Sherwood Engineering HF Test Results

Model: Ten-Tec RX-320 Serial # 05A10669 Test Date 6/6/99

IF BW, Wide AM -6/-40, kHz: 8.5/9.6 -40	Ultimate	60	dB	
IF BW, AM -6/-40 kHz 5.1/5.9 -40	Ultimate	60	dB	
IF BW, SSB -6/-40, kHz: 2.84/3.90 -40	Ultimate	60	dB	
IF BW, Nar SSB -6/-40, kHz: 2.10/3.10 -40	Ultimate	60	dB	
IF BW, CW -6/-40, Hz: 720/1600 -40	Ultimate	60	dB	

Front End Selectivity (A - F) highpass / low pass		D		
Image Rejection, 10 MHz (@ 455kHz IF)		60	dB	
First IF Rejection (@ 45MHz IF)		60	dB	

Dynamic Range @ 15 MHz, DR 20:		dB	IP3	dBm
Dynamic Range @ 15 MHz, DR 10:	72	dB	IP3 -18	dBm
Dynamic Range @ 15 MHz. DR 50:	90	dB	IP3 +9	dBm

Blocking at 100 kHz	146	dB		
Phase Noise (normalized) at 10 kHz offset:		-106	dBc	
Noise floor, CW bandwidth at 15.2 MHz		-133	dBm	
Noise floor, SSB bandwidth at 15.2 MHz		-126	dBm	
Sensitivity, SSB bandwidth at 15.2 MHz		0.31	uV	
Noise floor, CW bandwidth at 10 MHz:		-133	dBm•	
Noise floor, SSB bandwidth at 10 MHz		-126	dBm	
Sensitivity, SSB bandwidth at 10 MHz		0.31	uV	
Noise floor, SSB bandwidth at 5 MHz		-126	dBm	
Noise floor, SSB bandwidth at 5 MHz		0.31	uV	
Noise floor at 2 MHz	-119	dBm•		
Sensitivity at 2 MHz	0.7	uV		
Noise floor at 1 MHz	-111	dBm		
Sensitivity at 1 MHz	1.8	uV		
Noise floor at 200 kHz	-77	dBm		
Sensitivity at 200 kHz	89	uV		
AGC Threshold at -3dB:	4.0	uV		

Stability at 10 MHz after 10 second warmup	80	Hz

Distortion AM, 60% modulation, narrow and wide bandwidths:

100 Hz	%	1.0	%
200 Hz	%	1.0	%
400 Hz	%	0.8	%
1000 Hz	%	0.3	%
1500 Hz	%	0.3	%
2000 Hz	%	0.1	%

Distortion SSB

100 Hz	In noise	<0.3	%
200 Hz	In noise	<0.3	%
400 Hz	In noise	<0.1	%
1000 Hz	In noise	<0.1	%
2000 Hz		0.1	%

Note: In band noise floor -60 dB

Is distortion similar at line out as speaker output?	Yes
Gain pots other than AF: RF IF?	None
Attenuators .	None
Preamp:	None
Audio notches	
Fixed frequency:	kHz
Variable, range:	kHz

Comments (using Ten Tec's Program)

From a sheer performance aspect, this is the best computer-controlled radio tested (mid 1999). All measurements were right on spec. Dynamic range at 50 kHz was rated at 90 dB and that is what it measured. The IF and image rejection was rated at 60 dB and that is what was measured. The bandwidths were a little wider than the front panel value.

Shape factors were very good down to -40 dB, but could not be measured below that due to synthisizer noise and spurious. No specs were listed for the -40 or -60 dB bandwidths. Only the shape factor of 1.5 was listed. The only real weak point is the synthesizer,

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limiting close in dynamic range and ultimate. The book listed the AM bandwidths as 3.0 and 5.0 kHz, but the front panel and measurements were actually 5 and 8 kHz. Blocking was outstanding, being -146 dB with phase noise causing the limit at 100 khz, and blocking increased to -156 dB at 500

kHz where the reduced phase noise allowed a true measurement.

Some of the software choices are not a good as the electrical specs. Unlike all the other radios tested so far, the operator must move the mouse up and down on the virtual tuning knob to go up and down in frequency. Above center line on the knob, the left mouse button makes the frequency go up. Below the centerline on the knob, the left mouse button makes the frequency go down. All the other radios made use of the left AND right mouse buttons to tune. Left button goes down, right button goes up. This Icom/WinRadio method is much better.

The S meter starts at 0 and goes to 80. It reads too high, with band noise often reading 30 or more. The analyzer is terrible. Unlike in the Icom IC-PCR1000, which works full time in AM mode, this one only works on demand and sweeps rather slowly.

Also the display resolution is poor. Additionally, like the S meter, the analyzer display shows only noise in the bottom 30 or so dB. The AGC affects the display in such a way that after a strong signal is swept, the display trails off slowly. This makes all spectra show up as wedges. When sweeping my strong test signals, the analyzer would often give a divide by zero error, and crash the Windows program. Step tuning selection is good, just like in the Icom.

For some reason, you can turn off the S meter. With a virtual front panel,• there is no reason not to make it include all functions all the time. Physical room on the panel is not an issue. The radio has no built in speaker, and has no indication of power on/off.

The audio amp is rated at 1 watt, the highest yet tested. I used a Drake MS-4 speaker for all tests. The receiver has plenty of audio gain. The extendable whip was useless in the lab, heard only buzz from laptop computer or other noise sources. Used 20 meter beam for actual listening.

I did not encounter any obvious intermod/phantom signals. like I did with the Icom IC-PCR1000. The WinRadio WR-1500e was just terrible in comparison.

I found that the best way to tune the Ten-Tec is to use the cursor keys. The p arrow key makes it go up in frequency, and the down arrow key makes it go down in frequency. (What a concept.) The left / right arrow keys change

the step size. Cute. With no antenna connected at all, the S meter reads• about 20 out of 80. There should be some kind of offset/sensitivity• adjustment for this, as very strong signals run the S meter off scale,• and the low end is useless since it reads way too high with no signal.

The input circuit of the radio is high pass / low pass. That explains the low end roll off. Obviously goes down hill fast below 1 MHz.

The unit has an easy way to calibrate the frequency error. Just enter the offset in Hz, and this corrects any calibration errors. This unit requires about a -70 Hz correction cold, and about -145 Hz correction hot.

If the dynamic range were better on the Icom IC-PCR1000, I would choose it. But due to the significantly better dynamic range of the Ten-Tec unit, it wins in a shoot out.