

50 years on the market of geophysical equipment



**SPECIAL DESIGN BUREAU FOR
SEISMIC INSTRUMENTATION**
SKBSP.RU



RUSSIAN
GEOPHYSICAL
EQUIPMENT

Main office:
129, Krainyaya Str, 410019, Saratov, Russia
Phone: +7 927-119-98-17
sales@skbsp.ru
www.skbsp.ru

History

With its origins back to 1962, JSC "Special Design Bureau for Seismic Instrumentation" (SKB SP), based in Saratov, is the oldest Russian designer and manufacturer of geophysical equipment for oil and gas exploration. We are proud that the main oil and gas fields in Russia have been discovered using the seismic data acquisition systems which had been developed by our company.

Our seismic data acquisition systems have provided reliable data to more seismic recording crews in more places than any other system ever built in Russia.

The company has always laid particular stress on being capable of offering a wide range of advanced geophysical equipment. The company maintains the highest level of the equipment, offered to the clients, through a continuous R&D program. The company has a staff of experienced engineers specialized in the development of state-of-the-art geophysical equipment.

The company offers to its clients training, 24h after sail service and support, warranties.

Today

Today, the company's main line of business is to supply to its clients the cable telemetry seismic data acquisition systems "T3", "T155", cableless telemetry seismic data acquisition system SCOUT with unlimited channel capacity, portable telemetry seismic data acquisition systems "T3-Portable", shooting systems "SSV-2" for explosive and non-explosive (impulse) energy sources, geophone tester "TEST-SP", "LINE TESTER", testers for seismic field units. All this equipment is oriented to be used in land and transition zones seismic activities.

SKB SP continues to develop and manufacture new and improved products to meet the changing demands of the industry.

Geophysical equipment of our production enables high productivity, improved data quality and high reliability.

All our seismic data acquisition systems have 6 years guaranteed warranty.



Main products

SCOUT

Cableless telemetry seismic data acquisition system

T3

Cable telemetry seismic data acquisition system for land operations

T3-Portable

Cable telemetry seismic data acquisition system for land operations

T155

Cable telemetry seismic data acquisition system for operations in transition zones

TEST-SP

Electrodynamic geophon tester

Locations

The headquarters of our company is located in Saratov, Russia.

Manufacturing facilities and scientific research complex cover an area of over 10 thousand square meters.

Highly qualified staff consists of more than 300 people.

60% of staff are employees of engineering and technology sectors.

