



# Pre-release Product Information

## HF/50MHz TRANSCEIVER

# IC-7800



Icom Inc.

# IC-7800.

## Nothing else comes close.

Icom has been the world pioneer in amateur radio for 40 years. The first to bring transistor technology, digital PLL technology and the latest DSP technology to name a few achievements. It is therefore fitting that Icom brings you the most advanced amateur radio ever in the IC-7800! No less than four 32-bit floating point DSP chips, two completely independent receivers, 7-inch wide TFT display, RTTY/PSK31 encoder and decoder and compact flash technology are but a few of the amazing features this mighty rig offers. Simply the Best, simply the ultimate in amateur radio is now a reality for you to enjoy first hand.

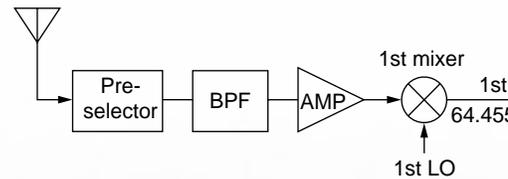
HF/50MHz TRANSCEIVER

# IC-7800

**Four 32-bit floating point DSP units**  
Four independent DSP units are used. One for the transmitter, one for each receiver, and the final one for the spectrum scope. The IC-7800 builds on the phenomenal performance of the 32-bit DSP that Icom introduced to the amateur world. With the 24-bit AD/DA converter, this powerful combination supports many DSP features exclusive to the IC-7800.



**+40dBm ultra high intercept point**  
By sparing no expense throughout the signal chain, Icom has developed an amateur rig that challenges the performance of any "Military Grade" transceiver. You'll enjoy a +40dBm\* 3rd order intercept point and ultra wide dynamic range that is amateur radio's highest. The IC-7800 is the new bench mark for HF transceivers. Examples include the use of mechanical relays instead of traditional semi-conductors and high performance DMOS mixers with a high-drive Local Oscillator. Using only two IF stages and Icom's new image rejection technology, enables the IC-7800 to clearly reproduce very weak signals as well as very strong signals without distortion.  
\* HF bands, pre-amp off.



## Automatic tracking pre-selector

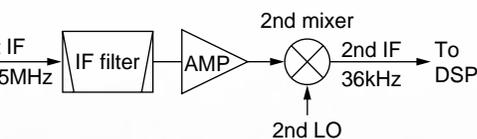
As your first line of defense against interfering signals, the pre-selector rejects unwanted out of band interference from multi-multi operation or strong broadcast stations. The 7800's pre-selector automatically tracks the intended signal, keeping the pre-selector's bandwidth centered on the operating frequency.

## Two completely independent receiver circuits

As the same "Military Grade" receiver is duplicated for the second receiver, the IC-7800 is like having two rigs in one box. Thus the ultimate in dual receiver performance is at your control; the receivers are completely independent all the way from the 4 antenna jacks, through the pre-selectors, DSP, signal detectors, front panel control, right into the stereo headphone! In addition to the separate receivers, the audio amplifiers and control circuits are duplicated for either headphones or external speakers. The true dual receiver takes your band hopping and contesting experience to the next level!

## 200W output power at full duty

Newly designed push-pull MOS-FET amplifiers work with 48V DC, providing a powerful 200W of output power at full duty cycle with low IMD in all bands. A low-noise switching power supply is built-in.



## Ultra high frequency stability

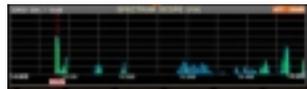
Your IC-7800 will be the reference point on the band with a standard stability of  $\pm 0.05\text{ppm}$ . Even on 6m band, that is less than 3Hz error from the Oven Controlled Crystal Oscillator! Also, a 10MHz reference frequency can be input/output for external equipment.

## 7-inch wide color TFT LCD

The large 7-inch wide (800x480 pixels) color display has to be seen to be believed! High linearity needle S-meters, multi-function spectrum scope and RTTY/PSK31 messages are displayed in vivid color. In addition, the IC-7800 has a VGA connector allowing you to connect an external monitor.

