

RD7000™



User Guide



Radiodetection

AN SPX COMPANY

Preface

About this guide

This guide provides basic operating instructions for the RD7000 receiver and transmitter. Please read this guide in its entirety before attempting to operate the RD7000.

This guide is intended as a portable reference only. For detailed instructions, please refer to the RD7000 operation manual, which is available for download from www.radiodetection.com. To download the manual go to the Library section, which is accessible via the menu; next go to Cable and Pipe Locators and then select User Manuals and click the RD7000 Operation Manual link.

The online User Manual library also contains links to the Centros™ Manager manual.

Copyright statement

This user guide is Copyright 2008 Radiodetection Ltd. Radiodetection is a subsidiary of SPX Corporation, all rights reserved.

Trademarks

RD7000, RD8000, RD4000, flexitrax, SurverCERT, StrikeAlert, SideStep and eCAL are trademarks of Radiodetection Ltd.

Important notices

When reporting any problems 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.**

 **WARNING! When using the transmitter, switch off the unit and disconnect cables before removing the battery pack.**

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 five seconds and then reinstall and switch the unit on.

 **WARNING!** The RD7000 will detect almost all buried conductors but there are some objects that do not radiate any detectable signal. The RD7000, or any other electromagnetic locator, cannot detect these objects so proceed with caution. There are also some live cables which the RD7000 will not be able to detect in Power mode. The RD7000 does not indicate whether a signal is from a single cable or from several in close proximity.

FCC and Industry Canada statements

This device complies with part 15 of the FCC Rules. Operation is subject to the following conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. To comply with the FCC RD explore compliance requirements, this device and its antenna must not be co-located or operated in conjunction with any other antenna or transmitter.

Training

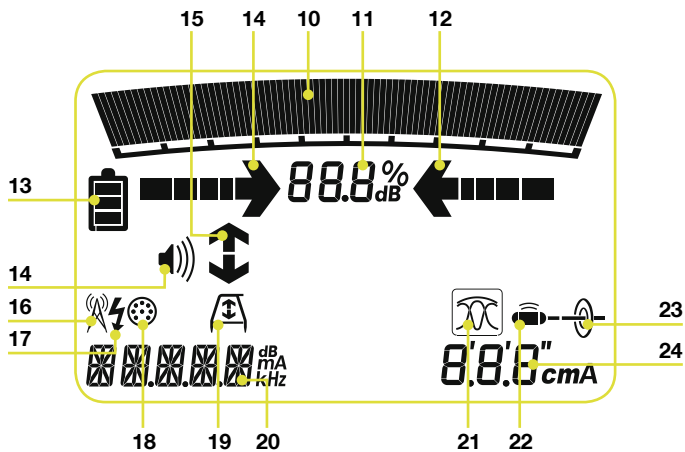
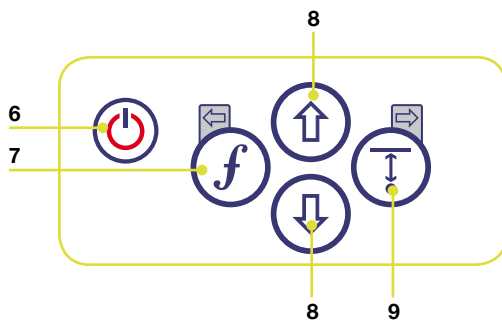
Radiodetection provides training services for most Radiodetection products. Our qualified instructors will train equipment operators or other personnel at your preferred location or at Radiodetection headquarters. For more information go to www.radiodetection.com or contact your local Radiodetection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

Service and Maintenance

The receiver and transmitter 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 representative for the latest information regarding the RD7000 or any Radiodetection product.

