ICOM

IC-R9500

Professional Communications Receiver

Professional communications receiver

with 0.005 to 3335MHz coverage and high performance spectrum scope

The IC-R9500 is a high-end professional communications receiver for wideband monitoring, signal detection, spectrum analysis, recording received signals, and more.

Main features

- 0.005–3335MHz wideband coverage
- +40dBm 3rd order intercept point and 109dB dynamic range* (*At 14.1MHz)
- Multi-function high performance spectrum scope
- ±0.05ppm high frequency stability
- ±3dB* accuracy of dBμ/dBμ(emf)/dBm meter (*10 to 70dBμ signal between 100kHz to 3335MHz at 25°C)
- SSB/CW/AM mode auto tuning function
- Optional P25 digital mode reception
- Professional grade operation, functionality and build

Dual DSP units provide superb receiver

BASIC PERFORMANCE

Wideband coverage

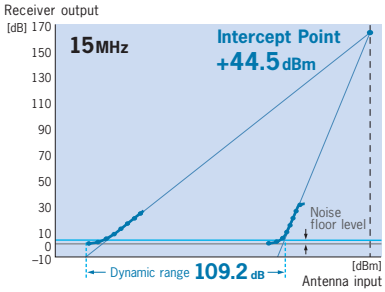
The IC-R9500 covers 0.005–3335MHz in SSB, AM, FM (WFM), CW, FSK and P25* modes. It is suitable for a wide variety of radio monitoring and listening activities.

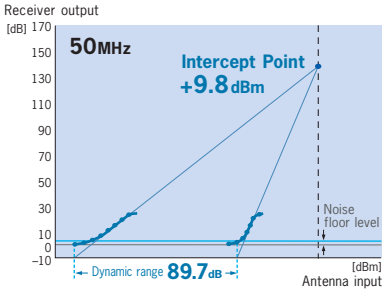
* Optional UT-122 digital unit is required.

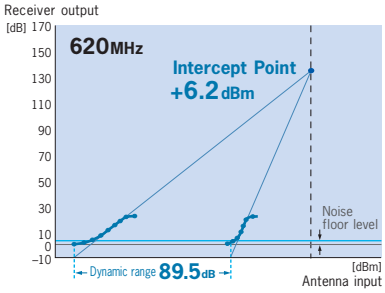
Superb receiver performance

The IC-R9500 achieves amazing performance by using a D-MOS FET array in the 1st mixer (below 30MHz) and an excellent IMD roofing filter.

The IC-R9500 has +40dBm IP3 and 109dB dynamic range at 14.1MHz. IP3 performance is +9.8dBm at 50MHz and +6.2dBm at 620MHz (+5dBm (typical) from 30MHz to 3335MHz).



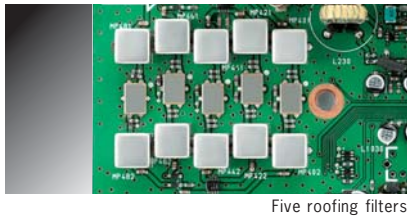




Five roofing filters

The IC-R9500 has 5 independent roofing filters (240, 50, 15, 6 and 3kHz) for improved selectivity. In very crowded RF spectrum conditions, it is extremely important to protect against strong in-band signals. The 3kHz roofing filter provides a 130dB (approx.)* blocking dynamic range.

* At 15MHz reception, with 5kHz separation signals.



Five roofing filters

Dual DSP

The IC-R9500 incorporates two independent, 32-bit floating point DSP units, a dedicated DSP unit for receiver functions and another for the spectrum scope. By using the power of two independent DSP units, the radio can respond to operator changes in an instant.

Dual DSP units

±0.05ppm high frequency stability

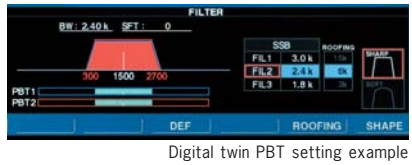
The IC-R9500 uses an OCXO (Oven Control Crystal Oscillator) unit which provides ±0.05ppm frequency stability from 0°C to 50°C. The 10MHz reference frequency can either be supplied to or input from external equipment.