## Multi function spectrum scope

With the dedicated DSP unit, the spectrum scope offers linearity, accuracy and resolution. By adjusting the scope selectivity (resolution band width), the spectrum scope allows you to find those weak signals right next to strong ones! With this ground breaking scope, you can even monitor the distortion or width of the received signals. In addition, the scope range can be set independently from the receiving frequency. You can monitor the band condition between the selected sweep edges, as well as sweep a selected band width centered on the receiving frequency in the scope screen.



Example of fixed spectrum scope range. The receiving frequency (red line) moves within the set sweep range.



Example of spectrum scope centered on the receiving frequency. Sweep range follows the receiving frequency.

## RTTY /PSK31 operation without PC connection

The IC-7800 has a modulator and demodulator for the 2 major HF Amateur digital modes. It is possible to encode and decode PSK31 as well as baudot RTTY signals by simply connecting a USB keyboard to the IC-7800. You no longer need to connect a PC for RTTY/PSK31 operation. In addition, transmitted and received messages can be stored to the CF card memory and transferred to your PC.



## IF notch filter with adjustable notch filter characteristics

The IC-7800's DSP controlled manual notch filter shape can be set in 3-steps for the various receiving conditions. Use a soft filter shape for tuning an interfered tone, then switch to the sharp one to cut 70dB off the tone.

## Professional 6m receiver

While most HF/50MHz transceivers share the pre-amp between the HF bands and 50MHz band, the IC-7800 uses an exclusive preamp and mixer especially for 50MHz. This preamp and mixer are tuned to the 50MHz band and improve cross modulation characteristics, particularly important when picking up a very weak signal near a strong station.

## Digital Voice Recorder

The Digital Voice Recorder (DVR) is a convenient function for contests, DX peditions, field day and even normal operation. Record your call sign, CQ, or other station information into a memory. Independent "Rec" and "Play" buttons are on the front panel.

## CF (Compact Flash) memory card

An IC-7800 has a CF card slot and a CF card will be supplied with the IC-7800. You can store your various settings such as filter, display, mic equalizer, etc, on your card. When sharing the IC-7800 with multi-users such as on a DX pedition, in a contest or as a club rig, the CF card allows you to restore your personal settings instantly.



## And more....

- Soft and sharp IF filter shapes for receiver
- Synchronous AM detection
- Reverse power protection circuit built-in
- RS-232C port for PC connection
- BNC type RF accessory connectors
- Audio Peak filter for CW
- Multi-function noise blander
- Advanced noise reduction and auto notch
- Twin peak audio filter and tuning indicator for RTTY
- High speed automatic antenna tuner
- Built-in Voice synthesizer
- Main/Sub receiver connectors
- Optional IC-PW1 1kW Linear Amplifier available



## SPECIFICATIONS

### GENERAL

- Frequency coverage (unit: MHz) :
  - Receive 0.030–60.000\*
  - Transmit 1.800–1.999 3.500–3.999
  - 7.000–7.300 10.100–10.150
  - 14.000–14.350 18.068–18.168
  - 21.000–21.450 24.890–24.990
  - 28.000–29.700 50.000–54.000
- \* Some frequency ranges are not guaranteed.
- Mode : USB, LSB, CW, RTTY, AM, FM, PSK31
- Number of memory channels : 101 (99 regular and 2 scan edges)
- Antenna impedance : 50Ω unbalanced (with antenna tuner OFF)
- Antenna connector : SO-239x4
- Temperature range : 0°C to +50°C; +32°F to +122°F
- Frequency stability : Less than ±0.05ppm (0°C to +50°C)
- Frequency resolution : 1Hz
- Power supply requirement : 85–265V AC
- Power consumption : Tx Max. power 800VA
- Rx Standby 200VA typ.
- Max. audio 210VA typ.
- Dimensions (W×H×D) : 424 × 150 × 420 mm;
- (projections not included) 16<sup>11</sup>/<sub>16</sub> × 5<sup>29</sup>/<sub>32</sub> × 16<sup>17</sup>/<sub>32</sub> in
- Weight (approx.) : 23kg; 50.7lb

