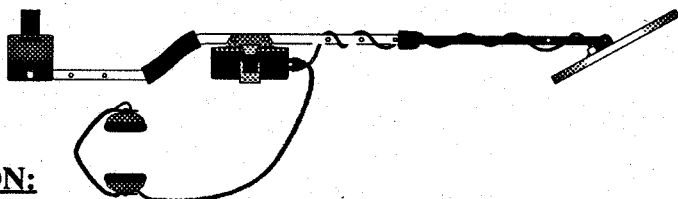

white's electronics, inc.

Surfmaster II *Plus*



ATTENTION:

To use your Surfmaster II Plus, set SENS control at ∇P .

When operating in high minerals, such as black sand and other types of mineralization, set the DISC control to ∇ .

When searching dry or wet sand with little or no other types of minerals besides salt, set the DISC Control to ∇ or slightly higher, (10:00 o'clock). Most nails will be rejected and most valuables detected at this setting.

When wanting to discriminate against junk, increase DISC Control toward $\nabla 3$. CAUTION: Most gold jewelry will be rejected at the $\nabla 3$ position.

The loop must be in continuous motion (moving from side to side) in order for this model to respond to metal. If the loop is held steady over a metal target, that target will be tuned out.

Good metals produce smooth solid beeps, junk metals produce clicks or sputter sounding beeps.

Pinpoint metals exact location by "X-ing" area slowly.

For more detailed operating instructions, refer to the information inside this manual.

**White's Electronics Inc.,
A Message from...
Kenneth R. White**



Congratulations, and thank you for choosing the Surfmaster II Plus.

Myself, an avid underwater detectorist, I commend you for making an excellent choice in equipment. White's continually strives to achieve performance and reliability above and beyond your expectations.

Your new Surfmaster II Plus has been hand built and carefully tested at our USA factory in Sweet Home, Oregon. Properly cared for it will last years.

The following instructions are intended to familiarize you with this fine detector, and give you a good understanding of the basics. Obviously, there is no substitute for field experience. Practice using your detector in the field, and study this manual carefully. Before long you may be able to teach the experts a thing or two!

People use our metal detectors to find valuables every day. Regardless of a metal detectors performance, it is the operator who makes the critical decisions that result in great recoveries. A metal detector is simply a tool which greatly increases the capabilities of the user to find such valuables. Knowing your detector, and researching good places to use it, are key elements to successful metal detecting.

With this understanding we know you're ready to "get your feet wet" using the Surfmaster II Plus to help you find valuables!

A handwritten signature in black ink, which appears to read "Kenneth R. White". The signature is stylized with a large, sweeping "K" and a long, horizontal stroke at the end.



Index

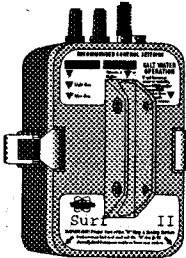
Assembly	2-4
Batteries	5-9
Background.....	10
Operating Instructions	11-12
Explanation of Controls	13-16
SENS (Sensitivity)	13-14
DISC (Discrimination)	15-16
Search Methods	17-18
Proper Care of your Detector	19-22
Advanced Operators	23-24
Glossary of Terms	25-27
Accessories.....	28
Warranty Statement.....	Inside Back Cover



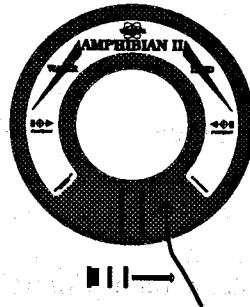
Assembly Instructions

Remove all parts from the shipping carton, and make sure you have the following:

