Discovery Treasure Baron Metal Detectors

A collection of valuable information for those who own a Treasure Baron or would like to know more about these great metal detectors designed by George Payne.

Much of this information was originally part of Jbirds dedicated Treasure Baron website, which is now deleted due to his passing away a number of years ago.



This collection was complied by Sven Stau, 2019 www.treasurelinx.com

Baron Tips

by Jbird

The more things change......the samer they get. The new Tesoro Tejon has brought back a new version of the dual discrimination circuit with some similarities to the old Fisher 1266 design. And thats good......more versatile than some notch set-ups.

I have been using an arrangement on my Baron Goldtrax that I think is even more versatile and effective. I think it allows me to identify some round tabs and leave them in the ground without missing out on any rings. I wish some of you Baron guys would try out these settings, if you haven't already, and let me know what you think. I especially like these settings with the 5.5 coil.

With these settings, I will be hunting in all metal mode and checking with discriminate mode. Set the discriminate mode in iron reject. You will understand why I do this as we go along. Iron Reject is a fixed setting that George Payne refers to as just rejecting salt water but remember that it is also rejecting some small foil and small gold items. Dont worry, we aint gonna miss any of them itty bitty thangs because we are gonna spot them first in all metal mode. Now throw a ringtab on the ground. I use one with the beaver tail sticking straight out but if most ringtabs you find have the tail folded, you might wont to use one of those. Next, adjust your high/low tone break point to do the hi/lo warble over the ringtab. So now when you hear the lo/hi warble, you know you are hearing a ringtab. Try speeding up and slowing down you coil speed sweeping over the tab and see if you dont notice the tab trying to go a little more hi tone with a faster sweep and a little more lo tone with a slower sweep. Your chances of finding jewelry or a ring that will sound like that is just about zilch. A ring in that conductance range will give a much better sound with a faster coil sweep whereas the ringtab, being irregular shaped, will tend to go scratchy.

So you start hunting in all metal mode. The Goldtrax will indicate iron with that gawdawful staccato sound plus the little red LED light flashes on the control panel. Since I belt mount, I just go by the audio sound to eliminate iron. A really good thing happens here. Almost all bottle caps have enough iron to cause a stacatto sound, we are eliminating them Even in wet conditions, where bottle caps sometimes fool us with higher conductivity readings, the Goldtrax will still identify them in all metal mode by the audio sound. Be careful of weak iron stacatto sounds as that could be gold or a small jewlry item. If you hear any sound thats not iron, switch to Discrimination mode.

If you have switched to disc and dont hear nothing, that is a good thing:-) That means what you heard in all metal is being discriminated out in disc. which places it in the conductance range between iron and saltwater. I have a couple of small rings and a gold chain that falls in that range but more often than not, you will find foil there. I did find a 22 caliber bullet at four inches in this range also.

If you switch to Disc. and hear the lo/hi warble you know you are over a ring tab. If you get a good solid low tone you know it is something in the conductance range below a ringtab and above saltwater. Nickels hit very solid here and so do some low conductance jewlry items and of course, more foil. If you switch to Disc and get a very solid hi tone, you are in the conductance range from ringtab up thru coins with some jewelry items also.

So there you have it. The Goldtrax is very accurate in indicating iron by audio sound once you become familiar with the variations in the Stacatto audio. It can identify them pesky bottle caps for us. It can exactly identify that very small range between iron and saltwater. It can identify some ringtabs so we dont have to dig them but still get rings in that conductance range. It gives a low tone for nickels and other low conductive items. It gives a high tone so we can dig coins and square tabs and such in the high range, including indian heads and wheaties that some push button and switcherator machines discriminate out.

I dig Square tabs without too many cuss words after I found out that a quarter with some low conductance item like a nickel or gob of foil laying within a couple of inches of it reads like a Square tab.

With the settings I am using, I still dig ring tabs with tail folded or those that are mutilated and warped out of shape cause they still give either a good low or high tone. I used the ringtab with the extended tail as the point to set my tone break point because I believe I can better differintuate between them and a ring.

Different detectors use some different ways of discriminating or alerting us as to what conductance range our targets are in. Ive always appreciated the versatility of this old Goldtrax. I could just as easily leave it in discrimination mode in the iron accept range with the tone break point set on nails and dig every high tone but the settings I have described are fun to play around with and allows me to eliminate iron better as well as bottle caps and some ring tabs. Makes me feel plumb technified:-) The Goldtrax has seperate sensitivity controls for all metel and discrimination modes and in my good dirt with both modes pumped up as high as they will go and that little 5.5 coil, I can get some serious depth, like about 8 inches if Im hunting careful. Does everything but dig its own hole. Im thinking of adding the deep hunter module to it and use it for blowing post holes:-)

The discrimination knob on the Cointrax Baron changes the break point for the audio tones. I set it to the 9 o,clock position on my Baron with iron audio on, that gives low tones for iron and small foil, split high/low tones on medium foil and nickels and high tones on everything else. As most gold rings fall in the foil/nickel range, having the audio giving the split tone is a constant alert that the target could be gold. Also, the preset sensitivity on the Cointrax is too high for many areas. I use the turn on mode, or Demo, most of the time and the sensitivety is preset to 3. I've found the Cointrax to run more stable by reducing the sensitivity to 5, and even 9 in some conditions. Very little depth is lost until the setting is at 7 or below.

For those who use the base Baron, ProHunter Baron and possibly the GoldTrax module. If you turn the iron audio off by pushing the disc knob the discrimination range changes. Most medium and small foil will be rejected at 0 discrimination as well as iron. That's good. What is not good is that a large number of smaller gold rings and all gold chains except large ones will also be rejected. I checked 20 small rings and 3 different size chains with my Baron converted back to the Base unit and with iron audio off it rejected 9 of the rings and all 3 chains, even with the 5.5" coil. One of the chains is a 14 kt medium size chain. With iron audio on and disc set to reject nails it hit on all the rings and

chains, even with the chains stretched out.

Jbird posted these tips on Carl's old forum. The two tones of the Barons help a lot. If you use JB's "Dig em Cowboy" setting of small iron like nails on low tone and everything else high tone, good targets will mostly be clean hi tones with varying strength of signal. Deeper the target, weaker the signal. I know the barons give a strong signal even on deeper targets but they will fade in strength noticably below about 5 to 6 inches. Lots of my deeper finds were just a tiny hi tone "duh". If I have any sensitivity adjustment left, I can tune that up to a good solid signal at very respectable depths by raising sensitivity. Of course very small targets at shallow depths can sound like some coin targets at deeper depths. Breaks of the game. If you get a hi tone with just a hint of low tone, that may be a low conductive target or one located very close to iron. A clear hi tone is a target further up the conductivity scale. The baron is good about giving 4 way signals on targets that are not masked by very close trash but you can't always ignore two way or even one way signals. Listen to the two tones and if you are getting a high tone chirp mixed in with low tones, you could have a coin or good target in there. This varies some by site, depending on what the predominate trash targets are and where you set your tone control.

More tips from Jbird. The CoinTrax and GoldTrax modules for the Treasure Baron are highly adjustable. The PRESETS work fine under most ground conditions but for fine tuning to more difficult conditions, the adjustments are very helpful. My experience has been only with the Goldtrax version but it seems to be almost exactly the same adjustments as on the coin-trax as near as I can figure without having a cointrax to play with. Im going to ramble on here and hope some of this may be helpful to ya'll. Contiued on Page 2......

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George Payne on the Treasure Baron & Teknetic

As many have observed the Baron with an installed CoinTrax module is just that. All the original Baron features are still present. I designed the CoinTrax module several years ago. As I recall most all of the features are spelled out in the available documentation. However, the GoldTrax module has several undocumented features.

The BH coils that were build by Teknetics in the 1980's will work fine on the Mark I. However, the newer BH coils may not work as well or not at all. One of the best coils ever made by Teknetics was the thin 10 inch coil. It's only about 3/8 inch thick and is white in color

The 9000 and 8500 series were also fine detectors. But they have limit depth. Here in Oregon the mineralized ground will limit the detection depth for a 9000/8500 to about 4 or 5 inches. The Mark will do better than that. In low mineralized ground the difference is even more. I used to take a (modified) Mark I with me when I went on trips. In Mississippi, where I grew up, I was amazed at how well the Mark performed. I also perferred the Mark's Target ID over the 9000/8500. The Mark's single sweep ID accuracy reading is far superior to the 9000/8500.

A Baron with a CoinTrax module installed can not be used with any other "front installed" module. The CoinTrax module becomes the actual detector. As you observed all the components not needed are removed from the main board. However modules can still be installed in the back. Deep Hunter and battery recharge for example. Discovery will discontinue making modules in the future. If you are interested in any module you might consider contacting the factory as soon as possible. The Mark I is really a 1 and 2 filter detector. The circuit automatically measures the ground mineral magnitude and decides which filter to use. If for example you make an "air test" on a target it will always use the 1 filter mode. However, as soon lower the loop to the ground it switches to 2 filters automatically. It will continually switch between the two based upon the ground mineral strength.

A analog signal can be converted into digital form for processing using "digital signal processing" or DSP for short. The DSP term is a very general and broad discription for manipulating analog signals digitally. In many cases using a DSP approach will cut parts count and cost but add little to actual performance. This is not to say that using DSP is no better than using conventional analog circuitry. Here is an example. It is possible to design analog filters in a digital format using what is called IIR filtering. There is a direct correlation between these two approaches. If we were to stop here the clear winner would be the analog circuit because it's generally cheaper. However, there is a lot more to "going digital" than designing analog filters in an IIR digital format. There are many other types of data manipulation that can be done digitally that can not be done in the analog world. For example, implementing a FIR filter is easy using DSP but for all practical purposes, impossible in the analog world. Here is now I look at the advantages of using DSP. There is a certain amount of analog circuitry required in all metal detectors. The Oscillator, front-end and audio circuits are analog. Additional circuitry is required to change the analog target signals into digital for processing. Once the input signals are within the microchip the degree of filtering, processing or anything else you want to do is only limited by the amount of available chip memory and the designers skill. It's really quite amazing what can be done. Before you can answer the question about which is best you must know more about what how the designer is using DSP inside the microchip. That may come down to how much you trust the manufacture and their engineering crew.

Anytime you add discrimination you might block (reject) targets that you may want. For example, assume you adjust the discrimination so that a target is not rejected in an air test. However, if you now bury that same target and try to find it with the discrimination set as before, you might not be able to locate it. This characteristic is due to the ground mineral effecting the target's phase. The greater the ground mineralization the worse this problem will be. The ground mineralization effect may force the target's phase into the discrimination zone where targets are rejected. Motion detectors like the Baron help reduce the negative effects of the mineral moving good targets into discrimination zones. However, they are not perfect. The deeper the target the weaker its signal and greater are the odds that the mineral will distort its phase to the point where it will be discrimination possible. Some will say use zero discrimination and you want miss anything. That's true, just use the "all metal" mode and you will get everyting. However, when I designed the Baron I wanted to find a better compromise. I designed the "iron reject" on the Baron to add the least amount of discrimination possible and still reject most iron. This will increase your odds of finding coins.

The original Baron detector was designed as a analog (non-digital) circuit on a printed circuit board or pcb. This board, which we call the "Main" board uses the entire space inside the case. The original circuit on the Main board was a totally functioning All Metal and Motion detector. The modules were apart of the original concept. However, at the time it was designed we had no plans to incorporate a microchip into a module or on the Main circuit board. It was only later that we decided to design a Module directed toward gold hunting using a Microchip. The main purpose of the module was All Metal mode operation with AutoTrax ground balancing. This type of design is best done using a Microcontroller or Microchip.The GoldTrax All Metal mode operation was programmed into the microchip. All other detector operation uses the standard analog circuitry on the main printed circuit board. The CoinTrax is completely different from the GoldTrax module. Remember how I said that for the GoldTrax module, detector operation is split between the module and the main board. Well that's not the case with the CoinTrax. The CoinTrax module is a complete metal detector all on that little module board. Except for the loop oscillator, power supply and audio output the circuitry on the main board is not used. The actual metal detector circuitry is on the CoinTrax module board and all the processing is done in the Microchip. The Microchip program completely operates the All Metal and Motion Modes.

Teknetics was started by several individuals who left White's Electronics. Since we had designed the coils at White's we, of course, knew everything about their characteristics. One particular characteristics about the Whites coil that we considered a negative was that the transmit coil was about an inch less than the diameter of the actual housing. At that time the White's transmit coil was about 7 1/4" in diameter. So, we reasoned that our Teknetics coil should have the same transmit diameter but with a newly designed housing. The overall housing diameter would be about 7 1/2". The result would be a coil with equal of better sensitivity (on a given target size and depth) but a physically smaller coil.

As most of you have observed a larger coil will pick-up more ground mineralization. Because of the coil size it is effectively closer to the ground than a smaller coil. Therefore, it may make more sense to use a smaller coil in high mineral. Keep in mind that a coil picks up the ground in a very non-linear way. Pushing the coil down against a high mineral ground may get you say 1/2" closer to the target. However, the increase in ground signal may be several times greater than a deep target's signal. In this case you would wind up with less sensitivity. For better results raise the coil 1 or even 2 inches and use a smaller coil in highly mineralized soils.

The push-push discrimination switch on the Treasure Baron changes the scaling or range allowed for the Discrimination control. In one position of the push-push switch you can scale the discrimination range to go from salt water to the rejection of screw caps. In this position all iron is rejected. This is considered to be the normal operating position for coin hunting similar to most detectors.

In the second position of the push-push switch, the discrimination range can go from iron accept to the rejection of screw caps. With the discrimination control counter clockwise many iron objects can now be picked up. When you choose this position you are in effect expanding the lower limit of your discrimination range. This is consider to be a relic hunting mode or when you are looking for objects that reside near the response of salt water. Thin rings for example. In both positions of the push-push switch the upper limit remains the same. That is, in the fully clockwise Discrimination control position screw caps should be rejected. This level of discrimination does not change with the selection of the push-push switch.

The confusion of the filters have to do with the Baron using three parallel double filters. The extra parallel filtering allows the Baron to incorporate the additional discrimination range when you select "iron accept" with the push-push switch. The two tone ID also works off of this same circuit. At the time of the Baron's design this particular discrimination approach was not used in the currently available products. I felt that it offered the customer greater detector flexibility and performance.

Incidentally, if you install the module with the notch feature then the Baron is operating with four parallel filters. Keep in mind that the Baron is still a two filter instrument as far ground rejection goes. The extra filters simply provide multiple discrimination settings or ranges. Multiple parallel

filter processing was not a new concept when the Baron was designed. I had used this approach in the Teknetics 9000 and 8500B. However, for those products it was not used for the same reason or in exactly the same manner. One final point. In the case of Microchip designs like the GoldTrax and CoinTrax Modules parallel filter processing is used extensively to enhance design performance. It is more expensive to add parallel processing in analog designs such at the Baron. This is not the case for Microchip designs.

At the time of its introduction we felt that the CoinTrax module would eliminate the need for some of the basic Baron features like the iron accept/reject mode. Needless to say we made a mistake in that assumption.

Why a VLF ground balanced detector has less sensitivity to higher conductive targets in the all metal mode.

The target signal returned to the receive coil can be thought of as composed of two components, one we call x and one we call r. The polarity of the x signal (its direction) tells us if the target is ferrous or non-ferrous. The r signal has only one polarity. Also, the ratio of the x and r signal tells us the target's phase. In addition, the signal magnitude (which relates to sensitivity) of both x and r are a function of operating frequency.

A VLF detector by its very nature is only designed to respond to the r signal and ignore the x signal. Since the ground reaction primarily produces a x signal in the receive coil the VLF detector does not pick-up the ground but only responds to the r signal of the target. Therefore, the VLF detector only needs the r signal for proper operation.

However, for discrimination we need to measure the x signal and the r signal to determine what the target is. Since we are using the x signal then we have to contend with the resultant ground signal pick-up.

The x and r target signals are frequency dependent and obey very predictable characteristics when the operating frequency changes. We know that the x component decreases as the operating frequency decreases. Above a certain frequency the x component reaches a maximum. The r component acts differently. It is maximum at one particular frequency and decreases if you go up or down in frequency. We call the special frequency at which the r signal is maximum, the target's "-3db" frequency. It also turns out that at the -3db frequency the x signal is one-half of its maximum value. This special frequency is unique to each target and is different for different target.

The higher the conductivity of the target the higher will be the targets -3db frequency. Conversely, the lower the conductivity the lower the -3db frequency. The -3db frequency of the high conductivity target will also make the r signal peak at a high frequency, normally well above the operating frequency of the VLF detector. This will make the high conductivity target have lower sensitivity on the VLF detector because the r signal amplitude drops if we are significantly below the -3db frequency. Simply put, maximum sensitivity on a VLF detector would be if we position the operating frequency directly at the target's -3db frequency. For example, a dime and penny have a -3db frequency of about 2.7KHz. This is where their r signal peaks and would be the best frequency for picking them up using a VLF detector. However, a silver dollar has a -3db frequency of 800Hz.

Nickels, on the other hand, have a -3db frequency, where its r peaks, at about 17KHz. Targets like thin rings and fine gold are higher still. Clearly there is no one frequency that is best for all these targets. The best you can do is have an operating frequency that is a compromise.

All of the discussion so far pertains just to "r reading" VLF detectors. If you now add in the discrimination requirement if gets really confusing. Remember, to obtain discrimination we need to read both the x and the r signal components. As I said the best response to the x signal is not the same as the r signal. We need to be at an entirely different frequency for x. Generally for best discrimination we need to have an operating frequency well above the targets -3db frequency.

As you can see the ideal frequency for each target is different. In addition, for best performance the operating frequency to read x should be different from the frequency to read r. The best we can do is reach a compromise frequency. Generally we can say that high frequencies are best for low conductivity targets and low frequencies are best for high conductivity targets.

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Cointrax Preset Modes Settings

Demo Mode Notched out...iron...AM Sens 4...Disc Sens 3

Coins Mode Notched out...iron, foil,tab, zinc penny.....AM Sens 4...Disc Sens 4

> Ring Mode Notched out...iron and \$1...AM Sens 6...Disc Sens 6

Relic Mode Notched out...none...AM Sens 3...Disc Sens 3

Pro Mode
Notched out...iron....AM Sens 2...Disc Sens 2

COINTRAX II QUICK PROGRAMMING GUIDE

Ground Tracking Speed--Main Menu LED position #2 General programming Procedure:

1) Tap the Menu Key - Main Menu activation indicated by flashing LED.

2) Using the Left or Right Key move the flashing LED to position #2.

3) Tap the Enter Key - Ground Tracking Speed Sub-Menu entered, no flashing LED.

4) To turn-on Manual Ground Balance use Left Key to move LED to position #10

5) To turn-on Automatic Ground Balancing move LED to any position #9 through #2.

6) Exit Ground Tracking Speed Sub-Menu using one of the following:

A) Toggle the Baron Toggle Switch to return to normal operation or.....

- B) Tap the Menu Key to return to normal operation or.....
- C) Tap the Enter Key to return to Main Menu.

Tracking Inhibit Control--Main Menu LED position #3 General programming procedure:

1) Tap the Menu Key - Main Menu activation indicated by flashing LED.

2) Using the Left or Right Key move the flashing LED to position #3.

3) Tap the Enter Key - Tracking Inhibit Control Sub-Menu entered, no flashing LED.

4) Using the Left Key turn Tracking Inhibit Off by moving LED to position #10

5) Using the Right Key turn Tracking Inhibit on by moving LED to position #9.

6) Exit Tracking Inhibit Control Sub-Menu using one of the following:

A) Toggle the Baron Toggle Switch to return to normal operation or.....

B) Tap the Menu Key to return to normal operation or.....

C) Tap the Enter Key to return to Main Menu.

Auto-Tune Speed--Main Menu LED position #4 General programming procedure:

1) Tap the Menu Key - Main Menu activation indicated by flashing LED.

2) Using the Left or Right Key move the flashing LED to position #4.

3) Tap the Enter Key Auto-Tune Speed Sub-Menu entered, no flashing LED.

4) To Turn Off Auto-Tune move LED to position #10.

5) To Turn on Auto-Tune and select speed move LED to any position 9 through 1.

6) Exit Auto-Tune Sub-Menu using one of the following:

A) Toggle the Baron Toggle Switch to return to normal operation or.....

- B) Tap the Menu Key to return to normal operation or.....
- C) Tap the Enter Key to return to Main Menu

Motion Mode Sensitivity--Main Menu LED position #5 General programming procedure:

1)Tap the Menu Key - Main Menu activation indicated by flashing LED. 2)Using the Left or Right Key move the flashing LED to position #5.

3)Tap the Enter Key - Motion Sensitivity Sub-Menu entered, no flashing LED.

4)Select Sensitivity by moving LED to desired location using Left and Right Keys.

5) Exit Motion Sensitivity Sub-Menu using one of the following:

A) Toggle the Baron Toggle Switch to return to normal operation or.....

- B) Tap the Menu Key to return to normal operation or.....
- C) Tap the Enter Key to return to Main Menu.

All Metal Mode Sensitivity--Main Menu LED position #6 General programming procedure:

1) Tap the Menu Key - Main Menu activation indicated by flashing LED.

2)Using the Left or Right Key move the flashing LED to position #6.

3)Tap the Enter Key - All Metal Sensitivity Sub-Menu entered, no flashing LED.

4)Select Sensitivity by moving LED to desired location using Left and Right Keys.

5) Exit All Metal Sensitivity Sub-Menu using one of the following:

A) Toggle the Baron Toggle Switch to return to normal operation or.....

- B) Tap the Menu Key to return to normal operation or.....
- C) Tap the Enter Key to return to Main Menu.

Deep Search Mode--Main Menu LED position #7 General programing procedure:

- 1) Tap the Menu Key Main Menu activation indicated by flashing LED.
- 2) Using the Left or Right Key move the flashing LED to position #7.
- 3) Tap the Enter Key Deep Search Sub-Menu entered, no flashing LED.
- 4) To Turn Off the Deep Search mode move the LED to position #10 or.....

5) Select the Low scale with normal audio by moving the LED to position #9,#8,#7 or #6

- 6) Select the high scale with staccato audio by moving the LED to position #4,#3,#2 or #1.
- 7) Exit Deep Search Sub-Menu using one of the following:
 - A) Toggle the Baron Toggle Switch to return to normal operation or.....
 - B) Tap the Menu Key to return to normal operation or.....
 - C) Tap the Enter Key to return to Main Menu.

Preset Operation--Main Menu LED position #8 General programming procedure:

1) Tap the Menu Key - Main Menu activation indicated by flashing LED.

2) Using the Left and Right Key move the flashing LED to position #8.

3) Tap the Enter Key - Preset Sub-Menu entered, no flashing LED.

To Read a Factory or User preset

- 4) Select a preset and move LED to that location:
 - LED position #8 Coins
 - LED position #7 Rings
 - LED position #6 Relic
 - LED position #5 Professional
 - LED position #4 User preset 4
 - LED position #3 User preset 3

LED position #2 User preset 2

LED position #1 User preset 1

5) Read a Preset (listed above) and exit Preset Sub-Menu using one of the following:

A) Toggle the Baron Toggle Switch to return to normal operation or.....

B) Tap the Menu Key to return to normal operation.

To store current detector image at User Preset

6) Select a User preset position (see below) and move the LED to that location:

LED position #4 User preset 4

LED position #3 User preset 3

LED position #2 User preset 2

LED position #1 User preset 1

7) Store the detector image at this User Preset position and exit Preset Sub-Menu:

A) Tap the Enter Key.

8) Exit Main Menu using one of the following:

- A) Toggle the Baron Toggle Switch to return to normal operation or.....
- B) Tap the Menu Key to return to normal operation.

Standard Discrimination Mode--Main Menu LED position #9 General programming procedure:

1) Select the Motion mode to control Motion mode Standard Discrimination or.....

2) Select All Metal mode to control All Metal mode Standard Discrimination.

- 3) Tap the Menu Key Main Menu activation indicated by flashing LED.
- 4) Using the Left and Right Key move the flashing LED to position #9.
- 5) Tap the Enter Key Standard Discrimination Sub-Menu entered.
- 6) Select Discrimination level using one or two LEDs. Note: Flashing LED represents numbers 0,1,2,3,4......9 Solid On LED represents numbers 10,20,30, 100

Solid On LED represents numbers 10,20,30......100

- 7) Exit Standard Discrimination Sub-Menu using one of the following:
 - A) Toggle the Baron Toggle Switch to return to normal operation or.....
 - B) Tap the Menu Key to return to normal operation or.....
 - C) Tap the Enter Key to return to Main Menu.

Notch Discrimination--Main Menu LED position #10 General programming procedure:

- 1) Tap the Menu Key Main Menu activation indicated by flashing LED.
- 2) Using the Left move the flashing LED to position #10.
- Tap the Enter Key Notch Sub-Menu entered.
 Note: Solid On LED indicates target block notched In.
 Unlit LED indicates target block notched Out.

4) Move flashing LED cursor to the desired notch block to be notched In or Out.

- 5) Tap Enter Key to Toggle LED block to alternate condition.
- 6) Exit Notch programming Sub-Menu using one of the following:A) Toggle the Baron Toggle Switch to return to normal operation

or.....

- B) Tap the Menu Key to return to normal operation or.
- 7) Exit Notch programming Sub-Menu and enter the Main Menu:A) Move the LED to position #10 and Tap the Enter Key.

HOT KEYS

All Metal mode audio threshold

1) Place the Toggle Switch in the Center All Metal mode position.

- 2) Tap the Right Key to increase the audio threshold level as needed.
- 3) Tap the Left Key to decrease the audio threshold level as needed.

To zero out or clear the audio offset

- 1) Turn off the Detector.
- 2) Place Detector in the All Metal mode (Center Toggle switch).
- 3) Press and hold down the Left Key.
- 4) Turn the Detector on.
- 5) When CoinTrax II enters Battery Check test and LEDs light release Left Key.
- 6) Select Operating mode and use Detector normally.

Motion mode GB Offset

1) Hold the Mode Toggle Switch in the momentary Depth Reading position.

2) Tap the Right Key to increase the audio response when the loop is lowered to the ground. Repeat taps to increase audio response.
3) Tap the Left Key to decrease the audio response when the loop is

lowered to the

ground. Repeat taps to decrease audio response.

4) Release the Mode Toggle Switch.

To zero out or clear the audio GB offset

- 1) Turn off the Detector.
- 2) Place Detector in the Motion Mode (Toggle in Right locked position).
- 3) Press and hold down the Left Key.
- 4) Turn the Detector on.

5) When CoinTrax II enters Battery Check test and LEDs light release Left Key.

6) Select Operating mode and use Detector normally.

Turbo Ground Balance mode

1) Exit Menu programming and enter Normal Operating mode.

2) With the loop near the ground, Tap the Enter Key to activate the Turbo mode.

 The Display will blank and the audio will go quiet if you are in the All Metal mode.

4) After a short time the Turbo mode will terminate and normal operation will resume.

5) During the Turbo mode operation if the LEDs light or the audio comes

on, move the loop to another location and Turbo GB again.

George Payne on fixed (preset) vs adjustable GB and coil design

A pure ground is a soil condition that reacts like it was pure ferrite. In other words a perfect magnetic condition where no electrical conduction (eddy currents) takes place. We can think of this as a soil that produces a signal in the detector with zero phase shift relative to the transmitted signal. This is considered our reference signal of zero phase to which all other signals can be referenced to. Of course the only real life object that produces this type of signal is pure ferrite. So ferrite becomes our reference target and produces what we call a pure "X" reactive signal.

Of course real ground conditions do not behave like pure ferrite. When subjected to a detectors magnetic field small currents begin to flow in the soil. This will cause the soil signal to be displaced slightly from that of pure ferrite. We call this difference a phase shift and define it to have an angle in degrees negative relative to pure ferrite. In addition, this phase shift produces a new signal in the detector which we call the "R" component signal. We can carry this analysis one more step. Using Trigonometry the ratio of the X signal to the R signal can be shown to be the actual measured phase of the ground.

All grounds have varying amounts of magnetic and conductive properties. Therefore, the ratio of the X or magnetic signal and R, the conductive signal, will vary from one location to another. However, the phase produced by this characteristic will always be negative relative to zero, the phase of pure ferrite.

From my experience most grounds produce a phase that falls somewhere between zero (ferrite) and a -5 degrees. Some highly magnetic soils can have a phase that is quite low, but it can never be zero. Once the phase exceeds several degrees the ground characteristics begin to fall into an area where it becomes more saline. This doesn't mean that its not magnetic. Its just that the R or conductive component of the ground becomes stronger in relation to the magnetic portion. Thus the phase becomes greater.

The manual ground adjustment works in this manner: When you position the "Ground Adjust" control to the phase of the target, in this case the ground, any up or down motion of the coil does not produce a corresponding change in the audio volume. For example, when you position the control to zero phase, and then move a piece of ferrite around near the coil, the audio volume will not change. In other words you have balanced out to the ferrite. However, if you now lower the coil to

real ground the audio will increase in volume. Of course this indicates that you are not balanced to the ground. As you begin to turn the control counter clock wise the ground adjust control phase changes from zero to a more negative amount. Once you have reached the point of "ground balance" the control and ground phases match. Of course as the coil is moved to various locations the ground phase changes slightly and you must readjust the control for a neutral reaction. As you can see there is no one control phase position that matches every condition since the ground phase varies from one location to another.

