Release Notes

BCM68620

OLT Controller Software Suite

RELEASE 2.2

BROADCOM CONFIDENTIAL

68620-SWRN116-R

Corporate Headquarters: San Jose, CA

March 30, 2017

For a comprehensive list of changes to this document, see the “Revision History”.

BROADCOM CONFIDENTIAL

Broadcom, the pulse logo, Connecting everything, Avago, Avago Technologies, and the A logo are among the trademarks of Broadcom and/or its affiliates in the United States, certain other countries and/or the EU.

Copyright © 2017 by Broadcom. All Rights Reserved.

The term “Broadcom” refers to Broadcom Limited and/or its subsidiaries. For more information, please visit www.broadcom.com.

Broadcom reserves the right to make changes without further notice to any products or data herein to improve reliability, function, or design. Information furnished by Broadcom is believed to be accurate and reliable. However, Broadcom does not assume any liability arising out of the application or use of this information, nor the application or use of any product or circuit described herein, neither does it convey any license under its patent rights nor the rights of others.

Table of Contents

Section 1: Introduction **5**
- **References** 5
- **Deliverables** 6
- **Supported Devices** 7

Section 2: Release Environment **8**
- **Build Options** 8
- **Additional Release-Related Information** 8
- **GPON/XGPON Transceiver Settings** 8

Section 3: BCM68620 OLT Controller **9**
- **New Features and Enhancements** 9
- **Resolved Issues** 12
- **Known Limitations** 13

Section 4: Broadband Adaptation Layer **14**
- **New Features and Enhancements** 14
- **Resolved Issues** 14
- **Known Limitations** 14

Section 5: Ordering Information **15**

Section 6: Revision History **16**

BROADCOM CONFIDENTIAL

List of Tables

Table 1: Supported Devices 7
Table 2: Build Options 8
Table 3: New Features and Enhancements 9
Table 4: Resolved Issues 12
Table 5: Known Limitations 13
Table 6: Object Attributes Not Supported 13
Table 7: BAL Known Limitations 14
Table 8: Ordering Information 15

BROADCOM CONFIDENTIAL

Section 1: Introduction

This document describes the BCM68620 OLT Controller and BAL Software Suite R2.2, including new and changed features, resolved issues, and known limitations that pertain to the software release. This document covers the BCM68620 family and the BCM55548/9 devices listed in Table 1.

The R2.2 release contains BCM68620/BCM5554X firmware and bootloader binaries as well as the BCM68620/BCM5554X host driver in source file format.

For the purposes of documentation, where the reference BCM68620 is used in this document, it pertains to all the supported devices shown in Table 1, unless stated otherwise.

Refer to the following documents for further integration instructions:

- BCM68620 OLT Controller User Manual for installation and integration instructions (see Reference [1]).
- BCM68620 OLT Controller Programmer's Guide for the functional description (see Reference [2]).
- BCM68620 OLT Controller SDK Reference Guide for the user interface detailed description (see Reference [3]).
- For porting from the BL3458 OLT controller, refer to the BL3458 to BCM68620 Porting Guide (see Reference [4]).
- For porting from the BCM55538 OLT controller, refer to the BCM55538 to BCM68620 Porting Guide (see Reference [5]).

The Broadband Adaptation Layer (BAL) is introduced in release 2.2. BAL is a software package that runs on top of the BCM68620 OLT Controller SDK and the BCM88470 (Qumran) switch SDK, and is responsible for configuring the system and setting up traffic. For information about the Broadband Adaptation Layer (BAL), refer to the BCM68620 BAL Programmer's Reference Guide (see Reference [9]).

BROADCOM CONFIDENTIAL

References

The references in this section may be used in conjunction with this document.

For Broadcom documents, replace the "xx" in the document number with the largest number available in the repository to ensure that you have the most current version of the document.

