

KENWOOD

Superior Standards in Performance

HF/50MHz TRANSCEIVER
TS-590SG



Be witness to the evolution of KENWOOD's pride
and joy - the TS-590S HF transceiver - pushing performance
and technology to its utmost limit,
with the receiver configured to capitalize on roofing filter performance
and IF AGC controlled through advanced DSP technology.
Enter the TS-590SG. A new generation of high performance transceiver,
with the type of high level response to meet DX'ers needs.

A Proven Pedigree in Performance The TS-590SG



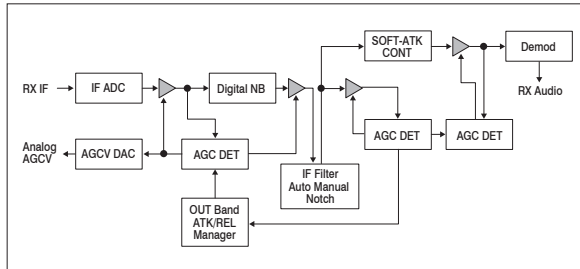
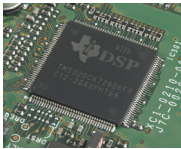
Incremental changes help performance and function to evolve.

- An even higher performance receiver with superior adjacent dynamic range.
- Advanced AGC control through digital signal processing from the IF stage.
- Highly reliable TX outputs high-quality TX signal.
- New morse code decoder. Scroll display on 13-segment display unit. Characters shown in dedicated window on ARCP-590G.
- MULTI/CH knob (with push-switch) and RIT/XIT/CL key also configurable in addition to existing PF A and PF B programmable functions.
- New Split function (TS-990S-style) enabling quick configuration added in addition to existing Split setting.
- Transceiver equalizer configurable by mode.
- FIL A/B configurable independently with VFO A/B (convenient during Split operation).
- Front or rear PTT selectable for Data PTT.
- Switching from HI CUT/LO CUT to WIDTH/SHIFT possible for reception bandwidth changing in SSB mode.

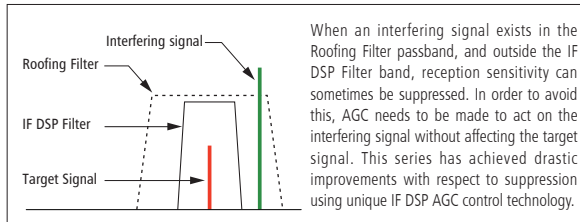
A variety of functions realized with 32-bit Floating-point DSP

Advanced AGC control through digital signal processing from the IF stage onward

It would be no exaggeration to say that KENWOOD's reception audio, which enjoys a reputation for being non-tiring even in long contests, is determined by IF AGC control based on unique DSP algorithms. This series features all of the IF DSP AGC technology developed with the TS-990S. A remodeling of the AGC circuitry has realized superb AGC performance covering from small to large inputs. Even if interference signals slip between the Roofing Filter and the IF DSP filter that determines the final selection, level-optimized AGC control enables operation without the need for awareness of Roofing Filter bandwidth.



Block diagram: IF AGC control

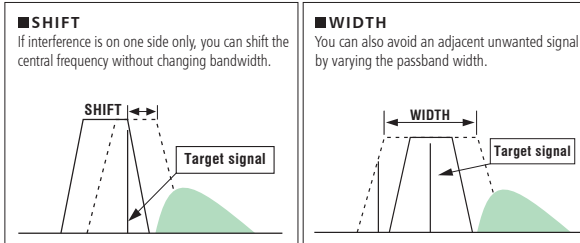


OUT BAND AGC CONTROL

Diverse interference/noise removal features

Adjustable IF filter passband

This operates as the passband HI CUT/LO CUT function in SSB/AM/FM modes, and as the WIDTH/SHIFT control function in CW/FSK/SSB-DATA modes. Operation can be switched using the menu in SSB and SSB-DATA modes.

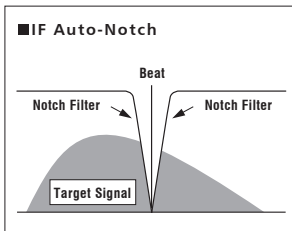


IF Notch

Remove a powerful interfering signal with a notch filter to capture a weak target signal. Choose from automatically variable notch frequency in IF Auto-Notch*1 and manually adjustable notch frequency in Manual Notch*2 depending on your interference situation.