Control Box



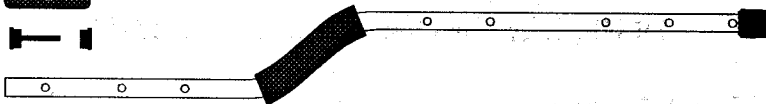
Loop



Arm Cup



"S" Rod



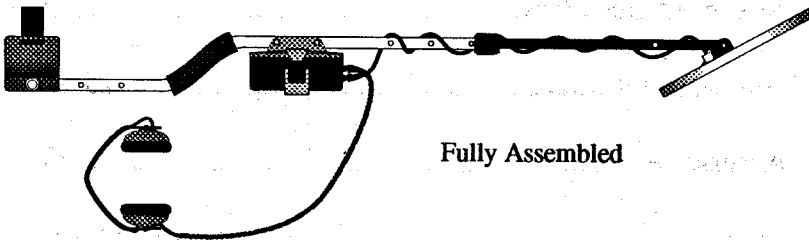
Straight Rod



Batteries

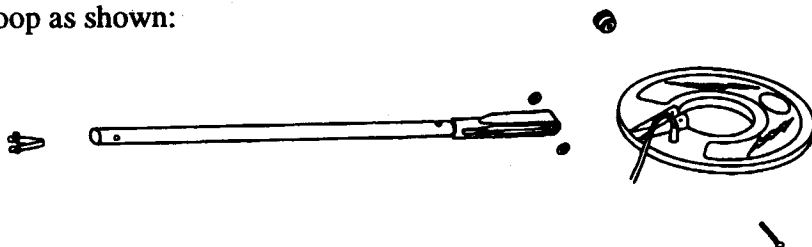


Fully Assembled



Assembly continued....

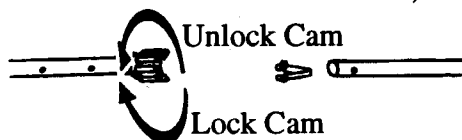
The SURFMASTER II Plus comes partially assembled. The Loop Isolator (Straight Rod) will need to be attached to the loop as shown:



Make sure washers are placed on the Loop Isolator (Straight Rod) before the isolator is slid onto the loop ears.



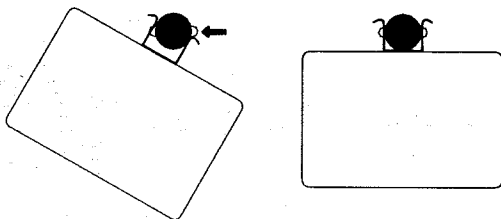
The Straight Rod connects to the "S" rod by unlocking camlock, lining up the two push buttons with holes in the "S" rod, and locking into place. Lock the camlock to avoid rattle. The loop cable should be wrapped around the rod, first revolution over the top of the rod. This will require unlocking the camlock and Straight Rod, and or removing the control box from the "S" rod so that it may be spun around the rods winding the loop cable (the Loop is not removeable from the control box).



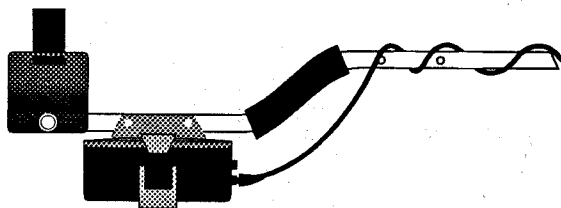
See assembly on page 2.

Assembly continued.....

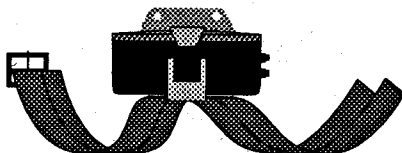
The control box snaps off and on the rod by compressing the two spring clips on one side and pivoting the control box:



Optional control box mountings are available on the "S" rod.



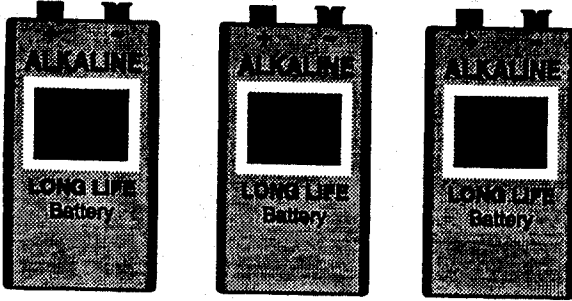
This model can also be worn as a hipmount simply by removing the control box from the "S" rod, adjusting the length of cable wound around the rod, and weaving a belt through the slots on the control box bracket.





Batteries

The Surfmaster II is powered by three TRANSISTOR 9 Volt batteries.



Open the battery compartment by pulling up on the two latches, one on each side of the control box, and disengaging the latch hooks from the top of the control box. Note that this procedure can be completed with the control box on or off the rod. Remove the top of the control box, note the position of the "O" ring on the lid, and battery leads. **Caution:** Do not get sand or dirt on the "O" ring.

Attach the battery leads to the batteries, they will snap on only one way. Note one of the battery leads is different than the other two. It may be a different color or be marked in such a way as to identify it from the other two. This battery runs the audio (beep). The batteries may or may not discharge at the same rate. It is recommended that the batteries be rotated occasionally to achieve maximum battery life.

