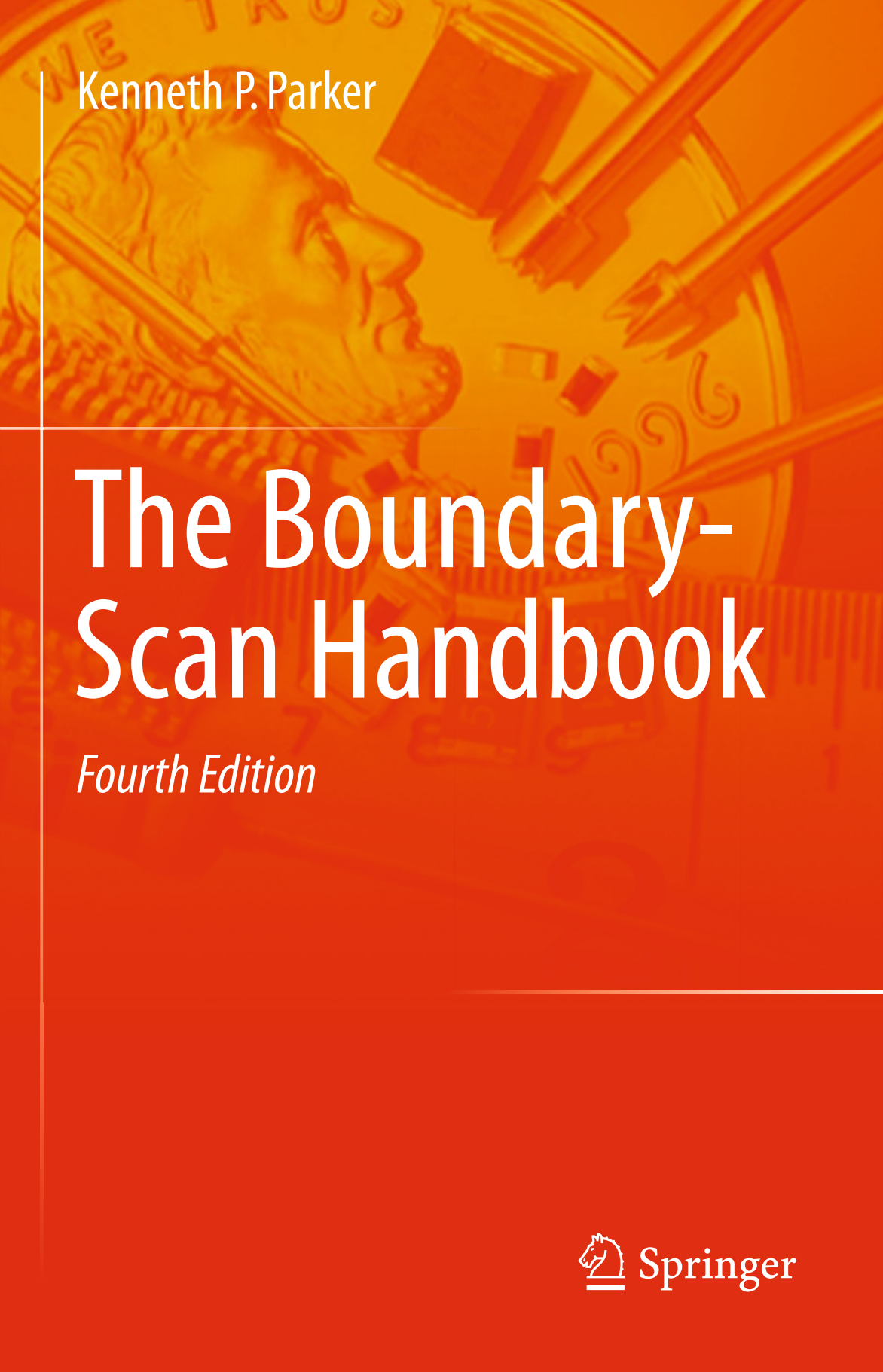




Kenneth P. Parker

The Boundary- Scan Handbook

Fourth Edition

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*This book is dedicated to the memory of an
Uncle for whom I was namesake.*

Kenneth Fredric Parker, 1912-1998

*This book is dedicated also to the memory
of my Parents, who instilled within me the
essential values of communication.*

Jack Donald Parker, 1918-2002

Marian Parker, 1918-2010

Preface

It has been 10 years since the third edition of this book first appeared. Since then it has been translated into the Japanese language by a team of engineers at Fujitsu, led by Shuichi Kameyama. I was amazed at the effort this required, and greatly appreciated the care and thoroughness that was exhibited by this team.

