

Internet Engineering Task Force (IETF)  
Request for Comments: 6767  
Category: Standards Track  
ISSN: 2070-1721

E. Beili  
Actelis Networks  
M. Morgenstern  
ECI Telecom  
February 2013

## Ethernet-Based xDSL Multi-Pair Bonding (G.Bond/Ethernet) MIB

### Abstract

This document defines a Management Information Base (MIB) module for use with network management protocols in TCP/IP-based internets. This document defines an extension to the GBOND-MIB module with a set of objects for managing Ethernet-based multi-pair bonded Digital Subscriber Line (xDSL) interfaces, as defined in ITU-T Recommendation G.998.2.

### Status of This Memo

This is an Internet Standards Track document.

This document is a product of the Internet Engineering Task Force (IETF). It represents the consensus of the IETF community. It has received public review and has been approved for publication by the Internet Engineering Steering Group (IESG). Further information on Internet Standards is available in Section 2 of RFC 5741.

Information about the current status of this document, any errata, and how to provide feedback on it may be obtained at <http://www.rfc-editor.org/info/rfc6767>.

### Copyright Notice

Copyright (c) 2013 IETF Trust and the persons identified as the document authors. All rights reserved.

This document is subject to BCP 78 and the IETF Trust's Legal Provisions Relating to IETF Documents (<http://trustee.ietf.org/license-info>) in effect on the date of publication of this document. Please review these documents carefully, as they describe your rights and restrictions with respect to this document. Code Components extracted from this document must include Simplified BSD License text as described in Section 4.e of the Trust Legal Provisions and are provided without warranty as described in the Simplified BSD License.

## Table of Contents

1. Introduction .....	2
2. The Internet-Standard Management Framework .....	2
3. The Broadband Forum Management Framework for xDSL Bonding .....	3
4. Relationship to Other MIB Modules .....	3
4.1. Relationship to Interfaces Group MIB Module .....	3
4.2. Relationship to G.Bond MIB Module .....	3
4.2.1. BACP-Based Discovery .....	3
4.3. Relationship to EFM Copper MIB Module .....	5
4.4. Relationship to IEEE 802.3.1 MIB Modules .....	6
5. MIB Structure .....	6
5.1. Overview .....	6
5.2. Performance Monitoring .....	7
5.3. Mapping of Broadband Forum TR-159 Managed Objects .....	7
6. G.Bond/Ethernet MIB Definitions .....	9
7. Security Considerations .....	49
8. IANA Considerations .....	50
9. Acknowledgments .....	50
10. References .....	50
10.1. Normative References .....	50
10.2. Informative References .....	52

## 1. Introduction

Ethernet-based xDSL Multi-Pair Bonding, a.k.a. G.Bond/Ethernet, is specified in ITU-T Recommendation G.998.2 [G.998.2], which defines a method for bonding (or aggregating) multiple xDSL lines (or individual bearer channels in multiple xDSL lines) into a single bidirectional logical link carrying Ethernet traffic.

The MIB module defined in this document provides G.Bond/Ethernet-specific objects for the management of G.998.2 bonded interfaces, extending the common bonding objects specified in the GBOND-MIB module [RFC6765].

## 2. The Internet-Standard Management Framework

For a detailed overview of the documents that describe the current Internet-Standard Management Framework, please refer to section 7 of RFC 3410 [RFC3410].

Managed objects are accessed via a virtual information store, termed the Management Information Base or MIB. MIB objects are generally accessed through the Simple Network Management Protocol (SNMP). Objects in the MIB are defined using the mechanisms defined in the Structure of Management Information (SMI). This memo specifies a MIB

module that is compliant to the SMIV2, which is described in STD 58, RFC 2578 [RFC2578], STD 58, RFC 2579 [RFC2579] and STD 58, RFC 2580 [RFC2580].

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in BCP 14, RFC 2119 [RFC2119].

### 3. The Broadband Forum Management Framework for xDSL Bonding

This document makes use of the Broadband Forum technical report "Management Framework for xDSL Bonding" [TR-159], defining a management model and a hierarchy of management objects for the bonded xDSL interfaces.

### 4. Relationship to Other MIB Modules

This section outlines the relationship of the MIB modules defined in this document with other MIB modules described in the relevant RFCs. Specifically, the following MIB modules are discussed: the Interfaces Group MIB (IF-MIB), G.Bond MIB (GBOND-MIB), and Ethernet in the First Mile (EFM) Copper MIB (EFM-CU-MIB).

#### 4.1. Relationship to Interfaces Group MIB Module

A G.Bond/Ethernet port is a private case of a bonded multi-pair xDSL interface and as such is managed using generic interface management objects defined in the IF-MIB [RFC2863]. In particular, an interface index (ifIndex) is used to index instances of G.Bond/Ethernet ports, as well as xDSL lines/channels, in a managed system.

#### 4.2. Relationship to G.Bond MIB Module

The GBOND-MIB module [RFC6765] defines management objects common for all bonded multi-pair xDSL interfaces. In particular, it describes the bonding management, bonded port and channel configuration, handshake-based discovery, initialization sequence, etc.

Both the GBOND-MIB [RFC6765] and G9982-MIB (this document) modules are REQUIRED to manage a G.Bond/Ethernet port.

##### 4.2.1. BACP-Based Discovery

All G.998 protocols share a remote Bonding Channel Entity (BCE) discovery, using the [G.994.1] handshake (G.hs). The GBOND-MIB module provides an example of an automatic BCE connection to the corresponding Generic Bonding Sub-layer (GBS) ports of a generic

G.998 multi-port Central Office (CO) device, using G.hs-based BCE discovery. Amendment 2 to the ITU-T G.998.2 specification [G.998.2-Amd2] provides an alternative optional Bonding Aggregation Control Protocol (BACP) for in-service discovery, aggregation, and pair management.

The following pseudocode gives the same example of the discovery and automatic BCE assignment for a multi-GBS G.Bond/Eth CO device, using BACP objects defined in this MIB module, as well as the IF-CAP-STACK-MIB [RFC5066] and IF-MIB modules. Note that automatic BCE assignment is only shown here for the purposes of the example. Fixed BCE pre-assignment, manual assignment, or auto-assignment using an alternative internal algorithm may be chosen by a particular implementation:

```
// Go over all GBS ports in the CO device
FOREACH gbs[i] IN CO_device
{ // Perform discovery and auto-assignment on GBS ports
  // with room for more channels.
  IF ( gbs[i].NumBCEs < gbs[i].BondCapacity )
  { IF ( gbs[i].g99820perCp == cpBACP )
    { // Using BACP

      // Get Eligible Group ID and Remote Group ID
      // from a connected BCE (during BACP
      // initialization, each BCE is connected to its own GBS)
      gid = ifStackTable[gbs[i]].bce[0].g9982BceEligibleGroupID;
      rgid =
        ifStackTable[gbs[i]].bce[0].g9982BcePeerEligibleGroupID;

      // Go over all disconnected channels, which can
      // potentially be connected to the GBS
      FOREACH bce[j] IN ifCapStackTable[gbs[i]] AND
        NOT IN ifStackTable[gbs[i]] // not connected
      { // Read the Remote Group ID for the selected BCE
        // and compare it with the Remote Group ID of the connected
        // BCE.
        r = bce[j].g9982BcePeerEligibleGroupID;
        IF ( r == rgid AND gbs[i].NumBCEs < gbs[i].BondCapacity )
        { // The Remote Terminal device (RT) connected via BCE[j] is
          // a peer for GBS[i], and there is room for another BCE in
          // the GBS[i] aggregation group (max. Bonding capacity is
          // not reached yet).
          // Connect this BCE to the GBS (via the ifStackTable; the
          // ifInvStackTable, which is the inverse of the
          // ifStackTable, is updated automatically; i.e., gbs[i] is
          // auto-added to ifInvStackTable[bce[j]]).

```

```

        ADD bce[j] TO ifStackTable[gbs[i]];
        gbs[i].NumBCEs = gbs[i].NumBCEs + 1;
    }
}
// At this point, we have discovered all local BCEs that
// are physically connected to the same RT
// and have connected them to GBS[i].  Go to the next GBS.
BREAK;
}
ELSE
{ // Use default G.hs discovery protocol.
    ...
}
}
}

```

An SNMP agent for a G.Bond device builds the ifCapStackTable and its inverse -- the ifInvCapStackTable -- on device initialization, according to the cross-connect capabilities of the device. When BACP is used, the g9982BceConfEligibleGroupID object identifying bonding eligibility MUST be automatically updated whenever the ifCapStackTable/ifInvCapStackTable are changed.

#### 4.3. Relationship to EFM Copper MIB Module

The EFM-CU-MIB module [RFC5066] defines objects for managing Ethernet in the First Mile Copper (EFMCu) interfaces 10PASS-TS and 2BASE-TL, as defined in IEEE Std 802.3-2005 [802.3]. These interfaces are based on Single-pair High-speed DSL (SHDSL) [G.991.2] and Very high speed DSL (VDSL) [G.993.1] technology, respectively, and can be optionally aggregated (bonded).

The ITU-T G.998.2 specification extends the IEEE 802.3 Clause 61 bonding to work over any xDSL technology, providing the ability to bond individual channels as well as physical lines. It also allows the use of alternative High-level Data Link Control (HDLC) encapsulation instead of the default 64/65-octet encapsulation and adds a new optional Bonding Aggregation Control Protocol (BACP) for in-service discovery, aggregation, and pair management instead of the default G.hs-based bonding protocol, which cannot be used in-service, while the link is 'up'.

EFM-CU-MIB can be used to manage all aspects of the EFMCu physical interfaces (PHYS), including complete (within the scope of the 802.3 standard) management of the SHDSL/VDSL lines. The GBOND-MIB and G9982-MIB modules, on the other hand, provide management objects only for the bonding part, leaving the management of the individual xDSL interfaces (lines/channels) to the respective xDSL-LINE-MIB modules.

Therefore, an IEEE 802.3 2BASE-TL/10PASS-TS interface can be managed by either combination of the following MIB modules:

IF-MIB + IF-CAP-STACK-MIB + EtherLike-MIB + MAU-MIB + EFM-CU-MIB

IF-MIB + IF-CAP-STACK-MIB + GBOND-MIB + G9982-MIB +  
HDSL2-SHDSL-LINE-MIB/VDSL-LINE-MIB

(The EtherLike-MIB, HDSL2-SHDSL-LINE-MIB, and VDSL-LINE-MIB modules are found in [RFC3635], [RFC4319], and [RFC3728], respectively.)

Note also that while EFM-CU-MIB relies on the ifMauMediaAvailable object from MAU-MIB [RFC4836] for the additional bonded xDSL-specific operational states, GBOND-MIB provides these indications via the gBondPortStatFltStatus object, complementing the ifOperStatus object from the IF-MIB.

Finally, the EFM-CU-MIB does not include historical Performance Monitoring (PM), while the GBOND-MIB/G9982-MIB/xDSL-LINE-MIB combination provides full PM functionality for a bonded link and individual xDSL lines.

