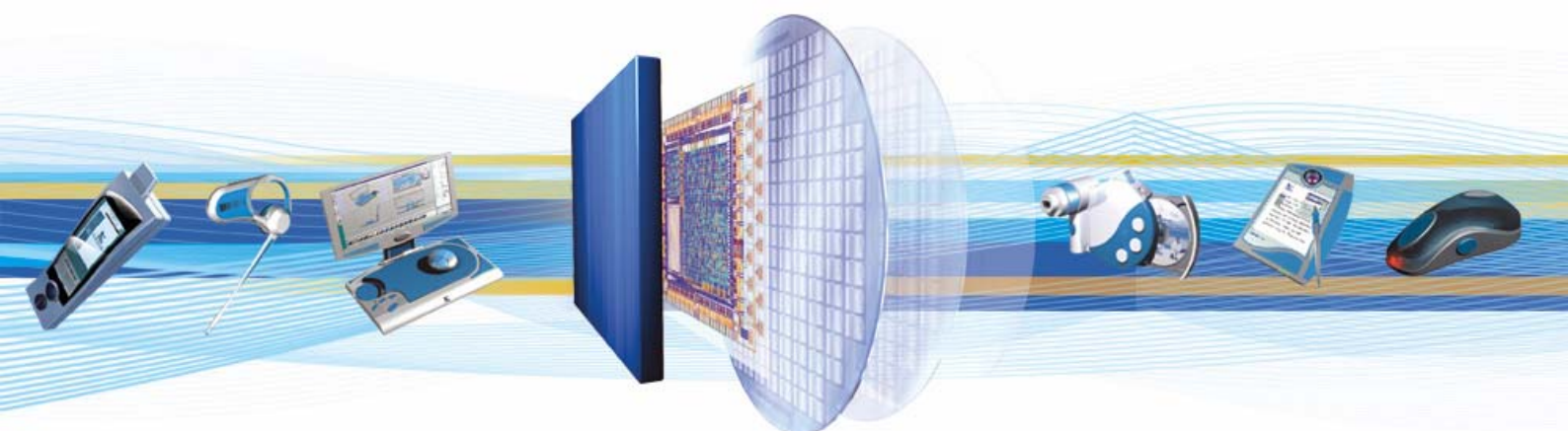**BlueLab™**

BlueLab v3.2

Software Release Note

June 2005

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1 Introduction

This document describes **BlueLab™ v3.2**, the most recent release of BlueLab3, CSR's software development kit for producing embedded applications for CSR's Bluetooth® wireless technology chips. Some additional documentation is included with BlueLab; see the manual available inside xIDE, the integrated development environment for BlueLab and the accompanying PDFs.

BlueLab3 has the same virtual machine (VM) architecture that has been successfully implemented in the vast majority of single chip Bluetooth products, including around 70% of all headset designs. The VM isolates user code in a "sandbox" where it cannot interfere with the basic Bluetooth operation of the chip. This allows the use of pre-qualified low-level stack firmware, greatly simplifying Bluetooth qualification process and reducing time to market. The user does not need to qualify complex low-level firmware. CSR does this.

BlueLab v3.0 introduced true on-chip, real-time debugging for the first time on any Bluetooth chip. There is no need to stop the chip running to get debug data. It is possible to watch traffic in real-time while the chip runs. The development environment monitors and records messages between the VM application and the upper layers of the Bluetooth stack. The resulting record can be as useful as, but much easier to obtain than, an air trace when debugging complex problems such as interoperability between two Bluetooth devices.

These features make BlueLab3 by far the most flexible and functional set of tools available for any Bluetooth chip today.

The new tools introduced with BlueLab3 make it easier to take advantage of its much improved and expanded set of software libraries. These libraries improve performance and consistency for functions such as event handling. Crucially, they are designed from the ground up to support applications that use multiple simultaneous connections. This function is essential for cutting edge Bluetooth products like wireless stereo headphones with call handling.

The library changes mean that applications written for BlueLab2 must be partially rewritten to run under BlueLab3. Rewriting the code need not be an arduous task because the new libraries automate many common functions. As a result BlueLab3 applications are considerably simpler than before. It is generally only necessary to write a user interface to sit above the highly functional libraries provided with the Software Development Kit (SDK).

The initial releases of BlueLab3 are focussed on wireless headphones with call handling (combined Headset/Hands-Free and Audiovisual profiles) because the ability to support multipoint connections is essential for these products. Some features, notably the Human Interface Profile and some elements of the Serial Port Profile, have not yet been implemented. The mono Headset/Hands-Free application is present but is not yet as mature as the code in BlueLab2.

Future versions of BlueLab3 will quickly expand support for these application areas. For now CSR recommends that customers producing combined HS/HF/AV devices and other stereo products switch immediately to BlueLab v3.2. Other customers should continue to use BlueLab2 for now and plan to switch to a future version of BlueLab3.

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1.1 New features in v3.2 relative to v3.1

In addition to the changes noted in Appendix B, BlueLab v3.2 introduces the following new features

- Improved release of xIDE
    - Automatic detection of BlueCore variant and flash size
    - New display of messages sent to the tasks in your application
- Toolchain and firmware updates
    - Filesystem support with compact firmware on 6Mbit parts
    - Larger applications with up to a full 64Kwords of code space
    - DFU tools now ship as part of BlueLab3
- Additional documentation
    - Kalimba DSP library reference documentation as part of the xIDE help system
    - Updated Kalimba DSP Assembler User Guide
    - An introduction to BlueLab
    - xIDE User Guide
    - A guide to BlueLab libraries
- Application changes
    - The robustness of the av_headset_hfp reference application has been improved
    - The av_headset_hfp application now includes a demonstration of the Clear Voice Capture (CVC) software
- Application library changes
    - Substantially revised versions of the OBEX libraries (GOEP, FTPC, FTPS, OPPC, OPPS)
    - StatusQuery and MessageStatusTask calls added to track internal firmware state, even on HCI builds
- Kalimba DSP library changes
    - codec_stream library substantially revised for better interoperability
    - mp3 library general robustness improved
    - Addition of the cbops library for simplified audio processing

1.2 Requirements

This release of BlueLab runs on machines operating on Windows® 2000 SP4 or later and Windows® XP SP1 or later. The development tools access BlueCore through the Serial Peripheral Interface (SPI); therefore, a board supporting this (such as Casira™ or other CSR development boards) is also required.

SPI access is performed through low-level printer port access, therefore LPT1 must be available on the PC running BlueLab.

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2 CSR Chips

Applications produced with this development kit will run on CSR's **BlueCore™2**, **BlueCore™3,** and **BlueCore™4** chips, with a firmware build supporting Virtual Machine (VM) v6.4.

Notes:

The firmware builds supplied with this release all require 6Mbit or 8Mbit devices.

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3 Release Functionality

3.1 xIDE

This release of BlueLab includes CSR's integrated development environment, xIDE, supporting development and debugging of both VM applications (in C) and Kalimba DSP code (in assembler).

3.2 Toolchain

BlueLab includes a set of development tools for VM applications:

- Compiler based on GCC v3.3.3 and targeting the BlueCore VM
- Supporting assembler, librarian and linker
- Libraries providing access to BlueCore specific features
- Libraries providing implementations of selected standard ANSI functions

BlueLab also includes development tools for Kalimba DSP applications written in assembler:

- Assembler, with linking ability
- Tools for embedding Kalimba DSP applications and data in BlueCore's read-only file system
- Libraries providing commonly required services

Additional tools (from BlueSuite™) are provided for downloading applications and updating the Persistent Store.

