Bluetooth PC Card Transport Layer
Version 1.0

The Bluetooth module can be connected to the Bluetooth host, e.g., a PC in various ways. One possibility is to place the module into a PC Card and the required communications is done between the PC and the PC Card.

Special Interest Group (SIG)

The following companies are represented in the Bluetooth Special Interest
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IBM Corp.
Intel Corp.
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1   Overview

Bluetooth SIG (Special Interest Group) has defined that USB, RS232 (serial cable), UART, and PC Card are alternatives for a Bluetooth module to be connected with a PC (host). Bluetooth SIG has specified the standardized interfaces for the USB, RS232, and UART but the interface to the PC Card will not be standardized. The reasons for this are varied but the dependency of the interface on the PC Card implementation and the fact, that SIG does not want restrict the technology by standardizing the interface, are examples.

The purpose of this white paper is to describe the general functionality how the PC Card communicates with the host and the general requirements for the SW component delivered within the Bluetooth PC Card product. However, the programming interface between the module within the PC Card and the host will not be specified according to the Bluetooth SIG decision. Manufacturers should use existing PC Card and Cardbus standards for designing their products along with existing PC and PDA guidelines regarding cards designed for these types of devices.

Figure 1 depicts the components of the Bluetooth host and the Bluetooth module in the cases of the USB, RS232, and PC Card devices. UART is not included in the figure. The upper interfaces of the minidriver (USB, RS232, or PC Card minidriver) are the interfaces, which connect the transport layer to the rest of the Bluetooth SW protocol stack on the host. This interface (See also Chapter 3.1) and the lower interface of the HC driver comply with each other and so, a proper information can exchange between these drivers. However, the HC driver may not have any knowledge, which of the transport layer connects the host and the module.
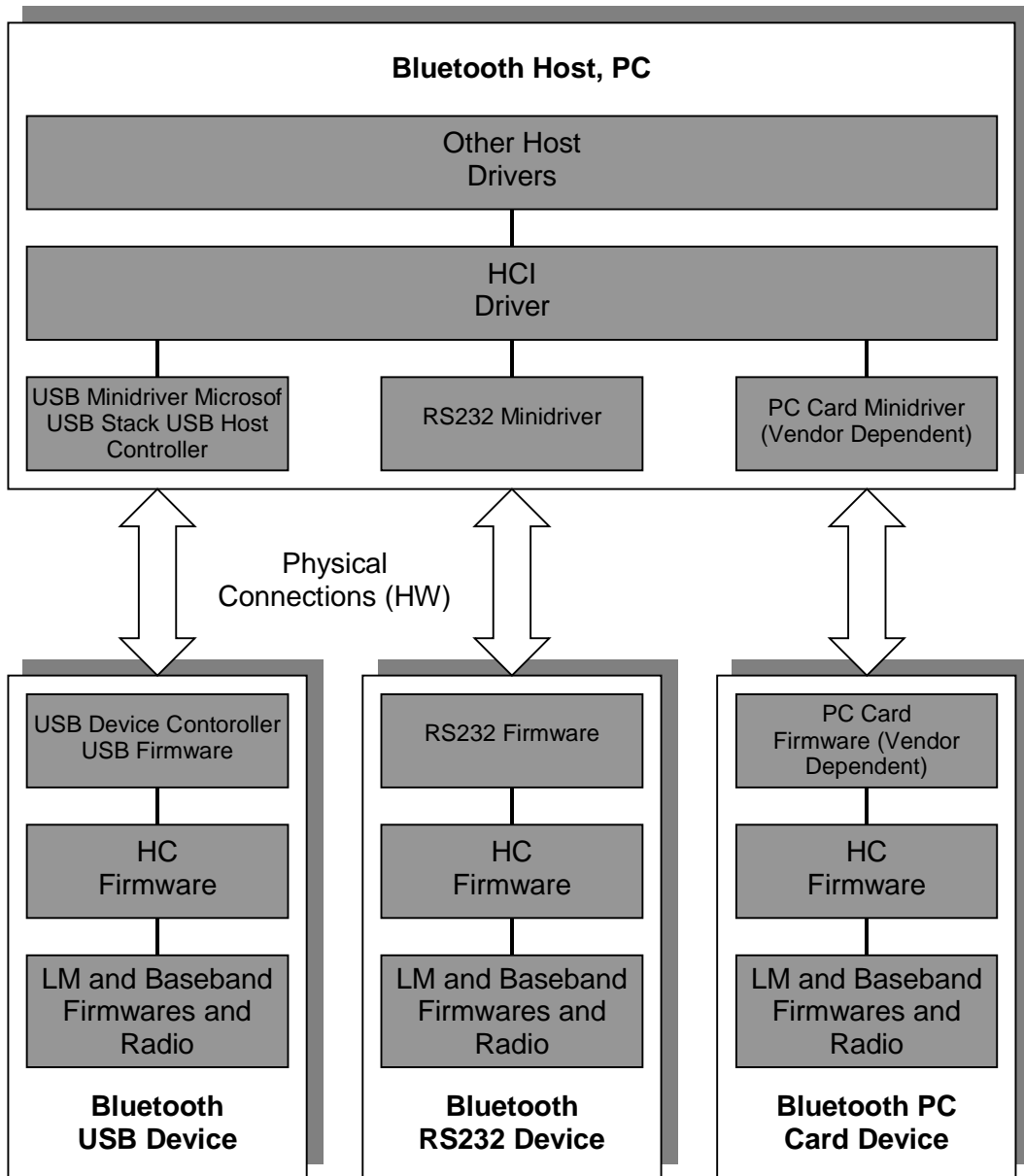
Bluetooth Host, PC

Other Host Drivers

HCI Driver

| USB Minidriver Microsof USB Stack USB Host Controller | RS232 Minidriver | PC Card Minidriver (Vendor Dependent) |

Physical
Connections (HW)

USB Device Contoroller USB Firmware	RS232 Firmware	PC Card Firmware (Vendor Dependent)
HC Firmware	HC Firmware	HC Firmware
LM and Baseband Firmwares and Radio	LM and Baseband Firmwares and Radio	LM and Baseband Firmwares and Radio
Bluetooth USB Device	**Bluetooth RS232 Device**	**Bluetooth PC Card Device**

Figure 1 USB, RS232, and PC Card Transport Layers

2   Transport Functionality

The PC Card transport layer indicates and transfers the different types of HC packets using the physical bus from the host to the module and vice versa. Thus, the receiving end is able to separate the different packet types. Figure 2 depicts this procedure.
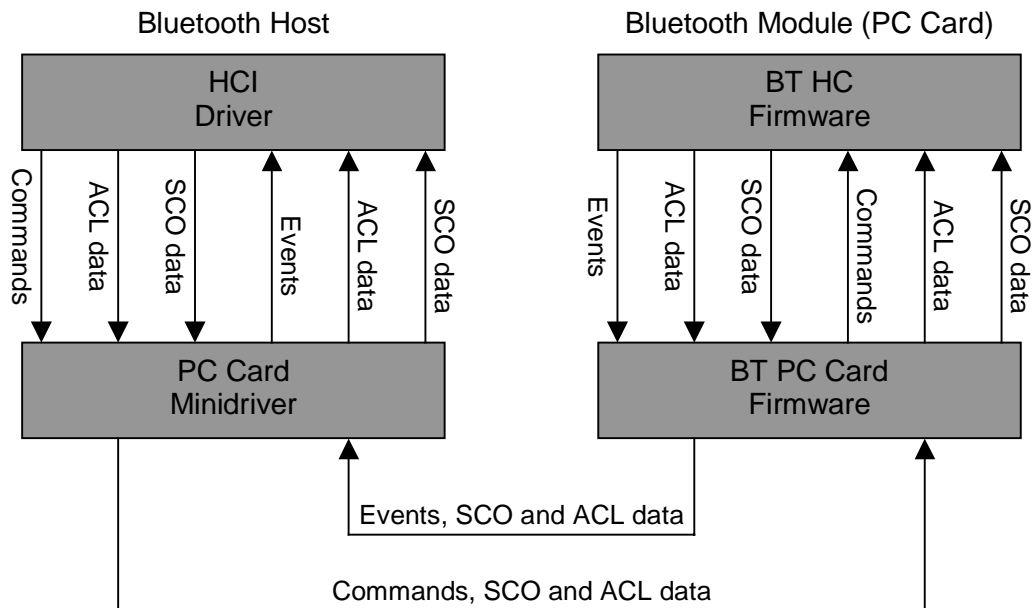

Figure 2 Bluetooth PC Card Transport Layer Functionality

2.1 Packet Types over Transport Layer

There are at least four different packet types, which the transport protocol must recognize (See also Figure 2). These packet types are HCI commands, HCI events, ACL data, and SCO data. The transport layer (PC Card Driver or Bluetooth PC Card Firmware) has to get information about the packet types directly from the HCI driver or from the HC firmware. Otherwise, the transport layer is not able to forward the packet type information from the host to the module or vice versa. However, the PC Card transport layer has not to have any visibility into the payload data, which the HCI driver sends to the host controller in the module or vice versa.

This document does not specify how the transport layer indicates the separate packet types. This depends on the different PC Card solutions.

3   PC Card Minidriver Requirements

The purpose of the Bluetooth PC Card minidriver is to give a possibility for sending and receiving the HCI messages to and from the PC Card, respectively. The minidriver has to provide two interfaces such that this communication is possible. These interfaces are the interface with the HCI driver (the upper interface) and the interface with the physical bus (the lower interface), to which the PC Card is also physically connected.

3.1 Interface with HCI Driver

If the vendor implementing a Bluetooth PC Card and a Bluetooth PC Card minidriver also delivers the rest of the Bluetooth SW protocol stack, there are no external requirements to this interface and the interface can be vendor specific. Also, in this case a separate Bluetooth PC Card minidriver may not exist but it is integrated with the other drivers including the HCI driver.

If the vendor delivers only the Bluetooth PC Card and the minidriver for it, the interface must comply with the lower interface of the HCI driver of an existing Bluetooth SW protocol stack implementation.

3.2 Interface with Physical Bus

There are no requirements for the lower interface of the Bluetooth PC Card minidriver. It is assumed that the Bluetooth PC Card including the PC Card firmware and the minidriver are provided by the same vendor. Thus, there will be no interoperability problems with the communications between the firmware and minidriver.

4   References

[1]   Bluetooth Special Interest Group, Bluetooth Host Controller Interface
       Functional Specification

[2]   Bluetooth Special Interest Group, Bluetooth HCI USB Transport Layer
       Specification

[3]   Bluetooth Special Interest Group, Bluetooth HCI RS232 Transport Layer
       Specification

[4]   Bluetooth Special Interest Group, Bluetooth UART Transport Layer
       Specification

5   Acronyms

Abbreviation or Acronym	Meaning
ACL	Asynchronous ConnectionLess
HC	Host Controller
HCI	Host Controller Interface
LM	Link Manager
PDA	Personal Digital Assistant
SCO	Synchronous Connection-Oriented
UART	Universal Asynchronous Receiver/Transmitter
USB	Universal Serial Bus