*1: Available only in SSB mode

*2: Available in SSB/CW/FSK modes



IF Filter

One-touch A/B switching

FIL A/B can be set independently with VFO A/B. This convenient function enables swift operation during contests or split operation.

《Other interference/noise removal features》

■ Digital/Analog Noise Blanking (NB1 / NB2)

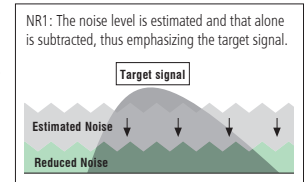
In addition to the analog noise blanker (NB1), which has a proven track record for eliminating weak noise, this transceiver is equipped with a digital noise blanker (NB2). The optimum blanker for the type of noise and reception conditions can be selected. NB1 enables stable noise suppression independent of reception bandwidth, while NB2 is effective against noise that defies tracking by an analog noise blanker.

■ DSP Noise Reduction (NR1 / NR2)

This series features 2 kinds of noise reduction methods: NR1 and NR2. NR1 applies the most optimum kind of noise reduction for each reception mode, while NR2 employs the SPAC method, which is more effective for CW operation.

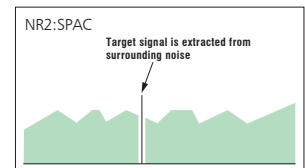
● NR1

Spectral-subtraction noise reduction has been developed with a focus on improving reception clarity for weak SSB signals. It enables the bringing to the surface of a target signal that is swamped by noise, without any loss in sound quality. For non-speech modes (CW/FSK), a line enhancer offers tried and true noise reduction.



● NR2

NR2 is SPAC-based noise reduction that is effective for CW operation as it can suppress noise at the same frequency as the target signal (not available for FM mode).



■ Beat cancel (BC1/BC2)

Whereas IF auto notch is effective against a single, powerful beat, the beat cancel feature works well when there are multiple, weak beats. BC1 is effective to remove weak and/or continuous beat interference, while BC2 is effective for intermittent beats like CW signals.





Highly reliable TX outputs high-quality TX signal.

Highly reliable design guarantees stable operation

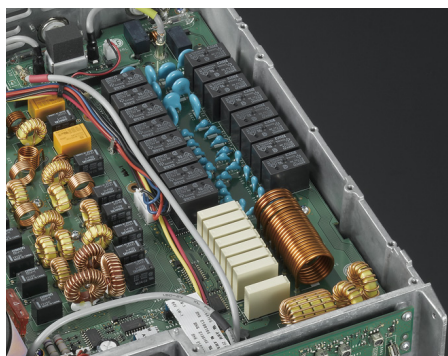
Heavy-duty design

A pair of 60 x 60 mm fans have been used for the cooling system, which provides sufficient air flow at low rpm for less noise. Attention has been paid not only to the fans and motors but also to the size and shape of the intake/exhaust vents as a comprehensive approach to quieter operation. The aluminum die-cast chassis is combined with a large heat sink to effectively dissipate heat, minimizing the rise in temperature in the final section during continuous transmission sessions. This heavy-duty design is capable of withstanding grueling conditions typical of contests or long hours of hard operation.



Built-in high-speed automatic antenna tuner

The built-in preset-type automatic antenna tuner covers amateur bands in the 160~6m band range and can operate when the transceiver is receiving. High-speed operation and the proven relay method enable rapid QSY through instantaneous band changing.



Drive output (including 135 kHz band)

The transceiver comes equipped with a drive output (DRV) connector that enables external access to the transmission drive output (approx. 0 dBm). This is not just convenient when a transverter is attached; this DRV connector can also be put to use for transmission on the 135 kHz band, for which the main antenna terminal cannot be used. Performance can be further enhanced when combined with a dedicated reception antenna connector.

Antenna output function (shared with DRV connector)

Switching the drive output (DRV) connector to the external receiver antenna output function in the menu settings enables output of the signal allocated by the antenna.

Note: ●When you use the Antenna output function, due to losses in the splitter, the receive sensitivity and gain decrease by approximately 3 dB. ●During transmission, the Drive output will leak a little through internal isolation (-20dBm or less). ●The ON/OFF status of the Antenna output function is stored separately in the 50MHz band and HF band.