OCXO unit

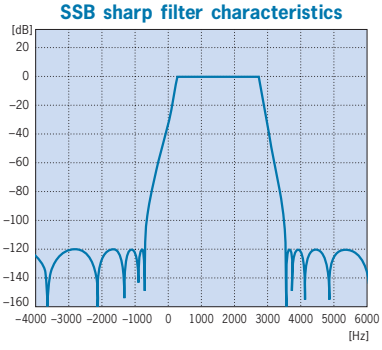
Digital IF filter

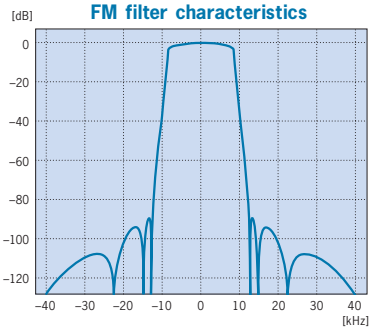
The digital IF filter* allows the operator to adjust the filter shape (sharp or soft), filter bandwidth, and center frequency characteristics. The digital twin PBT narrows and shifts the IF passband to efficiently eliminate undesired signals.

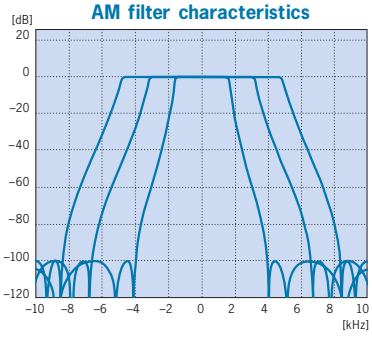
* For FM, WFM and P25 mode, the passband width is fixed.



Digital twin PBT setting example







performance and spectrum analysis

SPECTRUM SCOPE

Multi function spectrum scope

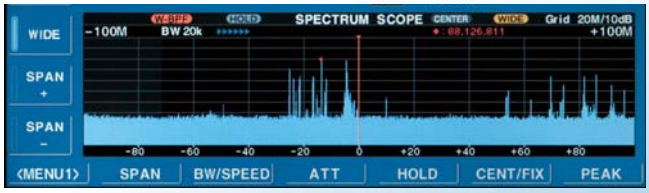
Using a dedicated DSP unit improves the dynamic range of the spectrum scope.
The IC-R9500 has four different spectrum modes such as normal/wide and center/fixed width. The normal spectrum scope covers a range from ±2.5kHz to ±5MHz, while the wide band spectrum scope* observes up to ±500MHz (±10MHz, ±25MHz, ±50MHz, ±100MHz ±250MHz and ±500MHz selectable). When using the normal spectrum scope, the digital scope's filter width can vary from 200Hz to 20kHz with a variable sweep speed.
The spectrum scope can also be set to use specific scope edges or to center the span on the receiving frequency.
The peak search function automatically moves the display marker to the strongest signal on the scope screen. In addition to these features, the scope has 3 levels of attenuation (10dB, 20dB, 30dB).

* While using the wide band scope function, AF output is muted.

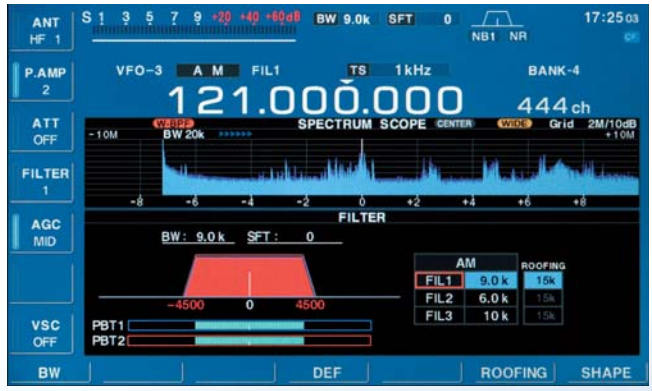
- Fixed mode ... the scope screen does not shift when you change the receiving frequency.
- Center mode ... the scope screen shifts as the receiving frequency moves. The receiving frequency is always centered on the scope screen.
- Wide band scope receives up to ±500MHz.
- Sweep speed/span/filter width setting
- Peak search function
- Peak hold function
- Attenuator
- Mini scope function

Center mode setting example

Fix mode setting example



Wide band scope example (±100MHz)



Mini scope function example

Monitor and connection cab

Multiple functions and sophisticated oper

FUNCTIONS

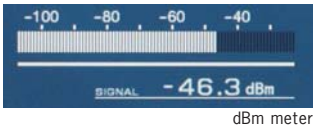
7-inch wide color TFT LCD

The large 7-inch wide (800 × 480 pixels) active matrix display delivers quick response time, high resolution and has a wide viewing angle. The multi-function spectrum scope is displayed in vivid color. The background color is selectable from black or blue for your preference. In addition, the IC-R9500 has a VGA connector allowing you to connect an external monitor.

