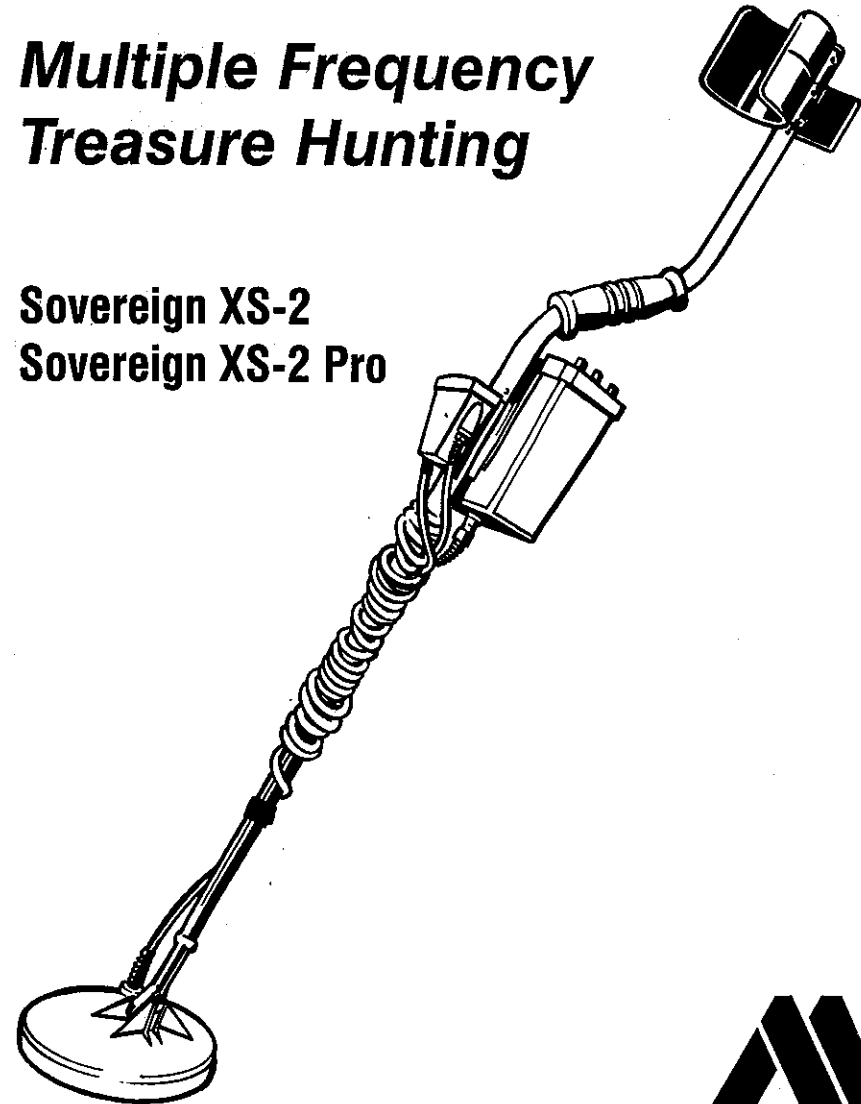


The Minelab Sovereign BBS Technology

*Multiple Frequency
Treasure Hunting*

**Sovereign XS-2
Sovereign XS-2 Pro**



MINELAB ELECTRONICS PTY LTD

118 Hayward Avenue, Torrensville, SA 5031, Australia

PO Box 537, Torrensville Plaza, SA 5031, Australia

Telephone: +618 8238 0888

Facsimile: +618 8239 0890

MINELAB USA

1878 E. Apache Blvd

Tempe, Az 85281, USA

Telephone: +1 602 517 1849

Facsimile: +1 602 829 7550



INSTRUCTION MANUAL

The Minelab Sovereign XS-2 Instruction Manual

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Introduction

Congratulations on purchasing one of Minelab's Sovereign XS-2 detectors. Sovereign XS-2 metal detectors have been designed for general-purpose treasure hunting and are an upgrade to the highly successful Sovereign Extra Sensitive detector which was voted America's "Detector of the Year 1997" by *Treasure Hunter's Gazette*.

Sovereign XS-2 detectors use Minelab's unique Broad Band Spectrum (BBS) technology, which enables the Sovereign XS-2 to automatically transmit at 17 individual frequencies at the same time.

The benefits of multiple frequency technology are numerous and include increased depth, greater sensitivity to non-ferrous metal objects, increased accuracy in discrimination, increased accuracy in target indication, and increased stability under most ground conditions.

Sovereign XS-2 detectors are designed to locate valuable metal objects in high trash areas and in areas of either extreme salt or ground mineralization, conditions which are commonly encountered by treasure hunters around the world. When using a single or dual-frequency detector under these conditions, a treasure hunter may experience a significant loss of detection depth and discrimination accuracy. However, the Sovereign XS-2, with its 17 individual frequencies, eliminates the interference from these ground conditions and enables you to penetrate deeply and discriminate accurately at full depth.

Sovereign XS-2 detectors are simple to operate, having very few controls that require adjustment after they have been set. The extremely advanced, yet simple-to-use discrimination features enable you to accurately select only the types of metal objects that you want to find and to ignore the rest. The variable signal tone responses and Digital Target Indication meter enable you to accurately identify the object found before you recover it.

If you have any questions or comments regarding the Sovereign XS-2, XS-2 Pro, or any other Minelab product, then please feel free to contact us via your local Authorised Minelab Dealer or write to us direct.

We wish you every success in your treasure hunting.

BBS Technology

When developing BBS technology, Minelab's engineers first looked at the technology that was already available on the market and identified its limitations in field use.

Discussions with seasoned treasure hunters from around the world identified a number of common problems facing detector operators. These problems included:

- Loss of detection depth in highly mineralized ground
- Inaccurate target identification beyond 5 or 6 inches
- Inability to detect good targets in close proximity to iron trash
- Erratic operation when searching salt-water beaches.

BBS circuitry allows the Sovereign XS-2 to automatically operate at 17 different frequencies simultaneously — a feature that is unique to Minelab metal detectors.

Most detectors on the market operate on a single (or dual) frequency, ranging from 1 to 60 kHz. Although this technology has served the industry well for years, Minelab's engineers found that a frequency that worked well in one area would often offer only marginal performance when used in another location. Ground mineralization, trash content, and target size all had an effect on how well a detector transmitting a single frequency would operate.

