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IPCablecom 1.5 Part 21: Signaling Extension MIB
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1 SCOPE

1.1 Purpose of the Document

New objects that are being introduced beyond IPCablecom 1.0 for Signaling MIBS are being grouped in this document so that the additional changes made can be tracked easily.

1.2 Requirements

Throughout this document, the words that are used to define the significance of particular requirements are capitalized. These words are:

"MUST" This word means that the item is an absolute requirement of this specification.

"MUST NOT" This phrase means that the item is an absolute prohibition of this specification.

"SHOULD" This word means that there may exist valid reasons in particular circumstances to ignore this item, but the full implications should be understood and the case carefully weighed before choosing a different course.

"SHOULD NOT" This phrase means that there may exist valid reasons in particular circumstances when the listed behavior is acceptable or even useful, but the full implications should be understood and the case carefully weighed before implementing any behavior described with this label.

"MAY" This word means that this item is truly optional. One vendor may choose to include the item because a particular marketplace requires it or because it enhances the product, for example; another vendor may omit the same item.
2 REFERENCES

The following documents contain provisions which, through reference in this text, constitute provisions of this standard. At the time of Subcommittee approval, the editions indicated were valid. All documents are subject to revision, and while parties to agreement based on this standard are encouraged to investigate the possibility of applying the most recent editions of the documents listed below, they are reminded that newer editions of those documents might not be compatible with the referenced version.

2.1 Normative References

[8] ANSI/SCTE 107 2009, Embedded Cable Modem Devices
[12] ANSI/SCTE 165-08 2016, IPCablecom 1.5 Part 8: Signaling MIB.

2.2 Informative References

In order to claim compliance with this standard, it is necessary to conform to the following standards and other works as indicated, in addition to the other requirements of this standard. Intellectual property rights may be required to implement these references.


[26] IETF RFC 2782, A DNS RR for specifying the location of services (DNS SRV), February 2000.


2.3 Reference Acquisition

- Cable Television Laboratories, Inc., 858 Coal Creek Circle, Louisville, CO 80027; Phone +1-303-661-9100; Fax +1-303-661-9199; Internet: http://www.cablelabs.com/.

- Internet Engineering Task Force (IETF) Secretariat c/o Corporation for National Research Initiatives, 1895 Preston White Drive, Suite 100, Reston, VA 20191-5434, Phone +1-703-620-8990, Fax +1-703-620-9071, Internet: www.ietf.org/

3 ABBREVIATIONS

There are no abbreviations used in this document.
4 REQUIREMENTS

The IPCablecom Extension Signaling MIB MUST be implemented as defined below.

PKTC-EN-SIG-MIB DEFINITIONS ::= BEGIN

IMPORTS
   MODULE-IDENTITY, OBJECT-TYPE, Unsigned32, BITS FROM SNMPv2-SMI
   ifIndex FROM IF-MIB
   SnmpAdminString FROM SNMP-FRAMEWORK-MIB
   TruthValue FROM SNMPv2-TC
   OBJECT-GROUP, MODULE-COMPLIANCE
   FROM SNMPv2-CONF
   pktcEnhancements FROM CLAB-DEF-MIB
   pktcNcsEndPntConfigEntry FROM PKTC-SIG-MIB;

pktcEnSigMib MODULE-IDENTITY
   LAST-UPDATED "201208130000Z" -- August 13, 2012
   ORGANIZATION "Cable Television Laboratories, Inc"
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   DESCRIPTION
     "This MIB module enhances the basic management
     objects defined for PacketCable Signaling
     protocols by the MIB group pktcSigMib.

     Acknowledgements:
     Rodney Osborne - Arris Interactive
     Eugene Nechamkin - Broadcom Corporation
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   REVISION "2012081300000Z" -- August 13, 2009

   DESCRIPTION
     "Revised Version includes ECNs
     MIB-EXSIG1.5-N-12.0689-2-M
     and published as part of PKT-SP-MIB-EXSIG1.5-I05-121030"
REVISION "2009061500002" -- June 15, 2009

DESCRIPTION
"Revised Version includes ECNs
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and published as part of PKT-SP-MIB-EXSIG1.5-I04-090624"

REVISION "2007041200002"

DESCRIPTION
"This revision is being published as part of the PacketCable
Signaling MIBs I03 enhancements for PacketCable 1.5."

REVISION "2005081200002"

DESCRIPTION
"This revision is being published as part of the PacketCable
Signaling MIBs enhancements for PacketCable 1.5."