Document (or Item) Name	*Number*	*Source*
Broadcom Items		
[1] BCM68620 OLT Controller User Manual	68620-SWUM1xx-R	CSP
[2] BCM68620 OLT Controller Programmer's Guide	68620-PG1xx-R	CSP
[3] BCM68620 OLT Controller SDK Reference Guide	68620-SDG1xx-R	CSP
[4] BL3458 to BCM68620 Porting Guide	68620-AN1xx-R	CSP
[5] BCM55538 to BCM68620 Porting Guide	68620-AN4xx-R	CSP

Document (or Item) Name (Cont.)	Number	Source
[6] ToD Transfer and Synchronization Support (G.984.3/G.987.3)	68620-AN6xx-R	CSP
[7] EPON Shaper, Scheduler and Dynamic Bandwidth Allocator	68620-PG2xx-R	CSP
[8] Transceiver Calibration Support	68620-AN9xx-R	CSP
[9] BCM68620 BAL Programmer's Reference Guide	68620-PG3xx-R	CSP

Deliverables

The BCM68620 OLT software release R2.2 is a set of software modules, each identified by a unique filename or an equivalent identifier.

The zip file SW-BCM68620_2_2_2_2.zip, contains two main folders bcm68620_release and bal_release.

The bcm68620_release folder contains the following:

- BCM68620 host driver files
- BCM68620 transport layer code
- BCM68620 bootloader binary file
- BCM68620 embedded application binary file
- OS abstraction — reference code
- API CLI — reference code
- Dev_log — reference code
- User application — reference code
- Linux build system (Makefiles) for compiling BCM68620 host driver files

The bal_release folder contains the following

- BAL (Broadband Adaptation Layer) source code

BROADCOM CONFIDENTIAL

Supported Devices

The devices listed in Table 1 are supported by this release.

Table 1: Supported Devices

Product	*Release*	*Description*
BCM68621	A0	8 × GPON OLT controller
	B0	8 × GPON/8 × EPON OLT controller
BCM68622	A0	16 × GPON OLT controller
	B0	16 × GPON/16 × EPON OLT controller
BCM68623	A0	8 × XGPON1 OLT controller
	B0	8 × XGPON1/8 × 10G-EPON (co-existence)/8 × 10G-EPON (10G only)/ 2 × XGS PON/2 × NG-PON2/8 × 10G Active Ethernet OLT controller
BCM68624	B0	4 × XGPON/4 × 10G-EPON (co-existence)/4 × 10G-EPON (10G only)/ 2 × XGS PON/2 × NG-PON2 OLT controller
BCM68626	B0	4 × GPON/4 × EPON OLT controller
BCM68628	B0	2 × XGS PON/2 × NG-PON2/2 × 10G-EPON (10G only) OLT Controller Note: This device does not support 10G-EPON co-existence mode
BCM55548	B0	8 × 1G EPON OLT controller
BCM55549	B0	16 × 1G EPON OLT controller

BROADCOM CONFIDENTIAL

Section 2: Release Environment

Build Options

Table 2 details the build options.

Table 2: Build Options

System Dependent Flag	*Description*
ENABLE_CLI	Enable operation of BRCM CLI. Includes compilation of all necessary files. ***Note:*** User must also enable CONFIG_LINENOISE, CONFIG_EDITLINE for correct CLI operation.
ENABLE_LOGGER	Enable operation of BRCM LOGGER. Includes compilation of all necessary files.
LINUX_USER_SPACE	If the host driver is initialized in Linux user space context, this flag should be set.
LINUX_KERNEL_SPACE	Use this flag if you write code that is compiled under kernel space.

Additional Release-Related Information

The operating system abstraction layer provides a proprietary abstraction layer of the operating system. It supports VxWorks and Linux only. If the user chooses to use a different OS, it is necessary to change the OS abstraction layer implementation to support the chosen OS.

The Logger and CLI utilities provide a proprietary logging utility. Although it is an optional package for the operation of the BCM68620 software suite, it is highly recommended to integrate these tools to allow an efficient debug operation.

Instructions on CLI and logger integration can be found in BCM68620 OLT Controller User Manual (see Reference [1]).

BROADCOM CONFIDENTIAL

GPON/XGPON Transceiver Settings

The BCM68620 software suite supports two types of transceiver settings:

- Specific settings that are optimized for a specific optical model, (Brand and Serial Number.)
- General settings that can be used by all models (ANY setting) or by a family of optical models (ANY-RESET-GUARD or ANY-RESET-PREAMBLE.) See detailed descriptions about each setting in the *BCM68620 OLT Controller Programmer's Guide* Reference [2].

The general settings may have a high penalty on available bandwidth since the physical overhead is larger than for the specific settings. Using the general settings for production is under the user's discretion.

Section 3: BCM68620 OLT Controller

New Features and Enhancements

Release R2.2 provides the features listed in Table 3. The features are described fully in the BCM68620 OLT Controller Programmer's Guide (Reference [2] on page 5).