Speech processor (SSB/AM/FM)

The speech processor increases the clarity of messages for the receiving station by raising average transmission modulation. Besides adjusting compression level, soft and hard modes are available for 2-level adjustment. Compression levels can be set for each of mic transmission and voice-message transmission.

Band-adjustable TX filter (SSB/AM)

The TX filter passband is switchable. Low-pass and high-pass cut-offs can be switched independently for fine control over filter operation.

TX equalizer (SSB/AM/FM for each mode)

The equalizer enables the adjustment of frequency characteristics to suit the voice quality and microphone characteristics on the transmitting end. Users can choose from flat (default), high boost (2 types), Formant pass, and bass boost (2 types), as well as conventional and user settings (using the ARCP-590G).

TX monitor

The transmission monitor function outputs transmission audio via the speaker in 20 steps, allowing you to check sound quality.

Other TX features

●VOX function (adjustable gain, selectable delay time) ●Adjustable TX power output ●Adjustable MIC gain ●Adjustable CAR level

Diverse functions supporting CW operation.

Comfortable CW support

Morse code decoder function

Received morse code displayable by scrolling on 13-segment display unit. Characters are shown in a dedicated window on the ARCP-590G.

Note: ●Proper decoding may not be available due to reception conditions, etc.

CW auto-tune

You can automatically zero-in on a target signal during reception in CW operation with just the press of a button. This function will also tune in to the RIT frequency during RIT operation.

2 key terminals on rear panel

An electronic keyer (built-in) paddle terminal and a separate terminal for an external keyer have been included. PC keying is possible even when a paddle is connected.

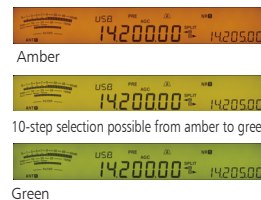
Other CW features

- Support for full break-in and semi break-in (semi break-in delay time: 50ms~1000ms)
- Pitch control (300~1000Hz)
- Side tone monitor with 20-step volume control
- Electronic keyer (selectable key speed, A/B modes)
- Memory keyer (max. 4-channel message memory)
- Microphone paddle mode
- CW reverse mode
- CW auto transmit function, in which a simple key-press will switch automatically to CW in SSB mode

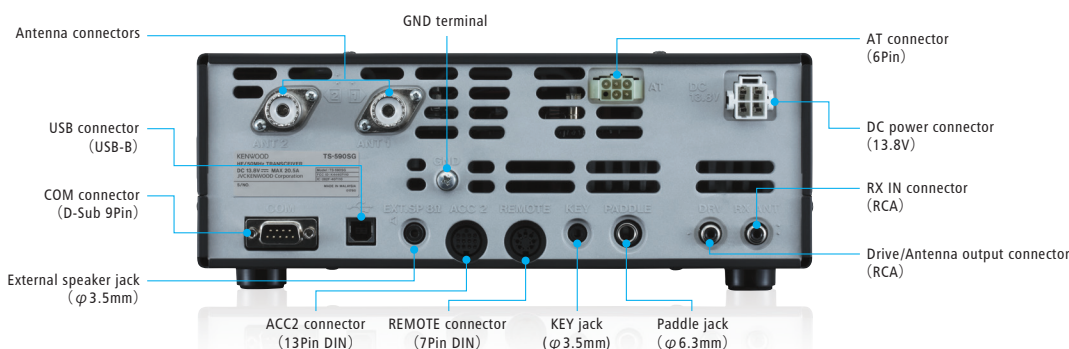
The large display

LED backlight with selectable color tone

The large display ensures outstanding visibility under all conditions. In addition to conventional amber and green, you can now select intermediate colors and change from amber to green in 10 steps.



External connector terminals



Super Ease of Operation, More Enjoyable TX/RX Performance and User-friendly Machine Interface.

A variety of functions for easy operation

User-friendly menus for outstanding operating ease

The TS-590SG features 100 menu functions and intuitive operation with its combination of menu and arrow keys. The menu mode is shown in the 7-segment display unit, while relevant guidance information is scroll-displayed in the 13-segment display unit, making a variety of detailed operations possible.



