Token Ring Extensions to the Remote Network Monitoring MIB

Status of this Memo

This RFC 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" for the standardization state and status of this protocol. Distribution of this memo is unlimited.

Abstract

This memo defines extensions to the Remote Network Monitoring MIB for managing 802.5 Token Ring networks.

The Remote Network Monitoring MIB, RFC 1271, defines a framework for remote monitoring functions implemented on a network probe. That MIB defines objects broken down into nine functional groups. Some of those functional groups, the statistics and the history groups, have a view of the data-link layer that is specific to the media type and require specific objects to be defined for each media type. RFC 1271 defined those specific objects necessary for Ethernet. This companion memo defines those specific objects necessary for Token Ring LANs.

In addition, this memo defines some additional monitoring functions specifically for Token Ring. These are defined in the Ring Station Group, the Ring Station Order Group, the Ring Station Configuration Group, and the Source Routing Statistics Group.

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The Internet-standard Network Management Framework consists of three components. They are:

STD 16, RFC 1155 [1] which defines the SMI, the mechanisms used for describing and naming objects for the purpose of management. STD 16, RFC 1212 [2] defines a more concise description mechanism, which is wholly consistent with the SMI.

STD 17, RFC 1213 [3] which defines MIB-II, the core set of managed objects for the Internet suite of protocols.

STD 15, RFC 1157 [4] which defines the SNMP, the protocol used for network access to managed objects.

The Framework permits new objects to be defined for the purpose of experimentation and evaluation.

Managed objects are accessed via a virtual information store, termed the Management Information Base or MIB. Within a given MIB module, objects are defined using STD 16, RFC 1212’s OBJECT-TYPE macro. At a minimum, each object has a name, a syntax, an access-level, and an implementation-status.

The name is an object identifier, an administratively assigned name, which specifies an object type. The object type together with an object instance serves to uniquely identify a specific instantiation of the object. For human convenience, we often use a textual string, termed the object descriptor, to also refer to the object type.
The syntax of an object type defines the abstract data structure corresponding to that object type. The ASN.1[5] language is used for this purpose. However, STD 16, RFC 1155 purposely restricts the ASN.1 constructs which may be used. These restrictions are explicitly made for simplicity.

The access-level of an object type defines whether it makes "protocol sense" to read and/or write the value of an instance of the object type. (This access-level is independent of any administrative authorization policy.)

The implementation-status of an object type indicates whether the object is mandatory, optional, obsolete, or deprecated.

2. Guidelines for implementing RFC1271 objects on a Token Ring network

Wherever a MacAddress is to be used in this MIB the source routing bit is stripped off. The resulting address will be consistently valid for all packets sent by a particular node.

2.1. Host Group

Only Token Ring isolating errors will increment the error counter for a particular hostEntry. The isolating errors are: LineErrors, BurstErrors, ACErrors, InternalErrors, and AbortErrors. ACErrors will increment the error counter only for the nearest upstream neighbor of the station reporting the error. LineErrors and BurstErrors will increment the error counters for the station reporting the error and its neighbor upstream neighbor. InternalErrors and AbortErrors will increment the error counter for the station reporting the error only. In addition, congestionErrors will also be counted for each hostEntry. These errors will be incremented in the host entry of the station that reports the errors in an error report frame.

The hostOutPkts and hostOutOctets counters shall not be incremented for packets with errors.

2.2. Matrix Group

Error counters are never incremented.

2.3. Filter Group

The following conditions make up the status bitmask for token ring networks:
bit #    Error

3    First packet after some packets were dropped
4    Packet with the Frame Copied Bit set
5    Packet with the Address Recognized Bit set

For the purpose of the packet match algorithm, the filters assume a 32 byte RIF field. Thus, when matching, the filter is compared to the packet starting at the AC byte of the packet, until the end of the RIF field; then the unused RIF bytes in the filter are skipped and matching proceeds from that point. Any filter "care" bits in the RIF that don’t correspond to bytes in the input packet will cause the filter to fail.

2.4. Other comments

Because soft error report packets may be sent with assured delivery, some errors may be accidently reported twice on devices that perform the RMON function promiscuously.

3. Overview of the RMON Token Ring Extensions MIB

The Remote Network Monitoring MIB, RFC 1271, defines a framework for remote monitoring functions implemented on a network probe. That MIB defines objects broken down into nine functional groups. Some of those functional groups, the statistics and the history groups, have a view of the data-link layer that is specific to the media type and require specific objects to be defined for each media type. RFC 1271 defined those specific objects necessary for Ethernet. This MIB defines contains four groups that define those specific objects necessary for Token Ring LANs.

In addition, this memo defines some additional monitoring functions specifically for Token Ring. These are defined in the Ring Station Group, the Ring Station Order Group, the Ring Station Configuration Group, and the Source Routing Statistics Group.

3.1. The Token Ring Statistics Groups

The Token Ring statistics groups contain current utilization and error statistics. The statistics are broken down into two groups, the Token Ring Mac-Layer Statistics Group and the Token Ring Promiscuous Statistics Group. The Token Ring Mac-Layer Statistics Group collects information from Mac Layer, including error reports for the ring and ring utilization of the Mac Layer. The Token Ring Promiscuous Statistics Group collects utilization statistics from data packets collected promiscuously.
3.2. The Token Ring History Groups

The Token Ring History Groups contain historical utilization and error statistics. The statistics are broken down into two groups, the Token Ring Mac-Layer History Group and the Token Ring Promiscuous History Group. The Token Ring Mac-Layer History Group collects information from Mac Layer, including error reports for the ring and ring utilization of the Mac Layer. The Token Ring Promiscuous History Group collects utilization statistics from data packets collected promiscuously.

3.3. The Token Ring Ring Station Group

The Token Ring Ring Station Group contains statistics and status information associated with each Token Ring station on the local ring. In addition, this group provides status information for each ring being monitored.

3.4. The Token Ring Ring Station Order Group

The Token Ring Ring Station Order Group provides the order of the stations on monitored rings.

3.5. The Token Ring Ring Station Config Group

The Token Ring Ring Station Config Group manages token ring stations through active means. Any station on a monitored ring may be removed or have configuration information downloaded from it.

3.6. The Token Ring Source Routing Group

The Token Ring Source Routing Group contains utilization statistics derived from source routing information optionally present in token ring packets.

4. Terminology

The 802.5 specification [7] defines the term "good frame" as a frame that is bounded by a valid SD and ED, is an integral number of octets in length, is composed of only 0 and 1 bits between the SD and the ED, has the FF bits of the GC field equal to 00 or 01, has a valid FCS, and has a minimum of 18 octets between the SD and the ED. This document will use the term "good frame" in the same manner.
5. Definitions

TOKEN-RING-RMON-MIB DEFINITIONS ::= BEGIN

IMPORTS
   Counter, TimeTicks FROM RFC1155-SMI
   OBJECT-TYPE FROM RFC-1212
   OwnerString, EntryStatus, -- Textual Conventions
   rmon, statistics, history FROM RFC1271-MIB;

-- All representations of MAC addresses in this MIB
-- Module use, as a textual convention (i.e. this
-- convention does not affect their encoding), the
-- data type:

MacAddress ::= OCTET STRING (SIZE (6)) -- a 6 octet
-- address in
-- the "canonical"
-- order

-- defined by IEEE 802.1a, i.e., as if it were
-- transmitted least significant bit first, even though
-- 802.5 (in contrast to other 802.x protocols) requires
-- MAC addresses to be transmitted most significant bit
-- first.

TimeInterval ::= INTEGER
-- A period of time, measured in units of 0.01 seconds.

-- This MIB module uses the extended OBJECT-TYPE macro as
-- defined in [2].