The introduction of the Motion detector solved this problem.....sort of. In a Motion detector design you can calibrate the "fixed" ground adjust control phase to approximately +0.5 degrees and set the audio threshold for silent operation. If that is done the detector will appear not to respond to the ground. In reality it is responding. Its just that you don't hear it since all ground reactions cause the audio to decrease in volume.

And since the audio is already silent you don't hear anything. Remember I said that all real targets, which includes the ground, have a phase between zero and some negative value. The preset ground control phase of +0.5 degrees is in a location where no real targets ever exist. Therefore, you never have a condition where you are balanced to anything, least of all the ground. As you move the coil over the ground, the internal detector signals are continually being driven negative. Any weak positive target signal is easily over-ridden by the huge negative ground signal. Of course, if the target is close enough to the coil its positive signal can override the negative ground signal and you will hear the reaction in the audio. The greater the phase and strength of the negative ground signal the more it will mask the positive target signals. A manual ground balance design would avoid this since the operator can adjust the control for a (near) neutral reaction on the ground.

For fixed machines the phase error between the internal "ground preset balance" and the actual ground condition can be much more than "slight". The internal preset is calibrated for +0.5 degrees. This is in an area where a real ground phase never occurs. The actual ground phase may be -2 or -3 degrees "negative". That's a huge difference, maybe 2.5 to 3.5 degrees. This much phase error will in effect cutoff several inches of detection depth.

When fixed ground balance (motion) machines first came out I was opposed to using this technique. I knew it was in some ways a trick into fooling the customer that there was no ground balance. The control was simply a fixed internal adjustment. However, the pressure to compete in the market place was enormous. So, I eventually gave up the argument and designed my first detector using a fixed ground balance the "Big Bud".

The standard loop size is the best size to use on a fixed GB detector since it was the coil most likely to which the detector was designed. If you read my post to Reg you will see that I took extra care to try to insure that the other loop sizes meet the same characteristics as that of the standard coil. It is also true that larger coils pickup the ground more than smaller coils. So any phase errors due to a detector-coil mismatch will make this problem worse. The only sure way to get around this is in using a detector with a GB mode and a manual ground balance.

If the ground is very heavily mineralized due to natural mineralization or pollution, a fixed GB machine would probably be of no value. An error of several degrees, as I point out above, will translate into a negative offset totally masking all targets. To make matters worse, most detectors are designed to work in moderately mineralized ground. Where the ground strength is not excessive. High mineralization will overdrive the front-end circuits of most detectors making them useless.

Raising the coil above the ground will eliminate front-end saturation. However, as an operator you may never know just how high to raise the coil in order to avoid saturation.

Loop fold-over was a term I came up with to describe the non-linear characteristics of a loop. Generally, as you lower the loop to the ground the output increase as a function of the mineral in the ground getting closer to the coil. However, I have noticed that some coil configurations will reverse signal polarity if the ground is close enough to the loop. This characteristic is loop design dependent. In some ways its good since it tends to balance the mineral out. Its very difficult to observe in an actual "real" ground condition since its simply a small change in the amplitude of the loop signal. In most cases the loop output does not change polarity. This characteristic is most easily observed using a point source ground, a piece of ferrite.

I don't want to make a big deal about this loop characteristic. Its just a second order effect loops generally have. The problem is that it can make a Automatic Ground Balance (AGB) circuit perform erratically if not designed properly. As you know the GoldTrax and CoinTrax both are Micro based designs. I wrote special programs (call routines) in code for both modules that reduce or eliminate any problem cause by loop fold-over. Its not that complicated. The programs simply readjust themselves to the threshold and balance out the mineral continually to that point, in other words the threshold level.

Remember, the ground adjust control is just another form of a discrimination control. Its used for discriminating out the ground. In this case.....to balance to the ground. I know you can have unusual effects by offsetting the ground balance, that is something that is best determine by experimentation and experience.

The choice of +0.5 degrees for the fixed ground control phase is somewhat arbitrary. If the designer sets the calibrated fixed phase to 0 degrees he runs the risk that a ground phase near zero degrees will be picked up. If this should happen the audio will come on due to the ground. This would produce an undesirable situation for a preset machine since the operator will have no way of adjusting the control. Therefore, the preset must be made positive by some amount. But how much positive? The more positive the preset phase value the greater the sensitivity reduction. The highest sensitivity would be obtained if we could set the control phase to match the ground. However, since this is a preset machine that is not a option. Years ago I found that a preset phase +0.5 degrees was the best compromise.

There is no question that a fixed detector design would be less sensitive than a design with a manual adjustment. It is interesting to note that normally an air test will not reveal any difference between the two. The reduction in sensitivity will only take place when you use the fixed ground balanced detector in mineralize ground.

The fixed ground adjust phase is generally calibrated using a typical coil. The phase difference between coils of the same size is usually small, 0.1 degrees or less. Coils of different sizes would be more. A well designed series of coils will keep this variation within acceptable limits. Coil inductance, wire size and operating frequency have to be monitored closely to keep this from being a problem. Overall, in a good design the phase difference between coils is not a problem. You would probably experience more sensitivity change due to the coil's different diameters than due to the phase difference between the coils.

The choice between having a fixed or manual ground control is difficult. Over the years I have experimented with many variations trying to arrive at a good solution. In many cases the best

solution is just to offer both on a single design. The fixed control solution offers ease of use and reasonable detector sensitivity. Then if the operator so chooses, manual adjustment produces the greatest sensitivity with some effort.

In 1984 I designed a Automatic Ground Balance (AGB) accessory for the Teknetics Mark I. Don't be surprised if you never heard about this potential Mark I feature. It was never release or advertised. At that time there were not any microcontrollers available for that type of design. Therefore, the circuit was designed using discrete digital components. The complete circuit went on a PCB that was about 4 by 5 inches. It was set up to mount on the back of the main Mark I board. The AGB feature was integrated into the Mark I operation and did not require any additional switches. It worked off of the toggle in the handle. The operator could achieve a Turbo or quick Ground Balance by holding the toggle in one position. Or you could let the AGB balance to the ground gradually. A prototype was built and tested. It actually worked quite well. It had a very smooth characteristic. The first time I tested it outside I felt it wasn't even working correctly since I was not getting any ground reaction. However, it was working fine. I just didn't expect that type of performance. There was one problem with the design that today I am aware of but I might not have known back then. The ground balance setting would track off on targets. This would have been a problem especially on large objects. That problem could have been solved given more development.

This project was never completed. It was dropped for several reasons. The add on circuit was fairly expensive. Teknetics would have had to add over 100 dollars to the cost of the Mark even more if offered as a "Mod". Also, it didn't seem to fit into the Mark I thinking. If you recall the Mark was designed for low mineral operation. In low mineral, maintaining a true ground balance is less of a problem than in high mineral. In reality this AGB feature would have been better suited on the Tek 9000 or 8500. However, those detectors, designed in 1981 and could not interface correctly with this AGB circuit.

Several years ago I designed two modules with AGB for the Discovery Treasure Baron. Both designs use microcontrollers. The micro AGB design performs better than the discrete circuit for the Mark I. Both have the iron inhibit feature. This feature reduces the potential of the ground balance setting from tracking off on targets. It works like this: An internal program measures the phase of all targets. Any target whose phase exceeds about -10 degrees (I don't recall the exact value) will produce an inhibit signal to the AGB program causing it to hold its current ground balance setting. After the target has passed it releases the inhibit and the AGB continues to track the ground. We called it iron inhibit but in reality it inhibits on all targets above a predetermine phase. In this case -10 degrees. All mineralize grounds have a phase less than -10 degrees. Therefore, the program will not inhibit tracking on mineralized ground. Of course if the ground's phase exceeds -10 degrees this technique would not work. The iron inhibit feature can be turned-off in case the operator runs into some unusual ground condition where the inhibit feature does not operate correctly. Or in case he or she simply prefers it disabled.

There is a difference between the standard round and DD loops. On the coils I designed for Discovery I don't recall a problem with excessive phase shift between the two coil configurations. When I first started designing coils for Discovery I decided to pick a particular frequency of operation and inductance for the Transmit and Receive coils. In addition the "Q" of the Transmit must be control within a certain range. For those who don't know.....the coil's Q is the ratio of the coil's inductance to its resistance at a given frequency. Whenever the coils change in size the turns are modified to return the inductance to the standard value. This tends to maintain winding resistance and more importantly, the Q of both the Transmit and Receive coils. So, its important to have standard coil values to target the design to. Normally this would be the coils, inductance, resistance and effective Q. It these values are maintained the resultant coil phase will be maintained over all coil designs regardless of the coils size and shape.

The DD coils can get you if you are not careful. As you know the Receive is generally the same size as the Transmit on these coils. Coupling that with the tendency to keep the Receive turns constant can result in a serious change in the coils output phase. Therefore, the Receive turns must be reduced considerably to lower the inductance back to the standard value. From a practical standpoint the inductance does not have to be exactly equal to the target inductances. As I said the tendency is to keep the turns the same as you change from one coil design to another. This tends to keep the sensitivity the same across many designs. However, that should not be the consideration. In this case its more important to control the phase across many designs. It's better to look at it this way. For example, suppose that we build two Receive coils where one coil has twice the diameter of the other. But we keep the turns the same in both coils. For this example the larger coil would have an inductance that was twice the smaller coil. These coils would not have the same output phase. The larger Receive would easily have more sensitivity than the smaller coil because of the greater turns and coil area. However, this would not be a good design. The turns on the larger coil must be cut by .707 times. This would make both coils have the same inductance. Ideally we would also need to change the Receive wire size to keep the Receive resistance constant. Remember the coil Q is the ratio of its inductance to resistance at a given frequency. If we keep the inductance and resistance constant then the Q would also be constant. However, I don't generally change the wire size on the Receive because if you maintain the inductance constant the resistance tends to not change as well. As I said, math calculations show that the wire size should be changed and to what size. But from a practical standpoint the Receive wire size can be left the same. When we reduce the Receive turns on the larger coil the coils characteristics approach the characteristics of the smaller coil. However, the larger coil will still has more sensitivity than the smaller one because of its greater area. The key here is not to get so concerned about the coil's sensitivity that you forget about the overall design.

All that being said the DD coils do have the worst phase shift away from the target value. However, it can be control within acceptable limits as outline above. I don't recall the exact phase tolerance on the Discovery DD coils but I think it's below 0.5 degrees. We always calibrate the fixed ground phase trimmer to be +0.5 degrees. The phase of most soils do not go below -0.5 degrees. Therefore, we have a total difference here of 1 degree. This 1 degree differential is well above the 0.5 degree tolerance on the DD coil. As a result we don't have any serious phase problems with the DD coils.

One question that might seem important here is......Why be concerned about the output phase on coils if you have a detector with a manual ground balance? After all, any phase shift between coils can be compensated for with the manual ground balance. Well that's true. But there is more to this consideration that must be understood. You may have many detector designs some with fixed and some with a manual ground balance. Also, I have produced many designs that had a fixed ground balance for the motion mode but a manual ground balance for the GB mode. The bottom line is this. You must decide on a standard and stick with it across all coils designs. This keeps everything interchangeable.

Yes, it is important to have good quality caps for the Transmit tank capacitor. The main reason to use polypropylene is because their capacitance is very stable over time. Much better than most caps.

Polystyrene caps are better but they don't come in the larger capacitances like those needed for the tank Transmit coil. If the capacitance is stable over time then the loop frequency is also stable over time. That's very important. If the frequency changes the Receive signal phase changes for a whole bunch of reasons all related to the frequency change. So it's important to keep the frequency constant. The other capacitor characteristic like it Dissipation Factor (called DA) and leakage are not that important in this application.

You would see no difference in sensitivity between coils with different tank capacitors (polypropylene vs. polyester) if the capacitors had exactly the same capacitance. However, you might see a slight improvement in drive efficiency. The polypropylene cap would probably take less current to drive than the polyester cap. The Transmit wire size has very little bearing upon the coils overall sensitivity. However, it will greatly effect how much current(or power) is required to drive the Transmit coil. The designer could make the Transmit wire size very small and reduce the weight of the coil. That would be very impressive. But you would not we impressed with the battery life. The coil would draw huge currents and drain the batteries quickly.

One last point. The internal fixed ground adjustment is calibrated using a dummy coil. Not a real live coil at all. So of like a dummy load on a ham transmitter. The ones that consume the power but do not radiate into the air.

Litz is not use by most manufacturers because of the following reasons: Litz is more expensive than standard solid wire and it is harder to work with. Soldering it is more difficult and as far as I know it's not available with self-supporting coatings. Also, it is probably difficult to quantify the improvement in using Litz. I have been using Litz wire in Transmit coils since 1989 but not for the reasons mentioned by Minelab. The applications where I have used Litz wire were only in industrial metal detectors where there is no ground considerations.

There are several effects to consider when discussing the ability for a detector to reject the ground mineral signal. The first is frequency. Some of the original mine detectors operated at 1000 Hz. At that frequency the reflective phenomena is almost nonexistent. At least it is not a design consideration.. At higher operating frequencies the reflective ground effect can be broken up into two main effects, static and dynamic.

Static effects refer to the fact that the ground is not balanced out when the loop is at various distances from the ground. This is the effect you mentioned. Using Litz wire for the coils in the loop will reduce the static effect problem.

The second or dynamic effect has not been address by anyone as far as I know. This phenomenon is due to the motion of the coil across mineralized ground and prohibits you from obtaining a true balance. It has nothing to do with the reflective ground effect but it appears to be related to it. But it's not. I have been interested in this effect for many years because it directly effects the performance of Motion detectors. A special circuit design can eliminate the problem. Some of the detectors that used this circuit were the Teknetics 9000, 8500 and Mark I. To some degree it was incorporated into the Discovery Treasure Baron.

Although not fully exploited. You can not tell what this particular component design arrangement is, just by looking at the schematic of the detector.

Ordinary hook-up wire is not the same as Litz. It very important that the individual Litz wires be insulated. This distributes the total current evenly in all the wires. If they are not insulated then you

might as well as not have individual strands. Also, the individual strands are wound in a very particular fashion that minimizes the skin effect in each strand. The end effect is that the resistance of a properly designed Litz is (almost) completely flat from DC to RF frequencies.

I have built and tested Litz wire loops for consumer detectors. However, they never went into production. The improvements gain by reducing the dynamic effect mentioned above and the use of AGB circuits were enough to satisfy our design requirements. Also, the use of a preset ground balance makes the static effect phenomena almost irrelevant. This is not to say that the elimination of static effects are unimportant.

Here are some general design parameters for a coil:

Transmit Coil -- 25 to 30 turns of 22 gauge wire. Diameter 7 to 8 inches. Receive Coil -- 200 to 300 turns of 31 gauge wire. Diameter 3 to 4 inches Feedback Coil -- 6 to 10 turns of 22 gauge wire. Diameter same as receive. Tank Capacitor -- 0.47uF

Generally the Receive is about half the diameter of the Transmit. So if you choose an 8 inch Transmit use a 4 inch Receive. Wind the Feedback Coil on top of the Receive coil. The wires are insulated so it ok to have the Receive and Feedback touching. The Transmit and Feedback coils can have the same wire gauge. Here is a very very important point! The end of the Receive wire nearest the Feedback Coil must be connected to ground. In other word it must be connect to the loop shield and to the ground in the circuit. If you don't do this the completed coil will not operate correctly. The R null component of the coil will be excessive and may overdrive the detector. This has to do with the high capacitive coupling between the Receive and Feedback windings. Connecting the coils as I have outline above will solve the problem.

The Transmit and Feedback coils must be connected series opposing. If they are connected incorrectly you will not be able to obtain a null signal from the Receive coil. This is generally not a problem since it only works one way and not the other. Basically what is required here is that the magnetic field produced by the Larger Transmit coil must be in the opposite direction to that of the Feedback coil. This is the key to obtaining a magnetic null for the Receive coil.

One final important point. The ratio of the Transmit turns to the Feedback turns is about 3.3 times. This holds only for this size coil, 7 to 8 inch diameter. In other words to determine the Feedback turns divide the Transmit turns by 3.3.

About the connection of the Receive in relation to the Feedback wind. It's seems to be a very minor thing and not important. The only reason this is a problem is due to the closeness (touching) of the windings. If they were an inch or two apart it would not be a problem. There is one other little point that I forgot to mention. Again this is very important. The Feedback winding must be connected to the un-driven side of the Transmit tank circuit. For the same reasons I mentioned before this reduces the capacitive coupling between the Transmit and Receive which will allow the resultant Receive null to be small.

The dynamic effect I refer to is a small second or third order effect. Most designers are not aware of this effect since it is so small. Other than the detectors I mentioned no one that I know of have ever used this circuit.

This dynamic effect has very little to do with the earth's magnetic field. It has to do with the interaction of the metal detector's magnetic field and the magnetic material in the ground when the

loop is moved in relation to the ground. Unless it's eliminated it is impossible to obtain a true balance if the coil is in motion. As you can see this is an important concept for the motion mode. It helps for the GB mode too. But, it is not as apparent in this mode since the loop does not have to be in motion all the time.

Sometimes there are very simple answers why some manufacturers use paint and others use foil or paper for the loop faraday shield. Usually it is related to ease of construction or cost, not necessarily to performance. Each technique has its advantages and disadvantages. And, you may only determine what those factors are by trial and error. My background has been in using paint shields. This process can be a little tricky if you don't know what to avoid. For example. It's best to have a very smooth surface on which to place the paint. Painting a shield on an irregular surface can cause excessive noise in the detector. If fact early Discovery loops had only the bottom cover painted in order to avoid too many surfaces that were not smooth. However, after some problems were worked out all their loops were 100%shielded. Making an electrical connection to a paint shield is difficult too. When I was with Teknetics we experimented with many correction methods before settling on one process that produced consistent results. A poor connection was prone to breaking loose or producing very high detector noise.

Generally its best to have some distance between the shield and the coils. However, I have seen many designs were the shield is place directly on the wire. A foil shield for example. The conductivity of the shield must be low enough to not interfere with the detector operation. My personal experience has suggested that resistances around 10K ohms per square or optimum. However, the resistance can vary quite a bit without effecting detector operation. When this value drops below 1k then you can have pickup problems.

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Setting the Notch on the Cobra II and A&S Special Treasure Barons There are two ways to set the notch control on the Cobra II and A&S Special Treasure Barons. Both methods are as follows.

With the power on, sweep an iron object across the coil. If it is not rejected, push in and release the DISC/TONE control knob one time. The iron object should then be rejected.

Next, to set the notch to reject a pulltab using the following procedure: Turn the NOTCH and DISC/TONE controls fully counterclockwise. Then while sweeping a pulltab across the coil, turn the DISC/TONE control clockwise. When you hear the tone change from a high tone to a low tone stop, then turn the DISC/TONE control slightly counterclockwise until the audio starts to give a high tone again. Don't turn the DISC/Tone control any more. Now turn the notch control clockwise until the audio doesn't respond to the pulltab. To reject zinc cents or bottlecaps, use one of those instead of a pulltab when turning the NOTCH control clockwise.

The second way to set the notch:

Turn the DISC/TONE ID knob as far as it will go counterclockwise, turn the notch on, sweep a zinc penny over the coil and turn the notch knob until the zinc penny is discriminated out. Then sweep a nickel over the coil and turn the DISC/TONE ID knob clockwise until the nickel is just accepted. That will accept nickels with a low tone and coins higher than zincs will give a high tone. To accept zinc pennies and reject tabs, substitute a pulltab for the zinc cent. When set to reject tabs and accept zinc cents the settings should be close to having the mark on the DISC/TONE ID knob set at just about the 5 o,clock position and the mark on the Notch knob set at the 9 o,clock position. Those settings allow nickels to be detected, 90 percent or more of the tabs to be rejected and zincs, indian head and wheat pennies and higher denomination coils to be detected. Your settings will undoubtly vary slightly, but that should get you in the ballpark.

Using the notch as a standard disc control:

Turn the Disc/Tone ID knob as far as it can go counterclockwise and use the Notch knob just as you would the Disc knob on a regular detector. Discriminated targets won't give an audio response, accepted targets will give a high tone signal.

Discovery Treasure Baron Field-Test Notes & Comments by Joe Patrick

After more than a year of seeing and hearing about Discovery Electronics modular Treasure Baron detector, I finally held one in my hands. I had heard pros & cons about it from many of my friends and associates and I had wondered about its performance myself...at last, it was now my turn to check one out--a week earlier Ron Shearer of Discover Electronics phoned to inform me that a Treasure Baron was on the way to me and asked if I could give it a "workout".

My initial reaction, on first examination of the Treasure Baron, was "this detector is built like a tank!" Its rugged, heavy-constructed, die-cast metal control housing is solid--although it does increase the overall detector weight. The coil and mounting ears are also very well constructed and should hold up with use. The search coil cable is likewise durable, but somewhat stiff--I prefer a somewhat softer, more flexible cable.

Upon examining the Pro Hunter and Gold Trax modules, one thing became very apparent...they are assembled and constructed using above average quality methods and components. 1/16" glass-epoxy printed circuit boards are used and the layout and construction are first rate...with several years of printed circuit board design under my belt...I feel I am somewhat qualified to comment about this aspect of the Treasure Baron's design.

All controls, switches and panel features are of similar quality--overall, the Treasure Baron

and its various plug-in modules embody first-rate quality and durability!

One aspect of the Baron's design which I had prejudged to be "old technology" came back to prove me totally wrong. When I first saw a Treasure Baron advertisement, over one year ago, I was not impressed with the light emitting diode (LED) depth display and iron indication features. I felt that this was a critical flaw in its design and that Discovery was not keeping up with current technology--LED electronic equipment is considered somewhat of a "dinosaur" by most people. The truth, however, after actually using the Treasure Baron with its BRIGHT & EASY TO SEE LED indicators is that I now actually prefer this type of visual indication. After having used all types of metered and visual displays, I have not viewed any that have been this simple to interpret or as intensely illuminated. You just can't miss seeing those bright red LED's, regardless of lighting conditions--I'll have a bit more on this farther into this field-test.

The Pro Hunter Module

On my first detecting trip into the field, I opted for the Pro Hunter module. I did this because I was not yet familiar with the Gold Trax Module and because the site I was detecting could have pull tabs, which I could easily notch out with the Pro Hunter. I also wanted the ability to manually ground balance the detector, as this is usually the way I prefer to detect.

Installing the Pro Hunter module was fast and simple, although care had to be taken to insure that the connecting ribbon-cable properly folded beneath the Pro Hunter module as it was inserted into the Treasure Baron's control housing.

The site detected that particular day was heavily wooded, with steep hillsides to maneuver. My detecting partners, Rick & Scott, split up and started searching in slightly different directions from me. I began by ground balancing the Baron to the site's somewhat mineralized ground. This took a few minutes, due to the somewhat "touchy" single-turn ground balance control. I found that just a very slight rotational increment would shift the ground balance point considerably. A "light touch" was needed to get it set correctly, but once this was accomplished, it canceled the ground very well.

After searching for several hours, we got together to compare finds. Rick and Scott had some wheat cents and some Boy Scout neckerchief slides, but I was the only one with silver--a 1916 Merc and two silver Roosevelt dimes. Not spectacular, but it proved to me that the Baron works. The 1916-S Merc was only a few inches deep, but it was in fill-dirt that was mostly mineralized slag from a nearby steel mill. For those who have not detected in this type of ground, it is a composition of slag, very fine iron particles and various size pieces of molten steel globules...very nasty to detect, but somewhat common in and around many detecting sites near Pittsburgh, Pennsylvania.

I would like to comment here about the Treasure Baron's smooth operation and minimal response to mineralized ground. Using the standard 8" concentric coil, its stability was excellent with few false signals. Some large, heavily-rusted iron and hot rocks (coal cinders, coke) would occasionally give a good solid response, but not very often (Note: The use of the

wide scan coil should eliminate the response to hot rocks).

The Treasure Baron's two-tone ID system performed well, but I would prefer to be able to turn off the audio response to rejected targets if needed. Presently, all conductive targets, rejected and non-rejected, (except those notched out) are heard and are identified by either a low or high tone whose reference point is set with the variable discrimination control. This method of audio tone ID works well for relic hunting or sites with minimal trash, but at locations that are heavily trashed, the continual bombardment of hearing ALL signals becomes annoying, promotes inattentiveness and reduces detecting concentration--especially after many hours of hearing all targets.

I was surprised and amazed to discover that several of the Treasure Baron's controls and switches have multiple functions incorporated into them. Momentarily pressing in on the Ground Balance control toggles the All-metal Auto-tuning either on or off. Pressing in on the Notch Control turns it either on or off. Likewise, pressing the Discrimination Control turns the Iron Elimination on or off. By holding the Mode Switch to the retune position, battery status is accurately indicated on the LED Depth Meter display(Note: These functions can vary with different modules).

Another item worth mentioning is the Power/Audio Range control of the Treasure Baron. This control facilitates either a modulated or amplified (compressed) audio signal. By setting the control low, weak signals sound soft and strong signals sound loud. Turning this control up to the pre-set mark or farther, makes weak signals sound as loud as surface targets. This makes it very easy to hear deep, weak targets--but difficult to judge depth by audio intensity alone. I usually "ran" this control at around the 9-o'clock position and obtained the benefits of both extremes.

The Power/Audio Range Control also sets the minimum signal level needed to produce a strong audio output signal. At low settings, the ground mineral noise (which can sometimes mimic a good target) will not produce full output audio. It is important not to "push" this control too high when detecting in severely mineralized ground. Even at reduced settings, desirable targets will still produce a strong, repeatable signal while ground mineral-chatter will not.

The Gold Trax Module

Discovery's introduction of the Gold Trax module has been very successful, and it did not take me long to discover why! THIS MODULE WORKS WELL! It does present one obstacle however...it is somewhat confusing to understand and remember all of its keypad-accessible functions, and it currently has no ability to store or recall any edited settings. Once the unit is powered off, then back on, all settings revert back to a factory-preset program.

Although I typically do not use detectors at factory-presets, I did use the Gold Trax this way and its performance was VERY GOOD. It operated smoothly and I was impressed with its depth, "hit intensity" and "exceptional" sensitivity to small non-ferrous targets. At one old park site, I uncovered a large ornate solid sterling silver walking cane grip and a 1902 Barber dime from some bad trash-infested gravel and cider-laden ground. I believe it was the Gold Trax module that made these recoveries possible--of the four detectorists that day, I was the only one to uncover a Barber coin.

I am especially impressed by, and VERY much like, the visual LED iron indicator. It is easy to see and its iron processing/driving circuitry is almost 100% accurate. I noticed that all iron targets encountered would either illuminate the LED to full intensity or cause it to flutter somewhat. However, every time I swept across a non-ferrous target it wouldn't flinch--not a hint of illumination could be seen. By listening to the audio tone and repeatability of the target, and by looking at the Iron LED indicator, I could accurately tell if the target was worth digging. The final step before digging was switching to all-metal and listening to the signal intensity. By the end of my first day a field with the Baron and Gold Trax module I had this technique fairly well mastered and was retrieving good items while bypassing most ferrous items.

CLOSING NOTES

Living in Pennsylvania, I did not have an opportunity to use the Gold Trax module for prospecting, so I cannot comment on this aspect of it. I have heard from detecting friends, and other sources, that it works very well. Likewise, I did not test the Deep Hunter or Black Sand modules--I have confidence that they perform equally well.

The addition of a Target ID module should make many Treasure Baron coin hunters VERY happy--one should be available in the near future. The ID Module will most likely be used by coin hunters, and many coin hunting locations are trashy...I hope Discover considers my comment about eliminating the audio signal from rejected targets. This one "deficiency" alone is enough to make me leave my Treasure Baron at home and use a different detector when detecting trash-filled sites. I would love to see this feature available on the Gold Trax and Pro Hunter as well--perhaps it can be incorporated into the base so that it would be available with any discriminating module used.

SUMMARY

Although the Treasure Baron can use some improvements (which detector can't?) I find it to be an EXCEPTIONAL PERFORMING DETECTOR! It definitely has more pros than cons. It is very well constructed...very functional and versatile...it provides above average depth, sensitivity and stability and its audio discrimination and iron elimination are accurate.

At first, the Treasure Baron can be somewhat intimidating and confusing to understand...with its many optional modules, multi-functional controls and somewhat non-standard concept and design. To some detectorists, it might first appear to be an "old technology" detector, but after using one I totally disagree with that interpretation! It didn't take too long to prove itself (in the field where it counts) and convince me of its ultimate potential.

If purchasing a Treasure Baron, I recommend with the base unit and only one module (unless you are an experienced detectorist), then when you fully comprehend and master that combination...add others. My module of choice, even with its somewhat complicated multi-sequence keypad operation, is definitely the Gold Trax module. Don't let the name fool

you...it is also a SUPER performing coin and relic module.

To me, the true acceptance and endorsement for any detector is when I decide to add it to my own personal detector arsenal. The Treasure Baron made the "cut" and is a detector that I plan on keeping and using for some time. The bottom line is...it works for me...**VERY WELL**!

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Testing The Treasure Baron

by Ben Myers

If you like to learn about new metal detectors, you're reading the right field test report. The Treasure Baron is a new product from Discover Electronics. This detector is not only outstanding in color (fire engine red) but in performance as well.

