



HF/50MHz TRANSCEIVER

IC-7600



Icom proudly announces debut of the HF/50MHz transceiver IC-7600.

Since the first release in 1996, four generations of the IC-756 series have earned a formidable reputation as the mainstream of 100W HF transceivers.

The IC-7600 takes a big leap from the IC-756PROIII, using the IC-7800's cutting-edge digital technology and over 45 years of analog RF circuit expertise. The newly employed double conversion superheterodyne system, the dual DSP units and 3kHz IF (roofing) filter makes the IC-7600's receiver performance closer to that of the IC-7800/7700. The ultra wide viewing angle display, high resolution spectrum scope and USB keyboard/USB flash drive connection greatly improves visibility and usability in practical operation.

The IC-7600 is yet another pinnacle of HF/50MHz transceiver design.

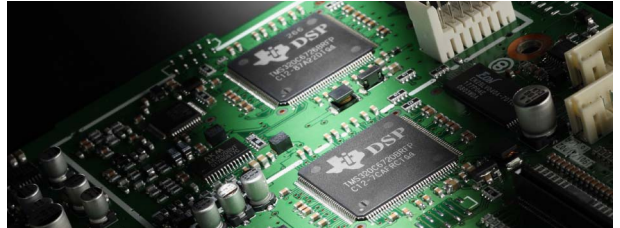
SELLING POINTS

- 104dB dynamic range, +30dBm 3rd order intercept point in HF bands
- Double conversion superheterodyne system improves inband IMD characteristics
- Two 32-bit floating point DSP units
(One for the transmit/receiver, one for the spectrum scope)
- Three 1st IF (roofing) filters (3kHz, 6kHz, 15kHz)
- 5.8-inch ultra wide viewing angle TFT display
- High resolution spectrum scope
- USB keyboard and USB flash drive connection
- PSK and RTTY encoder/decoder built-in (PC and software is not required)

FEATURES

Dual DSP for transmit/receive and spectrum scope

The IC-7600 is powered by two 32-bit floating point DSP units for Transmit/Receive and spectrum scope. The DSP units provide high performance comparable to our top-of-the-line transceivers IC-7800 and IC-7700. And the IC-7600 achieves similar performance for high speed digital signal processing combined with our analog RF technologies.



<DSP unit for Transmit and Receive>
 TMS320C6726B (Top in photo)
 Internal clock speed: 266MHz
 32-bit floating point DSP
 Maximum performance =1600MFLOPS

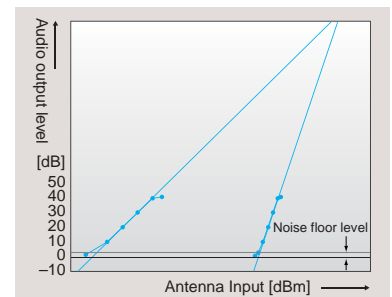
<DSP unit for Spectrum scope>
 TMS320C6720 (Bottom in photo)
 Internal clock speed: 200MHz
 32-bit floating point DSP
 Maximum performance =1200MFLOPS

[For your reference] IC-756PROIII
 <DSP unit for Transmit and Receive>
 Internal clock speed: 50MHz
 32-bit floating point DSP
 Maximum performance =150MFLOPS
 * Spectrum scope uses analog circuit.

104dB dynamic range and +30dBm third order intercept point (IP3)

Icom's long years of analog RF circuit experience combined with the latest digital technology results in an astonishing 104dB receiver dynamic range and +30dBm IP3 in the HF bands without sacrificing to the receiver sensitivity. Even a weak signal adjacent to strong signals is received by the IC-7600.