3.3 Support Libraries

In addition to the standard libraries, BlueLab includes libraries specific to BlueCore and Bluetooth:

- Battery library sampling voltage level
- Message library for splitting applications into communicating tasks
- Panic library for detecting errors and terminating the application
- Service and region libraries for searching SDP records

3.4 Application Libraries

The following libraries build on the access to BlueStack to simplify the production of Bluetooth applications:

- Connection library
  - Can create RFCOMM, L2CAP and SCO connections
  - Manages security settings and link policy
- AV profile libraries supporting applications using the Bluetooth AV profile
- HFP library supporting applications using the headset and hands-free profiles
- SPP library supporting applications using both roles of the serial port profile
- GOEP library supporting the client and server role of the generic object exchange profile underlying OBEX
- FTPC and FTPS libraries implementing the client and server side of the file transfer profile using GOEP
- OPPC and OPPS libraries implementing the client and server side of the object push profile

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3.5 Kalimba DSP libraries

- Core library – basic low level routines:
    - Timers
    - Messages
    - Interrupts
    - Connection buffers
    - Profiling
- Audio compression CODEC libraries
    - sbc library – the Bluetooth AV profiling mandatory CODEC SBC (Sub-band Coding), both encoder and decoder.
    - mp3 library – an mp3 decoder
- codec library – handles streaming audio over Bluetooth using the selected audio compression CODEC (sbc, mp3 etc)
- cbuffer operators (cbops) library – handles copying of data from a source buffer to a destination buffer with optional processing of the data in a simple 'linked list of operators' type way.

3.6 Example Applications

The following example applications are supplied.

Note:

That these are for demonstration purposes only and are intended as the starting point for customers' development effort.

On multimedia variants of BlueCore:

- av_headset application implementing a stereo AV sink
- av_headset_hfp application implementing both a mono headset and a stereo AV sink
- a2dp_source_dongle implements an AV source, taking audio from one of:
    - internal stereo CODECs
    - an external Wolfson CODEC
    - USB, enumerating as USB speakers

On all variants of BlueCore:

- spp_dev_a and spp_dev_b implementing role A, or role B, of the serial port profile
- ftp_server
- obex_server
- opp_server

Example applications are also provided demonstrating routing of SCO data through the Kalimba DSP on BlueCore3 Multimedia chips, use of the SBC encoder and decoder libraries, and use of the FTPC, GOEP and OPPC libraries.

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4   Firmware

CSR's policy is to distribute, with BlueLab, a selection of firmware builds whose sole purpose is the development of applications. Before going into production the developer must obtain from CSR Bluetooth-qualified production firmware (which they can use in place of the development firmware supplied with BlueLab). This is a mandatory part of the qualification process.

This release of BlueLab v3.2 includes development firmware for use with BlueCore2-External, BlueCore2-Audio, BlueCore2-Flash, BlueCore3-Audio Flash, BlueCore3-Multimedia, and BlueCore4-External.

Firmware name	Hardware	Flash Size	Read-only Filesystem	DFU	Application size limits		
					Code	Const	Total
unified_bc02	BC2-external	8Mbit	Yes	Yes	64Kw	24Kw	88Kw
unified_kato	BC2-audio/flash	8Mbit	Yes	Yes	64Kw	24Kw	88Kw
unified_kalimba	BC3-multimedia	8Mbit	Yes	Yes	64Kw	24Kw	88Kw
unified_coyote	BC4-external	8Mbit	Yes	Yes	64Kw	24Kw	88Kw
compact_paddywack	BC3-audio flash	6Mbit	Yes	No	64Kw	24Kw	52Kw (approx)
unified_paddywack	BC3-audio flash	6Mbit	No	Yes	64Kw	24Kw	32Kw

Notes:

Limits on the application size when the read-only filesystem is available assume that no other data is being placed there. Adding other files to the filesystem may reduce the figure for the total application size.

The hardware type is detected automatically by xIDE.

Choosing between compact and unified firmware is done using the project properties within xIDE.

Important Note:

BlueLab v3.2 applications require VM v6.4 and are not compatible with firmware supporting VM v5 (as released for BlueLab2).

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5 Major Changes in BlueLab3 Relative to BlueLab2

BlueLab3 builds on many years of experience with BlueLab1 and BlueLab2. Many components have been redesigned and replaced to make it easier and faster to build the sort of applications CSR's customers are now working on.

5.1 Tool Changes

The most visible change in BlueLab3 is the addition of xIDE, a complete integrated development environment. xIDE allows projects to be created, code to be edited, VM applications to be compiled, and Kalimba DSP code to be assembled within a single environment.

xIDE replaces the Java-based appdebug from BlueLab2. It also replaces the Matlab-based kaldbg which was provided as part of BlueLab v2.85 and later. The requirement to install Cygwin and Java has also been eliminated.

xIDE supports on-chip debug of applications over BlueCore's SPI debug interface, making it possible to debug applications which take control of the USB or UART interface on BlueCore. Such applications include serial-cable replacement and USB dongles.

The Matlab-based kalasm from BlueLab 2.85 and later has also been replaced by a new version, kalasm2.

A new C compiler based on gcc3.3.3 has replaced the gcc2.95 compiler used in BlueLab2 and typically yields a 10% improvement in code density.

5.2 Library Changes

The most significant change in BlueLab3 is the introduction of the new connection library which supports any combination of RFCOMM, L2CAP and SCO connections (and, soon, TCP and UDP) serving multiple profiles. For example, a single application implementing both AV and HF profiles is now possible. (The single connection and single profile limitations imposed by the `cm_rfcomm` library in BlueLab2 no longer apply.)

The lower-level libraries have been completely rewritten to support the new connection library. Notification of asynchronous events, either from the firmware or from lower-level libraries, is now uniformly handled by the delivery of messages. Tasks are now dynamically created and combine message handlers with local state. The scheduler library in BlueLab2 has been replaced by a simplified message loop, cutting latency on message delivery by a factor of five.

The upper-level libraries, which correspond to Bluetooth profiles, have also been completely rewritten as tasks which use the new connection library. This makes it possible to combine multiple profiles in a single application. For example an application can now open multiple SPP connections simply by creating multiple instances of the SPP profile.

5.3 Application Changes

BlueLab2 and BlueLab3 applications look significantly different. In general a BlueLab3 application will be much simpler than the corresponding BlueLab2 application, especially when multiple connections or profiles are being used. A typical BlueLab3 application simply arbitrates between the user-interface logic and the profile instances it creates.

However, the extensive changes to the libraries make it impractical for the same code to work with both BlueLab2 and BlueLab3. An existing BlueLab2 application will have to be partly rewritten to work with BlueLab3.

Note:

Some features available to BlueLab2 applications are not yet present in BlueLab3. For example, HID specific features are not present in this version of BlueLab3. See the Known Issues on page 13 for more details.

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5.4 Kalimba Library Changes

The Kalimba libraries have been rewritten, to support the new Kalimba Assembler and provide much improved support for both sbc and mp3 audio streaming over Bluetooth.

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6 Testing

BlueLab v3.2 has been in use within CSR throughout its development. Furthermore, explicit testing has covered:

- Installation (and de-installation) on all supported platforms

- Extensive interop-testing of the `av_headset_hfp` application (see the separate release note)

- Component testing of the `connection` library and profile libraries

A list of known issues is in Appendix A on page 13. CSR welcomes reports of any additional issues through official support channels.

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7   Document References

Document:	Reference, Date:
Specification of the Bluetooth System	Volume 1, Core, v1.1, 22 February 2001
Specification of the Bluetooth System	Volume 2, Profiles, v1.1, 22 February 2001
Headset Profile	Headset Profile Part K:6, v1.1, 22 February 2001
Hands-free Profile	Hands-free Profile, v1.0, 29 April 2003

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Appendix A   Known Issues

This section lists currently known issues for BlueLab v3.2. The "Severity" column gives a subjective assessment (Cosmetic, Minor, Major) of how severely each issue may affect the use of BlueLab v3.2.

The following items are known problems with the functionality of components which are new to BlueLab 3.

