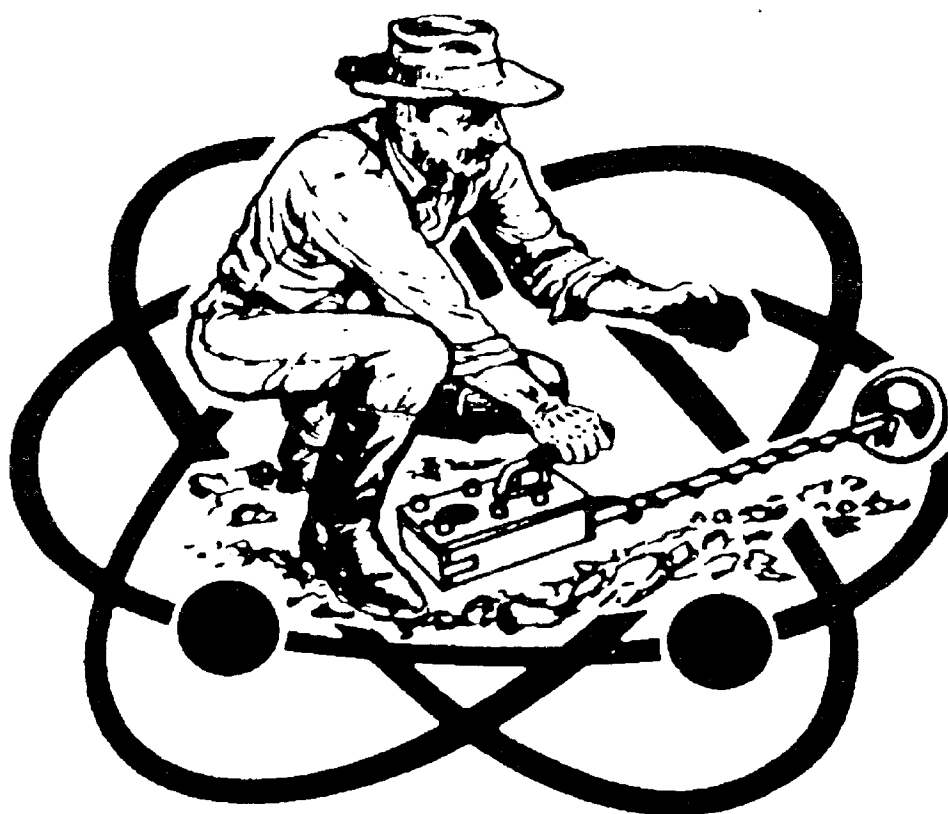




4900/DL MAX **CB**

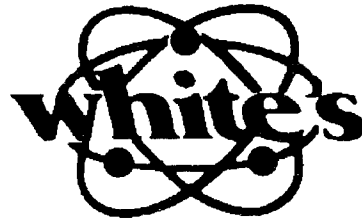
Manufactured by White's Electronics Inc. Sweet Home, OR. U.S.A.

INSTRUCTION MANUAL



ATTENTION: To use the 4900/DL MAX in normal conditions; Set all controls to their  position. Keep the loop moving. Good targets sound smooth and solid. Bad targets sound rough and broken. Squeeze and hold the Push Button on the handle to pinpoint. To fine tune for other than normal conditions or for optimum performance, refer to the information inside this manual.

White's Electronics Inc.
A Message from...
Kenneth R. White, C. E. O.



Congratulations, and thank you for choosing the 4900/DL MAX CB. Since 1983, 4900/D models have helped set the standard in metal detection technology. In the 4900/D tradition, the 4900/DL MAX continues to be a strong force within the metal detecting industry.

CB (Composite Board) indicates your new 4900/DL MAX has the latest electronic circuitry, closely related to its big brothers the 5900/Di Pro SL and 6000/Di Pro SL. By utilizing common circuitry among these models, White's is able to offer greater performance at more economical prices. Blue Max style loops only, such as the four inch BM350, six inch BM600, eight inch BM 800, and nine & half inch BM950, are recommended for use with your 4900/DL MAX.

The following instructions are intended to familiarize you with this fine metal 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!

Your new 4900/DL MAX has been hand built and carefully tested at our factory in Sweet Home, Oregon. Properly cared for, it will last for years.

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.

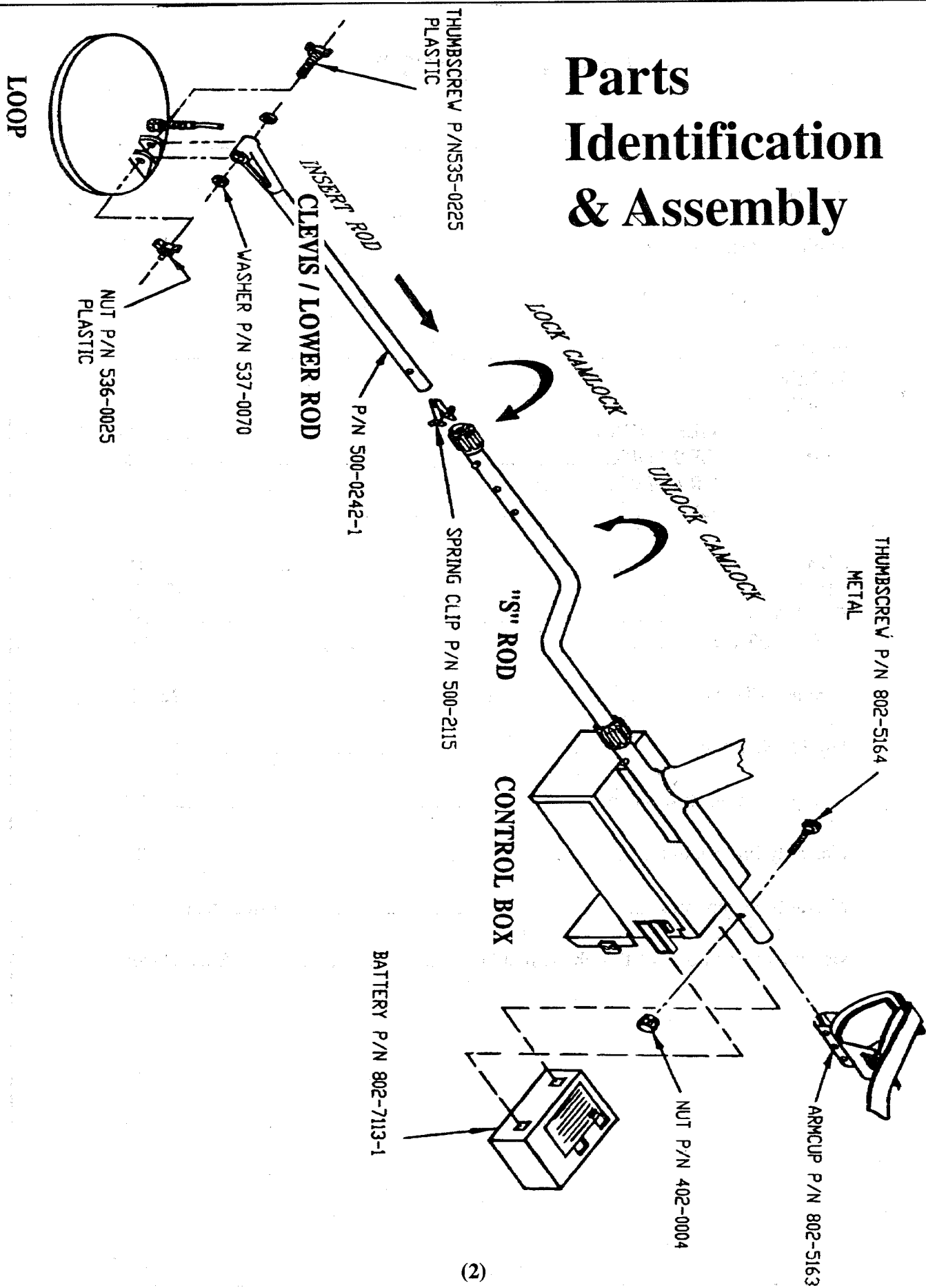
We know in a very short time you will be using the 4900/DL MAX to help you find treasure. We are proud to continue the 4900/D tradition with todays high performance and reliability.

