



**HANDS ON INSTRUCTION
FROM THE PROS ...**

TDI FIELD MANUAL



⇒ **PROSPECTING**



⇒ **RELIC RECOVER**



⇒ **COIN & BEACH**



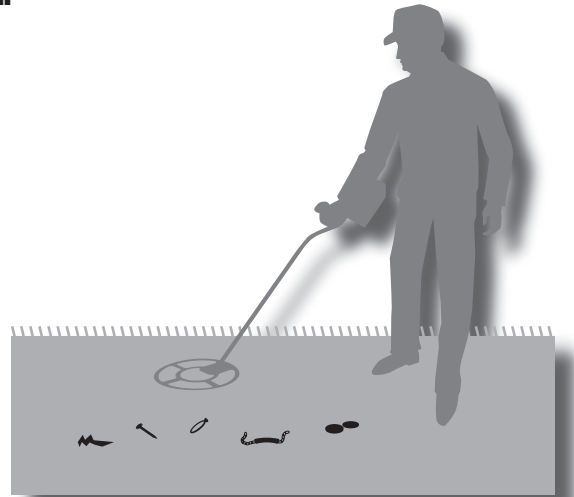
White's Electronics is proud to acknowledge the people who contributed to this Field Manual, and the development of the TDI ...

Jimmy "Sierra" Normandi -

Jimmy has spent the last 30 years distributing White's Metal Detectors. He has written about, inspired, and taught the rest of the world how to prospect for gold, and find America's and Europe's treasures.

"Digger" Bob Van Camp -

Digger Bob lives in the heart of California's Gold country, and works full time as a logistic manager, and part time as a metal detector Dealer. As a part of TDI's test team, his experience as a very successful nugget hunter is a valued contribution.



George Kinsey -

George works as the regional manager for an underground locating company, and spends his off hours hunting, and finding relics of America's east coast wars. George is very **detector savvy**, and closely watches emerging metal detecting technology. He was very instrumental in the development of TDI.

Bob Buttafuso -

Bob's life-long hobby has been hunting, finding, and preserving Civil war relics. Bob owns and manages **Centerville Electronics**, White's East Coast Service Center since 1978. He is often a technical resource for White's product development.

Keith Zorger -

Keith is a long-time treasure hunter, and White's Distributor since 1987. He's been around the world using his metal detector, and enjoying the hobby. Keith is often consulted as a member of White's Product Development team.

Greg Moscini -

Greg recently retired as a Police Officer. He has been a multi-line dealer, commentator, teacher, and writer for the metal detecting hobby for at least 30 years. Greg runs his own business, **Trans Bay Metal Detectors**, and can often be found, with a metal detector, on California's beaches.

QUICK START SETTINGS

■ **Easy Ground/No Variable Audio Desired -**

For use in ground where the threshold hum remains steady and smooth as the search coil is swept over the ground with Gnd Bal Toggle off indicating that the Pulsescan TDI can be used without Ground Balance as the pulse circuit itself can handle the ground without ground balancing. All targets will sound the same with no Variable Audio (best depth).

Gold Prospecting -

Best sensitivity to small/medium nuggets and small gold jewelry

Beach Hunting -

Best sensitivity to coins and larger gold/silver jewelry

Relic Hunting -

Best sensitivity to very large nuggets and all large metal

	Gold Prospecting	Beach Hunting	Relic Hunting
Gnd Bal toggle	OFF	OFF	OFF
Ground Balance	Ground Balance Control is not operative		
Conductivity toggle	Conductivity select is not operative		
Freq Adj (as needed)	12 NOON	12 NOON	12 NOON
Pulse Delay	10 u S	midway 17.5 u S	25 u S
Gain (adjust for stability)	6	6	6
Threshold	User adjusted to steady hum per manual		
Power Toggle	ON	ON	ON

■ **Bad Ground/Variable Audio Mandatory -**

For use in ground where Ground Balance was able to be achieved with the Gnd Bal Toggle on indicating that the Pulsescan required the use of the Ground Balance control. All targets will also respond with the Variable Audio = low/high tone.