::= { pktcEnhancements 2 }

-- Enhanced MIB Objects and Divisions.

pktcEnSigMibObjects OBJECT IDENTIFIER ::= { pktcEnSigMib 1 }
pktcEnSigDevConfigObjects OBJECT IDENTIFIER ::= { pktcEnSigMibObjects 1 }
pktcEnNcsEndPntConfigObjects OBJECT IDENTIFIER ::= { pktcEnSigMibObjects 2 }
pktcEnSigEndPntConfigObjects OBJECT IDENTIFIER ::= { pktcEnSigMibObjects 3 }
pktcEnDcsEndPntConfigObjects OBJECT IDENTIFIER ::= { pktcEnSigMibObjects 4 }

-- Enhanced Notification groups.

pktcEnSigNotificationPrefix OBJECT IDENTIFIER ::= { pktcEnSigMib 2 }
pktcEnSigNotification OBJECT IDENTIFIER ::= { pktcEnSigNotificationPrefix 0 }
pktcEnSigConformance OBJECT IDENTIFIER ::= { pktcEnSigMib 3 }
pktcEnSigCompliances OBJECT IDENTIFIER ::= { pktcEnSigConformance 1 }
pktcEnSigGroups OBJECT IDENTIFIER ::= { pktcEnSigConformance 2 }

pktcEnNcsMinimumDtmfPlayout OBJECT-TYPE
SYNTAX Unsigned32 (0 | 40..100)
UNITS "milliseconds"
MAX-ACCESS read-write
STATUS current
DESCRIPTION
"This object defines the minimum playout time for
the DTMF digit when IETF RFC 2833 DTMF Relay is used
for the egress gateway.
If the value set via this pktcEnNcsMinimumDtmfPlayout
object is different from that specified in RFC2833 packet,
then the MTA MUST use the maximum of the two values.
For example:
If the RFC 2833 packet specifies 23ms and if the object
pktcEnNcsMinimumDtmfPlayout is set to 40ms then
the egress gateway must use a value of 40ms.
Similarly if the RFC 2833 packet specifies
60 ms and if the object pktcEnNcsMinimumDtmfPlayout
is set to 40ms then the egress gateway must use a
value of 60 ms."

REFERENCE
"PacketCable(tm) Codec Specification"
DEFVAL {0}
::= { pktcEnSigDevConfigObjects 1}

--
-- The following table enhances the NCS End Point Config Table
-- (pktcNcsEndPntConfigTable) defined in pktSigMib.
--

pktcEnNcsEndPntConfigTable  OBJECT-TYPE
SYNTAX   SEQUENCE OF PktcEnNcsEndPntConfigEntry
MAX-ACCESS not-accessible
STATUS    current
DESCRIPTION
"This table augments pktcNcsEndPntConfigTable."
::=  { pktcEnNcsEndPntConfigObjects 1 }

pktcEnNcsEndPntConfigEntry  OBJECT-TYPE
SYNTAX   PktcEnNcsEndPntConfigEntry
MAX-ACCESS not-accessible
STATUS    current
DESCRIPTION
"An enhancement to pktcNcEndPntConfigTable - where each
entry describes endpoint characteristics."
AUGMENTS  { pktcNcsEndPntConfigEntry }
::=  { pktcEnNcsEndPntConfigTable 1 }

PktcEnNcsEndPntConfigEntry  ::=  
SEQUENCE  {
    pktcEnNcsEndPntQuarantineState  INTEGER,
    pktcEnNcsEndPntHookState  INTEGER,
    pktcEnNcsEndPntFaxDetection  TruthValue,
    pktcEnNcsEndPntStatusReportCtrl  INTEGER
}

pktcEnNcsEndPntQuarantineState  OBJECT-TYPE
SYNTAX INTEGER {
    normal           (1),
    notification     (2),
    lockstep         (3),
    extendedlockstep (4)
}
MAX-ACCESS read-only
STATUS    current
DESCRIPTION
"This object reflects the state of the Endpoint."
When the endpoint is in notification, lockstep or 'extended lockstep' states, the E-MTA MUST report the values of notification(2), lockstep(3) or extendedlockstep(4), respectively. Else, the endpoint MUST report a value of normal(1).

'Extended Lockstep' is defined as the state when the E-MTA is in the lockstep state for longer than 2 minutes. For more description about the states refer to the PacketCable Network Based Call signaling specification.

