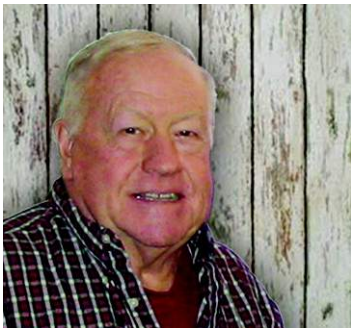
Spectra VX³

Owner's Manual

White's Electronics, Inc.
Sweet Home, Oregon USA
Building the World's Finest
metal detectors for over 60 years.



Congratulations! You have purchased a quality instrument that was designed and manufactured in the USA.

The Spectra series is the result of years of research and development, time-proven manufacturing and testing techniques, and, most of all... listening to our customers.

The *Spectra VX³* represents the state-of-the-art in metal detecting technology. Three frequencies, color display, advanced features, and the ability to use wireless headphones produce a powerful and capable detector. *VX³* has preset programs developed and refined by experts, leaving you ready to find what others have left behind.

This instruction manual covers the features of *VX³* and introduces the detecting basics you need to get started. There are no substitutes for field experience; study this manual, and practice using your *Spectra VX³*. Before long, you may well be teaching the experts a thing or two.

I am proud of the *Spectra VX³*, and the people here at White's who designed and built it for you. We've been designing, building, and distributing world-wide for over 60 years from our factory in Sweet Home, Oregon, USA. We put our "Made in America" label on every metal detector we build!

Happy Hunting!

Kenneth Whitt

President
White's Electronics, Inc.

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CHAPTER 1 Introduction

White's *VX³* represents the latest technology in metal detecting. The heart of *VX³* is a high-performance ARM-9 RISC microprocessor which simultaneously analyzes signals from 3 transmitted frequencies. Those frequencies — 2.5kHz, 7.5kHz, and 22.5kHz — were chosen for their diverse responses to a variety of metal targets, resulting in a superior system of target analysis and identification.

The face of *VX³* is a stunning 320x240 color display with an easy-to-use menu-driven interface. Along with three frequencies, there are three search modes and a three-level Spectra-Graph® display which provides detailed target information for each frequency. With a level of simplicity for the novice user and advanced features to satisfy the experienced user, *VX³* is a metal detector for everyone.

This manual is organized to provide progressive information, a format that attempts to minimize information overload. If you are a new detectorist, the *QuickStart* chapter will allow you to get a quick jump on using *VX³*. Then, as you run across new features and want to find out more, continue reading the manual to get progressively detailed information.

If you are already familiar with high-end detectors (especially those with a menu interface), you might want to read over the *QuickStart* chapter to get a feel for *VX³*'s features. *VX³*'s graphical interface makes the rest easy.

While *VX³* is easy to use, it does have more features than many other detectors, and can appear overwhelming. Don't be intimidated! Start with the preset programs and go at your own

pace. There is no need to master all the features to get excellent performance.

If you need help, White's Electronics is a phone call or mouse click away. Your dealer is an excellent resource, and the White's web site has a *VX³* help forum for questions & answers, tips, and sharing programs. Go to *www.whiteselectronics.com* and click on the Forum link. There are also many other on-line forums for metal detecting where you can chat with other White's users and ask questions. Finally, look for a detecting club in your area. Members are often eager to help people get started, and there is nothing like having that help close by in the field.

Conventions

In discussing the features of *VX³*, we will use **Arial-Bold-Caps** to distinguish keypad buttons and menu selections. For example, "press **ENTER**" means to press the "Enter" key on the keypad, and "select **Enable**" might mean to select the "Enable" menu option, probably by using the arrow keys to highlight it and then pressing **ENTER**. *VX³* keys and menus work just like a modern computer graphical interface, so things are fairly intuitive.

In some cases, you need to use multiple key combinations, or combinations with the trigger switch. "Press **MENU, ENTER**" means to press and release the **MENU** button, then press and release the **ENTER** button. But "press **MENU+ENTER**" means to press and hold the **MENU** button, and while holding it down press the **ENTER** button. Order often matters, so **MENU+ENTER** is not the same as **ENTER+MENU.** If you find that you have accidentally pressed the wrong key or key combo, pulling the trigger switch will usually back you out.

Tip: Keypad buttons usually take you into menus, trigger gets you out.

Two keypad buttons have dual names. **MENU/TAB** is used both as an entry button into the menu system, and to "tab" from one screen area to the next. This tab method is identical to how a PC interface uses it. So in some cases we will tell you to press **MENU**, in other cases press **TAB**. It's the same button. **ZOOM/VIEW** works the same way. *VX³* also has four arrow keys, and these may be either called **UP DOWN LEFT RIGHT** (or **UP DN LT RT**) or represented with the symbols ▲▼◀ ▶. Any of these representations might be used.

