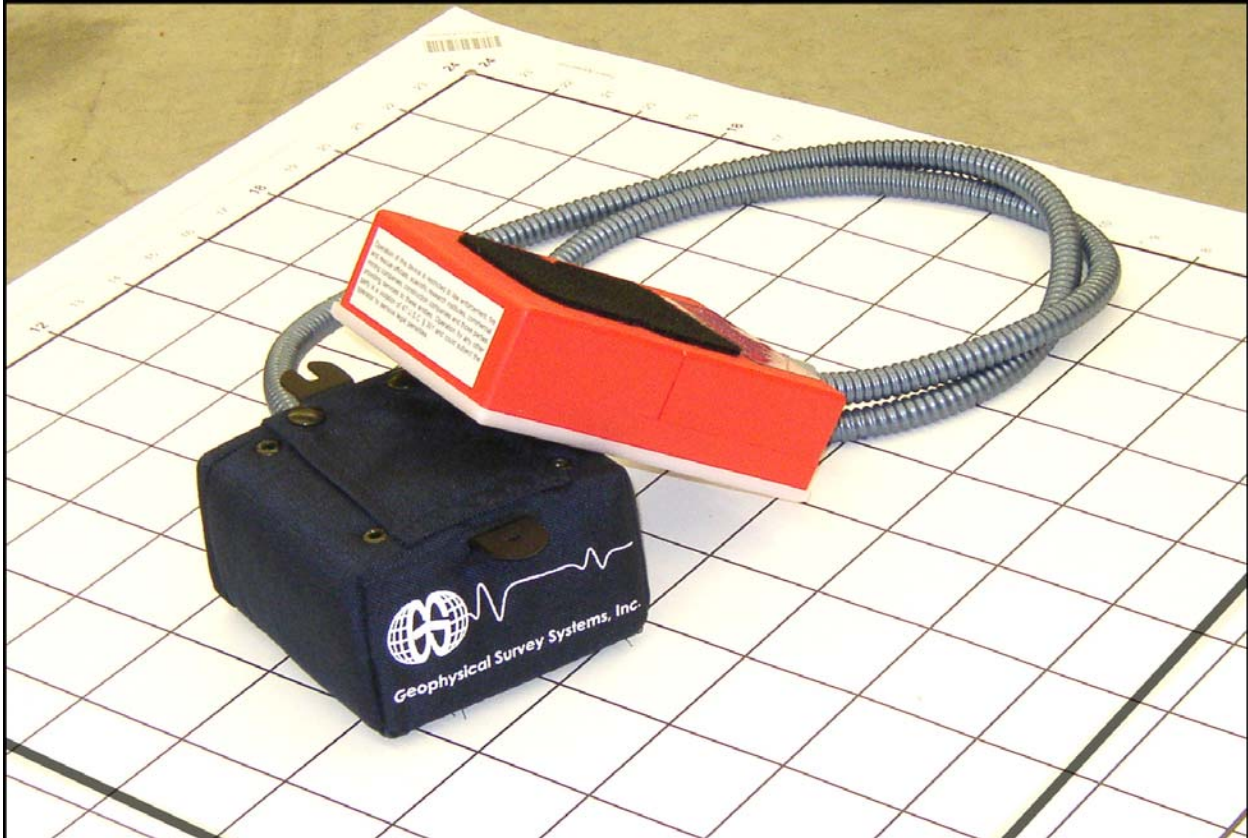


Model 5101 Antenna

System Settings and User Notes



The Difference is the Data

Geophysical Survey Systems, Inc.

13 Klein Drive, P.O. Box 97
North Salem, NH 03073-0097

Phone: (603) 893-1109 / FAX: (603) 889-3984

www.geophysical.com
sales@geophysical.com



Limited Warranty, Limitations Of Liability And Restrictions

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, GSSI's products 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.

GSSI ASSUMES NO LIABILITY FOR ANY DIRECT, INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES OR INJURIES CAUSED BY PROPER OR IMPROPER OPERATION OF ITS EQUIPMENT OR SOFTWARE, WHETHER OR NOT DEFECTIVE.