RD7000 receiver



Receiver features

1. Keypad.
2. LCD.
3. Battery compartment.
4. Accessory slot.
5. Headphone jack.

Receiver keypad

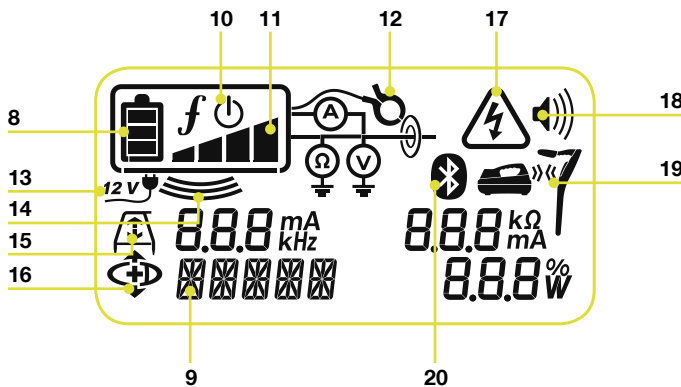
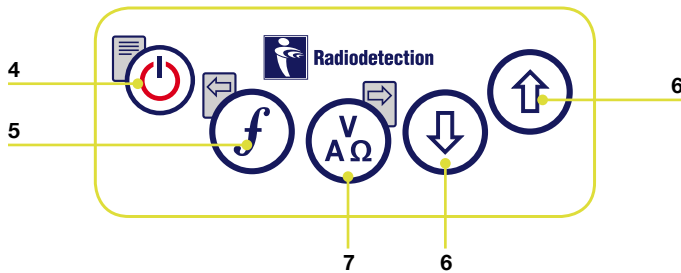
6. Power key: Switches the unit on and off. Opens the receiver menu.
7. *f* key: Selects frequency. Closes submenu.
8. Up and down arrows: Adjusts the signal gain. Scrolls through the menu options.
9. Antenna key: Toggles peak and null (PL and TL only) modes. Open submenu. Prolonged keypress toggles between depth or current display on the LCD.

Receiver screen icons

10. Indicates the signal strength and peak marker.
11. Signal strength: Numeric indication of signal strength.
12. Peak arrows: Indicates the location of the line relative to the receiver.
13. Battery icon: Indicates the battery level.
14. Volume icon: Displays the volume level.
15. Fault-Find arrows (PL and TL only)
16. Radio Mode: Indicates when Radio Mode is active.
17. Power Mode: Indicates when Power Mode is active.
18. Accessory indicator: Indicates when an accessory is connected.

19. A-Frame icon: Indicates when the A-Frame is connected.
20. Operating mode indicator.
21. Null / Peak / Single Mode icon: Indicates antenna selection.
22. Sonde icon: Indicates that the signal source is from a sonde.
23. Line icon: Indicates that the signal source is from a line.
24. Current / depth indicator.

Tx1, Tx3 and Tx10 transmitters



Transmitter features

1. Keypad.
2. LCD.
3. Removable accessory tray.

Transmitter keypad

4. Power key: Switches the unit on and off. Opens the transmitter menu.
5. *f* key: Selects frequency. Menu navigation key.
6. Up and down arrows: Adjusts the output signal. Scrolls through the menu options.
7. Measure key: Toggles measurement display between volts, current and impedance. Note: displayed measurements are based on the currently selected mode or the attached accessory, if applicable. Opens a submenu.

Transmitter screen icons

8. Battery icon: Indicates the battery level.
9. Alphanumeric description of selected operation mode.
10. Standby icon: Appears when the transmitter is in Standby Mode.
11. Output level: Displays transmitter output power.
12. Clamp icon: Indicates when a clamp is connected.
13. DC icon: Appears when the transmitter is powered from a DC source.
14. Induction indicator: Appears when the transmitter is in Induction Mode.
15. A-Frame: Indicates when the transmitter is in Fault-Find Mode.

16. CD Mode indicator: Indicates that the transmitter is in Current Direction Mode.
17. Voltage warning indicator: Indicates that the transmitter is outputting potentially hazardous voltage levels.
18. Volume icon: Displays the volume level.
19. Pairing icon (Tx3B and Tx10B only). For use with RD8000 receivers only.
20. *Bluetooth*[®] icon (Tx3B and Tx10B only). For use with RD8000 receivers only.