Alkaline 9 volt transistor batteries should last 20 - 30 hours if rotated from battery lead to battery lead. Battery rotation is suggested on the following page.

Batteries continued.....

First

White
Lead



A

Black
Lead



B

Black
Lead



C

Second

White
Lead



B

Black
Lead



A

Black
Lead



C

Third

White
Lead



C

Black
Lead



A

Black
Lead



B

Batteries continued.....

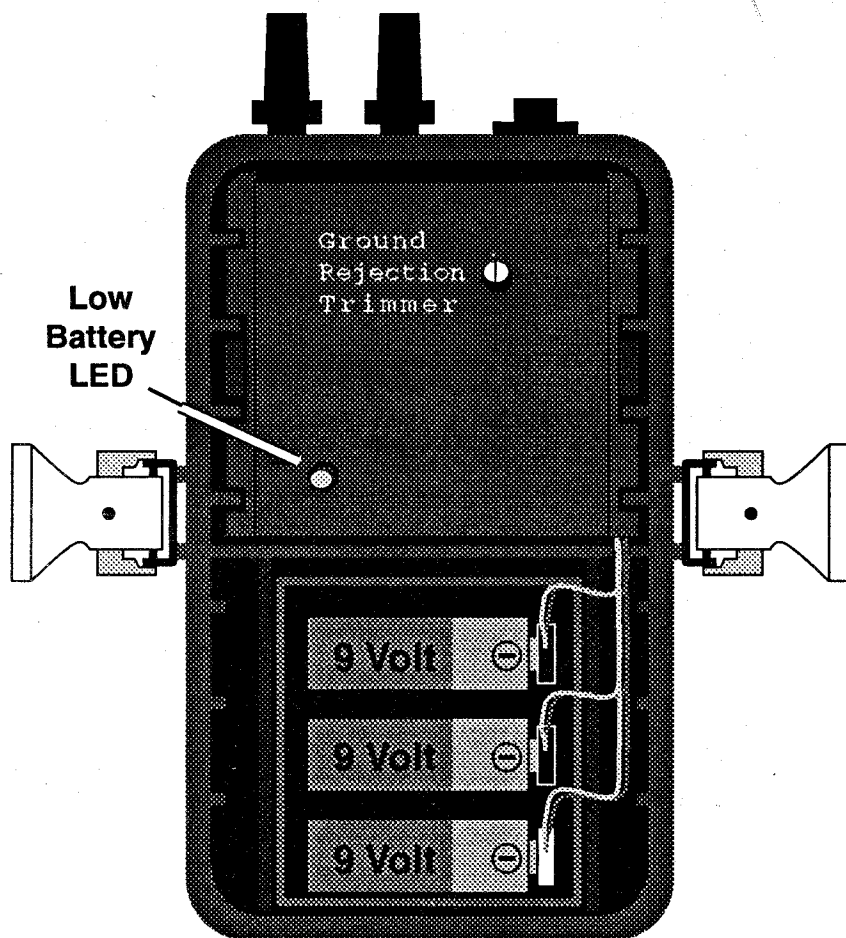
It is not necessary to reposition both black lead batteries to complete a rotation. Both black lead batteries run the same circuit thus moving one to the white lead and the white lead battery to the black lead completes a rotation.

Your instrument is designed to run on these batteries well below their normal voltages thus external battery testers will not accurately test whether the batteries need to be replaced.

1. If the volume (beep) seems to be getting weak (low), however the Low Battery LED is not glowing brightly, rotate the battery positions.
2. If the volume (beep) is strong, however Low Battery LED is glowing brightly, rotate the batteries or replace one or both non-audio batteries, (black leads).
3. If the volume (beep) is weak, and the Low Battery LED is glowing brightly, replace all three batteries.

