



MDHTALK – Metal Detecting Hobby Talk



Metal Detecting Discrimination 101

by **Lee Wiese**

Update: Sept. 16, 2013

Update: May 15, 2016

Update: March 01, 2017

Update: Feb. 24, 2021

mdhtalk.org

Metal Detecting Discrimination



Every Detectorist must be very familiar with their metal detector's discrimination function and discrimination characteristics before going into the field to detect.

Metal Detecting Discrimination



Discrimination:

- ✓ Is the ability of a metal detector to **tell the difference between various types of alloys or metals.**
- ✓ Is a feature of most metal detectors that **will reject some metal targets, while allowing others to respond.**
- ✓ Will **eliminate iron targets, then gold and aluminum, then copper and silver.** This allows you to selectively dig up only those types of metals likely to be of interest.
- ✓ **In some detectors is complemented with audio-tones (speaker / headphone) and visual-target ID (meter, LCD) discriminators.** Many higher end detectors have both.
- ✓ Is a **feature to increase the odds in favor of digging valuable targets,** and to decrease the odds of digging trash. Setting discrimination too high will cause you to miss valuable targets.
- ✓ Is **NOT** recommended for prospecting.

Metal Detecting Discrimination



Discrimination Implementation Methods

❖ Variable Discrimination

This is the **most basic type of discrimination**. The discrimination level Control can be set by the operator and all metals with a conductivity lower than where the level is set are eliminated & all metals with a higher conductivity are accepted.

❖ Notch Filter Discrimination

When all metals are arranged in an arrayed in order of their conductivity, from least conductive to most conductive, Notch Filter discrimination segments that array into "**Notches**" and each notch or segment can then be accepted or rejected. *Depending on the **number and width of the notches** offered on the detector, will determine to some degree how selective the detector can be at eliminating junk from good targets.*

❖ 2-D Discrimination

The Minelab Explorer Series has the ability to test and display a **metal target** for two characteristics, its **conductivity** and its **ferrous** properties. *By testing targets for these 2 characteristics, the Metal Detector is able to see very **selective** differences in metals.*

❖ Tone Identification and Meter ID Discrimination (Operator is the Discriminator using Tone & ID)

The operator sets up the detector without any discrimination since many detectors will indicate the **Target ID (identity)** by **changing the tone of the target signal**. Generally low conductive metals will give a lower tone while highly conductive metals will give a higher pitched tone. Most coin detectors today offer a meter or LCD screen, which will also identify the target using either a **numeric number (ID)** or/and a **graphic display**.

Note: The accuracy of discrimination is dependant on the repeatability of an object's conductivity rating. Man made objects will normally be consistent in their conductivity, however naturally occurring gold nuggets will often have variations in their purity and therefore their conductivity. *For this reason, most gold prospecting detectors tend to have more basic discrimination, often only identifying ferrous from non-ferrous objects*

Metal Detecting Discrimination

Metal Detecting
Discrimination
Class

Examples of Discrimination Implementation on Detectors:

➤ Variable Discrimination



Sovereign



Silver
u-max



Excalibur



Fast Tracker



XP Deus

➤ Notch Filter Discrimination



MX Sport



Treasurepro



Cortez



F75



DFX



ATpro



GTI 2500

➤ 2-D Discrimination



Explorer



CTX 3030

➤ Tone Identification with Meter ID



GTI 2500



Cortez



F75



Sovereign



DFX



Explorer

Three to Nine Tones

Tone Change for each type of Target ID

Metal Detecting Discrimination



❖ Notch Filter Discrimination

When all metals are arranged in an arrayed in order of their conductivity, from least conductive to most conductive, Notch Filter discrimination segments that array into "**Notches**" and each notch or segment can then be accepted or rejected.

Important:

Depending on the **number and width of the notches** offered on a detector, will determine to some degree how *selective the detector can be at eliminating junk from good targets.*

A few Detector Examples of Number & Notch Width for theirSelectivity

➤ Minelab CTX 3030	35 x 50 = 1750 Possible Notches	(Exceptional Selectivity)
➤ Minelab Explorer Series	31 x 31 = 961 Possible Notches	(Excellent Selectivity)
➤ White's XLT & DFX Series	95 + 95 = 190 Possible Notches	(Very Good Selectivity)
➤ Garrett GTI 2500	24 Notches	(Fair Selectivity)
➤ Garrett ACE 400	99 – 12 Notches	(Fair to Poor Selectivity)
➤ Fisher F2	7 Notches	(Poor Selectivity)
➤ Garrett Ace 150	5 Notches	(Very Poor Selectivity)