A handwritten signature in black ink, reading "Kenneth R. White". The signature is written in a cursive, flowing style with a large, prominent "K" and "W".

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Parts Identification & Assembly



Parts Identification & Assembly, Continued

1. Remove all parts from shipping carton. Check the assembly page to make sure all parts are present.
2. Place loop washers on clevis/lower rod, one on each side, and slide clevis onto loop ears. Use fiber bolt and thumbnut to secure.
3. Insert clevis/lower rod into curved "S" rod so that stainless steel spring clip buttons line up and lock into one of the adjustment holes in the curved "S" rod. Turn camlock to secure. (The second or third adjustment holes are suitable for average size adults. Individuals 6' or taller should consider the fully extended position. Individuals well over 6' tall should purchase the optional Tall Man Rod for a more comfortable fit.)
4. Remove the cable twist from the loop cable and wind the cable around the clevis rod with first revolution over the top of the rod. Leave a small section of slack in the cable near the loop to allow for loop tilting. Wind cable all the way to the top of the curved "S" rod. Use the black cable retainers, one near the loop, and one near the curve in the "S" rod, to hold the cable in place.
5. Insert curved "S" rod so that stainless steel spring clip buttons line up, and lock into the rod on top of the control box. Turn camlock to secure. Plug loop connector into control box, turn lock ring clockwise to secure.
6. Grip the instrument by the handle, with your arm in the armcup, and sweep the loop over the floor. If the instrument fit feels uncomfortable, adjust the armcup by removing and repositioning the bolt/thumbnut and installing in one of the optional positions. If necessary, readjust clevis/lower rod position.
7. Remove protective paper from the black armcup foam pad, carefully align it in the elbow support, and press firmly into place.
8. Adjust the armcup strap so that it is loose enough to slide your arm in and out without loosening each time you want to set the detector down.
9. Install the battery pack (described in the next section) decal facing up, steel contacts facing toward the loop.

NOTE: Your detector may not work as expected indoors due to the high degree of metals used in modern construction. It is best to tune and practice out-of-doors to ensure stable, predictable results.

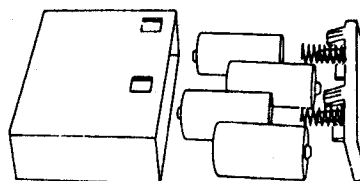
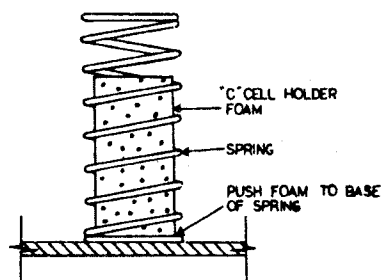
Batteries

Standard Batteries:

The standard battery holder supplied with your instrument holds four "C" size batteries. Alkalines are recommended as they supply more consistent power for longer time periods. Rechargeable "C" size batteries may also be used in this holder, although they will need to be removed from the holder for recharging.

Using The Standard Battery Holder:

1. Remove the battery holder lid by applying gentle pressure down on the four locking tab openings, two on each side, so that they unlock. Remove lid.
2. Note the position of each cell. The flat side of each battery cell fits against one of the four springs. There are two springs on the lid, and two in the case. The batteries fit alternating +, -, +, -.
3. Remove any weak cells and replace them with new "C" cells.
Caution: If the cells are put in backwards the detector may blow a fuse. Fuses can only be replaced by authorized service centers.
4. Line up the locking tabs on the lid with the locking tab openings on the battery holder. Snap the lid and holder together.
5. Insert the battery holder into the detector so that the decal is facing up, and the steel contacts are facing toward the insides of the detector.



Rechargeable Batteries:

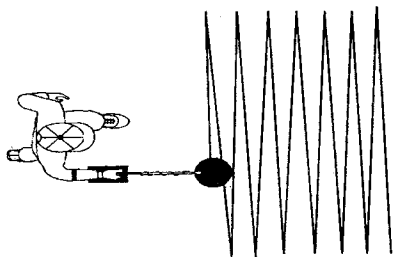
Although the 4900/DL MAX doesn't normally come with a rechargeable battery system, high quality systems are available for this model. White's rechargeable battery #802-5185 and charger #509-0020-1 are recommended. Please contact your dealer or telephone toll free, 1-800-547-6911, for more information.

Tuning & General Use

Preset: ▽P

Placing all the controls to their ▽P, (Preset), position will produce good results in average conditions. However, it may be necessary to fine tune the detector for use in other than average ground, or simply to maximize performance for a specific type of searching. The ▽P positions are intended to offer generally acceptable settings for each control. Most anxious detectorists prefer to venture out and use their new detector for the first time, before they have carefully read this manual. The ▽P allows such use with surprising success. It has also been found that becoming proficient using the detector at the ▽P settings eases the learning curve, making further study a smoother and more enjoyable experience.

To use the Preset settings place all the controls to ▽P. Keep the loop sweeping from side to side very close to the ground, always moving. Those using a detector for the first time often sweep the loop too slowly; a brisk sweep of about two seconds for each pass is necessary.



Overlap each pass by at least 50%.

Keep loop flat to the ground.

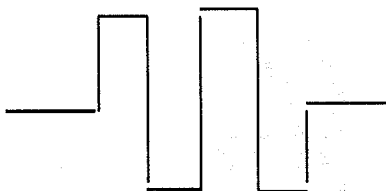


Good targets sound smooth and solid, bad targets sound rough and broken. Continue sweeping the loop (ignoring rough broken sounds) until a smooth solid sounding target is heard. When a smooth solid sound is heard, sweep the loop over the area several times listening carefully to the sound. Once the decision has been made to dig, squeeze and hold the Push Button on the handle and "X" the loop over the area to pinpoint. The strongest sound indicates target center.

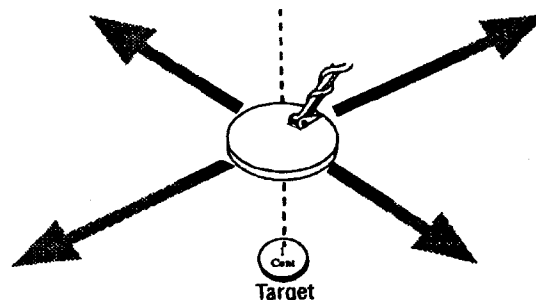
Good targets sound smooth.



Bad Targets sound rough.



Center of maximum signal equals center of target.



Fine Tuning:

Fine tuning the 4900/DL MAX results in an immediate improvement in performance. The keys to fine tuning are the GEB control, the SIG BAL control, and the MODE.

The GEB control sets the ground rejection. When the ground is rejected the detector can see deeper targets, and is less susceptible to ground interference.

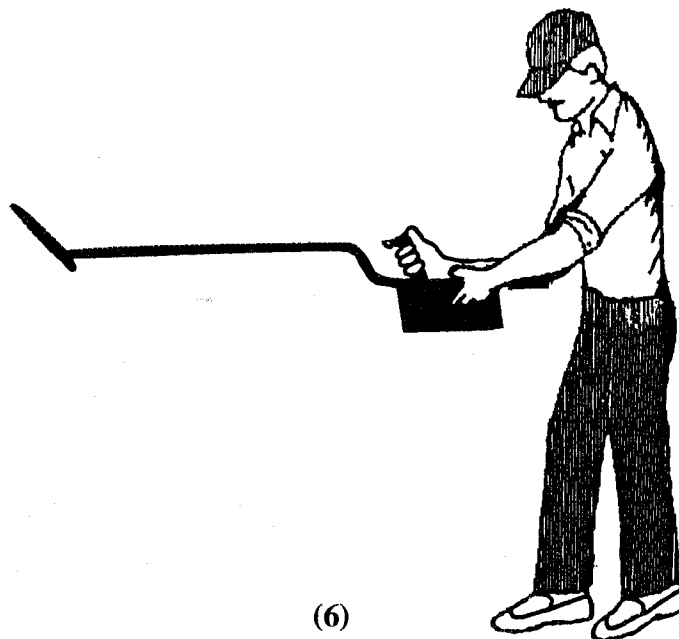
The SIG BAL control is used to regulate the maximum amount of ground signal the detector's electronic circuitry can handle. By finding the maximum amount of ground signal the circuitry can handle, maximum signal (maximum detection depth), can be achieved in each specific area.