The BBS circuit automatically transmits 17 frequencies simultaneously, ranging from 1.5 to 25.5 kHz in 1.5 kHz increments. The signal received from the coil is analyzed and information is relayed to the operator via the speaker, headphone, and meter (if attached). Through the use of its 17 frequencies, the Sovereign XS-2 is able to find and accurately identify targets at maximum depth, regardless of the ground conditions or trash present.

Essentially, when using a Sovereign XS-2 with BBS technology, it is like swinging 17 single-frequency detectors at the same time. Because BBS operates at a number of frequencies that no other detector does, BBS detectors such as the Sovereign XS-2 can find objects that no other detector has the ability to find.

Detector Comparison

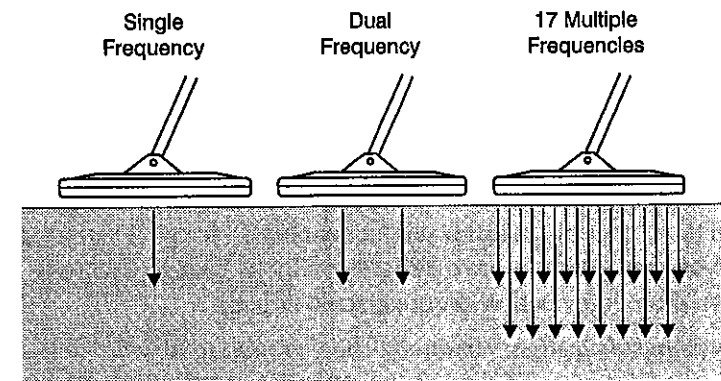


Figure 1 - Detector comparison chart

The most important factor when comparing detectors with and without BBS circuitry is that BBS-based detectors have the ability to hunt in even the most mineralized areas at maximum performance without the need to manually ground-balance the detector.

As soon as the Sovereign XS-2 is turned on and swept across the ground, the ground mineralization is analyzed and then compensated for by the microprocessor. This ensures that the Sovereign XS-2 can locate targets deeper than other units, which require the mineralization to be compensated for rather than simply ignoring it.

One of the major overall benefits of BBS technology is that although it automatically operates at 17 frequencies — all at the same time — it is actually easier to use than most of its competitors. Because it is microprocessor controlled, all you need do is to set the threshold, discrimination, and volume, and the rest is done for you automatically.

A BBS detector will penetrate more deeply, discriminate more accurately, and can be used in even the worst ground conditions. The bottom line is that when using a Minelab detector such as the Sovereign XS-2 with its BBS technology, you will find more good targets than you will with any other detector.

Internal Setting Options

The Sovereign XS-2 detector has two internally selectable options that your Minelab dealer can set for you.

Option 1: Silent Search or Audible Threshold in “Discriminate” Mode

While detecting in “Discriminate” mode, you may wish to either search with no background tone, with the detector producing only a “beep” when a target is located, or you may prefer to have a slight continuous background tone, which will give you more information about detected targets.

Minelab recommends a slight continuous background tone while detecting. Therefore, your Sovereign XS-2 has been shipped from the factory preset to the Audible Threshold position.

Option 2: Audio Modes

Your Sovereign XS-2 detector has two dealer selectable audio modes:

Fixed Tone Target Indication

In the Fixed Tone Target Indication position, the tone of the audio signal from targets will remain constant as the volume increases to indicate a target, regardless of the object detected.

Variable Tone Target Indication

In this setting, the tone and volume of audio signals received will change to help identify the object that has been detected. The lower an object’s conductivity, the lower the pitch of the signal tone. For example, the pitch of a piece of aluminum foil will be lower than that of a gold coin.

The advantage of Variable Tone Target Indication is that it allows you to identify the target you have found before recovering it from the ground.

Minelab recommends that this option is selected as it aids in the process of discrimination. Therefore your Sovereign XS-2 was shipped preset to the Variable Tone Target Indication position.

List of Parts

The box in which your Sovereign XS-2 is shipped should contain the following items. When you first receive your Sovereign XS-2, please check that all of these items are in the box:

Part	Sovereign model	
	XS	XS Pro
Control Box	✓	✓
Digital Target Indication Meter		✓
8" Round BBS 800 coil	✓	
10" Round BBS 1000 coil		✓
3-Piece Shaft Assembly	✓	✓
Black Armrest	✓	✓
2 Alkaline Battery Holders	✓	✓
Black PCB NiCad to Alkaline Battery Adapter	✓	✓
NiCad Battery Pack		✓
Mains NiCad Charger		✓
Hipmount Bag		✓
Warranty card	✓	✓

Accessories

Although not all items are standard for the Sovereign XS-2, these items may be purchased as accessories. In addition, the following items are available for you to purchase.

- 12V NiCad battery vehicle charger
- Blue Minelab Cap
- Blue Minelab Poloshirt

For further information on these and other Minelab products call your Minelab dealer.

Assembling the Sovereign XS-2 and XS-2 Pro

Please follow these simple instructions to assemble your new Sovereign XS-2. Refer to the drawings to identify parts and how they are positioned. If you have any difficulties, please call your dealer for further instructions.

Armrest / Upper Shaft Assembly

- Remove the black nylon bolt and wing nut (2) from the armrest (1).
- With the armrest's larger fins pointing in the same direction as the foam handgrip (4), slide the armrest (1) onto the end of the black upper shaft (3).
- Push the nylon bolt (2) through the holes and tighten the wing nut by hand.

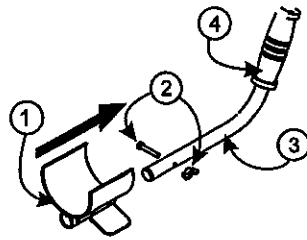


Figure 2 - The armrest and upper shaft assembly

Intermediate Shaft Assembly

- Slide the intermediate shaft (7) into the upper shaft (3). The black "V" clip (6) must be facing down along the foam handgrip section of the upper shaft (see Figure 4).
- Ensure that the two pieces click together and do not come apart easily.

Lower Shaft Assembly

- Remove the tape on the lower fiberglass tube (9) that is holding the black teardrop washers (10) in place.

NOTE:

Make sure the washers do not fall out after removing the tape.

- Remove the black nylon wing nut, washer and bolt (11) from the coil (12).
- With the teardrop washers in place, push the lower tube (9) into the bracket on the coil so that the holes line up.