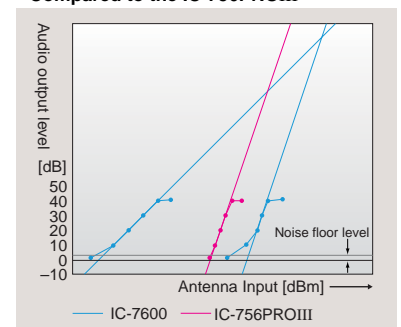
Dynamic range characteristics



Double conversion superheterodyne dramatically improves inband IMD

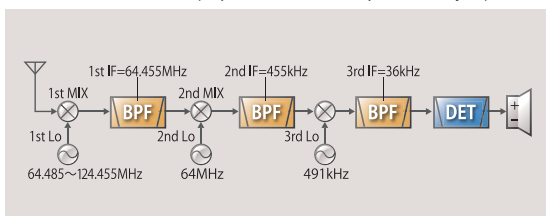
As you may have seen in the IC-7800 or IC-7700, the IC-7600 employs a double conversion superheterodyne system which has an image rejection mixer for the 2nd mixer stage. When compared to the triple conversion system, the double conversion system is technically difficult to achieve a stable mixer operation but it dramatically reduces signal distortion through IF processing and provides a high-fidelity signal to the DSP unit. As a result, the IC-7600 will provide a clearer, more distinct signal.

Inband dynamic range characteristics Compared to the IC-756PROIII

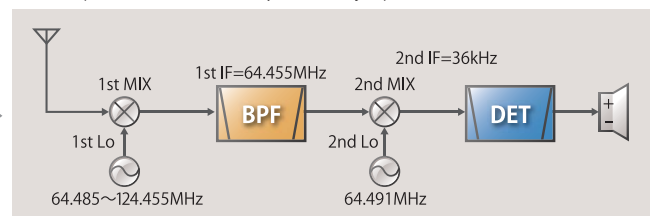


Receiver System

General HF transceiver (Triple Conversion Superheterodyne)



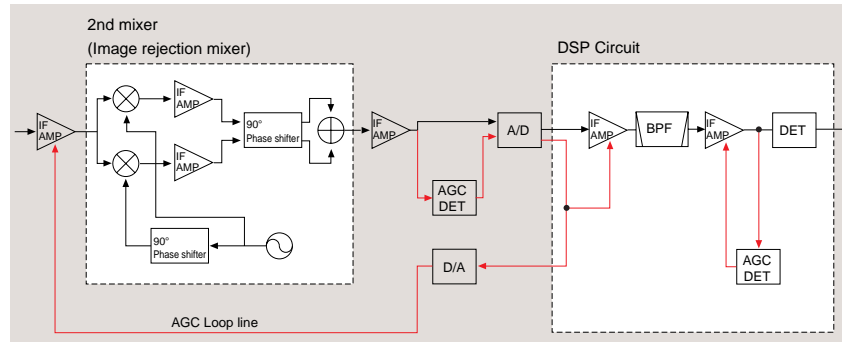
IC-7600 (Double Conversion Superheterodyne)



FEATURES

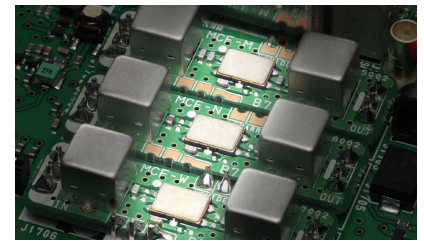
The AGC loop management controlled by the DSP unit

The IC-7600 detects the AGC voltage from the signal which has passed the digital IF filter. That means the IC-7600 prevents the AGC blocking from a nearby strong signal to bring out the full potential of the digital IF filter. The digital IF filter and manual notch filter are also processed in the AGC loop.



Three 1st IF filters, including 3kHz bandwidth

The IC-7600 has three 1st IF filters (roofing filters) in front of the 1st IF amplifier stage. You can select an appropriate filter width from 3kHz, 6kHz and 15kHz filter depending on operating mode. (15kHz fixed for FM mode). Especially the 3kHz 1st IF filter protects the subsequent stage from the influence of the nearby strong stations.



6kHz, 3kHz and 15kHz 1st IF filters (from top to bottom)

Digital IF filter

The IC-7600 also incorporates the “build your own” filter feature. This allows the operator to adjust filter shaping (sharp or soft), filter bandwidth, and center frequency characteristics, without missing the action. Multiple filter memories store the last used filter settings by used operation mode. This allows the operator to quickly switch filters for constant operating conditions, such as in a contest.



