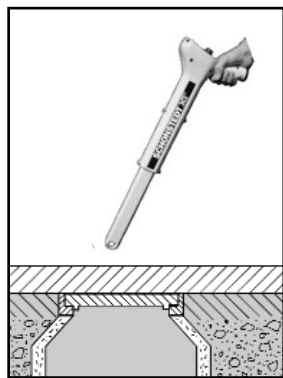


Figure 12. Locating Manhole Covers

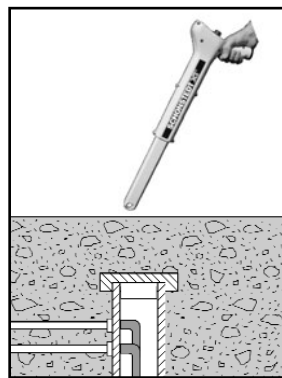


Figure 13. Locating Water Well Casings

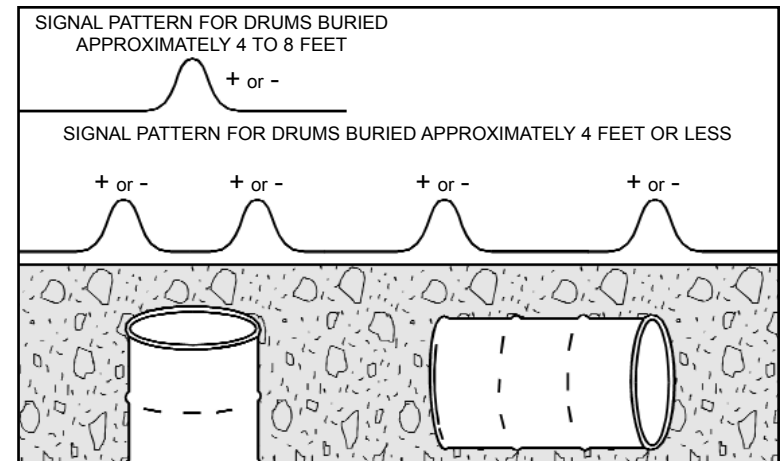
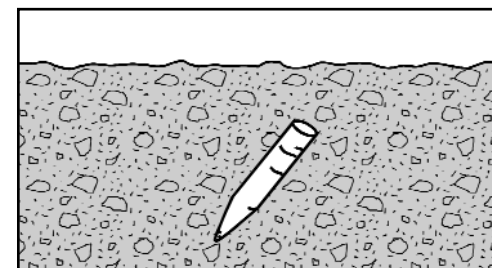
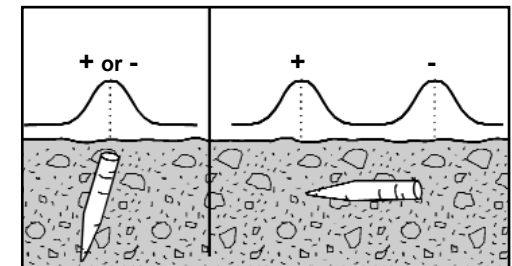


Figure 21. Signal patterns provided by steel drums

### Locating Ordnance and Weapons

The versatile, lightweight, cost-effective GA-92XT® is also designed to aid EOD technicians and law enforcement officers during area search operations.

Basic signal patterns from vertical and horizontal targets help to determine target orientation.



A 175mm projectile can be located up to 4 feet deep.

## Locating Cast-Iron Pipes

As illustrated in Figure 20, cast-iron pipes produce the strongest magnetic signals at their joints.

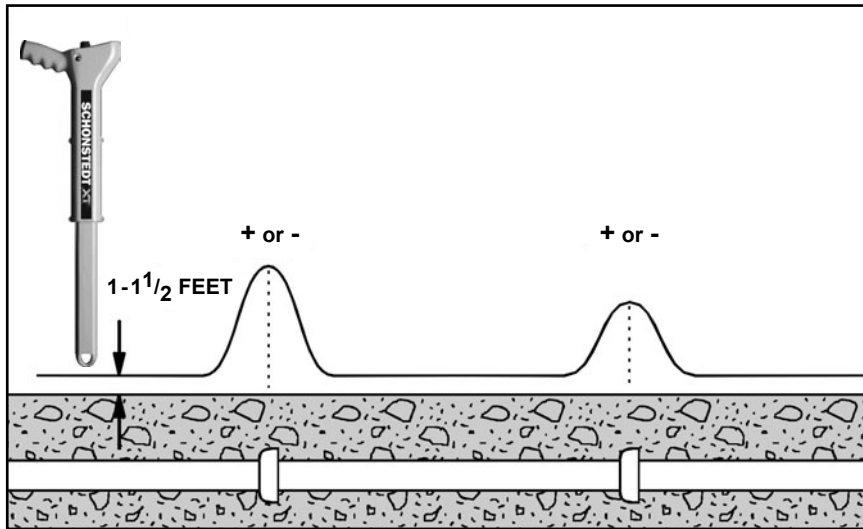


Figure 20. Signal Patterns Provided by Cast-Iron Pipes

The initial search should be performed as follows:

1. Set the Sensitivity control for maximum (XH indication).
2. Hold the locator vertically approximately 1 to 1-1/2 feet above the surface.
3. Walk along without turning or tilting the locator.
4. Mark the locations where the maximum signal levels occur.
5. Return to an area of maximum signal strength and hold the locator several inches above the surface. The sensitivity will probably have to be reduced during this second pass. Four-inch pipes can be located at depths up to 9 feet.