The MODE control selects the type of detection, such as the detection of all types of metals, or the rejection of iron.

When a new area is to be searched, the following steps should be followed to maximize performance. When changing to another area, or when dramatic changes in the ground are visible, these steps should be repeated.

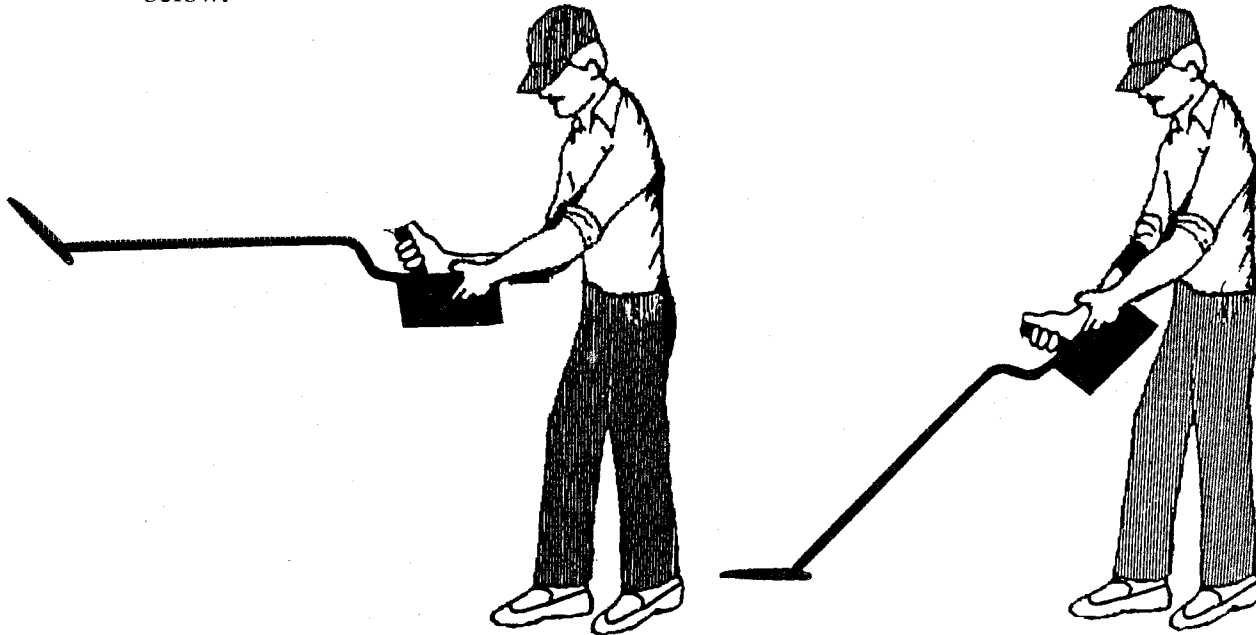
Fine Tuning Steps:

1. Place all controls to their  position except MODE. Set MODE control to the GEB/NORM position.
2. Hold the loop at waist level away from all types of metals. Squeeze and hold the Push Button on the handle, and adjust the TUNER control for a slight, faint hum (known as a threshold). Release the TRIGGER.



Fine Tuning & General Use, Continued

3. Lower the loop to the ground while listening for any dramatic change in the detector's steady hum (threshold). If there is not a significant change in the steady hum (threshold) the detector is tuned (ignoring the ground) and ready to be used, skip to step number 6 on page eight. If the steady hum (threshold) changed dramatically when the loop was lowered to the ground, further adjustments are necessary (the detector is not ignoring the ground). Proceed with step number 4 below.



4. If the steady hum (threshold) decreases or fades dramatically as the loop is lowered to the ground, turn the GEB control slightly clockwise, squeeze and release the Push Button (on the handle) with the loop held at waist level, and repeat step 3. The GEB control is a stacked tuner, coarse adjustment on bottom (large knob), fine on top (small Knob). Start with coarse adjustments, then when close to the correct setting is found use the smaller fine adjustment knob.

5. If the steady hum (threshold) increases or blares dramatically as the loop is lowered to the ground, turn the GEB control slightly counterclockwise, squeeze and release the Push Button (on the handle) with the loop held at waist level, and repeat step 3.

Continue these steps 3, 4, and 5, until little or no change in the steady hum (threshold) is noted as the loop is lowered to the ground.

Note: If it seems difficult or impossible to get little change in the steady hum (threshold) as the loop is lowered, you may be attempting to tune on top of a piece of metal. Move to a different spot on the ground and repeat the above steps. If difficulties persist, start turning SIGNAL BALANCE slightly counterclockwise (toward BAD GND) and repeat the above steps until ground rejection is successful.

Fine Tuning & General Use, Continued

6. If there is no dramatic change in the steady hum (threshold) as the loop is lowered in step 3, or if steps 3-5 are easily accomplished with the SIG BAL set at , turn the SIG BAL control slightly clockwise, squeeze and release the Push Button on the handle, and then repeat steps 3-5. By finding the highest SIG BAL setting (clockwise) that allows ground rejection and smooth stable operation, maximum detection depth is achieved.

CAUTION: If ground rejection can not be achieved in steps 3-5, failure to turn the SIG BAL control toward bad ground, and repeating steps 3-5, will result in poor detection depth. A setting toward bad ground may also be required in areas of heavy electrical interference to promote smooth stable operation. Squeeze and release the Push Button on the handle, and repeat steps 3-5 after each SIG BAL adjustment.

7. The detector is ready to be used. However, an operator must still make an important Mode decision which will significantly alter how the detector responds. Every time the MODE control is moved to another position, squeeze and release the Push Button on the handle with the loop held at waist level. This resetting ensures that all parts of the electronic circuitry are working in unison.

A. GEB/NORM (All Metal Ground Exclusion Balance Normal) is used for tuning, and in areas without lots of trash or mineralization, Relic Hunting. Because it responds to all types of metals, and doesn't operate as smoothly as GEB/SAT, GEB/NORM is usually not recommended for trashy or high mineral areas. However, if the detection of all metals is required without any loop motion, GEB/NORM would be the correct MODE to use. Because of its non-motion status, GEB/NORM is susceptible to drift from both internal and external sources. The Push Button on the handle will need to be squeezed and released every few minutes to reset the threshold hum, thereby keeping GEB/NORM operating correctly.

B. GEB/SAT (All Metal Ground Exclusion Balance Self Adjusting Threshold) If all types of metals are desired, (recommended when prospecting for natural gold nuggets and Relic Hunting), the GEB/SAT MODE should be selected. GEB/SAT will allow the detection of all types of metals while automatically maintaining smooth steady operation. It is necessary to keep the loop moving slightly for GEB/SAT to continue responding to metal. Thus, when pinpointing, "X" the loop slowly, always maintaining some movement. Another option would be to switch back to GEB/NORM momentarily to pinpoint. GEB/SAT is also a good MODE to use for locating steel pipes or iron property stakes. Such targets are typically rejected in the discrimination modes.

Fine Tuning & General Use, Continued

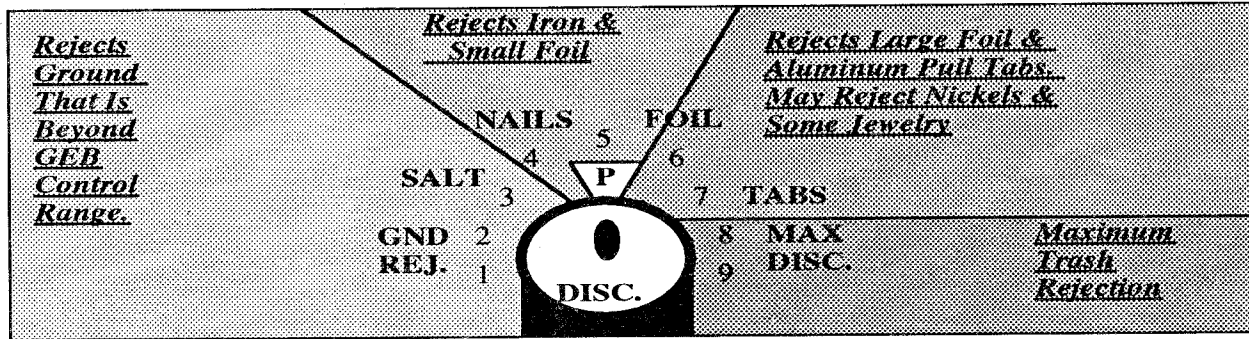
Note: Discrimination can be used in GEB/NORM or GEB/SAT simply by holding in the Push Button (on the handle) switching to the GEB/DISC MODE to check each target that has been located.