REFERENCE
"PacketCable(tm) Network-Based Call Signaling Protocol Specification",
::= { pktcEnNcsEndPntConfigEntry 1 }

pktcEnNcsEndPntHookState OBJECT-TYPE
SYNTAX INTEGER {
   onHook                (1),
   onHookPlusNCSActivity (2),
   offHook               (3)
}
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"This object reflects the 'hook state' and 'NCS Activity' of an endpoint. 'NCS Activity', by definition includes: an active timeout signal, active brief signal or existence of an NCS connection.
The onHook(1) state indicates that the endpoint is 'on hook' and the absence of 'NCS Activity' on that endpoint.
The onHookPlusNCSActivity(2) indicates that the endpoint is 'on hook' and the presence of 'NCS Activity' on that endpoint.
The offHook(3) state indicates that the endpoint is 'off hook'."

REFERENCE
"PacketCable(tm) Network-Based Call Signaling Protocol Specification"
::= { pktcEnNcsEndPntConfigEntry 2 }

pktcEnNcsEndPntFaxDetection OBJECT-TYPE
SYNTAX TruthValue
MAX-ACCESS read-create
STATUS current
DESCRIPTION
"This MIB object is used to configure the distinctive fax calling tone (CNG) detection feature on an MTA endpoint with reference to the analog interface.
When set to true, the MTA MUST enable the detection of CNG tones on the specific endpoint.
When set to false, the MTA MUST disable the detection of CNG tones on the specific endpoint.
If a connection already exists on the endpoint when this MIB Object is modified, then the setting needs to take effect on the next connection."

DEFVAL {false}
::= { pktcEnNcsEndPntConfigEntry 3}
pktcEnNcsEndPntStatusReportCtrl OBJECT-TYPE
SYNTAX INTEGER {
  unsupported               (1),
  reportActualStatus        (2),
  reportEndPointAsActive    (3)
}
MAX-ACCESS  read-create
STATUS      deprecated
DESCRIPTION
"This MIB object is be used to control
the Endpoint Status Reporting, if the feature is
supported by the MTA and is configurable.
The term 'Endpoint Status Reporting' refers to any
information that the MTA may provide to External
Systems for use in a particular reporting mechanism
(Ex: Home Alarm Systems). The definition of the External
Systems and reporting mechanism are beyond the scope
of this definition (In the example of Home Alarm Systems,
this MIB Object will allow Management Stations to
temporarily disable outage reporting on an EndPoint
during planned downtime).
If supported, the MTA MUST:
- reflect the actual Endpoint status when the value
  is set to 'reportActualStatus(2)'
- reflect the EndPoint status as being active when the
  value is set to 'reportEndPointAsActive(3)',
  irrespective of the actual status.
If unsupported, the MTA MUST set this value to
'unsupported(1)' and reject any attempt to set
this MIB object using SNMP SET to any other value."
::= { pktcEnNcsEndPntConfigEntry 4}

pktcEnEndPntInfoTable OBJECT-TYPE
SYNTAX    SEQUENCE OF PktcEnEndPntInfoTableEntry
MAX-ACCESS    not-accessible
STATUS        current
DESCRIPTION
"This table includes any additional information
associated with PacketCable Endpoints.
The number of entries in this table represents the
number of available PacketCable Endpoints."
::= { pktcEnNcsEndPntConfigObjects 2 }

PktcEnEndPntInfoTableEntry OBJECT-TYPE
SYNTAX    PktcEnEndPntInfoTableEntry
MAX-ACCESS    not-accessible
STATUS        current
DESCRIPTION
"An entry in this table MUST be created for each
PacketCable EndPoint.
The index needs to be the corresponding index in the ifTable
for the associated PacketCable EndPoint."
INDEX { ifIndex }
::= { pktcEnEndPntInfoTable 1 }

PktcEnEndPntInfoTableEntry ::= SEQUENCE {
  pktcEnEndPntFgnPotSupport      BITS,
  pktcEnEndPntFgnPotDescr        SnmpAdminString,
  pktcEnEndPntClrFgnPotTsts       BITS,
pktcEnEndPntRunFgnPotTsts   BITS,
pktcEnEndPntFgnTestValidity BITS,
pktcEnEndPntFgnTestResults  BITS
}

pktcEnEndPntFgnPotSupport  OBJECT-TYPE
SYNTAX   BITS {
         fgnPotDetection (0),
         hazardousFgnPotDetection (1)
    }
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"This MIB object indicates the capabilities of the MTA to
detect various conditions related to the presence of
foreign potential on an endpoint.
The MTA MUST set a value of '1' for each bit corresponding
to a supported functionality and a value of '0' for each
bit corresponding to an unsupported functionality."
::= { pktcEnEndPntInfoTableEntry 1 }

