

**HF DIGITAL  
TRANSCEIVER**

**TS-820 SERIES**  
TS-820S/TS-820/SP-820  
VFO-820/TL-922/AT-200



# KENWOOD TS-82

The Pacesetter Transceiver is here . . . . . the fruit of an all out effort by Kenwood's engineering department to produce a progressive ham rig for the amateur who wishes to experience the ultimate. The finished product is here . . . . . The Kenwood TS-820S Pacesetter. Loaded with functional features, the TS-820S allows you to command the band with superb selectivity, integral IF SHIFT, and much, much more.

## TS-820S PERFORMANCE SPECIFICATIONS

Frequency Range.....	160 meter band.....	1.8 to 2.0 MHz
	80 meter band.....	3.5 to 4.0 MHz
	40 meter band.....	7.0 to 7.3 MHz
	20 meter band.....	14.0 to 14.35 MHz
	15 meter band.....	21.0 to 21.45 MHz
	10 meter band.....	28.0 to 28.5 MHz
		28.5 to 29.0 MHz
		29.0 to 29.5 MHz
		29.5 to 29.7 MHz
	WWV	15.0 MHz (receive only)
	AUX band	
Mode.....	CW, USB, LSB, FSK	
RF Input Power.....	SSB: 200 Watts PEP	
	CW: 160 Watts DC	
	FSK: 100 Watts DC	
Antenna Impedance.....	50 to 75 ohms, unbalanced	
Carrier Suppression.....	Better than 50 dB (Mod. freq. at 1.5 kHz)	
Side-Band Suppression.....	Better than 60 dB (Mod. freq. at 1.5 kHz)	
Microphone.....	High impedance (50 kΩ)	
AF Response.....	400 to 2,600 Hz	
Spurious Radiation.....	Harmonics Less than -40 dB	
	Others Less than -60 dB	
Receiving Sensitivity.....	S/N 10 dB or better at 0.25 $\mu$ V	
Image Ratio.....	Better than 60 dB	
IF Rejection.....	Better than 80 dB	
Frequency Stability.....	Within $\pm 1$ kHz during one hour after one minute of warm-up, and within 100 Hz during 30 minute period thereafter	
Receiving Selectivity.....	SSB: More than 2.4kHz (-6 dB)	
	Less than 4.4kHz (-60 dB)	
	CW: More than 0.5kHz (-6 dB), with optional CW filter	
	Less than 1.8kHz (-60 dB), with optional CW filter.	
AF Output Power.....	More than 1.5 watts (with less than 10% distortion) into an 8 ohms load	
Audio Output Impedance.....	4 to 16 ohms (speaker or head phone)	
Tube and Semiconductors.....	3 tubes (2 x 52001A, 12BY7A)	
	5 ICs	
	30 FETs	
	74 transistors	
	167 diodes	
Power Requirements.....	120/220VAC, 50/60Hz	
Power Consumption.....	Transmit: 280 watts	
	Receive : 26 watts (with heater-off)	
Dimensions.....	13-1/8 (333) W x 5-15/16 (150) H x	
	14 (335) D inch (mm)	
Weight.....	35.2 lbs (16kg)	

\* Specification and designs are subject to change without prior notice.

### PLL

The Kenwood TS-820S employs the latest phase lock loop circuitry. PLL technology allows accurate frequency derivation without introducing spurious signals which are known to play havoc with some amateur equipment. The single conversion receiver section performance offers superb protection against unwanted cross-modulation. And now, PLL allows the frequency to remain the same when switching sidebands (USB, LSB, CW) and eliminates having to recalibrate each time.

### 6-DIGIT DIGITAL READOUT DG-1A BUILT-IN

Along with the easy to read dial, a digital counter display can be employed as an integral part of the VFO readout system. More than just the average readout circuit, this counter mixes the carrier, VFO, and first heterodyne frequencies to give you your exact frequency. The counter actually figures the frequency down to 10 Hz and the digital display reads out to 100 Hz. Both receive and transmit frequencies are displayed in handsome, easy to read, Kenwood Blue digits.

※ TS-820 (DG-1A as option) is also available.

### FULL METERING

During receive, a handsome, easy to read meter functions as an S-meter. The same meter displays ALC level, plate current, RF output, and plate voltage during transmit. The five position meter selector switch includes a COMP setting for adjusting the compression level of the built-in speech processor.

