IRCOS JSC

ARC-RP3M

Handheld Direction Finder

ИРКОС

ARC-RP3M Handheld Direction Finder

Distinctive Features:

- Improved mass and dimensions parameters
- Low power consumption
- Ergonomic design
- Easy to operate
- High performance
- Multifunctionality.

ARC-RP3M Handheld Direction Finder is designed to find direction and determine locations of radio-frequency sources. **ARC-RP3M** Handheld Direction Finder features compact design, small weight and low power consumption in combination with easy operation, ergonomics and high functionality.

ARGAMAK-M Panoramic Radio Receiver serves as the core of the direction finder. Self-contained power supply from 9 standard Ni-Mn batteries (AA size) ensures continuous operation during at least two hours. An additional battery set can essentially extend the continuous operation time. Receiver's weight with an integrated battery set is 1.3 kg. When in operation, receiver is placed in a small carry bag.

The antenna system with a handle and active directional antenna modules is used for manual direction finding. The handle and antenna module design allows to locate field sources with vertical and horizontal polarization.

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ARGAMAK-M. Front and Rear View

The handle weight and ergonomic characteristics are optimized to the maximum extent for comfortable work of an operator in the field. The handle weight including the antenna module does not exceed 700 g; the antenna module center of gravity is lower than the operator's palm, which allows the operator working for a long time without getting tired.

The antenna modules also feature compact dimensions and small weight. The set of three active antenna modules overlaps a frequency band 25 to 3,000 MHz. The most actively used frequency band 25 to 500 MHz is overlapped by a single antenna module. The antenna modules can be used both in active and passive modes.

Antenna Modules and Handle

The handheld direction finder is controlled by a special portable control and display device – **ARC-PP**. This device is provided with a back-lighted graphical LCD panoramic display and buttons to control the handheld direction finder. When in operation, the device is fixed on the operator's hand by means of a special wristband.

The operating temperature range of **ARC-PP** device is -20 to +55°C; this device is protected against atmospheric precipitation and dust (protection class – IP64). The panoramic display provides for contrast displaying of graphical information even under direct sun light.

ARC-PP

Interface functions of **ARC-PP** device are optimized for efficient fulfillment of tasks related to detection and localization of a radio-frequency source under severe operational environment.

ARGAMAK-M Panoramic Radio Receiver is designed on the principle of Software Defined Radio (SDR). Receiver functional capabilities and operation modes can be reprogrammed by the user through the USB interface. When using **ARGAMAK-M** Panoramic Radio Receiver with a handheld direction finder, two operation modes are possible: narrowband and broadband.

The narrowband mode is provided for operation with continuous signals and quasi-continuous signals having low duty ratios with AM, FM, etc. modulation types. The handheld direction finder provides for the following functions in this mode:

- Required frequency tuning
- Displaying of signal spectrum within bandwidths of 8, 2 and 0.5 MHz
- Selection of spectrum presentation – instantaneous, average, peak (spectrum averaging serves for distinction of weak signals over noise level; peak spectrum is used for determination of signals with high duty ratios)
- Selection of type and bandwidth for analog signal listening
- Assessment and displaying of signal strength in demodulator band
- Generation of a tone signal with a frequency depending on the signal strength for direction finding aurally
- Automatic scanning of signals within the set frequency range.

The broadband mode is provided for operation with the signals of modern communication systems such as Wi-Fi, WiMax, BlueTooth, DECT, etc. The panoramic view of signal spectrum within 128 MHz bandwidth or simultaneous bandwidth of 8 MHz is presented on the control and display device screen in this mode. In the latter case, the equipment provides for continuous real-time signal processing with spectrum calculation rate of 25,000 times per second. A high processing speed allows not only to reliably register short signals (up to 50 μs), but also distinguish the signals of several communication systems working at the same frequency channel.