pktcEnEndPntFgnPotDescr  OBJECT-TYPE
SYNTAX   SnmpAdminString
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"This MIB object provides information related to the
various tests for each detection mechanism supported by
the MTA. While the actual contents are vendor-specific,
the recommended format is:
[<Capability>:<Test References>:<Other Info>]...
Example:
<fgnPotDetection>:<test XYZ, Reference 'Document'>:<NA>;
<hazardousFngPotDetection>:<Test ABC, References>:<NA>
"
::= { pktcEnEndPntInfoTableEntry 2 }

pktcEnEndPntClrFgnPotTsts     OBJECT-TYPE
SYNTAX   BITS {
         clrFgnPotentialResults (0),
         clrHazardousPotResults (1)
    }
MAX-ACCESS     read-write
STATUS         current
DESCRIPTION
"This MIB object is used to clear the current test
results of supported conditions indicated by
'pktcEnEndPntFgnPotSupport'.
Setting a bit to a value of '1' clears the corresponding
results in the MIB Object 'pktcEnEndPntFgnTestResults' and
the validity as indicated by the MIB object
'pktcEnEndPntFgnTestValidity' for the supported
conditions only (i.e., the MTA MUST set the corresponding
bits to a value of '0' in the indicated tables).
If an SNMP SET attempts to set a bit corresponding to an
unsupported condition to a value of '1', then the MTA MUST
reject the entire SNMP SET and report an 'inconsistent
value' error.
For all unsupported scenarios, the corresponding bits MUST
be set to a value of '0'.
"
Whenever one or more tests are enabled by the MIB Object 'pktcEnEndPntRunFgnPotTests', the MTA MUST also reset the corresponding bits in this MIB Object to a value of '0'.

::= { pktcEnEndPntInfoTableEntry 3}

pktcEnEndPntRunFgnPotTsts OBJECT-TYPE
SYNTAX BITS {
  runFgnPotentialTsts (0),
  runHazardousPotTsts (1)
}
MAX-ACCESS read-write
STATUS current
DESCRIPTION "This MIB object is used to initiate one or more test cases associated with a supported foreign potential detection. Thus, whenever one or more BITS corresponding to supported foreign scenario potential detection mechanisms are set to a value of '1', the MTA MUST enable those tests. Once the tests are executed, the MTA MUST:
- set the corresponding bit to a value of '0'
- update the corresponding BITS in the MIB Objects 'pktcEnEndPntFgnTestValidity' and 'pktcEnEndPntFgnTestResults'.
If an SNMP SET attempts to set a bit corresponding to an unsupported condition to a value of '1', then the MTA MUST reject the entire SNMP SET and report an 'inconsistent value' error.
Whenever a test is being run on an Endpoint the MTA MUST set the corresponding 'ifOperStatus' MIB Object to a value of 'testing(3)' for the whole duration of the test. When the test is completed, the MTA MUST set the ifOperStatus to the value corresponding to the current state of the line.

Note: Whenever multiple tests are run, the ordering of the tests or the results is vendor dependent and need not necessarily follow the ordering of BITS in this MIB Object."

::= { pktcEnEndPntInfoTableEntry 4}

pktcEnEndPntFgnTestValidity OBJECT-TYPE
SYNTAX BITS {
  fgnPotTstValidity (0),
  hazardousPotTstValidity (1)
}
MAX-ACCESS read-only
STATUS current
DESCRIPTION "This MIB object is used to indicate the validity of the corresponding test cases that were initiated using the MIB Object 'pktcEnEndPntRunFgnPotTests'. An MTA MUST:
- return a value of '1' if the tests were run successfully and the results are valid.
- return a value of '0' if a particular test was not initiated or if the tests could not be run successfully and hence the results are invalid.
Note: The MTA MUST set all the BITS to '0' as soon as one or more test cases are initiated."