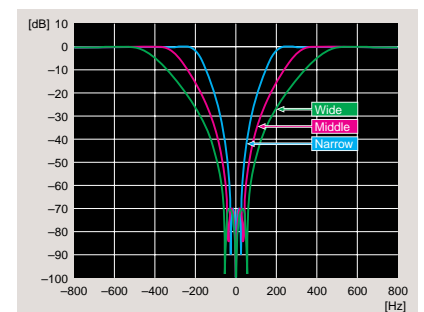
Digital IF filter setting example

Digital twin PBT

Once the IF filters have been “tweaked”, the operator has additional control with the digital twin Passband Tuning (PBT). The digital twin PBT allows flexibility of the IF shift and narrowing of the digital IF passband in moving the IF passband. With the digital IF filters, PBT performance allows you to cut away all the interference and noise to hear the actual signal.

Digital manual notch filter

Signals such as heterodynes and AM carriers can be eliminated with automatic notch filter technology, making interference from RF sources such as beat signals and RTTY signals a thing of the past. Additionally, the filter shape of the manual notch can be adjusted in three shapes, with more than 70dB attenuation.

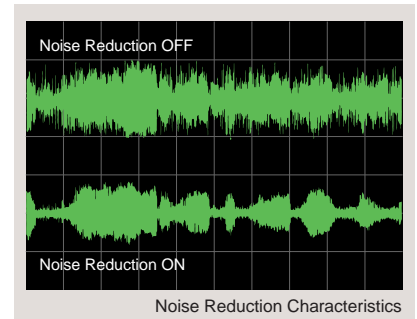


Manual notch filter characteristics

FEATURES

Noise reduction

The 32-bit DSP processing power produces real results by separating a signal component from the noise with the 16-step variable noise reduction. By suppressing the noise components, an outstanding signal-to-noise ratio is achieved, providing clear, clean audio in all modes without distortion of the target signal.

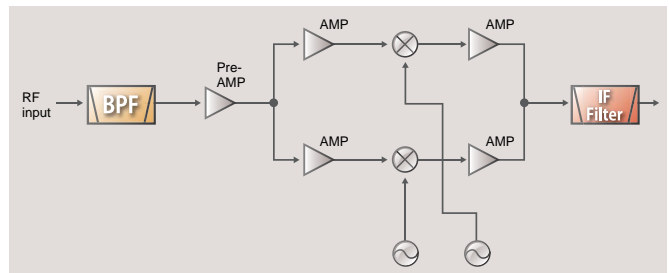


Noise blanker

The noise blanker reduces pulse noise such as engine ignition, with the fully adjustable 100 steps noise blanker.

Dualwatch function

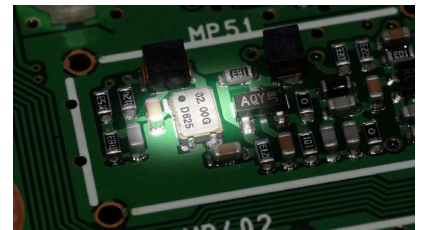
The dualwatch function allows you to receive two signals on the same band simultaneously. The main and sub-receivers can be toggled easily as the main and sub-receivers have identical components.



Dualwatch receiver (Same band only)

