

The logo for SPXX, featuring the letters 'SP' in a dark grey, bold, sans-serif font, followed by 'XX' in a bright green, bold, sans-serif font. A registered trademark symbol (®) is located to the right of the second 'X'.

SPXX®

A green arrow icon pointing to the right, positioned to the left of the text.

> Where Ideas Meet Industry

RD2000 SuperC.A.T™



RD2000: SuperC.A.T+ | SuperC.A.T™ | SuperC.A.T^s
SuperC.A.T^{CPS} | T1 Transmitter

User Guide



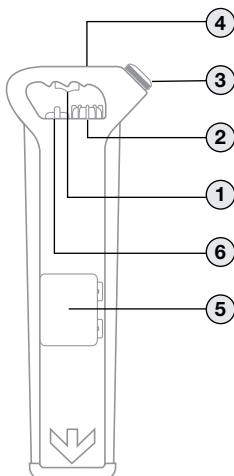
Radiodetection
AN SPX COMPANY

RD2000 SuperC.A.T User Guide

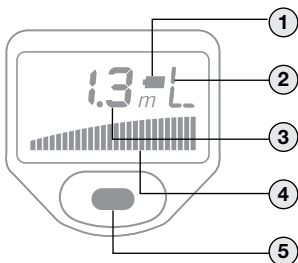
Functions

SuperC.A.T Locator functions

- 1 On/Off Trigger. Press and hold to use the SuperC.A.T. Release to switch off the SuperC.A.T.
- 2 Sensitivity Control. Rotate to increase or decrease detection sensitivity.
- 3 Loudspeaker. Unscrew to detach.
- 4 LCD Meter with automatic depth readout.
- 5 Battery compartment. To replace batteries, open the access cover using a screwdriver or coin. Use two LR20 or D type alkaline batteries (or equivalent NiMH rechargeable batteries).
- 6 Function Switch.



SuperC.A.T LCD functions



- 1 Battery Indicator.
- 2 Mode: is selected using the function switch (if it is indicated):
 - a L = Active line mode,
 - b R = Radio, P = Power,
 - c C = CPS (optional),
 - d S = Sonde (optional),
- 3 Depth,
- 4 Signal strength as indicated by the bar graph,
- 5 Frequency selection button.

Depth Measurement

The SuperC.A.T will automatically measure and display the depth in Active Line, Sonde and CPS modes. Note: The SuperC.A.T does not measure depth in Power or Radio modes.

Method: Locate the utility as follows. Hold the SuperC.A.T still and vertically centered above the detected line and across the line of the pipe/cable.

Note: A depth measurement will not be displayed where environmental conditions are poor (e.g. weak signal or interference).

The measurement is to the center of the pipe/conductor or to the center of the Sonde, which may rest at the bottom of the pipe.

The measurement accuracy is $\pm 5\%$ or better under standard earth conditions and with undistorted fields. When digging for cables after location, it is imperative that due care is taken appropriate to the danger of personal injury and damage to infrastructure. It is recommended that depth measurement is repeated throughout an excavation.

The SuperC.A.T is switched on by pressing and holding the On/Off trigger. You will hear an initial "chirp" sound. Low battery is indicated by a flashing battery icon and a lower pitch chirp.

Power and Radio mode location

Note: After completing a power mode sweep we recommend that you repeat the procedure in radio mode; the procedure is the same.

Power Mode

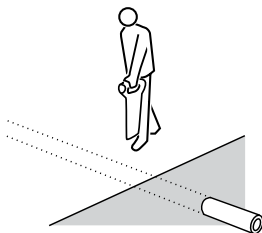
Power mode detects power signals radiated by loaded power cables. To select Power mode, rotate the function switch until the LCD displays a P icon. Rotate the sensitivity control fully clockwise for maximum sensitivity but reduce if there is a blanket signal across the site. Define the excavation site and carry out a grid pattern sweep. Note that sometimes the signal may be re-radiated from other conductors.

Sweep the site holding the SuperC.A.T upright at your side. Continue the sweep beyond the perimeter of the site. The presence of a buried conducting pipe or cable will be indicated by a tone emitted from the loudspeaker and a kick on the LCD's bar graph.

Keep the SuperC.A.T blade vertical and move slowly backwards and forwards over the conductor. Reduce the sensitivity for a narrower response; this will allow you to pinpoint the conductor. With the SuperC.A.T use the meter deflection to aid pinpointing. Maximum meter deflection and audible volume from the speaker will indicate the position of the conductor.

