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Ethernet-based xDSL multi-pair bonding (G.Bond/Ethernet) MIB
draft-ietf-adslmib-gbond-eth-mib-07.txt

Abstract

   This document defines 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 xDSL
   interfaces, defined in ITU-T recommendation G.998.2.

      described in the Simplified BSD License.

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1. Introduction

The Ethernet-based xDSL Multi-Pair Bonding, a.k.a. G.Bond/Ethernet,
is specified in ITU-T G.998.2 recommendation [G.998.2], which defines
a method for bonding (or aggregating) of multiple xDSL lines (or
individual bearer channels in multiple xDSL lines) into a single bi-
directional logical link, carrying an 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 GBOND-MIB
[I-D.ietf-adslmib-gbond-mib] module.

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 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. Relation 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: Interfaces
Group MIB (IF-MIB), G.Bond MIB (GBOND-MIB), and 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

   GBOND-MIB [I-D.ietf-adslmib-gbond-mib] module 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 GBOND-MIB and G9982-MIB 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 Sublayer (GBS) ports of a generic G.998
   multi-port Central Office (CO) device, using the 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 pseudo-code 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, IF-CAP-STACK-MIB 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].g9982OperCp == 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)
            { // Remote RT_device connected via BCE[j] is a peer
              // for GBS[i] and there room for another BCE in the
              // GBS[i] aggregation group (max. Bonding capacity is
              // not reached yet).
              // Connect this BCE to the GBS (via ifStackTable,
              // ifInvStackTable being inverse of 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 which
          // are physically connected to the same remote RT_device
          // and 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 ifCapStackTable and its
inverse 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

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

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 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 a complete (within the scope of the
802.3 standard) management of the SHDSL/VDSL lines. 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

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

Finally, EFM-CU-MIB does not include historical Performance
Monitoring (PM), while GBOND-MIB/GBOND-MIB-ETH/xDSL-LINE-MIB

combination provides full PM functionality for a bonded link and
individual xDSL lines.

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 Bonded Sub-layer (GBS) port configuration,
   capabilities, status, notifications and PM, is 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, is 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 intervals SHOULD be aligned with the start of a day.

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

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 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

G9982-MIB DEFINITIONS ::= BEGIN

```
  IMPORTS
    MODULE-IDENTITY,
    OBJECT-TYPE,
    Counter32,
    mib-2,
    Unsigned32
      FROM SNMPv2-SMI        -- [RFC2578]
    TEXTUAL-CONVENTION,
    TruthValue,
    PhysAddress
      FROM SNMPv2-TC         -- [RFC2579]
    MODULE-COMPLIANCE,
    OBJECT-GROUP
      FROM SNMPv2-CONF       -- [RFC2580]
    ifIndex
      FROM IF-MIB            -- [RFC2863]
    HCPerfCurrentCount,
    HCPerfValidIntervals,
    HCPerfInvalidIntervals,
    HCPerfTimeElapsed
      FROM  HC-PerfHist-TC-MIB  -- [RFC3705]
    ;
--------------------------------------------------------------------------
  g9982MIB MODULE-IDENTITY
    LAST-UPDATED "201203120000Z"  -- Mar 12, 2012
    ORGANIZATION "IETF ADSL MIB Working Group"
    CONTACT-INFO
      "WG charter:
```

http://www.ietf.org/html.charters/adslmib-charter.html

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

      This MIB module MUST be used in conjunction with 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 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 Transmission Unit
         BTU-C - Bonding Transmission Unit, CO side
         BTU-R - Bonding Transmission Unit, Remote Terminal (CPE) side
         CO   - Central Office
         CPE   - Customer Premises Equipment
         GBS   - Generic Bonding Sublayer
         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) The IETF Trust (2012).
      This version of this MIB module is part of RFC YYYY;
      see the RFC itself for full legal notices."

     REVISION   "201203120000Z" -- Mar 12, 2012
     DESCRIPTION "Initial version, published as RFC YYYY."

        -- EdNote: Replace YYYY with the actual RFC number &
        -- remove this note.

      ::= { mib-2 ZZZ }

        -- EdNote: Replace ZZZ with a real OID once it is
        -- allocated & remove this note.