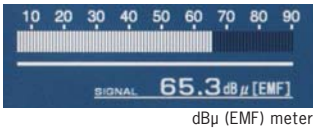
Multiple RSSI

S-meter, dBµ, dBµ(emf) and dBm meter types are selectable in the IC-R9500. The dBµ, dBµ(emf) and dBm meter have ±3dB of accuracy (10 to 70dBµ signal from 100kHz to 3335MHz at 25°C).

S-meter



dBm meter



dBµ (EMF) meter

Noise blanker

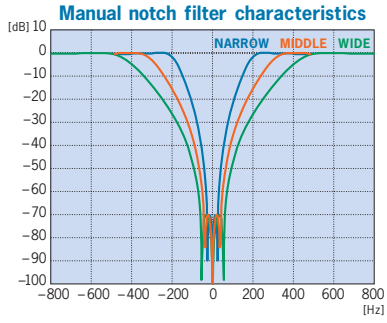
The IC-R9500 has a DSP controlled noise blanker that significantly reduces pulse type noise and improves the S/N ratio by removing interfering noise. The noise blanker has two channels with adjustable width and depth parameters. You can use these to target the specific noise interference.

Noise reduction

The noise reduction function separates signal components from random noise through Digital Signal Processing (DSP) and enhances the signals buried in noise for improved signal readability.

Two-point manual notch filter

The digital manual notch filter has a depth of more than 70dB at two points with adjustable filter width (wide, middle, narrow). This means that two strong beat signals can be eliminated at once even while using the auto notch filter.



Synchronous AM detection

The synchronous AM (S-AM) detection provides less distorted audio than normal diode detection. This mode is useful when fading occurs or signal level is low. The IC-R9500 can recreate the carrier signal exactly by using the DSP. In addition, upper or lower sideband demodulation for S-AM is selectable for eliminating interference from adjacent strong signals.

FSK demodulator & decoder

The IC-R9500 has built-in FSK demodulator and decoder.

- Twin peak filter
- Water-fall indicator
- FSK-R mode
- FSK tone and shift frequencies programmable

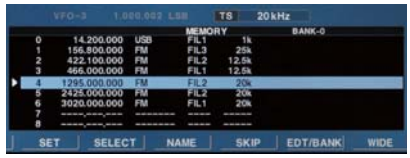
10 VFOs

The IC-R9500 has 10 VFO channels for tuning and storing operating frequencies, mode, filter width and other settings. For example, use VFO-1 for the 7MHz band, VFO-2 for the VHF marine band, VFO-3 for the 1200MHz band, etc. You can quickly change the operating bands with the 10-keypad. When the VFO is changed, the settings are automatically stored in that VFO channel.

A total of 1220 memory channels

The IC-R9500 has a total of 1220 memory channels. Store frequencies, modes, filter width and tuning steps. Memory channels are grouped into 10 memory banks. By connecting to a USB keyboard, you can edit memory contents directly.

- 1000ch regular memory channels
- 20ch scan edge channels
- 100 auto memory write channels
- 100 memory scan skip channels



Memory setting example

Digital voice recorder

The IC-R9500 has two types of digital voice recorders. One is the regular recorder, recording for long periods in “WAV” format into the built-in CF memory or an external USB memory. The sampling rate is variable from 8kHz (SQ1) to 48kHz (SHQ). In SQ1 mode, up to 130 minutes (approx.) of recorded audio can be stored into the CF memory. The other recorder is the short voice recorder, which saves the previous 15 seconds of radio audio into RAM, allowing you to play back the audio instantly.

Voice recorder setting example

ations allowing efficient radio monitoring

Multi-scan functions

Numerous scanning functions to search for desired stations are available to make operation easier. The IC-R9500 scans 40 channels per second in memory scan mode.

- Memory scan
- Program scan
- Fine program scan
- ⊿F scan/⊿F fine scan
- Priority scan
- Selected mode memory scan
- Selected memory scan
- Auto memory write scan
- Tone scan

Voice synthesizer

The built-in synthesizer announces the receiving frequency, mode and signal strength in English.

USB connector

The IC-R9500 has a USB connector for connecting external USB memory or other USB devices. Received audio and the receiver configuration files can be imported and exported to a PC. Firmware upgrades are also possible via USB memory.