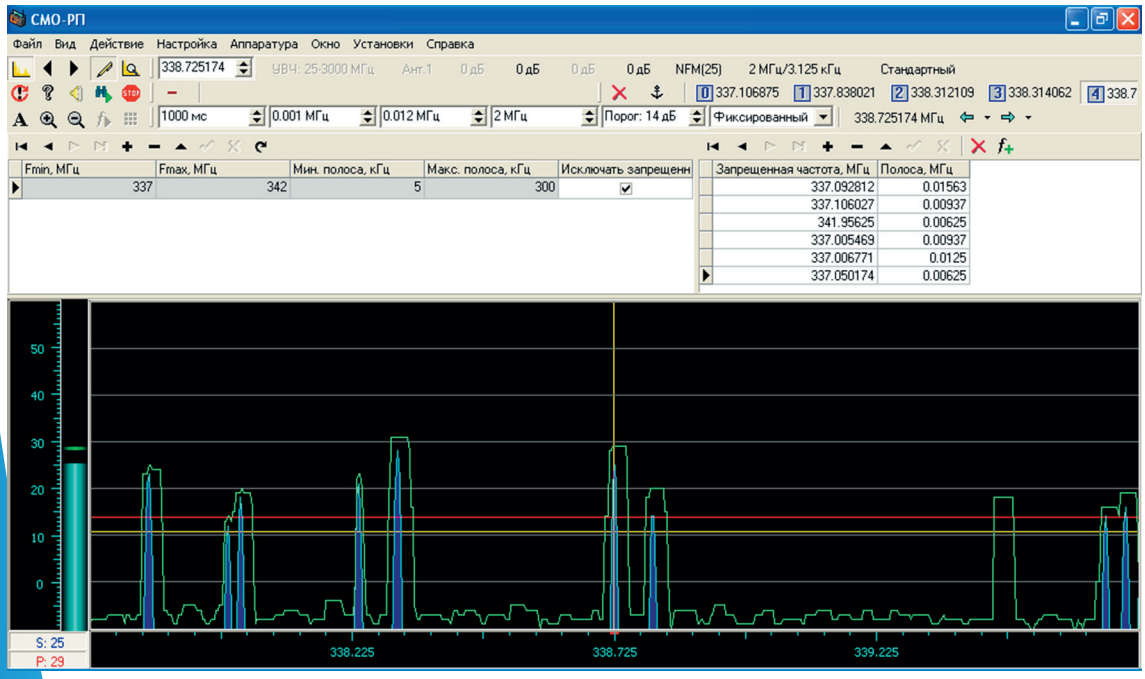
Options

As an option, the handheld direction finder can be controlled by a portable computer. USB 2.0 interface is provided in **ARGAMAK-M** Panoramic Radio Receiver for this purpose. Using a portable computer the operator can both carry out handheld direction finding and solve the radiomonitoring tasks in full scale.