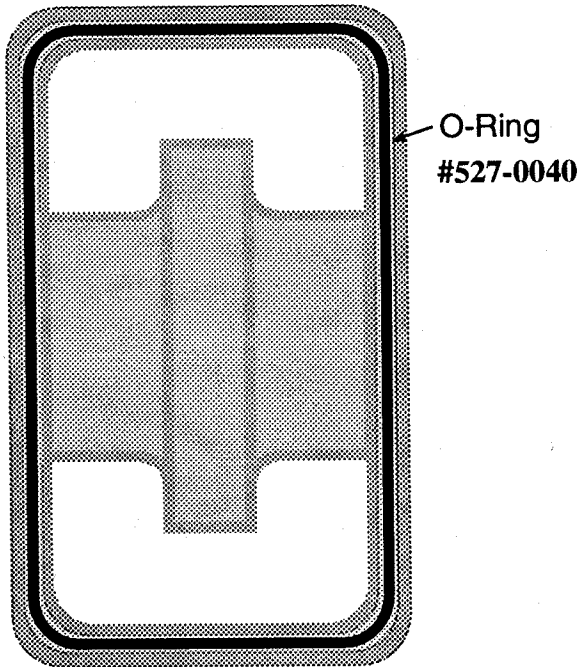
Note the battery positioning inside the control box on the following page.

Batteries continued.....



Batteries continued.....

Once the batteries are connected and positioned in the case, observe the "O" ring on the lid. Make sure it is positioned correctly in the lid groove, and is free of sand and dirt before re-assembling case. Also make sure the batteries are positioned correctly firmly pressed into their slots. The battery leads should not be on top of the batteries. They should be positioned beside the batteries.





Background

The Surfmaster II Plus is a high performance VLF (Very Low Frequency) metal detector, water proof to an underwater depth of 100 feet, which works on the Inductive Balance principle. It is capable of extreme depths in light to medium ground mineralization. The Surfmaster II Plus has excellent discrimination against trash, as compared to PI (Pulse Induction) types of underwater detectors. However, extreme mineralization, such as a combination of black sands and wet conductive salts, will significantly reduce the effectiveness of this model. Thus, the Surfmaster II Plus is recommended for fresh water, and low to medium mineralized beaches, where the operator desires trash rejection.

In the past basic TR (Transmit Receive) instruments dominated the beaches as well as underwater detecting. These early TR instruments had no ground rejection and therefore had great difficulties with ground mineralization. The ability to reject the ground was developed however difficulties continued with underwater detectors as early ground rejection systems proved un-manageable in the water environment. Soon after, two new types of electronics were developed to deal with the problems of penetrating mineralized soils.

The first designated Motion Discrimination or GEB / DISC, is the basis the Surfmaster II Plus is designed from. It offers superior discrimination, and respectable ground rejection, manageable in the water environment.

The second designated PI or Pulse Induction is the basis the Surfmaster **PI** Plus is based on. It offers superior extreme type ground rejection however, discrimination against trash, particularly iron, is minimal.



Operating Instructions

1. Turn the SENS (Sensitivity) Knob clockwise, click indicates ON, set to the ∇P .

2. The DISC (Discriminate) Knob has three ∇ (preset) settings.

a) If searching black sand or other types of high mineralization, set the DISC (Discriminate) control to $\nabla 1$. This model will respond to all types of metals at this setting. If the instrument doesn't operate smoothly at this setting, switch to the $\nabla 2$.

b) If searching in fresh water, or salt water beaches with little or no other types of ground minerals besides salt, set the DISC control to $\nabla 2$. This model will reject most nails and small iron at this setting, and respond to most jewelry. A setting slightly higher than $\nabla 2$ (10:00 o'clock) rejects most nails and accepts most valuables.

c) If more rejection against junk metals is desired, turning the DISC (Discriminate) Knob clockwise toward $\nabla 3$ increases discrimination. **Caution:** At or before the $\nabla 3$, many jewelry items are rejected. At $\nabla 3$, pulltabs are rejected as is nickels, and most small jewelry items. The $\nabla 3$ is mostly for detecting silver and copper coins only. The $\nabla 3$ setting may not perform well in wet saltwater, black sand or other highly mineralized ground conditions.

3. Sweep the loop close to the sand, silt, or ground passing from side to side. Walk, wade, or swim forward slowly while sweeping, and make sure each pass of the loop overlaps the last. Each pass of the loop from right to left should take approximately two seconds. If the loop is swept very very slow, or the loop is stopped, the detector may not respond to metal.

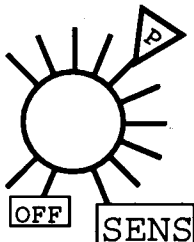
Operating Instructions continued.....