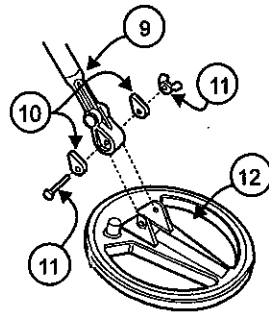


Figure 3 - The coil and lower shaft assembly

NOTE:

Ensure that the black nylon spring clip near the top of the fiberglass tube is pointing toward the rear of the coil.

- Push the black nylon bolt (11) through the holes in the bracket on the coil from the cable entry side, then place the washer and wing nut on the other end of the bolt and tighten it by hand.

Completing the Shaft Assembly

- Slide the lower shaft assembly (9) into the intermediate shaft (7). Note that the black plastic locking nut (8) may need to be loosened to get the lower shaft assembly in place.
- Set the length of the shaft by locking the black nylon spring clip into one of the holes provided, then tighten the plastic locking ring by hand.

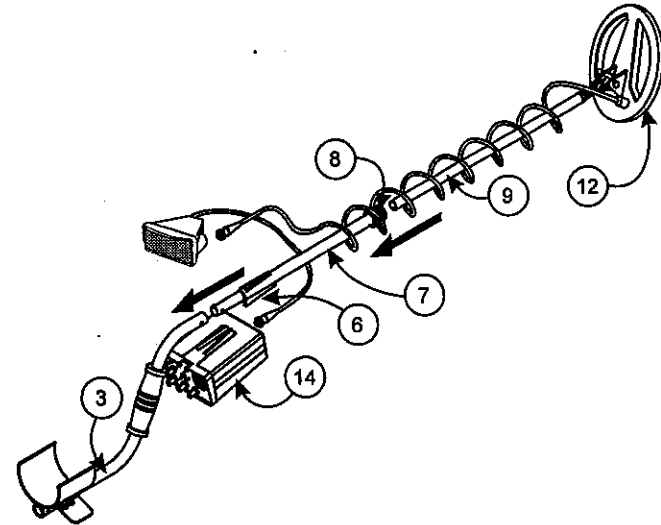


Figure 4 - Completing the shaft assembly

Shaft Mount

- Check that there are charged batteries in the control box (14).
- Position the control box (14) into the shaft "V" clip (6) then push down hard toward the coil until the control box "clicks" into place and cannot be easily removed.

- c) Begin winding the coil cable firmly around the shaft. Wind between 25 and 28 turns of the cable until it reaches the control box.

NOTE:

Leave enough slack at the bottom of the cable near the coil to adjust the coil position without straining the coil cable.

- d) Connect the cable connector (5) to the plug on the rear of the control box.

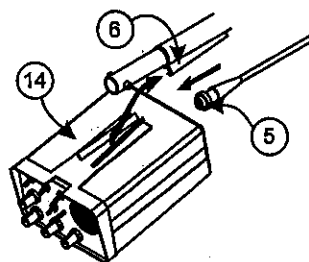


Figure 5 - Mounting the control box on the shaft

Hipmount

Hipmounting is an alternative to mounting the detector on the shaft and it significantly reduces the strain on your arm, enabling you to search for longer periods of time without undue fatigue.

Unless you own a Sovereign XS-2 Pro, to hipmount the detector you will be required to purchase the blue hipmount bag from your dealer.

- Check that there are charged batteries in the control box (14).
- With its control panel facing outward, put the control box into the hipmount bag.
- Either thread the bag onto your belt or suspend it from the bag strap.
- Wind the coil cable firmly around the shaft. Wind 5-10 turns of the cable around the shaft.

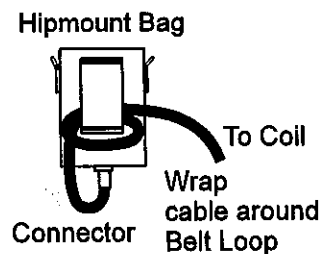


Figure 6 - Hipmounting the control box

NOTE:

Leave enough slack at the bottom of the cable near the coil to adjust the coil position without straining the coil cable.

- Thread the coil cable through the belt hole in the bag twice. This prevents strain being placed upon the cable and connector.
- Connect the cable connector (5) to the plug on the rear of the control box.

Batteries

Sovereign XS-2 detectors are all supplied with two alkaline battery holders and a black PCB NiCad to alkaline battery adapter. In addition, the Sovereign XS-2 Pro is provided with a drop-in NiCad battery pack and battery charger. (These items may be purchased and fitted to the Sovereign XS-2 as accessories.)

Installation of Alkaline Batteries

Ensure that the detector is switched "Off" before opening the battery compartment.

- Place 8 "AA" cell alkaline batteries into the supplied holders (17). Make sure that they are aligned as indicated in the holders.
- Clip the battery holders onto the alkaline adapter (18).
- Open the battery compartment lid (15) by pushing firmly down and sliding it from the rear of the control box (14).
- Install the assembled battery holders and adapter in the control box. Ensure that the battery terminals are aligned correctly.
- Replace the lid by sliding it back over the compartment.

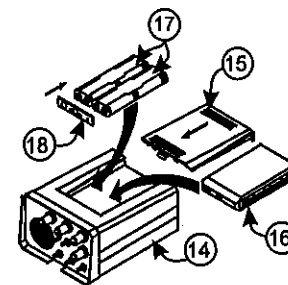


Figure 7 - Installing the batteries

CAUTION

High-quality alkaline batteries should be used instead of standard carbon batteries. Alkaline batteries will power Sovereign XS-2 detectors for about 40 hours. Use of headphones will extend this battery life.

Installation of NiCad Battery Pack

- Open the battery compartment lid (15) on the control box (14).
- Put the battery pack (16) into the battery compartment in the control box (14). Ensure that the holes in the pack are aligned with the spring connectors of the compartment.
- Replace the lid by sliding it back over the compartment.

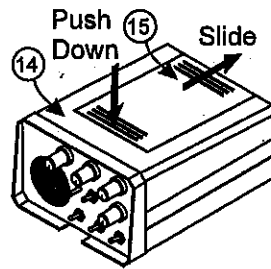


Figure 8 - Installing the NiCad Battery Pack

Low Battery Warning and NiCad Recharging

When the batteries are reaching the point at which they will no longer operate the Sovereign XS-2, a distinct sharp “pip” will sound from the speaker (or headphones) approximately every 30 seconds. When this tone is heard, there will be approximately 15 to 20 minutes of life left in the batteries. It is recommended that the batteries be replaced as soon as possible to avoid missing any targets.

The NiCad battery charger can be recharged using either a mains-powered charger or a 12V charger that can be plugged into the cigaret lighter of your vehicle.