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.

GSSI does not convey any license under its patent or other intellectual property rights or the rights of others.

Note: Information in this manual is subject to change without notice. Please consult the manual updates supplied with your system and contact GSSI with any additional questions.

Copyright© 2005 Geophysical Survey Systems, Inc.
All rights reserved
including the right of reproduction
in whole or in part in any form

Published by Geophysical Survey Systems, Inc.
13 Klein Drive
North Salem, New Hampshire 03073-0097

Printed in the United States

GSSI and SIR are registered trademarks of
Geophysical Survey Systems, Inc.

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.

Model 5101 Antenna

The Model 5101 antenna represents the state of the art in shallow earth or deeper concrete imaging. The high frequency allows excellent resolution at a penetration depth that is greater than antennas in the 1.5 GHz range. This antenna is appropriate in areas where higher frequencies do not have adequate penetration power and lower frequencies do not provide acceptable resolution.

Note: The Model 5101 antenna cannot at present be used with the large, three-wheeled utility cart. It can only be used with the small survey minicarts. Use of the Model 5101 for data collection on bridge decks requires the small minicart (Model 614 or 615) and the extension arm.

System Setup - Standard Settings

Note: You must follow these setup instructions exactly to use the Model 5101 antenna. Positioning of the signal will be the last step in the process.

Setup Mode: Manual

System Run Mode: Survey Wheel (recommended) or Continuous

Range: 20-40 ns

Number of Gain Points: 5

Vertical Low Pass Filter (FIR): 3000 MHz

Vertical High Pass Filter (FIR): 225 to 250 MHz

Vertical High Pass Filter (IIR): 10 MHz

Samples per Scan: 512

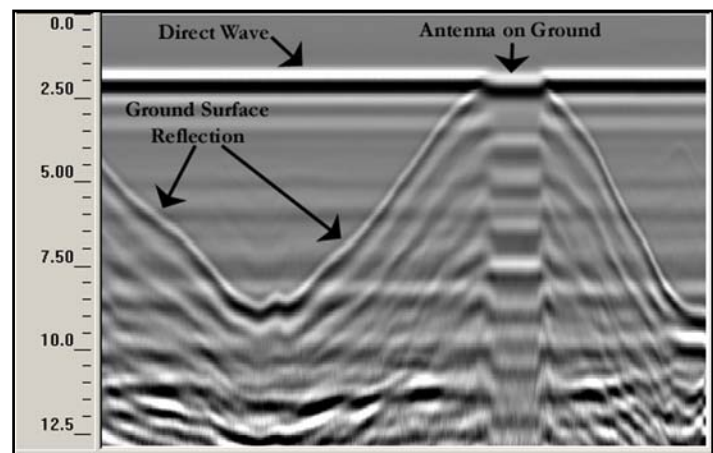
Bits per Sample: 16

Scans per Second: Set to the maximum scan rate allowed by the SIR System used

Signal Position

Place the antenna on the concrete floor and use the Automatic Signal Position selection. You may need to try this more than once to get the system to lock on to the surface pulse. If you are using the antenna with a minicart, remember that you must have the red “deadman” switch on the minicart’s handle depressed.

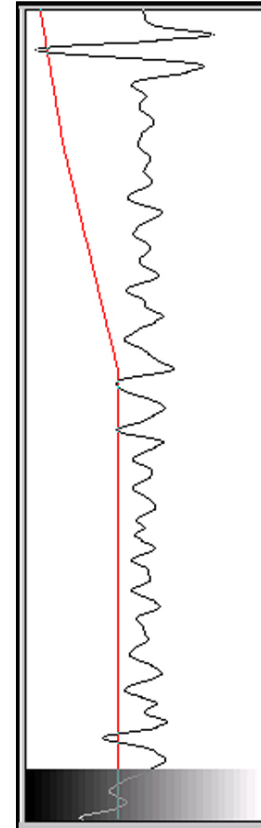
To test that you have the correct position, raise the antenna off the ground and you will observe on your system that the antenna transmit pulse will separate from the reflection from the ground. The higher that you raise the antenna, the further apart will be the two pulses.