### TRANSMITTER

- Output power (continuously adjustable):
  - SSB, CW, FM, RTTY, PSK31 5–200W
  - AM 5–50W
- Modulation system : SSB DPSN modulation
- AM Low power modulation
- FM Phase modulation
- Spurious emission : Less than –60dB
- Carrier suppression : More than 60dB
- Unwanted sideband suppression : More than 80dB
- Microphone connector : 8-pin connector (600Ω)

### RECEIVER

- Receive system : Double conversion superheterodyne
- Intermediate frequencies : 1st 64.455MHz
- 2nd 36kHz
- Sensitivity (typical) :
  - SSB, CW, RTTY (BW: 2.4kHz) 0.1–1.79 0.5μV\*<sup>1</sup>
  - (10dB S/N) 1.8–29.99 0.16μV\*<sup>1</sup>
  - 50.0–54.0 0.13μV\*<sup>2</sup>
  - AM (BW: 6kHz) 0.1–29.99 2μV\*<sup>1</sup>
  - (10dB S/N) 50.0–54.0 1μV\*<sup>2</sup>
  - FM (BW: 15kHz) 28.0–29.99 0.5μV\*<sup>1</sup>
  - (12dB SINAD) 50.0–54.0 0.32μV\*<sup>2</sup>
- \*1 Preamp-1 is ON, \*2 Preamp-2 is ON
- Squelch sensitivity (Pre-amp: OFF) :
  - SSB, CW, RTTY, PSK31 Less than 5.6μV
  - FM Less than 1μV
- Selectivity (representative value) :
  - SSB, RTTY (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/–6dB
  - Less than 20.0kHz/–60dB
- Spurious and image rejection ratio : More than 70dB (except 50MHz IF through point)
- AF output power : More than 2.6W at 10% distortion with an 8Ω load
- RIT variable range : ±9.999kHz
- PHONES connector : 3-conductor 6.35 (d) mm (1/4")
- External speaker connectors : 2-conductor 3.5 (d) mm (1/8")/8Ω

### ANTENNA TUNER

- Matching impedance range :
  - HF bands 16.7–150Ω unbalanced (Less than VSWR 3:1)
  - 50MHz band 20–125Ω unbalanced (Less than VSWR 2.5:1)
- Min. operating input power : 8W
- Tuning accuracy : VSWR 1.5:1 or less
- Insertion loss : Less than 1.0dB (after tuning)

## REAR VIEW



This device has not been approved by the appropriate authorities in each country. This device may not be sold or leased, or be offered for sale or lease, until approval has been obtained. All stated features, appearances, screen shots and specifications may be subject to change without notice. All screens show simulated pictures.

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Certificate Number Q14190

Icom Inc. (Japan), is an ISO9001 certification acquired company.

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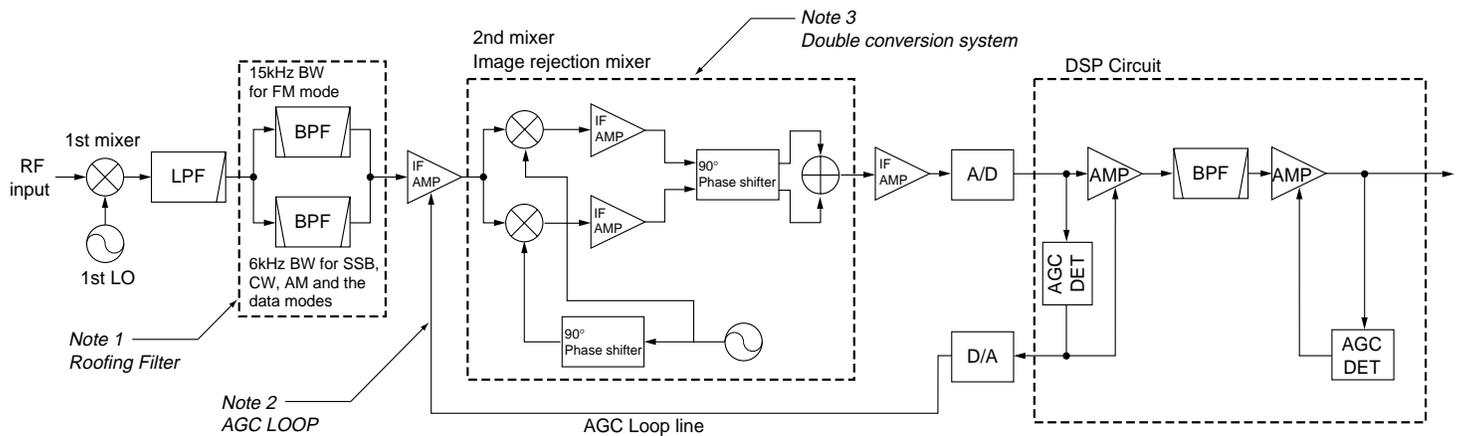
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**The IC-7800 has highly-advanced DSP units. To bring out the maximum DSP potential, Icom's engineering team has selected only the best parts to be used in the receiver stages, and have simplified the receiver circuit using the latest technology. As a result, the combination of digital and analog technology has achieved a level never seen before.**



