Abstract

This document defines Management Information Base (MIB) module for use with network management protocols in TCP/IP based internets. This document proposes an extension to the GBOND-MIB module with a set of objects for managing multi-pair bonded xDSL interfaces using Time-Division Inverse Multiplexing (TDIM), defined in ITU-T recommendation G.998.3.

Status of This Memo

This Internet-Draft is submitted in full conformance with the provisions of BCP 78 and BCP 79.

Internet-Drafts are working documents of the Internet Engineering Task Force (IETF). Note that other groups may also distribute working documents as Internet-Drafts. The list of current Internet-Drafts is at http://datatracker.ietf.org/drafts/current/.

Internet-Drafts are draft documents valid for a maximum of six months and may be updated, replaced, or obsoleted by other documents at any time. It is inappropriate to use Internet-Drafts as reference material or to cite them other than as "work in progress."

This Internet-Draft will expire on May 31, 2011.

Copyright Notice

Copyright (c) 2010 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 ............................................. 3
2. The Internet-Standard Management Framework ................. 3
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 ............ 4
   4.2. Relationship to G.Bond MIB module ...................... 4
5. MIB Structure ............................................ 4
   5.1. Overview ............................................ 4
   5.2. Link Protection Configuration ......................... 5
   5.3. Service Configuration ............................... 5
      5.3.1. Management of TDM Services and service drop
            priority during bandwidth degradation ............ 6
      5.3.2. Service Notifications ............................ 6
   5.4. Performance Monitoring ............................... 6
   5.5. Mapping of Broadband Forum TR-159 and ITU-T G.998.3
        Managed Objects ................................. 7
6. G.Bond/TDIM MIB Definitions ................................ 8
7. Security Considerations ................................... 50
8. IANA Considerations ..................................... 51
9. Acknowledgments ......................................... 51
10. References .............................................. 51
    10.1. Normative References ............................... 51
    10.2. Informative References ............................. 52
1. Introduction

The Multi-pair bonding using time-division inverse multiplexing (TDIM), a.k.a. G.Bond/TDIM, is specified in ITU-T G.998.3 recommendation [G.998.3], 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 a mix of various traffic streams, e.g. Ethernet, Asynchronous Transfer Mode (ATM), Time-Division Multiplexing (TDM).

The MIB module, defined in this document, provides G.Bond/TDIM-specific objects for the management of G.998.3 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", "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. 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: Interfaces Group MIB (IF-MIB) and G.Bond MIB (GBOND-MIB).
4.1. Relationship to Interfaces Group MIB module

A G.Bond/TDIM 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/TDIM 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, initialization sequence etc.

Both GBOND-MIB and GBOND-TDIM-MIB modules are REQUIRED to manage a G.Bond/TDIM port.

5. MIB Structure

5.1. Overview

All management objects defined in the GBOND-TDIM-MIB module are contained in a single group gBondTdimPort. This group is further split into 6 sub-groups, structured as recommended by RFC 4181 [RFC4181]:

- gBondTdimPortNotifications - containing notifications (TDIM Service Down/Up).
- gBondTdimPortConfTable - containing objects for configuration of a G.Bond/TDIM port.
- gBondTdimPortCapabilityTable - containing objects reflecting capability of a G.Bond/TDIM port.
- gBondTdimPortStatusTable - containing objects providing overall status information of a G.Bond/TDIM port, complementing the generic status information from the ifTable of IF-MIB and gBondFltStatus of GBOND-MIB.
- gBondTdimServiceTable - containing objects for configuration and status of the services in a G.Bond/TDIM port.
- gBondTdimPM - containing objects for an OPTIONAL Historical Performance Monitoring (PM) of a G.Bond/TDIM port.
5.2. Link Protection Configuration

G.Bond/TDIM specification allows an optional Forward Error Correction (FEC) and Interleaver block, which, if supported and enabled, provides a degree of protection against micro-interruptions, alien noise, and even individual Bonding Channel Entity (BCE) failures, a.k.a. cut-line protection.

Management objects in the gBondTdimPortConfTable can be used to configure and query the FEC and Interleaver function of the G.Bond/TDIM port.

5.3. Service Configuration

Unlike the other two xDSL Multi-Pair Bonding schemes (G.Bond/ATM and G.Bond/Ethernet), which send the information required for reassembly of the fragmented data along with the data, G.Bond/TDIM is a synchronous scheme, requiring both ends to know the data distribution tables before any actual data transfer can happen.

Management objects in the gBondTdimPortConfTable, gBondTdimServiceTable and gBondTdimOperServiceTable can be used to configure and query the configuration of services transported via the G.Bond/TDIM link. The services may be configured independently of the link state (i.e. in- and out-of-service), as G.998.3 communicates changes in the service configuration via specific Bonding Communication Channel (BCC) messages, switching both ends of the link to the new configuration synchronously.

There can be up to 60 active services defined on a G.Bond/TDIM link. This MIB module provides an ability to define up to 255 services via the gBondTdimServiceTable, with each row representing a possible service, and then set the actual service configuration using the gBondTdimAdminServices object (a byte-vector of service indices), listing the active services in order of their position in the G.Bond/TDIM frame. This design allows one to easily modify service drop priority, which directly corresponds to the service position.

The actual list of services is provided via read-only gBondTdimOperServiceTable, where each entry’s index corresponds to the service position, starting from index 1 for the first entry, 2 for the second entry etc., providing an easy service navigation for a management application using GET-NEXT (instead of counting bytes in the gBondTdimAdminServices object).

The service configuration can only be changed on a BTU-C side.
When configuring the services, please bear in mind that the sum of all the services’ bandwidth SHOULD be less or equal to the target data rate of the bonded link. Note that G.Bond/TDIM links are symmetrical, i.e. their upstream data rate equals to the downstream data rate.

5.3.1. Management of TDM Services and service drop priority during bandwidth degradation

G.Bond/TDIM protocol provides an ability to map TDM services into the TDIM bonded link directly, without any additional overhead. It addresses only structure-agnostic TDM transport, disregarding any structure that may be imposed on these streams, in particular the structure imposed by the standard TDM framing [G.704].

During bandwidth degradation services with a lower priority are impaired or dropped first. Synchronous services (fractional DS1/E1, clear channel E1/T1, T3/E3, clock) positioned in the beginning of the G.Bond/TDIM frame, have higher priority than asynchronous services (Ethernet, ATM, GFP encapsulated), positioned farther away. Within the services of the same type, those with lower position (index) have higher priority.

5.3.2. Service Notifications

This MIB module provides specific Up/Down notifications (gBondTdimServiceUp/gBondTdimServiceDown) for each of the configured services. During bandwidth degradation a number of services may be suspended (dropped) simultaneously, according to their drop priority (position in the service list). Please note that it is possible for a higher priority service to be dropped before a lower priority one.

For example, suppose there are two services configured on a 2 Mbps G.Bond/TDIM link: a T1 service (gBondTdimServiceType with a value of ds1, with a bandwidth requirement of 1.5 Mbps) and an Ethernet service with a size of 0.5 Mbps. When the actual link bandwidth is reduced to 1.4 Mbps, the T1 service with a gBondTdimServicePosition value of 1 would be dropped, while the Ethernet service with a gBondTdimServicePosition value of 2 would remain up.

5.4. 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 G.Bond TDIM port is reinitialized, but
rather only when the agent is reset or reinitialized (or under
specific request outside the scope of this MIB module).

5.5. Mapping of Broadband Forum TR-159 and ITU-T G.998.3 Managed
Objects

This section contains the mapping between relevant managed objects
(attributes) defined in [TR-159] and managed objects defined in this
document. Note that all management objects defined in [G.998.3] have
corresponding objects in [TR-159].