The manufacturing process complies with quality standards ISO 9001:2000

129, Krainyaya Str, 410019, Saratov, Russia

Phone: +7 927-119-98-17

sales@skbsp.ru

Contact: Vladimir Tarasov

Cableless telemetry seismic data acquisition system

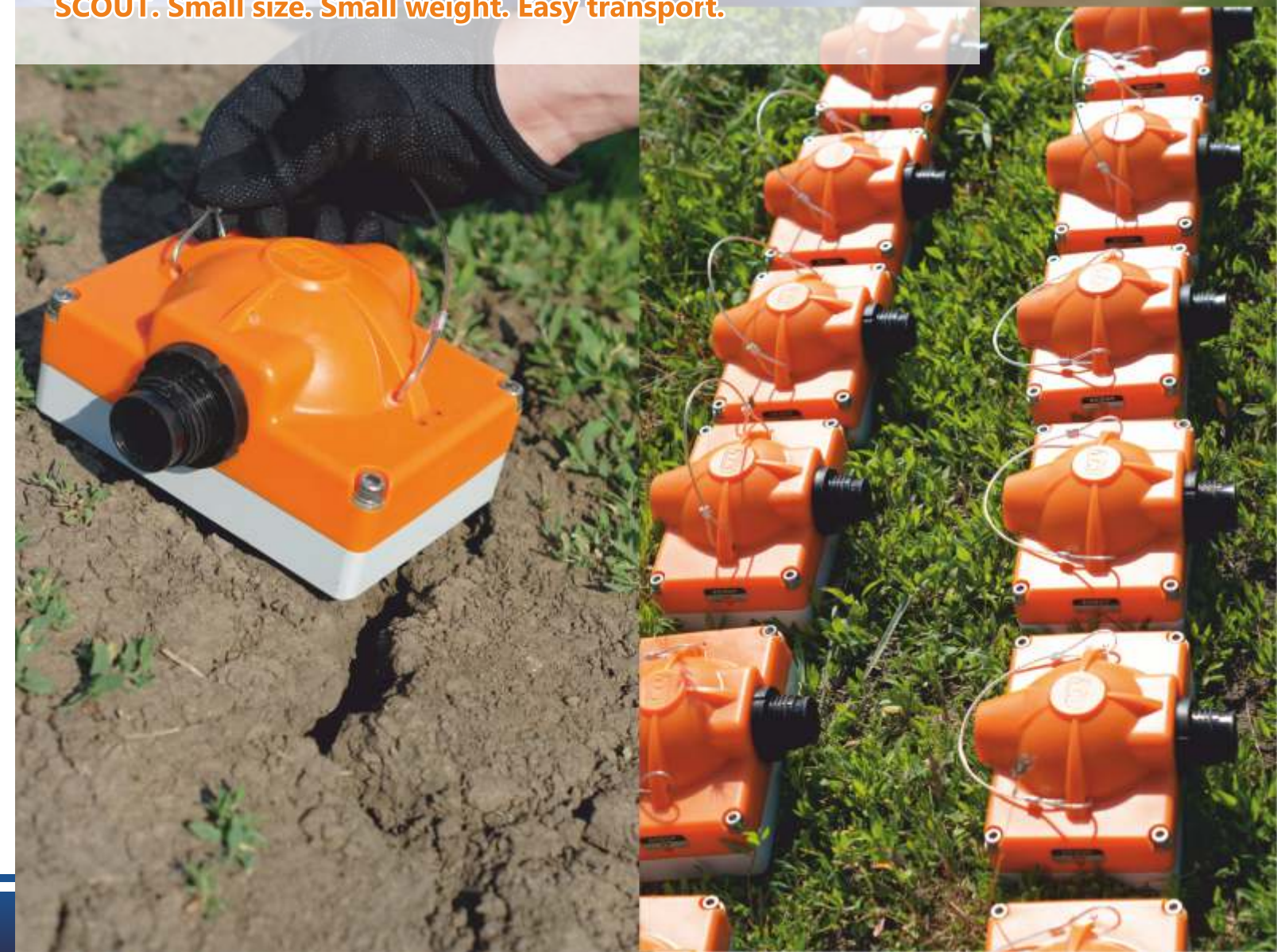
SCOUT

SCOUT – cableless data acquisition system is designed for 2D, 3D, 4D seismic projects and to provide ease of layout when it comes to difficult terrains or in sensitive environments. SCOUT makes the logistics easier thanks to the reduction of the systems weight compared to cable-based systems.

SCOUT does not set any limitation to survey design. Internal back-up battery provides 670h continuous working autonomy. Built-in test signal generator for unit tests minimizes acquisition errors and guarantees high quality data.



SCOUT. Small size. Small weight. Easy transport.



SCOUT. Cableless seismic data acquisition system

Taking into account growing demand for multichannel seismic surveys, JSC "SKBSP" enlarged the list of its products, including new land cableless seismic data acquisition system SCOUT. Due to full reduction in cables and light weight field unit, the seismic crews have got the possibility to perform seismic survey in accessing difficult terrain, whether in terms of a rugose landscape, urban settings or mitigation of environmental disturbance.

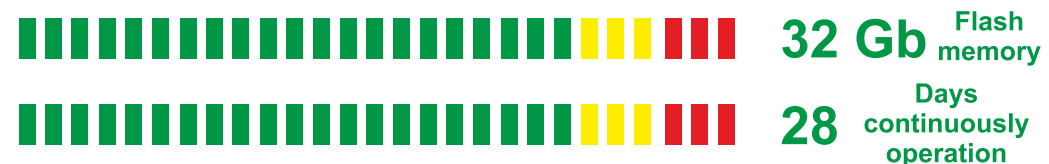
Limitless scalability

SCOUT has no restriction on the number of active channels.



Fully-autonomous system

High-precision GPS receivers and rechargeable batteries of enhanced capacity, built in SCOUT field units, provide the possibility to record seismic information continuously for up to 28 days (24-hour working day).



Unique power-saving technology

The technology of noncontact power-up/down is used to save the energy of the built-in battery. To switch on/off the power it is necessary just to place the magnet near the case of the field unit. Elimination of the buttons provides the field unit with enhanced tightness and environmental exposure resistance.



Contactless power system



SCOUT. Easy placement in any environment.



SCOUT system includes:

- Data control system;
- Field data acquisition units;
- Battery charger and data retrieval module;
- Vibrator timing module.

Field data acquisition unit

Field data acquisition unit is designed for autonomous seismic data recording. The self-contained unit includes 1, 2 or 3 channel of 32-bit digitization, an integrated high sensitivity GPS receiver and disciplined clock, built-in test signal generator, up to 32 GB of non-volatile solid-state data storage, Wi-Fi module and a high-speed data port. In the case of GPS signal loss, the clock oscillator will keep precise time for 2 hours.

The field unit is housed in a sealed case with geophone connector, extended life battery connector and recorded data downloading connector.

The seismic channel performance and sensor tests can be performed by SCOUT system. The user can choose a partial or complete set of tests. The user can choose to download all of the test results or only the failures. All accumulated test data are saved in the flash memory for successive analysis. The System Software automatically controls test performance sequencing and test oscillator settings during the tests. All tests are run for current set values of sample intervals and preamp gains.

Software package

The software package includes two software modules:

“SCOUT-service” and “SCOUT-station”

The software module “SCOUT-service is used for:

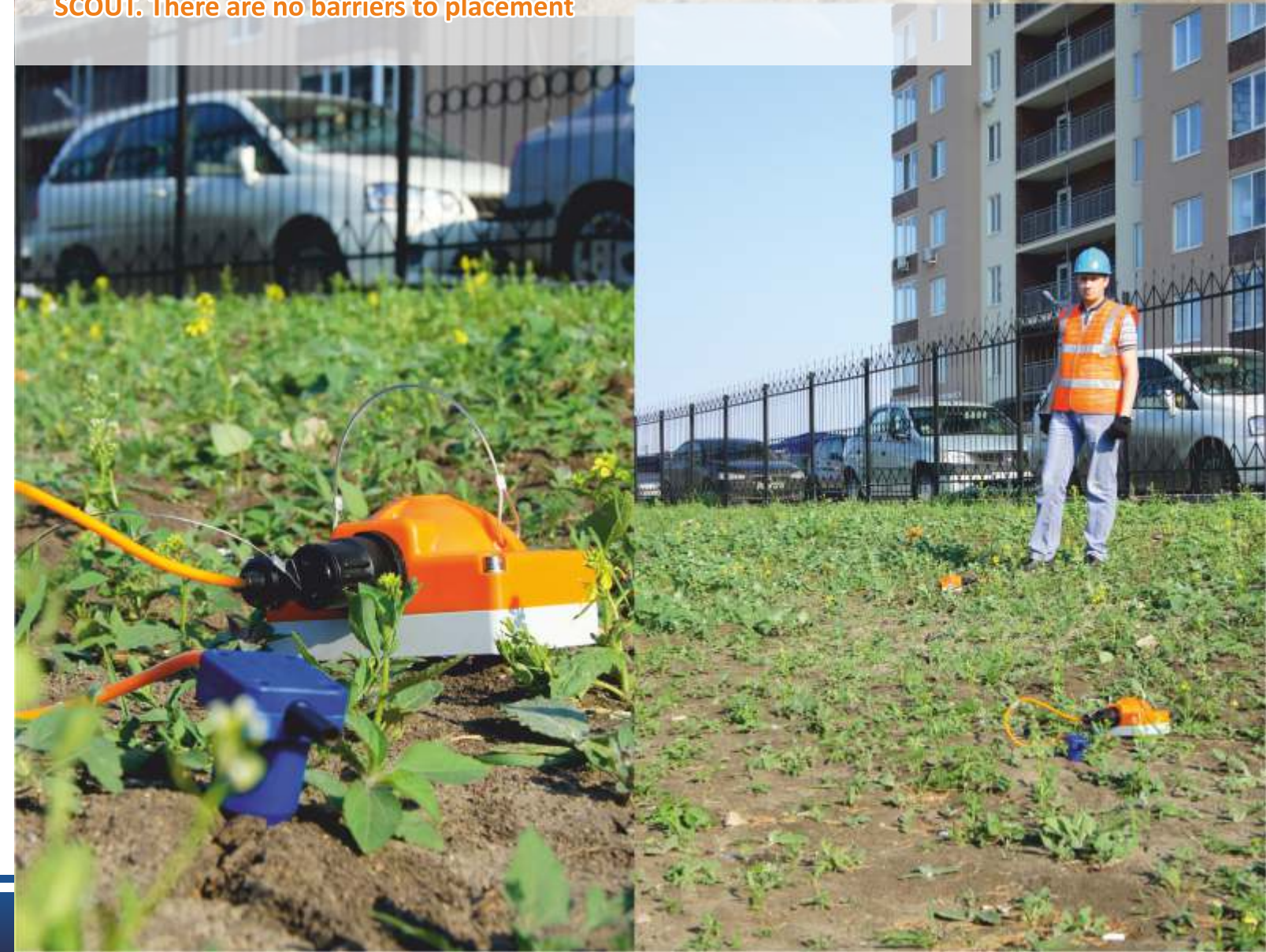
1. SCOUT field units and connected geophones/ geophone groups diagnostics;
2. Communication with SCOUT field units for:
 - pre-deployment parameter programming, i.e. sample rate, preamp gain, record mode, testing, etc.;
 - SCOUT field units test results data downloading;
 - seismic data, recorded in SCOUT field units, downloading.

The software module “SCOUT-station” is used for:

1. Description of spread topology and Source Point list, imported from SPS files or created manually;
2. Receiving of First Break precise time values for each stacking for each Source Point and saving them in the database;
3. Seismic cross-section imaging for each Source Point, assisted with the following data:
 - First Break precise time values from database;
 - seismic data files, downloaded from SCOUT field units;
 - SPS R-file with Receiving Point topology;
4. Communication with SCOUT field units for:
 - work task for SCOUT field units uploading;
 - the information, concerning SCOUT field units technical condition, downloading;
 - seismic data, recorded in SCOUT field units, downloading.



SCOUT. There are no barriers to placement





SCOUT. Wireless data downloading without stopping the recording



Rugged sealed case

1x or 2x built-in battery

Multifunctional connector
Charging, Data downloading,
External battery connection

Specifications

Number of channels	1,2,3
Synchronization accuracy, μ s	1
Max. signal, mV	2500
Frequency range, Hz	0-1600
Sample rates, ms	0.25; 0.5; 1.0; 2.0; 4.0
Common mode rejection, dB	100
Dynamic range, dB	140
Total harmonic distortion, dB	-109
Mutual influence	less -120
Preamplifier gain, dB	0;12;24;36
Input noise on the frequency band 100-125 Hz, μ V	0.17
Built-in memory, Gb	2,8,16,32
Hot-swappable batteries	Provided
Continuous autonomous recording capability supported by on-board memory options (2 ms), h	5120
Capability supported by 2x built-in battery, h	670
Weight, 1x built-in battery including, kg	1.2
Power consumption, mWt	
Sleep mode	10
Autonomous mode	220
Operating temperature range, $^{\circ}$ C	-40..+60
Storage temperature range, $^{\circ}$ C	-40..+80
Radio transmission:	
Built-in GPS receiver	Provided
Field unit status monitoring	Provided
Data	Provided
Unit built-in tests	Battery voltage, GPS status, Distortion, Noise, Offset, Common mode signal
Geophone built-in tests	Noise, Resistance, Isolation, Common mode signal, Tilt



SCOUT. Working with single geophones and geophone group.