Aluminum main knob

Programmable functions

(PF A, PF B and MULTI/CH SW)

Frequently used and other functions can be assigned to the programmable function (PF) keys. With the TS-590SG, in addition to the PF keys, functions can also be assigned to the MULTI/CH knob's Push SW. Quick settings are made possible by assigning level setting functions such as keying speed. The RIT/XIT/CL keys can also be used as programmable function keys.



New Split function enabling quick setting

"Direct frequency entry, Direct band selection"

In addition to conventional split frequency setting methods, the TS-990's proven split setting functionality has been included. A long press of the SPLIT key, when making a 2kHz up setting, will enable quick setting by pressing "2" on the keypad. Furthermore,



in simplex operation with just XIT on, the XIT frequency can be changed with TF-SET. The keypad keys are now band-direct keys. Each band has 3 memories, enabling quick call-up of usually-used frequencies.

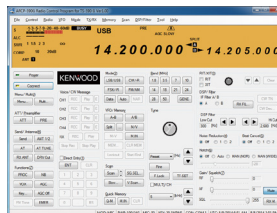
PC control through USB connectivity

PC control of the transceiver and transceiver audio transmission have been made possible through a USB cable with the inclusion of a dedicated PC-control USB connection terminal.

*Delays may occur when using USB audio. We recommend using USB audio in situations where time lag is not an issue.

Remote control of the TS-590SG via computer

Using the ARCP-590G (radio control program), virtually all functions can be controlled via a computer. Changing various function settings and managing memory channels can all be done from your PC. The ARCP-590G also enables the recording and erasure of voice messages.



*Related freeware can be downloaded from the KENWOOD website.

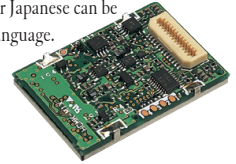
Easily discernible beep sound

Different beeps sound in response to function circumstances, enabling intuitive comprehension of transceiver status.

Voice guide, recording function (option)

The VGS-1 voice guide and storage unit enables voice guidance for frequency, key operation, settings, etc., and recording/playback of messages. A Manual Mode, in which vocalization takes place only when buttons are pressed, has been added to the voice guidance. Either English or Japanese can be selected for the voice guidance language.

- Voice memory: max. 4 channels (recording time: 30 seconds each for CH1 & CH2, 15 seconds each for CH3 & CH4)
- Constant receiver recording: 30 seconds. (1 channel)



Memory/Scan functions

● Easy-to-use, diverse memory functions

The transceiver features a memory that can store up to 120*1 frequency memory channels, with each able to be given a memory name of up to 8 letters. Also included are the memory scroll function, which can be used to check memory data without changing operating frequency, memory channel copy, which enables the copying of memory data to another channel, single channel memory clear, memory lockout, memory shift, and the ability to change memory data/frequency temporarily. Other features include the Quick Memory function, which can store up to 10 channels*2 on the fly, and the capacity for temporary changes to memory shift and memory data.

*1: Including specified range memory and expanded memory channels.

*2: 3, 5 or 10 channels can be selected.

● Multiple scan functions

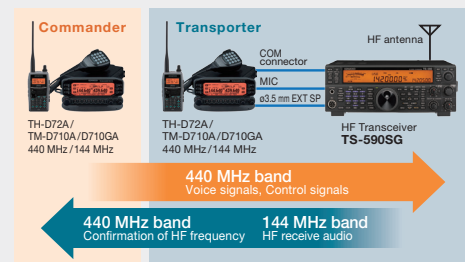
Program scan, memory scan, group scan, subtone scan and CTCSS scan are included among the many scan functions available. The transceiver also offers program slow scan, which automatically reduces the scanning speed around any frequency of special interest.

KENWOOD SKY COMMAND SYSTEM II

Enables full-duplex operation with improved functionality such as visual confirmation of HF frequency on the LCD panel. Control via TNC (AX.25) enables more access to HF functions: XIT, mode switching, split-frequency operations on/off, memory shift, and frequency step selection. The transporter sends out its pre-programmed call sign via CW every 10 minutes.

*KENWOOD SKY COMMAND SYSTEM II uses a pair of TH-D72A/TM-D710A/TM-D710GA transceivers.

