

Model 52600

System Settings and User Notes



**The World Leader in
Subsurface Imaging™**

Geophysical Survey Systems, Inc.

Tel 603.893.1109 • Fax 603.889.3984
sales@geophysical.com
www.geophysical.com

November, 2007

Copyright© 2001, 2007 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.
12 Industrial Way
Salem, New Hampshire 03079

Printed in the United States

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

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 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.

GSSI ASSUMES NO LIABILITY FOR ANY DIRECT, INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES OR INJURIES CAUSED BY PROPER OR IMPROPER OPERATION OF ITS EQUIPMENT, 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

FCC Notice (for U.S. Customers):

This device complies with part 15, class F 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, construction companies and private parties operating on behalf of these groups. 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.

Notice: Use of this device as a floor or wall imaging system requires the use of a "deadman switch" as supplied by GSSI.

For U.S. Customers

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 or 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.: *CHECK all antennas being registered.*

Model	FCC ID	Check
4105	QF74105	
5100(B)	QF75100	
5101	QF75101	
52600	QF752600	
4108F	QF74108F	
HandyScan	QF7HANDYSCAN	
3101D	QF73101D	
5103	QF75103	
TerraVision	QF7TERRAVISION	
5104	QF75104	
5106	QF75106	

7. Receipt Date Of Equipment:

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

Or

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.

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 $10\text{mW}/\text{cm}^2$ ($100\text{W}/\text{m}^2$) 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 $10\text{ mW}/\text{cm}^2$ (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
2000	Less than 0.0001	100
2600	Less than 0.0001	100

GEOPHYSICAL SURVEY SYSTEMS, INC.

Alan E. Schutz
Engineering Director

This page intentionally left blank.

Table Of Contents

Model 52600 Antenna.....	1
System Setup - Standard Settings	1
Signal Position.....	1
Gain Check.....	2
Minicart.....	2
Data Collection.....	2
Collecting Data Using The Survey Wheel With The Standard Settings.....	2
Remote Operation	2
Special Settings Used For Collecting Data On Bridge Decks.....	3
Specifications.....	4

Model 52600 Antenna

Thank you for purchasing a Model 52600 antenna. The Model 52600 represents the current state of the art in high resolution concrete structure imaging. The Model 52600 antenna has greatly improved resolution over previous high frequency antennas. Not only is the frequency higher, but the antenna has the ability to see objects at very close distances. The Model 52600 is the highest frequency ground coupled antenna available on the market today.

Note: The Model 52600 antenna cannot be used with the large, three-wheeled utility cart without the survey wheel adaptor cable. If you intend to use the antenna with the utility survey cart, contact your GSSI account representative to make sure that you have all of the necessary cabling.

System Setup - Standard Settings

Note: You must follow these setup instructions exactly to use the Model 52600 antenna. Positioning of the signal will be the last step in the process.

System Run Mode: Survey Wheel (recommended) or Continuous

Range: 8 ns

Number of Gain Points: 2

Vertical Low Pass FIR Filter: 5000 MHz

Vertical High Pass FIR Filter: 400 MHz

Vertical High Pass IIR Filter: 10 MHz

Samples per Scan: 512

Bits per Sample: 16

Transmit Rate: Set to the maximum rate allowed by the SIR System, but not higher than 200 KHz.

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

Signal Position

Place the antenna on the concrete floor and use the Automatic Signal Position selection. You may need to try this 2 to 3 times to get the system to lock on to the surface pulse. If after 3 tries the surface pulse is not in the signal window, point the antenna into the air and again try the Automatic Position.

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.

