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Definitions of Managed Objects for IEEE 802.3 Medium Attachment Units (MAUs)

Status of This Memo

This document specifies an Internet standards track protocol for the Internet community, and requests discussion and suggestions for improvements. Please refer to the current edition of the "Internet Official Protocol Standards" (STD 1) for the standardization state and status of this protocol. Distribution of this memo is unlimited.

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Abstract

This document defines a portion of the Management Information Base (MIB) for use with network management protocols in the Internet community. In particular, it defines objects for managing IEEE 802.3 Medium Attachment Units (MAUs). This document obsoletes RFC 3636. It amends that specification by moving MAU type OBJECT-IDENTITY definitions and relevant textual conventions into a separate Internet Assigned Number Authority (IANA) maintained MIB module. In addition, management information is added to enable support for Ethernet in the First Mile (EFM) and 10GBASE-CX4 MAUs.

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1. Introduction

This document defines a portion of the Management Information Base (MIB) for use with network management protocols in the Internet community. In particular, it defines objects for managing IEEE 802.3 [IEEE802.3] Medium Attachment Units (MAUs).

The previous version of this document, RFC 3636 [RFC3636], defined a single MIB module. This document splits the original MIB module into two, putting frequently updated object identities and textual conventions into a separate, IANA-maintained MIB module, in order to decrease the need of updating the basic MAU MIB module.

The first version of the IANA-maintained MIB module also extends the list of managed objects to support Ethernet in the First Mile (EFM) and 10GBASE-CX4 interfaces.

Ethernet technology, as defined by the 802.3 Working Group of the IEEE, continues to evolve, with scalable increases in speed, new types of cabling and interfaces, and new features. This evolution may require changes in the managed objects in order to reflect this new functionality. This document, as with other documents issued by this working group, reflects a certain stage in the evolution of Ethernet technology. In the future, this document might be revised, or new documents might be issued by the Ethernet Interfaces and Hub MIB Working Group, in order to reflect the evolution of Ethernet technology.

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. Overview

Instances of these object types represent attributes of an IEEE 802.3 MAU. Several types of MAUs are defined in the IEEE 802.3 CSMA/CD standard [IEEE802.3]. These MAUs may be connected to IEEE 802.3 repeaters or to 802.3 (Ethernet-like) interfaces. For convenience, this document refers to these devices as "repeater MAUs" and "interface MAUs."

The definitions presented here are based on Section 30.5, "Layer Management for 10 Mb/s, 100 Mb/s, 1000 Mb/s, and 10 Gb/s Medium Attachment Units (MAUs)", Section 30.6, "Management for link Auto-Negotiation", and Annex 30A, "GDMO Specifications for 802.3 managed object classes" of IEEE Std. 802.3-2005 [IEEE802.3]. This specification is intended to provide for management of all types of Ethernet/802.3 MAUs.

3.1. Relationship to RFC 3636

The management definitions provided in this document are intended to be a superset of those defined by RFC 3636 [RFC3636].

In order to decrease the need of updating the basic MAU MIB module due to the new MAU type, Media Available state, Auto Negotiation capability and/or Jack type introduction, all relevant object identities and textual conventions have been moved to a separate, IANA-maintained MIB module IANA-MAU-MIB, the first version of which is defined in this document. Thus when a new MAU type, Media Available state, Auto Negotiation capability, and/or Jack type is defined by the IEEE 802.3 working group, only the IANA-maintained module needs to be revised, leaving the basic MAU-MIB module defined in this document unchanged.

In addition, the new definitions are added to the IANA-maintained MIB module, to support Ethernet in the First Mile (EFM) and 10GBASE-CX4 interfaces, defined in IEEE Std 802.3ah-2004 [IEEE802.3ah] and IEEE Std 802.3ak-2004 [IEEE802.3ak] respectively, now part of IEEE Std 802.3-2005 [IEEE802.3].

It should be noted that the changes made in this revision will not be entirely backward-compatible with MIB modules that currently import MAU type object identity descriptors from the MAU-MIB; such modules will need to be revised to import those DESCRIPTORS from the IANA-MAU-MIB. Similarly, any management applications that process the object identity definitions (e.g., to present the DESCRIPTION text to a user) will need to get those definitions from the IANA-MAU-MIB instead of the MAU-MIB. While it is true that changes that require such adjustments are not strictly compliant with the SMIv2 rules

governing MIB module revisions (see [RFC2578] Section 10), in this case continued high maintenance costs that would result from not making these changes make the deviation from the rules justified. It should be noted that the working group was not able to find any examples of MIB modules or management applications that would actually be negatively affected by the changes.

3.2. Relationship to Other MIBs

It is assumed that an agent implementing MAU-MIB will also implement (at least) the 'system' group defined in the SNMPv2 MIB [RFC3418]. The following sections identify other MIBs that such an agent should implement.

3.2.1. Relationship to the Interfaces MIB

The sections of this document that define interface MAU-related objects specify an extension to the Interfaces MIB [RFC2863]. An agent implementing these interface-MAU related objects MUST also implement the relevant groups of the ifCompliance3 MODULE-COMPLIANCE statement of the Interface MIB. The value of the object ifMauIfIndex is the same as the value of 'ifIndex' used to instantiate the interface to which the given MAU is connected.

It is REQUIRED that an agent implementing the interface-MAU related objects in the MAU-MIB will also fully comply with the dot3Compliance2 MODULE-COMPLIANCE statement of the Ethernet-like Interfaces MIB, [RFC3635]. Furthermore, when the interface-MAU related objects are used to manage a 10GBASE-W PHY -- i.e., when ifMauType is equal to dot3MauType10GigBaseW or any other 10GBASE-W variant -- then the agent MUST also support the Ethernet WAN Interface Sublayer (WIS) MIB [RFC3637] and must follow the interface layering model specified therein. In that case the value of the object ifMauIfIndex is the same as the value of 'ifIndex' for the layer at the top of the stack, i.e., for the ifTable entry that has 'ifType' equal to ethernetCsmacd(6). If the interface-MAU related objects are used to manage a PHY that allows the MAU type to be changed dynamically, then the agent SHALL create ifTable, ifStackTable, and ifInvStackTable entries that pertain to the WIS when ifMauDefaultType is changed to a 10GBASEW variant (i.e., one of dot3MauType10GigBaseW, dot3MauType10GigBaseEW, dot3MauType10GigBaseLW, or dot3MauType10GigBaseSW) from any other type, and shall destroy the WIS-related entries when ifMauDefaultType is changed to a non- 10GBASE-W type. The agent SHALL also change the values of 'ifConnectorPresent' and 'ifHighSpeed' in the ifTable entry indexed by ifMauIfIndex as specified in [RFC3635] and [RFC3637] when ifMauDefaultType is manipulated in this way, but SHALL NOT otherwise alter that entry.

(Note that repeater ports are not represented as interfaces in the Interface MIB.)

3.2.2. Relationship to the 802.3 Repeater MIB Module

The section of this document that defines repeater MAU-related objects specifies an extension to the 802.3 Repeater MIB defined in [RFC2108]. An agent implementing these repeater-MAU related objects MUST also comply with the snmpRptrModCompl compliance statement of the 802.3 Repeater MIB module.

The values of 'rpMauGroupIndex' and 'rpMauPortIndex' used to instantiate a repeater MAU variable SHALL be the same as the values of 'rptrPortGroupIndex' and 'rptrPortIndex' used to instantiate the port that the given MAU is connected to.

3.3. Management of Internal MAUs

In some situations, a MAU can be "internal" -- i.e., its functionality is implemented entirely within a device. For example, a managed repeater may contain an internal repeater-MAU and/or an internal interface-MAU through which management communications originating on one of the repeater's external ports pass, in order to reach the management agent associated with the repeater. Such internal MAUs may or may not be managed. If they are managed, objects describing their attributes should appear in the appropriate MIB subtree: dot3RpMauBasicGroup for internal repeater-MAUs and dot3IfMauBasicGroup for internal interface-MAUs.

3.4. Mapping of IEEE 802.3 Managed Objects

This section contains the mapping between relevant managed objects (attributes) defined in [IEEE802.3] Clause 30, and managed objects defined in this document.

IEEE 802.3 Managed Object	Corresponding SNMP Object
oMAU	
.aMAUID	rpMauIndex or ifMauIndex or broadMauIndex
.aMAUType	rpMauType or ifMauType
.aMAUTypeList	ifMauTypeListBits
.aMediaAvailable	rpMauMediaAvailable or ifMauMediaAvailable
.aLoseMediaCounter	rpMauMediaAvailableStateExits or ifMauMediaAvailableStateExits
.aJabber	rpMauJabberState and rpMauJabberingStateEnters or ifMauJabberState and ifMauJabberingStateEnters
.aMAUAdminState	rpMauStatus or ifMauStatus
.aBbMAUXmitRcvSplitType	broadMauXmtRcvSplitType
.aBroadbandFrequencies	broadMauXmtCarrierFreq and broadMauTranslationFreq
.aFalseCarriers	rpMauFalseCarriers or ifMauFalseCarriers
.acResetMAU	rpMauStatus or ifMauStatus
.acMAUAdminControl	rpMauStatus or ifMauStatus
.nJabber	rpMauJabberTrap or ifMauJabberTrap
oAutoNegotiation	
.aAutoNegID	ifMauIndex
.aAutoNegAdminState	ifMauAutoNegAdminStatus
.aAutoNegRemoteSignalling	ifMauAutoNegRemoteSignalling

.aAutoNegAutoConfig	ifMauAutoNegConfig
.aAutoNegLocalTechnologyAbility	ifMauAutoNegCapabilityBits
.aAutoNegAdvertisedTechnologyAbility	ifMauAutoNegAdvertisedBits and ifMauAutoNegRemoteFaultAdvertised
.aAutoNegReceivedTechnologyAbility	ifMauAutoNegReceivedBits and ifMauAutoNegRemoteFaultReceived
.acAutoNegRestartAutoConfig	ifMauAutoNegRestart
.acAutoNegAdminControl	ifMauAutoNegAdminStatus

Table 1: Mapping of IEEE 802.3 Managed Objects

The following IEEE 802.3 managed objects have not been included in the MAU-MIB for the following reasons.

IEEE 802.3 Managed Object	Reason for exclusion
oMAU	
.aIdleErrorCount	Only useful for 100BaseT2, which is not widely implemented.
oAutoNegotiation	
.aAutoNegLocalSelectorAbility	Only needed for support of isoethernet (802.9a), which is not supported by MAU-MIB.
.aAutoNegAdvertisedSelectorAbility	
.aAutoNegReceivedSelectorAbility	

Table 2: Unmapped IEEE 802.3 Managed Objects

3.5. Addition of New MAU Types

3.5.1. dot3MauType OBJECT-IDENTITIES

The dot3MauType OBJECT IDENTIFIER and its OBJECT-IDENTITY definitions has been moved from the MAU-MIB into the IANA-maintained IANA-MAU-MIB, the first version of which is defined in this document.

When a new IEEE 802.3 MAU is defined, IANA can re-issue a version of IANA-MAU-MIB with the new dot3MauType OBJECT-IDENTITY and its matching IANAifMauTypeListBits textual convention value and, possibly, with new IANAifMauMediaAvailable, IANAifMauAutoNegCapBits, and/or IANAifJackType values.

An Expert Review, as defined in RFC 2434 [RFC2434], is REQUIRED for the addition of the new MAU, Media Available states, Auto Negotiation capabilities, and/or Jack types.

In some cases, new MAU types may require additional managed objects or may have side effects on the behavior of existing managed objects. In such cases a standards-track specification (which may be a new document or a revision of this document) is also REQUIRED. Any such document is REQUIRED to note any special properties of the MAU types that it defines - for example, side effects on the ifStackTable as noted in this document for 10GBASE-W MAUs.

3.5.2. IANAifMauTypeListBits TEXTUAL-CONVENTION

The syntax of ifMauTypeListBits is changed to be a textual convention, such that the enumerated integer values are now defined in the textual convention IANAifMauTypeListBits, which can be re-specified (with additional values, when defined by IEEE 802.3) in the IANA-maintained MIB module without issuing a new version of this document.

3.5.3. IANAifMauMediaAvailable TEXTUAL-CONVENTION

The syntax of ifMauMediaAvailable and rpMauMediaAvailable is changed to be a textual convention, such that the enumerated integer values are now defined in the textual convention IANAifMauMediaAvailable, which can be re-specified (with additional values, when defined by IEEE 802.3) in the IANA-maintained MIB module without issuing a new version of this document.

3.5.4. IANAifMauAutoNegCapBits TEXTUAL-CONVENTION

The syntax of ifMauAutoNegCapabilityBits, ifMauAutoNegCapAdvertisedBits, and ifMauAutoNegCapReceivedBits objects is changed to be a textual convention, such that the enumerated integer values are now defined in the textual convention IANAifMauAutoNegCapBits, which can be re-specified (with additional values, when defined by IEEE 802.3) in the IANA-maintained MIB module without issuing a new version of this document.

3.5.5. JackType TEXTUAL-CONVENTION

The JackType Textual Convention has been deprecated in favor of the IANAifJackType defined in the IANA-maintained MIB module, so the new Jack types can be added (when defined by IEEE 802.3) without issuing a new version of this document.