C. GEB/DISC. (Ground Exclusion Balance Discrimination) When the rejection of non-valuable metals, such as iron nails, bottle caps, etc. is desired, one of the DISC MODES should be selected. The GEB/DISC MODE is by far the most popular MODE to use. GEB/DISC is a true motion MODE. In other words, movement of the loop is critical for GEB/DISC to respond to metal. Practice with a steel bottle cap and a coin on top the ground. See that when the loop is moved too slowly, or stopped, this MODE doesn't respond. Only when the loop is in motion will GEB/DISC perform as designed. Also note that the coin produces a smoother sound than the bottle cap, thus the rejection of trash metals is recognized by the rougher sounds produced by trash targets. Because the 4900/DL MAX is designed to detect as deep as possible into the ground, large targets on top of the ground may be rejected. This is known as overload. Sweep the loop several inches above targets that are on top of the ground for normal results. It is rare for overload to occur when targets are actually in the ground. On the same note, targets which you bury in the ground will seldom produce accurate test results. Metals have to be left in the ground undisturbed for several years before accurate tests can be made. This phenomena results from digging which makes the minerals look different than the surrounding ground (ground matrix scarring). Such targets act much like mineralized hot rocks and therefore are rejected. However, it is also known that corrosion factors (halo effect) play a significant role in increasing detection depth, as well as affecting discriminate accuracy.

D. TR/DISC. (Transmit Receive Discrimination) When searching low mineralized areas, such as the dry part of a tan sand beach, or any area that allows an extreme clockwise SIG BAL setting, you may want to take advantage of the TR/DISC MODE. In low mineralized areas, TR/DISC provides excellent detection depth, and superior trash rejection, as well as being a non-motion mode. When there are minerals in the ground, GEB/DISC. will detect deeper than TR/DISC. Once the TR/DISC MODE has been selected, simply lower the loop to one inch above the ground, squeeze and release the Trigger on the handle, lower the loop the rest the way to the ground and search. Keeping the loop close to the ground at all times is critically important for TR/DISC to function properly.

CAUTION: Use of TR/DISC in high mineralized areas (which requires SIG BAL settings toward BAD GND) will result in poor results. There is a method of tuning TR/DISC for extremely high mineralized areas. It can then provide a non-discriminate, severe ground rejection, manual mode. This method is described in the Advanced Techniques section.

Fine Tuning & General Use, Continued



8. If either the GEB/DISC or TR/DISC MODES are selected, the DISC control then becomes active, and thus important.

A. The **P** position is recommended. At this position, most common trash such as nails, steel bottle caps, and light foil are rejected, and most valuables are accepted. The downside is that the aluminum pull tabs and aluminum twist-off bottle caps will still respond with a solid beep.

B. Turning the DISC control counterclockwise will provide even less trash rejection.

CAUTION: If searching saltwater beaches, the DISC control should not be reduced below the SALT indication marked on the dial. Salt, when wet, is conductive to a degree which cannot be rejected with the normal ground rejection feature. Rejection of salt is possible with a DISC setting clockwise of the SALT marking.

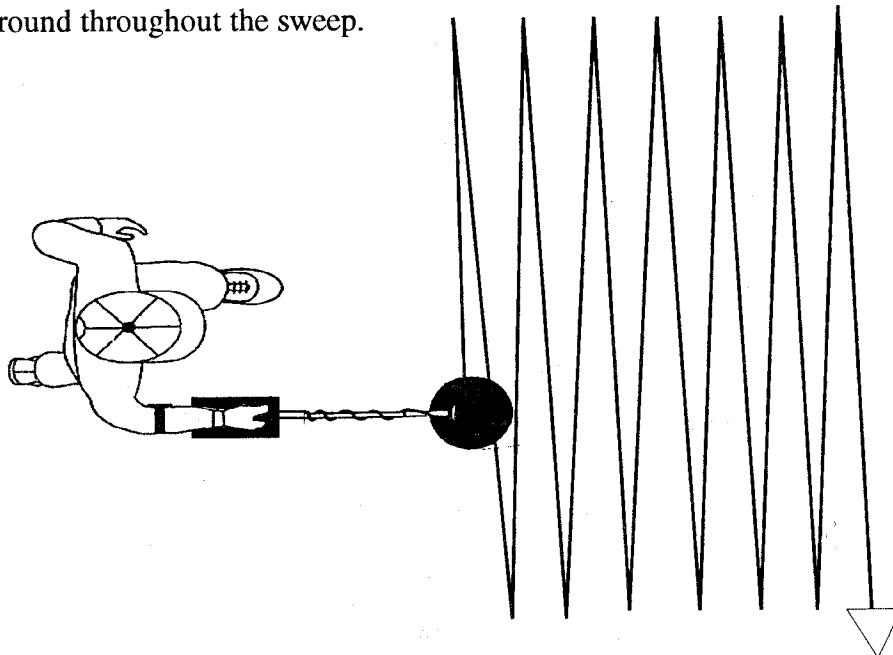
C. Turning the DISC control clockwise will provide more trash rejection.

CAUTION: If the DISC control is turned much further clockwise than **P**, nickels and many gold items will be rejected.

Note; You may ask, "How can optimum discrimination be achieved"? Only when the number of accepted trash targets becomes unbearable would it be advised to increase discrimination above **P**. Before long, trends will surface that give subtle clues regarding difficult targets. When pinpointing (Push Button held in) deep targets will produce softer sounds. Deep targets are more likely to be valuable. Differences in target size and shape can also be noticed during pinpointing. Often recommended is the highest DISC position that still responds to the U.S. nickel. Maximum trash rejection with minimum good target rejection is achieved.

Fine Tuning & General Use, Continued

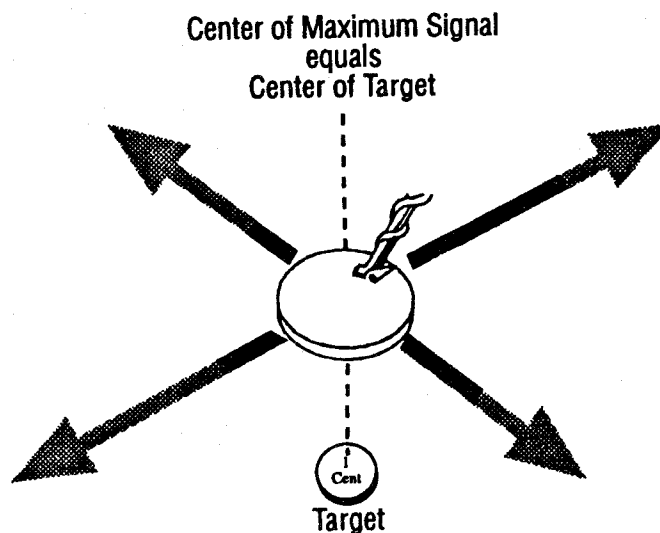
9. As searching begins, the sweep of the loop plays a critical role in how well the detector works. Sweep the loop close to the ground, from side to side, overlapping each pass. One pass from left to right should take one and a half to two seconds. Moving from right back to left, where the sweep first started, should take another one and a half to two seconds. The maximum detection depth will be in the center of the loop, thus if loop passes are not overlapped by at least 50%, some deep targets may be missed. Do not arc the sweep at each end. Keep the loop close to the ground throughout the sweep.



10. Once a smooth solid beep is heard, (indicating a good target), sweep the loop over the area several times, listening carefully to the sound. Squeeze and hold the Push Button on the handle, and "X" the loop over the area. Note the loudest sound. This pinpoints the targets precise location. Softer sounds (lower volume) indicates a deeper target depth. Deeper targets are more likely to be valuable and more likely to produce questionable responses, thus deeper, questionable targets should often be dug. The discrimination sounds are more accurate on shallow targets. However, strong targets that are shallow may overload, producing a junky sounding response. Lifting the loop a few inches higher and again sweeping over the area will improve discrimination accuracy in such cases. Additionally, once a questionable target's precise location is determined, release the TRIGGER and sweep the loop directly over the center, again consulting the sound. The most accurate indications are achieved when the loop is swept directly over the center of the target.