-- Token Ring Remote Network Monitoring MIB

tokenRing OBJECT IDENTIFIER ::= { rmon 10 }

-- The Token Ring Mac-Layer Statistics Group
--
-- Implementation of this group is optional

tokenRingMLStatsTable OBJECT-TYPE
SYNTAX SEQUENCE OF TokenRingMLStatsEntry
ACCESS not-accessible
STATUS mandatory
DESCRIPTION "A list of Mac-Layer Token Ring statistics"
entries."
::= { statistics 2 }

tokenRingMLStatsEntry OBJECT-TYPE
SYNTAX TokenRingMLStatsEntry
ACCESS not-accessible
STATUS mandatory
DESCRIPTION
"A collection of Mac-Layer statistics kept for a
particular Token Ring interface."
INDEX { tokenRingMLStatsIndex }
::= { tokenRingMLStatsTable 1 }

-- As an example, an instance of the
tokenRingMLStatsMacOctets object
-- might be named tokenRingMLStatsMacOctets.1

TokenRingMLStatsEntry ::= SEQUENCE {
  tokenRingMLStatsIndex                     INTEGER,
  tokenRingMLStatsDataSource            OBJECT IDENTIFIER,
  tokenRingMLStatsDropEvents                Counter,
  tokenRingMLStatsMacOctets                 Counter,
  tokenRingMLStatsMacPkts                   Counter,
  tokenRingMLStatsRingPurgeEvents           Counter,
  tokenRingMLStatsRingPurgePkts             Counter,
  tokenRingMLStatsBeaconEvents              Counter,
  tokenRingMLStatsBeaconTime                TimeInterval,
  tokenRingMLStatsBeaconPkts                Counter,
  tokenRingMLStatsClaimTokenEvents          Counter,
  tokenRingMLStatsClaimTokenPkts            Counter,
  tokenRingMLStatsNAUNChanges               Counter,
  tokenRingMLStatsLineErrors                Counter,
  tokenRingMLStatsInternalErrors            Counter,
  tokenRingMLStatsBurstErrors               Counter,
  tokenRingMLStatsACErrors                  Counter,
  tokenRingMLStatsACErrors                  Counter,
  tokenRingMLStatsAbortErrors               Counter,
  tokenRingMLStatsLostFrameErrors           Counter,
  tokenRingMLStatsCongestionErrors          Counter,
  tokenRingMLStatsFrameCopiedErrors         Counter,
  tokenRingMLStatsFrequencyErrors           Counter,
  tokenRingMLStatsTokenErrors               Counter,
  tokenRingMLStatsSoftErrorReports          Counter,
  tokenRingMLStatsRingPollEvents            Counter,
  tokenRingMLStatsOwner                     OwnerString,
  tokenRingMLStatsStatus                    EntryStatus
}
tokenRingMLStatsIndex OBJECT-TYPE
SYNTAX INTEGER (1..65535)
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The value of this object uniquely identifies this
tokenRingMLStats entry."
 ::= { tokenRingMLStatsEntry 1 }

tokenRingMLStatsDataSource OBJECT-TYPE
SYNTAX OBJECT IDENTIFIER
ACCESS read-write
STATUS mandatory
DESCRIPTION
"This object identifies the source of the data
that this tokenRingMLStats entry is configured to
analyze. This source can be any tokenRing
interface on this device. In order to identify a
particular interface, this object shall identify
the instance of the ifIndex object, defined in
MIB-II [3], for the desired interface. For
example, if an entry were to receive data from
interface #1, this object would be set to
ifIndex.1.

The statistics in this group reflect all error
reports on the local network segment attached to
the identified interface.

This object may not be modified if the associated
tokenRingMLStatsStatus object is equal to
valid(1)."
 ::= { tokenRingMLStatsEntry 2 }

tokenRingMLStatsDropEvents OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of events in which packets were
dropped by the probe due to lack of resources.
Note that this number is not necessarily the
number of packets dropped; it is just the number
of times this condition has been detected. This
value is the same as the corresponding
tokenRingPStatsDropEvents."
 ::= { tokenRingMLStatsEntry 3 }
tokenRingMLStatsMacOctets OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of octets of data in MAC packets
(excluding those that were not good frames)
received on the network (excluding framing bits
but including FCS octets)."
 ::= {tokenRingMLStatsEntry 4 }

tokenRingMLStatsMacPkts OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of MAC packets (excluding
packets that were not good frames) received."
 ::= {tokenRingMLStatsEntry 5 }

tokenRingMLStatsRingPurgeEvents OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of times that the ring enters
the ring purge state from normal ring state. The
ring purge state that comes in response to the
claim token or beacon state is not counted."
 ::= {tokenRingMLStatsEntry 6 }

tokenRingMLStatsRingPurgePkts OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of ring purge MAC packets
detected by probe."
 ::= {tokenRingMLStatsEntry 7 }

tokenRingMLStatsBeaconEvents OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of times that the ring enters a
beaconing state (beaconFrameStreamingState,
beaconBitStreamingState,
beaconSetRecoveryModeState, or
beaconRingSignalLossState) from a non-beaconing
state. Note that a change of the source address
of the beacon packet does not constitute a new
beacon event."
::= { tokenRingMLStatsEntry 8 }

tokenRingMLStatsBeaconTime OBJECT-TYPE
SYNTAX TimeInterval
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total amount of time that the ring has been
in the beaconing state."
::= { tokenRingMLStatsEntry 9 }

tokenRingMLStatsBeaconPkts OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of beacon MAC packets detected
by the probe."
::= { tokenRingMLStatsEntry 10 }

tokenRingMLStatsClaimTokenEvents OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of times that the ring enters
the claim token state from normal ring state or
ring purge state. The claim token state that
comes in response to a beacon state is not
counted."
::= { tokenRingMLStatsEntry 11 }

tokenRingMLStatsClaimTokenPkts OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of claim token MAC packets
detected by the probe."
::= { tokenRingMLStatsEntry 12 }
tokenRingMLStatsNAUNChanges OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of NAUN changes detected by the
probe."
::= { tokenRingMLStatsEntry 13 }

tokenRingMLStatsLineErrors OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of line errors reported in error
reporting packets detected by the probe."
::= { tokenRingMLStatsEntry 14 }

tokenRingMLStatsInternalErrors OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of adapter internal errors
reported in error reporting packets detected by
the probe."
::= { tokenRingMLStatsEntry 15 }

tokenRingMLStatsBurstErrors OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of burst errors reported in
error reporting packets detected by the probe."
::= { tokenRingMLStatsEntry 16 }

tokenRingMLStatsACErrors OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of AC (Address Copied) errors
reported in error reporting packets detected by
the probe."
::= { tokenRingMLStatsEntry 17 }
tokenRingMLStatsAbortErrors OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of abort delimiters reported in
error reporting packets detected by the probe."
::= { tokenRingMLStatsEntry 18 }

tokenRingMLStatsLostFrameErrors OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of lost frame errors reported in
error reporting packets detected by the probe."
::= { tokenRingMLStatsEntry 19 }

tokenRingMLStatsCongestionErrors OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of receive congestion errors
reported in error reporting packets detected by
the probe."
::= { tokenRingMLStatsEntry 20 }

tokenRingMLStatsFrameCopiedErrors OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of frame copied errors reported
in error reporting packets detected by the probe."
::= { tokenRingMLStatsEntry 21 }

tokenRingMLStatsFrequencyErrors OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of frequency errors reported in
error reporting packets detected by the probe."
::= { tokenRingMLStatsEntry 22 }
tokenRingMLStatsTokenErrors OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of token errors reported in
error reporting packets detected by the probe."
 ::= { tokenRingMLStatsEntry 23 }

tokenRingMLStatsSoftErrorReports OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of soft error report frames
detected by the probe."
 ::= { tokenRingMLStatsEntry 24 }

tokenRingMLStatsRingPollEvents OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of ring poll events detected by
the probe (i.e. the number of ring polls initiated
by the active monitor that were detected)."
 ::= { tokenRingMLStatsEntry 25 }

tokenRingMLStatsOwner OBJECT-TYPE
SYNTAX OwnerString
ACCESS read-write
STATUS mandatory
DESCRIPTION
"The entity that configured this entry and is
therefore using the resources assigned to it."
 ::= { tokenRingMLStatsEntry 26 }

tokenRingMLStatsStatus OBJECT-TYPE
SYNTAX EntryStatus
ACCESS read-write
STATUS mandatory
DESCRIPTION
"The status of this tokenRingMLStats entry."
 ::= { tokenRingMLStatsEntry 27 }
-- The Token Ring Promiscuous Statistics Group
--
-- Implementation of this group is optional

tokenRingPStatsTable OBJECT-TYPE
  SYNTAX  SEQUENCE OF TokenRingPStatsEntry
  ACCESS  not-accessible
  STATUS  mandatory
  DESCRIPTION
    "A list of promiscuous Token Ring statistics entries."
  ::= { statistics 3 }

TokenRingPStatsEntry OBJECT-TYPE
  SYNTAX  TokenRingPStatsEntry
  ACCESS  not-accessible
  STATUS  mandatory
  DESCRIPTION
    "A collection of promiscuous statistics kept for non-MAC packets on a particular Token Ring interface."
  INDEX  { tokenRingPStatsIndex }
  ::= { tokenRingPStatsTable 1 }