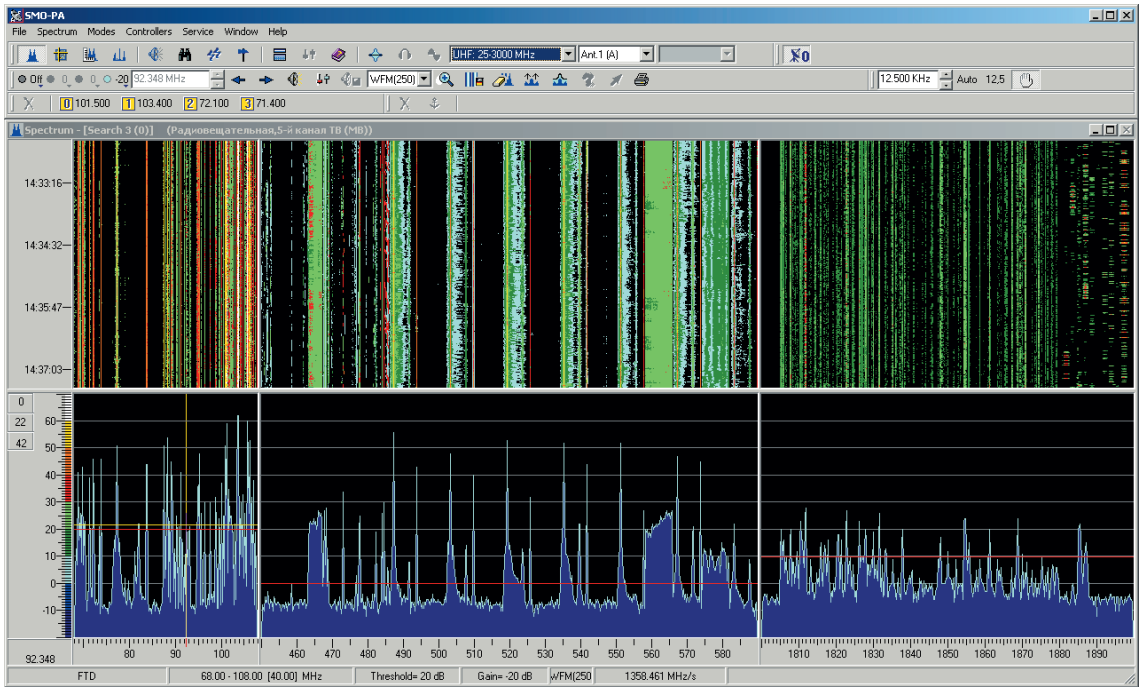
Special Pad for Portable PC

PC-Controlled Operation

A special pad placed on the operator's chest is provided for portable computer fixing during direction finding. The pad design provides for adjustment of position and angularity for comfortable work under different conditions considering operator's individual differences.



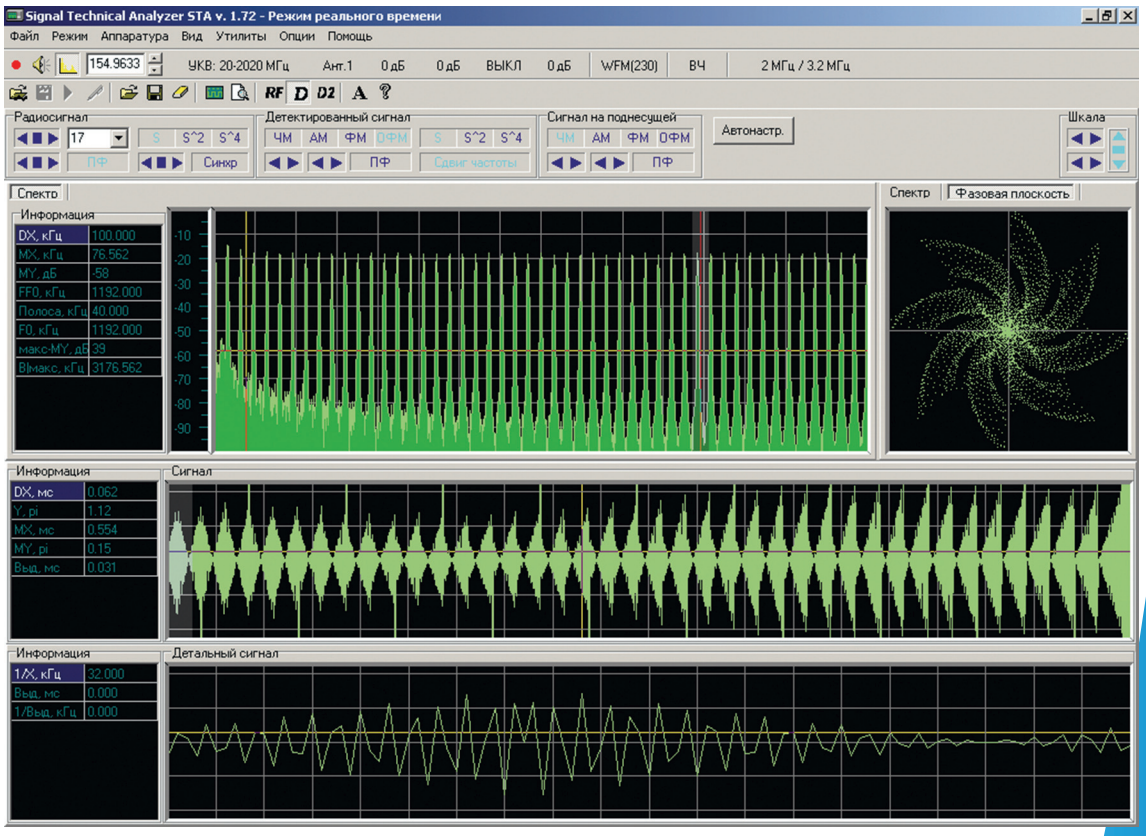
Software Package for Manual Direction Finding (SMO-RP)



Software Package for Automated Radio Monitoring (SMO-PA)

The following software packages are used for direction finder equipment control:

- **SMO-RP** Manual Direction Finding Software Package
- **SMO-PA** Panoramic Analysis Software Package
- **SMO-ASPD** Statistic Analysis Software Package
- **SMO-STA** Technical Analysis Software Package



Software Package for Technical Analysis (SMO-STA)

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Capabilities of the handheld direction finder controlled by a portable computer under severe climatic conditions are determined by characteristics of the used portable computer.

