# ICOM

# IC-7600

The Flagship's Lineage

# Pushing performance to the pinnacle

The latest DSP technologies developed for the IC-7800/7700 plus over 45 years
of analog circuit expertise give the IC-7600 the performance advantage.
The flagship's lineage: dual DSP units, 3kHz 1st (roofing) filter, double-conversion superheterodyne,
all direct descendents of the IC-7800/7700.

## Dual DSP

Separate DSP units for transmitter/
receiver and spectrum scope.

## Receiver System

The double-conversion superheterodyne system
and the image rejection mixer improve inband IMD.

## 1st IF Filter

Three built-in 1st IF (roofing)
filters: 3, 6 and 15kHz.

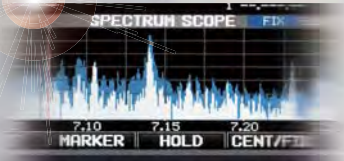**HF/50MHz ALL MODE TRANSCEIVER**

# IC-7600

## Display

5.8-inch WQVGA (400×240 pixel)
ultra-wide viewing angle
TFT display with long-life
LED backlighting.

## Spectrum Scope

High-resolution real-time spectrum
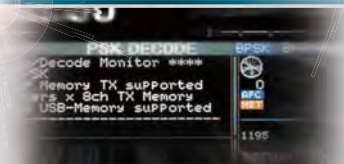scope using a dedicated DSP unit.

## USB Connectors

Easily connect keyboards,
flash memory drives, and PCs.

## PSK Operation

Built-in PSK and RTTY operation
with a USB keyboard
- PC not required.

# Receiver Performance Inherited from the Flagship

## Dual DSP for transmitter/receiver and spectrum scope

Two separate 32-bit DSP units power the transmitter/receiver and spectrum scope. These processors give the IC-7600 high performance comparable to our top-of-the-line IC-7800 and IC-7700, thanks to the combination of dual DSP and our analog RF design expertise.
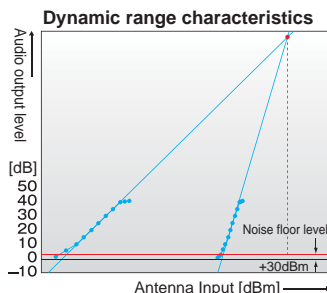
**DSP unit for Transmit and Receive**
TMS320C6726B (Top in photo)
Internal clock speed: 266MHz
32-bit floating point DSP
Maximum performance =1600MFLOPS

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

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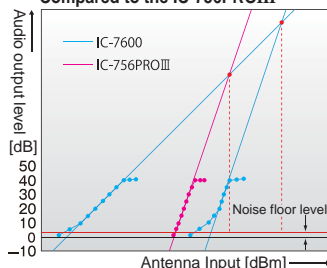
Icom's long years of analog RF circuit experience combined with the latest digital technology results in an astonishing 104dB receiver dynamic range and +30dBm IP3 in the HF bands without sacrificing receiver sensitivity. Even a weak signal adjacent to strong signals is clearly received by the IC-7600.

**Dynamic range characteristics**

Audio output level [dB]
50 40 30 20 10 0 −10
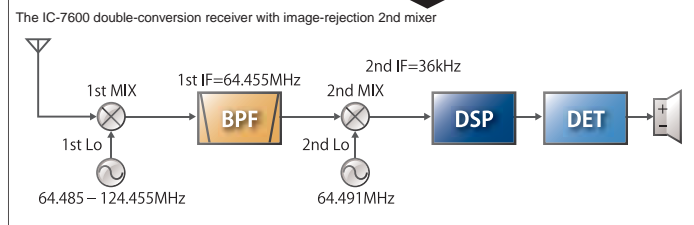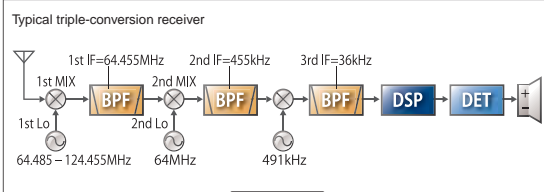Noise floor level
+30dBm
Antenna Input [dBm]

## Double-conversion superheterodyne dramatically improves inband IMD

The IC-7600 employs a double-conversion superheterodyne system which has an image rejection mixer for the 2nd mixer stage. When compared to a typical triple-conversion system, the double-conversion system is more difficult to implement but it dramatically reduces signal distortion and provides a high-fidelity RF signal to the DSP processor.