::= { pktcEnEndPntInfoTableEntry 5}
pktcEnEndPntFgnTestResults  OBJECT-TYPE
SYNTAX  BITS {
   fgnPotentialResults (0),
   hazardousPotResults (1)
}
MAX-ACCESS  read-only
STATUS  current
DESCRIPTION
"This MIB object is used to indicate the results of the corresponding test cases that were initiated using the MIB Object 'pktcEnEndPntRunFgnPotTests'. An MTA MUST:
- set the corresponding bit to a value of '1' if the tests indicated the presence of a foreign potential as per the associated test case.
- set the corresponding bit to a value of '0' if the tests indicated the absence of a foreign potential as per the associated test case.
Note: The MTA MUST set all the BITS to '0' as soon as one or more test cases are initiated."
::= { pktcEnEndPntInfoTableEntry 6}

pktcEnNcsEndPntLVmgmtTable  OBJECT-TYPE
SYNTAX  SEQUENCE OF PktcEnNcsEndPntLVmgmtTableEntry
MAX-ACCESS  not-accessible
STATUS  current
DESCRIPTION
"This MIB table contains the MIB Objects used for managing loop voltage on an MTA. An MTA MUST implement the defined MIB Objects and the associated functionality."
::= { pktcEnNcsEndPntConfigObjects 3 }

PktcEnNcsEndPntLVmgmtTableEntry  OBJECT-TYPE
SYNTAX  PktcEnNcsEndPntLVmgmtTableEntry
MAX-ACCESS  not-accessible
STATUS  current
DESCRIPTION
"Each entry in this MIB table consists of the loop voltage management policy for the specified index. The MTA MUST use the ifIndex with a value of '1' to represent the E-MTA and the remaining indices (if used) to represent the endpoints (as specified in [1]).

When the ifIndex is set to a value of '1', it represents a policy that MUST be applied to all the lines on an MTA.

A MTA MUST support access to this MIB Object via the ifIndex set to a value of '1' (i.e., per-device policy)."
REFERENCE "PacketCable Device Provisioning specification [1]"
INDEX { ifIndex }
::= { pktcEnNcsEndPntLVmgmtTable 1 }

PktcEnNcsEndPntLVmgmtTableEntry  ::=  
SEQUENCE {
    pktcEnNcsEndPntLVmgmtPolicy  INTEGER,
    pktcEnNcsEndPntLVmgmtResetTimer  Unsigned32,
    pktcEnNcsEndPntLVmgmtMaintTimer  Unsigned32
}

pktcEnNcsEndPntLVmgmtPolicy  OBJECT-TYPE
SYNTAX INTEGER {
  voltageAtAllTimes(1),
  voltageUnlessRFQAMAbsent(2),
  voltageBasedOnServiceOrTimers(3),
  voltageBasedOnService(4)
}
MAX-ACCESS read-write
STATUS current
DESCRIPTION

“This MIB Object allows the Service Provider to choose a suitable policy for Loop Voltage behavior on MTAs.

Unless overridden by the operator, the MTA MUST use the default value specified in the definition of this MIB Object.

The MTA MUST adhere to PacketCable signaling requirements, such as the NCS open loop voltage requirement, irrespective of any chosen policy.

For MTAs that need to remove loop voltage during the MTA initialization phase, in contradiction to a chosen policy, such a loop voltage removal period MUST NOT exceed 1000ms.

The MTA MUST retain the value of this MIB Object across hard reboots or soft resets (for a definition of the terms, please refer to [1]).

This MIB object specifies four policies. An informative illustration of the E-MTA behavior with different policies is presented in Appendix A.

Provisioned line is an MTA Endpoint that has been provided with valid per-line configuration data either via the configuration file (during provisioning) or the SNMP management interface.

When the MIB Object is set to a value of 'voltageAtAllTimes', - indicating Policy 1 - the MTA MUST maintain the loop idle voltage on all lines, irrespective of the line status.

When this MIB Object is set to a value of 'voltageUnlessRFQAMAbsent' - indicating Policy 2 - the MTA MUST apply loop idle voltage at all times except when it confirms the absence of any RF QAM carrier, following a complete scan of the spectrum (i.e., loop voltage is maintained during the scan). When the MTA detects the presence of any RF QAM carrier, it MUST apply the loop idle voltage. Additionally, the following conditions apply:
- during a hard reboot, this policy applies at all lines until the MTA is successfully provisioned (i.e., pktcMtaDevProvisioningState has a value other than 'inProgress')
- once the MTA is successfully provisioned (i.e., pktcMtaDevProvisioningState has a value of 'pass(1)', 'passWithWarnings(4)' or 'passWithIncompleteParsing(5)') then the policy
applies to all provisioned lines.  
- upon the onset of a re-initialization due to a soft reset (via SNMP or RF conditions) the MTA MUST continue to maintain the existing policy and state on previously provisioned lines, unless overridden by a policy or the provisioning process specifies otherwise.

This policy is similar to Policy 1, except for the ability to recognize events like cable cuts (due to malicious activities, or otherwise).