**Fig.1 Receiver block diagram**

### Two roofing filters (See Note 1 in the diagram)

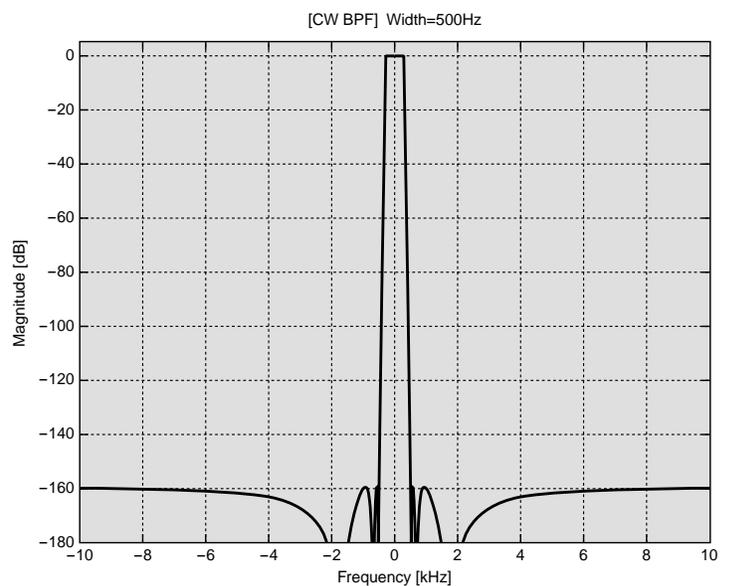
The 1st IF filter, commonly called the "Roofing Filter", covers the bandwidth required for operation of the transceiver's modes of operation. Typically transceivers will use only one Roofing Filter for all the modes, including FM. While a 15kHz, or more, roofing filter is used in almost all current amateur transceivers, it is not the "optimal design" for SSB, CW, or AM. The IC-7800 utilizes two 1st IF roofing filters, one for FM operation and the second with a 6kHz bandwidth for SSB, CW, AM, and the Data modes! This design combined with the wide dynamic range of the IF amplifier, dramatically improves the blocking characteristics for in-band interference from strong signals.

### AGC loop management (See Note 2 in the diagram)

The engineering team at ICOM redesigned the AGC loop management of the IC-756PROII. Combining the digital IF filter, manual notch, and now the 1st IF stage, these are all controlled by the DSP unit. 110dB of ultra wide dynamic range in the receiver, means the IF amplifier is distortion free by the strong signals.

### Double conversion system (See Note 3 in the diagram)

While mixers often become a cause of signal distortion and spurious emissions, the IC-7800 utilizes a double conversion super-heterodyne system using a newly developed image rejection mixer. This new mixer reduces signal distortion through IF processing and provides a high-fidelity signal to the DSP unit.



**Fig.2 IF Filter Characteristic created by the DSP unit**