4. MAU MIB Definitions

```
MAU-MIB DEFINITIONS ::= BEGIN

  IMPORTS
    Counter32, Integer32, Counter64,
    OBJECT-TYPE, MODULE-IDENTITY, NOTIFICATION-TYPE, mib-2
      FROM SNMPv2-SMI         -- RFC 2578
    TruthValue, AutonomousType, TEXTUAL-CONVENTION
      FROM SNMPv2-TC          -- RFC 2579
    OBJECT-GROUP, MODULE-COMPLIANCE, NOTIFICATION-GROUP
      FROM SNMPv2-CONF        -- RFC 2580
    InterfaceIndex
      FROM IF-MIB             -- RFC 2863
    IANAifMauTypeListBits, IANAifMauMediaAvailable,
    IANAifMauAutoNegCapBits, IANAifJackType
      FROM IANA-MAU-MIB
                      -- http://www.iana.org/assignments/ianamau-mib
    ;

  mauMod MODULE-IDENTITY
    LAST-UPDATED "200704210000Z"  -- April 21, 2007
    ORGANIZATION "IETF Ethernet Interfaces and Hub MIB Working Group"
    CONTACT-INFO
      "WG charter:
        http://www.ietf.org/html.charters/hubmib-charter.html

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

```
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       DESCRIPTION
         "Management information for 802.3 MAUs.

         The following reference is used throughout this MIB module:

         [IEEE802.3] refers to:
            IEEE Std 802.3, 2005 Edition: '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'.

            Of particular interest is Clause 30, 'Management'.

         Copyright (C) The IETF Trust (2007).
         This version of this MIB module is part of RFC 4836;
         see the RFC itself for full legal notices."

       REVISION    "200704210000Z"  -- April 21, 2007
       DESCRIPTION "Updated to reference IANA maintaned textual
                    conventions for MAU types, Media Availability state,
                    Auto Negotiation capabilities, and jack types,
                    instead of using internally defined values.

                    This version is published as RFC 4836."

       REVISION    "200309190000Z"  -- September 19, 2003
       DESCRIPTION "Updated to include support for 10 Gb/s MAUs.
                    This resulted in the following revisions:
                    - Added OBJECT-IDENTITY definitions for
                      10 gigabit MAU types
```

```
                  - Added fiberLC jack type to JackType TC
                  - Extended ifMauTypeListBits with bits for
                    the 10 gigabit MAU types
                  - Added enumerations to ifMauMediaAvailable,
                    and updated its DESCRIPTION to reflect
                    behaviour at 10 Gb/s
                  - Added 64-bit version of ifMauFalseCarriers
                    and added mauIfGrpHCStats object group to
                    contain the new object
                  - Deprecated mauModIfCompl2 and replaced it
                    with mauModIfCompl3, which includes the new
                    object group

                   This version published as RFC 3636."

       REVISION    "199908240400Z" -- August 24, 1999
       DESCRIPTION "This version published as RFC 2668.  Updated
                   to include support for 1000 Mb/sec
                   MAUs and flow control negotiation."

       REVISION    "199710310000Z" -- October 31, 1997
       DESCRIPTION "Version published as RFC 2239."

       REVISION    "199309300000Z" -- September 30, 1993
       DESCRIPTION "Initial version, published as RFC 1515."

       ::= { snmpDot3MauMgt 6 }

      snmpDot3MauMgt OBJECT IDENTIFIER ::= { mib-2 26 }

      -- Textual Conventions

      JackType ::= TEXTUAL-CONVENTION
        STATUS      deprecated
        DESCRIPTION "********** THIS TC IS DEPRECATED **********

                    This TC has been deprecated in favour of
                    IANAifJackType.

                    Common enumeration values for repeater
                    and interface MAU jack types."
        SYNTAX      INTEGER {
                              other(1),
                              rj45(2),
                              rj45S(3), -- rj45 shielded
                              db9(4),
                              bnc(5),
                              fAUI(6),  -- female aui
```

```
                            mAUI(7),  -- male aui
                            fiberSC(8),
                            fiberMIC(9),
                            fiberST(10),
                            telco(11),
                            mtrj(12),  -- fiber MT-RJ
                            hssdc(13), -- fiber channel style-2
                            fiberLC(14)
                        }

    dot3RpMauBasicGroup
        OBJECT IDENTIFIER ::= { snmpDot3MauMgt 1 }
    dot3IfMauBasicGroup
        OBJECT IDENTIFIER ::= { snmpDot3MauMgt 2 }
    dot3BroadMauBasicGroup
        OBJECT IDENTIFIER ::= { snmpDot3MauMgt 3 }

    -- OIDs under the following branch are reserved for
    -- the IANA-MAU-MIB to assign as MAU type values:
    --                         { snmpDot3MauMgt 4 }

    dot3IfMauAutoNegGroup
        OBJECT IDENTIFIER ::= { snmpDot3MauMgt 5 }

    -- the following OID is the MODULE-IDENTITY value
    -- for this MIB module:   { snmpDot3MauMgt 6 }

    --
    -- The Basic Repeater MAU Table
    --

    rpMauTable OBJECT-TYPE
      SYNTAX      SEQUENCE OF RpMauEntry
      MAX-ACCESS  not-accessible
      STATUS      current
      DESCRIPTION "Table of descriptive and status information
                   about the MAU(s) attached to the ports of a
                   repeater."
      ::= { dot3RpMauBasicGroup 1 }

    rpMauEntry OBJECT-TYPE
      SYNTAX      RpMauEntry
      MAX-ACCESS  not-accessible
      STATUS      current
      DESCRIPTION "An entry in the table, containing information
                   about a single MAU."
      INDEX       { rpMauGroupIndex,
                    rpMauPortIndex,
```

```
                  rpMauIndex
                }
    ::= { rpMauTable 1 }

  RpMauEntry ::=
    SEQUENCE {
        rpMauGroupIndex                    Integer32,
        rpMauPortIndex                     Integer32,
        rpMauIndex                         Integer32,
        rpMauType                          AutonomousType,
        rpMauStatus                        INTEGER,
        rpMauMediaAvailable                IANAifMauMediaAvailable,
        rpMauMediaAvailableStateExits      Counter32,
        rpMauJabberState                   INTEGER,
        rpMauJabberingStateEnters          Counter32,
        rpMauFalseCarriers                 Counter32
  }

  rpMauGroupIndex OBJECT-TYPE
    SYNTAX      Integer32 (1..2147483647)
    MAX-ACCESS  read-only  -- read-only since originally an
                           -- SMIv1 index
    STATUS      current
    DESCRIPTION "This variable uniquely identifies the group
                containing the port to which the MAU described
                by this entry is connected.

                Note:  In practice, a group will generally be
                a field-replaceable unit (i.e., module, card,
                or board) that can fit in the physical system
                enclosure, and the group number will correspond
                to a number marked on the physical enclosure.

                The group denoted by a particular value of this
                object is the same as the group denoted by the
                same value of rptrGroupIndex."
    REFERENCE   "RFC 2108, rptrGroupIndex."
    ::= { rpMauEntry 1 }

  rpMauPortIndex OBJECT-TYPE
    SYNTAX      Integer32 (1..2147483647)
    MAX-ACCESS  read-only  -- read-only since originally an
                           -- SMIv1 index
    STATUS      current
    DESCRIPTION "This variable uniquely identifies the repeater
                port within group rpMauGroupIndex to which the
                MAU described by this entry is connected."
    REFERENCE   "RFC 2108, rptrPortIndex."
```

```
        ::= { rpMauEntry 2 }

      rpMauIndex OBJECT-TYPE
        SYNTAX      Integer32 (1..2147483647)
        MAX-ACCESS  read-only  -- read-only since originally an
                               -- SMIv1 index
        STATUS      current
        DESCRIPTION "This variable uniquely identifies the MAU
                    described by this entry from among other
                    MAUs connected to the same port
                    (rpMauPortIndex)."
        REFERENCE   "[IEEE802.3], 30.5.1.1.1, aMAUID."
        ::= { rpMauEntry 3 }

      rpMauType OBJECT-TYPE
        SYNTAX      AutonomousType
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION "This object identifies the MAU type.  Values for
                    standard IEEE 802.3 MAU types are defined in the
                    IANA maintained IANA-MAU-MIB module, as
                    OBJECT-IDENTITIES of dot3MauType.
                    If the MAU type is unknown, the object identifier
                    zeroDotZero is returned."
        REFERENCE   "[IEEE802.3], 30.5.1.1.2, aMAUType."
        ::= { rpMauEntry 4 }

      rpMauStatus OBJECT-TYPE
          SYNTAX      INTEGER {
                          other(1),
                          unknown(2),
                          operational(3),
                          standby(4),
                          shutdown(5),
                          reset(6)
                      }
          MAX-ACCESS  read-write
          STATUS      current
          DESCRIPTION "The current state of the MAU.  This object MAY
                      be implemented as a read-only object by those
                      agents and MAUs that do not implement software
                      control of the MAU state.  Some agents may not
                      support setting the value of this object to some
                      of the enumerated values.

                      The value other(1) is returned if the MAU is in
                      a state other than one of the states 2 through
                      6.
```

```
                    The value unknown(2) is returned when the MAU's
                    true state is unknown; for example, when it is
                    being initialized.

                    A MAU in the operational(3) state is fully
                    functional; it operates, and passes signals to its
                    attached DTE or repeater port in accordance to
                    its specification.

                    A MAU in standby(4) state forces DI and CI to
                    idle, and the media transmitter to idle or fault,
                    if supported.  Standby(4) mode only applies to
                    link type MAUs.  The state of
                    rpMauMediaAvailable is unaffected.

                    A MAU in shutdown(5) state assumes the same
                    condition on DI, CI, and the media transmitter,
                    as though it were powered down or not connected.
                    The MAU MAY return other(1) value for the
                    rpMauJabberState and rpMauMediaAvailable objects
                    when it is in this state.  For an AUI, this
                    state will remove power from the AUI.

                    Setting this variable to the value reset(6)
                    resets the MAU in the same manner as a
                    power-off, power-on cycle of at least one-half
                    second would.  The agent is not required to
                    return the value reset(6).

                    Setting this variable to the value
                    operational(3), standby(4), or shutdown(5)
                    causes the MAU to assume the respective state,
                    except that setting a mixing-type MAU or an AUI
                    to standby(4) will cause the MAU to enter the
                    shutdown state."
        REFERENCE   "[IEEE802.3], 30.5.1.1.7, aMAUAdminState,
                    30.5.1.2.2, acMAUAdminControl, and 30.5.1.2.1,
                    acResetMAU."
        ::= { rpMauEntry 5 }

    rpMauMediaAvailable OBJECT-TYPE
        SYNTAX      IANAifMauMediaAvailable
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION "This object identifies Media Available state of
                    the MAU, complementary to the rpMauStatus.  Values
                    for the standard IEEE 802.3 Media Available states
                    are defined in the IANA maintained IANA-MAU-MIB
```

```
                module, as IANAifMauMediaAvailable TC."
        REFERENCE   "[IEEE802.3], 30.5.1.1.4, aMediaAvailable."
        ::= { rpMauEntry 6 }

    rpMauMediaAvailableStateExits OBJECT-TYPE
        SYNTAX      Counter32
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION "A count of the number of times that
                    rpMauMediaAvailable for this MAU instance leaves
                    the state available(3).

                    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 rptrMonitorPortLastChange."
        REFERENCE   "[IEEE802.3], 30.5.1.1.5, aLoseMediaCounter.
                    RFC 2108, rptrMonitorPortLastChange"
        ::= { rpMauEntry 7 }

    rpMauJabberState OBJECT-TYPE
        SYNTAX      INTEGER {
                        other(1),
                        unknown(2),
                        noJabber(3),
                        jabbering(4)
                    }
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION "The value other(1) is returned if the jabber
                    state is not 2, 3, or 4.  The agent MUST always
                    return other(1) for MAU type dot3MauTypeAUI.

                    The value unknown(2) is returned when the MAU's
                    true state is unknown; for example, when it is
                    being initialized.

                    If the MAU is not jabbering the agent returns
                    noJabber(3).  This is the 'normal' state.

                    If the MAU is in jabber state the agent returns
                    the jabbering(4) value."
        REFERENCE "[IEEE802.3], 30.5.1.1.6, aJabber.jabberFlag."
        ::= { rpMauEntry 8 }

    rpMauJabberingStateEnters OBJECT-TYPE
        SYNTAX      Counter32
        MAX-ACCESS  read-only
```

```
        STATUS      current
        DESCRIPTION "A count of the number of times that
                    mauJabberState for this MAU instance enters the
                    state jabbering(4).  For MAUs of type
                    dot3MauTypeAUI, dot3MauType100BaseT4,
                    dot3MauType100BaseTX, dot3MauType100BaseFX, and
                    all 1000Mbps types, this counter will always
                    indicate zero.

                    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 rptrMonitorPortLastChange."
        REFERENCE   "[IEEE802.3], 30.5.1.1.6, aJabber.jabberCounter.
                    RFC 2108, rptrMonitorPortLastChange"
        ::= { rpMauEntry 9 }

    rpMauFalseCarriers OBJECT-TYPE
        SYNTAX      Counter32
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION "A count of the number of false carrier events
                    during IDLE in 100BASE-X links.  This counter
                    does not increment at the symbol rate.  It can
                    increment after a valid carrier completion at a
                    maximum rate of once per 100 ms until the next
                    carrier event.

                    This counter increments only for MAUs of type
                    dot3MauType100BaseT4, dot3MauType100BaseTX,
                    dot3MauType100BaseFX, and all 1000Mbps types.

                    For all other MAU types, this counter will
                    always indicate zero.

                    The approximate minimum time for rollover of
                    this counter is 7.4 hours.