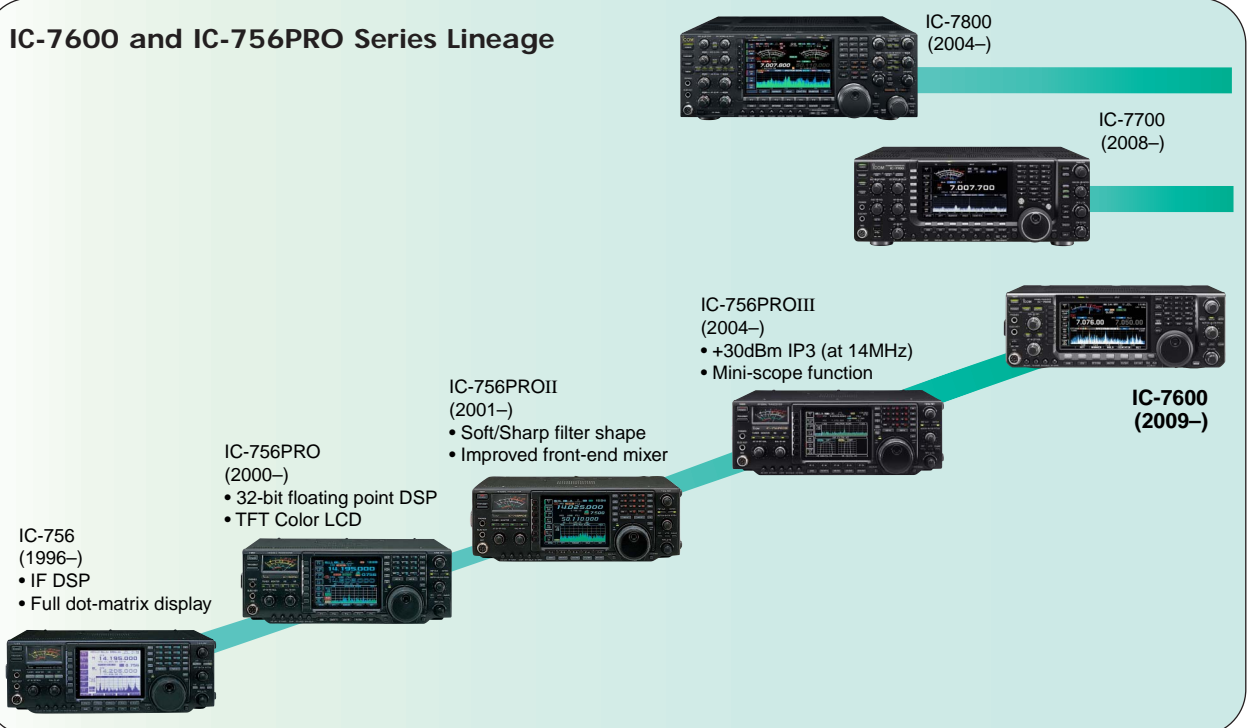
High stability TCXO unit

The IC-7600 provides ± 0.5 ppm frequency stability using a high stability temperature compensate crystal oscillator (0°C to +50°C). This high stability TCXO unit offers stable operation even during RTTY mode or PSK 31 mode operation.



TCXO Unit

IC-7600 and IC-756PRO Series Lineage



FEATURES

5.8 inch ultra-wide viewing angle TFT display

The IC-7600's display realizes ultra-wide viewing angle providing excellent color gradation reproducibility and a high contrast ratio at virtually any viewing angle. It improves the readability of the screen, regardless of installation position. In addition, as the response time is almost constant at all color gradations, the display provides smooth and natural movement in the spectrum scope. The white LED backlighting offers faster start-up time, stable brightness and relatively longer lifetime.



Ultra-wide viewing angle display

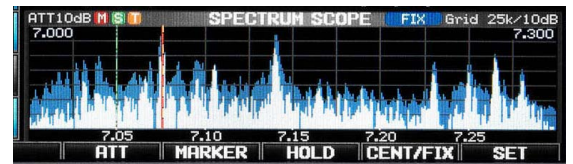
LCD and backlight Comparison between IC-7600 and IC-756PROIII

		IC-7600	IC-756PROIII
LCD	Size	5.8 inch WQVGA	5 inch QVGA
	Viewing Angle	180° (approx.) (Horizontal/Vertical)	90° (approx.) (Horizontal) 60° (approx.) (Vertical)
Backlighting	Type	LED (White)	CCFL (Cold cathode fluorescent lamp)

* These specifications show the specifications of the individual devices only.

Spectrum scope

The DSP unit dedicated for the spectrum scope greatly improves dynamic range, response time and frequency accuracy of the spectrum scope. The spectrum scope of the IC-7600 also uses the digital IF filter incorporated with the DSP unit. The optimum resolution bandwidth is automatically selected according to the sweep band width. In addition, the spectrum scope range can be set independently from the receiving frequency. You can monitor band conditions between the selected sweep edges (Max. 500kHz) in the fixed mode, as well as sweep a selected band width centered on the receiving frequency in the center mode.



Fix mode screen.

Digital voice memory

The digital voice memory which allows you to record incoming signal and replay the audio is now the must-have item for DX hunting and contesting. The IC-7600 has dedicated "Rec" and "Play" buttons on the front panel for immediate access. The time-shift playback function allows you to start saving the incoming signal from the immediate preceding 15 seconds before pushing the button. It is useful for checking a call back.