ID	Severity	Description
B-2770	Cosmetic	BlueLab3 (especially `make`) does not understand file or directory names containing spaces. Installing BlueLab under "Program Files" fails because of this.
B-2844	Minor	It is not currently possible to build a BlueLab library from within xIDE; this must be done using the shortcut placed in the Start Menu, or Makefiles from the command line.
B-3551	Minor	GOEP & FTP client do not implement OBEX-level authorisation.
B-3740	Minor	If an error occurs while building the BlueLab libraries from the start menu, the window is closed losing the error messages. (Invoking the same command from the command-line is an effective workaround.)
B-4221	Minor	Bluelab 3 is missing library routines necessary to handle long long types.
B-4222	Minor	gcc3 -O2 and -O3 optimisation levels are known to generate incorrect code.
B-4264	Cosmetic	Installing exactly the same version of BlueLab twice, then attempting to uninstall can leave orphaned shortcuts on the system.
B-4314	Minor	The `a2dp_source_dongle` application can sometimes take longer than the mandated 100ms to respond to an AVRCP transaction when streaming audio.
B-4315	Major	The `a2dp` library only supports one active stream endpoint.
B-4408	Minor	The `connection` library does not currently handle TCP or UDP connections.
B-4522	Cosmetic	If you leave `avcontrol.exe` running but unplug the AV dongle, the control application may leak memory.
B-4804	Minor	Type B instructions (those involving a constant) can contain only one memory access, but kalasm2 incorrectly accepts 'r?=M[r?]+M[k]' generating 'M[k]=r?+r?' instead of reporting an error.
B-4832	Minor	kalasm2 incorrectly interprets binary '-' as '+' in some circumstances; coding M[r1-1] as M[r1+(-1)] works around the problem.
B-4833	Minor	kalasm2 incorrectly accepts M[r1-r2] in an instruction.
B-4924	Major	The supplied firmware does not support SPDIF on BlueCore3 Multimedia.
B-5093	Minor	kalasm2 incorrectly accepts rMAC sub registers as source operands, coding them simply as rMAC.
B-5174	Minor	If variables are initialised with values which have to be calculated by the preprocessor, certain combinations using divide cause kalasm2 to return an error.
B-5235	Minor	Only a single instance of the `a2dp` library can be created by the application. Attempts to create more than one instance will fail.
B-5241	Minor	Only a single instance of the `avrcp` library can be created by the application. Attempts to create more than one instance will fail.
B-5608	Major	Stream connections using a file as their source are terminated when the source file is empty not when the last of the data has been read from the connection. This makes it impossible for the Kalimba DSP to read the last few hundred bytes of data from a file.
B-5662	Minor	It's not possible to run two instances of gcc at once due to poor naming of temporary files. Avoiding parallel `make` instances (such as building from two instances of xIDE at the same time) will avoid triggering this bug.
B-6161	Major	kalasm2 incorrectly accepts a memory read in parallel with a divide instruction, generating code only for the divide.

Table Appendix A.1: Known Issues

The following items are known problems with xIDE

ID	Severity	Description
B-5896	Minor	Using xIDE to single step and step over VM code is slow.
M-391	Cosmetic	After an application panic, it's still possible to click step and run in xIDE but they return error messages.
M-406	Minor	Stepping over `MessageLoop` will cause xIDE to stop responding until a message is received.
M-451	Minor	Clicking on **Restart** in xIDE when a VM application is being debugged and is stopped at the beginning of `main` is silently ignored, rather then restarting the application.
M-452	Minor	xIDE has excessive PC CPU usage while polling a running VM application.
M-455	Minor	xIDE takes a long time to load debug information for large VM projects.
M-463	Minor	**Go To Line** does not work in xIDE when the active project is a Kalimba project.
M-467	Minor	Stopping xIDE while firmware is being downloaded leaves a stray `BlueFlashCmd` process running.
M-469	Major	Stepping over functions in Kalimba DSP code in xIDE incorrectly steps into the function.
M-471	Minor	xIDE can ask if the user wants to overwrite a file which has changed on disk with an earlier copy which it has kept open.
M-480	Minor	xIDE does not currently handle workspaces containing multiple projects very well, despite allowing them to be created.
M-493	Major	If a breakpoint is set at a multiple word Kalimba DSP instruction, then xIDE will only execute the final word of the instruction when resuming execution after hitting the breakpoint.
M-522	Major	Data symbols from Kalimba DSP applications are not available in xIDE, making the variable and watch windows unusable.
M-563	Minor	If auto-indent is enabled then xIDE can incorrectly indent lines when `Undo` is used.
M-601	Major	Changing the number format of a Kalimba DSP register in the register window in xIDE can change the on chip value of the corresponding register.
M-607	Minor	If local and global variables have the same name, then xIDE will only display one of them while debugging a VM application.
M-678	Minor	Pointers to opaque types (such as GAVDP) in a VM application sometimes fail to display correctly in xIDE, even when the type has later been fully defined elsewhere in the source file.
M-699	Minor	xIDE can fail to display the parameters of functions that don't contain any automatic variables.
M-704	Minor	The **Stop-Build** button produces strange results if pressed during start-up of a Kalimba project.
M-705	Minor	It is not possible to force xIDE to refresh the register window values.

Table Appendix A.2: Known Issues (xIDE)

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The following items correspond to features which were present in BlueLab 2 but are not available in BlueLab v3.2.

ID	Severity	Description
B-3575	Minor	`DacGetBlock/Level` and `AdcSetBlock/Level` are missing from BlueLab3.
B-3584	Minor	HID streams and transforms are not yet part of BlueLab3.

Table Appendix A.3: Missing Features

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Appendix B   Issues Resolved since BlueLab v3.0

The following issues have been fixed since BlueLab v3.0 was released.

ID	Severity	Description
B-1730	Minor	The `strcmp` and `memcmp` functions in the C library now correctly use unsigned char according to the C standard, rather than plain char.
B-3997	Minor	`ConnectionReadRemoteName` has been implemented in the connection library. (It truncates names longer than 31 characters.)
B-4158	Minor	The (unused) `a2dp_discover` call has been removed from the `a2dp` library.
B-4335	Major	The `hfp` profile library will silently ignore any `AT+VGS` commands which come in faster than they can be handled. This is to avoid memory exhaustion.
B-4379	Minor	Server side functionality has been added to the `GOEP` library.
B-4404	Minor	The `av_headset` and `av_headset_hfp` applications now attempt to close down the AV connection gracefully when powered down.
B-4658	Minor	The `avrcp` library now provides a power table to the `connection` library. It uses the priority passed to `AvrcpInit` by the application.
B-4677	Major	An issue in the `av_headset_hfp` application where audio playback would not resume after the Source initiated an `AVDTP_SUSPEND` followed by `AVDTP_START` has been resolved.
B-4760	Minor	`kalimba_standard_messages.h` header has been added listing various messages passed between the Kalimba DSP code and the supplied VM applications.
B-4769	Fatal	Messaging from the Kalimba DSP to the VM application does not work with the firmware shipped with BlueLab 3.0-release. This has been resolved in subsequent firmware builds.
B-4771	Fatal	gcc3 has been updated to prevent it from generating incorrect assembler code for shifts in certain code fragments.
B-4811	Fatal	kalasm2 no longer writes truncated `.klib` files on certain source files.
B-4813	Cosmetic	xIDE no longer displays the (unused) BH and BL registers which were needed for gcc2.
B-4841	Minor	The `goep` and `ftpc` libraries have been extended to enable use of the optional type header.
B-4848	Major	Selection and loading of the Kalimba CODEC has been moved into the `a2dp` library (previously it was performed by the client applications.)
B-4849	Major	The `a2dp` library now performs capability negotiation for the CODECs and notifies the application of the result.
B-4895	Minor	The `a2dp` and `gavdp` libraries now refers internally to the AV stream using sinks rather than the SEID. The SEID is still passed up to the application for informational purposes.
B-4916	Major	The `a2dp` library now handles SEP registration. The application only needs to specify the type(s) (SBC,MP3, ...) of SEP they wish to register.
B-4918	Minor	The `a2dp_source_dongle` application can now be built so that it accepts an analogue input using the new `codec` library, or enumerates as USB speakers.
B-4973	Minor	A generic `codec` library for BleCore3 Multimedia has been added which currently supports both the internal CODECs and an external Wolfson WM8731.
B-5005	Minor	The `connection` library now informs clients that an ACL connection has been opened by sending `CL_DM_ACL_OPENED_IND`.
B-5008	Minor	The debug variant of the `connection` library now checks the status field of primitives it would otherwise ignore and panics if the status field is bad.
B-5010	Minor	Support for changing the local name has been added to the `connection` library.