                    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 rptrMonitorPortLastChange."
        REFERENCE   "[IEEE802.3], 30.5.1.1.10, aFalseCarriers.
                    RFC 2108, rptrMonitorPortLastChange"
        ::= { rpMauEntry 10 }

    -- The rpJackTable applies to MAUs attached to repeaters
    -- which have one or more external jacks (connectors).
```

```
    rpJackTable OBJECT-TYPE
        SYNTAX      SEQUENCE OF RpJackEntry
        MAX-ACCESS  not-accessible
        STATUS      current
        DESCRIPTION "Information about the external jacks attached
                    to MAUs attached to the ports of a repeater."
        ::= { dot3RpMauBasicGroup 2 }

    rpJackEntry OBJECT-TYPE
        SYNTAX      RpJackEntry
        MAX-ACCESS  not-accessible
        STATUS      current
        DESCRIPTION "An entry in the table, containing information
                    about a particular jack."
        INDEX       { rpMauGroupIndex,
                      rpMauPortIndex,
                      rpMauIndex,
                      rpJackIndex
                    }
        ::= { rpJackTable 1 }

    RpJackEntry ::=
        SEQUENCE {
            rpJackIndex                         Integer32,
            rpJackType                          IANAifJackType
        }

    rpJackIndex OBJECT-TYPE
        SYNTAX      Integer32 (1..2147483647)
        MAX-ACCESS  not-accessible
        STATUS      current
        DESCRIPTION "This variable uniquely identifies the jack
                    described by this entry from among other jacks
                    attached to the same MAU (rpMauIndex)."
        ::= { rpJackEntry 1 }

    rpJackType OBJECT-TYPE
        SYNTAX      IANAifJackType
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION "The jack connector type, as it appears on the
                    outside of the system."
        ::= { rpJackEntry 2 }

    --
    -- The Basic Interface MAU Table
    --
```

```
    ifMauTable OBJECT-TYPE
        SYNTAX      SEQUENCE OF IfMauEntry
        MAX-ACCESS  not-accessible
        STATUS      current
        DESCRIPTION "Table of descriptive and status information
                    about MAU(s) attached to an interface."
        ::= { dot3IfMauBasicGroup 1 }

    ifMauEntry OBJECT-TYPE
        SYNTAX      IfMauEntry
        MAX-ACCESS  not-accessible
        STATUS      current
        DESCRIPTION "An entry in the table, containing information
                    about a single MAU."
        INDEX       { ifMauIfIndex,
                      ifMauIndex
                    }
        ::= { ifMauTable 1 }

    IfMauEntry ::=
        SEQUENCE {
            ifMauIfIndex                    InterfaceIndex,
            ifMauIndex                      Integer32,
            ifMauType                       AutonomousType,
            ifMauStatus                     INTEGER,
            ifMauMediaAvailable             IANAifMauMediaAvailable,
            ifMauMediaAvailableStateExits   Counter32,
            ifMauJabberState                INTEGER,
            ifMauJabberingStateEnters       Counter32,
            ifMauFalseCarriers              Counter32,
            ifMauTypeList                   Integer32,
            ifMauDefaultType                AutonomousType,
            ifMauAutoNegSupported           TruthValue,
            ifMauTypeListBits               IANAifMauTypeListBits,
            ifMauHCFalseCarriers            Counter64
        }

    ifMauIfIndex OBJECT-TYPE
        SYNTAX      InterfaceIndex
        MAX-ACCESS  read-only  -- read-only since originally an
                               -- SMIv1 index
        STATUS      current
        DESCRIPTION "This variable uniquely identifies the interface
                    to which the MAU described by this entry is
                    connected."
        REFERENCE   "RFC 2863, ifIndex"
        ::= { ifMauEntry 1 }
```

```
      ifMauIndex OBJECT-TYPE
          SYNTAX      Integer32 (1..2147483647)
          MAX-ACCESS  read-only  -- read-only since originally an
                                 -- SMIv1 index
          STATUS      current
          DESCRIPTION "This variable uniquely identifies the MAU
                      described by this entry from among other MAUs
                      connected to the same interface (ifMauIfIndex)."
          REFERENCE   "[IEEE802.3], 30.5.1.1.1, aMAUID."
          ::= { ifMauEntry 2 }

      ifMauType OBJECT-TYPE
        SYNTAX      AutonomousType
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION "This object identifies the MAU type.  Values for
                    standard IEEE 802.3 MAU types are defined in the
                    IANA maintained IANA-MAU-MIB module, as
                    OBJECT-IDENTITIES of dot3MauType.
                    If the MAU type is unknown, the object identifier
                    zeroDotZero is returned.

                    This object represents the operational type of
                    the MAU, as determined by either 1) the result
                    of the auto-negotiation function or 2) if
                    auto-negotiation is not enabled or is not
                    implemented for this MAU, by the value of the
                    object ifMauDefaultType.  In case 2), a set to
                    the object ifMauDefaultType will force the MAU
                    into the new operating mode."
        REFERENCE   "[IEEE802.3], 30.5.1.1.2, aMAUType."
        ::= { ifMauEntry 3 }

      ifMauStatus OBJECT-TYPE
          SYNTAX      INTEGER {
                          other(1),
                          unknown(2),
                          operational(3),
                          standby(4),
                          shutdown(5),
                          reset(6)
                      }
          MAX-ACCESS  read-write
          STATUS      current
          DESCRIPTION "The current state of the MAU.  This object MAY
                      be implemented as a read-only object by those
                      agents and MAUs that do not implement software
                      control of the MAU state.  Some agents may not
```

```
                    support setting the value of this object to some
                    of the enumerated values.

                    The value other(1) is returned if the MAU is in
                    a state other than one of the states 2 through
                    6.

                    The value unknown(2) is returned when the MAU's
                    true state is unknown; for example, when it is
                    being initialized.

                    A MAU in the operational(3) state is fully
                    functional; it operates, and passes signals to its
                    attached DTE or repeater port in accordance to
                    its specification.

                    A MAU in standby(4) state forces DI and CI to
                    idle and the media transmitter to idle or fault,
                    if supported.  Standby(4) mode only applies to
                    link type MAUs.  The state of
                    ifMauMediaAvailable is unaffected.

                    A MAU in shutdown(5) state assumes the same
                    condition on DI, CI, and the media transmitter,
                    as though it were powered down or not connected.
                    The MAU MAY return other(1) value for the
                    ifMauJabberState and ifMauMediaAvailable objects
                    when it is in this state.  For an AUI, this
                    state will remove power from the AUI.

                    Setting this variable to the value reset(6)
                    resets the MAU in the same manner as a
                    power-off, power-on cycle of at least one-half
                    second would.  The agent is not required to
                    return the value reset(6).

                    Setting this variable to the value
                    operational(3), standby(4), or shutdown(5)
                    causes the MAU to assume the respective state,
                    except that setting a mixing-type MAU or an AUI
                    to standby(4) will cause the MAU to enter the
                    shutdown state."
        REFERENCE   "[IEEE802.3], 30.5.1.1.7, aMAUAdminState,
                    30.5.1.2.2, acMAUAdminControl, and 30.5.1.2.1,
                    acResetMAU."
        ::= { ifMauEntry 4 }

    ifMauMediaAvailable OBJECT-TYPE
```

```
        SYNTAX      IANAifMauMediaAvailable
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION "This object identifies Media Available state of
                    the MAU, complementary to the ifMauStatus.  Values
                    for the standard IEEE 802.3 Media Available states
                    are defined in the IANA maintained IANA-MAU-MIB
                    module, as IANAifMauMediaAvailable TC."
        REFERENCE   "[IEEE802.3], 30.5.1.1.4, aMediaAvailable."
        ::= { ifMauEntry 5 }

    ifMauMediaAvailableStateExits OBJECT-TYPE
        SYNTAX      Counter32
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION "A count of the number of times that
                    ifMauMediaAvailable for this MAU instance leaves
                    the state available(3).

                    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."
        REFERENCE   "[IEEE802.3], 30.5.1.1.5, aLoseMediaCounter.
                    RFC 2863, ifCounterDiscontinuityTime."
        ::= { ifMauEntry 6 }

    ifMauJabberState OBJECT-TYPE
        SYNTAX      INTEGER {
                        other(1),
                        unknown(2),
                        noJabber(3),
                        jabbering(4)
                    }
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION "The value other(1) is returned if the jabber
                    state is not 2, 3, or 4.  The agent MUST always
                    return other(1) for MAU type dot3MauTypeAUI.

                    The value unknown(2) is returned when the MAU's
                    true state is unknown; for example, when it is
                    being initialized.

                    If the MAU is not jabbering the agent returns
                    noJabber(3).  This is the 'normal' state.

                    If the MAU is in jabber state the agent returns
```

```
                the jabbering(4) value."
        REFERENCE   "[IEEE802.3], 30.5.1.1.6, aJabber.jabberFlag."
        ::= { ifMauEntry 7 }

    ifMauJabberingStateEnters OBJECT-TYPE
        SYNTAX      Counter32
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION "A count of the number of times that
                    mauJabberState for this MAU instance enters the
                    state jabbering(4).  This counter will always
                    indicate zero for MAUs of type dot3MauTypeAUI
                    and those of speeds above 10Mbps.

                    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."
        REFERENCE   "[IEEE802.3], 30.5.1.1.6, aJabber.jabberCounter.
                    RFC 2863, ifCounterDiscontinuityTime."
        ::= { ifMauEntry 8 }

    ifMauFalseCarriers OBJECT-TYPE
        SYNTAX      Counter32
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION "A count of the number of false carrier events
                    during IDLE in 100BASE-X and 1000BASE-X links.

                    For all other MAU types, this counter will
                    always indicate zero.  This counter does not
                    increment at the symbol rate.

                    It can increment after a valid carrier
                    completion at a maximum rate of once per 100 ms
                    for 100BASE-X and once per 10us for 1000BASE-X
                    until the next CarrierEvent.

                    This counter can roll over very quickly.  A
                    management station is advised to poll the
                    ifMauHCFalseCarriers instead of this counter in
                    order to avoid loss of information.

                    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."
        REFERENCE   "[IEEE802.3], 30.5.1.1.10, aFalseCarriers.
```

```
                    RFC 2863, ifCounterDiscontinuityTime."
        ::= { ifMauEntry 9 }

    ifMauTypeList OBJECT-TYPE
        SYNTAX      Integer32
        MAX-ACCESS  read-only
        STATUS      deprecated
        DESCRIPTION "********** THIS OBJECT IS DEPRECATED **********

                    This object has been deprecated in favour of
                    ifMauTypeListBits.

                    A value that uniquely identifies the set of
                    possible IEEE 802.3 types that the MAU could be.
                    The value is a sum that initially takes the
                    value zero.  Then, for each type capability of
                    this MAU, 2 raised to the power noted below is
                    added to the sum.  For example, a MAU that has
                    the capability to be only 10BASE-T would have a
                    value of 512 (2**9).  In contrast, a MAU that
                    supports both 10Base-T (full duplex) and
                    100BASE-TX (full duplex) would have a value of
                    ((2**11) + (2**16)), or 67584.

                    The powers of 2 assigned to the capabilities are
                    these:

                    Power  Capability
                      0      other or unknown
                      1      AUI
                      2      10BASE-5
                      3      FOIRL
                      4      10BASE-2
                      5      10BASE-T duplex mode unknown
                      6      10BASE-FP
                      7      10BASE-FB
                      8      10BASE-FL duplex mode unknown
                      9      10BROAD36
                     10      10BASE-T  half duplex mode
                     11      10BASE-T  full duplex mode
                     12      10BASE-FL half duplex mode
                     13      10BASE-FL full duplex mode
                     14      100BASE-T4
                     15      100BASE-TX half duplex mode
                     16      100BASE-TX full duplex mode
                     17      100BASE-FX half duplex mode
                     18      100BASE-FX full duplex mode
                     19      100BASE-T2 half duplex mode
```

```
                      20      100BASE-T2 full duplex mode

                    If auto-negotiation is present on this MAU, this
                    object will map to ifMauAutoNegCapability."
        ::= { ifMauEntry 10 }

      ifMauDefaultType OBJECT-TYPE
          SYNTAX      AutonomousType
          MAX-ACCESS  read-write
          STATUS      current
          DESCRIPTION "This object identifies the default
                      administrative baseband MAU type to be used in
                      conjunction with the operational MAU type
                      denoted by ifMauType.

                      The set of possible values for this object is
                      the same as the set defined for the ifMauType
                      object.

                      This object represents the
                      administratively-configured type of the MAU.  If
                      auto-negotiation is not enabled or is not
                      implemented for this MAU, the value of this
                      object determines the operational type of the
                      MAU.  In this case, a set to this object will
                      force the MAU into the specified operating mode.

                      If auto-negotiation is implemented and enabled
                      for this MAU, the operational type of the MAU
                      is determined by auto-negotiation, and the value
                      of this object denotes the type to which the MAU
                      will automatically revert if/when
                      auto-negotiation is later disabled.

                      NOTE TO IMPLEMENTORS:  It may be necessary to
                      provide for underlying hardware implementations
                      which do not follow the exact behavior specified
                      above.  In particular, when
                      ifMauAutoNegAdminStatus transitions from enabled
                      to disabled, the agent implementation MUST
                      ensure that the operational type of the MAU (as
                      reported by ifMauType) correctly transitions to
                      the value specified by this object, rather than
                      continuing to operate at the value earlier
                      determined by the auto-negotiation function."
          REFERENCE   "[IEEE802.3], 30.5.1.1.1, aMAUID, and 22.2.4.1.4."
          ::= { ifMauEntry 11 }
```

```
    ifMauAutoNegSupported OBJECT-TYPE
        SYNTAX      TruthValue
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION "This object indicates whether or not
                     auto-negotiation is supported on this MAU."
        ::= { ifMauEntry 12 }

    ifMauTypeListBits OBJECT-TYPE
        SYNTAX      IANAifMauTypeListBits
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION "A value that uniquely identifies the set of
                     possible IEEE 802.3 types that the MAU could be.
                     If auto-negotiation is present on this MAU, this
                     object will map to ifMauAutoNegCapabilityBits.