The principal new concept put forth by the Treasure Baron is the fact that it is a truly modular machine, quite willing and able to give the customer a modestly priced basic machine that possesses the ability to be upgraded to top-of-the-line with the insertion of one or two modules.

When first using the Treasure Baron I hunted with it as the base unit. I'm going to do a little coining of words here to make clear which form of Treasure Baron is being described during this article. From now on I'll call the base unit without added modules the "Basic Baron" and refer to the Treasure Baron with both modules installed as the "Modular Baron"

Walking along saltwater beaches and then a park with the Basic Baron I must say that I was not instantly excited about the machine. Now don't get me wrong. I was pleased with its performance and deemed it well worth it's reasonable price tag. Good depth and an ability to handle soil conditions were evident. I told myself that I was just expecting too much to think that each new machine should offer something new. This perception was about to change rapidly as I began to understand the controls and the excitement they could offer to a detectorist's arsenal.

I decided to add the two modules before the next outing and that is when I began to appreciate the Treasure Baron. Were the following trips more pleasing? Wow, were they ever! And that's mainly what what this field test is about, the Modular Treasure Baron in all its full modular glory, how it works and how it performed. I'll touch somewhat on the Basic Treasure Baron but it is so simple to operate there isn't much to say that you can't pick up from descriptions of the Modular Baron.

That is the beauty of this detector. If you are a beginner you can buy the Basic Treasure Baron to use until you are ready to handle more advanced features, at which time you buy and install modules one and/or two. On the other hand, if you already have detector experience you can start right off with the full Modular Treasure Baron.

Some interesting events took place during the field test and I'll touch on them in a bit, but first things first. If you want to get a real feel for this machine you

must take an in-depth look at the controls and features.

The metal control box sits atop an "S" handle configuration and receives it's signals through a high quality shielded cable from the 8" flat doughnut shaped coil. I should also mention here that when my friend Bernie Hehl and I did air tests on this machine at his work bench we did not get the outside interference from overhead lights that we have sometimes gotten while air testing other machines. That hole in the center of the coil will allow you to do some very precise pinpointing of targets. You can leave the probe in the ground over the target while moving the coil up and away to the side.

When I first checked out the face of the control box I saw controls that looked deceptively "unexciting." Some of the controls are of the multi-funciton variety which saves space and simplifies operation. I noticed a horizontal line running across the middle. That's where the top blank plate is removed and the Pro Hunter Module is iinstalled to provide features for target depth, ground balance/autotune, salt mode and notch. The bottom half is the Basic Treasure Baron with Power Off/On with audio range, Pinpoint retune/All Metal/Motion Disc Toggle, and Target Tone Discrimination ID Cointrol. While I'm at it I'll describe the rear of the control box. The same set up contains the battery compartment on the bottom portion and the top portion is where the plain plate is removed for the Deep Hunter Module which provides E.S.P. Boost of Off/Medium/High and a plugin if you use Nicad batteries. This is also where the searchcoil cable connects.

O.K. So now you know where the modules are added to update the maching and you may be thinking, "Egads! I can't install delicate electronic components into the detector, they might break!" Relax, it's easy. You only need a small Phillips head screwdriver to remove the screws holding the blank plates and to re-secure once the modules are in place. You'll also probably need a pair of tweezers to remove a couple of little plastic covers called shorting plugs. Each module has a connector that plugs into the circuit board, and don't worry, it can't be done wrong. The whole thing takes five to ten minutes and you will agree that even someone who is all thumbs can do it.

Control Box

Batteries (Lower Rear Panel): The Treasure Baron needs 8 AA's in a separate pack to drive the Deep Hunter Module for truly more power. With use of the Deep Hunter Module you can use an "on board" charging system when you are using Nicad rechargeable batteries. A recharge takes about 4-1/2 hours. The condition of the batteries can be checked using the LED lights (more on this later) plus the audio gives a chirping or pulsing sound when batteries are low.

Lower front Panel (Basic treasure Baron)

Power: This is a rotary knob to turn the detector On/Off plus increase the audio range (target loudness) as it is turned clockwise. The manual compares it to a sensitivity control of a conventional detector except it does not reduce sensitivity. I don't see it that way and would rewrite the manual here as in some other places. The sensitivity appears to be preset unless one purchases the Deep Hunter Module to change the boost (more later). Rather, this control allows a person to adjust the loudness of the audio response coming from the target. The signal is there, the higher the control is set the deeper you can hear it depending upon hunting conditions and your hearing comfort. It is a useful control and I kept it as high as possible. Mode: This is a three position toggle to allow switching between Silent Search Slow Motion Discrimination/Notch Mode (right hand position), Non Motion/Pinpoint Mode (middle position) and the Momentary (spring loaded) All-Metal retune (left position). Once again, more on these later.

Disc/ID: A multi-functional rotary knob is used to set the point at which the dual tone ID of targets changes from low to high tone. It also sets the start point for the Notch plus the push-push feature of the knob turns on/off the iron rejection feature.

You now have a picture of how the "Basic" detector works. But wait, there's more! Incidentally, I like the push-push idea rather than push-pull as it lessens the chance of accidentally bumping the pull position of a knob to the pushed-in positioin and thereby a wrong setting. It is much more difficult to bump these controls hard enough to change them by accident.

Pro Hunter Module (Upper Front Panel)

LED Bar Graph: I have to digress here a moment and ask if you remember the TV show and movie Battlestar Galactica? The plot dealt with human space travelers from the thirteenth planet and their enemies were advanced robots called Cylons with their optical device being a red light that pulsed back and forth across their upper face plate. Could it be that the designers of the Treasure Baron used to watch this show too? That is what the LED bar graph does as you detect various targets and go to All-Metal depth reading. But this feature does more than look futuristic.

Although this bar graph appears to be solely for the purpose of measuring the depth of targets from 1" to 10" it also performs other functions. With the target centered under the coil with the Mode in All-Metal center position the bar graph will indicate depth of target. It also indicates the battery condition for both battery packs. With the EXP BOOST in the off position and the Mode toggle held left the battery condition will light up for conventional or Nicad batteries, 1 being best. To check the batter pack for the Deep Hunter module switch the ESP BOOST to "M" or "H" and hold the Mode toggle left once again.

The 1 on the bar graph is also used to indicate functioning of other controls. Both the "GND" and "NOTCH" controls are push-push. When you push them watch the 1 LED. If it lights momentarily you know that the autotune of GND is on or the notch feature of NOTCH is on. If it doesn't light up they are off. No guess work involved.

GND: As just mentioned, when this rotary knob is pushed it will turn on the Autotune if you see the 1 LED lightup on the bar graph. The Autotune is a very slow retuning of the circuitry to maintain threshold (slight hum) when detecting in the All-Metal Mode.

To perform a manual ground balance turn off the Autotune and perform the usual coil bobbing method with controls set at preset. While in the All-Metal Mode lower the coil near the ground. If the tone increases there is mineralization present and you must adjust the GND knob counter-clockwise and hit the retune until there is no change or very little change in the tone volume. To manually balance out saltwater affects you will use the same procedure and notice that the control will end up more counter-clockwise near the area marked "salt."

GRD/Salt Toggle: This one is inoperable in the Basic Baron and mush have the Pro module installed to work. Simply put, the Salt side is used on saltwater beaches and surf while the GND position permits the motion mode to track the ground balance setting of the non motion mode. In the Salt position the motion ground balance is factory set. In the GND position, adjustment of the GND control will establish both the Non Motion and Motion Modes. If you want to balance out the salt in GND, adjust the GND control for All-Metal searching and then use autotune. If the toggle is set to GND the motion mode is adjusted to the balance setting of the All-Metal Mode. If the GND control is balanced for a salt setting the GND/Salt toggle must be set to salt.

Reject Notch Width: Once again we have a push-push rotary knob which when pushed to turn on notch will light up the 1 LED momentarily to let you know it is activated.

The rejection notch area starts at the spot where the DISC/ID knob is set to separate low tone from high tone. Be aware that the DISC/ID setting is different according to the Iron Reject being on or off. Rejectioin starts there and as the notch knob is turned clockwise the area of notch rejection widents.

Deep Hunter Module

E.S.P. Boost: This control has three positions: OFF, M (medium) and H (high). Off speaks for itself and seems to provide the same depth as the basic unit. The Medium setting provides a little more and High zaps up to three times the drive to the loop to increase depth and performance up to 45%. The high power does decrease the life of the Deep Hunter Module batteries though with battery life at Medium to 12 hours and at High to 6 hours. It's a good idea to switch the batter packs at some point to even usage.

charge: Don't forget that you can use rechargeable Nicads in this machine and charge them on board. Radio Shack has a charger to fit the job.

Jack: The only thing left to mention on the features is that the headphone jack is 1/8" and not 1/4" as usual. It is located under the right front of the control box. If you use headphones with 1/4" plug you can get an adapter at Radio Shack. The idea behind the 1/8" jack is that electronics are getting smaller including lighter and smaller headphones. Regardless of the type you prefer the adapter takes care of the problem.

Detecting Scenario

If you are going to get full use of this detector here is a suggested setup procedure for a typical park. Turn the Treasure Baron on and set ESP Boost to Off (to be checked later for increasing). Toggle to GND and proceed with Ground Balance using GND control and Mode. Flip Mode toggle to the right for silent search ultra slow sweep speed motion Mode. Sweep loop past a piece of iron, if detected push iron reject to reject it. Place a pulltab on a clean piece of ground and sweep the coil over it while turning the DISC/ID knob to just the point where the pulltab begins to give a high tone. Now turn the Notch on and turn the control clockwise until the pulltab does not produce a beep. You should now be able to reject iron, get low tones on nickels and certain gold rings, reject (notch out) most pulltabs and get high tones for higher coins from cent to silver dollar.

At this point if the detector is a little too heavy for you it is easily hip mountable and the rod is just a snap to set to your height. Make sure the coil cable is wrapped properly around the stem, especially at the lower end to keep the cable up away from the loop, and you are ready for some enjoyable and successful metal detecting.

Field Testing & Summary

As you see I've spent quite a bit of time describing the detector itself as I feel

that to be important with this machine. The controls of the Treasure Baron work differently than other machines of its configuration, thus my reason for the lengthy explanations.

In testing the Treasure Baron I took it to my usual type places--saltwater beaches, parks, schools, an old abandoned picnic area, and following bulldozers.

Understand that due to publishing deadlines the testing was done in the heat of the summer instead of the cool of winter when this report will appear in print. The conditions were not optimum. We hadn't had rain which left the ground extremely dry but fortunately not hard packed for digging. The noteworthy item here was that very good depth of targets was achieved in spite of the dry conditions.

Except for my first trip to a saltwater beach and a park at which I used the Basic Treasure Baron, the rest of the trips were made after I had installed the two modules for upgrading.

Three schools were hit with clad coins and the usual trash items the most abundant. The clads were as deep as 4" while an older school provided two Merc dimes at 5"and 6", three silver Rosies at about 4" and six Wheaties in the 4" to 7" range. Another school gave the Modular Treasure Baron the trash test. There were quite a few pulltabs so the Notch went into action. Of course I already had the Iron ID Disc on and set the notch according to manual instructions. The pulltabs blanked right out while nickels and higher coins came through with the Target Tone ID working fine.

The only caution I would give you here is to make sure you can still pick up nickels after making your adjustments. As with any detector, in employing notch discrimination one has to be aware that while rejecting this one zone of target response you risk missing any gold rings with the same signal. It depends on how much trash you can put up with and at this time in technology the only way to know for sure is to dig every signal. In burying some targets to test I did not notice any loss in depth due to using notch.

The coil is very sensitive and sometimes gives chirps while resting flat on the ground or bumped against it. Incidentally, I'd like to see Discovery Electronics widen the stand below the arm cup as the Baron has a tendency to tip over as it is set down while you dig. I didn't feel the Baron was too heavy but it is a bit heavier than some of the other detecotrs. I overcame this by making the rod shorter therby allowing the weight to be suspended from the shoulder rather than the bicep or forearm. Also, I'd like to see clips or small pieces of velcro included in the box to hold the searchcoil wire close to the rod, especially near the coil. Granted, these are small items but I think that is part of the reason for a field test, to find out what improvements may be made.

Next stop was a picnic area that hadn't had much use since the 1950's although the owner kept it nicely mowed. I stumbled upon it in an old newspaper item one day while researching for something else. It always produces some decent finds and this outing was no exception. With those dry conditions a Barber quarter was detected at 10", a Barber dime at 7", and two early Mercs at 6". Two Indian Head cents showed themselves as well. I used the depth reading LED to go for the deep targets and ignore the moderate trash items on the surface. With depth performance like this in dry soil, I'd sure like to test the Treasure Baron again in moist soil conditions.

When driving to a local lake I noticed some bulldozers building a new road. They had knocked down woods and a field of giant weeds and due to the prime looking site I had to come back after the bulldozers were done work for the day. They had scraped off about 10" of soil next to the old road and piled other dirt in a 12 foot oblong pile. To make the story short, another Barber quarter came up with two Mercs, a Rosie, three Wheat cents and alas, a large cent (although badly worn). Naturally the usual junk of bolts and aluminum cans were there as well. Coin depths were to 10".

At a park I went right to a spot I call "hot rock city" as they come in from "minus" readings to top "plus" readings. It was a great and pleasant surprise to me that the Modular Treasure Baron handled it with just a few chirps. Two Wheat cents at 4" plus a pre-WWI rifle shell casing were unearthed with ease as the hot rocks did not give any good signals. Nice job!

The saltwater beach was another triump for the Treasure Baron. Even though I only found a thin gold lady's ring (with the stone missing) and clads up to 10" the detector proved itself in this environment. My first trip to the beach was with the Basic Treasure Baron and I found I received false signals on the wet salt beach until hitting the iron reject as the the salt toggle does not work without the Pro Hunter module. Apparently the low rejection level is enough to knock out the salt as it smoothed right down without further problems. Of course this means it is not possible to hunt a wet salt beach with All-Metal or No Discrimination Motion without the Pro Hunter module installed to balance out the effects of salt. While this is fine for an average beach hunt I was also aware that the low discrimination level of iron reject would also knock out a woman's small thin ring. My advise is to move up to the Pro Hunter module ASAP. The control did do a nice job, though, of eliminating or causing a broken (short clipped) sound to iron nails, cigarette wrapper tin foil, iron bottle caps and bobby pins.

Doing the air tests at Bernie Hehl's house we found excellent coin depths, but the surprise came with gold items. The machine was very sensitive to small gold items, even pieces of chain. There was one small thin gold heart charm that Bernie said he has never gotten a detector to pick up more than 1-1/2" from the coil. The Treasure Baron produced a decent signal out to 4" with the Boost off and 6" with the Boost on High from the Deep Hunter module. Discovery may not have been building a gold machine but it apparently can double for one, not to mention a mean beach machine.

Opinion

My overall impression of the Treasure Baron is that it is well worth it's basic price and modular upgrades. Although the detector can use a couple of minor changes it does possess two qualities which I require in a good machine -- excellent depth and extreme sensitivity to gold.

Is there anything else I would do if I were the designer of the Treasure Baron? Most definitely. I'd get the Baron married and come out with the Baroness who is waer tight to go into shallow water and scoop all that gold!

If you would like more information on the Treasure Baron write to: Discovery Electronics, Inc., 1415 Poplar Street . Sweethome, OR 97386or call (541) 367-2585. Be sure to tell them you read all about it in Western & Eastern Treasure magazine.

Discovery Electronics

Discovery Electronics SST Baron Field Test From Page 12 of the October 2006 Issue

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Discovery Electronics Millennium Baron Metal Detector

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DISCOERY'S COIN TRAX BARON AND COIN TRAX MODULE

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Discovery Gold Trax Module Update

by Gary Finch

The Treasure Baron Gold Trax module is now barely six months old, and already Discovery Electronics has a new program for it that's a real killer! Those of you who read my field test report on it in this newsletter already know that I gave it a big thumbs up. The original Gold Trax module was good, but with this new program (version 2.0) it's now a whole lot better! Actually, this is the third version of the Gold Trax; version 1.2 came out in mid Dec. of 94, and now version 2.0 adds even more stability and smoothness. All Gold Trax modules are now shipping with the new program, and Gold Trax owners with the original program (version 1.0) can update by simply replacing the original microprocessor chip with the new one. If you don't want to try this yourself, a Discovery dealer can do it for you. I had mine changed in about 5 minutes - it's that easy! One of the things that is most impressive about all of Discovery's products is the fact that their performance exceeds their advertising claims, and the new Gold Trax continues this tradition of superb performance, Another great point in their favor is that they continually strive to improve their products and customer service.

The improvements in the Gold Trax are so dramatic that some of the statements I made about it in the original field test no longer apply. Sensitivity and smoothness have been improved, and auto tune speed is selectable from the keypad. Best of all, the extra sensitivity is fully usable, and the false signals are few and far between. New Gold Trax Features One of the things I really like about the new program is that none of the earlier functions have been changed. This means that all the keypad sequences you have already learned on the Gold Trax are still the same. The new boosted sensitivity is now 4 steps higher than the original program. The factory preset sensitivity level is now the same as the maximum sensitivity level was in the original program. This can mean as much as 4 inches more depth over the original Gold Trax program! Normally one would expect that this would result in more false signals and audio noise, but surprisingly this is not the case. The new programs results in very smooth operation that you have to hear and see to believe! Here's a quick rundown on the new features:

- (1) More sensitivity and fewer false signals
- (2) Audio Iron Indication in the all metal mode
- (3) Keypad selectable Auto tune speed
- (4) Less LED and audio false signals on gold targets
- (5)New GB mode noise reduction and smoothing

I've already discussed the improved sensitivity and stability, so lets move on to the new audio iron indication feature. When activated in the no-motion all metal mode, this feature causes iron targets to give a chattering audio signal that clearly identifies larger ferrous targets. To turn it on, press the IRON key, then press the ON key. To turn it off again, press the IRON key, the OFF key. This feature only works in the all metal mode, and will be a big aid to nugget and relic hunters who prefer to hunt in the all metal mode. There's not much more to say about it. other than that it works in conjunction with the iron LED. I tested it and it works well on the larger iron pieces. (Note: very small ferrous targets may not have enough mass to always activate this feature.)

The keypad selectable autotune speed is another excellent feature that nugget hunters will love. This was one feature that was lacking in the original Gold Trax. In the new version the auto tune is part of the factory preset program and is activated when you first turn the detector on. You have both a high and low auto tune retune speed range to select from. The present value is the slowest speed in the high speed range. If this is too fast for you, shift down to the slow speed range by first pressing and holding down the GND key, then press and release the CLR key. Now press and release the OFF (down) key. To move up and down within the slow speed range, press the ON or OFF keys while holding down the GND key until satisfied with you selection. Remember that this must be done in the all metal GB mode! This system offers such a wide range of retune speed options that you are sure to find just the right one. The overall stability of the new Gold Tra:x program has greatly reduced the problem of false iron indications on small and irregular gold targets. This is true of both the iron indicating LED and the new audio iron indicator. This makes it much less likely that you will miss small flakes and nuggets in highly mineralized ground.

The Iron Target Tracking inhibit feature remains the same in the new Gold Trax, but the keypad sequence to activate or deactivate it has been changed. This function is activated when the detector is first turned on, and it should remain on if you are in the Auto Ground Tracking mode for best performance. To deactivate it, first press and hold the IRON key, then quickly press and hold the GND key. Now press and release the OFF key. The LED will flash briefly if you have done this correctly. Remember, you must hold the GND key down until you are done, then release all keys. To reactivate the Target Tracking Inhibit, repeat the procedure, but press the ON key instead of the OFF key. The Target Tracking Inhibit functions extremely well on the Gold Trax, preventing it from mistakenly locking onto ferrous targets and attempting to balance them out. The result is smooth and stable ground tracking that keeps the detector functioning at maximum efficiency in even the most difficult ground conditions. As you should know by now, correct ground balance is one of the most important factors for good performance in bad ground. At the time of this field test I did not have one of the 6X9 elliptical coils to test, so all the statements in this field test will refer to the standard 8 inch concentric coil. (The new elliptical coil is a double-D design, and I expect it to be even better for prospecting and nugget shooting.) Be that as it may, let's get back to the new features.

The new GB Mode noise reduction and smoothing is a brand new function on the Gold Trax module, and in my opinion is a major improvement over the old program. In essence, it allows you to run the Gold Trax at high levels of sensitivity in bad ground, while simultaneously smoothing out the noises and false signals from ground mineralization that may cause you to miss small nuggets. This is a biggie, no doubt about it! More conventional methods of overcoming ground mineralization problems has always been to lower sensitivity, but of course this sometimes causes you to miss the small deeper targets. It's always been a trade-off that we just had to accept. Not any more! My recommendation for nugget hunting in highly mineralized ground is to run your sensitivity on the -GoldTrax wide open speed up the auto tune a little, and then use the noise reduction and smoothing function to knock out the mineralization noise. The only time when I wouldn't recommend operating this way is when the nuggets are very small and near the surface. Then it may be best to turn the smoothing function off and reduce the sensitivity, because you won't need a lot of depth anyway. You'll just have to experiment with this for yourself and then decide which method works best for you.

To turn on and increase the GB mode smoothing, press and hold the CLR key, then press the ON (up) key. To decrease GB mode smoothing, press and hold the CLR key, then press the OFF (down) key. To turn the GB mode smoothing off completely, press and hold the CLR key, then press the GND key. Once you use this function, you'll wish that all your detectors had it! This new function has been field tested in the worst ground in Arizona and Nevada, and it really works. The increased smoothness and stability also results in fewer false signals and more accurate audio and visual iron indications, which in turn really help in making the decision of whether or not to dig. I really gave this new feature a workout in my bench and field tests, and it really is a valuable feature and big improvement. Before we get into the bench tests, I'd like to make a few comments about field test reports in general. All my field test results on any new products are as unbiased and fair as I can possibly make them. When I test detectors "head-to-head", I first set them up exactly the same, test them in the same operating modes and at the same control settings and levels of sensitivity and discrimination, and honestly report the results.

If one of your favorite detectors does not perform as well as another, I'm sorry, but that's just the way it is! Maybe you need to pick up a different brand occasionally and try it! Gold Trax Bench Tests Bench tests showed that all the good features of the original Gold Trax have been retained in the new version. The new program is now better about not registering small pieces of conductive metal as iron. In my original field test I wrote that the Gold Trax would not detect the really tiny gold flakes less than two grains in weight. This is not true of the new program! My tests indicate that it will hold it's own with any of the popular nugget hunting detectors, and in any ground conditions! This is truly amazing because the Treasure Baron is an all around detector and not just a nugget hunting detector. I know this all sounds too good to be true, but I've held the proof in my own hands and seen how it performs! The factory chosen preset program is really excellent, and most Gold Trax owners will be able to just turn it on and start hunting effectively. Of course, human nature being what it is, I expect everyone to immediately boost the sensitivity to the max: go ahead, the Gold Trax is so smooth and stable that you can get away with it! Ground tracking is exceptionally smooth and accurate, resulting in the detector operating at peak efficiency in any ground mineralization conditions.

This is, of course, one of the key requirements for productive nugget hunting in most parts of the world where gold is found. Davie County, where I live, is located in western North Carolina and sits squarely on top of a mineralized slate belt that extends from southern Virginia into northern Georgia, with many old mining areas within it's confines. Iron mineralization often varies drastically within short distances, and hot and cold rocks are everywhere. To give a metal detector some really tough testing conditions, I only have to walk out in my own backyard! Many popular detectors won't find a small conductive target laying on top of the ground, much less buried in it. I conducted some backyard tests on small gold targets, and was most impressed with the results. At maximum sensitivity an extremely small and fine 14K. gold ankle chain weighing only 10 gr. buried 3 inches deep in the ground produced a good signal in the all metal mode. I couldn't resist a little head-to-head testing, so I also tested this target with the Fisher CZ-6 and Compass Gold Scanner Pro. These detectors were set up the same as the Treasure Baron/Gold Trax combo: 8" concentric coils, all metal mode, sensitivity set at maximum, and both detectors were carefully ground balanced. The CZ-6 couldn't detect the chain at all, and the Gold Scanner Pro gave a faint signal that I would probably have missed if I hadn't already known it was there. I repeated these tests again and the results were the same: the Treasure Baron/Gold Trax combo gave a solid signal, stronger than the other two detectors.

Next I buried a very small 5 gr. gold nugget in guartz matrix 3 inches deep and then proceeded to retest all three detectors on this difficult target. The results were almost identical to the first test: the Treasure Baron/Gold Trax produced a good smooth solid signal, the CZ-6 did not produce any signal at all, and as before the Gold Scanner Pro gave a weak signal. Burying a larger 19 gr. irregular nugget 5 inches deep, I found that the Treasure Baron consistently detected it 1-2" deeper than either the CZ-6 or Gold Scanner Pro in the all metal mode. Testing the detectors in the motion discrimination mode, the Treasure Baron/Gold Trax consistently gave a good solid signal and high audio tone I.D. on the larger 19 gr. nugget with the discrimination control set at 0. I set up the other two detectors the same way; the CZ-6 would sometimes give a solid signal, but consistently I.D.'ed the gold nugget as iron. The Gold Scanner Pro gave a weak signal and would not I.D. the nugget at all. Of course it's not a good practice to rely on target I.D. meters anyway when nugget hunting, because ground mineralization can often render I.D. circuits useless. However the results of these tests proves to me that the Treasure Baron Gold Trax aces definitely beat these other fine detectors on small gold targets in bad ground. Here I'd like to make some general observations about nugget hunting. Many novice nugget hunters assume that if they can locate relatively small targets like .22 shell cases in mineralized ground they will also be able to find gold nuggets with a metal detector, and this is often not true! A small gold nugget or flake is a far more difficult target, and usually only gives a tiny zip-zip signal that can easily be missed. The best way I know to practice nugget hunting I owe to Jim Straight:

glue a #6 lead shot to a business card and lay it down on top of some highly mineralized ground., Now try and detect it in the all metal mode. When you think you're pretty good, scatter a few #6 shot over a wide area and try to find them. Now you should have a much better idea of the difficulty involved! Of course, other factors besides sensitivity and depth are also important. A good nugget hunting detector must also be able to minimize or ignore hot rock responses, take abuse and rough treatment, get good battery life and maintain stability in extremes of temperature.

It should also be hip-mountable, lightweight, and have a good selection of search coils available. The Gold Trax meets all these criteria, although it's a little heavier than some other nugget hunting detectors because of the die cast aluminum case. To me that's not a big disadvantage; I'd rather have the solid construction of the Treasure Baron and tote a few extra ounces if necessary. Search coil selection is limited to either the standard 8" open center concentric of the 6X9" elliptical double-D, and it would be nice if Discovery would come out with an even smaller coil for the Treasure Baron, say a 4" round concentric. Only so much can be done in the backyard, so it was time to take the new Gold Trax into the field! Back To The Gold Fields There are a few old gold diggings in my own county, but for larger flakes and nuggets one needs to search some of the richer North Carolina gold bearing areas. One of the better areas is in the South Mountain area, located between Hendersonville and Ashville. The Burke County area is easily accessible and fairly productive. In the old days this was a wide open boomtown area that resembled some of the old western mining towns. I chose the area around Brindletown because I've had good luck in the past finding small nuggets here. This is not too far from Rutherfordton, where the old mint of the Bechtler's produced a large quantity of gold coins during the 1820's and 1830's. Very few of these territorial gold coins survive today, and they are all very valuable. I've never found one, but I keep hoping! The old Bechtler mint had the distinction of producing the first \$1 gold pieces in the United States.

This area can also produce an occasional sapphire or ruby of good guality. which adds a little spice to the hunt. Generally speaking, permission is easy to obtain from local residents. Just respect the property, and DON'T LEAVE ANY UNFILLED HOLES! Day One. The area I chose to hunt has a steep bluff with several exposed guartz stringers, and the entire hillside is heavily pocked by shallow pits, with a small stream winding at the base of the slope. Both sides of the stream were dotted with shallow pits, and broken pieces of iron-veined quartz littered the hillside. This place definitely had possibilities! In my mind I pictured the old timers as they laboriously dug and broke up the shallow quartz veins, carrying the rich vein material back down the slope to the stream to wash it out in rockers and separate the heavier gold. I set the Gold Trax up in the all metal mode, but was forced to reduce sensitivity 4 steps below factory preset level because of the fierce mineralization. I also increased the ground tracking speed 2 steps above preset to keep up with the rapidly changing ground mineralization. At this level of sensitivity I was able to maintain a good smooth threshold and the audio iron I.D. features and iron LED worked well. As expected, hot and cold rocks were everywhere, but the Gold Trax handled them well. I found several pieces of quartz vein matrix material which contained enough conductive metal to override the iron present in them and give a good signal. This would indicate the Treasure Baron Gold Trax combination can be used productively to hunt old ore dumps for rich specimens, which can be quite profitable at times.