The Sovereign XS-2 and XS-2 Pro Controls

This section gives detailed descriptions of both the Sovereign XS-2 and XS-2 Pro’s controls and their functionality.

For simplicity, we refer only to the Sovereign XS-2, but the text and illustrations apply equally to the Sovereign XS-2 Pro.

It is important that you read through this section carefully as it will provide you with all the information required to set and adjust these controls. As you gain experience with your detector it may be beneficial to refer back to this section.

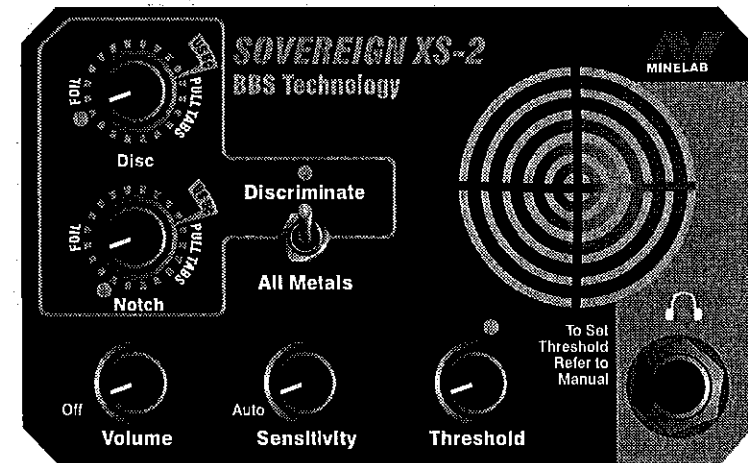


Figure 9 - The Sovereign XS-2 and XS-2 Pro Control Panel

Volume Control and On / Off Switch



This control, located in the bottom left corner of the control panel is used to adjust a target’s signal volume in addition to switching the Sovereign XS-2 “On” or “Off”.

When in the fully counter clockwise position, the Sovereign XS-2 is “Off”. Turning the control clockwise, the Sovereign XS-2 will “click” “On”. As you continue to turn this control in a clockwise direction, the volume of target signals will increase. At the most clockwise position, the volume is set at the “maximum” position.

Sensitivity Control



The Sensitivity control, located at the bottom of the control panel, allows you to adjust the level of sensitivity to suit the ground conditions in which you are detecting. It is often thought of in terms of a depth control and it is, to a point, but it also makes the unit more or less sensitive to interference caused by ground chemistry “mineralization”, or electrical fields.

At the most counter clockwise position this control “clicks” into the “Auto” position. In this setting the Sovereign XS-2 will automatically adjust the level of sensitivity to the optimal level under the prevailing conditions.

When detecting at the beach, set the Sensitivity to the “Auto” position when on wet sand, on concentrated black sand, or in water.

Turning the control clockwise will “click” the Sovereign XS-2 out of the “Auto” setting into manual sensitivity. As you continue to turn this control in a clockwise direction the level of sensitivity will reduce. At the most clockwise position, the Sovereign XS-2 is at “minimum” sensitivity.

When not in the “Auto” position, the Sensitivity control should be set to the maximum manual position without interference from ground minerals or electrical interference. If ground minerals or electrical interference become too high, the Sovereign XS-2 will produce a number of erratic signals. If this occurs, simply turn the Sensitivity control in a clockwise direction until these erratic signals disappear.

Threshold Control



Located at the bottom right-hand side of the front panel, the Threshold control allows you to adjust the level of background threshold. This background “threshold” or “hum” aids in the location of targets.

Small or large, deep targets may not produce a distinct target signal but rather cause only a slight change in the threshold tone.

Ideally, this control should be set to a position where the threshold tone is “just” audible. At this level, the presence of these small or deep targets will be more easily recognized.

Turning the Threshold control in a clockwise direction, the threshold level will increase. At the most clockwise setting, the threshold is at its “maximum”.

Once again, it is advisable to set this threshold to a level that is “just” audible. A threshold level that is too high will “mask” out the small or deep targets, while a “silent” or non-audible threshold level will not allow the small change in threshold tone created by small or deep targets to be heard.

Discriminate / All Metals Switch



This switch is located in the center of the control panel and is used to select either “Discriminate” mode or “All Metals” mode.

In “Discriminate” mode, the Discriminate (Disc) and Notch controls become active and can be used in combination to ignore various unwanted metal objects.

Metal objects fall into two broad categories: ferrous and non-ferrous. A magnet can be used to determine if an object is a ferrous or non-ferrous metal; ferrous metals are attracted to a magnet while non-ferrous metals are not. Generally while detecting, ferrous objects such as iron and steel are not wanted, whereas the more valuable non-ferrous metals such as gold, silver, and bronze are.

In the “Discriminate” mode of operation the Sovereign XS-2 will ignore or “mask out” ferrous metal objects while still accepting non-ferrous metal objects. In addition, providing that you have selected the appropriate internal setting, target signals from non-ferrous objects will vary in tone depending upon their level of conductivity.

Effectively this allows you to identify the type of object detected before recovering it from the ground. By way of example, a US quarter or Australian \$1 coin will produce a high pitch signal, whereas aluminum foil will produce a low pitch signal. Pull-tabs, rings, and certain coins will produce an intermediate pitch depending upon the object’s conductivity. The higher an object’s conductivity, the higher the signal tone will be.

Additionally, in “Discriminate” mode, when the Sovereign XS-2 detects a ferrous or rejected non-ferrous object, the background threshold tone will momentarily disappear and then return again at a pitch similar to the ignored signal. A ferrous object will cause the returning threshold pitch to be much lower than normal, while a pull-tab that is being ignored will cause the returning threshold pitch to be higher than normal.

If, when in "Discriminate" mode, the Sovereign XS-2 produces a high pitched rapidly pulsing sound, the detector is being overloaded by a substantially large piece of metal close to the coil. Raise the coil 5 to 10 inches above the ground and pass it over the area again to check the target. By lifting the coil away from the ground, it enables the Sovereign XS-2 to accurately analyze the object detected.

In "All Metals" mode the Sovereign XS-2 will detect both ferrous and non-ferrous objects. In this mode the Disc and Notch controls have no effect and the Sovereign XS-2 will respond in the same way to all types of metal. This mode is ideal for target pinpointing as the target signal response is fast and sharp.

"All Metals" mode is also useful if you are searching for ferrous targets such as relics.

Discriminate Control



The Discriminate (Disc) control is located at the top left-hand side of the control panel and is used when in "Discriminate" mode to "discriminate" or "ignore" unwanted non-ferrous metal targets.