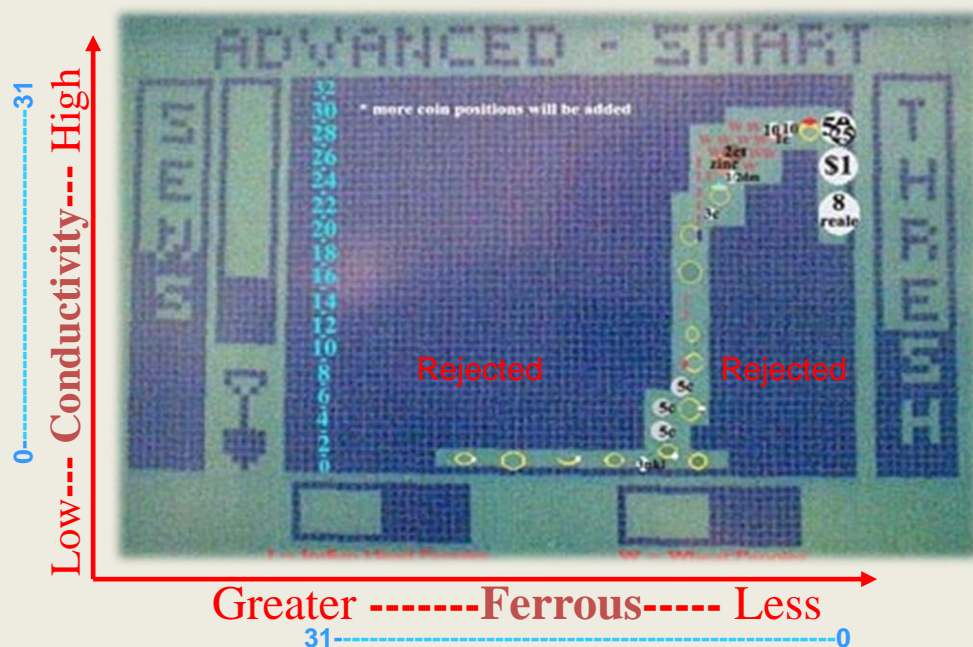
Metal Detecting Discrimination



❖ 2-D Discrimination

The Minelab Explorer Series has the ability to test & display a metal target for two characteristics, its **conductivity** and its **ferrous** properties. By testing targets for these 2 characteristics, the Metal Detector is able to see **very selective** differences in metals.

Smart Screen



Digital Screen



Minelab's Two Dimensional Detector Discrimination is not adaptable to the following Discrimination Table images.

Metal Detecting Discrimination

Each of the following seven slide images represent different discrimination notch settings.

The notched green area setting on each slide will remove select items from the detectors response.

Metal Detecting Discrimination

Metal Detecting Discrimination Table Only

Scale (1)	-95	-90		-20	-10	0	+10	+20	+30	+40	+50	+60	+70	+80	+90	+95	
Scale (2)					Iron			1	2	3	4	5	6	7	8	9	10
Silver Jewelry																	
Gold Jewelry					Small	Nuggets	27%	33%	25%	9%	5%	1%					
Clad Coins								.05c						10c	25-50c	\$1	
Copper Coins													Indian	Wheat	Pre 82		
													Pos 82	Memorial			
Silver Coins								.05c						10c	25c	50c	\$1
Gold Coins							\$1gold		\$2 1/2		\$5	\$10			\$20		
Foil / Pull Tab							Foil	Foil	Tabs	Tabs							
Bottle Caps										Caps							
Relics (Iron)	Large	Iron	Items		Nails	Pins											



Discriminated Out

Metal Detecting Discrimination

Metal Detecting Discrimination Table																
Scale (1)	-95	-90	←	-20	-10	0	+10	+20	+30	+40	+50	+60	+70	+80	+90	+95
Scale (2)				Iron			1	2	3	4	5	6	7	8	9	10
Silver Jewelry			←			↓										
Gold Jewelry			←		Small Nuggets	27%	33%	25%	9%	5%	1%					
Clad Coins			←		↓		.05c						10c	25-50c	\$1	
Copper Coins			←		↓							Indian	Wheat	Pre 82		
												Pos 82	Memorial			
Silver Coins			←		↓		.05c						10c	25c	50c	\$1
Gold Coins			←		↓	\$1gold		\$2 1/2		\$5	\$10		\$20			
Foil / Pull Tab			←		↓	Foil	Foil	Tabs	Tabs							
Bottle Caps			←		↓					Caps						
Relics (Iron)	Large	Iron	Items	←	Nails	Pins										

 Discriminated Out

Metal Detecting Discrimination

Build in IRON NULL (-95 to 0 Rejected) Discrimination Table																
Scale (1)	-95	-90	←	-20	-10	0	+10	+20	+30	+40	+50	+60	+70	+80	+90	+95
Scale (2)				Iron		↓	1	2	3	4	5	6	7	8	9	10
Silver Jewelry			←			↓										
Gold Jewelry			←		Small Nuggets		27%	33%	25%	9%	5%	1%				
Clad Coins			←			↓		.05c					10c	25-50c	\$1	
Copper Coins			←			↓						Indian	Wheat	Pre 82		
												Pos 82	Memorial			
Silver Coins			←			↓		.05c					10c	25c	50c	\$1
Gold Coins			←			↓	\$1gold		\$2 1/2		\$5	\$10		\$20		
Foil / Pull Tab			←			↓	Foil	Foil	Tabs	Tabs						
Bottle Caps			←			↓				Caps						
Relics (Iron)	Large	Iron	Items	←	Nails	Pins										




