LRLMAN'S MFD/LRL Generators
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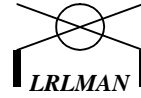
ARC-GEO LOGGER®

By Tim Williams   *Patent Pending*

Owners Manual

Release Date: Friday, November 05, 2010

This document is subjected to change without any notice. Please check the release date.
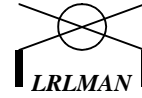
IMPORTANT NOTICE

Email: lrlman@yahoo.com **Web Site:** Http://lrlman.com
Bringing you the Best in MFD/LRL Generators

DESCRIPTION

The Arc-Geo Logger allows you to use a metal detector to log the sound output signal from the headphone jack. Then the data can be downloaded to a PC and displayed in a grid fashion to show all target locations within the plotted area. The software Snuffer is available *free* on the Internet. The software is used for ground resistivity and shows the data similar to a GRM. This is a first for a metal detector owner to log data and have a hard copy of a site for later reference. The poor man's GPR! The detector you use limits of the depth you can reach.

The Arc-Geo logger can store up to (16) 20x20 grids in 4 banks of memory. Or the user can select any size grid as long as the total memory for that bank is not exceeded. So you can plot 1 large grid of 20x100 in one bank. If you adjust higher than the allowed usage, you will get a DECREASE GRID SIZE warning.

The ARC-GEO Logger is subject to change for improvements in software or hardware at any time without notice. All software updates are free under warranty!

Features:

➢ Daylight visible LCD.
➢ LCD backlight for nighttime use.
➢ 4 banks of 4k total 16k.
➢ Max 4 grids per bank.
➢ Adjustable X, Y grid sizes up to bank limit. (45x45) Or any combination of X, Y.
➢ Down load data to PC link.
➢ Light and easy to carry.
➢ Headphone connection.
➢ Low battery LCD indication.
➢ Rechargeable 8-AA battery pack.
➢ Water proof Seahorse case.
➢ Auto/manual logging mode switch. Auto - samples once a second as you walk.
➢ 5-year parts and labor warranty.
➢ Free software updates under warranty.
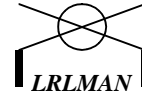➢ Real Time software viewing.

DESCRIPTION OF CONTROLS

POWER SWITCH:	Turns power on and off.
BANK SWITCH:	Sets the bank (1 of 4) to use.
GRID SWITCH:	Sets the grid (1 of 4) to log. (Maximum 4 per bank.)
LCD SWITCH:	Turns the backlight on or off. *If left on will reduce battery life.*

MANUAL/AUTO LOG:	Allows user to log manual or in auto mode.
X, Y ADJUSTMENTS:	Used to set the grid size of X, Y.
INPUT SENS:	Sets the signal-input attenuation.
LOG/YES BUTTON:	Button used to log data and select yes response.
DEL/NO BUTTON:	Button used to delete last log entry and no response.
DOWNLOAD BUTTON:	Button used to start the data download to PC.
ERASE BUTTON:	Button used to erase the bank selected.
SIGNAL INPUT JACK:	Signal headphones input.
AUTO/MANUAL LOG:	Auto mode logs once a second. Manual uses push button.
PC-LINK:	DB9 serial connection for data download.
CHARGE JACK:	12Vdc Connection to charge battery.
-/+:	Signal Polarity Switch

SETTING UP THE ARC-GRO LOGGER

Setup is fast and easy! The headphone jack on the metal detector connects to the Arc-Geo logger at the signal-input jack. Adjust your metal detector for a stable output. If you are using the TF-900 or Whites 808, ground balance the detector. Place a small test target on the ground and note the reading on the logger for comparison later. Adjust the detector for a slight background reading of around 10-30.

Don't worry if you do not have a range say from 0 to 1023. Software looks at the data values and sets up the colors according to the highest and lowest values. So you will still get a good image even if your data range is from 0 to 10! Set the detector according to the manufacture's manual. It's good to do a small test grid over a surface target to see ratios of background to target levels.

USING HEADPHONES

The Arc-Geo Logger now has a jack for mini headphones. You can use headphone with the logger now. If you have an older logger without the headphone jack there is a small board that's adds the headphone jack. There is also software upgrade to help with the 2-box problem FW: V1.o. Read the updates at the end of this manual for additional information.
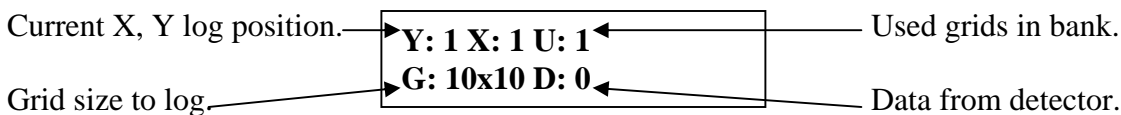
OPERATION NOTES

1. Once a grid has been started and you are in the log mode (L), you should NOT change the bank or grid switch positions.
2. To see what grids are used within a bank, turn to the bank you want to view. The display will show the grid size according to the grid switch position
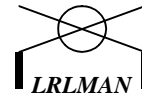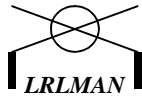
3. If the used grids = 0 for that bank, then there are no grids logged.
4. All grids must be logged in order from 1 to 4 and must be completed to be saved.
5. You can log a grid over, but you cannot change the grid size.
6. Once in the log mode you can exit logging by holding the erase button and the new button.
7. Check the detector before starting the grid. Make sure you are away from any metals when setting the detector.
8. When in auto-log mode, you can switch to manual at any time to manually log. You can switch back to auto any time to log in auto mode.
9. You may need an adapter form mono to stereo depending on the detector used.
10. Also if you have a newer laptop, you may need a USB to Serial cable adapter if you do not have a DB9 serial port.

Current X, Y log position. ——→ **Y: 1 X: 1 U: 1** ←—— Used grids in bank.

Grid size to log ——→ **G: 10x10 D: 0** ←—— Data from detector.

BATTERY STATUS "*V.1n and above*"

You can check the battery level any time the normal screen above is displayed by pressing log/yes button.

BATTERY: 100%

ERASING A BANK

Normal display

The normal display is shown at right after the startup screens. Y = width and X = height. U = used grids. G = grid size and D = signal data.

Y: 1 X: 1 U: 0
G: 0X0 D: 0

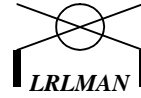If you want to erase the current bank, press ERASE then you will see.

ERASE BANK?
YES / NO?

If you want to erase the bank press yes. You will be asked if you are sure**. ALL DATA WILL BE ERASED.** Make sure you download the data first!

ARE YOU SURE?
YES / NO?

If you select yes the bank will be erased. If you say no then you will exit back to the normal display.

PLEAE WAIT…
ERASING BANK 15%

Note: You can not recover deleted data once it has been erased! Make sure your grids are saved before erasing the bank.

STARTING A NEW PLOT

Press NEW PLOT to start a plot. If you select no then you will exit back out. If you select YES then the display will show:

X: value Y: value and the remaining memory. Use the X & Y adjustments to set the grid size you want then press YES.

Press Start on software for real time then yes on logger. If you are using real time just press yes to go on.

The software will bring you out to the logging display and will show: L = LOG and the current x, y log position. G = grid size. U = total grids used in bank. D = signal data.

If the grid switch is on a higher grid than the first grid when the used grids = 0 then the following will be displayed when the NEW PLOT button is pressed. You MUST always log the grids in order from 0 – 3. After the grid is switched to 1 then the new plot display will show.

Or if you have logged a grid and have not changed to the next grid before pressing NEW PLOT the display will show:
You have an option to redo the grid but *you cannot change the grid size*. The grid size will be locked.

Or if you select no then the display will show:
After you switch to the next grid then the new plot display will show.

START NEW PLOT?
YES / NO?

GRID Y: 5 X: 7
RM: 98%

L> Y: 1 X: 1 U: 0
G: 5 X 7 D: 0

SET GRID TO 1
TO CONTINUE

GRID USED ERASE?
YES / NO?

| SELECT NEXT GRID |
| --- |
| THEN PRESS NEW |
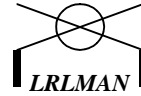
Note:
Logging is the same as before. Always start with bank and grid 0 and work to 3. The loggers still log internally in real time. IF you are logging only in real time on the arc-geo erase the bank once you reach grid 3 and start over at 0.

The grid number should be the same as the coil coverage. So if you were using a 12" coil on a 20x20 grid, with each log press you would move the coil in 12" steps. Remember to start at the upper left top of the grid you are plotting. You should be at position x1, y1. With each step you take press the LOG button. As you log, the Y will increase with each log pressed. When you reach the end of the first row the X will increase and then you walk on the next row the other direction logging as you go until the grid is complete. This is how the data is brought into the Snuffler program. See the grid figure below. When setting up your grid always walk the grid in this fashion.
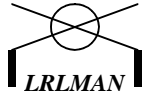
Also measure your grid area with a tape measure to place the grid markers correctly. Check across the corners to check for a good square grid. You can use a the tape measure with markers every 3 feet or every meter marked on the other side and lay it on the ground. Use this to walk along and press the log button at each mark. After the first row, move the tape to the next line and repeat the logging until you complete the grid. This helps keep you straight and inline when walking your grid.

The ARC-GEO LOGGER is very easy to use and can save you time and money in the field. Now you can log the size of a football field in a very short time. Review the data; mark the target area you want to check further at a later date. Now you have a picture to reference your digs.
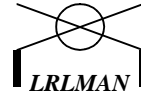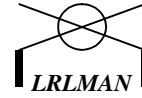
The grid below is an H=10 x W=20 grid. You will always face the (Y) rows of the grid to start.
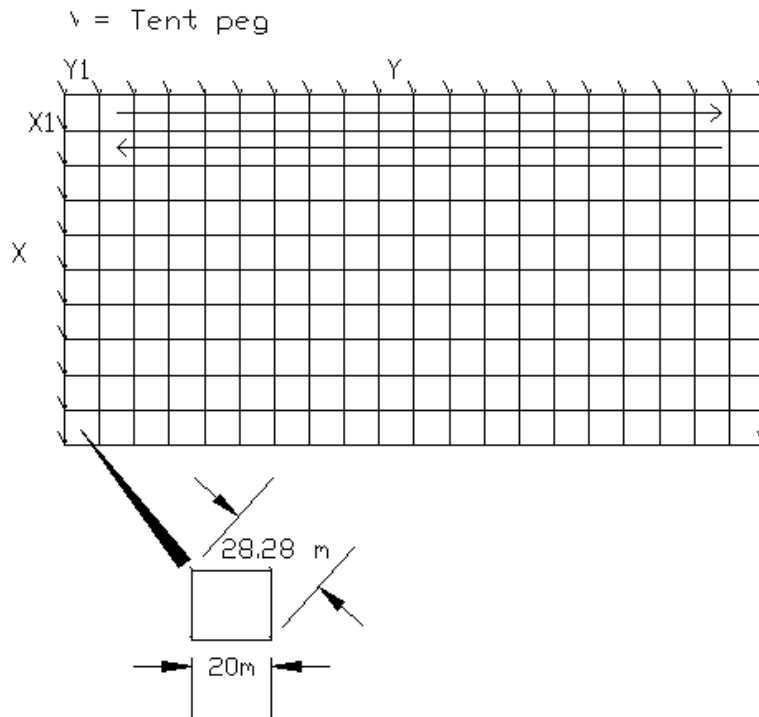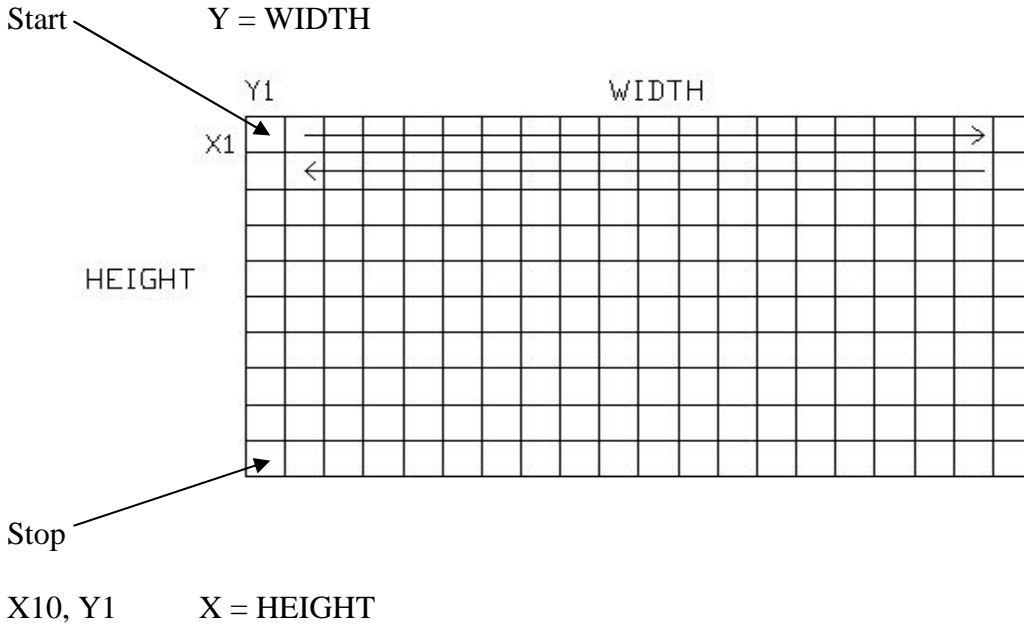
Start   Y = WIDTH

X10, Y1   X = HEIGHT

Place tent pegs along each section to log. If you are using meters, then each section should be the size above within the grid itself. Remember to use the tent pegs of the side of the previous grid and build each grid on the other. Marks can be in meters, feet or yards. Remember the larger the sections of the grid the less resolution you will get. Of course the smaller sections or log points the greater resolution.

Depending on the size of the target you want to see will determine the size of the log sections. So if you want to use the TF-900, you could have your increaments every 3 feet. But if you are searching inside a house, you want to use a smaller coil and cover less area. A 8" coil is just right for this. So everytime you move the coil you will move it every 8". Remember that the grid is a 1:1 ratio. So if the wall measures Y12 foot x X12 foot, then you should have a grid: 12ftx12ft = 144" / 8" = 18 movements of the coil. So you would enter a grid size of 18x18 in the Arc-Geo logger. If a 12" coil is used then the grid would be 12x12 and so on.

The smaller the increaments you use the greater the resolution you will get. If a detector with an 8" coil will reach the target use it.

As you log (L) the display will show which Y, X position you are currently logging, along with the grid size you are logging.

> **L> Y: 2 X: 1 U: 0**
> **G: 5 x 7 D: 0**

If you want to redo the last log or two press the delete button and with each beep the display will back up (1) Y position at a time. You cannot back up onto the last X, only Y.

When the last position is logged the U will increase showing you have used another grid location for that bank and show grid complete.

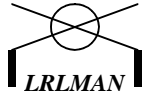> **L> Y: 5 X: 1 U: 1**
> **GRID COMPLETE**

If you want to do another grid, just select the next grid in order and repeat the process. If there are trees or other objects in the path, you must sample in their place. Sampling the last position, X number of times does this. Then when you download the data you can place the dummy value in those locations.
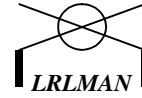
Polarity Switch:

Connect the Arc-Geo mini to the detector headphone jack. Turn the logger on and press no " not to add to existing grid". Turn the detector on and walk over a target. Watch the

Signal LED to light. Place the detector where the LED just comes on and press the Polarity switch. You want the strongest signal position. IF the LED goes out then put the polarity switch back in the first position. You should always use the strongest position for that detector.

