



Zond-12e 500A

Ground Penetrating Radar

USER'S MANUAL

Riga, 2019

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1. GENERAL DESCRIPTION

The Zond-12e 500A Ground Penetrating Radar (GPR) in operating condition consists of two parts: Control Unit with built-in battery 11.1V 8.7 A*h, integrated with antenna 500A, and notebook-type computer. (Fig. 1). The computer is connected to the Control Unit via Ethernet cross cable (Fig. 1). The antenna and the Control Unit are fit into plastic case with two runners as shown on Fig. 1. Brief description of parts of Zond-12e 500A GPR is given below.

Computer. Any computer may be used for the Zond-12e 500A GPR that is a notebook-type, PC compatible computer with the operating system **Windows 7 / 8 / 10**, having Ethernet network interface card 10/100BaseT. The exchange of information between the computer and the Control Unit as two peer elements of the network is facilitated by utilizing the **TCP/IPv4** protocol. Therefore, prior to connection of the computer to the Control Unit you have to set **IP address of computer** as **192.168.0.2** (if this address is occupied or is not accessible, you could use any address from 192.168.0.2 to 192.168.0.254, except 192.168.0.10. **Please, consult with your network administrator before changing IP addresses).**

Set **Subnet mask** as **255.255.255.0**.

The computer performs the following functions: it controls operation modes of the GPR, and receives, stores, processes and displays data.

Battery. The Zond-12e 500A GPR utilizes Li-Ion battery 11.1 V 8.7 A*h, which is built into the case under control panel. The status of the battery (voltage and percentage of the charge balance) is displayed on the computer screen in the settings and data receipt menu. In case of the battery discharge below the acceptable level, the computer will give a warning signal. Charging of the built-in battery is done by using the Mascot 2541 charger, which is supplied with the kit.

Control Unit & Antenna. The general view of the Control Unit is shown on Fig. 1. It is mounted on the top of antenna 500A and has two outgoing cables – Ethernet cable for connecting to computer and powering cable to be connected to the control panel.

Antenna. The Zond-12e 500A GPR uses shielded high-frequency antenna 500 MHz.

2. PREPARING OF THE GPR FOR OPERATION

Connect the data communication cable to the control unit and to the LAN connector of the computer as shown in Fig. 1.

Connect the powering cable to appropriate connector on the harness coming out from control panel.



Fig.1. Zond-12e 500A Ground Penetrating Radar in shockproof case.



Fig.2. View of shock proof case control panel of Zond-12e 500A GPR.

2.2. Turning GPR On

- 1) Turn ON the GPR using switch ON/OFF on control panel. The red light-emitting diode will light up.
- 2) Turn on the computer and install the **Prism2** software package onto a hard disk using the flash USB disk supplied with the kit. The installation process is described in the User's Manual for **Prism2** program. Once the installation is completed, you must perform the actions prescribed by the Manual in paragraphs 5.1 and 5.2 "Configuring the computer to connect with Zond-12e GPR Control Unit" and paragraph 6 "What to Do Immediately After Installation".
- 3) Run **Prism2** program. Main menu as below appears on computer screen.

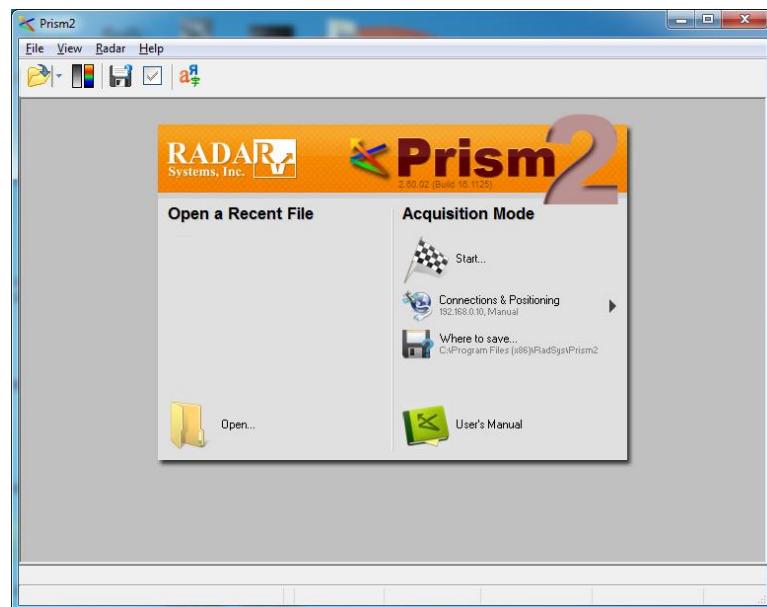


Fig. 3. Main menu of **Prism2** software.