Table 3: New Features and Enhancements

Number	*Description*
1.	The firmware image size has been reduced to 10.5 MB.
2.	Added support for the system mode 4 x XGPON. (I#3702)
3.	A new parameter, *chip_voltage* was added to the device object.(I#3989)
4.	New feature: In Service Software Upgrade (ISSU). (I#4061)
5.	Added the *tod_uart_baudrate* parameter to the Device object that enables the BCM68620 UART baud rate to be configured. (I#4348)
6.	The BCM68620 API now supports configuration of the TX and RX SerDes parameters for all SerDes instances. (I#4115)
GPON	
1.	New feature: Multiplexing of 4 x GPON to 1 x XFI interface in GPON system modes. (I#3849)
2.	New PON NI configuration to disable/enable REI indication with bip8_errors=0. (I#4106)
3.	Added new PON NI counter for dropped OMCI/CPU packets due to hardware queue overflow. (I#3710)
4.	Added full support of the ToD feature inside the BCM68620 device, with no need for an external FPGA. Refer to the *ToD Transfer and Synchronization Support* application note (Reference [6]) for further information. (I#3778)
5.	The minimum SLA can be set to 16000 when upstream FEC is disabled. The PON_NI reduce_minmum_acsess_size feature was removed. (I#4103)
6.	GEM packets and GEM bytes statistics have been added to the ONU object statistics. (I#4246)
7.	New feature: External DBA, this feature uses new fast API and fast indication. (I#4275)
8.	The parameter *gpon_xgpon_tod_string_length* was added to the Device object to enable the configuration of the ToD string length that is passed to the BCM68620 device UART. (I#4410)
XGPON	
1.	Added support for key switching for OMCI-based secure mutual authentication. As described in ITU-T 987.3, section 15-8. (I#3734)
2.	Added the new counters, *rx_crc_error* and *rx_droppkts_error* counters to the XGPON NI object statistics. (I#4141)
3.	Added support for the request registration operation. (I#4292)
4.	Added support for configuring *xgpon_num_of_onus* to 510 or 256 in the Device object. This is available when the Device object is configured in XGPON mode. (I#799)
5.	Added new PON NI counter for dropped OMCI/CPU packets due to hardware queue overflow. (I#3710)

BROADCOM CONFIDENTIAL

Table 3: New Features and Enhancements (Cont.)

Number	*Description*
6.	Added full support of the ToD feature inside the BCM68620 device, with no need for an external FPGA. Refer to the *ToD Transfer and Synchronization Support* application note (Reference [6]) for further information. (I#3778)
7.	The minimum SLA can be set to 16000 when upstream FEC is disabled. The PON_NI reduce_minmum_acsess_size feature was removed. (I#4103)
8.	GEM packets and GEM bytes statistics have been added to the ONU object statistics. (I#4246)
9.	New feature: External DBA, this feature uses new fast API and fast indication. (I#4275)
10.	The parameter *gpon_xgpon_tod_string_length* was added to the Device object to enable the configuration of the ToD string length that is passed to the BCM68620 device UART. (I#4410)
XGS PON	
1.	Added support for the rogue detection operation in XGS mode. (I#4129)
2.	Added support for ToD in XGS mode. (I#4130)
3.	Added support for protection switching type B in XGS mode. (I#4131)
4.	Added support for the XPP-XE-R3-CDFB optical module. (I#4172)
5.	Added support for configuring *xgpon_num_of_onus* to 510 or 256 in the Device object. This is available when the Device object is configured in XGS PON mode. (I#799)
6.	Added new PON NI counter for dropped OMCI/CPU packets due to hardware queue overflow. (I#3710)
7.	Added full support of the ToD feature inside the BCM68620 device, with no need for an external FPGA. Refer to the *ToD Transfer and Synchronization Support* application note (Reference [6]) for further information. (I#3778)
8.	The minimum SLA can be set to 16000 when upstream FEC is disabled. The PON_NI reduce_minmum_acsess_size feature was removed. (I#4103)
9.	GEM packets and GEM bytes statistics have been added to the ONU object statistics. (I#4246)
10.	New feature: External DBA, this feature uses new fast API and fast indication. (I#4275)
11.	The parameter *gpon_xgpon_tod_string_length* was added to the Device object to enable the configuration of the ToD string length that is passed to the BCM68620 device UART. (I#4410)
NGPON2	
1.	Added support for the ONU handover process as defined in IEEE G.989.3 (I#4276)
2.	Added support for configuring *xgpon_num_of_onus* to 510 or 256 in the Device object. This is available when the Device object is configured in NGPON2 mode. (I#799)
3.	Added new PON NI counter for dropped OMCI/CPU packets due to hardware queue overflow. (I#3710)
4.	Added full support of the ToD feature inside the BCM68620 device, with no need for an external FPGA. Refer to the *ToD Transfer and Synchronization Support* application note (Reference [6]) for further information. (I#3778)
5.	The minimum SLA can be set to 16000 when upstream FEC is disabled. The PON_NI reduce_minmum_acsess_size feature was removed. (I#4103)
6.	GEM packets and GEM bytes statistics have been added to the ONU object statistics. (I#4246)
7.	New feature: External DBA, this feature uses new fast API and fast indication. (I#4275)
8.	The parameter *gpon_xgpon_tod_string_length* was added to the Device object to enable the configuration of the ToD string length that is passed to the BCM68620 device UART. (I#4410)

BROADCOM CONFIDENTIAL

Table 3: New Features and Enhancements (Cont.)

Number	*Description*
EPON	
1.	Supports accepting the Time of Day string via either an API call or via the ToD UART. Previous releases only supported receiving this string via the ToD UART. (I#4081)
2.	A single host can manage multiple BCM68620 devices, with applications such as EPON OAM negotiation, host driven encryption, sample usage of the OAM library. (I#4388)
3.	BCM68620 firmware supports the concept of "denied links." When one of these links attempts to register, the BCM68620 device provides an indication noting the type of violation. These indications now include additional data to fully diagnose any underlying problem. (I#4368)
4.	A list of EPON link MAC addresses for each ONU has been added. This supplements the FEC correction statistics introduced in release 2.0. (I#4102)

BROADCOM CONFIDENTIAL

Resolved Issues

Table 4 provides a list of resolved issues in R2.2, which may or may not be encountered during the course of a typical operation.

Table 4: Resolved Issues

Number	*Description*
GPON	
1.	Protection switching GPIO trigger is working only on PON ID 0. The issue was fixed. (I#4093
2.	In a specific ONU configuration sequence, the alloc ID may be left in the bandwidth map even after the ONU is cleared. The issue was fixed (I#4461)
3.	Source Photonics TRX SPS-43-48H-HP-CDE-SD parameters have been updated. (I#4198)
4.	In rare cases, ONUs might appear as active when they are actually inactive. The issue was fixed. (I#4225)
5.	The IWF per flow mode did not work well when configuring forbidden_vlan_flow_gem_range_start !=128. The issue was fixed (I#4328)
6.	In 4 x GPON system mode, an OMCI reply was received only after 1 second. The issue was fixed (I#4437)
7.	Protection switching type C: after deactivation/activating a PON with an active standby ONU, the ONU might be get stuck in processing state or there might be an exception. The issue was fixed (I#4340)
8.	In a specific ONU configuration sequence, the alloc ID may be left in the bandwidth map even after the ONU is cleared. The issue was fixed (I#4461)
XGPON	
1.	Protection switching GPIO trigger is working only on PON ID 0. The issue was fixed. (I#4093
2.	In a specific ONU configuration sequence, the alloc ID may be left in the bandwidth map even after the ONU is cleared. The issue was fixed (I#4461)
3.	XGPON protection switching did not work well for some PON distances. The issue was fixed (I#4188)
4.	In rare cases, ONUs might appear as active when they are actually inactive. The issue was fixed (I#4225)
5.	In a specific ONU configuration sequence, the alloc ID may be left in the bandwidth map even after the ONU is cleared. The issue was fixed (I#4461)
XGS PON	
1.	In XGS PON system mode, the upstream_line_rate_capabilities reported as part of the ONU discovered indication is always set to 2.5G and doesn't represent the real ONU upstream rate. This issue was fixed (I#4350)
2.	The Operation control field could not be configured correctly in XGS PON system mode. The issue was fixed (I#4413)
3.	In a specific ONU configuration sequence, the alloc ID may be left in the bandwidth map even after the ONU is cleared. The issue was fixed (I#4461)

BROADCOM CONFIDENTIAL

Known Limitations

Known limitations in BCM68620 OLT Controller Software Suite R2.2, which may or may not be encountered during the course of typical operation and/or development phase, are listed in Table 5. These issues are currently under investigation and should be resolved in a future software release.

Table 5: Known Limitations

Number	*Description*
1.	In some cases, a software error might occur during ONU firmware upgrade (I#4159, I#4590)

The object attributes shown in Table 6 are not supported in R2.2.

Table 6: Object Attributes Not Supported

Object	*Section*	*Attribute*
XGPON_NI	Configuration	Power Management

BROADCOM CONFIDENTIAL

Section 4: Broadband Adaptation Layer

New Features and Enhancements

Newly introduced, refer to the BCM68620 BAL Programmer's Reference Guide (see Reference [9]).

Resolved Issues

N/A in this release.

Known Limitations

Table 7 shows the known limitations in the BCM68620 BAL software delivered with R2.2, which may or may not be encountered during the course of typical operation and/or development phase. These issues are currently under development and should be resolved in a future software release.

Table 7: BAL Known Limitations

Number	*Description*
1.	BAL supports a single instance of an access_terminal.
2.	The admin_state attribute of the access_terminal object cannot be set to ADMIN_DOWN.
3.	BAL can be configured for EPON mode, however, this mode of operation is not supported in this release.
4.	Modification of the following object types: access_terminal, flow, interface, subscriber_terminal, tm_queue, tm_sched is not supported in this release.
5.	The bcmbal_stat_get function is not supported for any BAL object.
6.	The user may not specify either the svc_port_id or the agg_port_id attributes of a flow if they have not been previously allocated to a flow by the system.
7.	BAL packet object subscriptions do not work for multiple subscribers.
8.	When specifying a subscriber terminal destination for a bcmbal_pkt_send function, the svc_port_id of the first flow associated with the specified subscriber terminal will be used as the GEM for the packet encapsulation on the PON interface.
9.	When a BAL flow is configured to perform an action, only a single action command should be specified (multiple flow actions are not supported).
10.	A BAL upstream flow DBA may be controlled either with the upstream flow SLA parameters, or by creating a tm_sched object (with owner agg_port), setting the rate and tcont_sla attributes of the tm_sched object, and attaching it to the flow. To control rate limiting for a downstream flow, only the flow sla attribute may be used. Note that the flow SLA attribute will be deprecated in a future release. At that time, upstream flow DBA will be controlled using a tm_sched object, and downstream flow rate limiting will be controlled using tm_queue rate attributes.
11.	BAL cannot perform separate actions based on group object membership.
12.	BAL cannot classify flows based on IP address.

BROADCOM CONFIDENTIAL

Section 5: Ordering Information

Table 8: Ordering Information

Product	*Version*	*Ordering*
BCM68620 OLT Controller Software Suite	2.2	Contact your Broadcom representative for details.

BROADCOM CONFIDENTIAL

Section 6: Revision History

Revision	Date	Change Description
68620-SWRN116-R	03/30/17	Software Version 2.2
68620-SWRN115-R	01/23/17	Software Version 2.0 patch C
68620-SWRN114-R	12/19/16	Software Version 2.0 patch B
68620-SWRN113-R	11/23/16	Software Version 2.0 patch A
68620-SWRN112-R	11/01/16	Software Version 2.0
68620-SWRN111-R	08/02/16	Software Version 1.9 patch A
68620-SWRN110-R	07/03/16	Software Version 1.9
68620-SWRN109-R	04/10/16	Software Version 1.8 patch A
68620-SWRN108-R	02/21/16	Software Version 1.8
68620-SWRN107-R	01/21/16	Software Version 1.0 patch D
68620-SWRN106-R	12/22/15	Software Version 1.0 patch B, update to filename
68620-SWRN105-R	12/09/15	Software Version 1.0 patch B
68620-SWRN104-R	10/29/15	Software Version 1.0 patch A
68620-SWRN103-R	09/16/15	Software Version 1.0
68620-SWRN102-R	07/30/15	Software Version 0.8
68620-SWRN101-R	04/28/15	Initial release—Software Version 0.6

BROADCOM CONFIDENTIAL

BROADCOM CONFIDENTIAL

Web: www.broadcom.com
Corporate Headquarters: San Jose, CA
© 2017 by Broadcom. All rights reserved.

68620-SWRN116-R March 30, 2017