# KBP SDK 1.5.13

# ARAD/Jericho ADDENDUM

# Revision History

| Revision | Date | Change Description |
|---|---|---|
| KBP-SDK-1.5.13 | 07/12/20 | Bug fixes and enhancements for OP2. |
| KBP-SDK-1.5.12 | 03/30/20 | Bug fixes and enhancements for OP2. |
| KBP-SDK-1.5.11 | 11/26/19 | Bug fixes and scale enhancements for OP2 and Jericho2 internal forwarding solution. Introduction of thread safety feature. |
| KBP-SDK-1.5.10 | 07/29/19 | Bug fixes and enhancements for OP,OP2, Jericho and Jericho2 internal forwarding solution |
| KBP-SDK-1.5.9.1 | 05/07/19 | Bug fix for OP2. |
| KBP-SDK-1.5.9 | 04/26/19 | Bug fixes and enhancements for OP and OP2. |
| KBP-SDK-1.5.8.2 | 04/17/19 | Bug fixes and enhancements for OP and OP2. |
| KBP-SDK-1.5.8.1 | 03/18/19 | Bug fixes and enhancements for OP2. |
| KBP-SDK-1.5.8 | 02/28/19 | Bug fixes and enhancements for OP2. |
| KBP-SDK-1.5.7.1 | 02/06/19 | Bug fix for OP2. |
| KBP-SDK-1.5.7 | 01/21/19 | Bug fixes and enhancements for OP2. |
| KBP-SDK-1.5.6.1 | 12/14/18 | Bug fixes for OP2. |
| KBP-SDK-1.5.6 | 12/05/18 | Bug fixes and enhancements for OP2 and Jericho2 internal forwarding solution. |
| KBP-SDK-1.5.5.1 | 10/12/18 | Bug fix for OP2. |
| KBP-SDK-1.5.5 | 09/24/18 | Bug fixes for OP2 and Jericho2 internal forwarding solution. Support for 156.25 |

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|---|---|---|
| | | MHz Ref CLK |
| KBP-SDK-1.5.4.1 | 08/31/18 | Bug fixes for OP2 and Jericho2 internal forwarding solution. |
| KBP-SDK-1.5.4 | 08/06/18 | Bug fixes and enhancements for OP2 and Jericho2 internal forwarding solution, introducing statistics support. |
| KBP-SDK-1.5.3.2 | 07/19/18 | Bug fixes for OP2. |
| KBP-SDK-1.5.3.1 | 06/25/18 | Bug fixes for OP2. |
| KBP-SDK-1.5.3 | 06/01/18 | Bug fixes and enhancements for OP2 and Jericho2 internal forwarding solution, introducing counter support. |
| KBP-SDK-1.5.2 | 03/29/18 | Bug fixes for OP, OP2 and Jericho2 internal forwarding solution. LUT programming API for OP and OP2 |
| KBP-SDK-1.5.1 | 02/23/18 | Bug fixes for OP2 and Jericho2 internal forwarding solution |
| KBP-SDK-1.5.0 | 10/25/17 | Preliminary support for Optimus Prime 2 and Jericho2 internal forwarding solution |

# KBP SDK Rev. 1.5.13 ARAD/Jericho Addendum

Compatibility with Jericho SDK

- This version of the SDK is compatible with Jericho SDK 6.5.16 SP1 or newer for OP2 users
- This version of the SDK is compatible with Jericho SDK 6.5.14 or newer for OP users

Compatibility with KBP Driver

This version of the SDK is compatible with KBP driver version 2.12

**Description:**

**KBP SDK 1.5.13 has the following fixes and enhancements:**

1) [CS9303101] Enhancement to improve consistency of counter values read at a fixed periodic interval.

   The following API needs to be used to enable this enhancement.

   ***kbp_tap_db_set_property(tap_db, KBP_TAP_DB_PROP_RATE_COMPUTE, 1)***

2) [CS9277297] Bug fix for issue in Stats DBs reporting more than expected value.

   The following API needs to be used to enable this fix.