#### 4.4. Relationship to IEEE 802.3.1 MIB Modules

The IEEE 802.3 working group chartered a task force [IEEE802.3.1], which continues the development of standard Ethernet-related MIB modules based on the initial work done in the IETF. Future projects resulting from the work of this task force may include and possibly extend the work done in the IETF.

## 5. MIB Structure

### 5.1. Overview

The main management objects defined in the G9982-MIB module are split into 2 groups, structured as recommended by RFC 4181 [RFC4181]:

- o g9982Port - containing objects for configuration, capabilities, status, and PM of G.Bond/Eth ports. Note that the rest of the objects for the Generic Bonding Sub-layer (GBS) port configuration, capabilities, status, notifications, and PM are located in the GBOND-MIB module.
- o g9982Bce - containing objects representing OPTIONAL status information and BACP configuration for each Bonding Channel Entity (BCE). Note that the rest of the objects for the BCE

configuration, capabilities, status, and notifications are located in relevant xDSL line MIB modules as well as in the GBOND-MIB module.

## 5.2. Performance Monitoring

The OPTIONAL Performance Monitoring counters, thresholds, and history buckets (interval-counters), similar to those defined in [TR-159], are implemented using the textual conventions defined in the HC-PerfHist-TC-MIB [RFC3705]. The HC-PerfHist-TC-MIB defines 64-bit versions of the textual conventions found in PerfHist-TC-MIB [RFC3593].

The agent SHOULD align the beginning of each interval to a fifteen-minute boundary of a wall clock. Likewise, the beginning of each one-day interval SHOULD be aligned with the start of a day.

Counters are not reset when a GBS is re-initialized, but rather only when the agent is reset or re-initialized.

## 5.3. Mapping of Broadband Forum TR-159 Managed Objects

This section contains the mapping between relevant managed objects (attributes) defined in [TR-159] and the managed objects defined in this document.

TR-159 Managed Object	Corresponding SNMP Object
oBondEth - Basic Package (Mandatory)	
aEthBACPSupported	g9982PortCapBacpSupported
aEthTcAdminType	g9982PortConfTcAdminType
aEthTcOperType	g9982PortStatTcOperType
aEthTcTypesSupported	g9982PortCapTcTypesSupported
aEthRxErrors	g9982PortStatRxErrors
aEthRxSmallFragments	g9982PortStatRxSmallFragments
aEthRxLargeFragments	g9982PortStatRxLargeFragments
aEthRxBadFragments	g9982PortStatRxBadFragments

aEthRxLostFragments	g9982PortStatRxLostFragments
aEthRxLostStarts	g9982PortStatRxLostStarts
aEthRxLostEnds	g9982PortStatRxLostEnds
aEthRxOverflows	g9982PortStatRxOverflows
oBondEth - BACP Package (Optional)	
aEthAdminCP	g9982PortConfAdminCp
aEthOperCP	g9982PortStatOperCp
oChannel - BACP Package (Optional)	
aChannelEligibleGroupID	g9982BceConfEligibleGroupID
aChannelEligibleStreamID	g9982BceConfPeerEligibleGroupID
oChannel - PM Package (Optional)	
aChannelPtmTcRxCodingViolations	g9982BceStatTcInCodingErrors
aChannelPtmTcRxCrcErrors	g9982BceStatTcInCrcErrors

Table 1: Mapping of TR-159 Managed Objects

Note that some of the mapping between the objects defined in TR-159 and the ones defined in this MIB module is not one-to-one; for example, while TR-159 PM attributes aGroupPerf\* map to the corresponding gBondPortPm\* objects of the GBOND-MIB module, there are no dedicated PM attributes for the g9982PortPm\* objects introduced in this MIB module. However, since their definition is identical to the definition of gBondPortPm\* objects of the GBOND-MIB module, we can map g9982PortPm\* to the relevant aGroupPerf\* attributes of TR-159 and use the term 'partial mapping' to denote the fact that this mapping is not one-to-one.

## 6. G.Bond/Ethernet MIB Definitions

The G9982-MIB module IMPORTS objects from SNMPv2-SMI [RFC2578], SNMPv2-TC [RFC2579], SNMPv2-CONF [RFC2580], IF-MIB [RFC2863], and HC-PerfHist-TC-MIB [RFC3705]. The module has been structured as recommended by [RFC4181].

```
G9982-MIB DEFINITIONS ::= BEGIN
```

```
IMPORTS
    MODULE-IDENTITY,
    OBJECT-TYPE,
    Counter32,
    mib-2,
    Unsigned32
        FROM SNMPv2-SMI          -- RFC 2578
    TEXTUAL-CONVENTION,
    TruthValue,
    PhysAddress
        FROM SNMPv2-TC          -- RFC 2579
    MODULE-COMPLIANCE,
    OBJECT-GROUP
        FROM SNMPv2-CONF        -- RFC 2580
    ifIndex
        FROM IF-MIB              -- RFC 2863
    HCPerfCurrentCount,
    HCPerfValidIntervals,
    HCPerfInvalidIntervals,
    HCPerfTimeElapsed
        FROM HC-PerfHist-TC-MIB -- RFC 3705
    ;
```

---

```
g9982MIB MODULE-IDENTITY
    LAST-UPDATED "201302200000Z" -- 20 February 2013
    ORGANIZATION "IETF ADSL MIB Working Group"
    CONTACT-INFO
        "WG charter:
         http://datatracker.ietf.org/wg/adslmib/charter/

        Mailing Lists:
        General Discussion: adslmib@ietf.org
        To Subscribe: adslmib-request@ietf.org
        In Body: subscribe your_email_address
```

Chair: Menachem Dodge  
Postal: ECI Telecom, Ltd.  
30 Hasivim St.  
Petach-Tikva 4951169  
Israel  
Phone: +972-3-926-8421  
EMail: menachemdodge@gmail.com

Editor: Edward Beili  
Postal: Actelis Networks, Inc.  
25 Bazel St., P.O.B. 10173  
Petach-Tikva 49103  
Israel  
Phone: +972-3-924-3491  
EMail: edward.beili@actelis.com

Editor: Moti Morgenstern  
Postal: ECI Telecom  
30 Hasivim St.  
Petach-Tikva 4951169  
Israel  
Phone: +972-3-926-6258  
EMail: moti.morgenstern@ecitele.com"

#### DESCRIPTION

"The objects in this MIB module are used to manage the Ethernet-based multi-pair bonded xDSL interfaces, as defined in ITU-T Recommendation G.998.2 (G.Bond/Ethernet).

This MIB module MUST be used in conjunction with the GBOND-MIB module, common to all G.Bond technologies.

The following references are used throughout this MIB module:

[G.998.2] refers to:

ITU-T Recommendation G.998.2: 'Ethernet-based multi-pair bonding', January 2005.

[G.998.2-Amd2] refers to:

ITU-T Recommendation G.998.2 Amendment 2, December 2007.

[802.3] refers to:

IEEE Std 802.3-2005: 'IEEE Standard for Information technology - Telecommunications and information exchange between systems - Local and metropolitan area networks - Specific requirements -

Part 3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications', December 2005.

[TR-159] refers to:

Broadband Forum Technical Report: 'Management Framework for xDSL Bonding', December 2008.

Naming Conventions:

BACP - Bonding Aggregation Control Protocol  
 BCE - Bonding Channel Entity  
 BTU - Bonding Terminating Unit  
 BTU-C - Bonding Terminating Unit, CO side  
 BTU-R - Bonding Terminating Unit, Remote Terminal (CPE) side  
 CO - Central Office  
 CPE - Customer Premises Equipment  
 GBS - Generic Bonding Sub-layer  
 HDLC - High-level Data Link Control  
 PTM-TC - Packet Transfer Mode Transmission Convergence  
 (sub-layer)  
 SNR - Signal to Noise Ratio  
 TC - Transmission Convergence (sub-layer)  
 UAS - Unavailable Seconds

Copyright (c) 2013 IETF Trust and the persons identified as authors of the code. All rights reserved.

Redistribution and use in source and binary forms, with or without modification, is permitted pursuant to, and subject to the license terms contained in, the Simplified BSD License set forth in Section 4.c of the IETF Trust's Legal Provisions Relating to IETF Documents (<http://trustee.ietf.org/license-info>).

REVISION "201302200000Z" -- 20 February 2013  
 DESCRIPTION "Initial version, published as RFC 6767."

::= { mib-2 264 }

-- Sections of the module

-- Structured as recommended by RFC 4181, Appendix D

g9982Objects OBJECT IDENTIFIER ::= { g9982MIB 1 }

g9982Conformance OBJECT IDENTIFIER ::= { g9982MIB 2 }

```
-- Groups in the module

g9982Port      OBJECT IDENTIFIER ::= { g9982Objects 1 }
g9982Bce       OBJECT IDENTIFIER ::= { g9982Objects 2 }

-----
-- Textual Conventions
-----

G9982PtmTcType ::= TEXTUAL-CONVENTION
    STATUS      current
    DESCRIPTION
        "This textual convention represents possible PTM-TC types in
        G.Bond/Eth ports.  The following values are defined:
            tc6465      - 64/65-octet encapsulation, as defined in
                        [802.3] Clause 61.3.3.
            tcHDLC      - HDLC encapsulation, as defined in [G.998.2]
                        Annex B."
    SYNTAX      INTEGER {
        tc6465(1),
        tcHDLC(2)
    }

G9982CpType ::= TEXTUAL-CONVENTION
    STATUS      current
    DESCRIPTION
        "This textual convention represents possible control protocol
        types in G.Bond/Eth ports.  The following values are defined:
            unknown     - the control protocol cannot be determined.
            cpHS        - G.hs-based discovery and aggregation,
                        as specified in [G.998.2].
            cpBACP      - Bonding Aggregation Control Protocol (BACP) --
                        a frame-based discovery, aggregation, and link
                        management protocol, as specified in
                        [G.998.2-Amd2] Annex C."
    SYNTAX      INTEGER {
        unknown(0),
        cpHS(1),
        cpBACP(2)
    }

-----
-- GBS Notifications group
-----

-- empty --
```

```
-----
-- GBS group
-----
```

```
g9982PortConfTable OBJECT-TYPE
```

```
SYNTAX SEQUENCE OF G9982PortConfEntry
```

```
MAX-ACCESS not-accessible
```

```
STATUS current
```

```
DESCRIPTION
```

```
"Table for configuration of G.Bond/Eth GBS ports. Entries in
this table MUST be maintained in a persistent manner."
```

```
::= { g9982Port 1 }
```

```
g9982PortConfEntry OBJECT-TYPE
```

```
SYNTAX G9982PortConfEntry
```

```
MAX-ACCESS not-accessible
```

```
STATUS current
```

```
DESCRIPTION
```

```
"An entry in the G.Bond/Eth Port Configuration table.
```

```
Each entry represents a G.Bond Ethernet port indexed by the
ifIndex.
```

```
Note that a G.Bond/Eth GBS port runs on top of a single or
multiple BCE port(s), which are also indexed by the ifIndex."
```

```
INDEX { ifIndex }
```

```
::= { g9982PortConfTable 1 }
```

```
G9982PortConfEntry ::=
```

```
SEQUENCE {
```

```
g9982PortConfTcAdminType G9982PtmTcType,
```

```
g9982PortConfAdminCp G9982CpType
```

```
}
```

```
g9982PortConfTcAdminType OBJECT-TYPE
```

```
SYNTAX G9982PtmTcType
```

```
MAX-ACCESS read-write
```

```
STATUS current
```

```
DESCRIPTION
```

```
"Administrative (desired) PTM-TC encapsulation type of a
G.Bond/Eth port (GBS).
```

```
Possible values are:
```

```
tc6465(1) - 64/65-octet encapsulation
```

```
tcHDLC(2) - HDLC encapsulation
```

```
Attempts to set a port to a non-supported PTM-TC encapsulation
type (see g9982PortCapTcTypesSupported) SHALL be rejected
(with the error inconsistentValue).
```

Changing g9982PortConfTcAdminType is a traffic-disruptive operation and as such SHALL be done when the link (GBS) is administratively 'down', as indicated by the ifAdminStatus object in the IF-MIB.