The following requirements apply to policies 3 and 4:
- upon the onset of a re-initialization due to a soft reset the MTA MUST continue to maintain the existing policy and state on provisioned lines, unless overridden by a policy or the provisioning process specifies otherwise.
- once the provisioning process is completed with the value of the MIB Object pktcMtaDevProvisioningState set to a value of 'pass(1)', 'passWithWarnings(4)' or 'passWithIncompleteParsing(5)', the MTA MUST apply the chosen policy to all the provisioned lines.

When this MIB Object is set to a value of 'voltageBasedOnServiceOrTimers' - indicating Policy 3 - the MTA MUST adhere to the requirements that follow at any given point in time:

- when the timer defined by pktcEnNcsEndPntLVMgmtResetTimer has a non-zero value, the MTA MUST apply loop idle voltage under all circumstances (similar to policy 1). Refer to the definition of the MIB Object for the persistence and timer requirements.

- when the timer defined by pktcEnNcsEndPntLVMgmtMaintTimer has a non-zero value, the MTA MUST maintain a line's loop idle voltage state that was in effect prior to the timer being set to a non-zero value. Refer to the definition of the MIB Object defining the timer for the persistence and timer requirements.

- When the timers defined by pktcEnNcsEndPntLVMgmtMaintTimer and pktcEnNcsEndPntLVMgmtResetTimer have expired (both have a value of zero), then:
  - the MTA MUST apply loop voltage if the provisioning process is completed with the value of pktcMtaDevProvisioningState set to a value of than 'pass(1)', 'passWithWarnings(4)' or 'passWithIncompleteParsing(5)'
  - During a T4 timeout (note: the timers have expired), the E-MTA MUST remove loop idle voltage on all lines.

- When both the timers are active (i.e., they both have non-zero values), then the timer defined by the MIB Object pktcEnNcsEndPntLVMgmtMaintTimer takes precedence.

- if none of the above cases apply, the MTA MUST remove loop idle voltage on all lines.
When the MIB Object is set to a value of 'voltageBasedOnService' - indicating Policy 4 - the following conditions apply at any given point in time:

- the MTA MUST apply loop idle voltage to all the provisioned lines if the value of the MIB Object 'pktcMtaDevProvisioningState' is set to a value of 'pass(1)', 'passWithWarnings(4)' or 'passWithIncompleteParsing(5)'

- in all other cases, the MTA MUST remove loop idle voltage on all lines.

REFERENCE "PacketCable Device Provisioning specification [1]"

DEFVAL { voltageBasedOnService }
 ::= { pktcEnNcsEndPntLVMgmtTableEntry 1}

pktcEnNcsEndPntLVMgmtResetTimer OBJECT-TYPE
SYNTAX Unsigned32 (0..1440)
UNITS "minutes"
MAX-ACCESS read-write
STATUS current
DESCRIPTION "This MIB Object specifies the time duration allowed for an MTA to successfully provision and is only applicable when the MIB Object pktcEnNcsEndPntLVMgmtPolicy is set to a value of 'voltageBasedOnServiceOrTimers'. In all other cases, the MTA MUST:
- return a value of '0' upon any retrieval requests
- return an error of 'inconsistentValue' upon any modification requests

The value contained by this MIB Object is a countdown timer and the MTA MUST start counting down the configured value only upon a hard reboot, a soft reset or a T4 timeout. Once this timer has reached a value of zero, the MTA MUST retain the value (of zero) until successfully configured otherwise. The MTA MUST use a change in the value of this MIB Object only on the next hard reboot, soft reset or T4 timeout.

The MTA MUST persist the last configured value (i.e., not the countdown value) of this MIB Object across hard reboots and soft resets.

Refer to the MIB Object pktcEnNcsEndPntLVMgmtPolicy for usage within 'voltageBasedOnServiceOrTimers'."

DEFVAL { 5 }
 ::= { pktcEnNcsEndPntLVMgmtTableEntry 2}

pktcEnNcsEndPntLVMgmtMaintTimer OBJECT-TYPE
SYNTAX Unsigned32 (0..1440)
UNITS "minutes"
MAX-ACCESS read-write
STATUS current
DESCRIPTION "This MIB Object allows the operator to specify the time that loop voltage condition will be maintained, irrespective of the changes to the MTA. It is only applicable when the MIB Object pktcEnNcsEndPntLVMgmtPolicy is set to a value of 'voltageBasedOnServiceOrTimers'. In all
other cases, the MTA MUST:
- return a value of '0' upon any retrieval requests
- return an error of 'inconsistentValue' upon any modification requests

The value contained in this MIB Object is a countdown timer and the MTA MUST start counting down the value immediately after a successful configuration to a non-zero value. Once this timer has reached a value of zero, the MTA MUST retain the value (of zero) until successfully configured otherwise.