I started at the base of the hill and slowly worked up, crisscrossing the slope in an attempt to find a piece of rich float, or a nugget that had rolled downhill. Hipmounting the detector on the left side proved guite comfortable, and the light weight of the coil and shaft made it much easier to follow the contour of the slope. The Treasure Baron/Gold Trax proved quite stable in the hipmount configuration for such a highly sensitive detector, and I had no problems with any false signal at any time while hunting in the all metal mode. It is only fair to say, however, that the 8. concentric coil is guite sensitive, and bumping it on brush or the ground does cause false signals. Fortunately for the nugget hunter, this is more of a problem in the motion discrimination mode than the all metal mode. I experimented a little with hunting in the motion mode at a zero discrimination setting, but the hot rocks caused so much static and noise this was impossible. This is one of the big advantages of nugget hunting in the all metal mode - hot rocks often simply null the threshold, allowing you to identify and ignore them. The audio iron I.D. of the Gold Trax works well, giving a chattering signal on iron that is unmistakable and enables you to easily bypass it. Just remember that no target I.D. circuit is perfect, and small and marginal gold specimens can sometimes I.D. as iron, so when in doubt, dig it!

After 3 hours of steady hunting (and just before my legs gave out). I heard that sweet sound I'd been waiting for. It was a narrow, intense signal that sounded the same when scanned from any direction, and as I raised the coil it only faded slightly in volume - this had to be a good one! Chopping out 3 inches of red clay revealed nothing, and that sweet sound was still there, now slightly stronger! I switched into the motion mode and it was still there - a solid high tone on repeated sweeps, definitely not iron! Three more inches removed from the hole, and still no sign of the target. Three more inches removed from the hole revealed a lump of white guartz, laced with red veins of iron and streaked with yellow gold! Carefully breaking it free from the surrounding clay, I hefted it and mentally estimated the total weight to be at least 2 ounces. Wow! This is a monster chunk of gold for North Carolina! (Later it weighed in at 2.3 ounces, and at least 50% gold). I took it down to the stream and very carefully washed it off with a small nylon brush to remove the sticky red clay. My mind was functioning at two totally different levels: one was disbelief and wild excitement, the other cool detachment, as I wondered if there could be any more pieces of rich float in the same area. Studying the hillside, I noted that the place where I'd found the big nugget was actually a shallow bench that had evidently trapped the heavy nugget and prevented it from rolling any further down the slope. After a short break to rest my legs and collect myself, I carefully worked the entire bench, but without any further success. My heart pounding, I decided that this was all the excitement I could handle for one day, and headed back to the truck. The long drive home passed quickly, and I passed the time mentally counting my vacation days, and carefully planning my next trip. Such is the lure of gold fever! Day Two Eight days later, with high hopes, I returned to the same site. This time I decided to try a different approach.

I studied the bottom land around the stream, carefully noting the pattern of the shallow placer pits and trenches. Since all the ore washing had obviously been done in the stream, there was a good possibility that some small nuggets had been lost or overlooked in the process. Due to it's fine performance, I had confidence that the Gold Trax would be able to find any nuggets if they were there. This confidence would prove to be well founded! The question was where to search first, the banks or the stream? Id brought along my Garrett plastic gold pan kit, with both 10" and 14" pans and classifier screen. These are really handy
for working in either dry or wet material. I like to stack the classifier in the 14" pan, then dump the soil into it and shake it down. All the larger rocks are trapped in the screen and the fine material falls through into the pan. Then just scan both the screen and the pan with the detector. It's fast and easy and you don't lose anything. I often carry just the small 10" pans when nugget hunting. And of course, you can also use them for panning in streams for the really fine stuff if desired.

I decided to work the streambed first, scanning with the detector for nuggets and hotspots. Probing down, I found that bedrock was lying under 8-10 inches of sand, clay, and mixed gravel. (Here's a tip; when prospecting of nugget hunting I always carry a ground probe rod for checking the depth of bedrock and probing for holes and tunnels. It's not the most high tech piece of treasure hunting equipment you can own, but at times it can be a very valuable tool.) Detecting the streambed, I soon locate several hot spots in the bends of the stream. Digging down to bedrock, I shoveled them out and panned them. None of the them contained any nuggets, but about 6 cups of black sand was recovered. By panning the black sand I was able to recover about a half pennyweight of small flakes and fine gold. My back isn't what is used to be, so I gave up on the streambed and started working the banks.

A long time passed without any signals other than the usual trash found around most old mining areas, so I climbed to the top of the hill, took a break for lunch, and again surveyed the area from my new vantage point. From the hilltop I was able to see 2 faint old trails that I hadn't noticed before that led down the hillside and then joined near the stream. Could this be the route the miners had used to carry the ore to the stream? I started carefully searching along the old trails, slowly scanning a 10 foot wide area along the trails. Bingo! A good signal, and a small nugget in quartz 5 inches deep! I boosted up the sensitivity two notches and got another good signal, 10 feet away and slightly stronger than the first. This was just too good to be true- but it was! Slightly deeper than the other, this one was a nice 15 grain nugget. Sure now that I was on the right track, I slowly and carefully hunted the entire area, then when I was about to give up, I got another good signal about 15 feet away from where I'd found the first nugget. This one was difficult to recover because it had turned and fallen between two rocks. There was nothing else to do but dig down and pry out the rocks, freeing the nugget (and in the process throwing dirt in my face). This one weighed 18 grains, and was irregularly shaped and flattened. Exhausted and guite pleased. and facing a long drive how, I called it guits and headed for home.

Overall Impression Of The Gold Trax after this much good fortune, it's hard not to rave about the new Gold Trax module. As all nugget hunters know, it's not at all uncommon to get "skunked" on nuggets for days at a time. Hey, if they were just laying all over on top of the ground, everyone would be rich! But even with a great place to hunt, you have to have the right detector to find them, and the Treasure Baron and Gold Trax module gets the job done. I've owned a Compass Gold Scanner Pro for years, and it's a great unit, but my honest opinion is that the Treasure Baron with the Gold Trax module outperforms it. The main advantage the Gold Trax has is it's auto ground tracking and the overall smoothness. These qualities let you forget all about adjusting the detector so you can concentrate more on listening for good signals, and this in turn lets you hunt more thoroughly and effectively. I didn't experience any problems any and kind while field testing the Gold Trax, and with the qualitY of construction I frankly don't expect any. You definitely need to hipmount it for all day nugget hunting to reduce the fatigue factor. The addition of the Gold Trax module didn't seem to shorten battery life of the trusty Baron by much, so evidently current drain is not excessive.

The transmitter frequency of the Treasure Baron is 12.5 Khz, and the is an excellent choice for response on gold targets. I personally have always favored the detectors that operate between 10 and 20 Khz. Lately the trend seems to be toward higher frequencies, with the Whites Goldmaster operating at 50 Khz and the Compass AU at 52 Khz. The theory seems to be that higher frequncy units are more sensitive to really small gold flakes, but do not have the depth of lower frequency units. I believe that searchcoil design is far more important than operating frequency, and any detector that operates at 10 Khz and above will produce good results if the searchcoil is well designed and constructed. The Treasure Baron/Gold Trax combination should offer some stiff competition to the auto ground tracking Minelab detectors. I have tried them, and personally I prefer the Treasure Baron and Gold Trax. Of course I must admit that I'm probably a little prejudiced because the Gold Trax has performed so well for me. But isn't that really the bottom line, metal detector performance? Search Methods and Techniques Nugget hunting is an art all it's own that demands top quality equipment, skill in detector operation, a certain amount of knowledge of the geology of gold bearing areas, and a whole lot of patience.

Sure you might hit it big your first time out, but the odds are against that. But you can find gold with a good detector, patience, and the right search methods. Many others have done it, and so can you! The choice of the right detector and patience are up to you. I'll fill you in here with the search methods that proved most productive with the Treasure Baron/Gold Trax combination, and of course these methods will also work with other nugget hunting units. (1) Make the all metal mode your primary search mode. There are several important reasons for this. The tiny signals from small bits of gold will be easier to hear, hot rock signals will usually produce a null (loss of threshold tone) that enables you to distinguish them from gold, and the threshold tone will alert you to changing ground mineral conditions. Use the audio iron indication and the iron LED to identify junk ferrous targets. Don't rely on the audio target I.D. feature to identify small bits of gold.

Severe ground mineralization makes it very difficult to accurately Identify small metal targets in the motion mode. Although this may work if the nugget is large or shallow enough, you will probably miss a lot of small ones. If you want to use the discrimination mode, hunt in the all metal mode and only switch to the discrimination mode to identify targets. Even at that, it's always best to set the discrimination control at zero and listen for the low iron tone or the high tone that signals conductive metal. Experiment with the ground tracking speed and autotune retune speed. Different ground conditions may require different setups for best performance. Take your business card with lead shot with you and use it to set up your detector for the best target response. In a pinch you can bury a nickel 10 inches deep and use it for this. The only warning I want to give you here is to be sure not to use too fast a ground tracking or autotune speed. Too fast & tracking or autotune speed will tune out the weak signals from deeply buried and small nuggets. Slow and patient hunting produces the most gold, not whipping the coil at a rapid rate and covering a lot of ground. Make use of the buried nickel to determine the best coil scanning speed for ground conditions.

Every detector will have an optimum scanning speed that will produce the best

response on small conductive targets, and this will be dependent on the severity and type of ground mineralization present and the way the detector is set up. Work with it, don't try to fight against it! Here's another tip: Don't wear any shoes with metal evelets! Today nugget hunting detectors are sensitive enough to pick them up! My own favorite nugget hunting shoes are a \$10 pair of tennis shoes with velcro straps that I bought at Walmart Mart on sale. If you want a good reference book on nugget hunting, I recommend "Follow The Drywashers", vol. 3, by Jim Straight. It's the best book available on nugget hunting, and will put you on the right track in a hurry. Nothing else on the market even comes close to it. Compatibility With Other Modules The Gold Trax is compatible with all other Treasure Baron modules. However, I would recommend that you not use it with the Deep Hunter module. The Gold Trax already is extremely sensitive, and increasing it even more in highly mineralized ground results in instability and a lot of false signals. This defeats the purpose of the Gold Trax, which is smooth and powerful operation in bad ground. It may be possible in areas of low mineralization, but this would be the only time. And anyway, gold is not usually found in areas of low ground mineralization. Since the Gold Trax is so versatile you will probably find yourself using it for a lot more than just nugget hunting.

In my opinion the most cost effective Treasure Baron/Gold Trax would be the basic Baron with Gold Trax and Ni-Cad modules. The Ni-Cad module only costs \$29.95 and cuts your battery costs to almost nothing. If you do a lot of coin hunting, you might also want the Pro Hunter module. Just remember that you can't use both the Gold Trax and Pro Hunter modules at the same time, because they both occupy the same board slot in the Treasure Baron case. If you want the best nugget hunting unit possible, opt for the Gold Trax module, the Black Sand module (has Ni-cad recharge too!), and the 6X9" elliptical searchcoil. I can't comment on the new 6X9 inch elliptical coil as yet because I haven't field tested it. It's a double-D design so it should be good for nugget hunting and prospecting. Given Discovery's excellent track record in quality it will probably perform well. Like most double-D coils it will probably not be very good at rejecting round iron targets, but I'm only speculating here and it might surprise me. For relic hunting, or for big and deeply buried nuggets you might also want the 10 inch coil. This is an excellent coil with good sensitivity and super depth on the larger targets. It's also a quiet and noise-free coil, and this is a big benefit in highly mineralized ground. Overall Rating of the New Gold Trax So here's the bottom line on the new Gold Trax module: it performs extremely well, even better than Discovery claims it does. It makes the Treasurer Baron a top notch nugget hunting detector that can hold its own with the best nugget hunting units on the market. Not only that, it also does a great job at relic and coin hunting. Don't just take my word, go to your Discovery dealer and see for yourself.

If I were limited to only one module for the Treasure Baron this would have to be it. The ability to quickly and easily upgrade it by replacing the microprocessor chip also makes it especially attractive. The price of the Gold Trax module is money well spent that you won't regret later. I highly recommend it to all Treasure Baron owners. Discovery Electronics Products Due to their high quality and great performance, I have decided to become a dealer for Discovery Electronics. I do not intend to become a high volume dealer, but I wish to make their products available to all readers of the Metal Detector Newsletter. All sales will be on a personal one-on- one basis; each price quoted will be a bottom line price, so don't even think about haggling with me about it! Either call or write for a price quote on the items you are interested in. All prices quoted will include shipping to your door. I'm not interested in making a lot of money out of this, I just want to make them available to my readers. late Developments Just before I went to press with this issue, I received information on the new Gold Trax Baron Detector. This new model is the Treasure Baron with a factory installed Gold Trax module, and the 6X9" elliptical widescan Double-D search coil. Discovery says there is nothing better at any price, and I have to agree with them. This model also has a gold colored control box, rather than the standard red box. The introductory list price of this detector is \$729.95. I can offer a special deal on this detector , but only to current subscribers of the Metal Detector Newsletter! Either write me here at the M.D. Newsletter, or call for the special price. This detector is a hot item, so you may have to wait a few weeks to get one.

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Discovery Electronics GoldTrax Module Version 2.10

Version 2.10 Changes:

1) Bug Correction.

2) New feature (non-documented).

Motion Filter modification.

3) New feature (non-documented).

Turn-ON and Turn-OFF Target Phase Window.

4) New feature (non-documented).

Baron Phase Calibration check.

The new version works in an identical fashion to version 2.00 except for the following modifications:

(1) TURBO MODE BUG

This program bug is present in all previous GoldTrax versions except v1.00. When you release the Baron Mode toggle, to exit the Turbo Mode, the following GoldTrax functions may be altered:

- 1) "Target Tracking Inhibit" control.
- 2) "Audio Iron alert" control.
- 3) Ground Tracking "Trax or Fixed" control.

Each of these Control features may be switched to its alternate condition. Or, they may not be altered at all. The choice as to what may happen is completely random. Turning the Audio Iron alert on and off can be easily detected. However, changing the Inhibit or Ground Tracking features will probably go unnoticed. If you are unaware of an alteration in these two features, GoldTrax performance could be seriously reduced.

Problem Solution for versions v1.01 to v2.00 ---

- (A) First of all just don't use the Turbo Mode and this problem will never come up. This is not necessarily a great disadvantage since the GoldTrax circuit will Ground Track within 3 to 10 seconds simply by sweeping the loop over the ground.
- (B) Go ahead and use the Turbo Mode but reset the three Control features listed above to restore to known conditions. Although

this works I don't think it makes sense. The purpose of the Turbo Ground Balance Mode was to offer a very quick method to achieve Ground Balance. If you have to reset the three features each time after you Turbo then its rather inconvenient and takes more time.

NOTE: This bug is corrected in v2.10.

(2) MOTION FILTER MODIFICATION (NON-DOCUMENTED)

Modification of Motion Filter Time Constants "TC". This new feature is added to version v2.10 and at this time should be non-documented and left out of the instruction manual.

When you first "turn-on" the GoldTrax or when you press the CLR button, twice quickly, the Motion Filter TC is set to 22ms. This is the same TC that has been used in all previous GoldTrax versions, and it has always been fixed. This TC value won't change under normal operation unless you know how to change it as described below. Therefore, this new version will normally operate like the previous GoldTrax Modules.

MOTION FILTER (TIME CONSTANT) SPEED INCREASE ----- Press and hold down the IRON key then press and release the UPON) key. DECREASE ----- Press and hold down the IRON key then

press and release the DOWN(OFF) key.

PRESET ------ Press and hold down the IRON key then

press and release the CLR key.

Note: Filter speed always returns to a preset 22ms at instrument turn-on or if you do a double clear on the CLR key.

Each time you press and release the UP or DOWN key while holding down the IRON key the filter speed will change in discrete increments. The eight possible values are:

MOTION FILTER TIME CONSTANT

155ms (Down Key direction) 41ms 22ms (preset value) 14ms 9.5ms 7ms 5ms 3.6ms (Up Key direction)

The Motion Filter speed (TC) does not directly affect the Ground Balance performance. For instance it doesn't alter the Ground Tracking speed. However, it does control the performance of the Audio Iron Alert and the Target Inhibit features. As you know, the Target Inhibit if activated does control how the automatic Ground Tracking is affected by ferrous and Non-ferrous targets. Therefore, the Motion Filter Time Constants can indirectly affect Ground Tracking performance. It is quite possible that slightly shorter (smaller) Time Constants could improve the GoldTrax module performance. This new feature will allow the operator to experiment with this feature.

Initial lab testing has shown that the extreme TC values; 3.6ms, 5ms and 155ms are probably not useful. Making the Time Constant smaller (say from 22 to 10ms) tightens the target response and decreases ground pick-up and target sensitivity. Making the Time Constant greater (say from 22 to 41ms) lengthens the target response and increases ground pick-up and target sensitivity.

There is no visual feedback when you alter the TC values as outline above. Therefore, it is somewhat difficult to know exactly what TC value is installed. Its best to first hold down the IRON key then press and release the CLR key to reset the TC value to preset 22ms. Then, step the TC value up or down to achieve the desired result.

NOTE: This new feature does not affect the normal function of the IRON key. As before when you hold down the IRON key the LED will indicate the battery condition. And when you release the IRON key the other IRON key functions will become active.

(3) TURN-ON AND TURN-OFF TARGET PHASE WINDOW (NON-DOCUMENTED).

The Target phase window is turned-ON (activated) in all previous GoldTrax versions whenever you used the Turbo GB feature. The idea behind this program is as follows:

Whenever you Turbo Ground Balance, the Target Inhibit feature is temporarily removed and the GoldTrax quickly nulls to the ground matrix. Immediately after that a small 1 degree phase window is placed around the resultant measured ground phase. When you exit the Turbo Mode this phase window stays in place. Now when you go across a ferrous or nonferrous target the GoldTrax will more accurately ignore the targets and will not "track-off". In other words, with the phase window concept the GoldTrax will track the Ground better and ignore targets.

When the GoldTrax Module is Turbo Ground Balanced over fairly uniform mineralized ground that is devoid of targets, this phase window program probably works quite well. Using the Turbo Mode over "bad ground", where the matrix is not uniform, and where "hot rocks" are present the installed phase window could cause the GoldTrax to lock-up and not track correctly. Under these unusual conditions it's quite possible that problems could occur.

In version v2.10 the small 1 degree target phase window is not normally installed when the Turbo GB Mode is activated. This is more in keeping with how the Turbo Mode is used. There should be no negative side effects in removing this program feature. However, if desired, the phase window can be installed as follows:

TARGET PHASE WINDOW

ON ----- Hold Baron Mode toggle in Turbo GB Mode

press and release the IRON key.

OFF/PRESET -- Hold Baron Mode toggle in Turbo GB Mode

press and release the CLR key.

Note: The Target Phase window will also be returned to the preset OFF condition when the Baron is first turned-ON and during a CLR CLR key sequence. After you turn-ON the window it will stay activated permanently until you manually turn it off as described above. After Activation or deactivation of the window using the IRON or CLR keys don't press any other keys for at lease 2 second to eliminate the possibility of starting an IRON or CLR key sequence.

(4) BARON PHASE CALIBRATION CHECK (NON-DOCUMENTED).

At turn-on or during a CLR CLR key sequence all GoldTrax versions have preset the Ground Balance (phase) to +0.5 degrees. This would be equivalent to turning the Ground Balance control fully

clockwise on a Pro Hunter Module. This preset setting is not critical since the GoldTrax program will automatically slew the Ground Balance to another phase location to null on mineralized ground. However, for operation in low mineralized ground the +0.5 degree value is probably the best place to preset the phase setting. Therefore, for operation in low mineral the operator turns-on the Baron then immediately deactivates the "Ground Tracking" by pressing the GND key then the OFF key. This locks the phase setting at the preset value.

A preset phase angle of +0.5 degrees is fine for normal operation. However, it would be useful to preset and lock the phase at 0 degrees. A zero degree preset allows for Baron Main board trimmer R108 phase calibration. Or, the trimmer can be checked for correct calibration. This may be useful since no target simulator is required and only a ferrite sample is needed to verify the correct setting of R108.

R108 CALIBRATION PROCEDURE

- (A) Hold the Baron Mode Toggle in momentary GB re-tune position.
- (B) Press and release the GND key then quickly press and Hold the OFF key.
- (C) Release the Mode Toggle then release the OFF key.
- (D) Press the GND key twice quickly.

The procedure above sets-up the GoldTrax module for Baron pcb R108 calibration. Step "A" activates Turbo GB and redefines what some of the keys do. Step "B" and "C" turns-off the Ground Tracking and sets the Ground phase to zero degrees. The Ground phase setting is now locked at zero degrees. Step "D" removes the AC auto-tune feature and places the program in its DC mode. Step "D" may be skipped if the DC adjustment method is preferred.

To Calibrate R108: Momentarily retune the threshold with the Mode Toggle as often as necessary to reset audio threshold. Move a pure ferrite sample about the loop and adjust R108 for minimum audio change as the ferrite is moved. If the audio changes too much, momentarily retune the threshold using the Baron Mode toggle. Don't hold the toggle too long in the momentary position otherwise Turbo GB will be activated which could alter the zero degree phase setting. If "D" above is skipped retuning the threshold may not be required, or at lease as often. Use only a pure ferrite sample such as half a pot core. Its diameter should be about 1/2 to 3/4 of an inch. Move the ferrite vertically up and down along a line perpendicular to the center of the loop. Do not place the ferrite closer than 1 and 1/2 inches from the loop otherwise a phase error is created. When the calibration is completed, press the CLR key twice quickly to remove the locked zero degree phase setting.

Introduction

Several prototype versions of the CoinTrax II were field tested. Three individuals, not associated with Hambyware LLC, tested the prototype chips in various ground conditions. JB of Amory Mississippi is in an area of low mineral ground. Reg Sniff of Pueblo Colorado and Discovery Electronics in Sweet Home Oregon are located in highly mineralized ground. All were asked to evaluate the CoinTrax II and prepare a report giving their observations of the new chip. These reports provide practical CoinTrax II operating tips. Also, the evaluation of the new Standard Discrimination and Deep Search modes is of special interest. Reg and Discovery **Electronics field** tested the new Deep Search mode and determined it performed well in mineralized ground. JB was mainly concerned with the Standard Discrimination mode and its performance in low mineral. All three reports are reprinted here with the permission of the parties involved.

Hunting Tips 1

Deep Search Feature: I have been asked to provide a little information about the new Deep Search

mode now part of the new features recently designed into the new CoinTrax II chip. But, before

going into even the basics, I would like to add a little information about the CoinTrax II and the

chip itself.

First, the CoinTrax II module is almost a complete detector in itself with just the limited amount of

operations taken place outside the module. At the heart, or better stated, the brain of the CoinTrax

Il is the microprocessor chip itself. This is where it all happens.

Now, the original CoinTrax had one major limitation that frustrated many users, including myself.

Once it was turned off, all settings were lost. This meant that when the unit was turned on again,

one would have to quickly go through whatever adjustments they preferred, before they could start hunting.

Actually, the preset on the CoinTrax was more than acceptable, so one could simply start

from

there, but doing so, didn't fully utilize the capabilities of the machine.

Well, this new Chip has eliminated this key limitation. Now, all adjustments are remembered so

when the detector is turned on again, one can start where they left off with the minimum of effort.

By itself, this feature is a great enhancement to the CoinTrax II. In essence, it effectively "creates"

a new detector of sorts. So, when one buys a replacement chip, they are effectively buying a new

detector.

All would be fine if that was all that was added to the new chip, but more was incorporated that

truly does "create" a new VLF.

One dramatic feature is the addition of a new mode called the "Deep Search mode". What this

mode does is add something that has been missing on all VLF's I know of. This new mode sort of

bridges the gap between the All Metal Mode and the Discrimination mode and in doing so, provides

the operator with one of the most versatile machines possible.

The fundamental concept of the Deep Search mode is to provide as much information about a very

deep target as possible, while actively compensating for the ground minerals. This mode works

best in areas having high mineralization. In such areas, the result is an increase in depth capabilities that has the potential to be significant. It all depends upon the mineralization, moisture, etc.

The key is, with the Deep Search mode many good or desirable targets just out of range of the

discrimination feature will now be detected with a certain level of reliability. One should also

realize that this isn't a perfect world and as such, a few more "trash" objects will be suspected to be

good items also. So, the result will be the detection of many more good objects normally out of

range of a true TID machine, and as a down side, a few more undesirable objects will be analyzed

as possible good objects.

It is difficult to describe just what is going on, but in general terms, additional ground compensation is introduced to compensate for the "shift" in target response as a target gets

deeper. All too often very deep targets will have a tendency to read high on the TID scale. What

isn't generally known is this shift doesn't stop at the top of the TID reading, but continues as the

signal from the target becomes weaker and weaker. The result is a very deep "good"

target" will

more than likely read as trash simply because it is out of range to be accurately evaluated. . The

key as to when this happens is a primarily a function of the ground conditions, the depth of the

object, and ground moisture.

Because all of the above issues are variables, there is no way to accurately state just what to

expect with the Deep Search mode in all cases. What can be said is this; in highly mineralized

ground, the Deep Search mode should provide additional depth capabilities. In some cases, the

increase can be very significant. In others, there will be less of an effect.

To allow the operator a wide range of adjustments, there are 4 levels that can be selected besides

the off feature. The operator can select the operating level by going to the position 7 and selecting

the desired setting. One can select one of 4 levels with only TID indication, or the same 4 levels

with both TID and audio indication. (See the instructions for the specific adjustments). My recommendations would be to start with the minimum setting initially.

Now, what the Deep Search mode effectively does is to compensate for the ground and then, based

upon the information it does have, provide an indication when the target is suspected to be a good

object. As the compensation is increased, the TID accuracy decreases, but depth increases. In

other words, as the level is increased, one should be prepared to dig more trash along with the

deeper "treasure" objects.

Probably the best way to describe this feature is the Deep Search mode is "it is a best guess

analysis". As stated before, the advantage of this mode is many deeper "iffy" targets that now only

provide an intermittent or more commonly, no response at all, will now provide a solid signal, but

will indicate them a little differently than a typical "good target". This allows the operator to know

when the Deep Search feature has activated and from there, the operator can decide on whether to

dig the object or not. Normal discrimination works basically the same in this mode, good objects

register as good, bad objects are rejected, but those deeper objects in question are sorted out and

may register as a "possible good" object, depending upon the analysis.

To provide the operator with as much information as possible, two methods of indication have been

added to this Deep Search mode. First, the TID will indicate a Deep Search mode object by activating the two highest LED's and the second feature is the audio, which can be

selected to

provide a "stutter" type audio signal when an object has been detected within the range of the

Deep Search mode, but outside the range of the regular discrimination feature.

In conclusion, I do have to say that the Deep Search mode is too new to actually determine the

true merits or and provide just what settings will ultimately work best. As such, there will be

learning curve to determine the best combination of other settings to provide the most accurate

indications.

Personally, I found that with the detector set at preset sensitivity and the Deep Search at the first

level, provided a significant depth increase while maintaining TID accuracy. This would be a good

place from which to start. At this setting, I found that several known good targets out of the

normal range of a TID machine did respond with a solid signal indicated by the dual LED's.

personally tried the audio, but did turn it off and elected to rely on the LED indicators only. Now, I

have not tried a lot of combinations at this time. It is hard to shift from something that works well.

Therefore, this new Deep Search feature is simply too new to know just what is the best combination of settings to use. Keep in mind, that this feature is not a simple sensitivity control. In fact, it is very possible that his feature will work better with the sensitivity control set

at preset or maybe even lower, depending upon the intensity of the ground signal. So, one should

take time to try different combinations to see just what works best at their location. Finally, what

works best at one location may not be the best setting at another.

What is very important to remember is this Deep Search mode is a totally new concept. It adds an

additional layer of information about the deeper buried items that are normally outside the range of

the normal discrimination mode. In a nutshell, this feature is designed for those people who want

extreme depth capabilities so they can dig those desirable objects at depths greater than normal,

and in doing so, realize that in providing such information, the accuracy level of the discrimination

will decline.

I hope this information helps in better understanding how the Deep search mode works.

Reg Sniff, Pueblo CO

Hunting Tips 2

As with all detectors, and all ground conditions, the key to optimum performance with the CoinTrax

Il in low mineralization is having it set up correctly. The sensitivity level is very important. Some

assume the sensitivity level can be run at, or near, maximum in mild ground and while that will

produce excellent results in some places, that's not always the case. I've found running the

sensitivity up to the point it just starts to become unstable and backing off until the CoinTrax II

stabilizes produces far better results in the mild ground here than setting it at maximum. My

optimum sensitivity setting is invariably 3 or 4, more often 4.

Achieving a proper ground balance is also very important. In the mild ground here the auto ground

balance always sets the balance a little too positive, as do other auto balance detectors. Always

check after the CoinTrax II finishes ground balancing and if it's too positive, or negative, use the

ground balance offset feature to achieve a neutral or slightly positive threshold tone or turn auto

balance off and manually ground balance. A too positive ground balance can cause a loss of depth

on higher conductive targets and a too negative balance can cause falsing.

In ground V nickels register as foil on most ID detectors here, well below Jefferson nickels, so I set

the Standard Discrimination Motion mode to a level that will easily accept them. That's with the

solidly lit LED on 6 and the blinking LED on 7 in our ground conditions. That setting discriminates

out some smaller gold rings (the smallest ring I've found discs out with the solidly lit LED on 6 and

the blinking LED on 5) but I use the new Standard Discrimination All Metal mode in conjunction

with the disc mode at places with moderate to low trash levels so small rings won't be missed. At

those sites I search in all metal mode and toggle to disc mode to check conductivity ranges when

the CoinTrax II gives a signal that doesn't ID as iron in the new all metal mode.