Before you begin

IMPORTANT! Please read this section before you attempt to operate the RD7000!


Starting the system

The receiver and transmitter are battery powered. Install good quality D-cell NiMH or Alkaline batteries into the receiver and transmitter battery compartments. Alternatively, you can power the transmitter from a mains or vehicle power source using a Radiodetection supplied adapter.

To switch the receiver or the transmitter on, press and hold the keypad Power Key for two seconds.

NOTE: Once the system is switched on, pressing the Power Key momentarily will activate the receiver or transmitter menu.

Shutting down

To switch the receiver or the transmitter off, press and hold the  key for two seconds.







System setup

It is important that you set up the system according to your personal preferences and operating requirements before you conduct your first survey. You can set the system up using the RD7000 menu as described below.

Before changing settings, ensure the receiver or transmitter is switched on by pressing the keypad Power Key for two seconds.








Power / mains frequency

Select the correct frequency (50 or 60Hz) for your country or region's national power supply. To change power frequency on the transmitter and the receiver:

1. Press the  key momentarily to enter the menu.
2. Scroll to the POWER option using the arrow keys.
3. Press the  key to enter the POWER submenu.
4. Scroll up or down using the  or  arrows to select the correct frequency.
5. Press the  key to accept your selection and return to the main menu.
6. Press the  key to return to the main operation screen.







Language

To select your preferred menu language:

1. Press the  key momentarily to enter the menu.
2. Scroll to the LANG option using the arrow keys.
3. Press the  key ( on the transmitter) to enter the LANG submenu.
4. Scroll up or down using the  or  arrows to select your preferred language.
5. Press the  key to accept your selection and return to the main menu.
6. Press the  key to return to the main operation screen.








Units (receiver only)

The RD7000 allows you to work in Metric or Imperial (US customary) units. To select your preferred units of measurement:

1. Press the  key momentarily to enter the menu.
2. Scroll to the UNIT option using the arrow keys.
3. Press the  key to enter the UNIT submenu.
4. Scroll up or down using the  or  arrows to select Metric or Imperial units.
5. Press the  key to accept your selection and return to the main menu.
6. Press the  key to return to the main operation screen.





Battery

The RD7000 receiver and transmitter support both NiMH or ALK batteries. It is important that you set the system to match the currently installed battery type to ensure optimal performance and correct battery level indication. To set your battery type:

1. Press the  key momentarily to enter the menu.
2. Scroll to the BATT option using the  or  arrows.
3. Press the  key ( on the transmitter) to enter the BATT submenu.
4. Scroll up or down to select the correct battery type.
5. Press the  key to accept your selection and return to the main menu.
6. Press the  key to return to the main operation screen.

The RD7000 is now ready to use.







Using the menu

The RD7000 receiver and transmitter menus allow you to select or change system options. Once entered, the menu is navigated using the arrow keys. Navigation is consistent on both the transmitter and the receiver. When in the menu, most on-screen icons will temporarily disappear and the menu options will appear in the bottom left-hand corner of the LCD. Note that when browsing the receiver menu, the  and  keys act as left and right arrows. When browsing the transmitter menu the  and  keys act as left and right arrows. The right arrow enters a submenu and the left arrow returns to the previous menu.

Note: When you select an option and press the Left arrow, the option will be enabled automatically.

To navigate the receiver menu:









1. First power up the receiver.
2. Press the  key to enter the menu.
3. Use the  or  arrows to scroll through the menu options.
4. Press the  key to enter the option's submenu.
5. Press the  key to return to the previous level.
6. Press the  key to return to the main operation screen.

Receiver menu options

- VOL: Adjust the speaker volume from 0 (mute) to 3 (loudest).
- UNIT: Choose metric or imperial units.
- LANG: Select your preferred system language.
- POWER: Set national power frequency: 50 or 60Hz.
- FREQ: Enable or disable individual frequencies.
- ALERT: Enable or disable StrikeAlert™.
- BATT: Set battery type. NiMH or ALK.
- ANT: Enable or disable any antenna mode with the exception of Peak, where present on your locator.