Also in this decade, a new standard, 1149.8.1, has appeared which is an addition to the family of supporting test standards. The “Dot-81” standard is aimed at supporting the test of passive components that often surround integrated circuits on boards. A classic example of such components is connectors that transfer signals to/from these ICs to other plug-in boards or cables. Boards that possess passive components still have to have them tested to assure they are free of open or shorted connections. A new chapter (10) has been added to describe this new standard.

The base standard, 1149.1, has undergone a very extensive revision and expansion, and this is called IEEE Std 1149.1-2013. This revision is detailed in its own chapter (12). This reflects the fact that the underlying basic concepts of Boundary-Scan testing are still the same (those covered in Chaps. 1–4) while new concepts have been added driven by advancing technology in the electronics industry. This new revision also has caused some significant changes and additions to the BSDL language (of Chap. 2). It is expected that well into the future, we will be seeing older devices (pre-2013) on boards along with newer devices that are compliant with the 2013 revision. Thus it was logical to retain the first chapters of this book in their largely pre-2013 state, while detailing the 2013 revision later in this book. That said, references in the earlier chapters are made to specific technology enhancements found in the new, post-2013 information.

The 23+ years that Boundary-Scan has been with us represents a full generation of engineers who have benefited from its contributions. As readers will see as they continue on, “This is not your father’s Boundary-Scan”.

Fort Collins, CO, USA

Kenneth P. Parker

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I'd like to acknowledge those who contributed to this effort. Significant technical contributions have been made over several years by Stig Oresjo, Ken Posse, John McDermid and Rod Browen. Others who influenced this work were Colin Maunder, Rod Tulloss, Chi Yau, Najmi Jarwala, Lee Whetsel, Gordon Robinson, Frans de Jong, Peter Hansen, Tom Williams, Luke Girard, Dick Chiles, Larry Saunders, David Simpson, Grady Giles, Tom Langford, Markus Robinson, C. J. Clark, Carl Thatcher, Adam Cron, Adam Ley, Steve Sunter, Mani Soma, Keith Lofstrom, Steve Dolens, Brian Wilkins and Ramaswami Dandapani.

Special mention goes to my friends at Matsushita Electric Industries in Osaka, Japan, who worked incredibly quickly to produce working silicon containing 1149.4 structures. They are Kozo Nuriya, Katsuhiko Hirayama, Akira Matsuzawa, Atsushi Kukutsu and Ren Franse.

Additional mention goes to my friends in the IEEE 1532 Working Group, Neil Jacobson, Kurt Guntheroth, Mark Moyer, Brad Ishihara, Alan Herrmann, Dave Bonnett, Ray Dellecker and Pat McHugh. Yet more recognition goes to contributors to the IEEE 1149.6 Working Group, Bill Eklow, Carl Barnhart, Jeff Rearick, John Rohrbaugh, Mike Gilsdorf, Charles Moore, Robert Schuelke, Benny Lai, Rodger Schuttert, Sung Chung, Sang Baeg, Greg Jordan, Ted Eaton, Terry Borroz, Harry Hulvershorn, John Braden and Bob Russell. The recent 1149.8.1 standard was brought into being by my friends, Jeff Burgess, "JJ" Grealish, Steve Sunter, Adam Cron, Steve Butkovich, Dave Dubberke, Ted Eaton, Heiko Ehrenberg, Adam Ley, Sopho Metsis, Skip Meyers and Tony Suto.

The 2013 revision of 1149.1 was a huge effort, and I single out the contributions of John Braden, Bill Bruce, Adam Cron, Wim Driessen, Dave Dubberke, Heiko Ehrenberg, Bill Eklow, Peter Elias, Josh Ferry, Jeff Halnon, Roland Latvala, Adam Ley, Francisco Russi, Brian Turmelle, John Seibold, Roger Sowada, Dharma Konda, Sankaran Menon, Craig Stephan, Hugh Wallace, Carol Pyron and C. J. Clark. Special mention goes to Carl Barnhart who took on the massive editing job for this effort.

I am indebted to my wife Jana, and daughters Katherine and Lisa who missed paternal contact while their father spent all those hours in the basement. Without their support, I could not have completed this work.

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