In our ground common size rusty nails light the iron LED and gives the staccato audio with the solidly lit LED on 7 and the blinking LED on 6 in the Standard Discrimination All Metal

mode, so if I get a fast solid signal in all metal mode and it doesn't repeat when toggling to disc

mode it's in the range between nails and nickels. Many women and girls rings are in that range,

including some with big diamonds. Gold rings, other than those with broken bands, will give harder

hitting signals than small size foil and smaller pieces of nonferrous trash so learning to

use the new

Standard Discrimination All Metal mode to ID targets in the lower conductive ranges will be a big

benefit to those who use the CoinTrax II.

For relic hunting, the new Standard Discrimination All Metal mode is a valuable tool. When hunting

relics most signals above small iron are dug which means the CoinTrax II can be used in the

Standard Discrimination All Metal mode and allow the user to ID small iron, that's a great feature.

If the user prefers hunting in the discrimination mode, running in Standard Discrimination Motion

mode with Deep Search turned on gives the ability to detect and recover targets too deep for the

normal discrimination mode to process. None of the wide variety of excellent relic detectors, I have

spent considerable time relic hunting with, can match the ID at depth abilities of the CoinTrax II and none have the CoinTrax's Deep Search ability to alert the operator on targets out of range of the

discrimination mode. I would choose the CoinTrax II over any other relic detector I've used without

hesitation.

JB, Amory MS

Hunting Tips 3

Coin Hunting General: At the hunt site turn the detector 'ON' and adjust for normal outdoor use.

Sweep the loop (search coil) from side to side in about a one to two foot arc while advancing in a

slightly overlapping pattern.

In most areas you will want to move the loop as close to the ground as possible. Keep the loop

level and moving within 1 to 2 inches of the ground. Avoid bumping the ground or rocks as this

can cause a false response.

Site analysis: How you choose to hunt a site depends on ground conditions, equipment, targets

(metal objects), and your ability. Ground can be mineralized or alkaline to varying degrees. It can

be a nicely cut lawn or a rocky and brushy area or smooth sand.

The metal objects your detector is capable of responding to can be anything from a diamond ring to

a rusty old nail. It may respond to a piece of foil just under the grass or to a horse shoe that is over

a foot deep in the ground.

To achieve the best success, practice-practice-practice, know your equipment and how is responds

to targets and ground conditions.

Deep mineralized top soil: If you are hunting an old site that does not contain a lot of shallow

trash (pull tabs and screw caps) you can take advantage of the all new "Deep search motion

mode". This mode is most effective in mineralized soil and when you do not want to miss any deep

metal object. Please read the 'Feature Description' for a complete understanding of this new mode.

Trashy areas: Hunt sites that contain a lot of pull tabs, screw caps, foil bits, and other metal trash

can be very difficult to search. We recommend that you turn the Deep search feature 'OFF' in these

areas.

When you are searching trashy areas, some false signals may occur at the end of your swing. At

the point where the loop reverses direction, the unit is most susceptible to trash-induced signals.

The way to tell whether the signal tone is trash or maybe a coin, is repeatability. Trashinduced

signals will not be repeatable as you swing the loop over the suspected target several times. Coins

or rings will generally be very repeatable causing a good clean audio response.

You can also switch to the pinpoint mode and check the target. In this mode, a weak response may

be caused by a very small metal object or one that is very deep. A very strong response over a

large area, may be a large piece of iron or other metal trash like foil. Check to see if there is more

than one target.

If you determine there is multiple targets, switch back to the disc ID mode and try sweeping at a

more favorable angle to avoid passing over more than one item at a time.

If the trash in an area is so much that you are getting a lot of choppy irregular sounds, you may

get better results by slowing down your sweep rate and using a shorter sweep arc. It is also helpful

to hunt an area twice, the second time at right angle to the first. This will allow detection of some

targets that were hidden by trash the first time.

Additional tips

If you feel that you simply must use the 'Deep search' mode where there is a lot of trash, you will get better results by slowing down and shortening your sweep arc. Check every

signal to see if it is repeatable from different sweep angles as you try to isolate each target.

Switch often to the pinpoint mode to check target size and depth. The All Metal mode now has a new 'Standard discrimination' feature that may help. This feature can be set to give an audio

"chatter" on rejected objects such as iron.

Using a smaller search coil such as Discovery's 5" loop will help a great deal by making it easier to pick up individual targets that are close together.

If there is any doubt whether a target is "good" or "bad" - DIG IT! If you do not dig any junk at all, you are surely passing up some good finds too.

Discovery Electronics, Inc. Sweet Home OR

Acknowledgments

Hambyware LLC would like to thank JB, Reg Sniff and Discovery Electronics for their CoinTrax II evaluation reports. This information will be useful to current CoinTrax users, and especially those new to the CoinTrax II.

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Shorting Plug Diagrams

SHORTING PLUG PLACEMENT



This is the diagram for the shorting plug arrangement on Prohunter and Cointrax Modules. It you have to remove your module, the plugs can be purcashed at an electronics supply store. Unplugging the module cable and inserting the shorting plugs converts the detector back to a base Baron.

DEEP HUNTER CONNECTOR SHORTING PLUG PLACEMENT



This is the diagram for the shorting plug arrangement when removing the Deephunter module. As stated above, the plugs can be purchased at an electronic store.

George Payne on ID Meters

There is a tendency for some objects to read upscale on a target ID detector in mineralized ground. There are a number of reasons why this can happen. I would like to explain one in particular that I am familiar with.

There are any number of methods for a designer to compute a Target ID reading. All are based upon determining the relationship between a target's X and R received signal components. A targets phase is related to the X and R relationship we desire to determine. Therefore, if we can compute this relationship we will determine the targets phase information. This resultant phase data, or ID reading, is used to operate the discrimination circuitry.

A straightforward method would be to use a trigonometric function to determine this relationship. However, I discovered a easy method that involves a division computation. A circuit was devised based upon division that was easier to implement than a trigonometric circuit. This division computation is given by X / (X + R). In other words we add the Targets X and R signal components. Then

divide that result into the targets X signal. In a practical detector design the X and R signals are applied to filters to remove ground mineral information. The filter outputs are then applied to a circuit that computes the X / (X + R) relationship. The Mark 1 and Big Bud series use similar circuitry based upon this relationship. Here are several examples of how this computation operates. The assumption here is that there is no mineral ground to influence the ID readings.

The Target ID circuit computed X / (X + R) to approximate a target's phase. An R component of zero corresponds to a target phase of 90 degrees. The computation X / (X + R) then was X / (X + 0) = 1. The "1" result will cause the meter to read full scale. In this case a full scale ID meter reading represents a target with a phase of 90 degrees.

As another example....let the target phase equal 45 degrees. In this case the target's X and R components are equal, X=R. If in the computation X / (X + R), X=R the result is X / (X + X) = 1/2. The meter would then read half scale. A half scale ID meter reading represents a target with a phase of 45 degrees.

The last example is a target of phase zero. Salt water is this type of target. In this case the target's X component is zero. In the computation X / (X + R), X=0 the result is 0 / (0 + R) or 0 / R = 0. The meter would then read zero. A zero scale ID meter reading represents a target with a phase of 0 degrees.

As you can see the computation X / (X + R) will compute the correct target phase perfectly for three values....0, 45 and 90 degrees. At all other phase values are computed with a small error.

As you know targets read differently in mineralized ground. Here is a realistic example of how this circuit works in mineralized ground. Here we will see the upscale reading phenomena that I spoke of.

For a real mineral ground the X signal within the detector is (Xm + Xt). In other words the sum of the Ground and Target's X signals. Like wise, the actual R signal is (Rm + Rt) or the sum of the Ground and Target's R signals. We can now substitute these real signals into our X / (X + R) computation. It looks something like this.....

Meter Reading = (Xm + Xt)/(Xm +Xt + Rm + Rt)

Here Xm = Mineral ground X reactive voltage Xt = Target X reactive voltage Rm = Mineral ground R resistive voltage Rt = Target R resistive voltage

If our detector is correctly ground balanced then the ground resistive voltage Rm will be zero or Rm=0. This component then drops out of the above equation. Or......

Meter Reading = (Xm + Xt)/(Xm + Xt + Rt)

Now here is where I am going with this. If the target is deep the target's Xt and Rt components are both near zero, or at lease very small compared to the magnitude of Xm. Therefore, our computation can be simplified to this......

Meter Reading = Xm / Xm Meter Reading = 1

As you can see the meter will read full scale. We of course have forced our condition of zero Xt and Rt signal components. If Rt were truly zero we wouldn't have picked up the target in the first place. Therefore, in practice the Xt and Rt signals can be very small. The tendency is then to have an up scale ID reading on weak (deep) targets.

We can make several conclusions regarding detectors who use circuits like that in the Mark 1 and Big Bud. Targets that have a small R signal component (example low conductivity) will tend to read upscale in mineral ground. In addition, if the target is deep it will more that likely tend to read upscale in mineralize ground.

The circuits that compute X / (X + R) all use a blocking circuit that eliminates the -1 meter reading. Only upscale readings are allowed.

The Tek 9000 and 8500 designs were the first target ID detectors. As such these circuit were less refined. They computed (X / R) in both -X and +X directions. This unbounded signal arrangement proved difficult. Therefore, the log(X / R) was used for display purposes. However, they still retained the -1/+1 reaction. Depending upon where you set the ground balance the ID reading could slew upscale or downscale on weak targets.

The X / (X + R) computation is a factual but simple explanation of how that circuit performs in the actual detector. The Tek circuits were biased for a zero meter reading. In other words the circuit itself would tend to produce a zero meter reading for weak target signals with no mineral. The later X / (X + R) design was biased for a meter reading of half scale. Here weak targets, in an air test, would tend to center scale. Therefore, it was on average more accurate. As mentioned the latter design was prohibited from reading down scale. Since it was also biased upscale it definitely has a tendency to read upscale.

As mentioned the Tek TID designs could read up or down scale with equal probability. However, on the Mark and Big Bud circuits the R signal input for the X / (X + R) computation is from a ground balanced R channel that is preset slightly positive. This action biases the X / (X + R) computation where R is always positive. By design it can never go negative. In an air test you cannot see this form of biasing since the ground is not present. What you do see in an air test is the previously mentioned circuit bias to center scale. Therefore, when mineral is present the preset positive R will eliminate TI spreading in the negative direction

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Testing Discovery Electronics' Treasure Baron/Gold Trax

by Robert H. Sickler Copyright © 1995, 2002

Discovery Electronics is not as new a company as you might think. They have been in business since 1981. Their chief electronics engineer/inventor is George Payne. George holds some rather important patents in the metal detector industry. His innovations are the most important features and tools still in use today. Ground balance was his first patent in 1973. George went on to invent Synchronous Phase Discrimination, better known as motion discrimination, in 1977. Next was metered target depth indication. Then came visual and audio target identification, notch discrimination, and surface blanking... need I go on! When asked by the company if I would evaluate his latest detector design, my answer was a comfortable yes! But the deal is, along with any praise I might have, I make constructive criticisms as well. This is something I have always felt very strongly about when writing field tests on metal detectors for the people who read them.

The Treasure Baron is the base of this modular detector. The modular concept allows the owner to upgrade and change circuit boards within the control housing himself. This means your investment in the searchcoil, pole, and control housing doesn't lose its value throughout the life of the detector. Every time this company comes out with a new circuit, you don't have to buy the whole detector all over again! Another interesting aspect of the modular concept is that should a problem with the detector develop, you could possibly go to your local Discovery Electronics dealership and get a warranty replacement of just the circuit board and be on your way without ever having to send the whole detector back to the factory for repairs.

The base Treasure Baron I tested was fitted with the new Gold Trax module. It is not my intention or desire to detail all the modules currently available. I will concentrate on the Gold Trax only. Although primarily designed for gold nugget hunting, Discovery Electronics (herein referred to as DE) feels the detector may have stature as a coin and relic hunting detector as well, this is where my evaluation and test begins.

Construction

Out of the box was a striking red control housing. Many of you veterans may remember a detector called the Red Baron back in the late '70s. This was the first motion discriminator on the market

invented by George. I believe the red color and "Baron" in the name Treasure Baron is intentionally nostalgic. The upper pole and control housing are heavyweight aluminum with a special powder coated baked finish that is highly abrasion resistant. The lower shaft is completely nonmetallic. I think the nylon bolt/wingnut combo that fastens the searchcoil and secures angularity should have a larger thread diameter. The searchcoil provided was an 8-inch concentric with a smaller viewing hole than most other brands. This proved to be very helpful in training my eyes on a spot of ground after pinpointing a target. This coil, despite its size, delivered an impressive transmission range in bench tests.

The control box is extruded aluminum by design with internal rails to support the modular circuit board arrangements and battery compartment. I feel the battery compartment door screws could be a bit larger and made captive to the cover plate. I wouldn't want to change batteries in the woods and drop one or both of these little screws around an old foundation littered with hundreds of square nails! Another dislike was the 1/8" stereo headphone jack on the bottom of the housing. With multiple circuit boards occupying most of the internal control housing area, I can understand why they chose the small jack. However, most of my coin and relic sites are heavily overgrown at times and the thin wire and loose fit of the smaller digital headphones are extremely vulnerable in this environment. I would have liked to see the standard 1/4" stereo jack here with the option to use an 1/8" adapter if need be. Since the Gold Trax has no volume control, I expected to have my ears blown off on the first large target using headphones that have no volume regulation. I was pleasantly surprised to discover that DE did their homework and reduced the audio output to a very comfortable level.

For those of us who like to hunt from sunup to sundown, the Gold Trax is a bit heavy in the polemounted configuration. Fortunately the Gold Trax is convertible to a hipmount detector. Two sets of spring buttons release the control housing from the pole. Two slots on a bracket, to which these buttons lock into, form the loop where your belt passes through. I would strongly recommend that you pad the underside of this bracket when wearing the control housing for long periods of time.

I liked the weight and sturdiness of the searchcoil cable. In the hipmount configuration, the wire did not tangle easily and present any obstacles to movement of the "S" pole. DE wisely provided strain relief where the searchcoil cable connects to the module. I would like to see the strain relief attachment at another location other than one of the battery door screws. Overall, the base Treasure Baron is built to last and makes for a sound investment when future modules are introduced by the manufacturer. Converting the Treasure Baron into the next generation detector will be far less expensive than buying a whole new detector. Incidentally, the upgrades can be performed by the purchaser.

Features and Controls

It will not be my intent here to detail each facet of every control. The Gold Trax's features are quite intense and will satisfy the needs of the most demanding detectorist desiring precision control. I also do not wish to scare away any of you who have "touchpad phobia". As sophisticated as the Gold Trax is, it is truly a "turn-on-and-go" detector. I found the factory "preset" (default) settings more than adequate for coin and relic hunting. In fact, during the entire time I tested the detector, I did not find myself needing to make any advanced adjustments. Unfortunately, limited publication space does not allow detailed discussions of advanced features and their adjustments. This is time better spent reading the owner's manual. Instead, I would like to concentrate and highlight the things that concern the average person when using a new detector.

The heart of the Gold Trax module is microprocessor controlled ground tracking primarily designed to continuously compensate for frequent changes in negative ground mineralization (ferrous oxides) in both search modes. There is also a factory preset ground balance option designed for low minerals and salt beach hunting. DE has also included the option for manual ground balance when mineralization is very stable.

There are two search modes of operation on the base Treasure Baron module: motion "Disc/ID" and all-metal. What I find attractive about the Treasure Baron/Gold Trax is that you can technically operate without conventional discrimination or rejection of any target, yet target ID is possible. The Gold Trax utilizes visual and audio identification in both search modes! I especially like the LED visual system of indicating the presence of metallic iron. As the searchcoil passes over ferrous metal targets, a small red light (light emitting diode) flashes brightly on the control panel. I tried to fool it with small pieces of low-conductive aluminum foil, but it knew the difference. In the all-metal mode, iron targets produced a very distinct distorted audio compared to nonferrous targets.

The Disc/ID mode has a two-pitch audio identification of metal targets and the option to block audio on small iron and foil targets. I liked the fact that the operator can adjust the conductive break point where the audio pitch change occurs. I used this to my advantage during the field tests. All targets conductively under the break point

produce a low pitch, while targets above sound off with a noticeable higher pitch. With the low conductive audio block "on" (knob pushswitch), small nails and foil are not heard. Large rusted iron still produces high or mixed pitch audio, but the LED still flashes to indicate iron. In bench tests, the effective range of the LED indication on iron ended after the target went beyond six inches from the bottom of the searchcoil.

The other knob of the two on this detector is the Power on/off and Audio Range. The Audio Range controls the depth at which the detector responds with full volume. To the right of this knob is the main mode switch. The center position activates the allmetal/autotuned pinpoint mode. The right position switches to the motion Disc/ID mode. Momentary to the left retunes the all-metal mode and sets up the "Automatic Turbo Ground Tracking" function.

Above the base module faceplate, lies the Ground Trax module. Both modules operate when the power is switched on. The Gold Trax module has six touch pads, the aforementioned LED and a ground balance option switch. The switch selects automatic ground tracking control or factory preset ground balance. The six touchpads control 10 circuit functions. Again, I wish I had the available space to detail operation of each touchpad, but the operator's manual covers them in depth. The ten adjustable functions are as follows with the factory preset assigned values:

- 1) Auto Ground Tracking Mode ON
- 2) Non-motion All-metal Mode Sensitivity NORMAL
- 3) Audio Threshold Offset NONE
- 4) Ground Autotune pinpoint autotune ON
- 5) Iron Alert ON
- 6) Audio Smoothing NORMAL
- 7) Audio GB Offsets NONE
- 8) Automatic Ground Balance ZERO DEGREES PHASE, no offsets
- 9) Auto ground Tracking Speed factory PRESET
- 10) Target Tracking Inhibit iron target inhibit ON

Preliminary Tests

Before I take any detector into the field, I take the time to do some bench testing to get an approximation of what to expect. In air, the Gold Trax responded with a clear, unmistakable signal on a silver dime held eight inches from the bottom of the searchcoil using the default settings. The same dime freshly buried in my test garden produced the best signal at seven inches. On a scale of 1-10 (ten being intense), negative mineralization in my area is about a "7". One inch less depth than the air value on silver (freshly buried in my soil) is rather good by my standards.

One of the worst targets for ground reject motion discriminators to identify is a thoroughly rusted 2-inch diameter steel washer. This causes it to have both conductive and nonconductive properties. The Gold Trax did not eliminate the washer signal at a slow normal sweep with the iron audio block feature "ON". However, speeding up the sweep totally rejected it. In each case, the iron LED indicator worked extremely well. With the iron audio rejection "OFF", the Gold Trax produced distorted audio on the washer. This effect was most noticeable when the "heel" of the searchcoil was scanned over the target. In the all-metal pinpoint mode, the washer was again clearly identified by the LED and distorted audio. Placing the silver dime centered between two iron targets, 12 inches apart, required a very slow sweep rate to respond to the dime clearly as the searchcoil was scanned over all three in-line. Placing the washer directly alongside the dime completely masked out the high-pitched dime signal.

Field Tests

Personally, I like conducting my field tests in areas previously searched with other brands of detectors. Picking an area to test that has never been searched does little to prove whether the detector has any advantage over the last unit tested. A site that is easy to hunt and has no challenge to finding targets could make any detector seem very good in the mind of the reader. The first test site was an older park in my hometown that has been worked many times by myself and others since metal detectors have been popular. This is the kind of park where you would think every time it rains, it rains pulltabs, steel bottlecaps, and screwcaps. Trash and desirable targets are so close together in the ground that every sweep of the searchcoil brings the sound of Morse Code to mind. It was extremely difficult to find a stretch of ground that was clean to balance the detector. I chose to balance the Gold Trax with the turbo method. Holding the main mode switch in the retune position (ground option toggle switch to "track") and sweeping the ground at normal searchcoil height completed ground balance in about three seconds. This method is verified by no iron LED indication or intermittent flashing as you sweep a few times. Should the LED lock up and stay lit, look for another area of ground that is free of metal, otherwise you will override the target tracking inhibit feature. In basic terms, you could be balancing the detector to a small piece of iron. I purposely left the touchpad controls at the defaults and opted to search in the Disc/ID mode with the iron audio block feature disabled. The Audio Range was also set to the preset level. The manual states this control does not change sensitivity. It adjusts how deep the detector responds to targets with full audio in the Disc/ID mode. Changing all-metal nonmotion receiver gain (sensitivity) from

the default must be altered with a touchpad sequence. Testing proved the all-metal gain is independent of the Audio Range control.

I scanned the ground in several locations of the park to find the worst concentration of signals. Finding just the location, I spent time digging guite a few targets to get an idea of their composition. I adjusted the Disc/ID so that the breakpoint between high and low tones was centered on aluminum screwcaps. This target proved to be the most numerous in the area I chose to search. By doing so, I would have a better chance of identifying this type of target without rejecting it. With no rejection enabled, I might have a chance of getting between targets that might ordinarily mask each other out. The iron LED indicator flashed repeatedly throughout the hunt. Several of these indications were verified with the recovery of heavily rusted steel bottlecaps, nails, screws and washers of various sizes. I directed my attention to high-pitched signals that were repeatable in nature. My hope would be coins from the swamp of mixed tone and broken audio. Pinpointing targets was easily accomplished with the main mode switch in the center position. Manual detuning was not necessary. The default autotune speed was fast enough to reduce the signal width to a small area. This was easily translated to the ground via the small hole through the center of the searchcoil. I was not getting any high-pitched signals at this point, so I slowed the speed of my searchcoil sweep and tightened my overlap.

At the end of my test in an area 14 feet wide by 50 feet long, I recovered: 1920, 1924, 1946 Wheat Cents; 1933, 1957 Canadian Cents; five Lincoln Memorial Cents; one clad dime; and a 1945 Mercury Dime. The depths at which the coins were found ranged from 3-6 inches. I was impressed by the fact all coin targets responded with a clear, loud, repeatable signal among the ever present trash chatter. One unidentified nickel-plated brass target, 1.5 inches long by .50 inches in diameter, was retrieved at the depth of nine inches. With the search method prescribed above, I could easily ignore most trash targets by tone and LED indication and hear coins quite well. If gold rings were my primary target, I would have spent a lot of time digging trash though. The Gold Trax easily passed the "worked out" park test for coins!

For the relic portion of my test, I chose a site that I have frequented more recently. On this site both coins and military relics from the mid 19th century have been found. I believe the site saw training activity before and during the Civil War. Added to the thick undergrowth in this area were "hot rocks" and shotgun shells by the pouch full. Employing the same strategy as before, I set the tone breakpoint for sampled shotgun shells. This time I enabled the iron audio block feature since the concentration of targets was not as intense as before. Other adjustments were again left at the default. Throughout the two tests, despite my love to tinker, I did not feel the need to alter the factory default touchpad settings. My plan would be to listen to both high and low pitched targets and dig any LED indications that proved long or wide in the pinpoint mode (hopefully gun barrels!?). For a time I hunted in the all-metal mode and checked targets in the Disc/ID mode, but the shotgun shells got the best of me. After digging many shotgun shells at the audio tone breakpoint, one signal edged out on the high pitch side near the base of a small tree. This target was a fired .58 cal. "Williams Cleaner" type II Minie Ball. It bore the cup marks on its nose from a hardworked ramrod down a fouled barrel. Hot rocks gave a telltale double beep in the motion Disc/ID mode with a strange edge of sound character. The all-metal pinpoint mode threshold nulled over the hot rocks. Being the all-metal mode has a moderately fast autotune rate, each hot rock responded with a rebound as the searchcoil passed over. Several iron LED indications responded with distorted audio in the all-metal mode and proved to be large square nails. Not being a great fan of digital earphones, I did however appreciate the fact they were a lot cooler than my normal sized headphones. But, before the day ended, the tugging from brush and branches took their toll on these fragile little phones. I was forced to hear signals from only one side of the phones - the other earpiece went dead. I did find the need to frequently tighten the nylon searchcoil bolt to maintain angularity of my preference.

From about a 500 square foot area, I retrieved eight relics with repeatable low-pitched signals. Ranging from just under the surface to seven inches deep, they were: a fired .44 cal. Colt pistol ball (conical); a fired .44 cal. unidentified pistol ball (conical); fired .38 cal. round shot; brass pendant or tag pierced perhaps from a small caliber gun shot; a small religious metal; half a brass tongue buckle I believe to be from the rear adjustment strap of a 1850s military vest; a brass locket cover; and a brass chain link possibly from a pocket watch. And, as stated earlier, a "pouch full" of brass shotgun shells that did not respond at the breakpoint. I recovered one high-pitched signal - a 1938 Wheat Cent obviously dropped by the same people who liked dropping shotgun shells!

Observations and Conclusions

I would have no trouble recommending this detector to anyone hunting military and nonmilitary relics and coins. The Gold Trax detects small low and high-conductive nonferrous metals readily. Despite the searchcoil's eight inch diameter, I found it capable in concentrated trash environments and ready to reach deeper than eight inches combined with the Gold Trax module. With a larger searchcoil, the Gold Trax could easily outdepth many detectors costing hundreds of dollars more.

I did not like the fact that any alterations from the default microprocessor program via the touchpads cannot be saved as a custom program by the user. To the manufacturer, I would recommend a one line LCD display (such as the type found on the newer fax machines) that would help the user through the multifunction touchpad adjustment process. I fear many first time detectorists, as well as experienced, could get a little confused trying to remember the sequences for these adjustments without access to the quick reference guide. To DE's credit though, their default program and quick reference guide do make it easy to get quickly acquainted to the Gold Trax module. In fairness to the original design concept, the advanced options are invaluable to the gold hunter where more severe and fluctuating mineral conditions are the norm.

I found the economy of operation very good. During both tests I used 8 AA nicad rechargeable batteries for a total of sixteen hours. After the first eight-hour test, I saw little loss in status in the LED flash rate when the "Iron" touchpad was pressed and held for on-the-fly battery testing. I very much liked the feature of combined audio and visual indications for iron targets. Despite minor personal dislikes in mechanical items mentioned earlier, the modular concept stands out as a true value in terms of investment. In comparison to other brands, the number of detectors you will have to sell to help pay for a new one will be virtually zero.

Overall, on a scale of 1-10 (ten being best), I rated the Gold Trax as follows:

- 1) User Friendly (full features): 7.5
- 2) Mechanical Design: 8
- 3) Performance: 9
- 4) Value of Investment: 9.5
- 5) Quality of Construction: 8.5
- 6) User Comfort (hipmounted): 9

For more information, contact: Discovery Electronics, Inc. 1115 Long Street Sweet Home, OR 97386 503-367-2585

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Photos illustrating steps in changing from Goldrax module to CoinTrax module. posted by Kevin







HSIL	H GRE SEL	SENS. AKTR	TRAN LER	
AGT 10	H PRE SET	SENS. AUTO	TRAX LED	N
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GoldTrax Version History

by George Payne

The following is the entire version history for the Discovery GoldTrax module. These are my own notes to indicate every change in the code from the first release till the last. Some of the information is rather technical. Please skip over the code descriptions and concentrate on the reasons for the changes. Each change is indicated by a 1), 2) and so on. To speed up placing this info on the forum I have left the file just as it is in the original program. Sorry about all the asterisks. They are needed to separate text from code. Please ignore them. Someone can reformat the text material and leave all of the astericks out. A careful reading can tell you exactly when and what changes were made to the GoldTrax program. I hope this will help anyone interested in the GoldTrax module versions. If this goes well I can post the CoinTrax version history.

HISTORY BLOCK BARON GOLD-TRAX MODULE PART PGM001

GoldTrax v1.0

Date Version Discription of Change

09/16/94 v1.00 First version tested by Roy.

10/05/94 v1.01 Subroutine TRBOGB changed. Code added to vary the gain of DATA TMP depending upon how fast the phase data GB OFFS is changing. This places a time controlled variable gain notch upon DATA TMP. If data GB OFFS changes slowly the gain of DATA_TMP will be reduced. As GB OFFS changes more quickly less and less gain reduction takes place. 11/09/94 v1.10 (1) The KP READ routine could read keys incorrectly. The individual column lines were not forced low after each column activation. This bug was Corrected. (2) The Auto-Tune feature is added to the GND Key routine.

(3) The HPFX1 and HPFX2 routines had reduntant code STA FILIN in "Add....

....intermediate results....". This code was removed.

(4) Sometimes a delay occurs for the LED to "light" when the IRON Key is depressed to check the batteries.

The BATCK and INIT.H code was modified to correct this condition.

(5) The limited range Key routines were modified so that the LED does not "light" when a "end of range" limit is reached. The Key routines effected are: Ground Tracking speed, GB Pin-Point Mode gain and Auto-Tune speed.

(6) The INIT.H and RAM_EQU.H Headers were also updated.

(7) The following routines were modified: OUTPUT, KEYPAD, KP_READ, GND_KEY, CLR_ALL, HPFX1, HPFX2, BATCK, SPDINC, SPDDEC, GBGINC, GBGDEC, ON_KEY and OFF_KEY. The following new AT routines were added: ATOTUN, HPFAT, GNDAT, ATNTOG, ATINC, ATDEC and AFCSEL.