### DIGITAL HOLD

A single pushbutton switch offers the operator unprecedented versatility in digital frequency readout. The digital hold circuit will lock the counter and display at any frequency, but will allow the VFO to tune normally. Have you ever wanted to return to a certain spot on the band and have forgotten the frequency? That won't happen again with the new digital hold feature on the Kenwood TS-820S.

### RF MONITOR

The built-in monitor circuit allows you to hear your own voice during transmission by sampling the RF signal. This circuit is especially useful for adjusting the RF Processor.

### NOISE BLANKER

The TS-820S uses an efficient noise blanker circuit, another Kenwood exclusive. By employing a special crystal filter, it assures unsurpassed efficiency in eliminating unwanted pulse noises such as ignition noise.

This is permanently installed.

### SPEECH PROCESSOR

The TS-820S also incorporates a unique RF speech processor. It utilizes a 455 kHz circuit to provide quick time constant compression. This feature is a true RF compressor as opposed to an IF clipper and the amount of compression is adjustable to the desired level by a convenient front panel control.

### HIGH STABILITY

The VFO, hermetic Kenwood housing which resists vibration and assures long deep drawn al

### DIGITAL HOLD

A new rated satin-surface fine Kenwood precision culture for and correctly pointed



# OS PACESETTER

## ABILITY VFO

part of the SSB transceiver, is an extended design using FET technology. The circuit serves to protect the components and shocks in mobile or field use, providing stability in a large, heavy gauge, aluminum case.

## ELECT READOUT SYSTEM (S) DIAL

The VFO tuning dial system is incorporated in the TS-820S. It includes the same smooth planetary drive found on other Kenwood models plus special, high-precision gears to add a new "monoscale" feature for easier frequency readout. LSB, USB, and CW operating frequencies can be dialed and accurately read from the same dial.

## CW AUDIO CHARACTERISTICS

During CW reception, a special 8 pole filter is used to alter the audio frequency response to provide a more comfortable, and easy to copy tone.

## RF NEGATIVE FEEDBACK

To improve the linearity during transmission, RF NFB is applied from the final stage to the driver stage. The use of amplified ALC and so, the RF NFB has brought a considerable further improvement to the quality of the transmitted signal.

## IF SHIFT

Sometimes called a "passband tuning" circuit, the IF SHIFT control varies the IF passband without changing the receive frequency. This special feature enables the operator to eliminate unwanted signals by moving them out of the passband of the receiver. This feature alone makes the TS-820S the pacesetter that it is.

## FINAL AMPLIFIER

The TS-820S is completely solid state except for the driver (12BY7A) and the final tubes. Rather than substitute TV sweep tubes as final amplifier tubes in a state of the art amateur transceiver, Kenwood has employed two husky 5-2001A (equivalent to 6146B) tubes. These rugged, time-proven tubes are known for their long life and superb linearity. The input power of the TS-820S is conservatively rated at 160 Watts DC, 200 Watts PEP. The tubes run cool with the aid of a noiseless fan (standard) mounted on the rear panel. The above tube and power combination minimizes the possibilities of TVI and helps to maintain the Kenwood reputation for excellent audio quality.

## VERNIER TUNING

Precision vernier tuning is incorporated with the plate tuning control to provide a rapid and accurate adjustment during the tune-up.

## RIT

The quick and easy way to vary the receive frequency 5 kHz either side of the VFO frequency. Of course, the effect of the RIT will be displayed by the DG-1A digital counter display.

## HEATER SWITCH

The heaters of the three vacuum tubes may be turned off during periods of "receive only." Because the TS-820S is "all solid state" with the heaters off, it draws less current than the dial lights in most automobiles.

## OTHER FEATURES INCLUDE:

- \* Built-in 25 kHz calibrator
- \* Built-in speaker
- \* CW Sidetone and semi-break in
- \* Rear panel terminals for linear amplifier, IF OUT, RTTY, and XVRTR.
- \* Handy phone patch IN and OUT terminals

## VOX

The voice-activated microphone circuit is built into the TS-820S with VOX GAIN, ANTIVOX, and VOX DELAY controls placed on the front panel for convenient adjustment any time.