The MTA MUST retain the value of this MIB Object (i.e., the countdown value) across soft resets. The MTA MUST reset the value of this MIB Object (to its default value) during a hard reboot of the MTA.

Refer to the MIB Object pktcEnNcsEndPntLVMgmtPolicy for information about applicability and usage.

DEFVAL { 0 }
::= { pktcEnNcsEndPntLVMgmtTableEntry 3}

--
-- The Provisioned Loss Plan Table
--

pktcEnNcsEndPntLossTable OBJECT-TYPE
SYNTAX SEQUENCE OF PktcEnNcsEndPntLossEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "The E-MTA supports two provisioned loss parameters, one for the D/A direction (towards the subscriber) and one for A/D direction (from the subscriber) direction. This data table represents the loss for each line provided by the E-MTA."
::= { pktcEnNcsEndPntConfigObjects 4 }

PktcEnNcsEndPntLossEntry OBJECT-TYPE
SYNTAX PktcEnNcsEndPntLossEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "The E-MTA supports two provisioned loss parameters, one for the D/A direction (towards the subscriber) and one for A/D direction (from the subscriber) direction. This data table represents the loss for each line provided by the E-MTA. Each entry in this data table describes the loss for the associated line."
INDEX { ifIndex }
::= { pktcEnNcsEndPntLossTable 1 }

PktcEnNcsEndPntLossEntry ::= SEQUENCE {
  pktcEnNcsEndPntLossDA   INTEGER32,
  pktcEnNcsEndPntLossAD   INTEGER32
}

pktcEnNcsEndPntLossDA OBJECT-TYPE
SYNTAX INTEGER32 (0..12)
UNITS "dB"
MAX-ACCESS read-write
STATUS current
DESCRIPTION
"This object specifies the provisioned loss parameter for the D/A direction (towards the subscriber) in dB.

The E-MTA MUST implement this element per the PacketCable Embedded MTA Analog Interface and Powering Specification."
REFERENCE "PacketCable AIP Specification"
DEFVAL {9}
::= { pktcEnNcsEndPntLossEntry 1 }

pktcEnNcsEndPntLossAD OBJECT-TYPE
SYNTAX      Integer32 (0..6)
UNITS       "dB"
MAX-ACCESS  read-write
STATUS      current
DESCRIPTION
"This object specifies the provisioned loss parameter for the A/D direction (from the subscriber) in dB.

The E-fMTA MUST implement this element per the PacketCable Embedded MTA Analog Interface and Powering Specification."
REFERENCE "PacketCable AIP Specification"
DEFVAL {3}
::= { pktcEnNcsEndPntLossEntry 2 }

-- Compliance statements
--
pktcEnSigBasicCompliance  MODULE-COMPLIANCE
STATUS     current
DESCRIPTION
"The compliance statement for devices that implement PacketCable defined Signaling on an MTA."

MODULE  PKTC-EN-SIG-MIB

-- Mandatory groups
--
MANDATORY-GROUPS {
  pktcEnNcsGroup
}

GROUP pktcEnNcsGroup
DESCRIPTION
"This group is mandatory for any MTA implementing PacketCable signaling."

GROUP pktcEnNcsLVMgmtGroup
DESCRIPTION
"This group is mandatory for any MTA implementing PacketCable signaling."
::={ pktcEnSigCompliances 1 }

-- Conformance group for common Signaling.
--
pktcEnSigGroup  OBJECT-GROUP
OBJECTS {

pktcEnNcsMinimumDtmfPlayout
)

STATUS current
DESCRIPTION
"Enhanced group of objects for the common portion of the PacketCable Signaling MIB."
 ::= { pktcEnSigGroups 1 }

--
-- Conformance group for NCS Signaling.
--
pktcEnNcsGroup OBJECT-GROUP
OBJECTS {
  pktcEnNcsEndPntQuarantineState,
pktcEnNcsEndPntHookState,
pktcEnNcsEndPntFaxDetection,
pktcEnEndPntFgnPotSupport,
pktcEnEndPntFgnPotDescr,
pktcEnEndPntClrFgnPotTsts,
pktcEnEndPntRunFgnPotTsts,
pktcEnEndPntFgnTestValidity,
pktcEnEndPntFgnTestResults,
pktcEnNcsEndPntLossDA,
pktcEnNcsEndPntLossAD
}