- 4) Click on **Start** menu item. Data acquisition menu as below appears on the screen.

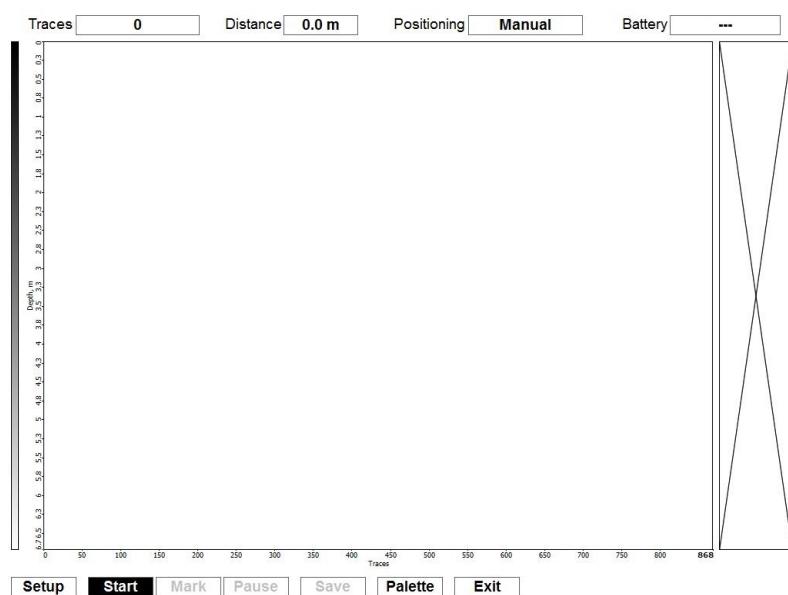


Fig. 4. Data acquisition menu.

Important: From this instant and up to returning back to the Main Menu, all control shall be made from the keyboard only. This is made specifically for convenient use of the computer in the field condition. In the Data Acquisition dialog box, use keys \leftarrow and \rightarrow to select Setup and press Enter or Space.

5. Enter **Setup** menu. Once **Setup** is activated, the screen shows **ZOND SYSTEM 12e SETUP** dialog box and set all the parameters the same as on the picture below. Menu options are selected using cursor keys and Enter or Space. At the first run signal may be not seen or located not in the same position as on picture. To set correct position of signal enter **Pulse delay** menu item and press “A” key on keyboard to start automatic adjustment. Just adjustment is finished press Enter and then **Close** setup menu.

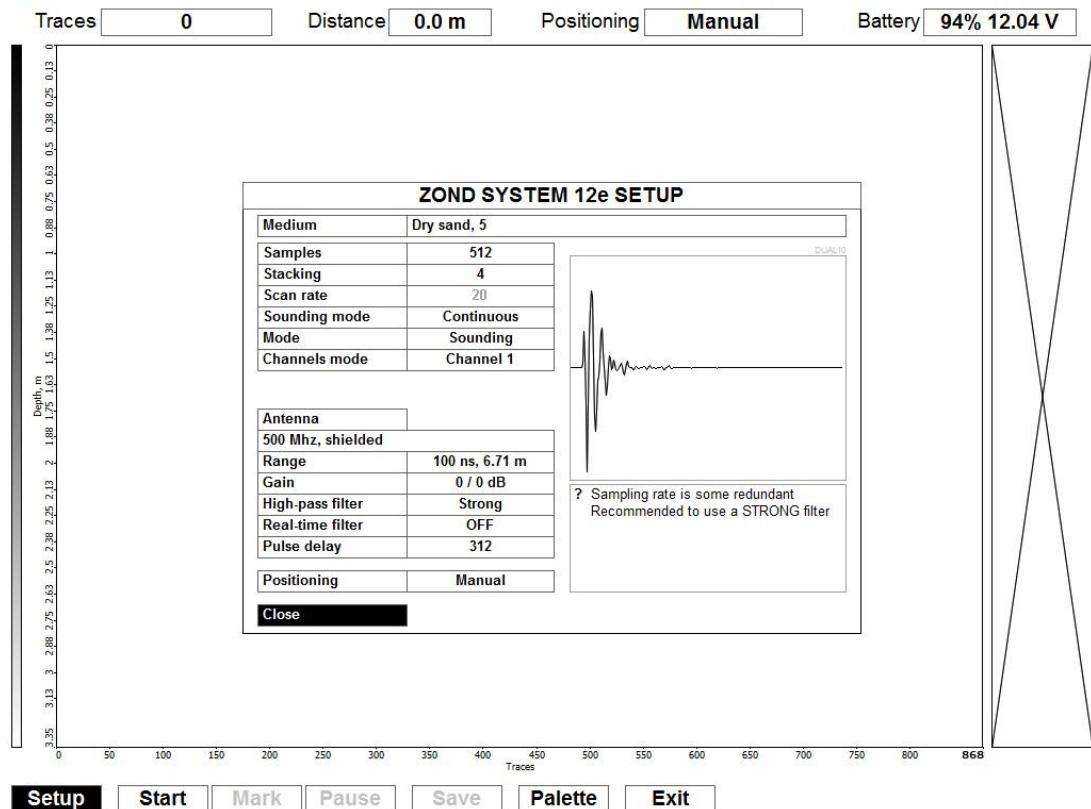


Fig. 5. Setup menu.