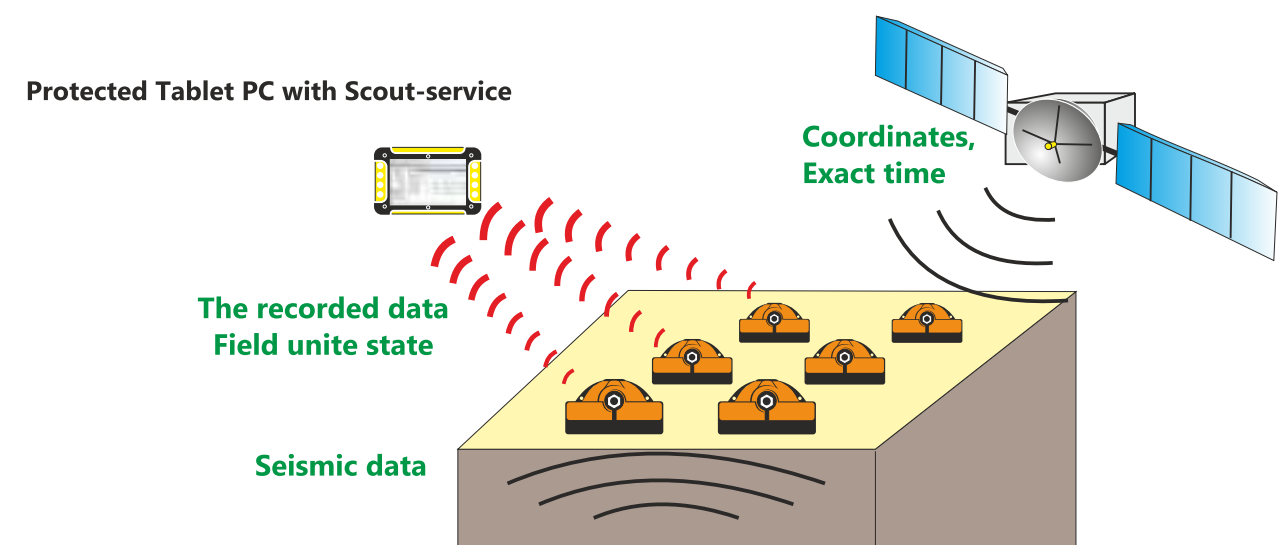


Full reduction in cables, light weight and compact size

Among the main problems of multichannel seismic survey are the weight of equipment and its transportation. Weight/size/functionality ratio makes SCOUT field unit the best choice among cableless seismic systems, represented on the market.

SCOUT advantages

The cableless system SCOUT makes it both logistically and economically feasible to acquire mega-channel count surveys and to get a lot of additional advantages, full-azimuth and offset coverage, including.



Wireless control and data transfer

Due to Wi-Fi modules, built in each field unit, the data saved in the units can be easily downloaded in any computer equipped with Wi-Fi. The data can be downloaded from field units that are in wireless network access area, simultaneously. It provides sizeable time saving.