Note: Refer to applicable amateur radio regulations to check whether you are permitted to use this function.



Other features

- ⟨RX⟩ •ATT, pre-amp •RF gain adjust •AF gain •SQL level set
- ⟨FSK⟩ •Basic RTTY operation settings (keying polarity, shift width, high/low tones, reverse mode)
- ⟨FM⟩ •FM Wide/Narrow switching for transmission/reception •Repeater subtone •FM signaling (CTCSS, cross-tone)
- ⟨DATA⟩ •SSB-DATA/FM-DATA/AM-DATA transmission mode-compatible. Transmission output settings and transmission sound source (front/rear) selectable for data transmission. •Variable DATA modulation/demodulation level •Selectable DATA modulation line (ACC2/USB) •DATA VOX
- ⟨Accessory connectors⟩ •ACC2 connector for DATA communication •Remote connector compatible with linear amp control (built-in vacuum tube linear amp control relay, selectable transmission attack delay)
- ⟨External connectivity⟩ •Compatible with external antenna tuner (AT-300*) •DX Packet Cluster tune (when connected to TM-D710A/TM-D710GA/TH-D72A)
- ⟨Other⟩ •Power-on message (message of up to 8 alphanumeric characters can be input for display when power is switched on) •Split data transfer using COM port •Firmware updates •Adjustable long-keypress timing

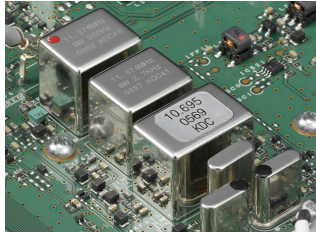
*Discontinued product

Performance refined further in the KENWOOD tradition operating ease and toughness - the TS-590SG.

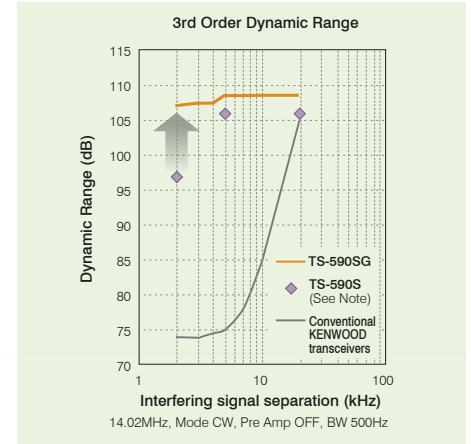
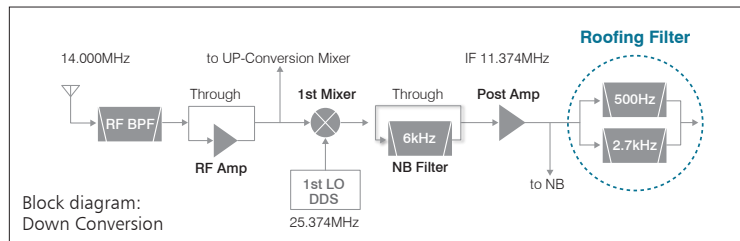
High-performance reception and improved adjacent dynamic range.

Equipped with 500 Hz/2.7 kHz Roofing Filter as standard*

1st IF frequency (11.374 MHz) down conversion* is employed when receiving on 15, 20, 40, 80 or 160 meter bands. Included as standard directly after the 1st Mixer and Post Amp that compensates for conversion loss is a BW 500 Hz and 2.7 kHz 6-pole MCF, which determines adjacent receptivity, realizing superb dynamic range performance that was not possible using up conversion. Even when an interfering signal approaches the reception frequency, a virtually flat dynamic range is maintained. You can capture a clear signal even in reception conditions where strong adjacent interfering signals become problematic.



*Down conversion is selected automatically when receiving in CW/FSK/SSB modes if the final passband is 2.7 kHz or less.

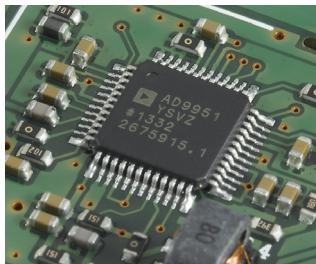


This graph shows what happens when the frequencies of 2 interference signals for measuring the dynamic range are converted from +2kHz to +20kHz from the reception frequency. For example, at the point where separation is 10kHz, the interference signals are 14.03MHz and 14.04MHz. It can be seen that the TS-590SG achieves virtually flat characteristics even in the 3rd Order Dynamic Range measurement method implemented by ARRL.