Important: Zond-12e 500A GPR has built-in deactivating mechanism, i.e. transmitter is switched ON only when operator enters SETUP menu item or START data acquisition. Transmitter switches OFF immediately after operator STOP data acquisition or leaves SETUP menu item.

2.3. Data acquisition.

Before to start survey please put Ethernet cable into groove on housing case wall and then close housing GPR case as it is shown on Fig.6. If Ethernet cable is too short it is possible to add one more cable using the coupler included in accessories kit.



Fig. 6. Operating configuration of Zond-12e 500A GPR.

Just SETUP menu is closed button START is active. Press Enter or Space key. Display shows data as on picture below. To stop data acquisition press Esc key or Enter (Space) when STOP button is active.

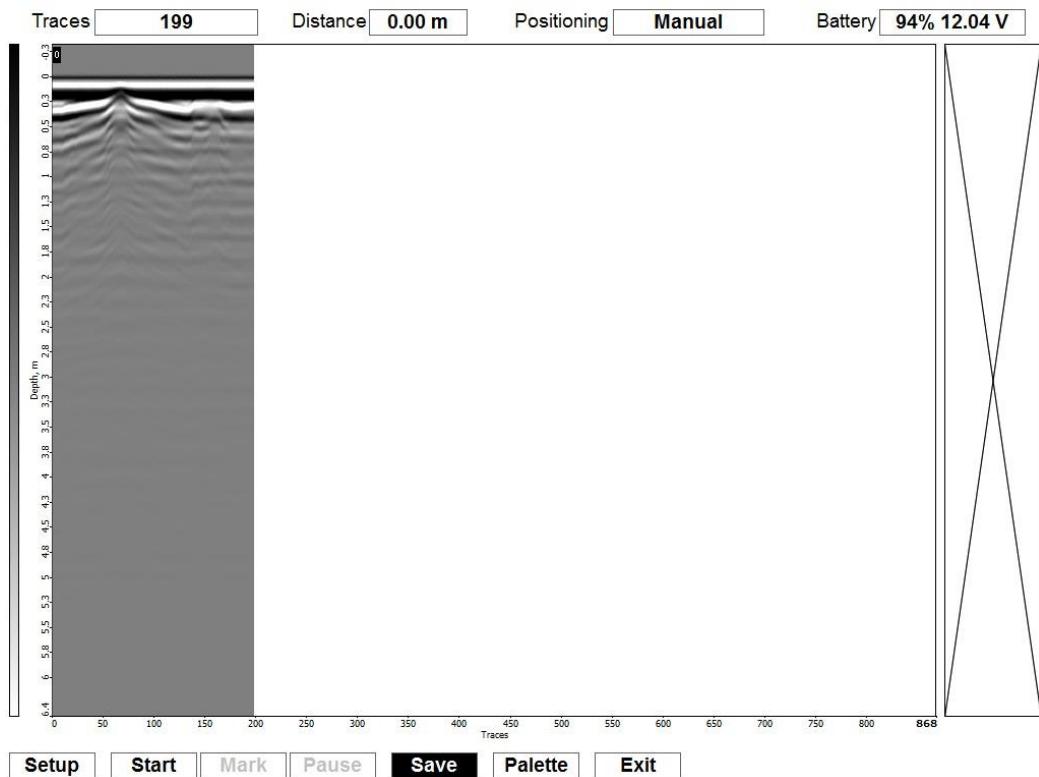


Fig. 7. Data acquisition.

3. CLIMATE OPERATION ENVIRONMENT

3.1. The Zond-12e 500A GPR can be operated at air temperature from 236°K (-10°C) to 313°K (+40°C) and relative humidity up to 95% at temperature 308°K (+35°C).

3.2. It is allowed operation of the also at lower temperature applying the heat insulating cover for the control unit.

3.3. It is not recommended to switch on the Zond-12e 500A GPR earlier than after an hour after its transfer from environment having negative temperature to a warm premise.

3.4. In case of operation of the Zond-12e 500A GPR in conditions of high air temperature (higher than +40°C) it is not recommended to leave the instrument in place where it can be affected by direct sun stares.