When directly over the conductor and with the sensitivity level set for a narrow response, rotate the SuperC.A.T on its axis until the signal minimum is found. The blade is now parallel with the conductor.

Trace the conductor beyond the site and mark the position as required with chalk or paint.



Radio Mode

Radio mode detects broadcast signals that originate from radio transmitters. These signals penetrate the ground and are re-radiated by buried conductors. However, depending on your location, these signals may not be present.

StrikeAlert™

If the StrikeAlert™ option is activated, the mode icon will flash an asterisk (*) when the locator detects a shallow cable radiating an electromagnetic signal. This is a useful shallow cable indicator; note however that not all live power cables radiate a signal that the Receiver can detect. StrikeAlert is indicated by a I or O at power-up.

Do not use the StrikeAlert™ feature to confirm the area is free from shallow cables. ALWAYS DIG WITH CAUTION.

Note: To disable StrikeAlert™, press and hold the frequency select button as you turn the Receiver on. Repeat the procedure to enable StrikeAlert™.

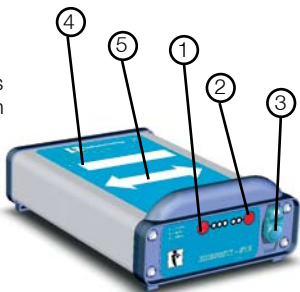
StrikeAlert does not operate in radio or sonde mode. It is activated by shallow cables radiating a power signal or an actively applied signal.

T1 – 1W Transmitter

The T1 is a general purpose, 1 Watt, transmitter that provides up to three locatable frequencies, two induction frequencies and two power levels. By default, the T1 induces a signal directly into the ground. It is the perfect companion to the SuperC.A.T range of cable and pipe locators.

Transmitter features

- 1 On/Off/Frequency Selector – LEDs indicate which frequency has been selected.
 - a First press switches the Transmitter on and selects the low locate frequency – depending on product specified (not an induction mode).
 - b Second and third press selects the next specified frequencies: Active and Induction.
 - c Fourth press turns the Transmitter off.
- 2 Power Selector
 - a Selects either high or low power level. LEDs indicate which power level is active.
- 3 Connection Socket
 - a Connects cables or optional accessories such as the Signal Clamp, Live Cable Connector or Live Plug Connector. When connected, induction mode is disabled. A loudspeaker emits a pulsing tone to indicate sufficient battery charge and a satisfactory direct connection.



4 Batteries Access Panel. No tone indicates that the batteries must be replaced. Unscrew fastener on the rear panel and replace with 4 LR20 (D cells) batteries. Observe correct battery polarity as indicated on the top-panel label.

5 Arrows

- a** The arrows on the top panel label indicate the required Transmitter alignment above the pipe or cable when using the Induction mode. The arrows and the pipe or cable must be parallel. Alignment is not required when the T1 is in Active mode.

Note: Turn off the T1 and remove any connection cables before changing batteries.

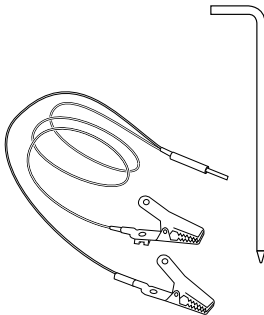
Connection Cable

The red cable connects the T1 directly to the target cable or pipe. The black cable provides the ground return when clamped to a Ground Stake. The connection cable plugs and locks into the connection socket on the front panel of the T1. To unlock the cable, grip the black sleeve on the outside of the plug and ease off the connector. Do not pull the wire as this may damage the cable and/or socket.

Ground Stake

The Ground Stake, when connected to the black ground cable, provides a ground connection and return signal to the T1.

Regularly check your SuperC.A.T and T1, in all modes over a cable which provides a response that you are familiar with.



