Detector
Field Test

Minelab Explorer XS - Part 2

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The first part of this field test (September 2000) mainly covered how the Explorer XS performs on the beach. In this article I will be looking at how the detector performs on inland sites, as well as giving more details on its set up and use.

The time I spent using the Explorer on the beach gave me a good indication of what to expect from this high tech detector on inland sites. Owing to the aforementioned my main objective here is to explain some of the multitude of discrimination options available with this machine.

As explained in part one, the Explorer has the facility to save up to six custom programs plus whatever settings are used at the time of switching off the machine. Unfortunately, it is necessary to go over some points covered in part one so that any readers who missed that copy can still "follow the plot" in a manner of speaking.

The save program at switch off works as follows. Whatever adjustments are used at the time of switching the machine off, remain in memory for when it is next switched on. If you want to revert back to the factory pre-set levels when switching on, just keep pressing the power on push pad for about 30 seconds or until a multi-tone sound is emitted.

One simple point that should not be overlooked is the full screen option of the LCD display, which is similar in principle to that used with many computer graphics applications. Owing to the already large display, when the full screen mode is used it makes working rapidly just that bit easier. I found the large ID numbers and target icons a boon when working junky sites.

Where to start explaining the different modes of operation available with this detector takes a little thinking about. It has most, if not all, of the features to be found on other computerised detectors and also some unique facilities of its own.

Audio Gain

I will start with something as simple as audio gain. Audio gain for those readers not familiar with technical terms is the specific characteristics of any given audio frequency amplifier. An amplifier is an amplifier, may be the thoughts of many readers, and all that matters is whether it is loud enough to do the job or not. Well, just bear with me for a few minutes and I will try to explain how different amplifier characteristics can enhance detector performance.

A standard audio amp as used, for example, in a hi-fi system gives a varying output depending on the amplitude of the signal applied to the input (see Fig.1.). This universal type of output amp is used in a great many detectors quite satisfactorily. However, a simple modification to this type of design can have a very real advantage when used in metal detecting circuits. If the standard amp has been used in a detector's circuitry, deeper or smaller targets will give a lower volume audio response when detected. The pluses of this type of amp are that you can get an idea of target size or depth. The negative side is that small and deep targets may be missed if you just raise the search head an inch or so up from the ground. The Explorer XS gives you the option of turning up the gain to such a degree that all detected targets give the same audio output. This means that you can work very fast while missing very few targets (see Fig.2.). Alternately, with this feature running you can work slowly to ensure that nothing has been missed on formerly productive but now "worked out" sites.

This facility is also useful for those with impaired hearing, for it enables normally faint signals to be heard loudly and clearly.

There is, in fact, at least one detector manufacturer who runs the gain at maximum all of the time, resulting in no soft signals. The Explorer, with its adjustable gain, provides much greater flexibility. There is a down side to using maximum gain at all times, and this is that you lose information regarding target size and signal strength. However, the Explorer still retains audio (tone variations) discrimination, even when the gain is set at maximum. This is because phase change is used for discrimination, whereas signal strength is used to drive the audio output.

Fig.1. Volume gain preset

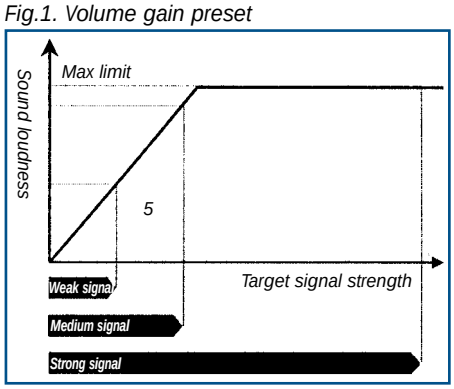
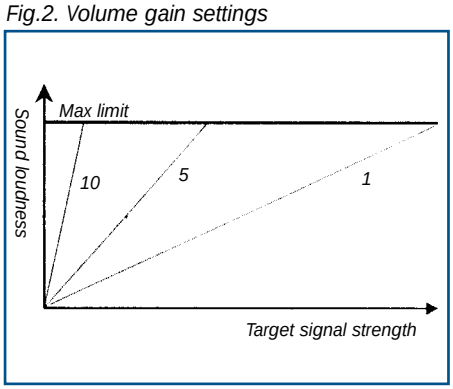
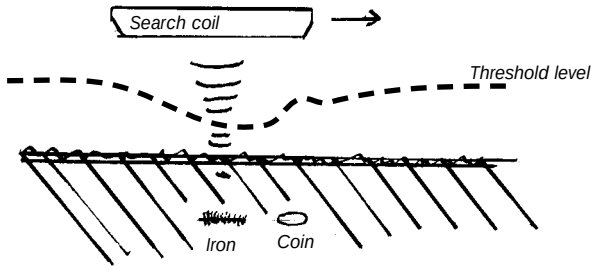


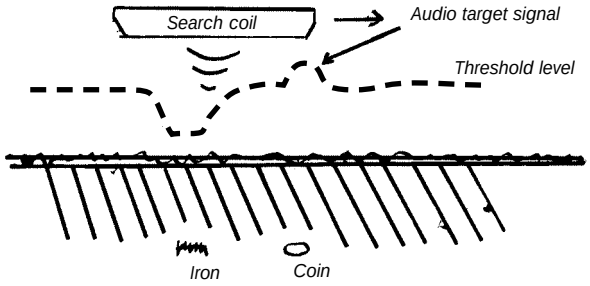
Fig.2. Volume gain settings





Slow attack slow recovery
Maximum depth poor discrimination

Fig.3.



Fast attack fast recovery
Less depth better discrimination

Fig.4.

Fast Attack Slow Recovery

The above cross head, although it may sound like it, has nothing to do with karate. This term and its opposite (slow attack, fast recovery) are often used to explain the characteristics of an auto tune circuit. The Explorer XS incorporates variables of both of these principles, which can be used to great advantage for discrimination when junk targets are in close proximity to wanted objects. Fast attack means that when a voltage in the circuit changes, the design in question is able to adjust back to the preset level very quickly. For example, if an iron target causes a drop in audio volume it requires a certain length of time to recover to threshold before it can rise in response to a wanted target close by (see Fig.3. and Fig.4.).

Fig.3. is an example of slow attack, slow recovery. You can see from the dotted line that the signal is easily pulled down below threshold just as the search coil approaches the iron target. This is denoted by the long downward slope, which represents the time taken for a signal to reach maximum. It shows how a wanted target such as a coin may be lost when using slow recovery and the two targets are in close proximity. The iron pulls the signal into such a negative or downward phase shift, that the slow recovery setting cannot rise back up to threshold quickly enough to respond to the coin before the search head has passed over it. Fig.4. shows the short upward slope rising to threshold represents a short time to recover before the detector is ready for the next target (ie fast recovery).

If the search head is swung from the opposite direction (ie the coin side) there may be a positive output before the iron takes effect. The latter will be dependent on the size of the iron and the proximity of the wanted target. If the iron is very large compared to the coin there may be a very sharp audio spike or blip, or even no signal at all.

Fast recovery therefore enables a separate signal to be heard from targets that are close together. This applies regardless of whether the targets are ferrous or non-ferrous. The down side of fast recovery is that when an auto tune circuit is running or re-tuning fast there will be some loss of detection depth. The sort of site where fast attack and fast recovery come into their own is where you are working a target-rich environment but the bulk of the targets are junk. With this double fast setting, target response will be very sharp and narrow (ie fast attack, fast recovery will "sort the wheat from the chaff" in a manner of speaking).

Slow attack, slow recovery will enable maximum detection depth when you working on ground with a low mineral content, and where targets are few and widely spaced. There is one other use for fast recovery speeds, and that is when the ground minerals are very patchy and tend to pull a detector out of tune at regular intervals. The manual, in fact, only says that you have the option of "fast" or "deep". "Fast" will give you fast attack, fast recovery (less depth but better target separation), while "deep" will give you slow attack, slow recovery (better sensitivity to small or deep targets).

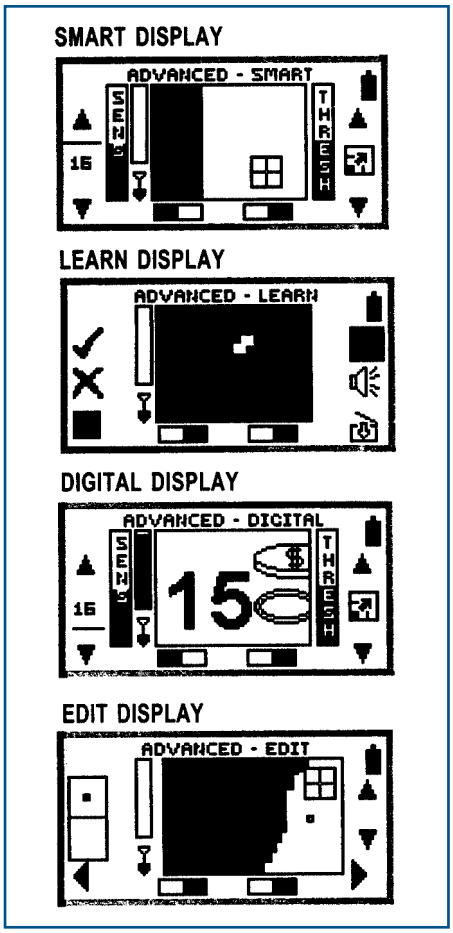
Incidentally, for those readers who have Web access a free download of the Explorer manual is available from the Minelab site.

Learn Mode

There are, in fact, so many innovative and useful set-up options that it is difficult to choose which will be of greatest interest to the reader. However, the option to reject very specific target types with a very accurate two-dimensional visual display must rank high on the list of desirable functions.

I will not waste valuable space in describing the nitty-gritty of set-up procedure, because the manual does that adequately. Basically, the user can teach the Explorer to create a window of target rejection or acceptance of very specific targets. If you are using the learn mode in advanced set-up, the Explorer will memorise a target ID when the search head is passed across a sample of the target you want to accept or reject. A black box will then appear on the screen, representing the characteristics of the sample concerned.

If the sample was an object you wanted to reject, and you find that you are still digging up similar unwanted targets, they will probably show on the display close to the reject box. The reject box has three size options, so it is a simple matter to increase the size of the rejection area to exclude those marginal nuisance targets that have been breaking through. Set-up allows you to reject a number of targets in this manner all at the same time (a form of "multi notch"). The two-dimensional display gives a very clear indication of desirable targets in close proximity to those rejected.



Heavy calibre machine gun and cannon bullets, plus complete 9mm round

Brass St Christopher

Roman "grots"

Bronze Coin Fragment

The reverse set-up procedure is also very useful when you are trying to extract wanted targets from a site that is infested with all manner of junk. For example, if a hoard of silver coins is scattered across a field that is heavily contaminated with unwanted target items, the Explorer can be set to just pick up one or two specific coins and ignore all other targets. Basically, the machine is set to reject everything and then taught to memorise the specific desired objects (ie white blocks on a black display screen, saved in custom memory). This type of set-up allows very rapid coverage of junky sites with little wasted time.

Audio Discrimination

Using a specific audio tone to identify wanted targets can also enhance the very selective targeting mentioned previously. In part one I stated that the audio discrimination gives a difference in tone for different targets.

Audio discrimination can be used in two different ways. The first or standard setting is where the tone increases in frequency the more highly conductive the target or the larger the target. The second option is to set the tone difference to respond to differences in a target's ferrous content (ie low tone for pure iron, high for copper and silver. If you are so single minded that you want to rely on your machine to only identify a specific target type, you may want to choose the third audio option of one single tone.

By using a combination of very specific accept target discrimination settings, a single tone (no audio disc) audio output, and the gain set at or near maximum, you can search very fast with excellent ground penetration. There will be no soft signals.

Inland Performance

At this point I will give you a break from the technical stuff, and go on to the Explorer's actual performance in the field. I am not going to go into detail about every individual find made, but instead intend to provide an overview of my experiences.

The first area where this machine scores points is its ability to find coins on worked out sites (yes, even the ones which have been "done to death"). One site I used the Explorer XS on was a meadow that I was pretty sure I had cleaned out. I found a dozen coins on this field, together with about 17 pieces of scrap. The most interesting thing was that nine of these coins were Roman "grots". The coins were of no value I must admit, but they were a good indication of the potential of this machine to find those more elusive valuables. Those "grots" could just as easily have been desirable hammered silver or even Roman *denarii*.

Some of the coins extracted from this meadow were at a good depth, but not all. This indicates that the multi frequency set-up does something that other designs do not when it comes to penetrating difficult ground. This is definitely a machine to use on those hoard sites that have supposedly been picked clean.

One thing I have said little about is the noise cancel option. The setting for noise cancel can be critical on some sites, but I believe this facility on the Explorer was adequately covered in an earlier review by Desi Dunne from Minelab.

The second site I visited was an ancient woodland site, where I have spent a great deal of time detecting in the past. I have worked this site with an assortment of high spec machines so I didn't expect to find too much. After several fruitless hours, and having found only a few cartridge cases, my thoughts were that maybe I was wasting my time and that I had really cleaned out this site. However, it was just at that point when my first decent find came to light.

I received a strong signal from above a tree root, so I began to scrape away the soil only to discover a large slab of rock just beneath the surface. After removing most of the soil from the top of the rock I ran the search head over it again. The signal was still there. I then set about removing the soil from the edge of the rock nearest to where the target signal seemed to be coming from. Fortunately the soil was very soft, and within a few minutes I had a large brass St. Christopher in my hand.

The very next signal came from a patch of ground that indicated that another detectorist had recently been

here before me. The signal came from a slight hollow in the ground and when I dug down I found a neat circle had been cut through the fine tree root system, which was prevalent over the whole of the wood. Next, some telltale chunks of rusty bucket started to come up. After removing all the loose soil that had obviously been recently disturbed, I was about to backfill the hole when I decided to pass the coil over it once more. When I did, the detector screamed out a clear high pitched tone. Digging down into the firm soil at the bottom of the hole I recovered a man's very heavy silver wrist chain nametag. So somebody before me had got very close but missed the goodies!

At the end of my six and a half hour search of this very worked out wood, my finds comprised: two farthings, nine heavily corroded Georgian copper coins, a fragment of a bronze badge, a brass St. Christopher, and a silver wrist chain ID bracelet. In addition, I had recovered about 20 pull-tabs and three or four pieces of soft metal (probably tin). I could have easily rejected the pull-tabs, but as it is so easy to miss small gold or silver rings at that setting I chose the extra work. If I were not conducting a field test, I would have probably opted for pull-tab reject as the discrimination had already proved itself accurate on the beach. However, I wanted to see if could better the results achieved with other machines on this site. The Georgian coins came as a surprise, as I had only found one other Georgian bronze coin in this wood before. What's more, all the Georgian coins came from areas I had heavily searched with other detectors in the past.

Some of you may be wondering about that all-important question, detection depth. Well, for the purposes of my test I had chosen two particularly difficult sites that to all intents and

purposes were completely worked out. The Explorer XS was finding targets that had been missed by the best of the rest. There are many detectors that can perform well on neutral soil but few can give a good account of themselves both on an assortment of the very worst worked out sites and on salt wet beaches.

Talking of beaches, I could not resist going back to one of the beaches I searched for part one of this test. The beach concerned is Dawlish Warren. I don't believe I mentioned it by name in that test, but it is the one where I found all the large, heavy calibre machinegun and cannon bullets. The reason I went back, is that after all the years this beach has been detected on, it still holds an abundance of large targets. This is a good indication that smaller items, such as gold rings, must also remain undiscovered. Unfortunately, on this occasion no gold rings came to light but I did find another dozen or so rounds encased in concretion and a handful of modern coins.

At this point a few words about using the icon and ID numbers for discrimination would not be out of place. If you look at the photograph of the large silver dollar and the pound coin next to it, which do you think of these will be the most conductive and give the highest ID numbers? The answer is obviously in the question. It is, surprisingly, the smaller mixed metal £1 piece. It also gives a correspondingly higher pitched tone on audio discrimination. Why? I must admit that I don't know. If I had been asked the same question before I had tried it, I would have said that without a doubt the silver dollar would have come out on top. The dollar piece is made of fine silver and the photographs are to scale.

The lesson to be learned here is to familiarise yourself with ID numbers by bench testing before taking the Explorer out into the field. The £1 gives an ID number of 26, and the silver $1 a number of 22. A £2 piece gives a reading of 28. (These readings are all approximate). The ID number system is very reliable but a little time spent learning the numbers that correspond to specific coins will prove invaluable in the field.

Although I have had the Minelab Explorer for quite a while to carry out this test, the weather has been against me. On the few days it didn't rain over the past couple of months, I was committed to something else. I did, however, manage to get in a few days on a new site that I have recently acquired for detecting, which is an early 19th century rifle butt. After gaining search permission, I spent several wonderful afternoons on my knees in wet grass recovering countless musket balls. There was a time when musket balls were a treasured prize, but now they are just a necessary evil recovered in the hope of a gold piece or two lurking amongst them, or maybe some interesting military buttons and buckles.

To sum up, the Explorer XS, it is a quality detector, which is reflected in the price. There is little that Minelab has overlooked in terms of build quality, accessories, or very simple to understand programming. I have not gone into detailed user program configurations deliberately because this machine is very user friendly in spite of its high tech capabilities. TH