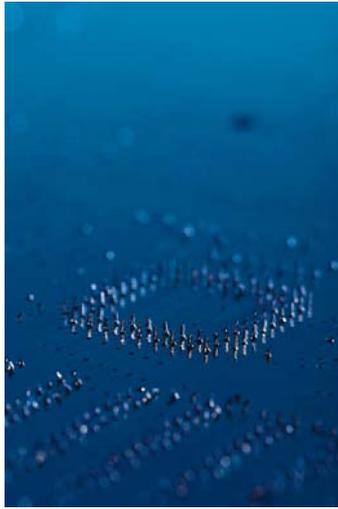




Hawkshead Designs Ltd



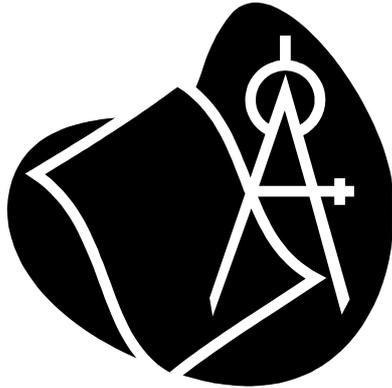
Version 4.0 Part 1

World Class Electronic Design Part 1

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What does design do for you?



Commercial Design is one of the fundamental keys to the bottom line success of business. It is also one of the most overlooked and misunderstood areas of business. "Design" is often treated as a superficial add-on for premium products, or a route for investing disposable revenue when trading is flush.

The same criteria apply to the inside of a product as apply to the outside. A product gains its competitive edge when the inside and outside complement one another well. External design offers ease of use, aesthetic quality and practical issues such as safety. Internally, design generates the ability to be effective at its job and to be cost effective. Electronic design is often involved in meeting safety standards and compliance with standards to preserve the planet.

What does all of this do for your business?

It gives you the competitive edge by being different.

- Improved performance
- Intuitive to use
- Long term reliability
- Generate interest/loyalty from your customers
- Add value to your business and your profits



Hawkshead has a unique proposition for you

Design is an opportunity in itself. Within Hawkshead, the opportunities come from many years' experience in the industry.

We want to encourage you to see Hawkshead's advanced electronic design as an opportunity – an opportunity to ensure that your product is unique in your market place – an elegant, cost effective solution to the challenges of your market that will exceed your customers' expectations.

The attitude of the company is one of openness and fair dealing. Many of our clients are non-technical, so we aim to keep technical terms and jargon out of the way. Design decisions and options are outlined in such a way that the client always appreciates the issues and maintains control.

In the next few pages we would like to demonstrate to you why we profoundly believe that unless "World Class Electronic Design" delivers the business benefits already mentioned above, it seriously fails in its purpose.

Hawkshead's unique potential to add value to your business through innovative design solutions springs from:

- a) the belief that analogue techniques often have a serious part to play in what (at first glance) may appear to be a digital environment
- b) multi-industry experience in the field of electronic design

Advanced

“The more digital the world strives to be, the more analogue it becomes”

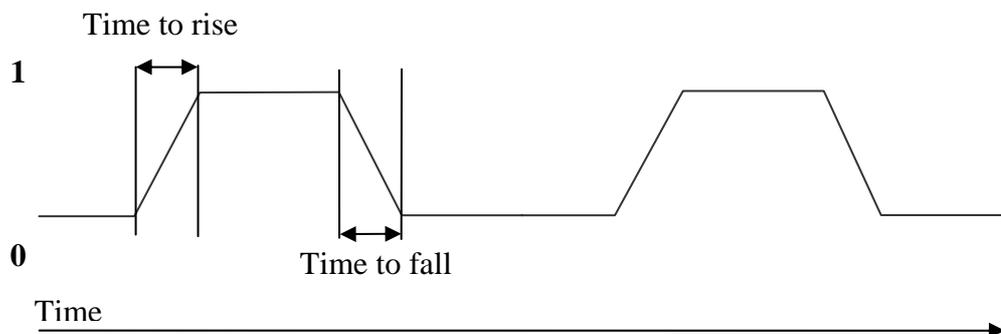
The world appears to have gone digital. There is no doubt that immense benefits have been obtained through digital processes. However, the world is not digital inherently.



Let us establish what we mean by analogue and digital:

- *Analogue (or Analog) - system or parameter that has a continuous spectrum*
- *Digital - system that can be represented as discrete digital codes (often termed as 1's & 0's)*

Even digital signals demonstrate analogue behaviours. Digital signals are effectively defined by thresholds. Above the upper threshold is considered to be 1 or ON. Conversely, below the lower threshold is considered to be 0 or OFF. Are you aware that there is a “gap” between 0 and 1? Did you know that it takes a finite time to go from one to the other?



These questions and more are effectively analogue in nature. Analogue and digital are inextricably intertwined. Hawkshead considers that analogue is not an old technology that has been superseded. Analogue is, and always will be, an intricate part of any system. The most leading edge digital systems recognise this fact.

There are applications in which the digital solution may fall short of expectation. In many cases, the performance of the product could be improved dramatically with little or no cost implication.

Consider this: Even the smallest element of analogue circuitry (or behaviour) must be carefully designed if the system is to perform well. The analogue circuitry that leads to or from the digital domain often holds the key to ultimate performance. Frequently overlooked, the power supply is also significant in these considerations. Hawkshead has demonstrated this many times.



Once in the digital domain, time is a critical parameter. In digital systems, time is frequently considered as a sequence of equally thick “salami” slices. However useful this may be for basic analysis, time is a continuum which is essentially analogue. This can have profound implications in successful electronic design.