If the Disc control is set to the most counter clockwise position (ensure the Notch control is also set to this position), ferrous metals will be "ignored" and the Sovereign XS-2 will not produce a "signal beep". (Large ferrous objects may produce short "pops" or "clicks".) However, non-ferrous objects will give a "signal beep" or be "accepted".

Typical ferrous objects encountered by treasure hunters are nails, screws, washers, bits of wire, etc. These objects are generally not considered to be of value, so it is a distinct advantage to be able to ignore them while detecting.

Objects that will cause the Sovereign XS-2 to produce a "signal beep" will be non-ferrous metals, including such items as aluminum foil, most jewelry, pull-tabs, coins, bottle tops, gold, silver, brass, etc.

Not all of these non-ferrous objects are considered valuable. Therefore, by using the Disc control, the Sovereign XS-2 can be adjusted to ignore some of the less valuable non-ferrous objects while still locating more valuable targets.

The Disc control is a one-turn pot with 17 graduations. As you turn the Disc control clockwise and increase the "discrimination", non-ferrous objects of lower conductivity will be ignored.

The Sovereign XS-2 uses the electrical conductivity of the object to determine the type of metal detected and, based upon the Disc control setting, will either ignore or accept the object. The most effective way to demonstrate this is to consider a number of objects, all of varying conductivity, placed in a line on the ground. As you move from left to right, the objects increase in conductivity.

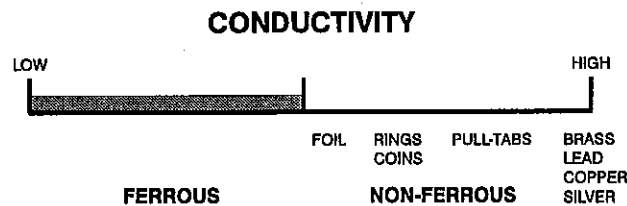


Figure 10 - Target conductivity

As you turn the Disc control more clockwise, objects of greater conductivity will be ignored. Imagine if you turn the Disc control to position 10 to ignore the pull-tab. Doing this will mean that all objects having a similar or lower conductivity than the pull-tab will be ignored while objects of higher conductivity are still accepted, as shown in Figure 11.

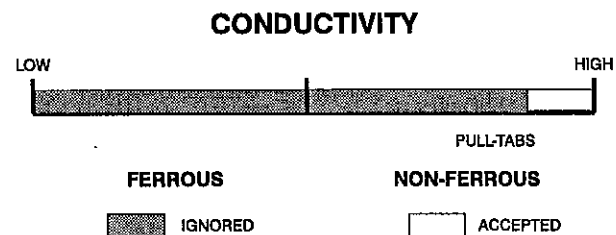


Figure 11 - Discriminating targets based on conductivity

Figure 12 shows some common objects and where the Disc control has to be set to ignore them.

As a general rule, the two objects treasure hunters most commonly wish to ignore are aluminum foil and pull-tabs. As can be seen in Figure 12, these objects both cover a significant range on the Disc control. Setting the Disc control to position 16 to ignore both foil and pull-tabs will also cause you to ignore a large amount of valuable non-ferrous objects including coins, rings, and other jewelry.

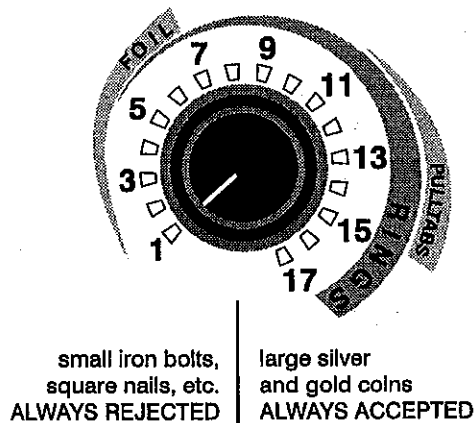


Figure 12 - Discriminate control examples

The Disc control setting must be relative to the types of objects that you wish to hunt for and the amount of trash that you are prepared to detect. For example, if you are hunting for fine white gold rings and set the Disc control to position 4, you will also find some types of aluminum foil. If you do not want to dig old bottle caps but do want to dig brass buttons and copper coins, the Disc control is set higher (approximately at number 13), but most fine white gold rings, foil, and some yellow gold rings will also be ignored.

With experience, setting the Disc control will become second nature, and you will be able to skillfully set this control (in combination with the Notch control) to ignore most targets you do not want.

Notch Control



Located on the center left-hand side of the control panel, the Notch control is used in combination with the Disc control to discriminate against, or ignore, certain metal objects.

When the Notch control is set to the most counter clockwise position (ensure the Disc control is also set at the most counter clockwise position), the Sovereign XS-2 will ignore ferrous objects and accept, or produce a signal for, non-ferrous objects.

Unlike the Disc control, the Notch control selects only a certain level of conductivity to ignore while still detecting all non-ferrous objects of different conductivity.

Using again our earlier example to demonstrate this, consider a number of objects, all of varying conductivity placed in a line on the ground. As you move from left to right, the objects increase in conductivity.

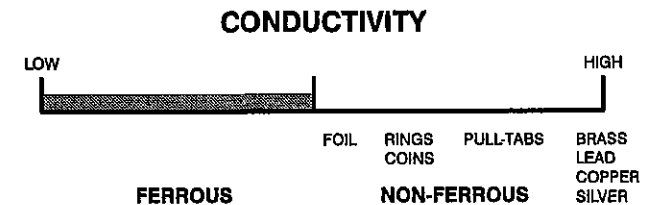


Figure 13 - Targets with increasing conductivity

As you turn the Notch control more clockwise, objects of a certain conductivity will be ignored. Imagine if you turn the Notch control to position 10 to ignore the pull-tab. Doing this will mean that only non-ferrous objects having a similar conductivity to the pull-tab will be ignored while all other non-ferrous objects of different conductivity are still accepted.

Note also in Figure 14 that ferrous objects are ignored.

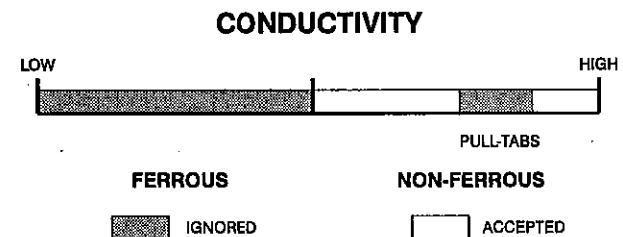


Figure 14 - Ignoring targets using the Notch control

Using the Notch and Disc controls in combination, you can successfully ignore most objects that you do not want to find. If we again use the earlier example of ignoring the pull-tab and the aluminum foil. Turn the Notch control to between positions 10 and 16 to ignore the pull-tab. The position of this will depend upon the type of pull-tab to be ignored. Now turn the Disc control to position 6 to ignore the aluminum foil.

