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Vince Miglore is a researcher and technical writer with a keen interest in metal detecting. He's written for numerous magazines, including W&E treasures, and is former editor of a hobbyist newsletter.

"I bought a detector back in 1982, and in the first 5 minutes I found an Indian Head penny dated 1881 -right in my own front yard! Since then I've been hooked."

You'll be hooked too, when you see how great this sport is for your physical fitness, your appreciation of natural science, and most of all for the wealth of treasures you can find.

Vince is the author of *Metal Detecting for the Beginner* 2nd Edition, 2010 which can be found at Amazon.com

Introduction to Metal Detector Discrimination
Vince Migliore, April, 2010

The following are typical examples of detectors and how they use discrimination. These units were chosen for illustration purposes only.

1. Tesoro Silver Umax

The Tesoro Silver Umax is an excellent machine with good discrimination capabilities, and its light weight makes it a breeze to use for long periods. This detector uses sounds to indicate the type of target you have detected. The control box is shown below. Notice that there is a speaker but no LCD display or meter. The audio tone is broken and clipped when you scan junk, but produces a solid, repeatable signal for coins and jewelry.

There are just 3 controls. At the bottom left is the mode switch. For coin hunting, you would set the toggle switch to the center position, into Discrimination mode. This activates the dial above it, the Discrimination control. It may be a little hard to see in the photo, but if you set the Discrimination dial to the 12 O'clock position (5-cents), you will be able to detect nickels and everything above that setting, including pull-tabs (1 O'clock position), dimes and quarters, but the foil (10 O'clock) and iron (9 O'clock) will be "discriminated out" and not produce a signal. This setting of the discrimination dial, and what it means is the only real learning curve for this machine, but once you master the sounds and get to know the meaning of discrimination, you will have excellent detecting results. There are ways to fine tune this setting to effectively notch out the junk pull-tab signals. For example, with the Discrimination set to 5-cents you get a somewhat broken signal. Then you move it to the Tab position and you still get the same broken signal. That's most likely a pull-tab. Next you get a signal at the 5-cents position, but it goes away when you move the Discrimination dial up to the Tab position. This usually means you have a nickel. The experienced user will also be able to make out differences in the smoothness and amplitude of the sound that helps you distinguish a nickel from a pull tab even without touching the discrimination setting.

Control plate for the Tesoro Silver Umax

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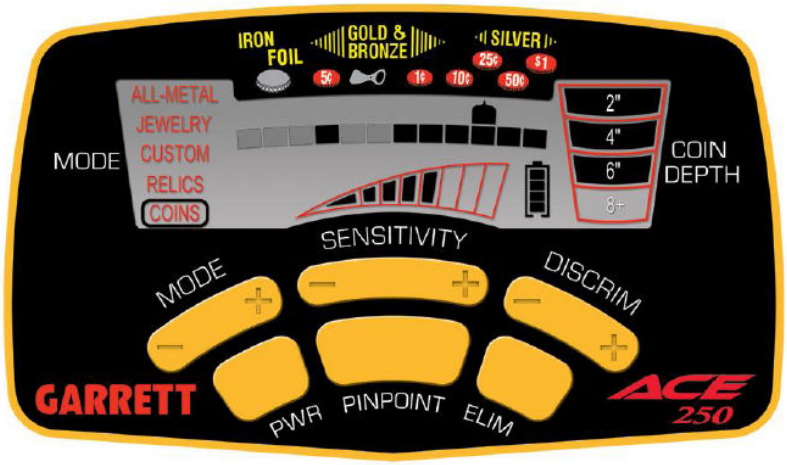
The Sensitivity dial is usually set when you first start detecting, and it's positioned so you get the loudest possible signal without chatter or static. This is usually around the 7 or 8 on the dial, and it will generally work well unless your ground conditions change. Most detectorists will use a set of head-phones while detecting. This is both a courtesy to other people and saves on battery power.

2. Garrett Ace 250

The Garrett Ace 250 adds a display to the discrimination function, as well as the ability to "notch out" undesirable portions of the dial. As you can see in the illustration below, there are 12 discrimination "segments" in the upper middle portion of the display. The instrument is set to the Coins mode, so some of the segments are blocked out. These are the lower ranges of the discrimination spectrum; iron, foil and bottle caps. The grayed-out blocks mean that you won't hear a signal if you are just scanning low quality metal.

Notice too that the area of the spectrum above nickels but lower than pennies is also grayed out. This means you will not be bothered by all those beeps from pull-tabs. You can imagine that such a setting is pretty handy for finding coins. The only drawback is that some jewelry and gold rings fall into the same slots as the pull-tabs, so by notching out those segments you may be missing valuable finds. These selectable segments are relatively broad, so by deleting any one of them you can lose valuable finds. You can see the words "Gold & Bronze" in the same area as the pull-tab icon on the upper part of the display. When you set the mode to Jewelry, these segments become active once again, and you will hear a beep for both gold rings and pull-tabs. In the All- Metal mode, all the segments are lit up and active. In Custom mode you can pick which segments to activate. This ability to pick and choose which segments of the discrimination spectrum you want to hunt in adds a tremendous amount of flexibility and customizability to your metal detecting.



Garrett Ace 250 display.