The IC-7600 has a 4 channel transmit memory (max 90 seconds per channel) and 20 channel receive memory (Max 30 seconds per channel, total 200 seconds with 20 channels). In addition, the recorded incoming signal can be saved on a USB flash drive.

RX MEMORY		VOICE RECORDER	
1	21,200.00 USB	12- 2	11:28 8s
2	50,110.00 USB	12- 2	11:28 10s
3	14,210.00 USB	12- 2	11:24 15s
4	14,120.00 CW	12- 2	11:23 15s
5	7,076.00 LSB	12- 2	11:22 21s
		Remain 91s	



Digital Voice Recorder

Voice memory buttons

FEATURES

Multi-function meter

The multi-function meter allows you to grasp the transmit/receive conditions at a glance.

In addition to the signal strength, transmit power level, ALC, compression level and SWR meters, the IC-7600 shows the drain terminal voltage of the final amplifier (Vd), the drain current of the final amplifier (Id) and temperature of PA circuit (TEMP).



Multi-function meter setting screen.

RF speech compressor

The digital RF compressor boosts average RF output power, while improving signal strength and readability.

RTTY/PSK31 operation with a USB keyboard

Simply by plugging in a USB keyboard, the IC-7600 allows you to start transmitting RTTY and PSK31 modes as well as receiving. The digital twin peak filter reduces interference from other signals between the receiving tones. The tuning indicator helps you to zero in on a signal. In addition, a total of 8 channels of RTTY and PSK transmit memory stores up to 62 characters of often used messages for each channel.



PSK Decode screen.

User programmable band edge beep

You can program the band edge not only according to the amateur radio band plan but also more specific frequencies like contest frequencies, CW operating mode, etc. If you try to operate on the OFF band, the band edge alerts you with a beep sound. You can also set to inhibit the transmission in the OFF band.

Triple band stacking register

The triple band stacking register quickly memorizes and calls up the operating frequency and mode for 3 channels on each band. Just push the band key button (ten-key pad), and you can call up the last operating frequency and mode. This function is convenient especially when switching bands during contests, etc.

Built-in memory keyer

Built-in memory keyer provides 4 channels for CW mode and 8 channels each for RTTY and PSK31 modes, capable of storing up to 70 characters for each mode. The memory keyer is useful for sending CQ or exchanging numbers during contests, even during regular operation, it stores your rig name, antenna, etc. When connecting a USB keyboard, memory keyer (including RTTY and PSK memory) can be sent with a Function button on the keyboard.



Memory keyer screen

USB connectors on the front and rear panel

The IC-7600 has USB connectors, one each for the front and rear panel. You can connect a USB keyboard or USB flash drive on the front panel (type A plug) and your PC on the rear panel (type B plug). The IC-7600 can be controlled by a PC through a USB cable using the C1-V data format. In addition, modulator and received audio can also be transferred over the USB cable. By using appropriate external software*, you can remotely control and operate the IC-7600 from your PC.

* Software is not supplied from Icom at this time.



USB keyboard connector on the rear panel



Installation example of USB keyboard

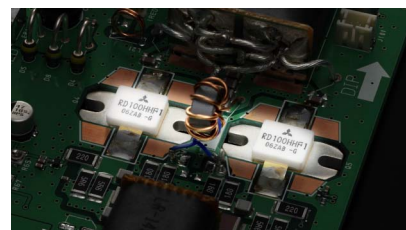
FEATURES

Microphone equalizer and adjustable transmit bandwidth

The built-in audio equalizer has separate bass and treble adjustments for a total of 121 combinations, so you can adjust the tonal quality of your voice as you want. In addition, the transmit bandwidth is selectable from 100, 200, 300, 500Hz at the lowpass edge, and 2500, 2700, 2800, 2900Hz at the high-pass edge, respectively. Three types of high and low combinations can be stored in the memory as favorite settings. With this flexibility of DSP-based waveform shaping, transmit audio quality is adjustable to your preference.

High power final amplifiers

High-power FET transistors, RD100HHF1, are used in the PA unit providing excellent signal quality and low IMD characteristics. With a large heat sink and cooling fans, reliable 100W with high duty cycle operation is offered during contests or data mode operation.