                     Note that this MAU may be capable of operating
                     as a MAU type that is beyond the scope of this
                     MIB.  This is indicated by returning the
                     bit value bOther in addition to any bit values
                     for standard capabilities that are listed in the
                     IANAifMauTypeListBits TC."
        ::= { ifMauEntry 13 }

    ifMauHCFalseCarriers OBJECT-TYPE
        SYNTAX      Counter64
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION "A count of the number of false carrier events
                     during IDLE in 100BASE-X and 1000BASE-X links.

                     For all other MAU types, this counter will
                     always indicate zero.  This counter does not
                     increment at the symbol rate.

                     This counter is a 64-bit version of
                     ifMauFalseCarriers.  Since the 32-bit version of
                     this counter can roll over very quickly,
                     management stations are advised to poll the
                     64-bit version instead, in order to avoid loss
                     of information.

                     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."
        REFERENCE   "[IEEE802.3], 30.5.1.1.10, aFalseCarriers.
```

```
                    RFC 2863, ifCounterDiscontinuityTime."
        ::= { ifMauEntry 14 }

    -- The ifJackTable applies to MAUs attached to interfaces
    -- which have one or more external jacks (connectors).

    ifJackTable OBJECT-TYPE
        SYNTAX      SEQUENCE OF IfJackEntry
        MAX-ACCESS  not-accessible
        STATUS      current
        DESCRIPTION "Information about the external jacks attached
                    to MAUs attached to an interface."
        ::= { dot3IfMauBasicGroup 2 }

    ifJackEntry OBJECT-TYPE
        SYNTAX      IfJackEntry
        MAX-ACCESS  not-accessible
        STATUS      current
        DESCRIPTION "An entry in the table, containing information
                    about a particular jack."
        INDEX       { ifMauIfIndex,
                      ifMauIndex,
                      ifJackIndex
                    }
        ::= { ifJackTable 1 }

    IfJackEntry ::=
        SEQUENCE {
            ifJackIndex                         Integer32,
            ifJackType                          IANAifJackType
        }

    ifJackIndex OBJECT-TYPE
        SYNTAX      Integer32 (1..2147483647)
        MAX-ACCESS  not-accessible
        STATUS      current
        DESCRIPTION "This variable uniquely identifies the jack
                    described by this entry from among other jacks
                    attached to the same MAU."
        ::= { ifJackEntry 1 }

    ifJackType OBJECT-TYPE
        SYNTAX      IANAifJackType
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION "The jack connector type, as it appears on the
                    outside of the system."
        ::= { ifJackEntry 2 }
```

```
    --
    -- The MAU Auto-Negotiation Table
    --

    ifMauAutoNegTable OBJECT-TYPE
        SYNTAX      SEQUENCE OF IfMauAutoNegEntry
        MAX-ACCESS  not-accessible
        STATUS      current
        DESCRIPTION "Configuration and status objects for the
                     auto-negotiation function of MAUs attached to
                     interfaces.

                     The ifMauAutoNegTable applies to systems in
                     which auto-negotiation is supported on one or
                     more MAUs attached to interfaces.  Note that if
                     auto-negotiation is present and enabled, the
                     ifMauType object reflects the result of the
                     auto-negotiation function."
        ::= { dot3IfMauAutoNegGroup 1 }

    ifMauAutoNegEntry OBJECT-TYPE
        SYNTAX      IfMauAutoNegEntry
        MAX-ACCESS  not-accessible
        STATUS      current
        DESCRIPTION "An entry in the table, containing configuration
                     and status information for the auto-negotiation
                     function of a particular MAU."
        INDEX       { ifMauIfIndex,
                      ifMauIndex
                     }
        ::= { ifMauAutoNegTable 1 }

    IfMauAutoNegEntry ::=
        SEQUENCE {
            ifMauAutoNegAdminStatus           INTEGER,
            ifMauAutoNegRemoteSignaling       INTEGER,
            ifMauAutoNegConfig                INTEGER,
            ifMauAutoNegCapability            Integer32,
            ifMauAutoNegCapAdvertised         Integer32,
            ifMauAutoNegCapReceived           Integer32,
            ifMauAutoNegRestart               INTEGER,
            ifMauAutoNegCapabilityBits        IANAifMauAutoNegCapBits,
            ifMauAutoNegCapAdvertisedBits     IANAifMauAutoNegCapBits,
            ifMauAutoNegCapReceivedBits       IANAifMauAutoNegCapBits,
            ifMauAutoNegRemoteFaultAdvertised INTEGER,
            ifMauAutoNegRemoteFaultReceived   INTEGER
        }
```

```
    ifMauAutoNegAdminStatus OBJECT-TYPE
        SYNTAX      INTEGER {
                        enabled(1),
                        disabled(2)
                    }
        MAX-ACCESS  read-write
        STATUS      current
        DESCRIPTION "Setting this object to enabled(1) will cause
                    the interface that has the auto-negotiation
                    signaling ability to be enabled.

                    If the value of this object is disabled(2) then
                    the interface will act as it would if it had no
                    auto-negotiation signaling.  Under these
                    conditions, an IEEE 802.3 MAU will immediately
                    be forced to the state indicated by the value of
                    the object ifMauDefaultType.

                    NOTE TO IMPLEMENTORS:  When
                    ifMauAutoNegAdminStatus transitions from enabled
                    to disabled, the agent implementation MUST
                    ensure that the operational type of the MAU (as
                    reported by ifMauType) correctly transitions to
                    the value specified by the ifMauDefaultType
                    object, rather than continuing to operate at the
                    value earlier determined by the auto-negotiation
                    function."
        REFERENCE   "[IEEE802.3], 30.6.1.1.2, aAutoNegAdminState,
                    and 30.6.1.2.2, acAutoNegAdminControl."
        ::= { ifMauAutoNegEntry 1 }

    ifMauAutoNegRemoteSignaling OBJECT-TYPE
        SYNTAX      INTEGER {
                        detected(1),
                        notdetected(2)
                    }
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION "A value indicating whether the remote end of
                    the link is using auto-negotiation signaling.  It
                    takes the value detected(1) if and only if,
                    during the previous link negotiation, FLP Bursts
                    were received."
        REFERENCE   "[IEEE802.3], 30.6.1.1.3,
                    aAutoNegRemoteSignaling."
        ::= { ifMauAutoNegEntry 2 }

    ifMauAutoNegConfig OBJECT-TYPE
```

```
          SYNTAX      INTEGER {
                          other(1),
                          configuring(2),
                          complete(3),
                          disabled(4),
                          parallelDetectFail(5)
                      }
          MAX-ACCESS  read-only
          STATUS      current
          DESCRIPTION "A value indicating the current status of the
                      auto-negotiation process.  The enumeration
                      parallelDetectFail(5) maps to a failure in
                      parallel detection as defined in 28.2.3.1 of
                      [IEEE802.3]."
          REFERENCE   "[IEEE802.3], 30.6.1.1.4, aAutoNegAutoConfig."
          ::= { ifMauAutoNegEntry 4 }

      ifMauAutoNegCapability OBJECT-TYPE
          SYNTAX      Integer32
          MAX-ACCESS  read-only
          STATUS      deprecated
          DESCRIPTION "********** THIS OBJECT IS DEPRECATED **********

                      This object has been deprecated in favour of
                      ifMauAutoNegCapabilityBits.

                      A value that uniquely identifies the set of
                      capabilities of the local auto-negotiation
                      entity.  The value is a sum that initially
                      takes the value zero.  Then, for each capability
                      of this interface, 2 raised to the power noted
                      below is added to the sum.  For example, an
                      interface that has the capability to support
                      only 100Base-TX half duplex would have a value
                      of 32768 (2**15).  In contrast, an interface
                      that supports both 100Base-TX half duplex and
                      100Base-TX full duplex would have a value of
                      98304 ((2**15) + (2**16)).

                      The powers of 2 assigned to the capabilities are
                      these:

                      Power   Capability
                        0       other or unknown
                       (1-9)    (reserved)
                       10       10BASE-T  half duplex mode
                       11       10BASE-T  full duplex mode
                       12       (reserved)
```

```
                    13       (reserved)
                    14       100BASE-T4
                    15       100BASE-TX half duplex mode
                    16       100BASE-TX full duplex mode
                    17       (reserved)
                    18       (reserved)
                    19      100BASE-T2 half duplex mode
                    20      100BASE-T2 full duplex mode

                  Note that interfaces that support this MIB may
                  have capabilities that extend beyond the scope
                  of this MIB."
      REFERENCE   "[IEEE802.3], 30.6.1.1.5,
                  aAutoNegLocalTechnologyAbility."
      ::= { ifMauAutoNegEntry 5 }

  ifMauAutoNegCapAdvertised OBJECT-TYPE
      SYNTAX      Integer32
      MAX-ACCESS  read-write
      STATUS      deprecated
      DESCRIPTION "********** THIS OBJECT IS DEPRECATED **********

                  This object has been deprecated in favour of
                  ifMauAutoNegCapAdvertisedBits.

                  A value that uniquely identifies the set of
                  capabilities advertised by the local
                  auto-negotiation entity. Refer to
                  ifMauAutoNegCapability for a description of the
                  possible values of this object.

                  Capabilities in this object that are not
                  available in ifMauAutoNegCapability cannot be
                  enabled."
      REFERENCE   "[IEEE802.3], 30.6.1.1.6,
                  aAutoNegAdvertisedTechnologyAbility."
      ::= { ifMauAutoNegEntry 6 }

  ifMauAutoNegCapReceived OBJECT-TYPE
      SYNTAX      Integer32
      MAX-ACCESS  read-only
      STATUS      deprecated
      DESCRIPTION "********** THIS OBJECT IS DEPRECATED **********

                  This object has been deprecated in favour of
                  ifMauAutoNegCapReceivedBits.

                  A value that uniquely identifies the set of
```

```
                    capabilities received from the remote
                    auto-negotiation entity. Refer to
                    ifMauAutoNegCapability for a description of the
                    possible values of this object.

                    Note that interfaces that support this MIB may
                    be attached to remote auto-negotiation entities
                    that have capabilities beyond the scope of this
                    MIB."
        REFERENCE   "[IEEE802.3], 30.6.1.1.7,
                    aAutoNegReceivedTechnologyAbility."
        ::= { ifMauAutoNegEntry 7 }

    ifMauAutoNegRestart OBJECT-TYPE
        SYNTAX      INTEGER {
                        restart(1),
                        norestart(2)
                    }
        MAX-ACCESS  read-write
        STATUS      current
        DESCRIPTION "If the value of this object is set to
                    restart(1) then this will force auto-negotiation
                    to begin link renegotiation.  If auto-negotiation
                    signaling is disabled, a write to this object
                    has no effect.
                    Setting the value of this object to norestart(2)
                    has no effect."
        REFERENCE   "[IEEE802.3], 30.6.1.2.1,
                    acAutoNegRestartAutoConfig."
        ::= { ifMauAutoNegEntry 8 }

    ifMauAutoNegCapabilityBits OBJECT-TYPE
        SYNTAX      IANAifMauAutoNegCapBits
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION "A value that uniquely identifies the set of
                    capabilities of the local auto-negotiation
                    entity.  Note that interfaces that support this
                    MIB may have capabilities that extend beyond the
                    scope of this MIB.

                    Note that the local auto-negotiation entity may
                    support some capabilities beyond the scope of
                    this MIB.  This is indicated by returning the
                    bit value bOther in addition to any bit values
                    for standard capabilities that are listed in the
                    IANAifMauAutoNegCapBits TC."
```

```
          REFERENCE   "[IEEE802.3], 30.6.1.1.5,
                      aAutoNegLocalTechnologyAbility."
          ::= { ifMauAutoNegEntry 9 }

      ifMauAutoNegCapAdvertisedBits OBJECT-TYPE
          SYNTAX      IANAifMauAutoNegCapBits
          MAX-ACCESS  read-write
          STATUS      current
          DESCRIPTION "A value that uniquely identifies the set of
                      capabilities advertised by the local
                      auto-negotiation entity.

                      Capabilities in this object that are not
                      available in ifMauAutoNegCapabilityBits cannot
                      be enabled.

                      Note that the local auto-negotiation entity may
                      advertise some capabilities beyond the scope of
                      this MIB.  This is indicated by returning the
                      bit value bOther in addition to any bit values
                      for standard capabilities that are listed in the
                      IANAifMauAutoNegCapBits TC."
          REFERENCE   "[IEEE802.3], 30.6.1.1.6,
                      aAutoNegAdvertisedTechnologyAbility."
          ::= { ifMauAutoNegEntry 10 }

      ifMauAutoNegCapReceivedBits OBJECT-TYPE
          SYNTAX      IANAifMauAutoNegCapBits
          MAX-ACCESS  read-only
          STATUS      current
          DESCRIPTION "A value that uniquely identifies the set of
                      capabilities received from the remote
                      auto-negotiation entity.
                      Note that interfaces that support this MIB may
                      be attached to remote auto-negotiation entities
                      that have capabilities beyond the scope of this
                      MIB.  This is indicated by returning the bit
                      value bOther in addition to any bit values for
                      standard capabilities that are listed in the
                      IANAifMauAutoNegCapBits TC."
          REFERENCE   "[IEEE802.3], 30.6.1.1.7,
                      aAutoNegReceivedTechnologyAbility."
          ::= { ifMauAutoNegEntry 11 }

      ifMauAutoNegRemoteFaultAdvertised OBJECT-TYPE
          SYNTAX      INTEGER {
                          noError(1),
                          offline(2),
```

```
                        linkFailure(3),
                        autoNegError(4)
                    }
        MAX-ACCESS  read-write
        STATUS      current
        DESCRIPTION "A value that identifies any local fault
                    indications that this MAU has detected and will
                    advertise at the next auto-negotiation
                    interaction for 1000Mbps MAUs."
        REFERENCE   "[IEEE802.3], 30.6.1.1.6,
                    aAutoNegAdvertisedTechnologyAbility."
        ::= { ifMauAutoNegEntry 12 }

    ifMauAutoNegRemoteFaultReceived OBJECT-TYPE
        SYNTAX      INTEGER {
                        noError(1),
                        offline(2),
                        linkFailure(3),
                        autoNegError(4)
                    }
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION "A value that identifies any fault indications
                    received from the far end of a link by the
                    local auto-negotiation entity for 1000Mbps
                    MAUs."
        REFERENCE   "[IEEE802.3], 30.6.1.1.7,
                    aAutoNegReceivedTechnologyAbility."
        ::= { ifMauAutoNegEntry 13 }


    --
    -- The Basic Broadband MAU Table
    --

    broadMauBasicTable OBJECT-TYPE
        SYNTAX      SEQUENCE OF BroadMauBasicEntry
        MAX-ACCESS  not-accessible
        STATUS      deprecated
        DESCRIPTION "********** THIS OBJECT IS DEPRECATED **********

                    This entire table has been deprecated.  There
                    have been no reported implementations of this
                    table, and it is unlikely that there ever will
                    be.  IEEE recommends that broadband MAU types
                    should not be used for new installations.