<table>
<thead>
<tr>
<th>TR-159 Managed Object</th>
<th>Corresponding SNMP Object</th>
</tr>
</thead>
<tbody>
<tr>
<td>oBondTDIM - Basic Package (Mandatory)</td>
<td></td>
</tr>
<tr>
<td>aCRC4Errors</td>
<td>gBondTdimCrc4Errors</td>
</tr>
<tr>
<td>aCRC6Errors</td>
<td>gBondTdimCrc6Errors</td>
</tr>
<tr>
<td>aCRC8Errors</td>
<td>gBondTdimCrc8Errors</td>
</tr>
<tr>
<td>aFECSupported</td>
<td>gBondTdimFecSupported</td>
</tr>
<tr>
<td>oBondTDIM - FEC Package (Optional)</td>
<td></td>
</tr>
<tr>
<td>aFECAdminState</td>
<td>gBondTdimFecAdminState</td>
</tr>
<tr>
<td>aFECOperState</td>
<td>gBondTdimFecOperState</td>
</tr>
<tr>
<td>aFECWordSize</td>
<td>gBondTdimFecWordSize</td>
</tr>
<tr>
<td>aFECRedundancySize</td>
<td>gBondTdimFecRedundancySize</td>
</tr>
<tr>
<td>aFECInterleaverType</td>
<td>gBondTdimFecInterleaverType</td>
</tr>
<tr>
<td>aFECInterleaverDepth</td>
<td>gBondTdimFecInterleaverDepth</td>
</tr>
<tr>
<td>aFECMaxWordSize</td>
<td>gBondTdimFecMaxWordSize</td>
</tr>
<tr>
<td>aFECMaxRedundancySize</td>
<td>gBondTdimFecMaxRedundancySize</td>
</tr>
</tbody>
</table>
Table 1: Mapping of TR-159 Managed Objects

6. G.Bond/TDIM MIB Definitions

GBOND-TDIM-MIB DEFINITIONS ::= BEGIN

IMPORTS
  MODULE-IDENTITY,
  OBJECT-TYPE,
  NOTIFICATION-TYPE,
  mib-2,
  Unsigned32,
  Counter32
  FROM SNMPv2-SMI -- [RFC2578]
  TEXTUAL-CONVENTION,
  RowStatus,
  TruthValue
  FROM SNMPv2-TC -- [RFC2579]
  MODULE-COMPLIANCE,
  OBJECT-GROUP,
  NOTIFICATION-GROUP
  FROM SNMPv2-CONF -- [RFC2580]
ifIndex,
InterfaceIndex
   -- [RFC2863]
HCPerfCurrentCount,
HCPerfIntervalCount,
HCPerfValidIntervals,
HCPerfInvalidIntervals,
HCPerfTimeElapsed
   FROM HC-PerfHist-TC-MIB  -- [RFC3705]

;
The following references are used throughout this MIB module:

[G.998.3] refers to:

[TR-159] refers to:

Naming Conventions:
BCE - Bonding Channel Entity
CO - Central Office
CPE - Customer Premises Equipment
GBS - Generic Bonding Sublayer
GBS-C - Generic Bonded Sub-layer, CO side
GBS-R - Generic Bonded Sub-layer, RT (or CPE) side
SNR - Signal to Noise Ratio

Copyright (C) The IETF Trust (2010).
This version of this MIB module is part of RFC YYYY; see the RFC itself for full legal notices."

REVISION "201011270000Z" -- Nov 27, 2010
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

gBondTdimObjects OBJECT IDENTIFIER ::= { gBondTdimMIB 1 }
gBondTdimConformance OBJECT IDENTIFIER ::= { gBondTdimMIB 2 }

-- Groups in the module
gBondTdimPort OBJECT IDENTIFIER ::= { gBondTdimObjects 1 }

-- Textual Conventions
GBondTdimServiceIndex ::= TEXTUAL-CONVENTION
DISPLAY-HINT "d"
STATUS current
DESCRIPTION
"A unique value, greater than zero, for each Service defined in the managed G.Bond/TDIM port. It is RECOMMENDED that values are assigned contiguously starting from 1. The value for each Service MUST remain constant at least from one re-initialization of the entity’s network management system to the next re-initialization."
SYNTAX Unsigned32 (1..255)

GBondTdimServiceIndexList ::= TEXTUAL-CONVENTION
DISPLAY-HINT "1d:"
STATUS current
DESCRIPTION
"This textual convention represents a continuous ordered list of all the servies defined for the managed G.Bond/TDIM port. The value of this object is a concatenation of zero or more (up to 60) octets, where each octet contains an 8-bit GBondTdimServiceIndex value, identifying a particular service. An octet’s position reflects the associated service position and its priority in the G.Bond/TDIM frame, with 1st octet being the 1st service of highest priority.

A zero-length octet string is object-specific and MUST therefore be defined as part of the description of any object that uses this syntax. Examples of the usage of a zero-length value might include situations where an object using this textual convention is irrelevant for a specific G.Bond/TDIM port type or that no services have been defined for this port."
SYNTAX OCTET STRING (SIZE(0..60))

GBondTdimServiceOrderIndex ::= TEXTUAL-CONVENTION
DISPLAY-HINT "d"
STATUS current
DESCRIPTION
"A unique value, greater than zero, for each Service defined in the managed G.Bond/TDIM port, showing its relative position inside the G.Bond/TDIM frame."
SYNTAX Unsigned32 (1..60)

-- Port Notifications Group

gBondTdimPortNotifications OBJECT IDENTIFIER ::= { gBondTdimPort 0 }

gBondTdimServiceUp NOTIFICATION-TYPE
OBJECTS {

gBondTdimServicePosition,
gBondTdimServiceIfIdx,
gBondTdimServiceOperState
}  
STATUS      current
DESCRIPTION
"This notification indicates that a service indicated by the
gBondTdimServicePosition (mapped to a particular interface
indicated by the gBondTdimServiceIfIdx) in a particular
G.Bond/TDIM port' is passing traffic.

This notification MAY be send for the G.Bond/TDIM port, while
the port is Up, when the gBondTdimServiceOperState object has
left the Down state.

Generation of this notification is controlled by the
gBondTdimServiceUpDownEnable object.

This object maps to the TR-159 notification nServiceUp."
REFERENCE
"[TR-159] 5.5.5.7"
::= { gBondTdimPortNotifications 1 }

This notification indicates that a service indicated by the
gBondTdimServicePosition (mapped to a particular interface
indicated by the gBondTdimServiceIfIdx) in a particular
G.Bond/TDIM port' has stopped passing the traffic.

This notification MAY be send for the G.Bond/TDIM port, while
the port is Up, when the gBondTdimServiceOperState object has
entered the Down state.

Generation of this notification is controlled by the
gBondTdimServiceUpDownEnable object.

This object maps to the TR-159 notification nServiceDown."
REFERENCE
"[TR-159] 5.5.5.8"
::= { gBondTdimPortNotifications 2 }

-- G.Bond/TDIM Port group

gBondTdimPortConfTable OBJECT-TYPE
SYNTAX      SEQUENCE OF GBondTdimPortConfEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
"Table for Configuration of G.Bond/TDIM ports. Entries in
this table MUST be maintained in a persistent manner"
::= { gBondTdimPort 1 }

gBondTdimPortConfEntry OBJECT-TYPE
SYNTAX      GBondTdimPortConfEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
"An entry in the G.Bond/TDIM Port Configuration table.
Each entry represents an G.Bond/TDIM port indexed by the
ifIndex. Additional configuration parameters are available
via the gBondPortConfEntry of GBOND-MIB.
Note that an G.Bond/TDIM port runs on top of a single or
multiple BCE port(s), which are also indexed by ifIndex."
INDEX  { ifIndex }
::= { gBondTdimPortConfTable 1 }

GBondTdimPortConfEntry ::= 
SEQUENCE {
  gBondTdimFecAdminState        TruthValue,
  gBondTdimFecWordSize          Unsigned32,
  gBondTdimFecRedundancySize    Unsigned32,
  gBondTdimFecInterleaverType   INTEGER,
  gBondTdimFecInterleaverDepth  Unsigned32,
  gBondTdimAdminServices        GBondTdimServiceIndexList,
  gBondTdimServiceUpDownEnable  TruthValue
}

GBondTdimFecAdminState OBJECT-TYPE
SYNTAX      TruthValue
MAX-ACCESS  read-write
STATUS      current
DESCRIPTION
"A desired state of the OPTIONAL Forward Error Correction
(FEC) function of the G.Bond/TDIM port.

A value of ‘false’ indicates that the FEC function SHALL be
disabled. A value of ‘true’ indicates that the FEC SHALL be
enabled, if supported by the G.Bond/TDIM port, as indicated by the gBondTdimFecSupported object. The gBondTdimFecOperState object indicates current operational state of the FEC function.

For the GBS-R ports, the value of this object cannot be changed directly. This value may be changed as a result of writing operation on the gBondTdimFecSupported object of a remote GBS-C.