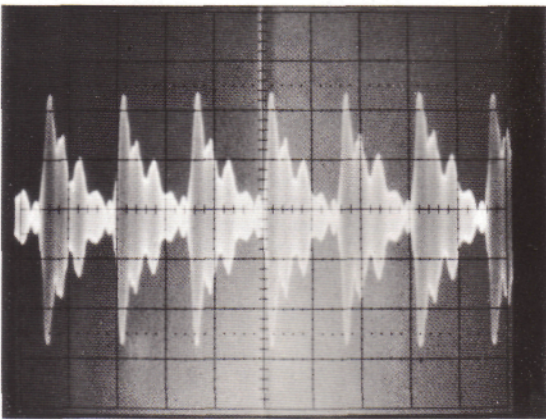
## RF ATTENUATOR

Easy, one touch activation of the attenuator supplies 20 dB of padding on receive. The switch is conveniently located on the front panel.



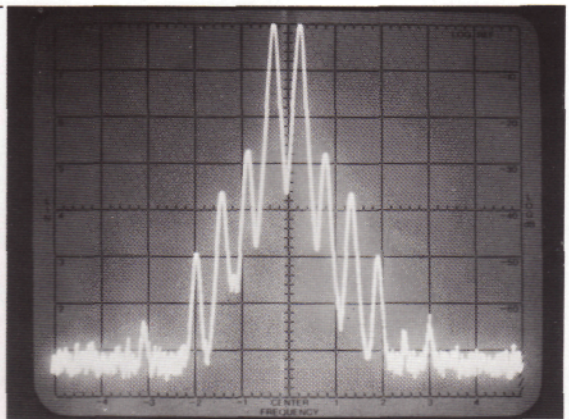
Comparison with and without RF Processor:

WITHOUT

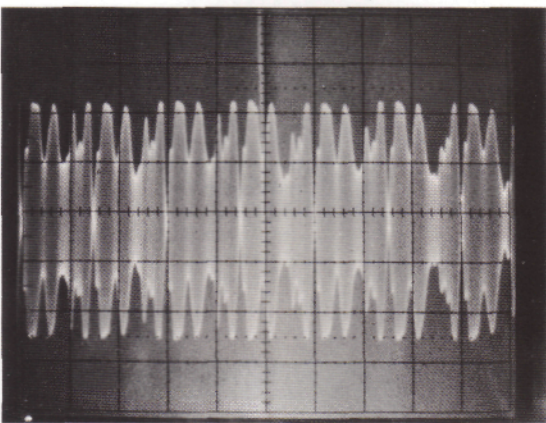


Comparison with and without RF NFB:

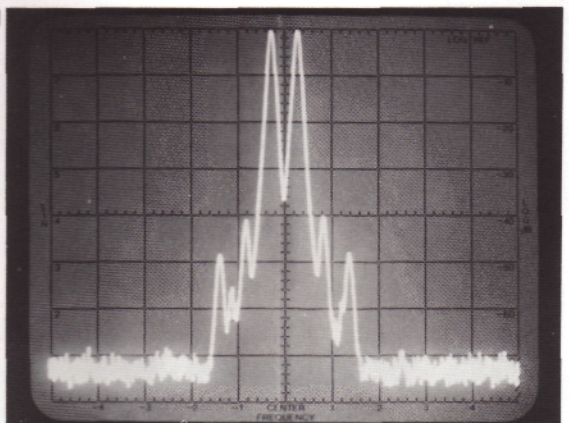
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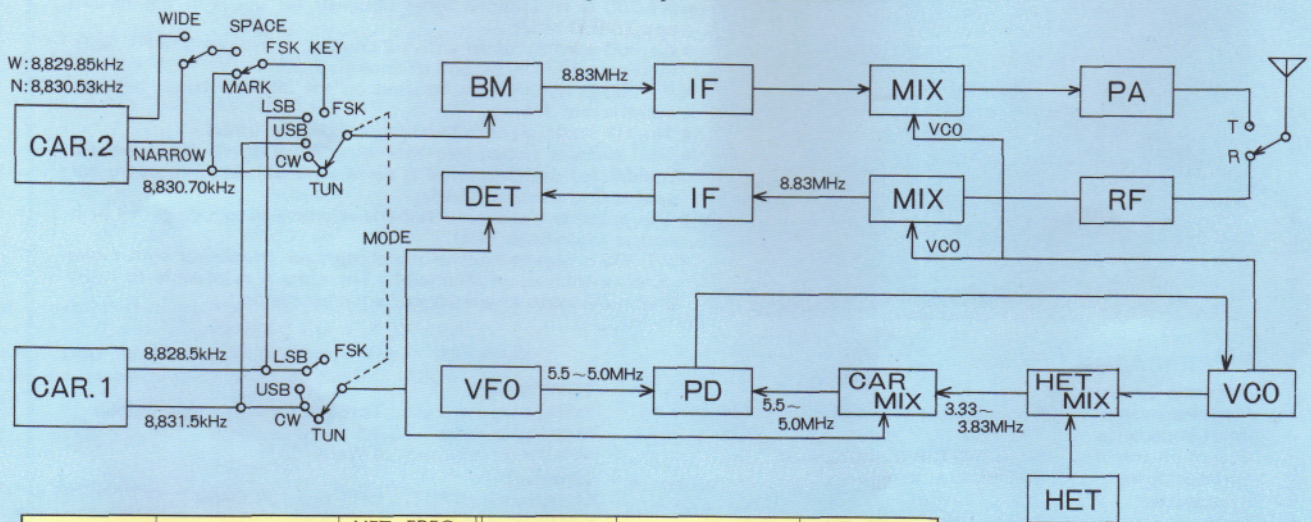
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WITH