                    Table of descriptive and status information
```

```
                    about the broadband MAUs connected to
                    interfaces."
        ::= { dot3BroadMauBasicGroup 1 }

    broadMauBasicEntry OBJECT-TYPE
        SYNTAX      BroadMauBasicEntry
        MAX-ACCESS  not-accessible
        STATUS      deprecated
        DESCRIPTION "********** THIS OBJECT IS DEPRECATED **********

                    An entry in the table, containing information
                    about a single broadband MAU."
        INDEX       { broadMauIfIndex,
                      broadMauIndex
                    }
        ::= { broadMauBasicTable 1 }

    BroadMauBasicEntry ::=
        SEQUENCE {
            broadMauIfIndex                     InterfaceIndex,
            broadMauIndex                       Integer32,
            broadMauXmtRcvSplitType             INTEGER,
            broadMauXmtCarrierFreq              Integer32,
            broadMauTranslationFreq             Integer32
        }

    broadMauIfIndex OBJECT-TYPE
        SYNTAX      InterfaceIndex
        MAX-ACCESS  read-only  -- read-only since originally an
                               -- SMIv1 index
        STATUS      deprecated
        DESCRIPTION "********** THIS OBJECT IS DEPRECATED **********

                    This variable uniquely identifies the interface
                    to which the MAU described by this entry is
                    connected."
        REFERENCE   "RFC 2863, ifIndex."
        ::= { broadMauBasicEntry 1 }

    broadMauIndex OBJECT-TYPE
        SYNTAX      Integer32 (1..2147483647)
        MAX-ACCESS  read-only  -- read-only since originally an
                               -- SMIv1 index
        STATUS      deprecated
        DESCRIPTION "********** THIS OBJECT IS DEPRECATED **********

                    This variable uniquely identifies the MAU
                    connected to interface broadMauIfIndex that is
```

```
                described by this entry."
        REFERENCE   "[IEEE802.3], 30.5.1.1.1, aMAUID."
        ::= { broadMauBasicEntry 2 }

    broadMauXmtRcvSplitType OBJECT-TYPE
        SYNTAX      INTEGER {
                        other(1),
                        single(2),
                        dual(3)
                    }
        MAX-ACCESS  read-only
        STATUS      deprecated
        DESCRIPTION "********* THIS OBJECT IS DEPRECATED **********

                    This object indicates the type of frequency
                    multiplexing/cabling system used to separate the
                    transmit and receive paths for the 10BROAD36
                    MAU.

                    The value other(1) is returned if the split type
                    is not either single or dual.

                    The value single(2) indicates a single cable
                    system.  The value dual(3) indicates a dual
                    cable system, offset normally zero."
        REFERENCE   "[IEEE802.3], 30.5.1.1.8, aBbMAUXmitRcvSplitType."
        ::= { broadMauBasicEntry 3 }

    broadMauXmtCarrierFreq OBJECT-TYPE
        SYNTAX      Integer32
        MAX-ACCESS  read-only
        STATUS      deprecated
        DESCRIPTION "********* THIS OBJECT IS DEPRECATED **********

                    This variable indicates the transmit carrier
                    frequency of the 10BROAD36 MAU in MHz/4; that
                    is, in units of 250 kHz."
        REFERENCE   "[IEEE802.3], 30.5.1.1.9,
                    aBroadbandFrequencies.xmitCarrierFrequency."
        ::= { broadMauBasicEntry 4 }

    broadMauTranslationFreq OBJECT-TYPE
        SYNTAX      Integer32
        MAX-ACCESS  read-only
        STATUS      deprecated
        DESCRIPTION "********* THIS OBJECT IS DEPRECATED **********

                    This variable indicates the translation offset
```

```
                    frequency of the 10BROAD36 MAU in MHz/4; that
                    is, in units of 250 kHz."
        REFERENCE   "[IEEE802.3], 30.5.1.1.9,
                    aBroadbandFrequencies.translationFrequency."
        ::= { broadMauBasicEntry 5 }

    -- Notifications for use by 802.3 MAUs

    snmpDot3MauTraps OBJECT IDENTIFIER ::= { snmpDot3MauMgt 0 }

    rpMauJabberTrap NOTIFICATION-TYPE
        OBJECTS     { rpMauJabberState }
        STATUS      current
        DESCRIPTION "This trap is sent whenever a managed repeater
                    MAU enters the jabber state.

                    The agent MUST throttle the generation of
                    consecutive rpMauJabberTraps so that there is at
                    least a five-second gap between them."
        REFERENCE   "[IEEE802.3], 30.5.1.3.1, nJabber notification."
        ::= { snmpDot3MauTraps 1 }

    ifMauJabberTrap NOTIFICATION-TYPE
        OBJECTS     { ifMauJabberState }
        STATUS      current
        DESCRIPTION "This trap is sent whenever a managed interface
                    MAU enters the jabber state.

                    The agent MUST throttle the generation of
                    consecutive ifMauJabberTraps so that there is at
                    least a five-second gap between them."

        REFERENCE   "[IEEE802.3], 30.5.1.3.1, nJabber notification."
        ::= { snmpDot3MauTraps 2 }

    -- Conformance information

    mauModConf
            OBJECT IDENTIFIER ::= { mauMod 1 }
      mauModCompls
            OBJECT IDENTIFIER ::= { mauModConf 1 }
      mauModObjGrps
            OBJECT IDENTIFIER ::= { mauModConf 2 }
      mauModNotGrps
            OBJECT IDENTIFIER ::= { mauModConf 3 }

    -- Object groups
```

```
    mauRpGrpBasic OBJECT-GROUP
        OBJECTS     { rpMauGroupIndex,
                      rpMauPortIndex,
                      rpMauIndex,
                      rpMauType,
                      rpMauStatus,
                      rpMauMediaAvailable,
                      rpMauMediaAvailableStateExits,
                      rpMauJabberState,
                      rpMauJabberingStateEnters
                    }
        STATUS      current
        DESCRIPTION "Basic conformance group for MAUs attached to
                    repeater ports.  This group is also the
                    conformance specification for RFC 1515
                    implementations."
        ::= { mauModObjGrps 1 }

    mauRpGrp100Mbs OBJECT-GROUP
        OBJECTS     { rpMauFalseCarriers }
        STATUS      current
        DESCRIPTION "Conformance group for MAUs attached to
                    repeater ports with 100 Mb/s or greater
                    capability."
        ::= { mauModObjGrps 2 }

    mauRpGrpJack OBJECT-GROUP
        OBJECTS     { rpJackType }
        STATUS      current
        DESCRIPTION "Conformance group for MAUs attached to
                    repeater ports with managed jacks."
        ::= { mauModObjGrps 3 }

    mauIfGrpBasic OBJECT-GROUP
        OBJECTS     { ifMauIfIndex,
                      ifMauIndex,
                      ifMauType,
                      ifMauStatus,
                      ifMauMediaAvailable,
                      ifMauMediaAvailableStateExits,
                      ifMauJabberState,
                      ifMauJabberingStateEnters
                    }
        STATUS      current
        DESCRIPTION "Basic conformance group for MAUs attached to
                    interfaces.  This group also provides a
                    conformance specification for RFC 1515
                    implementations."
```

```
        ::= { mauModObjGrps 4 }

    mauIfGrp100Mbs OBJECT-GROUP
        OBJECTS     { ifMauFalseCarriers,
                      ifMauTypeList,
                      ifMauDefaultType,
                      ifMauAutoNegSupported
                    }

        STATUS      deprecated
        DESCRIPTION "********** THIS GROUP IS DEPRECATED **********

                    Conformance group for MAUs attached to
                    interfaces with 100 Mb/s capability.

                    This object group has been deprecated in favor
                    of mauIfGrpHighCapacity."
        ::= { mauModObjGrps 5 }

    mauIfGrpJack OBJECT-GROUP
        OBJECTS     { ifJackType }
        STATUS      current
        DESCRIPTION "Conformance group for MAUs attached to
                    interfaces with managed jacks."
        ::= { mauModObjGrps 6 }

    mauIfGrpAutoNeg OBJECT-GROUP
        OBJECTS     { ifMauAutoNegAdminStatus,
                      ifMauAutoNegRemoteSignaling,
                      ifMauAutoNegConfig,
                      ifMauAutoNegCapability,
                      ifMauAutoNegCapAdvertised,
                      ifMauAutoNegCapReceived,
                      ifMauAutoNegRestart
                    }
        STATUS      deprecated
        DESCRIPTION "********** THIS GROUP IS DEPRECATED **********

                    Conformance group for MAUs attached to
                    interfaces with managed auto-negotiation.

                    This object group has been deprecated in favor
                    of mauIfGrpAutoNeg2."
        ::= { mauModObjGrps 7 }

    mauBroadBasic OBJECT-GROUP
        OBJECTS     { broadMauIfIndex,
                      broadMauIndex,
```

```
                    broadMauXmtRcvSplitType,
                    broadMauXmtCarrierFreq,
                    broadMauTranslationFreq
                  }
        STATUS      deprecated
        DESCRIPTION "********** THIS GROUP IS DEPRECATED **********
                    Conformance group for broadband MAUs attached
                    to interfaces.

                    This object group is deprecated.  There have
                    been no reported implementations of this group,
                    and it was felt to be unlikely that there will
                    be any future implementations."
        ::= { mauModObjGrps 8 }

    mauIfGrpHighCapacity OBJECT-GROUP
        OBJECTS     { ifMauFalseCarriers,
                    ifMauTypeListBits,
                    ifMauDefaultType,
                    ifMauAutoNegSupported
                  }
        STATUS      current
        DESCRIPTION "Conformance group for MAUs attached to
                    interfaces with 100 Mb/s or greater capability."
        ::= { mauModObjGrps 9 }

    mauIfGrpAutoNeg2 OBJECT-GROUP
        OBJECTS     { ifMauAutoNegAdminStatus,
                    ifMauAutoNegRemoteSignaling,
                    ifMauAutoNegConfig,
                    ifMauAutoNegCapabilityBits,
                    ifMauAutoNegCapAdvertisedBits,
                    ifMauAutoNegCapReceivedBits,
                    ifMauAutoNegRestart
                  }
        STATUS      current
        DESCRIPTION "Conformance group for MAUs attached to
                    interfaces with managed auto-negotiation."
        ::= { mauModObjGrps 10 }

    mauIfGrpAutoNeg1000Mbps OBJECT-GROUP
        OBJECTS     { ifMauAutoNegRemoteFaultAdvertised,
                    ifMauAutoNegRemoteFaultReceived
                  }
        STATUS      current
        DESCRIPTION "Conformance group for 1000Mbps MAUs attached to
                    interfaces with managed auto-negotiation."
        ::= { mauModObjGrps 11 }
```

```
    mauIfGrpHCStats OBJECT-GROUP
        OBJECTS     { ifMauHCFalseCarriers }
        STATUS      current
        DESCRIPTION "Conformance for high capacity statistics for
                    MAUs attached to interfaces."
        ::= { mauModObjGrps 12 }

    -- Notification groups

    rpMauNotifications NOTIFICATION-GROUP
        NOTIFICATIONS { rpMauJabberTrap }
        STATUS      current
        DESCRIPTION "Notifications for repeater MAUs."
        ::= { mauModNotGrps 1 }

    ifMauNotifications NOTIFICATION-GROUP
        NOTIFICATIONS { ifMauJabberTrap }
        STATUS      current
        DESCRIPTION "Notifications for interface MAUs."
        ::= { mauModNotGrps 2 }

    -- Compliances

    mauModRpCompl MODULE-COMPLIANCE
        STATUS      deprecated
        DESCRIPTION "******** THIS COMPLIANCE IS DEPRECATED ********
                    Compliance for MAUs attached to repeater
                    ports.

                    This compliance is deprecated and replaced by
                    mauModRpCompl2, which corrects an oversight by
                    allowing rpMauStatus to be implemented
                    read-only."

        MODULE -- this module
            MANDATORY-GROUPS { mauRpGrpBasic }

            GROUP       mauRpGrp100Mbs
            DESCRIPTION "Implementation of this optional group is
                        recommended for MAUs that have 100Mb/s or
                        greater capability."

            GROUP       mauRpGrpJack
            DESCRIPTION "Implementation of this optional group is
                        recommended for MAUs that have one or more
                        external jacks."