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.

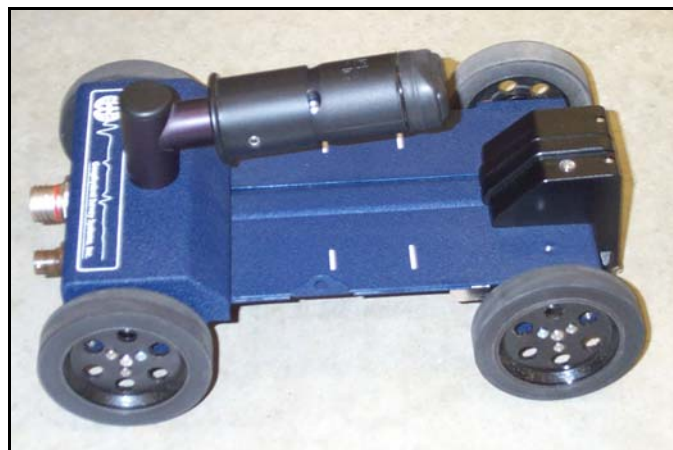
At the right is a screen shot from the SIR-3000. Initial pulse at the top of the window does not “run off” the right or left edge of the window. The red line superimposed on the window is the gain curve. Please see your control unit documentation for more information on this feature.



Minicart

Your Model 5101 is designed to fit into the Model 614 or Model 615 minicart. Using the antenna with the minicart allows you to take advantage of distance-based data collection which is possible with a survey wheel. A survey wheel (rear-axle of the cart) tracks the distance traveled and allows consistent scan spacing. The minicart is available as a separate purchase and is also compatible with the Model 5100/5100B high frequency antenna sold with the StructureScan systems. Please contact your GSSI sales representative for details.

Note: The red switch on the underside of the minicart’s handle operates as a ‘deadman’ switch. The switch must be fully depressed to activate the transmitter. If you release the red switch during data collection, the system will automatically turn off the transmitter within approximately 10 seconds unless you depress the switch again. This feature makes it legal to scan walls and ceiling within the United States. Operation of the 5101 on a wall or ceiling without a ‘deadman’ switch enabled cart or handle constitutes illegal operation with the USA as per FCC regulations.



Survey minicart

Data Collection

Consult your control unit documentation for instructions on configuring your GPR system to collect data with the Model 5101.

Collecting Data Using The Survey Wheel With The Standard Settings

System Run Mode: Survey Wheel (Distance)

Number of Scans per Meter: 200 (60 scans per foot) or higher

Remote Operation on the Survey Minicart

- Pressing the thumb rocker button for less than one second will place a marker in the data.
- Pressing the button for longer than 6 seconds will close any open files and turn off the transmitter. To resume, the data acquisition sequence must be repeated.

Special Settings Used For Collecting Data On Bridge Decks

Setup Mode: Manual

System Run Mode: Survey Wheel

Range: 6 ns (unpaved), 10 ns (paved)

Number of Gain Points: 1

Vertical Low Pass Filter: 3000 MHz

Vertical High Pass Filter: 225 to 250 MHz

Vertical High Pass Filter (IIR): 10 MHz

No Horizontal Filters

Samples per Scan: 512

Bits per Sample: 16

Scans per Second: Set to the maximum scan rate allowed by the SIR System used

Signal Positioning: Use the same procedure as in standard setup

Set the Scans per Meter parameter to 80 scans per meter (24 scans per foot)

Calibrate the survey wheel before collecting data

Note: See Bridge Assessment Manual before proceeding.