Most menus are nested, so instead of telling you to press **MENU**, then select the **Audio** menu, then select **Search Audio**, then select **Discrimination**, then select **Modulation**, we may instead say, select **MENU→Audio→Search Audio→Discrimination→Modulation**. This means to drill down through the stated menu path.

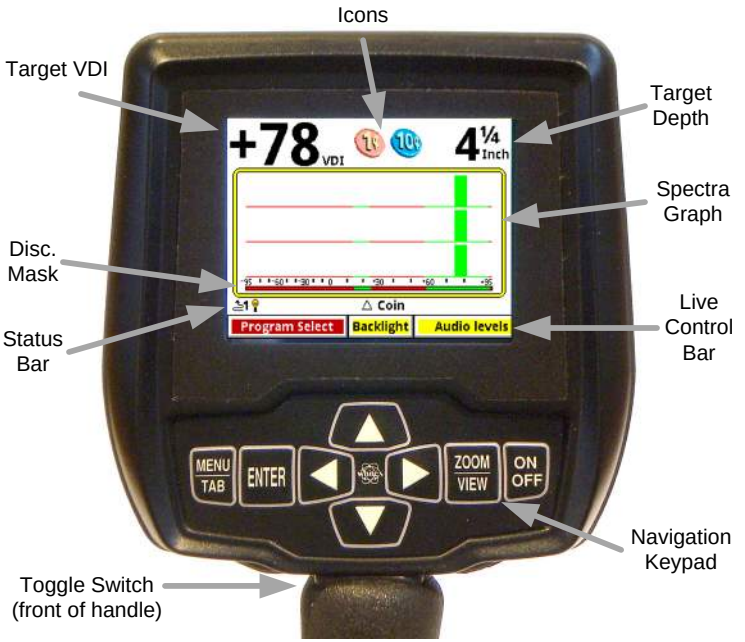
Finally, there is a trigger switch under the pod. It has a normal (center) position, a forward position, and a momentary pulled position. When we say "pull the trigger," we mean to pull it to the momentary position and release it. If we say "Pull/hold the trigger," then pull it back and hold it there. This might be in conjunction with a key press, such as, "Pull/hold the trigger and press **ENTER**," which is the same as "Trigger+**ENTER**."

Layout

The *VX³* interface consists of a keypad and a color screen. The next page has a picture of the pod face with the default layout for the search screen. The search screen has four major regions:

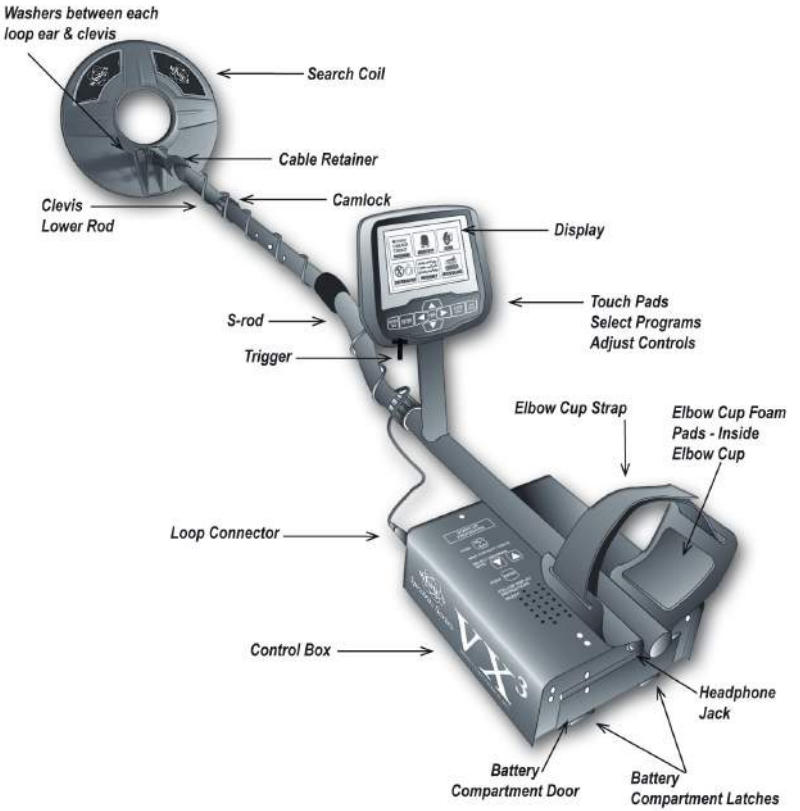
1. Target information
2. SpectraGraph
3. Status Bar
4. Live Control Bar

The target information includes the "VDI" number, the depth, and icons representing the likely target. SpectraGraph displays



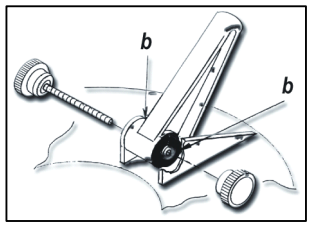
signal strength versus VDI and gives a detailed look at the VDI response. The status bar shows a few operational pieces of information, and the Live Control Bar provides quick on-the-fly access to operating modes and adjustment parameters. All of these will be covered in detail in subsequent chapters.