     -- Sections of the module
     -- Structured as recommended by [RFC4181], 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 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
        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 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] 5.5.3.4; IF-MIB, ifAdminStatus"
    ::= { g9982PortConfEntry 1 }

  g9982PortConfAdminCp OBJECT-TYPE
    SYNTAX   G9982CpType
    MAX-ACCESS read-write
    STATUS   current
    DESCRIPTION
      "Administrative (desired) bonding control protocol of
      G.Bond/Eth port (GBS). Possible values are:
        cpHS(1)   - use G.hs-based protocol (default)
        cpBACP(2) - use frame-based BACP
      Note 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 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] 5.5.3.2; 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 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] 5.5.3.6"
   ::= { g9982PortCapEntry 1 }

 g9982PortCapBacpSupported  OBJECT-TYPE
   SYNTAX      TruthValue
   MAX-ACCESS  read-only
   STATUS      current
   DESCRIPTION
```

```
      "Indicates whether Bonding Aggregation Control Protocol
      (BACP) - 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 the BACP is supported.
      A value of false(2) indicates that the 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] 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 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 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 objects maps to the TR-159 attribute aEthTcOperType."
     REFERENCE
       "[TR-159] 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 g9982PortConfAdminCp variable.

       This objects maps to the TR-159 attribute aEthOperCP."
     REFERENCE
       "[TR-159] 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 finction 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,
       defined in IF-MIB.

       This object maps to the TR-159 attribute aEthRxErrors."
     REFERENCE
       "[TR-159] 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,
       defined in IF-MIB.

       This object maps to the TR-159 attribute aEthRxSmallFragments."
     REFERENCE
       "[TR-159] 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),
       which 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,
      defined in IF-MIB.

      This object maps to the TR-159 attribute aEthRxLargeFragments."
    REFERENCE
      "[TR-159] 5.5.3.9"
    ::= { g9982PortStatEntry 5 }

  g9982PortStatRxBadFragments OBJECT-TYPE
    SYNTAX   Counter32
    UNITS   "fragments"
    MAX-ACCESS read-only
    STATUS   current
    DESCRIPTION
      "A number of fragments which do not fit into the sequence
      expected by the frame assembly function, 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,
      defined in IF-MIB.

      This object maps to the TR-159 attribute aEthRxBadFragments."
    REFERENCE
      "[TR-159] 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, which have
      been received by the bonding function (the frame buffer is
      flushed to the next valid frame start, when fragment/fragments
      expected by the frame assembly function is/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,
      defined in IF-MIB.

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

```
   REFERENCE
     "[TR-159] 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,
     defined in IF-MIB.

     This object maps to the TR-159 attribute aEthRxLostStarts."
   REFERENCE
     "[TR-159] 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,
     defined in IF-MIB.

     This object maps to the TR-159 attribute aEthRxLostEnds."
   REFERENCE
     "[TR-159] 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, which 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,
      defined in IF-MIB.

      This object maps to the TR-159 attribute aEthRxOverflows."
    REFERENCE
      "[TR-159] 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   HCPerfValidIntervals,
       g9982PortPm15MinInvalidIntervals   HCPerfInvalidIntervals,
       g9982PortPmCur15MinTimeElapsed   HCPerfTimeElapsed,
       g9982PortPmCur15MinRxErrors   HCPerfCurrentCount,
       g9982PortPmCur15MinRxSmallFragments HCPerfCurrentCount,
       g9982PortPmCur15MinRxLargeFragments HCPerfCurrentCount,
       g9982PortPmCur15MinRxBadFragments   HCPerfCurrentCount,