Attempts to change this object SHALL be rejected (with the error inconsistentValue) if the link is 'up' or initializing.

This object maps to the TR-159 attribute aEthTcAdminType."

REFERENCE

"[TR-159], Section 5.5.3.4; RFC 2863, IF-MIB, ifAdminStatus"  
 ::= { g9982PortConfEntry 1 }

g9982PortConfAdminCp OBJECT-TYPE

SYNTAX G9982CpType

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"Administrative (desired) bonding control protocol of a G.Bond/Eth port (GBS). Possible values are:  
 cpHS(1) - use G.hs-based protocol (default)  
 cpBACP(2) - use frame-based BACP

Note that G.hs-based protocol support is mandatory, according to [G.998.2]. Attempts to set a port to a non-supported bonding control protocol (e.g., BACP if the value of g9982PortCapBacpSupported is false) SHALL be rejected (with the error inconsistentValue).

Changing g9982PortConfAdminCp is a traffic-disruptive operation and as such SHALL be done when the link (GBS) is administratively 'down', as indicated by the ifAdminStatus object in the IF-MIB.

Attempts to change this object SHALL be rejected (with the error inconsistentValue) if the link is 'up' or initializing.

This object maps to the TR-159 attribute aEthAdminCP."

REFERENCE

"[TR-159], Section 5.5.3.2; RFC 2863, IF-MIB, ifAdminStatus"  
 DEFVAL { cpHS }  
 ::= { g9982PortConfEntry 2 }

g9982PortCapTable OBJECT-TYPE

SYNTAX SEQUENCE OF G9982PortCapEntry

MAX-ACCESS not-accessible

STATUS current

## DESCRIPTION

"Table for capabilities of G.Bond/Eth ports. Entries in this table MUST be maintained in a persistent manner."

```
::= { g9982Port 2 }
```

## g9982PortCapEntry OBJECT-TYPE

```
SYNTAX      G9982PortCapEntry
```

```
MAX-ACCESS  not-accessible
```

```
STATUS      current
```

## DESCRIPTION

"An entry in the G.Bond/Eth Port Capability table. Each entry represents a G.Bond port indexed by the ifIndex. Note that a G.Bond GBS port runs on top of a single or multiple BCE port(s), which are also indexed by the ifIndex."

```
INDEX { ifIndex }
```

```
::= { g9982PortCapTable 1 }
```

## G9982PortCapEntry ::=

```
SEQUENCE {
```

```
  g9982PortCapTcTypesSupported          BITS,
```

```
  g9982PortCapBacpSupported            TruthValue
```

```
}
```

## g9982PortCapTcTypesSupported OBJECT-TYPE

```
SYNTAX      BITS {
```

```
  tc6465(0),
```

```
  tcHDLC(1)
```

```
}
```

```
MAX-ACCESS  read-only
```

```
STATUS      current
```

## DESCRIPTION

"PTM-TC encapsulation types supported by the G.Bond/Eth port. This is a bitmap of possible encapsulation types. The various bit positions are:

```
tc6465 - GBS is capable of 64/65-octet encapsulation
```

```
tcHDLC - GBS is capable of HDLC encapsulation
```

A desired encapsulation is determined by g9982PortConfTcAdminType, while g9982PortStatTcOperType reflects the current operating mode.

This object maps to the TR-159 attribute aEthTcTypesSupported."

## REFERENCE

```
"[TR-159], Section 5.5.3.6"
```

```
::= { g9982PortCapEntry 1 }
```

## g9982PortCapBacpSupported OBJECT-TYPE

```
SYNTAX      TruthValue
```

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Indicates whether the Bonding Aggregation Control Protocol (BACP) -- the frame-based discovery, aggregation, and link management protocol specified in [G.998.2-Amd2]) is supported by the G.Bond/Ethernet port.

A value of true(1) indicates that BACP is supported.

A value of false(2) indicates that BACP is unsupported.

The BACP functionality, if supported, can be enabled or disabled via g9982AdminCP, while g9982OperCP reflects the current BACP operating mode.

This object maps to the TR-159 attribute aEthBACPSupported."

REFERENCE

"[TR-159], Section 5.5.3.1; [G.998.2-Amd2], Annex C"

::= { g9982PortCapEntry 2 }

g9982PortStatTable OBJECT-TYPE

SYNTAX SEQUENCE OF G9982PortStatEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"This table provides overall status information of G.Bond ports, complementing the generic status information from the ifTable of the IF-MIB. Additional status information about connected BCEs is available from the relevant line MIBs.

This table contains live data from the equipment. As such, it is NOT persistent."

::= { g9982Port 3 }

g9982PortStatEntry OBJECT-TYPE

SYNTAX G9982PortStatEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An entry in the G.Bond/Eth Port Status table.

Each entry represents a G.Bond/Eth port indexed by the ifIndex.

Note that a G.Bond GBS port runs on top of a single or multiple BCE port(s), which are also indexed by the ifIndex."

INDEX { ifIndex }

::= { g9982PortStatTable 1 }

G9982PortStatEntry ::=

```
SEQUENCE {
  g9982PortStatTcOperType          G9982PtmTcType,
  g9982PortStatOperCp              G9982CpType,
  g9982PortStatRxErrors            Counter32,
  g9982PortStatRxSmallFragments   Counter32,
  g9982PortStatRxLargeFragments   Counter32,
  g9982PortStatRxBadFragments     Counter32,
  g9982PortStatRxLostFragments    Counter32,
  g9982PortStatRxLostStarts       Counter32,
  g9982PortStatRxLostEnds         Counter32,
  g9982PortStatRxOverflows        Counter32
}
```

g9982PortStatTcOperType OBJECT-TYPE

SYNTAX G9982PtmTcType

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Current operational encapsulation type of the G.Bond/Eth port.

Possible values are:

- tc6465(1) - GBS uses 64/65-octet encapsulation
- tcHDLC(2) - GBS uses HDLC encapsulation

The operational PTM-TC encapsulation type can be configured via g9982PortConfTcAdminType.

This object maps to the TR-159 attribute aEthTcOperType."

REFERENCE

"[TR-159], Section 5.5.3.5"

::= { g9982PortStatEntry 1 }

g9982PortStatOperCp OBJECT-TYPE

SYNTAX G9982CpType

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Current operational bonding discovery and aggregation control protocol of the G.Bond/Eth port.

Possible values are:

- unknown(0) - the protocol cannot be determined, e.g., when the GBS is 'down'
- cpHS(1) - GBS uses G.hs-based protocol
- cpBACP(2) - GBS uses frame-based BACP

The operational discovery and aggregation control protocol can be configured via the g9982PortConfAdminCp variable.

This object maps to the TR-159 attribute aEthOperCP."

## REFERENCE

"[TR-159], Section 5.5.3.3"  
 ::= { g9982PortStatEntry 2 }

## g9982PortStatRxErrors OBJECT-TYPE

SYNTAX Counter32  
UNITS "fragments"  
MAX-ACCESS read-only  
STATUS current

## DESCRIPTION

"A number of Ethernet frame fragments that have been received by the bonding function and discarded due to various errors.

Discontinuities in the value of this counter can occur at re-initialization of the management system, and at other times as indicated by the value of ifCounterDiscontinuityTime, as defined in the IF-MIB.

This object maps to the TR-159 attribute aEthRxErrors."

## REFERENCE

"[TR-159], Section 5.5.3.7"  
 ::= { g9982PortStatEntry 3 }

## g9982PortStatRxSmallFragments OBJECT-TYPE

SYNTAX Counter32  
UNITS "fragments"  
MAX-ACCESS read-only  
STATUS current

## DESCRIPTION

"A number of fragments smaller than minFragmentSize (64 bytes) that have been received by the bonding function and discarded.

Discontinuities in the value of this counter can occur at re-initialization of the management system, and at other times as indicated by the value of ifCounterDiscontinuityTime, as defined in the IF-MIB.

This object maps to the TR-159 attribute aEthRxSmallFragments."

## REFERENCE

"[TR-159], Section 5.5.3.8"  
 ::= { g9982PortStatEntry 4 }

## g9982PortStatRxLargeFragments OBJECT-TYPE

SYNTAX Counter32  
UNITS "fragments"  
MAX-ACCESS read-only  
STATUS current

## DESCRIPTION

"A number of fragments larger than maxFragmentSize (512 bytes) that have been received by the bonding function and discarded.

Discontinuities in the value of this counter can occur at re-initialization of the management system, and at other times as indicated by the value of ifCounterDiscontinuityTime, as defined in the IF-MIB.

This object maps to the TR-159 attribute aEthRxLargeFragments."

## REFERENCE

"[TR-159], Section 5.5.3.9"  
 ::= { g9982PortStatEntry 5 }

## g9982PortStatRxBadFragments OBJECT-TYPE

SYNTAX Counter32  
UNITS "fragments"  
MAX-ACCESS read-only  
STATUS current

## DESCRIPTION

"A number of fragments that do not fit into the sequence expected by the frame assembly function and that have been received and discarded by the bonding function (the frame buffer is flushed to the next valid frame start).

Discontinuities in the value of this counter can occur at re-initialization of the management system, and at other times as indicated by the value of ifCounterDiscontinuityTime, as defined in the IF-MIB.

This object maps to the TR-159 attribute aEthRxBadFragments."

## REFERENCE

"[TR-159], Section 5.5.3.10"  
 ::= { g9982PortStatEntry 6 }

## g9982PortStatRxLostFragments OBJECT-TYPE

SYNTAX Counter32  
UNITS "fragments"  
MAX-ACCESS read-only  
STATUS current

## DESCRIPTION

"A number of gaps in the sequence of fragments that have been received by the bonding function (the frame buffer is flushed to the next valid frame start, when a fragment or fragments expected by the frame assembly function are not received).

Discontinuities in the value of this counter can occur at re-initialization of the management system, and at other times as indicated by the value of ifCounterDiscontinuityTime, as defined in the IF-MIB.

This object maps to the TR-159 attribute aEthRxLostFragments."

## REFERENCE

"[TR-159], Section 5.5.3.11"  
 ::= { g9982PortStatEntry 7 }

## g9982PortStatRxLostStarts OBJECT-TYPE

SYNTAX Counter32  
MAX-ACCESS read-only  
STATUS current

## DESCRIPTION

"A number of missing StartOfPacket indicators expected by the frame assembly function.