High power FET Transistors

Two types of send relay settings

In addition to the mechanical relay (Max. 16V/0.5A), the FET relay (Max. 250V/200mA) is selectable for the switching relay. The FET relay allows you to use a high voltage linear amplifier such as a vacuum type (non-icom) linear amplifier with the IC-7600. When sending a CW mode signal, the rise time of the CW envelop is selectable to 10ms.

Built-in high-speed automatic antenna tuner

When you tune a frequency once with the built-in antenna tuner, the IC-7600 memorizes the matching information. Then when you send a signal from the same frequency again, the matching information is recalled. High voltage capacitors make it possible for continuous transmission even during high power operation.

Other outstanding features

[Antenna line]

- Two Tx/Rx antenna connectors with automatic antenna selector
- Rx antenna In/Out connector for receiver antenna or external attenuator

[Receiver]

- General coverage receiver covers from 30kHz to 60MHz
(* Some frequency bands are not guaranteed, depending on version)
- Two types of receiver preamplifiers :
Preamp 1: Increases low level signal improving intermodulation characteristics
Preamp 2: High gain preamplifier
- Built-in 3-step RF attenuator (6, 12 and 18dB)

[Transmitter]

- Tx monitor
- VOX capability (Voice operated transmission)
- 50 CTCSS tone encoder and decoder
- All mode power control

[CW mode]

- DSP controlled CW keying waveform shaping
- Multi-function electronic keyer with adjustable keying speed, dot-dash ratio, paddle polarity and bug keyer
- CW pitch control from 300Hz to 900Hz
- Full break-in function and semi break-in function
- Double key jack

[Operation]

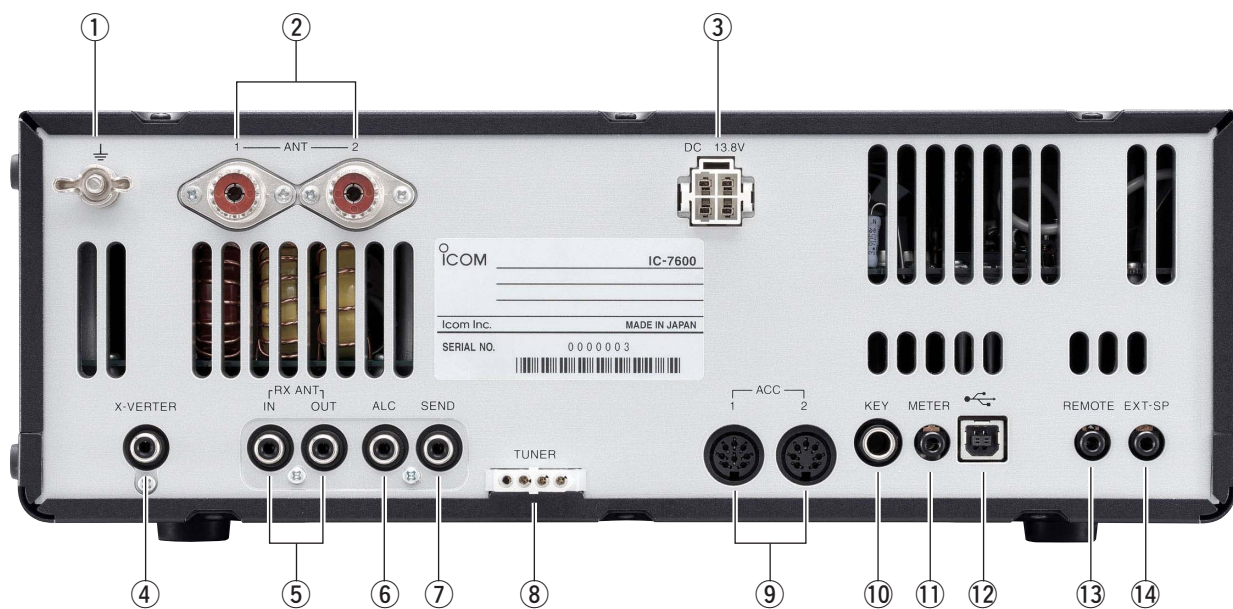
- Digital meter indicates output power, ALC level, SWR, COMP (compression level), Id (drain current of the final amplifier) and Vd (voltage of the final amplifier)
- Built-in voice synthesizer announces the frequency, mode and S-meter level in English.
- Set mode function for flexible and speedy setting
- Quick split function and frequency lock function
- RIT and delta Tx variable up to 9.999kHz
- 1Hz pitch tuning and indication
- Program, memory, select memory and Δf scans
- Adjustable tuning dial tension
- Band edge beep (Can be disabled)
- Automatic tuning speed for data mode operation
- Screen saver function
- Memory pad stores up to 5 or 10 operating frequencies
- Single knob control from RF gain to squelch
- Two clocks to show local and UTC time
- 101 memories with 10-character name
- Auto tuning step function
- Dial lock
- AH-4 control circuit
- CI-V interface with optional CT-17