- 4.** At this point, it is a good idea to find an area free of metal to practice. Place a quarter or dime on the ground. Pass the loop over the target. **Note:** If you sweep the loop over the coin it is detected. If you stop the loop over the coin or sweep too slowly, the instrument doesn't respond. Thus, loop movement is required for proper performance.
- 5.** With the DISC control at ∇ , place a nail on the ground and pass the loop over it. Note the way the detector clicks or produces a flutter sound. Now pass the loop over the coin and note the difference in sound. An operator will soon learn to ignore the clicks or flutters junk produces, and listen for the smooth beep coins and good metals produce.
- 6.** Once a smooth beep has been located, pinpoint exactly where to dig by slowly X-ing the area.
- 7.** If searching the beach, and wind causes a howling sound in the headphones, plug the drain holes in the headphones if so equipped, to eliminate such wind noise. Black electrical tape over these holes works fine. Be sure to unplug or take tape off before entering the water.



Explanation of Controls

SENS (Sensitivity)



What does it do?

The **SENS** control turns the detector ON and OFF, and is used to select the (Sensitivity) or degree to which this instrument responds.

Why would I use it?

The ∇ works well in most areas, however there are two reasons an operator may wish to change the sensitivity setting:

1. If when using this model with the **SENS** control at ∇ it makes a lot of noise, beeping or clicking, when you sweep the loop, or continues even when the loop is away from the ground, the **SENS** control should be turned counter clockwise thus reducing the sensitivity, and allowing smooth stable operation.

2. If when operating this detector with the **SENS** control at ∇ it works well, quiet and smooth, increasing the **SENS** control clockwise will increase sensitivity and detection depth, but may produce unstable audio responses.

Experience and personal preference will dictate how stable you prefer your instrument to perform. The **SENS** control allows for this adjustment.

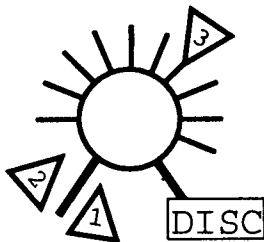
SENS (Sensitivity) continued.....

CAUTION: An incorrect DISC setting for the ground conditions (minerals/salts) can simulate having the SENS too high. Try the 10:00 o'clock DISC setting as well as the ∇ . If noise continues, then try a reduced SENS setting.



Explanation of Controls

DISC (Discrimination)



What does it do?

The **DISC** control selects the amount of rejection against junk metals. At **MIN** (minimum) most everything is detected. At **MAX** (Maximum), most junk is rejected.

Why would I use it?

▽ Improves performance in extreme conditions, high mineralization such as black sand. Responds to all types of metals.

▽ Works well in dry or wet salt or fresh water which doesn't contain high degrees of other types of mineralization. Rejects nails and most small iron, accepts most valuables.

▽ Heavy discrimination, rejects iron, foil and pulltabs.

Caution: Also rejects nickels, and most small jewelry. Doesn't work well in extreme ground conditions.

Use the **DISC** control to select the discrimination level that works smoothly for the area as well as providing the desired rejection against junk.

DISC (Discrimination) continued....

Again, experience and personal preference will be a factor in selecting this setting. An operator must consider the likeliness of jewelry in the area to be searched, and how much digging of junk metals is acceptable in the area; and to the operator personally, how hard do you want to work the area. The ground mineralization of an area must also be considered. The DISC setting can smooth operation in some conditions.

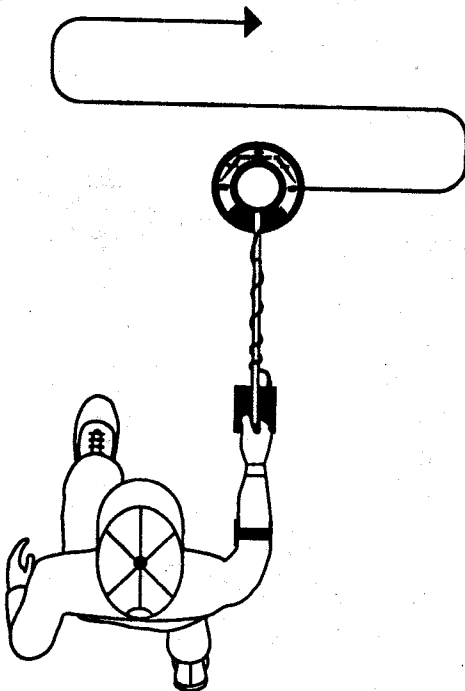
If you want to find nickels and jewelry with this model, you are going to have to dig your share of the junk metals that respond similarly such as aluminum.