Fine Tuning & General Use, Continued

11. Pinpointing and digging take some time and practice. Many different types of digging tools are available to help you. If you don't yet have a digging tool, contact your dealer. The type of digging tool best for your area, your type of searching, and best for you personally, is a matter of opinion. The important thing to remember is consideration. Fill in all holes you dig. Be thoughtful regarding where and when you dig. Obviously midday on a beach crowded with sun bathers, is not a good place to search. Early morning or late evening are more appropriate. If someone cares for a lawn (keeps it looking nice) and yet gives you permission to search, be equally thoughtful by taking extra steps to minimize any damage digging may do to the vegetation. The use of a small drop cloth (to place dug soil onto) is suggested in such areas. This minimizes soil smearing around the hole, making such diggings less noticeable.



12. A location to search, and getting permission, is a major part of successful metal detecting. Research always pays off. It may mean digging through old newspapers at the local library, documents at city hall, or just talking to a lot of longtime citizens. You will be surprised what you can find out, and research can be half the fun! Do not be discouraged if someone has already searched an area, that just makes for a little more challenge. No one finds all the valuables in an area even with multiple searches. Take a little more time and dig a few more of the questionable targets. Often areas replenish themselves either through use, such as a beach where jewelry is continually lost, or through naturally occurring shifts in the soil, frost heave, erosion, etc., which bring previously undetected targets within reach. Sand and soil movement in many areas makes each season a new ball game.

Explanation Of Controls

1. Power: The Power control turns the instrument ON/OFF, selects either Hot Rock Accept or Hot Rock Reject, and tests the battery strength.

A. POWER OFF position is selected when the detector is not in use. (Batteries should be removed when the detector is stored.)

B. HOT ROCK ACCEPT / REJECT only affects the GEB/DISC MODE.

1. ACCEPT provides maximum results. This setting may, however, be plagued by false signals in some areas. These false signals are caused by mineralized rocks and are recognized by the audio signal disappearing upon attempting to pinpoint. Typically ACCEPT produces more audio sounds which need to be interpreted by the operator.

2. REJECT eliminates most of the false signals associated with mineralized rocks. Rejection occurs by a nulling or fading of the audio sound. REJECT cancels responses caused by rocks higher in mineral than the current ground rejection setting. By definition this is a hot rock. The drawback is that some very deep targets, in highly mineralized ground, may appear to be similar to a hot rock, and be rejected. It is recommended to use this reject position until some field experience is gained. At the point of becoming comfortable with field use, try using the ACCEPT position. If hot rocks make it unbearable to search, switch back to REJECT. If hot rocks are not a problem, or if you can easily identify them with the pinpoint mode, continue using the ACCEPT position.

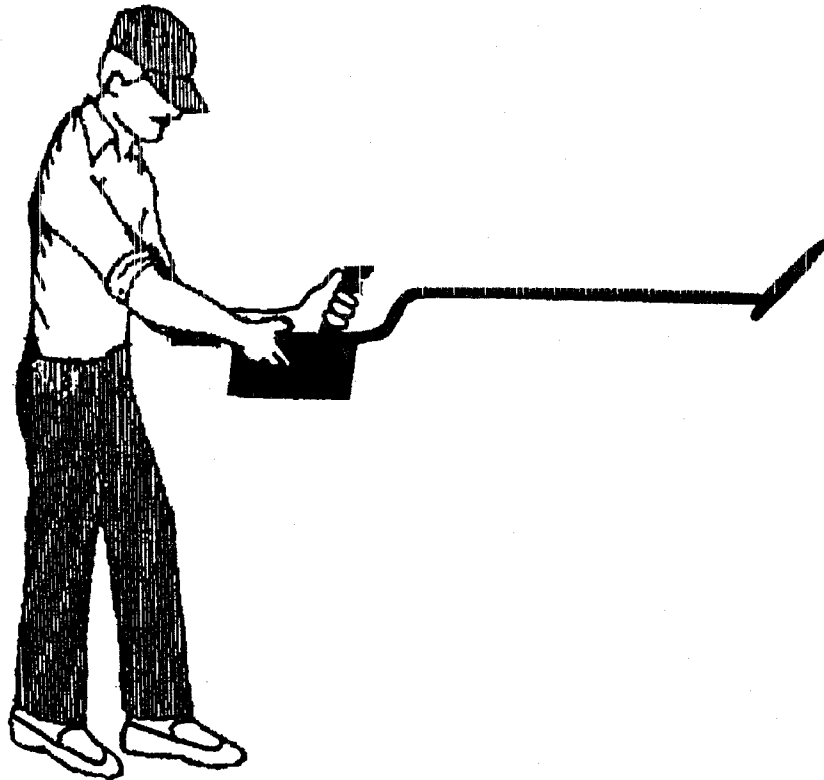
C. BAT. CHK. Battery Check is used to check the condition of the batteries. When placed in this position, the current battery condition is shown on the Battery Good LED light. A bright indication will operate the detector. Once the Battery Good light no longer indicates brightly, new batteries should be installed. Usually batteries last between eight and fifteen hours of use. (Battery life varies with type, temperature, and mode). The use of headphones will significantly improve battery life. Standard battery power tapers off steadily. Rechargeable battery power plateaus for most of its life, then rapidly drops below a usable level (always carry backup batteries).

Explanation Of Controls, Continued

2. Tuner: The Tuner selects the steady hum or threshold which should be heard continually during use. The Tuner should be set to a slight steady hum (threshold), each time the instrument is to be operated.

A. To set the Tuner place the Mode control to GEB/NORM, hold the loop at waist level away from all metals or ground minerals, squeeze and hold the Push Button on the handle, and turn the Tuner control until a very slight faint hum (threshold) is heard. Release the Push Button. Tuner control should end up near the  preset mark.

B. Silent Search once the threshold has been set, the Tuner can be turned slightly toward MIN to produce silence until a target is detected. Some detection depth may be compromised.



Explanation Of Controls, Continued

3. Mode: The Mode control selects the manner in which the detector operates, such as the detection of all types of metals, or the rejection of some metals, the rejection of ground minerals, etc. Mode selection has the greatest impact on how the detector operates and performs. No single Mode will offer all the advantages an operator desires, therefore four different modes are available.

A. GEB / NORM responds to all types of metals while rejecting ground mineralization. It is a true non-motion Mode, which indicates that the loop can be held stationary over a metal target and the detector will continue to respond. This makes GEB/NORM an excellent Mode to pinpoint a target's exact location. If the Push Button is squeezed and released several times as the loop is passed over the target area, more precise pinpointing can be achieved. This is called de-tuning. Before continuing to search, lift the loop to waist level and squeeze and release the Push Button once more to clear for wide-scan searching.

B. GEB / DISC  rejects some metals based on the DISC control setting, and rejects ground mineralization. It is best used for coin, beach, and general purpose searching. It is a true motion Mode, which indicates that the loop must be continuously swept (kept in motion) for metal targets to continue to respond. GEB/DISC is the most commonly used Mode. It rejects junk and ground minerals and thus operates smoothly and efficiently. Squeezing and holding the Push Button (on the handle) will temporarily access the GEB/NORM Mode for pinpointing. Releasing and re-squeezing the Push Button several times will allow more precise pinpointing (de-tuning). Before continuing to search, squeeze and release the Push Button once more with the loop at waist level to clear for wide-scan searching.

C. TR / DISC rejects some metals based on the DISC control setting. It will not reject ground minerals when set for discrimination, thus is only recommended for very low mineralized areas such as tan or white color sand, or areas which allow extremely high SIG. BAL. settings. TR/DISC has superior rejection against junk and is a true non-motion Mode. However, it will not penetrate mineralized ground and reject trash at the same time. (*See section on Advanced Techniques for setting TR/DISC for extended manual ground rejection.*) The TR/DISC Mode will pinpoint well. Holding the Push Button temporarily switches to GEB/NORM if extra help is needed for pinpointing the target's exact location.