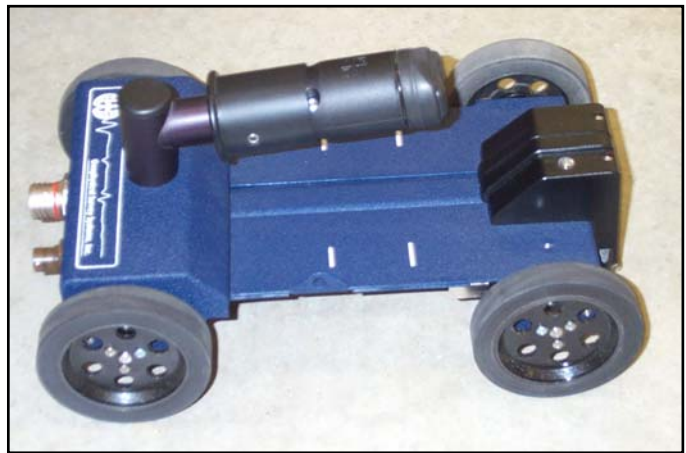
Gain Check

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.

Minicart

Your Model 52600 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 general purpose antenna sold with the StructureScan systems and the Model 5101 deep penetration concrete antenna. Please contact your GSSI account 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 ceilings within the United States and the European Community. Operation of the 52600 on a wall or ceiling without a 'deadman' switch enabled cart or handle constitutes illegal operation within the USA as per FCC regulations or within the European Community as per EU regulations.



Data Collection

Collecting Data Using The Survey Wheel With The Standard Settings

System Run Mode: Distance.

Number of Scans per Meter: 300 (90 scans per foot) or higher

Remote Operation

- Pressing the thumb rocker switch 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 FIR Filter: 5000 MHz

Vertical High Pass FIR Filter: 400 MHz

Vertical High Pass IIR Filter: 10 MHz

No Horizontal Filters

Samples per Scan: 512

Bits per Sample: 16

Transmit Rate: Set to the maximum scan rate allowed by the SIR System but not higher than 200 KHz.

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

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.

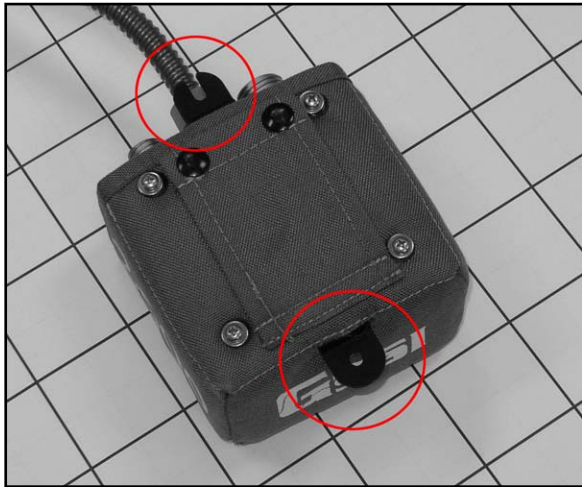
Specifications

Center frequency: 2600 MHz

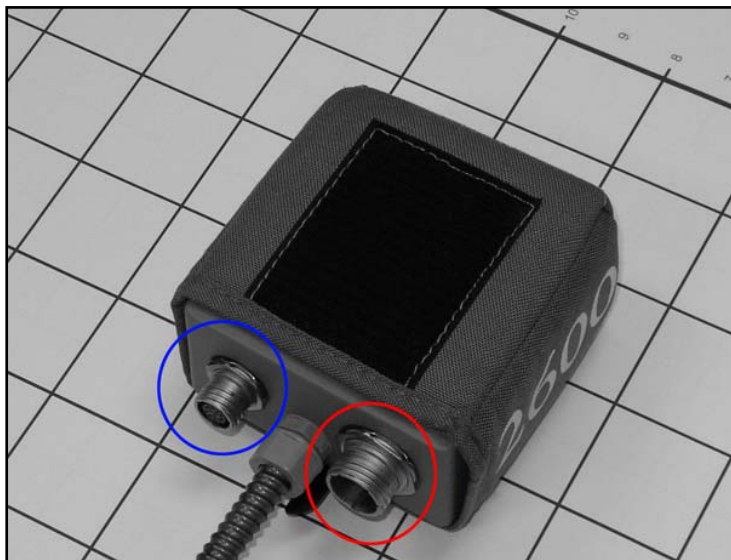
Pulse duration: 0.4 ns

Depth of penetration: 0-12 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 52600 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.