Various receive assist functions*1

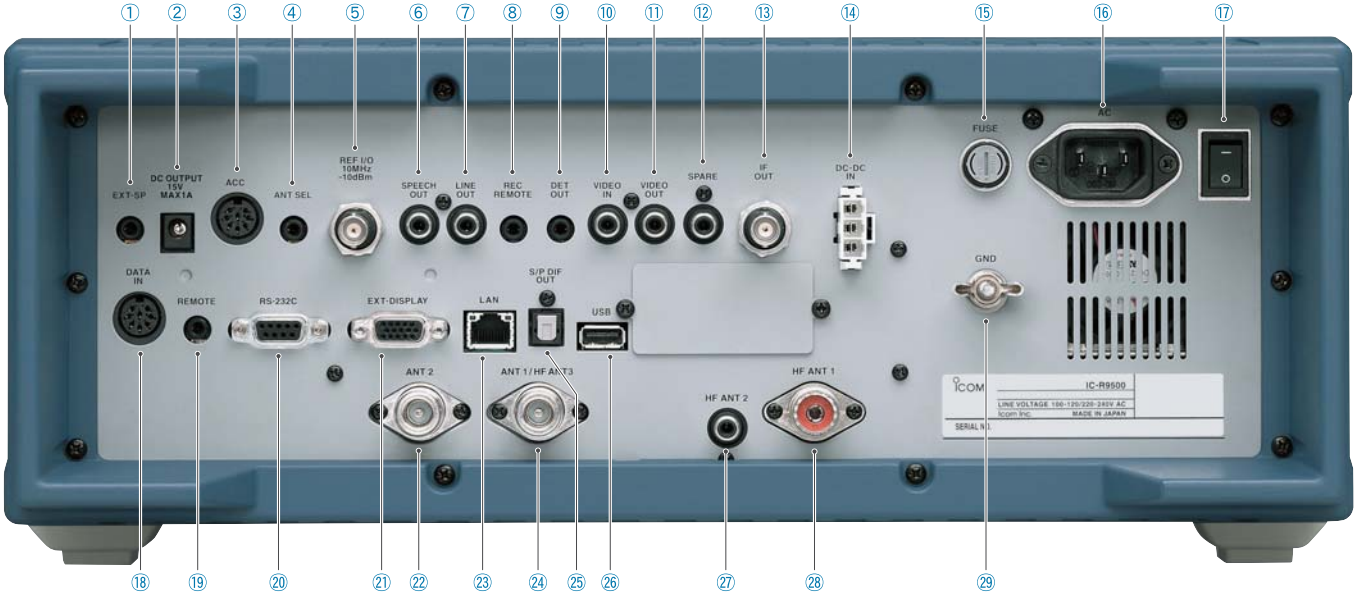
- SSB/CW/AM mode auto tuning function
- AFC function compensates for frequency shifts (FM/WFM mode only)
- Preamp and attenuator
- 1/4 tuning step function and dial click function
- CW-R (reverse) mode
- APF (Audio Peak Filter)
- AGC (Automatic Gain Control)
- VSC (Voice Squelch Control)
- Input overload protection (HF bands only)
- Optional P25 digital mode reception
- Optional CI-V interface and RS-232C for PC remote control
- Analog TV tuner (NTSC/PAL/SECAM)*2

*1 Some functions are not available depending on operating mode or band.

*2 Except USA version

Additional outstanding features

- 4 antenna connectors: an SO-239 type, a phono (RCA) connector and two type-N connectors
- S/P DIF output jack
- Video input/output
- Clock function with daily timer and sleep timer
- CTCSS and DTCS tone squelch
- Simplified frequency calibration using WWV or WWVH
- Dial lock function
- Panel lock function
- Adjustable tuning step
- Dimmer function
- Monitor function



① External Speaker Jack
② External DC Output Jack (15.0V)
③ ACC Socket
④ Antenna Selector Jack
⑤ Reference Frequency In/Out Terminal
⑥ Speech Output Jack
⑦ Line Output Jack
⑧ Recorder Remote Jack
⑨ Detector Output Jack
⑩ Video Input Jack
⑪ Video Output Jack
⑫ Spare Jack
⑬ IF Output Jack
⑭ DC-DC Power Socket
⑮ Fuse Holder
⑯ AC Power Socket
⑰ Main Power Switch
⑱ Data Input Socket
⑲ CI-V Remote Control Jack
⑳ RS-232C Connector
㉑ External Display Connector
㉒ Antenna Connector 2
㉓ Ethernet Connector
㉔ Antenna Connector 1/ HF Antenna Connector 3
㉕ S/P DIF Output Terminal
㉖ USB Connector
㉗ HF Antenna Connector 2
㉘ HF Antenna Connector 1
㉙ Ground Terminal