Cable location with the SuperC.A.T and T1 Transmitter

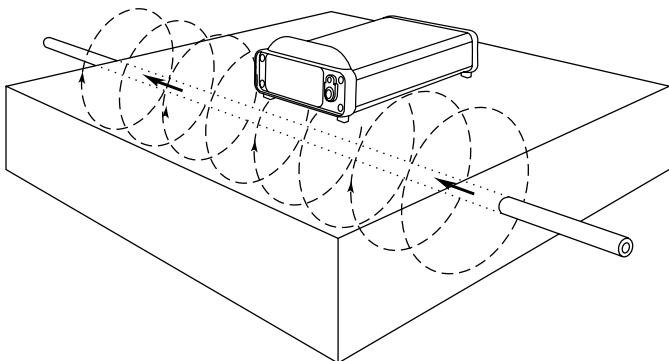
Induction Mode

The Transmitter has an internal aerial that will induce a signal onto a line (or lines) directly below it. This is useful when you do not have direct access to the line. Generally, induction is only effective to depths of 2m (6'6"). Note that the induction mode is indiscriminate and will apply a signal to all conductors within its range.

Induction is only available with frequencies 8kHz and above.

Procedure

Place the Transmitter over the approximate position of the line with arrows pointing parallel to the line. Set SuperC.A.T Receiver sensitivity to 50% and start locating the line at least 10 meters away from the Transmitter. Mark the ground when the Receiver detects any signal spike.



Note: Induction cannot apply a signal to a line below reinforced concrete.

The SuperC.A.T may detect the transmitter signal directly from the T1 rather than the target line, so do not attempt depth measurements within 10 meters of the transmitter.

To check if you are detecting a signal from the T1, point the Receiver directly at the transmitter. If the Receiver signal strength increases, either reduce the transmitter power or increase the distance between you and the transmitter.

If the Receiver signal strength decreases, the signal is from the buried line.

Direct Connection

Direct connection allows you to apply a signal directly onto a specific line. Direct connection is suitable for use on continuous tracer wire, water and gas distribution systems, a telecom cable, and pipeline at a CP test or other access point.

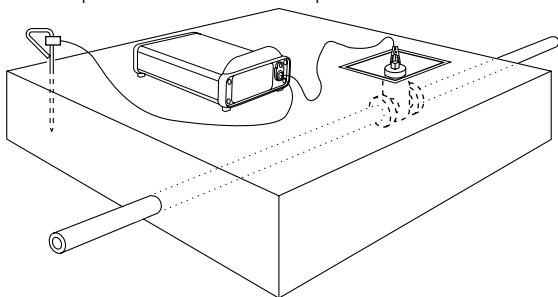
Procedure

First Plug the Connection Cable into the Transmitter and then clamp the terminals onto the target cable or pipeline. If necessary clean off paint, rust or scale to ensure good connection.

Clip the ground cable to an independent grounding point a few meters away from the transmitter and preferably perpendicular to the probable route of the target cable or pipeline. Do not attach the ground cable to water pipes or any buried line which could carry the induced locate signal.

Start with the T1's lowest power setting. A pulsed loudspeaker tone indicates a good connection. If there is no tonal change, check the electrical contacts and the ground. If necessary, change the position of the ground stake or pour water over the ground contact if placed in dry soil or sand. If there is still no change in tone increase the power setting.

Note: A receiver can detect a signal many times weaker than what is necessary for a transmitter tone change and short distances can be traced without pulse tone from the loudspeaker.

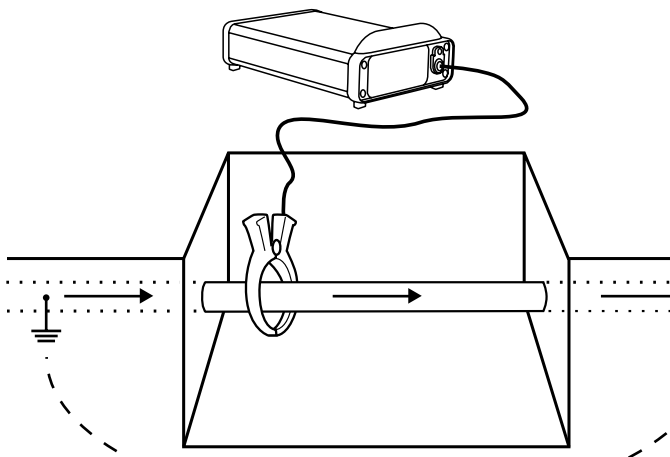


WARNING! Direct connection to power cable sheaths must be performed by qualified personnel!

Signal Clamp (optional extra)

The Signal Clamp applies a signal to a pipe or a live cable without interrupting the supply. It applies a very discriminating signal with reduced coupling to other conductors.

WARNING! To avoid the risk of electric shock, the signal clamp must be connected to the transmitter before being placed around the pipe or cable.