Gold Prospecting -

Best sensitivity to small/medium nuggets and small gold jewelry

Beach Hunting -

Best sensitivity to coins and larger gold/silver jewelry

Relic Hunting -

Best sensitivity to very large nuggets and all large metal

	Gold Prospecting	Beach Hunting	Relic Hunting
Gnd Bal toggle	ON	ON	ON
Ground Balance	Setting that produces perfect ground balance		
Conductivity toggle	User adjusted per manual under Explanation of Controls		
Freq Adj (as needed)	12 NOON	12 NOON	12 NOON
Pulse Delay	10 u S	midway 17 u S	25 u S
Gain (adjust for stability)	6	6	6
Threshold	User adjusted to steady hum per manual		
Power Toggle	ON	ON	ON

Easy Ground / Variable Audio Desired -

For use in ground where the threshold hum remains steady and smooth as the search coil is swept over the ground with Gnd Bal Toggle on but no setting could be found on the Ground Balance Control indicating that the Pulsescan TDI can be used without manual balancing, but with the Ground Balance control set to the mandatory levels shown the chart below. All targets will respond with the Variable Audio = low/high tone.

Gold Prospecting -

Best sensitivity to small/medium nuggets and small gold jewelry

Beach Hunting -

Best sensitivity to coins and larger gold/silver jewelry

Relic Hunting -

Best sensitivity to very large nuggets and all large metal



	Gold Prospecting	Beach Hunting	Relic Hunting
Gnd Bal toggle	ON	ON	ON
Ground Balance	8	6	2
Conductivity toggle	User adjusted per manual under Explanation of Controls		
Freq Adj (as needed)	12 NOON	12 NOON	12 NOON
Pulse Delay	10 u S	midway 17 u S	25 u S
Gain (adjust for stability)	6	6	6
Threshold	User adjusted to steady hum per manual		
Power Toggle	ON	ON	ON

USER GUIDE TO PROSPECTING

by ...

Jimmy "Sierra" Normandi

The TDI is a complex piece of electronics.... but it is definitely not complicated to use. In fact the user instructions can be boiled down to a very few important points of information. The mastering of the real potential of this instrument will come from experimentation in the field and experience. Hopefully, enough people will ultimately contribute their particular experiences to build a comprehensive field manual.

Quick Start for Prospecting for Gold:

The following settings will handle most all ground conditions

- 1)** Set GEB Toggle to ON (Ground Balance & Variable Audio Activated)
- 2)** Set Ground Balance Knob to 8 (*this will balance most all ground*)
- 3)** Set Pulse Delay Knob to 10 (*10 uS best for low conductive gold*)
- 4)** Set Gain Knob to 6 (*may be increased as long as audio is stable*)
- 5)** Set Power Toggle to ON (*this is a locking toggle, pull & switch*)
- 6)** Set Threshold Knob (*adjust just past warble & into faint steady hum*)
- 7)** Set Target Conductivity Toggle to low (*gold makes high tone*)
- 8)** Set Frequency Knob to 12 Noon (*turn to correct any interference*)
- 9)** You can start detecting.....Sweep Slow and Low

Why do I start with the GEB Toggle ON ?

If you set the GEB toggle on, then you can detect whether or not the mineralization is severe or mild. If the mineralization is mild, then it would be mandatory to set the Ground Balance Knob at about 8 to 9 to prevent losing gold. If the mineralization is heavy, a setting of 8 to 9 will cancel most ground anywhere. This is always done with pulse delay of 10uS.

Why is the Pulse Delay set at 10 micro seconds ?

All metal targets give their best signal at 10uS. This goes for gold nuggets as well. You might ask then why can the pulse delay be adjusted up to 25 uS. As you adjust the pulse delay to a larger number, small pieces of low conductive metal like small nuggets and small pieces of iron trash will be rejected and make it easier to hear higher conductive metals like silver or large iron objects. This feature allows the PulsescanTDI to be used for relic and beach hunting. In severe black sand it can also help to raise the pulse delay a little bit to help ground balance the detector. If you do attempt to raise the pulse delay you must adjust the ground balance knob accordingly. Check the manual for the correct procedure to balance.

