Push your limits to the
MAX

GARRETT
METAL DETECTORS
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AT **MAX** *Owner's Manual*

AT**MAX**™

GARRETT
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Owner's Manual
English / Spanish

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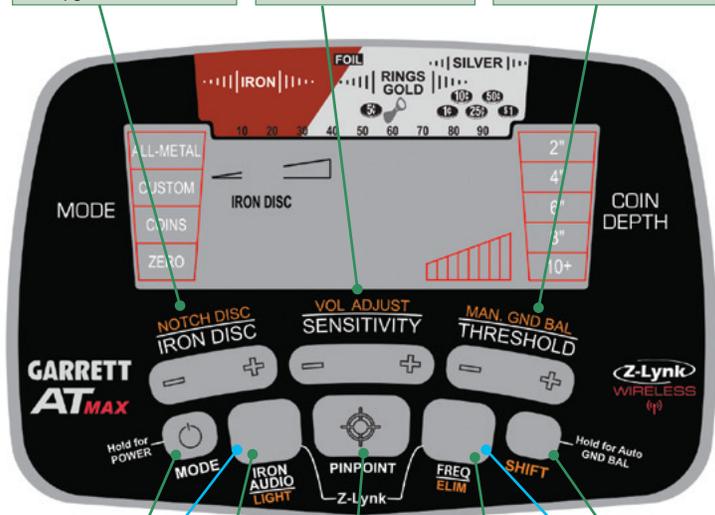
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Press for secondary functions.

Hold for Auto Ground Balance.

Simultaneously press and release these two buttons to pair to a new wireless receiver *(pg. 32)*.

AT Max Display Information

Iron Discrim Setting (0-44): also indicates Auto Ground Balance Window setting

Target ID Legend: indicates metal types

Lower Scale: indicates notch discrimination pattern

Target ID Cursor: indicates probable target identity

Z-Lynk Icon: indicates unit is wirelessly paired to a receiver. Steady = paired Blinking = searching Off = not paired

Mode Indicator *(pg. 12)*

Battery Level Indicator *(pg. 47)*

Digital Target ID: Also shows settings during adjustments.

Sensitivity Setting *(pg. 20)*

Depth Indicator: indicates depth of coin-sized target. *(pg. 10)*

Quick Start Guide

1. Power ON.
Press the ON / OFF Power button for 1 second. The *AT Max* powers on in the last mode used and is ready to search. The detector operates with four (4) AA batteries which are already installed by Garrett.

2. Select Mode.
Use the Mode button to select a different detection mode, when desired. (Factory default mode is Coins.)

3. Adjust settings.
Adjust Sensitivity, Threshold, Volume, or Discrimination settings, if desired.

4. Begin scanning.
Lower the searchcoil to approximately 1 inch above the ground and scan the coil left and right at approximately 3 ft/second. The coil must be in motion for target detection, but can remain stationary during Pinpoint.

3 ft/sec (1m/s) ← → 3 ft/sec (1m/s)
↕ 1-2 inch (2-3cm)

Components

Arm Strap
Arm Cuff
Handle Grip
Display Screen, Pushbutton Controls
Detector Stand
Control Box
S-shaped Stem
Battery Access Hatch
Camlock
Upper Stem
Camlock
Lower Stem
Searchcoil

AT Max Contents

Batteries installed

Control housing with S-shaped stem

Upper, lower stem (connected)

Searchcoil (with coil cover installed)

MS-3 wireless headphones

Nut, bolt, mounting washers

USB charging cable

Manuals

Warranty card

If any part is missing, please contact Garrett Customer Service.

Detector Assembly

Loosen lower camlock by turning it right (clockwise) while holding the upper and lower stem assembly in front of you as shown below. Extend lower stem, and press mounting washers firmly into place.

Connect searchcoil to stem as shown, and hand-tighten wing nut. Loosen upper camlock, depress the spring clip in the S-stem (containing control housing), and insert the S-stem through the upper camlock collar into the upper stem.

Note: The spring clip must be engaged in the FIRST stem opening in order to access battery compartment.

1st pin position
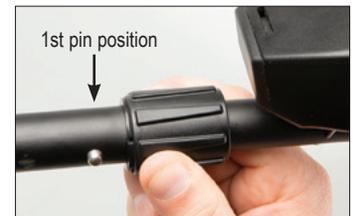
Adjust lower stem to comfortable length, and hand-tighten the camlocks. Wrap cable snugly around the stem with the first turn of the cable over the stem.

Insert coil connector into the 4-pin connector of the control box by lining up connector pins. Press firmly, yet carefully, until the O-ring is felt to be inserted, and hand-tighten.

Note: If the O-ring is properly seated, the connector's collar can be easily tightened; if the collar is difficult to turn, the O-ring may not be seated properly.

If needed, adjust the arm cuff by removing the screw on the bottom. Move the two-piece cuff to the other hole, reinsert the screw through the headphone cable clip, and tighten.

Powering ON / Basic Controls

| Power ON/ OFF Button | Battery Level Indicator | LIGHT *(must press SHIFT first)* | FREQ ADJUST |
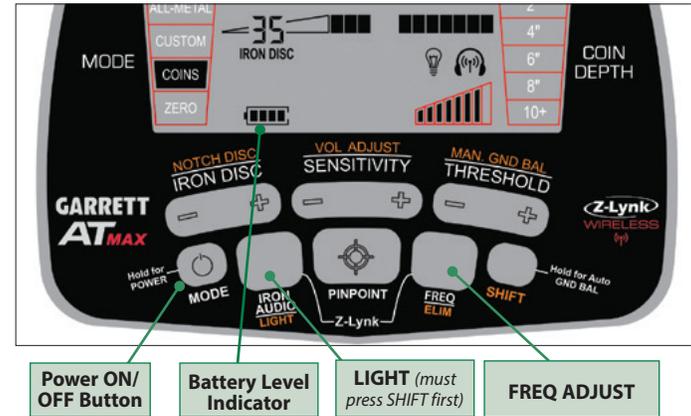
Power ON/OFF—Hold this button for 1 second to switch power ON or OFF.

Factory Reset —To restore factory settings, press and hold the power button for 5 seconds (until the detector produces a fast double beep).

Battery Level Indicator—Shows continuous status of battery life. Replace batteries when 1 segment remains (see page 47).

Frequency Adjust—Press the FREQ button to scroll through the frequency settings. Choose from four minor frequency adjustments (F1 to F4) in order to minimize interference caused by electrical sources or other metal detectors. Note that initial button press shows current setting.

Backlight—Press the SHIFT button, then push the LIGHT button to switch the LCD backlight on or off. Use the backlight in low light situations for improved visibility of the screen.

Target Information
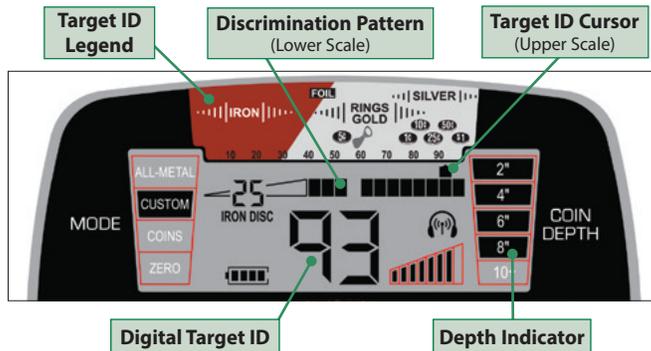
Target ID Legend—Works with the Target ID Cursor to indicate a target's probable identity, with Ferrous (iron) targets at the left, non-ferrous targets that are thin or have low conductivity in the middle, and thick or high conductivity targets (e.g. thick silver) at the right.

Lower Scale—Displays the current discrimination pattern, with lighted pixels indicating accepted targets and blank pixels indicating rejected targets.

Target ID Cursor (Upper Scale)—Will display for every target, but will produce audio only for targets accepted on the Lower Scale.

Digital Target ID—Provides a value from 0 to 99 to identify targets more precisely than the ID cursor.

Coin Depth Indicator—The depth of a coin, or a similar sized target, is indicated in 2-inch increments. Note: targets *larger* than a coin may display shallower than actual depth while targets *smaller* than a coin may display deeper than actual depth.

The sample chart on the following page provides Digital Target ID ranges of some commonly found items.
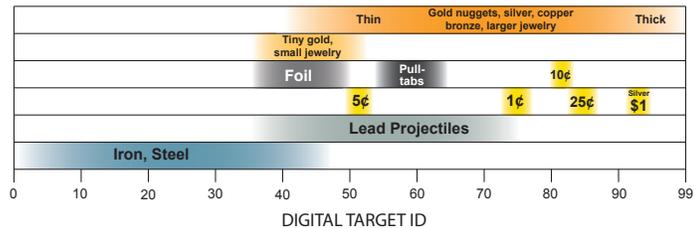
Target ID can vary widely based upon the target's size and thickness because small, thin pieces of metal cannot conduct electrical current as well as thicker pieces of metal. In addition, mineralized soils can cause Target ID errors, especially for small targets.

Tip: Target ID is most reliable when the target is centered under the searchcoil and the coil is swept flat and at a constant height above the ground.

Volume Adjust

To control the maximum loudness of target sounds, press the Shift button and then use the (+) or (-) VOL ADJUST buttons to set to your preference.

• Note that the *AT Max*'s volume adjustments only affects the maximum audio produced by a large signal and does not affect the audio level or sensitivity of faint signals (i.e. Volume is a "limiter" and not a gain control), thereby preserving maximum detection of faint signals.

• To ensure maximum detection of faint signals when using headphones, set the headphone's volume to maximum and adjust the *AT Max*'s volume to your preferred level.

Selecting Modes (Discrimination Patterns)
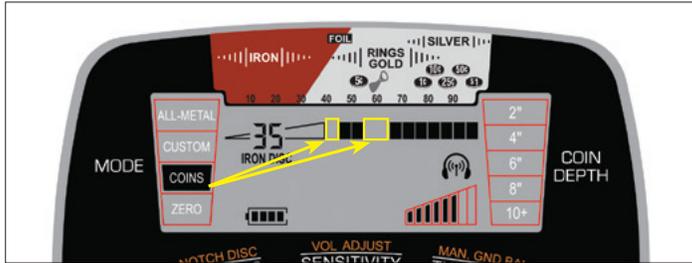
Example: this is the preset notch discrimination pattern for COINS Mode.

The *AT Max* includes four detection modes: a true All Metal Mode and three Discrimination Modes.

Press the MODE button to scroll through the four modes:

• **ALL METAL Mode**–Provides the greatest detection depth and sensitivity. The All Metal mode offers a continuous audio response to allow the operator to hear the subtle detection signals produced by faint targets. The All Metal Mode contains no discrimination, thus all types of metal will be detected.

• **CUSTOM Mode**–Can be programmed by the operator and the *AT Max* will retain the changes when the detector is switched off. The factory preset for the CUSTOM Mode is the same as the COINS Mode. Begin with this discrimination pattern and then use the NOTCH DISC (+) or (-) and ELIM buttons to customize the mode. *(For more information, see pages 18–19.)*

• **COINS Mode**–Designed to find most types of coins and eliminate common trash items such as iron, foil, and ring-style pull-tabs. Some desirable items that respond the same as foil or pull-tabs may be missed. Some digging of junk items is to be expected, such as aluminum cans.

• **ZERO Mode**–Detects every type of metal. All 12 discrimination pixels are switched on and High-Res Iron Discrim is set to 0 (zero)—indicating that no metals targets have been notched out (eliminated). Use this mode to find all metal items or when the material of the desired object is unknown. Switch to the Zero-Disc Mode to aid in locating a target when its signal is inconsistent. Such signals could mean a trash target is close to a good target.

All Metal Mode vs Discrimination Modes

In any of the three Discrimination Modes (Custom, Coins, or Zero), the *AT Max* provides more Tone ID information in addition to the ability to discriminate unwanted trash targets (e.g. nails, foil, pull-tabs). However, the three Discrimination Modes, by their nature, are less sensitive to small and deep targets than the All Metal Mode.

The All Metal Mode is ideal to use for maximum detection depth in areas that are not overly trashy or where there is no desire to eliminate any type of metal. The Discrimination Modes are usually desired in trashy areas for the elimination of some trash targets. The Discrimination Modes will provide quieter, more stable operation, but will not detect as deeply as the All Metal Mode.

In any of the modes, the *AT Max*'s searchcoil must be in motion to detect targets. Truly static detection is possible while using the detector's Pinpoint pushbutton.

All Metal Mode Audio Characteristics

While in the ALL METAL Mode, the *AT Max* will respond to the entire range of conductive and magnetic properties encountered, including ground responses. The user is continuously hearing what the searchcoil is "seeing" in the ground. Therefore, it is essential to be properly ground balanced while operating in the ALL METAL Mode. Naturally occurring minerals in the soil must be canceled out during the ground balance procedure in order to detect only the signals from metal objects.

The ALL METAL Mode provides target information, including a Target ID pixel on the upper scale, Digital Target ID, and depth reading. The *AT Max* thus allows the operator to remain in the ALL METAL Mode at all times, in contrast to some detectors which require the operator to switch to a Discrimination mode to obtain Target ID. Be aware that some deeper targets (faint audible signals) may exceed the reach of Target ID.

Because the ALL METAL Mode permits no discrimination, the detector will give an audible signal to indicate every piece of metal it scans over. Target responses will normally be heard as a proportional Medium Tone. However, the *AT Max* is a unique All Metal detector in that its Iron Discrimination and Iron Audio™ features can be used to hear if detected targets are ferrous, as indicated by a low tone. Iron Discrimination levels can only be adjusted in the ALL METAL Mode if the Iron Audio feature is on;

note, these changes will not be retained when the detector is switched off. *(See Iron Audio section, pages 28–31.)*

Gold prospectors and many relic hunters rely primarily on their ears to discern good target signals. These desired signals are presented as clean, repeatable responses that override the background audio.

Discrimination Mode Audio Characteristics

The *AT Max* includes three Discrimination Modes: Custom, Coins, and Zero. These modes are used to eliminate trash metal items (e.g. foil, pull-tabs, nails) from detection and provide more Tone ID information that the ALL METAL Mode. Discrimination filters are introduced in these three modes, which can make them less sensitive to small and deep targets than the ALL METAL MODE.

In its Discrimination Modes, the *AT Max*'s Tone Roll Audio provides the user with more target information to help identify targets, particularly flat iron objects such as bottle caps and washers, especially with Iron Audio switched on. Tone Roll Audio provides a variance of target tones as the searchcoil approaches and passes over the target. These varying tones of audio provide better overall target information and identification.

Tone ID in Discrimination Modes

In either Custom, Coins, or Zero Mode, the Tone ID feature produces up to three distinct audible tones based on a target's metal type and conductivity.

Low-Tone: Ferrous targets (Digital ID < 35) such as nails, iron, steel, etc.

Mid-Tone: Non-ferrous targets (Digital ID of 35–75) with low to medium conductivity, including small jewelry, small coins, foil, thin targets, etc., and ferrous targets that ID above the Iron Disc setting.

High-Tone: Non-ferrous targets (Digital ID > 75) with medium to high conductivity, including larger coins and jewelry.

Proportional Audio Characteristics

The *AT Max*'s advanced audio characteristics provide fast recovery speed, which is especially important in areas where good targets are in close proximity or may be scattered amongst iron trash. *(See Example A.)*
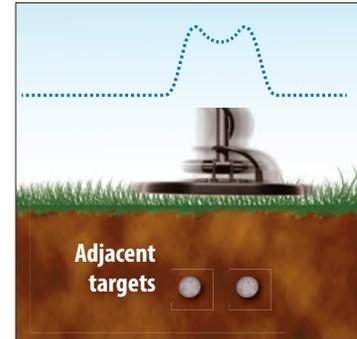
Adjacent targets

Example A: Adjacent targets can often produce a single strong signal with many metal detectors. The fast recovery of the *AT Max*, however, will provide two peaks of audio response to these adjacent coins. These multiple audio responses provide the experienced user with more target information.

This fast recovery time helps the *AT Max* operator to separate adjacent targets. The proportional audio response which makes this possible also allows the user to better judge a target's size, shape and depth. Proportional audio response means that the loudness of the target's response is proportional to a target's signal strength (i.e. small/deep signals sound faint and strong/large signals sound loud). *(See Example B.)*

Deep coin
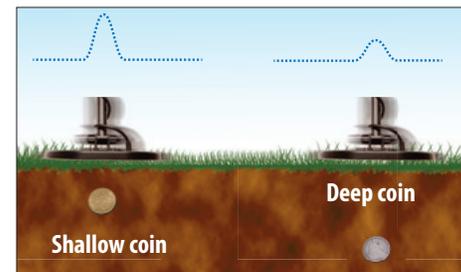
Shallow coin

Example B: Notice the different target response provided by the *AT Max*'s proportional audio in regards to target depth. The shallow coin target offers a stronger signal, while the same-sized deep coin provides a softer signal.

Notch Discrimination
(Discrim Modes Only)

The *AT Max* has 12 pixels or "notches" of discrimination, shown on the lower scale. Any combination of these pixels can be switched on or off based upon your preference. There are two primary methods for modifying the Notch Discrimination Pattern to reject a specific type of trash or unwanted item.

For the first method, press the SHIFT button and use the (+) or (-) NOTCH DISC buttons to move the Target ID cursor to the left or right. Next, press the ELIM button to eliminate or activate the pixel located on the Lower Scale, directly below the Target ID cursor. *(See illustrations on next page.)*

The second method of modifying the Notch Discrimination pattern uses only the ELIM button. When an unwanted target is audibly detected, simply push the SHIFT button and then the ELIM button to create a notch at that Target ID Cursor. The next time this item is encountered, it will not produce an audible signal.

Tip: Notch Discrimination can also be used to find specific metal items. For example, if an earring has been lost, scan the matching earring in ZERO-DISC mode and note its Target ID cursor. Then, press SHIFT and use the NOTCH DISC and ELIM buttons to switch off all the pixels except the one for the earring and an additional pixel on either side to account for some ID variations.

Example: Manual Modification of Notch Discrimination Pattern
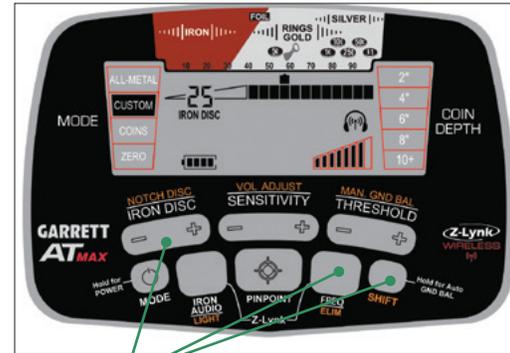
Modify pattern with these buttons

Press SHIFT, then use the NOTCH DISC buttons to position the Target ID Cursor above the pixel you wish to eliminate *(see illustration)*. Use the ELIM button to delete this pixel from the Lower Scale *(see below)*. This item is now rejected.
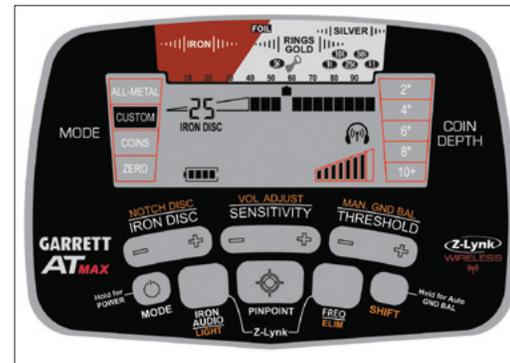

Note: Changes made to the Notch Discrimination pattern while in CUSTOM Mode will be retained when the detector is switched OFF. Changes made to all other modes will return to the factory settings when the detector is switched OFF and back ON.

Sensitivity

Use the (+) or (–) SENSITIVITY buttons to step through the eight (8) levels. Use increased sensitivity when searching for very small or very deep targets. Use lower sensitivity levels when the detector is behaving erratically (due to excessive metallic trash, highly mineralized soils, electrical interference or the presence of other metal detectors) and the erratic operation cannot be resolved with ground balance, discrimination or by changing frequency.

Sensitivity Button

Sensitivity Indicator

Audio Threshold Adjustment

Threshold Setting
*(only displays during Threshold adjustment)*
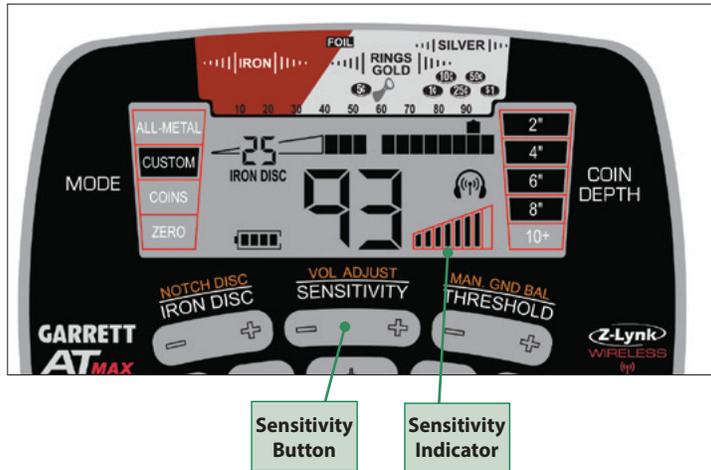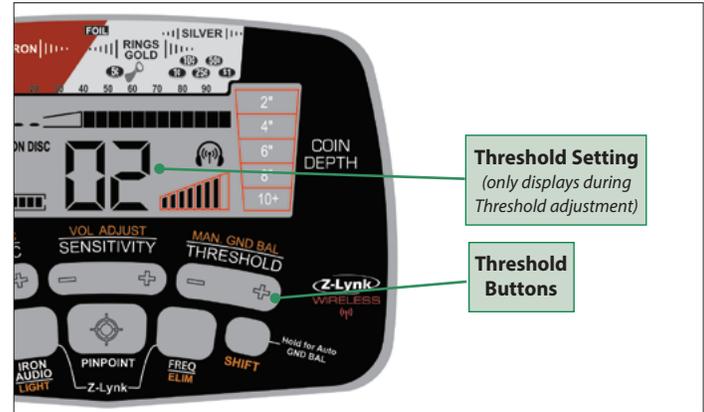
Threshold Buttons

Threshold is the constant background "hum" that is added to the target response. Press a Threshold button once to display the current setting. Press the (+) or (–) Threshold buttons again to select from 33 levels, ranging from -9 up to +23.

Positive Threshold values add an audible background hum to the target response (i.e. positive audio bias), while negative values subtract audio from the target response (i.e. negative audio bias). A Threshold of zero adds no audio bias.

Select a Threshold setting based on personal preference. However, to maximize the ability to hear faint signals, it is recommended to operate with a faint, yet barely audible threshold (i.e. faint positive audio bias). The louder the surrounding environment, the higher you may need to set the Threshold. Conversely, there may be times you wish to operate with a negative or silent threshold, for example, in order to reduce detector chatter, etc.

Headphones are also highly recommended to maximize the ability to hear faint signals, particularly in noisy environments.

Ground Balance

Ground Balance Window Setting

Fractional Ground Balance Setting *(Setting = 93.5)*

COIN DEPTH

VOL ADJUST SENSITIVITY

MAN. GND BAL THRESHOLD

Z-Lynk WIRELESS

GND BAL Setting *(only displays while in Ground Balance Mode)*

GND BAL Indicator *(only displays when in use)*

MAN. GND BAL *(must press SHIFT first)*
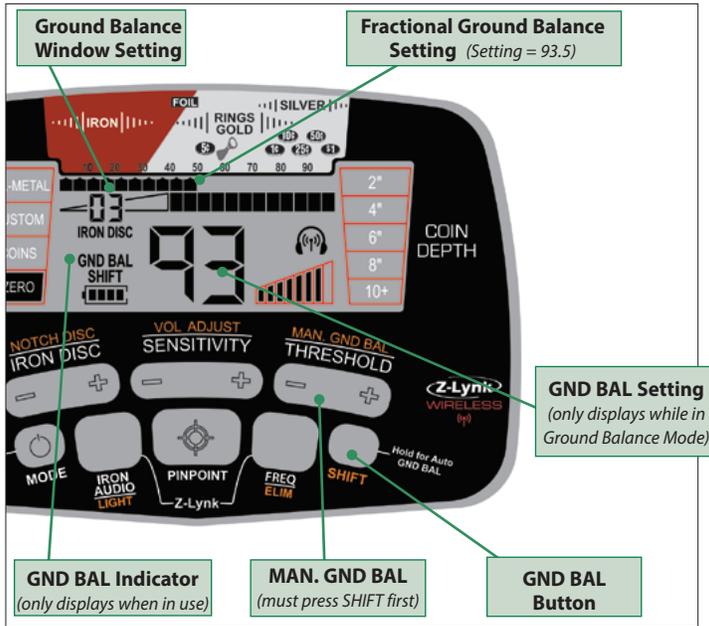
GND BAL Button

GND BAL Button—Hold the SHIFT button for Automatic Ground Balance or, for Manual Ground Balance, press and release SHIFT and then use the (+) and (-) MAN. GND BAL buttons.

Detector performance can be negatively affected by ground mineralization. The *AT Max* can be ground balanced either automatically or manually to cancel unwanted ground signals and obtain maximum stability and target detection.

Note: Always locate an area of soil free of metal before attempting to ground balance the detector.

The *AT Max* includes High Resolution Ground Balance, with 175 points of resolution, ranging from conductive soil, such as saltwater beaches, to ferrous mineralized ground. During Ground Balance function, the words GND BAL appear on the display and the ground balance value is indicated on the LCD.

Automatic Ground Balance: Press and hold the SHIFT button while continually "bouncing" or "pumping" the searchcoil from 1 to 8 inches (2 to 20 cm) above the ground until there is a minimal audio response from the ground. Then release the button and begin hunting. The ground balance value will have been indicated on the LCD. A low ground balance value indicates conductive soil, such as saltwater beaches; high ground balance values indicate ferrous soil.

As the detector is being ground balanced, the ground setting value can be observed where the Digital Target ID number would normally display. Ground balance values from 0 to 75 are indicated with whole numerals. Ground balance values from 75 to 99 represent hot ground, and at this point the *AT Max* utilizes High Resolution Ground Balance. Beginning at 75, the ground balance value begins increasing in quarter-point steps. This is represented by a whole numeral and increasing quarter-steps of the upper bar graph. *(See illustration below.)*
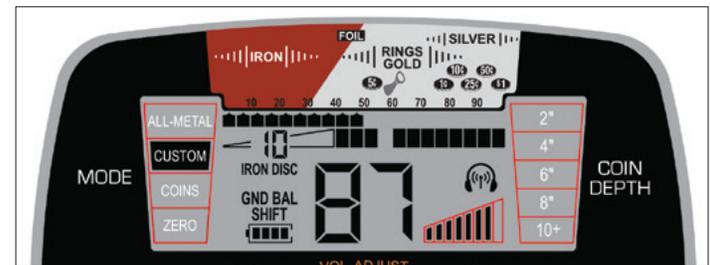
Ground Balance values above 75 increase in quarter-points of resolution. The above illustration indicates a Ground Balance value of 87.5. Above the solid numeral 87, each quarter-point of value is indicated by five blocks of pixels on the upper scale.

Note: If the Ground Balance setting does not change during the auto ground balancing process, the detector is either sufficiently ground balanced already or the current ground exhibits such neutral mineralization that the settings will not change.

Manual Ground Balance: Press and release the SHIFT button, then press either the (+) or (-) MAN. GND BAL button, and continually bounce (pump) the searchcoil from 1 to 8 inches (2 to 20 cm) above the ground. If low tones are produced, increase the Ground Balance setting using the (+) MAN. GND BAL button. If high tones are produced, decrease the setting using the (-) MAN. GND BAL button. Press and release the (+) or (-) MAN. GND BAL buttons to make single-step adjustments, or press and hold to make large adjustments.

Continue bouncing the coil and making manual adjustments until a minimum audio response is obtained, indicating the detector is ground balanced. The Ground Balance setting will be indicated on the LCD. The detector will automatically exit the Manual Ground Balance mode after five seconds without a button push. The Ground Balance setting will be retained when the detector is switched OFF.

You may want to use the Manual Ground Balance function to ground balance slightly positive to enhance detection of small targets or balance slightly negative to reduce detection of "hot rocks," terra cotta and clay bricks. Adjusting the *AT Max* to be ground balanced slightly positive may produce a weak but audible response from the ground as the searchcoil is lowered. Maintaining a level coil swing at a constant height above the ground will minimize this ground response.

Typical Ground Balance Ranges:

80–99: Highly ferrous (magnetite, ferrous oxide minerals, black sands, hot rocks, terra cotta)

60–80: Moderately mineralized soils (red clay, brown clay, iron-bearing clay minerals, etc.)

20–60: Likely an iron object

0–20: Highly conductive, non-ferrous minerals such as saltwater

Automatic Ground Balance Window™: Mineralized ground is often a mixture or matrix of different soils, rocks, and pockets of concentrated mineralization, each possibly requiring a slightly different ground balance setting. In such cases it may not be possible to find a single ground balance setting that simultaneously balances to the different ground components. This is not a result of limited ground balance resolution; rather, this is due to localized variations in the ground minerals.

For conventional detectors operating in All Metal Mode, these ground variations can produce false audio responses that reduce the operator's ability to discern faint signals, resulting in missed targets. Even detectors with continuous ground tracking cannot compensate for these localized ground variations.

Garrett has addressed this issue with its Automatic Ground Balance Window which effectively "spreads" the ground balance setting in order to simultaneously ground balance to a range of values. This smooths out the audio by reducing the subtle ground responses and allows the operator to hear those faint targets.

This Window or "spread" automatically adjusts while performing Auto Ground Balance. While in Ground Balance mode, the Ground Balance Window setting is displayed as a two-digit number above IRON DISC *(see illustration on page 22)*. The first digit represents the lower window setting and the second digit represents the upper window setting, each digit ranging from 0 to 9. For example, with Ground Balance set to 93.5 and a Ground Balance Window of 46, the effective ground balance spread is from 93.5 minus 4 steps to 93.5 plus 6 steps (i.e. from 92.5 to 95.0).

Iron Discrimination

IRON DISC Buttons—The *AT Max* features a high-resolution iron discrimination adjustment. This additional resolution allows more precise control of how much iron discrimination can be applied. The level can be adjusted from 0 (no iron discrimination) to 44 (maximum iron discrimination).

Iron Discrimination setting

IRON DISC Buttons
Use (+) or (-) IRON DISC buttons to adjust the Iron Discrimination setting up or down.
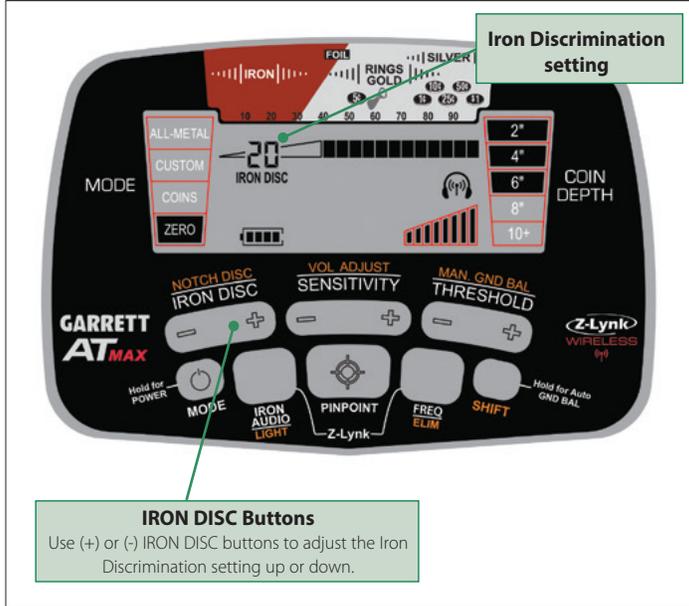
Iron Masking: To prevent an iron object from "masking" out the signal of an adjacent good target, use just enough discrimination to barely reject the iron trash (e.g. small nail, as seen in Illustration 1). This will allow you to detect the coin and nail together (see Illustration 2) and not miss/mask a good target.

# Detecting Targets in Trash with High-Res Iron Discrim
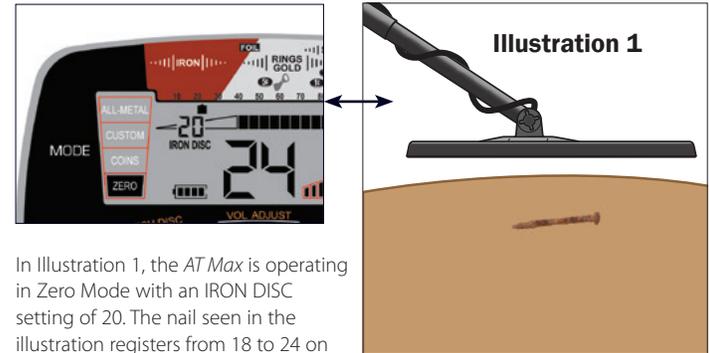
Illustration 1

In Illustration 1, the *AT Max* is operating in Zero Mode with an IRON DISC setting of 20. The nail seen in the illustration registers from 18 to 24 on the Digital Target ID scale. To eliminate the nail from detection, increase the iron discrimination level to 24 using the IRON DISC (+) button.
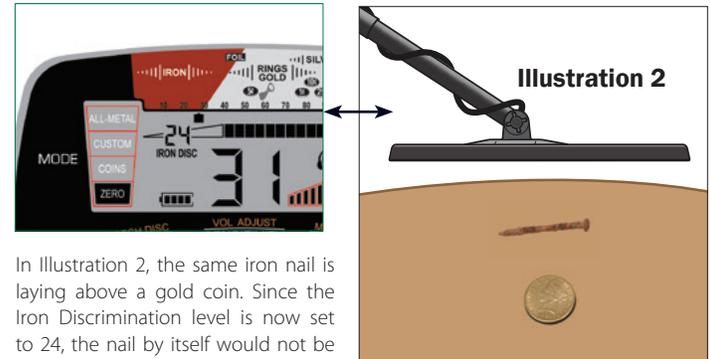

Illustration 2

In Illustration 2, the same iron nail is laying above a gold coin. Since the Iron Discrimination level is now set to 24, the nail by itself would not be detected; however, the two objects (nail and gold coin) have a combined conductivity of more than 24.

Therefore, the gold coin is detected due to the combined conductivity being higher than that of the discriminated target (nail) alone.

Iron Audio

Iron Audio is ON
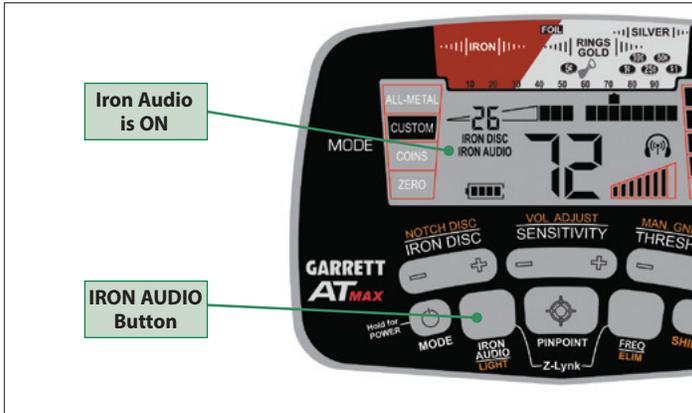
IRON AUDIO Button

Press and release the IRON AUDIO button to switch the Iron Audio feature ON/OFF. When this feature is on the words "IRON AUDIO" appear on the LCD (as shown in the illustration above). The Iron Audio feature can be used in any of the *AT Max*'s four modes. Its functionality in the three Discrimination Modes versus the All Metal Mode will be discussed separately.

Iron Audio Use in Discrimination Modes:

Scattered iron objects in the ground can mask good targets and even create "ghost signals" that appear to be a good target. Garrett's selectable Iron Audio feature allows the user to hear discriminated iron (normally silenced) in order to know the whole picture of what is in the ground and avoid being tricked into digging an undesired target.

Iron Audio helps the operator identify flat iron objects such as bottle caps that would otherwise appear to be good targets. With the use of Iron Audio, discriminated iron targets (normally silent) will produce a Low-Tone ID. Using Iron Audio, an iron nail

produces several fast low tones as the searchcoil passes over, while a bottle cap or steel washer produces a very distinctive Low-High-Low response.

Refer to the illustrations below regarding the use of the Iron Audio feature while in either Custom, Coins, or Zero Mode:
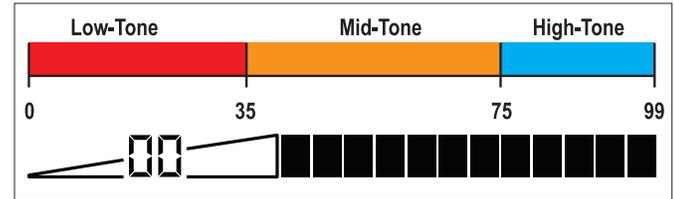
IRON AUDIO **OFF**: Normal division of low, mid and high tones in a Discrim Mode.
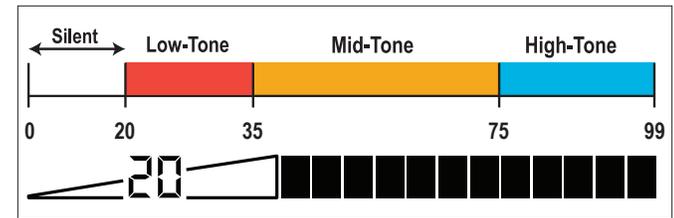
IRON AUDIO **OFF**: With Iron Discrimination set to 20, all targets below 20 are silent.
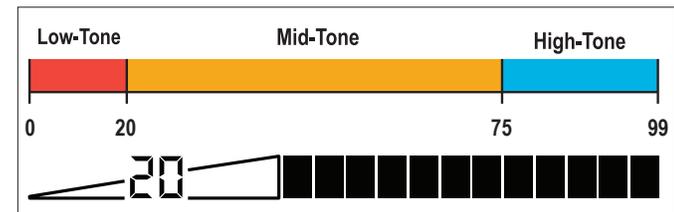

IRON AUDIO **ON**: Targets below 20 are now heard as a low tone and targets above 20 will produce a mid or high tone.

Tip for using Iron Audio: In areas with high concentrations of iron, it is recommended to switch off Iron Audio. Otherwise, it may produce far too many signals. Then, if a target is detected that has a questionable or inconsistent response, switch on Iron Audio to check if it is iron.

To fully appreciate the additional information offered by the Iron Audio feature, conduct the following experiment using a bottle cap and a coin. Start with the *AT Max* in Zero Mode, with Iron Disc set to 35 and Iron Audio off. Pass the bottle cap flat over the searchcoil at approximately 4 inches (10cm). Note the subtle breaks and inconsistencies of the target response, indicating it might be a good target or it might be made of iron. Next, pass the coin flat over the searchcoil and note the clean, High-Tone ID.

Now, switch on Iron Audio and pass the bottle cap flat over the searchcoil again. The distinctive Low-High-Low response indicates a target that is unmistakably iron. Note that the coin still produces a clean, High-Tone ID. *(See illustration below.)*
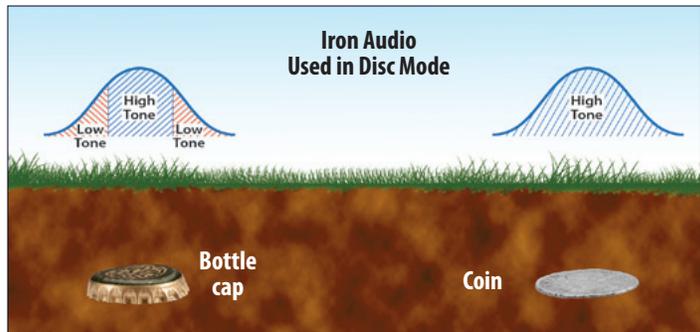
Bottle caps, steel washers and other flat iron objects often sound like good targets to standard detectors. This is because the bottle cap's shape and flat surface resembles a coin which can trick the detector. With the *AT Max*'s Iron Audio, however, the ferrous bottle cap will produce a very distinctive response with multiple tones, including Low-Tone flanking audio. As shown, the bottle cap will produce a distinctive response of Low-High-Low as compared to the coin's response of only High tone.

Iron Audio Use in ALL METAL Mode:

In the ALL METAL Mode, all metallic targets encountered by the *AT Max* are normally identified by a medium tone. The use of the Iron Audio feature, however, allows the introduction of a low-tone response to audibly indicate the ferrous content of targets. This Iron Audio feature in a True All Metal Mode metal detector is a Garrett exclusive.

The Iron Audio feature should be used in the All Metal Mode as a means to check targets for iron content. Therefore, it is not recommended to hunt with the Iron Audio feature continually switched on.

To fully appreciate All Metal Iron Audio, use an iron nail and a coin to experiment. Select the ALL METAL Mode, temporarily switch on Iron Audio, and set the IRON DISC to 35. *(Note: Iron Audio must be switched on in order to set Iron Discrimination in the ALL METAL Mode.)* Switch Iron Audio back off and pass the nail over the searchcoil. The nail will respond with a clean medium tone, similar to that of a good target, such as the coin. Now, switch on Iron Audio and separately pass the two targets completely over the coil again. The distinctive Low-Medium-Low response of the nail now indicates a target that is unmistakably iron. Note that the coin, however, continues to respond with a clean medium tone.

Refer to the illustration below regarding the use of the Iron Audio feature in the All Metal Mode:
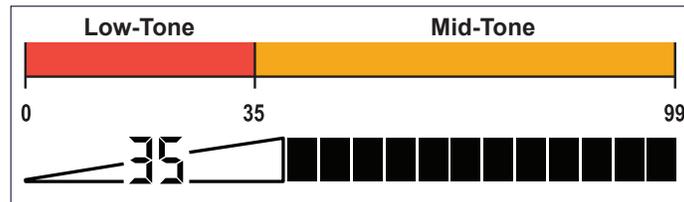
IRON AUDIO **ON:** In All Metal Mode with this example, iron targets below 35 are now heard with flanking low tones and targets above 35 produce a clean medium tone.

Z-Lynk Wireless Operation

Z-Lynk Wireless—The *AT Max* features a built-in Z-Lynk wireless transmitter which can be used with the Garrett MS-3 headphones. It will also connect to most any other headphones using a separate Z-Lynk receiver.

A Z-Lynk Wireless headphone icon *(see illustration)* on the LCD indicates the current status of your wireless connection. A steady icon indicates the detector is paired with an operating Z-Lynk receiver that is within range. A flashing icon indicates that the detector is searching for a receiver. Absence of the icon indicates that the *AT Max's* wireless transmitter is switched off.

Pairing: To pair with a new set of headphones/receiver, simply switch the headphone/receiver on, hold within 2 feet (0.6 meters) of the *AT Max*, and then press and release the Z-Lynk buttons (IRON AUDIO and FREQ) at the same time. Make sure the wireless icon on the *AT Max* is flashing or absent when you press the buttons.

PAIRING**:** Switch on headphones and hold within 2 feet of *AT Max*, then press and release Z-Lynk buttons (IRON AUDIO and FREQ) simultaneously.

A solid red LED on the MS-3 headphones and this steady Z-Lynk Wireless icon on the LCD indicates successful pairing.
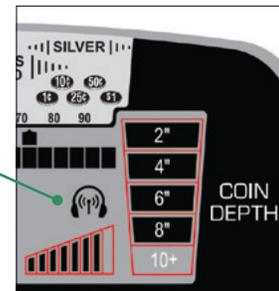
Once paired, if the headphone/receiver is switched off or moved out of range, the *AT Max* will search and attempt to reconnect to the receiver for 30 seconds, indicated by a flashing icon. If the connection is not reestablished during this time, the *AT Max* will switch off its wireless transmitter. It will be necessary to switch the *AT Max* off and then on again to initiate a new 30-second search.

To un-pair (forget) a set of headphones, simply press the Z-Lynk buttons simultaneously while the wireless icon on the *AT Max* is on steady.

Z-Lynk Wireless for Water Hunting: The *AT Max* can be operated wirelessly for shallow wading, but wireless operation is not possible when the detector is fully submerged. The Z-Lynk MS-3 Wireless Headphones should never be submerged. When the *AT Max* will be fully submerged, waterproof headphones (sold separately) are required. Refer to "Underwater Operation" section of this manual for more information.

Bench Tests

You should conduct bench tests to become more familiar with the *AT Max*'s operation in both ALL METAL and Discrimination Modes. In addition, the use of the Iron Audio feature should be tested in each mode. Suggested test items should include:

· Coins
· Iron nail
· Bottle cap or steel washer

To conduct a bench test, place the searchcoil on a flat, non-metallic surface that is several feet from other metallic objects. Begin by testing in the ALL METAL Mode. Pass the test items individually across the searchcoil at a distance of 3 to 4 inches (8–10cm). Observe the Target ID for each. Next, select the ZERO Mode and pass the same targets across the searchcoil. Use both large and small test pieces at varying distances from the searchcoil to observe the levels of their responses.

For bench testing, place the searchcoil on a flat, stable, non-metallic surface that is several feet from other metallic objects.

Discrimination bench test: A similar test procedure can be used to better understand how to set iron discrimination levels. Pass the iron nail across the searchcoil while in either ZERO or COINS Mode. Note that in ZERO Mode, with the factory preset level of zero (0) Iron Discrimination, the nail produces a Low Tone. If the iron nail registers up to a 26 on the Digital Target ID, increase the Iron Discrimination setting up to 26. Pass the iron nail across the searchcoil again to verify that it has been eliminated. If not, raise the Iron Discrimination setting a little higher until the iron target no longer produces an audible response. The factory preset Iron Discrimination level of 35 in COINS Mode will eliminate most iron nails from detection without adjustment.

Iron Audio bench test: Next, remain in ZERO Mode with your Iron Discrimination level set to remove the iron nail tested in the example above. Press the IRON AUDIO button and pass the nail across the searchcoil again to hear the distinctive iron sounds. Then, test this nail in the ALL METAL Mode. Switch on the Iron Audio feature, set IRON DISC to 26, and pass the nail completely across the searchcoil again. The distinctive Low-Medium-Low response indicates that the target is unmistakably iron.

Flat iron objects like bottle caps or steel washers can appear to be good conductive targets to detectors. To test the *AT Max*'s advanced iron recognition abilities, conduct another bench test with an iron bottle cap. First, set the detector to the ALL METAL Mode, switch off Iron Audio and pass the bottle cap across the searchcoil at a distance of 3 to 4 inches (8–10cm). Note that the bottle cap's flat surface gives a Digital Target ID reading generally in the 40–60 range.

Remaining in the ALL METAL Mode, switch on the Iron Audio feature and set IRON DISC at 35. Pass the bottle cap completely across the searchcoil again and listen for the distinctive Low–Medium–Low response indicating an iron target. This ability to check iron targets while operating in a true ALL METAL Mode is

a Garrett exclusive feature that helps make the *AT Max* such a powerful detector.

Next, switch to the COINS Mode, set IRON DISC to 35 and switch off the Iron Audio feature. Pass the bottle cap across the coil again and notice the subtle breaks and inconsistencies of the target response, indicating it might be good or made of iron. Pass a non-ferrous target such as a coin or gold ring across the coil and note its clean tone in comparison to that of the bottle cap. Remaining in COINS Mode, with IRON DISC at 35, switch on the Iron Audio feature. Pass the bottle cap completely across the coil again and note the Low–High–Low response that is unmistakably iron. Again, pass the coin or ring across the coil to compare its audio to that of the bottle cap.

Final tip: Record the results of your bench tests and refer to them when hunting in the field. Knowledge of the audio characteristics and the Iron Audio feature of the *AT Max* can reduce the amount of trash targets that are dug.

Hunting Tips

- If you are new to metal detecting, start searching in areas with sandy and loose soil to make it easier to learn how to use your metal detector, pinpoint and dig targets.

- Keep your searchcoil height about 1 inch above and parallel to the ground at all times for best detection results.
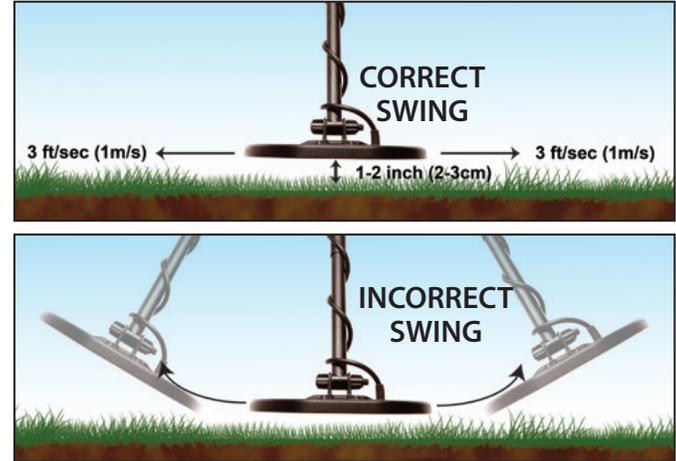

- Walk slowly as you scan your searchcoil from side to side at a speed of about 2 to 5 feet per second. Advance the searchcoil about half the length of the searchcoil at the end of each sweep *(see illustration on next page)*.
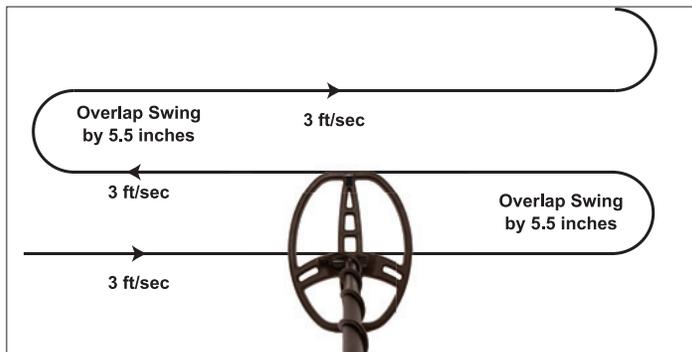
In order to fully search an area, overlap the swings of your searchcoil by half the length of the coil (about 5.5 inches). Sweep the searchcoil in a straight line or with a slight arc at a sweep speed of about 3 ft/sec.

• **Isolating adjacent targets:** The narrow detection field of the *AT Max*'s DD searchcoil allows better separation of adjacent targets versus a similar size concentric searchcoil. Use narrow swings of the searchcoil in trashy areas to isolate good targets amongst the trash.
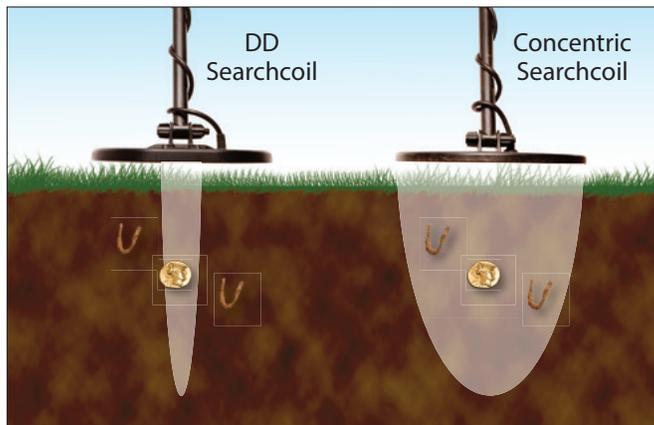
• **Tips for saltwater use:** Hunting in a saltwater environment is challenging for any Continuous Wave (VLF) metal detector. Saltwater is conductive and produces signals similar to foil and fine jewelry. Although the *AT Max* is not specifically designed for saltwater use, it can be used in this environment.

Proper ground balance is the most important step for stable saltwater operation. To achieve stable operation:

• First, auto Ground Balance the detector to the area that will be hunted (see pages 22–25). Saltwater beaches typically Ground Balance between 0 and 20.
• If necessary, reduce Sensitivity until signals become stable.
• Swing the searchcoil flat and at a constant height. Do not bounce the coil or lift the coil at end of swings.
• Swing the searchcoil parallel to the water's edge.
• The detector will be less stable in shallow, breaking surf where the searchcoil is in and out of the saltwater. In this area the detector is encountering a constantly changing environment produced by the surf, making it difficult for the detector to stabilize.

   To improve stability, negatively bias the ground balance by several points, if needed. To do so, simply press the SHIFT button and use the (-) MAN. GND BAL button to manually reduce the ground balance setting. For example, if the Ground Balance number was 11, reduce the Ground Balance number to 7 or 8. Introduce only enough negative bias to achieve sufficiently stable operation. Reduce the detector's Sensitivity as needed.

   Note: While some background chatter may remain, the more definitive response of a target can be recognized.
• If necessary, notch out the first pixel under Foil. It is important to note that by notching out this pixel, detection of some small jewelry items will be reduced.

• Tips for locating targets covered by terra cotta/hot rocks: Magnetic minerals such as hot rocks and terra cotta can mask the presence of good targets. In order to detect a good target, first ground balance the *AT Max* to the terra cotta or hot rocks that are present. Be aware, however, that the combined Target ID might be very low (e.g. a bronze coin and terra cotta together may register between 10 and 15 on the Digital Target ID). Therefore, Iron Discrimination levels must be reduced in order to ensure detection of good targets covered by the terra cotta. The Iron Audio feature can also be used so that all targets above the Iron Discrimination setting produce either a medium or high tone (i.e. "good" targets).

• Swing your searchcoil parallel to plow lines and the water's edge. This will minimize the negative effects caused by uneven ground in plowed fields and varying amounts of moisture near the water. Do not swing the searchcoil perpendicular to plow lines and the water's edge, as this may produce abrupt changes in ground response that can reduce the detector's performance.

Pinpointing

Accurate pinpointing enables fast recovery with the smallest hole possible. To use Pinpoint:

• Position the searchcoil to the side of the target's suspected location at a fixed height above the ground.
• Press and hold the Pinpoint button and slowly sweep the searchcoil over the target area while maintaining the same fixed height above the ground (e.g. 1 inch).
• Sweep the searchcoil side-to-side and front-to-back in a crosshair pattern to locate the peak signal, indicated by the loudest audio and the greatest number of segments on the Upper Scale.
• The center of the searchcoil is directly over the target with the depth of a coin-sized target shown on the depth scale.
• The symbol "PP" for pinpoint displays on the LCD while pinpointing.

It is recommended to practice pinpointing in a test plot.

Indicates pinpointing center of the 8.5" x 11" searchcoil.

Upper Scale indicates signal strength

Coin Depth Indicator

PINPOINT Button
(press and hold to pinpoint)
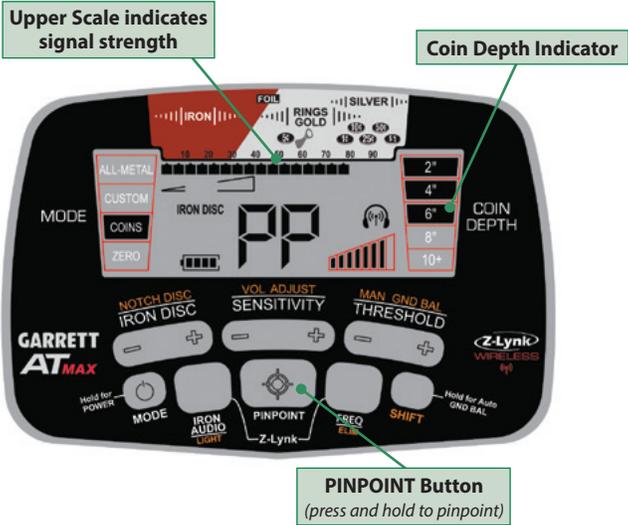
For the best pinpointing results, maintain a constant height above the ground (e.g. 1 inch).

Note: Use of the Pinpoint button is demonstrated on the *AT Max* training video, which can be seen at garrett.com.

• **Alternative pinpointing technique: DD-tip or tail.** In the standard pinpointing method described on pages 41, the target is pinpointed beneath the center of the searchcoil. Some detectorists using DD coils prefer to pinpoint off the tip or tail of the searchcoil.

Image A

PULL COIL TOWARD YOU

DD "tip" pinpointing technique
Press and hold the Pinpoint button and sweep the searchcoil side-to-side to center the target (the point where the strongest audio response is heard and the maximum signal strength is displayed on the LCD).

Then, pull the coil slowly toward you *(see Image A)*, while noting the target signal.

Indicates target position

Image B

Once the target signal drops off (both audibly and on the LCD meter), shallow targets should be located immediately in front of the searchcoil's tip *(see Image B)*. Deep targets will be under or just inside your searchcoil's tip. This is because the conical shape of the searchcoil's detection field begins bending in slightly as the depth increases.

You can reverse this pinpointing technique to pinpoint off the DD coil's tail; in this case, push the coil away from you. The audio and LCD meter will place the target just off the searchcoil's tail.

• **Alternative pinpointing technique: DD-wiggle.** Quickly locate targets without using the Pinpoint button as follows. Continuously swing the searchcoil side-to-side using fast, narrow swings of 2 to 4 inches (i.e. wiggle). While continuing this side-to-side wiggle, slowly move the searchcoil sideways toward the target's suspected position until the audio response produces a consistent, symmetric beat. This indicates the lateral left-to-right position of the target. Then locate the target's front-to-back position by rotating around 90° and repeating the same process.

Tip: Practice any or all of these various pinpointing options in your test plot. Choose the technique that works best for you. As you improve your pinpointing accuracy, you will dig smaller holes and increase your productive hunting time.

• **Retune to narrow the detection area:** Large targets can produce wide signals while pinpointing, making it difficult to precisely locate the target's center. To help pinpoint, the detector can be retuned to the target to narrow the detection field as follows.

While holding down the Pinpoint button, move the coil toward the target until the LCD just reaches a full-scale response. Then, quickly release and depress the Pinpoint button again to retune the detector and narrow its detection field. Continue moving the searchcoil toward the target to find its central peak response. If needed, repeat the retune process to further narrow the target's response.

A quality hand-held pinpointer such as Garrett's *Pro-Pointer AT* is a recommended accessory item to speed the target recovery process and to aid in locating secondary targets.

Underwater Operation

The *AT Max* can be submerged in water to a 10-foot depth (maximum) to search in and along shorelines, rivers, piers, docks or swimming holes. Use of the *AT Max* at depths exceeding 10 feet can cause leaks and damage the detector. Use of the *AT Max* beyond the recommended depth will void the manufacturer's warranty. For use in saltwater, see tips on page 39.

The *AT Max* is shipped with MS-3 Wireless Headphones which **should never be submerged**. The detector can be used to search along waterways and even in shallow water that does submerge the *AT Max* control housing. However, radio signals do not transmit through water, so if you will be hunting in water that will cause your control box to be submerged, you will need to switch to a wired headset. A fully submersible headset is available from Garrett as an optional accessory.
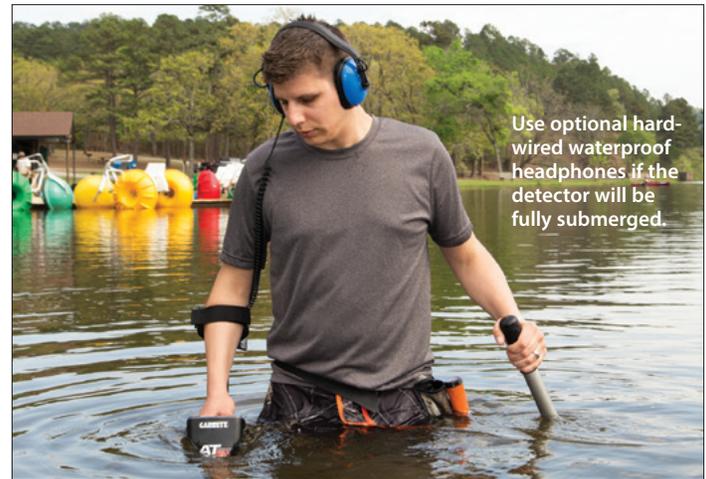
Use optional hard-wired waterproof headphones if the detector will be fully submerged.

When using the *AT Max* with its MS-3 wireless headphones, do not submerge the detector's control housing. Waterproof headphones *(sold separately)* must be used if the headset is fully immersed in water.

Troubleshooting Guide

SYMPTOM	SOLUTION
No power	1. Ensure batteries are installed in the correct orientation. 2. Replace all old batteries with all new batteries.
Erratic sounds or target ID cursor movement	1. Ensure your searchcoil is securely connected and the coil cable is snugly wound around the stem. 2. If using the detector indoors, be aware that excessive amounts of electrical interference exists, plus excessive amounts of metal can be found in floors and walls. 3. Determine if you are close to other metal detectors or other metal structures such as electrical power lines, wire fences, benches, etc. 4. Adjust frequency 5. Reduce your sensitivity setting.
Intermittent Signals	Intermittent signals typically mean you've found a deeply buried target or one that is positioned at a difficult angle for your detector to read. Scan from different directions to help define the signal. In the case of multiple targets switch to the ZERO Mode or press the pinpoint button to precisely locate all targets. In trashy areas, use the Super Sniper™ searchcoil. (NOTE: Iron targets may cause Intermittent Signals. You can identify iron targets in ZERO Mode) or with the Iron Audio feature.
I'm not finding specific targets	Ensure you are using the correct mode for the type hunting you are doing. If specifically hunting for coins, COINS mode should be your best choice to eliminate other undesirable targets. You may also use the ZERO mode, which detects all metal targets to ensure desired targets are present.
Target ID Cursor bounces	If your Target ID Cursor bounces erratically, chances are you've found a trash target. However, a Target ID Cursor may bounce if a good target (such as a coin) is not parallel to the searchcoil (e.g. on edge). It may also bounce if there is one or multiple "junk" targets laying next to the good target. Scan from different directions until your Target ID Cursor becomes more stable. NOTE: Large, flat pieces of iron—depending on their orientation in the ground—can read as a good target or can cause erratic Target ID Cursor movement. Use Iron Audio to help identify iron targets.
Wireless headphones will not properly pair	See "Z-Lynk Wireless Operation" section of this user's manual, pages 32–33.

Battery Replacement

Battery Level Indicator

Four bars indicate fully charged batteries. Replace batteries when there is only one bar remaining. The detector will maintain full performance until the batteries need to be replaced. NiMH rechargeable batteries may be used, but may have a shorter life per charge. You can expect 15-25 hours of operation without wireless headphones, and 10-20 hours with wireless headphones, depending on battery type and quality.

Access and replace the batteries by rotating the battery cover housing one-quarter turn counterclockwise. Pull and remove the cap to slide battery holder out. Remove batteries when the *AT Max* will be stored for longer than 30 days.

Note: 1.5V/cell Lithium batteries can also be used, but the use of 3.7V/cell Lithium batteries will damage the detector.

Metal Detecting Code of Ethics

The following is a Code of Ethics that many treasure hunters and clubs follow to preserve our exciting sport of metal detecting. We encourage you to do the same:

• I will respect private and public property, all historical and archaeological sites and will do no metal detecting on these lands without proper permission.

• I will keep informed on and obey all local and national legislation relating to the discovery and reporting of found treasures.

• I will aid law enforcement officials whenever possible.

• I will cause no willful damage to property of any kind, including fences, signs and buildings.

• I will always fill the holes I dig.

• I will not destroy property, buildings or the remains of deserted structures.

• I will not leave litter or other discarded junk items lying around.

• I will carry all rubbish and dug targets with me when I leave each search area.

• I will observe the Golden Rule, using good outdoor manners and conducting myself at all times in a manner which will add to the stature and public image of all people engaged in the field of metal detection.

Cautions

When searching for treasure with your Garrett detector, observe these precautions:

• Never trespass or hunt on private property without permission.
• National and state parks / monuments and military zones, etc. are absolutely off-limits.
• Avoid areas where pipelines or electric lines may be buried. If found, do not disturb and notify proper authorities.
• Use reasonable caution in digging any target, particularly if you are uncertain of the conditions.
• If you are unsure about using your metal detector in any area, always seek permission from the proper authorities.

Caring For Your Detector

Your Garrett detector is rugged, designed for outdoor use. However, as with all electronic equipment, there are some simple ways you can care for your detector to maintain its high performance.

• Avoid extreme temperatures as much as possible, such as storing the detector in an automobile trunk during the summer or outdoors in sub-freezing weather.
• Keep your detector clean. Disassemble the stem and wipe it, the control housing, and the searchcoil with a damp cloth when necessary.
• When storing for longer than one month, remove the batteries from the detector.
• When changing batteries, use quality alkaline or rechargeable batteries, and replace with all new batteries for optimum performance.
• Replace the protective cover on the connector when hunting without headphones or when using wireless headphones that do not require being plugged in.

AT Max **Warranty and Service**

Your *AT Max* detector is warranted for 24 months, limited parts and labor, but does not cover damage caused by alteration, modification, neglect, accident or misuse.

In the event you encounter problems with your *AT Max* detector please read through this Owner's Manual carefully to ensure the detector is not inoperable due to manual adjustments. Press and hold the power button for 5 seconds to return to the recommended factory settings.

You should also make certain you have:

1. Checked your batteries and connectors. Weak batteries are the most common cause of detector "failure."

2. Contacted your dealer for help, particularly if you are not familiar with the *AT Max* detector.

In the event that repairs or warranty service are necessary for your *AT Max*, contact the local retail outlet where your detector was purchased. To avoid excessive shipping and import charges, do not attempt to return a Garrett product to the factory in the United States.

Information on international warranty/repair needs can be found on the Garrett website: **www.garrett.com**. Click on the Sport Division and then the Warranty/Support menu for more details.

AT Max ACCESSORIES

Garrett offers a complete line of accessories that will increase your success and enjoyment of treasure hunting with your new detector.

These products—including optional *AT Max* searchcoils, fully submersible Garrett headphones, Garrett *Pro-Pointer* pinpointing detectors, Z-Lynk Wireless Receiver kits, and a wide selection of books on treasure hunting—are available from your dealer or by calling Garrett's factory at 1-800-527-4011.

To see Garrett's complete collection of metal detector accessories and books, please visit www.garrett.com and view products within our Sport Division.