To navigate the transmitter menu:



1. First power up the transmitter.
2. Press the  key to enter the menu.
3. Use the  or  arrows to scroll through the menu options.
4. Press the  key to enter the option's submenu.
5. Press the  key to return to the previous level or exit the menu.
6. Press the  key to return to the main operation screen.

Transmitter menu options

- VOL: Adjust the speaker volume from 0 (mute) to 3 (loudest).
- BT: Enable, disable or pair *Bluetooth*[®] connections (Tx3B and Tx10B only).
- MAX V: Set the output voltage.
- MODEL: Specify the model of your RD7000 receiver.
- MAX P: Select a specific maximum output wattage.
- BATT: Set battery type. NiMH or ALK.
- OPT F: Enable or disable SideStepauto[™].
- LANG: Select the transmitter system language.
- BOOST: Boost transmitter output for a specified period of time (in minutes).
- FREQ: Enable or disable individual frequencies.

Using accessories

Both the transmitter and receiver are compatible with a wide range of accessories, including all RD4000 accessories. Use clamps to help apply a signal to pipeline or live wire. Use an A-Frame to provide the RD7000 receiver with advanced fault-finding capabilities.

When an accessory is connected, the receiver or transmitter will instantly recognize it and will enable the mode appropriate to the accessory. For example, attaching an A-Frame (TL or PL only) to the RD7000 receiver will automatically switch the receiver to fault-find mode and limit the number of available frequencies to those that are compatible with the A-Frame. The LCD will also display an icon of the accessory and will remove any non-essential icons from the screen.

Locating pipes and cables

Passive Frequencies

Passive frequency detection takes advantage of signals that are already present on buried metallic conductors. The RD7000 supports two types of passive frequencies: power and radio signals. You can detect these frequencies without the aid of the transmitter.

Active Frequencies

Active frequencies are applied direct to the pipe or cable using the transmitter. The transmitter can apply a signal using two methods: induction and direct connection.


Induction

The transmitter is placed on the ground over or near the survey area. You select the appropriate frequency. The transmitter will then induce the signal indiscriminately to any nearby metallic conductors. In induction mode, using higher frequencies is generally recommended as they are inducted easier onto nearby conductors.

Direct connection

In direct connection, you connect the transmitter directly to the pipe or cable you wish to survey. The transmitter will then apply a discreet signal to the line, which you can locate using the receiver. This method provides the best signal on an individual line and enables the use of lower frequencies, which can be traced for longer distances.

Connecting the transmitter to a pipe or line requires the use of a direct connection lead or clamp and a ground stake to complete the circuit.

 **WARNING! Direct connection to live wires is POTENTIALLY LETHAL. Direct connections should be attempted by fully qualified personnel only!**

Signal clamps

A signal clamp can apply a signal to a live line without breaking the connection. Signal clamps are connected to the transmitter's accessory socket. Radiodetection supplies a range of signal clamps to suit most applications. Note that the RD7000 is fully compatible with the RD4000 range of signal clamps.

Stethoscopes

At times, it may not be possible to use a clamp around a cable because of congestion or inaccessibility. A stethoscope antenna should be used in place of a clamp to identify cables.

Radiodetection supplies a range of stethoscopes to suit most applications. As with signal clamps RD7000 is fully compatible with the RD4000 range of stethoscopes.

To use a stethoscope, connect it to the receiver's accessory socket. The receiver will automatically detect the device and filter out location modes that are irrelevant.

Locating sondes

Sondes are battery powered transmitters that are useful for tracking non-metallic pipes. The RD7000 PL, DL and TL can detect a range of sonde frequencies, including those transmitted by flexisondes and the P350 flexitrac™ crawler. For a detailed guide on locating sondes, please refer to the RD7000 Operation Manual

Fault-finding

The RD7000 TL and PL have the ability to detect cable faults accurately using an accessory A-Frame. Fault-finding works by detecting signal to ground bleeding caused by damaged cable sheaths. For a detailed guide to fault-finding, please refer to the RD7000 operation manual.

