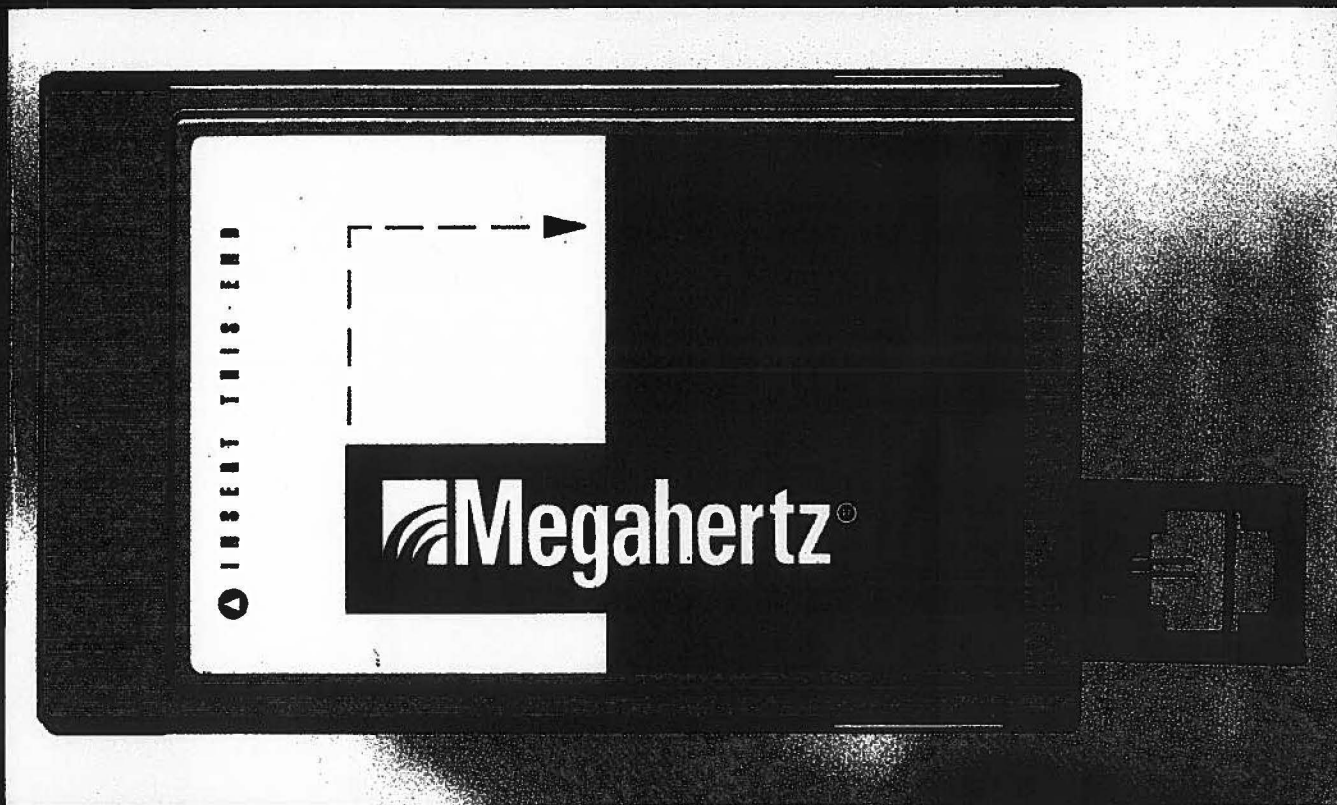


PCMCIA Primer



L
a
r
r
y
L
e
v
i
n
g

- The complete guide to using and troubleshooting PCMCIA cards
- Evaluates Type I, II, III & IV cards
- Troubleshooting guide to PCMCIA installation and configuration

M&T Books
A Division of MIS:Press, Inc.
A Subsidiary of Henry Holt and Company, Inc.
115 West 18th Street
New York, New York 10011

© 1995 by M&T Books

Printed in the United States of America

All rights reserved. No part of this book may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording, or by any information storage and retrieval system, without prior written permission from the Publisher. Contact the Publisher for information on foreign rights.

Limits of Liability and Disclaimer of Warranty

The Author and Publisher of this book have used their best efforts in preparing the book and the programs contained in it. These efforts include the development, research, and testing of the theories and programs to determine their effectiveness.

The Author and Publisher make no warranty of any kind, expressed or implied, with regard to these programs or the documentation contained in this book. The Author and Publisher shall not be liable in any event for incidental or consequential damages in connection with, or arising out of, the furnishing, performance, or use of these programs.

All products, names and services are trademarks or registered trademarks of their respective companies.

