



PCI-SIG ENGINEERING CHANGE REQUEST

TITLE:	UICC Inter-Chip USB Interface
DATE:	October 21, 2008
AFFECTED DOCUMENT:	PCI Express Mini-CEM 1.2
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Part I

1. Summary of the Functional Changes

Define the signaling to support the Inter-Chip USB interface between a UICC and a Mini Card (a USB UICC-enabled terminal).

[Update the legacy UICC-Mini Card signal definitions as defined in ISO/IEC 7816-3, 2006.](#)

The USB UICC behaves as a removable Inter-Chip USB peripheral as specified in the "Inter-Chip USB Supplement to the USB 2.0 Specification", Revision 1.0, March 13, 2006.

USB UICCs (the peripherals) and USB UICC-enabled terminals (the hosts) constitute an Inter-Chip USB family, as specified in ETSI TS 102 600: "Smart Cards; UICC-Terminal interface; Characteristics of the USB interface (Release 7)".

The USB UICC family is characterized by the following features:

- 1) The host and the peripheral have mechanical interfaces that interlock with each other, i.e. the form factors specified in TS 102 221: "Smart Cards; UICC-Terminal interface; Physical and logical characteristics".
- 2) Any host and peripheral support a common set of electrical parameters, i.e. class C' operating conditions.
- 3) Any host and peripheral support at least full-speed USB operation.

2. Benefits as a Result of the Changes

The Inter-Chip USB interface enables a UICC to attach to a Mini Card as a USB Full-speed device. This enables the UICC to provide standard USB capabilities to the Mini Card such as IP and mass storage applications in addition to providing access to existing UICC resources such as the file system and security features.

3. Assessment of the Impact

Mini Card pins 17 and 19 have already been allocated for a future UIM interface. This ECR assigns the standardized Inter-Chip USB functionality to these pins.

4. Analysis of the Hardware Implications

There are electrical restrictions specified in the Inter-Chip USB Supplement to the USB 2.0 Specification. For example, the length of the physical link between the UICC and the Mini Card is limited to 10 cm.

5. Analysis of the Software Implications

Additional software support is required on both the UICC and Mini Card. It is expected that such software will be reused from other form factors.

Part II

Detailed Description of the change

Change Section 3.2, Table 3-1, page 40 as follows:

3.2 System Interface Signals

Table 3-1: PCI Express Mini Card System Interface Signals

User Identity Module (UIM) Signals	UIM_PWR (1 pin)	Output	Power source for the UIM. Compliant to the ISO/IEC 7816-3 specification (VCC).
	UIM_RESET	Output	UIM reset signal. Compliant to the ISO/IEC 7816-3 specification (RST).
	UIM_CLK	Output	UIM clock signal. Compliant to the ISO/IEC 7816-3 specification (CLK).
	UIM_VPP	Output	Variable supply voltage (e.g., programming voltage) for class A devices. Refer to ISO/IEC 7816-3 for operating class definitions. This signal is reserved for future use for devices of other classes. Compliant to the ISO/IEC 7816-3 specification (VPP).
	<u>UIM_SPU</u>	<u>Input/Output</u>	<u>Standard or proprietary use signal. Compliant to the ISO/IEC 7816-3 specification (SPU).</u>
	UIM_DATA	Input/Output	UIM data signal. Compliant to the ISO/IEC 7816-3 specification (I/O).
	<u>UIM_IC_DP</u>	<u>Input/Output</u>	<u>Inter-Chip USB D+ Data line</u>
	<u>UIM_IC_DM</u>	<u>Input/Output</u>	<u>Inter-Chip USB D- Data line</u>

Change Section 3.2.6 page 49 as follows:

3.2.6. User Identity Module (UIM) Interface

The UIM signals are defined on the system connector to provide the interface between the

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removable User Identity Module (UIM), an extension of a Subscriber Identity Module (SIM), and a wireless wide area network (WWAN) radio device residing on the PCI Express Mini Card add-in ⁵ card. The UIM contains parameters necessary for the WWAN device's operation in a wireless wide area network radio environment. The UIM signals are described in the following sections for PCI Express Mini Card add-in cards that support the off-card UIM interface.

3.2.6.1. UIM_PWR

Refer to ISO/IEC 7816-3 for more details on the voltage and current tolerance requirements for the ¹⁰ UIM_PWR power source. Note that the UIM grounding requirements can be provided by using any GND pin. Only PCI Express Mini Card add-in cards that support a UIM card shall connect to this pin. If the add-in card has UIM support capabilities, it must support the UIM_PWR power source at the appropriate voltage for each class of operating conditions (i.e., voltage) supported as defined in ISO/IEC 7816-3.

¹⁵ UIM_PWR maps to contact number C1 as defined in ISO/IEC 7816-2.

3.2.6.2. UIM_RESET

This signal provides the UIM card with the reset signal. Refer to ISO/IEC 7816-3 for more details on the functional and tolerance requirements for the UIM_RESET signal. Only PCI Express Mini Card add-in cards that support a UIM card shall connect to this pin. ~~If the add-in card has UIM support capabilities, it must support the UIM_RESET signal.~~ UIM_RESET maps to contact number C2 as defined in ISO/IEC 7816-2.

3.2.6.3. UIM_CLK

This signal provides the UIM card with the clock signal. Refer to ISO/IEC 7816-3 for more details on the functional and tolerance requirements for the UIM_CLK signal. Only PCI Express Mini ²⁵ Card add-in cards that support a UIM card shall connect to this pin. ~~If the add-in card has UIM support capabilities, it must support the UIM_CLK signal.~~ UIM_CLK maps to contact number C3 as defined in ISO/IEC 7816-2.

~~3.2.6.4. UIM_VPP~~

~~Refer to ISO/IEC 7816-3 for more details on the voltage and current tolerance requirements for the UIM_VPP power source for class A devices. This signal is reserved for future use for devices of other classes.~~

~~UIM_VPP maps to contact number C6 as defined in ISO/IEC 7816-2.~~

3.2.6.4. UIM_SPU

This signal is available for either standard or proprietary use, as input and/or output.. Refer to ISO/IEC 7816-3 for more details on the voltage and current tolerance requirements for the UIM_SPU signal.

UIM_SPU maps to contact number C6 as defined in ISO/IEC 7816-2.

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3.2.6.5. UIM_DATA

This signal is used as output (UIM reception mode) or input (UIM transmission mode) for serial data. Refer to ISO/IEC 7816-3 for more details on the functional and tolerance requirements for the UIM_DATA signal. Only PCI Express Mini Card add-in cards that support a UIM card shall connect to this pin. ~~If the add-in card has UIM support capabilities, it must support the UIM_DATA signal.~~

UIM_DATA maps to contact number C7 as defined in ISO/IEC 7816-2.

Add Section 3.2.6.6 and Section 3.2.6.7:

3.2.6.6. UIM_IC_DP

This signal is used as the Inter-Chip USB D+ Data line.

Refer to “Inter-Chip USB supplement to the USB 2.0 Specification” and ETSI TS 102 600 for the functional and tolerance requirements for this signal.

Only PCI Express Mini Card add-in cards that support a UIM card shall connect to this pin.

UIM_IC_DP maps to contact number C4 as defined in ISO/IEC 7816-2.

3.2.6.6. UIM_IC_DM

This signal is used as the Inter-Chip USB D- Data line.

Refer to “Inter-Chip USB supplement to the USB 2.0 Specification” and ETSI TS 102 600 for the functional and tolerance requirements for this signal.

Only PCI Express Mini Card add-in cards that support a UIM card shall connect to this pin.

UIM_IC_DM maps to contact number C8 as defined in ISO/IEC 7816-2.

Modify Table 3-6:

Pin #	Name	Pin #	Name
51	Reserved	52	+3.3Vaux
49	Reserved	50	GND
47	Reserved	48	+1.5V
45	Reserved	46	LED_WPAN#
43	GND	44	LED_WLAN#
41	+3.3Vaux	42	LED_WWAN#

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39	+3.3Vaux	40	GND
37	GND	38	USB_D+
35	GND	36	USB_D-
33	PETp0	34	GND
31	PETn0	32	SMB_DATA
29	GND	30	SMB_CLK
27	GND	28	+1.5V
25	PERp0	26	GND
23	PERn0	24	+3.3Vaux
21	GND	22	PERST#
19	UIM_IC_DP Reserved* (UIM_C4)	20	W_DISABLE#
17	UIM_IC_DM Reserved* (UIM_C8)	18	GND
Mechanical Key			
15	GND	16	UIM_SPU UIM_VPP
13	REFCLK+	14	UIM_RESET
11	REFCLK-	12	UIM_CLK

Pin #	Name	Pin #	Name
9	GND	10	UIM_DATA
7	CLKREQ#	8	UIM_PWR
5	COEX2	6	1.5V
3	COEX1	4	GND
1	WAKE#	2	3.3Vaux
*	Reserved for future UIM interface (if needed)		