Search Methods

Because the loop of this model must be moving in order to respond to metal, the sweep of the loop is critical to performance. Sweep the loop close to the ground, keep it close throughout the sweep. (See examples)

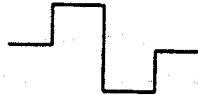
Overlap each pass to
assure good coverage.



Good targets sound smooth



Bad targets sound rough



**Keep loop flat to the
ground as you sweep**



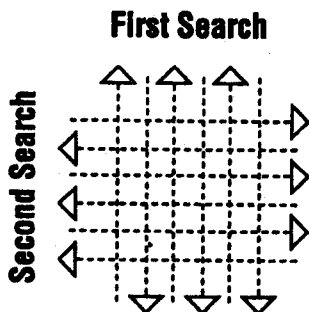
Right



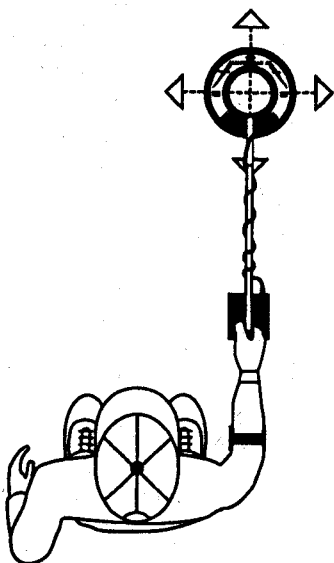
Wrong

Search Methods continued.....

If you have an area that has produced valuables, or has the potential for producing valuables, cover the area twice. First in one direction, then again at a different angle 90° from the first.



Once a good metal is located, "X" the area to pinpoint the target. Listen for the loudest beep as you sweep the loop, then stop and sweep in the other direction and listen for the loudest beep. The point where the two loudest beeps intersect is the center point of the target.





Proper Care of your Detector

CLEANING:

Both the loop and rod are waterproof, and can be cleaned with fresh water and a mild soap. After cleaning, dry the instrument thoroughly.

WEATHER CONDITIONS:

Protect your detector from excessively cold weather. Freezing can damage the electronic components, the case and/or the battery. Excessive heat can also damage the instrument. Never leave it in the sun. It's best to lay it in the shade when not in use. If it's left in a car on a hot day, cover it to protect it from the direct rays of the sun, and then leave the windows slightly open to permit ventilation.

SALTWATER:

Saltwater is very corrosive! After your detector has been exposed to saltwater, rinse the loop and rods in fresh water. Then wipe it with a cloth dampened with fresh water, and dry it thoroughly.

STORAGE:

If you plan to store your instrument for any length of time, unsnap the batteries and remove from the instrument, and leave the case latches disengaged. Whenever your instrument is not in use, turn the ON/OFF SENS Knob all the way to the left until it clicks off.

Proper Care continued.....

OPENING CONTROL BOX:

When opening the control box, first make sure the instrument is dry. Water, if allowed to contact the electronics will damage the detector.

When opening the control box to rotate or replace batteries, always make sure the "O" ring on the lid is free of dirt or sand, and is properly positioned before the case is closed. If this "O" ring shows any signs of wear, replace it before using this instrument in the water. This "O" ring is a custom shape White's Part Number 527-0040. It can be ordered from your White's Dealer or Service Center. Failure to maintain the "O" ring properly will result in extensive damage to the instrument, and will not be covered under warranty. If traveling abroad or using this model extensively, ordering additional "O" rings is highly advisable.

TRAVEL:

If traveling and expecting large variations in altitude, such as traveling through mountain passes, disengage control box latches to allow equalization of pressure.

SILICA GEL BAG:

The circuit board area of your detector contains a silica gel bag to protect the circuit board from moisture due to condensation in the control box. Periodically, let the inside of the control box dry out by leaving the control box open in a warm dry place.

Proper Care continued.....

If the worst happens and your control box fills with saltwater, the following steps will avoid additional problems:

- 1) Immediately disconnect and remove the battery pack, and silica gel bag.
- 2) Flush the inside of your control box, including the circuit board area repeatedly with fresh tap water to remove all traces of saltwater.
- 3) Remove and discard the batteries.
- 4) Allow all components to completely dry.
- 5) Inspect the "O" ring to see if it was the cause of the leak, if so replace.
- 6) Re-assemble the instrument with new batteries; often it will work fine.
- 7) If no obvious reason is found for the leak or if the unit is not operating at this point, return the instrument for servicing.
- 8) These steps will avoid extensive saltwater corrosion. Extensive saltwater corrosion is considered neglect and is not covered by the warranty.