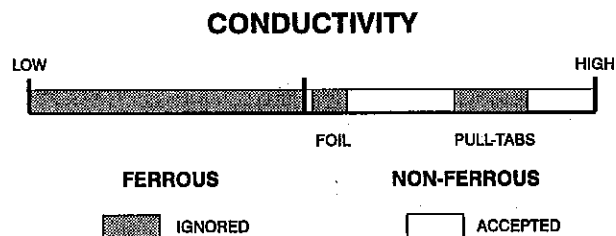
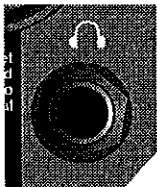


Figure 15 - Ignoring targets using the Disc and Notch controls

You have now set the Sovereign XS-2 to ignore pull-tabs and aluminum foil while still detecting other valuable non-ferrous objects.

Audio Output



The audio output of the Sovereign XS-2 is available through either an in-built loudspeaker or via a 1/4" stereo headphone jack. When the headphones are plugged in, the loudspeaker is disconnected.

Headphones are recommended for serious treasure hunting for the following reasons. They are more sensitive to slight target signals than the loudspeaker, they shield your ears from external noises which can be distracting, and their use will increase battery life.

Headphones used should be of a low impedance. The socket will accept most stereo headphones with a 1/4" jack. If the headphones have a "Stereo/Mono" switch, set it to "Stereo".

Sovereign XS-2 Pro Digital Target Indication Meter

Introduction

Supplied with the Sovereign XS-2 Pro (and an accessory for the Sovereign XS-2), the Sovereign XS-2 meter is a LCD (Liquid Crystal Display) Digital Target Indicator that has been designed to aid in the identification of metal objects before their recovery. It provides a digital display of the target ID tones produced by the Sovereign XS-2 series of detectors, and connects between the search coil and the control box without requiring any modification to the detector's electronics.

The meter has no negative effect upon the operation or overall performance of the detector, it simply provides for easier target recognition. It is also very useful for people with tonal hearing loss.

Installation

Plug the coil connector (21) into the socket (22) on the meter box, winding the excess cable around the shaft. Plug the meter cable connector (23) into the control box (14), winding the excess cable around the shaft.

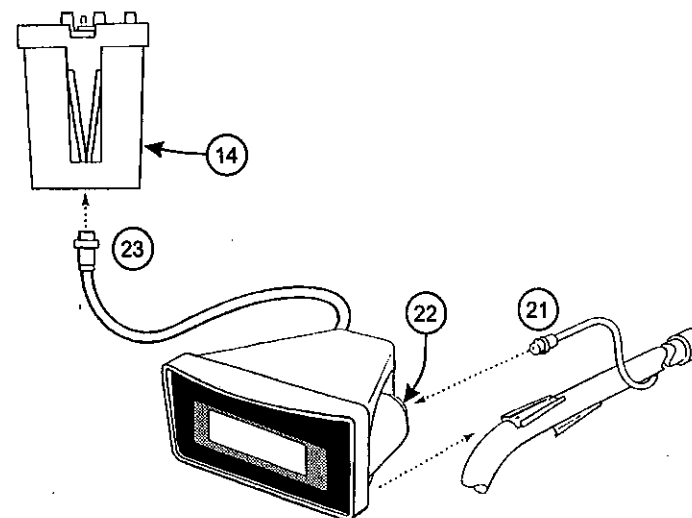


Figure 16 - Installing the meter

If hipmounting the control box, secure the meter cable to the shaft using the Velcro strip supplied with your detector. Loop the meter cable twice through the belt loop of the hipmount bag before attaching it to the control box. This reduces any stresses placed on the meter cable caused by hip-mounting and reduces the possibility of failure of the cable.

The meter requires no batteries.

Calibration

Before using the Sovereign XS-2 meter, it is necessary to calibrate it:

- a) Set the Calibration control near the center position of its range.
- b) Place your detector in a stationary position with the coil flat on the ground.
- c) Set the Sensitivity control to "Auto".
- d) If the Threshold is varying because of electrical interference, adjust the sensitivity control toward minimum until a constant Threshold is present.
- e) Slowly pass a common coin across the coil and finely adjust the calibration control to a nearby even number, e.g. US quarter 550, AUS 20¢ 500.
- f) Slowly pass additional coins and other common targets across the coil and record the results on the target recognition table (opposite).

This table will become a very useful guide for your Digital Target Indicator until you become familiar with the various target responses.

This meter should not be solely relied upon for discrimination. It is important that you also use the other features of the Sovereign XS-2 to aid in the process of discrimination.

Be aware that some similar objects may vary in Target Indication Reading because of changes in composition. For example, a gold ring will vary depending upon the purity of the gold and the size of the band. Coins minted in different years may have different alloy combinations and so the reading will differ. In addition, if different objects provide the same reading, this is because they have a similar metallic composition.

Finally, the Target Indication Reading will also be influenced by the length of time that an object has been buried in the ground.

Target Recognition Table

Object	Type	Reading
US quarter	non-ferrous	550
AUS 20¢	non-ferrous	500

Operating Instructions for the Sovereign XS-2 and XS-2 Pro

a) "Discriminate" Mode

- Install charged batteries.
- Set the All Metals / Discriminate Mode switch to "Discriminate".
- Turn the Sovereign XS-2 "On" by turning the Volume control in a clockwise direction. Turn this control to the most clockwise or "maximum" setting.
- Set the desired position of the Disc control.
- Set the desired position of the Notch control.
- Turn the Threshold control in a clockwise direction until the tone becomes "just" audible.
- Set the Sensitivity control to "Auto" or at the maximum manual setting without interference.

You are now ready to hunt.

a) "All Metals" Mode

- Install charged batteries.
- Set the All Metals / Discriminate Mode switch to "All Metals".
- Turn the Sovereign XS-2 "On" by turning the Volume control in a clockwise direction. Turn this control to the most clockwise or "maximum" setting.
- Turn the Threshold control in a clockwise direction until the tone becomes "just" audible.
- Set the Sensitivity control to "Auto" or at the maximum manual setting without interference.