PANEL VIEW

Front panel view



Rear panel view



- | | | |
|------------------------------|------------------------|----------------------------|
| ① Ground Terminal | ⑥ ALC Input Jack | ⑪ Meter Jack |
| ② Antenna Connectors | ⑦ SEND Control Jack | ⑫ USB Connector |
| ③ DC Power Socket | ⑧ Tuner Control Socket | ⑬ CI-V Remote Control Jack |
| ④ Transverter Jack | ⑨ Accessory Socket | ⑭ External Speaker Jack |
| ⑤ Receive Antenna Connectors | ⑩ Key Jack | |

SPECIFICATIONS

Specifications described below are target values. They may be subject to change.

■ GENERAL

- Frequency coverage :
 - U.S.A. version (#02)
 - Rx 0.030 – 60.000MHz*
 - Tx 1.800 – 1.999MHz 3.500 – 3.999MHz
 - 5.3305, 5.3465, 5.3665, 5.3715, 5.4035MHz**
 - 7.000 – 7.300MHz 10.100 – 10.150MHz
 - 14.000 – 14.350MHz 18.068 – 18.168MHz
 - 21.000 – 21.450MHz 24.890 – 24.990MHz
 - 28.000 – 29.700MHz 50.000 – 54.000MHz
 - ** USB mode only.
 - Europe (#03), Europe-1 (#04) versions
 - Rx 0.030 – 60.000MHz*
 - Tx 1.810 – 1.999MHz* 3.500 – 3.800MHz
 - 7.000 – 7.100MHz (Europe version only)
 - 7.000 – 7.200MHz (Europe-1 version only)
 - 10.100 – 10.150MHz 14.000 – 14.350MHz
 - 18.068 – 18.168MHz 21.000 – 21.450MHz
 - 24.890 – 24.990MHz 28.000 – 29.700MHz
 - 50.000 – 52.000MHz
- * Some frequency bands are not guaranteed.
- Modes : LSB, USB, CW, RTTY, PSK31, AM, FM
- No. of memory channels : 101 (99 regular, 2 scan edges)
- Antenna impedance : 50Ω unbalanced (Tuner off)
- Antenna connector : SO-239x2 and RCA x 1 (RX only)
- Power supply requirement : 13.8V DC ±15%
- Operating temp. range : 0 to +50°C; +32 to +122°F
- Frequency stability : Less than ±0.5ppm (0°C to +50°C)
- Frequency resolution : 1Hz (minimum)
- Current drain :
 - Receive Stand-by 3.0A
 - Max. audio 3.5A
 - Transmit Max. power 23A
- Dimensions (W×H×D) : 340×116×279.3 mm; (projections not included) 13³/₈×4⁹/₁₆×11 in
- Weight : 10kg; 49.6lb (approx.)

■ TRANSMITTER

- Modulation system :
 - SSB Digital PSN modulation
 - FM Digital phase modulation
 - AM Digital low power modulation
- Output power :
 - SSB, CW, FM, RTTY, PSK31 2–100W
 - AM 1–30W
- Spurious emissions :
 - Harmonics More than 50dB (HF bands)
 - More than 63dB (50MHz band)
 - Unwanted emissions More than 40dB (HF bands)
 - (Except harmonics) More than 60dB (50MHz band)
- Carrier suppression : More than 40dB
- Unwanted sideband suppression : More than 55dB
- Microphone impedance : 600Ω (8-pin connector)