-- As an example, an instance of the -- tokenRingPStatsDataOctets object -- might be named tokenRingPStatsDataOctets.1

TokenRingPStatsEntry ::= SEQUENCE {
  tokenRingPStatsIndex                          INTEGER,
  tokenRingPStatsDataSource               OBJECT IDENTIFIER,
  tokenRingPStatsDropEvents                     Counter,
  tokenRingPStatsDataOctets                     Counter,
  tokenRingPStatsDataPkts                       Counter,
  tokenRingPStatsDataBroadcastPkts              Counter,
  tokenRingPStatsDataMulticastPkts              Counter,
  tokenRingPStatsDataPkts18to63Octets           Counter,
  tokenRingPStatsDataPkts64to127Octets          Counter,
  tokenRingPStatsDataPkts128to255Octets         Counter,
  tokenRingPStatsDataPkts256to511Octets         Counter,
  tokenRingPStatsDataPkts512to1023Octets        Counter,
  tokenRingPStatsDataPkts1024to2047Octets       Counter,
  tokenRingPStatsDataPkts2048to4095Octets       Counter,
  tokenRingPStatsDataPkts4096to8191Octets       Counter,
  tokenRingPStatsDataPkts8192to18000Octets      Counter,
  tokenRingPStatsDataPktsGreaterThan18000Octets Counter,
  tokenRingPStatsOwner                         _OWNERSTRING,
  tokenRingPStatsStatus                         EntryStatus}
Token Ring Extensions to RMON MIB

tokenRingPStatsIndex OBJECT-TYPE
SYNTAX INTEGER (1..65535)
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The value of this object uniquely identifies this
tokenRingPStats entry."
::= { tokenRingPStatsEntry 1 }

tokenRingPStatsDataSource OBJECT-TYPE
SYNTAX OBJECT IDENTIFIER
ACCESS read-write
STATUS mandatory
DESCRIPTION
"This object identifies the source of the data
that this tokenRingPStats entry is configured to
analyze. This source can be any tokenRing
interface on this device. In order to identify a
particular interface, this object shall identify
the instance of the ifIndex object, defined in
MIB-II [3], for the desired interface. For
example, if an entry were to receive data from
interface #1, this object would be set to
ifIndex.1.

The statistics in this group reflect all non-MAC
packets on the local network segment attached to
the identified interface.

This object may not be modified if the associated
tokenRingPStatsStatus object is equal to
valid(1)."
::= { tokenRingPStatsEntry 2 }

tokenRingPStatsDropEvents OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of events in which packets were
dropped by the probe due to lack of resources.
Note that this number is not necessarily the
number of packets dropped; it is just the number
of times this condition has been detected. This
value is the same as the corresponding
tokenRingMLStatsDropEvents"
::= { tokenRingPStatsEntry 3 }

tokenRingPStatsDataOctets OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of octets of data in good frames received on the network (excluding framing bits but including FCS octets) in non-MAC packets."
::= { tokenRingPStatsEntry 4 }

tokenRingPStatsDataPkts OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of non-MAC packets in good frames received."
::= { tokenRingPStatsEntry 5 }

tokenRingPStatsDataBroadcastPkts OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of good non-MAC frames received that were directed to an LLC broadcast address (0xFFFFFFFFFFFF or 0xC000FFFFFFFF)."
::= { tokenRingPStatsEntry 6 }

tokenRingPStatsDataMulticastPkts OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of good non-MAC frames received that were directed to a local or global multicast or functional address. Note that this number does not include packets directed to the broadcast address."
::= { tokenRingPStatsEntry 7 }

tokenRingPStatsDataPkts18to63Octets OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of good non-MAC frames received that were between 18 and 63 octets in length inclusive, excluding framing bits but including FCS octets."

::= { tokenRingPStatsEntry 8 }

tokenRingPStatsDataPkts64to127Octets OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of good non-MAC frames received that were between 64 and 127 octets in length inclusive, excluding framing bits but including FCS octets."

::= { tokenRingPStatsEntry 9 }

tokenRingPStatsDataPkts128to255Octets OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of good non-MAC frames received that were between 128 and 255 octets in length inclusive, excluding framing bits but including FCS octets."

::= { tokenRingPStatsEntry 10 }

tokenRingPStatsDataPkts256to511Octets OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of good non-MAC frames received that were between 256 and 511 octets in length inclusive, excluding framing bits but including FCS octets."

::= { tokenRingPStatsEntry 11 }

tokenRingPStatsDataPkts512to1023Octets OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of good non-MAC frames received that were between 512 and 1023 octets in length inclusive, excluding framing bits but including FCS octets."
::= { tokenRingPStatsEntry 12 }

tokenRingPStatsDataPkts1024to2047Octets OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of good non-MAC frames received
that were between 1024 and 2047 octets in length
inclusive, excluding framing bits but including
FCS octets."
::= { tokenRingPStatsEntry 13 }

tokenRingPStatsDataPkts2048to4095Octets OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of good non-MAC frames received
that were between 2048 and 4095 octets in length
inclusive, excluding framing bits but including
FCS octets."
::= { tokenRingPStatsEntry 14 }

tokenRingPStatsDataPkts4096to8191Octets OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of good non-MAC frames received
that were between 4096 and 8191 octets in length
inclusive, excluding framing bits but including
FCS octets."
::= { tokenRingPStatsEntry 15 }

tokenRingPStatsDataPkts8192to18000Octets OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of good non-MAC frames received
that were between 8192 and 18000 octets in length
inclusive, excluding framing bits but including
FCS octets."
::= { tokenRingPStatsEntry 16 }

tokenRingPStatsDataPktsGreaterThan18000Octets OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of good non-MAC frames received
that were greater than 18000 octets in length,
excluding framing bits but including FCS octets."
::= { tokenRingPStatsEntry 17 }

tokenRingPStatsOwner OBJECT-TYPE
SYNTAX OwnerString
ACCESS read-write
STATUS mandatory
DESCRIPTION
"The entity that configured this entry and is
therefore using the resources assigned to it."
::= { tokenRingPStatsEntry 18 }

tokenRingPStatsStatus OBJECT-TYPE
SYNTAX EntryStatus
ACCESS read-write
STATUS mandatory
DESCRIPTION
"The status of this tokenRingPStats entry."
::= { tokenRingPStatsEntry 19 }

-- The Token Ring History Groups

-- When an entry in the historyControlTable is created that
-- identifies a token ring interface as its
-- historyControlDataSource, the probe shall create
-- corresponding entries in the tokenRingMLHistoryTable
-- and/or the tokenRingPHistoryTable, depending on which
-- groups it supports.

-- The Token Ring Mac-Layer History Group
--
-- Implementation of this group is optional.
-- Implementation of this group requires implementation of
-- the historyControl group from RFC1271.

tokenRingMLHistoryTable OBJECT-TYPE
SYNTAX SEQUENCE OF TokenRingMLHistoryEntry
ACCESS not-accessible
STATUS mandatory
DESCRIPTION
"A list of Mac-Layer Token Ring statistics
entries.
 ::= { history 3 }

tokenRingMLHistoryEntry OBJECT-TYPE
 SYNTAX TokenRingMLHistoryEntry
 ACCESS not-accessible
 STATUS mandatory
 DESCRIPTION
   "A collection of Mac-Layer statistics kept for a
   particular Token Ring interface."
 INDEX { tokenRingMLHistoryIndex,
             tokenRingMLHistorySampleIndex }
 ::= { tokenRingMLHistoryTable 1 }

-- As an example, an instance of the
-- tokenRingMLHistoryMacOctets
-- object might be named tokenRingMLHistoryMacOctets.1.27