Is there any other advantage to setting the GEB toggle ON ?

With the GEB toggle on, not only is the ground able to be balanced more accurately if need be, but the Variable Audio feature of the PulsescanTDI is activated. This means that you will hear a different sound when passing over targets according to their conductivity. Low-conductive targets, like small to medium gold nuggets will produce a higher pitched high tone sound and high-conductive metals like silver and large iron will make a lower pitched low tone sound. Whether a target produces the high tone or the low tone can depend on their size and shape as well as their content. This is a very valuable tool in helping to decide whether or not you wish to dig a target. By digging both the high tones and low tones for a while you will get an idea what to expect. Large gold can produce a high conductive low tone, but not always. I have a 12 oz gold quartz specimen which contains 3.5 ounces of gold by specific gravity and it sings out with a high tone. Very pure gold, upwards of 90% or more produces a high-conductive low tone. Australian and Alaskan gold can fit this category. Gold bullion and US gold coins larger than \$ 2 1/2 are high conductive due to their purity.

What is the Conductivity Toggle and Why did you set it at Low ?

I set the conductivity at low so you could get started right away detecting and find the least amount of trash items. Most gold nuggets will fall into the low conductive category, and only small pieces of trash will be found. Boot tacks, birdshot, 22 caliber shell casings and small pieces of lead bullets along with small bits of iron will fit this category, and give a high tone like gold. By setting the toggle to low, the high-conductive targets will not be heard. Since most of what you are looking for falls into the low-conductivity category, you can avoid a large part of the trash. You will note that there is an All position on the conductivity toggle. If you want to test an area to see what kind of targets exist, you can set the toggle at All. You will hear both high tones and low tones. You can decide to dig or not to dig. You will learn by experience. You will never miss any gold this way, so when in doubt DIG! You should also start out at low, because when you choose either high or low rather than All, the audio will be much quieter.

Do I have to operate the TDI with Variable Audio with low tones and high tones ?

If you wish to operate without the Variable Audio feature you will hear all targets with the same audio sound. They will sound with a high tone. You will have to find some other way to decide whether to dig or not, however this not a bad way to hunt, particularly if the targets are few and far between. You wont miss anything and there is also another bonus. The Pulsescan TDI will hear targets deeper. However, there is a catch. When you turn off the GEB toggle, besides turning off the Variable Audio low and high tones, you are also turning off the GEB, which is the capability to ground balance. You then have to rely on the ability of the pulse circuit itself to handle the ground minerals. This is possible as long as you are not detecting in very bad ground. Not all ground is heavily mineralized. It is easy to find out if you can do this. Turn Off the GEB toggle and sweep the search coil over the ground. If you can do this without hearing all kinds of ground noises and false signals then you are able to hunt. You can try to reduce the Gain a bit if there is mild noise. However, if you have to lower it too much, you lose the advantage of the extra depth. If there is enough ground to balance, you must have the GEB toggle on with Variable Audio active. If there is not enough ground to balance and you want Variable Audio active, turn GEB toggle on and set the Ground Balance about 8 to 9, or turn GEB toggle OFF and hear it all.

USER GUIDE TO PROSPECTING

by ...

Digger Bob

GETTING STARTED -

The new Whites TDI has so much potential and variables, that trying to come up with a hunting technique that works the same every time is almost impossible. But having said that, here's how I get started:

GAIN - 6. Start here and increase later if you can.

PULSE - 10

GROUND BALANCE SWITCH - ON

GROUND BALANCE -

Most gold bearing ground is mineralized and I have found just about everywhere I have used this machine, the ground balances somewhere between 8 and 9, even pure serpentine. Very mild clays or slate may balance out around 3, but this is the exception. I start with the Ground Balance at 8 and pump the loop up and down to make sure. Then I can make a small adjustment to get it exact; no change between the air and ground.

THRESHOLD -

Usually about straight up. Set to your comfort level with headphones, low and steady sound.

FREQUENCY -

Straight up, 12:00. I've not had a situation yet where I had to change it.

CONDUCTIVITY -

Low. More on that later...

The detector is now set for most conditions you will encounter.