Modifications of this object MUST be performed when the link is Down. Attempts to change this object MUST be rejected, if the link is Up or Initializing or if it is an GBS-R.

This object MUST be maintained in a persistent manner.

This object maps to TR-159/G.998.3 attribute aFECAdminState.''

REFERENCE

"[TR-159] 5.5.4.5; [G.998.3] Appendix II, B-X"
::= { gBondTdimPortConfEntry 1 }

gBondTdimFecWordSize OBJECT-TYPE
SYNTAX     Unsigned32(0|20..255)
UNITS       "octets"
MAX-ACCESS read-write
STATUS      current
DESCRIPTION
"A FEC code word size in octets for the G.Bond/TDIM ports supporting FEC function.

This object is read-write for the GBS-C ports and read-only for the GBS-R.

A value of zero SHALL be returned if the FEC is disabled (via gBondTdimFecAdminState) or not supported.

Changing of the FEC code word size MUST be performed when the FEC enabled link is Down. Attempts to change this object MUST be rejected, if the link is Up or Initializing or the FEC function is disabled/not supported.

This object MUST be maintained in a persistent manner.

This object maps to TR-159/G.998.3 attribute aFECWordSize.''

REFERENCE

"[TR-159] 5.5.4.7; [G.998.3] Appendix II, B-XI"
::= { gBondTdimPortConfEntry 2 }
gBondTdimFecRedundancySize  OBJECT-TYPE
SYNTAX      Unsigned32{0|2|4|8|16|20}
UNITS       "octets"
MAX-ACCESS  read-write
STATUS      current
DESCRIPTION  "A FEC redundancy word size in octets for the G.Bond/TDIM
ports supporting FEC function.

This object is read-write for the GBS-C ports and read-only
for the GBS-R.

A value of zero SHALL be returned if the FEC is disabled
(via gBondTdimFecAdminState) or not supported.

Changing of the FEC redundancy word size MUST be performed
when the FEC enabled link is Down. Attempts to change this
object MUST be rejected, if the link is Up or Initializing or
the FEC function is disabled/not supported.

This object MUST be maintained in a persistent manner.

This object maps to TR-159/G.998.3 attribute
aFECRedundancySize."
REFERENCE
  "[TR-159] 5.5.4.8; [G.998.3] Appendix II, B-XII"
 ::= { gBondTdimPortConfEntry 3 }

gBondTdimFecInterleaverType  OBJECT-TYPE
SYNTAX      INTEGER {
    none(0),
    block(1),
    convolution(2)
}
MAX-ACCESS  read-write
STATUS      current
DESCRIPTION  "An Interleaver type for the G.Bond/TDIM ports supporting
FEC function.

This object is read-write for the GBS-C ports and read-only
for the GBS-R.

A value of none(0) SHALL be returned if the FEC is disabled
(via gBondTdimFecAdminState) or not supported.

Changing of the Interleaver type MUST be performed when the
FEC enabled link is Down. Attempts to change this object MUST
be rejected, if the link is Up or Initializing or the FEC function is disabled/not supported.

This object MUST be maintained in a persistent manner.

This object maps to TR-159/G.998.3 attribute aFECInterleaverType.

REFERENCE

"[TR-159] 5.5.4.9; [G.998.3] Appendix II, B-XIII"

::= { gBondTdimPortConfEntry 4 }

gBondTdimFecInterleaverDepth  OBJECT-TYPE
SYNTAX      Unsigned32(0|1|2|3|4|6|8|12|16|24|32|48|96)
MAX-ACCESS  read-write
STATUS      current
DESCRIPTION
"An Interleaver Depth for the G.Bond/TDIM ports supporting FEC function.

This object is read-write for the GBS-C ports and read-only for the GBS-R.

A value of zero SHALL be returned if the FEC is disabled (via gBondTdimFecAdminState) or not supported.

Changing of the Interleaver Depth MUST be performed when the FEC enabled link is Down. Attempts to change this object MUST be rejected, if the link is Up or Initializing or the FEC function is disabled/not supported.

This object MUST be maintained in a persistent manner.

This object maps to TR-159/G.998.3 attribute aFECInterleaverDepth." 

REFERENCE

"[TR-159] 5.5.4.10; [G.998.3] Appendix II, B-XIV"

::= { gBondTdimPortConfEntry 5 }

gBondTdimAdminServices  OBJECT-TYPE
SYNTAX      GBondTdimServiceIndexList
MAX-ACCESS  read-write
STATUS      current
DESCRIPTION
"Desired list of services for a G.Bond/TDIM port. This object is a list of pointers to entries in the gBondTdimServiceTable.

The value of this object is a continuous ordered list of up to 60 indices (gBondTdimServiceIdx) of the active services carried
via the G.Bond/TDIM link.

This object is writable and readable for the GBS-C ports. It is irrelevant for the GBS-R ports - a zero-length octet string SHALL be returned on an attempt to read this object and an attempt to change this object MUST be rejected in this case.

Note that the current operational service list is available via the gBondTdimOperServiceTable object.

This object for a GBS-C port MAY be modified independently of the link’s state, i.e. in- and out-of-service. Attempts to set this object to a list with a member value that is not the value of the index for an active entry in the corresponding gBondTdimServiceTable table MUST be rejected.

This object MUST be maintained in a persistent manner.

REFERENCE
"[G.998.3] 10.2.3, 13.3.4.6-13.3.4.11"
::= { gBondTdimPortConfEntry 6 }

gBondTdimServiceUpDownEnable OBJECT-TYPE
SYNTAX TruthValue
MAX-ACCESS read-write
STATUS current
DESCRIPTION
"Indicates whether gBondTdimServiceUp and gBondTdimServiceDown notifications should be generated for this interface.

Value of true(1) indicates that the notifications are enabled. Value of false(2) indicates that the notifications are disabled.

This object MUST be maintained in a persistent manner.

This object maps to the TR-159 attribute aServiceUpDownEnable."
REFERENCE
"[TR-159] 5.5.5.6"
::= { gBondTdimPortConfEntry 7 }

gBondTdimPortCapabilityTable OBJECT-TYPE
SYNTAX SEQUENCE OF GBondTdimPortCapabilityEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"Table for Capabilities of G.Bond/TDIM ports. Entries in this
table MUST be maintained in a persistent manner."  ::= { gBondTdimPort 2 }

gBondTdimPortCapabilityEntry OBJECT-TYPE
SYNTAX      GBondTdimPortCapabilityEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
  "An entry in the G.Bond/TDIM port Capability table.
   Each entry represents an G.Bond/TDIM port indexed by the
   ifIndex. Additional capabilities are available via the
   gBondPortCapabilityEntry of GBOND-MIB.
   Note that a G.Bond/TDIM port runs on top of a single
   or multiple BCE port(s), which are also indexed by ifIndex."
INDEX  { ifIndex }
 ::= { gBondTdimPortCapabilityTable 1 }

GBondTdimPortCapabilityEntry ::= 
SEQUENCE {
  gBondTdimFecSupported            TruthValue,
  gBondTdimFecMaxWordSize          Unsigned32,
  gBondTdimFecMaxRedundancySize    Unsigned32,
  gBondTdimFecInterleaverTypeSupported   INTEGER,
  gBondTdimFecMaxInterleaverDepth  Unsigned32
}

gBondTdimFecSupported  OBJECT-TYPE
SYNTAX      TruthValue
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
  "FEC and Interleaver Capability of the G.Bond/TDIM port.
   This object has a value of true(1) when the port supports the
   FEC and Interleaver function.
   A value of false(2) is returned when the port does not
   support the FEC and Interleaver function.

   This object maps to the TR-159/G.998.3 attribute
   aFECSupported."
REFERENCE
  "[TR-159] 5.5.4.4; [G.998.3] Appendix II, B-VI"
 ::= { gBondTdimPortCapabilityEntry 1 }

gBondTdimFecMaxWordSize  OBJECT-TYPE
SYNTAX      Unsigned32(0|20..255)
UNITS       "octets"
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION

"A Maximum supported FEC code word size in octets for the
G.Bond/TDIM ports with FEC function.

A value of zero SHALL be returned if the FEC is not supported.