TokenRingMLHistoryEntry ::= SEQUENCE {
   tokenRingMLHistoryIndex                     INTEGER,
   tokenRingMLHistorySampleIndex               INTEGER,
   tokenRingMLHistoryIntervalStart             TimeTicks,
   tokenRingMLHistoryDropEvents                Counter,
   tokenRingMLHistoryMacOctets                 Counter,
   tokenRingMLHistoryMacPkts                   Counter,
   tokenRingMLHistoryRingPurgeEvents           Counter,
   tokenRingMLHistoryRingPurgePkts             Counter,
   tokenRingMLHistoryBeaconEvents              Counter,
   tokenRingMLHistoryBeaconTime                TimeInterval,
   tokenRingMLHistoryBeaconPkts                Counter,
   tokenRingMLHistoryClaimTokenEvents          Counter,
   tokenRingMLHistoryClaimTokenPkts            Counter,
   tokenRingMLHistoryNAUNChanges               Counter,
   tokenRingMLHistoryLineErrors                Counter,
   tokenRingMLHistoryInternalErrors            Counter,
   tokenRingMLHistoryBurstErrors               Counter,
   tokenRingMLHistoryACErrors                  Counter,
   tokenRingMLHistoryAbortErrors               Counter,
   tokenRingMLHistoryLostFrameErrors           Counter,
   tokenRingMLHistoryCongestionErrors          Counter,
   tokenRingMLHistoryFrameCopiedErrors         Counter,
   tokenRingMLHistoryFrequencyErrors           Counter,
   tokenRingMLHistoryTokenErrors               Counter,
   tokenRingMLHistorySoftErrorReports          Counter,
   tokenRingMLHistoryRingPollEvents            Counter,
   tokenRingMLHistoryActiveStations            INTEGER
}
tokenRingMLHistoryIndex OBJECT-TYPE
SYNTAX INTEGER (1..65535)
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The history of which this entry is a part. The
history identified by a particular value of this
index is the same history as identified by the
same value of historyControlIndex."
::= { tokenRingMLHistoryEntry 1 }

tokenRingMLHistorySampleIndex OBJECT-TYPE
SYNTAX INTEGER
ACCESS read-only
STATUS mandatory
DESCRIPTION
"An index that uniquely identifies the particular
Mac-Layer sample this entry represents among all
Mac-Layer samples associated with the same
historyControlEntry. This index starts at 1 and
increases by one as each new sample is taken."
::= { tokenRingMLHistoryEntry 2 }

tokenRingMLHistoryIntervalStart OBJECT-TYPE
SYNTAX TimeTicks
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The value of sysUpTime at the start of the
interval over which this sample was measured. If
the probe keeps track of the time of day, it
should start the first sample of the history at a
time such that when the next hour of the day
begins, a sample is started at that instant. Note
that following this rule may require the probe to
delay collecting the first sample of the history,
as each sample must be of the same interval. Also
note that the sample which is currently being
collected is not accessible in this table until
the end of its interval."
::= { tokenRingMLHistoryEntry 3 }

tokenRingMLHistoryDropEvents OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of events in which packets were
dropped by the probe due to lack of resources during this sampling interval. Note that this number is not necessarily the number of packets dropped, it is just the number of times this condition has been detected.

::= { tokenRingMLHistoryEntry 4 }

tokenRingMLHistoryMacOctets OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of octets of data in MAC packets (excluding those that were not good frames) received on the network during this sampling interval (excluding framing bits but including FCS octets)."

::= { tokenRingMLHistoryEntry 5 }

tokenRingMLHistoryMacPkts OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of MAC packets (excluding those that were not good frames) received during this sampling interval."

::= { tokenRingMLHistoryEntry 6 }

tokenRingMLHistoryRingPurgeEvents OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of times that the ring entered the ring purge state from normal ring state during this sampling interval. The ring purge state that comes from the claim token or beacon state is not counted."

::= { tokenRingMLHistoryEntry 7 }

tokenRingMLHistoryRingPurgePkts OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of Ring Purge MAC packets detected by the probe during this sampling interval."
::= { tokenRingMLHistoryEntry 8 }

**tokenRingMLHistoryBeaconEvents** OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of times that the ring enters a beaconing state (beaconFrameStreamingState, beaconBitStreamingState, beaconSetRecoveryModeState, or beaconRingSignalLossState) during this sampling interval. Note that a change of the source address of the beacon packet does not constitute a new beacon event."
::= { tokenRingMLHistoryEntry 9 }

**tokenRingMLHistoryBeaconTime** OBJECT-TYPE
SYNTAX TimeInterval
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The amount of time that the ring has been in the beaconing state during this sampling interval."
::= { tokenRingMLHistoryEntry 10 }

**tokenRingMLHistoryBeaconPkts** OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of beacon MAC packets detected by the probe during this sampling interval."
::= { tokenRingMLHistoryEntry 11 }

**tokenRingMLHistoryClaimTokenEvents** OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of times that the ring enters the claim token state from normal ring state or ring purge state during this sampling interval. The claim token state that comes from the beacon state is not counted."
::= { tokenRingMLHistoryEntry 12 }
tokenRingMLHistoryClaimTokenPkts OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of claim token MAC packets
detected by the probe during this sampling
timeval."
 ::= { tokenRingMLHistoryEntry 13 }

tokenRingMLHistoryNAUNChanges OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of NAUN changes detected by the
probe during this sampling interval."
 ::= { tokenRingMLHistoryEntry 14 }

tokenRingMLHistoryLineErrors OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of line errors reported in error
reporting packets detected by the probe during
this sampling interval."
 ::= { tokenRingMLHistoryEntry 15 }

tokenRingMLHistoryInternalErrors OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of adapter internal errors
reported in error reporting packets detected by
the probe during this sampling interval."
 ::= { tokenRingMLHistoryEntry 16 }

tokenRingMLHistoryBurstErrors OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of burst errors reported in error
reporting packets detected by the probe
during this sampling interval."
 ::= { tokenRingMLHistoryEntry 17 }
tokenRingMLHistoryACErrors OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of AC (Address Copied) errors reported in error reporting packets detected by the probe during this sampling interval."
::= { tokenRingMLHistoryEntry 18 }

tokenRingMLHistoryAbortErrors OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of abort delimiters reported in error reporting packets detected by the probe during this sampling interval."
::= { tokenRingMLHistoryEntry 19 }

tokenRingMLHistoryLostFrameErrors OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of lost frame errors reported in error reporting packets detected by the probe during this sampling interval."
::= { tokenRingMLHistoryEntry 20 }

tokenRingMLHistoryCongestionErrors OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of receive congestion errors reported in error reporting packets detected by the probe during this sampling interval."
::= { tokenRingMLHistoryEntry 21 }

tokenRingMLHistoryFrameCopiedErrors OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of frame copied errors reported in error reporting packets detected by the probe during this sampling interval."
tokenRingMLHistoryFrequencyErrors OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of frequency errors reported in error reporting packets detected by the probe during this sampling interval."
 ::= { tokenRingMLHistoryEntry 22 }

tokenRingMLHistoryTokenErrors OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of token errors reported in error reporting packets detected by the probe during this sampling interval."
 ::= { tokenRingMLHistoryEntry 23 }

tokenRingMLHistorySoftErrorReports OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of soft error report frames detected by the probe during this sampling interval."
 ::= { tokenRingMLHistoryEntry 24 }

tokenRingMLHistoryRingPollEvents OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of ring poll events detected by the probe during this sampling interval."
 ::= { tokenRingMLHistoryEntry 25 }

tokenRingMLHistoryActiveStations OBJECT-TYPE
SYNTAX INTEGER
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The maximum number of active stations on the ring detected by the probe during this sampling interval."
 ::= { tokenRingMLHistoryEntry 26 }
interval."
::= { tokenRingMLHistoryEntry 27}

-- The Token Ring Promiscuous History Group
--
-- Implementation of this group is optional.
-- Implementation of this group requires the implementation
-- of the historyControl group from RFC1271.

tokenRingPHistoryTable OBJECT-TYPE
SYNTAX SEQUENCE OF TokenRingPHistoryEntry
ACCESS not-accessible
STATUS mandatory
DESCRIPTION
"A list of promiscuous Token Ring statistics
entries."
::= { history 4 }

tokenRingPHistoryEntry OBJECT-TYPE
SYNTAX TokenRingPHistoryEntry
ACCESS not-accessible
STATUS mandatory
DESCRIPTION
"A collection of promiscuous statistics kept for a
particular Token Ring interface."
INDEX { tokenRingPHistoryIndex,
tokenRingPHistorySampleIndex }
::= { tokenRingPHistoryTable 1 }

-- As an example, an instance of the
-- tokenRingPHistoryDataPkts object
-- might be named tokenRingPHistoryDataPkts.1.27