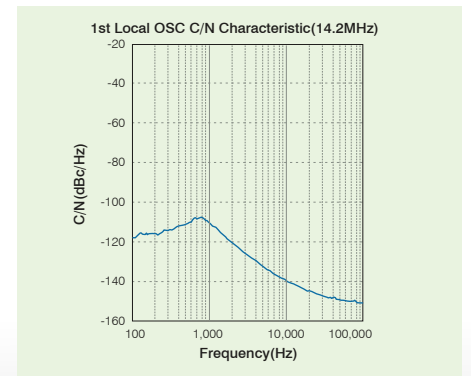
Note: TS-590S measurement values from QST® May 2011 PRODUCT REVIEW KENWOOD TS-590S HF and 6 Meter Transceiver published by ARRL (reprinted with permission of ARRL)

Superior adjacent C/N with DDS

This is a method in which, for the 1st local oscillator, instead of employing conventional PLL/VCO, the output of a DDS (Direct Digital Synthesizer) is supplied directly to the Mixer. During down conversion, the oscillation frequency is lower than it is in up conversion, so even better C/N (Carrier to Noise ratio) characteristics can be achieved. As a result, the characteristics for reciprocal mixing due to the large input signal approaching the reception signal are improved.



DDS IC Analog Devices, Inc. AD9951



TS-590SG

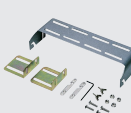
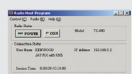
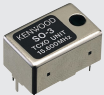


Actual Size
10.63(W)X3.78(H)X11.46(D) in
(Protrusions not shown)

- DRV connector switchable to antenna output function (convenient when connecting to external receiver).
- Large display with superior visibility.
LED backlight color tone configurable in 10 steps from amber to green.
- Speech processor independently configurable for microphone transmission and voice message transmission.
- 20-step expansion of settings range including TX monitor and CW side tone, etc.
- Operation when pressed now added to existing toggle operation for TX tuning function.

HF/50MHz TRANSCEIVER
TS-590SG

OPTIONS

MC-90 Deluxe Desktop Microphone 	HS-6 Headphones 	MB-430 Mobile Bracket 	VGS-1 Voice Guide & Storage Unit 
MC-60A Desktop Microphone 	HS-5 Headphones 	PS-60 Heavy-duty Power Supply (22.5A) 	ARCP-590G Radio Control Program  (available free for downloading from the KENWOOD website)
MC-47 Hand Microphone (4 PF Buttons) 	PG-20 DC Cable (7 metres) 	KES-3S External Speaker 	ARHP-590G Radio Host Program  (available free for downloading from the KENWOOD website)
MC-43 Hand Microphone 	SO-3 TCXO 	SP-23 External Speaker 	Not all accessories may be available. Please contact dealers for details.