This object partially maps to TR-159/G.998.3 attribute
aFECWordSize"

REFERENCE

"[TR-159] 5.5.4.11; [G.998.3] Appendix II, B-XI"

::= { gBondTdimPortCapabilityEntry 2 }

\begin{verbatim}

\textbf{gBondTdimFecMaxRedundancySize} \textbf{OBJECT-TYPE}

\textbf{SYNTAX} \textbf{Unsigned32(0|2|4|8|16|20)}

\textbf{UNITS} "octets"

\textbf{MAX-ACCESS} read-only

\textbf{STATUS} current

\textbf{DESCRIPTION}

"A Maximum supported FEC redundancy word size in octets for
the G.Bond/TDIM ports with FEC function.

A value of zero SHALL be returned if the FEC is not supported.

This object maps to TR-159 attribute
aFECMaxRedundancySize."

REFERENCE

"[TR-159] 5.5.4.12; [G.998.3] Appendix II, B-XII"

::= { gBondTdimPortCapabilityEntry 3 }

\textbf{gBondTdimFecInterleaverTypeSupported} \textbf{OBJECT-TYPE}

\textbf{SYNTAX} \textbf{INTEGER} {

none(0),

block(1),

convolution(2),

blockConvolution(3)

}

\textbf{MAX-ACCESS} read-only

\textbf{STATUS} current

\textbf{DESCRIPTION}

"Supported Interleaver types for the G.Bond/TDIM ports with
FEC function.

Possible values are:

none - the port does not support interleaving

block - the port supports Block Interleaver

convolution - the port supports Convolution Interleaver

blockConvolution - the port supports both Block and
Convolution Interleaver"
This object partially maps to TR-159 attribute aFECInterleaverTypesSupported.

REFERENCE
"[TR-159] 5.5.4.13; [G.998.3] Appendix II, B-XIII"
::= { gBondTdimPortCapabilityEntry 4 }

gBondTdimFecMaxInterleaverDepth OBJECT-TYPE
SYNTAX Unsigned32(0|1|2|3|4|6|8|12|16|24|32|48|96)
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"A Maximum Interleaver Depth for the G.Bond/TDIM ports with FEC function.

A value of zero SHALL be returned if the Interleaver is not supported.

This object partially maps to TR-159 attribute aFECMaxInterleaverDepth."
REFERENCE
"[TR-159] 5.5.4.14; [G.998.3] Appendix II, B-XIV"
::= { gBondTdimPortCapabilityEntry 5 }

gBondTdimPortStatusTable OBJECT-TYPE
SYNTAX SEQUENCE OF GBondTdimPortStatusEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"This table provides overall status information of G.Bond TDIM ports, complementing the generic status information from the ifTable of IF-MIB and gBondFltStatus of GBOND-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."
::= { gBondTdimPort 3 }

gBondTdimPortStatusEntry OBJECT-TYPE
SYNTAX GBondTdimPortStatusEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"An entry in the G.Bond/TDIM port Status table.
Each entry represents a G.Bond/TDIM port indexed by the ifIndex.
Note that an G.Bond GBS port runs on top of a single
or multiple BCE port(s), which are also indexed by ifIndex.
INDEX { ifIndex }
::= { gBondTdimPortStatusTable 1 }

GBondTdimPortStatusEntry ::= SEQUENCE {
gBondTdimFecOperState            TruthValue,
gBondTdimFltStatus               BITS,
gBondTdimCrc4Errors              Counter32,
gBondTdimCrc6Errors              Counter32,
gBondTdimCrc8Errors              Counter32
}

gBondTdimFecOperState  OBJECT-TYPE
SYNTAX      TruthValue
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
"A read-only value, indicating current operational state of
the OPTIONAL Forward Error Correction (FEC) function for the
G.998.3 port.
A value of ‘false’ indicates that the FEC function is
disabled. A value of ‘true’ indicates that the FEC function
is enabled (and supported).

This object maps to TR-159 attribute aFECOperState."
REFERENCE
"[TR-159] 5.5.4.6"
::= { gBondTdimPortStatusEntry 1 }

gBondTdimFltStatus  OBJECT-TYPE
SYNTAX      BITS {
  serviceDown(0),
  wrongConfig(1)
}
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
"G.Bond/TDIM port Fault Status. This is a bitmap of possible
conditions. The various bit positions are:
serviceDown       - at least one of the services defined
                   for this aggregation group is down
                   (due to low rate).
wrongConfig       - at least one BCE at the remote GBS-R
                   is already connected to another GBS.

This object is intended to supplement ifOperStatus object
in IF-MIB and gBondFltStatus in GBOND-MIB."
gBondTdimCrc4Errors OBJECT-TYPE
SYNTAX      Counter32
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
"The total number of CRC-4 errors (frame header error) on all pairs in the G.Bond/TDIM port. Simultaneous errors on M lines SHOULD be counted M times.

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/G.998.3 attribute aCRC4Errors."
REFERENCE
"[TR-159] 5.5.4.1; [G.998.3] Appendix II, B-VII"
::= { gBondTdimPortStatusEntry 3 }

---

gBondTdimCrc6Errors OBJECT-TYPE
SYNTAX      Counter32
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
"The total number of CRC-6 errors (super-frame error) on all pairs in the G.Bond/TDIM port. Simultaneous errors on M lines SHOULD be counted 1 time.

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/G.998.3 attribute aCRC6Errors."
REFERENCE
"[TR-159] 5.5.4.2; [G.998.3] Appendix II, B-VIII"
::= { gBondTdimPortStatusEntry 4 }

---

gBondTdimCrc8Errors OBJECT-TYPE
SYNTAX      Counter32
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
"The total number of CRC-8 errors (event/message error) on all pairs in the G.Bond/TDIM port. Simultaneous errors on M lines SHOULD be counted M times.

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/G.998.3 attribute aCRC8Errors."

REFERENCE
"[TR-159] 5.5.4.3; [G.998.3] Appendix II, B-IX"
::= { gBondTdimPortStatusEntry 5 }
gBondTdimServiceOperState  INTEGER
}

gBondTdimServicePosition  OBJECT-TYPE
SYNTAX  GBondTdimServiceOrderIndex
MAX-ACCESS  read-only
STATUS  current
DESCRIPTION "G.Bond/TDIM operational Service position - a unique index, indicating relative placement of the associated service pointed by gBondTdimServiceOperIdx, within the G.Bond/TDIM frame. There can be up to 60 services defined over TDIM bonded facility. Services with lower indices have higher priority in case of bandwidth degradation.

The value of gBondTdimServicePosition for the first gBondTdimOperServiceEntry is always 1, incrementing sequentially for each consecutive entry, i.e. 2 for the second entry, 3 for the third etc.

This objects maps to TR-159/G.998.3 attribute aServiceID."
REFERENCE "[TR-159] 5.5.5.1; [G.998.3] Appendix II, C-I"
::= { gBondTdimOperServiceEntry 1 }

gBondTdimServiceOperIdx  OBJECT-TYPE
SYNTAX  GBondTdimServiceIndex
MAX-ACCESS  read-only
STATUS  current
DESCRIPTION "G.Bond/TDIM operational Service index - a read-only pointer to an existing entry in the gBondTdimServiceTable (value of gBondTdimServiceIdx), describing a particular service."
REFERENCE ""
::= { gBondTdimOperServiceEntry 2 }

gBondTdimServiceOperState  OBJECT-TYPE
SYNTAX  INTEGER {
    up(1),
    down(2)
}
MAX-ACCESS  read-only
STATUS  current
DESCRIPTION "G.Bond/TDIM Service Operational State."
Possible values are:

- Service is up passing traffic.
- Service is down, due to a variety of reasons, e.g. G.Bond/TDIM port is down, current link bandwidth is too low to support a particular service, etc.

This object maps to TR-159 attribute aServiceOperState.