TokenRingPHistoryEntry ::= SEQUENCE {
tokenRingPHistoryIndex                          INTEGER,
tokenRingPHistorySampleIndex                    INTEGER,
tokenRingPHistoryIntervalStart                  TimeTicks,
tokenRingPHistoryDropEvents                     Counter,
tokenRingPHistoryDataOctets                     Counter,
tokenRingPHistoryDataPkts                        Counter,
tokenRingPHistoryDataBroadcastPkts              Counter,
tokenRingPHistoryDataMulticastPkts              Counter,
tokenRingPHistoryDataPkts18to63Octets            Counter,
tokenRingPHistoryDataPkts64to127Octets           Counter,
tokenRingPHistoryDataPkts128to255Octets          Counter,
tokenRingPHistoryDataPkts256to511Octets          Counter,
tokenRingPHistoryDataPkts512to1023Octets         Counter,
tokenRingPHistoryDataPkts1024to2047Octets Counter,
tokenRingPHistoryDataPkts2048to4095Octets Counter,
tokenRingPHistoryDataPkts4096to8191Octets Counter,
tokenRingPHistoryDataPkts8192to18000Octets Counter,
tokenRingPHistoryDataPktsGreaterThan18000Octets Counter}

tokenRingPHistoryIndex OBJECT-TYPE
SYNTAX INTEGER (1..65535)
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The history of which this entry is a part. The
history identified by a particular value of this
index is the same history as identified by the
same value of historyControlIndex."
::= { tokenRingPHistoryEntry 1 }

tokenRingPHistorySampleIndex OBJECT-TYPE
SYNTAX INTEGER
ACCESS read-only
STATUS mandatory
DESCRIPTION
"An index that uniquely identifies the particular
sample this entry represents among all samples
associated with the same historyControlEntry.
This index starts at 1 and increases by one as
each new sample is taken."
::= { tokenRingPHistoryEntry 2 }

tokenRingPHistoryIntervalStart OBJECT-TYPE
SYNTAX TimeTicks
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The value of sysUpTime at the start of the
interval over which this sample was measured. If
the probe keeps track of the time of day, it
should start the first sample of the history at a
time such that when the next hour of the day
begins, a sample is started at that instant. Note
that following this rule may require the probe to
delay collecting the first sample of the history,
as each sample must be of the same interval. Also
note that the sample which is currently being
collected is not accessible in this table until
the end of its interval."
::= { tokenRingPHistoryEntry 3 }
tokenRingPHistoryDropEvents OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of events in which packets were dropped by the probe due to lack of resources during this sampling interval. Note that this number is not necessarily the number of packets dropped, it is just the number of times this condition has been detected."
 ::= { tokenRingPHistoryEntry 4 }

tokenRingPHistoryDataOctets OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of octets of data in good frames received on the network (excluding framing bits but including FCS octets) in non-MAC packets during this sampling interval."
 ::= { tokenRingPHistoryEntry 5 }

tokenRingPHistoryDataPkts OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of good non-MAC frames received during this sampling interval."
 ::= { tokenRingPHistoryEntry 6 }

tokenRingPHistoryDataBroadcastPkts OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of good non-MAC frames received during this sampling interval that were directed to an LLC broadcast address (0xFFFFFFFFFFFF or 0xC000FFFFFF)."
 ::= { tokenRingPHistoryEntry 7 }

tokenRingPHistoryDataMulticastPkts OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
    "The total number of good non-MAC frames received during this sampling interval that were directed to a local or global multicast or functional address. Note that this number does not include packets directed to the broadcast address."

::= { tokenRingPHistoryEntry 8 }

tokenRingPHistoryDataPkts18to63Octets OBJECT-TYPE
    SYNTAX Counter
    ACCESS read-only
    STATUS mandatory
    DESCRIPTION
    "The total number of good non-MAC frames received during this sampling interval that were between 18 and 63 octets in length inclusive, excluding framing bits but including FCS octets."

::= { tokenRingPHistoryEntry 9 }

tokenRingPHistoryDataPkts64to127Octets OBJECT-TYPE
    SYNTAX Counter
    ACCESS read-only
    STATUS mandatory
    DESCRIPTION
    "The total number of good non-MAC frames received during this sampling interval that were between 64 and 127 octets in length inclusive, excluding framing bits but including FCS octets."

::= { tokenRingPHistoryEntry 10 }

tokenRingPHistoryDataPkts128to255Octets OBJECT-TYPE
    SYNTAX Counter
    ACCESS read-only
    STATUS mandatory
    DESCRIPTION
    "The total number of good non-MAC frames received during this sampling interval that were between 128 and 255 octets in length inclusive, excluding framing bits but including FCS octets."

::= { tokenRingPHistoryEntry 11 }

tokenRingPHistoryDataPkts256to511Octets OBJECT-TYPE
    SYNTAX Counter
    ACCESS read-only
    STATUS mandatory
    DESCRIPTION
    "The total number of good non-MAC frames received during this sampling interval that were between
256 and 511 octets in length inclusive, excluding framing bits but including FCS octets."
::= { tokenRingPHistoryEntry 12 }

tokenRingPHistoryDataPkts512to1023Octets OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of good non-MAC frames received during this sampling interval that were between 512 and 1023 octets in length inclusive, excluding framing bits but including FCS octets."
::= { tokenRingPHistoryEntry 13 }

tokenRingPHistoryDataPkts1024to2047Octets OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of good non-MAC frames received during this sampling interval that were between 1024 and 2047 octets in length inclusive, excluding framing bits but including FCS octets."
::= { tokenRingPHistoryEntry 14 }

tokenRingPHistoryDataPkts2048to4095Octets OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of good non-MAC frames received during this sampling interval that were between 2048 and 4095 octets in length inclusive, excluding framing bits but including FCS octets."
::= { tokenRingPHistoryEntry 15 }

tokenRingPHistoryDataPkts4096to8191Octets OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of good non-MAC frames received during this sampling interval that were between 4096 and 8191 octets in length inclusive, excluding framing bits but including FCS octets."
::= { tokenRingPHistoryEntry 16 }
tokenRingPHistoryDataPkts8192to18000Octets OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of good non-MAC frames received
during this sampling interval that were between
8192 and 18000 octets in length inclusive,
excluding framing bits but including FCS octets."
::= { tokenRingPHistoryEntry 17 }

tokenRingPHistoryDataPktsGreaterThan18000Octets OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of good non-MAC frames received
during this sampling interval that were greater
than 18000 octets in length, excluding framing
bits but including FCS octets."
::= { tokenRingPHistoryEntry 18 }

-- The Token Ring Ring Station Group
--
-- Implementation of this group is optional
--
-- Although the ringStationTable stores entries only for
-- those stations physically attached to the local ring and
-- the number of stations attached to a ring is limited, a
-- probe may still need to free resources when resources
-- grow tight. In such a situation, it is suggested that
-- the probe free only inactive stations, and to
-- first free the stations that have been inactive for the
-- longest time.

ringStationControlTable OBJECT-TYPE
SYNTAX SEQUENCE OF RingStationControlEntry
ACCESS not-accessible
STATUS mandatory
DESCRIPTION
"A list of ringStation table control entries."
::= { tokenRing 1 }

ringStationControlEntry OBJECT-TYPE
SYNTAX RingStationControlEntry
ACCESS not-accessible
STATUS mandatory
DESCRIPTION

"A list of parameters that set up the discovery of stations on a particular interface and the collection of statistics about these stations."

INDEX { ringStationControlIfIndex }
 ::= { ringStationControlTable 1 }

-- As an example, an instance of the
-- ringStationControlIfIndex object
-- might be named ringStationControlIfIndex.1

RingStationControlEntry ::= SEQUENCE {
  ringStationControlIfIndex          INTEGER,
  ringStationControlTableSize        INTEGER,
  ringStationControlActiveStations   INTEGER,
  ringStationControlRingState        INTEGER,
  ringStationControlBeaconSender     MacAddress,
  ringStationControlBeaconNAUN       MacAddress,
  ringStationControlActiveMonitor    MacAddress,
  ringStationControlOrderChanges     Counter,
  ringStationControlOwner            OwnerString,
  ringStationControlStatus           EntryStatus
}

ringStationControlIfIndex OBJECT-TYPE
SYNTAX INTEGER (1..65535)
ACCESS read-only
STATUS mandatory
DESCRIPTION

"The value of this object uniquely identifies the interface on this remote network monitoring device from which ringStation data is collected. The interface identified by a particular value of this object is the same interface as identified by the same value of the ifIndex object, defined in MIB-II [3]."

 ::= { ringStationControlEntry 1 }

ringStationControlTableSize OBJECT-TYPE
SYNTAX INTEGER
ACCESS read-only
STATUS mandatory
DESCRIPTION

"The number of ringStationEntries in the ringStationTable associated with this ringStationControlEntry."

