Contents

Part I Introduction

Embedded IT Security in Automotive Application – An Emerging Area
Christof Paar .................................................. 3

Part II Security in the Automotive Domain

Aspects of Secure Vehicle Software Flashing
Winfried Stephan, Solveig Richter, Markus Müller .................. 17

Secure Software Delivery and Installation in Embedded Systems
André Adelsbach, Ulrich Huber, Ahmad-Reza Sadeghi ............ 27

Anti-theft Protection: Electronic Immobilizers
Kerstin Lemke, Ahmad-Reza Sadeghi, Christian Stüble .......... 51

A Review of the Digital Tachograph System
Igor Furgel, Kerstin Lemke .......................................... 69

Secure In-Vehicle Communication
Marko Wolf, André Weimerskirch, Christof Paar ................ 95

A Survey of Research in Inter-Vehicle Communications
Jun Luo, Jean-Pierre Hubaux .................................... 111

Part III Embedded Security Technologies

Fundamentals of Symmetric Cryptography
Sandeep Kumar, Thomas Wollinger ................................. 125
Fundamentals of Asymmetric Cryptography
*Thomas Wollinger, Sandeep Kumar* .............................................. 145

Security Aspects of Mobile Communication Systems
*Jan Pelzl, Thomas Wollinger* ..................................................... 167

Embedded Cryptography: Side Channel Attacks
*Kai Schramm, Kerstin Lemke, Christof Paar* ............................... 187

Embedded Security: Physical Protection against Tampering Attacks
*Kerstin Lemke* ........................................................................... 207

Part IV Business Aspects of IT Systems in Cars

Automotive Digital Rights Management Systems
*Marko Wolf, André Weimerskirch, Christof Paar* .......................... 221

Security Risks and Business Opportunities in In-Car Entertainment
*Marcus Heitmann* ................................................................. 233

In-Vehicle M-Commerce: Business Models for Navigation Systems and Location-based Services
*Klaus Rüdiger, Martin Gersch* .................................................. 247