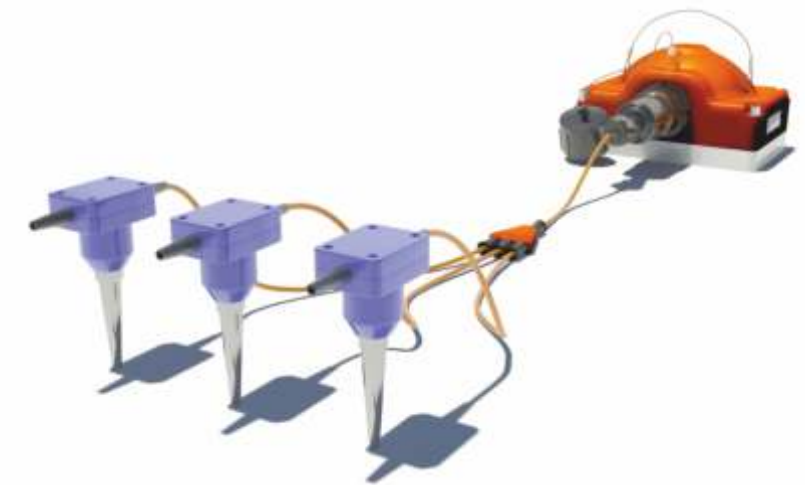


Field unit for any operations



1x channel field unit

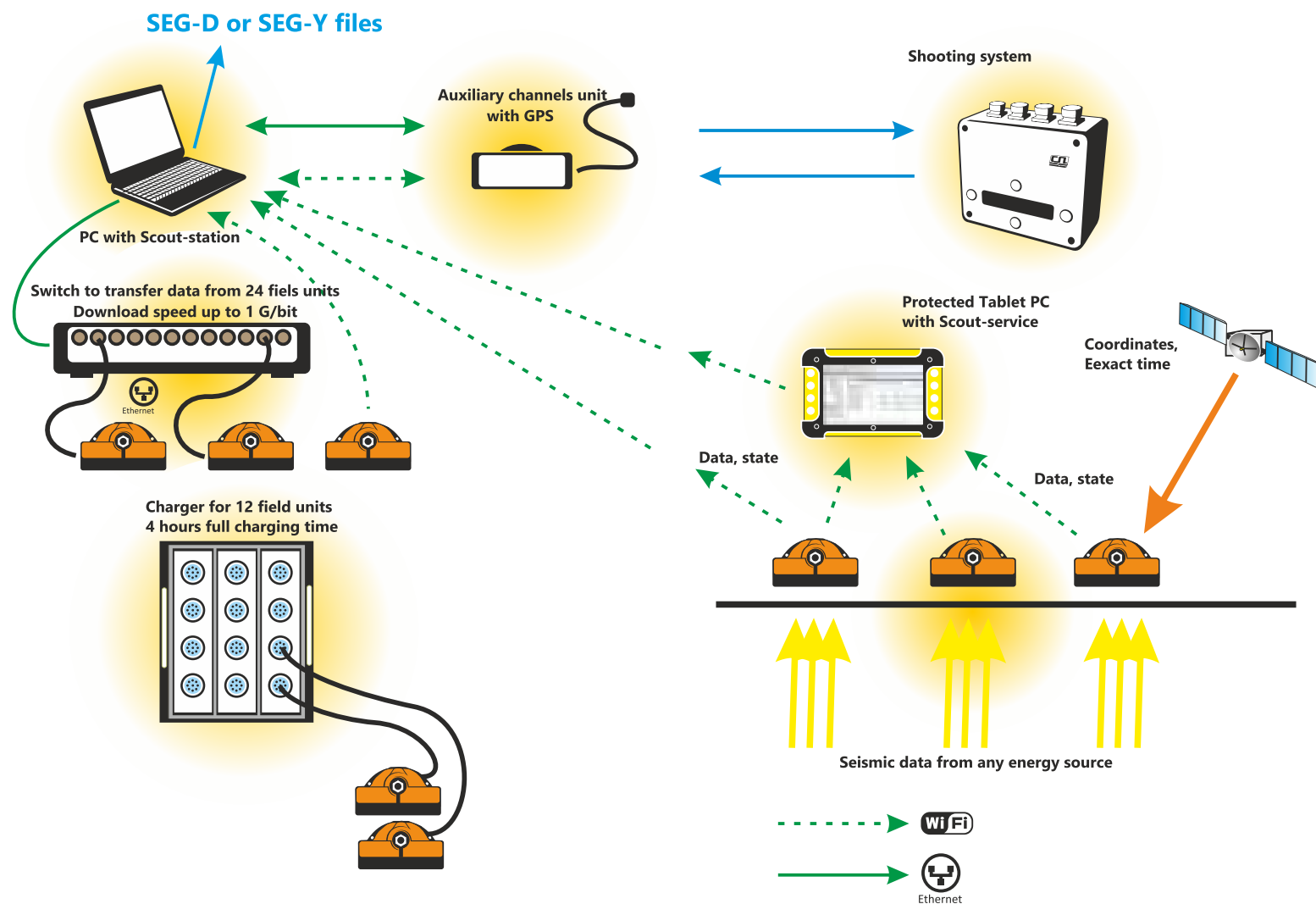
3x channel field unit



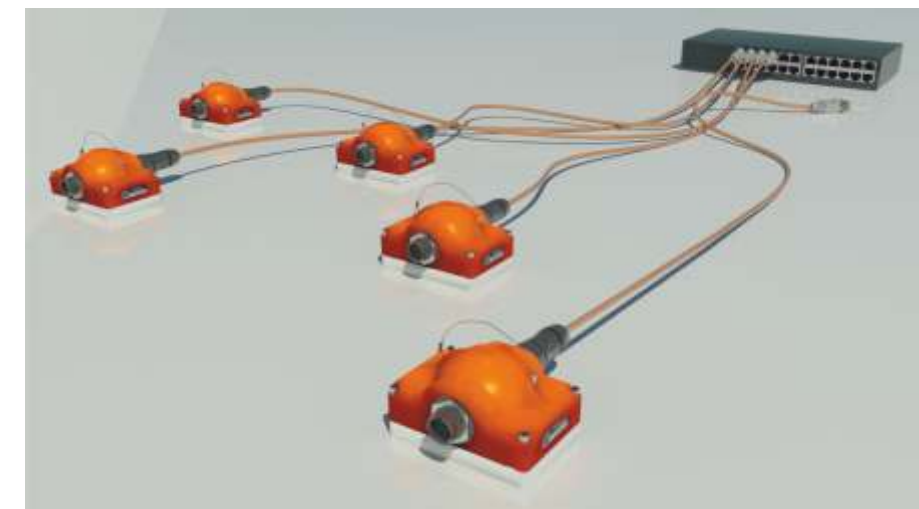
3x channel field unit
for 3C geophone



Concept of operations



Wi-Fi access point. Up to 1km data transfe.

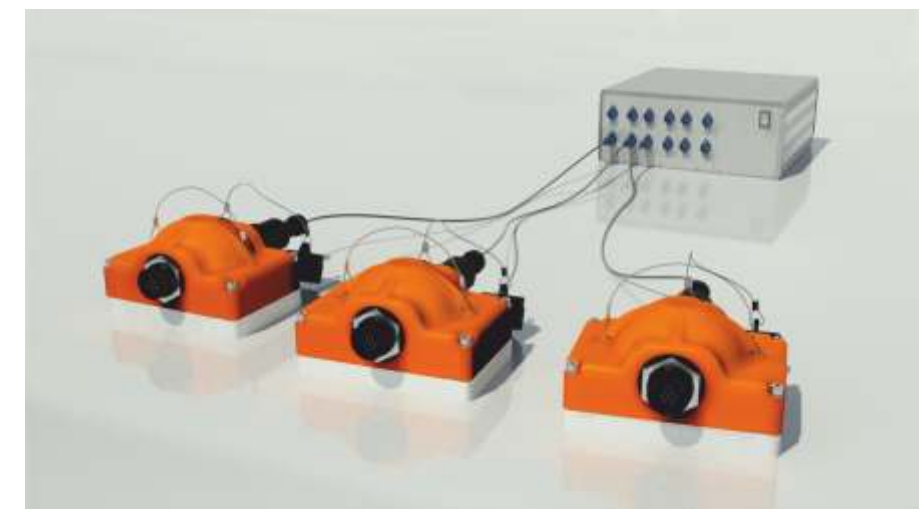


Switch to transfer data from 24 fields units
Download speed up to 1 G/bit

Support equipment



Protected Tablet PC with Scout-service



Charger for 12 field units
4 hours full charging time

Cable telemetry seismic data acquisition system for land operations



T3 - cable telemetry seismic data acquisition system specifically designed for land acquisition and realization medium-sized 3D projects with the maximum number of channels 26400 (at 2ms sample rate). T3 is easy to work, has a friendly user interface, a wide range of control of field equipment and control system of quality field data. All system components are designed to operate in difficult environmental conditions (-40 .. +70 ° C) and any terrain.