Lower the loop to the ground and start swinging, low and slow. Make note of any targets and the steadiness of the threshold. Before you dig anything, try to increase the gain to Max. In the Low or High conductivity setting the threshold should remain fairly steady even at Max gain. It will wobble a little, but one can still hunt. Beginners should probably stick with the gain at 6 until they get used to the variable sounds. Hunting in the All position will be more erratic and make it harder to concentrate on the different sounds.

Starting off in the Low setting, all you will hear is high tone sounds on targets. This does not necessarily mean they are all gold nuggets! Most targets you are going to hear at these settings are lead bullets and brass casings from .22 caliber shells, small flat pieces of iron, and some nails. There are other things out there, but these are the most common. Larger iron, aluminum, lead, brass, and yes, very large gold nuggets you won't hear at these settings. In the High setting, you will hear those big nuggets as a low tone, along with all the big iron and other things. For what it's worth, larger nuggets tend to be deeper so the sound will be softer, more mellow, than the loud screaming signal from near surface iron. Again, gold doesn't follow the rules!

There are a couple of things you can do to test a target before you dig it. About the only thing you can do is analyze signals from nails. Nails are long and will give a sound or no sound depending on what direction the loop passes

over them. In the Low setting, a long nail will give a good sound from one direction and no sound, or a choppy sound, from a 90 degree angle. So, pass over all targets from different directions and see if the sound changes. Small nails, partial nails, or nails that are straight down in the ground will give a good sound no matter what you do.

But there is one more test you can try before digging or walking on. Increase the Pulse Delay up to 17.5 and pass over the target. A lot of small iron targets will go away at this setting. You may hear a choppy or broken sound but a nugget will sound clean. The response will be softer and weaker on gold because you have increased the Pulse hence decreasing the sensitivity to low-conductive targets. This is most effective on shallow targets as most iron is near the surface. Deeper nuggets may also disappear so I would dig any target that give me a soft mellow signal.

As with any metal detector, there are no foolproof methods of discrimination. Those of us who have coin hunted have learned the difficulty of trying to determine a gold ring from a pull tab. The same rules apply here, *when in doubt, dig*. If you want to find everything, dig everything.

Nugget hunting is the most challenging pursuits one can undertake with a metal detector. There are so many wierd signals that come from unknown sources and the combination of minerals, salts, and man-made metal in all its forms is staggering in the types of signals they can generate. More tips will be coming as more people get their feet wet in the field with this detector.

Digger Bob

USER GUIDE TO RELIC HUNTING

by...

Keith Zorger
George Kinsey
Bob Buttafuso

Relic hunting with the Pulsescan TDI is easily accomplished. With manual ground balance, two tone target ID, three position conductivity switch, and Revolutionary Dual Field Coil, hunted out sites will come alive again. In areas of extreme mineralization, relics will be easily found, not only by the seasoned Professional, but by serious Hobbyists alike.

Let's take a moment to look at the controls. Understanding the controls of the Pulsescan is critical to your success.

Easy Start Up For Relic Hunting:

- 1)** Set the GEB switch to ON
- 2)** Set the Conductivity switch to "ALL".
- 3)** Tune the Threshold to a nice smooth hummmmmmmmm!
- 4)** Set the Pulse Delay to 10uS (You won't miss the small desirable relics at a delay of 10-12uS.
- 5)** Set the Gain at 6 (12:00 o'clock).
- 6)** Ground balance the detector. (Normal ground balance at 10 uS should be 8-9, but these results may vary by location) Ground Balance settings are not dependent on which coil is used.
- 7)** Adjust the Frequency control if there is audio interference (warble) i.e. from power lines or another detector. Otherwise leave it at 12:00 o'clock.
- 8)** Off you go.

At These Settings -

- *Most buttons and small caliber bullets will respond with a high tone.
- *Belt buckles, breast plates, and most of the larger bullets will respond with a low tone.
- *Keep the conductivity switch set to **ALL** because of the many shapes and sizes of relics.
- *If you happen to dig some small iron try bumping the pulse delay up a bit.
- *In bad ground the signal from small iron will normally be ground balanced out.

