SPR-4 REVIEW

1. SENSITIVITY Two SPR4 receivers, serial numbers 1443 and 201, were compared with a 1970 model HQ-180AC and a realigned National NC-183D. Both tube receivers were known to be in peak operating condition. Antennas used were a 100 foot long wire and the SM-2. The two SPR4's proved to be just as sensitive as the tube receivers. #1443 had slightly greater sensitivity and slightly lower internal noise than did #201. John had some trouble with noisy mixer transistors in #201 shortly after the warrenty expired. The manufacturer made the repairs and paid shipping charges...at no cost to John (Wederbrand). He said the company was most co-operative.

A Canadian DXer reports that the very expensive Collins 51S1 and 651S1 receivers are no more sensitive on the BCB than the HQ-180 (and, therefore, no more sensitive than the SPR4). (Refer to IRCA DX Monitor, p. 13, Aug. 12, 1972 issue). Receiver specifications on BCB sensitivity were given as:

Receiver	Signal required for 10 dB S+N/N (AM)
Collins 51S1 with preselector	5 microvolts on BCB
Collins 651S1	10 microvolts on BCB
HQ-180A	1-1.5 microvolts typically
Drake SPR-4 (manufacturer's specs)	0.5 microvolts all bands MW, SW

In my opinion, the two SPR-4's reviewed easily meet the manufacturer's specifications. I might add that the receivers were compared on the SW bands as well as on the BCB.

To get good long wave reception with the SPR-4, the antenna impedance must be matched exactly to the receiver input using an electrical pi network device.

2. SELECTIVITY Using the 1000 kHz calibration signal, plots of the receiver selectivity were made by first calibrating the receiver to exactly 1000 kHz, then switching the receiver to the AM, CW, USB and LSB modes and taking S-meter readings at 200 Hz intervals. This receiver has a crystal filter in the 5645 kHz 1st IF and an LC filter in the 2nd IF (50 kHz). The results were shown in four graphs (see note at end of article-DEE). In terms of selectivity, the most significant finding was the very steep slopes of the SSB and AM filters, giving the receiver excellent deep skirt selectivity even though the filter was 4.9 kHz wide on the top for the AM function. The shape factor of the AM filter was 1.4 which is nearly as good as a mechanical filter. The slope of the selectivity curve is considerably sharper than that for the corresponding 6 dB selectivity in the HQ-180A receiver. The graphs shown are for SPR #1443. Briefly, the receiver's deep skirt selectivity was found to be much better than the manufacturer's specifications.

MODE	MANUFACTURERS SPECS - BANDWIDTH at 6 dB	at 60 dB	SPR-4 #1443 ACTUAL SELECTIVITY at 6 dB	at 60 dB
AM	4.8 kHz	10.0 kHz	4.9 kHz	6.8 kHz
USB	2.4 kHz	7.2 kHz	2.5 kHz	4.5 kHz
LSB	2.4 kHz	7.2 kHz	2.7 kHz	4.9 kHz
CW	0.4 kHz	2.7 kHz	0.6 kHz	1.7 kHz

Of course, one should realize that AM signals on the BCB are much sloppier than the one generated by the crystal calibrator, which puts out about a 15-20 dB over S-9 sig on most bands.

In brief, the AM filter is quite broad at the top but it has steep slopes. Double peaks were noted on both #201 and #1443. On #201, the variation was about 2 dB, and on #1443, it was about 4 dB. The peaks have no significance in actual receiver operation.

3. DIAL ACCURACY Calibration is accomplished by switching the receiver to SSB or CW mode and tuning for zero beat on the 100 kHz harmonics. The dial can be slipped so that the receiver can be calibrated exactly.

On set #201, the dial accuracy was within 200 Hz when calibrated at the nearest 100 kHz harmonic. Maximum error over the 500 kHz band was 1 kHz without resetting the calibration.

On SPR-4 #1443, the VFO was almost perfectly linear. Dial accuracy was within 100 Hz (and typically zero, or 50 Hz) when calibrated at the nearest 100 kHz harmonic. Maximum error over the 500 kHz was only 100 Hz without having to reset the calibration. I doubt if a receiver could be calibrated better than this!

The two relative maxima in the crystal filter do not interfere with calibration or determining the exact frequency (to 100 Hz or less) of an unknown station. I might add that all crystal filters (except very expensive ones) probably have a few maxima and minima.