Explanation Of Controls, Continued

D. GEB / SAT responds to all types of metals while rejecting ground minerals. Unlike GEB/NORM, the GEB/SAT Mode has a feature called Self Adjusting Threshold which smooths operation over varied ground. This feature makes GEB/SAT a better choice for general all metal searching. Although it is not a true motion Mode, loop motion is required for GEB/SAT to continuously respond to a metal target. To pinpoint, either slow the loop sweep in an "X" pattern over the target area, or switch to GEB/NORM and pinpoint as described for that Mode.

4. GEB: The GEB control is used to select the actual ground rejection setting, so that ground minerals can be ignored. When ground minerals are ignored, increased detection depth and smoother operating stability are achieved. Setting the GEB control is recommended each time you use your instrument. The GEB control is a stacked tuner, coarse adjustment on bottom (large knob), fine adjustment on top (small knob).

A. To set GEB place all controls to  except Mode. Set Mode to GEB/NORM. Hold the loop at waist level away from all types of metals and ground minerals. Squeeze and hold the Push Button and adjust the TUNER for a slight hum (threshold), release the Push Button. Lower the loop to the ground while listening for any change in the threshold hum. Proper ground rejection is indicated by little or no change in sound as the loop is lowered to the ground. If the sound decreases as the loop is lowered to the ground turn GEB control slightly clockwise, squeeze and release the Push Button with the loop held at waist level, and again lower the loop to the ground. If the sound increases as the loop is lowered to the ground turn the GEB control counterclockwise slightly, squeeze and release the Push Button with the loop held at waist level, and again lower the loop to the ground. Continue until little or no change in threshold is noted as the loop is lowered. Use the larger coarse knob until close to the correct setting is found, then use the smaller fine adjustment to fine tune.

B. Difficulties may indicate you are attempting to balance over a metal, move to another spot on the ground and repeat the above steps.

C. Persistent trouble with this setting should be remedied by turning SIGNAL BALANCE control slightly counterclockwise (toward BAD GND) and repeating the above steps. The furthest clockwise SIGNAL BALANCE setting that allows ground rejection, and smooth stable performance, should be used. Ease in setting the GEB control would indicate a further clockwise SIGNAL BALANCE setting should be selected, and the above steps outlined in "A" repeated.

Explanation Of Controls, Continued

5. DISC: The Discrimination control selects the amount of rejection against junk metals such as nails, tin or aluminum foil, etc. It only affects the GEB/DISC and TR/DISC MODES.

A. GND REJ (Ground Reject) is used when operating one of the discriminate modes without rejection of trash. Indicates lowest Disc setting that rejects extreme ground mineralization. A DISC mode with minimum discrimination may be more stable (operate smoothly) in some ground conditions.

B. SALT indicates the DISC control must be set at this point or higher (further clockwise) when used on a saltwater beach. Salt is conductive when combined with water and tends to respond like a metal rather than a mineral. The DISC control can cancel much of this salt response when set at salt or higher.

C. Nails indicates the point on the dial that most iron is rejected.

D.  is the recommended setting for coins and general purpose searching. At the  setting, most common junk is rejected and most valuables are detected. Settings further clockwise than  may reject common gold jewelry. This exact point can be determined by finding the highest point on the dial that still responds to the U. S. nickel. When the DISC control is set to this point, maximum rejection of junk is achieved with very little rejection of gold jewelry.

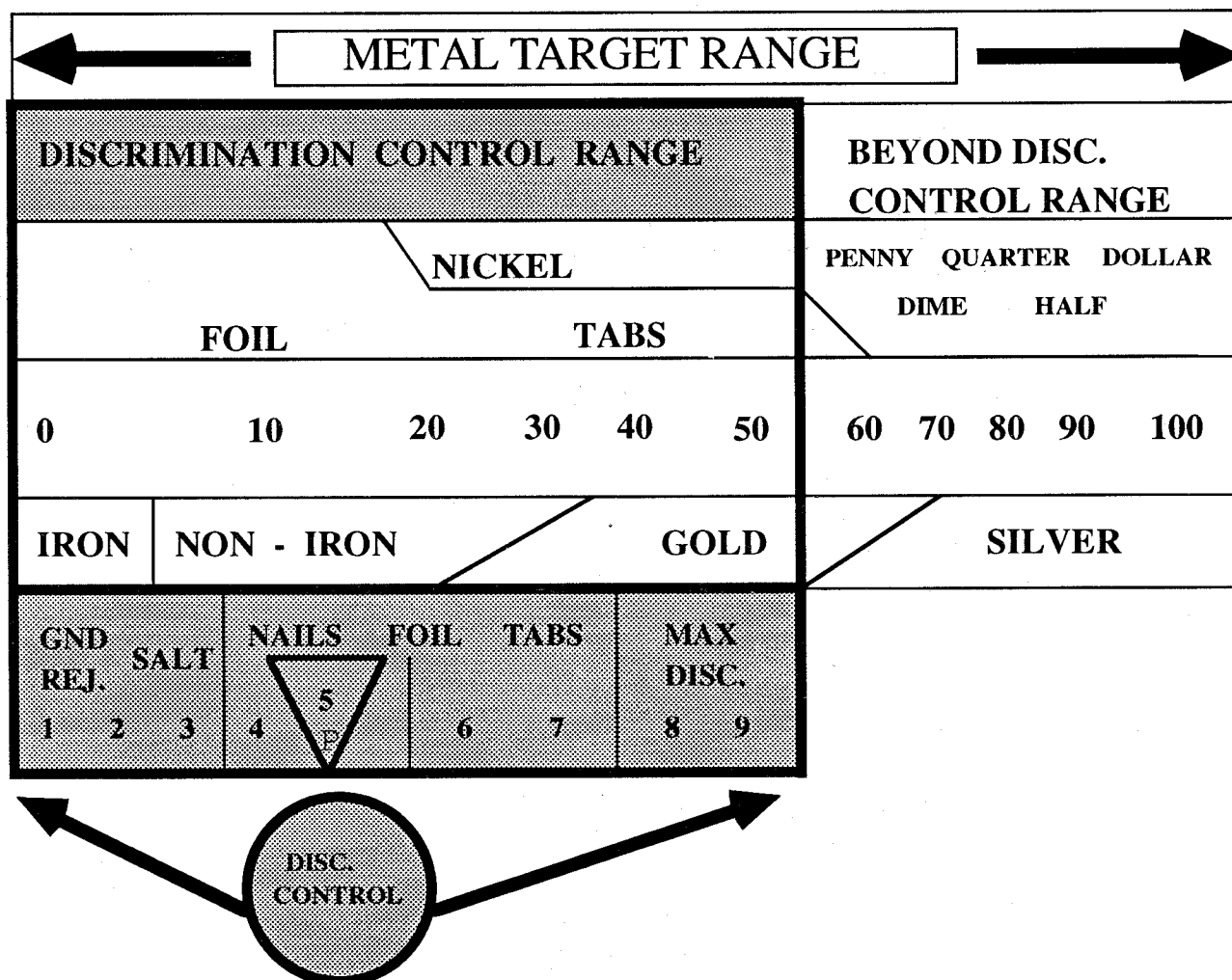
E. DISC control range from  through MAX represents high trash rejection. Small FOIL is rejected prior to NICKEL or . Large FOIL may not be rejected until after the NICKEL and gold jewelry (clockwise from ). The  setting on the DISC control represents medium trash rejection.

F. MAX DISC. would represent a setting just below PENNY rejection. PENNY indicates a copper one cent. 1982 and newer USA cents are made mostly of zinc and therefore can be rejected by the discriminator in some types of ground conditions, at high DISC control settings.

G. It is advised to use  or lower DISC control settings to avoid the rejection of nickels and gold. The highest DISC setting that still responds to the nickel (with a smooth solid sound) is highly recommended. DISC settings higher than this point on the DISC control, will reject some valuables.

Explanation Of Controls, Continued

H. When the DISC control is set to a particular position, all targets which fall counterclockwise of that position will be rejected. They will not respond with an acceptable smooth solid sound. Typically, either no sound will be heard or a broken "cut-short" sound will be produced by such rejected targets. Everything clockwise of that position will be accepted. Accepted targets produce noticeably smoother, more solid sounding responses.