SPECIFICATIONS

GENERAL

Frequency coverage (Unit: MHz)	0.005–3335.000000* * Cellular bands are blocked in the U.S.A. version.
France version	0.005 – 29.999999 50.200 – 51.200000 87.500 – 108.000000 144.000 – 146.000000 430.000 – 440.000000 1240.000 – 1300.000000
Mode	USB, LSB, CW, FSK, AM, FM, WFM, P25* * Optional UT-122 required.
Number of memory channels	1220 (1000 regular, 100 auto memory write channels, 100 memory scan skip and 20 scan edges)
Antenna connectors	SO-239 (50Ω for HF), Phono [RCA] (500Ω for HF), Type-N × 2 (50Ω, one each for 30–1149.99999MHz, 1150–3335MHz)
Temperature range	0˚C to +50˚C; +32˚F to +122˚F
Frequency stability	Less than ±0.05ppm (at 25˚C) after warm up (5 minutes)
Temperature fluctuation	Less than ±0.05ppm (0˚C to +50˚C)
Frequency resolution	1Hz
Power supply requirement	100V/120V/230V/240V AC
Power consumption	Stand-by Less than 100VA Max. audio Less than 100VA
Dimensions (W×H×D) (projections not included)	424 × 149 × 340 mm; 16.69 × 5.87 × 13.39 in
Weight	20kg; 44.1lb (approx.)

Supplied accessories

• AC power cable • Carrying handles • Spare fuses • ACC plugs
• RCA plugs • DC power plug • Speaker plugs

RECEIVER

Intermediate frequencies HF VHF/UHF	 58.7MHz (1st)/10.7MHz (2nd)/48kHz (3rd) 278.7MHz or 778.7MHz (1st)/ 58.7MHz (2nd)/10.7MHz (3rd)/48kHz (4th)

Sensitivity

	SSB, CW, FSK	AM	FM	FM50k	WFM
0.100 – 1.799MHz*1	0.5μV	6.3μV	–	–	–
1.800 – 29.999MHz*1	0.2μV	2.5μV	0.5μV*3	0.71μV*3	–
30.0–2499.999MHz*2	0.32μV	3.5μV	0.5μV	0.71μV	1.4μV
2500–2999.999MHz*2	0.32μV	3.5μV	0.5μV	0.71μV	1.4μV
3000–3335.000MHz*2	1.0μV	11μV	1.6μV	2.2μV	4.5μV

*1 Preamp1 ON *2 Preamp ON *3 28–29.999MHz
SSB, FSK BW=2.4kHz, CW BW=0.5kHz, AM BW=6.0kHz at 10dB S/N,
FM BW=15kHz, FM50k BW=50kHz, WFM BW=180kHz at 12dB SINAD

3rd order IMD dynamic range	109dB (typ.) at 14.1MHz, 100kHz separation, preamp OFF
Selectivity (Representative value)	
USB, LSB, FSK (BW= 2.4kHz)	More than 2.4kHz / –3dB Less than 3.6kHz / –60dB
CW (BW= 500Hz)	More than 500Hz / –3dB Less than 700Hz / –60dB
AM (BW= 6kHz)	More than 6.0kHz / –3dB Less than 15.0kHz / –60dB
FM (BW= 15kHz)	More than 12.0kHz / –3dB Less than 25.0kHz / –60dB
WFM	More than 180kHz / –6dB
Spurious and image rejection ratio	
0.1 – 30.0MHz	More than 70dB
30.0 – 2500MHz	More than 50dB
2500 – 3000MHz	More than 40dB
AF output power	More than 2.6W with an 8Ω load

All stated specifications are subject to change without notice or obligation.

OPTIONS

CT-17
CI-V LEVEL CONVERTER

For remote receiver control using a PC with an RS-232C.

UT-122
P25 DIGITAL UNIT

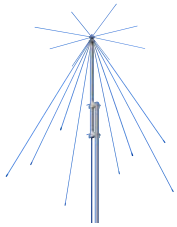
Provides APCO P25 digital mode reception.

SP-34
EXTERNAL SPEAKER

4 audio filters; headphone jack; can connect to 2 receivers.
Input impedance: 8Ω
Input power: 5W Max.

AH-8000
SUPER WIDEBAND OMNIDIRECTIONAL ANTENNA

Frequency coverage: 100–3300MHz.
Type-N antenna connector.



• All screen images are simulated.
• The LCD display may have cosmetic imperfections that appear as small or dark spots. This is not a malfunction or defect, but a normal characteristic of LCD displays.

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