GoldTrax v1.20

12/12/94 v1.20 (1) Changed OGBGAN routine so that the preset module gain is unity. Also, changed code to allow for gain increses above unity. There are now 4 gain increases above preset and 3 gain decreases below preset. (2) Reversed the order of routine OGBGAN and ATOTUN. Now the Auto-Tune routine occurs first. This change eliminates the possible overdrive condition on ATOTUN routine. (3) Module now preset with Auto-Tune "ON" when Baron is first turned ON. It is Set to the slowest speed within the hi Speed range. This will make the retune time constant equal to 137ms. (4) Low limit constant in the RSTROB routine changed from \$30 to \$90. The R strobe signal sensitivity is lowered. This makes it harder for weak high R component non-ferrous targets, like Gold, to activate the

Ferrous reading LED.

(5) Iron signal phase angle changed in IROPHA from -80 to -75 degrees. The constant multiplier changes from \$12 to \$16 (approximate). This also reduces false LED readings on weak Gold targets.

(6) Audio Iron Indication routine added after OGBGAN routine. With this routine active the audio will "break-up" or "chirp" when Iron or ferrous targets are detected. It is only active in the Pin-Point Mode with the Auto-Tune activated. (7) To turn the Audio Iron Alert OFF and ON press and release IRON Key ... then press either the ON or OFF Key. (8) To turn the Target Tracking Inhibit OFF and ON. First press and release the IRON Key.....then press and hold the GND Key. Now, press either the ON or OFF Key. (9) The following routines were modified: IRON KEY.

GoldTrax v1.30

01/03/95 v1.30 (1) Routine OGBGAN is rewritten as
routine OGBGIA. This routine now
calls new routine OGGINC if the
Pin-Point Mode Gain is increased
above preset.
(2) New routine OGBGIA increases GB
Pin-Point Mode Gain in a way that
produces lower Gain and lower noise
when the signal is weak and higher

Gain when the signal is weak and higher Gain when the signal is stronger. (3) A GB Pin-Point Mode Low Pass Filter is added. To produce the LPF the following new routines are included: OGBLPF, GBLPFC and LPFGO. The LPF is preset "off" and can be turned "on" or "off" by holding down the CLR Key and pressing either the ON or OFF Keys. It has a fixed time constant of .047 seconds. (4) The following routines were modified: CLR_KEY, CLR_ALL, INIT.H ON_KEY, OFF_KEY, ATOTUN and OUTPUT. (5) Low limit constant in the RSTROB

routine changed from \$90 to \$1000. The R strobe signal sensitivity is lowered. This makes it harder for weak high R component non-ferrous targets, like Gold, to activate the Ferrous reading LED.

GoldTrax v2.00

02/09/95 v2.00 (1) Changed the program so that any time the GB Mode is activated the GB output Low Pass Filter is always active. The initialized normal Time Constant is 47ms. If the CLR Key is held depressed and the ON (UP) Key is pressed then the Time Constant can be increased to 75ms. It can be reset to the normal 47ms if the GND Key is pressed instead or if the CLEAR ALL function is activated. To decrease the Time Constant press OFF (down) to change the TC to 10ms when holding down the CLR Key. (2) The code in routine OCR to Toggle TCMP1 is removed. However, it's still left in as a comment. (3) The Iron alert audio and LED signal gain was change again. This is done by changing a constant in routine RSTROB. They are: v1.00 to v1.10 \$000030 !48 v1.20 \$000090 !144 v1.30 \$001000 !4096 v2.00 \$0002FA !762 The detection distance changes about one inch for every 2.3 times change in gain. The gain in v1.30 was too low. So, the gain was set half way between versions 1.20 and 1.30. This version has three byte constant \$0002FA stored in routine RSTROB. (4) All of the high and low pass IIR filters had a code flaw. This error was located in the "ADD intermediate results." section. It required removing the instruction, ADC #\$00, which occurs twice in each routine.

Code: LDA DATA_TMP+\$03 ASL DATA_TMP+\$04 > ADC #\$00 ADC DATA_TMP+\$02 STA XXXXXX+\$02

LDA DATA_TMP+\$01

> ADC #\$00 ADC DATA_TMP STA XXXXXXX+\$01

TXA ok ADC #\$00 STA XXXXXX

Marked with ">": this causes a data error each time there is an overflow into C due to this ADD with carry instruction. (5) The routines OGBLPF and ATOTUN were modified to allow the three byte filter outputs to be rounded off to two bytes if necessary. (6) The follwing registers use in routines OGBLPF and ATOTUN were CLeaRed in the initialization code: DYHIA+\$02 **DYHOA+\$02** DYHOA+\$01 DYHOA DYLOO+\$02 (7) All the High Pass filters were modified to remove the instruction: MOV FILIN+\$0X DYHXXX+\$0X The store back of input data to the delayed storage registers was done at the start of the routine. This change reduces the amount of code and the time to do the routine. (8) The following routines were modified: OCR, OGBLPF, ATOTUN, GBLPFC, CLR KEY, CLR ALL, RSTROB,

LPFGO, HPFAT and all of the other high and low pass filters. The flag 3,RFLAG_1 was dropped. The output LPF variable Time Constant LPFTC was added to RAM_EQU.H and initialized to \$19 (47ms) in INIT.H.

GoldTrax v2.10

12/12/95 v2.10 (1) Program bug solution. There was an error in subroutine TRBOGB. When the Turbo GB flag, 2,GBFLAG goes low the register GBFLAG is combined with data from DATA_TMP+\$02. When flag bit 2,GBFLAG is set this information is correct. However, when the flag bit is clear data in register GBFLAG is corrupted by DATA_TMP+\$02. This bug was corrected.

(2) Non-documented feature added. Subroutine TCHLPF is added to the IRON key pad sequence. The new routine allows the operator to alter the Motion Filter Time Constants. To change the TC in all 4 High Pass and 4 Low Pass filters, hold down the IRON key and press the UP key to decrease the TCs. Or, hold down the IRON key and press the DOWN key to increase the TCs. Use the IRON and CLR key to reset the TC to 22ms. (3) Non-documented feature added. Normally the modified Routine VARPHA does not allow the small window to be installed. However, holding the Mode toggle in the Turbo GB Mode and pressing the IRON key will install the small 1 degree phase window about the Ground Phase, GB OFFS. Deactivate the window (return it to -8.5 degrees) by pressing the CLR key instead of the IRON key while in the Turbo GB Mode. A double CLR and Instrument Turn-on also deactivates the small window.

(4) Non-documented feature added. For calibration of R108 on the Baron main pcb the Gold Trax phase can be preset and locked to zero degrees, not the normal preset +0.5 degrees. The code for this feature is located in VARPHA. Setup procedure:

(A) Hold Mode Toggle in Turbo GB.(B) Press and release GND key then

quickly press and hold OFF key. (C) Release the Mode Toggle then....

release the OFF key.

(D) Press the GND key twice quickly. This action will lock the Ground phase to zero degrees. Move a ferrite sample about the loop and adjust R108 for minimum audio change on the Baron.

Two new Ram variables were added FHPTC and FLPTC, and preset for a TC of 22ms in INIT.H and CLR_ALL. The variable PRATIO is preset to \$FF in INIT.H and CLR_ALL. The following Routines were modified: TRBOGB, TCHLPF(new), LPFR1, LPFR2, HPFR1, HPFR2, LPFX1, LPFX2, HPFX1, HPFX2, IRON_KEY, CLR_ALL, VARPHA, TGTPHA, RAM_EQU.H and INIT.H. A new flag, 7,RFLAG_1, determines if the small 1 degree phase window is installed or the window is removed (returned to -8.5 degrees).

Cointrax II Engineering Details

Target ID

The CoinTrax II module provides the operator with two basic types of information. These are the

audio response and the Target ID reading. Within the CoinTrax II, these two systems operate

independently. When you pass the loop over a target, the audio will respond depending upon how

it analyzed the target. A fraction of a second later, the LED will lock-on to the target. These two

outputs may not agree. For example, suppose you have the Notch set to reject Iron. Let's say that

you pass the loop across a target and the audio responds. You check the LED and it reads Iron. Of

course these results do not agree. Here's the reason why. The internal LED Display program has

had more time to analyze the target to determine its characteristics. In this case it may have made

a more accurate determination of the target's type. To better determine the type of target located,

always monitor both the audio and the Target ID reading.

Normally, when the CoinTrax II locks onto a target only one LED will light. This indicates that the

microprocessor program analysis has determined that target type with a high degree of reliability.

However, if the incoming information is corrupted by ground mineralization or multiple targets, the

resulting analysis is less reliable. The CoinTrax II Display indicates this by lighting several LEDs.

Each LED indicates what the analysis has determined to be a possible target.

The original CoinTrax v1.00 has only one form audio Discrimination, or Target ID Discrimination.

This meant that the audio Discrimination response was derived from the Target ID reading. In

other words, if the Target ID reading fell into a Notched out area there was no audio indication. In

addition, if the Target ID reading was incorrect, the audio Discrimination indication would be

incorrect too. The CoinTrax Target ID computer program is primarily designed to read accurately in
moderate and low mineral ground. Therefore, in high mineral the Target ID will not respond as

accurately as it does in low mineral. Since the CoinTrax's audio Discrimination is intimately tied to

the Target ID reading, the audio Discrimination would suffer too. To overcome the audio

Discrimination limitation of the original CoinTrax microchip program, Hambyware LLC has added a

Standard Discrimination mode to the CoinTrax II. Refer to the section on Standard Discrimination

for more information.

Turbo Ground Balance

When you perform a Turbo ground balance, the CoinTrax II microprocessor will analyze the ground

to determine its characteristics, then set the detector for optimum performance in that ground. The

length of time required for this analysis varies depending upon the ground's strength. In normal

ground, this time is very short. Generally speaking, by the time you have removed your finger

from the Enter Key, the microprocessor has analyzed the ground, set the instrument for maximum

detection depth and turned off the Turbo GB mode. It's very fast!

The Turbo GB mode is particularly useful in low mineralized ground, and if you want to ground

balance in a localized spot. For example, say you want to ground balance right next to a target.

Simply move the loop a short distance away from the target, Tap the Enter Key and wait for The

Display to return to its normal operation. Then return the loop to where the target is located. In

this way the detector is balanced to the ground near the target for maximum detection depth.

Non-Volatile Memory

A "detector image" is the information needed to restore all detector settings should you turn the

detector off. The CoinTrax II keeps an image of your current settings and continuously updates this

image when you make changes. You do not have to be concerned with storing the detector image

in non-volatile memory. It's fully automatic. The CoinTrax II knows what information to store and

when to store it. This process is totally transparent to the user. Specifically, user data is stored

when a key is released, not when it is first pressed or continuously held down. If you turn the

detector off immediately after making a setting change, the information is still stored in non-

volatile memory. The exception to this is, if you press and hold down a key then turn the

detector

off before releasing the key. Although this is not likely to happen in normal operation, it's something to be aware of.

The CoinTrax II stores the four User programmable preset in a four block sections of EEPROM non-

volatile memory. The current operating image of all the detector settings is also stored in a block

of non-volatile memory. This block is called the Mirror EEPROM block. Whenever you make any

setting changes, this block is updated so that it is an exact mirror image of how you currently have

the detector set. When you turn the detector off, the last image that was present when you turned

off the metal detector is now stored in the Mirror memory block. Subsequently, when you turn the

detector on, one of the first things it does is fetch the information from the Mirror memory block

and restores it. To you, it appears that nothing has changed. Everything is set the same as before.

From the CoinTrax's view, anytime you use the Left or Right Keys the non-volatile internal memory

is being programmed. The programming system recognizes a Key Tap and a Key slew differently.

Remember, to "slew" means to press and hold down a Key. Using the slew capability is especially

important when changing a setting in the Standard Discrimination Sub-Menu. Use key Tapping

only when you need to change the setting one or two positions. For best EEPROM performance,

always slew to another Display setting as much as possible.

User Presets

Pressing the Enter Key in the Preset Sub-Menu always stores detector images in non-volatile

memory. In fact, this is the only way to store User Presets. On the other hand, Tapping the Menu

Key or flipping the Toggle switch always loads detector images. Remember, pressing the Enter Key

tells the CoinTrax II you are programming a Preset position. The Factory presets are not programmable. Therefore, if you select a Factory preset then press the Enter Key, nothing will

happen. Do not press the Enter Key at one of the User Preset locations unless you intend to store

the detector image at that location.

The detector image that is stored at each User preset can not be erased. However, that operation

is never necessary. Each User preset can be modified or entirely written over as needed. To

program a new detector image simply setup the CoinTrax for the desired operating conditions.

Then enter the Preset Sub-Menu, select one of the four User presets and press the Enter Key. The

new detector image is placed at that position writing over the older image. However, in some cases

you may only want to modify a User preset. In that case, select a current User image in the Preset

sub-menu, then flip the Toggle to return to normal operation. Now make the desired changes that

modify the detector's operation. When that is completed, re-enter the Preset Sub-Menu and select

a different User preset, then press the Enter Key. Now you have slightly different detector images

at two User presets.

Within the Preset Sub-Menu when LED #10 is lit, it indicates that the current detector setup is not

one of the Factory or User presets. However, if you enter the Preset Sub-Menu and one of the

LEDs, other than number 10 is lit, it indicates that a preset is activated and which one is activated.

For example, suppose you program a User preset at LED position #1 and exit to Normal Operation.

If you now re-enter the Preset Sub-Menu, you will observe that LED #1 is still lit. This indicates

that the current detector setup is the image stored at User preset #1. Suppose you make a change

in the audio threshold after returning to Normal Operation, if you re-enter the Preset Sub-Menu

again, LED #1 will not be lit. The CoinTrax II has noticed that you modified the current detector

setup, and it is different from the image stored at User Preset #1. A lit #10 LED signifies no Preset

is selected. Consequently, the CoinTrax II will light LED #10 when you re-enter the Preset Sub-Menu.

Suppose that after entering the Preset sub-menu you wish to exit it without making any changes.

If the LED is located at one of the Preset positions, do not use the Left or Right Keys. Simply Tap

the Menu Key or flip the Toggle switch, or, move the LED to location number 10 and Tap the Enter

Key. In the first example, you will enter the Normal Operating mode immediately. In the second

example, you will enter the Main Menu with the flashing LED. However, suppose that after entering

the Preset Sub-Menu LED number 10 is lit. To exit without making any changes, do not move the

LED to another position, simply Tap the Enter or Menu Key or, flip the Toggle switch.

LED position #9 is not used in the Preset sub-menu. Moving the LED to this position and pressing

the Enter or Menu Key or flipping the Toggle switch will have the same effect as having

Deep Search Mode

The Deep Search mode is a new and novel addition to the CoinTrax II. Basically it is a program

that uses the intelligent processing power of the internal microcontroller computer to increase

detection depth in mineralized ground.

When operating in mineralized ground, all motion detectors will have unreliable detection beyond a

specific depth. Primarily, the reliable detection limit is determined by the number of motion filters,

the mineralization strength and the target's depth. Also, the operators sweep uniformity relative to

the ground and the homogeneous nature of the ground are very important too. Therefore, due to

these factors, targets that are deeper than a certain depth, called the "critical depth," will not be

picked up reliably. In many cases, these deep targets will not be picked up at all. However, if the

Deep Search mode is activated, these targets will not be missed.

The Deep Search mode is a unique computer program that continuously measures the mineral

strength of the ground. When the coil passes over a target, the program compares the ground

mineral strength surrounding the target to the target's strength. The microchip program makes a

decision between two alternatives. If there is sufficient information for reliable motion discrimination, the CoinTrax II will produce a normal audio response. However, if the target is too

deep to provide a reliable audio indication, the Deep Search program notifies the operator that a

"iffy" target is present. An iffy target is indicated when two LEDs light on the CoinTrax II Display.

The operator can also choose to have an audible indication for iffy targets.

The Deep Search program continuously monitors varying ground and target conditions. Target and

ground condition analysis is done on a target by target basis. Therefore, if the operator goes from

an area of high mineral to an area of low mineral the CoinTrax II will formulate its analysis based

upon these varying soil conditions. Target analysis is done each time a target is detected. Therefore, if the operator receives an iffy indication the target can be swept again. However,

additional sweeps can be made with greater attention paid to obtaining a uniform sweep. During

multiple sweeps of the same target, the micro program will repeatedly give you an audible indication of the target based upon its analysis. For example, say you sweep a target several

times and each time it gives you an iffy indication. However, on the next sweep it produces no

audio sound at all. The last sweep was not an iffy indication sweep. Therefore, the CoinTrax II

produced a reliable reading, and it indicated that the target was rejected. As a second example,

suppose that you sweep another target and it gives multiple iffy indications too. However, on the

next sweep of the same target the detector produces a normal audio sound. In this case, the last

sweep produced a reliable reading too. But in this example the microchip program is indicating

that the target is good.

The Deep search Sub-Menu scale is divided into two regions of four selections each. The lower

scale will only produce LED indications on iffy targets. The upper scale will produce a LED and

audio indication on iffy targets. Some operators may prefer just the LED indication when the lower

scale is used. If the upper scale is selected, a staccato audio response will be generated on all iffy

targets.

The Deep Search mode is not recommended for use in low mineral ground. Also, in areas where a

lot of surface trash is present it may produce misleading results. See the Hunting Tips section

elsewhere in this manual for more information. The Deep Search mode can be used with either the

Target ID or Standard Discrimination modes. Also, for best results, choose position #3 or #4 on

either Deep Search Sub-Menu scale. The center position between the Low and High scales is LED

position #5. This position is not used and is not selectable. To turn off the Deep Search mode

enter the Sub-Menu and move the LED to position #10.

Standard Discrimination

The original CoinTrax microchip v1.00 has TID Notch Discrimination. This means that the audio

Discrimination in the Motion Mode is derived directly from the Target ID Display readings. Also,

since the Target ID only has Block readings, it is not continuously variable.

The new CoinTrax II retains the original TID Notch Discrimination. But, the CoinTrax II has two

additional Standard Discrimination modes. TID Discrimination works best in low mineral ground.

Standard Discrimination is more suited for operation in high mineral ground. There are two Standard Discrimination modes, one for the Motion and one for the All Metal mode. These two

modes are identical in operation, independently adjustable, and operate completely

separate from

each other. The All Metal mode will only operate using Standard Discrimination mode. However,

you can choose which type you want to use for audio Discrimination in the Motion mode.

The Standard Discrimination can be adjusted to a very low level of -14 degrees. This is deep within

the ferrous quadrant and allows you to pickup all iron objects. This mode operates similar to the

full range Discrimination on the ProHunter module. Hence, it is continuously variable. The operator can select a discrimination level higher than iron but still in the ferrous quadrant. This will

allow you to do a better job of picking up jewelry, fine chains and small gold objects. This type of

setup is not possible using TID Notch Discrimination.

Motion Mode

The original audio Motion mode Target ID Discrimination will not work well in highly mineralized ground. However, Standard Discrimination will operate better in high mineral ground and

ground. However, Standard Discrimination will operate better in high mineral ground and equally

well in low mineral ground too. Therefore, it's a better choice most of the time. To improve Motion

mode Discrimination even more, use Standard Discrimination in combination with the Deep Search

Mode. The two working together should add several inches of detection depth in highly mineral

ground.

All Metal Audio Threshold Offset

Occasionally you may want to zero or clear the Threshold Offset. There are two methods to clear

the Audio Threshold Offset.

Method 1

Exit Menu programming if it is activated and place the detector in the All Metal mode. Then press

and hold down either the Left or Right Key. Tap the remaining Left or Right Key, then release both

keys.

Method 2

Turn the Detector off and place the Toggle in the All Metal mode (center position). Turn the Detector on. As soon as the Battery Check LEDs light, Tap the Left Key. The CoinTrax II will immediately exit the Battery Check test. Remember, you must Tap the Left Key before the Battery

Check test is completed.

Note: If you have a Millennium II use method number 2.

All Metal GB Audio Offset

The GB Offset feature is most effective in moderate and highly mineralized ground. For best

performance we recommend that you do not alter the GB Offset if you intend to use the CoinTrax II

in saline or low mineral ground.

Occasionally you may want to zero or clear the GB Audio Offset. There are two methods to clear the GB Audio Offset.

the GB Audio Offset

Method 1

Exit Menu programming if it is activated and hold the Toggle switch in the momentary Depth

Reading position. Then press and hold down either the Left or Right Key. Tap the remaining Left

or Right Key, then release both keys and the Toggle switch.

Method 2

Turn the Detector off and place the Toggle in the Motion mode (right position). Turn the Detector on. As soon as the Battery Check LEDs light, Tap the Left Key. The CoinTrax II will immediately

exit the Battery Check test. Remember, you must Tap the Left Key before the Battery Check test is

completed.

Note: If you have a Millennium II use method number 2.

Automatic Ground Balance-Normal AGB Deactivation

The operator can turn off the AGB program by selecting the Ground Tracking Speed Sub-Menu and moving the selection LED to position #10. This action turns off the ground tracking program, but it does not effect the current selected ground balance offset data. In other words, the CoinTrax II will still be set to balance out whatever ground was present before it was deactivated. However, it will not track to any new ground offset data. Also, the Audio GB Offset data is not effected by this procedure. Note, by default, turning off the AGB simply turns on the Manual Ground Balance program.

Deactivate AGB for Low Mineral Operation

The procedure for setting the detector for operation in low or non-mineral ground is

described in

the CoinTrax II User Manual. If you review that process, you will note that it is a little different

than simply turning off the AGB program. The step of holding down the Left Key performs an extra

step of zeroing the user's Audio GB Offset data and the AGB program GB Offset data. This would

be equivalent to turning the manual ground balance control on a regular detector (Like the ProHunter Module) fully clockwise. The operator can still Manually ground balance the detector

after this procedure is executed. In that case, the previously zeroed Audio GB Offset data will be

modified.

Battery Check

The battery check Display was setup to read correctly on Ni-Cad batteries. The readings for

Alkaline batteries will be different. They tend to indicate a full charge longer since they have a

higher voltage when fresh. Other battery types may read differently too. Although the Display

reading for fresh batteries will be different for different batteries, the cut-off point will be the same

for any battery type. In other words, for any battery type if the Display only lights LEDs #9 and

#10 or just #10 alone then battery failure is imminent.

When you first turn on the detector, the Battery condition should be displayed like a continuous bar

graph, see Figure 18 in CoinTrax II User Manual. Occasionally, the Battery check will show a

random display of lit LEDs and not a bar graph. If this happens, turn the detector off, wait a moment, then turn it back on. Normally the battery condition will read correctly the second time.

New Features In Chip v2.20

Non-Volatile Memory

The original CoinTrax does not have the ability to save user setting when the detector is turned off.

The operator must re-program all control settings each time the detector is turned on. This serious

disadvantage has been solved in the CoinTrax II. The CoinTrax II contains non-volatile memory

that remembers all the control settings when the detector is turned off. When the detector is

turned on, all the settings are restored and the unit is returned to its original operating state.

User Presets

The original CoinTrax has four Factory presets. These are preprogrammed detector setups for four

different uses. The Factory presets are not programmable. The CoinTrax II has added User presets

that allow the operator to program four different custom operation setups into the CoinTrax II.

These User presets can be recalled at any time and can be re-programmed as often as desired.

Deep Search (DS)

The CoinTrax II has improved detection depth in the Motion mode. When the DS mode is activated,

the CoinTrax II can detect targets beyond its normal discrimination depth. Normally many deep

targets will produce no audio or TID indication and will be ignored. When you activate the DS

mode, you can be assured that these "iffy" targets will not be missed.

Activation LED

When the Deep Search mode is turned on, two LEDs will light when marginal targets are detected.

This signifies the detection of an iffy target. The operator can then use his or her skill and experience in identifying the questionable target.

Audio Indication

An audio indication can be used in conjunction with the Deep Search mode. In addition to the

activation LED, the operator can turn on an audio indication for iffy targets. If you use this optional

feature, you do not have to look at the display to recognize marginal targets. These targets are

easily recognized since the detector will produce a staccato audio sound when you pass over an iffy target.

Standard Discrimination

The original CoinTrax has only TID Discrimination. The new CoinTrax II retains the original TID but

has two additional Standard Discrimination modes. TID Discrimination works best in low mineral

ground. Standard Discrimination is more suited for operation in high mineral ground. In the

CoinTrax II, you can choose which type you want to use for the audio Discrimination in the Motion

and All Metal modes. Therefore, there are two Standard Discrimination modes, one for the Motion

and one for the All Metal mode. These two modes are identical in operation but operate completely

separate from each other in the CoinTrax II. The Discrimination level can be continuously

varied

over a wide range using a 0 to 100 scale. The Discrimination can be set in increments of 1 anywhere on the scale.

Reject LED

If Standard Discrimination is activated in the All Metal mode, two LEDs will light to indicate all

targets that fall below the Discrimination level. This feature allows you to recognize and ignore bad

targets in the All Metal mode that otherwise might be dug. This operates similarly to the way the

iron reject LED works in the GoldTrax Module. In the GoldTrax, this level was fixed and only allows

you to identify and reject iron objects. However, this feature has been improved in the CoinTrax II.

In the CoinTrax II you can change the Discrimination level and thereby effect where any target

between iron through screw caps falls out and lights the LEDs.

Audio Reject Indication

The audio reject indication works in combination with the reject LED. Whenever the reject LEDs

light in the All Metal mode, the audio will produce a staccato sound giving you an audible indication

of a rejected target. You do not have to look at the display to recognize rejected targets. You can

easily distinguish the staccato audio from the normal All Metal audio sound and ignore the target.

Battery Check By-pass

The CoinTrax checks the battery condition when the detector is first turned on. Normally this takes several seconds, during which normal operation is suspended. Therefore, you must wait for the battery check sequence to complete before you can use the detector. That problem has been solved in the CoinTrax II. As soon as the battery check test begins, simply flip the toggle switch to the momentary position and release the toggle. The CoinTrax II will immediately return to normal operation.

Factory Reset

The factory reset is a useful feature that allows you to restore the CoinTrax II to its default factory settings. A factory reset can be done at anytime and is helpful in restoring the detector to a known set of conditions.

SST Deactivated

Smart Scan Technology or SST is signified by the scanning back and forth LED on the CoinTrax display. The SST was always activated at "turn on" in the original CoinTrax. Many operators turned the SST off while they were using the detector. This became an annoyance since each time the CoinTrax was turned on the SST was turned on too. In the CoinTrax II, the SST has been disabled and will not be activated when the CoinTrax II is turned on. However, the operator can reactivate the SST if needed.

Acknowledgments

Hambyware LLC would like to thank JB, Reg Sniff and Discovery Electronics for their CoinTrax II evaluation reports. This information will be useful to current CoinTrax users, and especially those new to the CoinTrax II.

Hambyware LLC

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Baron User Comments

I doubt there is a deeper VLF unit on the market today, no matter how many frequencies it has......

If they make a deeper, more sensative detector, I would be afraid to use it......

the best I have used in my 20 years of hunting......

I have never used a detector that responds to gold jewelry like a Millennium Cointrax V.2.2.....

I constantly read about salt water beach hunting, and how it's a must to use a multi-frequency detector. Well I guess they have never used a Baron at the beach. With my usage of my unit at the beach I can turn it on in the dry sand, and go the damp, then into the water without any problems......

First time out with the unit I didn't know what to expect as this was my first outing with the brand. Lets just say I regretting NOT buying one sooner......

I'm thinking,"Why didn't I have a Baron years ago"......

Before I saw it for myself I would never have believed the depth and sensitivity to small gold......

Just got a new Millennium II with the 2.2. It's my first Baron and all I can say is I can't believe I didn't try these before now!!.....

I own and have owned LOTSA detectors and know how to run them all quite well. This Baron is really making me raise the ol' eyebrows a lot! I guess I shoulda known that George always makes "keepers"......

I tried it out and was amazed at it's depth, sensitivity to small, low conductive targets and it's ability to ID at depth......

There's gonna have to be a real kicka\$\$ detector released before I switch from the Barons.....

I have been using a Baron since I994 and have had many depth contests or comparisons with other machines and never lost......

I've found the detector I was looking for......

Would have laughed if anyone had told me how deep they go with the 5.5 inch coil......

The Baron is a joy to use.....

Impressive performance......

Found the detector that I was searching for when I tried all the detectors from all the different brands......

Deep, consistent and fun to use......

Why didn't someone tell me about them sooner......

more to come.....

Cointrax Chip info page

The final version, version 2.20, of the microchip is finished and the info on the additional features have been appended at the bottom of this page. The changes from version 2.0 were the additions of volume and tone control for the staccato audio in both the Standard Discrimination Motion mode and the Standard Discrimination All Metal mode. Beginning with version 1.10w, just below, all the

features listed in v 1.1w, 1.20q, 1.90d and 2.0 are programmed into the chip.

Below are the specs and operating instructions for the final chip version, ver: 2.20.

Chip Features

Hambyware CoinTrax II Microchip version 1.10w

Note: The following pre-release information applies only to the first prototypes. This program is subject to change. Additional improvements and features may be added before the production chip is released. The operation of the CoinTrax using this prototype chip is identical to version 1.00 except for the following improvements .