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ID	Severity	Description
B-5039	Minor	The `GOEP` library now sends an explicit delete request to its application when a remote client wishes to delete an object.
B-5059	Major	The `hfp` library now unconditionally sends volume indications to the client when in headset mode. Previously it incorrectly checked the local supported features but those are relevant only to the hands-free profile.
B-5069	Minor	Firmware for BlueCore4-external is now included with BlueLab.
B-5084	Major	A possible infinite loop in `gavdpHandleTransportChannelClosed` in the `gavdp` library has been eliminated.
B-5098	Minor	The `gavdp` library no longer relies on a (30 second) timeout to detect failed connections.
B-5111	Minor	A `FileParent` function has been added to find the directory containing an item in the read-only file system.
B-5120	Minor	The `buttonparse` tool has been extended to allow the creation of messages for double key presses.
B-5131	Minor	The `gavdp` library now returns an error message to the client if `GavdpClose` is attempted while in the wrong state. The close operation itself is not attempted.
B-5138	Major	The `hfp` library now correctly frees the memory containing the results of an SDP search.
B-5171	Major	The `spp` and `goep` libraries now correctly free the memory containing the results of an SDP search.
B-5181	Minor	The `TGAVDP100` timeout in the `gavdp` library has been increased to avoid signalling timeouts in cases where the packets are delayed due to heavy Bluetooth usage such as a scatternet with both a SCO connection and AV streaming.
B-5188	Minor	The `test_headset` application now correctly sets up `PSKEY_FIXED_PIN`.
B-5192	Minor	The `PcmRate` and `PcmRoute` calls are deprecated; the supplied example applications now use the combined `PcmRateAndRoute` call.
B-5193	Minor	The `test_headset` application now tries to use the internal CODEC and, if that doesn't exist, an external CODEC. As a result it will work on BlueCore variants with internal and external CODECs.
B-5194	Minor	Both `av_headset` and `av_headset_hfp` now panic if an attempt to register an SEP fails during startup. Previously they would just fail mysteriously if, say, the required Kalimba DSP application was not present on-chip.
B-5253	Fatal	gcc3 has been updated to eliminate a possible fatal failure during the reload phase of a `'movhi'` instruction.
B-5297	Major	The linker `'ld'` has been updated to eliminate warnings and a possibly incorrect stackusage calculation for programs containing very large call instructions.
B-5409	Minor	New `StreamConnectAndDispose` function added.
M-387	Major	xIDE should now correctly display the source code for `kalimba` libraries.
M-530	Minor	`PSKEY_VM_DISABLE` can no longer be accidentally left set to 2 (debug) if xIDE terminates abnormally; the VM will be left in the state it was before debugging.

Table Appendix B.1: Issues resolved since BlueLab v3.0

<div style="text-align: right">**BlueLab™ v3.2 Software Release Note**</div>

Appendix C   Issues Resolved since BlueLab v3.1

The following issues have been fixed since BlueLab v3.1 was released.

ID	Severity	Description
B-998	Minor	If a peer device opens and then closes a SCO connection before the application has a chance to respond with `DM_SCO_CONNECT_RES`, a `DM_SCO_DISCONNECT_IND` is now sent (previously no primitive was sent to indicate the disconnection.)
B-3579	Minor	The `MessageStatusTask` and `StatusQuery` calls have been introduced; these allow querying of link status which was performed using the `event` library in BlueLab2. The `examples/test_status` application illustrates their use.
B-3839	Minor	The `connection` library no longer rejects multiple rounds of RFCOMM parameter negotiation.
B-4026	Cosmetic	The security related function calls in the `connection` library now take a uint32 as the channel parameter (previously they took a uint16 which was passed to BlueStack as a uint32.)
B-4175	Cosmetic	The code generated by `genparse` has been adjusted to lint cleanly, but no functional changes were involved.
B-4390	Minor	The `examples/test_headset` application supplied with BlueLab3.0 and 3.1 was incomplete and has been removed from BlueLab3.2. It will be replaced with a full application in a later release.
B-4412	Minor	In the `a2dp` library a number of debug panics have been removed. If this error condition occurs the `a2dp` library now sends an error message instead.
B-4572	Major	gcc no longer generates invalid calling patterns for obscure cases involving 32-bit division where the result is passed to functions with many arguments.
B-4639	Minor	xIDE now correctly handles the case where both a `.button` file and the `.c` file it generates are part of a project. Previously it would cause an error from the linker.
B-4699	Fatal	SPI transports, no longer fail on fast (> 2.1 GHz) machines. The problem was caused by a signed integer being used for storing the clock speed.
B-4925	Minor	The `AV_Control` debug application for the PC no longer displays the SBC format and bitpool. This is a result of changes made to CODEC negotiation in the on-chip application.
B-5007	Minor	On receiving a `DM_SM_ENCRYPTION_CHANGE` message from BlueStack the connection library now sends a `CL_SM_ENCRYPTION_CHANGE_IND` message to each task that owns a connection on that ACL.
B-5011	Minor	The `ConnectionSmEncrypt` function has been added to the `connection` library.
B-5012	Minor	The `CL_SM_REMOVE_DEVICE_CFM` message has been removed from the `connection` library interface as it was never sent.
B-5038	Fatal	kalasm2 should no longer report `ERROR linking ????.klib "already in Module $mymodule"`.
B-5086	Minor	The documentation for the `ConnectionSmSetSdpSecurityIn()` function has been updated to make its usage clearer, and its use in the supplied code has been made more consistent.
B-5133	Minor	Within BlueLab applications, `MORE_DATA` messages used to be generated for every piece of data which arrived. The firmware has been updated to combine such messages automatically when they would be adjacent. This can vastly reduce the number of such messages seen by the application, and reduces the likelihood that a flood of messages can crash the firmware.
B-5167	Minor	The `a2dp_source_dongle` application no longer initialises a superfluous instance of the `codec` library when `USB_AUDIO_MODE` is defined.
B-5230	Fatal	kalasm2 now works reliably on Windows XP SP2; problems included errors being reported incorrectly and also incorrect assembler output.

