



# Intel<sup>®</sup> 10G PON Chipset

## System Package 1.6.7 Engineering Drop

for

Intel<sup>®</sup> 10G PON Chipset PRX120  
Intel<sup>®</sup> 10G PON Chipset PRX126  
Intel<sup>®</sup> 10G PON Chipset PRX321

## Release Notes

Intel Confidential

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**Revision History**

**Current:** Revision 1.0, 2020-03-17

**Previous:** None

<b>Page</b>	<b>Major changes since previous revision</b>



## Preface

This document gives an overview of the supported features, latest changes and open issues for the Intel® 10G PON Chipset System Package 1.6.7 Engineering Drop, where “1.6.7” is a label for the feature set described in [Chapter 2](#).

The components of the system package are listed in [Table 1](#). It is released for the devices listed under “Hardware Components”.

The Intel® 10G PON Chipset System Package 1.6.7 is undergoing functional and security updates.

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## 1 General

This chapter enumerates the components that belong to the system package. These components are available via your local technical support or sales team.

**Table 1 Components of the Intel® 10G PON Chipset System Package 1.6.7**

Component Type	Version	Comment
<b>Hardware Components</b>		
PRX120	PRX120B0BC	See also [1]
PRX126	PRX126B0BI	See also [2], [9]
PRX321	PRX321B0BI	See also [3], [7], [8], [11]
<b>Software Components (only the major functional components are listed)</b>		
Software Package Version	1.6.7	SDK is based on OpenWrt/LEDE
OpenWRT/LEDE	19.07	Linux* distribution for embedded devices
Linux* Kernel Version	4.9.189	–
Cross Compiler GCC	8.3.0	
UBOOT	2016.07 / 3.1.200	Boot loader
PON Library	1.9.0	PON subsystem functional API
PON Adapter Library	1.5.0	Interface layer between OMCI stack and PON FAPI
PON Mailbox Driver	1.7.0	Interface handler between PON FAPI and PON FW
PON Multicast Driver	1.2.1	Kernel and User API multicast control driver
PON Network Library	1.6.0	PON subsystem network API
PON Image Library	1.1.1	PON Image upgrade library
PON Tools	1.0.1	PON subsystem tools
PON ToD Daemon	1.0.0	–
OMCI Stack	8.6.0	ITU PON ONU Management Stack
OMCI API		Legacy API layer. <i>Note: Has been removed. Only the PON adapter shall be used.</i>
Voice TAPI	4.19.1.0	–
SFP Two Wire Slave Driver	1.0.5	–
SFP EEPROM	3.1.0	SFP EEPROM interface layer
IFXOS Library	1.6.9	–
CLI Library	2.8.0	Command line interface for debugging
PRX3xx GPHY Firmware	8732 <sub>H</sub>	B0 Firmware for the integrated Ethernet PHY module
PON Firmware	3.14.0.3.0 3.14.1.3.0	XGSPON Firmware for the integrated PON TC module GPON Firmware for the integrated PON TC module
QOS Driver	1.1.0	
QOS Firmware	1.9.1	Firmware for the integrated QoS module
SFP Two Wire Slave FW	1.0.2.1.24	Firmware for the integrated SFP Two Wire Slave module
PPA Driver	1.0-af197b81	–
<b>Documentation</b>		
Intel® 10G PON Chipset	–	Refer to all documents in <a href="#">Literature References</a> section.



## 2 Software and Firmware Features

The software and firmware release contains all the features that are listed in [Table 2](#).

In this table, the features are marked as either:

- D: Developed, but not fully tested
- Y: Supported, that is, both developed and tested
- N: Not supported

All other features that are described in the User's Manuals and contained in the delivered source code, but not marked or mentioned in this list, are not covered by this release.

This system package has passed applicable BBF 247 issue 2 test cases. The tests were done with eOLT-GPON/XGS-PON equipment and test sets from MT2, as used by BBF certified test labs.

Traffic tests were performed with different OLTs.

The verification was done using the following boot modes:

- Linux\*: External serial EEPROM/flash via QSPI interface

**Table 2 Supported Features**

Feature	Supp.	Restrictions/Comments
<b>PON Operation Modes</b>		
ITU-T G.984	D	GPON
ITU-T G.987	D	XG-PON
ITU-T G.9807	D	XGS-PON
ITU-T G.989	D	NG-PON2, for evaluation only
<b>Non PON Operation Modes</b>		
Active Ethernet	D	–
<b>ONU Management</b>		
OMCI stack	D (SLA)	Test stack included, productive solution depends on customer-specific requirements (IOP).
OLT provisioning of UNI interface	N	–
<b>Packet Processing</b>		
Direct forwarding	D	GEM port - UNI interface forwarding without bridging.
TPID translation	D	Limited to 2 TPIDs
Upstream untagged frame add default VLAN tag	D	BBF-247 scope
Upstream tagged frame: one/two/ptag VLAN tag translation	D	BBF-247 scope
Downstream processing: untagged pass	N	–
Downstream processing: tagged frame translation/removal	D	BBF-247 scope
Service classification: ethertype+vlan+pbit	D	BBF-247 scope
L2 switching	D	Unicast, multicast, and broadcast
L2 learning/aging	D	With learning limitation per MAC bridge port
L2 performance counter	D	Per ingress and egress UNI port
Priority processing	D	Downstream and Upstream PCP based queuing.



**Table 2 Supported Features** (cont'd)

Feature	Supp.	Restrictions/Comments
Color marking	D	Ingress and egress color marking as defined in traffic descriptor ME
Standard traffic management	D	Strict priority
Standard traffic management	D	WRR scheduling
Standard traffic management	N	Dual-token bucket shaping
Hierarchical scheduling	N	Hierarchical, color-aware scheduling in combination with shaping
Buffer reservation	D	Buffer reservation and traffic isolation per queue, egress port
IP passthrough	D	IPv4 and IPv6 packet forwarding
<b>IGMP / Multicast</b>		
Filter Multicast streams that are being viewed by subscribers supported on the SFP based on the Destination IP address or the Source IP and Destination IP address. (SSM)	D	–
Support Downstream Multicast traffic with VLAN VID translation	D	BBF-247 scope
IGMP messages can be transferred to the OLT with unicast rules without trapping to CPU	D	–
Support trap IGMP messages to CPU for Snooping	D	–
Support 1024 Dynamic Access Control List (DACL) entries	D	–
Support Broadcast GEM port for downstream broadcast & multicast frames arriving at the network facing interface and forward based on the VID to UNI port with VLAN action	D	BBF-247 scope
<b>Downstream QoS</b>		
DS UNI port supports Strict Priority scheduling (8 queue model)	D	–
DS QoS mapping based on outer CVLAN Tag Pbit	N	–
DS QoS mapping based on Pbit before VLAN operation	D	–
DS QoS mapping based on DS queue pointer from the GemPort	D	BBF-247 scope
<b>Upstream QoS</b>		
PON side upstream Strict Priority scheduling (8 queue model)	D	–
Multiple Gem Port and Multiple queues' configuration support within one TCONT	D	–
Upstream queue sharing and non sharing case; specifically, multiple gem ports can map to one single queue	D	–



Software and Firmware Features

**Table 2 Supported Features (cont'd)**

Feature	Supp.	Restrictions/Comments
Upstream gem sharing and non sharing case	D	–
Pbit translation and dscp-to-pbit translation	D	–
<b>PON IP</b>		
PLOAM firmware	D	–
AES encryption and decryption	D	AES-128, upstream and downstream
FEC support	D	Upstream and downstream
Alarm and performance monitoring	D	–
PON power saving modes	D	Doze, cyclic and watchful sleep
DBA status reporting	D	–
Disable/Enable Dying Gasp	D	–
Credential Update without Reboot	D	–
PRBS Generator	D	–
<b>Optical Interface</b>		
Optical module interface	D	Connects to and controls the SFP-based optics or PMD devices for BOSA on board.
Two Wire master interface (I2C)	D	Controls the optical module's or PMD's serial control bus.
Two Wire slave interface (I2C)	D	DDMI support for external host.
Two Wire bridge mode (I2C)	D	PMD calibration support
<b>Time Synchronization</b>		
<b>SyncE</b>		
G.8261 Timing and Synchronization Aspects in Packet Networks	D	Supported except Long Term Hold Over
G.8262 Wander Generation Limits	D	For ITU-T G.984, ITU-T G.987, ITU-T G.9807 towards LAN UNI
G.8262 Wander and Jitter Tolerance	D	–
G.8262 Jitter Generation Limits	D	–
G.8262 Short Term Transient Response	D	Optical Loss for 15 s, phase error less than 1 $\mu$ s.
G.8262 Long Term Hold Over	D	Not required for SFP. Requires external TCXO.
G.8263 Packet Based Equipment Clock	N	Not planned, but hardware ready.
G.8264 ESMC Generation	N	SyncE Status is supported.
<b>PTP V2</b>		
PTP driver support for 1- and 2-step modes	D	SYNC and DELAY_REQ packets with correct time stamp format.
/dev/ptp devices	D	PTP Kernel API for clock control verified.
PTP packet rate	D	16 and 128 packets/sec rates tests pass. No missing packets seen by Paragon-X.
PON-to-LAN PTP clock sync with phc2sys	D	–
LinuxPTP	D	Version 2.0 with all Intel patches
G.8273.2 Class A & Class B Compliance	D	–



**Table 2 Supported Features (cont'd)**

Feature	Supp.	Restrictions/Comments
G.8273.2 MOOC	D	–
G.8275.1 Telecom Profiles Compliance	D	–
G.8271.1 Network Limits for Time Synchronization in Packet Networks	N	Hardware ready.
Linux PTP Startup Scripts	D	–
<b>1PPS/ToD</b>		
1PPS Output	D	–
ToD Output Multiplexer	D	–
NMEA ToD	D	GPZDA, GPZDG
G.8271 ToD	D	–
<b>Type B Protection Optical loss for less than 100 ms</b>		
G.8262 Short Term Transient Response	D	–
PLOAM State Machine	D	–
<b>Rogue ONU</b>		
Rogue ONU	D	–
Rogue ONU auto-detection	D	–
Rogue ONU broadcast PLOAM shut down	D	Laser disable or reboot
Rogue ONU test trigger	D	–
<b>FTTdp</b>		
G.int Support	N	–
<b>OAM</b>		
OAM Support	N	–
<b>LCT</b>		
LCT Local Craft Terminal	D	–
<b>Voice</b>		
TAPI Demo	D	–
TAPI Driver	D	–
<b>UBOOT</b>		
MDIO Control for external PHY	D	–



### 3 Changes

For a full list of changes, please refer to the detailed ChangeLog files, which are part of the component packages.

**Table 3 Bug Fixes**

Issue
Cleanup of MAC forwarding table when reconfiguring bridge ports is needed [PONRTSYS-5439]
Utilization of only 25% of allocations at low upstream rates for big packets [PONRTSYS-6998]
Decoupling of PLOAM and OMCI allocation [PONRTSYS-6831]
Reconfigure VLAN quickly and repeatedly [PONRTSYS-6894]
Egress FW mailbox message corruption [PONRTSYS-7132]
Unexpected FW reboot [PONRTSYS-7082]
Bandwidth reconfiguration not always working [PONRTSYS-6395]
PPV4 drivers do many printouts during startup/configuration [PONRTSYS-6135]
After VLAN removal in VLAN aware test case #1 no upstream traffic [PONRTSYS-6231]
Cannot update Managed Entity attribute error occurs when reconfiguring bandwidth [PONRTSYS-6659]
ONU is stuck in O10 PLOAM state - PON mailbox reset is triggered [PONRTSYS-6848]
QoS Manager incorrect usage of dequeue index for pmapper netdev [PONRTSYS-7102]

**Table 4 Enhancements**

Issue
Request PON mailbox flush after receiving invalid messages from PON FW [PONRTSYS-6932]
Retry PON FW download in case it failed [PONRTSYS-6933]
Extend IP link command for GEM interface creation [PONRTSYS-6993]
Move GEM creation/deletion to ETH driver [PONRTSYS-6995]
Move allocation and GEM counters initializer to ETH driver [PONRTSYS-6996]
Implement WAN SerDes bit error counter application [PONRTSYS-6977]



### 3.1 Tool Chain

Due to the changes in OpenWRT 19.07 the Cross Compiler version changed to GCC 8.3.0.

*Note: External tool chain support is broken in OpenWRT 19.07.*

### 3.2 Signaling of LOS on SFP+

The LOS condition gets propagated from WAN to LAN port.

*Note: For 1588/SyncE measurements with Paragon-X, the SFP+ ONU must be connected to an OLT to avoid LOS signaling. This is a known issue of the Paragon software.*

### 3.3 1PPS Output on SFP+

By default the 1PPS output to SFP+ pin 9 is deactivated in the DTS.

It can be enabled in the DTS or with PON CLI command

```
$ pon pin_config_set 1 2
```

or with the respective PON library function.

### 3.4 Access via Telnet no longer supported

Local access via Telnet to Linux command no longer supported for system security. Use SSH instead.



## 4 Open Issues

**Table 5** lists the currently open issues of the Intel® 10G PON Chipset System Package 1.6.7.

**Table 5 Open Issues of the Intel® 10G PON Chipset System Package 1.6.7**

Issue Description	Status
This is a preliminary system package for the Intel® 10G PON Chipset and is applicable for engineering purposes	–
Delete rootfs_data partition in OMCI SW download [PONRTSYS-4011]	In progress
ExtVLAN and VLAN filters cannot be configured on pmapper [PONRTSYS-4392]	In progress
LAN port in 2.5G mode not supported in Linux for SFU and eth0_0 (Aquantia)	For future release
TX_FAULT indication from PMD not handled	In progress
US data loss with pbit regeneration profiles [PONRTSYS-5396]	In progress
Bandwidth reconfiguration not always working [PONRTSYS-6395]	Fixed
Drops on some priorities in Strict Priority with VLAN aware forwarding [PONRTSYS-6119]	In progress
PPv4 has 10% less throughput if SP is used instead of WRR or single queue for small packets [PONRTSYS-6084]	In progress
Queues cannot be configured on the OMCI T-CONT [PONRTSYS-5570]	In progress
Setting pq.drop_precedence=0 stalls OMCI [PONRTSYS-5851]	In progress
PPV4 drivers do many printouts during startup/configuration [PONRTSYS-6135]	Fixed
After VLAN removal in VLAN aware test case #1 no upstream traffic [PONRTSYS-6231]	Fixed
Some ethtool counters for eth0_0 not working in TX direction [PONRTSYS-6660]	In progress
Nokia OLT reconfigure VLAN quickly and repeatedly [PONRTSYS-6894]	Fixed
Cannot update Managed Entity attribute error occurs when reconfiguring bandwidth [PONRTSYS-6659]	Fixed
ONU is stuck in O10 PLOAM state - PON mailbox reset is triggered [PONRTSYS-6848]	Fixed
QoS Manager test case fails [PONRTSYS-7012]	For future release
RFC2544 tests yields bad results caused by rare packet drops in upstream due to optical side SerDes/PLL5 [PONRTSYS-7039]	For future release
QoS Manager incorrect usage of dequeue index for pmapper netdev [PONRTSYS-7102]	Fixed



**Table 5** Open Issues of the Intel® 10G PON Chipset System Package 1.6.7 (cont'd)

Issue Description	Status
First OMCI RX packet does not reach SW [PONRTSYS-7156]	In progress
PRBS test pattern generator and checker on PON WAN side [PONRTSYS-5568]	In progress
Add automatic Rogue ONU detection configuration values to UCI configuration [PONRTSYS-6195]	In progress
Link-State in standard ethtool info is wrong [PONRTSYS-7151]	In progress
Jumbo frames crash PP under congestion [PONRTSYS-6951]	In progress
Long traffic stabilization time [PONRTSYS-6909]	In progress
<b>BBF247</b>	
Multiple UNI ports For future release	For future release
WRED Color Marking Test cases 6.2.13, 6.2.14, 6.2.15, 6.2.16	For future release
Test Cases 6.10.1 (XGSPON, window size 16)	In progress

## 5 Known Restrictions

**Table 6** lists the currently known restrictions of the Intel® 10G PON Chipset System Package 1.6.7.

**Table 6** Ethernet PHY Restrictions

Functionality	Remark
RJ45 Tap Up	Link-up issue was seen with some interoperability (IOP) devices
There is a statistical probability of sub-optimal training leading to CRC error rates beyond the IEEE802.3 standard specification.	Fix planned for future release
Current Release is restricted to operate in consumer temperature range 0°C to 70°C ambient temperature.	Fix planned for future release
Power over Ethernet (PoE)	Not tested



## Literature References

- [1] Intel® 10G PON Chipset PRX120 (PRX120B0BC) Data Sheet Rev. 1.0
- [2] Intel® 10G PON Chipset PRX126 (PRX126B0BI) Data Sheet Rev. 2.1
- [3] Intel® 10G PON Chipset PRX321 (PRX321B0BI) Data Sheet Rev. 2.0
- [4] Intel® 10G PON Chipset System Overview Rev. 2.0
- [5] Intel® 10G PON Chipset 10G PON Subsystem Preliminary Software Overview Rev. 1.2
- [6] Intel® 10G PON Chipset 10G PON Subsystem Preliminary Programmer's Guide Rev. 1.7
- [7] Intel® 10G PON Development Kit EASY PRX321 REF BOARD V1.2/V1.3 (SFU) User's Manual Hardware Description Rev. 1.0
- [8] Intel® 10G PON Development Kit EASY PRX321 EVAL BOARD V1.2 (SFU) User's Manual Hardware Description Rev. 1.0
- [9] Intel® 10G PON Chipset PRX126 Design Considerations Preliminary Application Note Rev. 1.1
- [10] Intel® 10G PON Chipset PRX126 SFP+ Thermal Design Guidelines Application Note Rev. 1.0
- [11] Intel® 10G PON Chipset PRX321/GNX321 Design Considerations Application Note Rev. 1.1

**Attention: Please refer to the latest revision of the documents.**