General

Non-Volatile memory --

A "detector image" is the information needed to restore all detector settings should you turn the detector off. The CoinTrax keeps an image of your current settings and continuously updates this image when you make changes. You don't have to be concerned with storing the detector image in non-volatile memory. It's fully automatic. The CoinTrax knows what information to store and when to store it. This process is totally transparent to the user. Specifically user data is stored when a key is released, not when it is first pressed or continuously held down. If you turn the detector off immediately after making a setting change, the information is still stored in non-volatile memory. The exception to this is, if you press and hold down a key then turn the detector off before releasing the key. Although this is not likely to happen in normal operation it's something to be aware of.

The CoinTrax stores the User programmable presets in a four block section of EEPROM non-volatile memory. The current operating image of all the detector settings is also store in a block of non-volatile memory. This block is call the mirror EEPROM block. Whenever you make any setting changes this block is updated so that it is an exact mirror image of how you currently have the detector set. When you turn the detector off, the last image that was present when you turned off the metal detector is now stored in the mirror memory block. Subsequently, when you turn the detector on, one of the first things it does is fetch the information from the mirror memory and restores it. To you, it appears that nothing has changed. Everything is set the same as before.

User Presets --

In this version the Preset sub-menu has been modified and now contains 4 user

programmable settings.

These are located at led locations numbers 1, 2, 3 and 4. See the specifications section for more information.

The User presets are useful for storing common detector setups. The operator may have one or more setups that have been optimized for different applications. Since there are four User preset locations the operator can store up to four custom detector setups that can be recalled at any time.

Factory Reset --

The Factory (memory) reset feature allows you to return the detector to the factory default settings. These settings are listed in the specifications of this manual. Normally you will not need to use this feature. A Factory Reset is sometimes useful if you get confused with your settings and want to restore the detector to a known setup. A Factory Reset will not affect the User preset settings. The User presets are permanent and can never be erased. However, they can be written over or modified at any time. The Factory Reset is used to initialize the non-volatile EEPROM memory after the chip is programmed at the factory.

SST (Smart Scan Technology) --

When improvements are made in software programs, generally features are not removed. This is the case for the SST feature. In this version of the CoinTrax, the SST can be turned on and off from within the LED sub-menu. When you receive the CoinTrax, by default the SST feature has been turned off.

Battery Check by-pass --

Normally when you turn-on the Treasure Baron using the CoinTrax you must wait until the battery check sequence is completed before normal operation can begin. This takes several seconds. This step can be quickly by-passed using the Toggle switch.

Operation

Factory Reset

To active the Factory reset perform the following procedure:

Before starting this procedure the detector must be off. Now press and hold down the RIGHT key and the MENU key at the same time. While holding these two keys in this position turn the detection on. Wait until one or more leds light, then release both keys.

If the detector is on and you want to perform a Factory Reset turn it off and wait for at least 5 seconds before performing the procedure. Remember, you must hold both keys firmly depressed before and during detector turn-on and until one or more leds light before you can release either key. If your performed this procedure correctly all the leds will go off as soon as you release both keys. If they didn't go off immediately when you released the keys, you didn't perform it correctly. Repeat the procedure until the display goes off when you release the keys.

The Factory reset procedure was purposely made difficult to perform. Hence, it is highly unlikely that the operator would accidentally perform this exact

sequence of events and reset the CoinTrax. Detector operating images stored in User presets are not affected by the Factory Reset procedure.

Smart Scan Technology

The SST can be turned on and off as follows:

To turn the SST ON --

Enter the LED sub-menu. After selecting the led lock-on time press and hold down the ENTER key. Then press the RIGHT key. Now release both keys.

If you performed the procedure correctly, when you press the ENTER key the lit led will jump to number 10. Then when you press the RIGHT key the display will go back and light the led that selected the lock-on time. Finally, when you release both keys the number 10 led with flash in the Sub-Menu mode.

To turn the SST OFF --

Enter the LED sub-menu. After selecting the led lock-on time press and hold down the ENTER key. Then press the LEFT key. Now release both keys.

If you performed the procedure correctly, when you press the ENTER key the lit led will jump to number 10. Then when you press the LEFT key the display will go off completely. Finally, when you release both keys the number 10 led will flash in the Sub-Menu mode.

The SST default (factory reset) state has been changed to off. However, since the SST on or off condition is user programmable the operator can select the default condition for the SST. When you enable or disable the SST feature the led display will react differently as described above. It was programmed that way to give you visual key activation feedback. However, as soon as you return to normal operation you will immediately know if you did it correctly. You will notice if the SST is on or off by observing the led display.

After you release both keys in setting the SST condition the CoinTrax will enter the Sub-Menu mode and the number 10 led will begin to flash. At that point you can select another sub-menu or tap the Toggle to return to normal operation.

Presets

Version 1.10 has 4 Factory Presets and 4 User Presets located within the Preset sub-menu. The Factory presets are still located at the same led locations as in version 1.00. The 4 User Presets reside at led locations 1 through 4. The Preset sub-menu is used as follows:

Loading Factory or User Presets --

Press the MENU key to activate the Sub-Menu mode. Move the flashing led to position number 8 and press the ENTER key. The Preset sub-menu is now activated. Select a Factory or User preset and move the led to that location. To load the detector image stored at that location and return to normal operation press the MENU key or momentarily flip the Toggle switch. Do not press the ENTER key.

Storing User Presets ---

Press the MENU key to activate the Sub-Menu mode. Move the flashing led to position number 8 and

press the ENTER key. The Preset sub-menu is now activated. Select one of the four User presets and move the led to that location. To store the current detector image at this User preset and return to the Sub-Menu mode press the ENTER key. Do not press the MENU key or flip the Toggle switch.

The ENTER key works differently in this CoinTrax version. Pressing the ENTER key in the Preset sub-menu stores detector images in non-volatile memory. Pressing the MENU key or flipping the Toggle switch always loads detector images. Remember, pressing the ENTER key tells the CoinTrax you are programming a preset position. The Factory presets are not programmable. Therefore, if you select a Factory preset then press the ENTER key nothing will happen. Do not press the ENTER key at one of the User Preset locations unless you intend to store the detector image at that location.

The detector image that is stored at each User preset can not be erased. However, that operation is never necessary. Each User preset can be modified or entirely written over as needed. To program a new detector image simply setup the CoinTrax for the desired operating conditions. Then enter the Preset sub-menu, select one of the four User presets and press the ENTER key. The new detector image is placed at that position writing over the older image. However, in some cases you may only want to modify a User preset. In that case, select a current User image in the Preset sub-menu then flip the Toggle to return to normal operation. Now make the desired changes that modify the detector's operation. When that is completed re-enter the Preset sub-menu then select a different User preset and press the ENTER key. Now you have modified detector image at the second User preset.

Pressing the MENU key or flipping the Toggle switch will always return you to normal operation. However, when you press the ENTER key at a User Preset location you will return to the Sub-Menu mode and the flashing led. To return to normal operation press the MENU key or flip the Toggle switch. Hence, the former is a one step operation; the latter is a two step operation.

Within the Preset sub-menu when led number 10 is lit, it indicates that the current detector setup is not one of the Factory or User presets. However, if you enter the Preset sub-menu and one of the leds, other than number 10 is lit, it indicates that a preset is activated and which one is activate. For example, suppose you program a User preset at led position number 1 and exit to normal operation. If you now re-enter the Preset sub-menu you will observe that led number 1 is still lit. This indicates that the current detector setup is the image store at User preset number 1. On the other hand, suppose you make a change in the audio threshold after returning to normal operation. Now if you re-enter the Preset sub-menu led number 1 will not be lit.

The CoinTrax has notice that you modified the current detector setup and it is different from the image stored at User preset number 1. A lit number 10 led signifies no preset is selected. Consequently the CoinTrax will light led number 10 when you re-enter the Preset sub-menu.

Suppose that after entering the Preset sub-menu you wish to exit it without making any changes. If the led is located at one of the Preset positions simply press the MENU key or flip the Toggle switch. Or move the led to location number 10 and press the ENTER key. In the first example you will enter the

normal operating mode. In the second example you will enter the Sub-Menu mode with the flashing led. However, suppose that after entering the Preset submenu led number 10 is lit. To exit without making changes don't move the led to another position. Simply press the ENTER or MENU key or flip the Toggle switch.

Led position number 9 is not used in the Preset sub-menu. Moving the led to this position and pressing the ENTER or MENU key or flipping the Toggle switch will have the same effect as having moved it to number 10, the off position.

Battery Check by-pass

Perform the Battery Check by-pass as follows:

When the detector is first turned on momentarily flip the Toggle switch.

The CoinTrax will always test the battery condition at detector turn-on. This test last for approximately three and one half seconds. Normal operation is not possible until that time has passed. This feature allows you to immediately enter normal operation and by-pass the Battery Check procedure.

Hambyware CoinTrax II Microchip version 1.20q

New Features Deep Search mode - Motion mode Standard Discrimination - Motion mode Standard Discrimination - All Metal mode Reject LED - All Metal mode

Feature Description

The Deep Search mode is a new and novel addition to the CoinTrax II. Basically it is a program that uses the intelligent processing power of the internal microcontroller computer to increase detection depth in mineralized ground. When operated in mineralized soils all motion detectors will have unreliable detection beyond a specific depth. Primarily that detection limit is determined by the number of motion filters and the degree of mineralization strength. Targets that are deeper than the "critical depth" will not be picked up reliably. And in many cases, these deep targets will not be picked up at all. However, if the Deep Search mode is activated these deep targets will not be missed.

The Deep Search mode is a unique computer program that continuously analyzes the mineral strength surrounding a target. When the coil passes over a target the program compares the mineral ground signal to the target signal under the coil. The micro program makes a determination of deciding between two options. If there is sufficient information for normal motion discrimination that information is provided to the operator through the audio system. However, if the target is deep the Deep Search mode program is activated and notifies the operator that a target is present. Hence, the Deep Search mode will not allow you to miss targets. The Deep Search program monitors varying

ground and target conditions. Target and ground condition analysis is done on a target by target basis. Therefore, if the operator goes from an area of high mineral to an area of low mineral the CoinTrax II will formulate its analysis based upon these varying soil conditions.

The original CoinTrax version 1.00 used TID notch audio discrimination. This means that the audio Discrimination operated off of the TID reading. Suppose that the operator sets the notch discrimination to reject iron. If the TID program within the microcontroller reads the iron in error then the audio will sound on the iron because the audio operates off of the TID reading. However, the new Standard Discrimination mode operates independently of the TID reading. Depending upon the ground conditions one type of Discrimination might be better than the other. For example TID audio Discrimination works best in low mineralized ground.

There are two completely separate Standard Discrimination systems in the CoinTrax II. One is used for the Motion audio mode the other for the All Metal LED mode. They both are setup in an identical manner using the #9 LED sub-menu. Both Discrimination levels can be varied continuously from minimum to maximum in 100 steps. The Minimum Discrimination point is located at -14 degrees, a location deep within the ferrous quadrant. The maximum discrimination point is located approximately at the screw cap level.

The Motion mode low audio standard discrimination level is well within the ferrous quadrant and allows you to pickup iron objects. This mode operates similar to the full range discrimination of the Pro Hunter module. The operator can select a low discrimination level that can do a better job of picking up jewelry fine chains and similar objects. This is not as easily done using the original notch discrimination mode.

The Standard Discrimination operates differently in the All Metal mode. If you are in the Pin-Point All Metal mode the Standard Discrimination controls the activation of the reject LEDs. Specifically any target below the discrimination level will light the reject LEDs. The operation here is similar to the iron LED in the GoldTrax module. In the GoldTrax module the discrimination level that controlled the iron LED was fixed. In the CoinTrax II the operator can increase or decrease the amount of discrimination thereby effecting when the LEDs will light on different types of objects. Therefore, the CoinTrax II LEDs are called reject LEDs and not iron indication LEDs as they were on the GoldTrax.

Operation:

Deep Search Mode

- A) Tap the Menu Key.
- B) Move the flashing LED to position #7 and tap the Enter Key.
- C) Move the LED to the desired amount of Deep Search effect.
- D) Tap the Menu Key.

Standard Discrimination Motion Mode

- A) Place the CoinTrax in the Motion mode.
- B) Tap the Menu Key.
- C) Move the flashing LED to position #9 and tap the Enter Key.
- D) Move the solid and flashing LEDs to the desired amount of Discrimination.
- E) Tap the Menu Key.

Standard Discrimination All Metal Mode

- A) Place the CoinTrax in the All Metal mode.
- B) Tap the Menu Key.

- C) Move the flashing LED to position #9 and tap the Enter Key.
- D) Move the solid and flashing LEDs to the desired amount of Discrimination.
- E) Tap the Menu Key.

Detailed Operation:

Deep Search Mode

The Deep Search menu is located a LED #7. In the Deep Search sub-menu if the solid on LED is located to the far left (a location #10) the Deep Search mode is OFF. If you move the LED to next position, at location #9, the Deep Search mode will be activated with the least amount of effect. Moving the LED to the far right, at location #1, will install the Deep Search mode with the greatest effect. Generally, to pickup object that fall to the left on a TID scale use higher Deep Search settings (LED positions #7 and above). If this is your first experience using the Deep Search mode start with the LED located at the middle position, LED #6.

When the DS mode is activated it effects both the TID notch audio and standard audio Discrimination modes. Note: The DS mode is specifically designed for operation in highly mineralize soils. Although the DS mode will operate in non-mineral it is not recommended for use in low mineralized ground. To turn the DS mode off enter the DS sub-menu and move the LED to the far left position then return to normal operation by tapping the Menu Key.

Standard Discrimination Motion mode.

To set the Discrimination level tap the Menu Key to enter the function sub-menu with the flashing LED. Then move the LED to position #2 and press the Enter Key. If the Standard Discrimination is OFF the display will be completely blank. Press and hold down the Right key. A flashing LED will enter the display and move to the right. The flashing LED represents units of "1". Once the flashing LED reaches the far right it will jump to the far left and repeat going to the right. However, you will now notice that a solid LED will appear on the display. This LED represents units of "10". If you continue to hold down the Right Key you will notice that each time the flashing LED get to full scale it will jump to the left and start over. Also, when the flashing LED starts over from the far left the solid lit LED will jump one position to the right.

Each position of the blinking LED represents 1 unit. If it is at the far left position it represents 0 units. If it is at the far right position it represents 9 units. However, the solid lit LED represents units of 10. If it is at the far left position it represents 10 units. You can obtain various combinations of the two LEDs depending upon their position on the display scale. Actually we can have over 100 combinations. Consider the following example. Suppose that the solid lit LED is located at position #9. Also suppose that the flashing LED is located to the far right. To determine the number combination of both LEDs perform the following exercise. The solid LED is located at the second position and each of its positions represents 10 units. Therefore, that's 2 times 10 or 20. The flashing LED is just one unit per position so its position represents 9. These two numbers are added to give 29. Therefore, in this example the operator has dialed in a Discrimination level of 29. Depending upon the two LED placements it is possible to obtain number combinations of 0 to 100. If you set the level to 0 the discrimination is at a minimum amount. This is a level of -14 degrees in the ferrous quadrant. If you set the level to 100 the discrimination is increased to a level sufficient to reject screw caps.

If you hold down the left Key the flashing and solid LED will move continuously to the left on the display. If you hold down the left Key long enough both LEDs will scroll off the left end of the display scale. Eventually the display will be completely off with no LEDs lit. At that point the Standard Discrimination will be turned off.

Motion mode

It is very important to remember that to set the Standard Discrimination level in the Motion mode the detector must be in the Motion mode. The Standard Discrimination will only affect the audio sound in the Motion mode and will have no effect on the All Metal mode. Also, the TID and notch LED readings are independent and unaffected by the Motion Discrimination level.

All Metal mode

It is very important to remember that to set the Standard Discrimination level in the All Metal mode the detector must be in the All Metal mode. The Standard Discrimination will only affect the reject LEDs in the All Metal mode and will have no effect on the Motion mode. Also, the TID and notch LED readings are independent and unaffected by the All Metal discrimination level.

Unlike the original 1.00 version the new CoinTrax II allows the operator to disable the SST feature (the scanning back and forth LED). By default this feature is deactivated. However, if the operator turns the SST back on, the reject LEDs will not be available in the All Metal mode. Note: If the SST and All Metal Standard Discrimination features are both turned off the display will be completely off in the All Metal mode.

Microchip version 1.90d

This version is identical to v1.20q except for the following additional features:

- * Audible indication on rejected objects in the All Metal Standard Discrimination mode.
- * Operator selectable normal or audible indication for the Deep Search mode.

All Metal mode Discrimination

In v1.20q two LEDs light when the All Metal mode discrimination is activated and a target is below the set discrimination level. In this version the audio will chatter the same time the LEDs light. With an audible indication on suspect targets, the operator does not need to continuously monitor the LED display.

Deep Search Motion mode

The Deep Search mode in v1.20q has a scale with 9 selectable positions. Hambyware has determined that the higher selections are not need for normal Deep Search operation. Therefore, the scale has been reduced to two scales of four selections each. The first scale extends from position LED #9 to #6. The second scale goes from LED position #4 to #1. Both scales produce identical Deep Search effects. In other words, LED position #9 is the same as #4. LED position #8 is the same as #3 and so on. On the other hand, the scales are different in one aspect. The lower scale produces a normal Motion mode audio response. The upper scale, LED position #4 through #1, produces an audible audio indication on "iffy" targets when the Deep Search kicks in.

Some operators may prefer the normal audio response when the lower scale is used. Using the lower scale, the only indication of iffy targets are the two LEDs that light. If the operator chooses the upper scale iffy targets are indicated by both the lit LEDs and an audible audio response. The audible response is a characteristic chatter sound similar to that produced by rejected targets in the All Metal discrimination mode. However, the audio chatter is at a higher frequency than that produced by the All Metal discrimination mode.

Each scale on the Deep Search sub-menu has four selections. As before, LED position #10 on the sub-menu is the Deep Search off position. The center position between the scales is LED position #5. This position is not used and is not selectable. If the low scale is used, best performance is obtained if LED positions #9 or #8 are selected. If the high scale is used, best performance is obtained if LED positions #4 or #3 are selected.

Microchip Version 2.20

Audio TID - Special mode

The Audio TID frequency and volume are set by entering the Standard Discrimination Sub-Menu and using the Enter and Left and Right direction keys. When you press and hold down the Enter Key and tap either direction key, the CoinTrax II enters a special mode. One LED will light, indicating that you have entered the special mode. One of the display LEDs will stay lit as long as you hold the Enter Key depressed and remain in the special mode. The special mode will force the CoinTrax II to have zero discrimination. This will allow any target to produce the staccato sound. Also, if you are setting the frequency, the volume will be forced to its maximum level. The special mode temporarily configures the CoinTrax II, so that the operator can easily hear the different ID tone and volume changes. Note: this special mode should not be used for normal coin hunting. When the Enter and direction keys are released, the CoinTrax II will exit the special mode and restore the operator volume and discrimination settings.

Selecting the Low or High TID Tone

The operator can select either a low or high staccato frequency on targets that fall below the

Standard Discrimination level. The lower staccato frequency selection is identical to that used in the GoldTrax and previous CoinTrax II versions. The latest CoinTrax II version adds an additional higher staccato frequency. The higher frequency has shown to be a better choice in many situations. The higher rate offers improved performance in trashy areas. And, it is easier to distinguish multiple targets using the higher staccato frequency. Hambyware recommends that better overall performance will be obtained if you use the new high tone setting. However, you are free to use either frequency selection.

Using the Audio TID in combination with the Deep Search mode

The CoinTrax II has a normal audio frequency, two Audio TID frequency selections and one Deep Search staccato frequency. You can become confused listening to all these tones if they are activated at the same time. If you intend to use the Deep Search mode, we suggest the following setup. Set the Motion mode staccato Tone ID frequency to the high tone. Then, it will be easier to audibly separate the Motion mode target reject tone from the staccato Deep Search sound. It is not necessary to set the AM mode to the high tone since the Deep Search does not function in the AM mode.

Setting the Audio TID volume

The Audio TID volume is set by entering the Standard Discrimination Sub-Menu. Then turn the SD On by selecting some level of discrimination. It makes absolutely no difference where you set the standard discrimination level before changing the TID volume. If you

already have the discrimination set to a preferred level, you need not change the discrimination setting to modify the volume.

Checking the Audio TID volume

The Audio TID volume setting can be checked without altering the current volume selection. The first time you press the Enter Key and tap either direction key, the current volume setting is shown on the LED display. However, the setting is not altered. If your intent was just to observe the volume setting and not alter it, then exit the special mode by releasing all the keys. The program is designed so that you must press the Enter Key and tap a direction key once to activate the special mode and see the current selection. Then, use additional key taps to increase or decrease the volume setting.

Deactivating the Audio TID

There are two ways to turn the Audio TID off. The most obvious method is simply to deactivate the Standard Discrimination mode. You accomplish this by entering the SD Sub-Menu and holding the Left Key down until the display is blank. Unfortunately, this method destroys the operator SD discrimination selection. There is another method which is faster, and it will not alter your current discrimination setting. Enter the special volume setting mode and repeatedly tap the Left Key until the #10 LED is lit. Then release all keys. The #10 LED position will effectively turn Off the Audio TID since the volume is set to zero.

All Metal and Motion mode Audio TID

When the Audio TID is used in the All Metal mode, the CoinTrax II program automatically "extends" the time the staccato sound is On in order to enhance the Tone ID. This makes the Audio TID easier to hear in the All Metal mode. The operator can control the "extend" time using the Pulse Length Control feature described below. The Motion mode does not use this "extend" sound program. Therefore, if you choose the low frequency Audio TID selection, the loop must be swept slowly in the Motion mode in order to adequately hear the Tone ID. The loop sweep speed limitation can be eliminated by selecting the higher TID frequency for the Motion mode.

Millennium II Owners

As originally configured, the Discovery Millennium II does not have multi-tone Motion mode Audio discrimination. However, when the CoinTrax II is installed in the Millennium II, the operator will have the capability of two tone motion discrimination using the SD staccato audio feature.

Modular Treasure Baron Owners

When the CoinTrax II is installed in the original Modular Treasure Baron, a unique capability will result. The TB already has a two tone discrimination hardware feature that operates independently of the CoinTrax II module. The CoinTrax II incorporates Audio TID software discrimination. If they are used together, the hardware and software tone breakpoints can be set so that the full discrimination range is broken up into three audiotone blocks. We have determined that for best results, set the TB hardware breakpoint to occur above the CoinTrax II software breakpoint. Preferably, have the hardware breakpoint occur in the non-ferrous region and the software breakpoint to occur in the ferrous region. The result of this setup would operate as follows: The highest tone would be reserved for coins. The low tone would occur on targets near the center of the discrimination range. And, ferrous targets could be easily recognized since they would produce a combined low tone and staccato sound. Many other combinations are possible too. It is left up the operator to experiment and determine what three tone arrangement works best for him or her.

Audio TID Pulse Length Control

Activating the All Metal mode Standard Discrimination also activates the Audio TID. Targets that fall below the discrimination level will be indicated by a short staccato audio pulse. This pulse has a fixed time duration independent of loop sweep speed. The pulse length control allows the operator some discretion in selecting the pulse length time based upon the Tone ID frequency and operator preference.

To select the Audio TID time duration, the operators enters the Main menu and moves the LED cursor to position #9. To enter the Pulse Length Control mode, press and hold down the Enter Key. If this is the first time the Pulse Length Control is activated, the default time is selected. The default time is 0.2 seconds as indicated by LED #5 being lit. However, your setting may be different. The pulse length selections are scaled nearly linear from LED position #10 to position #1. Moving the LED cursor to position #10 will select a time of 0.1 seconds. Moving the LED cursor to position #1 will select a time of 0.3 seconds. After you have made your selection, release the Left, Right and Enter Key. This will deactivate the Pulse Length Control mode and return you to the Main Menu.

When the Audio TID is activated, it overrides normal All Metal audio function for a predetermined amount of time. Therefore, the Tone TID should last just long enough for the operator to recognize the different Tone ID and then stop. If the Tone TID lasts too long, it can mask nearby targets. A second criteria to consider is the Audio TID frequency. The lower the frequency the longer the time needed to adequately represent the frequency. Therefore, the optimum pulse length duration is the time long enough to represent the frequency but not long enough to produce target masking. In previous CoinTrax II versions, the selected time was fixed at 0.2 seconds. The 0.2 second pulse time is satisfactory for most applications. For that reason, it is the default time in the latest version of the CoinTrax II.

The Pulse Length Control allows the operator to select one of ten possible Tone ID pullse times. If the operator selects the low staccato TID tone, we recommend that you choose a time between 0.2 and 0.3 seconds. This corresponds to LED position #5 to position #1. However, if the operator selects the high TID Tone, you are free to select any pulse length between 0.1 and 0.3 seconds. This corresponds to LED position #10 to position #1.

Cointrax Chip FAQ

CoinTrax Version 2.2 chip features

- * All user settings are stored in non-volatile memory.
- * Four User custom programmable settings.
- * Two User programmable Standard Discrimination modes.
- * The SST feature is turned off.
- * Toggle Battery Check by-pass.
- * Factory memory reboot.

Non-volatile Memory-- This is the predominate change in this version of the CoinTrax chip. From now on, when you turn the detector on, it will come on in exactly the same setup as when you turned it off. There will be no need to reset all the controls to your personal taste. During normal operation the chip continuously keeps a mirror image of all your user settings in permanent non-volatile memory. At any time, if you turn the detector off this image is already saved and not lost. When you turn the detector on, the program automatically fetches this image and restores it as the current operational setup. This operation is totally transparent to the user and requires no intervention on your part.

Four User custom programmable settings--

Due to the lack of permanent memory this feature was not possible in the original CoinTrax. However, in this version the non-volatile memory capability allows the addition of this unique feature. We have added four locations in the PRESET submenu in which to store user custom settings. Here is an example how this feature might be used. After using the detector for a period of time you have found a particular collection of user settings that work best for you. This collection of settings is what we call a detector image. In other words, a snapshot of where you have placed all the settings. It is now possible to store the detector image in permanent memory so that you can recall it later. To store the current image just enter the PRESET submenu move the LED to position 1, 2, 3 or 4 and press the Enter Key. These four positions allow you to save several setups for different applications. The information stored at these locations is permanent and can never be lost. Although the images can never be erased

they can be modified or written over entirely if that is your intent.

The four User programmed positions normally save the entire operating image of the detector. The one exception to this is the Automatic ground tracking offset. Normally this is not saved in non-volatile memory since it is function of the soil condition and varies continuously as you use the detector. On the other hand, if manual ground balance is turned on, the ground offset is saved with the detector image when you program one of the 4 User custom positions.

Two User programmable Standard Discrimination modes--

The Cointrax II chip has a full range linear discriminate mode that starts deep in the ferrous quadrant and allows setting discriminated out targets to respond with a staccato audio response and an all metal discriminate mode that responds to any metal target but also allows setting targets to respond with a staccato audio response. That feature allows running in all metal mode with no loss of depth and still be able to discriminate out targets. The staccato audio responses in both modes are programmable for tone, duration and volume.

SST (SmartScan Technology)--

Many CoinTrax users choose to deactivate the scanning back-and-forth LED. Unfortunately, whenever the detector is turned on again the scanning feature is enabled. In the new chip the scan feature has been turned off. However, the feature has not been removed, just placed in an off state. It can still be turned on and then off again if you so choose.

Toggle battery check by-pass at turn on--

In the current CoinTrax when you turn the detector on it immediately executes a battery test that last several seconds. Normally it doesn't take that long to observe the battery condition. But you always have to wait until it's done before normal operation can begin. The new version allows you to bypass the battery check sequence. As soon as the detector enters the battery check test simply flip the Toggle switch to the momentary position then release it. The program immediately exits the battery test and starts normal operation.

Factory Reboot--

With the new chip when you turn the detector on it will always be restored to the same state that existed just before turned-off. However, occasionally for some reason you may want to reset the detector to its factory default settings. These factory settings will never change. Therefore, they give you a known operating starting point. After a factory reboot the settings can be modified and saved as needed. The factory reboot operation has no effect on the four User programmable positions.

Frequently Asked Questions--

- **Q** Do I have to send the CoinTrax module in to obtain the chip upgrade?
- A No, the chip can be changed by the user.
- Q How do I obtain the new chip?
- A It can be purchased by clicking the button on the Baron Page .
- **Q** I have a non-modular Treasure Baron. How do I get the chip replaced?
- A It can be user replaced or sent in to Discovery.
- **Q** When will the new CoinTrax chip order website become available?
- A It's available now, check the main Baron Page for link.
- **Q** What are "user settings"?

A These are settings like Motion mode sensitivity, All Metal mode sensitivity, Audio Threshold offset and so on. Essentially these are the control positions that customize the detector to your personal tastes.

- **Q** Do I need to tell the detector when to remember my user settings?
- A No. The new chip program knows what to save and when to save it.
- **Q** What is non-volatile memory?
- A A type of computer memory that does not forget its contents when the power is turned off. There are several types of memory that remember their contents when the power is removed. The new chip for the

CoinTrax

has **<u>EEPROM</u>** memory to perform this function.

Q What is EEPROM?

A This is an acronym for Electrically Erasable, Programmable Read Only Memory. It is a non-volatile type of memory that can be erased and reprogrammed many times by program instructions. All user settings

in the new chip are stored in EEPROM and this information is not lost when you turn the detector off.