REFERENCE

"[TR-159] 5.5.5.5"

::= { gBondTdimOperServiceEntry 3 }

---

gBondTdimServiceTable OBJECT-TYPE
SYNTAX      SEQUENCE OF GBondTdimServiceEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
"Table of possible Services for a G.Bond/TDIM ports. Entries in this table MUST be maintained in a persistent manner"
::= { gBondTdimPort 5 }

gBondTdimServiceEntry OBJECT-TYPE
SYNTAX      GBondTdimServiceEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
"An entry in the G.Bond/TDIM Port Service table, containing the management information applicable to a particular Service, indexed by the gBondTdimServiceIdx, on a G.Bond/TDIM port, indexed by the ifIndex."
INDEX  { ifIndex, gBondTdimServiceIdx }
::= { gBondTdimServiceTable 1 }

GBondTdimServiceEntry ::= SEQUENCE {
  gBondTdimServiceIdx           GBondTdimServiceIndex,
  gBondTdimServiceIfIdx         InterfaceIndex,
  gBondTdimServiceType          INTEGER,
  gBondTdimServiceSize          Unsigned32,
  gBondTdimServiceRowStatus     RowStatus
}

gBondTdimServiceIdx OBJECT-TYPE
SYNTAX      GBondTdimServiceIndex
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
"G.Bond/TDIM Service index - a unique index associated with a particular service entry."
REFERENCE ""
::= { gBondTdimServiceEntry 1 }

gBondTdimServiceIfIdx OBJECT-TYPE
SYNTAX InterfaceIndex
MAX-ACCESS read-write
STATUS current
DESCRIPTION "This is a unique index within the ifTable. It represents the interface index of a service to be transmitted over the G.Bond/TDIM service instance. This object maps to TR-159 attribute aServiceIfIndex."
REFERENCE "[TR-159] 5.5.5.2"
::= { gBondTdimServiceEntry 2 }

gBondTdimServiceType OBJECT-TYPE
SYNTAX INTEGER {
   ds1(0),
   e1(1),
   nxds0(2),
   nxe0(3),
   ds3(4),
   e3(5),
   clock(6),
   ethernet(7),
   atm(8),
   gfpNoFCS(9),
   gfp(10)
}
MAX-ACCESS read-write
STATUS current
DESCRIPTION "G.Bond/TDIM Service Type. Possible values are:
ds1 - Clear Channel DS1 (synchronous)
e1 - Clear Channel E1 (synchronous)
nxds0 - Fractional DS1 (synchronous)
nxe0 - Fractional E1 (synchronous)
ds3 - DS3 (synchronous)
e3 - E3 (synchronous)
clock - Clock transfer (synchronous)"
ethernet - Ethernet (asynchronous)
atm - ATM (asynchronous)
gfpNoFCS - GFP encapsulated without FCS (asynchronous)
gfp - GFP encapsulated with FCS (asynchronous)

For the GBS-R ports, the value of this object cannot be changed directly. This value may be changed as a result of writing operation on the gBondTdimServiceType object of a remote GBS-C.

Attempts to change this object MUST be rejected for the GBS-R ports.

This object MUST be maintained in a persistent manner.

This object maps to TR-159/G.998.3 attribute aServiceType.

REFERENCE

"[TR-159] 5.5.5.3; [G.998.3] Appendix II, C-II"
::= { gBondTdimServiceEntry 3 }

gBondTdimServiceSize OBJECT-TYPE
SYNTAX Unsigned32(0|20..255)
UNITS "octets"
MAX-ACCESS read-write
STATUS current
DESCRIPTION
"Service size in octets per bonding sub-block for a specific service identified by gBondTdimServiceIdx.

For TDM (synchronous) services with variable size e.g. fractional DS1/E1 - this object represents the number of DS0/E0 channels.
For asynchronous services (Ethernet, ATM, GFPnoFCS or GFP) - this object represents max. number of octets.
For non-fractional TDM services, i.e. DS1, E1, DS3, E3 and Clock, the value of this object MUST be 0.

A GET operation returns current value.
A SET operation, allowed on GBS-C ports, changes the service size to the indicated value. If the service type is a fixed rate synchronous service (gBondTdimServiceType is nxds0, nxe0, ds1, e1, ds3, e3 or clock), the operation MUST be rejected.

This object MUST be maintained in a persistent manner.

This object maps to TR-159/G.998.3 attribute aServiceSize.

REFERENCE

"[TR-159] 5.5.5.4; [G.998.3] Appendix II, C-III"
 ::= { gBondTdimServiceEntry 4 }

gBondTdimServiceRowStatus OBJECT-TYPE
SYNTAX RowStatus
MAX-ACCESS read-create
STATUS current
DESCRIPTION
"This object controls the creation, modification, or deletion of the associated entry in the gBondTdimServiceTable per the semantics of RowStatus.

If an ‘active’ entry is referenced via gBondTdimServiceOperIdx or gBondTdimAdminServices instance or indexes a gBondTdimServicePerf*Entry, the entry MUST remain ‘active’.

An ‘active’ entry SHALL NOT be modified. In order to modify an existing entry, it MUST be taken out of service (by setting this object to ‘notInService’), modified, and set ‘active’ again."
 ::= { gBondTdimServiceEntry 5 }

-- Performance Monitoring group
-----------------------------
gBondTdimPM OBJECT IDENTIFIER ::= { gBondTdimPort 6 }

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

gBondTdimPortPerfCurrEntry OBJECT-TYPE
SYNTAX GBondTdimPortPerfCurrEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"An entry in the G.Bond/TDIM Port PM table. Each entry represents an G.Bond/TDIM port indexed by the ifIndex."
INDEX { ifIndex }
gBondTdimPortPerf15MinValidIntervals 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"
 ::= { gBondTdimPortPerfCurrEntry 1 }

gBondTdimPortPerf15MinInvalidIntervals 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"
::= { gBondTdimPortPerfCurrEntry 2 }

gBondTdimPortPerfCurr15MinTimeElapsed OBJECT-TYPE
SYNTAX      HCPerfTimeElapsed
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 history interval.

This object partially maps to the TR-159 attribute
aGroupPerfCurr15MinTimeElapsed."

REFERENCE

"[TR-159] 5.5.1.34"
::= { gBondTdimPortPerfCurrEntry 3 }

gBondTdimPortPerfCurr15MinCrc4s OBJECT-TYPE
SYNTAX      HCPerfCurrentCount
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
"A read-only count of CRC-4 errors (frame header errors) on all
active pairs in the G.Bond/TDIM port during the current
15-minute performance history interval.
Simultaneous errors on M lines SHOULD be counted M times.

Note that the total number of CRC-4 errors is indicated by the
gBondTdimCrc4Errors object.

This object is inhibited during Severely Errored Seconds (SES)
or Unavailable Seconds (UAS)."

REFERENCE

"[TR-159] 5.5.4.1"
::= { gBondTdimPortPerfCurrEntry 4 }

gBondTdimPortPerfCurr15MinCrc6s OBJECT-TYPE
SYNTAX      HCPerfCurrentCount
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
"A read-only count of CRC-6 errors (super-frame errors) on all
active pairs in the G.Bond/TDIM port during the current
15-minute performance history interval.
Simultaneous errors on M lines SHOULD be counted 1 time.

Note that the total number of CRC-6 errors is indicated by the gBondTdimCrc6Errors object.

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

REFERENCE
"[TR-159] 5.5.4.2"
::= { gBondTdimPortPerfCurrEntry 5}

gBondTdimPortPerfCurr15MinCrc8s OBJECT-TYPE
SYNTAX HCPerfCurrentCount
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"A read-only count of CRC-8 errors (event/message errors) on all active pairs in the G.Bond/TDIM port during the current 15-minute performance history interval.
Simultaneous errors on M lines SHOULD be counted M times.

Note that the total number of CRC-8 errors is indicated by the gBondTdimCrc8Errors object.

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

REFERENCE
"[TR-159] 5.5.4.3"
::= { gBondTdimPortPerfCurrEntry 6}

gBondTdimPortPerf1DayValidIntervals OBJECT-TYPE
SYNTAX Unsigned32 (0..7)
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"
::= { gBondTdimPortPerfCurrEntry 7 }
SYNTAX      Unsigned32 (0..7)
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"
 ::= { gBondTdimPortPerfCurrEntry 8 }


gBondTdimPortPerfCurr1DayTimeElapsed OBJECT-TYPE
SYNTAX      HCPerfTimeElapsed
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 history interval."
REFERENCE
 "[TR-159] 5.5.1.47"
 ::= { gBondTdimPortPerfCurrEntry 9 }


gBondTdimPortPerfCurr1DayCrc4s OBJECT-TYPE
SYNTAX      HCPerfCurrentCount
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
 "A read-only count of CRC-4 errors on the G.Bond/TDIM port in
 the current 1-day performance history interval.