■ RECEIVER

- Receiver system : Double-conversion superheterodyne
- Intermediate frequencies : 1st 64.455MHz
- 2nd 36kHz
- Sensitivity (typical) :
 - SSB, CW 1.8– 29.995MHz 0.15μV*¹
 - (BW=2.4kHz, at 10dB S/N) 50– 54.000MHz 0.12μV*²
 - AM (BW=6kHz, at 10dB S/N) 0.1– 1.8MHz 6.3μV*¹
 - 1.8– 29.995MHz 2.0μV*¹
 - 50– 54.000MHz 1.6μV*²
 - FM 28– 29.7MHz 0.5μV*¹
 - (BW=15kHz, at 12dB SINAD) 50– 54.000MHz 0.3μV*²
 - *¹ Preamp-1: ON *² Preamp-2: ON
- Squelch sensitivity (preamp: ON, threshold):
 - SSB Less than 3.2μV
 - FM Less than 0.3μV
- Selectivity (filter shape: sharp) :
 - SSB (BW=2.4kHz) More than 2.4kHz/–6dB
 - Less than 3.8kHz/–60dB
 - CW (BW=500Hz) More than 500Hz/–6dB
 - Less than 900Hz/–60dB
 - RTTY (BW=350Hz) More than 350Hz/–6dB
 - Less than 650Hz/–60dB
 - AM (BW=6kHz) More than 6.0kHz/–6dB
 - Less than 15kHz/–60dB
 - FM (BW=15kHz) More than 12kHz/–6dB
 - Less than 20kHz/–60dB
- Spurious and image rejection ratio:
 - SSB, CW, AM, FM More than 70dB
 - (Except 50MHz IF through point)
- Audio output power : More than 2.0W
- at 10% distortion with an 8Ω load
- RIT variable range : ±9.999kHz
- PHONES connector : 3-conductor 3.5 (d) mm (1/8")
- External SP connector : 2-conductor 3.5 (d) mm (1/8") /8Ω

■ ANTENNA TUNER

- Matching range :
 - HF bands 16.7Ω to 150Ω unbalanced*¹
 - 50MHz band 20Ω to 125Ω unbalanced*²
 - *¹ VSWR : Less than 1:3 *² VSWR Less than 1:2.5
- Minimum operating power :
 - HF bands 8W
 - 50MHz band 15W
- Tuning quality : VSWR Less than 1:1.5 (Motor stopped)
- Insertion loss : Less than 1.0 dB (Matched at 100W output)

SUPPLIED ACCESSORIES

- DC power cable
- Spare fuses
- Keyer plug
- Hand microphone, HM-36
- Carrying handle, MB-121

OPTIONS

■ HF+50 MHz 1 kW HF LINEAR AMPLIFIER

IC-PW1/EURO : Covers all HF and 50 MHz bands, provides clean, stable 1 kW output. Automatic antenna tuner and compact detachable controller are standard. 2 exciter inputs are available.

■ ANTENNA ELEMENT

AH-2b : A 2.5m long antenna element for mobile operation with the AH-4. All bands between 7–54 MHz can be matched.

■ HF+50 MHz AUTOMATIC ANTENNA TUNER

AH-4 : Covers 3.5–54 MHz with a 7m (23ft) or longer wire antenna.

■ SHIELDED CONTROL CABLE

OPC-420 : 10 m (32.8ft) shielded control cable connects between AH-4 and transceiver. Protects the transceiver from RF feedback.

■ EXTERNAL SPEAKERS

SP-23 : 4 audio filters; headphone jack; can connect to 2 transceivers.
Input impedance: 8Ω Max. input power: 5W

■ DESKTOP MICROPHONE

SM-50 : Dynamic desktop microphone. Includes [UP]/[DOWN] switches and low cut function. (New)

SM-20 : Electret desktop microphone. Unidirectional, electret microphone for base station operation. Includes [UP]/[DOWN] switches and low cut function.

■ HAND MICROPHONE

HM-36 : Same as supplied with the radio.

■ CI-V LEVEL CONVERTER

CT-17 : For remote transceiver control from a PC equipped with an RS-232C port.

■ POWER SUPPLY UNIT

PS-126 : 4-pin cable type power supply unit. Output: 13.8V DC (25A max.) (New)

■ CARRYING HANDLE

MB-121 : Same as supplied with the radio. (New)

