

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 equaliser 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.



Actual Size
270(W)×96(H)×291(D)mm
(Protrusions not shown)

- DRV connector switchable to antenna output function (convenient when connecting to external receiver).
- Large display with superior visibility.
LED backlight colour 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

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

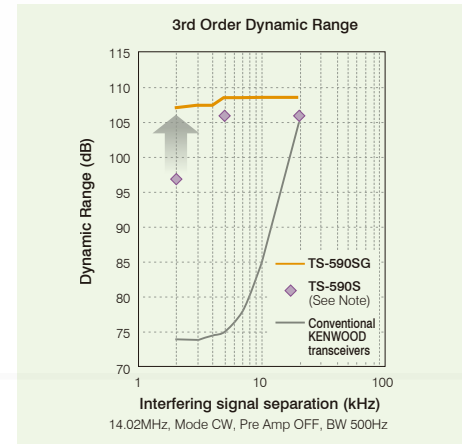
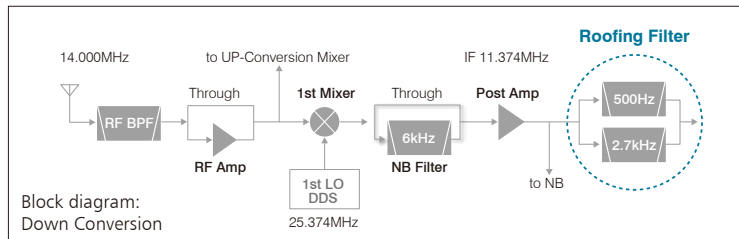
High-performance reception and improved adjacent dynamic range.

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.

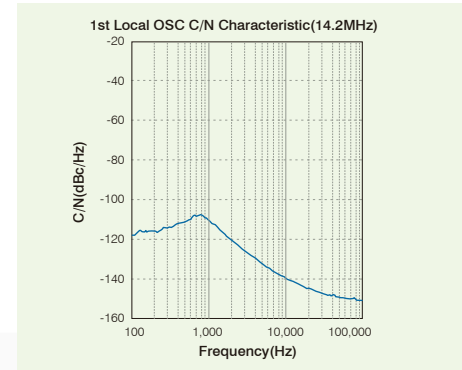
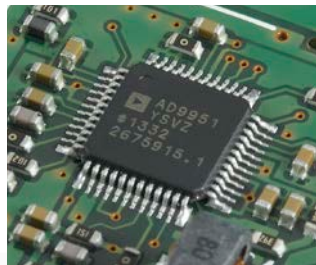


This graph shows what happens when the frequencies of 2 interference signals for measuring the dynamic range are converted from +2kHz to +20kHz from the reception frequency. For example, at the point where separation is 10kHz, the interference signals are 14.03MHz and 14.04MHz. It can be seen that the 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.



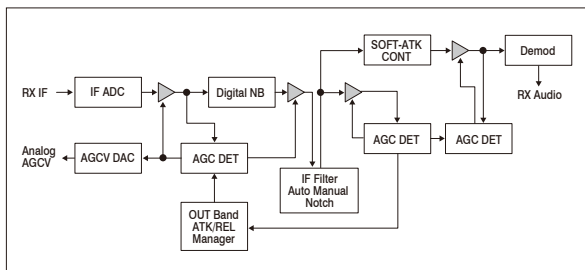
TS-590SG

of

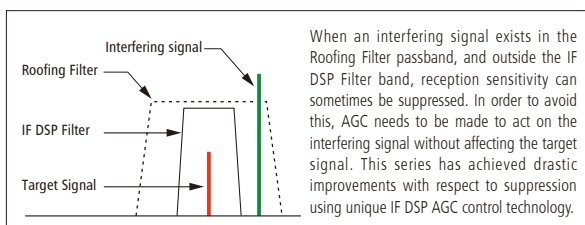
A variety of functions realized with 32-bit Floating-point DSP

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

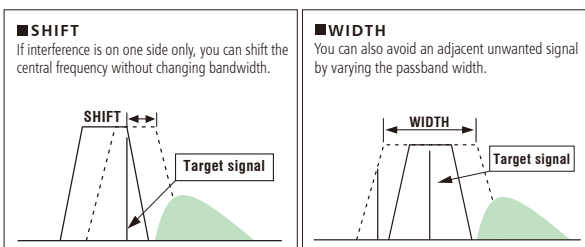


OUT BAND AGC CONTROL

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.