   ***kbp_device_set_property(device, KBP_DEVICE_PROP_TAP_RESERVE_UDM, 1)***

3) [KBPSDK-3019] [KBPSDK-3020] Bug fix related to result port assignment of counter enabled DBs.

4) Bug fix for issue in LUT programming for single port mode in OP.

5) General availability support for the 40M SKU of OP2

6) [SDK–209458] Enhancements in 0b AD feature to support return values in the range of 0-63 to ensure zeros on MSB 16 bits [23:8].

7) Bug fix for crash in a scenario where core0 in OP2 has no DBs.

8) Bug fix for crash in a scenario with variable size AD.

9) Bug fix for an issue where ACL DBs in OP produce occasional lookup failures.

10) Limited support for hitbits feature on OP2.

11) KBP transport layer (XPT) source code is available as a separate package upon request.

12) The following API has been introduced to enable programming and reset of Tx and Rx interfaces on SerDes.

***kbp_status kbp_device_interface_program_PHMF_FIFO(enum kbp_device_type type, struct kbp_device_config *config, uint64_t lane_bitmap, uint8_t reset);***

***kbp_status kbp_device_interface_PHMF_FIFO_toggle(enum kbp_device_type type, struct kbp_device_config *config, uint32_t flags);***

***kbp_status kbp_device_interface_TXPCS_soft_reset_toggle(enum kbp_device_type type, struct kbp_device_config *config);***

***kbp_status kbp_device_interface_tx_rx_toggle(struct kbp_device_config *config, uint32_t flags);***

**KBP SDK 1.5.12 has the following fixes and enhancements:**

1) General availability support KBP_DEVICE_THREAD_SAFETY feature.

2) Resource management behavior has been changed to not disable DB access from a different core when a constraint related to instructions is hit. Instead an error code will now be returned indicating the scenario could not fit into the device.

3) The following APIs have been introduced to enable configuration on resources on KBP using a predetermined customized profile.

***kbp_status kbp_device_load_resource_profile(struct kbp_device * device, char *resource_str);***

***kbp_status kbp_device_get_resource_profile(struct kbp_device *device, char *resource_str, uint32_t resource_str_size);***

4) [CS9341543] [CS9287140] Bug fixes in ILKN SerDes diagnostics APIs.

5) New APIs related to Statistics interface diagnostics have been added.

***kbp_status kbp_device_pm_interface_serdes_prbs(void *xpt_hdl, enum kbp_prbs_polynomial prbs_poly, uint32_t enable, uint16_t lane_bitmap);***

***kbp_status kbp_device_pm_interface_serdes_prbs_print(void *xpt_hdl, uint16_t lane_bitmap);***

***kbp_status kbp_device_pm_interface_serdes_eyescan(void *xpt, uint16_t lane_bmp);***

***kbp_status kbp_device_pm_interface_serdes_lanestate(void *xpt, uint16_t lane_bmp);***

6) [CS8256160] kbp_pcie_init() API has been enhanced to detect and correct corrupt PCIe command register.

7) Limited support for the 40M SKU of OP2.

**KBP SDK 1.5.11 has the following fixes and enhancements:**

1) kbp_device_interface_init API has been enhanced to improve link stability, it may take a longer time to execute compared to previous version.

2) Error handling demo has been updated to showcase more types of errors and appropriate handling of the same.

3) Scale improvements in Jericho2 internal forwarding engine.

4) Bug fix for coherency issue in Jericho2 internal forwarding engine.

5) [CS8759607] A new device property KBP_DEVICE_THREAD_SAFETY has been added. This flag can be used in kbp_pcie_init API to enable a locking mechanism in the PCIe transport layer to allow multiple threads accessing the transport layer. A separate thread can now be used for updates to search Databases, for Error handling and for reading Stats Databases. This release contains preliminary support only for this feature.

6) A new database property KBP_PROP_MC_DB has been added. A new API **kbp_key_set_critical_field** can be used in conjunction with this property to optimize the database for certain data patterns typically seen in Multicast Databases.

7) Bug fixes and enhancements in op and tap diagnostic tools.

8) [CS9015531] Bug fix for issue in kbp_instruction_set_property API where per port result size constraint of 128b for OP device types wasn't being enforced.

9) Fix for issue with warmboot for stats databases.

10) Scale improvements in LPM databases for OP2 device type.

11) Support added for 0b AD size in LPM databases for OP2 device type.

12) New device property KBP_DEVICE_PROP_HANDLE_INTERFACE_ERRORS added. This property can be used to disable handling of interface errors by kbp_device_fix_errors API.

13) kbp_status_errors structure has been enhanced to include additional error bits.

**KBP SDK 1.5.10 has the following fixes and enhancements:**

1) ILA mode support for Optimus Prime 2.

2) Blackhawk FW version upgraded to D100_07.

3) Fix in kbp_db_stats API for Jericho internal forwarding solution.

4) [CS8109495][CS8448612] Fix for issue where DB Soft Errors are observed on OP2 Core-1 after device initialization.

5) Fix for coherency issue in Jericho2 internal forwarding solution.

6) Capacity improvements for Databases using per entry AD feature.

7) Fix for bug related to kbp_pcie_init API usage during warmboot for OP/OP2.

8) Fix for issue found when kbp_device_warmboot_save_and_continue API is called subsequent to a kbp_pcie_destroy API call.

9) Blackhawk FW version upgraded to D100_06.

10) [CS7925669] [KBPSDK-2632] - O3S bug fix in IFSR with BROADCAST_AT_XPT property set.

11) [CS8080941] [KBPSDK-2614] – Fix for capacity issue in Jericho+ running in Jericho compatibility mode.

12) Default TXFIR settings for ILKN interfaces running in NRZ mode updated with optimized values for typical designs. Customers are expected to analyze individual systems and determine TXFIR settings that work best for the same.

13) Bug fix for an issue in LPM where databases using result resolution were occasionally returning incorrect hits.

14) Bug fix in “op show clk” command to display core clock frequency.

15) Fix for bug causing slowdown in entry addition after kbp_instruction_search API is invoked.

16) kbp_pcie_init API has enhanced to detect link issues and return appropriate return codes.

17) kbp_device_selective_shutdown API has been added to selectively shutdown resources on KBP.

18) The following APIs have been introduced to support reading and writing device registers using PIO transactions. These APIs have limited support across different devices. Please contact Broadcom Support for guidance on how to use them.

***kbp_status kbp_device_pio_register_write(struct kbp_device * device, uint32_t address, uint64_t data);***

***kbp_status kbp_device_pio_register_read(struct kbp_device * device, uint32_t address, uint64_t *o_data);***

19) A new API has been introduced to allow users to add overlay keyfields on top of the master key.

***kbp_status kbp_key_overlay_field(struct kbp_key *master_key, char *name, uint32_t width_1, enum kbp_key_field_type type, uint32_t offset_1) ;***

20) Fix for PRBS issue.

21) New command added “op show lut_tbl” to dump LUT info.

22) *struct kbp_status_errors* has been updated with new fields to allow additional interrupt triggers, please check the structure definition for additional details.

23) kbp_device_fix_errors API has been enhanced to handle Interface related errors as well.

24) The following API has been enhanced to take an additional argument to give control to users on what error bits to be cleared. The new argument is sel_clr.

***kbp_status kbp_device_clear_errors(struct kbp_device *device, struct kbp_status_errors *sel_clr)***

**KBP SDK 1.5.9.1 has the following fix:**

1) Bug fix for AVS related issue on OP2 A0 silicon.

**KBP SDK 1.5.9 has the following fix(es) and enhancement(s):**

1) [KBPSDK-2502] struct kbp_entry_info has a new member ad_db, this can be used to determine the ad_db associated with the current entry.

2) New DB property KBP_PROP_XL_DB added. This property can be used to indicate that a DB is exceptionally large and optimize resource allocation and management for the same.

3) New DB property KBP_PROP_REPLICATE_DB added. This property can be used to indicate if a DB needs to replicate when being accessed from multiple device threads.

4) Scale improvements for LPM DBs.

5) Blackhawk Firmware version upgraded to D100_05.

6) kbp_device_dump() API has been enhanced to dump TAP information.

**KBP SDK 1.5.8.2 has the following fix(es) and enhancement(s):**

1) Bug fix for portability issue with bit field.

2) New DB property KBP_PROP_LOCALITY added. This property can be used to group DBs together in KBP and optimize storage.

3) Bug fix for LUT issue related to DUMMY fields.

4) Supports OP core clock programming for 750MHz when CPSEL pins are set to 720MHz operation.

5) kbp_pcie_set_property API updated to support user programmable signal number for MSI.

6) kbp_pcie_set_property API updated with MSI disable feature

7) Bug fix in kbp_device_read_die_temperature API & kbp_device_read_die_voltage API

8) ***struct kbp_status_errors*** has been updated with a new field ***crb_error_interrupt.*** Error interrupts trigger PCIe MSI when this field is set through kbp_device_enable_interrupt API

9) Fix for spurious error messages generated as part of AVS initialization.

10) Fix for AVS bug in op present in the following KBP SDK versions: 1.5.4.1, 1.5.5.1 and 1.5.6.1

**KBP SDK 1.5.8.1 has the following fix(es) and enhancement(s):**

1) [KBPSDK-2532] LUT issue related to padding.

2) KBP device driver version updated to 2.9 to support Linux kernel version >= 4.11

**KBP SDK 1.5.8 has the following fixes and enhancements:**

1) [KBPSDK-2520] AD entries exhausted after different amount of entries added between 1.5.6 and 1.5.7.

2) LPM scale improvements.

3) AVS support for OP2.

**KBP SDK 1.5.8 also introduces the following APIs.**

***1) kbp_status kbp_device_inject_errors(struct kbp_device *device, struct kbp_status_errors *err, uint32_t emulate);***

This API injects/emulates an error in the device, non-emulation mode supported only for DBA/UDA/UIT memory

2) ***kbp_status kbp_device_get_errors(struct kbp_device *device, struct kbp_status_errors *o_errors);***

   This API can be used to get the current error status in the device.

3) ***kbp_status kbp_device_enable_interrupt(struct kbp_device *device, struct kbp_status_errors *en_err);***

   This API can be used to set the masks for the errors that will trigger interrupt. Each call will overwrite the previous values.

4) ***kbp_status kbp_device_clear_errors(struct kbp_device *device);***

   This API can be used to clear the errors in the device.

5) ***kbp_status kbp_device_get_error_list(struct kbp_device *device, uint64_t *error_buffer, uint32_t buffer_size, uint32_t *filled_count);***

   This API can be used to get the list of error codes for the errors addressed during the last kbp_device_fix_errors() call.

6) ***kbp_status kbp_device_interface_serdes_tap_settings(enum kbp_device_type type, struct kbp_device_config *config, uint32_t lane_bmp, struct kbp_serdes_tap_settings *tap_settings);***

   This API can be used to set TXFIR settings for ILKN/Search interface.

7) ***kbp_status kbp_device_pm_interface_serdes_tap_settings(void *xpt, uint16_t lane_bmp, struct kbp_serdes_tap_settings *tap_settings);***

   This API can be used to set TXFIR settings for PM/Stats interface.

KBP SDK 1.5.7.1 has the following fixes and enhancements:

1) Fix for spurious error messages from kbp_device_interface_init API.

KBP SDK 1.5.7 has the following fixes and enhancements:

1) Optimus Prime 2 B0 support.
2) AVS support for Optimus Prime 2.
3) [KBPSDK-2497] ACL counters combined with Stats are not working.
4) [KBPSDK-2506] OP2 fails to reestablish the stat ports.
5) The following API has been enhanced to take custom TXFIR settings as input

   ***kbp_status kbp_device_pm_interface_init(int unit, void *xpt_hdl, int32_t port_speed, int32_t port_bmp, int32_t is_nrz, int32_t link_training, struct kbp_serdes_tap_settings *user_emph_vals)***

KBP SDK 1.5.6.1 has the following fixes:

1) Bug fix issue with Counters.
2) Bug fix for issue in Warmboot for Statistics DBs.

KBP SDK 1.5.6 has the following fixes and enhancements:

1) Bug fix for issue in NetRoute multi-access databases on Optimus Prime 2.
2) Bug fix for issue with Dummy DBs in SMT mode.
3) Improved scale for v6 databases in Jericho2 internal forwarding solution.

KBP SDK 1.5.6 also introduces API to inject parity errors into the KBP.

***1) kbp_status kbp_device_inject_errors(struct kbp_device *device);***

This API can be used to inject a soft error into the KBP. This API facilitates testing the error handling capabilities of the KBP and is expected to be used in conjunction with kbp_device_fix_errors API.

KBP SDK 1.5.5.1 contains the following fix.

1) Bug fix for Optimus Prime 2 clock programming in Big Endian systems.

KBP SDK 1.5.5 introduces Warmboot support for Jericho2 internal forwarding solution and also contains bug fixes for Jericho2 internal forwarding solution.

KBP SDK 1.5.4.1 contains the following fixes.

1) Fix in API kbp_instruction_set_opcode for SMT mode.

2) Fix for assert in JR2 KAPS.

KBP SDK 1.5.4 contains bug fixes and enhancements for Jericho2 internal forwarding engine.

KBP SDK 1.5.3.2 contains the following fixes.

3) Fix in API kbp_instruction_set_opcode.

KBP SDK 1.5.3.1 contains the following fixes.

1) Fix for kbp_instruction_set_property to honor byte_offset for result configuration.

2) Fix in API kbp_instruction_set_opcode.

KBP SDK 1.5.3 contains bug fixes for Jericho2 internal forwarding engine. It additionally contains all the fixes incorporated for Jericho internal forwarding solution as of KBP SDK 1.4.18.

KBP SDK 1.5.2 contains bug fixes for Jericho2 internal forwarding engine.

KBP SDK 1.5.1 contains bug fixes for Jericho2 internal forwarding engine.

KBP SDK 1.5.0 introduces preliminary support for Jericho2 internal forwarding engine. This feature has been validated on C-Model. It additionally contains all the fixes incorporated for Jericho internal forwarding solution as of KBP SDK 1.3.13 and 1.4.17. This version of the SDK has been verified with two NLA8865x KBPs connected externally to Jericho and BCM15K connected to Jericho, Qumran and Jericho+. A number of feature enhancements for Jericho + NL8865x are available in this release.

**Packaging:**

The Arad/Jericho SDK package combines all the components of the SDK combined into a single library as expected by the ARAD/Jericho SDK. Please refer to the README.txt packaged in the distributions for additional information.

**ARAD + NLA8865x:**

The following KBP SDK property has been introduced since KBP SDK 1.3.3 to restrict the issuing of block clears to kbp_device_lock() function. This prevents the block clear operations from interfering with data path traffic in most cases

*kbp_device_set_property(device, KBP_DEVICE_PRE_CLEAR_ABS, 1);*

The use of the property requires equivalent patch to be available in ARAD SDK. Please consult ARAD SDK for additional information.

Flow control should be enabled on ARAD NPU. Not enabling it can result in FIFO overflow on KBP side and result in an unrecoverable fatal error. Flow control is always enabled on the KBP. Please consult the ARAD SDK for additional information.

**Jericho2 Internal Forwarding Engine:**

This version of the KBP SDK introduces preliminary support for the internal forwarding lookup engine in Jericho2. The following features are currently not supported

- Hit Bits
- Crash Recovery
- DMA Databases

**Jericho/Jericho+ Internal Forwarding Engine:**

This version of the KBP SDK fully supports the internal forwarding lookup engine in Jericho and Jericho+. All features have been fully tested on Silicon

**Jericho + NLA8865x:**

Jericho + NLA8865x connectivity has been fully validated. Please ensure all patches to the Jericho SDK pertaining to the KBP have been applied.

**Jericho + BCM15K:**

Jericho/Qumran and Jericho+ connectivity has been fully validated. Please ensure all patches to Jericho SDK pertaining to BCM15K have been applied.