

WiNRADiO AX-31B

active indoor antenna

By Ian Sachs

I must admit to some degree of fascination with WiNRADiO products. Ever since I got my first 'brick' WR-1550e unit, my life became more fun, and also somewhat simpler and more convenient — I now scan for frequencies while typing away on my PC, and don't even have to raise my fingers from the keyboard to be able to tune my scanner radio! Which reminds me, that *"Men first feel necessity, then look for utility, next attend to comfort, still later amuse themselves with pleasure, thence grow dissolute in luxury, and finally go mad and waste their substance"*, as someone once said, so I guess I must be at the third stage, heading for the fourth!

Being an inner city dweller, I have been always envious about those who think it nothing special to put a discone antenna up on the roof, or even build their own antenna tower in the backyard. For years, I had to make do with pieces of wire, ingeniously hidden behind my curtains and experimentally run around the room. Rolls of wire are often hiding behind (or on top of) furniture, waiting to be put back "in place" as soon as the guests leave.

After years of misery, enter the AX-31B, advertised as a professional log-periodic indoor antenna "ideally suited for EMC pre-testing, surveillance and monitoring" on the WiNRADiO Web page <http://www.winradio.com/home/ax31b.htm>.

I expected a hefty price tag, but at A\$225 I found it affordable even for my hobby purposes, so I pulled my credit card out. After all, I figured, this antenna can be used with other equipment as well (not only the WiNRADiO brand), and will also go with my ancient AOR-3000. (Later experimentation has shown it is also great with TV, but wait for it...)

The antenna comes in a beautiful glossy box. (Someone should tell the WiNRADiO people they are wasting their efforts on me; I won't be so easily bought with pretty packaging!) The antenna is packaged in an antistatic bag, together with about 6 feet of cable with connectors and an instruction sheet. The connecting RG-58/U cable has an SMA connector for the antenna, and a BNC connector which plugs into the receiver.

The antenna itself surpasses the box in its beauty. It is made of black fibreglass with the etched log-periodic dipole array elements clearly visible on both sides of the board. The surface-mount amplifier and impedance matching circuitry is placed directly on the antenna, together with the battery holder. There is also a miniature slide switch to turn the power on, and a tiny surface mount LED which glows bright red when the power is on.

The unit is powered by a standard 9V "transistor" battery (PP3 type). The current drain is 25mA, so it will last quite a few hours. After I took these photos, given my continuous use of the antenna, I connected it to an external DC power supply by soldering two wires to the battery terminals. The instruction

sheet also shows how the unit can be simply powered remotely through the coaxial cable, but I did not find this necessary.

The board is lightweight, so for my experimentation I attached it to a wall using a piece of double-sided tape.

The manufacturer specifies the frequency range 230 to 1400 MHz, but my first attempt to see if my new setup is working was to tune to a local FM station (101.9 MHz). This worked beautifully. Turning the switch on and off made a big difference. The antenna must be always operated with power on, as the amplifier is a necessary part of the circuit, probably due to some impedance matching requirement. A glance at the surface-mount circuitry reveals that the amplifier chip is connected to the dipole structure through an impedance-matching transformer.

As I started to experiment with VHF and UHF frequencies, my interest grew. Most stations which were noisy before (on my original pieces of wire), came out

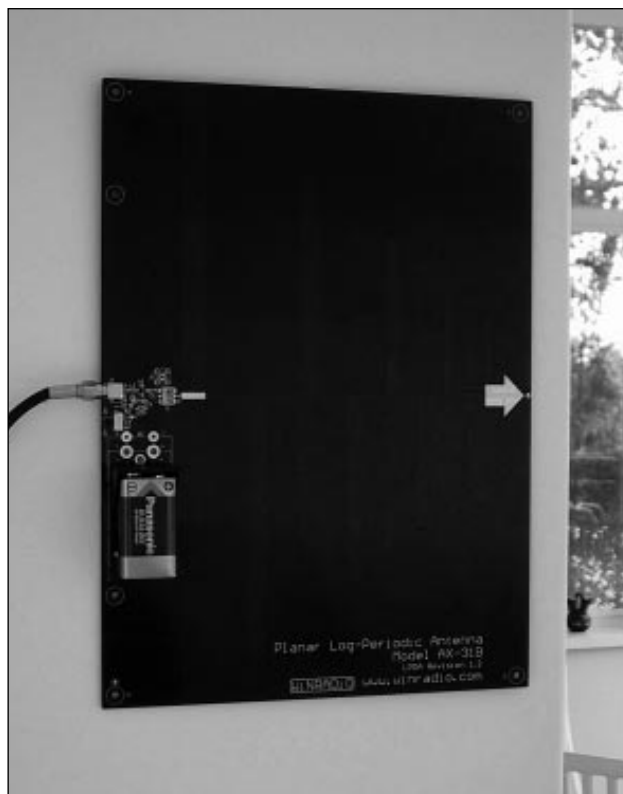
loud and clear on the AX-31B. The local police in the 460-470 MHz band, and trunking stations around 860 MHz sounded like they were around the corner.