Assembly



1. Remove all parts from the shipping carton. Check the assembly page to ensure all parts are present.

2. Insert the 2 rubber washers (b) into the recesses of the lower rod clevis and use the fiber bolt and thumb nut to secure the search loop to the lower rod.



3. Insert the lower rod into the "S" rod (unlock the cam lock if necessary); the spring clip buttons will click into the adjustment holes. Turn the cam lock

to secure. The second or third adjustment holes are suitable for average height adults. Exceptionally tall users may wish to consider purchase of the "tall-man" lower rod (500-0242-3) and/or the "tall-man" S-rod (500-0240-1).

4. Wind the search loop cable around the rod assembly, first revolution starting over the top of the rod. Work your way to the top of the S-rod. Use the Velcro retainers, one near the loop and one near the top, to hold the cable in place.
5. Insert the rod/loop assembly into the control box rod (unlock the cam lock if necessary); the spring clip buttons will click into the holes. Turn the cam lock to secure. Normally, the S-rod should curve upward.
6. Two adhesive black foam pads are included; they can be placed on the insides of the arm cup.
7. Adjust the Velcro arm strap so that you can easily slip your arm in and out. The strap provides extra leverage and control, though some prefer not to use it.
8. Install the battery pack (see next section for details).
9. Hold the detector normally and check for comfortable angle and balance. Adjust the lower rod extension and/or the arm cup position if necessary.

Batteries

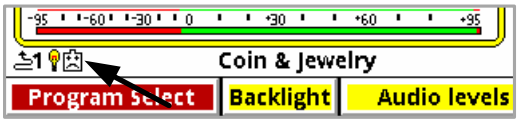
VX³ is provided with an 8-cell AA battery pack. For best results, use either alkaline batteries or high-capacity rechargeable (such as NiMH) batteries. Also available from White's is a NiMH rechargeable pack plus recharging station; contact your dealer or White's directly for details.

To install the batteries:

- Release the battery door latches on *VX³* to open the battery door.
- Slide the battery pack in, with the metal contact plates facing forward.

To replace the batteries, slide open the battery holder lid by gently lifting the tab.

A fresh set of alkalines will operate *VX³* for about 7-8 hours with no backlight. Use of the backlight will reduce battery life. When you first power-up *VX³* a start-up screen will display briefly with the battery voltage at the bottom. During operation, if the battery voltage drops below 8 volts a low-battery icon will display in the status bar:



You can also check the voltage at any time by selecting **Backlight,VIEW** from the Live Control Bar, or pressing **MENU+ENTER** to bring up the Info screen.

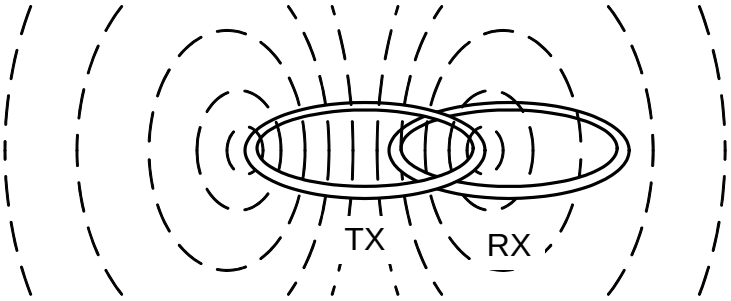
VX³ automatically powers off if no activity occurs in a 20 minute time span. Activity is defined as the use of the keypad or the trigger switch.

The Basics of VLF Operation

VX³ is a multi-frequency (MF) induction-balance (IB) very low frequency (VLF) transmit-receive (TR) metal detector. In order to understand what all the user adjustments do, it is important to have at least a rudimentary understanding of how a modern metal detector works.

Metal detectors work on the principle of induction, discovered by Michael Faraday in 1831. The typical induction-balance metal detector[1] uses a transmit coil to produce a magnetic field, and this magnetic field in turn produces a small reaction in nearby metal targets. A receive coil is used to detect this small

1. The first practical metal detector was an induction-balance design, built by Alexander Graham Bell in an effort to locate an assassin's bullet lodged in US President James Garfield. He failed — not enough sensitivity. Ever since then, "more sensitivity" has been the goal of every detector.