Explanation Of Controls Continued

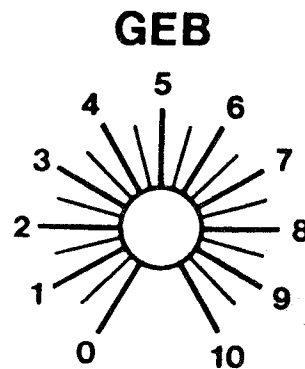
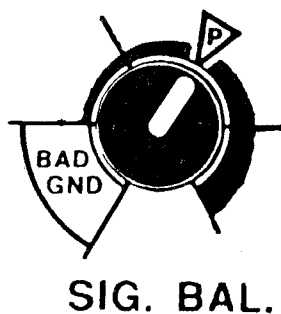
6. SIG BAL, (Signal Balance): The Signal Balance control allows the amount of receive signal coming from the loop into the circuitry to be controlled, thus optimizing detection depth in a variety of ground conditions.

A. To set the SIG BAL, find the furthest position clockwise which allows ground rejection and smooth stable operation. (*See Fine Tuning, pages 7 and 8.*)

B. High Mineralization typically will cause more receive signal than the electronic circuitry can handle. Such conditions result in overload of the receiver, which will cause poor detection depth. A SIG BAL setting toward BAD GND will reduce the size of the receive signal to a manageable level, thereby improving detection depth and stability.

C. Low Mineralization typically has little or no effect on the receive signal, therefore a SIG BAL setting further clockwise will improve detection depth. At some point as the SIG BAL control is turned clockwise, the detector will become unstable and unpredictable. A slightly counterclockwise SIG BAL setting will regain the stability necessary for good detection results. (More range than is usable is allowed on the SIG BAL control to allow for all possible conditions one may experience.)

D. GEB must be reset after every SIG BAL adjustment. Failure to reset the GEB after a SIG BAL adjustment will result in improper ground rejection and poor performance. The SIG BAL and GEB controls work hand in hand to tune out the effects of the ground and maximize detection depth.



Explanation Of Controls, Continued

7. PUSH BUTTON: The Push Button switch located on the handle is used for several different purposes. This Push Button has two possible positions; "not held in" which is used for normal searching, "pushed in and held" which activates a temporary change in the mode.

A. Reset, clear, or retune after control adjustments or pinpointing. Most control adjustments will cause sections of the electronic circuitry to become out of sequence. Squeezing and releasing the Push Button will reset or clear so that all the electronic circuitry works in unison. Manual pinpointing (when the Push Button is squeezed and released while the loop is near the target) will narrow the loop's detection field. This is called de-tuning. The loop's detection field will remain narrow until the Push Button is squeezed and released (while holding the loop away from any targets). This resets the loop's detection field allowing it to detect its widest possible search pattern.

B. Changes Mode to the opposite of that in use. If operating in GEB/DISC mode, squeezing and holding the Push Button switch will temporarily activate the all-metal GEB/NORM mode. This is ideal for pinpointing as GEB/NORM requires no movement of the loop to respond to metal targets. Releasing the Push Button returns the instrument to the original mode. The mode changed to depends on what mode the instrument is in at the time.

1. When operating in GEB/NORM, holding the Push Button will switch to GEB/DISC. This is useful as GEB/NORM ignores most mineralized rocks, hot rocks, and detects all metals. A determined operator may want to search in GEB/NORM and hold the Push Button to check each target in GEB/DISC. This type of searching takes a lot of patience as all types of metals will respond. It is however, a very good way to Relic Hunt.

2. When operating in GEB/DISC, holding the Push Button will switch to the GEB/NORM mode. This is useful as GEB/DISC must always have loop movement to respond to a metal target, making pinpointing difficult. GEB/NORM requires no loop movement to respond to metal targets.

3. When operating in TR/DISC, holding the Push Button switches to the GEB/NORM mode. This can be helpfull in checking deep weak responses.

Explanation Of Controls, Continued

Push Button Mode Changing, Continued

4. When operating in the GEB/SAT position, holding the Push Button switches to the GEB/DISC mode. This can also be used in the same manner as GEB/NORM. Searching in the GEB/SAT mode all metals are detected with little trouble from mineralized rocks (hot rock). Once a metal target is located the Push Button can be held (switching to GEB/DISC mode) to check the target. Again this is a very good way to Relic Hunt.

C. MODE SWITCHING CHART The following chart lists the Mode changes activated with the Push Button.

MODE CONTROL	Operating Mode Pushbutton (not held)	Operating Mode Pushbutton (held)
GEB/NORM	GEB/NORM	GEB/DISC
GEB/DISC	GEB/DISC	GEB/NORM
TR/DISC	TR/DISC	GEB/NORM
GEB/SAT	GEB/SAT	GEB/DISC

Advanced Techniques

There are many advanced searching techniques used with today's metal detectors, the scope of which can not be covered in any instruction manual. Once the information in this manual is fully understood, special uses and conditions will become a matter of common sense, experience, and experimentation. The following advanced technique has many different uses. It provides a way of manual ground rejection that has a range far beyond that possible with the standard system. Primarily used for prospecting natural gold nuggets, it also can be useful in other high mineral areas such as black sand salt water beaches.

1. To Begin place all controls to  except MODE and DISC. Set MODE to GEB/NORM and DISC in the middle of the area marked GND REJ. (ground reject). Squeeze and hold the Push Button with the loop at waist level, and adjust the TUNER for a very slight faint hum (threshold). Release the Push Button, place the MODE to TR/DISC. Squeeze and release the Push Button.

2. Lower The Loop to the ground while listening to the slight threshold hum. The hum will either increase, decrease, or stay the same. The desire is to find the point on the DISC control that allows the loop to be lowered to the ground with no noticeable change in the threshold hum. This indicates the ground is being ignored.

3. If The Hum Increased as the loop was lowered to the ground, turn the DISC control clockwise very slightly, lift the loop to waist level squeeze and release the Push Button, and again lower the loop to the ground while listening for any change in hum.

4. If The Hum Decreased as the loop was lowered to the ground, turn the Disc control counterclockwise slightly, lift the loop to waist level squeeze and release the Push Button, and again lower the loop to the ground while listening for any change in hum.

5. Continue the above steps until little or no change in hum is noted as the loop is lowered to the ground. Note that a very small adjustment of the DISC control has a dramatic effect, so each adjustment will need to be as small as possible.

Advanced Techniques, Continued

6. At this point the detector is ready to be used and will perform very similarly to the GEB/NORM MODE but with greater ability to reject extreme ground mineralization. The detector will be susceptible to occasional electronic drifting. Lifting the loop to waist level and squeezing and releasing the Push Button will be necessary to maintain the threshold. Additionally, changes in the ground such as dry sand to wet saltwater sand will be dramatically apparent. Attempts must be made to search one general area of a similar ground type, then when changing to another ground type re-tune as previously described under steps 2-5, of this section. Some areas of quickly changing ground conditions will be impossible to search using this method. The GEB/SAT MODE is better suited to these areas.

7. The SIGNAL BALANCE control will have an effect on the TR/DISC Mode. As with the GEB/NORM Mode, the Signal Balance control should be set at the furthest point clockwise that allows ground rejection. Ground rejection is indicated by no change in the threshold hum as the loop is lowered to the ground. If when attempting to set the DISC control for ground rejection, it is not possible to achieve little change in hum as the loop is lowered, turn the Signal Balance control slightly counterclockwise (toward Bad Ground) and try again. If it seems easy to achieve ground rejection, turn the Signal Balance control slightly clockwise and try again. By finding the furthest clockwise position which allows ground rejection, optimum detection depth will be achieved. As the Signal Balance control is turned clockwise, the instrument will become more temperamental (sensitive to both electrical and ground interference). A slightly counterclockwise Signal Balance setting may be required for smooth running performance.

8. Mode Changing from TR/DISC by squeezing and holding the Push Button switches to the GEB/NORM Mode. This can be useful in checking mineralized rocks for valuable metal content, "ore sampling". Ore sampling can be done while searching. A piece of ferrite will be needed. Ferrite is a magnetic iron sample which can be purchased inexpensively from local radio or electronic shops. First tune the TR/DISC Mode for ground rejection as described. Ore sampling is completed by tuning TR/DISC to reject the common ground in the area. The GEB/ NORM mode is tuned to ignore ferrite. When an unusual rock is found, the Push Button is squeezed and held, and the loop passed over the rock. Significant response (beep), indicates the presence of valuable ore (*See step 9*).