### TS-820S Frequency Construction



BAND MHz	VCO FREQ. MHz	HET FREQ. MHz	BAND MHz	VCO FREQ. MHz	HET FREQ. MHz
WWV/JJY	23.83-24.33	20.5	21	29.83-30.33	26.5
1.8	10.63-11.13	7.3	28	36.83-37.33	33.5
3.5	12.33-12.83	9.0	28.5	37.33-37.83	34.0
7	15.83-16.33	12.5	29	37.83-38.33	34.5
14	22.83-23.33	19.5	29.5	38.33-38.83	35.0

# TL-922

The TL-922 is an HF all band linear amplifier based on the pursuit of complete performance, and employing a pair of 3-500Z high performance transmitting tubes.



## FEATURES

- Employment of high performance transmitting tube, EIMAC 3-500Z
- AB<sub>2</sub> class G-G circuit
- Excellent IMD (intermodulation products distortion) characteristics
- Perfect safety protection
- Newly developed DELAY circuit of blower stop
- Variable threshold level type ALC circuit
- Employment of eye-ease two meters system
- Matching with KENWOOD HF transceivers and transmitters

## SPECIFICATIONS

Frequency Range ..... 160 meter band— 1.8 to 2.0 MHz  
 80 meter band— 3.5 to 4.0 MHz  
 40 meter band— 7.0 to 7.3 MHz  
 20 meter band—14.0 to 14.35 MHz  
 15 meter band—21.0 to 21.45 MHz  
 10 meter band—28.0 to 29.7 MHz

Mode ..... SSB, CW, RTTY

Drive Power.....80 Watts or more for full output

RF Input Power .....SSB: 2,000 Watts PEP  
 CW, RTTY: 1,000 Watts DC

Circuitry.....AB<sub>2</sub> Class Grounded-grid Linear Amplifier

Input Impedance.....50 Ohms

Output Impedance.....50 to 75 Ohms

Tubes .....2 x 3-500Z

Power Requirement ... 120/220/240 VAC, 50/60 Hz

Dimensions .....15-3/8(390)W x 7-1/2(190)H x 16(407)D inch (mm)

Weight.....68 lbs. (31 kg)

# AT-200

AT-200 is an antenna tuner equipped with such functions as an antenna coupler, throughline wattmeter, SWR meter and antenna selector switch necessary for various kinds of effective operations connecting a transceiver with an antenna.



## FEATURES

- AT-200 is an antenna tuner designed for use with the TS-520 and TS-820 series.
- AT-200 consists of an antenna coupler, a through-line RF wattmeter, an SWR meter and an antenna switch.
- AT-200 is designed to be used on the amateur bands between 1.8MHz and 30MHz.
- The RF wattmeter has two ranges, 20W and 200W.
- The antenna switch has four outputs. Two of these are for coaxial fed antennas, one is for a wire antenna and one is for connecting a dummy load.
- The antenna matching circuit is effective in reducing TVI as it acts as a band-pass filter.
- AT-200 is also capable of matching your transceiver with a wire antenna such as an inverted-L. Therefore it is possible to enjoy communication on the lower frequency bands.

## SPECIFICATIONS

### (Antenna Coupler)

Frequency range ..... 6 amateur bands from 1.8 to 29.7 MHz

Input impedance.....50 Ohms

Output impedance.....50 to 500 Ohms, unbalanced

Through power.....200 Watts at max.