Q What is the automatic ground tracking offset?

A When the AGB is activated the CoinTrax processor continually computes

the automatic ground tracking offset data necessary to balance the detector

in mineralized ground. Therefore, the automatic ground tracking offset is

the value of this data.

Re: Discovery Electronics/ Treasure Baron SST? Registered: 13 years ago Posted by: UK Brian [Send a Message] Posts: 1,116 Date: January 20, 2011 05:32AM I've still got a Treasure Baron + modules. Even the original carry bag (in bright red and original headphones). Still use it though its HEAVY. Thick alloy case. Lots of batteries plus extra ones for the Deep Hunter module.

You start with the base unit which only has an on/off/power adjustment on the left and the discrimination knob on the right with a large switch in the middle to select discrim. or all metal.

Then start adding beach/blacksand units or the Pro Hunter one (provides notch and ground balance). Deephunter that activates a passive componant in the coil for super depth. There's several add ons, Goldtrax, Cointrax etc the idea being that one base machine could be adapted to tackle any detecting task.

S.S.T. stands for Smart Scan Technology. Really bright red LED lights across the width of the case light up and scan back and forth as you detect. This helps with pinpointing and indicates coin depth.

All worked really well except for the weight/balance and the sheer cost of all the bits on top of the base unit.

I've got the stock coil but you could also get smaller and larger. I like the 11" Thunderhead.

One advantage is that good items that would move down scale on most detectors on bad ground ie sound like iron move up so you don't miss them.

There's cut down versions that you can't upgrade (Millenium Edition with a lighter plastic case) or you might be able to pick up the C-Scope 8SST which combined two modules in the one case at a much lower cost than going for the true Treasure Baron. Not expandable but cheap.

There's spin off models such as the Cobra/Cobra II and Viper. The last was the best of the bunch with a Quad depth range detecting circuit. Surface 0-5", Sub-surface 6-9", Mid-range 10-14" and Deep terrain 15-30" !! not that I ever managed that. The users of these detectors got REALLY upset when Kelly Co started to use the names on some very average detectors.

Hope thats of some help. Standard models seem reliable but the specialist Goldtrax for instance can suffer from sticking touchpads so watch out if buying off @#\$%&.

Treasure Baron SST		
Posted by: <u>JB(MS)</u> [<u>Send a</u>		
Message]		
Date: January 20, 2011 08:15PM		

Registered: 14 years ago Posts: 997

Discovery Electronics stopped building detectors and shut down a couple of years ago, but one of the coowners who retired several years ago has plans to begin producing at least one model and two coil sizes again. The SST was the last Treasure Baron version Discovery built. It's in the same housing as the Millennium II and, except for the notch feature, uses the same electronics as the Newforce CS-5ZX that was a joint Discovery/C-Scope effort, but the SST is more stable, has a faster recovery speed and more depth. It, like the other Barons, was designed by George Payne and at 2.75 lbs it's light weight and easy to use. It doesn't have quite as much depth as the Cointrax versions but it has good depth, the choice of one, two or nine tone audio and true auto ground balance with an inhibit feature that prevents it from tracking to iron or large targets. The SST is simple to use, darn good for coin hunting and like the other Barons it hits on tiny gold jewelry exceptionally well. It's also a fun detector to use. A hunting buddy bought an SST a couple of months ago and likes it so well his Fisher F5 and e-Class Baron, which is the same as the Millennium II, has been relegated to backup status and get very little use. A major downside is there's no warranty, and if one happens to need repairing getting it fixed could be a problem. As Larry said, there's a Treasure Baron forum and a website dedicated to them that has a very large amount of info about them. They can be found by Googling "Treasure Baron" with the quotation marks included.

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Quad depth range...... Posted by: <u>JB(MS)</u> [<u>Send a</u> Message]

Registered: 14 years ago Posts: 997

Date: January 20, 2011 09:36PM "Quad depth range" was just one of many misleading statements used by the big K in their ads. I have an A and S Special, which is a Cobra II that was sold by another company, and also have a Viper, which is a Cobra II with an LED intensity meter. Both are nothing more than base Baron boards with notch and circuitry added for charging Nicad batteries, plus the intensity meter on the Viper. They do have excellent depth, even without "Quad Depth Range" circuitry. I use the A and S, which has added external pots for ground balance and threshold, most of the time, in fact if I had to choose one detector from the many I've had I would choose the A and S. It's not as deep as the Cointrax versions, or the Prohunter when the Deephunter module is added, but it goes deep, runs stable at maximum sensitivity and like the other Barons it hits hard on small gold jewelry. The Cobra,and King Cobra sold by the big K were made by Gold Mountain Technologies, they were good detectors but didn't get much over half the depth the Cobra II and Viper gets here.

Re: Quad depth range	Registered: 13 years ago
Posted by: UK Brian [Send a	Posts: 1,116
Message]	
Date: January 21, 2011 05:56AM	
Not certain I would blame big K or did	d they sell them then ?

I used the Viper back in 1994, perhaps 1995 and the spec. sheet said something along the lines that it had been produced in response to detector user demands for a Cobra II that would go a little deeper and capture the target signal better. They had farmed the design out to outside engineering and it had taken six months to perfect the design

There's still the problem (as with the Viper being reissued but many not realising its not the detector they might have seen a good review on) that the U.K. CS 5 range sold under several 5 designations was nothing to do with Discovery. Its more a copy of the Fisher 1266 but with a battery check meter in the middle.

Same with the CS4ZX. A hybrid detector in the U.K. developed from the Metadec 2 and 3 design's. Seems the U.S. version gained an I.D. meter instead of the fixed level ferrous/non ferrous of the British original and lost the hybrid Arado type design of the original.

To skip to another two brands, I was reading a few weeks back that someone had "won" a Groundhawk (I assume on @#\$%&) thinking they were getting the U.S. relic hunting machine instead of which they received

a discriminating P.I. of British design and manufacture that even new (a) wasn't to hot and (b) you haven't been able to get spares or repairs in twenty years. There was also a Chinese origin "Groundhawk". Reply Quote Report



Re: Treasure Baron SST...... Posted by: <u>JB(MS)</u> [<u>Send a</u> <u>Message</u>] Date: January 21, 2011 09:21AM Registered: 14 years ago Posts: 997

I've been involved with Discovery Electronics and their products for a long time, and also with George Payne for a few years. Reg Sniff and I were the two people who tested every prototype and final version of the chips George Payne programmed for the Cointrax models, and I spoke with Alan Hughes, who was the marketing director at C-Scope then, several times re the CS-5ZX and 4ZX when they were first produced. Both of those models, and the CS-8SST which is a 5ZX with letters instead of coin designations for meter ID, use a George Payne designed, stand alone, simplified version of the Treasure Baron Cointrax module. I got a CS-5ZX right after they were released in 1997 or early 1998, and have one now as well as three other Baron versions. The board in the the SST and 5ZX, also the 4ZX and 8SST according to Roy Van Epps at Discovery, are basically identical. They all have the three different audio option capability and notch circuitry but don't have the switches and jumper configuration on the boards to allow changing the audio or the potentiometers required to be able to use the notch. In addition, the sensitivity was restricted on those models but installing a jumper across the J-3 contacts on the circuit board removes the restriction and allows full sensitivity. The SST had the jumper installed at the factory, as well as the switch and jumper configuration to allow the three different audio options. The Cobra II and Viper were built by Discovery as house brands for Kellyco after Gold Mountain shut down, the current Cobra and Viper models they sell are built in China. Discovery made the Hothead coils for the big K for several years after Wilson stopped making them, and also made the coils Jimmy Sierra sold for Whites detectors for a long time.

I've just turned up the ad for the Viper from 1995 and they were imported by "The Midas Touch" in Britain but no suggestion of any KellyCo involvement though I suppose they might have had some idea of a move into Europe through an established dealer here.

Reply Quote Report

Kellyco Viper..... R Posted by: <u>JB(MS)</u> [<u>Send a</u> P <u>Message</u>] Date: January 26, 2011 03:26PM

Registered: 14 years ago Posts: 997

Photo's of Kellyco Viper built by Discovery Electronics.



Reply Quote Report

Re: Kellyco Viper..... Posted by: <u>UK Brian</u> [<u>Send a</u> <u>Message</u>] Date: January 27, 2011 09:07AM Registered: 13 years ago Posts: 1,116

Similar in general look to the U.K. version but instead of "LED SELECT" it has a vertical moving switch with LED-1 above and LED-2 below. Power knob is the same. Where you have "reject width" we just had "NOTCH" printed to the left. DISC/ID is marked as per your picture but lacks the "Set for Tone I.D."

This version cost

Reply Quote Report



One of the Discover owners.... Posted by: <u>JB(MS)</u> [<u>Send a</u> <u>Message</u>]

Registered: 14 years ago Posts: 997

Date: January 27, 2011 11:37AM

Rich Salmon, who was a co-owner of Discovery until he retired 8 or 9 years ago said the Barons would have been big sellers in the UK if the distributors and dealers hadn't jacked the prices up. Discovery shut down, stopped building detectors a couple of years ago and closed all operations last year, but Rich acquired most of the equipment. He plans on making 5.5 and 8 inch coils initially, then a lighter weight version of the Cobra II with surface mount components and manual ground balance. He said it will be aimed primarily at the UK market and to keep the price down it will be sold direct from the factory instead of through distributors and dealers. It will also be available in the U.S. by direct order, but Rich is in his mid 70's, not in the best of health and it may not happen.

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Re: One of the Discover owners....Registered: 13 years agoPosted by: UK Brian [Send a ______Posts: 1,116Message]______

Date: January 28, 2011 06:13AM

Blame the importer every time. In the past the norm was to convert Dollars to Pounds and this could mean the U.K. price was double. Then cut the warranty down to the minimum allowed in the country.

Next do a "we will not be undersold in U.K". offer and any dealer who dares undercut the importer is found and can have his supplies cut off.

Here's a question you may be able to answer. I assumed that Discovery designed the hoard hunter who's name I can't think of but was almost identical to the C-scope 9000HPX and Whites TM808 versions because the Discovery version always seemed to be the one to have, with the others on catch up. Was it a Discovery design or Whites as has been suggested in the past ?

Thanks if you can help.

Reply Quote Report



 Re: One of the Discovery owners....
 Registered: 14 years ago

 Posted by: JB(MS) [Send a Message]
 Posts: 997

Date: January 28, 2011 08:11AM

Rich Salmon said the TM-800 was being manufactured by Discovery and marketed by White's when he and Roy Epps acquired the company, including the patents on it. He said Whites was buying about 100 month at that time and continued the arrangement with them, but when Discovery started marketing the Treasure Barons Whites stopped buying the two box units from them and started building their own version of it. The C-Scope version was the Discovery Electronics TF-900.

Treasure Baron vs Tesoro

How does the iron discrimination capability of a Cointrax or Goldtrax module-based Treasure Baron w/ 2.2 chip compare to say a Tesoro Bandito II uMax with respect to its ability to find quality non-ferrous item in iron-infested sites such as cellar holes or old farm home/school sites?

Similar or better capability? More or less quite? Deeper? Which module is best in thick iron?

Not looking to discredit either machine, just looking for objective comparisons. 😁

Thanks,

Keith

*I would say that if you can live with the weight the Treasure Baron would perform better and even with just the base machine plus the Pro Hunter module (which is the one most likely to be seen) the five inch coil outperforms many of the detectors on the market in those conditions. Switch to the Cointrax or Goldtrax and its better again and then George Payne upgraded the chip making a good machine even better. *The only drawback (apart from the weight) is will you be able to get coils you need to get the best from the detector. I have the stock, standard 10" and Thunderhead but got the five inch when they were almost being given away. I thought at the time it must mean the machine was about to be discontinued.

*I know that this is an old thread but since I own both machines mentioned I figured I'd chime in. The Cointrax is noisier in iron but still very good and its adjustable discrimination in all-metal rarely gets fooled by anything ferrous. The Bandido will give a good signal on round rusty iron whereas on the Baron, a quick flip over to AM and you'll get staccato audio on iron no matter how good it sounds in motion mode. The Baron is deeper. Both have excellent separation. The Tesoro has faster recovery. The Baron is much heavier. I prefer the Baron in old sites but both of them are up to the task. I traded my DFX for a Bandido 2 µMax. I'm happy with the trade.

The Modular Treasure Baron, having the deephunter rear module, and being
really heavy, but the extra power worth the weightRegistered: 12 years ago
Posts: 7,665Posted by: vlad [Send a Message]

Date: December 22, 2013 12:15PM

had me come up wiith a solution. I remote mounted both battery packs, the main one for the detector, and the one for the deephunter

on each side of the detector stand with the wires being held in place by strips of velcro. This greatly lowered the center of gravity below my hand.

No other detector runs with as much voltage across the loop with full boost on. And this all goes into one frequency,

its not divided by 2 or 3 depending on your number of frequencies.

Image error

HTTP request failed with code 502. open image URL

This is my version, the original Baron, and uses red L.E.D.'S to lock on target categories.

Until you hit a target, they scan continuously. A few years ago George designed a new chip to replace the original chip in the detector. In essense you got a brand new detector for about \$125.00, and you could do the work yourself it was so easy.

Edited 2 time(s). Last edit at 12/22/2013 12:35PM by vlad.

Reply Quote Report



Re: The Modular Treasure Baron, having the deephunter Registered: 14 years ago **rear module, and being really heavy, but the extra power** Posts: 14,391 **worth the weight** Posted by: Larry (IL) [Send a Message]

Date: December 22, 2013 12:54PM

What is the coil voltage in full boost vlad?

Bells and whistles are nice, but nothing will substitute for the basic understanding of the hobby.

M CTX 3030

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Re: The Modular Treasure Baron..... Registered: 14 years ago Posted by: <u>JB(MS)</u> [<u>Send a Message</u>] Posts: 997 Date: December 22, 2013 02:47PM

The Deephunter module allows pumping up to 5 extra volts to the coil. Not close to the 44 volts the Nautilus DMC IIb and IIa allow, but the 2.1 and 2.2 Cointrax versions have a DeepSearch boost mode that flat out goes deep, even without using the Deephunter module.

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Re: The Modular Treasure Baron, having the deephunter rear module, and being really heavy, but the extra power worth the weight Posted by: <u>Old California</u> [<u>Send a Message</u>] Date: December 22, 2013 07:25PM Registered: 12 years ago Posts: 2,245

Nice mod Vlad,

That is a great idea mounting both battery packs underneath the arm-rest, Bet it swings allot easier too.

Here in my area of California, We can't run the extra boost module our ground will not allow the extra sensitivity. However, Even without the boost any of the three baron modules get good depth.

Have been using all three modules for years, Actually went out yesterday and scored a 14K gold ring out in a school playground using the Goldtrax. Each have an edge over the other modules one way or another, My favorite for gold jewelry hunting is the GoldTrax have special way of using it going after low conductive signals only bypassing iron and high conductive.

I'll share my finds from yesterday here in a day or so, And my Goldtrax tips.

Thanks for sharing your Baron mod, That is a great idea 🥮

Paul (Ca)

Edited 1 time(s). Last edit at 12/22/2013 07:27PM by Old California.

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According to Mr.Bill its around 45 volts+ you have the voltage of Registered: 12 years ago the detector, then add the deephunter; it air tests targets farther Posts: 7,665 than my DMC-2B/10" coil.*N/T* Posted by: vlad [Send a Message]

Date: December 23, 2013 07:19PM

(This message does not contain any text.)

Reply Quote Report



 Mr.Bill swears the goldtrax is the best VLF unit for prospecting ever made. I know of people that use it for coin hunting. In your ground mineral situation
 Registered: 12 years ago

 Posted by: vlad [Send a Message]
 Date: December 23, 2013 07:37PM

you aren't using the big Thunderhead loop are you? If you run full boost with that loop you will overdrive the front-end; you can't run it right

on the ground like the 8". George told me to pick it up 2-3" and it would work just fine. Have you tried the DD for coin hunting?Bill talked

me out of mine. He goes prospecting out west, hikes all day to get to a place, and what does he find-a New Jersey key chain holder.

Reply Quote Report



Thanks, I didn't think it was that high but I wouldn't argue with Mr.Bill......

Bells and whistles are nice, but nothing will substitute for the basic understanding of the hobby.

M CTX 3030

Reply Quote Report



 Re: Mr.Bill swears the goldtrax is the best VLF unit for prospecting ever made. I know of people that use it for coin hunting. In your ground mineral situation
 Registered: 12 years ago

 Posted by: Old California [Send a Message]
 Date: December 24, 2013 12:06PM

Hi Vlad,

With the Goldtrax I use the Widescan DD coil, Or the smaller 5.5" coil in older sites as a clean up coil but mostly use the DD widescan. Don't use the Thunderhead anymore and sold my last one but know I'm thinking of getting another one for both coverage and depth.

Mr. Bill is a great guy especially with helping me get the hard to find Baron parts back then. Guess will be putting word out be needing a larger Thunderhead loop in the near future. Here in my area out west we can't use full sensivitity due to mineralized ground which is why I can't use the deephunter module, But with the depth I'm getting with the three modules that is good enough to get the deep rascals hidden away from most detectors.

Enjoy your Baron, You may want to try out the other two face modules especially the GoldTrax.

Paul (Ca)

AKA..Paul (Ca)

Whites GoldMaster BFO Compass Klodike BFO Bountyhunter BFO FisherScope TR Metrotech TR Detectron TR Rayscope TR Mity Mite TR Garrett BFO D-Tex BFO Goldak TR Relco BFO Jecto BFO Teknetics Roach TR

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I like the Cointrax 2.2 chip too much. You know there are 2 different size Thunderheads? N/T New Posted by: vlad [Send a Message] Date: December 24, 2013 03:14PM Registered: 12 years ago Posts: 7,665

(This message does not contain any text.)

Thunderhead coils...... Posted by: <u>JB(MS)</u> [<u>Send a</u>] Message 1

Registered: 14 years ago Posts: 997

Date: December 25, 2013 04:00PM

There were three large coils for the Barons. Discovery made an 11 and 10 inch with holes in the center and an 11 inch that didn't have a hole in it. The first large coil I had for the Barons, in 1997 or 1998, was listed as being 11 inches but it measured 10.75 inches, the one I have now and one I sold four or five years ago measures 10 inches. The one I have now and the two I sold had holes in the center of them. Don't know if he's right or not, but the guy i sold the 10 inch to said the 11 inch Thunderheads were made to be sold in Europe but some were sold here. Discovery also made Hothead coils for Kellyco and coils for Jimmy Sierra for a few years, photo from 1997 Kellyco catalog shows the Hothead coils Discovery built. I used a 10 inch Hothead coil for the Garrett GTA's and a 12 inch for Fisher 1266 that Discovery made, but at the time I didn't know Discovery made them. Rich Salmon, who was a co-owner of Discovery, either posted on the Baron forum about them building the Jimmy Sierra and Kellyco Hothead coils or mentioned it in an email.

Hot Head Search	coils for:	
DETECTOR-MODEL SERIES SIZ	ZE PRICE	
GARRETT PowerMaster Series	10" \$219.95 BC1.00	
GARRETT GTA & CX Series	10" \$219.95 BC1CU	
GARRETT Freedoms & 7-10X	10" \$219.95	
GARRETT (TRIAD) ALL 1990 thru 1996*	6"x7" \$199.95 BG1-C4	
GARRETT (FERRET) ALL 1990 thru 1996	5.5" \$219.95	
WHITE'S SL/DL 6000-5900-4900 Sierra Madre DL Max	12" \$219.95 BG1-C5	
WHITE'S XLT/Spectrum/Eagles	. 12" \$219.95 BG1C6	
WHITE'S Quantum II & QXT	. 12" \$219.95 BG1C14	
WHITE'S (FERRET) XLT/Spectrum/Eagle SLs	. 5.5" \$219.95 BG1-C10	
FISHER 1266-65-35-25 X	. 12" \$219.95 BG1-C7	
COBRA Cobra II/ SST/Viper	. 11" \$219.95 BG1-C11	
MINELAB (PENETRATOR) Sovereign XS	11" \$299.95 BG946-C1	
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All Hot Heads: Please add \$6.95 each Shipping and Handling		

Edited 1 time(s). Last edit at 12/25/2013 04:05PM by JB(MS).

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Registered: 14 years ago Posts: 997

Date: May 18, 2014 02:32PM

I was way off as to how many volts the DeepHunter module adds to the Treasure Baron coils.. When the DeepHunter module is turned off the voltage to the coil is 3.75v, when it's set in the low, middle position it increases the voltage to 12.3 and in the high mode its 20.8 volts.
Discovery and small coils..... Posted by: <u>JB(MS)</u> [<u>Send a</u> <u>Message</u>] Registered: 14 years ago Posts: 997

Date: December 11, 2005 10:12AM

I was just looking at the logs for jb-ms.com, saw a lot of hits from this forum and thought I'd check out the why of it. If you guys can talk Ron and Discovery into making a small coil for the new Fisher this might be of interest. Discovery currently makes a 5.5 inch coil for the Treasure Baron series that is the deepest small coil I've seen, and except for Minelab I've used or hunted alongside small coils from all the major manufacturers on their top end detectors. In side by side comparisons the 5.5 coil on a Cointrax air tested a nickel lying on top of the ground an accurately measured two inches deeper than a 5 inch coil on a CZ5 and almost equaled the depth on inground coins and Civil War relics, mostly .56 and .58 minies, of a CZ-70 Pro with 8 inch coil. On a Goldtrax it was a half inch deeper than my X5 with 7 inch coil on a freshly buried dime in loose sandy soil. Mr. Bill has used the Barons so he's aware of the performance level of the various coils, if that performance could be carried over to the same coil made for the ID-Edge you would have a winner.

Discovery has made the 5.5 coil for over 10 years, already have the molds and other equipment needed, so there should be little or no additional tooling cost. The only added cost should be tuning the coil to the Fisher and changing the connector. In a discussion on another forum about using other brand coils on the Barons, George Payne said a higher frequency coil could be used by installing a resistor with the apropriate value in the coil. If that's true, and I certainly don't doubt George Payne, it shouldn't add that much to existing costs. Assuming the only added cost would be the addition of a resistor and differect connector, the problem in convincing Discovery to make the coil would be how many they could reasonably expect to sell. The 5.5 Discovery coil is more costly than most other small coils but some of us feel they are well worth the cost, in fact I have two so if one goes bad or I damage one I'll still have one available without having to wait on repairs.

JB

10.25 inches on the nickel lying on the ground air test with the Cointrax. 8.5 inches on the freshly buried dime with the Goldtrax. Goldtrax with 5.5 still hit the dime at 10 inches in all metal mode. The inground tests were with the coins buried at actual depth, no raising the coil and adding air space.

JB

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Re: Discovery and small coils..... Registered: 14 years ago Posted by: <u>JB(MS)</u> [<u>Send a Message</u>] Posts: 997 Date: December 13, 2005 03:25PM

I only used the DeepHunter module one time and only at the medium setting. Didn't find anything I wouldn't have found without it. I traded it for a ProHunter module. Wish I had kept it, may pick another one up if I can find one but probably don't need it as the DeepSearch mode George put in the new chip does basically the same thing.

JB

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Thanks. Do you have a 7" goldtrax coil to do the same tests with?Registered: 14 years agoPosted by: John, in Florida [Send a Message]Posts: 2,115Date: December 13, 2005 03:29PMPosts: 2,215

I have found that in some situations my 5" coil outperforms the 9" coil on Dimes.

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Re: Thanks. Do you have a 7" goldtrax coil to do the same tests with?

Registered: 14 years ago Posts: 997

Posted by: <u>JB(MS)</u> [<u>Send a Message</u>] Date: December 13, 2005 04:18PM

Discovery doesn't make a 7", wish they did as I've always like that size coil. I don't think I'm going to do another test as comprehensive as that one. It took almost all day and actually proved nothing as the results could very well have been different a mile down the road. Depth comparisons are good for reference but as a world famous philosopher by the name of Jbird noted when discussing depth tests in specific locations, "There's my dirt, your dirt and that God awful redstuff in east Tennessee and Georgia." If those weren't his exact words they're close enough to be relevant. His point was what works best in one place might not be in the top 3 or 4 somewhere else. He's right.

JB



Re: George Payne.the treasure baron Posted by: <u>JB(MS)</u> [<u>Send a Message</u>] Date: June 21, 2008 10:33PM

Registered: 14 years ago Posts: 997

I guess the Treasure Barons could be called cousins to the Tek Mark I, but if so they can also be called the grandsons of the Tek ST⁽²⁾. There were several versions of the Barons made, one model uses two 9 volt batteries and the others 8 AA's Only when the DeepHunter module, which allows pumping up to 25 volts to the coil for more depth, was installed were 16 batteries required. All versions except the SST have the option to hipmount. The metal cased modular Barons were a little heavy but the only two currently in production are nonmodular models. The Millennium II, which weighs 3 pounds and the SST at 2.75 pounds.

Re: INFO on NEWFORCE CS 5ZXRegistered: 13 years agoPosted by: UK Brian [Send aPosts: 1,116Message]Posts: 1,116

Date: January 20, 2011 05:57AM

This was the highest tuned motion detector that C-Scope produced at one time. Based on the popular CS2MX but with an added meter (not I.D.) and a booster switch that could really add to the depth if the ground conditions allowed (same with the Treasure Baron, the Deep Hunter module wacked on the depth but also had to have an off position because on really bad ground it made things worse). Dual channel discrimination controls. Eight AA batteries.

C-Scope undercut Tesoro for instance in price and had the big plus with the upper range models of being rain and dust proof. The drawback with them was always lack of coil sizes and types. Usual thing would be a stock coil (10") and perhaps a 5".

Weight would be around 1.7 kg with batteries fitted. Weight balance was never right for me and there were better similar style Tesoro's if you paid more. My old Spectrum XLT felt lighter and worked better.

Sold in the U.S. under the Newforce label. You got five years warranty we only got two but they are very good with repairs and cheap compared to other manufacturers. A drawback is that you would have to send it back to the U.K. as I don't think you can get U.S. repairs anymore. Also a British CS4ZX was not the same as a U.S. CS4ZX !

One of the don't let the truth interfer with a good lie forums proudly says all C-Scope are rubbish and Discovery is C-Scope. Neither is true. The new(ish) and very cheap CS3MX is excellent, as is the CS4PI which is one of the cheapest pulse machines on the market.

Hope that helps...how are you finding the Garrett compared to what you already have?

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Re: INFO on NEWFORCE CS 5ZX Posted by: UK Brian [Send a Message] Date: January 21, 2011 06:28AM

Registered: 13 years ago Posts: 1,116

Ignore the CS 5ZX info. Woodcheck. That was the U.S. version rather than the British CS5 that evolved into the CS 5MX, CS 5 MXP etc. All the rest apart from the first paragraph is correct.

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Re: INFO on NEWFORCE CS 5ZX Posted by: <u>JB(MS)</u> [<u>Send a</u>] Message]

Registered: 14 years ago Posts: 997

Date: January 21, 2011 10:06AM

Brian, you have several different detectors mixed up together 🙂. The Newforce models, other than the Newforce 1220 that was a C-Scope 1220XD with no changes, had a simplified, stand alone version of the Cointrax module that was built by Discovery Electronics and installed in C-Scope built detectors. Like the Millennium II Cointrax, e-Class and SST the Newforce models didn't require a baseboard like the modular Barons do.



Re: Gold chains Posted by: <u>JB(MS)</u> [<u>Send a</u>] Message 1 Date: January 14, 2009 10:21PM

Registered: 14 years ago Posts: 997

Of the too many detectors I've had the two best at detecting small gold chains are the Discovery Treasure Baron Goldtrax and a Newforce/C-Scope CS- 1220-XD. The Goldtrax is only 12.5 khz, but was designed by George Payne for nugget hunting and in all metal mode it hits even tiny chains well. It has an iron ID feature in all metal mode that lights an LED and gives a staccato audio response, and has audio variations that allow skipping a lot of low conductive trash once you use the AM mode enough to hear and understand them. Example, a pencil erasor band, except those that have been flattened, that normally falls in the foil/nickel range gives a smoother, longer response than jewelry, or coins, and small foil will give some rather strange audio responses if you swing over it three or four times. Gold jewelry normally gives a hard, fast on/fast off signal. Really small gold chains give the iron staccato audio, but it's a weaker, fluttery sound compared to the normal iron audio. Jbird calls it a flatulent sound, but whatever it's called it's a distinctive sound. I still use the Goldtrax almost exclusively for jewelry hunting.

The 1220-XD runs at 17 khz and has a mode C-Scope calls the Meter/Audio mode. The meter swings left on ferrous targets, right on nonferrous targets and the audio in that mode is pretty awesome. The tone goes from a deep, low growl on iron, and some really tiny or deep targets, up through what I can best describe as a high pitched scream on larger, high conductive or shallow targets. I found a couple of tiny chains with one that gave a flat audio response and the meter basically didn't move. The small chain in the photo was found with the 1220-XD, three inches down in sand at a school playground. It's the deepest small chain I've found, but it still has both connectors on it so that helped. The 1220 is a nonmotion detector that has two TR disc modes and a preset ground balanced all metal mode in addition to the Meter/Audio mode. It works well in mild ground, not so good in tougher ground and requires a lot of attention to keeping the coil level and the same distance from the ground.