Discriminated Out

Metal Detecting Discrimination

Turn the Discrimination Control (-95 to +30 Rejected) to Eliminate some Pull Tabs

Scale (1)	-95	-90	←	-20	-10	0	+10	+20	+30	+40	+50	+60	+70	+80	+90	+95	
Scale (2)				Iron			↓	1	2	3	4	5	6	7	8	9	10
Silver Jewelry	←			↓													
Gold Jewelry	←			Small Nuggets			27%	33%	25%	9%	5%	1%					
Clad Coins	←			↓			.05c						10c	25-50c	\$1		
Copper Coins	←			↓							Indian		Wheat	Pre 82			
									Pos 82		Memorial						
Silver Coins	←			↓			.05c						10c	25c	50c	\$1	
Gold Coins	←			↓			\$1gold	\$2 1/2			\$5	\$10			\$20		
Foil / Pull Tab	←			↓			Foil	Foil	Tabs	Tabs							
Bottle Caps	←			↓						Caps							
Relics (Iron)	Large	Iron	Items	←	Nails	Pins											

 Discriminated Out

Metal Detecting Discrimination

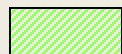
Notch (+30 Rejected) Metal Detecting Discrimination Table

Scale (1)	-95	-90		-20	-10	0	+10	+20	+30	+40	+50	+60	+70	+80	+90	+95
Scale (2)				Iron			1	2	3	4	5	6	7	8	9	10
Silver Jewelry																
Gold Jewelry					Small	Nuggets	27%	33%	25%	9%	5%	1%				
Clad Coins								.05c					10c	25-50c	\$1	
Copper Coins												Indian	Wheat	Pre 82		
												Pos 82	Memorial			
Silver Coins								.05c					10c	25c	50c	\$1
Gold Coins							\$1gold		\$2 1/2		\$5	\$10		\$20		
Foil / Pull Tab							Foil	Foil	Tabs	Tabs						
Bottle Caps										Caps						
Relics (Iron)	Large	Iron	Items		Nails	Pins										

Discriminated Out

Metal Detecting Discrimination

Silver Coin Metal Detecting Discrimination Program (-95 to +70 Rejected)																	
Scale (1)	-95	-90	←	-20	-10	0	+10	+20	+30	+40	+50	+60	+70	+80	+90	+95	
Scale (2)				Iron		↓	1	2	3	4	5	6	7	8	9	10	
Silver Jewelry	←					↓											
Gold Jewelry	←			Small Nuggets			27%	33%	25%	9%	5%	1%					
Clad Coins	←					↓	.05c					10c	25-50c	\$1			
Copper Coins	←					↓					Indian	Wheat	Pre 82				
											Pos 82	Memorial					
Silver Coins	←					↓	.05c					10c	25c	50c	\$1		
Gold Coins	←					↓	\$1gold	\$2 1/2		\$5		\$10	\$20				
Foil / Pull Tab	←					↓	Foil	Foil	Tabs	Tabs							
Bottle Caps	←					↓				Caps							
Relics (Iron)	Large	Iron	Items	←	Nails	Pins											



Discriminated Out

Metal Detecting Discrimination

Metal Detecting Gold Jewelry Discrimination Table Notch (-95 to 0, +70 to +95 Reject)																
Scale (1)	-95	-90	←	-20	-10	0	+10	+20	+30	+40	+50	+60	+70	+80	+90	+95
Scale (2)				Iron		↓	1	2	3	4	5	6	7	8	9	10
Silver Jewelry			←			↓										
Gold Jewelry			←		Small Nuggets		27%	33%	25%	9%	5%	1%				
Clad Coins			←			↓		.05c					10c	25-50c	\$1	
Copper Coins			←			↓							Indian Wheat	Pre 82		
													Pos 82	Memorial		
Silver Coins			←			↓		.05c					10c	25c	50c	\$1
Gold Coins			←			↓	\$1gold		\$2 1/2		\$5	\$10		\$20		
Foil / Pull Tab			←			↓	Foil	Foil	Tabs	Tabs						
Bottle Caps			←			↓					Caps					
Relics (Iron)	Large	Iron	Items	←	Nails	Pins										

 Discriminated Out

Metal Detecting Discrimination

Metal Detecting Discrimination Table Only																	
Scale (1)	-95	-90		-20	-10	0	+10	+20	+30	+40	+50	+60	+70	+80	+90	+95	
Scale (2)				Iron			1	2	3	4	5	6	7	8	9	10	
Silver Jewelry																	
Gold Jewelry					Small Nuggets	27%	33%	25%	9%	5%	1%						
Clad Coins								.05c					10c	25-50c	\$1		
Copper Coins													Indian	Wheat	Pre 82		
													Pos 82	Memorial			
Silver Coins								.05c						10c	25c	50c	\$1
Gold Coins							\$1gold		\$2 1/2		\$5	\$10		\$20			
Foil / Pull Tab							Foil	Foil	Tabs	Tabs							
Bottle Caps										Caps							
Relics (Iron)	Large	Iron	Items		Nails	Pins											



Discriminated Out

Metal Detecting Discrimination



Discrimination Class 101

[mdhtalk.org](http://www.mdhtalk.org)