

A11102 903092

NAT'L INST OF STANDARDS & TECH R.I.C.



A11102903092

Haykin, Martha E/Smart card technology ;
QC100 .U57 NO.500-157 1988 V19 C.1 NIST-

Standards and Technology
(formerly National Bureau of Standards)

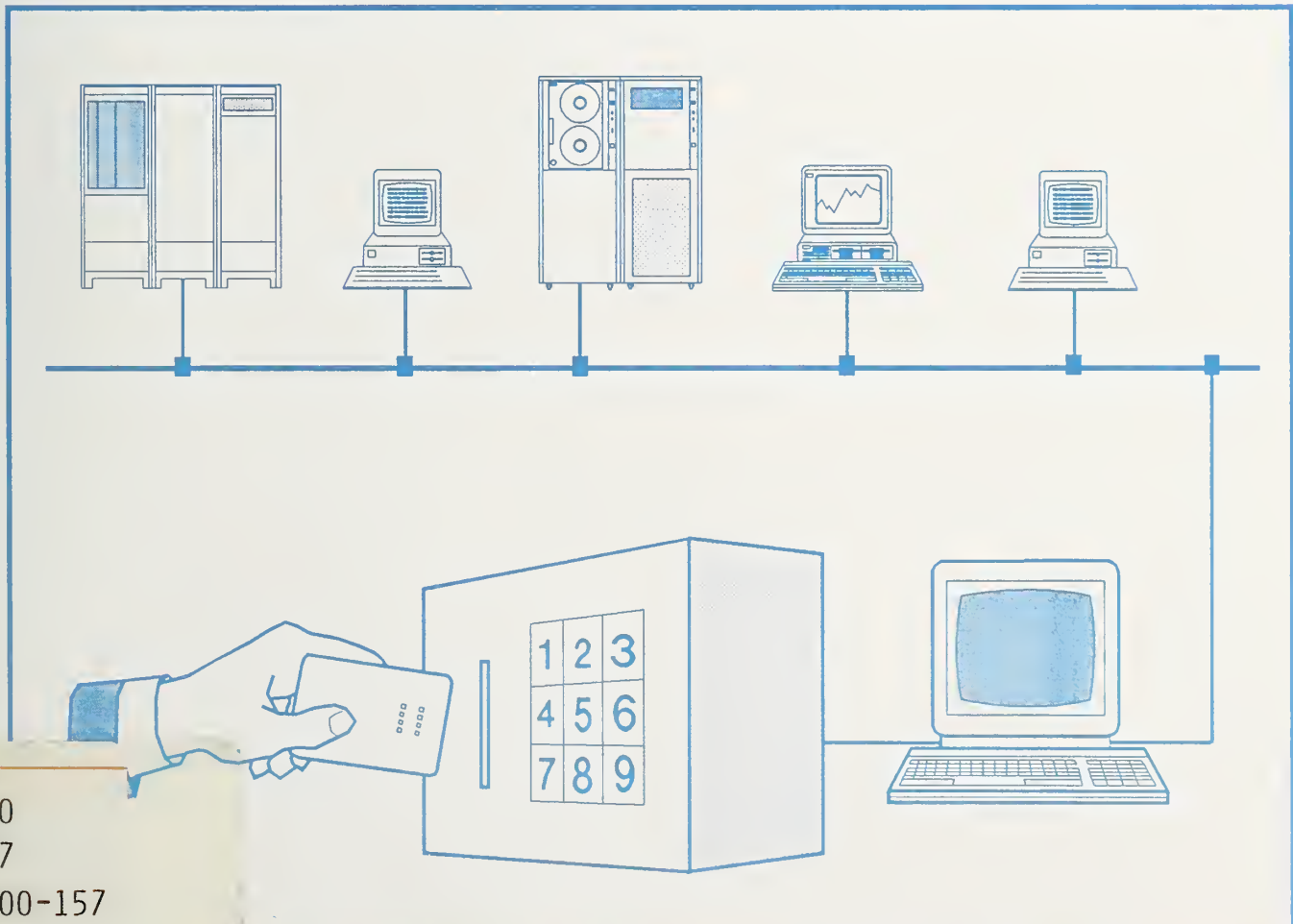
Computer Science and Technology

NBS
PUBLICATIONS

NIST Special Publication 500-157

Smart Card Technology: New Methods for Computer Access Control

Martha E. Haykin
Robert B. J. Warnar



QC
100
.U57
#500-157

Computer Science and Technology

NIST Special Publication 500-157

Smart Card Technology: New Methods for Computer Access Control

Martha E. Haykin and Robert B. J. Warnar

Security Technology Group
Institute for Computer Sciences and Technology
National Institute of Standards and Technology
Gaithersburg, MD 20899

September 1988



NOTE: As of 23 August 1988, the National Bureau of Standards (NBS) became the National Institute of Standards and Technology (NIST) when President Reagan signed into law the Omnibus Trade and Competitiveness Act.

U.S. DEPARTMENT OF COMMERCE

C. William Verity, Secretary

National Institute of Standards and Technology

(formerly National Bureau of Standards)

Ernest Ambler, Director

Reports on Computer Science and Technology

The National Institute of Standards and Technology has a special responsibility within the Federal Government for computer science and technology activities. The programs of the NIST Institute for Computer Sciences and Technology are designed to provide ADP standards, guidelines, and technical advisory services to improve the effectiveness of computer utilization, and to perform appropriate research and development efforts as foundation for such activities and programs. This publication series will report these NIST efforts to the Federal computer community as well as to interested specialists in the governmental, academic, and private sectors. Those wishing to receive notices of publications in this series should complete and return the form at the end of this publication.