You are now ready to hunt.

Practicing the Controls

We suggest you first take some time to become familiar with how your Sovereign XS-2 responds to various metal objects.

Gather a collection of different metal objects such as a rusted nail, pull-tab, brass button, aluminum foil, various coins, and some gold and silver jewelry.

Take the unit outside, away from known electrical devices or metal objects, and support the Sovereign XS-2 so that objects can easily be moved past the coil. Then remove all jewelry from your hands and wrists.

Switch the Sovereign XS-2 "On" and select "Discriminate" mode.

Turn the Disc and Notch controls to their most counter clockwise positions.

Turn the Sensitivity control to "maximum", the most counter clockwise position without clicking into "Auto". If excessive interference is encountered, turn the Sensitivity control clockwise until it disappears.

One at a time, pass the test objects across the coil. The Sovereign XS-2 should "beep" on the non-ferrous objects and ignore ferrous objects.

Take note that as you pass the ferrous nail over the coil the threshold tone disappears. As this tone returns it will have a lower than normal pitch, indicating that the object ignored was ferrous.

Passing different non-ferrous objects over the coil will produce different signal tones. Objects with high conductivity, such as silver or lead, will produce a high-pitched signal tone while objects with lower conductivity, such as aluminum foil, will produce a low-pitched signal tone.

With experience you will be able to use the signal pitch from an object to accurately determine the type of object you have found before recovering it from the ground.

Now turn the Disc control progressively clockwise in steps and pass the objects over the coil. Take note of when certain objects are rejected, this will enable you to more accurately discriminate these objects in the field.

Turn the Disc control to the position where it ignores the pull-tab. Passing objects with lower conductivity (such as the aluminum foil) over the coil will not produce a signal. Take note of the threshold tone as it disappears and then returns again. It should return at a slightly higher pitch than normal. This indicates that the Sovereign XS-2 ignored a non-ferrous object.

Turn the Disc control back to the most counter clockwise position.

Now progressively turn the Notch control in a clockwise direction, again passing the test objects across the coil. The Notch control enables you to ignore a small number of objects with similar conductivity while still detecting other valuable non-ferrous objects, even if they are of lower conductivity.

Turn the Notch control to ignore the pull-tab. Objects with similar conductivity to the pull-tab will be ignored. Pass the aluminum foil over the coil and the Sovereign XS-2 will produce a signal. This would not be possible using the Disc control.

Now turn the Disc control to position 6 to ignore the aluminum foil.

You have now successfully set the Sovereign XS-2 to ignore the two types of objects most commonly unwanted by treasure hunters.

Treasure Hunting Tips

The Sovereign XS-2 will perform at its best when the BBS coil is kept in contact with the ground. If you are not yet an experienced operator, you should practice maintaining a constant coil height at the extremity of each swing; maintaining contact with the ground will make this easier. This is important as variation in coil height at the end of each swing can cause confusing sounds and will reduce detection depth.

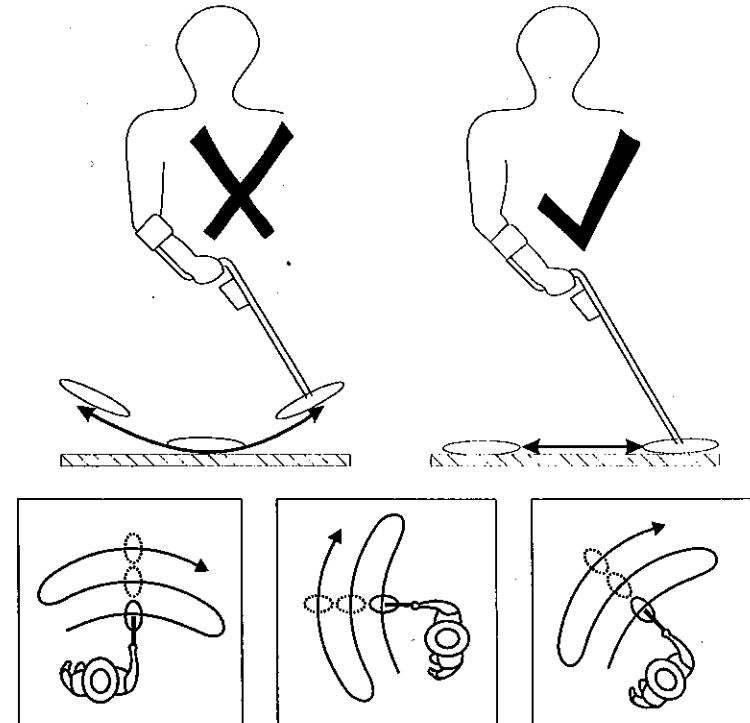


Figure 17 - Sweeping the coil

NOTE:

Each sweep of the coil should overlap the last one. This will ensure good ground coverage.

Keeping the BBS coil in contact with the ground will increase detection depth and response to small objects.

Pinpointing with the Sovereign XS-2

When the approximate location of the target has been determined, move the coil slowly over the target. The audio tone will increase in volume while moving towards the target and decrease in volume as you pass it. The tone will be loudest when the coil is directly over the target. Quite often the detector will be producing its maximum volume for a broad area over the target. This generally indicates that the target is near the surface or is quite large.

It may also be beneficial to switch to "All Metals" mode, because in this mode the Sovereign XS-2 produces a fast, sharp response to targets.

The open design of the BBS coil makes it easy to mark the ground directly about the target to aid recovery.

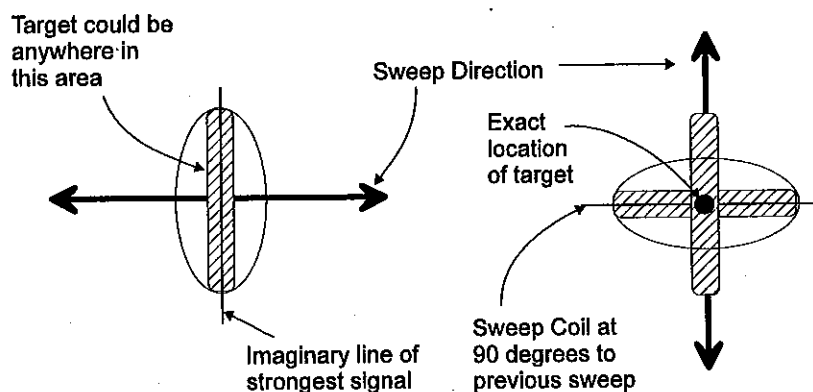


Figure 18 - Pinpointing the target with the Sovereign XS-2

Digging the Object

Once you have pinpointed the target, clear the surface material and check again for the signal. If there is no signal then the target is amongst the surface material. In this case search the area until you have located the target. However, if the signal is still there, remove a few inches of soil off the surface of the ground. If the target is not visible, sweep the coil over the hole again. The signal should still be there, so continue to dig.