Library of Congress Cataloging-in-Publication Data

Levine, Larry

PCMCIA primer / Larry Levine.

p. cm.

Includes index.

ISBN 1-55828-437-0

1. PCMCIA cards Microcomputers I. Title.

TK7895.P38L48 1995

004.6'4dc20

95-24177

CIP

Associate Publisher: Paul Farrell
Managing Editor: Cary Sullivan
Acquisitions Editor: Jono Hardjowirogo
Copy Edit Manager: Shari Chappell
Development Editor: Michael Sprague
Production Editor: Joe McPartland
Copy Editor: Greg Robertson
Technical Editor: Christine Nevin

CHAPTER 5

SEQUENCE OF EVENTS

By now, you should have a pretty good understanding of how each of the components within the PCMCIA architecture function—independently of one another. The architecture was presented in a bottom-up fashion to enable you to see how each of the services and functions within the PCMCIA architecture is abstracted. In getting such a detailed explanation of the services at each level, however, you may have lost sight of the forest for the trees. This chapter gives you a walk-through of what happens when various types of PC Cards are inserted into the system's PCMCIA slots. We will walk through the initialization, recognition, configuration, and use of an I/O PC Card and a memory PC Card. The exact same set of events occurs for all PC Cards within each class. The things that change with different types of PC Cards, however, are the clients that actually provide the recognition and configuration services as well as the resources actually needed by the PC Cards. This walk-through of a PC Card insertion summarizes the resulting events for all types of PC Cards and clients.



NOTE

For the remainder of this chapter, I describe a series of events and further processing that *might* and, in my opinion, *should* occur. This chapter does not attempt to describe any one or multiple implementations of PCMCIA 2.1, but rather an interpretation of the PCMCIA 2.1 specifications. In particular, this is *my* interpretation and theoretical implementation. Different vendors have their own, different interpretations and implementations.

Initialization

Before anything can happen with the PC Cards, the PCMCIA handlers must be loaded and initialized. This is accomplished differently on different PCs with different PCMCIA handler implementations. In all likelihood, they are loaded as device drivers within the DOS CONFIG.SYS file.

Socket Services is the first to be loaded. Quite simply, it recognizes the PCMCIA controller, resets the controller's configuration, installs a Card Status Change (CSC) interrupt handler, and installs itself as an INT 1AH handler.

Card Services is loaded next; it initializes its resource and client databases. It looks for Socket Services in memory, installs its *own* Card Status Change interrupt service routine replacing the one installed by Socket Services, and installs its *own* INT 1AH handler, again replacing the one installed by Socket Services. Lastly, it gathers the Memory, I/O, and IRQ resources into its database of *available* resources for allocation to PC Cards.

Finally, a set of Card Services clients registers with Card Services to provide recognition and configuration services to memory and I/O cards. This set of clients varies greatly depending on vendor implementation and user configuration.

After all the PCMCIA handlers and Card Services clients are loaded, the system is ready for insertion of PC Cards.



NOTE

In fact, PC Cards can be recognized and configured before *all* the PCMCIA handlers and clients are running. To provide any more insight at this point as to how or why this is possible would only confuse you. I will provide more insight into this in the "Troubleshooting" appendix.

Insertion, Recognition, and Configuration Processing

The first few steps of PC Card insertion processing (which all usually occur in less than 1 second) are identical for all types of PC Cards. Therefore, there will be only one discussion of the first few steps, in the "Insertion Processing" section. The recognition and configuration of I/O PC Cards and memory PC Cards tend to differ slightly. For this reason, the recognition and configuration of these cards are broken out into their own, appropriately named, "I/O PC Card Recognition and Configuration" and "Memory PC Card Recognition and Configuration" sections.

Insertion Processing

1. The first thing that happens, of course is that the PC Card is inserted into the PCMCIA slot (see Figure 5.1). Slowing this down, you can see how it makes sense that the power signals (Vpp and Vcc) are connected first through the longest pins. Next, the data, address, and various control signals make contact via the medium-length pins. Finally, the Card Detect (CD) pin makes contact. The connection of the Card Detect pin with a PC Card causes a Card Status Change interrupt to occur.
2. Having installed a Card Status Change interrupt service routine, Card Services is ready to handle the Card Status Change interrupt that just occurred when the Card Detect pins made contact with the PC Card. Card Services issues an *AcknowledgeInterrupt()* Socket Services call and will usually queue this event for later processing (possibly after an internal timer expires). It does this so that the Card Status Change interrupt can be returned as quickly as possible to avoid the possibility of the system missing lower-priority interrupts (Card Services is a good citizen here) and to *debounce* the Card Status Change signal in software as it is not done in hardware.

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.