            GROUP       rpMauNotifications
```

```
            DESCRIPTION "Implementation of this group is recommended
                        for MAUs attached to repeater ports."
        ::= { mauModCompls 1 }

    mauModIfCompl MODULE-COMPLIANCE
        STATUS      deprecated
        DESCRIPTION "******** THIS COMPLIANCE IS DEPRECATED ********

                    Compliance for MAUs attached to interfaces.
                    This compliance is deprecated and replaced by
                    mauModIfCompl2."

        MODULE -- this module
            MANDATORY-GROUPS { mauIfGrpBasic }

            GROUP       mauIfGrp100Mbs
            DESCRIPTION "Implementation of this optional group is
                        recommended for MAUs that have 100Mb/s
                        capability."

            GROUP       mauIfGrpJack
            DESCRIPTION "Implementation of this optional group is
                        recommended for MAUs that have one or more
                        external jacks."

            GROUP       mauIfGrpAutoNeg
            DESCRIPTION "Implementation of this group is mandatory
                        for MAUs that support managed
                        auto-negotiation."

            GROUP       mauBroadBasic
            DESCRIPTION "Implementation of this group is mandatory
                        for broadband MAUs."

            GROUP       ifMauNotifications
            DESCRIPTION "Implementation of this group is recommended
                        for MAUs attached to interfaces."
        ::= { mauModCompls 2 }

    mauModIfCompl2 MODULE-COMPLIANCE
        STATUS      deprecated
        DESCRIPTION "******** THIS COMPLIANCE IS DEPRECATED ********

                    Compliance for MAUs attached to interfaces.

                    This compliance is deprecated and replaced by
                    mauModIfCompl3."
```

```
        MODULE -- this module
            MANDATORY-GROUPS { mauIfGrpBasic }

            GROUP       mauIfGrpHighCapacity
            DESCRIPTION "Implementation of this optional group is
                        recommended for MAUs that have 100Mb/s
                        or greater capability."

            GROUP       mauIfGrpJack

            DESCRIPTION "Implementation of this optional group is
                        recommended for MAUs that have one or more
                        external jacks."

            GROUP       mauIfGrpAutoNeg2
            DESCRIPTION "Implementation of this group is mandatory
                        for MAUs that support managed
                        auto-negotiation."

            GROUP       mauIfGrpAutoNeg1000Mbps
            DESCRIPTION "Implementation of this group is mandatory
                        for MAUs that have 1000Mb/s or greater
                        capability and support managed
                        auto-negotiation."

            GROUP       ifMauNotifications
            DESCRIPTION "Implementation of this group is recommended
                        for MAUs attached to interfaces."

            OBJECT      ifMauStatus
            MIN-ACCESS  read-only
            DESCRIPTION "Write access is not required."
        ::= { mauModCompls 3 }

    mauModRpCompl2 MODULE-COMPLIANCE
        STATUS      current
        DESCRIPTION "Compliance for MAUs attached to repeater
                    ports.

                    Note that compliance with this compliance
                    statement requires compliance with the
                    snmpRptrModCompl MODULE-COMPLIANCE statement of
                    the SNMP-REPEATER-MIB (RFC 2108)."

        MODULE -- this module
            MANDATORY-GROUPS { mauRpGrpBasic }

            GROUP       mauRpGrp100Mbs
```

```
            DESCRIPTION "Implementation of this optional group is
                        recommended for MAUs that have 100Mb/s or
                        greater capability."

            GROUP       mauRpGrpJack
            DESCRIPTION "Implementation of this optional group is
                        recommended for MAUs that have one or more
                        external jacks."

            GROUP       rpMauNotifications

            DESCRIPTION "Implementation of this group is recommended
                        for MAUs attached to repeater ports."

            OBJECT      rpMauStatus
            MIN-ACCESS  read-only
            DESCRIPTION "Write access is not required."
        ::= { mauModCompls 4 }

    mauModIfCompl3 MODULE-COMPLIANCE
        STATUS      current
        DESCRIPTION "Compliance for MAUs attached to interfaces.

                    Note that compliance with this compliance
                    statement requires compliance with the
                    ifCompliance3 MODULE-COMPLIANCE statement of the
                    IF-MIB (RFC 2863) and the dot3Compliance2
                    MODULE-COMPLIANCE statement of the
                    EtherLike-MIB (RFC3635)."

        MODULE -- this module
            MANDATORY-GROUPS { mauIfGrpBasic }

            GROUP       mauIfGrpHighCapacity
            DESCRIPTION "Implementation of this optional group is
                        recommended for MAUs that have 100Mb/s
                        or greater capability."

            GROUP       mauIfGrpHCStats
            DESCRIPTION "Implementation of this group is mandatory
                        for MAUs that have 1000Mb/s capacity, and
                        is recommended for MAUs that have 100Mb/s
                        capacity."

            GROUP       mauIfGrpJack
            DESCRIPTION "Implementation of this optional group is
                        recommended for MAUs that have one or more
                        external jacks."
```

```
            GROUP       mauIfGrpAutoNeg2
            DESCRIPTION "Implementation of this group is mandatory
                        for MAUs that support managed
                        auto-negotiation."
            GROUP       mauIfGrpAutoNeg1000Mbps
            DESCRIPTION "Implementation of this group is mandatory
                        for MAUs that have 1000Mb/s or greater
                        capability and support managed
                        auto-negotiation."

            GROUP       ifMauNotifications
            DESCRIPTION "Implementation of this group is recommended
                        for MAUs attached to interfaces."

            OBJECT      ifMauStatus
            MIN-ACCESS  read-only
            DESCRIPTION "Write access is not required."
        ::= { mauModCompls 5 }

   END
```

5. IANA-Maintained MAU TC Definitions

```
   IANA-MAU-MIB DEFINITIONS ::= BEGIN

     IMPORTS
       MODULE-IDENTITY, OBJECT-IDENTITY, mib-2
         FROM SNMPv2-SMI
       TEXTUAL-CONVENTION
         FROM SNMPv2-TC
       ;

     ianaMauMIB MODULE-IDENTITY
       LAST-UPDATED "200704210000Z"  -- April 21, 2007
       ORGANIZATION "IANA"
       CONTACT-INFO "        Internet Assigned Numbers Authority

                     Postal: ICANN
                             4676 Admiralty Way, Suite 330
                             Marina del Rey, CA 90292

                        Tel: +1-310-823-9358
                      EMail: iana@iana.org"

       DESCRIPTION
         "This MIB module defines dot3MauType OBJECT-IDENTITIES and
         IANAifMauListBits, IANAifMauMediaAvailable,
         IANAifMauAutoNegCapBits, and IANAifJackType
```

```
        TEXTUAL-CONVENTIONs, specifying enumerated values of the
        ifMauTypeListBits, ifMauMediaAvailable / rpMauMediaAvailable,
        ifMauAutoNegCapabilityBits / ifMauAutoNegCapAdvertisedBits /
        ifMauAutoNegCapReceivedBits and ifJackType / rpJackType objects
        respectively, defined in the MAU-MIB.

        It is intended that each new MAU type, Media Availability
        state, Auto Negotiation capability and/or Jack type defined by
        the IEEE 802.3 working group and approved for publication in a
        revision of IEEE Std 802.3 will be added to this MIB module,
        provided that it is suitable for being managed by the base
        objects in the MAU-MIB.  An Expert Review, as defined in
        RFC 2434 [RFC2434], is REQUIRED for such additions.

        The following reference is used throughout this MIB module:

        [IEEE802.3] refers to:
           IEEE Std 802.3, 2005 Edition: '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'.

        This reference should be updated as appropriate when new
        MAU types, Media Availability states, Auto Negotiation
        capabilities, and/or Jack types are added to this MIB module.

        Copyright (C) The IETF Trust (2007).
        The initial version of this MIB module was published in
        RFC 4836; for full legal notices see the RFC itself.
        Supplementary information may be available at:
        http://www.ietf.org/copyrights/ianamib.html"

      REVISION     "200704210000Z"  -- April 21, 2007
      DESCRIPTION  "Initial version of this MIB as published in
                    RFC 4836."
      ::= { mib-2 154 }

    -- Textual Conventions

    IANAifMauTypeListBits ::= TEXTUAL-CONVENTION
      STATUS       current
      DESCRIPTION
        "This data type is used as the syntax of the ifMauTypeListBits
        object in the (updated) definition of MAU-MIB's ifMauTable.
```

```
      The most recent version of this textual convention is available
      in the online version of this MIB module on the IANA web site.

      Requests for new values should be made to IANA via email
      (iana@iana.org).

      Note that changes in this textual convention SHALL be
      synchronized with relevant changes in the dot3MauType
      OBJECT-IDENTITIES."
    REFERENCE
      "[IEEE802.3], Section 30.5.1.1.2"
    SYNTAX       BITS {
          bOther(0),          -- other or unknown
          bAUI(1),            -- AUI
          b10base5(2),        -- 10BASE-5
          bFoirl(3),          -- FOIRL

          b10base2(4),        -- 10BASE-2
          b10baseT(5),        -- 10BASE-T duplex mode unknown
          b10baseFP(6),       -- 10BASE-FP
          b10baseFB(7),       -- 10BASE-FB
          b10baseFL(8),       -- 10BASE-FL duplex mode unknown
          b10broad36(9),      -- 10BROAD36
          b10baseTHD(10),     -- 10BASE-T  half duplex mode
          b10baseTFD(11),     -- 10BASE-T  full duplex mode
          b10baseFLHD(12),    -- 10BASE-FL half duplex mode
          b10baseFLFD(13),    -- 10BASE-FL full duplex mode
          b100baseT4(14),     -- 100BASE-T4
          b100baseTXHD(15),   -- 100BASE-TX half duplex mode
          b100baseTXFD(16),   -- 100BASE-TX full duplex mode
          b100baseFXHD(17),   -- 100BASE-FX half duplex mode
          b100baseFXFD(18),   -- 100BASE-FX full duplex mode
          b100baseT2HD(19),   -- 100BASE-T2 half duplex mode
          b100baseT2FD(20),   -- 100BASE-T2 full duplex mode

          b1000baseXHD(21),   -- 1000BASE-X half duplex mode
          b1000baseXFD(22),   -- 1000BASE-X full duplex mode
          b1000baseLXHD(23),  -- 1000BASE-LX half duplex mode
          b1000baseLXFD(24),  -- 1000BASE-LX full duplex mode
          b1000baseSXHD(25),  -- 1000BASE-SX half duplex mode
          b1000baseSXFD(26),  -- 1000BASE-SX full duplex mode
          b1000baseCXHD(27),  -- 1000BASE-CX half duplex mode
          b1000baseCXFD(28),  -- 1000BASE-CX full duplex mode
          b1000baseTHD(29),   -- 1000BASE-T half duplex mode
          b1000baseTFD(30),   -- 1000BASE-T full duplex mode

          b10GbaseX(31),      -- 10GBASE-X
          b10GbaseLX4(32),    -- 10GBASE-LX4
```

```
            b10GbaseR(33),      -- 10GBASE-R
            b10GbaseER(34),     -- 10GBASE-ER
            b10GbaseLR(35),     -- 10GBASE-LR
            b10GbaseSR(36),     -- 10GBASE-SR
            b10GbaseW(37),      -- 10GBASE-W
            b10GbaseEW(38),     -- 10GBASE-EW
            b10GbaseLW(39),     -- 10GBASE-LW
            b10GbaseSW(40),     -- 10GBASE-SW
            -- new since RFC 3636
            b10GbaseCX4(41),    -- 10GBASE-CX4
            b2BaseTL(42),       -- 2BASE-TL
            b10PassTS(43),      -- 10PASS-TS
            b100BaseBX10D(44),  -- 100BASE-BX10D
            b100BaseBX10U(45),  -- 100BASE-BX10U
            b100BaseLX10(46),   -- 100BASE-LX10
            b1000BaseBX10D(47), -- 1000BASE-BX10D
            b1000BaseBX10U(48), -- 1000BASE-BX10U
            b1000BaseLX10(49),  -- 1000BASE-LX10
            b1000BasePX10D(50), -- 1000BASE-PX10D
            b1000BasePX10U(51), -- 1000BASE-PX10U
            b1000BasePX20D(52), -- 1000BASE-PX20D
            b1000BasePX20U(53)  -- 1000BASE-PX20U
        }

    IANAifMauMediaAvailable ::= TEXTUAL-CONVENTION
      STATUS       current
      DESCRIPTION
        "This data type is used as the syntax of the
        ifMauMediaAvailable and rpMauMediaAvailable objects in the
        (updated) definition of MAU-MIB's ifMauTable and rpMauTable
        respectively.