TS-590 SG SPECIFICATIONS

General		
Frequency Range (Transmitter)	160 m band	1.8 ~ 2.0 MHz
	80 m band	3.5 ~ 4.0 MHz
	60 m band	5.1675 MHz, 5.25 ~ 5.45 MHz
	40 m band	7.0 ~ 7.3 MHz
	30 m band	10.1 ~ 10.15 MHz
	20 m band	14.0 ~ 14.35 MHz
	17 m band	18.068 ~ 18.168 MHz
	15 m band	21.0 ~ 21.45 MHz
	12 m band	24.89 ~ 24.99 MHz
	10 m band	28.0 ~ 29.7 MHz
	6 m band	50.0 ~ 54.0 MHz
Frequency range (Receiver)		0.13 ~ 30 MHz, 50 ~ 54 MHz VFO: Continuous 30 kHz ~ 60 MHz
Mode		A1A (CW), A3E (AM), J3E (SSB), F3E (FM), F1B (FSK)
Frequency stability		±5 ppm, +14 °F ~ +122 °F (-10 °C ~ +50 °C) with SO-3: ±0.5 ppm, +14 °F ~ +122 °F (-10 °C ~ +50 °C)
Antenna impedance		50 Ω
Antenna tuner load range		16.7 Ω ~ 150 Ω
Supply voltage		DC 13.8 V ±15 %
Ground		Negative ground
Current Drain	TX	20.5 A or less
	RX (No signal)	1.5 A or less
Operating Temperature		+14 °F ~ +122 °F (-10 °C ~ +50 °C)
Dimensions	Without projections	W10.63 × H3.78 × D11.46 in. (W270 × H96 × D291 mm)
	With projections	W11.02 × H4.21 × D13.19 in. (W280 × H107 × D335 mm)
Weight		Approx. 16.31 lbs (7.4 kg)
Transmitter		
Output Power (AM)		Max 100 W / Min 5 W, (Max 25 W / Min 5 W)
Modulation		SSB: Balanced, AM: Low Power, FM: Reactance
Maximum frequency deviation (FM)		wide: ±5 kHz or less, narrow: ±2.5 kHz or less
Spurious emissions	HF: -50 dB or less	
	50 MHz: -60 dB or less	
Carrier suppression		50 dB or more
Unwanted sideband suppression		50 dB or more
Transmit frequency response		Within -6 dB (400 ~ 2600 Hz)
Microphone impedance		600 Ω
XIT variable range		±9.999 kHz

*1 In 160 m/ 80 m/ 40 m/ 20 m/ 15 m Amateur bands, IF band width 2.7 kHz or less (SSB, CW, FSK)

*2 Except in above *1

These specifications are guaranteed for Amateur Bands only.

KENWOOD SKY COMMAND SYSTEM II is a registered trademark of JVC KENWOOD Corporation in the U.S.

JVC KENWOOD follows a policy of continuous advancement in development.

For this reason, specifications may be changed without notice.

*Alterations may be made without notice to improve the ratings or the design of the transceiver.

*The photographic and printing processes may cause the coloration of the transceiver to appear different from that of the actual transceiver.

Receiver			
Circuit type		Double Superheterodyne *1	Triple Superheterodyne *2
Intermediate frequency	1st IF	11.374 MHz	73.095 MHz
	2nd IF	24 kHz	10.695 MHz
	3rd IF	-	24 kHz (except FM) 455 kHz (FM)
Sensitivity (TYP)	SSB / CW / FSK (S / N 10 dB)	0.5 μV (0.13 ~ 0.522 MHz) 4 μV (0.522 ~ 1.705 MHz) 0.2 μV (1.705 ~ 24.5 MHz) 0.13 μV (24.5 ~ 30 MHz) 0.13 μV (50 ~ 54 MHz)	
	AM (S / N 10 dB)	6.3 μV (0.13 ~ 0.522 MHz) 31.6 μV (0.522 ~ 1.705 MHz) 2 μV (1.705 ~ 24.5 MHz) 1.3 μV (24.5 ~ 30 MHz) 1.3 μV (50 ~ 54 MHz)	
	FM (12 dB SINAD)	0.22 μV (28 ~ 30 MHz) 0.22 μV (50 ~ 54 MHz)	
Squelch Sensitivity	SSB / CW / FSK / AM	5.6 μV or less (0.13 ~ 0.522 MHz) 18 μV or less (0.522 ~ 1.705 MHz) 1.8 μV or less (1.705 ~ 30 MHz) 1.1 μV or less (50 ~ 54 MHz)	
	FM	0.2 μV or less (28 ~ 30 MHz) 0.2 μV or less (50 ~ 54 MHz)	
Image Rejection Ratio		70 dB or more	
IF Rejection Ratio		70 dB or more	
Selectivity	SSB	2.2 kHz or more (-6 dB) 4.4 kHz or less (-60 dB)	
	CW / FSK	500 Hz or more (-6 dB) 1.2 kHz or less (-60 dB)	
	AM	6.0 kHz or more (-6 dB) 12 kHz or less (-50 dB)	
	FM	12 kHz or more (-6 dB) 25 kHz or less (-50 dB)	
RIT variable range		±9.999 kHz	
Notch filter attenuation		60 dB or more (Auto), 70 dB or more (Manual)	
Beat cancel attenuation		40 dB or more	
Audio output		1.5 W or more (8 Ω)	
Audio output impedance		4 Ω ~ 8 Ω	

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