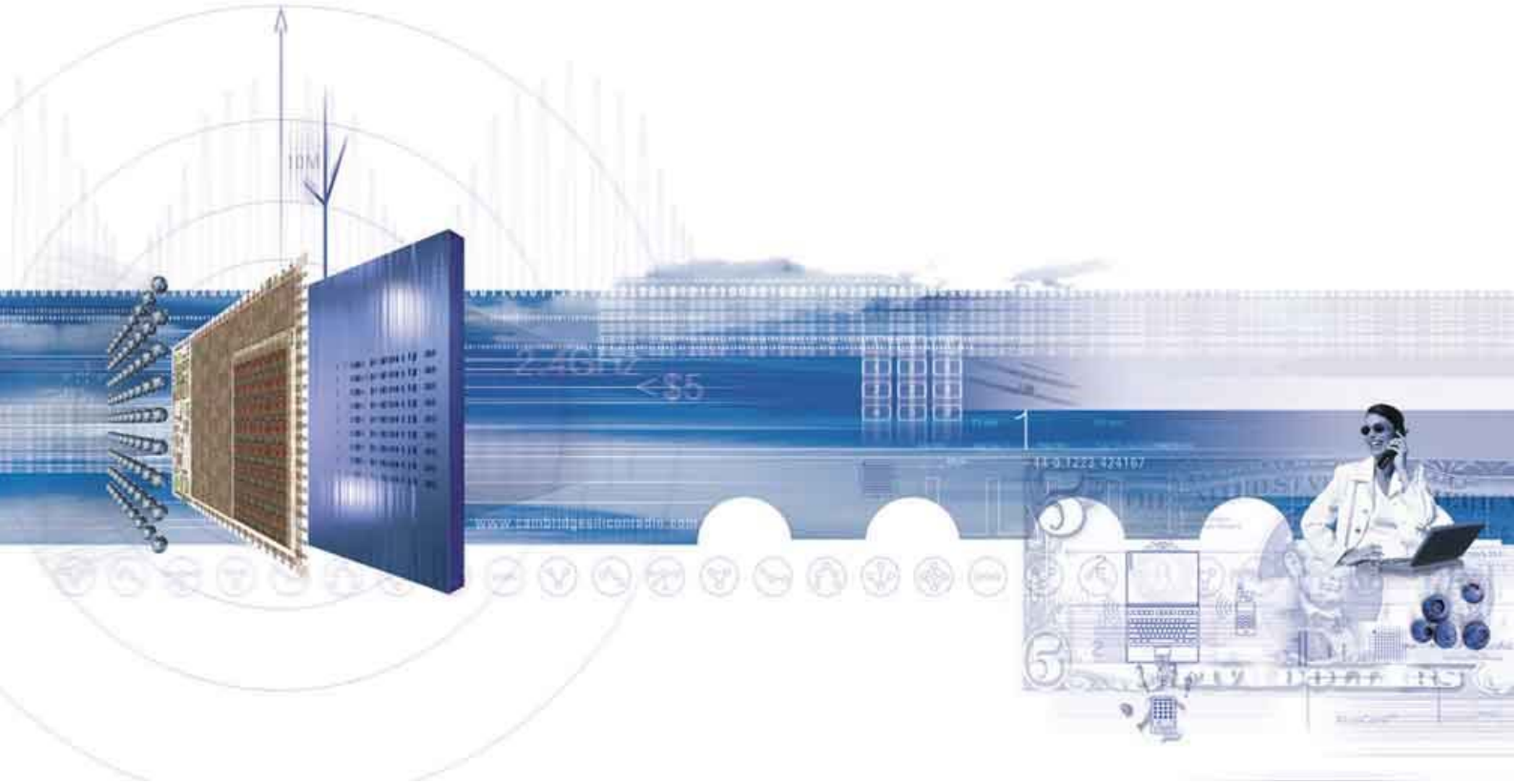
BlueCore™

BCSP Channel Allocation

July 2004



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1 Introduction

A CSR Bluetooth® wireless technology chip can use a UART link to connect to its host. The BlueCore Serial Protocol (BCSP) can run over this link, carrying such things as Host Controller Interface (HCI) commands, events and data.

BCSP provides a set of reliable and unreliable bidirectional datagram streams and is defined in [BCSP].

Although BCSP was designed to support Bluetooth communications, its specification document was deliberately written to be independent of its application. It mentions Bluetooth only in passing and does not specify how BCSP is used on the chip.

This document defines the allocation of the BCSP datagram streams used on CSR's Bluetooth chips.

2 Context

BCSP provides 15 reliable and 15 unreliable bidirectional datagram channels between a BlueCore chip and its host. However, the BCSP specification does not state how these 30 datagram channels are allocated. This is the role of this document.

This document deals with the top of the BCSP stack – shown as the dashed line marked “BCSP Channels” in the diagram.

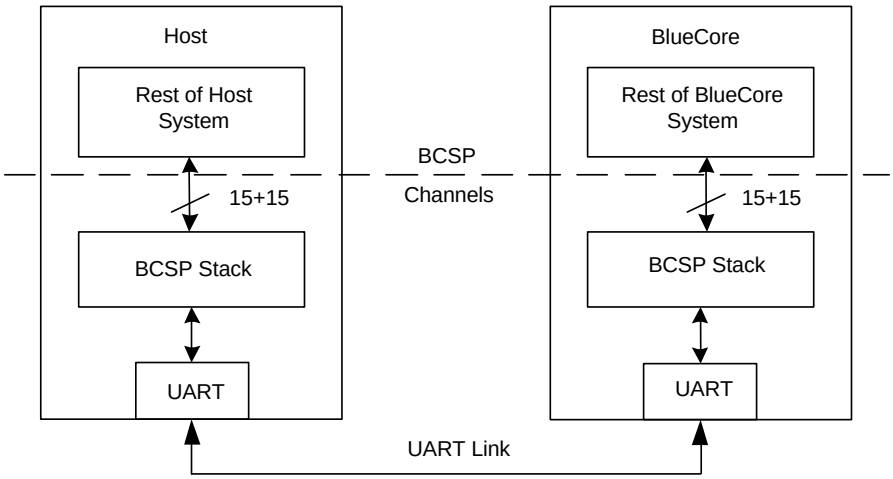

Figure 2.1: BCSP Stack

Strictly, the BCSP specification defines one reliable and one unreliable datagram channel. However, datagrams passed through BCSP carry a 4-bit protocol identifier, so this effectively gives 16 channels of each type. The BCSP specification requires that channel identifier zero must not be used by code above BCSP as it is used for signalling between a pair of BCSP stacks, thus code above BCSP sees 15 channels of each type.

3 Channel Allocation

This section defines the allocation of BCSP channels. The “Channel” column is carried in BCSP’s “Protocol Identifier” field.

Channel	Reliable	Unreliable	Notes
0	Not available	Not available	Used internally by BCSP. Must not be used by applications.
1	Unused	BCSP Link Establishment Protocol	Used by protocol defined in [BCSPLE]. Must not be used by applications.
2	BCCMD	Unused	Used by protocol defined in [BCCMD].(a)
3	HQ	Unused	Used by protocol defined in [HQ].(b)
4	Device Mgt	Unused	Protocol defined by BlueStack.(c)
5	HCI Cmd/Evt	Unused	HCI Commands and Events, as defined in the HCI section of [BT1.2].
6	HCI ACL	Unused	HCI ACL data, as defined in the HCI section of [BT1.2].
7	HCI SCO	HCI SCO	HCI SCO data, as defined in the HCI section of [BT1.2]. (d)
8	L2CAP	Unused	Protocol defined by BlueStack.(c)
9	RFCOMM	Unused	Protocol defined by BlueStack.(c)
10	SDP	Unused	Protocol defined by BlueStack.(c)
11	Reserved	Unused	(e)
12	DFU	Unused	Firmware upgrade, as defined in [DFUPROT].
13	VM	Unused	Virtual Machine.(f)
14	Unused	Unused	(g)
15	Reserved	Reserved	(h)

Table 3.1: BCSP Channel Allocation

Notes:

(a) BCCMD is the BlueCore Command interpreter channel, also known as the Host to Host Controller “private channel”. This is a CSR-proprietary control channel, and so is not part of the Bluetooth specification. Described in [BCCMD].

(b) HQ is the host query channel. This is very like BCCMD in style in that the protocol is used to access a command interpreter, though in this case, the command interpreter runs on the host, and the chip poses the questions. This is also known as the Host Controller to Host “private channel”. This is a CSR-proprietary control channel, and so is not part of the Bluetooth specification. Described in [HQ].

(c) Some BlueCore firmware builds provide a resource-limited Bluetooth stack on the chip including L2CAP, RFCOMM and SDP. Communication to the tops of these stack elements can pass through BCSP. These channels’ protocols are defined in BlueStack’s documents [BCCODE] and [BSTK]. The Device Manager channel is proprietary; effectively it is BlueStack's “private channel”.

(d) SCO data is naturally suited to an unreliable BCSP channel, though it could be carried on a reliable channel. Choice of whether the reliable or unreliable channel is used is currently an implementation-specific option. In practice, it is normal to carry SCO data over the BlueCore chip’s separate PCM interface, and so by-pass HCI completely.

(e) Used for carrying debug information from the chip to the host during development. Information on this channel will not be published.

(f) Channel for communication to/from application code in the VM. Protocol defined by [BLUELAB]. This can carry application and debug information using multiplexing.

(g) This is the last free channel. This must be multiplexed.

(h) One channel value should be reserved as a means of signalling future versions of the BCSP Specification.

Document References

Document ID	Document Title	CSR Reference
[BCCMD]	BCCMD Protocol	bcore-sp-002P
[BCCODE]	Packet coding procedure on BlueStack BCSP channels; BlueStack document AN-002 "Using the BlueStack API over BCSP"	n/a
[BCSP]	BlueCore Serial Protocol	bcore-sp-012P
[BCSPLE]	BCSP Link Establishment Protocol	bcore-sp-008P
[BLUELAB]	Documentation for BlueLab	
[BSTK]	BlueStack User Manual; BlueStack document C6066-UM-001 v1.6	n/a
[BT1.2]	Specification of the Bluetooth System, Version 1.2, Core Package, 5 November 2003	n/a
[DFUPROT]	Device Firmware Upgrade Protocol Specification	bc01-an-095P
[HQ]	HQ Protocol	bcore-sp-011P

Further References

Document Title	CSR Reference
HCI Implementation	bcore-me-007P (for pre-HCIStack1.2v18.1 releases) bcore-an-032P (for HCIStack1.2v18.1 and later releases)
BCCMD Test Commands	bcore-sp-001P

Acronyms and Definitions

ACL	Asynchronous Connection-Less; Bluetooth-defined reliable datagram service
BCCMD	BlueCore Command
BCSP	BlueCore Serial Protocol
BlueCore™	Group term for CSR's range of Bluetooth chips
BlueLab™	CSR's development toolset for building applications to run in the firmware's VM
BlueStack	Embedded upper layer stack originally written by CCL.
Bluetooth®	Set of technologies providing audio and data transfer over short-range radio connections
CCL	Cambridge Consultants Limited
CSR	Cambridge Silicon Radio
DFU	Device Firmware Upgrade
HCI	Host Controller Interface; part of the Bluetooth specification
HQ	Host Query
L2CAP	Bluetooth-defined reliable datagram service
PCM	Pulse Code Modulation; BlueCore chips provide a PCM port for audio
RFCOMM	Bluetooth-defined serial port emulation service
SCO	Synchronous Connection-Oriented; Bluetooth-defined unreliable sample stream service
SDP	Service Discovery Protocol; Bluetooth-defined port mapping service
UART	Universal Asynchronous Receiver Transmitter
VM	Virtual Machine

Record of Changes

Date	Revision	Comment
8 Jan 03	a	Document originally published as CSR reference bc01-an-003 (revisions a through c; versions through HCIStack1.1v15.x builds. New revision control number allocated to align with HCIStack1.1v16.x builds, which includes adding references to BlueLab..
15 Jul 04	b	Updated formatting, corrected typos.

BCSP Channel Allocation

bcore-sp-007Pb

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