Preface to First Edition, May 2010

Some six years since I wrote the above, I still have not completed the intended project and so I have 'upgraded' this work to a 'published' edition. It remains unaltered from the original PhD thesis apart from the addition, below, of a corrigenda.

I still have plans to publish the additional material mentioned above. During the last six years, I have pursued some interesting and highly-relevant research topics during my employment as a research project manager in the research and consultancy division of the UK's Mines Rescue Service. This material is overdue for publication too.

David Gibson, May 2010

The remainder of this volume is a close copy of the text of my submitted PhD thesis.

Corrigenda

Page	Location	Correction
35	Caption to Figure 2-6	For "a vacuum" read "a conducting medium"
41	Figure 2-9	There are a number of confusing aspects to this figure and the associated text. In the penultimate line on p40, replace "–3dB cutoff frequency" by "–3dB cutoff bandwidth". In Figure 2-9, the x-axis should be labelled "T: normalised depth". This is related (indirectly) to frequency by $T = r / \delta$. In Table 2-5, "–3dB b/w at" is better phrased as "–3dB b/w is". The Q-factors shown in Table 2-9 have been calculated as T / T_c but should, more accurately, have been calculated as $(T / T_c)^2$, and should therefore be 1.0 and 1.3 (to one decimal place).
69	After equation 3-20	For "bandwidth is proportional" read "bandwidth is inversely proportional"
72	§3.4.1.2	For "2.6 m" read "1.6 m"
74	After equation 3-40	At the start of the second line, the text "0.001% so R_e, in this example, is" should be deleted
94	§4.4.2.2	For "utilisation of the copper" read "utilisation of the ferrite"
126	After equation 5-17	Note that, with a class D driver, the term ¼ $g\pi$ should be replaced by 1 (although this does not allow for the power in the harmonics)
126	After equation 5-18	Note that, by substituting for Φ, we can arrive at $m_d = \frac{r}{\omega K_Q N} \cdot \frac{U_p}{\sqrt{12}}$
259	In §A7.3.2.1	After "as shown in" insert "Figure A7-8"
264	line 1	Replace "C1 + C2" by "C1 \\ C2"
	line 6	Replace "R3/1R1" by "R4/R1"
	line 7	replace "value give" with "value given"
	§7.3.2.2, line 4	the minus sign belongs on the next line, i.e. "-72dB"

Corrigenda 2

Page	Location	Correction
68	Equation 3-16	The formula for inductance was misquoted. It should read
Also see: 69	Also see: 3-19	$L_{loop} = N^2 \cdot \mu_0 \, r \left(\ln \frac{8d}{w} - 2 \right)$ where d is the diameter of the loop. Note that in addition to replacing r by d the position of the brackets is also corrected. This correction should also be applied to the log term in (3-19)

David Gibson, July 2019