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ID	Severity	Description
B-5236	Minor	The BlueLab toolchain has been extended to support large read-only filesystems on custom hardware using 16-Mbit of flash.
B-5248	Minor	gcc no longer outputs redundant nop instructions.
B-5249	Minor	The hfp library now sends a HFP_ENCRYPTION_CHANGE_IND message to the application task in response to receiving a CL_SM_ENCRYPTION_CHANGE_IND message from the connection library.
B-5250	Minor	In HFP mode, if a remote device disables encryption and does not re-enable it within 5 seconds, the av_headset_hfp application will now disconnect the Service Level Connection to that device.
B-5277	Minor	The a2dp library now allows switching between SBC rates by passing in configuration values, rather than requiring the profile library to be rebuilt.
B-5325	Minor	The gavdp library Reconfigure error codes have been reworked to be compliant to AVDTP test TP/SIG/SMG/BI-14-C
B-5332	Minor	The connection library has been updated to use the newly added power states interface to BlueStack. The connection library no longer needs to manage switching between the different low power modes as this is done automatically by BlueStack based on a power table supplied to it.
B-5339	Minor	A vGen library has been added to help OBEX applications generation vCard-like values.
B-5380	Major	The connection library now correctly handles crossover between incoming and outgoing I^{2}CAP connections.
B-5390	Minor	Fixed a memory leak in av_headset_hfp, av_headset, and a2dp_source_dongle when AVRCP requests are received in unexpected states.
B-5397	Minor	The avrcp library now rejects I^{2}CAP connection requests if it is currently not in the correct state to accept an incoming connection.
B-5414	Minor	Adding and removing files from the image/ directory now forces the read-only filesystem to be rebuilt (previously it was only rebuilt if a file was added with a date-stamp later than the last time the filesystem was built.)
B-5425	Minor	When removing a device from the list of paired devices the connection library did not remove it from the security manager in BlueStack. This would allow a device that had been removed from the list of paired devices to still connect, until a reset had been performed.
B-5426	Minor	A debug panic has been removed from the connection library; it could be triggered when it received an RFC_ESTABLISH_CFM message for a connection that had already been disconnected.
B-5427	Cosmetic	The battery library function BattInit has been renamed to BatteryInit.
B-5438	Major	The A2dpConfigure() function has been removed because it had no effect and if exposed required qualification.
B-5440	Minor	The l2cap_mtu parameter has been removed from the GavdpInit function as it was not being used.
B-5458	Major	In the spp library, the SPP_CONNECT_CFM message now correctly contains the SPP profile instance pointer.
B-5465	Minor	The av_headset_hfp headset application cancels the BUTTON_PLAY_PAUSE_REL message on a failure to create an SLC connection so it no longer continually attempts to connect the SLC if the first attempt failed.
B-5475	Minor	The connection library now sends a CL_DM_ACL_CLOSED_IND message whenever an ACL is closed. The message is sent to the task registered with the connection library as the main client task.
B-5476	Minor	The hfp library now correctly handles rejecting a call while another call is active.
B-5480	Minor	The gavdp library now rejects malformed set_configuration requests where more than one bit is set in any particular configuration field.

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ID	Severity	Description
B-5485	Medium	MPEG-2/4 AAC support added in `a2dp` library
B-5492	Minor	The `goep` library no longer calls `ConnectionSmSetSdpSecurityOut` to disable SDP security; it now leaves this policy decision to the application.
B-5496	Minor	The debug variant of the `ftpc` library has been updated to perform additional checking (as with other BlueLab libraries).
B-5498	Minor	The debug variant of the `ftps` library has been updated to perform additional checking (as with other BlueLab libraries).
B-5510	Minor	`GAVDP_CONFIGURE_CODEC_IND` message no longer includes a `media_sink` field. This field was invalid and the SEID should be used to identify the connection.
B-5514	Major	Fixed a bug in the AVRCP state machine of the `av_headset_hfp` and `av_headset` applications where receiving a START with an AVRCP connection already established would confuse the state machine and prevent remote control commands being sent to the source.
B-5525	Minor	Ringtones can now be played from locations other than VM constant space, such as stack memory or dynamic memory.
B-5526	Minor	Playing ringtones from the file system via audio sequence rather than using streams is no longer supported.
B-5527	Minor	A number of fields in library messages have been renamed in order to conform with BlueLab coding conventions. Messages with pointer fields name `ptr` have had their length field renamed to `size_ptr`.
B-5528	Major	gcc no longer overwrites arguments in functions which use partially initialised unions.
B-5533	Minor	The `av_headset_hfp` headset application now accepts an incoming AVRCP connection when it is in the "ready" state. Previously it refused and then opened later.
B-5543	Minor	The `gavdp` library will now always return a `GAVDP_START_CFM` when there is a crossover between two devices directing `GavdpStart` at each other.
B-5557	Minor	A debug variant has been added for the `oppc` and `opps` libraries.
B-5564	Minor	When using stream-based RFCOMM connections from a BlueLab application, the RFCOMM streams are destroyed less aggressively. This means that the sink in an `RFC_RELEASE_IND` generated by BlueStack is valid whereas previously it was always zero.
B-5570	Minor	The `gavdp` library now determines whether to send a `GAVDP_OPEN_IND` or a `GAVDP_OPEN_CFM` message depending on the device opening the AV channels rather than on the SEP role.
B-5585	Minor	The `gavdp` library now delays creation of internal data structures until a new connection instance is being created.
B-5592	Minor	The `gavdp` library now delays creation of internal data structures until a new connection data is being created.
B-5598	Minor	An `ftp_server` application has been added.
B-5601	Minor	The `connection` library API functions `ConnectionSmSetTrustLevel` and `ConnectionSmDeleteAuthDevice` now return void instead of uint16.
B-5610	Minor	Error robustness of sbc and mp3 decoding improved
B-5611	Fatal	gcc now generates more efficient code for 32-bit by 32-bit multiplication. (This also fixes an issue where the code could be incorrect in rare circumstances.)
B-5612	Minor	ISR (Interrupt Service Routine) now clears all length registers so that routines that are called from an interrupt have the length registers cleared.
B-5613	Minor	The naming convention for Kalimba DSP library routines has changed from `$lib_routine` to `$lib.routine`
B-5616	Minor	gcc now generates correct code for multiplying a 32-bit integer by a constant power of 2.

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ID	Severity	Description
B-5623	Minor	In the `avrcp` library, `AvrcpConnectResponse` no longer expects a bluetooth address to be passed in.
B-5624	Minor	In the `avrcp` library, calling `AvrcpConnect` will now always return a confirmation message if the request fails.
B-5625	Minor	The debug version of the `connection` library now panics if an I^{2}CAP connect response from the client contains invalid parameters.
B-5629	Minor	The `avrcp` library will now return confirmation messages for all API calls when the attempt fails, and not just when they are a success.
B-5631	Minor	The `examples/test_mp3decoder` application has been added to the MP3 add-on for BlueLab.
B-5639	Minor	PSR files have been added to the `a2dp_source_dongle` application to help configure the application for operation as a USB or analogue audio device. (These are selected automatically based on the project settings.)
B-5647	Minor	Reduced the sensitivity of the overflow check in `stream_decode.asm` in order to prevent it firing incorrectly with a bursty audio stream.
B-5649	Major	Putting multiple file systems (or applications) into a single DFU file no longer causes dfubuild to fail.
B-5658	Minor	It is now possible for a VM application to specify directly the analogue and digital gain settings for the internal CODEC on certain BlueCore devices. This can be done by setting bit 14 of the gain supplied to `CodecSetInput/OutputGain`. If this is done, bits 0..3 are written to the digital gain register and bits 4..6 are written to the analogue gain register.
B-5665	Minor	For more recent BlueCore variants, the PIO lines used to wake the chip from deep sleep can now be active low. This is controlled by `PSKEY_PIO_WAKEUP_STATE`.
B-5670	Minor	`AvrcpPassthrough` in the `avrcp` library will now send subunit data to the remote end correctly.
B-5674	Minor	A font lookup library has been added for a particular project (support for this is not present in the supplied firmware.)
B-5691	Minor	Tools and firmware have been modified to allow applications in the read-only filesystem to use a full 64Kwords of code space as well as 24Kwords of constants. (Previously the total of code and constant was limited to 64Kwords.)
B-5694	Minor	The PIOs used to drive the WM8731 are now configured during initialisation of the `codec` library.
B-5695	Minor	The `avrcp` library function, `AvcrpPassthrough`, now correctly truncates vendor data to 255 bytes.
B-5702	Medium	Modified the initial streaming state in `stream_decode.asm` so that it will start playing audio sooner than before. It previously started in poorlink which meant it could be several seconds before audio could be heard.
B-5703	Minor	A bug in the MP3 decoder has been fixed where `reorder_spectrum` wouldn't occur if only the right channel was using short windows.
B-5706	Minor	The Kalimba DSP decoders now start in their gobble state rather than poorlink to avoid an initial silence at the start of tracks.
B-5732	Minor	`BlueFlashCmd` now supports querying BlueCore for the chip version and flash size; this is used to automatically identify suitable firmware.
B-5748	Minor	The `HfpGetBdaddr()` function has now been removed from the `hfp` library API. The address of the remote device can be obtained from the connection sink.
B-5749	Minor	The `HFP_SLC_CONNECT_CFM` message sent from the `hfp` library now includes the sink for the SLC connection.

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ID	Severity	Description
B-5751	Minor	When the mp3 decoder was requested to skip over an 'mp3 granule' (equivalent to half an mp3 frame) it would actually consume a whole mp3 frame. This caused it to consume data twice as quickly as expected during the 'poorlink' condition. To get around this problem the 'poorlink percentage' in the past had to be half the value that you'd imagine it should have been. This bug has been corrected, i.e. the decoder correctly skips granules (half frames) when requested.
B-5752	Minor	On exiting the poorlink state, the Kalimba DSP decoders now start buffering rather than entering the gobbling state.
B-5759	Minor	In order to be consistent with the other BlueLab libraries the `avrcp` library no longer defines the `AVRCP_DISCONNECT_CFM` message. `AVRCP_DISCONNECT_IND` is used instead.
B-5765	Minor	The `avrcp` library now returns the status `avrcp_invalid_sink` in confirmation messages, if its functions are passed an invalid sink.
B-5766	Minor	The `avrcp` library now always returns the correct confirmation message for the API function called.
B-5767	Minor	`AvrcpSubUnitInfo` in the `avrcp` library now sends the page data correctly.
B-5771	Minor	The `avrcp` library message, `AVRCP_VENDORDEPENDENT_IND`, now contains the command type that was sent from the remote end.
B-5775	Minor	BlueLab upstream messages no longer contain pointers to data that their client must free. All such data is now allocated as part of the message so it is destroyed together with the message.
B-5780	Minor	The `gavdp` library now correctly rejects configurations which are not within the reported capabilities.
B-5784	Minor	All state in the `gavdp` library is now stored in the task instance; previously global data prevented multiple `gavdp` instances with differing client tasks.
B-5786	Minor	The `gavdp` library now correctly rejects configurations which are not within the reported capabilities.
B-5788	Minor	The `appquery` helper utility has been extended to report the traps supported by a firmware build; this is now used by the BlueLab makefiles to decide whether an application should be placed in the read-only filesystem.
B-5791	Minor	A firmware bug has been fixed which prevented `MESSAGE_ENERGY_CHANGED` from being delivered to a VM application.
B-5797	Minor	gcc now generates the correct labels for constant segment jump tables when optimising switches on values it can calculate at compile time.
B-5799	Minor	Passing a null bluetooth address to `AvrcpConnect` in the `avrcp` library will now cause a Panic in the debug build of the library.
B-5805	Minor	The sink is no longer passed in to many of the `avrcp` library API functions. It is stored internally within the library.
B-5808	Minor	The profile instance pointer is now the first field in all messages returned from the profile libraries.
B-5819	Minor	Some type definitions which were only relevant to BlueLab2 applications have been eliminated from the (shared) `vm_if.h` header file.
B-5830	Minor	The VM version of xIDE now provides stack backtracing functionality. CallStack and Backtrace variables windows have been added.
B-5863	Cosmetic	The `pio_if.h` header defined types which were used only for BlueLab2 and has been removed.
B-5864	Minor	The `PcmRoute` and `PcmRateAndRoute` calls now support Kalimba DSP-mode.
B-5866	Minor	Attempting to step over a switch statement in a VM app no longer causes xIDE to lock up in certain circumstances.

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ID	Severity	Description
B-5870	Minor	The default PIN code for all supplied applications has been changed from "4444" to "8888"
B-5871	Major	The `a2dp` library now respects the local bitpool parameters set during initialisation.
B-5874	Major	gcc3.3 is now less likely to fail with an internal error while compiling calls to `memcpy` involving pointers to pointers.
B-5890	Minor	A optimisation to the startup code for VM applications has saved one word of RAM in the global variables.
B-5891	Minor	The `hfp` library now handles `CL_RFCOMM_CONTROL_IND` messages sent by the `connection` library.
B-5893	Minor	The tools in BlueLab now support the read-only filesystem on 6-Mbit parts with suitable firmware. (Previously 8-Mbit parts were required.)
B-5894	Minor	Step over/into now copes with larger switch statements when debugging VM applications.
B-5898	Minor	As issue has been resolved which could cause warbling in the right channel when the MP3 decoder was decoding from mono.
B-5901	Minor	Some variables that were in scope were not shown when debugging a VM application. These variables now appear correctly.
B-5906	Minor	The combined headset application now checks its current state before attempting to close the AVRCP connection.
B-5909	Minor	The six functions to set the input and output gains in the `codec` library, have been replaced by two, where the channel that should be affected is now passed into the function.
B-5910	Minor	`CLASS_OF_DEVICE` is no longer defined in the `spp` library. The type named `deviceType` that was passed into `SppInit` has been renamed as `spp_device_type`.
B-5914	Minor	The `examples/test_headset` application has been removed; it was incomplete and will be replaced by a fully featured headset application in a later BlueLab release.
B-5915	Minor	The SBC and MP3 decoders are now better at correcting byte alignment when re-synchronising.
B-5918	Minor	A debug variant of the `avrcp` library is now built by default when installing Bluelab.
B-5919	Minor	The combined headset application now sends a button press to the AG if connected as HSP after an HFP connect has failed.
B-5920	Minor	The interface to the `goep` library has been substantially updated to make it more understandable and more consistent with other BlueLab libraries.
B-5921	Minor	The `AvrcpPassthrough` and `AvrcpVendorDependent` interfaces have been changed so that vendor data is passed as a Source and they handle it correctly.
B-5926	Minor	The `hfp` library API now complies with the BlueLab library coding standard.
B-5934	Minor	`spp` library code to connect the rfcomm stream to the UART and to operate LEDs has been moved to the application. The connect confirmation status has now been changed from type `rfcomm_connect_status` to `spp_connect_status`.
B-5945	Major	The `a2dp` library now uses `kalimba_standard_messages.h` for the kalimba message types.
B-5946	Minor	The `connection` library API now complies with the BlueLab library coding standard.
B-5949	Major	BlueLab now probes over SPI to automatically identify which hardware you are using, both BlueCore variant and flash size. As a result the 'hardware' project property in xIDE has been removed.
B-5955	Minor	BlueLab now includes 'compact' firmware builds that support the read-only filesystem (but not DFU) on 6-Mbit parts. These allow applications to exceed 32Kwords on 6-Mbit parts.

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ID	Severity	Description
B-5967	Minor	AV streaming has been improved so that the start of a track will play straight away rather than 200ms being lost. Also the poorlink state is now less likey to be entered and so previous mute periods between audio tracks should not exist any more.
B-5972	Minor	The power table in the `gavdp` library now uses passive mode.
B-5978	Minor	The firmware now correctly handles overlapping calls to `AdcRequest`; previously using the battery library to sample two sources could result in no readings being produced.
B-5988	Minor	The `gavdp` library no longer panics during `A2dpOpen` if the signalling channel establishment failed; checks have been added to make sure the signalling channel is valid when looking for a stream endpoint.
B-6029	Minor	`MESSAGE_SOURCE_EMPTY` has been added.
B-6053	Minor	The interface to the `ftpc` library has been updated to make it more consistent with other BlueLab libraries.
B-6059	Major	`MESSAGE_STREAM_DISCONNECT` is now sent to the task associated with the sink; previously it was only sent there if no task was associated with the source.
B-6060	Minor	The `gavdp` library no longer rejects connections from devices that have their MTU set to less than the I^{2}CAP default MTU (672 bytes). The library will now accept a connection from a remote device advertising any legal MTU.
B-6062	Minor	The combined headset application correctly updates its internal state when notified of an incoming call while currently in an active call.
B-6068	Minor	Debounce settings can now be specified in `.button` files using debounce *samples delay* .
B-6071	Minor	Low power table support has been added to the `spp` library.
B-6073	Minor	The `av_headset_hfp` application now uses the `codec` library.
B-6104	Minor	The `Connection` library manages a list of trusted devices. The list is keyed by Bluetooth address. A new API has been added to allow additional device attributes to be stored. - `ConnectionSmSetAttribute(..)` - `ConnectionSmGetAttribute(..)` This API can be used to store and retrieve attribute data for a device keyed by Bluetooth address.
B-6105	Minor	The default I^{2}CAP configuration in the `connection` library now sets the local MTU to 895 bytes, the maximum we can support, rather than 672 bytes.
B-6107	Cosmetic	kalasm2 no longer prints out random characters instead of meaningful strings as part of some warning and error messages.
B-6110	Major	The `gavdp` library now correctly updates its internal state if a suspend request is rejected by the remote end. This was causing it to reject subsequent suspend requests from the remote end.
B-6117	Minor	The Kalimba DSP decoder code has been adjusted to eliminate ticks which were sometimes heard at the beginning of a track.

B-6123	Minor	When reading or writing data to a Kalimba DSP port, you can now force different settings, for big/little endian and sign extension, than the defaults. To use different settings from the defaults the port identifiers can now be defined with the following extra definitions:
		
		`$cbuffer.FORCE_BIG_ENDIAN` or `$cbuffer.FORCE_LITTLE_ENDIAN`
		
		and
		
		`$cbuffer.FORCE_SIGN_EXTEND` or `$cbuffer.FORCE_NO_SIGN_EXTEND`

B-6124	Major	The `connection` library no longer leaks memory when its client attempts to connect to an invalid bluetooth address.

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ID	Severity	Description
B-6129	Minor	The interface to the `ftps` library has been updated to make it more consistent with other BlueLab libraries.
B-6143	Minor	`ConnectionSmDeleteAllAuthDevices(..)` previously failed to remove all devices from the paired device list.
B-6152	Minor	A firmware change means that the sink value in `DM_EX_SCO_DISCONNECT_IND` primitives is now correctly set, rather than being zero.
B-6153	Minor	The `av_headset_hfp` application now checks stream validity before routing SCO to the PCM hardware.
B-6155	Minor	Freeing a pointer which points into the middle of an allocated region (rather than the start of the region) now causes a VM panic.
B-6163	Minor	If the remote end initiates closing the media channel the `gavdp` library waits for 500ms (thus allowing the remote end to disconnect the signalling channel) before initiating a disconnect of the signalling channel, if it is still connected. Previously it would disconnect the signalling channel immediately.
B-6165	Minor	The `a2dp` and `gavdp` libraries now provide a `CloseAll` function to clean up all existing AV connections.
B-6177	Minor	The `gavdp` library no longer tries to use a signalling connection that doesn't exist.
B-6178	Minor	The `gavdp` library now does some additional checking on the result of a `SinkClaim`.
B-6179	Minor	The `oppc` library API has been updated as part of the changes to the `goep` API.
B-6188	Minor	Code has been added to prevent changing track, or playing of very short sound clips, resulting in a short clip of the last sound being played.
B-6194	Minor	If the AG does not support an in-band ring tone but opens a SCO while sending RING indications, the combined headset application will now play its own ring tone.
B-6198	Minor	A new 'Message' tab in xIDE traces messages passed to the tasks in the application, both from other tasks and from the firmware.
B-6208	Minor	The `a2dp` and `gavdp` no longer contain a `media_sink` field in their CODEC settings indication messages.
B-6210	Minor	The `opps` API has been updated to match the new `goep` API.
B-6214	Minor	An `opp_server` application has been added.
B-6217	Minor	A minor issue in the firmware has been resolved which could mean updates to local variables placed at `0xFFF8` were ignored by xIDE.
B-6230	Minor	`SinkIsValid` and `SourceIsValid` library routines have been added.
B-6233	Minor	A debug variant of the `spp` library is now built by default when installing BlueLab.
B-6234	Minor	The `opps` library no longer assumes that vCard mime types will all be lower case.
B-6245	Minor	The `hfp` library now correctly hangs up the active call if a second call comes in and the application issues an `HfpTerminateCall` request.
B-6259	Minor	gcc no longer allows bitfields to straddle word boundaries any more. Doing so generated extra code and broke applications which made assumptions about structure packing.
B-6275	Minor	An `obex_server` application has been added.
B-6276	Fatal	The `gavdp` library now correctly validates the service capabilities received in a get capabilities response.
B-6283	Minor	The `examples/oppc` application has been added.
B-6284	Minor	DFU tools have been included with BlueLab in tools/dfu.
B-6286	Minor	The AG may optionally include an alphanumeric representation of the number sent in the CLIP indication. If the hfp receives this it sends a single `HFP_CALLER_ID_NAME_IND` message to the client containing this string.
B-6287	Minor	The Kalimba DSP message library has been updated to avoid corrupting the timer list when the firmware took longer than expected to acknowledge a message.

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ID	Severity	Description
B-6330	Minor	Any streams connected to the Kalimba DSP are now disconnected before a new Kalimba DSP application is loaded by KalimbaLoad; previously the firmware could believe that streams were still connected, despite the Kalimba DSP having been restarted.
B-6347	Minor	A warping operator has been added to the Kalimba DSP libraries allowing `stream_decode` to maintain buffer levels at the good working level. This supports source and sink having non perfect sampling frequencies and helps to conceals flaws in encoders with poor buffer-level jitter control.
B-6375	Minor	The `connection` library now waits for the client to read the `CL_L2CAP_DISCONNECT_IND` message before acknowledging the disconnect.
B-6380	Minor	`PcmRateAndRoute` to internal CODECs on kalimba will now rejects 48kHz for the ADCs since it is not supported by the hardware.
B-6386	Minor	The `hfp` and `a2dp` libraries now allow their client task to supply a service record to be registered instead of the default service record for that profile.
B-6417	Minor	The `hfp` library now returns more specific error codes if the SLC attempt fails so its client can differentiate between a connect fail due to page timeout and the remote device not supporting the requested service.
B-6439	Minor	A `connection_id` field has been added to the `CL_L2CAP_CONNECT_CFM` message sent by the `connection` library.
B-6447	Minor	The Kalimba DSP profiler library no longer requires explicit calls to `profiler.register` before the first call to `profiler.start`.

B-6448	Minor	To be more consistent with other Kalimba DSP libraries the names of some constants have been changed. For example:
		
		`$codec.STREAM_ENCODER_IN_LEFT_BUFFER_FIELD`
		
		has been changed to:
		
		`$codec.stream_encode.IN_LEFT_BUFFER_FIELD`

B-6451	Major	The Kalimba DSP loop registers are now reset during `KalimbaLoad`; previously they were left alone. If, as a result of switching Kalimba DSP applications, this left them pointing to the first instruction in a loop, the Kalimba DSP could branch to a random address.
B-6483	Minor	The structures used to configure the profile library instance for the `hfp` and `a2dp` libraries have been renamed to `hfp_init_params` and `a2dp_init_params` respectively
B-6503	Minor	The `hfp` library now ignores RING indications if the AG sends them before the SLC is fully established. Both ends are forbidden (by the profiles) from sending any signalling messages until the SLC has completed.
B-6505	Minor	Scripts to help Matlab users to inspect Kalimba DSP state (such as buffer levels) have been added to the `tools/matlab` directory.
B-6510	Minor	A subtle bug in the gcc register allocator caused gcc to delete an instruction that was necessary in some obscure circumstances.
B-6555	Minor	Improved interop of Bluestack by always exiting sniff mode or park mode before opening a SCO or eSCO link. It was seen that certain phones would always reject a SCO connection if the ACL was in sniff.
B-6597	Minor	The firmware implementation of `StreamConnectDispose` has been optimised when applied to common case of region, file and audio sources.
B-6598	Minor	The `av_headset_hfp` application no longer attempts to configure the ADC to a rate the hardware does not support.
B-6601	Minor	When connecting an Audio Source to the Kalimba DSP, garbage data was occasionally sent. This has been fixed.
B-6631	Minor	At above maximum amplitude saturation now correctly occurs.