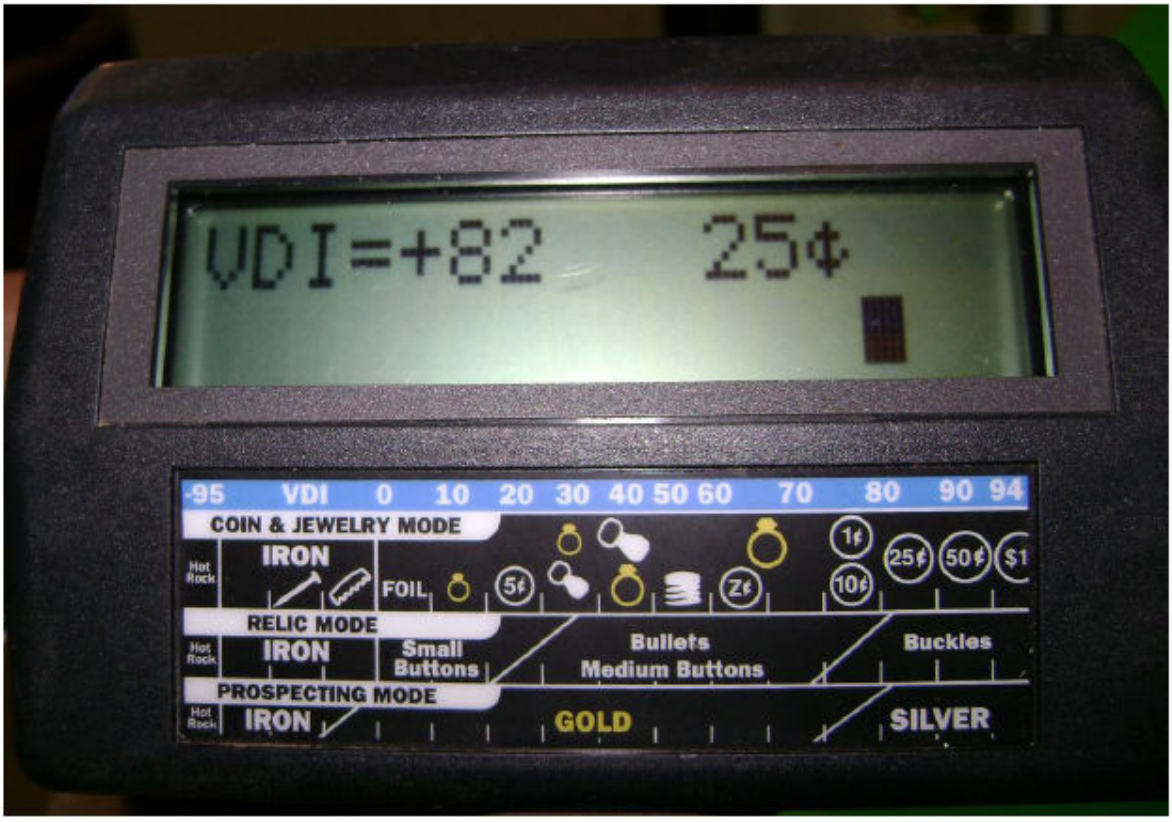
In the photograph of the Ace 250 display you can see a chevron type pointer above the segment for a 25-cent coin. This pointer changes position based on the type of object found by the coil. Many Ace 250 owners prefer to work in All-Metal mode, then use both the chevron indicator and the quality of the sound in the headphones to determine whether or not they will dig the target. For example, the user might get a signal for segment 6, the portion for a pull-tab just below the penny zone. From experience you learn that pull-tabs often create a short, clipped, chirping sound and they may sound different when scanned in the East-West direction versus the North-South direction (because they are not symmetrical) whereas a ring has more a steady, solid, repeatable sound, and it produces the same response no matter which direction you scan it from. Such a signal is a good prospect to dig.

3. White's MXT detector

The White's MXT takes the discrimination function to an even higher level of resolution. Instead of just 12 zones or segments as found in the Ace 250, the MXT, like many advanced detectors, uses Visual Display Indication (VDI) numbers that range from -90 to +90. This enables a much more acute discrimination between junk and valuable objects. After a while, the user begins to memorize different numbers and what type of target is associated with each. A nickel for example might register as a VDI value of 18 on the display, while a pull-tab will register as a 23. You would dig a target at 18, but not at 23. Likewise, a 79 or 80 is usually a dime, and an 81 is a silver dime. That level of resolution, the ability to discriminate between similar objects, makes the VDI type of detector the gold standard among detectorists.

The White's MXT display is shown below. The blue strip shows the VDI number scale, with icons just below it for various coins and pull-tabs. The specific VDI numbers, though, provide much more detail and resolution than you can get with the 12 segments in the Garrett Ace 250.

With the VDI type of detector, you learn very quickly what values represent which coins, and whether they are clad or silver coins too. You also learn common VDI numbers for pull-tabs, and this saves you a lot of digging time. Some industrious and friendly hobbyists will sometimes record and chart every object they find with their corresponding VDI numbers and will post their charts on some of the Internet forums for others with the same machine to compare notes. VDI numbers for rings and jewelry often range all across the spectrum, due to differences in their shape, gold content, and weight.



4. A Tool is Just a Tool

Remember, the discrimination function is just a tool. A curious thing happens once you become experienced in using such technology. As hinted at above, after a while you begin to learn to identify targets from sound alone. You can focus in on the quality of the sound (clipped, broken, symmetrical increase and decrease, amplitude, etc.), its repeatability when scanned from different directions, and its properties when you switch to pin-pointer mode. Once you've learned the sounds, you don't have to rely on the discrimination display as much as you did when first starting out. After listening to thousands of signals, you can pretty much guess, with good accuracy, the only decision that's important: whether to dig the signal or not. People who have achieved that level of expertise will sometimes then choose to go back to a lighter, simpler detector, such as one with no display.

The instruments described above were chosen as an introduction to discrimination. Many modern detectors have discrimination capabilities that extend far beyond the function of those shown here.