Additional **ARC-KNV3M** (3 to 8 GHz) and **ARC-KNV4M** (3 to 18 GHz) Frequency Down-Converters can be installed to extend the handheld direction finder bandwidth. Each of these converters is equipped with a built-in directional antenna system for amplitude direction finding.

When in operation, converters can be fixed on the operator's chest using a special case. The operator's hands are free in this case. Also the operator can hold the converter using a special removable handle. Converters can also be fixed on tripods and masts.

ARC-KNV4M

In some practical cases it is required that the signal source localization process takes place in a concealed mode, without drawing of attention. A special set of antennas for concealed direction finding is provided for this purpose.

Antennas for direction finding in the concealed mode are arranged in a carry bag together with receiver and a control and display device. Also **ARC-KNV3M** or **ARC KNV4M** converter can be arranged in a carry bag for direction finding in the concealed mode. The direction to the signal source is determined aurally – based on tone signal frequency change at the operator's body turn.

More detailed information on this function can be furnished upon request.

Main technical characteristics of ARC-RP3M handheld direction finder are given in the table below.

Operation of ARC-KNV3M – with Handle and in Carry Bag

Basic Specifications

General	
Operating frequency range	
• Basic configuration	25 – 3000 MHz
• with ARC-KNV3M	25 – 8 000 MHz
• with ARC-KNV4M	25 – 18 000 MHz
Intermodulation free dynamic range (3rd and 2nd order)	75 dB min
Receiver tuning resolution	1 Hz
Internal battery supply	Yes
Vehicle power supply	10 - 32 V
AC network power supply	90 - 250 V
Continuous battery run-time (internal battery set)	2 hours
Continuous battery run-time (with optional external battery)	up to 8 hours
Weight of antenna system	0.7 kg, max.
Receiver weight (with batteries):	1.3 kg, max.
Operating set weight (with single antenna)	3.5 kg, max.
Complete set weight	9 kg, max.
Receiver dimensions	106 x 56 x 235 mm
Operating set weight dimensions (including transportation casing)	400 x 300 x 150 mm

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Detection and Direction Finding	
Direction finding method	Amplitude
Sensitivity in direction finding mode	3 - 15 μV/m
Signal level evaluation limits (with attenuators)	-30 - 110 dB
Direction finding instrument accuracy (basic configuration)	7° – 15°
Simultaneous bandwidth	0.5 MHz, 2 MHz, 8 MHz, 128 MHz
Detected signal minimum duration	50 μs
Spectrum displaying modes	Normal / average / peak, 3D spectrum
Rate in narrow band analysis mode:	
• within 0.5 MHz band	up to 25 MHz/s
• within 2 MHz band	up to 100 MHz/s
Rate in wide band analysis mode:	
• within 8 MHz band	up to 10 GHz/s
• within 128 MHz band	up to 6 GHz/s
Rate in search mode	
• within 0.5 MHz band	up to 15 MHz/s
• within 2 MHz band	up to 60 MHz/s
• within 8 MHz band	up to 240 MHz/s
Typical time for wireless station detection:	
• in station active mode	0.1 s
• in low traffic mode	1 s
Typical time for wireless station direction finding:	
• In station active mode	5-10 s
• In low traffic mode	20-30 s
Sampling length	40 μs
Data refreshing rate	25000 sample/s

UNDER PC CONTROL

Panoramic Analysis and Frequency Saving	
Frequency range load recording time	24 hours
Registered parameters	Recording based on amplitude/frequency/time coordinates
Panorama rate (with 6 kHz discreteness)	2500 MHz/s
Radio Channel Monitoring and Broadcast Recording	
Receiver sensitivity	0.8 - 1.5 μV/m
Continuous saving time	24 hours
Types of recorded data	Signal, time, frequency
Technical Analysis, Radio Signal Recording and Postprocessing	
Frequency band width for IF signal recording:	
• continuous within the band	320 kHz, 250 kHz, 100 kHz, 50 kHz, 25 kHz, 12 kHz, 6 kHz
• fragments	up to 8 MHz

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