

# EXPRESSCARD<sup>®</sup> STANDARD

---

Release 2.0

February 2009



**ExpressCard**<sup>®</sup>

PCMCIA

© 2009 PCMCIA  
All rights reserved.

Printed in the United States of America.

PCMCIA (Personal Computer Memory  
Card International Association)  
2635 North First Street, Suite 218  
San Jose, CA 95134 USA  
+1-408-433-2273  
+1-408-433-9558 (Fax)  
<http://www.pcmcia.org>

PCMCIA MAKES NO WARRANTY,  
EXPRESS OR IMPLIED, WITH RESPECT  
TO THE EXPRESSCARD STANDARD  
("THE STANDARD"),  
IMPLEMENTATIONS OF THE  
STANDARD, INCLUDING AS TO NON-  
INFRINGEMENT OF ANY PATENT OR  
OTHER PROPRIETARY RIGHTS OF  
THIRD PARTIES, AND  
MERCHANTABILITY OR FITNESS FOR  
ANY PARTICULAR PURPOSE. THIS  
STANDARD IS PROVIDED TO YOU "AS  
IS".

PCMCIA has been informed that the  
following companies believe that certain  
implementations of the Standard could  
infringe their proprietary rights: Acticon  
Technologies [a division of General Patent  
Corporation] (Integrated Connector and  
Modem U.S. Patent 4,543,450, Connector  
Interface U.S. Patent No. 4,603,320,  
Multiple Connector Interface U.S. Patent  
No. 4,686,506, Programmable Connector  
Interface 4,972,470); SanDisk Corporation  
(U.S. Patent No. 6,434,034, Computer  
Memory Cards Using Flash EEPROM  
Integrated Circuit Chips and Memory-  
controller Systems). For more detailed  
information, contact these parties.  
PCMCIA is not undertaking any duty to  
advise users of the Standard of any  
further developments in this regard.

Other than any which may be listed in the  
preceding paragraph, PCMCIA has not  
been informed of any other such  
proprietary rights.

This document is being provided solely for  
the internal business use of the company  
who purchased the Standard and whose  
name is watermarked throughout the  
document. All other use, including  
distribution to third parties in any  
medium, is expressly prohibited.

The ExpressCard rabbit logo and  
ExpressCard are trademarks of PCMCIA,  
registered in the United States.

PCI Express is a trademark of the PCI  
Special Interest Group.

All other product names are trademarks,  
registered trademarks, or servicemarks of  
their respective owners.

---

Document No.022009-01

First Printing, February 2009

# REVISION HISTORY

Date	Specification Version	Revisions
September 10, 2003		Specification adopted
December 15, 2003	1.0	SCRs 001 – 004 Incorporated
July 20, 2004	1.0 Update #1	SCRs 006 – 009 and Proposals 001, 002, 006, 007 & 008 Incorporated
February 13, 2006	1.1	<p>Proposal 004: Electromechanical Interlock</p> <p>Proposal 005: Module Thermal Requirements</p> <p>Proposal 010: Release of WAKE# Timing</p> <p>Proposal 012: ESD Figure Correction</p> <p>Proposal 013: ESD Testing</p> <p>Proposal 014: Jitter Spec Updates</p> <p>Proposal 016: Support for PCI Bridges on Modules</p> <p>Proposal 018: BIOS ExpressCard PCIe Support in WinXP/2000</p> <p>Proposal 019: Security Notch Dimensioning Alignment</p> <p>Proposal 021: CLKREQ# Dynamic Protocol Enable Default</p> <p>Proposal 022: Enabling Additional Use of SMBus Pins</p> <p>Proposal 023: Finger Grip Dimensional Options</p> <p>Proposal 025: Definition of Terms Rx and Tx</p> <p>Proposal 026: Allow Modules to Stop PLL in L1 When CLKREQ# is Not Honored</p> <p>Proposal 027: Editorial Cleanup of Proposal 018</p>
March 30, 2007	1.2	<p>Proposal 030: Module Housing Wall Height Dimension Change</p> <p>Proposal 030: Specify Interior Radii in Module</p> <p>Proposal 033: Implementing Proper USB Data Line Termination in Bus Suspend Mode</p> <p>Proposal 034: Active State Link PM Disable Default</p> <p>Proposal 035: ExpressCard/54 Module Security Notch Dimensioning</p>
February 27, 2009	2.0	<p>Proposal 037: ExpressCard Seating Plane Clarification</p> <p>Proposal 039: UV Light Test Condition Correction</p> <p>Proposal 040: CLKREQ# Dynamic Protocol Disable Default</p> <p>Proposal 042: Adding Next Generation PCIe and USB Support</p> <p>Proposal 043: Miscellaneous Editorial Clarifications to the Standard</p>

## PCMCIA Membership Certificate

*Join PCMCIA today and receive a full refund of your ExpressCard Standard purchase price.*

Your purchase of the ExpressCard Standard entitles you to a 100% refund of the purchase price towards membership in the PCMCIA Association. This offer is good for 180 days from the Purchase Date shown below. Please visit <http://www.pcmcia.org> for information on the different levels and benefits of PCMCIA membership, which include access to the ExpressCard Certification Program and use of the ExpressCard logo.

To take advantage of this offer, please include a copy of your sales invoice reflecting the purchase of the ExpressCard Standard when communicating with PCMCIA regarding PCMCIA membership.

**By Mail:**

PCMCIA  
2635 North First Street Suite 218  
San Jose, CA 95134 USA

**By Phone/Fax:**

Telephone: (408) 433-2273  
Fax: (408) 433-9558  
Email: [sales@pcmcia.org](mailto:sales@pcmcia.org)  
<http://www.pcmcia.org>



# CONTENTS

<b>1. Introduction</b>	<b>1</b>
1.1 ExpressCard Standard Overview .....	1
1.2 Relationship to the PC Card Standard .....	3
1.3 Conventions .....	3
1.3.1 Signal Naming.....	3
1.3.2 Numeric Representation.....	3
1.4 Terms and Abbreviations.....	4
<b>2. Related Documents</b>	<b>7</b>
<b>3. Electrical Specifications</b>	<b>9</b>
3.1 Signal Descriptions .....	9
3.1.1 Pin Assignments.....	10
3.1.2 Signal/Pin Description.....	12
3.1.2.1 PCI Express Pins.....	12
3.1.2.2 Universal Serial Bus (USB) Pins.....	13
3.1.2.3 SMBus Pins.....	13
3.1.2.4 System Auxiliary Pins.....	13
3.1.2.5 Power Pins.....	14
3.1.3 Voltages and Grounds.....	14
3.1.4 SMBus Support.....	14
3.2 Module Detection and Operation .....	15
3.2.1 Module presence pins (CPPE# and CPUSB#).....	15
3.2.2 PCI Express functional reset (PERST#).....	16
3.2.3 PCI Express Reference Clock (REFCLK+ / REFCLK-).....	17
3.2.4 PCI Express clock request (CLKREQ#).....	17
3.2.4.1 Dynamic Clock Control .....	18
3.2.4.2 Clock Request Support Reporting and Enabling.....	19
3.2.5 PCI Express module power control operation.....	19
3.2.5.1 Initial power up for PCI Express-based modules.....	19
3.2.5.2 Power state transitions (S0 to S3/S4 to S0) for PCI Express-based modules.....	20
3.2.5.3 Power down for PCI Express-based modules.....	22
3.2.6 USB power control operation.....	22
3.2.7 I/O interface detection, set-up and operation.....	23
3.2.7.1 Modules Implementing Both Interface Options.....	24
3.2.7.2 Modules Implementing USB 3.0.....	25
3.2.8 Power management.....	25
3.2.8.1 PCI Express WAKE#.....	25

This document is being provided solely for the internal business use of the company who purchased the Standard and whose name is watermarked throughout the document. All other use, including distribution to third parties in any medium, is expressly prohibited.

# 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.