### (Wattmeter)

Type.....Through-line wattmeter

Frequency range ..... 1.8 to 30 MHz

Measurable RF power..Up to 20/200 Watts, switched

Kinds of RF power..... Forward and reflected power switched

Impedance .....50 Ohms

Accuracy .....Better than ±10% of full scale

### (SWR Meter)

SWR detection .....Toroidal core direction coupler

Measurable range.....1.1 to 10

Min.power required ...4 Watts

### (General)

Connectors, INPUT ...UHF type, 50 Ohms

Connectors, ANT-1 ...UHF type

ANT-2 ...UHF type

ANT-3 ...Wire antenna only

GND

Dimensions .....6-17/32 (166)W x 6 (153)H x 7-1/2 (190)D inch (mm)

Net weight .....6.2 lbs (2.8 kg) approx.

### VFO-820



The VFO is equipped with a DRS Dial of the same design as the TS-820 series for excellent linearity, stability and ease in frequency reading. The Digital Display of the main unit also indicates frequency of the remote VFO.

Frequency Range.....5.0 to 5.5 MHz  
 Frequency Stability.....100 Hz per 30 minutes after warm-up  
 Semiconductor.....2 FETs, 2 Transistors, 7 Diodes  
 Dimensions.....6-1/2(166)W x 5-7/8(150)H x 7-1/2(190)D inch (mm)  
 Weight.....6.6 lbs (3 kg)

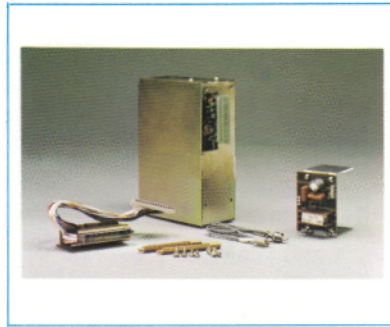
### SP-820



The SP-820 has built-in selectable tone filters to attenuate high or low frequency response inputs. And two channel selectable headphone output switchable through the tone filters.

Speaker Diameter.....12cm (4-3/4")  
 Max. Input power.....2 Watts  
 Input Impedance.....8 Ohms  
 Frequency Response...100Hz to 5kHz  
 Dimensions.....6-1/4 (169)W x 6 (153)H x 13-3/16 (335)D inch (mm)  
 Weight.....5.5 lbs (2.5 kg)

### DG-1A (optional)



The Digital Display Readout directly indicates the transmit and receive frequencies. Unlike dials using a VFO signal only, it indicates accurate frequency in any operating mode. The readout accuracy is determined by the standard 10MHz oscillator which is calibrated to WWV. Frequencies are displayed in KENWOOD blue digits for long operation without fatigue.

When the Digital Display Dial is installed, the D.H. (display hold) switch is used as a memory device. By pressing the switch, the selected frequency will remain displayed.

### TV-502S

The TV-502S is an all solid state 2 meter band transverter. The excellent performance of the TS-820 can be enjoyed on the 2 meter band by simply connecting it to the TS-820 with cables supplied.

Frequency Range .....144 to 146.00 MHz  
 RF Input .....16 watts  
 Semiconductor.....5 FETs, 15 Transistor, 10 Diodes  
 Dimensions.....6-5/8(168)W x 6-0(153)H x 13-5/16(336)D inch (mm)  
 Weight.....11.5 lbs (5.2 kg)



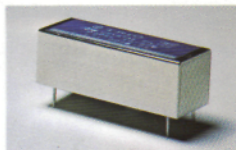
### TV-506

The TV-506 is an all solid state 6 meter band transverter. The excellent performance of the TS-820 can be enjoyed on the 6 meter band by simply connecting it to the TS-820 with cables supplied.

Frequency Range .....50.0 to 54.0 MHz  
 RF Input .....16 Watts  
 Semiconductor.....5 FETs, 15 Transistor, 10 Diodes  
 Dimensions.....6-5/8(168)W x 6-0(153)H x 13-5/16(336)D inch (mm)  
 Weight.....11.5 lbs (5.2 kg)



**DS-1A**  
DC-DC CONVERTER



**YG-88C**  
500Hz CW FILTER



**MC-10**  
50kΩ  
HANDY MIC



**MC-50**  
DYNAMIC DESK MIC.  
600/50kΩ



**HS-4**  
HEADPHONES  
8Ω