Procedure

Connect the Signal Clamp to the Transmitter.

Place the Signal Clamp around the pipe or cable, ensuring the jaws are closed. Switch on the Transmitter.

Note that unless a disconnected pipe or cable is grounded, it cannot generally be located using a Signal Clamp.

Locating a Sonde

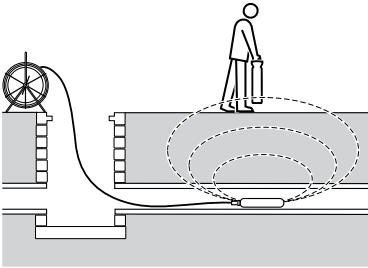
The SuperC.A.T is capable of locating a Radiodetection Sonde. Before attempting to locate a Sonde ensure that the Sonde's batteries are fully charged. Radiodetection recommends using new or fully recharged batteries at the beginning of each day and preferably at the start of each job. Also check that the Sonde and Receiver are operating at the same frequency and are working correctly.

To test the Sonde and Receiver, position the Sonde at a distance equal to its rated depth range from the Receiver. Point the Receiver at the Sonde with its blade parallel to the direction the Sonde is travelling. Check that the bar graph shows more than 50% at high sensitivity

Note: the blade of the new Receiver must be in line with the Sonde; this is the opposite to Line locate method.

Procedure

- 1 Attach the Sonde to the rod and insert it into the Drain or Duct to be mapped. Keep the Sonde just in view.
- 2 Hold the Receiver vertically directly over the Sonde with the blade in line with the Sonde's orientation.
- 3 Adjust the sensitivity of the Receiver to give a bar graph reading between 60-80%.

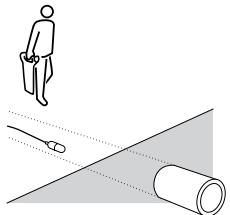


A Sonde radiates a peak field from the center of its axis with ghost signals at each side of the peak. Move the Receiver to one side and then along the axis of the Sonde forwards and backwards to detect the ghost signals.

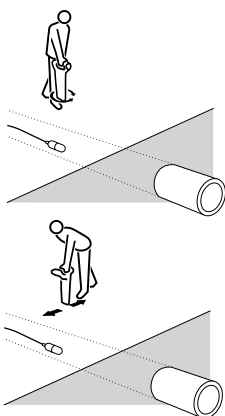
Radiodetection recommends locating the ghost signals as finding them confirms the position of the main peak. To lose the ghost signals, reduce the sensitivity of the Receiver; this should leave only the main peak signal detectable.

With the Receiver sensitivity set as desired, propel the Sonde along three or four meters and stop. Place the Receiver over the estimated position of the Sonde and:

- 1 Move the Receiver backwards and forwards with the blade's orientation parallel to the Sonde.



- 2 Stop when the bar graph indicates a clear peak.
- 3 Rotate the Receiver until the blade's orientation is perpendicular to the Sonde, stop when the bar graph indicates a clear peak.
- 4 Move the Receiver from side to side until the bar graph indicates a clear peak.
- 5 When the Receiver locates a peak signal, it will automatically calculate the depth of the Sonde. Observe the depth reading while moving the Receiver from side to side; the lowest reading will be the correct location.



Repeat each step in smaller increments with the Receiver blade resting on or near the ground. The Receiver should now be directly above the Sonde with the blade in line with the Sonde; mark this position.

Propel the Sonde a further three to four meters along the pipe and pinpoint and mark. Repeat the procedure along the route at similar intervals. Note, while tracking the Sonde altering the receiver's sensitivity is not required unless the depth pipe, or the distance between Receiver and Sonde changes.

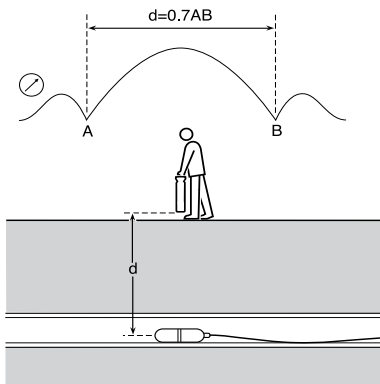
Measuring Sonde depth

Pinpoint the Sonde as previously described. Then rest the Receiver on the ground with the blade's orientation parallel to the orientation of the Sonde. Adjust the sensitivity to give a meter reading of 60% to 80% on the LCD's bar graph.