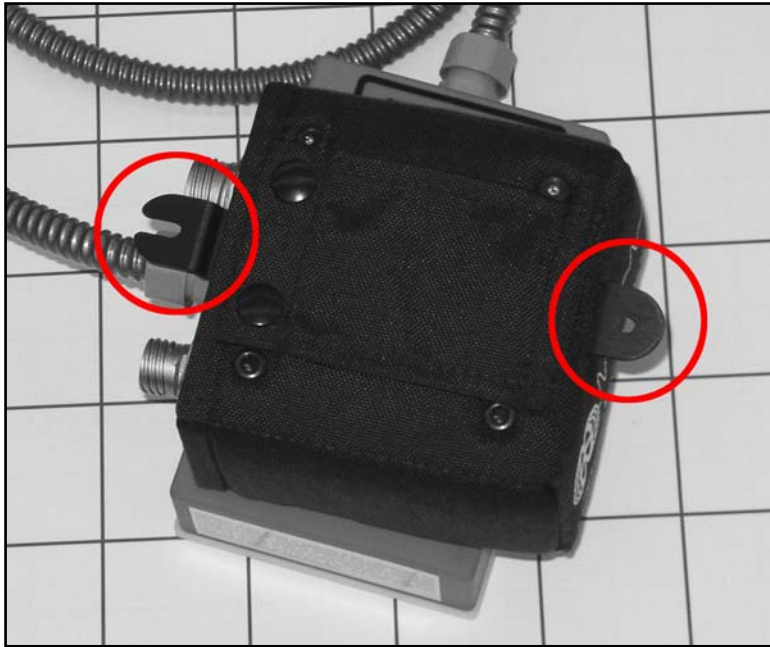
Specifications

Center frequency: 1000 MHz

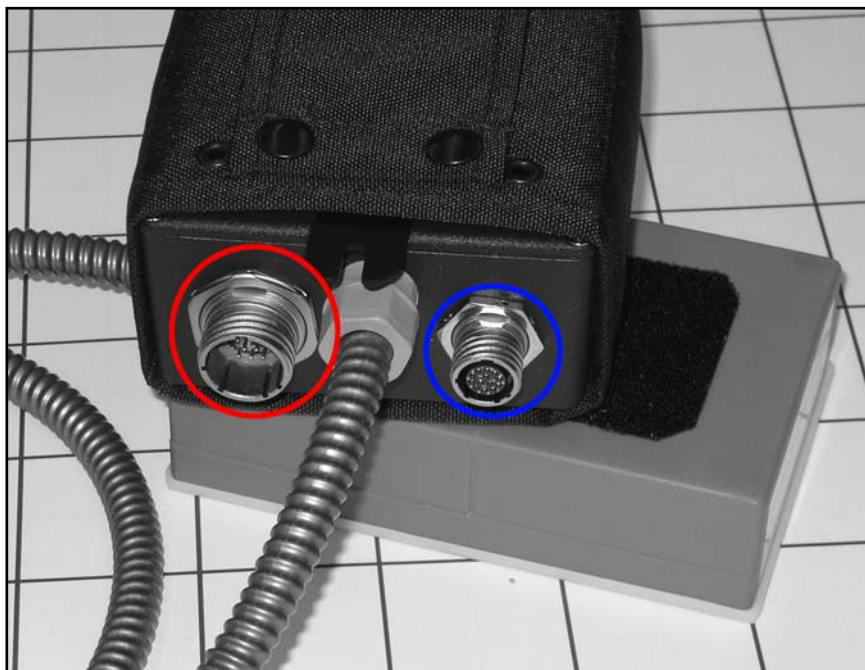
Pulse duration: 1 ns

Depth of penetration: 0-30 inches depending on type of concrete

Size of sensor: 1.5 x 4 x 6.5 inches (3.8 x 10 x 16.5 cm)



The 5101 controller box has two brackets to mount the box to the extension handle. The thumbscrews are provided with the SIR-3000.



The connector with the red circle is for the control cable (direct to the SIR-3000). The connector with the blue circle is for the survey minicart cable. This cable carries the information from the survey wheel, marker switch, and the bar code reader.