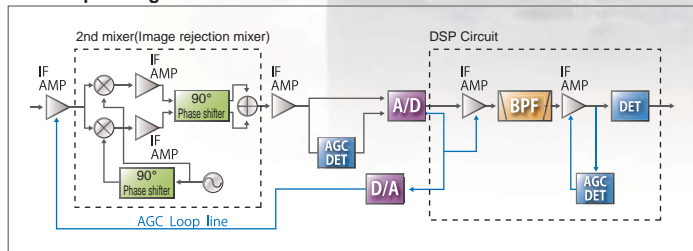**Inband dynamic range characteristics Compared to the IC-756PROIII**

IC-7600
IC-756PROIII

Audio output level [dB]
50 40 30 20 10 0 −10
Noise floor level
Antenna Input [dBm]

**Receiver System**

Typical triple-conversion receiver

1st IF=64.455MHz  2nd IF=455kHz  3rd IF=36kHz
1st MIX  2nd MIX
BPF  BPF  BPF  DSP  DET
1st Lo  2nd Lo
64.485 − 124.455MHz  64MHz  491kHz

The IC-7600 double-conversion receiver with image-rejection 2nd mixer

1st MIX  1st IF=64.455MHz  2nd IF=36kHz
2nd MIX
BPF  DSP  DET
1st Lo  2nd Lo
64.485 − 124.455MHz  64.491MHz

## Dual AGC loops controlled by DSP

The IC-7600 has dual AGC loops, one analog and one digital, both under DSP control. This architecture prevents strong adjacent signals from "pumping" the AGC and allows maximum dynamic range in the DSP.

**AGC loop management**

2nd mixer(Image rejection mixer)  DSP Circuit
IF AMP  IF AMP  90° Phase shifter  IF AMP  IF AMP  IF AMP
IF AMP  A/D  BPF  DET
90° Phase shifter  AGC DET  AGC DET
D/A
AGC Loop line

## Three built-in 1st IF (roofing) filters, including 3kHz

The IC-7600 has three built-in 1st IF (roofing) filters ahead of the 1st IF amplifier stage. The 3kHz filter is especially effective in CW and SSB modes to eliminate overloading caused by strong signals just outside the passband.
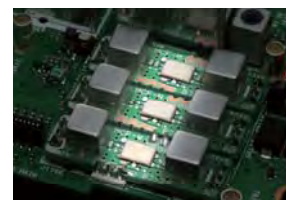
6kHz, 3kHz and 15kHz 1st IF filters (from top to bottom)

## Digital IF filter

The IC-7600 DSP allows you to "build your own" digital IF filter. You can quickly choose bandwidth, shape factor, and center frequency, so that you can work that rare DX station while your competition's still tweaking their transceiver controls. Three filter memories allow you to change filter settings instantly, a great help during contesting or other high-rate operating.
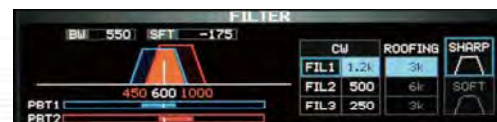
Digital IF filter setting example

Above photo includes optional SP-23 and IC-PW1/EURO.

## Digital twin PBT

After "building your own" digital IF filter, you can use digital twin Passband Tuning (PBT) to shift and narrow the IF passband until the interference is gone and you can clearly hear that weak signal.

## Digital 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. You can also choose three shape factors for the notch filter, to optimize interference rejection.

**Manual notch filter characteristics**

Wide
Middle
Narrow
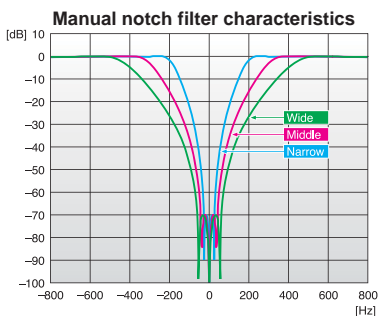
## Noise reduction

The processing power of the 32-bit DSP produces results you can hear! The 16-step variable noise reduction can significantly enhance the receiver's signal-to-noise ratio, giving you a clean, clear audio signal that may make the difference between making the contact or not.

**Noise Reduction Characteristics**
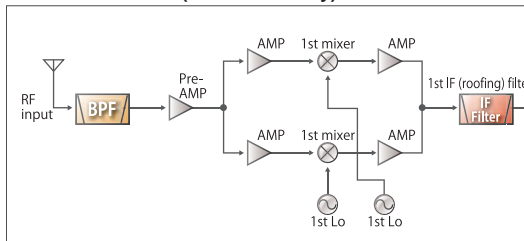
Noise Reduction OFF

Noise Reduction ON
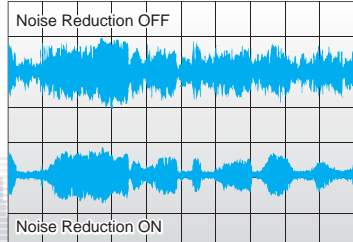
## Noise blanker

A 100-step digital noise blanker reduces interference from pulse-type noise sources such as engine ignition systems.