Proper Care continued....

ADDITIONAL PRECAUTIONS:

- a) Avoid dropping your detector.**
- b) Avoid sharp jars to the loop.**
- c) Do not allow battery to corrode inside the instrument.**
- d) Do not alter or modify your instrument during its warranty period. Alterations will void the warranty.**
- e) Do not use lubricants on any part of your detector.**
- f) Do not use cleaners with alcohol, such as common tuner cleaner, or allow any other type of alcohol to come in contact with your instrument.**
- g) Do not tighten the black plastic bolts on the loop, loop cable, and headphone cable. Special tools are used to set these bolts at their optimum waterproof setting. Although they may appear loose, they are waterproof.**
- h) During prolonged periods of storage position your instrument away from extremes in heat, cold, and direct sunlight, and disengage control box latches to allow equalization of pressure and humidity.**



Advanced Operators/Dealers

Ground Rejection

The ground rejection of the Surfmaster II Plus is factory preset at a level slightly positive of a ferrite mineral sample. This setting should provide good performance in most conditions.

If you notice false targeting, and/or you notice target response "beep" as the loop is abruptly lowered to and/or lifted from the ground, performance can be improved by readjusting the ground rejection.

Open the control box and look at the circuit board cover. You will see a small hole with adjustment trimmer used to adjust ground rejection. (See diagram, page 24.)

Use a very small thin regular screwdriver to adjust ground rejection. Counterclockwise sets this model for higher ground mineral. Clockwise sets this model for lower ground mineral. When set properly, the loop can be abruptly lowered to and lifted from the ground without a target response "beep". The proper ground rejection setting provides good detection depth with a minimum of false targeting.

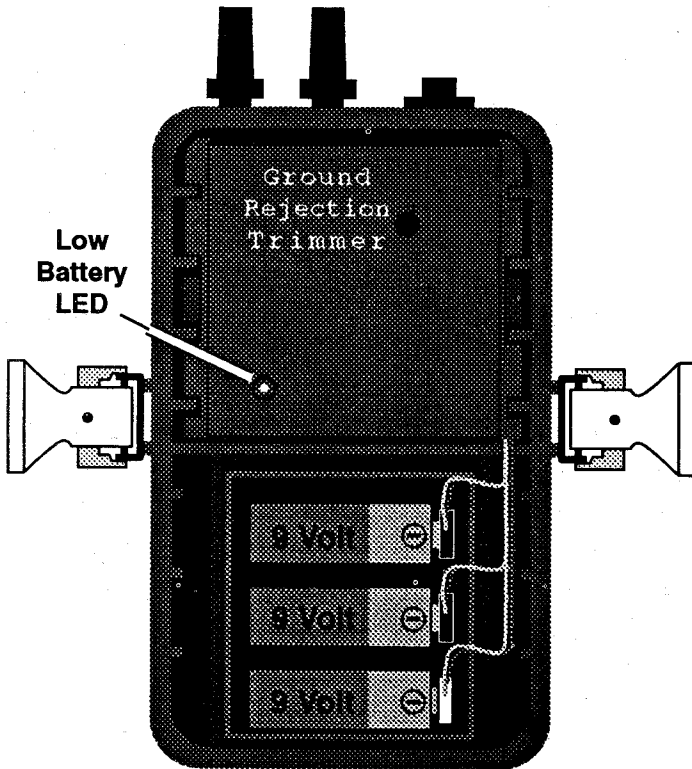
Regardless of proper ground rejection setting, the best performance in extreme conditions will still be achieved with the DISC control near the  position.

Advanced Operators/Dealers Ground Rejection continued.....

Ground Rejection Trimmer

Counterclockwise provides
more ground rejection.

Clockwise provides less
ground rejection





Glossary of Terms

Abruptly: Quickly, without hesitation.

Alkaline Battery: Type of non-rechargeable battery that can be purchased. It has the ability to sustain longer periods of current drain, and greater storage life than the carbon-zinc type batteries.

Black Sand: Granular material consisting mostly of magnetite.

Control Box: Body of instrument (case).

Detect: Respond by "beep".

Discrimination: The ability to accept or reject (distinguish) metals of different characteristics, nails, bottle caps, coins, etc.

