WE OFTEN COMPLAIN, and sometimes laugh, about the poor quality of the manuals and guides to our new technologies. Writing a good manual, however, is no simple task. You must provide a good manual both for new users needing to learn a technology and for expert users wishing to look up some forgotten detail.

The Core Test Wrapper Handbook is a guide to the new IEEE 1500 standard for wrappers around intellectual property (IP) cores, which go inside SoCs. It meets the needs of both new and expert readers quite well.

The first thing potential readers of this book should be aware of is that it is a guide to implementing the standard, and it is not designed to help someone decide whether to use it. There is a chapter on why the standard is useful, but it is only seven pages long. The target audience is the designer who has chosen to wrap cores, and needs guidance on how to do so.

IEEE Std. 1500 consists of the hardware design of the wrapper, but it is intimately tied to the Core Test Language (CTL) that is defined by the IEEE Std. 1450.6. CTL is a version of the Standard Test Interface Language (STIL). This book covers CTL to the extent needed to understand the examples, and STIL hardly at all. A book on CTL, CTL for Test Information of Digital ICs (Springer, 2002), is available for those readers wishing to understand the details of this language. I think the use of CTL in the Core Test Wrapper Handbook examples is clear, and should be adequate.

Let us move on to what the book does cover. The authors take us step by step through the design of an IEEE 1500 wrapper starting with the interface port, then adding instructions, both mandatory and optional. Next, they describe the design of the wrapper boundary register (WBR), which is used to isolate the core from the rest of the design during test. A short chapter describes the wrapper bypass register (WBY) that permits the core to be bypassed during test. The final major chapter on the wrapper design describes the wrapper instruction register.

All of these design parts are made concrete through the authors’ use of an example core, the wrapper for which is designed as the book progresses. The authors achieve this by building up the CTL to describe the wrapper in each chapter. In this way, the reader can see how the CTL expresses the design.

There are three final chapters on global issues. The first describes the increasingly common situation of hierarchical cores, in which a core is placed inside another core that is placed inside the SoC. Next, the CTL code needed to finalize the design is given, and the final chapter shows how the core can be integrated with others inside the SoC.

Who will benefit from reading The Core Test Wrapper Handbook? It depends on what a reader needs to learn. This book is written around the standard. An important issue in SoC design is the test access mechanism, TAM, which is used to move test information and results to and from cores. The TAM is not part of IEEE Std. 1500 and so is not discussed in detail here. Neither is the important issue of test scheduling, which is also not covered by the standard. However, someone wishing to understand the standard or design a wrapper will find this book an invaluable reference source.
How does it do as a manual? Quite well, I think. Although the person who reads this book cover to cover is not going to be kept on the edge of his seat, the structure is excellent, and the newcomer to IEEE Std. 1500 will neither be lost nor confused. Some explanation is given for various design decisions, but I personally would have liked to see more, since the authors were heavily involved in the creation of that standard.

The book works for the expert user also. Each chapter is complete in and of itself, and understanding the CTL examples does not require a lot of skipping around among chapters to find the context. The designer wishing to get a refresher on how a certain register is implemented will undoubtedly be able to find and use the information very quickly. The effort will entail a certain degree of redundancy, but for an indisputably good cause.

**IN SUMMARY, IT APPEARS** that the authors of this book decided to focus on a very specific subject, the design of an IEEE Std. 1500-compliant wrapper. Their adherence to this goal serves the book well, and it is recommended for anyone wishing to understand or implement the standard. Those wishing a broader view either of SoC test or CTL need to find supplemental material, but still should get this volume as a reference.

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