Take care with how you dig, a swift blow to an object with a pick could deface a valuable coin or split a piece of gold in two.

If the object is not clearly visible you may need to scan the soil that has been dug up, so be sure to pile the soil carefully while digging. There are two methods of scanning this soil.

1. Spread the soil out and then sweep the coil over it to locate the target. (Be sure that there is no object buried in the ground below the soil.)
2. Lay the coil on its side near the hole. Pick up a handful of soil from the pile and pass it across the coil. If there is no signal then place the soil in a second pile away from the first and grab another handful of soil. Continue this process until you receive a signal, the target is now in your hand. Sift through the soil until the object is located.

Once the target has been recovered it is a good idea to run the detector over the hole again to make sure that there are no other targets to be found.

When you have recovered all targets from the hole, remember to refill it. Once a target has been found, there is a high chance that more targets are close by, so it is advisable to search the surrounding area extremely carefully

Once again, always remember to refill your holes.

Environmental Concerns

Firstly, it should be pointed out that treasure hunting with a metal detector is the most environmentally friendly way to recover coins, rings, and other treasure items. However, it is important to leave an area that you have searched in the same condition as you found it.

All holes that have been dug must be properly refilled. Not only is it environmentally unacceptable to not fill in your holes, it is also very dangerous. There are special tools to enable you to recover targets easily from grassed areas without digging large holes.

Take away and properly dispose of any junk that you find or produce, such as nails, tin cans, or flat batteries. Leaving an area "scarred" can result in action being taken to prevent the use of metal detectors, which spoils this fascinating hobby for others as well as yourself.

Detector Care

The Sovereign XS-2 is a high-quality electronic instrument, finely engineered and packaged in a durable housing. Taking proper care of your detector is mostly common sense.

- **Do not leave batteries in the control box when the detector is not in use for a period exceeding two weeks.** Damage caused by leaking batteries would be severe and would void the warranty through user negligence.
- If temperatures are very high, **do not leave the detector in the sun for longer than necessary.** Covering it when not in use will help protect it. Try to avoid leaving it in a closed trunk or in the car sitting in sunlight.
- While the control box has been designed to be water-resistant, it is not waterproof. Avoid wetting it unnecessarily. **Never allow the box to come into contact with gasoline or other oil-based liquids.**
- **Keep the unit clean and dry** and avoid getting sand and grit into the shafts or the tightening nuts. Do not use solvents to clean the detector. Use a damp cloth with mild soap detergent.
- **Batteries.** Flat or faulty batteries cause many detector problems. Ensure that you use only quality alkaline batteries and that they are replaced when the warning signal indicated through the headphones or speaker is heard.
- **Cables.** Ensure the coil cable is in good condition and not subject to undue stress. The coil connector at the base of the cable must be firmly tightened.

Trouble-shooting Guide

Fault	Solution
No Sound	Check batteries and battery connections Ensure battery lid is completely closed Check headphones and their connection
Erratic Noises	Check battery charge and battery connections Ensure coil plug is tightened firmly Reduce the sensitivity by turning clockwise Switch to the "Auto" position Check headphones and their connection Check for sand or grit between coil cover and coil
No Target Response	Ensure unit is turned "On" Check battery charge and battery connections Check coil connection Check headphones and their connection

In the unfortunate circumstance that you need to return your detector to Minelab for service, please fill out the Minelab Service Repair Form on page 36 and enclose it with the detector. Please supply as much detail about the fault as possible as this will assist our service engineers to rectify the problem quickly and efficiently.

Specifications

These specifications are subject to change without notice.

Internal Options	Silent search or background threshold in "Discriminate" mode Fixed or multiple tone identification in "Discriminate" mode	
Applications	Coin, relic, and treasure hunting Inland, beach, or shallow water	
Length	Extended	55" (1400 mm)
	Unextended	33" (840 mm)
Weight	Control Box (excl. Batteries)	550 g
	8" BBS 800 Coil	590 g
	10" BBS 1000 Coil	780 g
Batteries	Alkaline Cells	Eight 1.5V AA"
	Nicad Battery Pack	12V, 600 mA/hr
Coil	8" Round "Double D" waterproof	XS-2
	10" Round "Double D" waterproof	XS-2 Pro
Headphones	Impedance	8 W
	Jack - Stereo / Mono	¼"
Transmission	Broad Band Spectrum: multiple simultaneous frequency transmission at 1.5, 3, 4.5, 6 ... 25.5 kHz	
Ground Rejection	Automatic Ground Tracking	
Search Modes	All Metals:	detects ferrous and non-ferrous metals
	Discriminate:	rejects ferrous, detects non-ferrous metals
Controls	Volume, On / Off	Pot. and Switch
	Sensitivity	Auto or Manual
	Threshold	Pot. and Switch
	Discriminate	Pot. 1 Turn
	Notch	Pot. 1 Turn
	All Metals / Discriminate	Switch 2 Pos.

Visual Display	Digital processing meter	Optional on XS-2
Warranty	Control Box	2 years
	Coil	1 year
Patents	US 4942360, AUS593139, US4890064, US4894618, AUS595835, CAN1260146, AUS 595835, and several others pending.	

Warranty and Service

There is a two-year parts and labour warranty for the electronic control box of the Sovereign XS-2. Refer to your Warranty Card for further details. The BBS coil is warranted for one year. Refer to your supplier or Minelab for service, either in or out of warranty.

NOTE:

This warranty is not transferable, nor is it valid unless the enclosed warranty registration card is returned to Minelab Electronics Pty Ltd or an authorised Minelab Electronics Pty Ltd regional distributor within 14 days of the original purchase.

The Minelab warranty does not cover damage caused by accident, misuse, neglect, alteration, modifications, or unauthorised service. For specific details of the Minelab warranty, please refer to the machine's "Product Warranty Card".

Minelab Service Repair Form

Today's Date:

Detector Model: Serial No.:

Purchased From:

Purchase Date:

Faulty Part(s):

.....

Description of Fault:

.....

.....

.....

.....

Owner's Name:

Address:

.....

Phone: Day () Home ()

Fax: () Email: