

3101A Antenna

System Settings and User Notes



The World Leader in
Subsurface Imaging™

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Geophysical Survey Systems, Inc. hereinafter referred to as GSSI, warrants that for a period of 24 months from the delivery date to the original purchaser this product will be free from defects in materials and workmanship. EXCEPT FOR THE FOREGOING LIMITED WARRANTY, GSSI DISCLAIMS ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. GSSI's obligation is limited to repairing or replacing parts or equipment which are returned to GSSI, transportation and insurance pre-paid, without alteration or further damage, and which in GSSI's judgment, were defective or became defective during normal use.

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Before returning any equipment to GSSI, a Return Material Authorization (RMA) number must be obtained. Please call the GSSI Customer Service Manager who will assign an RMA number. Be sure to have the serial number of the unit available

FCC Notice (for U.S. Customers):

This device complies with part 15 of the FCC Rules:

Operation is subject to the following conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation

Warning: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Operation of this device is restricted to law enforcement, fire and rescue officials, scientific research institutes, commercial mining companies, and construction companies. Operation by any other party is a violation of 47 U.S.C. § 301 and could subject the operator to serious legal penalties.

Coordination Requirements

(a) UWB imaging systems require coordination through the FCC before the equipment may be used. The operator shall comply with any constraints on equipment usage resulting from this coordination.

(b) The users of UWB imaging devices shall supply detailed operational areas to the FCC Office of Engineering and Technology who shall coordinate this information with the Federal Government through the National Telecommunications and Information Administration. The information provided by the UWB operator shall include the name, address and other pertinent contact information of the user, the desired geographical area of operation, and the FCC ID number and other nomenclature of the UWB device. This material shall be submitted to the following address:

Frequency Coordination Branch, OET
Federal Communications Commission
445 12th Street, SW
Washington, D.C. 20554
ATTN: UWB Coordination

(d) Users of authorized, coordinated UWB systems may transfer them to other qualified users and to different locations upon coordination of change of ownership or location to the FCC and coordination with existing authorized operations.

(e) The NTIA/FCC coordination report shall include any needed constraints that apply to day-to-day operations. Such constraints could specify prohibited areas of operations or areas located near authorized radio stations for which additional coordination is required before operation of the UWB equipment. If additional local coordination is required, a local coordination contact will be provided.

(f) The coordination of routine UWB operations shall not take longer than 15 business days from the receipt of the coordination request by NTIA. Special temporary operations may be handled with an expedited turn-around time when circumstances warrant. The operation of UWB systems in emergency situations involving the safety of life or property may occur without coordination provided a notification procedure, similar to that contained in CFR47 Section 2.405(a)-(e), is followed by the UWB equipment user.

Notice: Use of this device as a wall imaging system is prohibited by FCC regulations.

Canadian Requirements for RSS-220

Canadian Requirements of RSS-220 for Ground Antennas

This Ground Penetrating Radar Device shall be operated only when in contact with or within 1 m of the ground.

This Ground Penetrating Radar Device shall be operated only by law enforcement agencies, scientific research institutes, commercial mining companies, construction companies, and emergency rescue or firefighting organizations.

Cet appareil de radar de sol (ou géoradar) ne doit être utilisé qu'en contact avec le sol ou à 1 m maximum au dessus du sol.

Cet appareil de radar de sol ne doit être utilisé que par les forces de l'ordre, les instituts de recherche scientifiques, les sociétés minières, les sociétés de construction, et les organisations de secours d'urgence ou de combat du feu.

Canadian Requirements of RSS-220 for Hand-held Antennas

This In-wall Radar Imaging Device shall be operated where the device is directed at the wall and in contact with or within 20 cm of the wall surface.

This In-wall Radar Imaging Device shall be operated only by law enforcement agencies, scientific research institutes, commercial mining companies, construction companies, and emergency rescue or firefighting organizations.

Cet appareil de radar de structure (murs, poutres, dalles...) ne doit être utilisé qu'en contact avec la structure ou à 20 cm maximum décollé de cette structure.
scientifiques, les sociétés minières, les sociétés de construction, et les organisations de secours d'urgence ou de combat du feu.

Canadian Requirements of RSS-220 for Search and Rescue Antennas

This Through-wall Radar Imaging Device shall be operated only by law enforcement agencies or emergency rescue or firefighting organizations that are under a local, provincial or federal authority. The equipment is to be operated only in providing services and for necessary training operations.

Cet appareil de radar au travers des murs ne doit être utilisé que par les forces de l'ordre ou les organisations de secours d'urgence ou de combat du feu qui sont sous une autorité locale, provinciale ou fédérale. Cet équipement ne doit être utilisé que dans le cadre de services et pour les opérations d'entraînement nécessaires.

Certificate

To Whom it may concern:

This is to certify that electromagnetic radiation emissions from transducers (antenna with transmitting and receiving electronics) manufactured by Geophysical Survey Systems, Inc. (GSSI) DO NOT constitute a safety or health hazard to operating personnel.

Emissions from GSSI transducers are below the 10mW/cm² (100W/m²) level specified by the United States Occupational Safety and Health Administration (OSHA) regulations

Paragraph 1910.97 states:

"For normal environmental conditions and for incident electromagnetic frequencies from 100 MHz to 100 GHz, the radiation protection guide is 10 mW/cm² (milliwatt per square centimeter) as averaged over any possible 0.1 hour period."

Emissions data using GPR SIR System-10, SIR-2, SIR-3, SIR-4, SIR-8, SIR-20, SIR-2000 and SIR-3000 (at the standard Pulse Repetition Frequency of 100 KHz) with the antenna Models listed and levels of Electromagnetic Radiation are specified herein:

Following is the average power density data at 5cm and wide band.

ANTENNA (MHz)	AVERAGE POWER DENSITY (W/m ² @ 5 cm)	OSHA SPEC. (W/m ²)
100	Less than 0.0001	100
200	Less than 0.0001	100
300	Less than 0.0001	100
270	Less than 0.0001	100
400	Less than 0.0001	100
500	Less than 0.0001	100
900	Less than 0.0001	100
1000	Less than 0.0001	100
1600	Less than 0.0001	100

GEOPHYSICAL SURVEY SYSTEMS, INC.

Alan E. Schutz
VP Technology

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Ground Penetrating Radar Coordination Notice And Equipment Registration

Note: This form is only for Domestic United States users. The Federal Communications Commission (FCC) requires that all users of GPR who purchased antennas after July 15th, 2002 register their equipment and areas of operation. If you have purchased any of the antennas listed in question 6 after July 15th, 2002, you must fill out this form and Fax and Mail to the FCC.

Failure to do this is a violation of Federal law.

- 1. Date:**

- 2. Company name:**

- 3. Address:**

- 4. Contact Information [contact name and phone number]:**

- 5. Area Of Operation [state(s)]:**

---Continued on next page.

6. Equipment Identification:

Brand Name: Geophysical Survey Systems, Inc.

Antenna Model No. (center frequency): *CHECK all antennas being registered.*

Model	Frequency	FCC ID
4105	2.0 GHz	QF74105
5100	1.5 GHz	QF75100
5101	1.0 GHz	QF75100
4108F	1.0 GHz	QF74108F
HandyScan	1.0 GHz	QF7HANDYSCAN
3101	900 MHz	QF73101D
5103A	400 MHz	QF75103A
TerraVision	400 MHz	QF7TERRAVISION
5104	270 MHz	QF75104
5106	200 MHz	QF75106

7. Receipt Date Of Equipment:

Fax this form to the FCC at: 202-418-1944

And

Mail to:

Frequency Coordination Branch, OET
Federal Communications Commission
445 12th Street, SW
Washington, D.C. 20554

ATTN: UWB Coordination

Do not send this information to GSSI.

Table Of Contents

Model 3101A Antenna	1
System Setup - Standard Settings	1
Preset Settings:	1
Deeper Profiling:.....	1
Signal Position.....	2
Gain Check.....	2
Using Your 3101A Antenna with a Survey Wheel	3
Model 611 (3 5/6" wheel).....	3
Model 616 Minicart (4" wheel)	3
Model 62X Survey Cart	4
Antenna Specifications	4

Model 3101A Antenna

Thank you for purchasing a GSSI 3101A. The Model 3101A antenna is a high frequency antenna that is designed for applications requiring very fine resolution and shallow depth penetration in a variety of materials. Please take a moment to examine your shipment to familiarize yourself with this manual. If you need assistance, GSSI technical support can be reached Monday-Friday, 8am-5pm, US Eastern Time at (800) 524-3011, or at (603) 893-1109 (International). You can also access technical support on the web at www.geophysical.com.

The Model 3101A can be used in continuous, survey wheel or static stacking modes. Please consult your control unit documentation for instructions on configuring your system for data collection modes.

System Setup - Standard Settings

Preset Settings:

System Run Mode: Survey Wheel (recommended) or Continuous

Range: 15 ns

Number of Gain Points: 3

Vertical Low Pass Filter: 2500 MHz

Vertical High Pass Filter: 225 MHz

Samples per Scan: 512

Bits per Sample: 16

Scans per Second: Set to 64 (increase to 120 when using survey wheel).

Deeper Profiling:

Setup Mode: Manual

System Run Mode: Survey Wheel (recommended) or Continuous

Range: 30 – 50 ns

Number of Gain Points: 3

Vertical Low Pass Filter: 2500 MHz

Vertical High Pass Filter: 225 MHz

Samples per Scan: 512

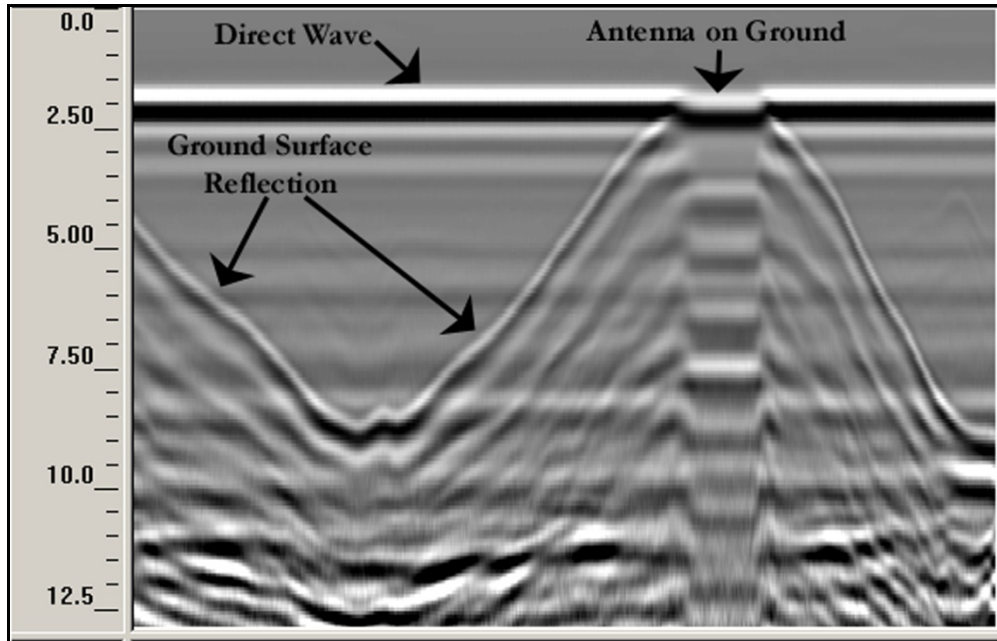
Bits per Sample: 16

Scans per Second: to 64 (increase to 120 when using survey wheel).

Signal Position

Place the antenna on the ground and use the Automatic Signal Position selection. The system will servo and place the direct coupling pulse at the top of the time range window.

To test that you have the correct position, raise the antenna off the ground and you will observe on your system that the antenna transmit pulse (direct wave) will separate from the reflection from the ground. The higher that you raise the antenna, the further apart will be the two pulses.



Newer control units such as the SIR-3000 and the SIR-20 have advanced algorithms to locate the surface position. If you would like to assure that the direct coupling pulse (time zero) is recorded, the user should place the Signal Position Servo in the manual mode. The signal should then be moved down in the time range window until the entire surface pulse is visible and there is some 'dead time' or flat trace visible above the direct coupling pulse in the time range window. If you are using your 3101A with the SIR-3000, it will be necessary to set the SURFACE% to zero in order to check the signal position. Please consult the SIR-3000 User's Manual for additional instructions on this point.

Gain Check

The surface pulse should be about 2/3 the width of the screen. If it is greater, reduce the Gains manually. If the signal appears too small, you can manually increase the Gains, but the first gain point should never exceed 10dB; the last gain point should not exceed 65dB.

Using Your 3101A Antenna with a Survey Wheel

By using a survey wheel with your antenna you can more easily relocate targets to the survey surface, and perform distance-based processing functions in RADAN without having to distance normalize your data.

Survey wheels are available as a separate purchase. If you do not already own one, please contact your GSSI Sales Representative to discuss the features and benefits of each type.

Model 611 (3 5/6" wheel)

Ticks/foot: 609.6

Ticks/meter: 2000

To attach the 611, simply undo the four screws holding the antenna's tow handle bracket and sandwich that 611 bracket plate between the antenna and the tow handle bracket. Replace the four screws to secure.



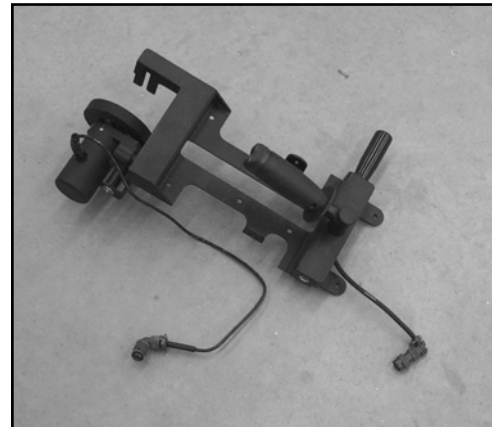
Model 616 Minicart (4" wheel)

Ticks/foot: 486

Ticks/meter: 1590

To attach the 616, first undo the four screws holding the antenna's tow handle. Set the tow handle bracket aside, but retain the four screws and washers. Attach the 616 assembly to the 3101A with the four screws. Connect the two leads from the 616 to the two small connectors on the antenna.

The wheel of the Model 616 can be removed and relocated on the cart to allow the antenna to scan with the dipoles oriented 90 degrees to normal.



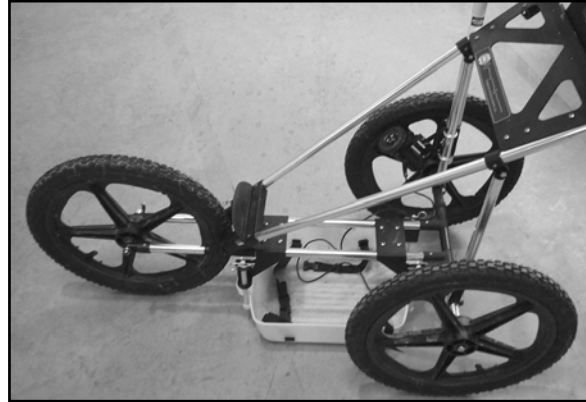
Model 62X Survey Cart

Ticks/foot: -487.8

Ticks/meter: -1583

The 3101A can be placed in the white plastic antenna holder of the 62X cart for use on rougher terrain or for large area surveys.

Note: Due to size limitations, a regular, straight connector control cable will not fit the 3101A and the 62X cart. Be sure that you have a control cable with a 90 degree connector on the antenna end. GSSI makes a 2-meter control cable with a 90 degree connector that is designed specifically to work with this cart.



Antenna Specifications

Center frequency: 900 MHz

Pulse duration: 1.1 ns

Depth of penetration: 0- 6 ft depending on dielectric permittivity

Size of sensor: 13×7.5×3.5 inches (33×20×8cm)

Weight of sensor: 7 lbs 4 oz. (3.4 kg)

Survey Wheel: Model 611 (3 5/6" wheel): 2000 ticks/meter
609.6 ticks/foot

Model 62X (three wheeled) Cart: -1583 ticks/meter
-487.8 ticks/foot

Model 616 cart (4.8" wheel): 1234.5 ticks/meter
486 ticks/foot