

Title: ***Elimination of Electrical Noise, 2nd Edition***

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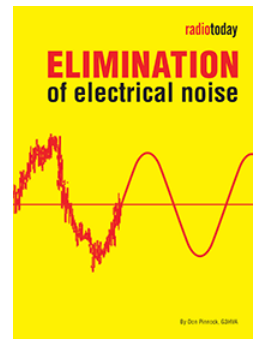
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Reviewer: Whitham D. Reeve



The target audience for this little booklet is the amateur radio operator. It has appeared in at least two editions, the current one and one from 2010. The covers are different but I believe the content is the same. Because radio astronomers face the same problems with radio frequency interference (RFI) as amateur radio operators, I thought it would be worthwhile to read ***Elimination of Electrical Noise*** to see what it has to offer.

Unfortunately, I quickly discovered this booklet has little substance and at times is repetitious to the point of monotony. Reorganization and better efficiency of writing would substantially reduce its already meager size. There is very little in this book for readers outside Britain, and some of the advice given is downright dangerous, as I will explain later. This is not an expensive book but, in my opinion, it has little value.

Elimination of Electrical Noise has twelve chapters, each written something like an outline. A list of definitions for use throughout the book is given in chapter 1 and “*Sources and characteristics of noise*” are given in chapter 2. Here, the author lists things like battery chargers, vehicle ignition systems, thermostats and PC crystal oscillator “*carriers*” among many other noise sources. For each offending source, he provides a brief description of the noise, its coverage (or distance range) and a cure to eliminate it. It seems the coverages and cures for almost all noise sources are identical: 30 m coverage and use “*clip-on*” ferrites to suppress the noise. The sage advice given for noise from fluorescent lights is “*replace worn out tubes and install appropriate capacitors to suppress any residual noise*”. The author never tells us what capacitance and voltage rating is “*appropriate*” or how or where to install the capacitors. Also, he never mentions the ballast, which can be an important noise source in these types of light fixtures.

The author frequently says to “*install appropriate ...*” something or other but never tells us what is appropriate or provides any other details. Perhaps his assumption is that the reader already knows what is *appropriate*. If so, why buy the book in the first place?

Chapter 3 goes into “*choosing a property & setting up a station*”. The apparent assumption here is that readers are going to leave their existing homes and buy another one based on its RFI environment. He discusses the advantages of operation from a “*garden shed*” or “*caravan in a relatively noise-free zone*”. The author tells us the “*noise-free zone*” is somewhere on the property but he never tells us how to find it. Obviously, small properties in non-rural neighborhoods are problematic because there may be no “*noise-free zone*”.

Chapter 4, “*Dealing with electrical noise*”, describes noise location methods but this chapter has so little detail that I was left wondering why it was included and, more importantly, what to do now. Chapter 5, “*Noise immunity of antennas*”, discusses some specific types of antennas such as the Windom and G5RV, presumably because the author believes these are low-noise antennas. Unfortunately, he offers no proof that they are, in

fact, low noise antennas. One must ask, do all readers use or should they use these antenna types? The discussion in this chapter would be much more useful if it had been generalized to include why certain antennas may be more or less noisier than others and what characteristics non-noisy antennas have.

Chapter 6, "*Electrical noise from outside the premises*", is where things get interesting. The author suggests using "*filters at the main input to the premises and/or shack*". He goes on to say that "*most modern domestic systems would require a filter rated 80 or 100 A*". While a large filter like this may reduce powerline noise conducted into the premises, it is very expensive both to purchase and install, possibly requiring major modifications to the electrical service entrance or the building's load center. It is very easy to under estimate the cost and effort of electrical mains filtering if it is to be done correctly. Before spending the money for such an upgrade, a thorough investigation should be undertaken to determine if conducted interference really is a problem. It is arguable that a filter on the "*main input*" is better or worse than point-of-use or individual branch circuit filtering, but the author should have posed and discussed that argument.

The so-called *switched-reluctance motors* and even ordinary electric motors used in clothes washers and dryers and heat pumps used for cooling can be significant noise sources, but these are not specifically mentioned in the book nor are any remedies provided.

Correctly, the author states many times that installations involving lethal voltages "*should be carried out by a competent registered electrician*". On the other hand, the author recommends disconnecting the "*mains earth*" to see if noise is reduced. In the US this would mean disconnecting the electrical service *grounding electrode*. I am not familiar with Britain's electrical practices, but in the US disconnecting the grounding electrode from the electrical service is extremely dangerous and never should be attempted because the voltages and currents involved can kill you. Also, in the US all grounding electrodes, including so-called secondary or supplementary electrodes, such as ground rods at a tower or "*shack*" must be bonded together (readers in the US should see [ReeveGrdg]).

In chapter 7, "*Direction finding equipment*", the author points out specific brands and models of loop antennas that may be used in locating noise sources, but he does not adequately describe how to use them or even why loop antennas could be useful for this purpose. My assumption here is that readers do not know how to use a direction finder and bought this book to learn how. They will be disappointed.

Chapter 8, "*Noise cancelling equipment*", does not go far enough in describing the techniques in using noise cancellers such as the Timewave ANC-4, which the author singles out. For a far more useful "how-to" article on using the ANC-4 and mitigating noise, I refer readers to [Beaumont-1] and [Beaumont-2].

I tried to find some value in ***Elimination of Electrical Noise***. The only thing of real value is the author's acknowledgement that many problems with RFI are self-caused and that station operators must first eliminate their own noise sources. The author describes troubleshooting and noise location methods that he appears to have thought out in advance, but his presentation of those thoughts in this booklet are not always clear or useful. The author claims to have many years' experience but that is only partially reflected in this book. How the reader can rely on this experience is not at all clear. Motivated readers might be able to use this book as a springboard to learning more about RFI from other publications and then gaining experience from their own investigations.

The book has some illustrations and pictures but with few exceptions they add nothing to the book. The author discusses several noise location schemes and provides a few photographs of hand-built equipment items. These sections are of little use because there are no schematics or construction and application details that would help the reader replicate the locating methods or equipment described.

There are much better books and articles on locating and mitigating radio frequency interference, some already mentioned. For a more complete RFI bibliography, see [ReeveRFI].

References:

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- [Beaumont-2] Beaumont, P., Radio Noise, Interference and Its Removal, **Radio Astronomy**, Society of Amateur Radio Astronomers (SARA), July-August 2012



Reviewer - Whitham Reeve is a contributing editor for the SARA journal, *Radio Astronomy*. He worked as an engineer and engineering firm owner/operator in the airline and telecommunications industries for more than 40 years and has lived in Anchorage, Alaska his entire life.