In switching from one band to another, the maximum change in calibration (1.1 kHz) was on the 11.5 mHz band. The drift for the other bands was: 9.5 mHz: 800 Hz; 6 mHz: 400 Hz; 15 mHz: 200 Hz; 17.5 mHz: 200 Hz; 0.2, 0.5, 1.0, 1.5, and 21.5 mHz: Zero. 7 mHz: 100 Hz.

4. S METER The meter works well. It produces a noticeable deflection on a weak signal but does not pin except on extremely strong signals. Meter needle deflection is roughly a function of the logarithm of signal strength (the meter has a wide dynamic range). It gives very true indications of the relative strength of signals. On many receivers, including the HQ-180 and the DX-150, almost any substantial signal will pin the meter. I do not consider this to be very useful; after all, the function of an S meter should be to measure signal strength!

5. IMAGE REJECTION The SPR-4 is free of images. No cross modulation was observed when tuning to a 50,000 watt station 4 miles from John's home near Philadelphia, using a 100 foot long wire or the Space Magnet.

6. BIRDIES The SPR-4 does have some. They are not operationally significant. On #1443, only 3 major birdies were found on the 0.2, 0.5, 1.0, 1.5, 6.0, 7.0, 9.5, 11.5, 15.0, 17.5, and 21.5 mHz bands, the only bands I have on this receiver. These birdies were at 9698, 9963, and 15334 kHz. The 9963 kHz birdie measured out at S-9 on SSB and S-8 on AM. The other 2 birdies did not produce an S meter reading. Besides these, a few other very weak spurs were found. Only the nominal 500 kHz ranges, plus or minus 50 kHz on the ends of each band, was considered. John reports there are some birdies on the 4.5 and 5.0 bands, with one on 4973 kHz being very strong. The birdies tune out sharply and I do not consider them to be a handicap to reception.

7. NOISE LIMITER Each noise blanker must be aligned to match the receiver in which it is installed. This is not a difficult process. John aligned the noise blanker in his set and discovered that LORAN impulse type noise was reduced by as much as 40 dB.

8. NOTCH FILTER The filter must be tuned carefully because of the very sharp null. Null depth ranged from 38 to 68+ dB on SSB and CW, and was typically 65 dB or more on the AM function. John reports that the HQ-180A notch filter is slightly more effective but the SPR-4 filter seems to be able to get the job done.

9. AGC RESPONSE TIME Without the noise blanker operating, a strong noise pulse may cut out the audio for ½ to 1 second, because of the slow AGC response time in the AM mode. When the noise blanker is operating properly, the AGC should be affected only by a received signal and not by the noise pulses. I have not had the adjustment made in the blanker in my set, so I cannot comment on this at the present time.

10. AUDIO The audio quality was judged to be good. The MS-4 speaker yielded somewhat better low frequency response than the one built into the set, on a qualitative judgement.

The RF gain switch, when set at zero, caused the S meter reading to jump to 60 dB over S-9. This is due to circuitry design. S meters on some Collins receivers behave similarly. I don't consider this important because when I listen I do not set the RF gain to zero, and I don't think anybody else would either.

The volume control, when set at the minimum volume setting, does not shut off the audio completely. Again, I have no qualms about this.

11. FINAL COMMENTS In light of our experiences with these two receivers, we believe the SPR-4 is an excellent receiver and probably the best receiver available in its price range. The SPR-4 reviewed by Mr. Ernest Behr in DX NEWS undoubtedly does not measure up to other SPR-4's. It is unfortunate that a few "lemons" did escape the factory. One could hope for a narrow AM filter, but, even without this, the SPR-4 does quite well. Of course, reception of splits very close to strong domestic stations may be difficult.

The SPR's strong points are, in review, excellent frequency stability, very accurate dial calibration and frequency determination, high sensitivity, excellent signal handling capability and image rejection, and a good S metering system, as well as excellent deep skirt selectivity.

The only improvements that might be made on this receiver might be the addition of a narrow AM filter, and a choice of AGC response times for a given reception mode. Perhaps the noise blanker could be included as standard equipment and adjusted at the factory during the manufacturing process.

I might add that I observed no frequency shift in the SPR-4 when changing from AM to CW or SSB. The apparent shift is due to the shape of the filter selectivity curve. By tuning the signal to zero beat, you notice no frequency shift.

---Robert Fischer, P. O. Box 94, Newark, Delaware 19711