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SILICON LABS UG513 BT122 HCI Mode User Guide

UG513: BT122 HCI Mode User's Guide

The document contains general assumptions of the HCI model implementation.

Contents

KEY FEATURES

- HCI Mode support
- DFU over UART possible in HCI mode
- Bluetooth host flexibility

General Assumptions

Connection to the Host

In the HCI mode, the BT122 module acts as a Bluetooth controller (according to the Bluetooth Core nomenclature). HCI mode also requires a connection to a host device, which is achieved using UART interface as the main way of communication and control of the BT122 module.

General Rules

BT122 module is based on two main parts:

- Texas Instruments CC2564C Bluetooth Dual Mode controller
- Silicon Labs microcontroller

After restart, the microcontroller initializes the TI radio chip by sending all needed vendor settings and configurations. Next, the microcontroller provides Silicon Labs Bluetooth Stack (the BT Host implementation) and uses that to communicate with the TI controller via the HCI protocol, as described in the Bluetooth Core Specification. In the HCI mode, the microcontroller is also responsible for the TI chip initialization and handling vendor commands. However, after that routine, all HCI commands, events, and responses will be passed to and from the main BT122 UART port.

The Initial Proposal for the HCI Mode Firmware Preparation

To create any BT122 project, prepare XML configuration files that are used by **BGBuild.exe** to generate end firmware. The same concept is used to generate the HCI mode firmware, as follows:

- Update the UART setting in **hardware.xml** file, for example:

  <uart baud="115200″ flowcontrol="true"/>
- Include a proper library in project.xml file:

  <software>

  <library in="bt122_HCI"/>

  </software>

Additionally, it is possible to turn on a sleep mode.
For more details, see UG496: BT122 Project Configuration User's Guide.

HCI Mode Comparison for iWRAP and BT122

Table 2.1. Comparison of HCI Mode on iWRAP and BT122

Feature	iWRAP	BT122
HCI protocol	BCSP, H4	H4
Interfaces	UART, USB	UART
UART baud rate	Configurable, up to 3686400 bps	Configurable, up to 3 Mbps
A way of launching the HCI mode	iWRAP command; the setting of a proper value in a dedicated PSKey	The setting of the HCI mode in an XML configuration file before building the firmware

Using BT122 Module with Host Bluetooth Stack

Custom Module Configuration

Three API commands are available in HCI mode, as follows:

- dumo_cmd_system_reset
- dumo_cmd_hardware_set_uart_configuration
- dumo_cmd_system_get_info

See BT122 Dual Mode API Reference for detailed command documentation. To configure the serial port, type expected parameter values into the hardware configuration (see UG496: BT122 Project Configuration User's Guide) or use the dumo_cmd_hardware_set_uart_configuration command.
To update firmware, reset the module in DFU mode with the dumo_cmd_system_reset command. Next, update firmware according to section 4.3 of UG497: BT122 User's Guide.

BlueZ Stack Example

BT122 module, flashed with HCI firmware, is ready to work with the host Bluetooth stack, for example, BlueZ stack. The following are example configuration steps on the code snippet below.
Because of resource limitations, set the maximum ACL packet length up to 350 bytes.
The highest stable serial port baud rate (for HCI mode) is 2 Mb/s. A higher serial port baud rate is not recommended for host Bluetooth stacks.
$ sudo attach /dev/ttyUSB0 any 2000000
$ sudo hciconfig hci0 aclmtu 350:3
$ sudo hciconfig hci0 up
After correct configuration, BT122 works as Bluetooth dual-mode device.
$ hciconfig
hci0: Type: Primary Bus: UART
BD Address: C4:64:E3:63:8A:AE ACL MTU: 350:3 SCO MTU: 180:4
UP RUNNING
RX bytes:21035348 acl:1089757 sco:0 events:722081 errors:0
TX bytes:79735765 acl:1137257 sco:0 commands:96 errors:0

References

- Silicon Labs, BT122 Dual Mode API Reference, 2021
- Silicon Labs, UG496: BT122 Project Configuration User's Guide, 2021
- Silicon Labs, UG497: BT122 User's Guide, 2021

Version History

Revision 1.0
October 2021

- Initial release.

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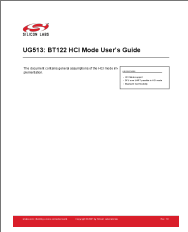
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