## Dualwatch function

Dualwatch allows you to receive two signals in the same band simultaneously. For example, you can listen to a DX station transmitting on 14.025MHz while also listening to the pileup calling him on 14.030MHz.

**Dualwatch receiver (Same band only)**

RF input — BPF — Pre-AMP — AMP — 1st mixer — AMP
AMP — 1st mixer — AMP
1st Lo — 1st Lo
1st IF (roofing) filter — IF Filter

## High stability TCXO unit

The IC-7600 provides ±0.5ppm 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 continuous transmission on RTTY or PSK31 mode.

TCXO Unit

# Versatile Functions and Intuitive Operation

## 5.8 inch ultra-wide viewing angle TFT display

The IC-7600's ultra-wide viewing angle display has excellent color rendition and high contrast ratio with fast response time. These features allow the spectrum scope and simulated analog meters to move smoothly and naturally. White LED backlighting offers faster start-up, stable brightness, and very long life.



400×240 pixels,
130.2×68.9mm large display



Photo taken with room light turned off.

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 dedicated spectrum scope DSP with built-in digital filtering greatly improves dynamic range, response time, and frequency accuracy of the spectrum scope. The scope automatically selects the optimum resolution based on the sweep bandwidth. 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



DSP unit for spectrum scope

## Digital voice memory

With digital voice memory, you can record the incoming signal and immediately replay the audio, a must-have feature for DXing and contesting. Because the transceiver is recording continuously, time-shift playback can replay the 15 seconds of audio that you heard <before> you pushed the Rec button!
The IC-7600 has a 4 channel transmit memory (maximum 90 seconds per channel) and 20 channel receive memory (maximum 30 seconds per channel, total 200 seconds with 20 channels). In addition, the recorded incoming signal can be saved on a USB flash drive.



Digital Voice Recorder



Voice memory buttons

## Multi-function meter

The multi-function meter allows you to observe 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 the PA circuit (TEMP).



Multi-function meter setting screen

## RF speech compressor

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

## RTTY/PSK31 operation with a USB keyboard

Simply plug in a USB keyboard to operate RTTY and PSK! The digital twin-peak filter greatly reduces interference and a tuning indicator helps you zero-beat the signals. Eight RTTY and PSK transmit memories store up to 62 characters per channel.

## 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.

## 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 transceiver alerts you with a beep sound. You can also inhibit transmitting in the OFF band.

## 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 channel. The memory keyer is useful for sending CQ or exchanging numbers during contests. When not contesting, you can store and send your name, QTH, rig, etc. With a USB keyboard, you can send memory contents using a function key on the keyboard.


Memory keyer screen

## USB connectors on the front and rear panel

The IC-7600 has one USB connector on the front panel and one on the rear panel. You can connect a USB keyboard or USB flash drive to the front panel (type A plug) and connect a PC to the rear panel (type B plug). Using the CI-V data format and external software*, you can control the IC-7600 from a PC via the USB port. You can also transfer audio, both transmit and receive, via the USB port. * Software is not supplied from Icom.


USB (type B) connector on the rear panel


Installation example of USB keyboard

## 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 low-pass 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 output at high duty cycle can be used, for example in contesting or data modes.


High power FET Transistors

## Two types of send relay settings

For amplifier keying (SEND jack), you can select either a mechanical relay (max. 16V/500mA) or a FET switch (max. 250V/200mA). The FET switch is designed to key older tube-type amplifiers that may have high voltage on the SEND line.

## Built-in high-speed automatic antenna tuner

The antenna tuner memorizes its settings based on your transmit frequency, so that it can rapidly tune when you change bands. High-voltage capacitors allow continuous-duty-cycle full-power operation.