Discontinuities in the value of this counter can occur at re-initialization of the management system, and at other times as indicated by the value of ifCounterDiscontinuityTime, as defined in the IF-MIB.

This object maps to the TR-159 attribute aEthRxLostStarts."

## REFERENCE

"[TR-159], Section 5.5.3.12"  
 ::= { g9982PortStatEntry 8 }

## g9982PortStatRxLostEnds OBJECT-TYPE

SYNTAX Counter32  
MAX-ACCESS read-only  
STATUS current

## DESCRIPTION

"A number of missing EndOfPacket indicators expected by the frame assembly function.

Discontinuities in the value of this counter can occur at re-initialization of the management system, and at other times as indicated by the value of ifCounterDiscontinuityTime, as defined in the IF-MIB.

This object maps to the TR-159 attribute aEthRxLostEnds."

## REFERENCE

"[TR-159], Section 5.5.3.13"  
 ::= { g9982PortStatEntry 9 }

## g9982PortStatRxOverflows OBJECT-TYPE

SYNTAX Counter32

```

UNITS          "fragments"
MAX-ACCESS    read-only
STATUS        current
DESCRIPTION
  "A number of fragments, received and discarded by the bonding
  function, that would have caused the frame assembly buffer to
  overflow.

  Discontinuities in the value of this counter can occur at
  re-initialization of the management system, and at other times
  as indicated by the value of ifCounterDiscontinuityTime, as
  defined in the IF-MIB.

  This object maps to the TR-159 attribute aEthRxOverflows."
REFERENCE
  "[TR-159], Section 5.5.3.14"
 ::= { g9982PortStatEntry 10 }

```

```

-----
-- GBS Performance Monitoring group
-----

```

```

g9982PM      OBJECT IDENTIFIER ::= { g9982Port 4 }

g9982PortPmCurTable OBJECT-TYPE
  SYNTAX      SEQUENCE OF G9982PortPmCurEntry
  MAX-ACCESS  not-accessible
  STATUS      current
  DESCRIPTION
    "This table contains current Performance Monitoring information
    for a G.Bond/Eth port. This table contains live data from the
    equipment and as such is NOT persistent."
  ::= { g9982PM 1 }

g9982PortPmCurEntry OBJECT-TYPE
  SYNTAX      G9982PortPmCurEntry
  MAX-ACCESS  not-accessible
  STATUS      current
  DESCRIPTION
    "An entry in the G.Bond/Eth Port PM table.
    Each entry represents a G.Bond/Eth port indexed by the
    ifIndex."
  INDEX      { ifIndex }
  ::= { g9982PortPmCurTable 1 }

```

G9982PortPmCurEntry ::=

```
SEQUENCE {
  g9982PortPm15MinValidIntervals      HCPperfValidIntervals,
  g9982PortPm15MinInvalidIntervals    HCPperfInvalidIntervals,
  g9982PortPmCur15MinTimeElapsed     HCPperfTimeElapsed,
  g9982PortPmCur15MinRxErrors        HCPperfCurrentCount,
  g9982PortPmCur15MinRxSmallFragments HCPperfCurrentCount,
  g9982PortPmCur15MinRxLargeFragments HCPperfCurrentCount,
  g9982PortPmCur15MinRxBadFragments   HCPperfCurrentCount,
  g9982PortPmCur15MinRxLostFragments  HCPperfCurrentCount,
  g9982PortPmCur15MinRxLostStarts     HCPperfCurrentCount,
  g9982PortPmCur15MinRxLostEnds       HCPperfCurrentCount,
  g9982PortPmCur15MinRxOverflows      HCPperfCurrentCount,
  g9982PortPm1DayValidIntervals       Unsigned32,
  g9982PortPm1DayInvalidIntervals     Unsigned32,
  g9982PortPmCur1DayTimeElapsed       HCPperfTimeElapsed,
  g9982PortPmCur1DayRxErrors          HCPperfCurrentCount,
  g9982PortPmCur1DayRxSmallFragments  HCPperfCurrentCount,
  g9982PortPmCur1DayRxLargeFragments  HCPperfCurrentCount,
  g9982PortPmCur1DayRxBadFragments    HCPperfCurrentCount,
  g9982PortPmCur1DayRxLostFragments   HCPperfCurrentCount,
  g9982PortPmCur1DayRxLostStarts      HCPperfCurrentCount,
  g9982PortPmCur1DayRxLostEnds        HCPperfCurrentCount,
  g9982PortPmCur1DayRxOverflows       HCPperfCurrentCount
}
```

g9982PortPm15MinValidIntervals OBJECT-TYPE

SYNTAX HCPperfValidIntervals

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"A read-only number of 15-minute intervals for which the performance data was collected. The value of this object will be 96 or the maximum number of 15-minute history intervals collected by the implementation, unless the measurement was (re)started recently, in which case the value will be the number of complete 15-minute intervals for which there are at least some data.

In certain cases, it is possible that some intervals are unavailable. In this case, this object reports the maximum interval number for which data is available.

This object partially maps to the TR-159 attribute aGroupPerf15MinValidIntervals."

REFERENCE

"[TR-159], Section 5.5.1.32"

::= { g9982PortPmCurEntry 1 }

g9982PortPm15MinInvalidIntervals OBJECT-TYPE  
SYNTAX HCPerfInvalidIntervals  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
"A read-only number of 15-minute intervals for which the performance data was not always available. The value will typically be zero, except in cases where the data for some intervals are not available.  
  
This object partially maps to the TR-159 attribute aGroupPerf15MinInvalidIntervals."  
REFERENCE  
"[TR-159], Section 5.5.1.33"  
 ::= { g9982PortPmCurEntry 2 }

g9982PortPmCur15MinTimeElapsed OBJECT-TYPE  
SYNTAX HCPerfTimeElapsed  
UNITS "seconds"  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
"A read-only count of seconds that have elapsed since the beginning of the current 15-minute performance interval.  
  
This object partially maps to the TR-159 attribute aGroupPerfCur15MinTimeElapsed."  
REFERENCE  
"[TR-159], Section 5.5.1.34"  
 ::= { g9982PortPmCurEntry 3 }

g9982PortPmCur15MinRxErrors OBJECT-TYPE  
SYNTAX HCPerfCurrentCount  
UNITS "fragments"  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
"A read-only count of errored fragments received and discarded by a G.Bond/Eth port during the current 15-minute performance interval.  
  
Note that the total number of errored fragments is indicated by the g9982PortStatRxErrors object.  
  
This object is inhibited during Unavailable Seconds (UAS)."  
REFERENCE  
"[TR-159], Section 5.5.3.7"  
 ::= { g9982PortPmCurEntry 4 }

g9982PortPmCur15MinRxSmallFragments OBJECT-TYPE

SYNTAX HCPerfCurrentCount

UNITS "fragments"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"A read-only count of fragments smaller than minFragmentSize (64 bytes) that have been received and discarded by a G.Bond/Eth port during the current 15-minute performance interval.

Note that the total number of small fragments is indicated by the g9982PortStatRxSmallFragments object.

This object is inhibited during Unavailable Seconds (UAS)."

REFERENCE

"[TR-159], Section 5.5.3.8"

::= { g9982PortPmCurEntry 5 }

g9982PortPmCur15MinRxLargeFragments OBJECT-TYPE

SYNTAX HCPerfCurrentCount

UNITS "fragments"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"A read-only count of fragments larger than maxFragmentSize (512 bytes) that have been received and discarded by a G.Bond/Eth port during the current 15-minute performance interval.

Note that the total number of large fragments is indicated by the g9982PortStatRxLargeFragments object.

This object is inhibited during Unavailable Seconds (UAS)."

REFERENCE

"[TR-159], Section 5.5.3.9"

::= { g9982PortPmCurEntry 6 }

g9982PortPmCur15MinRxBadFragments OBJECT-TYPE

SYNTAX HCPerfCurrentCount

UNITS "fragments"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"A read-only count of fragments that do not fit into the sequence expected by the frame assembly function and that have been received and discarded by a G.Bond/Eth port during the current 15-minute performance interval.

Note that the total number of bad fragments is indicated by the g9982PortStatRxBadFragments object.

This object is inhibited during Unavailable Seconds (UAS)."

## REFERENCE

"[TR-159], Section 5.5.3.10"

::= { g9982PortPmCurEntry 7 }

g9982PortPmCur15MinRxLostFragments OBJECT-TYPE

SYNTAX HCPerfCurrentCount

UNITS "fragments"

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"A read-only count of gaps in the sequence of fragments expected by the frame assembly function of a G.Bond/Eth port during the current 15-minute performance interval.

Note that the total number of these lost fragments is indicated by the g9982PortStatRxLostFragments object.

This object is inhibited during Unavailable Seconds (UAS)."

## REFERENCE

"[TR-159], Section 5.5.3.11"

::= { g9982PortPmCurEntry 8 }

g9982PortPmCur15MinRxLostStarts OBJECT-TYPE

SYNTAX HCPerfCurrentCount

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"A read-only count of missing StartOfPacket indicators expected by the frame assembly function of a G.Bond/Eth port during the current 15-minute performance interval.

Note that the total number of missing StartOfPacket indicators is indicated by the g9982PortStatRxLostStarts object.

This object is inhibited during Unavailable Seconds (UAS)."

## REFERENCE

"[TR-159], Section 5.5.3.12"

::= { g9982PortPmCurEntry 9 }

g9982PortPmCur15MinRxLostEnds OBJECT-TYPE

SYNTAX HCPerfCurrentCount

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"A read-only count of missing EndOfPacket indicators expected by the frame assembly function of a G.Bond/Eth port during the current 15-minute performance interval.

Note that the total number of missing EndOfPacket indicators is indicated by the g9982PortStatRxLostEnds object.

This object is inhibited during Unavailable Seconds (UAS)."

## REFERENCE

"[TR-159], Section 5.5.3.13"  
 ::= { g9982PortPmCurEntry 10}

## g9982PortPmCur15MinRxOverflows OBJECT-TYPE

SYNTAX            HCPperfCurrentCount  
UNITS             "fragments"  
MAX-ACCESS       read-only  
STATUS            current

## DESCRIPTION

"A read-only count of fragments that have been received and discarded by a G.Bond/Eth port, which would have caused the frame assembly buffer to overflow, during the current 15-minute performance interval.

Note that the total number of fragments that would have caused the frame assembly buffer to overflow is indicated by the g9982PortStatRxOverflows object.

This object is inhibited during Unavailable Seconds (UAS)."

## REFERENCE

"[TR-159], Section 5.5.3.14"  
 ::= { g9982PortPmCurEntry 11}

## g9982PortPm1DayValidIntervals OBJECT-TYPE

SYNTAX            Unsigned32 (0..7)  
UNITS             "days"  
MAX-ACCESS       read-only  
STATUS            current

## DESCRIPTION

"A read-only number of 1-day intervals for which data was collected. The value of this object will be 7 or the maximum number of 1-day history intervals collected by the implementation, unless the measurement was (re)started recently, in which case the value will be the number of complete 1-day intervals for which there are at least some data. In certain cases, it is possible that some intervals are unavailable. In this case, this object reports the maximum interval number for which data is available."