AUTO/MANUAL

In auto mode the unit will log every second. Try to step in time with each log or keep the coil moving at a steady pace. To start the auto log, stand ready and press the log button once. The unit will log till the end of the (Y) is complete. After you are ready on the next (X), press log to start. Each time you reach the end of (Y) the unit will stop and wait for you to start again. You can switch between manual and auto. But you will have to press log to start auto logging again.

For example: If you are walking and come up to a tree, you could switch to manual to log the number of points needed for the space of the tree and then switch back to auto to finish the (Y).

GRAPHIC SOFTWARE DUMMY VALUE

Whatever software you choose to use, here are a few things to remember. When doing a survey you may from time to time run into a wall, tree or some other object in your path. You still have to do a sample in the object place. To do this, just take samples in the place/area that these object take up in your grid. For example: If you have a tree that is on a row and the tree would take up 3 sample places, when you reach the tree press sample three times for the tree area on the grid. Note the X, Y of the tree samples.

When you download the data, you can correct the data for the tree by replacing the data in the X, Y positions with the dummy value 1024. This will draw blank spaces on the grid in place of the tree. You still need to make notes of what these blank spaces were in your notes. You should always do a rough graph of the area including trees and all objects within the grid area and reference them to the software plot.
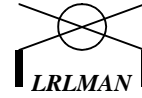
DETECTOR TYPES

At the time of this writing, any detector with a headphone output should work with this unit. A detector should be used that will give the best target size results and coverage of the area. You can always go over the area with a smaller coil or different type detector. The Arc-Geo Logger increases depth by the interface of the headphone jack. The unit picks up signals that you may not begin to hear. Also refer to the metal detector manual for correct setting of the detector. You can try to use a splitter and wear headphone with the logger, but the logger was not designed to use a splitter. Data loss is possible and depends on the detector used. If you try a splitter turn the volume all the way up on the detector.

Two Box – Is the best to use for large targets and depth. Will ignore smaller targets. The TF-900 by Discovery has a metal mode and a cave mode and was used for developing of this unit. The cave mode will detector non-ferrous objects, rejecting iron!

PI – Also can be used for depth, but may detect smaller targets.

VLF – Detectors with 8" to 12" coils are good for walls and floors inside houses. Also increases the resolution of the grid by logging every (coil size) 8"-12". These units can be set to only respond to gold and above giving even better possibilities to the user.

COIL SIZES – Select the coil size to fit the application. For house searching an 8" coil is fine. You would move the coil in 8" steps or the width of the coil you are using. For a deep target you should use a larger coil or a large PI coil and move the units the width of the coil or scan pattern of the unit. I log every 3 feet using a deep seeker.

The Arc-Geo Logger can log many signals. Mag's and other types of treasure locators that have a headphone jack or a dc voltage output up to 5vdc can be used with the Arc-Geo Logger.

GRID TYPES AND USES

You can think of many ways to grid a target after you get used to using this unit. To start when you are on a new site, mark the plot areas you want to grid in a notebook for reference later. This will show how to connect the grids in the software for viewing. Depending on the site and area to log I always do a sample log.

Sample Log:

A sample log is a log of an area to see if there are any metals over the section of interest. The X, Y is set for X = 1 and Y set to the number of samples for that area.
For example, let's say we have a mound of some type. If you are using a deep seeker, you need to find out how many steps it takes to walk across the mound from one side to the other crossing the top in the middle of the mound. This number is the Y of our sample grid. So you would make two grids that form an X over the mound. When you bring this grid into the software it will be shown as one line plot. But you will get a quick look to see if there are any metals of interest. If so then you can do a normal grid of the mound to get size and shape.

Grid Shapes:
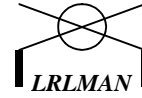
Because of the shape of our mound, it would be best to slice it by taking many grids and then putting them back together in software. Because of the uneven ground you cannot use a square grid. As you walk up the mound the area increases as you slice through the mound. So depending on the height of the mound, the first Y may be 5 the next 10 and so on. You can see that you will have to determine what would be the best grid to use given the area to grid.

Square and rectangle grids are the easiest to do. The only problem is trees or walls that are in the grid. You still need to take the sample in those spot. You can press log for the number of samples needed to cover that area, then continue pass that point.

WARNINGS

- Do not plug AC into the input jack!
- Do not open the unit for any reason. No reusable parts inside.
- Do not store the unit where temperatures may exceed 98 degrees.
- When moving the unit from a cold environment to a warm or hot environment may cause condensation inside the unit. Move the unit so that the unit's temperature changes slowly.
- Charge the unit when the display shows charge battery.
- It is not possible to recover data once it has been deleted.
- Always start at X1, Y1 upper left top of grid.
- Do not press any buttons during power up of unit.
- Do not use this unit during a lighting storm.
- The enclosure is waterproof when closed.
- Plotting a grid near high power lines may interfere with the metal detector response.
- Inspect your equipment before operating.
- Do not press against the LCD display.
- Leaving the LCD backlight on will reduce battery life.
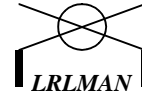- Using a headphone splitter may take away from the sensitivity of the logger.

SPECIFICATIONS

Memory Capacity	4 - 4k banks
RS232 Baud Rate	9600 8,N, 1
Battery Type	8 AA, 12vdc N-M-H
Battery Life	36hrs @ full charge
Input Signal	Audio/Headphone
Case	Seahorse SE-120
20 x 20 Grids	4 in each bank.
Charge Time	8-12 hours

Note: *The newer units have an LED charge indicator. Charging should not exceed 12 hours! The batteries will get hot and is normal for a fast charge system.*

HOUSE SEARCHING

Because the concept of the Arc-Geo Logger, house searching is made easy. You can grid each wall within a house and look at each shape and size of targets. One way to reference a target size and depth/position in the wall is, to have someone hold a small plate on the other side of the wall off at an angle to the target area. Then do another scan and export the data to a 3d file. This will allow you to rotate the picture and get a size and placement of the target in relation to the reference plate.

Any small detector should be used for house searching. Set the unit to cancel small nails and iron targets. Then any objects you will see would be high metals like brass, gold or silver.

UTILITY USE

The unit can be used to verify if rhubarb has been placed in a new slab. Or plumbers can grid a yard to locate the water main or other pipes. Some detectors have a ground density mode that will allow the user to see voids of large non-metal pipes and concrete. I'm sure those in this field can think of many other uses also.
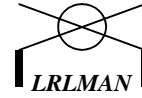
ARCHEOSURVEYOR-LITE SOFTWARE

I now have a lite version of AS for the logger and GCG. You can download it from the Arc-Geo page on my site.

BATTERY CHARGING

The newer units have a fast rate charge circuit, which means higher current. The charger supplied is designed for the batteries used in the Arc-Geo.

<div align="center">

DO NOT USE ANOTHER CHARGER!

DO NOT CHARGE OVER 24 HOURS!

</div>

The batteries will get hot and is normal. Over charging may cause battery damage.

CLOSING NOTES

Please read the manufactures software manuals to learn how to import data. Snuffler and other type programs can be used with the Arc-Geo logger. I have included in this manual step's to import files. For those of you that are not used to dealing with files in this way will have a learning curve. Remember to set the data range from 0-1023 in the graphic software you choose! Also set the dummy value of 1024. The logger is a powerful new innovation in metal detecting! To the serious treasure hunter it a must to log and store information on a site!

I wish the best to you. This is a great hobby!

Tim Williams