        Possible values are:
          other(1)             - undefined (not listed below)
          unknown(2)           - MAU's true state is unknown; e.g.,
                                 during initialization
          available(3)         - link, light, or loopback is normal
          notAvailable(4)      - link loss, low light, or no loopback
          remoteFault(5)       - a fault has been detected at the
                                 remote end of the link.  This value
                                 applies to 10BASE-FB, 100BASE-T4 Far
                                 End Fault Indication and non-specified
                                 remote faults from a system running
                                 auto-negotiation
          invalidSignal(6)     - invalid signal has been received from
                                 the other end of the link, 10BASE-FB
                                 only
          remoteJabber(7)      - remote fault, due to jabber
```

```
remoteLinkLoss(8)    - remote fault, due to link loss
remoteTest(9)        - remote fault, due to test
offline(10)          - offline, Clause 37 Auto-Negotiation
                       only
autoNegError(11)     - Auto-Negotiation Error, Clause 37
                       Auto-Negotiation only
pmdLinkFault(12)     - PMA/PMD receive link fault.  In case
                       of PAF (2BASE-TL / 10PASS-TS PHYs),
                       all PMEs in the aggregation group have
                       detected a link fault
wisFrameLoss(13)     - WIS loss of frame, 10GBASE-W only
wisSignalLoss(14)    - WIS loss of signal, 10GBASE-W only
pcsLinkFault(15)     - PCS receive link fault
excessiveBER(16)     - PCS Bit Error Ratio monitor
                       reporting excessive error ratio
dxsLinkFault(17)     - DTE XGXS receive link fault, XAUI only
pxsLinkFault(18)     - PHY XGXS receive link fault, XAUI only
availableReduced(19) - link normal, reduced bandwidth,
                       2BASE-TL / 10PASS-TS only
ready(20)            - at least one PME in the aggregation
                       group is detecting handshake tones,
                       2BASE-TL / 10PASS-TS only
```

If the MAU is a 10M b/s link or fiber type (FOIRL, 10BASE-T, 10BASE-F), then this is equivalent to the link test fail state/low light function. For an AUI, 10BASE2, 10BASE5, or 10BROAD36 MAU, this indicates whether loopback is detected on the DI circuit. The value of this attribute persists between packets for MAU types AUI, 10BASE5, 10BASE2, 10BROAD36, and 10BASEFP.

At power-up or following a reset, the Media Available state will be unknown(2) for AUI, 10BASE5, 10BASE2, 10BROAD36, and 10BASE-FP MAUs. For these MAUs loopback will be tested on each transmission during which no collision is detected.
If DI is receiving input when DO returns to IDL after a transmission and there has been no collision during the transmission, then loopback will be detected. The Media Available state will only change during noncollided transmissions for AUI, 10BASE2, 10BASE5, 10BROAD36, and 10BASE-FP MAUs.

For 100BASE-T2, 100BASE-T4, 100BASE-TX, 100BASE-FX, 100BASE-LX10, and 100BASE-BX10 PHYs the enumerations match the states within the link integrity state diagram.
Any MAU that implements management of [IEEE802.3] Clause 28 Auto-Negotiation, will map remote fault indication to remoteFault(5).

Any MAU that implements management of Clause 37 Auto-Negotiation, will map the received RF1 and RF2 bits as follows: Offline maps to offline(10), Link_Failure maps to remoteFault(5), and Auto-Negotiation Error maps to autoNegError(11).

The value remoteFault(5) applies to 10BASE-FB remote fault indication, the 100BASE-X far-end fault indication, and nonspecified remote faults from a system running Clause 28 Auto-Negotiation.

The value remoteJabber(7), remoteLink loss(8), or remoteTest(9) SHOULD be used instead of remoteFault(5) where the reason for remote fault is identified in the remote signaling protocol. Where a Clause 22 MII or Clause 35 GMII is present, a logic one in the remote fault bit maps to the value remoteFault(5), a logic zero in the link status bit maps to the enumeration notAvailable(4). The value notAvailable(4) takes precedence over remoteFault(5).

For 2BASE-TL and 10PASS-TS PHYs, the value unknown(2) maps to the condition where the PHY (PCS with connected PMEs) is initializing, the value ready(20) maps to the condition where the interface is down and at least one PME in the aggregation group is ready for handshake, the value available(3) maps to the condition where all the PMEs in the aggregation group are up, the value notAvailable(4) maps to the condition where all the PMEs in the aggregation group are down and no handshake tones are detected, the value availableReduced(19) maps to the condition where the interface is up, a link fault is detected at the receive direction by one or more PMEs in the aggregation group, but at least one PME is up and the enumeration pmdLinkFault(12) maps to the condition where a link fault is detected at the receive direction by all of the PMEs in the aggregation group.

For 10 Gb/s the enumerations map to value of the link_fault variable within the Link Fault Signaling state diagram as follows: the value OK maps to the value available(3), the value Local Fault maps to the value notAvailable(4), and the value Remote Fault maps to the value remoteFault(5). The value pmdLinkFault(12), wisFrameLoss(13), wisSignalLoss(14), pcsLinkFault(15), excessiveBER(16), or dxsLinkFault(17) SHOULD be used instead of the value notAvailable(4), where the reason for the Local Fault state can be identified through the use of the Clause 45 MDIO Interface. Where multiple reasons for the Local Fault state can be identified, only the highest precedence error SHOULD be

```
        reported.  This precedence in descending order is as follows:

          pxsLinkFault
          pmdLinkFault
          wisFrameLoss
          wisSignalLoss
          pcsLinkFault
          excessiveBER
          dxsLinkFault.

        Where a Clause 45 MDIO interface is present a logic zero in
        the PMA/PMD Receive link status bit ([IEEE802.3]
        Section 45.2.1.2.2) maps to the value pmdLinkFault(12),
        logic one in the LOF status bit (Section 45.2.2.10.4) maps
        to the value wisFrameLoss(13), a logic one in the LOS
        status bit (Section 45.2.2.10.5) maps to the value
        wisSignalLoss, a logic zero in the PCS Receive
        link status bit (Section 45.2.3.2.2) maps to the value
        pcsLinkFault(15), a logic one in the 10GBASE-R PCS Latched
        high BER status bit (Section 45.2.3.12.2) maps to the value
        excessiveBER, a logic zero in the DTE XS receive link status
        bit (Section 45.2.5.2.2) maps to the value dxsLinkFault(17)
        and a logic zero in the PHY XS transmit link status bit
        (Section 45.2.4.2.2) maps to the value pxsLinkFault(18).

        The most recent version of this textual convention is available
        in the online version of this MIB module on the IANA web site.

        Requests for new values should be made to IANA via email
        (iana@iana.org)."
      REFERENCE
        "[IEEE802.3], Section 30.5.1.1.4"
      SYNTAX       INTEGER {
            other(1),
            unknown(2),
            available(3),
            notAvailable(4),
            remoteFault(5),
            invalidSignal(6),
            remoteJabber(7),
            remoteLinkLoss(8),
            remoteTest(9),
            offline(10),
            autoNegError(11),
            pmdLinkFault(12),
            wisFrameLoss(13),
            wisSignalLoss(14),
            pcsLinkFault(15),
```

```
            excessiveBER(16),
            dxsLinkFault(17),
            pxsLinkFault(18),
            availableReduced(19),
            ready(20)
        }

    IANAifMauAutoNegCapBits ::= TEXTUAL-CONVENTION
      STATUS       current
      DESCRIPTION
        "This data type is used as the syntax of the
        ifMauAutoNegCapabilityBits, ifMauAutoNegCapAdvertisedBits, and
        ifMauAutoNegCapReceivedBits objects in the (updated) definition
        of MAU-MIB's ifMauAutoNegTable.

        The most recent version of this textual convention is available
        in the online version of this MIB module on the IANA web site.

        Requests for new values should be made to IANA via email
        (iana@iana.org)."
      REFERENCE
        "[IEEE802.3], Section 30.6.1.1.5"
      SYNTAX       BITS {
            bOther(0),          -- other or unknown
            b10baseT(1),        -- 10BASE-T  half duplex mode
            b10baseTFD(2),      -- 10BASE-T  full duplex mode
            b100baseT4(3),      -- 100BASE-T4
            b100baseTX(4),      -- 100BASE-TX half duplex mode
            b100baseTXFD(5),    -- 100BASE-TX full duplex mode
            b100baseT2(6),      -- 100BASE-T2 half duplex mode
            b100baseT2FD(7),    -- 100BASE-T2 full duplex mode
            bFdxPause(8),       -- PAUSE for full-duplex links
            bFdxAPause(9),      -- Asymmetric PAUSE for full-duplex
                                --     links
            bFdxSPause(10),     -- Symmetric PAUSE for full-duplex
                                --     links
            bFdxBPause(11),     -- Asymmetric and Symmetric PAUSE for
                                --     full-duplex links
            b1000baseX(12),     -- 1000BASE-X, -LX, -SX, -CX half
                                --     duplex mode
            b1000baseXFD(13),   -- 1000BASE-X, -LX, -SX, -CX full
                                --     duplex mode
            b1000baseT(14),     -- 1000BASE-T half duplex mode
            b1000baseTFD(15)    -- 1000BASE-T full duplex mode
        }

    IANAifJackType ::= TEXTUAL-CONVENTION
      STATUS       current
```

```
       DESCRIPTION
         "Common enumeration values for repeater and interface MAU
         jack types.  This data type is used as the syntax of the
         ifJackType and rpJackType objects in the (updated) definition
         of MAU-MIB's ifJackTable and rpJackTable respectively.

         Possible values are:
              other(1)          - undefined or unknown
              rj45(2)           - RJ45
              rj45S(3)          - RJ45 shielded
              db9(4)            - DB9
              bnc(5)            - BNC
              fAUI(6)           - AUI female
              mAUI(7)           - AUI male
              fiberSC(8)        - SC fiber
              fiberMIC(9)       - MIC fiber
              fiberST(10)       - ST fiber
              telco(11)         - Telco
              mtrj(12)          - MT-RJ fiber
              hssdc(13)         - fiber channel style-2
              fiberLC(14)       - LC fiber
              cx4(15)           - IB4X for 10GBASE-CX4

         The most recent version of this textual convention is available
         in the online version of this MIB module on the IANA web site.

         Requests for new values should be made to IANA via email
         (iana@iana.org)."
       SYNTAX       INTEGER {
              other(1),
              rj45(2),
              rj45S(3),
              db9(4),
              bnc(5),
              fAUI(6),
              mAUI(7),
              fiberSC(8),
              fiberMIC(9),
              fiberST(10),
              telco(11),
              mtrj(12),
              hssdc(13),
              fiberLC(14),
              -- new since RFC 3636
              cx4(15)
         }

     -- OBJECT IDENTITIES for MAU types
```

```
--  (see rpMauType and ifMauType of MAU-MIB for usage)
-- The following definitions has been moved from RFC 3636 and
-- no longer appear in its revision.

dot3MauType OBJECT IDENTIFIER ::= { mib-2 snmpDot3MauMgt(26) 4 }

dot3MauTypeAUI OBJECT-IDENTITY
  STATUS      current
  DESCRIPTION "no internal MAU, view from AUI"
  REFERENCE   "[IEEE802.3], Section 7"
  ::= { dot3MauType 1 }

dot3MauType10Base5 OBJECT-IDENTITY
  STATUS      current
  DESCRIPTION "thick coax MAU"
  REFERENCE   "[IEEE802.3], Section 7"
  ::= { dot3MauType 2 }

dot3MauTypeFoirl OBJECT-IDENTITY
  STATUS      current
  DESCRIPTION "FOIRL MAU"
  REFERENCE   "[IEEE802.3], Section 9.9"
  ::= { dot3MauType 3 }

dot3MauType10Base2 OBJECT-IDENTITY
  STATUS      current
  DESCRIPTION "thin coax MAU"
  REFERENCE   "[IEEE802.3], Section 10"
  ::= { dot3MauType 4 }

dot3MauType10BaseT OBJECT-IDENTITY
  STATUS      current
  DESCRIPTION "UTP MAU.
              Note that it is strongly recommended that
              agents return either dot3MauType10BaseTHD or
              dot3MauType10BaseTFD if the duplex mode is
              known.  However, management applications should
              be prepared to receive this MAU type value from
              older agent implementations."
  REFERENCE   "[IEEE802.3], Section 14"
  ::= { dot3MauType 5 }

dot3MauType10BaseFP OBJECT-IDENTITY
  STATUS      current
  DESCRIPTION "passive fiber MAU"
  REFERENCE   "[IEEE802.3], Section 16"
  ::= { dot3MauType 6 }
```

```
    dot3MauType10BaseFB OBJECT-IDENTITY
      STATUS      current
      DESCRIPTION "sync fiber MAU"
      REFERENCE   "[IEEE802.3], Section 17"
      ::= { dot3MauType 7 }

    dot3MauType10BaseFL OBJECT-IDENTITY
      STATUS      current
      DESCRIPTION "async fiber MAU.
                   Note that it is strongly recommended that
                   agents return either dot3MauType10BaseFLHD or
                   dot3MauType10BaseFLFD if the duplex mode is
                   known.  However, management applications should
                   be prepared to receive this MAU type value from
                   older agent implementations."
      REFERENCE   "[IEEE802.3], Section 18"
      ::= { dot3MauType 8 }

    dot3MauType10Broad36 OBJECT-IDENTITY
      STATUS      current
      DESCRIPTION "broadband DTE MAU.
                   Note that 10BROAD36 MAUs can be attached to
                   interfaces but not to repeaters."
      REFERENCE   "[IEEE802.3], Section 11"
      ::= { dot3MauType 9 }

    ------ new since RFC 1515:
    dot3MauType10BaseTHD OBJECT-IDENTITY
      STATUS      current
      DESCRIPTION "UTP MAU, half duplex mode"
      REFERENCE   "[IEEE802.3], Section 14"
      ::= { dot3MauType 10 }

    dot3MauType10BaseTFD OBJECT-IDENTITY
      STATUS      current
      DESCRIPTION "UTP MAU, full duplex mode"
      REFERENCE   "[IEEE802.3], Section 14"
      ::= { dot3MauType 11 }

    dot3MauType10BaseFLHD OBJECT-IDENTITY
      STATUS      current
      DESCRIPTION "async fiber MAU, half duplex mode"
      REFERENCE   "[IEEE802.3], Section 18"
      ::= { dot3MauType 12 }

    dot3MauType10BaseFLFD OBJECT-IDENTITY
      STATUS      current
      DESCRIPTION "async fiber MAU, full duplex mode"
```