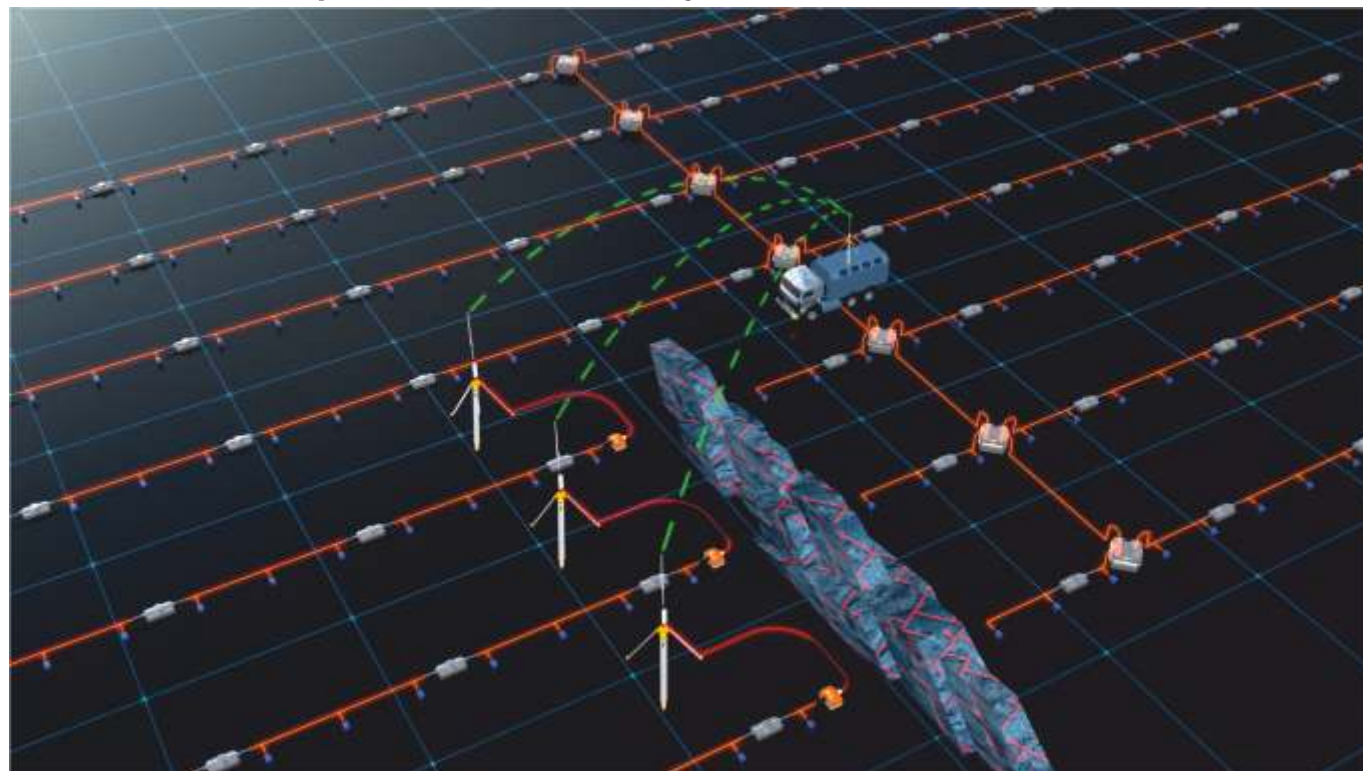
T3 work with various types of impulse energy sources and vibrators. System provides generation of output SPS files and receives external SPS-files. A powerful system monitoring and diagnostics of field units of ground complex allows real-time monitoring of their condition. The software package has the ability to work with multiple QC software.

High reliability

Equipment reliability is one of the main factors affecting the success of seismic surveys. In most cases, the seismic crews working in remote locations, so delivery of spare parts is a big problem, which turns into economic losses. All components of the T3 are designed to provide reliable operation in difficult environments and difficult terrain areas. High reliability is confirmed by a 6-year warranty on the system.

Nexus technology.

Simultaneous operation with cableless system SCOUT for more flexible work.



The System comprises:

- On-board equipment
- Ground equipment

Ground equipment

Includes:

- Field sections, composed of three-channel data acquisition units (BSD-3) connected by telemetry cables;
- Line units;
- Power units;
- Batteries in special cases.

Provides:

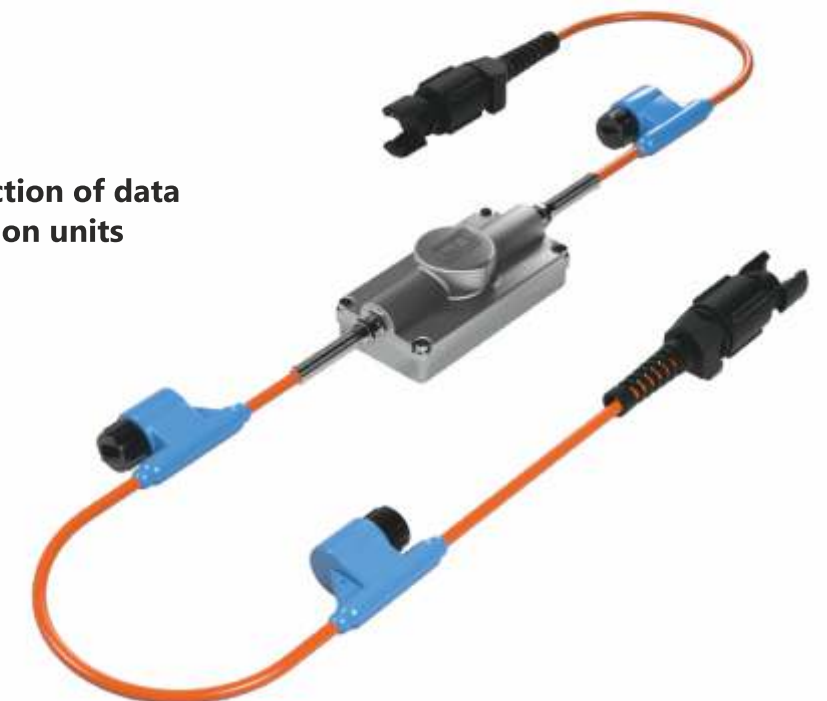
- Geophone signals reception;
- Amplification;
- A/D conversion (24 bits);
- Filtering;
- Transmission (reception) of data via telemetry cable;
- Synchronization and retransmission of data;

Field section of data acquisition units

The number of BSD-3 units in section is defined by the Customer. There are two types of field sections, which differ in lay-out of take-outs for geophones connection. In the sections for one-component survey the take-outs have uniform distribution along the telemetry cable that connects two adjacent units. The interval between the take-outs is defined by the Customer. In the sections for three-component survey each three take-outs for connecting of the three-component geophone are allocated near the corresponding unit BSD-3.