But how about directivity? WiNRADiO claims that this is a directional antenna, with directivity 6dBi (which, in my very rough interpretation, should mean that, in the active direction, the gain of this antenna should be almost 6dB greater than the omnidirectional piece of wire I had been using so far).

Rotating the antenna, I could indeed observe peaks and valleys in the received signal strength. This gives one the advantage in being able to reduce interference by pointing at the signal source, away from the interfering signals.

On the other hand, with scanner use, there is the possible problem that if some stations in the band of interest are in different directions, or are moving, then the antenna direction needs to be constantly adjusted. This has not been such a big problem in my case.

The directionality is also more apparent at higher frequencies. I have even tried this antenna on shortwave also (although I am aware that the lowest frequency is specified as 240 MHz), and was pleasantly surprised.

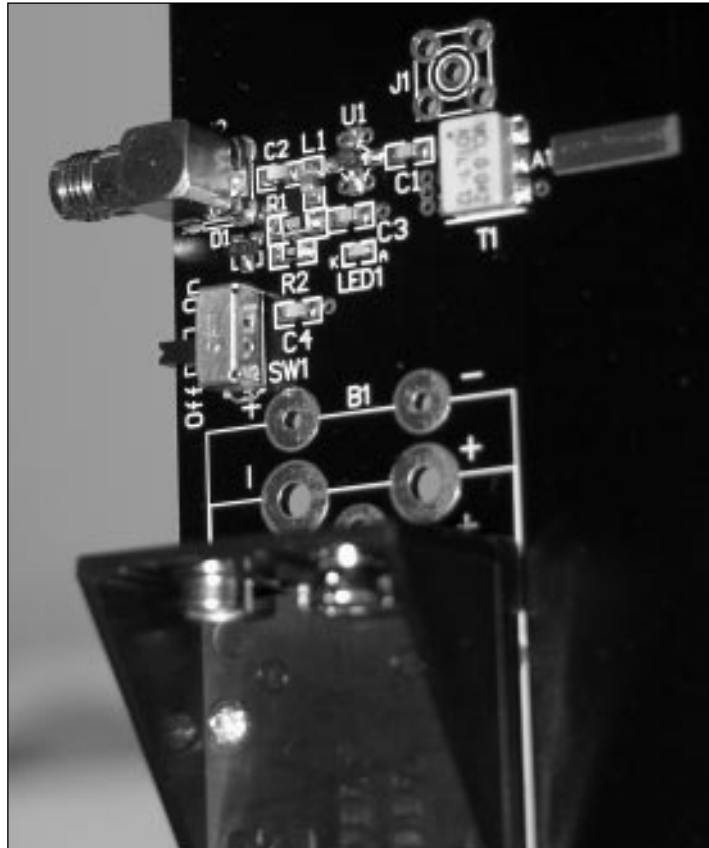


The antenna performs similarly to the wire antenna supplied with my Sangean receiver, but without the inconvenience of having to run the long wire around the room.

At these low frequencies there is no directivity and the antenna appears to work as an amplified short whip (the log-periodic structure are tuned much higher than shortwave frequencies, so it acts as an untuned short whip for shortwave).

One common problem with most active antennas is their susceptibility to overload and intermodulation. I was pleased to see that this is not an issue with AX-31B.

The third-order intercept point is specified at respectable 25dBm, which is much higher than any wide-band scanner likely to be connected to it. The gain of the amplifier is specified at 20dB, and the noise figure is a reasonable 3.8dB.



In summary, the AX-31B is probably no substitute for a good external antenna, but in my circumstances it significantly improved reception. While I was experimenting with tuning to various frequencies and connecting it to various radio equipment I have at home, I also thought it might be an interesting idea to try it with my TV.

And that's when the real surprise came: The result was absolutely stunning: I got better picture than with the TV antenna cable connected to the CATV socket in my apartment!

The WiNRADiO people are probably quite unaware that they are sitting on a gold mine: this unit doubles up as the finest indoor TV antenna I have ever seen!

I purchased my unit directly from WiNRADiO in Melbourne, (03) 9568 2568, for A\$225. It can be also bought on-line from <http://www.winradio.com>. **R**