Frequency: Current cycles produced by the transmit oscillator per second. (Cycles per second.)

G.E.B.: (Ground Exclusion Balance) Ground Rejection.

Good Metals: Metals determined by the position of the **DISC** control to be acceptable. Desirable metals.

Ground: Dirt or the surface of the earth.

Ground Rejection: The cancellation of ground mineralization to ignore the masking effect ground minerals have over metals.

Indicate: Advice, proclaim, or point out.

Glossary continued.....

Junk Targets: Metals determined to be trash or rejects, iron, foil, pulltabs, etc.

Max: The most or highest possible.

Metal: Metallic substances iron, foil, nickel, aluminum, gold, brass, lead, zinc, copper, silver, etc.

Mineral: Ferric oxide (iron) or other such non-organic substances naturally occurring.

Min: Minimum, the least possible.

Mode: An operation selection for specific operating characteristics.

Motion: Movement or sweep.

Ordinary: Common, average or not unusual.

Performance: Efficiency, the manner in which an instrument responds.

Pinpoint: Finding the metals exact location with respect to the loops physical center.

Preset: ▽ Control position determined to be ideal for average search conditions.

Range: A sequence, series, or scale between limits. (calibration)

Glossary continued.....

Reject: Discriminate, cancel response or effect.

Sensitivity: (SENS) Capacity or degree to which an instrument responds.

Stable: Ability of a metal detector to maintain smooth predictable operation.

Sweep: Loop movement from side-to-side.

Trimmer: Small component used for adjustment.

"X": Cross the target from two different sides 90° from each other.



Surfmaster Accessories:

Part Number	Description	Suggested Retail
627-0264 -----	Silica Gel Bag-----	\$ 1.00
527-0040 -----	Surfmaster "O" Ring-----	\$ 3.95
601-1050 -----	Lanyard Float-----	\$ 4.95
802-5190-1 -----	Loop Steadying Bracket-----	\$ 6.95
501-4066 -----	BM 950 Loop Cover "Scuff Plate"-----	\$ 6.95
601-0045-11 -----	Sand Scoop-----	\$ 19.95
509-0015-----	Transistor Nicad Kit (Battery & Charger-- (Requires Three Each)	\$ 8.95
601-1141-2 -----	Surfmaster Bag "With Mesh Drain"-----	\$ 49.95
802-5195 -----	Scuba Diver Rod Set-----	\$ 49.95
802-7089-4 -----	Under Water Headphones-----	\$119.95

**To Purchase Accessories:
Contact Your Dealer
Or Telephone
Toll Free;**

1-800-547-6911



White's Electronics, Inc.

Limited Warranty



If within one year (12 months) from the original date of purchase, your White's detector fails due to defects in either material or workmanship, White's will repair or replace at its option, all necessary parts without charge for parts or labor.

Simply return the complete detector to the Dealer where you purchased it, or to your nearest Authorized Service Center. The unit must be accompanied by a detailed explanation of the symptoms of the failure. You must provide proof of date-of-purchase before the unit is serviced.

This is a transferable manufacturer warranty, which covers the instrument two years from the original purchase date, regardless of the owner.

Items excluded from the warranty are non-rechargeable batteries, accessories that are not standard equipment, shipping / handling costs outside the continental USA, Special Delivery costs (Air Freight, Next Day, 2nd Day, Packaging Services, etc.) and all shipping / handling costs inside the continental USA 90 days after purchase.

White's registers your purchase only if the Sales Registration Card is filled out and returned to the factory address soon after original purchase for the purpose of recording this information, and keeping you up-to-date regarding White's ongoing research & development.

The warranty does not cover damage caused by accident, misuse, neglect, alterations, modifications, unauthorized service, or prolonged exposure to corrosive compounds, including salt.

Duration of any implied warranty (e.g., merchantability and fitness for a particular purpose) shall not be longer than the stated warranty. Neither the manufacturer or the retailer shall be liable for any incidental or consequential damages. Some states however, do not allow the limitation on the length of implied warranties, or the exclusion of incidental or consequential damages. Therefore, the above limitations may not apply to you.

In addition, the stated warranty gives you specific legal rights, and you may have other rights which vary from state-to-state.

The foregoing is the only warranty provided by White's as the manufacturer of your metal detector. Any "extended warranty" period beyond two years, which may be provided by a Dealer or other third party on your detector, may be without White's authority involvement and consent, and might not be honored by White's.



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