```
      g9982PortPmCur15MinRxLostFragments   HCPerfCurrentCount,
      g9982PortPmCur15MinRxLostStarts      HCPerfCurrentCount,
      g9982PortPmCur15MinRxLostEnds        HCPerfCurrentCount,
      g9982PortPmCur15MinRxOverflows       HCPerfCurrentCount,
      g9982PortPm1DayValidIntervals        Unsigned32,
      g9982PortPm1DayInvalidIntervals      Unsigned32,
      g9982PortPmCur1DayTimeElapsed        HCPerfTimeElapsed,
      g9982PortPmCur1DayRxErrors           HCPerfCurrentCount,
      g9982PortPmCur1DayRxSmallFragments   HCPerfCurrentCount,
      g9982PortPmCur1DayRxLargeFragments   HCPerfCurrentCount,
      g9982PortPmCur1DayRxBadFragments     HCPerfCurrentCount,
      g9982PortPmCur1DayRxLostFragments    HCPerfCurrentCount,
      g9982PortPmCur1DayRxLostStarts       HCPerfCurrentCount,
      g9982PortPmCur1DayRxLostEnds         HCPerfCurrentCount,
      g9982PortPmCur1DayRxOverflows        HCPerfCurrentCount
   }

g9982PortPm15MinValidIntervals  OBJECT-TYPE
   SYNTAX       HCPerfValidIntervals
   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 minutes 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] 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] 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
      aGroupPerfCurr15MinTimeElapsed."
    REFERENCE
      "[TR-159] 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] 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] 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] 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 which do not fit into the
   sequence expected by the frame assembly function, 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 g9982PortStatRxBadFragments object.

   This object is inhibited during Unavailable Seconds (UAS)."
  REFERENCE
   "[TR-159] 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 the lost fragments is indicated by
        the g9982PortStatRxLostFragments object.

        This object is inhibited during Unavailable Seconds (UAS)."
      REFERENCE
        "[TR-159] 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] 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] 5.5.3.13"
      ::= { g9982PortPmCurEntry 10}

   g9982PortPmCur15MinRxOverflows 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 current 15-minute
        performance interval.

        Note that the total number of fragments which 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] 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] 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] 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] 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] 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] 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] 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 which do not fit into the
       sequence expected by the frame assembly function, 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 g9982PortStatRxBadFragments object.

       This object is inhibited during Unavailable Seconds (UAS)."
     REFERENCE
       "[TR-159] 5.5.3.10"
     ::= { g9982PortPmCurEntry 18}

   g9982PortPmCur1DayRxLostFragments 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 the lost fragments is indicated by
     the g9982PortStatRxLostFragments object.

     This object is inhibited during Unavailable Seconds (UAS)."
   REFERENCE
     "[TR-159] 5.5.3.11"
   ::= { g9982PortPmCurEntry 19}

g9982PortPmCur1DayRxLostStarts  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] 5.5.3.12"
   ::= { g9982PortPmCurEntry 20}

g9982PortPmCur1DayRxLostEnds  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] 5.5.3.13"
   ::= { g9982PortPmCurEntry 21}
```

```
   g9982PortPmCur1DayRxOverflows  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 current 1-day
       performance interval.

       Note that the total number of fragments which 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] 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 ifIndex, collected during a
       particular 15-minute interval, indexed by
       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] 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] 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] 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] 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 which do not fit into the
       sequence expected by the frame assembly function, 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 g9982PortStatRxBadFragments object.

       This object is inhibited during Unavailable Seconds (UAS)."
     REFERENCE
       "[TR-159] 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 the lost fragments is indicated by
       the g9982PortStatRxLostFragments object.

       This object is inhibited during Unavailable Seconds (UAS)."
     REFERENCE
       "[TR-159] 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] 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] 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 which 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] 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. Valid bucket is reported as true(1)
      and 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 data base. In such case this object is
      not required as only valid history buckets are available while
      invalid history buckets are simply not in the data base.

      This object partially maps to the TR-159 attribute
      aGroupPerf15MinIntervalValid."
    REFERENCE
      "[TR-159] 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 port,
     indexed by ifIndex, collected during a particular 1-day
     interval, indexed by g9982PortPm1DayIntervalIndex."
   INDEX  { ifIndex, g9982PortPm1DayIntervalIndex }
   ::= { g9982PortPm1DayTable 1 }

G9982PortPm1DayEntry ::=
   SEQUENCE {
     g9982PortPm1DayIntervalIndex          Unsigned32,
     g9982PortPm1DayIntervalMoniTime       HCPerfTimeElapsed,
     g9982PortPm1DayIntervalRxErrors       HCPerfCurrentCount,
     g9982PortPm1DayIntervalRxSmallFragments  HCPerfCurrentCount,
     g9982PortPm1DayIntervalRxLargeFragments  HCPerfCurrentCount,
```

