



AOR AR-DV1

US\$1220 £1200 €1550

OVERVIEW

The Japanese company AOR – the letters standing for “Authority on Radio” and apparently derived from the amateur callsign of the founder, JA1AOR – is well known for innovative radio communications equipment for the professional and consumer market. The AR-DV1 is its newest receiver and although not at first glance aimed principally at the market represented by *WRTH* readers, it offers a fascinating insight into the possibilities of combining an SDR with a conventional front-panel interface and adding a great deal of leading-edge digital decoding technology.

FEATURES

In a sense the AR-DV1 is two receivers in one. Covering 100kHz to 1.3GHz, it is a direct-conversion design from its low-frequency limit to 18MHz. Between 18 and 180MHz it is a conventional up-converting double-conversion super-heterodyne with intermediate frequencies of 393 and 31MHz. From 180MHz to 1.3GHz the first IF becomes an up-converted 1705MHz with the second and third IFs as before. We would imagine that some form of SAW filter is used in the 1705MHz IF sub-system. The specification states that the IF bandwidths are 200 and 500Hz and 1.8, 2.6, 3.8, 5.5, 6, 8, 15, 30, 100 and 200kHz and these appear to be digitally implemented although no information is given in the manual. The available analogue receive modes are FM, AM, synchronous AM, USB, LSB and CW but in addition the AR-DV1 can cater for a wide variety of commercial digital modes. Some of these are used by radio amateurs and others are in wide use by private mobile radio systems of various types. From the point of view of broadcast reception it is a little unfortunate that modes such as DRM and some flavour of DAB are not available.

However, it would presumably not be difficult for the manufacturer to add them in future via a firmware update if it so chose. There are no less than four distinct squelch modes based on noise and level together with an auto notch facility, three selectable AGC speeds, three separate ‘VFOs’ and an effective noise-reduction mode available in AM only.

Physically the AR-DV1 measures 180 x 50 x 220mm and weighs about 1.5kg, from which it may be inferred that it is a very substantially made (and beautifully finished) package. The front panel is remarkably small and densely packed and the entire receiver is raised to a convenient height above whatever surface it is mounted on by two tilt-out feet. The left-hand side of the front panel is taken up with a small orange-backlit display with volume and squelch controls adjacent. A 4 x 4 matrix keypad is to the right of the display with most numeric keys having second functions. They keys themselves have short travel and quite high breakout force with rather too much lost motion for their size. Consequently they feel slightly “rattly” in use. A ‘VFO’ knob with up/down keys is at the right of the panel. In contrast with the keypad buttons, the breakout force here is very low and there is some lost motion around the detents. One of our few consistent criticisms of AOR receivers over the years is that their ergonomics are not particularly well thought out and implemented; accepting that modern receivers are complex and contain a good deal of functionality, many of them could easily be made more pleasant to use. Learning one’s way around the AR-DV1 is likely to be rather a protracted exercise, not helped by the relatively low display contrast and somewhat idiosyncratic interface.

Beneath the display is a Micro-B USB socket and a slot for an SD card. The latter can be used

for both voice recording and back-up memory management. The receiver has a comprehensive configuration and option menu for various user-selectable parameters and these can also be backed up on the card. As would be expected, the AR-DV-1's memory functions are very comprehensive. In effect there are 2,000 memories organised as 40 banks of 50 channels. Each memory location is capable of holding frequency, mode, tuning step and a text comment of up to 12 characters. The contents are held in an EEPROM so that no backup battery is required for memory retention and can also be stored on the SD card if required. The principal use of the USB socket is to form an interface to a PC and the manual gives a clear and comprehensive guide to how this function can be used. Unfortunately the review sample of the AR-DV1 receiver – which was kindly loaned to us by Messrs Waters & Stanton – was only available for a relatively short period and we did not have time to test this aspect of the unit's capabilities in any depth.

On the rear drop is a BNC antenna connector and a standard 12V DC power socket. The specification states that the receiver can run off any DC voltage between 10.8 and 16 and draws 750mA. The supplied PSU runs quite warm, as indeed does the receiver as a whole. Auxiliary and extension-speaker sockets are available on the rear. Given the receiver's wide coverage it would have been useful and convenient to have separate antenna input sockets available for different portions of the frequency range.

PERFORMANCE

We took the view that *WRTH* readers would be chiefly interested in the AR-DV-1's potential as an MF and HF broadcast receiver with a look at its FM capabilities in passing. We mostly used a Wellbrook *Imperium* loop antenna together with assorted dipoles and random wires and a TH7DX seven-element tri-band Yagi, the latter being used to generate some very strong signals from local amateurs. We used a Racal RA3791 and a WinRadio 'Excalibur Pro' for comparative evaluation. In general terms the AR-DV1 exhibited good sensitivity in the MF and HF bands. The specification states that from 530kHz to 18MHz the figure is 0.71µV for 12dB SINAD but no bandwidth is given. Our measurements suggested that this figure was a little pessimistic and the true figure was about 0.5 µV for 12dB SINAD at 17.9MHz in a 2.6kHz bandwidth in USB mode and was essentially independent of frequency elsewhere in the specified range. In the narrower CW bandwidths the MDS was found to be about -122dBm which more or less equates to the measured figure above. As such, the AR-DV1 could be said to be about 8dB worse than either the Racal or the WinRadio receivers but the actual sensitivity will be more than enough for real-world MF and HF reception. Above 18MHz, incidental-

ly, the sensitivity improved by about 4dB overall. Below 18MHz the strong-signal performance of the AR-DV1 approximated to that of a good portable receiver. It was happy enough with reasonably small antennas and input levels below about -14dBm but very strong signals in the MF and HF region (and in particular the 7MHz band at night when fed from a half-wave dipole) caused noticeable front-end distress and on occasions actual blocking. The switchable AGC worked fairly well although in the slow position there was a degree of audible 'pumping' on strong SSB and CW signals and none of the settings was quite ideal for utility SSB speech transmissions. Our guess is that the AR-DV1 would greatly benefit from the addition of an external preselector if it is fed from large antennas or used in a hostile RF environment. On balance it seemed to be happiest with the Wellbrook loop. Sensitivity in the 88-108MHz FM broadcast region was adequate for good reception with the supplied telescopic antenna and the IF filtering was very effective. Many FM receivers at the elevated test location suffer from adjacent-channel interference and noise caused by sub-par IF filter passband and stopband shapes but the AR-DV1 is certainly not one of them. Tests on non-broadcast frequencies suggested that this excellent performance is maintained elsewhere, for which air-band and utility UHF listeners in particular will be grateful.

CONCLUSION

Summing up the AR-DV1 is rather difficult. Clearly the AM broadcast listener is not the primary user at which the receiver is aimed. But for those wanting wide coverage of the RF spectrum together with the ability to decode various amateur and commercial digital modes, the AOR product might be an attractive choice. The inclusion of DAB and other digital broadcast modes in future models would be very useful. The wider significance of receivers of this general type is that they represent the convergence of SDR technology and the conventional dial-and-keypad interface and there is little doubt that this is how receiver technology of the future will develop. **JN**

Rating table for AOR AR-DV1

Constructional quality	★★★★
Sensitivity	★★★★
Dynamic range	★★★★
RF intermodulation	★★★★
Versatility	★★★★
VFM	★★★★

Overall rating ★★★★★

Key:
 ★ = Poor ★★ = Fair ★★★ = Average
 ★★★★ = Good ★★★★★ = Excellent
 VFM = Value for money