## REFERENCE

"[TR-159], Section 5.5.1.45"  
 ::= { g9982PortPmCurEntry 12 }

## g9982PortPm1DayInvalidIntervals OBJECT-TYPE

SYNTAX Unsigned32 (0..7)  
UNITS "days"  
MAX-ACCESS read-only  
STATUS current

## DESCRIPTION

"A read-only number of 1-day intervals for which data was not always available. The value will typically be zero, except in cases where the data for some intervals are not available."

## REFERENCE

"[TR-159], Section 5.5.1.46"  
 ::= { g9982PortPmCurEntry 13 }

## g9982PortPmCur1DayTimeElapsed OBJECT-TYPE

SYNTAX HCPerfTimeElapsed  
UNITS "seconds"  
MAX-ACCESS read-only  
STATUS current

## DESCRIPTION

"A read-only count of seconds that have elapsed since the beginning of the current 1-day performance interval."

## REFERENCE

"[TR-159], Section 5.5.1.47"  
 ::= { g9982PortPmCurEntry 14 }

## g9982PortPmCur1DayRxErrors OBJECT-TYPE

SYNTAX HCPerfCurrentCount  
UNITS "fragments"  
MAX-ACCESS read-only  
STATUS current

## DESCRIPTION

"A read-only count of errored fragments received and discarded by a G.Bond/Eth port during the current 1-day performance interval."

Note that the total number of errored fragments is indicated by the g9982PortStatRxErrors object.

This object is inhibited during Unavailable Seconds (UAS)."

## REFERENCE

"[TR-159], Section 5.5.3.7"  
 ::= { g9982PortPmCurEntry 15 }

g9982PortPmCur1DayRxSmallFragments OBJECT-TYPE  
SYNTAX HCPerfCurrentCount  
UNITS "fragments"  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
"A read-only count of fragments smaller than minFragmentSize  
(64 bytes) that have been received and discarded by a  
G.Bond/Eth port during the current 1-day performance interval.  
  
Note that the total number of small fragments is indicated by  
the g9982PortStatRxSmallFragments object.  
  
This object is inhibited during Unavailable Seconds (UAS)."  
REFERENCE  
"[TR-159], Section 5.5.3.8"  
 ::= { g9982PortPmCurEntry 16}

g9982PortPmCur1DayRxLargeFragments OBJECT-TYPE  
SYNTAX HCPerfCurrentCount  
UNITS "fragments"  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
"A read-only count of fragments larger than maxFragmentSize  
(512 bytes) that have been received and discarded by a  
G.Bond/Eth port during the current 1-day performance interval.  
  
Note that the total number of large fragments is indicated by  
the g9982PortStatRxLargeFragments object.  
  
This object is inhibited during Unavailable Seconds (UAS)."  
REFERENCE  
"[TR-159], Section 5.5.3.9"  
 ::= { g9982PortPmCurEntry 17}

g9982PortPmCur1DayRxBadFragments OBJECT-TYPE  
SYNTAX HCPerfCurrentCount  
UNITS "fragments"  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
"A read-only count of fragments that do not fit into the  
sequence expected by the frame assembly function and that have  
been received and discarded by a G.Bond/Eth port during the  
current 1-day performance interval."

Note that the total number of bad fragments is indicated by the g9982PortStatRxBadFragments object.

This object is inhibited during Unavailable Seconds (UAS)."

## REFERENCE

"[TR-159], Section 5.5.3.10"

::= { g9982PortPmCurEntry 18}

g9982PortPmCurlDayRxLostFragments OBJECT-TYPE

SYNTAX HCPerfCurrentCount

UNITS "fragments"

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"A read-only count of gaps in the sequence of fragments expected by the frame assembly function of a G.Bond/Eth port during the current 1-day performance interval.

Note that the total number of these lost fragments is indicated by the g9982PortStatRxLostFragments object.

This object is inhibited during Unavailable Seconds (UAS)."

## REFERENCE

"[TR-159], Section 5.5.3.11"

::= { g9982PortPmCurEntry 19}

g9982PortPmCurlDayRxLostStarts OBJECT-TYPE

SYNTAX HCPerfCurrentCount

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"A read-only count of missing StartOfPacket indicators expected by the frame assembly function of a G.Bond/Eth port during the current 1-day performance interval.

Note that the total number of missing StartOfPacket indicators is indicated by the g9982PortStatRxLostStarts object.

This object is inhibited during Unavailable Seconds (UAS)."

## REFERENCE

"[TR-159], Section 5.5.3.12"

::= { g9982PortPmCurEntry 20}

g9982PortPmCurlDayRxLostEnds OBJECT-TYPE

SYNTAX HCPerfCurrentCount

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"A read-only count of missing EndOfPacket indicators expected by the frame assembly function of a G.Bond/Eth port during the current 1-day performance interval.

Note that the total number of missing EndOfPacket indicators is indicated by the g9982PortStatRxLostEnds object.

This object is inhibited during Unavailable Seconds (UAS)."

## REFERENCE

"[TR-159], Section 5.5.3.13"

::= { g9982PortPmCurEntry 21 }

## g9982PortPmCurlDayRxOverflows OBJECT-TYPE

SYNTAX HCPperfCurrentCount

UNITS "fragments"

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"A read-only count of fragments that have been received and discarded by a G.Bond/Eth port, which would have caused the frame assembly buffer to overflow, during the current 1-day performance interval.

Note that the total number of fragments that would have caused the frame assembly buffer to overflow is indicated by the g9982PortStatRxOverflows object.

This object is inhibited during Unavailable Seconds (UAS)."

## REFERENCE

"[TR-159], Section 5.5.3.14"

::= { g9982PortPmCurEntry 22 }

-- Port PM history: 15-min buckets

## g9982PortPm15MinTable OBJECT-TYPE

SYNTAX SEQUENCE OF G9982PortPm15MinEntry

MAX-ACCESS not-accessible

STATUS current

## DESCRIPTION

"This table contains historical 15-minute buckets of Performance Monitoring information for a G.Bond/Eth port (a row for each 15-minute interval, up to 96 intervals).

Entries in this table MUST be maintained in a persistent manner."

::= { g9982PM 2 }

## g9982PortPm15MinEntry OBJECT-TYPE

SYNTAX G9982PortPm15MinEntry

```

MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
  "An entry in the G.Bond/Eth Port historical 15-minute PM table.
  Each entry represents Performance Monitoring data for a
  G.Bond/Eth port, indexed by the ifIndex, collected during a
  particular 15-minute interval, indexed by the
  g9982PortPm15MinIntervalIndex."
INDEX { ifIndex, g9982PortPm15MinIntervalIndex }
 ::= { g9982PortPm15MinTable 1 }

G9982PortPm15MinEntry ::=
SEQUENCE {
  g9982PortPm15MinIntervalIndex      Unsigned32,
  g9982PortPm15MinIntervalMoniTime   HCPerfTimeElapsed,
  g9982PortPm15MinIntervalRxErrors   HCPerfCurrentCount,
  g9982PortPm15MinIntervalRxSmallFragments HCPerfCurrentCount,
  g9982PortPm15MinIntervalRxLargeFragments HCPerfCurrentCount,
  g9982PortPm15MinIntervalRxBadFragments HCPerfCurrentCount,
  g9982PortPm15MinIntervalRxLostFragments HCPerfCurrentCount,
  g9982PortPm15MinIntervalRxLostStarts   HCPerfCurrentCount,
  g9982PortPm15MinIntervalRxLostEnds     HCPerfCurrentCount,
  g9982PortPm15MinIntervalRxOverflows   HCPerfCurrentCount,
  g9982PortPm15MinIntervalValid         TruthValue
}

g9982PortPm15MinIntervalIndex OBJECT-TYPE
SYNTAX      Unsigned32 (1..96)
MAX-ACCESS not-accessible
STATUS      current
DESCRIPTION
  "Performance Data Interval number. 1 is the most recent
  previous interval; interval 96 is 24 hours ago.
  Intervals 2..96 are OPTIONAL.

  This object partially maps to the TR-159 attribute
  aGroupPerf15MinIntervalNumber."
REFERENCE
  "[TR-159], Section 5.5.1.57"
 ::= { g9982PortPm15MinEntry 1 }

g9982PortPm15MinIntervalMoniTime OBJECT-TYPE
SYNTAX      HCPerfTimeElapsed
UNITS       "seconds"
MAX-ACCESS read-only
STATUS      current

```

## DESCRIPTION

"A read-only count of seconds over which the performance data was actually monitored. This value will be the same as the interval duration (900 seconds), except in a situation where performance data could not be collected for any reason."

::= { g9982PortPm15MinEntry 2 }

g9982PortPm15MinIntervalRxErrors OBJECT-TYPE

SYNTAX HCPerfCurrentCount

UNITS "fragments"

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"A read-only count of errored fragments received and discarded by a G.Bond/Eth port during the 15-minute performance history interval.

Note that the total number of errored fragments is indicated by the g9982PortStatRxErrors object.

This object is inhibited during Unavailable Seconds (UAS)."

## REFERENCE

"[TR-159], Section 5.5.3.7"

::= { g9982PortPm15MinEntry 3 }

g9982PortPm15MinIntervalRxSmallFragments OBJECT-TYPE

SYNTAX HCPerfCurrentCount

UNITS "fragments"

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"A read-only count of fragments smaller than minFragmentSize (64 bytes) that have been received and discarded by a G.Bond/Eth port during the 15-minute performance history interval.

Note that the total number of small fragments is indicated by the g9982PortStatRxSmallFragments object.

This object is inhibited during Unavailable Seconds (UAS)."

## REFERENCE

"[TR-159], Section 5.5.3.8"

::= { g9982PortPm15MinEntry 4 }

g9982PortPm15MinIntervalRxLargeFragments OBJECT-TYPE

SYNTAX HCPerfCurrentCount

UNITS "fragments"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"A read-only count of fragments larger than maxFragmentSize (512 bytes) that have been received and discarded by a G.Bond/Eth port during the 15-minute performance history interval.

Note that the total number of large fragments is indicated by the g9982PortStatRxLargeFragments object.

This object is inhibited during Unavailable Seconds (UAS)."

REFERENCE

"[TR-159], Section 5.5.3.9"  
 ::= { g9982PortPm15MinEntry 5 }

g9982PortPm15MinIntervalRxBadFragments OBJECT-TYPE

SYNTAX HCPerfCurrentCount

UNITS "fragments"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"A read-only count of fragments that do not fit into the sequence expected by the frame assembly function and that have been received and discarded by a G.Bond/Eth port during the 15-minute performance history interval.

Note that the total number of bad fragments is indicated by the g9982PortStatRxBadFragments object.

This object is inhibited during Unavailable Seconds (UAS)."

REFERENCE

"[TR-159], Section 5.5.3.10"  
 ::= { g9982PortPm15MinEntry 6 }

g9982PortPm15MinIntervalRxLostFragments OBJECT-TYPE

SYNTAX HCPerfCurrentCount

UNITS "fragments"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"A read-only count of gaps in the sequence of fragments expected by the frame assembly function of a G.Bond/Eth port during the 15-minute performance history interval.

