

PROFESSIONAL RECEIVER OF VHF-UHF FREQUENCY BAND WITH SIGNAL PROCESSING «GALAKTIKA-U»

Receiver “Galaktika-U” is purposed for operation in the composition of radio centers or independently for signal reception and demodulation in the frequency band from 20 to 3000 MHz.

Receiver is controlled by computer using interface USB 2.0. Information from the output of receiver is presented in the form of digital quadrature samples transmitting via USB-port. Receiver also has traditional LH outputs for connecting terminal equipment and playback of spoken information.

Receiver is equipped with control panel. This panel contains liquid-crystal indicator 3.5”purposed for easy control of receiver using menu and in addition provides spectrum indication of received signal.

In the frequency band from 20 to 1000 MHz receiver is built on a double frequency changing circuit with IF signal digitizing by 16-bit ADC and DDC-conversion into complex form (I/Q-samples) with subsequent processing of signal in FPGA and DSP-processor. Triple frequency changing is used the frequency band from 1 to 3 GHz.

Digital signal transformation has increased phase stability and parameters repetition.

Presence of two antenna inputs “20-1000 MHz” and “1-3 GHz” advances abilities of operation the receiver in radio centers with different HF-sections, antenna-feeder systems with antenna amplifiers.

Power supply of receiver is provided either from on-board line 12 V or industrial line 220 V, 50 Hz using state power supply unit.

COMPOSITION

- Preselector 20-1000 MHz;
- Microwave converter 1-3 GHz;
- Frequency synthesizer of the 1st heterodyne;
- Frequency synthesizer of the 2nd heterodyne, former of reference frequencies;
- Section of digital signal processing;
- Unit of secondary power supply sources;
- Control panel with color LCD;
- Casing with power supply unit;
- Set of connecting cables;
- Operational documentation;
- CD with remote control software

External view of receiver «Galaktika-U»



TECHNICAL PARAMETERS

• Operating frequency band	20 ... 3000 MHz
• Antenna inputs	20-1000 MHz, 1-3 GHz, $Z_{in} = 50 \text{ Ohm}$ < 2.0
• SWR _d of antenna inputs	
• Sensitivity with SNR = 10 dB, BW = 12 kHz:	
in the frequency band 20 – 1000 MHz	0.5...0.7 μB
in the frequency band 1 – 3 GHz	0.7...1.0 μB
• Dynamic range by compression of output signal by 2 dB single-signal interference	90 dB
• Dynamic range by third order intermodulation	> 80 dB
• Filter bandpass of:	
of demodulation path filter	2.5 ... 300 kHz
of registration path filter	2.5 ... 5000 kHz
• Rectangularity of amplitude frequency parameters of filters	1.1 ... 1.5
• Selectivity by adjacent channel ($\Delta f = \pm 25 \text{ kHz}$)	> 80 dB
• Adjustment of input attenuator	0 ... 30 db, step 10 dB
• Depth of AGC adjustment	90 dB
• ACG time constant of:	
«charge»	5 ms
«discharge»	0.1/0.5/1/5/10 s
• ADC resolution of digital section	16 bit
• Suppression of spurious receiving channels	> 80 dB
• Relative frequency instability	$\pm 5 \cdot 10^{-8}$
• Frequency tuning time	2 ms (max)
• Tuning step	1 Hz
• Spectral density of heterodyne noise (50 kHz tuning)	$\leq -90 \dots 105 \text{ dBc/Hz}$
• Quality assessment of received signal level	in dB
• Signal demodulation	AM, FM, CW, SSB
• BFO adjustment	$\pm 3 \text{ kHz}$, step 10 Hz
• Volume control of LF signal	0 ... 40 dB, step 1 dB
• Parameters of receiver's outputs :	
LF-output for connecting headphones	68 Ohm, 2 V
LF-output for connecting sound card	10 kOhm, 1 V
LF-output for connecting balanced line	600 Ohm, 2 V
• Remote control	USB 2.0
• Resolution frequency of output I/Q-samples frequency	44.4...6400 kHz
• Number of displayed spectrum components	256
• Power supply	220B/50 Hz, 12 V
• Consumed power	not more than 65 VA
• Overall dimensions (1/2 crate 3U)	150×480×236 mm
• Weight	not more than 12 kg

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