The sections withstand immersion in water up to 30 m depth. The waterproof connectors are used for connection of sections with each other and for connecting of geophones to BSD-3.

Field section of data acquisition units



Software

The system software takes advantage of the Windows™ 2000,XP operating system. It supports 3 high-resolution monitors, cartridge tape drive, thermoplotter, ink-jet and laser printers.

Recording data format – SEG-D 8058 4-byte IEEE demultiplexed (ANS/IEEE Std 754-1985).

Recording data format – SEG-Y is available.

Provides:

- setting of operating parameters and start of data acquisition;
- playback of seismograms on monitor's screen and thermoplotter;
- recording of seismograms on various recording media (DVD, Flash, SSD);
- observer's report creating;
- displaying of the results of diagnostics of ground electronics and geophone groups tests;
- creating of shot points list from SPS files;
- creating of the output SPS files;
- location of faults while instable work of any unit or cable of ground equipment;
- transmission of seismic data via the cable;
- transmission of seismic data via radio channel for evaluation of the field data quality;
- starting and synchronous operation of two data acquisition systems with the distance between them up to several kilometers, which are controlled from the shot point using the shooting system SSV-2.

On-board equipment

On-board equipment

-Central control unit (CCU); -Computer; -Thermoplotter; -System software; -Power system

On-board equipment provides: remote control of ground electronics, its diagnostics; acquiring, processing and recording of seismic data and of the results of diagnostics; daily production reports creating; playback of recorded seismic data, results of diagnostics and another supporting data on color screens and hard copies. On-board equipment monitors power system's

Processing of seismic data in real time includes:

- spike editing;
- vertical stack;
- diversity stack;
- correlation before and after stack;
- spectral analysis;
- monitoring of parameters of field units;
- automatic monitoring of geophone groups.

Diagnostics of field equipment includes:

- gain accuracy;
- phase accuracy;
- distortion;
- common mode rejection;
- noise;
- crossfeed isolation;
- power supply voltages;
- offset;
- impedance;
- leakage;
- impulse test;

Simultaneous operation on land and transition zone

There are no barriers for telemetry seismic data acquisition system T3. You don't need to worry about detouring of the river, swamp, lake or about the seismic line to be deployed in shallow water area. The telemetry seismic data acquisition system T3 can be successfully used on land and in transition zones. Data acquisition units BSD-3 can be immersed in water up to 30 m in depth.



Flexible on-board powering system

The powering system includes: batteries, diesel generator, battery charger units, UPS. For 2D spread, the ground electronics can be powered via the cable straight from on-board powering system.

Specifications:

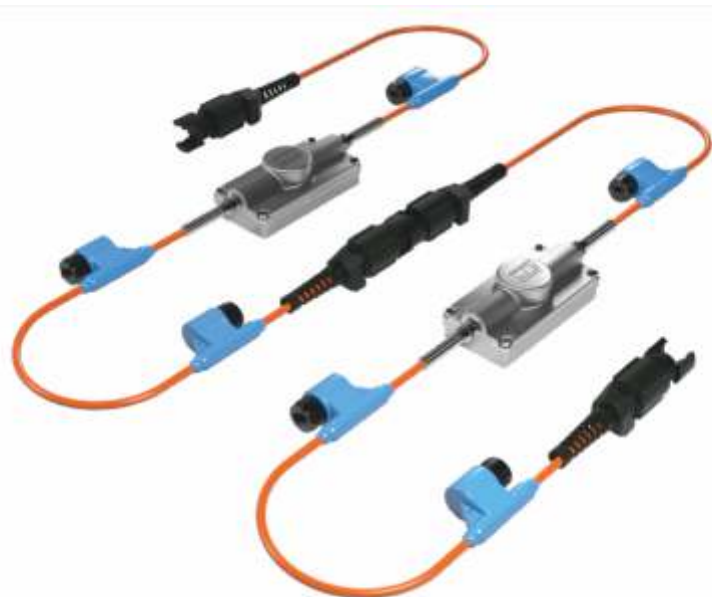
Maximum number of active channels per line:		26400
Sample rate, ms		Number of channels per line
0,25		330
0,5		660
1,0		1320
2,0		2640
4,0		5280
Number of telemetry ports		10
Maximum number of lines per port		64
Maximum number of channels per port		
Sample rate, ms		Number of channels per port
0,25		150
0,5		300
1,0		600
2,0		1200
4,0		2400
Types of processing		
Correlation before and after storing		provided
Vertical or weighted summation		provided
Edition of impulse noise		provided
Characteristics of data transmission channel		
Data transmission rate in the line		8 Mb/c
The hardware specifications of		
Output data format		SEG-D, SEG-Y (optional)
Maximum duration of registration at the maximum channel mode for each port		32 s
Reproduction		Plotter
Data recording		DVD, Flash, SSD

Data acquisition unit bsd-3

Data acquisition unit BSD-3 collects, amplifies, filters, digitizes (24 bits) seismic signals from three stations of seismic array or from three-component geophone, converts data to a form suitable for transmission and transmits it via the telemetry cable, acquires and regenerates data from adjacent BSD-3 or from on-board electronics.