Using accessories

Both the transmitter and receiver are compatible with a wide range of accessories, including all RD4000 accessories. Use clamps to help apply a signal to pipeline or live wire. Use an A-Frame to provide the RD7000 PL and TL receiver with advanced fault-finding capabilities.

When an accessory is connected, the receiver or transmitter will instantly recognize it and will enable the mode appropriate to the accessory. For example, attaching an A-Frame to the RD7000 PL or TL receiver will automatically switch the receiver to fault-find mode and limit the number of available frequencies to those that are compatible with the A-Frame. The LCD will also display an icon of the accessory and will remove any non-essential icons from the screen.

Centros™ Manager and eCAL™

eCAL makes it easy to validate your RD8000 or RD7000 receiver against its original factory calibration. eCAL is bundled with the Centros Manager application suite and is available as a free download from www.radiodetection.com. eCAL runs on laptop and desktop computers with Microsoft Windows XP or Vista and requires one free USB port to connect the receiver to the computer.

Before you can install Centros Manager, you must first register your receiver for the free extended 3-year warranty at www.radiodetection.com/extendedwarranty. To use eCAL, you must also purchase a validation key from www.radiodetection.com/ecal.

Installing Centros Manager

1. Download Centros Manager application bundle from www.radiodetection.com to your computer.
2. Close all applications on your PC, including your internet browser.
3. Extract the files within the bundle using WinZip or a similar compressed file manager.
4. Open the folder containing the extracted files and double click setup.exe. An install wizard will load to help guide you through the rest of the process. Click Next to continue and follow the on-screen prompts.
5. Once the installation process finishes, click Finish to exit the wizard.

Validating a receiver for the first time

1. Make sure you have purchased a validation key before continuing.
2. Connect your receiver to your computer using the supplied USB cable. On the receiver, the USB port is located inside the battery compartment.
3. Ensure the receiver is switched on before continuing with the firmware upgrade.
4. Open eCAL – Validation from the Windows Start Menu.
5. If you have previously loaded a validation key, the unit manager window will display list of any RD8000 or RD7000 receiver for which you have purchased a validation key.
6. Click the Load Validation Key icon on the toolbar.
7. Copy and paste your validation key from your validation email into the Add Validation Key dialogue box and click Add.
8. Expand the tree viewer for the receiver you wish to validate by clicking the Expand tree icon on the toolbar. eCAL will display a list of purchased Validation Keys and the device's Calibration History.

9. Check that your new key appears under the Key List in the unit manager. The key will be identifiable by the date you added it. The key will expire one week from that date.
10. Click the Calibrate Unit icon on the toolbar. eCAL will now validate the receiver against the original factory calibration. Do not disconnect the receiver until this process is complete.

For more information about Centros Manager and eCAL, please refer to the Centros Manager Operation Manual, which is available for download from www.radiodetection.com.

Upgrading your RD7000

As part of our continuous product improvement strategy, Radiodetection will release new firmware for the RD7000 and RD8000 system from time to time. Upgrading your receiver's firmware will improve performance, stability and may include new features. This firmware is available free of charge. To receive notification of new firmware releases, users should first register for extended warranty.

To register for extended warranty go to: www.radiodetection.com/extendedwarranty

When new firmware is available, registered users will receive notification automatically via email

To get more information about firmware upgrades go to:
www.radiodetection.com/firmwareupgrades

Extended Warranty

All RD8000 and RD7000 family products have a 1 year warranty. Users can extend the warranty on all RD7000 and RD8000 receivers and transmitters to 3 years by registering. Registration is free and entitles the user to free firmware upgrades.

To be eligible, customers must register within 3 months of purchase.

Upon registration customers will receive confirmation of registration by email. The email will include a Download key required for firmware upgrades of your RD7000 or RD8000 products using Centros™ Manager.