Note that the depth reading is the distance from the bottom of the Receiver blade to the center of the Sonde and not to the drain or duct being located.

CAUTION: Ensure Depth readings are taken from peak readings. Depth readings taken from ghost signal position will be incorrect.

Depth measurement is automatic. Depth reading will be displayed when the Receiver is moved slowly across the Sonde. The shallowest depth reading displayed on the LCD is also the correct position directly above the Sonde.



If the signal is too weak or unstable the Receiver unit will not calculate depth. In this case use a more powerful Sonde or use the Pinpoint procedure described below.

Pinpoint Procedure.

- 1** Move the Receiver ahead of the Sonde.
 - a** Ensure the blade's orientation is parallel with the Sonde's orientation
 - b** Increase the sensitivity slightly to find the ghost signal. Note that between the main peak and ghost there is a Null or minimum.
- 2** Mark this position for reference.
- 3** Now move behind the Sonde and repeat step 1.
- 4** Find the Null between the ghost and main peak. See points A and B on the diagram.
- 5** The higher the sensitivity of the Receiver the sharper the Null's appear.
- 6** Measure the distance between points A and B and multiply by 0.7 to give an approximate depth measurement.

Live Plug Connector (optional extra)

The Live Plug Connector applies the Transmitter signal to a live domestic power socket and via the domestic wiring system on the service cable and the supply cable in the street. The signal should be detectable on the supply system to a few hundred meters each side of the point of application.

Note: Do not connect the Transmitter to live cables without using a Plug Connector or Live Cable.

Procedure

Connect the Live Plug Connector to the Transmitter and to the live domestic power socket. Switch on the socket.

Note: Live Plug Connector contains a protection unit to protect the user and the Transmitter from mains voltage up to 250V.

Sweep the site holding the SuperC.A.T upright at your side. Continue the sweep beyond the perimeter of the site. The presence of a buried conducting cable will be indicated by a tone emitted from the loudspeaker and a spike on the LCD's bar graph.

Keep the SuperC.A.T blade vertical and move slowly backwards and forwards over the conductor. Reduce the sensitivity for a narrower response; this will allow you to pinpoint the conductor. With the SuperC.A.T use the meter deflection to aid pinpointing. Maximum meter deflection and audible volume from the speaker will indicate the position of the conductor.

When directly over the conductor and with the sensitivity level set for a narrow response, rotate the SuperC.A.T on its axis until the signal minimum is found. The blade is now parallel with the conductor.

Trace the conductor beyond the site and mark the position as required with chalk or paint.

Troubleshooting

When reporting any problem to your Radiodetection Dealer or Supplier it is important to quote the unit serial number and the purchase date.

WARNING! This equipment is NOT approved for use in areas where hazardous gases may be present.

Reduce audio level before using the earpiece.

Batteries should be disposed of in accordance with your company's work practice, and/or any relevant laws or guidelines in your country.

This instrument, or family of instruments, will not be permanently damaged by reasonable electrostatic discharge and has been tested in accordance with IEC 801-2. However, in extreme cases temporary malfunction may occur. If this happens, switch off, wait and switch on again. If the instrument still malfunctions, disconnect the batteries for a few seconds.

Radiodetection hereby declares that this T1 Transmitter is compliant with the essential requirements and other relevant provisions of Directive 1999/5/EC.

WARNING! The SuperC.A.T will detect almost all buried conductors but there are some objects which do not radiate any signal which the SuperC.A.T or any other electromagnetic instrument is unable to detect. There are also some live cables which the SuperC.A.T will not be able to detect in Power mode. The SuperC.A.T does not indicate whether a signal is from a single cable or from several in close proximity.

Service and Maintenance

The SuperC.A.T and the T1 are designed so that they do not require regular calibration. However, as with all safety equipment, it is recommended that they are serviced at least once a year either at Radiodetection or an approved repair center.

Radiodetection products, including this user guide, are under continuous development and are subject to change without notice. Go to www.radiodetection.com or contact your local Radiodetection representation for the latest information regarding the SuperC.A.T, T1 or any Radiodetection product.

Training

Radiodetection provides training services for most Radiodetection products. Our qualified instructors will train equipment operators or other personnel at your preferred location or at Radiodetection headquarters. For more information go to www.radiodetection.com or contact your local Radiodetection representative.

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