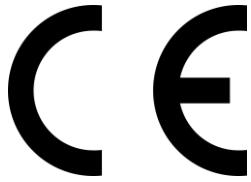
4. TRANSPORTATION RULES

4.1. In case of observing of rules of packaging of the instrument according to the Operation Manual it is allowed its transportation in soft and rigid package by railway, road and air transport without restriction of distance.

5. GUARANTEES

5.1. Radar Systems Inc. guarantees free of charge repair of any components of the Zond-12e 500A GPR and eliminate any defects for one year commencing on the date of purchase under condition of delivery of failed components to Radar Systems, Inc. address. Warranty does not extend to the case of mechanical damages due to incorrect use. In all other cases repair is performed for extra pay.

6. CE DECLARATION OF CONFORMITY



For the following equipment:

Zond-12e 500A GPR consisting of:

1. Control Unit;
2. Antenna 500A;

is herewith confirmed to comply with the requirements set out in the Council Directive on the Approximation of the Laws of the Member States relating to Electromagnetic Compatibility and Radio Spectrum Matters (99/5/EC), Short range devices, Ground- and Wall-Probing Radars applications, Low-voltage Directive (73/23/EEC) and the Amendment Directive (93/68/EEC). For the evaluation regarding the Directives, the following standards were applied:

1. EN 302 066-2
2. EN 55022
3. EN 61000 – 4 – 2
4. EN 61000 – 4 – 3
5. EN 61000 – 4 – 4
6. EN 61000 – 4 – 5
7. EN 61000 – 4 – 6
8. EN 61000 – 4 – 7
9. EN 61000 – 4 – 8
10. EN 61000 – 4 – 11
11. EN 61000 – 6 – 3
12. EN 61000 – 6 – 1

7. FEDERAL COMMUNICATIONS COMMISSION (FCC)



FCC ID: 2AUQQ-ZOND12E500A

7.1. Class A Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two 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.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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.

7.2. Coordination Requirements

1. GPR as Ultra-WideBand (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.
2. 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

3. 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.
4. 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 wall imaging system is prohibited by FCC regulations.

7.3. GPR Coordination Notice and Equipment Registration (For U.S. Customers)

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)]							
6.	<table border="0"> <tr> <td>Brand Name</td> <td>Radar Systems, Inc.</td> </tr> <tr> <td>Model</td> <td>Zond-12e 500A</td> </tr> <tr> <td>FCC ID</td> <td>2AUQQ-ZOND12E500A</td> </tr> </table>	Brand Name	Radar Systems, Inc.	Model	Zond-12e 500A	FCC ID	2AUQQ-ZOND12E500A
Brand Name	Radar Systems, Inc.						
Model	Zond-12e 500A						
FCC ID	2AUQQ-ZOND12E500A						
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

or fill this form online:

https://www.faa.gov/about/office_org/headquarters_offices/ato/service_units/techops/safety_ops_support/spec_management/library/gprc.cfm

Do not send this information to Radar Systems, Inc. or its representatives

8. INDUSTRY CANADA (IC)



IC ID: 25515-ZOND12E500A

8.1. Industry Canada Regulations – English

This device complies with RSS-220 of the Industry Canada Rules. Operation is subject to the following two 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.

Ground penetrating radar is a field disturbance sensor that operates when in contact with or within 1 m of the ground for the purpose of detecting or mapping subsurface structures. While primarily used for examining "underground," the term "ground" can be expanded to mean any lossy dielectric material. The energy from the GPR is intentionally directed down into the ground for this purpose.

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.

8.2. Règlement d'Industrie Canada – Français

Ce dispositif est conforme à la norme CNR-220 d'Industrie Canada applicable aux appareils radio exempts de licence. Son fonctionnement est sujet aux deux conditions suivantes: (1) le dispositif ne doit pas produire de brouillage préjudiciable, et (2) ce dispositif doit accepter tout brouillage reçu, y compris un brouillage susceptible de provoquer un fonctionnement indésirable.

Un radar à pénétration du sol désigne un capteur de perturbation de champ qui fonctionne en contact avec le sol ou à au plus 1 m du sol pour détecter ou cartographier des structures situées sous la surface. Bien que de tels dispositifs soient principalement utilisés pour examiner le « sous-sol », le terme « sol » peut être étendu pour représenter tout matériau diélectrique avec pertes. L'énergie émise par le radar à pénétration du sol est intentionnellement dirigée vers le sol à cet effet.

Ce dispositif radar à pénétration du sol ne doit être utilisé qu'en contact avec le sol ou à au plus 1 m du sol.

Ce dispositif radar à pénétration du sol ne doit être utilisé que par des organismes d'application de la loi, des établissements de recherche scientifique, des sociétés minières commerciales, des entreprises de construction, et des organismes d'intervention d'urgence ou de lutte contre les incendies.

9. OUR ADDRESS

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