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ID	Severity	Description
B-6641	Major	The MPEG-2 extended sample rates have been removed from the MP3 capabilities in the `a2dp` library because these are not supported by the Kalimba DSP application.
B-6694	Major	Calls to `StreamConnect` with a SCO stream no longer fail if the SCO connection is in the process of being closed by the baseband but the VM application has yet to be informed.
B-6699	Minor	A memory leak when connecting to an invalid Bluetooth address has been fixed in the `goep` library.
B-6901	Fatal	BlueFlash and BlueFlashCmd no longer report errors writing to sector 64 on BlueCore 3 when using certain flash devices.
B-6906	Fatal	The version of `strncpy` supplied as part of the BlueLab libraries could illegally access memory beyond the bound given on the source string. This has been fixed.
B-6941	Major	xIDE no longer reports nonsense values for the contents of a service record when logging a `SDS_REGISTER_REQ` in the BlueStack tab. (In unusual circumstance the firmware could panic while logging such a primitive.)
B-6980	Major	The AVRCP library now leaves data in the source until a response has been sent; previously it would hold the data in a dynamic block which caused problems with stacks (such as the iPaq HX2415) which sent mutliple AVRCP messages without waiting for an acknowledgement.
B-6983	Major	A problem has been resolved which could, in unusual circumstances, lead to gcc3 generating incorrect code when switching on a variable and then referencing the variable soon after the switch.
B-6996	Minor	The `spp_dev_a` application no longer looks for an exact class of device match during an inquiry result.
B-7203	Major	If the connection library receives an I^2cap connect response and cannot find the internally stored data for this connection it will now send a `CL_L2CAP_CONNECT_CFM` message to the client indicating this rather than panicking.
B-7217	Major	The `hfp` library now allows audio transfer when in the incoming and outgoing call states.
B-7246	Minor	Reference documentation for the Kalimba DSP library code is now included and accessible from xIDE's help panel.
B-7265	Minor	The CVSD filter is now available when using SCO streams.
B-7319	Major	The `gavdp` library could fail to attempt a role switch even when the device was configured as an AV sink. This could result in degraded throughput and poor AV performance and has been fixed.
B-7360	Minor	The hfp no longer leaks memory when an `HfpSlcConnect()` is issued with the `extra_indicators` parameter set and the connect attempt fails.
B-7370	Minor	The `hfp` library has been updated to use a longer sniff interval.
B-7386	Minor	The `gavdp` library now cleans up its state properly if it attempts to open a transport channel and this attempt fails.
B-7388	Major	The av source dongle application now correctly handles an `A2DP_CODEC_SETTINGS_IND` message from the `a2dp` library if the remote device is initiating the AV connection. Previously it was not expecting that message in that state and would panic.
B-7402	Minor	The `hfp` library now correctly parses +CCWA indications sent from the AG with fewer parameters than required by the HFP specification.
B-7405	Minor	The `avrcp` library has been updated so it can be configured to support either the target or the controller role. The correct UUID is inserted into the service record registered by the `avrcp` library depending on the role selected by the client.
B-7433	Minor	This release of firmware adds support for slave mode I2S audio.
B-7439	Minor	Explicit support for MBM29SL800BE was missing from BlueFlash and BlueFlashCmd. It has been added.

<div style="writing-mode: vertical">**BlueLab™ v3.2 Software Release Note**</div>

ID	Severity	Description
B-7638	Minor	A demonstration version of the CVC DSP code has been added to the `av_headset_hfp` application (this can be enabled by defining `INCLUDE_CVC` in the project properties.)
B-7693	Major	The `EnergyEstimationOn/Off` functions no longer fail if the SCO sink is connected to a source.
KEX-20	Minor	A spurious read has been eliminated from the gargle filter. This caused the audio to sound gargled even when the filter was off.
KEX-23	Minor	A tone generation example has been added, making use of the Kalimba DSP to generate the tones, and the VM to parse instructions typed by the user into an interface such as HyperTerminal.
KEX-28	Minor	BlueLab3.2 kalimba examples have been updated to align with the current naming convention. To that end modules are now named using the following convention: `$M.modName` not `$M_modName`.
KEX-29	Minor	A demonstration of the mix operator has been added to the `test_sbc_loopback` example in BlueLab.
M-399	Minor	Kalimba breakpoints are no longer lost when the Kalimba application is reloaded by the vm.
M-412	Minor	Debug output in xIDE is no longer slower with the BlueCore host transport set to none, and in general performance and robustness of the SPI transport has been improved.
M-427	Cosmetic	The debug transport for xIDE can no longer be 'unset' by dismissing the debug transport dialog without making a selection; which could prevent the debugger making contact with BlueCore.
M-442	Minor	The accuracy of timestamps in the xIDE primitive trace has been improved.
M-571	Minor	If the pre-processor symbols used in a Kalimba DSP project are changed, xIDE will now force a rebuild of the assembler source code. Previously, a manual 'clean' step was required to force this to happen.
M-577	Cosmetic	The version of BlueLab being used in now displayed in the title bar of the main xIDE window.
M-595	Major	Expanding certain items in the variable widget (especially pointers) could cause xIDE to crash. This no longer occurs.
M-596	Minor	xIDE can now parse debug information for code with variables declared as `volatile'.
M-599	Minor	Certain variables were displayed as ???? in the xIDE debugger. These variables are now read correctly.
M-690	Major	xIDE should now correctly handle setting breakpoints in Kalimba DSP source files. Previously it could refuse to set them if the file was opened from the File menu, rather than from the project file list.

Table Appendix C.1: Issues resolved since BlueLab v3.1

BlueLab™ v3.2 Software Release Note

Terms and Definitions

BlueCore™	Group term for CSR's range of Bluetooth wireless technology chips
BlueLab™	CSR's development toolset for building applications to run in the firmware's VM
Bluetooth®	Set of technologies providing audio and data transfer over short-range radio connections
BlueStack™	Mezoe's implementation of a Bluetooth protocol stack (up to RFCOMM level)
BlueSuite™	Family of software utilities for Bluetooth evaluation and development (supplied with CSR development systems Casira, MicroSira, CompactSira).
Casira™	CSR's main Bluetooth evaluation hardware
Persistent Store	Storage of BlueCore's configuration values in non-volatile memory
ADC	Analogue to Digital Converter (the analogue inputs on BlueCore)
AG	Audio Gateway
AT	Attention (modem command prefix)
API	Application Programming Interface
AVRCP	Audio/Video Remote Control Profile
BCCMD	BlueCore Command
BCSP	BlueCore Serial Protocol
CODEC	COder DECoder
CSR	Cambridge Silicon Radio
DM	Device Manager
DSP	Digital Signal Processor
EAG	Embedded Audio Gateway
FTPC	File Transport Profile Client
FTPS	File Transport Profile Server
GCC	GNU Compiler Collection
GOEP	Generic Object Exchange Profile
H4	UART-based HCI transport, described in section of H4of v1.0b of Bluetooth Specification
HCI	Host Controller Interface
HFP	Handsfree Profile
HID	Human Interface Design
OBEX	Object EXchange Protocol
OPPC	Object Push Protocol Client
OPPS	Object Push Protocol Server
PIO	Parallel Input Output; the parallel port on BlueCore
RFCOMM	Serial cable emulation protocol (element of Bluetooth)
SBC	Sub-Band Coding
SCO	Synchronous Connection Oriented link
SDP	Service Discovery Protocol
SIG	Special Interest Group (Bluetooth SIG controls the Bluetooth specifications)
SPI	Serial Peripheral Interface
SPP	Serial Port Profile
UART	Universal Asynchronous Receiver Transmitter

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Terms and Definitions (continued)

USB	Universal Serial Bus
VM	Virtual Machine; environment in the BlueCore firmware for running application-specific code produced with BlueLab

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Document History

Revision	Date	Reason for Change
a	01 JUN 05	Original publication of this document. (CSR reference: blab-srn-001Pa)

BlueLab

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blab-srn-001Pa

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