STATUS current
DESCRIPTION
"Enhanced group of objects for the NCS portion of the PacketCable Signaling MIB. This is mandatory for NCS signaling support."
 ::= { pktcEnSigGroups 2 }

--
-- Conformance group for Loop Voltage Management
--
pktcEnNcsLVMgmtGroup OBJECT-GROUP
OBJECTS {
  pktcEnNcsEndPntLVmgmtPolicy,
pktcEnNcsEndPntLVmgmtResetTimer,
pktcEnNcsEndPntLVmgmtMaintTimer
}

STATUS current
DESCRIPTION
"Enhanced group of objects for the loop voltage Management of PacketCable MTAs based on Signaling and configured policies."
 ::= { pktcEnSigGroups 3 }

pktcEnNcsDeprecatedGroup OBJECT-GROUP
OBJECTS {
  pktcEnNcsEndPntStatusReportCtrl
}

STATUS deprecated
DESCRIPTION
"This contains a list of deprecated Extension Signaling MIB Objects."
 ::= { pktcEnSigGroups 4 }

END
## Appendix A. Loop Voltage Management Policies

This appendix provides an illustration of the loop voltage management policies defined by the MIB Object pktcEnNcsEndPntLVMgmtPolicy. Please note that this is an informative illustration and the MIB Object definition is normative under all circumstances.

<table>
<thead>
<tr>
<th>Stage</th>
<th>Policy 1</th>
<th>Policy 2</th>
<th>Policy 3</th>
<th>Policy 4 (default)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boot loader initialization following a hard reboot</td>
<td>unspecified</td>
<td>unspecified</td>
<td>unspecified</td>
<td>unspecified</td>
</tr>
<tr>
<td>Boot loader initialization following a soft reset</td>
<td>Same status as prior to reset</td>
<td>Same status as prior to reset</td>
<td>Same status as prior to reset</td>
<td>Same status as prior to reset</td>
</tr>
<tr>
<td>DOCSIS RF Scan</td>
<td>APPLY voltage on all lines</td>
<td>APPLY for first full pass through spectrum, REMOVE if no QAM lock occurred; REAPPLY if QAM returns</td>
<td>APPLY until Maintenance Timer and Voltage Reset Timeout expire; REMOVE thereafter</td>
<td>REMOVE voltage</td>
</tr>
<tr>
<td>eCM Ranging/Registering</td>
<td>APPLY</td>
<td>APPLY</td>
<td>Same status as final state from scanning; REMOVE if timers expire;</td>
<td>REMOVE</td>
</tr>
<tr>
<td>eCM provisioning process</td>
<td>APPLY</td>
<td>Same status as final state from scanning</td>
<td>Same status as final state from scanning; REMOVE if timers expire</td>
<td>REMOVE</td>
</tr>
<tr>
<td>Loss of RF signal prior to T4</td>
<td>APPLY</td>
<td>APPLY</td>
<td>APPLY</td>
<td>APPLY</td>
</tr>
<tr>
<td>DOCSIS Rf scanning after T4</td>
<td>APPLY</td>
<td>APPLY for first full pass through spectrum, REMOVE if no QAM lock occurred; REAPPLY if QAM returns</td>
<td>APPLY until timers expire, REMOVE thereafter</td>
<td>REMOVE</td>
</tr>
<tr>
<td>eMTA provisioning (MTA1 onwards, while pktcMtaDevProvisioningState is set to a value of ‘inProgress’)</td>
<td>APPLY</td>
<td>Same status as final state from Rf scanning</td>
<td>APPLY until timers expire, REMOVE thereafter</td>
<td>REMOVE</td>
</tr>
<tr>
<td>E-MTA is operational and the eMTA MIB Object pktcMtaDevProvisioningState is set to a value of 'pass', 'passWithWarnings' or 'passWithIncompleteParsing'</td>
<td>APPLY</td>
<td>APPLY</td>
<td>APPLY</td>
<td>APPLY</td>
</tr>
<tr>
<td>E-MTA is operational, the eMTA provisioning is completed, but the MTA's MIB Object pktcMtaDevProvisioningState is set to a value *other than * 'pass', 'passWithWarnings' or 'passWithIncompleteParsing'</td>
<td>APPLY</td>
<td>APPLY</td>
<td>APPLY until timers expire, REMOVE thereafter</td>
<td>REMOVE</td>
</tr>
</tbody>
</table>