Note that the total number of these lost fragments is indicated by the g9982PortStatRxLostFragments object.

This object is inhibited during Unavailable Seconds (UAS)."

## REFERENCE

"[TR-159], Section 5.5.3.11"  
 ::= { g9982PortPm15MinEntry 7 }

g9982PortPm15MinIntervalRxLostStarts OBJECT-TYPE

SYNTAX HCPerfCurrentCount

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"A read-only count of missing StartOfPacket indicators expected by the frame assembly function of a G.Bond/Eth port during the 15-minute performance history interval.

Note that the total number of missing StartOfPacket indicators is indicated by the g9982PortStatRxLostStarts object.

This object is inhibited during Unavailable Seconds (UAS)."

## REFERENCE

"[TR-159], Section 5.5.3.12"  
 ::= { g9982PortPm15MinEntry 8 }

g9982PortPm15MinIntervalRxLostEnds OBJECT-TYPE

SYNTAX HCPerfCurrentCount

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"A read-only count of missing EndOfPacket indicators expected by the frame assembly function of a G.Bond/Eth port during the 15-minute performance history interval.

Note that the total number of missing EndOfPacket indicators is indicated by the g9982PortStatRxLostEnds object.

This object is inhibited during Unavailable Seconds (UAS)."

## REFERENCE

"[TR-159], Section 5.5.3.13"  
 ::= { g9982PortPm15MinEntry 9 }

g9982PortPm15MinIntervalRxOverflows OBJECT-TYPE

SYNTAX HCPerfCurrentCount

UNITS "fragments"

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"A read-only count of fragments that have been received and discarded by a G.Bond/Eth port, which would have caused the frame assembly buffer to overflow, during the 15-minute performance history interval.

Note that the total number of fragments that would have caused the frame assembly buffer to overflow is indicated by the g9982PortStatRxOverflows object.

This object is inhibited during Unavailable Seconds (UAS)."

## REFERENCE

"[TR-159], Section 5.5.3.14"  
 ::= { g9982PortPm15MinEntry 10 }

g9982PortPm15MinIntervalValid OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"A read-only object indicating whether or not this history bucket contains valid data. A valid bucket is reported as true(1) and an invalid bucket as false(2).

If this history bucket is invalid, the BTU MUST NOT produce notifications based upon the value of the counters in this bucket.

Note that an implementation may decide not to store invalid history buckets in its database. In such a case, this object is not required, as only valid history buckets are available while invalid history buckets are simply not in the database.

This object partially maps to the TR-159 attribute aGroupPerf15MinIntervalValid."

## REFERENCE

"[TR-159], Section 5.5.1.58"  
 ::= { g9982PortPm15MinEntry 11 }

-- Port PM history: 1-day buckets

g9982PortPm1DayTable OBJECT-TYPE

SYNTAX SEQUENCE OF G9982PortPm1DayEntry

MAX-ACCESS not-accessible

STATUS current

## DESCRIPTION

"This table contains historical 1-day buckets of Performance Monitoring information for a G.Bond/Eth port (a row for each 1-day interval, up to 7 intervals).

Entries in this table MUST be maintained in a persistent manner."

::= { g9982PM 3 }

g9982PortPm1DayEntry OBJECT-TYPE

SYNTAX G9982PortPm1DayEntry

MAX-ACCESS not-accessible

STATUS current

## DESCRIPTION

"An entry in the G.Bond/Eth port historical 1-day PM table. Each entry represents Performance Monitoring data for such a port, indexed by the ifIndex, collected during a particular 1-day interval, indexed by the g9982PortPmlDayIntervalIndex."

```
INDEX { ifIndex, g9982PortPmlDayIntervalIndex }
 ::= { g9982PortPmlDayTable 1 }
```

```
G9982PortPmlDayEntry ::=
```

```
SEQUENCE {
  g9982PortPmlDayIntervalIndex      Unsigned32,
  g9982PortPmlDayIntervalMoniTime   HCPperfTimeElapsed,
  g9982PortPmlDayIntervalRxErrors   HCPperfCurrentCount,
  g9982PortPmlDayIntervalRxSmallFragments HCPperfCurrentCount,
  g9982PortPmlDayIntervalRxLargeFragments HCPperfCurrentCount,
  g9982PortPmlDayIntervalRxBadFragments HCPperfCurrentCount,
  g9982PortPmlDayIntervalRxLostFragments HCPperfCurrentCount,
  g9982PortPmlDayIntervalRxLostStarts HCPperfCurrentCount,
  g9982PortPmlDayIntervalRxLostEnds HCPperfCurrentCount,
  g9982PortPmlDayIntervalRxOverflows HCPperfCurrentCount,
  g9982PortPmlDayIntervalValid      TruthValue
}
```

```
g9982PortPmlDayIntervalIndex OBJECT-TYPE
```

```
SYNTAX      Unsigned32 (1..7)
```

```
MAX-ACCESS not-accessible
```

```
STATUS      current
```

## DESCRIPTION

"Performance Data Interval number. 1 is the most recent previous interval; interval 7 is 7 days ago. Intervals 2..7 are OPTIONAL.

This object partially maps to the TR-159 attribute aGroupPerf1DayIntervalNumber."

## REFERENCE

"[TR-159], Section 5.5.1.62"

```
::= { g9982PortPmlDayEntry 1 }
```

```
g9982PortPmlDayIntervalMoniTime OBJECT-TYPE
```

```
SYNTAX      HCPperfTimeElapsed
```

```
UNITS       "seconds"
```

```
MAX-ACCESS read-only
```

```
STATUS      current
```

## DESCRIPTION

"A read-only count of seconds over which the performance data was actually monitored. This value will be the same as the interval duration (86400 seconds), except in a situation where performance data could not be collected for any reason.

This object partially maps to the TR-159 attribute  
aGroupPerf1DayIntervalMoniSecs."

## REFERENCE

"[TR-159], Section 5.5.1.64"  
 ::= { g9982PortPm1DayEntry 2 }

## g9982PortPm1DayIntervalRxErrors OBJECT-TYPE

SYNTAX HCPerfCurrentCount

UNITS "fragments"

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"A read-only count of errored fragments received and discarded  
by a G.Bond/Eth port during the 1-day performance history  
interval.

Note that the total number of errored fragments is indicated by  
the g9982PortStatRxErrors object.

This object is inhibited during Unavailable Seconds (UAS)."

## REFERENCE

"[TR-159], Section 5.5.3.7"  
 ::= { g9982PortPm1DayEntry 3 }

## g9982PortPm1DayIntervalRxSmallFragments OBJECT-TYPE

SYNTAX HCPerfCurrentCount

UNITS "fragments"

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"A read-only count of fragments smaller than minFragmentSize  
(64 bytes) that have been received and discarded by a  
G.Bond/Eth port during the 1-day performance history interval.

Note that the total number of small fragments is indicated by  
the g9982PortStatRxSmallFragments object.

This object is inhibited during Unavailable Seconds (UAS)."

## REFERENCE

"[TR-159], Section 5.5.3.8"  
 ::= { g9982PortPm1DayEntry 4 }

## g9982PortPm1DayIntervalRxLargeFragments OBJECT-TYPE

SYNTAX HCPerfCurrentCount

UNITS "fragments"

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"A read-only count of fragments larger than maxFragmentSize (512 bytes) that have been received and discarded by a G.Bond/Eth port during the 1-day performance history interval.

Note that the total number of large fragments is indicated by the g9982PortStatRxLargeFragments object.

This object is inhibited during Unavailable Seconds (UAS)."

## REFERENCE

"[TR-159], Section 5.5.3.9"  
 ::= { g9982PortPmlDayEntry 5 }

## g9982PortPmlDayIntervalRxBadFragments OBJECT-TYPE

SYNTAX HCPperfCurrentCount  
UNITS "fragments"  
MAX-ACCESS read-only  
STATUS current

## DESCRIPTION

"A read-only count of fragments that do not fit into the sequence expected by the frame assembly function and that have been received and discarded by a G.Bond/Eth port during the 1-day performance history interval.

Note that the total number of bad fragments is indicated by the g9982PortStatRxBadFragments object.

This object is inhibited during Unavailable Seconds (UAS)."

## REFERENCE

"[TR-159], Section 5.5.3.10"  
 ::= { g9982PortPmlDayEntry 6 }

## g9982PortPmlDayIntervalRxLostFragments OBJECT-TYPE

SYNTAX HCPperfCurrentCount  
UNITS "fragments"  
MAX-ACCESS read-only  
STATUS current

## DESCRIPTION

"A read-only count of gaps in the sequence of fragments expected by the frame assembly function of a G.Bond/Eth port during the 1-day performance history interval.

Note that the total number of these lost fragments is indicated by the g9982PortStatRxLostFragments object.

This object is inhibited during Unavailable Seconds (UAS)."

## REFERENCE

"[TR-159], Section 5.5.3.11"  
 ::= { g9982PortPmlDayEntry 7 }

g9982PortPmlDayIntervalRxLostStarts OBJECT-TYPE

SYNTAX HCPerfCurrentCount

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"A read-only count of missing StartOfPacket indicators expected by the frame assembly function of a G.Bond/Eth port during the 1-day performance history interval.

Note that the total number of missing StartOfPacket indicators is indicated by the g9982PortStatRxLostStarts object.

This object is inhibited during Unavailable Seconds (UAS)."

## REFERENCE

"[TR-159], Section 5.5.3.12"  
 ::= { g9982PortPmlDayEntry 8 }

g9982PortPmlDayIntervalRxLostEnds OBJECT-TYPE

SYNTAX HCPerfCurrentCount

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"A read-only count of missing EndOfPacket indicators expected by the frame assembly function of a G.Bond/Eth port during the 1-day performance history interval.

Note that the total number of missing EndOfPacket indicators is indicated by the g9982PortStatRxLostEnds object.

This object is inhibited during Unavailable Seconds (UAS)."

## REFERENCE

"[TR-159], Section 5.5.3.13"  
 ::= { g9982PortPmlDayEntry 9 }

g9982PortPmlDayIntervalRxOverflows OBJECT-TYPE

SYNTAX HCPerfCurrentCount

UNITS "fragments"

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"A read-only count of fragments that have been received and discarded by a G.Bond/Eth port, which would have caused the frame assembly buffer to overflow, during the 1-day performance history interval.

Note that the total number of fragments that would have caused the frame assembly buffer to overflow is indicated by the g9982PortStatRxOverflows object.

This object is inhibited during Unavailable Seconds (UAS)."

## REFERENCE

"[TR-159], Section 5.5.3.14"

::= { g9982PortPm1DayEntry 10 }

g9982PortPm1DayIntervalValid OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"A read-only object indicating whether or not this history bucket contains valid data. A valid bucket is reported as true(1) and an invalid bucket as false(2).

If this history bucket is invalid, the BTU MUST NOT produce notifications based upon the value of the counters in this bucket.

Note that an implementation may decide not to store invalid history buckets in its database. In such a case, this object is not required, as only valid history buckets are available while invalid history buckets are simply not in the database.