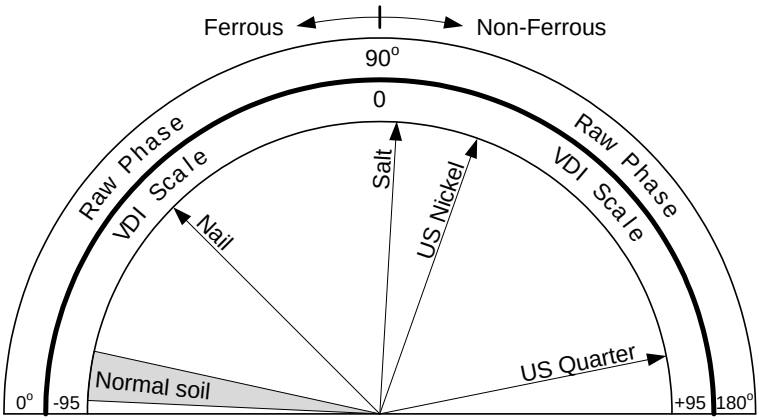
reaction. A so-called "induction-balanced" coil arrangement prevents the receive coil from being overwhelmed by the transmit signal, allowing it to see very small target signals.

Phase & VDI

Practically all VLF-IB detectors operate as phase discriminators. The received signal is converted to phase, and the phase is a strong indication of what the target might be. The particular phase of a target can vary with the frequency of the transmitted signal, so different detectors designed to use different frequencies can report completely different phase results.

To keep users from having to learn all these different phase response scales, White's has chosen to normalize them all to a standard "VDI" scale. VDI stands for *Visual Discrimination Indicator* and is simply a consistent numerical value assigned to targets regardless of the frequency being used. Therefore, a US nickel detected with a 6kHz detector will have the same VDI as with a 15kHz detector. For historical reasons, the standard VDI scale is based on a 6.592kHz detector and is shown below.

The ability to separate targets by VDI is what allows a detector to discriminate. Targets with a negative VDI are usually ferrous (iron), and targets with a positive VDI are usually non-ferrous. Small gold tends to have low VDI's while thick silver coins have high VDI's. Other targets like cupro-nickel coins, brass and bronze relics, and aluminum trash can have wildly varying VDI's depending on their alloy, size, and thick-



ness. This means you need to apply your own discriminator — your brain — in deciding what the VDI responses are telling you.

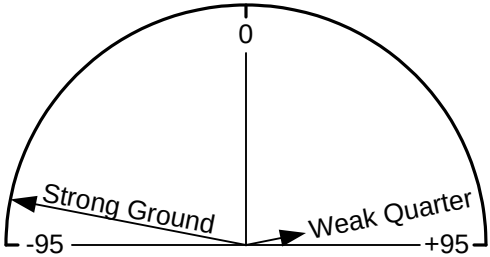
Ground Response

Unfortunately, buried metal is not the only thing the detector sees. Most soil contains ferric oxide minerals, and this mineralization looks like a target[2]. In terms of VDI, practically all ground mineralization falls in the extreme negative range of the scale, even beyond most iron targets. But it can vary somewhat as shown by the gray range in the prior diagram. At most locations the variation is small, so you can ground balance at a particular spot and be very close for the entire area. Some locations have significant variations and you should occasionally re-ground balance as you hunt, or use automatic ground tracking.

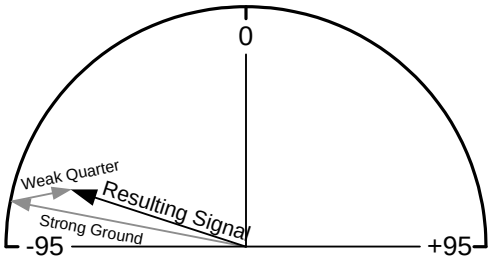
Many locations have enough mineralization to create quite a strong ground signal, often much stronger than that of a moderately deep target. The VDI diagram on the preceding page uses vectors to represent specific target responses, with the angle of the vector representing the VDI value. We can also use the length of the vector to represent the strength of the target

2. In this manual, we'll refer to the signal resulting from ground mineralization (including salts) as the "ground signal" or the "ground response."

response, so that a strong ground and weak quarter response would look like:



The detector will see both signals at the same time, and the combination of the two can be represented with a third vector as follows:



The resulting signal appears to be a fairly strong ferrous target instead of a quarter. This is the downfall of the old TR-discriminator designs. Fortunately, since the VDI response for ground is usually far away from the response of desirable targets, there are ways to deal with it. In a modern VLF motion discriminator, the receiver determines what part of the signal is the ground response and, using special filter techniques, normalizes the whole VDI scale to the current ground signal, resulting in the ground signal being ignored. Graphically, this looks like: