Active Ethernet and xPON Auto-Detection for SFP and Physical Link

Application Note

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Chapter 1: Overview

This document provides details about Active Ethernet (AE) and xPON (GPON, XGPON, XGSPON…) auto-detection for SFP and physical link. The scope of this document is limited to BCM63158 (and its variant) platform(s).

The need for auto-detection arises due to the fact that both AE and xPON MACs share the same 10G SerDes hardware, hence only one type of SFP/link can be supported at any given time.

NOTE: "SFP" refers to the "Small Form-factor Pluggable" module and represents any supported variant of SFP. "SFP" and "SFP Module" are used interchangeably throughout the document.

Chapter 2: SFP Database

Broadcom reference software maintains a database of supported/tested SFPs that also defines the characteristics of the SFP along with the type. This database is picked up from following two files:

- **Broadcom** maintained/tested SFPs:
  `bcmdrivers/opensource/char/opticaldet/impl1/trx_descr_gen.h`
- **Customer** maintained/tested SFPs:
  `bcmdrivers/opensource/char/opticaldet/impl1/trx_descr_usr.h`

Each SFP module is described as “C” data structure as below:

```
{
    .form_factor           = TRX_XFP,
    .type                  = TRX_TYPE_XPON,
    .vendor_name           = "Hisense",
    .vendor_pn             = "LTF7225-BC+",
    .lbe_polarity          = TRX_ACTIVE_HIGH,
    .tx_sd_polarity        = TRX_ACTIVE_HIGH,
    .tx_pwr_down_polarity  = TRX_ACTIVE_LOW,
    .tx_pwr_down_cfg_req   = false,
    .tx_sd_supported       = TRX_SIGNAL_NOT_SUPPORTED,
    .activation_func       = (f_activation) NULL,
    .wan_types_bitmap      = SUPPORTED_WAN_TYPES_BIT_NGPON2_10_10
},
```

- **vendor_name** and **vendor_pn** are two key *string type* parameters used to recognize SFP module.
- **type** parameter is used to indicate SFP type (AE, xPON..) as per definition in following file:
  `bcmdrivers/opensource/include/bcm963xx/opticaldet.h.`

Chapter 3: Adding New SFP to Database

Whenever software detects any unidentified/unregistered SFP, the following “type” of information is printed on console. The customer can use this information to add the SFP module information in the “usr” database. Other information in the database is populated based on board design and/or SFP data sheet.

```
Opticaldet: optical module detected on i2c bus 0:
Opticaldet Unknown Transceiver
Module Form Factor: SFP/SFP+
Module Type       : UNKNOWN
Vendor Name       : FINISAR CORP.
Part Number       : FTLF8519P2BTL
Part REV          : A
**********************************************************************
* Opticaldet: Unknown optical module - using default configuration    *
* Please make sure the optical module is correct for your connection  *
**********************************************************************
```

Chapter 4: Auto-Detection Process

The Ethernet driver is responsible for detecting the AE SFP/Link while the WanConf userspace daemon takes care of the xPON SFP. Whichever type of SFP is detected first continues to be the mode the system will use to operate, in other words, either AE or XPON.

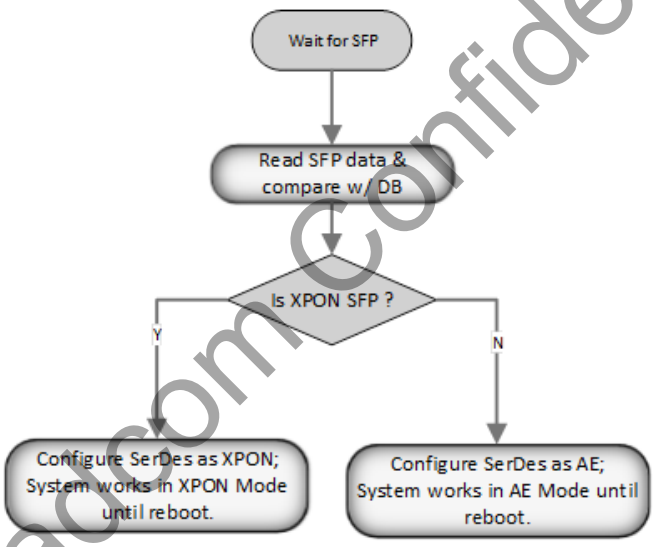
The system will continue to operate without reboot if the same type (AE or XPON) of SFP is unplugged/plugged, **but if the type is changed, a system reboot is required**.

As explained earlier, SFP detection works based on the registered SFP modules in the database.

The AE/XPON auto-detection feature is applicable only when **all** below conditions are satisfied:

- The AE port is defined in the board parameters, i.e., the customer intends to use AE as Ethernet WAN port.
- the image is compiled with GPON package (XPON add-on).

Figure 1: High-Level Auto-Detection Procedure



Revision History

Active Ethernet and xPON Auto-Detection-AN100-R, December 12, 2018

- Initial release