This object partially maps to the TR-159 attribute aGroupPerf1DayIntervalValid."

## REFERENCE

"[TR-159], Section 5.5.1.63"

::= { g9982PortPm1DayEntry 11 }

-----  
 -- BCE group  
 -----

g9982BceConfTable OBJECT-TYPE

SYNTAX SEQUENCE OF G9982BceConfEntry

MAX-ACCESS not-accessible

STATUS current

## DESCRIPTION

"Table for configuration of G.Bond/Eth-specific aspects for the Bonding Channel Entity (BCE) ports (modems/channels).

Entries in this table MUST be maintained in a persistent manner."

::= { g9982Bce 1 }

```

g9982BceConfEntry OBJECT-TYPE
    SYNTAX      G9982BceConfEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "An entry in the G.Bond/Eth BCE Configuration table.
        Each entry represents G.998.2-specific aspects of a BCE port
        indexed by the ifIndex. Note that a G.Bond/Eth BCE port can be
        stacked below a single GBS port, also indexed by the ifIndex."
    INDEX      { ifIndex }
    ::= { g9982BceConfTable 1 }

```

```

G9982BceConfEntry ::=
    SEQUENCE {
        g9982BceConfEligibleGroupID      PhysAddress,
        g9982BceConfPeerEligibleGroupID  PhysAddress
    }

```

```

g9982BceConfEligibleGroupID OBJECT-TYPE
    SYNTAX      PhysAddress (SIZE(0|6))
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "BACP Eligible Group ID of a G.Bond/ETH BCE port.
        A universally unique 6-octet-long identifier, used by the
        OPTIONAL BACP, to determine bonding eligibility. When two BCEs
        have the same g9982BceConfEligibleGroupID on a system, they
        are eligible to be aggregated on that system. Typically, all
        BCEs on a BTU-R device would be assigned the same
        g9982BceConfEligibleGroupID, to assert that all of the BCEs
        should be in the same bonded group. BCEs with different
        g9982BceConfEligibleGroupID values MUST NOT be connected to
        the same GBS.
        BCEs with the same g9982BceConfEligibleGroupID MAY be
        connected to different GBS ports.
        This object MUST be instantiated during BACP initialization,
        when every BCE belongs to its own GBS. Attempts to change this
        object MUST be rejected (with the error inconsistentValue), if
        the BCE is aggregated with other BCEs, i.e., more than one BCE
        is connected to the same GBS, or if the BCE in question is not
        eligible to be bonded with other BCEs having the same value
        (e.g., the bonding is limited to a single line card and BCEs are
        located on different line cards, or BCEs are the channels of
        the same line).

```

Note that bonding eligibility is reflected in the ifCapStackTable and its inverse, the ifInvCapStackTable; as such, any modification of g9982BceConfEligibleGroupID MUST be reflected in these tables.

A zero-length octet string SHALL be returned on an attempt to read this object on systems not supporting BACP (the value of g9982PortCapBacpSupported for the connected GBS is false).

This object maps to the TR-159 attribute aChannelEligibleGroupID."

## REFERENCE

"[TR-159], Section 5.5.7.3"  
 ::= { g9982BceConfEntry 1 }

## g9982BceConfPeerEligibleGroupID OBJECT-TYPE

SYNTAX PhysAddress (SIZE(0|6))

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"BACP Eligible Group ID of a peer G.Bond/ETH BCE port, most recently received by the local BCE via a Local info TLV BACPDU message from the peer BCE.

A universally unique 6-octet-long identifier, used by the OPTIONAL BACP, to determine bonding eligibility.

BCEs with different g9982BceConfPeerEligibleGroupID values MUST NOT be connected to the same GBS.

BCEs with the same g9982BceConfPeerEligibleGroupID MAY be connected to different GBS ports.

A zero-length octet string SHALL be returned on an attempt to read this object on systems not supporting BACP (the value of g9982PortCapBacpSupported for the connected GBS is false) or when no BACPDU have been received from the peer BCE.

This object maps to the G.998.2-Amd2 attribute Remote Group ID."

## REFERENCE

"[G.998.2-Amd2], Appendix C.3.1.6"  
 ::= { g9982BceConfEntry 2 }

## g9982BceStatTable OBJECT-TYPE

SYNTAX SEQUENCE OF G9982BceStatEntry

MAX-ACCESS not-accessible

STATUS current

## DESCRIPTION

"This table provides common status information of G.Bond/Eth BCE ports.

This table contains live data from the equipment. As such,  
it is NOT persistent."  
 ::= { g9982Bce 2 }

g9982BceStatEntry OBJECT-TYPE

SYNTAX G9982BceStatEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An entry in the G.Bond/Eth BCE Status table.

Each entry represents common aspects of a G.Bond/Eth BCE port indexed by the ifIndex. Note that a BCE port can be stacked below a single GBS port, also indexed by the ifIndex, possibly together with other BCE ports."

INDEX { ifIndex }

::= { g9982BceStatTable 1 }

G9982BceStatEntry ::=

SEQUENCE {

g9982BceStatTcInCodingErrors Counter32,

g9982BceStatTcInCrcErrors Counter32

}

g9982BceStatTcInCodingErrors OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"A number of PTM-TC encapsulation errors. This counter is incremented for each encapsulation error detected by the PTM-TC receive function.

Discontinuities in the value of this counter can occur at re-initialization of the management system, and at other times as indicated by the value of ifCounterDiscontinuityTime, as defined in the IF-MIB.

This object maps to the TR-159 attribute aChannelPtmTcRxCodingViolations."

REFERENCE

"[TR-159], Section 5.5.7.8"

::= { g9982BceStatEntry 1 }

g9982BceStatTcInCrcErrors OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"A number of PTM-TC CRC errors. This counter is incremented for each CRC error detected by the PTM-TC receive function.

Discontinuities in the value of this counter can occur at re-initialization of the management system, and at other times as indicated by the value of ifCounterDiscontinuityTime, as defined in the IF-MIB.

This object maps to the TR-159 attribute  
aChannelPtmTcRx\_crcErrors."

## REFERENCE

"[TR-159], Section 5.5.7.9"  
::= { g9982BceStatEntry 2 }

-----  
-- Conformance Statements  
-----

g9982Groups OBJECT IDENTIFIER  
::= { g9982Conformance 1 }

g9982Compliances OBJECT IDENTIFIER  
::= { g9982Conformance 2 }

-- Object groups

g9982BasicGroup OBJECT-GROUP  
OBJECTS {  
g9982PortCapTcTypesSupported,  
g9982PortCapBacpSupported,  
g9982PortConfTcAdminType,  
g9982PortStatTcOperType,  
g9982PortStatRxErrors,  
g9982PortStatRxSmallFragments,  
g9982PortStatRxLargeFragments,  
g9982PortStatRxBadFragments,  
g9982PortStatRxLostFragments,  
g9982PortStatRxLostStarts,  
g9982PortStatRxLostEnds,  
g9982PortStatRxOverflows,  
g9982BceStatTcInCodingErrors,  
g9982BceStatTcInCrcErrors  
}  
STATUS current

```
DESCRIPTION
  "A collection of objects representing management information
  for G.Bond/Eth GBS ports."
 ::= { g9982Groups 1 }

g9982BacpGroup OBJECT-GROUP
OBJECTS {
  g9982PortConfAdminCp,
  g9982PortStatOperCp,
  g9982BceConfEligibleGroupID,
  g9982BceConfPeerEligibleGroupID
}
STATUS      current
DESCRIPTION
  "A collection of objects representing management information
  for the OPTIONAL frame-based Bonding Aggregation Control
  Protocol (BACP) used by G.Bond/Eth GBS ports instead of the
  mandatory G.hs-based discovery and aggregation protocol."
 ::= { g9982Groups 2 }

g9982BceGroup OBJECT-GROUP
OBJECTS {
  g9982BceStatTcInCodingErrors,
  g9982BceStatTcInCrcErrors
}
STATUS      current
DESCRIPTION
  "A collection of objects representing OPTIONAL management
  information for G.Bond/Eth BCE ports."
 ::= { g9982Groups 3 }

g9982PerfCurrGroup OBJECT-GROUP
OBJECTS {
  g9982PortPm15MinValidIntervals,
  g9982PortPm15MinInvalidIntervals,
  g9982PortPmCur15MinTimeElapsed,
  g9982PortPmCur15MinRxErrors,
  g9982PortPmCur15MinRxSmallFragments,
  g9982PortPmCur15MinRxLargeFragments,
  g9982PortPmCur15MinRxBadFragments,
  g9982PortPmCur15MinRxLostFragments,
  g9982PortPmCur15MinRxLostStarts,
  g9982PortPmCur15MinRxLostEnds,
  g9982PortPmCur15MinRxOverflows,
  g9982PortPm1DayValidIntervals,
  g9982PortPm1DayInvalidIntervals,
  g9982PortPmCur1DayTimeElapsed,
```

```

    g9982PortPmCurlDayRxErrors,
    g9982PortPmCurlDayRxSmallFragments,
    g9982PortPmCurlDayRxLargeFragments,
    g9982PortPmCurlDayRxBadFragments,
    g9982PortPmCurlDayRxLostFragments,
    g9982PortPmCurlDayRxLostStarts,
    g9982PortPmCurlDayRxLostEnds,
    g9982PortPmCurlDayRxOverflows
  }
  STATUS          current
  DESCRIPTION
    "A collection of objects supporting OPTIONAL current Performance
    Monitoring information for G.Bond/Eth ports."
  ::= { g9982Groups 4 }

g9982Perf15MinGroup OBJECT-GROUP
  OBJECTS {
    g9982PortPm15MinIntervalMoniTime,
    g9982PortPm15MinIntervalRxErrors,
    g9982PortPm15MinIntervalRxSmallFragments,
    g9982PortPm15MinIntervalRxLargeFragments,
    g9982PortPm15MinIntervalRxBadFragments,
    g9982PortPm15MinIntervalRxLostFragments,
    g9982PortPm15MinIntervalRxLostStarts,
    g9982PortPm15MinIntervalRxLostEnds,
    g9982PortPm15MinIntervalRxOverflows,
    g9982PortPm15MinIntervalValid
  }
  STATUS          current
  DESCRIPTION
    "A collection of objects supporting OPTIONAL historical
    Performance Monitoring information for G.Bond/Eth ports, during
    previous 15-minute intervals."
  ::= { g9982Groups 5 }

g9982Perf1DayGroup OBJECT-GROUP
  OBJECTS {
    g9982PortPm1DayIntervalMoniTime,
    g9982PortPm1DayIntervalRxErrors,
    g9982PortPm1DayIntervalRxSmallFragments,
    g9982PortPm1DayIntervalRxLargeFragments,
    g9982PortPm1DayIntervalRxBadFragments,
    g9982PortPm1DayIntervalRxLostFragments,
    g9982PortPm1DayIntervalRxLostStarts,
    g9982PortPm1DayIntervalRxLostEnds,
    g9982PortPm1DayIntervalRxOverflows,
    g9982PortPm1DayIntervalValid
  }

```

```

STATUS      current
DESCRIPTION
  "A collection of objects supporting OPTIONAL historical
  Performance Monitoring information for G.Bond/Eth ports, during
  previous 1-day intervals."
 ::= { g9982Groups 6 }

```

```

-----
-- Compliance Statements
-----

```

```

g9982Compliance MODULE-COMPLIANCE

```

```

STATUS      current
DESCRIPTION
  "The compliance statement for G.Bond Ethernet interfaces.
  Compliance with the following external compliance statements
  is REQUIRED:

```

MIB Module	Compliance Statement
-----	-----
IF-MIB	ifCompliance3
GBOND-MIB	gBondCompliance"

```

MODULE -- this module

```

```

MANDATORY-GROUPS {
  g9982BasicGroup
}

```

```

GROUP      g9982BceGroup
DESCRIPTION
  "Support for this group is OPTIONAL."

