



Jigsaw Cambridgeshire Best Practice Users' Guide

An Introduction to Metal Detecting

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1 HOW METAL DETECTORS WORK

Metal detectors use one of three technologies:

- Beat-frequency oscillation (BFO)
- Very low frequency (VLF)
- Pulse induction (PI)

A **Beat Frequency Oscillator** (BFO) style detector works by comparing two different frequency oscillators in order to detect metal objects. The large search head coil is tuned to match the frequency of a reference oscillator, typically located inside the control box. As the head is swept over metal objects, the inductance of the head changes, causing a frequency shift in the oscillating circuit. As the two frequencies change in reference to each other, some simple circuitry alerts the operator that there is nearby treasure.

Very Low Frequency (VLF), also known as induction balance, is probably the most popular detector technology in use today. In a VLF metal detector, there are two distinct coils:

- Transmitter coil - this is the outer coil loop. Within it is a coil of wire. Electricity is sent along this wire, first in one direction and then in the other, thousands of times each second. The number of times that the current's direction switches each second establishes the frequency of the unit.
- Receiver coil - this inner coil loop contains another coil of wire. This wire acts as an antenna to pick up and amplify frequencies coming from target objects in the ground.

Pulse Induction detectors work much like SONAR on a submarine. Electric current is sent in microsecond long pulses through a coil of wire that causes a brief magnetic field to be induced. If this pulse hits a metal object, it is reflected back to the coil of wire, which measures the reflected pulse. While pulse induced detectors aren't very good at determining different types of metal, their effective working depth is much greater than that of a VLF detector.

Recommended detectors

Garrett Ace 250: Jigsaw has this model, available for free loan to affiliated groups. A good middle of the range detector.



Minelab Safari: a very good but costly detector.

Other good models are the **Blisstool**, **XP Deus** and **Whites Hoard Hunter**.





Testbeds planted with objects are useful for those learning how to detect, and to test the relative merits of different detectors.

Test Bed Checksheet

Please fill in this checksheet with as much information as you are happy providing.

In the future it is hoped this information will comprise useful data for comparing detectors.

Name _____ Date _____

Detector Used _____

Detector Settings _____

Conditions _____

Test Bed A - black rope			Depth Test	
Position	Item	Depth	Dig?	Signal
1	Musket Ball	4"		
2	Musket Ball	5"		
3	Musket Ball	6"		
4	Musket Ball	7"		
5	Musket Ball	8"		
6	Musket Ball	9"		
7	Musket Ball	10"		
8	Musket Ball	11"		
9	Musket Ball	12"		
10	Roman Grot	1"		
11	Roman Grot	2"		
12	Roman Grot	3"		
13	Roman Grot	4"		
14	Roman Grot	5"		
15	Roman Grot	6"		
16	Roman Grot	7"		
17	Roman Grot	8"		
18	Roman Grot	9"		

Test Bed B - 1st yellow rope			Mixed Finds	
Position	Item	Depth	Dig?	Signal
1	.22 Shell Case	3"		
2	Thimble	3"		
3	Hammered Coin	3"		
4	Tombac Button	3"		
5	Musket Ball	3"		
6	Pidgeon Ring	3"		
7	Lead Seal	3"		
8	George VI Halfpenny	3"		
9	1934 Three Pence	3"		
10		3"		
11		3"		
12		3"		
13		3"		
14		3"		
15		3"		
16		3"		
17		3"		
18		3"		
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29				
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32				

Test Bed C - 2nd yellow rope			Recovery Test	
Position	Item *	Depth	Dig?	Signal
1	8" Recovery	3"		
2	6" Recovery	3"		
3	4" Recovery	3"		
4	2" Recovery	3"		
5	Touching	3"		
6	8" Recovery	3"		
7	6" Recovery	3"		
8	4" Recovery	3"		
9	2" Recovery	3"		
10	Touching	3"		
11	8" Recovery	6"		
12	6" Recovery	6"		
13	4" Recovery	6"		
14	2" Recovery	6"		
15	Touching	6"		

* 1 - 5 = Bronze Buckles 6 - 15 = Musket Balls

Notes



2 DETECTING TECHNIQUES

“You’ve got to walk over it to find it”.

To Dig or Not To Dig?

- 1) Pinpoint target
- 2) What is the target’s depth?
- 3) What is the target’s size?
- 4) What is the metal type?
- 5) What is the target sound?

Dig everything, until you start to recognise targets, then you can choose to ignore some signals and slowly reduce the trash you dig.



3 RESPONSIBLE DETECTING

Responsible detectorists should ensure they do/have the following:

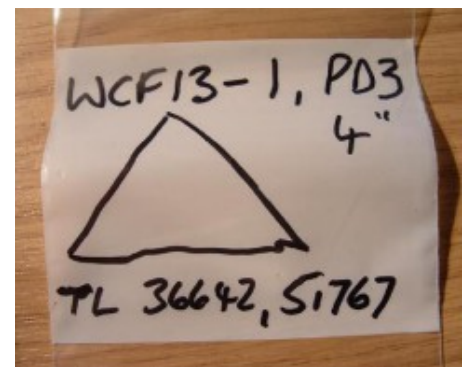
- Permission to detect
- Public Liability Insurance
- Observe the Country Code
- Fill your holes
- Remove your trash
- Show and Tell
- Record your finds and report to the Portable Antiquities Scheme as applicable

Recording finds

Field Mapping: once you have made some finds, it is good to record their location using a form such as the one below. It is good practice to use a **GPS** to record their locations. Jigsaw has a Garmin GPSMap 62st available which affiliated groups may borrow.

Finds should be bagged with the site code, bag number, grid reference, and a small find number in triangular brackets – see picture, right.

Once you have finished walking a site, to allow more people to find out about your research it is good to make a short written report outlining your findings, and submit this to Cambridgeshire's Historic Environment Record. Notify the Portable Antiquities Scheme (PAS) if you have found anything that can be classified as 'treasure', so they can report this to the Coroner.





Site Code	WCF13-	Name	
Date		Detector	
GPS Datum			

Rpt No	Bag No	Fabric	Description	Depth	GPS
	PDR				TL650 325

4 THE PORTABLE ANTIQUITIES SCHEME (PAS)

Reporting Treasure to the Coroner

All finders of gold and silver objects, and groups of coins from the same find over 300 years old, have a legal obligation to report such items under the Treasure Act 1996. Prehistoric base-metal assemblages found after 1st January 2003 also qualify as Treasure.



Portable Antiquities Scheme

www.finds.org.uk

5 WHERE CAN I DETECT?

Location	Yes/No	Comment
Scheduled Monuments	NO	illegal
Public Footpaths	NO	illegal
Parks	NO	illegal
Commons	NO	illegal
National Parks	NO	illegal
Nature Reserves	NO	illegal
National Trust Land	NO	illegal
Private Land	YES	with landowner's permission
Club land & Rallies	YES	£15 to £20 per day
Beaches	YES	with Crown Estates permission

6 WHAT CAN I FIND?

Trash



Buttons



Ammunition



Artifacts



Coins