The Tones You Might Hear -

Big High Tones = deep ration cans, flat iron, etc. High tones mean low conductivity.

Short high tones = buttons, deep smaller bullets, camp brass

Longer and smoother low tones = belt plates, etc.

Short Low Tones = Larger shallow bullets, medium sized iron.

More On Tones -

It seems we will be able to get more information from the TDI responses if we listen to not only the tones produced, but also the way the actual signal starts and stops.

Iron signals tend to 'draw out' more than non-ferrous responses. In other words, the less iron a target has in it, the sharper the response will be. Nails and other long iron objects often give a double low "blip" in one sweep direction and a single, much weaker single high tone in the other direction.

For non-ferrous targets we are looking for a "CRISP" edge to the signal as the coil approaches and leaves the target.

Pulse Delay Facts -

Be sure to set your Pulse Delay prior to Ground Balancing.

Lower delay settings are more sensitive on small targets. Set delay as low as possible. For relic hunting this control should not be set over 17.5 uS. If a balance can't be achieved, say at 10uS, then increase the delay slightly until it can be achieved.

Keep in mind that adjusting the delay will have a direct effect on how the GEB control operates. In general, when the Pulse Delay is advanced, the GEB control will have to be reduced. Example: A nail may be ignored at 5 with the delay at minimum, but may be ignored at 3 or less with the pulse delay advanced to 17.5 uS.

Expected Pulse Delay/Ground Balance Relationships -

Pulse Delay = 10 uS	Ground Balance = 8-9
Pulse Delay = 17.5 uS	Ground Balance = 6
Pulse Delay = 25 uS	Ground Balance = 3

NOTE: Depth will be lost at the low 1.5 GB setting, but it has the advantage of rejecting nearly all iron junk.

Ground Balance Procedure -

When finding the ground balance point the TDI will always signal a high tone when the ground balance setting is insufficient.

This high tone will gradually reduce in strength as the GB control is rotated clockwise, until a point is reached where there is little or no change in audio. As the GB control is further rotated, the signal will emerge again, but with a low tone, which indicates that now too much GB has been applied.

At this point turn the GB control back into the Null zone.

Always bob the coil when adjusting the ground balance, otherwise the SAT auto-tune will cancel the signal and result in a false setting.

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Threshold Facts -

Setting the Threshold either above or below the 'chatter' is beneficial.

When setting above so you hear a constant hummmmm, be sure not to advance the control further than that setting or smaller targets may be camouflaged by the noise.

When setting the Threshold just below the **chatter** be sure to keep it barely quiet. When operating with this method, slower sweep speeds will still pick out deeper relics.

NOTE: If operating quietly, be sure to Ground Balance the PulsescanTDI prior to reducing your threshold.

Advanced User Technique -

After you do your initial ground balance and set up try this –

Set the Conductivity switch to **LOW**. Then turn the Ground Balance Control to the (2-4) range. Depth on low conductivity targets increases dramatically.

Now, set the Conductivity switch to **HIGH**. Then turn the Ground Balance control to 9 or 10. Depth on high conductive targets increases.

Finally, set the Conductivity switch to **ALL**. Then turn the Ground Balance control to 6 (dead center on the dial). Depth on both high and low conductors is improved.

Targets -

HINT – When the PulsescanTDI gives a LOW tone, placing the coil on the ground beside the target and then SLOWLY moving over the target will often cause the WOOWOO of deep big iron items to become more evident.

HINT – Once a target is located, turning down the gain until it almost disappears will give a great indication of probable depth. The lower you can turn the gain, the more shallow the target. This should greatly reduce target recovery time and hole size.

HINT – Like VLF detectors, shallower targets will give a stronger signal than a deeper target which produces a weaker response.

Gain Control -

Extensive testing with the PulsescanTDI has not indicated a positive effect when advancing the Gain control past 7-8.

■ **USER GUIDE TO BEACH HUNTING**

by...