When new firmware is released, registered users will receive a notification email that links to the new firmware download page on the Radiodetection website. The email will also contain instructions on how to download the firmware and upgrade your RD8000 or RD7000 system.

To register for extended warranty go to: www.radiodetection.com/extendedwarranty

Warranty

Subject to the conditions set out herein, Radiodetection Limited expressly and exclusively provides the following warranty to original end user buyers of Radiodetection products. Radiodetection products includes Radiodetection, Pearpoint, Telespec, Bicotest, Riser Bond, Dielectric, Mark Products and Warren G-V brands. Radiodetection hereby warrants that its products shall be free from defects in material and workmanship for one year starting from point of sale to end customer. Extensions of this warranty period are available where the same terms and conditions apply.

Product families include:

- Cable & Pipeline Location
- Trenchless
- Water Leak Detectors
- Pipeline Integrity
- Pipeline Video Inspection
- Ground Penetrating Radar
- Cable Test
- Cable Dryers

To register for an extended warranty (3 years) go to:
www.radiodetection.com/extendedwarranty

Statement of warranty conditions

The sole and exclusive warranty for any Radiodetection product found to be defective is repair or replacement of the defective product at Radiodetection's sole discretion. Repaired parts or replacement products will be provided by Radiodetection on an exchange basis and will be either new or refurbished to be functionally equivalent to new.

In the event this exclusive remedy is deemed to have failed of its essential purpose, Radiodetection's liability shall not exceed the purchase price of the Radiodetection product. In no event will Radiodetection be liable for any direct, indirect, special, incidental, consequential or punitive damages (including lost profit) whether based on warranty, contract, tort or any other legal theory.

Warranty services will be provided only with the original invoice or sales receipt (indicating the date of purchase, model

name and dealer's name) within the warranty period. This warranty covers only the hardware components of the Radiodetection product. Data storage media or accessories must be removed prior to submission of the product for warranty service.

Radiodetection will not be responsible for loss or erasure of data storage media or accessories. Radiodetection is not responsible for transportation costs and risks associated with transportation of the product. The existence of a defect shall be determined by Radiodetection in accordance with procedures established by Radiodetection.

This warranty is in lieu of any other warranty, express or implied, including any implied warranty of merchantability or fitness for a particular purpose.

This warranty does not cover:

- a. periodic maintenance and repair or parts replacement due to wear and tear
- b. consumables (components that are expected to require periodic replacement during the lifetime of a product such as non-rechargeable batteries, bulbs, etc.)
- c. damage or defects caused by use, operation or treatment of the product inconsistent with its intended use
- d. damage or changes to the product as a result of:
 - i. misuse, including: - treatment resulting in physical, cosmetic or surface damage or changes to the product or damage to liquid crystal displays
 - ii. failure to install or use the product for its normal purpose or in accordance with Radiodetection instructions on installation or use
 - iii. failure to maintain the product in accordance with Radiodetection instructions on proper maintenance
 - iv. installation or use of the product in a manner inconsistent with the technical or safety laws or standards in the country where it is installed or used
 - v. virus infections or use of the product with software not provided with the product or incorrectly installed software
 - vi. the condition of or defects in systems with which the product is used or incorporated except other 'Radiodetection products' designed to be used with the product
- vii. use of the product with accessories, peripheral equipment and other products of a type, condition and standard other than prescribed by Radiodetection
- viii. repair or attempted repair by persons who are not Radiodetection warranted and certified repair houses
- ix. adjustments or adaptations without Radiodetection's prior written consent, including:
 - i. upgrading the product beyond specifications or features described in the instruction manual, or
 - ii. modifications to the product to conform it to national or local technical or safety standards in countries other than those for which the product was specifically designed and manufactured
- x. neglect e.g. opening of cases where there are no user replaceable parts
- xi. accidents, fire, liquids, chemicals, other substances, flooding, vibrations, excessive heat, improper ventilation, power surges, excess or incorrect supply or input voltage, radiation, electrostatic discharges including lighting, other external forces and impacts.

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