Specifications:

Number of seismic channels per unit	3
Maximum input signal, V	2.5
Digital High-Cut filter:	-3dB@from 16 Hz to Nyquist frequency
HC frequencies range	1.0
HC frequency setting step, Hz	12, 24, 36
slope, dB/oct	
Digital Low-Cut filter:	
LC frequencies range	-3dB@from 1 Hz to Nyquist frequency
LC frequency setting step, Hz	1.0
slope, dB/oct	12, 24, 36
Sample rate, ms	0.25, 0.5, 1.0, 2.0, 4.0
Equivalent input noise (10-125 Hz), μ V, no more	0.130
Instant Dynamic Range, dB	130
Total dynamic range, dB, no less	140
Crossfeed isolation, dB, no more	-110
Channel-to-channel similarity, %, no more	0.1
Common mode rejection, dB, no less	100
Amplitude non-identity, %	0.1
Phase nonidentical	20
Digitized sample format, bit	24
Tests	Power supply, data transfer Field tests (resistance, tilt, leakage, microseisms, the suppression of common mode) Instrument tests (noise, nonlinear distortion factor, Phase, enhancement, suppression of common mode noise, influence)
Power, V	± 35
Power consumption (per channel), mW	166
Operating temperature, $^{\circ}$ C	$-40^{\circ} \div +70$
Humidity, %	100(can be immersed in water up to 30m depth)
Dimensions, mm	155x79x52 (3 channels)
Weight, kg	0.6 (3 channels)



Line unit

Line unit (LU) acquires seismic and auxiliary data from upper and lower sections of the spread line that LU is installed in and transmits the data via the highway line to LU of adjacent spread line or to on-board electronics. LU acquires the data transmitted via the highway line from on-board electronics, transmits this data to upper and lower sections of the spread line that LU is installed in and transmits the data via the highway line to LU of adjacent spread line. LU works as regenerator while transmission of data between the spread lines and as the power unit for BSD-3 connected to it.

Specifications:

The data transfer speed in cross-line Mb/s	16
The interval between line-units without line repeaters, m	2300
DC supply voltage, V	± 35
Power consumption, not more, W	1.2
Operating Temperature Range, $^{\circ}$ C	$-40^{\circ} \div +70$
Allowable depth of immersion, m	up to 30
Overall dimensions of the unit, mm	220x220x125
Weight, no more than, kg	4.0



Power unit

Provides:

- Power for units of ground equipment;
- Battery "hot" swapping while acquisition.

Specifications:

DC input, V	10.5 \div 15
DC output, V	± 35
The number of data collection units provided an electrical energy power supply	60 (180 channels)
Operating Temperature Range, $^{\circ}$ C	$-40^{\circ} \div +70$
Allowable depth of immersion, m	up to 30
Overall dimensions, mm	220x220x 125
Unit Weight, kg	3.4



Portable telemetry seismic data acquisition system for rapid operations

T3 - Portable

T3-Portable unique system designed for rapid 2D operations on the land and in transition zones at depths up to 12 meters. The system is based on the central electronics of T3 system, has a built-in rechargeable battery, as well as the possibility of supply from the vehicle electrical system. The system has two types of performance - for a vehicle, where the host computer is a laptop and a marching variant where the laptop is replaced by industrial protected computer.



- Supports 2500 channels in real time with 2 ms sample rate (1250 channels without line unit)
- Ability to work with any energy source
- Lightweight and quick deployment
- Support combined work with cableless system
- Built-in quality control system



Telemetry seismic data acquisition system for operations in TZ

T155

Cable telemetry seismic data acquisition system T155 designed to work in difficult conditions of transit zones (offshore) at depths down to 70 m. Advantages of the system are lightweight and durable field equipment. To work with him geophysical teams can use walkable small boats and a hovercraft to work in marshland.

T155 allows geophysical teams receive quality information on difficult areas of work with a minimum of staff and supporting equipment. Field units one or two channel with the ability to simultaneously connect the geophone and hydrophone for more informative material.

- Cases of immersion units of durable stainless steel that allows for long periods of time in the sea water.
- The cables are made with water-repellent filler and kevlar.



Electrodynamic geophon tester

TEST-SP

Geophone tester "TEST-SP" provides automatic measurement of the following electrodynamic geophone's parameters: coil circuit DC resistance, natural frequency, damping constant, distortion, transduction constant, polarity.

Tester can be used in metrological and test laboratories while geophone and geophone based devices manufacture as well as in enterprises, running and repairing geophones.

Tester's mode of functioning is based on excitation of oscillations in geophone coil circuit using test signal. The current and frequency of these oscillations are measured and then, the specified algorithm.

Tester includes the square- and sine- wave test signal oscillator, ADC and notebook with special software installed.

Tester provides automated monitoring of parameters of single geophone as well as of geophone string.



Communication between computer and "TEST_SP" is organized according to TCP/IP protocol via Ethernet.

This solution provides:

- High data rate and performance reliability
- Connection of any computer with the network interface
- To use remote (up to 100 m) computer
- Connection of "TEST-SP" to the local area network
- To transmit the data via WI-FI radio link

Tester has the built-in temperature sensor.

Resistivity system

Alfa-1

Resistivity system "Alfa-1" is designed for rapid electrical profiling (EP) and of electrical sounding (EI) using capacitive dipole lines. The system also provides the possibility of working with electrically earthed lines.

The equipment is designed to work with the axial measurement unit. Reception and supply lines in this case are equal size.

The equipment allows us to solve the detailed geotechnical and environmental problems in depth research several tens of meters.

The payload includes two field-unit transmitter and receiver, remote control, power devices and charger kits capacitive cable transmitter and receiver.

Features:

- Easy to operate
- Operation over a wide temperature range (-40 .. 70)
- No need for equipment calibration during operation
- Setting and reading of data blocks with the remote control by radio