### Other outstanding features

[Antenna connectors]
• 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  • 50 CTCSS tone encoder and decoder  • VOX capability (Voice operated transmission)
• 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  • Double key jack
• Full break-in function and semi break-in function
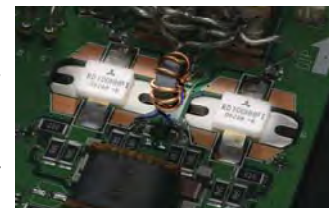• Adjustable CW envelope

[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
• Memory pad stores up to 5 or 10 operating frequencies
• Quick split function and frequency lock function  • Single knob control from RF gain to squelch
• RIT and delta Tx variable up to ±9.999kHz  • Two clocks to show local and UTC time
• 1Hz pitch tuning and indication  • 101 memories with 10-character name
• Program, memory, select memory and Δf scans  • Auto tuning step function
• Adjustable tuning dial tension  • Dial lock  • Band edge beep (Can be disabled)
• AH-4 control circuit  • Automatic tuning speed for data mode operation
• CI-V interface with optional CT-17  • Screen saver function

### Rear panel view

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

## SPECIFICATIONS

### GENERAL

- Frequency coverage :
  U.S.A. version (#02)
  | Rx | 0.030– 60.000MHz*[1] | |
  |---|---|---|
  | Tx | 1.800– 1.999MHz | 3.500– 3.999MHz |
  | | 5.3305, 5.3465, 5.3665, 5.3715, 5.4035MHz*[2] | |
  | | 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 |

  Europe (#03), Europe-1 (#04) versions
  | Rx | 0.030– 60.000MHz*[1] | |
  |---|---|---|
  | Tx | 1.810– 1.999MHz*[1] | 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 | |

  *[1] Some frequency bands are not guaranteed.  *[2] USB mode only.
- 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-239×2 and RCA × 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 :
  | Rx | Stand-by | 3.0A |
  |---|---|---|
  | | Max.audio | 3.5A |
  | Tx | Max. power | 23A |
- Dimensions (W×H×D) : 340×116×279.3 mm;
  (projections not included) 13 3/8 ×4 9/16 ×11 in
- Weight : 10kg; 22.0lb (approx.)

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

### TRANSMITTER

- Output power :
  | SSB, CW, FM, RTTY, PSK31 | 2–100W |
  |---|---|
  | AM | 1–30W |
- Modulation system :
  | SSB | Digital PSN modulation |
  |---|---|
  | FM | Digital phase modulation |
  | AM | Digital low power modulation |
- Spurious emissions :
  | HF bands | Less than –50dB |
  |---|---|
  | 50MHz bands | Less than –63dB |
- 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– 54.0MHz | 0.12µV*[2] |
  | AM | 0.1– 1.8MHz | 6.3µV*[1] |
  | (BW=6kHz, at 10dB S/N) | 1.8– 29.995MHz | 2.0µV*[1] |
  | | 50– 54.0MHz | 1.6µV*[2] |
  | FM | 28– 29.7MHz | 0.5µV*[1] |
  | (BW=15kHz, at 12dB SINAD) | 50– 54.0MHz | 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 : 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 6.35 (d) mm (1/4”)
- 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] Less than VSWR 3:1    *[2] Less than VSWR 2.5:1
- Minimum operating power :
  | HF bands | 8W |
  |---|---|
  | 50MHz band | 15W |
- Tuning accuracy : VSWR 1.5:1 or less (Motor stopped)
- Insertion loss : Less than 1.0 dB (after tuning at 100W output)

**SUPPLIED ACCESSORIES:**
- DC power cable
- Spare fuses
- CW key plug
- Hand microphone, HM-36
- Carrying handle, MB-121

## OPTIONS

**IC-PW1/EURO** HF+50 MHz 1 kW HF LINEAR AMPLIFIER
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.
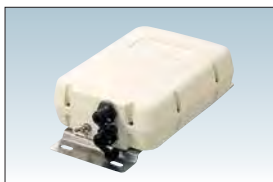
**AH-4** HF+50MHz AUTOMATIC ANTENNA TUNER
Covers 3.5–54 MHz with a 7m (23ft) or longer wire antenna.

**AH-2b** ANTENNA ELEMENT
A 2.5m long antenna element for mobile operation with the AH-4. All bands between 7–54 MHz can be matched.
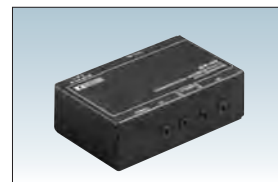
**CT-17** CI-V LEVEL CONVERTER
For remote transceiver control from a PC equipped with an RS-232C port.

**HM-36** HAND MICROPHONE
Same as supplied with the radio.

**SM-50** DESKTOP MICROPHONE
Dynamic desktop microphone. Includes [UP]/[DOWN] switches and low cut function.

**SM-20** DESKTOP MICROPHONE
Electret desktop microphone. Includes [UP]/[DOWN] switches and low cut function.

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

**SP-23** EXTERNAL SPEAKER
4 audio filters; headphone jack; Input impedance : 8Ω Input power : 5W Max.

The LCD display may have cosmetic imperfections that appear as tiny spots. This is not a malfunction or defect, but a normal characteristic of LCD displays.
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