## Locating Steel Drums

As shown in Figure 21, the GA-92XT's signal pattern will vary depending on the vertical or horizontal orientation of the drum and also how deep it is buried. A fifty-five gallon drum can be located at depths up to 8 feet.

easily trace the edges of covers near the surface. Locating depth ranges up to 8 feet. The great length of a well casing provides a strong field at the surface that makes it easy to locate casings buried up to 15 feet deep.

The GA-92XT® can be used to precisely locate the metal handles or reinforcing bars on septic tank covers at depths up to 4 feet.

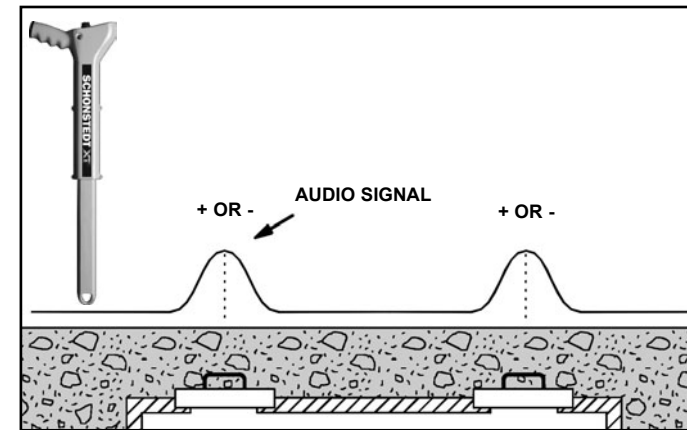


Figure 14. Signal Patterns Provided by Septic Tank Covers

## Locating and Tracing Barbed Wire

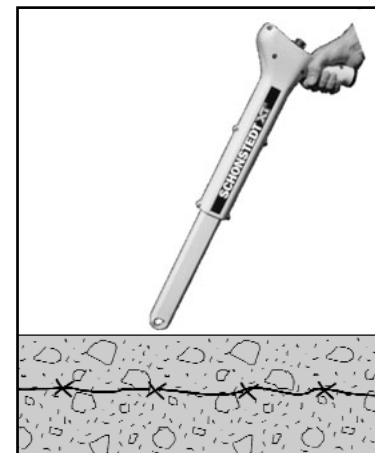


Figure 15. Tracing Barbed Wire

You can often trace barbed wire (from old fence lines) buried just beneath the surface. Even if the wire is only a trail of rust, it can still be detected near the surface. Tip the locator a little lower than usual - but not parallel with the ground.

Examine trees for bench marks and bits of embedded barbed wire. Hold the locator parallel with the direction of the wire.

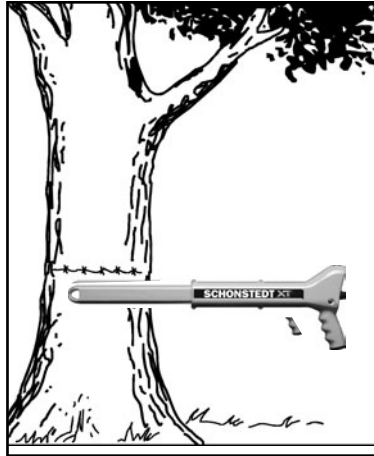


Figure 16. Tracing Barbed Wire from Old Fence Lines

### Searching Areas Along a Chain Link Fence

Searching in the vicinity of a chain link fence requires a reduced sensitivity setting and some control over the orientation of the locator. Position the locator horizontally with its long axis perpendicular to the fence as illustrated in Figure 17. This insures that the upper sensor is kept away from the fence.



Figure 17. Searching in the Vicinity of a Chain Link Fence

Perform the search by slowly moving the locator forward along the fence while also moving it to the right and to the left. This technique allows you to search an area several feet wide as you move forward. Listen for an abrupt drop in the signal (as shown by the null in Figure 18) that will occur when the lower sensor,

located 1-1/2 inches from the end of the locator, is directly over the stake. Any variation in the position of the locator will produce an abrupt rise in the frequency of the signal.

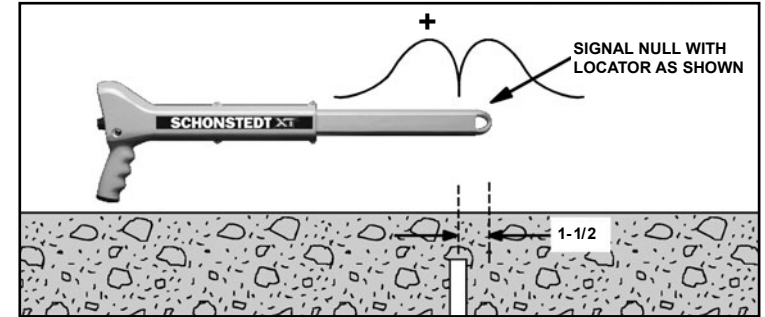


Figure 18. Placement of Locator while Searching along a Chain Link Fence

### Locating Valve Boxes

Both the valve and its casing, when iron, provide strong magnetic fields which make them easy to locate. Plastic enclosures containing magnets are easily located at depths of 6 feet or more.

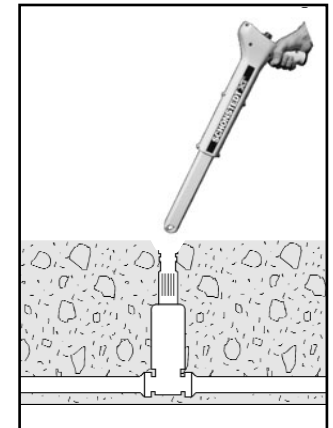


Figure 19. Locating Valve Boxes and Casings