 This object is inhibited during Severely Errored Seconds (SES)
 and Unavailable Seconds (UAS)."
REFERENCE
 """
 ::= { gBondTdimPortPerfCurrEntry 10 }


gBondTdimPortPerfCurr1DayCrc6s OBJECT-TYPE
SYNTAX      HCPerfCurrentCount
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
 "A read-only count of CRC-6 errors on the G.Bond/TDIM port in
 the current 1-day performance history interval.

 This object is inhibited during Unavailable Seconds (UAS)."
REFERENCE
 """
 ::= { gBondTdimPortPerfCurrEntry 11 }
gBondTdimPortPerfCurr1DayCrc8s OBJECT-TYPE
SYNTAX     HCPerfCurrentCount
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
 "A read-only count of CRC-8 on the G.Bond/TDIM port in 
the current 1-day performance history interval.

This object is inhibited during Unavailable Seconds (UAS)."
REFERENCE
""
 ::= ( gBondTdimPortPerfCurrEntry 12 )

-- Port PM history: 15-min buckets

gBondTdimPortPerf15MinTable OBJECT-TYPE
SYNTAX      SEQUENCE OF GBondTdimPortPerf15MinEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
 "This table contains historical 15-minute buckets of Performance 
Monitoring information for a G.Bond/TDIM port (a row for each 
15-minute interval, up to 96 intervals).
Entries in this table MUST be maintained in a persistent manner."
 ::= ( gBondTdimPM 2 )

GBondTdimPortPerf15MinEntry OBJECT-TYPE
SYNTAX      GBondTdimPortPerf15MinEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
 "An entry in the G.Bond/TDIM Port historical 15-minute PM table. 
Each entry represents performance monitoring data for a G.Bond 
TDIM port, indexed by ifIndex, collected during a particular 
15-minute interval, indexed by 
gBondTdimPortPerf15MinIntervalIndex."
INDEX  { ifIndex, gBondTdimPortPerf15MinIntervalIndex } 
 ::= ( gBondTdimPortPerf15MinTable 1 )

GBondTdimPortPerf15MinEntry ::= 
SEQUENCE { 
gBondTdimPortPerf15MinIntervalIndex Unsigned32, 
gBondTdimPortPerf15MinIntervalMoniTime HCPerfTimeElapsed, 
gBondTdimPortPerf15MinIntervalCrc4s HCPerfIntervalCount, 
gBondTdimPortPerf15MinIntervalCrc6s HCPerfIntervalCount, 
gBondTdimPortPerf15MinIntervalCrc8s HCPerfIntervalCount, 
gBondTdimPortPerf15MinIntervalValid TruthValue 
}
gBondTdimPortPerf15MinIntervalIndex 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"
 ::= { gBondTdimPortPerf15MinEntry 1 }


gBondTdimPortPerf15MinIntervalMoniTime OBJECT-TYPE
SYNTAX   HCPerfTimeElapsed
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." 
 ::= { gBondTdimPortPerf15MinEntry 2 }


gBondTdimPortPerf15MinIntervalCrc4s OBJECT-TYPE
SYNTAX   HCPerfIntervalCount
MAX-ACCESS read-only
STATUS    current
DESCRIPTION
 "A read-only count of CRC-4 errors on the G.Bond/TDIM port
 during the 15-minute performance history interval.

 This object is inhibited during Severely Errored Seconds (SES)
 and Unavailable Seconds (UAS)."
REFERENCE
 ""
 ::= { gBondTdimPortPerf15MinEntry 3 }


gBondTdimPortPerf15MinIntervalCrc6s OBJECT-TYPE
SYNTAX   HCPerfIntervalCount
MAX-ACCESS read-only
STATUS    current
DESCRIPTION
 "A read-only count of CRC-6 errors on the G.Bond/TDIM port
 during the 15-minute performance history interval."
This object is inhibited during Unavailable Seconds (UAS)."
REFERENCE
"
::= { gBondTdimPortPerf15MinEntry 4 }

---

## gBondTdimPortPerf15MinIntervalCrc8s

**OBJECT-TYPE**

**SYNTAX**  
HCPerfIntervalCount

**MAX-ACCESS**  
read-only

**STATUS**  
current

**DESCRIPTION**

"A read-only count of CRC-8 errors on the G.Bond/TDIM port during the current 15-minute performance history interval.

This object is inhibited during Unavailable Seconds (UAS)."
REFERENCE
"
::= { gBondTdimPortPerf15MinEntry 5 }

---

## gBondTdimPortPerf15MinIntervalValid

**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-C 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"
 ::= ( gBondTdimPortPerf15MinEntry 6 )

---

## Port PM history: 1-day buckets

**OBJECT-TYPE**

**SYNTAX**  
SEQUENCE OF GBondTdimPortPerf1DayEntry

**MAX-ACCESS**  
not-accessible

**STATUS**  
current

**DESCRIPTION**

"This table contains historical 1-day buckets of Performance
Monitoring information for a G.Bond/TDIM port (a row for each 1-day interval, up to 7 intervals). Entries in this table MUST be maintained in a persistent manner.

::= { gBondTdimPM 3 }

gBondTdimPortPerf1DayEntry OBJECT-TYPE
SYNTAX        GBondTdimPortPerf1DayEntry
MAX-ACCESS    not-accessible
STATUS        current
DESCRIPTION
"An entry in the G.Bond/TDIM 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 gBondTdimPortPerf1DayIntervalIndex."
INDEX  { ifIndex, gBondTdimPortPerf1DayIntervalIndex }
::= { gBondTdimPortPerf1DayTable 1 }

GBondTdimPortPerf1DayEntry ::= SEQUENCE {
    gBondTdimPortPerf1DayIntervalIndex       Unsigned32,
    gBondTdimPortPerf1DayIntervalMoniTime    HCPerfTimeElapsed,
    gBondTdimPortPerf1DayIntervalCrc4s       HCPerfIntervalCount,
    gBondTdimPortPerf1DayIntervalCrc6s       HCPerfIntervalCount,
    gBondTdimPortPerf1DayIntervalCrc8s       HCPerfIntervalCount,
    gBondTdimPortPerf1DayIntervalValid       TruthValue
}

gBondTdimPortPerf1DayIntervalIndex  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 24 hours ago. Intervals 2..7 are OPTIONAL."

This object partially maps to the TR-159 attribute aGroupPerf1DayIntervalNumber."
REFERENCE
"[TR-159] 5.5.1.62"
::= { gBondTdimPortPerf1DayEntry 1 }

gBondTdimPortPerf1DayIntervalMoniTime  OBJECT-TYPE
SYNTAX        HCPerfTimeElapsed
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"
::= { gBondTdimPortPerf1DayEntry 2 }

gBondTdimPortPerf1DayIntervalCrc4s OBJECT-TYPE
SYNTAX HCPerfIntervalCount
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"A read-only count of CRC-4 errors on the G.Bond/TDIM port during the 1-day performance history interval.

This object is inhibited during Severely Errored Seconds (SES) and Unavailable Seconds (UAS)."
REFERENCE
"
::= { gBondTdimPortPerf1DayEntry 3 }

gBondTdimPortPerf1DayIntervalCrc6s OBJECT-TYPE
SYNTAX HCPerfIntervalCount
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"A read-only count of CRC-6 errors on the G.Bond/TDIM port during the 1-day performance history interval.

This object is inhibited during Unavailable Seconds (UAS)."
REFERENCE
"
::= { gBondTdimPortPerf1DayEntry 4 }

gBondTdimPortPerf1DayIntervalCrc8s OBJECT-TYPE
SYNTAX HCPerfIntervalCount
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"A read-only count of CRC-8 errors on the G.Bond/TDIM port during the current 1-day performance history interval.