 ::= { ringStationControlEntry 2 }
ringStationControlActiveStations OBJECT-TYPE
SYNTAX INTEGER
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The number of active ringStationEntries in the
ringStationTable associated with this
ringStationControlEntry."
::= { ringStationControlEntry 3 }

ringStationControlRingState OBJECT-TYPE
SYNTAX INTEGER {
   normalOperation(1),
   ringPurgeState(2),
   claimTokenState(3),
   beaconFrameStreamingState(4),
   beaconBitStreamingState(5),
   beaconRingSignalLossState(6),
   beaconSetRecoveryModeState(7)
}
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The current status of this ring."
::= { ringStationControlEntry 4 }

ringStationControlBeaconSender OBJECT-TYPE
SYNTAX MacAddress
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The address of the sender of the last beacon
frame received by the probe on this ring. If no
beacon frames have been received, this object
shall be equal to six octets of zero."
::= { ringStationControlEntry 5 }

ringStationControlBeaconNAUN OBJECT-TYPE
SYNTAX MacAddress
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The address of the NAUN in the last beacon frame
received by the probe on this ring. If no beacon
frames have been received, this object shall be
equal to six octets of zero."
::= { ringStationControlEntry 6 }
ringStationControlActiveMonitor OBJECT-TYPE
SYNTAX MacAddress
ACCESS read-only
STATUS mandatory
DESCRIPTION
   "The address of the Active Monitor on this
   segment. If this address is unknown, this object
   shall be equal to six octets of zero."
 ::= { ringStationControlEntry 7 }

ringStationControlOrderChanges OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
   "The number of add and delete events in the
   ringStationOrderTable optionally associated with
   this ringStationControlEntry."
 ::= { ringStationControlEntry 8 }

ringStationControlOwner OBJECT-TYPE
SYNTAX OwnerString
ACCESS read-write
STATUS mandatory
DESCRIPTION
   "The entity that configured this entry and is
   therefore using the resources assigned to it."
 ::= { ringStationControlEntry 9 }

ringStationControlStatus OBJECT-TYPE
SYNTAX EntryStatus
ACCESS read-write
STATUS mandatory
DESCRIPTION
   "The status of this ringStationControl entry.
   If this object is not equal to valid(1), all
   associated entries in the ringStationTable shall
   be deleted by the agent."
 ::= { ringStationControlEntry 10 }

ringStationTable OBJECT-TYPE
SYNTAX SEQUENCE OF RingStationEntry
ACCESS not-accessible
STATUS mandatory
DESCRIPTION
   "A list of ring station entries. An entry will
   exist for each station that is now or has
previously been detected as physically present on this ring."
 ::= { tokenRing 2 }

ringStationEntry OBJECT-TYPE
SYNTAX  RingStationEntry
ACCESS not-accessible
STATUS mandatory
DESCRIPTION
"A collection of statistics for a particular station that has been discovered on a ring monitored by this device."
INDEX { ringStationIfIndex, ringStationMacAddress }
 ::= { ringStationTable 1 }

-- As an example, an instance of the
-- ringStationStationStatus object might be named
-- ringStationStationStatus.1.16.0.90.0.64.131

RingStationEntry ::= SEQUENCE {
  ringStationIfIndex                INTEGER,
  ringStationMacAddress             MacAddress,
  ringStationLastNAUN               MacAddress,
  ringStationStationStatus          INTEGER,
  ringStationLastEnterTime          TimeTicks,
  ringStationLastExitTime           TimeTicks,
  ringStationDuplicateAddresses     Counter,
  ringStationInLineErrors           Counter,
  ringStationOutLineErrors          Counter,
  ringStationInternalErrors         Counter,
  ringStationInBurstErrors          Counter,
  ringStationOutBurstErrors         Counter,
  ringStationACErrors               Counter,
  ringStationAbortErrors            Counter,
  ringStationLostFrameErrors        Counter,
  ringStationCongestionErrors       Counter,
  ringStationFrameCopiedErrors      Counter,
  ringStationFrequencyErrors        Counter,
  ringStationTokenErrors            Counter,
  ringStationInBeaconErrors         Counter,
  ringStationOutBeaconErrors        Counter,
  ringStationInsertions             Counter
}

ringStationIfIndex OBJECT-TYPE
SYNTAX  INTEGER
ACCESS read-only
STATUS mandatory
DESCRIPTION

"The value of this object uniquely identifies the interface on this remote network monitoring device on which this station was detected. The interface identified by a particular value of this object is the same interface as identified by the same value of the ifIndex object, defined in MIB-II [3]."

::= { ringStationEntry 1 }

ringStationMacAddress OBJECT-TYPE
SYNTAX MacAddress
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The physical address of this station."
::= { ringStationEntry 2 }

ringStationLastNAUN OBJECT-TYPE
SYNTAX MacAddress
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The physical address of last known NAUN of this station."
::= { ringStationEntry 3 }

ringStationStationStatus OBJECT-TYPE
SYNTAX INTEGER {
  active(1), -- actively participating in ring poll.
  inactive(2), -- Not participating in ring poll
  forcedRemoval(3) -- Forced off ring by network management.
}
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The status of this station on the ring."
::= { ringStationEntry 4 }

ringStationLastEnterTime OBJECT-TYPE
SYNTAX TimeTicks
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The value of sysUpTime at the time this station last entered the ring. If the time is unknown, this value shall be zero."
::= { ringStationEntry 5 }
ringStationLastExitTime OBJECT-TYPE
SYNTAX TimeTicks
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The value of sysUpTime at the time the probe
detected that this station last exited the ring.
If the time is unknown, this value shall be zero."
 ::= { ringStationEntry 6 }

ringStationDuplicateAddresses OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The number of times this station experienced a
duplicate address error."
 ::= { ringStationEntry 7 }

ringStationInLineErrors OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of line errors reported by this
station in error reporting packets detected by the
probe."
 ::= { ringStationEntry 8 }

ringStationOutLineErrors OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of line errors reported in error
reporting packets sent by the nearest active
downstream neighbor of this station and detected
by the probe."
 ::= { ringStationEntry 9 }

ringStationInternalErrors OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of adapter internal errors
reported by this station in error reporting
packets detected by the probe."
::= { ringStationEntry 10 }

ringStationInBurstErrors OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of burst errors reported by this
station in error reporting packets detected by the
probe."
 ::= { ringStationEntry 11 }

ringStationOutBurstErrors OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of burst errors reported in
error reporting packets sent by the nearest active
downstream neighbor of this station and detected
by the probe."
 ::= { ringStationEntry 12 }

ringStationACErrors OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of AC (Address Copied) errors
reported in error reporting packets sent by the
nearest active downstream neighbor of this station
and detected by the probe."
 ::= { ringStationEntry 13 }

ringStationAbortErrors OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of abort delimiters reported by
this station in error reporting packets detected
by the probe."
 ::= { ringStationEntry 14 }

ringStationLostFrameErrors OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of lost frame errors reported by
this station in error reporting packets detected
by the probe."
::= { ringStationEntry 15 }

ringStationCongestionErrors OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of receive congestion errors
reported by this station in error reporting
packets detected by the probe."
::= { ringStationEntry 16 }

ringStationFrameCopiedErrors OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of frame copied errors reported
by this station in error reporting packets
detected by the probe."
::= { ringStationEntry 17 }

ringStationFrequencyErrors OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of frequency errors reported by
this station in error reporting packets detected
by the probe."
::= { ringStationEntry 18 }

ringStationTokenErrors OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of token errors reported by this
station in error reporting frames detected by the
probe."
::= { ringStationEntry 19 }

ringStationInBeaconErrors OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of beacon frames sent by this
station and detected by the probe."
 ::= { ringStationEntry 20 }

ringStationOutBeaconErrors OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of beacon frames detected by the
probe that name this station as the NAUN."
 ::= { ringStationEntry 21 }

ringStationInsertions OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The number of times the probe detected this
station inserting onto the ring."
 ::= { ringStationEntry 22 }

-- The Token Ring Ring Station Order Group
--
-- Implementation of this group is optional
--
-- The ringStationOrderTable

ringStationOrderTable OBJECT-TYPE
SYNTAX SEQUENCE OF RingStationOrderEntry
ACCESS not-accessible
STATUS mandatory
DESCRIPTION
"A list of ring station entries for stations in
the ring poll, ordered by their ring-order."
 ::= { tokenRing 3 }

ringStationOrderEntry OBJECT-TYPE
SYNTAX RingStationOrderEntry
ACCESS not-accessible
STATUS mandatory
DESCRIPTION
"A collection of statistics for a particular
station that is active on a ring monitored by this
device. This table will contain information for
every interface that has a
ringStationControlStatus equal to valid."
INDEX { ringStationOrderIfIndex,
          ringStationOrderOrderIndex }
::= { ringStationOrderTable 1 }