```
      g9982PortPm1DayIntervalRxBadFragments     HCPerfCurrentCount,
      g9982PortPm1DayIntervalRxLostFragments    HCPerfCurrentCount,
      g9982PortPm1DayIntervalRxLostStarts       HCPerfCurrentCount,
      g9982PortPm1DayIntervalRxLostEnds         HCPerfCurrentCount,
      g9982PortPm1DayIntervalRxOverflows        HCPerfCurrentCount,
      g9982PortPm1DayIntervalValid              TruthValue
   }

g9982PortPm1DayIntervalIndex  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] 5.5.1.62"
   ::= { g9982PortPm1DayEntry 1 }

g9982PortPm1DayIntervalMoniTime  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 (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] 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] 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] 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] 5.5.3.9"
     ::= { g9982PortPm1DayEntry 5}

   g9982PortPm1DayIntervalRxBadFragments OBJECT-TYPE
     SYNTAX   HCPerfCurrentCount

```
         UNITS        "fragments"
         MAX-ACCESS   read-only
         STATUS       current
         DESCRIPTION
           "A read-only count of fragments which do not fit into the
           sequence expected by the frame assembly function, 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 g9982PortStatRxBadFragments object.

           This object is inhibited during Unavailable Seconds (UAS)."
         REFERENCE
           "[TR-159] 5.5.3.10"
         ::= { g9982PortPm1DayEntry 6}

      g9982PortPm1DayIntervalRxLostFragments  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 1-day performance history interval.

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

           This object is inhibited during Unavailable Seconds (UAS)."
         REFERENCE
           "[TR-159] 5.5.3.11"
         ::= { g9982PortPm1DayEntry 7}

      g9982PortPm1DayIntervalRxLostStarts  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] 5.5.3.12"
      ::= { g9982PortPm1DayEntry 8}

   g9982PortPm1DayIntervalRxLostEnds  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] 5.5.3.13"
      ::= { g9982PortPm1DayEntry 9}

   g9982PortPm1DayIntervalRxOverflows  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 which 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] 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. Valid bucket is reported as true(1)
```

      and 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 data base. In such case this object is
      not required as only valid history buckets are available while
      invalid history buckets are simply not in the data base.

      This object partially maps to the TR-159 attribute
      aGroupPerf1DayIntervalValid."
    REFERENCE
      "[TR-159] 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 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 the different Line Cards, or BCEs are the channels of
       the same line).

       Note that bonding eligibility is reflected in the
       ifCapStackTable and its inverse ifInvCapStackTable, and 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] 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 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 BACPPDUs has been received from the peer BCE.

      This object maps to the G.998.2-Amd2 attribute
      Remote Group ID."
    REFERENCE
      "[G.998.2-Amd2] 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 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,
     defined in IF-MIB.

     This object maps to TR-159 attribute
     aChannelPtmTcRxCodingViolations."
   REFERENCE
     "[TR-159] 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,
     defined in IF-MIB.

     This object maps to TR-159 attribute aChannelPtmTcRxCrcErrors."
   REFERENCE
     "[TR-159] 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,
      g9982PortPmCur1DayRxErrors,
      g9982PortPmCur1DayRxSmallFragments,
      g9982PortPmCur1DayRxLargeFragments,
      g9982PortPmCur1DayRxBadFragments,
      g9982PortPmCur1DayRxLostFragments,
      g9982PortPmCur1DayRxLostStarts,
      g9982PortPmCur1DayRxLostEnds,
      g9982PortPmCur1DayRxOverflows
    }
    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 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 is 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 case 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 which does not support cross-card
      bonding).

   Some of the readable objects in this MIB module (i.e., those with
   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 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 MUST provide the security features described by the
SNMPv3 framework (see [RFC3410]), including 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

An object identifier for g9982MIB MODULE-IDENTITY SHALL be allocated
by IANA [1] in the MIB-2 transmission sub-tree, before this document
is published as an RFC.

9. Acknowledgments

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