This object is inhibited during Unavailable Seconds (UAS)."
REFERENCE
"
gBondTdimPortPerf1DayIntervalValid 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-C 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"
 ::= { gBondTdimPortPerf1DayEntry 5 }

-- Services PM

gBondTdimServicePerfCurrTable OBJECT-TYPE
SYNTAX SEQUENCE OF GBondTdimServicePerfCurrEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"This table contains current Performance Monitoring information for the services of a G.Bond/TDIM port.
This table contains live data from the equipment and as such is NOT persistent."
 ::= { gBondTdimPM 4 }

gBondTdimServicePerfCurrEntry OBJECT-TYPE
SYNTAX GBondTdimServicePerfCurrEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"An entry in the G.Bond/TDIM Services PM table.
Each entry represents a service, indexed by the gBondTdimServiceIdx, in a G.Bond/TDIM port, indexed by the ifIndex."
INDEX { ifIndex, gBondTdimServiceIdx }
 ::= { gBondTdimServicePerfCurrTable 1 }
GBondTdimServicePerfCurrEntry ::= 
SEQUENCE { 
    gBondTdimServicePerf15MinValidIntervals   HCPerfValidIntervals, 
    gBondTdimServicePerf15MinInvalidIntervals HCPerfInvalidIntervals, 
    gBondTdimServicePerfCurr15MinTimeElapsed  HCPerfTimeElapsed, 
    gBondTdimServicePerfCurr15MinDowns        HCPerfCurrentCount, 
    gBondTdimServicePerf1DayValidIntervals    Unsigned32, 
    gBondTdimServicePerf1DayInvalidIntervals  Unsigned32, 
    gBondTdimServicePerfCurr1DayTimeElapsed   HCPerfTimeElapsed, 
    gBondTdimServicePerfCurr1DayDowns         HCPerfCurrentCount 
} 

&gbondtdimserviceperfcurrentry.1.1.32 = BEGIN 
    gBondTdimServicePerf15MinValidIntervals 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"
END

&gbondtdimserviceperfcurrentry.1.1.33 = BEGIN 
    gBondTdimServicePerf15MinInvalidIntervals 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"
END

::= { gBondTdimServicePerfCurrEntry 2 }

gBondTdimServicePerfCurr15MinTimeElapsed OBJECT-TYPE
SYNTAX      HCPerfTimeElapsed
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 history interval.
This object partially maps to the TR-159 attribute
aGroupPerfCurr15MinTimeElapsed."
REFERENCE
"[TR-159] 5.5.1.34"
::= { gBondTdimServicePerfCurrEntry 3 }

gBondTdimServicePerfCurr15MinDowns OBJECT-TYPE
SYNTAX      HCPerfCurrentCount
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
"A read-only count of seconds in the current 15-minute
performance history interval, during which a particular TDIM
Service was 'down', as indicated by the
gBondTdimServiceOperState object.
This object is inhibited during Unavailable Seconds (UAS)."
REFERENCE
"
::= { gBondTdimServicePerfCurrEntry 4 }

gBondTdimServicePerf1DayValidIntervals OBJECT-TYPE
SYNTAX      Unsigned32 (0..7)
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
"A read-only number of 1-day performance history intervals for
which the 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"
::= { gBondTdimServicePerfCurrEntry 5 }
gBondTdimServicePerf1DayInvalidIntervals OBJECT-TYPE
SYNTAX      Unsigned32 (0..7)
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
  "A read-only number of 1-day performance history 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."
REFERENCE
  "[TR-159] 5.5.1.46"
::= { gBondTdimServicePerfCurrEntry 6 }

gBondTdimServicePerfCurr1DayTimeElapsed OBJECT-TYPE
SYNTAX      HCPerfTimeElapsed
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 history interval."
REFERENCE
  "[TR-159] 5.5.1.47"
::= { gBondTdimServicePerfCurrEntry 7 }

gBondTdimServicePerfCurr1DayDowns OBJECT-TYPE
SYNTAX      HCPerfCurrentCount
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
  "A read-only count of seconds in the current 1-day performance history interval, during which a particular TDIM Service was 'down', as indicated by the gBondTdimServiceOperState object. This object is inhibited during Unavailable Seconds (UAS)."
REFERENCE
  ""
::= { gBondTdimServicePerfCurrEntry 8 }

-- Service PM history: 15-min buckets

gBondTdimServicePerf15MinTable OBJECT-TYPE
SYNTAX      SEQUENCE OF GBondTdimServicePerf15MinEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
  "This table contains historical 15-minute buckets of Performance Monitoring information for the Services of a G.Bond/TDIM port (a multi-dimensional row for each 15-minute interval, up to 96
Entries in this table MUST be maintained in a persistent manner.

```plaintext
::= { gBondTdimPM 5 }
```

**gBondTdimServicePerf15MinEntry**

**OBJECT-TYPE**

**SYNTAX**  GBondTdimServicePerf15MinEntry

**MAX-ACCESS**  not-accessible

**STATUS**  current

**DESCRIPTION**

"An entry in the G.Bond/TDIM Services historical 15-minute PM table.

Each entry represents performance monitoring data for a particular Service, indexed by `gBondTdimServiceIdx`, in a G.Bond TDIM port, indexed by `ifIndex`, collected during a particular 15-minute interval, indexed by `gBondTdimServicePerf15MinIntervalIndex`.

INDEX  { ifIndex, gBondTdimServiceIdx, gBondTdimServicePerf15MinIntervalIndex }

```plaintext
::= { gBondTdimServicePerf15MinTable 1 }
```

**GBondTdimServicePerf15MinEntry**

```plaintext
 ::==
SEQUENCE {
  gBondTdimServicePerf15MinIntervalIndex      Unsigned32,
  gBondTdimServicePerf15MinIntervalMoniTime   HCPerfTimeElapsed,
  gBondTdimServicePerf15MinIntervalDowns      HCPerfIntervalCount,
  gBondTdimServicePerf15MinIntervalValid      TruthValue
}
```

**gBondTdimServicePerf15MinIntervalIndex**

**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"

```plaintext
::= { gBondTdimServicePerf15MinEntry 1 }
```

**gBondTdimServicePerf15MinIntervalMoniTime**

**OBJECT-TYPE**

**SYNTAX**  HCPerfTimeElapsed

**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."
::= { gBondTdimServicePerf15MinEntry 2 }

gBondTdimServicePerf15MinIntervalDowns OBJECT-TYPE
SYNTAX      HCPerfIntervalCount
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
"A read-only count of seconds in the 15-minute performance
history interval, during which a particular TDIM Service was
‘down’, as indicated by the gBondTdimServiceOperState object.
This object is inhibited during Unavailable Seconds (UAS)."
REFERENCE
""
::= { gBondTdimServicePerf15MinEntry 3 }

gBondTdimServicePerf15MinIntervalValid 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-C 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"
::= { gBondTdimServicePerf15MinEntry 4 }

-- Service PM history: 1-day buckets

gBondTdimServicePerf1DayTable OBJECT-TYPE
SYNTAX      SEQUENCE OF GBondTdimServicePerf1DayEntry
MAX-ACCESS  not-accessible
STATUS current
DESCRIPTION
"This table contains historical 1-day buckets of Performance Monitoring information for the Services of a G.Bond/TDIM port (a multi-dimensional row for each 1-day interval, up to 7 intervals).
Entries in this table MUST be maintained in a persistent manner."
::= { gBondTdimPM 6 }

gBondTdimServicePerf1DayEntry OBJECT-TYPE
SYNTAX GBondTdimServicePerf1DayEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"An entry in the G.Bond/TDIM Service historical 1-day PM table. Each entry represents performance monitoring data for a particular Service, indexed by gBondTdimServiceIdx, defined in a G.Bond/TDIM port, indexed by ifIndex, collected during a particular 1-day interval, indexed by gBondTdimServicePerf1DayIntervalIndex."
INDEX { ifIndex, gBondTdimServiceIdx, gBondTdimServicePerf1DayIntervalIndex }
::= { gBondTdimServicePerf1DayTable 1 }

GBondTdimServicePerf1DayEntry ::= SEQUENCE {
gBondTdimServicePerf1DayIntervalIndex       Unsigned32,
gBondTdimServicePerf1DayIntervalMoniTime    HCPerfTimeElapsed,
gBondTdimServicePerf1DayIntervalDowns       HCPerfIntervalCount,
gBondTdimServicePerf1DayIntervalValid       TruthValue
}

gBondTdimServicePerf1DayIntervalIndex 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 24 hours ago. Intervals 2..7 are OPTIONAL.

This object partially maps to the TR-159 attribute aGroupPerf1DayIntervalNumber."
REFERENCE
"[TR-159] 5.5.1.62"
::= { gBondTdimServicePerf1DayEntry 1 }

gBondTdimServicePerf1DayIntervalMoniTime OBJECT-TYPE
SYNTAX      HCPercTimeElapsed
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"
::= { gBondTdimServicePerf1DayEntry 2 }

gBondTdimServicePerf1DayIntervalDowns  OBJECT-TYPE
SYNTAX      HCPercIntervalCount
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
  "A read-only count of seconds in the 1-day performance history
  interval, during which a particular TDIM Service was 'down',
  as indicated by the gBondTdimServiceOperState object.