-- As an example, an instance of the
-- ringStationOrderMacAddress object might be named
-- ringStationOrderMacAddress.1.14

RingStationOrderEntry ::= SEQUENCE {
    ringStationOrderIfIndex             INTEGER,
    ringStationOrderOrderIndex          INTEGER,
    ringStationOrderMacAddress          MacAddress
}

ringStationOrderIfIndex OBJECT-TYPE
SYNTAX INTEGER
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The value of this object uniquely identifies the
interface on this remote network monitoring device
on which this station was detected. The interface
identified by a particular value of this object is
the same interface as identified by the same value
of the ifIndex object, defined in MIB-II [3]."
::= { ringStationOrderEntry 1 }

ringStationOrderOrderIndex OBJECT-TYPE
SYNTAX INTEGER
ACCESS read-only
STATUS mandatory
DESCRIPTION
"This index denotes the location of this station
with respect to other stations on the ring. This
index is one more than the number of hops
downstream that this station is from the rmon
probe. The rmon probe itself gets the value one."
::= { ringStationOrderEntry 2 }

ringStationOrderMacAddress OBJECT-TYPE
SYNTAX MacAddress
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The physical address of this station."
 ::= { ringStationOrderEntry 3 }

-- The Token Ring Ring Station Config Group
-- Implementation of this group is optional.
-- The ring station config group manages token ring nodes
-- through active means.

ringStationConfigControlTable OBJECT-TYPE
    SYNNTAX SEQUENCE OF RingStationConfigControlEntry
    ACCESS not-accessible
    STATUS mandatory
    DESCRIPTION
        "A list of ring station configuration control
         entries."
    ::= { tokenRing 4 }

ringStationConfigControlEntry OBJECT-TYPE
    SYNNTAX RingStationConfigControlEntry
    ACCESS not-accessible
    STATUS mandatory
    DESCRIPTION
        "This entry controls active management of stations
         by the probe. One entry exists in this table for
         each active station in the ringStationTable."
    INDEX { ringStationConfigControlIfIndex,
                 ringStationConfigControlMacAddress }
    ::= { ringStationConfigControlTable 1 }

-- As an example, an instance of the
-- ringStationConfigControlRemove object might be named
-- ringStationConfigControlRemove.1.16.0.90.0.64.131

RingStationConfigControlEntry ::= SEQUENCE {
    ringStationConfigControlIfIndex         INTEGER,
    ringStationConfigControlMacAddress      MacAddress,
    ringStationConfigControlRemove          INTEGER,
    ringStationConfigControlUpdateStats     INTEGER
}

ringStationConfigControlIfIndex OBJECT-TYPE
    SYNNTAX INTEGER
    ACCESS read-only
    STATUS mandatory
    DESCRIPTION
        "The value of this object uniquely identifies the
interface on this remote network monitoring device on which this station was detected. The interface identified by a particular value of this object is the same interface as identified by the same value of the ifIndex object, defined in MIB-II [3]."

::= { ringStationConfigControlEntry 1 }

ringStationConfigControlMacAddress OBJECT-TYPE
   SYNTAX MacAddress
   ACCESS read-only
   STATUS mandatory
   DESCRIPTION
      "The physical address of this station."
   ::= { ringStationConfigControlEntry 2 }

ringStationConfigControlRemove OBJECT-TYPE
   SYNTAX INTEGER {
      stable(1),
      removing(2)
   }
   ACCESS read-write
   STATUS mandatory
   DESCRIPTION
      "Setting this object to 'removing(2)' causes a Remove Station MAC frame to be sent. The agent will set this object to 'stable(1)' after processing the request."
   ::= { ringStationConfigControlEntry 3 }

ringStationConfigControlUpdateStats OBJECT-TYPE
   SYNTAX INTEGER {
      stable(1),
      updating(2)
   }
   ACCESS read-write
   STATUS mandatory
   DESCRIPTION
      "Setting this object to 'updating(2)' causes the configuration information associate with this entry to be updated. The agent will set this object to 'stable(1)' after processing the request."
   ::= { ringStationConfigControlEntry 4 }
-- The ringStationConfig Table

-- Entries exist in this table after an active
-- configuration query has completed successfully for
-- a station. This query is initiated by the associated
-- ringStationConfigControlUpdateStats variable.

ringStationConfigTable OBJECT-TYPE
SYNTAX SEQUENCE OF RingStationConfigEntry
ACCESS not-accessible
STATUS mandatory
DESCRIPTION
"A list of configuration entries for stations on a
ring monitored by this probe."
 ::= { tokenRing 5 }

ringStationConfigEntry OBJECT-TYPE
SYNTAX RingStationConfigEntry
ACCESS not-accessible
STATUS mandatory
DESCRIPTION
"A collection of statistics for a particular
station that has been discovered on a ring
monitored by this probe."
INDEX { ringStationConfigIfIndex,
  ringStationConfigMacAddress }
 ::= { ringStationConfigTable 1 }

-- As an example, an instance of the
-- ringStationConfigLocation object might be named
-- ringStationConfigLocation.1.16.0.90.0.64.131

RingStationConfigEntry ::= SEQUENCE {
  ringStationConfigIfIndex            INTEGER,
  ringStationConfigMacAddress         MacAddress,
  ringStationConfigUpdateTime         TimeTicks,
  ringStationConfigLocation           OCTET STRING,
  ringStationConfigMicrocode          OCTET STRING,
  ringStationConfigGroupAddress       OCTET STRING,
  ringStationConfigFunctionalAddress  OCTET STRING
}

ringStationConfigIfIndex OBJECT-TYPE
SYNTAX INTEGER
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The value of this object uniquely identifies the
interface on this remote network monitoring device on which this station was detected. The interface identified by a particular value of this object is the same interface as identified by the same value of the ifIndex object, defined in MIB-II [3]."

```plaintext
::= { ringStationConfigEntry 1 }
```

```
ringStationConfigMacAddress  OBJECT-TYPE
SYNTAX  MacAddress
ACCESS read-only
STATUS mandatory
DESCRIPTION
   "The physical address of this station."
 ::= { ringStationConfigEntry 2 }
```

```
ringStationConfigUpdateTime  OBJECT-TYPE
SYNTAX  TimeTicks
ACCESS read-only
STATUS mandatory
DESCRIPTION
   "The value of sysUpTime at the time this configuration information was last updated (completely)."
 ::= { ringStationConfigEntry 3 }
```

```
ringStationConfigLocation  OBJECT-TYPE
SYNTAX  OCTET STRING (SIZE(4))
ACCESS read-only
STATUS mandatory
DESCRIPTION
   "The assigned physical location of this station."
 ::= { ringStationConfigEntry 4 }
```

```
ringStationConfigMicrocode  OBJECT-TYPE
SYNTAX  OCTET STRING (SIZE(10))
ACCESS read-only
STATUS mandatory
DESCRIPTION
   "The microcode EC level of this station."
 ::= { ringStationConfigEntry 5 }
```

```
ringStationConfigGroupAddress  OBJECT-TYPE
SYNTAX  OCTET STRING (SIZE(4))
ACCESS read-only
STATUS mandatory
DESCRIPTION
   "The low-order 4 octets of the group address recognized by this station."
```
::= { ringStationConfigEntry 6 }

ringStationConfigFunctionalAddress OBJECT-TYPE
SYNTAX OCTET STRING (SIZE(4))
ACCESS read-only
STATUS mandatory
DESCRIPTION "the functional addresses recognized by this station."
::= { ringStationConfigEntry 7 }

-- The Token Ring Source Routing group
--
-- Implementation of this group is optional.
-- The data in this group is collected from the source
-- routing information potentially present in any token ring
-- packet. This information will be valid only in a pure
-- source route bridging environment. In a transparent
-- bridging or a mixed bridging environment, this
-- information may not be accurate.

sourceRoutingStatsTable OBJECT-TYPE
SYNTAX SEQUENCE OF SourceRoutingStatsEntry
ACCESS not-accessible
STATUS mandatory
DESCRIPTION "A list of source routing statistics entries."
::= { tokenRing 6 }

sourceRoutingStatsEntry OBJECT-TYPE
SYNTAX SourceRoutingStatsEntry
ACCESS not-accessible
STATUS mandatory
DESCRIPTION "A collection of source routing statistics kept for a particular Token Ring interface."
INDEX { sourceRoutingStatsIfIndex }
::= { sourceRoutingStatsTable 1 }

