

**KBP SDK 1.4.22.2**

**Release Notes**

## Revision History

Revision	Date	Change Description
KBP-SDK-1.4.22.2	08/17/20	Enhancement for Jericho internal forwarding solution
KBP-SDK-1.4.22.1	06/27/19	Bug fix for OP
KBP-SDK-1.4.22	06/18/19	Bug fixes for O3S and Jericho+ internal forwarding solution
KBP-SDK-1.4.21	04/21/19	For ISSU feature new API added to selectively disable the blocks.
KBP-SDK-1.4.20	02/21/19	Bug fix for O3S IFSR issues.
KBP-SDK-1.4.19	08/21/18	Bug fix for O3S double capacity mode.
KBP-SDK-1.4.18	05/04/18	Bug fixes for warmboot, portability.
KBP-SDK-1.4.17	02/02/18	AD manager optimization for v4/v6 mix, kbp_db_stats API enhancement, BER API enhancements, bug fixes.
KBP-SDK-1.4.16	11/03/17	API to reset the device, bug fixes.
KBP-SDK-1.4.15	10/06/17	Option to return error instead of abort in assert function for transport error, MDIO read for last MDIO write, and few bug fixes
KBP-SDK-1.4.14	09/06/17	DMA database width fix for JR+, support IFSR for broadcast devices, and few bug fixes
KBP-SDK-1.4.13	06/25/17	Bug fixes
KBP-SDK-1.4.12	06/05/17	AVS API bug fixes, Memory optimizations, bug fixes
KBP-SDK-1.4.11	03/30/17	AVS API support, BCM15K related bug fixes and enhancements
KBP-SDK-1.4.10	01/15/17	BCM15K related bug fixes and enhancements
KBP-SDK-1.4.9	10/26/16	Serdes Enhancements
KBP-SDK-1.4.8	09/30/16	Bug fixes enhancements and performance improvements for Optimus Prime, silicon testing.
KBP-SDK-1.4.7	07/29/16	Update rate improvements for Jericho + NLA8865x. Bug fixes and performance improvements for Optimus Prime, silicon testing.
KBP-SDK-1.4.6	06/12/16	Update rate improvements for Jericho + NLA8865x. Bug fixes and performance improvements for Optimus Prime, silicon testing.
KBP-SDK-1.4.5	05/01/16	Bug fix for Crash Recovery

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KBP-SDK-1.4.4	03/09/16	Multiple features for Jericho + NLA8865x. Bug fixes and performance improvements for Optimus Prime
KBP-SDK-1.4.3	01/11/16	Optimus Prime full feature support and bug fixes. Increased IPv4 and IPv6 scale for ARAD/Jericho customers using NLA8865x (NLA12K)
KBP-SDK-1.4.2	07/27/15	Optimus Prime full feature support and bug fixes
KBP-SDK-1.4.1	03/16/15	Optimus Prime new feature support and bug fixes
KBP-SDK-1.4.0	12/19/14	Preliminary support for Optimus Prime

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## **Release Notes for KBP SDK Rev. 1.4.22.2**

### **Description:**

#### **KBP SDK 1.4.22.2 contains the following**

- [CS00010501563] – Enhancement to return error code instead of assertion in kbp\_device\_restore\_state API.

#### **KBP SDK 1.4.22.1 contains the following**

- [CS8421008] - Fix for kbp\_pcie\_init failing with "DMA Hang" message on DNX SDK 6.5.9

#### **KBP SDK 1.4.22 contains the following bug fixes**

- [CS7925669] [KBPSDK-2632] - O3S bug fix in IFSR with BROADCAST\_AT\_XPT property set
- [CS8080941] [KBPSDK-2614] – Fix for capacity issue in Jericho+ running in Jericho compatibility mode.

#### **KBP SDK 1.4.21 contains the following new API for ISSU feature**

- kbp\_device\_selective\_shutdown API has been added to selectively shutdown resources on KBP.

#### **KBP SDK 1.4.20 contains the following bug fixes**

- Bug fix for issue in IFSR related to incorrect repair address.
- Bug fix for IFSR of unused locations.

#### **KBP SDK 1.4.19 contains the following bug fix**

[CS4385183] - KBP abort when a certain number of prefixes are inserted.

#### **KBP SDK 1.4.18 contains the following bug fixes**

[CS4385183] [KBPSDK-2408] - Fix for warmboot failure in KAPS.

[CS4986975] [KBPSDK-2432] - Bug fix for error injection APIs.

#### **KBP SDK 1.4.17 contains the following enhancements and bug fixes**

##### **Enhancements:**

[CS4056503] AD resource manager optimization for v4 and v6 mix

[CS4091978] kbp\_db\_stats API modification for capacity estimate to reflect free space not allocated to any databases.

[CS4096364] SerDes tuning API enhancements.

##### **Bug Fixes:**

Broadcast bitmap fix when BROADCAST\_AT\_XPT device property is set.

[KBPSDK-2378] Memory leak fix for HitBits.

[KBPSDK-2379] Fix for -ve temperature values from read die temp API

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[KBPSDK-2375] NetACL capacity improvement.  
[KBPSDK-2393] Fix for database crash when LPM is used in MP mode on OP.  
[KBPSDK-2406] Fix for low capacity on JR+ KAPS full device.  
[KBPSDK-2388] kbp\_entry\_get\_info API bug fix.  
[KBPSDK-2388] ACL bug fix for entry update in Crash Recovery mode.

### **KBP SDK 1.4.16 contains the following bug fixes**

[KBPSDK-2369] – KAPS: Warmboot fails with DMA DB  
[CS3746044] [KBPSDK-2367] – OP: Create new API for OP reset control as Device initialization fails with DNX SDK ver 6.5.11  
[CS3847155] [KBPSDK-2363]– O3S: KBP fix errors doesn't work on DBSoftErrors on Core 1  
[CS3687258] [KBPSDK-2347] – KAPS: Exception seen randomly while accessing KAPS library on x86\_64 platform

### **KBP SDK 1.4.15 contains the following bug fixes**

[KBPSDK-2328] – O3S: Option to return error instead of abort in assert function  
[KBPSDK-2326] – OP: Added dummy MDIO read to functions, where last MDIO transaction is write.

- O3S: Handling of missing error flags in device error status register
- [CS3741300] OP: AVS Initialization fix - AVS getting enabled because of OVST bit even though silicon is not AVS tested

### **KBP SDK 1.4.14 contains the following bug fixes and enhancements**

[KBPSDK-2280] : O3S handling the response mask for the interface/parity error to smoothen the operation and handling the parity for IFSR  
[KBPSDK-2313] : OP XOR UDM power up issue and parity issues

#### **Bug fixes:**

- KAPS JR+ DMA DB width issue for the JR+
- Warm restart: Changing from stack to memory allocation call
- ACL update rate changes
- ioctl fix: Address getting truncated making BAR Address/Data space cacheable
- condition to check the interface width
- OP\_STATUS\_REGISTERS display fix for the LAST\_REQUEST\_DATA
- [CS3443926] IFSR support for broadcast devices
- Handling wider register writes for BIG\_ENDIAN (OPrime)
- Clearing ESR register during kbp\_device\_init()

### **KBP SDK 1.4.13 contains the following bug fixes**

- [KBPSDK-2108] - OP: SMT, Palladium mixed LPM+ACL case : assert
- [KBPSDK-2123] - OP: Non-DMA mode not working

- [KBPSDK-2146] - OP: NetACL + WB assertion
- [KBPSDK-2169] - OP: Deep power down of unused serdes lanes
- [KBPSDK-2233] - Have to store and restore the device properties for Crash Recovery
- [KBPSDK-2260] - O3S: KBP parallel flush is crashing
- [KBPSDK-2263] - OP: Broadcast with dynamic resources: search miss-match
- [KBPSDK-2267] - OP: PRBS Disable not being done correctly
- [KBPSDK-2269] - OP: Temperature API returning incorrect values
- [KBPSDK-2270] - OP: AVS code needs to be invoked after C\_RST

In addition all fixes and enhancements part of KBP SDK 1.4.12 are also part of this release

- `kbp_device_config` structure has been enhanced to have the additional fields.  
Setting of the `init_avs` field to non-zero value will cause AVS initialization to run as part of `kbp_device_interface_init()` or `kbp_device_init()`
  - `uint32_t init_avs;`                    */\*\*< Flag to init AVS \*/*
  - `int32_t max_avs_voltage;`        */\*\*< Upper limit for die convergence voltage \*/*
  - `int32_t min_avs_voltage;`        */\*\*< Lower limit for die convergence voltage \*/*
- Memory enhancements for NetRoute and ACLs
- [KBPSDK-2250] BCM15K device driver is broken for 32b x86
- BCM15K SMT related bug fixes and improvements
- Improvements to BCM15K update rates

This version of the SDK also includes all enhancements and fixes as of KBP SDK 1.4.11. KBP SDK 1.4.11 introduces support for Adaptive Voltage Scaling (AVS). A new header file “`kbp_avs.h`” is added under the “include” directory. Following AVS APIs are supported in this SDK release:

1. **`kbp_status kbp_device_interface_is_avs_enabled(enum kbp_device_type type, struct kbp_avs_config *config, uint32_t *is_enabled);`**

This API can be used to check if AVS is enabled in the KBP chip or not.

“type” : The device type. Currently `KBP_DEVICE_OP` is the only value supported  
“\*config” : AVS init configuration can be provided via. Users are expected to pass the MDIO read/write functions via the config structure. All other fields of this Structure other than the Opaque user provided handle can be set to 0  
“\*is\_enabled” : Will be set to 1 if the AVS is enabled in the chip; else set to 0

2. **`kbp_status kbp_device_interface_init_avs(enum kbp_device_type type, struct kbp_avs_config *config, FILE *fp);`**

This API can be used to compute and set the final convergence voltage of the chip. This API will attempt to change the convergence voltage only if the chip has been enabled for AVS.

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“type” : The device type. Currently KBP\_DEVICE\_IP is the only value supported  
 “\*config” : AVS init configuration can be provided via. Users are expected to pass the MDIO read/write functions via the config structure. All other fields of this Structure other than the Opaque user provided handle can be set to 0  
 “\*fp” : Is used for logging. Valid file pointer is expected. As of now is ignored

#### Bug Fixes:

- [KBPSDK-2209]: O3S crash issue fix during the kbp\_device\_init ()
- [KBPSDK-2197]: portability changes for linker errors during linking KAPS library into VxWorks image
- [KBPSDK-2186]: O3S Fixed memtest crash for BCM52311
- [KBPSDK-2182]: O3S kbp\_device\_fix\_errors(), must return the error code if ESR: bits set other than DBA/RPT errors
- [KBPSDK-2161]: O3S ISSU multi-thread support per SMT only during ISSU cache and flush

#### KBP SDK 1.4.10 enhancements and bug fixes

New APIs have been added to read the BCM15K die voltage and temperature

- *kbp\_status kbp\_device\_read\_die\_voltage(struct kbp\_device \*device, int32\_t \*voltage);*
- *kbp\_status kbp\_device\_read\_die\_temperature(struct kbp\_device \*device, int32\_t \*temperature);*
- [KBPSDK-2124] Generic and Selective broadcast support for BCM15K
  - When destroying device handles during teardown, only the main device handle should be destroyed
- [KBPSDK-2137] – BCM15K kbp\_diags has no option to connect to other KBP devices on line card
- [KBPSDK-2113] – BCM15K 640b + range cases with search mis-match
- [KBPSDK-2095] – Range expansion heuristics tuning
- [KBPSDK-2081] – KBP Driver: Need a way to specify PCI bus mapping to KBP selection
- [KBPSDK-1753] – Debug Feature Request - Result Register Read

The packaged version 1.7 of the device driver is the only compatible version with this release. The PCIE device driver must be upgraded along with the KBP SDK for BCM15K.

KBP SDK 1.4.9 resolves symbol conflict between the Broadcom Jericho SDK 5.5.6 and KBP SDK 1.4.8 which use the same Serdes IP code. In addition the following Serdes improvements have been incorporated in this version of the SDK.

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- [KBPSDK-2088] - Falcon16 API names clash with version of IP code in DNX SDK
  - [KBPSDK-2089] - Temperature monitoring not enabled for serdes
  - [KBPSDK-2090] - Unused lanes need to be powered down
  - [KBPSDK-2091] - Upgrade Falcon16 microcode to latest version D102\_02

KBP SDK 1.4.9 has been tested for all supported features on Optimus Prime (BCM15K). All features of NLA12K and Jericho internal forwarding solution are GA quality and fully supported.

The SDK contains the following enhancements/fixes delivered as part of KBP SDK 1.4.8

- Warmboot support for NetACL and NetRoute databases with and without associated data
- Aging and Hit Bits
- [KBPSDK-2038] O3S: Need XPT per NP / SMT for 2-to-1 application
- [KBPSDK-2072] BCM15K: Interface initialization enhancements for polarity inversion, asymmetric lane enables and lane swapping

The SDK contains the following bug fixes

- [KBPSDK-1981] BCM15K: PCIE xpt requires byte swapping on big endian systems
- [KBPSDK-2062] BCM15K: S\_RST and C\_RST callbacks have incorrect
- [KBPSDK-2017] BCM15K: Quad8 links not brought up correctly

The enhancement KBPSDK-2072 and KBPSDK-2038 introduced multiple interface related features. The device configuration structures defined in include/init.h passed to kbp\_device\_interface\_init and/or kbp\_device\_init has been enhanced to accept the following fields:

1. The start lane and num\_lanes field can be specified for up to four ports. For four port the following flag KBP\_DEVICE\_QUAD\_PORT should be passed in
2. *uint32\_t reverse\_lanes*: The field is interpreted as a bitmap. Each bit specifies whether the lanes of port are reversed. Bit0 if set to one will reverse all the lanes of port0, etc.
3. *int32\_t (\*get\_rx\_tx\_lanes\_bmp)(uint64\_t \*rx\_lanes\_bmp, uint64\_t \*tx\_lanes\_bmp)*; The callback function is invoked during init if provided. The user is expected to populate the RX and TX lanes bitmap if they which to configure asymmetric number of lanes for RX and TX. If this feature is used the num\_lanes field in the port map should be provided as maximum value of the two and the callback can be used to shut down specific lanes. The field can be set to NULL if not used
4. *int32\_t (\*get\_polarity\_invert\_lanes\_bmp)(uint64\_t \*lanes\_bmp)*; The following option callback pointer can be provided by the user to invert the polarity of the



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lanes. Each bit in the bitmap if set to one will invert the polarity of that physical lane number. If this feature is not used the callback function should be NULL.

5. *uint32\_t reset\_only*: This bitmap is one hot encoding for each port of the device. If the bit is set all the lanes belonging to that port are configured, however, RX is not enabled. The caller can lazily enable the RX at a later point. This feature is useful if the ports need to be enabled lazily.

Internally discovered bugs through testing on Optimus Prime silicon have been resolved. Please refer to the Optimus Prime Silicon Errata sheet for additional details on the silicon status.

This release also supports crash recovery for NLA12K and Jericho internal forwarding solution and contains all the issues resolved as of KBP SDK 1.3.13 and KBP SDK 1.4.7. All features of NLA12K and Jericho internal forwarding solution are GA quality and fully supported.

This SDK includes –

- APIs to initialize the device, create instructions and keys, and create and manage databases.
- Multiple Reference applications that showcase use of Optimus Prime and NLA12K.
- A C-Model for NLA12K and Optimus Prime. The model is transaction, not cycle accurate.
- The SDK can be used in Blackhole mode without using the C-Model or real device. Pass the transport layer handle as null in `kbp_device_init()`.
- Dynamic resource management of databases for NLA12K and Optimus Prime
- Support for managing multiple KBP's on one line card
- Warmboot and crash recovery

#### **Optimus Prime:**

- Any existing application coded for NLA12K is expected to work with Optimus Prime C-Model
- All aspects of configuring and managing the device
- NetACL, including associated data.
- NetRoute with associated data
- Support for Massively parallel ACLs, Power controlled ACLs with associated data.
- Single cycle lookup of multi access LPM databases.
- Resolution between lookup results of databases. Typical use is for resolving the result of a match between a public and private forwarding database.
- Hit bits and Aging
- Warmboot for all database types

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**NLA12K:**

- GA Support for NetRoute, Massively parallel ACLs, Power-controlled ACLs, and Associated data for ACLs, SMT and Cascade.
- Warmboot and crash recovery support for all database types
- Parity error correction (In field soft repair) for entries in DBA and correction of algorithmic errors reported by device

**Devices Supported:**

- NL12000, NLA12000, NLA88650, ERC120 , SD5452A
- SDK has been tested with Rev A2 and Rev B0 and B1 Silicon
- BCM52311 SDK has been verified against A0 and A1 silicon

**Related documents:** (available at <https://support.broadcom.com>) :

- Device Datasheets: NLA12000-DS116-R-KBP, NLA88650-DS107-R-KBP, 41CSERC120-DS115-R-KBP , 48CSSD5452A-DS115-R-KBP, 1CSCSCO-DS116-RDS-KBP 15000-DS100-R, 52311-DS101-R
- KBP SDK Reference Manual, KBP-SDK-SWUM103-R or newer

**Known Limitations / Issues:**

The following features of the Optimus Prime chip are currently not supported

- Capacity and update rates are not optimal for NetACL databases
- The KBP SDK cannot recover if a fatal error occurs when transporting messages to the KBP

**Optimus Prime C-Model Limitations:**

The C-Model is a transaction accurate, not cycle accurate model. Model does not support-

- Network / interface specific functionality such as ILA protocol, Network Byte Order, packet errors.
- ECC, Parity scan / protection, Parity Errors.
- MDIO, JTAG Boundary Tag Registers
- Response to Error Detection, Test Pattern Generator / Checker
- Multiple instances of C-Model may not be instantiated at the same time

**NLA12K C-Model Limitations:**

The C-Model is a transaction accurate, not cycle accurate model. Model does not support-

- Network / interface specific functionality such as ILA protocol, Network Byte Order, packet errors.
- ECC, Parity scan / protection, Parity Errors.
- MDIO, Cascade of processors, JTAG Boundary Tag Registers
- Upper limit on total Associated Data in responses
- Low Power Mode (see Dynamic Power Control section in Datasheet)
- Response to Error Detection, Test Pattern Generator / Checker