```
      REFERENCE   "[IEEE802.3], Section 18"
      ::= { dot3MauType 13 }

    dot3MauType100BaseT4 OBJECT-IDENTITY
      STATUS      current
      DESCRIPTION "4 pair category 3 UTP"
      REFERENCE   "[IEEE802.3], Section 23"
      ::= { dot3MauType 14 }

    dot3MauType100BaseTXHD OBJECT-IDENTITY
      STATUS      current
      DESCRIPTION "2 pair category 5 UTP, half duplex mode"
      REFERENCE   "[IEEE802.3], Section 25"
      ::= { dot3MauType 15 }

    dot3MauType100BaseTXFD OBJECT-IDENTITY
      STATUS      current
      DESCRIPTION "2 pair category 5 UTP, full duplex mode"
      REFERENCE   "[IEEE802.3], Section 25"
      ::= { dot3MauType 16 }

    dot3MauType100BaseFXHD OBJECT-IDENTITY
      STATUS      current
      DESCRIPTION "X fiber over PMT, half duplex mode"
      REFERENCE   "[IEEE802.3], Section 26"
      ::= { dot3MauType 17 }

    dot3MauType100BaseFXFD OBJECT-IDENTITY
      STATUS      current
      DESCRIPTION "X fiber over PMT, full duplex mode"
      REFERENCE   "[IEEE802.3], Section 26"
      ::= { dot3MauType 18 }

    dot3MauType100BaseT2HD OBJECT-IDENTITY
      STATUS      current
      DESCRIPTION "2 pair category 3 UTP, half duplex mode"
      REFERENCE   "[IEEE802.3], Section 32"
      ::= { dot3MauType 19 }

    dot3MauType100BaseT2FD OBJECT-IDENTITY
      STATUS      current
      DESCRIPTION "2 pair category 3 UTP, full duplex mode"
      REFERENCE   "[IEEE802.3], Section 32"
      ::= { dot3MauType 20 }

    ------ new since RFC 2239:
    dot3MauType1000BaseXHD OBJECT-IDENTITY
      STATUS      current
```

```
      DESCRIPTION "PCS/PMA, unknown PMD, half duplex mode"
      REFERENCE   "[IEEE802.3], Section 36"
      ::= { dot3MauType 21 }

    dot3MauType1000BaseXFD OBJECT-IDENTITY
      STATUS      current
      DESCRIPTION "PCS/PMA, unknown PMD, full duplex mode"
      REFERENCE   "[IEEE802.3], Section 36"
      ::= { dot3MauType 22 }

    dot3MauType1000BaseLXHD OBJECT-IDENTITY
      STATUS      current
      DESCRIPTION "Fiber over long-wavelength laser, half duplex
                   mode"
      REFERENCE   "[IEEE802.3], Section 38"
      ::= { dot3MauType 23 }

    dot3MauType1000BaseLXFD OBJECT-IDENTITY
      STATUS      current
      DESCRIPTION "Fiber over long-wavelength laser, full duplex
                   mode"
      REFERENCE   "[IEEE802.3], Section 38"
      ::= { dot3MauType 24 }

    dot3MauType1000BaseSXHD OBJECT-IDENTITY
      STATUS      current
      DESCRIPTION "Fiber over short-wavelength laser, half
                   duplex mode"
      REFERENCE   "[IEEE802.3], Section 38"
      ::= { dot3MauType 25 }

    dot3MauType1000BaseSXFD OBJECT-IDENTITY
      STATUS      current
      DESCRIPTION "Fiber over short-wavelength laser, full
                   duplex mode"
      REFERENCE   "[IEEE802.3], Section 38"
      ::= { dot3MauType 26 }

    dot3MauType1000BaseCXHD OBJECT-IDENTITY
      STATUS      current
      DESCRIPTION "Copper over 150-Ohm balanced cable, half
                   duplex mode"
      REFERENCE   "[IEEE802.3], Section 39"
      ::= { dot3MauType 27 }

    dot3MauType1000BaseCXFD OBJECT-IDENTITY
      STATUS      current
      DESCRIPTION "Copper over 150-Ohm balanced cable, full
```

```
                duplex mode"
      REFERENCE   "[IEEE802.3], Section 39"
      ::= { dot3MauType 28 }

    dot3MauType1000BaseTHD OBJECT-IDENTITY
      STATUS      current
      DESCRIPTION "Four-pair Category 5 UTP, half duplex mode"
      REFERENCE   "[IEEE802.3], Section 40"
      ::= { dot3MauType 29 }

    dot3MauType1000BaseTFD OBJECT-IDENTITY
      STATUS      current
      DESCRIPTION "Four-pair Category 5 UTP, full duplex mode"
      REFERENCE   "[IEEE802.3], Section 40"
      ::= { dot3MauType 30 }

    ------ new since RFC 2668:
    dot3MauType10GigBaseX OBJECT-IDENTITY
      STATUS      current
      DESCRIPTION "X PCS/PMA, unknown PMD."
      REFERENCE   "[IEEE802.3], Section 48"
      ::= { dot3MauType 31 }

    dot3MauType10GigBaseLX4 OBJECT-IDENTITY
      STATUS      current
      DESCRIPTION "X fiber over WWDM optics"
      REFERENCE   "[IEEE802.3], Section 53"
      ::= { dot3MauType 32 }

    dot3MauType10GigBaseR OBJECT-IDENTITY
      STATUS      current
      DESCRIPTION "R PCS/PMA, unknown PMD."
      REFERENCE   "[IEEE802.3], Section 49"
      ::= { dot3MauType 33 }

    dot3MauType10GigBaseER OBJECT-IDENTITY
      STATUS      current
      DESCRIPTION "R fiber over 1550 nm optics"
      REFERENCE   "[IEEE802.3], Section 52"
      ::= { dot3MauType 34 }

    dot3MauType10GigBaseLR OBJECT-IDENTITY
      STATUS      current
      DESCRIPTION "R fiber over 1310 nm optics"
      REFERENCE   "[IEEE802.3], Section 52"
      ::= { dot3MauType 35 }

    dot3MauType10GigBaseSR OBJECT-IDENTITY
```

```
      STATUS      current
      DESCRIPTION "R fiber over 850 nm optics"
      REFERENCE   "[IEEE802.3], Section 52"
      ::= { dot3MauType 36 }

    dot3MauType10GigBaseW OBJECT-IDENTITY
      STATUS      current
      DESCRIPTION "W PCS/PMA, unknown PMD."
      REFERENCE   "[IEEE802.3], Section 49 and 50"
      ::= { dot3MauType 37 }

    dot3MauType10GigBaseEW OBJECT-IDENTITY
      STATUS      current
      DESCRIPTION "W fiber over 1550 nm optics"
      REFERENCE   "[IEEE802.3], Section 52"
      ::= { dot3MauType 38 }

    dot3MauType10GigBaseLW OBJECT-IDENTITY
      STATUS      current
      DESCRIPTION "W fiber over 1310 nm optics"
      REFERENCE   "[IEEE802.3], Section 52"
      ::= { dot3MauType 39 }

    dot3MauType10GigBaseSW OBJECT-IDENTITY
      STATUS      current
      DESCRIPTION "W fiber over 850 nm optics"
      REFERENCE   "[IEEE802.3], Section 52"
      ::= { dot3MauType 40 }

    ------ new since RFC 3636:
    dot3MauType10GigBaseCX4 OBJECT-IDENTITY
      STATUS      current
      DESCRIPTION "X copper over 8 pair 100-Ohm balanced cable"
      REFERENCE   "[IEEE802.3], Section 54"
      ::= { dot3MauType 41 }

    dot3MauType2BaseTL OBJECT-IDENTITY
      STATUS      current
      DESCRIPTION "Voice grade UTP copper, up to 2700m, optional PAF"
      REFERENCE   "[IEEE802.3], Sections 61 and 63"
      ::= { dot3MauType 42 }

    dot3MauType10PassTS OBJECT-IDENTITY
      STATUS      current
      DESCRIPTION "Voice grade UTP copper, up to 750m, optional PAF"
      REFERENCE   "[IEEE802.3], Sections 61 and 62"
      ::= { dot3MauType 43 }
```

```
    dot3MauType100BaseBX10D OBJECT-IDENTITY
      STATUS      current
      DESCRIPTION "One single-mode fiber OLT, long wavelength, 10km"
      REFERENCE   "[IEEE802.3], Section 58"
      ::= { dot3MauType 44 }

    dot3MauType100BaseBX10U OBJECT-IDENTITY
      STATUS      current
      DESCRIPTION "One single-mode fiber ONU, long wavelength, 10km"
      REFERENCE   "[IEEE802.3], Section 58"
      ::= { dot3MauType 45 }

    dot3MauType100BaseLX10 OBJECT-IDENTITY
      STATUS      current
      DESCRIPTION "Two single-mode fibers, long wavelength, 10km"
      REFERENCE   "[IEEE802.3], Section 58"
      ::= { dot3MauType 46 }

    dot3MauType1000BaseBX10D OBJECT-IDENTITY
      STATUS      current
      DESCRIPTION "One single-mode fiber OLT, long wavelength, 10km"
      REFERENCE   "[IEEE802.3], Section 59"
      ::= { dot3MauType 47 }

    dot3MauType1000BaseBX10U OBJECT-IDENTITY
      STATUS      current
      DESCRIPTION "One single-mode fiber ONU, long wavelength, 10km"
      REFERENCE   "[IEEE802.3], Section 59"
      ::= { dot3MauType 48 }

    dot3MauType1000BaseLX10 OBJECT-IDENTITY
      STATUS      current
      DESCRIPTION "Two sigle-mode fiber, long wavelength, 10km"
      REFERENCE   "[IEEE802.3], Section 59"
      ::= { dot3MauType 49 }

    dot3MauType1000BasePX10D OBJECT-IDENTITY
      STATUS      current
      DESCRIPTION "One single-mode fiber EPON OLT, 10km"
      REFERENCE   "[IEEE802.3], Section 60"
      ::= { dot3MauType 50 }

    dot3MauType1000BasePX10U OBJECT-IDENTITY
      STATUS      current
      DESCRIPTION "One single-mode fiber EPON ONU, 10km"
      REFERENCE   "[IEEE802.3], Section 60"
      ::= { dot3MauType 51 }
```

```
    dot3MauType1000BasePX20D OBJECT-IDENTITY
      STATUS      current
      DESCRIPTION "One single-mode fiber EPON OLT, 20km"
      REFERENCE   "[IEEE802.3], Section 60"
      ::= { dot3MauType 52 }

    dot3MauType1000BasePX20U OBJECT-IDENTITY
      STATUS      current
      DESCRIPTION "One single-mode fiber EPON ONU, 20km"
      REFERENCE   "[IEEE802.3], Section 60"
      ::= { dot3MauType 53 }

  END
```

6. Security Considerations

The IANA-MAU-MIB does not define any management objects. Instead, it defines a set of textual conventions which are used by the MAU-MIB and may be used by other MIB modules to define management objects. Meaningful security considerations can only be written for MIB modules that define management objects.

There are a number of management objects defined in the MAU-MIB that have a MAX-ACCESS clause of read-write. Setting these objects can have a serious effect on the operation of the network, including:

- enabling or disabling a MAU
- changing a MAU's default type
- enabling, disabling, or restarting autonegotiation
- modifying the capabilities that a MAU advertizes during autonegotiation.

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.

Some of the readable objects in the MAU-MIB module (i.e., objects with a MAX-ACCESS other than not-accessible) may be considered sensitive or vulnerable in some network environments. In some environments, it may be undesirable to allow unauthorized parties to access statistics or status information about individual links in a network. It is thus important to control even GET and/or NOTIFY access to these objects and possibly to even encrypt the values of these objects when sending them over the network via SNMP.

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 the MAU-MIB module.

It is RECOMMENDED that the implementors 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).

Furthermore, 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 the MAU-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.

7. IANA Considerations

This document defines first version of the IANA-maintained IANA-MAU-MIB module. It is intended that each new MAU type, Media Available state, Auto Negotiation capability, and/or Jack type defined by the IEEE 802.3 working group and approved for publication in a revision of IEEE Std 802.3 will be added to the IANA-maintaned MIB module, provided that it is suitable for being managed by the base objects in the MAU-MIB module.

For each new MAU type added, a short description of the MAU technology and, wherever possible, a reference to a publicly available specification SHOULD be specified. An Expert Review, as defined in RFC 2434 [RFC2434], is REQUIRED, for each modification.

8. Acknowledgments

This document was produced by the IETF Ethernet Interfaces and Hub MIB Working Group, whose efforts were greatly advanced by the contributions of the following people:

Mike Heard

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This document is based on the Proposed Standard MAU MIB, RFC 3636 [RFC3636], edited by John Flick of Hewlett-Packard, and produced by

the Ethernet Interfaces and Hub MIB Working Group. It extends that document by moving the object identities and textual conventions for MAU types into a IANA-maintained MIB module. In addition, support is provided for the EFM and 10GBASE-CX4 MAUs as defined in [IEEE802.3ah] and [IEEE802.3ak] respectively.

RFC 3636, in turn, was based on the Proposed Standard MAU MIB, RFC 2668 [RFC2668], edited by John Flick of Hewlett-Packard and Andrew Smith, then of Extreme Networks, and produced by the Ethernet Interfaces and Hub MIB Working Group. It extends that document by providing support for 10 Gb/s MAUs as defined in [IEEE802.3ae].

RFC 2668, in turn, was based on the Proposed Standard MAU MIB, RFC 2239 [RFC2239], edited by Kathryn de Graaf, then of 3Com, and Dan Romascanu, then of Madge Networks, and produced by the Ethernet Interfaces and Hub MIB Working Group. It extended that document by providing support for 1000 Mb/sec MAUs, PAUSE negotiation and remote fault status as defined in [IEEE802.3].

RFC 2239, in turn, was based on the Proposed Standard MAU MIB, RFC 1515 [RFC1515], edited by Donna McMaster, then of SynOptics Communications, Keith McCloghrie, then of Hughes LAN Systems, and Sam Roberts, then of Farallon Computing, and produced by the Hub MIB Working Group. It extends that document by providing support for 100 Mb/sec MAUs, full duplex MAUs, auto-negotiation, and jack management as defined in [IEEE802.3].

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