  This object is inhibited during Unavailable Seconds (UAS)."
REFERENCE
  ""
::= { gBondTdimServicePerf1DayEntry 3 }

gBondTdimServicePerf1DayIntervalValid  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-C 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"
::= { gBondTdimServicePerf1DayEntry 4 }

--
-- Conformance Statements
--

gBondTdimGroups OBJECT IDENTIFIER
::= { gBondTdimConformance 1 }

gBondTdimCompliances OBJECT IDENTIFIER
::= { gBondTdimConformance 2 }

-- Object Groups

gBondTdimBasicGroup OBJECT-GROUP
OBJECTS {
  gBondTdimAdminServices,
gBondTdimCrc4Errors,
gBondTdimCrc6Errors,
gBondTdimCrc8Errors,
gBondTdimFecSupported,
gBondTdimServicePosition,
gBondTdimServiceOperIdx,
gBondTdimServiceOperState,
gBondTdimServiceIfIdx,
gBondTdimServiceType,
gBondTdimServiceSize,
gBondTdimServiceRowStatus,
gBondTdimFltStatus
}
STATUS current
DESCRIPTION
  "A collection of objects representing management information
  for G.Bond/ TDIM ports."
::= { gBondTdimGroups 1 }

gBondTdimFecGroup OBJECT-GROUP
OBJECTS {
  gBondTdimFecSupported,
gBondTdimFecAdminState,
gBondTdimFecOperState,
gBondTdimFecWordSize,
gBondTdimFecRedundancySize,
gBondTdimFecInterleaverType,
gBondTdimFecInterleaverDepth,
gBondTdimFecMaxWordSize,
gBondTdimFecMaxRedundancySize,
gBondTdimFecInterleaverTypeSupported,
gBondTdimFecMaxInterleaverDepth
}

STATUS current

DESCRIPTION

"A collection of objects supporting OPTIONAL Forward Error
Correction (FEC) and Interleaver function in G.Bond/TDIM
ports."

 ::= { gBondTdimGroups 2 }

gBondTdimAlarmConfGroup OBJECT-GROUP

OBJECTS {
  gBondTdimServiceUpDownEnable
}

STATUS current

DESCRIPTION

"A collection of objects required for configuration of alarm
thresholds and notifications in G.Bond/TDIM ports."

 ::= { gBondTdimGroups 3 }

gBondTdimNotificationGroup NOTIFICATION-GROUP

NOTIFICATIONS {
  gBondTdimServiceUp,
  gBondTdimServiceDown
}

STATUS current

DESCRIPTION

"This group supports notifications of significant conditions
associated with G.Bond/TDIM ports."

 ::= { gBondTdimGroups 4 }

gBondTdimPerfCurrGroup OBJECT-GROUP

OBJECTS {
  gBondTdimPortPerf15MinValidIntervals,
  gBondTdimPortPerf15MinInvalidIntervals,
  gBondTdimPortPerfCurr15MinTimeElapsed,
  gBondTdimPortPerfCurr15MinCrc4s,
  gBondTdimPortPerfCurr15MinCrc6s,
  gBondTdimPortPerfCurr15MinCrc8s,
  gBondTdimPortPerf1DayValidIntervals,
  gBondTdimPortPerf1DayInvalidIntervals,
  gBondTdimPortPerfCurr1DayTimeElapsed,
  gBondTdimPortPerfCurr1DayCrc4s,
  gBondTdimPortPerfCurr1DayCrc6s,
  gBondTdimPortPerfCurr1DayCrc8s,
  gBondTdimServicePerf15MinValidIntervals,
  gBondTdimServicePerf15MinInvalidIntervals,
gBondTdimServicePerfCurr15MinTimeElapsed,
gBondTdimServicePerfCurr15MinDowns,
gBondTdimServicePerf1DayValidIntervals,
gBondTdimServicePerf1DayInvalidIntervals,
gBondTdimServicePerfCurr1DayTimeElapsed,
gBondTdimServicePerfCurr1DayDowns

\}\n
STATUS current
DESCRIPTION
"A collection of objects supporting OPTIONAL current Performance Monitoring information for G.Bond/TDIM ports."
::= { gBondTdimGroups 5 }

gBondTdimPerf15MinGroup OBJECT-GROUP
OBJECTS {
  gBondTdimPortPerf15MinIntervalMoniTime,
gBondTdimPortPerf15MinIntervalCrc4s,
gBondTdimPortPerf15MinIntervalCrc6s,
gBondTdimPortPerf15MinIntervalCrc8s,
gBondTdimPortPerf15MinIntervalValid,
gBondTdimServicePerf15MinIntervalMoniTime,
gBondTdimServicePerf15MinIntervalDowns,
gBondTdimServicePerf15MinIntervalValid

}\n
STATUS current
DESCRIPTION
"A collection of objects supporting OPTIONAL historical Performance Monitoring information for G.Bond/TDIM ports, during previous 15-minute intervals ."
::= { gBondTdimGroups 6 }

gBondTdimPerf1DayGroup OBJECT-GROUP
OBJECTS {
  gBondTdimPortPerf1DayIntervalMoniTime,
  gBondTdimPortPerf1DayIntervalCrc4s,
  gBondTdimPortPerf1DayIntervalCrc6s,
  gBondTdimPortPerf1DayIntervalCrc8s,
  gBondTdimPortPerf1DayIntervalValid,
  gBondTdimServicePerf1DayIntervalMoniTime,
  gBondTdimServicePerf1DayIntervalDowns,
  gBondTdimServicePerf1DayIntervalValid

}\n
STATUS current
DESCRIPTION
"A collection of objects supporting OPTIONAL historical Performance Monitoring information for G.Bond/TDIM ports, during previous 1-day intervals ."
::= { gBondTdimGroups 7 }
-- Compliance Statements

gBondTdimCompliance MODULE-COMPLIANCE
  STATUS      current
  DESCRIPTION
    "The compliance statement for G.Bond/TDIM 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 {
  gBondTdimBasicGroup,
  gBondTdimAlarmConfGroup,
  gBondTdimNotificationGroup
}

GROUP       gBondTdimFecGroup
  DESCRIPTION
    "Support for this group is only required for implementations
    supporting G.Bond FEC and Interleaver function."

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

GROUP       gBondTdimPerf15MinGroup
  DESCRIPTION
    "Support for this group is only required for implementations
    supporting historical Performance Monitoring."

GROUP       gBondTdimPerf1DayGroup
  DESCRIPTION
    "Support for this group is only required for implementations
    supporting historical Performance Monitoring."

::= { gBondTdimCompliances 1 }
END
7. Security Considerations

There is a number of managed objects defined in the GBOND-TDIM-MIB module that have a MAX-ACCESS clause of read-write or read-create. Most objects are writeable only when the link is down. Writing to these objects can have potentially disruptive effects on network operation, for example:

- Changing of gBondTdimAdminServices object MAY lead to a potential service disruption, by changing a particular service’ position (therefore changing its drop priority) or even removing the service from the link altogether.

- Changing of gBondTdimServiceTable configuration parameters (e.g. gBondTdimServiceType or gBondTdimServiceSize) MAY lead to a potential service impairment, for example a TDM service would be dropped if there is not enough actual bandwidth on the bonded link to support this service.

- Changing of gBondTdimPortConfTable configuration parameters (e.g. gBondTdimFecAdminState) MAY lead to anything from link quality and rate degradation to a complete link initialization failure.

The user of the GBOND-TDIM-MIB module must therefore be aware that support for SET operations in a non-secure environment without proper protection can have a negative effect on network operations.

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

In such environments it is important to control also GET and NOTIFY access to these objects and possibly even to encrypt their values when sending them over the network via SNMP.

SNMP versions prior to SNMPv3 did not include adequate security. Even if the network itself is secure (for example by using IPSec), even then, 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.

It is RECOMMENDED that implementers consider the security features as provided by the SNMPv3 framework (see [RFC3410], section 8), including full support for the SNMPv3 cryptographic mechanisms (for authentication and privacy).
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 gBondTdimMIB 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

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

10. References

10.1. Normative References


[RFC2580] McCloghrie, K., Perkins, D., and J.


10.2. Informative References


URIs


Author’s Address

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

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