Advanced Techniques, Continued

9. Ore Sampling is completed once TR/DISC has been tuned for ground rejection, by switching to the GEB/NORM Mode. Place the Mode control in GEB/NORM, hold the loop away from all metals or the ground. Squeeze and release the Push Button. Move the ferrite sample toward the center of the loop. The slight hum (threshold) will either increase, decrease or stay the same. The desire is to find the point on the GEB control that ignores the ferrite sample. Squeeze and release the Push Button switch after each GEB adjustment. Now sweep the ferrite sample across the loop several times. Make sure it doesn't respond with a "beep". The ground balance may need to be adjusted several times to get good rejection of the ferrite sample, which is necessary for accurate ore sampling. Once completed, Switch back to the TR/DISC Mode and begin searching for nuggets. If an unusual rock is found, squeeze and hold the Trigger and pass the loop over it. A significant sound (beep) should be checked by separating a sample of the rock from the ground around it, and testing it by passing it past the loop separately from the rest the ground. A significant increase in sound while in TR/DISC with the Trigger held and the sample passed by the loop, indicates that the sample rock has traces of non-ferrous metal.

10. Non-Ferrous Metal is a metal not of iron i.e., nickel, aluminum, copper, silver, gold, etc., all of which have some value. Only a professional assay can tell exactly what and how much non-ferrous metal is present. However, because assays can be expensive, knowing what samples are strong (indicated by significant response), and which are weak (indicated by a softer weaker response), can save lots of time and money. A worthwhile mining proposition will vary with the size and accessibility of the material, how many ounces of valuable metal per ton of rock, as well as what type of ore it is, i.e., nickel, copper, gold, etc.

11. Straight Ore Sampling can be completed simply by leaving the detector in the GEB/NORM Mode tuned to ignore ferrite. Keep the loop away from the ground. Pass samples past the loop and note the response. Loud, strong responses indicate good samples to have assayed. Weak response indicate samples far less likely to contain significant non-ferrous (valuable) metal. Another option would be to tune TR/DISC, with the DISC control, to balance out the ferrite sample in the same way the ground was tuned out, only use the ferrite sample in place of the ground. At the point TR/DISC ignores the ferrite sample, strong non-ferrous ore samples will cause a significant increase in sound (threshold), when passed by the loop.

Trouble Shooting

When trouble occurs with the use of a metal detector, often a person can avoid unnecessary inconvenience by reviewing the following tips.

1. False Signals or Instability can often be caused by situations outside of the detector. For example electrical interference from power lines, or other high power transmitting devices. Often these devices can be identified, sometimes they can not.

A. Try reducing the Signal Balance control slightly counterclockwise, and resetting the ground balance using the GEB control.

B. Persistent false signals may require that you try searching a different area, at least several miles away. If you really want to search a high interference area, try different times of the day or week. Often such interference is only present at scheduled times.

C. If not area related, start checking the components of the detector. The battery pack should be removed from the instrument and the contacts inside the "C" cell battery holder should be scratched clean of any corrosion buildup, and the springs should be stretched a little to assure a firm contact. The contacts on the outside of the battery holder should also be scratched clean of any corrosion. The battery contacts inside the instrument battery compartment should be pulled slightly outward toward the battery door so that they make a firm contact with the battery. The instrument control box should be checked with a different loop, either an accessory, or a friend's loop off a similar model. Your Dealer may also be able to assist you in checking the instrument. Loop problems are most often due to damaged cable, from snags on brush or blackberry vines, or simple cable wear. Inspect the cable for any visible signs of damage.

2. Moisture and Humidity, when extreme, can cause problems with all electrical circuits. Most electronics are only guaranteed to operate in up to 75% humidity, which is minimal humidity in some areas. Although the electrical circuitry of your instrument has been sealed with a plastic coating, wetness can still cause failure, particularly when the dampness is combined with salt, as occurs in many beach environments.

A. Damp Environment Use should always be followed by placing the detector in a warm dry place to dry out when not in use. Remove the batteries and leave the battery door open.

Trouble Shooting, Continued

B. Dampness Failure can often be cured simply by drying the instrument out in the above manner. Dampness failure can cause varied symptoms, everything from complete non-responsiveness to instability or false-targeting.

3. Repairs in the unlikely event your instrument requires servicing should be referred to a trained professional at a Authorized White's Service Center. Today's models require specialized equipment and training to service properly. All White's Authorized Service Centers have years of experience and their work is guaranteed by the factory.

4. The Location of the White's Authorized Service Center for your area is enclosed in the Accessories catalog. If misplaced, telephone toll-free 1-800-547-6911 for their name and address. Please send the complete unit with an explanation of the trouble.

Caring For Your Instrument

Precautions:

1. Water can damage your instrument. The loop is waterproof and submersible, however the loop-to-control box connector and the control box itself are not waterproof. Light rain or drizzle will not cause a problem. However, the instrument control box must be protected from heavy rain or submersion in water.

A. The loop can be cleaned with a mild soap and water. A damp cloth can be used to wipe clean the control box. The control box can be polished with automotive or furniture wax. Use only cotton cloth to clean and wax. The instrument should be cleaned after heavy use in or around a saltwater beach. Salt is very corrosive. (The warranty does not cover cosmetic imperfections due to wear, or exposure to sun and salt.)

B. When searching with the loop in the water or wading, be careful. The rod will fill with water, and if lifted above the height of the control box, will run into the rod on top of the control box. Although sealed, some seepage can occur into and on top of the circuitry, causing malfunction. Again, drying the detector in a warm area with battery removed and compartment open will most often cure any malfunction. If for any reason the control box is dunked in saltwater, flush the entire instrument with fresh water immediately prior to letting the detector dry out.

Caring For Your Instrument, Continued

2. Loop Covers, a protective plastic shield for the loop bottom, are highly advised accessories when searching sand or rocky terrain on a regular basis. They are available from Dealers and have no effect on detection depth. Loop covers should be removed periodically to remove any sand which can affect detector performance.

3. Heat and Cold can have an adverse effect on your detector. When not searching, rest your detector in the shade. When left in a car on a hot day, cover it to protect it from the direct sun. Extreme sub-zero temperatures can also cause problems. Store your detector indoors in a heated area during the winter months, with the batteries removed from the instrument and from the battery holder.

4. Common Sense should be used. Avoid impacts, stacking heavy objects on top, and unnecessary roughhousing. When not in use, the detector should be treated like any other sophisticated electronic device.

Warranty Information

Should you for any reason sell your metal detector prior to the warranty described on the following page expiring, the remaining warranty is transferable. This transfer is authorized by calling toll free 1-800-547-6911, and getting an authorization number.

Fill out the following information, including the authorization number obtained from the toll free number, seal it in a stamped envelope, and send it to White's Electronics, 1011 Pleasant Valley Road, Sweet Home, Oregon 97386. The remaining warranty will then be available to the new owner.

The warranty statement on the following page applies to both the original owner as well as the second owner.



Original Owner:

Name: _____

Address which appeared on original warranty card: _____

Instrument Serial Number: _____

Date Code: _____

New Owner:

Name: _____

Address: _____

Comments: _____

Authorization Code: _____



White's Electronics, Inc.



Limited Warranty

If within two years (24 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.

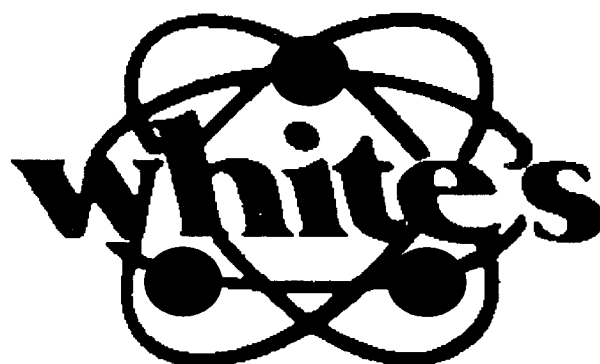
White's registers your purchase only if the Sales Registration Card is filled out and returned to the factory address soon after original purchase for the purpose of recording this information, and keeping you up-to-date regarding White's ongoing research & development.

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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1011 Pleasant Valley Road
Sweet Home, OR. 97386 USA**

**Distribution: 1-800-547-6911
Factory: 1-541-367-6121
FAX: 1-541-367-2968
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