-- As an example, an instance of the
-- sourceRoutingStatsInFrames object might be named
-- sourceRoutingStatsInFrames.1

SourceRoutingStatsEntry ::= SEQUENCE {
  sourceRoutingStatsIfIndex                  INTEGER,
  sourceRoutingStatsRingNumber               INTEGER,
  sourceRoutingStatsInFrames                 Counter,
-- in to our net
sourceRoutingStatsOutFrames Counter,
-- out from our net
sourceRoutingStatsThroughFrames Counter,
-- through our net
sourceRoutingStatsAllRoutesBroadcastFrames Counter,
sourceRoutingStatsSingleRouteBroadcastFrames Counter,
sourceRoutingStatsInOctets Counter,
sourceRoutingStatsOutOctets Counter,
sourceRoutingStatsThroughOctets Counter,
sourceRoutingStatsAllRoutesBroadcastOctets Counter,
sourceRoutingStatsSingleRoutesBroadcastOctets Counter,
sourceRoutingStatsLocalLLCFrames Counter,
sourceRoutingStats1HopFrames Counter,
sourceRoutingStats2HopsFrames Counter,
sourceRoutingStats3HopsFrames Counter,
sourceRoutingStats4HopsFrames Counter,
sourceRoutingStats5HopsFrames Counter,
sourceRoutingStats6HopsFrames Counter,
sourceRoutingStats7HopsFrames Counter,
sourceRoutingStats8HopsFrames Counter,
sourceRoutingStatsMoreThan8HopsFrames Counter,
sourceRoutingStatsOwner OwnerString,
sourceRoutingStatsStatus EntryStatus
}
	sourceRoutingStatsIfIndex OBJECT-TYPE
SYNTAX INTEGER
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The value of this object uniquely identifies the interface on this remote network monitoring device on which source routing statistics will be detected. The interface identified by a particular value of this object is the same interface as identified by the same value of the ifIndex object, defined in MIB-II [3]."
::= { sourceRoutingStatsEntry 1 }
	sourceRoutingStatsRingNumber OBJECT-TYPE
SYNTAX INTEGER
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The ring number of the ring monitored by this entry. When any object in this entry is created, the probe will attempt to discover the ring number. Only after the ring number is discovered will this object be created. After creating an object in this entry, the management station should poll this object to detect when it is created. Only after this object is created can the management station set the sourceRoutingStatsStatus entry to valid(1)."

::= { sourceRoutingStatsEntry 2 }

sourceRoutingStatsInFrames OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The count of frames sent into this ring from another ring."
 ::= { sourceRoutingStatsEntry 3 }

sourceRoutingStatsOutFrames OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The count of frames sent from this ring to another ring."
 ::= { sourceRoutingStatsEntry 4 }

sourceRoutingStatsThroughFrames OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The count of frames sent from another ring, through this ring, to another ring."
 ::= { sourceRoutingStatsEntry 5 }

sourceRoutingStatsAllRoutesBroadcastFrames OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of good frames received that were All Routes Broadcast."
 ::= { sourceRoutingStatsEntry 6 }
sourceRoutingStatsSingleRouteBroadcastFrames OBJECT-TYPE
   SYNTAX Counter
   ACCESS read-only
   STATUS mandatory
   DESCRIPTION
      "The total number of good frames received that
       were Single Route Broadcast."
   ::= { sourceRoutingStatsEntry 7 }

sourceRoutingStatsInOctets OBJECT-TYPE
   SYNTAX Counter
   ACCESS read-only
   STATUS mandatory
   DESCRIPTION
      "The count of octets in good frames sent into this
       ring from another ring."
   ::= { sourceRoutingStatsEntry 8 }

sourceRoutingStatsOutOctets OBJECT-TYPE
   SYNTAX Counter
   ACCESS read-only
   STATUS mandatory
   DESCRIPTION
      "The count of octets in good frames sent from this
       ring to another ring."
   ::= { sourceRoutingStatsEntry 9 }

sourceRoutingStatsThroughOctets OBJECT-TYPE
   SYNTAX Counter
   ACCESS read-only
   STATUS mandatory
   DESCRIPTION
      "The count of octets in good frames sent another
       ring, through this ring, to another ring."
   ::= { sourceRoutingStatsEntry 10 }

sourceRoutingStatsAllRoutesBroadcastOctets OBJECT-TYPE
   SYNTAX Counter
   ACCESS read-only
   STATUS mandatory
   DESCRIPTION
      "The total number of octets in good frames
       received that were All Routes Broadcast."
   ::= { sourceRoutingStatsEntry 11 }

sourceRoutingStatsSingleRoutesBroadcastOctets OBJECT-TYPE
   SYNTAX Counter
   ACCESS read-only
sourceRoutingStatsLocalLLCFrames OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of frames received who had no
RIF field (or had a RIF field that only included
the local ring’s number) and were not All Route
Broadcast Frames."
::= { sourceRoutingStatsEntry 13 }

sourceRoutingStats1HopFrames OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of frames received whose route
had 1 hop, were not All Route Broadcast Frames,
and whose source or destination were on this ring
(i.e. frames that had a RIF field and had this
ring number in the first or last entry of the RIF
field)."
::= { sourceRoutingStatsEntry 14 }

sourceRoutingStats2HopsFrames OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of frames received whose route
had 2 hops, were not All Route Broadcast Frames,
and whose source or destination were on this ring
(i.e. frames that had a RIF field and had this
ring number in the first or last entry of the RIF
field)."
::= { sourceRoutingStatsEntry 15 }

sourceRoutingStats3HopsFrames OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
 "The total number of frames received whose route had 3 hops, were not All Route Broadcast Frames, and whose source or destination were on this ring (i.e. frames that had a RIF field and had this ring number in the first or last entry of the RIF field)."

::= { sourceRoutingStatsEntry 16 }

sourceRoutingStats4HopsFrames OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
 "The total number of frames received whose route had 4 hops, were not All Route Broadcast Frames, and whose source or destination were on this ring (i.e. frames that had a RIF field and had this ring number in the first or last entry of the RIF field)."

::= { sourceRoutingStatsEntry 17 }

sourceRoutingStats5HopsFrames OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
 "The total number of frames received whose route had 5 hops, were not All Route Broadcast Frames, and whose source or destination were on this ring (i.e. frames that had a RIF field and had this ring number in the first or last entry of the RIF field)."

::= { sourceRoutingStatsEntry 18 }

sourceRoutingStats6HopsFrames OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
 "The total number of frames received whose route had 6 hops, were not All Route Broadcast Frames, and whose source or destination were on this ring (i.e. frames that had a RIF field and had this ring number in the first or last entry of the RIF field)."

::= { sourceRoutingStatsEntry 19 }

sourceRoutingStats7HopsFrames OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of frames received whose route had 7 hops, were not All Route Broadcast Frames, and whose source or destination were on this ring (i.e. frames that had a RIF field and had this ring number in the first or last entry of the RIF field)."
::= { sourceRoutingStatsEntry 20 }

sourceRoutingStats8HopsFrames OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of frames received whose route had 8 hops, were not All Route Broadcast Frames, and whose source or destination were on this ring (i.e. frames that had a RIF field and had this ring number in the first or last entry of the RIF field)."
::= { sourceRoutingStatsEntry 21 }

sourceRoutingStatsMoreThan8HopsFrames OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of frames received whose route had more than 8 hops, were not All Route Broadcast Frames, and whose source or destination were on this ring (i.e. frames that had a RIF field and had this ring number in the first or last entry of the RIF field)."
::= { sourceRoutingStatsEntry 22 }

sourceRoutingStatsOwner OBJECT-TYPE
SYNTAX OwnerString
ACCESS read-write
STATUS mandatory
DESCRIPTION
"The entity that configured this entry and is therefore using the resources assigned to it."
::= { sourceRoutingStatsEntry 23 }

sourceRoutingStatsStatus OBJECT-TYPE
SYNTAX EntryStatus
ACCESS read-write
STATUS mandatory
DESCRIPTION
"The status of this sourceRoutingStats entry."
::= { sourceRoutingStatsEntry 24 }

6. References


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8. Security Considerations

Security issues are not discussed in this memo.

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