Greg Moscini

Beach Hunting Settings -

- Ground Balance ON
- Conductivity Toggle set to ALL
- Frequency Adjust set to 12 O'clock Noon
- Set the Gain initially at minimum
- Set the Threshold to a Steady Smooth Tone (like a mosquito buzzing in your ear)
- Set the Pulse Delay at 10 uS (Best Sensitivity to All Metals)
- Set the Ground Balance Control 6 or High Noon
- Now, raise the Gain up as high as possible as long as TDI operates stable. Reset the Frequency Adjust as needed or reduce the gain. It should be noted that even with the Gain down all the way, you'll still hear very deep coin targets, but their response would be attenuated due to the lower gain. The benefit of lower gain is increased smoothness, stability and in some cases with coin size or increased smoothness, stability and in some cases with coin size or larger targets, one can better estimate the depth of the target.

Comment:

After hunting a number of salt-water beaches I ran into the following target scenarios.

HIGH Conductive Coins (Quarter, Dime, Penny) -

Initial Target Response: Low Audio Tone.... cross sweep the target looking for a coin-size and shape response.

If your hearing more than a single continuous response over the target, lift the loop up a couple of inches and repeat the process or with your free hand, reach over and turn the large Ground Balance control CCW (to the left) and re-scan the target. Coins should STILL respond with a LOW Tone. If the Audio Response turns to a HIGH Tone, the target is most likely contains Ferrous (Iron) content.

LOW Conductive Coins, Rings, (Nickels, White or Yellow Gold Rings) -

Initial Target Response: HIGH Audio Tone... Cross Sweep the Target looking for a COIN-SIZE & SHAPE Response.

If your hearing more than a single continuous response over the target, lift the loop up for a couple of inches and repeat the process OR with your free hand, reach over and the large Ground Balance control CW (to the right) and re-scan the target. Coins and Rings should STILL respond with a HIGH Tone. IF the Audio Response turns to a LOW Tone, the target most likely contains Ferrous (Iron) content.

POWER TIP -

In either of the techniques regarding HIGH or LOW Conductive Targets, note how the amplitude (strength) of the signal diminishes... this could also indicate a particular type of target. This is particularly true with a Quarter versus a Zinc Penny. The Quarter exhibits a stronger signal than the Zinc Penny. The Nickel or Ring remains stronger than a small shard of aluminum.

POWER TIP -

Very Strong Targets can sound off with strong COMBINATIONS of LOW and HIGH Tones and should be investigated..... you'll find Keys, Fishing Lures, Lead Sinkers and unique shaped metal targets like a vintage WW1 Hand Size Lead Toy Soldier.

USER GUIDE TO COIN HUNTING

by...

Greg Moscini

Yes, the Pulse Scan TDI makes a wonderful Turf Detector: The aforementioned beach tips like wise apply when running the TDI at 10uS on the pulse delay. Unfortunately, the parks have a high concentration of trash items, particularly shards of aluminum and foil that sound off strong at 10uS, even with the TDI's Gain set low.

- Ground Balance at 2 to 3 (8 to 9 O'Clock)
- Pulse Delay at 25 uS
- Gain low from Minimum to 12 O'Clock High

POWER TIP -

At 25uS pulse rate, and a lowered Gain at minimum or slightly elevated, the Pulse Scan TDI will ignore most small low-conductive foils and aluminum shards that would normally give a stronger high tone response at 10uS. This is not to say that you couldn't run the TDI at 17.5 uS. Nickels and gold rings will still be detected deeply. The ability to ignore most of the common trash that will be a nuisance to a VLF Detector which has to rely more on Tone ID and Visual ID which becomes less accurate beyond 4", gives the TDI a big advantage over standard metal detectors.

POWER TIP -

- Pulse Rate at 10 uS
- Ground Balance at 2 to 3 (8 to 9 O'Clock)
- Gain set as high as possible for maximum Signal Response
- Conductive Switch to High Conductors Only.

Comment:

Using this tip, the Pulse Scan TDI will ignore all the nuisance low-conductive target such as foils, aluminum tabs, steel bottle caps and because of the Pulse Rate and Ground Balance position, the normally high-conductive rusty nails turn and become low conductors like aluminum and foil and are subsequently ignored. The TDI will hear those deep Silver Coins, Quarters etc without having to listen to 90% of the other responses which are usually low conductive.



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