```

```

GROUP      g9982BacpGroup
DESCRIPTION
  "Support for this group is OPTIONAL and only required for
  implementations supporting BACP."

```

```

GROUP      g9982PerfCurrGroup
DESCRIPTION
  "Support for this group is only required for implementations
  supporting Performance Monitoring."

```

```

GROUP      g9982Perf15MinGroup
DESCRIPTION
  "Support for this group is only required for implementations
  supporting 15-minute historical Performance Monitoring."

```

```
GROUP          g9982Perf1DayGroup
DESCRIPTION
  "Support for this group is only required for implementations
  supporting 1-day historical Performance Monitoring."

OBJECT         g9982PortCapTcTypesSupported
SYNTAX        BITS {
  tc6465(0),
  tcHDLc(1)
}
DESCRIPTION
  "Support for all TC types is not required.  However, at least
  one value SHALL be supported."

OBJECT         g9982PortCapBacpSupported
SYNTAX        TruthValue
DESCRIPTION
  "Support for BACP is OPTIONAL; therefore, a value of false(2)
  SHALL be supported."

OBJECT         g9982PortConfTcAdminType
MIN-ACCESS    read-only
DESCRIPTION
  "Write access is not required (needed only for GBS
  supporting more than a single TC encapsulation type, i.e.,
  tc6465 and tcHDLc)."

OBJECT         g9982PortConfAdminCp
MIN-ACCESS    read-only
DESCRIPTION
  "Write access is not required (needed only for GBS
  supporting BACP in addition to mandatory G.hs-based bonding
  discovery and aggregation protocol)."
```

::= { g9982Compliances 1 }

END

## 7. Security Considerations

There are a number of managed objects defined in this MIB module with a MAX-ACCESS clause of read-write and/or read-create. Such objects may be considered sensitive or vulnerable in some network environments. The support for SET operations in a non-secure environment without proper protection can have a negative effect on network operations. These are the tables and objects and their sensitivity/vulnerability:

- o Changing of g9982PortConfTable configuration parameters (e.g., g9982PortConfTcAdminType) may lead to a complete service interruption in cases where the specified PTM-TC encapsulation type is not supported by the remote end.
- o Changing of g9982BceConfTable configuration parameters (e.g., g9982BceConfEligibleGroupID) may lead to preventing a non-bonded BCE from being bonded in any bonding group, or false advertisement of bonding eligibility (e.g., between BCEs residing on different line cards in an application that does not support cross-card bonding).

Some of the readable objects in this MIB module (i.e., objects with a MAX-ACCESS other than not-accessible) may be considered sensitive or vulnerable in some network environments since, collectively, they provide information about the performance of network interfaces and can reveal some aspects of their configuration.

It is thus important to control even GET and/or NOTIFY access to these objects and possibly to even encrypt the values of these objects when sending them over the network via SNMP. These are the tables and objects and their sensitivity/vulnerability:

- o g9982PortStatTable - objects in this table (e.g., g9982PortStatTcOperType) provide status information for the G.Bond port, which may aid in deciphering of the G.Bond/ETH transmissions.

SNMP versions prior to SNMPv3 did not include adequate security. Even if the network itself is secure (for example by using IPsec), there is no control as to who on the secure network is allowed to access and GET/SET (read/change/create/delete) the objects in this MIB module.

Implementations SHOULD provide the security features described by the SNMPv3 framework (see [RFC3410]), and implementations claiming compliance to the SNMPv3 standard MUST include full support for authentication and privacy via the User-based Security Model (USM)

[RFC3414] with the AES cipher algorithm [RFC3826]. Implementations MAY also provide support for the Transport Security Model (TSM) [RFC5591] in combination with a secure transport such as SSH [RFC5592] or TLS/DTLS [RFC6353].

Further, deployment of SNMP versions prior to SNMPv3 is NOT RECOMMENDED. Instead, it is RECOMMENDED to deploy SNMPv3 and to enable cryptographic security. It is then a customer/operator responsibility to ensure that the SNMP entity giving access to an instance of this MIB module is properly configured to give access to the objects only to those principals (users) that have legitimate rights to indeed GET or SET (change/create/delete) them.

## 8. IANA Considerations

IANA has assigned 264 as the object identifier for the g9982MIB MODULE-IDENTITY in the MIB-2 transmission sub-tree <<http://www.iana.org/>>.

## 9. Acknowledgments

This document was produced by the [ADSLMIB] working group.

Special thanks to Dan Romascanu for his meticulous review of this text.

## 10. References

### 10.1. Normative References

- [802.3] IEEE, "IEEE Standard for Information technology - Telecommunications and information exchange between systems - Local and metropolitan area networks - Specific requirements - Part 3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications", IEEE Std 802.3-2005, December 2005.
- [G.998.2] ITU-T, "Ethernet-based multi-pair bonding", ITU-T Recommendation G.998.2, January 2005, <<http://www.itu.int/rec/T-REC-G.998.2/en>>.
- [G.998.2-Amd2] ITU-T, "Ethernet-based multi-pair bonding Amendment 2", ITU-T Recommendation G.998.2/Amd.2, December 2007, <<http://www.itu.int/rec/T-REC-G.998.2-200712-I!Amd2/en>>.
- [RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, March 1997.

- [RFC2578] McCloghrie, K., Ed., Perkins, D., Ed., and J. Schoenwaelder, Ed., "Structure of Management Information Version 2 (SMIv2)", STD 58, RFC 2578, April 1999.
- [RFC2579] McCloghrie, K., Ed., Perkins, D., Ed., and J. Schoenwaelder, Ed., "Textual Conventions for SMIv2", STD 58, RFC 2579, April 1999.
- [RFC2580] McCloghrie, K., Perkins, D., and J. Schoenwaelder, "Conformance Statements for SMIv2", STD 58, RFC 2580, April 1999.
- [RFC2863] McCloghrie, K. and F. Kastenholz, "The Interfaces Group MIB", RFC 2863, June 2000.
- [RFC3414] Blumenthal, U. and B. Wijnen, "User-based Security Model (USM) for version 3 of the Simple Network Management Protocol (SNMPv3)", STD 62, RFC 3414, December 2002.
- [RFC3705] Ray, B. and R. Abbi, "High Capacity Textual Conventions for MIB Modules Using Performance History Based on 15 Minute Intervals", RFC 3705, February 2004.
- [RFC3826] Blumenthal, U., Maino, F., and K. McCloghrie, "The Advanced Encryption Standard (AES) Cipher Algorithm in the SNMP User-based Security Model", RFC 3826, June 2004.
- [RFC5591] Harrington, D. and W. Hardaker, "Transport Security Model for the Simple Network Management Protocol (SNMP)", RFC 5591, June 2009.
- [RFC5592] Harrington, D., Salowey, J., and W. Hardaker, "Secure Shell Transport Model for the Simple Network Management Protocol (SNMP)", RFC 5592, June 2009.
- [RFC6353] Hardaker, W., "Transport Layer Security (TLS) Transport Model for the Simple Network Management Protocol (SNMP)", RFC 6353, July 2011.
- [RFC6765] Beili, E. and M. Morgenstern, "xDSL Multi-Pair Bonding (G.Bond) MIB", RFC 6765, February 2013.
- [TR-159] Beili, E. and M. Morgenstern, "Management Framework for xDSL Bonding", Broadband Forum Technical Report TR-159, December 2008, <<http://www.broadband-forum.org/technical/download/TR-159.pdf>>.

## 10.2. Informative References

- [ADSLMIB] IETF, "ADSL MIB (adslmib) Charter",  
<<http://datatracker.ietf.org/wg/adslmib/charter/>>.
- [G.991.2] ITU-T, "Single-pair high-speed digital subscriber line (SHDSL) transceivers", ITU-T Recommendation G.991.2, December 2003, <<http://www.itu.int/rec/T-REC-G.991.2/en>>.
- [G.993.1] ITU-T, "Very high speed digital subscriber line transceivers (VDSL)", ITU-T Recommendation G.993.1, June 2004, <<http://www.itu.int/rec/T-REC-G.993.1/en>>.
- [G.994.1] ITU-T, "Handshake procedures for digital subscriber line (DSL) transceivers", ITU-T Recommendation G.994.1, February 2007, <<http://www.itu.int/rec/T-REC-G.994.1/en>>.
- [IEEE802.3.1]  
IEEE, "IEEE P802.3.1 Revision to IEEE Std 802.3.1-2011 (IEEE 802.3.1a) Ethernet MIBs Task Force", January 2012, <<http://grouper.ieee.org/groups/802/3/1/>>.
- [RFC3410] Case, J., Mundy, R., Partain, D., and B. Stewart, "Introduction and Applicability Statements for Internet-Standard Management Framework", RFC 3410, December 2002.
- [RFC3593] Tesink, K., "Textual Conventions for MIB Modules Using Performance History Based on 15 Minute Intervals", RFC 3593, September 2003.
- [RFC3635] Flick, J., "Definitions of Managed Objects for the Ethernet-like Interface Types", RFC 3635, September 2003.
- [RFC3728] Ray, B. and R. Abbi, "Definitions of Managed Objects for Very High Speed Digital Subscriber Lines (VDSL)", RFC 3728, February 2004.
- [RFC4181] Heard, C., "Guidelines for Authors and Reviewers of MIB Documents", BCP 111, RFC 4181, September 2005.
- [RFC4319] Sikes, C., Ray, B., and R. Abbi, "Definitions of Managed Objects for High Bit-Rate DSL - 2nd generation (HDSL2) and Single-Pair High-Speed Digital Subscriber Line (SHDSL) Lines", RFC 4319, December 2005.

- [RFC4836] Beili, E., "Definitions of Managed Objects for IEEE 802.3 Medium Attachment Units (MAUs)", RFC 4836, April 2007.
- [RFC5066] Beili, E., "Ethernet in the First Mile Copper (EFMCu) Interfaces MIB", RFC 5066, November 2007.

#### Authors' Addresses

Edward Beili  
Actelis Networks  
25 Bazel St.  
Petach-Tikva 49103  
Israel

Phone: +972-3-924-3491  
EMail: edward.beili@actelis.com

Moti Morgenstern  
ECI Telecom  
30 Hasivim St.  
Petach-Tikva 4951169  
Israel

Phone: +972-3-926-6258  
EMail: moti.morgenstern@ecitele.com