Library of Congress Catalog Card Number: 88-600577
National Institute of Standards and Technology
Special Publication 500-157, 52 pages (Sept. 1988)
CODEN: XNBSAV

U.S. GOVERNMENT PRINTING OFFICE
WASHINGTON: 1988

For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402

CONTENTS

	page
ABSTRACT	1
1.0 INTRODUCTION	1
1.1 Overview and Scope of this Document	1
1.2 The Definition of a Smart Card	2
1.3 Smart Cards and the International Organization for Standardization	2
1.4 Security in a Generalized Smart Card	4
2.0 SMART CARD INTEGRATED CIRCUIT TECHNOLOGIES	5
2.1 Integrated Circuits (ICs)	5
2.2 Limitations of IC Technology	6
3.0 THE SMART CARD MICROCOMPUTER	6
3.1 Single-chip Versus Multiple-chip Smart Card Microcomputers	7
3.2 The Smart Card Microprocessor	8
3.3 Smart Card Memories	8
3.4 Smart Card Input/Output (I/O)	10
3.4.1 Contact and Non-contact Smart Card Interfaces	10
3.4.2 The Smart Card Reader/Writer Device	13
4.0 OTHER CARD TECHNOLOGIES AND THE CURRENT ROLE OF THE SMART CARD	13
4.1 Storage Card Technologies—Machine- and Human- Readable	13
4.2 Storage Card Technologies—Machine-Readable Only	14
4.2.1 Early Approaches	14
4.2.2 The Magnetic Stripe Card	15
4.2.3 The Laser-Written Optical Memory Card	15
4.2.4 The Integrated Circuit (IC) Storage Card	16
4.3 Current Constraints on the Role of the Smart Card	17
4.3.1 Factors in the Placement of the Smart Card IC Chip(s)	17
4.3.2 Cost Factors of the Smart Card	18
5.0 ACCESS CONTROL AND THE SMART CARD	18
5.1 Basic Access Control Concepts	18
5.1.1 Cryptographic Techniques: Encryption and Message Authentication	18
5.1.2 User Authentication	19
5.1.3 Device Authentication	20
5.2 The Smart Card and Authentication	21

Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.