With the rise of digital technology and the enormous breakthroughs in applications, the essential role of the analogue content of any circuit may well have been overlooked.

Hawkshead’s approach to design is to embrace the analogue elements, fully aware of the applications and importance attached to digital. The analogue and digital realms co-exist and may be mutually dependent. The ultimate expression of good design is that the technology disappears to leave a simple seamless product solution.

In an evermore digital world, analogue appreciation it is increasingly viewed as a dying art. Some occurrences are hard to define in purely scientific terms, which tend to increase the belief in a sense of art behind some analogue design.

Part of Hawkshead’s unique offering truly understands the relationships between analogue and digital realms in today’s advanced electronic circuits. Analogue design is not old technology; it is advanced technology that can enhance or restrict a digital system.

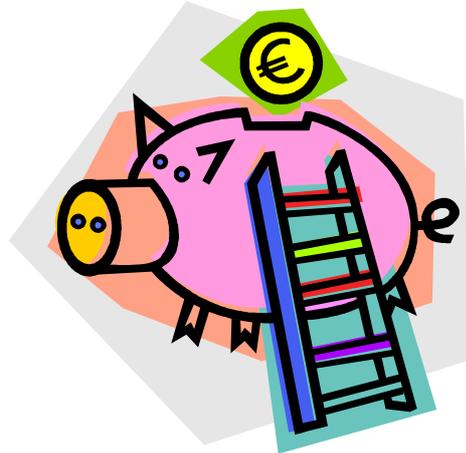


It costs the same to do it right...

Design is an investment. Each £, €, \$ or ¥ spent has the ability to do more to promote your business than the same spent in marketing. Yet, many companies make the mistake of looking on design as expensive.

The return on the design investment comes through profitability, increased sales and perceived value by your customers over your competition.

Doing it right (first time) costs no more than doing it wrong. Both of us need to ensure that there is a culture of shared ideas, an open mind and good communication. It costs nothing and can be worth everything.



Balance of simplicity and performance

Electronics and design are often seen as technical and difficult. Some parts of the subject are difficult. That's the job that we do. The rest of it is not so difficult and that is where we work as a team.



Simple solutions are generally the best in terms of cost, risk and reliability. Unlike some design cultures our designs do not involve producing a patch - to fix problems - created by a solution, which was too complicated in the first place!

Simplicity should not be confused with ease. It is not always easy to make a simple solution. Hawkshead will provide you with a neat and successful answer to your design needs. Our designs are well executed, cost effective and have the performance to meet or exceed market expectations.

Electronic

Experience, novelty & leadership

The vast world of electronics spans from illuminated key fobs through to large scale weapons systems. Your requirements may be a niche within some part of the spectrum. Our multi-industry experience in the field of electronic design can often facilitate the transfer of proven techniques into new applications.



This diverse but detailed experience coupled with Hawkshead's lateral approach creates the basis of novel solutions. This means that you have the advantage of innovation within your industry and also the reassurance of pedigree.

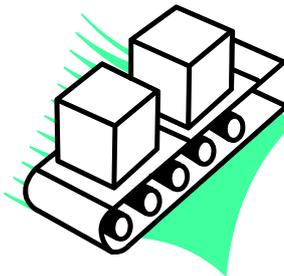
With increasing specialisation and project complexity, it is common for a team of different disciplines to work together. Indeed, in a number of larger projects Hawkshead has been the co-ordinating contractor by appreciating the importance of this holistic approach and related communication.

Hawkshead's considerable experience in the practicalities of PCB manufacture is in fact unusual. This will further ensure that at the production stage the board design is appropriate, easy and cost effective to produce. Importantly, it also allows a board design to be as robust as possible, for manufacture anywhere in the world.

Transition to manufacture

Having delivered the design and the successful prototype, Hawkshead is equally capable of working with your manufacturing facility to enable a smooth transition to large scale manufacture.

As a result of dealing first hand with contract manufacturers around the world for over 20 years, Hawkshead's experience is forever evolving. Generally there is a theme to all product transitions and each project draws on past knowledge and adds a little of its own.



For good reason Hawkshead maintains the facility to build, test and measure prototype circuits. This underlines our recognition that when it comes to practicality there is little substitute for "hands on". It also means that when talking to the front line factory staff there is a real understanding of the day to day reality of your product.

We hope that you will enjoy the process with us because every project is based on a level of teamwork.



This section sets out the basic framework of the stages involved in creating a design. Each project is individual and some stage may not be required or the order of events may vary.

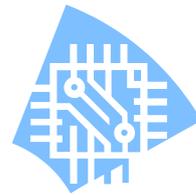
1. Design

You have a concept of the product you need, we have the capability to translate this into a commercial and practical reality.

Design is a process, taken in stages with you to the point of completion. Depending on the resources you have available, we can carry out the whole process or just parts of it.

Whether your company has technical resources or not we always operate on a very open basis. All clients are able to assess our work because we describe the issues in simple, non-technical ways.

Commercially we operate on a fixed price quotation. The Intellectual Property Rights (IPR) to the product becomes yours, absolutely, on receipt of the final payment.



2. Goal

Our goal is to design ourselves out of a job, leaving you with the best possible product that you can control, is market leading and cost effective.

Too often design companies try to harness their clients by creating a technical shroud over the work. We provide you with all the resources you need such that you have full knowledge and management of your product.

Our clients have the freedom of choice and want to retain us because they value this open, trusted relationship.



See our Part 2 document for the stages of the design process.