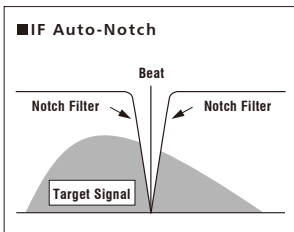


IF Notch

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/Analogue Noise Blanking (NB1 / NB2)

In addition to the analogue 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 analogue noise blanker.

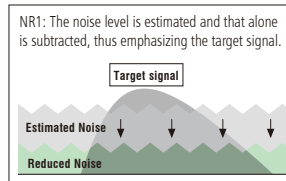
■ DSP Noise Reduction (NR1 / NR2)

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

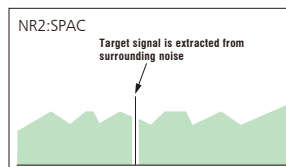
Spectral-subtraction noise reduction has been developed with a focus on improving reception clarity for weak SSB signals. It enables the bringing to the surface of a target signal that is swamped by noise, without any loss in sound quality.

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 60mm×60mm 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, minimising 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 equaliser (SSB/AM/FM for each mode)

The equaliser 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.

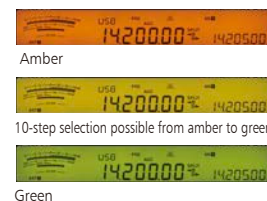
Other CW features

- 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

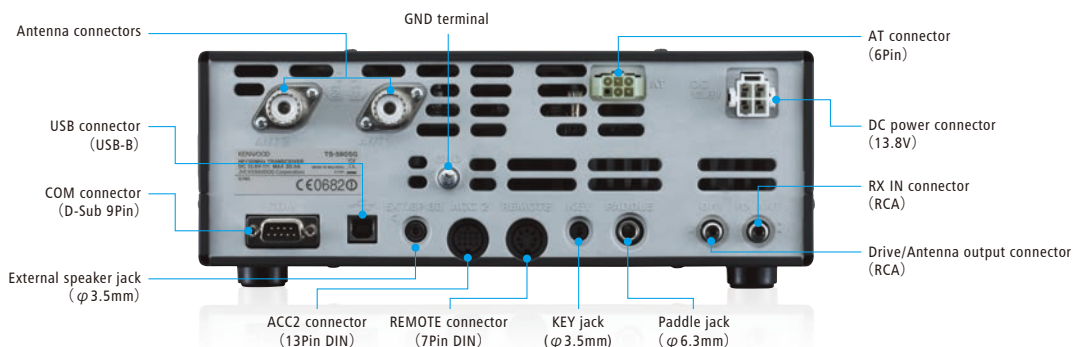
The large display

LED backlight with selectable colour tone

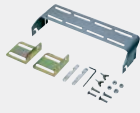
The large display ensures outstanding visibility under all conditions. In addition to conventional amber and green, you can now select intermediate colours and change from amber to green in 10 steps.



External connector terminals



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 80 m band 60 m band ^{*1} 40 m band 30 m band 20 m band 17 m band 15 m band 12 m band 10 m band 6 m band	1.81 ~ 2.0 MHz 3.5 ~ 3.8 MHz 5.25 ~ 5.45 MHz 7.0 ~ 7.2 MHz 10.1 ~ 10.15 MHz 14.0 ~ 14.35 MHz 18.068 ~ 18.168 MHz 21.0 ~ 21.45 MHz 24.89 ~ 24.99 MHz 28.0 ~ 29.7 MHz 50.0 ~ 52.0 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, -10 °C ~ +50 °C with SO-3: ±0.5 ppm, -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 RX (No signal)	20.5 A or less 1.5 A or less
Operating Temperature		-10 °C ~ +50 °C
Dimensions	Without projections With projections	W270 × H96 × D291 mm W280 × H107 × D335 mm)
Weight		Approx. 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: -63 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

Receiver			
Circuit type		Double Superheterodyne ^{*2}	Triple Superheterodyne ^{*3}
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	

*1 60 m band: Refer to applicable Amateur Radio regulations to your country.

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

*3 Except in above *2

These specifications are guaranteed for Amateur Bands only.

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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 colouration of the transceiver to appear different from that of the actual transceiver.

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